ZONE 7 WATER AGENCY
Delivering Quality, Reliability and Safety

# Livermore Valley Groundwater Basin

# Sustainable Groundwater Management Annual Report

# Water Year 2021 (October 2020 – September 2021)


Submitted by:

ZONE 7 WATER AGENCY

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# TABLE OF CONTENTS

## List of Tables



## List of Figures



## List of Appendices

## ***Abbreviations***

| | |
|---|---|
| ACEH | Alameda County Environmental Health |
| AF | acre-feet |
| AFY | acre-feet per year |
| ARM | Areal Recharge Spreadsheet Model |
| BBID | Byron-Bethany Irrigation District |
| CCR | California Code of Regulations |
| CIP | Capital Improvement Program |
| COC | Constituents of Concern |
| COL | Chain of Lakes |
| CWS | California Water Service |
| CY | calendar year |
| DDW | Division of Drinking Water |
| DSRSD | Dublin San Ramon Service District |
| DWR | Department of Water Resources |
| EIR | Environmental Impact Report |
| ft | feet |
| ft bgs | feet below ground surface |
| ft msl | feet above mean sea level |
| GAMA | Groundwater Ambient Monitoring and Assessment |
| GPQ | Groundwater Pumping Quota |
| GSA | Groundwater Sustainability Agency |
| GSP | Groundwater Sustainability Plan |
| GWE | Groundwater Elevation |
| HCM | Hydrogeologic Conceptual Model |
| HI | Hydrologic Inventory |
| ICSW | Interconnected Surface Water |
| IDC | Integrated Water Flow Model Demand Calculator |
| LAVWMA | Livermore-Amador Valley Water Management Agency |
| mg/L | Milligrams per liter |
| MGDP | Mocho Groundwater Demineralization Plant |
| MO | Measurable Objective |
| MT | Minimum Threshold |
| NMP | Nutrient Management Plan |
| NO3 | Nitrate Ion |
| OWTS | Onsite wastewater treatment system |
| PFAS | Per- and polyfluoroalkyl substances |
| RMS | Representative Monitoring Site |
| SBA | South Bay Aqueduct |
| SFPUC | San Francisco Public Utilities Commission |
| SGMA | Sustainable Groundwater Management Act |
| SMC | Sustainable Management Criteria |
| SMP | Salt Management Plan |
| SWP | State Water Project |
| SWRCB | State Water Resources Control Board |
| TAF | thousand acre-feet |
| TDS | Total Dissolved Solid |
| UR | Undesirable Result |
| WMP | Well Master Plan |
| WY | Water Year |

## 1. Executive Summary

The Livermore Valley Groundwater Basin (also referred to herein as "the Basin"), California Department of Water Resources (DWR) Basin No. 2-010, is classified as a "medium priority" basin (DWR, 2019). Alameda County Flood Control and Water Conservation District, Zone 7 (Zone 7 Water Agency or Zone 7) is the exclusive Groundwater Sustainability Agency (GSA) for the Basin and has managed local surface and groundwater resources for beneficial uses and users for more than 50 years.

Zone 7 submitted an Alternative Groundwater Sustainability Plan (Alternative GSP) for the Basin in December 2016. Subsequently, DWR reviewed and approved the Alternative GSP in July 2019. Zone 7 submitted the first Five-Year periodic evaluation to the Alternative GSP (2021 Alternative GSP) in December 2021, which is currently under review. This 2021 Water Year (WY) Annual Report for the Basin was prepared in compliance with California Code of Regulations (CCR) 23 §356.2 and covers the period from 1 October 2020 through 30 September 2021. **Appendix A** provides a summary of the required information and corresponding location(s) in the report. **Appendix B** provides supplemental data/information including additional water quality, land subsidence, and water budget data.

General information about the Basin is provided in **Section 2**. The Basin encompasses approximately 69,600 acres (109 square miles) in Alameda and Contra Costa counties, and includes three Management Areas, defined by varying geologic, hydrogeologic, and groundwater conditions: the Main Basin Management Area (Main Basin), the Fringe Management Area (Fringe Area), and the Upland Management Area (Upland Area), as shown in **Figure 1**. Principal Aquifer units include the Upper Aquifer and Lower Aquifer within the Main Basin, the Fringe Aquifer within the Fringe Area, and the Upland Aquifer within the Upland Area.

Recent groundwater elevation trends within the Basin are detailed in **Section 3**. Groundwater elevation contours are shown for Spring 2021 (seasonal high) and Fall 2021 (seasonal low) groundwater conditions by Principal Aquifer unit on **Figure 2** through **Figure 5**. As indicated by the contours, groundwater flow directions and magnitudes did not vary greatly between the seasonal high to seasonal low periods in 2021 WY.

The 2021 Alternative GSP established 12 Representative Monitoring Sites for Chronic Lowering of Groundwater Levels (RMS-WL) and 14 Representative Monitoring Sites for Depletions of Interconnected Surface Water (RMS-ICSW). Hydrographs comparing recent groundwater elevations to the Sustainable Management Criteria (SMCs) defined at each RMS-WL and RMS-ICSW location are shown on **Figure 6** and **Figure 7**, respectively. As shown in **Table 1**, groundwater levels at all RMS-WL locations continued to remain well above their respective Minimum Thresholds (MTs) and Measurable Objectives (MOs) throughout the 2021 WY**.** As shown in **Table 2**, groundwater levels dropped below their MTs at two RMS-ICSW (Wells 3S1E16P005 and 3S2E23E001) and below their MOs at three additional RMS-ICSW (Wells 3S2E30D002, 3S2E29F004, and 3S2E33C001) during the seasonal low (i.e., Fall) 2021 WY monitoring event; however, all measured water level data at the RMS-ICSW wells were recorded above their MTs and MOs during the seasonal high (i.e., Spring) monitoring event. As such, no Undesirable Results (URs) were observed within the Basin during the 2021 WY.

Groundwater and surface water supplies and uses within the Basin during the 2021 WY are detailed in **Sections 4, 5,** and **6**. Basin-wide groundwater extractions totaled approximately 22,747 acre-feet (AF) during the 2021 WY, 98% (22,249 AF) of which was used for municipal supplies. Zone 7 extracted 71% (16,440 AF, including 181 AF of pumping losses) of the total extraction (**Table 3** and **Table 4**). General locations of groundwater extractions are shown on **Figure 8**. In addition to groundwater extraction, Zone 7 imported a total of 27,547 AF of surface water supplies to the Basin in 2021 WY (**Table 5**). Total water use within the Basin for the 2021 WY consisted of 39% groundwater, 47% imported water, and 14% recycled water (**Table 6**, **Figure 9** and **Figure 10**).

Changes in groundwater storage over the 2021 WY were estimated using both the Groundwater Elevation (GWE) method and the Hydrologic Inventory (HI) method, as further described in **Section 7**. Taking an average of the two methods, the total groundwater in storage at the end of 2021 WY was calculated to be 223.4 thousand acre-feet (TAF), which is about 18.8 TAF less than the 2020 WY average total storage value (**Table 7**). **Figure 11** shows the change in storage from Fall 2020 to Fall 2021 for each Main Basin node. **Figure 12** shows the annual change in groundwater storage and cumulative change in groundwater storage for the Basin along with the water year type from 1974 WY through 2021 WY. DWR defined the 2021 WY as a critically dry water year (DWR, 2021), and the change in groundwater storage for the Basin (-18.8 TAF) was similar to that observed in other recent critically dry years.

**Section 8** presents a summary of Alternative GSP Implementation during 2021 WY. The 2021 Alternative GSP outlined potential Projects and Management Actions (P/MAs) currently being implemented or otherwise proposed for future implementation. The P/MAs outlined in the 2021 Alternative GSP generally fall into the following four categories: (1) water supply augmentation, (2) water demand reduction, (3) improvement of groundwater quality, and (4) data gap-filling activities. A brief description of the status of each P/MA as through the 2021 WY is listed in **Section 8.2**.

**Table 8** summarizes the SMCs and their 2021 WY status for each Sustainability Indicator defined for the Basin. As further detailed in **Table 8**, no URs occurred during the 2021 WY for any of the five Sustainability Indicators with SMCs defined in the 2021 Alternative GSP.

To avoid duplication, material included in the 2021 Alternative GSP has not been repeated here, but specific sections are referenced when more background detail may be desired.

## 2. General Information

☑ *§ 356.2 (a)*

*Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:*

*(a) General information, including an executive summary and a location map depicting the basin covered by the report.*

On 16 September 2014, the California legislature enacted the Sustainable Groundwater Management Act (SGMA), the primary purpose of which is to achieve and/or maintain sustainability within the state's high and medium priority groundwater basins. The Livermore Valley Groundwater Basin, DWR Basin No. 2-010, is classified as a "medium priority" basin (DWR, 2019) and is not subject to the critical conditions of overdraft. Under its authority as the exclusive GSA of the Basin, Zone 7 submitted an Alternative GSP for the Basin in December 2016, which was approved by DWR in July 2019, and the first Five-Year Update to the Alternative GSP in December 2021, which is currently under review.

This 2021 WY Annual Report for the Basin has been prepared in compliance with CCR 23 § 356.2. The 2021 WY includes the period from 1 October 2020 through 30 September 2021. This report also contains available and appropriate historical information back to Calendar Year (CY) 2015, as required by CCR 23 §356.2 (b), to provide information and data related to Basin conditions through the current reporting year. All the data included in this report are conveyed based on the 2021 WY (i.e., October 1, 2020 through September 30, 2021); however, due to other reporting obligations, some information in this report (e.g., retailer groundwater pumping quota and surface water supply volumes) is compiled and reported on a CY basis (i.e., January 1 through December 31, 2021).

Zone 7 provides water management in the Basin as part of its mission to deliver safe, reliable, efficient, and sustainable water services, and more specifically addresses Strategic Plan initiatives #7 - Manage as the GSA and implement the groundwater management plan and #8 - Study and refine knowledge of the groundwater basins. Zone 7 has managed local surface and groundwater resources for beneficial uses for more than 50 years.

The Zone 7 service area is located about 40 miles southeast of San Francisco and encompasses an area of approximately 425 square miles of the eastern portion of Alameda County, including the Livermore-Amador Valley, Sunol Valley, and portions of the Diablo Range (**Figure 1**). Zone 7 also serves a portion of Contra Costa County (Dougherty Valley in San Ramon) through an out-of-service-area agreement with Dublin San Ramon Service District (DSRSD).

As shown on **Figure 1**, the Basin encompasses approximately 69,600 acres (109 square miles) in Alameda and Contra Costa counties, and includes three Management Areas based on varying geologic, hydrogeologic, and groundwater conditions: the Main Basin, Fringe Area, and Upland Area. The Basin is boarded on the northwest by the San Ramon Valley Basin (Basin No. 2-07), a very-low priority basin that extends to the northwest in Contra Costa County, and on the southwest by the Sunol Valley Basin (Basin No. 2-11), which is also a very-low priority basin.

Available hydrogeologic information indicates that the Basin is bounded by the Calaveras Fault on the west, the Greenville Fault on the east, and bedrock deposits of the Plio-Pleistocene Tassajara and Livermore Formations to the north and south, respectively. Principal Aquifer units include the Upper Aquifer and Lower Aquifer within the Main Basin, the Fringe Aquifer within the Fringe Area, and the Upland Aquifer within the Upland Area. The Upper Aquifer consists of recent (Holocene) alluvial fill materials and extends continually across the Main Basin at depths up to 190 feet below ground surface (ft bgs), containing groundwater typically under unconfined conditions. The Lower Aquifer exists below a confining aquitard with thicknesses ranging from less than five feet up to 50 feet in the central and eastern parts of the Main Basin. The Lower Aquifer consists of Quaternary alluvial fill materials and the productive upper portion of the Livermore Formation, extending to depths of up to 800 ft bgs in the central Main Basin. A large majority of groundwater production occurs within the Lower Aquifer of the Main Basin. The Fringe Aquifer and Upland Aquifer are demonstrated to be of lower productivity and quality than the aquifers of the Main Basin, and groundwater production is limited to domestic and agricultural uses in these areas.

Sources of recharge to the Basin include rainfall recharge, applied water recharge, stream recharge, subsurface groundwater inflow, and pipe leakage. Groundwater outflows from the Basin include municipal pumping, agricultural pumping, mining use, and subsurface groundwater outflow. A historical water budget period (1974-2020 WYs) presented in the 2021 Alternative GSP shows that long-term sustainability has been maintained in the Basin for at least 45 years, as groundwater storage conditions have remained generally stable to increasing and have shown resilience following dry periods (Zone 7, 2021).

Detailed information regarding the Plan Area, Hydrogeologic Conceptual Model, and historical and recent Groundwater Conditions are provided in the 2021 Alternative GSP (Zone 7 GSA, 2021).

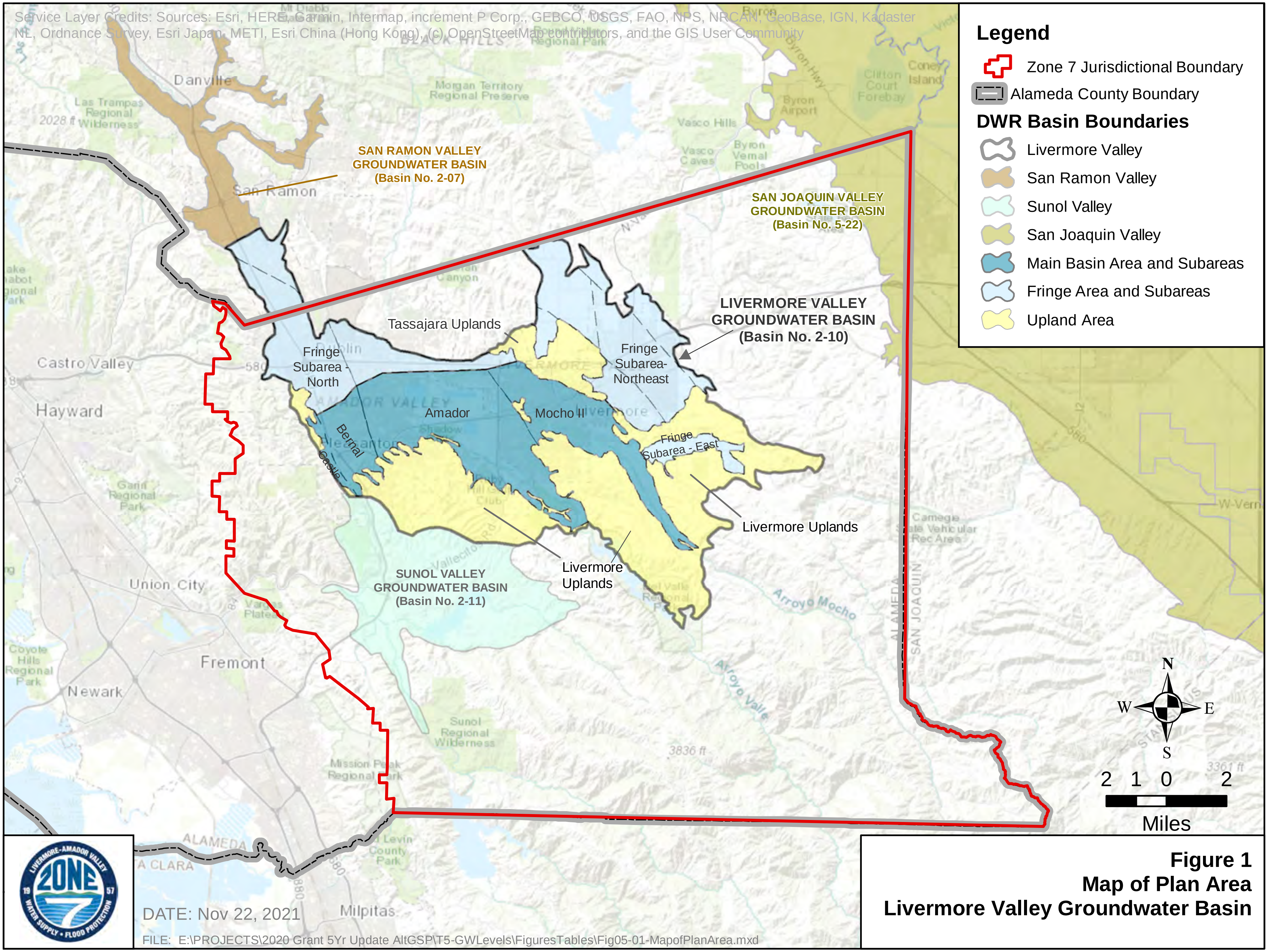



**Figure 1**
**Map of Plan Area**
**Livermore Valley Groundwater Basin**

## 3. Groundwater Elevation Data

☑ *§ 356.2 (b) (1)*

*Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:*

*(b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:*

*(1) Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:*

*(A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.*

*(B) Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year.*

Zone 7 has conducted an extensive program of groundwater level monitoring throughout the Basin for over 45 years. Background information regarding the Groundwater Elevation Monitoring Program is provided in *Section 14.2.1 Monitoring Network for Chronic Lowering of Groundwater Levels* of the 2021 Alternative GSP. This program includes the measurement of groundwater levels in monitoring and production wells to confirm that management objectives are met, to assess groundwater supplies, and to define any new management objectives needed to maintain sustainability. The program focuses on the Main Basin, where groundwater is pumped for municipal uses; however, water levels are also measured in the Fringe and Upland Areas.

Approximately 236 wells were included in Zone 7's Groundwater Elevation Monitoring Program during the 2021 WY. Groundwater elevations in most of these wells were measured at least two times throughout the water year, during both seasonal high (Spring) and seasonal low (Fall) groundwater conditions. Seasonal high (Spring) and seasonal low (Fall) 2021 WY groundwater elevation contour maps are presented in **Section 3.1** for each Principal Aquifer[1] in the Basin using water level measurements from the wells in the Groundwater Elevation Monitoring Program.

The Basin currently has 12 RMS-WLs and 14 RMS-ICSWs which represent a subset of the Groundwater Elevation Monitoring Program. Updated hydrographs of groundwater elevations are presented in **Section 3.2** for each of the wells included in the RMS-WL and RMS-ICSW monitoring networks. Seasonal high and seasonal low water levels at the RMS-WL and RMS-ICSW sites are compared to their corresponding SMCs in **Table 1** and **Table 2**.

[1] Insufficient monitoring wells currently exist in the Upland Area to prepare contour maps for the Upland Aquifer.

### 3.1. Groundwater Elevation Contour Maps

**Upper Aquifer and Fringe Aquifer**

**Figure 2** and **Figure 3** show 2021 WY groundwater elevation contours in the Upper Aquifer and Fringe Aquifer during seasonal high (Spring) and seasonal low (Fall) conditions, respectively. The groundwater gradient in the Upper Aquifer was generally from east to west and ranged from 0.005 to 0.025 ft/ft. Flow directions and magnitudes indicated by the groundwater elevation contours did not vary greatly between the seasonal low and seasonal high conditions during the 2021 WY.

**Table 1** compares water level measurements from the seasonal high (Spring) and seasonal low (Fall) 2021 WY monitoring events to the MTs and MOs defined at RMS-WL wells in the 2021 Alternative GSP. The table also shows the change in elevation from the previous year's seasonal low to this year's seasonal low. While groundwater elevations in all Main Basin RMS-WL wells in the Upper Aquifer dropped relative to 2020 WY conditions, especially in the western portion of the Basin, water levels at all RMS-WL wells continued to remain well above their respective MTs and MOs during both the seasonal high and seasonal low 2021 WY monitoring events.

**Table 2** compares water level measurements from the seasonal high and seasonal low 2021 WY monitoring events to the MTs and MOs defined at RMS-ICSW wells in the 2021 Alternative GSP. The table also shows the change in elevation from the previous year's seasonal low to this year's seasonal low. Groundwater levels dropped below their MTs at two RMS-ICSW (Wells 3S1E16P005 and 3S2E23E001) and below their MOs at three additional RMS-ICSW (Wells 3S2E30D002, 3S2E29F004, and 3S2E33C001) during the seasonal low (i.e., Fall) 2021 WY monitoring event; however, all RMS-ICSW wells were measured above their MTs and MOs during the seasonal high (i.e., Spring) monitoring event. As further described in **Section 8.1**, the MT exceedances observed at Wells 3S1E16P005 and 3S2E23E001 do not currently constitute a UR per the definition provided in *Section 13.6.1 Undesirable Results for Depletions of Interconnected Surface Water* of the 2021 Alternative GSP.

Quarry dewatering operations in the eastern Amador Subarea create groundwater depressions in pits where water is pumped and mounds in pits that are not clay-lined and where excess water is stored. The water from the dewatering of P42 and P46 (future Lakes B and J, respectively) was discharged into other adjacent clay-lined mining pits. The water from pit R28 (future Lake D) was eventually discharged into Cope Lake after which it was conveyed into Lake I and was recharged back into the Basin. Most of the groundwater elevation head change (the steepest groundwater gradient) occurs in the central area of the Basin, where mining pits are being excavated, and did not appear to vary significantly between the seasonal low and seasonal high periods of the 2021 WY.

Water levels in wells in the southwestern portion of the Basin near the Arroyo de la Laguna (as indicated primarily by the Bernal Upper Key Well 3S1E20C007 and Well 3S1E29M004) were below the upper threshold groundwater elevation at which Basin overflow occurs (i.e., about 295 feet above mean sea level [ft msl]). Consequently, no water overflowed from the Upper Aquifer into the Arroyo de la Laguna and exited the Basin during the 2021 WY.

Groundwater levels in the RMS-WL wells in the Fringe Aquifer stayed relatively constant throughout 2021 WY, generally varying by less than five feet compared to groundwater levels in 2020 WY. No data was available last year for the RMS-WL well in the Upland Area; however, the water level dropped about 2.2 feet from the seasonal high to the seasonal low in 2021 WY. For more information regarding historic groundwater elevations and trends observed for the Fringe Area, refer to *Section 8.3 Current and Historical Groundwater Conditions* of the 2021 Alternative GSP.

**Lower Aquifer**

**Figure 4** and **Figure 5** show 2021 WY groundwater elevation contours in the Lower Aquifer during seasonal high (Spring) and seasonal low (Fall) conditions, respectively. Flow directions and magnitudes indicated by the groundwater elevation contours did not vary greatly between the seasonal low and seasonal high conditions during the 2021 WY. In general, the groundwater gradient runs toward the center of the Basin where there are piezometric depressions created around several municipal wellfields and two mining pits (P42 [Lake B] and R28 [Lake D]) that appear to extend into the Lower Aquifer. The lowest groundwater elevation in the Lower Aquifer was observed near the R28 (Lake D) mining excavation pond (166 ft msl).

**Table 1** shows that groundwater elevations in all Main Basin RMS-WL wells in the Lower Aquifer also dropped relative to 2020 WY conditions, especially in the western portion of the Basin. However, as was the case in the Upper Aquifer, water levels at all RMS-WL wells continued to remain well above their respective MTs and MOs during both the seasonal high and seasonal low 2021 WY monitoring events.

As is usually the case, groundwater elevations in the Mocho II Subarea during the 2021 WY were about 140 to 160 ft higher than those to the west, across the Livermore Fault in the Amador Subarea. Deep groundwater elevations in the Dublin/Camp/Bishop Fringe Subareas were 50 to 70 ft higher than those across the Main Basin boundary to the south.

For more information on general groundwater gradient and water level trends, see *Section 8 Current and Historical Groundwater Conditions* of the 2021 Alternative GSP.

### 3.2. Groundwater Elevation Hydrographs

Groundwater levels for the 2021 WY followed a typical seasonal pattern observed from the historical data, rising in the beginning of the year with rainfall recharge and minimal pumping occurring, levelling off in late spring, and then dropping during the second half of the water year as rainfall ceased and pumping demands increased. Groundwater elevations generally decreased at all RMS-WL wells in the Main Basin compared to water levels during the 2020 WY when the Basin was largely full. For reference, the 2021 WY was designated as a critically dry water year by DWR. Historical water year types are provided in **Figure 12**.

**Figure 6** and **Figure 7** show hydrographs of historical and recent groundwater elevations at all RMS-WL and RMS-ICSW wells, respectively. These hydrographs further demonstrate the seasonal trends observed in both the Upper/Fringe Aquifers and the Lower Aquifer. The seasonal fluctuations are greater in the Lower Aquifer where more pumping occurs to meet seasonal demands in the warmer months, and when surface water treatment plant outages occur.

Groundwater elevations will continue to be monitored at all RMS-WL and RMS-ICSW sites per the monitoring plans described in *Section 14 Monitoring Network* of the 2021 Alternative GSP.

TABLE 1
GROUNDWATER ELEVATIONS AT REPRESENTATIVE MONITORING SITES
FOR CHRONIC LOWERING OF GROUNDWATER ELEVATIONS
2021 WATER YEAR
LIVERMORE VALLEY GROUNDWATER BASIN

| *RMS Well* | | *Management Area/Unit* | | | *2021 Water Year* | | | | | *SMCs for Groundwater Elevations* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Well Name* | *Map* | *Area* | *Subarea* | *Aquifer* | *Season High* | *Season Low* | *Change from 2020** | *Height above MT* | *Height above MO* | *MT* | *IM-5* | *IM-10* | *IM-15* | *MO* |
| 3S1E20C007 | 20C7 | Main | Bernal | Upper | 288.5 | 264.6 | -25.5 | 119.8 | 85.1 | 144.8 | 153.4 | 162.1 | 170.8 | 179.5 |
| 3S1E20C008 | 20C8 | Main | Bernal | Lower | 284.6 | 250.5 | -35.9 | 105.8 | 71.1 | 144.8 | 153.4 | 162.1 | 170.8 | 179.5 |
| 3S1E09P005 | 9P5 | Main | Amador West | Upper | 291.8 | 278.2 | -16.3 | 98.4 | 71.5 | 179.8 | 186.5 | 193.2 | 199.9 | 206.7 |
| 3S1E09P010 | 9P10 | Main | Amador West | Lower | 279.9 | 254.3 | -16.4 | 74.5 | 47.6 | 179.8 | 186.5 | 193.2 | 199.9 | 206.7 |
| 3S1E11G001 | 11G1 | Main | Amador East | Upper | 305.3 | 293.8 | -12.6 | 112.8 | 73.9 | 181.0 | 190.7 | 200.4 | 210.2 | 219.9 |
| 3S1E12K003 | 12K3 | Main | Amador East | Lower | 265.6 | 235.4 | -18.9 | 54.4 | 15.5 | 181.0 | 190.7 | 200.4 | 210.2 | 219.9 |
| 3S2E08K002 | 8K2 | Main | Mocho II | Upper | 422.8 | 417.4 | -6.1 | 162.3 | 124.3 | 255.1 | 264.6 | 274.1 | 283.6 | 293.1 |
| 3S2E08H003 | 8H3 | Main | Mocho II | Lower | 420.6 | 416.3 | -4.8 | 161.2 | 123.2 | 255.1 | 264.6 | 274.1 | 283.6 | 293.1 |
| 3S1E06F003 | 6F3 | Fringe | Northwest | Upper | 325.4 | 323.8 | -0.8 | 18.9 | 9.2 | 305.0 | 307.4 | 309.8 | 312.2 | 314.6 |
| 2S2E34E001 | 34E1 | Fringe | Northeast | Upper | 495.3 | 493.5 | -0.4 | 5.3 | 2.3 | 488.2 | 489.0 | 489.7 | 490.5 | 491.2 |
| 3S2E24A001 | 24A1 | Fringe | East | Upper | 699.6 | 699.6 | 0.2 | 24.1 | 21.3 | 675.5 | 676.2 | 676.9 | 677.6 | 678.3 |
| 3S2E21K009 | 21K9 | Upland | Upland | Upper | 478.4 | 476.2 | NA | 6.1 | 6.1 | 470.1 | 470.1 | 470.1 | 470.1 | 470.1 |

RMS = Representative Monitoring Site
SMC = Sustainable Management Criteria
IM = Interim Milestone
MO = Measurable Objective
MT = Minimum Threshold
* = 2020 Seasonal Low minus 2021 Seasonal Low

| |
|---|
| Main |
| Fringe |
| Upland |

# TABLE 2
# GROUNDWATER ELEVATIONS AT REPRESENTATIVE MONITORING SITES FOR INTERCONNECTED SURFACE WATER
# 2021 WATER YEAR
# LIVERMORE VALLEY GROUNDWATER BASIN

| RMS Well | | Management Area/Unit | | | 2021 Water Year | | | | | SMCs for ICSW | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Map | Area | Subarea | Aquifer | Season High | Season Low | Change from 2020* | Height above MT | Height above MO | MT | IM-5 | IM-10 | IM-15 | MO |
| 3S2E30D002 | 30D2 | Main | Amador | Upper | 409.1 | 405.63 | -3.55 | 4.63 | -0.87 | 401 | 403.8 | 404.7 | 405.6 | 407 |
| 3S1E16P005 | 16P5 | Main | Amador | Upper | 315.49 | 284.89 | -12.57 | -0.31 | -0.31 | 285 | 285.2 | 285.2 | 285.2 | 285 |
| 3S2E33G001 | 33G1 | Main | Amador | Upper | 502.8 | 502.32 | 0.65 | 1.32 | 1.02 | 501 | 501.1 | 501.2 | 501.2 | 501 |
| 3S2E29F004 | 29F4 | Main | Amador | Upper | 448.84 | 444.55 | -1.92 | 6.75 | -0.05 | 438 | 441.2 | 442.3 | 443.5 | 445 |
| 3S2E33C001 | 33C1 | Main | Amador | Upper | 486.23 | 485.33 | -1.16 | 3.23 | -0.87 | 482 | 484.2 | 484.8 | 485.5 | 486 |
| 3S1E02N006 | 2N6 | Main | Camp | Upper | 338.11 | 336.72 | -0.25 | 5.22 | 2.82 | 332 | 333.9 | 333.9 | 333.9 | 334 |
| 3S2E16E004 | 16E4 | Main | Mocho II | Upper | 472.51 | 467.01 | -9.17 | 0.11 | 0.01 | 467 | 466.9 | 466.9 | 466.9 | 467 |
| 3S2E23E001 | 23E1 | Main | Mocho II | Upper | 595.75 | 594.37 | -0.98 | -1.03 | -1.03 | 595 | 595.4 | 595.4 | 595.4 | 595 |
| 4S2E01A001 | 1A1 | Main | Mocho II | Upper | 797.76 | 795.96 | NA | 14.76 | 14.76 | 781 | 781.2 | 781.2 | 781.2 | 781 |
| 2S2E27P002 | 27P2 | Fringe | Spring | Upper | 502.25 | 501.12 | -0.43 | 0.12 | 0.12 | 501 | 501 | 501 | 501 | 501 |
| 2S2E34E001 | 34E1 | Fringe | May | Upper | 495.09 | 493.53 | -0.37 | 2.33 | 0.53 | 491 | 492.1 | 492.4 | 492.7 | 493 |
| 3S1E05K006 | 5K6 | Fringe | Camp | Upper | 331.5 | 329.7 | -1.79 | 3.7 | 1.5 | 326 | 328.2 | 328.2 | 328.2 | 328 |
| 3S1E02R001 | 2R1 | Fringe | Camp | Upper | 355.94 | 353.97 | -2.24 | 8.67 | 0.37 | 345 | 349.4 | 350.8 | 352.2 | 354 |
| 3S2E32E007 | 32E7 | Upland | Upland | Upper | 592.86 | 592.54 | -0.57 | 1.14 | 1.14 | 591 | 591.4 | 591.4 | 591.4 | 591 |

RMS = Representative Monitoring Site
SMC = Sustainable Management Criteria
ICSW = Interconnected Surface Water
IM = Interim Milestone
MO = Measurable Objective
MT = Minimum Threshold
* = 2020 Seasonal Low minus 2021 Seasonal Low

Main
Fringe
Upland

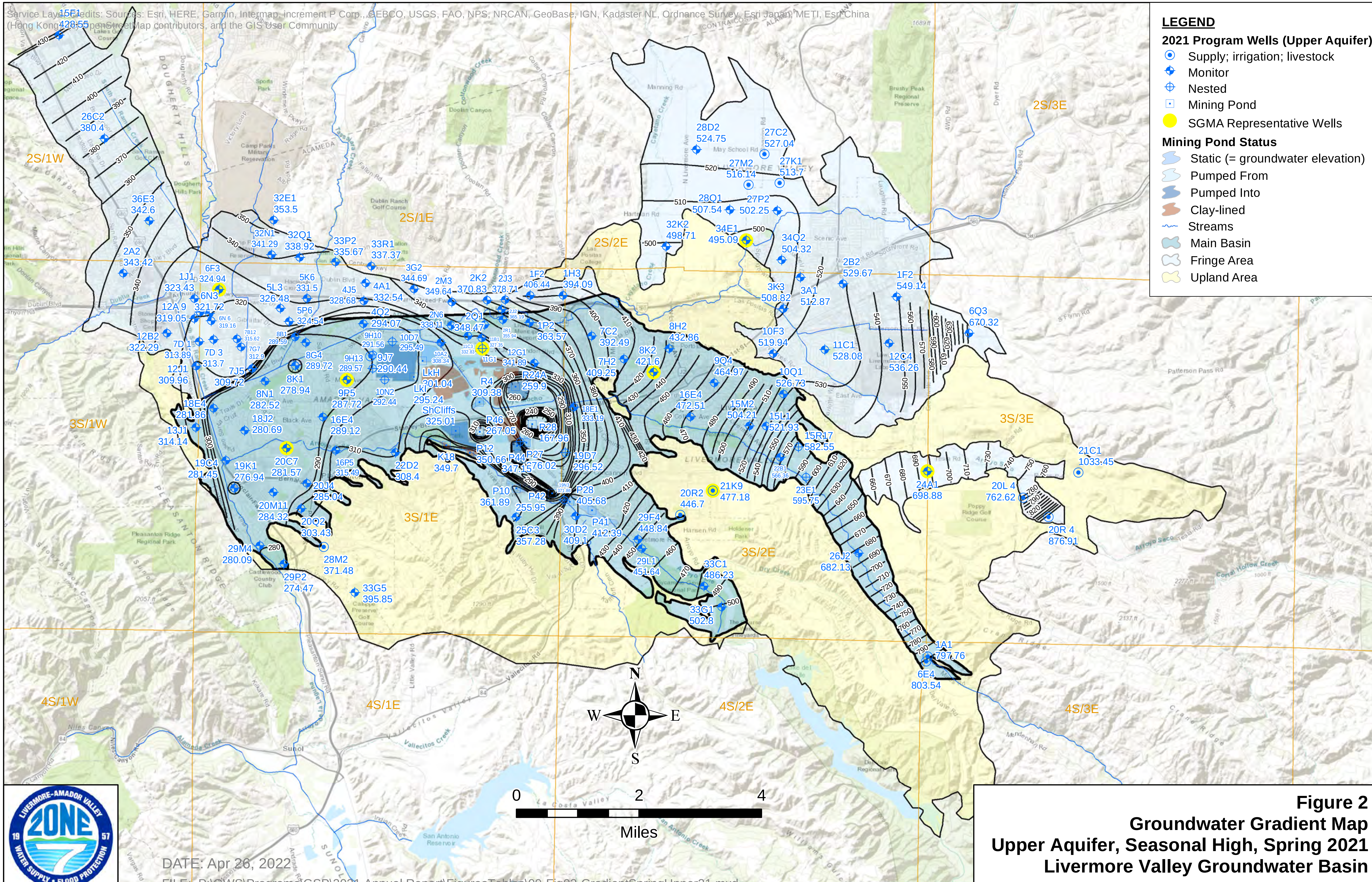



**Figure 2**
**Groundwater Gradient Map**
**Upper Aquifer, Seasonal High, Spring 2021**
**Livermore Valley Groundwater Basin**

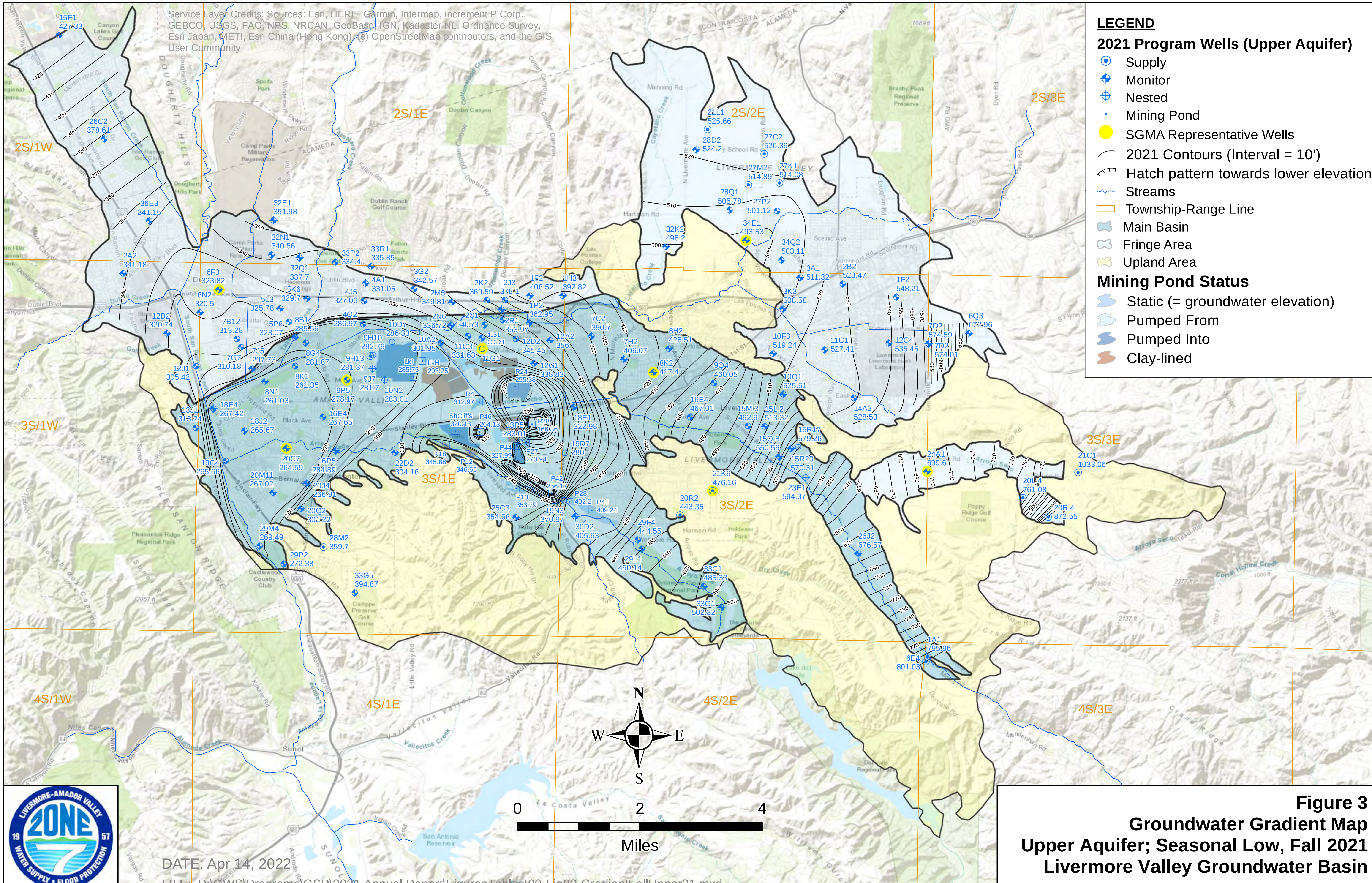



**Figure 3**
**Groundwater Gradient Map**
**Upper Aquifer; Seasonal Low, Fall 2021**
**Livermore Valley Groundwater Basin**

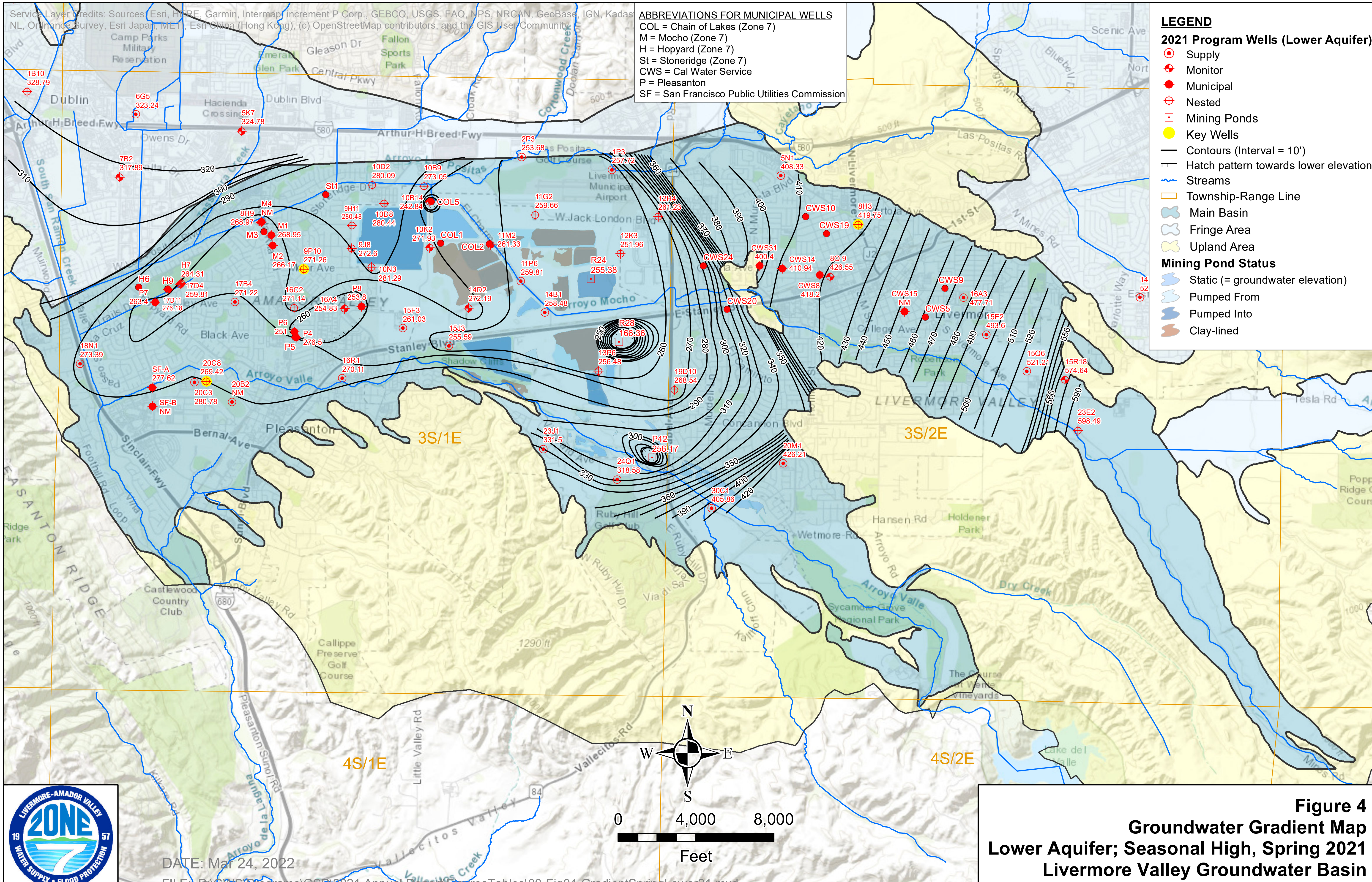



**Figure 4**
**Groundwater Gradient Map**
**Lower Aquifer; Seasonal High, Spring 2021**
**Livermore Valley Groundwater Basin**

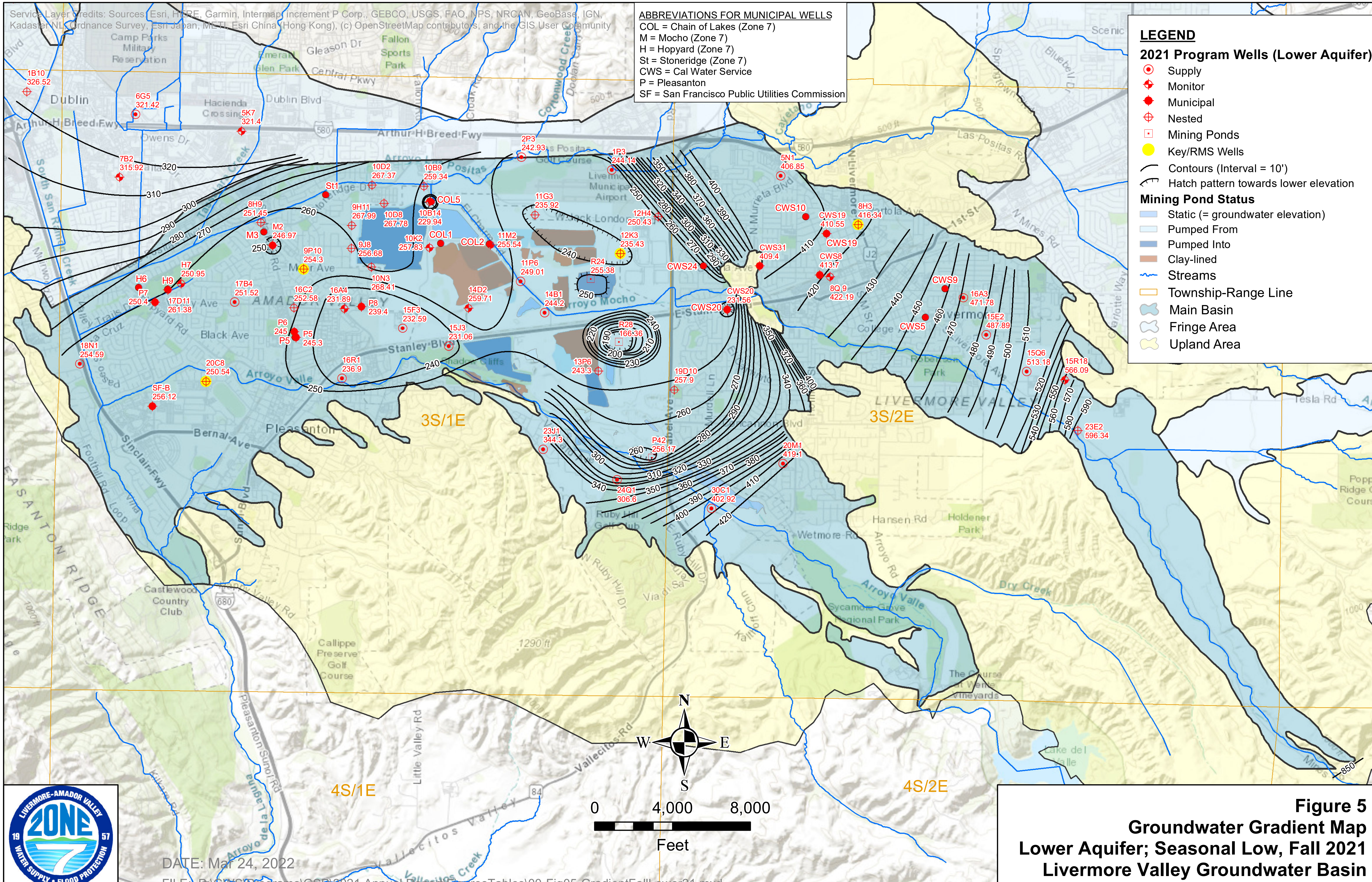
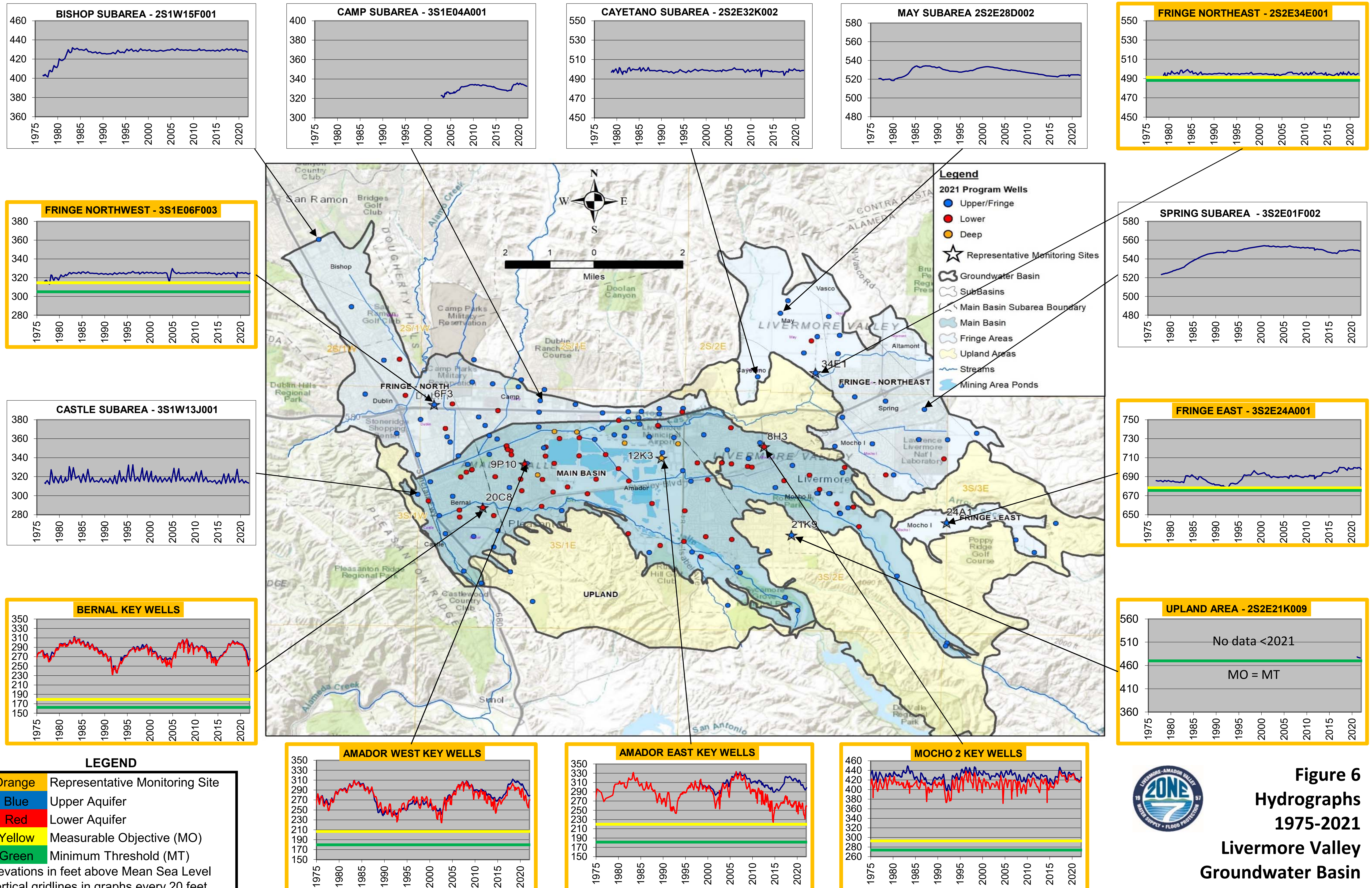



**Figure 5**
**Groundwater Gradient Map**
**Lower Aquifer; Seasonal Low, Fall 2021**
**Livermore Valley Groundwater Basin**

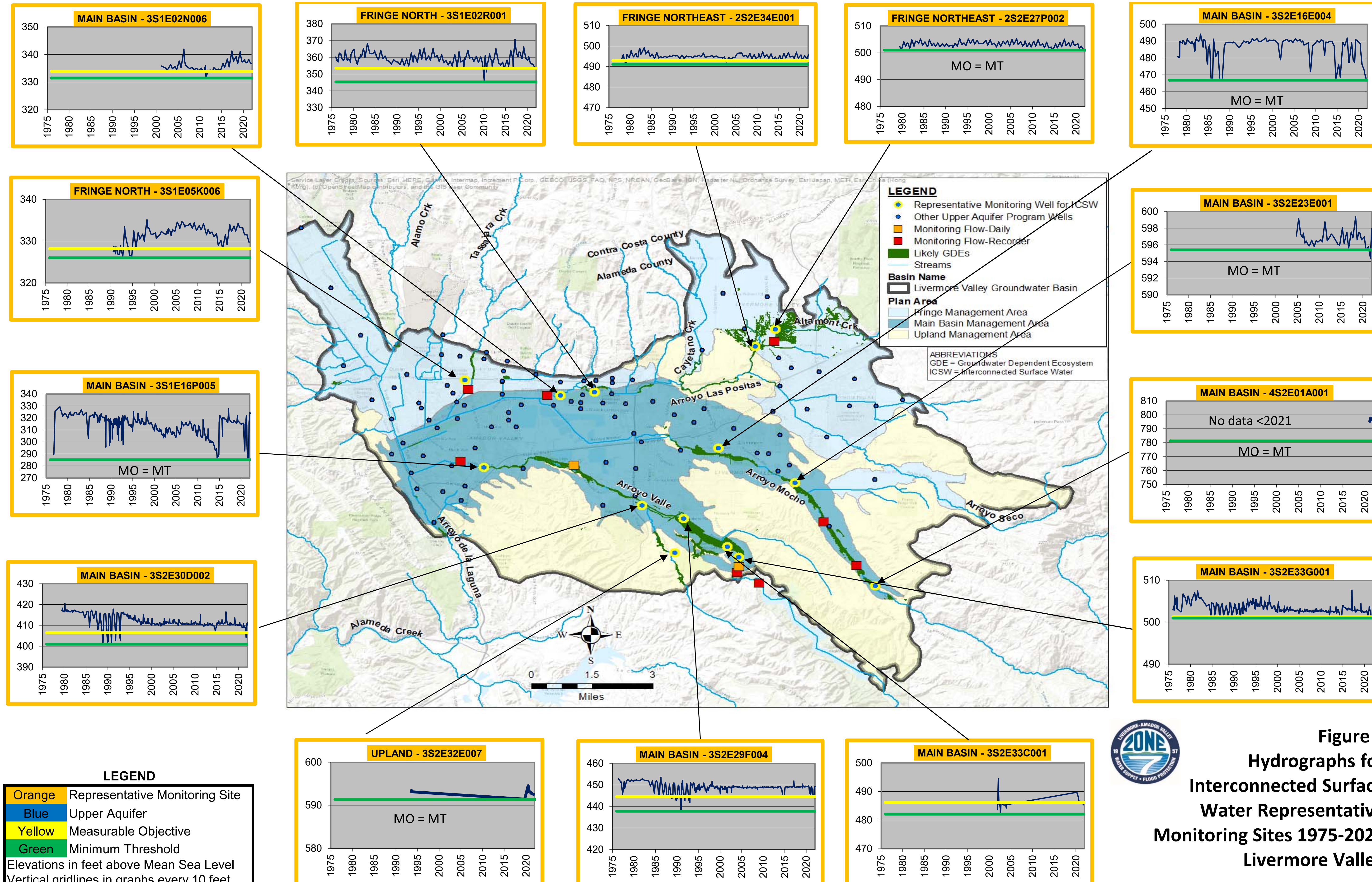



**LEGEND**

| | |
|---|---|
| Orange | Representative Monitoring Site |
| Blue | Upper Aquifer |
| Red | Lower Aquifer |
| Yellow | Measurable Objective (MO) |
| Green | Minimum Threshold (MT) |

Elevations in feet above Mean Sea Level
Vertical gridlines in graphs every 20 feet

**Figure 6**
**Hydrographs**
**1975-2021**
**Livermore Valley**
**Groundwater Basin**




LEGEND

| | |
|---|---|
| Orange | Representative Monitoring Site |
| Blue | Upper Aquifer |
| Yellow | Measurable Objective |
| Green | Minimum Threshold |

Elevations in feet above Mean Sea Level
Vertical gridlines in graphs every 10 feet

**Figure 7**
**Hydrographs for Interconnected Surface Water Representative Monitoring Sites 1975-2021**
**Livermore Valley**

## 4. Groundwater Extraction Data

☑ ***§ 356.2 (b) (2)***

*Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:*

*(b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:*

*(2) Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector, and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions.*

Since the 1960s, Zone 7 has actively embraced a "conjunctive use" approach to Basin management by integrating local and imported surface water supplies with the local conveyance, storage, and groundwater recharge features. Zone 7's annual groundwater production and artificial recharge operations vary with the availability of surface water, treatment plant capacity, and the available groundwater storage space.

**Table 3** below shows the Basin-wide, 2021 WY groundwater extraction data by water use sector and measurement method; reported units are in AF. Groundwater extractions within the Basin totaled approximately 22,747 AF during the 2021 WY, of which 98% was for the municipal sector.

**Table 3. Summary of Groundwater Extractions by Source and Sector**

| Water Use Sector / Entity | 2021 WY Groundwater Extractions (AF) | Measurement Method | Estimated Accuracy (AF) |
|---|---|---|---|
| **Municipal Pumping** | | | |
| Zone 7 Production (i.e., excluding DSRSD, waste, and brine) | 15,614 | Metered by Zone 7 | 10 |
| Zone 7 (for DSRSD) | 645 | DSRSD Groundwater Pumping Quota | 1 |
| City of Pleasanton | 3,802 | Metered by Pleasanton | 10 |
| California Water Service – Livermore (CWS) | 1,475 | Metered by CWS | 10 |
| San Francisco Public Utilities Commission (SFPUC) | 360 | Metered by SFPUC | 10 |
| Fairgrounds | 353 | Metered by Fairgrounds | 10 |
| **Domestic Pumping** | **107** | **Estimated** | **50** |
| **Irrigated Agriculture** | **122** | **Estimated** | **100** |
| **Golf Courses** | **269** | **Estimated** | **50** |
| **Total** | **22,747** | **-** | **-** |

Approximately 26% of the municipal pumping comes from groundwater pumped by Zone 7's retailers (i.e., the City of Pleasanton, City of Livermore, CWS, and DSRSD). The retailers are permitted by contract to pump a Groundwater Pumping Quota (GPQ) (accounted for on a CY basis) without having to pay a replenishment fee to Zone 7. They can carry forward any unpumped GPQ (up to 20% of their GPQ). The retailer's GPQ and total pumping for the 2021 CY (in AF) are shown in **Table 4** below. None of the retailers pumped more than their respective GPQ in 2021 CY.

**Table 4. Retailer Groundwater Extractions vs. Groundwater Pumping Quota***

| Retailer | GPQ (AF) | Carryover from 2020 (AF) | Pumped in CY 2021 (AF) | Carryover to 2022*** (AF) |
|---|---|---|---|---|
| City of Pleasanton | 3,500 | 391 | 3,331 | 168 |
| Cal Water Service | 3,069 | 614 | 1,389 | 614 |
| DSRSD (pumped by Zone 7) | 645 | 0 | 645 | 0 |
| City of Livermore (not used)** | 31 | - | - | - |
| **Total** | **7,214** | **1,005** | **5,365** | **782** |

* = All values accounted for and reported on a CY basis
** = Livermore no longer pumps groundwater, GPQ not included in totals or carryover.
*** = Maximum of 20% of GPQ can be carried over

**Figure 8** shows the general location and volume of groundwater extractions occurring throughout the Basin in 2021 WY. A large majority of groundwater production is municipal pumping and occurs within the Lower Aquifer of the Main Basin. There are no municipal supply wells within the Fringe and Upland Areas. There are domestic wells within the Basin, but the pumping volumes from these domestic wells are minimum (i.e., less than 2 acre-feet per year [AFY] per well). Agricultural pumping is estimated by the Areal Recharge Model, which is discussed in detail in *Section 9 Water Budget Information* of the 2021 Alternative GSP.

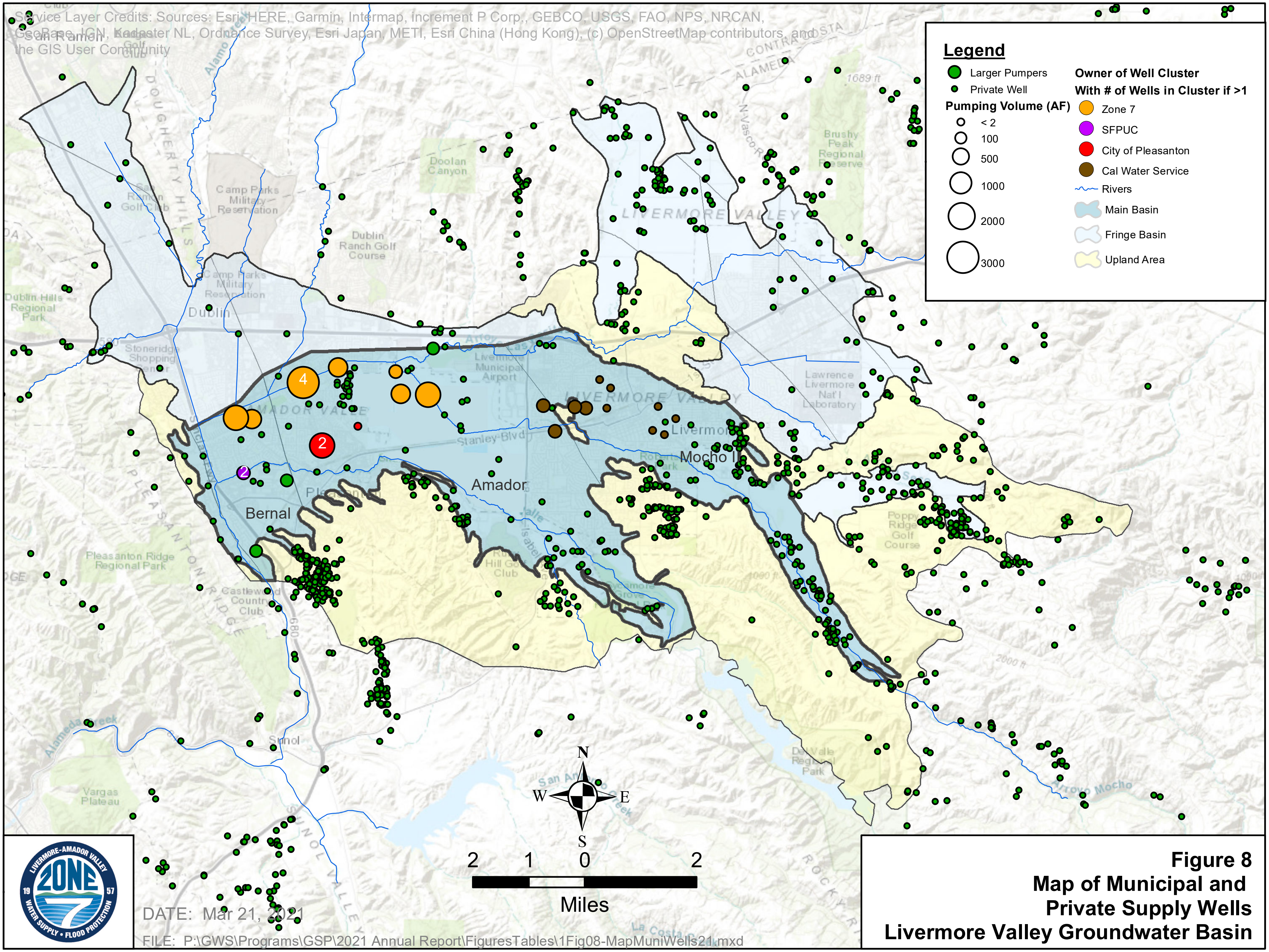



**Figure 8**
**Map of Municipal and Private Supply Wells**
**Livermore Valley Groundwater Basin**

## 5. Surface Water Supply

☑ ***§ 356.2 (b) (3)***

*Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:*

*(b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:*

*(3) Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describes the annual volume and sources for the preceding water year.*

Zone 7 ensures that local water supplies (e.g., groundwater) are not depleted by importing approximately 80% of the Basin's water supply from the State Water Project (SWP) to be delivered to Zone 7's retailers and agricultural customers, and by recharging the Main Basin with surplus surface water when available ("artificial recharge"). Details regarding the surface water supply sources and contract amounts are provided in *Section 7.7.6 Source and Point of Delivery for Imported Water Supplies* of the 2021 Alternative GSP.

In accordance with DWR's accounting time-interval of SWP water, the allocation totals are accounted for by Calendar Year. The SWP allocation for the 2021 CY was 5% of Zone 7's maximum allocation (80,619 AF). **Table 5** shows Zone 7's imported water supplies for 2021 CY and the amounts being carried over to the 2022 CY. All deliveries of imported surface water are measured with electromagnetic flow meters and are accurate to within 1%.

Table 5. Summary of Surface Water Supplies by Source and Sector*

| Source | Available at end of 2020 (AF) | Added in 2021 * (AF) | Used in 2021 (AF) | Carryover to 2022 (AF) |
|---|---|---|---|---|
| **State Water Project** | **8,860** | **5,831** | **8,700** | **5,991** |
| *Table A* | *0* | *4,031* | *0* | *4,031* |
| *To San Luis from Semitropic* | *0* | *1,800* | *0* | *1,800* |
| *Article 56* | *8,860* | *0* | *8,700* | *160* |
| **Byron-Bethany Irrigation District**ǂ | **0** | **0** | **0** | **0** |
| **Kern Groundwater Basin** | **116,075** | **0** | **10,400** | **105,675** |
| *Semitropic Delivered* | *86,170* | *0* | *8,600* | *77,570* |
| *Semitropic to San Luis* | *0* | *0* | *1,800* | *-1,800* |
| *Cawelo Delivered* | *29,905* | *0* | *0* | *29,905* |
| **Other** | **0** | **9,327** | **9,327** | **0** |
| *Yuba/Dry Year Transfer Program* | *0* | *1,237* | *1,237* | *0* |
| *Mojave Water Agency Transfer* | *0* | *8,090* | *8,090* | *0* |
| **Lake Del Valle (AV Water Rights)** | **20** | **3,200** | **920** | **2,300** |
| ***Total*** | ***124,955*** | ***18,358*** | ***29,347*** | ***113,966*** |

* = All values accounted for and reported on a CY basis
** = 5% State Water Project Allocation for 2021 CY
ǂ = BBID Agreement terminated in 2021 CY
AV = Arroyo Valle

## 6. Total Water Use

☑ *§ 356.2 (b) (4)*

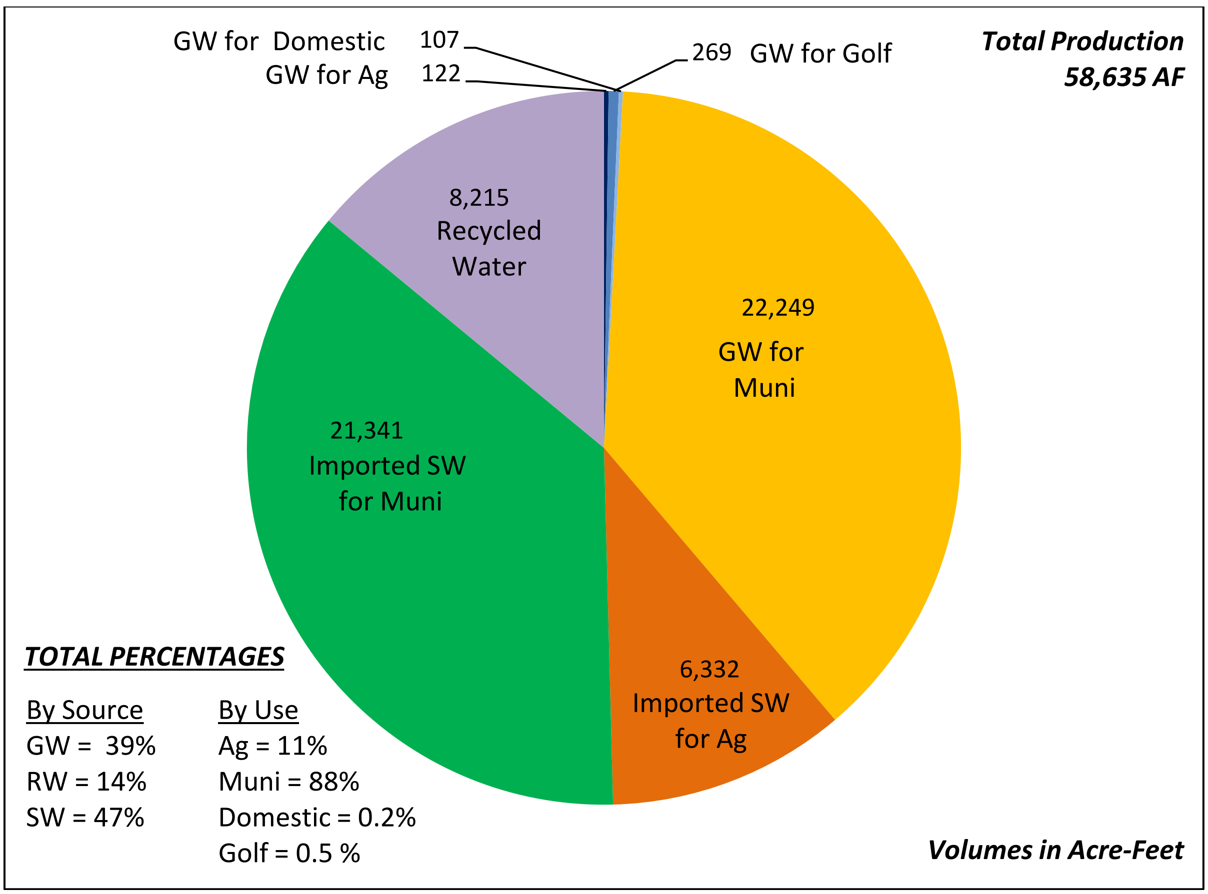
*Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:*

*(b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:*

*(4) Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.*

The volume of water produced and used in the Basin over the 2021 WY is shown by water source type and by water use sector in **Figure 9** and **Table 6** below.

**Figure 9: Pie-Chart Summary of Total Water Use by Source and Sector**




Ag = Agriculture; Muni = Municipal; GW= Groundwater; RW = Recycled Water; SW = Surface Water

Total groundwater production in the Basin (including by Zone 7, retailers, agriculture, domestic, etc.) supplied about 39% of the total Basin-wide water demand in the 2021 WY. Total surface water used in the Basin supplied about 47% of the total Basin-wide water demand, which allowed 27,673 AF of groundwater to be conserved instead of being pumped to meet this demand. The final 14% of water demands were satisfied by recycled water supplies, 100% of which were used for urban irrigation.

Of the total water use within the Basin during the 2021 WY (including groundwater, surface water, and recycled water), about 88% was used by the municipal sector, 11% was used by the agricultural sector, 0.5% was used for golf courses, and 0.2% was used by the domestic sector. A more detailed breakdown of water supply and uses by source and sector within the Basin is provided in **Figure 10**.

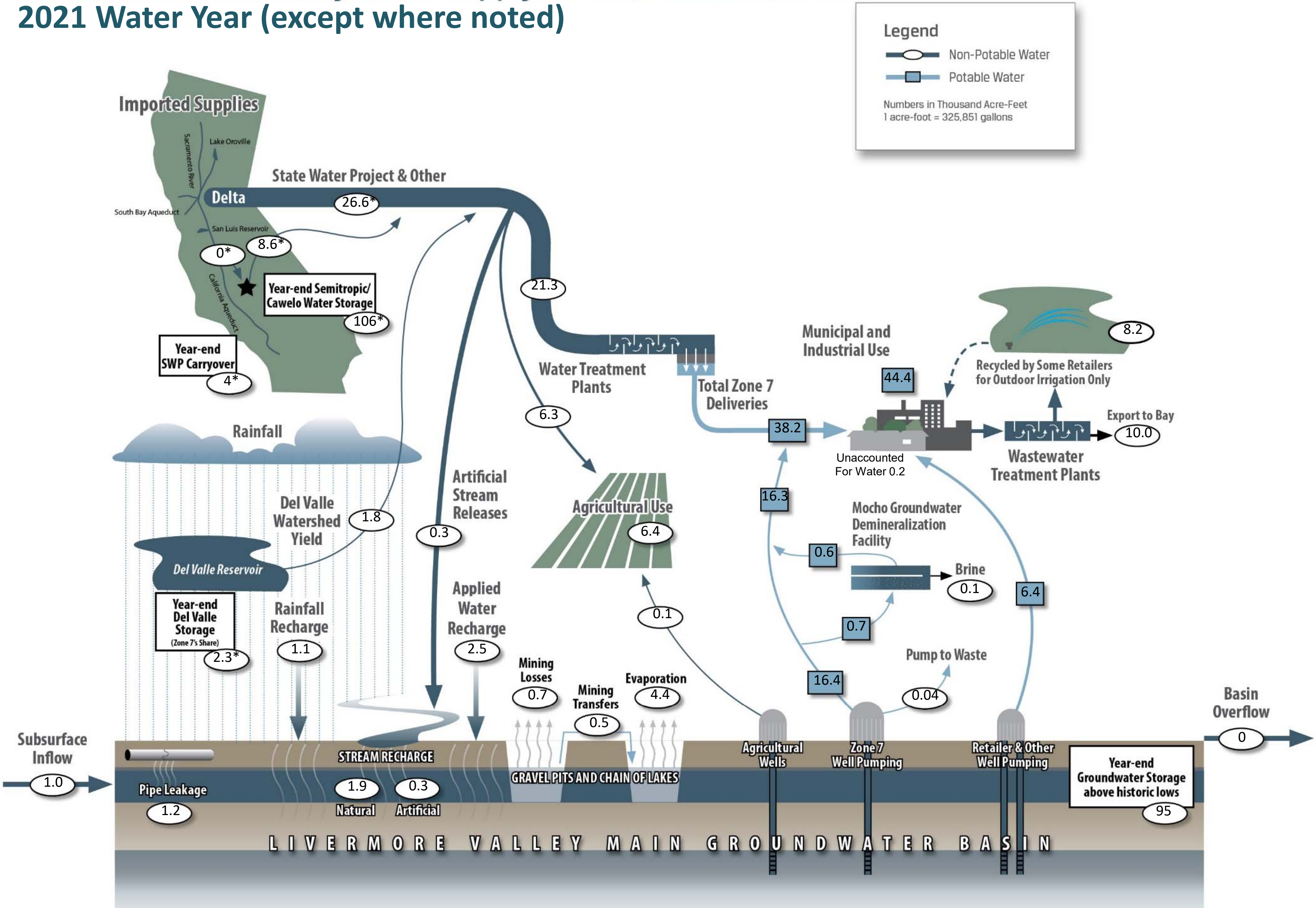
**Table 6. Summary of Total Water Use by Source and Sector**

| Water Use Sector | Water Source | 2021 WY Water Use (AF) |
|---|---|---|
| Municipal | Groundwater | 22,249 |
| | Imported Surface Water | 21,341 |
| | Recycled Water | 8,215 |
| Agriculture | Groundwater | 122 |
| | Imported Surface Water | 6,332 |
| Golf | Groundwater | 269 |
| Domestic | Groundwater | 107 |
| **Total** | | **58,635** |

Methods of measurement and accuracy of measurements for groundwater extraction and surface water data are summarized in **Section 4** and **Section 5** respectively.

# Figure 10

## Livermore-Amador Valley Water Supply & Use (in Thousands of Acre-Feet)
## 2021 Water Year (except where noted)




* 2021 Calendar Year

## 7. Change in Groundwater Storage

☑ *§ 356.2 (b) (4)*

*Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:*

*(b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:*

*(4) Change in groundwater in storage shall include the following:*

*(A) Change in groundwater in storage maps for each principal aquifer in the basin.*

*(B) A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.*

To avoid significant depletion of groundwater storage, Zone 7 operates the Basin such that groundwater storage remains between a full Basin volume (254 TAF) and the historic low storage volume (128 TAF), or about one half of total storage volume. This 126 TAF (254 TAF – 128 TAF) is considered the Operational Storage. Groundwater below this historic low storage volume is regarded as Reserve Storage that is unavailable during nonemergency conditions. Most of the groundwater storage is contained in the Main Basin, which is characterized by the largest saturated thickness of aquifer materials.

Zone 7 uses two methods for calculating groundwater storage in the Basin: The GWE method and the HI method. The GWE method uses groundwater level data and storage coefficients for "nodes" (originally developed by DWR in 1974) to estimate the total volume of water in the Basin (see *Sections 8.4, Groundwater Storage,* in the 2021 Alternative GSP). The HI method, also known as the Water Budget, involves an accounting of all inflows and outflows and derivation of the change in storage as the residual of the water budget equation (see *Sections 8.4, Groundwater Storage, in the 2021 Alternative GSP*). Storage volumes from the two methods are averaged to quantify the total storage of the Basin.

The GWE method yielded a total storage of 219.8 TAF at the end of 2021 WY, which is 17.3 TAF less than the GWE value calculated for the 2020 WY. **Figure 11** shows the change in storage from Fall 2020 to Fall 2021 for each Main Basin node.

The HI method produced a total storage value of 227.1 TAF for the end of 2021 WY, which is 20.1 TAF less than the end of 2020 WY HI value. **Figure 12** shows the annual change in groundwater storage and cumulative change in groundwater storage for the Basin along with the water year type from 1974 WY to 2021 WY.

The total groundwater storage for the Basin is computed by averaging the storage estimates from the GWE and HI methods. As shown in **Table 7** below, the average total groundwater in storage at the end of 2021 WY was calculated to be 223.4 TAF, which is about 18.8 TAF less than the 2020

WY average total storage value of 242.2 TAF. This equates to approximately 95.4 TAF of groundwater available as Operational Storage, which is about 76% of the total operational storage capacity (i.e., 126 TAF).

**Table 7: Groundwater Storage Summary, 2021 WY (in Thousand AF)**

| Storage Calculation Method | End of 2020 WY | End of 2021 WY | Change in Storage |
|---|---|---|---|
| GWE Method | 237.1 | 219.8 | -17.3 |
| HI Method | 247.2 | 227.1 | -20.1 |
| **TOTAL STORAGE (Average of GWE and HI Methods)** | **242.2** | **223.4** | **-18.8** |
| Operational Storage | 114.2 | 95.4 | -18.8 |

In the past the groundwater storage values calculated by both the GWE and HI Methods have typically been within about 6 TAF. However, the difference between the HI and GWE methods was about 10.1 TAF in the 2020 WY and 7.3 TAF in the 2021 WY. The reason for this divergence is unclear; however, there have been significant differences between the two methods in the past that converged a few years later (e.g., 1992 and 2008/2009). Zone 7 staff continues to investigate possible reasons for this significant difference.

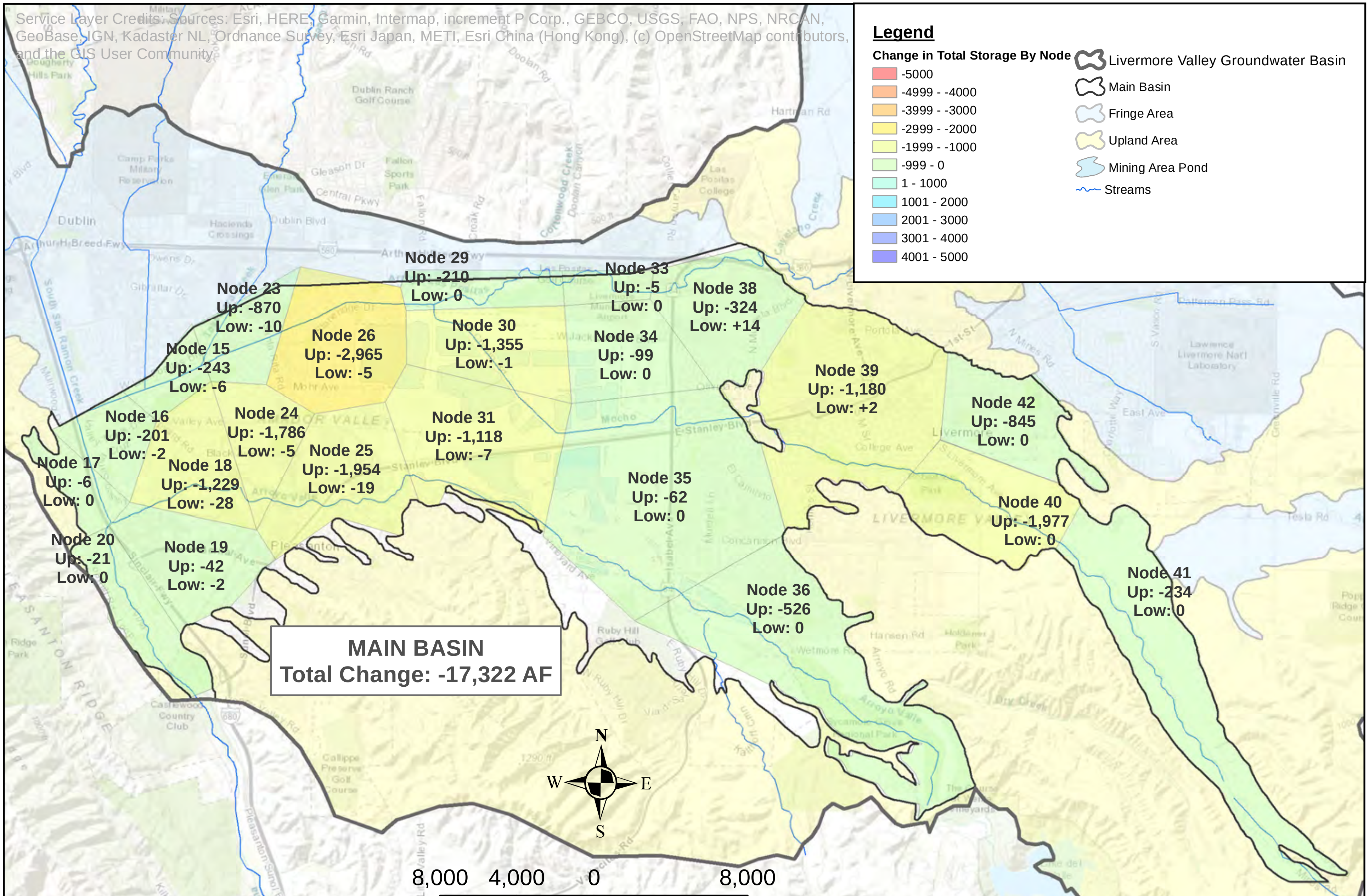



**Figure 11**
**Change in Groundwater Storage**
**Fall 2020 to Fall 2021**
**Livermore Valley Main Basin**

DATE: Apr 27, 2022

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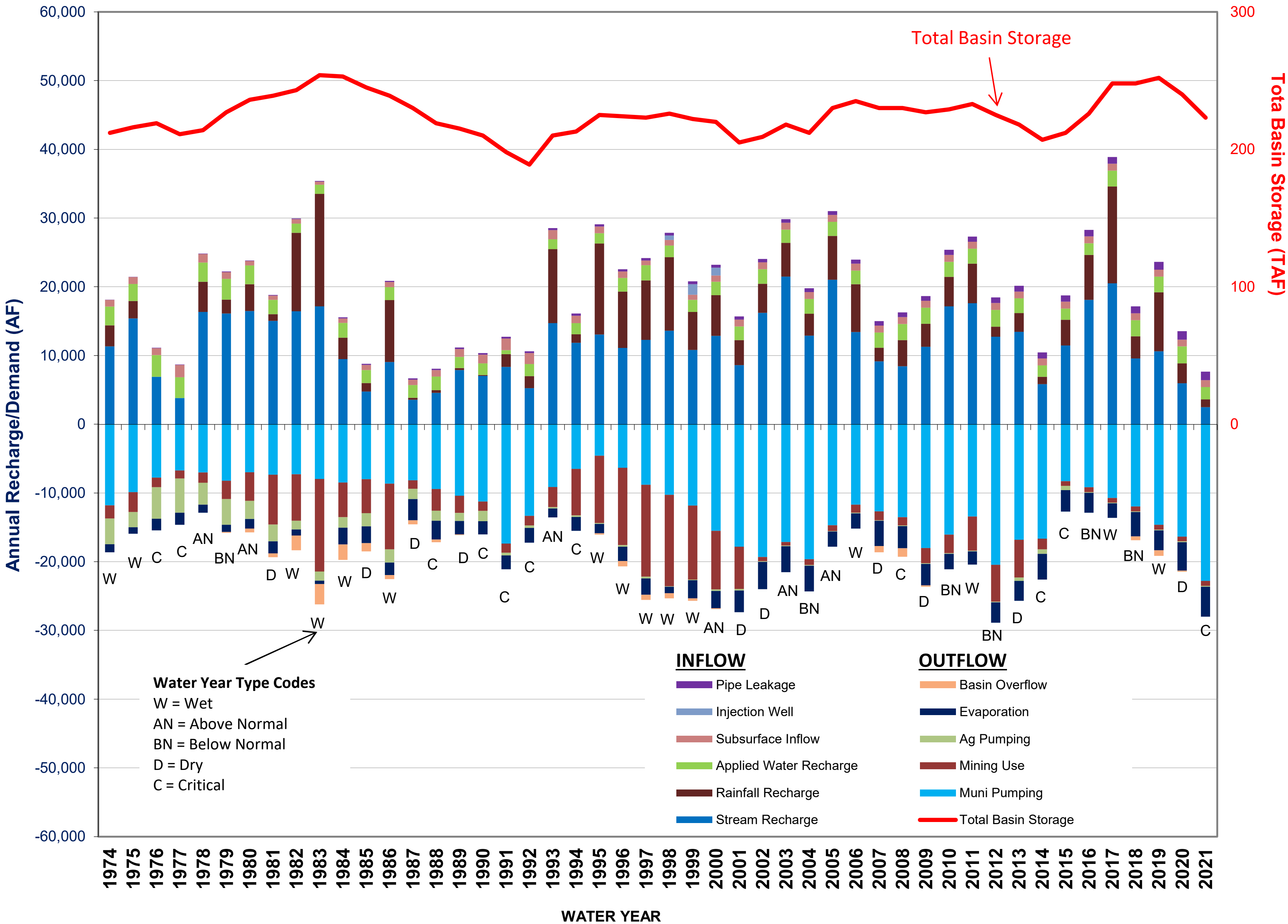
## FIGURE 12
## GRAPH OF GROUNDWATER STORAGE 1974 - 2021 WATER YEARS
## LIVERMORE VALLEY GROUNDWATER BASIN

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3/21/2022

## 8. Plan Implementation

☑ ***§ 356.2 (b) (4)***

*Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:*

*(c) A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.*

### 8.1. Progress Towards Interim Milestones for Chronic Lowering of Groundwater Levels

**Table 8** summarizes the five Sustainability Indicators for which SMCs are defined within the Basin[2], their associated URs, and MTs as presented in the 2021 Alternative GSP. The table also includes the 2021 WY status for each indicator and any action taken in the 2021 WY or planned for the upcoming water year.

As described in **Section 3** and shown in **Table 1**, water levels at all RMS-WL wells continued to remain well above their respective MTs and MOs during both the seasonal high and seasonal low 2021 WY monitoring events.

As described in **Section 3** and shown in **Table 2**, groundwater levels dropped below their MTs at two RMS-ICSW (by ≤1.03 feet) and below their MOs at three additional RMS-ICSW (also by ≤1.03 feet) during the seasonal low (i.e., Fall) 2021 WY monitoring event; however, all measured water level data at RMS-ICSW wells were recorded above their MTs and MOs during the seasonal high (i.e., Spring) monitoring event. As described in *Section 13.6.1. Undesirable Results for Depletions of Interconnected Surface Water* of the 2021 Alternative GSP, URs for Depletions of ICSW *will be experienced if and when Depletions of Interconnected Surface Water occur as a result of unsustainable groundwater extraction such that groundwater levels decline below their MTs in greater than 40% of the RMS-ICSW for more than two consecutive years.* Thus, the two MT exceedances experienced in the RMS-ICSW monitoring network during the Spring 2021 monitoring event <u>do not</u> constitute a UR per the definition in the 2021 Alternative GSP.

For land subsidence monitoring, MTs were not exceeded at any applicable proxy RMS-WL sites, and elastic fluctuations in ground surface elevations were measured at less than 0.04 ft throughout the 2021 WY.

As described in **Table 8,** Total Dissolved Solids (TDS) was detected above the MT (by 19 mg/L) in one RMS-WQ (Well 3S2E08H003) during the 2021 WY. No other Constituents of Concern (COCs), including TDS, Nitrate, Boron, and Chromium, were detected above their corresponding MTs in any other RMS-WQs. SMCs for per- and polyfluoroalkyl substances (PFAS) have not been established. Zone 7 will continue to sample for PFAS compounds, identify possible sources, and

[2] Seawater intrusion is not occurring in the Basin and thus no SMCs have been defined for this Sustainability Indicator.

perform PFAS groundwater modeling. SMCs for PFAS will be addressed in the next Alternative GSP update once additional data have been collected and regulatory criteria established. Zone 7 will continue to monitor the other COCs within the Basin and implement the Salt Management Plan (SMP) and Nutrient Management Plan (NMP).

**Table 8: Sustainable Management Criteria Status, 2021 WY**

| Sustainability Indicator | Undesirable Results Criteria | Minimum Threshold | 2021 WY Status | Action Taken |
|---|---|---|---|---|
| Chronic Lowering of Groundwater Levels | Water levels in greater than 25% of the RMS-WLs decline below their respective MTs for two consecutive years. | Historic low minus maximum annual rate of groundwater level change, or historic low if maximum annual rate of groundwater level change is not available. | MTs were not exceeded at any RMS-WLs, see **Figure 6**. | Continue to monitor and maintain artificial recharge operations. |
| Depletion of Groundwater Storage | Water levels in greater than 25% of the RMS-WLs decline below their respective MTs for two consecutive years.<br><br>Not applicable to Upland Management Area. | Water Level SMCs used as proxy. | MTs were not exceeded at any RMS-WLs, see **Figure 6**. | Continue to monitor maintain artificial recharge operations. |
| Degradation of Groundwater Quality | If MTs are exceeded for any of the identified constituents of concern in greater than 25% of the RMS-WQs at least two (2) consecutive years as a result of SGMA-related groundwater management activities such that they cannot be managed to provide drinking water supply (i.e., that treatment or blending is not possible or practicable). | TDS > 1,000 milligrams per liter (mg/L) or 2015 Baseline concentration plus maximum deviation, whichever is greater. | TDS was detected above the MT (by 19 mg/L) in RMS-WQ 3S2E08H003. TDS was not detected above the MT in any other RMS-WQs. | Continue to monitor and increase municipal supply pumping, implement SMP, increase operation of Mocho Groundwater Demineralization Plant (MGDP), and conduct artificial groundwater recharge with low TDS water. |
| | | NO3 (as N) > 10 mg/L or 2015 Baseline concentration plus maximum deviation, whichever is greater. | Nitrate was not detected above the MT in any RMS-WQs | Continue to monitor and implement NMP. |
| | | Boron > 1.4 mg/L, or 2015 Baseline concentration plus maximum deviation, whichever is greater. | Boron was not detected above the MT in any RMS-WQs | Continue to monitor. |
| | | Total Chromium > 0.050 mg/L, or 2015 Baseline | Chromium was not detected above the MT in any RMS-WQs | Continue to monitor. |

| Sustainability Indicator | Undesirable Results Criteria | Minimum Threshold | 2021 WY Status | Action Taken |
|---|---|---|---|---|
| Degradation of Groundwater Quality (continued) | | concentration plus maximum deviation, whichever is greater. | | |
| | | SMCs for PFAS in development | Zone 7 continued to sample for PFAS compounds, investigated possible sources, and performed PFAS groundwater modeling | Continue to monitor |
| Land Subsidence | Water Level SMCs used as proxy for Main Basin and Fringe Management Area, and no more than 0.4 ft of irreversible land surface elevation decrease in one year.<br><br>Not applicable to Upland Management Area. | Water Level SMCs used as proxy and irreversible land surface elevation decrease of 0.4 ft. | MTs were not exceeded at any applicable RMS-WLs and Elastic fluctuations less than 0.04 ft for the year | Continue to monitor |
| Depletion of Interconnected Surface Waters | If groundwater levels decline below their MTs in greater than 40% of the RMS-ICSWs for more than two consecutive years. | Historic low water levels or to be determined if historical water levels are not available. | Two MT exceedances were recorded RMS-ICSWs (Wells 3S1E16P005 and 3S2E23E001) during the seasonal low (fall) monitoring event (see **Table 2** and **Figure 7**); however no URs have been triggered within the Basin. | Continue to monitor |

## 8.2. Implementation of Projects and Management Actions

This section provides an update on the P/MAs described in *Section 15 Projects and Management Actions* of the 2021 Alternative GSP. As demonstrated in the 2021 Alternative GSP and in this Annual Report, Zone 7 continues to sustainably manage the Basin through numerous interrelated programs to assess, manage, monitor, and protect groundwater supplies. Using information from its robust monitoring programs, Zone 7 adaptively manages its groundwater supplies in consideration of and with regard to current hydrologic conditions, water demands, water quality conditions, and future water supply/demand forecasts. In addition to continuing the monitoring programs that are critical to Zone 7's sustainable groundwater management, Zone 7 is also working to improve long-term surface water supply reliability, maximize conjunctive use opportunities, provide watershed protection, and support water recycling operations.

**Water Supply Augmentation Projects**

Existing Imported Water Supplies

Imported surface water supplies secured by Zone 7 for the 2021 WY are shown in **Table 5** and **Figure 10** and are summarized below include:

- The State Water Project (SWP deliveries via the South Bay Aqueduct [SBA] allocation for the 2021 CY was 5% of Zone 7's maximum allocation (80,619 AF) for 4,031 AF.

- Zone 7 imported 8,600 AF of its total 116,075 AF banked in the Kern Groundwater Basin (care of the Semitropic Water Storage District the Cawelo Water District) and transferred 1,800 AF from the Kern Groundwater Basin to San Luis Reservoir.

- Zone 7 transferred 1,237 AF from the Lover River Yuba Accord (Yuba) and 8,090 AF from the Mojave Water Agency.

- Total imported surface water supplies in the 2021 met 47% of regional water demands.

- Total groundwater production in the Basin (including by Zone 7, retailers, agriculture, domestic, etc.) supplied about 39% of the total Basin-wide water demand in the 2021 WY.

- Of the 16,440 AF of groundwater pumped by Zone 7 during the 2021 WY, about 16,259 AF went into production; the remainder of which is accounted for in pumping losses and exported brine from the groundwater demineralization process.

- Zone 7's total produced groundwater was about 43% of the total treated water production that Zone 7 delivered to its retailers during the 2021 WY (on average, groundwater makes up about 15% of Zone 7's annual treated water deliveries).

Future Water Supply Projects

Zone 7 continued its strategy of securing the long-term reliability of the water supply system to meet the needs of both existing and future customers as summarized below:

- In 2021, Zone 7 continued its petition to extend Zone 7's water rights permit for diverting surface water captured in Lake Del Valle from the upper Arroyo Valle. Under the existing permit, Zone 7's average annual yield from the upper Arroyo Valle is about 7,300 AFY. A diversion structure from Arroyo Valle into Lake A, and a pipeline connecting Lake A to other lakes in the Chain of Lakes (COLs), are included in Zone 7's Capital Improvement Plan (CIP, 2018-2028). Once constructed, these projects will facilitate the capture and storage of additional water from the Del Valle Watershed up to about 3,000 AFY on average.

- Zone 7 continues to support the Delta Conveyance Project, the State of California's proposed project to upgrade the SWP system infrastructure and operations and improve its long-term reliability while protecting the Sacramento-San Joaquin Delta (Delta) ecosystem. At this time, while the project's design is still being re-evaluated, Zone 7 is assuming that some form of the Delta Conveyance Project would be in-service by 2040.

- Zone 7 is also continuing to evaluate alternative water supply and storage options such as the Bay Area Regional Desalination Project, potable reuse, Los Vaqueros Expansion, Sites Reservoir, and water transfers. Ultimately, Zone 7 may choose to implement one or several of these options depending on the results of the studies and planning efforts, the amounts and timing of development and conservation, and the determination of costs and benefits to the Basin.

- Finally, Zone 7 continues to evaluate the feasibility of an intertie with another major water agency (e.g., East Bay Municipal Utilities District or SFPUC). An outage of the SBA, or major disruptions in the Delta, would prevent Zone 7 access to most of its water supplies, leaving only groundwater, water in the Chain of Lakes, and water in Lake Del Valle available to meet its demands. An intertie with another agency could provide an additional source of water during an emergency or drought and could also facilitate water transfers.

Conjunctive Use

Zone 7 continues to implement conjunctive use practices within the Basin to the greatest extent possible given current hydrologic conditions and imported water supply availability. During the 2021 WY, Zone 7 released 1,050 AF from the SBA into the Arroyo Valle for artificial recharge and water rights, of which 789 AF recharged.

Additionally, Zone 7 recently commissioned a technical study to assess the potential to increase conjunctive use in the Basin, including expansion of artificial recharge operations within the COL.

Well Master Plan (WMP)

During the 2021 WY, Zone 7 staff continued the process of reevaluating Zone 7's supply well needs. Site specific evaluation and future well construction will depend on the outcome of PFAS investigations and future regulatory requirements. Once the evaluation is complete, staff plans to begin WMP update in the upcoming fiscal year.

Chain of Lakes Recharge Projects

During the 2021 WY, Zone 7 continued to work with Hanson Aggregates (former quarry operator for Lakes H, I, and Cope) while they continue to finalize reclamation on Lake H.

The amendment to surface mining permit SMP-23 submitted by CEMEX (the quarry operator for Lakes A, B, and J) was approved in the 2021 WY. The amendment eliminates any additional mining in Pits P28 and P41 (Lake A), while increasing the amount mined in Pits P42 (Lake B) and P46 (Lake J). Zone 7 is still working with CEMEX to understand the potential impacts the proposed deeper mining in Lakes B and J will have on the Basin. The Environmental Impact Report (EIR) for the SMP-23 amendment was adopted by the Alameda County Planning Commission in June 2021. The Planning Commission also authorized new conditions of approval for SMP-23. One of the new conditions of approval is to install up to three new monitoring wells with guidance from Zone 7 on location and screened intervals. Zone 7 and CEMEX are working together on these wells which should be installed in the 2022 WY.

**Water Demand Reduction Management Actions**

Existing and Future Non-Potable Recycled Water Use

Both City of Livermore and DSRSD plan to expand the use of recycled water for turf and landscape irrigation projects over the next few years. Similarly, Pleasanton is planning to use recycled water from DSRSD and/or Livermore for irrigation of city parks and landscapes located over the Main Basin. In 2021, 8,215 AF were used, approximately 14% of the total water use for the Basin.

Zone 7 continues to collaborate with Livermore, DSRSD, and Pleasanton to mitigate for additional potential impact to groundwater quality from the future planned recycled water use.

Water Conservation

Throughout the 2021 WY, Zone 7 continued its regional coordination of conservation programs, including community workshops and other education/training events, school education programs, and rebates and water-saving giveaway programs, with adjustments made for pandemic conditions.

Groundwater Pumping Quota Program

The retailers are permitted by contract to pump a GPQ (accounted for on a CY basis) without having to pay a replenishment fee to Zone 7. They can carry forward any un-pumped GPQ (up to 20% of their GPQ). The retailer's GPQ, along with their groundwater pumping volumes for the

2021 CY, are shown in **Table 4**. None of the retailers pumped more than their respective GPQ in 2021 WY.

## Projects to Improve Drinking Water Quality in Zone 7 Service Area

### Well Ordinance Program

During the 2021 WY, Zone 7 issued 142 drilling permits, 26 more permits than in the 2020 WY. **Table 9** details the breakdown of the types of permits issued during the 2021 WY and their quantities.

**Table 9: Well Ordinance Permits Issued in the 2021 WY**

| Permit Type | Quantity |
|---|---|
| Geotechnical Investigations | 78 |
| Well Destructions | 24 |
| Contamination Investigations/Remediation | 9 |
| Water Supply Wells | 17 |
| Groundwater Monitoring | 12 |
| Cathodic Protection Wells | 2 |
| ***Total*** | ***142*** |

- Seventeen (17) water supply well permits were issued in the 2021 WY. The pre-drought average was 25 per year.
- About 78% of the permitted well work was physically inspected by Zone 7 permit compliance staff; the remaining 22% could proceed with self-monitoring and reporting efforts when a licensed professional was supervising the project.

### Toxic Site Surveillance Program

In the 2021 WY, Zone 7 tracked the progress of 58 active sites where contamination has been detected in groundwater or is threatening groundwater. Five of these active sites have a contaminant plume that is within 2,000 ft of a water supply well or a surface water source and are therefore classified as "High Priority" cases due to their impact or threat of impact on potable groundwater supplies. Zone 7's database also contains 274 other contamination cases that have been either "Closed" or classified as "No Action Required" because they have been sufficiently cleaned up and/or pose minimal threat to drinking water supplies.

### Salt Management

**Table 10** below shows the salt loading summary for the 2021 WY.

Table 10: Salt Loading Summary for 2021 WY

| Category | Volume (AF) | Salt Mass (Tons) | TDS Concentration (mg/L) | Change in Concentration from 2020 WY (mg/L) |
|---|---|---|---|---|
| Inflow | 7,827 | 11,425 | 1,074 | 93 |
| Outflow | 27,999 | 18,364 | 483 | 38 |
| Net (In – Out) | -20,172 | -6,939 | 253 | |
| **Basin Total** | **227,071** | **220,463** | **715** | **38** |

- In the WY, the total salt mass added to the Main Basin by all the inflow (Supply) components was approximately 11,425 tons, whereas the total mass of salts removed from the Basin by all the outflow (Demand) components is estimated at 18,364 tons; a net decrease of 6,939 tons.

- While the salt load decreased during the 2021 WY, the end-of-water-year theoretical average TDS concentration for the Main Basin increased by 38 mg/L from the previous water year average. This is because the Basin storage dropped by 20,172 AF, which essentially concentrates the remaining salt in storage.

Groundwater Demineralization Program

The Mocho Groundwater Demineralization Plant (MGDP) was operated sparingly throughout the 2021 WY to conserve water during the drought:

- During the 2021 WY, the MGDP produced 143 AF of brine (compared to 344 AF in the 2020 WY) that resulted in the export of about 448 tons of salt from the Main Basin through the LAVWMA pipeline (compared to 1,230 tons in the 2020 WY).

- Since its inception, the MGDP has exported over 19,000 tons of salt from the Valley.

Nutrient Management

During the 2021 WY, Zone 7 continued working with Alameda County Environmental Health (ACEH) to implement the NMP measures. Zone 7 did receive one application for nonresidential onsite wastewater treatment systems (Onsite wastewater treatment system [OWTS], e.g., septic systems) in the 2021 WY and is working with ACEH to process the application.

**Data Gap-Filling and Other Alternative GSP Implementation Projects**

In 2021 Zone 7 conducted the following data gap filling activities and/or projects and will be seeking grant funding to fill additional data gaps:

- **Refinement and update of numerical groundwater flow model:** As part of the 2021 Alternative GSP, Zone 7 purchased a license for RockWorks (a three dimensional (3D) geologic modeling software platform), transferred the existing e-log and geology database, extended the hydrogeologic conceptual model (HCM) to include the Fringe and Upland Areas, and prepared three new cross sections that trace through the major groundwater production areas of the Basin. Zone 7's also migrated its existing Areal Recharge Spreadsheet Model (ARM) to DWR's Integrated Water Flow Model Demand Calculator (IDC) platform and extended the model to include the entire Basin.
- **Groundwater Contaminant Mobilization Study:** In 2021 and continuing into 2022, Zone 7 used its existing groundwater model to develop water quality fate and transport simulations to evaluate existing and future groundwater operations and the impact of constituents (including PFAS) that pose existing and/or anticipated challenges. The results of this study are expected to be presented later in 2022.
- **Well Metering and Pumping Record**: Zone 7 continues to assess the need for well metering and groundwater pumping data collection. Based on this assessment, a pumping data collection program may be implemented (e.g., well metering for all wells expected to pump more than 2 AFY).
- **Address and Resolve the Groundwater Storage Differences:** Zone 7 continues to refine the HI, Nodal/RockWorks GWE, and cross section methods for calculating groundwater storage. Although these conventional methodologies yield reasonable groundwater storage estimates, Zone 7 plans to use the updated groundwater model to estimate groundwater storage volumes more accurately once it becomes available.
- **Water Supply Risk Model:** Zone 7 continues to develop its new robust risk model using RiverWare software. This model will run on a monthly time step, and it will be able to represent the seasonal availability of supplies including local runoff, imported surface water, recovered water from groundwater banks and local groundwater in an integrated manner. Additionally, the risk model can be used in conjunction with the groundwater model to analyze sustainable management of the Basin.

## 9. References and Technical Studies

DWR, 2019, Sustainable Groundwater Management Act 2019, Basin Prioritization Process and Results. April 2019, 64 pp.

DWR, 2021. Sustainable Groundwater Management Act Water Year Type Data Set Development Report, January 2021, 17pp. https://data.cnra.ca.gov/dataset/sgma-water-year-type-dataset/resource/79c7b9c1-1203-4203-b956-844554fcec79

Zone 7 GSA, 2021, Alternative Groundwater Sustainability Plan 2021 Update for the Livermore Valley Groundwater Basin. Zone 7 Water Agency. December 2021. https://www.zone7water.com/alternative-groundwater-sustainability-plan-and-updates

# APPENDICES

# Appendix A

**Annual Report Submittal Checklist**

# Groundwater Sustainability Plan Annual Report Elements Guide

| | | | |
|---|---|---|---|
| Basin Name | Livermore Valley Groundwater Basin | | |
| GSP Local ID | | | |
| ***California Code of Regulations - GSP Regulation Sections*** | ***Groundwater Sustainability Plan Elements*** | **Document *page number(s) that address the applicable GSP element.*** | ***Notes: Briefly describe the GSP element does not apply.*** |
| **Article 5** | **Plan Contents** | | |
| ***Subarticle 4*** | ***Monitoring Networks*** | | |
| **§ 354.40** | **Reporting Monitoring Data to the Department** | | |
| | Monitoring data shall be stored in the data management system developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department. | 14:15 | |
| | Note: Authority cited: Section 10733.2, Water Code. Reference: Sections 10728, 10728.2, 10733.2 and 10733.8, Water Code. | | |
| **Article 7** | **Annual Reports and Periodic Evaluations by the Agency** | | |
| **§ 356.2** | **Annual Reports** | | |
| | Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year: | | |
| | (a) General information, including an executive summary and a location map depicting the basin covered by the report. | 5:9 | |
| | (b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan: | | |
| | (1) Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows: | | |
| | (A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions. | 16:19 | |
| | (B) Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year. | 20:21 | |
| | (2) Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector, and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions. | 22:25 | |
| | (3) Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describes the annual volume and sources for the preceding water year. | 26:27 | |

# Groundwater Sustainability Plan Annual Report Elements Guide

| | | | |
|---|---|---|---|
| Basin Name | Livermore Valley Groundwater Basin | | |
| GSP Local ID | | | |
| ***California Code of Regulations - GSP Regulation Sections*** | ***Groundwater Sustainability Plan Elements*** | **Document *page number(s) that address the applicable GSP element.*** | ***Notes: Briefly describe the GSP element does not apply.*** |
| | (4) Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year. | 28:30 | |
| | (5) Change in groundwater in storage shall include the following: | | |
| | (A) Change in groundwater in storage maps for each principal aquifer in the basin. | 31:33 | |
| | (B) A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year. | 34 | |
| | (c) A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report. | 35:44 | |

# Appendix B

**Supplemental Information**

**APPENDIX B: Supplemental Information**

**Livermore Valley Groundwater Basin**

**Sustainable Groundwater Management Annual Report**

**Water Year 2021 (October 2020 – September 2021)**

Submitted by:

ZONE 7 WATER AGENCY

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Livermore, CA  94551

(925) 454-5000

**PREPARED BY:**

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# Table of Contents

***List of Figures and Tables***



**Attached**

*Figure 12-5: Main Basin Salt Loading and TDS Concentration, 1974 to 2021 WY*

# Acronyms and Abbreviations

| Abbrev | Description | Abbrev | Description |
|---|---|---|---|
| µg/L | Micrograms per liter | HRL | Health reference level |
| ACCDA | Alameda County Community Development Agency | InSAR | Interferometric Synthetic Aperture Radar |
| ACDEH | Alameda County Department of Environmental Health | ISCO | In-situ chemical oxidation |
| ACNP | Alamo Canal near Pleasanton | LAMP | Local Agency Management Program |
| ADLLV | Arroyo de la Laguna at Verona | LAVWMA | Livermore-Amador Valley Water Management Agency |
| ADVP | Arroyo Del Valle Pleasanton | lbs | Pounds |
| AF | Acre-feet | LDV | Lake Del Valle |
| AF/yr | Acre-feet per year | LLNL | Lawrence Livermore National Laboratory |
| ALP | Arroyo Las Positas | LRI | Livermore Rain Index |
| ALP_ELCH | Arroyo Las Positas above El Charro | LTCP | Low-Threat Underground Storage Tank Closure Policy |
| ALPL | Arroyo Las Positas near Livermore | LWRP | Livermore Water Reclamation Plant |
| ALTC | Altamont Creek | MCL | Maximum contaminant level |
| AMHAG | Arroyo Mocho Hageman | mg/L | Milligrams per liter |
| AM_KB | Arroyo Mocho at Kaiser Bridge | MGDP | Mocho Groundwater Demineralization Plant |
| AMNL | Arroyo Mocho near Livermore | MOU | Memorandum of Understanding |
| AMP | Arroyo Mocho Pleasanton | msl | Mean sea level |
| AOC | Area of Concern | MTBE | Methyl tertiary-butyl ether |
| AVADLL | Arroyo Valle at Arroyo de la Laguna | N | Nitrogen |
| AVBLC | Arroyo Valle below Lang Canyon | NC | North Canyons |
| AVNL | Arroyo Valle near Livermore | NL | Notifications Level |
| BBID | Byron-Bethany Irrigation District | NMP | Nutrient Management Plan |
| bgs | Below ground surface | $NO_3$ | Nitrate Ion |
| BMPs | Best management practices | OWTS | Onsite wastewater treatment system |
| CaCO3 | Calcium carbonate | PCE | Tetrachloroethylene |
| CASGEM | California Statewide Groundwater Elevation Monitoring | PFAS | Per- and polyfluoroalkyl substances |
| CCNP | Chabot Canal near Pleasanton | PFBS | Perfluorobutanesulfonic acid |
| CCR | California Code of Regulations | PFOA | Perfluorooctanoic acid |
| CEC | Constituents-of-emerging-concern | PFOS | Perfluorooctanesulfonic acid |
| CEQA | California Environmental Quality Act | POTW | Publicly owned treatment works |
| cfs | Cubic feet per second | ppb | Parts per billion |
| CIMIS | California Irrigation Management Information System | ppt | Parts per trillion |
| CIP | Capital Improvement Program | PPWTP | Patterson Pass Water Treatment Plant |
| COLs | Chain of Lakes | PRG | Preliminary Remediation goals |
| Cr | Chromium | RL | Response Level |
| CrVI | Hexavalent chromium | RO | Reverse osmosis |
| CWS | California Water Service | RP | Responsible Party |
| CY | Calendar year | RWQCB | California Regional Water Quality Control Board |
| DCE | Dichloroethene | SBA | South Bay Aqueduct |
| DERWA | DSRSD-EBMUD Recycled Water Authority | SGMA | Sustainable Groundwater Management Act |
| DDW | California State Water Resources Control Board Division of Drinking Water | SFPUC | San Francisco Public Utilities Commission |
| DSRSD | Dublin San Ramon Services District | SMP | Salt Management Plan |

| | | | |
|---|---|---|---|
| DTSC | Department of Toxic Substances Control | SMP | Surface mining permit |
| DVWTP | Del Valle Water Treatment Plant | SNMP | Salt Nutrient Management Plan |
| DWR | California Department of Water Resources | SVE | Soil vapor extraction |
| EBMUD | East Bay Municipal Utilities District | SWP | State Water Project |
| EBRPD | East Bay Regional Parks District | SWRCB | State Water Resources Control Board |
| EIR | Environmental Impact Report | TAF | Thousand acre-feet |
| EPA | Environmental Protection Agency | TCE | Trichloroethylene |
| ESL | Environmental screening level | TDS | Total dissolved solids |
| ETo | Evapotranspiration | TKN | Total Kjeldahl nitrogen |
| ft | Feet | TSS | Toxic Sites Surveillance |
| GDE | Groundwater-dependent ecosystem | USEPA | U.S. Environmental Protection Agency |
| GIS | Geographic information system | USGS | U.S. Geological Survey |
| GPQ | Groundwater Pumping Quota | VA | Veteran's Administration |
| GSA | Groundwater Sustainability Agency | WBIC | Weather-Based Irrigation Controller |
| GSP | Groundwater Sustainability Plan | WMP | Well Master Plan |
| GWMP | Groundwater Management Plan | WWMP | Wastewater Management Plan |
| GWE | Groundwater Elevation | WY | Water year (October 1 through September 30) |
| HI | Hydrologic Inventory | | |

# 1 Climatological Monitoring

## 1.1 Program Changes

Historically, Station 15E (CM_015E or 15E) was used as the representative station for rainfall within Livermore Valley Groundwater Basin (Basin) because of its extensive historical record; however, Station 15E was relocated in 2020 and the data was no longer available in a consistent and regular basis. After evaluating data quality and availability, Zone 7 Water Agency (Zone 7) determined that data from the nearby Livermore Municipal Airport Station (CM_KLVK or KLVK) will be more reliable and representative. Therefore, this Water Year (WY) KLVK was selected to replace Station 15E. Accordingly, Zone 7's Livermore Rainfall Index (LRI), which represents a long-term historical record for the Basin, will primarily consist of 15E data up through June 2020 and KLVK data thereafter.

For more information on the Climatological Monitoring Program; see the following sections of the *2021 Alternative Groundwater Sustainability Plan* (2021 Alternative GSP):

- **Section 5.2.1:** Existing Monitoring and Management Programs
- **Section 14.2.7.1:** Other Monitoring Networks – Climatological Monitoring Program

## 1.2 Results for the 2021 Water Year

Zone 7 uses a network of climatological stations (mapped on ***Figure 1-1*** and tabulated on ***Table 1-1***) to provide high-quality precipitation and evaporation data for water inventory calculation and management decisions, including both daily record stations and 15-minute record stations. Rainfall and evaporation information is provided in the following tables.

- ***Table 1-2*** - Monthly Precipitation Data, 2021 WY
- ***Figure 1-2*** – Graph of Livermore Index Rainfall, 2021 WY
- ***Table 1-3*** - Historical Monthly Precipitation (inches), Livermore Rainfall Index, 1871 to 2021 WY
- ***Table 1-4*** - Monthly Evapotranspiration Data, 2021 WY
- ***Table 1-5*** - Historical Monthly Pan Evaporation (inches), Lake Del Valle Station, Livermore

California Department of Water Resources (DWR) designated the 2021 WY as a critically dry WY. In fact, based on the LRI, 2021 WY was the driest year (previous driest was 1977, see ***Figure 1-2***) with daily data at 5.59 inches (39% of average). Total rainfall on the watershed was 44% of average. Total rainfall from individual stations ranged from 4.96 inches (39% of average) at Station CM_AMNL to 15.51 inches (64% of average) at CM_044 (Lick Observatory in Santa Clara County).

The network average evapotranspiration (ETo) for the 2021 WY was 53.50 inches (114% of normal), ranging from 51.41 inches at the Lake del Valle Station (CM_LDV, 119% of normal) to 57.73 inches at the CIMIS Station 191 (CM_191, 112% of normal).

## 1.3 Attached Tables and Figures

# TABLE 1-1
# TABLE OF CLIMATOLOGICAL STATIONS
# 2021 WATER YEAR

| PRECIPITATION NETWORK | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SITE ID | MAP LABEL | STATION NAME | LOCATION | OBSERVER | ELEV-ATION | ESTAB-LISHED | 15 MIN RECORD | MEAN ANNUAL (IN) |
| CM_015E* | 15E | Hafner NOAA Livermore | Wellingham Drive, Livermore | Mr. Ron Hafner | 480 | 1871 to 2020 | - | 14.42 |
| CM_017 | 17 | Del Valle Plant | 601 East Vallecitos Rd, Livermore | ZONE 7 | 640 | 1974 | 1978 to Present | 15.77 |
| CM_024 | 24 | Patterson Plant | Patterson Pass Rd, Livermore | ZONE 7 | 680 | 1963 | 1969 to 2016 | 12.70 |
| CM_034 | 34 | Mocho Wellfield | Santa Rita Rd, Pleasanton | ZONE 7 | 340 | 1968 | 1970 to 2010 | 17.61 |
| CM_044 | 44 | Mt Hamilton | Lick Observatory, Mt. Hamilton | Lick Observatory | 4209 | 1881 | - | 24.25 |
| CM_101 | 101 | Tassajara | Camino Tassajara Rd, Danville | Mrs. Joan Hansen | 800 | 1912 | - | 18.36 |
| CM_170 | 170 | Parkside | Parkside Drive, Pleasanton | ZONE 7 | 330 | 1986 | 1986 to 2005 | 20.34 |
| CM_191 | 191 | CIMIS Station | Alameda County Fairgrounds Golf Course | DWR | 335 | 2004 | 2004 to Present | 16.45 |
| CM_ALTC_BD | ALTC_BD | Altamont Creek | at ALTC_BD surface water station | ZONE 7 | 500 | 2015 | 2015 to Present | 11.85 |
| CM_AMNL | AMNL | Arroyo Mocho Near Livermore | at AMNL surface water station | ZONE 7 | 750 | 2015 | 2015 to Present | 12.80 |
| CM_AMP | AMP | Arroyo Mocho Pleaslanton | At AMP Surface Water Station | ZONE 7 | 335 | 2016 | 2016 to Present | 12.97 |
| CM_AVBLC | AVBLC | Arroyo Valle Below Lang Canyon | at AVBLC surface water station | Alameda County | 757 | 2016 | 2016 to Present | 12.97 |
| CM_KLVK* | KLVK | Livermore Municipal Airport | Livermore Municipal Airport | NOAA | 395 | 1998 | - | 13.13 |
| CM_LG1_DB | LG1_DB | Line G-1 at Dublin BLVD | Dublin Blvd and Scarlett Dr, Dublin | ZONE 7 | 336 | 2019 | 2019 to Present | 9.55 |
| CM_LJ1_BDB | LJ1_BDB | Line J-1 Below Dublin BLVD | Dublin Doulevard, Dublin | ZONE 7 | 332 | 2019 | 2019 to Present | 11.85 |
| CM_NC | NC | North Canyons Office | Zone 7's North Canyons building | ZONE 7 | 450 | 2015 | 2015 to Present | 10.82 |
| CM_SGE | SGE | Sunol Glen Elementary | Sunol Glen Elementary School at Main & Bond | ZONE 7 | 253 | 2016 | 2016 to Present | 13.88 |
| CM_TC_BI580 | TC_BI580 | Tassajara Creek below I-580 | Old Santa Rita Rd, Pleasanton | ZONE 7 | 342 | 2018 | 2019 to Present | 9.76 |
| **EVAPORATION NETWORK** | | | | | | | | |
| SITE ID | MAP LABEL | STATION NAME | LOCATION | OBSERVER | ELEV-ATION | ESTAB-LISHED | 15 MIN RECORD | MEAN ANNUAL (IN) |
| CM_LDV | LDV | Lake Del Valle | Lake Del Valle | DWR | 760 | 1968 | - | 67.70 |
| CM_LWRP | LWRP | Livermore Water Reclamation Plant | Lake Del Valle | LWRP | 410 | 1974 | - | 72.27 |
| CM_191 | 191 | CIMIS Station | Alameda County Fairgrounds Golf Course | DWR | 335 | 2004 | 2004 to Present | 51.67 |

* Livermore Rainfall Index comprises of CM_015E to June 2020 and CM_KLVK thereafter.

Stations LDV and LWRP record evaporation using pan evaporation equipment. ETo is derived using : ETo= Pan Evaporation x 0.6402

# TABLE 1-2
# MONTHLY PRECIPITATION DATA
# 2021 WATER YEAR

**MONTHLY PRECIPITATION IN INCHES**

| WATER YEAR MONTH | MONITORING STATION LRI | 17 | 24 | 34 | 44 | 101 | 170 | 191 | ALTC | AMNL | AMP | AVBLC | LG1_DB | LJ1_BDB | NC | SGE | TC_BI580 | 2021 Network Average | % Historic Network Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| OCT | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.1% |
| NOV | 0.33 | 0.48 | 0.31 | 0.46 | 0.56 | 0.79 | 0.51 | 0.42 | 0.28 | 0.18 | 0.41 | 0.50 | 0.43 | 0.64 | 0.25 | 0.97 | 0.36 | 0.46 | 25.8% |
| DEC | 1.10 | 1.07 | 1.40 | 0.00 | 2.95 | 1.75 | 0.00 | 1.21 | 1.42 | 1.16 | 1.15 | 1.26 | 1.21 | 1.30 | 1.01 | 1.21 | 1.19 | 1.20 | 46.5% |
| JAN | 2.74 | 2.30 | 1.93 | 3.47 | 5.35 | 3.48 | 3.95 | 3.40 | 2.05 | 2.29 | 3.18 | 4.99 | 3.17 | 3.61 | 2.57 | 3.10 | 3.16 | 3.22 | 105.5% |
| FEB | 0.40 | 0.60 | 0.51 | 0.48 | 2.22 | 0.81 | 0.64 | 0.51 | 0.56 | 0.51 | 0.40 | 0.59 | 0.55 | 0.66 | 0.40 | 1.01 | 0.46 | 0.67 | 25.8% |
| MAR | 0.89 | 1.09 | 0.72 | 0.96 | 4.08 | 1.03 | 1.31 | 1.12 | 0.63 | 0.82 | 0.84 | 1.64 | 0.74 | 0.96 | 0.73 | 1.32 | 0.87 | 1.16 | 42.6% |
| APR | 0.13 | 0.05 | 0.10 | 0.12 | 0.33 | 0.10 | 0.14 | 0.24 | 0.04 | 0.00 | 0.13 | 0.12 | 0.18 | 0.21 | 0.22 | 0.17 | 0.13 | 0.14 | 10.3% |
| MAY | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 2.4% |
| JUN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.5% |
| JUL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0% |
| AUG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0% |
| SEP | 0.00 | 0.00 | 0.01 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.3% |
| **TOTAL** | **5.59** | **5.59** | **4.98** | **5.49** | **15.51** | **7.98** | **6.55** | **6.90** | **4.98** | **4.96** | **6.11** | **9.31** | **6.29** | **7.39** | **5.16** | **7.78** | **6.18** | **6.87** | |
| **% AVG** | **39%** | **35%** | **39%** | **31%** | **64%** | **43%** | **32%** | **42%** | **42%** | **39%** | **47%** | **72%** | **49%** | **57%** | **40%** | **60%** | **48%** | **44%** | |

* Not included in Network Average due to insufficient age

** Not enough data for average calculation.

LRI Livermore Rain Index (CM_015E to June 2020 and CM_KLVK thereafter)

**DISTRIBUTION OF DAILY PRECIPITATION**

Number of days with rainfall greater than reference

| Rainfall (inches) | MONITORING STATION LRI | 17 | 24 | 34 | 44 | 101 | 170 | 191 | ALTC | AMNL | AMP | AVBLC | LG1_DB | LJ1_BDB | NC | SGE | TC_BI580 | 2021 Network Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **>Trace** | 31 | 31 | 34 | 24 | 36 | 34 | 28 | 34 | 34 | 31 | 38 | 46 | 38 | 38 | 28 | 39 | 35 | 34 |
| **>0.1** | 14 | 16 | 14 | 14 | 28 | 21 | 13 | 17 | 13 | 15 | 16 | 20 | 16 | 17 | 14 | 20 | 17 | 17 |
| **>0.5** | 2 | 2 | 2 | 3 | 12 | 4 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 4 | 2 | 3 | 3 | 3 |
| **>1** | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| **>2** | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

# TABLE 1-3
# HISTORICAL MONTHLY PRECIPITATION
# LIVERMORE RAINFALL INDEX (LRI)
# 1871 to 2021 WATER YEARS

| Water Year | OCTWY | NOVWY | DECWY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL OCT-SEP | TOTAL JULY-JUNE | % AVERAGE OCT-SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1871 | NA | NA | NA | 1.42 | 1.93 | 0.36 | 1.25 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | NA | NA | NA |
| 1872 | 0.00 | 1.13 | 11.69 | 2.15 | 2.69 | 0.65 | 0.43 | 0.00 | 0.32 | 0.00 | 0.00 | 0.00 | 19.06 | 19.06 | 132% |
| 1873 | 0.00 | 1.22 | 3.87 | 1.04 | 3.73 | 0.68 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.69 | 10.69 | 74% |
| 1874 | 0.42 | 0.70 | 4.48 | 2.96 | 1.03 | 1.34 | 0.95 | 0.32 | 0.06 | 0.00 | 0.00 | 0.30 | 12.56 | 12.26 | 87% |
| 1875 | 1.67 | 2.03 | 0.20 | 5.40 | 1.20 | 0.35 | 0.00 | 0.00 | 0.52 | 0.00 | 0.00 | 0.00 | 11.37 | 11.67 | 79% |
| 1876 | 0.00 | 7.23 | 1.62 | 2.68 | 3.01 | 4.39 | 0.73 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 19.99 | 19.99 | 139% |
| 1877 | 1.26 | 0.10 | 0.00 | 2.47 | 0.56 | 1.10 | 0.13 | 0.39 | 0.00 | 0.00 | 0.00 | 0.00 | 6.01 | 6.01 | 42% |
| 1878 | 1.27 | 1.29 | 0.73 | 4.61 | 6.73 | 2.01 | 0.96 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 17.66 | 17.66 | 123% |
| 1879 | 0.24 | 0.31 | 0.17 | 2.83 | 1.78 | 2.49 | 0.75 | 1.34 | 0.20 | 0.00 | 0.00 | 0.00 | 10.11 | 10.11 | 70% |
| 1880 | 0.83 | 1.06 | 1.94 | 1.48 | 1.80 | 1.45 | 6.51 | 0.91 | 0.00 | 0.00 | 0.00 | 0.00 | 15.98 | 15.98 | 111% |
| 1881 | 0.00 | 0.65 | 7.75 | 2.40 | 2.62 | 1.06 | 1.93 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 16.45 | 16.45 | 114% |
| 1882 | 0.08 | 0.78 | 1.97 | 1.07 | 1.72 | 4.85 | 1.03 | 0.20 | 0.00 | 0.00 | 0.00 | 0.34 | 12.04 | 11.70 | 84% |
| 1883 | 1.52 | 1.48 | 0.38 | 2.38 | 0.63 | 3.45 | 1.50 | 2.18 | 0.00 | 0.00 | 0.00 | 0.35 | 13.87 | 13.86 | 96% |
| 1884 | 1.52 | 0.57 | 0.44 | 4.03 | 5.29 | 5.92 | 2.70 | 0.20 | 1.73 | 0.00 | 0.10 | 0.30 | 22.80 | 22.75 | 158% |
| 1885 | 1.14 | 0.02 | 6.22 | 1.72 | 0.36 | 0.78 | 1.29 | 0.08 | 0.00 | 0.00 | 0.00 | 0.05 | 11.66 | 12.01 | 81% |
| 1886 | 0.00 | 6.20 | 1.94 | 4.20 | 0.24 | 1.18 | 2.36 | 0.00 | 0.00 | 0.40 | 0.00 | 0.00 | 16.52 | 16.17 | 115% |
| 1887 | 0.30 | 0.70 | 0.81 | 0.90 | 6.23 | 0.23 | 1.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.80 | 11.57 | 11.17 | 80% |
| 1888 | 0.00 | 0.61 | 3.51 | 3.20 | 0.94 | 2.51 | 0.60 | 0.66 | 0.30 | 0.00 | 0.00 | 0.76 | 13.09 | 13.13 | 91% |
| 1889 | 0.00 | 3.80 | 2.21 | 0.46 | 0.67 | 5.15 | 0.51 | 2.25 | 0.00 | 0.00 | 0.00 | 0.00 | 15.05 | 15.81 | 104% |
| 1890 | 3.94 | 2.95 | 8.63 | 5.24 | 3.71 | 2.85 | 0.86 | 0.48 | 0.00 | 0.00 | 0.00 | 1.20 | 29.86 | 28.66 | 207% |
| 1891 | 0.00 | 0.00 | 3.31 | 0.54 | 4.18 | 2.50 | 1.88 | 0.40 | 0.15 | 0.00 | 0.00 | 1.32 | 14.28 | 14.16 | 99% |
| 1892 | 0.05 | 0.38 | 4.42 | 0.84 | 1.08 | 3.96 | 0.90 | 1.30 | 0.00 | 0.00 | 0.00 | 0.45 | 13.38 | 14.25 | 93% |
| 1893 | 1.65 | 4.97 | 7.27 | 3.02 | 3.12 | 3.68 | 1.40 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 25.84 | 26.29 | 179% |
| 1894 | 0.00 | 1.59 | 2.14 | 4.97 | 5.36 | 0.81 | 0.58 | 1.19 | 0.52 | 0.00 | 0.00 | 1.45 | 18.61 | 17.16 | 129% |
| 1895 | 1.15 | 0.50 | 8.56 | 6.83 | 1.56 | 1.81 | 1.26 | 1.25 | 0.00 | 0.00 | 0.00 | 0.22 | 23.14 | 24.37 | 161% |
| 1896 | 0.83 | 1.69 | 1.28 | 7.16 | 0.17 | 1.50 | 3.11 | 0.39 | 0.00 | 0.00 | 0.73 | 0.55 | 17.41 | 16.35 | 121% |
| 1897 | 1.48 | 3.02 | 1.71 | 1.89 | 3.54 | 4.04 | 0.24 | 0.00 | 0.08 | 0.00 | 0.00 | 0.06 | 16.06 | 17.28 | 111% |
| 1898 | 1.43 | 0.52 | 1.31 | 1.47 | 1.78 | 0.78 | 0.45 | 0.96 | 0.35 | 0.00 | 0.00 | 0.95 | 10.00 | 9.11 | 69% |
| 1899 | 0.74 | 0.25 | 1.61 | 2.60 | 0.08 | 4.81 | 0.35 | 0.15 | 0.22 | 0.00 | 0.00 | 0.00 | 10.81 | 11.76 | 75% |
| 1900 | 2.52 | 2.49 | 2.07 | 2.44 | 0.34 | 1.11 | 0.86 | 1.10 | 0.00 | 0.00 | 0.00 | 0.18 | 13.11 | 12.93 | 91% |
| 1901 | 1.93 | 4.48 | 1.06 | 2.69 | 5.15 | 0.95 | 1.80 | 1.58 | 0.00 | 0.00 | 0.00 | 0.68 | 20.32 | 19.82 | 141% |
| 1902 | 0.70 | 1.99 | 0.74 | 0.99 | 3.62 | 2.69 | 0.75 | 0.32 | 0.00 | 0.00 | 0.13 | 0.00 | 11.93 | 12.48 | 83% |
| 1903 | 0.47 | 2.07 | 0.87 | 3.19 | 0.94 | 5.65 | 0.81 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 14.12 | 14.25 | 98% |
| 1904 | 0.00 | 2.16 | 0.59 | 0.89 | 4.18 | 3.71 | 1.56 | 0.24 | 0.00 | 0.00 | 0.32 | 1.62 | 15.27 | 13.33 | 106% |
| 1905 | 1.00 | 0.78 | 1.42 | 2.43 | 2.30 | 3.12 | 0.93 | 1.89 | 0.00 | 0.00 | 0.00 | 0.00 | 13.87 | 15.81 | 96% |
| 1906 | 0.00 | 1.01 | 1.18 | 5.56 | 2.67 | 5.18 | 0.95 | 1.61 | 0.56 | 0.00 | 0.00 | 0.20 | 18.92 | 18.72 | 131% |
| 1907 | 0.03 | 1.34 | 6.45 | 3.22 | 1.86 | 8.85 | 0.47 | 0.16 | 0.56 | 0.00 | 0.00 | 0.00 | 22.94 | 23.14 | 159% |
| 1908 | 0.81 | 0.04 | 3.90 | 2.27 | 1.35 | 0.73 | 0.28 | 0.53 | 0.00 | 0.00 | 0.00 | 0.03 | 9.94 | 9.91 | 69% |
| 1909 | 0.27 | 0.60 | 1.55 | 10.18 | 3.96 | 1.94 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.62 | 19.17 | 18.58 | 133% |
| 1910 | 0.75 | 1.68 | 5.77 | 2.50 | 1.14 | 1.90 | 0.10 | 0.00 | 0.04 | 0.00 | 0.00 | 0.10 | 13.98 | 14.50 | 97% |
| 1911 | 0.29 | 0.10 | 1.32 | 12.60 | 1.42 | 4.45 | 0.69 | 0.24 | 0.07 | 0.00 | 0.00 | 0.00 | 21.18 | 21.28 | 147% |
| 1912 | 0.43 | 0.29 | 1.71 | 2.66 | 0.20 | 1.99 | 0.73 | 0.94 | 0.65 | 0.00 | 0.00 | 0.48 | 10.08 | 9.60 | 70% |
| 1913 | 0.71 | 0.44 | 0.81 | 2.63 | 0.38 | 1.65 | 0.54 | 0.58 | 0.01 | 0.27 | 0.02 | 0.00 | 8.04 | 8.23 | 56% |
| 1914 | 0.00 | 2.47 | 3.17 | 7.10 | 2.11 | 0.66 | 0.76 | 0.45 | 0.19 | 0.00 | 0.00 | 0.00 | 16.91 | 17.20 | 117% |
| 1915 | 0.45 | 0.33 | 3.96 | 4.16 | 5.79 | 1.50 | 0.66 | 2.66 | 0.00 | 0.00 | 0.00 | 0.00 | 19.51 | 19.51 | 135% |
| 1916 | 0.00 | 0.76 | 4.41 | 11.35 | 2.17 | 1.47 | 0.21 | 0.05 | 0.00 | 0.00 | 0.00 | 0.44 | 20.86 | 20.42 | 145% |
| 1917 | 0.50 | 0.68 | 3.28 | 1.06 | 3.37 | 1.08 | 0.15 | 0.02 | 0.00 | 0.00 | 0.00 | 0.04 | 10.18 | 10.58 | 71% |
| 1918 | 0.00 | 0.43 | 0.66 | 0.59 | 3.08 | 3.32 | 0.61 | 0.00 | 0.00 | 0.00 | 0.00 | 5.72 | 14.41 | 8.73 | 100% |
| 1919 | 0.39 | 2.38 | 1.51 | 1.03 | 4.58 | 2.33 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.48 | 12.75 | 17.99 | 88% |
| 1920 | 0.15 | 0.33 | 2.21 | 0.22 | 0.71 | 3.52 | 1.07 | 0.00 | 0.13 | 0.00 | 0.00 | 0.00 | 8.34 | 8.82 | 58% |
| 1921 | 2.03 | 1.43 | 3.81 | 3.38 | 0.59 | 0.83 | 0.16 | 1.05 | 0.00 | 0.00 | 0.00 | 0.05 | 13.33 | 13.28 | 93% |
| 1922 | 0.15 | 1.17 | 3.38 | 1.51 | 5.46 | 1.83 | 0.23 | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 14.00 | 14.05 | 97% |
| 1923 | 0.54 | 2.86 | 5.43 | 1.80 | 0.65 | 0.15 | 2.15 | 0.00 | 0.02 | 0.00 | 0.00 | 0.82 | 14.42 | 13.60 | 100% |
| 1924 | 0.25 | 0.76 | 0.87 | 1.40 | 0.93 | 0.65 | 0.28 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 5.21 | 6.03 | 36% |
| 1925 | 1.30 | 1.53 | 2.63 | 1.02 | 3.74 | 1.14 | 1.75 | 1.41 | 0.04 | 0.00 | 0.00 | 0.00 | 14.56 | 14.56 | 101% |
| 1926 | 0.00 | 0.97 | 1.14 | 2.44 | 3.58 | 0.16 | 3.11 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 11.51 | 11.51 | 80% |
| 1927 | 0.93 | 2.83 | 0.78 | 1.74 | 3.49 | 1.54 | 1.73 | 0.10 | 0.18 | 0.00 | 0.00 | 0.03 | 13.35 | 13.32 | 93% |
| 1928 | 1.71 | 1.43 | 2.00 | 1.46 | 0.89 | 3.43 | 1.43 | 0.45 | 0.00 | 0.00 | 0.00 | 0.00 | 12.80 | 12.83 | 89% |
| 1929 | 0.00 | 2.57 | 2.76 | 1.26 | 0.87 | 1.07 | 0.70 | 0.03 | 0.83 | 0.00 | 0.00 | 0.00 | 10.09 | 10.09 | 70% |

# TABLE 1-3
# HISTORICAL MONTHLY PRECIPITATION
# LIVERMORE RAINFALL INDEX (LRI)
# 1871 to 2021 WATER YEARS

| Water Year | OCTWY | NOVWY | DECWY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL OCT-SEP | TOTAL JULY-JUNE | % AVERAGE OCT-SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1930 | 0.01 | 0.00 | 1.81 | 3.64 | 1.91 | 1.88 | 1.14 | 0.43 | 0.00 | 0.00 | 0.00 | 0.20 | 11.02 | 10.82 | 76% |
| 1931 | 0.58 | 1.15 | 0.26 | 3.45 | 1.67 | 0.57 | 0.36 | 0.93 | 0.11 | 0.00 | 0.00 | 0.00 | 9.08 | 9.28 | 63% |
| 1932 | 0.27 | 1.89 | 5.63 | 1.29 | 3.15 | 0.19 | 0.41 | 0.37 | 0.00 | 0.00 | 0.00 | 0.00 | 13.20 | 13.20 | 92% |
| 1933 | 0.00 | 0.51 | 2.03 | 4.51 | 0.44 | 2.09 | 0.13 | 0.70 | 0.03 | 0.00 | 0.00 | 0.01 | 10.45 | 10.44 | 73% |
| 1934 | 0.75 | 0.00 | 3.69 | 1.29 | 2.86 | 0.00 | 0.13 | 0.60 | 0.53 | 0.00 | 0.00 | 0.27 | 10.12 | 9.86 | 70% |
| 1935 | 0.62 | 2.71 | 2.32 | 3.53 | 0.52 | 3.16 | 3.28 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 16.18 | 16.41 | 112% |
| 1936 | 0.79 | 0.21 | 1.53 | 3.28 | 6.76 | 0.71 | 0.63 | 0.46 | 0.10 | 0.00 | 0.00 | 0.00 | 14.47 | 14.51 | 100% |
| 1937 | 0.40 | 0.02 | 3.26 | 3.38 | 4.13 | 5.07 | 0.68 | 0.17 | 0.20 | 0.00 | 0.00 | 0.00 | 17.31 | 17.31 | 120% |
| 1938 | 0.55 | 2.46 | 4.57 | 2.40 | 6.14 | 4.09 | 0.90 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 21.13 | 21.13 | 147% |
| 1939 | 1.00 | 1.08 | 0.52 | 2.40 | 1.57 | 2.18 | 0.53 | 0.18 | 0.00 | 0.00 | 0.00 | 0.16 | 9.62 | 9.46 | 67% |
| 1940 | 1.23 | 0.15 | 0.78 | 8.13 | 5.14 | 2.60 | 0.35 | 0.14 | 0.00 | 0.00 | 0.00 | 0.25 | 18.77 | 18.68 | 130% |
| 1941 | 0.50 | 0.43 | 4.63 | 3.24 | 4.19 | 2.07 | 2.76 | 0.23 | 0.00 | 0.00 | 0.03 | 0.00 | 18.08 | 18.30 | 125% |
| 1942 | 0.72 | 0.89 | 5.34 | 3.89 | 1.68 | 1.42 | 3.10 | 1.00 | 0.00 | 0.00 | 0.00 | 0.09 | 18.13 | 18.07 | 126% |
| 1943 | 1.08 | 3.05 | 1.73 | 4.48 | 1.68 | 2.39 | 1.14 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 15.61 | 15.70 | 108% |
| 1944 | 0.30 | 0.53 | 1.23 | 2.36 | 4.89 | 1.01 | 0.94 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 11.99 | 11.99 | 83% |
| 1945 | 0.77 | 3.41 | 2.03 | 0.87 | 3.68 | 3.19 | 0.20 | 0.17 | 0.00 | 0.00 | 0.02 | 0.00 | 14.34 | 14.32 | 100% |
| 1946 | 1.07 | 2.07 | 2.98 | 0.76 | 1.23 | 1.69 | 0.02 | 0.61 | 0.00 | 0.24 | 0.00 | 0.02 | 10.69 | 10.45 | 74% |
| 1947 | 0.02 | 2.93 | 2.07 | 0.69 | 1.45 | 2.34 | 0.53 | 0.17 | 0.36 | 0.00 | 0.00 | 0.00 | 10.56 | 10.82 | 73% |
| 1948 | 1.84 | 0.85 | 0.51 | 0.20 | 1.11 | 2.79 | 2.50 | 1.03 | 0.16 | 0.03 | 0.00 | 0.00 | 11.02 | 10.99 | 76% |
| 1949 | 0.46 | 0.34 | 2.71 | 1.39 | 2.47 | 3.38 | 0.02 | 0.34 | 0.00 | 0.03 | 0.16 | 0.05 | 11.35 | 11.14 | 79% |
| 1950 | 0.08 | 1.20 | 1.21 | 4.65 | 1.54 | 1.44 | 0.85 | 0.59 | 0.01 | 0.00 | 0.00 | 0.08 | 11.65 | 11.81 | 81% |
| 1951 | 1.84 | 5.95 | 4.95 | 2.23 | 1.81 | 1.82 | 0.55 | 0.35 | 0.06 | 0.00 | 0.00 | 0.00 | 19.56 | 19.64 | 136% |
| 1952 | 1.04 | 3.01 | 6.07 | 7.60 | 1.40 | 2.36 | 2.20 | 0.16 | 0.04 | 0.00 | 0.00 | 0.10 | 23.98 | 23.88 | 166% |
| 1953 | 0.01 | 2.11 | 6.33 | 2.07 | 0.05 | 1.12 | 1.42 | 0.61 | 0.59 | 0.00 | 0.15 | 0.00 | 14.46 | 14.41 | 100% |
| 1954 | 0.21 | 1.33 | 0.64 | 2.19 | 2.27 | 3.00 | 0.73 | 0.16 | 0.27 | 0.00 | 0.00 | 0.04 | 10.84 | 10.95 | 75% |
| 1955 | 0.00 | 1.68 | 3.33 | 2.45 | 1.69 | 0.38 | 1.28 | 0.65 | 0.00 | 0.00 | 0.01 | 0.01 | 11.48 | 11.50 | 80% |
| 1956 | 0.01 | 1.31 | 10.15 | 5.49 | 1.15 | 0.14 | 1.92 | 0.63 | 0.00 | 0.00 | 0.00 | 0.63 | 21.43 | 20.82 | 149% |
| 1957 | 0.79 | 0.03 | 0.48 | 2.65 | 2.23 | 1.30 | 1.14 | 2.65 | 0.04 | 0.00 | 0.00 | 0.05 | 11.36 | 11.94 | 79% |
| 1958 | 1.06 | 0.37 | 1.62 | 3.16 | 5.37 | 4.44 | 3.74 | 0.66 | 0.41 | 0.00 | 0.00 | 0.02 | 20.85 | 20.88 | 145% |
| 1959 | 0.09 | 0.14 | 0.86 | 2.45 | 3.59 | 0.29 | 0.35 | 0.00 | 0.00 | 0.00 | 0.07 | 1.89 | 9.73 | 7.79 | 68% |
| 1960 | 0.00 | 0.00 | 0.75 | 2.98 | 4.12 | 0.60 | 0.48 | 0.42 | 0.00 | 0.02 | 0.00 | 0.01 | 9.38 | 11.31 | 65% |
| 1961 | 0.05 | 2.92 | 1.25 | 2.08 | 1.04 | 1.92 | 1.03 | 0.69 | 0.19 | 0.00 | 0.13 | 0.16 | 11.46 | 11.20 | 80% |
| 1962 | 0.15 | 2.24 | 0.82 | 0.73 | 5.61 | 1.82 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.59 | 11.88 | 80% |
| 1963 | 3.64 | 0.28 | 1.55 | 1.40 | 4.50 | 2.60 | 3.47 | 0.70 | 0.00 | 0.00 | 0.00 | 0.33 | 18.47 | 18.14 | 128% |
| 1964 | 0.93 | 3.18 | 0.19 | 2.37 | 0.08 | 1.57 | 0.21 | 0.48 | 0.32 | 0.00 | 0.12 | 0.04 | 9.49 | 9.66 | 66% |
| 1965 | 0.85 | 2.44 | 4.91 | 2.11 | 0.59 | 1.73 | 1.53 | 0.00 | 0.00 | 0.00 | 0.21 | 0.00 | 14.37 | 14.32 | 100% |
| 1966 | 0.03 | 4.22 | 3.23 | 1.05 | 1.17 | 0.17 | 0.33 | 0.10 | 0.12 | 0.17 | 0.00 | 0.11 | 10.70 | 10.63 | 74% |
| 1967 | 0.00 | 3.43 | 2.35 | 6.14 | 0.29 | 4.15 | 4.65 | 0.19 | 0.48 | 0.00 | 0.00 | 0.02 | 21.70 | 21.96 | 151% |
| 1968 | 0.24 | 0.88 | 1.62 | 3.93 | 0.90 | 2.40 | 0.43 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 10.55 | 10.57 | 73% |
| 1969 | 0.43 | 2.48 | 3.04 | 6.28 | 4.76 | 0.55 | 1.24 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 18.86 | 18.86 | 131% |
| 1970 | 1.10 | 0.49 | 2.34 | 5.38 | 1.18 | 1.42 | 0.40 | 0.07 | 0.32 | 0.00 | 0.00 | 0.00 | 12.70 | 12.70 | 88% |
| 1971 | 0.41 | 5.24 | 5.27 | 1.19 | 0.33 | 1.75 | 1.37 | 0.54 | 0.00 | 0.00 | 0.00 | 0.13 | 16.23 | 16.10 | 113% |
| 1972 | 0.04 | 0.46 | 3.27 | 0.90 | 0.79 | 0.14 | 0.64 | 0.00 | 0.04 | 0.00 | 0.00 | 0.58 | 6.86 | 6.41 | 48% |
| 1973 | 2.98 | 4.91 | 2.22 | 5.50 | 3.38 | 2.63 | 0.29 | 0.03 | 0.00 | 0.00 | 0.00 | 0.08 | 22.02 | 22.52 | 153% |
| 1974 | 2.08 | 3.71 | 3.80 | 1.50 | 0.71 | 2.69 | 1.62 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 16.11 | 16.19 | 112% |
| 1975 | 0.50 | 0.66 | 1.98 | 0.84 | 3.65 | 5.24 | 1.42 | 0.00 | 0.06 | 0.10 | 0.35 | 0.00 | 14.80 | 14.35 | 103% |
| 1976 | 1.27 | 0.08 | 0.21 | 0.30 | 1.46 | 0.48 | 0.39 | 0.00 | 0.18 | 0.00 | 0.91 | 0.95 | 6.23 | 4.82 | 43% |
| 1977 | 0.50 | 0.50 | 0.73 | 1.15 | 0.83 | 0.82 | 0.16 | 1.01 | 0.00 | 0.10 | 0.00 | 0.22 | 6.02 | 7.56 | 42% |
| 1978 | 0.13 | 1.34 | 3.07 | 5.44 | 2.95 | 3.07 | 2.49 | 0.01 | 0.00 | 0.00 | 0.00 | 0.04 | 18.54 | 18.82 | 129% |
| 1979 | 0.00 | 2.16 | 0.58 | 4.52 | 3.19 | 1.86 | 0.88 | 0.34 | 0.00 | 0.06 | 0.00 | 0.00 | 13.59 | 13.57 | 94% |
| 1980 | 1.51 | 1.13 | 2.66 | 4.16 | 4.24 | 1.36 | 1.32 | 0.48 | 0.00 | 0.70 | 0.00 | 0.00 | 17.56 | 16.92 | 122% |
| 1981 | 0.04 | 0.28 | 1.18 | 3.97 | 1.11 | 2.94 | 0.61 | 0.11 | 0.00 | 0.00 | 0.00 | 0.06 | 10.30 | 10.94 | 71% |
| 1982 | 2.07 | 3.44 | 2.57 | 5.29 | 2.16 | 5.58 | 1.50 | 0.00 | 0.28 | 0.00 | 0.01 | 1.48 | 24.38 | 22.95 | 169% |
| 1983 | 2.24 | 3.72 | 2.80 | 6.28 | 5.56 | 6.14 | 3.51 | 0.21 | 0.00 | 0.00 | 0.50 | 1.02 | 31.98 | 31.95 | 222% |
| 1984 | 0.27 | 5.44 | 3.44 | 0.33 | 1.87 | 1.00 | 0.53 | 0.01 | 0.03 | 0.00 | 0.00 | 0.04 | 12.96 | 14.44 | 90% |
| 1985 | 1.25 | 4.71 | 1.51 | 0.48 | 1.25 | 2.62 | 0.32 | 0.07 | 0.22 | 0.00 | 0.03 | 0.13 | 12.59 | 12.47 | 87% |
| 1986 | 0.89 | 2.69 | 1.97 | 2.04 | 7.11 | 4.09 | 0.40 | 0.14 | 0.00 | 0.01 | 0.00 | 0.45 | 19.79 | 19.49 | 137% |
| 1987 | 0.04 | 0.08 | 0.92 | 1.83 | 3.47 | 2.30 | 0.16 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 8.89 | 9.35 | 62% |
| 1988 | 0.87 | 1.40 | 2.30 | 1.78 | 0.38 | 0.26 | 1.15 | 0.45 | 0.10 | 0.00 | 0.00 | 0.00 | 8.69 | 8.69 | 60% |
| 1989 | 0.11 | 1.92 | 2.03 | 0.81 | 0.95 | 2.94 | 0.88 | 0.08 | 0.10 | 0.00 | 0.00 | 1.33 | 11.15 | 9.82 | 77% |

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# 1871 to 2021 WATER YEARS

| Water Year | OCTWY | NOVWY | DECWY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL OCT-SEP | TOTAL JULY-JUNE | % AVERAGE OCT-SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 | 1.13 | 1.02 | 0.10 | 1.54 | 2.46 | 0.87 | 0.37 | 1.78 | 0.00 | 0.02 | 0.00 | 0.06 | 9.35 | 10.60 | 65% |
| 1991 | 0.08 | 0.39 | 1.45 | 0.31 | 2.20 | 5.87 | 0.34 | 0.35 | 0.08 | 0.00 | 0.21 | 0.04 | 11.32 | 11.15 | 79% |
| 1992 | 1.65 | 0.31 | 1.19 | 1.39 | 4.61 | 1.97 | 0.43 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 11.64 | 11.89 | 81% |
| 1993 | 0.90 | 0.15 | 4.99 | 6.41 | 4.53 | 2.91 | 0.63 | 0.51 | 0.30 | 0.00 | 0.00 | 0.00 | 21.33 | 21.33 | 148% |
| 1994 | 0.57 | 2.00 | 1.81 | 0.94 | 3.33 | 0.15 | 1.20 | 1.78 | 0.04 | 0.00 | 0.00 | 0.00 | 11.82 | 11.82 | 82% |
| 1995 | 0.58 | 3.08 | 1.36 | 6.64 | 0.33 | 6.66 | 1.02 | 0.92 | 0.70 | 0.00 | 0.00 | 0.00 | 21.29 | 21.29 | 148% |
| 1996 | 0.00 | 0.01 | 5.37 | 5.17 | 4.10 | 2.34 | 1.91 | 1.05 | 0.00 | 0.00 | 0.00 | 0.00 | 19.95 | 19.95 | 138% |
| 1997 | 1.08 | 2.55 | 4.43 | 5.81 | 0.15 | 0.06 | 0.15 | 0.29 | 0.17 | 0.00 | 0.42 | 0.00 | 15.11 | 14.69 | 105% |
| 1998 | 0.28 | 4.23 | 1.95 | 5.47 | 7.30 | 2.37 | 1.37 | 2.00 | 0.13 | 0.00 | 0.00 | 0.18 | 25.28 | 25.52 | 175% |
| 1999 | 0.54 | 2.48 | 0.73 | 3.23 | 3.33 | 1.67 | 0.99 | 0.08 | 0.01 | 0.00 | 0.03 | 0.04 | 13.13 | 13.24 | 91% |
| 2000 | 0.15 | 1.26 | 0.25 | 4.61 | 4.87 | 1.25 | 0.59 | 0.69 | 0.18 | 0.00 | 0.01 | 0.24 | 14.10 | 13.92 | 98% |
| 2001 | 1.97 | 0.49 | 0.45 | 1.92 | 2.89 | 1.22 | 1.80 | 0.00 | 0.12 | 0.00 | 0.00 | 0.09 | 10.95 | 11.11 | 76% |
| 2002 | 0.37 | 1.92 | 5.09 | 0.72 | 0.62 | 1.65 | 0.16 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 11.21 | 11.30 | 78% |
| 2003 | 0.00 | 2.65 | 7.01 | 0.66 | 1.31 | 1.07 | 3.09 | 0.95 | 0.00 | 0.00 | 0.29 | 0.00 | 17.03 | 16.74 | 118% |
| 2004 | 0.02 | 2.02 | 3.57 | 2.19 | 4.01 | 0.39 | 0.18 | 0.11 | 0.00 | 0.00 | 0.00 | 0.58 | 13.07 | 12.78 | 91% |
| 2005 | 2.77 | 0.89 | 3.01 | 2.81 | 3.55 | 3.41 | 1.53 | 1.03 | 0.05 | 0.00 | 0.00 | 0.25 | 19.30 | 19.63 | 134% |
| 2006 | 0.17 | 0.65 | 5.40 | 2.22 | 1.32 | 4.79 | 2.60 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 17.49 | 17.74 | 121% |
| 2007 | 0.20 | 1.68 | 2.25 | 0.52 | 3.92 | 0.33 | 0.44 | 0.11 | 0.00 | 0.00 | 0.00 | 0.21 | 9.66 | 9.45 | 67% |
| 2008 | 1.12 | 0.71 | 2.05 | 4.79 | 1.89 | 0.10 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.68 | 10.89 | 74% |
| 2009 | 0.33 | 1.40 | 1.56 | 1.34 | 3.31 | 2.29 | 0.23 | 0.51 | 0.11 | 0.00 | 0.00 | 0.31 | 11.39 | 11.08 | 79% |
| 2010 | 2.79 | 0.21 | 2.02 | 3.53 | 2.36 | 1.57 | 2.10 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 14.82 | 15.13 | 103% |
| 2011 | 1.00 | 2.02 | 3.87 | 0.78 | 2.69 | 4.10 | 0.22 | 0.46 | 1.07 | 0.00 | 0.00 | 0.00 | 16.21 | 16.21 | 112% |
| 2012 | 1.06 | 0.93 | 0.04 | 1.52 | 0.52 | 2.57 | 2.01 | 0.02 | 0.12 | 0.00 | 0.00 | 0.01 | 8.80 | 8.79 | 61% |
| 2013 | 0.27 | 3.40 | 4.22 | 1.07 | 0.47 | 0.33 | 0.44 | 0.14 | 0.04 | 0.00 | 0.00 | 0.33 | 10.71 | 10.38 | 74% |
| 2014 | 0.00 | 1.30 | 0.38 | 0.08 | 2.58 | 1.25 | 0.98 | 0.00 | 0.01 | 0.00 | 0.00 | 0.22 | 6.80 | 6.91 | 47% |
| 2015 | 0.17 | 1.19 | 8.23 | 0.00 | 1.62 | 0.25 | 0.78 | 0.50 | 0.33 | 0.00 | 0.01 | 0.05 | 13.13 | 13.29 | 91% |
| 2016 | 0.02 | 2.49 | 2.55 | 3.95 | 0.69 | 3.30 | 2.14 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 15.35 | 15.41 | 107% |
| 2017 | 3.34 | 1.37 | 2.62 | 8.10 | 6.07 | 2.09 | 1.93 | 0.03 | 0.02 | 0.00 | 0.00 | 0.00 | 25.57 | 25.57 | 177% |
| 2018 | 0.18 | 2.20 | 0.06 | 3.30 | 0.57 | 4.44 | 1.68 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 12.44 | 12.44 | 86% |
| 2019 | 0.18 | 1.64 | 1.54 | 2.66 | 6.31 | 2.58 | 0.30 | 1.63 | 0.00 | 0.00 | 0.00 | 0.22 | 17.06 | 16.84 | 118% |
| 2020 | 0.00 | 0.97 | 2.91 | 0.96 | 0.00 | 2.45 | 0.82 | 0.26 | 0.00 | 0.00 | 0.11 | 0.00 | 8.48 | 8.59 | 59% |
| 2021 | 0.00 | 0.33 | 1.10 | 2.74 | 0.40 | 0.89 | 0.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 | 5.70 | 39% |
| MAXIMUM | 3.94 | 7.23 | 11.69 | 12.60 | 7.30 | 8.85 | 6.51 | 2.66 | 1.73 | 0.70 | 0.91 | 5.72 | 31.98 | 31.95 | 222% |
| MINIMUM | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.21 | 4.82 | 36% |
| MEAN | 0.70 | 1.63 | 2.63 | 2.90 | 2.46 | 2.18 | 1.07 | 0.46 | 0.11 | 0.01 | 0.03 | 0.23 | 14.42 | 14.45 | 100% |

Livermore Rainfall Index (LRI) comprises of CM_015E to June 2020 and CM_KLVK thereafter.

# TABLE 1-4
# MONTHLY EVAPOTRANSPIRATION (ETo, in Inches)
# 2021 WATER YEAR

| Month | Station | | | 2021 Network Average | % Historic Network Average |
|---|---|---|---|---|---|
| | LDV* | LWRP* | 191 | | |
| OCT | 4.95 | 5.36 | 4.15 | 4.82 | 138.4% |
| NOV | 2.13 | 2.62 | 2.23 | 2.33 | 133.0% |
| DEC | 1.38 | 1.28 | 1.69 | 1.45 | 118.6% |
| JAN | 1.64 | 1.43 | 1.73 | 1.60 | 134.6% |
| FEB | 1.57 | 2.01 | 2.63 | 2.07 | 122.7% |
| MAR | 2.93 | 2.93 | 4.01 | 3.29 | 116.0% |
| APR | 4.64 | 4.43 | 5.72 | 4.93 | 120.8% |
| MAY | 6.20 | 5.97 | 7.19 | 6.46 | 116.8% |
| JUN | 6.82 | 6.65 | 7.66 | 7.05 | 107.9% |
| JUL | 7.12 | 7.14 | 8.03 | 7.43 | 102.7% |
| AUG | 6.44 | 6.32 | 7.04 | 6.60 | 102.4% |
| SEP | 5.53 | 5.28 | 5.65 | 5.49 | 107.4% |
| **TOTAL** | **51.36** | **51.42** | **57.73** | **53.50** | |
| **% AVG** | **119%** | **111%** | **112%** | **114%** | |

* Measured as Pan Evaporation and converted to ETo

ETo values for pan evaporation stations were approximated using : ETo= Pan Evaporation x 0.6

# TABLE 1-5
# HISTORICAL MONTHLY PAN EVAPORATION
# LAKE DEL VALLE STATION, LIVERMORE (CM_LDV in Inches)
# 1969 to 2021 WATER YEARS

| Water Year | OCTWY | NOVWY | DECWY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL OCT-SEP | TOTAL JULY-JUNE | % AVERAGE OCT-SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1969 | 3.20 | 2.50 | 1.54 | 0.66 | 1.08 | 4.89 | 5.92 | 9.99 | 7.84 | 11.38 | 11.77 | 8.32 | 69.09 | NA | 102% |
| 1970 | 4.04 | 2.94 | 1.12 | 1.23 | 2.29 | 4.96 | 5.83 | 8.88 | 8.88 | 11.52 | 9.92 | 9.16 | 70.77 | 71.64 | 105% |
| 1971 | 5.07 | 2.14 | 1.05 | 1.33 | 2.12 | 3.67 | 5.17 | 6.54 | 8.91 | 10.92 | 10.30 | 9.12 | 66.34 | 66.60 | 98% |
| 1972 | 5.91 | 3.01 | 1.49 | 1.53 | 2.01 | 4.74 | 6.52 | 8.84 | 10.03 | 11.63 | 10.40 | 7.12 | 73.23 | 74.42 | 108% |
| 1973 | 3.67 | 1.30 | 0.93 | 1.14 | 1.20 | 2.98 | 6.36 | 8.69 | 10.59 | 10.89 | 10.21 | 7.33 | 65.29 | 66.01 | 96% |
| 1974 | 4.70 | 1.86 | 0.85 | 1.40 | 1.73 | 2.40 | 4.16 | 7.31 | 9.14 | 9.68 | 9.73 | 7.94 | 60.90 | 61.98 | 90% |
| 1975 | 5.52 | 2.15 | 1.44 | 1.73 | 1.99 | 3.01 | 3.64 | 8.27 | 8.63 | 9.45 | 9.39 | 7.45 | 62.67 | 63.73 | 93% |
| 1976 | 3.72 | 2.28 | 1.58 | 2.45 | 1.96 | 3.94 | 5.56 | 8.47 | 9.85 | 9.80 | 7.05 | 6.80 | 63.46 | 66.10 | 94% |
| 1977 | 4.82 | 2.75 | 2.59 | 1.08 | 2.12 | 3.84 | 7.15 | 5.48 | 9.28 | 11.24 | 8.89 | 6.74 | 65.98 | 62.76 | 97% |
| 1978 | 5.12 | 2.70 | 1.37 | 0.99 | 1.43 | 2.57 | 3.73 | 8.69 | 8.91 | 10.52 | 10.24 | 7.90 | 64.17 | 62.38 | 95% |
| 1979 | 5.80 | 2.24 | 1.51 | 1.25 | 1.29 | 2.29 | 4.80 | 8.36 | 11.02 | 10.40 | 9.23 | 9.47 | 67.66 | 67.22 | 100% |
| 1980 | 4.14 | 1.85 | 1.95 | 1.66 | 1.40 | 3.82 | 4.78 | 6.22 | 8.18 | 9.41 | 9.17 | 7.16 | 59.74 | 63.10 | 88% |
| 1981 | 5.86 | 3.30 | 1.79 | 1.08 | 2.18 | 2.83 | 5.80 | 8.11 | 11.82 | 11.34 | 10.23 | 7.72 | 72.06 | 68.51 | 106% |
| 1982 | 4.43 | 2.10 | 1.14 | 1.23 | 2.10 | 2.25 | 4.59 | 7.55 | 7.31 | 10.34 | 10.58 | 6.83 | 60.45 | 61.99 | 89% |
| 1983 | 4.53 | 1.50 | 1.54 | 1.72 | 1.54 | 2.17 | 4.05 | 6.71 | 8.34 | 10.44 | 9.35 | 7.82 | 59.71 | 59.85 | 88% |
| 1984 | 4.37 | 1.86 | 1.08 | 1.52 | 1.79 | 4.29 | 5.32 | 9.04 | 9.88 | 11.99 | 9.80 | 9.24 | 70.18 | 66.76 | 104% |
| 1985 | 4.02 | 1.63 | 1.11 | 1.18 | 2.70 | 3.09 | 5.95 | 7.75 | 10.40 | 11.49 | 9.23 | 6.38 | 64.93 | 68.86 | 96% |
| 1986 | 5.05 | 2.27 | 1.11 | 1.11 | 1.75 | 3.55 | 4.96 | 7.44 | 8.67 | 10.20 | 8.88 | 6.10 | 61.09 | 63.01 | 90% |
| 1987 | 4.84 | 3.47 | 1.22 | 1.45 | 2.08 | 3.19 | 6.43 | 7.90 | 8.73 | 8.46 | 8.97 | 7.29 | 64.03 | 64.49 | 95% |
| 1988 | 4.71 | 1.71 | 1.50 | 1.21 | 2.94 | 5.17 | 5.30 | 7.22 | 8.92 | 11.46 | 8.90 | 7.90 | 66.94 | 63.40 | 99% |
| 1989 | 4.81 | 1.85 | 1.64 | 1.39 | 1.57 | 2.75 | 5.75 | 7.70 | 9.30 | 11.30 | 9.14 | 6.41 | 63.61 | 65.02 | 94% |
| 1990 | 4.86 | 2.95 | 1.75 | 1.57 | 1.83 | 3.64 | 5.74 | 7.86 | 9.18 | 10.19 | 9.21 | 7.09 | 65.87 | 66.23 | 97% |
| 1991 | 6.56 | 3.48 | 1.95 | 1.86 | 2.44 | 2.63 | 5.00 | 6.42 | 8.50 | 10.25 | 8.00 | 7.61 | 64.70 | 65.33 | 96% |
| 1992 | 6.45 | 3.03 | 1.71 | 0.96 | 1.65 | 2.84 | 5.91 | 8.87 | 8.23 | 10.01 | 10.76 | 7.82 | 68.24 | 65.51 | 101% |
| 1993 | 5.12 | 2.79 | 1.19 | 1.21 | 1.42 | 2.83 | 4.93 | 6.61 | 9.64 | 10.23 | 10.02 | 8.18 | 64.17 | 64.33 | 95% |
| 1994 | 4.65 | 3.27 | 1.22 | 1.49 | 1.36 | 4.12 | 5.23 | 6.38 | 10.01 | 10.03 | 10.31 | 7.44 | 65.51 | 66.16 | 97% |
| 1995 | 4.94 | 1.66 | 0.76 | 0.73 | 1.61 | 2.33 | 4.75 | 5.22 | 8.18 | 10.06 | 10.39 | 7.65 | 58.28 | 57.96 | 86% |
| 1996 | 6.23 | 2.80 | 0.88 | 1.33 | 1.66 | 3.85 | 6.38 | 8.12 | 9.68 | 12.03 | 11.13 | 7.48 | 71.57 | 69.03 | 106% |
| 1997 | 5.44 | 2.05 | 1.04 | 1.02 | 2.67 | 4.82 | 6.45 | 8.95 | 9.40 | 10.32 | 8.78 | 8.52 | 69.46 | 72.48 | 103% |
| 1998 | 5.25 | 1.82 | 1.60 | 1.19 | 0.96 | 2.80 | 4.36 | 4.13 | 7.10 | 9.91 | 10.57 | 7.51 | 57.20 | 56.83 | 85% |
| 1999 | 4.51 | 1.63 | 1.41 | 1.32 | 1.58 | 2.93 | 5.25 | 7.04 | 8.70 | 10.51 | 8.58 | 7.53 | 60.99 | 62.36 | 90% |
| 2000 | 6.86 | 2.73 | 2.51 | 1.57 | 1.55 | 3.91 | 5.48 | 7.16 | 9.66 | 9.23 | 9.82 | 7.86 | 68.35 | 68.06 | 101% |
| 2001 | 3.84 | 1.84 | 1.68 | 1.45 | 2.20 | 4.14 | 4.86 | 10.05 | 10.92 | 9.78 | 9.75 | 7.98 | 68.49 | 67.89 | 101% |
| 2002 | 6.56 | 2.56 | 1.47 | 1.97 | 2.56 | 4.63 | 5.65 | 7.82 | 9.87 | 11.08 | 9.87 | 9.13 | 73.17 | 70.60 | 108% |
| 2003 | 5.64 | 3.23 | 1.73 | 1.26 | 2.31 | 4.04 | 4.05 | 7.62 | 9.78 | 12.14 | 9.23 | 8.84 | 69.87 | 69.74 | 103% |
| 2004 | 6.71 | 1.72 | 1.12 | 1.08 | 2.22 | 4.99 | 7.38 | 8.66 | 9.46 | 10.16 | 9.88 | 8.76 | 72.14 | 73.55 | 107% |
| 2005 | 4.86 | 2.21 | 1.54 | 1.14 | 1.54 | 3.20 | 4.93 | 6.60 | 8.37 | 11.13 | 10.65 | 7.41 | 63.58 | 63.19 | 94% |
| 2006 | 5.19 | 2.50 | 1.50 | 1.52 | 2.47 | 3.04 | 3.81 | 8.54 | 9.82 | 12.43 | 9.37 | 8.42 | 68.61 | 67.58 | 101% |
| 2007 | 5.27 | 2.09 | 2.22 | 1.98 | 1.71 | 4.34 | 5.86 | 8.58 | 9.59 | 9.814 | 10.45 | 7 | 68.90 | 71.86 | 102% |
| 2008 | 4.45 | 3.25 | 1.68 | 1.37 | 2.14 | 4.60 | 6.65 | 8.66 | 10.37 | 10.54 | 10.54 | 8.42 | 72.67 | 70.43 | 107% |
| 2009 | 6.27 | 2.40 | 1.35 | 2.04 | 1.95 | 3.90 | 6.24 | 8.52 | 9.09 | 11.053 | 10.12 | 8.63 | 71.566 | 71.26 | 106% |
| 2010 | 4.84 | 3.00 | 1.28 | 1.20 | 1.61 | 3.91 | 4.65 | 6.40 | 9.52 | 10.2 | 9.08 | 8.26 | 63.95 | 66.21 | 94% |
| 2011 | 4.98 | 2.43 | 1.13 | 1.53 | 2.46 | 2.64 | 5.64 | 7.13 | 8.22 | 10.25 | 9.62 | 8.46 | 64.49 | 63.70 | 95% |
| 2012 | 4.73 | 2.30 | 2.93 | 2.49 | 2.84 | 3.46 | 5.52 | 8.84 | 10.19 | 11.27 | 10.58 | 8.08 | 73.23 | 71.63 | 108% |
| 2013 | 5.28 | 2.55 | 1.89 | 1.48 | 2.51 | 4.74 | 7.61 | 9.09 | 10.20 | 11.78 | 9.35 | 7.45 | 73.93 | 75.28 | 109% |
| 2014 | 6.04 | 3.41 | 2.59 | 3.43 | 2.43 | 4.66 | 6.23 | 10.51 | 10.77 | 11.05 | 9.56 | 7.6 | 78.28 | 78.65 | 116% |
| 2015 | 6.26 | 2.73 | 1.16 | 1.79 | 2.65 | 4.96 | 6.62 | 7.31 | 10.01 | 10.73 | 10 | 9.37 | 73.59 | 71.70 | 109% |
| 2016 | 5.81 | 2.19 | 1.20 | 0.75 | 2.80 | 3.30 | 5.70 | 7.92 | 11.87 | 12.29 | 9.71 | 9.06 | 72.6 | 71.64 | 107% |
| 2017 | 4.74 | 2.32 | 1.56 | 1.16 | 1.49 | 3.78 | 5.18 | 8.93 | 9.78 | 12.02 | 10.04 | 8.34 | 69.34 | 70.00 | 102% |
| 2018 | 6.53 | 2.15 | 2.60 | 1.51 | 3.33 | 3.46 | 5.30 | 7.95 | 10.43 | 12.22 | 9.84 | 8.11 | 73.43 | 73.66 | 108% |
| 2019 | 5.88 | 4.07 | 1.70 | 1.93 | 1.57 | 3.22 | 5.99 | 6.27 | 10.99 | 11.55 | 11.25 | 8.36 | 72.78 | 71.79 | 108% |
| 2020 | 6.99 | 4.01 | 1.20 | 1.27 | 3.82 | 3.29 | 5.64 | 9.41 | 10.80 | 11.26 | 11 | 7.68 | 76.37 | 77.59 | 113% |
| 2021 | 7.73 | 3.33 | 2.16 | 2.56 | 2.45 | 4.58 | 7.24 | 9.69 | 10.66 | 11.12 | 10.06 | 8.64 | 80.228 | 80.35 | 119% |
| **Maximum** | **7.73** | **4.07** | **2.93** | **3.43** | **3.82** | **5.17** | **7.61** | **10.51** | **11.87** | **12.43** | **11.77** | **9.47** | **80.23** | **80.35** | **119%** |
| **Minimum** | **3.20** | **1.30** | **0.76** | **0.66** | **0.96** | **2.17** | **3.64** | **4.13** | **7.10** | **8.46** | **7.05** | **6.10** | **57.20** | **56.83** | **85%** |
| **Mean** | **5.24** | **2.49** | **1.53** | **1.46** | **2.02** | **3.62** | **5.51** | **7.86** | **9.50** | **10.76** | **9.79** | **7.90** | **67.70** | **67.70** | **100%** |

ETo can be approximated using: ETo= Pan Evaporation x 0.6402

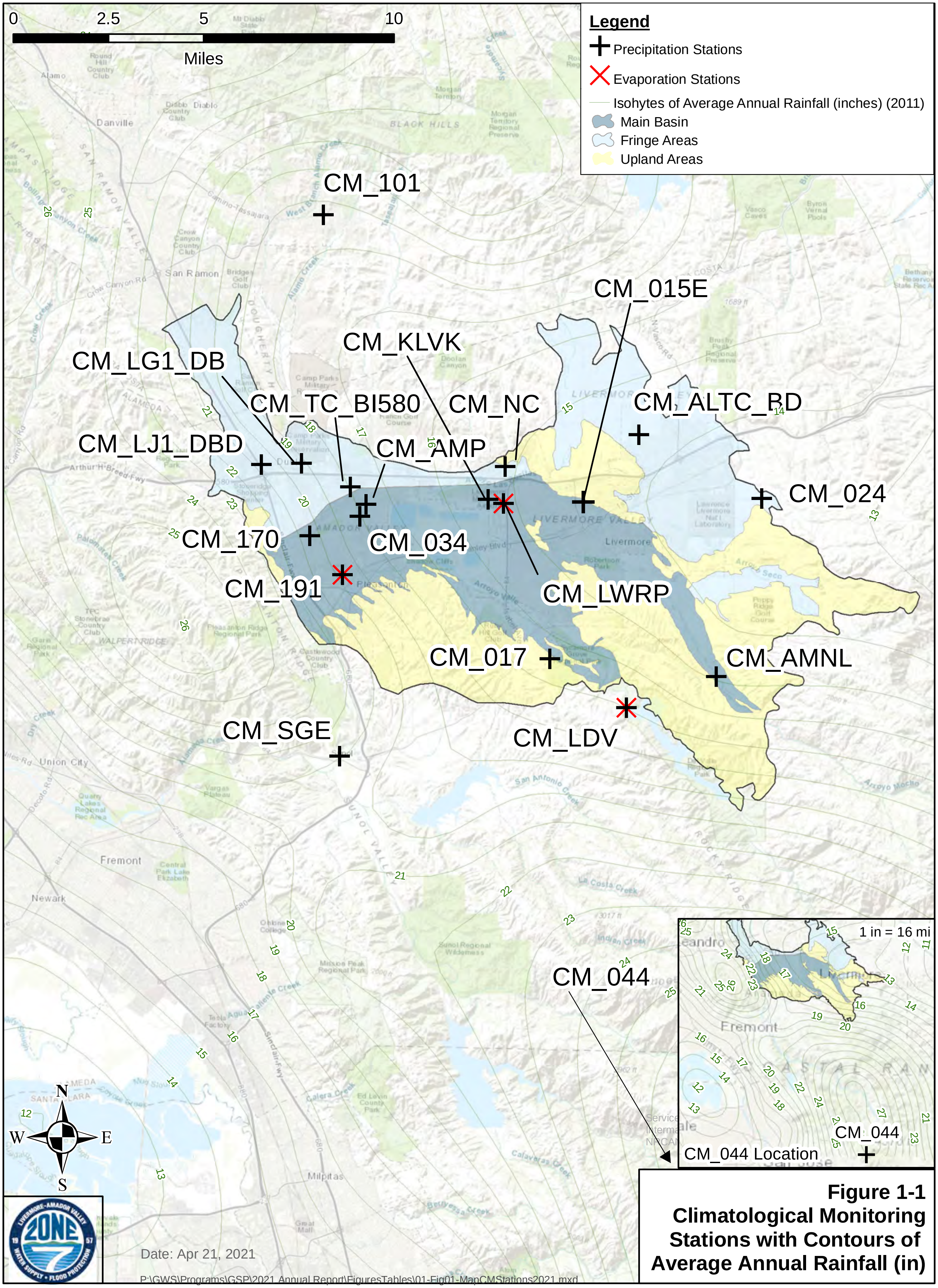
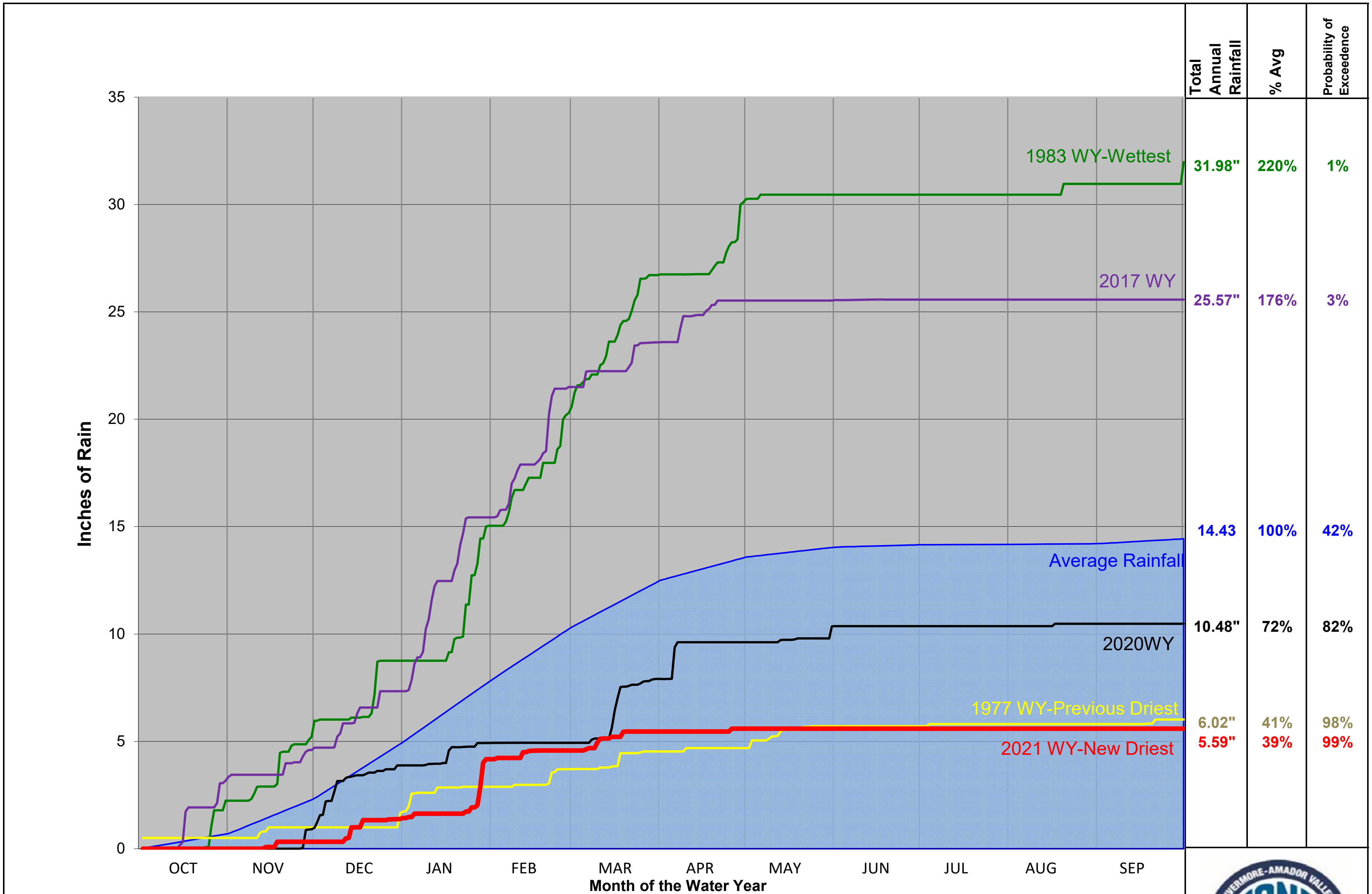



**Figure 1-1**
**Climatological Monitoring Stations with Contours of Average Annual Rainfall (in)**

**FIGURE 1-2**
**Graph of Livermore Rainfall Index (in inches)**
**(Station CM_015E to 2020, Station CM_KLVK after 2020)**




| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monthly (inches) | 0.00 | 0.33 | 1.10 | 2.74 | 0.40 | 0.89 | 0.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| % Monthly Avg | 0% | 20% | 42% | 94% | 16% | 41% | 12% | 0% | 0% | 0% | 0% | 0% |
| YTD (inches) | 0.00 | 0.33 | 1.43 | 4.17 | 4.57 | 5.46 | 5.59 | 5.59 | 5.59 | 5.59 | 5.59 | 5.59 |
| % Average YTD | 0% | 14% | 29% | 53% | 44% | 44% | 41% | 40% | 39% | 39% | 39% | 39% |
| % Annual Avg | 0% | 2% | 10% | 29% | 32% | 38% | 39% | 39% | 39% | 39% | 39% | 39% |

4/21/2022
P:\GWS\Programs\GSP\2021 Annual Report\FiguresTables\01-Fig02-GraphLRIRain.xlsx

# 2 Surface Water Monitoring

## 2.1 Program Changes

During the 2021 WY, the high-flow only station designated as Arroyo De La Laguna at Highway (Hwy) 84 at Sunol (ADLL_Hwy84) was installed in August 2021 (see

***Figure*** 2-1). For more information on the Surface Water Monitoring Program, see the following sections of the 2021 Alternative GSP:

- **Section 5.2.1:** Existing Monitoring and Management Programs
- **Section 14.2.7.2:** Other Monitoring Networks – Surface Water Monitoring Program

## 2.2 Results for the 2021 Water Year

- All the surface water stations monitored for the 2021 WY are mapped on

***Figure*** 2-1 and listed in ***Table 2-1***. ***Table 2-2*** tabulates monthly flows during the 2021 WY at 20 stations along the main streams over the Basin. ***Table 2-3*** presents the water quality results from all stations sampled during the 2021 WY to identify the quality of water recharging and discharging from the Basin.

***Table 2-A*** below summarizes the natural flows that flowed from the upper watershed into the three recharging stream reaches for the 2021 WY:

***Table 2-A: Natural Flows From Upper Watershed, 2021 WY***

| Station | Stream | Natural Flow (Acre-Feet) | Percent of Average |
|---|---|---|---|
| AVBLC* | Arroyo Valle | 2,423 | 10% |
| AMNL | Arroyo Mocho | 525 | 15% |
| ALPL | Arroyo Las Positas | 2,455 | 46% |
| **TOTAL Natural Inflow** | | **5,403** | **16%** |

* Natural flow into Lake del Valle

***Table 2-B*** below summarizes the South Bay Aqueduct (SBA) releases to the recharging streams for “artificial” (or “conservation”) recharge during the 2021 WY:

***Table 2-B: South Bay Aqueduct Releases, 2021 WY***

| Station | Stream | Released (Acre-Feet) | Percent of Average |
|---|---|---|---|
| SBA_TO2_AV | Arroyo Valle | 1,066 | 36% |
| SBA_AM | Arroyo Mocho | 0 | 0% |
| SBA_ALTC | Arroyo Las Positas | 0 | 0% |
| **TOTAL SBA Releases** | | **1,066** | **16%** |

- There were no flood releases from Lake del Valle into Arroyo Valle.
- “Live stream” conditions were maintained in the Arroyo Valle with natural and artificial flows for a brief period in January 2021 (January 27 to 30) and again from February 17 to March 21, 2021.
- Due to the critically dry year, Zone 7 was unable to provide any water to East Bay Regional Parks District (EBRPD) for Shadow Cliffs Lake recharge. For comparison, during the 2020 WY, EBRPD was able to divert 444 acre-feet (AF) from the Arroyo Valle for Shadow Cliffs recharge.
- Peak flows and average flows are shown in the table below:

***Table 2-C: Peak and Annual Mean Flows, 2021 WY***

| Pond | Station | Peak (cfs) | Annual Mean (cfs) |
|---|---|---|---|
| Arroyo Valle | ADVP | 62 | 1.6 |
| Arroyo Mocho | AMNL | 509 | 0.7 |
| Arroyo Las Positas | ALPL | 404 | 3.4 |
| Arroyo de la Laguna | ADLLV | 2,240 | 14.5 |

- A total of 10,479 AF of water flowed out of the Valley past Station Arroyo de la Laguna at Verona (ADLLV); 20% of average.

## 2.3 Attached Tables and Figures

*Table 2-1: Table of Surface Water Monitoring Stations and Monitoring Frequencies, 2021 WY*
*Table 2-2: Monthly Flows, 2021 WY*
*Table 2-3: Table of Surface Water Quality Results, 2021 WY*

*Figure 2-1: Map of Surface Water Monitoring Sites, 2021 WY*

# TABLE 2-1
# TABLE OF SURFACE WATER MONITORING STATIONS AND MONITORING INFORMATION
# 2021 WATER YEAR

| Station ID | Station Name | Station Type | Flow Range | Flow Freq | Gauge Height | Flow (Q) | Water Temp | Other Parameters | WQ Freq | Primary Operator |
|---|---|---|---|---|---|---|---|---|---|---|
| ALAMO CANAL - LINE F | | | | | | | | | | |
| ACNP | Alamo Canal near Pleasanton | Gauge Height | Entire | 15 Min | x | x | 15 Min | SSD | - | USGS |
| AC_WCD | Alamo Creek at Willow Creek Dr near Dublin | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Balance |
| ALTAMONT CREEK - LINE R | | | | | | | | | | |
| ALTC_BD | Altamont Creek at Bluebell Drive | Gauge Height | High | 15 Min | x | x | 15 Min | - | - | Zone 7 |
| SBA_ALTC | SBA Turnout to Altamont Creek | Flow Meter | Entire | 15 Min | - | x | - | - | - | DWR |
| ARROYO DE LA LAGUNA - LINE B | | | | | | | | | | |
| ADLL_HWY84 | Arroyo De La Laguna at Highway 84 in Sunol | Gauge Height | High | 15 Min | x | x | 15 Min | - | - | Balance |
| ADLLV | Arroyo De La Laguna at Verona | Gauge Height | Entire | 15 Min | x | x | 15 Min | pH, SC | Annual | USGS |
| ARROYO LAS POSITAS - LINE H | | | | | | | | | | |
| ALP_ELCH | Arroyo Las Positas above El Charro Road | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Annual | Zone 7 |
| ALPL | Arroyo Las Positas at Livermore | Gauge Height | Entire | 15 Min | x | x | 15 Min | SSD | Annual | Zone 7 |
| LLNL_ALP | LLNL Treated Groundwater Discharge to ALP | Estimated | Entire | Daily | - | x | - | - | - | LLNL |
| ARROYO MOCHO - LINE G | | | | | | | | | | |
| AMHAG | Arroyo Mocho at Livermore | Gauge Height | Entire | 15 Min | x | x | - | SSD | Annual | Zone 7 |
| AM_KB | Arroyo Mocho at Kaiser Bridge | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Annual | Zone 7 |
| AMNL | Arroyo Mocho near Livermore | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Annual | Zone 7 |
| AMP | Arroyo Mocho near Pleasanton | Gauge Height | Entire | 15 Min | x | x | 15 Min | SSD | Annual | Zone 7 |
| MA_COPE_I | Cope Lake to Lake I | Gauge Height | Entire | Hourly | x | x | - | - | - | Zone 7 |
| MA_VUL_COPE | Vulcan Discharge to Cope Lake | Flow Meter | Entire | Daily | - | x | - | - | - | Vulcan |
| SBA_AM | SBA Turnout to Arroyo Mocho | Flow Meter | Entire | 15 Min | - | x | - | - | - | DWR |
| ARROYO SECO - LINE P | | | | | | | | | | |
| AS_SFR | Arroyo Seco at Southfront Rd | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Balance |
| ARROYO VALLE - LINE E | | | | | | | | | | |
| ADVP | Arroyo Valle at Pleasanton | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Quarterly | Zone 7 |
| AVADLL | Arroyo Valle above Arroyo De La Laguna | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| AVBLC | Arroyo Valle below Lang Canyon | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Annual | USGS |
| AVCAT | Arroyo Valle along Camp Arroyo Trail | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| AVDCC | Arroyo Valle at Dry Creek Confluence | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| AV_DIV_SC | Arroyo Valle Diversion to Shadow Cliffs | Flow Meter | Entire | Daily | - | x | - | - | - | EBRPD |
| AV_ISABEL | Arroyo Valle at Isabel | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| AVNL | Arroyo Valle near Livermore | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Quarterly | USGS |
| AVSCPK18 | Arroyo Valle at Shadow Cliffs Pond K18 | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| AVSGP | Arroyo Valle at Sycamore Grove Park | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| LDV_FLD_GATE | Lake Del Valle Flood Gate | Calculated | Entire | 15 Min | - | x | - | - | - | DWR |
| SBA_TO1_AV | SBA Turnout 1 to Arroyo Valle | Estimated | Entire | 15 Min | - | x | - | - | - | Zone 7 |
| SBA_TO2_AV | SBA Turnout 2 to Arroyo Valle | Flow Meter | Entire | 15 Min | - | x | 15 Min | - | - | DWR |
| CHABOT CANAL - LINE G-1 | | | | | | | | | | |
| CC_BSRD | Chabot Canal below Stoneridge Drive nr Pleasanton | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Balance |
| LG1_DB | Line G1 at Dublin Blvd | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Balance |
| SOUTH SAN RAMON CREEK - LINE J | | | | | | | | | | |
| LJ1_BDB | Line J1 Below Dublin Blvd | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Balance |
| SSRC_AAVBLVD | South San Ramon Creek above Amador Valley Blvd | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Zone 7 |
| TASSAJARA CREEK - LINE K | | | | | | | | | | |
| TC_BI580 | Tassajara Creek below Interstate 580 | Gauge Height | High | 15 Min | x | x | 15 Min | - | - | Balance |

Quarterly Water Quality satisfies water rights requirements. SSD = Suspended Sediment Discharge. SC = Specific Conductance.

# TABLE 2-2
# MONTHLY FLOWS (Acre-Feet)
# 2021 WATER YEAR

| Station | Abbrev | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arroyo Valle** | | | | | | | | | | | | | | |
| below Lang Canyon | AVBLC | 0 | 0 | 0 | 1806.9 | 325.1 | 217.8 | 69.1 | 4.1 | 0 | 0 | 0 | 0 | 2423 |
| SBA Releases | SBA_TO2_AV | 4.6 | 4.5 | 11.6 | 6.7 | 721.5 | 288.5 | 7 | 4 | 4 | 5.6 | 4 | 3.8 | 1065.8 |
| Near Livermore | AVNL | 11.4 | 16.8 | 26 | 19.8 | 690.5 | 275.1 | 55.3 | 16.1 | 7 | 7.6 | 6.8 | 10 | 1142.4 |
| Diversion to Shadow Cliffs | AV_DIV_SC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Recharged Artificial* | *AV_RC* | *0* | *0* | *0* | *0* | *601* | *213* | *2* | *0* | *0* | *0* | *0* | *0* | *816* |
| *Recharged Natural* | *AV_RN* | *11* | *47* | *85* | *284* | *1* | *40* | *53* | *16* | *7* | *8* | *7* | *10* | *569* |
| at Pleasanton | ADVP | 0 | 0 | 0 | 49.2 | 87.9 | 62.1 | 0 | 0 | 0 | 0 | 0 | 0 | 199.2 |
| **Arroyo Mocho** | | | | | | | | | | | | | | |
| Near Livermore | AMNL | 0 | 0 | 0 | 469.8 | 24.1 | 22.4 | 7.9 | 1.1 | 0 | 0 | 0 | 0 | 525.3 |
| SBA Releases | SBA_AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Recharged Artificial* | *AM_RC* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| *Recharged Natural* | *AM_RN* | *0* | *5* | *22* | *478* | *32* | *38* | *10* | *1* | *0* | *0* | *0* | *0* | *586* |
| at Livermore | AMHAG | 0 | 0 | 0.7 | 304.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 305.2 |
| at Kaiser Bridge | AM_KB | 0 | 0 | 0 | 238.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 238.5 |
| Near Pleasanton | AMP | 125.4 | 167 | 424.4 | 1204.2 | 247.2 | 259 | 146.2 | 106.2 | 80.4 | 93.2 | 83.5 | 70.9 | 3007.6 |
| **Arroyo Las Positas** | | | | | | | | | | | | | | |
| SBA Releases | SBA_ALTC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| at Livermore | ALPL | 151.6 | 176.7 | 343.7 | 509.3 | 232.4 | 229.5 | 166.9 | 157.6 | 127.1 | 123.3 | 128.1 | 108.8 | 2455 |
| *Recharged Artificial* | *ALP_RC* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| *Recharged Natural* | *ALP_RN* | *65* | *56* | *64* | *43* | *49* | *55* | *57* | *70* | *65* | *63* | *79* | *66* | *732* |
| above El Charro | ALP_ELCH | 93.3 | 127.2 | 321.4 | 587.1 | 208.3 | 199.2 | 116.6 | 94.6 | 68.9 | 77.7 | 55.7 | 49.5 | 1999.5 |
| **Alamo Canal/Arroyo de la Laguna** | | | | | | | | | | | | | | |
| Near Pleasanton | ACNP | 153.5 | 624.7 | 933.1 | 2240.5 | 476.7 | 494.7 | 186.2 | 116.9 | 83.5 | 37.1 | 37 | 38.5 | 5422.4 |
| at Verona | ADLLV | 326.6 | 708.3 | 1406.5 | 4444 | 1064.7 | 1101.3 | 467.8 | 307.7 | 193.8 | 162.4 | 146.2 | 149.9 | 10479.2 |

SBA Releases = Zone 7 releases from the South Bay Aqueduct to streams ("artificial")
Recharged Natural = stream recharge from rainfall runoff ("natural").
Recharged Artificial = recharge from South Bay Aqueduct Releases

# TABLE 2-3
# SURFACE WATER QUALITY RESULTS
# 2021 WATER YEAR

| SITE ID | Date | Time | FLOW (cfs) | TEMP. °C | SC mS/cm | pH | Mineral Constituents (mg/L) Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | Select Metals (ug/L) B | As | Fe | Cr | TDS mg/L | Hard mg/L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AC_WCD | 8/11/2021 | 15:00 | 0.2 | 29 | 1657 | 8.2 | 80 | 52 | 247 | 5.8 | 438 | 186 | 258 | < 0.1 | 23.5 | 1070 | 4.3 | < 100 | < 1 | 1076 | 414 |
| ACNP | 8/11/2021 | 14:00 | 0.4* | 28.7 | 1496 | 8.2 | 85 | 51 | 212 | 2.6 | 360 | 201 | 227 | < 0.1 | 20.5 | 1000 | 4.5 | < 100 | < 1 | 985 | 422 |
| ADLLV | 8/11/2021 | 13:05 | 2.6 | 25.7 | 1648 | 8.1 | 77 | 57 | 209 | 3.8 | 413 | 166 | 246 | < 0.1 | 14.6 | 1670 | 4.9 | < 100 | < 1 | 980 | 427 |
| ADVP | 3/11/2021 | 14:08 | 1.5 | 11.2 | 485 | 7.4 | 32 | 19 | 39 | 2.6 | 117 | 52 | 61 | < 0.1 | 3.2 | 210 | < 1 | < 100 | < 1 | 267 | 158 |
| ALP_ELCH | 9/8/2021 | 13:43 | 0.6 | 21.7 | 1280 | 8.1 | 56 | 45 | 149 | 2.7 | 411 | 86 | 190 | 0.71 | 16.5 | 2380 | 2.5 | < 100 | < 1 | 757 | 325 |
| ALPL | 9/8/2021 | 11:22 | 1.6 | 20.1 | 1402 | 7.9 | 66 | 46 | 141 | 2.3 | 435 | 79 | 177 | 2.72 | 27.8 | 2300 | 2.2 | < 100 | 1.9 | 769 | 355 |
| AMNL | 4/28/2021 | 13:04 | 0.1 | 17.5 | 1089 | 7.8 | 44 | 101 | 51 | 3 | 622 | 91 | 52 | < 0.1 | 11.3 | 1020 | < 1 | < 100 | < 1 | 662 | 524 |
| AMP | 8/11/2021 | 11:20 | 1.1 | 22.4 | 1400 | 7.9 | 67 | 54 | 181 | 4.2 | 409 | 87 | 227 | 0.16 | 16.1 | 2000 | 2.8 | < 100 | < 1 | 841 | 390 |
| AVBLC | 4/28/2021 | 12:45 | 0.6* | 21.1 | 643 | 8.1 | 48 | 34 | 33 | 1.7 | 274 | 89 | 22 | < 0.1 | 6.6 | 940 | < 1 | < 100 | < 1 | 373 | 260 |
| AVNL | 11/23/2020 | 13:15 | 0.3* | 9.7 | 899 | 7.5 | 66 | 37 | 82 | 3.4 | 250 | 151 | 81 | < 0.1 | 21.4 | 1150 | 1 | < 100 | < 1 | 565 | 317 |
| AVNL | 3/11/2021 | 14:55 | 3* | 11.7 | 657 | 7.9 | 39 | 24 | 71 | 3.5 | 159 | 73 | 87 | 0.29 | 12 | 390 | 2.1 | < 100 | < 1 | 391 | 197 |
| AVNL | 6/28/2021 | 12:42 | 0.1* | 18.8 | 1047 | 7.7 | 67 | 34 | 103 | 3.5 | 289 | 136 | 95 | < 0.1 | 25.7 | 1220 | 2.1 | < 100 | < 1 | 607 | 306 |
| SSRC_AAVBLVD | 8/11/2021 | 15:45 | 0.5 | 30.4 | 1115 | 8.3 | 67 | 39 | 136 | 2.5 | 356 | 105 | 150 | 0.42 | 17.3 | 470 | 4.3 | < 100 | < 1 | 701 | 329 |

* Daily mean flow

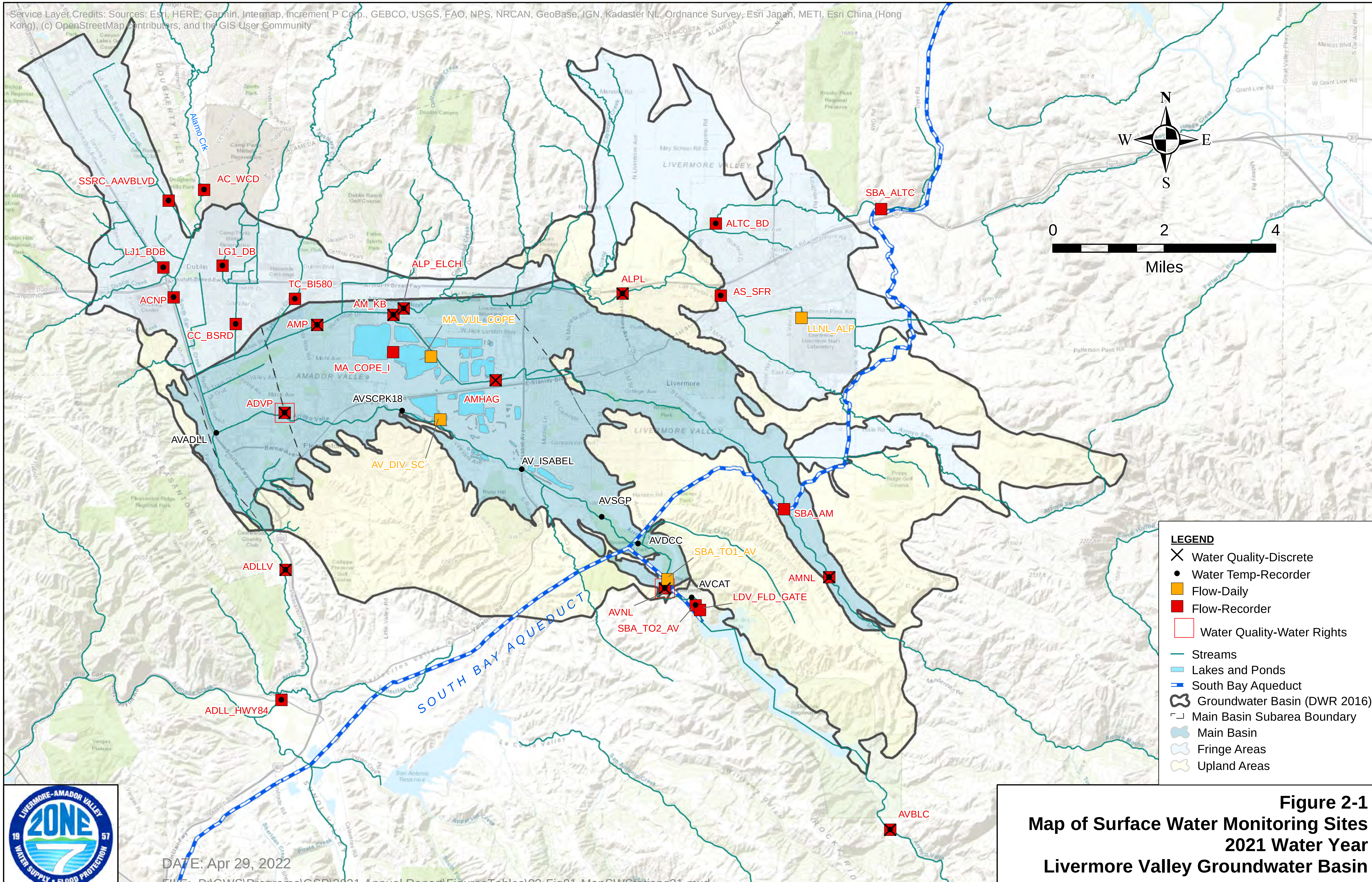



**Figure 2-1**
**Map of Surface Water Monitoring Sites**
**2021 Water Year**
**Livermore Valley Groundwater Basin**

# 3 Mining Area Monitoring

## 3.1 Program Changes

Presently, two mining companies, CEMEX and Vulcan Materials, have on-going surface mining operations for the extraction and sale of sands and gravels in the central portion of the Main Basin Management Area (Main Basin). The Mining Area Monitoring Program includes water level measurements and water quality analysis for many of the mining area ponds or quarry lakes within the mined area. No changes were made to the program in the 2021 WY. For more information on the Mining Area Program, see the following sections of the 2021 Alternative GSP:

- **Section 5.2.1:** Existing Monitoring and Management Programs
- **Section 14.2.7.3:** Other Monitoring Networks – Chain of Lakes/Mining Area Monitoring Program

## 3.2 Results for the 2021 Water Year

***Figure 3-1*** is a map of the gravel mining pits and ponds that includes Fall 2021 WY groundwater elevation contours for the Upper Aquifer. ***Figure 3-2*** shows the planned locations of the future Chain of Lakes following mining activities (planned completion in 2058). ***Table 3-1*** summarizes the water levels observed in the mining area ponds for the 2021 WY. ***Table 3-2*** shows water quality results from grab samples of mining ponds for the 2021 WY. Per- and polyfluoroalkyl substances (PFAS) results from the mining ponds are included in ***Table 6-7***. Water quality results from the mining ponds are discussed in ***Section 6: Groundwater Quality***.

