FINAL REPORT | APRIL 2022

Elsinore Valley Subbasin 2021 Annual Report

PREPARED PURSUANT TO

Sustainable Groundwater Management Act

PREPARED FOR

Elsinore Valley Groundwater Sustainability Agency

PREPARED BY

WEST YOST
Water. Engineered.

Elsinore Valley Subbasin
2021 Annual Report

Prepared for

Elsinore Valley Groundwater Sustainability Agency

Project No. 836-80-21-09

REGISTERED PROFESSIONAL ENGINEER
CAROLINA SANCHEZ
No. C85598
Exp. 9-30-22
CIVIL
STATE OF CALIFORNIA

Project Manager: Carolina Sanchez	04-01-22 Date
QA/QC Review: Samantha Adams	04-01-22 Date

WEST YOST
Water. Engineered.

FINAL REPORT | APRIL 2022

Table of Contents

Table of Contents

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS AND ABBREVIATIONS

af	Acre-Feet
afy	Acre-Feet Per Year
Annual Report	Annual Report for The Elsinore Valley Groundwater Subbasin
Basin	Elsinore Valley Groundwater Subbasin
Basin Plan	Santa Ana River Basin
CCR	California Code of Regulations
CDFM	Cumulative Departure from Mean
CIMIS	California Irrigation Management Information System Station
CWC	California Water Code
DDW	State Department of Drinking Water
DWR	California Department of Water Resources
EMWD	Eastern Municipal Water District
ET	Evapotranspiration
ETo	Reference Evapotranspiration
EVGSA	Elsinore Valley Groundwater Sustainability Agency
EVMWD	Elsinore Valley Municipal Water District
GIS	Geographic Information System
GSP	Groundwater Sustainability Plan
GWE	Groundwater Elevation
GWMP	Groundwater Management Plan
MA	Management Area
mg/L	Milligrams Per Liter

MO	Measurable Objectives
MT	Minimum Thresholds
MWDSC	Metropolitan Water District of Southern California
NOAA	National Oceanic and Atmospheric Administration
OAL	Office of Administrative Law
PMA	Project Management Actions
QA/QC	Quality Assurance and Quality Control
Regional Board	Regional Water Quality Control Board – Santa Ana Region
SARW	Santa Ana River Watershed
SGMA	Sustainable Groundwater Management Act
SMC	Sustainable Management Criteria
SNMP	Salt And Nutrient Management Plan
State Board	State Water Resources Control Board
TDS	Total Dissolved Solids
TVP	Temescal Valley Pipeline
USFS	United States Forest Service
USGS	U.S. Geological Survey
WMWD	Western Municipal Water District
WRF	Water Reclamation Facilities
WTP	Water Treatment Plant
WY	Water Year

EXECUTIVE SUMMARY

This 2021 Annual Report (Annual Report) for the Elsinore Valley Subbasin (Annual Report) has been prepared for submittal to the California State Department of Water Resources (DWR) pursuant to the requirements of the Sustainable Groundwater Management Act (SGMA), specifically Article 7, Section 356.2—Annual Reports, of the California Code of Regulations (CCR).[1] This report was prepared by the Elsinore Valley Groundwater Sustainability Agency (EVGSA), which was formed by the only member of the EVGSA, Elsinore Valley Municipal Water District (EVMWD), in January, 2017, and is responsible for managing the Elsinore Valley Subbasin (Basin). The Basin Groundwater Sustainability Plan (GSP) was adopted on July 7, 2021 and a public hearing was held on December 16, 2021. The Basin GSP was submitted to DWR for review on January 26, 2022.

The GSP includes the scientific and other background information about the Basin required by SGMA and provides a roadmap for how sustainability is to be achieved, including through projects and management actions (PMAs), monitoring and analysis, and establishment of sustainable management criteria (e.g. sustainability indicators, minimum thresholds, and measurable objectives) to track progress over time. Completion of the GSP represents a key milestone in achieving groundwater sustainability by 2040.

SGMA regulations require that an annual report be submitted to the DWR by April 1 of each year following the adoption of the GSP or Alternative Plan. This is the first Annual Report for the Basin which provides an update on the groundwater conditions as of Water Year (WY) 2021 (October 1, 2020 through September 30, 2021). The Plan Area for the purposes of the GSP and this Annual Report is defined as DWR Basin No. 8-004.1: the Elsinore Valley Subbasin, which is shown in Figure 1.

Table 1 is the reference guide that illustrates where each of the required annual reporting elements described in CCR Article 7, Section 356.2 can be found within this report. The following is a summary of the key information and findings presented in this Annual Report.

Section 1 – Introduction. This section provides background information on the Plan Area, important elements of the GSP, including an overview of the sustainable management criteria, sustainability indicators, minimum thresholds, measurable objectives, and identified PMAs.

Section 2 – Data Collection and Monitoring. This section describes the EVMWD's monitoring programs and the data collected in WY 2021. The data collected include climate, surface water, and groundwater data. This section also presents the climate and surface water data for WY 2021.

Section 3 – Current Groundwater Conditions. This section describes the current Basin groundwater level conditions as of WY 2021, as specified by the SGMA regulations (see Table 1). The assessment of Basin conditions includes characterization of groundwater level trends based on time history charts at all wells and a comparison of spring 2021 water levels with the minimum thresholds, measurable objectives, and 2025 interim milestones for the key indicator wells defined in the GSP; and the development of groundwater elevation contours for spring 2019, 2020, and 2021, and fall 2021. Inspection of the data presented in Section 3 indicates that the rate of decline in groundwater levels in the Basin has been

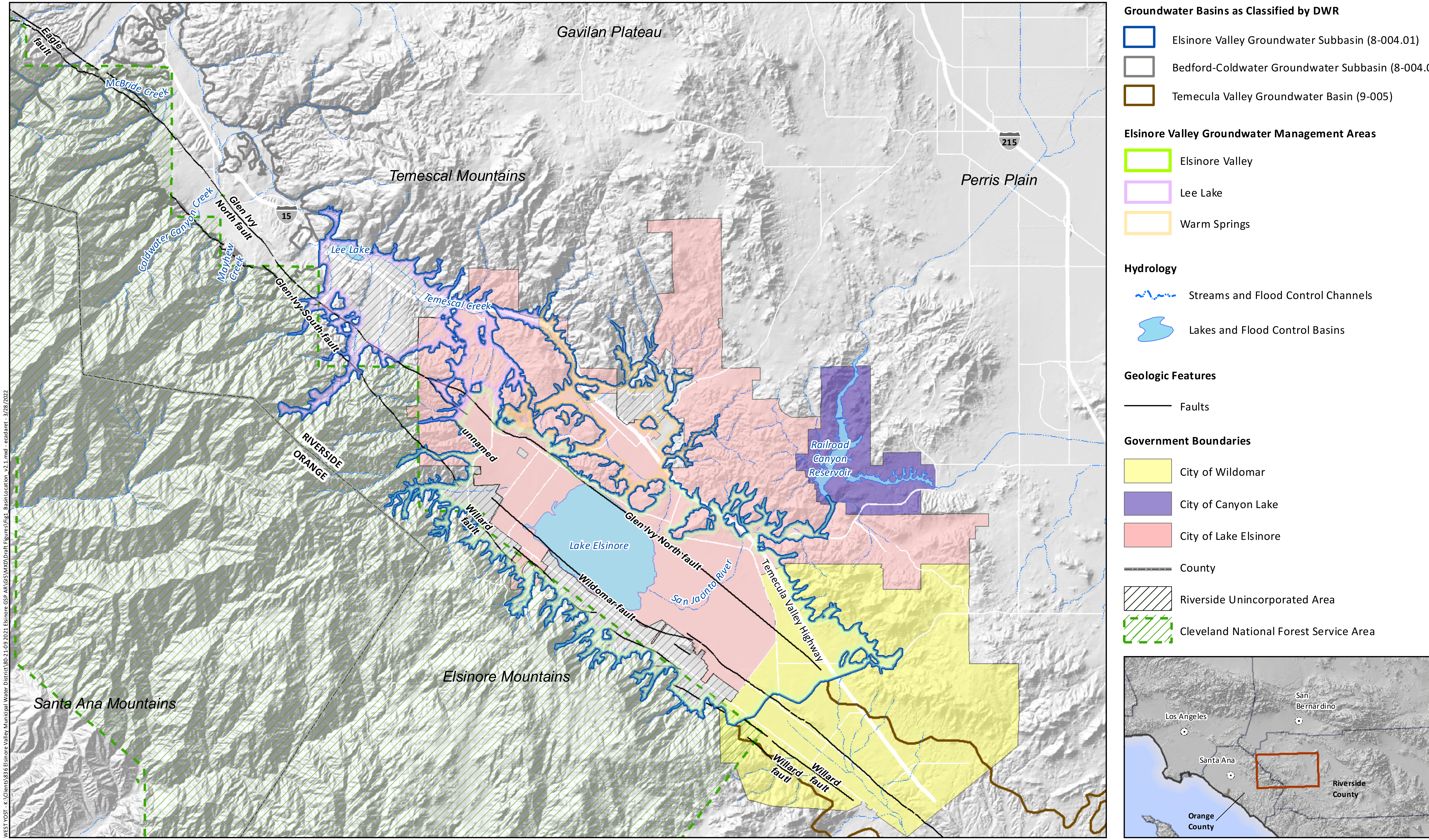
[1] Title 23, Division 2, Chapter 1.5, Subchapter 2 of the California Code of Regulations, which is commonly referred to as the Groundwater Sustainability Plan Regulations (GSP Regulations).

marginal and that groundwater levels have not changed significantly in the Basin. Groundwater levels from WY 2020 to 2021 have not changed or have risen.

Section 4 – Water Use. This section summarizes the total estimated water use in the Basin for the reporting period. Total water use is equivalent to the sum of all groundwater extractions and surface water which includes imported water, surface water from Canyon Lake, and recycled water. Total water use was estimated to be 30,919 acre-feet (af) in WY 2021.

Section 5 – Change in Groundwater Storage. This section describes the methods used to compute the change in storage for the reporting period, reports the change in storage for spring 2020 to spring 2021, and compares the change in storage to the history of storage changes and annual groundwater extractions. The total groundwater in storage from spring 2020 to spring 2021 increased by about 1,135 af. The cumulative increase in storage since WY 2015 was about 8,419 af.

Section 6 – GSP Implementation Progress. This section summarizes the key milestones accomplished since the adoption of the GSP in July 2021.



Prepared by:

WEST YOST

Elsinore Valley Municipal Water District
Elsinore Subbasin 2021 Annual Report

Prepared for:

EVMWD

Elsinore Valley Groundwater Subbasin
Location Map

Figure 1

Table 1. Alternative Annual Report Elements Guide Map for the Elsinore Valley Subbasin 2021 Annual Report		
CCR – GSP Regulation Sections	Groundwater Sustainability Plan Elements	Document which section(s), page number(s), or briefly describe why that Alternative element does not apply to the entity.
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.	• Executive Summary: pages 1 – 2 • Elsinore Valley Groundwater Subbasin Map: Figure 1 (page 3) • Section 1 – Introduction: pages 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:	• Section 3 – Current Groundwater Level Conditions: Pages 21 - 28
(A)	Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.	• Spring 2021 contours: Figure 6 & 7 (pages 25 & 26) • Fall 2021 contours: Figure 8 & 9 (pages 27 & 28) • Spring 2020 contours: Figure 11 & 12 (pages 36 & 37)
(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.	• Time History of Groundwater Levels for Selected Wells: Figure 5 (page 22) • Appendix A – Groundwater Level Hydrographs for All Monitored Wells for period 1990 - 2021
(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.	• Section 4.1 – Groundwater Extractions: Pages 29 – 30 • Groundwater Extraction by Sector: Table 7 (page 29) • Urban Groundwater Extractions: Figure 10 (page 30)
(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.	• Section 4.2 – Surface Water Use: Page 31 – 32 • Surface Water Use: Table 8 (page 32)
(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.	• Section 4.3 – Total Water Use: Page 33 • Total Water Use: Table 9 (page 33)
(5)	Change in groundwater in storage shall include the following:	• Section 5 – Change in Groundwater Storage: Pages 34 – 44
(A)	Change in groundwater in storage maps for each principal aquifer in the basin.	• Change in Storage spring 2020 – spring 2021: Figure 15 & 16 (pages 42 & 43)
(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.	• Change in Groundwater Storage: Table 10 - 12 (page 40 & 41) • Graph depicting water year type, annual change in storage, cumulative change in storage since 2015 to current reporting year – Figure 17 (page 44)
(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.	• Section 6: GSP Implementation Progress: Page 45 - 47

1.0 INTRODUCTION

1.1 Background

The Elsinore Valley Subbasin (Basin) is designated by the California Department of Water Resources (DWR) as a medium priority basin which requires the development of a Groundwater Sustainability Plan (GSP) in accordance with the 2014 Sustainable Groundwater Management Act (SGMA) within the California Water Code (CWC)[2]. In January 2017, the Elsinore Valley Groundwater Sustainability Agency (EVGSA) was formed by the Elsinore Valley Municipal Water District (EVMWD) for the Basin. A draft final GSP[3] in accordance with the DWR's GSP Regulations defined in the California Code of Regulations (CCR)[4] was completed in July 2021 and was submitted to DWR on January 26, 2022. The documents submitted to the DWR are available on the DWR's SGMA Portal website.

SGMA regulations[5] require that an annual report be submitted to the DWR by April 1 of each year following the adoption of the GSP or Alternative Plan. This first Annual Report for the Basin provides an update on the groundwater conditions as of Water Year (WY) 2021 (October 1, 2020 through September 30, 2021). Table 1 is a reference guide that illustrates where each of the required annual reporting elements described in CCR Article 7, Section 356.2 can be found within this report.

1.2 Plan Area

The Plan Area for the purposes of the GSP and this Annual Report is defined as DWR Basin No. 8-004.01: the Elsinore Valley Subbasin (Figure 1). The Basin underlies the Elsinore Valley in western Riverside County and is located within the Santa Ana River Watershed. The Basin has a surface area of approximately 37 square miles (23,600 acres). The basin is divided into three Management Areas (MAs): Elsinore MA, Warm Springs MA, and Lee Lake MA. The basin is located within one of the structural blocks of the Peninsular Ranges of Southern California where groundwater basins in this region occupy valleys in linear, low-lying areas between the Santa Ana and Elsinore Mountains on the west and the Temescal Mountains, Perris Plain, and Gavilan Plateau on the east (Norris and Webb, 1990). These valleys were formed by differential movement between parallel strike slip faults to form a pull-apart basin (Dorsey et al., 2012). The basin is bounded by the Willard fault, a splay of the active Elsinore fault zone, and Santa Ana and Elsinore mountains and non-water bearing rocks of the Peninsular Ranges along the Glen Ivy fault on the northeast boundary. The basin is also bounded by the Bedford-Coldwater Subbasin (8-004.2) to the northwest and the Temecula Valley Basin (9-005) to the southeast.

The Plan Area consists primarily of private land under the City of Elsinore, City of Canyon Lake, City of Wildomar, and Riverside County jurisdiction. Unincorporated lands are under the jurisdiction of Riverside County. To the southeast, the Plan Area is adjacent to the United States Forest Service (USFS) Cleveland National Forest. Within the Plan Area, developed land uses include single family residential, recreational, industrial, or are undeveloped. The major municipal water district serving the Plan Area is the EVMWD, which provides water and sewer service to the developed portions of Elsinore Valley within its service area. Some residents and businesses rely on private wells for groundwater.

---

[2] California Water Code Section 10720–10737.8, et al.

[3] Information regarding the GSP, including its stakeholder process, is available from EVMWD's website.

[4] California Code of Regulations, Title 23, Section 350 et seq.

[5] Citation 5. CCR Title 23, Division 2, Chapter 1.5, Subchapter 2, Article 7

The largest source of water is imported supply purchased from Metropolitan Water District of Southern California (MWDSC) through Western Municipal Water District (WMWD) accounting for over 68 percent of the Plan Area total water supply. Groundwater from the Basin is the second largest source of water supply within the Plan Area accounting for approximately 23 percent of the total water supply. Groundwater is pumped for municipal supply; irrigation of agriculture, golf courses, and other recreational landscapes; and private domestic or commercial supply. From 1990 to 2010, groundwater levels steadily declined within the Elsinore MA due to groundwater pumping in excesses of average annual recharge. During this period, there was an estimated decline in groundwater storage of about 35,000 acre-feet (af). Basin storage has since rebounded due to reduced pumping in accordance with the 2005 Groundwater Management Plan's (GWMP) Safe Yield estimate of 5,500 af per year (afy) for the Elsinore MA. Groundwater levels have been relatively stable since 1990 in the Lee Lake MA and rising in the Warm Springs MA due to large influxes of recharge during wet years. These conditions within the Plan Area prompted the DWR to designate the Basin as a medium priority for groundwater management.

The groundwater system within the Basin has been subdivided into the noted MAs as each has its own set of unique characteristics:

- The Elsinore MA is the main groundwater producing MA within the basin and has a two layered aquifer system; an unconfined aquifer of alluvial deposits underlain by a semi-confined to confined aquifer of the Pauba Formation. The unconfined aquifer alluvial deposits can be more than 300-feet thick locally and are composed of interfingered gravels, sands, silts, and clays (MWH, 2005). The semi-confined Pauba Formation can be more than 2,300 feet thick beneath Lake Elsinore and is composed of medium to coarse-grained sandstones, siltstones, and clay (DWR 2003, 2016; MWH 2005, 2009).
- The Warm Springs MA is located east of the Elsinore MA and south of the Lee Lake MA and is hydraulically connected to both the Elsinore and Lee Lake MAs through the Temescal Wash. The Warm Springs MA has a single aquifer unit of alluvium associated with Temescal Wash and alluvial fan and fluvial deposits.
- The Lee Lake MA is located downgradient and to the north of the Elsinore MA and Warm Springs MA. The Lee Lake MA has limited hydraulic connection with the Elsinore MA and is a single aquifer unit of alluvium composed of interlayered gravels, sands, silts, and clays that is associated with Temescal Wash.

A detailed description of the Plan Area's basin setting, hydrogeology, historical conditions, and water budget elements is included in Chapters 1 through 5 of the GSP.

1.3 Groundwater Basin Management

EVMWD has managed the Basin sustainably and plans to continue to do so throughout the planning and implementation horizon of the GSP. The implementation elements of the Basin GSP are described below.

1.3.1 Groundwater Sustainability Plan

The GSP report includes a detailed description of the Basin and other information required by SGMA, including but not limited to: historical groundwater conditions and trends, an estimate of sustainable yield, sustainable management criteria (e.g. sustainability indicators, minimum thresholds, and measurable objectives), a monitoring program to track progress over time, and proposed projects and management actions (PMAs).

The GSP is intended to ensure that by 2040, and thereafter within the planning and implementation horizon (50 years), the Basin is operated within its sustainable yield such that there are no undesirable results as defined by CWC Section 10721(v). The GSP is intended to provide a roadmap for how groundwater sustainability is to be achieved and represents a key milestone in achieving sustainability within the Plan Area by 2040. Key provisions of the GSP are highlighted below.

1.3.1.1 Overview of Sustainability Goal and Sustainable Management Criteria

The sustainability goal is to manage the Basin to provide sustainably and adequacy for all beneficial uses within the Basin over wet and dry climatic cycles. The GSP included initial sustainable management criteria (SMC), including minimum thresholds (MTs) and measurable objectives (MO), for the following sustainability indicators determined to be a current and/or potential future undesirable result:

Chronic Lowering of Groundwater Levels. In the Elsinore MA, MTs are defined by operational considerations to maintain pumping water levels at municipal supply wells that are sufficiently above the current pump intakes to avoid the cost of lowering pump bowls, adding pump stages, and/or increasing pumping energy usage. In the Warm Springs and Lee Lake MAs, MTs are defined based on observed historical-low groundwater levels. Undesirable results are triggered when more than 75 percent of the wells (or 100 percent of the wells in the case of the Warm Springs MA) exceed the MT.

Groundwater in Storage. The sustainability goal for groundwater in storage is to maintain groundwater levels within a historical operating range from observed water levels from 1990 to 2019. The MTs established for the chronic lowering of groundwater levels serve as a proxy for the MT for groundwater in storage.

Land Subsidence. The sustainability goal for land subsidence is to limit land surface displacement (e.g. the decrease in land surface elevation) to one-foot or less over a 50-year period. Land surface displacement will be measured by InSAR and compared to the earliest available InSAR measurement for the Basin from May 2015. The MT is defined as six-inches of land surface displacement occurring over a 50-year period.

Water Quality. The sustainability goals for water quality are to comply with the salt and nutrient management plans (SNMP) for each MA. The Water Quality Control Plan for the Santa Ana River Basin (Basin Plan) includes two specific SNMPs within the Plan Area: the Elsinore GMZ Maximum Benefit Salt and Nutrient Management Plan Elsinore SNMP and Upper Temescal Valley SNMP. The Santa Ana Regional Water Quality Control Board (Regional Board) amended the Elsinore and Upper Temescal Valley SNMPs into the Basin Plan in November 2017 and December 2020, respectively. The Upper Temescal Valley SNMP was accepted by the State Water Resources Control Board (State Board) in June 2021 and became effective in September 2021 when it was accepted by the Office of Administrative Law (OAL). The Elsinore SNMP is pending approval by the State Board and OAL. Each SNMP defines water quality objectives for total dissolved solids (TDS) and nitrate (as nitrogen) and an associated monitoring and management program to manage salinity to protect beneficial uses.

MTs are defined for TDS and nitrate based on the TDS and nitrate water quality objectives established by the SNMPs and the Basin Plan. The MT for TDS is defined as 530 milligrams per liter (mg/L) in the Elsinore MA and 820 mg/L in the Warm Springs and Lee Lake MAs. The MT for nitrate (as N) is defined as 5 mg/L in the Elsinore MA, which is consistent with Maximum Benefit Objectives, while the MTs for nitrate in the Lee Lake and Warm Springs MAs are defined as 7.9 mg/L, which is consistent with the Upper Temescal Valley SNMP water quality objectives.

The assessment of compliance with the MTs will be based on the triennial[6] calculation of ambient water quality required by the SNMPs. The last ambient water quality calculation was completed in July 2020 for the Elsinore Basin (WSC, 2020) and November 2020 for the Warm Springs and Lee Lake MAs (West Yost, 2020).

Interconnected Surface Water. The sustainability goal for interconnected surface water is to maintain sufficient surface water flows in area-supporting phreatophytic riparian trees. The MT is defined as the amount of depletion that occurs when the depth to water in areas supporting phreatophytic riparian vegetation is greater than 35 feet for a period exceeding one year or more.

1.3.1.2 Overview of Projects and Management Actions

The primary management tool to achieve long-term sustainability of the basin is by implementing the PMAs. The GSP included proposed PMAs in three groups: Baseline PMAs (Group 1), PMAs evaluated against SMCs (Group 2), and PMAs that may be considered in the future (Group 3). Group 1 projects are considered existing or established commitments by the EVGSA. Group 2 projects have been assigned implementation dates. Group 3 projects are conceptual activities that can be considered in the future if any Group 2 projects fail to be implemented or additional intervention is required to achieve basin sustainability goals. Table 2 provides an overview of the PMAs that were presented in the GSP. A more detailed description of current GSP implementation progress of the PMAs is provided in Section 6 of this report.

[6] The SNMPs provide for flexibility in amending the analysis frequency, up to every five years in accordance with the State Board's 2019 Recycled Water Policy.

Table 2. Elsinore Valley Subbasin GSP Projects and Management Actions

Description	Responsible Agency	Category	Status	Anticipated Timeframe
Group 1 - Baseline PMAs				
Groundwater well replacements	EVMWD	Project	Ongoing	Ongoing
Managing pumping in Elsinore MA with in-lieu recharge due to conjunctive use agreements	EVMWD, MWDSC, WMWD	Management Action	Ongoing	Implemented
Group 2 - PMAs Evaluated Against SMCs				
Begin groundwater pumping in Lee Lake MA for municipal use	EVMWD	Project	In design	2019 - 2023: design and construction. 2024+ implementation and operation
Rotate pumping locations and flows	EVMWD	Management Action	Not started	Can be implemented as needed dependent on groundwater levels
Recycled water IPR	EVMWD	Project	Planning Phase	Dependent on wastewater flow increases
Septic tank conversions	EVMWD	Project	Not started	Dependent on funding sources
Group 3 - Identified PMAs that may be considered in the future				
Imported water recharge and recovery	EVMWD, MWDSC	Project	Inactive	No current anticipated timeline
Stormwater capture and recharge	EVMWD	Project	Not started	No current anticipated timeline
Begin groundwater pumping in Warm Springs MA for municipal use	EVMWD	Project	Not started	No current anticipated timeline

2.0 DATA COLLECTION AND MONITORING

The GSP defines the monitoring program necessary to support the sustainable management of the Basin and includes the collection of climate, surface water, and groundwater data. These data are used to characterize and understand current Basin conditions and trends and to evaluate the Basin response to GSP implementation. All environmental data collected by the EVGSA are post-processed into standardized formats, checked for quality assurance/quality control (QA/QC), and uploaded to a centralized relational database management system managed internally by EVMWD.

This section describes the monitoring programs and data collected in WY 2021.

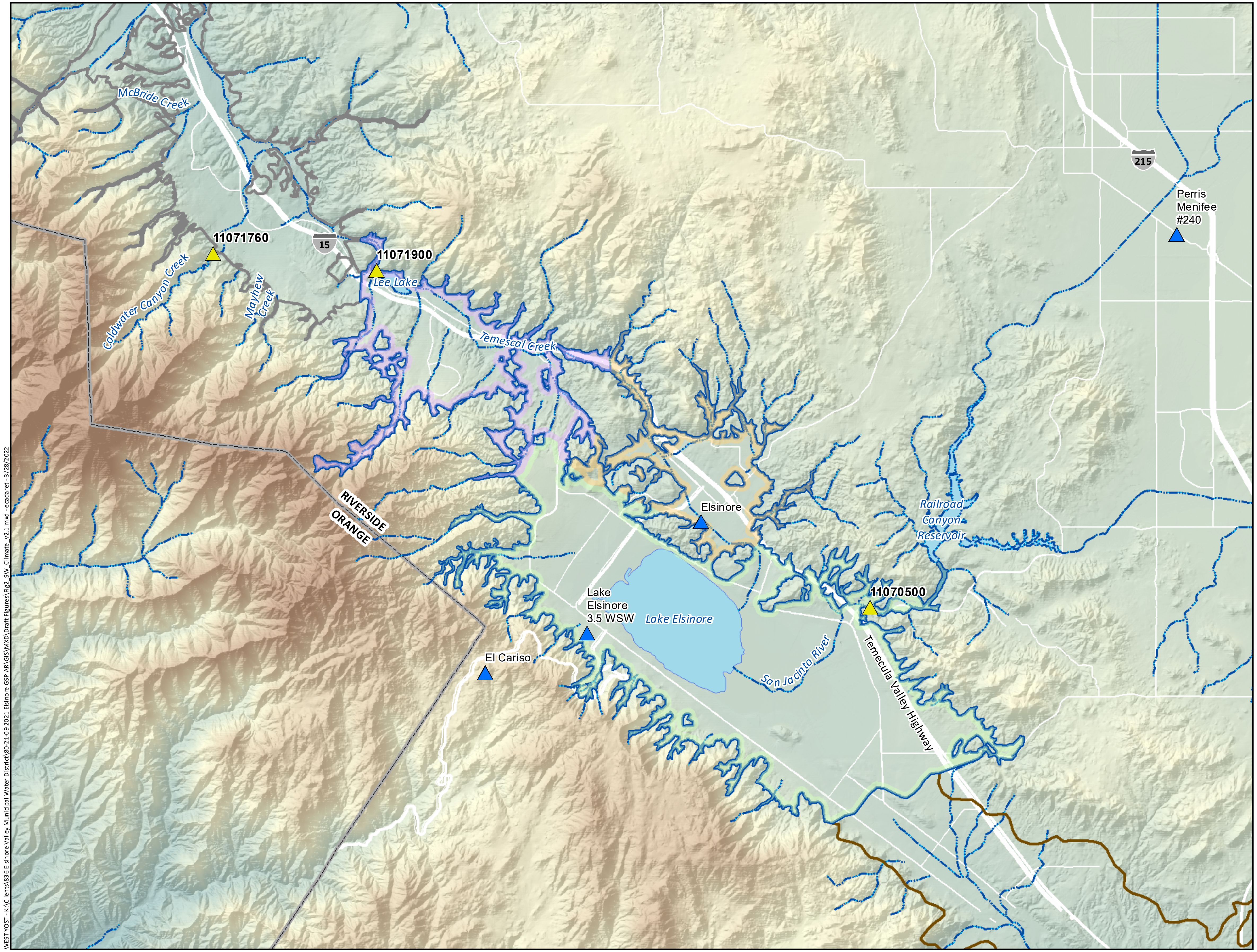
2.1 Climate Data

Figure 2 shows the location of the climate stations in and around the Basin that provide precipitation, temperature, and/or evapotranspiration (ET) data for the Plan Area. Each data type is described below.

2.1.1 Precipitation

Within the Plan Area, average annual precipitation ranges from up to 16 inches per year along the eastern edge of the Santa Ana Mountains on the west side of the Basin, to less than eight inches per year to the southeast of the Basin. Precipitation is greater outside the Plan Area in the mountains to the west and east of the Elsinore Valley. The weather station in the Plan Area with the longest and most complete precipitation record is the NOAA/CAL FIRE Station at Lake Elsinore[7] (shown on Figure 2), which has complete water year records from WY 1898 to present. The mean WY precipitation is approximately 12.11 inches. Figure 3 is a plot of the WY annual precipitation totals, the long-term mean and standard deviation from the mean, and the cumulative departure from mean (CDFM) precipitation for WYs 1888 to 2021. The CDFM plot is a useful way to characterize the occurrence and magnitude of wet and dry periods (relative to the mean): positive sloping segments (trending upward from left to right) indicate wet periods, and negative sloping segments (trending downward from left to right) indicate dry periods. Precipitation in WY 2021 was 1.43 inches, which is 11.68 inches lower than the average. As shown in Figure 3, based on the standard deviation from the mean, WY 2021 was dry; and based on the CDFM curve, WYs 2020-2021 were a dry period. Out of the 123 total WY year record (1898 to present), there have been 91 normal years, 20 wet years, 12 dry years, and 71 years (or approximately 58% of the total precipitation record) where the WY total precipitation was below the long-term average of 12.11 inches.

[7] NOAA, 2022. Station: Elsinore, Network ID - GHCND: USC00042805.



Weather Stations and Stream Gages

- Weather Stations
- USGS Stream Gages

Groundwater Basins as Classified by DWR

- Elsinore Valley Groundwater Subbasin (8-004.01)
- Bedford-Coldwater Groundwater Subbasin (8-004.02)
- Temecula Valley Groundwater Basin (9-005)

Elsinore Valley Groundwater Management Areas

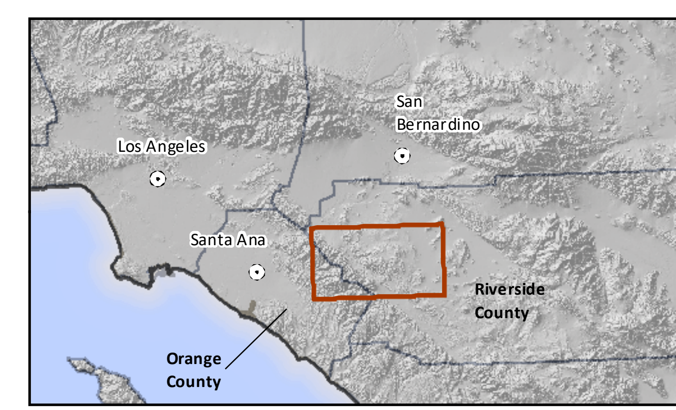
- Elsinore Valley
- Lee Lake
- Warm Springs

Hydrology

- Streams and Flood Control Channels
- Lakes and Flood Control Basins

Government Boundaries

- County



Prepared by:

Miles 0 2 4
Km 0 3 6

Elsinore Valley Municipal Water District
Elisnore Subbasin Annual Report - WY 2021

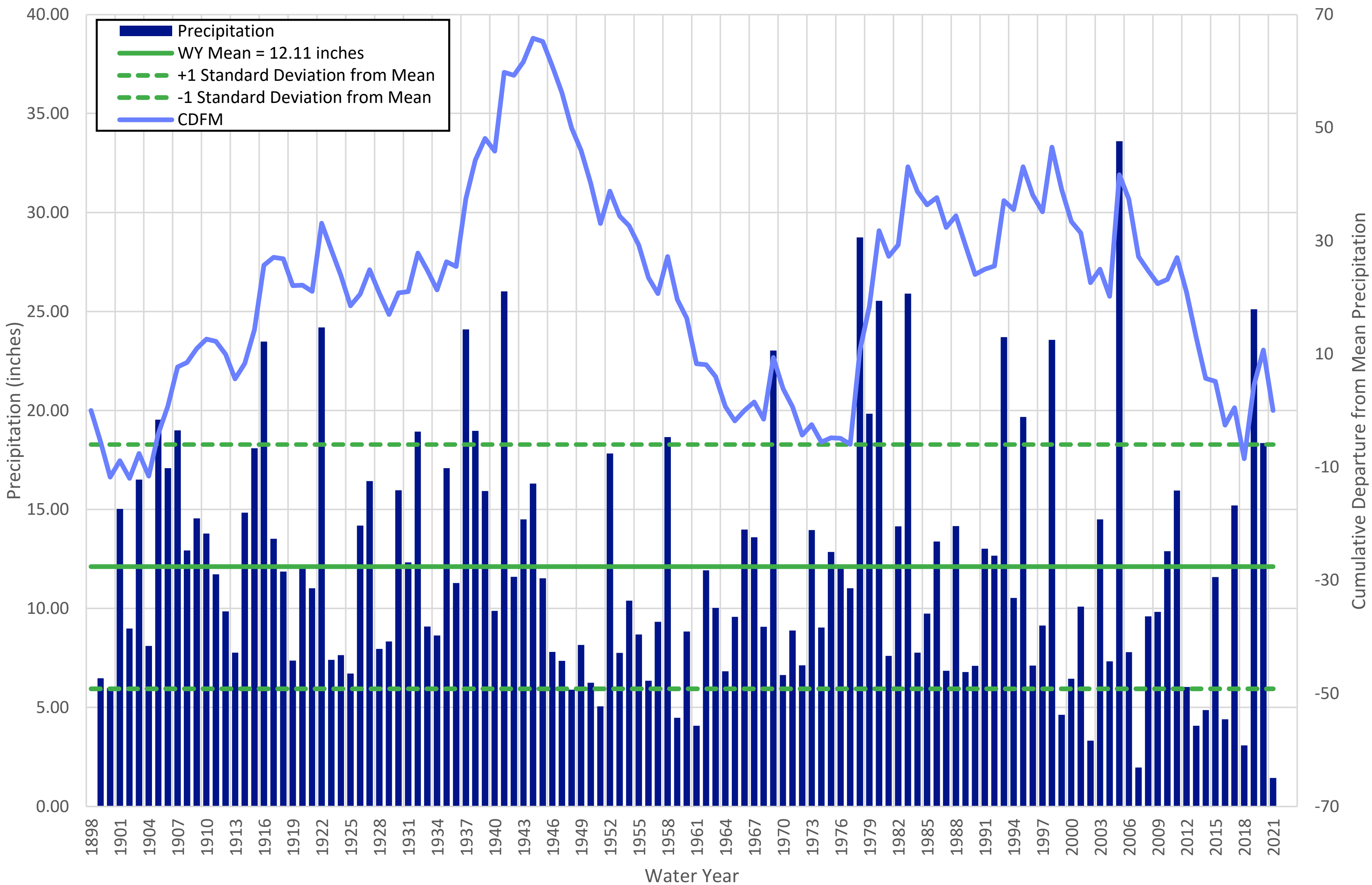
Prepared for:

Surface Water Features and Climate Monitoring Stations

Figure 2

WEST YOST - K:\Clients\836 Elsinore Valley Municipal Water District\80-21-09 2021 Elsinore GSP AR\GIS\MXD\Draft Figures\Fig2_SW_Climate_v2.1.mxd - ecadaret - 3/28/2022

Figure 3. Time History of Annual Precipitation and Cumulative Departure From Mean: Elsinore Station



WEST YOST

K-836-80-21-09-WP-R-2021AR

Elsinore Valley Groundwater Sustainability Authority
Elsinore Valley Subbasin
2021 Annual Report
Last Revised: 03-15-21

2.1.2 Evapotranspiration

According to the State of California Reference Evapotranspiration Map developed by California Irrigation Management Information System Station (CIMIS), the Plan Area is located within Evapotranspiration Zone 6, with an annual average Reference ET (ETo)[8] of 49.7 inches or 4.14 feet (DWR 2012). This regional average annual ETo estimate is comparable to the ETo measured at the CIMIS Perris Menifee Station (Station 240) in the Plan Area (see station location on Figure 2). Station 240 has nearly complete annual records of daily data since May 2013. The monthly and annual totals are shown in Table 3. The average annual ETo measured at CIMIS Station 240 between 2014 and 2021 is 60.94 inches per year (5.08 feet per year). In 2021, the annual total ETo was 65.24 inches (5.43 feet) (CIMIS, 2021).

[8] The ETo values calculated from the CIMIS data reflect the amount of water that could be transpired by grass or alfalfa if supplied by irrigation. The ETo values do not represent the actual transpiration from any specific crop or native vegetation. To calculate the ET rate for a specific crop or vegetation type, the ETo is multiplied by a crop coefficient that adjusts the water consumption for that crop relative to the water consumption for alfalfa.