The following ponds were actively mined during the 2021 WY:

***Table 3-A: Ponds Actively Mined during 2021 WY***

| Pond | Chain of Lake | Mining Company |
|---|---|---|
| MA-R028 | Lake D | Vulcan Materials (formerly Calmat) |
| MA-P046 | Lake J | CEMEX (formerly RMC Lonestar) |
| MA-P042 | Lake B | CEMEX (formerly RMC Lonestar). |

- Mining Ponds MA-R028 (Lake D) and MA-P042 (Lake B) have been mined to depths such that the ponds appear to be in contact with both the Upper and Lower Aquifers. These two pond elevations are included in both the Upper and Lower Aquifer groundwater elevation contour maps presented in ***Section 5: Groundwater Elevations***.

- Pond MA-R024 was mined deeper than the depth shown on the reclamation plan. The footprint of the excavation includes a portion of Lake E and former Pond 7 to the west. The pond is temporarily being used as a silt pond. Once the silt fills in the bottom of the excavation to the final reclamation depth, a berm will be placed between Lake E and former Pond 7.

- Vulcan Materials continues to transfer its pumped groundwater into various ponds and eventually discharges excess water into Cope Lake. Vulcan's discharge into Cope Lake was significantly lower in the 2021 WY due to a combination of a drier-than-normal WY and Vulcan adding MA-R024A as a silt pond with a large storage capacity.

- CEMEX transferred its pumped groundwater into other onsite ponds and used some water as a gravel wash water source.

- Estimated groundwater transfers and losses associated with the mining area are shown in ***Table 3-B*** below.

***Table 3-B: Estimated Groundwater Transfer and Losses in Mining Area, 2021 WY (AF)***

| Activity | 2021 WY | Typical/ Average (AF) |
|---|---|---|
| **Mining Area Transfers*** | | |
| Vulcan to Cope Lake | 548 | 8,700 |
| Cope Lake to Lake I | 808 | 7,000 |
| Diverted to Shadow Cliffs | 0 | 600 |
| **Mining Area Losses** | | |
| Processing Losses** | 700 | 700 |
| Net Pond Precip/Evaporation | 4,372 | 2,400 |
| Pumped GW Exported from Valley | 0 | 0 |

* Transfers made to locations outside of the quarries.
** Estimated

- Due to the critically dry year, Zone 7 was unable to provide any water to EBRPD for Shadow Cliffs Lake recharge.

# 3.3 Attached Tables and Figures

# TABLE 3-1
# SEMIANNUAL WATER LEVELS IN MINING AREA PONDS
# 2021 WATER YEAR

| EXCAVATIONS | | | | | | | | CURRENT PONDS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Excavation | Chain of Lake | Display Name | Original Ground Elev | Deepest Mined Depth (ft) | | Pit Area | Mining Status | Pond Name | Pond Area | Contact | Water Elev | Mining Use | Pond Elevation (ft MSL, NAVD88) | | | |
| | | | | *Elev* | *Depth* | *(acres)* | | | *(acres)* | with Aquifer | Status | | *Fall 20* | *Spring 21* | *Fall 21* | *WY Diff* |
| **CALROCK/RHODES & JAMIESON/PLEASANTON GRAVEL COMPANY/CALMAT/VULCAN** | | | | | | | | | | | | | | | | |
| MA-C001 | Lake C | C1/ Lake C | 410 | 360 | 50 | 32.2 | Excavated | MA-C001 | 5.4 | No | Static | Unused | 358.6 | 358.91 | 355.8 | -2.82 |
| MA-C002 | | C2 | 410 | 360 | 50 | 6.1 | Excavated | | | | | | | | | |
| MA-C003 | | C3 | 410 | 360 | 50 | 11.3 | Excavated | | | | | | | | | |
| MA-C004 | | C4 | 400 | 390 | 10 | 1.7 | Backfilled | | | | | | | | | |
| MA-C005 | | C5 | 400 | 290 | 110 | 19.2 | Backfilled | | | | | | | | | |
| MA-C006 | Lake C | C6/ Lake C | 400 | 385 | 15 | 12.4 | Excavated | | | | | | | | | |
| MA-C007 | Lake D | C7/ Lake D | 400 | 330 | 70 | 22.1 | Backfilled | | | | | | | | | |
| MA-C008A | Lake D | C8A/ Lake D | 410 | 330 | 80 | 20.2 | Backfilled | | | | | | | | | |
| MA-C009 | Lake D | C9/ Lake D | 410 | 310 | 100 | 20.8 | Active Mining | | | | | | | | | |
| MA-C008B | Lake D | C8B/ Lake D | 410 | 340 | 70 | 26.8 | Backfilled | | | | | | | | | |
| MA-C010 | Lake D | C10/ Lake D | 410 | 310 | 100 | 62.3 | Active Mining | | | | | | | | | |
| MA-R003 | | R3 | 370 | 240 | 130 | 14.8 | Excavated | MA-R003 | 3.6 | No | Lined | Settling Pond | 345.6 | 0 | 344.5 | -1.09 |
| MA-R004 | | R4 | 380 | 240 | 140 | 16.5 | Excavated | MA-R004 | 11.4 | Yes | InFlux | Water Storage | 315.6 | 309.38 | 313 | -2.61 |
| MA-R005 | | R5 | 380 | 240 | 140 | 31.1 | Backfilled | | | | | | | | | |
| MA-R008 | Lake G | R8/ Lake G | 365 | 260 | 105 | 46 | Excavated | MA-R008 | 4.6 | No | Lined | Settling Pond | NM | NM | NM | |
| MA-R010 | | R10 | 380 | 370 | 10 | 2.2 | Backfilled | | | | | | | | | |
| MA-R011 | | R11 | 390 | 370 | 20 | 3.4 | Backfilled | | | | | | | | | |
| MA-R012 | | R12 | 370 | 240 | 130 | 39.4 | Backfilled | | | | | | | | | |
| MA-R013 | | R13 | 370 | 270 | 100 | 28.3 | Backfilled | | | | | | | | | |
| MA-R014 | | R14 | 400 | 380 | 20 | 11.5 | Backfilled | | | | | | | | | |
| MA-R021 | | R21 | 380 | 280 | 100 | 44.2 | Excavated | MA-R021 | 28.5 | No | Lined | Unused | NM | NM | NM | |
| MA-R022 | Lake F | R22/ Lake F | 380 | 290 | 90 | 79.3 | Excavated | MA-R022 | 59.5 | No | Lined | Settling Pond | 364 | 363.24 | 362.6 | -1.43 |
| MA-R023 | | R23 | 380 | 270 | 110 | 27.5 | Excavated | MA-R023 | 21.6 | No | Lined | Water Storage | 360.7 | 361.2 | 360.3 | -0.4 |
| MA-R024 | Lake E | R24A/ Lake E | 390 | 200 | 190 | 55.9 | Excavated | MA-R024A | 59.1 | Yes | Elevated | Settling Pond | 235.3 | 259.9 | NM | |
| MA-R025 | Lake E | R25/ Lake E | 395 | 300 | 95 | 43.7 | Backfilled | | | | | | | | | |
| MA-R027 | | R27 | 380 | 300 | 80 | 59.5 | Excavated | MA-R027 | 23.6 | No | Lined | Unused | NM | NM | NM | |
| MA-R028 | Lake D | R28/ Lake D | 400 | 165 | 235 | 62.9 | Active Mining | MA-R028 | 0.7 | Yes | Depressed | Dewatering | 168.4 | 167.96 | 166.4 | -2.05 |

COL = Chain of Lake, A = Annual; SA = Semiannual,
WY Diff = Water Year Difference (Fall to Fall)

# TABLE 3-1
# SEMIANNUAL WATER LEVELS IN MINING AREA PONDS
# 2021 WATER YEAR

| EXCAVATIONS | | | | | | | | CURRENT PONDS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Excavation | Chain of Lake | Display Name | Original Ground Elev | Deepest Mined Depth (ft) *Elev* | *Depth* | Pit Area *(acres)* | Mining Status | Pond Name | Pond Area *(acres)* | Contact with Aquifer | Water Elev Status | Mining Use | Pond Elevation (ft MSL, NAVD88) *Fall 20* | *Spring 21* | *Fall 21* | *WY Diff* |
| **KAISER GRAVELS/HANSON AGGREGATES** | | | | | | | | | | | | | | | | |
| MA-K001 | | K1 | 350 | 325 | 25 | 3.4 | Backfilled | | | | | | | | | |
| MA-K002 | | K2 | 350 | 325 | 25 | 3.2 | Backfilled | | | | | | | | | |
| MA-K004 | | K4 | 350 | 315 | 35 | 13 | Backfilled | | | | | | | | | |
| MA-K005 | | K5 | 350 | 315 | 35 | 10.4 | Backfilled | | | | | | | | | |
| MA-K006 | | K6 | 350 | 325 | 25 | 13.4 | Backfilled | | | | | | | | | |
| MA-K007 | | K7 | 350 | 320 | 30 | 11.7 | Backfilled | | | | | | | | | |
| MA-K008 | | K8 | 350 | 320 | 30 | 17.7 | Backfilled | | | | | | | | | |
| MA-K009 | | K9 | 360 | 305 | 55 | 57.4 | Backfilled | | | | | | | | | |
| MA-K010 | | K10 | 370 | 355 | 15 | 4.4 | Backfilled | | | | | | | | | |
| MA-K011 | | K11 | 370 | 315 | 55 | 24 | Backfilled | | | | | | | | | |
| MA-K012 | | K12 | 370 | 275 | 95 | 37.7 | Backfilled | | | | | | | | | |
| MA-K013 | | K13 | 370 | 275 | 95 | 14.9 | Backfilled | | | | | | | | | |
| MA-K014 | | K14 | 370 | 275 | 95 | 5.6 | Backfilled | | | | | | | | | |
| MA-K015 | | K15 | 360 | 265 | 95 | 142.3 | Excavated | MA-K015 | 81.4 | Yes | Elevated | Water Storage | 327.3 | 325.01 | 320.1 | -7.17 |
| MA-K018 | Lake Boris | K18/ Lake Boris | 360 | 330 | 30 | 24.5 | Excavated | MA-K018 | 7.1 | Yes | Lined | Unused | 349 | 349.7 | 345.9 | -3.11 |
| MA-K019 | | K19A | 350 | 335 | 15 | 8 | Excavated | MA-K019A | 2.1 | Yes | Static | Unused | NM | NM | NM | |
| MA-K024 | | K24 | 360 | 220 | 140 | 87.9 | Backfilled | MA-K024 | | | | | | | | |
| MA-K028 | Lake H | K28/ Lake H | 360 | 220 | 140 | 89.6 | Reclaiming | MA-K028 | 60.3 | Yes | Static | Water Storage | 307.4 | 301.04 | 293.3 | -14.11 |
| MA-K030 | Cope Lake | K30/ Cope Lake | 370 | 240 | 130 | 233.9 | Reclaimed | MA-K030 | 184.4 | No | Lined | Settling Pond | 331.3 | 331.29 | 327 | -4.34 |
| MA-K032 | | K32 | 360 | 335 | 25 | 34.2 | Backfilled | | | | | | | | | |
| MA-K033 | | K33 | 360 | 335 | 25 | 12.8 | Backfilled | | | | | | | | | |
| MA-K037 | Lake I | K37/ Lake I | 360 | 220 | 140 | 300.8 | Reclaimed | MA-K037 | 232.3 | Yes | Elevated | Water Storage | 302.8 | 295.24 | 285.8 | -17 |



COL = Chain of Lake, A = Annual; SA = Semiannual,
WY Diff = Water Year Difference (Fall to Fall)

# TABLE 3-1
# SEMIANNUAL WATER LEVELS IN MINING AREA PONDS
# 2021 WATER YEAR

| EXCAVATIONS | | | | | | | | CURRENT PONDS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Excavation | Chain of Lake | Display Name | Original Ground Elev | Deepest Mined Depth (ft) | | Pit Area (acres) | Mining Status | Pond Name | Pond Area (acres) | Contact with Aquifer | Water Elev Status | Mining Use | Pond Elevation (ft MSL, NAVD88) | | | |
| | | | | *Elev* | *Depth* | | | | | | | | *Fall 20* | *Spring 21* | *Fall 21* | *WY Diff* |
| **PACIFIC AGGREGATE/RMC/LONESTAR/CEMEX** | | | | | | | | | | | | | | | | |
| MA-P001 | | P1 | 380 | 360 | 20 | 0.8 | Backfilled | | | | | | | | | |
| MA-P002 | | P2 | 380 | 360 | 20 | 1.9 | Excavated | MA-P002 | 0.6 | Yes | Elevated | Water Storage | NM | NM | NM | |
| MA-P003 | | P3 | 400 | 360 | 40 | 8.5 | Backfilled | | | | | | | | | |
| MA-P004 | | P4 | 400 | 360 | 40 | 7.8 | Excavated | | | | | | | | | |
| MA-P006 | | P6 | 380 | 280 | 100 | 28.8 | Backfilled | | | | | | | | | |
| MA-P007 | | P7 | 380 | 280 | 100 | 16.7 | Backfilled | | | | | | | | | |
| MA-P010 | | P10 | 400 | 340 | 60 | 34 | Excavated | MA-P010 | 12.7 | Yes | Static | Unused | 361 | 361.89 | 353.8 | -7.23 |
| MA-P011 | | P11 | 380 | 340 | 40 | 6.9 | Excavated | | | | | | | | | |
| MA-P012 | Island Pond | P12/ Island Pond | 360 | 330 | 30 | 29.5 | Excavated | MA-P012 | 12.4 | Yes | Lined | Unused | 349.5 | 350.66 | 346.7 | -2.82 |
| MA-P013 | | P13 | 380 | 300 | 80 | 2.6 | Backfilled | MA-P013 | 1 | Yes | Elevated | Water Storage | NM | NM | NM | |
| MA-P021 | | P21 | 380 | 240 | 140 | 10.5 | Backfilled | | | | | | | | | |
| MA-P027 | | P27 | 390 | 250 | 140 | 31 | Excavated | MA-P027 | 10.3 | Yes | Static | Water Storage | 277.4 | 276.02 | 270.9 | -6.48 |
| MA-P028 | Lake A | P28/Lake A | 420 | 360 | 60 | 24.6 | Reclaiming | MA-P028 | 7.2 | Yes | Static | Water Storage | 406.3 | 405.68 | 402.2 | -4.07 |
| MA-P034 | | P34 | 380 | 270 | 110 | 46 | Backfilled | | | | | | | | | |
| MA-P039 | Lake B | P39/ Lake B | 410 | 380 | 30 | 36.4 | Active Mining | | | | | | | | | |
| MA-P040 | | P40 | 390 | 260 | 130 | 14.5 | Excavated | MA-P040 | | | | | NM | NM | NM | |
| MA-P041 | Lake A | P41/ Lake A | 410 | 370 | 40 | 91.3 | Reclaiming | MA-P041 | 55.7 | Yes | Static | Water Storage | 411.7 | 412.39 | 409.2 | -2.47 |
| MA-P042 | Lake B | P42/Lake B | 380 | 255 | 125 | 101.8 | Active Mining | MA-P042 | 8.1 | Yes | Depressed | Dewatering | 255.8 | 255.95 | 256.2 | 0.39 |
| MA-P043 | | P43 | 390 | 240 | 150 | 130.9 | Excavated | MA-P043 | 80.2 | No | Lined | Settling Pond | NM | NM | NM | |
| MA-P044 | | P44 | 390 | 250 | 140 | 20 | Excavated | MA-P044 | 14.2 | Yes | Elevated | Water Storage | 345 | 347.15 | 328 | -17 |
| MA-P045 | | P45 | 380 | 310 | 70 | 25 | Excavated | MA-P045 | 17.9 | Yes | Elevated | Water Storage | NM | NM | NM | |
| MA-P046 | Lake J | P46/Lake J | 380 | 250 | 130 | 23.8 | Active Mining | MA-P046 | 7.4 | Yes | Depressed | Active Mining | 294 | 267.05 | 264.1 | -29.82 |



COL = Chain of Lake, A = Annual; SA = Semiannual,
WY Diff = Water Year Difference (Fall to Fall)

# TABLE 3-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| MA-C001 | 4/21/21 | ZONE7 | 19.8 | 981 | 8.5 | 34 | 56 | 79 | 3.4 | 275 | 41 | 178 | < 0.1 | 0.9 | 460 | 3 | < 100 | < 1 | 540 | 316 |
| MA-K015 | 4/22/21 | ZONE7 | 21.7 | 766 | 8.6 | 29 | 34 | 79 | 4.1 | 222 | 59 | 109 | < 0.1 | 1.3 | 490 | 2.5 | < 100 | < 1 | 435 | 212 |
| MA-K018 | 4/22/21 | ZONE7 | 21.1 | 681 | 8.2 | 46 | 25 | 56 | 2.9 | 160 | 78 | 97 | < 0.1 | 3.6 | 270 | 1 | < 100 | < 1 | 390 | 218 |
| MA-K028 | 4/21/21 | ZONE7 | 20.9 | 892 | 8.8 | 32 | 57 | 81 | 2.5 | 305 | 55 | 127 | < 0.1 | 1.4 | 700 | 3.1 | < 100 | < 1 | 524 | 315 |
| MA-K030 | 4/21/21 | ZONE7 | 19.6 | 758 | 8.6 | 40 | 51 | 52 | 2.5 | 263 | 53 | 103 | < 0.1 | 9 | 400 | 3.4 | < 100 | < 1 | 450 | 310 |
| MA-K037 | 4/21/21 | ZONE7 | 20 | 764 | 8.7 | 28 | 51 | 50 | 2.5 | 246 | 52 | 105 | < 0.1 | 3.6 | 450 | 3.4 | < 100 | < 1 | 425 | 280 |
| MA-P010 | 4/22/21 | ZONE7 | 23.1 | 515 | 9.5 | 19 | 28 | 50 | 2.4 | 105 | 46 | 68 | < 0.1 | 0.2 | 290 | 2.7 | < 100 | < 1 | 304 | 163 |
| MA-P012 | 4/22/21 | ZONE7 | 17.9 | 695 | 7.9 | 49 | 25 | 56 | 2.8 | 165 | 77 | 99 | < 0.1 | 7.3 | 260 | < 1 | < 100 | < 1 | 398 | 225 |
| MA-P027 | 4/22/21 | ZONE7 | 19.1 | 682 | 8.3 | 45 | 28 | 60 | 1.8 | 202 | 51 | 98 | < 0.1 | 9 | 430 | 1.3 | < 100 | < 1 | 397 | 227 |
| MA-P042 | 4/22/21 | ZONE7 | 20.2 | 635 | 8.4 | 45 | 27 | 52 | 1.5 | 188 | 55 | 85 | < 0.1 | 14.6 | 300 | < 1 | < 100 | < 1 | 381 | 223 |
| MA-P044 | 4/22/21 | ZONE7 | 20 | 663 | 8.5 | 39 | 30 | 62 | 2.2 | 181 | 54 | 98 | < 0.1 | 8.3 | 420 | 1.4 | < 100 | < 1 | 391 | 222 |
| MA-P046 | 4/22/21 | ZONE7 | 21.6 | 796 | 8 | 60 | 33 | 58 | 2.2 | 278 | 51 | 98 | 1.36 | 16.9 | 410 | < 1 | < 100 | < 1 | 464 | 286 |
| MA-R004 | 4/21/21 | ZONE7 | 19.2 | 749 | 8.3 | 51 | 44 | 44 | 2.6 | 259 | 46 | 92 | 0.57 | 15.8 | 330 | < 1 | < 100 | 1.3 | 430 | 309 |
| MA-R022 | 4/21/21 | ZONE7 | 20.4 | 660 | 8.4 | 39 | 39 | 39 | 2.1 | 223 | 46 | 89 | 0.22 | 10.7 | 320 | < 1 | < 100 | 1.4 | 382 | 259 |
| MA-R023 | 4/21/21 | ZONE7 | 19.2 | 681 | 8.4 | 41 | 42 | 40 | 2.4 | 233 | 46 | 91 | 0.12 | 8.6 | 320 | < 1 | < 100 | 1.1 | 395 | 275 |
| MA-R024A | 4/21/21 | ZONE7 | 18.8 | 762 | 8.3 | 55 | 46 | 40 | 2.6 | 289 | 46 | 92 | 0.88 | 17.5 | 330 | < 1 | < 100 | 1.7 | 452 | 328 |
| MA-R028 | 4/21/21 | ZONE7 | 18.2 | 653 | 7.9 | 55 | 32 | 35 | 1.6 | 240 | 43 | 79 | 1.08 | 19.5 | 280 | < 1 | < 100 | 2.8 | 390 | 270 |

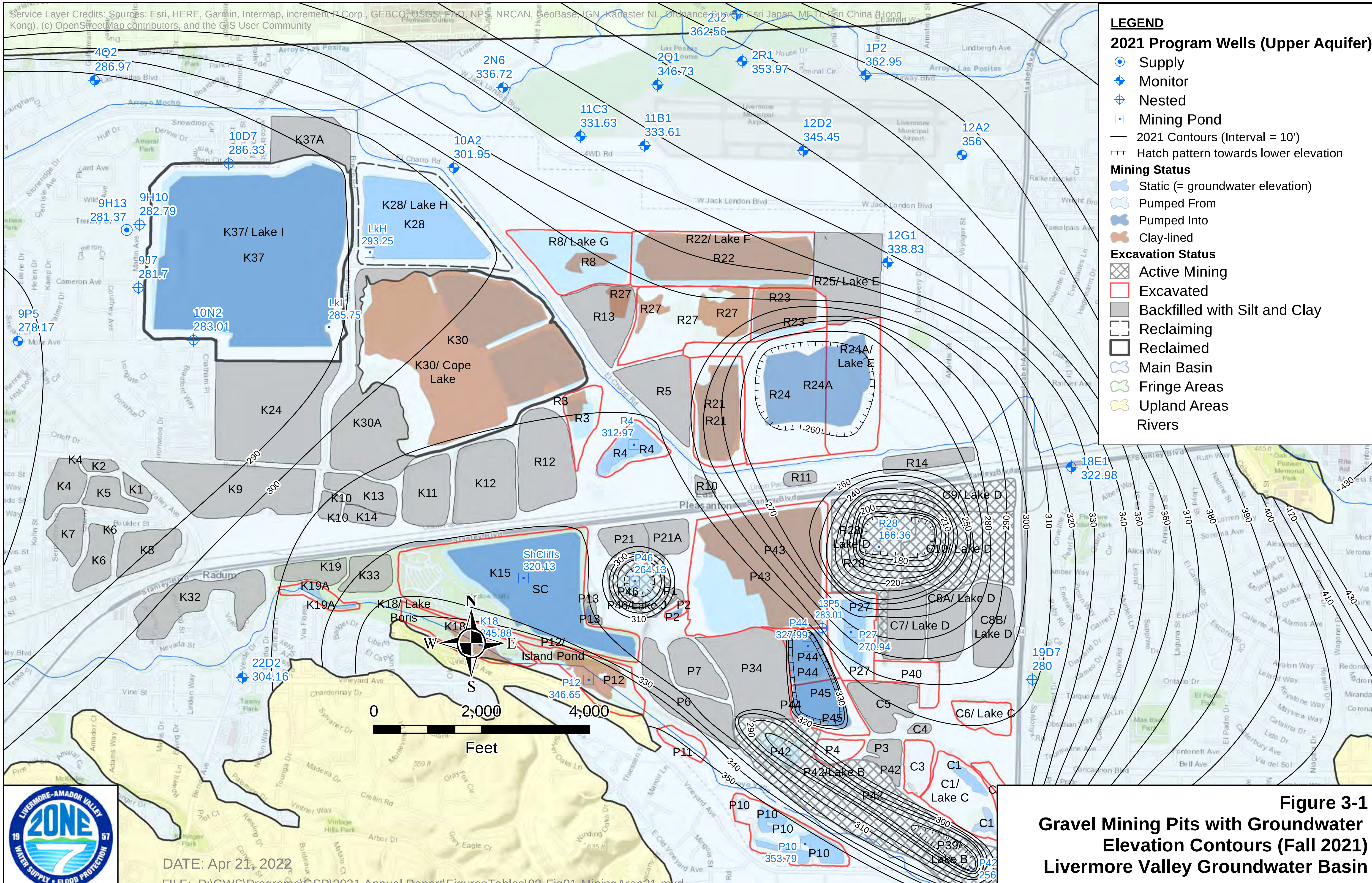



**Figure 3-1**
**Gravel Mining Pits with Groundwater Elevation Contours (Fall 2021)**
**Livermore Valley Groundwater Basin**

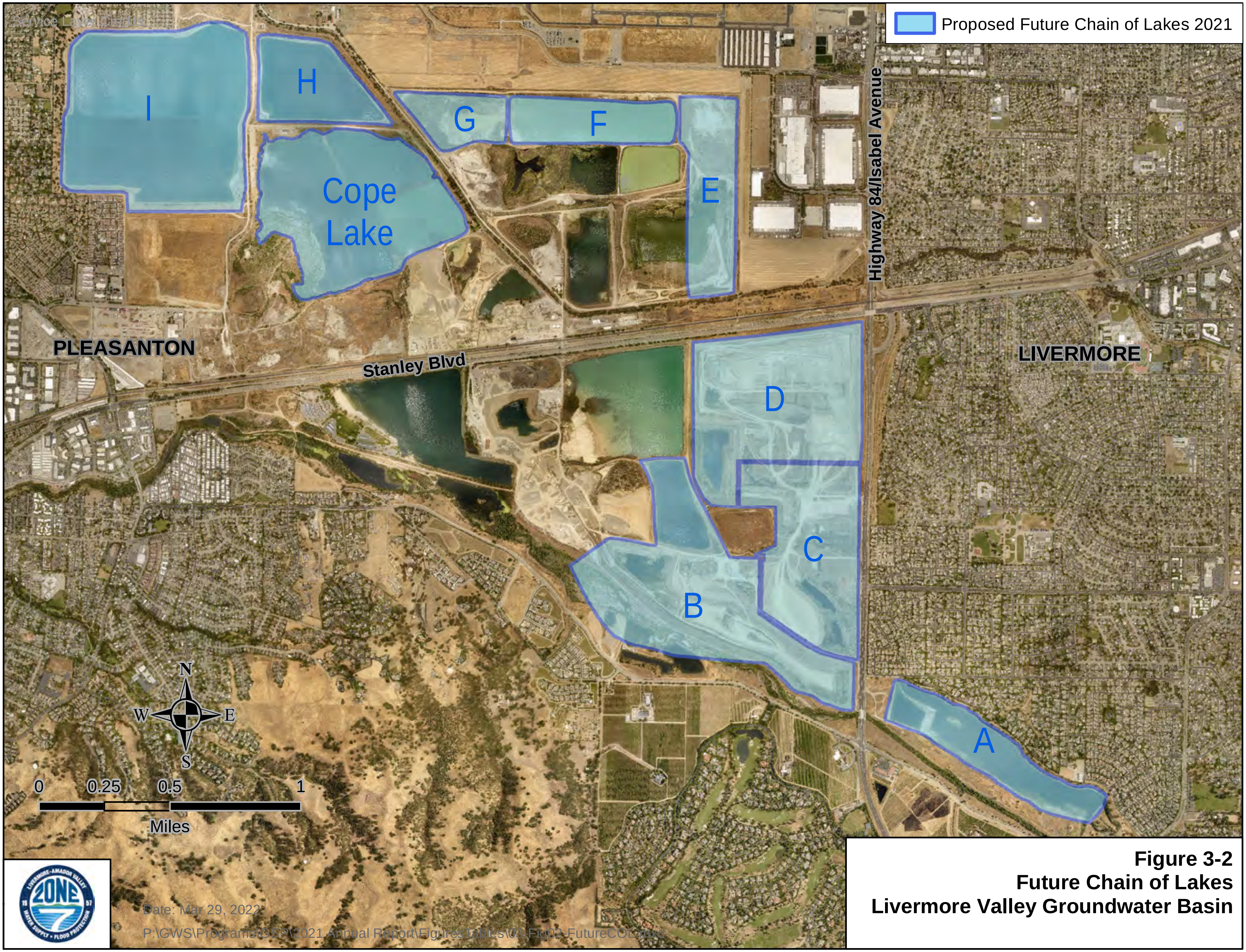



**Figure 3-2**
**Future Chain of Lakes**
**Livermore Valley Groundwater Basin**

# 4 Interconnected Surface Water-Groundwater Monitoring

## 4.1 Program Changes

As part of the 2021 Alternative GSP, Zone 7 made significant changes to the Interconnected Surface Water-Groundwater Monitoring Program including:

- Identifying potential Interconnected Surface Water (ICSW) and or Groundwater Dependent Ecosystems (GDE) areas that were not recognized in the 2016 Alternative GSP.
- Identifying 14 wells as Representative Monitoring Sites for Interconnected Surface Water (RMS-ICSW).
- Creating Sustainability Management Criteria (SMCs) for these RMS-ICSW (see ***Table 4-A*** below).

***Table 4-A: SMCs for Depletions of Interconnected Surface Water***

| Undesirable Results Definition | Undesirable Results Criteria | Minimum Threshold (MT) | Measurable Objective (MO) |
|---|---|---|---|
| When groundwater extractions in the Basin cause significant and unreasonable depletions of hydrologically connected surface water, such that beneficial uses and users of the surface water (including the likely GDEs and protected species) are significantly and unreasonably harmed. Specifically, a significant and unreasonable negative effect would be experienced if the health of the GDE areas in the Basin are adversely impacted by mechanisms that can be directly attributed to pumping-related lowering of groundwater levels over time, rather than effects of natural or climactic processes and/or unfavorable hydrologic conditions or land use changes. | If and when Depletions of Interconnected Surface Water occur as a result of unsustainable groundwater extraction such that groundwater levels decline below their MTs in greater than 40% of the RMS-ICSW for more than two consecutive years. | Historic low water levels measured at each RMS-ICSW, or when unavailable, estimated from Zone 7 groundwater elevation rasters. | Minimum water levels measured between 2014 and 2020 at each RMS-ICSW, or when unavailable, estimated from Zone 7 groundwater elevation rasters. |

GDE = Groundwater Dependent Ecosystems
RMS-ICSW = Representative Monitoring Sites for Interconnected Surface Water

More detail is available in the following sections of the 2021 Alternative GSP:

- **Section 1.2.5:** Surface Water-Groundwater Interaction/Groundwater Dependent Ecosystems Program Update

- **Section 8.8:** Current and Historical Groundwater Conditions - Groundwater Dependent Ecosystems
- **Section 13.6:** Sustainability Indicators – Depletions of Interconnected Surface Water
- **Section 14.2.6:** Monitoring Network for Depletions of Interconnected Surface Water
- **Section 14.4:** Representative Monitoring

# 4.2 Results for the 2021 Water Year

***Figure 4-1*** shows the hydrographs for the two RMS-ICSW in the vicinity of the Springtown Alkali Sink. ***Figure 4-2*** shows hydrographs for all the RMS-ICSW wells. ***Table 4-1*** compares water level measurements from the seasonal high and seasonal low 2021 WY monitoring events to the Minimum Thresholds (MTs) and Measurable Objectives (MOs) defined at RMS-ICSW wells in the 2021 Alternative GSP. The table also shows the change in elevation from the previous year's seasonal low to this year's seasonal low. Groundwater levels dropped below their MTs at two RMS-ICSW (Wells 3S1E16P005 [16P5] and 3S2E23E001 [23E1]) and below their MOs at three additional RMS-ICSW (Wells 3S2E30D002 [30D2], 3S2E29F004 [29F4], and 3S2E33C001 [33C1]) during the seasonal low (i.e., Fall) 2021 WY monitoring event; however, all RMS-ICSW wells were measured above their MTs and MOs during the seasonal high (i.e., spring) monitoring event. The MT exceedances observed at 16P5 and 23E1 do not currently constitute an Undesirable Result (UR) per the definition shown in ***Table 4-A***.

# 4.3 Attached Tables and Figures

***Table 4-1****: 2021 Groundwater Elevations at Representative Monitoring Sites for ICSW*

***Figure 4-1****: Hydrographs in the Vicinity of the Alkali Sink & Springtown Springs*
***Figure 4-2****: Spider Map of Representative Monitoring Sites for Interconnected Surface Water*

**TABLE 4-1**
**GROUNDWATER ELEVATIONS AT REPRESENTATIVE MONITORING SITES**
**FOR INTERCONNECTED SURFACE WATER**
**2021 WATER YEAR**
**LIVERMORE VALLEY GROUNDWATER BASIN**

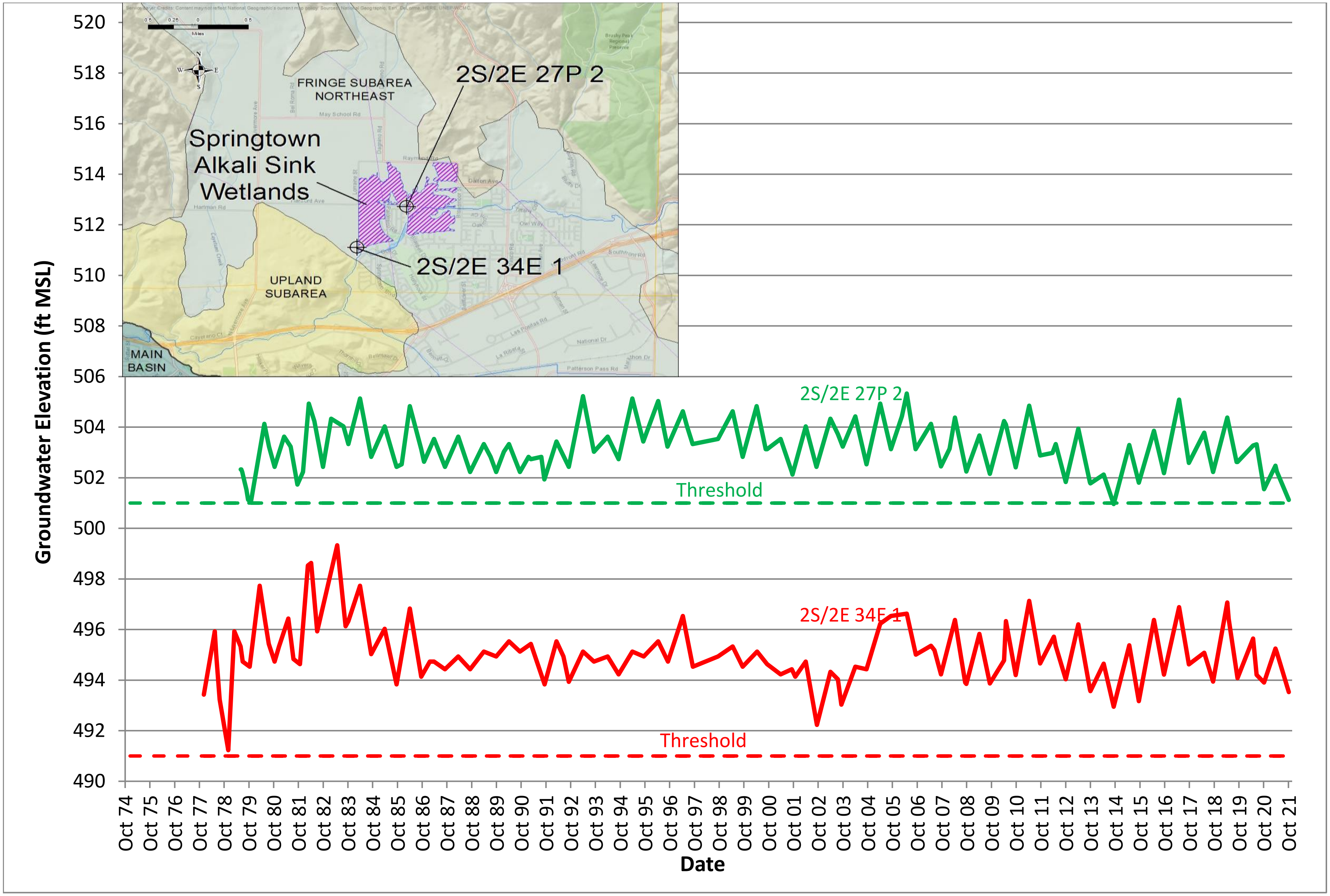
| *RMS Well* | | *Management Area/Unit* | | | *2021 Water Year* | | | | | *SMCs for ICSW* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Well Name* | *Map* | *Area* | *Subarea* | *Aquifer* | *Season High* | *Season Low* | *Change from 2020** | *Height above MT* | *Height above MO* | *MT* | *IM-5* | *IM-10* | *IM-15* | *MO* |
| 3S2E30D002 | 30D2 | Main | Amador | Upper | 409.1 | 405.63 | -3.55 | 4.63 | -0.87 | 401 | 403.8 | 404.7 | 405.6 | 407 |
| 3S1E16P005 | 16P5 | Main | Amador | Upper | 315.49 | 284.89 | -12.57 | -0.31 | -0.31 | 285 | 285.2 | 285.2 | 285.2 | 285 |
| 3S2E33G001 | 33G1 | Main | Amador | Upper | 502.8 | 502.32 | 0.65 | 1.32 | 1.02 | 501 | 501.1 | 501.2 | 501.2 | 501 |
| 3S2E29F004 | 29F4 | Main | Amador | Upper | 448.84 | 444.55 | -1.92 | 6.75 | -0.05 | 438 | 441.2 | 442.3 | 443.5 | 445 |
| 3S2E33C001 | 33C1 | Main | Amador | Upper | 486.23 | 485.33 | -1.16 | 3.23 | -0.87 | 482 | 484.2 | 484.8 | 485.5 | 486 |
| 3S1E02N006 | 2N6 | Main | Camp | Upper | 338.11 | 336.72 | -0.25 | 5.22 | 2.82 | 332 | 333.9 | 333.9 | 333.9 | 334 |
| 3S2E16E004 | 16E4 | Main | Mocho II | Upper | 472.51 | 467.01 | -9.17 | 0.11 | 0.01 | 467 | 466.9 | 466.9 | 466.9 | 467 |
| 3S2E23E001 | 23E1 | Main | Mocho II | Upper | 595.75 | 594.37 | -0.98 | -1.03 | -1.03 | 595 | 595.4 | 595.4 | 595.4 | 595 |
| 4S2E01A001 | 1A1 | Main | Mocho II | Upper | 797.76 | 795.96 | NA | 14.76 | 14.76 | 781 | 781.2 | 781.2 | 781.2 | 781 |
| 2S2E27P002 | 27P2 | Fringe | Spring | Upper | 502.25 | 501.12 | -0.43 | 0.12 | 0.12 | 501 | 501 | 501 | 501 | 501 |
| 2S2E34E001 | 34E1 | Fringe | May | Upper | 495.09 | 493.53 | -0.37 | 2.33 | 0.53 | 491 | 492.1 | 492.4 | 492.7 | 493 |
| 3S1E05K006 | 5K6 | Fringe | Camp | Upper | 331.5 | 329.7 | -1.79 | 3.7 | 1.5 | 326 | 328.2 | 328.2 | 328.2 | 328 |
| 3S1E02R001 | 2R1 | Fringe | Camp | Upper | 355.94 | 353.97 | -2.24 | 8.67 | 0.37 | 345 | 349.4 | 350.8 | 352.2 | 354 |
| 3S2E32E007 | 32E7 | Upland | Upland | Upper | 592.86 | 592.54 | -0.57 | 1.14 | 1.14 | 591 | 591.4 | 591.4 | 591.4 | 591 |

RMS = Representative Monitoring Site
SMC = Sustainable Management Criteria
ICSW = Interconnected Surface Water
IM = Interim Milestone
MO = Measurable Objective
MT = Minimum Threshold
* = 2020 Seasonal Low minus 2021 Seasonal Low

| |
|---|
| Main |
| Fringe |
| Upland |

3/29/2022
P:\GWS\Programs\GSP\2021 Annual Report\FiguresTables\00-Tbl02-RMSforICSW.xlsx

# FIGURE 4-1
## HYDROGRAPHS IN THE VICINITY OF THE ALKALI SINK AND SPRINGTOWN SPRINGS
## LIVERMORE VALLEY GROUNDWATER BASIN



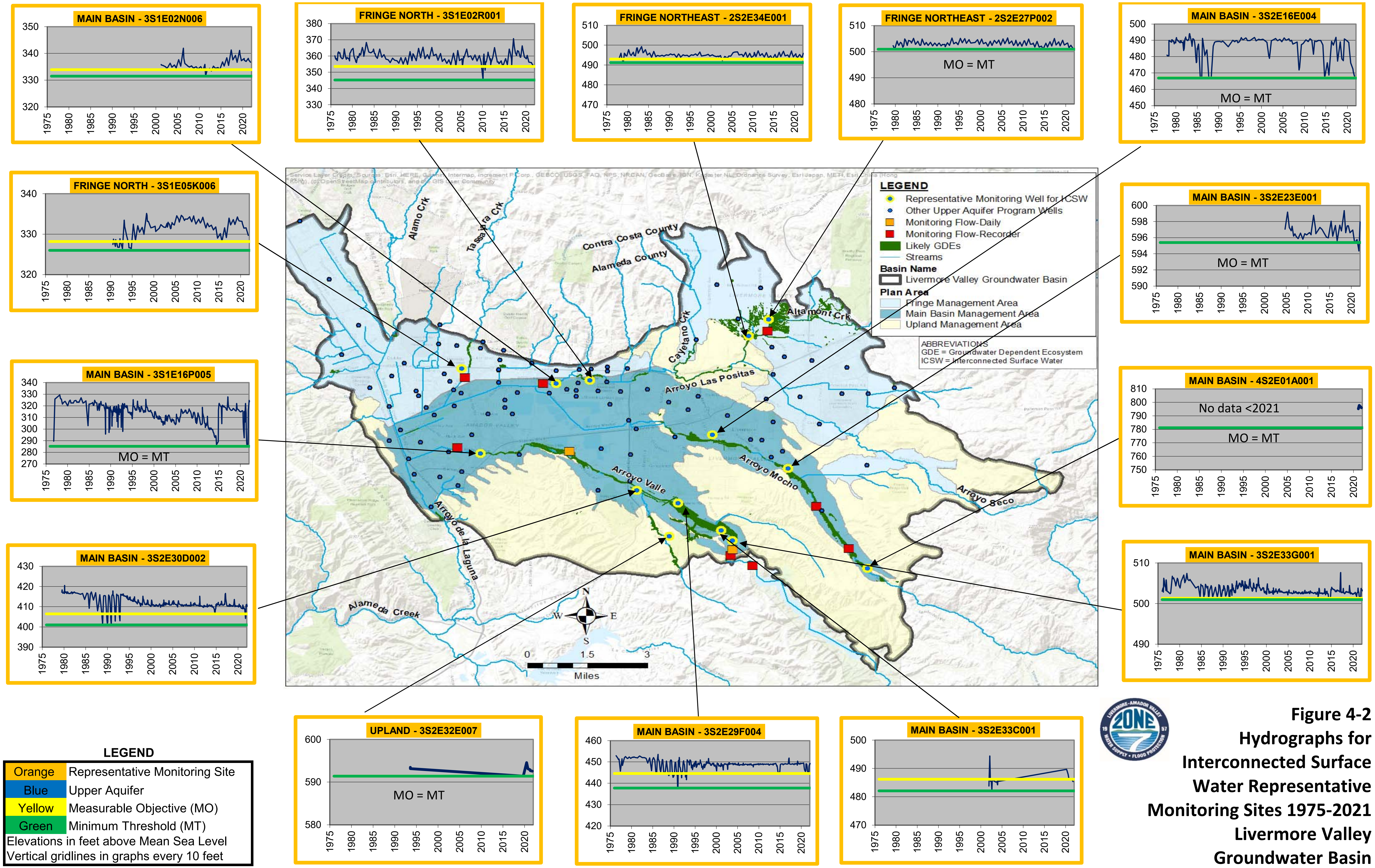



**Figure 4-2**
**Hydrographs for Interconnected Surface Water Representative Monitoring Sites 1975-2021**
**Livermore Valley Groundwater Basin**

# 5 Groundwater Elevation Monitoring

## 5.1 Program Changes

***Table 5-A*** below lists the changes that were made to the Groundwater Elevation Monitoring Program for the 2021 WY.

***Table 5-A: Program Well Changes during the 2021 WY***

| Action | Reason | Note |
|---|---|---|
| **3S2E17E002 Removed from program** | Owner's request | Zone 7 is researching possible nearby wells for a replacement. |
| **3S1E20B002 Removed from program** | No access port | Well is still used for water quality monitoring. 3S1E20C003 is used for groundwater elevation monitoring. |
| **20 wells added to the program** | 2021 Alternative GSP | Added to address DWR recommendations. See ***Table 1-1*** in 2021 Alternative GSP |

Zone 7's 2021 Alternative GSP established SMCs for Chronic Lowering of Groundwater Levels as shown in ***Table 5-B*** below.

***Table 5-B: SMCs for Chronic Lowering of Groundwater Levels***

| Undesirable Results Definition | Undesirable Results Criteria | Minimum Threshold (MT) | Measurable Objective (MO) |
|---|---|---|---|
| If and when a chronic decline in groundwater levels over the course of the planning and implementation horizon significantly and unreasonably impairs the reasonable and beneficial use of, and access to, groundwater for beneficial uses and users within the Basin. | Water levels in greater than 25% of the RMS-WLs decline below their respective MTs for two consecutive years. | Difference between the historic low water level and maximum annual rate of groundwater change for each RMS-WL, or the historic low if annual groundwater level change data are unavailable. | Historic low water level for each RMS-WL. |

RMS-WL = Representative Monitoring Sites for Water Levels

For more information on general groundwater gradients, water level trends, and the groundwater elevation program; see the following sections of the 2021 Alternative GSP:

- **Section 1.2.1:** Groundwater Level Program Updates
- **Section 8.3:** Current and Historical Groundwater Conditions - Groundwater Elevations and Flow Directions

- **Section 13.1:** Sustainability Indicators – Chronic Lowering of Groundwater Levels
- **Section 14.2.1:** Monitoring Network for Chronic Lowering of Groundwater Levels
- **Section 14.4:** Representative Monitoring

# 5.2 Results for the 2021 Water Year

## 5.2.1 General

***Figure 5-1*** and ***Table 5-1*** show all 236 wells in the 2021 WY Groundwater Elevation Program. ***Table 5-2*** shows wells construction information for each of the wells. ***Table 5-3*** shows water level measurements from all wells in the program for the 2021 WY. ***Table 5-4*** shows water level measurements in Representative Monitoring Sites for Water Level (RMS-WL) and their heights above the MO and MT.

In general, groundwater levels for the 2021 WY followed a typical seasonal pattern observed from the historical data, rising in the beginning of the year with rainfall recharge and minimal pumping occurring, levelling off in late spring, and then dropping during the second half of the WY as rainfall ceased and pumping demands increased. The groundwater gradients in both the Upper and Lower Aquifers were generally from east to west and ranged from 0.005 to 0.025 ft/ft, except across major groundwater barriers (e.g., in Upper Aquifer between the Mocho 2 and Amador Subareas). In general, the groundwater gradient runs toward the center of the Basin where there are piezometric depressions created around several municipal wellfields and actively dewatered quarry excavations that extend into the Lower Aquifer. Flow directions and magnitudes indicated by the groundwater elevation contours did not vary greatly between the seasonal low and seasonal high conditions during the 2021 WY.

Most of the groundwater elevation declines in the Basin (the steepest groundwater gradient) occurs in the central area of the Main Basin, where the mining pits (MA-R028, MA-P042, and MA-P046) are being excavated. These quarry dewatering operations create groundwater depressions in pits where water is pumped and mounds in unlined pits where excess water is stored. In fact, the lowest groundwater elevation in the Basin corresponded to the pond in mining pit MA-R028 (future Lake D) at 166 feet above mean sea level (ft msl). The water from the dewatering of MA-P042 and MA-P046 (future Lakes B and J, respectively) was discharged into other adjacent clay-lined mining pits. The water from pit MA-R028 (future Lake D) was discharged into MA-R024, where it likely recharged back into the Basin.

As is usually the case, water levels in the Fringe Management Area (Fringe Area) and Upland Management Area (Upland Area) stayed relatively constant throughout the 2021 WY. Wells located in the Fringe and Upland Areas rely mainly on natural recharge to maintain water supply. During below normal, dry, and critically dry hydrologic years, natural recharge may not be sufficient to maintain the groundwater levels in these wells and lack of sufficient natural recharge can potentially cause loss of production in these wells. In order to sustainably manage these Management Areas, groundwater pumping must be limited to available supply from natural recharge.

### 5.2.2 Representative Monitoring Sites for Water Levels (RMS-WL)

***Figure 5-2*** shows locations of all RMS-WL for the 2021 WY. ***Figure 5-3*** shows hydrographs of historical and recent groundwater elevations at all RMS-WL, respectively. These hydrographs further demonstrate the seasonal trends observed in both the Upper/Fringe Aquifers and the Lower Aquifer. The seasonal fluctuations are greater in the Lower Aquifer where more pumping occurs to meet seasonal demands in the warmer months, and when surface water treatment plant outages occur.

***Table 5-4*** compares water level measurements from the seasonal high (Spring) and seasonal low (Fall) 2021 WY monitoring events to the MTs and MOs defined at RMS-WL wells in the 2021 Alternative GSP. The table also shows the change in elevation from the previous year's seasonal low to this year's seasonal low. While groundwater elevations in all Main Basin RMS-WL wells in the Upper Aquifer dropped relative to 2020 WY conditions, especially in the western portion of the Basin (up to 36 ft), water levels at all RMS-WL wells continued to remain well above their respective MTs and MOs during both the seasonal high and seasonal low 2021 WY monitoring events.

In the Fringe Aquifer, water elevations in the RMS-WL wells stayed relatively constant throughout the 2021 WY, generally varying by less than one foot compared to groundwater levels in 2020 WY. Since it was added to the program in 2021, no monitoring data was available last year for the RMS-WL in the Upland Area (Well 3S2E21K009 [21K9]); however, the water level dropped about 2.2 feet from the seasonal high to the seasonal low in 2021 WY.

### 5.2.3 Upper and Fringe Aquifers

***Figure 5-4*** and ***Figure 5-5*** show 2021 WY groundwater elevation contours in the Upper and Fringe Aquifers during seasonal high (Spring) and seasonal low (Fall) conditions, respectively. ***Figure 5-6*** shows the difference in water elevations from Fall 2020 to Fall 2021. ***Figure 5-7*** shows the depth to water using Fall 2021 water levels.

Upper Aquifer water levels generally fluctuated by less than five feet except in the western portion of the Main Basin where the water level dropped more than 25 feet. This is likely because of below average recharge (rainfall and stream) and above average municipal pumping in this portion of the Basin.

Water levels in wells in the southwestern portion of the Basin near the Arroyo de la Laguna (as indicated primarily by the Bernal Upper Key Well 3S1E20C007 [20C7] and Well 3S1E29M004

[29M4]) were below the upper threshold groundwater elevation at which Basin overflow occurs (i.e., about 295 ft msl). Consequently, no water overflowed from the Upper Aquifer into the Arroyo de la Laguna and exited the Basin during the 2021 WY.

### 5.2.4 Lower Aquifer

***Figure 5-8*** and ***Figure 5-9*** show 2021 WY groundwater elevation contours in the Lower Aquifer during seasonal high (Spring) and seasonal low (Fall) conditions, respectively. ***Figure 5-10*** shows the difference in groundwater elevations from Fall 2020 to Fall 2021***.*** ***Figure 5-11*** shows the height of water levels above historic lows, which was used to create the Measurable Objectives for the Main Basin.

Lower Aquifer water levels dropped significantly (up to about 40 feet) in portions of the Basin from Fall 2020 to Fall 2021 due to below average recharge (rainfall and stream), above average municipal pumping, and deeper mining activity. In general, groundwater elevations remained well above historic lows; however, mining area dewatering operations continued to create localized depressions in groundwater levels that exceeded the historic low in two of the mining area pits. Groundwater elevations in the southwestern portion of the Amador Subarea were near historic lows. The reason for this depression is unknown but may be from a supply well used for Shadow Cliffs Recreational Area.

## 5.3 Attached Tables and Figures

***Table 5-1****: Groundwater Elevation Program Wells and Respective Monitoring Frequency*
***Table 5-2****: Well Construction Details*
***Table 5-3****: Table of Semiannual Groundwater Levels, Fall 2020 To Fall 2021*
***Table 5-4****: Table of Semiannual Groundwater Levels in Representative Monitoring Sites, Fall 2020 To Fall 2021*

***Figure 5-1****: Map of Wells in Water Level Monitoring Network*
***Figure 5-2****: Representative Monitoring Sites*
***Figure 5-3****: Hydrographs, 1975 to 2021 WYs*
***Figure 5-4****: Groundwater Gradient Map, Upper Aquifer, Spring 2021 WY*
***Figure 5-5****: Groundwater Gradient Map, Upper Aquifer, Fall 2021 WY*
***Figure 5-6****: Change in Groundwater Elevation, Upper Aquifer, Fall 2020 WY to Fall 2021 WY*
***Figure 5-7****: Depth to Groundwater, Upper Aquifer, Fall 2021 WY*
***Figure 5-8****: Groundwater Gradient Map, Lower Aquifer, Spring 2021 WY*
***Figure 5-9****: Groundwater Gradient Map, Lower Aquifer, Fall 2021 WY*
***Figure 5-10****: Change in Groundwater Elevation, Lower Aquifer, Fall 2020 WY to Fall 2021 WY*
***Figure 5-11****: Map of Groundwater Levels Above Historical Lows, Lower Aquifer, Fall 2021 WY*

**TABLE 5-1**
**MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM**
**LIVERMORE VALLEY GROUNDWATER BASIN**

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1S4E31P005 | 31P5 | CASGEM Tracy WAPA | Tracy | U | monitor | unknown | Zone 7 | 2 | | | | | | |
| 2S1E32E001 | 32E1 | End of Arnold Rd | None | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1E32N001 | 32N1 | Camp Parks | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1E32Q001 | 32Q1 | Summer Glen Dr | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1E33L001 | 33L1 | Gleason Dr @ Tassajara | None | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1E33P002 | 33P2 | Central Pkwy at Emerald Glen Pk | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1E33R001 | 33R1 | Central Pkwy @ Grafton | None | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1W15F001 | 15F1 | BOLLINGER | Bishop | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1W26C002 | 26C2 | PINE VALLEY | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1W36E003 | 36E3 | Kolb Park | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1W36F001 | 36F1 | Dublin High shallow | Dublin | L | nested | active | Zone 7 | 2 | | | | | | |
| 2S1W36F002 | 36F2 | Dublin High mid | Dublin | L | nested | active | Zone 7 | 2 | | | | | | |
| 2S1W36F003 | 36F3 | Dublin High deep | Dublin | L | nested | damaged | Zone 7 | 2 | | | | | | |
| 2S2E21L001 | 21L1 | Merlin | May | U | domestic | active | Zone 7 | 2 | | | | | | |
| 2S2E27C002 | 27C2 | Dagnino Rd | Spring | U | domestic | active | Zone 7 | 2 | | | | | | |
| 2S2E27K001 | 27K1 | Model Airport | Spring | U | livestock | inactive | Zone 7 | 2 | | | | | | |
| 2S2E27M002 | 27M2 | Kwan | May | U | domestic | active | Zone 7 | 2 | | | | | | |
| 2S2E27P002 | 27P2 | hartford ave east | Spring | U | monitor | active | Zone 7 | 2 | | | X | | | |
| 2S2E28D002 | 28D2 | May School | May | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S2E28J002 | 28J2 | FCC Well | May | L | industrial | active | Zone 7 | 2 | | | | | | |
| 2S2E28Q001 | 28Q1 | hartford ave | May | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S2E32K002 | 32K2 | jenson's N liv. Ave | Cayetano | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S2E34E001 | 34E1 | Mud City | May | U | monitor | active | Zone 7 | 2 | | X | X | | | |
| 2S2E34Q002 | 34Q2 | Hollyhock & Crocus | Spring | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S3E01D001 | 1D1 | CASGEM Tracy PGE | Tracy | U | irrigation | unknown | Zone 7 | 2 | | | | | | |
| 3S1E01F002 | 1F2 | Constitution Dr | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E01H003 | 1H3 | Collier Canyon g1 | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E01J004 | 1J04 | Collier Vineyards | Camp | L | irrigation | active | Zone 7 | 2 | | | | | | |
| 3S1E01L001 | 1L1 | Kitty Hawk | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E01P002 | 1P2 | Airport gas g5 | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E01P003 | 1P3 | New airport well | Amador | L | supply | inactive | Zone 7 | 2 | | | | | | |
| 3S1E02J002 | 2J2 | Maint. Bldg | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E02J003 | 2J3 | Doolan Rd East | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E02K002 | 2K2 | Doolan Rd West | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E02M003 | 2M3 | Friesman Rd North | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E02N006 | 2N6 | Friesman Rd South | Amador | U | monitor | active | Zone 7 | 2 | | | X | | | |
| 3S1E02P003 | 2P3 | Crosswinds Church | Camp | L | domestic | active | Zone 7 | 2 | | | | | | |
| 3S1E02Q001 | 2Q1 | LPGC #1 | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E02R001 | 2R1 | Beebs | Amador | U | monitor | active | Zone 7 | 2 | | | X | | | |

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E03G002 | 3G2 | fallon rd | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E04A001 | 4A1 | SMP-DUB-2 | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E04J005 | 4J5 | Pimlico shallow | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E04J006 | 4J6 | Pimlico deep | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E04Q002 | 4Q2 | gulfstream | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E05K006 | 5K6 | Rosewood shallow | Camp | U | monitor | active | Zone 7 | 2 | | | X | | | |
| 3S1E05K007 | 5K7 | Rosewood deep | Camp | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E05L003 | 5L3 | Oracle | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E05P006 | 5P6 | Owens Park | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E06F003 | 6F3 | Dublin Ct | Dublin | U | monitor | active | Zone 7 | 2 | | X | | | | |
| 3S1E06G005 | 6G5 | Nissan Repair | Dublin | L | industrial | GPO Intent to use | Zone 7 | 2 | | | | | | |
| 3S1E06N002 | 6N2 | DSRSD MW-3 | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E07B002 | 7B2 | Hopyard rd | Dublin | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E07B012 | 7B12 | Hacienda Arch | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E07G007 | 7G7 | Chabot Well | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E07J005 | 7J5 | Thomas Hart School | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E08B001 | 8B1 | Lizard Well | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E08G004 | 8G4 | Apache | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E08H009 | 8H9 | Mocho 4 Nested Shallow | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E08H010 | 8H10 | Mocho 4 Nested Middle | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E08H011 | 8H11 | Mocho 4 Nested deep | Amador | D | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E08H013 | 8H13 | Mocho 3 mon | Amador | D | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E08H018 | M4 | Mocho 4 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E08K001 | 8K1 | Cockroach well | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E08N001 | 8N1 | sports park | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E09H010 | 9H10 | NW Lake I Shallow | Amador | U | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E09H011 | 9H11 | NW Lake I Deep | Amador | L | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E09H013 | 9H13 | Lister | Amador | U | domestic | active | Zone 7 | 2 | | | | | | X |
| 3S1E09J007 | 9J7 | SW Lake I Shallow | Amador | U | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E09J008 | 9J8 | SW Lake I Middle | Amador | L | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E09J009 | 9J9 | SW Lake I Deep | Amador | L | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E09M002 | M1 | Mocho 1 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E09M003 | M2 | Mocho 2 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E09M004 | M3 | Mocho 3 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E09P005 | 9P5 | Key_AmW_U (Mohr Key) | Amador | U | monitor | active | Zone 7 | 12 | | X | | X | | |
| 3S1E09P009 | 9P9 | Mohr Ave Shallow | Amador | L | nested | active | Zone 7 | 12 | 15 | | | | | X |
| 3S1E09P010 | 9P10 | Key_AmW_L | Amador | L | nested | active | Zone 7 | 12 | | X | | X | | |
| 3S1E09P011 | 9P11 | Mohr Ave Deep | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E10A002 | 10A2 | El Charro Rd | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |

## TABLE 5-1
## MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM
## LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E10B008 | 10B8 | Kaiser Rd Shallow | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10B009 | 10B9 | Kaiser Rd Middle 1 | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10B010 | 10B10 | Kaiser Rd Middle 2 | Amador | L | nested | unknown | Zone 7 | 2 | | | | | | |
| 3S1E10B011 | 10B11 | Kaiser Rd Deep | Amador | D | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10B014 | 10B14 | COL 5 Monitoring | Amador | L | monitor | unknown | Zone 7 | 2 | | | | | | |
| 3S1E10D002 | 10D2 | Stoneridge Shallow | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10D003 | 10D3 | Stoneridge Middle 1 | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10D004 | 10D4 | Stoneridge Middle 2 | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10D005 | 10D5 | Stoneridge Deep | Amador | D | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10D007 | 10D7 | North Lake I Shallow | Amador | U | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E10D008 | 10D8 | North Lake I Cluster 2 | Amador | L | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E10K002 | 10K2 | COL 1 Monitoring | Amador | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E10N002 | 10N2 | South Lake I Shallow | Amador | U | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E10N003 | 10N3 | South Lake I Deep | Amador | L | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E11B001 | 11B1 | Airport West | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E11C003 | 11C3 | LAVWMA ROW | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E11G001 | 11G1 | Key_AmE_U | Amador | U | nested | active | Zone 7 | 12 | | X | | X | | |
| 3S1E11G002 | 11G2 | Rancho Charro Middle 1 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E11G003 | 11G3 | Rancho Charro Middle 2 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E11G004 | 11G4 | Rancho Charro Deep | Amador | D | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E11M002 | 11M2 | COL 2 Monitoring | Amador | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E11P006 | 11P6 | New Jamieson Residence | Amador | L | domestic | unknown | Zone 7 | 2 | | | | | | |
| 3S1E12A002 | 12A2 | Airport South | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E12D002 | 12D2 | LWRP G6 | Amador | U | monitor | active | LWRP | 2 | | | | | | |
| 3S1E12G001 | 12G1 | Oaks Park Shallow | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E12H004 | 12H4 | LWRP Shallow | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E12H005 | 12H5 | LWRP Middle 1 | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E12H006 | 12H6 | LWRP Middle 2 | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E12H007 | 12H7 | LWRP Deep | Amador | D | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E12K002 | 12K2 | Oaks Park Mid | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E12K003 | 12K3 | Key_AmE_L | Amador | L | nested | active | Zone 7 | 12 | | X | | X | | |
| 3S1E12K004 | 12K4 | Oaks Park Deep | Amador | D | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E13P005 | 13P5 | LGA Grant Nested 1 | Amador | U | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E13P006 | 13P6 | LGA Grant Nested 2 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E13P007 | 13P7 | LGA Grant Nested 3 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E13P008 | 13P8 | LGA Grant Nested 4 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E14B001 | 14B1 | Industrial Asphalt | Amador | L | industrial | unknown | Zone 7 | 2 | | | | | | |
| 3S1E14D002 | 14D2 | South Cope Lake | Amador | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E15F003 | 15F3 | Kaiser #8 | Amador | L | supply | inactive | Zone 7 | 2 | | | | | | |

## TABLE 5-1
## MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM
## LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E15J003 | 15J3 | shadow cliff | Amador | L | supply | unknown | Zone 7 | 2 | | | | | | |
| 3S1E15M003 | 15M3 | Bush/Valley South | Amador | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E16A004 | 16A4 | Bush/Valley Mid | Amador | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E16B001 | 16B1 | Bush/Valley North | Amador | D | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E16C002 | 16C2 | Santa Rita Valley Shallow | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E16C003 | 16C3 | Santa Rita Valley Middle | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E16C004 | 16C4 | Santa Rita Valley Deep | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E16E004 | 16E4 | black ave - cultural | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E16L002 | P4 | Pleas 4 | Amador | L | muni | inactive | Pleas | 2 | | | | | | |
| 3S1E16P005 | 16P5 | Vervais Monitor | Amador | U | monitor | active | Zone 7 | 12 | | | X | | X | |
| 3S1E16R001 | 16R1 | Stanley Berry Farm | Amador | L | supply | unknown | Zone 7 | 2 | | | | | | |
| 3S1E17B004 | 17B4 | Casterson | Amador | L | supply | unknown | Zone 7 | 2 | | | | | | |
| 3S1E17D003 | 17D3 | Hopyard Nested Shallow | Bernal | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E17D004 | 17D4 | Hopyard Nested Middle 1 | Bernal | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E17D005 | 17D5 | Hopyard Nested Middle 2 | Bernal | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E17D006 | 17D6 | Hopyard Nested Middle 3 | Bernal | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E17D007 | 17D7 | Hopyard Nested Deep | Bernal | D | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E17D010 | H7 | Hopyard 7 | Bernal | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E17D011 | 17D11 | Hopyard 9 Monitoring Well | Bernal | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E18A005 | P7 | Pleas 7 | Bernal | L | muni | inactive | Pleas | 2 | | | | | | |
| 3S1E18E004 | 18E4 | Valley Trails II | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E18J002 | 18J2 | camino segura | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E18N001 | 18N1 | merritt | Bernal | L | irrigation | unknown | Zone 7 | 2 | | | | | | |
| 3S1E19A010 | SF-B | SFWD South (B) | Bernal | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E19A011 | SF-A | SFWD North (A) | Bernal | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E19C004 | 19C4 | del valle & laguna | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E19K001 | 19K1 | 680/bernal | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E20C003 | 20C3 | Fairgrounds Potable Backup | Bernal | L | supply | active | Zone 7 | 2 | | | | | | |
| 3S1E20C007 | 20C7 | Key_Bern_U | Bernal | U | monitor | active | Zone 7 | 12 | | X | | X | X | |
| 3S1E20C008 | 20C8 | Key_Bern_L | Bernal | L | nested | active | Zone 7 | 12 | | X | | X | | |
| 3S1E20C009 | 20C9 | Fair Nested Deep | Bernal | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E20J004 | 20J4 | civic center | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E20M011 | 20M11 | S.F "M"LINE | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E20Q002 | 20Q2 | 20Q2 | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E22D002 | 22D2 | vineyard trailer | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E23J001 | 23J1 | 1627 vineyard trailer | Amador | L | domestic | unknown | Zone 7 | 2 | | | | | | |
| 3S1E24Q001 | 24Q1 | Ruby Hills | Amador | L | irrigation | unknown | Zone 7 | 2 | | | | | | |
| 3S1E25C003 | 25C3 | Katz Winery Mansion | Amador | U | monitor | unknown | Zone 7 | 2 | | | | | | |
| 3S1E28M002 | 28M2 | Bargar | Upland | U | supply | active | Zone 7 | 2 | | | | | | |

## TABLE 5-1
## MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM
## LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E29M004 | 29M4 | f.c. channel | Castle | U | monitor | active | Zone 7 | 12 | | | | | X | |
| 3S1E29P002 | 29P2 | castlewood dr | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E33G005 | 33G5 | Pleasanton Calippe 33G5 | Upland | U | monitor | unknown | Zone 7 | 2 | | | | | | |
| 3S1W01B009 | 1B9 | DSRSD Shallow | Dublin | L | nested | unknown | Zone 7 | 2 | | | | | | |
| 3S1W01B010 | 1B10 | DSRSD Middle | Dublin | L | nested | unknown | Zone 7 | 2 | | | | | | |
| 3S1W01B011 | 1B11 | DSRSD Deep | Dublin | L | nested | unknown | Zone 7 | 2 | | | | | | |
| 3S1W02A002 | 2A2 | McNamara's | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1W12B002 | 12B2 | Stoneridge Mall Rd | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1W12J001 | 12J1 | DSRSD South | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1W13J001 | 13J1 | muirwood dr | Castle | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E01F002 | 1F2 | Brisa at Circuit City | Spring | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E02B002 | 2B2 | south front rd | Spring | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E03A001 | 3A1 | Bluebell | Spring | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E03K003 | 3K3 | first & S. front rd | Mocho I | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E05N001 | 5N1 | Spider Well | Mocho II | M | supply | inactive | Zone 7 | 2 | | | | | | |
| 3S2E07C002 | 7C2 | jaws - york way - G4 | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E07H002 | 7H2 | dakota | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E07N002 | 7N2 | Isabel & Arroyo Mocho | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E07P003 | CWS24 | CWS 24 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E07R002 | 7R2 | CWS 31 Monitoring | Mocho II | D | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E07R003 | CWS31 | CWS 31 | Upland | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E08H002 | 8H2 | North k | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E08H003 | 8H3 | Key_Mo2_L | Mocho II | L | nested | active | Zone 7 | 12 | | X | | X | | |
| 3S2E08H004 | 8H4 | N Liv Ave Deep | Mocho II | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E08K002 | 8K2 | Key_Mo2_U (Livermore Key) | Mocho II | U | monitor | active | Zone 7 | 12 | 15 | X | | X | | |
| 3S2E08N002 | CWS14 | CWS 14 | Mocho II | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E08P001 | CWS8 | CWS 8 | Mocho II | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E08Q009 | 8Q9 | D-2 | Mocho II | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E09Q004 | 9Q4 | school st | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E10F003 | 10F3 | hexcel | Mocho I | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E10Q001 | 10Q1 | almond | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E10Q002 | 10Q2 | LLNL W-703 | Mocho II | L | monitor | unknown | LLNL | 2 | | | | | | |
| 3S2E11C001 | 11C1 | joan way | Mocho I | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E12C004 | 12C4 | LLNL W-486 | Spring | U | monitor | unknown | LLNL | 2 | | | | | | |
| 3S2E12J003 | 12J3 | LLNL W-017A | Spring | L | monitor | unknown | LLNL | 2 | | | | | | |
| 3S2E14A003 | 14A3 | S. vasco @east ave | Mocho I | U | monitor | active | LLNL | 2 | | | | | | |
| 3S2E14B001 | 14B1 | 5763 east ave | Mocho I | L | domestic | unknown | Zone 7 | 2 | | | | | | |
| 3S2E15E002 | 15E2 | Retzlaff Winery | Mocho II | L | irrigation | active | Zone 7 | 2 | | | | | | |
| 3S2E15L001 | 15L1 | Concannon 2 | Mocho II | U | monitor | active | Other | 2 | | | | | | |

# TABLE 5-1
# MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM
# LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S2E15L002 | 15L2 | Concannon 6D | Mocho II | U | monitor | active | Other | 2 | | | | | | |
| 3S2E15M002 | 15M2 | Concannon 1 | Mocho II | U | monitor | active | Other | 2 | | | | | | |
| 3S2E15M003 | 15M3 | Concannon 5D | Mocho II | U | monitor | active | Other | 2 | | | | | | |
| 3S2E15Q006 | 15Q6 | Concannon Old Pumping | Mocho II | L | irrigation | abandoned | Zone 7 | 2 | | | | | | |
| 3S2E15Q008 | 15Q 8 | Concannon 4 | Mocho II | U | monitor | active | Other | 2 | | | | | | |
| 3S2E15R017 | 15R17 | Buena Vista Shallow | Mocho II | U | nested | active | Zone 7 | 2 | | | | | | |
| 3S2E15R018 | 15R18 | Buena Vista Deep | Mocho II | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E15R020 | 15R20 | Concannon 3 | Mocho II | U | monitor | active | Other | 2 | | | | | | |
| 3S2E16A003 | 16A3 | Memory Gardens | Mocho II | L | irrigation | active | Zone 7 | 2 | | | | | | |
| 3S2E16C001 | CWS15 | CWS 15 | Mocho II | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E16E004 | 16E4 | pepper tree | Mocho II | U | monitor | active | Zone 7 | 2 | | | X | | | |
| 3S2E18B001 | CWS20 | CWS 20 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E18E001 | 18E1 | Stanley East of Isabel | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E19D007 | 19D7 | Isabel Shallow | Amador | U | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E19D008 | 19D8 | Isabel Middle 1 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E19D009 | 19D9 | Isabel Middle 2 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E19D010 | 19D10 | Isabel Deep | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E19N003 | 19N3 | Shallow Cemex Nested | Amador | U | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E19N004 | 19N4 | Deep Cemex Nested | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E20M001 | 20M1 | Alden Lane | Amador | L | supply | unknown | Zone 7 | 2 | | | | | | |
| 3S2E20R002 | 20R2 | Ravenswood South Well | Upland | U | irrigation | active | Zone 7 | 2 | | | | | | |
| 3S2E21K009 | 21K9 | Hughey Marina Ave | Upland | U | domestic | active | Zone 7 | 2 | | X | | | | |
| 3S2E22B001 | 22B1 | grapes | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E23E001 | 23E1 | Murrieta Nested Shallow | Mocho II | U | nested | active | Zone 7 | 2 | | | X | | | |
| 3S2E23E002 | 23E2 | Murrieta Nested Deep | Mocho II | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S2E24A001 | 24A1 | S. greenville | Mocho I | U | monitor | active | Zone 7 | 2 | | X | | | | |
| 3S2E26J002 | 26J2 | mines rd | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E29F004 | 29F4 | Wetmore | Amador | U | monitor | active | Zone 7 | 12 | | | X | | X | |
| 3S2E29L001 | 29L1 (P3) | Sycamore Grove P3 | Amador | U | monitor | active | Zone 7 | 2 | | | | | | X |
| 3S2E30C001 | 30C1 | Vineyard 30C 1 | Amador | L | supply | active | Zone 7 | 12 | | | | | | X |
| 3S2E30D002 | 30D2 | vineyard | Amador | U | monitor | active | Zone 7 | 12 | 15 | | X | | X | |
| 3S2E32E007 | 32E7 | DVWTP 32E7 | Upland | U | monitor | active | Zone 7 | 2 | | | X | | | |
| 3S2E33C001 | 33C1 (P1) | Sycamore Grove P1 | Amador | U | monitor | inactive | Zone 7 | 2 | | | X | | | |
| 3S2E33G001 | 33G1 | Crohare | Amador | U | monitor | active | Zone 7 | 12 | | | X | | X | |
| 3S3E06Q003 | 6Q3 | PPWTP South Monitoring | Altamont | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S3E07D002 | 7D2 | 7D 2 | Spring | U | monitor | active | LLNL | 2 | | | | | | |
| 3S3E20L004 | 20L4 | Vail on Tesla | Mocho I | U | domestic | active | Zone 7 | 2 | | | | | | |
| 3S3E20R004 | 20R4 | Buonanno on Tesla | Mocho I | U | domestic | active | Zone 7 | 2 | | | | | | |
| 3S3E21C001 | 21C1 | Russell on Reuss | Upland | U | domestic | active | Zone 7 | 2 | | | | | | |

# TABLE 5-1
# MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM
# LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4S2E01A001 | 1A1 | Gallagher Ag | Mocho II | U | irrigation | active | Zone 7 | 2 | | | X | | | |
| 4S3E06E004 | 6E4 | Gallagher Domestic | Mocho II | U | domestic | active | Zone 7 | 2 | | | | | | |
| WELLS IN THE GROUNDWATER LEVELS PROGRAM = 236 | | | | | | | | | | | | | | |

RMS = Representative Monitoring Site
ICSW = Interconnected Surface Water
WL = Water Levels
WR = Water Rights

# TABLE 5-2
# GROUNDWATER PROGRAM
# WELL CONSTRUCTION DETAILS
# 2021 WATER YEAR

| Site | Map | Type | Other Name | Completed | Basin | Aquifer | RP | TD | Dia | Perf |
|---|---|---|---|---|---|---|---|---|---|---|
| 2S1E32E001 | 32E1 | monitor | End of Arnold Rd | 12/28/2000 | None | U | 392.56 | 70 | 2 | 55 - 70 |
| 2S1E32N001 | 32N1 | monitor | Camp Parks | 7/1/1976 | Camp | U | 360.79 | 44 | 2.5 | 34 - 39 |
| 2S1E32Q001 | 32Q1 | monitor | Summer Glen Dr | 12/29/2000 | Camp | U | 367.55 | 45 | 2 | 30 - 45 |
| 2S1E33L001 | 33L1 | monitor | Gleason Dr @ Tassajara | 12/27/2000 | None | U | 389.46 | 80 | 2 | 65 - 80 |
| 2S1E33P002 | 33P2 | monitor | Central Pkwy at Emerald Glen P | 12/20/2000 | Camp | U | 370.05 | 55 | 2 | 45 - 55 |
| 2S1E33R001 | 33R1 | monitor | Central Pkwy @ Grafton | 10/23/2001 | None | U | 358.5 | 60 | 2 | 40 - 60 |
| 2S1W15F001 | 15F1 | monitor | BOLLINGER | 9/28/1976 | Bishop | U | 439.44 | 60 | 2.5 | 50.3 - 55.3 |
| 2S1W26C002 | 26C2 | monitor | PINE VALLEY | 9/28/1976 | Dublin | U | 406.53 | 50 | 2.5 | 40 - 45 |
| 2S1W36E003 | 36E3 | monitor | Kolb Park | 9/13/1977 | Dublin | U | 346.51 | 60 | 2.5 | 50 - 55 |
| 2S1W36F001 | 36F1 | nested | Dublin High shallow | 5/8/1996 | Dublin | L | 342.71 | 190 | 2 | 140 - 180 |
| 2S1W36F002 | 36F2 | nested | Dublin High mid | 5/8/1996 | Dublin | L | 342.71 | 320 | 2 | 270 - 310 |
| 2S2E21L001 | 21L1 | domestic | Merlin | 5/1/1973 | May | U | 563 | 168 | 10 | 49 - 168 |
| 2S2E27K001 | 27K1 | livestock | Model Airport | 4/28/1954 | Spring | U | 521.8 | 96 | 8 | 49 - 88 |
| 2S2E27M002 | 27M2 | domestic | Kwan | 7/16/1975 | May | U | 521 | 112 | 6 | 0 - 0 |
| 2S2E27P002 | 27P2 | monitor | hartford ave east | 6/18/1979 | Spring | U | 505.43 | 68 | 4 | 35 - 63 |
| 2S2E28D002 | 28D2 | monitor | May School | 11/2/1976 | May | U | 555.15 | 55 | 2.5 | 44 - 49 |
| 2S2E28J002 | 28J2 | industrial | FCC Well | 7/26/1984 | May | L | 522.292 | 230 | 6 | 50 - 230 |
| 2S2E28Q001 | 28Q1 | monitor | hartford ave | 11/2/1976 | May | U | 513.04 | 28 | 2.5 | 17.6 - 22.6 |
| 2S2E32K002 | 32K2 | monitor | jenson's N liv. Ave | 12/20/1977 | Cayetano | U | 507.43 | 43 | 2.5 | 33 - 38 |
| 2S2E34E001 | 34E1 | monitor | Mud City | 12/21/1977 | May | U | 499.73 | 49 | 2.5 | 40 - 45 |
| 2S2E34Q002 | 34Q2 | monitor | Hollyhock & Crocus | 12/12/2001 | Spring | U | 507.24 | 50 | 2 | 25 - 50 |
| 3S1E01F002 | 1F2 | monitor | Constitution Dr | 12/18/2000 | Camp | U | 428.44 | 40 | 2 | 25 - 40 |
| 3S1E01H003 | 1H3 | monitor | Collier Canyon g1 | 12/20/1977 | Camp | U | 422.8 | 80 | 2.5 | 70 - 75 |
| 3S1E01J004 | 1J04 | irrigation | Collier Vineyards | 2/6/2018 | Camp | L |  | 300 | 12 | 260 - 280 |
| 3S1E01L001 | 1L1 | monitor | Kitty Hawk | 12/19/2000 | Camp | U | 403.04 | 70 | 2 | 60 - 70 |
| 3S1E01P002 | 1P2 | monitor | Airport gas g5 | 12/11/1975 | Amador | U | 389.64 | 50 | 2.5 | 40 - 45 |
| 3S1E01P003 | 1P3 | supply | New airport well | 7/28/1988 | Amador | L | 394.44 | 480 | 12 | 245 - 460 |
| 3S1E02J002 | 2J2 | monitor | Maint. Bldg | 7/16/2003 | Camp | U | 380.89 | 41 | 2 | 31 - 41 |
| 3S1E02J003 | 2J3 | monitor | Doolan Rd East | 7/16/2003 | Camp | U | 406.35 | 65 | 2 | 55 - 65 |
| 3S1E02K002 | 2K2 | monitor | Doolan Rd West | 12/10/1975 | Camp | U | 397.04 | 46 | 2.5 | 36.5 - 41.5 |
| 3S1E02M003 | 2M3 | monitor | Friesman Rd North | 11/13/2000 | Camp | U | 365.04 | 50 | 2 | 35 - 50 |
| 3S1E02N006 | 2N6 | monitor | Friesman Rd South | 11/13/2000 | Amador | U | 366.14 | 55 | 2 | 40 - 55 |
| 3S1E02P003 | 2P3 | domestic | Crosswinds Church | 9/26/1977 | Camp | L | 371.73 | 380 | 10 | 340 - 372 |
| 3S1E02Q001 | 2Q1 | monitor | LPGC #1 | 7/16/2003 | Amador | U | 369.92 | 45 | 2 | 35 - 45 |
| 3S1E02R001 | 2R1 | monitor | Beebs | 11/1/1975 | Amador | U | 376.29 | 33 | 2.5 | 21 - 26 |
| 3S1E03G002 | 3G2 | monitor | fallon rd | 1/18/1978 | Camp | U | 354.24 | 50 | 2.5 | 40 - 45 |
| 3S1E04A001 | 4A1 | monitor | SMP-DUB-2 | 10/23/2001 | Camp | U | 350.67 | 49.5 | 2 | 29.5 - 49.5 |
| 3S1E04J005 | 4J5 | monitor | Pimlico shallow | 10/25/2001 | Camp | U | 345.2 | 47 | 2 | 22 - 47 |
| 3S1E04J006 | 4J6 | monitor | Pimlico deep | 10/24/2001 | Camp | U | 345.55 | 110 | 2 | 65 - 110 |
| 3S1E04Q002 | 4Q2 | monitor | gulfstream | 12/13/1977 | Amador | U | 345.42 | 90 | 2.5 | 80 - 85 |
| 3S1E05K006 | 5K6 | monitor | Rosewood shallow | 6/7/1990 | Camp | U | 346.05 | 75 | 4 | 40 - 70 |
| 3S1E05K007 | 5K7 | monitor | Rosewood deep | 6/8/1990 | Camp | L | 346.19 | 150 | 4 | 134 - 144 |
| 3S1E05L003 | 5L3 | monitor | Oracle | 12/11/2001 | Camp | U | 339.43 | 40 | 2 | 15 - 40 |
| 3S1E05P006 | 5P6 | monitor | Owens Park | 12/19/2000 | Camp | U | 336.65 | 35 | 2 | 25 - 35 |

RP = Reference Point Elevation (in feet above MSL)
TD = Total Depth of well (in feet below ground surface)
Dia = Diameter of well casing (in inches)
Perf = Preferated interval (in feet below ground surface), uppermost - lowermost

| Site | Map | Type | Other Name | Completed | Basin | Aquifer | RP | TD | Dia | Perf |
|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E06F003 | 6F3 | monitor | Dublin Ct | 9/29/1976 | Dublin | U | 329.82 | 36 | 2.5 | 27 - 32 |
| 3S1E06N002 | 6N2 | monitor | DSRSD MW-3 | 3/20/1985 | Dublin | U | 335.2 | 67 | 4 | 47 - 67 |
| 3S1E06N003 | 6N3 | monitor | DSRSD MW-4 | 12/4/1984 | Dublin | U | 340.74 | 72 | | 52 - 72 |
| 3S1E06N006 | 6N6 | monitor | DSRSD NE-76 | 11/9/2007 | Dublin | U | 333.58 | 75 | 2 | 50 - 70 |
| 3S1E07B002 | 7B2 | monitor | Hopyard rd | 5/17/1979 | Dublin | L | 327.77 | 152 | 4 | 143 - 149 |
| 3S1E07B012 | 7B12 | monitor | Hacienda Arch | 7/31/2002 | Dublin | U | 327.82 | 70 | 2 | 50 - 70 |
| 3S1E07D001 | 7D1 | monitor | DSRSD SW-75 | 11/6/2007 | Dublin | U | 330.09 | 75 | 2 | 54 - 74 |
| 3S1E07D003 | 7D3 | monitor | DSRSD SE-70 | 11/2/2007 | Dublin | U | 332.28 | 70 | 2 | 45 - 65 |
| 3S1E07G007 | 7G7 | monitor | Chabot Well | 1/22/2002 | Dublin | U | 327.33 | 55 | 2 | 35 - 55 |
| 3S1E07J005 | 7J5 | monitor | Thomas Hart School | 7/10/2002 | Dublin | U | 326.78 | 50 | 2 | 30 - 50 |
| 3S1E08B001 | 8B1 | monitor | Lizard Well | 5/31/1979 | Amador | U | 338.28 | 148 | 4 | 55 - 82 |
| 3S1E08G004 | 8G4 | monitor | Apache | 12/19/2001 | Amador | U | 341.47 | 85 | 2 | 60 - 85 |
| 3S1E08H009 | 8H9 | nested | Mocho 4 Nested Shallow | 12/12/1996 | Amador | L | 338.53 | 240 | 2 | 210 - 230 |
| 3S1E08H010 | 8H10 | nested | Mocho 4 Nested Middle | 12/12/1996 | Amador | L | 339.26 | 440 | 2 | 290 - 430 |
| 3S1E08H011 | 8H11 | nested | Mocho 4 Nested deep | 12/21/1996 | Amador | D | 339.26 | 720 | 2 | 520 - 720 |
| 3S1E08H013 | 8H13 | monitor | Mocho 3 mon | 12/11/1998 | Amador | D | 338.96 | 800 | 2 | 570 - 790 |
| 3S1E08H018 | M4 | muni | Mocho 4 | 11/1/2000 | Amador | L | 341.94 | 745 | 20 | 515 - 730 |
| 3S1E08K001 | 8K1 | monitor | Cockroach well | 1/23/1978 | Amador | U | 332.37 | 99 | 2.5 | 89 - 94 |
| 3S1E08N001 | 8N1 | monitor | sports park | 8/27/1976 | Bernal | U | 323.68 | 72 | 2.5 | 62 - 67 |
| 3S1E09B001 | St1 | muni | Stoneridge | 1/28/1992 | Amador | L | 349.23 | 810 | 20 | 250 - 800 |
| 3S1E09H013 | 9H13 | domestic | Lister | | Amador | U | | 145 | 8 | - |
| 3S1E09J007 | 9J7 | nested | SW Lake I Shallow | 11/23/2004 | Amador | U | 357.36 | 145 | 2 | 120 - 140 |
| 3S1E09J008 | 9J8 | nested | SW Lake I Middle | 11/23/2004 | Amador | L | 357.55 | 305 | 2 | 280 - 300 |
| 3S1E09J009 | 9J9 | nested | SW Lake I Deep | 11/23/2004 | Amador | L | 357.68 | 505 | 2 | 480 - 500 |
| 3S1E09M002 | M1 | muni | Mocho 1 | 4/6/1964 | Amador | L | 343.95 | 530 | 16 | 150 - 510 |
| 3S1E09M003 | M2 | muni | Mocho 2 | 5/4/1967 | Amador | L | 347.47 | 575 | 18 | 250 - 570 |
| 3S1E09M004 | M3 | muni | Mocho 3 | 11/1/2000 | Amador | L | 342.89 | 498 | 20 | 315 - 493 |
| 3S1E09P005 | 9P5 | monitor | Key_AmW_U (Mohr Key) | 12/6/1977 | Amador | U | 349.4 | 105 | 2.5 | 95 - 100 |
| 3S1E09P009 | 9P9 | nested | Mohr Ave Shallow | 3/23/2005 | Amador | L | 349.59 | 210 | 2 | 185 - 205 |
| 3S1E09P010 | 9P10 | nested | Key_AmW_L | 3/23/2005 | Amador | L | 349.51 | 310 | 2 | 285 - 305 |
| 3S1E09P011 | 9P11 | nested | Mohr Ave Deep | 3/23/2005 | Amador | L | 349.44 | 425 | 2 | 405 - 420 |
| 3S1E10A002 | 10A2 | monitor | El Charro Rd | 5/10/1979 | Amador | U | 367.35 | 88 | 4 | 70 - 80 |
| 3S1E10B008 | 10B8 | nested | Kaiser Rd Shallow | 6/18/1997 | Amador | L | 353.6 | 200 | 2 | 100 - 190 |
| 3S1E10B009 | 10B9 | nested | Kaiser Rd Middle 1 | 6/18/1997 | Amador | L | 353.49 | 294 | 2 | 244 - 284 |
| 3S1E10B010 | 10B10 | nested | Kaiser Rd Middle 2 | 6/18/1997 | Amador | L | 353.52 | 600 | 2 | 400 - 590 |
| 3S1E10B011 | 10B11 | nested | Kaiser Rd Deep | 6/18/1997 | Amador | D | 353.52 | 810 | 2 | 660 - 800 |
| 3S1E10B014 | 10B14 | monitor | COL 5 Monitoring | 2/26/2014 | Amador | L | 355.591 | 690 | 2 | 390 - 690 |
| 3S1E10B016 | COL5 | muni | COL 5 | 7/19/2014 | Amador | L | 357.584 | 690 | 18 | 390 - 690 |
| 3S1E10D002 | 10D2 | nested | Stoneridge Shallow | 9/10/1998 | Amador | L | 349.32 | 212 | 2 | 182 - 212 |
| 3S1E10D003 | 10D3 | nested | Stoneridge Middle 1 | 9/10/1998 | Amador | L | 349.28 | 322 | 2 | 262 - 312 |
| 3S1E10D004 | 10D4 | nested | Stoneridge Middle 2 | 9/10/1998 | Amador | L | 349.3 | 616 | 2 | 366 - 606 |
| 3S1E10D005 | 10D5 | nested | Stoneridge Deep | 9/10/1998 | Amador | D | 349.32 | 790 | 2 | 720 - 780 |
| 3S1E10K002 | 10K2 | monitor | COL 1 Monitoring | 1/17/2007 | Amador | L | 358.68 | 590.6 | 4 | 195.5 - 585.6 |
| 3S1E10K003 | COL1 | muni | COL 1 | 2/27/2008 | Amador | L | 363.79 | 530 | 18 | 205 - 530 |
| 3S1E11B001 | 11B1 | monitor | Airport West | 12/11/1975 | Amador | U | 369.35 | 43 | 2.5 | 33 - 38 |
| 3S1E11C003 | 11C3 | monitor | LAVWMA ROW | 12/22/2003 | Amador | U | 364.82 | 55 | 2 | 35 - 55 |
| 3S1E11G001 | 11G1 | nested | Key_AmE_U | 4/8/1997 | Amador | U | 371.62 | 120 | 2 | 100 - 110 |
| 3S1E11G002 | 11G2 | nested | Rancho Charro Middle 1 | 4/8/1997 | Amador | L | 371.61 | 350 | 2 | 230 - 340 |
| 3S1E11G003 | 11G3 | nested | Rancho Charro Middle 2 | 4/8/1997 | Amador | L | 371.64 | 590 | 2 | 380 - 580 |
| 3S1E11G004 | 11G4 | nested | Rancho Charro Deep | 4/8/1997 | Amador | D | 371.68 | 790 | 2 | 620 - 780 |
| 3S1E11M002 | 11M2 | monitor | COL 2 Monitoring | 9/25/2007 | Amador | L | 365.96 | 700 | 4.5 | 199 - 699 |

RP = Reference Point Elevation (in feet above MSL)  TD = Total Depth of well (in feet below ground surface)
Dia = Diameter of well casing (in inches)  Perf = Preferated interval (in feet below ground surface), uppermost - lowermost

| Site | Map | Type | Other Name | Completed | Basin | Aquifer | RP | TD | Dia | Perf |
|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E11M003 | COL2 | muni | COL 2 | 2/14/2008 | Amador | L | 369.24 | 684 | 18 | 345 - 684 |
| 3S1E11P006 | 11P6 | domestic | New Jamieson Residence | 3/10/2000 | Amador | L | 376.67 | 400 | 5 | 240 - 380 |
| 3S1E12A002 | 12A2 | monitor | Airport South | 12/11/1975 | Amador | U | 401.35 | 69 | 2.5 | 63.7 - 68.7 |
| 3S1E12D002 | 12D2 | monitor | LWRP G6 | | Amador | U | 384.45 | 44.6 | | 36 - 41 |
| 3S1E12G001 | 12G1 | monitor | Oaks Park Shallow | 12/12/1975 | Amador | U | 404.47 | 73 | 2.5 | 63 - 68 |
| 3S1E12H004 | 12H4 | nested | LWRP Shallow | 1/8/1998 | Amador | L | 407.75 | 270 | 2 | 185 - 260 |
| 3S1E12H005 | 12H5 | nested | LWRP Middle 1 | 1/8/1998 | Amador | L | 407.78 | 400 | 2 | 360 - 390 |
| 3S1E12H006 | 12H6 | nested | LWRP Middle 2 | 1/8/1998 | Amador | L | 407.75 | 480 | 2 | 410 - 468 |
| 3S1E12H007 | 12H7 | nested | LWRP Deep | 1/8/1998 | Amador | D | 407.67 | 684 | 2 | 609 - 674 |
| 3S1E12K002 | 12K2 | nested | Oaks Park Mid | 11/1/2005 | Amador | L | 406.29 | 300 | 2 | 210 - 295 |
| 3S1E12K003 | 12K3 | nested | Key_AmE_L | 11/1/2005 | Amador | L | 406.83 | 475 | 2 | 355 - 470 |
| 3S1E12K004 | 12K4 | nested | Oaks Park Deep | 11/1/2005 | Amador | D | 406.71 | 575 | 2 | 550 - 570 |
| 3S1E13P005 | 13P5 | nested | LGA Grant Nested 1 | 11/2/2010 | Amador | U | 399.97 | 135 | 2 | 110 - 130 |
| 3S1E13P006 | 13P6 | nested | LGA Grant Nested 2 | 11/2/2010 | Amador | L | 399.93 | 255 | 2 | 230 - 250 |
| 3S1E13P007 | 13P7 | nested | LGA Grant Nested 3 | 11/2/2010 | Amador | L | 399.97 | 375 | 2 | 350 - 370 |
| 3S1E13P008 | 13P8 | nested | LGA Grant Nested 4 | 11/2/2010 | Amador | L | 399.94 | 605 | 2 | 580 - 600 |
| 3S1E14B001 | 14B1 | industrial | Industrial Asphalt | | Amador | L | 384.2 | 435 | 8 | 200 - 410 |
| 3S1E14D002 | 14D2 | monitor | South Cope Lake | 8/30/2006 | Amador | L | 371.83 | 740 | 14.5 | 170 - 740 |
| 3S1E15J003 | 15J3 | supply | shadow cliff | 12/2/1980 | Amador | L | 344.59 | 196 | 8 | 154 - 184 |
| 3S1E15M003 | 15M3 | monitor | Bush/Valley South | 12/15/1998 | Amador | L | 362.88 | 600 | 2 | 280 - 590 |
| 3S1E16A002 | P8 | muni | Pleas 8 | 3/27/1992 | Amador | L | 358.2 | 500 | 20 | 200 - 495 |
| 3S1E16A004 | 16A4 | monitor | Bush/Valley Mid | 12/3/1998 | Amador | L | 359.36 | 603 | 2 | 280 - 580 |
| 3S1E16B001 | 16B1 | monitor | Bush/Valley North | 12/18/1998 | Amador | D | 355.81 | 805 | 2 | 605 - 800 |
| 3S1E16C002 | 16C2 | nested | Santa Rita Valley Shallow | 4/14/2005 | Amador | L | 344.38 | 190 | 2 | 165 - 185 |
| 3S1E16C003 | 16C3 | nested | Santa Rita Valley Middle | 4/14/2005 | Amador | L | 344.27 | 305 | 2 | 280 - 300 |
| 3S1E16C004 | 16C4 | nested | Santa Rita Valley Deep | 4/14/2005 | Amador | L | 344.16 | 375 | 2 | 355 - 370 |
| 3S1E16E004 | 16E4 | monitor | black ave - cultural | 12/15/1977 | Amador | U | 351.69 | 105 | 2.5 | 95 - 100 |
| 3S1E16L005 | P5 | muni | Pleas 5 | 4/4/1962 | Amador | L | 358.05 | 685 | 18 | 149 - 650 |
| 3S1E16L007 | P6 | muni | Pleas 6 | 6/1/1966 | Amador | L | 354.47 | 647 | 18 | 165 - 647 |
| 3S1E16P005 | 16P5 | monitor | Vervais Monitor | 10/8/1976 | Amador | U | 354.51 | 75 | 2.5 | 64 - 69 |
| 3S1E17B004 | 17B4 | supply | Casterson | 1/1/1950 | Amador | L | 337.69 | 248 | 8 | 0 - 248 |
| 3S1E17D003 | 17D3 | nested | Hopyard Nested Shallow | 8/6/1996 | Bernal | L | 325.13 | 108 | 4 | 92 - 98 |
| 3S1E17D004 | 17D4 | nested | Hopyard Nested Middle 1 | 8/6/1996 | Bernal | L | 325.14 | 236 | 4 | 206 - 226 |
| 3S1E17D005 | 17D5 | nested | Hopyard Nested Middle 2 | 8/6/1996 | Bernal | L | 325.13 | 308 | 4 | 266 - 286 |
| 3S1E17D006 | 17D6 | nested | Hopyard Nested Middle 3 | 8/6/1996 | Bernal | L | 325.12 | 408 | 4 | 378 - 398 |
| 3S1E17D007 | 17D7 | nested | Hopyard Nested Deep | 8/6/1996 | Bernal | D | 325.13 | 684 | 4 | 654 - 674 |
| 3S1E17D011 | 17D11 | monitor | Hopyard 9 Monitoring Well | 12/16/1998 | Bernal | L | 324.84 | 603 | 2 | 340 - 505 |
| 3S1E17D012 | H9 | muni | Hopyard 9 | 11/5/1999 | Bernal | L | 327.9 | 315 | 18 | 235 - 310 |
| 3S1E18A006 | H6 | muni | Hopyard 6 | 2/1/1987 | Bernal | L | 326.74 | 500 | 18 | 158 - 490 |
| 3S1E18E004 | 18E4 | monitor | Valley Trails II | 5/31/1979 | Bernal | U | 320.21 | 83 | 4 | 69 - 79 |
| 3S1E18J002 | 18J2 | monitor | camino segura | 10/20/1977 | Bernal | U | 323.02 | 71 | 2.5 | 61 - 66 |
| 3S1E19A010 | SF-B | muni | SFWD South (B) | | Bernal | L | 337.02 | 331 | | 189 - 327 |
| 3S1E19A011 | SF-A | muni | SFWD North (A) | 10/9/2001 | Bernal | L | 334.27 | 330 | 18 | 196 - 320 |
| 3S1E19C004 | 19C4 | monitor | del valle & laguna | 6/11/1979 | Bernal | U | 322.23 | 78 | 4 | 68 - 73 |
| 3S1E19K001 | 19K1 | monitor | 680/bernal | 12/8/1975 | Bernal | U | 321.54 | 57.6 | 2.5 | 47.6 - 52.6 |
| 3S1E20B002 | 20B2 | supply | Fairgrounds Potable | 12/27/1961 | Bernal | L | 344.03 | 500 | 12 | 218 - 500 |
| 3S1E20C007 | 20C7 | monitor | Key_Bern_U | 6/15/2000 | Bernal | U | 338.66 | 153 | 2 | 65 - 145 |
| 3S1E20C008 | 20C8 | nested | Key_Bern_L | 10/20/2008 | Bernal | L | 338.67 | 315 | 2 | 295 - 315 |
| 3S1E20C009 | 20C9 | nested | Fair Nested Deep | 10/20/2008 | Bernal | L | 338.78 | 515 | 2 | 495 - 515 |
| 3S1E20J004 | 20J4 | monitor | civic center | 12/5/1975 | Bernal | U | 331.62 | 72 | 2.5 | 62 - 67 |
| 3S1E20M011 | 20M11 | monitor | S.F "M"LINE | 10/12/1977 | Bernal | U | 325.73 | 71 | 2.5 | 61 - 66 |

RP = Reference Point Elevation (in feet above MSL)
TD = Total Depth of well (in feet below ground surface)
Dia = Diameter of well casing (in inches)
Perf = Preferated interval (in feet below ground surface), uppermost - lowermost

| Site | Map | Type | Other Name | Completed | Basin | Aquifer | RP | TD | Dia | Perf |
|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E20Q002 | 20Q2 | monitor | 20Q2 | 2/17/1976 | Bernal | U | 325.82 | 65 | 10 | 45 - 53 |
| 3S1E22D002 | 22D2 | monitor | vineyard trailer | 10/28/1976 | Amador | U | 368.05 | 72 | 2.5 | 62 - 67 |
| 3S1E23J001 | 23J1 | domestic | 1627 vineyard trailer | 3/4/1958 | Amador | L | 428.2 | 120 | 8 | 0 - 120 |
| 3S1E25C003 | 25C3 | monitor | Katz Winery Mansion | 11/28/1990 | Amador | U | 454.16 | 146 | 2 | 70 - 140 |
| 3S1E28M002 | 28M2 | supply | Bargar | 2/8/1962 | Upland | U | 0 | 141 | 5 | 80 - 141 |
| 3S1E29M004 | 29M4 | monitor | f.c. channel | 12/4/1975 | Castle | U | 310.94 | 57 | 2.5 | 47 - 52 |
| 3S1E29P002 | 29P2 | monitor | castlewood dr | 12/9/1975 | Bernal | U | 302.82 | 42 | 2.5 | 32 - 37 |
| 3S1E33G005 | 33G5 | monitor | Pleasanton Calippe 33G5 | 7/21/2006 | Upland | U | 0 | 35 | 2 | 11 - 35 |
| 3S1W01B009 | 1B9 | nested | DSRSD Shallow | 2/15/1996 | Dublin | L | 333.56 | 162 | 2 | 122 - 152 |
| 3S1W01B010 | 1B10 | nested | DSRSD Middle | 2/15/1996 | Dublin | L | 333.57 | 414 | 2 | 274 - 404 |
| 3S1W01B011 | 1B11 | nested | DSRSD Deep | 2/15/1996 | Dublin | L | 333.74 | 560 | 2 | 480 - 550 |
| 3S1W01J001 | 1J1 | monitor | DSRSD MW-1 | 12/4/1984 | Dublin | U | 334.36 | 70 | | 47 - 64 |
| 3S1W02A002 | 2A2 | monitor | McNamara's | 10/7/1976 | Dublin | U | 369.4 | 47 | 2.5 | 37 - 42 |
| 3S1W12B002 | 12B2 | monitor | Stoneridge Mall Rd | 6/21/1996 | Dublin | U | 342.89 | 39.5 | 4 | 20 - 50 |
| 3S1W12J001 | 12J1 | monitor | DSRSD South | 12/9/1975 | Dublin | U | 329.31 | 62 | 2.5 | 52 - 57 |
| 3S1W13J001 | 13J1 | monitor | muirwood dr | 10/7/1976 | Castle | U | 343.94 | 48 | 2.5 | 39 - 44 |
| 3S2E01F002 | 1F2 | monitor | Brisa at Circuit City | 12/22/1977 | Spring | U | 572.99 | 68.6 | 2.5 | 59 - 64 |
| 3S2E02B002 | 2B2 | monitor | south front rd | 6/7/1976 | Spring | U | 539.45 | 46 | 2.5 | 36.9 - 41.9 |
| 3S2E03A001 | 3A1 | monitor | Bluebell | 12/21/1977 | Spring | U | 517.63 | 54 | 2.5 | 44 - 49 |
| 3S2E03K003 | 3K3 | monitor | first & S. front rd | 12/12/1977 | Mocho I | U | 522.83 | 60 | 2.5 | 50 - 55 |
| 3S2E05N001 | 5N1 | supply | Spider Well | 10/5/1977 | Mocho II | M | 444 | 210 | 10 | 0 - 210 |
| 3S2E07C002 | 7C2 | monitor | jaws - york way - G4 | 4/6/1978 | Mocho II | U | 420.84 | 49 | 2.5 | 39 - 44 |
| 3S2E07H002 | 7H2 | monitor | dakota | 7/29/1989 | Mocho II | U | 442.85 | 54 | 2 | 44 - 54 |
| 3S2E07N002 | 7N2 | monitor | Isabel & Arroyo Mocho | 12/20/2012 | Amador | U | 422 | 162 | 2 | 132 - 152 |
| 3S2E07P003 | CWS24 | muni | CWS 24 | 4/4/1972 | Amador | L | 431.46 | 510 | 16 | 300 - 490 |
| 3S2E07R003 | CWS31 | muni | CWS 31 | 9/20/2002 | Upland | L | 446 | 583 | 16 | 410 - 528 |
| 3S2E08F001 | CWS10 | muni | CWS 10 | 5/15/1954 | Mocho II | L | 456.24 | 470 | 16 | 143 - 433 |
| 3S2E08H002 | 8H2 | monitor | North k | 6/14/1976 | Mocho II | U | 469.61 | 46 | 2.5 | 36 - 41 |
| 3S2E08H003 | 8H3 | nested | Key_Mo2_L | 7/10/2009 | Mocho II | L | 477.25 | 195 | 2 | 170 - 190 |
| 3S2E08H004 | 8H4 | nested | N Liv Ave Deep | 7/10/2009 | Mocho II | L | 476.97 | 385 | 2 | 360 - 380 |
| 3S2E08K002 | 8K2 | monitor | Key_Mo2_U (Livermore Key) | 12/13/1977 | Mocho II | U | 464.78 | 74 | 2.5 | 64 - 69 |
| 3S2E08N002 | CWS14 | muni | CWS 14 | 1/16/1958 | Mocho II | L | 453.64 | 526 | 10 | 140 - 515 |
| 3S2E08Q009 | 8Q9 | monitor | D-2 | 6/15/1999 | Mocho II | L | 464.7 | 114 | 2 | 99 - 114 |
| 3S2E09Q001 | CWS9 | muni | CWS 9 | 2/18/1952 | Mocho II | L | 518.15 | 572 | 14 | 180 - 492 |
| 3S2E09Q004 | 9Q4 | monitor | school st | 11/1/1977 | Mocho II | U | 505.425 | 80 | 2.5 | 70 - 75 |
| 3S2E10F003 | 10F3 | monitor | hexcel | 12/12/1977 | Mocho I | U | 534.84 | 45 | 2.5 | 35 - 40 |
| 3S2E10Q001 | 10Q1 | monitor | almond | 11/1/1976 | Mocho II | U | 555.36 | 43.5 | 2.5 | 33.5 - 39 |
| 3S2E10Q002 | 10Q2 | monitor | LLNL W-703 | 12/3/1990 | Mocho II | L | 549.569 | 325 | 4.5 | 298 - 325 |
| 3S2E11C001 | 11C1 | monitor | joan way | 11/1/1976 | Mocho I | U | 556.347 | 66.2 | 2.5 | 56.2 - 61.2 |
| 3S2E12C004 | 12C4 | monitor | LLNL W-486 | 3/11/1988 | Spring | U | 591.46 | 108 | 4.5 | 100 - 108 |
| 3S2E12J003 | 12J3 | monitor | LLNL W-017A | 5/20/1981 | Spring | L | 631.05 | 160 | 5 | 127 - 157 |
| 3S2E14A003 | 14A3 | monitor | S. vasco @east ave | 12/13/1977 | Mocho I | U | 602.24 | 110 | 2.5 | 100 - 105 |
| 3S2E14B001 | 14B1 | domestic | 5763 east ave | 5/26/1983 | Mocho I | L | 593.36 | 300 | 9 | 146 - 234 |
| 3S2E15E002 | 15E2 | irrigation | Retzlaff Winery | 11/14/1983 | Mocho II | L | 549.69 | 192 | 8 | 104 - 189 |
| 3S2E15L001 | 15L1 | monitor | Concannon 2 | 10/10/2013 | Mocho II | U | 561.5 | 40.5 | 2 | 20 - 40.5 |
| 3S2E15L002 | 15L2 | monitor | Concannon 6D | 1/14/2015 | Mocho II | U | | 70.5 | 2 | 40 - 70 |
| 3S2E15M002 | 15M2 | monitor | Concannon 1 | 10/10/2013 | Mocho II | U | 549.46 | 45 | 2 | 25 - 45 |
| 3S2E15M003 | 15M3 | monitor | Concannon 5D | 1/13/2015 | Mocho II | U | | 75.8 | 2 | 45.3 - 75.3 |
| 3S2E15Q008 | 15Q 8 | monitor | Concannon 4 | 1/14/2015 | Mocho II | U | | 41 | 2 | 10.5 - 40.5 |
| 3S2E15R017 | 15R17 | nested | Buena Vista Shallow | 12/14/2006 | Mocho II | U | 592.41 | 63 | 2 | 38 - 58 |
| 3S2E15R018 | 15R18 | monitor | Buena Vista Deep | 12/15/2007 | Mocho II | L | 592.47 | 138 | 2 | 113 - 133 |

RP = Reference Point Elevation (in feet above MSL) TD = Total Depth of well (in feet below ground surface)
Dia = Diameter of well casing (in inches) Perf = Preferated interval (in feet below ground surface), uppermost - lowermost

| Site | Map | Type | Other Name | Completed | Basin | Aquifer | RP | TD | Dia | Perf |
|---|---|---|---|---|---|---|---|---|---|---|
| 3S2E15R020 | 15R20 | monitor | Concannon 3 | 1/14/2015 | Mocho II | U | | 51 | 2 | 20.5 - 50.5 |
| 3S2E16A003 | 16A3 | irrigation | Memory Gardens | 5/1/1972 | Mocho II | L | 527.06 | 240 | 10 | 91 - 240 |
| 3S2E16C001 | CWS15 | muni | CWS 15 | 2/18/1958 | Mocho II | L | 510.97 | 584 | 16 | 150 - 523 |
| 3S2E16E004 | 16E4 | monitor | pepper tree | 12/15/1977 | Mocho II | U | 506.26 | 45 | 2.5 | 35 - 40 |
| 3S2E18B001 | CWS20 | muni | CWS 20 | 1/30/1961 | Amador | L | 438.56 | 497 | 16 | 190 - 465 |
| 3S2E18E001 | 18E1 | monitor | Stanley East of Isabel | 4/22/1977 | Amador | U | 423.86 | 133.8 | 2.5 | 123.8 - 128.8 |
| 3S2E19D007 | 19D7 | nested | Isabel Shallow | 1/29/1999 | Amador | U | 415.07 | 180 | 2 | 100 - 180 |
| 3S2E19D008 | 19D8 | nested | Isabel Middle 1 | 1/29/1999 | Amador | L | 415.04 | 260 | 2 | 210 - 260 |
| 3S2E19D009 | 19D9 | nested | Isabel Middle 2 | 1/29/1999 | Amador | L | 414.98 | 390 | 2 | 280 - 390 |
| 3S2E19D010 | 19D10 | nested | Isabel Deep | 1/29/1999 | Amador | L | 414.89 | 470 | 2 | 420 - 470 |
| 3S2E19K001 | 19K1 | supply | Cavicchi | | Amador | L | 0 | 160 | 2 | 0 - 0 |
| 3S2E19N003 | 19N3 | nested | Shallow Cemex Nested | 7/27/2018 | Amador | U | 418.45 | 120 | 2 | 105 - 115 |
| 3S2E19N004 | 19N4 | nested | Deep Cemex Nested | 7/27/2018 | Amador | L | 417.96 | 203 | 2 | 188 - 198 |
| 3S2E20M001 | 20M1 | supply | Alden Lane | 9/15/1928 | Amador | L | 478.79 | 184 | 12 | 0 - 184 |
| 3S2E20R002 | 20R2 | irrigation | Ravenswood South Well | 5/1/1985 | Upland | U | 522 | 257 | 9 | 107 - 252 |
| 3S2E21K008 | 21K8 | supply | Roberts on Marina | | Upland | | 0 | 220 | 6 | 0 - 0 |
| 3S2E21K009 | 21K9 | domestic | Hughey Marina Ave | | Upland | U | 0 | 0 | 6 | 0 - 0 |
| 3S2E22B001 | 22B1 | monitor | grapes | 7/8/1976 | Mocho II | U | 585.88 | 31.9 | 2.5 | 21.9 - 26.9 |
| 3S2E23E001 | 23E1 | nested | Murrieta Nested Shallow | 9/2/2004 | Mocho II | U | 613.36 | 40 | 2 | 20 - 35 |
| 3S2E23E002 | 23E2 | nested | Murrieta Nested Deep | 9/2/2004 | Mocho II | L | 613.23 | 110 | 2 | 95 - 105 |
| 3S2E24A001 | 24A1 | monitor | S. greenville | 11/1/1976 | Mocho I | U | 717.7 | 46.3 | 2.5 | 36.3 - 41.3 |
| 3S2E26J002 | 26J2 | monitor | mines rd | 12/27/1977 | Mocho II | U | 689.92 | 44 | 2.5 | 34 - 39 |
| 3S2E29F004 | 29F4 | monitor | Wetmore | 10/28/1976 | Amador | U | 457.5 | 36 | 2.5 | 26 - 31 |
| 3S2E29L001 | 29L1 (P3 | monitor | Sycamore Grove P3 | 11/29/2001 | Amador | U | 457.96 | 23 | 2 | 8 - 23 |
| 3S2E30C001 | 30C1 | supply | Vineyard 30C 1 | 3/16/1995 | Amador | L | 439.41 | 150 | 6 | 125 - 145 |
| 3S2E30D002 | 30D2 | monitor | vineyard | 6/18/1979 | Amador | U | 431.6 | 44 | 4 | 24 - 39 |
| 3S2E32E007 | 32E7 | monitor | DVWTP 32E7 | 7/16/1991 | Upland | U | 610.94 | 37 | 6 | 19 - 34 |
| 3S2E33C001 | 33C1 (P | monitor | Sycamore Grove P1 | 11/29/2001 | Amador | U | 493.23 | 20 | 2 | 5 - 20 |
| 3S2E33G001 | 33G1 | monitor | Crohare | 12/12/1975 | Amador | U | 511.52 | 17 | 2.5 | 9 - 14 |
| 3S2E33K001 | 33K1 | monitor | VA | | Amador | U | 546.83 | 15 | 2.5 | 7 - 12 |
| 3S2E33L001 | 33L1 | monitor | VA/CROHARE FENCE | | Amador | U | 557.63 | 16 | 2.5 | 11 - 16 |
| 3S3E06Q003 | 6Q3 | monitor | PPWTP South Monitoring | 8/29/2016 | Altamont | U | 681.07 | 30 | 2 | 20 - 30 |
| 3S3E07D002 | 7D2 | monitor | 7D 2 | 11/1/1976 | Spring | U | 621.94 | 72 | 2.5 | 64 - 69 |
| 3S3E18Q001 | 18Q1 | domestic | Nagy on Tesla | | Mocho I | | 0 | 0 | 0 | 0 - 0 |
| 3S3E19C002 | 19C2 | domestic | Wilker well 2 | | Mocho I | U | 740.7 | 66 | 8 | 0 - 66 |
| 3S3E20L004 | 20L4 | domestic | Vail on Tesla | 8/15/2005 | Mocho I | U | 0 | 340 | 5 | 0 - 0 |
| 3S3E20R004 | 20R4 | domestic | Buonanno on Tesla | | Mocho I | U | 0 | 0 | 6 | 0 - 0 |
| 3S3E21C001 | 21C1 | domestic | Russell on Reuss | 1/1/1977 | Upland | U | 0 | 128 | 12 | 60 - 124 |
| 4S2E01A001 | 1A1 | irrigation | Gallagher Ag | 2/6/2015 | Mocho II | U | | 130 | 6 | 45 - 130 |
| 4S3E06E004 | 6E4 | domestic | Gallagher Domestic | 5/28/1976 | Mocho II | U | | 220 | 10 | 184 - 212 |

RP = Reference Point Elevation (in feet above MSL)
TD = Total Depth of well (in feet below ground surface)
Dia = Diameter of well casing (in inches)
Perf = Preferated interval (in feet below ground surface), uppermost - lowermost

# TABLE 5-3
# SEMIANNUAL GROUNDWATER LEVELS
# (Feet above Mean Sea Level, NAVD88)
# FALL 2020 TO FALL 2021

| | | | | Fall 2020 | | Spring 2021 | | Fall 2021 | | Change in Elevation (ft) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Seasonal | | Annual |
| Well Number | Well Depth | Aquifer | Subarea | Depth to Water | GW Elev | Depth to Water (ft) | GW Elev | Depth to Water (ft) | GW Elev | Fall 20 to Spring 21 | Spring 21 to Fall 21 | Fall 20 to Fall 21 |
| 1S4E31P005 | 24 | U | Tracy | 18.5 | 41.5 | 19.0 | 41.0 | 18.5 | 41.5 | -0.5 | 0.6 | 0.1 |
| 2S1E32E001 | 70 | U | None | 37.7 | 354.9 | 39.1 | 353.5 | 40.6 | 352.0 | -1.4 | -1.5 | -2.9 |
| 2S1E32N001 | 44 | U | Camp | 19.2 | 341.6 | 19.5 | 341.3 | 20.2 | 340.6 | -0.3 | -0.7 | -1.0 |
| 2S1E32Q001 | 45 | U | Camp | 28.0 | 339.6 | 28.6 | 338.9 | 29.9 | 337.7 | -0.7 | -1.2 | -1.9 |
| 2S1E33L001 | 80 | U | None | 52.0 | 337.5 | 53.8 | 335.6 | 55.1 | 334.4 | -1.8 | -1.3 | -3.1 |
| 2S1E33P002 | 55 | U | Camp | 32.9 | 337.2 | 34.4 | 335.7 | 35.7 | 334.4 | -1.5 | -1.3 | -2.8 |
| 2S1E33R001 | 60 | U | None | 19.9 | 338.6 | 21.1 | 337.4 | 22.7 | 335.9 | -1.2 | -1.5 | -2.7 |
| 2S1W15F001 | 60 | U | Bishop | 11.1 | 428.3 | 10.9 | 428.6 | 12.1 | 427.3 | 0.2 | -1.2 | -1.0 |
| 2S1W26C002 | 50 | U | Dublin | 25.7 | 380.9 | 26.1 | 380.4 | 27.9 | 378.6 | -0.5 | -1.8 | -2.3 |
| 2S1W36E003 | 60 | U | Dublin | 4.7 | 341.8 | 3.9 | 342.6 | 5.4 | 341.2 | 0.8 | -1.4 | -0.7 |
| 2S1W36F001 | 190 | L | Dublin | 11.6 | 331.1 | 12.1 | 330.6 | 14.7 | 328.1 | -0.5 | -2.5 | -3.1 |
| 2S1W36F002 | 320 | L | Dublin | 9.2 | 333.5 | 7.9 | 334.8 | 9.5 | 333.2 | 1.3 | -1.6 | -0.3 |
| 2S1W36F003 | 520 | L | Dublin | 24.3 | 318.4 | 17.8 | 325.0 | 24.7 | 318.0 | 6.5 | -7.0 | -0.4 |
| 2S2E21L001 | 168 | U | May | NA | NA | NA | NA | 37.3 | 525.7 | - | - | - |
| 2S2E27C002 | 108 | U | Spring | 14.3 | 527.9 | 15.1 | 527.0 | 15.8 | 526.4 | -0.9 | -0.6 | -1.5 |
| 2S2E27K001 | 96 | U | Spring | NA | NA | 10.8 | 513.7 | 10.4 | 514.1 | - | 0.4 | - |
| 2S2E27M002 | 112 | U | May | NA | NA | 8.4 | 516.1 | 9.6 | 514.9 | - | -1.3 | - |
| 2S2E27P002 | 68 | U | Spring | 3.9 | 501.6 | 3.2 | 502.3 | 4.3 | 501.1 | 0.7 | -1.1 | -0.4 |
| 2S2E28D002 | 55 | U | May | 30.6 | 524.6 | 30.4 | 524.8 | 31.0 | 524.2 | 0.2 | -0.6 | -0.4 |
| 2S2E28J002 | 230 | L | May | 7.1 | 515.2 | 6.8 | 515.5 | 7.7 | 514.6 | 0.3 | -0.9 | -0.6 |
| 2S2E28Q001 | 28 | U | May | 7.0 | 506.1 | 5.5 | 507.5 | 7.3 | 505.8 | 1.5 | -1.8 | -0.3 |
| 2S2E32K002 | 43 | U | Cayetano | 8.8 | 498.7 | 8.7 | 498.7 | 9.2 | 498.2 | 0.0 | -0.5 | -0.5 |
| 2S2E34E001 | 49 | U | May | 5.8 | 493.9 | 4.6 | 495.1 | 6.2 | 493.5 | 1.2 | -1.6 | -0.4 |
| 2S2E34Q002 | 50 | U | Spring | 3.7 | 503.6 | 2.9 | 504.3 | 4.1 | 503.1 | 0.8 | -1.2 | -0.4 |
| 2S3E01D001 | 80 | U | Tracy | 11.6 | 78.4 | 12.0 | 78.0 | 12.9 | 77.1 | -0.4 | -0.9 | -1.3 |
| 3S1E01F002 | 40 | U | Camp | 20.5 | 408.0 | 22.0 | 406.4 | 21.9 | 406.5 | -1.5 | 0.1 | -1.4 |
| 3S1E01H003 | 80 | U | Camp | 27.6 | 395.2 | 28.7 | 394.1 | 30.0 | 392.8 | -1.1 | -1.3 | -2.3 |
| 3S1E01J004 | 300 | L | Camp | NA | NA | NA | NA | NA | NA | - | - | - |
| 3S1E01L001 | 70 | U | Camp | 57.5 | 345.5 | 60.8 | 342.3 | 62.0 | 341.1 | -3.3 | -1.2 | -4.4 |
| 3S1E01P002 | 50 | U | Amador | 23.6 | 366.0 | 26.1 | 363.6 | 26.7 | 363.0 | -2.5 | -0.6 | -3.1 |
| 3S1E01P003 | 480 | L | Amador | 143.4 | 251.1 | 136.7 | 257.7 | 150.3 | 244.1 | 6.7 | -13.6 | -6.9 |
| 3S1E02J002 | 41 | U | Camp | 15.4 | 365.5 | 15.7 | 365.2 | 18.3 | 362.6 | -0.3 | -2.6 | -2.9 |
| 3S1E02J003 | 65 | U | Camp | 26.1 | 380.3 | 27.6 | 378.7 | 28.3 | 378.1 | -1.6 | -0.6 | -2.2 |
| 3S1E02K002 | 46 | U | Camp | 26.2 | 370.8 | 26.2 | 370.8 | 27.5 | 369.6 | 0.0 | -1.2 | -1.3 |
| 3S1E02M003 | 50 | U | Camp | 15.7 | 349.3 | 15.4 | 349.6 | 15.2 | 349.8 | 0.3 | 0.2 | 0.5 |
| 3S1E02N006 | 55 | U | Amador | 29.2 | 337.0 | 28.0 | 338.1 | 29.4 | 336.7 | 1.1 | -1.4 | -0.3 |
| 3S1E02P003 | 380 | L | Camp | 126.4 | 245.3 | 118.1 | 253.7 | 128.8 | 242.9 | 8.4 | -10.8 | -2.4 |
| 3S1E02Q001 | 45 | U | Amador | 21.2 | 348.8 | 21.5 | 348.5 | 23.2 | 346.7 | -0.3 | -1.7 | -2.0 |
| 3S1E02R001 | 33 | U | Amador | 20.1 | 356.2 | 20.4 | 355.9 | 22.3 | 354.0 | -0.3 | -2.0 | -2.2 |
| 3S1E03G002 | 50 | U | Camp | 10.8 | 343.4 | 9.6 | 344.7 | 11.7 | 342.6 | 1.3 | -2.1 | -0.9 |
| 3S1E04A001 | 50 | U | Camp | 17.1 | 333.6 | 18.1 | 332.5 | 19.6 | 331.1 | -1.1 | -1.5 | -2.6 |
| 3S1E04J005 | 47 | U | Camp | 15.7 | 329.5 | 16.5 | 328.7 | 18.1 | 327.1 | -0.8 | -1.6 | -2.4 |
| 3S1E04J006 | 110 | U | Camp | 17.8 | 327.8 | 19.6 | 326.0 | 21.5 | 324.1 | -1.8 | -1.9 | -3.7 |
| 3S1E04Q002 | 90 | U | Amador | 44.2 | 301.2 | 51.4 | 294.1 | 58.5 | 287.0 | -7.1 | -7.1 | -14.2 |
| 3S1E05K006 | 75 | U | Camp | 14.6 | 331.5 | 14.6 | 331.5 | 16.4 | 329.7 | 0.0 | -1.8 | -1.8 |
| 3S1E05K007 | 150 | L | Camp | 19.9 | 326.3 | 21.4 | 324.8 | 24.8 | 321.4 | -1.6 | -3.4 | -4.9 |
| 3S1E05L003 | 40 | U | Camp | 13.0 | 326.5 | 13.0 | 326.5 | 13.7 | 325.8 | 0.0 | -0.7 | -0.7 |
| 3S1E05P006 | 35 | U | Camp | 11.7 | 324.9 | 12.1 | 324.5 | 13.6 | 323.1 | -0.4 | -1.5 | -1.8 |
| 3S1E06F003 | 36 | U | Dublin | 5.2 | 324.6 | 4.9 | 324.9 | 6.0 | 323.8 | 0.4 | -1.1 | -0.8 |
| 3S1E06G005 | 200 | L | Dublin | 8.4 | 323.8 | 9.0 | 323.2 | 10.8 | 321.4 | -0.6 | -1.8 | -2.4 |
| 3S1E06N002 | 67 | U | Dublin | 13.4 | 321.8 | 13.4 | 321.8 | 14.7 | 320.5 | 0.0 | -1.3 | -1.3 |
| 3S1E07B002 | 152 | L | Dublin | 9.2 | 318.5 | 9.9 | 317.9 | 11.9 | 315.9 | -0.6 | -2.0 | -2.6 |
| 3S1E07B012 | 70 | U | Dublin | 11.7 | 316.1 | 12.2 | 315.6 | 14.5 | 313.3 | -0.5 | -2.3 | -2.8 |
| 3S1E07G007 | 55 | U | Dublin | 13.2 | 314.1 | 14.4 | 312.9 | 17.2 | 310.2 | -1.2 | -2.7 | -3.9 |
| 3S1E07J005 | 50 | U | Dublin | 15.8 | 311.0 | 17.1 | 309.7 | 29.1 | 297.7 | -1.3 | -12.0 | -13.3 |
| 3S1E08B001 | 148 | U | Amador | 43.4 | 294.9 | 48.7 | 289.6 | 52.7 | 285.6 | -5.3 | -4.0 | -9.4 |
| 3S1E08G004 | 85 | U | Amador | 46.2 | 295.3 | 51.8 | 289.7 | 59.6 | 281.9 | -5.5 | -7.9 | -13.4 |
| 3S1E08H009 | 240 | L | Amador | 75.4 | 263.1 | 69.6 | 269.0 | 87.1 | 251.5 | 5.9 | -17.5 | -11.7 |
| 3S1E08H010 | 440 | L | Amador | 97.7 | 241.5 | 76.5 | 262.7 | 110.6 | 228.7 | 21.2 | -34.1 | -12.9 |
| 3S1E08H011 | 720 | D | Amador | 89.8 | 249.5 | 113.8 | 225.5 | 142.9 | 196.3 | -24.0 | -29.1 | -53.1 |
| 3S1E08H013 | 800 | D | Amador | 89.0 | 250.0 | 108.1 | 230.8 | 137.4 | 201.6 | -19.2 | -29.2 | -48.4 |
| 3S1E08H018 | 745 | L | Amador | 94.0 | 247.9 | NM | NM | NM | NM | - | - | - |
| 3S1E08K001 | 99 | U | Amador | 44.6 | 287.8 | 53.4 | 278.9 | 71.0 | 261.4 | -8.8 | -17.6 | -26.4 |
| 3S1E08N001 | 72 | U | Bernal | 33.3 | 290.4 | 41.2 | 282.5 | 62.7 | 261.0 | -7.9 | -21.5 | -29.4 |
| 3S1E09H010 | 145 | U | Amador | 53.7 | 299.2 | 61.3 | 291.6 | 70.1 | 282.8 | -7.6 | -8.8 | -16.4 |
| 3S1E09H011 | 190 | L | Amador | 69.8 | 283.3 | 72.6 | 280.5 | 85.1 | 268.0 | -2.8 | -12.5 | -15.3 |
| 3S1E09H013 | 145 | U | Amador | NA | NA | 64.4 | 289.6 | 72.6 | 281.4 | - | -8.2 | - |
| 3S1E09J007 | 145 | U | Amador | 60.0 | 297.4 | 66.9 | 290.4 | 75.7 | 281.7 | -6.9 | -8.7 | -15.7 |
| 3S1E09J008 | 305 | L | Amador | 86.6 | 270.9 | 85.0 | 272.6 | 100.9 | 256.7 | 1.7 | -15.9 | -14.3 |
| 3S1E09J009 | 505 | L | Amador | 110.5 | 247.2 | 105.0 | 252.6 | 126.4 | 231.3 | 5.4 | -21.3 | -15.9 |
| 3S1E09M002 | 530 | L | Amador | 75.0 | 269.0 | 75.0 | 269.0 | NM | NM | 0.0 | - | - |

U = Upper; L = Lower; NM = Not Measured; NA = Not Available; OBS = Obstructed; - = Not Applicable
Highlighted = Representative Monitoring Site
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# TABLE 5-3
# SEMIANNUAL GROUNDWATER LEVELS
# (Feet above Mean Sea Level, NAVD88)
# FALL 2020 TO FALL 2021

| | | | | Fall 2020 | | Spring 2021 | | Fall 2021 | | Change in Elevation (ft) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Seasonal | | Annual |
| Well Number | Well Depth | Aquifer | Subarea | Depth to Water | GW Elev | Depth to Water (ft) | GW Elev | Depth to Water (ft) | GW Elev | Fall 20 to Spring 21 | Spring 21 to Fall 21 | Fall 20 to Fall 21 |
| 1S4E31P005 | 24 | U | Tracy | 18.5 | 41.5 | 19.0 | 41.0 | 18.5 | 41.5 | -0.5 | 0.6 | 0.1 |
| 2S1E32E001 | 70 | U | None | 37.7 | 354.9 | 39.1 | 353.5 | 40.6 | 352.0 | -1.4 | -1.5 | -2.9 |
| 2S1E32N001 | 44 | U | Camp | 19.2 | 341.6 | 19.5 | 341.3 | 20.2 | 340.6 | -0.3 | -0.7 | -1.0 |
| 2S1E32Q001 | 45 | U | Camp | 28.0 | 339.6 | 28.6 | 338.9 | 29.9 | 337.7 | -0.7 | -1.2 | -1.9 |
| 2S1E33L001 | 80 | U | None | 52.0 | 337.5 | 53.8 | 335.6 | 55.1 | 334.4 | -1.8 | -1.3 | -3.1 |
| 2S1E33P002 | 55 | U | Camp | 32.9 | 337.2 | 34.4 | 335.7 | 35.7 | 334.4 | -1.5 | -1.3 | -2.8 |
| 3S1E09M003 | 575 | L | Amador | 106.4 | 241.1 | 81.3 | 266.2 | 100.5 | 247.0 | 25.1 | -19.2 | 5.9 |
| 3S1E09M004 | 498 | L | Amador | NA | NA | NA | NA | NA | NA | - | - | - |
| 3S1E09P005 | 105 | U | Amador | 54.9 | 294.5 | 61.7 | 287.7 | 71.2 | 278.2 | -6.8 | -9.6 | -16.3 |
| 3S1E09P009 | 210 | L | Amador | 64.6 | 285.0 | 69.1 | 280.5 | 82.3 | 267.3 | -4.5 | -13.2 | -17.7 |
| 3S1E09P010 | 310 | L | Amador | 78.8 | 270.7 | 78.3 | 271.3 | 95.2 | 254.3 | 0.6 | -17.0 | -16.4 |
| 3S1E09P011 | 425 | L | Amador | 100.5 | 249.0 | 93.4 | 256.1 | 118.0 | 231.4 | 7.1 | -24.7 | -17.5 |
| 3S1E10A002 | 88 | U | Amador | 53.4 | 313.9 | 59.0 | 308.3 | 65.4 | 302.0 | -5.6 | -6.4 | -12.0 |
| 3S1E10B008 | 200 | L | Amador | 62.8 | 290.9 | 66.6 | 287.0 | 78.1 | 275.5 | -3.8 | -11.5 | -15.3 |
| 3S1E10B009 | 294 | L | Amador | 81.6 | 271.9 | 80.4 | 273.1 | 94.2 | 259.3 | 1.2 | -13.7 | -12.6 |
| 3S1E10B010 | 600 | L | Amador | 107.1 | 246.4 | 103.3 | 250.2 | 119.3 | 234.3 | 3.8 | -15.9 | -12.2 |
| 3S1E10B011 | 810 | D | Amador | 106.7 | 246.8 | 114.2 | 239.3 | 134.4 | 219.2 | -7.5 | -20.2 | -27.7 |
| 3S1E10B014 | 690 | L | Amador | 112.3 | 243.3 | 112.8 | 242.8 | 125.7 | 229.9 | -0.5 | -12.9 | -13.4 |
| 3S1E10D002 | 212 | L | Amador | 67.3 | 282.0 | 69.2 | 280.1 | 82.0 | 267.4 | -1.9 | -12.7 | -14.7 |
| 3S1E10D003 | 322 | L | Amador | 79.6 | 269.7 | 76.6 | 272.7 | 92.4 | 256.9 | 3.0 | -15.7 | -12.8 |
| 3S1E10D004 | 616 | L | Amador | 104.8 | 244.5 | 90.5 | 258.8 | 114.9 | 234.4 | 14.3 | -24.4 | -10.1 |
| 3S1E10D005 | 790 | D | Amador | 107.6 | 241.7 | 104.2 | 245.1 | NM | NM | 3.4 | - | - |
| 3S1E10D007 | 145 | U | Amador | 58.1 | 302.9 | 65.6 | 295.5 | 74.7 | 286.3 | -7.4 | -9.2 | -16.6 |
| 3S1E10D008 | 215 | L | Amador | 77.8 | 283.2 | 80.6 | 280.4 | 93.2 | 267.8 | -2.8 | -12.7 | -15.4 |
| 3S1E10K002 | 591 | L | Amador | 88.0 | 270.7 | 86.8 | 271.9 | 100.9 | 257.8 | 1.3 | -14.1 | -12.8 |
| 3S1E10N002 | 195 | U | Amador | 57.8 | 300.1 | 65.5 | 292.4 | 74.9 | 283.0 | -7.7 | -9.4 | -17.1 |
| 3S1E10N003 | 195 | L | Amador | 73.3 | 284.7 | 76.7 | 281.3 | 89.6 | 268.4 | -3.4 | -12.9 | -16.3 |
| 3S1E11B001 | 43 | U | Amador | 32.5 | 336.9 | 42.0 | 327.4 | 35.7 | 333.6 | -9.6 | 6.3 | -3.3 |
| 3S1E11C003 | 55 | U | Amador | 31.7 | 333.1 | 32.0 | 332.8 | 33.2 | 331.6 | -0.3 | -1.2 | -1.4 |
| 3S1E11G001 | 120 | U | Amador | 65.3 | 306.4 | 68.7 | 302.9 | 77.8 | 293.8 | -3.5 | -9.1 | -12.6 |
| 3S1E11G002 | 350 | L | Amador | 122.1 | 249.5 | 112.0 | 259.7 | 122.1 | 249.5 | 10.2 | -10.1 | 0.0 |
| 3S1E11G003 | 590 | L | Amador | 127.3 | 244.3 | 123.2 | 248.5 | 135.7 | 235.9 | 4.1 | -12.5 | -8.4 |
| 3S1E11G004 | 790 | D | Amador | 122.6 | 249.1 | NA | NA | 151.5 | 220.2 | - | - | -28.9 |
| 3S1E11M002 | 700 | L | Amador | 107.4 | 258.6 | 104.6 | 261.3 | 110.4 | 255.5 | 2.7 | -5.8 | -3.1 |
| 3S1E11P006 | 400 | L | Amador | 123.1 | 253.6 | 116.9 | 259.8 | 127.7 | 249.0 | 6.2 | -10.8 | -4.6 |
| 3S1E12A002 | 69 | U | Amador | 36.5 | 364.9 | NA | NA | 45.4 | 356.0 | - | - | -8.9 |
| 3S1E12D002 | 45 | U | Amador | 35.0 | 349.5 | NA | NA | 39.0 | 345.5 | - | - | -4.0 |
| 3S1E12G001 | 73 | U | Amador | 58.5 | 346.0 | 62.6 | 341.9 | 65.6 | 338.8 | -4.1 | -3.1 | -7.1 |
| 3S1E12H004 | 270 | L | Amador | 153.9 | 253.9 | 146.5 | 261.2 | 157.3 | 250.4 | 7.4 | -10.8 | -3.4 |
| 3S1E12H005 | 400 | L | Amador | 156.1 | 251.7 | 159.5 | 248.3 | 179.0 | 228.8 | -3.4 | -19.5 | -22.9 |
| 3S1E12H006 | 480 | L | Amador | 154.5 | 253.3 | 161.7 | 246.0 | 181.7 | 226.0 | -7.3 | -20.0 | -27.3 |
| 3S1E12H007 | 684 | D | Amador | 139.3 | 268.4 | 182.0 | 225.7 | 191.9 | 215.8 | -42.7 | -9.9 | -52.6 |
| 3S1E12K002 | 300 | L | Amador | 157.7 | 248.6 | 147.9 | 258.4 | 153.1 | 253.2 | 9.9 | -5.3 | 4.6 |
| 3S1E12K003 | 475 | L | Amador | 152.5 | 254.4 | 154.9 | 252.0 | 171.4 | 235.4 | -2.4 | -16.5 | -18.9 |
| 3S1E12K004 | 575 | D | Amador | 147.1 | 259.7 | 156.1 | 250.6 | 180.2 | 226.5 | -9.1 | -24.1 | -33.2 |
| 3S1E13P005 | 135 | U | Amador | NA | NA | 105.6 | 288.5 | 110.7 | 283.0 | - | -5.5 | - |
| 3S1E13P006 | 255 | L | Amador | NA | NA | 137.7 | 256.5 | 150.4 | 243.3 | - | -13.2 | - |
| 3S1E13P007 | 375 | L | Amador | NA | NA | 133.0 | 261.2 | 152.8 | 240.7 | - | -20.5 | - |
| 3S1E13P008 | 605 | L | Amador | NA | NA | 148.8 | 245.3 | 166.6 | 227.0 | - | -18.3 | - |
| 3S1E14B001 | 435 | L | Amador | 132.3 | 251.9 | 125.7 | 258.5 | 140.0 | 244.2 | 6.6 | -14.3 | -7.7 |
| 3S1E14D002 | 740 | L | Amador | 96.8 | 275.0 | 99.6 | 272.2 | 112.1 | 259.7 | -2.8 | -12.5 | -15.3 |
| 3S1E15F003 | 625 | L | Amador | 100.3 | 268.7 | 108.0 | 261.0 | 136.4 | 232.6 | -7.7 | -28.4 | -36.1 |
| 3S1E15J003 | 196 | L | Amador | 89.3 | 255.3 | 89.0 | 255.6 | 113.5 | 231.1 | 0.3 | -24.5 | -24.2 |
| 3S1E15M003 | 600 | L | Amador | 106.7 | 256.2 | NA | NA | NA | NA | - | - | - |
| 3S1E16A004 | 603 | L | Amador | 111.2 | 248.2 | 104.5 | 254.8 | 127.5 | 231.9 | 6.7 | -22.9 | -16.3 |
| 3S1E16B001 | 805 | D | Amador | 113.9 | 241.9 | 112.2 | 243.6 | 137.9 | 217.9 | 1.7 | -25.7 | -24.0 |
| 3S1E16C002 | 190 | L | Amador | 74.0 | 270.4 | 73.2 | 271.1 | 91.8 | 252.6 | 0.7 | -18.6 | -17.9 |
| 3S1E16C003 | 305 | L | Amador | 96.3 | 248.0 | 88.0 | 256.3 | 113.3 | 231.0 | 8.3 | -25.3 | -17.0 |
| 3S1E16C004 | 375 | L | Amador | 100.2 | 244.0 | 95.6 | 248.6 | 123.9 | 220.3 | 4.6 | -28.3 | -23.7 |
| 3S1E16E004 | 105 | U | Amador | 55.9 | 295.8 | 62.6 | 289.1 | 84.0 | 267.7 | -6.7 | -21.5 | -28.2 |
| 3S1E16L002 | 151 | L | Amador | 56.5 | 289.8 | 69.8 | 276.5 | 89.7 | 256.6 | -13.3 | -19.9 | -33.2 |
| 3S1E16P005 | 75 | U | Amador | 57.1 | 297.5 | 39.0 | 315.5 | 69.6 | 284.9 | 18.0 | -30.6 | -12.6 |
| 3S1E16R001 | 239 | L | Amador | 92.3 | 270.2 | 92.4 | 270.1 | 125.6 | 236.9 | -0.1 | -33.2 | -33.3 |
| 3S1E17B004 | 248 | L | Amador | 50.0 | 287.7 | 66.5 | 271.2 | 86.2 | 251.5 | -16.5 | -19.7 | -36.2 |
| 3S1E17D003 | 108 | L | Bernal | 41.1 | 284.0 | 56.7 | 268.4 | 72.9 | 252.2 | -15.6 | -16.2 | -31.8 |
| 3S1E17D004 | 236 | L | Bernal | 43.0 | 282.1 | 65.3 | 259.8 | 78.6 | 246.5 | -22.3 | -13.3 | -35.6 |
| 3S1E17D005 | 308 | L | Bernal | 43.0 | 282.1 | 62.4 | 262.8 | 75.5 | 249.6 | -19.4 | -13.2 | -32.6 |
| 3S1E17D006 | 408 | L | Bernal | 29.0 | 296.1 | 51.9 | 273.2 | 66.2 | 259.0 | -22.9 | -14.3 | -37.2 |
| 3S1E17D007 | 684 | D | Bernal | 19.6 | 305.5 | 19.5 | 305.6 | 21.1 | 304.1 | 0.1 | -1.5 | -1.4 |
| 3S1E17D010 | 425 | L | Bernal | 45.3 | 282.8 | 63.8 | 264.3 | 77.2 | 251.0 | -18.5 | -13.4 | -31.8 |
| 3S1E17D011 | 603 | L | Bernal | 34.7 | 290.1 | 48.7 | 276.2 | 63.5 | 261.4 | -13.9 | -14.8 | -28.7 |

U = Upper; L = Lower; NM = Not Measured; NA = Not Available; OBS = Obstructed; - = Not Applicable
Highlighted = Representative Monitoring Site
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# TABLE 5-3
# SEMIANNUAL GROUNDWATER LEVELS
# (Feet above Mean Sea Level, NAVD88)
# FALL 2020 TO FALL 2021

| | | | | Fall 2020 | | Spring 2021 | | Fall 2021 | | Change in Elevation (ft) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Seasonal | | Annual |
| Well Number | Well Depth | Aquifer | Subarea | Depth to Water | GW Elev | Depth to Water (ft) | GW Elev | Depth to Water (ft) | GW Elev | Fall 20 to Spring 21 | Spring 21 to Fall 21 | Fall 20 to Fall 21 |
| 1S4E31P005 | 24 | U | Tracy | 18.5 | 41.5 | 19.0 | 41.0 | 18.5 | 41.5 | -0.5 | 0.6 | 0.1 |
| 2S1E32E001 | 70 | U | None | 37.7 | 354.9 | 39.1 | 353.5 | 40.6 | 352.0 | -1.4 | -1.5 | -2.9 |
| 2S1E32N001 | 44 | U | Camp | 19.2 | 341.6 | 19.5 | 341.3 | 20.2 | 340.6 | -0.3 | -0.7 | -1.0 |
| 2S1E32Q001 | 45 | U | Camp | 28.0 | 339.6 | 28.6 | 338.9 | 29.9 | 337.7 | -0.7 | -1.2 | -1.9 |
| 2S1E33L001 | 80 | U | None | 52.0 | 337.5 | 53.8 | 335.6 | 55.1 | 334.4 | -1.8 | -1.3 | -3.1 |
| 2S1E33P002 | 55 | U | Camp | 32.9 | 337.2 | 34.4 | 335.7 | 35.7 | 334.4 | -1.5 | -1.3 | -2.8 |
| 3S1E18A005 | 454 | L | Bernal | 39.2 | 288.1 | 63.9 | 263.4 | 76.9 | 250.4 | -24.7 | -13.0 | -37.7 |
| 3S1E18E004 | 83 | U | Bernal | 30.3 | 290.0 | 38.4 | 281.9 | 52.8 | 267.4 | -8.1 | -14.4 | -22.5 |
| 3S1E18J002 | 71 | U | Bernal | 32.7 | 290.3 | 42.3 | 280.7 | 57.4 | 265.7 | -9.6 | -15.0 | -24.7 |
| 3S1E19A010 | 331 | L | Bernal | 50.7 | 286.3 | NM | NM | 80.9 | 256.1 | - | - | -30.2 |
| 3S1E19A011 | 330 | L | Bernal | 44.7 | 289.5 | 56.7 | 277.6 | NM | NM | -11.9 | - | - |
| 3S1E19C004 | 78 | U | Bernal | 31.4 | 290.9 | 40.8 | 281.5 | 56.6 | 265.7 | -9.4 | -15.8 | -25.2 |
| 3S1E19K001 | 58 | U | Bernal | 33.4 | 288.2 | 44.6 | 276.9 | Dry | Dry | -11.2 | - | - |
| 3S1E20C003 | 110 | L | Bernal | 48.7 | 289.9 | 57.8 | 280.8 | 74.9 | 263.7 | -9.1 | -17.1 | -26.2 |
| 3S1E20C007 | 153 | U | Bernal | 48.5 | 290.1 | 57.1 | 281.6 | 74.1 | 264.6 | -8.6 | -17.0 | -25.5 |
| 3S1E20C008 | 315 | L | Bernal | 52.2 | 286.5 | 69.3 | 269.4 | 88.1 | 250.5 | -17.0 | -18.9 | -35.9 |
| 3S1E20C009 | 515 | L | Bernal | 51.8 | 287.0 | 64.0 | 274.8 | 82.8 | 256.0 | -12.2 | -18.8 | -31.0 |
| 3S1E20J004 | 72 | U | Bernal | 38.3 | 293.3 | 46.6 | 285.0 | 64.7 | 266.9 | -8.3 | -18.1 | -26.4 |
| 3S1E20M011 | 71 | U | Bernal | 32.1 | 293.6 | 41.4 | 284.3 | 58.7 | 267.0 | -9.3 | -17.3 | -26.6 |
| 3S1E20Q002 | 65 | U | Bernal | 21.8 | 304.1 | 22.4 | 303.4 | 24.6 | 301.2 | -0.6 | -2.2 | -2.8 |
| 3S1E22D002 | 72 | U | Amador | 56.7 | 311.4 | 59.7 | 308.4 | 63.9 | 304.2 | -3.0 | -4.2 | -7.2 |
| 3S1E23J001 | 120 | L | Amador | 93.8 | 334.4 | 96.7 | 331.5 | 83.9 | 344.3 | -2.9 | 12.8 | 9.9 |
| 3S1E24Q001 | 440 | L | Amador | 100.3 | 327.2 | 108.9 | 318.6 | 120.9 | 306.6 | -8.6 | -12.0 | -20.6 |
| 3S1E25C003 | 146 | U | Amador | 92.4 | 361.8 | 96.9 | 357.3 | 99.5 | 354.7 | -4.5 | -2.6 | -7.1 |
| 3S1E28M002 | 141 | U | Upland | NA | NA | 18.5 | 371.5 | 30.3 | 359.7 | - | -11.8 | - |
| 3S1E29M004 | 57 | U | Castle | 22.6 | 288.3 | 30.9 | 280.1 | 41.5 | 269.5 | -8.2 | -10.6 | -18.8 |
| 3S1E29P002 | 42 | U | Bernal | 28.0 | 274.9 | 28.4 | 274.5 | 30.4 | 272.4 | -0.4 | -2.1 | -2.5 |
| 3S1E33G005 | 35 | U | Upland | NA | NA | 12.7 | 395.9 | 13.7 | 394.9 | - | -1.0 | - |
| 3S1W01B009 | 162 | L | Dublin | 9.1 | 324.4 | 9.4 | 324.2 | 11.1 | 322.5 | -0.2 | -1.7 | -1.9 |
| 3S1W01B010 | 414 | L | Dublin | 4.0 | 329.6 | 4.8 | 328.8 | 7.1 | 326.5 | -0.8 | -2.3 | -3.1 |
| 3S1W01B011 | 560 | L | Dublin | 12.8 | 320.9 | 11.2 | 322.6 | 18.2 | 315.5 | 1.7 | -7.1 | -5.4 |
| 3S1W02A002 | 47 | U | Dublin | 27.7 | 341.7 | 26.0 | 343.4 | 28.2 | 341.2 | 1.7 | -2.2 | -0.5 |
| 3S1W12B002 | 40 | U | Dublin | 21.7 | 321.2 | 20.6 | 322.3 | 22.2 | 320.7 | 1.1 | -1.5 | -0.5 |
| 3S1W12J001 | 62 | U | Dublin | 17.4 | 312.0 | 19.4 | 310.0 | 23.9 | 305.4 | -2.0 | -4.5 | -6.5 |
| 3S1W13J001 | 48 | U | Castle | 30.8 | 313.2 | 29.8 | 314.1 | 30.7 | 313.2 | 1.0 | -0.9 | 0.1 |
| 3S2E01F002 | 69 | U | Spring | 23.8 | 549.2 | 23.9 | 549.1 | 24.8 | 548.2 | -0.1 | -0.9 | -1.0 |
| 3S2E02B002 | 46 | U | Spring | 10.4 | 529.1 | 9.8 | 529.7 | 11.0 | 528.5 | 0.6 | -1.2 | -0.6 |
| 3S2E03A001 | 54 | U | Spring | 5.9 | 511.8 | 4.8 | 512.9 | 6.3 | 511.3 | 1.1 | -1.6 | -0.5 |
| 3S2E03K003 | 60 | U | Mocho I | 14.0 | 508.8 | 14.0 | 508.8 | 14.3 | 508.6 | 0.0 | -0.2 | -0.3 |
| 3S2E05N001 | 210 | M | Mocho II | 34.1 | 410.0 | 35.7 | 408.3 | 37.2 | 406.9 | -1.6 | -1.5 | -3.1 |
| 3S2E07C002 | 49 | U | Mocho II | 27.2 | 393.6 | 28.4 | 392.5 | 30.1 | 390.7 | -1.1 | -1.8 | -2.9 |
| 3S2E07H002 | 54 | U | Mocho II | 32.3 | 410.6 | 33.6 | 409.3 | 36.8 | 406.1 | -1.3 | -3.2 | -4.5 |
| 3S2E07N002 | 162 | U | Amador | 135.5 | 286.5 | 135.0 | 287.0 | 148.8 | 273.3 | 0.5 | -13.8 | -13.3 |
| 3S2E07P003 | 510 | L | Amador | 166.0 | 265.5 | NA | NA | NA | NA | - | - | - |
| 3S2E07R002 | 805 | D | Mocho II | 4.0 | 442.0 | 4.0 | 442.0 | 4.4 | 441.6 | 0.0 | -0.4 | -0.4 |
| 3S2E07R003 | 583 | L | Upland | NA | NA | 45.6 | 400.4 | 36.6 | 409.4 | - | 9.0 | - |
| 3S2E08H002 | 46 | U | Mocho II | 36.5 | 433.1 | 36.8 | 432.9 | 41.1 | 428.5 | -0.2 | -4.4 | -4.6 |
| 3S2E08H003 | 195 | L | Mocho II | 56.1 | 421.2 | 57.5 | 419.8 | 60.9 | 416.3 | -1.4 | -3.4 | -4.8 |
| 3S2E08H004 | 385 | L | Mocho II | 78.2 | 398.8 | 80.1 | 396.9 | 61.0 | 416.0 | -1.9 | 19.1 | 17.2 |
| 3S2E08K002 | 74 | U | Mocho II | 41.3 | 423.5 | 43.2 | 421.6 | 47.4 | 417.4 | -1.9 | -4.2 | -6.1 |
| 3S2E08N002 | 526 | L | Mocho II | 99.0 | 354.6 | 42.7 | 410.9 | NA | NA | 56.3 | - | - |
| 3S2E08P001 | 273 | L | Mocho II | 48.5 | 419.7 | 50.0 | 418.2 | 54.5 | 413.7 | -1.5 | -4.5 | -6.0 |
| 3S2E08Q009 | 114 | L | Mocho II | 36.1 | 428.6 | 38.2 | 426.6 | 42.5 | 422.2 | -2.1 | -4.4 | -6.4 |
| 3S2E09Q004 | 80 | U | Mocho II | 36.0 | 468.5 | 39.5 | 465.0 | 44.5 | 460.1 | -3.6 | -4.9 | -8.5 |
| 3S2E10F003 | 45 | U | Mocho I | 14.7 | 520.2 | 14.9 | 519.9 | 15.6 | 519.2 | -0.3 | -0.7 | -1.0 |
| 3S2E10Q001 | 44 | U | Mocho II | 28.7 | 526.7 | 28.6 | 526.7 | 29.9 | 525.5 | 0.0 | -1.2 | -1.2 |
| 3S2E10Q002 | 325 | L | Mocho II | 34.0 | 515.4 | NA | NA | NA | NA | - | - | - |
| 3S2E11C001 | 66 | U | Mocho I | 28.4 | 528.7 | 29.0 | 528.1 | 29.7 | 527.4 | -0.6 | -0.7 | -1.3 |
| 3S2E12C004 | 108 | U | Spring | 55.1 | 536.4 | 55.2 | 536.3 | 56.0 | 535.5 | -0.1 | -0.8 | -0.9 |
| 3S2E12J003 | 160 | L | Spring | 82.1 | 546.7 | NA | NA | 84.0 | 547.1 | - | - | 0.3 |
| 3S2E14A003 | 110 | U | Mocho I | NA | NA | NA | NA | 73.7 | 528.5 | - | - | - |
| 3S2E14B001 | 300 | L | Mocho I | 65.0 | 528.3 | 65.9 | 527.5 | 66.6 | 526.8 | -0.9 | -0.7 | -1.6 |
| 3S2E15E002 | 192 | L | Mocho II | 55.2 | 494.5 | 56.1 | 493.6 | 61.8 | 487.9 | -0.9 | -5.7 | -6.6 |
| 3S2E15L001 | 41 | U | Mocho II | 39.3 | 522.2 | 39.6 | 521.9 | NA | NA | -0.2 | - | - |
| 3S2E15L002 | 71 | U | Mocho II | NA | NA | NA | NA | 47.5 | 513.3 | - | - | - |
| 3S2E15M002 | 45 | U | Mocho II | 45.2 | 504.2 | 45.3 | 504.2 | NA | NA | 0.0 | - | - |
| 3S2E15M003 | 76 | U | Mocho II | NA | NA | NA | NA | 55.5 | 492.9 | - | - | - |
| 3S2E15Q006 | 301 | L | Mocho II | 59.3 | 518.3 | 56.4 | 521.2 | 64.4 | 513.2 | 2.9 | -8.0 | -5.1 |
| 3S2E15Q008 | 41 | U | Mocho II | NA | NA | NA | NA | 33.8 | 550.6 | - | - | - |
| 3S2E15R017 | 63 | U | Mocho II | 12.8 | 579.6 | 9.9 | 582.6 | 13.2 | 579.3 | 2.9 | -3.3 | -0.4 |
| 3S2E15R018 | 138 | L | Mocho II | 26.2 | 566.3 | 17.8 | 574.6 | 26.4 | 566.1 | 8.4 | -8.5 | -0.2 |

U = Upper; L = Lower; NM = Not Measured; NA = Not Available; OBS = Obstructed; - = Not Applicable
Highlighted = Representative Monitoring Site
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# TABLE 5-3
# SEMIANNUAL GROUNDWATER LEVELS
# (Feet above Mean Sea Level, NAVD88)
# FALL 2020 TO FALL 2021

| Well Number | Well Depth | Aquifer | Subarea | Fall 2020 | | Spring 2021 | | Fall 2021 | | Change in Elevation (ft) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Seasonal | | Annual |
| | | | | Depth to Water | GW Elev | Depth to Water (ft) | GW Elev | Depth to Water (ft) | GW Elev | Fall 20 to Spring 21 | Spring 21 to Fall 21 | Fall 20 to Fall 21 |
| 1S4E31P005 | 24 | U | Tracy | 18.5 | 41.5 | 19.0 | 41.0 | 18.5 | 41.5 | -0.5 | 0.6 | 0.1 |
| 2S1E32E001 | 70 | U | None | 37.7 | 354.9 | 39.1 | 353.5 | 40.6 | 352.0 | -1.4 | -1.5 | -2.9 |
| 2S1E32N001 | 44 | U | Camp | 19.2 | 341.6 | 19.5 | 341.3 | 20.2 | 340.6 | -0.3 | -0.7 | -1.0 |
| 2S1E32Q001 | 45 | U | Camp | 28.0 | 339.6 | 28.6 | 338.9 | 29.9 | 337.7 | -0.7 | -1.2 | -1.9 |
| 2S1E33L001 | 80 | U | None | 52.0 | 337.5 | 53.8 | 335.6 | 55.1 | 334.4 | -1.8 | -1.3 | -3.1 |
| 2S1E33P002 | 55 | U | Camp | 32.9 | 337.2 | 34.4 | 335.7 | 35.7 | 334.4 | -1.5 | -1.3 | -2.8 |
| 3S2E15R020 | 51 | U | Mocho II | NA | NA | NA | NA | 19.1 | 570.3 | - | - | - |
| 3S2E16A003 | 240 | L | Mocho II | 77.4 | 449.7 | 49.4 | 477.7 | 55.3 | 471.8 | 28.0 | -5.9 | 22.1 |
| 3S2E16C001 | 584 | L | Mocho II | 71.5 | 439.5 | NM | NM | NA | NA | - | - | - |
| 3S2E16E004 | 45 | U | Mocho II | 30.1 | 476.2 | 33.8 | 472.5 | 39.3 | 467.0 | -3.7 | -5.5 | -9.2 |
| 3S2E18B001 | 497 | L | Amador | NM | NM | 194.4 | 244.2 | 207.0 | 231.6 | - | -12.6 | - |
| 3S2E18E001 | 134 | U | Amador | 97.8 | 326.1 | 90.7 | 333.2 | 100.9 | 323.0 | 7.1 | -10.2 | -3.1 |
| 3S2E19D007 | 180 | U | Amador | 108.8 | 306.3 | 118.6 | 296.5 | 135.1 | 280.0 | -9.8 | -16.5 | -26.3 |
| 3S2E19D008 | 260 | L | Amador | 109.2 | 305.8 | 118.9 | 296.1 | 135.4 | 279.6 | -9.7 | -16.5 | -26.2 |
| 3S2E19D009 | 390 | L | Amador | 150.4 | 264.6 | 159.3 | 255.7 | 180.0 | 235.0 | -8.9 | -20.7 | -29.6 |
| 3S2E19D010 | 470 | L | Amador | 127.9 | 287.0 | 146.4 | 268.5 | 157.0 | 257.9 | -18.5 | -10.6 | -29.1 |
| 3S2E19N003 | 120 | U | Amador | 49.1 | 369.3 | 46.6 | 371.9 | 47.5 | 371.0 | 2.5 | -0.9 | 1.6 |
| 3S2E19N004 | 203 | L | Amador | 45.1 | 372.9 | 47.4 | 370.6 | 36.7 | 381.2 | -2.3 | 10.6 | 8.3 |
| 3S2E20M001 | 184 | L | Amador | 55.4 | 423.4 | 52.6 | 426.2 | 59.7 | 419.1 | 2.8 | -7.1 | -4.3 |
| 3S2E20R002 | 257 | U | Upland | NA | NA | 76.5 | 446.7 | 79.8 | 443.4 | - | -3.4 | - |
| 3S2E21K009 | 0 | U | Upland | NA | NA | 89.9 | 477.2 | 90.9 | 476.2 | - | -1.0 | - |
| 3S2E22B001 | 32 | U | Mocho II | Dry | Dry | 19.5 | 566.4 | Dry | Dry | - | - | - |
| 3S2E23E001 | 40 | U | Mocho II | 18.0 | 595.4 | 17.6 | 595.8 | 19.0 | 594.4 | 0.4 | -1.4 | -1.0 |
| 3S2E23E002 | 110 | L | Mocho II | 16.1 | 597.1 | 14.7 | 598.5 | 16.9 | 596.3 | 1.4 | -2.1 | -0.8 |
| 3S2E24A001 | 46 | U | Mocho I | 18.3 | 699.4 | 18.8 | 698.9 | 18.1 | 699.6 | -0.5 | 0.7 | 0.2 |
| 3S2E26J002 | 44 | U | Mocho II | 12.4 | 677.5 | 7.8 | 682.1 | 13.4 | 676.6 | 4.6 | -5.6 | -1.0 |
| 3S2E29F004 | 36 | U | Amador | 11.0 | 446.5 | 8.7 | 448.8 | 13.0 | 444.6 | 2.4 | -4.3 | -1.9 |
| 3S2E29L001 | 23 | U | Amador | NA | NA | 12.0 | 451.6 | 13.5 | 450.1 | - | -1.5 | - |
| 3S2E30C001 | 150 | L | Amador | 34.0 | 405.4 | 33.6 | 405.9 | 36.5 | 402.9 | 0.4 | -2.9 | -2.5 |
| 3S2E30D002 | 44 | U | Amador | 22.4 | 409.2 | 22.5 | 409.1 | 26.0 | 405.6 | -0.1 | -3.5 | -3.6 |
| 3S2E32E007 | 37 | U | Upland | 17.8 | 593.1 | 18.1 | 592.9 | 18.4 | 592.5 | -0.3 | -0.3 | -0.6 |
| 3S2E33C001 | 20 | U | Amador | 11.6 | 486.5 | 11.4 | 486.2 | 12.3 | 485.3 | -0.3 | -0.9 | -1.2 |
| 3S2E33G001 | 17 | U | Amador | 9.9 | 501.7 | 8.7 | 502.8 | 9.2 | 502.3 | 1.1 | -0.5 | 0.7 |
| 3S3E06Q003 | 30 | U | Altamont | 8.9 | 672.2 | 10.8 | 670.3 | 8.1 | 673.0 | -1.8 | 2.6 | 0.8 |
| 3S3E07D002 | 72 | U | Spring | NA | NA | NA | NA | 47.9 | 574.0 | - | - | - |
| 3S3E20L004 | 340 | U | Mocho I | NA | NA | 99.8 | 762.6 | 101.3 | 761.1 | - | -1.5 | - |
| 3S3E20R004 | 0 | U | Mocho I | NA | NA | 46.9 | 876.9 | 51.2 | 872.6 | - | -4.4 | - |
| 3S3E21C001 | 128 | U | Upland | NA | NA | 33.8 | 1033.5 | 34.1 | 1033.1 | - | -0.4 | - |
| 4S2E01A001 | 130 | U | Mocho II | NA | NA | 22.0 | 797.8 | 23.8 | 796.0 | - | -1.8 | - |
| 4S3E06E004 | 220 | U | Mocho II | NA | NA | 4.1 | 803.5 | 6.7 | 801.0 | - | -2.5 | - |

U = Upper; L = Lower; NM = Not Measured; NA = Not Available; OBS = Obstructed; - = Not Applicable
Highlighted = Representative Monitoring Site
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# TABLE 5-4
# GROUNDWATER ELEVATIONS AT REPRESENTATIVE MONITORING SITES
# FOR CHRONIC LOWERING OF GROUNDWATER ELEVATIONS
# 2021 WATER YEAR
# LIVERMORE VALLEY GROUNDWATER BASIN

| *RMS Well* | | *Management Area/Unit* | | | *2021 Water Year* | | | | | *SMCs for Groundwater Elevations* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Well Name* | *Map* | *Area* | *Subarea* | *Aquifer* | *Season High* | *Season Low* | *Change from 2020** | *Height above MT* | *Height above MO* | *MT* | *IM-5* | *IM-10* | *IM-15* | *MO* |
| 3S1E20C007 | 20C7 | Main | Bernal | Upper | 288.5 | 264.6 | -25.5 | 119.8 | 85.1 | 144.8 | 153.4 | 162.1 | 170.8 | 179.5 |
| 3S1E20C008 | 20C8 | Main | Bernal | Lower | 284.6 | 250.5 | -35.9 | 105.8 | 71.1 | 144.8 | 153.4 | 162.1 | 170.8 | 179.5 |
| 3S1E09P005 | 9P5 | Main | Amador West | Upper | 291.8 | 278.2 | -16.3 | 98.4 | 71.5 | 179.8 | 186.5 | 193.2 | 199.9 | 206.7 |
| 3S1E09P010 | 9P10 | Main | Amador West | Lower | 279.9 | 254.3 | -16.4 | 74.5 | 47.6 | 179.8 | 186.5 | 193.2 | 199.9 | 206.7 |
| 3S1E11G001 | 11G1 | Main | Amador East | Upper | 305.3 | 293.8 | -12.6 | 112.8 | 73.9 | 181.0 | 190.7 | 200.4 | 210.2 | 219.9 |
| 3S1E12K003 | 12K3 | Main | Amador East | Lower | 265.6 | 235.4 | -18.9 | 54.4 | 15.5 | 181.0 | 190.7 | 200.4 | 210.2 | 219.9 |
| 3S2E08K002 | 8K2 | Main | Mocho II | Upper | 422.8 | 417.4 | -6.1 | 162.3 | 124.3 | 255.1 | 264.6 | 274.1 | 283.6 | 293.1 |
| 3S2E08H003 | 8H3 | Main | Mocho II | Lower | 420.6 | 416.3 | -4.8 | 161.2 | 123.2 | 255.1 | 264.6 | 274.1 | 283.6 | 293.1 |
| 3S1E06F003 | 6F3 | Fringe | Northwest | Upper | 325.4 | 323.8 | -0.8 | 18.9 | 9.2 | 305.0 | 307.4 | 309.8 | 312.2 | 314.6 |
| 2S2E34E001 | 34E1 | Fringe | Northeast | Upper | 495.3 | 493.5 | -0.4 | 5.3 | 2.3 | 488.2 | 489.0 | 489.7 | 490.5 | 491.2 |
| 3S2E24A001 | 24A1 | Fringe | East | Upper | 699.6 | 699.6 | 0.2 | 24.1 | 21.3 | 675.5 | 676.2 | 676.9 | 677.6 | 678.3 |
| 3S2E21K009 | 21K9 | Upland | Upland | Upper | 478.4 | 476.2 | NA | 6.1 | 6.1 | 470.1 | 470.1 | 470.1 | 470.1 | 470.1 |

RMS = Representative Monitoring Site
SMC = Sustainable Management Criteria
IM = Interim Milestone
MO = Measurable Objective
MT = Minimum Threshold
* = 2020 Seasonal Low minus 2021 Seasonal Low

| |
|---|
| Main |
| Fringe |
| Upland |

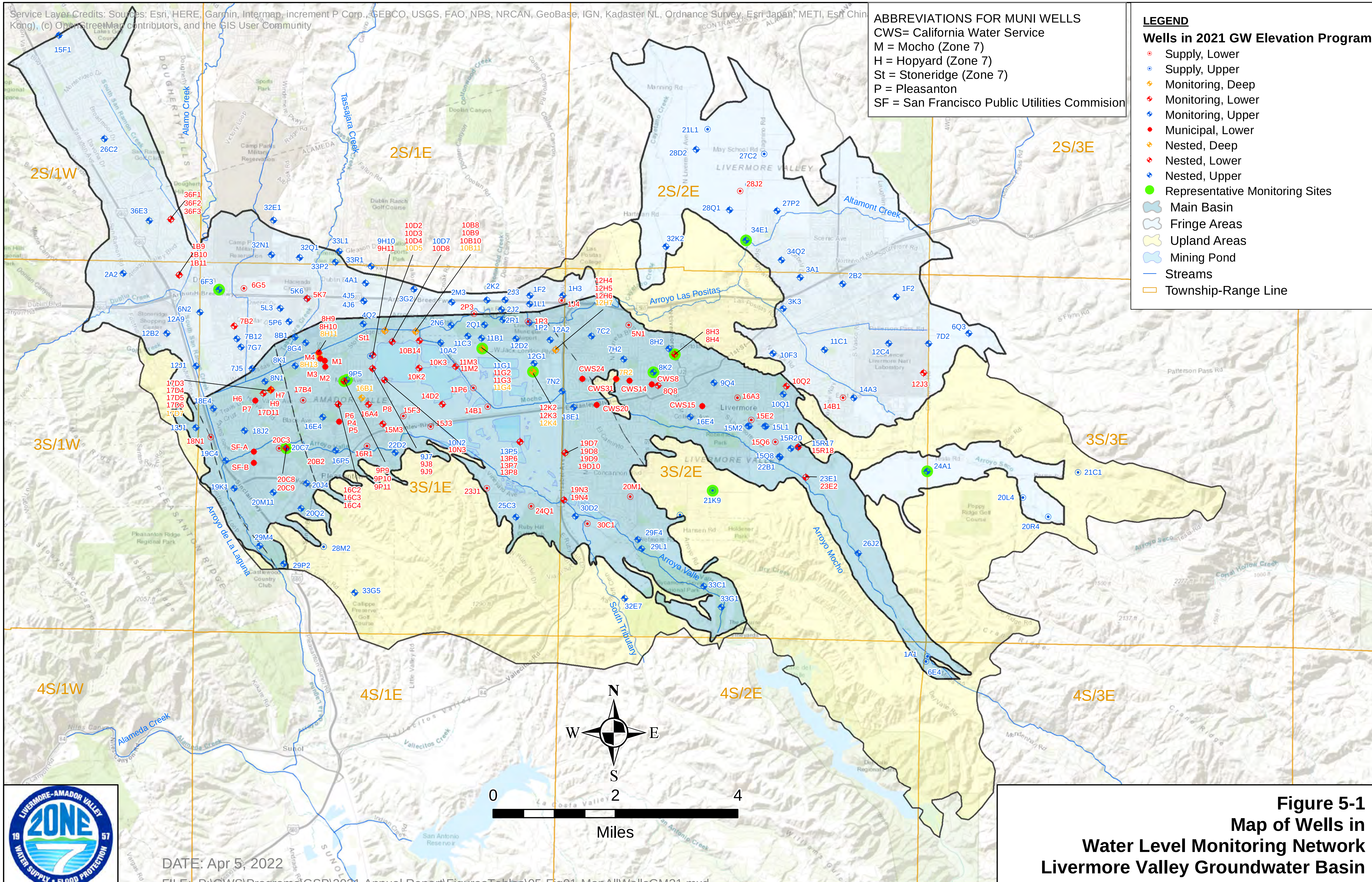


**Figure 5-1**
**Map of Wells in**
**Water Level Monitoring Network**
**Livermore Valley Groundwater Basin**

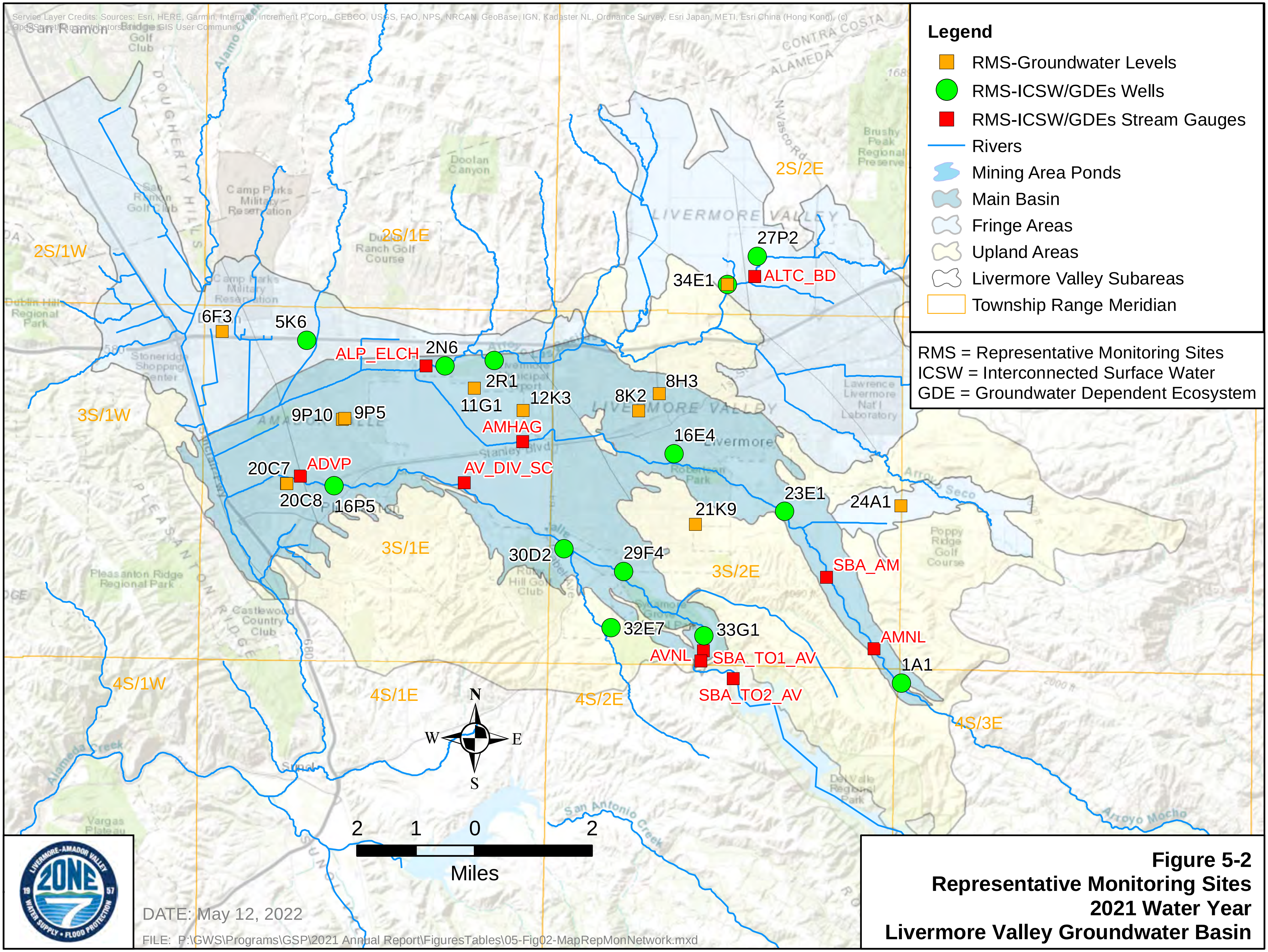


**Figure 5-2**
**Representative Monitoring Sites**
**2021 Water Year**
**Livermore Valley Groundwater Basin**

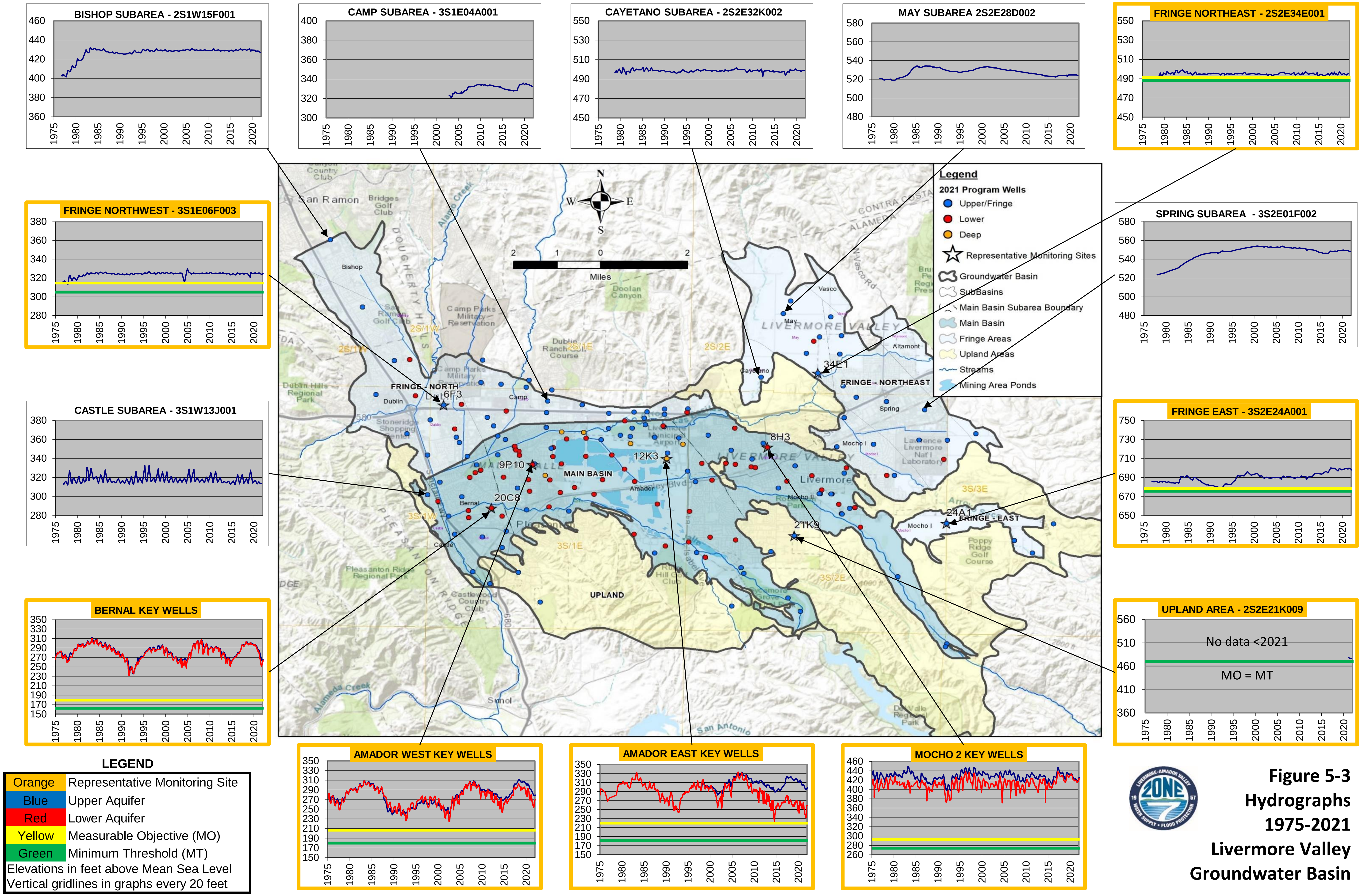


**Figure 5-3**
**Hydrographs**
**1975-2021**
**Livermore Valley**
**Groundwater Basin**

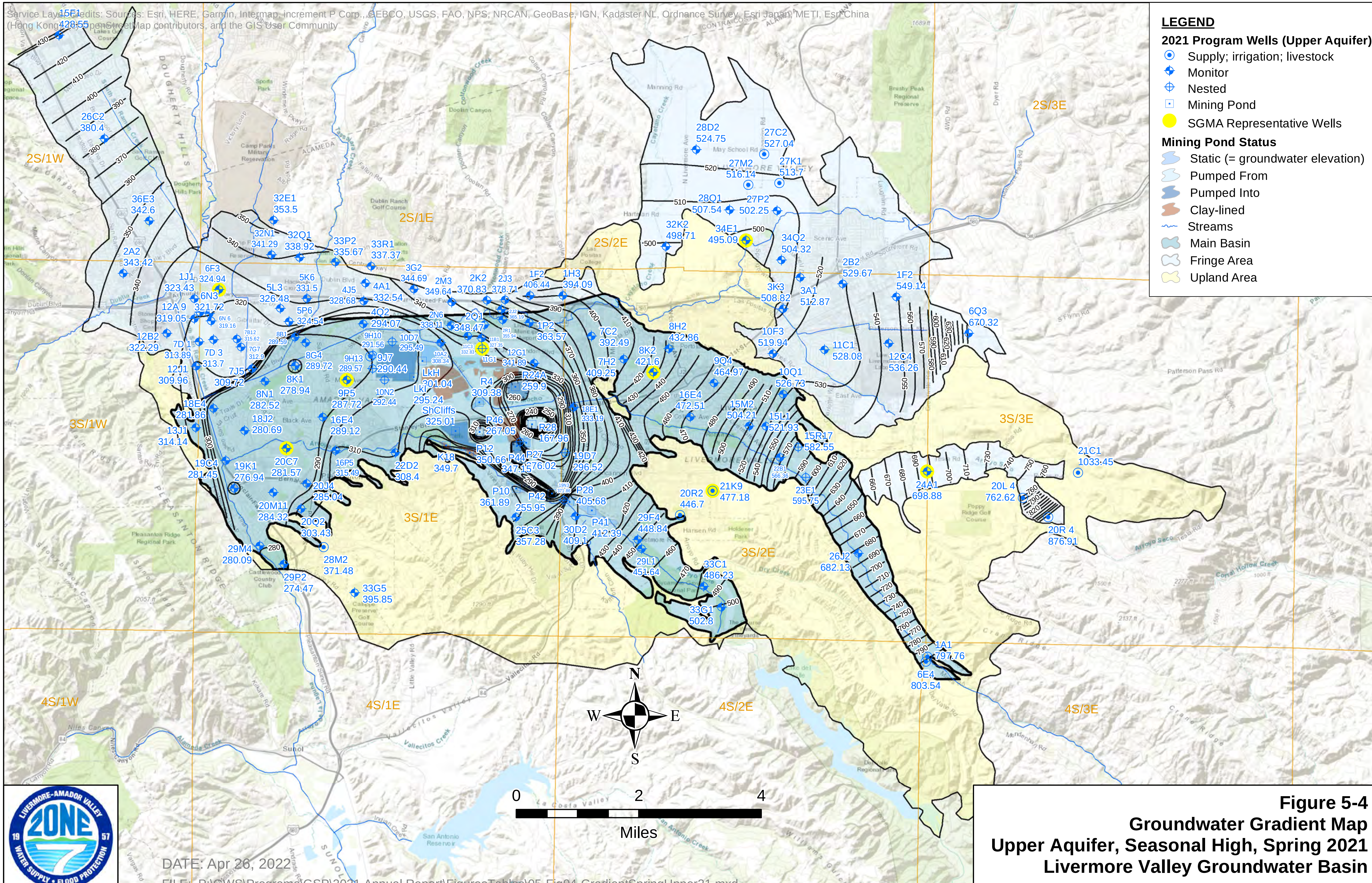


**Figure 5-4**
**Groundwater Gradient Map**
**Upper Aquifer, Seasonal High, Spring 2021**
**Livermore Valley Groundwater Basin**

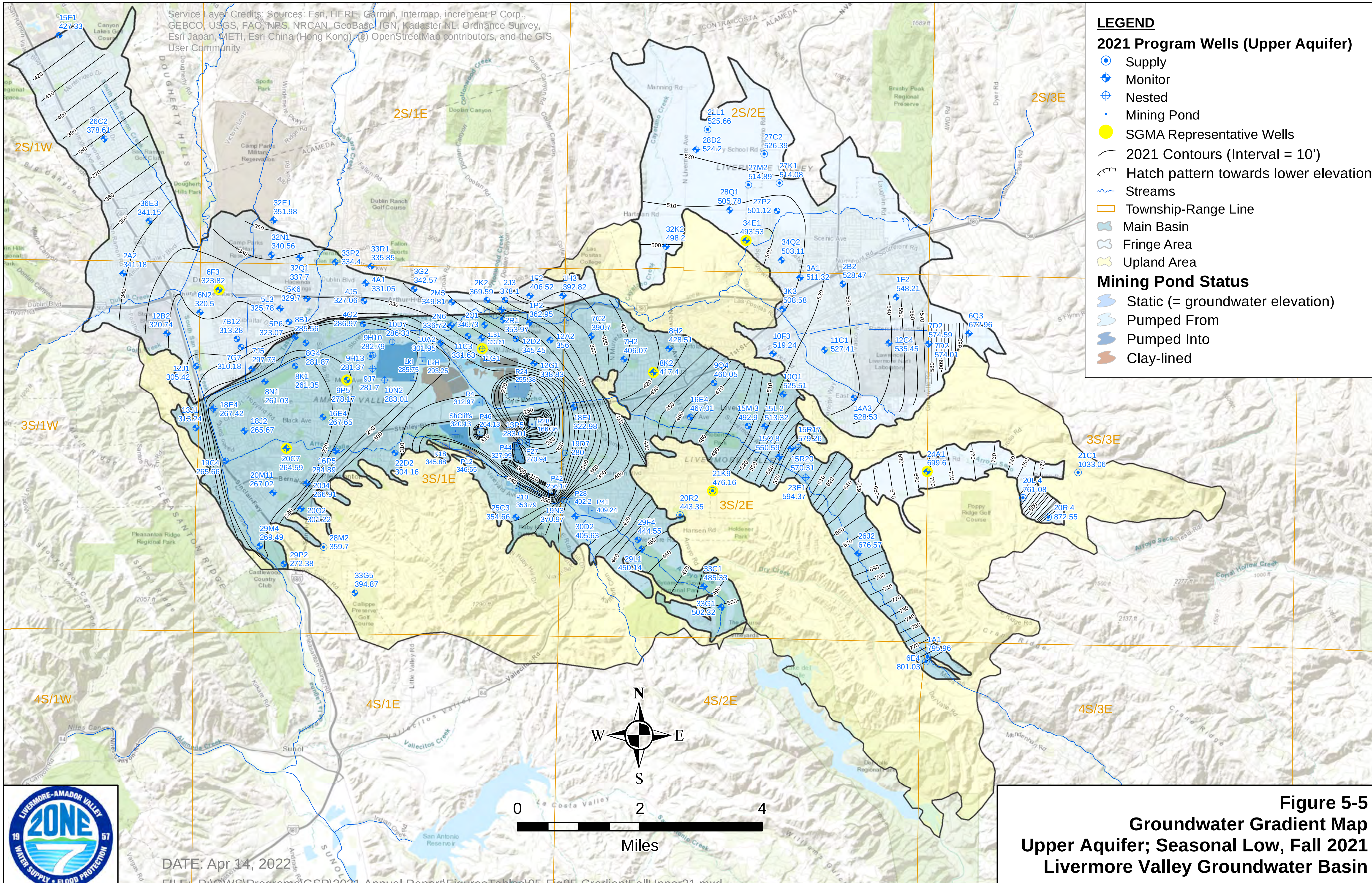


**Figure 5-5**
**Groundwater Gradient Map**
**Upper Aquifer; Seasonal Low, Fall 2021**
**Livermore Valley Groundwater Basin**

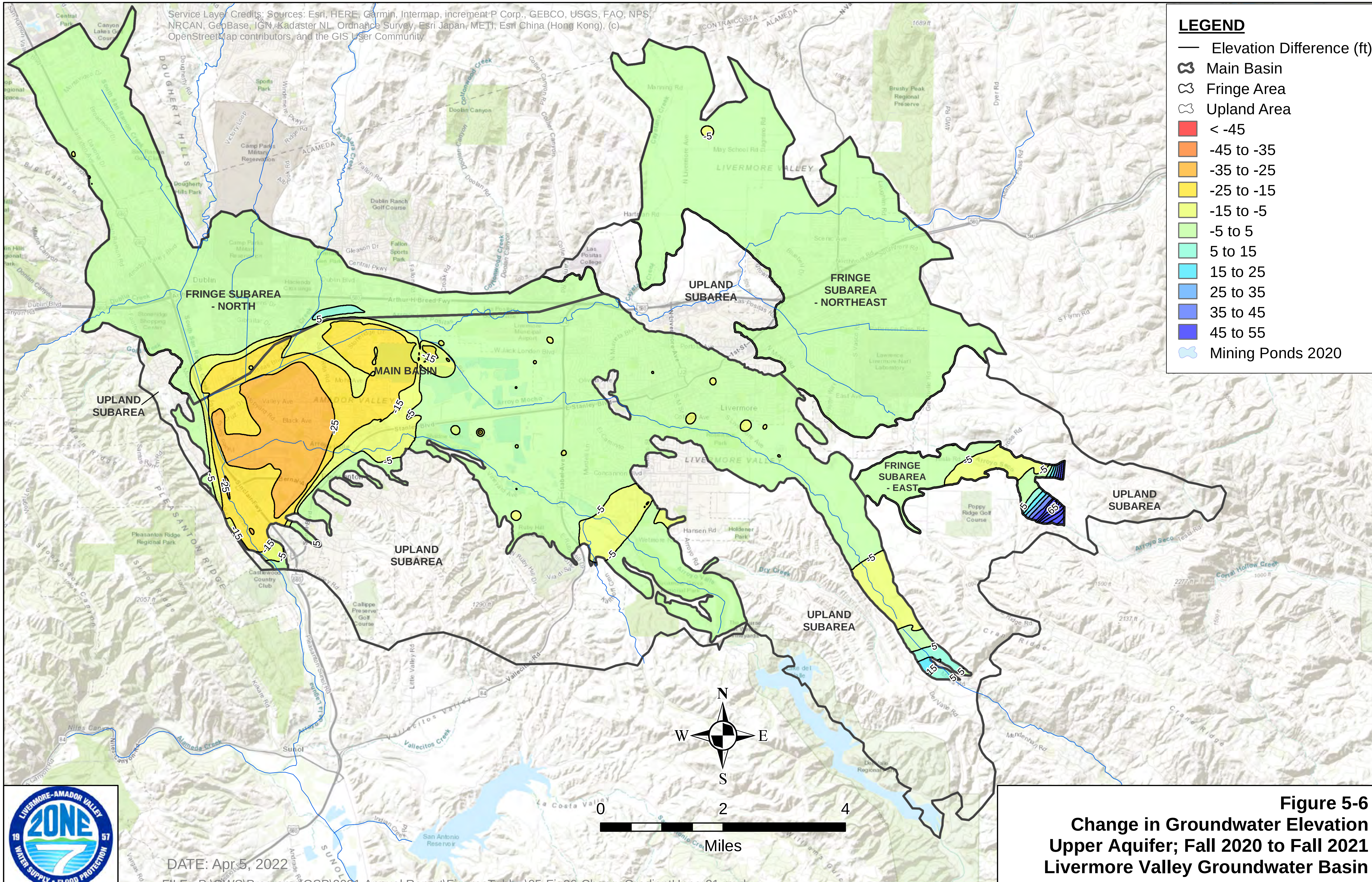

**Figure 5-6**
**Change in Groundwater Elevation**
**Upper Aquifer; Fall 2020 to Fall 2021**
**Livermore Valley Groundwater Basin**

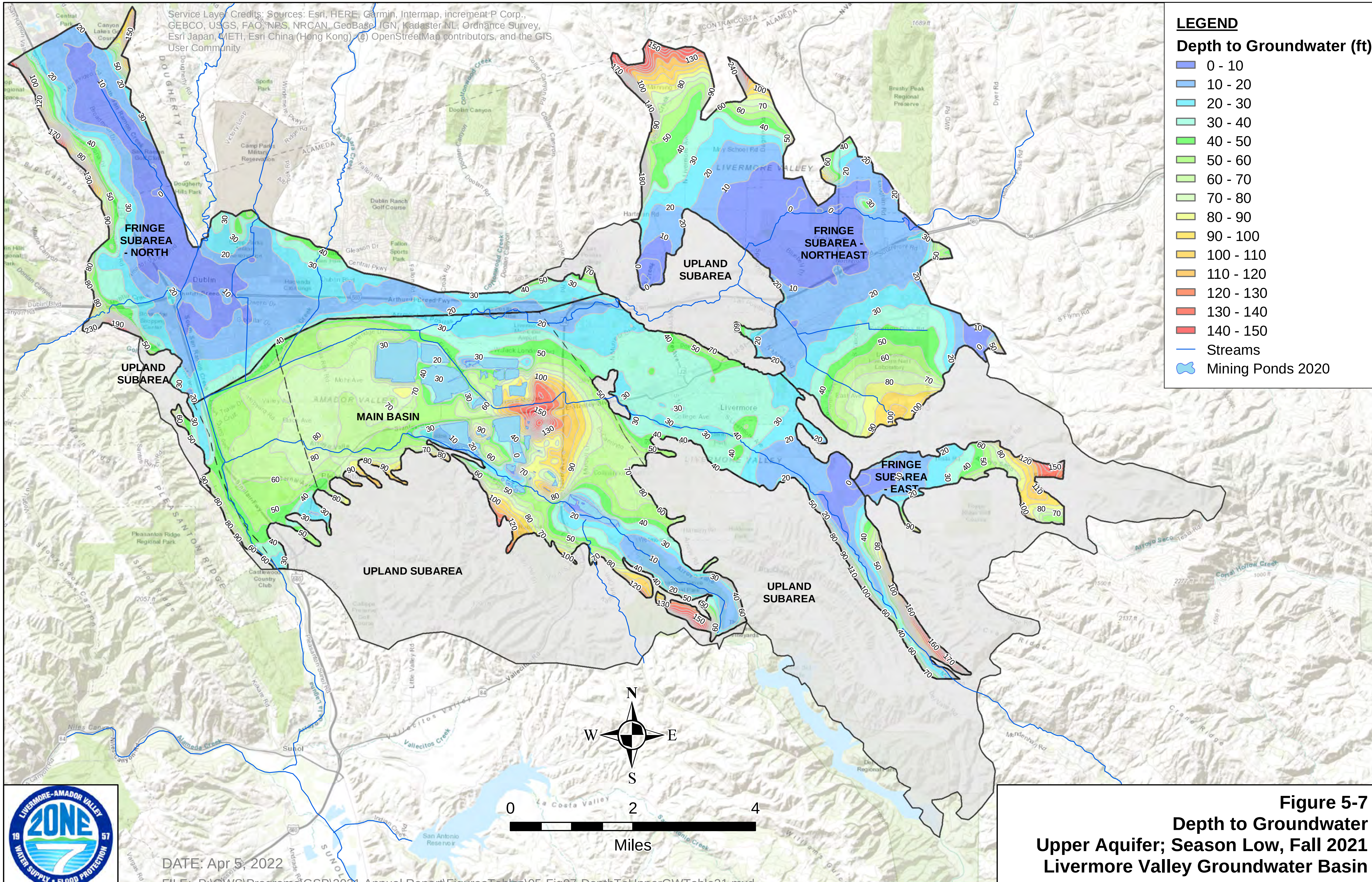


**Figure 5-7**
**Depth to Groundwater**
**Upper Aquifer; Season Low, Fall 2021**
**Livermore Valley Groundwater Basin**

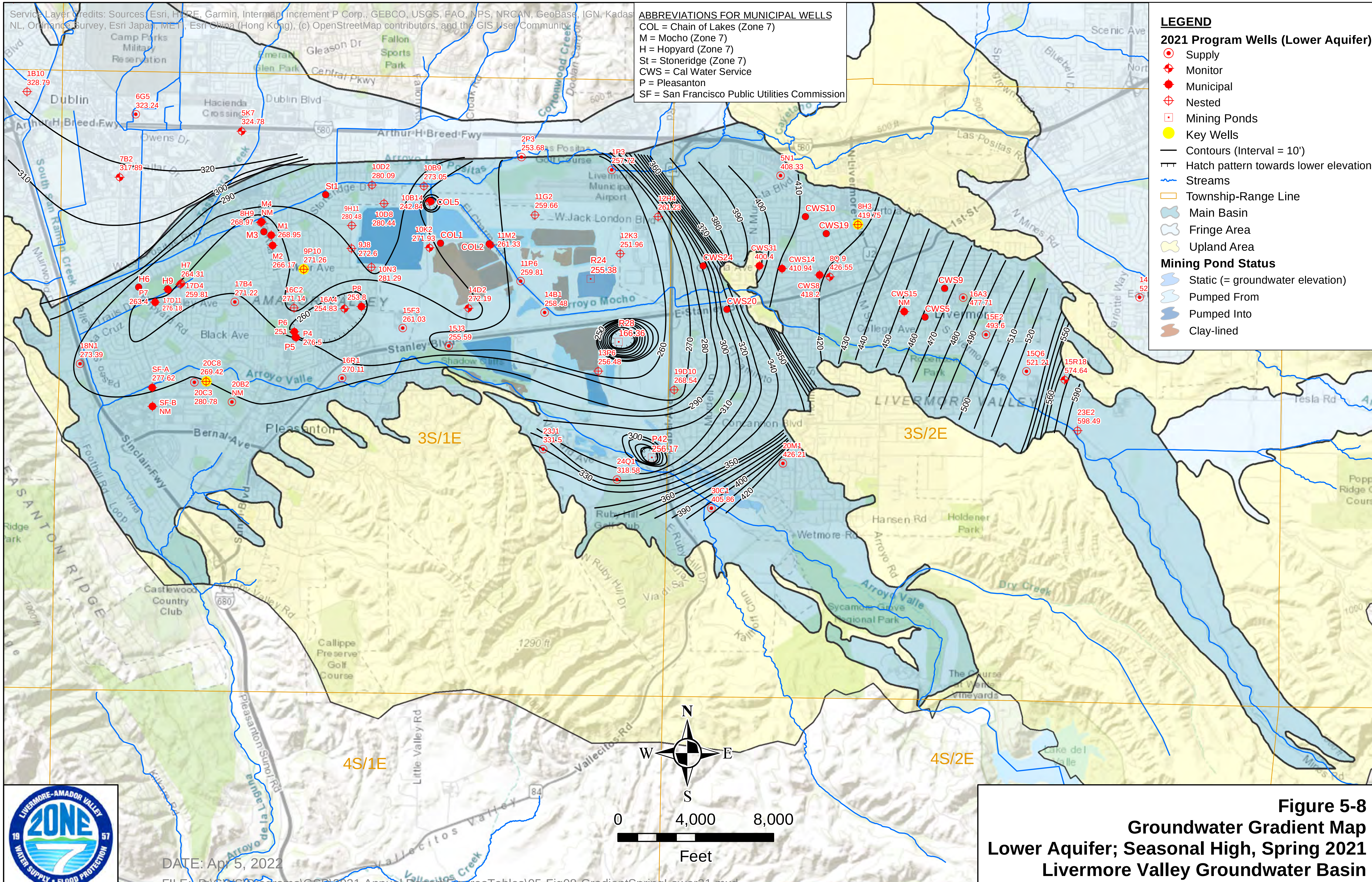


**Figure 5-8**
**Groundwater Gradient Map**
**Lower Aquifer; Seasonal High, Spring 2021**
**Livermore Valley Groundwater Basin**

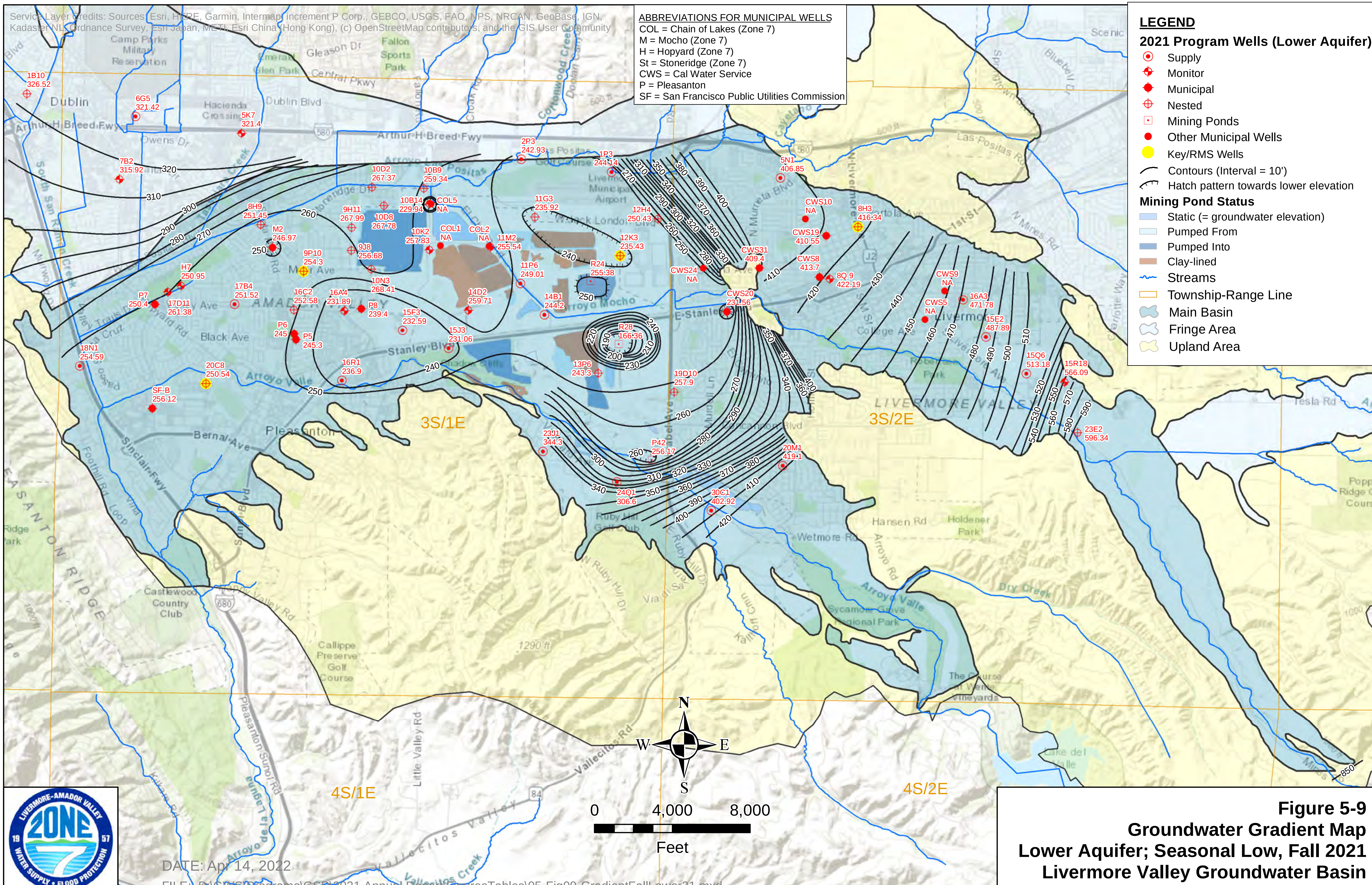


**Figure 5-9**
**Groundwater Gradient Map**
**Lower Aquifer; Seasonal Low, Fall 2021**
**Livermore Valley Groundwater Basin**

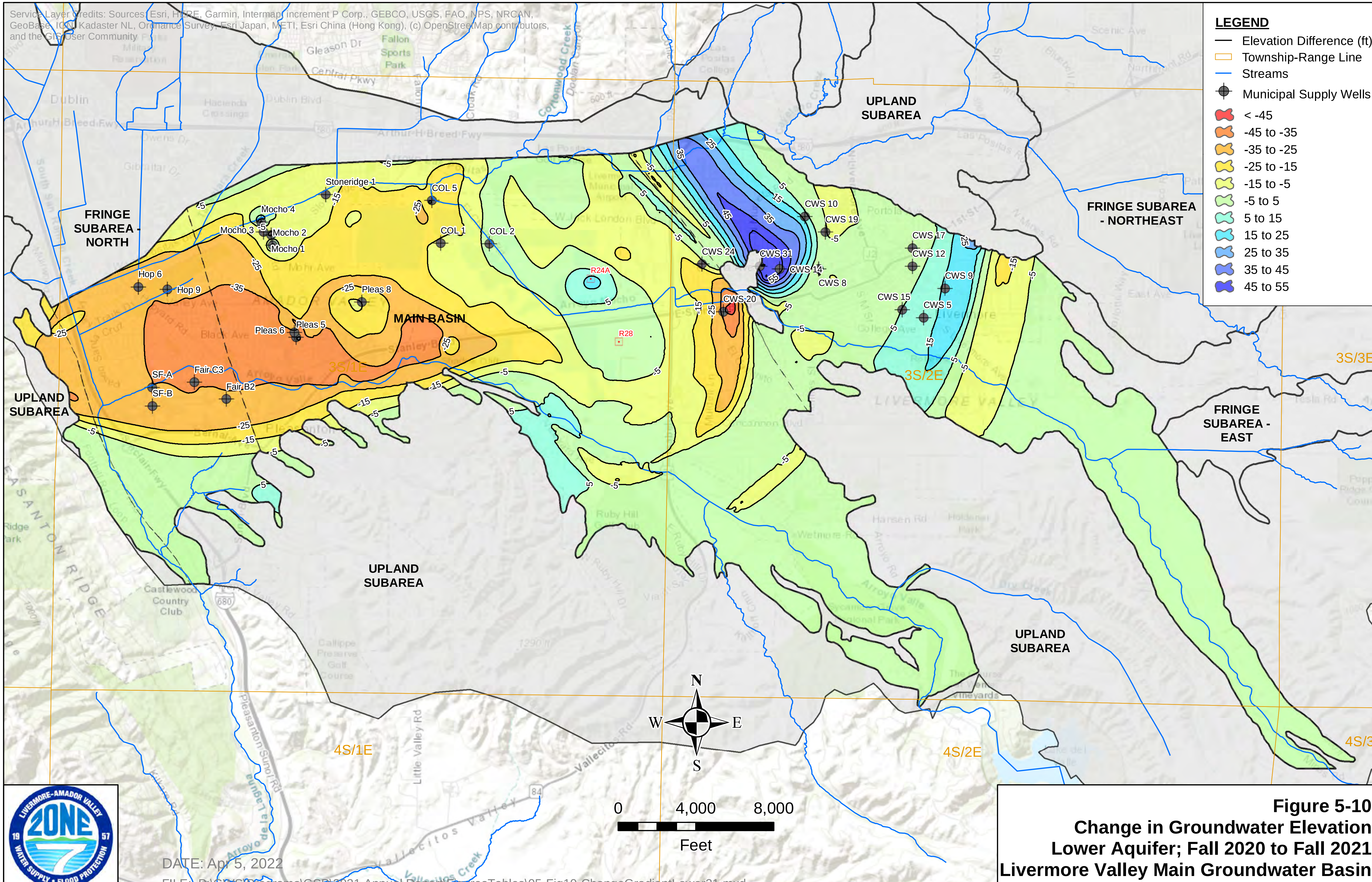


**Figure 5-10**
**Change in Groundwater Elevation**
**Lower Aquifer; Fall 2020 to Fall 2021**
**Livermore Valley Main Groundwater Basin**

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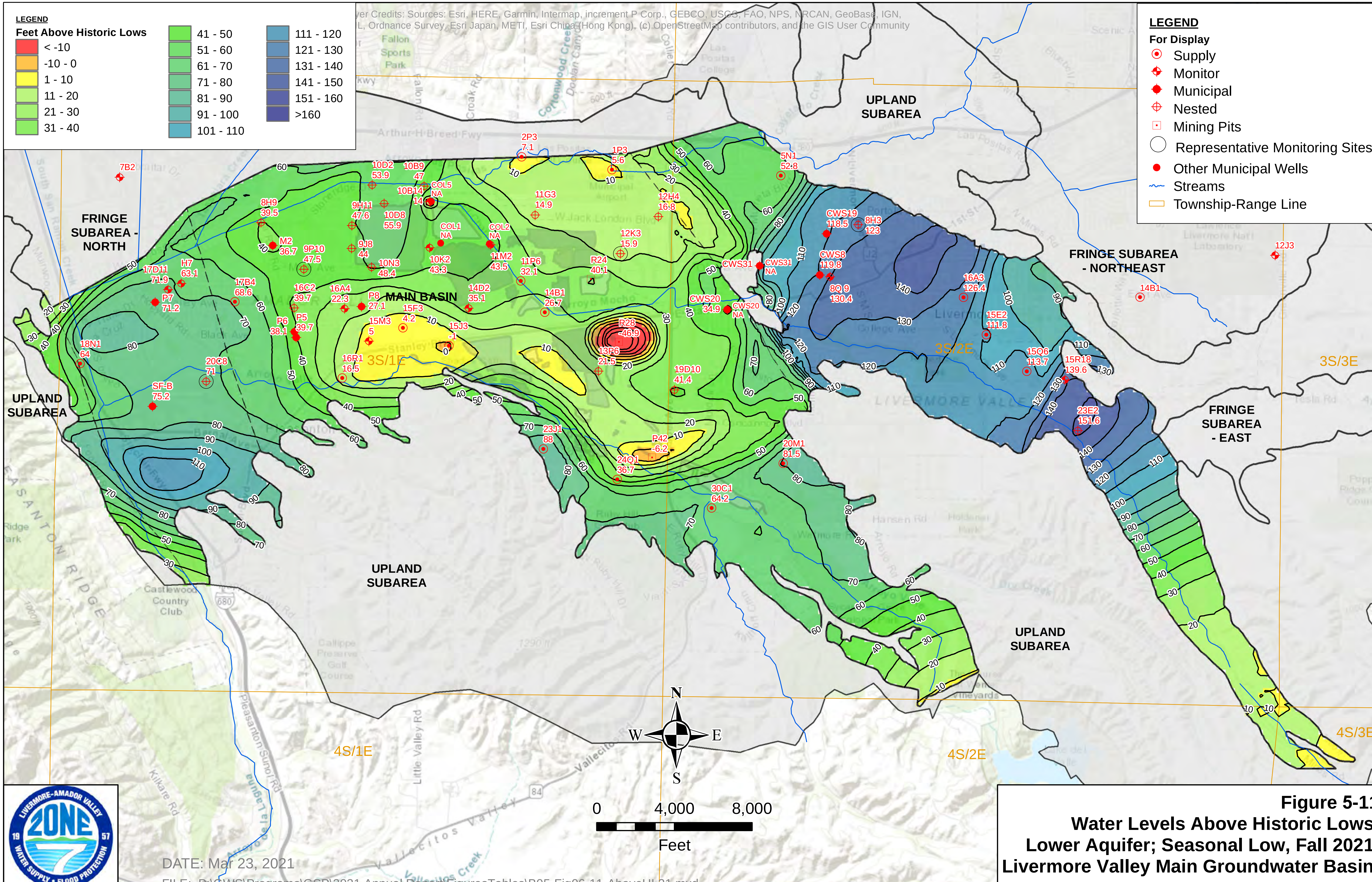


**Figure 5-11**
**Water Levels Above Historic Lows**
**Lower Aquifer; Seasonal Low, Fall 2021**
**Livermore Valley Main Groundwater Basin**

# 6 Groundwater Quality Monitoring

## 6.1 Program Changes

***Table 6-A*** below lists the changes that were made to the Groundwater Quality Monitoring Program for the 2021 WY.

***Table 6-A: Program Wells Changes during the 2021 WY***

| Action | Reason | Note |
|---|---|---|
| **3S1E20C003**<br>**Removed from program** | No longer pumping | Still used for elevations.<br>3S1E20B002 used for water quality. |
| **21 wells added to program** | 2021 Alternative GSP | Added to address DWR recommendations.<br>See Table 1-1 in 2021 Alternative GSP |

Zone 7's 2021 Alternative GSP also established the SMCs for Degraded Water Quality as shown in ***Table 6-B*** below.

***Table 6-B: SMCs for Degraded Water Quality***

| Undesirable Results Definition | Undesirable Results Criteria | Minimum Threshold | Measurable Objective |
|---|---|---|---|
| If groundwater recharge or extraction causes significant and unreasonable degradation of water quality in the Basin, such that these changes impact to the long-term viability of domestic, agricultural, municipal, environmental, or other beneficial uses over the planning and implementation horizon of this Alternative GSP. Significant and unreasonable changes to water quality associated with Undesirable Results would include a significant increase, on a regional basis, in concentrations of identified COCs above applicable state and federal regulatory thresholds, as a result of groundwater recharge or extraction. | If and when MTs are exceeded for any of the identified COCs in greater than 25% the RMS-WQs at least two consecutive years as a result of groundwater recharge or extraction, such that they cannot be managed to provide drinking water supply (i.e., that treatment or blending is not possible or practicable). | Greater of MCL (or other appropriate regulatory criteria) or the SGMA baseline concentration plus maximum historical annual range. | <u>TDS</u>: Recommended Secondary MCL (500 mg/L) in the Main Basin, Upper Secondary MCL (1,000 mg/L) or 2015 concentrations (whichever is greater) in the Fringe and Upland Areas.<br><u>Nitrate</u>: Primary MCL (10 mg/L)<br><u>Boron</u>: Health Risk Limit (HRL; 1,400 µg/L)<br><u>Hexavalent Chromium</u>: Primary MCL (50 µg/L) |

SMC = Sustainable Management Criteria
COCs = Constituents of Concern
RMS-WQ = Representative Monitoring Sites for Water Quality
MCL = Maximum Contaminant Level
SGMA = Sustainable Groundwater Management Act
MT = Minimum Threshold
GSP = Groundwater Sustainability Plan

TDS = Total Dissolved Solids

In 2020, Zone 7 hired Jacobs Engineering, Inc. to conduct a Per- and Polyfluoroalkyl Substances (PFAS) Potential Source Investigation (*Jacobs, 2020*). The investigation, which concluded in December 2020, included recommendations for additional sampling of existing monitoring wells. Those wells were incorporated into the 2021 WY sampling program. Jacob's PFAS Potential Source Investigation Report and other information on PFAS are located on the Zone 7 website: http://www.zone7water.com/pfas-information.

For more information on general groundwater quality and the groundwater quality program, see the following sections of the 2021 Alternative GSP:

- **Section 1.2.3:** Groundwater Quality Program Updates
- **Section 8.6:** Current and Historical Groundwater Conditions - Groundwater Quality
- **Section 13.4:** Sustainability Indicators – Degraded Water Quality
- **Section 14.2.4:** Monitoring Network for Degraded Water Quality
- **Section 14.4:** Representative Monitoring

## 6.2 Results for the 2021 Water Year

### 6.2.1 General

***Figure 6-1*** and ***Table 6-1*** show all 233 wells in the 2021 WY Groundwater Quality Program. ***Table 5-2*** from ***Section 5: Groundwater Elevation Monitoring*** shows well construction information for each of the wells. ***Table 6-2*** shows metal and mineral results from all wells in the program for the 2021 Water Year. In general, concentrations of the constituents of concern (TDS, nitrate, boron, chromium, and PFAS) remain relatively unchanged over the last several years.

### 6.2.2 Total Dissolved Solids (TDS)

***Table 6-3*** shows TDS results for the 2021 WY in Representative Monitoring Sites for Degraded Water Quality (RMS-WQ) and their differences between the MOs and MTs. Concentrations were below the MTs in all wells except for 3S2E08H003 (8H3, in the Mocho II Lower Aquifer) which had detections of TDS at 737 milligrams per liter (mg/L) (19 mg/L above the MT). Six wells had concentrations above the MOs including five wells in the Main Basin and one in the Fringe Area. As stated in *the* 2021 Alternative GSP, a UR for Degraded Water Quality occurs if and when:

*MTs are exceeded for any of the identified constituents of concern in greater than 25% of the RMS-WQs at least two (2) consecutive years as a result of SGMA-related groundwater* *management activities such that they cannot be managed to provide drinking water supply (i.e., that treatment or blending is not possible or practicable).*

Therefore, since only one RMS-WQ had a concentration above the MT during the 2021 WY, this MT exceedance does not constitute a UR for TDS.

***Figure 6-2*** shows graphs of TDS concentrations from 1975 to 2021 in various wells including the RMS-WQ. ***Figure 6-3*** and ***Figure 6-4*** show TDS concentrations for the 2021 WY in the Upper and Lower Aquifers, respectively.

- During the 2021 WY, the TDS concentrations in groundwater continued to be lowest in areas adjacent to the Arroyo Valle and the Arroyo Mocho, where they were generally less than 500 mg/L in both the Upper and Lower Aquifers.

- There continues to be two main areas of the Basin where TDS concentrations exceed 1,000 mg/L in the Upper Aquifer:

  - In the northwestern Fringe Area and extending south into the Main Basin. This high TDS area is most likely due to the combination of the concentrating effects of urban irrigation, leaching of buried lacustrine and marine sediments, recharge of poorer quality water from Arroyo Las Positas, and legacy wastewater and sludge disposal practices in the Pleasanton and Livermore areas.
  - In the northeastern Fringe Area. This high-TDS area is likely due to poorer quality water that runs off marine sediments on the east and north of the Basin and recharges the Basin along the hill-fronts.
- Many of the supply wells in the Pleasanton area produced water with TDS concentrations greater than the basin objective of 500 mg/L (also used as the MO for the RMS-WQ wells) during the 2021 WY. The highest concentrations were detected as follows:

  - The highest concentration detected in a Zone 7 municipal well was in the Stoneridge Well (labeled St1) at 707 mg/L.

  - One of the San Francisco Public Utilities Commission (SFPUC) wells in the Bernal wellfield (SF-B) detected TDS at 725 mg/L.

  - A private irrigation well (3S1E17B004 or 17B4) located central to four active wellfields (Mocho, Hopyard, Bernal, and Busch Valley) had TDS at 781 mg/L.

### 6.2.3 Nitrates

***Table 6-4*** shows nitrate (as nitrogen, $NO_3$-N) results for the 2021 WY in RMS-WQ and their differences between the MOs and MTs. Concentrations were below the MTs in all wells and above the MOs in two wells in the Main Basin. Since no RMS-WQ had a concentration above the MT, there were no UR occurrences for nitrate.

***Figure 6-5*** shows graphs of $NO_3$-N concentrations from 1975 to 2021 in various wells including the RMS-WQ. ***Figure 6-6*** and ***Figure 6-7*** show $NO_3$-N concentrations for the 2021 WY in the Upper and Lower Aquifers, respectively.

The Nutrient Management Plan (NMP) (*Zone 7, 2015b*) identified ten local high nitrate Areas of Concern (AOC) where nitrate concentrations persist above the Basin Objective (which is the Maximum Contaminant Level [MCL], 10 mg/L $NO_3$-N). Overall, these AOCs have been decreasing in size and/or concentration or have been relatively stable over the last five years:

- **Happy Valley**—Two wells have been added to the program near this area; however, only 3S1E28M002 (28M2) was sampled and analyzed for nitrate (at 6.1 mg/L) in the 2021 WY.
- **Bernal**—The long-term trend of concentrations in this well continues to decline slowly. In the 2021 WY, the concentration was at 8.38 mg/L compared to 9.58 mg/L for the 2020 WY.
- **Staples Ranch**—For the past few years, nitrate concentrations in this AOC have dropped below the Basin Objective. The highest concentration during the 2021 WY was detected in 3S1E05K006 (5K6) at 9.95 mg/L.
- **Constitution**—Nitrate concentrations continue to drop in 3S1E01H003 (1H3), but were still detected above the Basin Objective at 13.3 mg/L during the 2021 WY compared to 15.7 mg/L in 2020 WY.
- **Jack London**—The highest nitrate concentration detected in this AOC was in 3S2E07H002 (7H2) at 11.7 mg/L during the 2021 WY (12.5 mg/L in 2020 WY), however well 3S1E12D002 (12D2, 13.2 mg/L in 2020 WY) was not sampled this year by the Livermore Water Reclamation Plant (LWRP).
- **May School**—Historically, the nitrate concentration in this AOC has been characterized annually by the results of a single monitoring well (2S2E28D002 or 28D2), which have varied over the last 7 years between 16.7 mg/L and 42.8 mg/L. This year 2S2E21L001 (21L1) was added to the program and had a nitrate concentration of 19.8 mg/L.
- **Charlotte Way**— In the 2021 WY, two wells in this area exceeded the MCL; 13.8 mg/L in 3S2E03K003 (3K3) and 10.2 mg/L in 3S2E14A003 (14A3) (13.8 mg/L and 9.83 mg/L, respectively in the 2020 WY).
- **Buena Vista**—During the 2021 WY, the highest concentration was again detected in the northeastern portion of the plume at 14.6 mg/L in 3S2E10Q001 (10Q1, 15.2 mg/L in the 2020 WY). Five wells in this AOC that were added to the program in the 2021 WY had concentrations similar to other nearby wells and ranged from 7.6 mg/L to 12 mg/L.

Overall, this Lower Aquifer nitrate plume has been relatively stable over the last five years.

- **Greenville**—This AOC typically characterized by the results of a single monitoring well (3S2E24A001, 24A1); however, nearby well 3S2E19C002 (19C2) was added to the program in the 2021 WY. For the 2021 WY, 24A1 had a concentration of 1.5 mg/L (24.5 mg/L in 2020 WY) and 19C2 had 18.9 mg/L. Two wells southeast of this AOC that were also added to the program in the 2021 WY also had concentrations above the Basin Objective (3S3E20L004, 20L4, at 16.5 mg/L and 3S3E20R004, 20R4 at 12.7 mg/L).

- **Mines Road**—For the 2021 WY, the nitrate concentration in 3S2E26J002 (26J2) was again below the Basin Objective at 1.94 mg/L (1.37 mg/L in 2020 WY). Two wells southeast of this AOC that were added to the program in the 2021 WY were both non-detect for nitrate.

### 6.2.4 Boron

***Table 6-5*** shows boron results for the 2021 WY in RMS-WQ and their differences between the MOs and MTs. Concentrations were below the MTs in all wells but were above the MOs in two wells in the Fringe Area.

***Figure 6-8*** shows graphs of boron concentrations from 1975 to 2021 in various wells including the RMS-WQ. ***Figure 6-9*** and ***Figure 6-10*** show boron concentrations for the 2021 WY in the Upper and Lower Aquifers, respectively. Boron exists at elevated concentrations in the areas of the Basin listed below. These localized concentrations of boron have been relatively stable for many years.

- Along the boundary between the northwestern Fringe Area and the Main Basin. The highest concentration was detected near the center of this area in 3S1E04J005 (4J5) at 11,600 µg/L the 2021 WY (12,000 µg/L in 2020 WY). It appears that a small portion of this plume extends into the Lower Aquifer just north of Lake I.

- In portions of the northeastern Fringe Area. The highest concentration detected in these areas in the 2021 WY was detected at 27,000 µg/L in 2S2E27P002 (27P2), compared to 29,000 µg/L in the 2020 WY.

- In the eastern Fringe Area. While this area historically has only been represented by one well in the Zone 7 Water Quality program (3S2E24A001 or 24A1), four wells in this area (three in the Fringe Area and one well just east in the Upland Area) were added to the program for the 2021 WY. Three of these had concentrations above the Basin Objective, the highest of which was detected in 3S2E21C001 (21C1, in the Upland Area) at 4,040 µg/L.

### 6.2.5 Chromium

***Table 6-6*** shows total Chromium (Cr) results for the 2021 WY in RMS-WQ and their differences between the MOs and MTs. Concentrations were below the MTs and MOs in all wells.

***Figure 6-11*** shows graphs of Cr concentrations from 1975 to 2021 in various wells including the RMS-WQ. ***Figure 6-12*** and ***Figure 6-13*** show Cr concentrations for the 2021 WY in the Upper and Lower Aquifers, respectively.

Cr concentrations did not exceed the 50 µg/L threshold in any wells for the 2021 WY, however there are two areas that historically have had concentrations above the 50 µg/L threshold.

- While samples from monitoring well 3S2E12C004 (12C4) in the northeastern Fringe Area have typically exhibited high Cr values in the past (94µg/L in the 2020 WY), the concentration was only 11 µg/L in the 2021 WY.
- In the 2020 WY Cr was detected at 108 µg/L in monitoring well 3S1E07G007 (7G7) in the northwestern Fringe Area just north of the Main Basin, however in the 2021 WY the concentration was below the detection limit.

### 6.2.6 PFAS

***Table 6-7*** shows results from the wells sampled and tested for PFAS for the 2021 WY. The PFAS compound with the highest concentrations in the Basin has been perfluorooctane sulfonic acid (PFOS). PFOS concentrations in the Upper and Lower Aquifers are shown on ***Figure 6-14*** and ***Figure 6-15***, respectively.

- The majority of wells with PFOS concentrations that were above the Department of Drinking Water's (DDW) 40 parts per trillion (ppt) response level (RL) appear to be within a roughly-triangular area in both the Upper and Lower Aquifers that stretches from the southwestern edge of the airport (north of the mining area) to Pleasanton's Wellfield (west of the mining area) and to Zone 7's Mocho Wellfield (northwest of the mining area).
- The highest concentration detected has been in well 3S1E10B008 (10B8, north of Lake I) at 1,400 ppt in the 2020 WY (not sampled during the 2021 WY).
- Eight of Zone 7's municipal wells have tested above the Notification Level (NL) for PFOS (6.1 ppt), and four of the municipal wells have had PFOS concentrations that exceeded DDW's recommended RL of 40 ppt, the highest of which was in Mocho 1 (3S1E09M002 or M1) at 110 ppt in 2020 WY. Mocho 1 was not pumping, and therefore not sampled, during the 2021 WY.

- Four of Zone 7's municipal wells have also tested above the NL for perfluorooctanoic acid (PFOA) (5.1 ppt). Although additional PFAS compounds have also been detected in Zone 7's water supplies, the results were either below the NL (e.g., PFBS at 500 ppt) or at present there are no regulatory guidelines for these contaminants.

- Pleasanton's Well 8 (Pleas 8 or P8) had a concentration of PFOS at 75 ppt in the 2021 WY (110 ppt in the 2020 WY). This area of elevated PFOS concentration appears to be relatively isolated as evidenced by several wells with concentrations below the RL both north (roughly up-gradient) and west (down-gradient) of Pleas 8.

- PFOS was detected in five of six California Water Service (CWS) wells sampled in the 2021 WY, however, none of the wells had concentrations above the RL (40ppt).

## 6.3 Attached Tables and Figures

# TABLE 6-1
# MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM
# LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2S1E32E001 | 32E1 | End of Arnold Rd | None | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1E32N001 | 32N1 | Camp Parks | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1E32Q001 | 32Q1 | Summer Glen Dr | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1E33L001 | 33L1 | Gleason Dr @ Tassajara | None | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1E33P002 | 33P2 | Central Pkwy at Emerald Glen Pk | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1E33R001 | 33R1 | Central Pkwy @ Grafton | None | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1W15F001 | 15F1 | BOLLINGER | Bishop | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1W26C002 | 26C2 | PINE VALLEY | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1W36E003 | 36E3 | Kolb Park | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1W36F001 | 36F1 | Dublin High shallow | Dublin | L | nested | active | Zone 7 | 1 | | | | |
| 2S1W36F002 | 36F2 | Dublin High mid | Dublin | L | nested | active | Zone 7 | 1 | | | | |
| 2S2E21L001 | 21L1 | Merlin | May | U | domestic | active | Zone 7 | 1 | | | | |
| 2S2E27K001 | 27K1 | Model Airport | Spring | U | livestock | inactive | Zone 7 | 1 | | | | |
| 2S2E27M002 | 27M2 | Kwan | May | U | domestic | active | Zone 7 | 1 | | | | |
| 2S2E27P002 | 27P2 | hartford ave east | Spring | U | monitor | active | Zone 7 | 1 | | | | |
| 2S2E28D002 | 28D2 | May School | May | U | monitor | active | Zone 7 | 1 | | | | |
| 2S2E28J002 | 28J2 | FCC Well | May | L | industrial | active | Zone 7 | 1 | | | | |
| 2S2E28Q001 | 28Q1 | hartford ave | May | U | monitor | active | Zone 7 | 1 | | | | |
| 2S2E32K002 | 32K2 | jenson's N liv. Ave | Cayetano | U | monitor | active | Zone 7 | 1 | | | | |
| 2S2E34E001 | 34E1 | Mud City | May | U | monitor | active | Zone 7 | 1 | X | | | |
| 2S2E34Q002 | 34Q2 | Hollyhock & Crocus | Spring | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E01F002 | 1F2 | Constitution Dr | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E01H003 | 1H3 | Collier Canyon g1 | Camp | U | monitor | active | Zone 7 | 4 | | | | |
| 3S1E01J004 | 1J04 | Collier Vineyards | Camp | L | irrigation | active | Zone 7 | 1 | | | | |
| 3S1E01L001 | 1L1 | Kitty Hawk | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E01P002 | 1P2 | Airport gas g5 | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E01P003 | 1P3 | New airport well | Amador | L | supply | inactive | Zone 7 | 4 | | | | |
| 3S1E02J002 | 2J2 | Maint. Bldg | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02J003 | 2J3 | Doolan Rd East | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02K002 | 2K2 | Doolan Rd West | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02M003 | 2M3 | Friesman Rd North | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02N006 | 2N6 | Friesman Rd South | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02P003 | 2P3 | Crosswinds Church | Camp | L | domestic | active | Zone 7 | 1 | | | | |
| 3S1E02Q001 | 2Q1 | LPGC #1 | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02R001 | 2R1 | Beebs | Amador | U | monitor | active | Zone 7 | 4 | | | | |

# TABLE 6-1
# MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM
# LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E03G002 | 3G2 | fallon rd | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E04A001 | 4A1 | SMP-DUB-2 | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E04J005 | 4J5 | Pimlico shallow | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E04J006 | 4J6 | Pimlico deep | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E04Q002 | 4Q2 | gulfstream | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E05K006 | 5K6 | Rosewood shallow | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E05K007 | 5K7 | Rosewood deep | Camp | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E05L003 | 5L3 | Oracle | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E05P006 | 5P6 | Owens Park | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E06F003 | 6F3 | Dublin Ct | Dublin | U | monitor | active | Zone 7 | 1 | X | | | |
| 3S1E06N002 | 6N2 | DSRSD MW-3 | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E06N003 | 6N3 | DSRSD MW-4 | Dublin | U | monitor | active | Other | 1 | | | | |
| 3S1E06N006 | 6N6 | DSRSD NE-76 | Dublin | U | monitor | active | Other | 1 | | | | |
| 3S1E07B002 | 7B2 | Hopyard rd | Dublin | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E07B012 | 7B12 | Hacienda Arch | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E07D001 | 7D1 | DSRSD SW-75 | Dublin | U | monitor | unknown | Other | 1 | | | | |
| 3S1E07D003 | 7D3 | DSRSD SE-70 | Dublin | U | monitor | unknown | Other | 1 | | | | |
| 3S1E07G007 | 7G7 | Chabot Well | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E07J005 | 7J5 | Thomas Hart School | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E08B001 | 8B1 | Lizard Well | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E08G004 | 8G4 | Apache | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E08H009 | 8H9 | Mocho 4 Nested Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E08H010 | 8H10 | Mocho 4 Nested Middle | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E08H011 | 8H11 | Mocho 4 Nested deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E08H013 | 8H13 | Mocho 3 mon | Amador | D | monitor | active | Zone 7 | 1 | | | | |
| 3S1E08H018 | M4 | Mocho 4 | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E08K001 | 8K1 | Cockroach well | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E08N001 | 8N1 | sports park | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E09B001 | St1 | Stoneridge | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E09H013 | 9H13 | Lister | Amador | U | domestic | active | Zone 7 | 1 | | | | |
| 3S1E09J007 | 9J7 | SW Lake I Shallow | Amador | U | nested | active | Zone 7 | 1 | | | | |
| 3S1E09J008 | 9J8 | SW Lake I Middle | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E09J009 | 9J9 | SW Lake I Deep | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E09M002 | M1 | Mocho 1 | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E09M003 | M2 | Mocho 2 | Amador | L | muni | active | Zone 7 | 4 | | | | X |

## TABLE 6-1
## MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM
## LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E09M004 | M3 | Mocho 3 | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E09P005 | 9P5 | Key_AmW_U (Mohr Key) | Amador | U | monitor | active | Zone 7 | 1 | X | X | | |
| 3S1E09P009 | 9P9 | Mohr Ave Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E09P010 | 9P10 | Key_AmW_L | Amador | L | nested | active | Zone 7 | 1 | X | X | | |
| 3S1E09P011 | 9P11 | Mohr Ave Deep | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10A002 | 10A2 | El Charro Rd | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E10B008 | 10B8 | Kaiser Rd Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10B009 | 10B9 | Kaiser Rd Middle 1 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10B010 | 10B10 | Kaiser Rd Middle 2 | Amador | L | nested | unknown | Zone 7 | 1 | | | | |
| 3S1E10B011 | 10B11 | Kaiser Rd Deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E10B014 | 10B14 | COL 5 Monitoring | Amador | L | monitor | unknown | Zone 7 | 1 | | | | |
| 3S1E10B016 | COL5 | COL 5 | Amador | L | muni | active | Zone 7 | 4 | | | | |
| 3S1E10D002 | 10D2 | Stoneridge Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10D003 | 10D3 | Stoneridge Middle 1 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10D004 | 10D4 | Stoneridge Middle 2 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10D005 | 10D5 | Stoneridge Deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E10K002 | 10K2 | COL 1 Monitoring | Amador | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E10K003 | COL1 | COL 1 | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E11B001 | 11B1 | Airport West | Amador | U | monitor | active | Zone 7 | 4 | | | | |
| 3S1E11C003 | 11C3 | LAVWMA ROW | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E11G001 | 11G1 | Key_AmE_U | Amador | U | nested | active | Zone 7 | 1 | X | X | | |
| 3S1E11G002 | 11G2 | Rancho Charro Middle 1 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E11G003 | 11G3 | Rancho Charro Middle 2 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E11G004 | 11G4 | Rancho Charro Deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E11M002 | 11M2 | COL 2 Monitoring | Amador | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E11M003 | COL2 | COL 2 | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E11P006 | 11P6 | New Jamieson Residence | Amador | L | domestic | unknown | Zone 7 | 1 | | | | |
| 3S1E12A002 | 12A2 | Airport South | Amador | U | monitor | active | Zone 7 | 4 | | | | |
| 3S1E12D002 | 12D2 | LWRP G6 | Amador | U | monitor | active | LWRP | 4 | | | | |
| 3S1E12G001 | 12G1 | Oaks Park Shallow | Amador | U | monitor | active | Zone 7 | 4 | | | | |
| 3S1E12H004 | 12H4 | LWRP Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E12H005 | 12H5 | LWRP Middle 1 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E12H006 | 12H6 | LWRP Middle 2 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E12H007 | 12H7 | LWRP Deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E12K002 | 12K2 | Oaks Park Mid | Amador | L | nested | active | Zone 7 | 1 | | | | |

## TABLE 6-1
## MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM
## LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E12K003 | 12K3 | Key_AmE_L | Amador | L | nested | active | Zone 7 | 1 | X | X | | |
| 3S1E12K004 | 12K4 | Oaks Park Deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E13P005 | 13P5 | LGA Grant Nested 1 | Amador | U | nested | active | Zone 7 | 1 | | | | |
| 3S1E13P006 | 13P6 | LGA Grant Nested 2 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E13P007 | 13P7 | LGA Grant Nested 3 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E13P008 | 13P8 | LGA Grant Nested 4 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E14B001 | 14B1 | Industrial Asphalt | Amador | L | industrial | unknown | Zone 7 | 1 | | | | |
| 3S1E14D002 | 14D2 | South Cope Lake | Amador | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E15J003 | 15J3 | shadow cliff | Amador | L | supply | unknown | Zone 7 | 1 | | | | |
| 3S1E15M003 | 15M3 | Bush/Valley South | Amador | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E16A002 | P8 | Pleas 8 | Amador | L | muni | active | Pleas | 1 | | | | |
| 3S1E16A004 | 16A4 | Bush/Valley Mid | Amador | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E16B001 | 16B1 | Bush/Valley North | Amador | D | monitor | active | Zone 7 | 1 | | | | |
| 3S1E16C002 | 16C2 | Santa Rita Valley Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E16C003 | 16C3 | Santa Rita Valley Middle | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E16C004 | 16C4 | Santa Rita Valley Deep | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E16E004 | 16E4 | black ave - cultural | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E16L005 | P5 | Pleas 5 | Amador | L | muni | active | Pleas | 1 | | | | |
| 3S1E16L007 | P6 | Pleas 6 | Amador | L | muni | active | Pleas | 1 | | | | |
| 3S1E16P005 | 16P5 | Vervais Monitor | Amador | U | monitor | active | Zone 7 | 2 | | | X | |
| 3S1E17B004 | 17B4 | Casterson | Amador | L | supply | unknown | Zone 7 | 1 | | | | |
| 3S1E17D003 | 17D3 | Hopyard Nested Shallow | Bernal | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E17D004 | 17D4 | Hopyard Nested Middle 1 | Bernal | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E17D005 | 17D5 | Hopyard Nested Middle 2 | Bernal | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E17D006 | 17D6 | Hopyard Nested Middle 3 | Bernal | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E17D007 | 17D7 | Hopyard Nested Deep | Bernal | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E17D011 | 17D11 | Hopyard 9 Monitoring Well | Bernal | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E17D012 | H9 | Hopyard 9 | Bernal | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E18A006 | H6 | Hopyard 6 | Bernal | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E18E004 | 18E4 | Valley Trails II | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E18J002 | 18J2 | camino segura | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E19A010 | SF-B | SFWD South (B) | Bernal | L | muni | active | Zone 7 | 1 | | | | |
| 3S1E19A011 | SF-A | SFWD North (A) | Bernal | L | muni | active | Zone 7 | 1 | | | | |
| 3S1E19C004 | 19C4 | del valle & laguna | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E19K001 | 19K1 | 680/bernal | Bernal | U | monitor | active | Zone 7 | 1 | | | | |

# TABLE 6-1
# MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM
# LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E20B002 | 20B2 | Fairgrounds Potable | Bernal | L | supply | active | Zone 7 | 1 | | | | |
| 3S1E20C003 | 20C3 | Fairgrounds Potable Backup | Bernal | L | supply | active | Zone 7 | 1 | | | | |
| 3S1E20C007 | 20C7 | Key_Bern_U | Bernal | U | monitor | active | Zone 7 | 2 | X | X | X | |
| 3S1E20C008 | 20C8 | Key_Bern_L | Bernal | L | nested | active | Zone 7 | 1 | X | X | | |
| 3S1E20C009 | 20C9 | Fair Nested Deep | Bernal | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E20J004 | 20J4 | civic center | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E20M011 | 20M11 | S.F "M"LINE | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E20Q002 | 20Q2 | 20Q2 | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E22D002 | 22D2 | vineyard trailer | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E23J001 | 23J1 | 1627 vineyard trailer | Amador | L | domestic | unknown | Zone 7 | 1 | | | | |
| 3S1E25C003 | 25C3 | Katz Winery Mansion | Amador | U | monitor | unknown | Zone 7 | 1 | | | | |
| 3S1E28M002 | 28M2 | Bargar | Upland | U | supply | active | Zone 7 | 1 | | | | |
| 3S1E29M004 | 29M4 | f.c. channel | Castle | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E29P002 | 29P2 | castlewood dr | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E33G005 | 33G5 | Pleasanton Calippe 33G5 | Upland | U | monitor | unknown | Zone 7 | 1 | | | | |
| 3S1W01B009 | 1B9 | DSRSD Shallow | Dublin | L | nested | unknown | Zone 7 | 1 | | | | |
| 3S1W01B010 | 1B10 | DSRSD Middle | Dublin | L | nested | unknown | Zone 7 | 1 | | | | |
| 3S1W01B011 | 1B11 | DSRSD Deep | Dublin | L | nested | unknown | Zone 7 | 1 | | | | |
| 3S1W01J001 | 1J1 | DSRSD MW-1 | Dublin | U | monitor | unknown | Other | 1 | | | | |
| 3S1W02A002 | 2A2 | McNamara's | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1W12B002 | 12B2 | Stoneridge Mall Rd | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1W12J001 | 12J1 | DSRSD South | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1W13J001 | 13J1 | muirwood dr | Castle | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E01F002 | 1F2 | Brisa at Circuit City | Spring | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E02B002 | 2B2 | south front rd | Spring | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E03A001 | 3A1 | Bluebell | Spring | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E03K003 | 3K3 | first & S. front rd | Mocho I | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E05N001 | 5N1 | Spider Well | Mocho II | M | supply | inactive | Zone 7 | 1 | | | | |
| 3S2E07C002 | 7C2 | jaws - york way - G4 | Mocho II | U | monitor | active | Zone 7 | 4 | | | | |
| 3S2E07H002 | 7H2 | dakota | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E07N002 | 7N2 | Isabel & Arroyo Mocho | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E07P003 | CWS24 | CWS 24 | Amador | L | muni | active | Zone 7 | 1 | | | | |
| 3S2E07R003 | CWS31 | CWS 31 | Upland | L | muni | active | Zone 7 | 1 | | | | |
| 3S2E08F001 | CWS10 | CWS 10 | Mocho II | L | muni | active | CWS | 1 | | | | |
| 3S2E08H002 | 8H2 | North k | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |

# TABLE 6-1
## MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM
## LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S2E08H003 | 8H3 | Key_Mo2_L | Mocho II | L | nested | active | Zone 7 | 1 | X | X | | |
| 3S2E08H004 | 8H4 | N Liv Ave Deep | Mocho II | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E08K002 | 8K2 | Key_Mo2_U (Livermore Key) | Mocho II | U | monitor | active | Zone 7 | 1 | X | X | | |
| 3S2E08N002 | CWS14 | CWS 14 | Mocho II | L | muni | active | Zone 7 | 1 | | | | |
| 3S2E08Q009 | 8Q 9 | D-2 | Mocho II | L | monitor | active | Zone 7 | 1 | | | | |
| 3S2E09Q001 | CWS9 | CWS 9 | Mocho II | L | muni | active | CWS | 1 | | | | |
| 3S2E09Q004 | 9Q4 | school st | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E10F003 | 10F3 | hexcel | Mocho I | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E10Q001 | 10Q1 | almond | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E10Q002 | 10Q2 | LLNL W-703 | Mocho II | L | monitor | unknown | LLNL | 1 | | | | |
| 3S2E11C001 | 11C1 | joan way | Mocho I | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E12C004 | 12C4 | LLNL W-486 | Spring | U | monitor | unknown | LLNL | 1 | | | | |
| 3S2E12J003 | 12J3 | LLNL W-017A | Spring | L | monitor | unknown | LLNL | 1 | | | | |
| 3S2E14A003 | 14A3 | S. vasco @east ave | Mocho I | U | monitor | active | LLNL | 1 | | | | |
| 3S2E14B001 | 14B1 | 5763 east ave | Mocho I | L | domestic | unknown | Zone 7 | 1 | | | | |
| 3S2E15E002 | 15E2 | Retzlaff Winery | Mocho II | L | irrigation | active | Zone 7 | 1 | | | | |
| 3S2E15L001 | 15L1 | Concannon 2 | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E15L002 | 15L2 | Concannon 6D | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E15M002 | 15M2 | Concannon 1 | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E15M003 | 15M3 | Concannon 5D | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E15Q008 | 15Q 8 | Concannon 4 | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E15R017 | 15R17 | Buena Vista Shallow | Mocho II | U | nested | active | Zone 7 | 1 | | | | |
| 3S2E15R018 | 15R18 | Buena Vista Deep | Mocho II | L | monitor | active | Zone 7 | 1 | | | | |
| 3S2E15R020 | 15R20 | Concannon 3 | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E16A003 | 16A3 | Memory Gardens | Mocho II | L | irrigation | active | Zone 7 | 1 | | | | |
| 3S2E16C001 | CWS15 | CWS 15 | Mocho II | L | muni | active | Zone 7 | 1 | | | | |
| 3S2E16E004 | 16E4 | pepper tree | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E18B001 | CWS20 | CWS 20 | Amador | L | muni | active | Zone 7 | 1 | | | | |
| 3S2E18E001 | 18E1 | Stanley East of Isabel | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E19D007 | 19D7 | Isabel Shallow | Amador | U | nested | active | Zone 7 | 1 | | | | |
| 3S2E19D008 | 19D8 | Isabel Middle 1 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E19D009 | 19D9 | Isabel Middle 2 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E19D010 | 19D10 | Isabel Deep | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E19K001 | 19K1 | Cavicchi | Amador | L | supply | active | Zone 7 | 1 | | | | |
| 3S2E19N003 | 19N3 | Shallow Cemex Nested | Amador | U | nested | active | Zone 7 | 1 | | | | |

TABLE 6-1
MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM
LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S2E19N004 | 19N4 | Deep Cemex Nested | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E20M001 | 20M1 | Alden Lane | Amador | L | supply | unknown | Zone 7 | 1 | | | | |
| 3S2E20R002 | 20R2 | Ravenswood South Well | Upland | U | irrigation | active | Zone 7 | 1 | | | | |
| 3S2E21K009 | 21K9 | Hughey Marina Ave | Upland | U | domestic | active | Zone 7 | 1 | | | | |
| 3S2E22B001 | 22B1 | grapes | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E23E001 | 23E1 | Murrieta Nested Shallow | Mocho II | U | nested | active | Zone 7 | 1 | | | | |
| 3S2E23E002 | 23E2 | Murrieta Nested Deep | Mocho II | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E24A001 | 24A1 | S. greenville | Mocho I | U | monitor | active | Zone 7 | 1 | X | | | |
| 3S2E26J002 | 26J2 | mines rd | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E29F004 | 29F4 | Wetmore | Amador | U | monitor | active | Zone 7 | 2 | | | X | |
| 3S2E30C001 | 30C1 | Vineyard 30C 1 | Amador | L | supply | active | Zone 7 | 1 | | | | |
| 3S2E30D002 | 30D2 | vineyard | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E32E007 | 32E7 | DVWTP 32E7 | Upland | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E33C001 | 33C1 (P1) | Sycamore Grove P1 | Amador | U | monitor | inactive | Zone 7 | 1 | | | | |
| 3S2E33G001 | 33G1 | Crohare | Amador | U | monitor | active | Zone 7 | 2 | | | X | |
| 3S3E06Q003 | 6Q3 | PPWTP South Monitoring | Altamont | U | monitor | active | Zone 7 | 1 | | | | |
| 3S3E07D002 | 7D2 | 7D 2 | Spring | U | monitor | active | LLNL | 1 | | | | |
| 3S3E19C002 | 19C2 | Wilker well 2 | Mocho I | U | domestic | active | Zone 7 | 1 | | | | |
| 3S3E20L004 | 20L 4 | Vail on Tesla | Mocho I | U | domestic | active | Zone 7 | 1 | | | | |
| 3S3E20R004 | 20R 4 | Buonanno on Tesla | Mocho I | U | domestic | active | Zone 7 | 1 | | | | |
| 3S3E21C001 | 21C1 | Russell on Reuss | Upland | U | domestic | active | Zone 7 | 1 | | | | |
| 4S2E01A001 | 1A1 | Gallagher Ag | Mocho II | U | irrigation | active | Zone 7 | 1 | | | | |
| 4S3E06E004 | 6E4 | Gallagher Domestic | Mocho II | U | domestic | active | Zone 7 | 1 | | | | |
| WELLS IN GROUNDWATER QUALITY PROGRAM = 233 | | | | | | | | | | | | |

RMS = Representative Monitoring Sites
WQ-Water Quality
WR = Water Rights
Muni = Municipal

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 2S1E32E001 | 3/2/21 | ZONE7 | 20.7 | 1417 | 7 | 138 | 34 | 123 | 1.4 | 643 | 30 | 131 | 8.7 | 42.8 | < 100 | 3.3 | < 100 | < 1 | 855 | 485 |
| 2S1E32N001 | 3/2/21 | ZONE7 | 23.4 | 940 | 7.4 | 75 | 20 | 103 | 1.8 | 322 | 35 | 127 | 2.39 | 27.8 | 480 | 1.8 | < 100 | 4 | 559 | 270 |
| 2S1E32Q001 | 3/2/21 | ZONE7 | 22.9 | 2051 | 7 | 156 | 66 | 194 | 2.3 | 602 | 87 | 353 | 4.8 | 32.1 | 740 | < 2 | < 200 | < 2 | 1208 | 662 |
| 2S1E33L001 | 3/2/21 | ZONE7 | 18.9 | 1427 | 7.2 | 116 | 32 | 154 | 2.6 | 543 | 50 | 179 | 5.56 | 30 | 440 | 1.9 | < 100 | 4.7 | 856 | 422 |
| 2S1E33P002 | 5/4/21 | ZONE7 | 21.4 | 2372 | 7.1 | 165 | 77 | 221 | 2.5 | 866 | 63 | 371 | 0.96 | 25.7 | 890 | < 2 | < 200 | 5.8 | 1356 | 729 |
| 2S1E33R001 | 5/4/21 | ZONE7 | 25.7 | 749 | 7.5 | 57 | 15 | 71 | 1 | 267 | 17 | 95 | 3.97 | 27.8 | 110 | 2.1 | < 100 | 24 | 433 | 204 |
| 2S1W26C002 | 3/2/21 | ZONE7 | 20 | 734 | 6.8 | 104 | 21 | 44 | 0.9 | 382 | 36 | 33 | 5.49 | 32.1 | 100 | 2.9 | < 100 | < 1 | 483 | 347 |
| 2S1W36E003 | 3/2/21 | ZONE7 | 21.9 | 957 | 7 | 125 | 26 | 61 | 0.7 | 411 | 89 | 69 | 4.57 | 38.5 | 120 | 4.5 | < 100 | < 1 | 632 | 419 |
| 2S1W36F001 | 6/30/21 | ZONE7 | 20.2 | 690 | 7.4 | 56 | 22 | 76 | 2.5 | 382 | 13 | 34 | < 0.1 | 19.9 | 270 | 12 | < 100 | 2.2 | 412 | 231 |
| 2S1W36F002 | 6/30/21 | ZONE7 | 24 | 837 | 7.6 | 37 | 16 | 135 | 0.8 | 396 | < 1 | 100 | < 0.1 | 23.5 | 600 | 145 | 252 | < 1 | 508 | 158 |
| 2S2E21L001 | 9/21/21 | ZONE7 | 19.2 | 1301 | 7.6 | 57 | 34 | 179 | 1.2 | 367 | 36 | 198 | 19.8 | 34.2 | 510 | 5.7 | < 100 | 4.6 | 809 | 282 |
| 2S2E27M002 | 2/4/21 | ZONE7 | - | 1994 | 7.9 | 55 | 59 | 292 | 0.9 | 591 | 144 | 297 | 10.3 | 36.4 | 2700 | 6.1 | < 100 | 3.4 | 1225 | 381 |
| 2S2E27P002 | 3/29/21 | ZONE7 | 20.7 | 4676 | 7.7 | 75 | 44 | 833 | 2.1 | 214 | < 1 | 1470 | < 0.1 | 27.8 | 27000 | < 5 | 611 | < 5 | 2558 | 369 |
| 2S2E28D002 | 3/29/21 | ZONE7 | 21.5 | 1535 | 7.5 | 81 | 44 | 195 | 2.6 | 266 | 45 | 278 | 41.2 | 34.2 | 560 | 3.6 | < 100 | 6.7 | 994 | 383 |
| 2S2E28J002 | 5/11/21 | ZONE7 | 19.6 | 964 | 8.3 | 4 | 4 | 212 | 0.5 | 384 | 60 | 87 | < 0.1 | 20.3 | 1620 | < 1 | < 100 | < 1 | 580 | 26 |
| 2S2E28Q001 | 3/29/21 | ZONE7 | 24.4 | 1148 | 7.8 | 38 | 34 | 179 | 1 | 369 | 99 | 146 | 2.67 | 34.2 | 540 | 12 | < 100 | < 1 | 726 | 235 |
| 2S2E32K002 | 3/29/21 | ZONE7 | 19.6 | 939 | 7.6 | 39 | 32 | 133 | 1.8 | 322 | 58 | 126 | 2.37 | 40.7 | 360 | 6.2 | < 100 | 13 | 600 | 230 |
| 2S2E34E001 | 3/29/21 | ZONE7 | 24.1 | 1244 | 8.1 | 9 | 10 | 242 | 0.5 | 383 | 74 | 151 | < 0.1 | 27.8 | 2300 | 32 | < 100 | < 1 | 707 | 63 |
| 2S2E34Q002 | 3/29/21 | ZONE7 | 20.9 | 1817 | 7.5 | 68 | 59 | 210 | 1.2 | 269 | 143 | 390 | 0.92 | 32.1 | 2380 | 4.1 | < 100 | 1.1 | 1040 | 413 |
| 3S1E01F002 | 3/30/21 | ZONE7 | 21.5 | 1442 | 7 | 106 | 43 | 129 | 0.8 | 540 | 24 | 176 | 7.72 | 51.4 | 150 | 5.7 | < 100 | 2.8 | 830 | 442 |
| 3S1E01H003 | 3/30/21 | ZONE7 | 22.6 | 1838 | 7.3 | 65 | 41 | 251 | 1.3 | 475 | 76 | 303 | 13.3 | 30 | 550 | 4.9 | < 100 | 6.3 | 1061 | 331 |
| 3S1E01H003 | 4/21/21 | LWRP | - | 1840 | - | 76 | 37 | 260 | 1.2 | - | 74 | 250 | 17 | 31 | 1600. | - | - | - | 1110 | - |
| 3S1E01H003 | 9/21/21 | LWRP | - | 1730 | - | 72 | 45 | 270 | 1.3 | - | 66 | 345 | 11.6 | 30 | < 0. | - | - | - | 1010 | - |
| 3S1E01L001 | 3/30/21 | ZONE7 | 23.9 | 1687 | 7.2 | 76 | 37 | 239 | 1.3 | 551 | 46 | 249 | 13.3 | 32.1 | 2200 | 4.5 | < 100 | 9.6 | 1011 | 342 |
| 3S1E01P002 | 4/21/21 | LWRP | - | 1420 | - | 66 | 37 | 160 | 1.5 | - | 80 | 210 | 0.5 | 22 | 3400. | - | - | - | 800 | - |
| 3S1E01P002 | 9/21/21 | LWRP | - | 1410 | - | 70 | 46 | 190 | 1.7 | - | 80 | 263 | 0.6 | 22 | < 0. | - | - | - | 820 | - |
| 3S1E02J002 | 3/30/21 | ZONE7 | 20.7 | 4558 | 7 | 268 | 139 | 599 | 1.9 | 633 | 284 | 1118 | 8.69 | 30 | 5110 | 5.3 | < 500 | < 5 | 2790 | 1243 |
| 3S1E02J003 | 9/23/21 | ZONE7 | 25.2 | 1787 | 7.3 | 61 | 34 | 257 | 29 | 378 | 92 | 357 | 1.21 | 21.4 | 1270 | 8.3 | < 200 | 30 | 1043 | 292 |
| 3S1E02K002 | 3/30/21 | ZONE7 | 23.2 | 1158 | 7.7 | 21 | 21 | 219 | 1.7 | 487 | 50 | 99 | 7.66 | 21.4 | 650 | 6 | < 100 | 10 | 708 | 139 |
| 3S1E02M003 | 5/19/21 | ZONE7 | 20.9 | 2051 | 7.4 | 41 | 41 | 338 | 1.8 | 828 | 76 | 204 | 1.13 | 27.8 | 2830 | 4.1 | < 200 | 18 | 1142 | 271 |
| 3S1E02N006 | 5/19/21 | ZONE7 | 19.9 | 1593 | 7.3 | 52 | 52 | 201 | 1.3 | 522 | 83 | 247 | < 0.1 | 19.5 | 3210 | 3.2 | < 100 | < 1 | 913 | 344 |
| 3S1E02P003 | 5/19/21 | ZONE7 | 20 | 857 | 7.8 | 33 | 33 | 99 | 1.7 | 326 | 55 | 87 | 3.28 | 25.7 | 750 | 2.6 | < 100 | 3.1 | 510 | 218 |
| 3S1E02Q001 | 5/19/21 | ZONE7 | 24.6 | 2101 | 7.5 | 59 | 59 | 258 | 5.7 | 510 | 139 | 326 | 0.76 | 17.5 | 3240 | 3.5 | 327 | < 2 | 1120 | 391 |
| 3S1E02R001 | 4/21/21 | LWRP | - | 1480 | - | 73 | 44 | 160 | 1 | - | 68 | 190 | 3.7 | 25 | 3200. | - | - | - | 880 | - |
| 3S1E02R001 | 9/21/21 | LWRP | - | 1480 | - | 75 | 55 | 180 | 1.1 | - | 65 | 249 | 2.9 | 25 | < 0. | - | - | - | 870 | - |
| 3S1E03G002 | 3/2/21 | ZONE7 | 18.3 | 1579 | 7.3 | 71 | 36 | 218 | 2.3 | 670 | 24 | 188 | < 0.1 | 25.7 | 1150 | 5.3 | 126 | < 1 | 895 | 326 |
| 3S1E04A001 | 3/2/21 | ZONE7 | 21.1 | 1699 | 7.2 | 140 | 35 | 187 | 1.9 | 521 | 42 | 309 | 4.52 | 25.7 | 480 | 2.2 | < 100 | 2.3 | 1017 | 494 |
| 3S1E04J005 | 4/19/21 | ZONE7 | 22.5 | 3344 | 7.6 | 32 | 50 | 618 | 0.9 | 1117 | 242 | 437 | 6.6 | 18.2 | 11500 | 10 | < 500 | < 5 | 1981 | 286 |
| 3S1E04J006 | 4/19/21 | ZONE7 | 18.2 | 2126 | 7.2 | 111 | 47 | 208 | 2.2 | 463 | 98 | 385 | 1.32 | 23.5 | 1740 | 2.2 | < 200 | < 2 | 1109 | 472 |
| 3S1E04Q002 | 4/19/21 | ZONE7 | 18.7 | 1994 | 7.4 | 88 | 61 | 234 | 1.7 | 525 | 105 | 344 | 3.59 | 21.4 | 2500 | 3.9 | < 100 | 8.7 | 1130 | 471 |
| 3S1E05K006 | 4/20/21 | ZONE7 | 19.8 | 2021 | 7.5 | 126 | 57 | 241 | 1.4 | 689 | 237 | 226 | 9.95 | 21.4 | 1730 | 2.1 | < 200 | < 2 | 1294 | 550 |
| 3S1E05K007 | 4/20/21 | ZONE7 | 20.1 | 964 | 7.9 | 43 | 27 | 133 | 1.2 | 358 | 133 | 70 | < 0.1 | 23.5 | 870 | 4.5 | < 100 | < 1 | 610 | 219 |
| 3S1E05L003 | 4/19/21 | ZONE7 | 18.1 | 1315 | 7.4 | 56 | 35 | 170 | 0.9 | 454 | 162 | 116 | < 0.1 | 23.5 | 880 | 3.3 | < 100 | < 1 | 788 | 284 |
| 3S1E05P006 | 4/19/21 | ZONE7 | 22.4 | 4285 | 7.1 | 240 | 168 | 431 | 1.4 | 586 | 1056 | 578 | 4.01 | 27.8 | 1530 | < 5 | < 500 | < 5 | 2809 | 1292 |
| 3S1E06F003 | 3/2/21 | ZONE7 | 23.5 | 4421 | 7 | 357 | 140 | 500 | 3.4 | 557 | 687 | 944 | < 0.1 | 23.5 | 2640 | < 5 | < 500 | < 5 | 2929 | 1469 |
| 3S1E06M002 | 11/30/20 | DSRSD | 17.6 | 8494 | 7.16 | - | - | - | - | - | 2960 | 355 | < 5 | - | - | 5.2 | - | 0.23J | 7160 | - |
| 3S1E06M002 | 4/29/21 | DSRSD | 18.3 | 8333 | 6.88 | - | - | - | - | - | 3000 | 371 | < 5 | - | - | 4.7J | - | < 5 | 7280 | - |
| 3S1E06N002 | 12/1/20 | DSRSD | 17.6 | 22540 | 6.84 | - | - | - | - | - | 1320 | 8770 | < 5 | - | - | 9.5 | - | 0.3J | 17200 | - |
| 3S1E06N002 | 4/29/21 | DSRSD | 22.5 | 24610 | 6.64 | - | - | - | - | - | 1360 | 9420 | < 5 | - | - | 10 | - | < 5 | 16700 | - |

- = Not Analyzed
Highlighted = Representative Monitoring Site

4/22/2022
P:\GWS\Programs\GSP\2021 Annual Report\FiguresTables\06-Tbl02-GQChem21.xlsx

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 3S1E06N003 | 11/30/20 | DSRSD | 17.8 | 11460 | 7.2 | - | - | - | - | - | 257 | 2060 | < 5 | - | - | 6.2 | - | 2.1J | 7120 | - |
| 3S1E06N003 | 4/29/21 | DSRSD | 23.2 | 11360 | 7.17 | - | - | - | - | - | 198 | 4110 | < 5 | - | - | 6.5 | - | < 5 | 6700 | - |
| 3S1E06N004 | 12/1/20 | DSRSD | 18.4 | 6040 | 7.5 | - | - | - | - | - | 2670 | 333 | < 5 | - | - | 8 | - | 0.73J | 5480 | - |
| 3S1E06N004 | 4/29/21 | DSRSD | 22.3 | 3208 | 7.15 | - | - | - | - | - | 930 | 115 | < 5 | - | - | 8.4 | - | 1.2J | 2430 | - |
| 3S1E06N005 | 12/1/20 | DSRSD | 19 | 32220 | 6.78 | - | - | - | - | - | 4760 | 10700 | < 5 | - | - | 6.2 | - | 0.82J | 24200 | - |
| 3S1E06N005 | 4/29/21 | DSRSD | 21.7 | 31620 | 6.82 | - | - | - | - | - | 6050 | 14200 | < 5 | - | - | 5.6 | - | < 5 | 24700 | - |
| 3S1E06N006 | 12/1/20 | DSRSD | 18.8 | 24760 | 6.65 | - | - | - | - | - | 1410 | 9310 | < 5 | - | - | 4.7J | - | 0.22J | 16500 | - |
| 3S1E06N006 | 4/29/21 | DSRSD | 23.5 | 24730 | 6.82 | - | - | - | - | - | 1360 | 10900 | < 5 | - | - | 5.4 | - | < 5 | 17400 | - |
| 3S1E07B002 | 4/20/21 | ZONE7 | 19.8 | 688 | 7.6 | 7 | 7 | 133 | 1.4 | 237 | 20 | 93 | < 0.1 | 9.2 | 860 | 2.2 | < 100 | < 1 | 394 | 47 |
| 3S1E07B012 | 4/20/21 | ZONE7 | 20.9 | 15950 | 7.1 | 532 | 441 | 2690 | < 10 | 347 | 2132 | 5015 | < 0.1 | 25.7 | < 2000 | < 20 | < 2000 | < 20 | 11007 | 3143 |
| 3S1E07D001 | 11/30/20 | DSRSD | 20.4 | 5317 | 6.82 | - | - | - | - | - | 188 | 1580 | < 5 | - | - | 23.6 | - | 1.2J | 3370 | - |
| 3S1E07D001 | 4/28/21 | DSRSD | 23 | 5011 | 7 | - | - | - | - | - | 158 | 1560 | < 5 | - | - | 14.8 | - | < 5 | 3340 | - |
| 3S1E07D002 | 11/30/20 | DSRSD | 20.6 | 23420 | 7.02 | - | - | - | - | - | 10800 | 3850 | < 5 | - | - | 26.5 | - | < 5 | 24600 | - |
| 3S1E07D002 | 4/28/21 | DSRSD | 22 | 23320 | 6.82 | - | - | - | - | - | 14400 | 5860 | 0.1 | - | - | 32.7 | - | < 5 | 24100 | - |
| 3S1E07D003 | 11/30/20 | DSRSD | 18.7 | 19130 | 6.6 | - | - | - | - | - | 575 | 6960 | < 5 | - | - | 49.9 | - | 1.8J | 12100 | - |
| 3S1E07D003 | 4/29/21 | DSRSD | 17.3 | 19060 | 6.46 | - | - | - | - | - | 475 | 9770 | < 5 | - | - | 48.4 | - | < 5 | 13800 | - |
| 3S1E07D004 | 12/1/20 | DSRSD | 18.3 | 35490 | 6.64 | - | - | - | - | - | 8450 | 10800 | < 5 | - | - | 5 | - | 0.26J | 30900 | - |
| 3S1E07D004 | 4/29/21 | DSRSD | 17.4 | 34760 | 6.54 | - | - | - | - | - | 9710 | 12700 | < 5 | - | - | 4J | - | 1.6J | 29700 | - |
| 3S1E07G007 | 4/19/21 | ZONE7 | 19.3 | 18330 | 7 | 394 | 526 | 3060 | 4.5 | 483 | 3028 | 5277 | 0.11 | 18.6 | 4380 | < 20 | < 2000 | < 20 | 12547 | 3148 |
| 3S1E07J005 | 3/8/21 | ZONE7 | 17.4 | 2382 | 7.3 | 106 | 93 | 382 | 2.1 | 950 | 341 | 178 | < 0.1 | 25.7 | 5910 | < 5 | < 500 | < 5 | 1596 | 648 |
| 3S1E07J005 | 8/10/21 | ZONE7 | 25.3 | 2373 | 7.2 | 106 | 88 | 347 | 1.8 | 877 | 328 | 183 | < 0.1 | 25.7 | 5620 | 2.8 | < 200 | < 2 | 1512 | 628 |
| 3S1E08G004 | 5/4/21 | ZONE7 | 20.6 | 2381 | 7.3 | 92 | 80 | 293 | 2.1 | 702 | 191 | 363 | 5.3 | 27.8 | 3890 | 2 | < 200 | 9.8 | 1418 | 560 |
| 3S1E08H009 | 7/6/21 | ZONE7 | 26.4 | 955 | 7.6 | 56 | 48 | 75 | 1.8 | 380 | 46 | 92 | 5.24 | 27.8 | 790 | 2.5 | < 100 | 8.4 | 557 | 338 |
| 3S1E08H010 | 7/6/21 | ZONE7 | 20.5 | 1209 | 7.5 | 55 | 39 | 148 | 2.1 | 441 | 86 | 136 | 3.97 | 30 | 1640 | 1.9 | < 100 | 6.7 | 731 | 296 |
| 3S1E08H011 | 7/6/21 | ZONE7 | 19.9 | 1040 | 7.4 | 56 | 41 | 108 | 2.3 | 361 | 75 | 129 | 1.29 | 27.8 | 1160 | 1.2 | < 100 | 4 | 623 | 308 |
| 3S1E08H013 | 8/31/21 | ZONE7 | 21 | 1291 | 7.2 | 79 | 52 | 111 | 2.8 | 457 | 68 | 137 | 3.48 | 27.8 | 1320 | < 1 | < 100 | 3 | 718 | 412 |
| 3S1E08H018 | 10/5/20 | ZONE7 | 19.9 | 1377 | 7.4 | 90 | 62 | 116 | 3.3 | 455 | 111 | 170 | 2.74 | 27.8 | 1320 | < 1 | < 100 | 4.3 | 817 | 481 |
| 3S1E08H018 | 4/12/21 | ZONE7 | 20.2 | 1184 | 7.5 | 75 | 52 | 99 | 2.9 | 423 | 87 | 148 | 2.8 | 27.8 | 1120 | 1.2 | < 100 | 4.3 | 713 | 402 |
| 3S1E08H018 | 6/17/21 | ZONE7 | 21.3 | 1207 | 7.4 | 84 | - | - | - | 410 | - | - | - | - | - | - | - | - | - | - |
| 3S1E08H018 | 7/12/21 | ZONE7 | 20.1 | 1177 | 7.4 | 68 | 48 | 93 | 2.6 | 415 | 79 | 113 | 2.58 | 27.8 | 1020 | 1.1 | < 100 | 4 | 648 | 368 |
| 3S1E08K001 | 7/13/21 | ZONE7 | 25.5 | 1932 | 7.2 | 139 | 100 | 112 | 3.1 | 683 | 231 | 184 | 2.48 | 27.8 | 1700 | 1.1 | < 100 | 5.7 | 1144 | 760 |
| 3S1E08N001 | 3/8/21 | ZONE7 | 17.5 | 2123 | 7.1 | 154 | 104 | 196 | 3.4 | 799 | 299 | 181 | 2.64 | 30 | 2710 | < 2 | < 200 | 4 | 1372 | 813 |
| 3S1E09B001 | 12/17/20 | ZONE7 | 18.6 | 1237 | 7.6 | 90 | 59 | 81 | 2.6 | 435 | 75 | 142 | 3.24 | 27.8 | 710 | 1.5 | < 100 | 4.7 | 707 | 468 |
| 3S1E09B001 | 7/21/21 | ZONE7 | - | 1084 | 7.3 | 70 | 62 | 70 | 2.3 | 423 | 68 | 136 | 3.09 | 25.7 | 680 | 1.7 | 373 | 5.3 | 657 | 430 |
| 3S1E09H013 | 2/16/21 | ZONE7 | - | 792 | 7.5 | 42 | 40 | 63 | 1.6 | 258 | 48 | 99 | < 0.1 | 17.1 | 540 | < 1 | < 100 | < 1 | 438 | 270 |
| 3S1E09J007 | 9/8/21 | ZONE7 | 21.8 | 738 | 7.3 | 48 | 30 | 57 | 1.8 | 247 | 48 | 103 | < 0.1 | 15.2 | 520 | < 1 | < 100 | < 1 | 425 | 244 |
| 3S1E09J008 | 9/8/21 | ZONE7 | 30.1 | 835 | 7.4 | 78 | 35 | 38 | 1.8 | 288 | 56 | 111 | 0.18 | 20.3 | 540 | < 1 | < 100 | 1.4 | 483 | 339 |
| 3S1E09J009 | 9/8/21 | ZONE7 | 34.3 | 830 | 7.4 | 60 | 53 | 26 | 1.9 | 317 | 44 | 76 | 3.38 | 27.8 | 260 | < 1 | < 100 | 8 | 460 | 368 |
| 3S1E09M003 | 10/5/20 | ZONE7 | 17.9 | 961 | 7.4 | 64 | 40 | 78 | 2.1 | 307 | 69 | 115 | 1.19 | 21.4 | 810 | < 1 | < 100 | 3.5 | 546 | 326 |
| 3S1E09M003 | 7/12/21 | ZONE7 | 18 | 919 | 7.4 | 60 | 40 | 63 | 1.9 | 305 | 61 | 92 | 1.05 | 23.5 | 670 | < 1 | < 100 | 3.2 | 497 | 315 |
| 3S1E09M004 | 10/5/20 | ZONE7 | 18.5 | 1063 | 7.5 | 52 | 40 | 113 | 2.3 | 347 | 81 | 124 | 1.42 | 25.7 | 1190 | 1 | < 100 | 4.3 | 616 | 295 |
| 3S1E09M004 | 4/12/21 | ZONE7 | 19.1 | 1035 | 7.5 | 51 | 43 | 107 | 2.2 | 349 | 76 | 126 | 2.21 | 27.8 | 1140 | 1.1 | < 100 | 4.1 | 615 | 305 |
| 3S1E09M004 | 6/17/21 | ZONE7 | 19.8 | 1046 | 7.5 | 62 | - | - | - | 350 | - | - | - | - | - | - | - | - | - | - |
| 3S1E09M004 | 7/14/21 | ZONE7 | 18.3 | 1076 | 7.4 | 49 | 42 | 107 | 2.1 | 356 | 74 | 107 | 2.06 | 25.7 | 1180 | 1.1 | < 100 | 4.4 | 592 | 295 |
| 3S1E09P005 | 9/8/21 | ZONE7 | 23.7 | 743 | 7 | 52 | 25 | 49 | 1.9 | 223 | 50 | 99 | 0.13 | 16.9 | 470 | < 1 | < 100 | < 1 | 404 | 233 |
| 3S1E09P009 | 8/31/21 | ZONE7 | 31.9 | 798 | 7.3 | 50 | 29 | 62 | 1.9 | 245 | 52 | 88 | 0.17 | 21.4 | 610 | < 1 | < 100 | 1.2 | 426 | 244 |
| 3S1E09P010 | 8/31/21 | ZONE7 | 29.4 | 922 | 7.2 | 83 | 39 | 51 | 1.8 | 343 | 60 | 99 | 1.08 | 21.4 | 480 | < 1 | < 100 | 2.1 | 529 | 369 |
| 3S1E09P011 | 8/31/21 | ZONE7 | 20.1 | 446 | 7.6 | 30 | 13 | 52 | 1.3 | 218 | 32 | 18 | < 0.1 | 21 | 530 | 6.8 | < 100 | < 1 | 275 | 129 |
| 3S1E10A002 | 6/7/21 | ZONE7 | 18.5 | 1902 | 7.2 | 76 | 76 | 208 | 2.2 | 566 | 128 | 291 | 9.29 | 30 | 2700 | 1.5 | < 100 | 4.1 | 1131 | 503 |

- = Not Analyzed
Highlighted = Representative Monitoring Site

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 3S1E10B008 | 9/15/21 | ZONE7 | 19.6 | 1388 | 7.3 | 71 | 73 | 148 | 2.1 | 563 | 79 | 151 | 9.82 | 27.8 | 2510 | 1.9 | < 100 | 13 | 873 | 479 |
| 3S1E10B009 | 9/15/21 | ZONE7 | 24 | 1017 | 7.6 | 61 | 57 | 82 | 2.2 | 384 | 61 | 120 | 5.79 | 25.7 | 1240 | 1.8 | < 100 | 6.9 | 625 | 387 |
| 3S1E10B010 | 9/15/21 | ZONE7 | 27.3 | 733 | 7.5 | 48 | 45 | 42 | 1.7 | 297 | 44 | 75 | 3.12 | 27.8 | 410 | 1.2 | < 100 | 7.8 | 444 | 305 |
| 3S1E10B011 | 9/15/21 | ZONE7 | 22.5 | 516 | 7.7 | 31 | 23 | 51 | 1.6 | 213 | 35 | 42 | 2.82 | 27.8 | 440 | 3.6 | < 100 | 2.3 | 329 | 173 |
| 3S1E10B014 | 9/15/21 | ZONE7 | 26.1 | 708 | 7.4 | 50 | 49 | 34 | 1.7 | 301 | 41 | 70 | 3.39 | 27.8 | 340 | < 1 | < 100 | 8.5 | 437 | 327 |
| 3S1E10B016 | 4/12/21 | ZONE7 | 19 | 660 | 7.6 | 44 | 43 | 33 | 1.7 | 293 | 39 | 47 | 3.62 | 27.8 | 310 | 1.1 | < 100 | 12 | 396 | 287 |
| 3S1E10B016 | 7/12/21 | ZONE7 | 18.7 | 689 | 7.4 | 42 | 42 | 32 | 1.7 | 295 | 35 | 50 | 3.37 | 25.7 | 320 | 1.1 | < 100 | 12 | 389 | 278 |
| 3S1E10D002 | 9/21/21 | ZONE7 | 26.5 | 1302 | 7.4 | 69 | 66 | 117 | 2.1 | 478 | 72 | 151 | 7.39 | 30 | 1860 | 2 | < 100 | 7.2 | 776 | 444 |
| 3S1E10D003 | 9/21/21 | ZONE7 | 23.2 | 984 | 7.5 | 67 | 57 | 90 | 2.3 | 410 | 61 | 121 | 6.91 | 25.7 | 1290 | 1.8 | < 100 | 8.1 | 657 | 403 |
| 3S1E10D004 | 9/21/21 | ZONE7 | 20 | 649 | 7.5 | 45 | 38 | 66 | 1.6 | 302 | 44 | 78 | 3.38 | 27.8 | 550 | 1.9 | < 100 | 10 | 465 | 269 |
| 3S1E10D005 | 9/21/21 | ZONE7 | 25.8 | 507 | 7.5 | 34 | 24 | 55 | 1.8 | 265 | 33 | 35 | 2.36 | 25.7 | 290 | 2.5 | < 100 | 10 | 350 | 184 |
| 3S1E10K002 | 9/15/21 | ZONE7 | 19.6 | 818 | 7.3 | 68 | 42 | 53 | 1.8 | 307 | 38 | 109 | 0.41 | 21 | 520 | < 1 | < 100 | 2.1 | 486 | 343 |
| 3S1E10K003 | 10/6/20 | ZONE7 | 18 | 824 | 7.4 | 54 | 49 | 40 | 1.7 | 300 | 45 | 90 | 2.25 | 23.5 | 370 | < 1 | < 100 | 6.2 | 461 | 336 |
| 3S1E10K003 | 7/12/21 | ZONE7 | 17.9 | 870 | 7.4 | 54 | 52 | 38 | 1.8 | 322 | 43 | 97 | 2.7 | 23.5 | 390 | < 1 | < 100 | 6.2 | 480 | 349 |
| 3S1E11B001 | 4/21/21 | LWRP | - | 1830 | - | 69 | 54 | 220 | 1.6 | - | 85 | 230 | 8.7 | 29 | 4800. | - | - | - | 1120 | - |
| 3S1E11C003 | 5/19/21 | ZONE7 | 19.2 | 1596 | 7.1 | 62 | 62 | 182 | 1.7 | 521 | 84 | 224 | 6.39 | 23.5 | 2180 | 3.2 | 129 | 2.7 | 924 | 410 |
| 3S1E11G001 | 4/12/21 | ZONE7 | 21.7 | 1206 | 7.4 | 61 | 76 | 75 | 2.7 | 471 | 64 | 120 | 10.9 | 34.2 | 860 | 1.4 | < 100 | 5.3 | 713 | 465 |
| 3S1E11G002 | 4/12/21 | ZONE7 | 21.2 | 1034 | 7.5 | 59 | 59 | 63 | 2.1 | 397 | 54 | 119 | 6.4 | 25.7 | 830 | < 1 | < 100 | 6.9 | 606 | 391 |
| 3S1E11G003 | 4/12/21 | ZONE7 | 19.6 | 654 | 7.6 | 41 | 46 | 29 | 1.7 | 293 | 38 | 43 | 3.82 | 30 | 250 | 2.1 | < 100 | 10 | 390 | 292 |
| 3S1E11G004 | 4/12/21 | ZONE7 | 28 | 1039 | 7.6 | 61 | 61 | 66 | 2.1 | 392 | 54 | 117 | 6.35 | 25.7 | 840 | 1.7 | < 100 | 8.2 | 608 | 403 |
| 3S1E11M002 | 9/14/21 | ZONE7 | 25.4 | 1067 | 7.3 | 64 | 70 | 62 | 2.1 | 383 | 60 | 129 | 5.3 | 23.5 | 880 | < 1 | < 100 | 7 | 623 | 448 |
| 3S1E11M003 | 10/5/20 | ZONE7 | 20.1 | 694 | 7.5 | 47 | 43 | 31 | 1.5 | 278 | 41 | 61 | 3.79 | 23.5 | 270 | < 1 | < 100 | 7.7 | 402 | 296 |
| 3S1E11M003 | 4/12/21 | ZONE7 | 18.4 | 714 | 7.5 | 49 | 47 | 30 | 1.7 | 286 | 43 | 63 | 4.05 | 25.7 | 280 | < 1 | < 100 | 7.8 | 418 | 316 |
| 3S1E11M003 | 6/17/21 | ZONE7 | 20 | 738 | 7.4 | 56 | - | - | - | 290 | - | - | - | - | - | - | - | - | - | - |
| 3S1E11M003 | 7/12/21 | ZONE7 | 18.5 | 756 | 7.4 | 48 | 46 | 30 | 1.6 | 295 | 39 | 67 | 3.84 | 25.7 | 300 | < 1 | < 100 | 7.7 | 420 | 310 |
| 3S1E11P006 | 6/7/21 | ZONE7 | 17.9 | 723 | 7.5 | 33 | 47 | 39 | 1.6 | 252 | 50 | 91 | 0.88 | 18.6 | 390 | < 1 | < 100 | 2.4 | 408 | 276 |
| 3S1E12A002 | 4/21/21 | LWRP | - | 1170 | - | 59 | 75 | 45 | 2.1 | - | 60 | 110 | 12 | 32 | 600. | - | - | - | 700 | - |
| 3S1E12A002 | 9/21/21 | LWRP | - | 1170 | - | 64 | 94 | 58 | 2.2 | - | 61 | 134 | 10.7 | 32 | < 0. | - | - | - | 690 | - |
| 3S1E12G001 | 4/21/21 | LWRP | - | 1090 | - | 56 | 66 | 58 | 2 | - | 53 | 96 | 10.1 | 31 | 800. | - | - | - | 630 | - |
| 3S1E12H004 | 9/14/21 | ZONE7 | 20.3 | 749 | 7.3 | 51 | 58 | 31 | 1.7 | 338 | 46 | 64 | 4.59 | 30 | 300 | < 1 | < 100 | 7.3 | 469 | 367 |
| 3S1E12H005 | 9/14/21 | ZONE7 | 22.3 | 684 | 7.4 | 46 | 51 | 31 | 1.8 | 309 | 42 | 53 | 2.9 | 32.1 | 300 | < 1 | < 100 | 11 | 422 | 325 |
| 3S1E12H006 | 9/14/21 | ZONE7 | 27.9 | 637 | 7.6 | 41 | 42 | 39 | 2 | 322 | 38 | 31 | 2.22 | 30 | 260 | 1.3 | < 100 | 16 | 392 | 275 |
| 3S1E12H007 | 9/14/21 | ZONE7 | 24.5 | 638 | 7.6 | 40 | 44 | 36 | 1.6 | 304 | 37 | 40 | 2.42 | 32.1 | 300 | 3.4 | < 100 | 12 | 392 | 281 |
| 3S1E12K002 | 9/23/21 | ZONE7 | 27.7 | 594 | 7.4 | 35 | 41 | 30 | 1.4 | 234 | 33 | 63 | 1.73 | 25.7 | 280 | < 1 | < 100 | 3.6 | 352 | 257 |
| 3S1E12K003 | 9/23/21 | ZONE7 | 36.2 | 767 | 7.4 | 49 | 56 | 37 | 1.8 | 302 | 44 | 68 | 3.8 | 27.8 | 390 | < 1 | < 100 | 4.6 | 449 | 353 |
| 3S1E12K004 | 9/23/21 | ZONE7 | 29.3 | 326 | 8 | 18 | 18 | 26 | 1.3 | 163 | 8 | 17 | 2.64 | 25.7 | 140 | < 1 | < 100 | 3.7 | 207 | 119 |
| 3S1E13P005 | 12/1/20 | ZONE7 | 16.2 | 711 | 7.9 | 44 | 24 | 71 | 2.5 | 189 | 55 | 101 | < 0.1 | 14.3 | 390 | < 1 | < 100 | < 1 | 405 | 209 |
| 3S1E13P005 | 8/10/21 | ZONE7 | 20 | 721 | 7.5 | 48 | 26 | 62 | 1.8 | 206 | 56 | 101 | 0.12 | 12 | 430 | < 1 | < 100 | < 1 | 409 | 227 |
| 3S1E13P006 | 12/1/20 | ZONE7 | 17.4 | 618 | 7.5 | 63 | 21 | 47 | 2.1 | 268 | 50 | 37 | 0.56 | 21 | 300 | < 1 | < 100 | 3.6 | 376 | 245 |
| 3S1E13P006 | 8/10/21 | ZONE7 | 24.3 | 663 | 7.5 | 66 | 23 | 44 | 1.8 | 251 | 51 | 59 | 0.42 | 21.2 | 320 | < 1 | < 100 | 2 | 392 | 260 |
| 3S1E13P007 | 12/1/20 | ZONE7 | 19 | 504 | 7.5 | 49 | 16 | 45 | 1.8 | 252 | 39 | 17 | 0.34 | 23.5 | 200 | < 1 | < 100 | < 1 | 317 | 188 |
| 3S1E13P007 | 8/10/21 | ZONE7 | 19.5 | 508 | 7.5 | 48 | 14 | 45 | 1.7 | 244 | 41 | 17 | 0.34 | 23.5 | 190 | < 1 | < 100 | < 1 | 312 | 178 |
| 3S1E13P008 | 12/1/20 | ZONE7 | 18.2 | 1515 | 11.2 | 72 | < 0 | 186 | 8.4 | 7 | 132 | 174 | < 0.1 | 32.1 | < 200 | 9.3 | < 200 | < 2 | 737 | 181 |
| 3S1E13P008 | 8/10/21 | ZONE7 | 31.8 | 1418 | 11.1 | 61 | < 0 | 170 | 7.2 | 8 | 124 | 165 | 0.14 | 27.8 | 190 | 6.7 | < 100 | < 1 | 675 | 152 |
| 3S1E14B001 | 6/7/21 | ZONE7 | 18.2 | 808 | 7.4 | 35 | 55 | 44 | 1.9 | 275 | 55 | 97 | 1 | 19.7 | 410 | < 1 | < 100 | 1.9 | 448 | 316 |
| 3S1E14D002 | 8/18/21 | ZONE7 | 19.6 | 799 | 7.1 | 72 | 35 | 62 | 1.7 | 291 | 57 | 103 | 1.1 | 20.3 | 550 | < 1 | < 100 | 2 | 499 | 324 |
| 3S1E15J003 | 5/5/21 | ZONE7 | 20 | 831 | 7.4 | 75 | 38 | 43 | 2.2 | 392 | 22 | 76 | 1.95 | 16.5 | 380 | < 1 | 1500 | < 1 | 475 | 345 |
| 3S1E15M003 | 7/13/21 | ZONE7 | 21 | 872 | 7.2 | 64 | 37 | 48 | 1.5 | 302 | 39 | 84 | 5.14 | 25.7 | 210 | < 1 | < 100 | < 1 | 471 | 312 |
| 3S1E16A002 | 8/11/21 | ZONE7 | - | 867 | 7.3 | 78 | 35 | 56 | 2.1 | 319 | 48 | 99 | 1.21 | 19.5 | 540 | < 1 | < 100 | 1.9 | 501 | 339 |

- = Not Analyzed

Highlighted = Representative Monitoring Site

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 3S1E16A004 | 7/13/21 | ZONE7 | 21.2 | 883 | 7.4 | 88 | 35 | 35 | 1.8 | 334 | 51 | 88 | 1.38 | 21.4 | 300 | < 1 | < 100 | 2.9 | 491 | 364 |
| 3S1E16C002 | 8/30/21 | ZONE7 | 18.8 | 859 | 7.5 | 44 | 14 | 124 | 2 | 179 | 133 | 96 | 0.51 | 20.3 | 300 | 1.1 | < 100 | 1.2 | 524 | 168 |
| 3S1E16C003 | 8/30/21 | ZONE7 | 24.4 | 1067 | 7.3 | 118 | 46 | 66 | 2.5 | 457 | 72 | 121 | 2.21 | 25.7 | 800 | < 1 | < 100 | 4.1 | 686 | 485 |
| 3S1E16C004 | 8/30/21 | ZONE7 | 24.3 | 883 | 7.4 | 106 | 35 | 40 | 2.1 | 358 | 54 | 92 | 2.64 | 25.7 | 400 | < 1 | < 100 | 3.7 | 543 | 409 |
| 3S1E16E004 | 5/4/21 | ZONE7 | 20.6 | 919 | 7.3 | 77 | 37 | 62 | 2.3 | 410 | 59 | 75 | 3.22 | 21.4 | 550 | < 1 | < 100 | 3.1 | 550 | 344 |
| 3S1E16L005 | 8/11/21 | ZONE7 | - | 854 | 7.1 | 85 | 37 | 57 | 2.1 | 339 | 55 | 93 | 2.32 | 23.5 | 520 | < 1 | < 100 | 3.4 | 530 | 364 |
| 3S1E16L007 | 8/11/21 | ZONE7 | - | 987 | 7.2 | 88 | 42 | 62 | 2.2 | 358 | 62 | 110 | 1.7 | 23.5 | 690 | < 1 | < 100 | 3.7 | 574 | 393 |
| 3S1E16P005 | 4/27/21 | ZONE7 | 15.6 | 617 | 6.6 | 48 | 29 | 48 | 2.6 | 171 | 86 | 92 | 0.51 | 10.1 | 270 | < 1 | < 100 | < 1 | 402 | 239 |
| 3S1E17B004 | 5/5/21 | ZONE7 | 19.4 | 1360 | 7.3 | 114 | 61 | 67 | 10 | 559 | 73 | 138 | 4.63 | 21.4 | 790 | < 1 | < 100 | 3.8 | 781 | 536 |
| 3S1E17D003 | 6/30/21 | ZONE7 | 17.8 | 687 | 7.6 | 24 | 47 | 54 | 2.2 | 297 | < 1 | 93 | < 0.1 | 4.9 | 380 | < 1 | 2590 | < 1 | 372 | 254 |
| 3S1E17D003 | 7/20/21 | ZONE7 | 20.3 | 1378 | 7.1 | 127 | 84 | 61 | 2.5 | 721 | 101 | 117 | 5.89 | 21.4 | 580 | < 1 | 391 | < 1 | 895 | 664 |
| 3S1E17D004 | 6/30/21 | ZONE7 | 21.9 | 1227 | 8.3 | 15 | 5 | 233 | 0.9 | 278 | 17 | 236 | < 0.1 | 21.4 | 2460 | 9.8 | < 100 | < 1 | 668 | 59 |
| 3S1E17D004 | 7/20/21 | ZONE7 | 18.5 | 1170 | 8.2 | 14 | 5 | 248 | 0.9 | 282 | 19 | 241 | < 0.1 | 20.3 | 2400 | 9.4 | < 100 | < 1 | 688 | 56 |
| 3S1E17D005 | 6/30/21 | ZONE7 | 20.2 | 1198 | 8.3 | 17 | 12 | 214 | 0.7 | 281 | 13 | 231 | < 0.1 | 16.7 | 2390 | 63 | < 100 | < 1 | 645 | 91 |
| 3S1E17D005 | 8/11/21 | ZONE7 | 29 | 1065 | 8.5 | 16 | 9 | 221 | 0.9 | 281 | < 1 | 220 | < 0.1 | 7.7 | 2270 | 31 | < 100 | < 1 | 621 | 77 |
| 3S1E17D006 | 6/30/21 | ZONE7 | 18.1 | 1485 | 8.3 | 22 | 7 | 273 | 1 | 289 | 8 | 334 | < 0.1 | 21.4 | 1510 | 8.3 | < 100 | < 1 | 811 | 84 |
| 3S1E17D006 | 8/11/21 | ZONE7 | 26 | 1339 | 8.6 | 13 | 5 | 261 | 1 | 254 | < 1 | 300 | < 0.1 | 13.3 | 1560 | 3.6 | < 100 | < 1 | 728 | 53 |
| 3S1E17D007 | 6/30/21 | ZONE7 | 20.8 | 1355 | 8.9 | 7 | 6 | 250 | 1.5 | 176 | < 1 | 343 | < 0.1 | 3 | 1670 | 28 | < 100 | < 1 | 704 | 43 |
| 3S1E17D007 | 7/20/21 | ZONE7 | 23.1 | 1280 | 8.7 | 6 | 5 | 277 | 1.5 | 176 | < 0.1 | 354 | < 0.1 | 2.8 | 1650 | 23 | < 100 | < 1 | 736 | 36 |
| 3S1E17D010 | 7/20/21 | ZONE7 | 23.7 | 1161 | 8.1 | 14 | 5 | 254 | 0.8 | 280 | 20 | 237 | < 0.1 | 21.2 | 2390 | 13 | < 100 | < 1 | 691 | 56 |
| 3S1E17D010 | 9/7/21 | ZONE7 | - | 1202 | 8.1 | 15 | 4 | 222 | 0.8 | 270 | 17 | 251 | < 0.1 | 21.4 | 2470 | 13 | < 100 | < 1 | 667 | 54 |
| 3S1E17D011 | 8/11/21 | ZONE7 | 20.5 | 1309 | 8.2 | 17 | 4 | 247 | 0.9 | 283 | < 1 | 270 | < 0.1 | 23.5 | 2620 | 11 | < 100 | < 1 | 704 | 58 |
| 3S1E17D012 | 4/14/21 | ZONE7 | 17.2 | 860 | 7.4 | 68 | 46 | 47 | 1.9 | 345 | 52 | 86 | 3.6 | 23.5 | 520 | 1.1 | < 100 | 6.2 | 510 | 360 |
| 3S1E17D012 | 6/17/21 | ZONE7 | 18.3 | 929 | 7.4 | 82 | - | - | - | 353 | - | - | - | - | - | - | - | - | - | - |
| 3S1E17D012 | 7/12/21 | ZONE7 | 18.6 | 923 | 7.4 | 68 | 46 | 51 | 1.9 | 358 | 47 | 92 | 3.33 | 23.5 | 570 | 1.1 | < 100 | 6.1 | 521 | 360 |
| 3S1E18A006 | 10/6/20 | ZONE7 | 17.7 | 1074 | 7.4 | 81 | 54 | 77 | 1.9 | 426 | 88 | 93 | 3.13 | 23.5 | 540 | 1.4 | < 100 | 4.8 | 643 | 425 |
| 3S1E18A006 | 4/13/21 | ZONE7 | 17 | 1064 | 7.5 | 81 | 55 | 72 | 2 | 431 | 88 | 97 | 3.47 | 25.7 | 500 | 1.6 | < 100 | 4.9 | 649 | 429 |
| 3S1E18A006 | 6/17/21 | ZONE7 | 18.3 | 1115 | 7.4 | 94 | - | - | - | 448 | - | - | - | - | - | - | - | - | - | - |
| 3S1E18A006 | 7/12/21 | ZONE7 | 18.3 | 1112 | 7.4 | 78 | 53 | 70 | 1.8 | 447 | 91 | 99 | 3.12 | 23.5 | 550 | 1.5 | < 100 | 4.8 | 651 | 413 |
| 3S1E18E004 | 3/8/21 | ZONE7 | 15.9 | 749 | 7.5 | 60 | 22 | 77 | 0.9 | 318 | 63 | 51 | < 0.1 | 25.7 | 490 | < 1 | 374 | < 1 | 456 | 241 |
| 3S1E18J002 | 3/8/21 | ZONE7 | 18.2 | 3139 | 7.2 | 184 | 172 | 348 | 3.2 | 928 | 524 | 432 | 0.5 | 25.7 | 1550 | 15 | < 500 | < 5 | 2148 | 1169 |
| 3S1E18M002 | 2/24/21 | ZONE7 | - | 709 | 7.1 | 56 | 31 | 60 | 0.9 | 310 | 70 | 37 | 1.98 | 27.8 | 400 | < 1 | < 100 | < 1 | 444 | 268 |
| 3S1E19A010 | 6/23/21 | UNKN | - | 1300 | 7.23 | 123 | 63 | 55.5 | 2.54 | - | 101 | 111 | - | - | - | < 2 | < 100 | < 10 | 719 | 538 |
| 3S1E19A010 | 7/14/21 | ZONE7 | - | 1197 | 7.4 | 113 | 60 | 53 | 2.2 | 532 | 102 | 101 | 2.32 | 20.8 | 460 | < 1 | < 100 | 3.3 | 725 | 529 |
| 3S1E19C004 | 3/8/21 | ZONE7 | 18.3 | 615 | 7.9 | 38 | 32 | 50 | 1.8 | 279 | 8 | 70 | < 0.1 | 11.3 | 330 | 1.3 | 563 | < 1 | 349 | 227 |
| 3S1E19K001 | 2/18/21 | ZONE7 | 19.6 | 1092 | 7.1 | 86 | 52 | 104 | 1.9 | 578 | 120 | 43 | < 0.1 | 17.3 | 720 | 3.2 | < 100 | < 1 | 709 | 429 |
| 3S1E20B002 | 7/14/21 | ZONE7 | - | 887 | 7.4 | 71 | 41 | 51 | 1.6 | 375 | 54 | 86 | 3.34 | 25.7 | 360 | < 1 | < 100 | 2.1 | 530 | 347 |
| 3S1E20C007 | 4/27/21 | ZONE7 | 17.8 | 608 | 7 | 51 | 28 | 49 | 2 | 274 | 42 | 63 | 0.78 | 18.2 | 330 | < 1 | < 100 | 1.8 | 392 | 243 |
| 3S1E20C008 | 7/13/21 | ZONE7 | 21 | 942 | 7.4 | 84 | 48 | 40 | 2 | 434 | 49 | 89 | 5.12 | 21.2 | 250 | < 1 | < 100 | 3.8 | 569 | 408 |
| 3S1E20C009 | 7/13/21 | ZONE7 | 28 | 983 | 7.4 | 82 | 52 | 46 | 2.1 | 441 | 63 | 93 | 2.82 | 23.5 | 400 | 1.2 | < 100 | 3.3 | 591 | 419 |
| 3S1E20J004 | 2/18/21 | ZONE7 | 17.6 | 1011 | 6.8 | 55 | 37 | 127 | 1.2 | 398 | 60 | 102 | 5.68 | 34.2 | 600 | < 1 | 120 | 7.3 | 638 | 290 |
| 3S1E20M011 | 2/18/21 | ZONE7 | 18.8 | 988 | 7.1 | 93 | 48 | 64 | 2.3 | 458 | 71 | 80 | 3.57 | 25.7 | 410 | < 1 | < 100 | 1.4 | 625 | 430 |
| 3S1E20Q002 | 5/5/21 | ZONE7 | 26.2 | 1542 | 7.4 | 84 | 81 | 135 | 0.8 | 847 | 45 | 133 | < 0.1 | 27.8 | 720 | < 1 | 10400 | < 1 | 924 | 544 |
| 3S1E22D002 | 7/13/21 | ZONE7 | 20.6 | 971 | 6.7 | 38 | 40 | 101 | 0.7 | 317 | 53 | 100 | 8.38 | 40.7 | < 100 | < 1 | < 100 | 2.4 | 566 | 260 |
| 3S1E23J001 | 5/5/21 | ZONE7 | 20 | 936 | 6.9 | 49 | 39 | 65 | 1.2 | 171 | 18 | 200 | 5.08 | 34.2 | 120 | < 1 | < 100 | < 1 | 513 | 283 |
| 3S1E25C003 | 5/5/21 | ZONE7 | 20.1 | 800 | 7.3 | 49 | 29 | 67 | 1.5 | 258 | 30 | 111 | 3.41 | 25.7 | 350 | 2.9 | 435 | 2.5 | 455 | 241 |
| 3S1E28M002 | 2/2/21 | ZONE7 | - | 1250 | 7 | 72 | 47 | 167 | 0.9 | 548 | 56 | 154 | 5.1 | 27.8 | 700 | 1.1 | < 100 | < 1 | 817 | 374 |
| 3S1E29M004 | 2/18/21 | ZONE7 | 18.8 | 632 | 6.9 | 59 | 35 | 34 | 2.1 | 313 | 46 | 36 | < 0.1 | 25.7 | 270 | 16 | 6880 | < 1 | 392 | 292 |
| 3S1E29P002 | 5/5/21 | ZONE7 | 20.8 | 1082 | 7.7 | 52 | 46 | 107 | 1.8 | 515 | 14 | 112 | < 0.1 | 20.8 | 1300 | < 1 | 101 | < 1 | 607 | 320 |

- = Not Analyzed
Highlighted = Representative Monitoring Site

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 3S1W01B009 | 2/17/21 | ZONE7 | 20.4 | 1157 | 7.6 | 70 | 30 | 152 | 1.6 | 416 | 98 | 118 | 6.87 | 25.7 | 590 | 5.4 | < 100 | < 1 | 732 | 299 |
| 3S1W01B010 | 2/17/21 | ZONE7 | 22.2 | 799 | 7.7 | 43 | 16 | 123 | 0.8 | 383 | 1 | 88 | < 0.1 | 27.8 | 530 | 157 | 351 | < 1 | 489 | 174 |
| 3S1W01B011 | 2/17/21 | ZONE7 | 19.4 | 886 | 7.9 | 26 | 10 | 153 | 1.1 | 277 | 1 | 154 | < 0.1 | 25.7 | 650 | 21 | 100 | < 1 | 508 | 106 |
| 3S1W01J001 | 11/30/20 | DSRSD | 19.2 | 2979 | 7.08 | - | - | - | - | - | 582 | 227 | < 5 | - | - | 40.7 | - | < 5 | 2090 | - |
| 3S1W01J001 | 4/29/21 | DSRSD | 22.3 | 3025 | 6.77 | - | - | - | - | - | 579 | 258 | < 5 | - | - | 41 | - | < 5 | 2100 | - |
| 3S1W01J002 | 11/30/20 | DSRSD | 19 | 3509 | 7.54 | - | - | - | - | - | 646 | 399 | 1.06 | - | - | 11 | - | 0.68J | 2290 | - |
| 3S1W01J002 | 4/29/21 | DSRSD | 23.4 | 2502 | 7.1 | - | - | - | - | - | 547 | 101 | 9.16 | - | - | 9.3 | - | < 5 | 1740 | - |
| 3S1W02A002 | 2/18/21 | ZONE7 | 18.3 | 1512 | 6.8 | 189 | 40 | 108 | 0.8 | 650 | 76 | 177 | 4.72 | 25.7 | 420 | 1.6 | < 100 | < 1 | 957 | 637 |
| 3S1W12A009 | 12/1/20 | DSRSD | 20 | 6228 | 7.36 | - | - | - | - | - | 108 | 2130 | < 5 | - | - | 3.6J | - | < 5 | 4120 | - |
| 3S1W12A009 | 4/28/21 | DSRSD | 22.7 | 6503 | 7.25 | - | - | - | - | - | 120 | 2230 | < 5 | - | - | 4.7J | - | < 5 | 4470 | - |
| 3S1W12A010 | 12/1/20 | DSRSD | 19.7 | 2072 | 7.95 | - | - | - | - | - | 334 | 204 | 4.01 | - | - | 7.8 | - | 0.38J | 1380 | - |
| 3S1W12A010 | 4/28/21 | DSRSD | 24.3 | 2313 | 7.62 | - | - | - | - | - | 486 | 187 | 2.51 | - | - | 7.5 | - | < 5 | 1620 | - |
| 3S1W12B002 | 2/18/21 | ZONE7 | 19.6 | 845 | 7 | 88 | 31 | 46 | 0.7 | 367 | 76 | 38 | 0.35 | 30 | 190 | < 1 | < 100 | < 1 | 492 | 348 |
| 3S1W12J001 | 4/20/21 | ZONE7 | 25.8 | 1371 | 7.5 | 85 | 32 | 176 | 1 | 439 | 207 | 141 | < 0.1 | 23.5 | 630 | 2.7 | < 100 | < 1 | 882 | 344 |
| 3S1W13J001 | 2/18/21 | ZONE7 | 19.4 | 868 | 6.7 | 93 | 41 | 46 | 0.6 | 324 | 110 | 69 | 3.57 | 27.8 | 180 | < 1 | < 100 | < 1 | 563 | 401 |
| 3S2E01F002 | 6/2/21 | ZONE7 | 19.9 | 1617 | 7.4 | 44 | 82 | 162 | 5.2 | 473 | 67 | 246 | 1.31 | 42.8 | 2070 | 2 | < 100 | 1.8 | 888 | 447 |
| 3S2E02B002 | 5/11/21 | ZONE7 | 30.7 | 1692 | 7.2 | 123 | 46 | 154 | 4.7 | 299 | 76 | 373 | < 0.1 | 44.9 | 1700 | 8.5 | 8270 | 17 | 969 | 498 |
| 3S2E03A001 | 5/11/21 | ZONE7 | 28.3 | 1115 | 7.6 | 39 | 39 | 124 | 1.1 | 311 | 69 | 161 | 5.7 | 40.7 | 1460 | 3.1 | < 100 | 15 | 653 | 259 |
| 3S2E03K003 | 5/19/21 | ZONE7 | 20.6 | 1194 | 7.5 | 46 | 46 | 117 | 2 | 341 | 84 | 132 | 14.1 | 30 | 1300 | 1.7 | < 100 | 12 | 688 | 305 |
| 3S2E07C002 | 2/17/21 | ZONE7 | 21.3 | 1100 | 7.2 | 58 | 77 | 63 | 3.4 | 425 | 71 | 113 | 11.5 | 38.5 | 400 | 1.2 | < 100 | 6.8 | 685 | 462 |
| 3S2E07C002 | 4/21/21 | LWRP | - | 1150 | - | 54 | 77 | 50 | 2.6 | - | 60 | 110 | 12.5 | 36 | 300. | - | - | - | 720 | - |
| 3S2E07C002 | 9/21/21 | LWRP | - | 1169 | - | 58 | 93 | 60 | 2.9 | - | 64 | 129 | 11.3 | 35 | < 0. | - | - | - | 690 | - |
| 3S2E07H002 | 2/17/21 | ZONE7 | 21 | 1218 | 7.1 | 57 | 66 | 114 | 3.3 | 444 | 149 | 100 | 11.7 | 34.2 | 720 | < 1 | < 100 | < 1 | 794 | 414 |
| 3S2E07N002 | 5/4/21 | ZONE7 | 20.4 | 530 | 7.5 | 27 | 32 | 27 | 1.4 | 196 | 34 | 54 | 1.43 | 25.7 | 210 | < 1 | < 100 | 2.1 | 304 | 200 |
| 3S2E08F001 | 12/16/20 | UNKN | - | 990 | - | 59 | 65 | 40 | 2.3 | - | 60 | 96 | - | - | - | < 2 | 160 | < 10 | 580 | 410 |
| 3S2E08H002 | 6/14/21 | ZONE7 | 22.6 | 1635 | 7.1 | 116 | 116 | 110 | 1.1 | 628 | 142 | 199 | 7.97 | 34.2 | 400 | < 1 | < 100 | 4.8 | 1063 | 768 |
| 3S2E08H003 | 8/17/21 | ZONE7 | 31.1 | 1163 | 7.1 | 80 | 84 | 63 | 1.6 | 428 | 71 | 147 | 10.8 | 32.1 | 460 | 1.3 | < 100 | 5.3 | 7370 | 546 |
| 3S2E08H004 | 8/17/21 | ZONE7 | 26.2 | 1146 | 7.5 | 48 | 47 | 121 | 2.1 | 353 | 25 | 191 | 4.65 | 27.8 | 540 | 2.1 | < 100 | 8.7 | 657 | 314 |
| 3S2E08K002 | 6/7/21 | ZONE7 | 21.4 | 1068 | 7.4 | 77 | 77 | 49 | 1.9 | 380 | 66 | 120 | 8.27 | 30 | 380 | < 1 | < 100 | 3.8 | 645 | 509 |
| 3S2E08N002 | 1/26/21 | UNKN | - | 820 | - | 48 | 55 | 37 | < 0 | - | 48 | 74 | - | - | - | < 2 | < 100 | < 10 | 460 | 340 |
| 3S2E08N002 | 2/9/21 | UNKN | - | - | - | - | - | - | - | - | - | - | - | - | - | < 2 | < 100 | < 10 | - | - |
| 3S2E08Q009 | 6/7/21 | ZONE7 | 21.5 | 925 | 7.5 | 67 | 67 | 42 | 2.1 | 356 | 54 | 97 | 5.6 | 25.7 | 380 | < 1 | < 100 | 3.7 | 555 | 444 |
| 3S2E09Q004 | 6/2/21 | ZONE7 | 22.6 | 1279 | 7.3 | 87 | 87 | 59 | 1.4 | 388 | 98 | 140 | 9.44 | 38.5 | 870 | < 1 | < 100 | 3.8 | 744 | 576 |
| 3S2E10F003 | 6/2/21 | ZONE7 | 25 | 1534 | 7 | 94 | 94 | 105 | 1.6 | 507 | 105 | 171 | 9.2 | 34.2 | 1300 | 1.2 | < 100 | 4.5 | 895 | 622 |
| 3S2E10Q001 | 6/2/21 | ZONE7 | 23.6 | 1754 | 7.1 | 107 | 107 | 116 | 1.3 | 520 | 124 | 221 | 14.6 | 36.4 | 1650 | < 1 | < 100 | 2.8 | 1033 | 709 |
| 3S2E10Q002 | 3/25/21 | ZONE7 | - | 813 | 7.8 | 53 | 39 | 59 | 2.8 | 194 | 93 | 95 | 6.51 | 27.8 | 600 | 1.1 | < 100 | 9.2 | 495 | 293 |
| 3S2E11C001 | 6/2/21 | ZONE7 | 22.8 | 865 | 7.6 | 25 | 39 | 85 | 2.1 | 305 | 36 | 99 | 3.01 | 32.1 | 390 | < 1 | < 100 | 3.8 | 482 | 223 |
| 3S2E12C004 | 3/25/21 | ZONE7 | - | 1293 | 8 | 70 | 28 | 178 | 1.7 | 285 | 97 | 216 | 2.36 | 40.7 | 2500 | 1.6 | < 100 | 11 | 785 | 290 |
| 3S2E12J003 | 3/25/21 | ZONE7 | - | 698 | 8.1 | 41 | 16 | 75 | 3.2 | 64 | 64 | 144 | 0.33 | 25.7 | 300 | 1.8 | < 100 | < 1 | 403 | 168 |
| 3S2E14A003 | 6/2/21 | ZONE7 | 25.2 | 1122 | 7.3 | 47 | 74 | 77 | 2.6 | 478 | 35 | 92 | 10.2 | 32.1 | 570 | < 1 | < 100 | 6.2 | 640 | 423 |
| 3S2E14B001 | 8/17/21 | ZONE7 | 20 | 967 | 7.3 | 78 | 43 | 77 | 2.1 | 340 | 48 | 117 | 9.9 | 30 | 680 | < 1 | < 100 | 11 | 607 | 372 |
| 3S2E15L001 | 6/21/21 | UNKN | 19.5 | - | - | 47 | 95 | 61 | 1.6 | - | 110 | 170 | 12 | - | - | - | - | - | 920 | - |
| 3S2E15L002 | 12/15/20 | UNKN | 19.8 | - | - | - | - | - | - | - | - | - | 10 | - | - | - | - | - | 820 | - |
| 3S2E15L002 | 3/15/21 | UNKN | 18.6 | - | - | - | - | - | - | - | - | - | 10 | - | - | - | - | - | 760 | - |
| 3S2E15L002 | 6/21/21 | UNKN | 19.9 | - | - | 46 | 87 | 65 | 2 | - | 100 | 150 | 11 | - | - | - | - | - | 850 | - |
| 3S2E15L002 | 9/15/21 | UNKN | 20.5 | - | - | - | - | - | - | - | - | - | 10 | - | - | - | - | - | 950 | - |
| 3S2E15M003 | 12/15/20 | UNKN | 19.8 | - | - | - | - | - | - | - | - | - | 6.5 | - | - | - | - | - | 800 | - |
| 3S2E15M003 | 3/15/21 | UNKN | 18.2 | - | - | - | - | - | - | - | - | - | 6.7 | - | - | - | - | - | 780 | - |
| 3S2E15M003 | 6/21/21 | UNKN | 19.7 | - | - | 59 | 78 | 42 | 2 | - | 78 | 110 | 8.9 | - | - | - | - | - | 820 | - |

- = Not Analyzed

Highlighted = Representative Monitoring Site

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 3S2E15M003 | 9/15/21 | UNKN | 20.6 | - | - | - | - | - | - | - | - | - | 6.7 | - | - | - | - | - | 920 | - |
| 3S2E15Q008 | 12/15/20 | UNKN | 19.8 | - | - | - | - | - | - | - | - | - | 5.1 | - | - | - | - | - | 650 | - |
| 3S2E15Q008 | 3/15/21 | UNKN | 17.3 | - | - | - | - | - | - | - | - | - | 7.7 | - | - | - | - | - | 810 | - |
| 3S2E15Q008 | 6/21/21 | UNKN | 21.2 | - | - | 56 | 91 | 53 | 1.6 | - | 150 | 110 | 7.7 | - | - | - | - | - | 900 | - |
| 3S2E15Q008 | 9/15/21 | UNKN | 20 | - | - | - | - | - | - | - | - | - | 8.4 | - | - | - | - | - | 960 | - |
| 3S2E15R017 | 9/28/21 | ZONE7 | 20.6 | 980 | 7.4 | 44 | 86 | 42 | 1.6 | 364 | 63 | 89 | 11.4 | 30 | 600 | < 1 | < 100 | 8.3 | 585 | 464 |
| 3S2E15R018 | 9/28/21 | ZONE7 | 20.2 | 653 | 7.5 | 51 | 44 | 33 | 1.6 | 323 | 38 | 41 | 1.17 | 30 | 200 | < 1 | < 100 | < 1 | 403 | 309 |
| 3S2E15R020 | 12/15/20 | UNKN | 20.9 | - | - | - | - | - | - | - | - | - | 7.5 | - | - | - | - | - | 740 | - |
| 3S2E15R020 | 3/15/21 | UNKN | 19.4 | - | - | - | - | - | - | - | - | - | 7.6 | - | - | - | - | - | 680 | - |
| 3S2E15R020 | 6/21/21 | UNKN | 20.4 | - | - | 45 | 80 | 73 | 1.6 | - | 78 | 150 | 7.8 | - | - | - | - | - | 820 | - |
| 3S2E15R020 | 9/15/21 | UNKN | 20.6 | - | - | - | - | - | - | - | - | - | 7.8 | - | - | - | - | - | 880 | - |
| 3S2E16A003 | 6/2/21 | ZONE7 | 19.6 | 1166 | 7.5 | 90 | 63 | 49 | 1.4 | 382 | 86 | 108 | 11.1 | 30 | 450 | < 1 | < 100 | 3.3 | 665 | 483 |
| 3S2E16E004 | 6/2/21 | ZONE7 | 27.6 | 724 | 7.2 | 47 | 47 | 39 | 2.1 | 271 | 45 | 71 | 2.25 | 19.7 | 290 | < 1 | < 100 | < 1 | 414 | 312 |
| 3S2E18E001 | 6/7/21 | ZONE7 | 23 | 517 | 7.5 | 35 | 35 | 21 | 1.6 | 201 | 34 | 48 | 1.65 | 25.7 | 200 | < 1 | < 100 | 2.1 | 307 | 232 |
| 3S2E19D007 | 8/18/21 | ZONE7 | 27.4 | 482 | 7.3 | 38 | 19 | 22 | 1.3 | 152 | 7 | 49 | 6.67 | 25.7 | < 100 | < 1 | < 100 | 7.4 | 266 | 173 |
| 3S2E19D008 | 8/18/21 | ZONE7 | 21 | 430 | 7.3 | 37 | 18 | 22 | 1.2 | 146 | 6 | 45 | 6.53 | 25.7 | < 100 | < 1 | < 100 | 7.4 | 256 | 166 |
| 3S2E19D009 | 8/18/21 | ZONE7 | 22.8 | 757 | 7.1 | 62 | 31 | 44 | 1.7 | 227 | 31 | 91 | 10.3 | 30 | < 100 | < 1 | < 100 | 1.2 | 448 | 283 |
| 3S2E19D010 | 8/18/21 | ZONE7 | 19.7 | 781 | 7 | 66 | 34 | 48 | 1.8 | 234 | 31 | 95 | 10.4 | 30 | 100 | < 1 | < 100 | 1.1 | 467 | 305 |
| 3S2E19K001 | 2/2/21 | ZONE7 | - | 1021 | 7 | 71 | 58 | 53 | 1.8 | 305 | 42 | 167 | 5.16 | 32.1 | 100 | < 1 | < 100 | < 1 | 598 | 417 |
| 3S2E19N003 | 8/11/21 | ZONE7 | 26.1 | 518 | 7.7 | 39 | 19 | 53 | 1.5 | 250 | 23 | 35 | 0.24 | 27.8 | 240 | 2.1 | < 100 | < 1 | 322 | 176 |
| 3S2E19N004 | 8/11/21 | ZONE7 | 27.9 | 623 | 7.7 | 24 | 12 | 117 | 1.7 | 279 | 25 | 66 | < 0.1 | 17.5 | 340 | 31 | < 100 | < 1 | 401 | 109 |
| 3S2E20M001 | 6/7/21 | ZONE7 | 18.7 | 928 | 7.3 | 43 | 51 | 64 | 1.7 | 339 | 57 | 103 | 2.82 | 21.4 | 300 | 1.1 | < 100 | < 1 | 521 | 318 |
| 3S2E21K008 | 2/3/21 | ZONE7 | - | 1084 | 7.3 | 39 | 53 | 94 | 1.8 | 166 | 7.2 | 240 | 6.18 | 32.1 | 130 | < 1 | < 100 | < 1 | 576 | 316 |
| 3S2E21K009 | 2/17/21 | ZONE7 | - | 1150 | 7.3 | 52 | 50 | 96 | 2.2 | 188 | 11 | 260 | 5.73 | 27.8 | 110 | 1 | < 100 | < 1 | 617 | 336 |
| 3S2E22B001 | 4/27/21 | ZONE7 | 22 | 1265 | 7.3 | 66 | 95 | 66 | 1.5 | 476 | 165 | 141 | 4.47 | 32.1 | 480 | < 1 | < 100 | 1.3 | 821 | 556 |
| 3S2E23E001 | 8/17/21 | ZONE7 | 24.5 | 682 | 7.5 | 39 | 52 | 49 | 1.8 | 334 | 39 | 57 | 1.71 | 23.5 | 450 | < 1 | < 100 | 2.3 | 433 | 312 |
| 3S2E23E002 | 8/17/21 | ZONE7 | 23.4 | 1062 | 7.5 | 45 | 63 | 108 | 2.6 | 396 | 53 | 164 | 0.14 | 25.7 | 2660 | 2.5 | < 100 | < 1 | 657 | 372 |
| 3S2E24A001 | 5/11/21 | ZONE7 | 25.9 | 1462 | 7 | 60 | 60 | 125 | 1.7 | 539 | 70 | 158 | 1.51 | 32.1 | 990 | < 1 | < 100 | 3 | 779 | 397 |
| 3S2E26J002 | 4/27/21 | ZONE7 | 20.9 | 946 | 7.4 | 50 | 70 | 63 | 2.7 | 511 | 58 | 78 | 1.94 | 15.8 | 670 | < 1 | < 100 | < 1 | 599 | 413 |
| 3S2E29F004 | 4/27/21 | ZONE7 | 19.3 | 613 | 7.6 | 60 | 27 | 39 | 1.7 | 267 | 59 | 57 | < 0.1 | 19.7 | 300 | 4.3 | < 100 | < 1 | 395 | 261 |
| 3S2E29F004 | 9/28/21 | ZONE7 | 26.2 | 654 | 7.5 | 68 | 29 | 40 | 1.7 | 321 | 57 | 35 | < 0.1 | 23.5 | 340 | 5.5 | 104 | < 1 | 413 | 289 |
| 3S2E30C001 | 9/28/21 | ZONE7 | 19.3 | 724 | 7.3 | 54 | 32 | 59 | 1.7 | 286 | 39 | 71 | 4.61 | 27.8 | 410 | 2.5 | < 100 | 1.7 | 446 | 267 |
| 3S2E30D002 | 9/28/21 | ZONE7 | 27 | 716 | 7 | 55 | 30 | 56 | 2.1 | 237 | 56 | 79 | 0.09 | 18.2 | 320 | < 1 | < 100 | < 1 | 413 | 262 |
| 3S2E32E007 | 4/27/21 | ZONE7 | 22.4 | 543 | 6.9 | 29 | 21 | 47 | 1.4 | 118 | 39 | 86 | 4.01 | 21.4 | 110 | < 1 | < 100 | < 1 | 321 | 159 |
| 3S2E33G001 | 4/27/21 | ZONE7 | 19 | 747 | 7.1 | 46 | 26 | 84 | 3.3 | 202 | 96 | 112 | < 0.1 | 13.7 | 590 | 1.4 | < 100 | < 1 | 481 | 222 |
| 3S2E33G001 | 9/28/21 | ZONE7 | 25.9 | 916 | 7.3 | 59 | 35 | 93 | 3.7 | 292 | 86 | 92 | 0.75 | 17.1 | 1700 | 1.2 | < 100 | < 1 | 533 | 292 |
| 3S2E33K001 | 12/29/20 | VA | 10.5 | 1360 | 6.8 | - | - | - | - | - | - | 210 | 1.8 | - | - | - | - | - | 895 | - |
| 3S2E33L001 | 12/29/20 | VA | 10 | 1270 | 6.8 | - | - | - | - | - | - | 190 | 2.3 | - | - | - | - | - | 798 | - |
| 3S2E33L001 | 3/31/21 | VA | 18 | 805 | 7.7 | - | - | - | - | - | - | 75 | 2 | - | - | - | - | - | 594 | - |
| 3S2E33L001 | 6/29/21 | VA | 24.8 | 1380 | 7.6 | - | - | - | - | - | - | 180 | 1 | - | - | - | - | - | 715 | - |
| 3S2E33L001 | 9/29/21 | VA | 22.7 | 1540 | 7.2 | - | - | - | - | - | - | 210 | 2.4 | - | - | - | - | - | 948 | - |
| 3S3E06Q003 | 5/11/21 | ZONE7 | 27.3 | 1832 | 7.4 | 42 | 42 | 239 | 2.5 | 308 | 321 | 255 | 8.13 | 49.2 | 4410 | 1.3 | < 100 | 3.5 | 1139 | 278 |
| 3S3E07D002 | 5/11/21 | ZONE7 | 29.3 | 2349 | 7.6 | 64 | 64 | 323 | 2.4 | 259 | 312 | 456 | 6.09 | 49.2 | 6570 | 2.3 | < 200 | 3.8 | 1425 | 424 |
| 3S3E18Q001 | 2/16/21 | ZONE7 | - | 1264 | 7.2 | 102 | 41 | 105 | 2.2 | 279 | 190 | 141 | 8.46 | 23.5 | 1020 | < 1 | < 100 | 2.1 | 780 | 424 |
| 3S3E19C002 | 2/3/21 | ZONE7 | - | 1674 | 7.4 | 122 | 60 | 143 | 2.3 | 307 | 46 | 359 | 18.9 | 30 | 1420 | < 1 | < 100 | 1.9 | 998 | 552 |
| 3S3E20L004 | 2/17/21 | ZONE7 | - | 1660 | 7.3 | 112 | 54 | 160 | 2.3 | 287 | 184 | 277 | 16.5 | 27.8 | 1610 | < 1 | < 100 | 1.5 | 1032 | 502 |
| 3S3E20R004 | 2/17/21 | ZONE7 | - | 2588 | 7.4 | 153 | 102 | 298 | 6.3 | 410 | 396 | 453 | 12.7 | 25.7 | 1270 | < 5 | < 500 | < 5 | 1693 | 802 |
| 3S3E21C001 | 2/17/21 | ZONE7 | - | 2558 | 7.6 | 84 | 86 | 402 | 11.4 | 637 | 433 | 331 | < 0.1 | 59.9 | 4040 | 7.8 | < 500 | < 5 | 1723 | 564 |
| 4S2E01A001 | 2/3/21 | ZONE7 | - | 1687 | 8.1 | 15 | 60 | 256 | 2.1 | 432 | 179 | 202 | < 0.1 | 16.3 | 12000 | < 1 | < 100 | < 1 | 948 | 285 |

- = Not Analyzed

Highlighted = Representative Monitoring Site

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 4S3E06E004 | 2/4/21 | ZONE7 | - | 2433 | 7.9 | 25 | 58 | 431 | 3.2 | 390 | 20 | 689 | < 0.1 | 14.6 | 5040 | < 5 | < 500 | < 5 | 1436 | 301 |

- = Not Analyzed
Highlighted = Representative Monitoring Site

## TABLE 6-3
## TOTAL DISSOLVED SOLIDS (TDS) AT REPRESENTATIVE MONITORING SITES
## 2021 WATER YEAR
## LIVERMORE VALLEY GROUNDWATER BASIN

| RMS Well | | Management Area/Unit | | | TDS (mg/L) | | | SMCs for TDS (mg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Map | Area | Subarea | Aquifer | 2021 WY | Below MT | Below MO | MT | IM-5 | IM-10 | IM-15 | MO |
| 3S1E20C007 | 20C7 | Main | Bernal | Upper | 392 | 408 | 108 | 800 | 725 | 650 | 575 | 500 |
| 3S1E20C008 | 20C8 | Main | Bernal | Lower | 569 | 185 | -69 | 754 | 691 | 627 | 564 | 500 |
| 3S1E09P005 | 9P5 | Main | Amador West | Upper | 404 | 904 | 96 | 1,308 | 1,106 | 904 | 702 | 500 |
| 3S1E09P010 | 9P10 | Main | Amador West | Lower | 529 | 88 | -29 | 617 | 588 | 559 | 529 | 500 |
| 3S1E11G001 | 11G1 | Main | Amador East | Upper | 713 | 249 | -213 | 962 | 847 | 731 | 616 | 500 |
| 3S1E12K003 | 12K3 | Main | Amador East | Lower | 449 | 147 | 51 | 596 | 572 | 548 | 524 | 500 |
| 3S2E08K002 | 8K2 | Main | Mocho II | Upper | 645 | 51 | -145 | 696 | 647 | 598 | 549 | 500 |
| 3S2E08H003 | 8H3 | Main | Mocho II | Lower | 737 | -19 | -237 | 718 | 664 | 609 | 555 | 500 |
| 3S1E06F003 | 6F3 | Fringe | Northwest | Upper | 2,929 | 726 | -84 | 3,655 | 3,453 | 3,250 | 3,048 | 2,845 |
| 2S2E34E001 | 34E1 | Fringe | Northeast | Upper | 707 | 293 | 293 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| 3S2E24A001 | 24A1 | Fringe | East | Upper | 779 | 400 | 245 | 1,179 | 1,140 | 1,102 | 1,063 | 1,024 |
| 3S2E21K009 | 21K9 | Upland | Upland | Upper | 617 | 383 | 383 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |

| | |
|---|---|
| RMS | Representative Monitoring Sites |
| TDS | Total Dissolved Solids |
| mg/L | milligrams per liter |
| MT | Minimum Threshold |
| IM-# | Interim Milestone at # years |
| MO | Measurable Objective |
| SMC | Sustainable Management Criteria |

# TABLE 6-4
# NITRATE (as $NO_3N$) AT REPRESENTATIVE MONITORING SITES
# 2021 WATER YEAR
# LIVERMORE VALLEY GROUNDWATER BASIN

| RMS Well | | Management Area/Unit | | | Nitrate as Nitrogen (mg/L) | | | SMCs Nitrate (mg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Map | Area | Subarea | Aquifer | 2021 WY | Below MT | Below MO | MT | IM-5 | IM-10 | IM-15 | MO |
| 3S1E20C007 | 20C7 | Main | Bernal | Upper | 0.78 | 9.2 | 9.2 | 10 | 10 | 10 | 10 | 10 |
| 3S1E20C008 | 20C8 | Main | Bernal | Lower | 5.12 | 4.9 | 4.9 | 10 | 10 | 10 | 10 | 10 |
| 3S1E09P005 | 9P5 | Main | Amador West | Upper | 0.13 | 9.9 | 9.9 | 10 | 10 | 10 | 10 | 10 |
| 3S1E09P010 | 9P10 | Main | Amador West | Lower | 1.08 | 8.9 | 8.9 | 10 | 10 | 10 | 10 | 10 |
| 3S1E11G001 | 11G1 | Main | Amador East | Upper | 10.9 | 8.4 | -0.9 | 19 | 17 | 15 | 12 | 10 |
| 3S1E12K003 | 12K3 | Main | Amador East | Lower | 3.8 | 6.2 | 6.2 | 10 | 10 | 10 | 10 | 10 |
| 3S2E08K002 | 8K2 | Main | Mocho II | Upper | 8.27 | 7.9 | 1.7 | 16 | 15 | 13 | 12 | 10 |
| 3S2E08H003 | 8H3 | Main | Mocho II | Lower | 10.8 | 3.9 | -0.8 | 15 | 14 | 12 | 11 | 10 |
| 3S1E06F003 | 6F3 | Fringe | Northwest | Upper | ND | 10.0 | 10.0 | 10 | 10 | 10 | 10 | 10 |
| 2S2E34E001 | 34E1 | Fringe | Northeast | Upper | ND | 10.0 | 10.0 | 10 | 10 | 10 | 10 | 10 |
| 3S2E24A001 | 24A1 | Fringe | East | Upper | 1.51 | 36.0 | 8.5 | 38 | 31 | 24 | 17 | 10 |
| 3S2E21K009 | 21K9 | Upland | Upland | Upper | 5.73 | 4.3 | 4.3 | 10 | 10 | 10 | 10 | 10 |

| | |
|---|---|
| RMS | Representative Monitoring Sites |
| TDS | Total Dissolved Solids |
| mg/L | milligrams per liter |
| MT | Minimum Threshold |
| IM-# | Interim Milestone at # years |
| MO | Measurable Objective |
| SMC | Sustainable Management Criteria |
| ND | Not Detected (i.e., below lab detection limits). Assumed 0 for calculations. |

# TABLE 6-5
# BORON (B) AT REPRESENTATIVE MONITORING SITES
# 2021 WATER YEAR
# LIVERMORE VALLEY GROUNDWATER BASIN

| RMS Well | | Management Area/Unit | | | Boron (ug/L) | | | SMCs Boron (ug/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Map | Area | Subarea | Aquifer | 2021 WY | Below MT | Below MO | MT | IM-5 | IM-10 | IM-15 | MO |
| 3S1E20C007 | 20C7 | Main | Bernal | Upper | 330 | 1,070 | 1,070 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E20C008 | 20C8 | Main | Bernal | Lower | 250 | 1,150 | 1,150 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E09P005 | 9P5 | Main | Amador West | Upper | 470 | 930 | 930 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E09P010 | 9P10 | Main | Amador West | Lower | 480 | 920 | 920 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E11G001 | 11G1 | Main | Amador East | Upper | 860 | 540 | 540 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E12K003 | 12K3 | Main | Amador East | Lower | 390 | 1,010 | 1,010 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S2E08K002 | 8K2 | Main | Mocho II | Upper | 380 | 1,020 | 1,020 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S2E08H003 | 8H3 | Main | Mocho II | Lower | 460 | 940 | 940 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E06F003 | 6F3 | Fringe | Northwest | Upper | 2,640 | 1,950 | -1,240 | 4,590 | 3,793 | 2,995 | 2,198 | 1,400 |
| 2S2E34E001 | 34E1 | Fringe | Northeast | Upper | 2,300 | 2,420 | -900 | 4,720 | 3,890 | 3,060 | 2,230 | 1,400 |
| 3S2E24A001 | 24A1 | Fringe | East | Upper | 990 | 1,410 | 410 | 2,400 | 2,150 | 1,900 | 1,650 | 1,400 |
| 3S2E21K009 | 21K9 | Upland | Upland | Upper | 110 | 1,290 | 1,290 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |

| | |
|---|---|
| RMS | Representative Monitoring Sites |
| TDS | Total Dissolved Solids |
| ug/L | micrograms per liter |
| MT | Minimum Threshold |
| IM-# | Interim Milestone at # years |
| MO | Measurable Objective |
| SMC | Sustainable Management Criteria |

TABLE 6-6
CHROMIUM (Cr) AT REPRESENTATIVE MONITORING SITES
2021 WATER YEAR
LIVERMORE VALLEY GROUNDWATER BASIN

| RMS Well | | Management Area/Unit | | | Chromium (ug/L) | | | SMCs Chromium (ug/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Map | Area | Subarea | Aquifer | 2021 WY | Below MT | Below MO | MT | IM-5 | IM-10 | IM-15 | MO |
| 3S1E20C007 | 20C7 | Main | Bernal | Upper | 1.8 | 48 | 48 | 50 | 50 | 50 | 50 | 50 |
| 3S1E20C008 | 20C8 | Main | Bernal | Lower | 3.8 | 46 | 46 | 50 | 50 | 50 | 50 | 50 |
| 3S1E09P005 | 9P5 | Main | Amador West | Upper | ND | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 3S1E09P010 | 9P10 | Main | Amador West | Lower | 2.1 | 48 | 48 | 50 | 50 | 50 | 50 | 50 |
| 3S1E11G001 | 11G1 | Main | Amador East | Upper | 5.3 | 45 | 45 | 50 | 50 | 50 | 50 | 50 |
| 3S1E12K003 | 12K3 | Main | Amador East | Lower | 4.6 | 45 | 45 | 50 | 50 | 50 | 50 | 50 |
| 3S2E08K002 | 8K2 | Main | Mocho II | Upper | 3.8 | 46 | 46 | 50 | 50 | 50 | 50 | 50 |
| 3S2E08H003 | 8H3 | Main | Mocho II | Lower | 5.3 | 45 | 45 | 50 | 50 | 50 | 50 | 50 |
| 3S1E06F003 | 6F3 | Fringe | Northwest | Upper | ND | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 2S2E34E001 | 34E1 | Fringe | Northeast | Upper | ND | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 3S2E24A001 | 24A1 | Fringe | East | Upper | 3 | 47 | 47 | 50 | 50 | 50 | 50 | 50 |
| 3S2E21K009 | 21K9 | Upland | Upland | Upper | ND | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

| | |
|---|---|
| RMS | Representative Monitoring Sites |
| TDS | Total Dissolved Solids |
| ug/L | micrograms per liter |
| MT | Minimum Threshold |
| IM-# | Interim Milestone at # years |
| MO | Measurable Objective |
| SMC | Sustainable Management Criteria |
| ND | Not Detected (i.e., below lab detection limits). Assumed 0 for calculations. |

# TABLE 6-7
# WATER QUALITY RESULTS FOR PFAS
# 2021 WATER YEAR
# (Only PFAS Compounds with detected concentrations shown)

| | | | | | | ***DETECTED PFAS COMPOUNDS (with Notification and Response Levels)*** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | ***NEtFOSAA*** | ***NMeFOSAA*** | ***PFBS*** | ***PFDA*** | ***PFHpA*** | ***PFHxA*** | ***PFHxS*** | ***PFNA*** | ***PFOA*** | ***PFOS*** |
| | | | | | | **-** | **-** | **500** | **-** | **-** | **-** | **-** | **-** | **5** | **6.5** |
| ***Well*** | ***WellName*** | ***Type*** | ***Aquifer*** | ***Sampled*** | ***Units*** | **-** | **-** | ***5000*** | **-** | **-** | **-** | **-** | **-** | ***10*** | ***40*** |
| 2S1E33P002 | Central Pkwy at Emerald Glen Pk | well-static | U | 5/4/21 | ng/L | < 2.0 | < 2.0 | 12 | < 2.0 | < 2.0 | 8.6 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 2S1E33R001 | Central Pkwy @ Grafton | well-static | U | 5/4/21 | ng/L | < 2.0 | < 2.0 | 2.3 | < 2.0 | < 2.0 | 6.8 | < 2.0 | < 2.0 | < 2.0 | 3 |
| 3S1E01F002 | Constitution Dr | well-static | U | 3/30/21 | ng/L | < 2 | < 2 | 16 | < 2 | 7.1 | 14 | 40 | < 2 | 18 | 86 |
| 3S1E01H003 | Collier Canyon g1 | well-static | U | 3/30/21 | ng/L | < 2 | < 2 | 3.4 | < 2 | < 2 | < 2 | 2.9 | < 2 | < 2 | < 2 |
| 3S1E01L001 | Kitty Hawk | well-static | U | 3/30/21 | ng/L | < 2 | < 2 | 16 | < 2 | < 2 | 2.8 | 25 | < 2 | 4.4 | 22 |
| 3S1E02J002 | Maint. Bldg | well-static | U | 3/30/21 | ng/L | < 2 | < 2 | 34 | < 2 | < 2 | < 2 | 46 | < 2 | < 2 | 35 |
| 3S1E02K002 | Doolan Rd West | well-static | U | 3/30/21 | ng/L | < 2 | < 2 | 34 | < 2 | 20 | 75 | 1200 | 2.9 | 110 | 970 |
| 3S1E05K006 | Rosewood shallow | well-static | U | 4/20/21 | ng/L | < 2.0 | < 2.0 | 3.4 | < 2.0 | < 2.0 | < 2.0 | 4.5 | < 2.0 | < 2.0 | 2.4 |
| 3S1E05K007 | Rosewood deep | well-static | L | 4/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E07B002 | Hopyard rd | well-static | L | 4/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E07B012 | Hacienda Arch | well-static | U | 4/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E07J005 | Thomas Hart School | well-static | U | 8/10/21 | ng/L | < 2.0 | < 2.0 | 6 | < 2.0 | < 2.0 | < 2.0 | 2.1 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E08G004 | Apache | well-static | U | 5/4/21 | ng/L | < 2.0 | < 2.0 | 5.5 | < 2.0 | 2.5 | 5.3 | 8.7 | < 2.0 | 5.2 | 5.1 |
| **3S1E08H018** | **Mocho 4** | **well-supply** | **L** | **10/26/20** | **ng/L** | **< 2** | **< 2** | **5.3** | **< 2** | **< 2** | **3.8** | **17** | **< 2** | **3.7** | **15** |
| **3S1E08H018** | **Mocho 4** | **well-supply** | **L** | **5/10/21** | **ng/L** | **< 2.0** | **< 2.0** | **4.6** | **< 2.0** | **< 2.0** | **3.3** | **16** | **< 2.0** | **3.1** | **15** |
| **3S1E08H018** | **Mocho 4** | **well-supply** | **L** | **7/12/21** | **ng/L** | **< 2.0** | **< 2.0** | **4.2** | **< 2.0** | **< 2.0** | **3** | **14** | **< 2.0** | **2.7** | **13** |
| **3S1E08H018** | **Mocho 4** | **well-supply** | **L** | **10/4/21** | **ng/L** | **< 2.0** | **< 2.0** | **3.7** | **< 2.0** | **< 2.0** | **2.5** | **13** | **< 2.0** | **2.3** | **12** |
| 3S1E08K001 | Cockroach well | well-static | U | 7/13/21 | ng/L | < 2.0 | < 2.0 | 3.5 | < 2.0 | < 2.0 | < 2.0 | 4.3 | < 2.0 | 2.4 | 4 |
| **3S1E09B001** | **Stoneridge** | **well-supply** | **L** | **12/17/20** | **ng/L** | **< 2.0** | **< 2.0** | **5.6** | **< 2.0** | **< 2.0** | **3.6** | **18** | **< 2.0** | **2.7** | **16** |
| **3S1E09B001** | **Stoneridge** | **well-supply** | **L** | **7/21/21** | **ng/L** | **< 2.0** | **< 2.0** | **4.7** | **< 2.0** | **< 2.0** | **3.3** | **18** | **< 2.0** | **2.6** | **16** |
| **3S1E09B001** | **Stoneridge** | **well-supply** | **L** | **10/4/21** | **ng/L** | **< 2.0** | **< 2.0** | **4.5** | **< 2.0** | **< 2.0** | **3.4** | **19** | **< 2.0** | **2.7** | **18** |
| **3S1E09M003** | **Mocho 2** | **well-supply** | **L** | **10/26/20** | **ng/L** | **< 2** | **< 2** | **7** | **< 2** | **2.1** | **5.6** | **34** | **< 2** | **4.8** | **40** |
| **3S1E09M003** | **Mocho 2** | **well-supply** | **L** | **3/30/21** | **ng/L** | **< 2** | **< 2** | **6.3** | **< 2** | **2.1** | **4.7** | **29** | **< 2** | **4.1** | **31** |
| **3S1E09M003** | **Mocho 2** | **well-supply** | **L** | **5/10/21** | **ng/L** | **< 2.0** | **< 2.0** | **6.2** | **< 2.0** | **2** | **4.7** | **28** | **< 2.0** | **4.2** | **33** |
| **3S1E09M003** | **Mocho 2** | **well-supply** | **L** | **7/21/21** | **ng/L** | **< 2.0** | **< 2.0** | **5.6** | **< 2.0** | **< 2.0** | **4.1** | **28** | **< 2.0** | **3.9** | **< 2.0** |
| **3S1E09M003** | **Mocho 2** | **well-supply** | **L** | **10/7/21** | **ng/L** | **< 2.0** | **< 2.0** | **6.2** | **< 2.0** | **< 2.0** | **4.8** | **29** | **< 2.0** | **4.3** | **32** |
| **3S1E09M004** | **Mocho 3** | **well-supply** | **L** | **10/26/20** | **ng/L** | **< 2** | **< 2** | **7.2** | **< 2** | **2.2** | **5.5** | **28** | **< 2** | **5.1** | **34** |
| **3S1E09M004** | **Mocho 3** | **well-supply** | **L** | **5/10/21** | **ng/L** | **< 2.0** | **< 2.0** | **8.1** | **< 2.0** | **2.4** | **6.6** | **36** | **< 2.0** | **5.5** | **47** |
| **3S1E09M004** | **Mocho 3** | **well-supply** | **L** | **7/14/21** | **ng/L** | **< 2.0** | **< 2.0** | **8.4** | **< 2.0** | **2.5** | **7.5** | **42** | **< 2.0** | **5.8** | **56** |
| **3S1E10B016** | **COL 5** | **well-supply** | **L** | **5/11/21** | **ng/L** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **12** | **< 2.0** | **< 2.0** | **18** |
| **3S1E10B016** | **COL 5** | **well-supply** | **L** | **7/12/21** | **ng/L** | **< 2.0** | **< 2.0** | **2.9** | **< 2.0** | **< 2.0** | **2.3** | **16** | **< 2.0** | **< 2.0** | **20** |

**Municipal Wells are Bold**

U=Upper; L=Lower; D=Deep

Orange Highlight = Above Notification Limit

Red Highlight = Above Response Level

# TABLE 6-7
# WATER QUALITY RESULTS FOR PFAS
# 2021 WATER YEAR
# (Only PFAS Compounds with detected concentrations shown)

| | | | | | | DETECTED PFAS COMPOUNDS (with Notification and Response Levels) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E10D002 | Stoneridge Shallow | well-static | L | 9/21/21 | ng/L | < 2.0 | < 2.0 | 16 | < 2.0 | 4.8 | 14 | 65 | < 2.0 | 8.5 | 82 |
| 3S1E10D003 | Stoneridge Middle 1 | well-static | L | 9/21/21 | ng/L | < 2.0 | < 2.0 | 12 | < 2.0 | 3.5 | 12 | 69 | < 2.0 | 6.5 | 120 |
| 3S1E10D004 | Stoneridge Middle 2 | well-static | L | 9/21/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| **3S1E10K003** | **COL 1** | **well-supply** | **L** | **10/6/20** | **ng/L** | **< 2.0** | **< 2.0** | **4.9** | **< 2.0** | **< 2.0** | **4.2** | **22** | **< 2.0** | **4.4** | **30** |
| **3S1E10K003** | **COL 1** | **well-supply** | **L** | **10/4/21** | **ng/L** | **< 2.0** | **< 2.0** | **7.6** | **< 2.0** | **2.4** | **6.6** | **39** | **< 2.0** | **5.9** | **46** |
| 3S1E11G001 | Key_AmE_U | well-static | U | 4/12/21 | ng/L | < 2.0 | < 2.0 | 26 | < 2.0 | 8.5 | 25 | 100 | < 2.0 | 18 | 210 |
| 3S1E11G002 | Rancho Charro Middle 1 | well-static | L | 4/12/21 | ng/L | < 2.0 | < 2.0 | 6.7 | < 2.0 | < 2.0 | 4.5 | 23 | < 2.0 | 3.7 | 32 |
| 3S1E11G003 | Rancho Charro Middle 2 | well-static | L | 4/12/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E11G004 | Rancho Charro Deep | well-static | D | 4/12/21 | ng/L | < 2.0 | < 2.0 | 6.5 | < 2.0 | < 2.0 | 4.6 | 23 | < 2.0 | 3.6 | 30 |
| **3S1E11M003** | **COL 2** | **well-supply** | **L** | **10/26/20** | **ng/L** | **< 2** | **< 2** | **3.6** | **< 2** | **< 2** | **2.8** | **15** | **< 2** | **2.3** | **14** |
| **3S1E11M003** | **COL 2** | **well-supply** | **L** | **7/12/21** | **ng/L** | **< 2.0** | **< 2.0** | **4.2** | **< 2.0** | **< 2.0** | **3.3** | **16** | **< 2.0** | **2.6** | **18** |
| **3S1E11M003** | **COL 2** | **well-supply** | **L** | **10/4/21** | **ng/L** | **< 2.0** | **< 2.0** | **5.4** | **< 2.0** | **< 2.0** | **4.6** | **20** | **< 2.0** | **3.6** | **22** |
| 3S1E13P005 | LGA Grant Nested 1 | well-static | U | 12/1/20 | ng/L | < 2.0 | < 2.0 | 2.9 | < 2.0 | < 2.0 | < 2.0 | 4 | < 2.0 | 5.6 | 11 |
| 3S1E13P005 | LGA Grant Nested 1 | well-static | U | 8/10/21 | ng/L | < 2.0 | < 2.0 | 2.8 | < 2.0 | < 2.0 | 3.4 | < 2.0 | < 2.0 | 2.5 | 3.7 |
| 3S1E13P006 | LGA Grant Nested 2 | well-static | L | 12/1/20 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E13P006 | LGA Grant Nested 2 | well-static | L | 8/10/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E13P007 | LGA Grant Nested 3 | well-static | L | 12/1/20 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E13P007 | LGA Grant Nested 3 | well-static | L | 8/10/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E13P008 | LGA Grant Nested 4 | well-static | L | 12/1/20 | ng/L | 3.2 | 4.4 | 3.2 | 7 | 4.2 | 9.7 | 8.6 | 5.2 | 25 | 73 |
| 3S1E13P008 | LGA Grant Nested 4 | well-static | L | 8/10/21 | ng/L | 2.6 | 3.5 | 8.3 | < 2.0 | 3.3 | 5.9 | 7.9 | 3.7 | 20 | 54 |
| 3S1E14D002 | South Cope Lake | well-static | L | 8/18/21 | ng/L | < 2.0 | < 2.0 | 8.3 | < 2.0 | 2.6 | 6.6 | 39 | < 2.0 | 5.7 | 30 |
| 3S1E15M003 | Bush/Valley South | well-static | L | 7/13/21 | ng/L | < 2.0 | < 2.0 | 6.7 | < 2.0 | 2.8 | 3.7 | 7.7 | < 2.0 | 5.9 | 9.4 |
| **3S1E16A002** | **Pleas 8** | **well-supply** | **L** | **11/17/20** | **ng/L** | **-** | **-** | **9.9** | **<2** | **6.8** | **12** | **59** | **2.9** | **7.6** | **75** |
| **3S1E16A002** | **Pleas 8** | **well-supply** | **L** | **2/3/21** | **ng/L** | **-** | **-** | **7** | **<0.6** | **5.31** | **8** | **41.7** | **2.57** | **6.39** | **64.4** |
| **3S1E16A002** | **Pleas 8** | **well-supply** | **L** | **8/11/21** | **ng/L** | **-** | **-** | **5.73** | **<0.65** | **2.68** | **4.63** | **24** | **1.11** | **4.47** | **32.6** |
| 3S1E16A004 | Bush/Valley Mid | well-static | L | 7/13/21 | ng/L | < 2.0 | < 2.0 | 7 | < 2.0 | 5 | 8.4 | 39 | 2.7 | 6 | 48 |
| 3S1E16E004 | black ave - cultural | well-static | U | 5/4/21 | ng/L | < 2.0 | < 2.0 | 4.2 | < 2.0 | < 2.0 | 2.3 | 7.9 | < 2.0 | 2.2 | 5.8 |
| **3S1E16L005** | **Pleas 5** | **well-supply** | **L** | **11/17/20** | **ng/L** | **-** | **-** | **6.8** | **<2** | **2.5** | **4.6** | **23** | **<2** | **4** | **22** |
| **3S1E16L005** | **Pleas 5** | **well-supply** | **L** | **2/3/21** | **ng/L** | **-** | **-** | **6.11** | **<0.7** | **2.2** | **3.94** | **22.5** | **0.667** | **4.21** | **22.9** |
| **3S1E16L005** | **Pleas 5** | **well-supply** | **L** | **5/4/21** | **ng/L** | **-** | **-** | **6.14** | **<0.6** | **2.38** | **4.7** | **22.6** | **<0.8** | **4.38** | **23.3** |
| **3S1E16L005** | **Pleas 5** | **well-supply** | **L** | **8/11/21** | **ng/L** | **-** | **-** | **4.73** | **<0.622** | **2** | **3.39** | **16.9** | **<0.868** | **3.66** | **18.6** |
| **3S1E16L007** | **Pleas 6** | **well-supply** | **L** | **11/17/20** | **ng/L** | **-** | **-** | **6.9** | **<2** | **2.6** | **4.7** | **26** | **<2** | **4** | **26** |
| **3S1E16L007** | **Pleas 6** | **well-supply** | **L** | **2/3/21** | **ng/L** | **-** | **-** | **6.43** | **<0.7** | **2.1** | **4.51** | **24.2** | **<0.6** | **3.81** | **24.7** |
| **3S1E16L007** | **Pleas 6** | **well-supply** | **L** | **5/4/21** | **ng/L** | **-** | **-** | **6.7** | **<0.6** | **2.49** | **5.12** | **27.6** | **<0.9** | **4.26** | **26.8** |

**Municipal Wells are Bold**

U=Upper; L=Lower; D=Deep

Orange Highlight = Above Notification Limit

Red Highlight = Above Response Level

# TABLE 6-7
# WATER QUALITY RESULTS FOR PFAS
# 2021 WATER YEAR
# (Only PFAS Compounds with detected concentrations shown)

| | | | | | | *DETECTED PFAS COMPOUNDS (with Notification and Response Levels)* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E17D003 | Hopyard Nested Shallow | well-static | L | 7/20/21 | ng/L | < 2.0 | < 2.0 | 3.8 | < 2.0 | < 2.0 | 4.6 | 8.3 | < 2.0 | 3.3 | 3.5 |
| 3S1E17D004 | Hopyard Nested Middle 1 | well-static | L | 7/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E17D005 | Hopyard Nested Middle 2 | well-static | L | 8/11/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E17D006 | Hopyard Nested Middle 3 | well-static | L | 8/11/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E17D007 | Hopyard Nested Deep | well-static | D | 7/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E17D010 | Hopyard 7 | well-static | L | 7/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| **3S1E17D012** | **Hopyard 9** | **well-supply** | **L** | **7/12/21** | **ng/L** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** |
| **3S1E18A006** | **Hopyard 6** | **well-supply** | **L** | **7/12/21** | **ng/L** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** |
| **3S1E19A010** | **SFWD South (B)** | **well-supply** | **L** | **10/7/20** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3** | **<2** | **<2** | **<2** |
| **3S1E19A010** | **SFWD South (B)** | **well-supply** | **L** | **1/4/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3** | **<2** | **<2** | **<2** |
| **3S1E19A010** | **SFWD South (B)** | **well-supply** | **L** | **4/5/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.5** | **<2** | **<2** | **<2** |
| **3S1E19A010** | **SFWD South (B)** | **well-supply** | **L** | **7/6/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.3** | **<2** | **<2** | **<2** |
| **3S1E19A010** | **SFWD South (B)** | **well-supply** | **L** | **10/4/21** | **ng/L** | **-** | **-** | **0** | **<2** | **<2** | **<2** | **3.5** | **<2** | **<2** | **<2** |
| **3S1E19A011** | **SFWD North (A)** | **well-supply** | **L** | **10/7/20** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| **3S1E19A011** | **SFWD North (A)** | **well-supply** | **L** | **1/4/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| 3S1E20B002 | Fairgrounds Potable | well-supply | L | 11/17/20 | ng/L | - | - | 6.8 | <1.7 | 2.5 | 4.6 | 23 | <1.7 | 4 | 22 |
| 3S1E20B002 | Fairgrounds Potable | well-supply | L | 2/3/21 | ng/L | - | - | 6.11 | <0.7 | 2.2 | 3.94 | 22.5 | 0.667 | 4.21 | 22.9 |
| 3S1E20B002 | Fairgrounds Potable | well-supply | L | 5/4/21 | ng/L | - | - | 6.14 | <0.6 | 2.38 | 4.7 | 22.6 | <0.8 | 4.38 | 23.3 |
| 3S1E20C008 | Key_Bern_L | well-static | L | 7/13/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | 3.6 | < 2.0 | < 2.0 | 3.4 |
| 3S1E20C009 | Fair Nested Deep | well-static | L | 7/13/21 | ng/L | < 2.0 | < 2.0 | 3 | < 2.0 | < 2.0 | < 2.0 | 6.3 | < 2.0 | < 2.0 | 4.4 |
| 3S1E22D002 | vineyard trailer | well-static | U | 7/13/21 | ng/L | < 2.0 | < 2.0 | 4.1 | < 2.0 | < 2.0 | 2.1 | 6.7 | < 2.0 | 3.9 | 2.6 |
| 3S1W01B009 | DSRSD Shallow | well-static | L | 2/17/21 | ng/L | < 2 | < 2 | < 2 | < 2 | < 2 | < 2 | < 2 | < 2 | < 2 | < 2 |
| 3S1W12J001 | DSRSD South | well-static | U | 4/20/21 | ng/L | 3.7 | < 2.0 | 2.8 | < 2.0 | 7.3 | 6.5 | 12 | 3.1 | 31 | 93 |
| 3S2E07C002 | jaws - york way - G4 | well-static | U | 2/17/21 | ng/L | < 2 | < 2 | 18 | < 2 | 15 | 27 | 39 | < 2 | 30 | 60 |
| 3S2E07N002 | Isabel & Arroyo Mocho | well-static | U | 5/4/21 | ng/L | < 2.0 | < 2.0 | 3.2 | < 2.0 | < 2.0 | 2.4 | < 2.0 | < 2.0 | 4.1 | 6 |
| **3S2E07P003** | **CWS 24** | **well-supply** | **L** | **10/21/20** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| **3S2E07P003** | **CWS 24** | **well-supply** | **L** | **2/11/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| **3S2E07P003** | **CWS 24** | **well-supply** | **L** | **6/24/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| **3S2E07P003** | **CWS 24** | **well-supply** | **L** | **9/29/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| **3S2E07R003** | **CWS 31** | **well-supply** | **L** | **10/22/20** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.6** | **<2** | **<2** | **4.5** |
| **3S2E07R003** | **CWS 31** | **well-supply** | **L** | **3/24/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.3** | **<2** | **<2** | **4.5** |
| **3S2E07R003** | **CWS 31** | **well-supply** | **L** | **6/14/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.3** | **<2** | **<2** | **4.5** |
| **3S2E07R003** | **CWS 31** | **well-supply** | **L** | **9/29/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.4** | **<2** | **2.4** | **3.8** |
| **3S2E08F001** | **CWS 10** | **well-supply** | **L** | **12/16/20** | **ng/L** | **-** | **-** | **3.5** | **<2** | **2.1** | **3.2** | **7.6** | **<2** | **4.1** | **11** |

**Municipal Wells are Bold**
U=Upper; L=Lower; D=Deep
Orange Highlight = Above Notification Limit
Red Highlight = Above Response Level

# TABLE 6-7
# WATER QUALITY RESULTS FOR PFAS
# 2021 WATER YEAR
# (Only PFAS Compounds with detected concentrations shown)

| | | | | | | *DETECTED PFAS COMPOUNDS (with Notification and Response Levels)* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3S2E08F001** | **CWS 10** | **well-supply** | **L** | **7/22/21** | **ng/L** | **-** | **-** | **4.4** | **<2** | **<2** | **3.8** | **8** | **<2** | **4.2** | **13** |
| **3S2E08N002** | **CWS 14** | **well-supply** | **L** | **10/15/20** | **ng/L** | **-** | **-** | **2.4** | **<2** | **<2** | **<2** | **3.2** | **<2** | **2.3** | **5** |
| **3S2E08N002** | **CWS 14** | **well-supply** | **L** | **3/18/21** | **ng/L** | **-** | **-** | **2.7** | **<2** | **<2** | **<2** | **3.6** | **<2** | **2.8** | **5.1** |
| **3S2E08N002** | **CWS 14** | **well-supply** | **L** | **6/24/21** | **ng/L** | **-** | **-** | **2.3** | **<2** | **<2** | **<2** | **3** | **<2** | **2.6** | **4.4** |
| **3S2E08N002** | **CWS 14** | **well-supply** | **L** | **9/15/21** | **ng/L** | **-** | **-** | **2.4** | **<2** | **<2** | **<2** | **3.4** | **<2** | **2.6** | **5** |
| **3S2E08N002** | **CWS 14** | **well-supply** | **L** | **10/28/21** | **ng/L** | **-** | **-** | **2.6** | **<2** | **<2** | **<2** | **3** | **<2** | **2.6** | **3.8** |
| **3S2E18B001** | **CWS 20** | **well-supply** | **L** | **10/22/20** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **2.2** | **<2** | **<2** | **<2** |
| **3S2E18B001** | **CWS 20** | **well-supply** | **L** | **3/18/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **2.1** | **<2** | **2.1** | **2.2** |
| **3S2E18B001** | **CWS 20** | **well-supply** | **L** | **6/14/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **2.1** | **<2** |
| **3S2E18B001** | **CWS 20** | **well-supply** | **L** | **9/16/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **2** | **<2** | **<2** | **2.5** |
| **3S2E18B001** | **CWS 20** | **well-supply** | **L** | **10/27/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **2.8** | **<2** | **2.6** | **3.8** |
| 3S2E19D007 | Isabel Shallow | well-static | U | 8/18/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S2E19D008 | Isabel Middle 1 | well-static | L | 8/18/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S2E19D009 | Isabel Middle 2 | well-static | L | 8/18/21 | ng/L | < 2.0 | < 2.0 | 3.1 | < 2.0 | 3.7 | 9.7 | 4.1 | < 2.0 | 8.2 | 6.8 |
| 3S2E19D010 | Isabel Deep | well-static | L | 8/18/21 | ng/L | < 2.0 | < 2.0 | 3.1 | < 2.0 | 3.8 | 9.5 | 4.1 | < 2.0 | 8.1 | 7.1 |
| AC_WCD | Alamo Creek at Willow Creek Dr near Dublin | surface | - | 8/11/21 | ng/L | < 2.0 | < 2.0 | 13 | 5.4 | 7.3 | 22 | 8.9 | 4.4 | 17 | 13 |
| ACNP | Alamo Canal near Pleasanton | surface | - | 8/11/21 | ng/L | < 2.0 | < 2.0 | 12 | 4.7 | 3.9 | 12 | 14 | 3.3 | 10 | 25 |
| ADLLV | Arroyo De La Laguna at Verona | surface | - | 8/11/21 | ng/L | < 2.0 | < 2.0 | 12 | 2.3 | 6.8 | 20 | 26 | 3.4 | 13 | 33 |
| AMP | Arroyo Mocho near Pleasanton | surface | - | 8/11/21 | ng/L | < 2.0 | < 2.0 | 6.7 | < 2.0 | 4.1 | 11 | 12 | 2 | 9.6 | 13 |
| SSRC_AAVBLVD | South San Ramon Creek above Amador Valley Blvd | surface | - | 8/11/21 | ng/L | < 2.0 | < 2.0 | 12 | 3.8 | 2.7 | 7 | 7.3 | 2.4 | 6.5 | 29 |
| MA-K028 | Lake H | mining | - | 4/20/21 | ng/L | < 2 | < 2 | 9.4 | < 2 | 4.1 | 8.1 | 38 | < 2 | 12 | 85 |
| MA-K030 | Cope Lake | mining | - | 4/20/21 | ng/L | < 2 | < 2 | 4.9 | < 2 | 2.2 | 4 | 12 | < 2 | 5.4 | 12 |
| MA-K030 | Cope Lake | mining | - | 10/13/21 | ng/L | < 2.0 | < 2.0 | 5.4 | < 2.0 | 2.4 | 4.6 | 15 | < 2.0 | 5.4 | 10 |
| MA-K037 | Lake I | mining | - | 4/20/21 | ng/L | < 2 | < 2 | 4.5 | < 2 | 2.8 | 4.2 | 16 | < 2 | 6.8 | 71 |
| MA-K037 | Lake I | mining | - | 10/13/21 | ng/L | < 2.0 | < 2.0 | 5.4 | < 2.0 | 2.6 | 5.3 | 18 | < 2.0 | 6 | 31 |
| MA-P042 | Lake B - west | mining | - | 4/22/21 | ng/L | < 2.0 | < 2.0 | 2.2 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | 2.4 | 2.3 |
| MA-P042 | Lake B - west | mining | - | 10/14/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | 2.2 | 2.4 |
| MA-R028 | Lake D - northwest | mining | - | 4/21/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | 2.5 | < 2.0 | < 2.0 | 2.5 |
| MA-R028 | Lake D - northwest | mining | - | 10/13/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |

**Municipal Wells are Bold**
U=Upper; L=Lower; D=Deep
Orange Highlight = Above Notification Limit
Red Highlight = Above Response Level

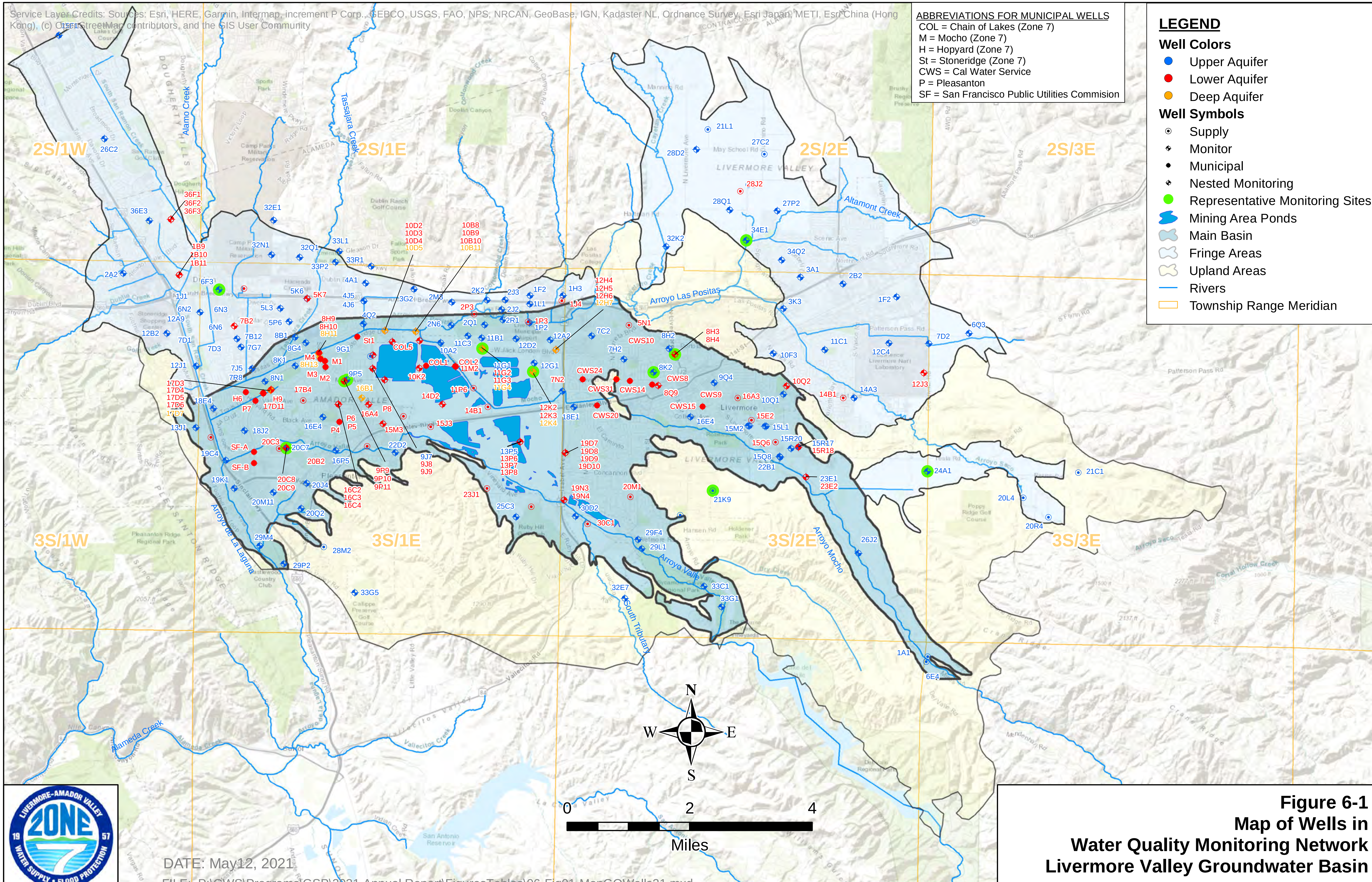


**Figure 6-1**
**Map of Wells in**
**Water Quality Monitoring Network**
**Livermore Valley Groundwater Basin**

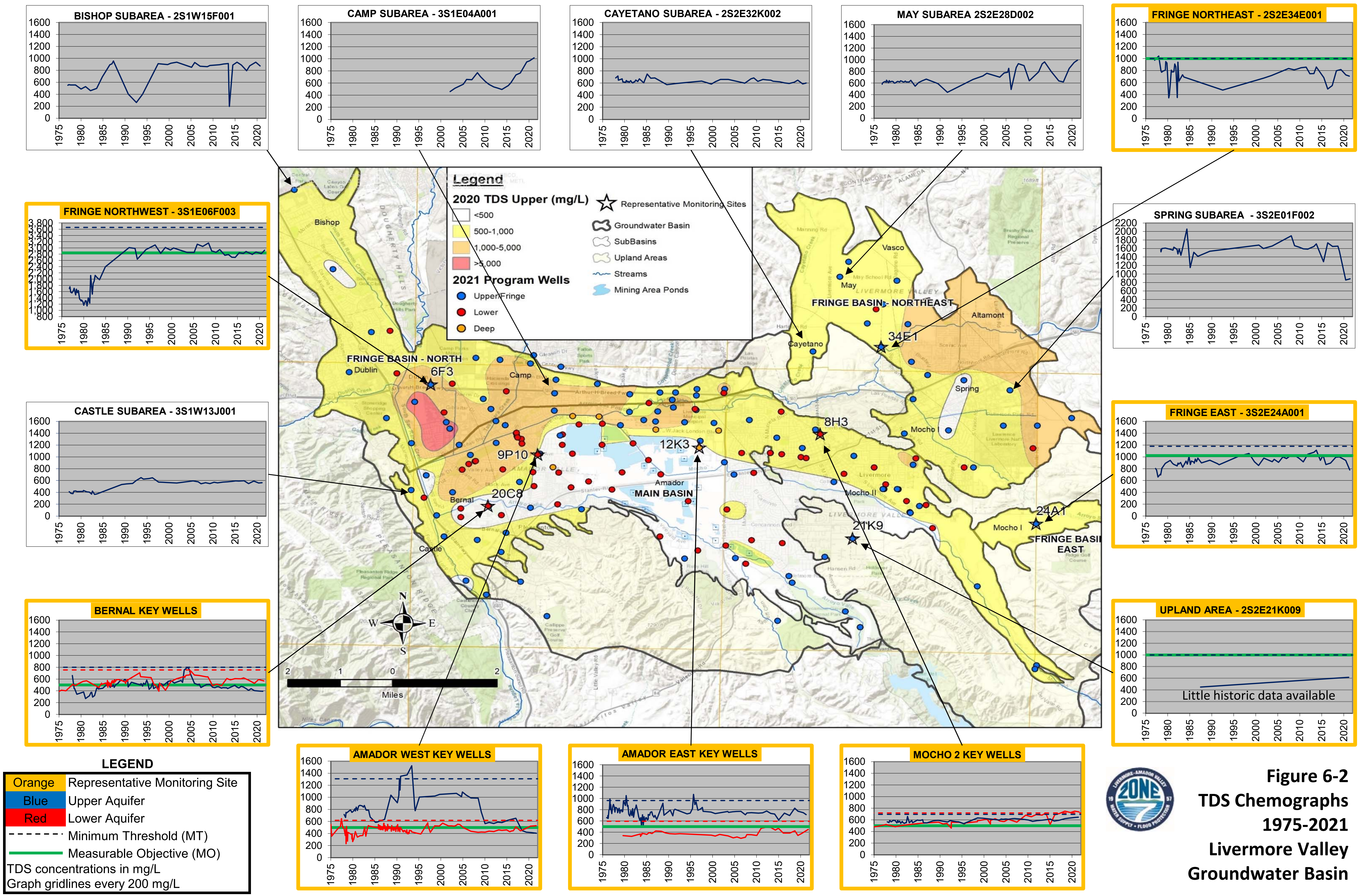


**Figure 6-2**
**TDS Chemographs**
**1975-2021**
**Livermore Valley**
**Groundwater Basin**

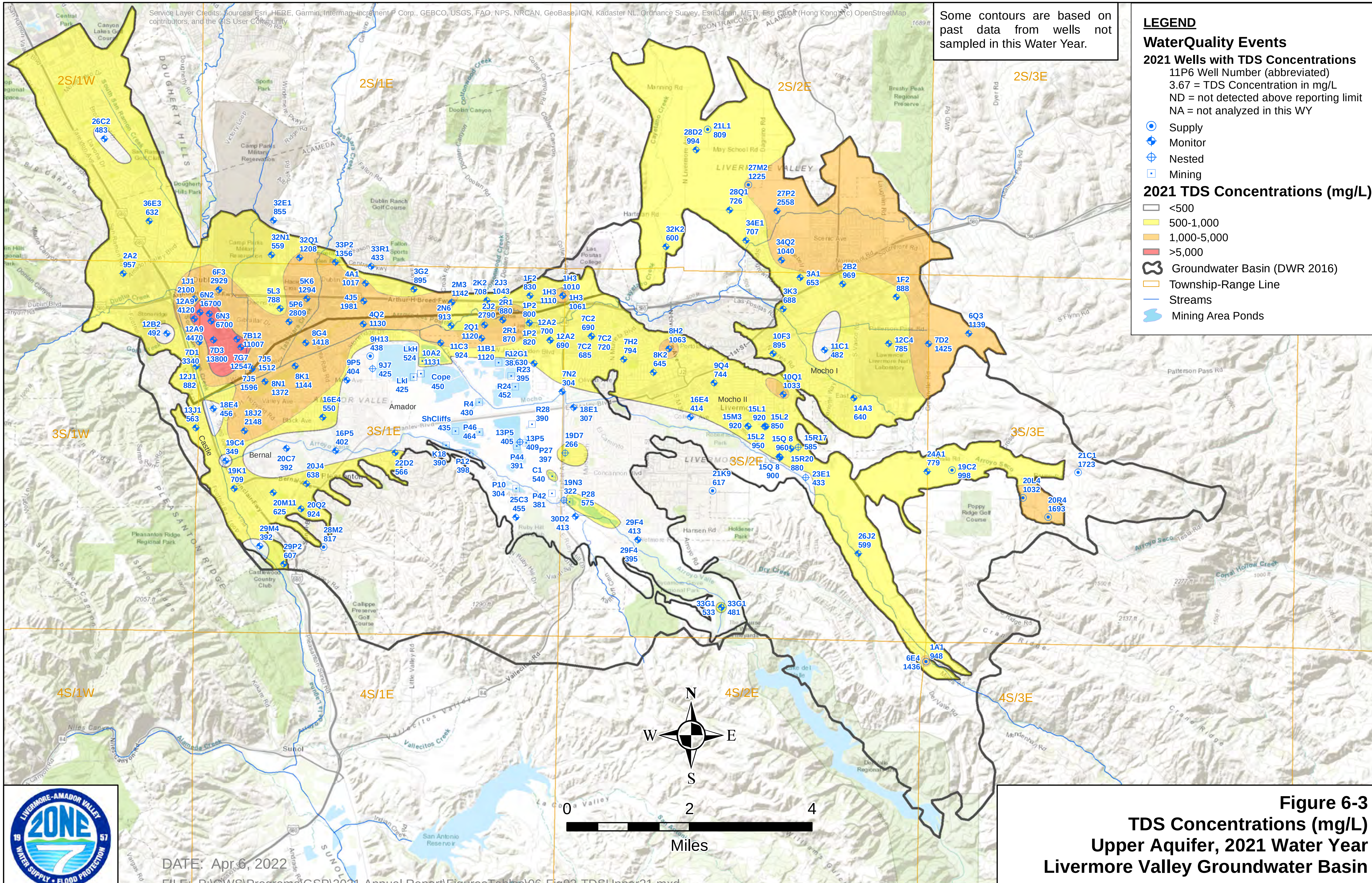


**Figure 6-3**
**TDS Concentrations (mg/L)**
**Upper Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

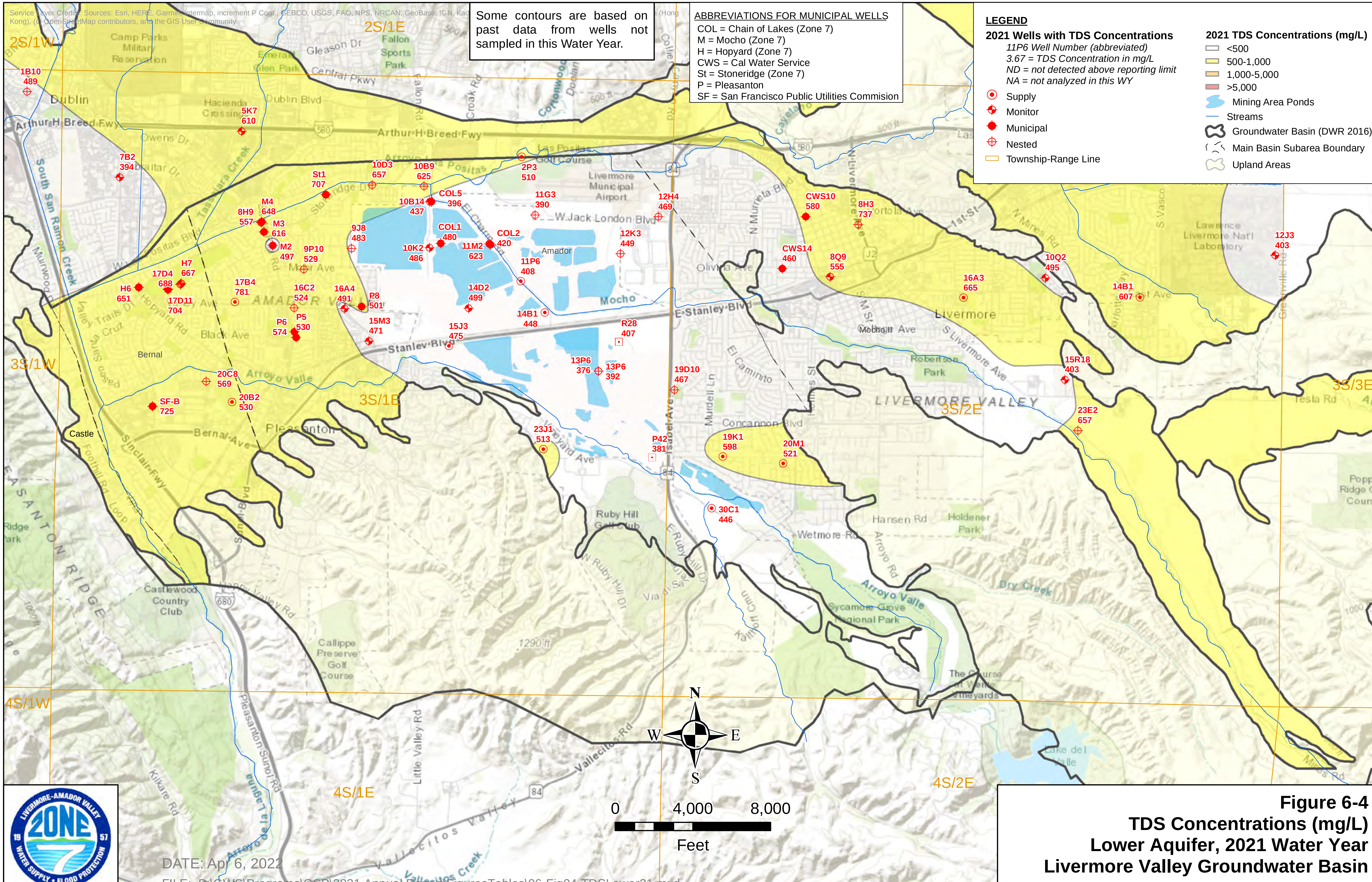


**Figure 6-4**
**TDS Concentrations (mg/L)**
**Lower Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

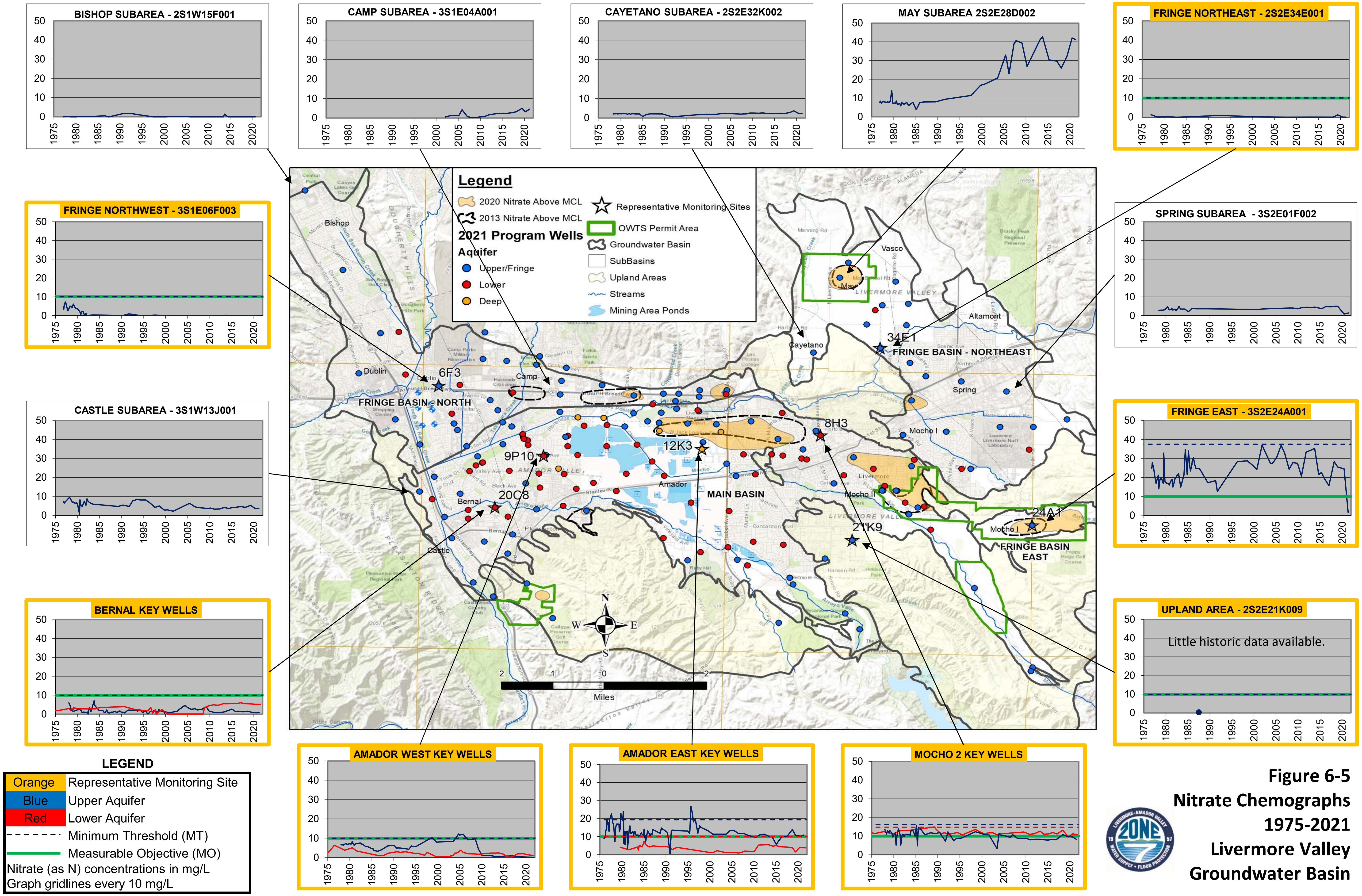


**Figure 6-5**
**Nitrate Chemographs**
**1975-2021**
**Livermore Valley**
**Groundwater Basin**

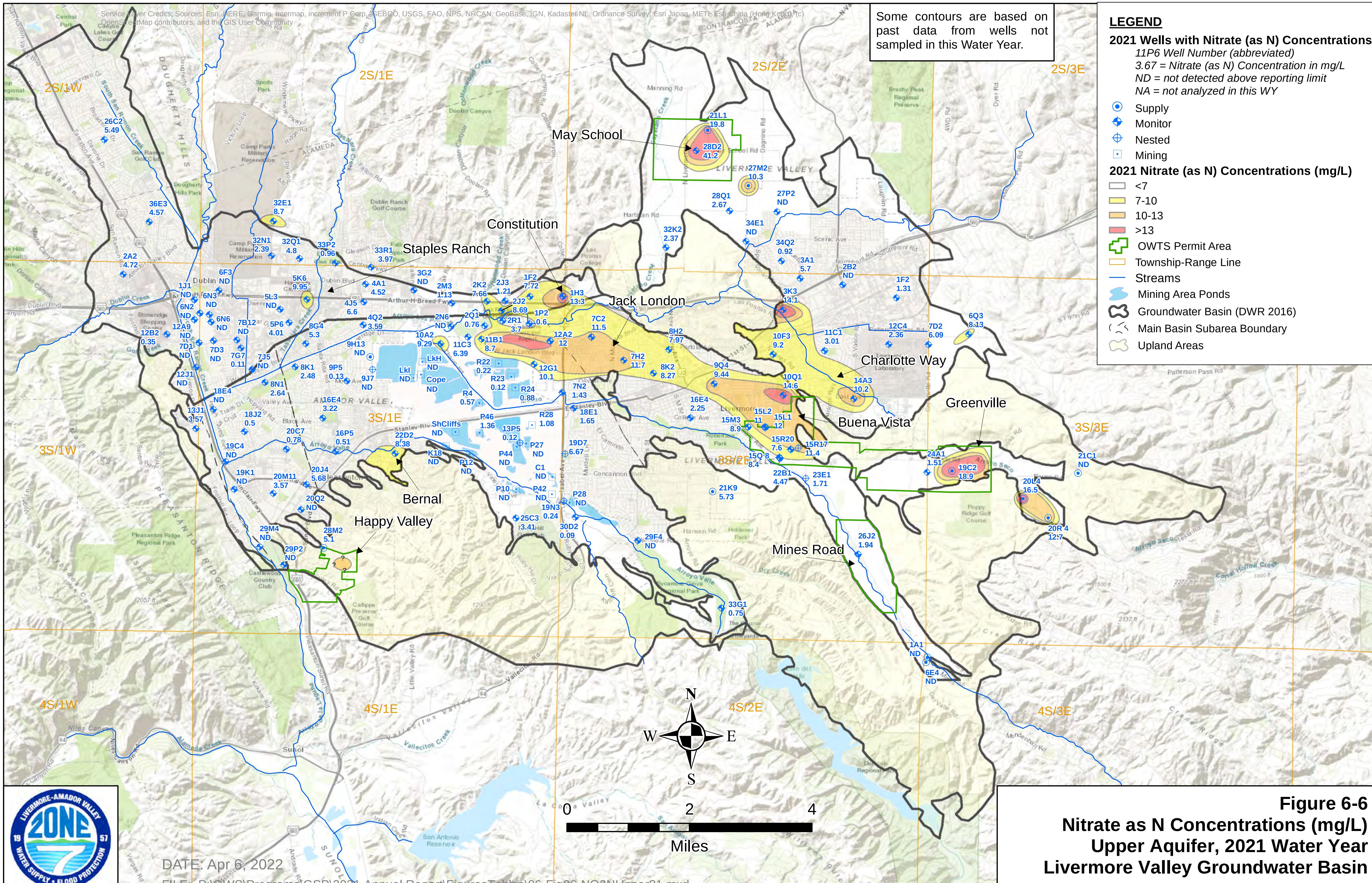


**Figure 6-6**
**Nitrate as N Concentrations (mg/L)**
**Upper Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

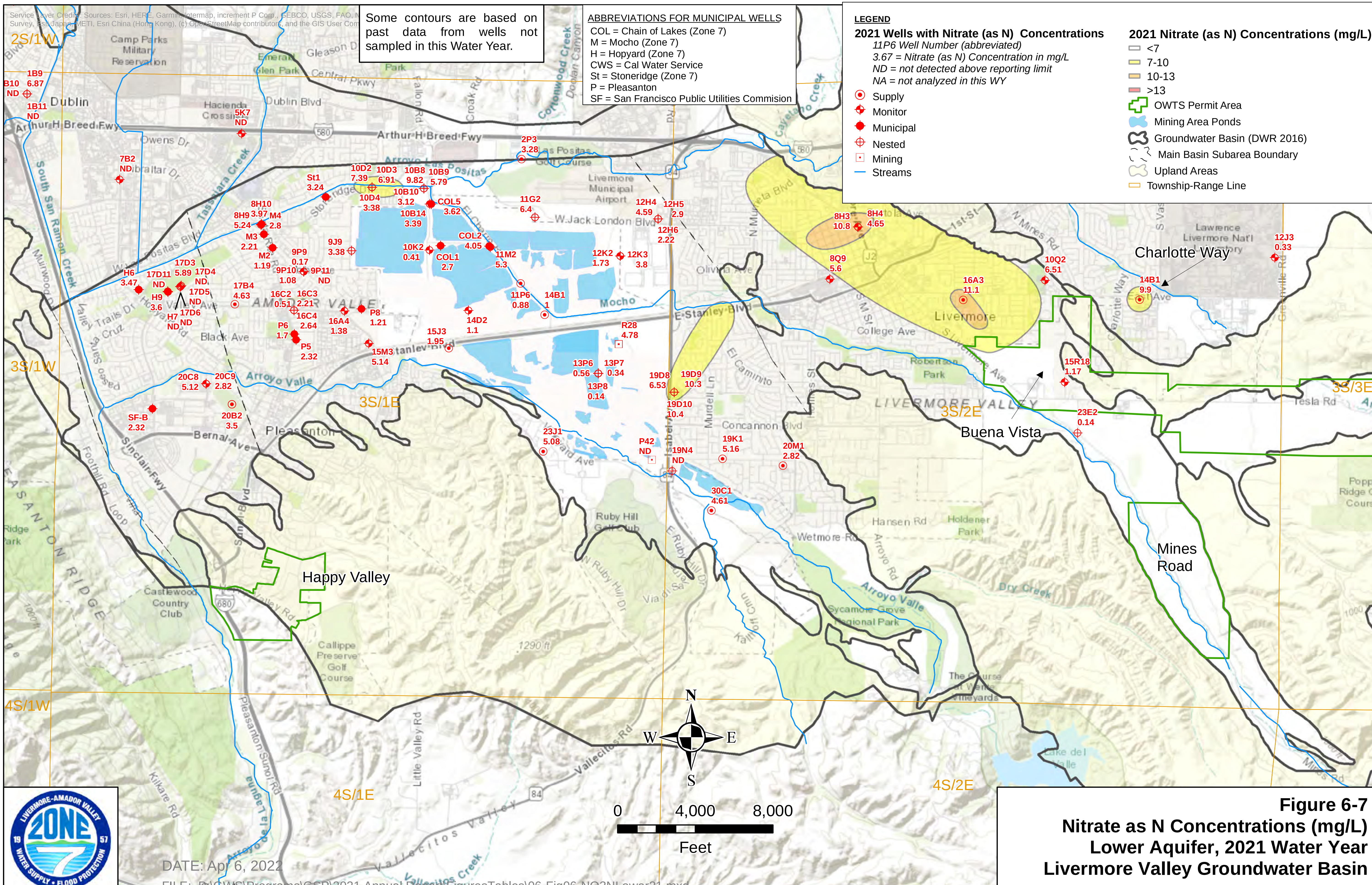


**Figure 6-7**
**Nitrate as N Concentrations (mg/L)**
**Lower Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

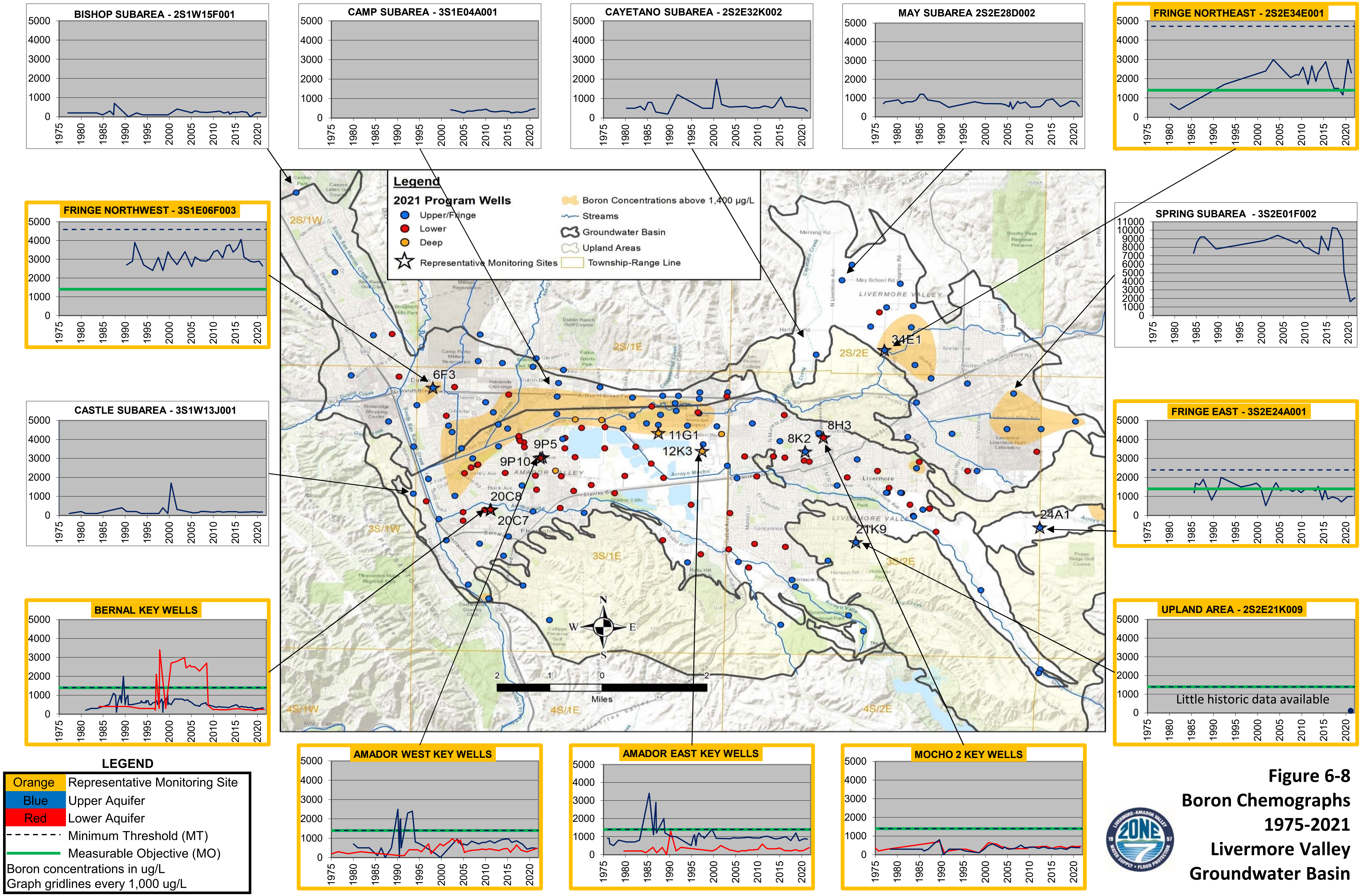


**Figure 6-8**
**Boron Chemographs**
**1975-2021**
**Livermore Valley**
**Groundwater Basin**

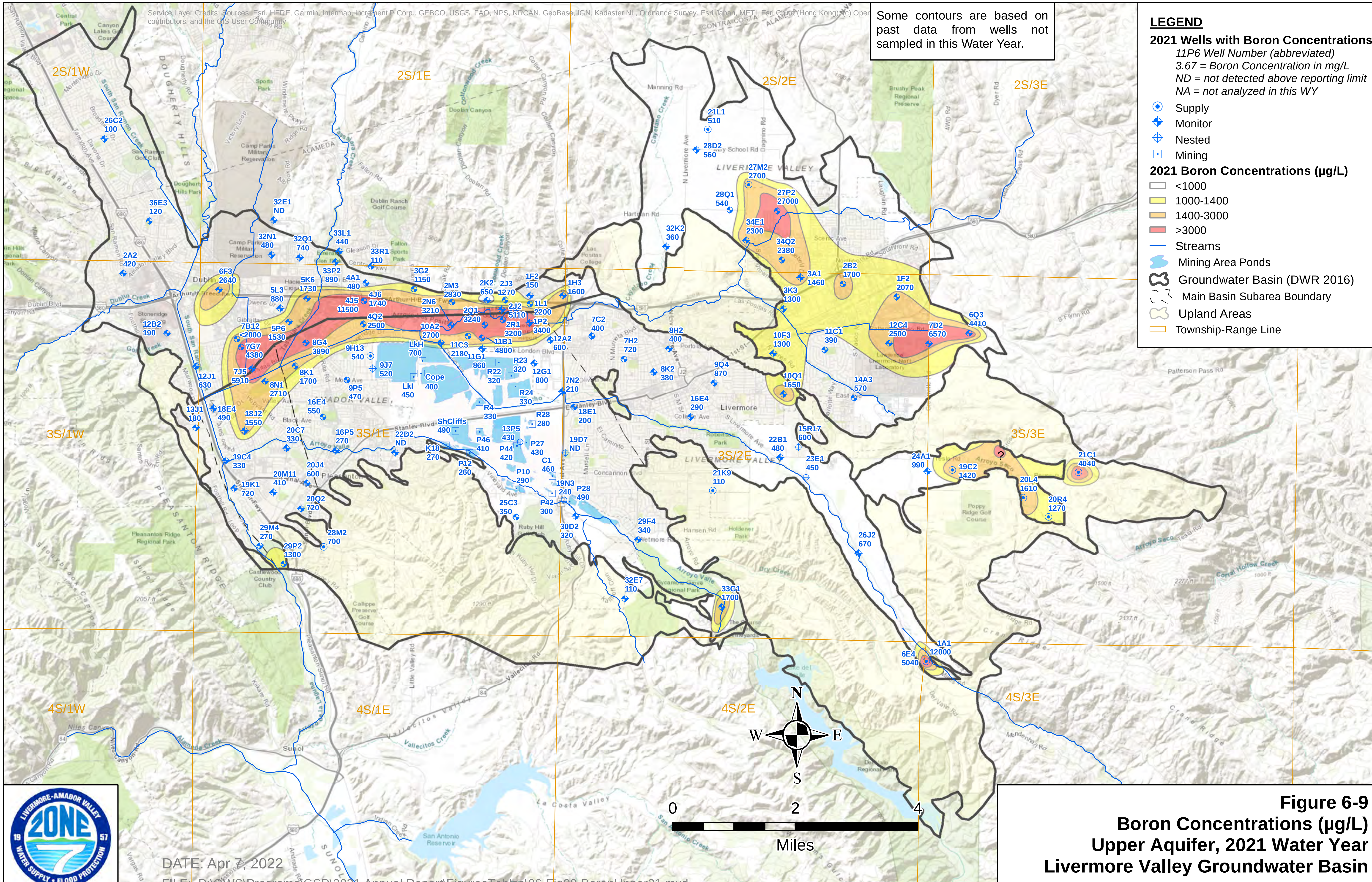


**Figure 6-9**
**Boron Concentrations (µg/L)**
**Upper Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

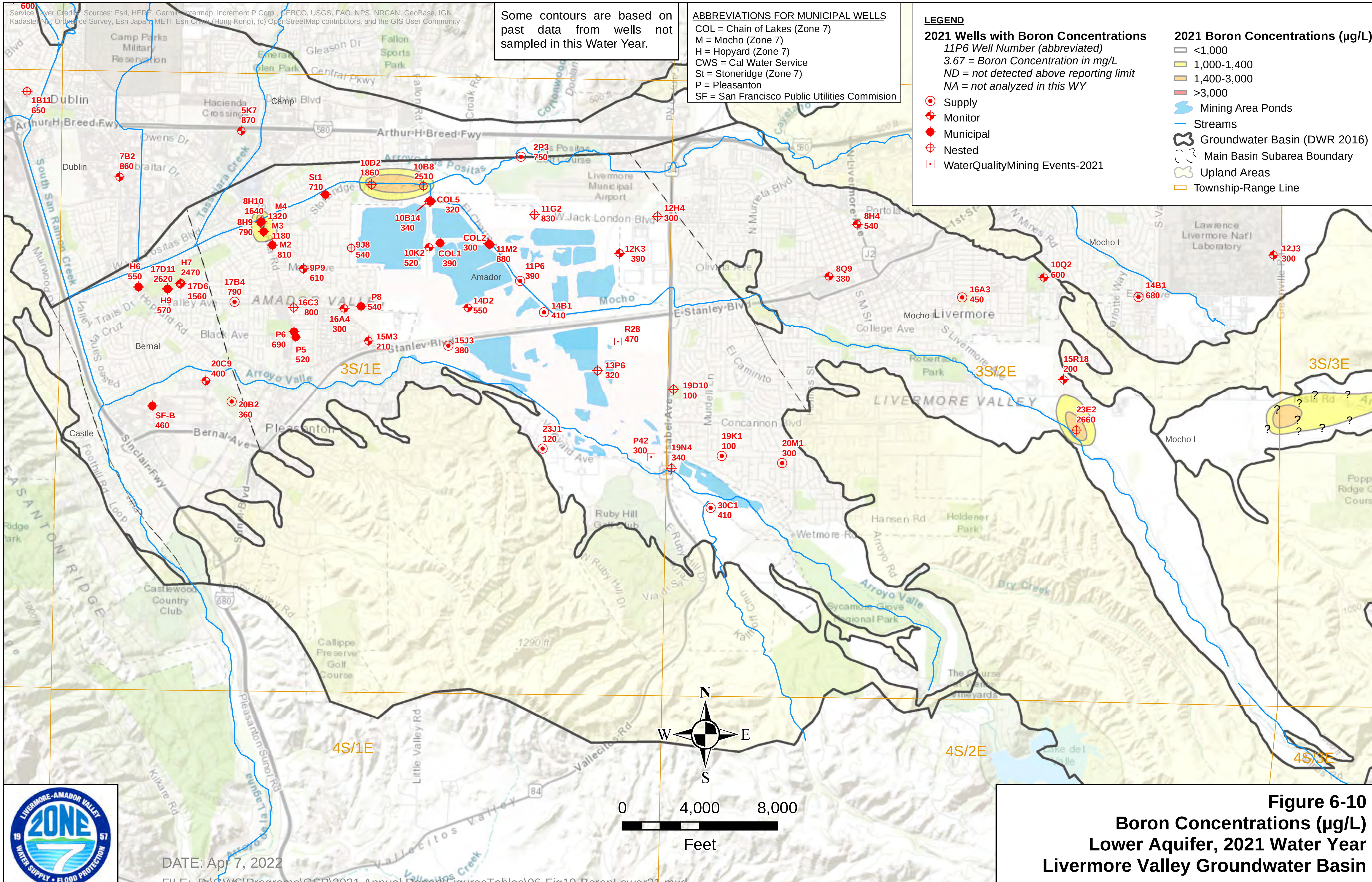


**Figure 6-10**
**Boron Concentrations (µg/L)**
**Lower Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

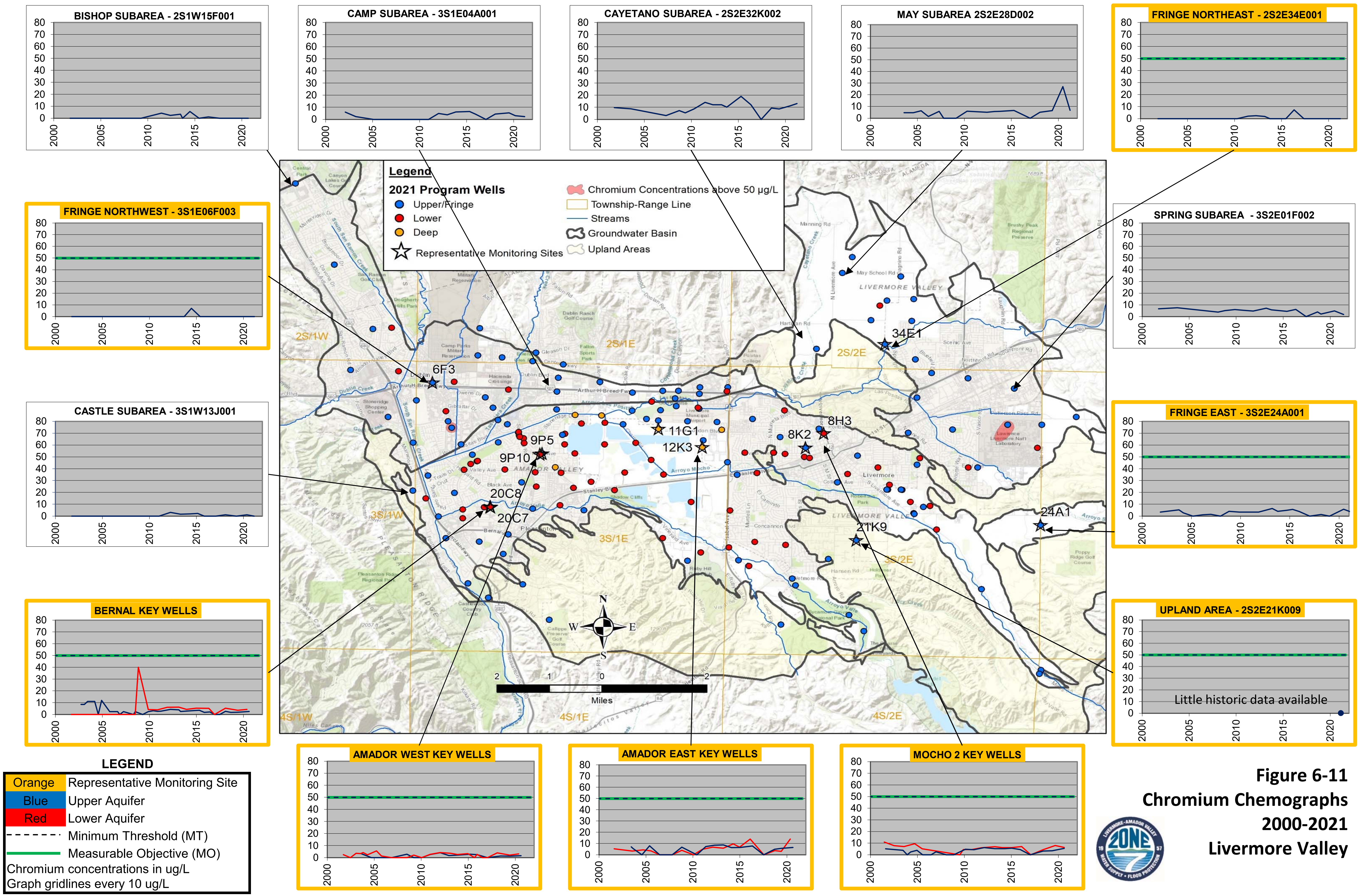


**Figure 6-11**
**Chromium Chemographs**
**2000-2021**
**Livermore Valley**

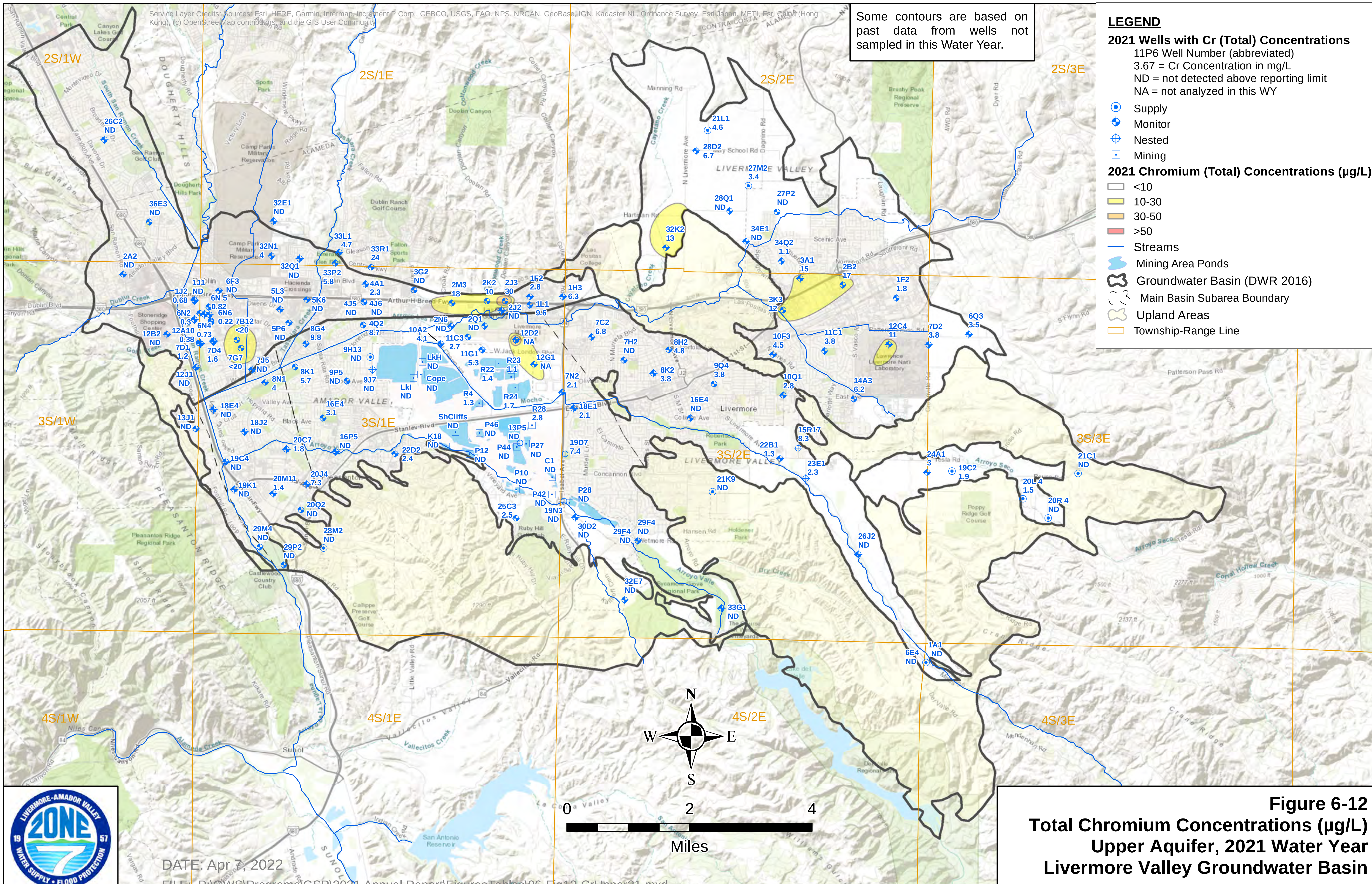


**Figure 6-12**
**Total Chromium Concentrations (µg/L)**
**Upper Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

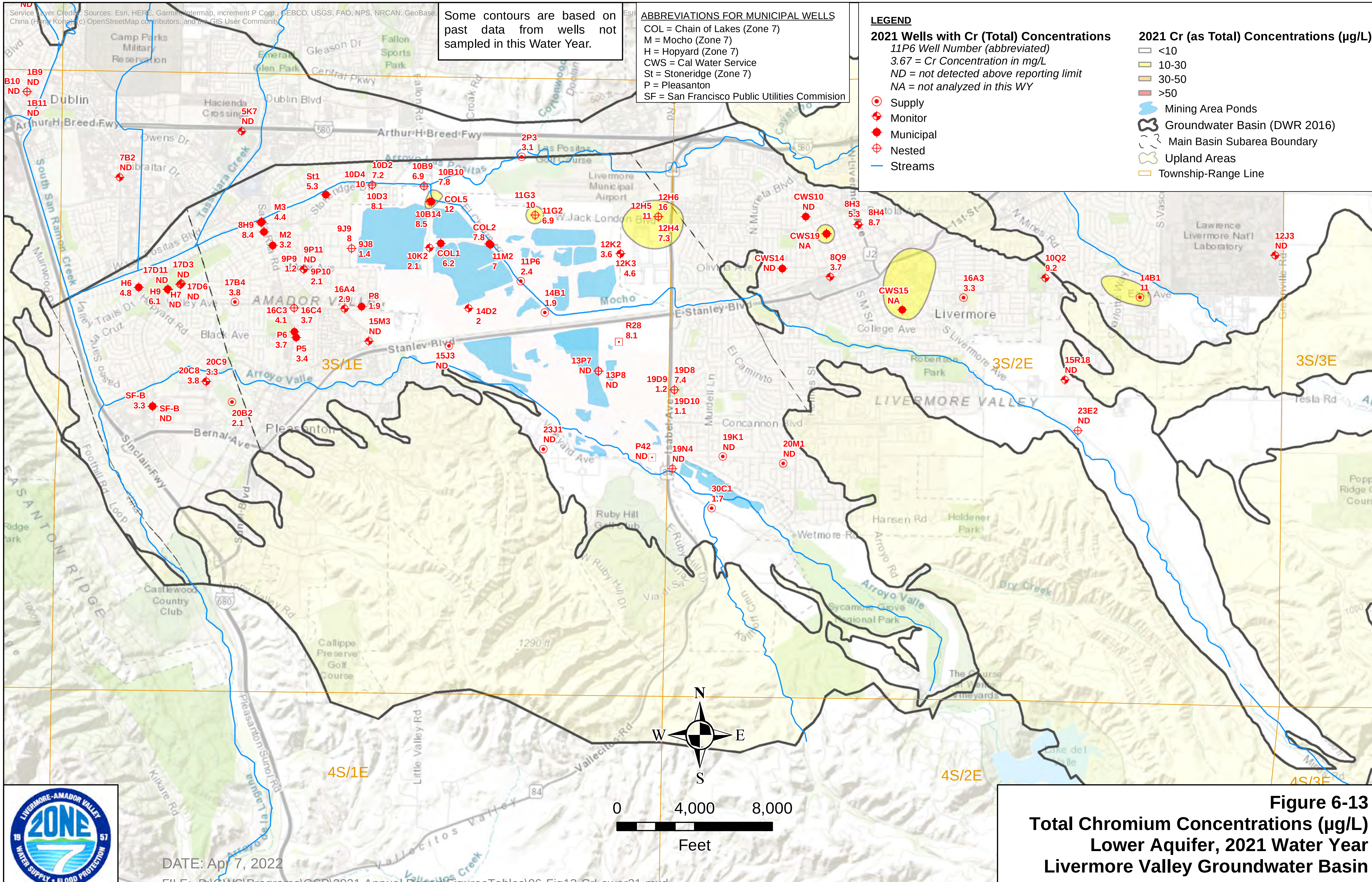


**Figure 6-13**
**Total Chromium Concentrations (µg/L)**
**Lower Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

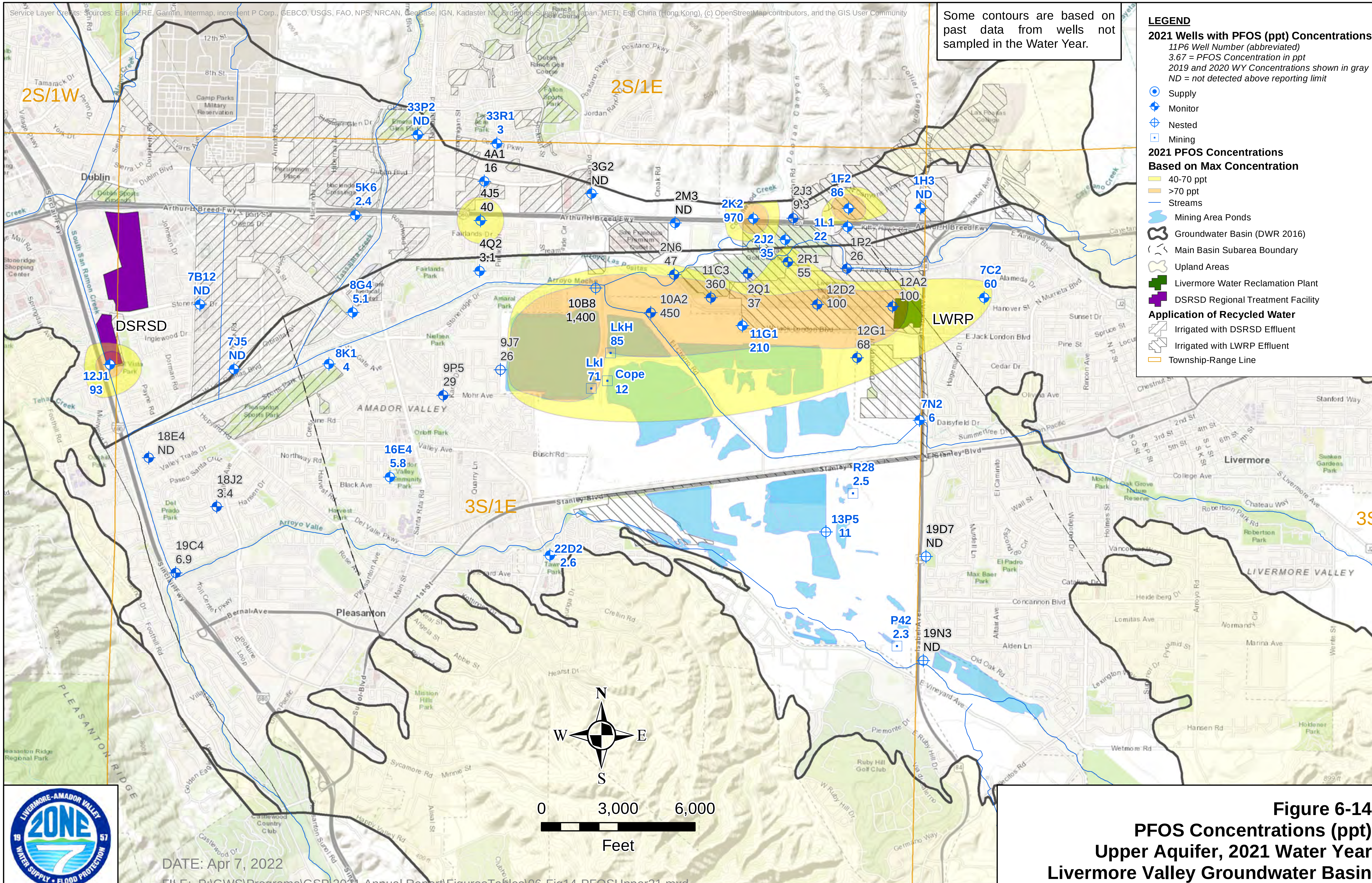


**Figure 6-14**
**PFOS Concentrations (ppt)**
**Upper Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

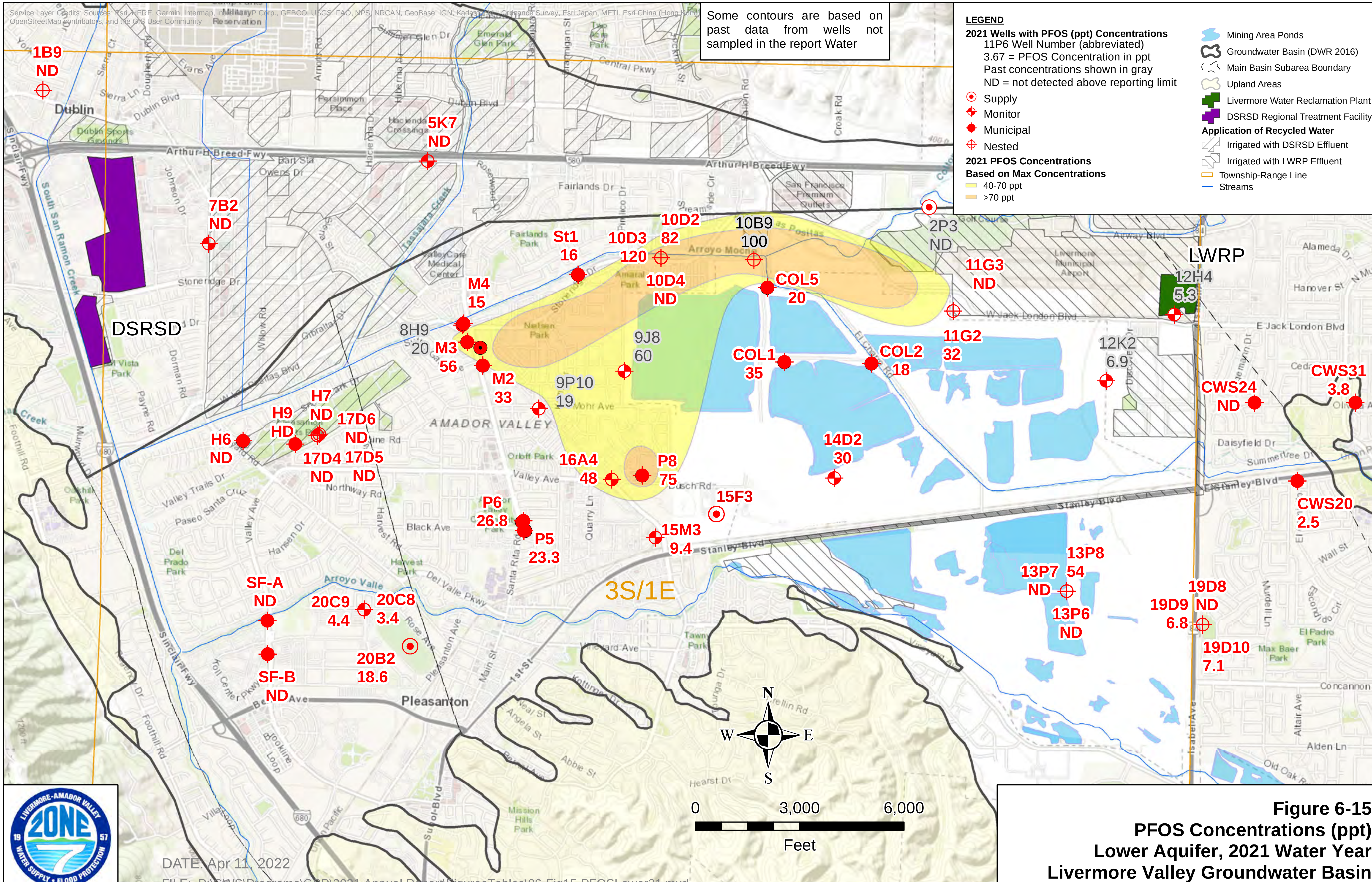


**Figure 6-15**
**PFOS Concentrations (ppt)**
**Lower Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

# 7 Land Subsidence Monitoring

## 7.1 Program Changes

Zone 7's 2021 Alternative GSP established SMCs for Land Subsidence as shown in ***Table 7-A*** below.