Table 3. Monthly and Yearly Reference Evapotranspiration (ETo) Totals for CIMIS Station No. 240 -- 2013-2021 (inches, except where noted)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Annual Total
2013					1.78K	7.94K	7.79	7.94K	6.05K	4.39K	2.42	2.64	40.95
2014	3.06	2.98	4.53	6.19	7.88K	8.36	8.64K	7.59K	6.44K	4.72	3.21	1.78K	65.38
2015	2.53K	3.26K	5.35	5.96	5.66	7.72K	6.95K	6.76	4.96K	3.56K	2.48K	1.88	61.56
2016	1.71	3.25K	4.06	4.78	6.23K	8.33K	9.01K	8.54K	6.16K	4.32K	3.25K	1.92K	70.01
2017	1.86	2.09	4.86K	6.32K	6.68K	8.21K	8.38K	7.53K	5.69K	4.90K	2.73K	3.25K	62.50
2018	2.73K	3.22K	4.18	6.06K	5.94K	8.14K	7.92K	7.56K	6.26K	4.18K	3.25K	1.92K	61.36
2019	2.02K	1.97K	3.62K	5.41K	4.98K	6.99K	8.33	8.00K	5.66	5.13	2.92	1.60K	56.63
2020	2.07K	2.63	2.69K	3.82K	6.66K	7.33K	9.25	8.67K	6.83K	5.03	3.30K	2.38K	60.66
2021	2.74K	3.32	4.22K	5.88	6.97	8.43	9.29	8.20K	6.60	4.28	3.58	21.73	85.24
9-Year Average (inches)	2.34	2.84	4.19	5.55	5.86	7.87	8.40	7.87	6.07	4.50	3.02	4.34	62.70
9-Year Average (feet)	0.20	0.24	0.35	0.46	0.49	0.66	0.70	0.66	0.51	0.38	0.25	0.36	5.23

Source: CIMIS 2021 – Station No. 240 (https://cimis.water.ca.gov/). Values reported for 2021 were downloaded from CIMIS daily data and compiled on 2/10/2022.

K = One or More Daily Values Flagged

2.2 Surface Water

The Basin is located within the Santa Ana River Watershed (SARW), which encompasses a large area within southern California. The SARW drains the San Gabriel, San Bernardino, San Jacinto, and Santa Ana Mountains to the west, north, east, and south of the Basin, respectively. The Basin is adjacent to the Santa Ana Mountains which provides most of the recharge to the Basin through infiltration of streamflow into the shallow alluvial sediments. Mountain front recharge that occurs at the interface between surrounding bedrock and unconsolidated sediments is the primary source of recharge along the smaller tributaries that enter the Basin, largely comprising the Temescal Wash and the San Jacinto River. Tributaries include Warm Springs Creek, Murrieta Creek, and Coldwater Canyon Creek. Surface water in the Plan Area is measured at several United States Geological Survey (USGS) managed stream gages within the basin.

The Basin relies on imported water from MWDSC that is used to supplement local surface water, groundwater, and recycled water supplies. Recycled water supply comes from three reclamation facilities within the Plan Area—Regional Water Reclamation Facilities (WRF), Railroad Canyon WRF, and Horsethief Canyon WRF—that discharge to local streams or discharge ponds and may influence surface water flows and recharge. Surface water recharge occurs through streambed infiltration of stormwater and recycled water and return flows of applied irrigation water and septic recharge. Septic systems also constitute a source of recharge to the Basin and contribute to recharge within the Elsinore MA.

2.2.1 USGS Stream Gages

There are three active historical stream gages located within the vicinity of the Basin (USGS, 2021). Each has recorded daily discharge and manual flow measurements data. All three were actively monitored in 2021 by the USGS. Table 4 provides a summary of data available at each stream gage as well as streamflow statistics.

Table 4. Summary of USGS Stream Gage Data and Streamflow Statistics within the Vicinity of the Basin

Station Number	Station Name	Drainage Area, sq mi	Elevation, feet msl	Historical Estimated Average AFY	WY 2021 Estimate Average AFY	WY 2021 Min Discharge, cfs	WY 2021 Max Discharge, cfs	WY 2021 Average Discharge, cfs	Period of Record	
									Starting Year	Ending Year
11070500	SAN JACINTO R NR ESLINORE CA	723	1,270	11,323	2,679	0	214	3.7	1916	Present
11071760	COLDWATER CANYON C NR CORONA CA	4.2	1,323	1,306	570	0	6.3	0.8	2018	Present
11071900	TEMESCAL C A CORONA LK NR CORONA CA	57.9	1,190	1,701	650	0	27.3	0.9	2013	Present

2.3 Groundwater

The GSP defines the groundwater monitoring program necessary to support the sustainable management of the Basin and includes the monitoring of groundwater pumping, levels, and quality. The monitoring network is designed to collect sufficient data to evaluate changing conditions that occur through the implementation of the GSP over time.

2.3.1 Groundwater Pumping

Groundwater pumpers in the basin include EVMWD, the City of Lake Elsinore, and other private users. EVMWD groundwater pumping accounts for approximately 99 percent of the total groundwater pumping within the Basin. Per the California Water Code (CWC Division 2, Part 5, Section 5001)[9], users that pump groundwater greater than 25 afy must file an annual "Notice of Extraction and Diversion" with the State Board. Users that pump groundwater less than 25 afy are not required to file and are considered de minimis users. Production data are available through the Western-San Bernardino Watermaster (MWH, 2011) and directly from EVMWD.

2.3.2 Groundwater Monitoring Network

Within the Basin, there are multiple existing local, regional, state, and federal programs that monitor groundwater levels. These programs include:

- **EVMWD Groundwater Level Monitoring Program:** includes 39 monitoring and production wells that are monitored up to three times a year and 60 wells that are monitoring two times a year. Water levels that are collected two times a year from 60 monitoring and production wells are submitted to the DWR California Statewide Groundwater Elevation Monitoring (CASGEM) program.
- **EVMWD Groundwater Quality Monitoring Program:** includes water quality sampling from production wells on an annual basis to comply with state and federal drinking water regulations. EVMWD also collects quarterly water quality for TDS monitoring on their production and monitoring wells in the Upper Temescal Valley per the Upper Temescal SNMP. EVMWD provides water quality data to the State Department of Drinking Water (DDW).

Wells included in the water level monitoring program are listed in Table 5 and shown in Figure 4. Table 5 lists the wells by MA and includes the local well name, State Well ID (if assigned), and monitoring type. For groundwater levels, Table 5 also specifies the monitoring type as manual or transducer. Manual groundwater level measurements are also collected. Short-term trends are tracked by pressure transducers with onboard data loggers that are installed in six wells. The data loggers record groundwater levels at high-frequency intervals of 15 minutes to 1 hour. Long-term trends are tracked by analysis of data from key indicator wells monitored semi-annually and with data dating back to the late-1980s. Groundwater quality samples are collected from various wells on an annual to monthly basis to determine and track groundwater quality trends; these wells are shown on Figure 4.

During WY 2021, groundwater levels were monitored quarterly for most wells, except for a few that were monitored semi-annually. Overall, a reasonable spatial distribution of water level data were obtained to perform the requisite characterizations of current groundwater conditions as required by CCR Article 7,

[9] CWC Division 2, Part 5, Section 5001

Section 256.s. The only significant data gap for performing these characterizations are the lack of shallow piezometers for monitoring surface water-groundwater interaction.

The analysis of groundwater conditions is presented in Sections 3, 4, and 5 of this Annual Report.

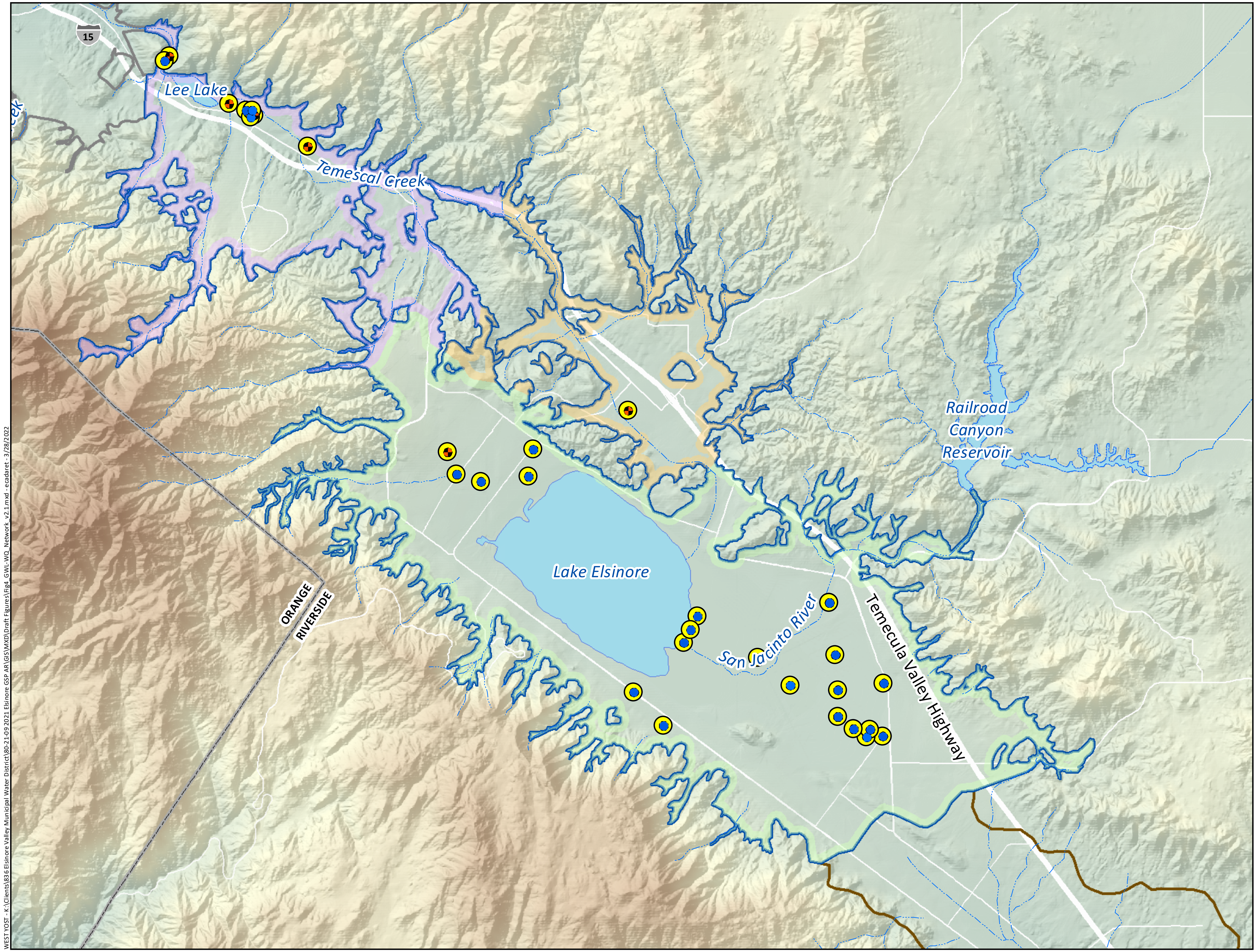
Table 5. Groundwater Level Monitoring Network and Wells Monitored in Calendar Year 2021

Local Well Name	State Well ID	Well Use	Groundwater Monitoring Type – Water Level: Sounding Method	Q1 2021	Q2 2021	Q3 2021	Q4 2021
Elsinore MA							
Beecher		Monitoring	M	X	X	X	X
Cereal 1	06S04W21J03	Potable	M			X	X
Cereal 3	06S04W17K01	Potable	M	X	X	X	X
Cereal 4	06S04W17L01	Potable	M			X	X
Corydon[(a)]	06S04W22M08	Potable	M				
Diamond		Potable	M			X	X
Grand	06S05W24A	Monitoring	M	X	X	X	X
Joy St.	06S05W02G05	Potable	M	X	X		
Lincoln	06S05W02M04	Potable	M			X	X
Machado	06S05W03H01	Potable	M	X	X	X	X
McVicker Park		Monitoring	M	X			
Middle Island		Monitoring	M	X	X	X	X
MW 1 Deep		Monitoring	M	X	X	X	X
MW 1 Shallow		Monitoring	M	X	X	X	X
MW 2 Shallow		Monitoring	M	X	X	X	X
MW 2 Deep		Monitoring	M	X	X	X	X
MW 3 Shallow		Monitoring	M	X	X	X	X
MW 3 Deep		Monitoring	M	X	X	X	X
North Island		Non-Potable	M	X	X	X	X
Olive	06S04W22D02	Non-Potable	M	X	X	X	X
South Island		Non-Potable	M		X	X	X
Stadium Deep		Monitoring	M	X	X	X	X
Stadium Shallow		Monitoring	M	X	X	X	X
Summerly		Potable	M	X	X	X	
Terra Cotta		Potable	M	X	X	X	X
Wisconsin	06S05W02A	Monitoring	M	X	X	X	X
Wood # 2		Monitoring	M	X	X	X	X
Lee Lake MA							
Gregory 1	05S05W07C01	Non-Potable	T	X	X	X	X
Gregory 2	05S05W07E01	Non-Potable	M	X			X
Alberhill 2		Monitoring	T	X	X	X	X
Barney Lee 1	05S05W08N01	Non-Potable	M	X		X	X
Barney Lee 2	05S05W08P01	Non-Potable	T/M	X			X
Barney Lee 3	05S05W08P03	Non-Potable	M	X		X	X
Barney Lee 4	05S05W08P02	Non-Potable	M	X	X	X	X
Station 70	05S05W08N02	Monitoring	T	X	X	X	
Warm Springs MA							
Cemetery		Non-Potable	T	X	X	X	X

T = Wells denoted with "transducer" have a pressure transducer installed that continuously records water level measurements on a high frequency interval (15-minutes to 1 hour)

M = Well water level measurements on a sounder

(a) - Cordyon water level measurements were attempted in 2021, but there are maintenance issues that prevented water level measurements. EVMWD is currently working to resolve these issues.



Groundwater Monitoring Network Well Symbolized by Data Collection

- Manual Water-level Data
- Transducer Water-level Data
- Water Qualiy Data

Groundwater Basins as Classified by DWR

- Elsinore Valley Groundwater Subbasin (8-004.01)
- Bedford-Coldwater Groundwater Subbasin (8-004.02)
- Temecula Valley Groundwater Basin (9-005)

Elsinore Valley Groundwater Management Areas

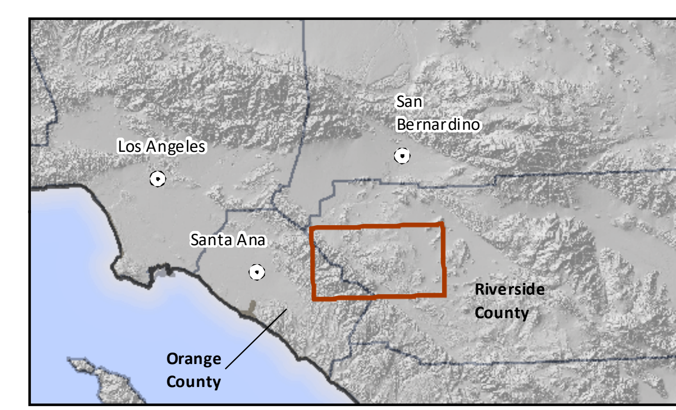
- Elsinore Valley
- Lee Lake
- Warm Springs

Hydrology

- Streams and Flood Control Channels
- Lakes and Flood Control Basins

Government Boundaries

- County



Prepared by:

WEST YOST

0 2 4 Miles

0 3 6 Km

Elsinore Valley Municipal Water District
Elsinore Subbasin 2021 Annual Report

Prepared for:

Groundwater Level and Quality Monitoring Network

Figure 4

3.0 CURRENT GROUNDWATER LEVEL CONDITIONS

This section describes the current Basin groundwater level conditions as of WY 2021 as specified in the Alternative Annual Reporting Elements Guide (see Table 1).

3.1 Groundwater Level Trends

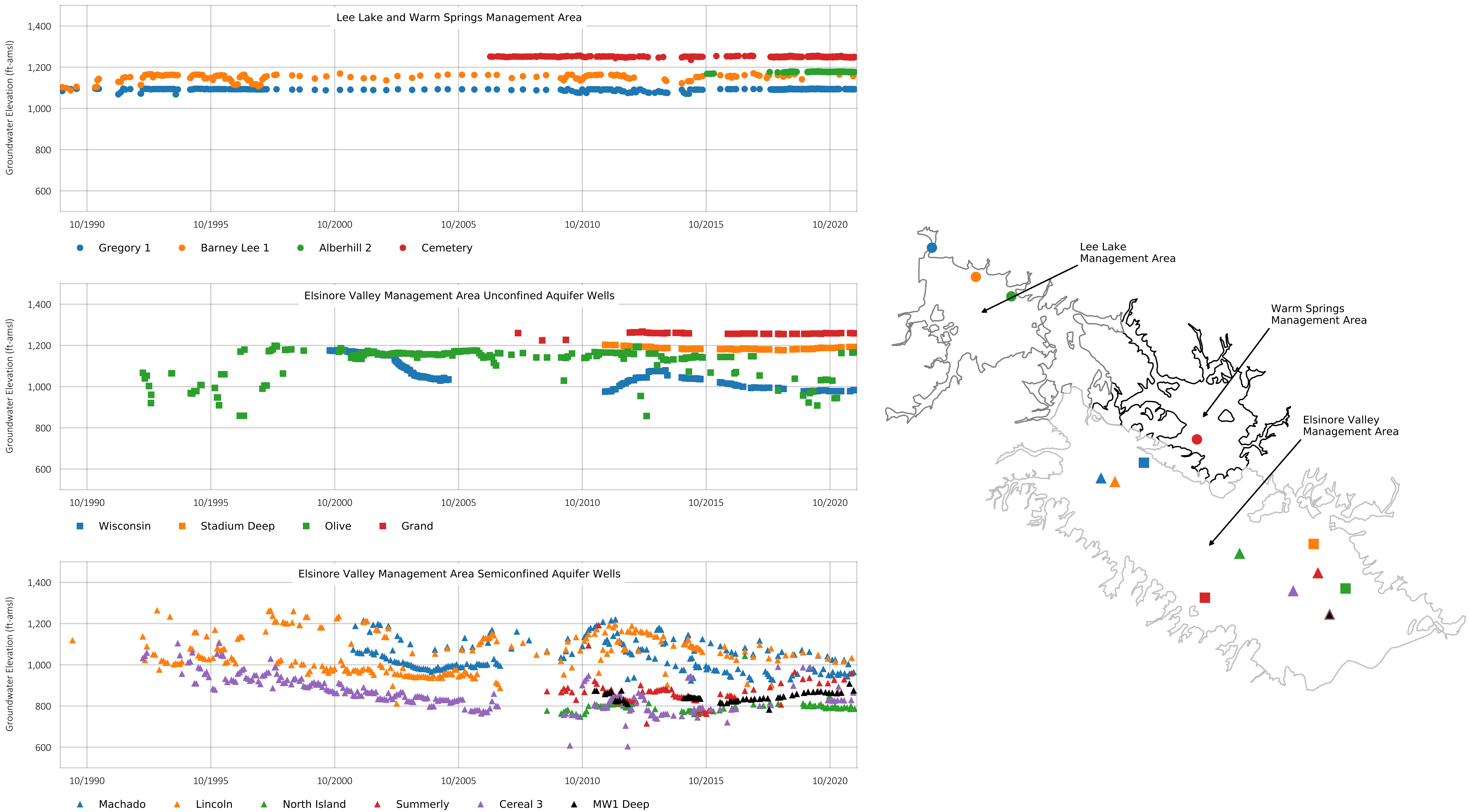
From the late 1990's to 2007, groundwater extractions in the Basin have exceeded recharge, causing declines in groundwater levels primarily in the Elsinore MA due to rapid growth within the region. However, growth halted during the 2007/2008 recession, and through the adoption of the GWMP for the Elsinore Valley Groundwater Subbasin in 2005, groundwater levels have stabilized over the last decade and in some cases, risen. Time history charts of available groundwater level data for each well in the monitoring network were plotted for the period of record from 1990 through 2021 and are included with this Annual Report as Appendix A. Figure 5 is a time history chart that shows the long-term trend in groundwater levels in selected wells in the Lee Lake and Warm Springs MA, Elsinore Valley MA unconfined aquifer, and Elsinore Valley MA semiconfined aquifer.

The long-term decline in groundwater levels within the Basin is most pronounced in the Elsinore Valley MA confined aquifer and generally decreases in intensity in wells closest to Lake Elsinore. Conversely, groundwater levels in the Lee Lake, Warm Springs, Elsinore Valley MA unconfined/semiconfined aquifer generally show little to no change except for the one well that also is screened in the deep confined aquifer (Wisconsin). One of the key objectives of the groundwater level monitoring program is to track and monitor trends to demonstrate progress toward meeting the sustainability goals, including comparing current conditions to minimum thresholds and measurable objectives for the relevant sustainability indicators for the Basin. The sustainability goal for groundwater levels is to ensure groundwater is maintained at adequate levels at key wells. Key groundwater level indicator wells were identified in the GSP to establish minimum thresholds and measurable objectives in each management area of the Basin. Table 6 shows the historical water level trends and minimum thresholds for select key indicator wells compared to the groundwater levels measured in spring 2020 and spring 2021. MTs are defined based on observed historical-low groundwater levels. Undesirable results are triggered when more than 75 percent of the wells (or 100 percent of the wells in the case of the Warm Springs MA) exceed the MT. For the purpose of tracking this trend, the start of the GSP implementation period is fall 2021. Table 6 also shows the change in depth to water from spring 2020 and spring 2021 at each indicator well.

Inspection of the time histories shown in Figure 5 and Appendix A, and the select key wells in Table 6, illustrates groundwater levels throughout the basin have been relatively stable with minor declines in recent years compared to historical long-term trends where groundwater levels have been relatively stable and gradually rising.

Prepared by:

WEST YOST
Water. Engineered.



Groundwater Level Trends in Select Key Monitoring Wells in Elsinore Valley Groundwater Subbasin

Figure 5

Table 6. Historical Water Level Trends and Minimum Thresholds for Key Indicator Wells Compared to 2021 Groundwater Levels

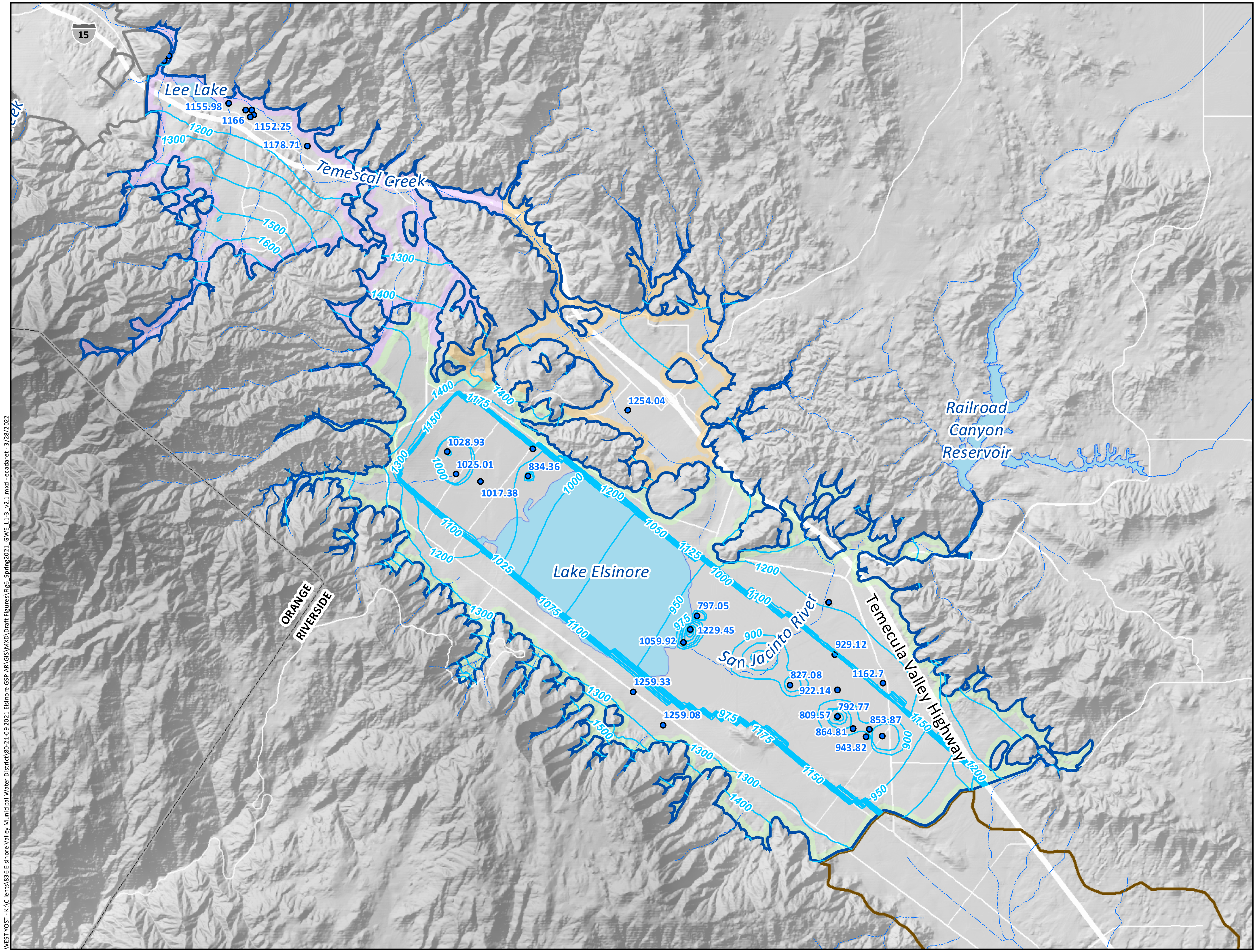
Local Well Name	State Well ID	Historical Groundwater Level Trend [a], ft-yr	Minimum Threshold[b], ft bgs	Spring 2020 Depth to Water[c], ft bgs	Spring 2021 Depth to Water[d], ft bgs	1-Year Change in Groundwater Level, ft
Lee Lake and Warm Springs Management Area						
Gregory 1	05S05W07C01	0.06	20	6.81	8.07	-1.3
Aberhill 2		0.32	20	8.49	8.81	-0.3
Barney Lee 1	05S05W08N01	0.26	70	16.18	*17.00*	-0.8
Station 70	05S05W08N02	0.18	60	20.57	*22.62*	-2.0
Cemetery		-0.20	25	5.73	6.43	-0.7
Elsinore Valley Management Area Unconfined/Semiconfined Aquifer Wells						
Wood #2		-0.34	40	33.00	29.42	3.6
Grand	06S05W24A	0.32	40	34.17	*32.17*	2.0
Olive	06S04W22D02	1.21	390	111.40	*107.30*	4.1
Stadium Deep		-1.31	110	96.04	91.24	4.8
Wisconsin	06S05W02A	-8.30	350	298.42	298.42	0.0
Elsinore Valley Management Area Confined Aquifer Wells						
Cereal 3	06S04W17K01	-6.55	484	303.40	*429.96*	-126.6
Lincoln	06S05W02M04	-3.39	350	232.00	*262.62*	-30.6
Machado	06S05W03H01	-5.39	350	267.08	287.74	-20.7
North Island		1.83	600	458.51	*467.85*	-9.3
MW-1 Deep		1.85	484	392.46	397.66	-5.2
Summerly		1.26	540	357.20	*339.38*	17.8

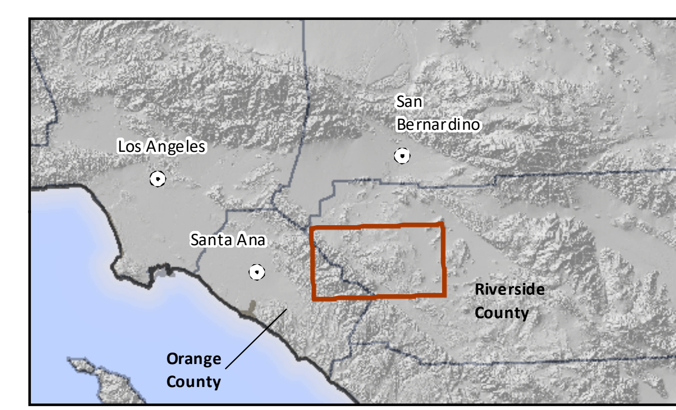
(a) Historical groundwater level trend based on pre-2022 groundwater levels.
(b) The Minimum Threshold is the maximum allowable decline in groundwater levels as measured at the beginning of GSP Implementation through 2040.
(c) If a Spring 2020 water level was not measured, reported measurement value nearest to this date. Values from alternative nearest to April 15 dates or were interpolated are shown in italics.
(d) If a Spring 2021 water level was not measured, reported measurement value nearest to this date. Values from alternative nearest to April 15 dates or were interpolated are shown in italics.

3.2 Groundwater Elevation Contour Maps

To estimate seasonal high and low groundwater elevations in the Basin for WY 2021, all wells in the study area with reliable groundwater-elevation measurements during spring and fall 2021 were mapped. Each well location was assigned a groundwater-elevation representative of each time period. Groundwater elevation contours were generated by hand, using the existing groundwater modeled contours from Spring 2018 as a starting point. For further discussion and justification for this approach, please refer to Section 5.0 Groundwater Change in Storage of this report.

Figure 6 and Figure 7 show the groundwater wells with data and groundwater elevation contours for spring 2021 for the shallow unconfined aquifer and deep semiconfined aquifer, respectively. Figure 8 and Figure 9 show the same information for fall 2021. Changes in groundwater elevations and how they relate to change in storage are described in Section 5.





Groundwater Monitoring Wells Used to Develop Groundwater Elevation Contours for Spring 2021 (ft-amsl)

Other Groundwater Monitoring Wells

Groundwater Elevation Contours
Spring 2021 (ft-amsl)

Groundwater Basins as Classified by DWR

Elsinore Valley Groundwater Subbasin (8-004.01)

Bedford-Coldwater Groundwater Subbasin (8-004.02)

Temecula Valley Groundwater Basin (9-005)

Elsinore Valley Groundwater Management Areas

Elsinore Valley

Lee Lake

Warm Springs

Hydrology

Streams and Flood Control Channels

Lakes and Flood Control Basins

Government Boundaries

County

WEST YOST - K:\Clients\836 Elsinore Valley Municipal Water District\80-21-09 2021 Elsinore GSP AR\GIS\MXD\Draft Figures\Fig6_Spring2021_GWE_L1-3_v2.1.mxd -ecadaret - 3/28/2022

Prepared by:

WEST YOST

0 2 Miles

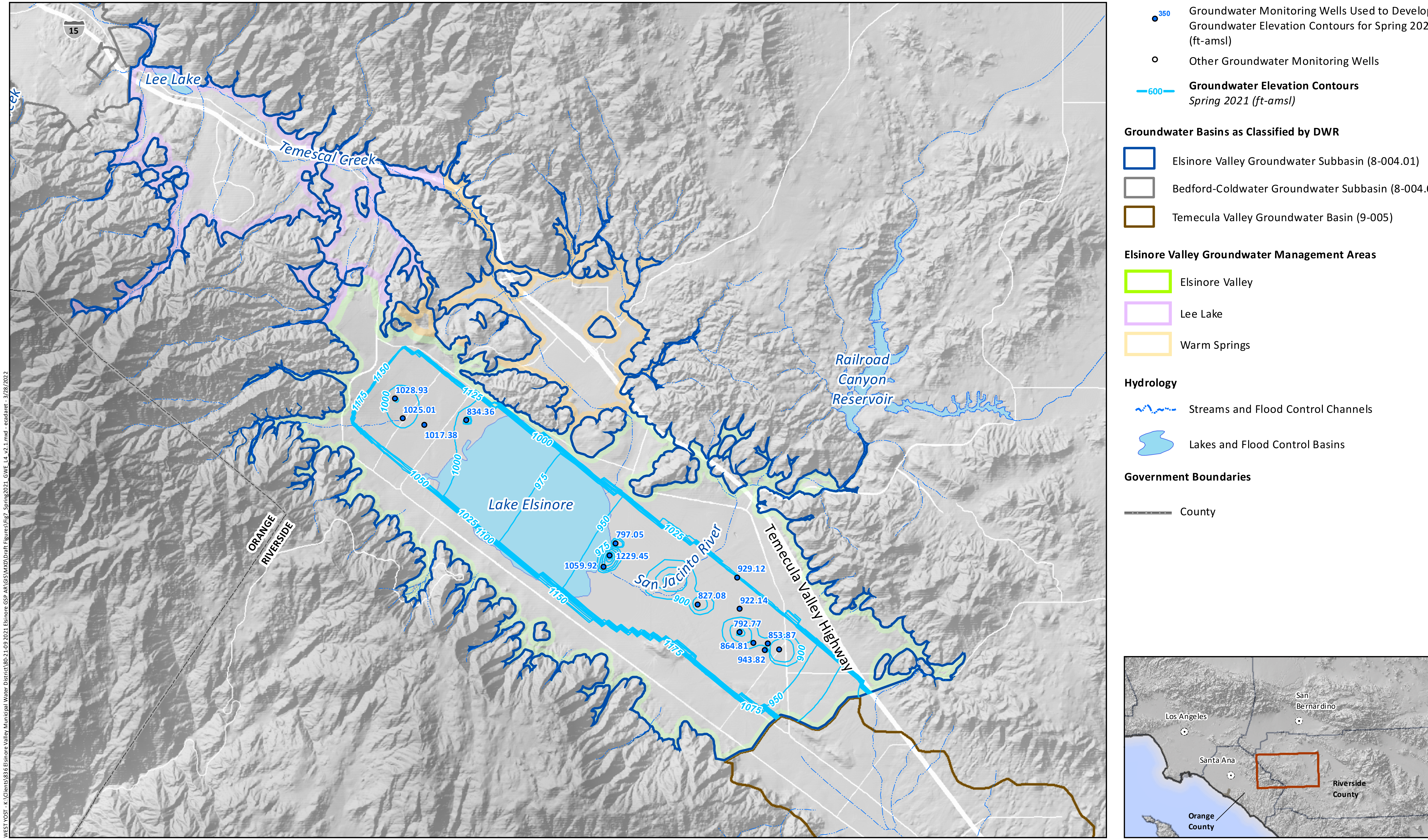
0 3 Km

Elsinore Valley Municipal Water District
Elsinore Subbasin 2021 Annual Report

Prepared for:

Spring 2021 Groundwater Elevation in Shallow Unconfined Aquifer (Layers 1-3)

Figure 6



WEST YOST - K:\Clients\836 Elsinore Valley Municipal Water District\80-21-09 2021 Elsinore GSP AR\GIS\MXD\Draft Figures\Fig7_Spring2021_GWE_L4_v2.1.mxd - ecadaret - 3/28/2022

Prepared by:

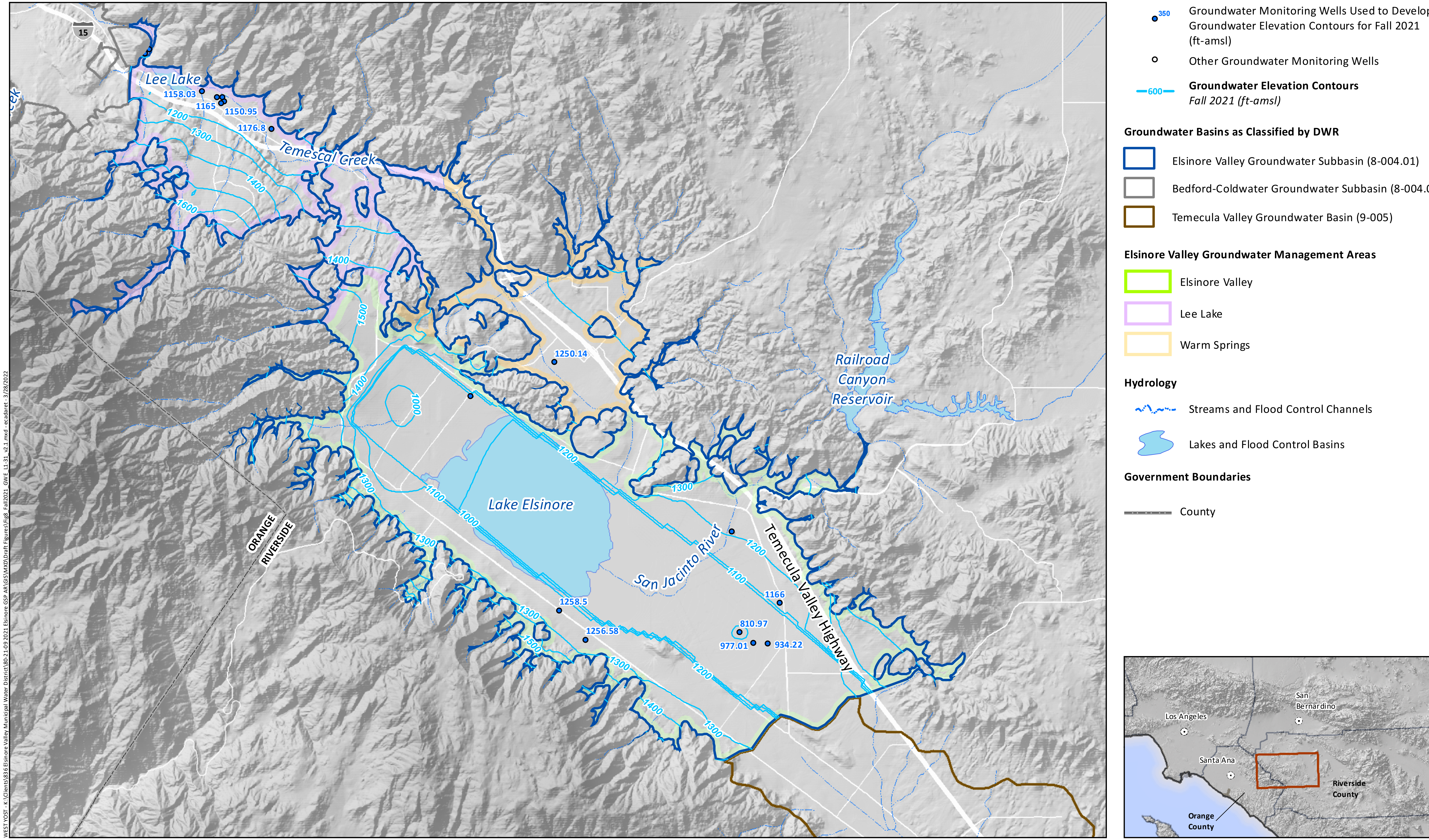
WEST YOST

Elsinore Valley Municipal Water District
Elsinore Subbasin 2021 Annual Report

Prepared for:

Spring 2021 Groundwater Elevation in Deep Semiconfined Aquifer (Layer 4)

Figure 7



Prepared by:

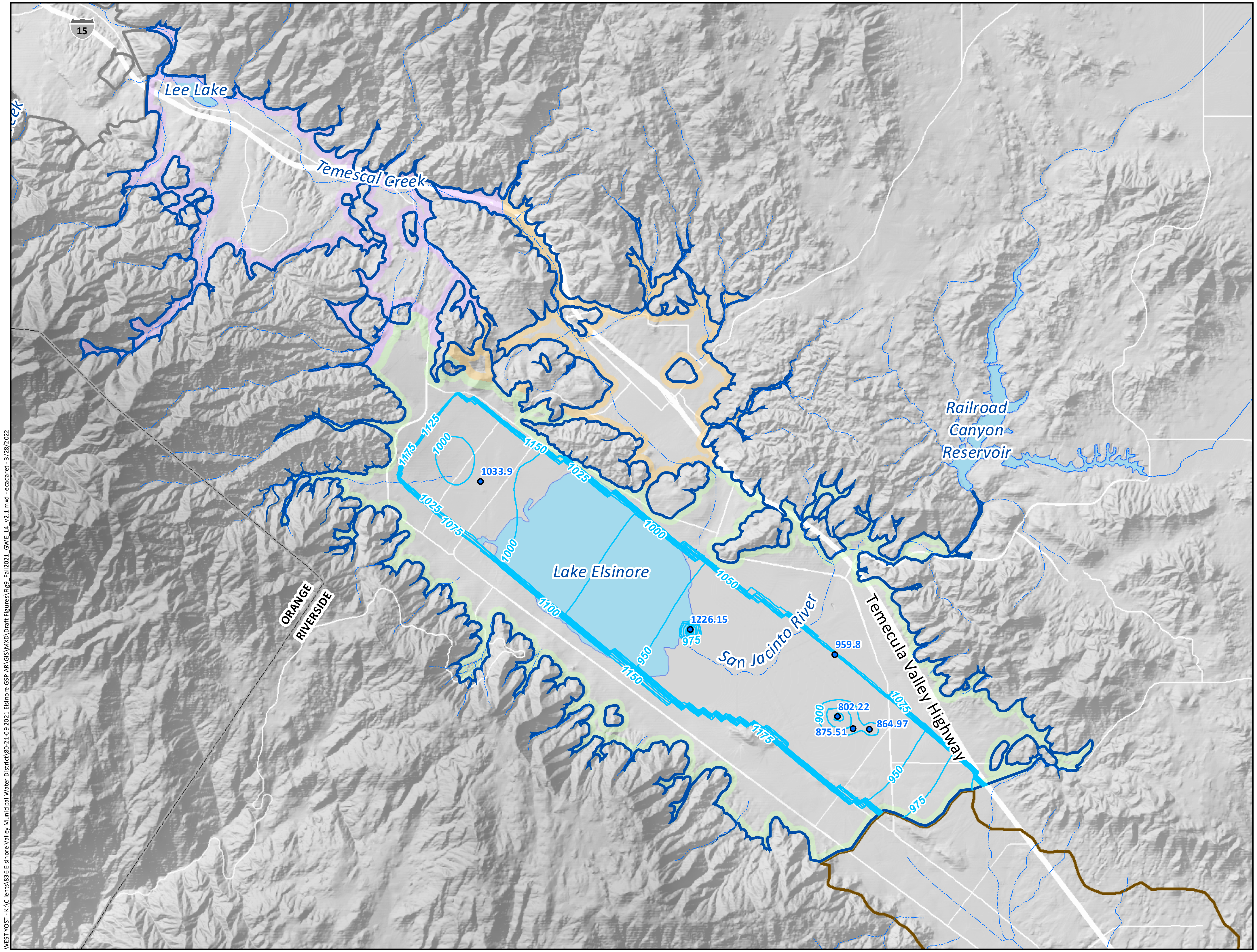
WEST YOST

Elsinore Valley Municipal Water District
Elsinore Subbasin 2021 Annual Report

Prepared for:

Fall 2021 Groundwater Elevation in Shallow Unconfined Aquifer (Layers 1-3)

Figure 8



Groundwater Monitoring Wells Used to Develop Groundwater Elevation Contours for Fall 2021 (ft-amsl)

Other Groundwater Monitoring Wells

Groundwater Elevation Contours *Fall 2021 (ft-amsl)*

Groundwater Basins as Classified by DWR

- Elsinore Valley Groundwater Subbasin (8-004.01)
- Bedford-Coldwater Groundwater Subbasin (8-004.02)
- Temecula Valley Groundwater Basin (9-005)

Elsinore Valley Groundwater Management Areas

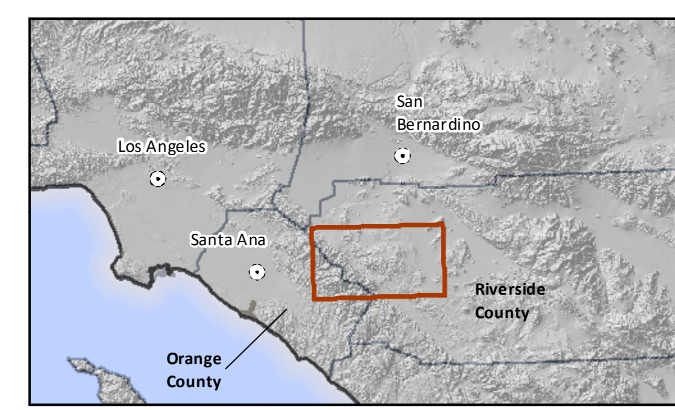
- Elsinore Valley
- Lee Lake
- Warm Springs

Hydrology

- Streams and Flood Control Channels
- Lakes and Flood Control Basins

Government Boundaries

- County



0 2 Miles

0 3 Km

Prepared by:

WEST YOST

Elsinore Valley Municipal Water District

Elsinore Subbasin 2021 Annual Report

Prepared for:

Fall 2021 Groundwater Elevation in Deep Semiconfined Aquifer (Layer 4)

Figure 9

WEST YOST - K:\Clients\836 Elsinore Valley Municipal Water District\80-21-09 2021 Elsinore GSP AR\GIS\MXD\Draft Figures\Fig9_Fall2021_GWE_L4_v2.1.mxd - ecadaret - 3/28/2022

4.0 WATER USE

4.1 Groundwater Extractions

The primary sectors that extract groundwater in the Basin include:

- **Agriculture**. Agricultural pumping is used to irrigate citrus in the Lee Lake MA.
- **Urban**. Urban pumping is mostly done by EVMWD (approximately 99%) and remaining is done by local private pumpers and the City of Lake Elsinore.

To support the development of the GSP, groundwater extraction data provided by the urban pumpers were compiled and tabulated by calendar year. The model was used to estimate groundwater extraction used for agricultural irrigation in Lee Lake MA. The extractions for 2016 through 2021 are summarized by sector in Table 7. The general locations and magnitude of groundwater pumping by sector are shown on Figure 10.

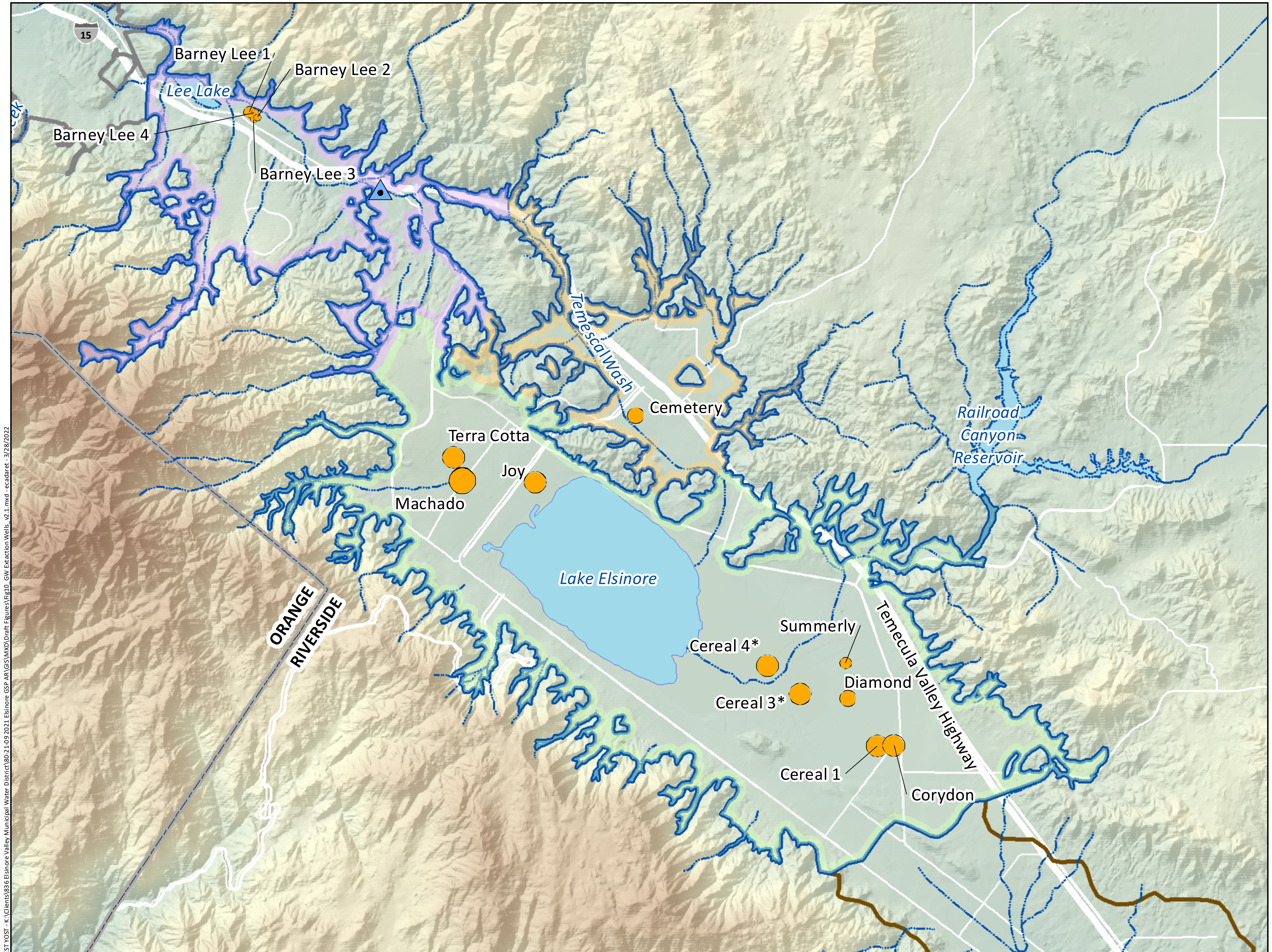
As shown on Table 7, the total annual volume of groundwater extracted in the Basin has been generally decreasing over the last seven years and in dry years, pumping increases to meet demand. Pumping declined by 53 percent over this period, from about 8,800 afy in 2015 to 4,174 afy in 2021. This is a reduction in groundwater extractions of 4,626 af from 2015 to 2021, or an annual average of about 661 afy. The estimated reduction in groundwater extractions is driven by reductions in pumping by EVMWD due to several wells being inactive for several months for maintenance or repair.

Table 7. Groundwater Extractions by Sector - WY 2015 to 2021

Groundwater Use Type	Annual Groundwater Extraction[(a)], acre-feet						
	2015	2016	2017	2018	2019	2020	2021
Agricultural	296	346	317	345	336	336	336
Urban	8,504	5,914	3,270	2,965	2,648	5,921	3,838
Total Groundwater Extraction	**8,800**	**6,260**	**3,587**	**3,310**	**2,984**	**6,257**	**4,174**

(a) EVMWD 2020 UWMP water use calculations are based on calendar year and in this report water use calculations are based on water year which resulted in differences.

Source: Todd, 2021: agricultural pumping from 2015 - 2018 that occurred in the Lee Lake MA was estimated in the GSP using the model based on evaporative demand and crop characteristics. Values for 2019 - 2021 were averaged from the 2016 - 2018 values.



Groundwater Extractionin WY 2021 (af)

- 0.01 - 0.24
- >0.24 - 0.83
- >0.83 - 53.0
- >53.0 - 635.0
- >635.0 - 991.6
- Private Well with Unknown Groundwater Extraction

Groundwater Basins as Classified by DWR

- Elsinore Valley Groundwater Subbasin (8-004.01)
- Bedford-Coldwater Groundwater Subbasin (8-004.02)
- Temecula Valley Groundwater Basin (9-005)

Elsinore Valley Groundwater Management Areas

- Elsinore Valley
- Lee Lake
- Warm Springs

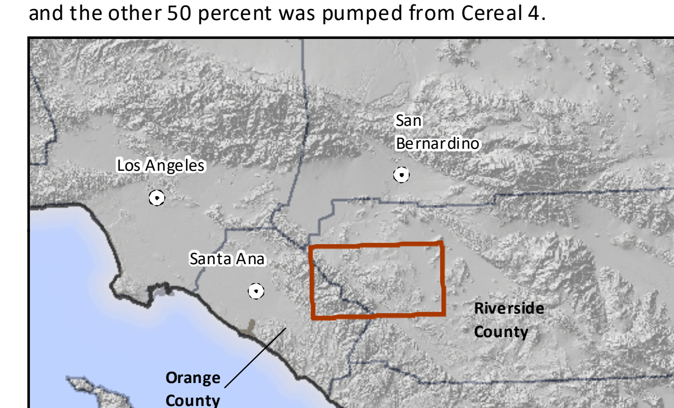
Hydrology

- Streams and Flood Control Channels
- Lakes and Flood Control Basins

Government Boundaries

- County

*Note: Pumping from Cereal 3 and Cereal 4 are combined and treated at the Back Basin Groundwater Treatment Plant (BBGWTP). Individual pumping volume for these wells are not provided and only total volume for the BBGWTP is provided in 2021. It is assumed that 50 percent of total treated volume was pumped from Cereal 3 and the other 50 percent was pumped from Cereal 4.



WEST YOST - K:\Clients\836 Elsinore Valley Municipal Water District\80-21-09 2021 Elsinore GSP AR\GIS\MXD\Draft Figures\Fig10_GW Extraction Wells_v2.1.mxd - ecadaret - 3/28/2022

Prepared by:

WEST YOST

0 1 2 Miles
0 1.5 3 Km

Prepared for:

Elsinore Valley Municipal Water District
Elsinore Subbasin 2021 Annual Report

Urban Groundwater Extraction in 2021

Figure 10

4.2 Surface Water Use

Over two thirds of the water used in the basin comes from imported water. EVMWD purchases imported water from MWDSC through WMWD. Imported water delivered to EVMWD comes from two surface water treatment facilities. Skinner Filtration Plant and Miller Filtration Plant. Treated water from Skinner Filtration Plant is conveyed to EVMWD via the Auld Valley Pipeline, and EVMWD has the rights to purchase up to 27,000 afy of that conveyance, but annual use is limited by hydraulic conditions to approximately 22,500 afy (MWH, 2016). Water purchased from WMWD is treated at MWDSC's Mills Filtration Plant. Treated water from Mills Filtration Plant is conveyed to EVMWD via the Mills Gravity Pipeline and the Temescal Valley Pipeline (TVP). EVMWD may obtain up to 12,700 afy of imported water via the TVP (MWH, 2016) and can increase its use of water from Mills Filtration Plant with implementation of additional pumping capacity. Additional surface water from Canyon Lake is imported and treated at the Canyon Lake Water Treatment Plant (WTP). Since 2007, eight wells in the Basin are used to inject treated imported water into the groundwater as in-lieu recharge.

As shown in Table 8, the total volume of imported water for potable use in the EVMWD service area has been increasing over the last seven years from 2015 to 2021. Imported water use increased by 38 percent over this period, from about 13,778 afy in 2015 to 18,954 afy in 2021. This is an increase in imported water use of 5,176 afy from 2015 to 2021, or an annual average of about 739 afy. The estimated increase in imported water use may be driven by an increase in development within the Basin and several groundwater wells being inactive for several months for maintenance or repair.

In addition to imported water, recycled water for non-potable use from five wastewater reclamation facilities augments groundwater recharge in the form of irrigation of recreational landscape areas and discharges into Temescal Wash and the San Jacinto River. Recycled water from the Regional WRF is also discharged to Lake Elsinore for managed wetland use. The total volume of recycled water for non-potable and managed wetland use in the EVMWD service area has been increasing over the last seven years from 2015 to 2021. Recycled water use increased by 7 percent over this period, from about 7,298 afy in 2015 to 7,791 afy in 2021. This is an increase in recycled water use of 493 afy from 2015 to 2021, or an annual average of about 70 afy.

Table 8. Imported Water and Recycled Water Use - WY 2015 to 2021

Water Type	Primary Water Use	Annual Water Use[d], acre-feet						
		2015	2016	2017	2018	2019	2020	2021
Imported Water[a]	Potable Use	11,269	15,751	16,080	19,898	16,351	14,882	18,954
Surface water from Canyon Lake WTP	Potable Use	2,509	168	2,351	1,158	1,832	582	0
Recycled Water from Railroad Canyon WRF	Non-potable use, irrigation	228	506	474	556	441	487	509
Recycled Water from Horsethief Canyon WRF	Non-potable use, irrigation	430	234	227	248	197	206	241
Recycled Water from Santa Rosa WRF[b]	Non-potable use, irrigation	171	257	232	332	362	362	411
Recycled water from Regional WRF for irrigation	Non-potable use, irrigation	5	5	5	5	5	5	5
Recycled water from Regional WRF discharged to Temescal Wash	Managed Wetlands	625	642	589	622	520	569	540
Recycled water from Regional WRF discharged to Lake Elsinore	Managed Wetlands	5,598	4,853	5,265	4,757	6,118	6,037	5,915
Supplemental Recycled Water from Eastern MWD[c]	Non-potable use, irrigation	241	139	178	175	159	114	171
	Total Water Use	**21,076**	**22,555**	**25,401**	**27,751**	**25,986**	**23,243**	**26,745**

(a) Imported water from Mills and Skinner Plants

(b) Under a three-agency agreement between Elsinore Valley MWD, the Eastern MWD, and the Rancho California Water District (RCWD), recycled water from the Santa Rosa WRF is conveyed to the Wildomar recycled water system through the Eastern MWD's Temecula Valley Recycled Water Pipeline (TVRWP). Under this agreement, Elsinore Valley MWD has the right to access recycled water supply from the Santa Rosa WRF in an amount equal to the wastewater generated in Elsinore Valley MWD's Southern sewershed.

(c) Elsinore Valley MWD purchases recycled water from Eastern MWD to supplement recycled water supply during summer months when irrigation demand is high.

(d) EVMWD 2020 UWMP water use calculations are based on calendar year and in this report water use calculations are based on water year which resulted in differences.

4.3 Total Water Use

Total water use in the basin is primarily sourced from imported water and groundwater making up on average 89 percent of the total water used in the Basin over the past seven years from 2015 to 2021. As shown in Table 9, total water use in the Basin has been increasing over the last seven years. Total water use increased by 3 percent over this period, from about 29,876 afy in 2015 to 30,919 afy in 2021. This is an increase in total water use of 1,043 afy from 2015 to 2021, or an annual average of about 149 afy.

Table 9. Total Water Use - WY 2015 to 2021

Water Type	Annual Water Use[c], acre-feet						
	2015	2016	2017	2018	2019	2020	2021
Groundwater	8,800	6,260	3,587	3,310	2,984	6,257	4,174
Imported Water[a]	11,269	15,751	16,080	19,898	16,351	14,882	18,954
Surface Water from Canyon Lake WTP	2,509	168	2,351	1,158	1,832	582	0
Recycled Water[b]	7,298	6,636	6,970	6,696	7,803	7,780	7,791
Total Water Use	**29,876**	**28,815**	**28,988**	**31,061**	**28,969**	**29,501**	**30,919**

(a) Imported water from Mills and Skinner Plants

(b) Includes recycled water from Railroad Canyon WRF, Horsethief Canyon WRF, Santa Rosa WRF, Regional WRF, and supplemental recycled water from Eastern MWD.

(c) EVMWD 2020 UWMP water use calculations are based on calendar year and in this report water use calculations are based on water year which resulted in differences.

5.0 CHANGE IN GROUNDWATER STORAGE

This section describes the methods used to compute the change in storage for the reporting period, reports the change in storage for spring 2020 to spring 2021, and compares the change in storage to the history of storage changes and annual groundwater extractions. Note that the storage change estimates reported herein are preliminary estimates and are not intended to be used to change management actions under the GSP. Detailed evaluations of changes in groundwater conditions will be performed every five years consistent with SGMA and the GSP. For the purpose of this compliance report, the change in storage methods applied herein will be used for each Annual Report for the Basin to the DWR in order to provide year-over-year comparisons reported therein. Future reports may include revised estimates of historical changes in storage based on changes in the methods over time.

5.1 Change in Storage Methods

As previously noted in Section 1.2, the four principal aquifers of the Basin are considered to comprise two aquifers: shallow unconfined and deep semiconfined. The change in volume of groundwater stored in the Basin subsurface is not a parameter that can be directly measured; rather, change in storage must be estimated using model aquifer properties and groundwater elevation data collected at monitoring wells. For this reporting period, the one-year change in storage was computed for spring 2020 to spring 2021.

The information required to estimate the change in storage for the Basin includes:

- Groundwater elevation maps for spring 2018, 2019, and 2020 and fall 2021.
- 100 x 100 ft cell storage grid for the shallow aquifer and deep aquifer superimposed over the Basin area to assign groundwater elevations and aquifer properties.
- The specific yield of the aquifer sediments where the change in groundwater elevations occurred. Specific yield is a ratio of the volumetric fraction that a bulk aquifer volume will yield when the water drains out by gravity.

Figure 11 and Figure 12 show the groundwater-elevation contours for spring 2020 and spring 2021, respectively.

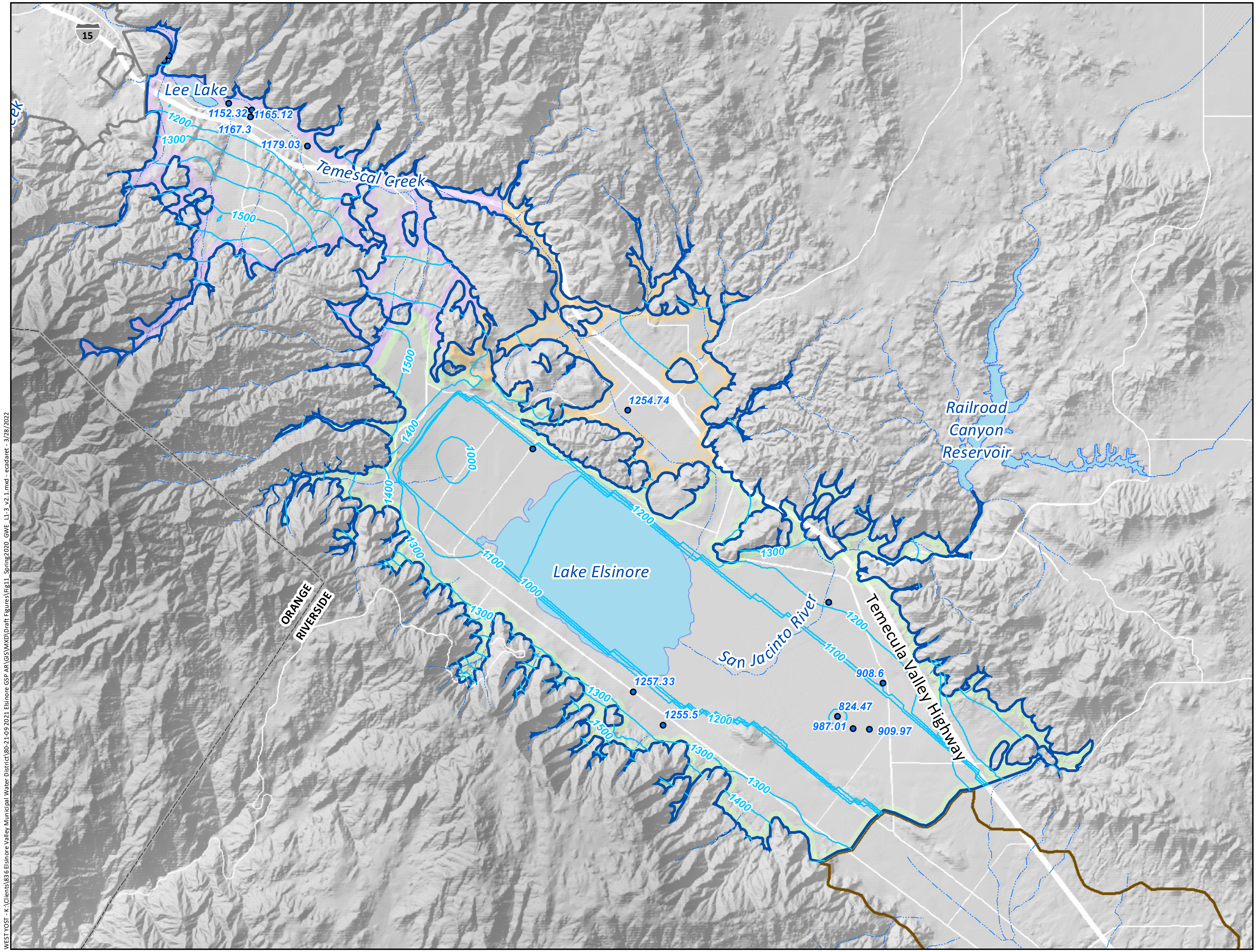
Figure 13 shows the storage change grid superimposed over the basin for the shallow and deep aquifer. The shallow aquifer and deep aquifer grid domains include a total of 96,786 cells and 31,636 cells, respectively. To assign aquifer properties to each grid cell, the storage grid was superimposed over the model grid. The model grid is subdivided vertically into four layers. Each layer within a Basin model grid cell has specific yield values unique to each layer based on textural analysis of the lithologic logs. The estimated average specific yield of the shallow aquifer is six percent, while the deep aquifer is 2.8 percent. Because the entire Basin behaves in a predominantly unconfined to semi-confined/confined manner, the specific yield values for each model grid cell were averaged across the upper three layers of the model to create one value of average specific yield per grid cell and the lowest aquifer used the specific yield that was originally assigned in the model. Then, a one-to-one spatial join using a closest match option was performed to join the Basin grid averaged specific yield values to the 100 ft by 100 ft storage change grid shown on Figure 13. A specific yield of zero (0) was assigned to all grid cells outside the model grid domain. Figure 13 shows the grid cells included in the change in storage calculation.

The annual change in storage was calculated at the grid-cell level using the following equation:

$$Change\ in\ Storage_i = \left(GWE_i^{t1} - GWE_i^{t0}\right) \times S_{y_i} \times A$$

where *i* represents a unique cell within the storage change calculation grid, *GWE* is the interpolated groundwater elevation at cell *i*, S*y* is the specific yield defined at cell *i*, A is the area of each cell, and *t1* and *t0* are the two years between which storage change is calculated.

For the purposes of calculating change in storage, the model was evaluated by inspecting water level data and aquifer properties for all four model layers described in the model appendices (Todd, 2021). It was determined that model layers 1 through 3 consist of wells that are representative of the shallow unconfined aquifer and model layer 4 consists of wells that are representative of the deep semiconfined aquifer. Figure 14 shows a schematic of layering in the model and layer thickness. Model layers 1 through 3 consist of consist of alluvial deposits and weathered bedrock (all MAs), Bedford Canyon Formation (Lee Lake MA), Silverado Formation (Warm Springs MA), and a semi-confining clay (Elsinore MA). Model layer 4 consists of the semi-confining to confining Pauba Formation. Contours generated from the model for spring 2018 were used as a basis for hand contouring spring 2019, spring 2020, spring 2021, and fall 2021 contours for both the shallow and deep aquifers for this Annual Report, because the model generated contours account for complex geologic structures and aquifer properties. These hand-generated contours were digitized in Geographic Information System (GIS). Interpolated groundwater elevation values for each set of contours were generated in GIS. The groundwater elevation values for each grid cell were assigned to the Basin grid that contained the averaged specific yield values as described above. The sum of the change in storage values by grid cell provided an estimate of the total annual change in groundwater in storage in the Basin and for each management area.



- Groundwater Monitoring Wells Used to Develop Groundwater Elevation Contours for Spring 2020 (ft-amsl)
- Other Groundwater Monitoring Wells
- **Groundwater Elevation Contours** *Spring 2020 (ft-amsl)*

Groundwater Basins as Classified by DWR

- Elsinore Valley Groundwater Subbasin (8-004.01)
- Bedford-Coldwater Groundwater Subbasin (8-004.02)
- Temecula Valley Groundwater Basin (9-005)

Elsinore Valley Groundwater Management Areas

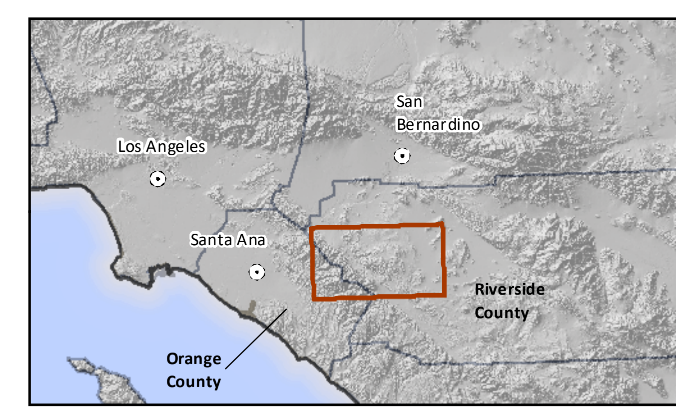
- Elsinore Valley
- Lee Lake
- Warm Springs

Hydrology

- Streams and Flood Control Channels
- Lakes and Flood Control Basins

Government Boundaries

- County



WEST YOST - K:\Clients\836 Elsinore Valley Municipal Water District\80-21-09 2021 Elsinore GSP AR\GIS\MXD\Draft Figures\Fig11_Spring2020_GWE_L1-3_v2.1.mxd - ecadaret - 3/28/2022

Prepared by:

WEST YOST

0 2 Miles

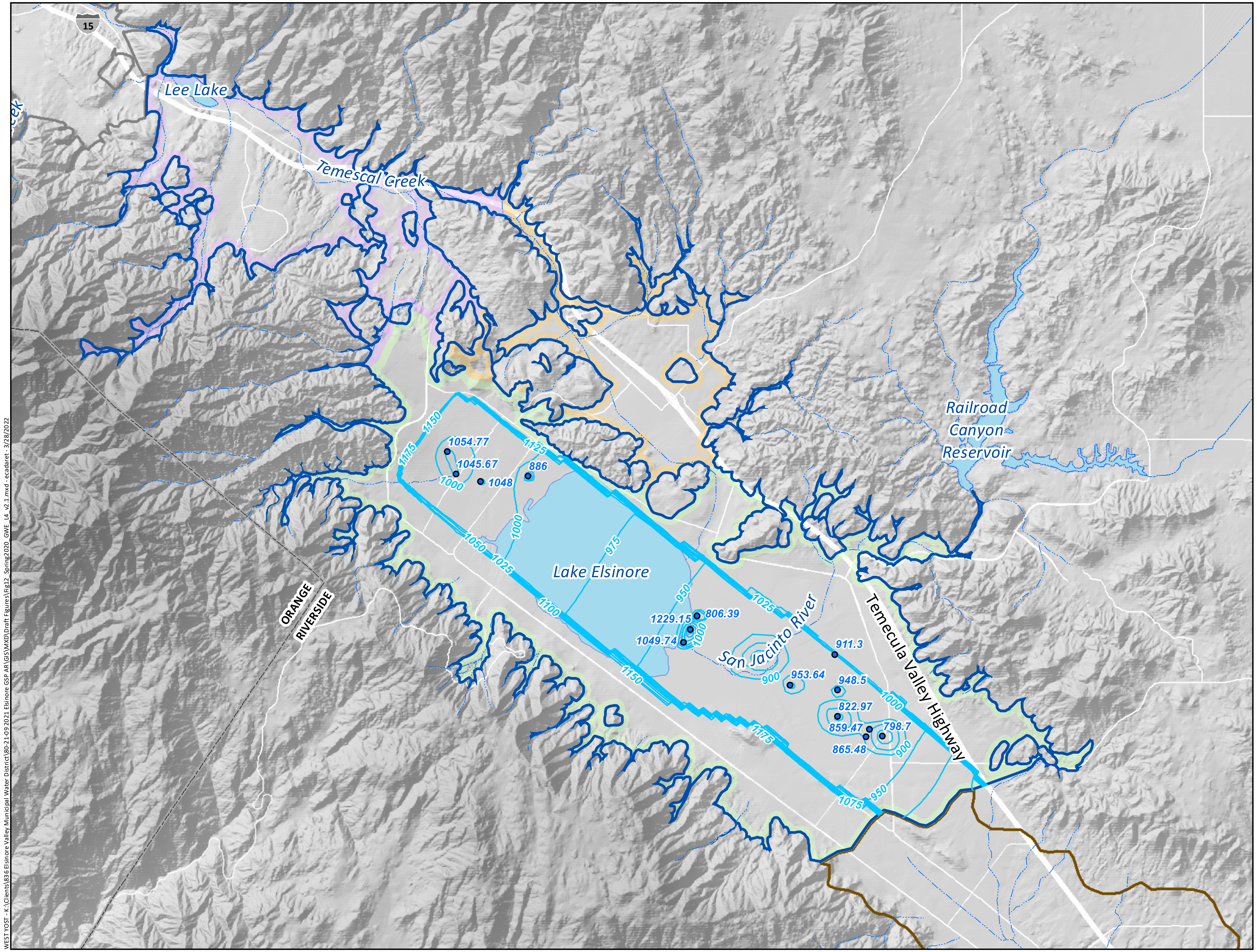
0 3 Km

Prepared for:

Elsinore Valley Municipal Water District
Elsinore Subbasin 2021 Annual Report

Spring 2020 Groundwater Elevation in Shallow Unconfined Aquifer (Layers 1-3)

Figure 11



Groundwater Monitoring Wells Used to Develop Groundwater Elevation Contours for Spring 2020 (ft-amsl)

Other Groundwater Monitoring Wells

Groundwater Elevation Contours
Spring 2020 (ft-amsl)

Groundwater Basins as Classified by DWR

Elsinore Valley Groundwater Subbasin (8-004.01)

Bedford-Coldwater Groundwater Subbasin (8-004.02)

Temecula Valley Groundwater Basin (9-005)

Elsinore Valley Groundwater Management Areas

Elsinore Valley

Lee Lake

Warm Springs

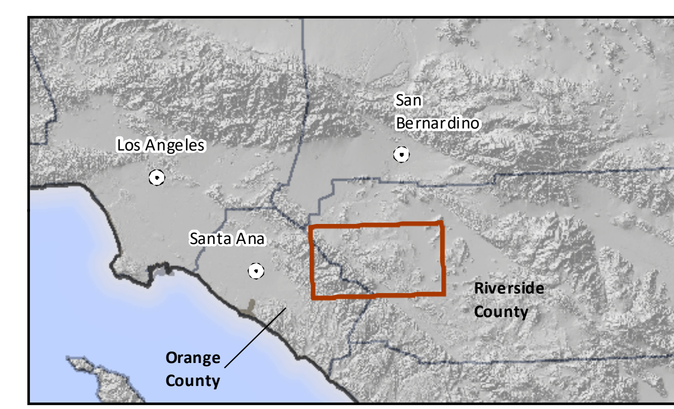
Hydrology

Streams and Flood Control Channels

Lakes and Flood Control Basins

Government Boundaries

County



Prepared by:

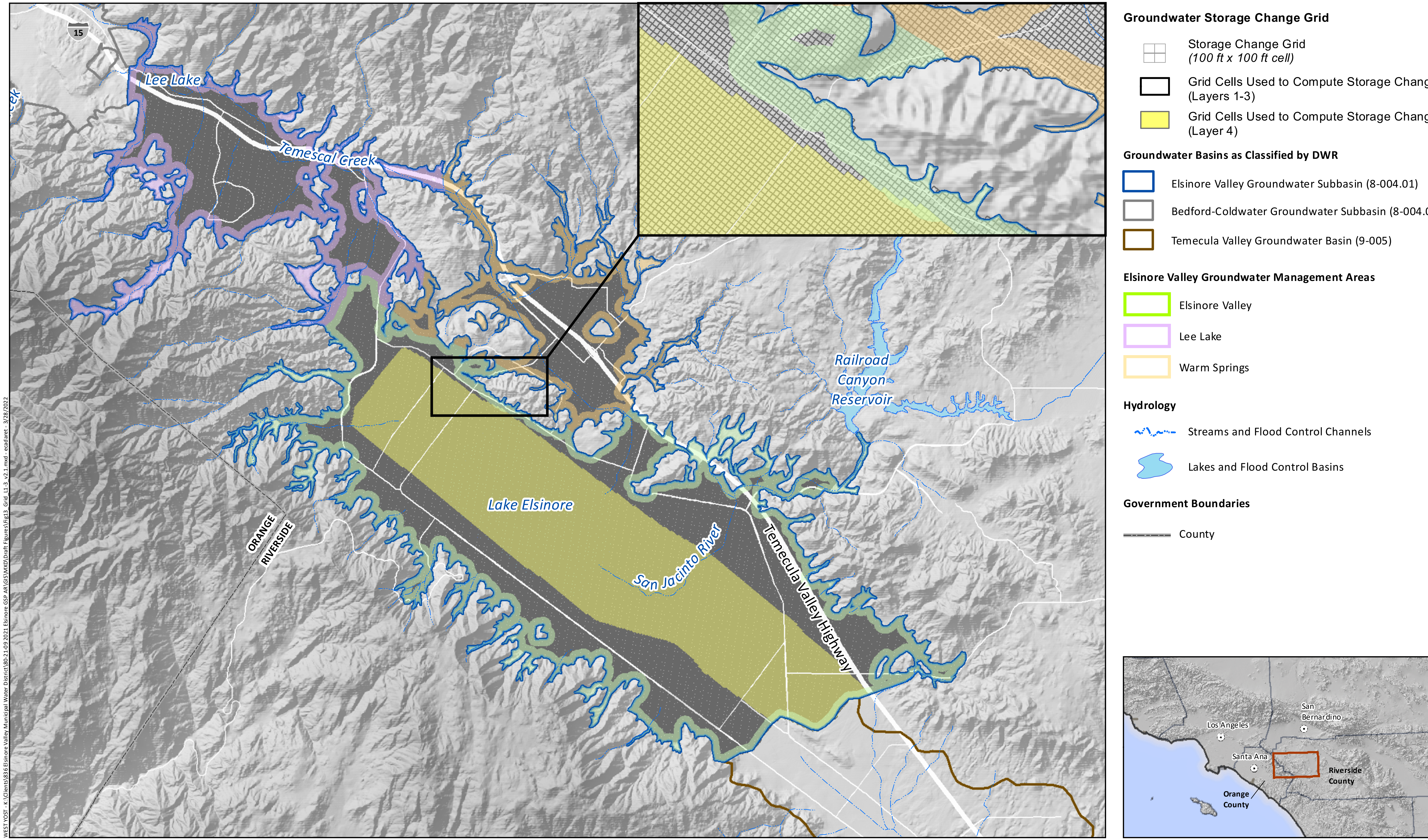
0 2 Miles
0 3 Km

Elsinore Valley Municipal Water District
Elsinore Subbasin 2021 Annual Report

Prepared for:

Spring 2020 Groundwater Elevation in Deep Semiconfined Aquifer (Layer 4)

Figure 12



WEST YOST - K:\Clients\836 Elsinore Valley Municipal Water District\80-21-09 2021 Elsinore GSP AR\GIS\MXD\Draft Figures\Fig13_Grid_L1-3_v2.1.mxd - ecadaret - 3/28/2022

Prepared by:

WEST YOST

0 2 Miles

0 3 Km

Elsinore Valley Municipal Water District
Elsinore Subbasin 2021 Annual Report

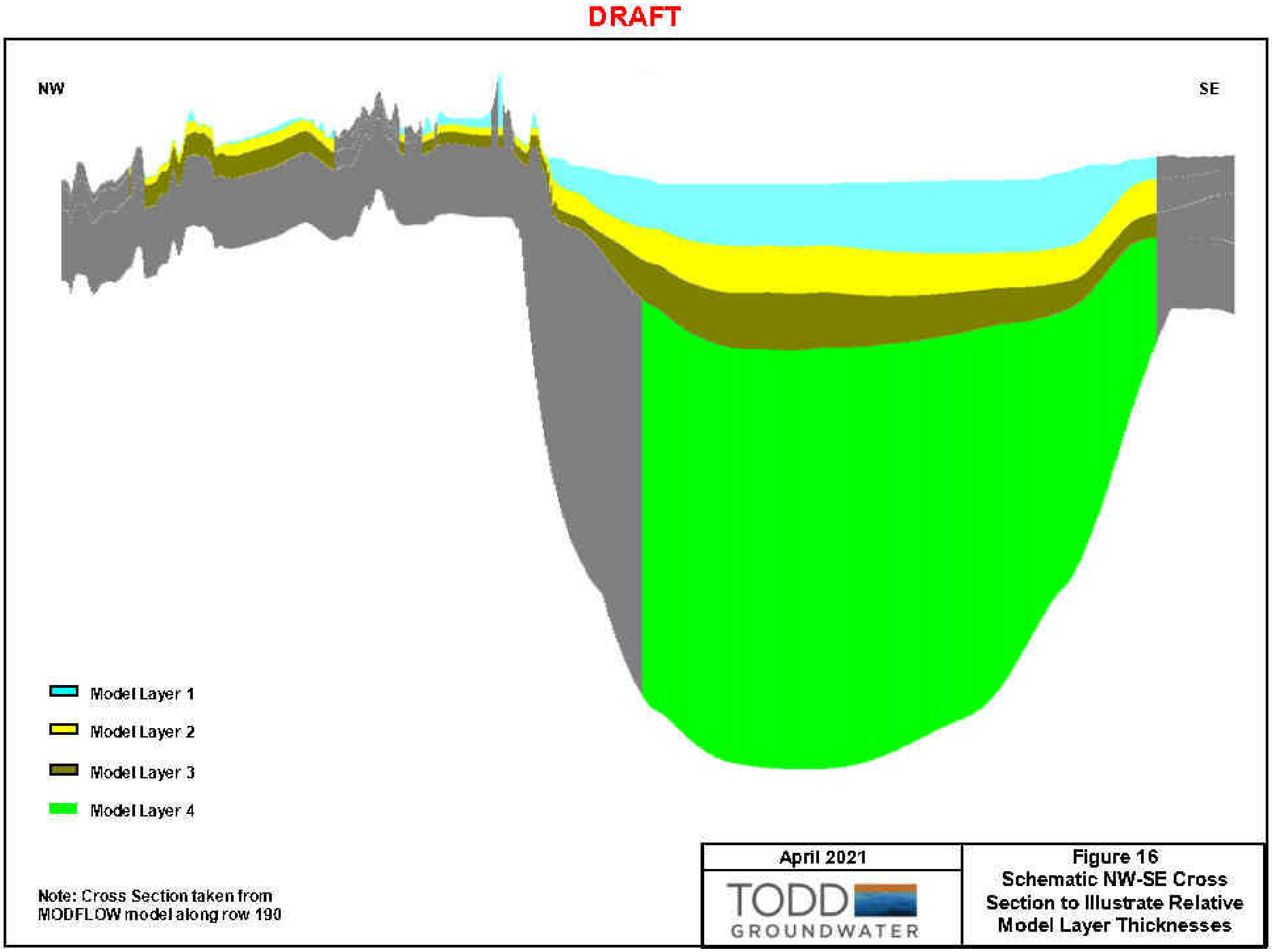
Prepared for:

EVMWD

Storage Change Grid Used to Compute Storage Change for Layers 1--4

Figure 13

Figure 14. Model Layering and Thickness (Todd, 2021).



5.2 Annual and Cumulative Change in Storage

Figure 15 and Figure 16 show the spatial distribution of the change in groundwater storage volume from spring 2020 to spring 2021 for the shallow and deep aquifers. Also shown on Figure 15 and Figure 16 are the wells with representative groundwater elevation data in both spring 2020 and spring 2021 that were used to generate the change in storage. The total change in storage over WY 2021 was about 1,311 af. This change in storage is consistent with observations made in the GSP (Todd, 2021) that Basin groundwater levels are stable and have steadily risen in some areas.

Table 10 summarizes the annual change in storage for each MA, and the Basin as whole and the cumulative change in storage for spring 2015 through fall 2021. The spring 2015 to spring 2018 annual change in storage values were derived from the GSP modeled change in storage calculations found in the GSP Appendices (Todd, 2021). Over this period, the volume of groundwater in storage in the Basin increased by about 8,419 af.

Table 10. Annual and Cumulative Change in Groundwater Storage in the Basin

Period	Shallow Unconfined (Layers 1-3) and Deep Semiconfined (Layer 4) Aquifers				
	Annual Change in Storage in the Lee Lake MA (af)	Annual Change in Storage in the Warm Springs MA (af)	Annual Change in Storage in the Elsinore Valley MA (af)	Annual Change in Storage for the Basin (af)	Cumulative Change in Storage (af)
Spring 2015	45	-38	-2,774	-2,767	-2,767
Spring 2016	-87	-234	-1,406	-1,727	-4,494
Spring 2017	1,349	255	8,943	10,547	6,053
Spring 2018	-467	-203	373	-297	5,756
Spring 2019	31	105	1,469	1,605	7,361
Spring 2020	0	-117	40	-77	7,284
Spring 2021	-16	141	-301	-176	7,108
Fall 2021	2	-28	1,337	1,311	8,419

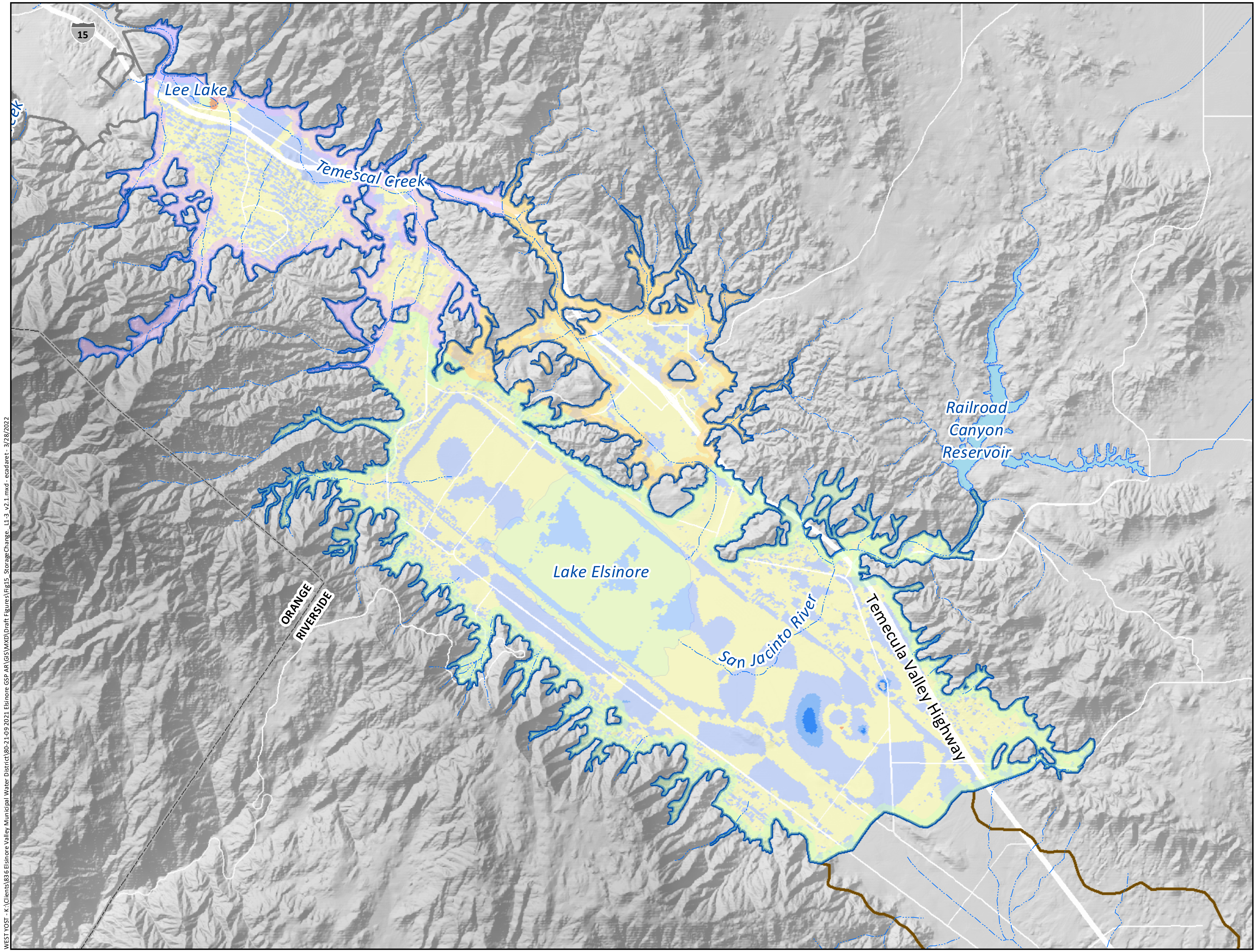
Table 11 shows the annual change in storage for each MA, and the Basin as a whole and the cumulative change in storage for the shallow unconfined aquifer from WY 2019 through 2021. Table 12 shows the annual change in storage and the cumulative change in storage for the deep aquifer from WY 2019 through 2021; both of which were calculated as a part of this report. Over this period, the volume of groundwater in storage in the shallow and deep aquifers increased by about 114 af and 2,549 af, respectively. As shown in Table 11 and Table 12, and Figure 15 and Figure 16, the magnitude of change in storage varies from year to year and is generally correlated with an increase in imported water deliveries, and a reduction in pumping since 2016 that has allowed groundwater storage in the basin to increase. Figure 17 shows the 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 WY 2015 to the current reporting year.

Table 11. Annual and Cumulative Change in Groundwater Storage in the Shallow Unconfined Aquifer from Spring 2019 – Fall 2021

Period	Shallow Unconfined Aquifer (Layers 1-3)				
	Annual Change in Storage in the Lee Lake MA (af)	Annual Change in Storage in the Warm Springs MA (af)	Annual Change in Storage in the Elsinore Valley MA (af)	Annual Change in Storage for the Basin (af)	Cumulative Change in Storage (af)
Spring 2019	31	105	1	137	137
Spring 2020	0	-117	0	-117	20
Spring 2021	-16	141	0	125	145
Fall 2021	2	-28	-5	-31	114

Table 12. Annual and Cumulative Change in Groundwater Storage in the Deep Semiconfined Aquifer from Spring 2019 – Fall 2021

Period	Deep Semiconfined Aquifer (Layer 4)	
	Annual Change in Storage Elsinore Valley (af)	Cumulative Change in Storage (af)
Spring 2019	1468	1468
Spring 2020	40	1508
Spring 2021	-301	1207
Fall 2021	1342	2549



Groundwater Storage Change
Spring 2020 to Spring 2021 (af)

- < -0.3
- -0.3 - -0.2
- -0.2 - -0.1
- -0.1 - 0
- 0
- 0 - 0.1
- 0.1 - 0.2
- >.2

Groundwater Basins as Classified by DWR

- Elsinore Valley Groundwater Subbasin (8-004.01)
- Bedford-Coldwater Groundwater Subbasin (8-004.02)
- Temecula Valley Groundwater Basin (9-005)

Elsinore Valley Groundwater Management Areas

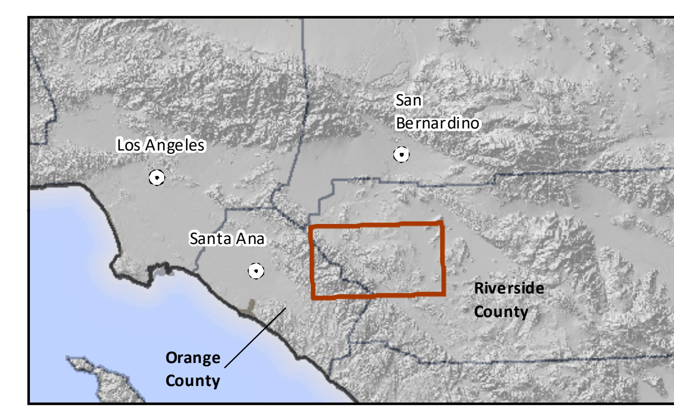
- Elsinore Valley
- Lee Lake
- Warm Springs

Hydrology

- Streams and Flood Control Channels
- Lakes and Flood Control Basins

Government Boundaries

- County



Prepared by:

WEST YOST

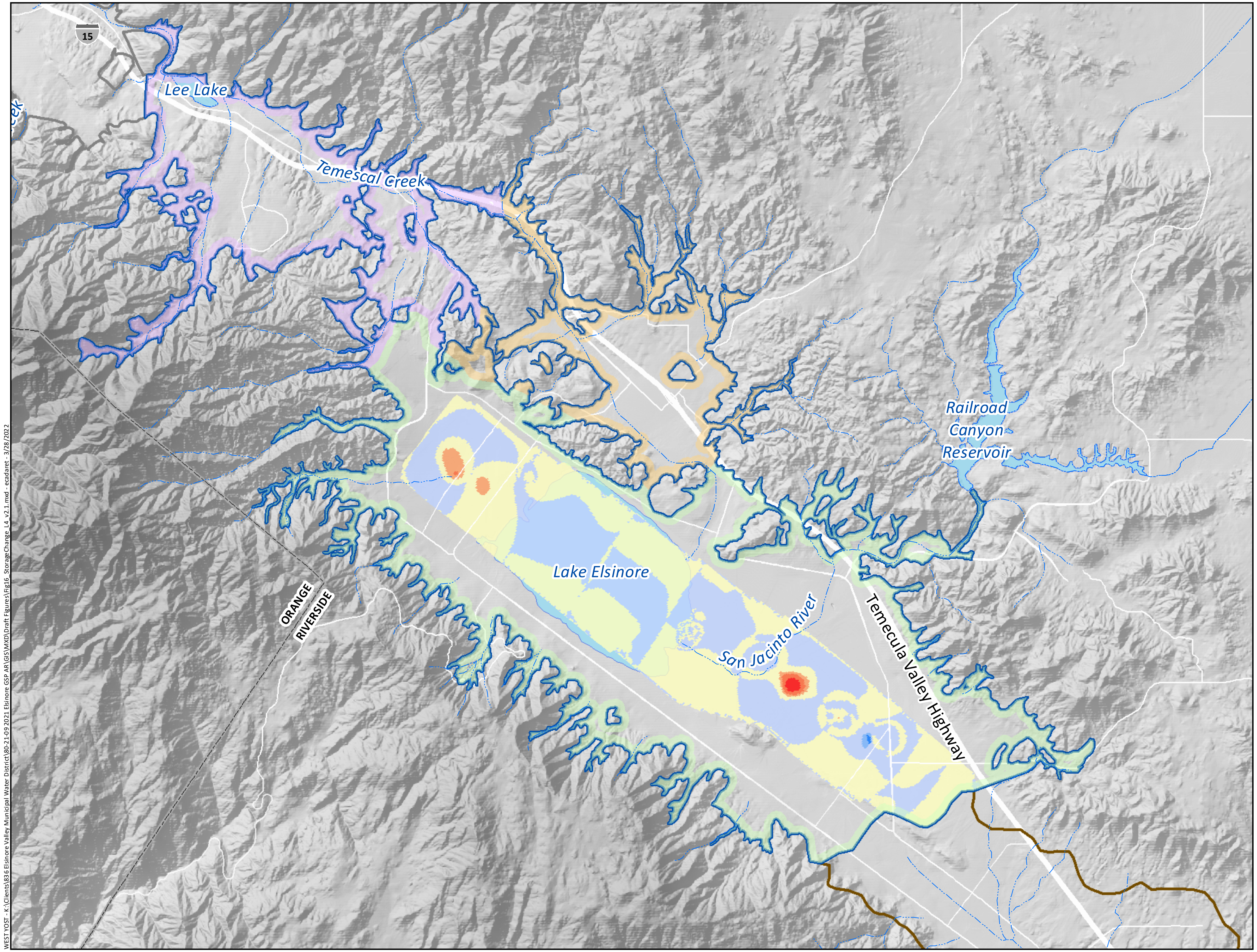
0 2 Miles
0 3 Km

Elsinore Valley Municipal Water District
Elsinore Subbasin 2021 Annual Report

Prepared for:

Change in Groundwater Storage in Shallow Aquifer (Layers 1-3)
Spring 2020 to Spring 2021

Figure 15



Groundwater Storage Change
Spring 2020 to Spring 2021 (af)

- < -1.0
- -1.0 - -0.5
- -0.5 - -0.25
- -0.25 - 0.0
- 0
- 0- 0.25
- 0.25 - 0.5
- > .5

Groundwater Basins as Classified by DWR

- Elsinore Valley Groundwater Subbasin (8-004.01)
- Bedford-Coldwater Groundwater Subbasin (8-004.02)
- Temecula Valley Groundwater Basin (9-005)

Elsinore Valley Groundwater Management Areas

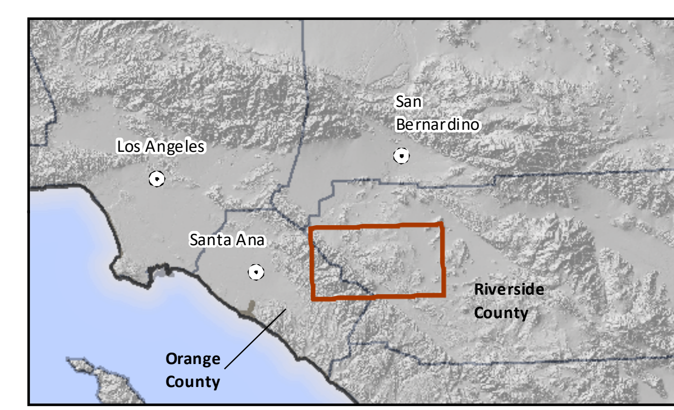
- Elsinore Valley
- Lee Lake
- Warm Springs

Hydrology

- Streams and Flood Control Channels
- Lakes and Flood Control Basins

Government Boundaries

- County



Prepared by:

WEST YOST

0 2 Miles

0 3 Km

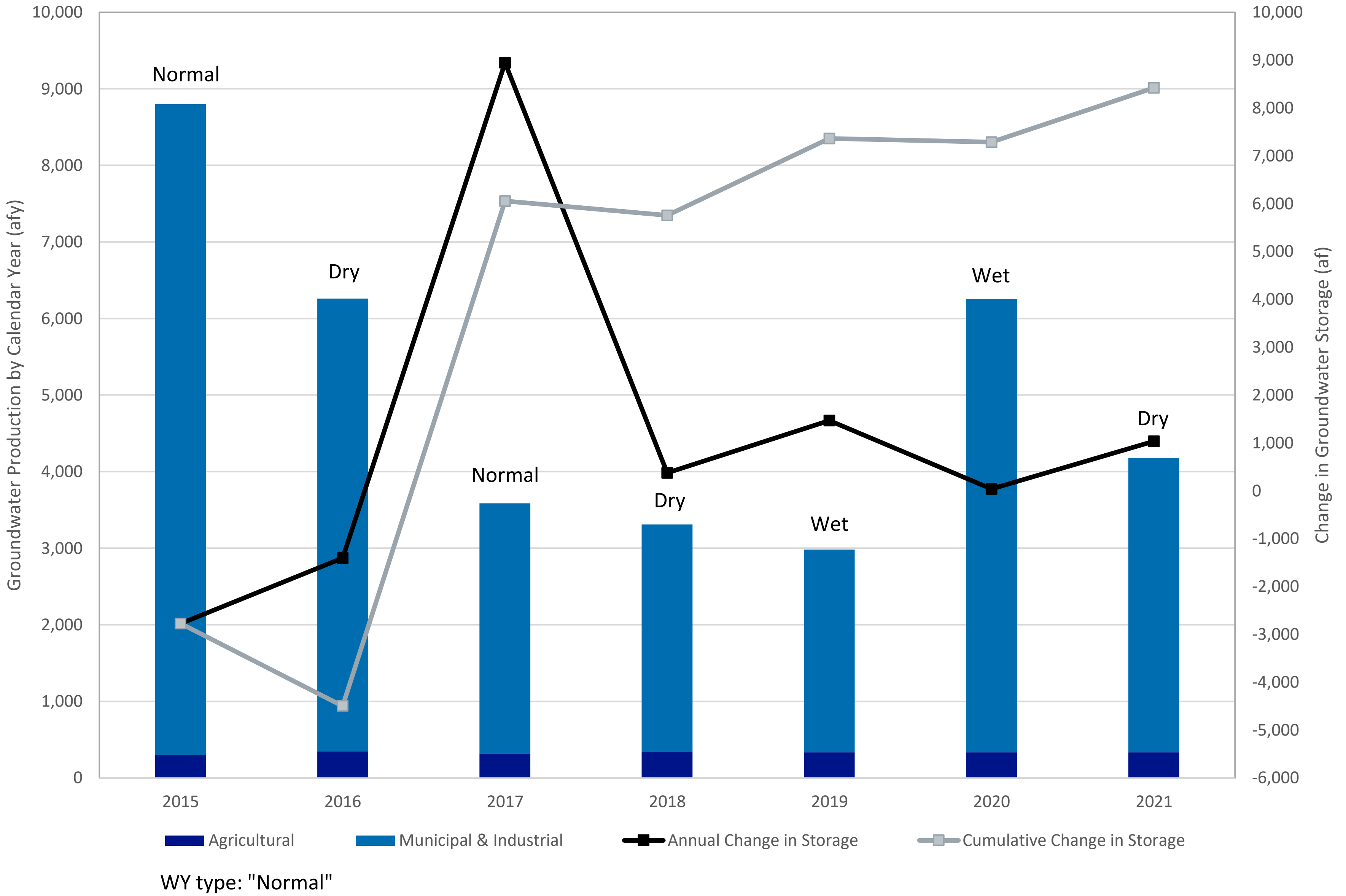
Elsinore Valley Municipal Water District
Elsinore Subbasin Annual Report

Prepared for:

Change in Groundwater Storage in Deep Aquifer (Layer 4)
Spring 2020 to Spring 2021

Figure 16

Figure 17. Annual Groundwater Extractions and Change in Groundwater Storage – 2015 to 2021



6.0 GSP IMPLEMENTATION PROGRESS

As described in Section 1, completion of the GSP represents a key milestone in achieving groundwater sustainability within the Basin by 2040. Through the execution of the GSP and formation of the EVGSA, the EVGSA has made measurable progress in the initial steps of implementation. The EVGSA was formed in January 2017 and, as of the writing of this report, has held four Regular or Special meetings of the Board to advance the implementation of the GSP.

The following are some of the key milestones accomplished since the formation of the EVGSA:

- Completed the construction of two monitoring wells located in the Lee Lake and Warm Springs sub-basins in April 2021. Pressure transducers that record groundwater levels at high frequency are installed in the monitoring wells.
- Completed the draft GSP in July 2021.
- Adopted the draft GSP on December 16, 2021.
- Submitted the draft GSP to the DWR on January 26, 2021.

Additional information about all of the activities of the EVGSA can be found on its website at www.evmwd.com.

Table 13 below provides a summary of the sustainable management criteria and MTs and if any MTs were triggered in 2021. As shown, no MTs were triggered in 2021 and therefore, no mitigation measures were required to be implemented to address a triggered MT.

Table 13. 2021 Sustainable Management Criteria and MTs

Sustainability Criteria MTs	2021	MT Mitigation Measures
Chronic Lowering of Groundwater Levels	The Subbasin was not marked by reports of significant water level decline impacts to production wells. No exceedance/thresholds were triggered during the reporting period	Development of recycled water sources to offset potable water demands, acquiring imported water for direct use and managed aquifer recharge, and other conjunctive use operations.
Reduction of Groundwater Storage	Fulfilled by MT related to Chronic Lowering of Groundwater Levels	Fulfilled by MT related to Chronic Lowering of Groundwater Levels
Degradation Water Quality Elsinore TDS: 530 mg/L Nitrate: 5 mg/L Arsenic: Not Defined Lee Lake and Warm Springs TDS: 820 mg/L Nitrate: 7.9 mg/L Arsenic: Not Defined	No exceedance/thresholds were triggered during the reporting period. Current conditions in Elsinore MA (averaged values) TDS: 490 mg/L Nitrate: 2.3 mg/L Arsenic: 7.5 µg/L Current conditions in Lee Lake and Warm Springs MAs (averaged values) TDS: 692 mg/L Nitrate: 6.0 mg/L Arsenic: 2.1 µg/L	Existing and ongoing collection of groundwater quality samples from the existing network will be used to track long-term trends in groundwater quality that may impact beneficial uses and users of groundwater in the Subbasin.
Land Subsidence (DWR, 2022)	TRE Altamira InSAR Dataset Vertical Displacement (SGMA Data viewer) data shows no land subsidence occurred in the Basin from 9/1/2020 – 9/1/2021. A full assessment of land subsidence will be completed during the 5-year GSP update.	Management actions to prevent subsidence will involve maintaining groundwater levels above historical low water levels and will prevent significant inelastic subsidence.
Depletion of Interconnected Surface Water	No exceedance/thresholds were triggered during the reporting period.	Systematic evaluation of each potential impact may be warranted. Management actions call for the installation of shallow piezometers to fill data gaps.

Table 14 provides an overview of PMAs and their status as of 2021. Group 1 Baseline PMAs are currently ongoing and several Group 2 PMAs evaluated against SMCs are in the planning and in design phases. No Group 3 PMAs have been started in 2021.

Table 14. 2021 Projects and Management Actions

Description	Agency	Category	2021 Status	Anticipated Timeframe
Group 1 - Baseline PMAs				
Groundwater well replacements	EVMWD	Project	Ongoing	Ongoing
Managing pumping in Elsinore MA with in-lieu recharge due to conjunctive use agreements	EVMWD, MWDSC, WMWD	Management Action	Ongoing	Implemented
Group 2 - PMAs Evaluated Against SMCs				
Begin groundwater pumping in Lee Lake MA for municipal use	EVMWD	Project	In design	2019 - 2023: design and construction. 2024+ implementation and operation
Rotate pumping locations and flows	EVMWD	Management Action	Not started	Can be implemented as needed dependent on groundwater levels
Recycled water IPR	EVMWD	Project	Planning Phase	Dependent on wastewater flow increases
Septic tank conversions	EVMWD	Project	Not started	Dependent on funding sources
Group 3 - Identified PMAs that may be considered in the future				
Imported water recharge and recovery	EVMWD, MWDSC	Project	Inactive	No current anticipated timeline
Stormwater capture and recharge	EVMWD	Project	Not started	No current anticipated timeline
Begin groundwater pumping in Warm Springs MA for municipal use	EVMWD	Project	Not started	No current anticipated timeline

7.0 REFERENCES

CIMIS (California Irrigation Management Information System). 2022. *Daily Evapotranspiration Data for CIMIS Station 2240 - 2011 through 2021*. Compiled February 2022.

California Department of Water Resources (DWR). 2003. *Bulletin 118, California's Groundwater, 2003 Update*. October 2003.

California Department of Water Resources (DWR). 2012. *California Irrigation Management Information System Reference Evapotranspiration Zones.* January 2012.

California Department of Water Resources (DWR). 2016. *Bulletin 118, California's Groundwater, Interim Update 2016, available at* https://water.ca.gov/-/media/DWR-Website/WebPages/Programs/Groundwater-Management/Bulletin-118/Files/B118-Interim-Update-2016_ay_19.pdf, December 22.

California Department of Water Resources (DWR). 2022. *DWR SGMA Data Viewer, Land Subsidence, TRE InSAR Dataset, available at* https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer. Last accessed March 2022

Dorsey, R. J., G. J. Axen, T. C. Peryam, and M. E. Kairouz. 2012. *Initiation of the Southern Elsinore Fault at ~1.2 Ma: Evidence from the Fish Creek–Vallecito Basin, Southern California*. Tectonics, 31, TC2006, doi:10.1029/2011TC003009, March 2012.

MWH. 2005. *Elsinore Basin Groundwater Management Plan Final Report*. Prepared for EVMWD. March 2005.

MWH. 2009. *Imported Water Recharge Modeling Study for the Elsinore Basin Final Report*. Prepared for EVMWD. July 2009.

MWH. 2011. *2010 Elsinore Basin Status Report*. Prepared for EVMWD. July 2011.

MWH. 2016. *2016 Sewer System Master Plan, Final Report, prepared for EVMWD*, August 2016

NOAA (National Oceanic and Atmospheric Administration). 2021. *Climate Data Online—Elsinore, California Daily Summary Observations.* Network ID – GHCND: USC00042805. Compiled February 2021.

Norris, Robert M. and Webb, Robert W. 1990. *Geology of California*. Second Edition. John Wiley & Sons.

Todd Groundwater. 2021. *Draft Final Groundwater Management Plan for the Elsinore Valley Subbasin*.

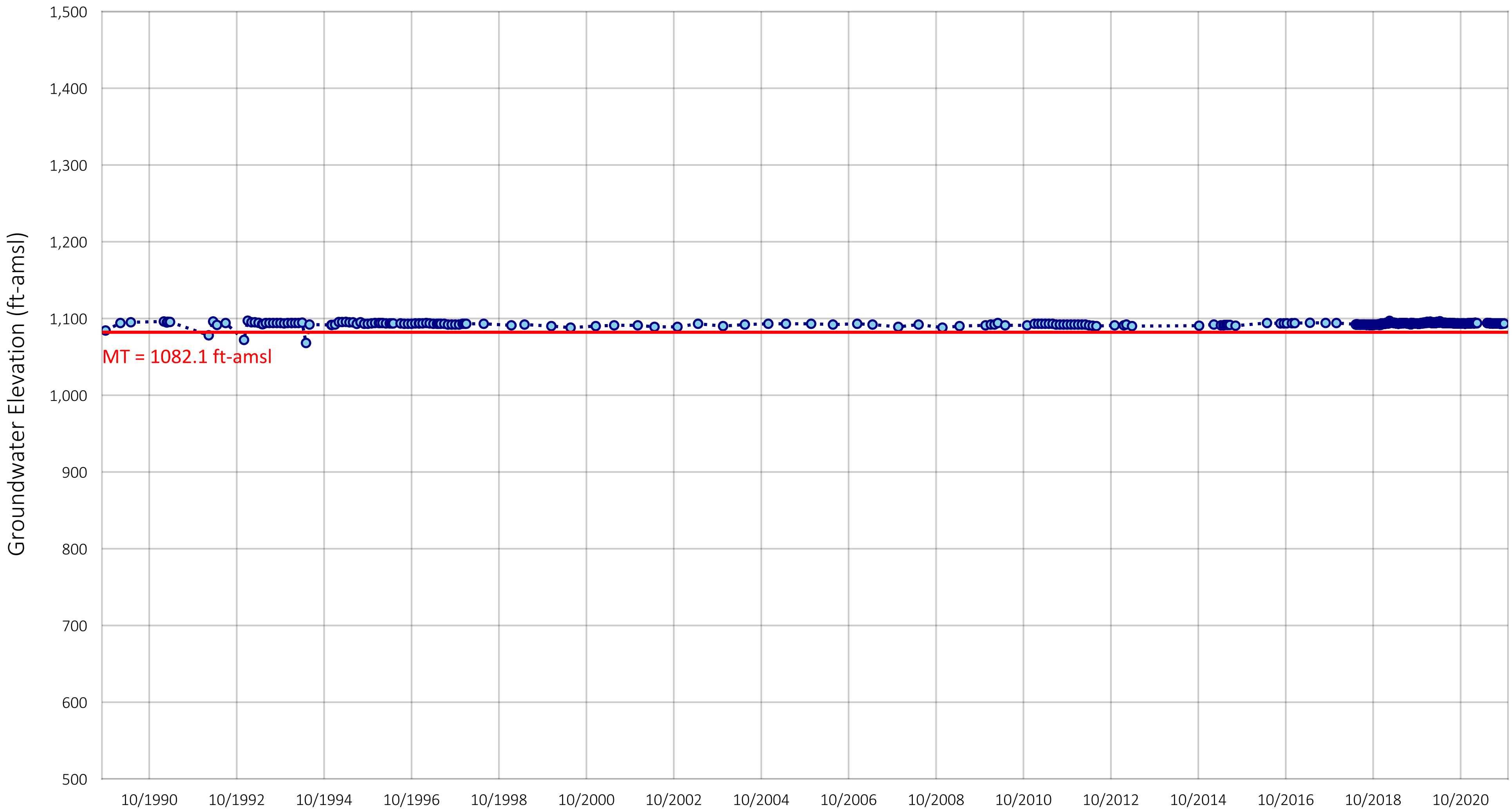
USGS, 2022, *National Water Information System Web Interface. USGS 11070500 San Jacinto River Near Elsinore CA; USGS 11070365 San Jacinto River Near Sun City CA; USGS 11070465 Salt Creek at Murrieta Road near Sun City CA; USGS 11071900 Corona Lake (Lee Lake) near Corona CA*. Compiled February 2022.

Water Systems Consulting, Inc. (WSC). 2020. *Recomputation of Ambient Water Quality in the Santa Ana River Watershed for the Period 1999 to 2018*. Prepared for the Santa Ana Watershed Project Authority Basin Monitoring Program Task Force. July 8.

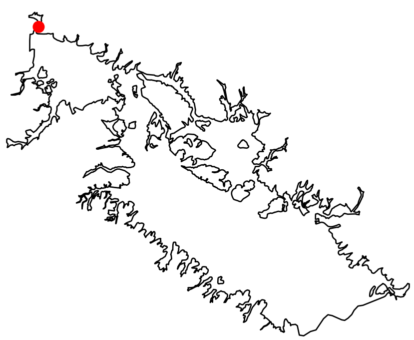
West Yost. 2020. *Upper Temescal Valley Salt and Nutrient Management Plan 2020 Update*. Elsinore Valley Municipal Water District and Eastern Municipal Water District. November 2020.