***Table 7-A: SMCs for Land Subsidence***

| Undesirable Results Definition | Undesirable Results Criteria | Minimum Threshold (MT) | Measurable Objective (MO) |
|---|---|---|---|
| If the occurrence of land subsidence substantially interferes with beneficial uses of groundwater and infrastructure within the Basin during the planning and implementation horizon of this Alternative GSP. | Water levels in greater than 25% of the RMS-WLs decline below their respective MTs for two consecutive years, that result in a confirmed decrease of 0.4 feet of land surface in any given cycle with a goal of experiencing no inelastic subsidence spatially and temporally. Not applicable to Upland Management Area. | Main Basin and Fringe Area: Chronic Lowering of Groundwater Levels used as a proxy, with the additional constraint of no more than 0.4 feet of inelastic land subsidence in any year. Upland Area: No MTs established. | Main Basin and Fringe Area: Chronic Lowering of Groundwater Levels used as a proxy. Upland Area: No MOs established. |

RMS-WL = Representative Monitoring Sites for Water Levels

The 2021 Alternative GSP recommended continuing with Interferometric Synthetic Aperture Radar (InSAR) on an annual basis, in lieu of the benchmark land surveys, to evaluate land subsidence over the entire Basin. For the 2021 WY, Zone 7 used InSAR data publicly available through the DWR. This data can be viewed by the public with the SGMA Data Viewer at:

https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer

For more information on the Land Subsidence program; see the following sections of the 2021 Alternative GSP:

- **Section 1.2.4:** Land Subsidence Program Update
- **Section 8.7:** Current and Historical Groundwater Conditions – Land Subsidence
- **Section 13.5:** Sustainability Indicators – Land Subsidence
- **Section 14.2.5:** Monitoring Network for Land Subsidence
- **Section 14.4:** Representative Monitoring

# 7.2 Results for the 2021 Water Year

***Figure 7-1*** shows the land surface elevation change (approximately 100-meter resolution) from Fall 2020 to Fall 2021. ***Figure 7-2*** shows cumulative land surface elevation change (raster obtained from DWR) from June 2015 (the earliest InSAR dataset with the Sentinel satellite) to Fall 2021. Both figures shows that land surface elevations generally rose (green) or dropped (yellow) within 0.05 feet. These elevation changes are within the range Zone 7 considers to be "elastic deformation" (i.e., rebounds to the original elevation when groundwater levels return to previous levels).

Some areas in the mining area appear to have dropped more than 0.10 feet (indicated by orange), however, these changes are likely due to excavation and grading activities, and not from land subsidence.

# 7.3 Attached Tables and Figures

***Figure 7-1***: *Land Surface Elevation Change from Fall 2020 to Fall 2021*
***Figure 7-2***: *Land Surface Elevation Change from June 2015 to October 2021*

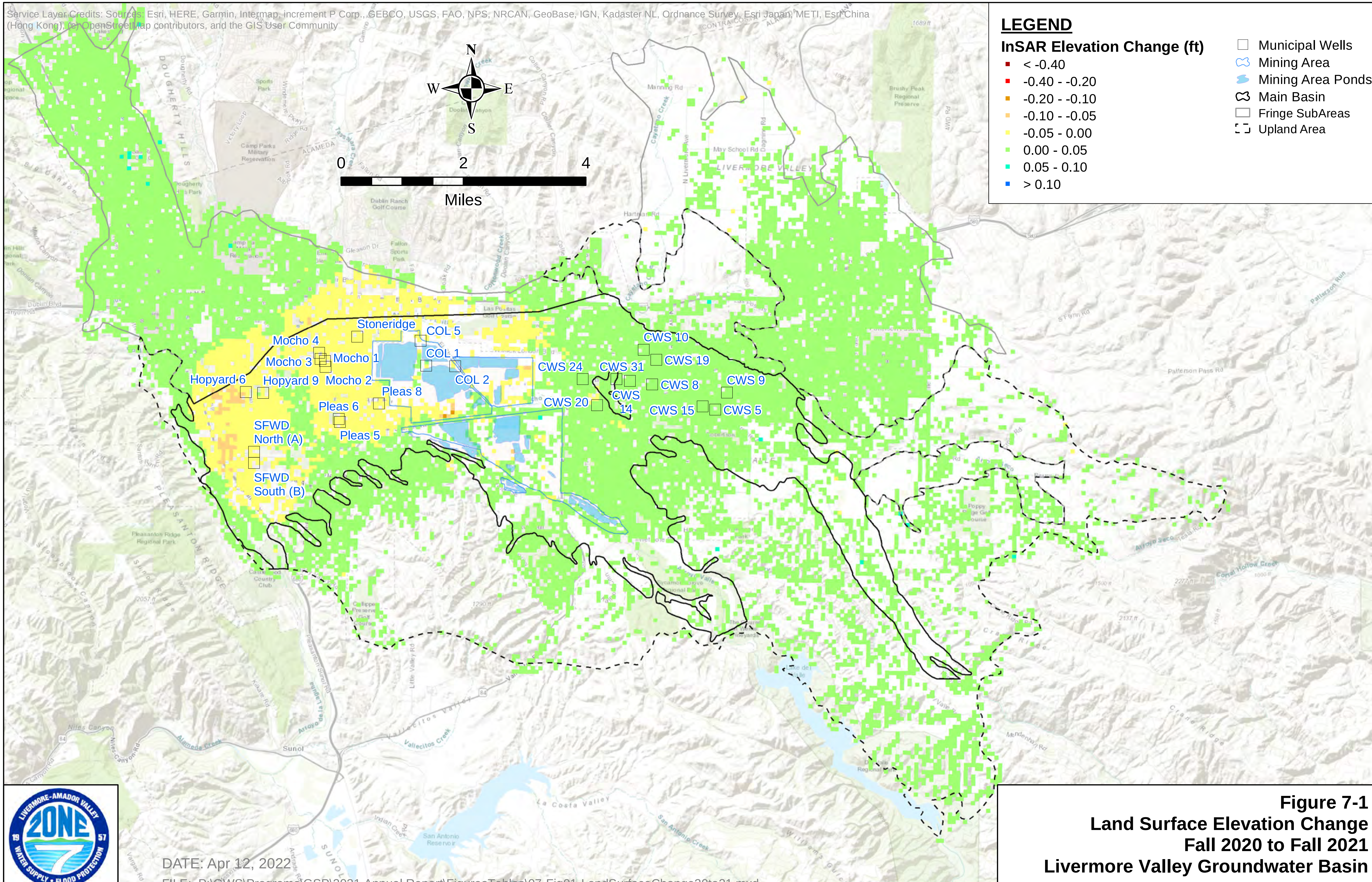


**Figure 7-1**
**Land Surface Elevation Change**
**Fall 2020 to Fall 2021**
**Livermore Valley Groundwater Basin**

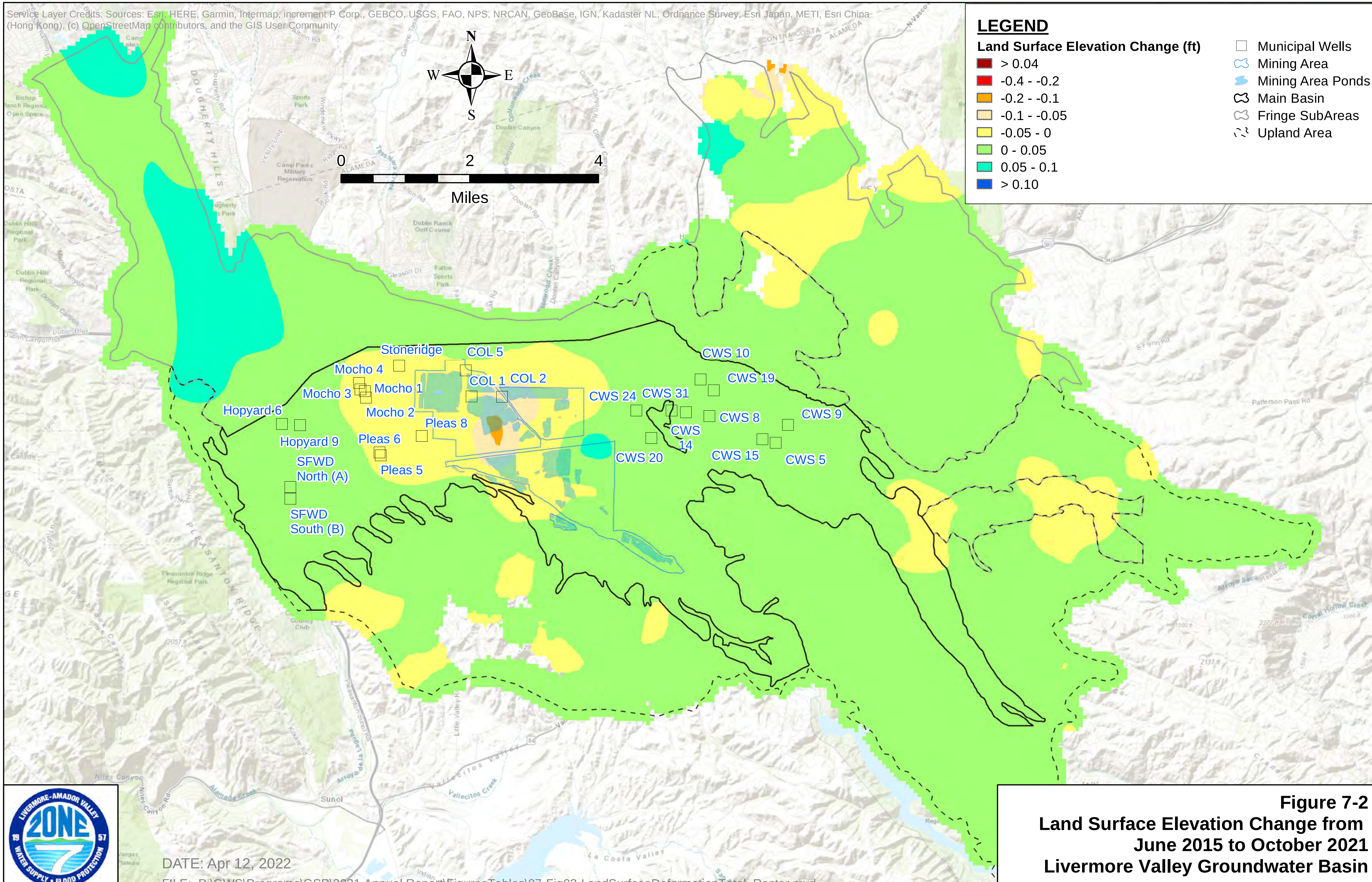


**Figure 7-2**
**Land Surface Elevation Change from June 2015 to October 2021**
**Livermore Valley Groundwater Basin**

# 8 Land Use Monitoring

## 8.1 Program Changes

There were no changes to the Land Use Monitoring Program during the 2021 WY. For more information on the Land Use program; see the following section of the 2021 Alternative GSP:

- **Section 5.1.4:** Existing Land Use and Water Use Sector and Source

## 8.2 Results for the 2021 Water Year

***Figure 8-1*** shows Land and Water Use overlying the Basin and ***Table 8-1*** tabulates the areas by Land Use Category, Water Use Type, and Basin Management Area. Although there was some in-fill development that occurred during the 2021 WY, no major land use change that would significantly affect the groundwater supply or groundwater quality was identified by Zone 7's land use review efforts.

## 8.3 Attached Tables and Figures

***Table 8-1***: *Land Use Acreage, 2021 WY*
***Figure 8-1***: *Map of Land Use, 2021 WY*

# TABLE 8-1
# LAND USE ACREAGE (in acres)
# 2021 WATER YEAR
# LIVERMORE VALLEY GROUNDWATER BASIN

| Category / Basin: Irrigation Water Source | Main Basin | | | | | Fringe Areas | | | | | Upland Areas | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** | **DW** | **GW** | **RW** | **none** | **Total** | **DW** | **GW** | **RW** | **none** | **Total** | **DW** | **GW** | **RW** | **none** | **Total** |
| Agriculture (non-vineyard) | 56 | 94 | 0 | 0 | 150 | 0 | 28 | 0 | 0 | 28 | 146 | 47 | 0 | 0 | 193 |
| Agriculture (vineyard) | 1,497 | 19 | 0 | 0 | 1,516 | 708 | 0 | 0 | 0 | 708 | 1,840 | 1 | 0 | 0 | 1,841 |
| ***Total Agricultural*** | ***1,552*** | ***113*** | ***0*** | ***0*** | ***1,666*** | ***708*** | ***28*** | ***0*** | ***0*** | ***735*** | ***1,986*** | ***48*** | ***0*** | ***0*** | ***2,033*** |
| Commercial and Business | 1,406 | 42 | 400 | 0 | 1,849 | 3,872 | 117 | 1,268 | 0 | 5,257 | 387 | 15 | 28 | 0 | 430 |
| Public | 563 | 0 | 400 | 0 | 962 | 957 | 3 | 57 | 0 | 1,018 | 143 | 0 | 88 | 0 | 232 |
| Public (Irrigated Park) | 563 | 0 | 118 | 0 | 680 | 185 | 0 | 87 | 0 | 272 | 97 | 0 | 11 | 0 | 108 |
| Residential (high density) | 421 | 0 | 0 | 0 | 421 | 264 | 0 | 158 | 0 | 422 | 29 | 0 | 15 | 0 | 44 |
| Residential (medium density) | 6,446 | 0 | 17 | 0 | 6,463 | 5,279 | 0 | 45 | 0 | 5,324 | 2,937 | 0 | 49 | 0 | 2,986 |
| Residential (low density) | 147 | 150 | 0 | 0 | 297 | 20 | 0 | 0 | 0 | 20 | 185 | 177 | 0 | 0 | 362 |
| Roads | 0 | 0 | 0 | 78 | 78 | 0 | 0 | 0 | 701 | 701 | 0 | 0 | 0 | 93 | 93 |
| ***Total Urban*** | ***9,545*** | ***192*** | ***934*** | ***78*** | ***10,749*** | ***10,576*** | ***120*** | ***1,616*** | ***701*** | ***13,013*** | ***3,778*** | ***192*** | ***192*** | ***93*** | ***4,255*** |
| Golf Course | 140 | 90 | 126 | 0 | 356 | 230 | 15 | 66 | 0 | 311 | 466 | 172 | 0 | 0 | 638 |
| Residential (rural) | 41 | 155 | 0 | 0 | 196 | 19 | 373 | 0 | 0 | 392 | 166 | 192 | 0 | 0 | 358 |
| Mining Area (pit) | 0 | 0 | 0 | 1,959 | 1,959 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Open Space | 0 | 0 | 102 | 3,748 | 3,850 | 0 | 0 | 0 | 7,440 | 7,440 | 0 | 0 | 0 | 20,324 | 20,324 |
| Water | 0 | 0 | 0 | 1,034 | 1,034 | 0 | 0 | 0 | 65 | 65 | 0 | 0 | 0 | 170 | 170 |
| ***Total Other*** | ***181*** | ***245*** | ***229*** | ***6,740*** | ***7,394*** | ***249*** | ***389*** | ***66*** | ***7,505*** | ***8,208*** | ***632*** | ***364*** | ***0*** | ***20,494*** | ***21,490*** |
| **TOTALS FOR 2021 WY** | **11,278** | **550** | **1,163** | **6,818** | **19,809** | **11,532** | **536** | **1,681** | **8,206** | **21,956** | **6,396** | **603** | **192** | **20,587** | **27,778** |
| **TOTALS FOR 2020 WY** | **11,278** | **550** | **1,163** | **6,818** | **19,809** | **11,532** | **536** | **1,681** | **8,206** | **21,956** | **6,396** | **603** | **192** | **20,587** | **27,778** |
| **CHANGE SINCE PREVIOUS YEAR** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

Irrigation Water Sources
DW = Delivered Municipal Water
GW = Groundwater
RW = Recycled Water

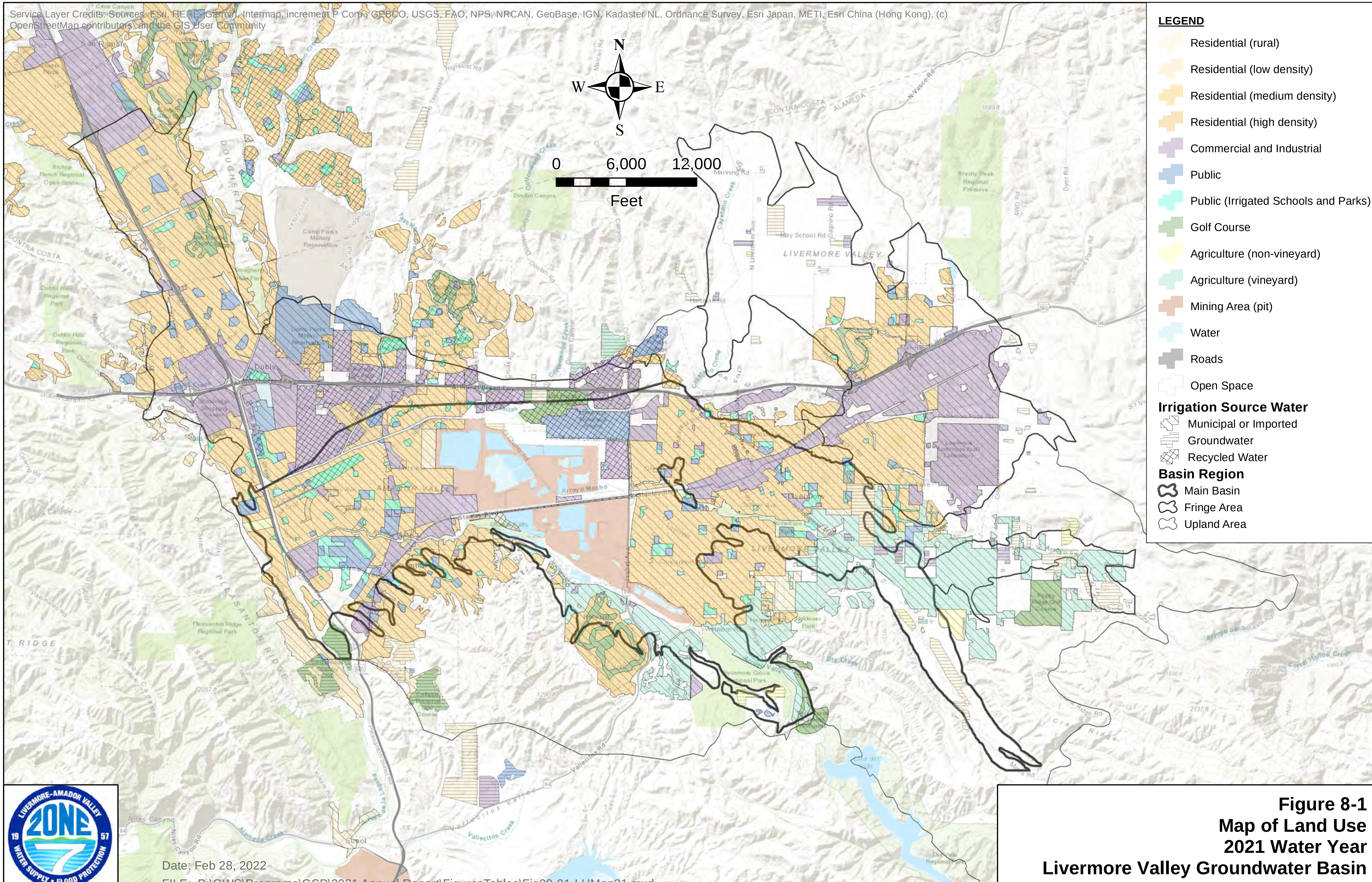


**Figure 8-1**
**Map of Land Use**
**2021 Water Year**
**Livermore Valley Groundwater Basin**

# 9 Wastewater and Recycled Water Monitoring

## 9.1 Program Changes

There were no changes to the Wastewater and Recycled Water Monitoring Program during the 2021 WY. See ***Section 8.10.2*** of the 2021 Alternative GSP for specific details about the Wastewater and Recycled Water Program.

## 9.2 Results for the 2021 Water Year

### 9.2.1 Wastewater and Recycled Water Volumes

Wastewater and recycled water application areas for 2021 WY are shown on ***Figure 9-1***. In the 2021 WY, about 96% of the wastewater produced over the Basin was treated at Livermore Wastewater Reclamation Plant (LWRP) and Dublin San Ramon Services District (DSRSD). A summary of the wastewater volumes for the 2021 WY are presented in ***Table 9-A*** below.

***Table 9-A: Municipal Wastewater and Recycled Water Volumes, 2021 WY***

| Water Type | LWRP | DSRSD | Total |
|---|---|---|---|
| Wastewater Influent | 6,040 | 12,059 | 18,099 |
| Treated Effluent Exported via LAVWMA* | 4,436 | 5,442 | 9,878 |
| Total Volume Recycled | 2,201 | 6,014 | 8,215 |
| **RW Applied to Main Basin**** | **615** | **464** | **1,079** |

| | |
|---|---|
| * | Does not include Zone 7 Demin Plant discharge to LAVWMA via DSRSD |
| ** | Recycled water applied over the Main Basin as landscape irrigation |
| DSRSD | Dublin San Ramon Services District |
| LAVWMA | Livermore-Amador Valley Water Management Agency |
| LWRP | Livermore Wastewater Reclamation Plant |
| RW | Recycled Water |

Recycled water continues to account for small fractions of the Basin's water supply (14%) and Main Basin recharging waters (approximately 3%); however, of greater benefit, the recycled water use in the 2021 WY potentially conserved up to 8,215 AF of water that might have otherwise come from groundwater storage.

The estimated 2021 WY leachate volumes from the Veterans (VA) Hospital wastewater treatment ponds located in southern Livermore, domestic onsite wastewater treatment systems (OWTS) (e.g., septic systems), and leaking wastewater pipelines that run throughout the Basin are presented in ***Table 9-B*** below.

***Table 9-B: Other Wastewater Volumes (AF), 2021 WY***

| | VA Hospital* | Septic Tanks* | Pipe Leakage** | Total |
|---|---|---|---|---|
| Wastewater Leachate | 50 | 80 | 569 | 699 |

* Estimated total over the Main Basin
** Calculated. Includes leakage from sanitary sewer & RW pipes

## 9.2.2 Wastewater and Recycled Water Quality

### 9.2.2.1 Salt Loading

***Table 9-C*** below presents the estimated salt loading over the Main Basin from applied wastewater and recycled water during the 2021 WY.

***Table 9-C: Salt Loading from Applied Recycled Water and Wastewater, 2021 WY***

| Source | Volume (AF) | TDS Average (mg/L) | Salt Applied (tons) |
|---|---|---|---|
| LWRP RW | 615 | 578 | 483 |
| DSRSD RW | 464 | 726 | 458 |
| *Total RW* | *1,079* | *641* | *940* |
| VA Hospital | 50 | 573 | 39 |
| Septic | 80 | 600 | 65 |
| Pipe Leakage | 569 | 467 | 361 |
| *Total WW* | *699* | *490* | *465* |
| ***Total*** | ***1,778*** | ***754*** | ***1,406*** |

DSRSD Dublin San Ramon Services District
LWRP Livermore Wastewater Reclamation Plant
RW Recycled Water
WW Wastewater

About 967 tons (approximately 9%) of the Main Basin's salt inflow (11,365 tons) was attributed to recycled water use over the Main Basin during the 2021 WY (see ***Table 12-2***). However, if potable water supplies had been used for this irrigation demand, the salt loading would have been about 593 tons (a reduction of only about 374 tons). This difference is significantly less than the 448 tons that were removed by Zone 7's Mocho Groundwater Demineralization Plant (MGDP) in the 2021 WY (see ***Table 12-C***).

***Table 9-D*** below presents the estimated nitrogen loading over the Main Basin from applied wastewater and recycled water during the 2021 WY.

***Table 9-D: Nitrogen Loading from Applied Recycled Water and Wastewater, 2021 WY***

| Source | Volume (AF) | Nitrogen Compounds (mg/L) | | | Nitrogen Applied (lbs) |
|---|---|---|---|---|---|
| | | NO3(N) | NO2(N) | TKN | |
| LWRP RW | 615 | 0.1 | 0.8 | 52.5 | 88,267 |
| DSRSD RW | 464 | 0.8 | 1.6 | 30.0 | 38,679 |
| *Total RW* | *1,079* | *0.4* | *1.1* | *42.8* | *126,946* |
| VA Hospital | 50 | 11.1 | 0.1 | 5.0 | 1,025 |
| Septic | 80 | 35.0 | 0.0 | 0.0 | 1,719 |
| Pipe Leakage | 569 | 0.2 | 0.5 | 19.7 | 30,859 |
| *Total WW* | *699* | *5.0* | *0.4* | *16.4* | *33,603* |
| ***Total*** | ***1,778*** | ***2.2*** | ***0.9*** | ***32.5*** | ***160,549*** |

DSRSD Dublin San Ramon Services District
LWRP Livermore Wastewater Reclamation Plant
NO3(N) Nitrate as Nitrogen
NO2(N) Nitrite as Nitrogen
RW Recycled Water
TKN Total Kejldahl Nitrogen
WW Wastewater
lbs pounds

The table shows that about 160,500 pounds (lbs) of nitrogen was applied over the Main Basin during the 2021 WY. However, from a practical standpoint, much of the nitrogen will be removed from the percolate through soil denitrification and plant uptake processes.

# 9.3 Attached Tables and Figures

***Figure 9-1**: Wastewater and Recycled Water Application Areas, 2021 WY*

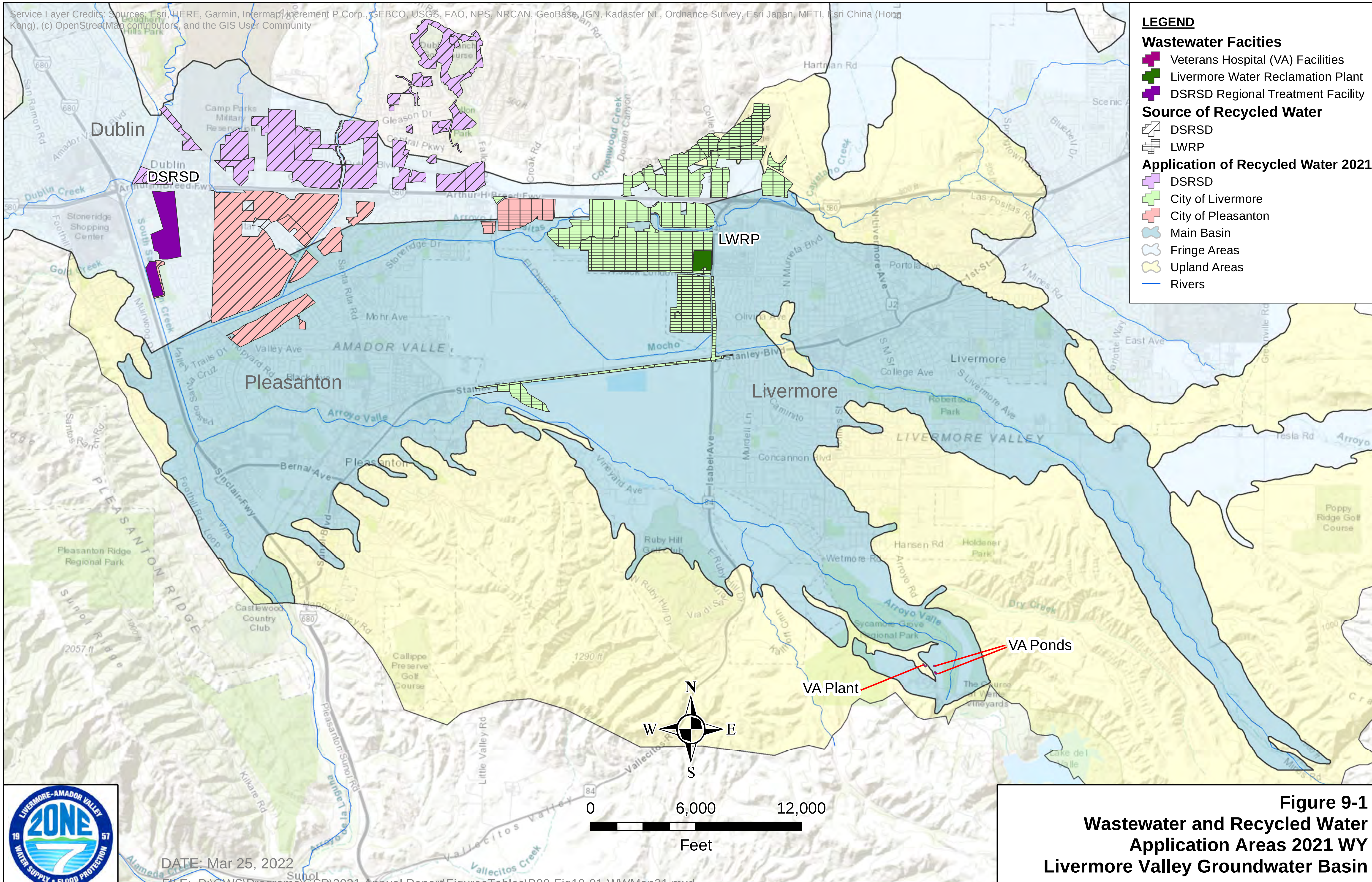


**Figure 9-1**
**Wastewater and Recycled Water Application Areas 2021 WY**
**Livermore Valley Groundwater Basin**

# 10 Groundwater Storage

## 10.1 Program Changes

As part of the 2021 Alternative GSP, Zone 7 refined its Hydrogeologic Conceptual Model (HCM) of the Basin as it relates to groundwater storage. Tasks performed for this effort included:

- Purchasing a license for RockWorks (a three dimensional [3D] geologic modeling software platform),
- Transferring the existing e-log and geology database to RockWorks,
- Extending the HCM to include the Fringe and Upland Areas,
- Preparing three new cross sections that trace through the major groundwater production areas of the Basin,
- Migrating the existing Areal Recharge Spreadsheet Model (ARM) to DWR's Integrated Water Flow Model Demand Calculator (IDC) platform, and
- Extending the IDC model to include the entire Basin.

The 2021 Alternative GSP also established SMCs for Reduction of Groundwater Storage as shown in ***Table 10-A*** below.

***Table 10-A: SMCs for Reduction of Groundwater Storage***

| Undesirable Results Definition | Undesirable Results Criteria | Minimum Threshold (MT) | Measurable Objective (MO) |
|---|---|---|---|
| If and when a reduction in storage in the Principal Aquifers of the Basin negatively affects the long-term viable access to groundwater for the beneficial uses and users within the Basin. Specifically, significant and unreasonable effects would include an aggregate reduction in usable groundwater storage of more than 50% within the Basin relative to the SGMA Baseline Storage volume for two consecutive years. | Water levels in greater than 25% of the RMS-WLs decline below their respective MTs for two consecutive years.<br><br>Not applicable to Upland Management Area. | Main Basin and Fringe Area: Chronic Lowering of Groundwater Levels used as a proxy.<br><br>Upland Area: No MTs established. | Main Basin and Fringe Area: Chronic Lowering of Groundwater Levels used as a proxy.<br><br>Upland Area: No MOs established. |

RMS-WL = Representative Monitoring Sites for Water Levels

The following sections in the 2021 Alternative GSP provide more information on the Groundwater Storage program and the improvements made to the HCM:

- **Section 1.2.2**: Groundwater Storage Program Updates

- **Section 8.4**: Current and Historical Groundwater Conditions – Groundwater Storage
- **Section 9**: Water Budget Information
- **Section 13.2**: Sustainability Management Criteria – Reduction of Groundwater Storage
- **Section 14.2.2**: Monitoring Network for Reduction of Groundwater Storage

# 10.2 Results for the 2021 Water Year

## 10.2.1 Total Storage

Zone 7 uses two methods for calculating groundwater storage in the Main Basin: The Groundwater Elevation (GWE) Method and the Hydrologic Inventory (HI) Method. The GWE method uses groundwater level data and storage coefficients for "nodes" (originally developed by DWR in 1974) to estimate the total volume of water in the Main Basin. The HI method involves accounting for inflows and outflows for each WY and adds the net change in storage to the previous year's volume. Storage volumes from the two methods are averaged to quantify the total storage of the Main Basin.

***Figure 10-1*** shows the Upper and Lower Aquifer groundwater elevations used to calculate the GWE method storage for the 2021 WY. The change in storage from Fall 2020 to Fall 2021 for each Main Basin node is shown in ***Figure 10-2***. ***Table 10-1*** shows the historical annual GWE groundwater storage volumes for each Subarea from the 1974 WY to 2021 WY.

The results of the HI method for the 2021 WY are summarized below in ***Table 10-B*** below. All the HI components are listed in ***Table 10-2*** along with their method of measurement and their approximate accuracy. The historic HI components and results for WYs 1974 to 2021 are tabulated in ***Table 10-3***, and charted in ***Figure 10-3*** along with the WY type (e.g., wet, normal, dry, etc.) noted for each year. ***Figure 10-4*** shows a map of the pumping well locations during the 2021 WY and a representation of the relative volumes of water pumped from each well.

***Table 10-B: HI Method Groundwater Storage Supply and Demand Volumes, 2021 WY (AF)***

| CATEGORY | Sustainable Avg | 2021 | % of Avg | Change from 2020 |
|---|---|---|---|---|
| **SUPPLIES** | **19,800** | **7,827** | **40%** | **-5,699** |
| Stream Recharge Artificial | 5,300 | 277 | 5% | -2,184 |
| Stream Recharge Natural | 6,600 | 2,426 | 37% | -1,085 |
| Rainfall Recharge | 4,300 | 1,079 | 25% | -1,790 |
| Applied Water Recharge | 1,600 | 1,798 | 112% | -678 |
| Pipe Leakage | 1,000 | 1,248 | 125% | 39 |
| Subsurface Inflow | 1,000 | 1,000 | 100% | 0 |
| **DEMANDS** | **18,800** | **27,999** | **149%** | **6,552** |
| Zone 7 Pumping excluding DSRSD | 5,300 | 15,795 | 298% | 4,694 |
| Other Pumping | 8,400 | 7,011 | 83% | 1,763 |
| Agricultural Pumping | 400 | 122 | 30% | 9 |
| Mining Losses | 1,400 | 700 | 50% | 0 |
| Evapotranspiration (Eto) | 3,200 | 4,372 | 137% | 232 |
| Subsurface Outflow | 100 | 0 | 0% | -146 |
| **NET CHANGE (SUPPLY – DEMAND)** | **1,000** | **-20,172** | | **-12,250** |
| **TOTAL STORAGE (HI Method)** | | **227,071** | | **-20,172** |

AF = acre-feet
Avg = average
DSRSD = Dublin San Ramon Services District

The groundwater storage volumes at the end of the 2021 WY for both the GWE and HI methods are presented below in ***Table 10-C***. The total groundwater storage for the Main Basin at the end of 2021 WY was calculated to be 223.4 thousand acre-feet (TAF), with 95.4 TAF of groundwater available as operational storage, which is about 76% of the total operational storage capacity (i.e., 126 TAF from 1983 WY).

***Table 10-C: Groundwater Storage Summary, 2021 WY (in TAF)***

| Storage Calculation Method | End of 2020 WY | End of 2021 WY | Change in Storage |
|---|---|---|---|
| Groundwater Elevations (GWE) | 237.1 | 219.8 | -17.3 |
| Hydrologic Inventory (HI) | 247.2 | 227.1 | -20.1 |
| **Total Storage (average of GWE & HI)** | **242.2** | **223.4** | **-18.8** |
| Operational Storage* | 114.2 | 95.4 | -18.8 |

* Operational Storage = Total Storage - Reserve Storage (i.e., 128 TAF)

In the past, groundwater storage values calculated by both the GWE and HI Methods have typically been within about 6 TAF. However, the difference between the HI and GWE methods was 10.1 TAF in the 2020 WY and 7.3 TAF in the 2021 WY. The reason for this divergence is unclear; however, there have been significant differences between the two methods in the past that converged a few years later (e.g., 1992 and 2008/2009). Zone 7 staff continues to investigate possible reasons for this significant difference.

### 10.2.2 Natural Recharge and Demand

***Table 10-D*** below summarizes the "natural" recharge (inflows) and the "natural" demand (outflows to which natural recharge is allocated) for the 2021 WY.

***Table 10-D: Natural Groundwater Inflow and Outflows, 2021 WY***

| Component | Estimated Sustainable Values (AF/Yr) | 2021 WY (AF) | Percentage of Sustainable Average |
|---|---|---|---|
| Natural Recharge | 13,400 | 6,302 | 47% |
| Natural Demand | 13,400 | 12,204 | 91% |
| Net Natural Recharge | 0 | -5,902 | -44%* |

AF = acre-feet
AF/Yr = acre-feet per year
* = percent of Sustainable Natural Recharge

The retailer's Groundwater Pumping Quota (GPQ), along with their groundwater pumping volumes for the 2021 Calendar Year (CY), are shown in ***Table 10-E*** below. None of the retailers pumped more than their respective GPQ in 2021 WY.

***Table 10-E: Retailer Groundwater Pumping and Quotas in 2021 Calendar Year (AF)***

| Retailer | GPQ | Carryover from 2020 | Pumped in CY 2021 | Carryover to 2022** |
|---|---|---|---|---|
| City of Pleasanton | 3,500 | 391 | 3,331 | 168 |
| Cal Water Service (CWS) | 3,069 | 614 | 1,389 | 614 |
| DSRSD (pumped by Zone 7) | 645 | 0 | 645 | 0 |
| City of Livermore (not used)* | 31 | - | 0 | - |
| **Total** | **7,214** | **1,005** | **5,365** | **782** |

AF = Acre-feet
GPQ = Groundwater Pumping Quota
* = Livermore no longer pumps groundwater, GPQ not included in totals or carryover.
** = Maximum of 20% of GPQ can be carried over

### 10.2.3 Artificial Recharge and Demand—Conjunctive Use

***Figure 10-5*** shows the cumulative change net inflow/outflow from both natural and artificial components since 1974. ***Table 10-F*** below shows the artificial recharge and Zone 7's groundwater pumping totals for the 2021 WY.

***Table 10-F: Conjunctive Use Supply and Demand, 2021 WY***

| Component | Estimated Sustainable Avg (AF/Yr) | 2021 WY (AF) | Percentage of Sustainable Average |
|---|---|---|---|
| Artificial Recharge | 5,300 | 277 | 5% |
| Zone 7 Pumping | 5,300 | 15,795 | 298% |
| **Net Artificial Recharge** | **0** | **-15,518** | **-293%*** |

AF = acre-feet
Avg = average
AF/Yr = acre-feet per year
* = percent of Sustainable Artificial Recharge

Since 1974, Zone 7 has artificially recharged 39,853 AF more than it has pumped. These totals do not include the water Zone 7 pumps for DSRSD (usually 645 AF/yr), which is considered part of the "natural" demand.

## 10.3 Attached Tables and Figures

***Table 10-1***: *Total Main Basin Storage by Subarea, 1974 to 2021 WYs*
***Table 10-2***: *Description of Hydrologic Inventory Components*
***Table 10-3***: *Historical Groundwater Storage, Hydrologic Inventory Method, 1974 to 2021 WYs*

**TABLE 10-1**
**TOTAL MAIN BASIN STORAGE BY SUBAREA (AF)**
**GROUNDWATER ELEVATION METHOD**
**1974 TO 2021 WATER YEARS**

| Water Year | Bernal | Amador | | Mocho II | Total |
|---|---|---|---|---|---|
| | | Amador West | Amador East | | |
| 1974 | 49,651 | 52,916 | 80,671 | 29,821 | 213,060 |
| 1975 | 51,149 | 54,220 | 80,840 | 28,872 | 215,080 |
| 1976 | 54,180 | 56,319 | 86,194 | 29,012 | 225,705 |
| 1977 | 51,970 | 53,968 | 81,889 | 27,954 | 215,782 |
| 1978 | 50,272 | 52,077 | 79,541 | 27,751 | 209,641 |
| 1979 | 52,863 | 56,739 | 89,122 | 29,210 | 227,933 |
| 1980 | 55,952 | 60,000 | 94,014 | 29,500 | 239,466 |
| 1981 | 57,910 | 61,890 | 95,688 | 30,224 | 245,712 |
| 1982 | 57,623 | 61,228 | 93,235 | 29,156 | 241,242 |
| 1983 | 58,654 | 63,488 | 100,642 | 31,492 | 254,277 |
| 1984 | 59,021 | 64,418 | 102,569 | 31,626 | 257,635 |
| 1985 | 58,487 | 64,024 | 95,703 | 31,568 | 249,782 |
| 1986 | 56,723 | 60,837 | 95,019 | 27,719 | 240,298 |
| 1987 | 55,723 | 58,635 | 91,170 | 25,147 | 230,675 |
| 1988 | 54,486 | 53,217 | 83,377 | 25,672 | 216,752 |
| 1989 | 52,754 | 51,260 | 82,836 | 27,433 | 214,282 |
| 1990 | 50,712 | 50,879 | 80,834 | 27,321 | 209,746 |
| 1991 | 44,627 | 49,348 | 76,543 | 24,631 | 195,148 |
| 1992 | 29,663 | 35,438 | 74,616 | 44,036 | 183,753 |
| 1993 | 29,749 | 38,787 | 83,714 | 58,498 | 210,748 |
| 1994 | 30,941 | 39,437 | 88,451 | 56,713 | 215,542 |
| 1995 | 32,193 | 43,156 | 89,301 | 60,834 | 225,484 |
| 1996 | 32,217 | 42,917 | 87,193 | 60,865 | 223,193 |
| 1997 | 32,240 | 41,992 | 88,828 | 59,157 | 222,217 |
| 1998 | 32,292 | 43,411 | 88,140 | 61,336 | 225,179 |
| 1999 | 32,065 | 43,310 | 86,508 | 60,595 | 222,479 |
| 2000 | 31,894 | 42,591 | 87,585 | 59,947 | 222,018 |
| 2001 | 30,720 | 40,853 | 73,393 | 58,231 | 203,198 |
| 2002 | 30,685 | 37,537 | 84,147 | 59,655 | 212,025 |
| 2003 | 30,597 | 41,563 | 87,510 | 60,749 | 220,419 |
| 2004 | 30,518 | 43,784 | 79,441 | 59,614 | 213,357 |
| 2005 | 31,969 | 48,734 | 93,670 | 61,720 | 236,093 |
| 2006 | 32,382 | 53,465 | 91,847 | 60,685 | 238,379 |
| 2007 | 32,401 | 54,368 | 90,478 | 54,733 | 231,980 |
| 2008 | 32,365 | 54,160 | 91,898 | 56,097 | 234,520 |
| 2009 | 32,350 | 51,088 | 91,755 | 57,605 | 232,798 |
| 2010 | 32,350 | 50,282 | 92,080 | 59,167 | 233,879 |
| 2011 | 32,353 | 50,631 | 92,729 | 59,214 | 234,927 |
| 2012 | 31,772 | 47,442 | 90,475 | 58,154 | 227,844 |
| 2013 | 30,892 | 44,226 | 87,086 | 58,684 | 220,889 |
| 2014 | 30,313 | 42,116 | 82,627 | 53,961 | 209,017 |
| 2015 | 31,411 | 46,309 | 81,465 | 55,215 | 214,401 |
| 2016 | 32,205 | 52,833 | 83,016 | 57,583 | 225,637 |
| 2017 | 32,391 | 66,825 | 86,119 | 59,564 | 244,899 |
| 2018 | 32,409 | 70,197 | 85,792 | 56,347 | 244,745 |
| 2019 | 32,410 | 69,427 | 85,031 | 60,942 | 247,810 |
| 2020 | 32,361 | 61,398 | 86,625 | 56,701 | 237,086 |
| 2021 | 30,580 | 52,550 | 84,477 | 52,156 | 219,764 |

Calculated as one aquifer
Sum of Upper and Lower Aquifers

# TABLE 10-2
# DESCRIPTION OF HYDROLOGIC INVENTORY COMPONENTS
# LIVERMORE VALLEY GROUNDWATER BASIN

| *COMPONENTS* | *DESCRIPTION/REMARK* | *Direct/ Indirect* | *HOW CALCULATED/MEASURED* | *ESTIMATED ACCURACY* |
|---|---|---|---|---|
| ***SUPPLY INDICES*** | | | | |
| Rainfall | Pleasanton rainfall (Parkside Office) | Direct | Measured by Zone 7 | 0.5 in |
| Evaporation | Evaporation at Lake Del Valle Station | Direct | Collected by DWR | 0.5 in |
| Streamflow | Arroyo Valle Streamflow if Lake Del Valle Dam did not exist | Direct | USGS Stream Gage Station AV_BLC | 10 AF |
| Water Year Type | Indicator of Water Year in Sacramento Valley | Direct | DWR California Data Exchange Center | - |
| ***SUPPLY COMPONENTS*** | | | | |
| **NATURAL STREAM RECHARGE** | | | | |
| ARROYO VALLE | AV natural recharge. | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| ARROYO MOCHO | AM natural recharge. | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| ARROYO LAS POSITAS | ALP natural recharge. | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| **ARTIFICIAL RECHARGE** | | | | |
| ARROYO VALLE | Total artificial recharge on Arroyo Valle minus AV_RC_PR | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| ARROYO VALLE PRIOR RIGHTS | AVBLC flow that would have recharged if no dam. Subset of AV_RC. | Indirect | Formula based on AVBLC flow. | 100 AF |
| ARROYO MOCHO | Total artificial recharge on Arroyo Mocho | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| ARROYO LAS POSITAS | Total artificial recharge on Arroyo Las Positas | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| **INJECTION WELL RECHARGE** | Injection at Hop 6 from 1998 to 2000 | Direct | Metered by Zone 7 | 10 AF |
| **RAINFALL RECHARGE** | Recharge from rainfall | Indirect | Calculated by Areal Recharge Model | 1000 AF |
| **PIPE LEAKAGE** | Pipe leakage that recharges the GW basin | Indirect | Estimated using length and age of pipes | 500 AF |
| **APPLIED WATER RECHARGE** | | | | |
| URBAN MUNICIPAL (GW & SBA) | Applied recharge in urban area - delivered water (gw & sba) | Indirect | Calculated by Areal Recharge Model | 100 AF |
| URBAN RECYCLED WATER | Applied water recharge from urban area - recycled water | Indirect | Calculated using Wastewater Plant deliveries | 10 AF |
| AGRICULTURAL (SBA) | Total applied recharge from 'untreated' ag sources (untreated SBA) | Indirect | Calculated by Areal Recharge Model | 100 AF |
| AGRICULTURAL (GW) | Total applied water recharge from groundwater ag sources | Indirect | Calculated by Areal Recharge Model | 100 AF |
| GOLF COURSES (GW) | Applied water from golf courses on groundwater | Indirect | Calculated by Areal Recharge Model | 100 AF |
| GOLF COURSES (RW) | Applied water from golf courses from recycled water | Indirect | Calculated using Wastewater Plant deliveries | 10 AF |
| **SUBSURFACE BASIN INFLOW** | Subsurface Inflow from Northern Fringe Basin | Indirect | Estimated historically groundwater contours | 500 AF |
| ***DEMAND COMPONENTS*** | | | | |
| **MUNICIPAL PUMPING** | | | | |
| ZONE 7 | Total pumping by Zone 7, including pumping to waste | Direct | Metered by Zone 7 | 10 AF |
| *DSRSD* | *Pumping by Zone 7 for DSRSD.* | *Direct* | *DSRSD Groundwater Pumping Quota* | *0 AF* |
| PLEASANTON | Pumping by Pleasanton. | Direct | Metered by Pleasatnon | 10 AF |
| CALIFORNIA WATER SERVICE | Pumping by CWS. | Direct | Metered by CWS | 10 AF |
| SFPUC | Pumping by SF Public Utilities Commission | Direct | Metered by SFPUC | 10 AF |
| FAIRGROUNDS | Pumping by Alameda County Fairgrounds | Indirect | Metered by Fairgrounds | 10 AF |
| DOMESTIC | Pumping from active domestic, supply, and potable wells | Indirect | Estimated: Number of Wells x 0.5 AF/yr | 50 AF |
| **GOLF COURSES** | | | | |
| *CASTLEWOOD GOLF COURSE* | *Pumping for Castlewood Golf Course* | *Indirect* | *Estimated using historical meter data* | *50 AF* |
| *TRI VALLEY GOLF CENTER* | *Pumping for TriValley Golf Driving Range* | *Indirect* | *Calculated by Areal Recharge Model* | *50 AF* |
| **AGRICULTURAL PUMPING** | Unmetered pumping for agriculture | Indirect | Calculated by Areal Recharge Model | 100 AF |
| **MINING** | | | | |
| EXPORT | Total mining area releases that leave the basin | Indirect | Calculated from metered data and stream recharge rate | 50 AF |
| EVAPORATION | Pond evaporation & rainfall. | Indirect | Calculated using lake area, evaporation, and rainfall | 100 AF |
| PROCESSING | Mining Area processing losses | Indirect | Estimated at 700 AF/Yr | 100 AF |
| **SUBSURFACE BASIN OUTFLOW** | Basin overflow leaving basin | Indirect | Formula based on GW elevation and synoptic data | 100 AF |



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3/28/2022

# TABLE 10-3
# HISTORICAL GROUNDWATER STORAGE
# HYDROLOGIC INVENTORY (HI) METHOD
# 1974-2021 WATER YEARS (in Acre-Feet, except where indicated)

| | WATER YEAR (Oct - Sep) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COMPONENTS** | **1974** | **1975** | **1976** | **1977** | **1978** | **1979** | **1980** | **1981** | **1982** | **1983** | **1984** | **1985** | **1986** | **1987** | **1988** | **1989** | **1990** |
| **INDICES** | | | | | | | | | | | | | | | | | |
| Rainfall at Livermore (in) | 16.1 | 14.8 | 6.2 | 6.0 | 18.5 | 13.6 | 17.6 | 10.3 | 24.4 | 32.0 | 13.0 | 12.6 | 19.8 | 8.9 | 8.7 | 11.2 | 9.4 |
| 8 Station Rain Index (N. CA)(in) | 78.6 | 48.8 | 28.3 | 19.0 | 71.6 | 39.1 | 59.6 | 37.6 | 84.8 | 88.5 | 58.1 | 37.8 | 72.1 | 28.6 | 34.9 | 50.1 | 36.0 |
| Evap at Lake Del Valle (in) | 60.9 | 62.7 | 63.5 | 66.0 | 64.2 | 67.7 | 59.7 | 72.1 | 60.5 | 59.7 | 70.2 | 64.9 | 61.1 | 64.0 | 66.9 | 63.6 | 65.9 |
| Arroyo Valle Stream flow (AF) | 30538 | 28307 | 475 | 177 | 43749 | 9721 | 45800 | 5817 | 61427 | 125882 | 25653 | 7282 | 67903 | 3023 | 1506 | 1988 | 815 |
| Water Year Type* | W | W | C | C | AN | BN | AN | D | W | W | W | D | W | D | C | D | C |
| **SUPPLY** | **18,140** | **21,437** | **11,121** | **8,683** | **24,813** | **22,213** | **23,830** | **18,821** | **29,942** | **35,412** | **15,547** | **8,784** | **20,866** | **6,670** | **8,071** | **11,170** | **10,353** |
| **Injection Well Recharge** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Stream Recharge** | **11,340** | **15,400** | **6,910** | **3,820** | **16,330** | **16,110** | **16,480** | **15,040** | **16,420** | **17,158** | **9,486** | **4,747** | **9,045** | **3,565** | **4,549** | **7,880** | **7,026** |
| Artificial Stream Recharge | 3,509 | 6,750 | 5,695 | 3,190 | 6,442 | 12,266 | 10,211 | 11,918 | 5,952 | 901 | 0 | 0 | 0 | 0 | 1,172 | 4,320 | 4,488 |
| *Arroyo Valle* | *1,439* | *4,320* | *1,875* | *1,300* | *3,002* | *5,886* | *4,541* | *6,328* | *2,442* | *0* | *0* | *0* | *0* | *0* | *0* | *139* | *304* |
| *Arroyo Mocho* | *1,670* | *1,830* | *3,220* | *1,290* | *2,840* | *5,780* | *5,270* | *5,130* | *3,290* | *901* | *0* | *0* | *0* | *0* | *1,172* | *4,181* | *4,184* |
| *Arroyo las Positas* | *400* | *600* | *600* | *600* | *600* | *600* | *400* | *460* | *220* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| Natural Stream Recharge | 6,060 | 7,110 | 1,100 | 630 | 8,850 | 2,860 | 4,850 | 2,200 | 8,620 | 14,387 | 8,326 | 3,541 | 8,168 | 2,696 | 2,653 | 2,589 | 2,250 |
| *Arroyo Valle* | *2,400* | *2,950* | *360* | *290* | *2,450* | *1,290* | *1,750* | *840* | *2,970* | *4,893* | *2,580* | *751* | *2,831* | *527* | *679* | *458* | *418* |
| *Arroyo Mocho* | *3,160* | *3,760* | *540* | *140* | *5,900* | *1,170* | *2,500* | *880* | *4,810* | *8,514* | *4,616* | *1,716* | *4,176* | *843* | *902* | *809* | *428* |
| *Arroyo las Positas* | *500* | *400* | *200* | *200* | *500* | *400* | *600* | *480* | *840* | *980* | *1,130* | *1,074* | *1,161* | *1,326* | *1,072* | *1,322* | *1,404* |
| Arroyo Valle Prior Rights | 1,771 | 1,540 | 115 | 0 | 1,038 | 984 | 1,419 | 922 | 1,848 | 1,870 | 1,160 | 1,206 | 877 | 869 | 724 | 971 | 288 |
| **Rainfall Recharge** | **3,031** | **2,523** | **0** | **0** | **4,398** | **2,002** | **3,891** | **967** | **11,423** | **16,357** | **3,110** | **1,249** | **9,008** | **290** | **398** | **283** | **141** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Pipe Leakage** | **31** | **37** | **44** | **51** | **60** | **71** | **82** | **95** | **109** | **124** | **139** | **155** | **169** | **185** | **200** | **217** | **233** |
| **Applied Water Recharge** | **2,738** | **2,477** | **3,158** | **3,022** | **2,795** | **3,041** | **2,727** | **2,089** | **1,360** | **1,344** | **2,162** | **1,884** | **1,904** | **1,860** | **2,004** | **1,630** | **1,694** |
| Urban - Municipal | 1,074 | 766 | 1,354 | 1,375 | 1,087 | 1,179 | 810 | 1,284 | 668 | 690 | 1,253 | 1,027 | 998 | 1,328 | 1,377 | 1,053 | 1,025 |
| Urban - Recycled Water | 0 | 0 | 27 | 16 | 26 | 13 | 21 | 7 | 12 | 8 | 16 | 6 | 12 | 8 | 5 | 14 | 5 |
| Agricultural - Municipal (SBA) | 74 | 109 | 157 | 124 | 95 | 118 | 147 | 182 | 140 | 165 | 208 | 182 | 232 | 245 | 289 | 240 | 265 |
| Agricultural - Groundwater | 384 | 280 | 513 | 525 | 352 | 388 | 281 | 241 | 174 | 139 | 198 | 210 | 190 | 137 | 152 | 140 | 153 |
| Golf Courses - Groundwater | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golf Courses - Recycled Water | 0 | 0 | 64 | 68 | 75 | 73 | 73 | 60 | 54 | 63 | 62 | 55 | 61 | 47 | 63 | 60 | 64 |
| Others | 1,206 | 1,322 | 1,042 | 915 | 1,160 | 1,270 | 1,394 | 315 | 312 | 279 | 425 | 404 | 411 | 95 | 118 | 123 | 182 |
| **Subsurface Basin Inflow** | **1,000** | **1,000** | **1,010** | **1,790** | **1,230** | **990** | **650** | **630** | **630** | **430** | **650** | **750** | **740** | **770** | **920** | **1,160** | **1,260** |
| **DEMAND** | **18,618** | **15,929** | **15,432** | **14,636** | **12,871** | **15,819** | **15,727** | **19,349** | **18,349** | **26,220** | **19,750** | **18,506** | **22,550** | **14,575** | **17,176** | **16,143** | **16,045** |
| **Municipal Pumpage** | **11,806** | **9,881** | **7,782** | **6,721** | **7,022** | **8,207** | **6,982** | **7,361** | **7,281** | **7,965** | **8,473** | **7,990** | **8,652** | **8,152** | **9,431** | **10,393** | **11,255** |
| Zone 7 (excluding DSRSD) | 5,403 | 3,090 | 1,292 | 309 | 776 | 816 | 41 | 0 | 0 | 25 | 348 | 1,199 | 1,163 | 480 | 2,017 | 3,213 | 3,327 |
| Zone 7 for DSRSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| City of Pleasanton | 2,264 | 2,497 | 1,707 | 3,271 | 2,640 | 3,273 | 2,961 | 3,089 | 3,565 | 3,886 | 3,486 | 3,056 | 3,705 | 3,310 | 3,548 | 3,316 | 3,856 |
| Cal. Water Service | 2,612 | 2,852 | 2,781 | 1,312 | 1,964 | 2,358 | 2,489 | 2,695 | 2,286 | 2,660 | 3,035 | 2,788 | 2,774 | 3,276 | 2,761 | 2,850 | 3,073 |
| Camp Parks | 769 | 808 | 980 | 925 | 796 | 881 | 819 | 808 | 713 | 630 | 647 | 40 | 0 | 0 | 0 | 0 | 0 |
| SFWD | 302 | 242 | 495 | 374 | 397 | 413 | 372 | 402 | 348 | 321 | 378 | 353 | 484 | 491 | 472 | 443 | 362 |
| Fairgrounds | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 267 | 217 | 242 | 281 | 272 | 280 | 280 | 280 | 280 | 280 |
| Domestic | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Golf Courses | 156 | 92 | 227 | 230 | 149 | 166 | 0 | 0 | 52 | 101 | 198 | 182 | 146 | 215 | 253 | 191 | 257 |
| **Agricultural Pumpage** | **3,744** | **2,217** | **4,596** | **4,970** | **3,191** | **3,711** | **2,628** | **2,433** | **1,295** | **1,342** | **1,556** | **1,914** | **1,911** | **1,470** | **1,476** | **1,166** | **1,478** |
| SFWD | 500 | 0 | 62 | 304 | 252 | 365 | 168 | 513 | 150 | 549 | 107 | 410 | 543 | 663 | 493 | 359 | 548 |
| Concannon | 6 | 15 | 20 | 20 | 20 | 70 | 250 | 112 | 0 | 0 | 68 | 0 | 60 | 26 | 59 | 0 | 0 |
| Calculated | 3,238 | 2,202 | 4,514 | 4,646 | 2,919 | 3,276 | 2,210 | 1,808 | 1,145 | 793 | 1,381 | 1,504 | 1,308 | 781 | 924 | 807 | 930 |
| **Mining Use** | **3,068** | **3,831** | **3,054** | **2,945** | **2,658** | **3,751** | **5,586** | **9,005** | **7,613** | **13,953** | **7,481** | **7,402** | **11,387** | **4,353** | **5,869** | **4,484** | **3,312** |
| Stream Export | 1,219 | 2,200 | 690 | 470 | 800 | 2,000 | 3,480 | 6,530 | 6,050 | 12,760 | 4,340 | 4,265 | 8,858 | 558 | 2,443 | 1,808 | 665 |
| *Discharges to Cope Lake* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| Evaporation | 1,149 | 931 | 1,664 | 1,775 | 1,158 | 1,051 | 1,406 | 1,775 | 863 | 493 | 2,441 | 2,437 | 1,829 | 3,095 | 2,726 | 1,976 | 1,947 |
| Production | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 |
| **Subsurface Basin Overflow** | **0** | **0** | **0** | **0** | **0** | **150** | **530** | **550** | **2,160** | **2,960** | **2,240** | **1,200** | **600** | **600** | **400** | **100** | **0** |
| **NET RECHARGE (AF)** | **-478** | **5,508** | **-4,311** | **-5,953** | **11,942** | **6,394** | **8,103** | **-528** | **11,593** | **9,192** | **-4,203** | **-9,722** | **-1,684** | **-7,906** | **-9,106** | **-4,973** | **-5,692** |
| **INVENTORY STORAGE (AF)** | **211,522** | **217,030** | **212,719** | **206,766** | **218,708** | **225,102** | **233,205** | **232,677** | **244,270** | **253,462** | **249,259** | **239,537** | **237,853** | **229,947** | **220,841** | **215,868** | **210,176** |

| **STORAGE CALCULATION** | **1974** | **1975** | **1976** | **1977** | **1978** | **1979** | **1980** | **1981** | **1982** | **1983** | **1984** | **1985** | **1986** | **1987** | **1988** | **1989** | **1990** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INVENTORY (Rounded to TAF) | 212 | 217 | 213 | 207 | 219 | 225 | 233 | 233 | 244 | 253 | 249 | 240 | 238 | 230 | 221 | 216 | 210 |
| GW ELEVATIONS (Rounded to TAF) | 213 | 215 | 226 | 216 | 210 | 228 | 239 | 246 | 241 | 254 | 258 | 250 | 240 | 231 | 217 | 214 | 210 |
| **AVERAGE STORAGE (TAF)** | **212** | **216** | **219** | **211** | **214** | **227** | **236** | **239** | **243** | **254** | **253** | **245** | **239** | **230** | **219** | **215** | **210** |
| **AVAILABLE STORAGE (TAF)** | **84** | **88** | **91** | **83** | **86** | **99** | **108** | **111** | **115** | **126** | **125** | **117** | **111** | **102** | **91** | **87** | **82** |

Artificial Components Natural Components

*Water Year Type (CDEC Sacramento Valley)
W = Wet; AN = Above Normal;
BN = Below Normal; D = Dry; C = Critical

# TABLE 10-3
# HISTORICAL GROUNDWATER STORAGE
# HYDROLOGIC INVENTORY (HI) METHOD
# 1974-2021 WATER YEARS (in Acre-Feet, except where indicated)

| | WATER YEAR (Oct - Sep) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COMPONENTS** | **1991** | **1992** | **1993** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** |
| **INDICES** | | | | | | | | | | | | | | | | | | | | |
| Rainfall at Livermore (in) | 11.3 | 11.6 | 21.3 | 11.8 | 21.3 | 20.0 | 15.1 | 25.3 | 13.1 | 14.1 | 11.0 | 11.2 | 17.0 | 13.1 | 19.3 | 17.5 | 9.7 | 10.7 | 11.4 | 14.8 |
| 8 Station Rain Index (N. CA)(in) | 32.2 | 36.0 | 65.3 | 31.8 | 85.4 | 61.3 | 68.8 | 82.4 | 54.8 | 56.7 | 33.0 | 46.3 | 59.7 | 47.3 | 57.4 | 80.1 | 37.3 | 34.9 | 46.8 | 53.6 |
| Evap at Lake Del Valle (in) | 64.7 | 68.2 | 64.2 | 65.5 | 58.3 | 71.6 | 69.5 | 57.2 | 61.0 | 68.3 | 68.5 | 73.2 | 69.9 | 72.1 | 63.6 | 68.6 | 68.9 | 72.7 | 71.6 | 64.0 |
| Arroyo Valle Stream flow (AF) | 9909 | 11692 | 52831 | 3424 | 67142 | 51058 | 54115 | 87819 | 15169 | 18949 | 8156 | 7848 | 19648 | 11410 | 26930 | 28325 | 2027 | 18059 | 11231 | 12914 |
| Water Year Type* | C | C | AN | C | W | W | W | W | W | AN | D | D | AN | BN | AN | W | D | C | D | BN |
| **SUPPLY** | **12,715** | **10,610** | **28,529** | **16,095** | **29,095** | **22,556** | **24,184** | **27,853** | **20,780** | **23,211** | **15,691** | **24,052** | **29,840** | **19,778** | **31,021** | **23,960** | **14,998** | **16,258** | **18,659** | **25,382** |
| **Injection Well Recharge** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **652** | **1,524** | **1,146** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Stream Recharge** | **8,347** | **5,247** | **14,714** | **11,838** | **13,058** | **11,109** | **12,284** | **13,603** | **10,813** | **12,842** | **8,601** | **16,195** | **21,483** | **12,885** | **21,025** | **13,418** | **9,154** | **8,448** | **11,249** | **17,144** |
| Artificial Stream Recharge | 3,261 | 914 | 5,621 | 7,883 | 4,672 | 2,968 | 5,314 | 2,343 | 5,174 | 8,019 | 3,428 | 10,588 | 11,409 | 8,084 | 11,143 | 4,583 | 4,811 | 2,229 | 3,984 | 6,773 |
| *Arroyo Valle* | *82* | *412* | *1,182* | *798* | *179* | *144* | *1,827* | *413* | *1,181* | *890* | *1,476* | *1,831* | *1,547* | *1,670* | *2,277* | *1,216* | *2,879* | *2,229* | *2,104* | *2,459* |
| *Arroyo Mocho* | *3,178* | *502* | *4,439* | *7,085* | *4,493* | *2,824* | *3,487* | *1,930* | *3,993* | *7,129* | *1,930* | *8,755* | *9,862* | *6,414* | *8,698* | *3,205* | *1,932* | *0* | *1,880* | *4,314* |
| *Arroyo las Positas* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *22* | *2* | *0* | *0* | *168* | *162* | *0* | *0* | *0* | *0* |
| Natural Stream Recharge | 4,418 | 3,997 | 8,247 | 3,080 | 7,259 | 7,743 | 6,607 | 10,533 | 5,091 | 4,178 | 4,512 | 4,476 | 8,462 | 3,458 | 9,589 | 6,905 | 3,536 | 5,913 | 6,018 | 10,371 |
| *Arroyo Valle* | *1,215* | *970* | *2,754* | *735* | *2,818* | *1,426* | *2,753* | *4,401* | *1,796* | *1,389* | *2,440* | *2,259* | *4,397* | *1,447* | *5,980* | *3,043* | *1,941* | *4,030* | *3,958* | *6,909* |
| *Arroyo Mocho* | *1,883* | *1,711* | *3,903* | *1,263* | *3,144* | *5,226* | *2,670* | *4,560* | *1,833* | *1,539* | *961* | *1,279* | *2,980* | *1,082* | *2,854* | *3,104* | *858* | *1,077* | *970* | *2,547* |
| *Arroyo las Positas* | *1,320* | *1,315* | *1,591* | *1,082* | *1,297* | *1,091* | *1,184* | *1,572* | *1,462* | *1,250* | *1,111* | *939* | *1,085* | *929* | *755* | *758* | *737* | *806* | *1,090* | *915* |
| Arroyo Valle Prior Rights | 668 | 337 | 846 | 876 | 1,127 | 398 | 362 | 727 | 548 | 644 | 660 | 1,131 | 1,612 | 1,343 | 293 | 1,930 | 807 | 306 | 1,247 | 0 |
| **Rainfall Recharge** | **1,838** | **1,760** | **10,761** | **1,242** | **13,243** | **8,176** | **8,634** | **10,692** | **5,540** | **5,924** | **3,644** | **4,239** | **4,899** | **3,192** | **6,378** | **6,969** | **1,987** | **3,782** | **3,375** | **4,315** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Pipe Leakage** | **249** | **267** | **285** | **304** | **324** | **344** | **365** | **387** | **410** | **434** | **461** | **490** | **518** | **548** | **579** | **610** | **642** | **675** | **708** | **742** |
| **Applied Water Recharge** | **602** | **1,766** | **1,440** | **1,621** | **1,480** | **2,007** | **2,221** | **1,709** | **1,743** | **1,960** | **1,985** | **2,129** | **1,940** | **2,153** | **2,039** | **1,962** | **2,214** | **2,353** | **2,327** | **2,181** |
| Urban - Municipal | 222 | 1,288 | 1,108 | 1,252 | 1,060 | 1,467 | 1,632 | 1,472 | 1,549 | 1,743 | 1,770 | 1,888 | 1,749 | 1,926 | 1,834 | 1,747 | 1,983 | 2,124 | 2,064 | 1,894 |
| Urban - Recycled Water | 2 | 0 | 11 | 14 | 13 | 18 | 21 | 15 | 12 | 21 | 19 | 30 | 10 | 14 | 15 | 26 | 24 | 7 | 52 | 84 |
| Agricultural - Municipal (SBA) | 242 | 279 | 177 | 192 | 257 | 347 | 401 | 104 | 57 | 64 | 59 | 67 | 66 | 64 | 63 | 63 | 62 | 68 | 68 | 67 |
| Agricultural - Groundwater | 109 | 133 | 96 | 100 | 92 | 100 | 109 | 26 | 11 | 12 | 11 | 13 | 12 | 12 | 12 | 12 | 12 | 13 | 13 | 12 |
| Golf Courses - Groundwater | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 49 | 55 | 56 | 60 | 56 | 61 | 58 | 56 | 63 | 68 | 65 | 60 |
| Golf Courses - Recycled Water | 26 | 66 | 48 | 63 | 58 | 75 | 58 | 50 | 65 | 66 | 69 | 72 | 47 | 75 | 58 | 59 | 71 | 74 | 66 | 64 |
| Others | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Subsurface Basin Inflow** | **1,680** | **1,570** | **1,330** | **1,090** | **990** | **920** | **680** | **810** | **750** | **906** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |
| **DEMAND** | **21,104** | **17,237** | **13,555** | **15,503** | **16,064** | **20,683** | **25,574** | **25,342** | **25,691** | **26,885** | **27,357** | **23,991** | **21,531** | **24,338** | **17,828** | **15,169** | **18,636** | **19,269** | **23,656** | **21,091** |
| **Municipal Pumpage** | **17,355** | **13,331** | **9,132** | **6,499** | **4,594** | **6,324** | **8,824** | **10,264** | **11,832** | **15,520** | **17,806** | **19,307** | **17,123** | **19,635** | **14,686** | **11,697** | **12,681** | **13,516** | **18,022** | **16,064** |
| Zone 7 (excluding DSRSD) | 8,119 | 5,136 | 2,215 | 213 | 368 | 2,388 | 1,565 | 1,682 | 4,912 | 6,140 | 9,864 | 11,047 | 7,734 | 11,175 | 6,213 | 3,157 | 4,146 | 6,210 | 9,439 | 8,274 |
| Zone 7 for DSRSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 645 | 645 | 645 | 645 | 645 | 645 | 645 | 645 |
| City of Pleasanton | 4,164 | 3,368 | 3,252 | 2,578 | 1,262 | 1,333 | 3,208 | 3,935 | 2,563 | 4,558 | 3,112 | 3,579 | 3,674 | 3,688 | 3,604 | 3,587 | 3,638 | 2,387 | 3,660 | 3,280 |
| Cal. Water Service | 3,966 | 3,744 | 2,570 | 2,626 | 2,053 | 1,551 | 2,947 | 3,595 | 3,271 | 3,567 | 3,707 | 3,458 | 3,979 | 2,911 | 3,166 | 3,106 | 2,971 | 3,143 | 3,123 | 2,844 |
| Camp Parks | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SFWD | 408 | 410 | 414 | 396 | 370 | 411 | 477 | 460 | 380 | 532 | 472 | 448 | 423 | 481 | 436 | 467 | 494 | 492 | 446 | 417 |
| Fairgrounds | 346 | 336 | 282 | 325 | 285 | 343 | 342 | 230 | 333 | 369 | 318 | 423 | 327 | 365 | 284 | 441 | 443 | 289 | 335 | 284 |
| Domestic | 100 | 113 | 113 | 116 | 116 | 117 | 117 | 113 | 116 | 109 | 109 | 134 | 134 | 167 | 131 | 93 | 96 | 109 | 123 | 112 |
| Golf Courses | 252 | 222 | 286 | 245 | 139 | 182 | 169 | 249 | 256 | 245 | 223 | 218 | 208 | 203 | 207 | 199 | 249 | 241 | 250 | 208 |
| **Agricultural Pumpage** | **382** | **355** | **213** | **218** | **150** | **212** | **266** | **73** | **81** | **231** | **227** | **119** | **93** | **92** | **88** | **88** | **87** | **96** | **95** | **94** |
| SFWD | 20 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Concannon | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 140 | 143 | 25 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Calculated | 351 | 346 | 213 | 218 | 150 | 212 | 266 | 73 | 81 | 91 | 84 | 94 | 93 | 91 | 88 | 88 | 87 | 96 | 95 | 94 |
| **Mining Use** | **3,367** | **3,551** | **4,210** | **8,786** | **11,120** | **13,381** | **15,724** | **14,255** | **13,416** | **11,010** | **9,324** | **4,564** | **4,314** | **4,610** | **3,055** | **3,385** | **4,947** | **4,452** | **5,346** | **4,934** |
| Stream Export | 639 | 712 | 2,219 | 6,070 | 9,071 | 10,577 | 12,661 | 12,617 | 10,082 | 7,827 | 5,461 | 143 | 0 | 163 | 150 | 487 | 594 | 523 | 1,493 | 1,996 |
| *Discharges to Cope Lake* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| Evaporation | 2,028 | 2,139 | 1,291 | 2,016 | 1,349 | 2,104 | 2,363 | 938 | 2,634 | 2,483 | 3,163 | 3,951 | 3,764 | 3,762 | 2,205 | 2,198 | 3,653 | 3,230 | 3,153 | 2,238 |
| Production | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 470 | 550 | 686 | 700 | 700 | 700 | 700 | 700 | 700 |
| **Subsurface Basin Overflow** | **0** | **0** | **0** | **0** | **200** | **766** | **760** | **750** | **362** | **125** | **0** | **0** | **0** | **0** | **0** | **0** | **921** | **1,205** | **194** | **0** |
| **NET RECHARGE (AF)** | **-8,389** | **-6,628** | **14,974** | **592** | **13,031** | **1,873** | **-1,390** | **2,511** | **-4,911** | **-3,674** | **-11,666** | **62** | **8,309** | **-4,560** | **13,193** | **8,790** | **-3,639** | **-3,011** | **-4,997** | **4,290** |
| **INVENTORY STORAGE (AF)** | **201,787** | **195,159** | **210,133** | **210,725** | **223,756** | **225,629** | **224,239** | **226,750** | **221,839** | **218,165** | **206,499** | **206,561** | **214,870** | **210,310** | **223,503** | **232,293** | **228,654** | **225,643** | **220,646** | **224,936** |

| **STORAGE CALCULATION** | **1991** | **1992** | **1993** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INVENTORY (Rounded to TAF) | 202 | 195 | 210 | 211 | 224 | 226 | 224 | 227 | 222 | 218 | 206 | 207 | 215 | 210 | 224 | 232 | 229 | 226 | 221 | 225 |
| GW ELEVATIONS (Rounded to TAF) | 195 | 184 | 211 | 216 | 225 | 223 | 222 | 225 | 222 | 222 | 203 | 212 | 220 | 213 | 236 | 238 | 232 | 235 | 233 | 234 |
| **AVERAGE STORAGE (TAF)** | **198** | **189** | **210** | **213** | **225** | **224** | **223** | **226** | **222** | **220** | **205** | **209** | **218** | **212** | **230** | **235** | **230** | **230** | **227** | **229** |
| **AVAILABLE STORAGE (TAF)** | **70** | **61** | **82** | **85** | **97** | **96** | **95** | **98** | **94** | **92** | **77** | **81** | **90** | **84** | **102** | **107** | **102** | **102** | **99** | **101** |

Artificial Components Natural Components

*Water Year Type (CDEC Sacramento Valley)
W = Wet; AN = Above Normal;
BN = Below Normal; D = Dry; C = Critical

# TABLE 10-3
# HISTORICAL GROUNDWATER STORAGE
# HYDROLOGIC INVENTORY (HI) METHOD
# 1974-2021 WATER YEARS (in Acre-Feet, except where indicated)

| | WATER YEAR (Oct - Sep) | | | | | | | | | | | 1974 - 2021 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COMPONENTS | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | AVG | Sust Avg | TOTAL |
| **INDICES** | | | | | | | | | | | | | | |
| Rainfall at Livermore (in) | 16.2 | 8.8 | 10.7 | 6.8 | 13.1 | 15.4 | 25.6 | 12.4 | 17.1 | 10.5 | 5.1 | 14 | | |
| 8 Station Rain Index (N. CA)(in) | 72.8 | 41.5 | 46.3 | 31.3 | 37.2 | 57.8 | 94.6 | 40.9 | 70.7 | 31.7 | 24.1 | 52 | | |
| Evap at Lake Del Valle (in) | 64.5 | 73.2 | 73.9 | 78.3 | 73.6 | 72.6 | 69.3 | 73.4 | 72.8 | 76.4 | 80.3 | 68 | | |
| Arroyo Valle Stream flow (AF) | 28634 | 1557 | 7801 | 272 | 2217 | 19436 | 89173 | 2783 | 36944 | 2701 | 2423 | 24430 | | **1172659** |
| Water Year Type* | W | BN | D | C | C | BN | W | BN | W | D | C | | | |
| **SUPPLY** | **27,315** | **18,442** | **20,158** | **10,452** | **18,753** | **28,293** | **38,895** | **17,164** | **23,625** | **13,526** | **7,827** | **19,908** | **19,800** | **955,589** |
| **Injection Well Recharge** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **69** | **0** | **3,322** |
| **Stream Recharge** | **17,595** | **12,734** | **13,457** | **5,820** | **11,469** | **18,083** | **20,495** | **9,560** | **10,605** | **5,972** | **2,703** | **11,734** | **11,900** | **563,255** |
| Artificial Stream Recharge | 4,555 | 8,778 | 7,887 | 3,826 | 3,766 | 8,910 | 9,615 | 6,773 | 2,943 | 2,461 | 277 | 5,204 | 5,300 | 249,805 |
| *Arroyo Valle* | *768* | *3,613* | *1,916* | *924* | *3,718* | *3,983* | *3,271* | *3,778* | *2,168* | *2,045* | *277* | *1,767* | *1,640* | *84,832* |
| *Arroyo Mocho* | *3,671* | *5,059* | *5,961* | *2,844* | *0* | *4,927* | *6,344* | *2,995* | *775* | *416* | *0* | *3,329* | *3,530* | *159,802* |
| *Arroyo las Positas* | *116* | *106* | *10* | *58* | *48* | *0* | *0* | *0* | *0* | *0* | *0* | *108* | *130* | *5,172* |
| Natural Stream Recharge | 11,272 | 3,355 | 4,200 | 1,987 | 6,822 | 8,289 | 10,433 | 1,938 | 6,439 | 2,595 | 1,887 | 5,635 | 5,700 | 270,501 |
| *Arroyo Valle* | *8,540* | *1,676* | *2,790* | *891* | *4,567* | *4,749* | *6,053* | *740* | *3,419* | *793* | *569* | *2,498* | *1,800* | *119,884* |
| *Arroyo Mocho* | *2,293* | *1,225* | *838* | *587* | *1,748* | *2,794* | *3,775* | *590* | *2,393* | *1,072* | *586* | *2,254* | *2,600* | *108,210* |
| *Arroyo las Positas* | *439* | *454* | *572* | *509* | *507* | *746* | *605* | *608* | *627* | *730* | *732* | *883* | *1,300* | *42,407* |
| Arroyo Valle Prior Rights | 1,768 | 601 | 1,370 | 7 | 881 | 884 | 447 | 849 | 1,223 | 916 | 539 | 895 | 900 | 42,948 |
| **Rainfall Recharge** | **5,771** | **1,462** | **2,708** | **1,075** | **3,735** | **6,554** | **14,087** | **3,220** | **8,588** | **2,869** | **1,079** | **4,600** | **4,300** | **220,809** |
| *Lake Recharge* | *0* | *0* | *0* | *2,428* | *4,322* | *6,785* | *13,029* | *15,003* | *13,248* | *7,529* | *490* | *1,309* | *NA* | *62,833* |
| **Pipe Leakage** | **776** | **811** | **847** | **884** | **921** | **958** | **996** | **1,034** | **1,146** | **1,209** | **1,248** | **462** | **1,000** | **22,170** |
| **Applied Water Recharge** | **2,172** | **2,435** | **2,147** | **1,674** | **1,629** | **1,697** | **2,316** | **2,350** | **2,286** | **2,476** | **1,798** | **2,056** | **1,600** | **98,698** |
| Urban - Municipal | 1,849 | 2,061 | 1,750 | 1,229 | 1,143 | 1,312 | 1,957 | 2,020 | 1,956 | 2,109 | 1,407 | 1,436 | 1,280 | 68,912 |
| Urban - Recycled Water | 133 | 159 | 189 | 220 | 275 | 160 | 147 | 106 | 119 | 140 | 148 | 50 | 26 | 2,400 |
| Agricultural - Municipal (SBA) | 61 | 68 | 64 | 66 | 61 | 88 | 77 | 80 | 80 | 80 | 86 | 136 | 92 | 6,547 |
| Agricultural - Groundwater | 11 | 13 | 7 | 20 | 18 | 15 | 14 | 14 | 14 | 14 | 15 | 115 | 12 | 5,520 |
| Golf Courses - Groundwater | 59 | 65 | 62 | 66 | 67 | 65 | 61 | 63 | 61 | 66 | 73 | 30 | 146 | 1,458 |
| Golf Courses - Recycled Water | 59 | 70 | 75 | 73 | 65 | 59 | 60 | 66 | 57 | 67 | 68 | 60 | 44 | 2,888 |
| Others | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 229 | 0 | 10,973 |
| **Subsurface Basin Inflow** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **986** | **1,000** | **47,336** |
| **DEMAND** | **20,421** | **28,880** | **25,700** | **22,604** | **12,717** | **12,888** | **13,636** | **16,879** | **19,142** | **21,447** | **27,999** | **19,594** | **18,800** | **940,517** |
| **Municipal Pumpage** | **13,430** | **20,463** | **16,823** | **16,662** | **8,284** | **9,176** | **10,714** | **11,966** | **14,635** | **16,349** | **22,806** | **11,893** | **13,700** | **570,877** |
| Zone 7 (excluding DSRSD) | 5,618 | 11,461 | 8,909 | 8,137 | 1,920 | 1,357 | 3,243 | 4,215 | 8,021 | 11,101 | 15,795 | 4,443 | 5,300 | 213,274 |
| Zone 7 for DSRSD | 646 | 644 | 646 | 645 | 645 | 645 | 645 | 645 | 645 | 645 | 645 | 255 | 645 | 12,256 |
| City of Pleasanton | 3,435 | 3,900 | 3,301 | 3,740 | 2,775 | 3,752 | 4,222 | 3,913 | 3,785 | 2,701 | 3,802 | 3,275 | 3,500 | 157,188 |
| Cal. Water Service | 2,673 | 3,333 | 2,770 | 3,085 | 2,012 | 2,575 | 1,878 | 2,389 | 1,296 | 904 | 1,475 | 2,734 | 3,070 | 131,255 |
| Camp Parks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 184 | 0 | 8,819 |
| SFWD | 442 | 482 | 482 | 398 | 309 | 286 | 214 | 253 | 286 | 322 | 360 | 402 | 450 | 19,316 |
| Fairgrounds | 301 | 318 | 350 | 286 | 268 | 231 | 208 | 196 | 270 | 321 | 353 | 289 | 310 | 13,880 |
| Domestic | 107 | 90 | 105 | 115 | 112 | 110 | 107 | 115 | 116 | 108 | 107 | 109 | 200 | 5,230 |
| Golf Courses | 208 | 236 | 260 | 257 | 243 | 220 | 198 | 240 | 216 | 247 | 269 | 201 | 225 | 9,659 |
| **Agricultural Pumpage** | **85** | **95** | **486** | **640** | **590** | **115** | **109** | **113** | **113** | **112** | **122** | **978** | **400** | **46,940** |
| SFWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 125 | 0 | 6,015 |
| Concannon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 1,047 |
| Calculated | 85 | 95 | 486 | 640 | 590 | 115 | 109 | 113 | 113 | 112 | 122 | 831 | 400 | 39,877 |
| **Mining Use** | **6,906** | **8,322** | **8,391** | **5,302** | **3,843** | **3,597** | **2,813** | **4,236** | **3,585** | **4,840** | **5,072** | **6,342** | **4,600** | **304,408** |
| Stream Export | 4,277 | 4,676 | 4,796 | 850 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,275 | 700 | 157,219 |
| *Discharges to Cope Lake* | *0* | *0* | *0* | *5,420* | *4,890* | *7,700* | *13,452* | *15,562* | *13,864* | *7,906* | *548* | *1,445* | *NA* | *69,341* |
| Evaporation | 1,929 | 2,946 | 2,895 | 3,752 | 3,143 | 2,897 | 2,113 | 3,536 | 2,885 | 4,140 | 4,372 | 2,375 | 3,200 | 113,983 |
| Production | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 692 | 700 | 33,206 |
| **Subsurface Basin Overflow** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **564** | **809** | **146** | **0** | **381** | **100** | **18,292** |
| **NET RECHARGE (AF)** | **6,893** | **-10,438** | **-5,542** | **-12,153** | **6,037** | **15,405** | **25,259** | **285** | **4,482** | **-7,921** | **-20,172** | **314** | **1,000** | **15,071** |
| **INVENTORY STORAGE (AF)** | **231,829** | **221,391** | **215,849** | **203,696** | **209,733** | **225,138** | **250,397** | **250,682** | **255,164** | **247,243** | **227,071** | **223,942** | **13,400** | |

| STORAGE CALCULATION | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INVENTORY (Rounded to TAF) | 232 | 221 | 216 | 204 | 210 | 225 | 250 | 251 | 255 | 247 | 227 |
| GW ELEVATIONS (Rounded to TAF) | 235 | 228 | 221 | 209 | 214 | 226 | 245 | 245 | 248 | 237 | 220 |
| **AVERAGE STORAGE (TAF)** | **233** | **225** | **218** | **206** | **212** | **225** | **248** | **248** | **251** | **242** | **223** |
| **AVAILABLE STORAGE (TAF)** | **105** | **97** | **90** | **78** | **84** | **97** | **120** | **120** | **123** | **114** | **95** |

Artificial Components Natural Components

*Water Year Type (CDEC Sacramento Valley)
W = Wet; AN = Above Normal;
BN = Below Normal; D = Dry; C = Critical

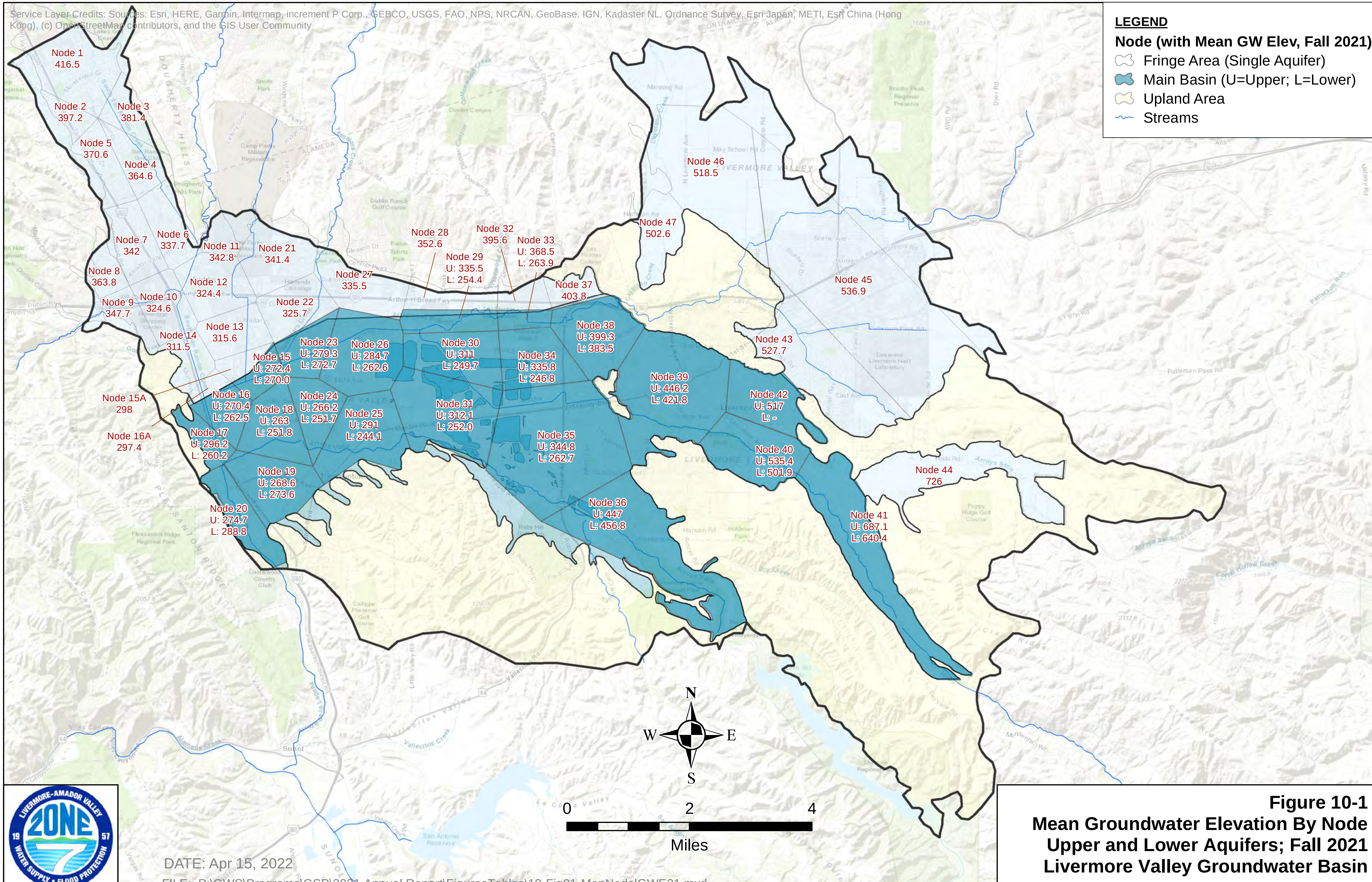



**Figure 10-1**
**Mean Groundwater Elevation By Node**
**Upper and Lower Aquifers; Fall 2021**
**Livermore Valley Groundwater Basin**

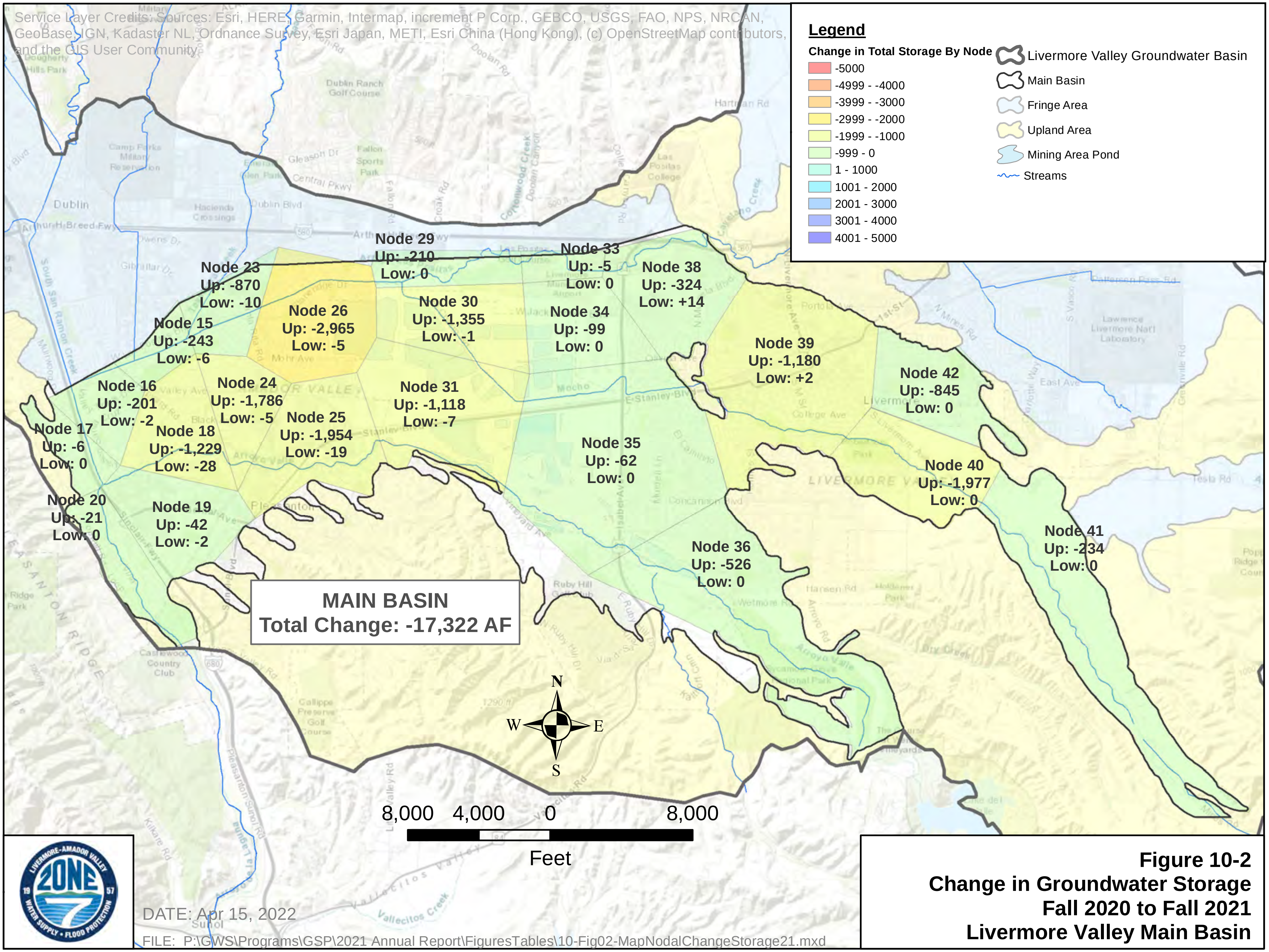
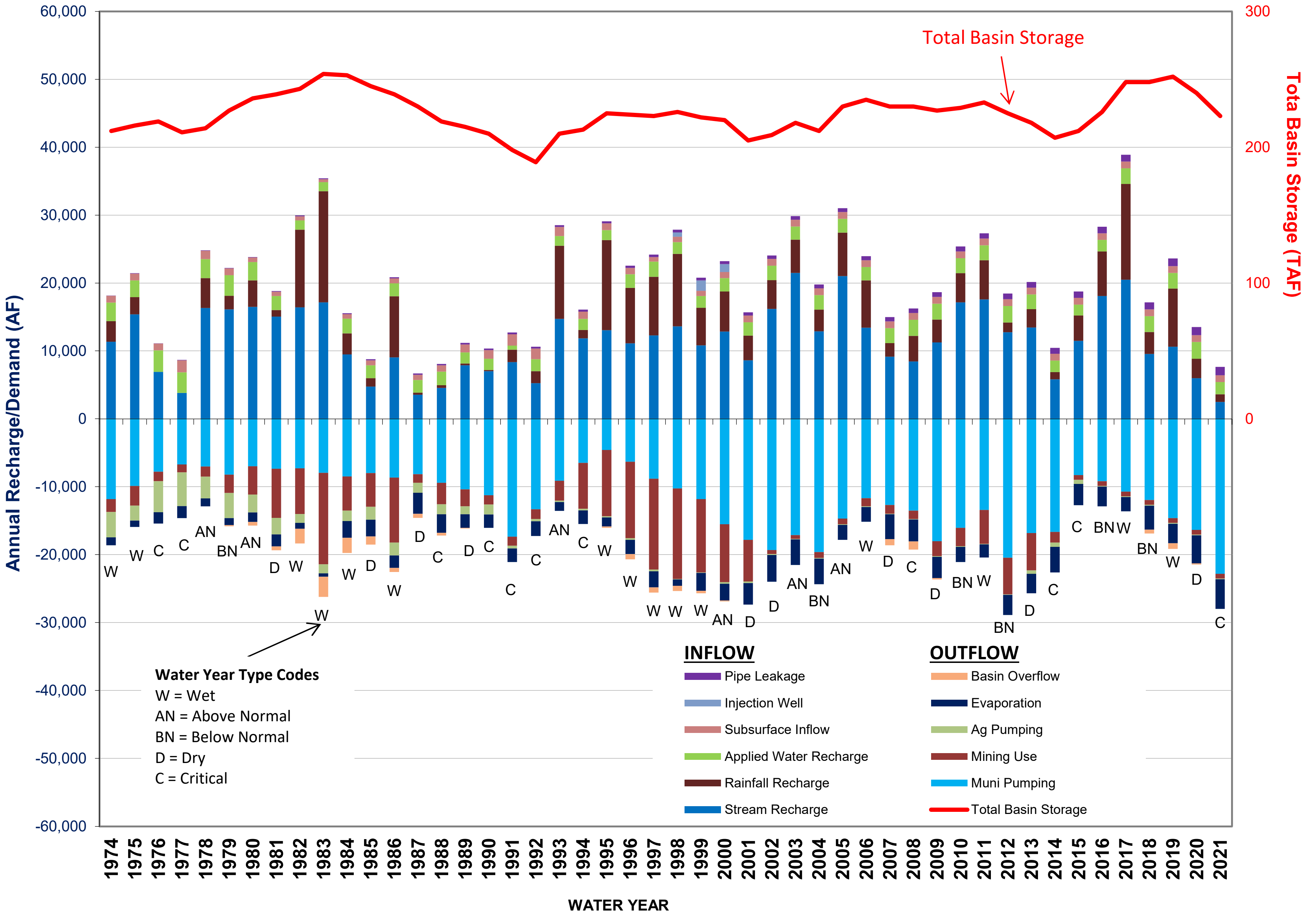



**Figure 10-2**
**Change in Groundwater Storage**
**Fall 2020 to Fall 2021**
**Livermore Valley Main Basin**

# FIGURE 10-3
# GRAPH OF GROUNDWATER STORAGE 1974 - 2021 WATER YEARS
# LIVERMORE VALLEY GROUNDWATER BASIN

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3/28/2022

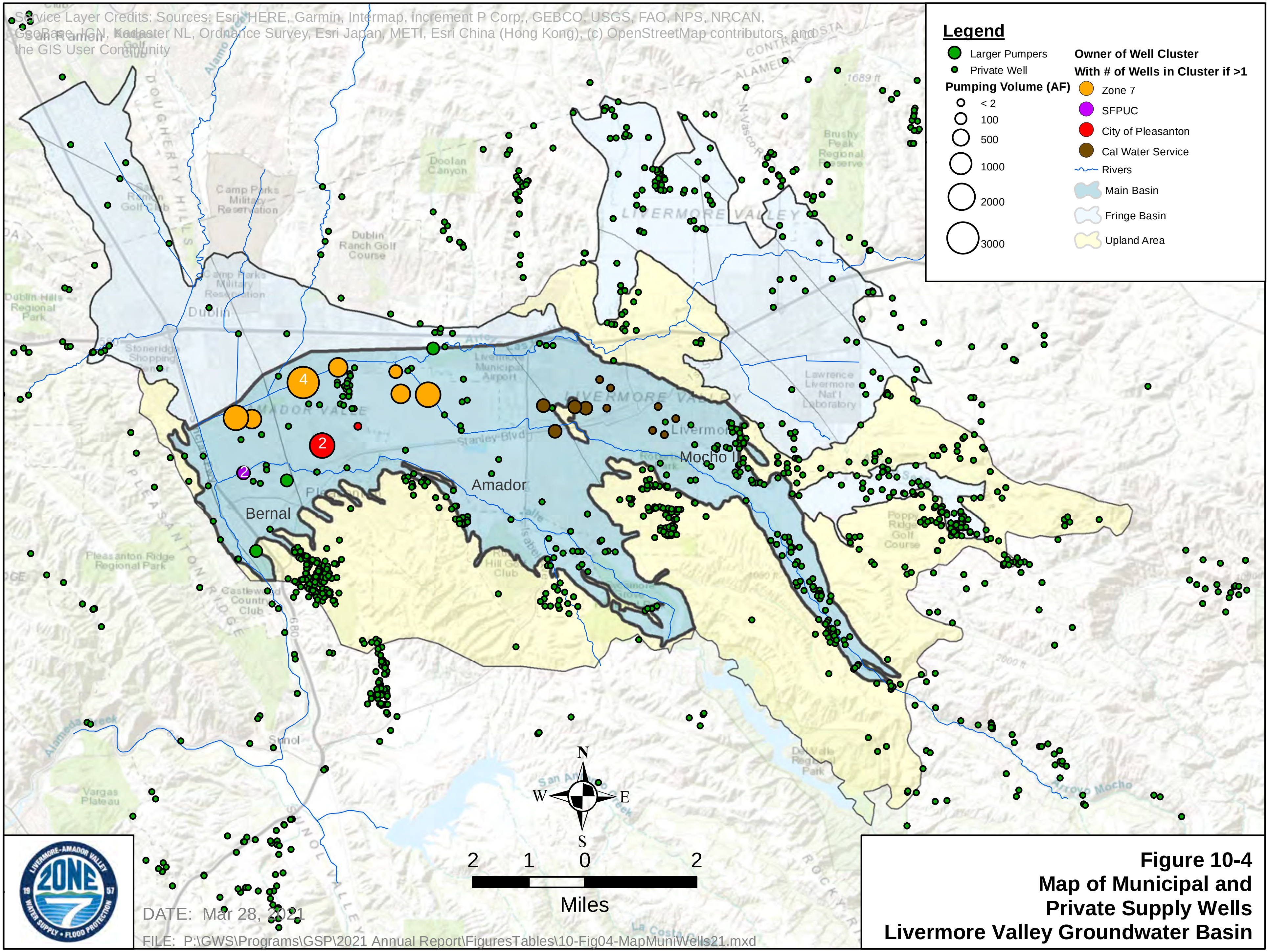
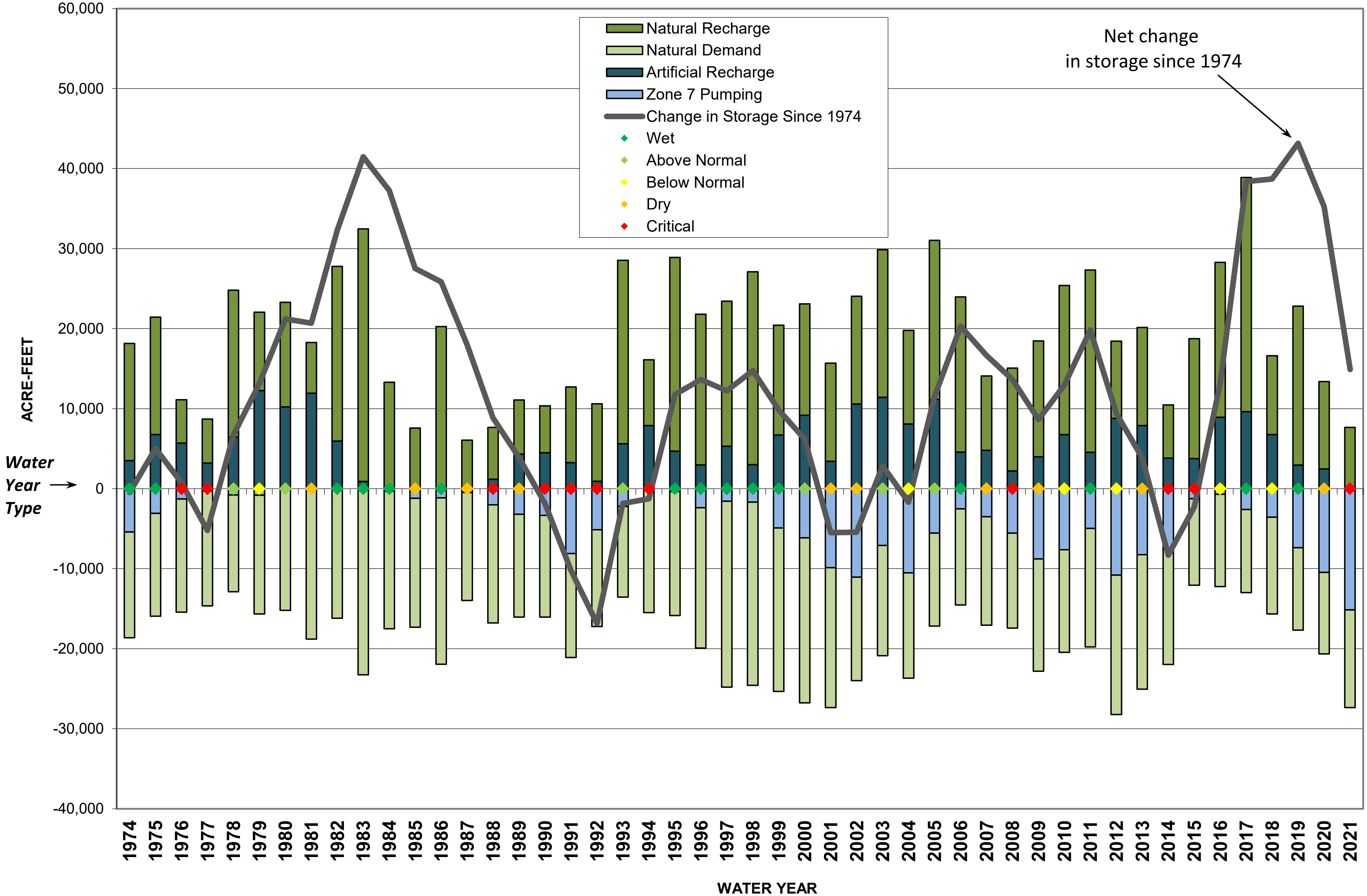



**Figure 10-4**
**Map of Municipal and Private Supply Wells**
**Livermore Valley Groundwater Basin**

**FIGURE 10-5**
**CUMULATIVE CHANGE IN NATURAL AND ARTIFICIAL RECHARGE AND DEMAND 1974 - 2021 WATER YEARS**
**LIVERMORE VALLEY GROUNDWATER BASIN**



# 11 Groundwater Supply Sustainability

## 11.1 Import of Surface Water

Imported surface water supplies secured by Zone 7 for the 2021 CY are shown in ***Table 11-A*** below, ***Figure 11-1***, and are summarized below include:

- The State Water Project (SWP) deliveries via the South Bay Aqueduct [SBA] allocation for the 2021 CY was 5% of Zone 7's maximum allocation (80,619 AF) for 4,031 AF.
- Zone 7 imported 8,600 AF of its total 116,075 AF banked in the Kern Groundwater Basin (care of the Semitropic Water Storage District) and transferred 1,800 AF from the Kern Groundwater Basin to San Luis Reservoir.
- Zone 7 transferred 1,237 AF from the Lover River Yuba Accord (Yuba) and 8,090 AF from the Mojave Water Agency.
- Total imported surface water supplies in the 2021 CY made up 47% of regional water demands.

***Table 11-A: Imported Water Sources for the 2021 Calendar Year (AF)***

| Source | Available at end of 2020 | Added in 2021 | Used in 2021 | Carryover to 2022 |
|---|---|---|---|---|
| **State Water Project** | **8,860** | **5,831** | **8,700** | **5,991** |
| Imported Table A* | 0 | 4,031 | 0 | 4,031 |
| To San Luis from Semitropic | 0 | 1,800 | 0 | 1,800 |
| Article 56 | 8,860 | 0 | 8,700 | 160 |
| **BBID**** | **0** | **0** | **0** | **0** |
| **Kern Groundwater Basin** | **116,075** | **0** | **10,400** | **105,675** |
| Semitropic Delivered | 86,170 | 0 | 8,600 | 77,570 |
| Semitropic to San Luis | 0 | 0 | 1,800 | -1,800 |
| Cawelo Delivered | 29,905 | 0 | 0 | 29,905 |
| **Other** | **0** | **9,327** | **9,327** | **0** |
| Yuba/Dry Year Transfer Program | 0 | 1,237 | 1,237 | 0 |
| Mojave Water Agency Transfer | 0 | 8,090 | 8,090 | 0 |
| **Lake Del Valle (AV Water Rights)** | **20** | **3,200** | **920** | **2,300** |
| ***TOTAL*** | ***124,955*** | ***18,358*** | ***29,347*** | ***113,966*** |

* 5% State Water Project Allocation for 2021 CY

** BBID Agreement terminated in 2021 CY

AV Arroyo Valle

# 11.2 Valley-Wide Water Production and Use

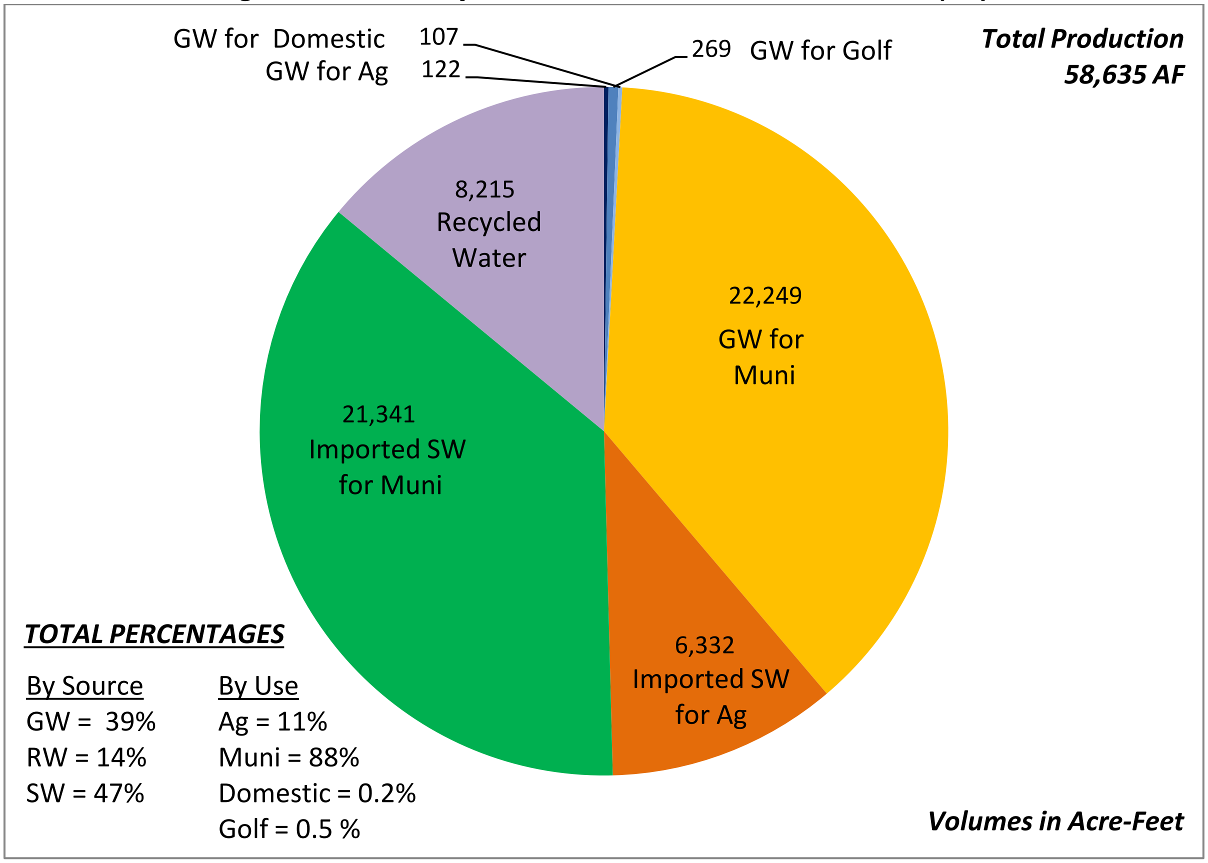
The volume of water produced and used in the Basin is shown in ***Figure 11-A*** (by WY) and ***Figure 11-1*** (by WY except where noted). ***Figure 11-2*** shows the historical percentage of groundwater production relative to total Basin-wide production from the 1974 to 2021 WYs. The following activities occurred during the 2021 WY:

- Total groundwater production in the Basin (including by Zone 7, retailers, agriculture, domestic, etc.) supplied about 39% of the total Basin-wide water demand in the 2021 WY.

- Of the 16,440 AF of groundwater pumped by Zone 7 during the 2021 WY, about 16,259 AF went into production; the remainder of which is accounted for in pumping losses and exported brine from the groundwater demineralization process.

- Zone 7's total produced groundwater was about 43% of the total treated water production that Zone 7 delivered to its retailers during the 2021 WY (on average, groundwater makes up about 15% of Zone 7's annual treated water deliveries).

***Figure 11-A: Valley-Wide Water Production, 2021 WY (AF)***




Ag = Agriculture; Muni = Municipal; GW= Groundwater; RW = Recycled Water; SW = Surface Water

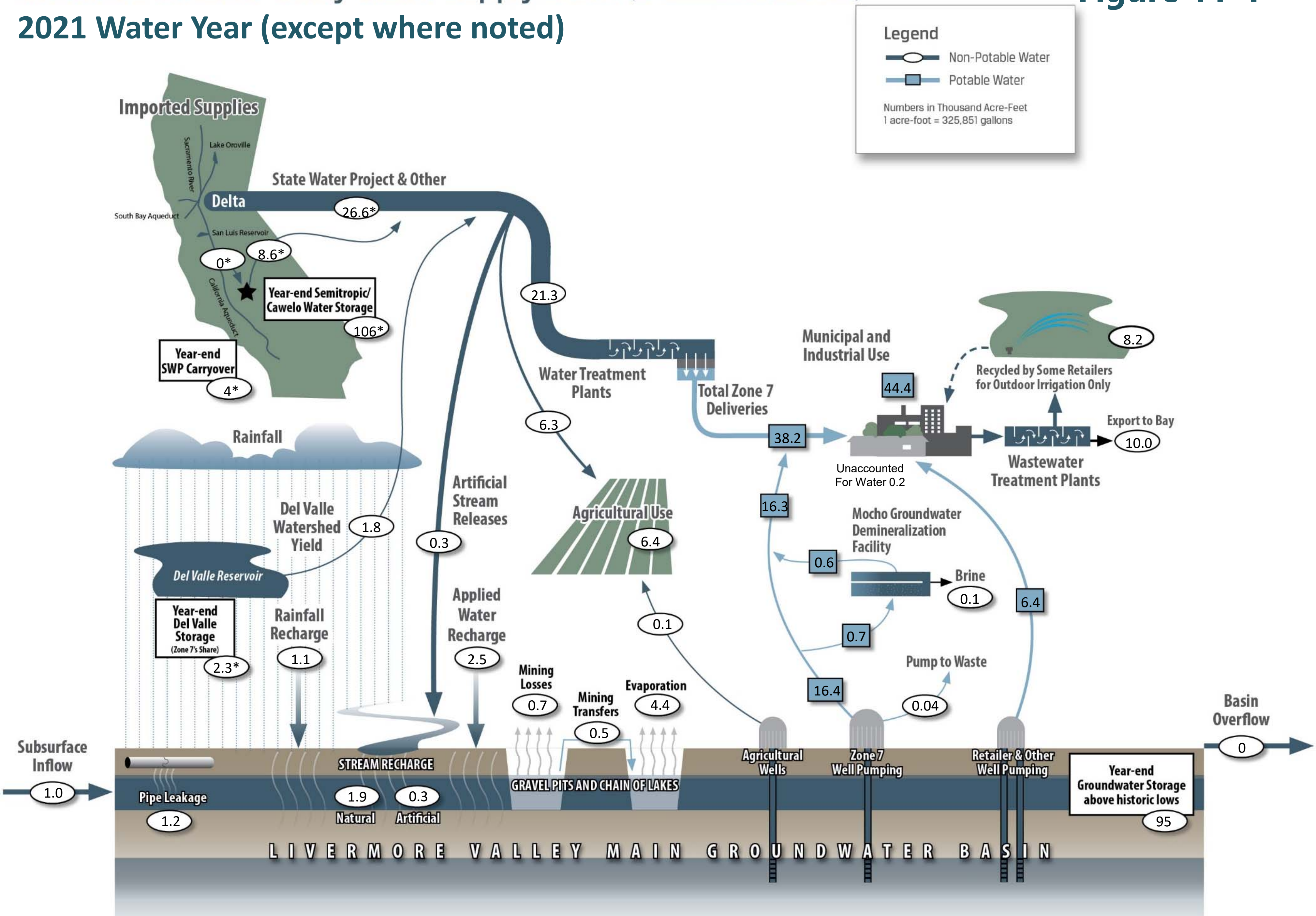
# 11.3 Attached Tables and Figures

***Figure 11-1**: Livermore-Amador Valley Water Supply and Use, 2021 WY*
***Figure 11-2**: Valley Water Production from Imported Water and Groundwater, 1974 to 2021 WYs*

Livermore-Amador Valley Water Supply & Use (in Thousands of Acre-Feet)

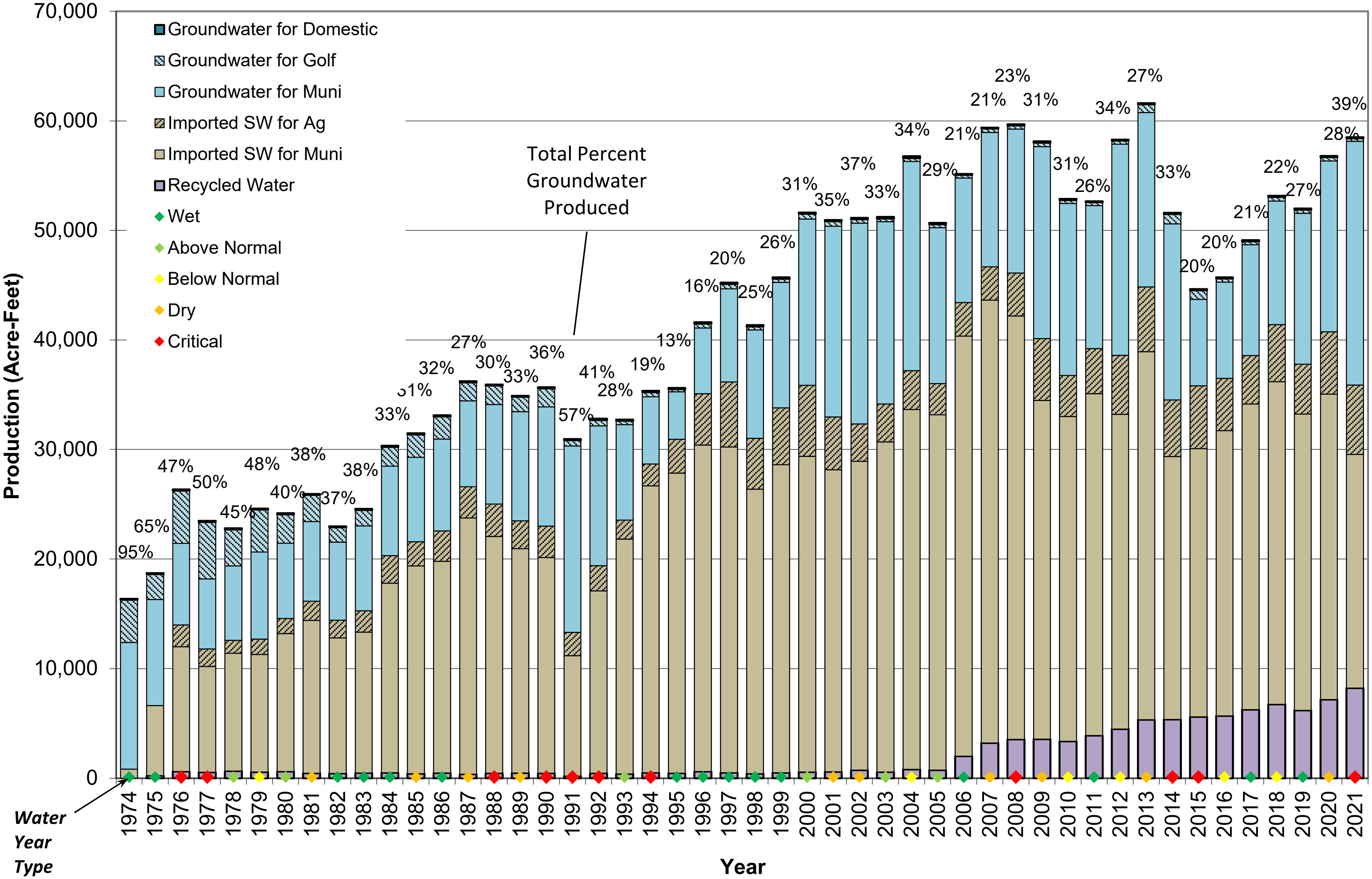
**Figure 11-1**

## 2021 Water Year (except where noted)




* 2021 Calendar Year

# FIGURE 11-2
# VALLEY WATER PRODUCTION FROM IMPORTED WATER AND GROUNDWATER
# 1974 TO 2021 WATER YEARS




3/29/2022
P:\GWS\Programs\GSP\2021 Annual Report\FiguresTables\00-Fig09-PieChartTtlUse.xlsx

# 12 Water Quality Sustainability

## 12.1 Well Ordinance Program

Zone 7 administers the associated well permit program within its service area including the three incorporated cities (Dublin, Livermore, and Pleasanton) pursuant to a Memorandum of Understanding (MOU) with Alameda County and ordinances adopted by the three cities. As a result, any planned new well construction, soil-boring construction, or well destruction must be permitted by Zone 7 before the work is started. Additionally, all unused or abandoned wells must be properly destroyed, or, if there are plans to use the well in the future, a signed statement of future intent must be filed with Zone 7.

During the 2021 WY, Zone 7 issued 142 drilling permits, 26 more than in the 2020 WY. ***Table 12-A*** details the breakdown of the types of permits issued during the 2021 WY and their quantities.

***Table 12-A: Well Ordinance Permits Issued in the 2021 WY***

| Permit Type | Quantity |
|---|---|
| Geotechnical Investigations | 78 |
| Well Destructions | 24 |
| Contamination Investigations/Remediation | 9 |
| Water Supply Wells | 17 |
| Groundwater Monitoring | 12 |
| Cathodic Protection Wells | 2 |
| ***Total*** | ***142*** |

- Seventeen (17) water supply well permits were issued in the 2021 WY. The pre-drought average was 25 per year.
- About 78% of the permitted well work was physically inspected by Zone 7 permit compliance staff; the remaining 22% could proceed with self-monitoring and reporting efforts when a licensed professional was supervising the project.

## 12.2 Toxic Site Surveillance Program

Through the Toxic Site Surveilance (TSS) Program, Zone 7 documents and tracks polluted sites that pose a potential threat to drinking water. In general, the TSS Program monitors two types of contamination threatening groundwater: petroleum-based fuel products and industrial chemical contamination (e.g., chlorinated solvents).

The locations of all the toxic sites, and their proximity to the Basin's municipal water wells, are shown on the accompanying individual area maps (***Figure 12-1*** through ***Figure 12-3***, Livermore, Pleasanton/Sunol, and Dublin, respectively). ***Table 12-1*** contains a summary for each of the active sites including the case status, its priority, and which agency is responsible for providing oversight for the case. In addition, copies of plans, reports, directive letters, and background data on the cases can be found at the State Water Resources Control Board's (SWRCB) GeoTracker website: http://geotracker.waterboards.ca.gov/. The GeoTracker number for each case (if one is assigned) is also included in ***Table 12-1***.

## 12.2.1 Program Changes

There were no changes to the TSS Program during the 2021 WY.

## 12.2.2 Results for the 2021 Water Year

### 12.2.2.1 Cases Closed

Four toxic sites were granted "Case Closed" status in the 2021 WY. Their locations are shown on ***Figure 12-4*** and are summarized below (from west to east).

- Site 209: Shell Oil, Dublin. This case was evaluated for closure consistent with the Regional Water Resources Control Board's (RWQCB) Low-Threat Underground Storage Tank Closure Policy (LTCP) for petroleum related contaminants. Alameda County Department of Environmental Health (ACDEH) determined that the site met the LTCP General Criteria and Groundwater Media Specific Criteria and the Petroleum Vapor Intrusion Media Specific Criteria by the active fueling station exception. The following groundwater specific closure criteria were met; the contaminant plume that exceeds water quality objectives is <1,000 feet in length, there is no free product, the nearest existing water supply well or surface water body is >1,000 feet from the defined plume boundary, and the dissolved concentrations of benzene and Methyl tert-butyl ether (MTBE) are both <1,000 micrograms per liter (µg/L).

- Site 14: Former Clorox Campus, Building 9, Pleasanton. This case met the criteria in the Water Board's 2009 Assessment Tool for Closure of Low-Threat Chlorinated Solvent Sites. Groundwater sampling data show that concentrations of volatile organic compounds (VOCs) contaminants are greater than MCLs but are declining. Groundwater off site exceeds MCLs for VOCs, but there are no complete receptor pathways. Covenant and environmental restrictions were placed on the Property at 7035 Commerce Circle, Pleasanton that limit the contact with first groundwater by disallowing drilling for the purpose of extracting water for any use. The deed restriction also states the property "is used for commercial purposes and is adjacent to commercial/industrial land uses".

- Site 331: Taylor Corporation, Livermore. RWQCB found that the groundwater pollution detected beneath the property is likely the result of the migration of pollutants in groundwater from nearby upgradient sources related to releases from historical operations on or near the Salinas Reinforcing property located at 355 South Vasco Road. Therefore, RWQCB determined that this site is not a source of the groundwater pollution found beneath it and that no further action is required by the current or past property owners.

- Site 292: Former K&S Heavy Equipment, Livermore. ACDEH's closure determination was based on a human health and ecological risk analysis including applicable Environmental Screening Levels (ESLs). ACDEH concluded that historic on-site operations had not adversely effected groundwater quality at the site.

#### 12.2.2.2 Sites Pending Closure Review

"Case Closure" was requested by representatives for the five contamination sites listed below. Their locations are provided on ***Figure 12-4***. At the end of the 2021 WY, the lead agencies were still considering the requests but may ask for additional information before making their decision. Cases approved for closure by ACDEH must be reviewed and accepted by the RWQCB before they are officially closed. Information on each pending closure request, including Zone 7's recommendations, is summarized as follows (from west to east):

- Site 284: Former Crow Canyon Dry Cleaner, Dublin. The Responsible Party (RP) requested closure in 2015 based on the success of remedial actions, and because the vapor measurements are below ESLs. Vapor contamination is the main concern at the site. The groundwater detections for tetrachloroethylene (PCE) and trichloroethylene (TCE) are below their respective MCL. ACDEH directed the RP to conduct additional work to move ACDEH's consideration forward. The RP has not followed through with the work requested by ACDEH. Staff does not object to the groundwater case closure if the additional work is completed to ACDEH satisfaction and the groundwater detections remain below MCLs.

- Site 308: Green on Park Place, Dublin. The case was slated for closure in 2014 but the case closure was never finalized. The only tasks remaining in October 2014 involved properly disposing of contaminated stockpiled soil. ACDEH sent a compliance letter to the RP in 2019. Staff does not object to the closure of this case if the remaining tasks are completed to ACDEH satisfaction.

- Site 37: Applied Biosystems, Pleasanton. A 5-year remedial action review report was submitted by the RP in July 2018. The report showed that the groundwater concentrations in the sole remaining monitoring well were below MCLs for PCE, TCE, and 1, 1-Dichloroethene (DCE). The RP requested permission to discontinue groundwater monitoring, for the well to be destroyed, the case closed, and the deed restriction rescinded. The Department of Toxic Substances Control (DTSC) approved discontinuing the groundwater sampling and then requested a well decommissioning plan. DTSC said the removal of the deed restriction will need to be done in accordance with Health and Safety Code 25224 following the well decommissioning. Staff does not object to the pending closure.

- Site 317: Walgreens Spill, Sunol. Case was approved for closure by ACDEH under the LTCP. To finalize the case closure, ACDEH required the RP to remove any remaining waste from the site and to provide a report by April 22, 2018. In response, Apex submitted a Site Cleanup Program Case Closure letter to ACDEH in October 2020. Case closure is still pending. There was no progress in the 2021 WY. Staff does not object to the case closure if the remaining tasks are completed to ACDEH satisfaction.

- Site 313: Just Tires, Livermore. This case is a soil contamination case slated for closure; no fuel contaminants were detected in groundwater beneath the site. Comments on pending closure were due January 2016. ACDEH sent multiple letters to the RP to finalize the closure report, but they have not responded. There was no progress in the 2021 WY. Staff does not object to the pending case closure if the remaining tasks are completed to ACDEH satisfaction.

#### 12.2.2.3 New Cases

No new cases were added to the Zone 7 TSS Program in the 2021 WY.

# 12.3 Salt Management

## 12.3.1 Program Changes

No changes were made involving the Salt Management Program (SMP) or SMP strategies in the 2021 WY.

## 12.3.2 Results for the 2021 Water Year

Salt balance calculations for the 2021 WY are tabulated in ***Table 12-B*** (summary) below and attached ***Table 12-2*** (detailed). ***Table 12-3*** summarizes the salt balance calculations from 1974 to 2021 WY. ***Figure 12-5*** graphs the salt inflows, outflows, and resulting Basin-wide salt concentrations from 1974 to 2021 WY.

***Table 12-B: Salt Loading Summary, 2021 WY***

| **Category** | **Volume (AF)** | **Salt Mass (Tons)** | **TDS Concentration (mg/L)** | **Change in Concentration from 2020 WY (mg/L)** |
|---|---|---|---|---|
| Inflow | 7,827 | 11,425 | 1,074 | 93 |
| Outflow | 27,999 | 18,364 | 483 | 38 |
| Net (In – Out) | -20,172 | -6,939 | 253 | |
| **Basin Total** | **227,071** | **220,463** | **715** | **38** |

The following is a summary of the salt management actions conducted by Zone 7 during the 2021 WY:

- The total salt mass in the Main Basin decreased 6,939 tons.
- While the salt load decreased during the WY, the end-of-water-year theoretical average TDS concentration for the Main Basin increased by 38 mg/L from the previous WY average. This is because the Basin storage dropped by about 20 TAF, which essentially concentrates the remaining salt in storage.

The Mocho Groundwater Demineralization Plant (MGDP) was operated sparingly throughout the 2021 WY to conserve water during the drought:

- During the 2021 WY, the MGDP produced 143 AF of brine (compared to 344 AF in the 2020 WY) that resulted in the export of about 448 tons of salt from the Main Basin through the Livermore-Amador Valley Water Management Agency (LAVWMA) pipeline (compared to 1,230 tons in the 2020 WY).
- Since its inception, the MGDP has exported over 19,000 tons of salt from the Valley (see ***Table 12-C*** below).

***Table 12-C: Salts Removed by Zone 7's Mocho Groundwater Demineralization Plant***

| Water Year | Brine Volume Exported from Valley (AF) | Average Brine TDS Concentration (mg/L) | Salt Mass Exported (Tons) | Salt Removed per AF of Brine Export (Tons/AF) |
|---|---|---|---|---|
| 2009 | 192 | 3,059 | 798 | 4.16 |
| 2010 | 675 | 3,010 | 2,760 | 4.09 |
| 2011 | 429 | 3,445 | 2,008 | 4.68 |
| 2012 | 935 | 3,198 | 4,062 | 4.34 |
| 2013 | 518 | 3,522 | 2,478 | 4.78 |
| 2014 | 214 | 3,607 | 1,049 | 4.9 |
| 2015 | 16 | 3,474 | 76 | 4.75 |
| 2016 | 51 | 2,662 | 184 | 3.61 |
| 2017 | 244 | 2,863 | 949 | 3.89 |
| 2018 | 268 | 3,209 | 1,168 | 4.36 |
| 2019 | 480 | 2,867 | 1,869 | 3.89 |
| 2020 | 344 | 2,633 | 1,230 | 3.58 |
| 2021 | 143 | 2,307 | 448 | 3.13 |
| **TOTAL** | **4,509** | **3,115** | **19,079** | **4.23** |

AF = acre-feet TDS = total dissolved solids

mg/L = milligrams per liter

# 12.4 Attached Tables and Figures

***Table 12-1***: *Toxic Site Surveillance - Active Site Summary, 2021 WY*
***Table 12-2***: *Salt Loading 2021 WY*
***Table 12-3***: *Historical Salt Loading, 1974 to 2021 WYs*

***Figure 12-1***: *Toxic Site Surveillance; Livermore Area Sites*
***Figure 12-2***: *Toxic Site Surveillance; Pleasanton and Sunol Area Sites*
***Figure 12-3***: *Toxic Site Surveillance; Dublin Area Sites*
***Figure 12-4***: *Toxic Site Surveillance; Cases with Status Changes in 2021 WY*
***Figure 12-5***: *Main Basin Salt Loading and TDS Concentration, 1974 to 2021 WY*

# TABLE 12-1
# TOXIC SITES SURVEILLANCE - ACTIVE SITES SUMMARY
# 2021 WATER YEAR

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 1 | Lawrence Livermore National Laboratory | Lawrence Livermore Lab | 7000 East Avenue | Livermore | 3A3 | 7 | DTSC | Drilling and sampling work plans were submitted to DTSC by Lawrence Livermore National Laboratory 2021 to include the installation of 3 new monitoring wells. These wells will be used to monitor elevated VOC concentrations near hydrostratigraphic unit 4. |
| GEOTRACKER ID: T0600191466 | | | | | | | | |
| 5 | Sandia National Laboratory | Sandia National Labs | 7011 East Avenue | Livermore | 3A3 | 8 | RWQCB | The Site Environmental Report for 2020 Sandia National Laboratories is the most recent report available. Monitoring results continued to show carbon tetrachloride in groundwater at the Navy Landfill in 2020 with a concentration similar to that detected in past years. Diesel was not detected in groundwater from wells at the Fuel Oil Spill site in 2020. |
| GEOTRACKER ID: T0600191470 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 6 | Santa Rita Rehabilitation Center | | 5325 Broder Boulevard | Pleasanton | 2A4 | NR | | An incident report was filed in March 2013 for a diesel fuel leak at 4985 Broder Boulevard, Dublin that occurred in 2012. Contaminated soil was subsequently removed from the property by the end of 2012. This site is currently inactive. |
| GEOTRACKER ID: T10000005213 | | | | | | | | |
| 10 | Industrial Ladder Company | | 115 North Mines Road | Livermore | 2A4 | 1 | RWQCB | A 1985 subsurface report reported chlorobenzene, 1,1-dichloroethane, 1, 1-dichloroethene, trans-1,2 dichloroethene, PCE, 1,1,1-trichloroethane, and TCE found in a sample collected from an observation well on-site. This case is open and inactive as of 6/21/2016. |
| GEOTRACKER ID: | | | | | | | | |
| 11 | Intel | Intel Livermore Fabrication Plant 3 | 250 North Mines Road | Livermore | 2A3 | 8 | RWQCB | 1/3<br>In March 2022, The Water Board approved the 2020 Annual Monitoring and Technical Report and Requirement for Well Destruction Workplan. According to approval letter background, groundwater elevations, and halogenated volatile organic compound (HVOC) data were collected from 16 groundwater monitoring wells and Sump S-2, which had been operating continuously since construction in 1976 to prevent flooding of the Building 3 basement. |
| GEOTRACKER ID: SL18368788 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 11 | Intel | Intel Livermore Fabrication Plant 3 | 250 North Mines Road | Livermore | 2A3 | 8 | RWQCB | 2/3 Groundwater data showed a decreasing or stable contaminant plume with maximum trichloroethene, cis-1,2-dichloroethene, and vinyl chloride concentrations of 65 micrograms per liter (µg/L), 55 µg/L, and 10 µg/L, respectively. The Water Board commented that the wells proposed for destruction are not needed because the groundwater plume has been shown to be stable or decreasing throughout the site for more than 10 years and contaminants are at relatively low concentrations. |
| GEOTRACKER ID: SL18368788 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 11 | Intel | Intel Livermore Fabrication Plant 3 | 250 North Mines Road | Livermore | 2A3 | 8 | RWQCB | 3/3 The 2020 Annual Monitoring and Technical Report and Requirement for Well Destruction Workplan recommended destruction of the groundwater monitoring wells at the site, with the exception of wells WM-3, WM-22A, IP-1, and WM-20A. Wells WM-3, WM-22A, and IP-1 to be left in place for potential monitoring, and Well WM-20A to be left in place as it may be of use if the site is redeveloped. The Water Board concurred with these reccomendations and Intel's reccomendation for continued annual inspection and water level monitoring of the remaining wells and HVOC analysis of groundwater samples from Sump S-2. |
| GEOTRACKER ID: SL18368788 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 14 | Nucleopore Corporation | Former Clorox Campus - Building 9 | 7035 Commerce Circle | Pleasanton | 2A2 | CL | RWQCB | 1/2 No Further Action Former Clorox Technical Campus (CTC) was approved by RWQCB for Building 9, 7035 Commerce Circle, Pleasanton, Alameda County. The case met the criteria in the Water Board’s 2009 Assessment Tool for Closure of Low-Threat Chlorinated Solvent Sites. Groundwater sampling data show that concentrations of VOC contaminants are greater than maximum contaminant levels (MCLs) but are declining. Groundwater off site exceeds maximum contaminant levels (MCLs) for volatile organic compounds (VOCs), but there are no complete receptor pathways. |
| GEOTRACKER ID: T0600191468 | | | | | | | | |
| 14 | Nucleopore Corporation | Former Clorox Campus - Building 9 | 7035 Commerce Circle | Pleasanton | 2A2 | CL | RWQCB | 2/2 On December 29th 2020, covenant and environmental restrictions were placed on Property 7035 Commerce Circle, Pleasanton. The deed restriction implemented on December 29, 2020 limits the contact with first groundwater at the restricted property by disallowing drilling for purpose of extracting water for any use. The deed restriction also states the property "is used for commercial puposes and is adjacent to commercial/industial land uses". This case is closed as of 8/9/21. |
| GEOTRACKER ID: T0600191468 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 36 | Richmond Lox/ Salinas Reinforcement | Salinas Reinforcing Inc. | 355 South Vasco Road | Livermore | 3A3 | 5C | RWQCB | SFBRWQCB approved a temporary suspension of groundwater monitoring based on the stability of groundwater concentrations in existing monitoring wells. |
| GEOTRACKER ID: SL18266687 | | | | | | | | |
| 36 | Richmond Lox/ Salinas Reinforcement | Salinas Reinforcing Inc. | 355 South Vasco Road | Livermore | 3A3 | 5C | RWQCB | SFBRWQCB approved the suspension of the 2020 groundwater monitoring and reporting. This approval did not change the requirement for future groundwater monitoring and reporting. |
| GEOTRACKER ID: SL18266687 | | | | | | | | |
| 37 | Applied Biosystems (formerly Kaiser Aluminum & Chemical) | Applied Biosystems | 6001 (Formerly 6177) Sunol Boulevard | Pleasanton | 2C | 8 | DTSC | DTSC determined that the Operation and Maintenance Agreement for this site is no longer warranted because groundwater cleanup goals (California drinking water maximum contaminant levels) have been met, as documented in the Five-Year Remedial Action Review Report, dated April 18, 2018. DTSC approved the Annual Certification Regarding Covenant to Restrict Use of Property dated January 6, 2021. |
| GEOTRACKER ID: 01280050 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 84 | Livermore Redevelopment Agency<br>GEOTRACKER ID: T0600100116 | 5 | 187 North L Street | Livermore | 1A2 | CL | ACEH | 1/2<br>This LUST case was evaluated for closure consistent with the State Water Resource Control Board's Low-Threat Underground Storage Tank Closure Policy (LTCP) for petroleum related contaminants. Alameda County Department of Environmental Health (ACDH) determined that the site met all the LTCP General Criteria and Media Specific Criteria. This case met LTCP Media Specific Evaluation Groundwater case closure scenario 2 for moderate stabilized contaminant plumes. |
| 84 | Livermore Redevelopment Agency<br>GEOTRACKER ID: T0600100116 | 5 | 187 North L Street | Livermore | 1A2 | CL | ACEH | 2/2<br>Case closure was granted for the current commercial land use as a vacant commercial rental yard and vacant office building. If a change in land use to any residential, commercial other than as a vacant commercial rental yard and vacant office building, or conservative land use, or if any site redevelopment is planned, ACDH must be notified as required by Government Code Section 65850.2.2. |
| 115 | LASC/MOSC (Livermore Arcade)<br>GEOTRACKER ID: SL18227625 | Livermore Arcade (Miller's Outpost) | 1410/1554 First Street | Livermore | 1A2 | 7 | RWQCB | The Indoor Air, Subslab Vapor, and Soil Vapor Sampling Plan in and the Off-Site Soil Vapor Intrusion Evaluation Work, submitted by Apex Companies, LLC, were approved by the SFBRWQCB in the 2021 Water Year. |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 115 | LASC/MOSC (Livermore Arcade) | Livermore Arcade (Miller's Outpost) | 1410/1554 First Street | Livermore | 1A2 | 7 | RWQCB | 1/2 The RWCCB approved the 2020 First and Second Quarter Semi-Annual Groundwater Monitoring and Remedial Progress Reports in December 2020. Forty-four groundwater monitoring wells located at and downgradient of the source properties were sampled. Analytical groundwater results report PCE concentrations in 24 wells above environmental screening levels (ESL) for vapor intrusion commercial/industrial and PCE concentrations in 30 wells above vapor intrusion residential ESLs. |
| GEOTRACKER ID: SL18227625 | | | | | | | | |
| 115 | LASC/MOSC (Livermore Arcade) | Livermore Arcade (Miller's Outpost) | 1410/1554 First Street | Livermore | 1A2 | 7 | RWQCB | 2/2 According to the 2020 reports, PCE concentrations in the LASC source area wells were significantly less than the concentrations measured prior to the 2017 EISB injections and PCE concentrations in the MOSC area had slightly increased since the last monitoring event. PCE concentrations downgradient of the source properties remained stable. |
| GEOTRACKER ID: SL18227625 | | | | | | | | |
| 115 | LASC/MOSC (Livermore Arcade) | Livermore Arcade (Miller's Outpost) | 1410/1554 First Street | Livermore | 1A2 | 7 | RWQCB | April 8, 2021, the RWQCB approved the Off-Site Soil Vapor Intrusion Evaluation Work Plan submitted by Apex Companies, LLC, for the Livermore Arcade Shopping Center. |
| GEOTRACKER ID: SL18227625 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 137 | Busick Air Conditioning | Busick Gearing Properties | 6341 Scarlett Court | Dublin | 2A3 | 5C | RWQCB | RWQCB issued a directive letter on October 15, 2019 requiring a technical report for the vapor intrusion assessment and groundwater investigation at the site, in addition to the implementation of the remedial investigation workplan dated March 12, 2014. The technical report was due February 24,2020. |
| GEOTRACKER ID: SL20256874 | | | | | | | | |
| 149 | Kaiser Sand and Gravel | Hanson Aggregates | 3000 Busch Road | Pleasanton | 2A4 | 5R | ACEH | Cases SLT19719376 and SL0600101555 (AOCs 2 through 9) have been eligible for closure as of 9/18/2020. Case T10000009398 (AOC 6 and 7) is open for long term management as of 7/18/2017. The site's remaining environmental concerns will be conducted under two new SCP cases (RO0003458 and RO0003459). |
| GEOTRACKER ID: SLT19719376 | | | | | | | | |
| 164 | Mike Fuller/Jeff Pitcock | Fuller Card Lock/Bay Counties CFN | 533 Exchange Court and National Drive | Livermore | 2A2 | 3B | ACEH | McGinly and Associates submitted a Data Gap Work Plan for investigation of soil and groundwater conditions resulting from an unauthorized release discovered during removal and replacement of fuel dispensers and under dispenser containments. ACDH evaluated the case in accordance with the State Water Resources Control Board's Low Threat Underground Storage Tank Case Closure Policy and proposed admendments to the soil and groundwater sampling scope of work. |
| GEOTRACKER ID: T0600122511 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| **209** | Shell Oil | SHELL #13-5244 | 8999 San Ramon Road | Dublin | 2C | CL | ACEH | 1/2<br>ACDH closed this case in June 2021. The case was evaluated for closure consistent with the RWQCB's LTCP) for petroleum related contaminants. ACDH determined that the site met the LTCP General Criteria and Groundwater Media Specific Criteria and the Petroleum Vapor Intrusion Media Specific Criteria by the active fueling station exception. |
| ***GEOTRACKER ID:*** T0600159797 | | | | | | | | |
| **209** | Shell Oil | SHELL #13-5244 | 8999 San Ramon Road | Dublin | 2C | CL | ACEH | 2/2<br>The following groundwater specific closure criterias were met; The contaminant plume that exceeds water quality objectives is <1,000 feet in length, there is no free product, the nearest existing water supply well or surface water body is >1,000 feet from the defined plume boundary, and the dissolved concentrations of benzene and MTBE are both <1,000 µg/L. |
| ***GEOTRACKER ID:*** T0600159797 | | | | | | | | |
| **232** | Bordoni Ranch LLC and Green Valley Corporation Tenancy in Common | Groth Brothers Chevrolet | 59 South L Street | Livermore | 2A2 | 5R | RWQCB | The Revised Vapor Intrusion Mitigation System Design Report was approved November, 2020. Construction of the system was in progress and inspected in November 2020. |
| ***GEOTRACKER ID:*** SL0600147081 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 232 | Bordoni Ranch LLC and Green Valley Corporation Tenancy in Common | Groth Brothers Chevrolet | 59 South L Street | Livermore | 2A2 | 5R | RWQCB | In March 2021, a Soil and Groundwater Management Completion Report by Geocon Consultants was submitted. SFBRWB reviewed this report and requested revisions to clarify the presented results. |
| GEOTRACKER ID: SL0600147081 | | | | | | | | |
| 242 | Alameda County Fairgrounds | Fairground Main Well (3S/1E 20B 2) | 4501 Pleasanton Avenue | Pleasanton | 1A1 | 1 | | In January 2021, Zone 7 provided comments to the San Francisco Regional Water Quality Board on the American Cleaners Feasibilty Study as requested by the Water Board. |
| GEOTRACKER ID: | | | | | | | | |
| 250 | Murray Kelsoe | Sunol Tree Gas | 3004 andrade Road | Sunol | 1A1 | 7 | RWQCB | ACDH approved the May 25, 2021 Interim Remedial Action Plan (IRAP), prepared and submitted by RMD Environmental Solutions, Inc. for soil excavation, which consists of excavating soil impacted with Total Petroleum Hydrocarbons (TPH) as gasoline (g) and constituents above their applicable Environmental Screening Levels (ESLs) or extent practicable along the gasoline spill path, which resulting from a vehicle accident on Interstate 680. |
| GEOTRACKER ID: T0600114064 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 259 | City of Livermore | CHEVRON #30-7233 /Mills Square Park/Performing Arts Theater | 2259 First Street | Livermore | 2A4 | 7 | ACEH | ACDH conditionally approved the Final Lead RAIP and Final Petroleum RAIP on October 15, 2020. This approval is limited to the remedial actions relating to the soil matrix only. ACDH approved the Supplemental Remedial Action Implementation Plan Addendum on September 22, 2021, |
| GEOTRACKER ID: T0600196622 | | | | | | | | |
| 259 | City of Livermore | CHEVRON #30-7233 /Mills Square Park/Performing Arts Theater | 2259 First Street | Livermore | 2A4 | 7 | ACEH | According to a monthly status update by Arcadis, dated May 3rd, 2021, the first semiannual groundwater sampling event was completed March 28, 2021. |
| GEOTRACKER ID: T0600196622 | | | | | | | | |
| 267 | Shamrock Ford | Shamrock Ford | 7499 Dublin Boulevard | Dublin | 3A2 | 3A | ACEH | According to the 2000 Soil and Groundwater Sampling Report by Clayton Group Services, TPH, MTBE and BTEX were detected in some goundwater samples above reporting limits. This case has been open and inactive as of 1/14/2016. |
| GEOTRACKER ID: T0600101067 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 284 | Gabriel Chiu | Former Crow Canyon Dry Cleaner | 7272 or 7242 San Ramon Road | Dublin | 3C | 8 | ACEH | In 2020, ACDH required the submittal of deliverables including the Evaluation, Work Plan, & Site Conceptual Model and an Interim Risk Management Plan no later than May 8, 2020. This deliverable has not been uploaded to Geotracker. |
| GEOTRACKER ID: T06019764784 | | | | | | | | |
| 291 | Country Club Cleaners | Perciva/Metro Valley Cleaners | 224 Rickenbacker Circle | Livermore | 3A2 | 7 | ACEH | Paloma Environmental Services submitted a Soil and Groundwater Assessment Technical Memorandum Paloma Environmental Services in January 2021. According to this report, Tetrachloroethylene (PCE) was detected above EPA MCL in 1 of eleven grab groundwater samples in MW-2 (7.27 µg/L). |
| GEOTRACKER ID: T06019748481 | | | | | | | | |
| 291 | Country Club Cleaners | Perciva/Metro Valley Cleaners | 224 Rickenbacker Circle | Livermore | 3A2 | 7 | ACEH | In February 2021, Paloma Environmental Services submitted a site investigation summary report which includes groundwater analysis from the February 2021 monitoring event. During this event, groundwater samples were collected from 9 wells and one grab sample. PCE and TCE concentrations were detected in some wells at levels below the SFRWQCB ESL and/or EPA MCL of 5 µg/L for both constituents. |
| GEOTRACKER ID: T06019748481 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 292 | CW Roen | Former K&S Heavy Equipment | 495 Greenville Road | Livermore | 2C | CL | ACEH | Case closed as of 7/19/2021. ACDH's closure determination was based on a human health and ecological risk analysis including applicable ESLs. ACDH concluded that historic on-site operations had not adversly effected groundwater quality at the site. |
| GEOTRACKER ID: T06019726510 | | | | | | | | |
| 298 | Chevron | Former Chevron Records Facility | 6400 Sierra Court | Dublin | 2B4 | 7 | RWQCB | The Regional Water Board Order approved a revised Self-Monitoring Program in May, 2021 to reduce monitoring from an annual to a semi-annual basis. |
| GEOTRACKER ID: SL0600196603 | | | | | | | | |
| 299 | TDW Construction | Nica Metals | 101 Greenville Road | Livermore | 3A2 | 3A | ACEH | Site is non-compliant. Soil removal and a site assessment were due May 2010. ACDH issued notice of violation letters in 2009 and 2010. There was no change in status for this case in the 2020 WY. |
| GEOTRACKER ID: SLT19765274 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 302 | Federal Corrections Institution Dublin | FCI Dublin | 5701 8th Street | Dublin | 3A1 | 3B | ACEH | In response to a site investigation report, ACDH commented in 2010 that further investigation is needed to determine groundwater gradient and extent of contamination. Quarterly monitoring was required. The RP submitted a case closure request in Oct 2010. The case is still open and ACDH has not agreed to closure. No change in 2021 water year. |
| GEOTRACKER ID: SLT19749067 | | | | | | | | |
| 307 | City of Pleasanton Public Works | City of Pleasanton Theater Parking Lot | 0 Kottinger Drive | Pleasanton | 3B1 | 5C | ACEH | The new ACEH caseworker sent a letter on May 21, 2018 requesting a meeting to move the case to closure. There are no additional notes on GeoTracker for the 2021 WY. |
| GEOTRACKER ID: T10000001164 | | | | | | | | |
| 308 | Stockbridge/BHV Emerald Place Land Co | Green on Park Place | 5411 Martinelli Way | Dublin | 3C | 8 | ACEH | ACDH established a Cleanup Program Site case RO0003131 to evaluate commercial land use scenario relative to the proposed IKEA redevelopment. Underground storage tank case RO0002993 has been closed for this site. |
| GEOTRACKER ID: T10000005547 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 311 | Crown Chevrolet | Aster Apartments/Crown Chevrolet Cadillac Isuzu | 6775 Golden Gate Drive (formerly 7544 Dublin Boulevard) | Dublin | 3A1 | 5R | ACEH | According to the 2020 Indoor Air and Sub-Slab Soil Gas Sampling Report, two indoor air samples and one outdoor air sample were collected by GeoKinetics in October 2020. Benzene, chlorobenzene, 1,1-DCE, 1,4-DCB, chlorobenzene, trans-1,2-DCE, and vinyl chloride were detected in at least one sample. PCE, the main constituent of concern for the site, was detected at concentrations of 0.86 and 0.89 micrograms per cubic meter (µg/m3) in the indoor air samples. The 2020 sampling report is pending regulatory review. |
| GEOTRACKER ID: T10000010517 | | | | | | | | |
| 311 | Crown Chevrolet | Aster Apartments/Crown Chevrolet Cadillac Isuzu | 6775 Golden Gate Drive (formerly 7544 Dublin Boulevard) | Dublin | 3A1 | 5R | ACEH | 1/2<br>In March 2021, ACDH assigned the Case to a status of "Open – Long Term Management" on the State Water Board's GeoTracker database to align with the next phase of work. ACDH concurred with that engineering controls currently in-place at the Site are sufficient to control the vapor intrusion pathway and that vapor intrusion is not currently considered a complete exposure pathway to on-site receptors. |
| GEOTRACKER ID: T10000010517 | | | | | | | | |
| 311 | Crown Chevrolet | Aster Apartments/Crown Chevrolet Cadillac Isuzu | 6775 Golden Gate Drive (formerly 7544 Dublin Boulevard) | Dublin | 3A1 | 5R | ACEH | 2/2<br>ACDH required the Operations, Maintenance, Monitoring, and Reporting Plan for Vapor Mitigation System (the "OMM&R Plan") to include the full TO-15 suite be reported for all soil vapor samples and contingencies for the implementation of point of control sampling. |
| GEOTRACKER ID: T10000010517 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 312 | Cemex | Cemex Sunol | 6527 Calaveras Road | Sunol | 3A1 | 1 | ACEH | CEMEX responded to ACEH's letter asking for funds to cover oversight. They said the spill was contained and cleaned up immediately after release the same day ACEH was notified. A report was filed within two days. They don't feel there is cause to open a case for investigation/remediation. Case is listed as Inactive on GeoTracker. No update in the 2021 WY. |
| GEOTRACKER ID: T10000003431 | | | | | | | | |
| 313 | Good Year Tire and Rubber Company | Just Tires | 1485 First Street | Livermore | 2C | 8 | ACEH | No updates were reported for this case in the 2021 WY. Comments on pending closure were due January 2017. |
| GEOTRACKER ID: T10000003435 | | | | | | | | |
| 317 | Walgreens | Walgreens Spill Sunol | 9494 Koopman Road | Sunol | 2C | 8 | ACEH | Case was eligible for closure by ACDH under the LTCP. The RP was required to remove any remaining waste from the site and provide ACDH with a report by April 22, 2018 to finalize the requirements for case closure. Apex submitted a Site Cleanup Program Case Closure letter to ACDH in October 2020 in response to ACDH's 2018 finalization requirements. |
| GEOTRACKER ID: T10000006478 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 318 | E&B Natural Resources Management Corporation | G.I.G Oil Production Facility | 8467 Patterson Pass Road | Livermore | 2A4 | 8 | ACEH | ACDH has not responded to the RP's case closure request in 2017. All soil and groundwater samples were non-detect for fuel contaminants and within background range for metals. |
| GEOTRACKER ID: T10000007269 | | | | | | | | |
| 319 | Johnson Drive Holdings I, LLC/Clorox Products Manufacturing | Former Clorox Site - Building 7 | 7200 - 7208 Johnson Drive | Pleasanton | 2A2 | 5R | RWQCB | Building 7 remains open while the a portion of the Former Clorox site containing Building 8 has closed (TS#316, GeoTracker ID T10000005195). The RWQCB approved the expansion of the SVE system to accelerate remediation of PCE in soil vapor. The 2021 Soil Vapor Extraction System Expansion Completion Report submitted by Rosso Environmental was approved by the REWQCB in June 2021. |
| GEOTRACKER ID: T10000007118 | | | | | | | | |
| 320 | Ready Family Partnership, LP | Dublin Crossroads Center & Park Ave Cleaners | 7100-7120 Dublin Boulevard | Dublin | 2A4 | 5C | ACDEH | A Site Investigation Report was requested by ACDH in 2020. There were no new regulatory activities in 2021 water year. |
| GEOTRACKER ID: T10000004783 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 322 | Pacific Locomotive Association DBA Niles Canyon Railway<br>GEOTRACKER ID: T10000006021 | Niles Canyon Railway | 9 Kilkare Road | Sunol | 3B1 | 7 | ACDEH | No updates in the 2021 water year. An oil leak was discovered from a locomotive on the Niles Canyon Railway. Soil was removed and confirmation sampling was conducted under the direction of the ACDH. The report was submitted to ACDH on 7/20/2016. The RP requested closure. ACDH sent a notice to comply letter in July 2020 for submission of Revised Site Investigation Report. A response from the RP was received in July 2020 to review. Regulatory response is pending. |
| 323 | Stoll Main Street Trust<br>GEOTRACKER ID: T10000008240 | Former American Cleaners | 555 Main Street | Pleasanton | 1A4 | 3A | RWQCB | 1/2<br>The RP submitted a Ground Water Monitoring and Sampling Report to the RWQCB in December 2020. Groundwater was analyzed from one deep well (screened from 180 to 190 feet), 4 shallow wells (screened from 30-50 feet), and 5 groundwater grab samples. VOCs were detected in all well samples above California MCLs including PCE levels at 27,000 ug/l in MW-3 screened from 30 to 50 feet below surface. |
| 323 | Stoll Main Street Trust<br>GEOTRACKER ID: T10000008240 | Former American Cleaners | 555 Main Street | Pleasanton | 1A4 | 3A | RWQCB | 2/2<br>Analytical groundwater results from well MW-1D, screened from 180 to 190 feet below surface, reported detections of VOCs, including PCE ranging from 11 to 35 ug/l in 2020. Analytical groundwater results of groundwater grab samples at this location reported detections of PCE ranging from 3.0 ug/l in MW1D-W-51 to 1,100 ug/l in MW1D-W-127. |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 323 | Stoll Main Street Trust | Former American Cleaners | 555 Main Street | Pleasanton | 1A4 | 3A | RWQCB | In June 2021, the RWQCB approved the May 31, 2021, Indoor Air and Subslab Vapor Assessment Work Plan submitted by AdvancedGeo and required the addressees to submit an investigation completion report. |
| GEOTRACKER ID: T10000008240 | | | | | | | | |
| 323 | Stoll Main Street Trust | Former American Cleaners | 555 Main Street | Pleasanton | 1A4 | 3A | RWQCB | On 9/22/2021, the RWQCB approved the August 16, 2021 Soil Vapor Extraction & In-Situ Air Sparging Pilot Test Work Plan. The proposed 6-month pilot test is designed to evaluate feasibility of combining air sparging with SVE as a remediation method and evaluate feasibility of volatilizing dissolved chlorinated solvents (PCE) as a remediation method at the site. |
| GEOTRACKER ID: T10000008240 | | | | | | | | |
| 324 | MidPen Housing Corporation | Chestnut Square | 1651 and 1665 Chestnut Street | Livermore | 1A2 | 8 | ACDEH | ACDH is proceeding with regulatory case closure of Cleanup Program Case No. RO0003179 and has transitioned regulatory oversight to two separate Long-Term Management Cases identified by ACDH Case Nos. RO0003461 (Chestnut Square Family Housing) and RO0003460 (Chestnut Square Senior Housing). |
| GEOTRACKER ID: T10000007202 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 325 | MidPen Housing Corporation | 217 North N St | 217 North N Street | Livermore | 2A1 | 8 | ACDEH | ACDH concurred the vapor intrusion mitigation and migration engineering controls (VIMMECs) for buidings 3,4,5, and 6 and issuanced the certificate of occupancy clearance for these buildings. The CAP for this site includes mitigation measures to protect future residents from an upgradient contamination. |
| GEOTRACKER ID: T10000011094 | | | | | | | | |
| 325 | MidPen Housing Corporation | 217 North N St | 217 North N Street | Livermore | 2A1 | 8 | ACDEH | In March 2021, a new case (RO0003492/T10000016944) was created for tracking long term management at this site. |
| GEOTRACKER ID: T10000011094 | | | | | | | | |
| 326 | City of Livermore | Livermore Department of Public Works | Rincon and Juniper and Spruce | Livermore | 1A1 | 3A | RWQCB | This site has been eligible for closure as of August 2021. Under its current land use, the site is eligible for closure under the State's Low-Threat Closure Policy. SFRWQCB agrees with the RP's site assessment results. The data does not indicate that the former Water Plant and sewage ponds are the source of the residual contamination. |
| GEOTRACKER ID: SLT2O09096 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 327 | BMMR USA, Inc. | VIP Cleaners | 1809 Santa Rita Road, Suite F | Pleasanton | 2A2 | 3B | RWQCB | The RWQCB approved the July 31, 2020, Additional Remedial Investigation (Report) and required the Pleasanton Valley Plaza LLC to submit an investigation workplan to include characterization of the groundwater plume on and off-property. Grab groundwater samples on-property have PCE concentrations up to 140 ug/L and warrant groundwater monitoring wells to confirm contaminant concentrations in the grab groundwater sampling locations and to determine groundwater flow direction. |
| GEOTRACKER ID: T10000008254 | | | | | | | | |
| 327 | BMMR USA, Inc. | VIP Cleaners | 1809 Santa Rita Road, Suite F | Pleasanton | 2A2 | 3B | RWQCB | The RP submitted an Additional Remedial Excavation workplan in the 2021 WY. The RWQCB's response requested that the plan include more comprehensive groundwater sampling to define the extent of the groundwater plume. |
| GEOTRACKER ID: T10000008254 | | | | | | | | |
| 329 | Terrell Bates & Kimberly R Trust | Pleasanton French Laundry (Former) | 560 Main Street | Pleasanton | 2A4 | 3A | RWQCB | According to the RWQCB, the potential media of concern for this site is indoor air and soil vapor. In July 2021, the RWQCB identified steps for the site to be considered for a low-threat case closure evaluation. |
| GEOTRACKER ID: T10000008241 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 330 | FFHS Associates - Gateway, L.P. ; Margo Foster | City Cleaners | 4855 Hopyard Road, Suite C | Pleasanton | 2A4 | 5R | RWQCB | Remediation case as of 7/21/2021. In June 2021, FFHA Associates submitted a Remedial Excavation Report in response to the SFRWQCB's request for an interim remedial action report to include excavation and vapor sampling at the site. This report was approved by SFRWQCB in August 2021. An interim confirmation sub-slab and soil gas sampling report is due. |
| GEOTRACKER ID: T10000008237 | | | | | | | | |
| 331 | Taylor Corporation; John Tanke | Taylor Corporation | 5775 Brisa Street | Livermore | 2A1 | CL | RWQCB | Case closed in July 2021. SFBRWQB found that the groundwater pollution detected beneath the property is likely the result of the migration of pollutants in groundwater from nearby upgradient sources related to releases from historical operations on or near the Salinas Reinforcing property located at 355 South Vasco Road. Therefore SFBRWQB determined that this site is not a source of the groundwater pollution found beneath it and that no further action is required by the current or past property owners. |
| GEOTRACKER ID: T10000013016 | | | | | | | | |
| 332 | Renn Transportation | Renn Transportation Fuel Spill | I-680 | Sunol | 2A2 | 7 | ACDEH | In August 2021, ACDH approved the Interim Remedial Action Plan which consists of excavating soil impacted by the gasoline spill from a vehicle accident on Interstate 680. |
| GEOTRACKER ID: T10000013696 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 335 | J Cleaners | J Cleaners | 2093 Railroad Avenue | Livermore | 1A2 | 3A | RWQCB | In December 2020, Pangea Environmental Services, Inc prepared a Soil Gas Monitoring Workplan for the City of Livermore to evaluate soil gas conditions at the existing buildings, the proposed future buildings, and the Former J Cleaners Facility and Excavation Area. |
| GEOTRACKER ID: T10000008401 | | | | | | | | |
| 336 | Old Train Depot | Old Train Depot | 2009 Railroad Avenue | Livermore | 1A2 | 5C | RWQCB | A Data Gap Assessment Workplan, approved by the SFRWQCB in June 2021, proposed work to further characterize TPH and VOCs in the soil and groundwater. Evaluation includes perched (31-44 feet below ground surface [bgs]) and shallow (60-72 feet bgs) groundwater to further characterize and monitor plume stability. |
| GEOTRACKER ID: T10000016758 | | | | | | | | |
| 336 | Old Train Depot | Old Train Depot | 2009 Railroad Avenue | Livermore | 1A2 | 5C | RWQCB | An Interim Remedial Action Plan, dated May 17, 2021, was prepared for the City of Livermore to "facilitate interim remedial action in advance of site development planned to commence in 2022. This plan includes contingent scope expansion based on data from implementation of the separate Data Gap Assessment Workplanin advance of site development planned to commence in 2022." |
| GEOTRACKER ID: T10000016758 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 337 | Pacific Avenue Cleaners | Pacific Avenue Cleaners | 3018 Pacific Avenue | Livermore | 1A2 | 5C | RWQCB | According to a site characterization study, dated July 2020, PCE was detected in 78% of groundwater samples collected at the site and is the chemical of concern in groundwater. Groundwater water quality data for this study is based on 6 grab groundwater samples collected at shallow depths. Soil vapor data is based on samples collected from 41 locations at this site, one of which reported significantly higher concentrations of PCE, observed in the deeper vapor probe B-33, at concentrations levels of 14864.04 µg/M3. This site is approximately 500 feet north-east of municipal well CWSO4. |
| GEOTRACKER ID: T10000008716 | | | | | | | | |
| 338 | Quality Cleaners | Quality Cleaners | 2048 First Street | Livermore | 1A1 | 3A | RWQCB | In February 2021, the SFRWQCB approved a 2020 Site History Technical Report and 2020 Site Assessment Report. The SFRWQCB concurred with the Report's conclusions that PCE in soil could be a source for vapors in soil gas and that the stability and extent of the VOC plume of in groundwater and soil vapor should be fully assessed. In addition, the SFRWQCB requested the City to submit an Interim Remedial Action Plan (IRAP). |
| GEOTRACKER ID: T10000014462 | | | | | | | | |
| 340 | Arroyo Crossing | Arroyo Crossing | 1364 Arroyo Road | Livermore | 3A1 | 7 | RWQCB | In 2007, RWQCB concurred with a request to proceed with placing geotextile and had no objections to construction preparation on Phase 5. This case is out of compliance with reporting. |
| GEOTRACKER ID: SL0600174278 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 341 | Warmington Homes - Hansen Hills | Warmington Homes - Hansen Hills | Silvergate Drive | Livermore | 3A1 | NR | RWQCB | Inactive as of 6/4/2009. No records have been uploaded to Geotracker for this site. |
| GEOTRACKER ID: SL18307727 | | | | | | | | |
| 342 | Camp Parks | Camp Parks | 0 Parks RFTA | Dublin | 2A2 | 3B | ACDEH | Parks RFTA has 22 areas of concern. A feasability study report for the Tassajara Creek Landfill (CCPRFTA-01) was due 12/16/2021. |
| GEOTRACKER ID: T06019796867 | | | | | | | | |
| 343 | Laguna Oaks Site | Laguna Oaks Site | 3465 Old Foothill Road | Pleasanton | 3A1 | 3B | RWQCB | According to a Site Characterization Report by Dames and Moore in 1992, PCE was dectected in groundwater samples from MW2 and MW-3 but was not detected in the remaining 4 wells samples at the site. A summary of PCE analytical results from a 1992 Quarterly Goundwater Quality Monitoring report presents results from 6 rounds of sampling between July 1990 and November 1992. PCE was dectected in all groundwater samples from wells MW-2 and MW-3 at levels up to 98 ug/L and 610 ug/L, respectively. This site is currently inactive. |
| GEOTRACKER ID: T06019749061 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| **344** | Pleasanton Assisted Living Facility | Pleasanton Assisted Living Facility | 0 JUNIPERO ST & SUNOL | Pleasanton | 3A2 | 3B | RWQCB | Historical landuses for this site include sewage treatment and the City of Pleasanton Corporation Yard. Limited excavations were performed at this site to remove hydrocarbon impacted soils. According to ACDH, further evaluation of the case is required. |

***GEOTRACKER ID:*** T06019724209

Z7 ID - corresponds to file number in TSS database and the location on site maps
OWNER - responsible party for the contamination investigation/cleanup
SITE NAME - indicates a site name if different from owner
PRIORITY - the first number of the priority code indicates whether the case is high priority (1), moderate priority (2), or low priority (3).
STATUS - the status code is based on the RWQCB ranking of the progress of a case (see below)
NOTES - highlights, cureent activites, or concerns at a site.

CASE STATUS CODES:
1 - Leak Confirmed
3A - Preliminary Site Assessment Workplan Submitted
3B - Preliminary Site Assessment Underway
5C - Pollution Characterization Underway
5R Remediation Workplan (Corrective Action Plan) Submitted
7 - Remediation Underway
8 - Post Remediation Monitoring Begun
CL - Case Closure
NR - Further investigation not required
ReO - Reopened

CONCENTRATION ug/L - the most recent concentration in groundwater in micrograms per liter (parts per billion)
CHEMICAL - the chemicals of concern at the site.

BENZ - benzene
CCl4 - carbon tetrachloride
Cr(VI) - hexavalent chromium
1,2-DCE - 1,2-dichloromethene
DRO - diesel range organics
GRO - gasoline range organics
MTBE - methyl tertiary-butyl ether
NO3 - nitrate
PCE - tetrachloroethene
TBA - tertiary-butyl alchohol
TCE - trichloroethene
TOLU - toluene
TPHd - total petroleum hydrocarbons diesel
TPHg - total petroleum hydrocarbons gasoline
TPHmo - total petroleum hydrocarbons motoroil
VC - vinyl chloride
XYL - xylenes

# TABLE 12-2
# MAIN BASIN SALT LOADING
# 2021 WATER YEAR

| INFLOW COMPONENTS | SURFACE WATER | | | RECHARGED WATER | | | SALT LOAD |
|---|---|---|---|---|---|---|---|
| | Volume Applied (AF) | TDS Conc (mg/L) | % Recharged | Volume Recharged (AF) | TDS Conc (mg/L) | Salt Load (Tons) | (Tons per TAF of Rch) |
| **NATURAL STREAM RECHARGE** | **3,854** | **624** | **49%** | **1,887** | **624** | **1,599** | **850** |
| **Arroyo Valle** | **573** | **353** | **99%** | **569** | **353** | **273** | **480** |
| Flood releases recharge | 0 | 226 | 0% | 0 | 226 | 0 | 0 |
| Natural inflow (above AVNL) | 130 | 565 | 143% | 186 | 565 | 143 | 770 |
| Natural inflow (below AVNL) | 443 | 250 | 86% | 383 | 250 | 130 | 340 |
| **Arroyo Mocho** | 826 | 491 | 71% | **586** | **491** | **391** | **670** |
| **Arroyo Las Positas** | 2,455 | 940 | 30% | **732** | **940** | **935** | **1,280** |
| **ARROYO VALLE PRIOR RIGHTS** | **2,423** | **230** | **22%** | **539** | **230** | **168** | **310** |
| **ARTIFICIAL STREAM RECHARGE** | **1,050** | **230** | **26%** | **277** | **230** | **87** | **310** |
| **Arroyo Valle** | 1,050 | 230 | 26% | **277** | **230** | **87** | **310** |
| **Arroyo Mocho** | 0 | 240 | 0% | **0** | **240** | **0** | **0** |
| **Arroyo Las Positas** | 0 | 240 | 0% | **0** | **240** | **0** | **0** |
| **INJECTION WELL RECHARGE** | **-** | **-** | **-** | **0** | **0** | **0** | **0** |
| **RAINFALL RECHARGE** | **9,231** | **0** | **12%** | **1,079** | **0** | **0** | **0** |
| *LAKE RECHARGE* | - | - | - | *490* | *450* | *299* | *610* |
| **LEAKAGE** | **-** | **-** | **-** | **1,248** | **500** | **848** | **680** |
| **APPLIED WATER RECHARGE** | **11,822** | **411** | **15%** | **1,798** | **2,704** | **6,604** | **3,670** |
| **Urban - Municipal** | 8,889 | 404 | 16% | 1,407 | 2,555 | 4,884 | 3,470 |
| **Urban - Recycled Water** | 738 | 670 | 20% | 148 | 3,351 | 672 | 4,560 |
| **Agricultural - Municipal (SBA)** | 1,490 | 264 | 6% | 86 | 4,575 | 534 | 6,210 |
| **Agricultural - Groundwater** | 85 | 595 | 18% | 15 | 3,296 | 69 | 4,510 |
| **Golf Courses - Groundwater** | 279 | 396 | 26% | 73 | 1,510 | 150 | 2,050 |
| **Golf Courses - Recycled Water** | 341 | 636 | 20% | 68 | 3,174 | 295 | 4,310 |
| **SUBSURFACE BASIN INFLOW** | | | | **1,000** | **1,560** | **2,119** | **2,120** |
| **TOTAL INFLOW** | | | | **7,827** | **1,074** | **11,425** | **1,460** |

| OUTFLOW COMPONENTS | | WATER EXTRACTED | | | SALT REMOVED |
|---|---|---|---|---|---|
| | | Volume Removed (AF) | TDS Conc (mg/L) | Salt Removed (Tons) | (Tons/TAF of Export) |
| **MUNICIPAL PUMPAGE** | | **22,806** | **576** | **17,857** | **780** |
| **Zone 7 Wells - Hop, Stone, COL** | | **8,598** | **550** | **6,420** | **750** |
| **Zone 7 Wells - Mocho** | | **7,842** | **653** | **6,961** | **890** |
| *Demin Salts Exported from Valley* | *(subset of Zone 7 - Mocho)* | *143* | *2,307* | *449* | *3,130* |
| **Other** | | **6,366** | **518** | **4,476** | **700** |
| **AGRICULTURAL PUMPAGE (all salt is reapplied)** | | **122** | **595** | **98** | **810** |
| **MINING USE** | | **5,072** | **59** | **409** | **80** |
| Stream Export | | 0 | 430 | 0 | 0 |
| | *Discharge to Cope* | *548* | *450* | *335* | *610* |
| Evaporation | | 4,372 | 0 | 0 | 0 |
| Processing Losses | | 700 | 430 | 409 | 580 |
| **GROUNDWATER BASIN OVERFLOW** | | **0** | **530** | **0** | **0** |
| **TOTAL OUTFLOW** | | **27,999** | **483** | **18,364** | **660** |

| | | | | |
|---|---|---|---|---|
| **NET IN 2021 WY** | **-20,172** | **253** | **-6,939** | |

# TABLE 12-3
# HISTORICAL SALT LOADING (in tons)
# 1974 TO 2021 WATER YEARS

| SALT INFLOW COMPONENTS | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|
| **NATURAL STREAM RECHARGE** | **3,210** | **3,464** | **874** | **581** | **4,638** | **1,723** | **2,706** |
| **Total Arroyo Valle** | **1,018** | **1,041** | **391** | **315** | **957** | **707** | **777** |
| Flood releases recharge | 100 | 344 | 0 | 0 | 216 | 0 | 128 |
| Non Flood Natural Inflow | 918 | 697 | 391 | 315 | 741 | 707 | 649 |
| **Arroyo Mocho** | **1,717** | **2,043** | **293** | **76** | **3,206** | **636** | **1,358** |
| **Arroyo Las Positas** | **475** | **380** | **190** | **190** | **475** | **380** | **571** |
| **AV PRIOR RIGHTS** | **361** | **418** | **31** | **0** | **494** | **267** | **386** |
| **ARTIFICIAL STREAM RECHARGE** | **986** | **2,201** | **1,914** | **2,289** | **3,286** | **3,699** | **2,897** |
| Arroyo Valle | 293 | 1,174 | 509 | 883 | 1,427 | 1,599 | 1,234 |
| Arroyo Mocho | 340 | 497 | 875 | 876 | 1,350 | 1,570 | 1,432 |
| Arroyo Las Positas | 353 | 530 | 530 | 530 | 509 | 530 | 231 |
| **INJECTION WELL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **RAINFALL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **LEAKAGE** | **21** | **25** | **30** | **35** | **41** | **48** | **56** |
| **APPLIED WATER RECHARGE** | **7,670** | **7,218** | **9,123** | **10,675** | **8,352** | **8,304** | **7,175** |
| **SUBSURFACE BASIN INFLOW** | **2,038** | **2,038** | **2,058** | **3,648** | **2,506** | **2,017** | **1,325** |
| **NET INFLOW** | **14,286** | **15,364** | **14,030** | **17,228** | **19,317** | **16,058** | **14,545** |

| OUTFLOW COMPONENTS | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|
| **MUNICIPAL PUMPAGE** | **-7,217** | **-6,577** | **-5,074** | **-4,382** | **-4,579** | **-5,351** | **-4,458** |
| **Zone 7 Wells - Hop, Stone, COL** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Zone 7 Wells - Mocho** | **-3,303** | **-2,057** | **-842** | **-201** | **-506** | **-532** | **-26** |
| *Demin Salts Exported from Valley* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Other Pumpage** | **-3,914** | **-4,520** | **-4,232** | **-4,181** | **-4,073** | **-4,819** | **-4,432** |
| **AGRICULTURAL PUMPAGE** | **-2,289** | **-1,476** | **-2,997** | **-3,241** | **-2,081** | **-2,420** | **-1,678** |
| **MINING USE** | **-1,126** | **-1,725** | **-802** | **-668** | **-869** | **-1,603** | **-2,508** |
| **Stream Export** | -745 | -1,345 | -422 | -287 | -489 | -1,223 | -2,127 |
| **Evaporation** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Processing Losses** | -380 | -380 | -380 | -380 | -380 | -380 | -380 |
| **GROUNDWATER BASIN OVERFLOW** | **0** | **0** | **0** | **0** | **0** | **-173** | **-612** |
| **NET OUTFLOW** | **-10,632** | **-9,778** | **-8,873** | **-8,291** | **-7,529** | **-9,547** | **-9,256** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **NET SALT INFLOW (Tons)** | **3,654** | **5,586** | **5,157** | **8,937** | **11,788** | **6,511** | **5,289** |
| **CUMULATIVE SALT INFLOW (Tons)*** | **3,654** | **9,240** | **14,397** | **23,334** | **35,122** | **41,633** | **46,922** |

| TDS Concentration Calculations | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|
| Net Basin Recharge (AF) | -478 | 5,508 | -4,311 | -5,953 | 11,942 | 6,394 | 8,103 |
| Basin Storage (HI Method)(AF) | 211,522 | 217,030 | 212,719 | 206,766 | 218,708 | 225,102 | 233,205 |
| Total Salt in Main Basin (tons) | 133,252 | 138,838 | 143,995 | 152,932 | 164,720 | 171,231 | 176,520 |
| **Main Basin TDS Concentration (mg/L)** | **464** | **471** | **498** | **544** | **554** | **560** | **557** |
| **Cumulative Increase in TDS Conc (mg/L)**** | **14** | **21** | **48** | **94** | **104** | **110** | **107** |

* Basinwide salt buildup since 1973

** Basinwide TDS concentration increase relative to 1973 value of 450 mg/L

# TABLE 12-3
# HISTORICAL SALT LOADING (in tons)
# 1974 TO 2021 WATER YEARS

| SALT INFLOW COMPONENTS | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|---|---|
| **NATURAL STREAM RECHARGE** | **1,513** | **4,803** | **7,657** | **5,286** | **3,058** | **4,941** | **2,852** | **2,610** | **2,782** | **2,480** |
| **Total Arroyo Valle** | **579** | **1,048** | **1,433** | **936** | **375** | **779** | **232** | **372** | **187** | **206** |
| Flood releases recharge | 0 | 271 | 624 | 20 | 0 | 415 | 0 | 0 | 0 | 0 |
| Non Flood Natural Inflow | 579 | 777 | 809 | 916 | 375 | 364 | 232 | 372 | 187 | 206 |
| **Arroyo Mocho** | **478** | **2,614** | **4,626** | **2,508** | **932** | **2,269** | **458** | **490** | **440** | **233** |
| **Arroyo Las Positas** | **456** | **1,141** | **1,598** | **1,842** | **1,751** | **1,893** | **2,162** | **1,748** | **2,155** | **2,041** |
| **AV PRIOR RIGHTS** | **251** | **502** | **381** | **236** | **328** | **286** | **283** | **325** | **356** | **125** |
| **ARTIFICIAL STREAM RECHARGE** | **3,238** | **1,617** | **184** | **0** | **0** | **0** | **0** | **525** | **1,585** | **1,809** |
| Arroyo Valle | 1,719 | 663 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 132 |
| Arroyo Mocho | 1,394 | 894 | 184 | 0 | 0 | 0 | 0 | 525 | 1,534 | 1,677 |
| Arroyo Las Positas | 125 | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **INJECTION WELL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **RAINFALL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **LEAKAGE** | **65** | **74** | **84** | **94** | **105** | **115** | **125** | **136** | **147** | **158** |
| **APPLIED WATER RECHARGE** | **5,507** | **4,709** | **4,723** | **5,046** | **5,938** | **6,632** | **5,558** | **6,834** | **6,015** | **6,541** |
| **SUBSURFACE BASIN INFLOW** | **1,284** | **1,284** | **876** | **1,325** | **1,528** | **1,508** | **1,569** | **1,875** | **2,364** | **2,568** |
| **NET INFLOW** | **11,858** | **12,989** | **13,905** | **11,987** | **10,957** | **13,482** | **10,387** | **12,305** | **13,249** | **13,681** |

| OUTFLOW COMPONENTS | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|---|---|
| **MUNICIPAL PUMPAGE** | **-4,700** | **-4,748** | **-5,410** | **-5,525** | **-5,752** | **-6,465** | **-5,537** | **-6,662** | **-6,915** | **-7,185** |
| **Zone 7 Wells - Hop, Stone, COL** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **-54** | **-441** |
| **Zone 7 Wells - Mocho** | **0** | **0** | **-17** | **-227** | **-863** | **-869** | **-326** | **-1,425** | **-2,082** | **-1,683** |
| *Demin Salts Exported from Valley* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Other Pumpage** | **-4,700** | **-4,748** | **-5,393** | **-5,298** | **-4,889** | **-5,595** | **-5,211** | **-5,237** | **-4,779** | **-5,062** |
| **AGRICULTURAL PUMPAGE** | **-1,553** | **-844** | **-912** | **-1,015** | **-1,378** | **-1,428** | **-998** | **-1,043** | **-776** | **-944** |
| **MINING USE** | **-4,372** | **-4,161** | **-7,834** | **-2,857** | **-2,814** | **-6,011** | **-839** | **-2,301** | **-1,728** | **-918** |
| **Stream Export** | -3,992 | -3,781 | -7,454 | -2,476 | -2,433 | -5,535 | -364 | -1,825 | -1,253 | -443 |
| **Evaporation** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Processing Losses** | -380 | -380 | -380 | -380 | -380 | -475 | -475 | -475 | -475 | -475 |
| **GROUNDWATER BASIN OVERFLOW** | **-635** | **-2,494** | **-3,418** | **-2,587** | **-1,386** | **-693** | **-693** | **-462** | **-122** | **0** |
| **NET OUTFLOW** | **-11,260** | **-12,247** | **-17,574** | **-11,984** | **-11,330** | **-14,597** | **-8,067** | **-10,468** | **-9,541** | **-9,047** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **NET SALT INFLOW (Tons)** | **598** | **742** | **-3,669** | **3** | **-373** | **-1,115** | **2,320** | **1,837** | **3,708** | **4,634** |
| **CUMULATIVE SALT INFLOW (Tons)*** | **47,520** | **48,262** | **44,593** | **44,596** | **44,223** | **43,108** | **45,428** | **47,265** | **50,973** | **55,607** |

| TDS Concentration Calculations | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|---|---|
| Net Basin Recharge (AF) | -528 | 11,593 | 9,192 | -4,203 | -9,722 | -1,684 | -7,906 | -9,106 | -4,973 | -5,692 |
| Basin Storage (HI Method)(AF) | 232,677 | 244,270 | 253,462 | 249,259 | 239,537 | 237,853 | 229,947 | 220,841 | 215,868 | 210,176 |
| Total Salt in Main Basin (tons) | 177,118 | 177,860 | 174,191 | 174,194 | 173,821 | 172,706 | 175,026 | 176,863 | 180,571 | 185,205 |
| **Main Basin TDS Concentration (mg/L)** | **560** | **536** | **506** | **514** | **534** | **535** | **560** | **590** | **616** | **649** |
| **Cumulative Increase in TDS Conc (mg/L)**** | **110** | **86** | **56** | **64** | **84** | **85** | **110** | **140** | **166** | **199** |

* Basinwide salt buildup since 1973

** Basinwide TDS concentration increase relative to 1973 value of 450 mg/L

# TABLE 12-3
# HISTORICAL SALT LOADING (in tons)
# 1974 TO 2021 WATER YEARS

| SALT INFLOW COMPONENTS | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|
| **NATURAL STREAM RECHARGE** | **3,356** | **3,665** | **5,743** | **2,544** | **4,376** | **4,331** | **4,639** | **5,704** | **3,727** | **3,409** |
| **Total Arroyo Valle** | **575** | **743** | **1,083** | **300** | **1,034** | **400** | **1,450** | **1,661** | **1,361** | **956** |
| Flood releases recharge | 98 | 0 | 528 | 0 | 472 | 336 | 183 | 524 | 0 | 55 |
| Non Flood Natural Inflow | 477 | 743 | 555 | 300 | 562 | 64 | 1,267 | 1,137 | 1,361 | 901 |
| **Arroyo Mocho** | **1,023** | **814** | **2,174** | **995** | **1,580** | **2,627** | **1,741** | **2,292** | **996** | **857** |
| **Arroyo Las Positas** | **1,758** | **2,108** | **2,486** | **1,249** | **1,762** | **1,304** | **1,448** | **1,751** | **1,370** | **1,596** |
| **AV PRIOR RIGHTS** | **290** | **151** | **276** | **321** | **306** | **87** | **93** | **188** | **149** | **175** |
| **ARTIFICIAL STREAM RECHARGE** | **1,590** | **410** | **1,953** | **2,795** | **1,026** | **491** | **1,325** | **500** | **1,352** | **2,276** |
| Arroyo Valle | 36 | 185 | 385 | 293 | 49 | 31 | 472 | 107 | 321 | 242 |
| Arroyo Mocho | 1,554 | 225 | 1,568 | 2,502 | 977 | 460 | 853 | 393 | 1,031 | 2,034 |
| Arroyo Las Positas | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **INJECTION WELL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **204** | **497** | **498** |
| **RAINFALL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **LEAKAGE** | **169** | **181** | **193** | **206** | **220** | **234** | **248** | **263** | **279** | **294** |
| **APPLIED WATER RECHARGE** | **6,918** | **5,793** | **5,109** | **4,989** | **3,323** | **4,071** | **4,887** | **4,367** | **3,479** | **4,314** |
| **SUBSURFACE BASIN INFLOW** | **3,423** | **3,199** | **2,710** | **2,221** | **2,017** | **1,875** | **1,386** | **1,651** | **1,528** | **1,846** |
| **NET INFLOW** | **15,746** | **13,399** | **15,984** | **13,076** | **11,268** | **11,089** | **12,578** | **12,877** | **11,011** | **12,812** |

| OUTFLOW COMPONENTS | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|
| **MUNICIPAL PUMPAGE** | **-11,014** | **-8,752** | **-6,072** | **-3,867** | **-2,681** | **-3,874** | **-5,192** | **-6,468** | **-6,101** | **-8,560** |
| **Zone 7 Wells - Hop, Stone, COL** | **-1,679** | **-1,185** | **-859** | **-85** | **-87** | **-754** | **-270** | **-475** | **-2,362** | **-2,553** |
| **Zone 7 Wells - Mocho** | **-3,313** | **-2,111** | **-609** | **-24** | **-125** | **-767** | **-682** | **-397** | **-167** | **-783** |
| *Demin Salts Exported from Valley* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Other Pumpage** | **-6,023** | **-5,455** | **-4,604** | **-3,757** | **-2,469** | **-2,353** | **-4,240** | **-5,596** | **-3,572** | **-5,224** |
| **AGRICULTURAL PUMPAGE** | **-249** | **-236** | **-142** | **-130** | **-88** | **-130** | **-155** | **-47** | **-46** | **-188** |
| **MINING USE** | **-970** | **-1,007** | **-2,134** | **-4,928** | **-6,883** | **-7,507** | **-9,983** | **-9,588** | **-8,642** | **-5,792** |
| **Stream Export** | -495 | -532 | -1,658 | -4,453 | -6,408 | -7,041 | -9,460 | -9,084 | -8,081 | -5,316 |
| **Evaporation** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Processing Losses** | -475 | -475 | -475 | -475 | -475 | -466 | -523 | -504 | -561 | -475 |
| **GROUNDWATER BASIN OVERFLOW** | **0** | **0** | **0** | **0** | **-226** | **-968** | **-960** | **-998** | **-482** | **-175** |
| **NET OUTFLOW** | **-12,233** | **-9,995** | **-8,348** | **-8,925** | **-9,878** | **-12,479** | **-16,290** | **-17,101** | **-15,271** | **-14,715** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **NET SALT INFLOW (Tons)** | **3,513** | **3,404** | **7,636** | **4,151** | **1,390** | **-1,390** | **-3,712** | **-4,224** | **-4,260** | **-1,903** |
| **CUMULATIVE SALT INFLOW (Tons)*** | **59,120** | **62,524** | **70,160** | **74,311** | **75,701** | **74,311** | **70,599** | **66,375** | **62,115** | **60,212** |

| TDS Concentration Calculations | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|
| Net Basin Recharge (AF) | -8,389 | -6,628 | 14,974 | 592 | 13,031 | 1,873 | -1,390 | 2,511 | -4,911 | -3,674 |
| Basin Storage (HI Method)(AF) | 201,787 | 195,159 | 210,133 | 210,725 | 223,756 | 225,629 | 224,239 | 226,750 | 221,839 | 218,165 |
| Total Salt in Main Basin (tons) | 188,718 | 192,122 | 199,758 | 203,909 | 205,299 | 203,909 | 200,197 | 195,973 | 191,713 | 189,810 |
| **Main Basin TDS Concentration (mg/L)** | **688** | **725** | **700** | **712** | **675** | **665** | **657** | **636** | **636** | **640** |
| **Cumulative Increase in TDS Conc (mg/L)**** | **238** | **275** | **250** | **262** | **225** | **215** | **207** | **186** | **186** | **190** |

* Basinwide salt buildup since 1973

** Basinwide TDS concentration increase relative to 1973 value of 450 mg/L

4/27/2022
E:\MONITOR\SaltBalance\2021WY\SaltBalaceCalcs2021.xlsx; T12-2-AllSalt

# TABLE 12-3
# HISTORICAL SALT LOADING (in tons)
# 1974 TO 2021 WATER YEARS

| SALT INFLOW COMPONENTS | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| **NATURAL STREAM RECHARGE** | **3,666** | **3,267** | **7,097** | **3,105** | **5,796** | **4,962** | **3,260** | **4,078** | **4,367** | **5,080** |
| **Total Arroyo Valle** | **1,823** | **1,399** | **2,833** | **1,081** | **3,652** | **2,274** | **1,450** | **2,691** | **2,554** | **2,974** |
| Flood releases recharge | 0 | 193 | 302 | 0 | 731 | 0 | 0 | 327 | 0 | 1,383 |
| Non Flood Natural Inflow | 1,823 | 1,206 | 2,531 | 1,081 | 2,921 | 2,274 | 1,450 | 2,364 | 2,554 | 1,591 |
| **Arroyo Mocho** | **575** | **886** | **2,996** | **838** | **1,241** | **1,813** | **839** | **380** | **540** | **1,211** |
| **Arroyo Las Positas** | **1,268** | **982** | **1,268** | **1,186** | **903** | **875** | **971** | **1,007** | **1,273** | **895** |
| **AV PRIOR RIGHTS** | **224** | **399** | **416** | **383** | **80** | **524** | **219** | **100** | **407** | **0** |
| **ARTIFICIAL STREAM RECHARGE** | **1,351** | **3,503** | **2,811** | **2,480** | **1,949** | **1,266** | **1,359** | **727** | **1,248** | **1,690** |
| Arroyo Valle | 501 | 647 | 399 | 476 | 619 | 330 | 782 | 727 | 686 | 635 |
| Arroyo Mocho | 839 | 2,855 | 2,412 | 2,004 | 1,300 | 914 | 577 | 0 | 562 | 1,055 |
| Arroyo Las Positas | 11 | 1 | 0 | 0 | 30 | 22 | 0 | 0 | 0 | 0 |
| **INJECTION WELL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **RAINFALL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **LEAKAGE** | **313** | **333** | **352** | **372** | **393** | **414** | **436** | **458** | **481** | **504** |
| **APPLIED WATER RECHARGE** | **5,074** | **5,606** | **4,618** | **5,090** | **4,824** | **3,223** | **5,157** | **6,258** | **6,152** | **5,079** |
| **SUBSURFACE BASIN INFLOW** | **1,970** | **1,970** | **1,970** | **1,970** | **2,513** | **2,309** | **2,174** | **2,214** | **2,106** | **1,997** |
| **NET INFLOW** | **12,598** | **15,078** | **17,264** | **13,400** | **15,555** | **12,698** | **12,605** | **13,835** | **14,761** | **14,350** |

| OUTFLOW COMPONENTS | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| **MUNICIPAL PUMPAGE** | **-10,467** | **-12,061** | **-11,096** | **-12,419** | **-10,057** | **-5,557** | **-8,423** | **-9,271** | **-14,577** | **-12,609** |
| **Zone 7 Wells - Hop, Stone, COL** | **-3,867** | **-3,690** | **-3,360** | **-4,198** | **-1,858** | **-1,382** | **-1,340** | **-3,217** | **-3,920** | **-1,290** |
| **Zone 7 Wells - Mocho** | **-1,745** | **-3,322** | **-2,271** | **-3,762** | **-3,003** | **-1,170** | **-1,976** | **-1,402** | **-5,448** | **-6,563** |
| *Demin Salts Exported from Valley* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *-798* | *2,759* |
| **Other Pumpage** | **-4,855** | **-5,049** | **-5,465** | **-4,459** | **-5,196** | **-3,005** | **-5,107** | **-4,651** | **-5,208** | **-4,756** |
| **AGRICULTURAL PUMPAGE** | **-182** | **-94** | **-73** | **-79** | **-80** | **-46** | **-43** | **-68** | **-68** | **-73** |
| **MINING USE** | **-4,520** | **-475** | **-276** | **-438** | **-454** | **-658** | **-584** | **-714** | **-1,341** | **-1,428** |
| **Stream Export** | -4,006 | -111 | 0 | -84 | -94 | -218 | -274 | -305 | -913 | -1,057 |
| **Evaporation** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Processing Losses** | -514 | -364 | -276 | -354 | -360 | -440 | -310 | -409 | -428 | -371 |
| **GROUNDWATER BASIN OVERFLOW** | **0** | **0** | **0** | **0** | **0** | **0** | **-738** | **-1,080** | **-171** | **0** |
| **NET OUTFLOW** | **-15,169** | **-12,630** | **-11,445** | **-12,936** | **-10,591** | **-6,261** | **-9,788** | **-11,133** | **-16,157** | **-14,110** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **NET SALT INFLOW (Tons)** | **-2,571** | **2,448** | **5,819** | **464** | **4,964** | **6,437** | **2,817** | **2,702** | **-1,396** | **240** |
| **CUMULATIVE SALT INFLOW (Tons)*** | **57,641** | **60,089** | **65,908** | **66,372** | **71,336** | **77,773** | **80,590** | **83,292** | **81,896** | **82,136** |

| TDS Concentration Calculations | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Net Basin Recharge (AF) | -11,666 | 62 | 8,309 | -4,560 | 13,193 | 8,790 | -3,639 | -3,011 | -4,997 | 4,290 |
| Basin Storage (HI Method)(AF) | 206,499 | 206,561 | 214,870 | 210,310 | 223,503 | 232,293 | 228,654 | 225,643 | 220,646 | 224,936 |
| Total Salt in Main Basin (tons) | 187,239 | 189,687 | 195,506 | 195,970 | 200,934 | 207,371 | 210,188 | 212,890 | 211,494 | 211,734 |
| **Main Basin TDS Concentration (mg/L)** | **667** | **676** | **670** | **686** | **662** | **657** | **677** | **695** | **706** | **693** |
| **Cumulative Increase in TDS Conc (mg/L)**** | **217** | **226** | **220** | **236** | **212** | **207** | **227** | **245** | **256** | **243** |

* Basinwide salt buildup since 1973

** Basinwide TDS concentration increase relative to 1973 value of 450 mg/L

# TABLE 12-3
# HISTORICAL SALT LOADING (in tons)
# 1974 TO 2021 WATER YEARS

| SALT INFLOW COMPONENTS | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | AVG | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NATURAL STREAM RECHARGE** | **5,459** | **2,026** | **2,242** | **1,820** | **3,735** | **3,366** | **4,948** | **1,315** | **3,499** | **1,952** | **1,599** | **3,611** | **173,311** |
| **Total Arroyo Valle** | **3,039** | **553** | **963** | **356** | **1,664** | **1,620** | **2,392** | **249** | **1,153** | **285** | **273** | **1,171** | **56,194** |
| Flood releases recharge | 150 | 0 | 0 | 0 | 0 | 0 | 404 | 0 | 16 | 0 | 0 | 163 | 7,820 |
| Non Flood Natural Inflow | 2,889 | 553 | 963 | 356 | 1,664 | 1,620 | 1,988 | 249 | 1,137 | 285 | 273 | 1,008 | 48,374 |
| **Arroyo Mocho** | **2,056** | **949** | **751** | **973** | **1,472** | **945** | **1,882** | **430** | **1,648** | **834** | **391** | **1,315** | **63,126** |
| **Arroyo Las Positas** | **364** | **524** | **528** | **491** | **599** | **801** | **674** | **636** | **698** | **833** | **935** | **1,125** | **53,991** |
| **AV PRIOR RIGHTS** | **384** | **196** | **409** | **3** | **395** | **288** | **91** | **208** | **249** | **249** | **168** | **260** | **12,458** |
| **ARTIFICIAL STREAM RECHARGE** | **882** | **2,851** | **2,519** | **1,483** | **1,689** | **2,571** | **2,046** | **1,494** | **558** | **675** | **87** | **1,566** | **75,187** |
| Arroyo Valle | 167 | 1,178 | 573 | 339 | 1,667 | 1,299 | 667 | 924 | 442 | 556 | 87 | 531 | 25,506 |
| Arroyo Mocho | 698 | 1,649 | 1,943 | 1,120 | 0 | 1,272 | 1,379 | 570 | 116 | 119 | 0 | 961 | 46,129 |
| Arroyo Las Positas | 17 | 24 | 3 | 24 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 74 | 3,552 |
| **INJECTION WELL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **25** | **1,199** |
| **RAINFALL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| *Lake Recharge* | *0* | *0* | *0* | *1,603* | *2,736* | *3,641* | *6,743* | *8,295* | *6,864* | *3,979* | *299* | *712* | *34,160* |
| **LEAKAGE** | **527** | **551** | **403** | **600** | **625** | **651** | **677** | **703** | **778** | **821** | **848** | **310** | **14,886** |
| **APPLIED WATER RECHARGE** | **4,295** | **6,074** | **8,158** | **5,654** | **6,505** | **5,251** | **4,421** | **5,707** | **5,625** | **6,638** | **6,604** | **5,818** | **279,283** |
| **SUBSURFACE BASIN INFLOW** | **2,024** | **2,092** | **448** | **1,834** | **2,051** | **2,078** | **2,106** | **2,078** | **2,187** | **2,201** | **2,119** | **2,002** | **96,078** |
| **NET INFLOW** | **13,571** | **13,790** | **14,179** | **11,394** | **15,000** | **14,205** | **14,289** | **11,505** | **12,896** | **12,536** | **11,425** | **13,592** | **652,402** |

| OUTFLOW COMPONENTS | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | AVERAGE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MUNICIPAL PUMPAGE** | **-9,873** | **-16,765** | **-12,781** | **-11,831** | **-6,080** | **-6,194** | **-7,635** | **-8,700** | **-10,427** | **-12,388** | **-17,857** | **-10,500** | **-356,958** |
| **Zone 7 Wells - Hop, Stone, COL** | **-1,197** | **-2,785** | **-3,595** | **-2,639** | **-870** | **-750** | **-1,107** | **-1,938** | **-1,982** | **-4,441** | **-6,420** | **-2,642** | **-60,760** |
| **Zone 7 Wells - Mocho** | **-4,040** | **-8,204** | **-3,997** | **-3,713** | **-1,080** | **-666** | **-2,200** | **-2,642** | **-4,895** | **-4,890** | **-6,961** | **-3,241** | **-74,536** |
| *Demin Salts Exported from Valley* | *2,006* | *4,064* | *2,479* | *1,047* | *76* | *183* | *949* | *1,168* | *1,869* | *1,231* | *449* | *364* | *17,482* |
| **Other Pumpage** | **-4,625** | **-5,766** | **-5,179** | **-5,583** | **-4,128** | **-4,779** | **-4,326** | **-4,120** | **-3,549** | **-3,057** | **-4,476** | **-4,618** | **-221,662** |
| **AGRICULTURAL PUMPAGE** | **-68** | **-77** | **-393** | **-515** | **-490** | **-92** | **-84** | **-87** | **-101** | **-97** | **-98** | **-654** | **-31,393** |
| **MINING USE** | **-2,756** | **-3,064** | **-3,042** | **-502** | **-417** | **-378** | **-364** | **-388** | **-368** | **-363** | **-409** | **-3,357** | **-161,119** |
| **Stream Export** | -2,368 | -2,665 | -2,655 | -442 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -2,165 | -103,914 |
| **Evaporation** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Processing Losses** | -388 | -399 | -387 | -364 | -417 | -378 | -364 | -388 | -372 | -363 | -409 | -414 | -19,894 |
| **GROUNDWATER BASIN OVERFLOW** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **-506** | **-758** | **-113** | **0** | **-426** | **-20,450** |
| **NET OUTFLOW** | **-12,697** | **-19,906** | **-16,216** | **-12,848** | **-6,987** | **-6,664** | **-8,083** | **-9,681** | **-11,654** | **-12,961** | **-18,364** | **-11,699** | **-561,537** |

| | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | AVG | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NET SALT INFLOW (Tons)** | **874** | **-6,116** | **-2,037** | **-1,454** | **8,013** | **7,541** | **6,206** | **1,824** | **1,242** | **-425** | **-6,939** | **1,893** | **90,865** |
| **CUMULATIVE SALT INFLOW (Tons)*** | **83,010** | **76,894** | **74,857** | **73,403** | **81,416** | **88,957** | **95,163** | **96,987** | **98,229** | **97,804** | **90,865** | | |

| TDS Concentration Calculations | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Net Basin Recharge (AF) | 6,893 | -10,438 | -5,542 | -12,153 | 6,037 | 15,405 | 25,259 | 285 | 4,482 | -7,921 | -20,172 |
| Basin Storage (HI Method)(AF) | 231,829 | 221,391 | 215,849 | 203,696 | 209,733 | 225,138 | 250,397 | 250,682 | 255,164 | 247,243 | 227,071 |
| Total Salt in Main Basin (tons) | 212,608 | 206,492 | 204,455 | 203,001 | 211,014 | 218,555 | 224,761 | 226,585 | 227,827 | 227,402 | 220,463 |
| **Main Basin TDS Concentration (mg/L)** | **675** | **687** | **697** | **734** | **741** | **715** | **661** | **665** | **657** | **677** | **715** |
| **Cumulative Increase in TDS Conc (mg/L)**** | **225** | **237** | **247** | **284** | **291** | **265** | **211** | **215** | **207** | **227** | **265** |

* Basinwide salt buildup since 1973

** Basinwide TDS concentration increase relative to 1973 value of 450 mg/L

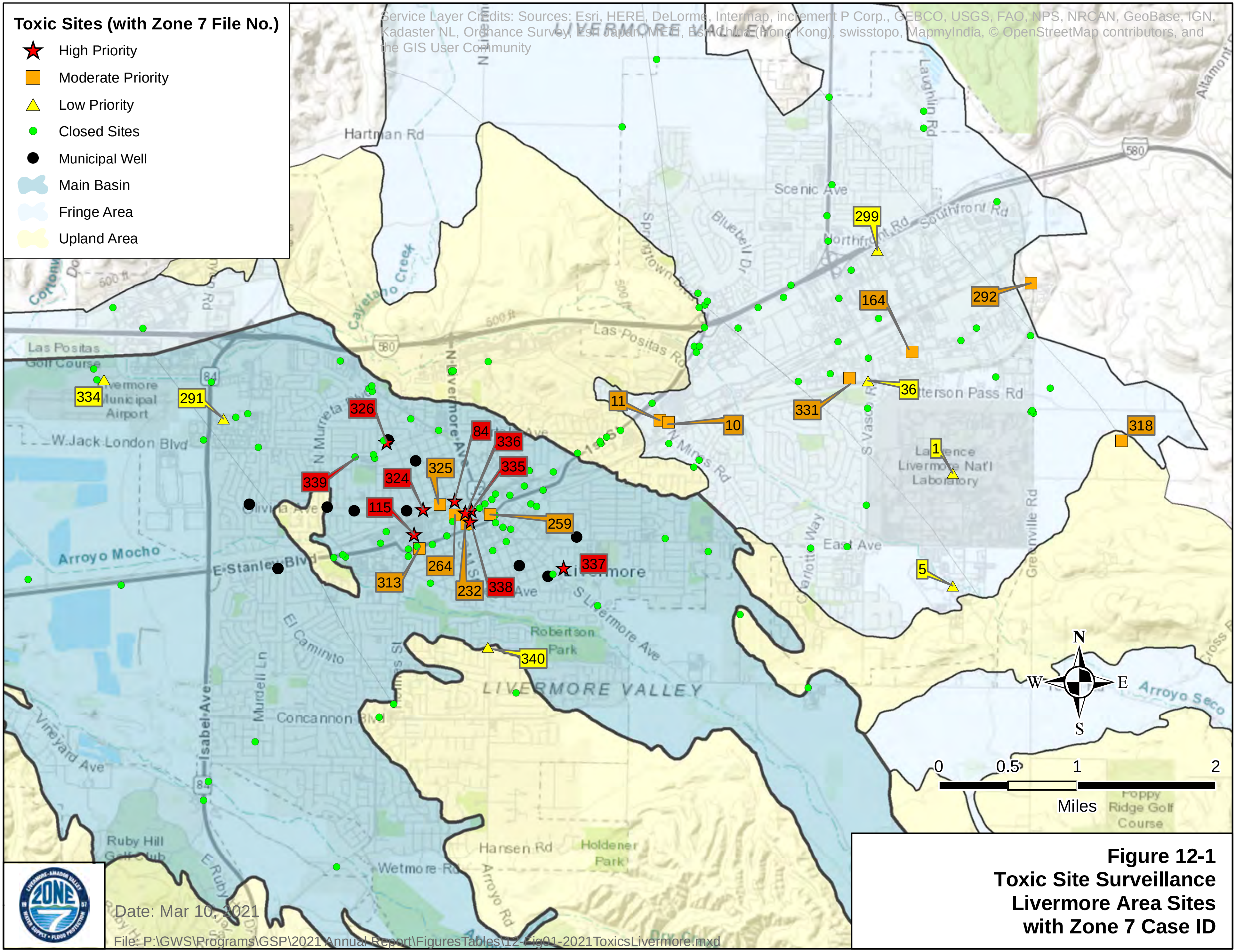
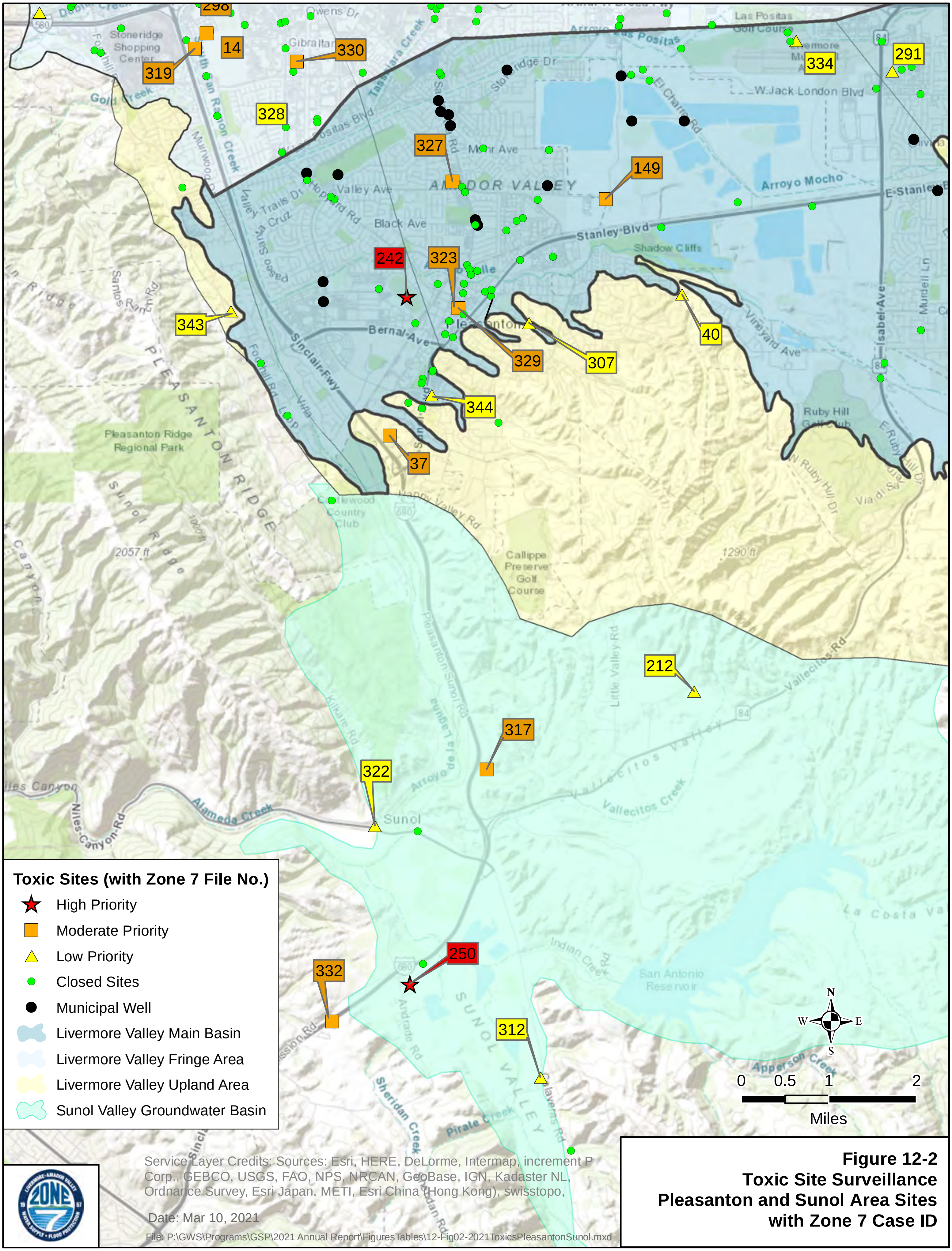



**Figure 12-1**
**Toxic Site Surveillance**
**Livermore Area Sites**
**with Zone 7 Case ID**




Service Layer Credits: Sources: Esri, HERE, DeLorme, Intermap, increment P Corp., GEBCO, USGS, FAO, NPS, NRCAN, GeoBase, IGN, Kadaster NL, Ordnance Survey, Esri Japan, METI, Esri China (Hong Kong), swisstopo,

Date: Mar 10, 2021

File: P:\GWS\Programs\GSP\2021 Annual Report\FiguresTables\12-Fig02-2021ToxicsPleasantonSunol.mxd

**Figure 12-2**
**Toxic Site Surveillance**
**Pleasanton and Sunol Area Sites**
**with Zone 7 Case ID**

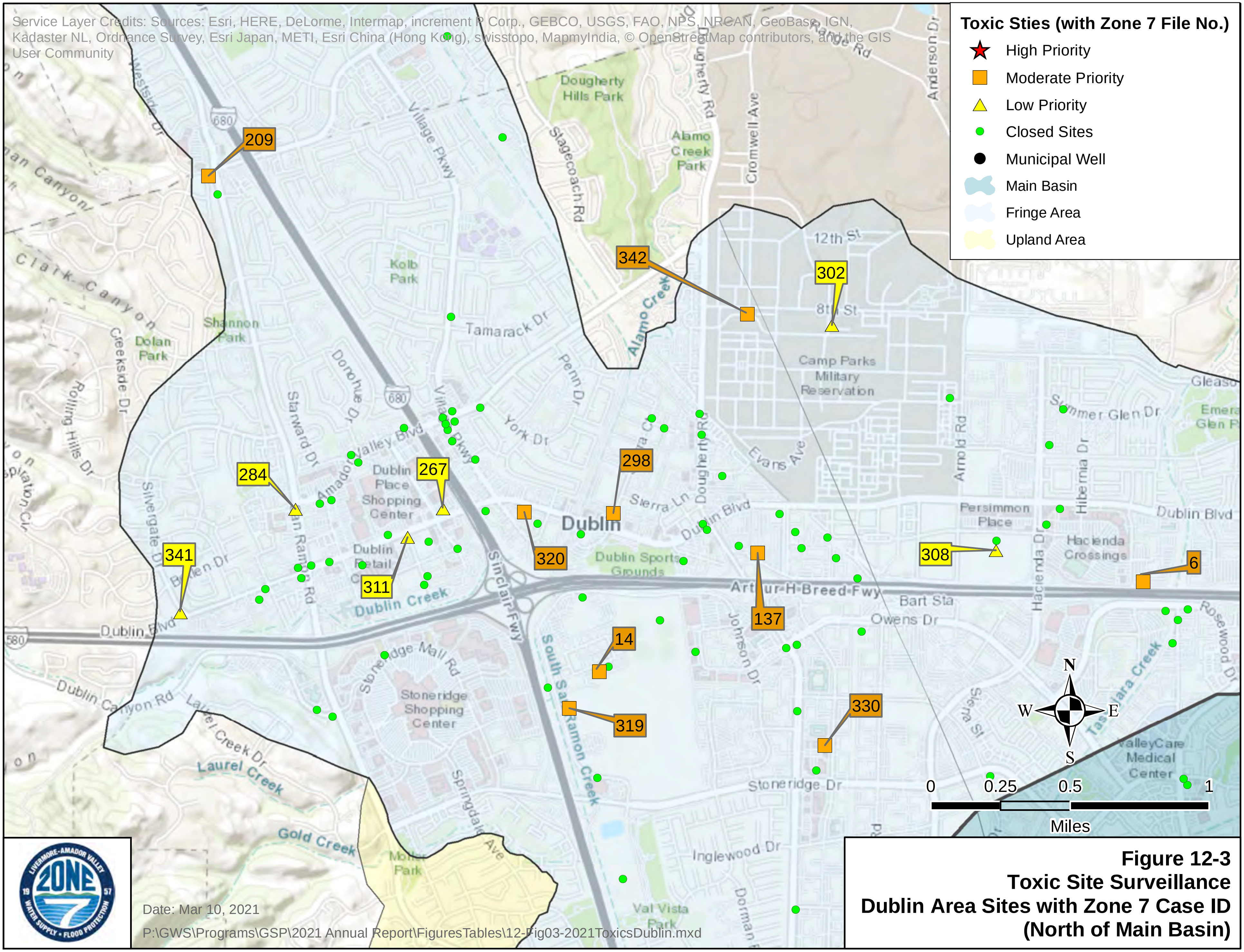



**Figure 12-3**
**Toxic Site Surveillance**
**Dublin Area Sites with Zone 7 Case ID**
**(North of Main Basin)**

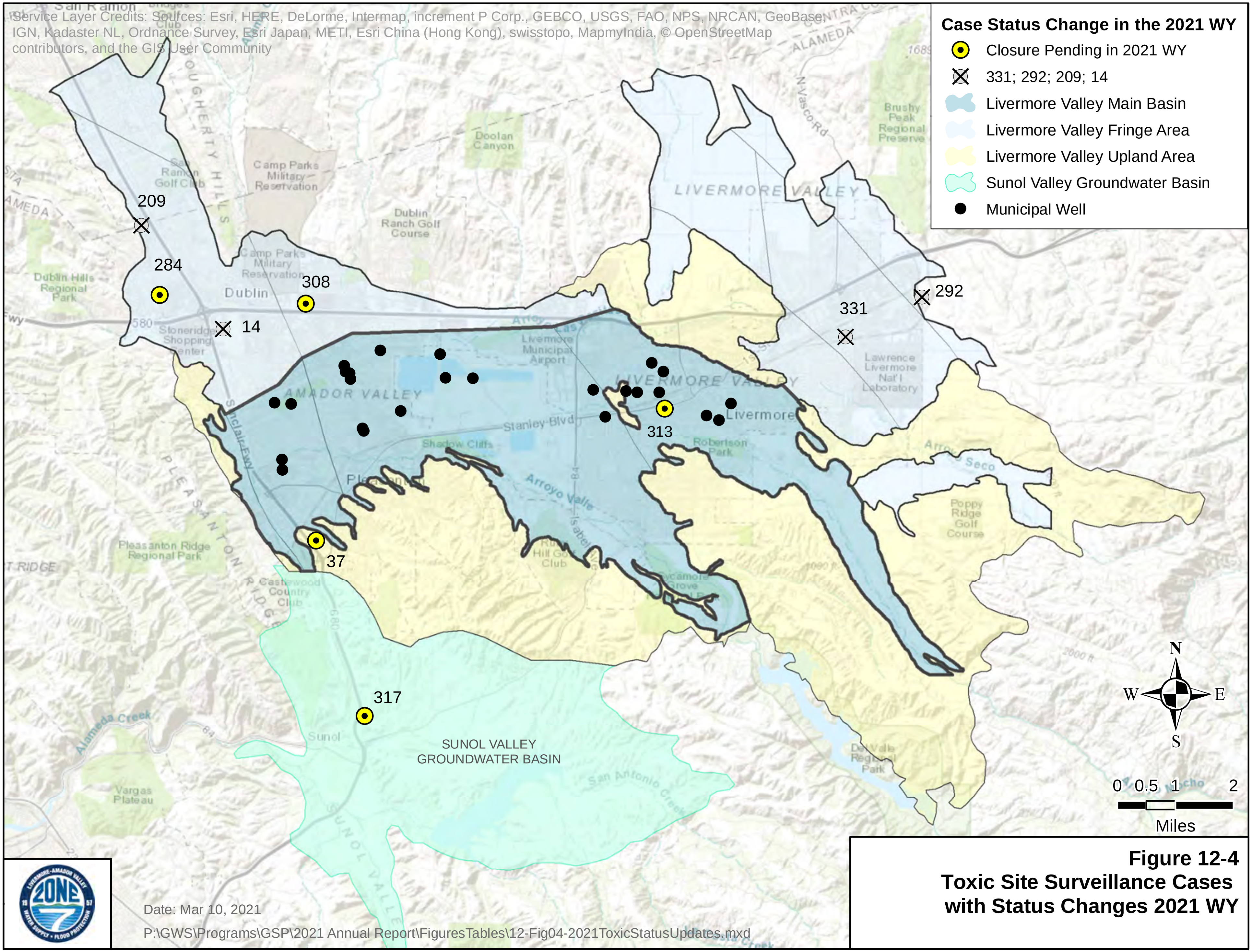
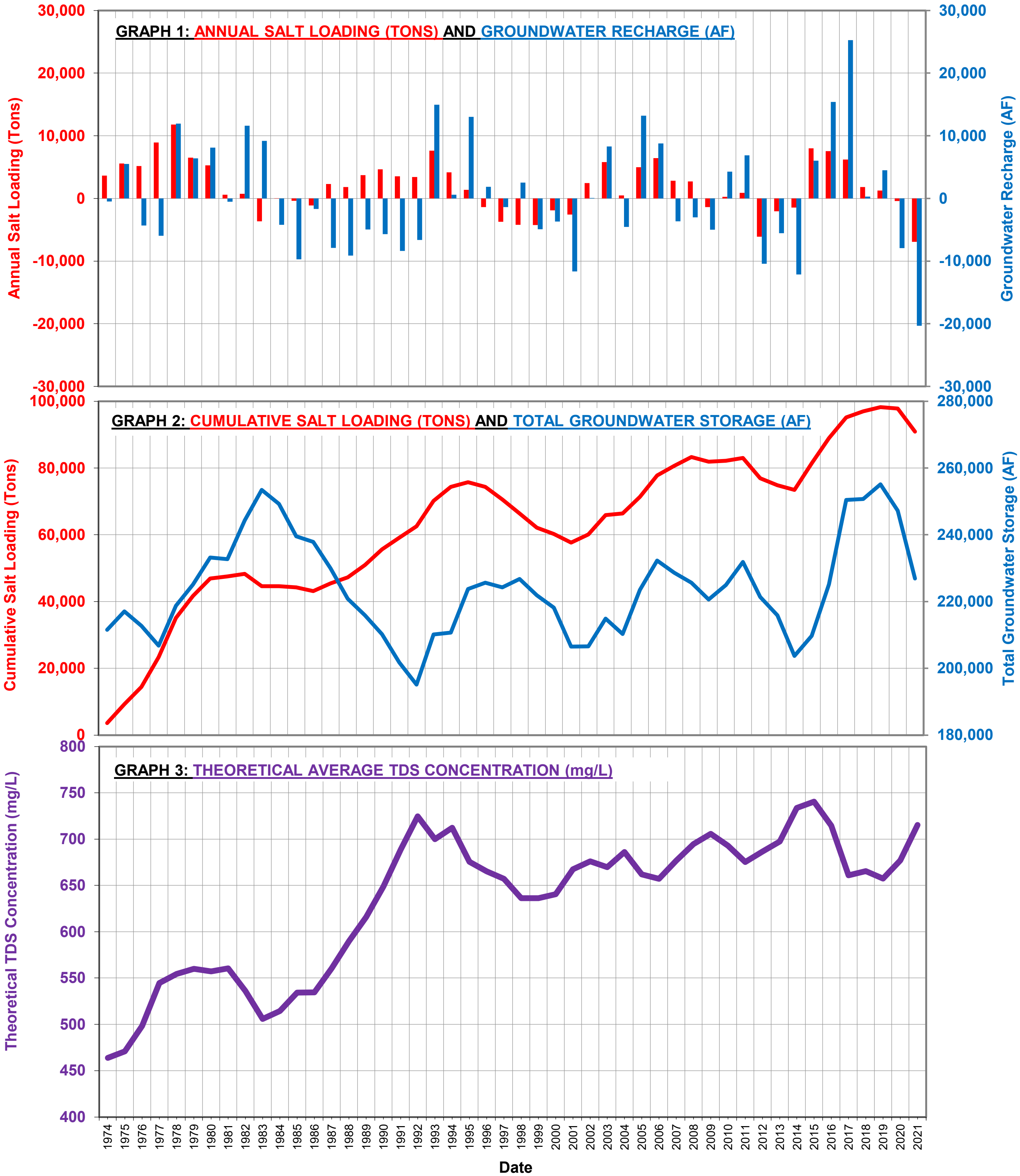



**Figure 12-4**
**Toxic Site Surveillance Cases with Status Changes 2021 WY**

# FIGURE 12-5
# MAIN BASIN SALT LOADING AND TDS CONCENTRATION
# 1974 to 2021 WATER YEARS




E:\MONITOR\SaltBalance\2021WY\SaltBalaceCalcs2021.xlsx
4/15/2022

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**APPENDIX B: Supplemental Information**

**Livermore Valley Groundwater Basin**

**Sustainable Groundwater Management Annual Report**

**Water Year 2021 (October 2020 – September 2021)**

Submitted by:

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# Table of Contents

***List of Figures and Tables***



**Attached**

*Figure 12-5: Main Basin Salt Loading and TDS Concentration, 1974 to 2021 WY*

# Acronyms and Abbreviations

| Abbrev | Description | Abbrev | Description |
|---|---|---|---|
| µg/L | Micrograms per liter | HRL | Health reference level |
| ACCDA | Alameda County Community Development Agency | InSAR | Interferometric Synthetic Aperture Radar |
| ACDEH | Alameda County Department of Environmental Health | ISCO | In-situ chemical oxidation |
| ACNP | Alamo Canal near Pleasanton | LAMP | Local Agency Management Program |
| ADLLV | Arroyo de la Laguna at Verona | LAVWMA | Livermore-Amador Valley Water Management Agency |
| ADVP | Arroyo Del Valle Pleasanton | lbs | Pounds |
| AF | Acre-feet | LDV | Lake Del Valle |
| AF/yr | Acre-feet per year | LLNL | Lawrence Livermore National Laboratory |
| ALP | Arroyo Las Positas | LRI | Livermore Rain Index |
| ALP_ELCH | Arroyo Las Positas above El Charro | LTCP | Low-Threat Underground Storage Tank Closure Policy |
| ALPL | Arroyo Las Positas near Livermore | LWRP | Livermore Water Reclamation Plant |
| ALTC | Altamont Creek | MCL | Maximum contaminant level |
| AMHAG | Arroyo Mocho Hageman | mg/L | Milligrams per liter |
| AM_KB | Arroyo Mocho at Kaiser Bridge | MGDP | Mocho Groundwater Demineralization Plant |
| AMNL | Arroyo Mocho near Livermore | MOU | Memorandum of Understanding |
| AMP | Arroyo Mocho Pleasanton | msl | Mean sea level |
| AOC | Area of Concern | MTBE | Methyl tertiary-butyl ether |
| AVADLL | Arroyo Valle at Arroyo de la Laguna | N | Nitrogen |
| AVBLC | Arroyo Valle below Lang Canyon | NC | North Canyons |
| AVNL | Arroyo Valle near Livermore | NL | Notifications Level |
| BBID | Byron-Bethany Irrigation District | NMP | Nutrient Management Plan |
| bgs | Below ground surface | $NO_3$ | Nitrate Ion |
| BMPs | Best management practices | OWTS | Onsite wastewater treatment system |
| CaCO3 | Calcium carbonate | PCE | Tetrachloroethylene |
| CASGEM | California Statewide Groundwater Elevation Monitoring | PFAS | Per- and polyfluoroalkyl substances |
| CCNP | Chabot Canal near Pleasanton | PFBS | Perfluorobutanesulfonic acid |
| CCR | California Code of Regulations | PFOA | Perfluorooctanoic acid |
| CEC | Constituents-of-emerging-concern | PFOS | Perfluorooctanesulfonic acid |
| CEQA | California Environmental Quality Act | POTW | Publicly owned treatment works |
| cfs | Cubic feet per second | ppb | Parts per billion |
| CIMIS | California Irrigation Management Information System | ppt | Parts per trillion |
| CIP | Capital Improvement Program | PPWTP | Patterson Pass Water Treatment Plant |
| COLs | Chain of Lakes | PRG | Preliminary Remediation goals |
| Cr | Chromium | RL | Response Level |
| CrVI | Hexavalent chromium | RO | Reverse osmosis |
| CWS | California Water Service | RP | Responsible Party |
| CY | Calendar year | RWQCB | California Regional Water Quality Control Board |
| DCE | Dichloroethene | SBA | South Bay Aqueduct |
| DERWA | DSRSD-EBMUD Recycled Water Authority | SGMA | Sustainable Groundwater Management Act |
| DDW | California State Water Resources Control Board Division of Drinking Water | SFPUC | San Francisco Public Utilities Commission |
| DSRSD | Dublin San Ramon Services District | SMP | Salt Management Plan |

| | | | |
|---|---|---|---|
| DTSC | Department of Toxic Substances Control | SMP | Surface mining permit |
| DVWTP | Del Valle Water Treatment Plant | SNMP | Salt Nutrient Management Plan |
| DWR | California Department of Water Resources | SVE | Soil vapor extraction |
| EBMUD | East Bay Municipal Utilities District | SWP | State Water Project |
| EBRPD | East Bay Regional Parks District | SWRCB | State Water Resources Control Board |
| EIR | Environmental Impact Report | TAF | Thousand acre-feet |
| EPA | Environmental Protection Agency | TCE | Trichloroethylene |
| ESL | Environmental screening level | TDS | Total dissolved solids |
| ETo | Evapotranspiration | TKN | Total Kjeldahl nitrogen |
| ft | Feet | TSS | Toxic Sites Surveillance |
| GDE | Groundwater-dependent ecosystem | USEPA | U.S. Environmental Protection Agency |
| GIS | Geographic information system | USGS | U.S. Geological Survey |
| GPQ | Groundwater Pumping Quota | VA | Veteran's Administration |
| GSA | Groundwater Sustainability Agency | WBIC | Weather-Based Irrigation Controller |
| GSP | Groundwater Sustainability Plan | WMP | Well Master Plan |
| GWMP | Groundwater Management Plan | WWMP | Wastewater Management Plan |
| GWE | Groundwater Elevation | WY | Water year (October 1 through September 30) |
| HI | Hydrologic Inventory | | |

# 1 Climatological Monitoring

## 1.1 Program Changes

Historically, Station 15E (CM_015E or 15E) was used as the representative station for rainfall within Livermore Valley Groundwater Basin (Basin) because of its extensive historical record; however, Station 15E was relocated in 2020 and the data was no longer available in a consistent and regular basis. After evaluating data quality and availability, Zone 7 Water Agency (Zone 7) determined that data from the nearby Livermore Municipal Airport Station (CM_KLVK or KLVK) will be more reliable and representative. Therefore, this Water Year (WY) KLVK was selected to replace Station 15E. Accordingly, Zone 7's Livermore Rainfall Index (LRI), which represents a long-term historical record for the Basin, will primarily consist of 15E data up through June 2020 and KLVK data thereafter.

For more information on the Climatological Monitoring Program; see the following sections of the *2021 Alternative Groundwater Sustainability Plan* (2021 Alternative GSP):

- **Section 5.2.1:** Existing Monitoring and Management Programs
- **Section 14.2.7.1:** Other Monitoring Networks – Climatological Monitoring Program

## 1.2 Results for the 2021 Water Year

Zone 7 uses a network of climatological stations (mapped on ***Figure 1-1*** and tabulated on ***Table 1-1***) to provide high-quality precipitation and evaporation data for water inventory calculation and management decisions, including both daily record stations and 15-minute record stations. Rainfall and evaporation information is provided in the following tables.

- ***Table 1-2*** - Monthly Precipitation Data, 2021 WY
- ***Figure 1-2*** – Graph of Livermore Index Rainfall, 2021 WY
- ***Table 1-3*** - Historical Monthly Precipitation (inches), Livermore Rainfall Index, 1871 to 2021 WY
- ***Table 1-4*** - Monthly Evapotranspiration Data, 2021 WY
- ***Table 1-5*** - Historical Monthly Pan Evaporation (inches), Lake Del Valle Station, Livermore

California Department of Water Resources (DWR) designated the 2021 WY as a critically dry WY. In fact, based on the LRI, 2021 WY was the driest year (previous driest was 1977, see ***Figure 1-2***) with daily data at 5.59 inches (39% of average). Total rainfall on the watershed was 44% of average. Total rainfall from individual stations ranged from 4.96 inches (39% of average) at Station CM_AMNL to 15.51 inches (64% of average) at CM_044 (Lick Observatory in Santa Clara County).

The network average evapotranspiration (ETo) for the 2021 WY was 53.50 inches (114% of normal), ranging from 51.41 inches at the Lake del Valle Station (CM_LDV, 119% of normal) to 57.73 inches at the CIMIS Station 191 (CM_191, 112% of normal).

## 1.3 Attached Tables and Figures

# TABLE 1-1
# TABLE OF CLIMATOLOGICAL STATIONS
# 2021 WATER YEAR

| PRECIPITATION NETWORK | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SITE ID | MAP LABEL | STATION NAME | LOCATION | OBSERVER | ELEV-ATION | ESTAB-LISHED | 15 MIN RECORD | MEAN ANNUAL (IN) |
| CM_015E* | 15E | Hafner NOAA Livermore | Wellingham Drive, Livermore | Mr. Ron Hafner | 480 | 1871 to 2020 | - | 14.42 |
| CM_017 | 17 | Del Valle Plant | 601 East Vallecitos Rd, Livermore | ZONE 7 | 640 | 1974 | 1978 to Present | 15.77 |
| CM_024 | 24 | Patterson Plant | Patterson Pass Rd, Livermore | ZONE 7 | 680 | 1963 | 1969 to 2016 | 12.70 |
| CM_034 | 34 | Mocho Wellfield | Santa Rita Rd, Pleasanton | ZONE 7 | 340 | 1968 | 1970 to 2010 | 17.61 |
| CM_044 | 44 | Mt Hamilton | Lick Observatory, Mt. Hamilton | Lick Observatory | 4209 | 1881 | - | 24.25 |
| CM_101 | 101 | Tassajara | Camino Tassajara Rd, Danville | Mrs. Joan Hansen | 800 | 1912 | - | 18.36 |
| CM_170 | 170 | Parkside | Parkside Drive, Pleasanton | ZONE 7 | 330 | 1986 | 1986 to 2005 | 20.34 |
| CM_191 | 191 | CIMIS Station | Alameda County Fairgrounds Golf Course | DWR | 335 | 2004 | 2004 to Present | 16.45 |
| CM_ALTC_BD | ALTC_BD | Altamont Creek | at ALTC_BD surface water station | ZONE 7 | 500 | 2015 | 2015 to Present | 11.85 |
| CM_AMNL | AMNL | Arroyo Mocho Near Livermore | at AMNL surface water station | ZONE 7 | 750 | 2015 | 2015 to Present | 12.80 |
| CM_AMP | AMP | Arroyo Mocho Pleaslanton | At AMP Surface Water Station | ZONE 7 | 335 | 2016 | 2016 to Present | 12.97 |
| CM_AVBLC | AVBLC | Arroyo Valle Below Lang Canyon | at AVBLC surface water station | Alameda County | 757 | 2016 | 2016 to Present | 12.97 |
| CM_KLVK* | KLVK | Livermore Municipal Airport | Livermore Municipal Airport | NOAA | 395 | 1998 | - | 13.13 |
| CM_LG1_DB | LG1_DB | Line G-1 at Dublin BLVD | Dublin Blvd and Scarlett Dr, Dublin | ZONE 7 | 336 | 2019 | 2019 to Present | 9.55 |
| CM_LJ1_BDB | LJ1_BDB | Line J-1 Below Dublin BLVD | Dublin Doulevard, Dublin | ZONE 7 | 332 | 2019 | 2019 to Present | 11.85 |
| CM_NC | NC | North Canyons Office | Zone 7's North Canyons building | ZONE 7 | 450 | 2015 | 2015 to Present | 10.82 |
| CM_SGE | SGE | Sunol Glen Elementary | Sunol Glen Elementary School at Main & Bond | ZONE 7 | 253 | 2016 | 2016 to Present | 13.88 |
| CM_TC_BI580 | TC_BI580 | Tassajara Creek below I-580 | Old Santa Rita Rd, Pleasanton | ZONE 7 | 342 | 2018 | 2019 to Present | 9.76 |

| EVAPORATION NETWORK | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| SITE ID | MAP LABEL | STATION NAME | LOCATION | OBSERVER | ELEV-ATION | ESTAB-LISHED | 15 MIN RECORD | MEAN ANNUAL (IN) |
| CM_LDV | LDV | Lake Del Valle | Lake Del Valle | DWR | 760 | 1968 | - | 67.70 |
| CM_LWRP | LWRP | Livermore Water Reclamation Plant | Lake Del Valle | LWRP | 410 | 1974 | - | 72.27 |
| CM_191 | 191 | CIMIS Station | Alameda County Fairgrounds Golf Course | DWR | 335 | 2004 | 2004 to Present | 51.67 |

* Livermore Rainfall Index comprises of CM_015E to June 2020 and CM_KLVK thereafter.
Stations LDV and LWRP record evaporation using pan evaporation equipment. ETo is derived using : ETo= Pan Evaporation x 0.6402

# TABLE 1-2
# MONTHLY PRECIPITATION DATA
# 2021 WATER YEAR

### MONTHLY PRECIPITATION IN INCHES

| WATER YEAR MONTH | MONITORING STATION | | | | | | | | | | | | | | | | | 2021 Network Average | % Historic Network Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LRI | 17 | 24 | 34 | 44 | 101 | 170 | 191 | ALTC | AMNL | AMP | AVBLC | LG1_DB | LJ1_BDB | NC | SGE | TC_BI580 | | |
| OCT | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.1% |
| NOV | 0.33 | 0.48 | 0.31 | 0.46 | 0.56 | 0.79 | 0.51 | 0.42 | 0.28 | 0.18 | 0.41 | 0.50 | 0.43 | 0.64 | 0.25 | 0.97 | 0.36 | 0.46 | 25.8% |
| DEC | 1.10 | 1.07 | 1.40 | 0.00 | 2.95 | 1.75 | 0.00 | 1.21 | 1.42 | 1.16 | 1.15 | 1.26 | 1.21 | 1.30 | 1.01 | 1.21 | 1.19 | 1.20 | 46.5% |
| JAN | 2.74 | 2.30 | 1.93 | 3.47 | 5.35 | 3.48 | 3.95 | 3.40 | 2.05 | 2.29 | 3.18 | 4.99 | 3.17 | 3.61 | 2.57 | 3.10 | 3.16 | 3.22 | 105.5% |
| FEB | 0.40 | 0.60 | 0.51 | 0.48 | 2.22 | 0.81 | 0.64 | 0.51 | 0.56 | 0.51 | 0.40 | 0.59 | 0.55 | 0.66 | 0.40 | 1.01 | 0.46 | 0.67 | 25.8% |
| MAR | 0.89 | 1.09 | 0.72 | 0.96 | 4.08 | 1.03 | 1.31 | 1.12 | 0.63 | 0.82 | 0.84 | 1.64 | 0.74 | 0.96 | 0.73 | 1.32 | 0.87 | 1.16 | 42.6% |
| APR | 0.13 | 0.05 | 0.10 | 0.12 | 0.33 | 0.10 | 0.14 | 0.24 | 0.04 | 0.00 | 0.13 | 0.12 | 0.18 | 0.21 | 0.22 | 0.17 | 0.13 | 0.14 | 10.3% |
| MAY | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.20 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.01 | 2.4% |
| JUN | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.5% |
| JUL | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0% |
| AUG | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.0% |
| SEP | 0.00 | 0.00 | 0.01 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 2.3% |
| **TOTAL** | **5.59** | **5.59** | **4.98** | **5.49** | **15.51** | **7.98** | **6.55** | **6.90** | **4.98** | **4.96** | **6.11** | **9.31** | **6.29** | **7.39** | **5.16** | **7.78** | **6.18** | **6.87** | |
| **% AVG** | **39%** | **35%** | **39%** | **31%** | **64%** | **43%** | **32%** | **42%** | **42%** | **39%** | **47%** | **72%** | **49%** | **57%** | **40%** | **60%** | **48%** | **44%** | |

* Not included in Network Average due to insufficient age

** Not enough data for average calculation.

LRI Livermore Rain Index (CM_015E to June 2020 and CM_KLVK thereafter)

### DISTRIBUTION OF DAILY PRECIPITATION

Number of days with rainfall greater than reference

| Rainfall (inches) | MONITORING STATION | | | | | | | | | | | | | | | | | 2021 Network Average |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | LRI | 17 | 24 | 34 | 44 | 101 | 170 | 191 | ALTC | AMNL | AMP | AVBLC | LG1_DB | LJ1_BDB | NC | SGE | TC_BI580 | |
| **>Trace** | 31 | 31 | 34 | 24 | 36 | 34 | 28 | 34 | 34 | 31 | 38 | 46 | 38 | 38 | 28 | 39 | 35 | 34 |
| **>0.1** | 14 | 16 | 14 | 14 | 28 | 21 | 13 | 17 | 13 | 15 | 16 | 20 | 16 | 17 | 14 | 20 | 17 | 17 |
| **>0.5** | 2 | 2 | 2 | 3 | 12 | 4 | 3 | 3 | 2 | 3 | 3 | 3 | 2 | 4 | 2 | 3 | 3 | 3 |
| **>1** | 1 | 1 | 0 | 1 | 2 | 1 | 1 | 1 | 0 | 0 | 2 | 2 | 1 | 1 | 1 | 1 | 1 | 1 |
| **>2** | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 |

# TABLE 1-3
# HISTORICAL MONTHLY PRECIPITATION
# LIVERMORE RAINFALL INDEX (LRI)
# 1871 to 2021 WATER YEARS

| Water Year | OCTWY | NOVWY | DECWY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL OCT-SEP | TOTAL JULY-JUNE | % AVERAGE OCT-SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1871 | NA | NA | NA | 1.42 | 1.93 | 0.36 | 1.25 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | NA | NA | NA |
| 1872 | 0.00 | 1.13 | 11.69 | 2.15 | 2.69 | 0.65 | 0.43 | 0.00 | 0.32 | 0.00 | 0.00 | 0.00 | 19.06 | 19.06 | 132% |
| 1873 | 0.00 | 1.22 | 3.87 | 1.04 | 3.73 | 0.68 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.69 | 10.69 | 74% |
| 1874 | 0.42 | 0.70 | 4.48 | 2.96 | 1.03 | 1.34 | 0.95 | 0.32 | 0.06 | 0.00 | 0.00 | 0.30 | 12.56 | 12.26 | 87% |
| 1875 | 1.67 | 2.03 | 0.20 | 5.40 | 1.20 | 0.35 | 0.00 | 0.00 | 0.52 | 0.00 | 0.00 | 0.00 | 11.37 | 11.67 | 79% |
| 1876 | 0.00 | 7.23 | 1.62 | 2.68 | 3.01 | 4.39 | 0.73 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 | 19.99 | 19.99 | 139% |
| 1877 | 1.26 | 0.10 | 0.00 | 2.47 | 0.56 | 1.10 | 0.13 | 0.39 | 0.00 | 0.00 | 0.00 | 0.00 | 6.01 | 6.01 | 42% |
| 1878 | 1.27 | 1.29 | 0.73 | 4.61 | 6.73 | 2.01 | 0.96 | 0.06 | 0.00 | 0.00 | 0.00 | 0.00 | 17.66 | 17.66 | 123% |
| 1879 | 0.24 | 0.31 | 0.17 | 2.83 | 1.78 | 2.49 | 0.75 | 1.34 | 0.20 | 0.00 | 0.00 | 0.00 | 10.11 | 10.11 | 70% |
| 1880 | 0.83 | 1.06 | 1.94 | 1.48 | 1.80 | 1.45 | 6.51 | 0.91 | 0.00 | 0.00 | 0.00 | 0.00 | 15.98 | 15.98 | 111% |
| 1881 | 0.00 | 0.65 | 7.75 | 2.40 | 2.62 | 1.06 | 1.93 | 0.00 | 0.04 | 0.00 | 0.00 | 0.00 | 16.45 | 16.45 | 114% |
| 1882 | 0.08 | 0.78 | 1.97 | 1.07 | 1.72 | 4.85 | 1.03 | 0.20 | 0.00 | 0.00 | 0.00 | 0.34 | 12.04 | 11.70 | 84% |
| 1883 | 1.52 | 1.48 | 0.38 | 2.38 | 0.63 | 3.45 | 1.50 | 2.18 | 0.00 | 0.00 | 0.00 | 0.35 | 13.87 | 13.86 | 96% |
| 1884 | 1.52 | 0.57 | 0.44 | 4.03 | 5.29 | 5.92 | 2.70 | 0.20 | 1.73 | 0.00 | 0.10 | 0.30 | 22.80 | 22.75 | 158% |
| 1885 | 1.14 | 0.02 | 6.22 | 1.72 | 0.36 | 0.78 | 1.29 | 0.08 | 0.00 | 0.00 | 0.00 | 0.05 | 11.66 | 12.01 | 81% |
| 1886 | 0.00 | 6.20 | 1.94 | 4.20 | 0.24 | 1.18 | 2.36 | 0.00 | 0.00 | 0.40 | 0.00 | 0.00 | 16.52 | 16.17 | 115% |
| 1887 | 0.30 | 0.70 | 0.81 | 0.90 | 6.23 | 0.23 | 1.60 | 0.00 | 0.00 | 0.00 | 0.00 | 0.80 | 11.57 | 11.17 | 80% |
| 1888 | 0.00 | 0.61 | 3.51 | 3.20 | 0.94 | 2.51 | 0.60 | 0.66 | 0.30 | 0.00 | 0.00 | 0.76 | 13.09 | 13.13 | 91% |
| 1889 | 0.00 | 3.80 | 2.21 | 0.46 | 0.67 | 5.15 | 0.51 | 2.25 | 0.00 | 0.00 | 0.00 | 0.00 | 15.05 | 15.81 | 104% |
| 1890 | 3.94 | 2.95 | 8.63 | 5.24 | 3.71 | 2.85 | 0.86 | 0.48 | 0.00 | 0.00 | 0.00 | 1.20 | 29.86 | 28.66 | 207% |
| 1891 | 0.00 | 0.00 | 3.31 | 0.54 | 4.18 | 2.50 | 1.88 | 0.40 | 0.15 | 0.00 | 0.00 | 1.32 | 14.28 | 14.16 | 99% |
| 1892 | 0.05 | 0.38 | 4.42 | 0.84 | 1.08 | 3.96 | 0.90 | 1.30 | 0.00 | 0.00 | 0.00 | 0.45 | 13.38 | 14.25 | 93% |
| 1893 | 1.65 | 4.97 | 7.27 | 3.02 | 3.12 | 3.68 | 1.40 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 25.84 | 26.29 | 179% |
| 1894 | 0.00 | 1.59 | 2.14 | 4.97 | 5.36 | 0.81 | 0.58 | 1.19 | 0.52 | 0.00 | 0.00 | 1.45 | 18.61 | 17.16 | 129% |
| 1895 | 1.15 | 0.50 | 8.56 | 6.83 | 1.56 | 1.81 | 1.26 | 1.25 | 0.00 | 0.00 | 0.00 | 0.22 | 23.14 | 24.37 | 161% |
| 1896 | 0.83 | 1.69 | 1.28 | 7.16 | 0.17 | 1.50 | 3.11 | 0.39 | 0.00 | 0.00 | 0.73 | 0.55 | 17.41 | 16.35 | 121% |
| 1897 | 1.48 | 3.02 | 1.71 | 1.89 | 3.54 | 4.04 | 0.24 | 0.00 | 0.08 | 0.00 | 0.00 | 0.06 | 16.06 | 17.28 | 111% |
| 1898 | 1.43 | 0.52 | 1.31 | 1.47 | 1.78 | 0.78 | 0.45 | 0.96 | 0.35 | 0.00 | 0.00 | 0.95 | 10.00 | 9.11 | 69% |
| 1899 | 0.74 | 0.25 | 1.61 | 2.60 | 0.08 | 4.81 | 0.35 | 0.15 | 0.22 | 0.00 | 0.00 | 0.00 | 10.81 | 11.76 | 75% |
| 1900 | 2.52 | 2.49 | 2.07 | 2.44 | 0.34 | 1.11 | 0.86 | 1.10 | 0.00 | 0.00 | 0.00 | 0.18 | 13.11 | 12.93 | 91% |
| 1901 | 1.93 | 4.48 | 1.06 | 2.69 | 5.15 | 0.95 | 1.80 | 1.58 | 0.00 | 0.00 | 0.00 | 0.68 | 20.32 | 19.82 | 141% |
| 1902 | 0.70 | 1.99 | 0.74 | 0.99 | 3.62 | 2.69 | 0.75 | 0.32 | 0.00 | 0.00 | 0.13 | 0.00 | 11.93 | 12.48 | 83% |
| 1903 | 0.47 | 2.07 | 0.87 | 3.19 | 0.94 | 5.65 | 0.81 | 0.12 | 0.00 | 0.00 | 0.00 | 0.00 | 14.12 | 14.25 | 98% |
| 1904 | 0.00 | 2.16 | 0.59 | 0.89 | 4.18 | 3.71 | 1.56 | 0.24 | 0.00 | 0.00 | 0.32 | 1.62 | 15.27 | 13.33 | 106% |
| 1905 | 1.00 | 0.78 | 1.42 | 2.43 | 2.30 | 3.12 | 0.93 | 1.89 | 0.00 | 0.00 | 0.00 | 0.00 | 13.87 | 15.81 | 96% |
| 1906 | 0.00 | 1.01 | 1.18 | 5.56 | 2.67 | 5.18 | 0.95 | 1.61 | 0.56 | 0.00 | 0.00 | 0.20 | 18.92 | 18.72 | 131% |
| 1907 | 0.03 | 1.34 | 6.45 | 3.22 | 1.86 | 8.85 | 0.47 | 0.16 | 0.56 | 0.00 | 0.00 | 0.00 | 22.94 | 23.14 | 159% |
| 1908 | 0.81 | 0.04 | 3.90 | 2.27 | 1.35 | 0.73 | 0.28 | 0.53 | 0.00 | 0.00 | 0.00 | 0.03 | 9.94 | 9.91 | 69% |
| 1909 | 0.27 | 0.60 | 1.55 | 10.18 | 3.96 | 1.94 | 0.00 | 0.00 | 0.05 | 0.00 | 0.00 | 0.62 | 19.17 | 18.58 | 133% |
| 1910 | 0.75 | 1.68 | 5.77 | 2.50 | 1.14 | 1.90 | 0.10 | 0.00 | 0.04 | 0.00 | 0.00 | 0.10 | 13.98 | 14.50 | 97% |
| 1911 | 0.29 | 0.10 | 1.32 | 12.60 | 1.42 | 4.45 | 0.69 | 0.24 | 0.07 | 0.00 | 0.00 | 0.00 | 21.18 | 21.28 | 147% |
| 1912 | 0.43 | 0.29 | 1.71 | 2.66 | 0.20 | 1.99 | 0.73 | 0.94 | 0.65 | 0.00 | 0.00 | 0.48 | 10.08 | 9.60 | 70% |
| 1913 | 0.71 | 0.44 | 0.81 | 2.63 | 0.38 | 1.65 | 0.54 | 0.58 | 0.01 | 0.27 | 0.02 | 0.00 | 8.04 | 8.23 | 56% |
| 1914 | 0.00 | 2.47 | 3.17 | 7.10 | 2.11 | 0.66 | 0.76 | 0.45 | 0.19 | 0.00 | 0.00 | 0.00 | 16.91 | 17.20 | 117% |
| 1915 | 0.45 | 0.33 | 3.96 | 4.16 | 5.79 | 1.50 | 0.66 | 2.66 | 0.00 | 0.00 | 0.00 | 0.00 | 19.51 | 19.51 | 135% |
| 1916 | 0.00 | 0.76 | 4.41 | 11.35 | 2.17 | 1.47 | 0.21 | 0.05 | 0.00 | 0.00 | 0.00 | 0.44 | 20.86 | 20.42 | 145% |
| 1917 | 0.50 | 0.68 | 3.28 | 1.06 | 3.37 | 1.08 | 0.15 | 0.02 | 0.00 | 0.00 | 0.00 | 0.04 | 10.18 | 10.58 | 71% |
| 1918 | 0.00 | 0.43 | 0.66 | 0.59 | 3.08 | 3.32 | 0.61 | 0.00 | 0.00 | 0.00 | 0.00 | 5.72 | 14.41 | 8.73 | 100% |
| 1919 | 0.39 | 2.38 | 1.51 | 1.03 | 4.58 | 2.33 | 0.05 | 0.00 | 0.00 | 0.00 | 0.00 | 0.48 | 12.75 | 17.99 | 88% |
| 1920 | 0.15 | 0.33 | 2.21 | 0.22 | 0.71 | 3.52 | 1.07 | 0.00 | 0.13 | 0.00 | 0.00 | 0.00 | 8.34 | 8.82 | 58% |
| 1921 | 2.03 | 1.43 | 3.81 | 3.38 | 0.59 | 0.83 | 0.16 | 1.05 | 0.00 | 0.00 | 0.00 | 0.05 | 13.33 | 13.28 | 93% |
| 1922 | 0.15 | 1.17 | 3.38 | 1.51 | 5.46 | 1.83 | 0.23 | 0.27 | 0.00 | 0.00 | 0.00 | 0.00 | 14.00 | 14.05 | 97% |
| 1923 | 0.54 | 2.86 | 5.43 | 1.80 | 0.65 | 0.15 | 2.15 | 0.00 | 0.02 | 0.00 | 0.00 | 0.82 | 14.42 | 13.60 | 100% |
| 1924 | 0.25 | 0.76 | 0.87 | 1.40 | 0.93 | 0.65 | 0.28 | 0.07 | 0.00 | 0.00 | 0.00 | 0.00 | 5.21 | 6.03 | 36% |
| 1925 | 1.30 | 1.53 | 2.63 | 1.02 | 3.74 | 1.14 | 1.75 | 1.41 | 0.04 | 0.00 | 0.00 | 0.00 | 14.56 | 14.56 | 101% |
| 1926 | 0.00 | 0.97 | 1.14 | 2.44 | 3.58 | 0.16 | 3.11 | 0.11 | 0.00 | 0.00 | 0.00 | 0.00 | 11.51 | 11.51 | 80% |
| 1927 | 0.93 | 2.83 | 0.78 | 1.74 | 3.49 | 1.54 | 1.73 | 0.10 | 0.18 | 0.00 | 0.00 | 0.03 | 13.35 | 13.32 | 93% |
| 1928 | 1.71 | 1.43 | 2.00 | 1.46 | 0.89 | 3.43 | 1.43 | 0.45 | 0.00 | 0.00 | 0.00 | 0.00 | 12.80 | 12.83 | 89% |
| 1929 | 0.00 | 2.57 | 2.76 | 1.26 | 0.87 | 1.07 | 0.70 | 0.03 | 0.83 | 0.00 | 0.00 | 0.00 | 10.09 | 10.09 | 70% |

# TABLE 1-3
# HISTORICAL MONTHLY PRECIPITATION
# LIVERMORE RAINFALL INDEX (LRI)
# 1871 to 2021 WATER YEARS

| Water Year | OCTWY | NOVWY | DECWY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL OCT-SEP | TOTAL JULY-JUNE | % AVERAGE OCT-SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1930 | 0.01 | 0.00 | 1.81 | 3.64 | 1.91 | 1.88 | 1.14 | 0.43 | 0.00 | 0.00 | 0.00 | 0.20 | 11.02 | 10.82 | 76% |
| 1931 | 0.58 | 1.15 | 0.26 | 3.45 | 1.67 | 0.57 | 0.36 | 0.93 | 0.11 | 0.00 | 0.00 | 0.00 | 9.08 | 9.28 | 63% |
| 1932 | 0.27 | 1.89 | 5.63 | 1.29 | 3.15 | 0.19 | 0.41 | 0.37 | 0.00 | 0.00 | 0.00 | 0.00 | 13.20 | 13.20 | 92% |
| 1933 | 0.00 | 0.51 | 2.03 | 4.51 | 0.44 | 2.09 | 0.13 | 0.70 | 0.03 | 0.00 | 0.00 | 0.01 | 10.45 | 10.44 | 73% |
| 1934 | 0.75 | 0.00 | 3.69 | 1.29 | 2.86 | 0.00 | 0.13 | 0.60 | 0.53 | 0.00 | 0.00 | 0.27 | 10.12 | 9.86 | 70% |
| 1935 | 0.62 | 2.71 | 2.32 | 3.53 | 0.52 | 3.16 | 3.28 | 0.00 | 0.00 | 0.00 | 0.04 | 0.00 | 16.18 | 16.41 | 112% |
| 1936 | 0.79 | 0.21 | 1.53 | 3.28 | 6.76 | 0.71 | 0.63 | 0.46 | 0.10 | 0.00 | 0.00 | 0.00 | 14.47 | 14.51 | 100% |
| 1937 | 0.40 | 0.02 | 3.26 | 3.38 | 4.13 | 5.07 | 0.68 | 0.17 | 0.20 | 0.00 | 0.00 | 0.00 | 17.31 | 17.31 | 120% |
| 1938 | 0.55 | 2.46 | 4.57 | 2.40 | 6.14 | 4.09 | 0.90 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 21.13 | 21.13 | 147% |
| 1939 | 1.00 | 1.08 | 0.52 | 2.40 | 1.57 | 2.18 | 0.53 | 0.18 | 0.00 | 0.00 | 0.00 | 0.16 | 9.62 | 9.46 | 67% |
| 1940 | 1.23 | 0.15 | 0.78 | 8.13 | 5.14 | 2.60 | 0.35 | 0.14 | 0.00 | 0.00 | 0.00 | 0.25 | 18.77 | 18.68 | 130% |
| 1941 | 0.50 | 0.43 | 4.63 | 3.24 | 4.19 | 2.07 | 2.76 | 0.23 | 0.00 | 0.00 | 0.03 | 0.00 | 18.08 | 18.30 | 125% |
| 1942 | 0.72 | 0.89 | 5.34 | 3.89 | 1.68 | 1.42 | 3.10 | 1.00 | 0.00 | 0.00 | 0.00 | 0.09 | 18.13 | 18.07 | 126% |
| 1943 | 1.08 | 3.05 | 1.73 | 4.48 | 1.68 | 2.39 | 1.14 | 0.00 | 0.06 | 0.00 | 0.00 | 0.00 | 15.61 | 15.70 | 108% |
| 1944 | 0.30 | 0.53 | 1.23 | 2.36 | 4.89 | 1.01 | 0.94 | 0.73 | 0.00 | 0.00 | 0.00 | 0.00 | 11.99 | 11.99 | 83% |
| 1945 | 0.77 | 3.41 | 2.03 | 0.87 | 3.68 | 3.19 | 0.20 | 0.17 | 0.00 | 0.00 | 0.02 | 0.00 | 14.34 | 14.32 | 100% |
| 1946 | 1.07 | 2.07 | 2.98 | 0.76 | 1.23 | 1.69 | 0.02 | 0.61 | 0.00 | 0.24 | 0.00 | 0.02 | 10.69 | 10.45 | 74% |
| 1947 | 0.02 | 2.93 | 2.07 | 0.69 | 1.45 | 2.34 | 0.53 | 0.17 | 0.36 | 0.00 | 0.00 | 0.00 | 10.56 | 10.82 | 73% |
| 1948 | 1.84 | 0.85 | 0.51 | 0.20 | 1.11 | 2.79 | 2.50 | 1.03 | 0.16 | 0.03 | 0.00 | 0.00 | 11.02 | 10.99 | 76% |
| 1949 | 0.46 | 0.34 | 2.71 | 1.39 | 2.47 | 3.38 | 0.02 | 0.34 | 0.00 | 0.03 | 0.16 | 0.05 | 11.35 | 11.14 | 79% |
| 1950 | 0.08 | 1.20 | 1.21 | 4.65 | 1.54 | 1.44 | 0.85 | 0.59 | 0.01 | 0.00 | 0.00 | 0.08 | 11.65 | 11.81 | 81% |
| 1951 | 1.84 | 5.95 | 4.95 | 2.23 | 1.81 | 1.82 | 0.55 | 0.35 | 0.06 | 0.00 | 0.00 | 0.00 | 19.56 | 19.64 | 136% |
| 1952 | 1.04 | 3.01 | 6.07 | 7.60 | 1.40 | 2.36 | 2.20 | 0.16 | 0.04 | 0.00 | 0.00 | 0.10 | 23.98 | 23.88 | 166% |
| 1953 | 0.01 | 2.11 | 6.33 | 2.07 | 0.05 | 1.12 | 1.42 | 0.61 | 0.59 | 0.00 | 0.15 | 0.00 | 14.46 | 14.41 | 100% |
| 1954 | 0.21 | 1.33 | 0.64 | 2.19 | 2.27 | 3.00 | 0.73 | 0.16 | 0.27 | 0.00 | 0.00 | 0.04 | 10.84 | 10.95 | 75% |
| 1955 | 0.00 | 1.68 | 3.33 | 2.45 | 1.69 | 0.38 | 1.28 | 0.65 | 0.00 | 0.00 | 0.01 | 0.01 | 11.48 | 11.50 | 80% |
| 1956 | 0.01 | 1.31 | 10.15 | 5.49 | 1.15 | 0.14 | 1.92 | 0.63 | 0.00 | 0.00 | 0.00 | 0.63 | 21.43 | 20.82 | 149% |
| 1957 | 0.79 | 0.03 | 0.48 | 2.65 | 2.23 | 1.30 | 1.14 | 2.65 | 0.04 | 0.00 | 0.00 | 0.05 | 11.36 | 11.94 | 79% |
| 1958 | 1.06 | 0.37 | 1.62 | 3.16 | 5.37 | 4.44 | 3.74 | 0.66 | 0.41 | 0.00 | 0.00 | 0.02 | 20.85 | 20.88 | 145% |
| 1959 | 0.09 | 0.14 | 0.86 | 2.45 | 3.59 | 0.29 | 0.35 | 0.00 | 0.00 | 0.00 | 0.07 | 1.89 | 9.73 | 7.79 | 68% |
| 1960 | 0.00 | 0.00 | 0.75 | 2.98 | 4.12 | 0.60 | 0.48 | 0.42 | 0.00 | 0.02 | 0.00 | 0.01 | 9.38 | 11.31 | 65% |
| 1961 | 0.05 | 2.92 | 1.25 | 2.08 | 1.04 | 1.92 | 1.03 | 0.69 | 0.19 | 0.00 | 0.13 | 0.16 | 11.46 | 11.20 | 80% |
| 1962 | 0.15 | 2.24 | 0.82 | 0.73 | 5.61 | 1.82 | 0.22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 11.59 | 11.88 | 80% |
| 1963 | 3.64 | 0.28 | 1.55 | 1.40 | 4.50 | 2.60 | 3.47 | 0.70 | 0.00 | 0.00 | 0.00 | 0.33 | 18.47 | 18.14 | 128% |
| 1964 | 0.93 | 3.18 | 0.19 | 2.37 | 0.08 | 1.57 | 0.21 | 0.48 | 0.32 | 0.00 | 0.12 | 0.04 | 9.49 | 9.66 | 66% |
| 1965 | 0.85 | 2.44 | 4.91 | 2.11 | 0.59 | 1.73 | 1.53 | 0.00 | 0.00 | 0.00 | 0.21 | 0.00 | 14.37 | 14.32 | 100% |
| 1966 | 0.03 | 4.22 | 3.23 | 1.05 | 1.17 | 0.17 | 0.33 | 0.10 | 0.12 | 0.17 | 0.00 | 0.11 | 10.70 | 10.63 | 74% |
| 1967 | 0.00 | 3.43 | 2.35 | 6.14 | 0.29 | 4.15 | 4.65 | 0.19 | 0.48 | 0.00 | 0.00 | 0.02 | 21.70 | 21.96 | 151% |
| 1968 | 0.24 | 0.88 | 1.62 | 3.93 | 0.90 | 2.40 | 0.43 | 0.15 | 0.00 | 0.00 | 0.00 | 0.00 | 10.55 | 10.57 | 73% |
| 1969 | 0.43 | 2.48 | 3.04 | 6.28 | 4.76 | 0.55 | 1.24 | 0.08 | 0.00 | 0.00 | 0.00 | 0.00 | 18.86 | 18.86 | 131% |
| 1970 | 1.10 | 0.49 | 2.34 | 5.38 | 1.18 | 1.42 | 0.40 | 0.07 | 0.32 | 0.00 | 0.00 | 0.00 | 12.70 | 12.70 | 88% |
| 1971 | 0.41 | 5.24 | 5.27 | 1.19 | 0.33 | 1.75 | 1.37 | 0.54 | 0.00 | 0.00 | 0.00 | 0.13 | 16.23 | 16.10 | 113% |
| 1972 | 0.04 | 0.46 | 3.27 | 0.90 | 0.79 | 0.14 | 0.64 | 0.00 | 0.04 | 0.00 | 0.00 | 0.58 | 6.86 | 6.41 | 48% |
| 1973 | 2.98 | 4.91 | 2.22 | 5.50 | 3.38 | 2.63 | 0.29 | 0.03 | 0.00 | 0.00 | 0.00 | 0.08 | 22.02 | 22.52 | 153% |
| 1974 | 2.08 | 3.71 | 3.80 | 1.50 | 0.71 | 2.69 | 1.62 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 16.11 | 16.19 | 112% |
| 1975 | 0.50 | 0.66 | 1.98 | 0.84 | 3.65 | 5.24 | 1.42 | 0.00 | 0.06 | 0.10 | 0.35 | 0.00 | 14.80 | 14.35 | 103% |
| 1976 | 1.27 | 0.08 | 0.21 | 0.30 | 1.46 | 0.48 | 0.39 | 0.00 | 0.18 | 0.00 | 0.91 | 0.95 | 6.23 | 4.82 | 43% |
| 1977 | 0.50 | 0.50 | 0.73 | 1.15 | 0.83 | 0.82 | 0.16 | 1.01 | 0.00 | 0.10 | 0.00 | 0.22 | 6.02 | 7.56 | 42% |
| 1978 | 0.13 | 1.34 | 3.07 | 5.44 | 2.95 | 3.07 | 2.49 | 0.01 | 0.00 | 0.00 | 0.00 | 0.04 | 18.54 | 18.82 | 129% |
| 1979 | 0.00 | 2.16 | 0.58 | 4.52 | 3.19 | 1.86 | 0.88 | 0.34 | 0.00 | 0.06 | 0.00 | 0.00 | 13.59 | 13.57 | 94% |
| 1980 | 1.51 | 1.13 | 2.66 | 4.16 | 4.24 | 1.36 | 1.32 | 0.48 | 0.00 | 0.70 | 0.00 | 0.00 | 17.56 | 16.92 | 122% |
| 1981 | 0.04 | 0.28 | 1.18 | 3.97 | 1.11 | 2.94 | 0.61 | 0.11 | 0.00 | 0.00 | 0.00 | 0.06 | 10.30 | 10.94 | 71% |
| 1982 | 2.07 | 3.44 | 2.57 | 5.29 | 2.16 | 5.58 | 1.50 | 0.00 | 0.28 | 0.00 | 0.01 | 1.48 | 24.38 | 22.95 | 169% |
| 1983 | 2.24 | 3.72 | 2.80 | 6.28 | 5.56 | 6.14 | 3.51 | 0.21 | 0.00 | 0.00 | 0.50 | 1.02 | 31.98 | 31.95 | 222% |
| 1984 | 0.27 | 5.44 | 3.44 | 0.33 | 1.87 | 1.00 | 0.53 | 0.01 | 0.03 | 0.00 | 0.00 | 0.04 | 12.96 | 14.44 | 90% |
| 1985 | 1.25 | 4.71 | 1.51 | 0.48 | 1.25 | 2.62 | 0.32 | 0.07 | 0.22 | 0.00 | 0.03 | 0.13 | 12.59 | 12.47 | 87% |
| 1986 | 0.89 | 2.69 | 1.97 | 2.04 | 7.11 | 4.09 | 0.40 | 0.14 | 0.00 | 0.01 | 0.00 | 0.45 | 19.79 | 19.49 | 137% |
| 1987 | 0.04 | 0.08 | 0.92 | 1.83 | 3.47 | 2.30 | 0.16 | 0.09 | 0.00 | 0.00 | 0.00 | 0.00 | 8.89 | 9.35 | 62% |
| 1988 | 0.87 | 1.40 | 2.30 | 1.78 | 0.38 | 0.26 | 1.15 | 0.45 | 0.10 | 0.00 | 0.00 | 0.00 | 8.69 | 8.69 | 60% |
| 1989 | 0.11 | 1.92 | 2.03 | 0.81 | 0.95 | 2.94 | 0.88 | 0.08 | 0.10 | 0.00 | 0.00 | 1.33 | 11.15 | 9.82 | 77% |

# TABLE 1-3
# HISTORICAL MONTHLY PRECIPITATION
# LIVERMORE RAINFALL INDEX (LRI)
# 1871 to 2021 WATER YEARS

| Water Year | OCTWY | NOVWY | DECWY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL OCT-SEP | TOTAL JULY-JUNE | % AVERAGE OCT-SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1990 | 1.13 | 1.02 | 0.10 | 1.54 | 2.46 | 0.87 | 0.37 | 1.78 | 0.00 | 0.02 | 0.00 | 0.06 | 9.35 | 10.60 | 65% |
| 1991 | 0.08 | 0.39 | 1.45 | 0.31 | 2.20 | 5.87 | 0.34 | 0.35 | 0.08 | 0.00 | 0.21 | 0.04 | 11.32 | 11.15 | 79% |
| 1992 | 1.65 | 0.31 | 1.19 | 1.39 | 4.61 | 1.97 | 0.43 | 0.00 | 0.09 | 0.00 | 0.00 | 0.00 | 11.64 | 11.89 | 81% |
| 1993 | 0.90 | 0.15 | 4.99 | 6.41 | 4.53 | 2.91 | 0.63 | 0.51 | 0.30 | 0.00 | 0.00 | 0.00 | 21.33 | 21.33 | 148% |
| 1994 | 0.57 | 2.00 | 1.81 | 0.94 | 3.33 | 0.15 | 1.20 | 1.78 | 0.04 | 0.00 | 0.00 | 0.00 | 11.82 | 11.82 | 82% |
| 1995 | 0.58 | 3.08 | 1.36 | 6.64 | 0.33 | 6.66 | 1.02 | 0.92 | 0.70 | 0.00 | 0.00 | 0.00 | 21.29 | 21.29 | 148% |
| 1996 | 0.00 | 0.01 | 5.37 | 5.17 | 4.10 | 2.34 | 1.91 | 1.05 | 0.00 | 0.00 | 0.00 | 0.00 | 19.95 | 19.95 | 138% |
| 1997 | 1.08 | 2.55 | 4.43 | 5.81 | 0.15 | 0.06 | 0.15 | 0.29 | 0.17 | 0.00 | 0.42 | 0.00 | 15.11 | 14.69 | 105% |
| 1998 | 0.28 | 4.23 | 1.95 | 5.47 | 7.30 | 2.37 | 1.37 | 2.00 | 0.13 | 0.00 | 0.00 | 0.18 | 25.28 | 25.52 | 175% |
| 1999 | 0.54 | 2.48 | 0.73 | 3.23 | 3.33 | 1.67 | 0.99 | 0.08 | 0.01 | 0.00 | 0.03 | 0.04 | 13.13 | 13.24 | 91% |
| 2000 | 0.15 | 1.26 | 0.25 | 4.61 | 4.87 | 1.25 | 0.59 | 0.69 | 0.18 | 0.00 | 0.01 | 0.24 | 14.10 | 13.92 | 98% |
| 2001 | 1.97 | 0.49 | 0.45 | 1.92 | 2.89 | 1.22 | 1.80 | 0.00 | 0.12 | 0.00 | 0.00 | 0.09 | 10.95 | 11.11 | 76% |
| 2002 | 0.37 | 1.92 | 5.09 | 0.72 | 0.62 | 1.65 | 0.16 | 0.68 | 0.00 | 0.00 | 0.00 | 0.00 | 11.21 | 11.30 | 78% |
| 2003 | 0.00 | 2.65 | 7.01 | 0.66 | 1.31 | 1.07 | 3.09 | 0.95 | 0.00 | 0.00 | 0.29 | 0.00 | 17.03 | 16.74 | 118% |
| 2004 | 0.02 | 2.02 | 3.57 | 2.19 | 4.01 | 0.39 | 0.18 | 0.11 | 0.00 | 0.00 | 0.00 | 0.58 | 13.07 | 12.78 | 91% |
| 2005 | 2.77 | 0.89 | 3.01 | 2.81 | 3.55 | 3.41 | 1.53 | 1.03 | 0.05 | 0.00 | 0.00 | 0.25 | 19.30 | 19.63 | 134% |
| 2006 | 0.17 | 0.65 | 5.40 | 2.22 | 1.32 | 4.79 | 2.60 | 0.34 | 0.00 | 0.00 | 0.00 | 0.00 | 17.49 | 17.74 | 121% |
| 2007 | 0.20 | 1.68 | 2.25 | 0.52 | 3.92 | 0.33 | 0.44 | 0.11 | 0.00 | 0.00 | 0.00 | 0.21 | 9.66 | 9.45 | 67% |
| 2008 | 1.12 | 0.71 | 2.05 | 4.79 | 1.89 | 0.10 | 0.02 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 10.68 | 10.89 | 74% |
| 2009 | 0.33 | 1.40 | 1.56 | 1.34 | 3.31 | 2.29 | 0.23 | 0.51 | 0.11 | 0.00 | 0.00 | 0.31 | 11.39 | 11.08 | 79% |
| 2010 | 2.79 | 0.21 | 2.02 | 3.53 | 2.36 | 1.57 | 2.10 | 0.24 | 0.00 | 0.00 | 0.00 | 0.00 | 14.82 | 15.13 | 103% |
| 2011 | 1.00 | 2.02 | 3.87 | 0.78 | 2.69 | 4.10 | 0.22 | 0.46 | 1.07 | 0.00 | 0.00 | 0.00 | 16.21 | 16.21 | 112% |
| 2012 | 1.06 | 0.93 | 0.04 | 1.52 | 0.52 | 2.57 | 2.01 | 0.02 | 0.12 | 0.00 | 0.00 | 0.01 | 8.80 | 8.79 | 61% |
| 2013 | 0.27 | 3.40 | 4.22 | 1.07 | 0.47 | 0.33 | 0.44 | 0.14 | 0.04 | 0.00 | 0.00 | 0.33 | 10.71 | 10.38 | 74% |
| 2014 | 0.00 | 1.30 | 0.38 | 0.08 | 2.58 | 1.25 | 0.98 | 0.00 | 0.01 | 0.00 | 0.00 | 0.22 | 6.80 | 6.91 | 47% |
| 2015 | 0.17 | 1.19 | 8.23 | 0.00 | 1.62 | 0.25 | 0.78 | 0.50 | 0.33 | 0.00 | 0.01 | 0.05 | 13.13 | 13.29 | 91% |
| 2016 | 0.02 | 2.49 | 2.55 | 3.95 | 0.69 | 3.30 | 2.14 | 0.21 | 0.00 | 0.00 | 0.00 | 0.00 | 15.35 | 15.41 | 107% |
| 2017 | 3.34 | 1.37 | 2.62 | 8.10 | 6.07 | 2.09 | 1.93 | 0.03 | 0.02 | 0.00 | 0.00 | 0.00 | 25.57 | 25.57 | 177% |
| 2018 | 0.18 | 2.20 | 0.06 | 3.30 | 0.57 | 4.44 | 1.68 | 0.01 | 0.00 | 0.00 | 0.00 | 0.00 | 12.44 | 12.44 | 86% |
| 2019 | 0.18 | 1.64 | 1.54 | 2.66 | 6.31 | 2.58 | 0.30 | 1.63 | 0.00 | 0.00 | 0.00 | 0.22 | 17.06 | 16.84 | 118% |
| 2020 | 0.00 | 0.97 | 2.91 | 0.96 | 0.00 | 2.45 | 0.82 | 0.26 | 0.00 | 0.00 | 0.11 | 0.00 | 8.48 | 8.59 | 59% |
| 2021 | 0.00 | 0.33 | 1.10 | 2.74 | 0.40 | 0.89 | 0.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.59 | 5.70 | 39% |
| MAXIMUM | 3.94 | 7.23 | 11.69 | 12.60 | 7.30 | 8.85 | 6.51 | 2.66 | 1.73 | 0.70 | 0.91 | 5.72 | 31.98 | 31.95 | 222% |
| MINIMUM | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 5.21 | 4.82 | 36% |
| MEAN | 0.70 | 1.63 | 2.63 | 2.90 | 2.46 | 2.18 | 1.07 | 0.46 | 0.11 | 0.01 | 0.03 | 0.23 | 14.42 | 14.45 | 100% |

Livermore Rainfall Index (LRI) comprises of CM_015E to June 2020 and CM_KLVK thereafter.

**TABLE 1-4**
**MONTHLY EVAPOTRANSPIRATION (ETo, in Inches)**
**2021 WATER YEAR**

| Month | Station | | | 2021 Network Average | % Historic Network Average |
|---|---|---|---|---|---|
| | LDV* | LWRP* | 191 | | |
| OCT | 4.95 | 5.36 | 4.15 | 4.82 | 138.4% |
| NOV | 2.13 | 2.62 | 2.23 | 2.33 | 133.0% |
| DEC | 1.38 | 1.28 | 1.69 | 1.45 | 118.6% |
| JAN | 1.64 | 1.43 | 1.73 | 1.60 | 134.6% |
| FEB | 1.57 | 2.01 | 2.63 | 2.07 | 122.7% |
| MAR | 2.93 | 2.93 | 4.01 | 3.29 | 116.0% |
| APR | 4.64 | 4.43 | 5.72 | 4.93 | 120.8% |
| MAY | 6.20 | 5.97 | 7.19 | 6.46 | 116.8% |
| JUN | 6.82 | 6.65 | 7.66 | 7.05 | 107.9% |
| JUL | 7.12 | 7.14 | 8.03 | 7.43 | 102.7% |
| AUG | 6.44 | 6.32 | 7.04 | 6.60 | 102.4% |
| SEP | 5.53 | 5.28 | 5.65 | 5.49 | 107.4% |
| **TOTAL** | **51.36** | **51.42** | **57.73** | **53.50** | |
| **% AVG** | **119%** | **111%** | **112%** | **114%** | |

* Measured as Pan Evaporation and converted to ETo

ETo values for pan evaporation stations were approximated using : ETo= Pan Evaporation x 0.6

# TABLE 1-5
# HISTORICAL MONTHLY PAN EVAPORATION
# LAKE DEL VALLE STATION, LIVERMORE (CM_LDV in Inches)
# 1969 to 2021 WATER YEARS

| Water Year | OCTWY | NOVWY | DECWY | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL OCT-SEP | TOTAL JULY-JUNE | % AVERAGE OCT-SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1969 | 3.20 | 2.50 | 1.54 | 0.66 | 1.08 | 4.89 | 5.92 | 9.99 | 7.84 | 11.38 | 11.77 | 8.32 | 69.09 | NA | 102% |
| 1970 | 4.04 | 2.94 | 1.12 | 1.23 | 2.29 | 4.96 | 5.83 | 8.88 | 8.88 | 11.52 | 9.92 | 9.16 | 70.77 | 71.64 | 105% |
| 1971 | 5.07 | 2.14 | 1.05 | 1.33 | 2.12 | 3.67 | 5.17 | 6.54 | 8.91 | 10.92 | 10.30 | 9.12 | 66.34 | 66.60 | 98% |
| 1972 | 5.91 | 3.01 | 1.49 | 1.53 | 2.01 | 4.74 | 6.52 | 8.84 | 10.03 | 11.63 | 10.40 | 7.12 | 73.23 | 74.42 | 108% |
| 1973 | 3.67 | 1.30 | 0.93 | 1.14 | 1.20 | 2.98 | 6.36 | 8.69 | 10.59 | 10.89 | 10.21 | 7.33 | 65.29 | 66.01 | 96% |
| 1974 | 4.70 | 1.86 | 0.85 | 1.40 | 1.73 | 2.40 | 4.16 | 7.31 | 9.14 | 9.68 | 9.73 | 7.94 | 60.90 | 61.98 | 90% |
| 1975 | 5.52 | 2.15 | 1.44 | 1.73 | 1.99 | 3.01 | 3.64 | 8.27 | 8.63 | 9.45 | 9.39 | 7.45 | 62.67 | 63.73 | 93% |
| 1976 | 3.72 | 2.28 | 1.58 | 2.45 | 1.96 | 3.94 | 5.56 | 8.47 | 9.85 | 9.80 | 7.05 | 6.80 | 63.46 | 66.10 | 94% |
| 1977 | 4.82 | 2.75 | 2.59 | 1.08 | 2.12 | 3.84 | 7.15 | 5.48 | 9.28 | 11.24 | 8.89 | 6.74 | 65.98 | 62.76 | 97% |
| 1978 | 5.12 | 2.70 | 1.37 | 0.99 | 1.43 | 2.57 | 3.73 | 8.69 | 8.91 | 10.52 | 10.24 | 7.90 | 64.17 | 62.38 | 95% |
| 1979 | 5.80 | 2.24 | 1.51 | 1.25 | 1.29 | 2.29 | 4.80 | 8.36 | 11.02 | 10.40 | 9.23 | 9.47 | 67.66 | 67.22 | 100% |
| 1980 | 4.14 | 1.85 | 1.95 | 1.66 | 1.40 | 3.82 | 4.78 | 6.22 | 8.18 | 9.41 | 9.17 | 7.16 | 59.74 | 63.10 | 88% |
| 1981 | 5.86 | 3.30 | 1.79 | 1.08 | 2.18 | 2.83 | 5.80 | 8.11 | 11.82 | 11.34 | 10.23 | 7.72 | 72.06 | 68.51 | 106% |
| 1982 | 4.43 | 2.10 | 1.14 | 1.23 | 2.10 | 2.25 | 4.59 | 7.55 | 7.31 | 10.34 | 10.58 | 6.83 | 60.45 | 61.99 | 89% |
| 1983 | 4.53 | 1.50 | 1.54 | 1.72 | 1.54 | 2.17 | 4.05 | 6.71 | 8.34 | 10.44 | 9.35 | 7.82 | 59.71 | 59.85 | 88% |
| 1984 | 4.37 | 1.86 | 1.08 | 1.52 | 1.79 | 4.29 | 5.32 | 9.04 | 9.88 | 11.99 | 9.80 | 9.24 | 70.18 | 66.76 | 104% |
| 1985 | 4.02 | 1.63 | 1.11 | 1.18 | 2.70 | 3.09 | 5.95 | 7.75 | 10.40 | 11.49 | 9.23 | 6.38 | 64.93 | 68.86 | 96% |
| 1986 | 5.05 | 2.27 | 1.11 | 1.11 | 1.75 | 3.55 | 4.96 | 7.44 | 8.67 | 10.20 | 8.88 | 6.10 | 61.09 | 63.01 | 90% |
| 1987 | 4.84 | 3.47 | 1.22 | 1.45 | 2.08 | 3.19 | 6.43 | 7.90 | 8.73 | 8.46 | 8.97 | 7.29 | 64.03 | 64.49 | 95% |
| 1988 | 4.71 | 1.71 | 1.50 | 1.21 | 2.94 | 5.17 | 5.30 | 7.22 | 8.92 | 11.46 | 8.90 | 7.90 | 66.94 | 63.40 | 99% |
| 1989 | 4.81 | 1.85 | 1.64 | 1.39 | 1.57 | 2.75 | 5.75 | 7.70 | 9.30 | 11.30 | 9.14 | 6.41 | 63.61 | 65.02 | 94% |
| 1990 | 4.86 | 2.95 | 1.75 | 1.57 | 1.83 | 3.64 | 5.74 | 7.86 | 9.18 | 10.19 | 9.21 | 7.09 | 65.87 | 66.23 | 97% |
| 1991 | 6.56 | 3.48 | 1.95 | 1.86 | 2.44 | 2.63 | 5.00 | 6.42 | 8.50 | 10.25 | 8.00 | 7.61 | 64.70 | 65.33 | 96% |
| 1992 | 6.45 | 3.03 | 1.71 | 0.96 | 1.65 | 2.84 | 5.91 | 8.87 | 8.23 | 10.01 | 10.76 | 7.82 | 68.24 | 65.51 | 101% |
| 1993 | 5.12 | 2.79 | 1.19 | 1.21 | 1.42 | 2.83 | 4.93 | 6.61 | 9.64 | 10.23 | 10.02 | 8.18 | 64.17 | 64.33 | 95% |
| 1994 | 4.65 | 3.27 | 1.22 | 1.49 | 1.36 | 4.12 | 5.23 | 6.38 | 10.01 | 10.03 | 10.31 | 7.44 | 65.51 | 66.16 | 97% |
| 1995 | 4.94 | 1.66 | 0.76 | 0.73 | 1.61 | 2.33 | 4.75 | 5.22 | 8.18 | 10.06 | 10.39 | 7.65 | 58.28 | 57.96 | 86% |
| 1996 | 6.23 | 2.80 | 0.88 | 1.33 | 1.66 | 3.85 | 6.38 | 8.12 | 9.68 | 12.03 | 11.13 | 7.48 | 71.57 | 69.03 | 106% |
| 1997 | 5.44 | 2.05 | 1.04 | 1.02 | 2.67 | 4.82 | 6.45 | 8.95 | 9.40 | 10.32 | 8.78 | 8.52 | 69.46 | 72.48 | 103% |
| 1998 | 5.25 | 1.82 | 1.60 | 1.19 | 0.96 | 2.80 | 4.36 | 4.13 | 7.10 | 9.91 | 10.57 | 7.51 | 57.20 | 56.83 | 85% |
| 1999 | 4.51 | 1.63 | 1.41 | 1.32 | 1.58 | 2.93 | 5.25 | 7.04 | 8.70 | 10.51 | 8.58 | 7.53 | 60.99 | 62.36 | 90% |
| 2000 | 6.86 | 2.73 | 2.51 | 1.57 | 1.55 | 3.91 | 5.48 | 7.16 | 9.66 | 9.23 | 9.82 | 7.86 | 68.35 | 68.06 | 101% |
| 2001 | 3.84 | 1.84 | 1.68 | 1.45 | 2.20 | 4.14 | 4.86 | 10.05 | 10.92 | 9.78 | 9.75 | 7.98 | 68.49 | 67.89 | 101% |
| 2002 | 6.56 | 2.56 | 1.47 | 1.97 | 2.56 | 4.63 | 5.65 | 7.82 | 9.87 | 11.08 | 9.87 | 9.13 | 73.17 | 70.60 | 108% |
| 2003 | 5.64 | 3.23 | 1.73 | 1.26 | 2.31 | 4.04 | 4.05 | 7.62 | 9.78 | 12.14 | 9.23 | 8.84 | 69.87 | 69.74 | 103% |
| 2004 | 6.71 | 1.72 | 1.12 | 1.08 | 2.22 | 4.99 | 7.38 | 8.66 | 9.46 | 10.16 | 9.88 | 8.76 | 72.14 | 73.55 | 107% |
| 2005 | 4.86 | 2.21 | 1.54 | 1.14 | 1.54 | 3.20 | 4.93 | 6.60 | 8.37 | 11.13 | 10.65 | 7.41 | 63.58 | 63.19 | 94% |
| 2006 | 5.19 | 2.50 | 1.50 | 1.52 | 2.47 | 3.04 | 3.81 | 8.54 | 9.82 | 12.43 | 9.37 | 8.42 | 68.61 | 67.58 | 101% |
| 2007 | 5.27 | 2.09 | 2.22 | 1.98 | 1.71 | 4.34 | 5.86 | 8.58 | 9.59 | 9.814 | 10.45 | 7 | 68.90 | 71.86 | 102% |
| 2008 | 4.45 | 3.25 | 1.68 | 1.37 | 2.14 | 4.60 | 6.65 | 8.66 | 10.37 | 10.54 | 10.54 | 8.42 | 72.67 | 70.43 | 107% |
| 2009 | 6.27 | 2.40 | 1.35 | 2.04 | 1.95 | 3.90 | 6.24 | 8.52 | 9.09 | 11.053 | 10.12 | 8.63 | 71.566 | 71.26 | 106% |
| 2010 | 4.84 | 3.00 | 1.28 | 1.20 | 1.61 | 3.91 | 4.65 | 6.40 | 9.52 | 10.2 | 9.08 | 8.26 | 63.95 | 66.21 | 94% |
| 2011 | 4.98 | 2.43 | 1.13 | 1.53 | 2.46 | 2.64 | 5.64 | 7.13 | 8.22 | 10.25 | 9.62 | 8.46 | 64.49 | 63.70 | 95% |
| 2012 | 4.73 | 2.30 | 2.93 | 2.49 | 2.84 | 3.46 | 5.52 | 8.84 | 10.19 | 11.27 | 10.58 | 8.08 | 73.23 | 71.63 | 108% |
| 2013 | 5.28 | 2.55 | 1.89 | 1.48 | 2.51 | 4.74 | 7.61 | 9.09 | 10.20 | 11.78 | 9.35 | 7.45 | 73.93 | 75.28 | 109% |
| 2014 | 6.04 | 3.41 | 2.59 | 3.43 | 2.43 | 4.66 | 6.23 | 10.51 | 10.77 | 11.05 | 9.56 | 7.6 | 78.28 | 78.65 | 116% |
| 2015 | 6.26 | 2.73 | 1.16 | 1.79 | 2.65 | 4.96 | 6.62 | 7.31 | 10.01 | 10.73 | 10 | 9.37 | 73.59 | 71.70 | 109% |
| 2016 | 5.81 | 2.19 | 1.20 | 0.75 | 2.80 | 3.30 | 5.70 | 7.92 | 11.87 | 12.29 | 9.71 | 9.06 | 72.6 | 71.64 | 107% |
| 2017 | 4.74 | 2.32 | 1.56 | 1.16 | 1.49 | 3.78 | 5.18 | 8.93 | 9.78 | 12.02 | 10.04 | 8.34 | 69.34 | 70.00 | 102% |
| 2018 | 6.53 | 2.15 | 2.60 | 1.51 | 3.33 | 3.46 | 5.30 | 7.95 | 10.43 | 12.22 | 9.84 | 8.11 | 73.43 | 73.66 | 108% |
| 2019 | 5.88 | 4.07 | 1.70 | 1.93 | 1.57 | 3.22 | 5.99 | 6.27 | 10.99 | 11.55 | 11.25 | 8.36 | 72.78 | 71.79 | 108% |
| 2020 | 6.99 | 4.01 | 1.20 | 1.27 | 3.82 | 3.29 | 5.64 | 9.41 | 10.80 | 11.26 | 11 | 7.68 | 76.37 | 77.59 | 113% |
| 2021 | 7.73 | 3.33 | 2.16 | 2.56 | 2.45 | 4.58 | 7.24 | 9.69 | 10.66 | 11.12 | 10.06 | 8.64 | 80.228 | 80.35 | 119% |
| **Maximum** | **7.73** | **4.07** | **2.93** | **3.43** | **3.82** | **5.17** | **7.61** | **10.51** | **11.87** | **12.43** | **11.77** | **9.47** | **80.23** | **80.35** | **119%** |
| **Minimum** | **3.20** | **1.30** | **0.76** | **0.66** | **0.96** | **2.17** | **3.64** | **4.13** | **7.10** | **8.46** | **7.05** | **6.10** | **57.20** | **56.83** | **85%** |
| **Mean** | **5.24** | **2.49** | **1.53** | **1.46** | **2.02** | **3.62** | **5.51** | **7.86** | **9.50** | **10.76** | **9.79** | **7.90** | **67.70** | **67.70** | **100%** |

ETo can be approximated using: ETo= Pan Evaporation x 0.6402

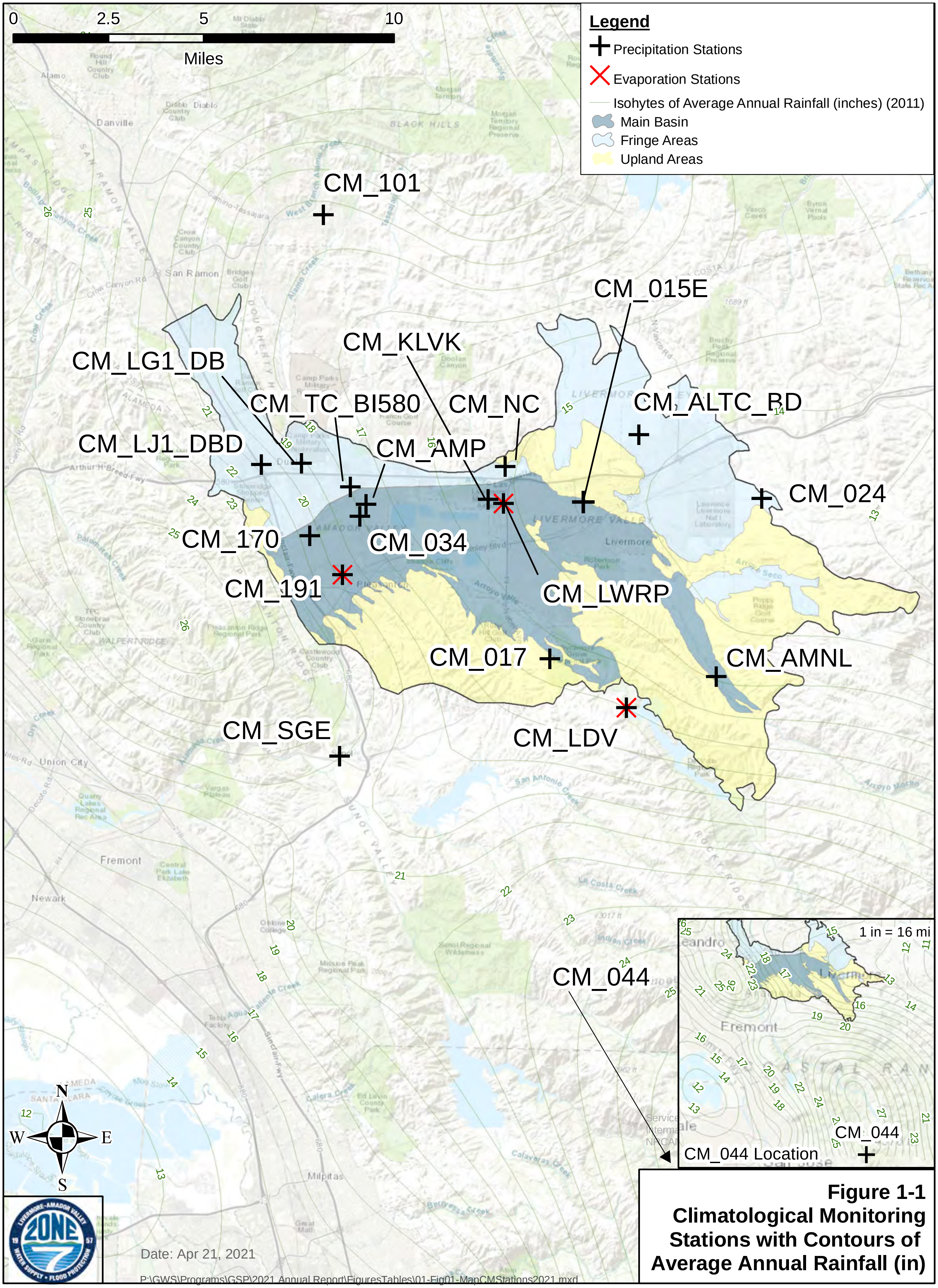
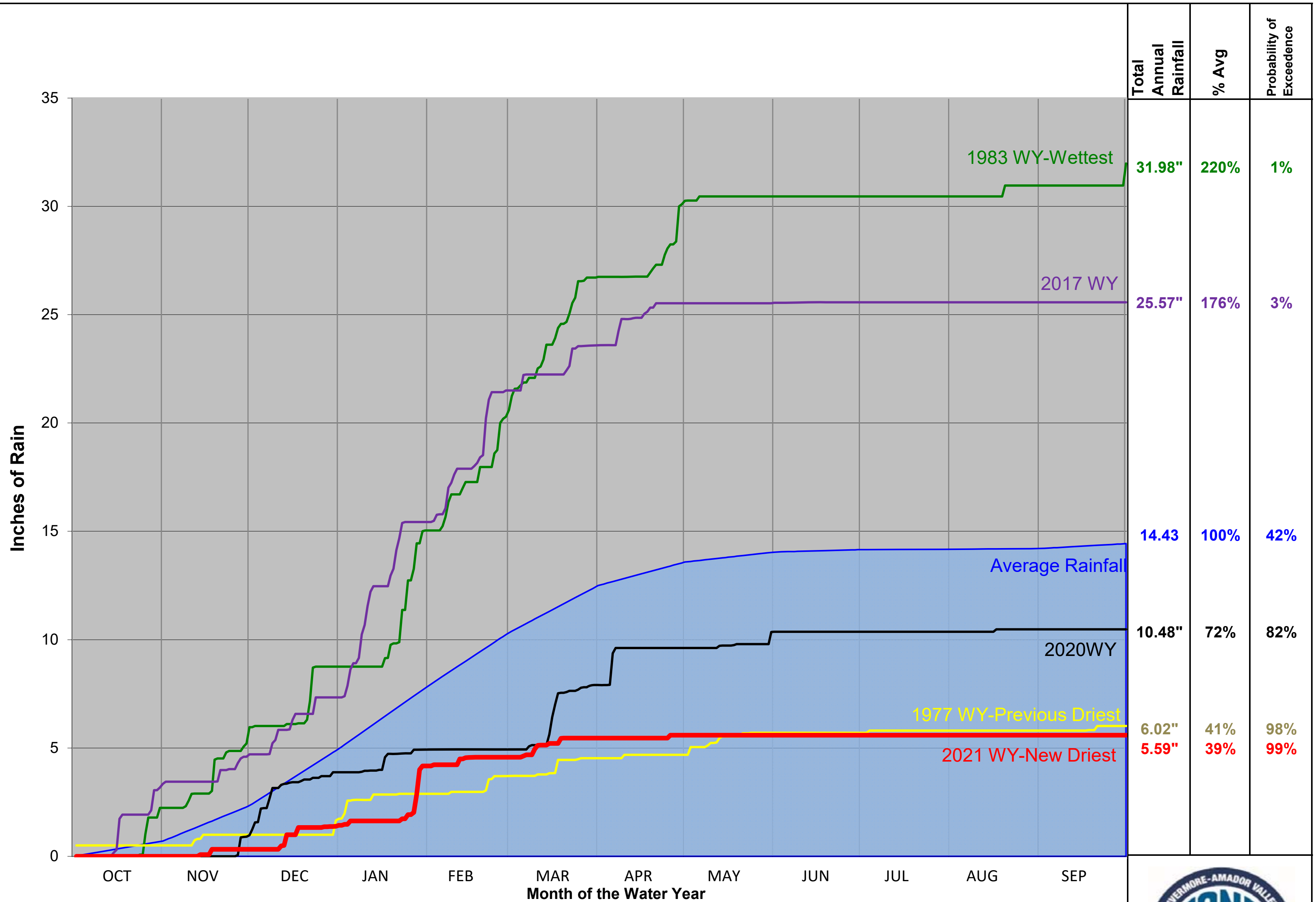



**Figure 1-1**
**Climatological Monitoring Stations with Contours of Average Annual Rainfall (in)**

**FIGURE 1-2**
**Graph of Livermore Rainfall Index (in inches)**
**(Station CM_015E to 2020, Station CM_KLVK after 2020)**




| | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Monthly (inches) | 0.00 | 0.33 | 1.10 | 2.74 | 0.40 | 0.89 | 0.13 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| % Monthly Avg | 0% | 20% | 42% | 94% | 16% | 41% | 12% | 0% | 0% | 0% | 0% | 0% |
| YTD (inches) | 0.00 | 0.33 | 1.43 | 4.17 | 4.57 | 5.46 | 5.59 | 5.59 | 5.59 | 5.59 | 5.59 | 5.59 |
| % Average YTD | 0% | 14% | 29% | 53% | 44% | 44% | 41% | 40% | 39% | 39% | 39% | 39% |
| % Annual Avg | 0% | 2% | 10% | 29% | 32% | 38% | 39% | 39% | 39% | 39% | 39% | 39% |

4/21/2022
P:\GWS\Programs\GSP\2021 Annual Report\FiguresTables\01-Fig02-GraphLRIRain.xlsx

# 2 Surface Water Monitoring

## 2.1 Program Changes

During the 2021 WY, the high-flow only station designated as Arroyo De La Laguna at Highway (Hwy) 84 at Sunol (ADLL_Hwy84) was installed in August 2021 (see

***Figure*** 2-1). For more information on the Surface Water Monitoring Program, see the following sections of the 2021 Alternative GSP:

- **Section 5.2.1:** Existing Monitoring and Management Programs
- **Section 14.2.7.2:** Other Monitoring Networks – Surface Water Monitoring Program

## 2.2 Results for the 2021 Water Year

- All the surface water stations monitored for the 2021 WY are mapped on

***Figure*** 2-1 and listed in ***Table 2-1***. ***Table 2-2*** tabulates monthly flows during the 2021 WY at 20 stations along the main streams over the Basin. ***Table 2-3*** presents the water quality results from all stations sampled during the 2021 WY to identify the quality of water recharging and discharging from the Basin.

***Table 2-A*** below summarizes the natural flows that flowed from the upper watershed into the three recharging stream reaches for the 2021 WY:

***Table 2-A: Natural Flows From Upper Watershed, 2021 WY***

| Station | Stream | Natural Flow (Acre-Feet) | Percent of Average |
|---|---|---|---|
| AVBLC* | Arroyo Valle | 2,423 | 10% |
| AMNL | Arroyo Mocho | 525 | 15% |
| ALPL | Arroyo Las Positas | 2,455 | 46% |
| **TOTAL Natural Inflow** | | **5,403** | **16%** |

* Natural flow into Lake del Valle

***Table 2-B*** below summarizes the South Bay Aqueduct (SBA) releases to the recharging streams for “artificial” (or “conservation”) recharge during the 2021 WY:

***Table 2-B: South Bay Aqueduct Releases, 2021 WY***

| Station | Stream | Released (Acre-Feet) | Percent of Average |
|---|---|---|---|
| SBA_TO2_AV | Arroyo Valle | 1,066 | 36% |
| SBA_AM | Arroyo Mocho | 0 | 0% |
| SBA_ALTC | Arroyo Las Positas | 0 | 0% |
| **TOTAL SBA Releases** | | **1,066** | **16%** |

- There were no flood releases from Lake del Valle into Arroyo Valle.
- "Live stream" conditions were maintained in the Arroyo Valle with natural and artificial flows for a brief period in January 2021 (January 27 to 30) and again from February 17 to March 21, 2021.
- Due to the critically dry year, Zone 7 was unable to provide any water to East Bay Regional Parks District (EBRPD) for Shadow Cliffs Lake recharge. For comparison, during the 2020 WY, EBRPD was able to divert 444 acre-feet (AF) from the Arroyo Valle for Shadow Cliffs recharge.
- Peak flows and average flows are shown in the table below:

***Table 2-C: Peak and Annual Mean Flows, 2021 WY***

| Pond | Station | Peak (cfs) | Annual Mean (cfs) |
|---|---|---|---|
| Arroyo Valle | ADVP | 62 | 1.6 |
| Arroyo Mocho | AMNL | 509 | 0.7 |
| Arroyo Las Positas | ALPL | 404 | 3.4 |
| Arroyo de la Laguna | ADLLV | 2,240 | 14.5 |

- A total of 10,479 AF of water flowed out of the Valley past Station Arroyo de la Laguna at Verona (ADLLV); 20% of average.

# 2.3 Attached Tables and Figures

*Table 2-1: Table of Surface Water Monitoring Stations and Monitoring Frequencies, 2021 WY*
*Table 2-2: Monthly Flows, 2021 WY*
*Table 2-3: Table of Surface Water Quality Results, 2021 WY*

*Figure 2-1: Map of Surface Water Monitoring Sites, 2021 WY*

# TABLE 2-1
# TABLE OF SURFACE WATER MONITORING STATIONS AND MONITORING INFORMATION
# 2021 WATER YEAR

| Station ID | Station Name | Station Type | Flow Range | Flow Freq | Gauge Height | Flow (Q) | Water Temp | Other Parameters | WQ Freq | Primary Operator |
|---|---|---|---|---|---|---|---|---|---|---|
| ALAMO CANAL - LINE F | | | | | | | | | | |
| ACNP | Alamo Canal near Pleasanton | Gauge Height | Entire | 15 Min | x | x | 15 Min | SSD | - | USGS |
| AC_WCD | Alamo Creek at Willow Creek Dr near Dublin | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Balance |
| ALTAMONT CREEK - LINE R | | | | | | | | | | |
| ALTC_BD | Altamont Creek at Bluebell Drive | Gauge Height | High | 15 Min | x | x | 15 Min | - | - | Zone 7 |
| SBA_ALTC | SBA Turnout to Altamont Creek | Flow Meter | Entire | 15 Min | - | x | - | - | - | DWR |
| ARROYO DE LA LAGUNA - LINE B | | | | | | | | | | |
| ADLL_HWY84 | Arroyo De La Laguna at Highway 84 in Sunol | Gauge Height | High | 15 Min | x | x | 15 Min | - | - | Balance |
| ADLLV | Arroyo De La Laguna at Verona | Gauge Height | Entire | 15 Min | x | x | 15 Min | pH, SC | Annual | USGS |
| ARROYO LAS POSITAS - LINE H | | | | | | | | | | |
| ALP_ELCH | Arroyo Las Positas above El Charro Road | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Annual | Zone 7 |
| ALPL | Arroyo Las Positas at Livermore | Gauge Height | Entire | 15 Min | x | x | 15 Min | SSD | Annual | Zone 7 |
| LLNL_ALP | LLNL Treated Groundwater Discharge to ALP | Estimated | Entire | Daily | - | x | - | - | - | LLNL |
| ARROYO MOCHO - LINE G | | | | | | | | | | |
| AMHAG | Arroyo Mocho at Livermore | Gauge Height | Entire | 15 Min | x | x | - | SSD | Annual | Zone 7 |
| AM_KB | Arroyo Mocho at Kaiser Bridge | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Annual | Zone 7 |
| AMNL | Arroyo Mocho near Livermore | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Annual | Zone 7 |
| AMP | Arroyo Mocho near Pleasanton | Gauge Height | Entire | 15 Min | x | x | 15 Min | SSD | Annual | Zone 7 |
| MA_COPE_I | Cope Lake to Lake I | Gauge Height | Entire | Hourly | x | x | - | - | - | Zone 7 |
| MA_VUL_COPE | Vulcan Discharge to Cope Lake | Flow Meter | Entire | Daily | - | x | - | - | - | Vulcan |
| SBA_AM | SBA Turnout to Arroyo Mocho | Flow Meter | Entire | 15 Min | - | x | - | - | - | DWR |
| ARROYO SECO - LINE P | | | | | | | | | | |
| AS_SFR | Arroyo Seco at Southfront Rd | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Balance |
| ARROYO VALLE - LINE E | | | | | | | | | | |
| ADVP | Arroyo Valle at Pleasanton | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Quarterly | Zone 7 |
| AVADLL | Arroyo Valle above Arroyo De La Laguna | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| AVBLC | Arroyo Valle below Lang Canyon | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Annual | USGS |
| AVCAT | Arroyo Valle along Camp Arroyo Trail | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| AVDCC | Arroyo Valle at Dry Creek Confluence | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| AV_DIV_SC | Arroyo Valle Diversion to Shadow Cliffs | Flow Meter | Entire | Daily | - | x | - | - | - | EBRPD |
| AV_ISABEL | Arroyo Valle at Isabel | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| AVNL | Arroyo Valle near Livermore | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | Quarterly | USGS |
| AVSCPK18 | Arroyo Valle at Shadow Cliffs Pond K18 | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| AVSGP | Arroyo Valle at Sycamore Grove Park | Water Temp | - | - | - | - | 15 Min | - | - | Zone 7 |
| LDV_FLD_GATE | Lake Del Valle Flood Gate | Calculated | Entire | 15 Min | - | x | - | - | - | DWR |
| SBA_TO1_AV | SBA Turnout 1 to Arroyo Valle | Estimated | Entire | 15 Min | - | x | - | - | - | Zone 7 |
| SBA_TO2_AV | SBA Turnout 2 to Arroyo Valle | Flow Meter | Entire | 15 Min | - | x | 15 Min | - | - | DWR |
| CHABOT CANAL - LINE G-1 | | | | | | | | | | |
| CC_BSRD | Chabot Canal below Stoneridge Drive nr Pleasanton | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Balance |
| LG1_DB | Line G1 at Dublin Blvd | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Balance |
| SOUTH SAN RAMON CREEK - LINE J | | | | | | | | | | |
| LJ1_BDB | Line J1 Below Dublin Blvd | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Balance |
| SSRC_AAVBLVD | South San Ramon Creek above Amador Valley Blvd | Gauge Height | Entire | 15 Min | x | x | 15 Min | - | - | Zone 7 |
| TASSAJARA CREEK - LINE K | | | | | | | | | | |
| TC_BI580 | Tassajara Creek below Interstate 580 | Gauge Height | High | 15 Min | x | x | 15 Min | - | - | Balance |

Quarterly Water Quality satisfies water rights requirements. SSD = Suspended Sediment Discharge. SC = Specific Conductance.

# TABLE 2-2
# MONTHLY FLOWS (Acre-Feet)
# 2021 WATER YEAR

| Station | Abbrev | OCT | NOV | DEC | JAN | FEB | MAR | APR | MAY | JUN | JUL | AUG | SEP | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Arroyo Valle** | | | | | | | | | | | | | | |
| below Lang Canyon | AVBLC | 0 | 0 | 0 | 1806.9 | 325.1 | 217.8 | 69.1 | 4.1 | 0 | 0 | 0 | 0 | 2423 |
| SBA Releases | SBA_TO2_AV | 4.6 | 4.5 | 11.6 | 6.7 | 721.5 | 288.5 | 7 | 4 | 4 | 5.6 | 4 | 3.8 | 1065.8 |
| Near Livermore | AVNL | 11.4 | 16.8 | 26 | 19.8 | 690.5 | 275.1 | 55.3 | 16.1 | 7 | 7.6 | 6.8 | 10 | 1142.4 |
| Diversion to Shadow Cliffs | AV_DIV_SC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Recharged Artificial* | *AV_RC* | *0* | *0* | *0* | *0* | *601* | *213* | *2* | *0* | *0* | *0* | *0* | *0* | *816* |
| *Recharged Natural* | *AV_RN* | *11* | *47* | *85* | *284* | *1* | *40* | *53* | *16* | *7* | *8* | *7* | *10* | *569* |
| at Pleasanton | ADVP | 0 | 0 | 0 | 49.2 | 87.9 | 62.1 | 0 | 0 | 0 | 0 | 0 | 0 | 199.2 |
| **Arroyo Mocho** | | | | | | | | | | | | | | |
| Near Livermore | AMNL | 0 | 0 | 0 | 469.8 | 24.1 | 22.4 | 7.9 | 1.1 | 0 | 0 | 0 | 0 | 525.3 |
| SBA Releases | SBA_AM | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| *Recharged Artificial* | *AM_RC* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| *Recharged Natural* | *AM_RN* | *0* | *5* | *22* | *478* | *32* | *38* | *10* | *1* | *0* | *0* | *0* | *0* | *586* |
| at Livermore | AMHAG | 0 | 0 | 0.7 | 304.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 305.2 |
| at Kaiser Bridge | AM_KB | 0 | 0 | 0 | 238.5 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 238.5 |
| Near Pleasanton | AMP | 125.4 | 167 | 424.4 | 1204.2 | 247.2 | 259 | 146.2 | 106.2 | 80.4 | 93.2 | 83.5 | 70.9 | 3007.6 |
| **Arroyo Las Positas** | | | | | | | | | | | | | | |
| SBA Releases | SBA_ALTC | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| at Livermore | ALPL | 151.6 | 176.7 | 343.7 | 509.3 | 232.4 | 229.5 | 166.9 | 157.6 | 127.1 | 123.3 | 128.1 | 108.8 | 2455 |
| *Recharged Artificial* | *ALP_RC* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| *Recharged Natural* | *ALP_RN* | *65* | *56* | *64* | *43* | *49* | *55* | *57* | *70* | *65* | *63* | *79* | *66* | *732* |
| above El Charro | ALP_ELCH | 93.3 | 127.2 | 321.4 | 587.1 | 208.3 | 199.2 | 116.6 | 94.6 | 68.9 | 77.7 | 55.7 | 49.5 | 1999.5 |
| **Alamo Canal/Arroyo de la Laguna** | | | | | | | | | | | | | | |
| Near Pleasanton | ACNP | 153.5 | 624.7 | 933.1 | 2240.5 | 476.7 | 494.7 | 186.2 | 116.9 | 83.5 | 37.1 | 37 | 38.5 | 5422.4 |
| at Verona | ADLLV | 326.6 | 708.3 | 1406.5 | 4444 | 1064.7 | 1101.3 | 467.8 | 307.7 | 193.8 | 162.4 | 146.2 | 149.9 | 10479.2 |

SBA Releases = Zone 7 releases from the South Bay Aqueduct to streams ("artificial")
Recharged Natural = stream recharge from rainfall runoff ("natural").
Recharged Artificial = recharge from South Bay Aqueduct Releases

# TABLE 2-3
# SURFACE WATER QUALITY RESULTS
# 2021 WATER YEAR

| SITE ID | Date | Time | FLOW (cfs) | TEMP. °C | SC mS/cm | pH | Mineral Constituents (mg/L) Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | Select Metals (ug/L) B | As | Fe | Cr | TDS mg/L | Hard mg/L |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| AC_WCD | 8/11/2021 | 15:00 | 0.2 | 29 | 1657 | 8.2 | 80 | 52 | 247 | 5.8 | 438 | 186 | 258 | < 0.1 | 23.5 | 1070 | 4.3 | < 100 | < 1 | 1076 | 414 |
| ACNP | 8/11/2021 | 14:00 | 0.4* | 28.7 | 1496 | 8.2 | 85 | 51 | 212 | 2.6 | 360 | 201 | 227 | < 0.1 | 20.5 | 1000 | 4.5 | < 100 | < 1 | 985 | 422 |
| ADLLV | 8/11/2021 | 13:05 | 2.6 | 25.7 | 1648 | 8.1 | 77 | 57 | 209 | 3.8 | 413 | 166 | 246 | < 0.1 | 14.6 | 1670 | 4.9 | < 100 | < 1 | 980 | 427 |
| ADVP | 3/11/2021 | 14:08 | 1.5 | 11.2 | 485 | 7.4 | 32 | 19 | 39 | 2.6 | 117 | 52 | 61 | < 0.1 | 3.2 | 210 | < 1 | < 100 | < 1 | 267 | 158 |
| ALP_ELCH | 9/8/2021 | 13:43 | 0.6 | 21.7 | 1280 | 8.1 | 56 | 45 | 149 | 2.7 | 411 | 86 | 190 | 0.71 | 16.5 | 2380 | 2.5 | < 100 | < 1 | 757 | 325 |
| ALPL | 9/8/2021 | 11:22 | 1.6 | 20.1 | 1402 | 7.9 | 66 | 46 | 141 | 2.3 | 435 | 79 | 177 | 2.72 | 27.8 | 2300 | 2.2 | < 100 | 1.9 | 769 | 355 |
| AMNL | 4/28/2021 | 13:04 | 0.1 | 17.5 | 1089 | 7.8 | 44 | 101 | 51 | 3 | 622 | 91 | 52 | < 0.1 | 11.3 | 1020 | < 1 | < 100 | < 1 | 662 | 524 |
| AMP | 8/11/2021 | 11:20 | 1.1 | 22.4 | 1400 | 7.9 | 67 | 54 | 181 | 4.2 | 409 | 87 | 227 | 0.16 | 16.1 | 2000 | 2.8 | < 100 | < 1 | 841 | 390 |
| AVBLC | 4/28/2021 | 12:45 | 0.6* | 21.1 | 643 | 8.1 | 48 | 34 | 33 | 1.7 | 274 | 89 | 22 | < 0.1 | 6.6 | 940 | < 1 | < 100 | < 1 | 373 | 260 |
| AVNL | 11/23/2020 | 13:15 | 0.3* | 9.7 | 899 | 7.5 | 66 | 37 | 82 | 3.4 | 250 | 151 | 81 | < 0.1 | 21.4 | 1150 | 1 | < 100 | < 1 | 565 | 317 |
| AVNL | 3/11/2021 | 14:55 | 3* | 11.7 | 657 | 7.9 | 39 | 24 | 71 | 3.5 | 159 | 73 | 87 | 0.29 | 12 | 390 | 2.1 | < 100 | < 1 | 391 | 197 |
| AVNL | 6/28/2021 | 12:42 | 0.1* | 18.8 | 1047 | 7.7 | 67 | 34 | 103 | 3.5 | 289 | 136 | 95 | < 0.1 | 25.7 | 1220 | 2.1 | < 100 | < 1 | 607 | 306 |
| SSRC_AAVBLVD | 8/11/2021 | 15:45 | 0.5 | 30.4 | 1115 | 8.3 | 67 | 39 | 136 | 2.5 | 356 | 105 | 150 | 0.42 | 17.3 | 470 | 4.3 | < 100 | < 1 | 701 | 329 |



* Daily mean flow

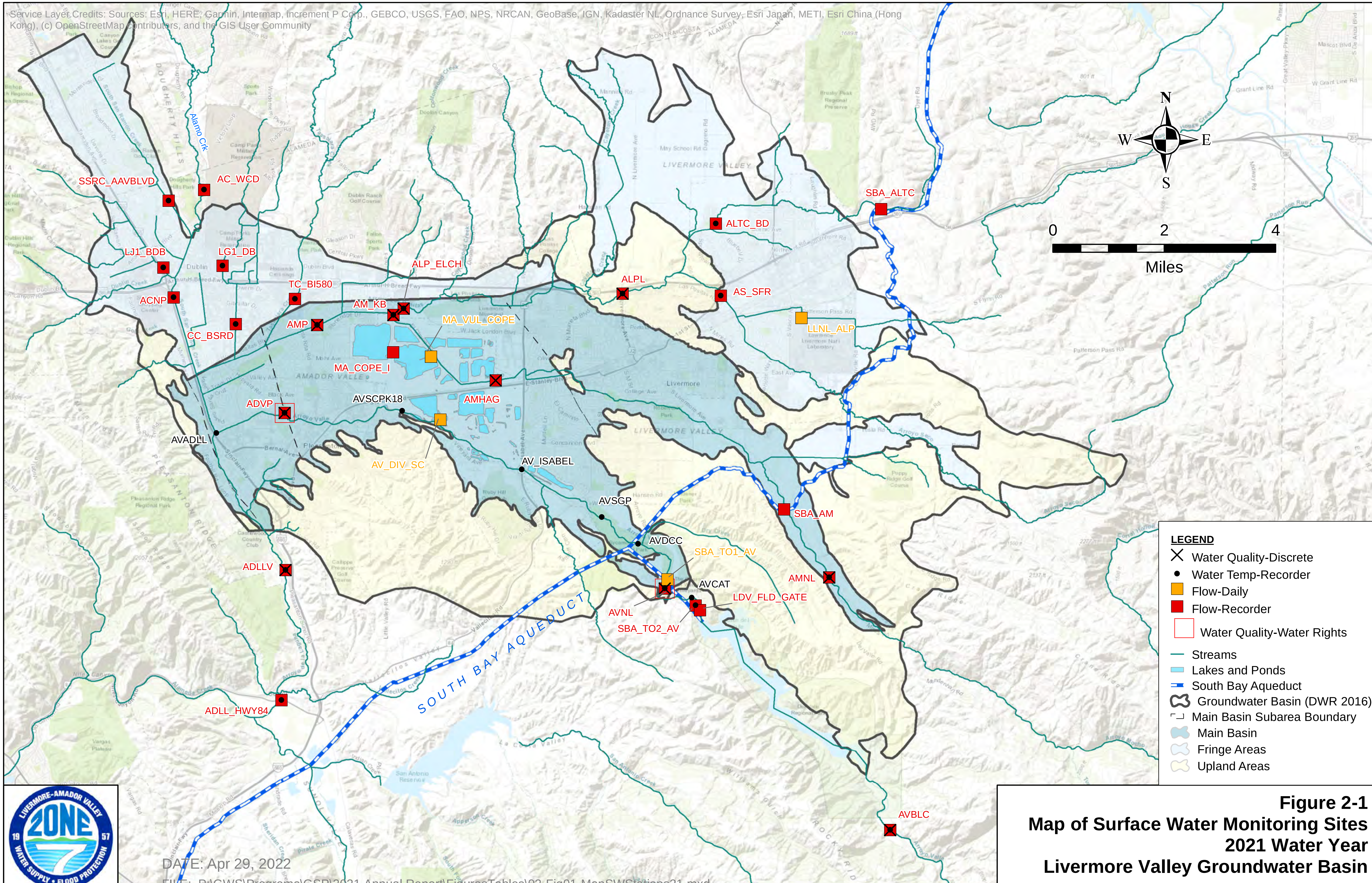



**Figure 2-1**
**Map of Surface Water Monitoring Sites**
**2021 Water Year**
**Livermore Valley Groundwater Basin**

# 3 Mining Area Monitoring

## 3.1 Program Changes

Presently, two mining companies, CEMEX and Vulcan Materials, have on-going surface mining operations for the extraction and sale of sands and gravels in the central portion of the Main Basin Management Area (Main Basin). The Mining Area Monitoring Program includes water level measurements and water quality analysis for many of the mining area ponds or quarry lakes within the mined area. No changes were made to the program in the 2021 WY. For more information on the Mining Area Program, see the following sections of the 2021 Alternative GSP:

- **Section 5.2.1:** Existing Monitoring and Management Programs
- **Section 14.2.7.3:** Other Monitoring Networks – Chain of Lakes/Mining Area Monitoring Program

## 3.2 Results for the 2021 Water Year

***Figure 3-1*** is a map of the gravel mining pits and ponds that includes Fall 2021 WY groundwater elevation contours for the Upper Aquifer. ***Figure 3-2*** shows the planned locations of the future Chain of Lakes following mining activities (planned completion in 2058). ***Table 3-1*** summarizes the water levels observed in the mining area ponds for the 2021 WY. ***Table 3-2*** shows water quality results from grab samples of mining ponds for the 2021 WY. Per- and polyfluoroalkyl substances (PFAS) results from the mining ponds are included in ***Table 6-7***. Water quality results from the mining ponds are discussed in ***Section 6: Groundwater Quality***.

The following ponds were actively mined during the 2021 WY:

***Table 3-A: Ponds Actively Mined during 2021 WY***

| Pond | Chain of Lake | Mining Company |
|---|---|---|
| MA-R028 | Lake D | Vulcan Materials (formerly Calmat) |
| MA-P046 | Lake J | CEMEX (formerly RMC Lonestar) |
| MA-P042 | Lake B | CEMEX (formerly RMC Lonestar). |

- Mining Ponds MA-R028 (Lake D) and MA-P042 (Lake B) have been mined to depths such that the ponds appear to be in contact with both the Upper and Lower Aquifers. These two pond elevations are included in both the Upper and Lower Aquifer groundwater elevation contour maps presented in ***Section 5: Groundwater Elevations***.

- Pond MA-R024 was mined deeper than the depth shown on the reclamation plan. The footprint of the excavation includes a portion of Lake E and former Pond 7 to the west. The pond is temporarily being used as a silt pond. Once the silt fills in the bottom of the excavation to the final reclamation depth, a berm will be placed between Lake E and former Pond 7.

- Vulcan Materials continues to transfer its pumped groundwater into various ponds and eventually discharges excess water into Cope Lake. Vulcan's discharge into Cope Lake was significantly lower in the 2021 WY due to a combination of a drier-than-normal WY and Vulcan adding MA-R024A as a silt pond with a large storage capacity.

- CEMEX transferred its pumped groundwater into other onsite ponds and used some water as a gravel wash water source.

- Estimated groundwater transfers and losses associated with the mining area are shown in ***Table 3-B*** below.

***Table 3-B: Estimated Groundwater Transfer and Losses in Mining Area, 2021 WY (AF)***

| Activity | 2021 WY | Typical/ Average (AF) |
|---|---|---|
| **Mining Area Transfers*** | | |
| Vulcan to Cope Lake | 548 | 8,700 |
| Cope Lake to Lake I | 808 | 7,000 |
| Diverted to Shadow Cliffs | 0 | 600 |
| **Mining Area Losses** | | |
| Processing Losses** | 700 | 700 |
| Net Pond Precip/Evaporation | 4,372 | 2,400 |
| Pumped GW Exported from Valley | 0 | 0 |

* Transfers made to locations outside of the quarries.
** Estimated

- Due to the critically dry year, Zone 7 was unable to provide any water to EBRPD for Shadow Cliffs Lake recharge.

## 3.3 Attached Tables and Figures

***Table 3-1***: *Semiannual Water Levels in Mining Area Ponds, 2021 WY*
***Table 3-2***: *Water Quality Results for Mining Area Water Samples, 2021 WY*

***Figure 3-1***: *Gravel Mining Pits with Groundwater Elevation Contours (Fall 2021)*
***Figure 3-2***: *Future Chain of Lakes*

# TABLE 3-1
# SEMIANNUAL WATER LEVELS IN MINING AREA PONDS
# 2021 WATER YEAR

| EXCAVATIONS | | | | | | | | CURRENT PONDS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Excavation | Chain of Lake | Display Name | Original Ground Elev | Deepest Mined Depth (ft) Elev | Depth | Pit Area (acres) | Mining Status | Pond Name | Pond Area (acres) | Contact with Aquifer | Water Elev Status | Mining Use | Pond Elevation (ft MSL, NAVD88) Fall 20 | Spring 21 | Fall 21 | WY Diff |
| **CALROCK/RHODES & JAMIESON/PLEASANTON GRAVEL COMPANY/CALMAT/VULCAN** | | | | | | | | | | | | | | | | |
| MA-C001 | Lake C | C1/ Lake C | 410 | 360 | 50 | 32.2 | Excavated | MA-C001 | 5.4 | No | Static | Unused | 358.6 | 358.91 | 355.8 | -2.82 |
| MA-C002 | | C2 | 410 | 360 | 50 | 6.1 | Excavated | | | | | | | | | |
| MA-C003 | | C3 | 410 | 360 | 50 | 11.3 | Excavated | | | | | | | | | |
| MA-C004 | | C4 | 400 | 390 | 10 | 1.7 | Backfilled | | | | | | | | | |
| MA-C005 | | C5 | 400 | 290 | 110 | 19.2 | Backfilled | | | | | | | | | |
| MA-C006 | Lake C | C6/ Lake C | 400 | 385 | 15 | 12.4 | Excavated | | | | | | | | | |
| MA-C007 | Lake D | C7/ Lake D | 400 | 330 | 70 | 22.1 | Backfilled | | | | | | | | | |
| MA-C008A | Lake D | C8A/ Lake D | 410 | 330 | 80 | 20.2 | Backfilled | | | | | | | | | |
| MA-C009 | Lake D | C9/ Lake D | 410 | 310 | 100 | 20.8 | Active Mining | | | | | | | | | |
| MA-C008B | Lake D | C8B/ Lake D | 410 | 340 | 70 | 26.8 | Backfilled | | | | | | | | | |
| MA-C010 | Lake D | C10/ Lake D | 410 | 310 | 100 | 62.3 | Active Mining | | | | | | | | | |
| MA-R003 | | R3 | 370 | 240 | 130 | 14.8 | Excavated | MA-R003 | 3.6 | No | Lined | Settling Pond | 345.6 | 0 | 344.5 | -1.09 |
| MA-R004 | | R4 | 380 | 240 | 140 | 16.5 | Excavated | MA-R004 | 11.4 | Yes | InFlux | Water Storage | 315.6 | 309.38 | 313 | -2.61 |
| MA-R005 | | R5 | 380 | 240 | 140 | 31.1 | Backfilled | | | | | | | | | |
| MA-R008 | Lake G | R8/ Lake G | 365 | 260 | 105 | 46 | Excavated | MA-R008 | 4.6 | No | Lined | Settling Pond | NM | NM | NM | |
| MA-R010 | | R10 | 380 | 370 | 10 | 2.2 | Backfilled | | | | | | | | | |
| MA-R011 | | R11 | 390 | 370 | 20 | 3.4 | Backfilled | | | | | | | | | |
| MA-R012 | | R12 | 370 | 240 | 130 | 39.4 | Backfilled | | | | | | | | | |
| MA-R013 | | R13 | 370 | 270 | 100 | 28.3 | Backfilled | | | | | | | | | |
| MA-R014 | | R14 | 400 | 380 | 20 | 11.5 | Backfilled | | | | | | | | | |
| MA-R021 | | R21 | 380 | 280 | 100 | 44.2 | Excavated | MA-R021 | 28.5 | No | Lined | Unused | NM | NM | NM | |
| MA-R022 | Lake F | R22/ Lake F | 380 | 290 | 90 | 79.3 | Excavated | MA-R022 | 59.5 | No | Lined | Settling Pond | 364 | 363.24 | 362.6 | -1.43 |
| MA-R023 | | R23 | 380 | 270 | 110 | 27.5 | Excavated | MA-R023 | 21.6 | No | Lined | Water Storage | 360.7 | 361.2 | 360.3 | -0.4 |
| MA-R024 | Lake E | R24A/ Lake E | 390 | 200 | 190 | 55.9 | Excavated | MA-R024A | 59.1 | Yes | Elevated | Settling Pond | 235.3 | 259.9 | NM | |
| MA-R025 | Lake E | R25/ Lake E | 395 | 300 | 95 | 43.7 | Backfilled | | | | | | | | | |
| MA-R027 | | R27 | 380 | 300 | 80 | 59.5 | Excavated | MA-R027 | 23.6 | No | Lined | Unused | NM | NM | NM | |
| MA-R028 | Lake D | R28/ Lake D | 400 | 165 | 235 | 62.9 | Active Mining | MA-R028 | 0.7 | Yes | Depressed | Dewatering | 168.4 | 167.96 | 166.4 | -2.05 |

COL = Chain of Lake, A = Annual; SA = Semiannual,
WY Diff = Water Year Difference (Fall to Fall)

# TABLE 3-1
# SEMIANNUAL WATER LEVELS IN MINING AREA PONDS
# 2021 WATER YEAR

| EXCAVATIONS | | | | | | | | CURRENT PONDS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Excavation | Chain of Lake | Display Name | Original Ground Elev | Deepest Mined Depth (ft) | | Pit Area | Mining Status | Pond Name | Pond Area | Contact | Water Elev | Mining Use | Pond Elevation (ft MSL, NAVD88) | | | |
| | | | | *Elev* | *Depth* | *(acres)* | | | *(acres)* | with Aquifer | Status | | *Fall 20* | *Spring 21* | *Fall 21* | *WY Diff* |
| **KAISER GRAVELS/HANSON AGGREGATES** | | | | | | | | | | | | | | | | |
| MA-K001 | | K1 | 350 | 325 | 25 | 3.4 | Backfilled | | | | | | | | | |
| MA-K002 | | K2 | 350 | 325 | 25 | 3.2 | Backfilled | | | | | | | | | |
| MA-K004 | | K4 | 350 | 315 | 35 | 13 | Backfilled | | | | | | | | | |
| MA-K005 | | K5 | 350 | 315 | 35 | 10.4 | Backfilled | | | | | | | | | |
| MA-K006 | | K6 | 350 | 325 | 25 | 13.4 | Backfilled | | | | | | | | | |
| MA-K007 | | K7 | 350 | 320 | 30 | 11.7 | Backfilled | | | | | | | | | |
| MA-K008 | | K8 | 350 | 320 | 30 | 17.7 | Backfilled | | | | | | | | | |
| MA-K009 | | K9 | 360 | 305 | 55 | 57.4 | Backfilled | | | | | | | | | |
| MA-K010 | | K10 | 370 | 355 | 15 | 4.4 | Backfilled | | | | | | | | | |
| MA-K011 | | K11 | 370 | 315 | 55 | 24 | Backfilled | | | | | | | | | |
| MA-K012 | | K12 | 370 | 275 | 95 | 37.7 | Backfilled | | | | | | | | | |
| MA-K013 | | K13 | 370 | 275 | 95 | 14.9 | Backfilled | | | | | | | | | |
| MA-K014 | | K14 | 370 | 275 | 95 | 5.6 | Backfilled | | | | | | | | | |
| MA-K015 | | K15 | 360 | 265 | 95 | 142.3 | Excavated | MA-K015 | 81.4 | Yes | Elevated | Water Storage | 327.3 | 325.01 | 320.1 | -7.17 |
| MA-K018 | Lake Boris | K18/ Lake Boris | 360 | 330 | 30 | 24.5 | Excavated | MA-K018 | 7.1 | Yes | Lined | Unused | 349 | 349.7 | 345.9 | -3.11 |
| MA-K019 | | K19A | 350 | 335 | 15 | 8 | Excavated | MA-K019A | 2.1 | Yes | Static | Unused | NM | NM | NM | |
| MA-K024 | | K24 | 360 | 220 | 140 | 87.9 | Backfilled | MA-K024 | | | | | | | | |
| MA-K028 | Lake H | K28/ Lake H | 360 | 220 | 140 | 89.6 | Reclaiming | MA-K028 | 60.3 | Yes | Static | Water Storage | 307.4 | 301.04 | 293.3 | -14.11 |
| MA-K030 | Cope Lake | K30/ Cope Lake | 370 | 240 | 130 | 233.9 | Reclaimed | MA-K030 | 184.4 | No | Lined | Settling Pond | 331.3 | 331.29 | 327 | -4.34 |
| MA-K032 | | K32 | 360 | 335 | 25 | 34.2 | Backfilled | | | | | | | | | |
| MA-K033 | | K33 | 360 | 335 | 25 | 12.8 | Backfilled | | | | | | | | | |
| MA-K037 | Lake I | K37/ Lake I | 360 | 220 | 140 | 300.8 | Reclaimed | MA-K037 | 232.3 | Yes | Elevated | Water Storage | 302.8 | 295.24 | 285.8 | -17 |

COL = Chain of Lake, A = Annual; SA = Semiannual,
WY Diff = Water Year Difference (Fall to Fall)

# TABLE 3-1
# SEMIANNUAL WATER LEVELS IN MINING AREA PONDS
# 2021 WATER YEAR

| EXCAVATIONS | | | | | | | | CURRENT PONDS | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Excavation | Chain of Lake | Display Name | Original Ground Elev | Deepest Mined Depth (ft) Elev | Depth | Pit Area (acres) | Mining Status | Pond Name | Pond Area (acres) | Contact with Aquifer | Water Elev Status | Mining Use | Pond Elevation (ft MSL, NAVD88) Fall 20 | Spring 21 | Fall 21 | WY Diff |
| PACIFIC AGGREGATE/RMC/LONESTAR/CEMEX | | | | | | | | | | | | | | | | |
| MA-P001 | | P1 | 380 | 360 | 20 | 0.8 | Backfilled | | | | | | | | | |
| MA-P002 | | P2 | 380 | 360 | 20 | 1.9 | Excavated | MA-P002 | 0.6 | Yes | Elevated | Water Storage | NM | NM | NM | |
| MA-P003 | | P3 | 400 | 360 | 40 | 8.5 | Backfilled | | | | | | | | | |
| MA-P004 | | P4 | 400 | 360 | 40 | 7.8 | Excavated | | | | | | | | | |
| MA-P006 | | P6 | 380 | 280 | 100 | 28.8 | Backfilled | | | | | | | | | |
| MA-P007 | | P7 | 380 | 280 | 100 | 16.7 | Backfilled | | | | | | | | | |
| MA-P010 | | P10 | 400 | 340 | 60 | 34 | Excavated | MA-P010 | 12.7 | Yes | Static | Unused | 361 | 361.89 | 353.8 | -7.23 |
| MA-P011 | | P11 | 380 | 340 | 40 | 6.9 | Excavated | | | | | | | | | |
| MA-P012 | Island Pond | P12/ Island Pond | 360 | 330 | 30 | 29.5 | Excavated | MA-P012 | 12.4 | Yes | Lined | Unused | 349.5 | 350.66 | 346.7 | -2.82 |
| MA-P013 | | P13 | 380 | 300 | 80 | 2.6 | Backfilled | MA-P013 | 1 | Yes | Elevated | Water Storage | NM | NM | NM | |
| MA-P021 | | P21 | 380 | 240 | 140 | 10.5 | Backfilled | | | | | | | | | |
| MA-P027 | | P27 | 390 | 250 | 140 | 31 | Excavated | MA-P027 | 10.3 | Yes | Static | Water Storage | 277.4 | 276.02 | 270.9 | -6.48 |
| MA-P028 | Lake A | P28/Lake A | 420 | 360 | 60 | 24.6 | Reclaiming | MA-P028 | 7.2 | Yes | Static | Water Storage | 406.3 | 405.68 | 402.2 | -4.07 |
| MA-P034 | | P34 | 380 | 270 | 110 | 46 | Backfilled | | | | | | | | | |
| MA-P039 | Lake B | P39/ Lake B | 410 | 380 | 30 | 36.4 | Active Mining | | | | | | | | | |
| MA-P040 | | P40 | 390 | 260 | 130 | 14.5 | Excavated | MA-P040 | | | | | NM | NM | NM | |
| MA-P041 | Lake A | P41/ Lake A | 410 | 370 | 40 | 91.3 | Reclaiming | MA-P041 | 55.7 | Yes | Static | Water Storage | 411.7 | 412.39 | 409.2 | -2.47 |
| MA-P042 | Lake B | P42/Lake B | 380 | 255 | 125 | 101.8 | Active Mining | MA-P042 | 8.1 | Yes | Depressed | Dewatering | 255.8 | 255.95 | 256.2 | 0.39 |
| MA-P043 | | P43 | 390 | 240 | 150 | 130.9 | Excavated | MA-P043 | 80.2 | No | Lined | Settling Pond | NM | NM | NM | |
| MA-P044 | | P44 | 390 | 250 | 140 | 20 | Excavated | MA-P044 | 14.2 | Yes | Elevated | Water Storage | 345 | 347.15 | 328 | -17 |
| MA-P045 | | P45 | 380 | 310 | 70 | 25 | Excavated | MA-P045 | 17.9 | Yes | Elevated | Water Storage | NM | NM | NM | |
| MA-P046 | Lake J | P46/Lake J | 380 | 250 | 130 | 23.8 | Active Mining | MA-P046 | 7.4 | Yes | Depressed | Active Mining | 294 | 267.05 | 264.1 | -29.82 |

COL = Chain of Lake, A = Annual; SA = Semiannual,
WY Diff = Water Year Difference (Fall to Fall)

# TABLE 3-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| MA-C001 | 4/21/21 | ZONE7 | 19.8 | 981 | 8.5 | 34 | 56 | 79 | 3.4 | 275 | 41 | 178 | < 0.1 | 0.9 | 460 | 3 | < 100 | < 1 | 540 | 316 |
| MA-K015 | 4/22/21 | ZONE7 | 21.7 | 766 | 8.6 | 29 | 34 | 79 | 4.1 | 222 | 59 | 109 | < 0.1 | 1.3 | 490 | 2.5 | < 100 | < 1 | 435 | 212 |
| MA-K018 | 4/22/21 | ZONE7 | 21.1 | 681 | 8.2 | 46 | 25 | 56 | 2.9 | 160 | 78 | 97 | < 0.1 | 3.6 | 270 | 1 | < 100 | < 1 | 390 | 218 |
| MA-K028 | 4/21/21 | ZONE7 | 20.9 | 892 | 8.8 | 32 | 57 | 81 | 2.5 | 305 | 55 | 127 | < 0.1 | 1.4 | 700 | 3.1 | < 100 | < 1 | 524 | 315 |
| MA-K030 | 4/21/21 | ZONE7 | 19.6 | 758 | 8.6 | 40 | 51 | 52 | 2.5 | 263 | 53 | 103 | < 0.1 | 9 | 400 | 3.4 | < 100 | < 1 | 450 | 310 |
| MA-K037 | 4/21/21 | ZONE7 | 20 | 764 | 8.7 | 28 | 51 | 50 | 2.5 | 246 | 52 | 105 | < 0.1 | 3.6 | 450 | 3.4 | < 100 | < 1 | 425 | 280 |
| MA-P010 | 4/22/21 | ZONE7 | 23.1 | 515 | 9.5 | 19 | 28 | 50 | 2.4 | 105 | 46 | 68 | < 0.1 | 0.2 | 290 | 2.7 | < 100 | < 1 | 304 | 163 |
| MA-P012 | 4/22/21 | ZONE7 | 17.9 | 695 | 7.9 | 49 | 25 | 56 | 2.8 | 165 | 77 | 99 | < 0.1 | 7.3 | 260 | < 1 | < 100 | < 1 | 398 | 225 |
| MA-P027 | 4/22/21 | ZONE7 | 19.1 | 682 | 8.3 | 45 | 28 | 60 | 1.8 | 202 | 51 | 98 | < 0.1 | 9 | 430 | 1.3 | < 100 | < 1 | 397 | 227 |
| MA-P042 | 4/22/21 | ZONE7 | 20.2 | 635 | 8.4 | 45 | 27 | 52 | 1.5 | 188 | 55 | 85 | < 0.1 | 14.6 | 300 | < 1 | < 100 | < 1 | 381 | 223 |
| MA-P044 | 4/22/21 | ZONE7 | 20 | 663 | 8.5 | 39 | 30 | 62 | 2.2 | 181 | 54 | 98 | < 0.1 | 8.3 | 420 | 1.4 | < 100 | < 1 | 391 | 222 |
| MA-P046 | 4/22/21 | ZONE7 | 21.6 | 796 | 8 | 60 | 33 | 58 | 2.2 | 278 | 51 | 98 | 1.36 | 16.9 | 410 | < 1 | < 100 | < 1 | 464 | 286 |
| MA-R004 | 4/21/21 | ZONE7 | 19.2 | 749 | 8.3 | 51 | 44 | 44 | 2.6 | 259 | 46 | 92 | 0.57 | 15.8 | 330 | < 1 | < 100 | 1.3 | 430 | 309 |
| MA-R022 | 4/21/21 | ZONE7 | 20.4 | 660 | 8.4 | 39 | 39 | 39 | 2.1 | 223 | 46 | 89 | 0.22 | 10.7 | 320 | < 1 | < 100 | 1.4 | 382 | 259 |
| MA-R023 | 4/21/21 | ZONE7 | 19.2 | 681 | 8.4 | 41 | 42 | 40 | 2.4 | 233 | 46 | 91 | 0.12 | 8.6 | 320 | < 1 | < 100 | 1.1 | 395 | 275 |
| MA-R024A | 4/21/21 | ZONE7 | 18.8 | 762 | 8.3 | 55 | 46 | 40 | 2.6 | 289 | 46 | 92 | 0.88 | 17.5 | 330 | < 1 | < 100 | 1.7 | 452 | 328 |
| MA-R028 | 4/21/21 | ZONE7 | 18.2 | 653 | 7.9 | 55 | 32 | 35 | 1.6 | 240 | 43 | 79 | 1.08 | 19.5 | 280 | < 1 | < 100 | 2.8 | 390 | 270 |

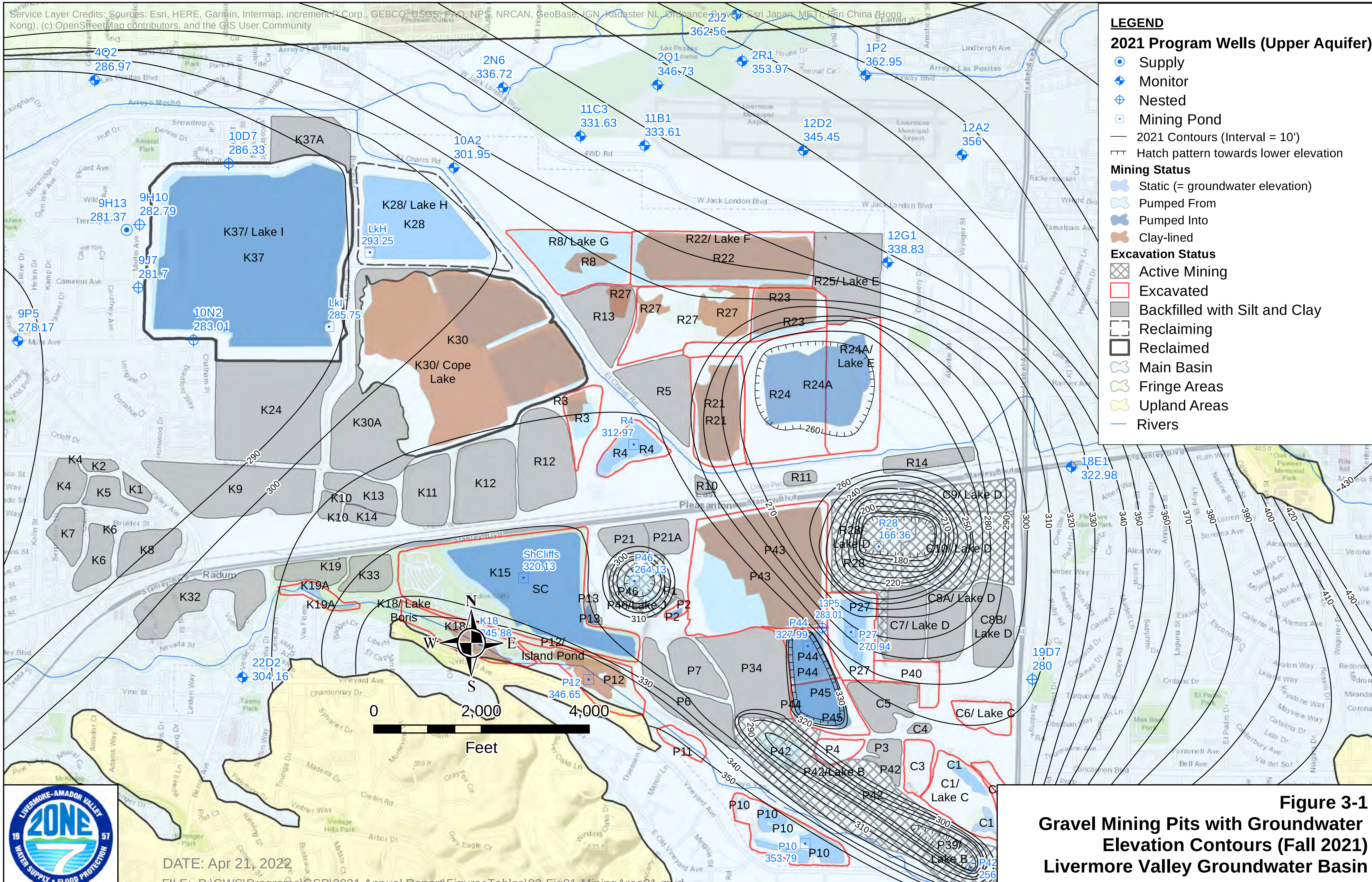



**Figure 3-1**
**Gravel Mining Pits with Groundwater Elevation Contours (Fall 2021)**
**Livermore Valley Groundwater Basin**

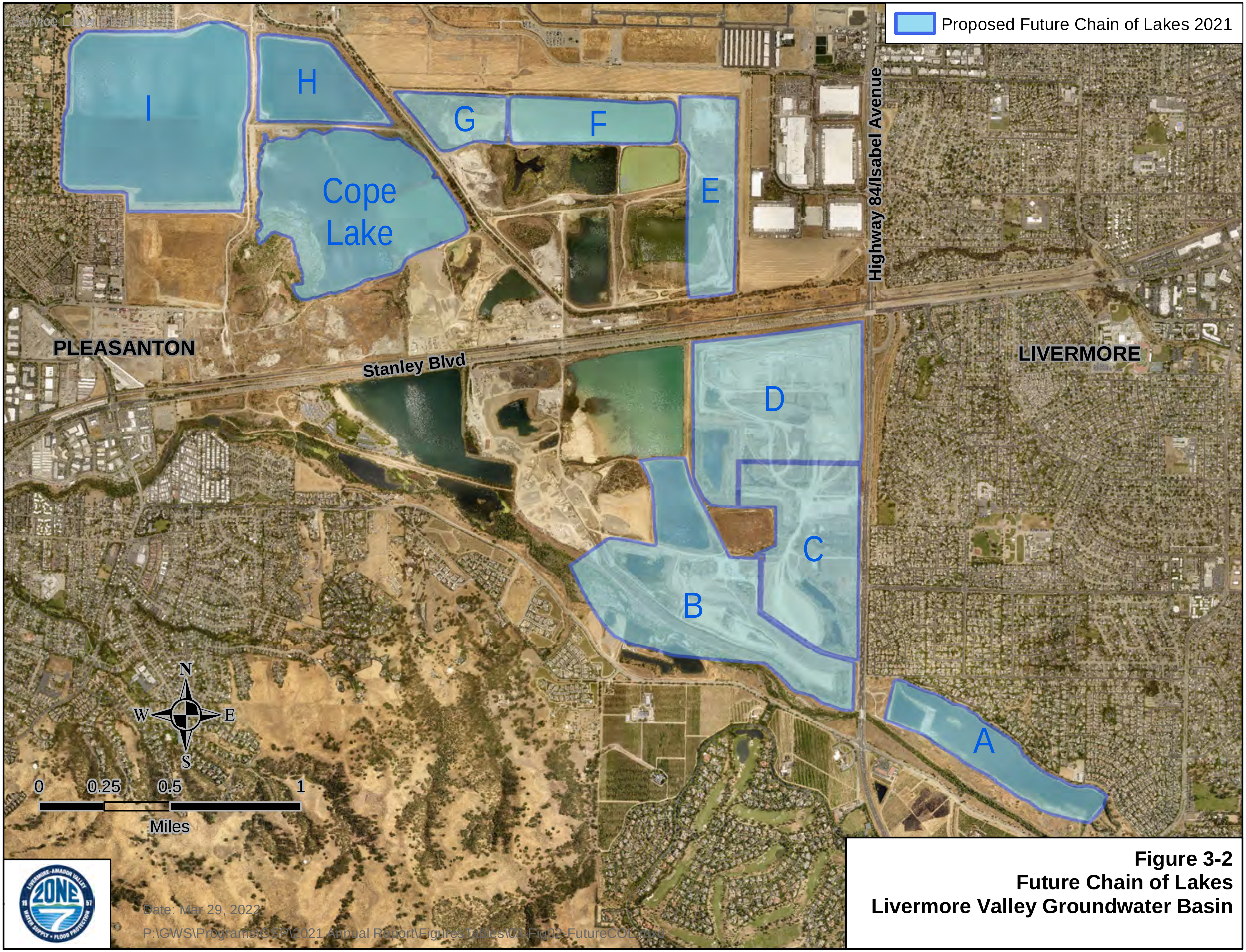



**Figure 3-2**
**Future Chain of Lakes**
**Livermore Valley Groundwater Basin**

# 4 Interconnected Surface Water-Groundwater Monitoring

## 4.1 Program Changes

As part of the 2021 Alternative GSP, Zone 7 made significant changes to the Interconnected Surface Water-Groundwater Monitoring Program including:

- Identifying potential Interconnected Surface Water (ICSW) and or Groundwater Dependent Ecosystems (GDE) areas that were not recognized in the 2016 Alternative GSP.
- Identifying 14 wells as Representative Monitoring Sites for Interconnected Surface Water (RMS-ICSW).
- Creating Sustainability Management Criteria (SMCs) for these RMS-ICSW (see ***Table 4-A*** below).

***Table 4-A: SMCs for Depletions of Interconnected Surface Water***

| Undesirable Results Definition | Undesirable Results Criteria | Minimum Threshold (MT) | Measurable Objective (MO) |
|---|---|---|---|
| When groundwater extractions in the Basin cause significant and unreasonable depletions of hydrologically connected surface water, such that beneficial uses and users of the surface water (including the likely GDEs and protected species) are significantly and unreasonably harmed. Specifically, a significant and unreasonable negative effect would be experienced if the health of the GDE areas in the Basin are adversely impacted by mechanisms that can be directly attributed to pumping-related lowering of groundwater levels over time, rather than effects of natural or climactic processes and/or unfavorable hydrologic conditions or land use changes. | If and when Depletions of Interconnected Surface Water occur as a result of unsustainable groundwater extraction such that groundwater levels decline below their MTs in greater than 40% of the RMS-ICSW for more than two consecutive years. | Historic low water levels measured at each RMS-ICSW, or when unavailable, estimated from Zone 7 groundwater elevation rasters. | Minimum water levels measured between 2014 and 2020 at each RMS-ICSW, or when unavailable, estimated from Zone 7 groundwater elevation rasters. |

GDE = Groundwater Dependent Ecosystems
RMS-ICSW = Representative Monitoring Sites for Interconnected Surface Water

More detail is available in the following sections of the 2021 Alternative GSP:

- **Section 1.2.5:** Surface Water-Groundwater Interaction/Groundwater Dependent Ecosystems Program Update

- **Section 8.8:** Current and Historical Groundwater Conditions - Groundwater Dependent Ecosystems
- **Section 13.6:** Sustainability Indicators – Depletions of Interconnected Surface Water
- **Section 14.2.6:** Monitoring Network for Depletions of Interconnected Surface Water
- **Section 14.4:** Representative Monitoring

## 4.2 Results for the 2021 Water Year

***Figure 4-1*** shows the hydrographs for the two RMS-ICSW in the vicinity of the Springtown Alkali Sink. ***Figure 4-2*** shows hydrographs for all the RMS-ICSW wells. ***Table 4-1*** compares water level measurements from the seasonal high and seasonal low 2021 WY monitoring events to the Minimum Thresholds (MTs) and Measurable Objectives (MOs) defined at RMS-ICSW wells in the 2021 Alternative GSP. The table also shows the change in elevation from the previous year's seasonal low to this year's seasonal low. Groundwater levels dropped below their MTs at two RMS-ICSW (Wells 3S1E16P005 [16P5] and 3S2E23E001 [23E1]) and below their MOs at three additional RMS-ICSW (Wells 3S2E30D002 [30D2], 3S2E29F004 [29F4], and 3S2E33C001 [33C1]) during the seasonal low (i.e., Fall) 2021 WY monitoring event; however, all RMS-ICSW wells were measured above their MTs and MOs during the seasonal high (i.e., spring) monitoring event. The MT exceedances observed at 16P5 and 23E1 do not currently constitute an Undesirable Result (UR) per the definition shown in ***Table 4-A***.

## 4.3 Attached Tables and Figures

***Table 4-1****:  2021 Groundwater Elevations at Representative Monitoring Sites for ICSW*

***Figure 4-1****:  Hydrographs in the Vicinity of the Alkali Sink & Springtown Springs*
***Figure 4-2****:  Spider Map of Representative Monitoring Sites for Interconnected Surface Water*

# TABLE 4-1
# GROUNDWATER ELEVATIONS AT REPRESENTATIVE MONITORING SITES
# FOR INTERCONNECTED SURFACE WATER
# 2021 WATER YEAR
# LIVERMORE VALLEY GROUNDWATER BASIN

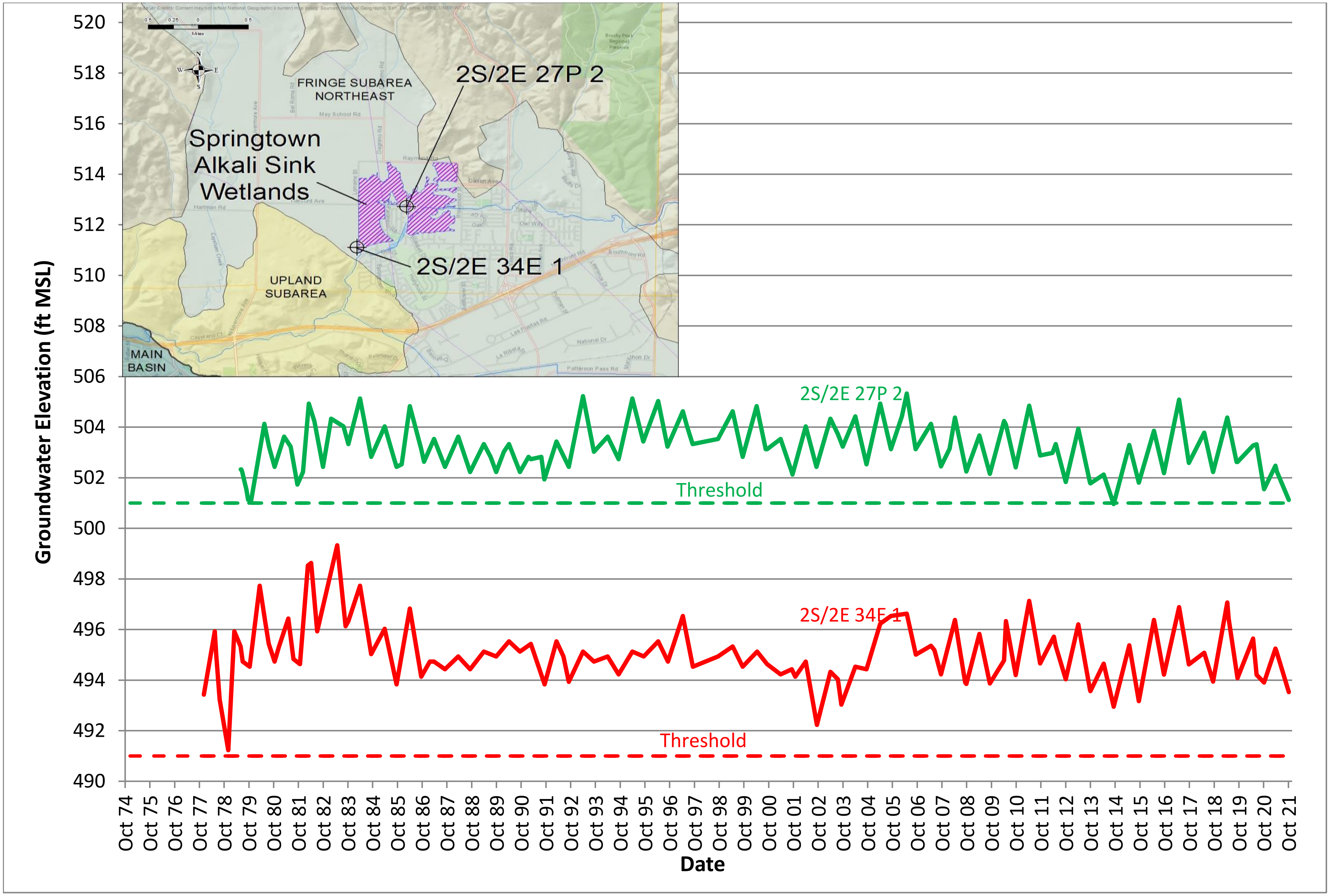
| RMS Well | | Management Area/Unit | | | 2021 Water Year | | | | | SMCs for ICSW | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Map | Area | Subarea | Aquifer | Season High | Season Low | Change from 2020* | Height above MT | Height above MO | MT | IM-5 | IM-10 | IM-15 | MO |
| 3S2E30D002 | 30D2 | Main | Amador | Upper | 409.1 | 405.63 | -3.55 | 4.63 | -0.87 | 401 | 403.8 | 404.7 | 405.6 | 407 |
| 3S1E16P005 | 16P5 | Main | Amador | Upper | 315.49 | 284.89 | -12.57 | -0.31 | -0.31 | 285 | 285.2 | 285.2 | 285.2 | 285 |
| 3S2E33G001 | 33G1 | Main | Amador | Upper | 502.8 | 502.32 | 0.65 | 1.32 | 1.02 | 501 | 501.1 | 501.2 | 501.2 | 501 |
| 3S2E29F004 | 29F4 | Main | Amador | Upper | 448.84 | 444.55 | -1.92 | 6.75 | -0.05 | 438 | 441.2 | 442.3 | 443.5 | 445 |
| 3S2E33C001 | 33C1 | Main | Amador | Upper | 486.23 | 485.33 | -1.16 | 3.23 | -0.87 | 482 | 484.2 | 484.8 | 485.5 | 486 |
| 3S1E02N006 | 2N6 | Main | Camp | Upper | 338.11 | 336.72 | -0.25 | 5.22 | 2.82 | 332 | 333.9 | 333.9 | 333.9 | 334 |
| 3S2E16E004 | 16E4 | Main | Mocho II | Upper | 472.51 | 467.01 | -9.17 | 0.11 | 0.01 | 467 | 466.9 | 466.9 | 466.9 | 467 |
| 3S2E23E001 | 23E1 | Main | Mocho II | Upper | 595.75 | 594.37 | -0.98 | -1.03 | -1.03 | 595 | 595.4 | 595.4 | 595.4 | 595 |
| 4S2E01A001 | 1A1 | Main | Mocho II | Upper | 797.76 | 795.96 | NA | 14.76 | 14.76 | 781 | 781.2 | 781.2 | 781.2 | 781 |
| 2S2E27P002 | 27P2 | Fringe | Spring | Upper | 502.25 | 501.12 | -0.43 | 0.12 | 0.12 | 501 | 501 | 501 | 501 | 501 |
| 2S2E34E001 | 34E1 | Fringe | May | Upper | 495.09 | 493.53 | -0.37 | 2.33 | 0.53 | 491 | 492.1 | 492.4 | 492.7 | 493 |
| 3S1E05K006 | 5K6 | Fringe | Camp | Upper | 331.5 | 329.7 | -1.79 | 3.7 | 1.5 | 326 | 328.2 | 328.2 | 328.2 | 328 |
| 3S1E02R001 | 2R1 | Fringe | Camp | Upper | 355.94 | 353.97 | -2.24 | 8.67 | 0.37 | 345 | 349.4 | 350.8 | 352.2 | 354 |
| 3S2E32E007 | 32E7 | Upland | Upland | Upper | 592.86 | 592.54 | -0.57 | 1.14 | 1.14 | 591 | 591.4 | 591.4 | 591.4 | 591 |

RMS = Representative Monitoring Site
SMC = Sustainable Management Criteria
ICSW = Interconnected Surface Water
IM = Interim Milestone
MO = Measurable Objective
MT = Minimum Threshold
* = 2020 Seasonal Low minus 2021 Seasonal Low

Main
Fringe
Upland

3/29/2022
P:\GWS\Programs\GSP\2021 Annual Report\FiguresTables\00-Tbl02-RMSforICSW.xlsx

# FIGURE 4-1
## HYDROGRAPHS IN THE VICINITY OF THE ALKALI SINK AND SPRINGTOWN SPRINGS
## LIVERMORE VALLEY GROUNDWATER BASIN



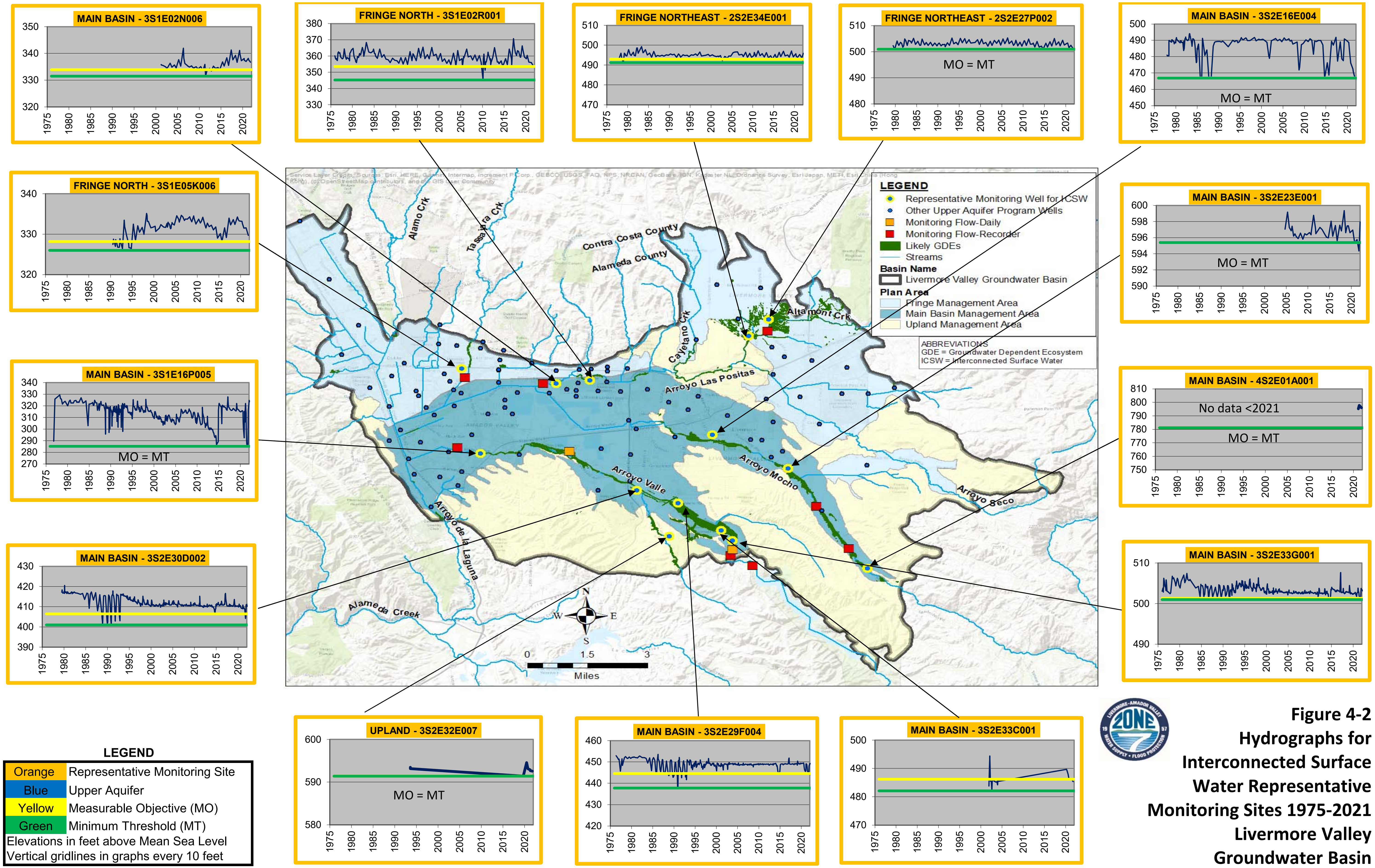



**Figure 4-2**
**Hydrographs for Interconnected Surface Water Representative Monitoring Sites 1975-2021**
**Livermore Valley Groundwater Basin**

# 5 Groundwater Elevation Monitoring

## 5.1 Program Changes

***Table 5-A*** below lists the changes that were made to the Groundwater Elevation Monitoring Program for the 2021 WY.

***Table 5-A: Program Well Changes during the 2021 WY***

| Action | Reason | Note |
|---|---|---|
| **3S2E17E002 Removed from program** | Owner's request | Zone 7 is researching possible nearby wells for a replacement. |
| **3S1E20B002 Removed from program** | No access port | Well is still used for water quality monitoring. 3S1E20C003 is used for groundwater elevation monitoring. |
| **20 wells added to the program** | 2021 Alternative GSP | Added to address DWR recommendations. See ***Table 1-1*** in 2021 Alternative GSP |

Zone 7's 2021 Alternative GSP established SMCs for Chronic Lowering of Groundwater Levels as shown in ***Table 5-B*** below.

***Table 5-B: SMCs for Chronic Lowering of Groundwater Levels***

| Undesirable Results Definition | Undesirable Results Criteria | Minimum Threshold (MT) | Measurable Objective (MO) |
|---|---|---|---|
| If and when a chronic decline in groundwater levels over the course of the planning and implementation horizon significantly and unreasonably impairs the reasonable and beneficial use of, and access to, groundwater for beneficial uses and users within the Basin. | Water levels in greater than 25% of the RMS-WLs decline below their respective MTs for two consecutive years. | Difference between the historic low water level and maximum annual rate of groundwater change for each RMS-WL, or the historic low if annual groundwater level change data are unavailable. | Historic low water level for each RMS-WL. |

RMS-WL = Representative Monitoring Sites for Water Levels

For more information on general groundwater gradients, water level trends, and the groundwater elevation program; see the following sections of the 2021 Alternative GSP:

- **Section 1.2.1:** Groundwater Level Program Updates
- **Section 8.3:** Current and Historical Groundwater Conditions - Groundwater Elevations and Flow Directions

- **Section 13.1:** Sustainability Indicators – Chronic Lowering of Groundwater Levels
- **Section 14.2.1:** Monitoring Network for Chronic Lowering of Groundwater Levels
- **Section 14.4:** Representative Monitoring

# 5.2 Results for the 2021 Water Year

## 5.2.1 General

***Figure 5-1*** and ***Table 5-1*** show all 236 wells in the 2021 WY Groundwater Elevation Program. ***Table 5-2*** shows wells construction information for each of the wells. ***Table 5-3*** shows water level measurements from all wells in the program for the 2021 WY. ***Table 5-4*** shows water level measurements in Representative Monitoring Sites for Water Level (RMS-WL) and their heights above the MO and MT.

In general, groundwater levels for the 2021 WY followed a typical seasonal pattern observed from the historical data, rising in the beginning of the year with rainfall recharge and minimal pumping occurring, levelling off in late spring, and then dropping during the second half of the WY as rainfall ceased and pumping demands increased. The groundwater gradients in both the Upper and Lower Aquifers were generally from east to west and ranged from 0.005 to 0.025 ft/ft, except across major groundwater barriers (e.g., in Upper Aquifer between the Mocho 2 and Amador Subareas). In general, the groundwater gradient runs toward the center of the Basin where there are piezometric depressions created around several municipal wellfields and actively dewatered quarry excavations that extend into the Lower Aquifer. Flow directions and magnitudes indicated by the groundwater elevation contours did not vary greatly between the seasonal low and seasonal high conditions during the 2021 WY.

Most of the groundwater elevation declines in the Basin (the steepest groundwater gradient) occurs in the central area of the Main Basin, where the mining pits (MA-R028, MA-P042, and MA-P046) are being excavated. These quarry dewatering operations create groundwater depressions in pits where water is pumped and mounds in unlined pits where excess water is stored. In fact, the lowest groundwater elevation in the Basin corresponded to the pond in mining pit MA-R028 (future Lake D) at 166 feet above mean sea level (ft msl). The water from the dewatering of MA-P042 and MA-P046 (future Lakes B and J, respectively) was discharged into other adjacent clay-lined mining pits. The water from pit MA-R028 (future Lake D) was discharged into MA-R024, where it likely recharged back into the Basin.

As is usually the case, water levels in the Fringe Management Area (Fringe Area) and Upland Management Area (Upland Area) stayed relatively constant throughout the 2021 WY. Wells located in the Fringe and Upland Areas rely mainly on natural recharge to maintain water supply. During below normal, dry, and critically dry hydrologic years, natural recharge may not be sufficient to maintain the groundwater levels in these wells and lack of sufficient natural recharge can potentially cause loss of production in these wells. In order to sustainably manage these Management Areas, groundwater pumping must be limited to available supply from natural recharge.

### 5.2.2 Representative Monitoring Sites for Water Levels (RMS-WL)

***Figure 5-2*** shows locations of all RMS-WL for the 2021 WY. ***Figure 5-3*** shows hydrographs of historical and recent groundwater elevations at all RMS-WL, respectively. These hydrographs further demonstrate the seasonal trends observed in both the Upper/Fringe Aquifers and the Lower Aquifer. The seasonal fluctuations are greater in the Lower Aquifer where more pumping occurs to meet seasonal demands in the warmer months, and when surface water treatment plant outages occur.

***Table 5-4*** compares water level measurements from the seasonal high (Spring) and seasonal low (Fall) 2021 WY monitoring events to the MTs and MOs defined at RMS-WL wells in the 2021 Alternative GSP. The table also shows the change in elevation from the previous year's seasonal low to this year's seasonal low. While groundwater elevations in all Main Basin RMS-WL wells in the Upper Aquifer dropped relative to 2020 WY conditions, especially in the western portion of the Basin (up to 36 ft), water levels at all RMS-WL wells continued to remain well above their respective MTs and MOs during both the seasonal high and seasonal low 2021 WY monitoring events.

In the Fringe Aquifer, water elevations in the RMS-WL wells stayed relatively constant throughout the 2021 WY, generally varying by less than one foot compared to groundwater levels in 2020 WY. Since it was added to the program in 2021, no monitoring data was available last year for the RMS-WL in the Upland Area (Well 3S2E21K009 [21K9]); however, the water level dropped about 2.2 feet from the seasonal high to the seasonal low in 2021 WY.

### 5.2.3 Upper and Fringe Aquifers

***Figure 5-4*** and ***Figure 5-5*** show 2021 WY groundwater elevation contours in the Upper and Fringe Aquifers during seasonal high (Spring) and seasonal low (Fall) conditions, respectively. ***Figure 5-6*** shows the difference in water elevations from Fall 2020 to Fall 2021. ***Figure 5-7*** shows the depth to water using Fall 2021 water levels.