Appendix A

Groundwater Level Time Histories at Monitoring Wells – 1990 to 2021



Location of Well in Elsinore Valley

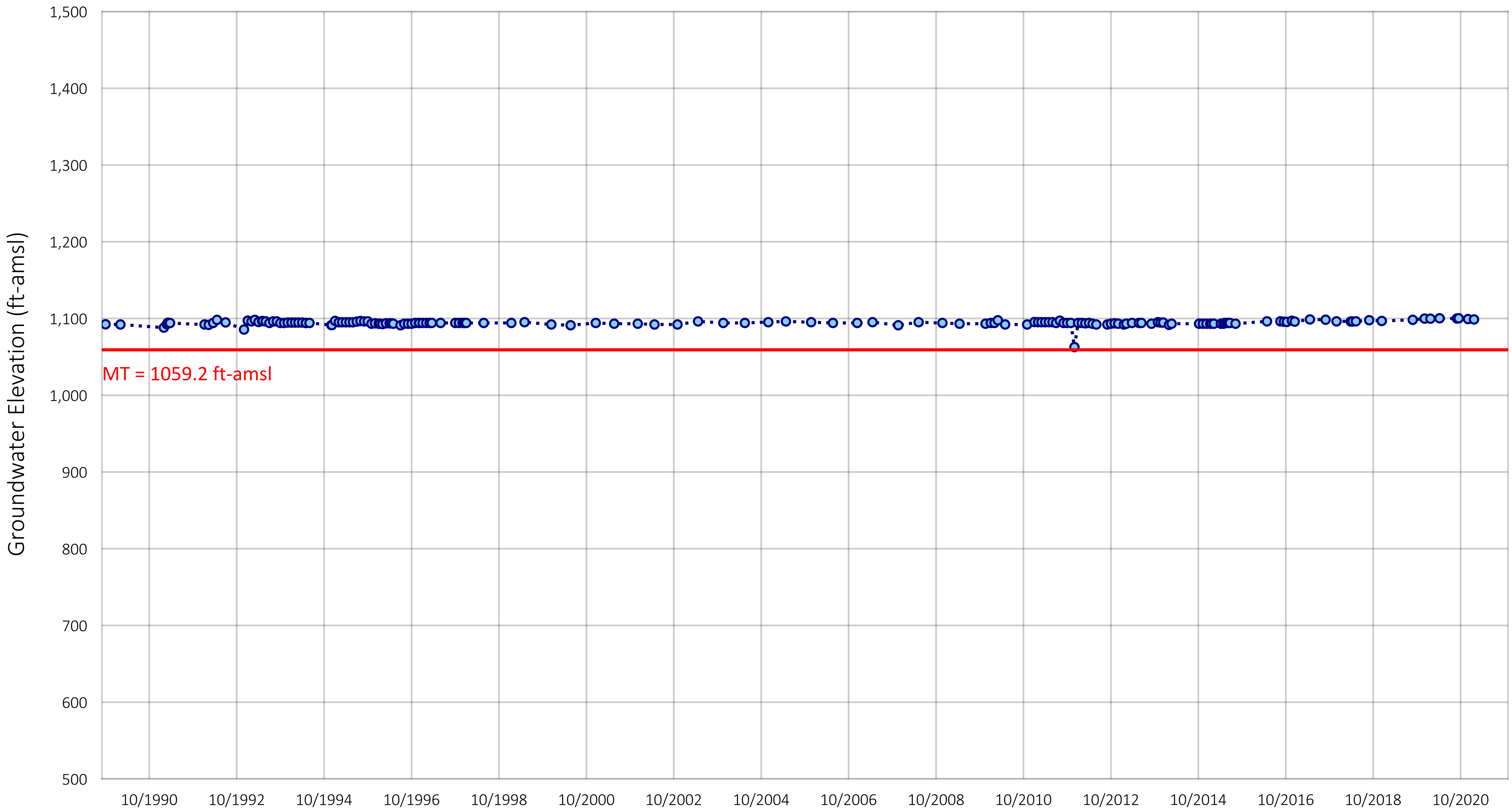


Prepared by:

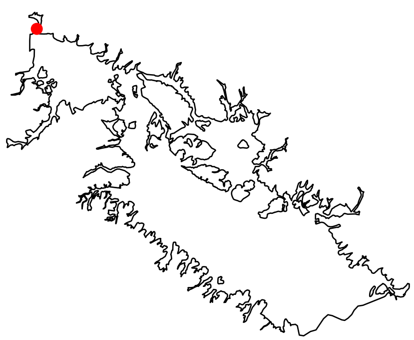
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005774
Well Name: Gregory 1
State Well ID: 05S05W07C01

Figure A-1



Location of Well in Elsinore Valley

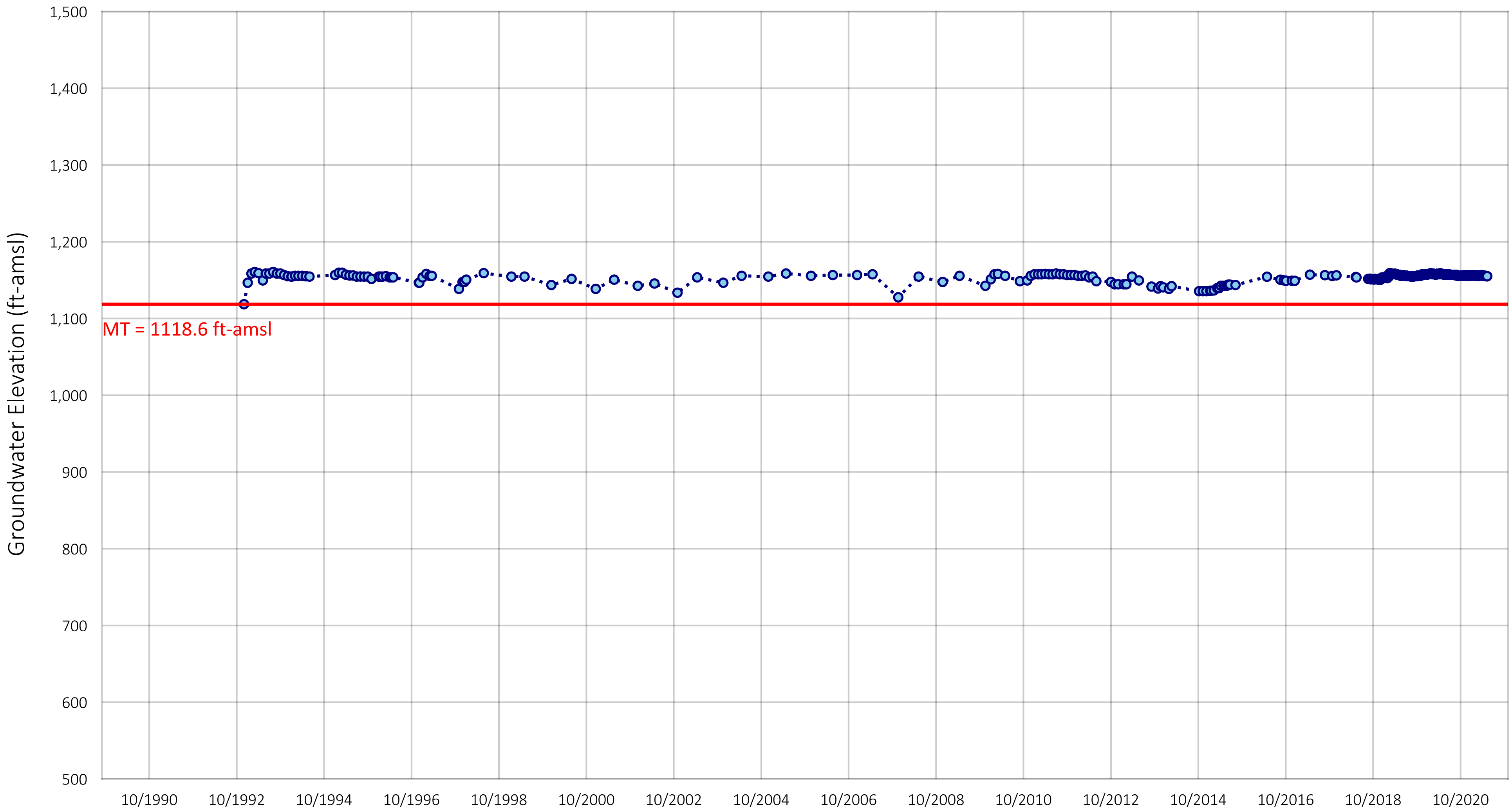


Prepared by:

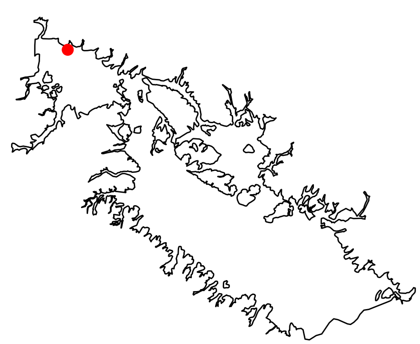
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005775
Well Name: Gregory 2
State Well ID: 05S05W07E01

Figure A-2



Location of Well in Elsinore Valley

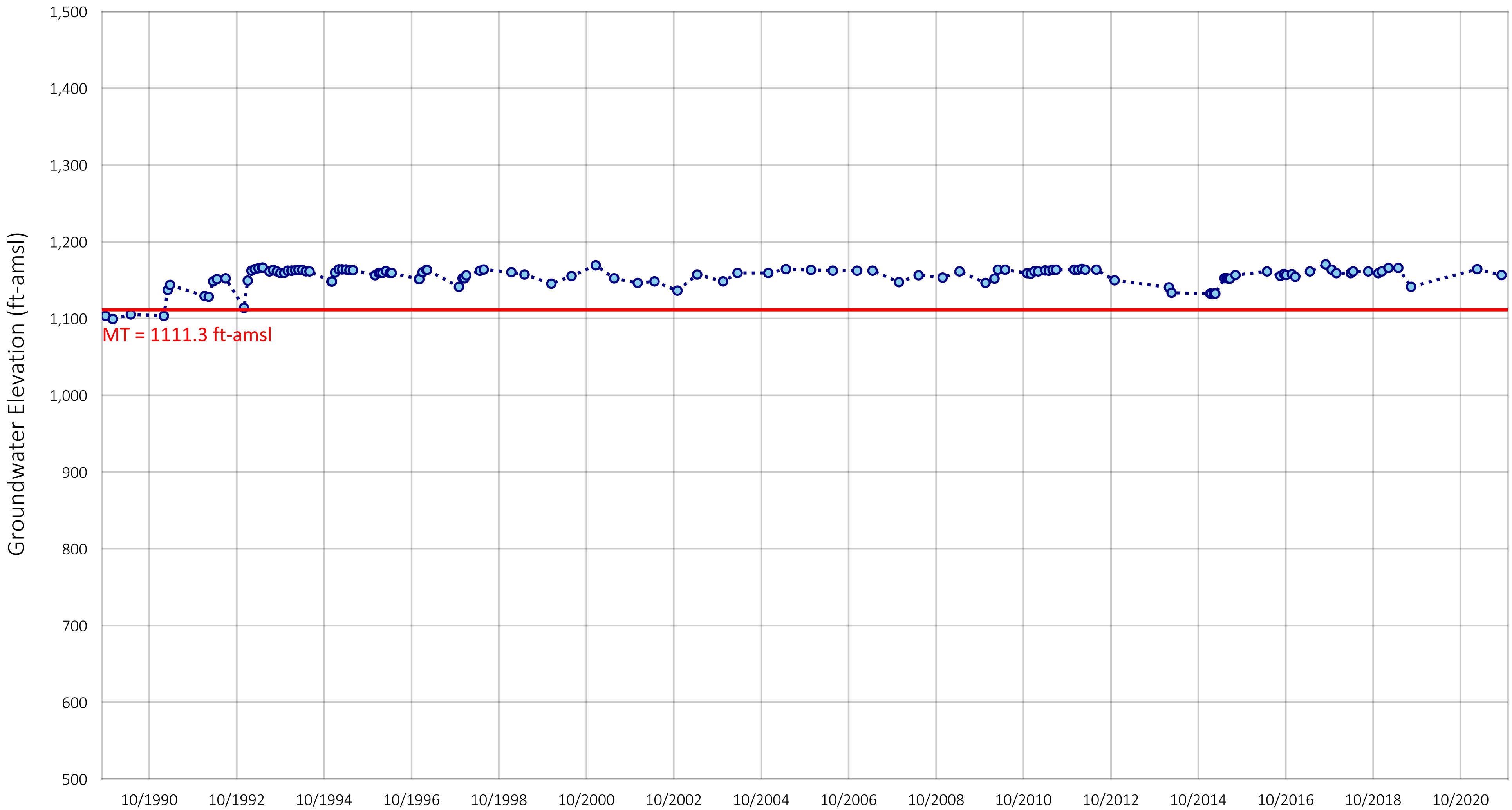


Prepared by:

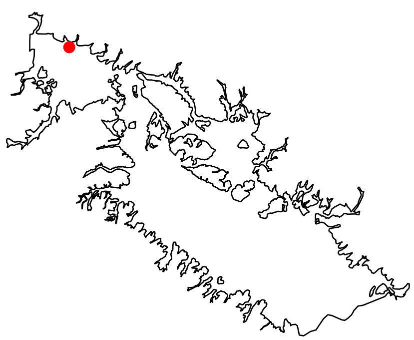
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005777
Well Name: Station 70
State Well ID: 05S05W08N02

Figure A-3



Location of Well in Elsinore Valley

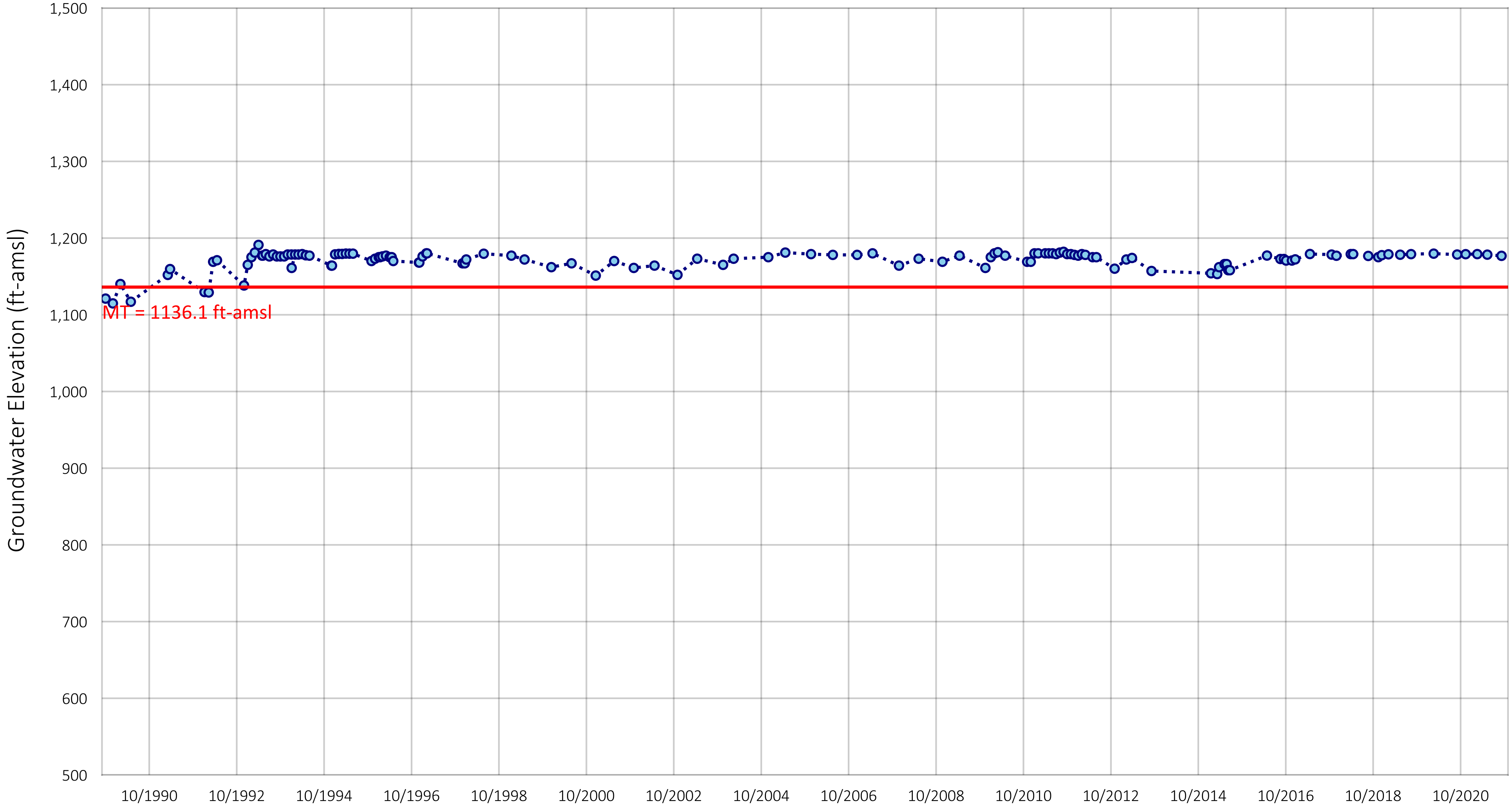


Prepared by:

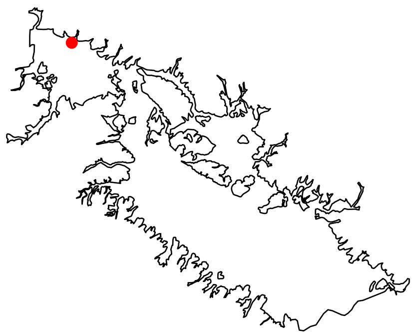
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005776
Well Name: Barney Lee 1
State Well ID: 05S05W08N01

Figure A-4



Location of Well in Elsinore Valley

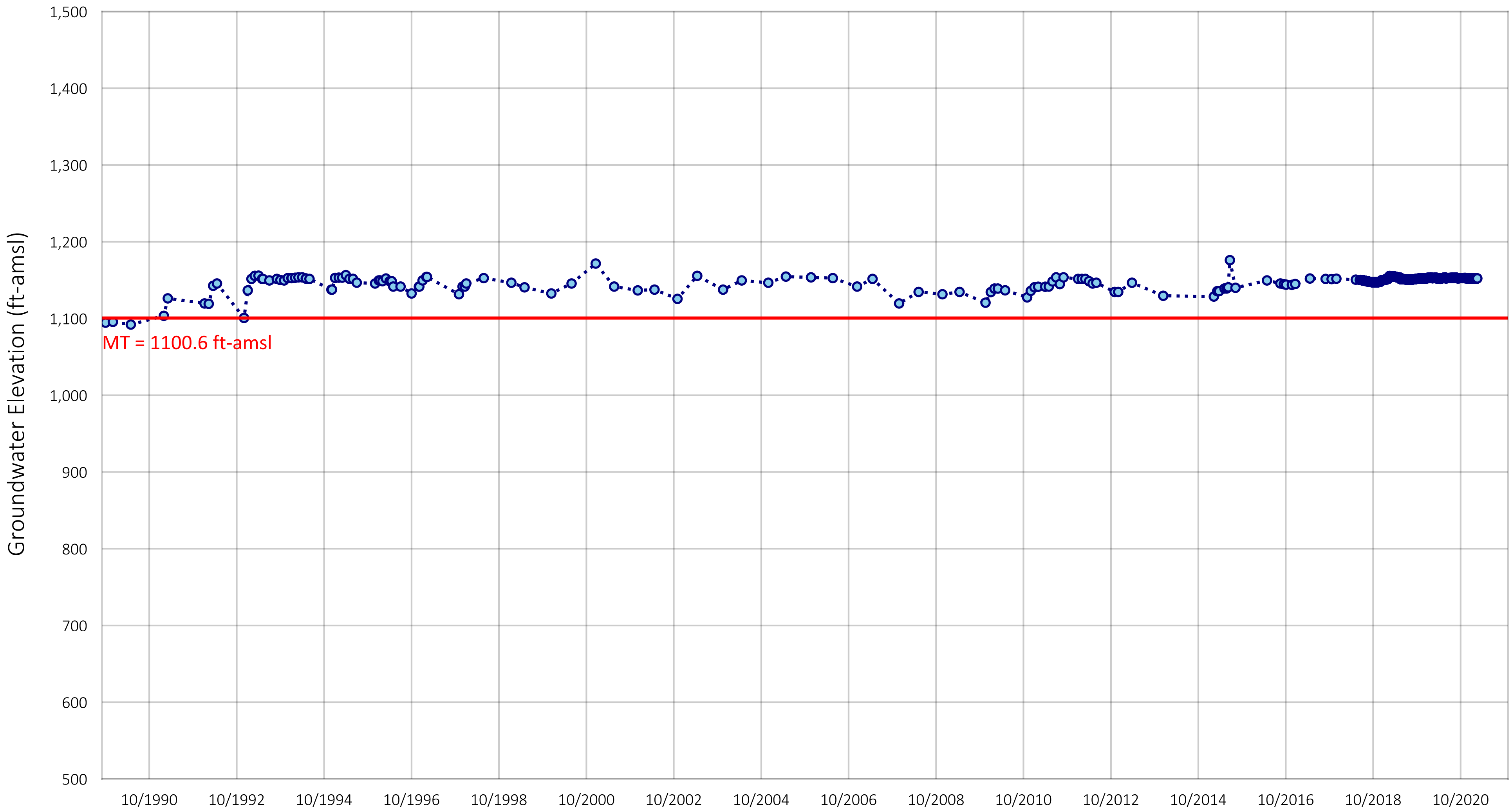


Prepared by:

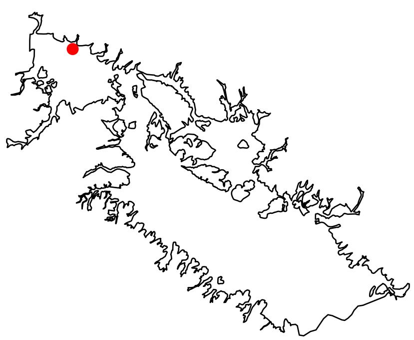
WEST YOST Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005779
Well Name: Barney Lee 4
State Well ID: 05S05W08P02

Figure A-5



Location of Well in Elsinore Valley

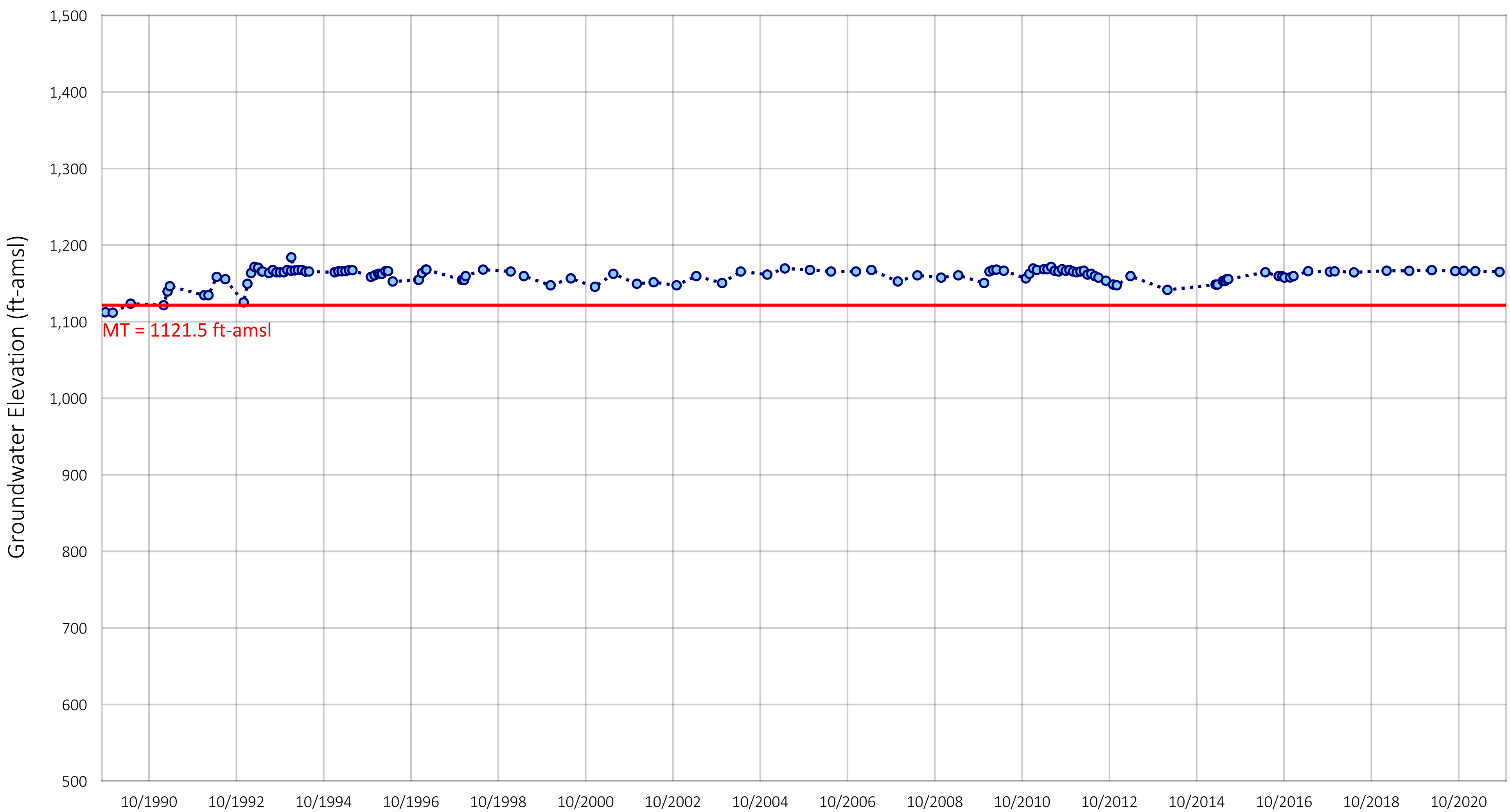


Prepared by:

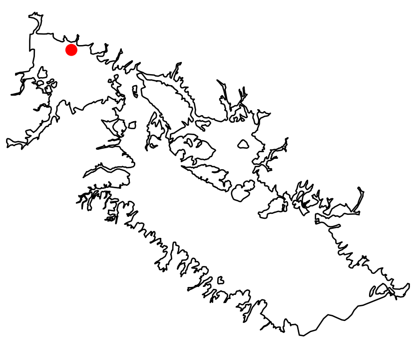
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005778
Well Name: Barney Lee 2
State Well ID: 05S05W08P01

Figure A-6



Location of Well in Elsinore Valley

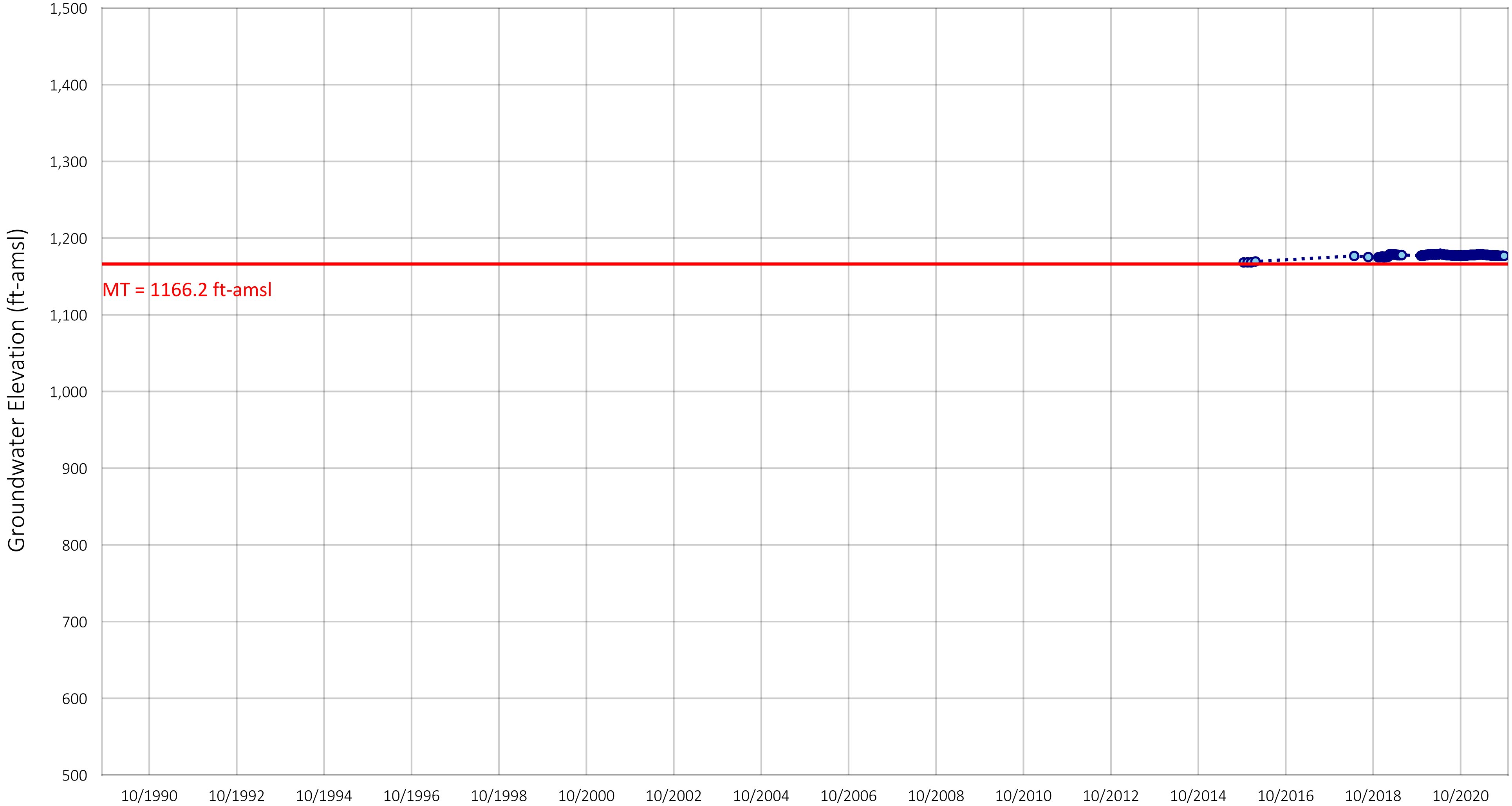


Prepared by:

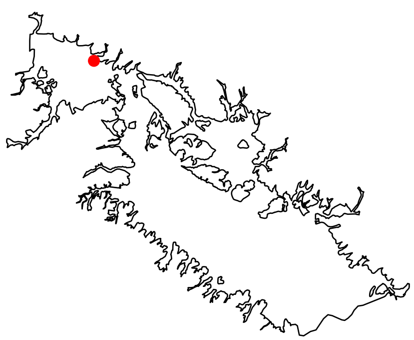
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005780
Well Name: Barney Lee 3
State Well ID: 05S05W08P03

Figure A-7



Location of Well in Elsinore Valley

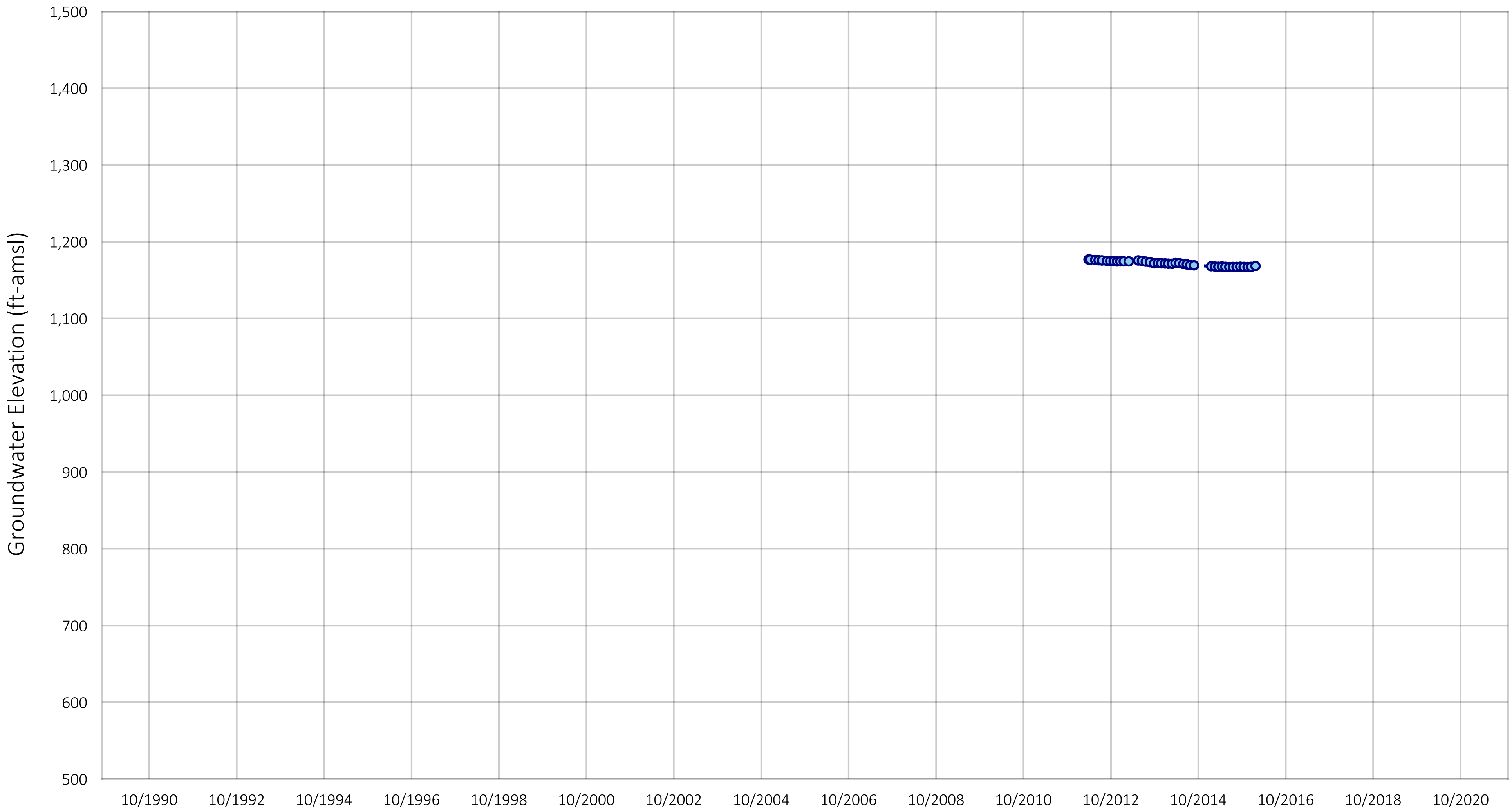


Prepared by:

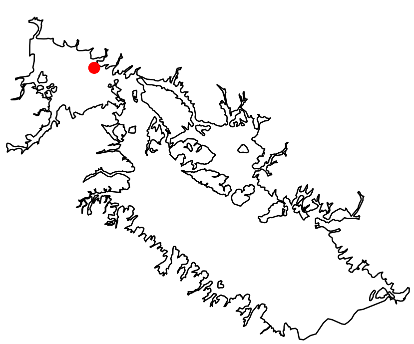
WEST YOST Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1234088
Well Name: Alberhill 2

Figure A-8



Location of Well in Elsinore Valley

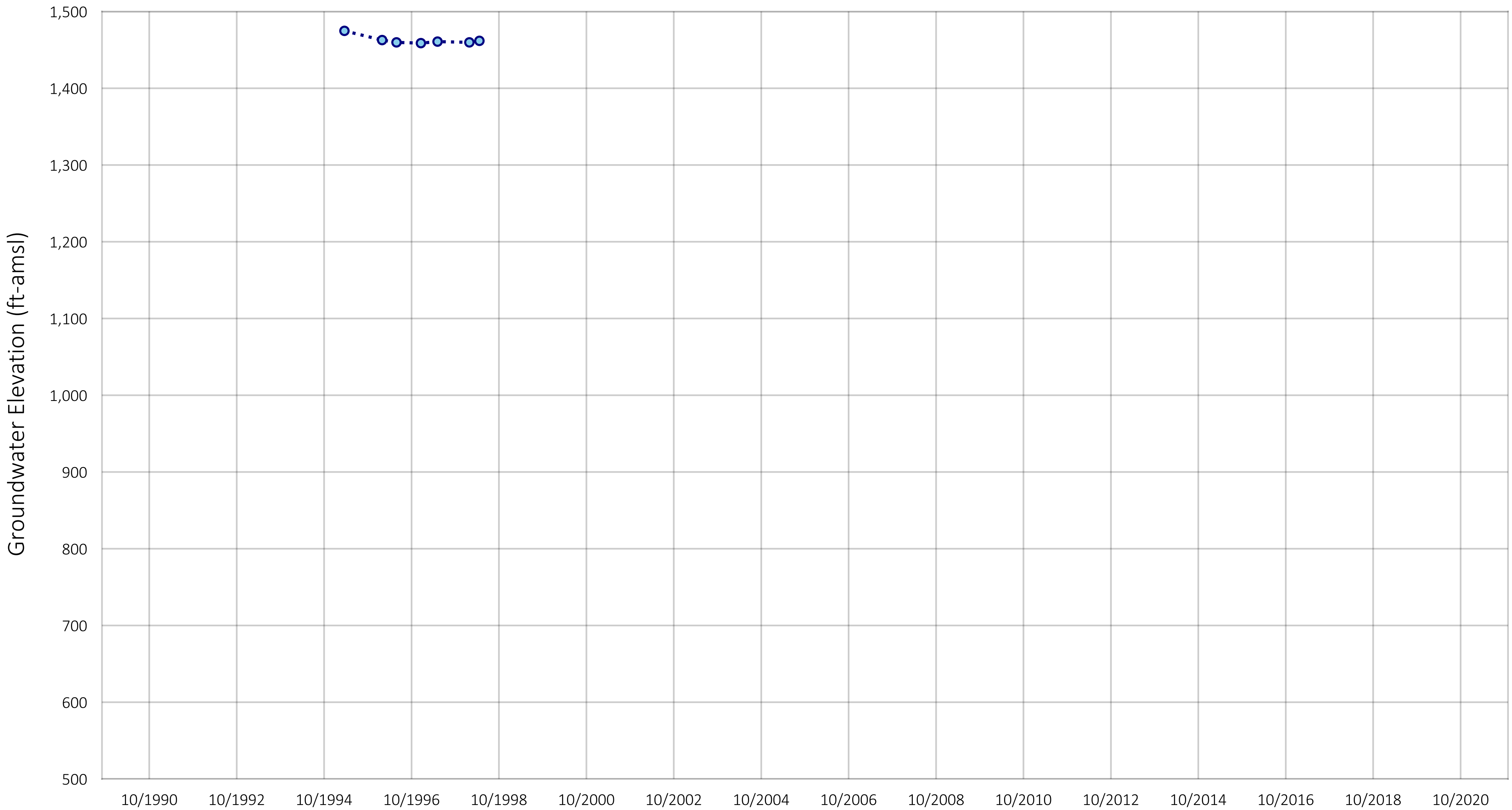


Prepared by:

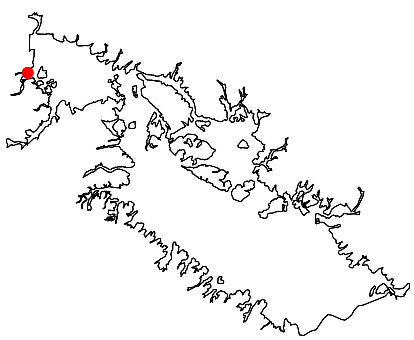
WEST YOST Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1234087
Well Name: Alberhill 1

Figure A-9



Location of Well in Elsinore Valley

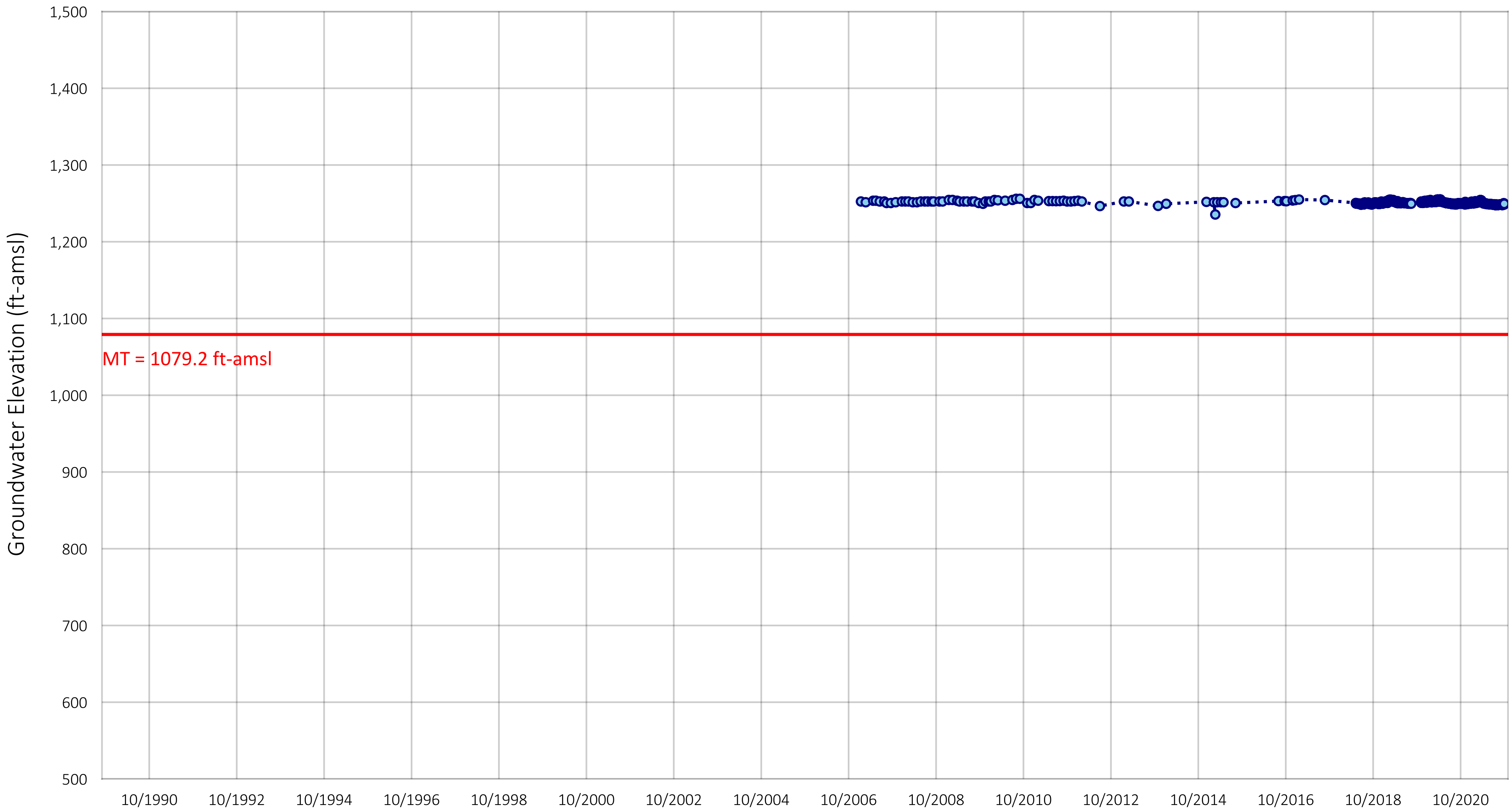


Prepared by:

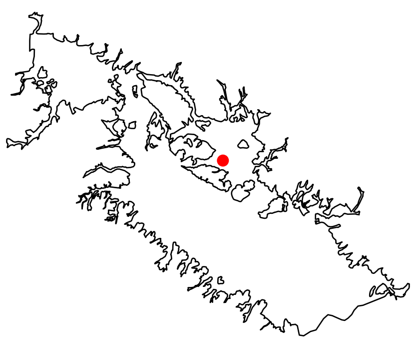
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1203666
Well Name: Indian Truck Trail
State Well ID: 05S06W13, SE 1/4

Figure A-10



Location of Well in Elsinore Valley

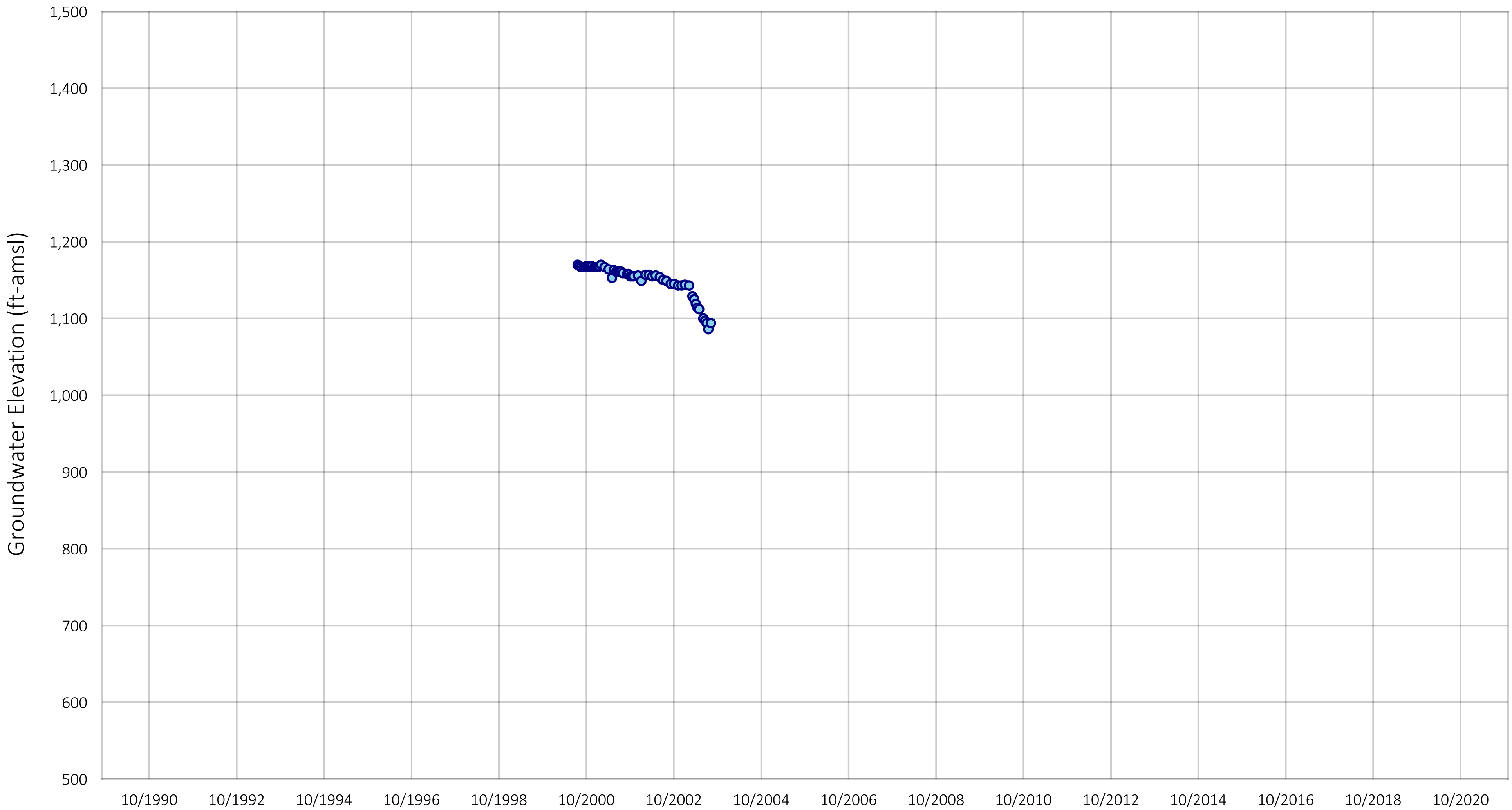


Prepared by:

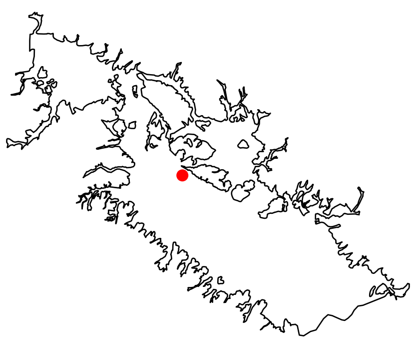
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232298
Well Name: Cemetery

Figure A-11



Location of Well in Elsinore Valley

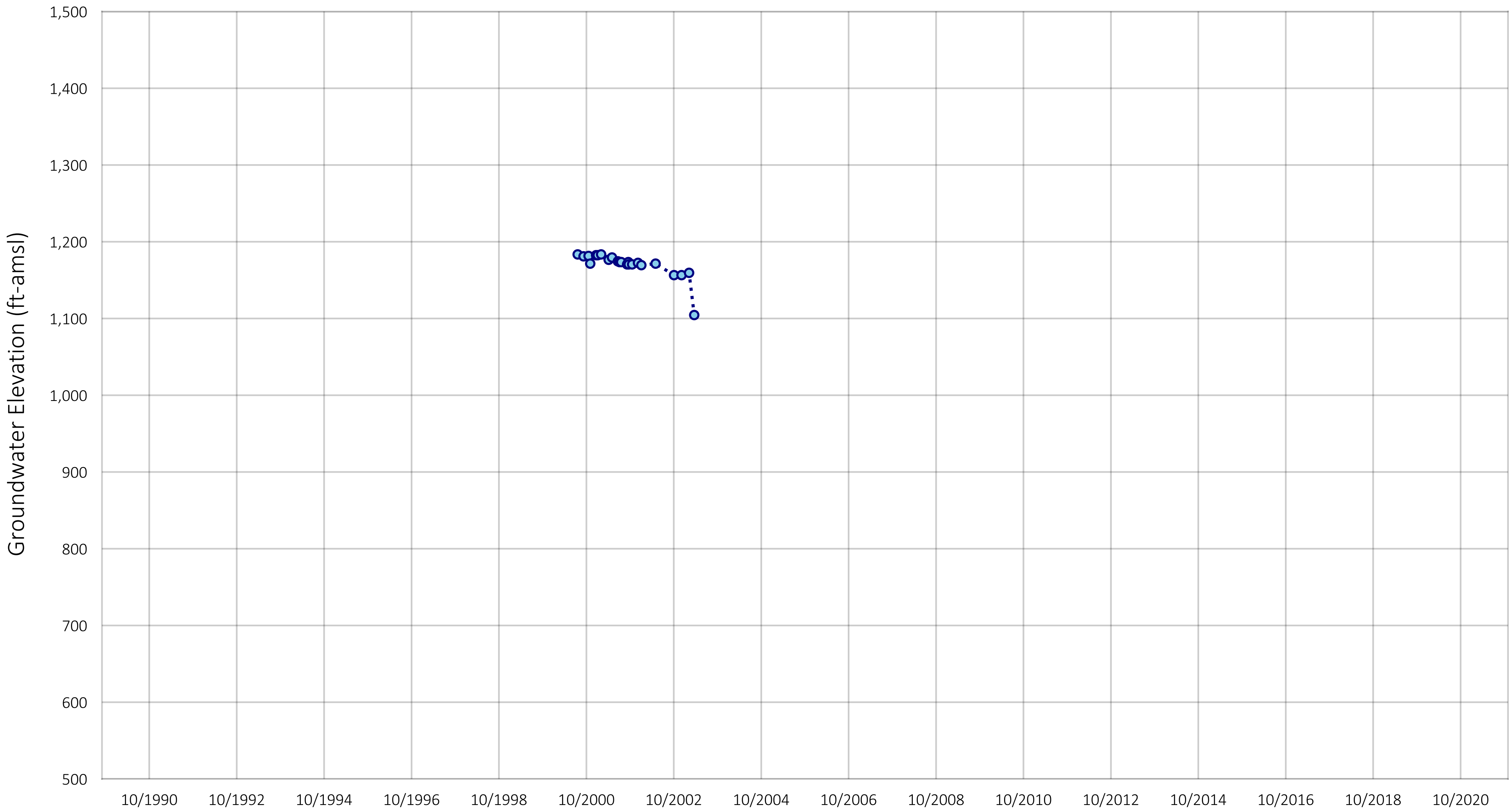


Prepared by:

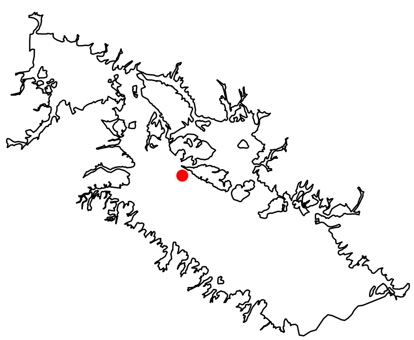
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1203646
Well Name: Fraiser
State Well ID: 06S05W02B

Figure A-12



Location of Well in Elsinore Valley

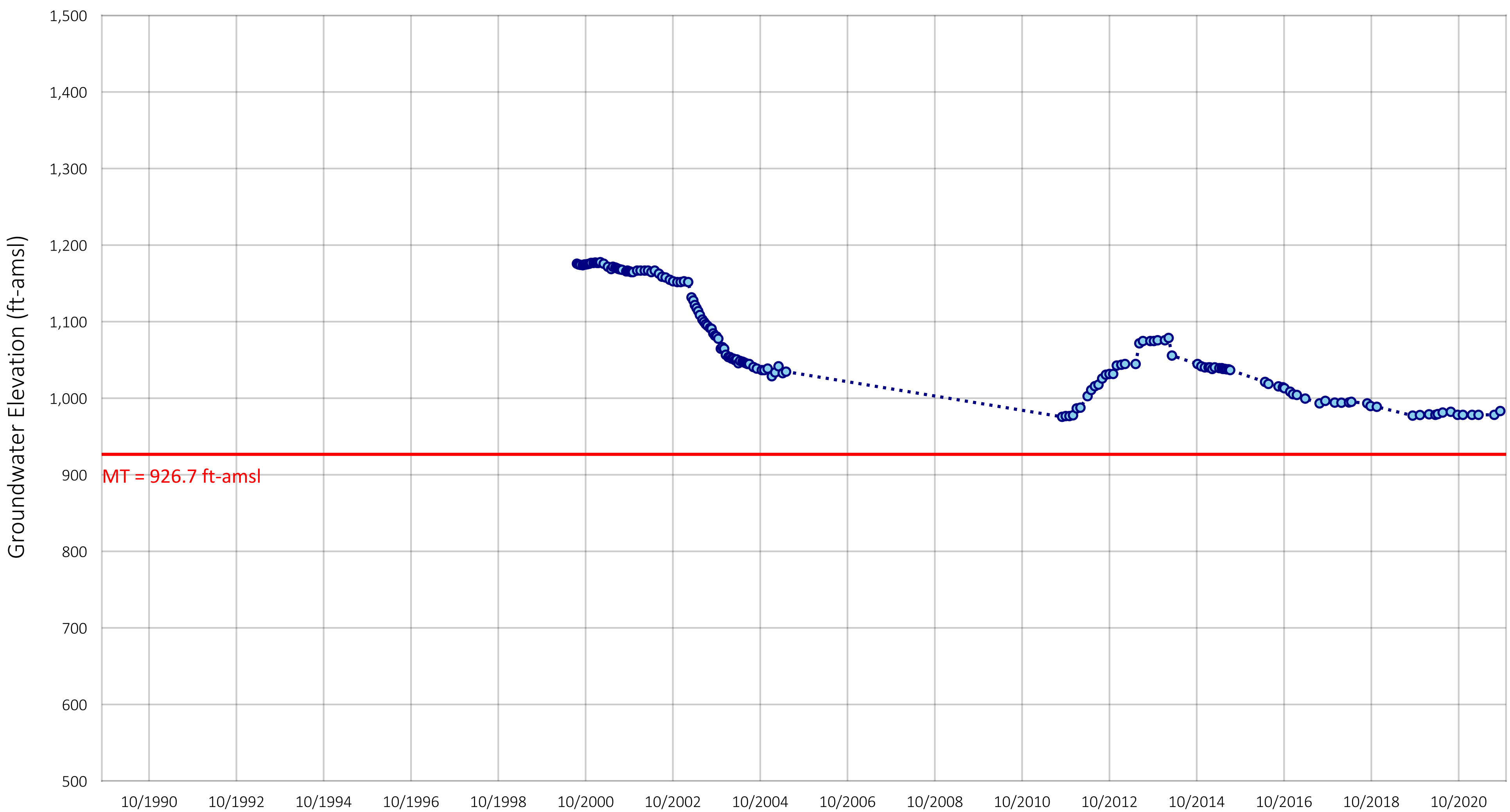


Prepared by:

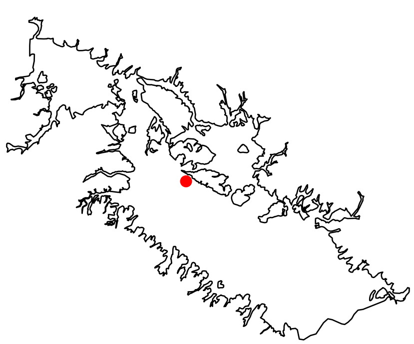
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1203677
Well Name: Fraiser II
State Well ID: 06S05W02B03

Figure A-13



Location of Well in Elsinore Valley

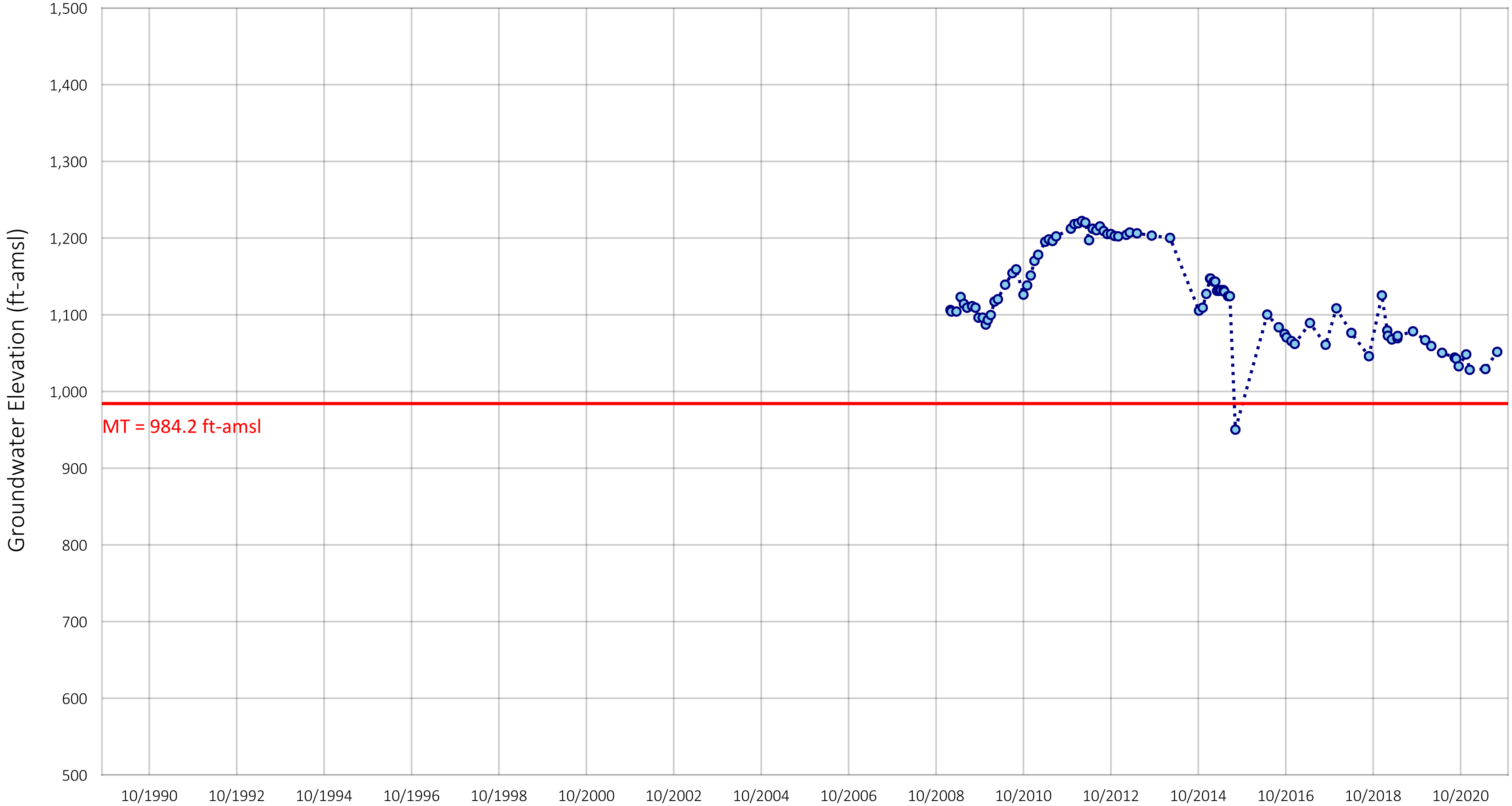


Prepared by:

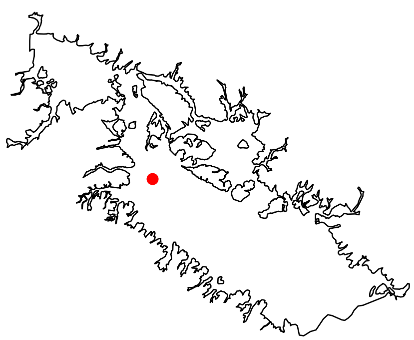
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1203676
Well Name: Wisconsin
State Well ID: 06S05W02A

Figure A-14



Location of Well in Elsinore Valley

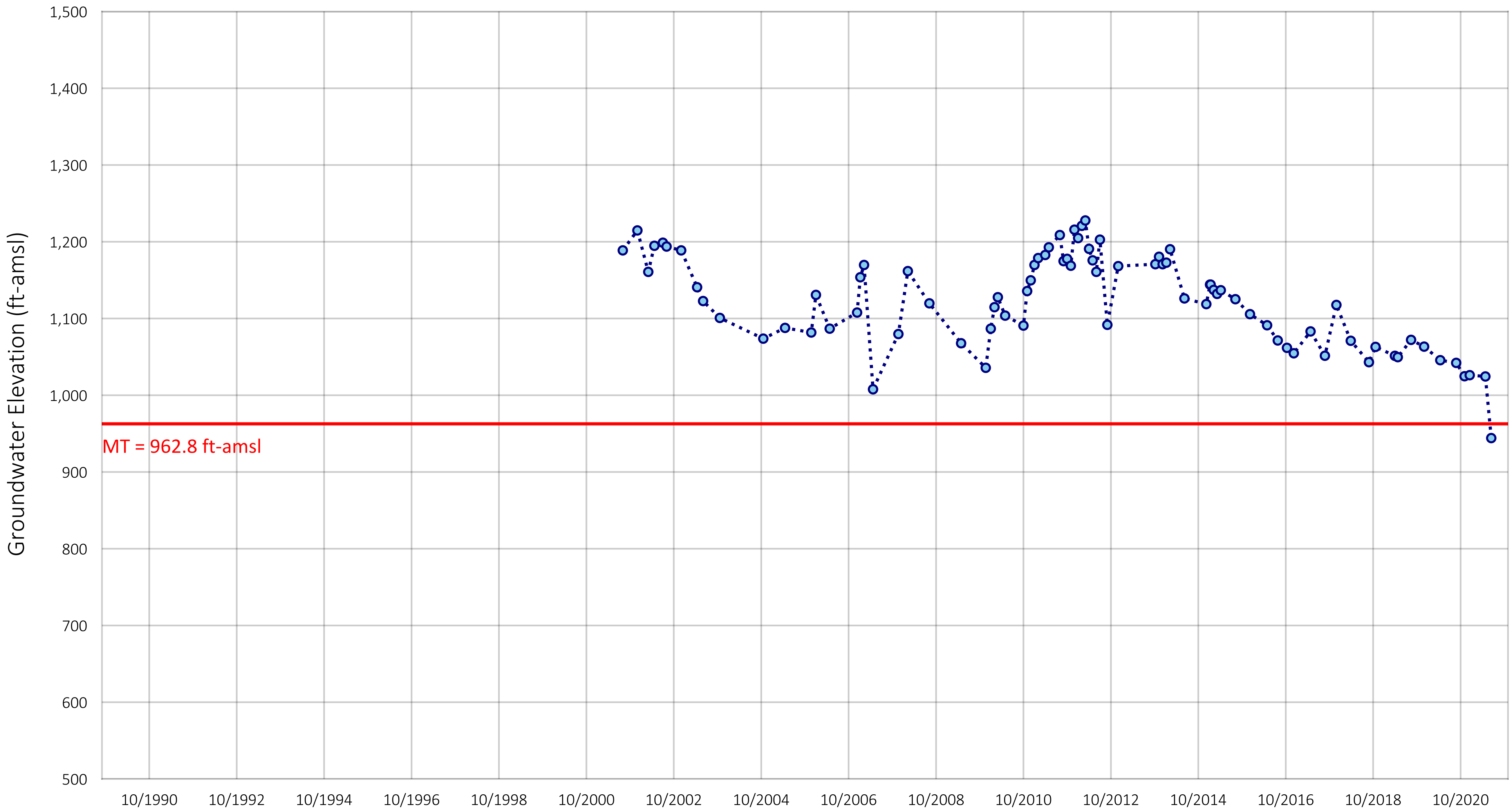


Prepared by:

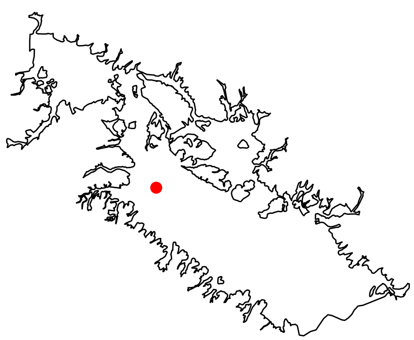
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232310
Well Name: Terra Cotta

Figure A-15



Location of Well in Elsinore Valley

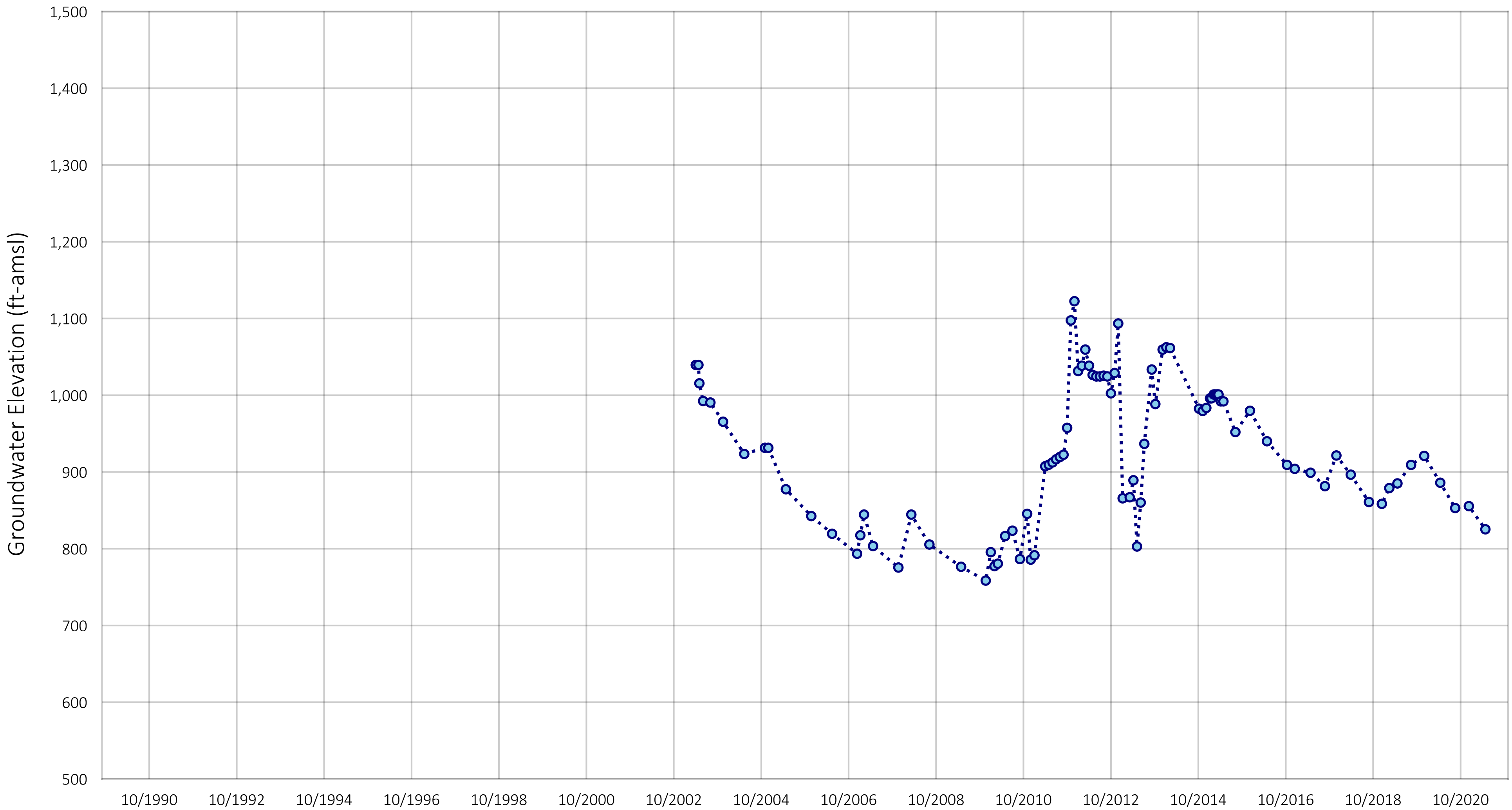


Prepared by:

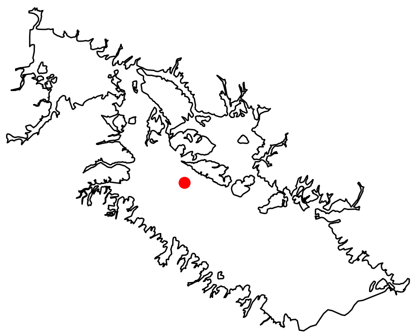
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1208006
Well Name: Machado
State Well ID: 06S05W03H01

Figure A-16



Location of Well in Elsinore Valley

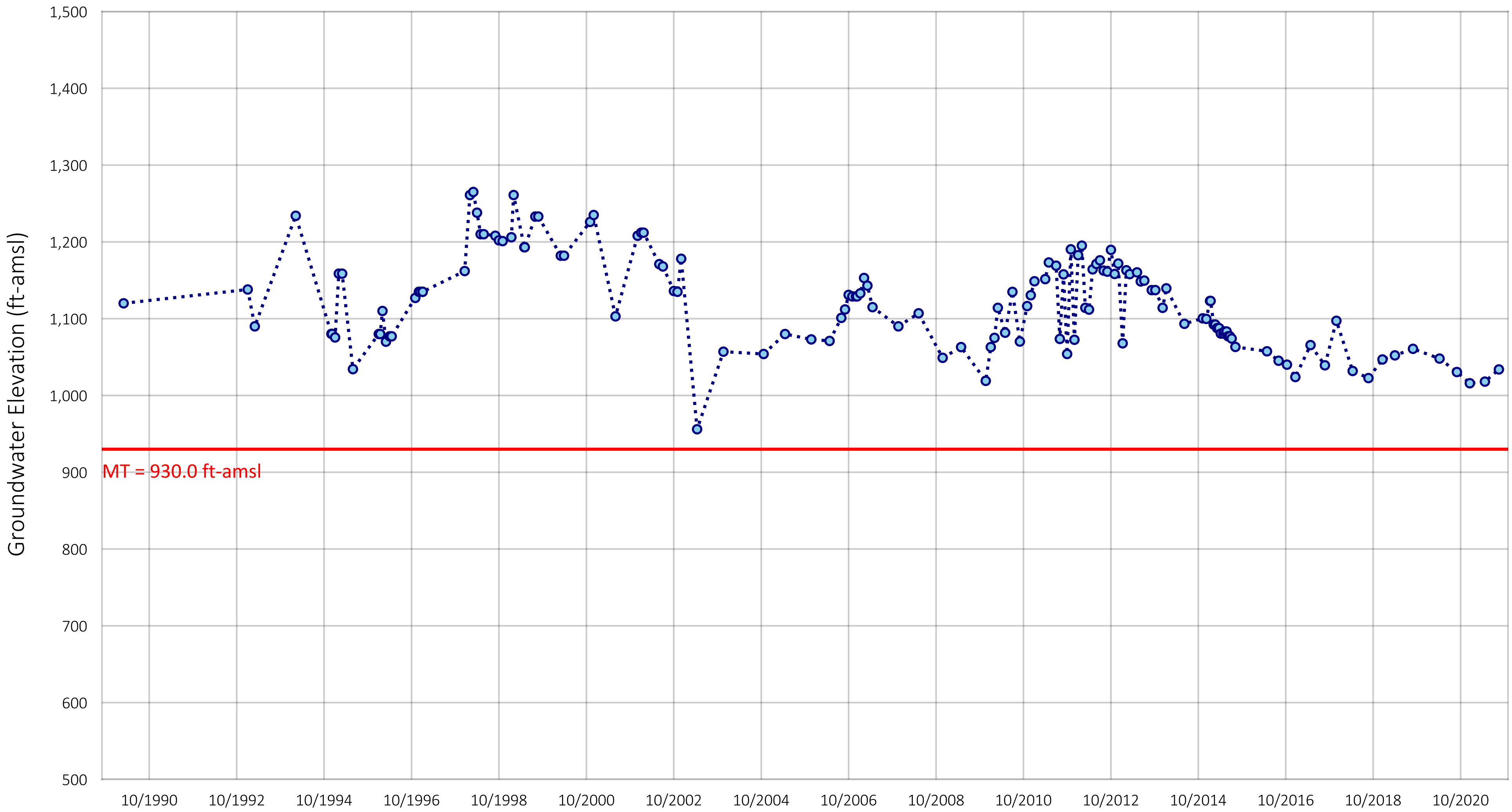


Prepared by:

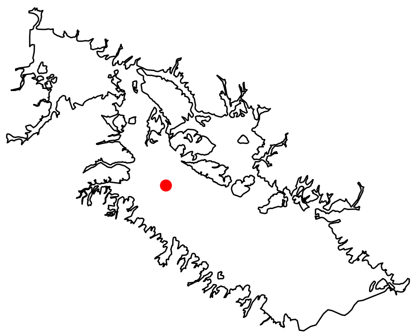
WEST YOST Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1208005
Well Name: Joy St.
State Well ID: 06S05W02G05

Figure A-17



Location of Well in Elsinore Valley

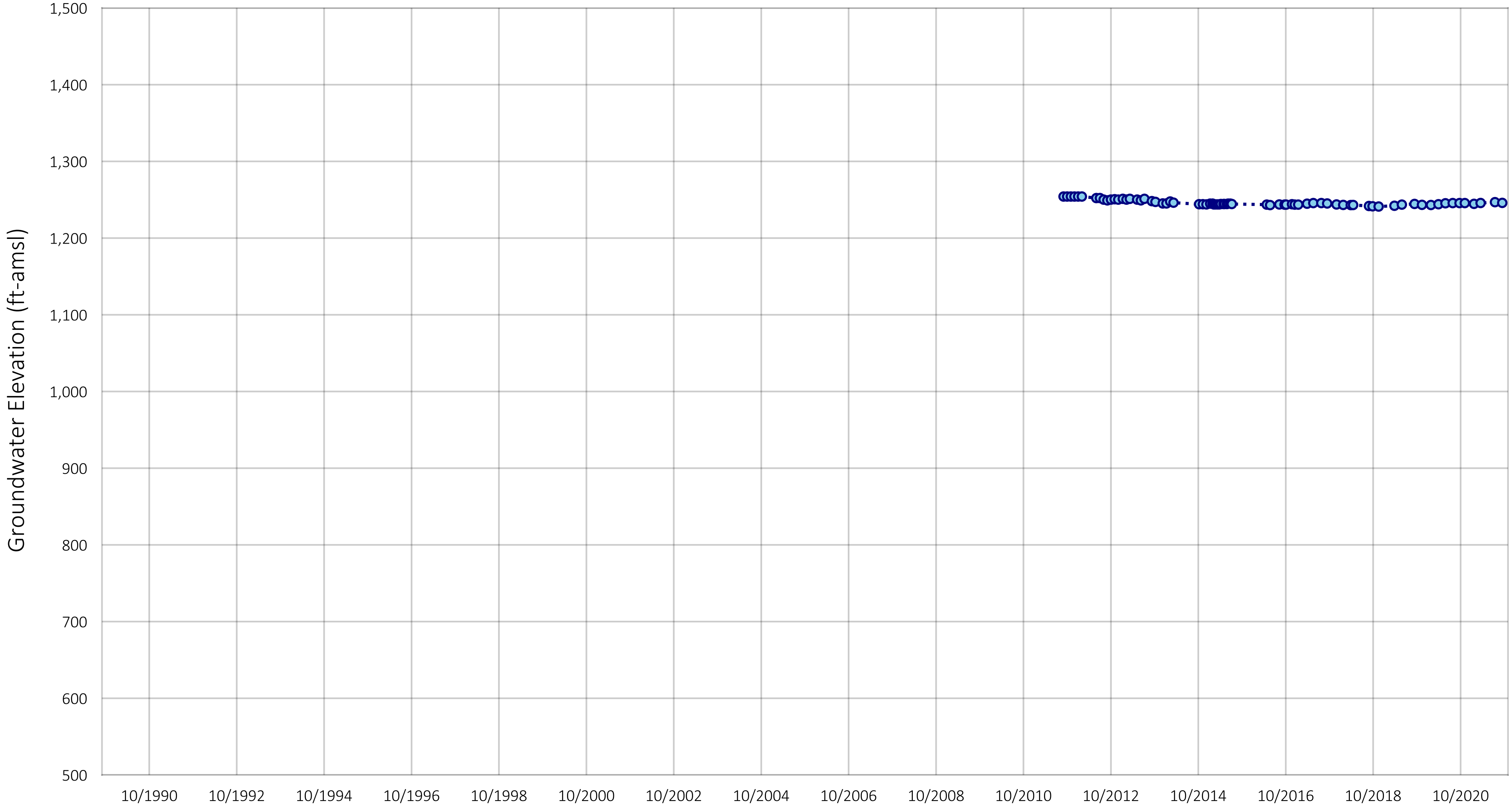


Prepared by:

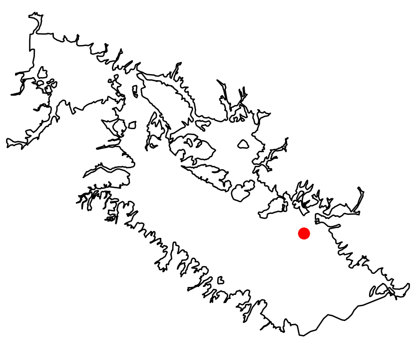
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005921
Well Name: Lincoln
State Well ID: 06S05W02M04

Figure A-18



Location of Well in Elsinore Valley

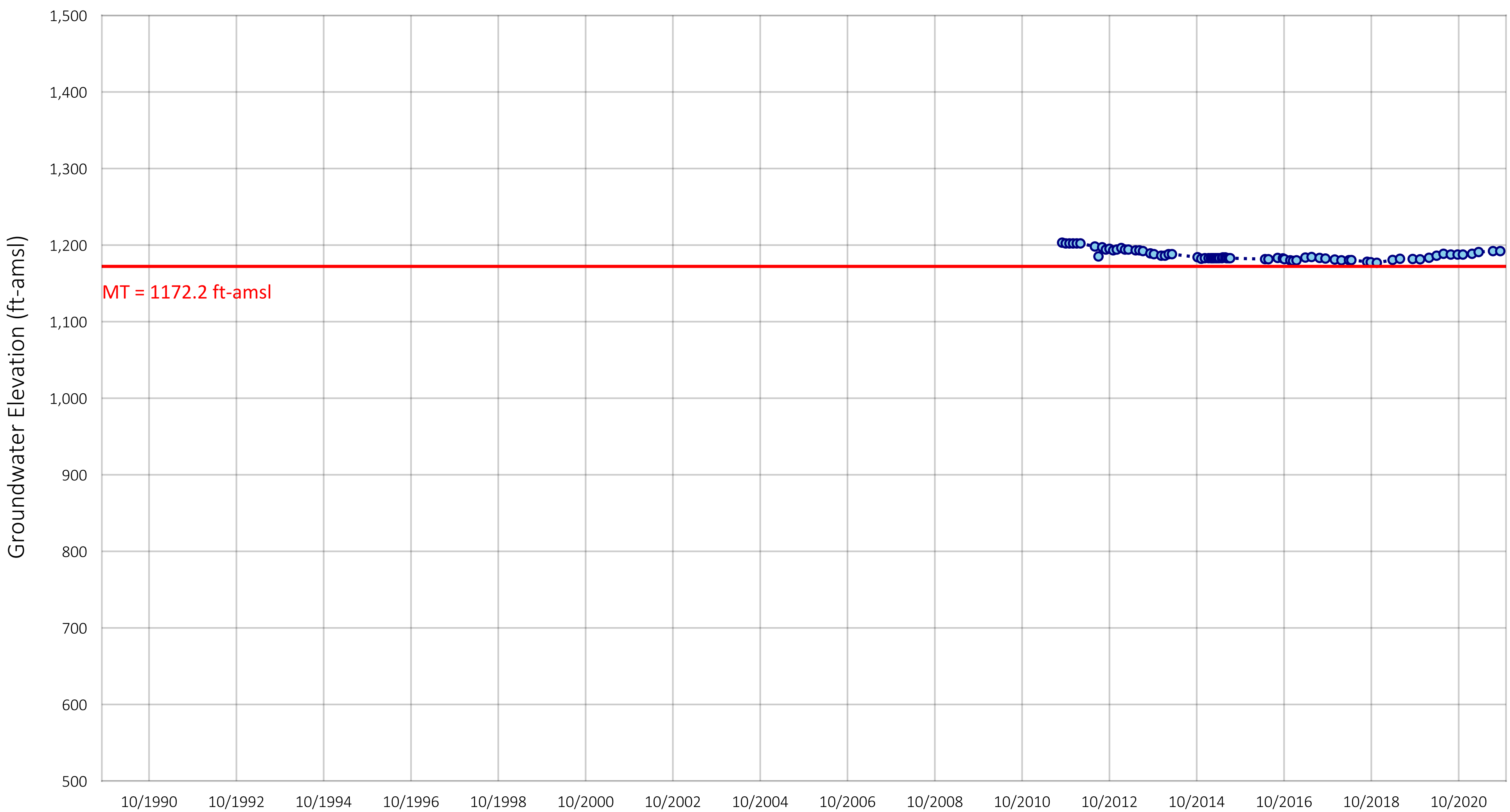


Prepared by:

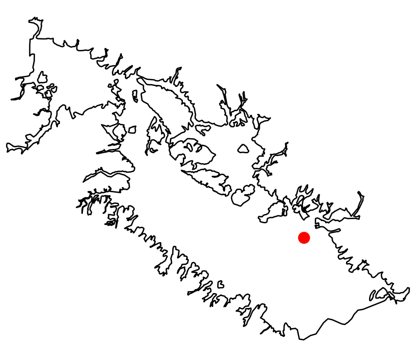
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232309
Well Name: Stadium Shallow

Figure A-19



Location of Well in Elsinore Valley

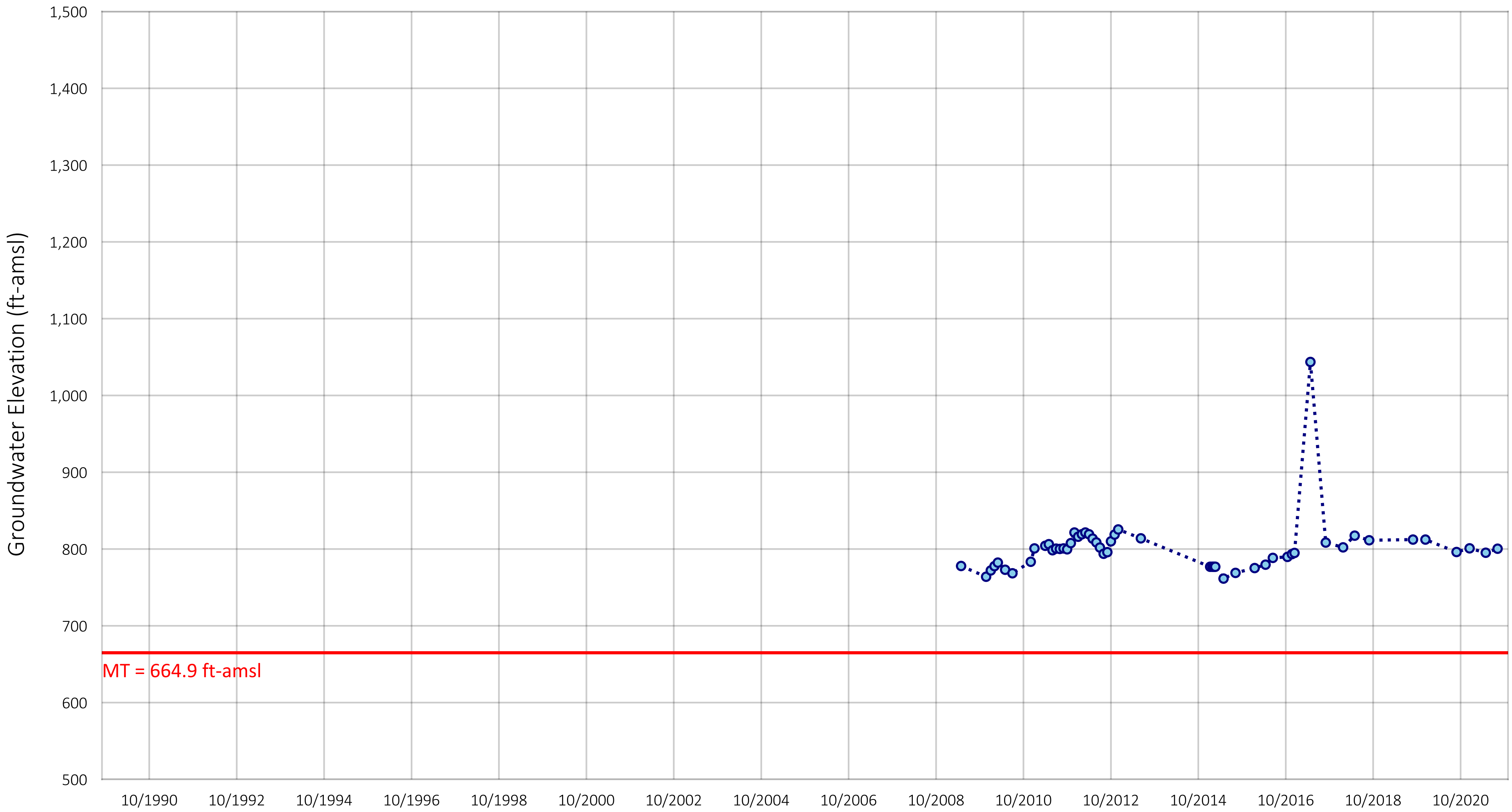


Prepared by:

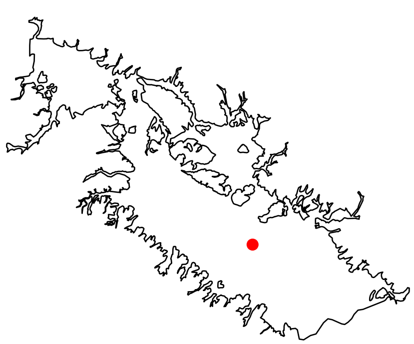
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232308
Well Name: Stadium Deep

Figure A-20



Location of Well in Elsinore Valley

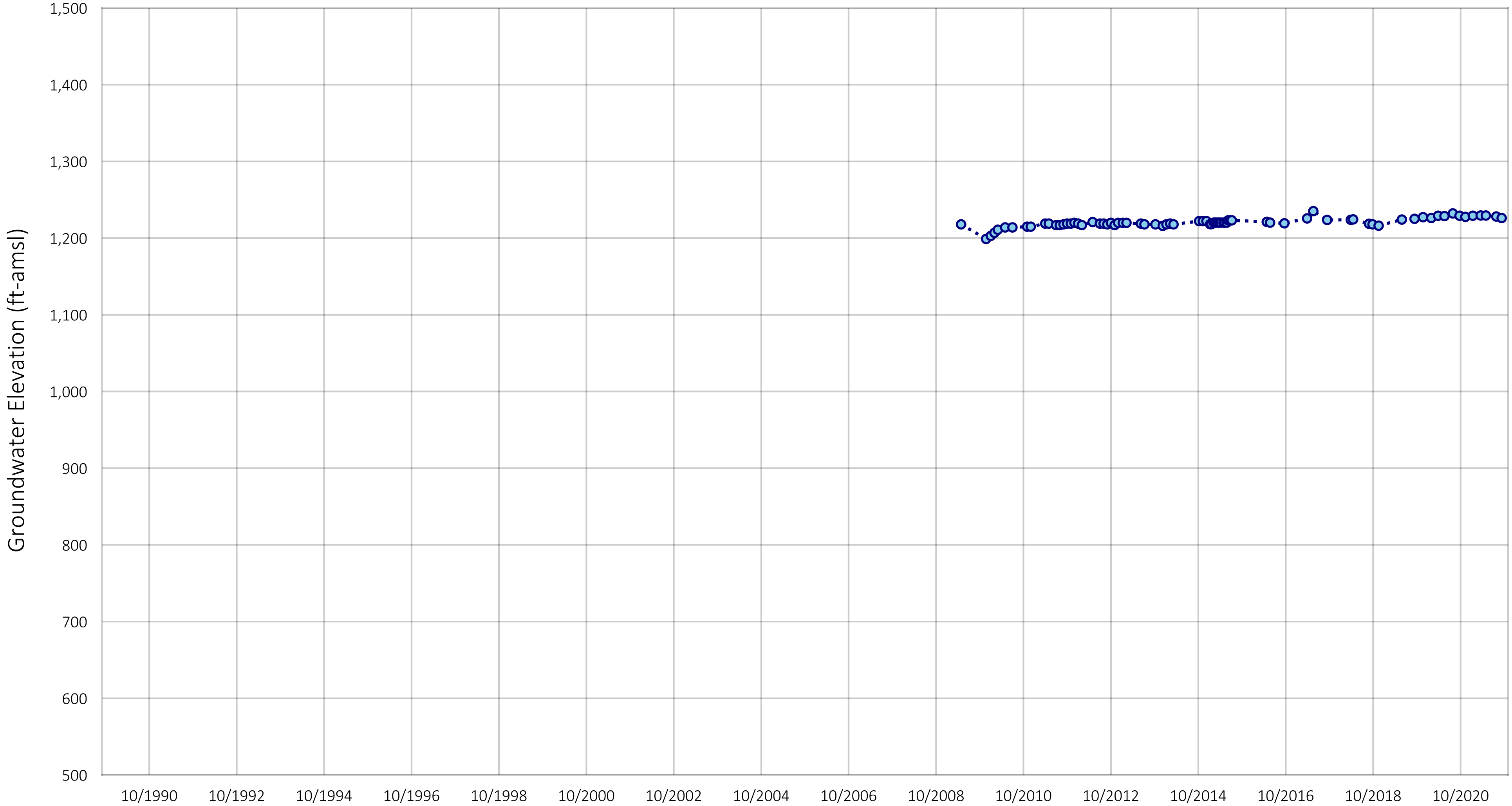


Prepared by:

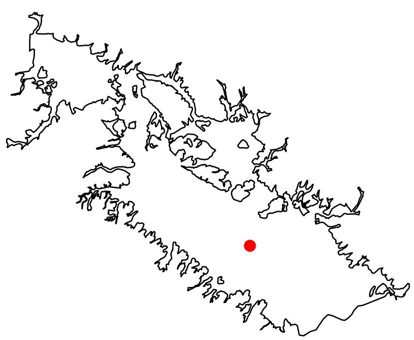
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1222271
Well Name: North Island

Figure A-21



Location of Well in Elsinore Valley

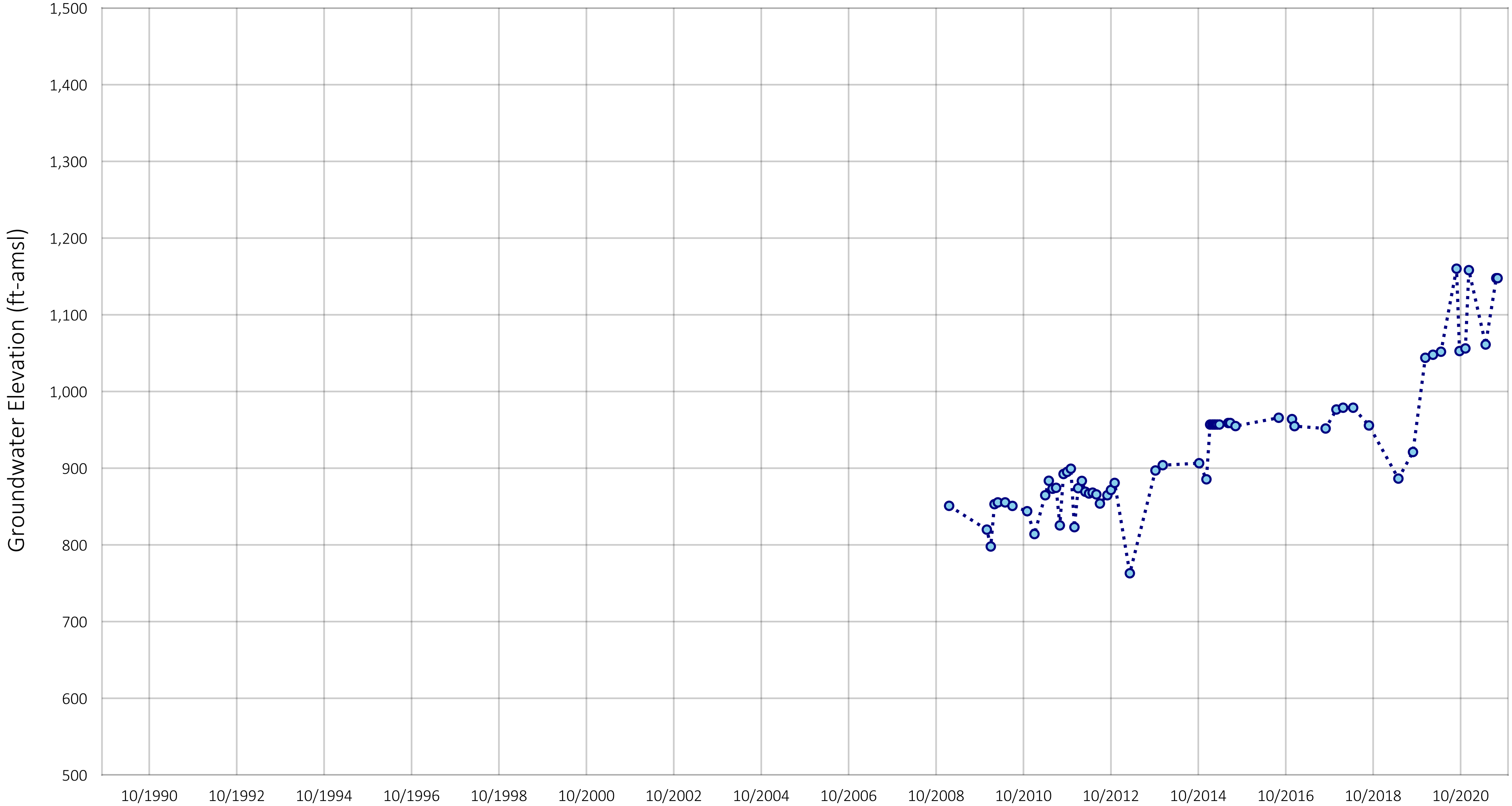


Prepared by:

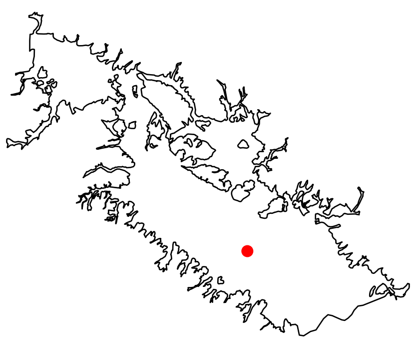
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1222272
Well Name: Middle Island

Figure A-22



Location of Well in Elsinore Valley

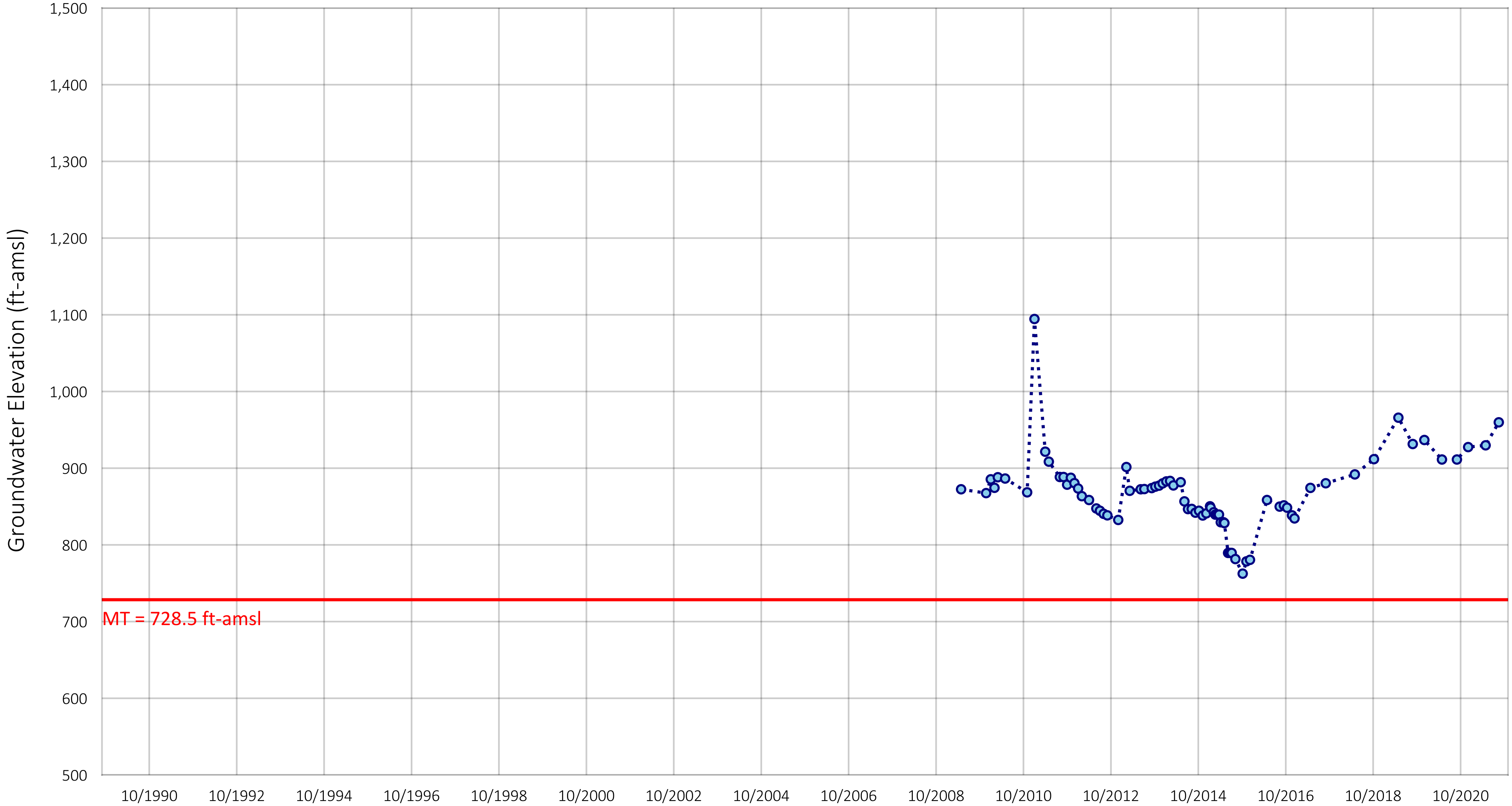


Prepared by:

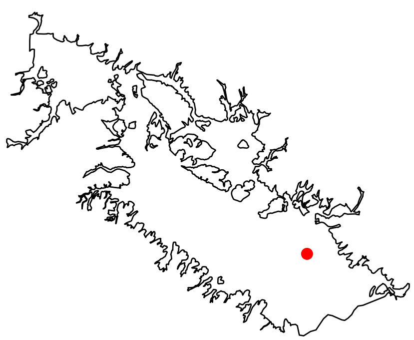
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1222273
Well Name: South Island

Figure A-23



Location of Well in Elsinore Valley

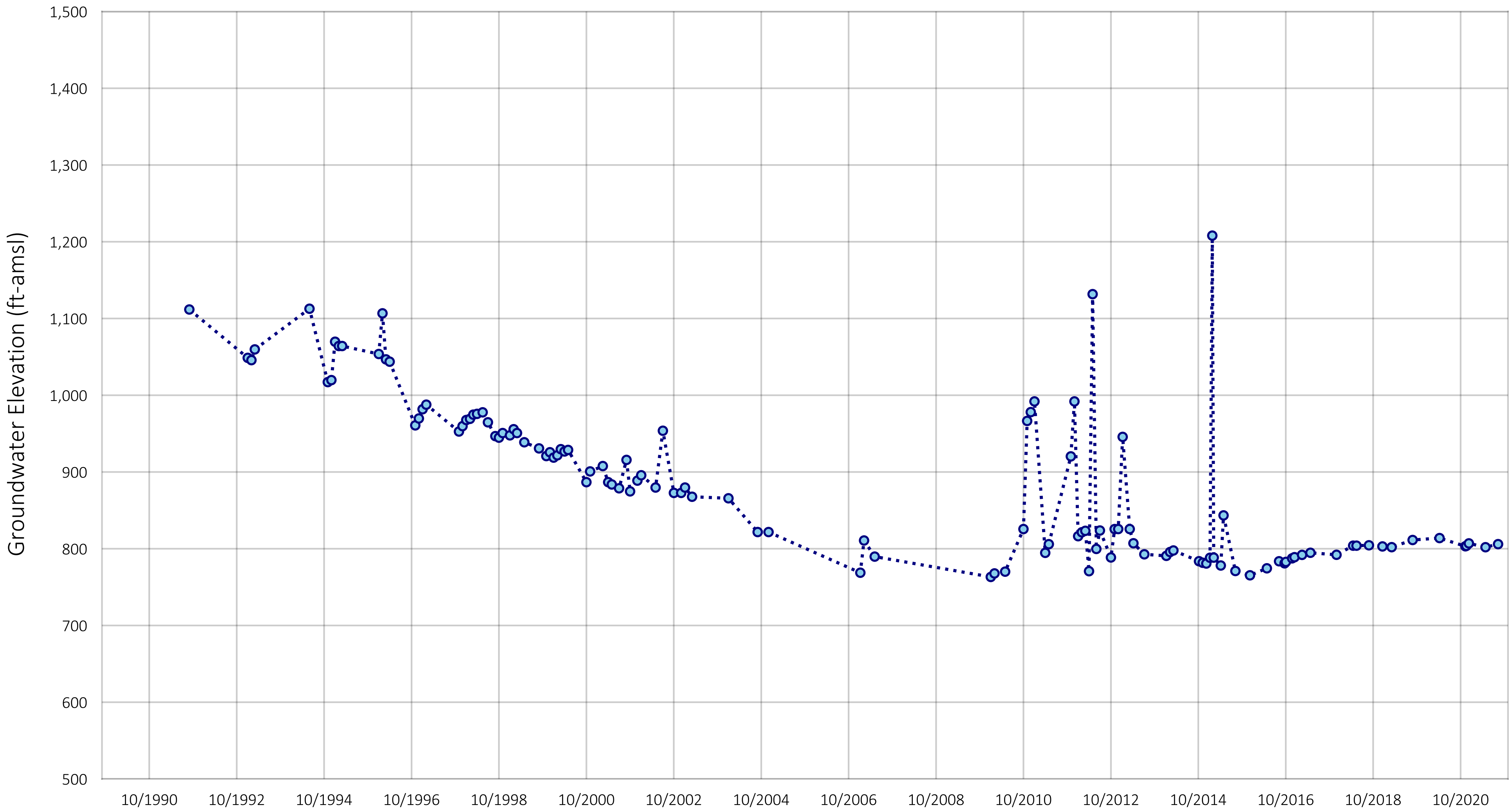


Prepared by:

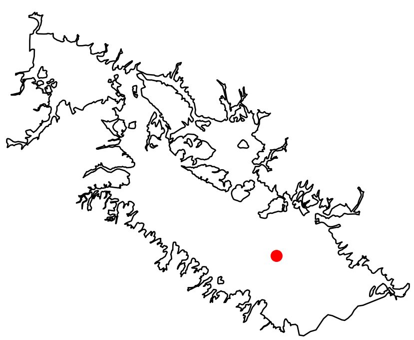
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1222270
Well Name: Summerly

Figure A-24



Location of Well in Elsinore Valley

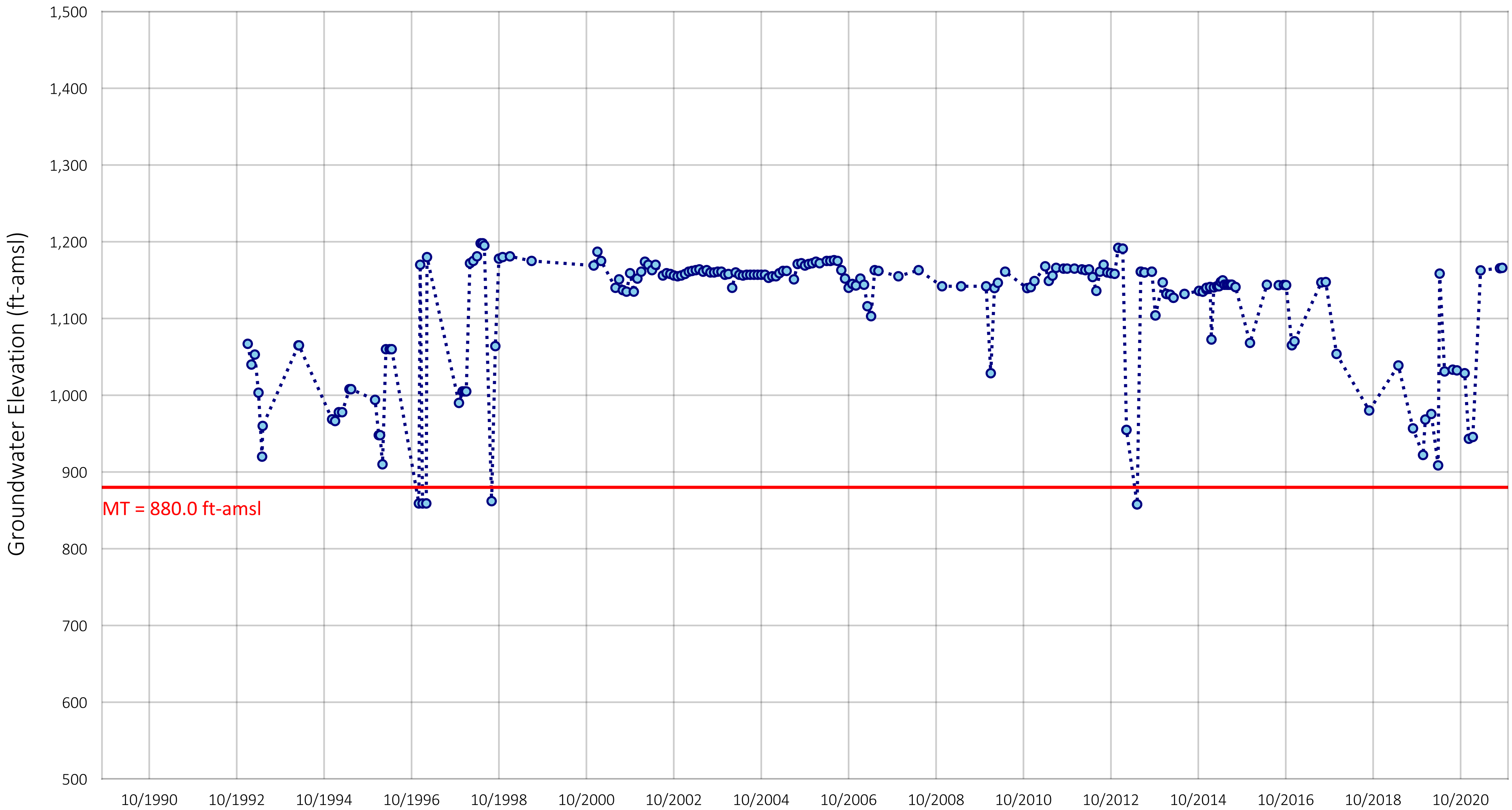


Prepared by:

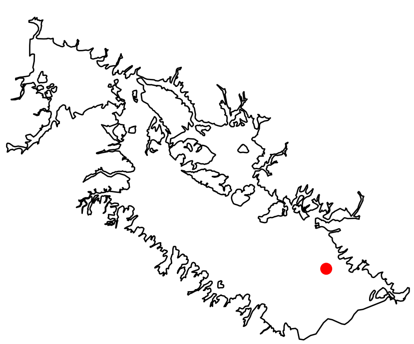
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005914
Well Name: Cereal 4
State Well ID: 06S04W17L01

Figure A-25



Location of Well in Elsinore Valley

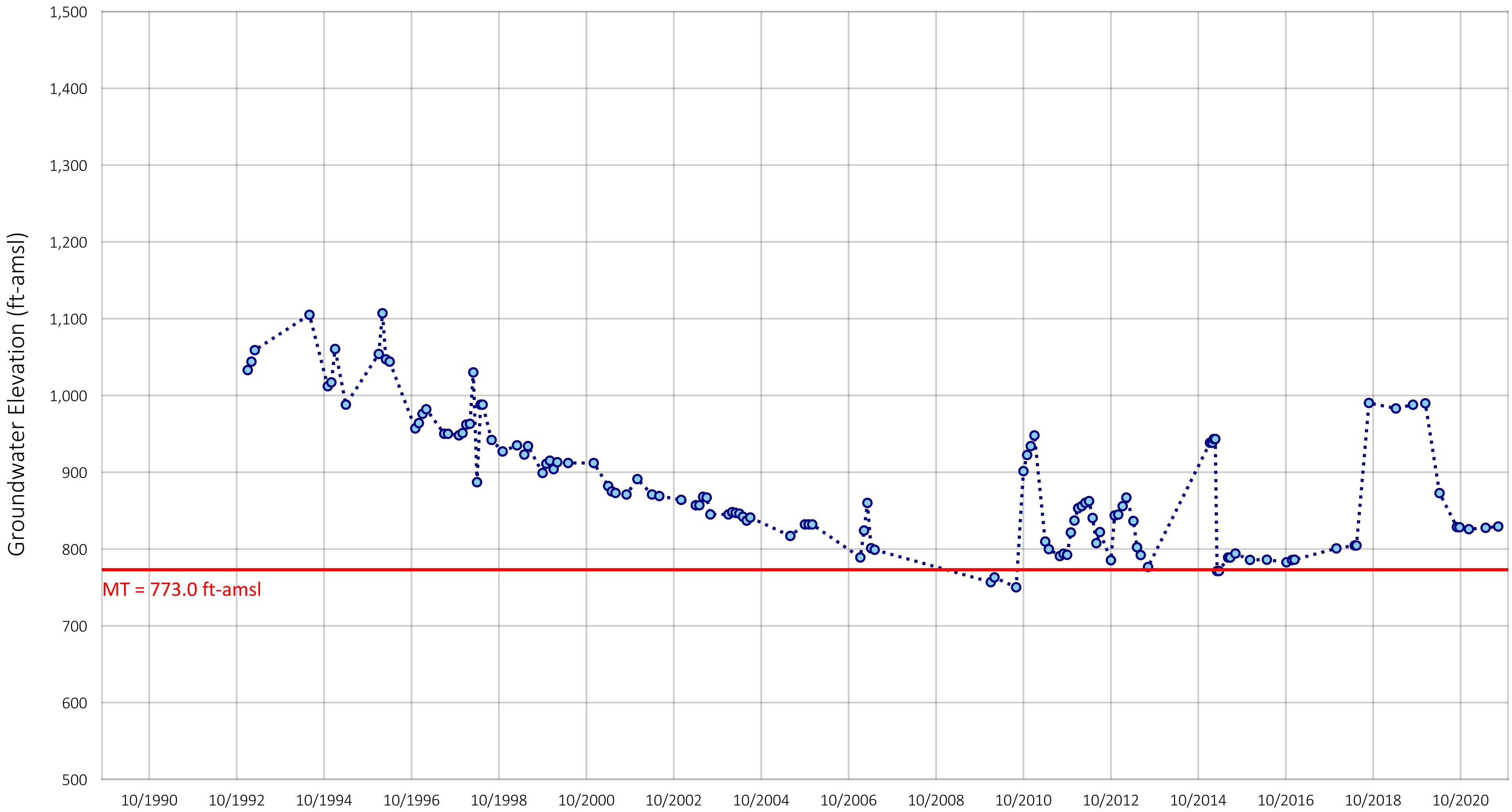


Prepared by:

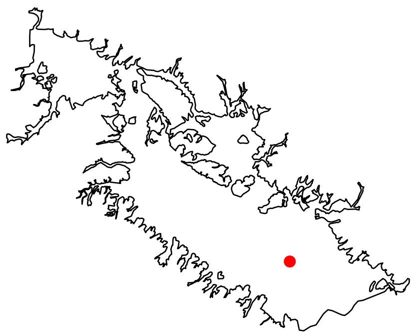
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005917
Well Name: Olive
State Well ID: 06S04W22D02