Upper Aquifer water levels generally fluctuated by less than five feet except in the western portion of the Main Basin where the water level dropped more than 25 feet. This is likely because of below average recharge (rainfall and stream) and above average municipal pumping in this portion of the Basin.

Water levels in wells in the southwestern portion of the Basin near the Arroyo de la Laguna (as indicated primarily by the Bernal Upper Key Well 3S1E20C007 [20C7] and Well 3S1E29M004

[29M4]) were below the upper threshold groundwater elevation at which Basin overflow occurs (i.e., about 295 ft msl). Consequently, no water overflowed from the Upper Aquifer into the Arroyo de la Laguna and exited the Basin during the 2021 WY.

### 5.2.4 Lower Aquifer

***Figure 5-8*** and ***Figure 5-9*** show 2021 WY groundwater elevation contours in the Lower Aquifer during seasonal high (Spring) and seasonal low (Fall) conditions, respectively. ***Figure 5-10*** shows the difference in groundwater elevations from Fall 2020 to Fall 2021***. Figure 5-11*** shows the height of water levels above historic lows, which was used to create the Measurable Objectives for the Main Basin.

Lower Aquifer water levels dropped significantly (up to about 40 feet) in portions of the Basin from Fall 2020 to Fall 2021 due to below average recharge (rainfall and stream), above average municipal pumping, and deeper mining activity. In general, groundwater elevations remained well above historic lows; however, mining area dewatering operations continued to create localized depressions in groundwater levels that exceeded the historic low in two of the mining area pits. Groundwater elevations in the southwestern portion of the Amador Subarea were near historic lows. The reason for this depression is unknown but may be from a supply well used for Shadow Cliffs Recreational Area.

## 5.3 Attached Tables and Figures

***Table 5-1****: Groundwater Elevation Program Wells and Respective Monitoring Frequency*
***Table 5-2****: Well Construction Details*
***Table 5-3****: Table of Semiannual Groundwater Levels, Fall 2020 To Fall 2021*
***Table 5-4****: Table of Semiannual Groundwater Levels in Representative Monitoring Sites, Fall 2020 To Fall 2021*

***Figure 5-1****: Map of Wells in Water Level Monitoring Network*
***Figure 5-2****: Representative Monitoring Sites*
***Figure 5-3****: Hydrographs, 1975 to 2021 WYs*
***Figure 5-4****: Groundwater Gradient Map, Upper Aquifer, Spring 2021 WY*
***Figure 5-5****: Groundwater Gradient Map, Upper Aquifer, Fall 2021 WY*
***Figure 5-6****: Change in Groundwater Elevation, Upper Aquifer, Fall 2020 WY to Fall 2021 WY*
***Figure 5-7****: Depth to Groundwater, Upper Aquifer, Fall 2021 WY*
***Figure 5-8****: Groundwater Gradient Map, Lower Aquifer, Spring 2021 WY*
***Figure 5-9****: Groundwater Gradient Map, Lower Aquifer, Fall 2021 WY*
***Figure 5-10****: Change in Groundwater Elevation, Lower Aquifer, Fall 2020 WY to Fall 2021 WY*
***Figure 5-11****: Map of Groundwater Levels Above Historical Lows, Lower Aquifer, Fall 2021 WY*

**TABLE 5-1**
**MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM**
**LIVERMORE VALLEY GROUNDWATER BASIN**

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1S4E31P005 | 31P5 | CASGEM Tracy WAPA | Tracy | U | monitor | unknown | Zone 7 | 2 | | | | | | |
| 2S1E32E001 | 32E1 | End of Arnold Rd | None | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1E32N001 | 32N1 | Camp Parks | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1E32Q001 | 32Q1 | Summer Glen Dr | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1E33L001 | 33L1 | Gleason Dr @ Tassajara | None | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1E33P002 | 33P2 | Central Pkwy at Emerald Glen Pk | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1E33R001 | 33R1 | Central Pkwy @ Grafton | None | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1W15F001 | 15F1 | BOLLINGER | Bishop | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1W26C002 | 26C2 | PINE VALLEY | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1W36E003 | 36E3 | Kolb Park | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S1W36F001 | 36F1 | Dublin High shallow | Dublin | L | nested | active | Zone 7 | 2 | | | | | | |
| 2S1W36F002 | 36F2 | Dublin High mid | Dublin | L | nested | active | Zone 7 | 2 | | | | | | |
| 2S1W36F003 | 36F3 | Dublin High deep | Dublin | L | nested | damaged | Zone 7 | 2 | | | | | | |
| 2S2E21L001 | 21L1 | Merlin | May | U | domestic | active | Zone 7 | 2 | | | | | | |
| 2S2E27C002 | 27C2 | Dagnino Rd | Spring | U | domestic | active | Zone 7 | 2 | | | | | | |
| 2S2E27K001 | 27K1 | Model Airport | Spring | U | livestock | inactive | Zone 7 | 2 | | | | | | |
| 2S2E27M002 | 27M2 | Kwan | May | U | domestic | active | Zone 7 | 2 | | | | | | |
| 2S2E27P002 | 27P2 | hartford ave east | Spring | U | monitor | active | Zone 7 | 2 | | | X | | | |
| 2S2E28D002 | 28D2 | May School | May | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S2E28J002 | 28J2 | FCC Well | May | L | industrial | active | Zone 7 | 2 | | | | | | |
| 2S2E28Q001 | 28Q1 | hartford ave | May | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S2E32K002 | 32K2 | jenson's N liv. Ave | Cayetano | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S2E34E001 | 34E1 | Mud City | May | U | monitor | active | Zone 7 | 2 | | X | X | | | |
| 2S2E34Q002 | 34Q2 | Hollyhock & Crocus | Spring | U | monitor | active | Zone 7 | 2 | | | | | | |
| 2S3E01D001 | 1D1 | CASGEM Tracy PGE | Tracy | U | irrigation | unknown | Zone 7 | 2 | | | | | | |
| 3S1E01F002 | 1F2 | Constitution Dr | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E01H003 | 1H3 | Collier Canyon g1 | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E01J004 | 1J04 | Collier Vineyards | Camp | L | irrigation | active | Zone 7 | 2 | | | | | | |
| 3S1E01L001 | 1L1 | Kitty Hawk | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E01P002 | 1P2 | Airport gas g5 | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E01P003 | 1P3 | New airport well | Amador | L | supply | inactive | Zone 7 | 2 | | | | | | |
| 3S1E02J002 | 2J2 | Maint. Bldg | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E02J003 | 2J3 | Doolan Rd East | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E02K002 | 2K2 | Doolan Rd West | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E02M003 | 2M3 | Friesman Rd North | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E02N006 | 2N6 | Friesman Rd South | Amador | U | monitor | active | Zone 7 | 2 | | | X | | | |
| 3S1E02P003 | 2P3 | Crosswinds Church | Camp | L | domestic | active | Zone 7 | 2 | | | | | | |
| 3S1E02Q001 | 2Q1 | LPGC #1 | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E02R001 | 2R1 | Beebs | Amador | U | monitor | active | Zone 7 | 2 | | | X | | | |

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E03G002 | 3G2 | fallon rd | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E04A001 | 4A1 | SMP-DUB-2 | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E04J005 | 4J5 | Pimlico shallow | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E04J006 | 4J6 | Pimlico deep | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E04Q002 | 4Q2 | gulfstream | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E05K006 | 5K6 | Rosewood shallow | Camp | U | monitor | active | Zone 7 | 2 | | | X | | | |
| 3S1E05K007 | 5K7 | Rosewood deep | Camp | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E05L003 | 5L3 | Oracle | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E05P006 | 5P6 | Owens Park | Camp | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E06F003 | 6F3 | Dublin Ct | Dublin | U | monitor | active | Zone 7 | 2 | | X | | | | |
| 3S1E06G005 | 6G5 | Nissan Repair | Dublin | L | industrial | GPO Intent to use | Zone 7 | 2 | | | | | | |
| 3S1E06N002 | 6N2 | DSRSD MW-3 | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E07B002 | 7B2 | Hopyard rd | Dublin | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E07B012 | 7B12 | Hacienda Arch | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E07G007 | 7G7 | Chabot Well | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E07J005 | 7J5 | Thomas Hart School | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E08B001 | 8B1 | Lizard Well | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E08G004 | 8G4 | Apache | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E08H009 | 8H9 | Mocho 4 Nested Shallow | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E08H010 | 8H10 | Mocho 4 Nested Middle | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E08H011 | 8H11 | Mocho 4 Nested deep | Amador | D | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E08H013 | 8H13 | Mocho 3 mon | Amador | D | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E08H018 | M4 | Mocho 4 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E08K001 | 8K1 | Cockroach well | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E08N001 | 8N1 | sports park | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E09H010 | 9H10 | NW Lake I Shallow | Amador | U | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E09H011 | 9H11 | NW Lake I Deep | Amador | L | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E09H013 | 9H13 | Lister | Amador | U | domestic | active | Zone 7 | 2 | | | | | | X |
| 3S1E09J007 | 9J7 | SW Lake I Shallow | Amador | U | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E09J008 | 9J8 | SW Lake I Middle | Amador | L | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E09J009 | 9J9 | SW Lake I Deep | Amador | L | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E09M002 | M1 | Mocho 1 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E09M003 | M2 | Mocho 2 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E09M004 | M3 | Mocho 3 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E09P005 | 9P5 | Key_AmW_U (Mohr Key) | Amador | U | monitor | active | Zone 7 | 12 | | X | | X | | |
| 3S1E09P009 | 9P9 | Mohr Ave Shallow | Amador | L | nested | active | Zone 7 | 12 | 15 | | | | | X |
| 3S1E09P010 | 9P10 | Key_AmW_L | Amador | L | nested | active | Zone 7 | 12 | | X | | X | | |
| 3S1E09P011 | 9P11 | Mohr Ave Deep | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E10A002 | 10A2 | El Charro Rd | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |

**TABLE 5-1**
**MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM**
**LIVERMORE VALLEY GROUNDWATER BASIN**

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E10B008 | 10B8 | Kaiser Rd Shallow | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10B009 | 10B9 | Kaiser Rd Middle 1 | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10B010 | 10B10 | Kaiser Rd Middle 2 | Amador | L | nested | unknown | Zone 7 | 2 | | | | | | |
| 3S1E10B011 | 10B11 | Kaiser Rd Deep | Amador | D | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10B014 | 10B14 | COL 5 Monitoring | Amador | L | monitor | unknown | Zone 7 | 2 | | | | | | |
| 3S1E10D002 | 10D2 | Stoneridge Shallow | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10D003 | 10D3 | Stoneridge Middle 1 | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10D004 | 10D4 | Stoneridge Middle 2 | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10D005 | 10D5 | Stoneridge Deep | Amador | D | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E10D007 | 10D7 | North Lake I Shallow | Amador | U | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E10D008 | 10D8 | North Lake I Cluster 2 | Amador | L | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E10K002 | 10K2 | COL 1 Monitoring | Amador | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E10N002 | 10N2 | South Lake I Shallow | Amador | U | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E10N003 | 10N3 | South Lake I Deep | Amador | L | nested | active | Zone 7 | 2 | | | | | | X |
| 3S1E11B001 | 11B1 | Airport West | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E11C003 | 11C3 | LAVWMA ROW | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E11G001 | 11G1 | Key_AmE_U | Amador | U | nested | active | Zone 7 | 12 | | X | | X | | |
| 3S1E11G002 | 11G2 | Rancho Charro Middle 1 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E11G003 | 11G3 | Rancho Charro Middle 2 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E11G004 | 11G4 | Rancho Charro Deep | Amador | D | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E11M002 | 11M2 | COL 2 Monitoring | Amador | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E11P006 | 11P6 | New Jamieson Residence | Amador | L | domestic | unknown | Zone 7 | 2 | | | | | | |
| 3S1E12A002 | 12A2 | Airport South | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E12D002 | 12D2 | LWRP G6 | Amador | U | monitor | active | LWRP | 2 | | | | | | |
| 3S1E12G001 | 12G1 | Oaks Park Shallow | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E12H004 | 12H4 | LWRP Shallow | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E12H005 | 12H5 | LWRP Middle 1 | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E12H006 | 12H6 | LWRP Middle 2 | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E12H007 | 12H7 | LWRP Deep | Amador | D | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E12K002 | 12K2 | Oaks Park Mid | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E12K003 | 12K3 | Key_AmE_L | Amador | L | nested | active | Zone 7 | 12 | | X | | X | | |
| 3S1E12K004 | 12K4 | Oaks Park Deep | Amador | D | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E13P005 | 13P5 | LGA Grant Nested 1 | Amador | U | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E13P006 | 13P6 | LGA Grant Nested 2 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E13P007 | 13P7 | LGA Grant Nested 3 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E13P008 | 13P8 | LGA Grant Nested 4 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E14B001 | 14B1 | Industrial Asphalt | Amador | L | industrial | unknown | Zone 7 | 2 | | | | | | |
| 3S1E14D002 | 14D2 | South Cope Lake | Amador | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E15F003 | 15F3 | Kaiser #8 | Amador | L | supply | inactive | Zone 7 | 2 | | | | | | |

# TABLE 5-1
# MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM
# LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E15J003 | 15J3 | shadow cliff | Amador | L | supply | unknown | Zone 7 | 2 | | | | | | |
| 3S1E15M003 | 15M3 | Bush/Valley South | Amador | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E16A004 | 16A4 | Bush/Valley Mid | Amador | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E16B001 | 16B1 | Bush/Valley North | Amador | D | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E16C002 | 16C2 | Santa Rita Valley Shallow | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E16C003 | 16C3 | Santa Rita Valley Middle | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E16C004 | 16C4 | Santa Rita Valley Deep | Amador | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E16E004 | 16E4 | black ave - cultural | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E16L002 | P4 | Pleas 4 | Amador | L | muni | inactive | Pleas | 2 | | | | | | |
| 3S1E16P005 | 16P5 | Vervais Monitor | Amador | U | monitor | active | Zone 7 | 12 | | | X | | X | |
| 3S1E16R001 | 16R1 | Stanley Berry Farm | Amador | L | supply | unknown | Zone 7 | 2 | | | | | | |
| 3S1E17B004 | 17B4 | Casterson | Amador | L | supply | unknown | Zone 7 | 2 | | | | | | |
| 3S1E17D003 | 17D3 | Hopyard Nested Shallow | Bernal | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E17D004 | 17D4 | Hopyard Nested Middle 1 | Bernal | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E17D005 | 17D5 | Hopyard Nested Middle 2 | Bernal | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E17D006 | 17D6 | Hopyard Nested Middle 3 | Bernal | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E17D007 | 17D7 | Hopyard Nested Deep | Bernal | D | nested | active | Zone 7 | 2 | | | | | | |
| 3S1E17D010 | H7 | Hopyard 7 | Bernal | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E17D011 | 17D11 | Hopyard 9 Monitoring Well | Bernal | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E18A005 | P7 | Pleas 7 | Bernal | L | muni | inactive | Pleas | 2 | | | | | | |
| 3S1E18E004 | 18E4 | Valley Trails II | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E18J002 | 18J2 | camino segura | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E18N001 | 18N1 | merritt | Bernal | L | irrigation | unknown | Zone 7 | 2 | | | | | | |
| 3S1E19A010 | SF-B | SFWD South (B) | Bernal | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E19A011 | SF-A | SFWD North (A) | Bernal | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S1E19C004 | 19C4 | del valle & laguna | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E19K001 | 19K1 | 680/bernal | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E20C003 | 20C3 | Fairgrounds Potable Backup | Bernal | L | supply | active | Zone 7 | 2 | | | | | | |
| 3S1E20C007 | 20C7 | Key_Bern_U | Bernal | U | monitor | active | Zone 7 | 12 | | X | | X | X | |
| 3S1E20C008 | 20C8 | Key_Bern_L | Bernal | L | nested | active | Zone 7 | 12 | | X | | X | | |
| 3S1E20C009 | 20C9 | Fair Nested Deep | Bernal | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S1E20J004 | 20J4 | civic center | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E20M011 | 20M11 | S.F "M"LINE | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E20Q002 | 20Q2 | 20Q2 | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E22D002 | 22D2 | vineyard trailer | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E23J001 | 23J1 | 1627 vineyard trailer | Amador | L | domestic | unknown | Zone 7 | 2 | | | | | | |
| 3S1E24Q001 | 24Q1 | Ruby Hills | Amador | L | irrigation | unknown | Zone 7 | 2 | | | | | | |
| 3S1E25C003 | 25C3 | Katz Winery Mansion | Amador | U | monitor | unknown | Zone 7 | 2 | | | | | | |
| 3S1E28M002 | 28M2 | Bargar | Upland | U | supply | active | Zone 7 | 2 | | | | | | |

## TABLE 5-1
## MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM
## LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E29M004 | 29M4 | f.c. channel | Castle | U | monitor | active | Zone 7 | 12 | | | | | X | |
| 3S1E29P002 | 29P2 | castlewood dr | Bernal | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1E33G005 | 33G5 | Pleasanton Calippe 33G5 | Upland | U | monitor | unknown | Zone 7 | 2 | | | | | | |
| 3S1W01B009 | 1B9 | DSRSD Shallow | Dublin | L | nested | unknown | Zone 7 | 2 | | | | | | |
| 3S1W01B010 | 1B10 | DSRSD Middle | Dublin | L | nested | unknown | Zone 7 | 2 | | | | | | |
| 3S1W01B011 | 1B11 | DSRSD Deep | Dublin | L | nested | unknown | Zone 7 | 2 | | | | | | |
| 3S1W02A002 | 2A2 | McNamara's | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1W12B002 | 12B2 | Stoneridge Mall Rd | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1W12J001 | 12J1 | DSRSD South | Dublin | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S1W13J001 | 13J1 | muirwood dr | Castle | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E01F002 | 1F2 | Brisa at Circuit City | Spring | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E02B002 | 2B2 | south front rd | Spring | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E03A001 | 3A1 | Bluebell | Spring | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E03K003 | 3K3 | first & S. front rd | Mocho I | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E05N001 | 5N1 | Spider Well | Mocho II | M | supply | inactive | Zone 7 | 2 | | | | | | |
| 3S2E07C002 | 7C2 | jaws - york way - G4 | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E07H002 | 7H2 | dakota | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E07N002 | 7N2 | Isabel & Arroyo Mocho | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E07P003 | CWS24 | CWS 24 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E07R002 | 7R2 | CWS 31 Monitoring | Mocho II | D | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E07R003 | CWS31 | CWS 31 | Upland | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E08H002 | 8H2 | North k | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E08H003 | 8H3 | Key_Mo2_L | Mocho II | L | nested | active | Zone 7 | 12 | | X | | X | | |
| 3S2E08H004 | 8H4 | N Liv Ave Deep | Mocho II | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E08K002 | 8K2 | Key_Mo2_U (Livermore Key) | Mocho II | U | monitor | active | Zone 7 | 12 | 15 | X | | X | | |
| 3S2E08N002 | CWS14 | CWS 14 | Mocho II | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E08P001 | CWS8 | CWS 8 | Mocho II | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E08Q009 | 8Q9 | D-2 | Mocho II | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E09Q004 | 9Q4 | school st | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E10F003 | 10F3 | hexcel | Mocho I | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E10Q001 | 10Q1 | almond | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E10Q002 | 10Q2 | LLNL W-703 | Mocho II | L | monitor | unknown | LLNL | 2 | | | | | | |
| 3S2E11C001 | 11C1 | joan way | Mocho I | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E12C004 | 12C4 | LLNL W-486 | Spring | U | monitor | unknown | LLNL | 2 | | | | | | |
| 3S2E12J003 | 12J3 | LLNL W-017A | Spring | L | monitor | unknown | LLNL | 2 | | | | | | |
| 3S2E14A003 | 14A3 | S. vasco @east ave | Mocho I | U | monitor | active | LLNL | 2 | | | | | | |
| 3S2E14B001 | 14B1 | 5763 east ave | Mocho I | L | domestic | unknown | Zone 7 | 2 | | | | | | |
| 3S2E15E002 | 15E2 | Retzlaff Winery | Mocho II | L | irrigation | active | Zone 7 | 2 | | | | | | |
| 3S2E15L001 | 15L1 | Concannon 2 | Mocho II | U | monitor | active | Other | 2 | | | | | | |

## TABLE 5-1
## MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM
## LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S2E15L002 | 15L2 | Concannon 6D | Mocho II | U | monitor | active | Other | 2 | | | | | | |
| 3S2E15M002 | 15M2 | Concannon 1 | Mocho II | U | monitor | active | Other | 2 | | | | | | |
| 3S2E15M003 | 15M3 | Concannon 5D | Mocho II | U | monitor | active | Other | 2 | | | | | | |
| 3S2E15Q006 | 15Q6 | Concannon Old Pumping | Mocho II | L | irrigation | abandoned | Zone 7 | 2 | | | | | | |
| 3S2E15Q008 | 15Q 8 | Concannon 4 | Mocho II | U | monitor | active | Other | 2 | | | | | | |
| 3S2E15R017 | 15R17 | Buena Vista Shallow | Mocho II | U | nested | active | Zone 7 | 2 | | | | | | |
| 3S2E15R018 | 15R18 | Buena Vista Deep | Mocho II | L | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E15R020 | 15R20 | Concannon 3 | Mocho II | U | monitor | active | Other | 2 | | | | | | |
| 3S2E16A003 | 16A3 | Memory Gardens | Mocho II | L | irrigation | active | Zone 7 | 2 | | | | | | |
| 3S2E16C001 | CWS15 | CWS 15 | Mocho II | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E16E004 | 16E4 | pepper tree | Mocho II | U | monitor | active | Zone 7 | 2 | | | X | | | |
| 3S2E18B001 | CWS20 | CWS 20 | Amador | L | muni | active | Zone 7 | 2 | | | | | | |
| 3S2E18E001 | 18E1 | Stanley East of Isabel | Amador | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E19D007 | 19D7 | Isabel Shallow | Amador | U | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E19D008 | 19D8 | Isabel Middle 1 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E19D009 | 19D9 | Isabel Middle 2 | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E19D010 | 19D10 | Isabel Deep | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E19N003 | 19N3 | Shallow Cemex Nested | Amador | U | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E19N004 | 19N4 | Deep Cemex Nested | Amador | L | nested | active | Zone 7 | 12 | | | | | | X |
| 3S2E20M001 | 20M1 | Alden Lane | Amador | L | supply | unknown | Zone 7 | 2 | | | | | | |
| 3S2E20R002 | 20R2 | Ravenswood South Well | Upland | U | irrigation | active | Zone 7 | 2 | | | | | | |
| 3S2E21K009 | 21K9 | Hughey Marina Ave | Upland | U | domestic | active | Zone 7 | 2 | | X | | | | |
| 3S2E22B001 | 22B1 | grapes | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E23E001 | 23E1 | Murrieta Nested Shallow | Mocho II | U | nested | active | Zone 7 | 2 | | | X | | | |
| 3S2E23E002 | 23E2 | Murrieta Nested Deep | Mocho II | L | nested | active | Zone 7 | 2 | | | | | | |
| 3S2E24A001 | 24A1 | S. greenville | Mocho I | U | monitor | active | Zone 7 | 2 | | X | | | | |
| 3S2E26J002 | 26J2 | mines rd | Mocho II | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S2E29F004 | 29F4 | Wetmore | Amador | U | monitor | active | Zone 7 | 12 | | | X | | X | |
| 3S2E29L001 | 29L1 (P3) | Sycamore Grove P3 | Amador | U | monitor | active | Zone 7 | 2 | | | | | | X |
| 3S2E30C001 | 30C1 | Vineyard 30C 1 | Amador | L | supply | active | Zone 7 | 12 | | | | | | X |
| 3S2E30D002 | 30D2 | vineyard | Amador | U | monitor | active | Zone 7 | 12 | 15 | | X | | X | |
| 3S2E32E007 | 32E7 | DVWTP 32E7 | Upland | U | monitor | active | Zone 7 | 2 | | | X | | | |
| 3S2E33C001 | 33C1 (P1) | Sycamore Grove P1 | Amador | U | monitor | inactive | Zone 7 | 2 | | | X | | | |
| 3S2E33G001 | 33G1 | Crohare | Amador | U | monitor | active | Zone 7 | 12 | | | X | | X | |
| 3S3E06Q003 | 6Q3 | PPWTP South Monitoring | Altamont | U | monitor | active | Zone 7 | 2 | | | | | | |
| 3S3E07D002 | 7D2 | 7D 2 | Spring | U | monitor | active | LLNL | 2 | | | | | | |
| 3S3E20L004 | 20L4 | Vail on Tesla | Mocho I | U | domestic | active | Zone 7 | 2 | | | | | | |
| 3S3E20R004 | 20R4 | Buonanno on Tesla | Mocho I | U | domestic | active | Zone 7 | 2 | | | | | | |
| 3S3E21C001 | 21C1 | Russell on Reuss | Upland | U | domestic | active | Zone 7 | 2 | | | | | | |

# TABLE 5-1
# MONITORING WELLS IN 2021 GROUNDWATER LEVELS PROGRAM
# LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Meas By | Frequency (per year) | Recorder (min) | RMS-WL | RMS-ICSW | Key | Water Rights | Other |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 4S2E01A001 | 1A1 | Gallagher Ag | Mocho II | U | irrigation | active | Zone 7 | 2 | | | X | | | |
| 4S3E06E004 | 6E4 | Gallagher Domestic | Mocho II | U | domestic | active | Zone 7 | 2 | | | | | | |
| WELLS IN THE GROUNDWATER LEVELS PROGRAM = 236 | | | | | | | | | | | | | | |

RMS = Representative Monitoring Site
ICSW = Interconnected Surface Water
WL = Water Levels
WR = Water Rights

# TABLE 5-2
# GROUNDWATER PROGRAM
# WELL CONSTRUCTION DETAILS
# 2021 WATER YEAR

| Site | Map | Type | Other Name | Completed | Basin | Aquifer | RP | TD | Dia | Perf |
|---|---|---|---|---|---|---|---|---|---|---|
| 2S1E32E001 | 32E1 | monitor | End of Arnold Rd | 12/28/2000 | None | U | 392.56 | 70 | 2 | 55 - 70 |
| 2S1E32N001 | 32N1 | monitor | Camp Parks | 7/1/1976 | Camp | U | 360.79 | 44 | 2.5 | 34 - 39 |
| 2S1E32Q001 | 32Q1 | monitor | Summer Glen Dr | 12/29/2000 | Camp | U | 367.55 | 45 | 2 | 30 - 45 |
| 2S1E33L001 | 33L1 | monitor | Gleason Dr @ Tassajara | 12/27/2000 | None | U | 389.46 | 80 | 2 | 65 - 80 |
| 2S1E33P002 | 33P2 | monitor | Central Pkwy at Emerald Glen P | 12/20/2000 | Camp | U | 370.05 | 55 | 2 | 45 - 55 |
| 2S1E33R001 | 33R1 | monitor | Central Pkwy @ Grafton | 10/23/2001 | None | U | 358.5 | 60 | 2 | 40 - 60 |
| 2S1W15F001 | 15F1 | monitor | BOLLINGER | 9/28/1976 | Bishop | U | 439.44 | 60 | 2.5 | 50.3 - 55.3 |
| 2S1W26C002 | 26C2 | monitor | PINE VALLEY | 9/28/1976 | Dublin | U | 406.53 | 50 | 2.5 | 40 - 45 |
| 2S1W36E003 | 36E3 | monitor | Kolb Park | 9/13/1977 | Dublin | U | 346.51 | 60 | 2.5 | 50 - 55 |
| 2S1W36F001 | 36F1 | nested | Dublin High shallow | 5/8/1996 | Dublin | L | 342.71 | 190 | 2 | 140 - 180 |
| 2S1W36F002 | 36F2 | nested | Dublin High mid | 5/8/1996 | Dublin | L | 342.71 | 320 | 2 | 270 - 310 |
| 2S2E21L001 | 21L1 | domestic | Merlin | 5/1/1973 | May | U | 563 | 168 | 10 | 49 - 168 |
| 2S2E27K001 | 27K1 | livestock | Model Airport | 4/28/1954 | Spring | U | 521.8 | 96 | 8 | 49 - 88 |
| 2S2E27M002 | 27M2 | domestic | Kwan | 7/16/1975 | May | U | 521 | 112 | 6 | 0 - 0 |
| 2S2E27P002 | 27P2 | monitor | hartford ave east | 6/18/1979 | Spring | U | 505.43 | 68 | 4 | 35 - 63 |
| 2S2E28D002 | 28D2 | monitor | May School | 11/2/1976 | May | U | 555.15 | 55 | 2.5 | 44 - 49 |
| 2S2E28J002 | 28J2 | industrial | FCC Well | 7/26/1984 | May | L | 522.292 | 230 | 6 | 50 - 230 |
| 2S2E28Q001 | 28Q1 | monitor | hartford ave | 11/2/1976 | May | U | 513.04 | 28 | 2.5 | 17.6 - 22.6 |
| 2S2E32K002 | 32K2 | monitor | jenson's N liv. Ave | 12/20/1977 | Cayetano | U | 507.43 | 43 | 2.5 | 33 - 38 |
| 2S2E34E001 | 34E1 | monitor | Mud City | 12/21/1977 | May | U | 499.73 | 49 | 2.5 | 40 - 45 |
| 2S2E34Q002 | 34Q2 | monitor | Hollyhock & Crocus | 12/12/2001 | Spring | U | 507.24 | 50 | 2 | 25 - 50 |
| 3S1E01F002 | 1F2 | monitor | Constitution Dr | 12/18/2000 | Camp | U | 428.44 | 40 | 2 | 25 - 40 |
| 3S1E01H003 | 1H3 | monitor | Collier Canyon g1 | 12/20/1977 | Camp | U | 422.8 | 80 | 2.5 | 70 - 75 |
| 3S1E01J004 | 1J04 | irrigation | Collier Vineyards | 2/6/2018 | Camp | L | | 300 | 12 | 260 - 280 |
| 3S1E01L001 | 1L1 | monitor | Kitty Hawk | 12/19/2000 | Camp | U | 403.04 | 70 | 2 | 60 - 70 |
| 3S1E01P002 | 1P2 | monitor | Airport gas g5 | 12/11/1975 | Amador | U | 389.64 | 50 | 2.5 | 40 - 45 |
| 3S1E01P003 | 1P3 | supply | New airport well | 7/28/1988 | Amador | L | 394.44 | 480 | 12 | 245 - 460 |
| 3S1E02J002 | 2J2 | monitor | Maint. Bldg | 7/16/2003 | Camp | U | 380.89 | 41 | 2 | 31 - 41 |
| 3S1E02J003 | 2J3 | monitor | Doolan Rd East | 7/16/2003 | Camp | U | 406.35 | 65 | 2 | 55 - 65 |
| 3S1E02K002 | 2K2 | monitor | Doolan Rd West | 12/10/1975 | Camp | U | 397.04 | 46 | 2.5 | 36.5 - 41.5 |
| 3S1E02M003 | 2M3 | monitor | Friesman Rd North | 11/13/2000 | Camp | U | 365.04 | 50 | 2 | 35 - 50 |
| 3S1E02N006 | 2N6 | monitor | Friesman Rd South | 11/13/2000 | Amador | U | 366.14 | 55 | 2 | 40 - 55 |
| 3S1E02P003 | 2P3 | domestic | Crosswinds Church | 9/26/1977 | Camp | L | 371.73 | 380 | 10 | 340 - 372 |
| 3S1E02Q001 | 2Q1 | monitor | LPGC #1 | 7/16/2003 | Amador | U | 369.92 | 45 | 2 | 35 - 45 |
| 3S1E02R001 | 2R1 | monitor | Beebs | 11/1/1975 | Amador | U | 376.29 | 33 | 2.5 | 21 - 26 |
| 3S1E03G002 | 3G2 | monitor | fallon rd | 1/18/1978 | Camp | U | 354.24 | 50 | 2.5 | 40 - 45 |
| 3S1E04A001 | 4A1 | monitor | SMP-DUB-2 | 10/23/2001 | Camp | U | 350.67 | 49.5 | 2 | 29.5 - 49.5 |
| 3S1E04J005 | 4J5 | monitor | Pimlico shallow | 10/25/2001 | Camp | U | 345.2 | 47 | 2 | 22 - 47 |
| 3S1E04J006 | 4J6 | monitor | Pimlico deep | 10/24/2001 | Camp | U | 345.55 | 110 | 2 | 65 - 110 |
| 3S1E04Q002 | 4Q2 | monitor | gulfstream | 12/13/1977 | Amador | U | 345.42 | 90 | 2.5 | 80 - 85 |
| 3S1E05K006 | 5K6 | monitor | Rosewood shallow | 6/7/1990 | Camp | U | 346.05 | 75 | 4 | 40 - 70 |
| 3S1E05K007 | 5K7 | monitor | Rosewood deep | 6/8/1990 | Camp | L | 346.19 | 150 | 4 | 134 - 144 |
| 3S1E05L003 | 5L3 | monitor | Oracle | 12/11/2001 | Camp | U | 339.43 | 40 | 2 | 15 - 40 |
| 3S1E05P006 | 5P6 | monitor | Owens Park | 12/19/2000 | Camp | U | 336.65 | 35 | 2 | 25 - 35 |

RP = Reference Point Elevation (in feet above MSL)
TD = Total Depth of well (in feet below ground surface)
Dia = Diameter of well casing (in inches)
Perf = Preferated interval (in feet below ground surface), uppermost - lowermost

| Site | Map | Type | Other Name | Completed | Basin | Aquifer | RP | TD | Dia | Perf |
|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E06F003 | 6F3 | monitor | Dublin Ct | 9/29/1976 | Dublin | U | 329.82 | 36 | 2.5 | 27 - 32 |
| 3S1E06N002 | 6N2 | monitor | DSRSD MW-3 | 3/20/1985 | Dublin | U | 335.2 | 67 | 4 | 47 - 67 |
| 3S1E06N003 | 6N3 | monitor | DSRSD MW-4 | 12/4/1984 | Dublin | U | 340.74 | 72 | | 52 - 72 |
| 3S1E06N006 | 6N6 | monitor | DSRSD NE-76 | 11/9/2007 | Dublin | U | 333.58 | 75 | 2 | 50 - 70 |
| 3S1E07B002 | 7B2 | monitor | Hopyard rd | 5/17/1979 | Dublin | L | 327.77 | 152 | 4 | 143 - 149 |
| 3S1E07B012 | 7B12 | monitor | Hacienda Arch | 7/31/2002 | Dublin | U | 327.82 | 70 | 2 | 50 - 70 |
| 3S1E07D001 | 7D1 | monitor | DSRSD SW-75 | 11/6/2007 | Dublin | U | 330.09 | 75 | 2 | 54 - 74 |
| 3S1E07D003 | 7D3 | monitor | DSRSD SE-70 | 11/2/2007 | Dublin | U | 332.28 | 70 | 2 | 45 - 65 |
| 3S1E07G007 | 7G7 | monitor | Chabot Well | 1/22/2002 | Dublin | U | 327.33 | 55 | 2 | 35 - 55 |
| 3S1E07J005 | 7J5 | monitor | Thomas Hart School | 7/10/2002 | Dublin | U | 326.78 | 50 | 2 | 30 - 50 |
| 3S1E08B001 | 8B1 | monitor | Lizard Well | 5/31/1979 | Amador | U | 338.28 | 148 | 4 | 55 - 82 |
| 3S1E08G004 | 8G4 | monitor | Apache | 12/19/2001 | Amador | U | 341.47 | 85 | 2 | 60 - 85 |
| 3S1E08H009 | 8H9 | nested | Mocho 4 Nested Shallow | 12/12/1996 | Amador | L | 338.53 | 240 | 2 | 210 - 230 |
| 3S1E08H010 | 8H10 | nested | Mocho 4 Nested Middle | 12/12/1996 | Amador | L | 339.26 | 440 | 2 | 290 - 430 |
| 3S1E08H011 | 8H11 | nested | Mocho 4 Nested deep | 12/21/1996 | Amador | D | 339.26 | 720 | 2 | 520 - 720 |
| 3S1E08H013 | 8H13 | monitor | Mocho 3 mon | 12/11/1998 | Amador | D | 338.96 | 800 | 2 | 570 - 790 |
| 3S1E08H018 | M4 | muni | Mocho 4 | 11/1/2000 | Amador | L | 341.94 | 745 | 20 | 515 - 730 |
| 3S1E08K001 | 8K1 | monitor | Cockroach well | 1/23/1978 | Amador | U | 332.37 | 99 | 2.5 | 89 - 94 |
| 3S1E08N001 | 8N1 | monitor | sports park | 8/27/1976 | Bernal | U | 323.68 | 72 | 2.5 | 62 - 67 |
| 3S1E09B001 | St1 | muni | Stoneridge | 1/28/1992 | Amador | L | 349.23 | 810 | 20 | 250 - 800 |
| 3S1E09H013 | 9H13 | domestic | Lister | | Amador | U | | 145 | 8 | - |
| 3S1E09J007 | 9J7 | nested | SW Lake I Shallow | 11/23/2004 | Amador | U | 357.36 | 145 | 2 | 120 - 140 |
| 3S1E09J008 | 9J8 | nested | SW Lake I Middle | 11/23/2004 | Amador | L | 357.55 | 305 | 2 | 280 - 300 |
| 3S1E09J009 | 9J9 | nested | SW Lake I Deep | 11/23/2004 | Amador | L | 357.68 | 505 | 2 | 480 - 500 |
| 3S1E09M002 | M1 | muni | Mocho 1 | 4/6/1964 | Amador | L | 343.95 | 530 | 16 | 150 - 510 |
| 3S1E09M003 | M2 | muni | Mocho 2 | 5/4/1967 | Amador | L | 347.47 | 575 | 18 | 250 - 570 |
| 3S1E09M004 | M3 | muni | Mocho 3 | 11/1/2000 | Amador | L | 342.89 | 498 | 20 | 315 - 493 |
| 3S1E09P005 | 9P5 | monitor | Key_AmW_U (Mohr Key) | 12/6/1977 | Amador | U | 349.4 | 105 | 2.5 | 95 - 100 |
| 3S1E09P009 | 9P9 | nested | Mohr Ave Shallow | 3/23/2005 | Amador | L | 349.59 | 210 | 2 | 185 - 205 |
| 3S1E09P010 | 9P10 | nested | Key_AmW_L | 3/23/2005 | Amador | L | 349.51 | 310 | 2 | 285 - 305 |
| 3S1E09P011 | 9P11 | nested | Mohr Ave Deep | 3/23/2005 | Amador | L | 349.44 | 425 | 2 | 405 - 420 |
| 3S1E10A002 | 10A2 | monitor | El Charro Rd | 5/10/1979 | Amador | U | 367.35 | 88 | 4 | 70 - 80 |
| 3S1E10B008 | 10B8 | nested | Kaiser Rd Shallow | 6/18/1997 | Amador | L | 353.6 | 200 | 2 | 100 - 190 |
| 3S1E10B009 | 10B9 | nested | Kaiser Rd Middle 1 | 6/18/1997 | Amador | L | 353.49 | 294 | 2 | 244 - 284 |
| 3S1E10B010 | 10B10 | nested | Kaiser Rd Middle 2 | 6/18/1997 | Amador | L | 353.52 | 600 | 2 | 400 - 590 |
| 3S1E10B011 | 10B11 | nested | Kaiser Rd Deep | 6/18/1997 | Amador | D | 353.52 | 810 | 2 | 660 - 800 |
| 3S1E10B014 | 10B14 | monitor | COL 5 Monitoring | 2/26/2014 | Amador | L | 355.591 | 690 | 2 | 390 - 690 |
| 3S1E10B016 | COL5 | muni | COL 5 | 7/19/2014 | Amador | L | 357.584 | 690 | 18 | 390 - 690 |
| 3S1E10D002 | 10D2 | nested | Stoneridge Shallow | 9/10/1998 | Amador | L | 349.32 | 212 | 2 | 182 - 212 |
| 3S1E10D003 | 10D3 | nested | Stoneridge Middle 1 | 9/10/1998 | Amador | L | 349.28 | 322 | 2 | 262 - 312 |
| 3S1E10D004 | 10D4 | nested | Stoneridge Middle 2 | 9/10/1998 | Amador | L | 349.3 | 616 | 2 | 366 - 606 |
| 3S1E10D005 | 10D5 | nested | Stoneridge Deep | 9/10/1998 | Amador | D | 349.32 | 790 | 2 | 720 - 780 |
| 3S1E10K002 | 10K2 | monitor | COL 1 Monitoring | 1/17/2007 | Amador | L | 358.68 | 590.6 | 4 | 195.5 - 585.6 |
| 3S1E10K003 | COL1 | muni | COL 1 | 2/27/2008 | Amador | L | 363.79 | 530 | 18 | 205 - 530 |
| 3S1E11B001 | 11B1 | monitor | Airport West | 12/11/1975 | Amador | U | 369.35 | 43 | 2.5 | 33 - 38 |
| 3S1E11C003 | 11C3 | monitor | LAVWMA ROW | 12/22/2003 | Amador | U | 364.82 | 55 | 2 | 35 - 55 |
| 3S1E11G001 | 11G1 | nested | Key_AmE_U | 4/8/1997 | Amador | U | 371.62 | 120 | 2 | 100 - 110 |
| 3S1E11G002 | 11G2 | nested | Rancho Charro Middle 1 | 4/8/1997 | Amador | L | 371.61 | 350 | 2 | 230 - 340 |
| 3S1E11G003 | 11G3 | nested | Rancho Charro Middle 2 | 4/8/1997 | Amador | L | 371.64 | 590 | 2 | 380 - 580 |
| 3S1E11G004 | 11G4 | nested | Rancho Charro Deep | 4/8/1997 | Amador | D | 371.68 | 790 | 2 | 620 - 780 |
| 3S1E11M002 | 11M2 | monitor | COL 2 Monitoring | 9/25/2007 | Amador | L | 365.96 | 700 | 4.5 | 199 - 699 |

RP = Reference Point Elevation (in feet above MSL)
TD = Total Depth of well (in feet below ground surface)
Dia = Diameter of well casing (in inches)
Perf = Preferated interval (in feet below ground surface), uppermost - lowermost

| Site | Map | Type | Other Name | Completed | Basin | Aquifer | RP | TD | Dia | Perf |
|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E11M003 | COL2 | muni | COL 2 | 2/14/2008 | Amador | L | 369.24 | 684 | 18 | 345 - 684 |
| 3S1E11P006 | 11P6 | domestic | New Jamieson Residence | 3/10/2000 | Amador | L | 376.67 | 400 | 5 | 240 - 380 |
| 3S1E12A002 | 12A2 | monitor | Airport South | 12/11/1975 | Amador | U | 401.35 | 69 | 2.5 | 63.7 - 68.7 |
| 3S1E12D002 | 12D2 | monitor | LWRP G6 | | Amador | U | 384.45 | 44.6 | | 36 - 41 |
| 3S1E12G001 | 12G1 | monitor | Oaks Park Shallow | 12/12/1975 | Amador | U | 404.47 | 73 | 2.5 | 63 - 68 |
| 3S1E12H004 | 12H4 | nested | LWRP Shallow | 1/8/1998 | Amador | L | 407.75 | 270 | 2 | 185 - 260 |
| 3S1E12H005 | 12H5 | nested | LWRP Middle 1 | 1/8/1998 | Amador | L | 407.78 | 400 | 2 | 360 - 390 |
| 3S1E12H006 | 12H6 | nested | LWRP Middle 2 | 1/8/1998 | Amador | L | 407.75 | 480 | 2 | 410 - 468 |
| 3S1E12H007 | 12H7 | nested | LWRP Deep | 1/8/1998 | Amador | D | 407.67 | 684 | 2 | 609 - 674 |
| 3S1E12K002 | 12K2 | nested | Oaks Park Mid | 11/1/2005 | Amador | L | 406.29 | 300 | 2 | 210 - 295 |
| 3S1E12K003 | 12K3 | nested | Key_AmE_L | 11/1/2005 | Amador | L | 406.83 | 475 | 2 | 355 - 470 |
| 3S1E12K004 | 12K4 | nested | Oaks Park Deep | 11/1/2005 | Amador | D | 406.71 | 575 | 2 | 550 - 570 |
| 3S1E13P005 | 13P5 | nested | LGA Grant Nested 1 | 11/2/2010 | Amador | U | 399.97 | 135 | 2 | 110 - 130 |
| 3S1E13P006 | 13P6 | nested | LGA Grant Nested 2 | 11/2/2010 | Amador | L | 399.93 | 255 | 2 | 230 - 250 |
| 3S1E13P007 | 13P7 | nested | LGA Grant Nested 3 | 11/2/2010 | Amador | L | 399.97 | 375 | 2 | 350 - 370 |
| 3S1E13P008 | 13P8 | nested | LGA Grant Nested 4 | 11/2/2010 | Amador | L | 399.94 | 605 | 2 | 580 - 600 |
| 3S1E14B001 | 14B1 | industrial | Industrial Asphalt | | Amador | L | 384.2 | 435 | 8 | 200 - 410 |
| 3S1E14D002 | 14D2 | monitor | South Cope Lake | 8/30/2006 | Amador | L | 371.83 | 740 | 14.5 | 170 - 740 |
| 3S1E15J003 | 15J3 | supply | shadow cliff | 12/2/1980 | Amador | L | 344.59 | 196 | 8 | 154 - 184 |
| 3S1E15M003 | 15M3 | monitor | Bush/Valley South | 12/15/1998 | Amador | L | 362.88 | 600 | 2 | 280 - 590 |
| 3S1E16A002 | P8 | muni | Pleas 8 | 3/27/1992 | Amador | L | 358.2 | 500 | 20 | 200 - 495 |
| 3S1E16A004 | 16A4 | monitor | Bush/Valley Mid | 12/3/1998 | Amador | L | 359.36 | 603 | 2 | 280 - 580 |
| 3S1E16B001 | 16B1 | monitor | Bush/Valley North | 12/18/1998 | Amador | D | 355.81 | 805 | 2 | 605 - 800 |
| 3S1E16C002 | 16C2 | nested | Santa Rita Valley Shallow | 4/14/2005 | Amador | L | 344.38 | 190 | 2 | 165 - 185 |
| 3S1E16C003 | 16C3 | nested | Santa Rita Valley Middle | 4/14/2005 | Amador | L | 344.27 | 305 | 2 | 280 - 300 |
| 3S1E16C004 | 16C4 | nested | Santa Rita Valley Deep | 4/14/2005 | Amador | L | 344.16 | 375 | 2 | 355 - 370 |
| 3S1E16E004 | 16E4 | monitor | black ave - cultural | 12/15/1977 | Amador | U | 351.69 | 105 | 2.5 | 95 - 100 |
| 3S1E16L005 | P5 | muni | Pleas 5 | 4/4/1962 | Amador | L | 358.05 | 685 | 18 | 149 - 650 |
| 3S1E16L007 | P6 | muni | Pleas 6 | 6/1/1966 | Amador | L | 354.47 | 647 | 18 | 165 - 647 |
| 3S1E16P005 | 16P5 | monitor | Vervais Monitor | 10/8/1976 | Amador | U | 354.51 | 75 | 2.5 | 64 - 69 |
| 3S1E17B004 | 17B4 | supply | Casterson | 1/1/1950 | Amador | L | 337.69 | 248 | 8 | 0 - 248 |
| 3S1E17D003 | 17D3 | nested | Hopyard Nested Shallow | 8/6/1996 | Bernal | L | 325.13 | 108 | 4 | 92 - 98 |
| 3S1E17D004 | 17D4 | nested | Hopyard Nested Middle 1 | 8/6/1996 | Bernal | L | 325.14 | 236 | 4 | 206 - 226 |
| 3S1E17D005 | 17D5 | nested | Hopyard Nested Middle 2 | 8/6/1996 | Bernal | L | 325.13 | 308 | 4 | 266 - 286 |
| 3S1E17D006 | 17D6 | nested | Hopyard Nested Middle 3 | 8/6/1996 | Bernal | L | 325.12 | 408 | 4 | 378 - 398 |
| 3S1E17D007 | 17D7 | nested | Hopyard Nested Deep | 8/6/1996 | Bernal | D | 325.13 | 684 | 4 | 654 - 674 |
| 3S1E17D011 | 17D11 | monitor | Hopyard 9 Monitoring Well | 12/16/1998 | Bernal | L | 324.84 | 603 | 2 | 340 - 505 |
| 3S1E17D012 | H9 | muni | Hopyard 9 | 11/5/1999 | Bernal | L | 327.9 | 315 | 18 | 235 - 310 |
| 3S1E18A006 | H6 | muni | Hopyard 6 | 2/1/1987 | Bernal | L | 326.74 | 500 | 18 | 158 - 490 |
| 3S1E18E004 | 18E4 | monitor | Valley Trails II | 5/31/1979 | Bernal | U | 320.21 | 83 | 4 | 69 - 79 |
| 3S1E18J002 | 18J2 | monitor | camino segura | 10/20/1977 | Bernal | U | 323.02 | 71 | 2.5 | 61 - 66 |
| 3S1E19A010 | SF-B | muni | SFWD South (B) | | Bernal | L | 337.02 | 331 | | 189 - 327 |
| 3S1E19A011 | SF-A | muni | SFWD North (A) | 10/9/2001 | Bernal | L | 334.27 | 330 | 18 | 196 - 320 |
| 3S1E19C004 | 19C4 | monitor | del valle & laguna | 6/11/1979 | Bernal | U | 322.23 | 78 | 4 | 68 - 73 |
| 3S1E19K001 | 19K1 | monitor | 680/bernal | 12/8/1975 | Bernal | U | 321.54 | 57.6 | 2.5 | 47.6 - 52.6 |
| 3S1E20B002 | 20B2 | supply | Fairgrounds Potable | 12/27/1961 | Bernal | L | 344.03 | 500 | 12 | 218 - 500 |
| 3S1E20C007 | 20C7 | monitor | Key_Bern_U | 6/15/2000 | Bernal | U | 338.66 | 153 | 2 | 65 - 145 |
| 3S1E20C008 | 20C8 | nested | Key_Bern_L | 10/20/2008 | Bernal | L | 338.67 | 315 | 2 | 295 - 315 |
| 3S1E20C009 | 20C9 | nested | Fair Nested Deep | 10/20/2008 | Bernal | L | 338.78 | 515 | 2 | 495 - 515 |
| 3S1E20J004 | 20J4 | monitor | civic center | 12/5/1975 | Bernal | U | 331.62 | 72 | 2.5 | 62 - 67 |
| 3S1E20M011 | 20M11 | monitor | S.F "M"LINE | 10/12/1977 | Bernal | U | 325.73 | 71 | 2.5 | 61 - 66 |

RP = Reference Point Elevation (in feet above MSL) TD = Total Depth of well (in feet below ground surface)
Dia = Diameter of well casing (in inches) Perf = Preferated interval (in feet below ground surface), uppermost - lowermost

| Site | Map | Type | Other Name | Completed | Basin | Aquifer | RP | TD | Dia | Perf |
|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E20Q002 | 20Q2 | monitor | 20Q2 | 2/17/1976 | Bernal | U | 325.82 | 65 | 10 | 45 - 53 |
| 3S1E22D002 | 22D2 | monitor | vineyard trailer | 10/28/1976 | Amador | U | 368.05 | 72 | 2.5 | 62 - 67 |
| 3S1E23J001 | 23J1 | domestic | 1627 vineyard trailer | 3/4/1958 | Amador | L | 428.2 | 120 | 8 | 0 - 120 |
| 3S1E25C003 | 25C3 | monitor | Katz Winery Mansion | 11/28/1990 | Amador | U | 454.16 | 146 | 2 | 70 - 140 |
| 3S1E28M002 | 28M2 | supply | Bargar | 2/8/1962 | Upland | U | 0 | 141 | 5 | 80 - 141 |
| 3S1E29M004 | 29M4 | monitor | f.c. channel | 12/4/1975 | Castle | U | 310.94 | 57 | 2.5 | 47 - 52 |
| 3S1E29P002 | 29P2 | monitor | castlewood dr | 12/9/1975 | Bernal | U | 302.82 | 42 | 2.5 | 32 - 37 |
| 3S1E33G005 | 33G5 | monitor | Pleasanton Calippe 33G5 | 7/21/2006 | Upland | U | 0 | 35 | 2 | 11 - 35 |
| 3S1W01B009 | 1B9 | nested | DSRSD Shallow | 2/15/1996 | Dublin | L | 333.56 | 162 | 2 | 122 - 152 |
| 3S1W01B010 | 1B10 | nested | DSRSD Middle | 2/15/1996 | Dublin | L | 333.57 | 414 | 2 | 274 - 404 |
| 3S1W01B011 | 1B11 | nested | DSRSD Deep | 2/15/1996 | Dublin | L | 333.74 | 560 | 2 | 480 - 550 |
| 3S1W01J001 | 1J1 | monitor | DSRSD MW-1 | 12/4/1984 | Dublin | U | 334.36 | 70 | | 47 - 64 |
| 3S1W02A002 | 2A2 | monitor | McNamara's | 10/7/1976 | Dublin | U | 369.4 | 47 | 2.5 | 37 - 42 |
| 3S1W12B002 | 12B2 | monitor | Stoneridge Mall Rd | 6/21/1996 | Dublin | U | 342.89 | 39.5 | 4 | 20 - 50 |
| 3S1W12J001 | 12J1 | monitor | DSRSD South | 12/9/1975 | Dublin | U | 329.31 | 62 | 2.5 | 52 - 57 |
| 3S1W13J001 | 13J1 | monitor | muirwood dr | 10/7/1976 | Castle | U | 343.94 | 48 | 2.5 | 39 - 44 |
| 3S2E01F002 | 1F2 | monitor | Brisa at Circuit City | 12/22/1977 | Spring | U | 572.99 | 68.6 | 2.5 | 59 - 64 |
| 3S2E02B002 | 2B2 | monitor | south front rd | 6/7/1976 | Spring | U | 539.45 | 46 | 2.5 | 36.9 - 41.9 |
| 3S2E03A001 | 3A1 | monitor | Bluebell | 12/21/1977 | Spring | U | 517.63 | 54 | 2.5 | 44 - 49 |
| 3S2E03K003 | 3K3 | monitor | first & S. front rd | 12/12/1977 | Mocho I | U | 522.83 | 60 | 2.5 | 50 - 55 |
| 3S2E05N001 | 5N1 | supply | Spider Well | 10/5/1977 | Mocho II | M | 444 | 210 | 10 | 0 - 210 |
| 3S2E07C002 | 7C2 | monitor | jaws - york way - G4 | 4/6/1978 | Mocho II | U | 420.84 | 49 | 2.5 | 39 - 44 |
| 3S2E07H002 | 7H2 | monitor | dakota | 7/29/1989 | Mocho II | U | 442.85 | 54 | 2 | 44 - 54 |
| 3S2E07N002 | 7N2 | monitor | Isabel & Arroyo Mocho | 12/20/2012 | Amador | U | 422 | 162 | 2 | 132 - 152 |
| 3S2E07P003 | CWS24 | muni | CWS 24 | 4/4/1972 | Amador | L | 431.46 | 510 | 16 | 300 - 490 |
| 3S2E07R003 | CWS31 | muni | CWS 31 | 9/20/2002 | Upland | L | 446 | 583 | 16 | 410 - 528 |
| 3S2E08F001 | CWS10 | muni | CWS 10 | 5/15/1954 | Mocho II | L | 456.24 | 470 | 16 | 143 - 433 |
| 3S2E08H002 | 8H2 | monitor | North k | 6/14/1976 | Mocho II | U | 469.61 | 46 | 2.5 | 36 - 41 |
| 3S2E08H003 | 8H3 | nested | Key_Mo2_L | 7/10/2009 | Mocho II | L | 477.25 | 195 | 2 | 170 - 190 |
| 3S2E08H004 | 8H4 | nested | N Liv Ave Deep | 7/10/2009 | Mocho II | L | 476.97 | 385 | 2 | 360 - 380 |
| 3S2E08K002 | 8K2 | monitor | Key_Mo2_U (Livermore Key) | 12/13/1977 | Mocho II | U | 464.78 | 74 | 2.5 | 64 - 69 |
| 3S2E08N002 | CWS14 | muni | CWS 14 | 1/16/1958 | Mocho II | L | 453.64 | 526 | 10 | 140 - 515 |
| 3S2E08Q009 | 8Q9 | monitor | D-2 | 6/15/1999 | Mocho II | L | 464.7 | 114 | 2 | 99 - 114 |
| 3S2E09Q001 | CWS9 | muni | CWS 9 | 2/18/1952 | Mocho II | L | 518.15 | 572 | 14 | 180 - 492 |
| 3S2E09Q004 | 9Q4 | monitor | school st | 11/1/1977 | Mocho II | U | 505.425 | 80 | 2.5 | 70 - 75 |
| 3S2E10F003 | 10F3 | monitor | hexcel | 12/12/1977 | Mocho I | U | 534.84 | 45 | 2.5 | 35 - 40 |
| 3S2E10Q001 | 10Q1 | monitor | almond | 11/1/1976 | Mocho II | U | 555.36 | 43.5 | 2.5 | 33.5 - 39 |
| 3S2E10Q002 | 10Q2 | monitor | LLNL W-703 | 12/3/1990 | Mocho II | L | 549.569 | 325 | 4.5 | 298 - 325 |
| 3S2E11C001 | 11C1 | monitor | joan way | 11/1/1976 | Mocho I | U | 556.347 | 66.2 | 2.5 | 56.2 - 61.2 |
| 3S2E12C004 | 12C4 | monitor | LLNL W-486 | 3/11/1988 | Spring | U | 591.46 | 108 | 4.5 | 100 - 108 |
| 3S2E12J003 | 12J3 | monitor | LLNL W-017A | 5/20/1981 | Spring | L | 631.05 | 160 | 5 | 127 - 157 |
| 3S2E14A003 | 14A3 | monitor | S. vasco @east ave | 12/13/1977 | Mocho I | U | 602.24 | 110 | 2.5 | 100 - 105 |
| 3S2E14B001 | 14B1 | domestic | 5763 east ave | 5/26/1983 | Mocho I | L | 593.36 | 300 | 9 | 146 - 234 |
| 3S2E15E002 | 15E2 | irrigation | Retzlaff Winery | 11/14/1983 | Mocho II | L | 549.69 | 192 | 8 | 104 - 189 |
| 3S2E15L001 | 15L1 | monitor | Concannon 2 | 10/10/2013 | Mocho II | U | 561.5 | 40.5 | 2 | 20 - 40.5 |
| 3S2E15L002 | 15L2 | monitor | Concannon 6D | 1/14/2015 | Mocho II | U | | 70.5 | 2 | 40 - 70 |
| 3S2E15M002 | 15M2 | monitor | Concannon 1 | 10/10/2013 | Mocho II | U | 549.46 | 45 | 2 | 25 - 45 |
| 3S2E15M003 | 15M3 | monitor | Concannon 5D | 1/13/2015 | Mocho II | U | | 75.8 | 2 | 45.3 - 75.3 |
| 3S2E15Q008 | 15Q 8 | monitor | Concannon 4 | 1/14/2015 | Mocho II | U | | 41 | 2 | 10.5 - 40.5 |
| 3S2E15R017 | 15R17 | nested | Buena Vista Shallow | 12/14/2006 | Mocho II | U | 592.41 | 63 | 2 | 38 - 58 |
| 3S2E15R018 | 15R18 | monitor | Buena Vista Deep | 12/15/2007 | Mocho II | L | 592.47 | 138 | 2 | 113 - 133 |

RP = Reference Point Elevation (in feet above MSL) TD = Total Depth of well (in feet below ground surface)
Dia = Diameter of well casing (in inches) Perf = Preferated interval (in feet below ground surface), uppermost - lowermost

| Site | Map | Type | Other Name | Completed | Basin | Aquifer | RP | TD | Dia | Perf |
|---|---|---|---|---|---|---|---|---|---|---|
| 3S2E15R020 | 15R20 | monitor | Concannon 3 | 1/14/2015 | Mocho II | U | | 51 | 2 | 20.5 - 50.5 |
| 3S2E16A003 | 16A3 | irrigation | Memory Gardens | 5/1/1972 | Mocho II | L | 527.06 | 240 | 10 | 91 - 240 |
| 3S2E16C001 | CWS15 | muni | CWS 15 | 2/18/1958 | Mocho II | L | 510.97 | 584 | 16 | 150 - 523 |
| 3S2E16E004 | 16E4 | monitor | pepper tree | 12/15/1977 | Mocho II | U | 506.26 | 45 | 2.5 | 35 - 40 |
| 3S2E18B001 | CWS20 | muni | CWS 20 | 1/30/1961 | Amador | L | 438.56 | 497 | 16 | 190 - 465 |
| 3S2E18E001 | 18E1 | monitor | Stanley East of Isabel | 4/22/1977 | Amador | U | 423.86 | 133.8 | 2.5 | 123.8 - 128.8 |
| 3S2E19D007 | 19D7 | nested | Isabel Shallow | 1/29/1999 | Amador | U | 415.07 | 180 | 2 | 100 - 180 |
| 3S2E19D008 | 19D8 | nested | Isabel Middle 1 | 1/29/1999 | Amador | L | 415.04 | 260 | 2 | 210 - 260 |
| 3S2E19D009 | 19D9 | nested | Isabel Middle 2 | 1/29/1999 | Amador | L | 414.98 | 390 | 2 | 280 - 390 |
| 3S2E19D010 | 19D10 | nested | Isabel Deep | 1/29/1999 | Amador | L | 414.89 | 470 | 2 | 420 - 470 |
| 3S2E19K001 | 19K1 | supply | Cavicchi | | Amador | L | 0 | 160 | 2 | 0 - 0 |
| 3S2E19N003 | 19N3 | nested | Shallow Cemex Nested | 7/27/2018 | Amador | U | 418.45 | 120 | 2 | 105 - 115 |
| 3S2E19N004 | 19N4 | nested | Deep Cemex Nested | 7/27/2018 | Amador | L | 417.96 | 203 | 2 | 188 - 198 |
| 3S2E20M001 | 20M1 | supply | Alden Lane | 9/15/1928 | Amador | L | 478.79 | 184 | 12 | 0 - 184 |
| 3S2E20R002 | 20R2 | irrigation | Ravenswood South Well | 5/1/1985 | Upland | U | 522 | 257 | 9 | 107 - 252 |
| 3S2E21K008 | 21K8 | supply | Roberts on Marina | | Upland | | 0 | 220 | 6 | 0 - 0 |
| 3S2E21K009 | 21K9 | domestic | Hughey Marina Ave | | Upland | U | 0 | 0 | 6 | 0 - 0 |
| 3S2E22B001 | 22B1 | monitor | grapes | 7/8/1976 | Mocho II | U | 585.88 | 31.9 | 2.5 | 21.9 - 26.9 |
| 3S2E23E001 | 23E1 | nested | Murrieta Nested Shallow | 9/2/2004 | Mocho II | U | 613.36 | 40 | 2 | 20 - 35 |
| 3S2E23E002 | 23E2 | nested | Murrieta Nested Deep | 9/2/2004 | Mocho II | L | 613.23 | 110 | 2 | 95 - 105 |
| 3S2E24A001 | 24A1 | monitor | S. greenville | 11/1/1976 | Mocho I | U | 717.7 | 46.3 | 2.5 | 36.3 - 41.3 |
| 3S2E26J002 | 26J2 | monitor | mines rd | 12/27/1977 | Mocho II | U | 689.92 | 44 | 2.5 | 34 - 39 |
| 3S2E29F004 | 29F4 | monitor | Wetmore | 10/28/1976 | Amador | U | 457.5 | 36 | 2.5 | 26 - 31 |
| 3S2E29L001 | 29L1 (P3 | monitor | Sycamore Grove P3 | 11/29/2001 | Amador | U | 457.96 | 23 | 2 | 8 - 23 |
| 3S2E30C001 | 30C1 | supply | Vineyard 30C 1 | 3/16/1995 | Amador | L | 439.41 | 150 | 6 | 125 - 145 |
| 3S2E30D002 | 30D2 | monitor | vineyard | 6/18/1979 | Amador | U | 431.6 | 44 | 4 | 24 - 39 |
| 3S2E32E007 | 32E7 | monitor | DVWTP 32E7 | 7/16/1991 | Upland | U | 610.94 | 37 | 6 | 19 - 34 |
| 3S2E33C001 | 33C1 (P | monitor | Sycamore Grove P1 | 11/29/2001 | Amador | U | 493.23 | 20 | 2 | 5 - 20 |
| 3S2E33G001 | 33G1 | monitor | Crohare | 12/12/1975 | Amador | U | 511.52 | 17 | 2.5 | 9 - 14 |
| 3S2E33K001 | 33K1 | monitor | VA | | Amador | U | 546.83 | 15 | 2.5 | 7 - 12 |
| 3S2E33L001 | 33L1 | monitor | VA/CROHARE FENCE | | Amador | U | 557.63 | 16 | 2.5 | 11 - 16 |
| 3S3E06Q003 | 6Q3 | monitor | PPWTP South Monitoring | 8/29/2016 | Altamont | U | 681.07 | 30 | 2 | 20 - 30 |
| 3S3E07D002 | 7D2 | monitor | 7D 2 | 11/1/1976 | Spring | U | 621.94 | 72 | 2.5 | 64 - 69 |
| 3S3E18Q001 | 18Q1 | domestic | Nagy on Tesla | | Mocho I | | 0 | 0 | 0 | 0 - 0 |
| 3S3E19C002 | 19C2 | domestic | Wilker well 2 | | Mocho I | U | 740.7 | 66 | 8 | 0 - 66 |
| 3S3E20L004 | 20L4 | domestic | Vail on Tesla | 8/15/2005 | Mocho I | U | 0 | 340 | 5 | 0 - 0 |
| 3S3E20R004 | 20R4 | domestic | Buonanno on Tesla | | Mocho I | U | 0 | 0 | 6 | 0 - 0 |
| 3S3E21C001 | 21C1 | domestic | Russell on Reuss | 1/1/1977 | Upland | U | 0 | 128 | 12 | 60 - 124 |
| 4S2E01A001 | 1A1 | irrigation | Gallagher Ag | 2/6/2015 | Mocho II | U | | 130 | 6 | 45 - 130 |
| 4S3E06E004 | 6E4 | domestic | Gallagher Domestic | 5/28/1976 | Mocho II | U | | 220 | 10 | 184 - 212 |

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TD = Total Depth of well (in feet below ground surface)
Dia = Diameter of well casing (in inches)
Perf = Preferated interval (in feet below ground surface), uppermost - lowermost

# TABLE 5-3
# SEMIANNUAL GROUNDWATER LEVELS
# (Feet above Mean Sea Level, NAVD88)
# FALL 2020 TO FALL 2021

| | | | | Fall 2020 | | Spring 2021 | | Fall 2021 | | Change in Elevation (ft) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Seasonal | | Annual |
| Well Number | Well Depth | Aquifer | Subarea | Depth to Water | GW Elev | Depth to Water (ft) | GW Elev | Depth to Water (ft) | GW Elev | Fall 20 to Spring 21 | Spring 21 to Fall 21 | Fall 20 to Fall 21 |
| 1S4E31P005 | 24 | U | Tracy | 18.5 | 41.5 | 19.0 | 41.0 | 18.5 | 41.5 | -0.5 | 0.6 | 0.1 |
| 2S1E32E001 | 70 | U | None | 37.7 | 354.9 | 39.1 | 353.5 | 40.6 | 352.0 | -1.4 | -1.5 | -2.9 |
| 2S1E32N001 | 44 | U | Camp | 19.2 | 341.6 | 19.5 | 341.3 | 20.2 | 340.6 | -0.3 | -0.7 | -1.0 |
| 2S1E32Q001 | 45 | U | Camp | 28.0 | 339.6 | 28.6 | 338.9 | 29.9 | 337.7 | -0.7 | -1.2 | -1.9 |
| 2S1E33L001 | 80 | U | None | 52.0 | 337.5 | 53.8 | 335.6 | 55.1 | 334.4 | -1.8 | -1.3 | -3.1 |
| 2S1E33P002 | 55 | U | Camp | 32.9 | 337.2 | 34.4 | 335.7 | 35.7 | 334.4 | -1.5 | -1.3 | -2.8 |
| 2S1E33R001 | 60 | U | None | 19.9 | 338.6 | 21.1 | 337.4 | 22.7 | 335.9 | -1.2 | -1.5 | -2.7 |
| 2S1W15F001 | 60 | U | Bishop | 11.1 | 428.3 | 10.9 | 428.6 | 12.1 | 427.3 | 0.2 | -1.2 | -1.0 |
| 2S1W26C002 | 50 | U | Dublin | 25.7 | 380.9 | 26.1 | 380.4 | 27.9 | 378.6 | -0.5 | -1.8 | -2.3 |
| 2S1W36E003 | 60 | U | Dublin | 4.7 | 341.8 | 3.9 | 342.6 | 5.4 | 341.2 | 0.8 | -1.4 | -0.7 |
| 2S1W36F001 | 190 | L | Dublin | 11.6 | 331.1 | 12.1 | 330.6 | 14.7 | 328.1 | -0.5 | -2.5 | -3.1 |
| 2S1W36F002 | 320 | L | Dublin | 9.2 | 333.5 | 7.9 | 334.8 | 9.5 | 333.2 | 1.3 | -1.6 | -0.3 |
| 2S1W36F003 | 520 | L | Dublin | 24.3 | 318.4 | 17.8 | 325.0 | 24.7 | 318.0 | 6.5 | -7.0 | -0.4 |
| 2S2E21L001 | 168 | U | May | NA | NA | NA | NA | 37.3 | 525.7 | - | - | - |
| 2S2E27C002 | 108 | U | Spring | 14.3 | 527.9 | 15.1 | 527.0 | 15.8 | 526.4 | -0.9 | -0.6 | -1.5 |
| 2S2E27K001 | 96 | U | Spring | NA | NA | 10.8 | 513.7 | 10.4 | 514.1 | - | 0.4 | - |
| 2S2E27M002 | 112 | U | May | NA | NA | 8.4 | 516.1 | 9.6 | 514.9 | - | -1.3 | - |
| 2S2E27P002 | 68 | U | Spring | 3.9 | 501.6 | 3.2 | 502.3 | 4.3 | 501.1 | 0.7 | -1.1 | -0.4 |
| 2S2E28D002 | 55 | U | May | 30.6 | 524.6 | 30.4 | 524.8 | 31.0 | 524.2 | 0.2 | -0.6 | -0.4 |
| 2S2E28J002 | 230 | L | May | 7.1 | 515.2 | 6.8 | 515.5 | 7.7 | 514.6 | 0.3 | -0.9 | -0.6 |
| 2S2E28Q001 | 28 | U | May | 7.0 | 506.1 | 5.5 | 507.5 | 7.3 | 505.8 | 1.5 | -1.8 | -0.3 |
| 2S2E32K002 | 43 | U | Cayetano | 8.8 | 498.7 | 8.7 | 498.7 | 9.2 | 498.2 | 0.0 | -0.5 | -0.5 |
| 2S2E34E001 | 49 | U | May | 5.8 | 493.9 | 4.6 | 495.1 | 6.2 | 493.5 | 1.2 | -1.6 | -0.4 |
| 2S2E34Q002 | 50 | U | Spring | 3.7 | 503.6 | 2.9 | 504.3 | 4.1 | 503.1 | 0.8 | -1.2 | -0.4 |
| 2S3E01D001 | 80 | U | Tracy | 11.6 | 78.4 | 12.0 | 78.0 | 12.9 | 77.1 | -0.4 | -0.9 | -1.3 |
| 3S1E01F002 | 40 | U | Camp | 20.5 | 408.0 | 22.0 | 406.4 | 21.9 | 406.5 | -1.5 | 0.1 | -1.4 |
| 3S1E01H003 | 80 | U | Camp | 27.6 | 395.2 | 28.7 | 394.1 | 30.0 | 392.8 | -1.1 | -1.3 | -2.3 |
| 3S1E01J004 | 300 | L | Camp | NA | NA | NA | NA | NA | NA | - | - | - |
| 3S1E01L001 | 70 | U | Camp | 57.5 | 345.5 | 60.8 | 342.3 | 62.0 | 341.1 | -3.3 | -1.2 | -4.4 |
| 3S1E01P002 | 50 | U | Amador | 23.6 | 366.0 | 26.1 | 363.6 | 26.7 | 363.0 | -2.5 | -0.6 | -3.1 |
| 3S1E01P003 | 480 | L | Amador | 143.4 | 251.1 | 136.7 | 257.7 | 150.3 | 244.1 | 6.7 | -13.6 | -6.9 |
| 3S1E02J002 | 41 | U | Camp | 15.4 | 365.5 | 15.7 | 365.2 | 18.3 | 362.6 | -0.3 | -2.6 | -2.9 |
| 3S1E02J003 | 65 | U | Camp | 26.1 | 380.3 | 27.6 | 378.7 | 28.3 | 378.1 | -1.6 | -0.6 | -2.2 |
| 3S1E02K002 | 46 | U | Camp | 26.2 | 370.8 | 26.2 | 370.8 | 27.5 | 369.6 | 0.0 | -1.2 | -1.3 |
| 3S1E02M003 | 50 | U | Camp | 15.7 | 349.3 | 15.4 | 349.6 | 15.2 | 349.8 | 0.3 | 0.2 | 0.5 |
| 3S1E02N006 | 55 | U | Amador | 29.2 | 337.0 | 28.0 | 338.1 | 29.4 | 336.7 | 1.1 | -1.4 | -0.3 |
| 3S1E02P003 | 380 | L | Camp | 126.4 | 245.3 | 118.1 | 253.7 | 128.8 | 242.9 | 8.4 | -10.8 | -2.4 |
| 3S1E02Q001 | 45 | U | Amador | 21.2 | 348.8 | 21.5 | 348.5 | 23.2 | 346.7 | -0.3 | -1.7 | -2.0 |
| 3S1E02R001 | 33 | U | Amador | 20.1 | 356.2 | 20.4 | 355.9 | 22.3 | 354.0 | -0.3 | -2.0 | -2.2 |
| 3S1E03G002 | 50 | U | Camp | 10.8 | 343.4 | 9.6 | 344.7 | 11.7 | 342.6 | 1.3 | -2.1 | -0.9 |
| 3S1E04A001 | 50 | U | Camp | 17.1 | 333.6 | 18.1 | 332.5 | 19.6 | 331.1 | -1.1 | -1.5 | -2.6 |
| 3S1E04J005 | 47 | U | Camp | 15.7 | 329.5 | 16.5 | 328.7 | 18.1 | 327.1 | -0.8 | -1.6 | -2.4 |
| 3S1E04J006 | 110 | U | Camp | 17.8 | 327.8 | 19.6 | 326.0 | 21.5 | 324.1 | -1.8 | -1.9 | -3.7 |
| 3S1E04Q002 | 90 | U | Amador | 44.2 | 301.2 | 51.4 | 294.1 | 58.5 | 287.0 | -7.1 | -7.1 | -14.2 |
| 3S1E05K006 | 75 | U | Camp | 14.6 | 331.5 | 14.6 | 331.5 | 16.4 | 329.7 | 0.0 | -1.8 | -1.8 |
| 3S1E05K007 | 150 | L | Camp | 19.9 | 326.3 | 21.4 | 324.8 | 24.8 | 321.4 | -1.6 | -3.4 | -4.9 |
| 3S1E05L003 | 40 | U | Camp | 13.0 | 326.5 | 13.0 | 326.5 | 13.7 | 325.8 | 0.0 | -0.7 | -0.7 |
| 3S1E05P006 | 35 | U | Camp | 11.7 | 324.9 | 12.1 | 324.5 | 13.6 | 323.1 | -0.4 | -1.5 | -1.8 |
| 3S1E06F003 | 36 | U | Dublin | 5.2 | 324.6 | 4.9 | 324.9 | 6.0 | 323.8 | 0.4 | -1.1 | -0.8 |
| 3S1E06G005 | 200 | L | Dublin | 8.4 | 323.8 | 9.0 | 323.2 | 10.8 | 321.4 | -0.6 | -1.8 | -2.4 |
| 3S1E06N002 | 67 | U | Dublin | 13.4 | 321.8 | 13.4 | 321.8 | 14.7 | 320.5 | 0.0 | -1.3 | -1.3 |
| 3S1E07B002 | 152 | L | Dublin | 9.2 | 318.5 | 9.9 | 317.9 | 11.9 | 315.9 | -0.6 | -2.0 | -2.6 |
| 3S1E07B012 | 70 | U | Dublin | 11.7 | 316.1 | 12.2 | 315.6 | 14.5 | 313.3 | -0.5 | -2.3 | -2.8 |
| 3S1E07G007 | 55 | U | Dublin | 13.2 | 314.1 | 14.4 | 312.9 | 17.2 | 310.2 | -1.2 | -2.7 | -3.9 |
| 3S1E07J005 | 50 | U | Dublin | 15.8 | 311.0 | 17.1 | 309.7 | 29.1 | 297.7 | -1.3 | -12.0 | -13.3 |
| 3S1E08B001 | 148 | U | Amador | 43.4 | 294.9 | 48.7 | 289.6 | 52.7 | 285.6 | -5.3 | -4.0 | -9.4 |
| 3S1E08G004 | 85 | U | Amador | 46.2 | 295.3 | 51.8 | 289.7 | 59.6 | 281.9 | -5.5 | -7.9 | -13.4 |
| 3S1E08H009 | 240 | L | Amador | 75.4 | 263.1 | 69.6 | 269.0 | 87.1 | 251.5 | 5.9 | -17.5 | -11.7 |
| 3S1E08H010 | 440 | L | Amador | 97.7 | 241.5 | 76.5 | 262.7 | 110.6 | 228.7 | 21.2 | -34.1 | -12.9 |
| 3S1E08H011 | 720 | D | Amador | 89.8 | 249.5 | 113.8 | 225.5 | 142.9 | 196.3 | -24.0 | -29.1 | -53.1 |
| 3S1E08H013 | 800 | D | Amador | 89.0 | 250.0 | 108.1 | 230.8 | 137.4 | 201.6 | -19.2 | -29.2 | -48.4 |
| 3S1E08H018 | 745 | L | Amador | 94.0 | 247.9 | NM | NM | NM | NM | - | - | - |
| 3S1E08K001 | 99 | U | Amador | 44.6 | 287.8 | 53.4 | 278.9 | 71.0 | 261.4 | -8.8 | -17.6 | -26.4 |
| 3S1E08N001 | 72 | U | Bernal | 33.3 | 290.4 | 41.2 | 282.5 | 62.7 | 261.0 | -7.9 | -21.5 | -29.4 |
| 3S1E09H010 | 145 | U | Amador | 53.7 | 299.2 | 61.3 | 291.6 | 70.1 | 282.8 | -7.6 | -8.8 | -16.4 |
| 3S1E09H011 | 190 | L | Amador | 69.8 | 283.3 | 72.6 | 280.5 | 85.1 | 268.0 | -2.8 | -12.5 | -15.3 |
| 3S1E09H013 | 145 | U | Amador | NA | NA | 64.4 | 289.6 | 72.6 | 281.4 | - | -8.2 | - |
| 3S1E09J007 | 145 | U | Amador | 60.0 | 297.4 | 66.9 | 290.4 | 75.7 | 281.7 | -6.9 | -8.7 | -15.7 |
| 3S1E09J008 | 305 | L | Amador | 86.6 | 270.9 | 85.0 | 272.6 | 100.9 | 256.7 | 1.7 | -15.9 | -14.3 |
| 3S1E09J009 | 505 | L | Amador | 110.5 | 247.2 | 105.0 | 252.6 | 126.4 | 231.3 | 5.4 | -21.3 | -15.9 |
| 3S1E09M002 | 530 | L | Amador | 75.0 | 269.0 | 75.0 | 269.0 | NM | NM | 0.0 | - | - |

U = Upper; L = Lower; NM = Not Measured; NA = Not Available; OBS = Obstructed; - = Not Applicable
Highlighted = Representative Monitoring Site
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# TABLE 5-3
# SEMIANNUAL GROUNDWATER LEVELS
# (Feet above Mean Sea Level, NAVD88)
# FALL 2020 TO FALL 2021

| | | | | Fall 2020 | | Spring 2021 | | Fall 2021 | | Change in Elevation (ft) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Seasonal | | Annual |
| Well Number | Well Depth | Aquifer | Subarea | Depth to Water | GW Elev | Depth to Water (ft) | GW Elev | Depth to Water (ft) | GW Elev | Fall 20 to Spring 21 | Spring 21 to Fall 21 | Fall 20 to Fall 21 |
| 1S4E31P005 | 24 | U | Tracy | 18.5 | 41.5 | 19.0 | 41.0 | 18.5 | 41.5 | -0.5 | 0.6 | 0.1 |
| 2S1E32E001 | 70 | U | None | 37.7 | 354.9 | 39.1 | 353.5 | 40.6 | 352.0 | -1.4 | -1.5 | -2.9 |
| 2S1E32N001 | 44 | U | Camp | 19.2 | 341.6 | 19.5 | 341.3 | 20.2 | 340.6 | -0.3 | -0.7 | -1.0 |
| 2S1E32Q001 | 45 | U | Camp | 28.0 | 339.6 | 28.6 | 338.9 | 29.9 | 337.7 | -0.7 | -1.2 | -1.9 |
| 2S1E33L001 | 80 | U | None | 52.0 | 337.5 | 53.8 | 335.6 | 55.1 | 334.4 | -1.8 | -1.3 | -3.1 |
| 2S1E33P002 | 55 | U | Camp | 32.9 | 337.2 | 34.4 | 335.7 | 35.7 | 334.4 | -1.5 | -1.3 | -2.8 |
| 3S1E09M003 | 575 | L | Amador | 106.4 | 241.1 | 81.3 | 266.2 | 100.5 | 247.0 | 25.1 | -19.2 | 5.9 |
| 3S1E09M004 | 498 | L | Amador | NA | NA | NA | NA | NA | NA | - | - | - |
| 3S1E09P005 | 105 | U | Amador | 54.9 | 294.5 | 61.7 | 287.7 | 71.2 | 278.2 | -6.8 | -9.6 | -16.3 |
| 3S1E09P009 | 210 | L | Amador | 64.6 | 285.0 | 69.1 | 280.5 | 82.3 | 267.3 | -4.5 | -13.2 | -17.7 |
| 3S1E09P010 | 310 | L | Amador | 78.8 | 270.7 | 78.3 | 271.3 | 95.2 | 254.3 | 0.6 | -17.0 | -16.4 |
| 3S1E09P011 | 425 | L | Amador | 100.5 | 249.0 | 93.4 | 256.1 | 118.0 | 231.4 | 7.1 | -24.7 | -17.5 |
| 3S1E10A002 | 88 | U | Amador | 53.4 | 313.9 | 59.0 | 308.3 | 65.4 | 302.0 | -5.6 | -6.4 | -12.0 |
| 3S1E10B008 | 200 | L | Amador | 62.8 | 290.9 | 66.6 | 287.0 | 78.1 | 275.5 | -3.8 | -11.5 | -15.3 |
| 3S1E10B009 | 294 | L | Amador | 81.6 | 271.9 | 80.4 | 273.1 | 94.2 | 259.3 | 1.2 | -13.7 | -12.6 |
| 3S1E10B010 | 600 | L | Amador | 107.1 | 246.4 | 103.3 | 250.2 | 119.3 | 234.3 | 3.8 | -15.9 | -12.2 |
| 3S1E10B011 | 810 | D | Amador | 106.7 | 246.8 | 114.2 | 239.3 | 134.4 | 219.2 | -7.5 | -20.2 | -27.7 |
| 3S1E10B014 | 690 | L | Amador | 112.3 | 243.3 | 112.8 | 242.8 | 125.7 | 229.9 | -0.5 | -12.9 | -13.4 |
| 3S1E10D002 | 212 | L | Amador | 67.3 | 282.0 | 69.2 | 280.1 | 82.0 | 267.4 | -1.9 | -12.7 | -14.7 |
| 3S1E10D003 | 322 | L | Amador | 79.6 | 269.7 | 76.6 | 272.7 | 92.4 | 256.9 | 3.0 | -15.7 | -12.8 |
| 3S1E10D004 | 616 | L | Amador | 104.8 | 244.5 | 90.5 | 258.8 | 114.9 | 234.4 | 14.3 | -24.4 | -10.1 |
| 3S1E10D005 | 790 | D | Amador | 107.6 | 241.7 | 104.2 | 245.1 | NM | NM | 3.4 | - | - |
| 3S1E10D007 | 145 | U | Amador | 58.1 | 302.9 | 65.6 | 295.5 | 74.7 | 286.3 | -7.4 | -9.2 | -16.6 |
| 3S1E10D008 | 215 | L | Amador | 77.8 | 283.2 | 80.6 | 280.4 | 93.2 | 267.8 | -2.8 | -12.7 | -15.4 |
| 3S1E10K002 | 591 | L | Amador | 88.0 | 270.7 | 86.8 | 271.9 | 100.9 | 257.8 | 1.3 | -14.1 | -12.8 |
| 3S1E10N002 | 195 | U | Amador | 57.8 | 300.1 | 65.5 | 292.4 | 74.9 | 283.0 | -7.7 | -9.4 | -17.1 |
| 3S1E10N003 | 195 | L | Amador | 73.3 | 284.7 | 76.7 | 281.3 | 89.6 | 268.4 | -3.4 | -12.9 | -16.3 |
| 3S1E11B001 | 43 | U | Amador | 32.5 | 336.9 | 42.0 | 327.4 | 35.7 | 333.6 | -9.6 | 6.3 | -3.3 |
| 3S1E11C003 | 55 | U | Amador | 31.7 | 333.1 | 32.0 | 332.8 | 33.2 | 331.6 | -0.3 | -1.2 | -1.4 |
| 3S1E11G001 | 120 | U | Amador | 65.3 | 306.4 | 68.7 | 302.9 | 77.8 | 293.8 | -3.5 | -9.1 | -12.6 |
| 3S1E11G002 | 350 | L | Amador | 122.1 | 249.5 | 112.0 | 259.7 | 122.1 | 249.5 | 10.2 | -10.1 | 0.0 |
| 3S1E11G003 | 590 | L | Amador | 127.3 | 244.3 | 123.2 | 248.5 | 135.7 | 235.9 | 4.1 | -12.5 | -8.4 |
| 3S1E11G004 | 790 | D | Amador | 122.6 | 249.1 | NA | NA | 151.5 | 220.2 | - | - | -28.9 |
| 3S1E11M002 | 700 | L | Amador | 107.4 | 258.6 | 104.6 | 261.3 | 110.4 | 255.5 | 2.7 | -5.8 | -3.1 |
| 3S1E11P006 | 400 | L | Amador | 123.1 | 253.6 | 116.9 | 259.8 | 127.7 | 249.0 | 6.2 | -10.8 | -4.6 |
| 3S1E12A002 | 69 | U | Amador | 36.5 | 364.9 | NA | NA | 45.4 | 356.0 | - | - | -8.9 |
| 3S1E12D002 | 45 | U | Amador | 35.0 | 349.5 | NA | NA | 39.0 | 345.5 | - | - | -4.0 |
| 3S1E12G001 | 73 | U | Amador | 58.5 | 346.0 | 62.6 | 341.9 | 65.6 | 338.8 | -4.1 | -3.1 | -7.1 |
| 3S1E12H004 | 270 | L | Amador | 153.9 | 253.9 | 146.5 | 261.2 | 157.3 | 250.4 | 7.4 | -10.8 | -3.4 |
| 3S1E12H005 | 400 | L | Amador | 156.1 | 251.7 | 159.5 | 248.3 | 179.0 | 228.8 | -3.4 | -19.5 | -22.9 |
| 3S1E12H006 | 480 | L | Amador | 154.5 | 253.3 | 161.7 | 246.0 | 181.7 | 226.0 | -7.3 | -20.0 | -27.3 |
| 3S1E12H007 | 684 | D | Amador | 139.3 | 268.4 | 182.0 | 225.7 | 191.9 | 215.8 | -42.7 | -9.9 | -52.6 |
| 3S1E12K002 | 300 | L | Amador | 157.7 | 248.6 | 147.9 | 258.4 | 153.1 | 253.2 | 9.9 | -5.3 | 4.6 |
| 3S1E12K003 | 475 | L | Amador | 152.5 | 254.4 | 154.9 | 252.0 | 171.4 | 235.4 | -2.4 | -16.5 | -18.9 |
| 3S1E12K004 | 575 | D | Amador | 147.1 | 259.7 | 156.1 | 250.6 | 180.2 | 226.5 | -9.1 | -24.1 | -33.2 |
| 3S1E13P005 | 135 | U | Amador | NA | NA | 105.6 | 288.5 | 110.7 | 283.0 | - | -5.5 | - |
| 3S1E13P006 | 255 | L | Amador | NA | NA | 137.7 | 256.5 | 150.4 | 243.3 | - | -13.2 | - |
| 3S1E13P007 | 375 | L | Amador | NA | NA | 133.0 | 261.2 | 152.8 | 240.7 | - | -20.5 | - |
| 3S1E13P008 | 605 | L | Amador | NA | NA | 148.8 | 245.3 | 166.6 | 227.0 | - | -18.3 | - |
| 3S1E14B001 | 435 | L | Amador | 132.3 | 251.9 | 125.7 | 258.5 | 140.0 | 244.2 | 6.6 | -14.3 | -7.7 |
| 3S1E14D002 | 740 | L | Amador | 96.8 | 275.0 | 99.6 | 272.2 | 112.1 | 259.7 | -2.8 | -12.5 | -15.3 |
| 3S1E15F003 | 625 | L | Amador | 100.3 | 268.7 | 108.0 | 261.0 | 136.4 | 232.6 | -7.7 | -28.4 | -36.1 |
| 3S1E15J003 | 196 | L | Amador | 89.3 | 255.3 | 89.0 | 255.6 | 113.5 | 231.1 | 0.3 | -24.5 | -24.2 |
| 3S1E15M003 | 600 | L | Amador | 106.7 | 256.2 | NA | NA | NA | NA | - | - | - |
| 3S1E16A004 | 603 | L | Amador | 111.2 | 248.2 | 104.5 | 254.8 | 127.5 | 231.9 | 6.7 | -22.9 | -16.3 |
| 3S1E16B001 | 805 | D | Amador | 113.9 | 241.9 | 112.2 | 243.6 | 137.9 | 217.9 | 1.7 | -25.7 | -24.0 |
| 3S1E16C002 | 190 | L | Amador | 74.0 | 270.4 | 73.2 | 271.1 | 91.8 | 252.6 | 0.7 | -18.6 | -17.9 |
| 3S1E16C003 | 305 | L | Amador | 96.3 | 248.0 | 88.0 | 256.3 | 113.3 | 231.0 | 8.3 | -25.3 | -17.0 |
| 3S1E16C004 | 375 | L | Amador | 100.2 | 244.0 | 95.6 | 248.6 | 123.9 | 220.3 | 4.6 | -28.3 | -23.7 |
| 3S1E16E004 | 105 | U | Amador | 55.9 | 295.8 | 62.6 | 289.1 | 84.0 | 267.7 | -6.7 | -21.5 | -28.2 |
| 3S1E16L002 | 151 | L | Amador | 56.5 | 289.8 | 69.8 | 276.5 | 89.7 | 256.6 | -13.3 | -19.9 | -33.2 |
| 3S1E16P005 | 75 | U | Amador | 57.1 | 297.5 | 39.0 | 315.5 | 69.6 | 284.9 | 18.0 | -30.6 | -12.6 |
| 3S1E16R001 | 239 | L | Amador | 92.3 | 270.2 | 92.4 | 270.1 | 125.6 | 236.9 | -0.1 | -33.2 | -33.3 |
| 3S1E17B004 | 248 | L | Amador | 50.0 | 287.7 | 66.5 | 271.2 | 86.2 | 251.5 | -16.5 | -19.7 | -36.2 |
| 3S1E17D003 | 108 | L | Bernal | 41.1 | 284.0 | 56.7 | 268.4 | 72.9 | 252.2 | -15.6 | -16.2 | -31.8 |
| 3S1E17D004 | 236 | L | Bernal | 43.0 | 282.1 | 65.3 | 259.8 | 78.6 | 246.5 | -22.3 | -13.3 | -35.6 |
| 3S1E17D005 | 308 | L | Bernal | 43.0 | 282.1 | 62.4 | 262.8 | 75.5 | 249.6 | -19.4 | -13.2 | -32.6 |
| 3S1E17D006 | 408 | L | Bernal | 29.0 | 296.1 | 51.9 | 273.2 | 66.2 | 259.0 | -22.9 | -14.3 | -37.2 |
| 3S1E17D007 | 684 | D | Bernal | 19.6 | 305.5 | 19.5 | 305.6 | 21.1 | 304.1 | 0.1 | -1.5 | -1.4 |
| 3S1E17D010 | 425 | L | Bernal | 45.3 | 282.8 | 63.8 | 264.3 | 77.2 | 251.0 | -18.5 | -13.4 | -31.8 |
| 3S1E17D011 | 603 | L | Bernal | 34.7 | 290.1 | 48.7 | 276.2 | 63.5 | 261.4 | -13.9 | -14.8 | -28.7 |

U = Upper; L = Lower; NM = Not Measured; NA = Not Available; OBS = Obstructed; - = Not Applicable
Highlighted = Representative Monitoring Site
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# TABLE 5-3
# SEMIANNUAL GROUNDWATER LEVELS
# (Feet above Mean Sea Level, NAVD88)
# FALL 2020 TO FALL 2021

| | | | | Fall 2020 | | Spring 2021 | | Fall 2021 | | Change in Elevation (ft) | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Seasonal | | Annual |
| Well Number | Well Depth | Aquifer | Subarea | Depth to Water | GW Elev | Depth to Water (ft) | GW Elev | Depth to Water (ft) | GW Elev | Fall 20 to Spring 21 | Spring 21 to Fall 21 | Fall 20 to Fall 21 |
| 1S4E31P005 | 24 | U | Tracy | 18.5 | 41.5 | 19.0 | 41.0 | 18.5 | 41.5 | -0.5 | 0.6 | 0.1 |
| 2S1E32E001 | 70 | U | None | 37.7 | 354.9 | 39.1 | 353.5 | 40.6 | 352.0 | -1.4 | -1.5 | -2.9 |
| 2S1E32N001 | 44 | U | Camp | 19.2 | 341.6 | 19.5 | 341.3 | 20.2 | 340.6 | -0.3 | -0.7 | -1.0 |
| 2S1E32Q001 | 45 | U | Camp | 28.0 | 339.6 | 28.6 | 338.9 | 29.9 | 337.7 | -0.7 | -1.2 | -1.9 |
| 2S1E33L001 | 80 | U | None | 52.0 | 337.5 | 53.8 | 335.6 | 55.1 | 334.4 | -1.8 | -1.3 | -3.1 |
| 2S1E33P002 | 55 | U | Camp | 32.9 | 337.2 | 34.4 | 335.7 | 35.7 | 334.4 | -1.5 | -1.3 | -2.8 |
| 3S1E18A005 | 454 | L | Bernal | 39.2 | 288.1 | 63.9 | 263.4 | 76.9 | 250.4 | -24.7 | -13.0 | -37.7 |
| 3S1E18E004 | 83 | U | Bernal | 30.3 | 290.0 | 38.4 | 281.9 | 52.8 | 267.4 | -8.1 | -14.4 | -22.5 |
| 3S1E18J002 | 71 | U | Bernal | 32.7 | 290.3 | 42.3 | 280.7 | 57.4 | 265.7 | -9.6 | -15.0 | -24.7 |
| 3S1E19A010 | 331 | L | Bernal | 50.7 | 286.3 | NM | NM | 80.9 | 256.1 | - | - | -30.2 |
| 3S1E19A011 | 330 | L | Bernal | 44.7 | 289.5 | 56.7 | 277.6 | NM | NM | -11.9 | - | - |
| 3S1E19C004 | 78 | U | Bernal | 31.4 | 290.9 | 40.8 | 281.5 | 56.6 | 265.7 | -9.4 | -15.8 | -25.2 |
| 3S1E19K001 | 58 | U | Bernal | 33.4 | 288.2 | 44.6 | 276.9 | Dry | Dry | -11.2 | - | - |
| 3S1E20C003 | 110 | L | Bernal | 48.7 | 289.9 | 57.8 | 280.8 | 74.9 | 263.7 | -9.1 | -17.1 | -26.2 |
| 3S1E20C007 | 153 | U | Bernal | 48.5 | 290.1 | 57.1 | 281.6 | 74.1 | 264.6 | -8.6 | -17.0 | -25.5 |
| 3S1E20C008 | 315 | L | Bernal | 52.2 | 286.5 | 69.3 | 269.4 | 88.1 | 250.5 | -17.0 | -18.9 | -35.9 |
| 3S1E20C009 | 515 | L | Bernal | 51.8 | 287.0 | 64.0 | 274.8 | 82.8 | 256.0 | -12.2 | -18.8 | -31.0 |
| 3S1E20J004 | 72 | U | Bernal | 38.3 | 293.3 | 46.6 | 285.0 | 64.7 | 266.9 | -8.3 | -18.1 | -26.4 |
| 3S1E20M011 | 71 | U | Bernal | 32.1 | 293.6 | 41.4 | 284.3 | 58.7 | 267.0 | -9.3 | -17.3 | -26.6 |
| 3S1E20Q002 | 65 | U | Bernal | 21.8 | 304.1 | 22.4 | 303.4 | 24.6 | 301.2 | -0.6 | -2.2 | -2.8 |
| 3S1E22D002 | 72 | U | Amador | 56.7 | 311.4 | 59.7 | 308.4 | 63.9 | 304.2 | -3.0 | -4.2 | -7.2 |
| 3S1E23J001 | 120 | L | Amador | 93.8 | 334.4 | 96.7 | 331.5 | 83.9 | 344.3 | -2.9 | 12.8 | 9.9 |
| 3S1E24Q001 | 440 | L | Amador | 100.3 | 327.2 | 108.9 | 318.6 | 120.9 | 306.6 | -8.6 | -12.0 | -20.6 |
| 3S1E25C003 | 146 | U | Amador | 92.4 | 361.8 | 96.9 | 357.3 | 99.5 | 354.7 | -4.5 | -2.6 | -7.1 |
| 3S1E28M002 | 141 | U | Upland | NA | NA | 18.5 | 371.5 | 30.3 | 359.7 | - | -11.8 | - |
| 3S1E29M004 | 57 | U | Castle | 22.6 | 288.3 | 30.9 | 280.1 | 41.5 | 269.5 | -8.2 | -10.6 | -18.8 |
| 3S1E29P002 | 42 | U | Bernal | 28.0 | 274.9 | 28.4 | 274.5 | 30.4 | 272.4 | -0.4 | -2.1 | -2.5 |
| 3S1E33G005 | 35 | U | Upland | NA | NA | 12.7 | 395.9 | 13.7 | 394.9 | - | -1.0 | - |
| 3S1W01B009 | 162 | L | Dublin | 9.1 | 324.4 | 9.4 | 324.2 | 11.1 | 322.5 | -0.2 | -1.7 | -1.9 |
| 3S1W01B010 | 414 | L | Dublin | 4.0 | 329.6 | 4.8 | 328.8 | 7.1 | 326.5 | -0.8 | -2.3 | -3.1 |
| 3S1W01B011 | 560 | L | Dublin | 12.8 | 320.9 | 11.2 | 322.6 | 18.2 | 315.5 | 1.7 | -7.1 | -5.4 |
| 3S1W02A002 | 47 | U | Dublin | 27.7 | 341.7 | 26.0 | 343.4 | 28.2 | 341.2 | 1.7 | -2.2 | -0.5 |
| 3S1W12B002 | 40 | U | Dublin | 21.7 | 321.2 | 20.6 | 322.3 | 22.2 | 320.7 | 1.1 | -1.5 | -0.5 |
| 3S1W12J001 | 62 | U | Dublin | 17.4 | 312.0 | 19.4 | 310.0 | 23.9 | 305.4 | -2.0 | -4.5 | -6.5 |
| 3S1W13J001 | 48 | U | Castle | 30.8 | 313.2 | 29.8 | 314.1 | 30.7 | 313.2 | 1.0 | -0.9 | 0.1 |
| 3S2E01F002 | 69 | U | Spring | 23.8 | 549.2 | 23.9 | 549.1 | 24.8 | 548.2 | -0.1 | -0.9 | -1.0 |
| 3S2E02B002 | 46 | U | Spring | 10.4 | 529.1 | 9.8 | 529.7 | 11.0 | 528.5 | 0.6 | -1.2 | -0.6 |
| 3S2E03A001 | 54 | U | Spring | 5.9 | 511.8 | 4.8 | 512.9 | 6.3 | 511.3 | 1.1 | -1.6 | -0.5 |
| 3S2E03K003 | 60 | U | Mocho I | 14.0 | 508.8 | 14.0 | 508.8 | 14.3 | 508.6 | 0.0 | -0.2 | -0.3 |
| 3S2E05N001 | 210 | M | Mocho II | 34.1 | 410.0 | 35.7 | 408.3 | 37.2 | 406.9 | -1.6 | -1.5 | -3.1 |
| 3S2E07C002 | 49 | U | Mocho II | 27.2 | 393.6 | 28.4 | 392.5 | 30.1 | 390.7 | -1.1 | -1.8 | -2.9 |
| 3S2E07H002 | 54 | U | Mocho II | 32.3 | 410.6 | 33.6 | 409.3 | 36.8 | 406.1 | -1.3 | -3.2 | -4.5 |
| 3S2E07N002 | 162 | U | Amador | 135.5 | 286.5 | 135.0 | 287.0 | 148.8 | 273.3 | 0.5 | -13.8 | -13.3 |
| 3S2E07P003 | 510 | L | Amador | 166.0 | 265.5 | NA | NA | NA | NA | - | - | - |
| 3S2E07R002 | 805 | D | Mocho II | 4.0 | 442.0 | 4.0 | 442.0 | 4.4 | 441.6 | 0.0 | -0.4 | -0.4 |
| 3S2E07R003 | 583 | L | Upland | NA | NA | 45.6 | 400.4 | 36.6 | 409.4 | - | 9.0 | - |
| 3S2E08H002 | 46 | U | Mocho II | 36.5 | 433.1 | 36.8 | 432.9 | 41.1 | 428.5 | -0.2 | -4.4 | -4.6 |
| 3S2E08H003 | 195 | L | Mocho II | 56.1 | 421.2 | 57.5 | 419.8 | 60.9 | 416.3 | -1.4 | -3.4 | -4.8 |
| 3S2E08H004 | 385 | L | Mocho II | 78.2 | 398.8 | 80.1 | 396.9 | 61.0 | 416.0 | -1.9 | 19.1 | 17.2 |
| 3S2E08K002 | 74 | U | Mocho II | 41.3 | 423.5 | 43.2 | 421.6 | 47.4 | 417.4 | -1.9 | -4.2 | -6.1 |
| 3S2E08N002 | 526 | L | Mocho II | 99.0 | 354.6 | 42.7 | 410.9 | NA | NA | 56.3 | - | - |
| 3S2E08P001 | 273 | L | Mocho II | 48.5 | 419.7 | 50.0 | 418.2 | 54.5 | 413.7 | -1.5 | -4.5 | -6.0 |
| 3S2E08Q009 | 114 | L | Mocho II | 36.1 | 428.6 | 38.2 | 426.6 | 42.5 | 422.2 | -2.1 | -4.4 | -6.4 |
| 3S2E09Q004 | 80 | U | Mocho II | 36.0 | 468.5 | 39.5 | 465.0 | 44.5 | 460.1 | -3.6 | -4.9 | -8.5 |
| 3S2E10F003 | 45 | U | Mocho I | 14.7 | 520.2 | 14.9 | 519.9 | 15.6 | 519.2 | -0.3 | -0.7 | -1.0 |
| 3S2E10Q001 | 44 | U | Mocho II | 28.7 | 526.7 | 28.6 | 526.7 | 29.9 | 525.5 | 0.0 | -1.2 | -1.2 |
| 3S2E10Q002 | 325 | L | Mocho II | 34.0 | 515.4 | NA | NA | NA | NA | - | - | - |
| 3S2E11C001 | 66 | U | Mocho I | 28.4 | 528.7 | 29.0 | 528.1 | 29.7 | 527.4 | -0.6 | -0.7 | -1.3 |
| 3S2E12C004 | 108 | U | Spring | 55.1 | 536.4 | 55.2 | 536.3 | 56.0 | 535.5 | -0.1 | -0.8 | -0.9 |
| 3S2E12J003 | 160 | L | Spring | 82.1 | 546.7 | NA | NA | 84.0 | 547.1 | - | - | 0.3 |
| 3S2E14A003 | 110 | U | Mocho I | NA | NA | NA | NA | 73.7 | 528.5 | - | - | - |
| 3S2E14B001 | 300 | L | Mocho I | 65.0 | 528.3 | 65.9 | 527.5 | 66.6 | 526.8 | -0.9 | -0.7 | -1.6 |
| 3S2E15E002 | 192 | L | Mocho II | 55.2 | 494.5 | 56.1 | 493.6 | 61.8 | 487.9 | -0.9 | -5.7 | -6.6 |
| 3S2E15L001 | 41 | U | Mocho II | 39.3 | 522.2 | 39.6 | 521.9 | NA | NA | -0.2 | - | - |
| 3S2E15L002 | 71 | U | Mocho II | NA | NA | NA | NA | 47.5 | 513.3 | - | - | - |
| 3S2E15M002 | 45 | U | Mocho II | 45.2 | 504.2 | 45.3 | 504.2 | NA | NA | 0.0 | - | - |
| 3S2E15M003 | 76 | U | Mocho II | NA | NA | NA | NA | 55.5 | 492.9 | - | - | - |
| 3S2E15Q006 | 301 | L | Mocho II | 59.3 | 518.3 | 56.4 | 521.2 | 64.4 | 513.2 | 2.9 | -8.0 | -5.1 |
| 3S2E15Q008 | 41 | U | Mocho II | NA | NA | NA | NA | 33.8 | 550.6 | - | - | - |
| 3S2E15R017 | 63 | U | Mocho II | 12.8 | 579.6 | 9.9 | 582.6 | 13.2 | 579.3 | 2.9 | -3.3 | -0.4 |
| 3S2E15R018 | 138 | L | Mocho II | 26.2 | 566.3 | 17.8 | 574.6 | 26.4 | 566.1 | 8.4 | -8.5 | -0.2 |

U = Upper; L = Lower; NM = Not Measured; NA = Not Available; OBS = Obstructed; - = Not Applicable
Highlighted = Representative Monitoring Site
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# TABLE 5-3
# SEMIANNUAL GROUNDWATER LEVELS
# (Feet above Mean Sea Level, NAVD88)
# FALL 2020 TO FALL 2021

| Well Number | Well Depth | Aquifer | Subarea | Fall 2020 Depth to Water | Fall 2020 GW Elev | Spring 2021 Depth to Water (ft) | Spring 2021 GW Elev | Fall 2021 Depth to Water (ft) | Fall 2021 GW Elev | Change in Elevation (ft) Seasonal Fall 20 to Spring 21 | Change in Elevation (ft) Seasonal Spring 21 to Fall 21 | Change in Elevation (ft) Annual Fall 20 to Fall 21 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1S4E31P005 | 24 | U | Tracy | 18.5 | 41.5 | 19.0 | 41.0 | 18.5 | 41.5 | -0.5 | 0.6 | 0.1 |
| 2S1E32E001 | 70 | U | None | 37.7 | 354.9 | 39.1 | 353.5 | 40.6 | 352.0 | -1.4 | -1.5 | -2.9 |
| 2S1E32N001 | 44 | U | Camp | 19.2 | 341.6 | 19.5 | 341.3 | 20.2 | 340.6 | -0.3 | -0.7 | -1.0 |
| 2S1E32Q001 | 45 | U | Camp | 28.0 | 339.6 | 28.6 | 338.9 | 29.9 | 337.7 | -0.7 | -1.2 | -1.9 |
| 2S1E33L001 | 80 | U | None | 52.0 | 337.5 | 53.8 | 335.6 | 55.1 | 334.4 | -1.8 | -1.3 | -3.1 |
| 2S1E33P002 | 55 | U | Camp | 32.9 | 337.2 | 34.4 | 335.7 | 35.7 | 334.4 | -1.5 | -1.3 | -2.8 |
| 3S2E15R020 | 51 | U | Mocho II | NA | NA | NA | NA | 19.1 | 570.3 | - | - | - |
| 3S2E16A003 | 240 | L | Mocho II | 77.4 | 449.7 | 49.4 | 477.7 | 55.3 | 471.8 | 28.0 | -5.9 | 22.1 |
| 3S2E16C001 | 584 | L | Mocho II | 71.5 | 439.5 | NM | NM | NA | NA | - | - | - |
| 3S2E16E004 | 45 | U | Mocho II | 30.1 | 476.2 | 33.8 | 472.5 | 39.3 | 467.0 | -3.7 | -5.5 | -9.2 |
| 3S2E18B001 | 497 | L | Amador | NM | NM | 194.4 | 244.2 | 207.0 | 231.6 | - | -12.6 | - |
| 3S2E18E001 | 134 | U | Amador | 97.8 | 326.1 | 90.7 | 333.2 | 100.9 | 323.0 | 7.1 | -10.2 | -3.1 |
| 3S2E19D007 | 180 | U | Amador | 108.8 | 306.3 | 118.6 | 296.5 | 135.1 | 280.0 | -9.8 | -16.5 | -26.3 |
| 3S2E19D008 | 260 | L | Amador | 109.2 | 305.8 | 118.9 | 296.1 | 135.4 | 279.6 | -9.7 | -16.5 | -26.2 |
| 3S2E19D009 | 390 | L | Amador | 150.4 | 264.6 | 159.3 | 255.7 | 180.0 | 235.0 | -8.9 | -20.7 | -29.6 |
| 3S2E19D010 | 470 | L | Amador | 127.9 | 287.0 | 146.4 | 268.5 | 157.0 | 257.9 | -18.5 | -10.6 | -29.1 |
| 3S2E19N003 | 120 | U | Amador | 49.1 | 369.3 | 46.6 | 371.9 | 47.5 | 371.0 | 2.5 | -0.9 | 1.6 |
| 3S2E19N004 | 203 | L | Amador | 45.1 | 372.9 | 47.4 | 370.6 | 36.7 | 381.2 | -2.3 | 10.6 | 8.3 |
| 3S2E20M001 | 184 | L | Amador | 55.4 | 423.4 | 52.6 | 426.2 | 59.7 | 419.1 | 2.8 | -7.1 | -4.3 |
| 3S2E20R002 | 257 | U | Upland | NA | NA | 76.5 | 446.7 | 79.8 | 443.4 | - | -3.4 | - |
| 3S2E21K009 | 0 | U | Upland | NA | NA | 89.9 | 477.2 | 90.9 | 476.2 | - | -1.0 | - |
| 3S2E22B001 | 32 | U | Mocho II | Dry | Dry | 19.5 | 566.4 | Dry | Dry | - | - | - |
| 3S2E23E001 | 40 | U | Mocho II | 18.0 | 595.4 | 17.6 | 595.8 | 19.0 | 594.4 | 0.4 | -1.4 | -1.0 |
| 3S2E23E002 | 110 | L | Mocho II | 16.1 | 597.1 | 14.7 | 598.5 | 16.9 | 596.3 | 1.4 | -2.1 | -0.8 |
| 3S2E24A001 | 46 | U | Mocho I | 18.3 | 699.4 | 18.8 | 698.9 | 18.1 | 699.6 | -0.5 | 0.7 | 0.2 |
| 3S2E26J002 | 44 | U | Mocho II | 12.4 | 677.5 | 7.8 | 682.1 | 13.4 | 676.6 | 4.6 | -5.6 | -1.0 |
| 3S2E29F004 | 36 | U | Amador | 11.0 | 446.5 | 8.7 | 448.8 | 13.0 | 444.6 | 2.4 | -4.3 | -1.9 |
| 3S2E29L001 | 23 | U | Amador | NA | NA | 12.0 | 451.6 | 13.5 | 450.1 | - | -1.5 | - |
| 3S2E30C001 | 150 | L | Amador | 34.0 | 405.4 | 33.6 | 405.9 | 36.5 | 402.9 | 0.4 | -2.9 | -2.5 |
| 3S2E30D002 | 44 | U | Amador | 22.4 | 409.2 | 22.5 | 409.1 | 26.0 | 405.6 | -0.1 | -3.5 | -3.6 |
| 3S2E32E007 | 37 | U | Upland | 17.8 | 593.1 | 18.1 | 592.9 | 18.4 | 592.5 | -0.3 | -0.3 | -0.6 |
| 3S2E33C001 | 20 | U | Amador | 11.6 | 486.5 | 11.4 | 486.2 | 12.3 | 485.3 | -0.3 | -0.9 | -1.2 |
| 3S2E33G001 | 17 | U | Amador | 9.9 | 501.7 | 8.7 | 502.8 | 9.2 | 502.3 | 1.1 | -0.5 | 0.7 |
| 3S3E06Q003 | 30 | U | Altamont | 8.9 | 672.2 | 10.8 | 670.3 | 8.1 | 673.0 | -1.8 | 2.6 | 0.8 |
| 3S3E07D002 | 72 | U | Spring | NA | NA | NA | NA | 47.9 | 574.0 | - | - | - |
| 3S3E20L004 | 340 | U | Mocho I | NA | NA | 99.8 | 762.6 | 101.3 | 761.1 | - | -1.5 | - |
| 3S3E20R004 | 0 | U | Mocho I | NA | NA | 46.9 | 876.9 | 51.2 | 872.6 | - | -4.4 | - |
| 3S3E21C001 | 128 | U | Upland | NA | NA | 33.8 | 1033.5 | 34.1 | 1033.1 | - | -0.4 | - |
| 4S2E01A001 | 130 | U | Mocho II | NA | NA | 22.0 | 797.8 | 23.8 | 796.0 | - | -1.8 | - |
| 4S3E06E004 | 220 | U | Mocho II | NA | NA | 4.1 | 803.5 | 6.7 | 801.0 | - | -2.5 | - |

U = Upper; L = Lower; NM = Not Measured; NA = Not Available; OBS = Obstructed; - = Not Applicable
Highlighted = Representative Monitoring Site
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# TABLE 5-4
## GROUNDWATER ELEVATIONS AT REPRESENTATIVE MONITORING SITES
## FOR CHRONIC LOWERING OF GROUNDWATER ELEVATIONS
## 2021 WATER YEAR
## LIVERMORE VALLEY GROUNDWATER BASIN

| *RMS Well* | | *Management Area/Unit* | | | *2021 Water Year* | | | | | *SMCs for Groundwater Elevations* | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| *Well Name* | *Map* | *Area* | *Subarea* | *Aquifer* | *Season High* | *Season Low* | *Change from 2020** | *Height above MT* | *Height above MO* | *MT* | *IM-5* | *IM-10* | *IM-15* | *MO* |
| 3S1E20C007 | 20C7 | Main | Bernal | Upper | 288.5 | 264.6 | -25.5 | 119.8 | 85.1 | 144.8 | 153.4 | 162.1 | 170.8 | 179.5 |
| 3S1E20C008 | 20C8 | Main | Bernal | Lower | 284.6 | 250.5 | -35.9 | 105.8 | 71.1 | 144.8 | 153.4 | 162.1 | 170.8 | 179.5 |
| 3S1E09P005 | 9P5 | Main | Amador West | Upper | 291.8 | 278.2 | -16.3 | 98.4 | 71.5 | 179.8 | 186.5 | 193.2 | 199.9 | 206.7 |
| 3S1E09P010 | 9P10 | Main | Amador West | Lower | 279.9 | 254.3 | -16.4 | 74.5 | 47.6 | 179.8 | 186.5 | 193.2 | 199.9 | 206.7 |
| 3S1E11G001 | 11G1 | Main | Amador East | Upper | 305.3 | 293.8 | -12.6 | 112.8 | 73.9 | 181.0 | 190.7 | 200.4 | 210.2 | 219.9 |
| 3S1E12K003 | 12K3 | Main | Amador East | Lower | 265.6 | 235.4 | -18.9 | 54.4 | 15.5 | 181.0 | 190.7 | 200.4 | 210.2 | 219.9 |
| 3S2E08K002 | 8K2 | Main | Mocho II | Upper | 422.8 | 417.4 | -6.1 | 162.3 | 124.3 | 255.1 | 264.6 | 274.1 | 283.6 | 293.1 |
| 3S2E08H003 | 8H3 | Main | Mocho II | Lower | 420.6 | 416.3 | -4.8 | 161.2 | 123.2 | 255.1 | 264.6 | 274.1 | 283.6 | 293.1 |
| 3S1E06F003 | 6F3 | Fringe | Northwest | Upper | 325.4 | 323.8 | -0.8 | 18.9 | 9.2 | 305.0 | 307.4 | 309.8 | 312.2 | 314.6 |
| 2S2E34E001 | 34E1 | Fringe | Northeast | Upper | 495.3 | 493.5 | -0.4 | 5.3 | 2.3 | 488.2 | 489.0 | 489.7 | 490.5 | 491.2 |
| 3S2E24A001 | 24A1 | Fringe | East | Upper | 699.6 | 699.6 | 0.2 | 24.1 | 21.3 | 675.5 | 676.2 | 676.9 | 677.6 | 678.3 |
| 3S2E21K009 | 21K9 | Upland | Upland | Upper | 478.4 | 476.2 | NA | 6.1 | 6.1 | 470.1 | 470.1 | 470.1 | 470.1 | 470.1 |

RMS = Representative Monitoring Site
SMC = Sustainable Management Criteria
IM = Interim Milestone
MO = Measurable Objective
MT = Minimum Threshold
* = 2020 Seasonal Low minus 2021 Seasonal Low

| |
|---|
| Main |
| Fringe |
| Upland |

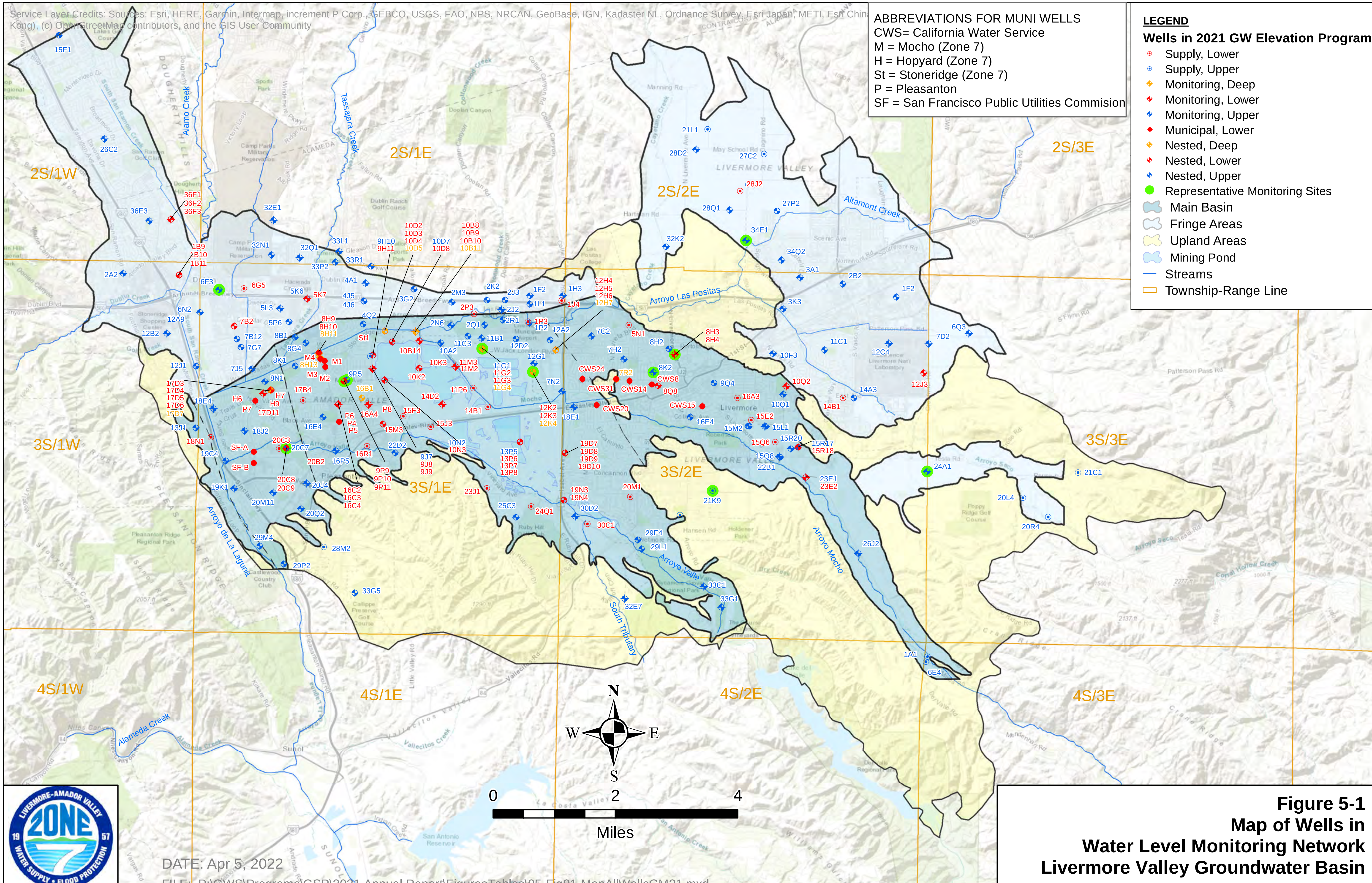



**Figure 5-1**
**Map of Wells in**
**Water Level Monitoring Network**
**Livermore Valley Groundwater Basin**

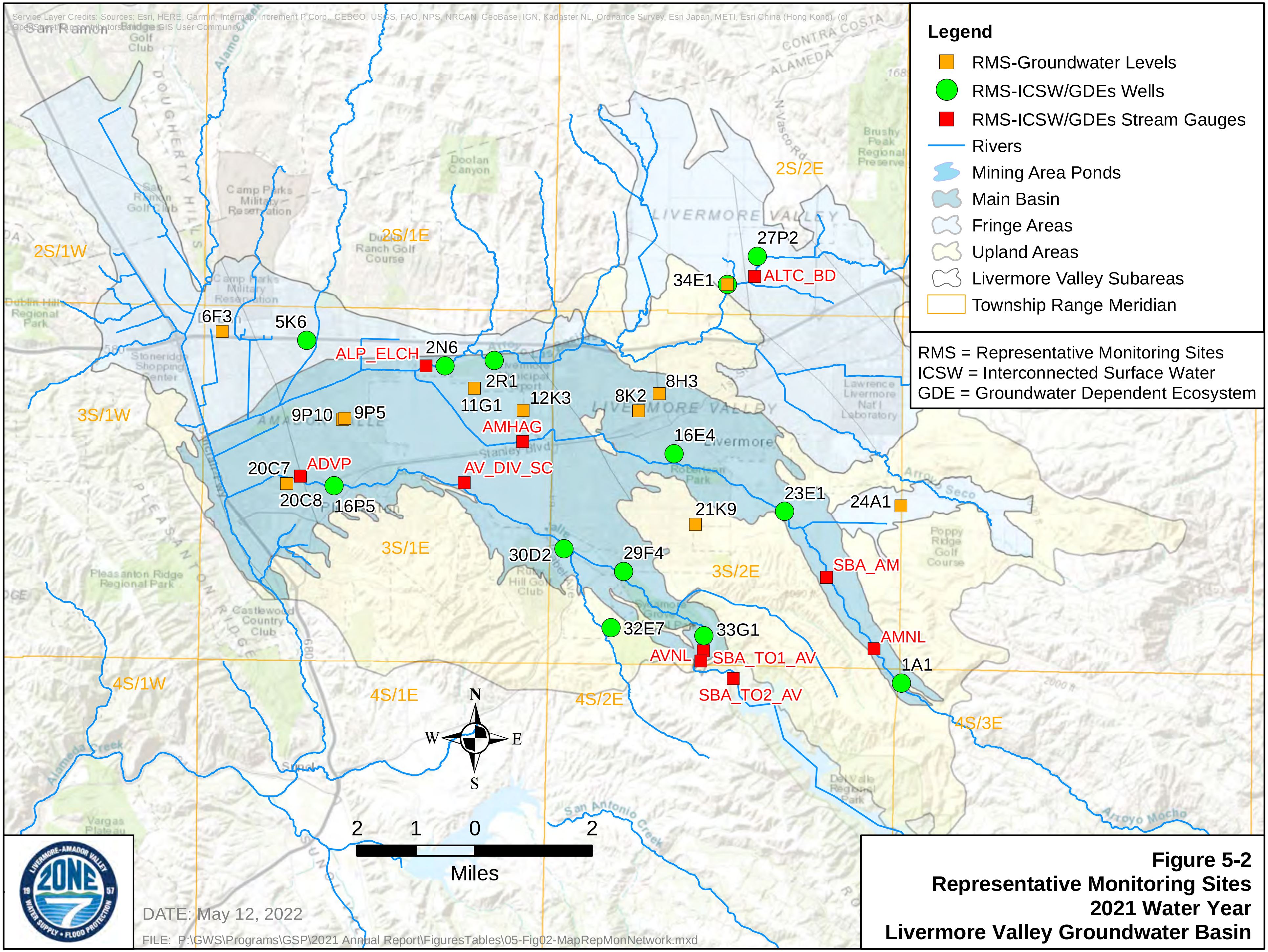



**Figure 5-2**
**Representative Monitoring Sites**
**2021 Water Year**
**Livermore Valley Groundwater Basin**

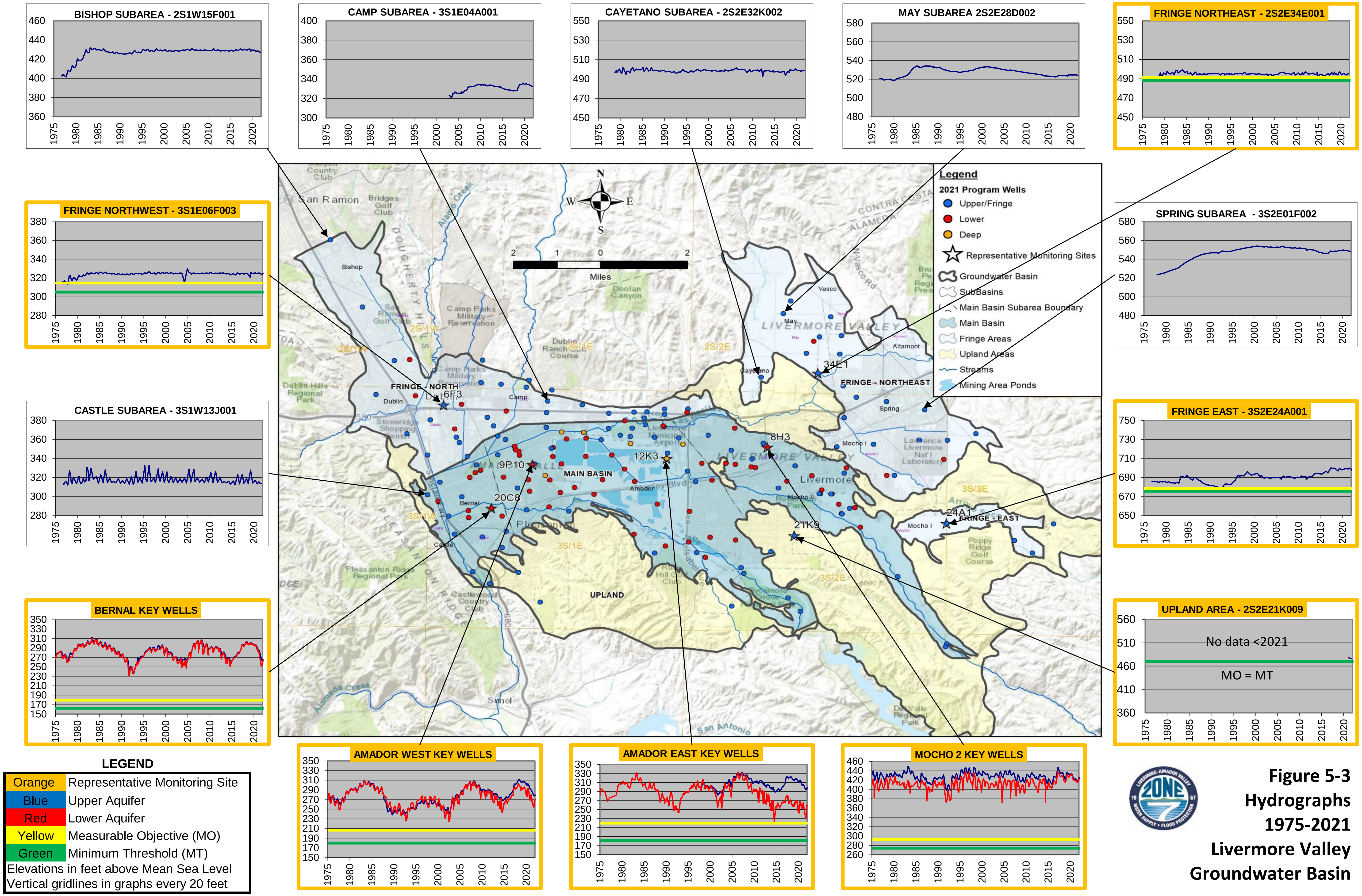



**Figure 5-3**
**Hydrographs**
**1975-2021**
**Livermore Valley**
**Groundwater Basin**

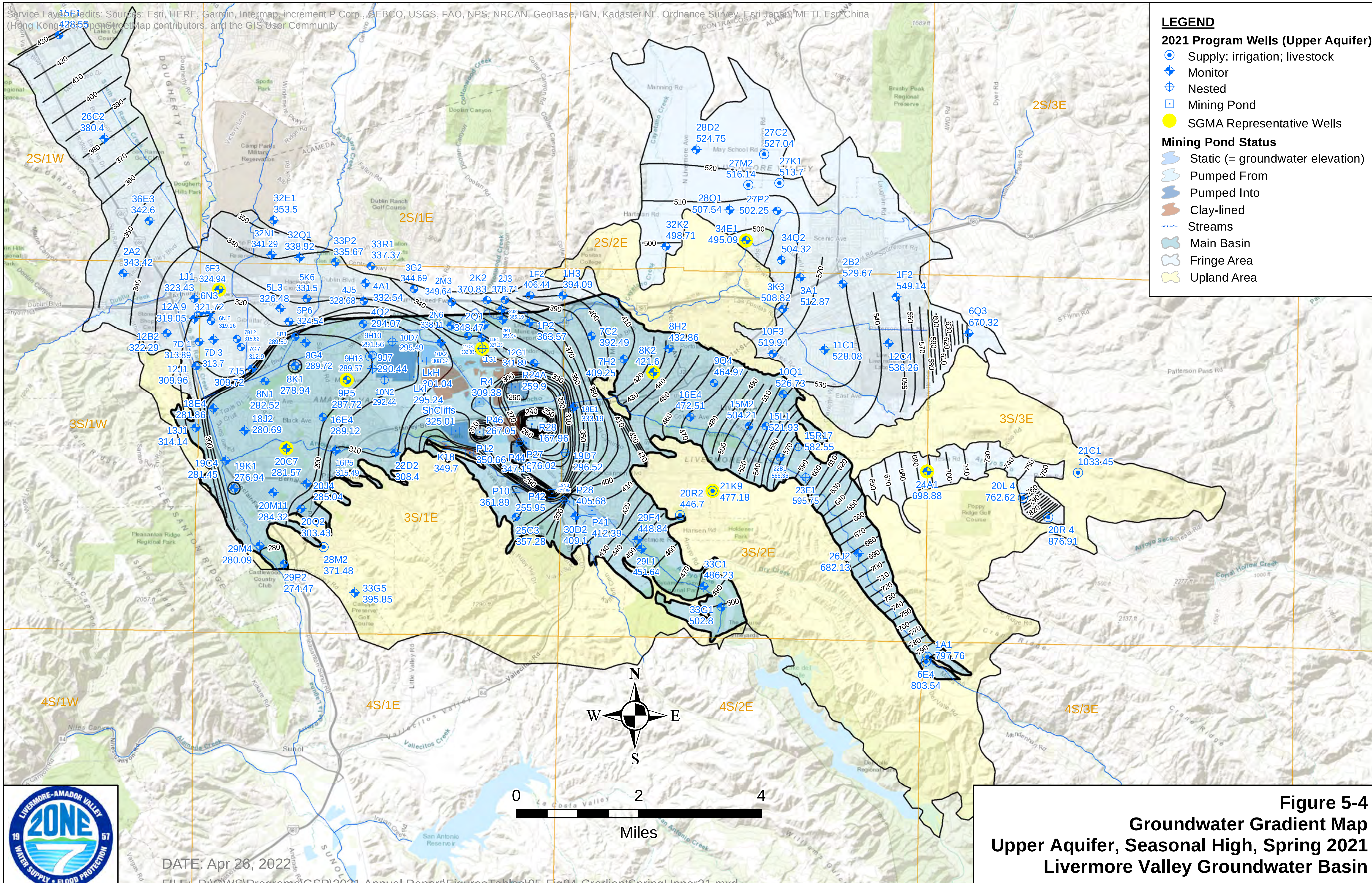



**Figure 5-4**
**Groundwater Gradient Map**
**Upper Aquifer, Seasonal High, Spring 2021**
**Livermore Valley Groundwater Basin**

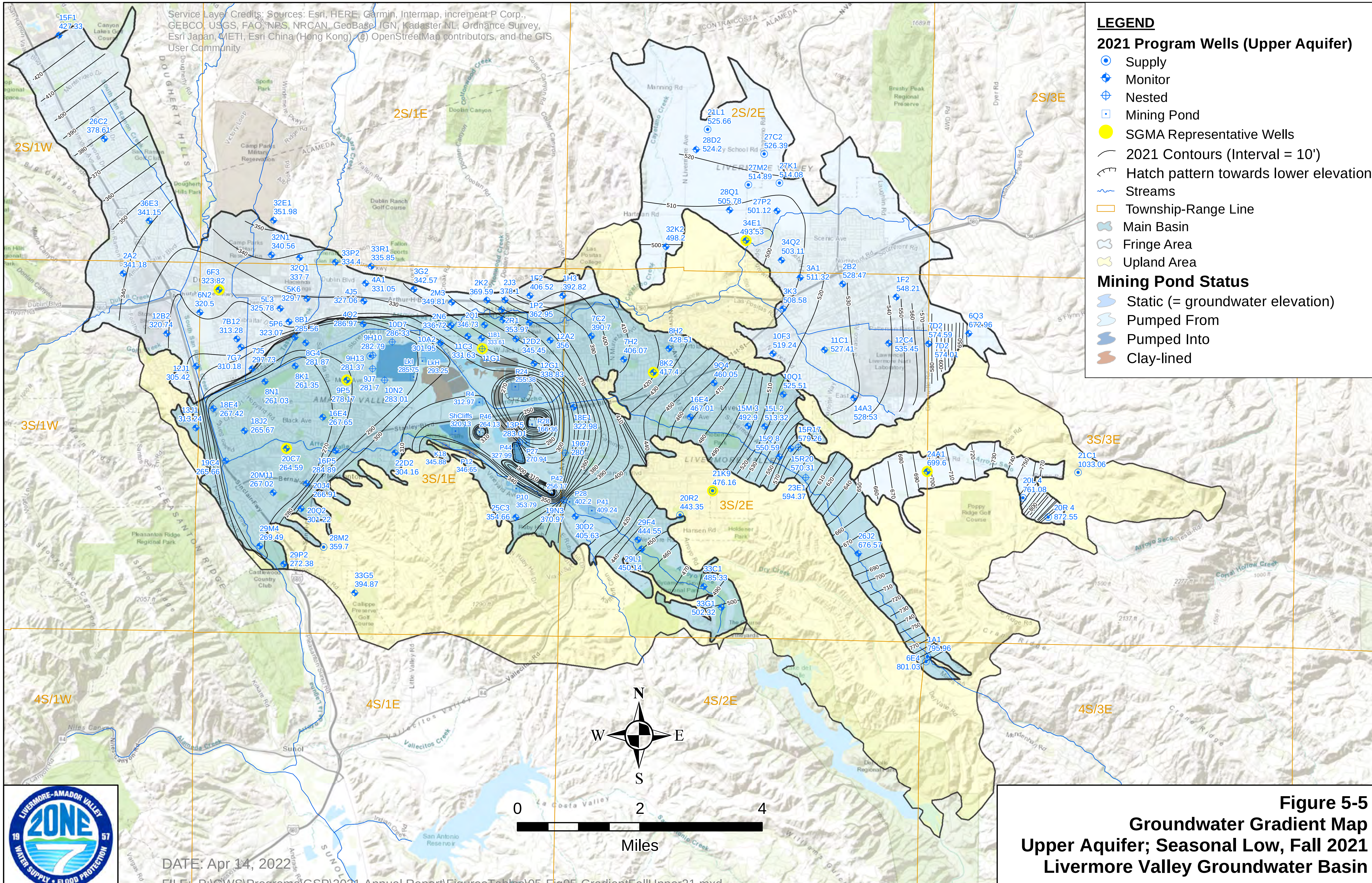



**Figure 5-5**
**Groundwater Gradient Map**
**Upper Aquifer; Seasonal Low, Fall 2021**
**Livermore Valley Groundwater Basin**

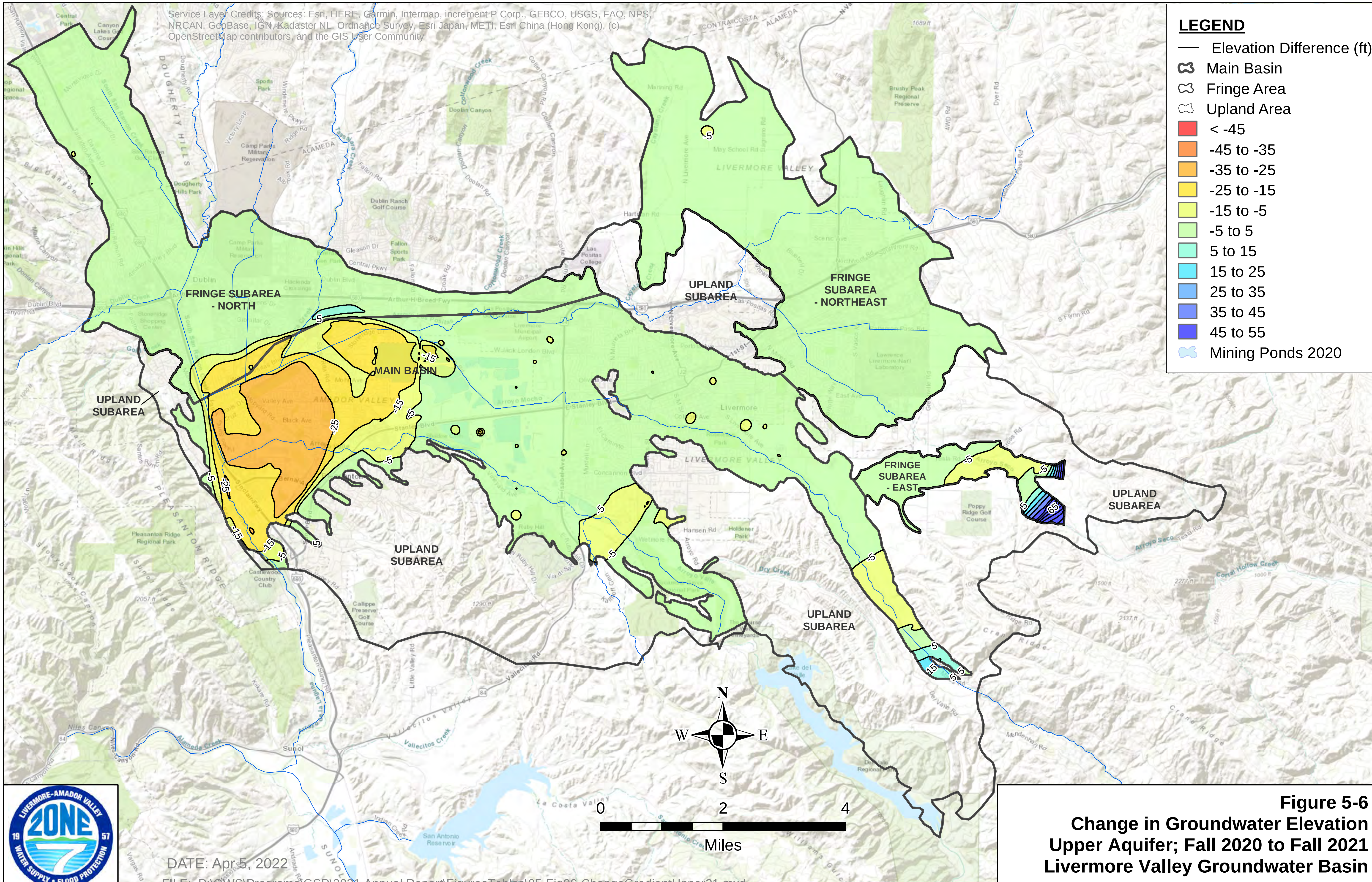



**Figure 5-6**
**Change in Groundwater Elevation**
**Upper Aquifer; Fall 2020 to Fall 2021**
**Livermore Valley Groundwater Basin**

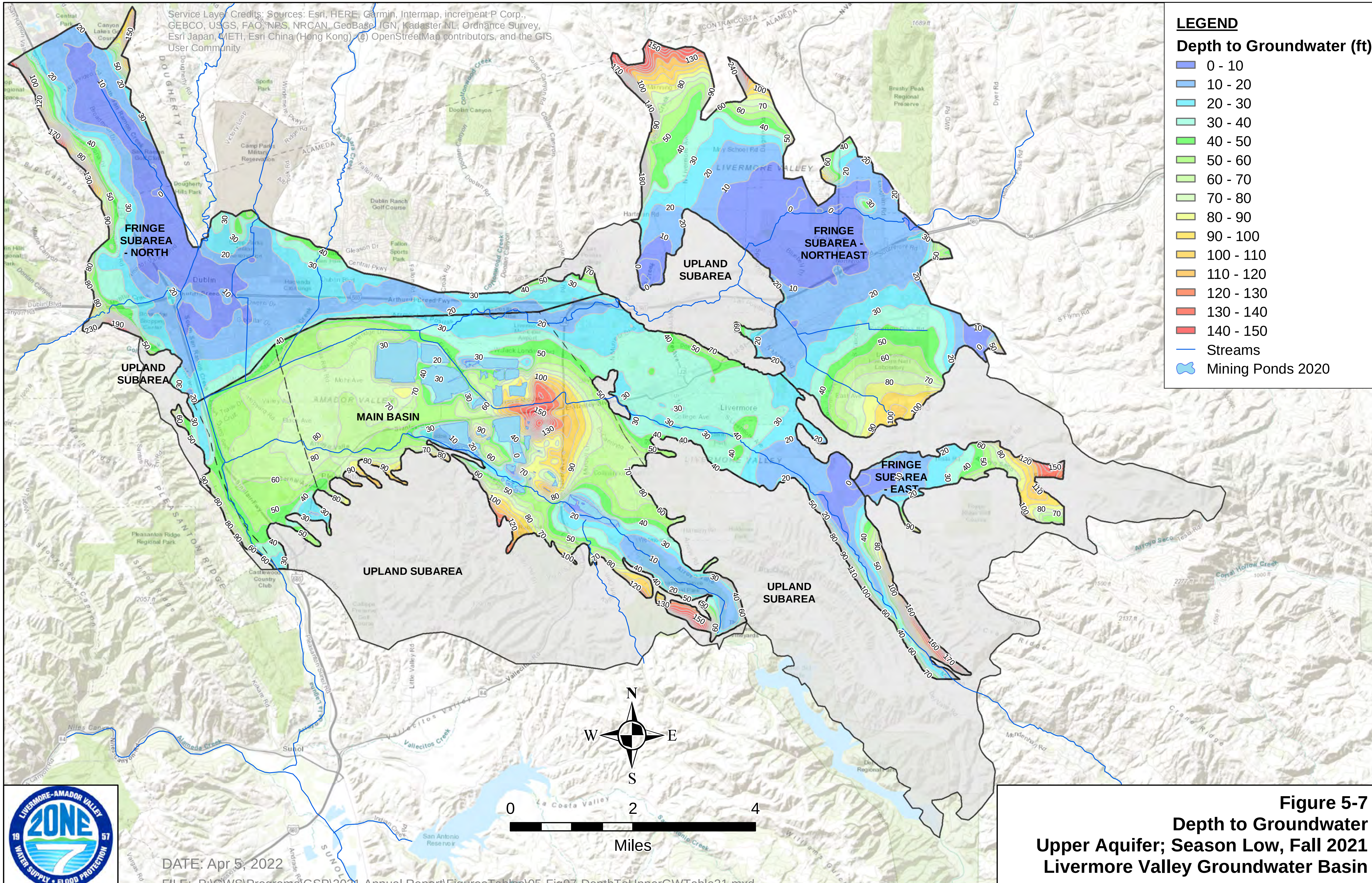



**Figure 5-7**
**Depth to Groundwater**
**Upper Aquifer; Season Low, Fall 2021**
**Livermore Valley Groundwater Basin**

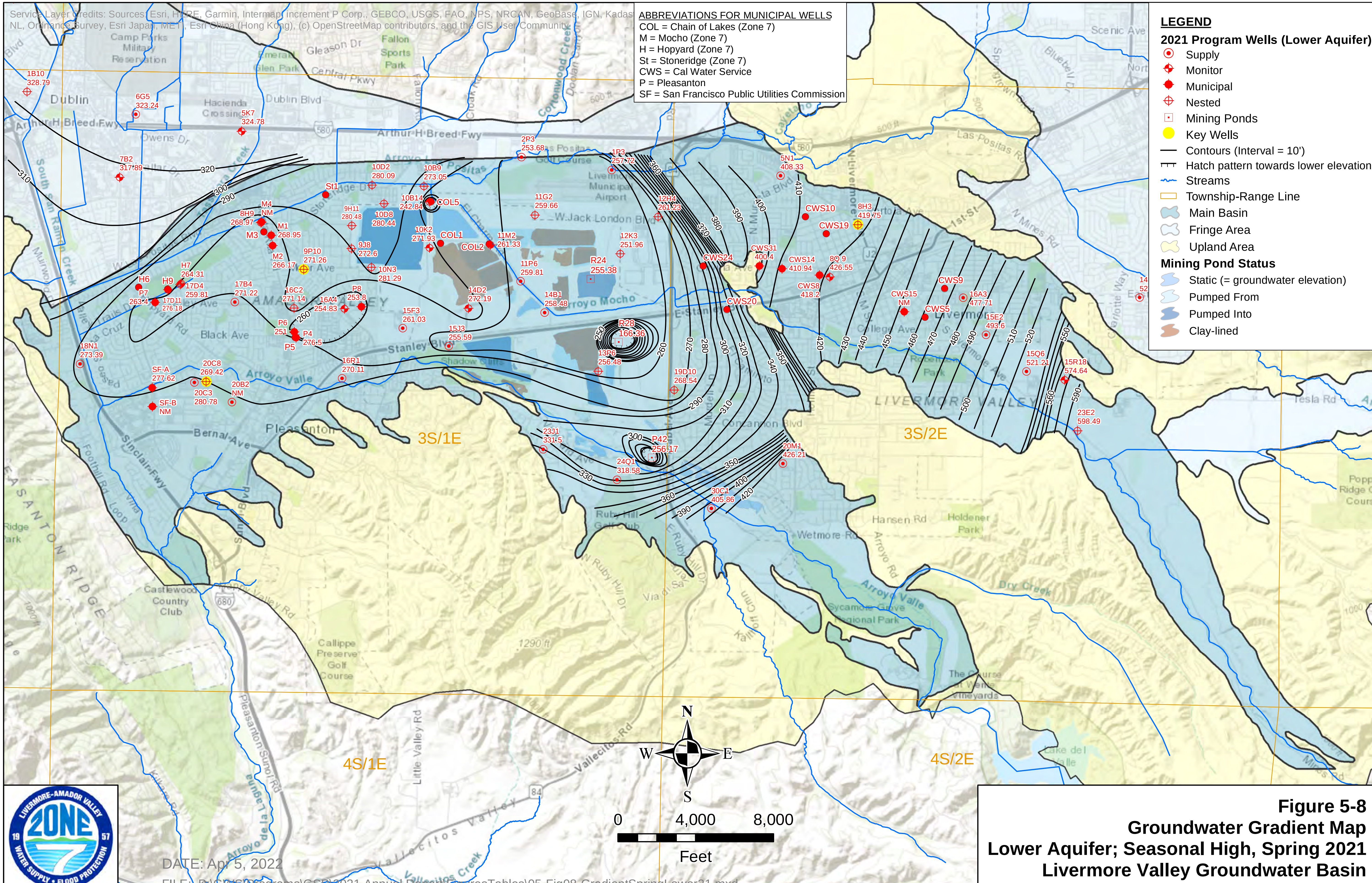



**Figure 5-8**
**Groundwater Gradient Map**
**Lower Aquifer; Seasonal High, Spring 2021**
**Livermore Valley Groundwater Basin**

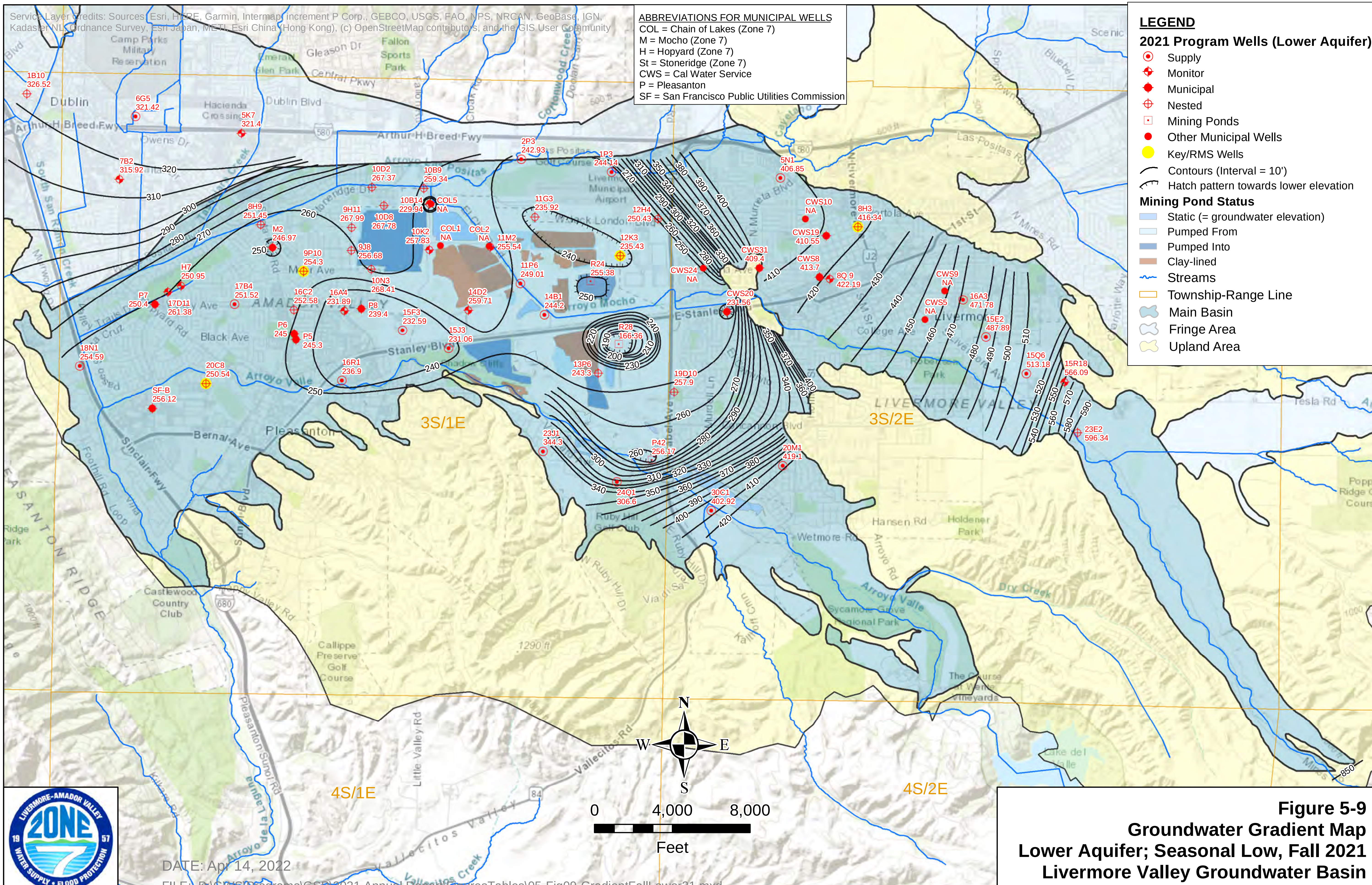



**Figure 5-9**
**Groundwater Gradient Map**
**Lower Aquifer; Seasonal Low, Fall 2021**
**Livermore Valley Groundwater Basin**

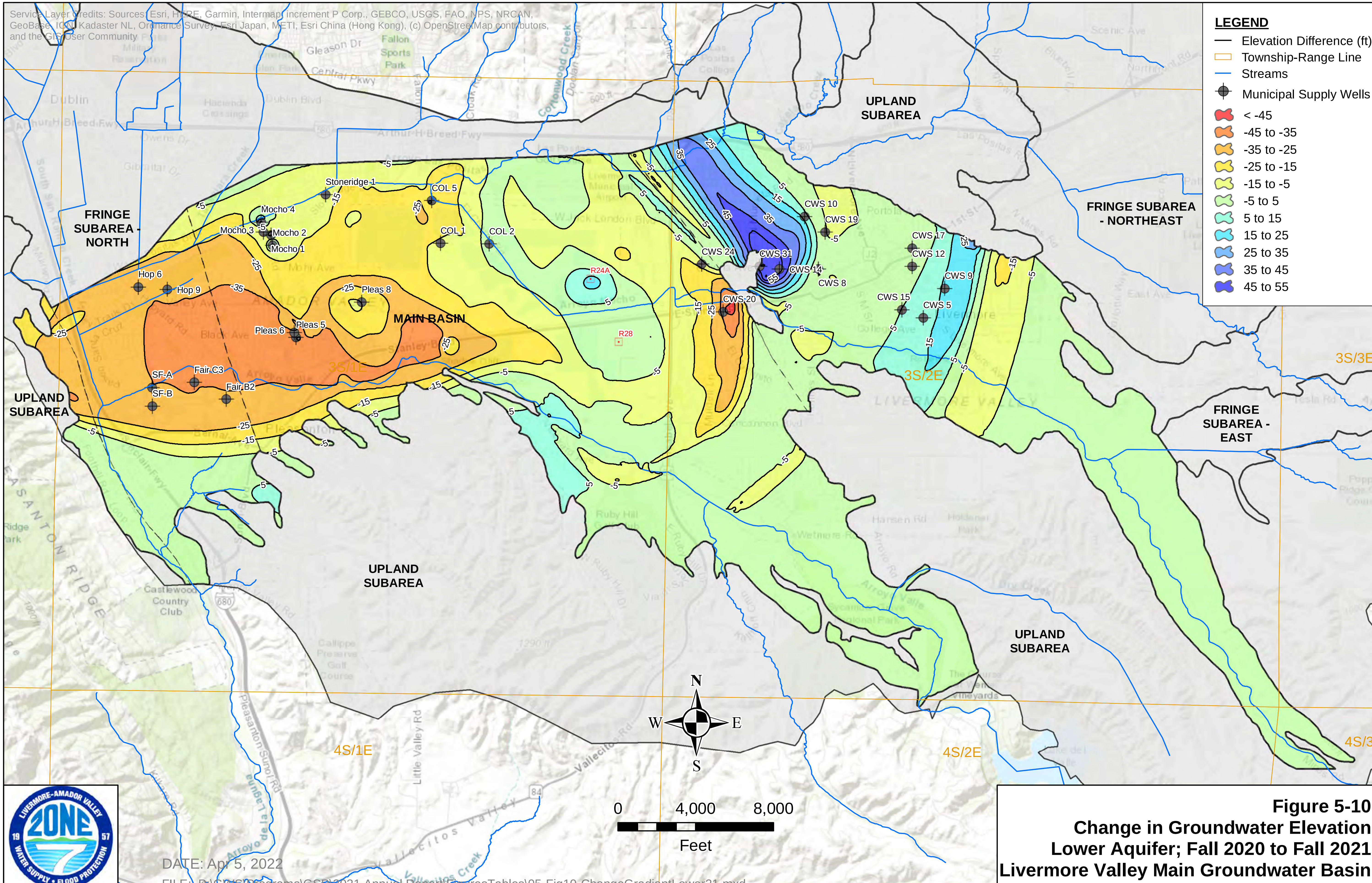



**Figure 5-10**
**Change in Groundwater Elevation**
**Lower Aquifer; Fall 2020 to Fall 2021**
**Livermore Valley Main Groundwater Basin**

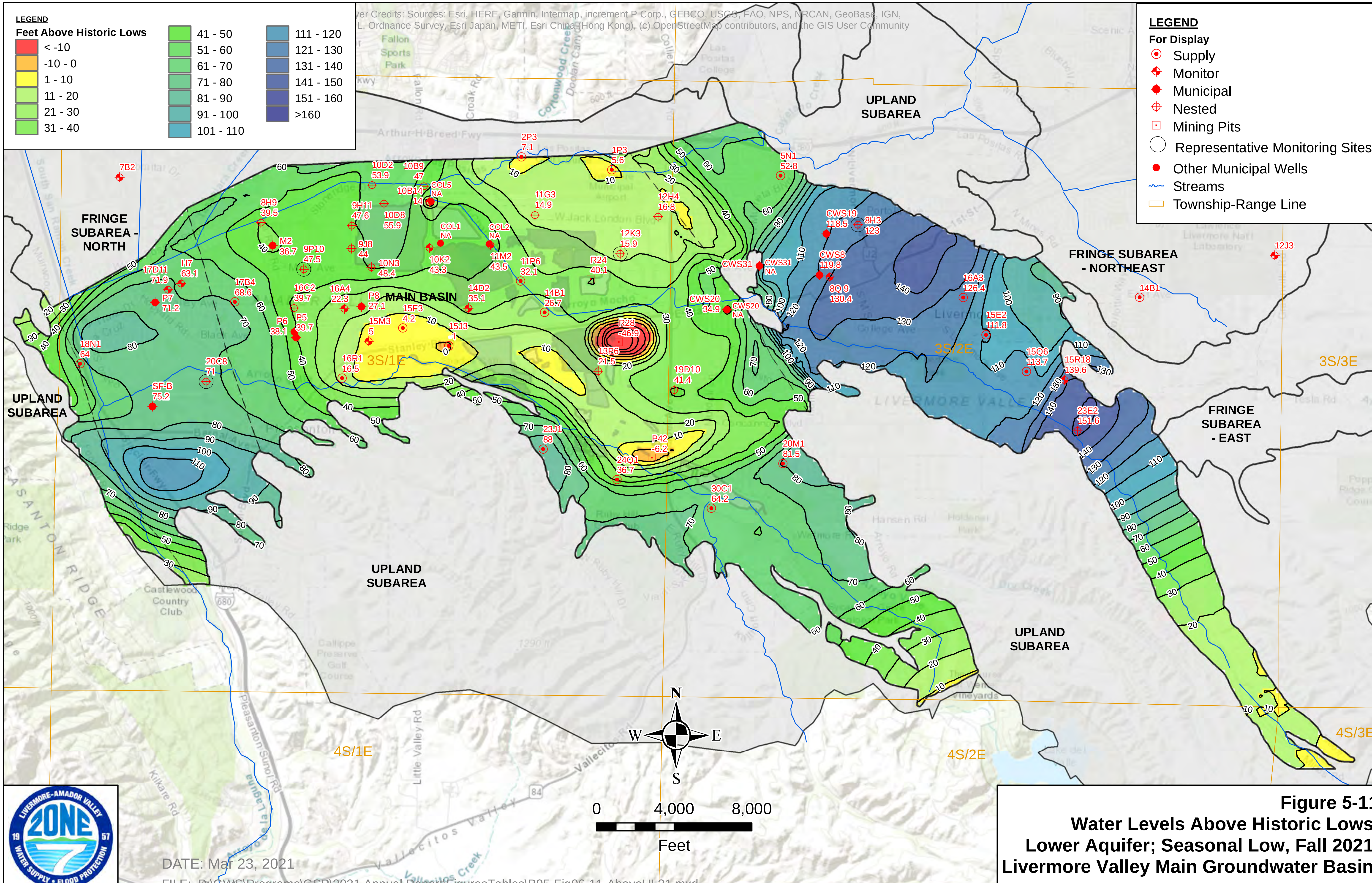



**Figure 5-11**
**Water Levels Above Historic Lows**
**Lower Aquifer; Seasonal Low, Fall 2021**
**Livermore Valley Main Groundwater Basin**

# 6 Groundwater Quality Monitoring

## 6.1 Program Changes

***Table 6-A*** below lists the changes that were made to the Groundwater Quality Monitoring Program for the 2021 WY.

***Table 6-A: Program Wells Changes during the 2021 WY***

| Action | Reason | Note |
|---|---|---|
| **3S1E20C003**<br>**Removed from program** | No longer pumping | Still used for elevations.<br>3S1E20B002 used for water quality. |
| **21 wells added to program** | 2021 Alternative GSP | Added to address DWR recommendations.<br>See Table 1-1 in 2021 Alternative GSP |

Zone 7's 2021 Alternative GSP also established the SMCs for Degraded Water Quality as shown in ***Table 6-B*** below.

***Table 6-B: SMCs for Degraded Water Quality***

| Undesirable Results Definition | Undesirable Results Criteria | Minimum Threshold | Measurable Objective |
|---|---|---|---|
| If groundwater recharge or extraction causes significant and unreasonable degradation of water quality in the Basin, such that these changes impact to the long-term viability of domestic, agricultural, municipal, environmental, or other beneficial uses over the planning and implementation horizon of this Alternative GSP. Significant and unreasonable changes to water quality associated with Undesirable Results would include a significant increase, on a regional basis, in concentrations of identified COCs above applicable state and federal regulatory thresholds, as a result of groundwater recharge or extraction. | If and when MTs are exceeded for any of the identified COCs in greater than 25% the RMS-WQs at least two consecutive years as a result of groundwater recharge or extraction, such that they cannot be managed to provide drinking water supply (i.e., that treatment or blending is not possible or practicable). | Greater of MCL (or other appropriate regulatory criteria) or the SGMA baseline concentration plus maximum historical annual range. | <u>TDS</u>: Recommended Secondary MCL (500 mg/L) in the Main Basin, Upper Secondary MCL (1,000 mg/L) or 2015 concentrations (whichever is greater) in the Fringe and Upland Areas.<br><u>Nitrate</u>: Primary MCL (10 mg/L)<br><u>Boron</u>: Health Risk Limit (HRL; 1,400 µg/L)<br><u>Hexavalent Chromium</u>: Primary MCL (50 µg/L) |

SMC = Sustainable Management Criteria
COCs = Constituents of Concern
RMS-WQ = Representative Monitoring Sites for Water Quality
MCL = Maximum Contaminant Level
SGMA = Sustainable Groundwater Management Act
MT = Minimum Threshold
GSP = Groundwater Sustainability Plan

TDS = Total Dissolved Solids

In 2020, Zone 7 hired Jacobs Engineering, Inc. to conduct a Per- and Polyfluoroalkyl Substances (PFAS) Potential Source Investigation (*Jacobs, 2020*). The investigation, which concluded in December 2020, included recommendations for additional sampling of existing monitoring wells. Those wells were incorporated into the 2021 WY sampling program. Jacob's PFAS Potential Source Investigation Report and other information on PFAS are located on the Zone 7 website: http://www.zone7water.com/pfas-information.

For more information on general groundwater quality and the groundwater quality program, see the following sections of the 2021 Alternative GSP:

- **Section 1.2.3:** Groundwater Quality Program Updates
- **Section 8.6:** Current and Historical Groundwater Conditions - Groundwater Quality
- **Section 13.4:** Sustainability Indicators – Degraded Water Quality
- **Section 14.2.4:** Monitoring Network for Degraded Water Quality
- **Section 14.4:** Representative Monitoring

## 6.2 Results for the 2021 Water Year

### 6.2.1 General

***Figure 6-1*** and ***Table 6-1*** show all 233 wells in the 2021 WY Groundwater Quality Program. ***Table 5-2*** from ***Section 5: Groundwater Elevation Monitoring*** shows well construction information for each of the wells. ***Table 6-2*** shows metal and mineral results from all wells in the program for the 2021 Water Year. In general, concentrations of the constituents of concern (TDS, nitrate, boron, chromium, and PFAS) remain relatively unchanged over the last several years.

### 6.2.2 Total Dissolved Solids (TDS)

***Table 6-3*** shows TDS results for the 2021 WY in Representative Monitoring Sites for Degraded Water Quality (RMS-WQ) and their differences between the MOs and MTs. Concentrations were below the MTs in all wells except for 3S2E08H003 (8H3, in the Mocho II Lower Aquifer) which had detections of TDS at 737 milligrams per liter (mg/L) (19 mg/L above the MT). Six wells had concentrations above the MOs including five wells in the Main Basin and one in the Fringe Area. As stated in *the* 2021 Alternative GSP, a UR for Degraded Water Quality occurs if and when:

*MTs are exceeded for any of the identified constituents of concern in greater than 25% of the RMS-WQs at least two (2) consecutive years as a result of SGMA-related groundwater* *management activities such that they cannot be managed to provide drinking water supply (i.e., that treatment or blending is not possible or practicable).*

Therefore, since only one RMS-WQ had a concentration above the MT during the 2021 WY, this MT exceedance does not constitute a UR for TDS.

***Figure 6-2*** shows graphs of TDS concentrations from 1975 to 2021 in various wells including the RMS-WQ. ***Figure 6-3*** and ***Figure 6-4*** show TDS concentrations for the 2021 WY in the Upper and Lower Aquifers, respectively.

- During the 2021 WY, the TDS concentrations in groundwater continued to be lowest in areas adjacent to the Arroyo Valle and the Arroyo Mocho, where they were generally less than 500 mg/L in both the Upper and Lower Aquifers.

- There continues to be two main areas of the Basin where TDS concentrations exceed 1,000 mg/L in the Upper Aquifer:

  - In the northwestern Fringe Area and extending south into the Main Basin. This high TDS area is most likely due to the combination of the concentrating effects of urban irrigation, leaching of buried lacustrine and marine sediments, recharge of poorer quality water from Arroyo Las Positas, and legacy wastewater and sludge disposal practices in the Pleasanton and Livermore areas.
  - In the northeastern Fringe Area. This high-TDS area is likely due to poorer quality water that runs off marine sediments on the east and north of the Basin and recharges the Basin along the hill-fronts.

- Many of the supply wells in the Pleasanton area produced water with TDS concentrations greater than the basin objective of 500 mg/L (also used as the MO for the RMS-WQ wells) during the 2021 WY. The highest concentrations were detected as follows:

  - The highest concentration detected in a Zone 7 municipal well was in the Stoneridge Well (labeled St1) at 707 mg/L.

  - One of the San Francisco Public Utilities Commission (SFPUC) wells in the Bernal wellfield (SF-B) detected TDS at 725 mg/L.

  - A private irrigation well (3S1E17B004 or 17B4) located central to four active wellfields (Mocho, Hopyard, Bernal, and Busch Valley) had TDS at 781 mg/L.

### 6.2.3 Nitrates

***Table 6-4*** shows nitrate (as nitrogen, $NO_3$-N) results for the 2021 WY in RMS-WQ and their differences between the MOs and MTs. Concentrations were below the MTs in all wells and above the MOs in two wells in the Main Basin. Since no RMS-WQ had a concentration above the MT, there were no UR occurrences for nitrate.

***Figure 6-5*** shows graphs of $NO_3$-N concentrations from 1975 to 2021 in various wells including the RMS-WQ. ***Figure 6-6*** and ***Figure 6-7*** show $NO_3$-N concentrations for the 2021 WY in the Upper and Lower Aquifers, respectively.

The Nutrient Management Plan (NMP) (*Zone 7, 2015b*) identified ten local high nitrate Areas of Concern (AOC) where nitrate concentrations persist above the Basin Objective (which is the Maximum Contaminant Level [MCL], 10 mg/L $NO_3$-N). Overall, these AOCs have been decreasing in size and/or concentration or have been relatively stable over the last five years:

- **Happy Valley**—Two wells have been added to the program near this area; however, only 3S1E28M002 (28M2) was sampled and analyzed for nitrate (at 6.1 mg/L) in the 2021 WY.
- **Bernal**—The long-term trend of concentrations in this well continues to decline slowly. In the 2021 WY, the concentration was at 8.38 mg/L compared to 9.58 mg/L for the 2020 WY.
- **Staples Ranch**—For the past few years, nitrate concentrations in this AOC have dropped below the Basin Objective. The highest concentration during the 2021 WY was detected in 3S1E05K006 (5K6) at 9.95 mg/L.
- **Constitution**—Nitrate concentrations continue to drop in 3S1E01H003 (1H3), but were still detected above the Basin Objective at 13.3 mg/L during the 2021 WY compared to 15.7 mg/L in 2020 WY.
- **Jack London**—The highest nitrate concentration detected in this AOC was in 3S2E07H002 (7H2) at 11.7 mg/L during the 2021 WY (12.5 mg/L in 2020 WY), however well 3S1E12D002 (12D2, 13.2 mg/L in 2020 WY) was not sampled this year by the Livermore Water Reclamation Plant (LWRP).
- **May School**—Historically, the nitrate concentration in this AOC has been characterized annually by the results of a single monitoring well (2S2E28D002 or 28D2), which have varied over the last 7 years between 16.7 mg/L and 42.8 mg/L. This year 2S2E21L001 (21L1) was added to the program and had a nitrate concentration of 19.8 mg/L.
- **Charlotte Way**— In the 2021 WY, two wells in this area exceeded the MCL; 13.8 mg/L in 3S2E03K003 (3K3) and 10.2 mg/L in 3S2E14A003 (14A3) (13.8 mg/L and 9.83 mg/L, respectively in the 2020 WY).
- **Buena Vista**—During the 2021 WY, the highest concentration was again detected in the northeastern portion of the plume at 14.6 mg/L in 3S2E10Q001 (10Q1, 15.2 mg/L in the 2020 WY). Five wells in this AOC that were added to the program in the 2021 WY had concentrations similar to other nearby wells and ranged from 7.6 mg/L to 12 mg/L.

Overall, this Lower Aquifer nitrate plume has been relatively stable over the last five years.

- **Greenville**—This AOC typically characterized by the results of a single monitoring well (3S2E24A001, 24A1); however, nearby well 3S2E19C002 (19C2) was added to the program in the 2021 WY. For the 2021 WY, 24A1 had a concentration of 1.5 mg/L (24.5 mg/L in 2020 WY) and 19C2 had 18.9 mg/L. Two wells southeast of this AOC that were also added to the program in the 2021 WY also had concentrations above the Basin Objective (3S3E20L004, 20L4, at 16.5 mg/L and 3S3E20R004, 20R4 at 12.7 mg/L).

- **Mines Road**—For the 2021 WY, the nitrate concentration in 3S2E26J002 (26J2) was again below the Basin Objective at 1.94 mg/L (1.37 mg/L in 2020 WY). Two wells southeast of this AOC that were added to the program in the 2021 WY were both non-detect for nitrate.

### 6.2.4 Boron

***Table 6-5*** shows boron results for the 2021 WY in RMS-WQ and their differences between the MOs and MTs. Concentrations were below the MTs in all wells but were above the MOs in two wells in the Fringe Area.

***Figure 6-8*** shows graphs of boron concentrations from 1975 to 2021 in various wells including the RMS-WQ. ***Figure 6-9*** and ***Figure 6-10*** show boron concentrations for the 2021 WY in the Upper and Lower Aquifers, respectively. Boron exists at elevated concentrations in the areas of the Basin listed below. These localized concentrations of boron have been relatively stable for many years.

- Along the boundary between the northwestern Fringe Area and the Main Basin. The highest concentration was detected near the center of this area in 3S1E04J005 (4J5) at 11,600 µg/L the 2021 WY (12,000 µg/L in 2020 WY). It appears that a small portion of this plume extends into the Lower Aquifer just north of Lake I.

- In portions of the northeastern Fringe Area. The highest concentration detected in these areas in the 2021 WY was detected at 27,000 µg/L in 2S2E27P002 (27P2), compared to 29,000 µg/L in the 2020 WY.

- In the eastern Fringe Area. While this area historically has only been represented by one well in the Zone 7 Water Quality program (3S2E24A001 or 24A1), four wells in this area (three in the Fringe Area and one well just east in the Upland Area) were added to the program for the 2021 WY. Three of these had concentrations above the Basin Objective, the highest of which was detected in 3S2E21C001 (21C1, in the Upland Area) at 4,040 µg/L.

### 6.2.5 Chromium

***Table 6-6*** shows total Chromium (Cr) results for the 2021 WY in RMS-WQ and their differences between the MOs and MTs. Concentrations were below the MTs and MOs in all wells.

***Figure 6-11*** shows graphs of Cr concentrations from 1975 to 2021 in various wells including the RMS-WQ. ***Figure 6-12*** and ***Figure 6-13*** show Cr concentrations for the 2021 WY in the Upper and Lower Aquifers, respectively.

Cr concentrations did not exceed the 50 µg/L threshold in any wells for the 2021 WY, however there are two areas that historically have had concentrations above the 50 µg/L threshold.

- While samples from monitoring well 3S2E12C004 (12C4) in the northeastern Fringe Area have typically exhibited high Cr values in the past (94µg/L in the 2020 WY), the concentration was only 11 µg/L in the 2021 WY.

- In the 2020 WY Cr was detected at 108 µg/L in monitoring well 3S1E07G007 (7G7) in the northwestern Fringe Area just north of the Main Basin, however in the 2021 WY the concentration was below the detection limit.

### 6.2.6 PFAS

***Table 6-7*** shows results from the wells sampled and tested for PFAS for the 2021 WY. The PFAS compound with the highest concentrations in the  Basin has been perfluorooctane sulfonic acid (PFOS). PFOS concentrations in the Upper and Lower Aquifers are shown on ***Figure 6-14*** and ***Figure 6-15***, respectively.

- The majority of wells with PFOS concentrations that were above the Department of Drinking Water's (DDW) 40 parts per trillion (ppt) response level (RL) appear to be within a roughly-triangular area in both the Upper and Lower Aquifers that stretches from the southwestern edge of the airport (north of the mining area) to Pleasanton's Wellfield (west of the mining area) and to Zone 7's Mocho Wellfield (northwest of the mining area).

- The highest concentration detected has been in well 3S1E10B008 (10B8, north of Lake I) at 1,400 ppt in the 2020 WY (not sampled during the 2021 WY).

- Eight of Zone 7's municipal wells have tested above the Notification Level (NL) for PFOS (6.1 ppt), and four of the municipal wells have had PFOS concentrations that exceeded DDW's recommended RL of 40 ppt, the highest of which was in Mocho 1 (3S1E09M002 or M1) at 110 ppt in 2020 WY. Mocho 1 was not pumping, and therefore not sampled, during the 2021 WY.

- Four of Zone 7's municipal wells have also tested above the NL for perfluorooctanoic acid (PFOA) (5.1 ppt). Although additional PFAS compounds have also been detected in Zone 7's water supplies, the results were either below the NL (e.g., PFBS at 500 ppt) or at present there are no regulatory guidelines for these contaminants.

- Pleasanton's Well 8 (Pleas 8 or P8) had a concentration of PFOS at 75 ppt in the 2021 WY (110 ppt in the 2020 WY). This area of elevated PFOS concentration appears to be relatively isolated as evidenced by several wells with concentrations below the RL both north (roughly up-gradient) and west (down-gradient) of Pleas 8.

- PFOS was detected in five of six California Water Service (CWS) wells sampled in the 2021 WY, however, none of the wells had concentrations above the RL (40ppt).

## 6.3 Attached Tables and Figures

# TABLE 6-1
# MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM
# LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 2S1E32E001 | 32E1 | End of Arnold Rd | None | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1E32N001 | 32N1 | Camp Parks | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1E32Q001 | 32Q1 | Summer Glen Dr | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1E33L001 | 33L1 | Gleason Dr @ Tassajara | None | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1E33P002 | 33P2 | Central Pkwy at Emerald Glen Pk | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1E33R001 | 33R1 | Central Pkwy @ Grafton | None | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1W15F001 | 15F1 | BOLLINGER | Bishop | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1W26C002 | 26C2 | PINE VALLEY | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1W36E003 | 36E3 | Kolb Park | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 2S1W36F001 | 36F1 | Dublin High shallow | Dublin | L | nested | active | Zone 7 | 1 | | | | |
| 2S1W36F002 | 36F2 | Dublin High mid | Dublin | L | nested | active | Zone 7 | 1 | | | | |
| 2S2E21L001 | 21L1 | Merlin | May | U | domestic | active | Zone 7 | 1 | | | | |
| 2S2E27K001 | 27K1 | Model Airport | Spring | U | livestock | inactive | Zone 7 | 1 | | | | |
| 2S2E27M002 | 27M2 | Kwan | May | U | domestic | active | Zone 7 | 1 | | | | |
| 2S2E27P002 | 27P2 | hartford ave east | Spring | U | monitor | active | Zone 7 | 1 | | | | |
| 2S2E28D002 | 28D2 | May School | May | U | monitor | active | Zone 7 | 1 | | | | |
| 2S2E28J002 | 28J2 | FCC Well | May | L | industrial | active | Zone 7 | 1 | | | | |
| 2S2E28Q001 | 28Q1 | hartford ave | May | U | monitor | active | Zone 7 | 1 | | | | |
| 2S2E32K002 | 32K2 | jenson's N liv. Ave | Cayetano | U | monitor | active | Zone 7 | 1 | | | | |
| 2S2E34E001 | 34E1 | Mud City | May | U | monitor | active | Zone 7 | 1 | X | | | |
| 2S2E34Q002 | 34Q2 | Hollyhock & Crocus | Spring | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E01F002 | 1F2 | Constitution Dr | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E01H003 | 1H3 | Collier Canyon g1 | Camp | U | monitor | active | Zone 7 | 4 | | | | |
| 3S1E01J004 | 1J04 | Collier Vineyards | Camp | L | irrigation | active | Zone 7 | 1 | | | | |
| 3S1E01L001 | 1L1 | Kitty Hawk | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E01P002 | 1P2 | Airport gas g5 | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E01P003 | 1P3 | New airport well | Amador | L | supply | inactive | Zone 7 | 4 | | | | |
| 3S1E02J002 | 2J2 | Maint. Bldg | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02J003 | 2J3 | Doolan Rd East | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02K002 | 2K2 | Doolan Rd West | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02M003 | 2M3 | Friesman Rd North | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02N006 | 2N6 | Friesman Rd South | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02P003 | 2P3 | Crosswinds Church | Camp | L | domestic | active | Zone 7 | 1 | | | | |
| 3S1E02Q001 | 2Q1 | LPGC #1 | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E02R001 | 2R1 | Beebs | Amador | U | monitor | active | Zone 7 | 4 | | | | |

# TABLE 6-1
# MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM
# LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E03G002 | 3G2 | fallon rd | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E04A001 | 4A1 | SMP-DUB-2 | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E04J005 | 4J5 | Pimlico shallow | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E04J006 | 4J6 | Pimlico deep | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E04Q002 | 4Q2 | gulfstream | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E05K006 | 5K6 | Rosewood shallow | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E05K007 | 5K7 | Rosewood deep | Camp | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E05L003 | 5L3 | Oracle | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E05P006 | 5P6 | Owens Park | Camp | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E06F003 | 6F3 | Dublin Ct | Dublin | U | monitor | active | Zone 7 | 1 | X | | | |
| 3S1E06N002 | 6N2 | DSRSD MW-3 | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E06N003 | 6N3 | DSRSD MW-4 | Dublin | U | monitor | active | Other | 1 | | | | |
| 3S1E06N006 | 6N6 | DSRSD NE-76 | Dublin | U | monitor | active | Other | 1 | | | | |
| 3S1E07B002 | 7B2 | Hopyard rd | Dublin | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E07B012 | 7B12 | Hacienda Arch | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E07D001 | 7D1 | DSRSD SW-75 | Dublin | U | monitor | unknown | Other | 1 | | | | |
| 3S1E07D003 | 7D3 | DSRSD SE-70 | Dublin | U | monitor | unknown | Other | 1 | | | | |
| 3S1E07G007 | 7G7 | Chabot Well | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E07J005 | 7J5 | Thomas Hart School | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E08B001 | 8B1 | Lizard Well | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E08G004 | 8G4 | Apache | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E08H009 | 8H9 | Mocho 4 Nested Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E08H010 | 8H10 | Mocho 4 Nested Middle | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E08H011 | 8H11 | Mocho 4 Nested deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E08H013 | 8H13 | Mocho 3 mon | Amador | D | monitor | active | Zone 7 | 1 | | | | |
| 3S1E08H018 | M4 | Mocho 4 | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E08K001 | 8K1 | Cockroach well | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E08N001 | 8N1 | sports park | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E09B001 | St1 | Stoneridge | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E09H013 | 9H13 | Lister | Amador | U | domestic | active | Zone 7 | 1 | | | | |
| 3S1E09J007 | 9J7 | SW Lake I Shallow | Amador | U | nested | active | Zone 7 | 1 | | | | |
| 3S1E09J008 | 9J8 | SW Lake I Middle | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E09J009 | 9J9 | SW Lake I Deep | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E09M002 | M1 | Mocho 1 | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E09M003 | M2 | Mocho 2 | Amador | L | muni | active | Zone 7 | 4 | | | | X |

**TABLE 6-1**
**MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM**
**LIVERMORE VALLEY GROUNDWATER BASIN**

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E09M004 | M3 | Mocho 3 | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E09P005 | 9P5 | Key_AmW_U (Mohr Key) | Amador | U | monitor | active | Zone 7 | 1 | X | X | | |
| 3S1E09P009 | 9P9 | Mohr Ave Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E09P010 | 9P10 | Key_AmW_L | Amador | L | nested | active | Zone 7 | 1 | X | X | | |
| 3S1E09P011 | 9P11 | Mohr Ave Deep | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10A002 | 10A2 | El Charro Rd | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E10B008 | 10B8 | Kaiser Rd Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10B009 | 10B9 | Kaiser Rd Middle 1 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10B010 | 10B10 | Kaiser Rd Middle 2 | Amador | L | nested | unknown | Zone 7 | 1 | | | | |
| 3S1E10B011 | 10B11 | Kaiser Rd Deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E10B014 | 10B14 | COL 5 Monitoring | Amador | L | monitor | unknown | Zone 7 | 1 | | | | |
| 3S1E10B016 | COL5 | COL 5 | Amador | L | muni | active | Zone 7 | 4 | | | | |
| 3S1E10D002 | 10D2 | Stoneridge Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10D003 | 10D3 | Stoneridge Middle 1 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10D004 | 10D4 | Stoneridge Middle 2 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E10D005 | 10D5 | Stoneridge Deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E10K002 | 10K2 | COL 1 Monitoring | Amador | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E10K003 | COL1 | COL 1 | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E11B001 | 11B1 | Airport West | Amador | U | monitor | active | Zone 7 | 4 | | | | |
| 3S1E11C003 | 11C3 | LAVWMA ROW | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E11G001 | 11G1 | Key_AmE_U | Amador | U | nested | active | Zone 7 | 1 | X | X | | |
| 3S1E11G002 | 11G2 | Rancho Charro Middle 1 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E11G003 | 11G3 | Rancho Charro Middle 2 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E11G004 | 11G4 | Rancho Charro Deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E11M002 | 11M2 | COL 2 Monitoring | Amador | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E11M003 | COL2 | COL 2 | Amador | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E11P006 | 11P6 | New Jamieson Residence | Amador | L | domestic | unknown | Zone 7 | 1 | | | | |
| 3S1E12A002 | 12A2 | Airport South | Amador | U | monitor | active | Zone 7 | 4 | | | | |
| 3S1E12D002 | 12D2 | LWRP G6 | Amador | U | monitor | active | LWRP | 4 | | | | |
| 3S1E12G001 | 12G1 | Oaks Park Shallow | Amador | U | monitor | active | Zone 7 | 4 | | | | |
| 3S1E12H004 | 12H4 | LWRP Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E12H005 | 12H5 | LWRP Middle 1 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E12H006 | 12H6 | LWRP Middle 2 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E12H007 | 12H7 | LWRP Deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E12K002 | 12K2 | Oaks Park Mid | Amador | L | nested | active | Zone 7 | 1 | | | | |

# TABLE 6-1
# MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM
# LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E12K003 | 12K3 | Key_AmE_L | Amador | L | nested | active | Zone 7 | 1 | X | X | | |
| 3S1E12K004 | 12K4 | Oaks Park Deep | Amador | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E13P005 | 13P5 | LGA Grant Nested 1 | Amador | U | nested | active | Zone 7 | 1 | | | | |
| 3S1E13P006 | 13P6 | LGA Grant Nested 2 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E13P007 | 13P7 | LGA Grant Nested 3 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E13P008 | 13P8 | LGA Grant Nested 4 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E14B001 | 14B1 | Industrial Asphalt | Amador | L | industrial | unknown | Zone 7 | 1 | | | | |
| 3S1E14D002 | 14D2 | South Cope Lake | Amador | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E15J003 | 15J3 | shadow cliff | Amador | L | supply | unknown | Zone 7 | 1 | | | | |
| 3S1E15M003 | 15M3 | Bush/Valley South | Amador | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E16A002 | P8 | Pleas 8 | Amador | L | muni | active | Pleas | 1 | | | | |
| 3S1E16A004 | 16A4 | Bush/Valley Mid | Amador | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E16B001 | 16B1 | Bush/Valley North | Amador | D | monitor | active | Zone 7 | 1 | | | | |
| 3S1E16C002 | 16C2 | Santa Rita Valley Shallow | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E16C003 | 16C3 | Santa Rita Valley Middle | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E16C004 | 16C4 | Santa Rita Valley Deep | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E16E004 | 16E4 | black ave - cultural | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E16L005 | P5 | Pleas 5 | Amador | L | muni | active | Pleas | 1 | | | | |
| 3S1E16L007 | P6 | Pleas 6 | Amador | L | muni | active | Pleas | 1 | | | | |
| 3S1E16P005 | 16P5 | Vervais Monitor | Amador | U | monitor | active | Zone 7 | 2 | | | X | |
| 3S1E17B004 | 17B4 | Casterson | Amador | L | supply | unknown | Zone 7 | 1 | | | | |
| 3S1E17D003 | 17D3 | Hopyard Nested Shallow | Bernal | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E17D004 | 17D4 | Hopyard Nested Middle 1 | Bernal | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E17D005 | 17D5 | Hopyard Nested Middle 2 | Bernal | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E17D006 | 17D6 | Hopyard Nested Middle 3 | Bernal | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E17D007 | 17D7 | Hopyard Nested Deep | Bernal | D | nested | active | Zone 7 | 1 | | | | |
| 3S1E17D011 | 17D11 | Hopyard 9 Monitoring Well | Bernal | L | monitor | active | Zone 7 | 1 | | | | |
| 3S1E17D012 | H9 | Hopyard 9 | Bernal | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E18A006 | H6 | Hopyard 6 | Bernal | L | muni | active | Zone 7 | 4 | | | | X |
| 3S1E18E004 | 18E4 | Valley Trails II | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E18J002 | 18J2 | camino segura | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E19A010 | SF-B | SFWD South (B) | Bernal | L | muni | active | Zone 7 | 1 | | | | |
| 3S1E19A011 | SF-A | SFWD North (A) | Bernal | L | muni | active | Zone 7 | 1 | | | | |
| 3S1E19C004 | 19C4 | del valle & laguna | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E19K001 | 19K1 | 680/bernal | Bernal | U | monitor | active | Zone 7 | 1 | | | | |

**TABLE 6-1**
**MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM**
**LIVERMORE VALLEY GROUNDWATER BASIN**

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E20B002 | 20B2 | Fairgrounds Potable | Bernal | L | supply | active | Zone 7 | 1 | | | | |
| 3S1E20C003 | 20C3 | Fairgrounds Potable Backup | Bernal | L | supply | active | Zone 7 | 1 | | | | |
| 3S1E20C007 | 20C7 | Key_Bern_U | Bernal | U | monitor | active | Zone 7 | 2 | X | X | X | |
| 3S1E20C008 | 20C8 | Key_Bern_L | Bernal | L | nested | active | Zone 7 | 1 | X | X | | |
| 3S1E20C009 | 20C9 | Fair Nested Deep | Bernal | L | nested | active | Zone 7 | 1 | | | | |
| 3S1E20J004 | 20J4 | civic center | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E20M011 | 20M11 | S.F "M"LINE | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E20Q002 | 20Q2 | 20Q2 | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E22D002 | 22D2 | vineyard trailer | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E23J001 | 23J1 | 1627 vineyard trailer | Amador | L | domestic | unknown | Zone 7 | 1 | | | | |
| 3S1E25C003 | 25C3 | Katz Winery Mansion | Amador | U | monitor | unknown | Zone 7 | 1 | | | | |
| 3S1E28M002 | 28M2 | Bargar | Upland | U | supply | active | Zone 7 | 1 | | | | |
| 3S1E29M004 | 29M4 | f.c. channel | Castle | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E29P002 | 29P2 | castlewood dr | Bernal | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1E33G005 | 33G5 | Pleasanton Calippe 33G5 | Upland | U | monitor | unknown | Zone 7 | 1 | | | | |
| 3S1W01B009 | 1B9 | DSRSD Shallow | Dublin | L | nested | unknown | Zone 7 | 1 | | | | |
| 3S1W01B010 | 1B10 | DSRSD Middle | Dublin | L | nested | unknown | Zone 7 | 1 | | | | |
| 3S1W01B011 | 1B11 | DSRSD Deep | Dublin | L | nested | unknown | Zone 7 | 1 | | | | |
| 3S1W01J001 | 1J1 | DSRSD MW-1 | Dublin | U | monitor | unknown | Other | 1 | | | | |
| 3S1W02A002 | 2A2 | McNamara's | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1W12B002 | 12B2 | Stoneridge Mall Rd | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1W12J001 | 12J1 | DSRSD South | Dublin | U | monitor | active | Zone 7 | 1 | | | | |
| 3S1W13J001 | 13J1 | muirwood dr | Castle | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E01F002 | 1F2 | Brisa at Circuit City | Spring | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E02B002 | 2B2 | south front rd | Spring | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E03A001 | 3A1 | Bluebell | Spring | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E03K003 | 3K3 | first & S. front rd | Mocho I | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E05N001 | 5N1 | Spider Well | Mocho II | M | supply | inactive | Zone 7 | 1 | | | | |
| 3S2E07C002 | 7C2 | jaws - york way - G4 | Mocho II | U | monitor | active | Zone 7 | 4 | | | | |
| 3S2E07H002 | 7H2 | dakota | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E07N002 | 7N2 | Isabel & Arroyo Mocho | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E07P003 | CWS24 | CWS 24 | Amador | L | muni | active | Zone 7 | 1 | | | | |
| 3S2E07R003 | CWS31 | CWS 31 | Upland | L | muni | active | Zone 7 | 1 | | | | |
| 3S2E08F001 | CWS10 | CWS 10 | Mocho II | L | muni | active | CWS | 1 | | | | |
| 3S2E08H002 | 8H2 | North k | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |

**TABLE 6-1**
**MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM**
**LIVERMORE VALLEY GROUNDWATER BASIN**

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S2E08H003 | 8H3 | Key_Mo2_L | Mocho II | L | nested | active | Zone 7 | 1 | X | X | | |
| 3S2E08H004 | 8H4 | N Liv Ave Deep | Mocho II | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E08K002 | 8K2 | Key_Mo2_U (Livermore Key) | Mocho II | U | monitor | active | Zone 7 | 1 | X | X | | |
| 3S2E08N002 | CWS14 | CWS 14 | Mocho II | L | muni | active | Zone 7 | 1 | | | | |
| 3S2E08Q009 | 8Q 9 | D-2 | Mocho II | L | monitor | active | Zone 7 | 1 | | | | |
| 3S2E09Q001 | CWS9 | CWS 9 | Mocho II | L | muni | active | CWS | 1 | | | | |
| 3S2E09Q004 | 9Q4 | school st | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E10F003 | 10F3 | hexcel | Mocho I | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E10Q001 | 10Q1 | almond | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E10Q002 | 10Q2 | LLNL W-703 | Mocho II | L | monitor | unknown | LLNL | 1 | | | | |
| 3S2E11C001 | 11C1 | joan way | Mocho I | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E12C004 | 12C4 | LLNL W-486 | Spring | U | monitor | unknown | LLNL | 1 | | | | |
| 3S2E12J003 | 12J3 | LLNL W-017A | Spring | L | monitor | unknown | LLNL | 1 | | | | |
| 3S2E14A003 | 14A3 | S. vasco @east ave | Mocho I | U | monitor | active | LLNL | 1 | | | | |
| 3S2E14B001 | 14B1 | 5763 east ave | Mocho I | L | domestic | unknown | Zone 7 | 1 | | | | |
| 3S2E15E002 | 15E2 | Retzlaff Winery | Mocho II | L | irrigation | active | Zone 7 | 1 | | | | |
| 3S2E15L001 | 15L1 | Concannon 2 | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E15L002 | 15L2 | Concannon 6D | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E15M002 | 15M2 | Concannon 1 | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E15M003 | 15M3 | Concannon 5D | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E15Q008 | 15Q 8 | Concannon 4 | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E15R017 | 15R17 | Buena Vista Shallow | Mocho II | U | nested | active | Zone 7 | 1 | | | | |
| 3S2E15R018 | 15R18 | Buena Vista Deep | Mocho II | L | monitor | active | Zone 7 | 1 | | | | |
| 3S2E15R020 | 15R20 | Concannon 3 | Mocho II | U | monitor | active | Other | 1 | | | | |
| 3S2E16A003 | 16A3 | Memory Gardens | Mocho II | L | irrigation | active | Zone 7 | 1 | | | | |
| 3S2E16C001 | CWS15 | CWS 15 | Mocho II | L | muni | active | Zone 7 | 1 | | | | |
| 3S2E16E004 | 16E4 | pepper tree | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E18B001 | CWS20 | CWS 20 | Amador | L | muni | active | Zone 7 | 1 | | | | |
| 3S2E18E001 | 18E1 | Stanley East of Isabel | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E19D007 | 19D7 | Isabel Shallow | Amador | U | nested | active | Zone 7 | 1 | | | | |
| 3S2E19D008 | 19D8 | Isabel Middle 1 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E19D009 | 19D9 | Isabel Middle 2 | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E19D010 | 19D10 | Isabel Deep | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E19K001 | 19K1 | Cavicchi | Amador | L | supply | active | Zone 7 | 1 | | | | |
| 3S2E19N003 | 19N3 | Shallow Cemex Nested | Amador | U | nested | active | Zone 7 | 1 | | | | |

## TABLE 6-1
## MONITORING WELLS IN 2021 GROUNDWATER QUALITY PROGRAM
## LIVERMORE VALLEY GROUNDWATER BASIN

| Well | Map | Alias | Basin | Aquifer | Type | Status | Sampled By | Frequency (per year) | RMS-WQ | Key | WR | Muni |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S2E19N004 | 19N4 | Deep Cemex Nested | Amador | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E20M001 | 20M1 | Alden Lane | Amador | L | supply | unknown | Zone 7 | 1 | | | | |
| 3S2E20R002 | 20R2 | Ravenswood South Well | Upland | U | irrigation | active | Zone 7 | 1 | | | | |
| 3S2E21K009 | 21K9 | Hughey Marina Ave | Upland | U | domestic | active | Zone 7 | 1 | | | | |
| 3S2E22B001 | 22B1 | grapes | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E23E001 | 23E1 | Murrieta Nested Shallow | Mocho II | U | nested | active | Zone 7 | 1 | | | | |
| 3S2E23E002 | 23E2 | Murrieta Nested Deep | Mocho II | L | nested | active | Zone 7 | 1 | | | | |
| 3S2E24A001 | 24A1 | S. greenville | Mocho I | U | monitor | active | Zone 7 | 1 | X | | | |
| 3S2E26J002 | 26J2 | mines rd | Mocho II | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E29F004 | 29F4 | Wetmore | Amador | U | monitor | active | Zone 7 | 2 | | | X | |
| 3S2E30C001 | 30C1 | Vineyard 30C 1 | Amador | L | supply | active | Zone 7 | 1 | | | | |
| 3S2E30D002 | 30D2 | vineyard | Amador | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E32E007 | 32E7 | DVWTP 32E7 | Upland | U | monitor | active | Zone 7 | 1 | | | | |
| 3S2E33C001 | 33C1 (P1) | Sycamore Grove P1 | Amador | U | monitor | inactive | Zone 7 | 1 | | | | |
| 3S2E33G001 | 33G1 | Crohare | Amador | U | monitor | active | Zone 7 | 2 | | | X | |
| 3S3E06Q003 | 6Q3 | PPWTP South Monitoring | Altamont | U | monitor | active | Zone 7 | 1 | | | | |
| 3S3E07D002 | 7D2 | 7D 2 | Spring | U | monitor | active | LLNL | 1 | | | | |
| 3S3E19C002 | 19C2 | Wilker well 2 | Mocho I | U | domestic | active | Zone 7 | 1 | | | | |
| 3S3E20L004 | 20L 4 | Vail on Tesla | Mocho I | U | domestic | active | Zone 7 | 1 | | | | |
| 3S3E20R004 | 20R 4 | Buonanno on Tesla | Mocho I | U | domestic | active | Zone 7 | 1 | | | | |
| 3S3E21C001 | 21C1 | Russell on Reuss | Upland | U | domestic | active | Zone 7 | 1 | | | | |
| 4S2E01A001 | 1A1 | Gallagher Ag | Mocho II | U | irrigation | active | Zone 7 | 1 | | | | |
| 4S3E06E004 | 6E4 | Gallagher Domestic | Mocho II | U | domestic | active | Zone 7 | 1 | | | | |
| WELLS IN GROUNDWATER QUALITY PROGRAM = 233 | | | | | | | | | | | | |

RMS = Representative Monitoring Sites
WQ-Water Quality
WR = Water Rights
Muni = Municipal

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 2S1E32E001 | 3/2/21 | ZONE7 | 20.7 | 1417 | 7 | 138 | 34 | 123 | 1.4 | 643 | 30 | 131 | 8.7 | 42.8 | < 100 | 3.3 | < 100 | < 1 | 855 | 485 |
| 2S1E32N001 | 3/2/21 | ZONE7 | 23.4 | 940 | 7.4 | 75 | 20 | 103 | 1.8 | 322 | 35 | 127 | 2.39 | 27.8 | 480 | 1.8 | < 100 | 4 | 559 | 270 |
| 2S1E32Q001 | 3/2/21 | ZONE7 | 22.9 | 2051 | 7 | 156 | 66 | 194 | 2.3 | 602 | 87 | 353 | 4.8 | 32.1 | 740 | < 2 | < 200 | < 2 | 1208 | 662 |
| 2S1E33L001 | 3/2/21 | ZONE7 | 18.9 | 1427 | 7.2 | 116 | 32 | 154 | 2.6 | 543 | 50 | 179 | 5.56 | 30 | 440 | 1.9 | < 100 | 4.7 | 856 | 422 |
| 2S1E33P002 | 5/4/21 | ZONE7 | 21.4 | 2372 | 7.1 | 165 | 77 | 221 | 2.5 | 866 | 63 | 371 | 0.96 | 25.7 | 890 | < 2 | < 200 | 5.8 | 1356 | 729 |
| 2S1E33R001 | 5/4/21 | ZONE7 | 25.7 | 749 | 7.5 | 57 | 15 | 71 | 1 | 267 | 17 | 95 | 3.97 | 27.8 | 110 | 2.1 | < 100 | 24 | 433 | 204 |
| 2S1W26C002 | 3/2/21 | ZONE7 | 20 | 734 | 6.8 | 104 | 21 | 44 | 0.9 | 382 | 36 | 33 | 5.49 | 32.1 | 100 | 2.9 | < 100 | < 1 | 483 | 347 |
| 2S1W36E003 | 3/2/21 | ZONE7 | 21.9 | 957 | 7 | 125 | 26 | 61 | 0.7 | 411 | 89 | 69 | 4.57 | 38.5 | 120 | 4.5 | < 100 | < 1 | 632 | 419 |
| 2S1W36F001 | 6/30/21 | ZONE7 | 20.2 | 690 | 7.4 | 56 | 22 | 76 | 2.5 | 382 | 13 | 34 | < 0.1 | 19.9 | 270 | 12 | < 100 | 2.2 | 412 | 231 |
| 2S1W36F002 | 6/30/21 | ZONE7 | 24 | 837 | 7.6 | 37 | 16 | 135 | 0.8 | 396 | < 1 | 100 | < 0.1 | 23.5 | 600 | 145 | 252 | < 1 | 508 | 158 |
| 2S2E21L001 | 9/21/21 | ZONE7 | 19.2 | 1301 | 7.6 | 57 | 34 | 179 | 1.2 | 367 | 36 | 198 | 19.8 | 34.2 | 510 | 5.7 | < 100 | 4.6 | 809 | 282 |
| 2S2E27M002 | 2/4/21 | ZONE7 | - | 1994 | 7.9 | 55 | 59 | 292 | 0.9 | 591 | 144 | 297 | 10.3 | 36.4 | 2700 | 6.1 | < 100 | 3.4 | 1225 | 381 |
| 2S2E27P002 | 3/29/21 | ZONE7 | 20.7 | 4676 | 7.7 | 75 | 44 | 833 | 2.1 | 214 | < 1 | 1470 | < 0.1 | 27.8 | 27000 | < 5 | 611 | < 5 | 2558 | 369 |
| 2S2E28D002 | 3/29/21 | ZONE7 | 21.5 | 1535 | 7.5 | 81 | 44 | 195 | 2.6 | 266 | 45 | 278 | 41.2 | 34.2 | 560 | 3.6 | < 100 | 6.7 | 994 | 383 |
| 2S2E28J002 | 5/11/21 | ZONE7 | 19.6 | 964 | 8.3 | 4 | 4 | 212 | 0.5 | 384 | 60 | 87 | < 0.1 | 20.3 | 1620 | < 1 | < 100 | < 1 | 580 | 26 |
| 2S2E28Q001 | 3/29/21 | ZONE7 | 24.4 | 1148 | 7.8 | 38 | 34 | 179 | 1 | 369 | 99 | 146 | 2.67 | 34.2 | 540 | 12 | < 100 | < 1 | 726 | 235 |
| 2S2E32K002 | 3/29/21 | ZONE7 | 19.6 | 939 | 7.6 | 39 | 32 | 133 | 1.8 | 322 | 58 | 126 | 2.37 | 40.7 | 360 | 6.2 | < 100 | 13 | 600 | 230 |
| 2S2E34E001 | 3/29/21 | ZONE7 | 24.1 | 1244 | 8.1 | 9 | 10 | 242 | 0.5 | 383 | 74 | 151 | < 0.1 | 27.8 | 2300 | 32 | < 100 | < 1 | 707 | 63 |
| 2S2E34Q002 | 3/29/21 | ZONE7 | 20.9 | 1817 | 7.5 | 68 | 59 | 210 | 1.2 | 269 | 143 | 390 | 0.92 | 32.1 | 2380 | 4.1 | < 100 | 1.1 | 1040 | 413 |
| 3S1E01F002 | 3/30/21 | ZONE7 | 21.5 | 1442 | 7 | 106 | 43 | 129 | 0.8 | 540 | 24 | 176 | 7.72 | 51.4 | 150 | 5.7 | < 100 | 2.8 | 830 | 442 |
| 3S1E01H003 | 3/30/21 | ZONE7 | 22.6 | 1838 | 7.3 | 65 | 41 | 251 | 1.3 | 475 | 76 | 303 | 13.3 | 30 | 550 | 4.9 | < 100 | 6.3 | 1061 | 331 |
| 3S1E01H003 | 4/21/21 | LWRP | - | 1840 | - | 76 | 37 | 260 | 1.2 | - | 74 | 250 | 17 | 31 | 1600. | - | - | - | 1110 | - |
| 3S1E01H003 | 9/21/21 | LWRP | - | 1730 | - | 72 | 45 | 270 | 1.3 | - | 66 | 345 | 11.6 | 30 | < 0. | - | - | - | 1010 | - |
| 3S1E01L001 | 3/30/21 | ZONE7 | 23.9 | 1687 | 7.2 | 76 | 37 | 239 | 1.3 | 551 | 46 | 249 | 13.3 | 32.1 | 2200 | 4.5 | < 100 | 9.6 | 1011 | 342 |
| 3S1E01P002 | 4/21/21 | LWRP | - | 1420 | - | 66 | 37 | 160 | 1.5 | - | 80 | 210 | 0.5 | 22 | 3400. | - | - | - | 800 | - |
| 3S1E01P002 | 9/21/21 | LWRP | - | 1410 | - | 70 | 46 | 190 | 1.7 | - | 80 | 263 | 0.6 | 22 | < 0. | - | - | - | 820 | - |
| 3S1E02J002 | 3/30/21 | ZONE7 | 20.7 | 4558 | 7 | 268 | 139 | 599 | 1.9 | 633 | 284 | 1118 | 8.69 | 30 | 5110 | 5.3 | < 500 | < 5 | 2790 | 1243 |
| 3S1E02J003 | 9/23/21 | ZONE7 | 25.2 | 1787 | 7.3 | 61 | 34 | 257 | 29 | 378 | 92 | 357 | 1.21 | 21.4 | 1270 | 8.3 | < 200 | 30 | 1043 | 292 |
| 3S1E02K002 | 3/30/21 | ZONE7 | 23.2 | 1158 | 7.7 | 21 | 21 | 219 | 1.7 | 487 | 50 | 99 | 7.66 | 21.4 | 650 | 6 | < 100 | 10 | 708 | 139 |
| 3S1E02M003 | 5/19/21 | ZONE7 | 20.9 | 2051 | 7.4 | 41 | 41 | 338 | 1.8 | 828 | 76 | 204 | 1.13 | 27.8 | 2830 | 4.1 | < 200 | 18 | 1142 | 271 |
| 3S1E02N006 | 5/19/21 | ZONE7 | 19.9 | 1593 | 7.3 | 52 | 52 | 201 | 1.3 | 522 | 83 | 247 | < 0.1 | 19.5 | 3210 | 3.2 | < 100 | < 1 | 913 | 344 |
| 3S1E02P003 | 5/19/21 | ZONE7 | 20 | 857 | 7.8 | 33 | 33 | 99 | 1.7 | 326 | 55 | 87 | 3.28 | 25.7 | 750 | 2.6 | < 100 | 3.1 | 510 | 218 |
| 3S1E02Q001 | 5/19/21 | ZONE7 | 24.6 | 2101 | 7.5 | 59 | 59 | 258 | 5.7 | 510 | 139 | 326 | 0.76 | 17.5 | 3240 | 3.5 | 327 | < 2 | 1120 | 391 |
| 3S1E02R001 | 4/21/21 | LWRP | - | 1480 | - | 73 | 44 | 160 | 1 | - | 68 | 190 | 3.7 | 25 | 3200. | - | - | - | 880 | - |
| 3S1E02R001 | 9/21/21 | LWRP | - | 1480 | - | 75 | 55 | 180 | 1.1 | - | 65 | 249 | 2.9 | 25 | < 0. | - | - | - | 870 | - |
| 3S1E03G002 | 3/2/21 | ZONE7 | 18.3 | 1579 | 7.3 | 71 | 36 | 218 | 2.3 | 670 | 24 | 188 | < 0.1 | 25.7 | 1150 | 5.3 | 126 | < 1 | 895 | 326 |
| 3S1E04A001 | 3/2/21 | ZONE7 | 21.1 | 1699 | 7.2 | 140 | 35 | 187 | 1.9 | 521 | 42 | 309 | 4.52 | 25.7 | 480 | 2.2 | < 100 | 2.3 | 1017 | 494 |
| 3S1E04J005 | 4/19/21 | ZONE7 | 22.5 | 3344 | 7.6 | 32 | 50 | 618 | 0.9 | 1117 | 242 | 437 | 6.6 | 18.2 | 11500 | 10 | < 500 | < 5 | 1981 | 286 |
| 3S1E04J006 | 4/19/21 | ZONE7 | 18.2 | 2126 | 7.2 | 111 | 47 | 208 | 2.2 | 463 | 98 | 385 | 1.32 | 23.5 | 1740 | 2.2 | < 200 | < 2 | 1109 | 472 |
| 3S1E04Q002 | 4/19/21 | ZONE7 | 18.7 | 1994 | 7.4 | 88 | 61 | 234 | 1.7 | 525 | 105 | 344 | 3.59 | 21.4 | 2500 | 3.9 | < 100 | 8.7 | 1130 | 471 |
| 3S1E05K006 | 4/20/21 | ZONE7 | 19.8 | 2021 | 7.5 | 126 | 57 | 241 | 1.4 | 689 | 237 | 226 | 9.95 | 21.4 | 1730 | 2.1 | < 200 | < 2 | 1294 | 550 |
| 3S1E05K007 | 4/20/21 | ZONE7 | 20.1 | 964 | 7.9 | 43 | 27 | 133 | 1.2 | 358 | 133 | 70 | < 0.1 | 23.5 | 870 | 4.5 | < 100 | < 1 | 610 | 219 |
| 3S1E05L003 | 4/19/21 | ZONE7 | 18.1 | 1315 | 7.4 | 56 | 35 | 170 | 0.9 | 454 | 162 | 116 | < 0.1 | 23.5 | 880 | 3.3 | < 100 | < 1 | 788 | 284 |
| 3S1E05P006 | 4/19/21 | ZONE7 | 22.4 | 4285 | 7.1 | 240 | 168 | 431 | 1.4 | 586 | 1056 | 578 | 4.01 | 27.8 | 1530 | < 5 | < 500 | < 5 | 2809 | 1292 |
| 3S1E06F003 | 3/2/21 | ZONE7 | 23.5 | 4421 | 7 | 357 | 140 | 500 | 3.4 | 557 | 687 | 944 | < 0.1 | 23.5 | 2640 | < 5 | < 500 | < 5 | 2929 | 1469 |
| 3S1E06M002 | 11/30/20 | DSRSD | 17.6 | 8494 | 7.16 | - | - | - | - | - | 2960 | 355 | < 5 | - | - | 5.2 | - | 0.23J | 7160 | - |
| 3S1E06M002 | 4/29/21 | DSRSD | 18.3 | 8333 | 6.88 | - | - | - | - | - | 3000 | 371 | < 5 | - | - | 4.7J | - | < 5 | 7280 | - |
| 3S1E06N002 | 12/1/20 | DSRSD | 17.6 | 22540 | 6.84 | - | - | - | - | - | 1320 | 8770 | < 5 | - | - | 9.5 | - | 0.3J | 17200 | - |
| 3S1E06N002 | 4/29/21 | DSRSD | 22.5 | 24610 | 6.64 | - | - | - | - | - | 1360 | 9420 | < 5 | - | - | 10 | - | < 5 | 16700 | - |

\- = Not Analyzed
Highlighted = Representative Monitoring Site

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 3S1E06N003 | 11/30/20 | DSRSD | 17.8 | 11460 | 7.2 | - | - | - | - | - | 257 | 2060 | < 5 | - | - | 6.2 | - | 2.1J | 7120 | - |
| 3S1E06N003 | 4/29/21 | DSRSD | 23.2 | 11360 | 7.17 | - | - | - | - | - | 198 | 4110 | < 5 | - | - | 6.5 | - | < 5 | 6700 | - |
| 3S1E06N004 | 12/1/20 | DSRSD | 18.4 | 6040 | 7.5 | - | - | - | - | - | 2670 | 333 | < 5 | - | - | 8 | - | 0.73J | 5480 | - |
| 3S1E06N004 | 4/29/21 | DSRSD | 22.3 | 3208 | 7.15 | - | - | - | - | - | 930 | 115 | < 5 | - | - | 8.4 | - | 1.2J | 2430 | - |
| 3S1E06N005 | 12/1/20 | DSRSD | 19 | 32220 | 6.78 | - | - | - | - | - | 4760 | 10700 | < 5 | - | - | 6.2 | - | 0.82J | 24200 | - |
| 3S1E06N005 | 4/29/21 | DSRSD | 21.7 | 31620 | 6.82 | - | - | - | - | - | 6050 | 14200 | < 5 | - | - | 5.6 | - | < 5 | 24700 | - |
| 3S1E06N006 | 12/1/20 | DSRSD | 18.8 | 24760 | 6.65 | - | - | - | - | - | 1410 | 9310 | < 5 | - | - | 4.7J | - | 0.22J | 16500 | - |
| 3S1E06N006 | 4/29/21 | DSRSD | 23.5 | 24730 | 6.82 | - | - | - | - | - | 1360 | 10900 | < 5 | - | - | 5.4 | - | < 5 | 17400 | - |
| 3S1E07B002 | 4/20/21 | ZONE7 | 19.8 | 688 | 7.6 | 7 | 7 | 133 | 1.4 | 237 | 20 | 93 | < 0.1 | 9.2 | 860 | 2.2 | < 100 | < 1 | 394 | 47 |
| 3S1E07B012 | 4/20/21 | ZONE7 | 20.9 | 15950 | 7.1 | 532 | 441 | 2690 | < 10 | 347 | 2132 | 5015 | < 0.1 | 25.7 | < 2000 | < 20 | < 2000 | < 20 | 11007 | 3143 |
| 3S1E07D001 | 11/30/20 | DSRSD | 20.4 | 5317 | 6.82 | - | - | - | - | - | 188 | 1580 | < 5 | - | - | 23.6 | - | 1.2J | 3370 | - |
| 3S1E07D001 | 4/28/21 | DSRSD | 23 | 5011 | 7 | - | - | - | - | - | 158 | 1560 | < 5 | - | - | 14.8 | - | < 5 | 3340 | - |
| 3S1E07D002 | 11/30/20 | DSRSD | 20.6 | 23420 | 7.02 | - | - | - | - | - | 10800 | 3850 | < 5 | - | - | 26.5 | - | < 5 | 24600 | - |
| 3S1E07D002 | 4/28/21 | DSRSD | 22 | 23320 | 6.82 | - | - | - | - | - | 14400 | 5860 | 0.1 | - | - | 32.7 | - | < 5 | 24100 | - |
| 3S1E07D003 | 11/30/20 | DSRSD | 18.7 | 19130 | 6.6 | - | - | - | - | - | 575 | 6960 | < 5 | - | - | 49.9 | - | 1.8J | 12100 | - |
| 3S1E07D003 | 4/29/21 | DSRSD | 17.3 | 19060 | 6.46 | - | - | - | - | - | 475 | 9770 | < 5 | - | - | 48.4 | - | < 5 | 13800 | - |
| 3S1E07D004 | 12/1/20 | DSRSD | 18.3 | 35490 | 6.64 | - | - | - | - | - | 8450 | 10800 | < 5 | - | - | 5 | - | 0.26J | 30900 | - |
| 3S1E07D004 | 4/29/21 | DSRSD | 17.4 | 34760 | 6.54 | - | - | - | - | - | 9710 | 12700 | < 5 | - | - | 4J | - | 1.6J | 29700 | - |
| 3S1E07G007 | 4/19/21 | ZONE7 | 19.3 | 18330 | 7 | 394 | 526 | 3060 | 4.5 | 483 | 3028 | 5277 | 0.11 | 18.6 | 4380 | < 20 | < 2000 | < 20 | 12547 | 3148 |
| 3S1E07J005 | 3/8/21 | ZONE7 | 17.4 | 2382 | 7.3 | 106 | 93 | 382 | 2.1 | 950 | 341 | 178 | < 0.1 | 25.7 | 5910 | < 5 | < 500 | < 5 | 1596 | 648 |
| 3S1E07J005 | 8/10/21 | ZONE7 | 25.3 | 2373 | 7.2 | 106 | 88 | 347 | 1.8 | 877 | 328 | 183 | < 0.1 | 25.7 | 5620 | 2.8 | < 200 | < 2 | 1512 | 628 |
| 3S1E08G004 | 5/4/21 | ZONE7 | 20.6 | 2381 | 7.3 | 92 | 80 | 293 | 2.1 | 702 | 191 | 363 | 5.3 | 27.8 | 3890 | 2 | < 200 | 9.8 | 1418 | 560 |
| 3S1E08H009 | 7/6/21 | ZONE7 | 26.4 | 955 | 7.6 | 56 | 48 | 75 | 1.8 | 380 | 46 | 92 | 5.24 | 27.8 | 790 | 2.5 | < 100 | 8.4 | 557 | 338 |
| 3S1E08H010 | 7/6/21 | ZONE7 | 20.5 | 1209 | 7.5 | 55 | 39 | 148 | 2.1 | 441 | 86 | 136 | 3.97 | 30 | 1640 | 1.9 | < 100 | 6.7 | 731 | 296 |
| 3S1E08H011 | 7/6/21 | ZONE7 | 19.9 | 1040 | 7.4 | 56 | 41 | 108 | 2.3 | 361 | 75 | 129 | 1.29 | 27.8 | 1160 | 1.2 | < 100 | 4 | 623 | 308 |
| 3S1E08H013 | 8/31/21 | ZONE7 | 21 | 1291 | 7.2 | 79 | 52 | 111 | 2.8 | 457 | 68 | 137 | 3.48 | 27.8 | 1320 | < 1 | < 100 | 3 | 718 | 412 |
| 3S1E08H018 | 10/5/20 | ZONE7 | 19.9 | 1377 | 7.4 | 90 | 62 | 116 | 3.3 | 455 | 111 | 170 | 2.74 | 27.8 | 1320 | < 1 | < 100 | 4.3 | 817 | 481 |
| 3S1E08H018 | 4/12/21 | ZONE7 | 20.2 | 1184 | 7.5 | 75 | 52 | 99 | 2.9 | 423 | 87 | 148 | 2.8 | 27.8 | 1120 | 1.2 | < 100 | 4.3 | 713 | 402 |
| 3S1E08H018 | 6/17/21 | ZONE7 | 21.3 | 1207 | 7.4 | 84 | - | - | - | 410 | - | - | - | - | - | - | - | - | - | - |
| 3S1E08H018 | 7/12/21 | ZONE7 | 20.1 | 1177 | 7.4 | 68 | 48 | 93 | 2.6 | 415 | 79 | 113 | 2.58 | 27.8 | 1020 | 1.1 | < 100 | 4 | 648 | 368 |
| 3S1E08K001 | 7/13/21 | ZONE7 | 25.5 | 1932 | 7.2 | 139 | 100 | 112 | 3.1 | 683 | 231 | 184 | 2.48 | 27.8 | 1700 | 1.1 | < 100 | 5.7 | 1144 | 760 |
| 3S1E08N001 | 3/8/21 | ZONE7 | 17.5 | 2123 | 7.1 | 154 | 104 | 196 | 3.4 | 799 | 299 | 181 | 2.64 | 30 | 2710 | < 2 | < 200 | 4 | 1372 | 813 |
| 3S1E09B001 | 12/17/20 | ZONE7 | 18.6 | 1237 | 7.6 | 90 | 59 | 81 | 2.6 | 435 | 75 | 142 | 3.24 | 27.8 | 710 | 1.5 | < 100 | 4.7 | 707 | 468 |
| 3S1E09B001 | 7/21/21 | ZONE7 | - | 1084 | 7.3 | 70 | 62 | 70 | 2.3 | 423 | 68 | 136 | 3.09 | 25.7 | 680 | 1.7 | 373 | 5.3 | 657 | 430 |
| 3S1E09H013 | 2/16/21 | ZONE7 | - | 792 | 7.5 | 42 | 40 | 63 | 1.6 | 258 | 48 | 99 | < 0.1 | 17.1 | 540 | < 1 | < 100 | < 1 | 438 | 270 |
| 3S1E09J007 | 9/8/21 | ZONE7 | 21.8 | 738 | 7.3 | 48 | 30 | 57 | 1.8 | 247 | 48 | 103 | < 0.1 | 15.2 | 520 | < 1 | < 100 | < 1 | 425 | 244 |
| 3S1E09J008 | 9/8/21 | ZONE7 | 30.1 | 835 | 7.4 | 78 | 35 | 38 | 1.8 | 288 | 56 | 111 | 0.18 | 20.3 | 540 | < 1 | < 100 | 1.4 | 483 | 339 |
| 3S1E09J009 | 9/8/21 | ZONE7 | 34.3 | 830 | 7.4 | 60 | 53 | 26 | 1.9 | 317 | 44 | 76 | 3.38 | 27.8 | 260 | < 1 | < 100 | 8 | 460 | 368 |
| 3S1E09M003 | 10/5/20 | ZONE7 | 17.9 | 961 | 7.4 | 64 | 40 | 78 | 2.1 | 307 | 69 | 115 | 1.19 | 21.4 | 810 | < 1 | < 100 | 3.5 | 546 | 326 |
| 3S1E09M003 | 7/12/21 | ZONE7 | 18 | 919 | 7.4 | 60 | 40 | 63 | 1.9 | 305 | 61 | 92 | 1.05 | 23.5 | 670 | < 1 | < 100 | 3.2 | 497 | 315 |
| 3S1E09M004 | 10/5/20 | ZONE7 | 18.5 | 1063 | 7.5 | 52 | 40 | 113 | 2.3 | 347 | 81 | 124 | 1.42 | 25.7 | 1190 | 1 | < 100 | 4.3 | 616 | 295 |
| 3S1E09M004 | 4/12/21 | ZONE7 | 19.1 | 1035 | 7.5 | 51 | 43 | 107 | 2.2 | 349 | 76 | 126 | 2.21 | 27.8 | 1140 | 1.1 | < 100 | 4.1 | 615 | 305 |
| 3S1E09M004 | 6/17/21 | ZONE7 | 19.8 | 1046 | 7.5 | 62 | - | - | - | 350 | - | - | - | - | - | - | - | - | - | - |
| 3S1E09M004 | 7/14/21 | ZONE7 | 18.3 | 1076 | 7.4 | 49 | 42 | 107 | 2.1 | 356 | 74 | 107 | 2.06 | 25.7 | 1180 | 1.1 | < 100 | 4.4 | 592 | 295 |
| 3S1E09P005 | 9/8/21 | ZONE7 | 23.7 | 743 | 7 | 52 | 25 | 49 | 1.9 | 223 | 50 | 99 | 0.13 | 16.9 | 470 | < 1 | < 100 | < 1 | 404 | 233 |
| 3S1E09P009 | 8/31/21 | ZONE7 | 31.9 | 798 | 7.3 | 50 | 29 | 62 | 1.9 | 245 | 52 | 88 | 0.17 | 21.4 | 610 | < 1 | < 100 | 1.2 | 426 | 244 |
| 3S1E09P010 | 8/31/21 | ZONE7 | 29.4 | 922 | 7.2 | 83 | 39 | 51 | 1.8 | 343 | 60 | 99 | 1.08 | 21.4 | 480 | < 1 | < 100 | 2.1 | 529 | 369 |
| 3S1E09P011 | 8/31/21 | ZONE7 | 20.1 | 446 | 7.6 | 30 | 13 | 52 | 1.3 | 218 | 32 | 18 | < 0.1 | 21 | 530 | 6.8 | < 100 | < 1 | 275 | 129 |
| 3S1E10A002 | 6/7/21 | ZONE7 | 18.5 | 1902 | 7.2 | 76 | 76 | 208 | 2.2 | 566 | 128 | 291 | 9.29 | 30 | 2700 | 1.5 | < 100 | 4.1 | 1131 | 503 |

- = Not Analyzed

Highlighted = Representative Monitoring Site

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 3S1E10B008 | 9/15/21 | ZONE7 | 19.6 | 1388 | 7.3 | 71 | 73 | 148 | 2.1 | 563 | 79 | 151 | 9.82 | 27.8 | 2510 | 1.9 | < 100 | 13 | 873 | 479 |
| 3S1E10B009 | 9/15/21 | ZONE7 | 24 | 1017 | 7.6 | 61 | 57 | 82 | 2.2 | 384 | 61 | 120 | 5.79 | 25.7 | 1240 | 1.8 | < 100 | 6.9 | 625 | 387 |
| 3S1E10B010 | 9/15/21 | ZONE7 | 27.3 | 733 | 7.5 | 48 | 45 | 42 | 1.7 | 297 | 44 | 75 | 3.12 | 27.8 | 410 | 1.2 | < 100 | 7.8 | 444 | 305 |
| 3S1E10B011 | 9/15/21 | ZONE7 | 22.5 | 516 | 7.7 | 31 | 23 | 51 | 1.6 | 213 | 35 | 42 | 2.82 | 27.8 | 440 | 3.6 | < 100 | 2.3 | 329 | 173 |
| 3S1E10B014 | 9/15/21 | ZONE7 | 26.1 | 708 | 7.4 | 50 | 49 | 34 | 1.7 | 301 | 41 | 70 | 3.39 | 27.8 | 340 | < 1 | < 100 | 8.5 | 437 | 327 |
| 3S1E10B016 | 4/12/21 | ZONE7 | 19 | 660 | 7.6 | 44 | 43 | 33 | 1.7 | 293 | 39 | 47 | 3.62 | 27.8 | 310 | 1.1 | < 100 | 12 | 396 | 287 |
| 3S1E10B016 | 7/12/21 | ZONE7 | 18.7 | 689 | 7.4 | 42 | 42 | 32 | 1.7 | 295 | 35 | 50 | 3.37 | 25.7 | 320 | 1.1 | < 100 | 12 | 389 | 278 |
| 3S1E10D002 | 9/21/21 | ZONE7 | 26.5 | 1302 | 7.4 | 69 | 66 | 117 | 2.1 | 478 | 72 | 151 | 7.39 | 30 | 1860 | 2 | < 100 | 7.2 | 776 | 444 |
| 3S1E10D003 | 9/21/21 | ZONE7 | 23.2 | 984 | 7.5 | 67 | 57 | 90 | 2.3 | 410 | 61 | 121 | 6.91 | 25.7 | 1290 | 1.8 | < 100 | 8.1 | 657 | 403 |
| 3S1E10D004 | 9/21/21 | ZONE7 | 20 | 649 | 7.5 | 45 | 38 | 66 | 1.6 | 302 | 44 | 78 | 3.38 | 27.8 | 550 | 1.9 | < 100 | 10 | 465 | 269 |
| 3S1E10D005 | 9/21/21 | ZONE7 | 25.8 | 507 | 7.5 | 34 | 24 | 55 | 1.8 | 265 | 33 | 35 | 2.36 | 25.7 | 290 | 2.5 | < 100 | 10 | 350 | 184 |
| 3S1E10K002 | 9/15/21 | ZONE7 | 19.6 | 818 | 7.3 | 68 | 42 | 53 | 1.8 | 307 | 38 | 109 | 0.41 | 21 | 520 | < 1 | < 100 | 2.1 | 486 | 343 |
| 3S1E10K003 | 10/6/20 | ZONE7 | 18 | 824 | 7.4 | 54 | 49 | 40 | 1.7 | 300 | 45 | 90 | 2.25 | 23.5 | 370 | < 1 | < 100 | 6.2 | 461 | 336 |
| 3S1E10K003 | 7/12/21 | ZONE7 | 17.9 | 870 | 7.4 | 54 | 52 | 38 | 1.8 | 322 | 43 | 97 | 2.7 | 23.5 | 390 | < 1 | < 100 | 6.2 | 480 | 349 |
| 3S1E11B001 | 4/21/21 | LWRP | - | 1830 | - | 69 | 54 | 220 | 1.6 | - | 85 | 230 | 8.7 | 29 | 4800. | - | - | - | 1120 | - |
| 3S1E11C003 | 5/19/21 | ZONE7 | 19.2 | 1596 | 7.1 | 62 | 62 | 182 | 1.7 | 521 | 84 | 224 | 6.39 | 23.5 | 2180 | 3.2 | 129 | 2.7 | 924 | 410 |
| 3S1E11G001 | 4/12/21 | ZONE7 | 21.7 | 1206 | 7.4 | 61 | 76 | 75 | 2.7 | 471 | 64 | 120 | 10.9 | 34.2 | 860 | 1.4 | < 100 | 5.3 | 713 | 465 |
| 3S1E11G002 | 4/12/21 | ZONE7 | 21.2 | 1034 | 7.5 | 59 | 59 | 63 | 2.1 | 397 | 54 | 119 | 6.4 | 25.7 | 830 | < 1 | < 100 | 6.9 | 606 | 391 |
| 3S1E11G003 | 4/12/21 | ZONE7 | 19.6 | 654 | 7.6 | 41 | 46 | 29 | 1.7 | 293 | 38 | 43 | 3.82 | 30 | 250 | 2.1 | < 100 | 10 | 390 | 292 |
| 3S1E11G004 | 4/12/21 | ZONE7 | 28 | 1039 | 7.6 | 61 | 61 | 66 | 2.1 | 392 | 54 | 117 | 6.35 | 25.7 | 840 | 1.7 | < 100 | 8.2 | 608 | 403 |
| 3S1E11M002 | 9/14/21 | ZONE7 | 25.4 | 1067 | 7.3 | 64 | 70 | 62 | 2.1 | 383 | 60 | 129 | 5.3 | 23.5 | 880 | < 1 | < 100 | 7 | 623 | 448 |
| 3S1E11M003 | 10/5/20 | ZONE7 | 20.1 | 694 | 7.5 | 47 | 43 | 31 | 1.5 | 278 | 41 | 61 | 3.79 | 23.5 | 270 | < 1 | < 100 | 7.7 | 402 | 296 |
| 3S1E11M003 | 4/12/21 | ZONE7 | 18.4 | 714 | 7.5 | 49 | 47 | 30 | 1.7 | 286 | 43 | 63 | 4.05 | 25.7 | 280 | < 1 | < 100 | 7.8 | 418 | 316 |
| 3S1E11M003 | 6/17/21 | ZONE7 | 20 | 738 | 7.4 | 56 | - | - | - | 290 | - | - | - | - | - | - | - | - | - | - |
| 3S1E11M003 | 7/12/21 | ZONE7 | 18.5 | 756 | 7.4 | 48 | 46 | 30 | 1.6 | 295 | 39 | 67 | 3.84 | 25.7 | 300 | < 1 | < 100 | 7.7 | 420 | 310 |
| 3S1E11P006 | 6/7/21 | ZONE7 | 17.9 | 723 | 7.5 | 33 | 47 | 39 | 1.6 | 252 | 50 | 91 | 0.88 | 18.6 | 390 | < 1 | < 100 | 2.4 | 408 | 276 |
| 3S1E12A002 | 4/21/21 | LWRP | - | 1170 | - | 59 | 75 | 45 | 2.1 | - | 60 | 110 | 12 | 32 | 600. | - | - | - | 700 | - |
| 3S1E12A002 | 9/21/21 | LWRP | - | 1170 | - | 64 | 94 | 58 | 2.2 | - | 61 | 134 | 10.7 | 32 | < 0. | - | - | - | 690 | - |
| 3S1E12G001 | 4/21/21 | LWRP | - | 1090 | - | 56 | 66 | 58 | 2 | - | 53 | 96 | 10.1 | 31 | 800. | - | - | - | 630 | - |
| 3S1E12H004 | 9/14/21 | ZONE7 | 20.3 | 749 | 7.3 | 51 | 58 | 31 | 1.7 | 338 | 46 | 64 | 4.59 | 30 | 300 | < 1 | < 100 | 7.3 | 469 | 367 |
| 3S1E12H005 | 9/14/21 | ZONE7 | 22.3 | 684 | 7.4 | 46 | 51 | 31 | 1.8 | 309 | 42 | 53 | 2.9 | 32.1 | 300 | < 1 | < 100 | 11 | 422 | 325 |
| 3S1E12H006 | 9/14/21 | ZONE7 | 27.9 | 637 | 7.6 | 41 | 42 | 39 | 2 | 322 | 38 | 31 | 2.22 | 30 | 260 | 1.3 | < 100 | 16 | 392 | 275 |
| 3S1E12H007 | 9/14/21 | ZONE7 | 24.5 | 638 | 7.6 | 40 | 44 | 36 | 1.6 | 304 | 37 | 40 | 2.42 | 32.1 | 300 | 3.4 | < 100 | 12 | 392 | 281 |
| 3S1E12K002 | 9/23/21 | ZONE7 | 27.7 | 594 | 7.4 | 35 | 41 | 30 | 1.4 | 234 | 33 | 63 | 1.73 | 25.7 | 280 | < 1 | < 100 | 3.6 | 352 | 257 |
| 3S1E12K003 | 9/23/21 | ZONE7 | 36.2 | 767 | 7.4 | 49 | 56 | 37 | 1.8 | 302 | 44 | 68 | 3.8 | 27.8 | 390 | < 1 | < 100 | 4.6 | 449 | 353 |
| 3S1E12K004 | 9/23/21 | ZONE7 | 29.3 | 326 | 8 | 18 | 18 | 26 | 1.3 | 163 | 8 | 17 | 2.64 | 25.7 | 140 | < 1 | < 100 | 3.7 | 207 | 119 |
| 3S1E13P005 | 12/1/20 | ZONE7 | 16.2 | 711 | 7.9 | 44 | 24 | 71 | 2.5 | 189 | 55 | 101 | < 0.1 | 14.3 | 390 | < 1 | < 100 | < 1 | 405 | 209 |
| 3S1E13P005 | 8/10/21 | ZONE7 | 20 | 721 | 7.5 | 48 | 26 | 62 | 1.8 | 206 | 56 | 101 | 0.12 | 12 | 430 | < 1 | < 100 | < 1 | 409 | 227 |
| 3S1E13P006 | 12/1/20 | ZONE7 | 17.4 | 618 | 7.5 | 63 | 21 | 47 | 2.1 | 268 | 50 | 37 | 0.56 | 21 | 300 | < 1 | < 100 | 3.6 | 376 | 245 |
| 3S1E13P006 | 8/10/21 | ZONE7 | 24.3 | 663 | 7.5 | 66 | 23 | 44 | 1.8 | 251 | 51 | 59 | 0.42 | 21.2 | 320 | < 1 | < 100 | 2 | 392 | 260 |
| 3S1E13P007 | 12/1/20 | ZONE7 | 19 | 504 | 7.5 | 49 | 16 | 45 | 1.8 | 252 | 39 | 17 | 0.34 | 23.5 | 200 | < 1 | < 100 | < 1 | 317 | 188 |
| 3S1E13P007 | 8/10/21 | ZONE7 | 19.5 | 508 | 7.5 | 48 | 14 | 45 | 1.7 | 244 | 41 | 17 | 0.34 | 23.5 | 190 | < 1 | < 100 | < 1 | 312 | 178 |
| 3S1E13P008 | 12/1/20 | ZONE7 | 18.2 | 1515 | 11.2 | 72 | < 0 | 186 | 8.4 | 7 | 132 | 174 | < 0.1 | 32.1 | < 200 | 9.3 | < 200 | < 2 | 737 | 181 |
| 3S1E13P008 | 8/10/21 | ZONE7 | 31.8 | 1418 | 11.1 | 61 | < 0 | 170 | 7.2 | 8 | 124 | 165 | 0.14 | 27.8 | 190 | 6.7 | < 100 | < 1 | 675 | 152 |
| 3S1E14B001 | 6/7/21 | ZONE7 | 18.2 | 808 | 7.4 | 35 | 55 | 44 | 1.9 | 275 | 55 | 97 | 1 | 19.7 | 410 | < 1 | < 100 | 1.9 | 448 | 316 |
| 3S1E14D002 | 8/18/21 | ZONE7 | 19.6 | 799 | 7.1 | 72 | 35 | 62 | 1.7 | 291 | 57 | 103 | 1.1 | 20.3 | 550 | < 1 | < 100 | 2 | 499 | 324 |
| 3S1E15J003 | 5/5/21 | ZONE7 | 20 | 831 | 7.4 | 75 | 38 | 43 | 2.2 | 392 | 22 | 76 | 1.95 | 16.5 | 380 | < 1 | 1500 | < 1 | 475 | 345 |
| 3S1E15M003 | 7/13/21 | ZONE7 | 21 | 872 | 7.2 | 64 | 37 | 48 | 1.5 | 302 | 39 | 84 | 5.14 | 25.7 | 210 | < 1 | < 100 | < 1 | 471 | 312 |
| 3S1E16A002 | 8/11/21 | ZONE7 | - | 867 | 7.3 | 78 | 35 | 56 | 2.1 | 319 | 48 | 99 | 1.21 | 19.5 | 540 | < 1 | < 100 | 1.9 | 501 | 339 |

- = Not Analyzed

Highlighted = Representative Monitoring Site

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 3S1E16A004 | 7/13/21 | ZONE7 | 21.2 | 883 | 7.4 | 88 | 35 | 35 | 1.8 | 334 | 51 | 88 | 1.38 | 21.4 | 300 | < 1 | < 100 | 2.9 | 491 | 364 |
| 3S1E16C002 | 8/30/21 | ZONE7 | 18.8 | 859 | 7.5 | 44 | 14 | 124 | 2 | 179 | 133 | 96 | 0.51 | 20.3 | 300 | 1.1 | < 100 | 1.2 | 524 | 168 |
| 3S1E16C003 | 8/30/21 | ZONE7 | 24.4 | 1067 | 7.3 | 118 | 46 | 66 | 2.5 | 457 | 72 | 121 | 2.21 | 25.7 | 800 | < 1 | < 100 | 4.1 | 686 | 485 |
| 3S1E16C004 | 8/30/21 | ZONE7 | 24.3 | 883 | 7.4 | 106 | 35 | 40 | 2.1 | 358 | 54 | 92 | 2.64 | 25.7 | 400 | < 1 | < 100 | 3.7 | 543 | 409 |
| 3S1E16E004 | 5/4/21 | ZONE7 | 20.6 | 919 | 7.3 | 77 | 37 | 62 | 2.3 | 410 | 59 | 75 | 3.22 | 21.4 | 550 | < 1 | < 100 | 3.1 | 550 | 344 |
| 3S1E16L005 | 8/11/21 | ZONE7 | - | 854 | 7.1 | 85 | 37 | 57 | 2.1 | 339 | 55 | 93 | 2.32 | 23.5 | 520 | < 1 | < 100 | 3.4 | 530 | 364 |
| 3S1E16L007 | 8/11/21 | ZONE7 | - | 987 | 7.2 | 88 | 42 | 62 | 2.2 | 358 | 62 | 110 | 1.7 | 23.5 | 690 | < 1 | < 100 | 3.7 | 574 | 393 |
| 3S1E16P005 | 4/27/21 | ZONE7 | 15.6 | 617 | 6.6 | 48 | 29 | 48 | 2.6 | 171 | 86 | 92 | 0.51 | 10.1 | 270 | < 1 | < 100 | < 1 | 402 | 239 |
| 3S1E17B004 | 5/5/21 | ZONE7 | 19.4 | 1360 | 7.3 | 114 | 61 | 67 | 10 | 559 | 73 | 138 | 4.63 | 21.4 | 790 | < 1 | < 100 | 3.8 | 781 | 536 |
| 3S1E17D003 | 6/30/21 | ZONE7 | 17.8 | 687 | 7.6 | 24 | 47 | 54 | 2.2 | 297 | < 1 | 93 | < 0.1 | 4.9 | 380 | < 1 | 2590 | < 1 | 372 | 254 |
| 3S1E17D003 | 7/20/21 | ZONE7 | 20.3 | 1378 | 7.1 | 127 | 84 | 61 | 2.5 | 721 | 101 | 117 | 5.89 | 21.4 | 580 | < 1 | 391 | < 1 | 895 | 664 |
| 3S1E17D004 | 6/30/21 | ZONE7 | 21.9 | 1227 | 8.3 | 15 | 5 | 233 | 0.9 | 278 | 17 | 236 | < 0.1 | 21.4 | 2460 | 9.8 | < 100 | < 1 | 668 | 59 |
| 3S1E17D004 | 7/20/21 | ZONE7 | 18.5 | 1170 | 8.2 | 14 | 5 | 248 | 0.9 | 282 | 19 | 241 | < 0.1 | 20.3 | 2400 | 9.4 | < 100 | < 1 | 688 | 56 |
| 3S1E17D005 | 6/30/21 | ZONE7 | 20.2 | 1198 | 8.3 | 17 | 12 | 214 | 0.7 | 281 | 13 | 231 | < 0.1 | 16.7 | 2390 | 63 | < 100 | < 1 | 645 | 91 |
| 3S1E17D005 | 8/11/21 | ZONE7 | 29 | 1065 | 8.5 | 16 | 9 | 221 | 0.9 | 281 | < 1 | 220 | < 0.1 | 7.7 | 2270 | 31 | < 100 | < 1 | 621 | 77 |
| 3S1E17D006 | 6/30/21 | ZONE7 | 18.1 | 1485 | 8.3 | 22 | 7 | 273 | 1 | 289 | 8 | 334 | < 0.1 | 21.4 | 1510 | 8.3 | < 100 | < 1 | 811 | 84 |
| 3S1E17D006 | 8/11/21 | ZONE7 | 26 | 1339 | 8.6 | 13 | 5 | 261 | 1 | 254 | < 1 | 300 | < 0.1 | 13.3 | 1560 | 3.6 | < 100 | < 1 | 728 | 53 |
| 3S1E17D007 | 6/30/21 | ZONE7 | 20.8 | 1355 | 8.9 | 7 | 6 | 250 | 1.5 | 176 | < 1 | 343 | < 0.1 | 3 | 1670 | 28 | < 100 | < 1 | 704 | 43 |
| 3S1E17D007 | 7/20/21 | ZONE7 | 23.1 | 1280 | 8.7 | 6 | 5 | 277 | 1.5 | 176 | < 0.1 | 354 | < 0.1 | 2.8 | 1650 | 23 | < 100 | < 1 | 736 | 36 |
| 3S1E17D010 | 7/20/21 | ZONE7 | 23.7 | 1161 | 8.1 | 14 | 5 | 254 | 0.8 | 280 | 20 | 237 | < 0.1 | 21.2 | 2390 | 13 | < 100 | < 1 | 691 | 56 |
| 3S1E17D010 | 9/7/21 | ZONE7 | - | 1202 | 8.1 | 15 | 4 | 222 | 0.8 | 270 | 17 | 251 | < 0.1 | 21.4 | 2470 | 13 | < 100 | < 1 | 667 | 54 |
| 3S1E17D011 | 8/11/21 | ZONE7 | 20.5 | 1309 | 8.2 | 17 | 4 | 247 | 0.9 | 283 | < 1 | 270 | < 0.1 | 23.5 | 2620 | 11 | < 100 | < 1 | 704 | 58 |
| 3S1E17D012 | 4/14/21 | ZONE7 | 17.2 | 860 | 7.4 | 68 | 46 | 47 | 1.9 | 345 | 52 | 86 | 3.6 | 23.5 | 520 | 1.1 | < 100 | 6.2 | 510 | 360 |
| 3S1E17D012 | 6/17/21 | ZONE7 | 18.3 | 929 | 7.4 | 82 | - | - | - | 353 | - | - | - | - | - | - | - | - | - | - |
| 3S1E17D012 | 7/12/21 | ZONE7 | 18.6 | 923 | 7.4 | 68 | 46 | 51 | 1.9 | 358 | 47 | 92 | 3.33 | 23.5 | 570 | 1.1 | < 100 | 6.1 | 521 | 360 |
| 3S1E18A006 | 10/6/20 | ZONE7 | 17.7 | 1074 | 7.4 | 81 | 54 | 77 | 1.9 | 426 | 88 | 93 | 3.13 | 23.5 | 540 | 1.4 | < 100 | 4.8 | 643 | 425 |
| 3S1E18A006 | 4/13/21 | ZONE7 | 17 | 1064 | 7.5 | 81 | 55 | 72 | 2 | 431 | 88 | 97 | 3.47 | 25.7 | 500 | 1.6 | < 100 | 4.9 | 649 | 429 |
| 3S1E18A006 | 6/17/21 | ZONE7 | 18.3 | 1115 | 7.4 | 94 | - | - | - | 448 | - | - | - | - | - | - | - | - | - | - |
| 3S1E18A006 | 7/12/21 | ZONE7 | 18.3 | 1112 | 7.4 | 78 | 53 | 70 | 1.8 | 447 | 91 | 99 | 3.12 | 23.5 | 550 | 1.5 | < 100 | 4.8 | 651 | 413 |
| 3S1E18E004 | 3/8/21 | ZONE7 | 15.9 | 749 | 7.5 | 60 | 22 | 77 | 0.9 | 318 | 63 | 51 | < 0.1 | 25.7 | 490 | < 1 | 374 | < 1 | 456 | 241 |
| 3S1E18J002 | 3/8/21 | ZONE7 | 18.2 | 3139 | 7.2 | 184 | 172 | 348 | 3.2 | 928 | 524 | 432 | 0.5 | 25.7 | 1550 | 15 | < 500 | < 5 | 2148 | 1169 |
| 3S1E18M002 | 2/24/21 | ZONE7 | - | 709 | 7.1 | 56 | 31 | 60 | 0.9 | 310 | 70 | 37 | 1.98 | 27.8 | 400 | < 1 | < 100 | < 1 | 444 | 268 |
| 3S1E19A010 | 6/23/21 | UNKN | - | 1300 | 7.23 | 123 | 63 | 55.5 | 2.54 | - | 101 | 111 | - | - | - | < 2 | < 100 | < 10 | 719 | 538 |
| 3S1E19A010 | 7/14/21 | ZONE7 | - | 1197 | 7.4 | 113 | 60 | 53 | 2.2 | 532 | 102 | 101 | 2.32 | 20.8 | 460 | < 1 | < 100 | 3.3 | 725 | 529 |
| 3S1E19C004 | 3/8/21 | ZONE7 | 18.3 | 615 | 7.9 | 38 | 32 | 50 | 1.8 | 279 | 8 | 70 | < 0.1 | 11.3 | 330 | 1.3 | 563 | < 1 | 349 | 227 |
| 3S1E19K001 | 2/18/21 | ZONE7 | 19.6 | 1092 | 7.1 | 86 | 52 | 104 | 1.9 | 578 | 120 | 43 | < 0.1 | 17.3 | 720 | 3.2 | < 100 | < 1 | 709 | 429 |
| 3S1E20B002 | 7/14/21 | ZONE7 | - | 887 | 7.4 | 71 | 41 | 51 | 1.6 | 375 | 54 | 86 | 3.34 | 25.7 | 360 | < 1 | < 100 | 2.1 | 530 | 347 |
| 3S1E20C007 | 4/27/21 | ZONE7 | 17.8 | 608 | 7 | 51 | 28 | 49 | 2 | 274 | 42 | 63 | 0.78 | 18.2 | 330 | < 1 | < 100 | 1.8 | 392 | 243 |
| 3S1E20C008 | 7/13/21 | ZONE7 | 21 | 942 | 7.4 | 84 | 48 | 40 | 2 | 434 | 49 | 89 | 5.12 | 21.2 | 250 | < 1 | < 100 | 3.8 | 569 | 408 |
| 3S1E20C009 | 7/13/21 | ZONE7 | 28 | 983 | 7.4 | 82 | 52 | 46 | 2.1 | 441 | 63 | 93 | 2.82 | 23.5 | 400 | 1.2 | < 100 | 3.3 | 591 | 419 |
| 3S1E20J004 | 2/18/21 | ZONE7 | 17.6 | 1011 | 6.8 | 55 | 37 | 127 | 1.2 | 398 | 60 | 102 | 5.68 | 34.2 | 600 | < 1 | 120 | 7.3 | 638 | 290 |
| 3S1E20M011 | 2/18/21 | ZONE7 | 18.8 | 988 | 7.1 | 93 | 48 | 64 | 2.3 | 458 | 71 | 80 | 3.57 | 25.7 | 410 | < 1 | < 100 | 1.4 | 625 | 430 |
| 3S1E20Q002 | 5/5/21 | ZONE7 | 26.2 | 1542 | 7.4 | 84 | 81 | 135 | 0.8 | 847 | 45 | 133 | < 0.1 | 27.8 | 720 | < 1 | 10400 | < 1 | 924 | 544 |
| 3S1E22D002 | 7/13/21 | ZONE7 | 20.6 | 971 | 6.7 | 38 | 40 | 101 | 0.7 | 317 | 53 | 100 | 8.38 | 40.7 | < 100 | < 1 | < 100 | 2.4 | 566 | 260 |
| 3S1E23J001 | 5/5/21 | ZONE7 | 20 | 936 | 6.9 | 49 | 39 | 65 | 1.2 | 171 | 18 | 200 | 5.08 | 34.2 | 120 | < 1 | < 100 | < 1 | 513 | 283 |
| 3S1E25C003 | 5/5/21 | ZONE7 | 20.1 | 800 | 7.3 | 49 | 29 | 67 | 1.5 | 258 | 30 | 111 | 3.41 | 25.7 | 350 | 2.9 | 435 | 2.5 | 455 | 241 |
| 3S1E28M002 | 2/2/21 | ZONE7 | - | 1250 | 7 | 72 | 47 | 167 | 0.9 | 548 | 56 | 154 | 5.1 | 27.8 | 700 | 1.1 | < 100 | < 1 | 817 | 374 |
| 3S1E29M004 | 2/18/21 | ZONE7 | 18.8 | 632 | 6.9 | 59 | 35 | 34 | 2.1 | 313 | 46 | 36 | < 0.1 | 25.7 | 270 | 16 | 6880 | < 1 | 392 | 292 |
| 3S1E29P002 | 5/5/21 | ZONE7 | 20.8 | 1082 | 7.7 | 52 | 46 | 107 | 1.8 | 515 | 14 | 112 | < 0.1 | 20.8 | 1300 | < 1 | 101 | < 1 | 607 | 320 |

- = Not Analyzed

Highlighted = Representative Monitoring Site

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 3S1W01B009 | 2/17/21 | ZONE7 | 20.4 | 1157 | 7.6 | 70 | 30 | 152 | 1.6 | 416 | 98 | 118 | 6.87 | 25.7 | 590 | 5.4 | < 100 | < 1 | 732 | 299 |
| 3S1W01B010 | 2/17/21 | ZONE7 | 22.2 | 799 | 7.7 | 43 | 16 | 123 | 0.8 | 383 | 1 | 88 | < 0.1 | 27.8 | 530 | 157 | 351 | < 1 | 489 | 174 |
| 3S1W01B011 | 2/17/21 | ZONE7 | 19.4 | 886 | 7.9 | 26 | 10 | 153 | 1.1 | 277 | 1 | 154 | < 0.1 | 25.7 | 650 | 21 | 100 | < 1 | 508 | 106 |
| 3S1W01J001 | 11/30/20 | DSRSD | 19.2 | 2979 | 7.08 | - | - | - | - | - | 582 | 227 | < 5 | - | - | 40.7 | - | < 5 | 2090 | - |
| 3S1W01J001 | 4/29/21 | DSRSD | 22.3 | 3025 | 6.77 | - | - | - | - | - | 579 | 258 | < 5 | - | - | 41 | - | < 5 | 2100 | - |
| 3S1W01J002 | 11/30/20 | DSRSD | 19 | 3509 | 7.54 | - | - | - | - | - | 646 | 399 | 1.06 | - | - | 11 | - | 0.68J | 2290 | - |
| 3S1W01J002 | 4/29/21 | DSRSD | 23.4 | 2502 | 7.1 | - | - | - | - | - | 547 | 101 | 9.16 | - | - | 9.3 | - | < 5 | 1740 | - |
| 3S1W02A002 | 2/18/21 | ZONE7 | 18.3 | 1512 | 6.8 | 189 | 40 | 108 | 0.8 | 650 | 76 | 177 | 4.72 | 25.7 | 420 | 1.6 | < 100 | < 1 | 957 | 637 |
| 3S1W12A009 | 12/1/20 | DSRSD | 20 | 6228 | 7.36 | - | - | - | - | - | 108 | 2130 | < 5 | - | - | 3.6J | - | < 5 | 4120 | - |
| 3S1W12A009 | 4/28/21 | DSRSD | 22.7 | 6503 | 7.25 | - | - | - | - | - | 120 | 2230 | < 5 | - | - | 4.7J | - | < 5 | 4470 | - |
| 3S1W12A010 | 12/1/20 | DSRSD | 19.7 | 2072 | 7.95 | - | - | - | - | - | 334 | 204 | 4.01 | - | - | 7.8 | - | 0.38J | 1380 | - |
| 3S1W12A010 | 4/28/21 | DSRSD | 24.3 | 2313 | 7.62 | - | - | - | - | - | 486 | 187 | 2.51 | - | - | 7.5 | - | < 5 | 1620 | - |
| 3S1W12B002 | 2/18/21 | ZONE7 | 19.6 | 845 | 7 | 88 | 31 | 46 | 0.7 | 367 | 76 | 38 | 0.35 | 30 | 190 | < 1 | < 100 | < 1 | 492 | 348 |
| 3S1W12J001 | 4/20/21 | ZONE7 | 25.8 | 1371 | 7.5 | 85 | 32 | 176 | 1 | 439 | 207 | 141 | < 0.1 | 23.5 | 630 | 2.7 | < 100 | < 1 | 882 | 344 |
| 3S1W13J001 | 2/18/21 | ZONE7 | 19.4 | 868 | 6.7 | 93 | 41 | 46 | 0.6 | 324 | 110 | 69 | 3.57 | 27.8 | 180 | < 1 | < 100 | < 1 | 563 | 401 |
| 3S2E01F002 | 6/2/21 | ZONE7 | 19.9 | 1617 | 7.4 | 44 | 82 | 162 | 5.2 | 473 | 67 | 246 | 1.31 | 42.8 | 2070 | 2 | < 100 | 1.8 | 888 | 447 |
| 3S2E02B002 | 5/11/21 | ZONE7 | 30.7 | 1692 | 7.2 | 123 | 46 | 154 | 4.7 | 299 | 76 | 373 | < 0.1 | 44.9 | 1700 | 8.5 | 8270 | 17 | 969 | 498 |
| 3S2E03A001 | 5/11/21 | ZONE7 | 28.3 | 1115 | 7.6 | 39 | 39 | 124 | 1.1 | 311 | 69 | 161 | 5.7 | 40.7 | 1460 | 3.1 | < 100 | 15 | 653 | 259 |
| 3S2E03K003 | 5/19/21 | ZONE7 | 20.6 | 1194 | 7.5 | 46 | 46 | 117 | 2 | 341 | 84 | 132 | 14.1 | 30 | 1300 | 1.7 | < 100 | 12 | 688 | 305 |
| 3S2E07C002 | 2/17/21 | ZONE7 | 21.3 | 1100 | 7.2 | 58 | 77 | 63 | 3.4 | 425 | 71 | 113 | 11.5 | 38.5 | 400 | 1.2 | < 100 | 6.8 | 685 | 462 |
| 3S2E07C002 | 4/21/21 | LWRP | - | 1150 | - | 54 | 77 | 50 | 2.6 | - | 60 | 110 | 12.5 | 36 | 300. | - | - | - | 720 | - |
| 3S2E07C002 | 9/21/21 | LWRP | - | 1169 | - | 58 | 93 | 60 | 2.9 | - | 64 | 129 | 11.3 | 35 | < 0. | - | - | - | 690 | - |
| 3S2E07H002 | 2/17/21 | ZONE7 | 21 | 1218 | 7.1 | 57 | 66 | 114 | 3.3 | 444 | 149 | 100 | 11.7 | 34.2 | 720 | < 1 | < 100 | < 1 | 794 | 414 |
| 3S2E07N002 | 5/4/21 | ZONE7 | 20.4 | 530 | 7.5 | 27 | 32 | 27 | 1.4 | 196 | 34 | 54 | 1.43 | 25.7 | 210 | < 1 | < 100 | 2.1 | 304 | 200 |
| 3S2E08F001 | 12/16/20 | UNKN | - | 990 | - | 59 | 65 | 40 | 2.3 | - | 60 | 96 | - | - | - | < 2 | 160 | < 10 | 580 | 410 |
| 3S2E08H002 | 6/14/21 | ZONE7 | 22.6 | 1635 | 7.1 | 116 | 116 | 110 | 1.1 | 628 | 142 | 199 | 7.97 | 34.2 | 400 | < 1 | < 100 | 4.8 | 1063 | 768 |
| 3S2E08H003 | 8/17/21 | ZONE7 | 31.1 | 1163 | 7.1 | 80 | 84 | 63 | 1.6 | 428 | 71 | 147 | 10.8 | 32.1 | 460 | 1.3 | < 100 | 5.3 | 7370 | 546 |
| 3S2E08H004 | 8/17/21 | ZONE7 | 26.2 | 1146 | 7.5 | 48 | 47 | 121 | 2.1 | 353 | 25 | 191 | 4.65 | 27.8 | 540 | 2.1 | < 100 | 8.7 | 657 | 314 |
| 3S2E08K002 | 6/7/21 | ZONE7 | 21.4 | 1068 | 7.4 | 77 | 77 | 49 | 1.9 | 380 | 66 | 120 | 8.27 | 30 | 380 | < 1 | < 100 | 3.8 | 645 | 509 |
| 3S2E08N002 | 1/26/21 | UNKN | - | 820 | - | 48 | 55 | 37 | < 0 | - | 48 | 74 | - | - | - | < 2 | < 100 | < 10 | 460 | 340 |
| 3S2E08N002 | 2/9/21 | UNKN | - | - | - | - | - | - | - | - | - | - | - | - | - | < 2 | < 100 | < 10 | - | - |
| 3S2E08Q009 | 6/7/21 | ZONE7 | 21.5 | 925 | 7.5 | 67 | 67 | 42 | 2.1 | 356 | 54 | 97 | 5.6 | 25.7 | 380 | < 1 | < 100 | 3.7 | 555 | 444 |
| 3S2E09Q004 | 6/2/21 | ZONE7 | 22.6 | 1279 | 7.3 | 87 | 87 | 59 | 1.4 | 388 | 98 | 140 | 9.44 | 38.5 | 870 | < 1 | < 100 | 3.8 | 744 | 576 |
| 3S2E10F003 | 6/2/21 | ZONE7 | 25 | 1534 | 7 | 94 | 94 | 105 | 1.6 | 507 | 105 | 171 | 9.2 | 34.2 | 1300 | 1.2 | < 100 | 4.5 | 895 | 622 |
| 3S2E10Q001 | 6/2/21 | ZONE7 | 23.6 | 1754 | 7.1 | 107 | 107 | 116 | 1.3 | 520 | 124 | 221 | 14.6 | 36.4 | 1650 | < 1 | < 100 | 2.8 | 1033 | 709 |
| 3S2E10Q002 | 3/25/21 | ZONE7 | - | 813 | 7.8 | 53 | 39 | 59 | 2.8 | 194 | 93 | 95 | 6.51 | 27.8 | 600 | 1.1 | < 100 | 9.2 | 495 | 293 |
| 3S2E11C001 | 6/2/21 | ZONE7 | 22.8 | 865 | 7.6 | 25 | 39 | 85 | 2.1 | 305 | 36 | 99 | 3.01 | 32.1 | 390 | < 1 | < 100 | 3.8 | 482 | 223 |
| 3S2E12C004 | 3/25/21 | ZONE7 | - | 1293 | 8 | 70 | 28 | 178 | 1.7 | 285 | 97 | 216 | 2.36 | 40.7 | 2500 | 1.6 | < 100 | 11 | 785 | 290 |
| 3S2E12J003 | 3/25/21 | ZONE7 | - | 698 | 8.1 | 41 | 16 | 75 | 3.2 | 64 | 64 | 144 | 0.33 | 25.7 | 300 | 1.8 | < 100 | < 1 | 403 | 168 |
| 3S2E14A003 | 6/2/21 | ZONE7 | 25.2 | 1122 | 7.3 | 47 | 74 | 77 | 2.6 | 478 | 35 | 92 | 10.2 | 32.1 | 570 | < 1 | < 100 | 6.2 | 640 | 423 |
| 3S2E14B001 | 8/17/21 | ZONE7 | 20 | 967 | 7.3 | 78 | 43 | 77 | 2.1 | 340 | 48 | 117 | 9.9 | 30 | 680 | < 1 | < 100 | 11 | 607 | 372 |
| 3S2E15L001 | 6/21/21 | UNKN | 19.5 | - | - | 47 | 95 | 61 | 1.6 | - | 110 | 170 | 12 | - | - | - | - | - | 920 | - |
| 3S2E15L002 | 12/15/20 | UNKN | 19.8 | - | - | - | - | - | - | - | - | - | 10 | - | - | - | - | - | 820 | - |
| 3S2E15L002 | 3/15/21 | UNKN | 18.6 | - | - | - | - | - | - | - | - | - | 10 | - | - | - | - | - | 760 | - |
| 3S2E15L002 | 6/21/21 | UNKN | 19.9 | - | - | 46 | 87 | 65 | 2 | - | 100 | 150 | 11 | - | - | - | - | - | 850 | - |
| 3S2E15L002 | 9/15/21 | UNKN | 20.5 | - | - | - | - | - | - | - | - | - | 10 | - | - | - | - | - | 950 | - |
| 3S2E15M003 | 12/15/20 | UNKN | 19.8 | - | - | - | - | - | - | - | - | - | 6.5 | - | - | - | - | - | 800 | - |
| 3S2E15M003 | 3/15/21 | UNKN | 18.2 | - | - | - | - | - | - | - | - | - | 6.7 | - | - | - | - | - | 780 | - |
| 3S2E15M003 | 6/21/21 | UNKN | 19.7 | - | - | 59 | 78 | 42 | 2 | - | 78 | 110 | 8.9 | - | - | - | - | - | 820 | - |

- = Not Analyzed
Highlighted = Representative Monitoring Site

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 3S2E15M003 | 9/15/21 | UNKN | 20.6 | - | - | - | - | - | - | - | - | - | 6.7 | - | - | - | - | - | 920 | - |
| 3S2E15Q008 | 12/15/20 | UNKN | 19.8 | - | - | - | - | - | - | - | - | - | 5.1 | - | - | - | - | - | 650 | - |
| 3S2E15Q008 | 3/15/21 | UNKN | 17.3 | - | - | - | - | - | - | - | - | - | 7.7 | - | - | - | - | - | 810 | - |
| 3S2E15Q008 | 6/21/21 | UNKN | 21.2 | - | - | 56 | 91 | 53 | 1.6 | - | 150 | 110 | 7.7 | - | - | - | - | - | 900 | - |
| 3S2E15Q008 | 9/15/21 | UNKN | 20 | - | - | - | - | - | - | - | - | - | 8.4 | - | - | - | - | - | 960 | - |
| 3S2E15R017 | 9/28/21 | ZONE7 | 20.6 | 980 | 7.4 | 44 | 86 | 42 | 1.6 | 364 | 63 | 89 | 11.4 | 30 | 600 | < 1 | < 100 | 8.3 | 585 | 464 |
| 3S2E15R018 | 9/28/21 | ZONE7 | 20.2 | 653 | 7.5 | 51 | 44 | 33 | 1.6 | 323 | 38 | 41 | 1.17 | 30 | 200 | < 1 | < 100 | < 1 | 403 | 309 |
| 3S2E15R020 | 12/15/20 | UNKN | 20.9 | - | - | - | - | - | - | - | - | - | 7.5 | - | - | - | - | - | 740 | - |
| 3S2E15R020 | 3/15/21 | UNKN | 19.4 | - | - | - | - | - | - | - | - | - | 7.6 | - | - | - | - | - | 680 | - |
| 3S2E15R020 | 6/21/21 | UNKN | 20.4 | - | - | 45 | 80 | 73 | 1.6 | - | 78 | 150 | 7.8 | - | - | - | - | - | 820 | - |
| 3S2E15R020 | 9/15/21 | UNKN | 20.6 | - | - | - | - | - | - | - | - | - | 7.8 | - | - | - | - | - | 880 | - |
| 3S2E16A003 | 6/2/21 | ZONE7 | 19.6 | 1166 | 7.5 | 90 | 63 | 49 | 1.4 | 382 | 86 | 108 | 11.1 | 30 | 450 | < 1 | < 100 | 3.3 | 665 | 483 |
| 3S2E16E004 | 6/2/21 | ZONE7 | 27.6 | 724 | 7.2 | 47 | 47 | 39 | 2.1 | 271 | 45 | 71 | 2.25 | 19.7 | 290 | < 1 | < 100 | < 1 | 414 | 312 |
| 3S2E18E001 | 6/7/21 | ZONE7 | 23 | 517 | 7.5 | 35 | 35 | 21 | 1.6 | 201 | 34 | 48 | 1.65 | 25.7 | 200 | < 1 | < 100 | 2.1 | 307 | 232 |
| 3S2E19D007 | 8/18/21 | ZONE7 | 27.4 | 482 | 7.3 | 38 | 19 | 22 | 1.3 | 152 | 7 | 49 | 6.67 | 25.7 | < 100 | < 1 | < 100 | 7.4 | 266 | 173 |
| 3S2E19D008 | 8/18/21 | ZONE7 | 21 | 430 | 7.3 | 37 | 18 | 22 | 1.2 | 146 | 6 | 45 | 6.53 | 25.7 | < 100 | < 1 | < 100 | 7.4 | 256 | 166 |
| 3S2E19D009 | 8/18/21 | ZONE7 | 22.8 | 757 | 7.1 | 62 | 31 | 44 | 1.7 | 227 | 31 | 91 | 10.3 | 30 | < 100 | < 1 | < 100 | 1.2 | 448 | 283 |
| 3S2E19D010 | 8/18/21 | ZONE7 | 19.7 | 781 | 7 | 66 | 34 | 48 | 1.8 | 234 | 31 | 95 | 10.4 | 30 | 100 | < 1 | < 100 | 1.1 | 467 | 305 |
| 3S2E19K001 | 2/2/21 | ZONE7 | - | 1021 | 7 | 71 | 58 | 53 | 1.8 | 305 | 42 | 167 | 5.16 | 32.1 | 100 | < 1 | < 100 | < 1 | 598 | 417 |
| 3S2E19N003 | 8/11/21 | ZONE7 | 26.1 | 518 | 7.7 | 39 | 19 | 53 | 1.5 | 250 | 23 | 35 | 0.24 | 27.8 | 240 | 2.1 | < 100 | < 1 | 322 | 176 |
| 3S2E19N004 | 8/11/21 | ZONE7 | 27.9 | 623 | 7.7 | 24 | 12 | 117 | 1.7 | 279 | 25 | 66 | < 0.1 | 17.5 | 340 | 31 | < 100 | < 1 | 401 | 109 |
| 3S2E20M001 | 6/7/21 | ZONE7 | 18.7 | 928 | 7.3 | 43 | 51 | 64 | 1.7 | 339 | 57 | 103 | 2.82 | 21.4 | 300 | 1.1 | < 100 | < 1 | 521 | 318 |
| 3S2E21K008 | 2/3/21 | ZONE7 | - | 1084 | 7.3 | 39 | 53 | 94 | 1.8 | 166 | 7.2 | 240 | 6.18 | 32.1 | 130 | < 1 | < 100 | < 1 | 576 | 316 |
| 3S2E21K009 | 2/17/21 | ZONE7 | - | 1150 | 7.3 | 52 | 50 | 96 | 2.2 | 188 | 11 | 260 | 5.73 | 27.8 | 110 | 1 | < 100 | < 1 | 617 | 336 |
| 3S2E22B001 | 4/27/21 | ZONE7 | 22 | 1265 | 7.3 | 66 | 95 | 66 | 1.5 | 476 | 165 | 141 | 4.47 | 32.1 | 480 | < 1 | < 100 | 1.3 | 821 | 556 |
| 3S2E23E001 | 8/17/21 | ZONE7 | 24.5 | 682 | 7.5 | 39 | 52 | 49 | 1.8 | 334 | 39 | 57 | 1.71 | 23.5 | 450 | < 1 | < 100 | 2.3 | 433 | 312 |
| 3S2E23E002 | 8/17/21 | ZONE7 | 23.4 | 1062 | 7.5 | 45 | 63 | 108 | 2.6 | 396 | 53 | 164 | 0.14 | 25.7 | 2660 | 2.5 | < 100 | < 1 | 657 | 372 |
| 3S2E24A001 | 5/11/21 | ZONE7 | 25.9 | 1462 | 7 | 60 | 60 | 125 | 1.7 | 539 | 70 | 158 | 1.51 | 32.1 | 990 | < 1 | < 100 | 3 | 779 | 397 |
| 3S2E26J002 | 4/27/21 | ZONE7 | 20.9 | 946 | 7.4 | 50 | 70 | 63 | 2.7 | 511 | 58 | 78 | 1.94 | 15.8 | 670 | < 1 | < 100 | < 1 | 599 | 413 |
| 3S2E29F004 | 4/27/21 | ZONE7 | 19.3 | 613 | 7.6 | 60 | 27 | 39 | 1.7 | 267 | 59 | 57 | < 0.1 | 19.7 | 300 | 4.3 | < 100 | < 1 | 395 | 261 |
| 3S2E29F004 | 9/28/21 | ZONE7 | 26.2 | 654 | 7.5 | 68 | 29 | 40 | 1.7 | 321 | 57 | 35 | < 0.1 | 23.5 | 340 | 5.5 | 104 | < 1 | 413 | 289 |
| 3S2E30C001 | 9/28/21 | ZONE7 | 19.3 | 724 | 7.3 | 54 | 32 | 59 | 1.7 | 286 | 39 | 71 | 4.61 | 27.8 | 410 | 2.5 | < 100 | 1.7 | 446 | 267 |
| 3S2E30D002 | 9/28/21 | ZONE7 | 27 | 716 | 7 | 55 | 30 | 56 | 2.1 | 237 | 56 | 79 | 0.09 | 18.2 | 320 | < 1 | < 100 | < 1 | 413 | 262 |
| 3S2E32E007 | 4/27/21 | ZONE7 | 22.4 | 543 | 6.9 | 29 | 21 | 47 | 1.4 | 118 | 39 | 86 | 4.01 | 21.4 | 110 | < 1 | < 100 | < 1 | 321 | 159 |
| 3S2E33G001 | 4/27/21 | ZONE7 | 19 | 747 | 7.1 | 46 | 26 | 84 | 3.3 | 202 | 96 | 112 | < 0.1 | 13.7 | 590 | 1.4 | < 100 | < 1 | 481 | 222 |
| 3S2E33G001 | 9/28/21 | ZONE7 | 25.9 | 916 | 7.3 | 59 | 35 | 93 | 3.7 | 292 | 86 | 92 | 0.75 | 17.1 | 1700 | 1.2 | < 100 | < 1 | 533 | 292 |
| 3S2E33K001 | 12/29/20 | VA | 10.5 | 1360 | 6.8 | - | - | - | - | - | - | 210 | 1.8 | - | - | - | - | - | 895 | - |
| 3S2E33L001 | 12/29/20 | VA | 10 | 1270 | 6.8 | - | - | - | - | - | - | 190 | 2.3 | - | - | - | - | - | 798 | - |
| 3S2E33L001 | 3/31/21 | VA | 18 | 805 | 7.7 | - | - | - | - | - | - | 75 | 2 | - | - | - | - | - | 594 | - |
| 3S2E33L001 | 6/29/21 | VA | 24.8 | 1380 | 7.6 | - | - | - | - | - | - | 180 | 1 | - | - | - | - | - | 715 | - |
| 3S2E33L001 | 9/29/21 | VA | 22.7 | 1540 | 7.2 | - | - | - | - | - | - | 210 | 2.4 | - | - | - | - | - | 948 | - |
| 3S3E06Q003 | 5/11/21 | ZONE7 | 27.3 | 1832 | 7.4 | 42 | 42 | 239 | 2.5 | 308 | 321 | 255 | 8.13 | 49.2 | 4410 | 1.3 | < 100 | 3.5 | 1139 | 278 |
| 3S3E07D002 | 5/11/21 | ZONE7 | 29.3 | 2349 | 7.6 | 64 | 64 | 323 | 2.4 | 259 | 312 | 456 | 6.09 | 49.2 | 6570 | 2.3 | < 200 | 3.8 | 1425 | 424 |
| 3S3E18Q001 | 2/16/21 | ZONE7 | - | 1264 | 7.2 | 102 | 41 | 105 | 2.2 | 279 | 190 | 141 | 8.46 | 23.5 | 1020 | < 1 | < 100 | 2.1 | 780 | 424 |
| 3S3E19C002 | 2/3/21 | ZONE7 | - | 1674 | 7.4 | 122 | 60 | 143 | 2.3 | 307 | 46 | 359 | 18.9 | 30 | 1420 | < 1 | < 100 | 1.9 | 998 | 552 |
| 3S3E20L004 | 2/17/21 | ZONE7 | - | 1660 | 7.3 | 112 | 54 | 160 | 2.3 | 287 | 184 | 277 | 16.5 | 27.8 | 1610 | < 1 | < 100 | 1.5 | 1032 | 502 |
| 3S3E20R004 | 2/17/21 | ZONE7 | - | 2588 | 7.4 | 153 | 102 | 298 | 6.3 | 410 | 396 | 453 | 12.7 | 25.7 | 1270 | < 5 | < 500 | < 5 | 1693 | 802 |
| 3S3E21C001 | 2/17/21 | ZONE7 | - | 2558 | 7.6 | 84 | 86 | 402 | 11.4 | 637 | 433 | 331 | < 0.1 | 59.9 | 4040 | 7.8 | < 500 | < 5 | 1723 | 564 |
| 4S2E01A001 | 2/3/21 | ZONE7 | - | 1687 | 8.1 | 15 | 60 | 256 | 2.1 | 432 | 179 | 202 | < 0.1 | 16.3 | 12000 | < 1 | < 100 | < 1 | 948 | 285 |

- = Not Analyzed

Highlighted = Representative Monitoring Site

# TABLE 6-2
# WATER QUALITY RESULTS FOR SELECT METALS AND MINERALS
# 2021 WATER YEAR

| | | | TEMP | EC | | Mineral Constituents (mg/L) | | | | | | | | | Select Metals (ug/L) | | | | TDS | Hard |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| SITE ID | DATE | By | °C | umhos/cm | pH | Ca | Mg | Na | K | HCO3 | SO4 | Cl | NO3N | SiO2 | B | As | Fe | Cr | mg/L | mg/L |
| 4S3E06E004 | 2/4/21 | ZONE7 | - | 2433 | 7.9 | 25 | 58 | 431 | 3.2 | 390 | 20 | 689 | < 0.1 | 14.6 | 5040 | < 5 | < 500 | < 5 | 1436 | 301 |

- = Not Analyzed
Highlighted = Representative Monitoring Site

## TABLE 6-3
## TOTAL DISSOLVED SOLIDS (TDS) AT REPRESENTATIVE MONITORING SITES
## 2021 WATER YEAR
## LIVERMORE VALLEY GROUNDWATER BASIN

| RMS Well | | Management Area/Unit | | | TDS (mg/L) | | | SMCs for TDS (mg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Map | Area | Subarea | Aquifer | 2021 WY | Below MT | Below MO | MT | IM-5 | IM-10 | IM-15 | MO |
| 3S1E20C007 | 20C7 | Main | Bernal | Upper | 392 | 408 | 108 | 800 | 725 | 650 | 575 | 500 |
| 3S1E20C008 | 20C8 | Main | Bernal | Lower | 569 | 185 | -69 | 754 | 691 | 627 | 564 | 500 |
| 3S1E09P005 | 9P5 | Main | Amador West | Upper | 404 | 904 | 96 | 1,308 | 1,106 | 904 | 702 | 500 |
| 3S1E09P010 | 9P10 | Main | Amador West | Lower | 529 | 88 | -29 | 617 | 588 | 559 | 529 | 500 |
| 3S1E11G001 | 11G1 | Main | Amador East | Upper | 713 | 249 | -213 | 962 | 847 | 731 | 616 | 500 |
| 3S1E12K003 | 12K3 | Main | Amador East | Lower | 449 | 147 | 51 | 596 | 572 | 548 | 524 | 500 |
| 3S2E08K002 | 8K2 | Main | Mocho II | Upper | 645 | 51 | -145 | 696 | 647 | 598 | 549 | 500 |
| 3S2E08H003 | 8H3 | Main | Mocho II | Lower | 737 | -19 | -237 | 718 | 664 | 609 | 555 | 500 |
| 3S1E06F003 | 6F3 | Fringe | Northwest | Upper | 2,929 | 726 | -84 | 3,655 | 3,453 | 3,250 | 3,048 | 2,845 |
| 2S2E34E001 | 34E1 | Fringe | Northeast | Upper | 707 | 293 | 293 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |
| 3S2E24A001 | 24A1 | Fringe | East | Upper | 779 | 400 | 245 | 1,179 | 1,140 | 1,102 | 1,063 | 1,024 |
| 3S2E21K009 | 21K9 | Upland | Upland | Upper | 617 | 383 | 383 | 1,000 | 1,000 | 1,000 | 1,000 | 1,000 |

| | |
|---|---|
| RMS | Representative Monitoring Sites |
| TDS | Total Dissolved Solids |
| mg/L | milligrams per liter |
| MT | Minimum Threshold |
| IM-# | Interim Milestone at # years |
| MO | Measurable Objective |
| SMC | Sustainable Management Criteria |

# TABLE 6-4
## NITRATE (as $NO_3N$) AT REPRESENTATIVE MONITORING SITES
## 2021 WATER YEAR
## LIVERMORE VALLEY GROUNDWATER BASIN

| RMS Well | | Management Area/Unit | | | Nitrate as Nitrogen (mg/L) | | | SMCs Nitrate (mg/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Map | Area | Subarea | Aquifer | 2021 WY | Below MT | Below MO | MT | IM-5 | IM-10 | IM-15 | MO |
| 3S1E20C007 | 20C7 | Main | Bernal | Upper | 0.78 | 9.2 | 9.2 | 10 | 10 | 10 | 10 | 10 |
| 3S1E20C008 | 20C8 | Main | Bernal | Lower | 5.12 | 4.9 | 4.9 | 10 | 10 | 10 | 10 | 10 |
| 3S1E09P005 | 9P5 | Main | Amador West | Upper | 0.13 | 9.9 | 9.9 | 10 | 10 | 10 | 10 | 10 |
| 3S1E09P010 | 9P10 | Main | Amador West | Lower | 1.08 | 8.9 | 8.9 | 10 | 10 | 10 | 10 | 10 |
| 3S1E11G001 | 11G1 | Main | Amador East | Upper | 10.9 | 8.4 | -0.9 | 19 | 17 | 15 | 12 | 10 |
| 3S1E12K003 | 12K3 | Main | Amador East | Lower | 3.8 | 6.2 | 6.2 | 10 | 10 | 10 | 10 | 10 |
| 3S2E08K002 | 8K2 | Main | Mocho II | Upper | 8.27 | 7.9 | 1.7 | 16 | 15 | 13 | 12 | 10 |
| 3S2E08H003 | 8H3 | Main | Mocho II | Lower | 10.8 | 3.9 | -0.8 | 15 | 14 | 12 | 11 | 10 |
| 3S1E06F003 | 6F3 | Fringe | Northwest | Upper | ND | 10.0 | 10.0 | 10 | 10 | 10 | 10 | 10 |
| 2S2E34E001 | 34E1 | Fringe | Northeast | Upper | ND | 10.0 | 10.0 | 10 | 10 | 10 | 10 | 10 |
| 3S2E24A001 | 24A1 | Fringe | East | Upper | 1.51 | 36.0 | 8.5 | 38 | 31 | 24 | 17 | 10 |
| 3S2E21K009 | 21K9 | Upland | Upland | Upper | 5.73 | 4.3 | 4.3 | 10 | 10 | 10 | 10 | 10 |

| | |
|---|---|
| RMS | Representative Monitoring Sites |
| TDS | Total Dissolved Solids |
| mg/L | milligrams per liter |
| MT | Minimum Threshold |
| IM-# | Interim Milestone at # years |
| MO | Measurable Objective |
| SMC | Sustainable Management Criteria |
| ND | Not Detected (i.e., below lab detection limits). Assumed 0 for calculations. |

**TABLE 6-5**
**BORON (B) AT REPRESENTATIVE MONITORING SITES**
**2021 WATER YEAR**
**LIVERMORE VALLEY GROUNDWATER BASIN**

| RMS Well | | Management Area/Unit | | | Boron (ug/L) | | | SMCs Boron (ug/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Map | Area | Subarea | Aquifer | 2021 WY | Below MT | Below MO | MT | IM-5 | IM-10 | IM-15 | MO |
| 3S1E20C007 | 20C7 | Main | Bernal | Upper | 330 | 1,070 | 1,070 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E20C008 | 20C8 | Main | Bernal | Lower | 250 | 1,150 | 1,150 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E09P005 | 9P5 | Main | Amador West | Upper | 470 | 930 | 930 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E09P010 | 9P10 | Main | Amador West | Lower | 480 | 920 | 920 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E11G001 | 11G1 | Main | Amador East | Upper | 860 | 540 | 540 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E12K003 | 12K3 | Main | Amador East | Lower | 390 | 1,010 | 1,010 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S2E08K002 | 8K2 | Main | Mocho II | Upper | 380 | 1,020 | 1,020 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S2E08H003 | 8H3 | Main | Mocho II | Lower | 460 | 940 | 940 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |
| 3S1E06F003 | 6F3 | Fringe | Northwest | Upper | 2,640 | 1,950 | -1,240 | 4,590 | 3,793 | 2,995 | 2,198 | 1,400 |
| 2S2E34E001 | 34E1 | Fringe | Northeast | Upper | 2,300 | 2,420 | -900 | 4,720 | 3,890 | 3,060 | 2,230 | 1,400 |
| 3S2E24A001 | 24A1 | Fringe | East | Upper | 990 | 1,410 | 410 | 2,400 | 2,150 | 1,900 | 1,650 | 1,400 |
| 3S2E21K009 | 21K9 | Upland | Upland | Upper | 110 | 1,290 | 1,290 | 1,400 | 1,400 | 1,400 | 1,400 | 1,400 |

| | |
|---|---|
| RMS | Representative Monitoring Sites |
| TDS | Total Dissolved Solids |
| ug/L | micrograms per liter |
| MT | Minimum Threshold |
| IM-# | Interim Milestone at # years |
| MO | Measurable Objective |
| SMC | Sustainable Management Criteria |

# TABLE 6-6
# CHROMIUM (Cr) AT REPRESENTATIVE MONITORING SITES
# 2021 WATER YEAR
# LIVERMORE VALLEY GROUNDWATER BASIN

| RMS Well | | Management Area/Unit | | | Chromium (ug/L) | | | SMCs Chromium (ug/L) | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Well Name | Map | Area | Subarea | Aquifer | 2021 WY | Below MT | Below MO | MT | IM-5 | IM-10 | IM-15 | MO |
| 3S1E20C007 | 20C7 | Main | Bernal | Upper | 1.8 | 48 | 48 | 50 | 50 | 50 | 50 | 50 |
| 3S1E20C008 | 20C8 | Main | Bernal | Lower | 3.8 | 46 | 46 | 50 | 50 | 50 | 50 | 50 |
| 3S1E09P005 | 9P5 | Main | Amador West | Upper | ND | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 3S1E09P010 | 9P10 | Main | Amador West | Lower | 2.1 | 48 | 48 | 50 | 50 | 50 | 50 | 50 |
| 3S1E11G001 | 11G1 | Main | Amador East | Upper | 5.3 | 45 | 45 | 50 | 50 | 50 | 50 | 50 |
| 3S1E12K003 | 12K3 | Main | Amador East | Lower | 4.6 | 45 | 45 | 50 | 50 | 50 | 50 | 50 |
| 3S2E08K002 | 8K2 | Main | Mocho II | Upper | 3.8 | 46 | 46 | 50 | 50 | 50 | 50 | 50 |
| 3S2E08H003 | 8H3 | Main | Mocho II | Lower | 5.3 | 45 | 45 | 50 | 50 | 50 | 50 | 50 |
| 3S1E06F003 | 6F3 | Fringe | Northwest | Upper | ND | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 2S2E34E001 | 34E1 | Fringe | Northeast | Upper | ND | 50 | 50 | 50 | 50 | 50 | 50 | 50 |
| 3S2E24A001 | 24A1 | Fringe | East | Upper | 3 | 47 | 47 | 50 | 50 | 50 | 50 | 50 |
| 3S2E21K009 | 21K9 | Upland | Upland | Upper | ND | 50 | 50 | 50 | 50 | 50 | 50 | 50 |

| | |
|---|---|
| RMS | Representative Monitoring Sites |
| TDS | Total Dissolved Solids |
| ug/L | micrograms per liter |
| MT | Minimum Threshold |
| IM-# | Interim Milestone at # years |
| MO | Measurable Objective |
| SMC | Sustainable Management Criteria |
| ND | Not Detected (i.e., below lab detection limits). Assumed 0 for calculations. |

# TABLE 6-7
# WATER QUALITY RESULTS FOR PFAS
# 2021 WATER YEAR
# (Only PFAS Compounds with detected concentrations shown)

| Well | WellName | Type | Aquifer | Sampled | Units | DETECTED PFAS COMPOUNDS (with Notification and Response Levels) | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | NEtFOSAA | NMeFOSAA | PFBS | PFDA | PFHpA | PFHxA | PFHxS | PFNA | PFOA | PFOS |
| | | | | | | - | - | 500 | - | - | - | - | - | 5 | 6.5 |
| | | | | | | - | - | 5000 | - | - | - | - | - | 10 | 40 |
| 2S1E33P002 | Central Pkwy at Emerald Glen Pk | well-static | U | 5/4/21 | ng/L | < 2.0 | < 2.0 | 12 | < 2.0 | < 2.0 | 8.6 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 2S1E33R001 | Central Pkwy @ Grafton | well-static | U | 5/4/21 | ng/L | < 2.0 | < 2.0 | 2.3 | < 2.0 | < 2.0 | 6.8 | < 2.0 | < 2.0 | < 2.0 | 3 |
| 3S1E01F002 | Constitution Dr | well-static | U | 3/30/21 | ng/L | < 2 | < 2 | 16 | < 2 | 7.1 | 14 | 40 | < 2 | 18 | 86 |
| 3S1E01H003 | Collier Canyon g1 | well-static | U | 3/30/21 | ng/L | < 2 | < 2 | 3.4 | < 2 | < 2 | < 2 | 2.9 | < 2 | < 2 | < 2 |
| 3S1E01L001 | Kitty Hawk | well-static | U | 3/30/21 | ng/L | < 2 | < 2 | 16 | < 2 | < 2 | 2.8 | 25 | < 2 | 4.4 | 22 |
| 3S1E02J002 | Maint. Bldg | well-static | U | 3/30/21 | ng/L | < 2 | < 2 | 34 | < 2 | < 2 | < 2 | 46 | < 2 | < 2 | 35 |
| 3S1E02K002 | Doolan Rd West | well-static | U | 3/30/21 | ng/L | < 2 | < 2 | 34 | < 2 | 20 | 75 | 1200 | 2.9 | 110 | 970 |
| 3S1E05K006 | Rosewood shallow | well-static | U | 4/20/21 | ng/L | < 2.0 | < 2.0 | 3.4 | < 2.0 | < 2.0 | < 2.0 | 4.5 | < 2.0 | < 2.0 | 2.4 |
| 3S1E05K007 | Rosewood deep | well-static | L | 4/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E07B002 | Hopyard rd | well-static | L | 4/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E07B012 | Hacienda Arch | well-static | U | 4/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E07J005 | Thomas Hart School | well-static | U | 8/10/21 | ng/L | < 2.0 | < 2.0 | 6 | < 2.0 | < 2.0 | < 2.0 | 2.1 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E08G004 | Apache | well-static | U | 5/4/21 | ng/L | < 2.0 | < 2.0 | 5.5 | < 2.0 | 2.5 | 5.3 | 8.7 | < 2.0 | 5.2 | 5.1 |
| **3S1E08H018** | **Mocho 4** | **well-supply** | **L** | **10/26/20** | **ng/L** | **< 2** | **< 2** | **5.3** | **< 2** | **< 2** | **3.8** | **17** | **< 2** | **3.7** | **15** |
| **3S1E08H018** | **Mocho 4** | **well-supply** | **L** | **5/10/21** | **ng/L** | **< 2.0** | **< 2.0** | **4.6** | **< 2.0** | **< 2.0** | **3.3** | **16** | **< 2.0** | **3.1** | **15** |
| **3S1E08H018** | **Mocho 4** | **well-supply** | **L** | **7/12/21** | **ng/L** | **< 2.0** | **< 2.0** | **4.2** | **< 2.0** | **< 2.0** | **3** | **14** | **< 2.0** | **2.7** | **13** |
| **3S1E08H018** | **Mocho 4** | **well-supply** | **L** | **10/4/21** | **ng/L** | **< 2.0** | **< 2.0** | **3.7** | **< 2.0** | **< 2.0** | **2.5** | **13** | **< 2.0** | **2.3** | **12** |
| 3S1E08K001 | Cockroach well | well-static | U | 7/13/21 | ng/L | < 2.0 | < 2.0 | 3.5 | < 2.0 | < 2.0 | < 2.0 | 4.3 | < 2.0 | 2.4 | 4 |
| **3S1E09B001** | **Stoneridge** | **well-supply** | **L** | **12/17/20** | **ng/L** | **< 2.0** | **< 2.0** | **5.6** | **< 2.0** | **< 2.0** | **3.6** | **18** | **< 2.0** | **2.7** | **16** |
| **3S1E09B001** | **Stoneridge** | **well-supply** | **L** | **7/21/21** | **ng/L** | **< 2.0** | **< 2.0** | **4.7** | **< 2.0** | **< 2.0** | **3.3** | **18** | **< 2.0** | **2.6** | **16** |
| **3S1E09B001** | **Stoneridge** | **well-supply** | **L** | **10/4/21** | **ng/L** | **< 2.0** | **< 2.0** | **4.5** | **< 2.0** | **< 2.0** | **3.4** | **19** | **< 2.0** | **2.7** | **18** |
| **3S1E09M003** | **Mocho 2** | **well-supply** | **L** | **10/26/20** | **ng/L** | **< 2** | **< 2** | **7** | **< 2** | **2.1** | **5.6** | **34** | **< 2** | **4.8** | **40** |
| **3S1E09M003** | **Mocho 2** | **well-supply** | **L** | **3/30/21** | **ng/L** | **< 2** | **< 2** | **6.3** | **< 2** | **2.1** | **4.7** | **29** | **< 2** | **4.1** | **31** |
| **3S1E09M003** | **Mocho 2** | **well-supply** | **L** | **5/10/21** | **ng/L** | **< 2.0** | **< 2.0** | **6.2** | **< 2.0** | **2** | **4.7** | **28** | **< 2.0** | **4.2** | **33** |
| **3S1E09M003** | **Mocho 2** | **well-supply** | **L** | **7/21/21** | **ng/L** | **< 2.0** | **< 2.0** | **5.6** | **< 2.0** | **< 2.0** | **4.1** | **28** | **< 2.0** | **3.9** | **< 2.0** |
| **3S1E09M003** | **Mocho 2** | **well-supply** | **L** | **10/7/21** | **ng/L** | **< 2.0** | **< 2.0** | **6.2** | **< 2.0** | **< 2.0** | **4.8** | **29** | **< 2.0** | **4.3** | **32** |
| **3S1E09M004** | **Mocho 3** | **well-supply** | **L** | **10/26/20** | **ng/L** | **< 2** | **< 2** | **7.2** | **< 2** | **2.2** | **5.5** | **28** | **< 2** | **5.1** | **34** |
| **3S1E09M004** | **Mocho 3** | **well-supply** | **L** | **5/10/21** | **ng/L** | **< 2.0** | **< 2.0** | **8.1** | **< 2.0** | **2.4** | **6.6** | **36** | **< 2.0** | **5.5** | **47** |
| **3S1E09M004** | **Mocho 3** | **well-supply** | **L** | **7/14/21** | **ng/L** | **< 2.0** | **< 2.0** | **8.4** | **< 2.0** | **2.5** | **7.5** | **42** | **< 2.0** | **5.8** | **56** |
| **3S1E10B016** | **COL 5** | **well-supply** | **L** | **5/11/21** | **ng/L** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **12** | **< 2.0** | **< 2.0** | **18** |
| **3S1E10B016** | **COL 5** | **well-supply** | **L** | **7/12/21** | **ng/L** | **< 2.0** | **< 2.0** | **2.9** | **< 2.0** | **< 2.0** | **2.3** | **16** | **< 2.0** | **< 2.0** | **20** |

**Municipal Wells are Bold**

U=Upper; L=Lower; D=Deep

Orange Highlight = Above Notification Limit

Red Highlight = Above Response Level

# TABLE 6-7
# WATER QUALITY RESULTS FOR PFAS
# 2021 WATER YEAR
# (Only PFAS Compounds with detected concentrations shown)

| | | | | | | *DETECTED PFAS COMPOUNDS (with Notification and Response Levels)* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E10D002 | Stoneridge Shallow | well-static | L | 9/21/21 | ng/L | < 2.0 | < 2.0 | 16 | < 2.0 | 4.8 | 14 | 65 | < 2.0 | 8.5 | 82 |
| 3S1E10D003 | Stoneridge Middle 1 | well-static | L | 9/21/21 | ng/L | < 2.0 | < 2.0 | 12 | < 2.0 | 3.5 | 12 | 69 | < 2.0 | 6.5 | 120 |
| 3S1E10D004 | Stoneridge Middle 2 | well-static | L | 9/21/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| **3S1E10K003** | **COL 1** | **well-supply** | **L** | **10/6/20** | **ng/L** | **< 2.0** | **< 2.0** | **4.9** | **< 2.0** | **< 2.0** | **4.2** | **22** | **< 2.0** | **4.4** | **30** |
| **3S1E10K003** | **COL 1** | **well-supply** | **L** | **10/4/21** | **ng/L** | **< 2.0** | **< 2.0** | **7.6** | **< 2.0** | **2.4** | **6.6** | **39** | **< 2.0** | **5.9** | **46** |
| 3S1E11G001 | Key_AmE_U | well-static | U | 4/12/21 | ng/L | < 2.0 | < 2.0 | 26 | < 2.0 | 8.5 | 25 | 100 | < 2.0 | 18 | 210 |
| 3S1E11G002 | Rancho Charro Middle 1 | well-static | L | 4/12/21 | ng/L | < 2.0 | < 2.0 | 6.7 | < 2.0 | < 2.0 | 4.5 | 23 | < 2.0 | 3.7 | 32 |
| 3S1E11G003 | Rancho Charro Middle 2 | well-static | L | 4/12/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E11G004 | Rancho Charro Deep | well-static | D | 4/12/21 | ng/L | < 2.0 | < 2.0 | 6.5 | < 2.0 | < 2.0 | 4.6 | 23 | < 2.0 | 3.6 | 30 |
| **3S1E11M003** | **COL 2** | **well-supply** | **L** | **10/26/20** | **ng/L** | **< 2** | **< 2** | **3.6** | **< 2** | **< 2** | **2.8** | **15** | **< 2** | **2.3** | **14** |
| **3S1E11M003** | **COL 2** | **well-supply** | **L** | **7/12/21** | **ng/L** | **< 2.0** | **< 2.0** | **4.2** | **< 2.0** | **< 2.0** | **3.3** | **16** | **< 2.0** | **2.6** | **18** |
| **3S1E11M003** | **COL 2** | **well-supply** | **L** | **10/4/21** | **ng/L** | **< 2.0** | **< 2.0** | **5.4** | **< 2.0** | **< 2.0** | **4.6** | **20** | **< 2.0** | **3.6** | **22** |
| 3S1E13P005 | LGA Grant Nested 1 | well-static | U | 12/1/20 | ng/L | < 2.0 | < 2.0 | 2.9 | < 2.0 | < 2.0 | < 2.0 | 4 | < 2.0 | 5.6 | 11 |
| 3S1E13P005 | LGA Grant Nested 1 | well-static | U | 8/10/21 | ng/L | < 2.0 | < 2.0 | 2.8 | < 2.0 | < 2.0 | 3.4 | < 2.0 | < 2.0 | 2.5 | 3.7 |
| 3S1E13P006 | LGA Grant Nested 2 | well-static | L | 12/1/20 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E13P006 | LGA Grant Nested 2 | well-static | L | 8/10/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E13P007 | LGA Grant Nested 3 | well-static | L | 12/1/20 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E13P007 | LGA Grant Nested 3 | well-static | L | 8/10/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E13P008 | LGA Grant Nested 4 | well-static | L | 12/1/20 | ng/L | 3.2 | 4.4 | 3.2 | 7 | 4.2 | 9.7 | 8.6 | 5.2 | 25 | 73 |
| 3S1E13P008 | LGA Grant Nested 4 | well-static | L | 8/10/21 | ng/L | 2.6 | 3.5 | 8.3 | < 2.0 | 3.3 | 5.9 | 7.9 | 3.7 | 20 | 54 |
| 3S1E14D002 | South Cope Lake | well-static | L | 8/18/21 | ng/L | < 2.0 | < 2.0 | 8.3 | < 2.0 | 2.6 | 6.6 | 39 | < 2.0 | 5.7 | 30 |
| 3S1E15M003 | Bush/Valley South | well-static | L | 7/13/21 | ng/L | < 2.0 | < 2.0 | 6.7 | < 2.0 | 2.8 | 3.7 | 7.7 | < 2.0 | 5.9 | 9.4 |
| **3S1E16A002** | **Pleas 8** | **well-supply** | **L** | **11/17/20** | **ng/L** | **-** | **-** | **9.9** | **<2** | **6.8** | **12** | **59** | **2.9** | **7.6** | **75** |
| **3S1E16A002** | **Pleas 8** | **well-supply** | **L** | **2/3/21** | **ng/L** | **-** | **-** | **7** | **<0.6** | **5.31** | **8** | **41.7** | **2.57** | **6.39** | **64.4** |
| **3S1E16A002** | **Pleas 8** | **well-supply** | **L** | **8/11/21** | **ng/L** | **-** | **-** | **5.73** | **<0.65** | **2.68** | **4.63** | **24** | **1.11** | **4.47** | **32.6** |
| 3S1E16A004 | Bush/Valley Mid | well-static | L | 7/13/21 | ng/L | < 2.0 | < 2.0 | 7 | < 2.0 | 5 | 8.4 | 39 | 2.7 | 6 | 48 |
| 3S1E16E004 | black ave - cultural | well-static | U | 5/4/21 | ng/L | < 2.0 | < 2.0 | 4.2 | < 2.0 | < 2.0 | 2.3 | 7.9 | < 2.0 | 2.2 | 5.8 |
| **3S1E16L005** | **Pleas 5** | **well-supply** | **L** | **11/17/20** | **ng/L** | **-** | **-** | **6.8** | **<2** | **2.5** | **4.6** | **23** | **<2** | **4** | **22** |
| **3S1E16L005** | **Pleas 5** | **well-supply** | **L** | **2/3/21** | **ng/L** | **-** | **-** | **6.11** | **<0.7** | **2.2** | **3.94** | **22.5** | **0.667** | **4.21** | **22.9** |
| **3S1E16L005** | **Pleas 5** | **well-supply** | **L** | **5/4/21** | **ng/L** | **-** | **-** | **6.14** | **<0.6** | **2.38** | **4.7** | **22.6** | **<0.8** | **4.38** | **23.3** |
| **3S1E16L005** | **Pleas 5** | **well-supply** | **L** | **8/11/21** | **ng/L** | **-** | **-** | **4.73** | **<0.622** | **2** | **3.39** | **16.9** | **<0.868** | **3.66** | **18.6** |
| **3S1E16L007** | **Pleas 6** | **well-supply** | **L** | **11/17/20** | **ng/L** | **-** | **-** | **6.9** | **<2** | **2.6** | **4.7** | **26** | **<2** | **4** | **26** |
| **3S1E16L007** | **Pleas 6** | **well-supply** | **L** | **2/3/21** | **ng/L** | **-** | **-** | **6.43** | **<0.7** | **2.1** | **4.51** | **24.2** | **<0.6** | **3.81** | **24.7** |
| **3S1E16L007** | **Pleas 6** | **well-supply** | **L** | **5/4/21** | **ng/L** | **-** | **-** | **6.7** | **<0.6** | **2.49** | **5.12** | **27.6** | **<0.9** | **4.26** | **26.8** |

**Municipal Wells are Bold**

U=Upper; L=Lower; D=Deep

Orange Highlight = Above Notification Limit

Red Highlight = Above Response Level

# TABLE 6-7
# WATER QUALITY RESULTS FOR PFAS
# 2021 WATER YEAR
# (Only PFAS Compounds with detected concentrations shown)

| | | | | | | ***DETECTED PFAS COMPOUNDS (with Notification and Response Levels)*** | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 3S1E17D003 | Hopyard Nested Shallow | well-static | L | 7/20/21 | ng/L | < 2.0 | < 2.0 | 3.8 | < 2.0 | < 2.0 | 4.6 | 8.3 | < 2.0 | 3.3 | 3.5 |
| 3S1E17D004 | Hopyard Nested Middle 1 | well-static | L | 7/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E17D005 | Hopyard Nested Middle 2 | well-static | L | 8/11/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E17D006 | Hopyard Nested Middle 3 | well-static | L | 8/11/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E17D007 | Hopyard Nested Deep | well-static | D | 7/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S1E17D010 | Hopyard 7 | well-static | L | 7/20/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| **3S1E17D012** | **Hopyard 9** | **well-supply** | **L** | **7/12/21** | **ng/L** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** |
| **3S1E18A006** | **Hopyard 6** | **well-supply** | **L** | **7/12/21** | **ng/L** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** | **< 2.0** |
| **3S1E19A010** | **SFWD South (B)** | **well-supply** | **L** | **10/7/20** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3** | **<2** | **<2** | **<2** |
| **3S1E19A010** | **SFWD South (B)** | **well-supply** | **L** | **1/4/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3** | **<2** | **<2** | **<2** |
| **3S1E19A010** | **SFWD South (B)** | **well-supply** | **L** | **4/5/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.5** | **<2** | **<2** | **<2** |
| **3S1E19A010** | **SFWD South (B)** | **well-supply** | **L** | **7/6/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.3** | **<2** | **<2** | **<2** |
| **3S1E19A010** | **SFWD South (B)** | **well-supply** | **L** | **10/4/21** | **ng/L** | **-** | **-** | **0** | **<2** | **<2** | **<2** | **3.5** | **<2** | **<2** | **<2** |
| **3S1E19A011** | **SFWD North (A)** | **well-supply** | **L** | **10/7/20** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| **3S1E19A011** | **SFWD North (A)** | **well-supply** | **L** | **1/4/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| 3S1E20B002 | Fairgrounds Potable | well-supply | L | 11/17/20 | ng/L | - | - | 6.8 | <1.7 | 2.5 | 4.6 | 23 | <1.7 | 4 | 22 |
| 3S1E20B002 | Fairgrounds Potable | well-supply | L | 2/3/21 | ng/L | - | - | 6.11 | <0.7 | 2.2 | 3.94 | 22.5 | 0.667 | 4.21 | 22.9 |
| 3S1E20B002 | Fairgrounds Potable | well-supply | L | 5/4/21 | ng/L | - | - | 6.14 | <0.6 | 2.38 | 4.7 | 22.6 | <0.8 | 4.38 | 23.3 |
| 3S1E20C008 | Key_Bern_L | well-static | L | 7/13/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | 3.6 | < 2.0 | < 2.0 | 3.4 |
| 3S1E20C009 | Fair Nested Deep | well-static | L | 7/13/21 | ng/L | < 2.0 | < 2.0 | 3 | < 2.0 | < 2.0 | < 2.0 | 6.3 | < 2.0 | < 2.0 | 4.4 |
| 3S1E22D002 | vineyard trailer | well-static | U | 7/13/21 | ng/L | < 2.0 | < 2.0 | 4.1 | < 2.0 | < 2.0 | 2.1 | 6.7 | < 2.0 | 3.9 | 2.6 |
| 3S1W01B009 | DSRSD Shallow | well-static | L | 2/17/21 | ng/L | < 2 | < 2 | < 2 | < 2 | < 2 | < 2 | < 2 | < 2 | < 2 | < 2 |
| 3S1W12J001 | DSRSD South | well-static | U | 4/20/21 | ng/L | 3.7 | < 2.0 | 2.8 | < 2.0 | 7.3 | 6.5 | 12 | 3.1 | 31 | 93 |
| 3S2E07C002 | jaws - york way - G4 | well-static | U | 2/17/21 | ng/L | < 2 | < 2 | 18 | < 2 | 15 | 27 | 39 | < 2 | 30 | 60 |
| 3S2E07N002 | Isabel & Arroyo Mocho | well-static | U | 5/4/21 | ng/L | < 2.0 | < 2.0 | 3.2 | < 2.0 | < 2.0 | 2.4 | < 2.0 | < 2.0 | 4.1 | 6 |
| **3S2E07P003** | **CWS 24** | **well-supply** | **L** | **10/21/20** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| **3S2E07P003** | **CWS 24** | **well-supply** | **L** | **2/11/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| **3S2E07P003** | **CWS 24** | **well-supply** | **L** | **6/24/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| **3S2E07P003** | **CWS 24** | **well-supply** | **L** | **9/29/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** |
| **3S2E07R003** | **CWS 31** | **well-supply** | **L** | **10/22/20** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.6** | **<2** | **<2** | **4.5** |
| **3S2E07R003** | **CWS 31** | **well-supply** | **L** | **3/24/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.3** | **<2** | **<2** | **4.5** |
| **3S2E07R003** | **CWS 31** | **well-supply** | **L** | **6/14/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.3** | **<2** | **<2** | **4.5** |
| **3S2E07R003** | **CWS 31** | **well-supply** | **L** | **9/29/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **3.4** | **<2** | **2.4** | **3.8** |
| **3S2E08F001** | **CWS 10** | **well-supply** | **L** | **12/16/20** | **ng/L** | **-** | **-** | **3.5** | **<2** | **2.1** | **3.2** | **7.6** | **<2** | **4.1** | **11** |

**Municipal Wells are Bold**

U=Upper; L=Lower; D=Deep

Orange Highlight = Above Notification Limit

Red Highlight = Above Response Level



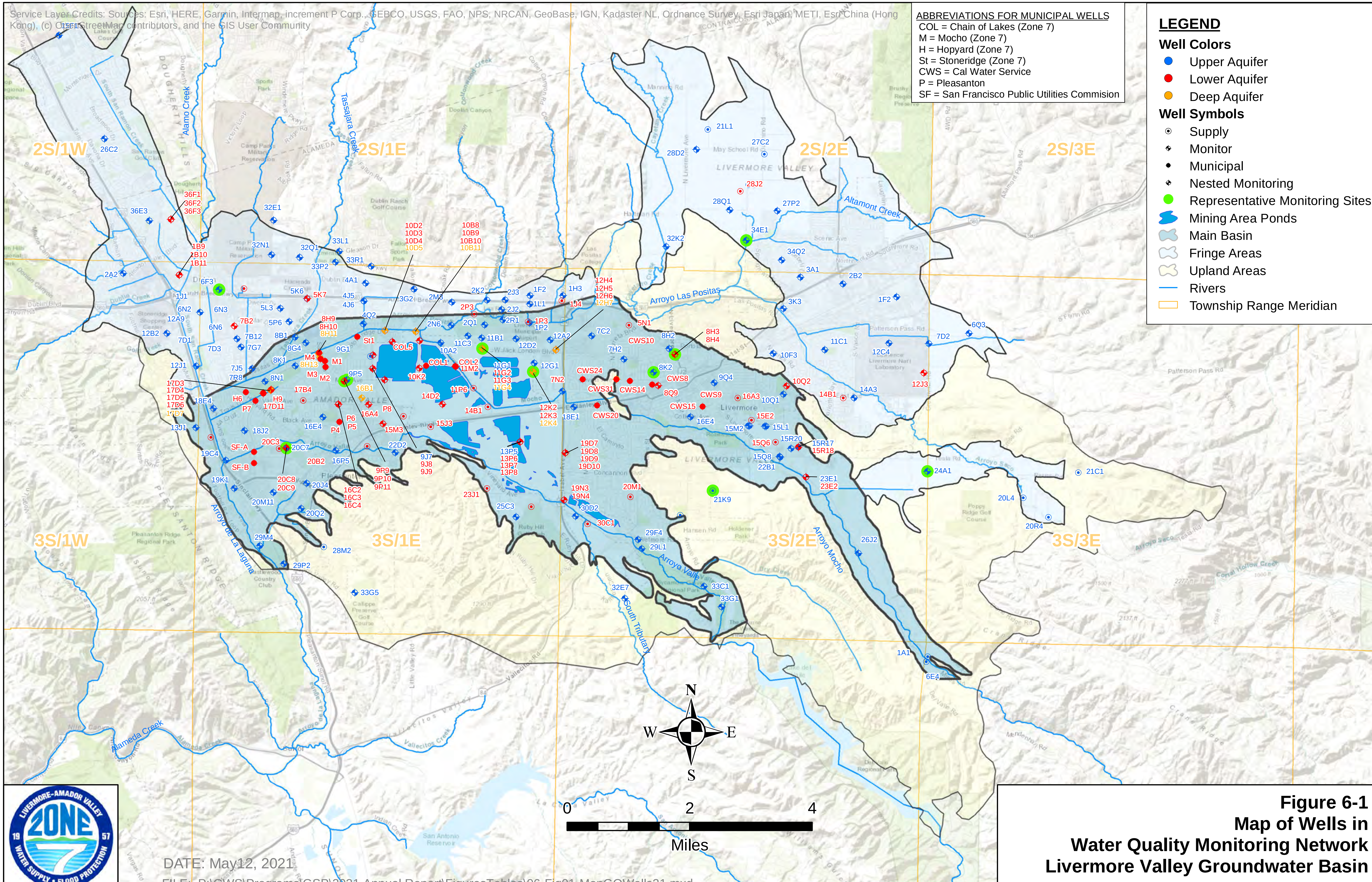
4/28/2022

P:\GWS\Programs\GSP\2021 Annual Report\FiguresTables\06-Tbl07-PFASResults21.xlsx

# TABLE 6-7
# WATER QUALITY RESULTS FOR PFAS
# 2021 WATER YEAR
# (Only PFAS Compounds with detected concentrations shown)

| | | | | | | *DETECTED PFAS COMPOUNDS (with Notification and Response Levels)* | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **3S2E08F001** | **CWS 10** | **well-supply** | **L** | **7/22/21** | **ng/L** | **-** | **-** | **4.4** | **<2** | **<2** | **3.8** | **8** | **<2** | **4.2** | **13** |
| **3S2E08N002** | **CWS 14** | **well-supply** | **L** | **10/15/20** | **ng/L** | **-** | **-** | **2.4** | **<2** | **<2** | **<2** | **3.2** | **<2** | **2.3** | **5** |
| **3S2E08N002** | **CWS 14** | **well-supply** | **L** | **3/18/21** | **ng/L** | **-** | **-** | **2.7** | **<2** | **<2** | **<2** | **3.6** | **<2** | **2.8** | **5.1** |
| **3S2E08N002** | **CWS 14** | **well-supply** | **L** | **6/24/21** | **ng/L** | **-** | **-** | **2.3** | **<2** | **<2** | **<2** | **3** | **<2** | **2.6** | **4.4** |
| **3S2E08N002** | **CWS 14** | **well-supply** | **L** | **9/15/21** | **ng/L** | **-** | **-** | **2.4** | **<2** | **<2** | **<2** | **3.4** | **<2** | **2.6** | **5** |
| **3S2E08N002** | **CWS 14** | **well-supply** | **L** | **10/28/21** | **ng/L** | **-** | **-** | **2.6** | **<2** | **<2** | **<2** | **3** | **<2** | **2.6** | **3.8** |
| **3S2E18B001** | **CWS 20** | **well-supply** | **L** | **10/22/20** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **2.2** | **<2** | **<2** | **<2** |
| **3S2E18B001** | **CWS 20** | **well-supply** | **L** | **3/18/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **2.1** | **<2** | **2.1** | **2.2** |
| **3S2E18B001** | **CWS 20** | **well-supply** | **L** | **6/14/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **<2** | **<2** | **2.1** | **<2** |
| **3S2E18B001** | **CWS 20** | **well-supply** | **L** | **9/16/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **2** | **<2** | **<2** | **2.5** |
| **3S2E18B001** | **CWS 20** | **well-supply** | **L** | **10/27/21** | **ng/L** | **-** | **-** | **<2** | **<2** | **<2** | **<2** | **2.8** | **<2** | **2.6** | **3.8** |
| 3S2E19D007 | Isabel Shallow | well-static | U | 8/18/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S2E19D008 | Isabel Middle 1 | well-static | L | 8/18/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |
| 3S2E19D009 | Isabel Middle 2 | well-static | L | 8/18/21 | ng/L | < 2.0 | < 2.0 | 3.1 | < 2.0 | 3.7 | 9.7 | 4.1 | < 2.0 | 8.2 | 6.8 |
| 3S2E19D010 | Isabel Deep | well-static | L | 8/18/21 | ng/L | < 2.0 | < 2.0 | 3.1 | < 2.0 | 3.8 | 9.5 | 4.1 | < 2.0 | 8.1 | 7.1 |
| AC_WCD | Alamo Creek at Willow Creek Dr near Dublin | surface | - | 8/11/21 | ng/L | < 2.0 | < 2.0 | 13 | 5.4 | 7.3 | 22 | 8.9 | 4.4 | 17 | 13 |
| ACNP | Alamo Canal near Pleasanton | surface | - | 8/11/21 | ng/L | < 2.0 | < 2.0 | 12 | 4.7 | 3.9 | 12 | 14 | 3.3 | 10 | 25 |
| ADLLV | Arroyo De La Laguna at Verona | surface | - | 8/11/21 | ng/L | < 2.0 | < 2.0 | 12 | 2.3 | 6.8 | 20 | 26 | 3.4 | 13 | 33 |
| AMP | Arroyo Mocho near Pleasanton | surface | - | 8/11/21 | ng/L | < 2.0 | < 2.0 | 6.7 | < 2.0 | 4.1 | 11 | 12 | 2 | 9.6 | 13 |
| SSRC_AAVBLVD | South San Ramon Creek above Amador Valley Blvd | surface | - | 8/11/21 | ng/L | < 2.0 | < 2.0 | 12 | 3.8 | 2.7 | 7 | 7.3 | 2.4 | 6.5 | 29 |
| MA-K028 | Lake H | mining | - | 4/20/21 | ng/L | < 2 | < 2 | 9.4 | < 2 | 4.1 | 8.1 | 38 | < 2 | 12 | 85 |
| MA-K030 | Cope Lake | mining | - | 4/20/21 | ng/L | < 2 | < 2 | 4.9 | < 2 | 2.2 | 4 | 12 | < 2 | 5.4 | 12 |
| MA-K030 | Cope Lake | mining | - | 10/13/21 | ng/L | < 2.0 | < 2.0 | 5.4 | < 2.0 | 2.4 | 4.6 | 15 | < 2.0 | 5.4 | 10 |
| MA-K037 | Lake I | mining | - | 4/20/21 | ng/L | < 2 | < 2 | 4.5 | < 2 | 2.8 | 4.2 | 16 | < 2 | 6.8 | 71 |
| MA-K037 | Lake I | mining | - | 10/13/21 | ng/L | < 2.0 | < 2.0 | 5.4 | < 2.0 | 2.6 | 5.3 | 18 | < 2.0 | 6 | 31 |
| MA-P042 | Lake B - west | mining | - | 4/22/21 | ng/L | < 2.0 | < 2.0 | 2.2 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | 2.4 | 2.3 |
| MA-P042 | Lake B - west | mining | - | 10/14/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | 2.2 | 2.4 |
| MA-R028 | Lake D - northwest | mining | - | 4/21/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | 2.5 | < 2.0 | < 2.0 | 2.5 |
| MA-R028 | Lake D - northwest | mining | - | 10/13/21 | ng/L | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 | < 2.0 |

**Municipal Wells are Bold**
U=Upper; L=Lower; D=Deep
Orange Highlight = Above Notification Limit
Red Highlight = Above Response Level




DATE: May12, 2021

FILE: P:\GWS\Programs\GSP\2021 Annual Report\FiguresTables\06-Fig01-MapGQWells21.mxd

**Figure 6-1**
**Map of Wells in**
**Water Quality Monitoring Network**
**Livermore Valley Groundwater Basin**

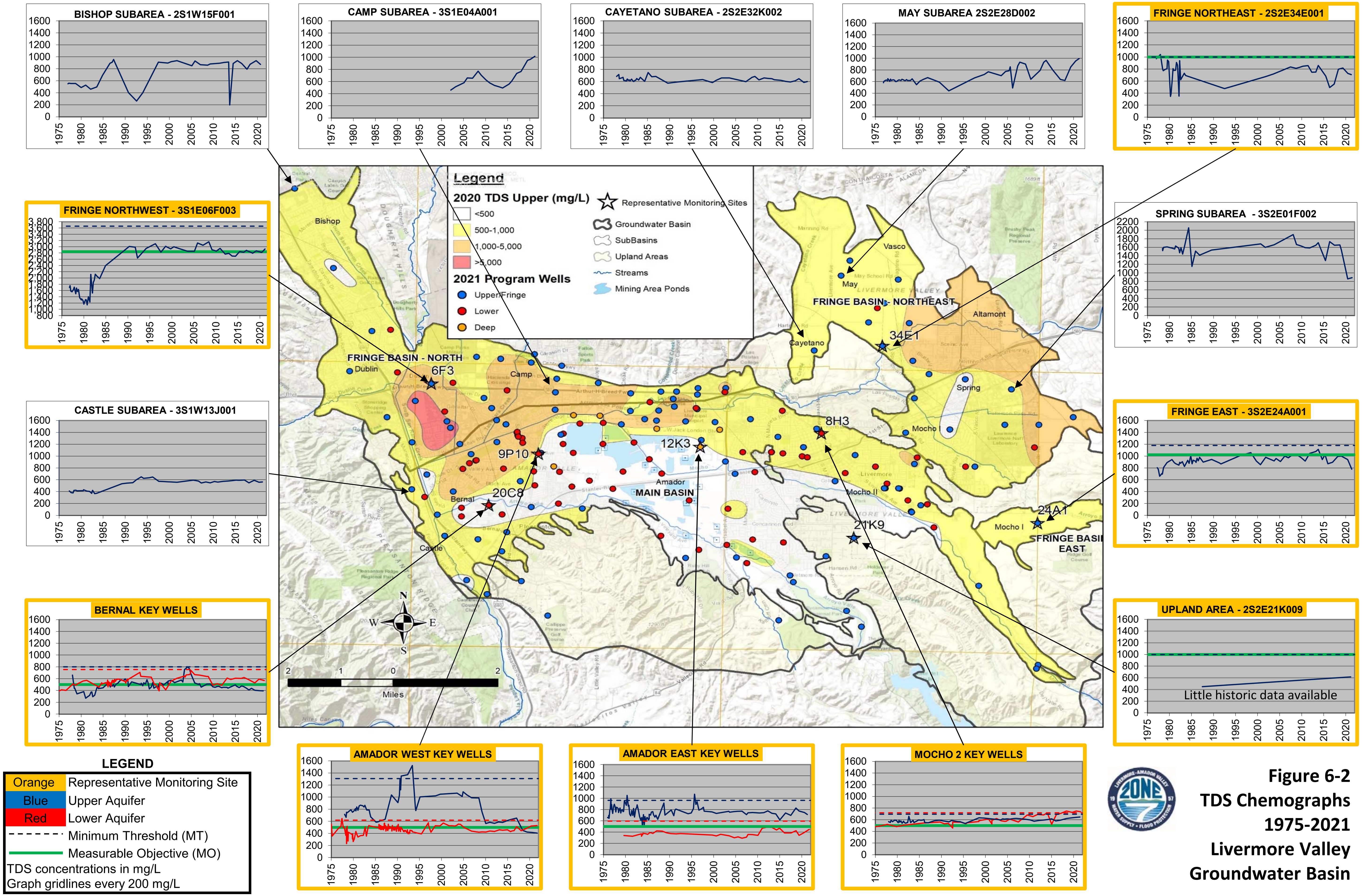



**Figure 6-2**
**TDS Chemographs**
**1975-2021**
**Livermore Valley**
**Groundwater Basin**

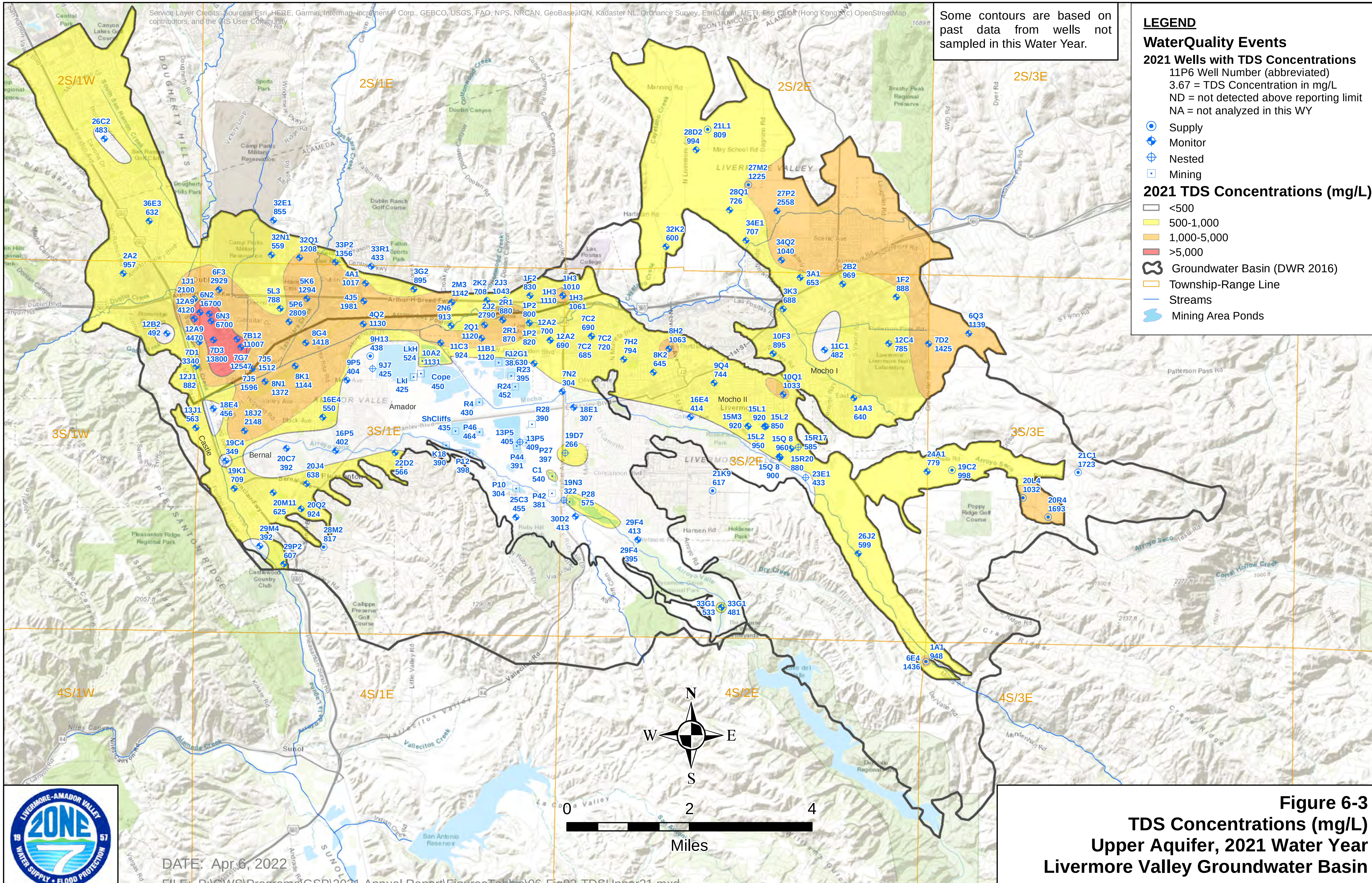
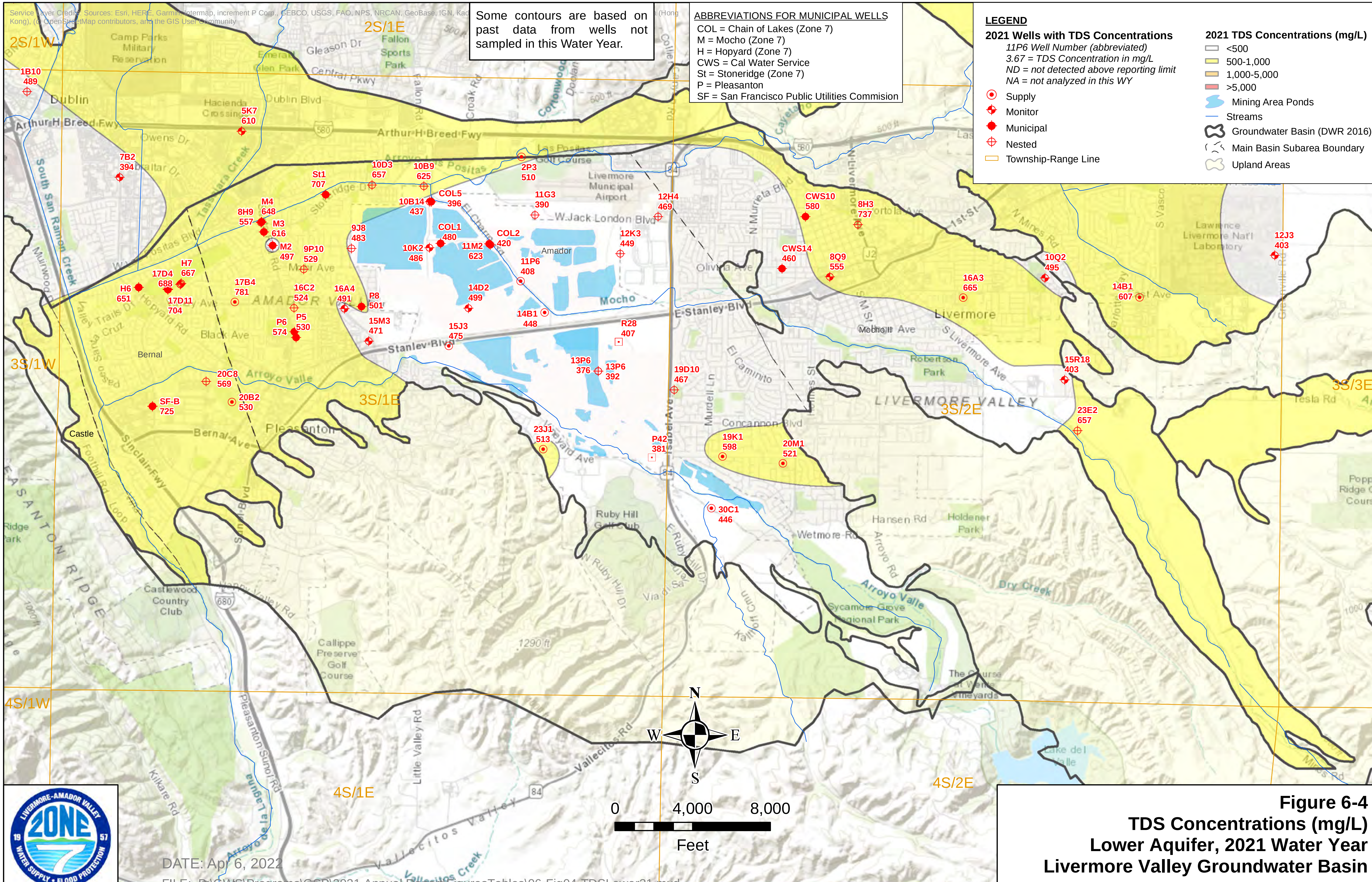



**Figure 6-3**
**TDS Concentrations (mg/L)**
**Upper Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**




# Figure 6-4
# TDS Concentrations (mg/L)
# Lower Aquifer, 2021 Water Year
# Livermore Valley Groundwater Basin

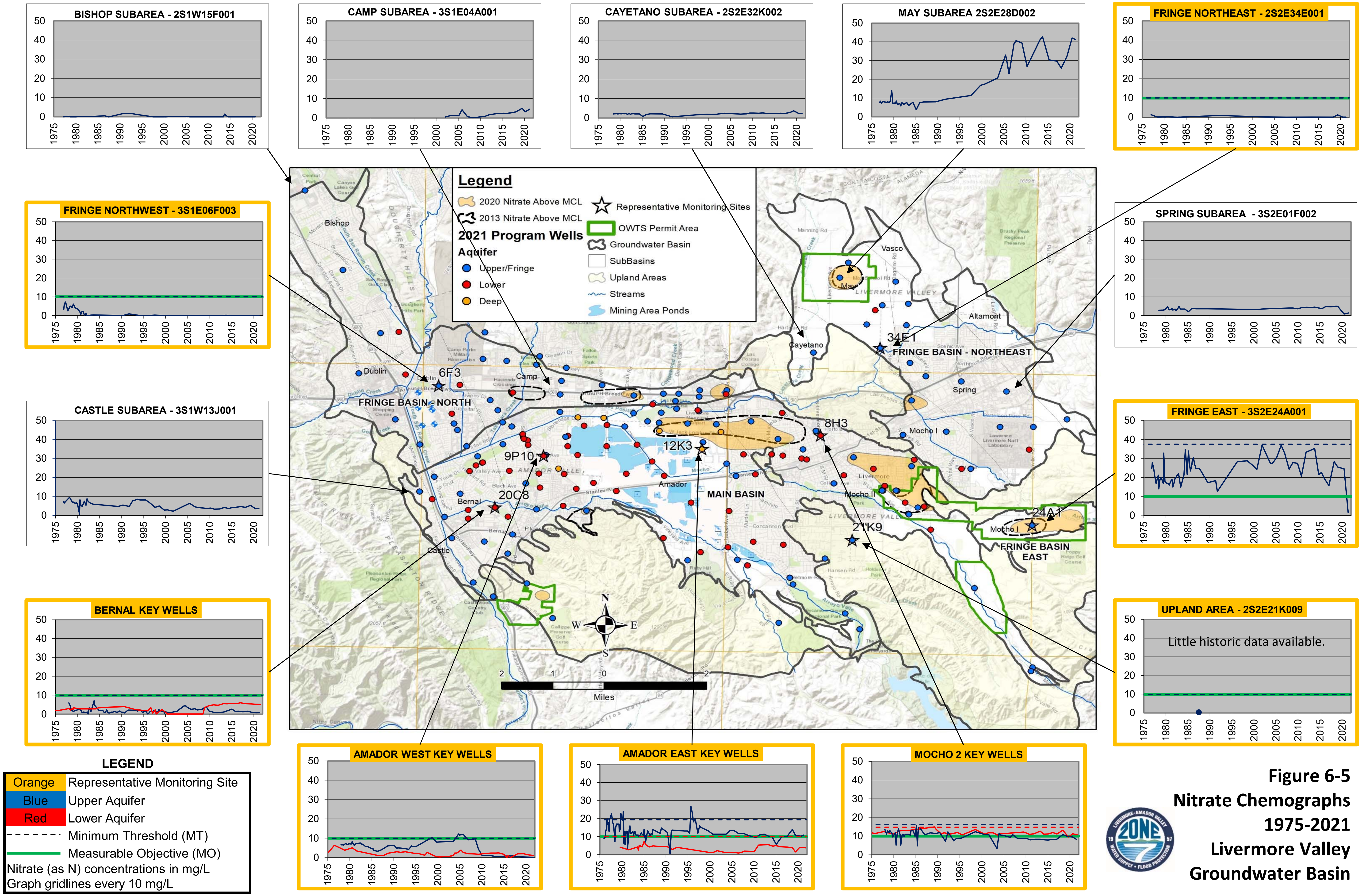



**Figure 6-5**
**Nitrate Chemographs**
**1975-2021**
**Livermore Valley**
**Groundwater Basin**

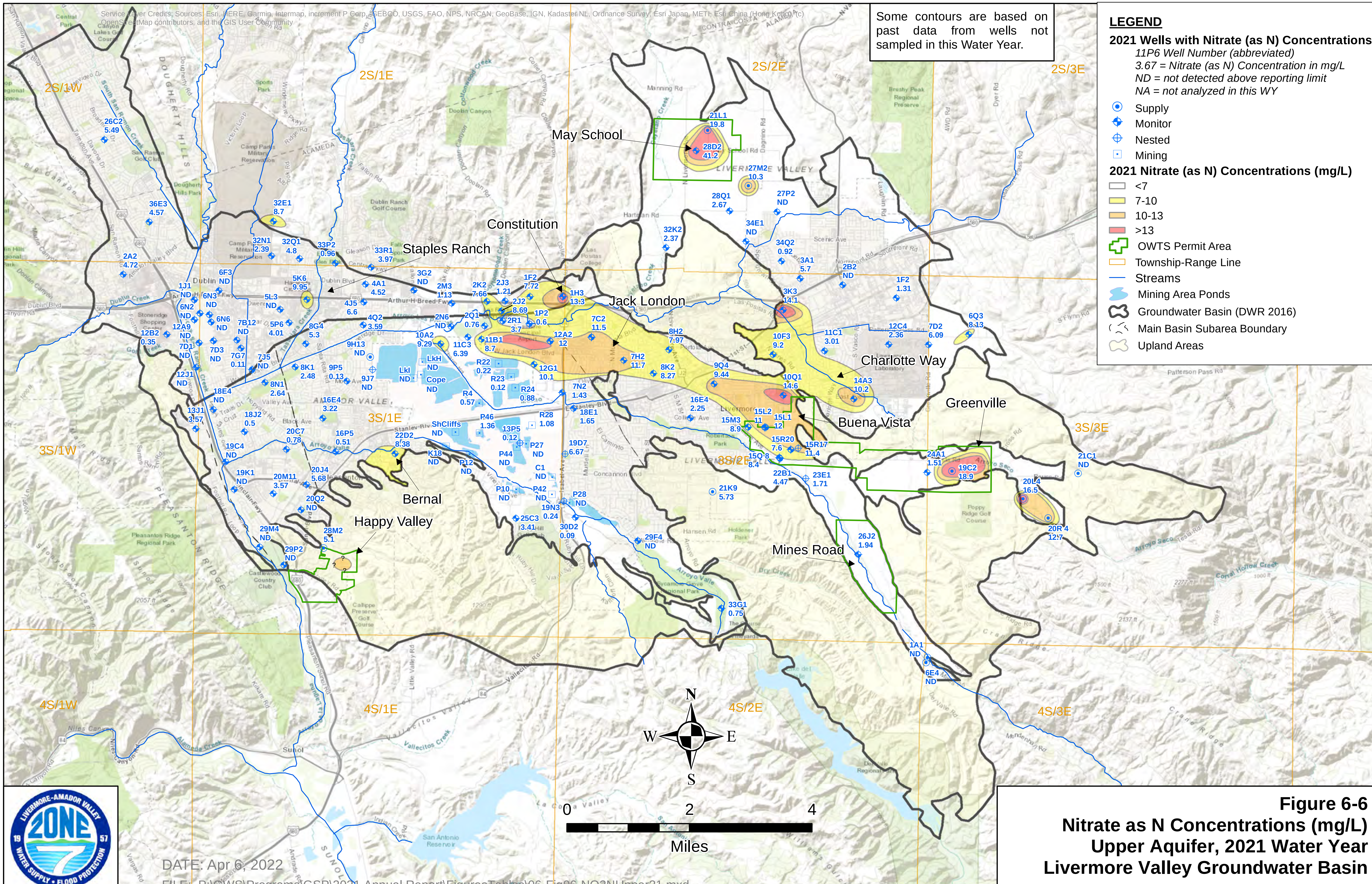



**Figure 6-6**
**Nitrate as N Concentrations (mg/L)**
**Upper Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

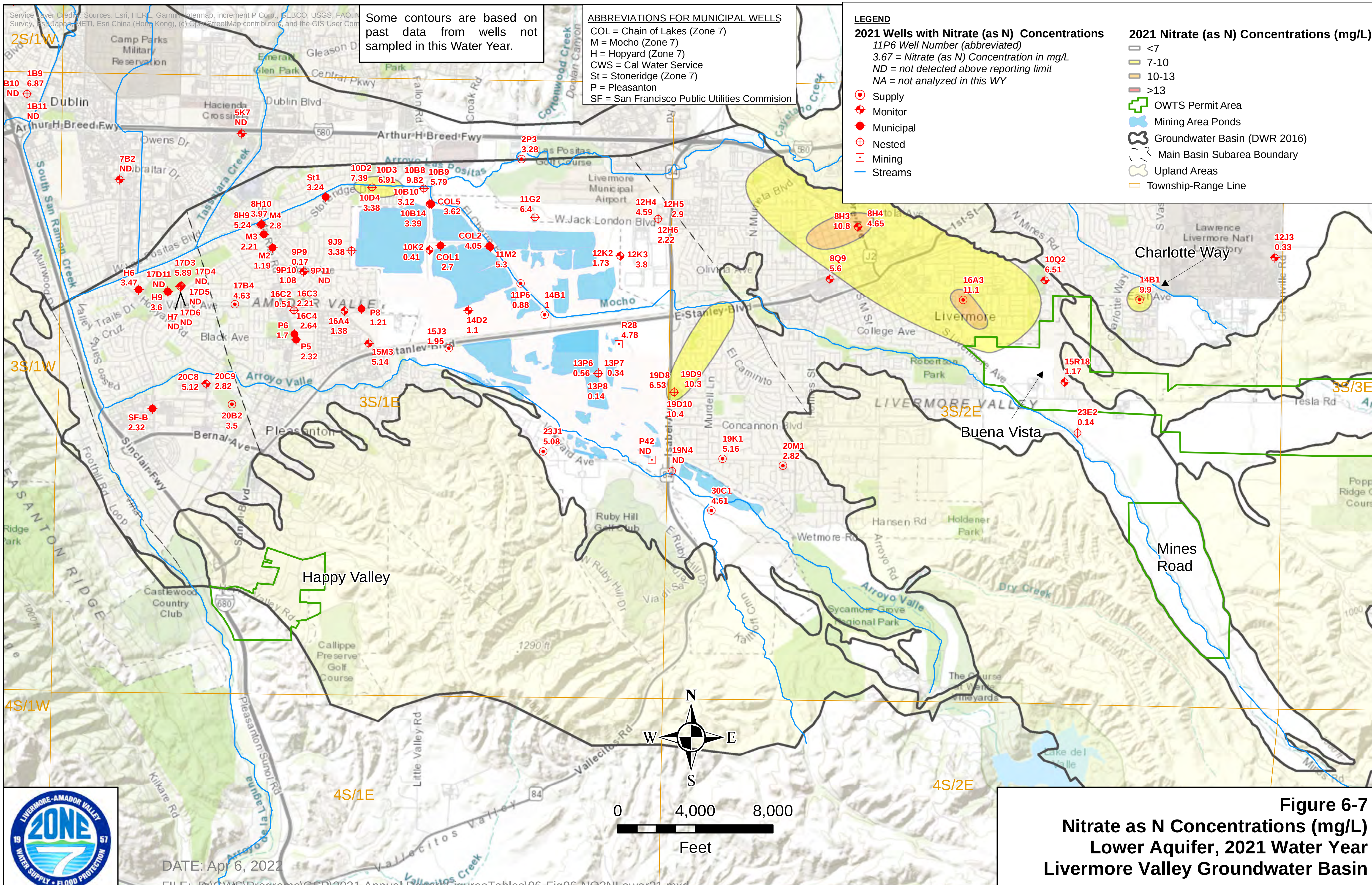



**Figure 6-7**
**Nitrate as N Concentrations (mg/L)**
**Lower Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

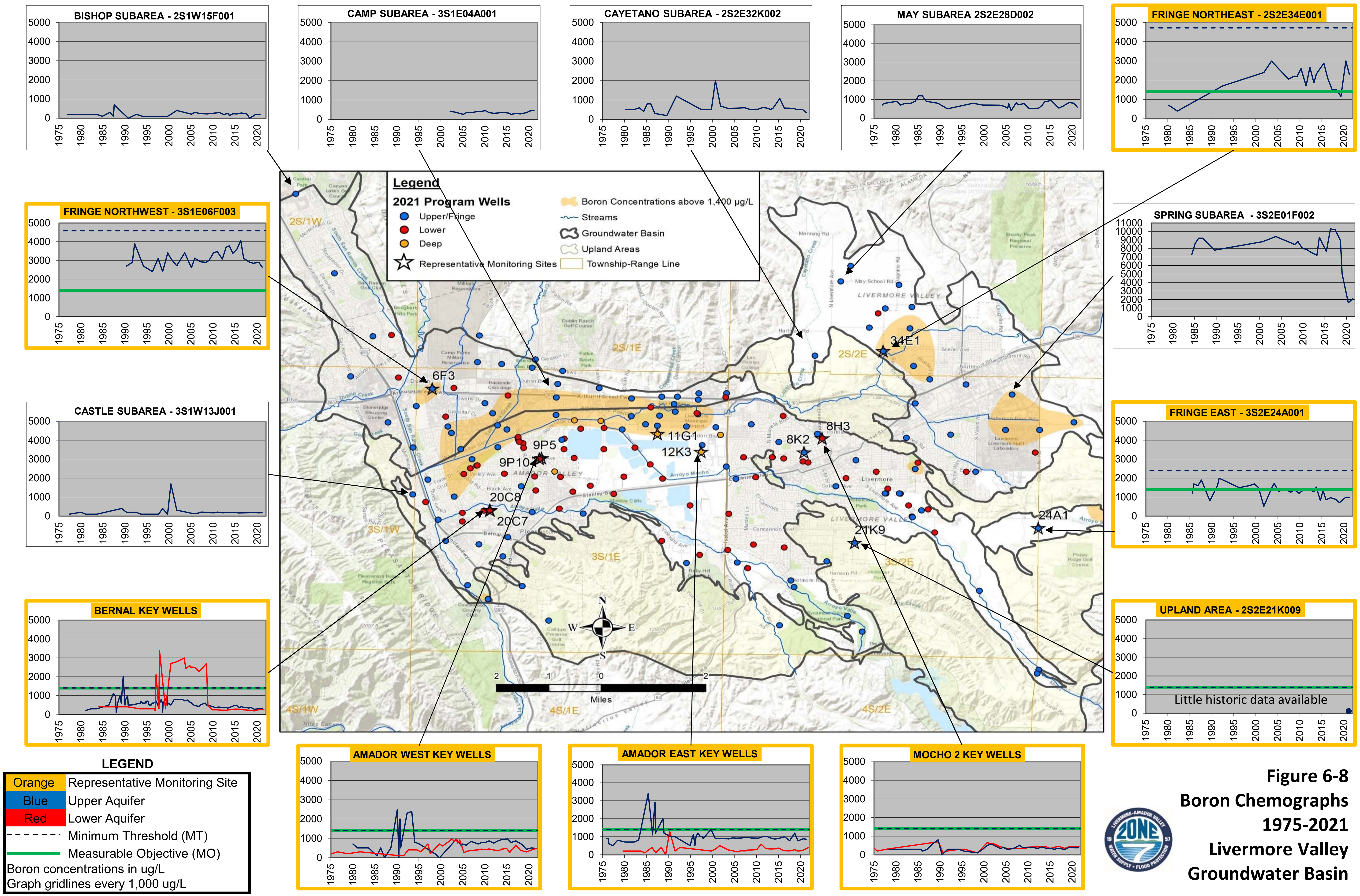



**Figure 6-8**
**Boron Chemographs**
**1975-2021**
**Livermore Valley**
**Groundwater Basin**

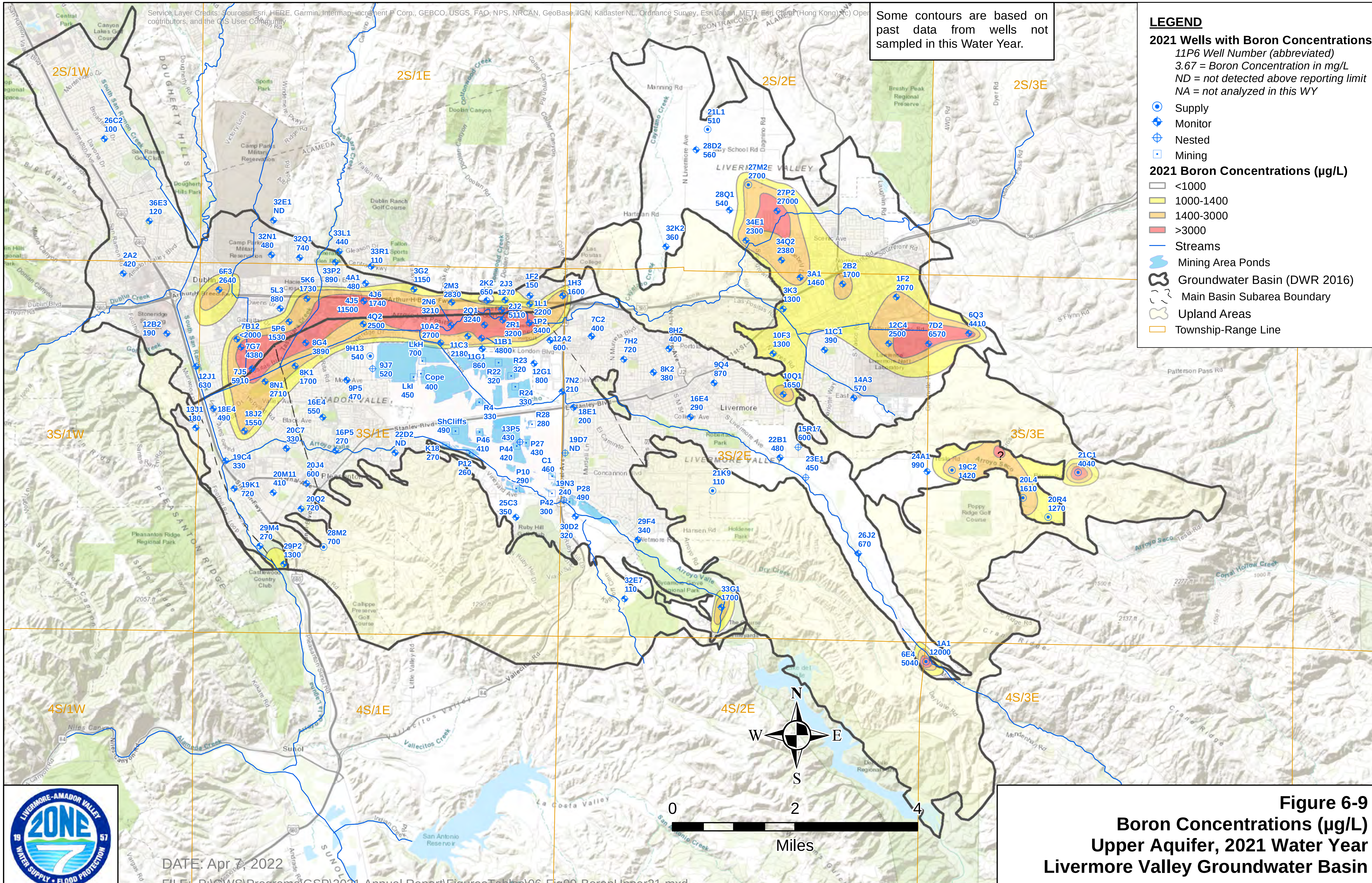



**Figure 6-9**
**Boron Concentrations (µg/L)**
**Upper Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

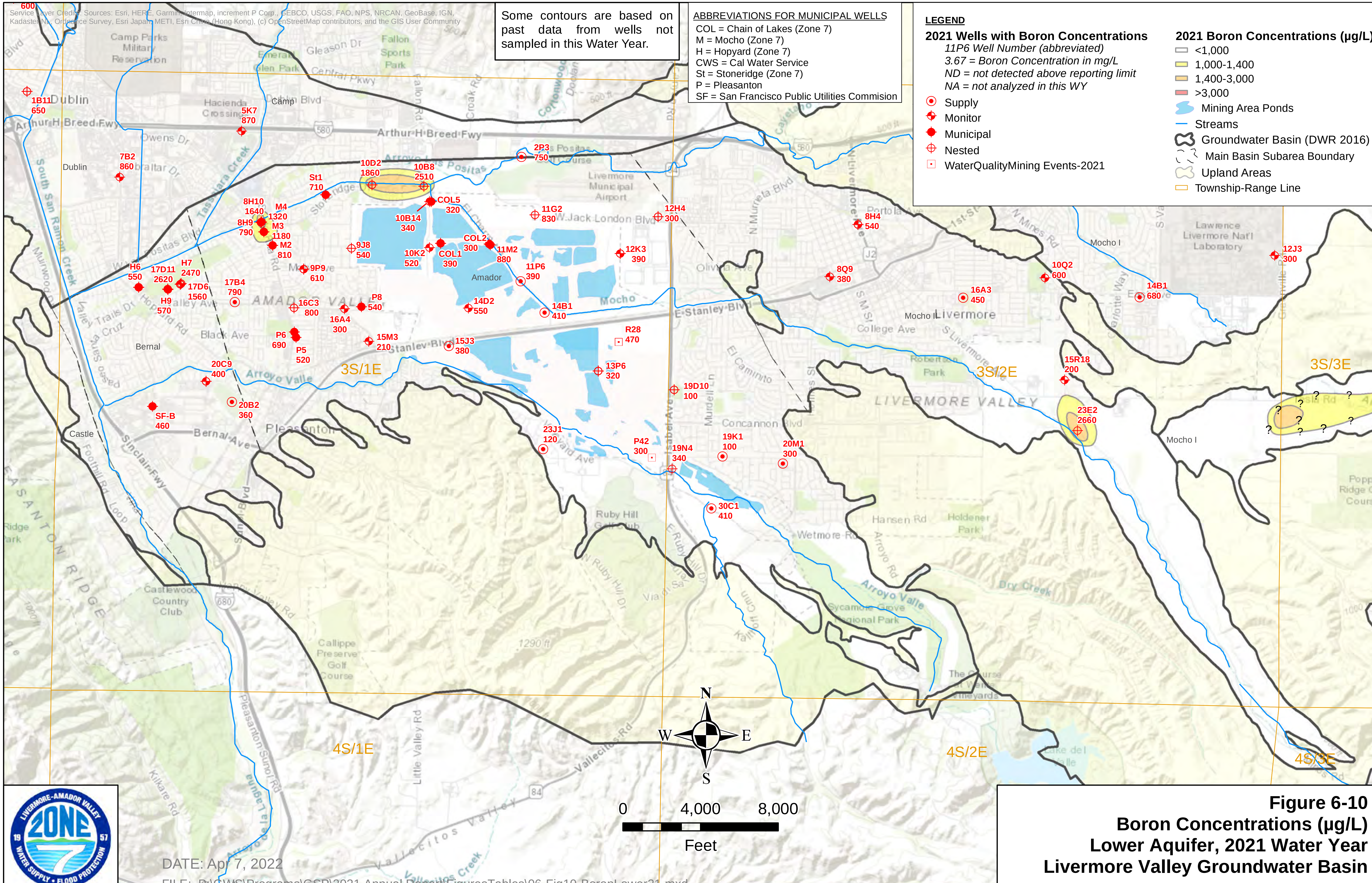



**Figure 6-10**
**Boron Concentrations (µg/L)**
**Lower Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

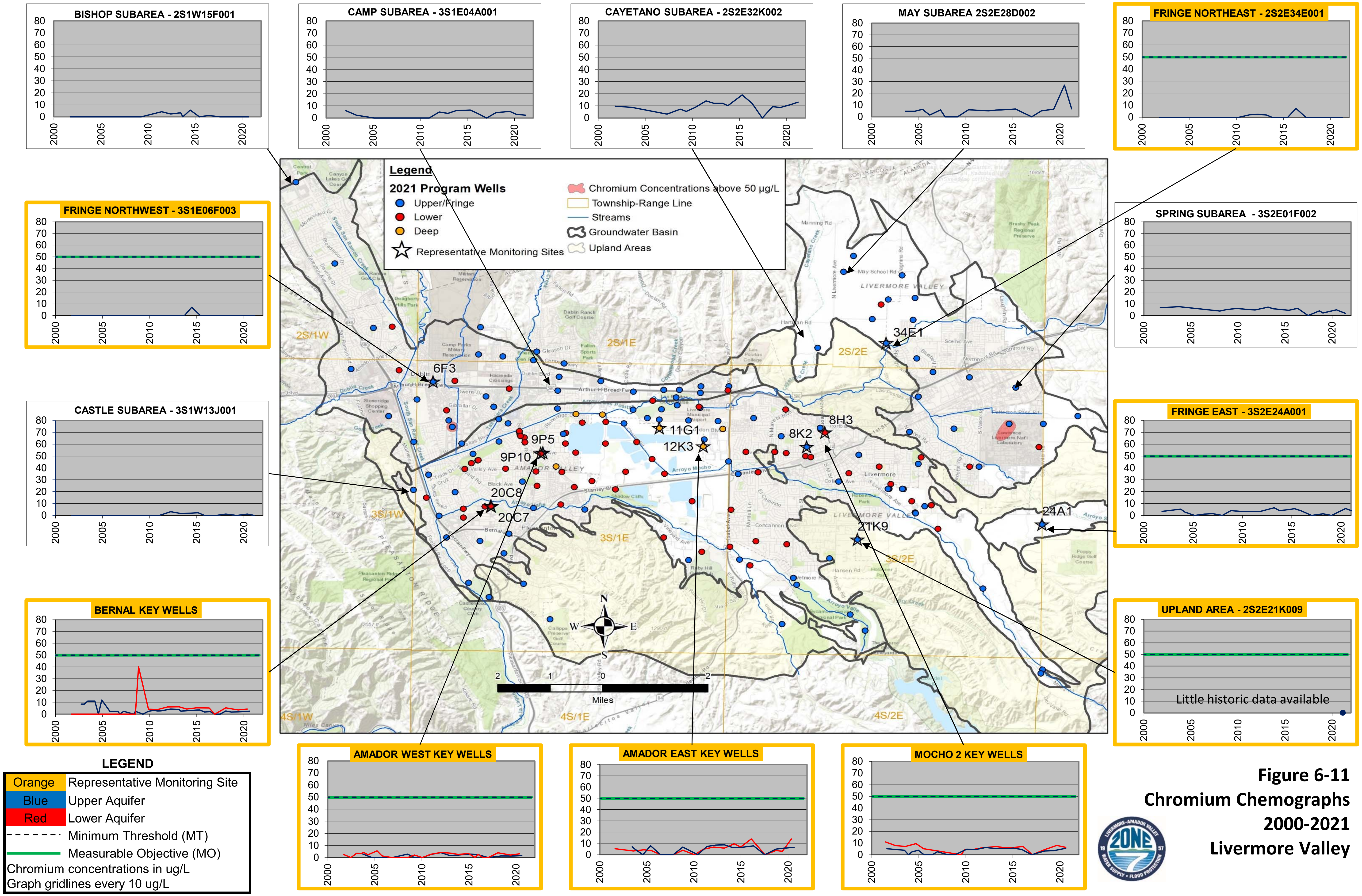



**Figure 6-11**
**Chromium Chemographs**
**2000-2021**
**Livermore Valley**

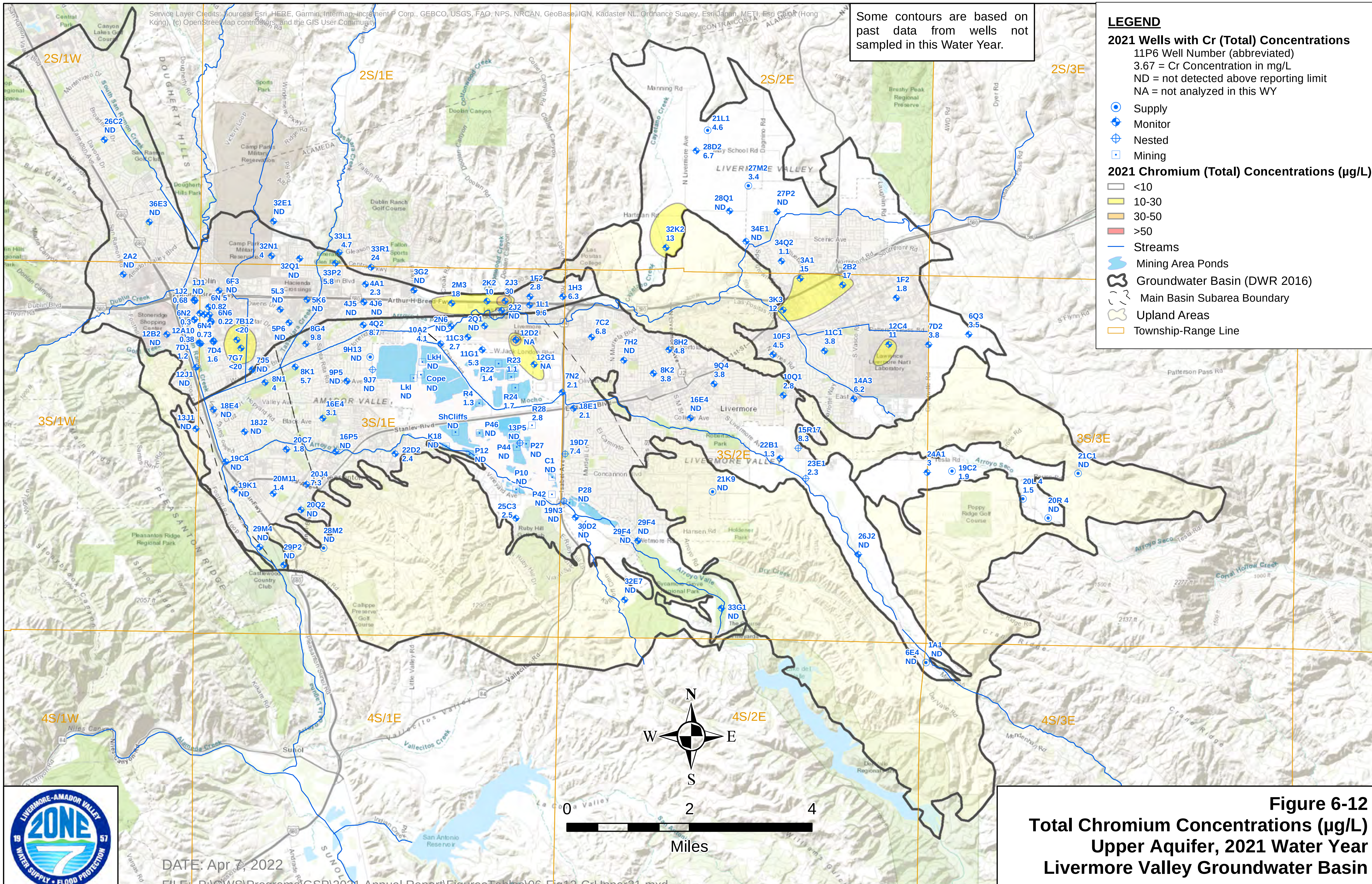



**Figure 6-12**
**Total Chromium Concentrations (µg/L)**
**Upper Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

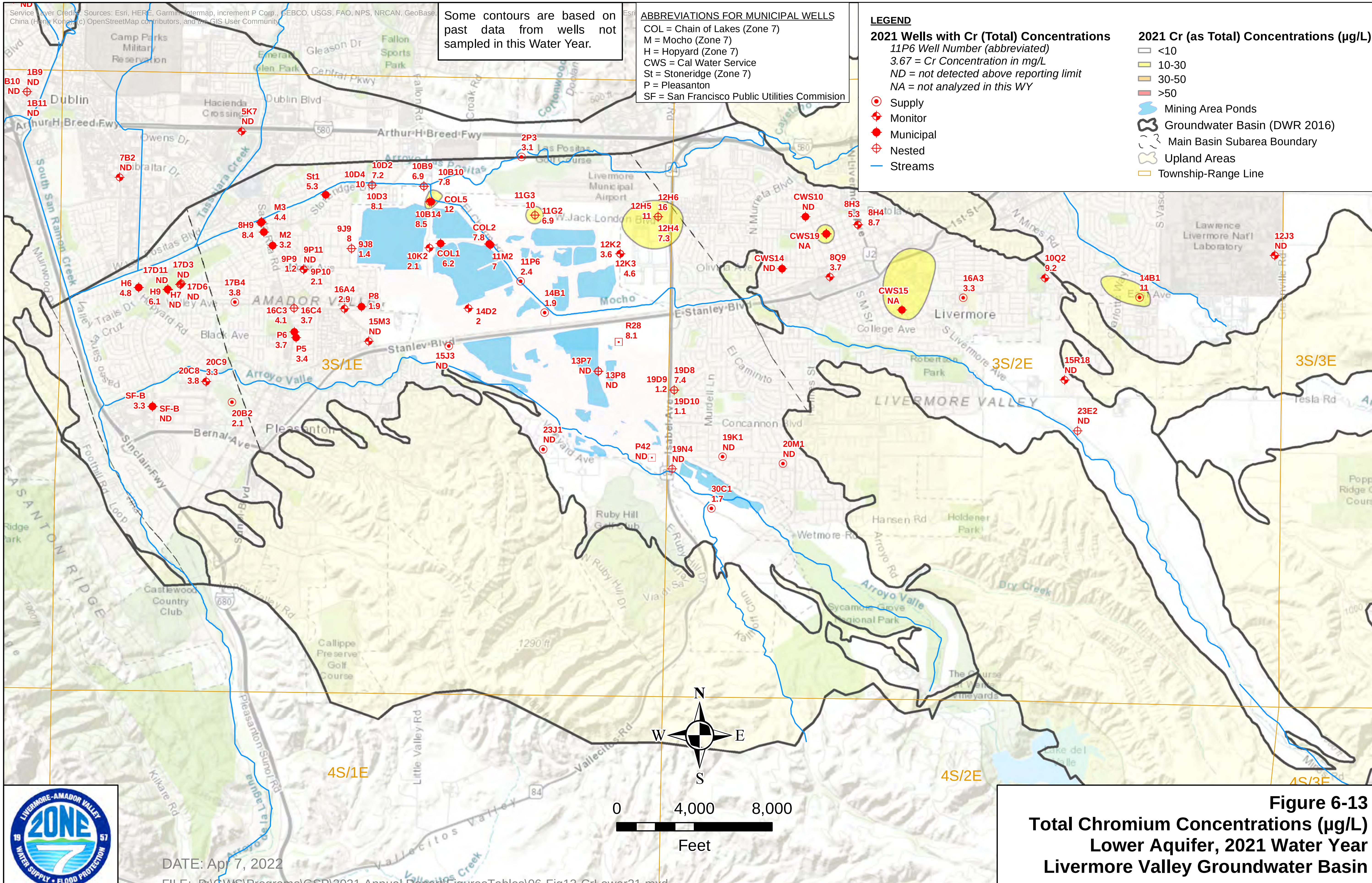



**Figure 6-13**
**Total Chromium Concentrations (µg/L)**
**Lower Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

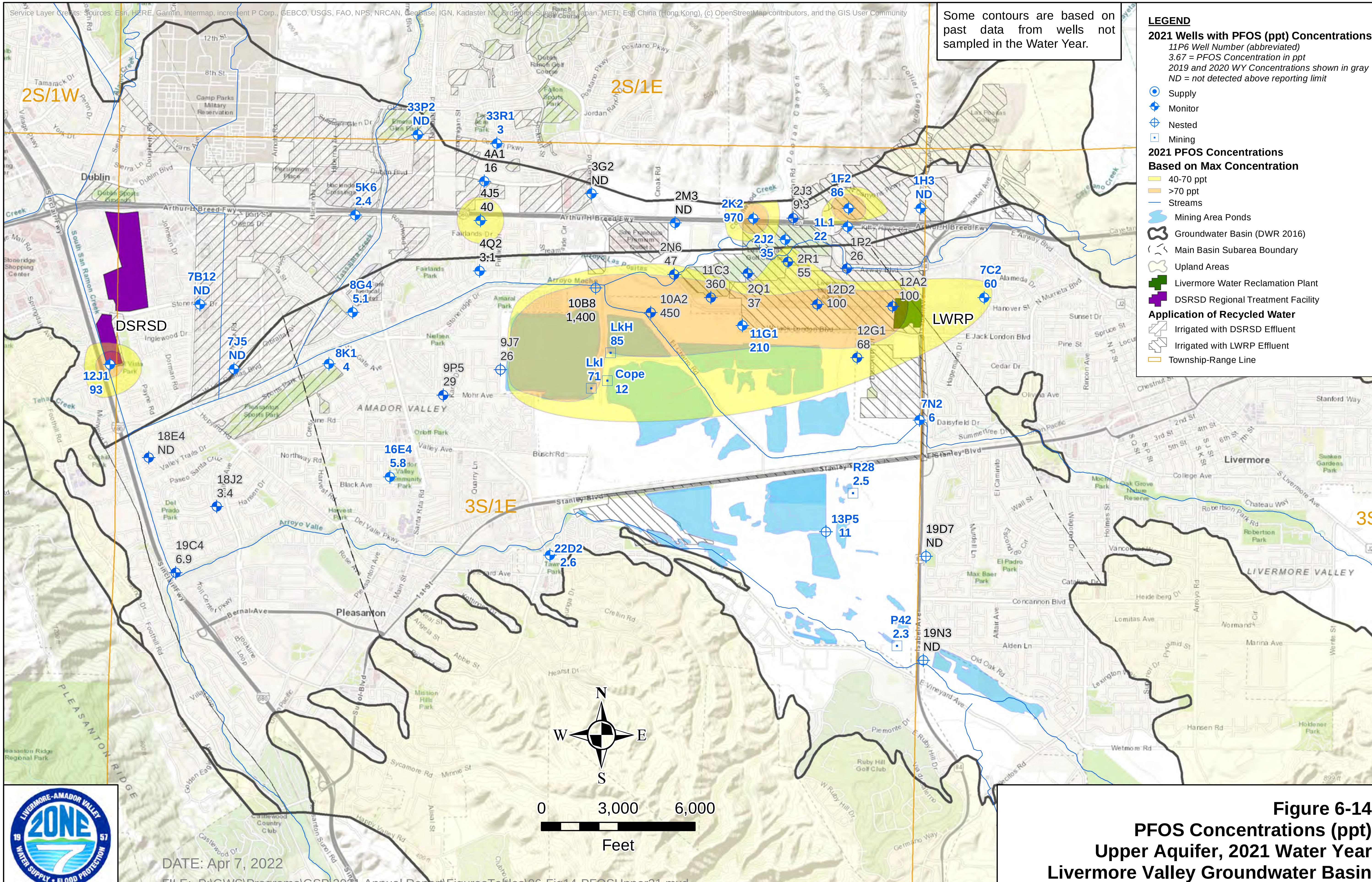



**Figure 6-14**
**PFOS Concentrations (ppt)**
**Upper Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

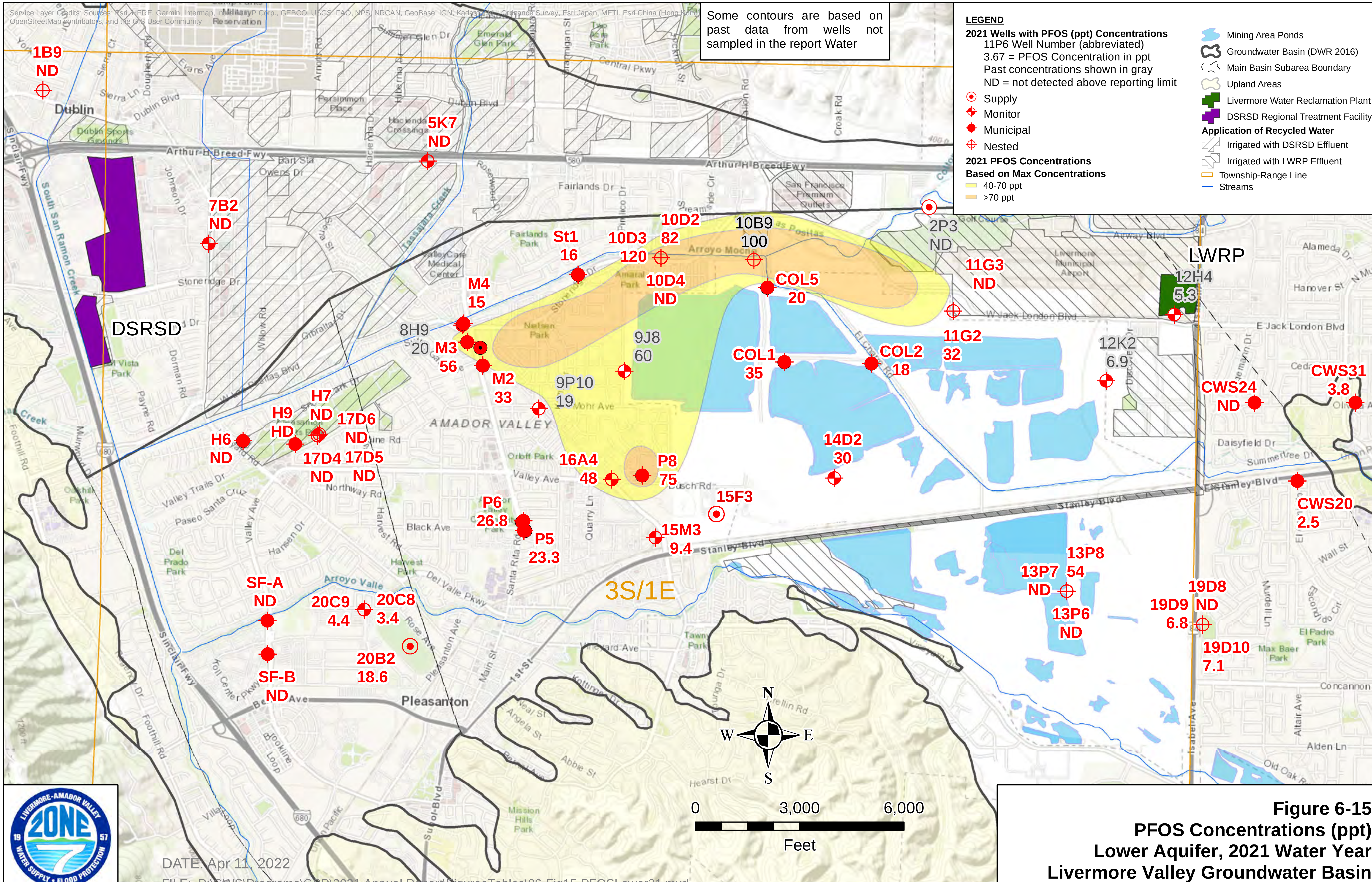



**Figure 6-15**
**PFOS Concentrations (ppt)**
**Lower Aquifer, 2021 Water Year**
**Livermore Valley Groundwater Basin**

# 7 Land Subsidence Monitoring

## 7.1 Program Changes

Zone 7's 2021 Alternative GSP established SMCs for Land Subsidence as shown in ***Table 7-A*** below.

***Table 7-A: SMCs for Land Subsidence***

| Undesirable Results Definition | Undesirable Results Criteria | Minimum Threshold (MT) | Measurable Objective (MO) |
|---|---|---|---|
| If the occurrence of land subsidence substantially interferes with beneficial uses of groundwater and infrastructure within the Basin during the planning and implementation horizon of this Alternative GSP. | Water levels in greater than 25% of the RMS-WLs decline below their respective MTs for two consecutive years, that result in a confirmed decrease of 0.4 feet of land surface in any given cycle with a goal of experiencing no inelastic subsidence spatially and temporally. Not applicable to Upland Management Area. | Main Basin and Fringe Area: Chronic Lowering of Groundwater Levels used as a proxy, with the additional constraint of no more than 0.4 feet of inelastic land subsidence in any year. Upland Area: No MTs established. | Main Basin and Fringe Area: Chronic Lowering of Groundwater Levels used as a proxy. Upland Area: No MOs established. |

RMS-WL = Representative Monitoring Sites for Water Levels

The 2021 Alternative GSP recommended continuing with Interferometric Synthetic Aperture Radar (InSAR) on an annual basis, in lieu of the benchmark land surveys, to evaluate land subsidence over the entire Basin. For the 2021 WY, Zone 7 used InSAR data publicly available through the DWR. This data can be viewed by the public with the SGMA Data Viewer at:

https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer

For more information on the Land Subsidence program; see the following sections of the 2021 Alternative GSP:

- **Section 1.2.4:** Land Subsidence Program Update
- **Section 8.7:** Current and Historical Groundwater Conditions – Land Subsidence
- **Section 13.5:** Sustainability Indicators – Land Subsidence
- **Section 14.2.5:** Monitoring Network for Land Subsidence
- **Section 14.4:** Representative Monitoring

## 7.2 Results for the 2021 Water Year

***Figure 7-1*** shows the land surface elevation change (approximately 100-meter resolution) from Fall 2020 to Fall 2021. ***Figure 7-2*** shows cumulative land surface elevation change (raster obtained from DWR) from June 2015 (the earliest InSAR dataset with the Sentinel satellite) to Fall 2021. Both figures shows that land surface elevations generally rose (green) or dropped (yellow) within 0.05 feet. These elevation changes are within the range Zone 7 considers to be “elastic deformation” (i.e., rebounds to the original elevation when groundwater levels return to previous levels).

Some areas in the mining area appear to have dropped more than 0.10 feet (indicated by orange), however, these changes are likely due to excavation and grading activities, and not from land subsidence.

## 7.3 Attached Tables and Figures

***Figure 7-1****: Land Surface Elevation Change from Fall 2020 to Fall 2021*
***Figure 7-2****: Land Surface Elevation Change from June 2015 to October 2021*

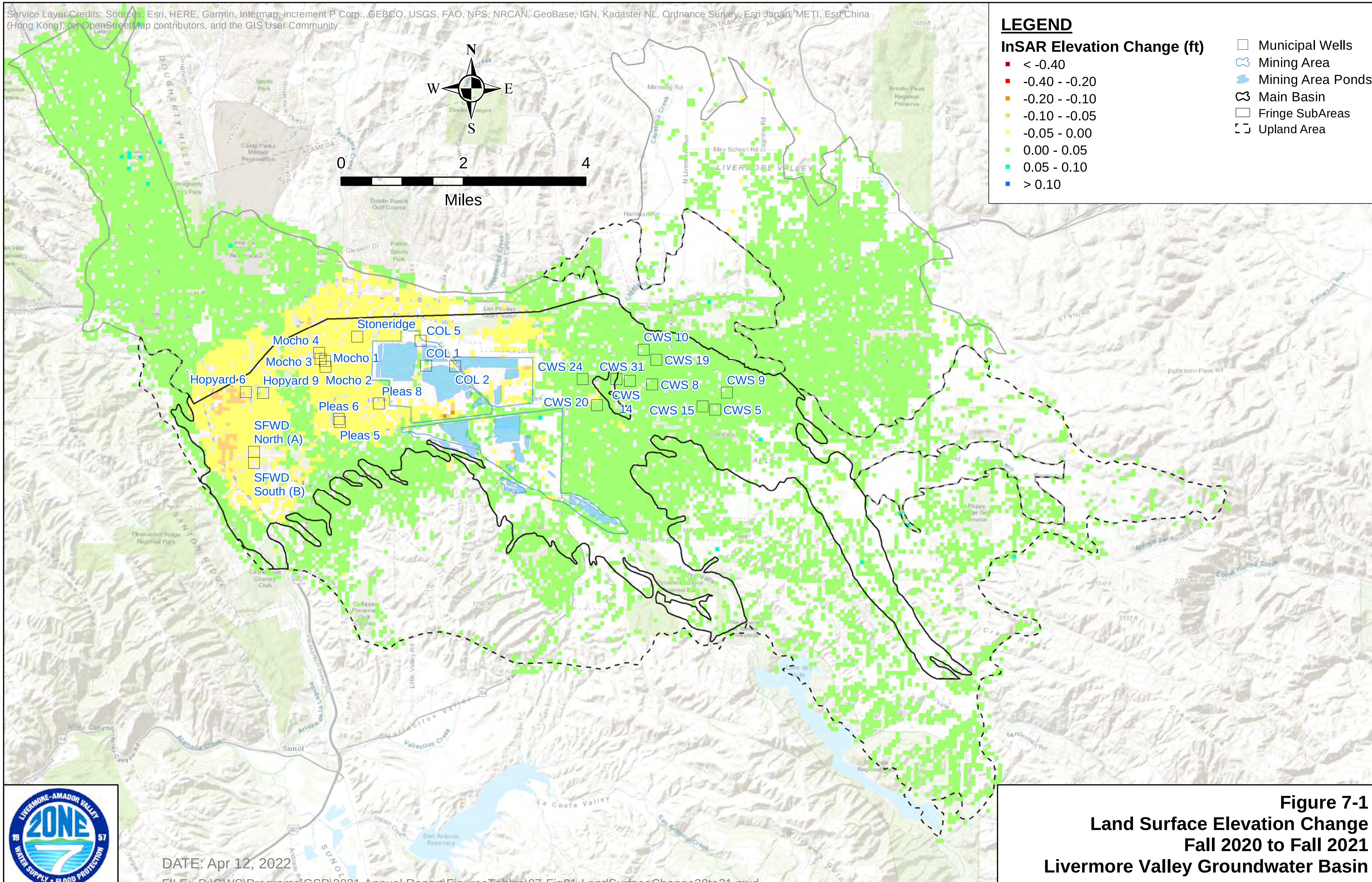



**Figure 7-1**
**Land Surface Elevation Change**
**Fall 2020 to Fall 2021**
**Livermore Valley Groundwater Basin**

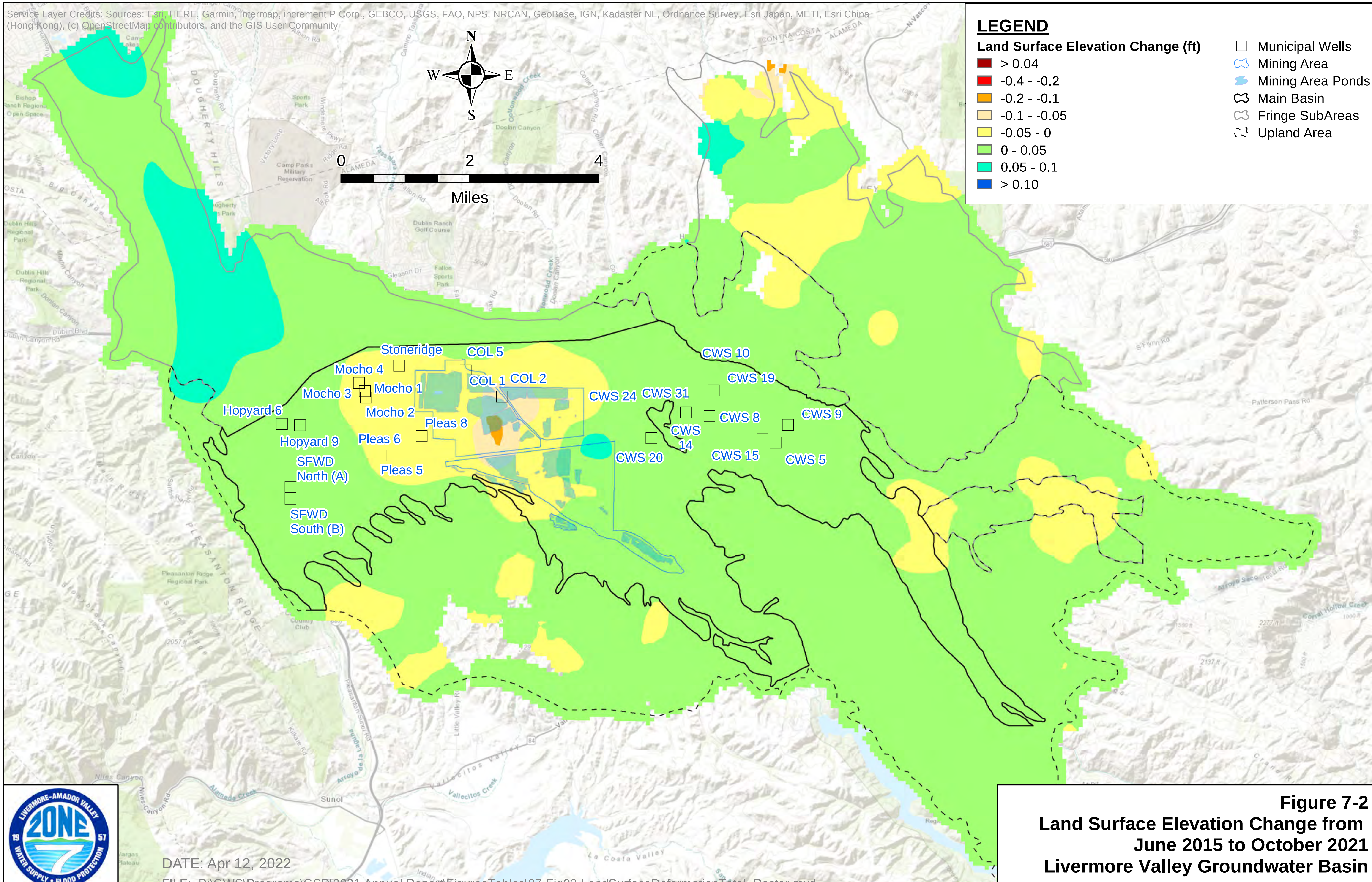



**Figure 7-2**
**Land Surface Elevation Change from June 2015 to October 2021**
**Livermore Valley Groundwater Basin**

# 8 Land Use Monitoring

## 8.1 Program Changes

There were no changes to the Land Use Monitoring Program during the 2021 WY. For more information on the Land Use program; see the following section of the 2021 Alternative GSP:

- **Section 5.1.4:** Existing Land Use and Water Use Sector and Source

## 8.2 Results for the 2021 Water Year

***Figure 8-1*** shows Land and Water Use overlying the Basin and ***Table 8-1*** tabulates the areas by Land Use Category, Water Use Type, and Basin Management Area. Although there was some in-fill development that occurred during the 2021 WY, no major land use change that would significantly affect the groundwater supply or groundwater quality was identified by Zone 7's land use review efforts.

## 8.3 Attached Tables and Figures

***Table 8-1****: Land Use Acreage, 2021 WY*
***Figure 8-1****: Map of Land Use, 2021 WY*

## TABLE 8-1
## LAND USE ACREAGE (in acres)
## 2021 WATER YEAR
## LIVERMORE VALLEY GROUNDWATER BASIN

| *Basin* | Main Basin | | | | | Fringe Areas | | | | | Upland Areas | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Category** *Irrigation Water Source* | **DW** | **GW** | **RW** | **none** | **Total** | **DW** | **GW** | **RW** | **none** | **Total** | **DW** | **GW** | **RW** | **none** | **Total** |
| Agriculture (non-vineyard) | 56 | 94 | 0 | 0 | 150 | 0 | 28 | 0 | 0 | 28 | 146 | 47 | 0 | 0 | 193 |
| Agriculture (vineyard) | 1,497 | 19 | 0 | 0 | 1,516 | 708 | 0 | 0 | 0 | 708 | 1,840 | 1 | 0 | 0 | 1,841 |
| ***Total Agricultural*** | ***1,552*** | ***113*** | ***0*** | ***0*** | ***1,666*** | ***708*** | ***28*** | ***0*** | ***0*** | ***735*** | ***1,986*** | ***48*** | ***0*** | ***0*** | ***2,033*** |
| Commercial and Business | 1,406 | 42 | 400 | 0 | 1,849 | 3,872 | 117 | 1,268 | 0 | 5,257 | 387 | 15 | 28 | 0 | 430 |
| Public | 563 | 0 | 400 | 0 | 962 | 957 | 3 | 57 | 0 | 1,018 | 143 | 0 | 88 | 0 | 232 |
| Public (Irrigated Park) | 563 | 0 | 118 | 0 | 680 | 185 | 0 | 87 | 0 | 272 | 97 | 0 | 11 | 0 | 108 |
| Residential (high density) | 421 | 0 | 0 | 0 | 421 | 264 | 0 | 158 | 0 | 422 | 29 | 0 | 15 | 0 | 44 |
| Residential (medium density) | 6,446 | 0 | 17 | 0 | 6,463 | 5,279 | 0 | 45 | 0 | 5,324 | 2,937 | 0 | 49 | 0 | 2,986 |
| Residential (low density) | 147 | 150 | 0 | 0 | 297 | 20 | 0 | 0 | 0 | 20 | 185 | 177 | 0 | 0 | 362 |
| Roads | 0 | 0 | 0 | 78 | 78 | 0 | 0 | 0 | 701 | 701 | 0 | 0 | 0 | 93 | 93 |
| ***Total Urban*** | ***9,545*** | ***192*** | ***934*** | ***78*** | ***10,749*** | ***10,576*** | ***120*** | ***1,616*** | ***701*** | ***13,013*** | ***3,778*** | ***192*** | ***192*** | ***93*** | ***4,255*** |
| Golf Course | 140 | 90 | 126 | 0 | 356 | 230 | 15 | 66 | 0 | 311 | 466 | 172 | 0 | 0 | 638 |
| Residential (rural) | 41 | 155 | 0 | 0 | 196 | 19 | 373 | 0 | 0 | 392 | 166 | 192 | 0 | 0 | 358 |
| Mining Area (pit) | 0 | 0 | 0 | 1,959 | 1,959 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Open Space | 0 | 0 | 102 | 3,748 | 3,850 | 0 | 0 | 0 | 7,440 | 7,440 | 0 | 0 | 0 | 20,324 | 20,324 |
| Water | 0 | 0 | 0 | 1,034 | 1,034 | 0 | 0 | 0 | 65 | 65 | 0 | 0 | 0 | 170 | 170 |
| ***Total Other*** | ***181*** | ***245*** | ***229*** | ***6,740*** | ***7,394*** | ***249*** | ***389*** | ***66*** | ***7,505*** | ***8,208*** | ***632*** | ***364*** | ***0*** | ***20,494*** | ***21,490*** |
| **TOTALS FOR 2021 WY** | **11,278** | **550** | **1,163** | **6,818** | **19,809** | **11,532** | **536** | **1,681** | **8,206** | **21,956** | **6,396** | **603** | **192** | **20,587** | **27,778** |
| **TOTALS FOR 2020 WY** | **11,278** | **550** | **1,163** | **6,818** | **19,809** | **11,532** | **536** | **1,681** | **8,206** | **21,956** | **6,396** | **603** | **192** | **20,587** | **27,778** |
| **CHANGE SINCE PREVIOUS YEAR** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |

Irrigation Water Sources
DW = Delivered Municipal Water
GW = Groundwater
RW = Recycled Water

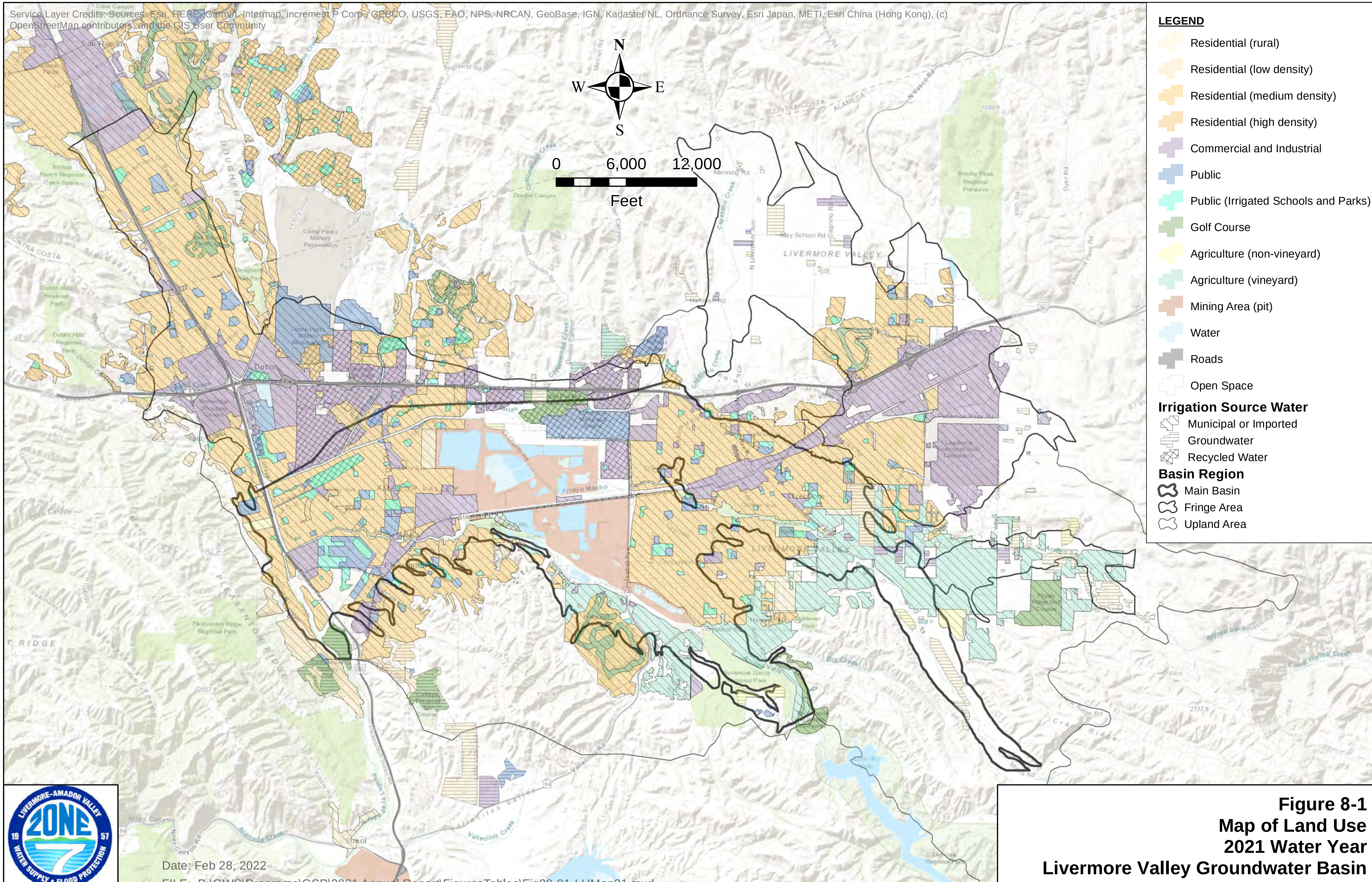



**Figure 8-1**
**Map of Land Use**
**2021 Water Year**
**Livermore Valley Groundwater Basin**

# 9 Wastewater and Recycled Water Monitoring

## 9.1 Program Changes

There were no changes to the Wastewater and Recycled Water Monitoring Program during the 2021 WY. See ***Section 8.10.2*** of the 2021 Alternative GSP for specific details about the Wastewater and Recycled Water Program.

## 9.2 Results for the 2021 Water Year

### 9.2.1 Wastewater and Recycled Water Volumes

Wastewater and recycled water application areas for 2021 WY are shown on ***Figure 9-1***. In the 2021 WY, about 96% of the wastewater produced over the Basin was treated at Livermore Wastewater Reclamation Plant (LWRP) and Dublin San Ramon Services District (DSRSD). A summary of the wastewater volumes for the 2021 WY are presented in ***Table 9-A*** below.

***Table 9-A: Municipal Wastewater and Recycled Water Volumes, 2021 WY***

| Water Type | LWRP | DSRSD | Total |
|---|---|---|---|
| Wastewater Influent | 6,040 | 12,059 | 18,099 |
| Treated Effluent Exported via LAVWMA* | 4,436 | 5,442 | 9,878 |
| Total Volume Recycled | 2,201 | 6,014 | 8,215 |
| **RW Applied to Main Basin**** | **615** | **464** | **1,079** |

| | |
|---|---|
| * | Does not include Zone 7 Demin Plant discharge to LAVWMA via DSRSD |
| ** | Recycled water applied over the Main Basin as landscape irrigation |
| DSRSD | Dublin San Ramon Services District |
| LAVWMA | Livermore-Amador Valley Water Management Agency |
| LWRP | Livermore Wastewater Reclamation Plant |
| RW | Recycled Water |

Recycled water continues to account for small fractions of the Basin's water supply (14%) and Main Basin recharging waters (approximately 3%); however, of greater benefit, the recycled water use in the 2021 WY potentially conserved up to 8,215 AF of water that might have otherwise come from groundwater storage.

The estimated 2021 WY leachate volumes from the Veterans (VA) Hospital wastewater treatment ponds located in southern Livermore, domestic onsite wastewater treatment systems (OWTS) (e.g., septic systems), and leaking wastewater pipelines that run throughout the Basin are presented in ***Table 9-B*** below.

***Table 9-B: Other Wastewater Volumes (AF), 2021 WY***

| | VA Hospital* | Septic Tanks* | Pipe Leakage** | Total |
|---|---|---|---|---|
| Wastewater Leachate | 50 | 80 | 569 | 699 |

* Estimated total over the Main Basin
** Calculated. Includes leakage from sanitary sewer & RW pipes

## 9.2.2 Wastewater and Recycled Water Quality

### 9.2.2.1 Salt Loading

***Table 9-C*** below presents the estimated salt loading over the Main Basin from applied wastewater and recycled water during the 2021 WY.

***Table 9-C: Salt Loading from Applied Recycled Water and Wastewater, 2021 WY***

| Source | Volume (AF) | TDS Average (mg/L) | Salt Applied (tons) |
|---|---|---|---|
| LWRP RW | 615 | 578 | 483 |
| DSRSD RW | 464 | 726 | 458 |
| *Total RW* | *1,079* | *641* | *940* |
| VA Hospital | 50 | 573 | 39 |
| Septic | 80 | 600 | 65 |
| Pipe Leakage | 569 | 467 | 361 |
| *Total WW* | *699* | *490* | *465* |
| ***Total*** | ***1,778*** | ***754*** | ***1,406*** |

DSRSD Dublin San Ramon Services District
LWRP Livermore Wastewater Reclamation Plant
RW Recycled Water
WW Wastewater

About 967 tons (approximately 9%) of the Main Basin's salt inflow (11,365 tons) was attributed to recycled water use over the Main Basin during the 2021 WY (see ***Table 12-2***). However, if potable water supplies had been used for this irrigation demand, the salt loading would have been about 593 tons (a reduction of only about 374 tons). This difference is significantly less than the 448 tons that were removed by Zone 7's Mocho Groundwater Demineralization Plant (MGDP) in the 2021 WY (see ***Table 12-C***).

***Table 9-D*** below presents the estimated nitrogen loading over the Main Basin from applied wastewater and recycled water during the 2021 WY.

***Table 9-D: Nitrogen Loading from Applied Recycled Water and Wastewater, 2021 WY***

| Source | Volume (AF) | Nitrogen Compounds (mg/L) | | | Nitrogen Applied (lbs) |
|---|---|---|---|---|---|
| | | NO3(N) | NO2(N) | TKN | |
| LWRP RW | 615 | 0.1 | 0.8 | 52.5 | 88,267 |
| DSRSD RW | 464 | 0.8 | 1.6 | 30.0 | 38,679 |
| *Total RW* | *1,079* | *0.4* | *1.1* | *42.8* | *126,946* |
| VA Hospital | 50 | 11.1 | 0.1 | 5.0 | 1,025 |
| Septic | 80 | 35.0 | 0.0 | 0.0 | 1,719 |
| Pipe Leakage | 569 | 0.2 | 0.5 | 19.7 | 30,859 |
| *Total WW* | *699* | *5.0* | *0.4* | *16.4* | *33,603* |
| ***Total*** | ***1,778*** | ***2.2*** | ***0.9*** | ***32.5*** | ***160,549*** |

DSRSD Dublin San Ramon Services District
LWRP Livermore Wastewater Reclamation Plant
NO3(N) Nitrate as Nitrogen
NO2(N) Nitrite as Nitrogen
RW Recycled Water
TKN Total Kejldahl Nitrogen
WW Wastewater
lbs pounds

The table shows that about 160,500 pounds (lbs) of nitrogen was applied over the Main Basin during the 2021 WY. However, from a practical standpoint, much of the nitrogen will be removed from the percolate through soil denitrification and plant uptake processes.

# 9.3 Attached Tables and Figures

***Figure 9-1**: Wastewater and Recycled Water Application Areas, 2021 WY*

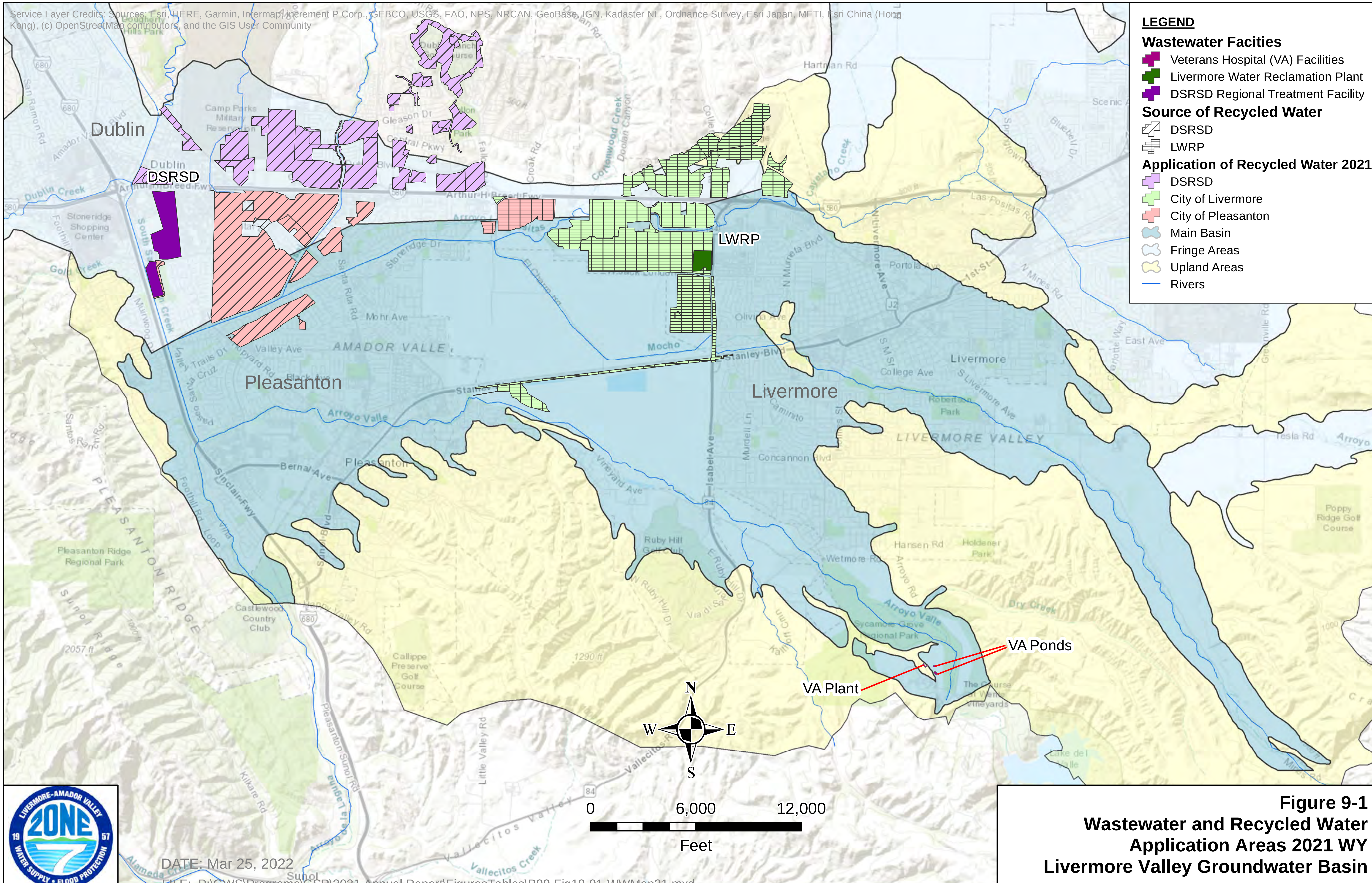



**Figure 9-1**
**Wastewater and Recycled Water Application Areas 2021 WY**
**Livermore Valley Groundwater Basin**

# 10 Groundwater Storage

## 10.1 Program Changes

As part of the 2021 Alternative GSP, Zone 7 refined its Hydrogeologic Conceptual Model (HCM) of the Basin as it relates to groundwater storage. Tasks performed for this effort included:

- Purchasing a license for RockWorks (a three dimensional [3D] geologic modeling software platform),
- Transferring the existing e-log and geology database to RockWorks,
- Extending the HCM to include the Fringe and Upland Areas,
- Preparing three new cross sections that trace through the major groundwater production areas of the Basin,
- Migrating the existing Areal Recharge Spreadsheet Model (ARM) to DWR's Integrated Water Flow Model Demand Calculator (IDC) platform, and
- Extending the IDC model to include the entire Basin.

The 2021 Alternative GSP also established SMCs for Reduction of Groundwater Storage as shown in ***Table 10-A*** below.

***Table 10-A: SMCs for Reduction of Groundwater Storage***

| Undesirable Results Definition | Undesirable Results Criteria | Minimum Threshold (MT) | Measurable Objective (MO) |
|---|---|---|---|
| If and when a reduction in storage in the Principal Aquifers of the Basin negatively affects the long-term viable access to groundwater for the beneficial uses and users within the Basin. Specifically, significant and unreasonable effects would include an aggregate reduction in usable groundwater storage of more than 50% within the Basin relative to the SGMA Baseline Storage volume for two consecutive years. | Water levels in greater than 25% of the RMS-WLs decline below their respective MTs for two consecutive years.<br><br>Not applicable to Upland Management Area. | Main Basin and Fringe Area: Chronic Lowering of Groundwater Levels used as a proxy.<br><br>Upland Area: No MTs established. | Main Basin and Fringe Area: Chronic Lowering of Groundwater Levels used as a proxy.<br><br>Upland Area: No MOs established. |

RMS-WL = Representative Monitoring Sites for Water Levels

The following sections in the 2021 Alternative GSP provide more information on the Groundwater Storage program and the improvements made to the HCM:

- **Section 1.2.2**: Groundwater Storage Program Updates

- **Section 8.4**: Current and Historical Groundwater Conditions – Groundwater Storage
- **Section 9**: Water Budget Information
- **Section 13.2**: Sustainability Management Criteria – Reduction of Groundwater Storage
- **Section 14.2.2**: Monitoring Network for Reduction of Groundwater Storage

# 10.2 Results for the 2021 Water Year

## 10.2.1 Total Storage

Zone 7 uses two methods for calculating groundwater storage in the Main Basin: The Groundwater Elevation (GWE) Method and the Hydrologic Inventory (HI) Method. The GWE method uses groundwater level data and storage coefficients for "nodes" (originally developed by DWR in 1974) to estimate the total volume of water in the Main Basin. The HI method involves accounting for inflows and outflows for each WY and adds the net change in storage to the previous year's volume. Storage volumes from the two methods are averaged to quantify the total storage of the Main Basin.

***Figure 10-1*** shows the Upper and Lower Aquifer groundwater elevations used to calculate the GWE method storage for the 2021 WY. The change in storage from Fall 2020 to Fall 2021 for each Main Basin node is shown in ***Figure 10-2***. ***Table 10-1*** shows the historical annual GWE groundwater storage volumes for each Subarea from the 1974 WY to 2021 WY.

The results of the HI method for the 2021 WY are summarized below in ***Table 10-B*** below. All the HI components are listed in ***Table 10-2*** along with their method of measurement and their approximate accuracy. The historic HI components and results for WYs 1974 to 2021 are tabulated in ***Table 10-3***, and charted in ***Figure 10-3*** along with the WY type (e.g., wet, normal, dry, etc.) noted for each year. ***Figure 10-4*** shows a map of the pumping well locations during the 2021 WY and a representation of the relative volumes of water pumped from each well.

***Table 10-B: HI Method Groundwater Storage Supply and Demand Volumes, 2021 WY (AF)***

| CATEGORY | Sustainable Avg | 2021 | % of Avg | Change from 2020 |
|---|---|---|---|---|
| **SUPPLIES** | **19,800** | **7,827** | **40%** | **-5,699** |
| Stream Recharge Artificial | 5,300 | 277 | 5% | -2,184 |
| Stream Recharge Natural | 6,600 | 2,426 | 37% | -1,085 |
| Rainfall Recharge | 4,300 | 1,079 | 25% | -1,790 |
| Applied Water Recharge | 1,600 | 1,798 | 112% | -678 |
| Pipe Leakage | 1,000 | 1,248 | 125% | 39 |
| Subsurface Inflow | 1,000 | 1,000 | 100% | 0 |
| **DEMANDS** | **18,800** | **27,999** | **149%** | **6,552** |
| Zone 7 Pumping excluding DSRSD | 5,300 | 15,795 | 298% | 4,694 |
| Other Pumping | 8,400 | 7,011 | 83% | 1,763 |
| Agricultural Pumping | 400 | 122 | 30% | 9 |
| Mining Losses | 1,400 | 700 | 50% | 0 |
| Evapotranspiration (Eto) | 3,200 | 4,372 | 137% | 232 |
| Subsurface Outflow | 100 | 0 | 0% | -146 |
| **NET CHANGE (SUPPLY – DEMAND)** | **1,000** | **-20,172** | | **-12,250** |
| **TOTAL STORAGE (HI Method)** | | **227,071** | | **-20,172** |

AF = acre-feet
Avg = average
DSRSD = Dublin San Ramon Services District

The groundwater storage volumes at the end of the 2021 WY for both the GWE and HI methods are presented below in ***Table 10-C***. The total groundwater storage for the Main Basin at the end of 2021 WY was calculated to be 223.4 thousand acre-feet (TAF), with 95.4 TAF of groundwater available as operational storage, which is about 76% of the total operational storage capacity (i.e., 126 TAF from 1983 WY).

***Table 10-C: Groundwater Storage Summary, 2021 WY (in TAF)***

| Storage Calculation Method | End of 2020 WY | End of 2021 WY | Change in Storage |
|---|---|---|---|
| Groundwater Elevations (GWE) | 237.1 | 219.8 | -17.3 |
| Hydrologic Inventory (HI) | 247.2 | 227.1 | -20.1 |
| **Total Storage (average of GWE & HI)** | **242.2** | **223.4** | **-18.8** |
| Operational Storage* | 114.2 | 95.4 | -18.8 |

* Operational Storage = Total Storage - Reserve Storage (i.e., 128 TAF)

In the past, groundwater storage values calculated by both the GWE and HI Methods have typically been within about 6 TAF. However, the difference between the HI and GWE methods was 10.1 TAF in the 2020 WY and 7.3 TAF in the 2021 WY. The reason for this divergence is unclear; however, there have been significant differences between the two methods in the past that converged a few years later (e.g., 1992 and 2008/2009). Zone 7 staff continues to investigate possible reasons for this significant difference.

### 10.2.2 Natural Recharge and Demand

***Table 10-D*** below summarizes the "natural" recharge (inflows) and the "natural" demand (outflows to which natural recharge is allocated) for the 2021 WY.

***Table 10-D: Natural Groundwater Inflow and Outflows, 2021 WY***

| Component | Estimated Sustainable Values (AF/Yr) | 2021 WY (AF) | Percentage of Sustainable Average |
|---|---|---|---|
| Natural Recharge | 13,400 | 6,302 | 47% |
| Natural Demand | 13,400 | 12,204 | 91% |
| Net Natural Recharge | 0 | -5,902 | -44%* |

AF = acre-feet
AF/Yr = acre-feet per year
* = percent of Sustainable Natural Recharge

The retailer's Groundwater Pumping Quota (GPQ), along with their groundwater pumping volumes for the 2021 Calendar Year (CY), are shown in ***Table 10-E*** below. None of the retailers pumped more than their respective GPQ in 2021 WY.

***Table 10-E: Retailer Groundwater Pumping and Quotas in 2021 Calendar Year (AF)***

| Retailer | GPQ | Carryover from 2020 | Pumped in CY 2021 | Carryover to 2022** |
|---|---|---|---|---|
| City of Pleasanton | 3,500 | 391 | 3,331 | 168 |
| Cal Water Service (CWS) | 3,069 | 614 | 1,389 | 614 |
| DSRSD (pumped by Zone 7) | 645 | 0 | 645 | 0 |
| City of Livermore (not used)* | 31 | - | 0 | - |
| **Total** | **7,214** | **1,005** | **5,365** | **782** |

AF = Acre-feet
GPQ = Groundwater Pumping Quota
* = Livermore no longer pumps groundwater, GPQ not included in totals or carryover.
** = Maximum of 20% of GPQ can be carried over

### 10.2.3 Artificial Recharge and Demand—Conjunctive Use

***Figure 10-5*** shows the cumulative change net inflow/outflow from both natural and artificial components since 1974. ***Table 10-F*** below shows the artificial recharge and Zone 7's groundwater pumping totals for the 2021 WY.

***Table 10-F: Conjunctive Use Supply and Demand, 2021 WY***

| Component | Estimated Sustainable Avg (AF/Yr) | 2021 WY (AF) | Percentage of Sustainable Average |
|---|---|---|---|
| Artificial Recharge | 5,300 | 277 | 5% |
| Zone 7 Pumping | 5,300 | 15,795 | 298% |
| **Net Artificial Recharge** | **0** | **-15,518** | **-293%*** |

AF = acre-feet Avg = average
AF/Yr = acre-feet per year * = percent of Sustainable Artificial Recharge

Since 1974, Zone 7 has artificially recharged 39,853 AF more than it has pumped. These totals do not include the water Zone 7 pumps for DSRSD (usually 645 AF/yr), which is considered part of the "natural" demand.

## 10.3 Attached Tables and Figures

***Table 10-1****: Total Main Basin Storage by Subarea, 1974 to 2021 WYs*
***Table 10-2****: Description of Hydrologic Inventory Components*
***Table 10-3****: Historical Groundwater Storage, Hydrologic Inventory Method, 1974 to 2021 WYs*

## TABLE 10-1
## TOTAL MAIN BASIN STORAGE BY SUBAREA (AF)
## GROUNDWATER ELEVATION METHOD
## 1974 TO 2021 WATER YEARS

| Water Year | Bernal | Amador | | Mocho II | Total |
|---|---|---|---|---|---|
| | | Amador West | Amador East | | |
| 1974 | 49,651 | 52,916 | 80,671 | 29,821 | 213,060 |
| 1975 | 51,149 | 54,220 | 80,840 | 28,872 | 215,080 |
| 1976 | 54,180 | 56,319 | 86,194 | 29,012 | 225,705 |
| 1977 | 51,970 | 53,968 | 81,889 | 27,954 | 215,782 |
| 1978 | 50,272 | 52,077 | 79,541 | 27,751 | 209,641 |
| 1979 | 52,863 | 56,739 | 89,122 | 29,210 | 227,933 |
| 1980 | 55,952 | 60,000 | 94,014 | 29,500 | 239,466 |
| 1981 | 57,910 | 61,890 | 95,688 | 30,224 | 245,712 |
| 1982 | 57,623 | 61,228 | 93,235 | 29,156 | 241,242 |
| 1983 | 58,654 | 63,488 | 100,642 | 31,492 | 254,277 |
| 1984 | 59,021 | 64,418 | 102,569 | 31,626 | 257,635 |
| 1985 | 58,487 | 64,024 | 95,703 | 31,568 | 249,782 |
| 1986 | 56,723 | 60,837 | 95,019 | 27,719 | 240,298 |
| 1987 | 55,723 | 58,635 | 91,170 | 25,147 | 230,675 |
| 1988 | 54,486 | 53,217 | 83,377 | 25,672 | 216,752 |
| 1989 | 52,754 | 51,260 | 82,836 | 27,433 | 214,282 |
| 1990 | 50,712 | 50,879 | 80,834 | 27,321 | 209,746 |
| 1991 | 44,627 | 49,348 | 76,543 | 24,631 | 195,148 |
| 1992 | 29,663 | 35,438 | 74,616 | 44,036 | 183,753 |
| 1993 | 29,749 | 38,787 | 83,714 | 58,498 | 210,748 |
| 1994 | 30,941 | 39,437 | 88,451 | 56,713 | 215,542 |
| 1995 | 32,193 | 43,156 | 89,301 | 60,834 | 225,484 |
| 1996 | 32,217 | 42,917 | 87,193 | 60,865 | 223,193 |
| 1997 | 32,240 | 41,992 | 88,828 | 59,157 | 222,217 |
| 1998 | 32,292 | 43,411 | 88,140 | 61,336 | 225,179 |
| 1999 | 32,065 | 43,310 | 86,508 | 60,595 | 222,479 |
| 2000 | 31,894 | 42,591 | 87,585 | 59,947 | 222,018 |
| 2001 | 30,720 | 40,853 | 73,393 | 58,231 | 203,198 |
| 2002 | 30,685 | 37,537 | 84,147 | 59,655 | 212,025 |
| 2003 | 30,597 | 41,563 | 87,510 | 60,749 | 220,419 |
| 2004 | 30,518 | 43,784 | 79,441 | 59,614 | 213,357 |
| 2005 | 31,969 | 48,734 | 93,670 | 61,720 | 236,093 |
| 2006 | 32,382 | 53,465 | 91,847 | 60,685 | 238,379 |
| 2007 | 32,401 | 54,368 | 90,478 | 54,733 | 231,980 |
| 2008 | 32,365 | 54,160 | 91,898 | 56,097 | 234,520 |
| 2009 | 32,350 | 51,088 | 91,755 | 57,605 | 232,798 |
| 2010 | 32,350 | 50,282 | 92,080 | 59,167 | 233,879 |
| 2011 | 32,353 | 50,631 | 92,729 | 59,214 | 234,927 |
| 2012 | 31,772 | 47,442 | 90,475 | 58,154 | 227,844 |
| 2013 | 30,892 | 44,226 | 87,086 | 58,684 | 220,889 |
| 2014 | 30,313 | 42,116 | 82,627 | 53,961 | 209,017 |
| 2015 | 31,411 | 46,309 | 81,465 | 55,215 | 214,401 |
| 2016 | 32,205 | 52,833 | 83,016 | 57,583 | 225,637 |
| 2017 | 32,391 | 66,825 | 86,119 | 59,564 | 244,899 |
| 2018 | 32,409 | 70,197 | 85,792 | 56,347 | 244,745 |
| 2019 | 32,410 | 69,427 | 85,031 | 60,942 | 247,810 |
| 2020 | 32,361 | 61,398 | 86,625 | 56,701 | 237,086 |
| 2021 | 30,580 | 52,550 | 84,477 | 52,156 | 219,764 |

Calculated as one aquifer
Sum of Upper and Lower Aquifers

# TABLE 10-2
# DESCRIPTION OF HYDROLOGIC INVENTORY COMPONENTS
# LIVERMORE VALLEY GROUNDWATER BASIN

| *COMPONENTS* | *DESCRIPTION/REMARK* | *Direct/ Indirect* | *HOW CALCULATED/MEASURED* | *ESTIMATED ACCURACY* |
|---|---|---|---|---|
| ***SUPPLY INDICES*** | | | | |
| Rainfall | Pleasanton rainfall (Parkside Office) | Direct | Measured by Zone 7 | 0.5 in |
| Evaporation | Evaporation at Lake Del Valle Station | Direct | Collected by DWR | 0.5 in |
| Streamflow | Arroyo Valle Streamflow if Lake Del Valle Dam did not exist | Direct | USGS Stream Gage Station AV_BLC | 10 AF |
| Water Year Type | Indicator of Water Year in Sacramento Valley | Direct | DWR California Data Exchange Center | - |
| ***SUPPLY COMPONENTS*** | | | | |
| **NATURAL STREAM RECHARGE** | | | | |
| ARROYO VALLE | AV natural recharge. | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| ARROYO MOCHO | AM natural recharge. | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| ARROYO LAS POSITAS | ALP natural recharge. | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| **ARTIFICIAL RECHARGE** | | | | |
| ARROYO VALLE | Total artificial recharge on Arroyo Valle minus AV_RC_PR | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| ARROYO VALLE PRIOR RIGHTS | AVBLC flow that would have recharged if no dam. Subset of AV_RC. | Indirect | Formula based on AVBLC flow. | 100 AF |
| ARROYO MOCHO | Total artificial recharge on Arroyo Mocho | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| ARROYO LAS POSITAS | Total artificial recharge on Arroyo Las Positas | Indirect | Stream Inflows - Stream Outflows | 100 AF |
| **INJECTION WELL RECHARGE** | Injection at Hop 6 from 1998 to 2000 | Direct | Metered by Zone 7 | 10 AF |
| **RAINFALL RECHARGE** | Recharge from rainfall | Indirect | Calculated by Areal Recharge Model | 1000 AF |
| **PIPE LEAKAGE** | Pipe leakage that recharges the GW basin | Indirect | Estimated using length and age of pipes | 500 AF |
| **APPLIED WATER RECHARGE** | | | | |
| URBAN MUNICIPAL (GW & SBA) | Applied recharge in urban area - delivered water (gw & sba) | Indirect | Calculated by Areal Recharge Model | 100 AF |
| URBAN RECYCLED WATER | Applied water recharge from urban area - recycled water | Indirect | Calculated using Wastewater Plant deliveries | 10 AF |
| AGRICULTURAL (SBA) | Total applied recharge from 'untreated' ag sources (untreated SBA) | Indirect | Calculated by Areal Recharge Model | 100 AF |
| AGRICULTURAL (GW) | Total applied water recharge from groundwater ag sources | Indirect | Calculated by Areal Recharge Model | 100 AF |
| GOLF COURSES (GW) | Applied water from golf courses on groundwater | Indirect | Calculated by Areal Recharge Model | 100 AF |
| GOLF COURSES (RW) | Applied water from golf courses from recycled water | Indirect | Calculated using Wastewater Plant deliveries | 10 AF |
| **SUBSURFACE BASIN INFLOW** | Subsurface Inflow from Northern Fringe Basin | Indirect | Estimated historically groundwater contours | 500 AF |
| ***DEMAND COMPONENTS*** | | | | |
| **MUNICIPAL PUMPING** | | | | |
| ZONE 7 | Total pumping by Zone 7, including pumping to waste | Direct | Metered by Zone 7 | 10 AF |
| *DSRSD* | *Pumping by Zone 7 for DSRSD.* | *Direct* | *DSRSD Groundwater Pumping Quota* | *0 AF* |
| PLEASANTON | Pumping by Pleasanton. | Direct | Metered by Pleasatnon | 10 AF |
| CALIFORNIA WATER SERVICE | Pumping by CWS. | Direct | Metered by CWS | 10 AF |
| SFPUC | Pumping by SF Public Utilities Commission | Direct | Metered by SFPUC | 10 AF |
| FAIRGROUNDS | Pumping by Alameda County Fairgrounds | Indirect | Metered by Fairgrounds | 10 AF |
| DOMESTIC | Pumping from active domestic, supply, and potable wells | Indirect | Estimated: Number of Wells x 0.5 AF/yr | 50 AF |
| **GOLF COURSES** | | | | |
| *CASTLEWOOD GOLF COURSE* | *Pumping for Castlewood Golf Course* | *Indirect* | *Estimated using historical meter data* | *50 AF* |
| *TRI VALLEY GOLF CENTER* | *Pumping for TriValley Golf Driving Range* | *Indirect* | *Calculated by Areal Recharge Model* | *50 AF* |
| **AGRICULTURAL PUMPING** | Unmetered pumping for agriculture | Indirect | Calculated by Areal Recharge Model | 100 AF |
| **MINING** | | | | |
| EXPORT | Total mining area releases that leave the basin | Indirect | Calculated from metered data and stream recharge rate | 50 AF |
| EVAPORATION | Pond evaporation & rainfall. | Indirect | Calculated using lake area, evaporation, and rainfall | 100 AF |
| PROCESSING | Mining Area processing losses | Indirect | Estimated at 700 AF/Yr | 100 AF |
| **SUBSURFACE BASIN OUTFLOW** | Basin overflow leaving basin | Indirect | Formula based on GW elevation and synoptic data | 100 AF |

# TABLE 10-3
# HISTORICAL GROUNDWATER STORAGE
# HYDROLOGIC INVENTORY (HI) METHOD
# 1974-2021 WATER YEARS (in Acre-Feet, except where indicated)

| | WATER YEAR (Oct - Sep) | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COMPONENTS** | **1974** | **1975** | **1976** | **1977** | **1978** | **1979** | **1980** | **1981** | **1982** | **1983** | **1984** | **1985** | **1986** | **1987** | **1988** | **1989** | **1990** |
| **INDICES** | | | | | | | | | | | | | | | | | |
| Rainfall at Livermore (in) | 16.1 | 14.8 | 6.2 | 6.0 | 18.5 | 13.6 | 17.6 | 10.3 | 24.4 | 32.0 | 13.0 | 12.6 | 19.8 | 8.9 | 8.7 | 11.2 | 9.4 |
| 8 Station Rain Index (N. CA)(in) | 78.6 | 48.8 | 28.3 | 19.0 | 71.6 | 39.1 | 59.6 | 37.6 | 84.8 | 88.5 | 58.1 | 37.8 | 72.1 | 28.6 | 34.9 | 50.1 | 36.0 |
| Evap at Lake Del Valle (in) | 60.9 | 62.7 | 63.5 | 66.0 | 64.2 | 67.7 | 59.7 | 72.1 | 60.5 | 59.7 | 70.2 | 64.9 | 61.1 | 64.0 | 66.9 | 63.6 | 65.9 |
| Arroyo Valle Stream flow (AF) | 30538 | 28307 | 475 | 177 | 43749 | 9721 | 45800 | 5817 | 61427 | 125882 | 25653 | 7282 | 67903 | 3023 | 1506 | 1988 | 815 |
| Water Year Type* | W | W | C | C | AN | BN | AN | D | W | W | W | D | W | D | C | D | C |
| **SUPPLY** | **18,140** | **21,437** | **11,121** | **8,683** | **24,813** | **22,213** | **23,830** | **18,821** | **29,942** | **35,412** | **15,547** | **8,784** | **20,866** | **6,670** | **8,071** | **11,170** | **10,353** |
| **Injection Well Recharge** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Stream Recharge** | **11,340** | **15,400** | **6,910** | **3,820** | **16,330** | **16,110** | **16,480** | **15,040** | **16,420** | **17,158** | **9,486** | **4,747** | **9,045** | **3,565** | **4,549** | **7,880** | **7,026** |
| Artificial Stream Recharge | 3,509 | 6,750 | 5,695 | 3,190 | 6,442 | 12,266 | 10,211 | 11,918 | 5,952 | 901 | 0 | 0 | 0 | 0 | 1,172 | 4,320 | 4,488 |
| *Arroyo Valle* | *1,439* | *4,320* | *1,875* | *1,300* | *3,002* | *5,886* | *4,541* | *6,328* | *2,442* | *0* | *0* | *0* | *0* | *0* | *0* | *139* | *304* |
| *Arroyo Mocho* | *1,670* | *1,830* | *3,220* | *1,290* | *2,840* | *5,780* | *5,270* | *5,130* | *3,290* | *901* | *0* | *0* | *0* | *0* | *1,172* | *4,181* | *4,184* |
| *Arroyo las Positas* | *400* | *600* | *600* | *600* | *600* | *600* | *400* | *460* | *220* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| Natural Stream Recharge | 6,060 | 7,110 | 1,100 | 630 | 8,850 | 2,860 | 4,850 | 2,200 | 8,620 | 14,387 | 8,326 | 3,541 | 8,168 | 2,696 | 2,653 | 2,589 | 2,250 |
| *Arroyo Valle* | *2,400* | *2,950* | *360* | *290* | *2,450* | *1,290* | *1,750* | *840* | *2,970* | *4,893* | *2,580* | *751* | *2,831* | *527* | *679* | *458* | *418* |
| *Arroyo Mocho* | *3,160* | *3,760* | *540* | *140* | *5,900* | *1,170* | *2,500* | *880* | *4,810* | *8,514* | *4,616* | *1,716* | *4,176* | *843* | *902* | *809* | *428* |
| *Arroyo las Positas* | *500* | *400* | *200* | *200* | *500* | *400* | *600* | *480* | *840* | *980* | *1,130* | *1,074* | *1,161* | *1,326* | *1,072* | *1,322* | *1,404* |
| Arroyo Valle Prior Rights | 1,771 | 1,540 | 115 | 0 | 1,038 | 984 | 1,419 | 922 | 1,848 | 1,870 | 1,160 | 1,206 | 877 | 869 | 724 | 971 | 288 |
| **Rainfall Recharge** | **3,031** | **2,523** | **0** | **0** | **4,398** | **2,002** | **3,891** | **967** | **11,423** | **16,357** | **3,110** | **1,249** | **9,008** | **290** | **398** | **283** | **141** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Pipe Leakage** | **31** | **37** | **44** | **51** | **60** | **71** | **82** | **95** | **109** | **124** | **139** | **155** | **169** | **185** | **200** | **217** | **233** |
| **Applied Water Recharge** | **2,738** | **2,477** | **3,158** | **3,022** | **2,795** | **3,041** | **2,727** | **2,089** | **1,360** | **1,344** | **2,162** | **1,884** | **1,904** | **1,860** | **2,004** | **1,630** | **1,694** |
| Urban - Municipal | 1,074 | 766 | 1,354 | 1,375 | 1,087 | 1,179 | 810 | 1,284 | 668 | 690 | 1,253 | 1,027 | 998 | 1,328 | 1,377 | 1,053 | 1,025 |
| Urban - Recycled Water | 0 | 0 | 27 | 16 | 26 | 13 | 21 | 7 | 12 | 8 | 16 | 6 | 12 | 8 | 5 | 14 | 5 |
| Agricultural - Municipal (SBA) | 74 | 109 | 157 | 124 | 95 | 118 | 147 | 182 | 140 | 165 | 208 | 182 | 232 | 245 | 289 | 240 | 265 |
| Agricultural - Groundwater | 384 | 280 | 513 | 525 | 352 | 388 | 281 | 241 | 174 | 139 | 198 | 210 | 190 | 137 | 152 | 140 | 153 |
| Golf Courses - Groundwater | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Golf Courses - Recycled Water | 0 | 0 | 64 | 68 | 75 | 73 | 73 | 60 | 54 | 63 | 62 | 55 | 61 | 47 | 63 | 60 | 64 |
| Others | 1,206 | 1,322 | 1,042 | 915 | 1,160 | 1,270 | 1,394 | 315 | 312 | 279 | 425 | 404 | 411 | 95 | 118 | 123 | 182 |
| **Subsurface Basin Inflow** | **1,000** | **1,000** | **1,010** | **1,790** | **1,230** | **990** | **650** | **630** | **630** | **430** | **650** | **750** | **740** | **770** | **920** | **1,160** | **1,260** |
| **DEMAND** | **18,618** | **15,929** | **15,432** | **14,636** | **12,871** | **15,819** | **15,727** | **19,349** | **18,349** | **26,220** | **19,750** | **18,506** | **22,550** | **14,575** | **17,176** | **16,143** | **16,045** |
| **Municipal Pumpage** | **11,806** | **9,881** | **7,782** | **6,721** | **7,022** | **8,207** | **6,982** | **7,361** | **7,281** | **7,965** | **8,473** | **7,990** | **8,652** | **8,152** | **9,431** | **10,393** | **11,255** |
| Zone 7 (excluding DSRSD) | 5,403 | 3,090 | 1,292 | 309 | 776 | 816 | 41 | 0 | 0 | 25 | 348 | 1,199 | 1,163 | 480 | 2,017 | 3,213 | 3,327 |
| Zone 7 for DSRSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| City of Pleasanton | 2,264 | 2,497 | 1,707 | 3,271 | 2,640 | 3,273 | 2,961 | 3,089 | 3,565 | 3,886 | 3,486 | 3,056 | 3,705 | 3,310 | 3,548 | 3,316 | 3,856 |
| Cal. Water Service | 2,612 | 2,852 | 2,781 | 1,312 | 1,964 | 2,358 | 2,489 | 2,695 | 2,286 | 2,660 | 3,035 | 2,788 | 2,774 | 3,276 | 2,761 | 2,850 | 3,073 |
| Camp Parks | 769 | 808 | 980 | 925 | 796 | 881 | 819 | 808 | 713 | 630 | 647 | 40 | 0 | 0 | 0 | 0 | 0 |
| SFWD | 302 | 242 | 495 | 374 | 397 | 413 | 372 | 402 | 348 | 321 | 378 | 353 | 484 | 491 | 472 | 443 | 362 |
| Fairgrounds | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 267 | 217 | 242 | 281 | 272 | 280 | 280 | 280 | 280 | 280 |
| Domestic | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
| Golf Courses | 156 | 92 | 227 | 230 | 149 | 166 | 0 | 0 | 52 | 101 | 198 | 182 | 146 | 215 | 253 | 191 | 257 |
| **Agricultural Pumpage** | **3,744** | **2,217** | **4,596** | **4,970** | **3,191** | **3,711** | **2,628** | **2,433** | **1,295** | **1,342** | **1,556** | **1,914** | **1,911** | **1,470** | **1,476** | **1,166** | **1,478** |
| SFWD | 500 | 0 | 62 | 304 | 252 | 365 | 168 | 513 | 150 | 549 | 107 | 410 | 543 | 663 | 493 | 359 | 548 |
| Concannon | 6 | 15 | 20 | 20 | 20 | 70 | 250 | 112 | 0 | 0 | 68 | 0 | 60 | 26 | 59 | 0 | 0 |
| Calculated | 3,238 | 2,202 | 4,514 | 4,646 | 2,919 | 3,276 | 2,210 | 1,808 | 1,145 | 793 | 1,381 | 1,504 | 1,308 | 781 | 924 | 807 | 930 |
| **Mining Use** | **3,068** | **3,831** | **3,054** | **2,945** | **2,658** | **3,751** | **5,586** | **9,005** | **7,613** | **13,953** | **7,481** | **7,402** | **11,387** | **4,353** | **5,869** | **4,484** | **3,312** |
| Stream Export | 1,219 | 2,200 | 690 | 470 | 800 | 2,000 | 3,480 | 6,530 | 6,050 | 12,760 | 4,340 | 4,265 | 8,858 | 558 | 2,443 | 1,808 | 665 |
| *Discharges to Cope Lake* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| Evaporation | 1,149 | 931 | 1,664 | 1,775 | 1,158 | 1,051 | 1,406 | 1,775 | 863 | 493 | 2,441 | 2,437 | 1,829 | 3,095 | 2,726 | 1,976 | 1,947 |
| Production | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 |
| **Subsurface Basin Overflow** | **0** | **0** | **0** | **0** | **0** | **150** | **530** | **550** | **2,160** | **2,960** | **2,240** | **1,200** | **600** | **600** | **400** | **100** | **0** |
| **NET RECHARGE (AF)** | **-478** | **5,508** | **-4,311** | **-5,953** | **11,942** | **6,394** | **8,103** | **-528** | **11,593** | **9,192** | **-4,203** | **-9,722** | **-1,684** | **-7,906** | **-9,106** | **-4,973** | **-5,692** |
| **INVENTORY STORAGE (AF)** | **211,522** | **217,030** | **212,719** | **206,766** | **218,708** | **225,102** | **233,205** | **232,677** | **244,270** | **253,462** | **249,259** | **239,537** | **237,853** | **229,947** | **220,841** | **215,868** | **210,176** |

| **STORAGE CALCULATION** | **1974** | **1975** | **1976** | **1977** | **1978** | **1979** | **1980** | **1981** | **1982** | **1983** | **1984** | **1985** | **1986** | **1987** | **1988** | **1989** | **1990** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INVENTORY (Rounded to TAF) | 212 | 217 | 213 | 207 | 219 | 225 | 233 | 233 | 244 | 253 | 249 | 240 | 238 | 230 | 221 | 216 | 210 |
| GW ELEVATIONS (Rounded to TAF) | 213 | 215 | 226 | 216 | 210 | 228 | 239 | 246 | 241 | 254 | 258 | 250 | 240 | 231 | 217 | 214 | 210 |
| **AVERAGE STORAGE (TAF)** | **212** | **216** | **219** | **211** | **214** | **227** | **236** | **239** | **243** | **254** | **253** | **245** | **239** | **230** | **219** | **215** | **210** |
| **AVAILABLE STORAGE (TAF)** | **84** | **88** | **91** | **83** | **86** | **99** | **108** | **111** | **115** | **126** | **125** | **117** | **111** | **102** | **91** | **87** | **82** |

Artificial Components Natural Components

*Water Year Type (CDEC Sacramento Valley)
W = Wet; AN = Above Normal;
BN = Below Normal; D = Dry; C = Critical

# TABLE 10-3
# HISTORICAL GROUNDWATER STORAGE
# HYDROLOGIC INVENTORY (HI) METHOD
# 1974-2021 WATER YEARS (in Acre-Feet, except where indicated)

| | WATER YEAR (Oct - Sep) | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| COMPONENTS | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
| **INDICES** | | | | | | | | | | | | | | | | | | | | |
| Rainfall at Livermore (in) | 11.3 | 11.6 | 21.3 | 11.8 | 21.3 | 20.0 | 15.1 | 25.3 | 13.1 | 14.1 | 11.0 | 11.2 | 17.0 | 13.1 | 19.3 | 17.5 | 9.7 | 10.7 | 11.4 | 14.8 |
| 8 Station Rain Index (N. CA)(in) | 32.2 | 36.0 | 65.3 | 31.8 | 85.4 | 61.3 | 68.8 | 82.4 | 54.8 | 56.7 | 33.0 | 46.3 | 59.7 | 47.3 | 57.4 | 80.1 | 37.3 | 34.9 | 46.8 | 53.6 |
| Evap at Lake Del Valle (in) | 64.7 | 68.2 | 64.2 | 65.5 | 58.3 | 71.6 | 69.5 | 57.2 | 61.0 | 68.3 | 68.5 | 73.2 | 69.9 | 72.1 | 63.6 | 68.6 | 68.9 | 72.7 | 71.6 | 64.0 |
| Arroyo Valle Stream flow (AF) | 9909 | 11692 | 52831 | 3424 | 67142 | 51058 | 54115 | 87819 | 15169 | 18949 | 8156 | 7848 | 19648 | 11410 | 26930 | 28325 | 2027 | 18059 | 11231 | 12914 |
| Water Year Type* | C | C | AN | C | W | W | W | W | W | AN | D | D | AN | BN | AN | W | D | C | D | BN |
| **SUPPLY** | **12,715** | **10,610** | **28,529** | **16,095** | **29,095** | **22,556** | **24,184** | **27,853** | **20,780** | **23,211** | **15,691** | **24,052** | **29,840** | **19,778** | **31,021** | **23,960** | **14,998** | **16,258** | **18,659** | **25,382** |
| **Injection Well Recharge** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **652** | **1,524** | **1,146** | **1** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Stream Recharge** | **8,347** | **5,247** | **14,714** | **11,838** | **13,058** | **11,109** | **12,284** | **13,603** | **10,813** | **12,842** | **8,601** | **16,195** | **21,483** | **12,885** | **21,025** | **13,418** | **9,154** | **8,448** | **11,249** | **17,144** |
| Artificial Stream Recharge | 3,261 | 914 | 5,621 | 7,883 | 4,672 | 2,968 | 5,314 | 2,343 | 5,174 | 8,019 | 3,428 | 10,588 | 11,409 | 8,084 | 11,143 | 4,583 | 4,811 | 2,229 | 3,984 | 6,773 |
| *Arroyo Valle* | *82* | *412* | *1,182* | *798* | *179* | *144* | *1,827* | *413* | *1,181* | *890* | *1,476* | *1,831* | *1,547* | *1,670* | *2,277* | *1,216* | *2,879* | *2,229* | *2,104* | *2,459* |
| *Arroyo Mocho* | *3,178* | *502* | *4,439* | *7,085* | *4,493* | *2,824* | *3,487* | *1,930* | *3,993* | *7,129* | *1,930* | *8,755* | *9,862* | *6,414* | *8,698* | *3,205* | *1,932* | *0* | *1,880* | *4,314* |
| *Arroyo las Positas* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *22* | *2* | *0* | *0* | *168* | *162* | *0* | *0* | *0* | *0* |
| Natural Stream Recharge | 4,418 | 3,997 | 8,247 | 3,080 | 7,259 | 7,743 | 6,607 | 10,533 | 5,091 | 4,178 | 4,512 | 4,476 | 8,462 | 3,458 | 9,589 | 6,905 | 3,536 | 5,913 | 6,018 | 10,371 |
| *Arroyo Valle* | *1,215* | *970* | *2,754* | *735* | *2,818* | *1,426* | *2,753* | *4,401* | *1,796* | *1,389* | *2,440* | *2,259* | *4,397* | *1,447* | *5,980* | *3,043* | *1,941* | *4,030* | *3,958* | *6,909* |
| *Arroyo Mocho* | *1,883* | *1,711* | *3,903* | *1,263* | *3,144* | *5,226* | *2,670* | *4,560* | *1,833* | *1,539* | *961* | *1,279* | *2,980* | *1,082* | *2,854* | *3,104* | *858* | *1,077* | *970* | *2,547* |
| *Arroyo las Positas* | *1,320* | *1,315* | *1,591* | *1,082* | *1,297* | *1,091* | *1,184* | *1,572* | *1,462* | *1,250* | *1,111* | *939* | *1,085* | *929* | *755* | *758* | *737* | *806* | *1,090* | *915* |
| Arroyo Valle Prior Rights | 668 | 337 | 846 | 876 | 1,127 | 398 | 362 | 727 | 548 | 644 | 660 | 1,131 | 1,612 | 1,343 | 293 | 1,930 | 807 | 306 | 1,247 | 0 |
| **Rainfall Recharge** | **1,838** | **1,760** | **10,761** | **1,242** | **13,243** | **8,176** | **8,634** | **10,692** | **5,540** | **5,924** | **3,644** | **4,239** | **4,899** | **3,192** | **6,378** | **6,969** | **1,987** | **3,782** | **3,375** | **4,315** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Pipe Leakage** | **249** | **267** | **285** | **304** | **324** | **344** | **365** | **387** | **410** | **434** | **461** | **490** | **518** | **548** | **579** | **610** | **642** | **675** | **708** | **742** |
| **Applied Water Recharge** | **602** | **1,766** | **1,440** | **1,621** | **1,480** | **2,007** | **2,221** | **1,709** | **1,743** | **1,960** | **1,985** | **2,129** | **1,940** | **2,153** | **2,039** | **1,962** | **2,214** | **2,353** | **2,327** | **2,181** |
| Urban - Municipal | 222 | 1,288 | 1,108 | 1,252 | 1,060 | 1,467 | 1,632 | 1,472 | 1,549 | 1,743 | 1,770 | 1,888 | 1,749 | 1,926 | 1,834 | 1,747 | 1,983 | 2,124 | 2,064 | 1,894 |
| Urban - Recycled Water | 2 | 0 | 11 | 14 | 13 | 18 | 21 | 15 | 12 | 21 | 19 | 30 | 10 | 14 | 15 | 26 | 24 | 7 | 52 | 84 |
| Agricultural - Municipal (SBA) | 242 | 279 | 177 | 192 | 257 | 347 | 401 | 104 | 57 | 64 | 59 | 67 | 66 | 64 | 63 | 63 | 62 | 68 | 68 | 67 |
| Agricultural - Groundwater | 109 | 133 | 96 | 100 | 92 | 100 | 109 | 26 | 11 | 12 | 11 | 13 | 12 | 12 | 12 | 12 | 12 | 13 | 13 | 12 |
| Golf Courses - Groundwater | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 42 | 49 | 55 | 56 | 60 | 56 | 61 | 58 | 56 | 63 | 68 | 65 | 60 |
| Golf Courses - Recycled Water | 26 | 66 | 48 | 63 | 58 | 75 | 58 | 50 | 65 | 66 | 69 | 72 | 47 | 75 | 58 | 59 | 71 | 74 | 66 | 64 |
| Others | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Subsurface Basin Inflow** | **1,680** | **1,570** | **1,330** | **1,090** | **990** | **920** | **680** | **810** | **750** | **906** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** |
| **DEMAND** | **21,104** | **17,237** | **13,555** | **15,503** | **16,064** | **20,683** | **25,574** | **25,342** | **25,691** | **26,885** | **27,357** | **23,991** | **21,531** | **24,338** | **17,828** | **15,169** | **18,636** | **19,269** | **23,656** | **21,091** |
| **Municipal Pumpage** | **17,355** | **13,331** | **9,132** | **6,499** | **4,594** | **6,324** | **8,824** | **10,264** | **11,832** | **15,520** | **17,806** | **19,307** | **17,123** | **19,635** | **14,686** | **11,697** | **12,681** | **13,516** | **18,022** | **16,064** |
| Zone 7 (excluding DSRSD) | 8,119 | 5,136 | 2,215 | 213 | 368 | 2,388 | 1,565 | 1,682 | 4,912 | 6,140 | 9,864 | 11,047 | 7,734 | 11,175 | 6,213 | 3,157 | 4,146 | 6,210 | 9,439 | 8,274 |
| Zone 7 for DSRSD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 645 | 645 | 645 | 645 | 645 | 645 | 645 | 645 |
| City of Pleasanton | 4,164 | 3,368 | 3,252 | 2,578 | 1,262 | 1,333 | 3,208 | 3,935 | 2,563 | 4,558 | 3,112 | 3,579 | 3,674 | 3,688 | 3,604 | 3,587 | 3,638 | 2,387 | 3,660 | 3,280 |
| Cal. Water Service | 3,966 | 3,744 | 2,570 | 2,626 | 2,053 | 1,551 | 2,947 | 3,595 | 3,271 | 3,567 | 3,707 | 3,458 | 3,979 | 2,911 | 3,166 | 3,106 | 2,971 | 3,143 | 3,123 | 2,844 |
| Camp Parks | 0 | 3 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| SFWD | 408 | 410 | 414 | 396 | 370 | 411 | 477 | 460 | 380 | 532 | 472 | 448 | 423 | 481 | 436 | 467 | 494 | 492 | 446 | 417 |
| Fairgrounds | 346 | 336 | 282 | 325 | 285 | 343 | 342 | 230 | 333 | 369 | 318 | 423 | 327 | 365 | 284 | 441 | 443 | 289 | 335 | 284 |
| Domestic | 100 | 113 | 113 | 116 | 116 | 117 | 117 | 113 | 116 | 109 | 109 | 134 | 134 | 167 | 131 | 93 | 96 | 109 | 123 | 112 |
| Golf Courses | 252 | 222 | 286 | 245 | 139 | 182 | 169 | 249 | 256 | 245 | 223 | 218 | 208 | 203 | 207 | 199 | 249 | 241 | 250 | 208 |
| **Agricultural Pumpage** | **382** | **355** | **213** | **218** | **150** | **212** | **266** | **73** | **81** | **231** | **227** | **119** | **93** | **92** | **88** | **88** | **87** | **96** | **95** | **94** |
| SFWD | 20 | 9 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Concannon | 11 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 140 | 143 | 25 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 |
| Calculated | 351 | 346 | 213 | 218 | 150 | 212 | 266 | 73 | 81 | 91 | 84 | 94 | 93 | 91 | 88 | 88 | 87 | 96 | 95 | 94 |
| **Mining Use** | **3,367** | **3,551** | **4,210** | **8,786** | **11,120** | **13,381** | **15,724** | **14,255** | **13,416** | **11,010** | **9,324** | **4,564** | **4,314** | **4,610** | **3,055** | **3,385** | **4,947** | **4,452** | **5,346** | **4,934** |
| Stream Export | 639 | 712 | 2,219 | 6,070 | 9,071 | 10,577 | 12,661 | 12,617 | 10,082 | 7,827 | 5,461 | 143 | 0 | 163 | 150 | 487 | 594 | 523 | 1,493 | 1,996 |
| *Discharges to Cope Lake* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| Evaporation | 2,028 | 2,139 | 1,291 | 2,016 | 1,349 | 2,104 | 2,363 | 938 | 2,634 | 2,483 | 3,163 | 3,951 | 3,764 | 3,762 | 2,205 | 2,198 | 3,653 | 3,230 | 3,153 | 2,238 |
| Production | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 470 | 550 | 686 | 700 | 700 | 700 | 700 | 700 | 700 |
| **Subsurface Basin Overflow** | **0** | **0** | **0** | **0** | **200** | **766** | **760** | **750** | **362** | **125** | **0** | **0** | **0** | **0** | **0** | **0** | **921** | **1,205** | **194** | **0** |
| **NET RECHARGE (AF)** | **-8,389** | **-6,628** | **14,974** | **592** | **13,031** | **1,873** | **-1,390** | **2,511** | **-4,911** | **-3,674** | **-11,666** | **62** | **8,309** | **-4,560** | **13,193** | **8,790** | **-3,639** | **-3,011** | **-4,997** | **4,290** |
| **INVENTORY STORAGE (AF)** | **201,787** | **195,159** | **210,133** | **210,725** | **223,756** | **225,629** | **224,239** | **226,750** | **221,839** | **218,165** | **206,499** | **206,561** | **214,870** | **210,310** | **223,503** | **232,293** | **228,654** | **225,643** | **220,646** | **224,936** |

| **STORAGE CALCULATION** | **1991** | **1992** | **1993** | **1994** | **1995** | **1996** | **1997** | **1998** | **1999** | **2000** | **2001** | **2002** | **2003** | **2004** | **2005** | **2006** | **2007** | **2008** | **2009** | **2010** |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| INVENTORY (Rounded to TAF) | 202 | 195 | 210 | 211 | 224 | 226 | 224 | 227 | 222 | 218 | 206 | 207 | 215 | 210 | 224 | 232 | 229 | 226 | 221 | 225 |
| GW ELEVATIONS (Rounded to TAF) | 195 | 184 | 211 | 216 | 225 | 223 | 222 | 225 | 222 | 222 | 203 | 212 | 220 | 213 | 236 | 238 | 232 | 235 | 233 | 234 |
| **AVERAGE STORAGE (TAF)** | **198** | **189** | **210** | **213** | **225** | **224** | **223** | **226** | **222** | **220** | **205** | **209** | **218** | **212** | **230** | **235** | **230** | **230** | **227** | **229** |
| **AVAILABLE STORAGE (TAF)** | **70** | **61** | **82** | **85** | **97** | **96** | **95** | **98** | **94** | **92** | **77** | **81** | **90** | **84** | **102** | **107** | **102** | **102** | **99** | **101** |

Artificial Components Natural Components

*Water Year Type (CDEC Sacramento Valley)
W = Wet; AN = Above Normal;
BN = Below Normal; D = Dry; C = Critical

# TABLE 10-3
# HISTORICAL GROUNDWATER STORAGE
# HYDROLOGIC INVENTORY (HI) METHOD
# 1974-2021 WATER YEARS (in Acre-Feet, except where indicated)

| | WATER YEAR (Oct - Sep) | | | | | | | | | | | 1974 - 2021 | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **COMPONENTS** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** | **AVG** | **Sust Avg** | **TOTAL** |
| **INDICES** | | | | | | | | | | | | | | |
| Rainfall at Livermore (in) | 16.2 | 8.8 | 10.7 | 6.8 | 13.1 | 15.4 | 25.6 | 12.4 | 17.1 | 10.5 | 5.1 | 14 | | |
| 8 Station Rain Index (N. CA)(in) | 72.8 | 41.5 | 46.3 | 31.3 | 37.2 | 57.8 | 94.6 | 40.9 | 70.7 | 31.7 | 24.1 | 52 | | |
| Evap at Lake Del Valle (in) | 64.5 | 73.2 | 73.9 | 78.3 | 73.6 | 72.6 | 69.3 | 73.4 | 72.8 | 76.4 | 80.3 | 68 | | |
| Arroyo Valle Stream flow (AF) | 28634 | 1557 | 7801 | 272 | 2217 | 19436 | 89173 | 2783 | 36944 | 2701 | 2423 | 24430 | | **1172659** |
| Water Year Type* | W | BN | D | C | C | BN | W | BN | W | D | C | | | |
| **SUPPLY** | **27,315** | **18,442** | **20,158** | **10,452** | **18,753** | **28,293** | **38,895** | **17,164** | **23,625** | **13,526** | **7,827** | **19,908** | **19,800** | **955,589** |
| **Injection Well Recharge** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **69** | **0** | **3,322** |
| **Stream Recharge** | **17,595** | **12,734** | **13,457** | **5,820** | **11,469** | **18,083** | **20,495** | **9,560** | **10,605** | **5,972** | **2,703** | **11,734** | **11,900** | **563,255** |
| Artificial Stream Recharge | 4,555 | 8,778 | 7,887 | 3,826 | 3,766 | 8,910 | 9,615 | 6,773 | 2,943 | 2,461 | 277 | 5,204 | 5,300 | 249,805 |
| *Arroyo Valle* | *768* | *3,613* | *1,916* | *924* | *3,718* | *3,983* | *3,271* | *3,778* | *2,168* | *2,045* | *277* | *1,767* | *1,640* | *84,832* |
| *Arroyo Mocho* | *3,671* | *5,059* | *5,961* | *2,844* | *0* | *4,927* | *6,344* | *2,995* | *775* | *416* | *0* | *3,329* | *3,530* | *159,802* |
| *Arroyo las Positas* | *116* | *106* | *10* | *58* | *48* | *0* | *0* | *0* | *0* | *0* | *0* | *108* | *130* | *5,172* |
| Natural Stream Recharge | 11,272 | 3,355 | 4,200 | 1,987 | 6,822 | 8,289 | 10,433 | 1,938 | 6,439 | 2,595 | 1,887 | 5,635 | 5,700 | 270,501 |
| *Arroyo Valle* | *8,540* | *1,676* | *2,790* | *891* | *4,567* | *4,749* | *6,053* | *740* | *3,419* | *793* | *569* | *2,498* | *1,800* | *119,884* |
| *Arroyo Mocho* | *2,293* | *1,225* | *838* | *587* | *1,748* | *2,794* | *3,775* | *590* | *2,393* | *1,072* | *586* | *2,254* | *2,600* | *108,210* |
| *Arroyo las Positas* | *439* | *454* | *572* | *509* | *507* | *746* | *605* | *608* | *627* | *730* | *732* | *883* | *1,300* | *42,407* |
| Arroyo Valle Prior Rights | 1,768 | 601 | 1,370 | 7 | 881 | 884 | 447 | 849 | 1,223 | 916 | 539 | 895 | 900 | 42,948 |
| **Rainfall Recharge** | **5,771** | **1,462** | **2,708** | **1,075** | **3,735** | **6,554** | **14,087** | **3,220** | **8,588** | **2,869** | **1,079** | **4,600** | **4,300** | **220,809** |
| *Lake Recharge* | *0* | *0* | *0* | *2,428* | *4,322* | *6,785* | *13,029* | *15,003* | *13,248* | *7,529* | *490* | *1,309* | *NA* | *62,833* |
| **Pipe Leakage** | **776** | **811** | **847** | **884** | **921** | **958** | **996** | **1,034** | **1,146** | **1,209** | **1,248** | **462** | **1,000** | **22,170** |
| **Applied Water Recharge** | **2,172** | **2,435** | **2,147** | **1,674** | **1,629** | **1,697** | **2,316** | **2,350** | **2,286** | **2,476** | **1,798** | **2,056** | **1,600** | **98,698** |
| Urban - Municipal | 1,849 | 2,061 | 1,750 | 1,229 | 1,143 | 1,312 | 1,957 | 2,020 | 1,956 | 2,109 | 1,407 | 1,436 | 1,280 | 68,912 |
| Urban - Recycled Water | 133 | 159 | 189 | 220 | 275 | 160 | 147 | 106 | 119 | 140 | 148 | 50 | 26 | 2,400 |
| Agricultural - Municipal (SBA) | 61 | 68 | 64 | 66 | 61 | 88 | 77 | 80 | 80 | 80 | 86 | 136 | 92 | 6,547 |
| Agricultural - Groundwater | 11 | 13 | 7 | 20 | 18 | 15 | 14 | 14 | 14 | 14 | 15 | 115 | 12 | 5,520 |
| Golf Courses - Groundwater | 59 | 65 | 62 | 66 | 67 | 65 | 61 | 63 | 61 | 66 | 73 | 30 | 146 | 1,458 |
| Golf Courses - Recycled Water | 59 | 70 | 75 | 73 | 65 | 59 | 60 | 66 | 57 | 67 | 68 | 60 | 44 | 2,888 |
| Others | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 229 | 0 | 10,973 |
| **Subsurface Basin Inflow** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **1,000** | **986** | **1,000** | **47,336** |
| **DEMAND** | **20,421** | **28,880** | **25,700** | **22,604** | **12,717** | **12,888** | **13,636** | **16,879** | **19,142** | **21,447** | **27,999** | **19,594** | **18,800** | **940,517** |
| **Municipal Pumpage** | **13,430** | **20,463** | **16,823** | **16,662** | **8,284** | **9,176** | **10,714** | **11,966** | **14,635** | **16,349** | **22,806** | **11,893** | **13,700** | **570,877** |
| Zone 7 (excluding DSRSD) | 5,618 | 11,461 | 8,909 | 8,137 | 1,920 | 1,357 | 3,243 | 4,215 | 8,021 | 11,101 | 15,795 | 4,443 | 5,300 | 213,274 |
| Zone 7 for DSRSD | 646 | 644 | 646 | 645 | 645 | 645 | 645 | 645 | 645 | 645 | 645 | 255 | 645 | 12,256 |
| City of Pleasanton | 3,435 | 3,900 | 3,301 | 3,740 | 2,775 | 3,752 | 4,222 | 3,913 | 3,785 | 2,701 | 3,802 | 3,275 | 3,500 | 157,188 |
| Cal. Water Service | 2,673 | 3,333 | 2,770 | 3,085 | 2,012 | 2,575 | 1,878 | 2,389 | 1,296 | 904 | 1,475 | 2,734 | 3,070 | 131,255 |
| Camp Parks | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 184 | 0 | 8,819 |
| SFWD | 442 | 482 | 482 | 398 | 309 | 286 | 214 | 253 | 286 | 322 | 360 | 402 | 450 | 19,316 |
| Fairgrounds | 301 | 318 | 350 | 286 | 268 | 231 | 208 | 196 | 270 | 321 | 353 | 289 | 310 | 13,880 |
| Domestic | 107 | 90 | 105 | 115 | 112 | 110 | 107 | 115 | 116 | 108 | 107 | 109 | 200 | 5,230 |
| Golf Courses | 208 | 236 | 260 | 257 | 243 | 220 | 198 | 240 | 216 | 247 | 269 | 201 | 225 | 9,659 |
| **Agricultural Pumpage** | **85** | **95** | **486** | **640** | **590** | **115** | **109** | **113** | **113** | **112** | **122** | **978** | **400** | **46,940** |
| SFWD | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 125 | 0 | 6,015 |
| Concannon | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 22 | 0 | 1,047 |
| Calculated | 85 | 95 | 486 | 640 | 590 | 115 | 109 | 113 | 113 | 112 | 122 | 831 | 400 | 39,877 |
| **Mining Use** | **6,906** | **8,322** | **8,391** | **5,302** | **3,843** | **3,597** | **2,813** | **4,236** | **3,585** | **4,840** | **5,072** | **6,342** | **4,600** | **304,408** |
| Stream Export | 4,277 | 4,676 | 4,796 | 850 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3,275 | 700 | 157,219 |
| *Discharges to Cope Lake* | *0* | *0* | *0* | *5,420* | *4,890* | *7,700* | *13,452* | *15,562* | *13,864* | *7,906* | *548* | *1,445* | *NA* | *69,341* |
| Evaporation | 1,929 | 2,946 | 2,895 | 3,752 | 3,143 | 2,897 | 2,113 | 3,536 | 2,885 | 4,140 | 4,372 | 2,375 | 3,200 | 113,983 |
| Production | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 700 | 692 | 700 | 33,206 |
| **Subsurface Basin Overflow** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **564** | **809** | **146** | **0** | **381** | **100** | **18,292** |
| **NET RECHARGE (AF)** | **6,893** | **-10,438** | **-5,542** | **-12,153** | **6,037** | **15,405** | **25,259** | **285** | **4,482** | **-7,921** | **-20,172** | **314** | **1,000** | **15,071** |
| **INVENTORY STORAGE (AF)** | **231,829** | **221,391** | **215,849** | **203,696** | **209,733** | **225,138** | **250,397** | **250,682** | **255,164** | **247,243** | **227,071** | **223,942** | **13,400** | |

| **STORAGE CALCULATION** | **2011** | **2012** | **2013** | **2014** | **2015** | **2016** | **2017** | **2018** | **2019** | **2020** | **2021** |
|---|---|---|---|---|---|---|---|---|---|---|---|
| INVENTORY (Rounded to TAF) | 232 | 221 | 216 | 204 | 210 | 225 | 250 | 251 | 255 | 247 | 227 |
| GW ELEVATIONS (Rounded to TAF) | 235 | 228 | 221 | 209 | 214 | 226 | 245 | 245 | 248 | 237 | 220 |
| **AVERAGE STORAGE (TAF)** | **233** | **225** | **218** | **206** | **212** | **225** | **248** | **248** | **251** | **242** | **223** |
| **AVAILABLE STORAGE (TAF)** | **105** | **97** | **90** | **78** | **84** | **97** | **120** | **120** | **123** | **114** | **95** |

Artificial Components Natural Components

*Water Year Type (CDEC Sacramento Valley)
W = Wet; AN = Above Normal;
BN = Below Normal; D = Dry; C = Critical

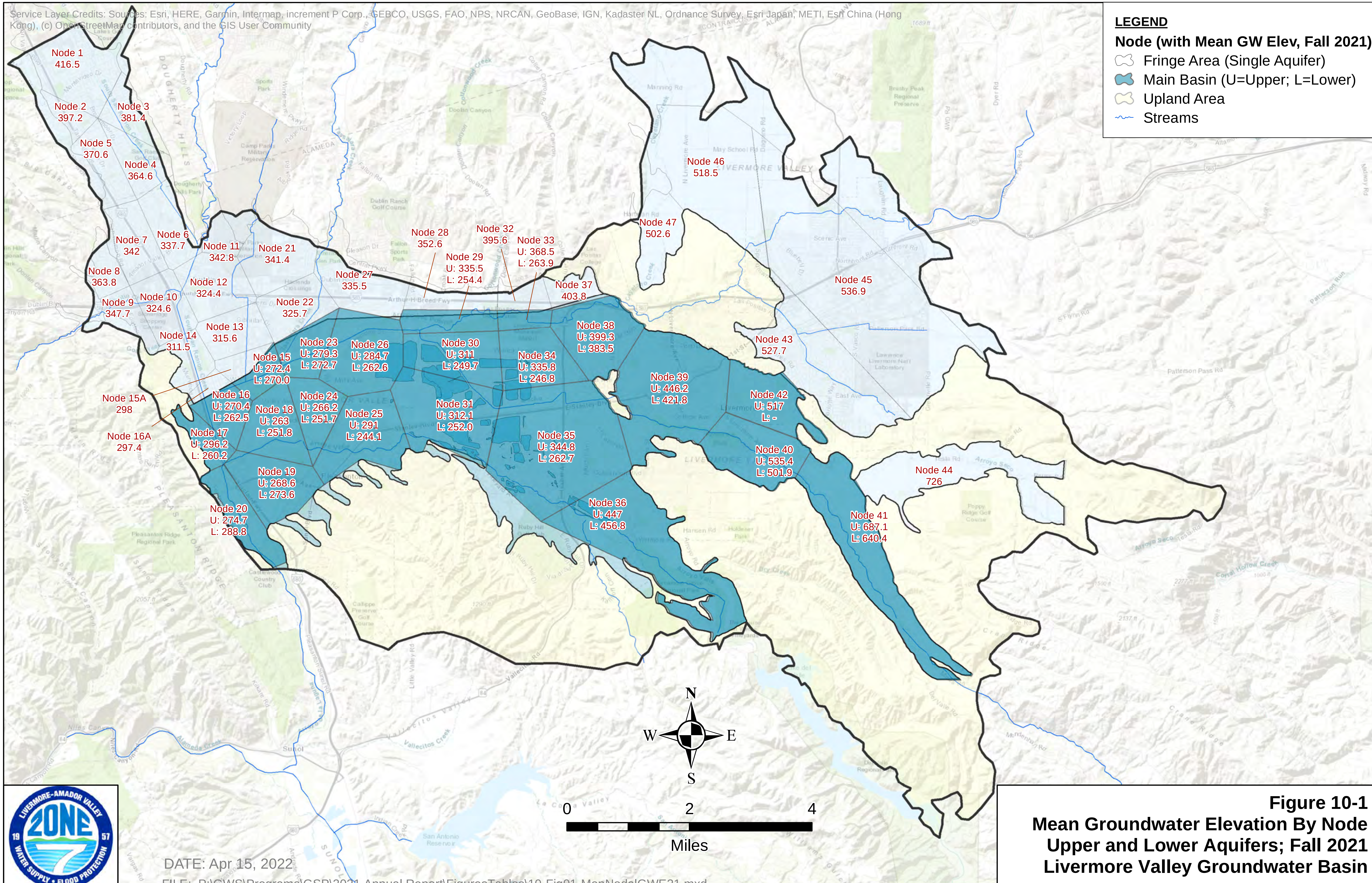



**Figure 10-1**
**Mean Groundwater Elevation By Node**
**Upper and Lower Aquifers; Fall 2021**
**Livermore Valley Groundwater Basin**

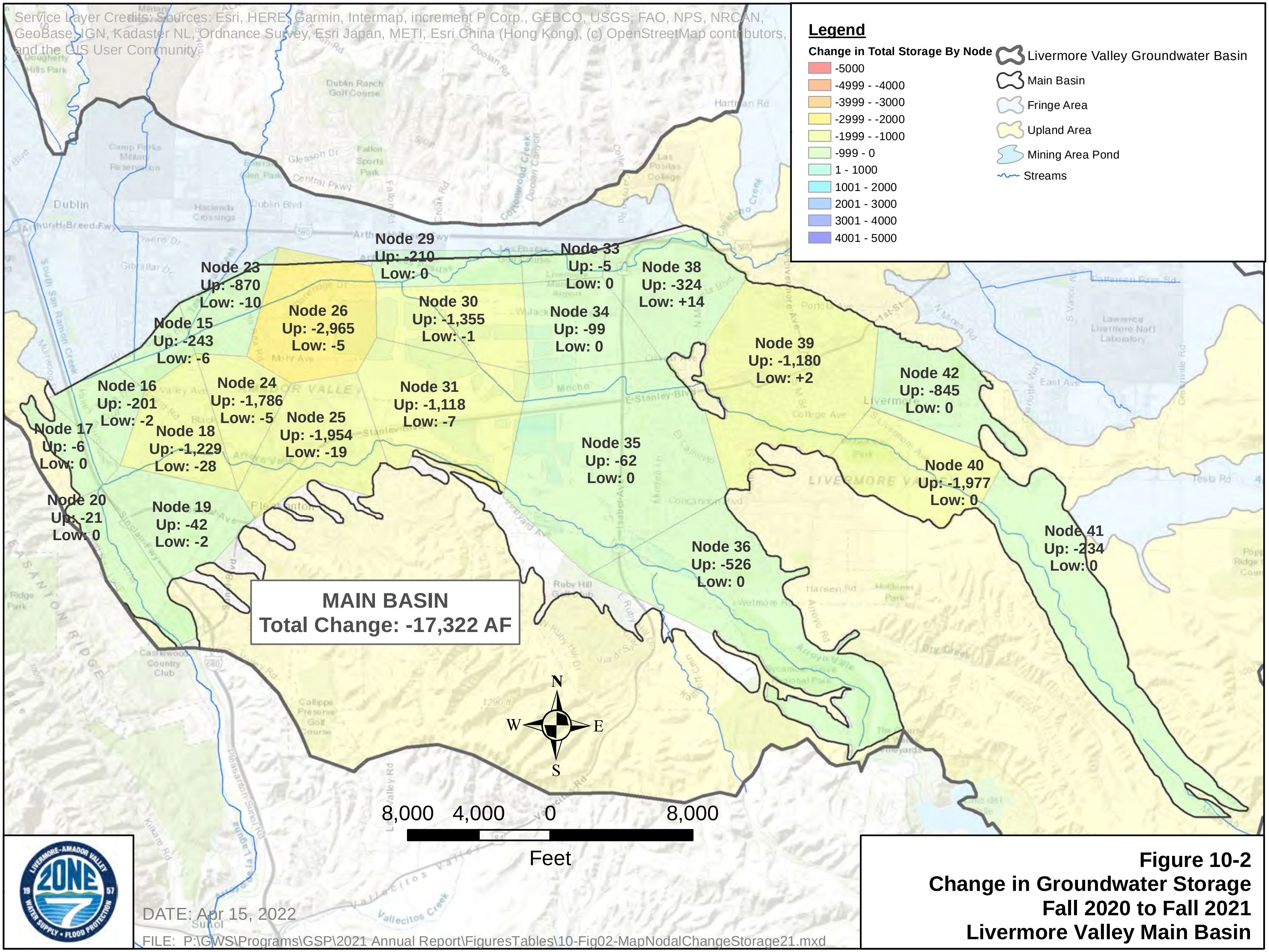
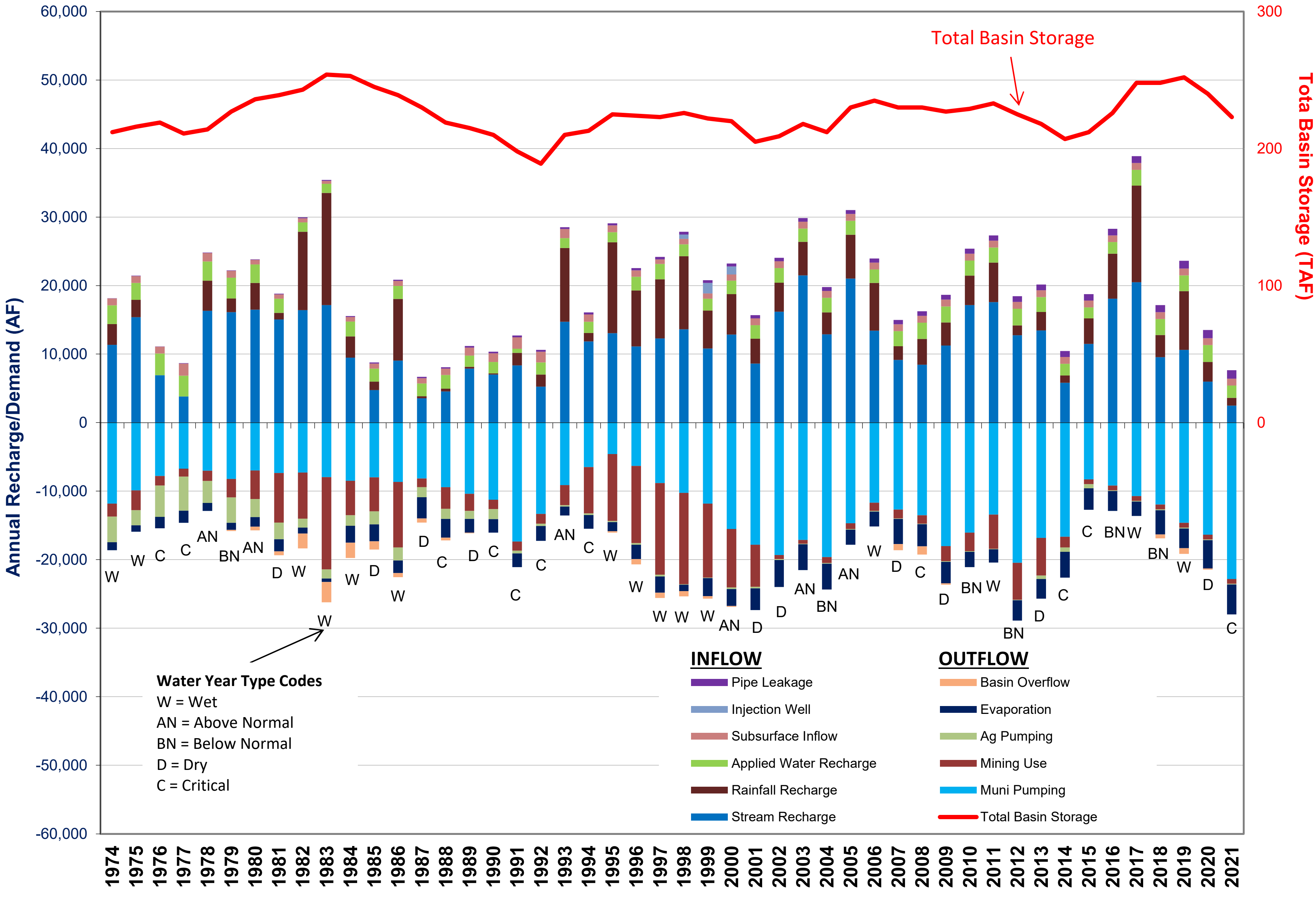



**Figure 10-2**
**Change in Groundwater Storage**
**Fall 2020 to Fall 2021**
**Livermore Valley Main Basin**

# FIGURE 10-3
# GRAPH OF GROUNDWATER STORAGE 1974 - 2021 WATER YEARS
# LIVERMORE VALLEY GROUNDWATER BASIN

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3/28/2022

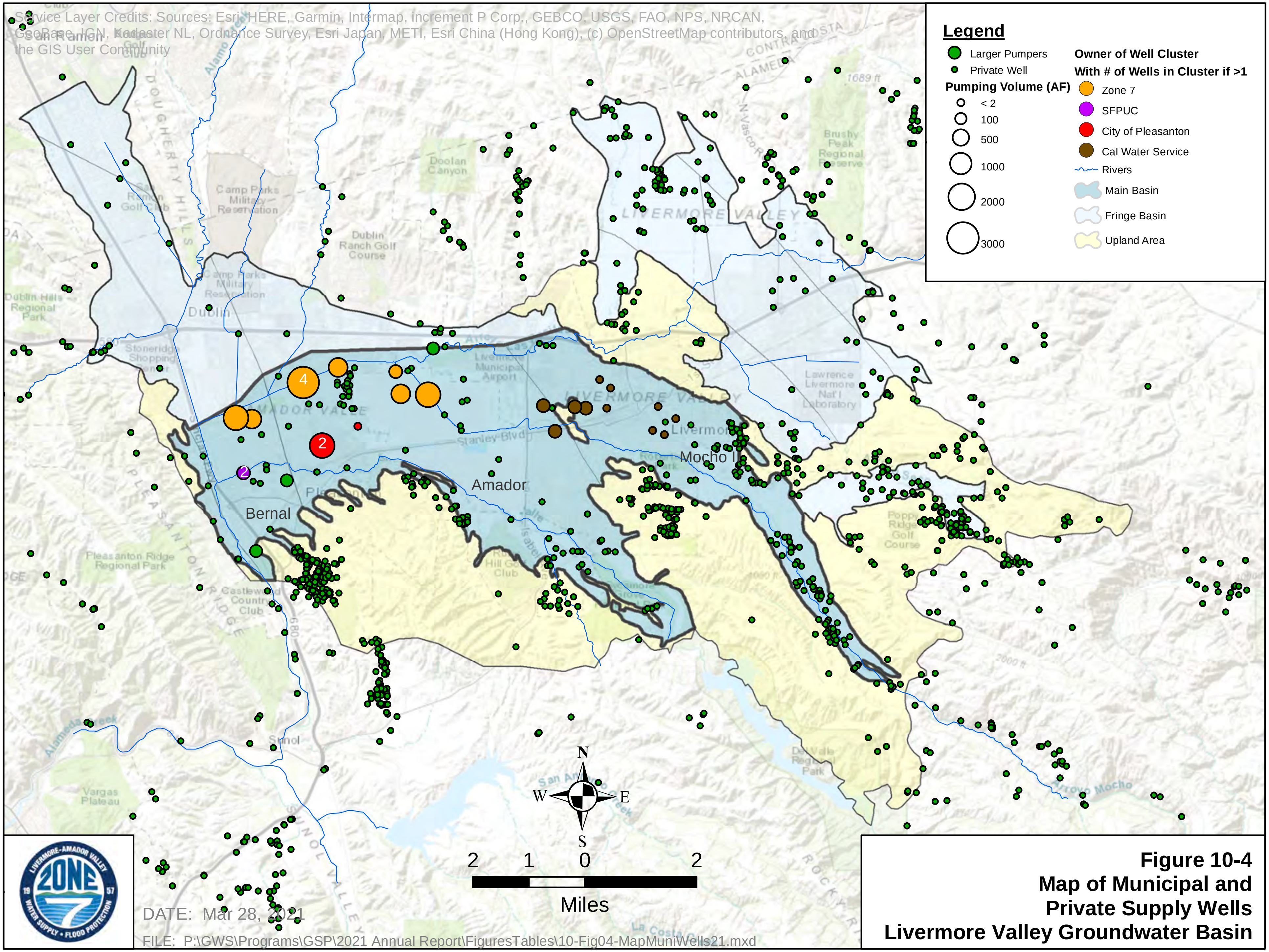
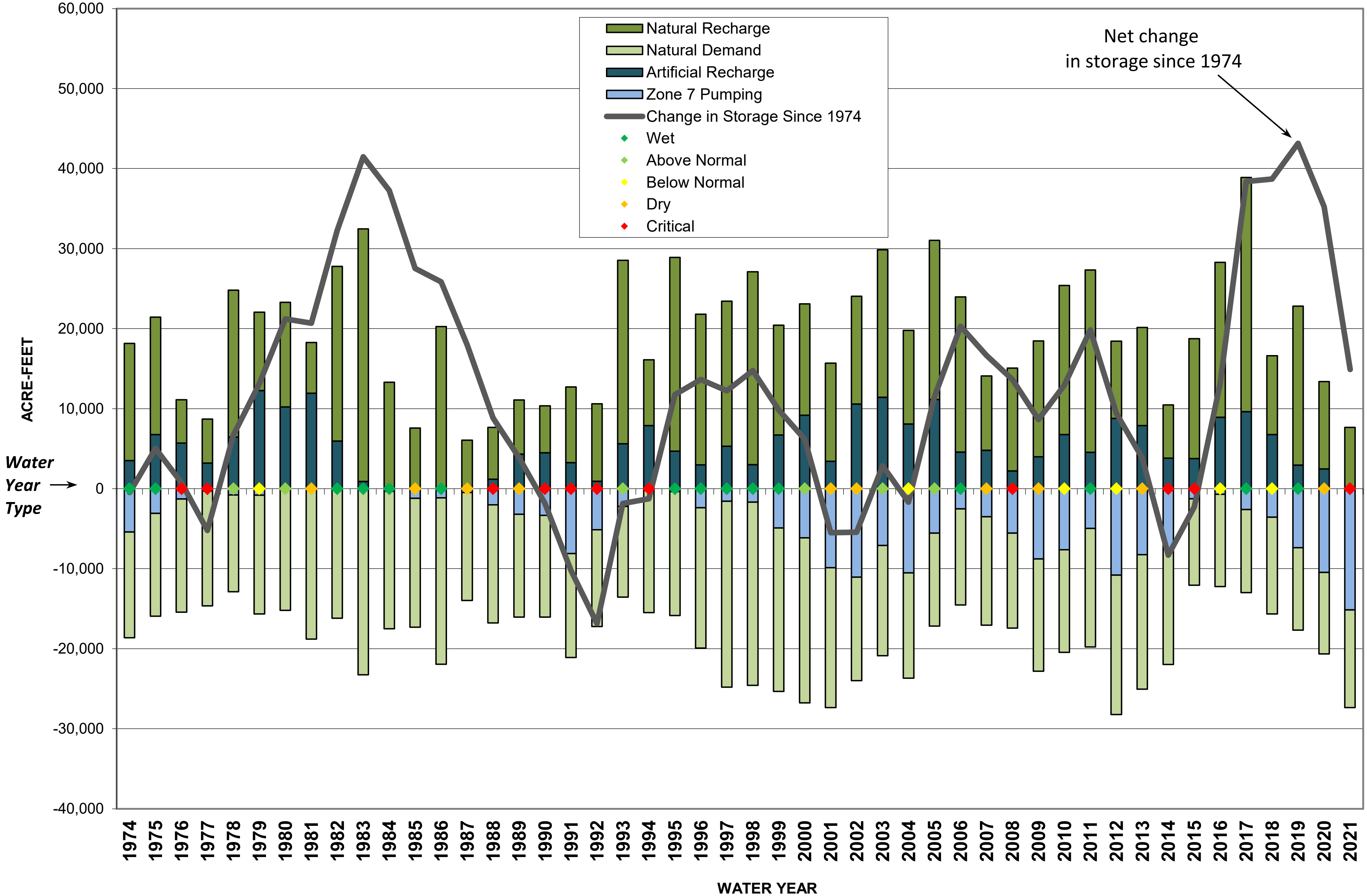



**Figure 10-4**
**Map of Municipal and Private Supply Wells**
**Livermore Valley Groundwater Basin**

**FIGURE 10-5**
**CUMULATIVE CHANGE IN NATURAL AND ARTIFICIAL RECHARGE AND DEMAND 1974 - 2021 WATER YEARS**
**LIVERMORE VALLEY GROUNDWATER BASIN**

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# 11 Groundwater Supply Sustainability

## 11.1 Import of Surface Water

Imported surface water supplies secured by Zone 7 for the 2021 CY are shown in ***Table 11-A*** below***, Figure 11-1***, and are summarized below include:

- The State Water Project (SWP) deliveries via the South Bay Aqueduct [SBA] allocation for the 2021 CY was 5% of Zone 7's maximum allocation (80,619 AF) for 4,031 AF.
- Zone 7 imported 8,600 AF of its total 116,075 AF banked in the Kern Groundwater Basin (care of the Semitropic Water Storage District) and transferred 1,800 AF from the Kern Groundwater Basin to San Luis Reservoir.
- Zone 7 transferred 1,237 AF from the Lover River Yuba Accord (Yuba) and 8,090 AF from the Mojave Water Agency.
- Total imported surface water supplies in the 2021 CY made up 47% of regional water demands.

***Table 11-A: Imported Water Sources for the 2021 Calendar Year (AF)***

| Source | Available at end of 2020 | Added in 2021 | Used in 2021 | Carryover to 2022 |
|---|---|---|---|---|
| **State Water Project** | **8,860** | **5,831** | **8,700** | **5,991** |
| Imported Table A* | 0 | 4,031 | 0 | 4,031 |
| To San Luis from Semitropic | 0 | 1,800 | 0 | 1,800 |
| Article 56 | 8,860 | 0 | 8,700 | 160 |
| **BBID**** | **0** | **0** | **0** | **0** |
| **Kern Groundwater Basin** | **116,075** | **0** | **10,400** | **105,675** |
| Semitropic Delivered | 86,170 | 0 | 8,600 | 77,570 |
| Semitropic to San Luis | 0 | 0 | 1,800 | -1,800 |
| Cawelo Delivered | 29,905 | 0 | 0 | 29,905 |
| **Other** | **0** | **9,327** | **9,327** | **0** |
| Yuba/Dry Year Transfer Program | 0 | 1,237 | 1,237 | 0 |
| Mojave Water Agency Transfer | 0 | 8,090 | 8,090 | 0 |
| **Lake Del Valle (AV Water Rights)** | **20** | **3,200** | **920** | **2,300** |
| ***TOTAL*** | ***124,955*** | ***18,358*** | ***29,347*** | ***113,966*** |

* 5% State Water Project Allocation for 2021 CY

** BBID Agreement terminated in 2021 CY

AV Arroyo Valle

# 11.2 Valley-Wide Water Production and Use

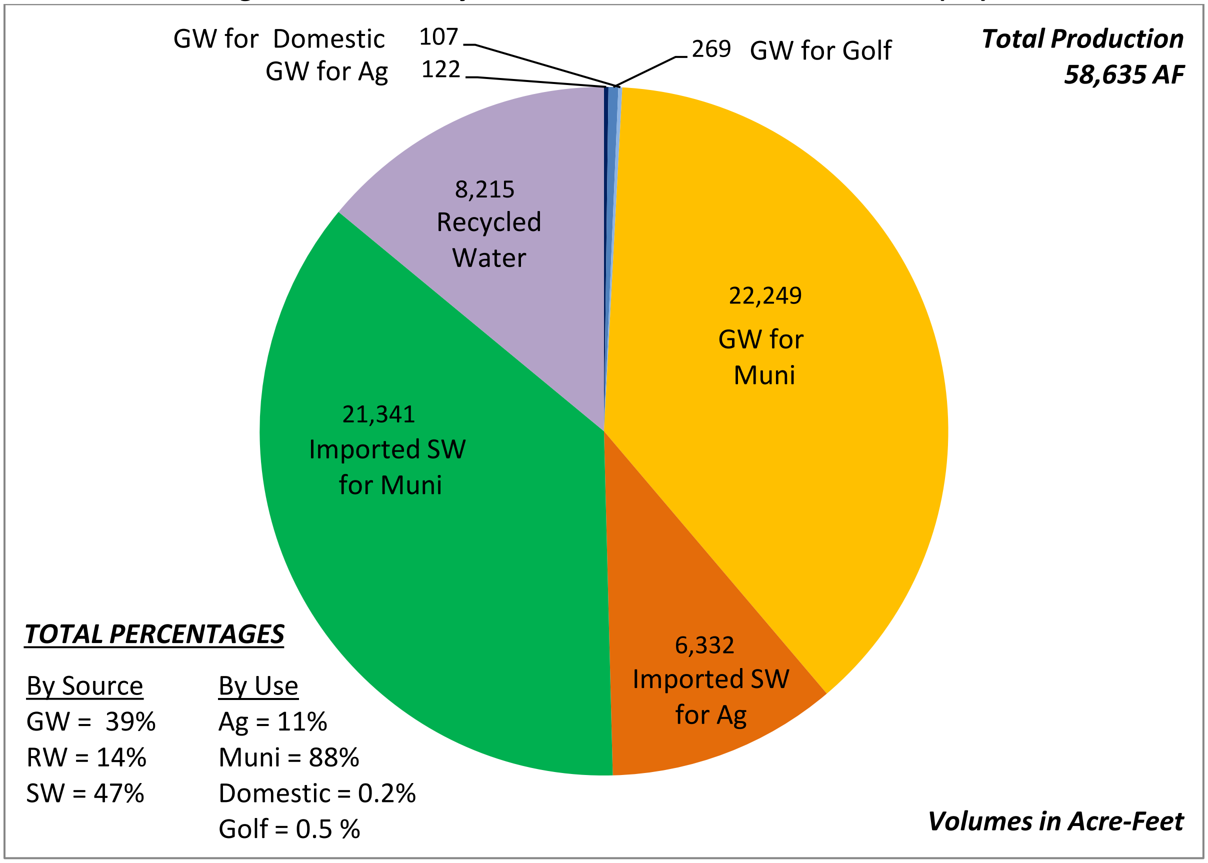
The volume of water produced and used in the Basin is shown in ***Figure 11-A*** (by WY) and ***Figure 11-1*** (by WY except where noted). ***Figure 11-2*** shows the historical percentage of groundwater production relative to total Basin-wide production from the 1974 to 2021 WYs. The following activities occurred during the 2021 WY:

- Total groundwater production in the Basin (including by Zone 7, retailers, agriculture, domestic, etc.) supplied about 39% of the total Basin-wide water demand in the 2021 WY.

- Of the 16,440 AF of groundwater pumped by Zone 7 during the 2021 WY, about 16,259 AF went into production; the remainder of which is accounted for in pumping losses and exported brine from the groundwater demineralization process.

- Zone 7's total produced groundwater was about 43% of the total treated water production that Zone 7 delivered to its retailers during the 2021 WY (on average, groundwater makes up about 15% of Zone 7's annual treated water deliveries).

***Figure 11-A: Valley-Wide Water Production, 2021 WY (AF)***




Ag = Agriculture; Muni = Municipal; GW= Groundwater; RW = Recycled Water; SW = Surface Water

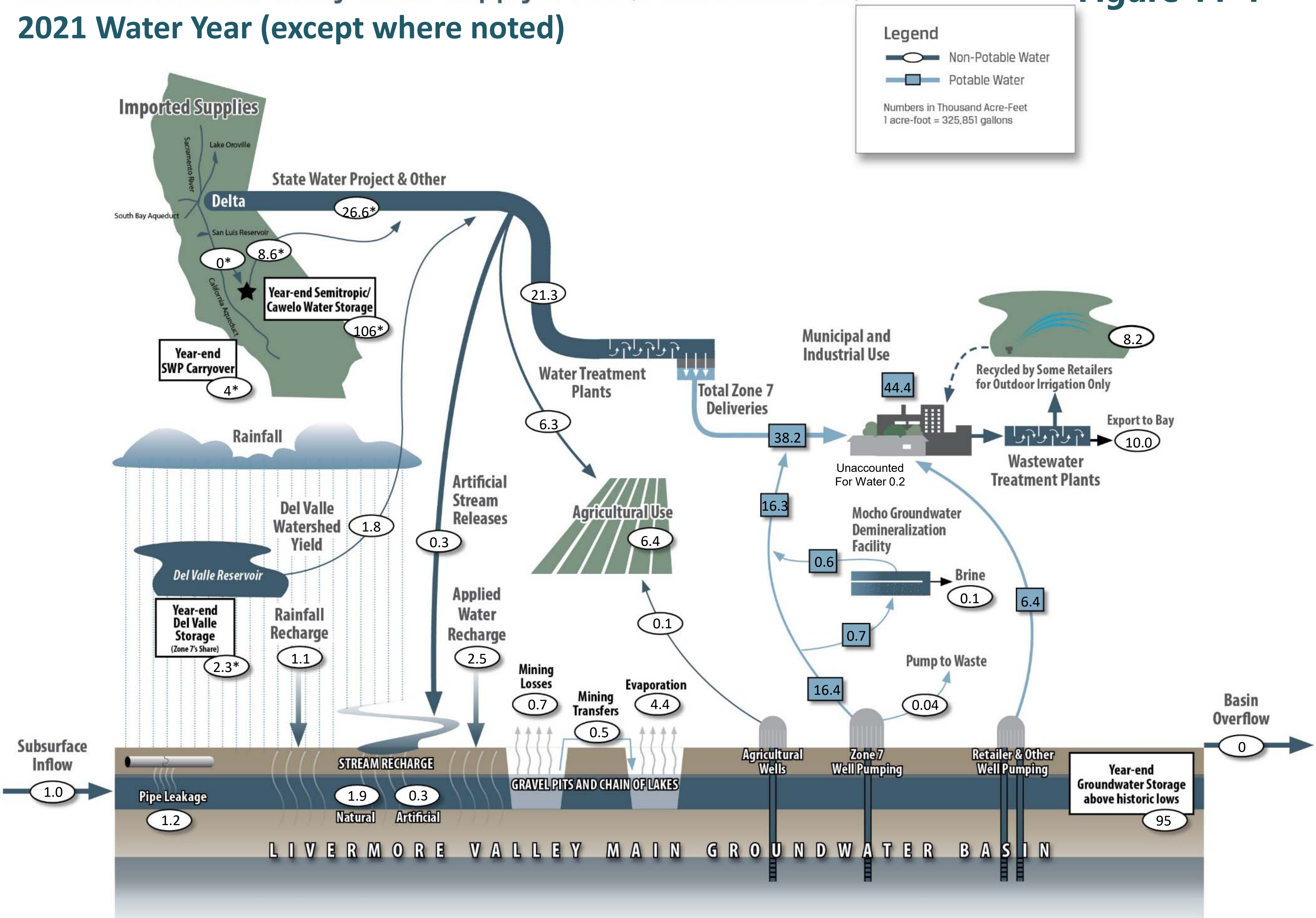
# 11.3 Attached Tables and Figures

***Figure 11-1**: Livermore-Amador Valley Water Supply and Use, 2021 WY*
***Figure 11-2**: Valley Water Production from Imported Water and Groundwater, 1974 to 2021 WYs*

# Livermore-Amador Valley Water Supply & Use (in Thousands of Acre-Feet)

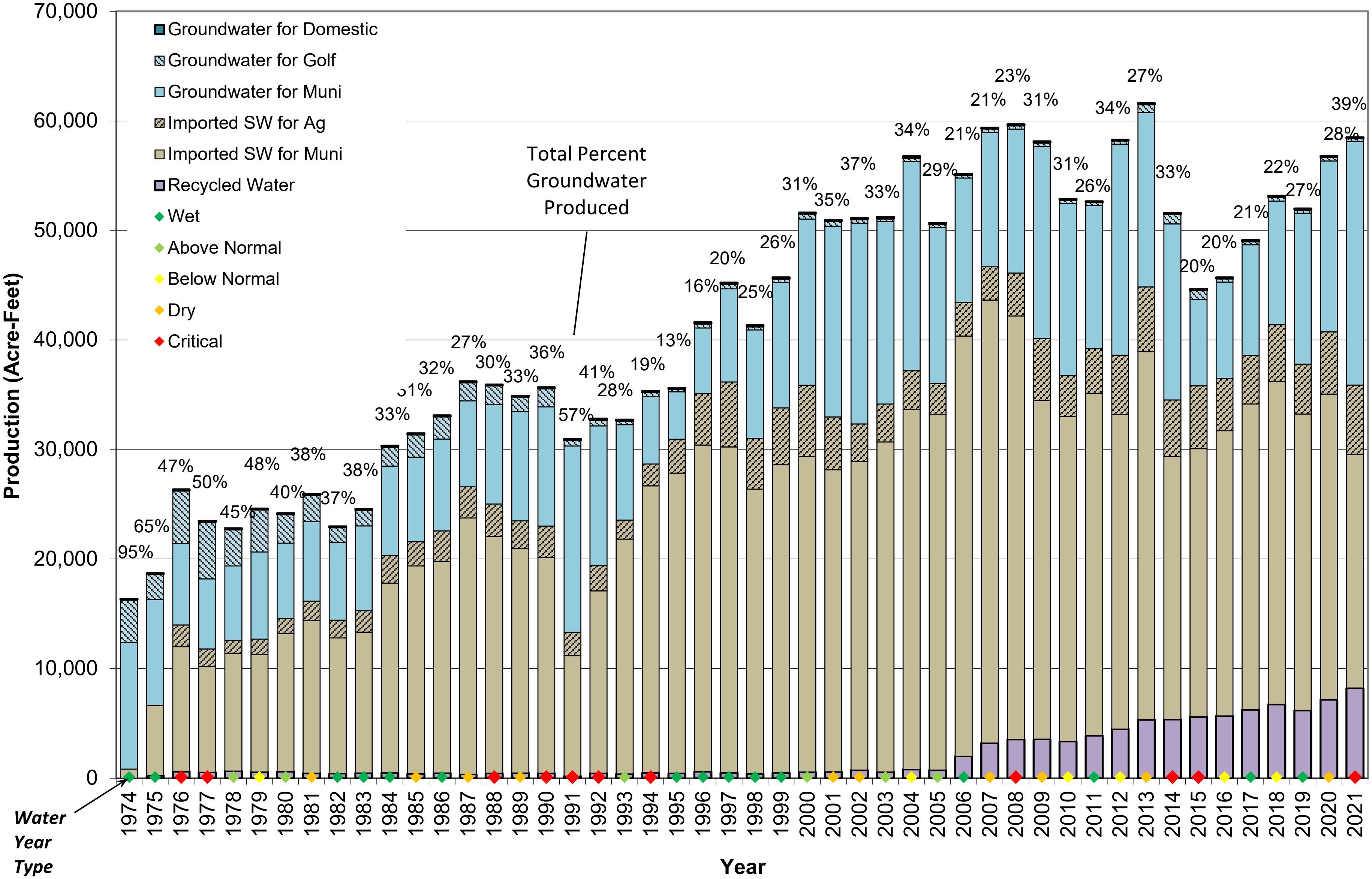
## 2021 Water Year (except where noted)

**Figure 11-1**




* 2021 Calendar Year

**FIGURE 11-2**
**VALLEY WATER PRODUCTION FROM IMPORTED WATER AND GROUNDWATER**
**1974 TO 2021 WATER YEARS**




3/29/2022
P:\GWS\Programs\GSP\2021 Annual Report\FiguresTables\00-Fig09-PieChartTtlUse.xlsx

# 12 Water Quality Sustainability

## 12.1 Well Ordinance Program

Zone 7 administers the associated well permit program within its service area including the three incorporated cities (Dublin, Livermore, and Pleasanton) pursuant to a Memorandum of Understanding (MOU) with Alameda County and ordinances adopted by the three cities. As a result, any planned new well construction, soil-boring construction, or well destruction must be permitted by Zone 7 before the work is started. Additionally, all unused or abandoned wells must be properly destroyed, or, if there are plans to use the well in the future, a signed statement of future intent must be filed with Zone 7.

During the 2021 WY, Zone 7 issued 142 drilling permits, 26 more than in the 2020 WY. ***Table 12-A*** details the breakdown of the types of permits issued during the 2021 WY and their quantities.

***Table 12-A: Well Ordinance Permits Issued in the 2021 WY***

| Permit Type | Quantity |
|---|---|
| Geotechnical Investigations | 78 |
| Well Destructions | 24 |
| Contamination Investigations/Remediation | 9 |
| Water Supply Wells | 17 |
| Groundwater Monitoring | 12 |
| Cathodic Protection Wells | 2 |
| ***Total*** | ***142*** |

- Seventeen (17) water supply well permits were issued in the 2021 WY. The pre-drought average was 25 per year.
- About 78% of the permitted well work was physically inspected by Zone 7 permit compliance staff; the remaining 22% could proceed with self-monitoring and reporting efforts when a licensed professional was supervising the project.

## 12.2 Toxic Site Surveillance Program

Through the Toxic Site Surveilance (TSS) Program, Zone 7 documents and tracks polluted sites that pose a potential threat to drinking water. In general, the TSS Program monitors two types of contamination threatening groundwater: petroleum-based fuel products and industrial chemical contamination (e.g., chlorinated solvents).

The locations of all the toxic sites, and their proximity to the Basin's municipal water wells, are shown on the accompanying individual area maps (***Figure 12-1*** through ***Figure 12-3***, Livermore, Pleasanton/Sunol, and Dublin, respectively). ***Table 12-1*** contains a summary for each of the active sites including the case status, its priority, and which agency is responsible for providing oversight for the case. In addition, copies of plans, reports, directive letters, and background data on the cases can be found at the State Water Resources Control Board's (SWRCB) GeoTracker website: http://geotracker.waterboards.ca.gov/. The GeoTracker number for each case (if one is assigned) is also included in ***Table 12-1***.

## 12.2.1 Program Changes

There were no changes to the TSS Program during the 2021 WY.

## 12.2.2 Results for the 2021 Water Year

### 12.2.2.1 Cases Closed

Four toxic sites were granted "Case Closed" status in the 2021 WY. Their locations are shown on ***Figure 12-4*** and are summarized below (from west to east).

- Site 209: Shell Oil, Dublin. This case was evaluated for closure consistent with the Regional Water Resources Control Board's (RWQCB) Low-Threat Underground Storage Tank Closure Policy (LTCP) for petroleum related contaminants. Alameda County Department of Environmental Health (ACDEH) determined that the site met the LTCP General Criteria and Groundwater Media Specific Criteria and the Petroleum Vapor Intrusion Media Specific Criteria by the active fueling station exception. The following groundwater specific closure criteria were met; the contaminant plume that exceeds water quality objectives is <1,000 feet in length, there is no free product, the nearest existing water supply well or surface water body is >1,000 feet from the defined plume boundary, and the dissolved concentrations of benzene and Methyl tert-butyl ether (MTBE) are both <1,000 micrograms per liter (µg/L).

- Site 14: Former Clorox Campus, Building 9, Pleasanton. This case met the criteria in the Water Board's 2009 Assessment Tool for Closure of Low-Threat Chlorinated Solvent Sites. Groundwater sampling data show that concentrations of volatile organic compounds (VOCs) contaminants are greater than MCLs but are declining. Groundwater off site exceeds MCLs for VOCs, but there are no complete receptor pathways. Covenant and environmental restrictions were placed on the Property at 7035 Commerce Circle, Pleasanton that limit the contact with first groundwater by disallowing drilling for the purpose of extracting water for any use. The deed restriction also states the property "is used for commercial purposes and is adjacent to commercial/industrial land uses".

- Site 331: Taylor Corporation, Livermore. RWQCB found that the groundwater pollution detected beneath the property is likely the result of the migration of pollutants in groundwater from nearby upgradient sources related to releases from historical operations on or near the Salinas Reinforcing property located at 355 South Vasco Road. Therefore, RWQCB determined that this site is not a source of the groundwater pollution found beneath it and that no further action is required by the current or past property owners.

- Site 292: Former K&S Heavy Equipment, Livermore. ACDEH's closure determination was based on a human health and ecological risk analysis including applicable Environmental Screening Levels (ESLs). ACDEH concluded that historic on-site operations had not adversely effected groundwater quality at the site.

#### 12.2.2.2 Sites Pending Closure Review

“Case Closure” was requested by representatives for the five contamination sites listed below. Their locations are provided on ***Figure 12-4***. At the end of the 2021 WY, the lead agencies were still considering the requests but may ask for additional information before making their decision. Cases approved for closure by ACDEH must be reviewed and accepted by the RWQCB before they are officially closed. Information on each pending closure request, including Zone 7’s recommendations, is summarized as follows (from west to east):

- Site 284: Former Crow Canyon Dry Cleaner, Dublin. The Responsible Party (RP) requested closure in 2015 based on the success of remedial actions, and because the vapor measurements are below ESLs. Vapor contamination is the main concern at the site. The groundwater detections for tetrachloroethylene (PCE) and trichloroethylene (TCE) are below their respective MCL. ACDEH directed the RP to conduct additional work to move ACDEH’s consideration forward. The RP has not followed through with the work requested by ACDEH. Staff does not object to the groundwater case closure if the additional work is completed to ACDEH satisfaction and the groundwater detections remain below MCLs.

- Site 308: Green on Park Place, Dublin. The case was slated for closure in 2014 but the case closure was never finalized. The only tasks remaining in October 2014 involved properly disposing of contaminated stockpiled soil. ACDEH sent a compliance letter to the RP in 2019. Staff does not object to the closure of this case if the remaining tasks are completed to ACDEH satisfaction.

- Site 37: Applied Biosystems, Pleasanton. A 5-year remedial action review report was submitted by the RP in July 2018. The report showed that the groundwater concentrations in the sole remaining monitoring well were below MCLs for PCE, TCE, and 1, 1-Dichloroethene (DCE). The RP requested permission to discontinue groundwater monitoring, for the well to be destroyed, the case closed, and the deed restriction rescinded. The Department of Toxic Substances Control (DTSC) approved discontinuing the groundwater sampling and then requested a well decommissioning plan. DTSC said the removal of the deed restriction will need to be done in accordance with Health and Safety Code 25224 following the well decommissioning. Staff does not object to the pending closure.

- Site 317: Walgreens Spill, Sunol. Case was approved for closure by ACDEH under the LTCP. To finalize the case closure, ACDEH required the RP to remove any remaining waste from the site and to provide a report by April 22, 2018. In response, Apex submitted a Site Cleanup Program Case Closure letter to ACDEH in October 2020. Case closure is still pending. There was no progress in the 2021 WY. Staff does not object to the case closure if the remaining tasks are completed to ACDEH satisfaction.

- Site 313: Just Tires, Livermore. This case is a soil contamination case slated for closure; no fuel contaminants were detected in groundwater beneath the site. Comments on pending closure were due January 2016. ACDEH sent multiple letters to the RP to finalize the closure report, but they have not responded. There was no progress in the 2021 WY. Staff does not object to the pending case closure if the remaining tasks are completed to ACDEH satisfaction.

#### 12.2.2.3 New Cases

No new cases were added to the Zone 7 TSS Program in the 2021 WY.

# 12.3 Salt Management

## 12.3.1 Program Changes

No changes were made involving the Salt Management Program (SMP) or SMP strategies in the 2021 WY.

## 12.3.2 Results for the 2021 Water Year

Salt balance calculations for the 2021 WY are tabulated in ***Table 12-B*** (summary) below and attached ***Table 12-2*** (detailed). ***Table 12-3*** summarizes the salt balance calculations from 1974 to 2021 WY. ***Figure 12-5*** graphs the salt inflows, outflows, and resulting Basin-wide salt concentrations from 1974 to 2021 WY.

***Table 12-B: Salt Loading Summary, 2021 WY***

| Category | Volume (AF) | Salt Mass (Tons) | TDS Concentration (mg/L) | Change in Concentration from 2020 WY (mg/L) |
|---|---|---|---|---|
| Inflow | 7,827 | 11,425 | 1,074 | 93 |
| Outflow | 27,999 | 18,364 | 483 | 38 |
| Net (In – Out) | -20,172 | -6,939 | 253 | |
| **Basin Total** | **227,071** | **220,463** | **715** | **38** |

The following is a summary of the salt management actions conducted by Zone 7 during the 2021 WY:

- The total salt mass in the Main Basin decreased 6,939 tons.
- While the salt load decreased during the WY, the end-of-water-year theoretical average TDS concentration for the Main Basin increased by 38 mg/L from the previous WY average. This is because the Basin storage dropped by about 20 TAF, which essentially concentrates the remaining salt in storage.

The Mocho Groundwater Demineralization Plant (MGDP) was operated sparingly throughout the 2021 WY to conserve water during the drought:

- During the 2021 WY, the MGDP produced 143 AF of brine (compared to 344 AF in the 2020 WY) that resulted in the export of about 448 tons of salt from the Main Basin through the Livermore-Amador Valley Water Management Agency (LAVWMA) pipeline (compared to 1,230 tons in the 2020 WY).
- Since its inception, the MGDP has exported over 19,000 tons of salt from the Valley (see ***Table 12-C*** below).

***Table 12-C: Salts Removed by Zone 7's Mocho Groundwater Demineralization Plant***

| Water Year | Brine Volume Exported from Valley (AF) | Average Brine TDS Concentration (mg/L) | Salt Mass Exported (Tons) | Salt Removed per AF of Brine Export (Tons/AF) |
|---|---|---|---|---|
| 2009 | 192 | 3,059 | 798 | 4.16 |
| 2010 | 675 | 3,010 | 2,760 | 4.09 |
| 2011 | 429 | 3,445 | 2,008 | 4.68 |
| 2012 | 935 | 3,198 | 4,062 | 4.34 |
| 2013 | 518 | 3,522 | 2,478 | 4.78 |
| 2014 | 214 | 3,607 | 1,049 | 4.9 |
| 2015 | 16 | 3,474 | 76 | 4.75 |
| 2016 | 51 | 2,662 | 184 | 3.61 |
| 2017 | 244 | 2,863 | 949 | 3.89 |
| 2018 | 268 | 3,209 | 1,168 | 4.36 |
| 2019 | 480 | 2,867 | 1,869 | 3.89 |
| 2020 | 344 | 2,633 | 1,230 | 3.58 |
| 2021 | 143 | 2,307 | 448 | 3.13 |
| **TOTAL** | **4,509** | **3,115** | **19,079** | **4.23** |

AF = acre-feet TDS = total dissolved solids

mg/L = milligrams per liter

# 12.4 Attached Tables and Figures

***Table 12-1****: Toxic Site Surveillance - Active Site Summary, 2021 WY*
***Table 12-2****: Salt Loading 2021 WY*
***Table 12-3****: Historical Salt Loading, 1974 to 2021 WYs*

***Figure 12-1****: Toxic Site Surveillance; Livermore Area Sites*
***Figure 12-2****: Toxic Site Surveillance; Pleasanton and Sunol Area Sites*
***Figure 12-3****: Toxic Site Surveillance; Dublin Area Sites*
***Figure 12-4****: Toxic Site Surveillance; Cases with Status Changes in 2021 WY*
***Figure 12-5****: Main Basin Salt Loading and TDS Concentration, 1974 to 2021 WY*

# TABLE 12-1
# TOXIC SITES SURVEILLANCE - ACTIVE SITES SUMMARY
# 2021 WATER YEAR

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 1 | Lawrence Livermore National Laboratory | Lawrence Livermore Lab | 7000 East Avenue | Livermore | 3A3 | 7 | DTSC | Drilling and sampling work plans were submitted to DTSC by Lawrence Livermore National Laboratory 2021 to include the installation of 3 new monitoring wells. These wells will be used to monitor elevated VOC concentrations near hydrostratigraphic unit 4. |
| ***GEOTRACKER ID:*** T0600191466 | | | | | | | | |
| 5 | Sandia National Laboratory | Sandia National Labs | 7011 East Avenue | Livermore | 3A3 | 8 | RWQCB | The Site Environmental Report for 2020 Sandia National Laboratories is the most recent report available. Monitoring results continued to show carbon tetrachloride in groundwater at the Navy Landfill in 2020 with a concentration similar to that detected in past years. Diesel was not detected in groundwater from wells at the Fuel Oil Spill site in 2020. |
| ***GEOTRACKER ID:*** T0600191470 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 6 | Santa Rita Rehabilitation Center | | 5325 Broder Boulevard | Pleasanton | 2A4 | NR | | An incident report was filed in March 2013 for a diesel fuel leak at 4985 Broder Boulevard, Dublin that occurred in 2012. Contaminated soil was subsequently removed from the property by the end of 2012. This site is currently inactive. |
| GEOTRACKER ID: T10000005213 | | | | | | | | |
| 10 | Industrial Ladder Company | | 115 North Mines Road | Livermore | 2A4 | 1 | RWQCB | A 1985 subsurface report reported chlorobenzene, 1,1-dichloroethane, 1, 1-dichloroethene, trans-1,2 dichloroethene, PCE, 1,1,1-trichloroethane, and TCE found in a sample collected from an observation well on-site. This case is open and inactive as of 6/21/2016. |
| GEOTRACKER ID: | | | | | | | | |
| 11 | Intel | Intel Livermore Fabrication Plant 3 | 250 North Mines Road | Livermore | 2A3 | 8 | RWQCB | 1/3<br>In March 2022, The Water Board approved the 2020 Annual Monitoring and Technical Report and Requirement for Well Destruction Workplan. According to approval letter background, groundwater elevations, and halogenated volatile organic compound (HVOC) data were collected from 16 groundwater monitoring wells and Sump S-2, which had been operating continuously since construction in 1976 to prevent flooding of the Building 3 basement. |
| GEOTRACKER ID: SL18368788 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 11 | Intel | Intel Livermore Fabrication Plant 3 | 250 North Mines Road | Livermore | 2A3 | 8 | RWQCB | 2/3 Groundwater data showed a decreasing or stable contaminant plume with maximum trichloroethene, cis-1,2-dichloroethene, and vinyl chloride concentrations of 65 micrograms per liter (µg/L), 55 µg/L, and 10 µg/L, respectively. The Water Board commented that the wells proposed for destruction are not needed because the groundwater plume has been shown to be stable or decreasing throughout the site for more than 10 years and contaminants are at relatively low concentrations. |
| GEOTRACKER ID: SL18368788 | | | | | | | | |
| 11 | Intel | Intel Livermore Fabrication Plant 3 | 250 North Mines Road | Livermore | 2A3 | 8 | RWQCB | 3/3 The 2020 Annual Monitoring and Technical Report and Requirement for Well Destruction Workplan recommended destruction of the groundwater monitoring wells at the site, with the exception of wells WM-3, WM-22A, IP-1, and WM-20A. Wells WM-3, WM-22A, and IP-1 to be left in place for potential monitoring, and Well WM-20A to be left in place as it may be of use if the site is redeveloped. The Water Board concurred with these reccomendations and Intel's reccomendation for continued annual inspection and water level monitoring of the remaining wells and HVOC analysis of groundwater samples from Sump S-2. |
| GEOTRACKER ID: SL18368788 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 14 | Nucleopore Corporation | Former Clorox Campus - Building 9 | 7035 Commerce Circle | Pleasanton | 2A2 | CL | RWQCB | 1/2<br>No Further Action Former Clorox Technical Campus (CTC) was approved by RWQCB for Building 9, 7035 Commerce Circle, Pleasanton, Alameda County. The case met the criteria in the Water Board's 2009 Assessment Tool for Closure of Low-Threat Chlorinated Solvent Sites. Groundwater sampling data show that concentrations of VOC contaminants are greater than maximum contaminant levels (MCLs) but are declining. Groundwater off site exceeds maximum contaminant levels (MCLs) for volatile organic compounds (VOCs), but there are no complete receptor pathways. |
| GEOTRACKER ID: T0600191468 | | | | | | | | |
| 14 | Nucleopore Corporation | Former Clorox Campus - Building 9 | 7035 Commerce Circle | Pleasanton | 2A2 | CL | RWQCB | 2/2<br>On December 29th 2020, covenant and environmental restrictions were placed on Property 7035 Commerce Circle, Pleasanton. The deed restriction implemented on December 29, 2020 limits the contact with first groundwater at the restricted property by disallowing drilling for purpose of extracting water for any use. The deed restriction also states the property "is used for commercial puposes and is adjacent to commercial/industial land uses". This case is closed as of 8/9/21. |
| GEOTRACKER ID: T0600191468 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 36 | Richmond Lox/ Salinas Reinforcement | Salinas Reinforcing Inc. | 355 South Vasco Road | Livermore | 3A3 | 5C | RWQCB | SFBRWQCB approved a temporary suspension of groundwater monitoring based on the stability of groundwater concentrations in existing monitoring wells. |
| GEOTRACKER ID: SL18266687 | | | | | | | | |
| 36 | Richmond Lox/ Salinas Reinforcement | Salinas Reinforcing Inc. | 355 South Vasco Road | Livermore | 3A3 | 5C | RWQCB | SFBRWQCB approved the suspension of the 2020 groundwater monitoring and reporting. This approval did not change the requirement for future groundwater monitoring and reporting. |
| GEOTRACKER ID: SL18266687 | | | | | | | | |
| 37 | Applied Biosystems (formerly Kaiser Aluminum & Chemical) | Applied Biosystems | 6001 (Formerly 6177) Sunol Boulevard | Pleasanton | 2C | 8 | DTSC | DTSC determined that the Operation and Maintenance Agreement for this site is no longer warranted because groundwater cleanup goals (California drinking water maximum contaminant levels) have been met, as documented in the Five-Year Remedial Action Review Report, dated April 18, 2018. DTSC approved the Annual Certification Regarding Covenant to Restrict Use of Property dated January 6, 2021. |
| GEOTRACKER ID: 01280050 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 84 | Livermore Redevelopment Agency<br>**GEOTRACKER ID:** T0600100116 | 5 | 187 North L Street | Livermore | 1A2 | CL | ACEH | 1/2<br>This LUST case was evaluated for closure consistent with the State Water Resource Control Board's Low-Threat Underground Storage Tank Closure Policy (LTCP) for petroleum related contaminants. Alameda County Department of Environmental Health (ACDH) determined that the site met all the LTCP General Criteria and Media Specific Criteria. This case met LTCP Media Specific Evaluation Groundwater case closure scenario 2 for moderate stabilized contaminant plumes. |
| 84 | Livermore Redevelopment Agency<br>**GEOTRACKER ID:** T0600100116 | 5 | 187 North L Street | Livermore | 1A2 | CL | ACEH | 2/2<br>Case closure was granted for the current commercial land use as a vacant commercial rental yard and vacant office building. If a change in land use to any residential, commercial other than as a vacant commercial rental yard and vacant office building, or conservative land use, or if any site redevelopment is planned, ACDH must be notified as required by Government Code Section 65850.2.2. |
| 115 | LASC/MOSC (Livermore Arcade)<br>**GEOTRACKER ID:** SL18227625 | Livermore Arcade (Miller's Outpost) | 1410/1554 First Street | Livermore | 1A2 | 7 | RWQCB | The Indoor Air, Subslab Vapor, and Soil Vapor Sampling Plan in and the Off-Site Soil Vapor Intrusion Evaluation Work, submitted by Apex Companies, LLC, were approved by the SFBRWQCB in the 2021 Water Year. |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
| **115** | LASC/MOSC (Livermore Arcade) | Livermore Arcade (Miller's Outpost) | 1410/1554 First Street | Livermore | 1A2 | 7 | RWQCB | 1/2 The RWCCB approved the 2020 First and Second Quarter Semi-Annual Groundwater Monitoring and Remedial Progress Reports in December 2020. Forty-four groundwater monitoring wells located at and downgradient of the source properties were sampled. Analytical groundwater results report PCE concentrations in 24 wells above environmental screening levels (ESL) for vapor intrusion commercial/industrial and PCE concentrations in 30 wells above vapor intrusion residential ESLs. |
| ***GEOTRACKER ID:*** SL18227625 | | | | | | | | |
| **115** | LASC/MOSC (Livermore Arcade) | Livermore Arcade (Miller's Outpost) | 1410/1554 First Street | Livermore | 1A2 | 7 | RWQCB | 2/2 According to the 2020 reports, PCE concentrations in the LASC source area wells were significantly less than the concentrations measured prior to the 2017 EISB injections and PCE concentrations in the MOSC area had slightly increased since the last monitoring event. PCE concentrations downgradient of the source properties remained stable. |
| ***GEOTRACKER ID:*** SL18227625 | | | | | | | | |
| **115** | LASC/MOSC (Livermore Arcade) | Livermore Arcade (Miller's Outpost) | 1410/1554 First Street | Livermore | 1A2 | 7 | RWQCB | April 8, 2021, the RWQCB approved the Off-Site Soil Vapor Intrusion Evaluation Work Plan submitted by Apex Companies, LLC, for the Livermore Arcade Shopping Center. |
| ***GEOTRACKER ID:*** SL18227625 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 137 | Busick Air Conditioning | Busick Gearing Properties | 6341 Scarlett Court | Dublin | 2A3 | 5C | RWQCB | RWQCB issued a directive letter on October 15, 2019 requiring a technical report for the vapor intrusion assessment and groundwater investigation at the site, in addition to the implementation of the remedial investigation workplan dated March 12, 2014. The technical report was due February 24,2020. |
| GEOTRACKER ID: SL20256874 | | | | | | | | |
| 149 | Kaiser Sand and Gravel | Hanson Aggregates | 3000 Busch Road | Pleasanton | 2A4 | 5R | ACEH | Cases SLT19719376 and SL0600101555 (AOCs 2 through 9) have been eligible for closure as of 9/18/2020. Case T10000009398 (AOC 6 and 7) is open for long term management as of 7/18/2017. The site's remaining environmental concerns will be conducted under two new SCP cases (RO0003458 and RO0003459). |
| GEOTRACKER ID: SLT19719376 | | | | | | | | |
| 164 | Mike Fuller/Jeff Pitcock | Fuller Card Lock/Bay Counties CFN | 533 Exchange Court and National Drive | Livermore | 2A2 | 3B | ACEH | McGinly and Associates submitted a Data Gap Work Plan for investigation of soil and groundwater conditions resulting from an unauthorized release discovered during removal and replacement of fuel dispensers and under dispenser containments. ACDH evaluated the case in accordance with the State Water Resources Control Board’s Low Threat Underground Storage Tank Case Closure Policy and proposed admendments to the soil and groundwater sampling scope of work. |
| GEOTRACKER ID: T0600122511 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 209 | Shell Oil | SHELL #13-5244 | 8999 San Ramon Road | Dublin | 2C | CL | ACEH | 1/2<br>ACDH closed this case in June 2021. The case was evaluated for closure consistent with the RWQCB's LTCP) for petroleum related contaminants. ACDH determined that the site met the LTCP General Criteria and Groundwater Media Specific Criteria and the Petroleum Vapor Intrusion Media Specific Criteria by the active fueling station exception. |
| GEOTRACKER ID: T0600159797 | | | | | | | | |
| 209 | Shell Oil | SHELL #13-5244 | 8999 San Ramon Road | Dublin | 2C | CL | ACEH | 2/2<br>The following groundwater specific closure criterias were met; The contaminant plume that exceeds water quality objectives is <1,000 feet in length, there is no free product, the nearest existing water supply well or surface water body is >1,000 feet from the defined plume boundary, and the dissolved concentrations of benzene and MTBE are both <1,000 µg/L. |
| GEOTRACKER ID: T0600159797 | | | | | | | | |
| 232 | Bordoni Ranch LLC and Green Valley Corporation Tenancy in Common | Groth Brothers Chevrolet | 59 South L Street | Livermore | 2A2 | 5R | RWQCB | The Revised Vapor Intrusion Mitigation System Design Report was approved November, 2020. Construction of the system was in progress and inspected in November 2020. |
| GEOTRACKER ID: SL0600147081 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 232 | Bordoni Ranch LLC and Green Valley Corporation Tenancy in Common | Groth Brothers Chevrolet | 59 South L Street | Livermore | 2A2 | 5R | RWQCB | In March 2021, a Soil and Groundwater Management Completion Report by Geocon Consultants was submitted. SFBRWB reviewed this report and requested revisions to clarify the presented results. |
| GEOTRACKER ID: SL0600147081 | | | | | | | | |
| 242 | Alameda County Fairgrounds | Fairground Main Well (3S/1E 20B 2) | 4501 Pleasanton Avenue | Pleasanton | 1A1 | 1 | | In January 2021, Zone 7 provided comments to the San Francisco Regional Water Quality Board on the American Cleaners Feasibilty Study as requested by the Water Board. |
| GEOTRACKER ID: | | | | | | | | |
| 250 | Murray Kelsoe | Sunol Tree Gas | 3004 andrade Road | Sunol | 1A1 | 7 | RWQCB | ACDH approved the May 25, 2021 Interim Remedial Action Plan (IRAP), prepared and submitted by RMD Environmental Solutions, Inc. for soil excavation, which consists of excavating soil impacted with Total Petroleum Hydrocarbons (TPH) as gasoline (g) and constituents above their applicable Environmental Screening Levels (ESLs) or extent practicable along the gasoline spill path, which resulting from a vehicle accident on Interstate 680. |
| GEOTRACKER ID: T0600114064 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 259 | City of Livermore | CHEVRON #30-7233 /Mills Square Park/Performing Arts Theater | 2259 First Street | Livermore | 2A4 | 7 | ACEH | ACDH conditionally approved the Final Lead RAIP and Final Petroleum RAIP on October 15, 2020. This approval is limited to the remedial actions relating to the soil matrix only. ACDH approved the Supplemental Remedial Action Implementation Plan Addendum on September 22, 2021, |
| GEOTRACKER ID: T0600196622 | | | | | | | | |
| 259 | City of Livermore | CHEVRON #30-7233 /Mills Square Park/Performing Arts Theater | 2259 First Street | Livermore | 2A4 | 7 | ACEH | According to a monthly status update by Arcadis, dated May 3rd, 2021, the first semiannual groundwater sampling event was completed March 28, 2021. |
| GEOTRACKER ID: T0600196622 | | | | | | | | |
| 267 | Shamrock Ford | Shamrock Ford | 7499 Dublin Boulevard | Dublin | 3A2 | 3A | ACEH | According to the 2000 Soil and Groundwater Sampling Report by Clayton Group Services, TPH, MTBE and BTEX were detected in some goundwater samples above reporting limits. This case has been open and inactive as of 1/14/2016. |
| GEOTRACKER ID: T0600101067 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| **284** | Gabriel Chiu | Former Crow Canyon Dry Cleaner | 7272 or 7242 San Ramon Road | Dublin | 3C | 8 | ACEH | In 2020, ACDH required the submittal of deliverables including the Evaluation, Work Plan, & Site Conceptual Model and an Interim Risk Management Plan no later than May 8, 2020. This deliverable has not been uploaded to Geotracker. |
| ***GEOTRACKER ID:*** T06019764784 | | | | | | | | |
| **291** | Country Club Cleaners | Perciva/Metro Valley Cleaners | 224 Rickenbacker Circle | Livermore | 3A2 | 7 | ACEH | Paloma Environmental Services submitted a Soil and Groundwater Assessment Technical Memorandum Paloma Environmental Services in January 2021. According to this report, Tetrachloroethylene (PCE) was detected above EPA MCL in 1 of eleven grab groundwater samples in MW-2 (7.27 µg/L). |
| ***GEOTRACKER ID:*** T06019748481 | | | | | | | | |
| **291** | Country Club Cleaners | Perciva/Metro Valley Cleaners | 224 Rickenbacker Circle | Livermore | 3A2 | 7 | ACEH | In February 2021, Paloma Environmental Services submitted a site investigation summary report which includes groundwater analysis from the February 2021 monitoring event. During this event, groundwater samples were collected from 9 wells and one grab sample. PCE and TCE concentrations were detected in some wells at levels below the SFRWQCB ESL and/or EPA MCL of 5 µg/L for both constituents. |
| ***GEOTRACKER ID:*** T06019748481 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 292 | CW Roen | Former K&S Heavy Equipment | 495 Greenville Road | Livermore | 2C | CL | ACEH | Case closed as of 7/19/2021. ACDH's closure determination was based on a human health and ecological risk analysis including applicable ESLs. ACDH concluded that historic on-site operations had not adversly effected groundwater quality at the site. |
| GEOTRACKER ID: T06019726510 | | | | | | | | |
| 298 | Chevron | Former Chevron Records Facility | 6400 Sierra Court | Dublin | 2B4 | 7 | RWQCB | The Regional Water Board Order approved a revised Self-Monitoring Program in May, 2021 to reduce monitoring from an annual to a semi-annual basis. |
| GEOTRACKER ID: SL0600196603 | | | | | | | | |
| 299 | TDW Construction | Nica Metals | 101 Greenville Road | Livermore | 3A2 | 3A | ACEH | Site is non-compliant. Soil removal and a site assessment were due May 2010. ACDH issued notice of violation letters in 2009 and 2010. There was no change in status for this case in the 2020 WY. |
| GEOTRACKER ID: SLT19765274 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 302 | Federal Corrections Institution Dublin | FCI Dublin | 5701 8th Street | Dublin | 3A1 | 3B | ACEH | In response to a site investigation report, ACDH commented in 2010 that further investigation is needed to determine groundwater gradient and extent of contamination. Quarterly monitoring was required. The RP submitted a case closure request in Oct 2010. The case is still open and ACDH has not agreed to closure. No change in 2021 water year. |
| GEOTRACKER ID: SLT19749067 | | | | | | | | |
| 307 | City of Pleasanton Public Works | City of Pleasanton Theater Parking Lot | 0 Kottinger Drive | Pleasanton | 3B1 | 5C | ACEH | The new ACEH caseworker sent a letter on May 21, 2018 requesting a meeting to move the case to closure. There are no additional notes on GeoTracker for the 2021 WY. |
| GEOTRACKER ID: T10000001164 | | | | | | | | |
| 308 | Stockbridge/BHV Emerald Place Land Co | Green on Park Place | 5411 Martinelli Way | Dublin | 3C | 8 | ACEH | ACDH established a Cleanup Program Site case RO0003131 to evaluate commercial land use scenario relative to the proposed IKEA redevelopment. Underground storage tank case RO0002993 has been closed for this site. |
| GEOTRACKER ID: T10000005547 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 311 | Crown Chevrolet | Aster Apartments/Crown Chevrolet Cadillac Isuzu | 6775 Golden Gate Drive (formerly 7544 Dublin Boulevard) | Dublin | 3A1 | 5R | ACEH | According to the 2020 Indoor Air and Sub-Slab Soil Gas Sampling Report, two indoor air samples and one outdoor air sample were collected by GeoKinetics in October 2020. Benzene, chlorobenzene, 1,1-DCE, 1,4-DCB, chlorobenzene, trans-1,2-DCE, and vinyl chloride were detected in at least one sample. PCE, the main constituent of concern for the site, was detected at concentrations of 0.86 and 0.89 micrograms per cubic meter (µg/m3) in the indoor air samples. The 2020 sampling report is pending regulatory review. |
| ***GEOTRACKER ID:*** T10000010517 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 311 | Crown Chevrolet | Aster Apartments/Crown Chevrolet Cadillac Isuzu | 6775 Golden Gate Drive (formerly 7544 Dublin Boulevard) | Dublin | 3A1 | 5R | ACEH | 1/2<br>In March 2021, ACDH assigned the Case to a status of "Open – Long Term Management" on the State Water Board's GeoTracker database to align with the next phase of work. ACDH concurred with that engineering controls currently in-place at the Site are sufficient to control the vapor intrusion pathway and that vapor intrusion is not currently considered a complete exposure pathway to on-site receptors. |
| ***GEOTRACKER ID:*** T10000010517 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 311 | Crown Chevrolet | Aster Apartments/Crown Chevrolet Cadillac Isuzu | 6775 Golden Gate Drive (formerly 7544 Dublin Boulevard) | Dublin | 3A1 | 5R | ACEH | 2/2<br>ACDH required the Operations, Maintenance, Monitoring, and Reporting Plan for Vapor Mitigation System (the "OMM&R Plan") to include the full TO-15 suite be reported for all soil vapor samples and contingencies for the implementation of point of control sampling. |
| ***GEOTRACKER ID:*** T10000010517 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 312 | Cemex | Cemex Sunol | 6527 Calaveras Road | Sunol | 3A1 | 1 | ACEH | CEMEX responded to ACEH's letter asking for funds to cover oversight. They said the spill was contained and cleaned up immediately after release the same day ACEH was notified. A report was filed within two days. They don't feel there is cause to open a case for investigation/remediation. Case is listed as Inactive on GeoTracker. No update in the 2021 WY. |
| GEOTRACKER ID: T10000003431 | | | | | | | | |
| 313 | Good Year Tire and Rubber Company | Just Tires | 1485 First Street | Livermore | 2C | 8 | ACEH | No updates were reported for this case in the 2021 WY. Comments on pending closure were due January 2017. |
| GEOTRACKER ID: T10000003435 | | | | | | | | |
| 317 | Walgreens | Walgreens Spill Sunol | 9494 Koopman Road | Sunol | 2C | 8 | ACEH | Case was eligible for closure by ACDH under the LTCP. The RP was required to remove any remaining waste from the site and provide ACDH with a report by April 22, 2018 to finalize the requirements for case closure. Apex submitted a Site Cleanup Program Case Closure letter to ACDH in October 2020 in response to ACDH's 2018 finalization requirements. |
| GEOTRACKER ID: T10000006478 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 318 | E&B Natural Resources Management Corporation | G.I.G Oil Production Facility | 8467 Patterson Pass Road | Livermore | 2A4 | 8 | ACEH | ACDH has not responded to the RP's case closure request in 2017. All soil and groundwater samples were non-detect for fuel contaminants and within background range for metals. |
| GEOTRACKER ID: T10000007269 | | | | | | | | |
| 319 | Johnson Drive Holdings I, LLC/Clorox Products Manufacturing | Former Clorox Site - Building 7 | 7200 - 7208 Johnson Drive | Pleasanton | 2A2 | 5R | RWQCB | Building 7 remains open while the a portion of the Former Clorox site containing Building 8 has closed (TS#316, GeoTracker ID T10000005195). The RWQCB approved the expansion of the SVE system to accelerate remediation of PCE in soil vapor. The 2021 Soil Vapor Extraction System Expansion Completion Report submitted by Rosso Environmental was approved by the REWQCB in June 2021. |
| GEOTRACKER ID: T10000007118 | | | | | | | | |
| 320 | Ready Family Partnership, LP | Dublin Crossroads Center & Park Ave Cleaners | 7100-7120 Dublin Boulevard | Dublin | 2A4 | 5C | ACDEH | A Site Investigation Report was requested by ACDH in 2020. There were no new regulatory activities in 2021 water year. |
| GEOTRACKER ID: T10000004783 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 322 | Pacific Locomotive Association DBA Niles Canyon Railway | Niles Canyon Railway | 9 Kilkare Road | Sunol | 3B1 | 7 | ACDEH | No updates in the 2021 water year. An oil leak was discovered from a locomotive on the Niles Canyon Railway. Soil was removed and confirmation sampling was conducted under the direction of the ACDH. The report was submitted to ACDH on 7/20/2016. The RP requested closure. ACDH sent a notice to comply letter in July 2020 for submission of Revised Site Investigation Report. A response from the RP was received in July 2020 to review. Regulatory response is pending. |
| GEOTRACKER ID: T10000006021 | | | | | | | | |
| 323 | Stoll Main Street Trust | Former American Cleaners | 555 Main Street | Pleasanton | 1A4 | 3A | RWQCB | 1/2 The RP submitted a Ground Water Monitoring and Sampling Report to the RWQCB in December 2020. Groundwater was analyzed from one deep well (screened from 180 to 190 feet), 4 shallow wells (screened from 30-50 feet), and 5 groundwater grab samples. VOCs were detected in all well samples above California MCLs including PCE levels at 27,000 ug/l in MW-3 screened from 30 to 50 feet below surface. |
| GEOTRACKER ID: T10000008240 | | | | | | | | |
| 323 | Stoll Main Street Trust | Former American Cleaners | 555 Main Street | Pleasanton | 1A4 | 3A | RWQCB | 2/2 Analytical groundwater results from well MW-1D, screened from 180 to 190 feet below surface, reported detections of VOCs, including PCE ranging from 11 to 35 ug/l in 2020. Analytical groundwater results of groundwater grab samples at this location reported detections of PCE ranging from 3.0 ug/l in MW1D-W-51 to 1,100 ug/l in MW1D-W-127. |
| GEOTRACKER ID: T10000008240 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 323 | Stoll Main Street Trust | Former American Cleaners | 555 Main Street | Pleasanton | 1A4 | 3A | RWQCB | In June 2021, the RWQCB approved the May 31, 2021, Indoor Air and Subslab Vapor Assessment Work Plan submitted by AdvancedGeo and required the addressees to submit an investigation completion report. |
| GEOTRACKER ID: T10000008240 | | | | | | | | |
| 323 | Stoll Main Street Trust | Former American Cleaners | 555 Main Street | Pleasanton | 1A4 | 3A | RWQCB | On 9/22/2021, the RWQCB approved the August 16, 2021 Soil Vapor Extraction & In-Situ Air Sparging Pilot Test Work Plan. The proposed 6-month pilot test is designed to evaluate feasibility of combining air sparging with SVE as a remediation method and evaluate feasibility of volatilizing dissolved chlorinated solvents (PCE) as a remediation method at the site. |
| GEOTRACKER ID: T10000008240 | | | | | | | | |
| 324 | MidPen Housing Corporation | Chestnut Square | 1651 and 1665 Chestnut Street | Livermore | 1A2 | 8 | ACDEH | ACDH is proceeding with regulatory case closure of Cleanup Program Case No. RO0003179 and has transitioned regulatory oversight to two separate Long-Term Management Cases identified by ACDH Case Nos. RO0003461 (Chestnut Square Family Housing) and RO0003460 (Chestnut Square Senior Housing). |
| GEOTRACKER ID: T10000007202 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 325 | MidPen Housing Corporation | 217 North N St | 217 North N Street | Livermore | 2A1 | 8 | ACDEH | ACDH concurred the vapor intrusion mitigation and migration engineering controls (VIMMECs) for buidings 3,4,5, and 6 and issuanced the certificate of occupancy clearance for these buildings. The CAP for this site includes mitigation measures to protect future residents from an upgradient contamination. |
| GEOTRACKER ID: T10000011094 | | | | | | | | |
| 325 | MidPen Housing Corporation | 217 North N St | 217 North N Street | Livermore | 2A1 | 8 | ACDEH | In March 2021, a new case (RO0003492/T10000016944) was created for tracking long term management at this site. |
| GEOTRACKER ID: T10000011094 | | | | | | | | |
| 326 | City of Livermore | Livermore Department of Public Works | Rincon and Juniper and Spruce | Livermore | 1A1 | 3A | RWQCB | This site has been eligible for closure as of August 2021. Under its current land use, the site is eligible for closure under the State's Low-Threat Closure Policy. SFRWQCB agrees with the RP's site assessment results. The data does not indicate that the former Water Plant and sewage ponds are the source of the residual contamination. |
| GEOTRACKER ID: SLT2O09096 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 327 | BMMR USA, Inc. | VIP Cleaners | 1809 Santa Rita Road, Suite F | Pleasanton | 2A2 | 3B | RWQCB | The RWQCB approved the July 31, 2020, Additional Remedial Investigation (Report) and required the Pleasanton Valley Plaza LLC to submit an investigation workplan to include characterization of the groundwater plume on and off-property. Grab groundwater samples on-property have PCE concentrations up to 140 ug/L and warrant groundwater monitoring wells to confirm contaminant concentrations in the grab groundwater sampling locations and to determine groundwater flow direction. |
| GEOTRACKER ID: T10000008254 | | | | | | | | |
| 327 | BMMR USA, Inc. | VIP Cleaners | 1809 Santa Rita Road, Suite F | Pleasanton | 2A2 | 3B | RWQCB | The RP submitted an Additional Remedial Excavation workplan in the 2021 WY. The RWQCB's response requested that the plan include more comprehensive groundwater sampling to define the extent of the groundwater plume. |
| GEOTRACKER ID: T10000008254 | | | | | | | | |
| 329 | Terrell Bates & Kimberly R Trust | Pleasanton French Laundry (Former) | 560 Main Street | Pleasanton | 2A4 | 3A | RWQCB | According to the RWQCB, the potential media of concern for this site is indoor air and soil vapor. In July 2021, the RWQCB identified steps for the site to be considered for a low-threat case closure evaluation. |
| GEOTRACKER ID: T10000008241 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 330 | FFHS Associates - Gateway, L.P. ; Margo Foster | City Cleaners | 4855 Hopyard Road, Suite C | Pleasanton | 2A4 | 5R | RWQCB | Remediation case as of 7/21/2021. In June 2021, FFHA Associates submitted a Remedial Excavation Report in response to the SFRWQCB's request for an interim remedial action report to include excavation and vapor sampling at the site. This report was approved by SFRWQCB in August 2021. An interim confirmation sub-slab and soil gas sampling report is due. |
| GEOTRACKER ID: T10000008237 | | | | | | | | |
| 331 | Taylor Corporation; John Tanke | Taylor Corporation | 5775 Brisa Street | Livermore | 2A1 | CL | RWQCB | Case closed in July 2021. SFBRWQB found that the groundwater pollution detected beneath the property is likely the result of the migration of pollutants in groundwater from nearby upgradient sources related to releases from historical operations on or near the Salinas Reinforcing property located at 355 South Vasco Road. Therefore SFBRWQB determined that this site is not a source of the groundwater pollution found beneath it and that no further action is required by the current or past property owners. |
| GEOTRACKER ID: T10000013016 | | | | | | | | |
| 332 | Renn Transportation | Renn Transportation Fuel Spill | I-680 | Sunol | 2A2 | 7 | ACDEH | In August 2021, ACDH approved the Interim Remedial Action Plan which consists of excavating soil impacted by the gasoline spill from a vehicle accident on Interstate 680. |
| GEOTRACKER ID: T10000013696 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 335 | J Cleaners | J Cleaners | 2093 Railroad Avenue | Livermore | 1A2 | 3A | RWQCB | In December 2020, Pangea Environmental Services, Inc prepared a Soil Gas Monitoring Workplan for the City of Livermore to evaluate soil gas conditions at the existing buildings, the proposed future buildings, and the Former J Cleaners Facility and Excavation Area. |
| GEOTRACKER ID: T10000008401 | | | | | | | | |
| 336 | Old Train Depot | Old Train Depot | 2009 Railroad Avenue | Livermore | 1A2 | 5C | RWQCB | A Data Gap Assessment Workplan, approved by the SFRWQCB in June 2021, proposed work to further characterize TPH and VOCs in the soil and groundwater. Evaluation includes perched (31-44 feet below ground surface [bgs]) and shallow (60-72 feet bgs) groundwater to further characterize and monitor plume stability. |
| GEOTRACKER ID: T10000016758 | | | | | | | | |
| 336 | Old Train Depot | Old Train Depot | 2009 Railroad Avenue | Livermore | 1A2 | 5C | RWQCB | An Interim Remedial Action Plan, dated May 17, 2021, was prepared for the City of Livermore to "facilitate interim remedial action in advance of site development planned to commence in 2022. This plan includes contingent scope expansion based on data from implementation of the separate Data Gap Assessment Workplanin advance of site development planned to commence in 2022." |
| GEOTRACKER ID: T10000016758 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| **337** | Pacific Avenue Cleaners | Pacific Avenue Cleaners | 3018 Pacific Avenue | Livermore | 1A2 | 5C | RWQCB | According to a site characterization study, dated July 2020, PCE was detected in 78% of groundwater samples collected at the site and is the chemical of concern in groundwater. Groundwater water quality data for this study is based on 6 grab groundwater samples collected at shallow depths. Soil vapor data is based on samples collected from 41 locations at this site, one of which reported significantly higher concentrations of PCE, observed in the deeper vapor probe B-33, at concentrations levels of 14864.04 µg/M3. This site is approximately 500 feet north-east of municipal well CWSO4. |
| ***GEOTRACKER ID:*** T10000008716 | | | | | | | | |
| **338** | Quality Cleaners | Quality Cleaners | 2048 First Street | Livermore | 1A1 | 3A | RWQCB | In February 2021, the SFRWQCB approved a 2020 Site History Technical Report and 2020 Site Assessment Report. The SFRWQCB concurred with the Report's conclusions that PCE in soil could be a source for vapors in soil gas and that the stability and extent of the VOC plume of in groundwater and soil vapor should be fully assessed. In addition, the SFRWQCB requested the City to submit an Interim Remedial Action Plan (IRAP). |
| ***GEOTRACKER ID:*** T10000014462 | | | | | | | | |
| **340** | Arroyo Crossing | Arroyo Crossing | 1364 Arroyo Road | Livermore | 3A1 | 7 | RWQCB | In 2007, RWQCB concurred with a request to proceed with placing geotextile and had no objections to construction preparation on Phase 5. This case is out of compliance with reporting. |
| ***GEOTRACKER ID:*** SL0600174278 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| 341 | Warmington Homes - Hansen Hills | Warmington Homes - Hansen Hills | Silvergate Drive | Livermore | 3A1 | NR | RWQCB | Inactive as of 6/4/2009. No records have been uploaded to Geotracker for this site. |
| GEOTRACKER ID: SL18307727 | | | | | | | | |
| 342 | Camp Parks | Camp Parks | 0 Parks RFTA | Dublin | 2A2 | 3B | ACDEH | Parks RFTA has 22 areas of concern. A feasability study report for the Tassajara Creek Landfill (CCPRFTA-01) was due 12/16/2021. |
| GEOTRACKER ID: T06019796867 | | | | | | | | |
| 343 | Laguna Oaks Site | Laguna Oaks Site | 3465 Old Foothill Road | Pleasanton | 3A1 | 3B | RWQCB | According to a Site Characterization Report by Dames and Moore in 1992, PCE was dectected in groundwater samples from MW2 and MW-3 but was not detected in the remaining 4 wells samples at the site. A summary of PCE analytical results from a 1992 Quarterly Goundwater Quality Monitoring report presents results from 6 rounds of sampling between July 1990 and November 1992. PCE was dectected in all groundwater samples from wells MW-2 and MW-3 at levels up to 98 ug/L and 610 ug/L, respectively. This site is currently inactive. |
| GEOTRACKER ID: T06019749061 | | | | | | | | |

| Z7 ID | OWNER | SITE NAME | ADDRESS | CITY | PRIORITY | STATUS | LEAD AGENCY | NOTES |
|---|---|---|---|---|---|---|---|---|
| **344** | Pleasanton Assisted Living Facility | Pleasanton Assisted Living Facility | 0 JUNIPERO ST & SUNOL | Pleasanton | 3A2 | 3B | RWQCB | Historical landuses for this site include sewage treatment and the City of Pleasanton Corporation Yard. Limited excavations were performed at this site to remove hydrocarbon impacted soils. According to ACDH, further evaluation of the case is required. |

***GEOTRACKER ID:*** T06019724209

Z7 ID - corresponds to file number in TSS database and the location on site maps
OWNER - responsible party for the contamination investigation/cleanup
SITE NAME - indicates a site name if different from owner
PRIORITY - the first number of the priority code indicates whether the case is high priority (1), moderate priority (2), or low priority (3).
STATUS - the status code is based on the RWQCB ranking of the progress of a case (see below)
NOTES - highlights, cureent activites, or concerns at a site.

CASE STATUS CODES:
1 - Leak Confirmed
3A - Preliminary Site Assessment Workplan Submitted
3B - Preliminary Site Assessment Underway
5C - Pollution Characterization Underway
5R Remediation Workplan (Corrective Action Plan) Submitted
7 - Remediation Underway
8 - Post Remediation Monitoring Begun
CL - Case Closure
NR - Further investigation not required
ReO - Reopened

CONCENTRATION ug/L - the most recent concentration in groundwater in micrograms per liter (parts per billion)
CHEMICAL - the chemicals of concern at the site.

BENZ - benzene
CCl4 - carbon tetrachloride
Cr(VI) - hexavalent chromium
1,2-DCE - 1,2-dichloromethene
DRO - diesel range organics
GRO - gasoline range organics
MTBE - methyl tertiary-butyl ether
NO3 - nitrate
PCE - tetrachloroethene
TBA - tertiary-butyl alchohol
TCE - trichloroethene
TOLU - toluene
TPHd - total petroleum hydrocarbons diesel
TPHg - total petroleum hydrocarbons gasoline
TPHmo - total petroleum hydrocarbons motoroil
VC - vinyl chloride
XYL - xylenes

# TABLE 12-2
# MAIN BASIN SALT LOADING
# 2021 WATER YEAR

| INFLOW COMPONENTS | SURFACE WATER | | % | RECHARGED WATER | | | SALT LOAD |
|---|---|---|---|---|---|---|---|
| | Volume Applied (AF) | TDS Conc (mg/L) | Recharged | Volume Recharged (AF) | TDS Conc (mg/L) | Salt Load (Tons) | (Tons per TAF of Rch) |
| **NATURAL STREAM RECHARGE** | **3,854** | **624** | **49%** | **1,887** | **624** | **1,599** | **850** |
| **Arroyo Valle** | **573** | **353** | **99%** | **569** | **353** | **273** | **480** |
| Flood releases recharge | 0 | 226 | 0% | 0 | 226 | 0 | 0 |
| Natural inflow (above AVNL) | 130 | 565 | 143% | 186 | 565 | 143 | 770 |
| Natural inflow (below AVNL) | 443 | 250 | 86% | 383 | 250 | 130 | 340 |
| **Arroyo Mocho** | 826 | 491 | 71% | **586** | **491** | **391** | **670** |
| **Arroyo Las Positas** | 2,455 | 940 | 30% | **732** | **940** | **935** | **1,280** |
| **ARROYO VALLE PRIOR RIGHTS** | **2,423** | **230** | **22%** | **539** | **230** | **168** | **310** |
| **ARTIFICIAL STREAM RECHARGE** | **1,050** | **230** | **26%** | **277** | **230** | **87** | **310** |
| **Arroyo Valle** | 1,050 | 230 | 26% | **277** | **230** | **87** | **310** |
| **Arroyo Mocho** | 0 | 240 | 0% | **0** | **240** | **0** | **0** |
| **Arroyo Las Positas** | 0 | 240 | 0% | **0** | **240** | **0** | **0** |
| **INJECTION WELL RECHARGE** | **-** | **-** | **-** | **0** | **0** | **0** | **0** |
| **RAINFALL RECHARGE** | **9,231** | **0** | **12%** | **1,079** | **0** | **0** | **0** |
| *LAKE RECHARGE* | - | - | - | *490* | *450* | *299* | *610* |
| **LEAKAGE** | **-** | **-** | **-** | **1,248** | **500** | **848** | **680** |
| **APPLIED WATER RECHARGE** | **11,822** | **411** | **15%** | **1,798** | **2,704** | **6,604** | **3,670** |
| **Urban - Municipal** | 8,889 | 404 | 16% | 1,407 | 2,555 | 4,884 | 3,470 |
| **Urban - Recycled Water** | 738 | 670 | 20% | 148 | 3,351 | 672 | 4,560 |
| **Agricultural - Municipal (SBA)** | 1,490 | 264 | 6% | 86 | 4,575 | 534 | 6,210 |
| **Agricultural - Groundwater** | 85 | 595 | 18% | 15 | 3,296 | 69 | 4,510 |
| **Golf Courses - Groundwater** | 279 | 396 | 26% | 73 | 1,510 | 150 | 2,050 |
| **Golf Courses - Recycled Water** | 341 | 636 | 20% | 68 | 3,174 | 295 | 4,310 |
| **SUBSURFACE BASIN INFLOW** | | | | **1,000** | **1,560** | **2,119** | **2,120** |
| **TOTAL INFLOW** | | | | **7,827** | **1,074** | **11,425** | **1,460** |

| OUTFLOW COMPONENTS | | WATER EXTRACTED | | | SALT REMOVED |
|---|---|---|---|---|---|
| | | Volume Removed (AF) | TDS Conc (mg/L) | Salt Removed (Tons) | (Tons/TAF of Export) |
| **MUNICIPAL PUMPAGE** | | **22,806** | **576** | **17,857** | **780** |
| **Zone 7 Wells - Hop, Stone, COL** | | **8,598** | **550** | **6,420** | **750** |
| **Zone 7 Wells - Mocho** | | **7,842** | **653** | **6,961** | **890** |
| *Demin Salts Exported from Valley* | *(subset of Zone 7 - Mocho)* | *143* | *2,307* | *449* | *3,130* |
| **Other** | | **6,366** | **518** | **4,476** | **700** |
| **AGRICULTURAL PUMPAGE (all salt is reapplied)** | | **122** | **595** | **98** | **810** |
| **MINING USE** | | **5,072** | **59** | **409** | **80** |
| Stream Export | | 0 | 430 | 0 | 0 |
| | *Discharge to Cope* | *548* | *450* | *335* | *610* |
| Evaporation | | 4,372 | 0 | 0 | 0 |
| Processing Losses | | 700 | 430 | 409 | 580 |
| **GROUNDWATER BASIN OVERFLOW** | | **0** | **530** | **0** | **0** |
| **TOTAL OUTFLOW** | | **27,999** | **483** | **18,364** | **660** |
| **NET IN 2021 WY** | | **-20,172** | **253** | **-6,939** | |

# TABLE 12-3
# HISTORICAL SALT LOADING (in tons)
# 1974 TO 2021 WATER YEARS

| SALT INFLOW COMPONENTS | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|
| **NATURAL STREAM RECHARGE** | **3,210** | **3,464** | **874** | **581** | **4,638** | **1,723** | **2,706** |
| **Total Arroyo Valle** | **1,018** | **1,041** | **391** | **315** | **957** | **707** | **777** |
| Flood releases recharge | 100 | 344 | 0 | 0 | 216 | 0 | 128 |
| Non Flood Natural Inflow | 918 | 697 | 391 | 315 | 741 | 707 | 649 |
| **Arroyo Mocho** | **1,717** | **2,043** | **293** | **76** | **3,206** | **636** | **1,358** |
| **Arroyo Las Positas** | **475** | **380** | **190** | **190** | **475** | **380** | **571** |
| **AV PRIOR RIGHTS** | **361** | **418** | **31** | **0** | **494** | **267** | **386** |
| **ARTIFICIAL STREAM RECHARGE** | **986** | **2,201** | **1,914** | **2,289** | **3,286** | **3,699** | **2,897** |
| Arroyo Valle | 293 | 1,174 | 509 | 883 | 1,427 | 1,599 | 1,234 |
| Arroyo Mocho | 340 | 497 | 875 | 876 | 1,350 | 1,570 | 1,432 |
| Arroyo Las Positas | 353 | 530 | 530 | 530 | 509 | 530 | 231 |
| **INJECTION WELL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **RAINFALL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **LEAKAGE** | **21** | **25** | **30** | **35** | **41** | **48** | **56** |
| **APPLIED WATER RECHARGE** | **7,670** | **7,218** | **9,123** | **10,675** | **8,352** | **8,304** | **7,175** |
| **SUBSURFACE BASIN INFLOW** | **2,038** | **2,038** | **2,058** | **3,648** | **2,506** | **2,017** | **1,325** |
| **NET INFLOW** | **14,286** | **15,364** | **14,030** | **17,228** | **19,317** | **16,058** | **14,545** |

| OUTFLOW COMPONENTS | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|
| **MUNICIPAL PUMPAGE** | **-7,217** | **-6,577** | **-5,074** | **-4,382** | **-4,579** | **-5,351** | **-4,458** |
| **Zone 7 Wells - Hop, Stone, COL** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **Zone 7 Wells - Mocho** | **-3,303** | **-2,057** | **-842** | **-201** | **-506** | **-532** | **-26** |
| *Demin Salts Exported from Valley* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Other Pumpage** | **-3,914** | **-4,520** | **-4,232** | **-4,181** | **-4,073** | **-4,819** | **-4,432** |
| **AGRICULTURAL PUMPAGE** | **-2,289** | **-1,476** | **-2,997** | **-3,241** | **-2,081** | **-2,420** | **-1,678** |
| **MINING USE** | **-1,126** | **-1,725** | **-802** | **-668** | **-869** | **-1,603** | **-2,508** |
| **Stream Export** | -745 | -1,345 | -422 | -287 | -489 | -1,223 | -2,127 |
| **Evaporation** | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Processing Losses** | -380 | -380 | -380 | -380 | -380 | -380 | -380 |
| **GROUNDWATER BASIN OVERFLOW** | **0** | **0** | **0** | **0** | **0** | **-173** | **-612** |
| **NET OUTFLOW** | **-10,632** | **-9,778** | **-8,873** | **-8,291** | **-7,529** | **-9,547** | **-9,256** |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| **NET SALT INFLOW (Tons)** | **3,654** | **5,586** | **5,157** | **8,937** | **11,788** | **6,511** | **5,289** |
| **CUMULATIVE SALT INFLOW (Tons)*** | **3,654** | **9,240** | **14,397** | **23,334** | **35,122** | **41,633** | **46,922** |

| TDS Concentration Calculations | 1974 | 1975 | 1976 | 1977 | 1978 | 1979 | 1980 |
|---|---|---|---|---|---|---|---|
| Net Basin Recharge (AF) | -478 | 5,508 | -4,311 | -5,953 | 11,942 | 6,394 | 8,103 |
| Basin Storage (HI Method)(AF) | 211,522 | 217,030 | 212,719 | 206,766 | 218,708 | 225,102 | 233,205 |
| Total Salt in Main Basin (tons) | 133,252 | 138,838 | 143,995 | 152,932 | 164,720 | 171,231 | 176,520 |
| **Main Basin TDS Concentration (mg/L)** | **464** | **471** | **498** | **544** | **554** | **560** | **557** |
| **Cumulative Increase in TDS Conc (mg/L)**** | **14** | **21** | **48** | **94** | **104** | **110** | **107** |

* Basinwide salt buildup since 1973

** Basinwide TDS concentration increase relative to 1973 value of 450 mg/L

# TABLE 12-3
# HISTORICAL SALT LOADING (in tons)
# 1974 TO 2021 WATER YEARS

| SALT INFLOW COMPONENTS | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|---|---|
| **NATURAL STREAM RECHARGE** | **1,513** | **4,803** | **7,657** | **5,286** | **3,058** | **4,941** | **2,852** | **2,610** | **2,782** | **2,480** |
| **Total Arroyo Valle** | **579** | **1,048** | **1,433** | **936** | **375** | **779** | **232** | **372** | **187** | **206** |
| Flood releases recharge | 0 | 271 | 624 | 20 | 0 | 415 | 0 | 0 | 0 | 0 |
| Non Flood Natural Inflow | 579 | 777 | 809 | 916 | 375 | 364 | 232 | 372 | 187 | 206 |
| **Arroyo Mocho** | **478** | **2,614** | **4,626** | **2,508** | **932** | **2,269** | **458** | **490** | **440** | **233** |
| **Arroyo Las Positas** | **456** | **1,141** | **1,598** | **1,842** | **1,751** | **1,893** | **2,162** | **1,748** | **2,155** | **2,041** |
| **AV PRIOR RIGHTS** | **251** | **502** | **381** | **236** | **328** | **286** | **283** | **325** | **356** | **125** |
| **ARTIFICIAL STREAM RECHARGE** | **3,238** | **1,617** | **184** | **0** | **0** | **0** | **0** | **525** | **1,585** | **1,809** |
| Arroyo Valle | 1,719 | 663 | 0 | 0 | 0 | 0 | 0 | 0 | 51 | 132 |
| Arroyo Mocho | 1,394 | 894 | 184 | 0 | 0 | 0 | 0 | 525 | 1,534 | 1,677 |
| Arroyo Las Positas | 125 | 60 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **INJECTION WELL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **RAINFALL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **LEAKAGE** | **65** | **74** | **84** | **94** | **105** | **115** | **125** | **136** | **147** | **158** |
| **APPLIED WATER RECHARGE** | **5,507** | **4,709** | **4,723** | **5,046** | **5,938** | **6,632** | **5,558** | **6,834** | **6,015** | **6,541** |
| **SUBSURFACE BASIN INFLOW** | **1,284** | **1,284** | **876** | **1,325** | **1,528** | **1,508** | **1,569** | **1,875** | **2,364** | **2,568** |
| **NET INFLOW** | **11,858** | **12,989** | **13,905** | **11,987** | **10,957** | **13,482** | **10,387** | **12,305** | **13,249** | **13,681** |

| OUTFLOW COMPONENTS | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|---|---|
| **MUNICIPAL PUMPAGE** | **-4,700** | **-4,748** | **-5,410** | **-5,525** | **-5,752** | **-6,465** | **-5,537** | **-6,662** | **-6,915** | **-7,185** |
| **Zone 7 Wells - Hop, Stone, COL** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **-54** | **-441** |
| **Zone 7 Wells - Mocho** | **0** | **0** | **-17** | **-227** | **-863** | **-869** | **-326** | **-1,425** | **-2,082** | **-1,683** |
| *Demin Salts Exported from Valley* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Other Pumpage** | **-4,700** | **-4,748** | **-5,393** | **-5,298** | **-4,889** | **-5,595** | **-5,211** | **-5,237** | **-4,779** | **-5,062** |
| **AGRICULTURAL PUMPAGE** | **-1,553** | **-844** | **-912** | **-1,015** | **-1,378** | **-1,428** | **-998** | **-1,043** | **-776** | **-944** |
| **MINING USE** | **-4,372** | **-4,161** | **-7,834** | **-2,857** | **-2,814** | **-6,011** | **-839** | **-2,301** | **-1,728** | **-918** |
| **Stream Export** | -3,992 | -3,781 | -7,454 | -2,476 | -2,433 | -5,535 | -364 | -1,825 | -1,253 | -443 |
| **Evaporation** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Processing Losses** | -380 | -380 | -380 | -380 | -380 | -475 | -475 | -475 | -475 | -475 |
| **GROUNDWATER BASIN OVERFLOW** | **-635** | **-2,494** | **-3,418** | **-2,587** | **-1,386** | **-693** | **-693** | **-462** | **-122** | **0** |
| **NET OUTFLOW** | **-11,260** | **-12,247** | **-17,574** | **-11,984** | **-11,330** | **-14,597** | **-8,067** | **-10,468** | **-9,541** | **-9,047** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **NET SALT INFLOW (Tons)** | **598** | **742** | **-3,669** | **3** | **-373** | **-1,115** | **2,320** | **1,837** | **3,708** | **4,634** |
| **CUMULATIVE SALT INFLOW (Tons)*** | **47,520** | **48,262** | **44,593** | **44,596** | **44,223** | **43,108** | **45,428** | **47,265** | **50,973** | **55,607** |

| TDS Concentration Calculations | 1981 | 1982 | 1983 | 1984 | 1985 | 1986 | 1987 | 1988 | 1989 | 1990 |
|---|---|---|---|---|---|---|---|---|---|---|
| Net Basin Recharge (AF) | -528 | 11,593 | 9,192 | -4,203 | -9,722 | -1,684 | -7,906 | -9,106 | -4,973 | -5,692 |
| Basin Storage (HI Method)(AF) | 232,677 | 244,270 | 253,462 | 249,259 | 239,537 | 237,853 | 229,947 | 220,841 | 215,868 | 210,176 |
| Total Salt in Main Basin (tons) | 177,118 | 177,860 | 174,191 | 174,194 | 173,821 | 172,706 | 175,026 | 176,863 | 180,571 | 185,205 |
| **Main Basin TDS Concentration (mg/L)** | **560** | **536** | **506** | **514** | **534** | **535** | **560** | **590** | **616** | **649** |
| **Cumulative Increase in TDS Conc (mg/L)**** | **110** | **86** | **56** | **64** | **84** | **85** | **110** | **140** | **166** | **199** |

* Basinwide salt buildup since 1973

** Basinwide TDS concentration increase relative to 1973 value of 450 mg/L

# TABLE 12-3
# HISTORICAL SALT LOADING (in tons)
# 1974 TO 2021 WATER YEARS

| SALT INFLOW COMPONENTS | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|
| **NATURAL STREAM RECHARGE** | **3,356** | **3,665** | **5,743** | **2,544** | **4,376** | **4,331** | **4,639** | **5,704** | **3,727** | **3,409** |
| **Total Arroyo Valle** | **575** | **743** | **1,083** | **300** | **1,034** | **400** | **1,450** | **1,661** | **1,361** | **956** |
| Flood releases recharge | 98 | 0 | 528 | 0 | 472 | 336 | 183 | 524 | 0 | 55 |
| Non Flood Natural Inflow | 477 | 743 | 555 | 300 | 562 | 64 | 1,267 | 1,137 | 1,361 | 901 |
| **Arroyo Mocho** | **1,023** | **814** | **2,174** | **995** | **1,580** | **2,627** | **1,741** | **2,292** | **996** | **857** |
| **Arroyo Las Positas** | **1,758** | **2,108** | **2,486** | **1,249** | **1,762** | **1,304** | **1,448** | **1,751** | **1,370** | **1,596** |
| **AV PRIOR RIGHTS** | **290** | **151** | **276** | **321** | **306** | **87** | **93** | **188** | **149** | **175** |
| **ARTIFICIAL STREAM RECHARGE** | **1,590** | **410** | **1,953** | **2,795** | **1,026** | **491** | **1,325** | **500** | **1,352** | **2,276** |
| Arroyo Valle | 36 | 185 | 385 | 293 | 49 | 31 | 472 | 107 | 321 | 242 |
| Arroyo Mocho | 1,554 | 225 | 1,568 | 2,502 | 977 | 460 | 853 | 393 | 1,031 | 2,034 |
| Arroyo Las Positas | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **INJECTION WELL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **204** | **497** | **498** |
| **RAINFALL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **LEAKAGE** | **169** | **181** | **193** | **206** | **220** | **234** | **248** | **263** | **279** | **294** |
| **APPLIED WATER RECHARGE** | **6,918** | **5,793** | **5,109** | **4,989** | **3,323** | **4,071** | **4,887** | **4,367** | **3,479** | **4,314** |
| **SUBSURFACE BASIN INFLOW** | **3,423** | **3,199** | **2,710** | **2,221** | **2,017** | **1,875** | **1,386** | **1,651** | **1,528** | **1,846** |
| **NET INFLOW** | **15,746** | **13,399** | **15,984** | **13,076** | **11,268** | **11,089** | **12,578** | **12,877** | **11,011** | **12,812** |

| OUTFLOW COMPONENTS | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|
| **MUNICIPAL PUMPAGE** | **-11,014** | **-8,752** | **-6,072** | **-3,867** | **-2,681** | **-3,874** | **-5,192** | **-6,468** | **-6,101** | **-8,560** |
| **Zone 7 Wells - Hop, Stone, COL** | **-1,679** | **-1,185** | **-859** | **-85** | **-87** | **-754** | **-270** | **-475** | **-2,362** | **-2,553** |
| **Zone 7 Wells - Mocho** | **-3,313** | **-2,111** | **-609** | **-24** | **-125** | **-767** | **-682** | **-397** | **-167** | **-783** |
| *Demin Salts Exported from Valley* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **Other Pumpage** | **-6,023** | **-5,455** | **-4,604** | **-3,757** | **-2,469** | **-2,353** | **-4,240** | **-5,596** | **-3,572** | **-5,224** |
| **AGRICULTURAL PUMPAGE** | **-249** | **-236** | **-142** | **-130** | **-88** | **-130** | **-155** | **-47** | **-46** | **-188** |
| **MINING USE** | **-970** | **-1,007** | **-2,134** | **-4,928** | **-6,883** | **-7,507** | **-9,983** | **-9,588** | **-8,642** | **-5,792** |
| **Stream Export** | -495 | -532 | -1,658 | -4,453 | -6,408 | -7,041 | -9,460 | -9,084 | -8,081 | -5,316 |
| **Evaporation** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Processing Losses** | -475 | -475 | -475 | -475 | -475 | -466 | -523 | -504 | -561 | -475 |
| **GROUNDWATER BASIN OVERFLOW** | **0** | **0** | **0** | **0** | **-226** | **-968** | **-960** | **-998** | **-482** | **-175** |
| **NET OUTFLOW** | **-12,233** | **-9,995** | **-8,348** | **-8,925** | **-9,878** | **-12,479** | **-16,290** | **-17,101** | **-15,271** | **-14,715** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **NET SALT INFLOW (Tons)** | **3,513** | **3,404** | **7,636** | **4,151** | **1,390** | **-1,390** | **-3,712** | **-4,224** | **-4,260** | **-1,903** |
| **CUMULATIVE SALT INFLOW (Tons)*** | **59,120** | **62,524** | **70,160** | **74,311** | **75,701** | **74,311** | **70,599** | **66,375** | **62,115** | **60,212** |

| TDS Concentration Calculations | 1991 | 1992 | 1993 | 1994 | 1995 | 1996 | 1997 | 1998 | 1999 | 2000 |
|---|---|---|---|---|---|---|---|---|---|---|
| Net Basin Recharge (AF) | -8,389 | -6,628 | 14,974 | 592 | 13,031 | 1,873 | -1,390 | 2,511 | -4,911 | -3,674 |
| Basin Storage (HI Method)(AF) | 201,787 | 195,159 | 210,133 | 210,725 | 223,756 | 225,629 | 224,239 | 226,750 | 221,839 | 218,165 |
| Total Salt in Main Basin (tons) | 188,718 | 192,122 | 199,758 | 203,909 | 205,299 | 203,909 | 200,197 | 195,973 | 191,713 | 189,810 |
| **Main Basin TDS Concentration (mg/L)** | **688** | **725** | **700** | **712** | **675** | **665** | **657** | **636** | **636** | **640** |
| **Cumulative Increase in TDS Conc (mg/L)**** | **238** | **275** | **250** | **262** | **225** | **215** | **207** | **186** | **186** | **190** |

* Basinwide salt buildup since 1973

** Basinwide TDS concentration increase relative to 1973 value of 450 mg/L

# TABLE 12-3
# HISTORICAL SALT LOADING (in tons)
# 1974 TO 2021 WATER YEARS

| SALT INFLOW COMPONENTS | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| **NATURAL STREAM RECHARGE** | **3,666** | **3,267** | **7,097** | **3,105** | **5,796** | **4,962** | **3,260** | **4,078** | **4,367** | **5,080** |
| **Total Arroyo Valle** | **1,823** | **1,399** | **2,833** | **1,081** | **3,652** | **2,274** | **1,450** | **2,691** | **2,554** | **2,974** |
| Flood releases recharge | 0 | 193 | 302 | 0 | 731 | 0 | 0 | 327 | 0 | 1,383 |
| Non Flood Natural Inflow | 1,823 | 1,206 | 2,531 | 1,081 | 2,921 | 2,274 | 1,450 | 2,364 | 2,554 | 1,591 |
| **Arroyo Mocho** | **575** | **886** | **2,996** | **838** | **1,241** | **1,813** | **839** | **380** | **540** | **1,211** |
| **Arroyo Las Positas** | **1,268** | **982** | **1,268** | **1,186** | **903** | **875** | **971** | **1,007** | **1,273** | **895** |
| **AV PRIOR RIGHTS** | **224** | **399** | **416** | **383** | **80** | **524** | **219** | **100** | **407** | **0** |
| **ARTIFICIAL STREAM RECHARGE** | **1,351** | **3,503** | **2,811** | **2,480** | **1,949** | **1,266** | **1,359** | **727** | **1,248** | **1,690** |
| Arroyo Valle | 501 | 647 | 399 | 476 | 619 | 330 | 782 | 727 | 686 | 635 |
| Arroyo Mocho | 839 | 2,855 | 2,412 | 2,004 | 1,300 | 914 | 577 | 0 | 562 | 1,055 |
| Arroyo Las Positas | 11 | 1 | 0 | 0 | 30 | 22 | 0 | 0 | 0 | 0 |
| **INJECTION WELL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| **RAINFALL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| *Lake Recharge* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* |
| **LEAKAGE** | **313** | **333** | **352** | **372** | **393** | **414** | **436** | **458** | **481** | **504** |
| **APPLIED WATER RECHARGE** | **5,074** | **5,606** | **4,618** | **5,090** | **4,824** | **3,223** | **5,157** | **6,258** | **6,152** | **5,079** |
| **SUBSURFACE BASIN INFLOW** | **1,970** | **1,970** | **1,970** | **1,970** | **2,513** | **2,309** | **2,174** | **2,214** | **2,106** | **1,997** |
| **NET INFLOW** | **12,598** | **15,078** | **17,264** | **13,400** | **15,555** | **12,698** | **12,605** | **13,835** | **14,761** | **14,350** |

| OUTFLOW COMPONENTS | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| **MUNICIPAL PUMPAGE** | **-10,467** | **-12,061** | **-11,096** | **-12,419** | **-10,057** | **-5,557** | **-8,423** | **-9,271** | **-14,577** | **-12,609** |
| **Zone 7 Wells - Hop, Stone, COL** | **-3,867** | **-3,690** | **-3,360** | **-4,198** | **-1,858** | **-1,382** | **-1,340** | **-3,217** | **-3,920** | **-1,290** |
| **Zone 7 Wells - Mocho** | **-1,745** | **-3,322** | **-2,271** | **-3,762** | **-3,003** | **-1,170** | **-1,976** | **-1,402** | **-5,448** | **-6,563** |
| *Demin Salts Exported from Valley* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *0* | *-798* | *2,759* |
| **Other Pumpage** | **-4,855** | **-5,049** | **-5,465** | **-4,459** | **-5,196** | **-3,005** | **-5,107** | **-4,651** | **-5,208** | **-4,756** |
| **AGRICULTURAL PUMPAGE** | **-182** | **-94** | **-73** | **-79** | **-80** | **-46** | **-43** | **-68** | **-68** | **-73** |
| **MINING USE** | **-4,520** | **-475** | **-276** | **-438** | **-454** | **-658** | **-584** | **-714** | **-1,341** | **-1,428** |
| **Stream Export** | -4,006 | -111 | 0 | -84 | -94 | -218 | -274 | -305 | -913 | -1,057 |
| **Evaporation** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Processing Losses** | -514 | -364 | -276 | -354 | -360 | -440 | -310 | -409 | -428 | -371 |
| **GROUNDWATER BASIN OVERFLOW** | **0** | **0** | **0** | **0** | **0** | **0** | **-738** | **-1,080** | **-171** | **0** |
| **NET OUTFLOW** | **-15,169** | **-12,630** | **-11,445** | **-12,936** | **-10,591** | **-6,261** | **-9,788** | **-11,133** | **-16,157** | **-14,110** |

| | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| **NET SALT INFLOW (Tons)** | **-2,571** | **2,448** | **5,819** | **464** | **4,964** | **6,437** | **2,817** | **2,702** | **-1,396** | **240** |
| **CUMULATIVE SALT INFLOW (Tons)*** | **57,641** | **60,089** | **65,908** | **66,372** | **71,336** | **77,773** | **80,590** | **83,292** | **81,896** | **82,136** |

| TDS Concentration Calculations | 2001 | 2002 | 2003 | 2004 | 2005 | 2006 | 2007 | 2008 | 2009 | 2010 |
|---|---|---|---|---|---|---|---|---|---|---|
| Net Basin Recharge (AF) | -11,666 | 62 | 8,309 | -4,560 | 13,193 | 8,790 | -3,639 | -3,011 | -4,997 | 4,290 |
| Basin Storage (HI Method)(AF) | 206,499 | 206,561 | 214,870 | 210,310 | 223,503 | 232,293 | 228,654 | 225,643 | 220,646 | 224,936 |
| Total Salt in Main Basin (tons) | 187,239 | 189,687 | 195,506 | 195,970 | 200,934 | 207,371 | 210,188 | 212,890 | 211,494 | 211,734 |
| **Main Basin TDS Concentration (mg/L)** | **667** | **676** | **670** | **686** | **662** | **657** | **677** | **695** | **706** | **693** |
| **Cumulative Increase in TDS Conc (mg/L)**** | **217** | **226** | **220** | **236** | **212** | **207** | **227** | **245** | **256** | **243** |

* Basinwide salt buildup since 1973

** Basinwide TDS concentration increase relative to 1973 value of 450 mg/L

# TABLE 12-3
# HISTORICAL SALT LOADING (in tons)
# 1974 TO 2021 WATER YEARS

| SALT INFLOW COMPONENTS | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | AVG | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NATURAL STREAM RECHARGE** | **5,459** | **2,026** | **2,242** | **1,820** | **3,735** | **3,366** | **4,948** | **1,315** | **3,499** | **1,952** | **1,599** | **3,611** | **173,311** |
| **Total Arroyo Valle** | **3,039** | **553** | **963** | **356** | **1,664** | **1,620** | **2,392** | **249** | **1,153** | **285** | **273** | **1,171** | **56,194** |
| Flood releases recharge | 150 | 0 | 0 | 0 | 0 | 0 | 404 | 0 | 16 | 0 | 0 | 163 | 7,820 |
| Non Flood Natural Inflow | 2,889 | 553 | 963 | 356 | 1,664 | 1,620 | 1,988 | 249 | 1,137 | 285 | 273 | 1,008 | 48,374 |
| **Arroyo Mocho** | **2,056** | **949** | **751** | **973** | **1,472** | **945** | **1,882** | **430** | **1,648** | **834** | **391** | **1,315** | **63,126** |
| **Arroyo Las Positas** | **364** | **524** | **528** | **491** | **599** | **801** | **674** | **636** | **698** | **833** | **935** | **1,125** | **53,991** |
| **AV PRIOR RIGHTS** | **384** | **196** | **409** | **3** | **395** | **288** | **91** | **208** | **249** | **249** | **168** | **260** | **12,458** |
| **ARTIFICIAL STREAM RECHARGE** | **882** | **2,851** | **2,519** | **1,483** | **1,689** | **2,571** | **2,046** | **1,494** | **558** | **675** | **87** | **1,566** | **75,187** |
| Arroyo Valle | 167 | 1,178 | 573 | 339 | 1,667 | 1,299 | 667 | 924 | 442 | 556 | 87 | 531 | 25,506 |
| Arroyo Mocho | 698 | 1,649 | 1,943 | 1,120 | 0 | 1,272 | 1,379 | 570 | 116 | 119 | 0 | 961 | 46,129 |
| Arroyo Las Positas | 17 | 24 | 3 | 24 | 22 | 0 | 0 | 0 | 0 | 0 | 0 | 74 | 3,552 |
| **INJECTION WELL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **25** | **1,199** |
| **RAINFALL RECHARGE** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **0** |
| *Lake Recharge* | *0* | *0* | *0* | *1,603* | *2,736* | *3,641* | *6,743* | *8,295* | *6,864* | *3,979* | *299* | *712* | *34,160* |
| **LEAKAGE** | **527** | **551** | **403** | **600** | **625** | **651** | **677** | **703** | **778** | **821** | **848** | **310** | **14,886** |
| **APPLIED WATER RECHARGE** | **4,295** | **6,074** | **8,158** | **5,654** | **6,505** | **5,251** | **4,421** | **5,707** | **5,625** | **6,638** | **6,604** | **5,818** | **279,283** |
| **SUBSURFACE BASIN INFLOW** | **2,024** | **2,092** | **448** | **1,834** | **2,051** | **2,078** | **2,106** | **2,078** | **2,187** | **2,201** | **2,119** | **2,002** | **96,078** |
| **NET INFLOW** | **13,571** | **13,790** | **14,179** | **11,394** | **15,000** | **14,205** | **14,289** | **11,505** | **12,896** | **12,536** | **11,425** | **13,592** | **652,402** |

| OUTFLOW COMPONENTS | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | AVERAGE | TOTAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **MUNICIPAL PUMPAGE** | **-9,873** | **-16,765** | **-12,781** | **-11,831** | **-6,080** | **-6,194** | **-7,635** | **-8,700** | **-10,427** | **-12,388** | **-17,857** | **-10,500** | **-356,958** |
| **Zone 7 Wells - Hop, Stone, COL** | **-1,197** | **-2,785** | **-3,595** | **-2,639** | **-870** | **-750** | **-1,107** | **-1,938** | **-1,982** | **-4,441** | **-6,420** | **-2,642** | **-60,760** |
| **Zone 7 Wells - Mocho** | **-4,040** | **-8,204** | **-3,997** | **-3,713** | **-1,080** | **-666** | **-2,200** | **-2,642** | **-4,895** | **-4,890** | **-6,961** | **-3,241** | **-74,536** |
| *Demin Salts Exported from Valley* | *2,006* | *4,064* | *2,479* | *1,047* | *76* | *183* | *949* | *1,168* | *1,869* | *1,231* | *449* | *364* | *17,482* |
| **Other Pumpage** | **-4,625** | **-5,766** | **-5,179** | **-5,583** | **-4,128** | **-4,779** | **-4,326** | **-4,120** | **-3,549** | **-3,057** | **-4,476** | **-4,618** | **-221,662** |
| **AGRICULTURAL PUMPAGE** | **-68** | **-77** | **-393** | **-515** | **-490** | **-92** | **-84** | **-87** | **-101** | **-97** | **-98** | **-654** | **-31,393** |
| **MINING USE** | **-2,756** | **-3,064** | **-3,042** | **-502** | **-417** | **-378** | **-364** | **-388** | **-368** | **-363** | **-409** | **-3,357** | **-161,119** |
| **Stream Export** | -2,368 | -2,665 | -2,655 | -442 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | -2,165 | -103,914 |
| **Evaporation** | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| **Processing Losses** | -388 | -399 | -387 | -364 | -417 | -378 | -364 | -388 | -372 | -363 | -409 | -414 | -19,894 |
| **GROUNDWATER BASIN OVERFLOW** | **0** | **0** | **0** | **0** | **0** | **0** | **0** | **-506** | **-758** | **-113** | **0** | **-426** | **-20,450** |
| **NET OUTFLOW** | **-12,697** | **-19,906** | **-16,216** | **-12,848** | **-6,987** | **-6,664** | **-8,083** | **-9,681** | **-11,654** | **-12,961** | **-18,364** | **-11,699** | **-561,537** |

| | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **NET SALT INFLOW (Tons)** | **874** | **-6,116** | **-2,037** | **-1,454** | **8,013** | **7,541** | **6,206** | **1,824** | **1,242** | **-425** | **-6,939** | **1,893** | **90,865** |
| **CUMULATIVE SALT INFLOW (Tons)*** | **83,010** | **76,894** | **74,857** | **73,403** | **81,416** | **88,957** | **95,163** | **96,987** | **98,229** | **97,804** | **90,865** | | |

| TDS Concentration Calculations | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Net Basin Recharge (AF) | 6,893 | -10,438 | -5,542 | -12,153 | 6,037 | 15,405 | 25,259 | 285 | 4,482 | -7,921 | -20,172 |
| Basin Storage (HI Method)(AF) | 231,829 | 221,391 | 215,849 | 203,696 | 209,733 | 225,138 | 250,397 | 250,682 | 255,164 | 247,243 | 227,071 |
| Total Salt in Main Basin (tons) | 212,608 | 206,492 | 204,455 | 203,001 | 211,014 | 218,555 | 224,761 | 226,585 | 227,827 | 227,402 | 220,463 |
| **Main Basin TDS Concentration (mg/L)** | **675** | **687** | **697** | **734** | **741** | **715** | **661** | **665** | **657** | **677** | **715** |
| **Cumulative Increase in TDS Conc (mg/L)**** | **225** | **237** | **247** | **284** | **291** | **265** | **211** | **215** | **207** | **227** | **265** |

* Basinwide salt buildup since 1973

** Basinwide TDS concentration increase relative to 1973 value of 450 mg/L

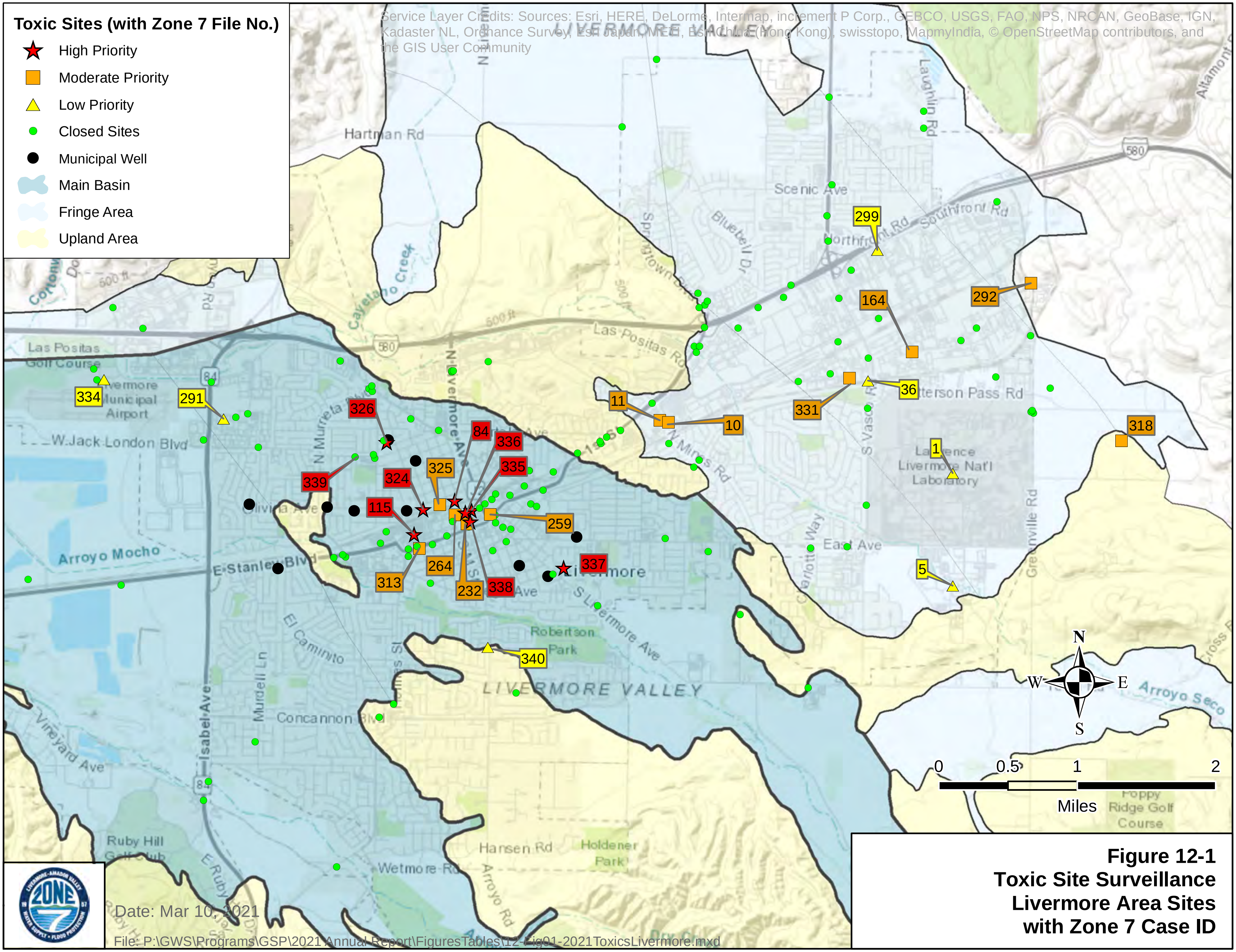



**Figure 12-1**
**Toxic Site Surveillance**
**Livermore Area Sites**
**with Zone 7 Case ID**

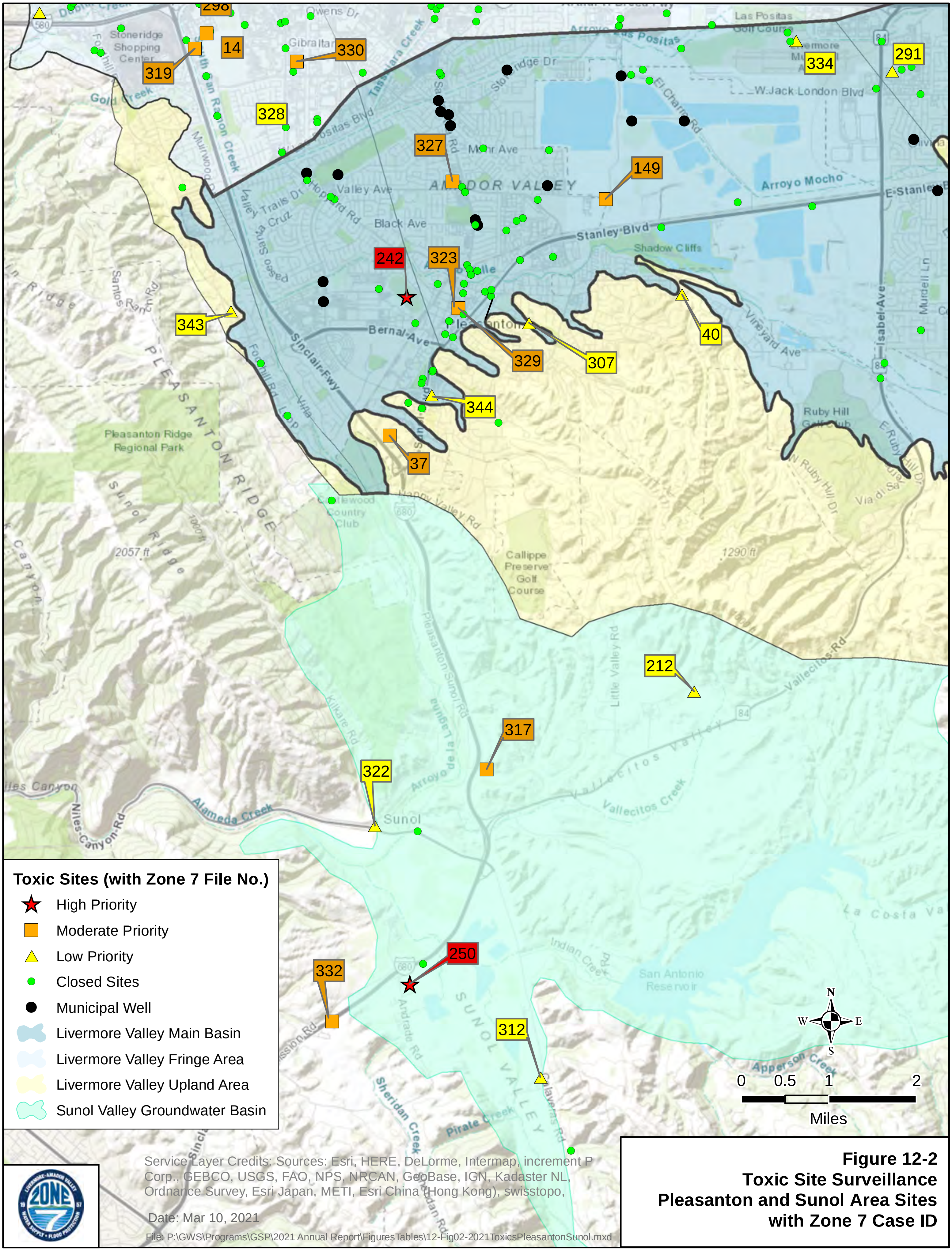
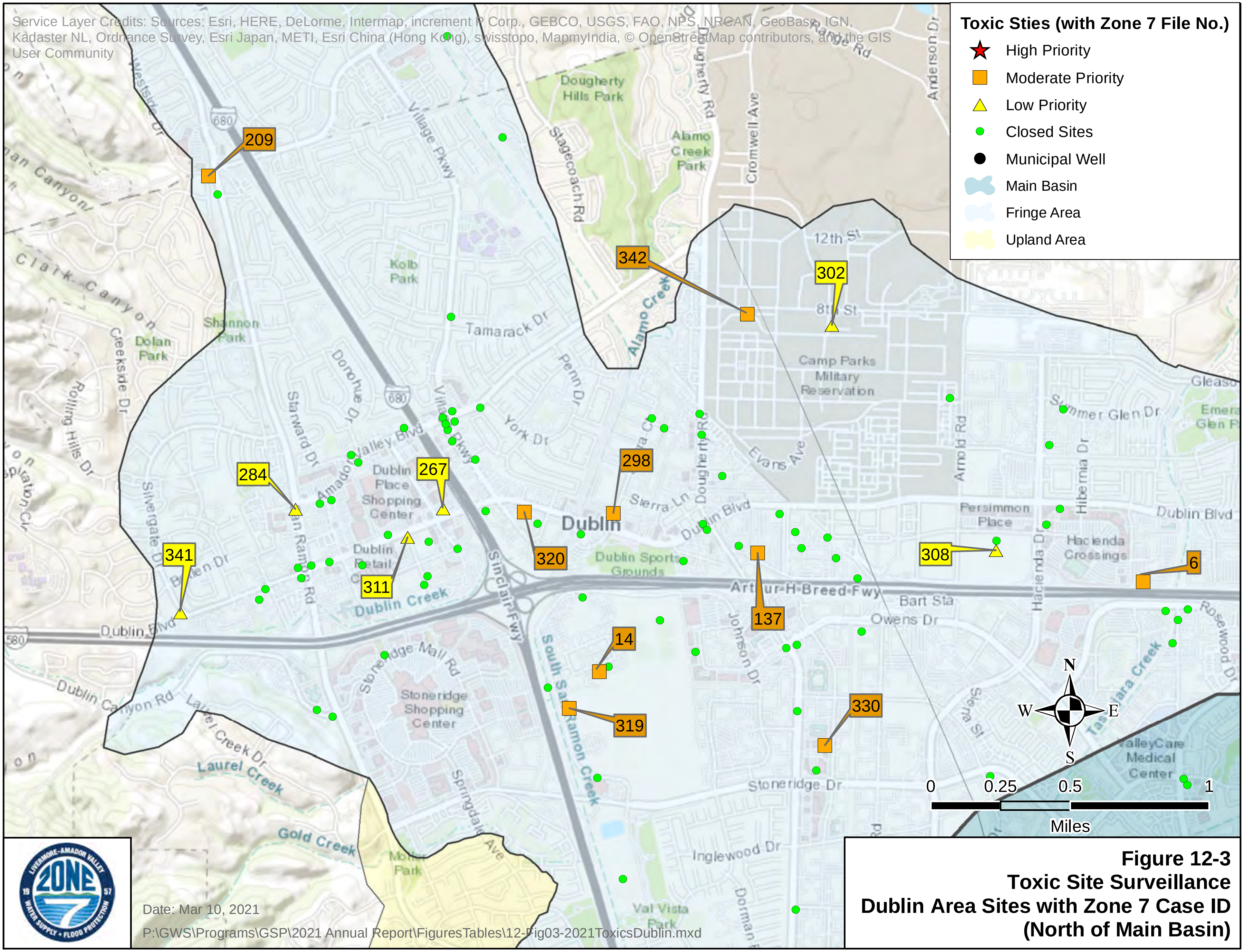



**Figure 12-2**
**Toxic Site Surveillance**
**Pleasanton and Sunol Area Sites**
**with Zone 7 Case ID**




Date: Mar 10, 2021

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**Figure 12-3**
**Toxic Site Surveillance**
**Dublin Area Sites with Zone 7 Case ID**
**(North of Main Basin)**

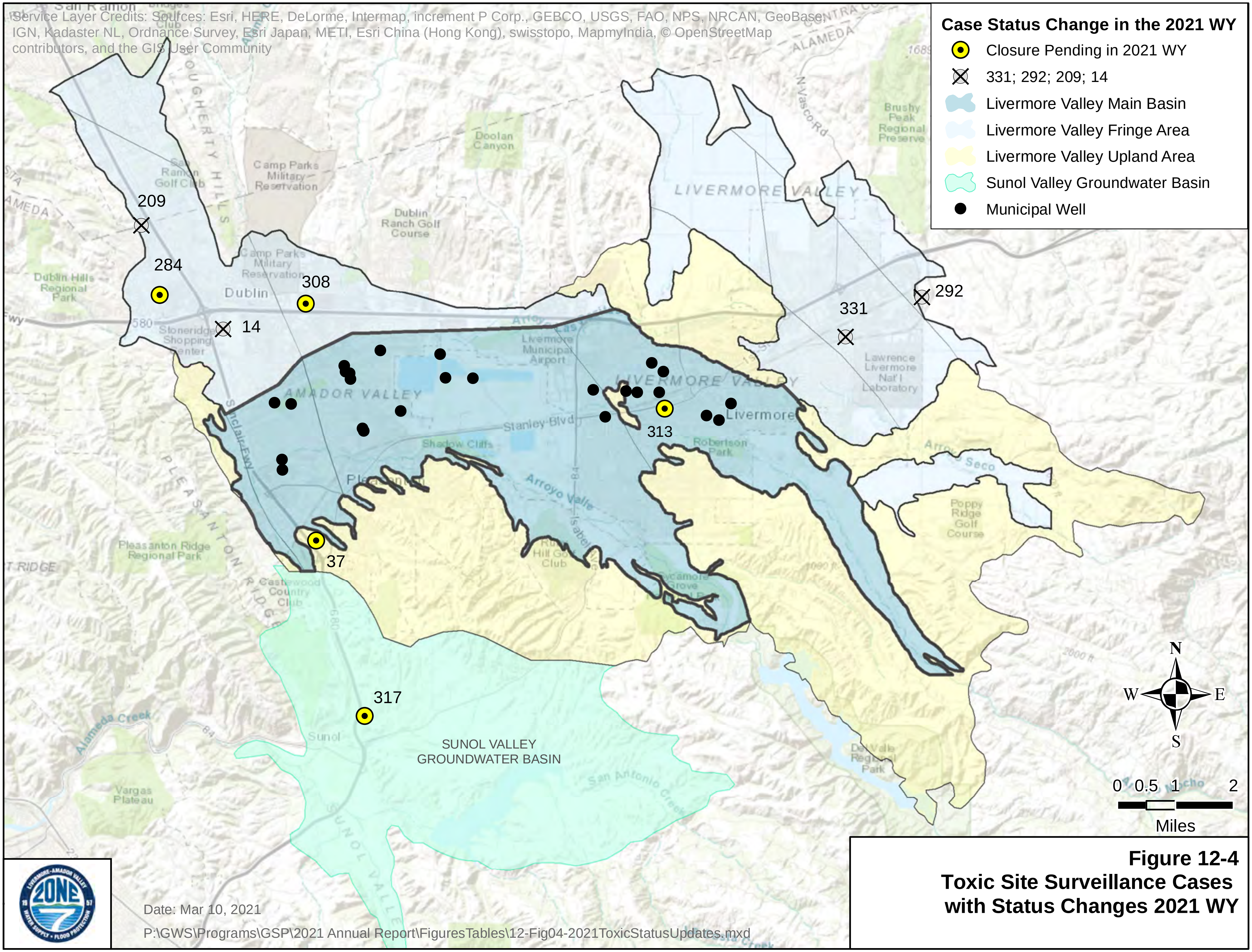
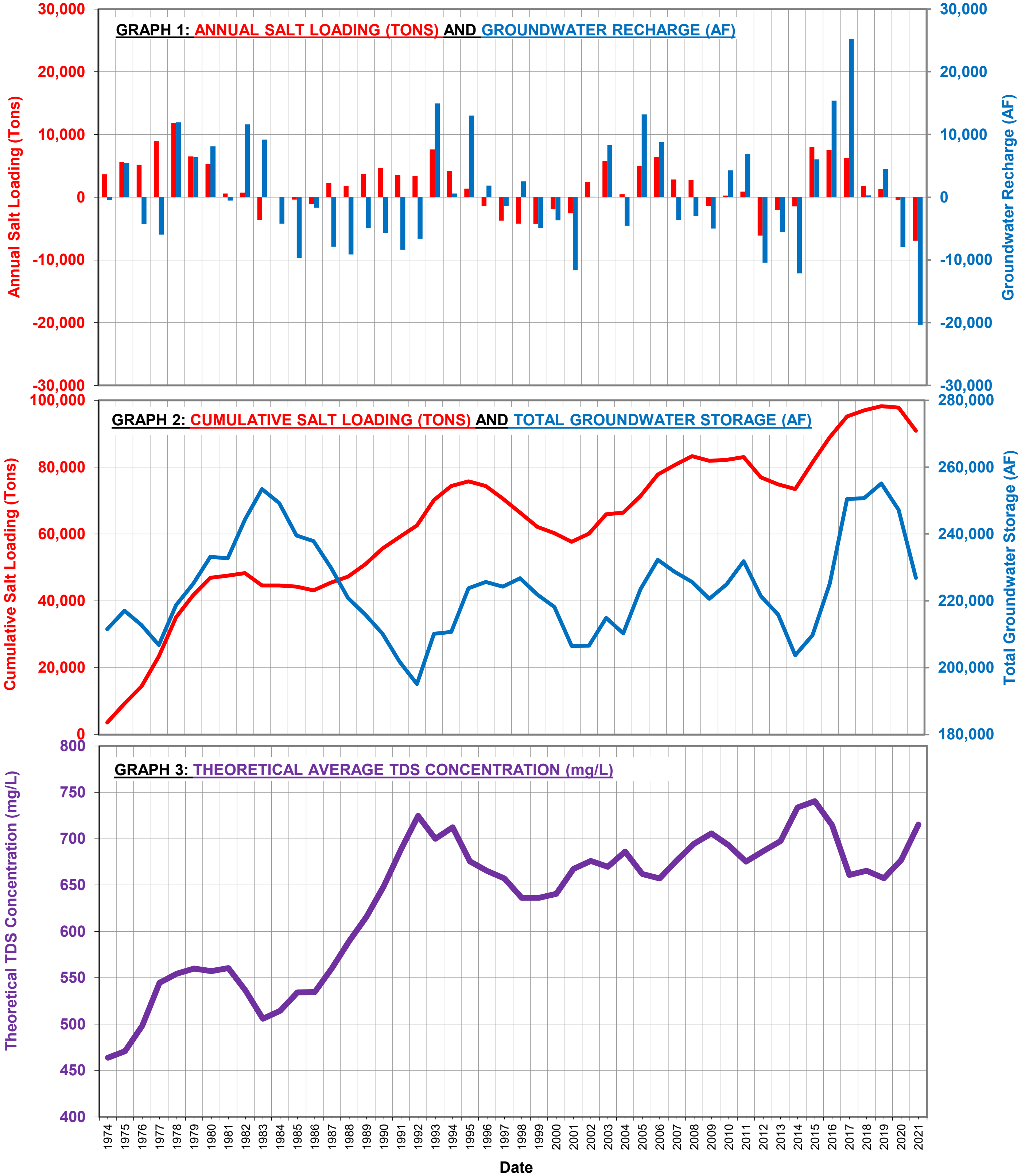



**Figure 12-4**
**Toxic Site Surveillance Cases with Status Changes 2021 WY**

# FIGURE 12-5
# MAIN BASIN SALT LOADING AND TDS CONCENTRATION
# 1974 to 2021 WATER YEARS

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4/15/2022

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