Figure A-26



Location of Well in Elsinore Valley

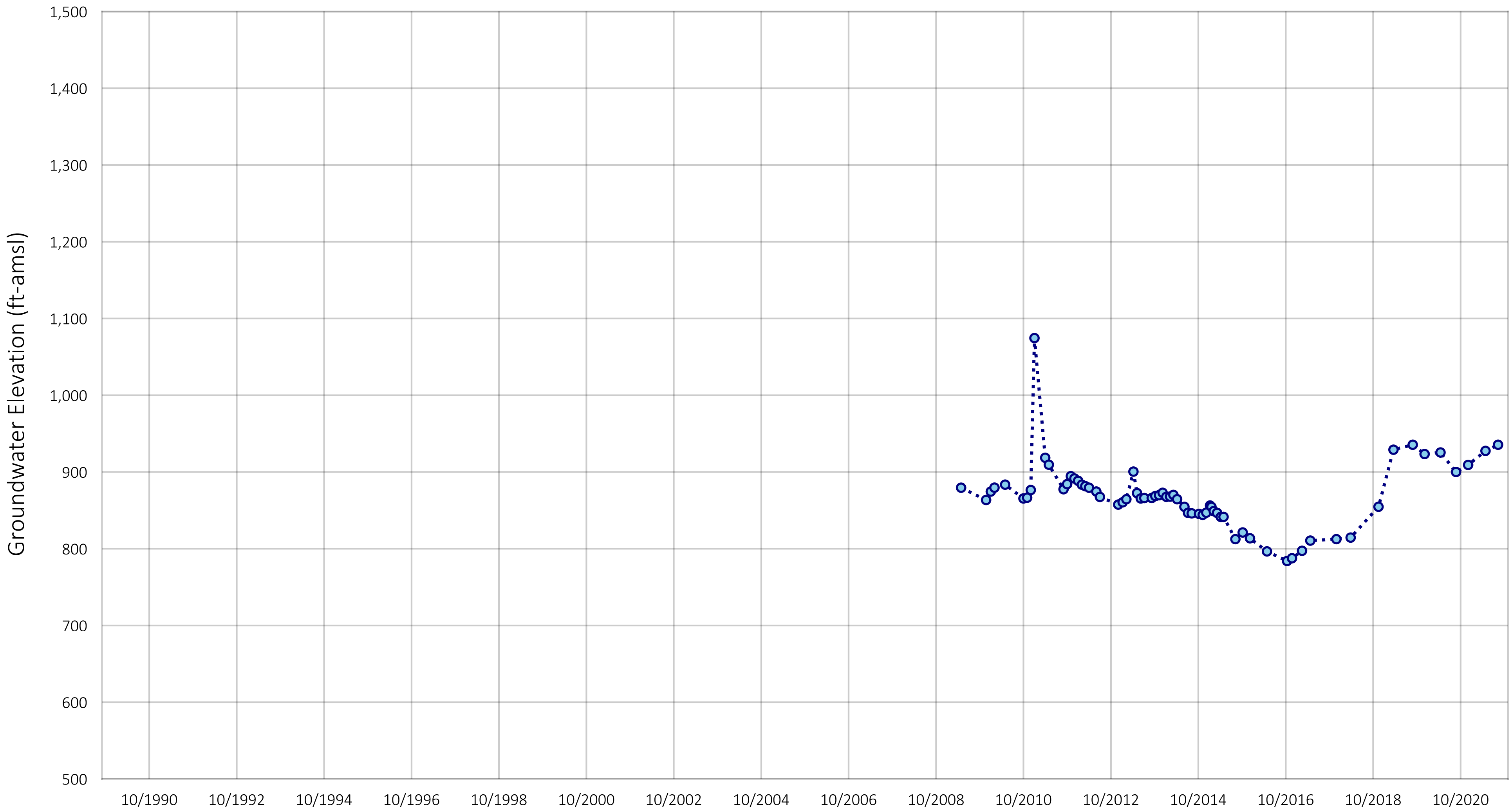


Prepared by:

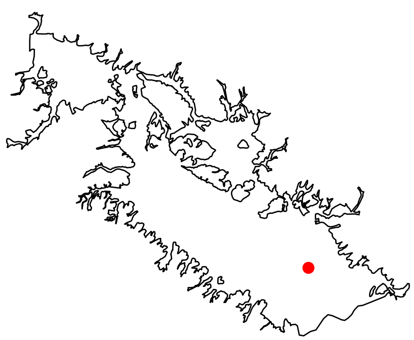
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005913
Well Name: Cereal 3
State Well ID: 06S04W17K01

Figure A-27



Location of Well in Elsinore Valley

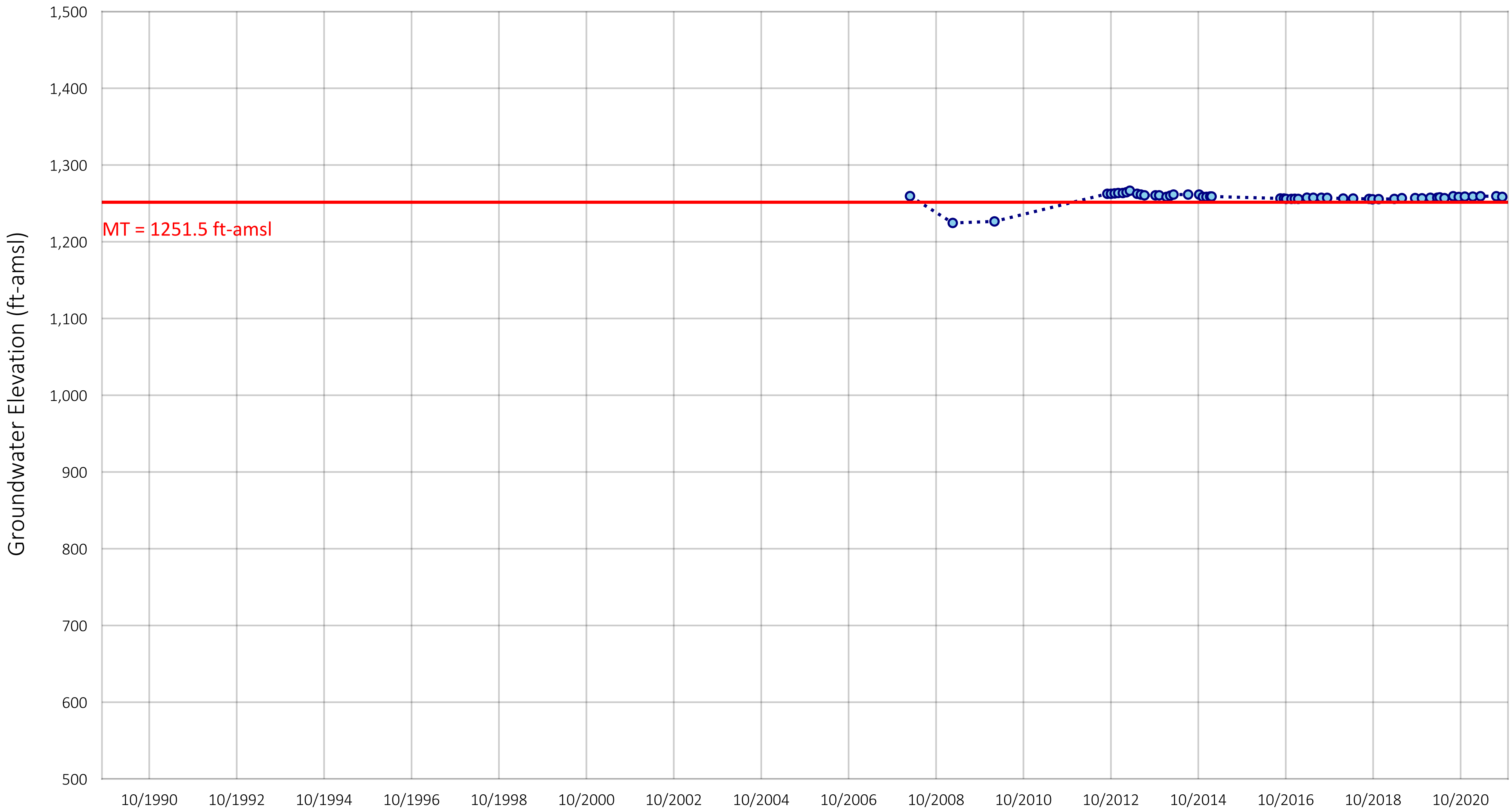


Prepared by:

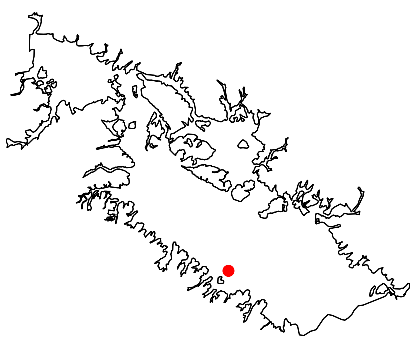
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1222269
Well Name: Diamond

Figure A-28



Location of Well in Elsinore Valley

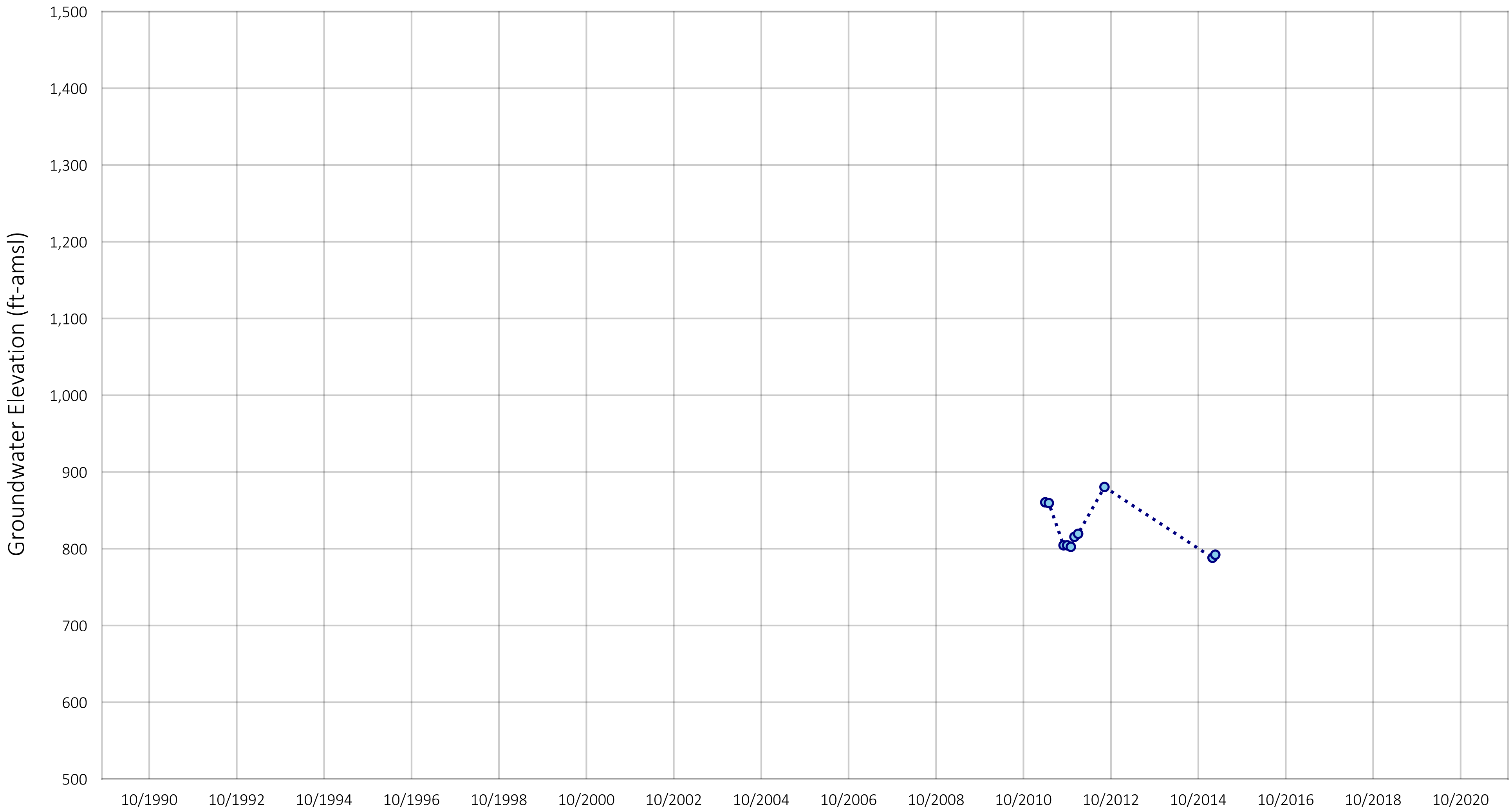


Prepared by:

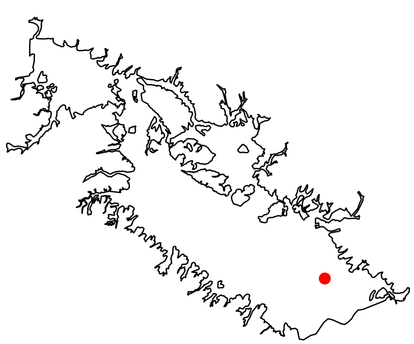
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1203678
Well Name: Grand
State Well ID: 06S05W24A

Figure A-29



Location of Well in Elsinore Valley

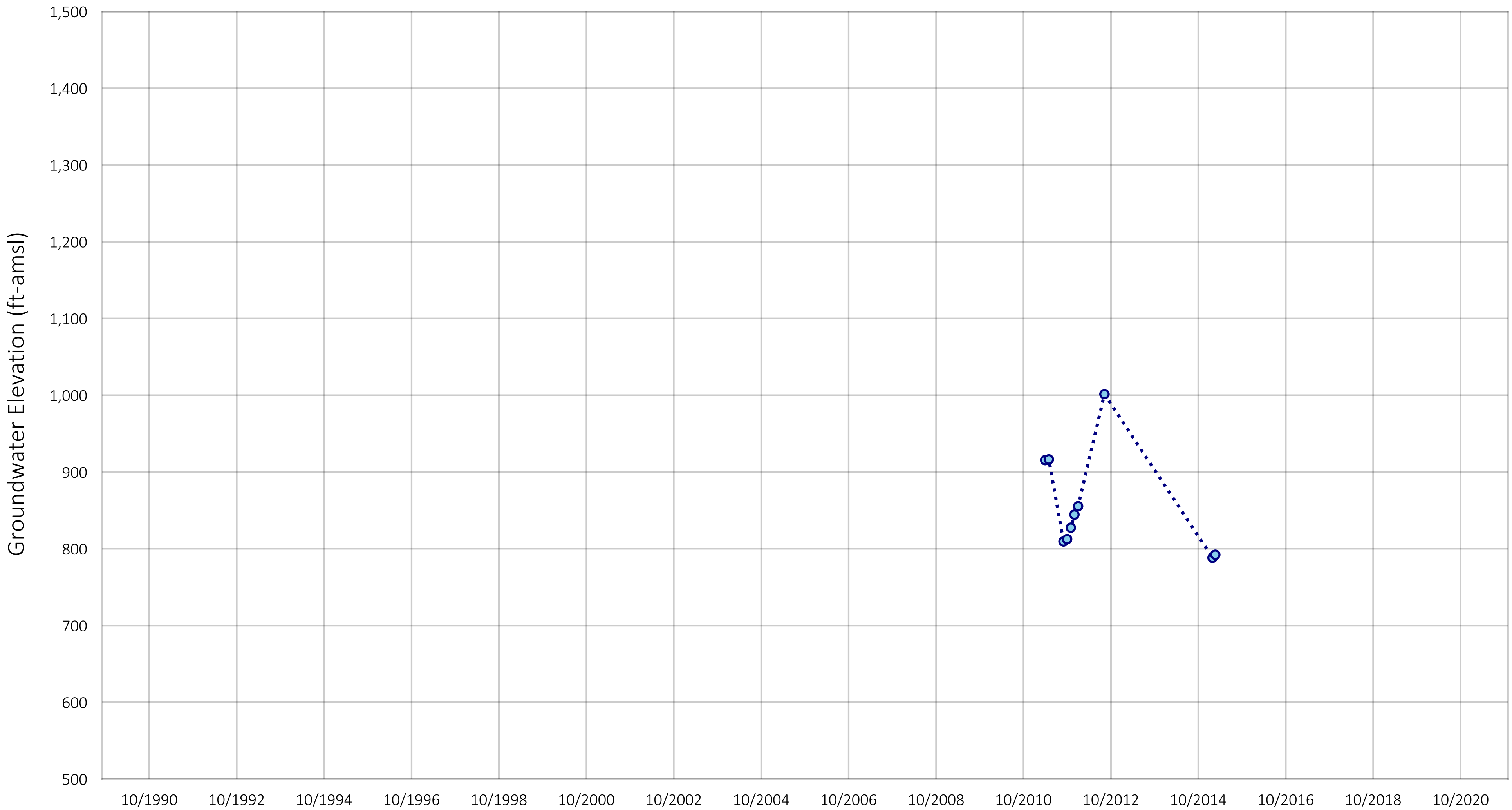


Prepared by:

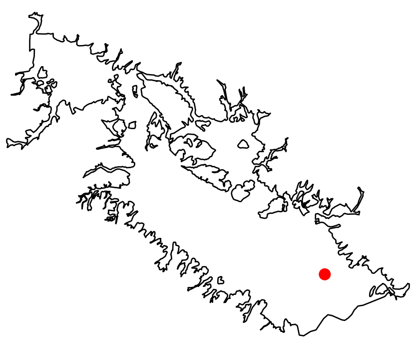
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232305
Well Name: MW4 Deep

Figure A-30



Location of Well in Elsinore Valley

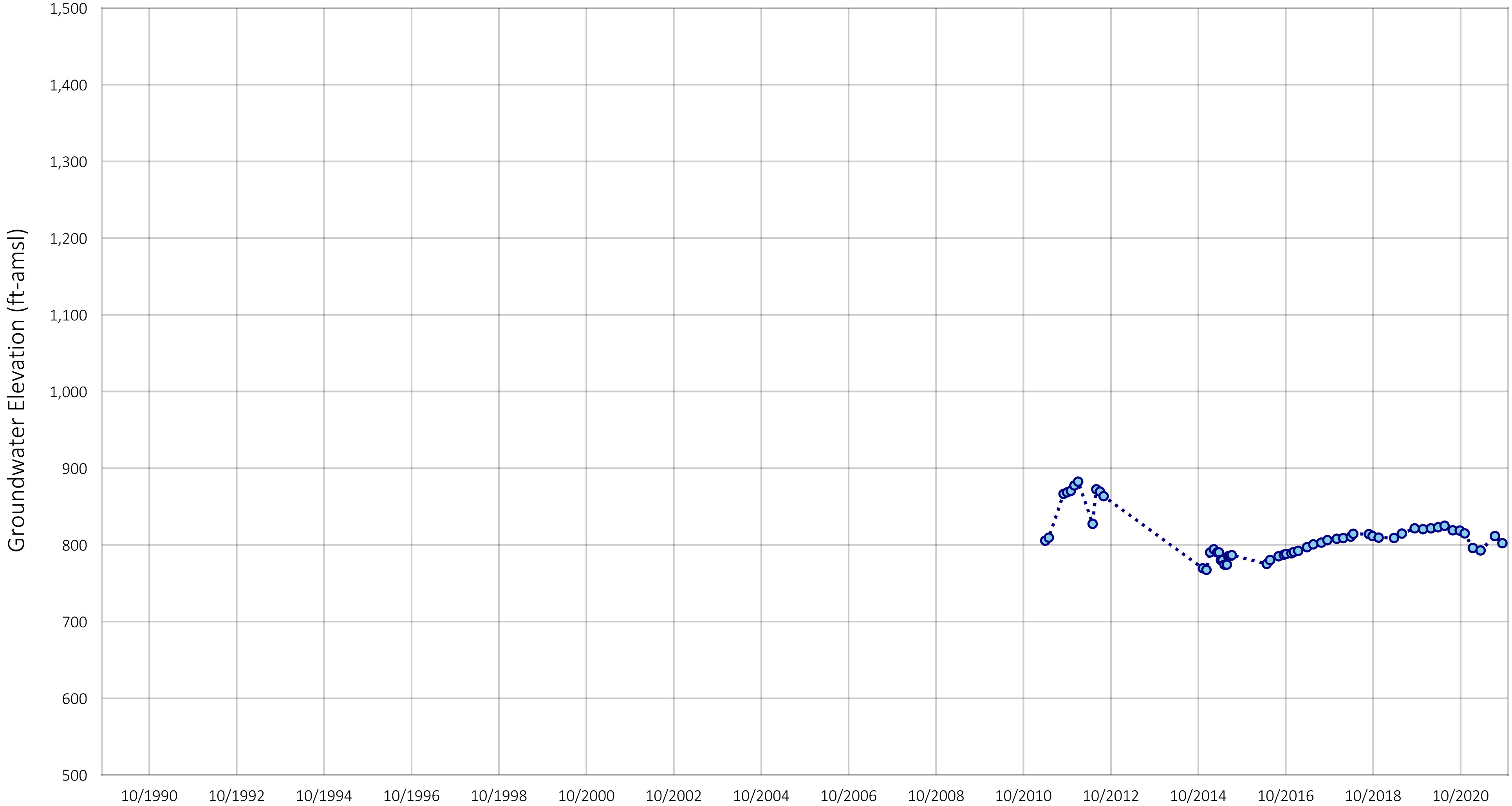


Prepared by:

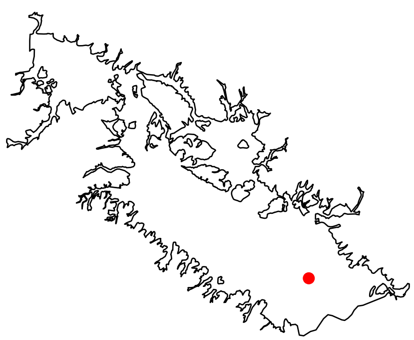
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232306
Well Name: MW4 Shallow

Figure A-31



Location of Well in Elsinore Valley

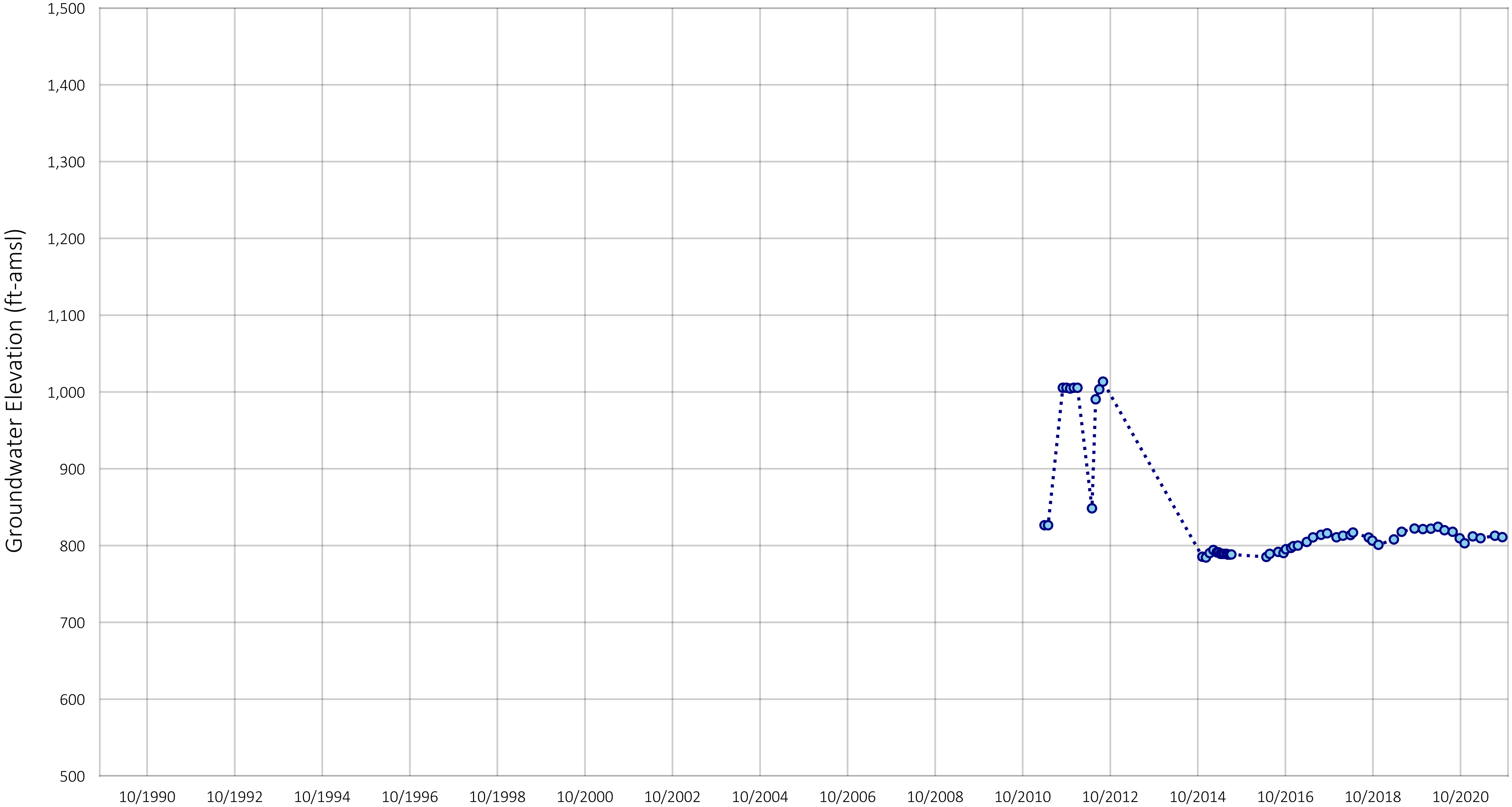


Prepared by:

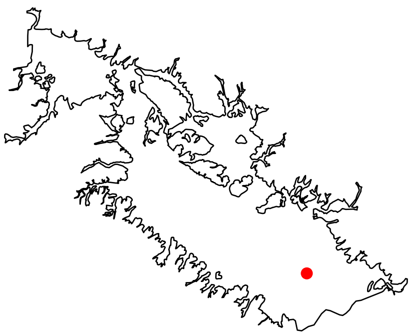
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232303
Well Name: MW3 Deep

Figure A-32



Location of Well in Elsinore Valley

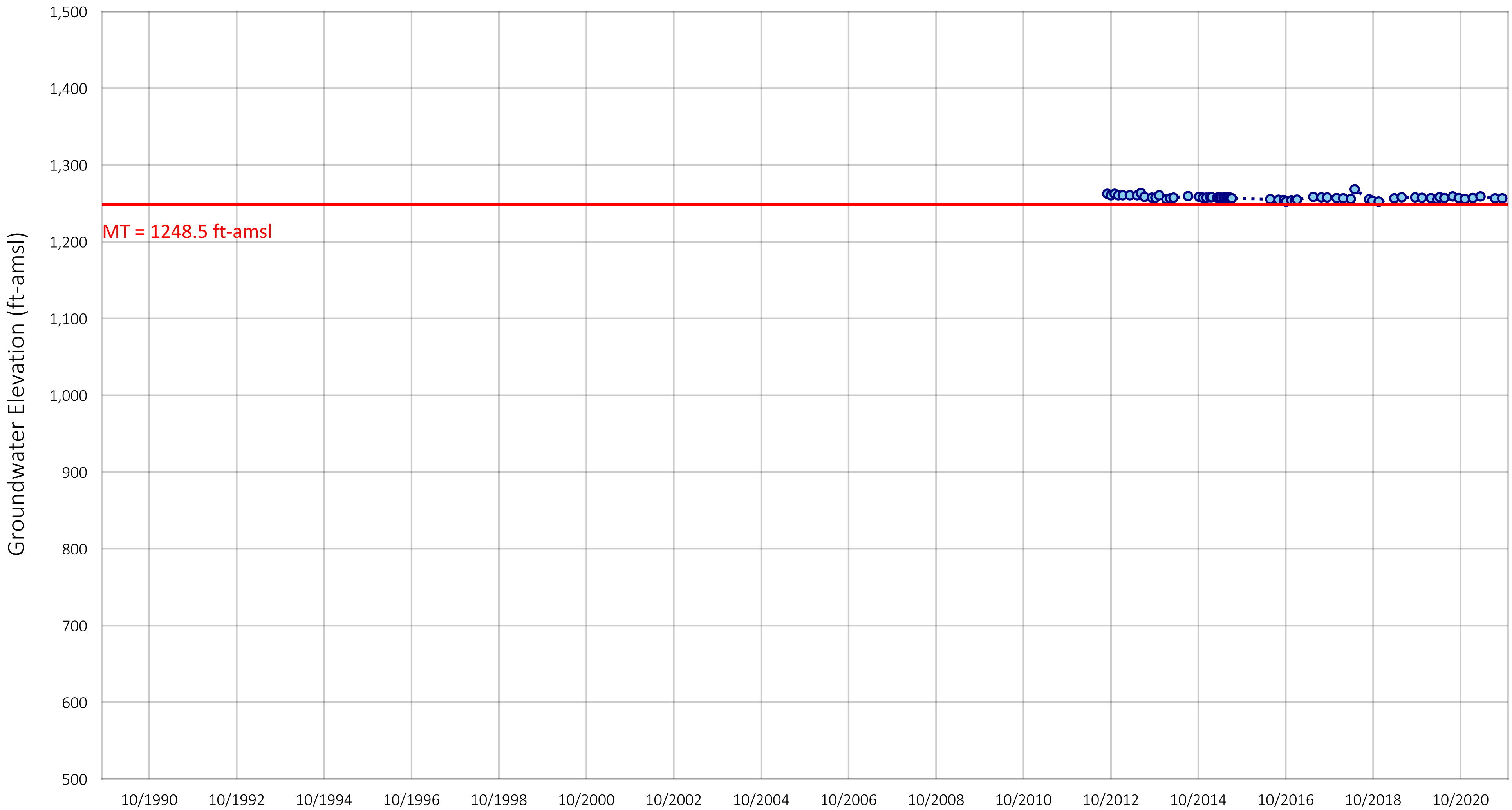


Prepared by:

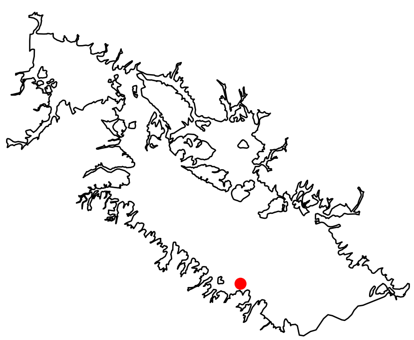
WEST YOST Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232304
Well Name: MW3 Shallow

Figure A-33



Location of Well in Elsinore Valley

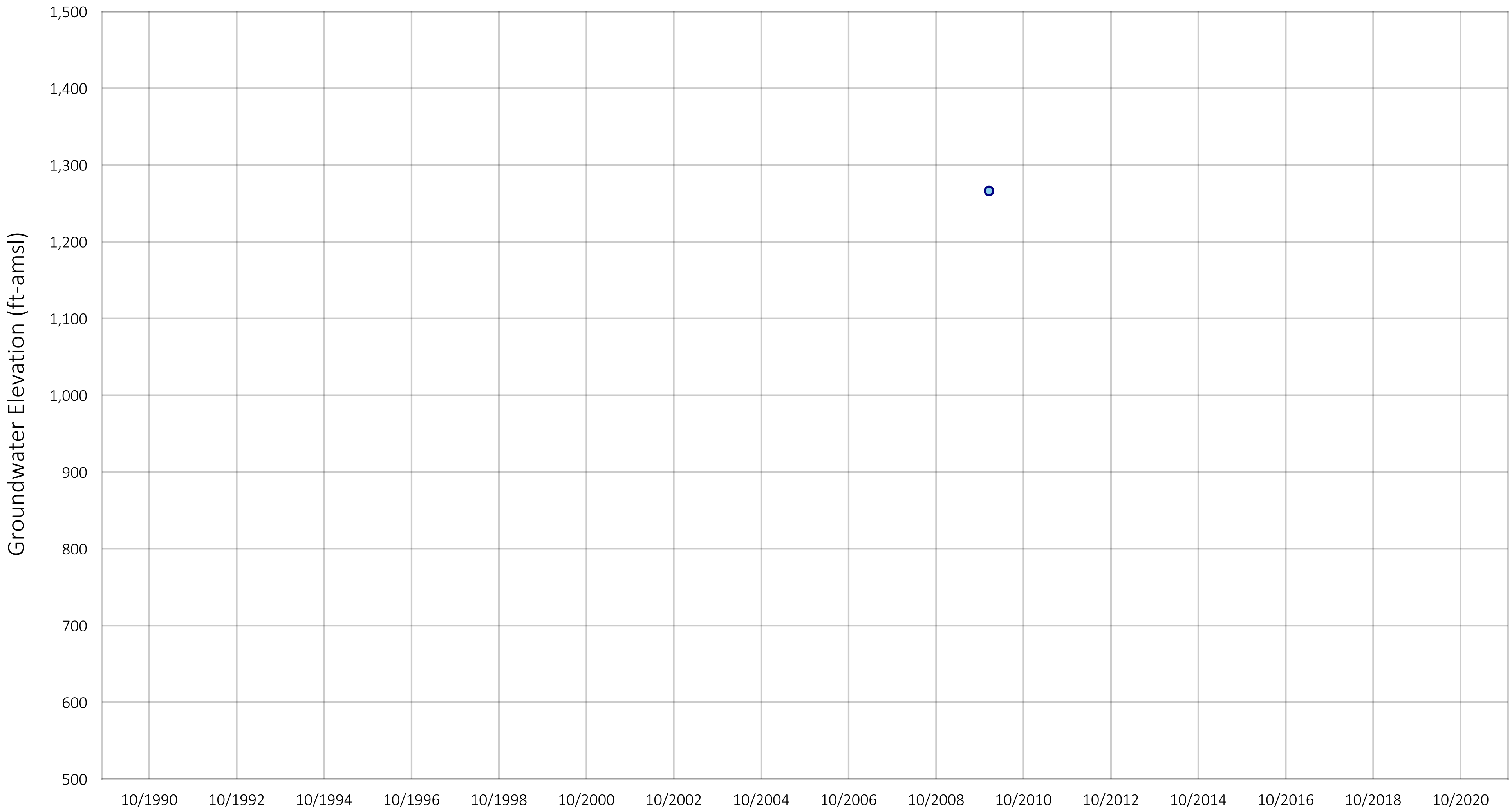


Prepared by:

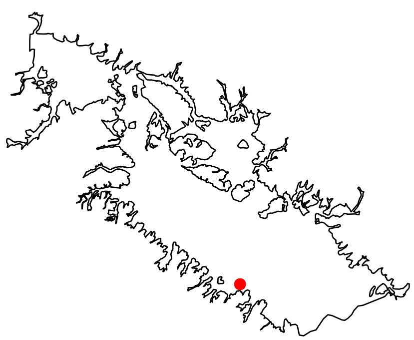
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232311
Well Name: Wood 2

Figure A-34



Location of Well in Elsinore Valley

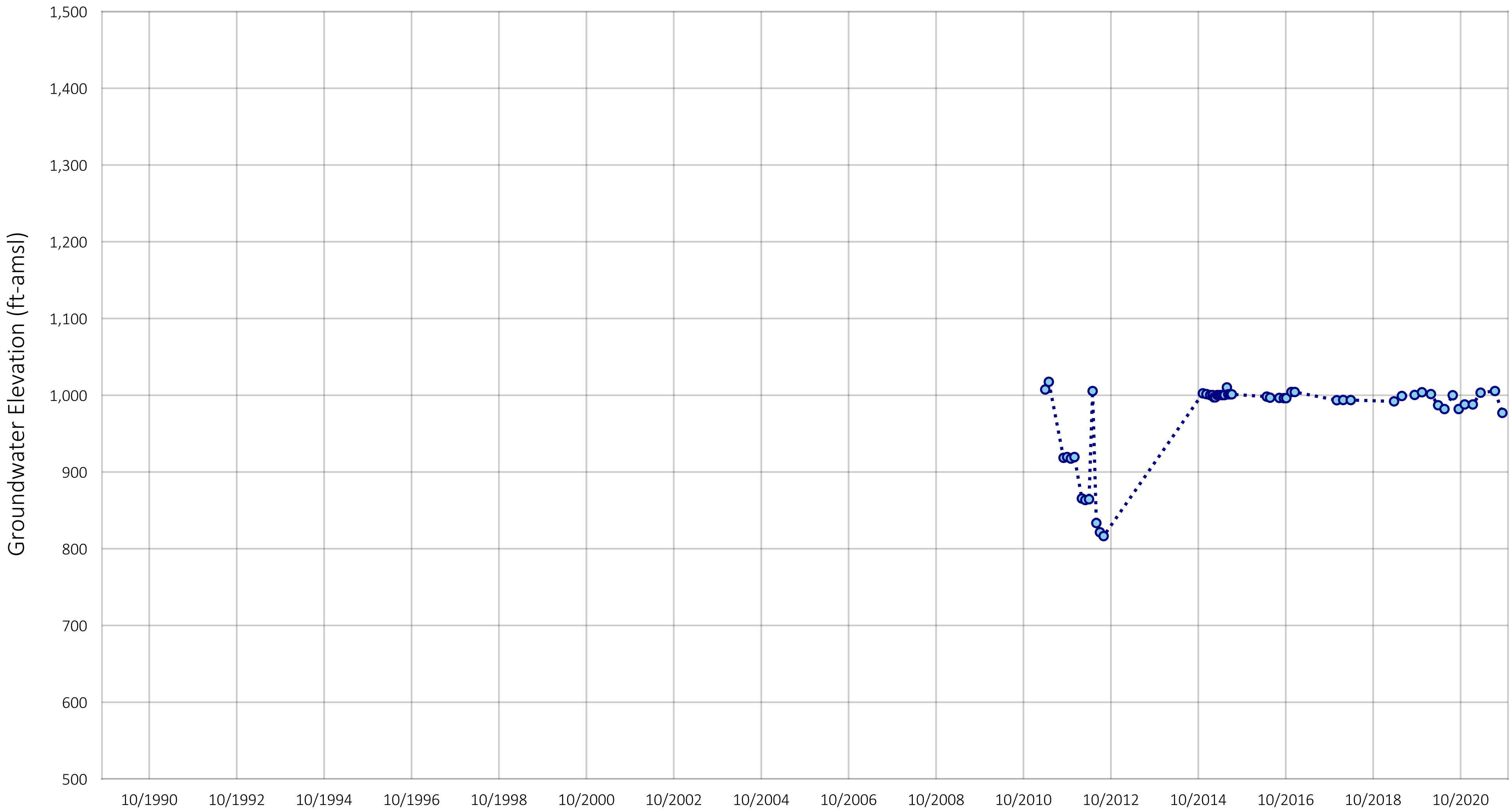


Prepared by:

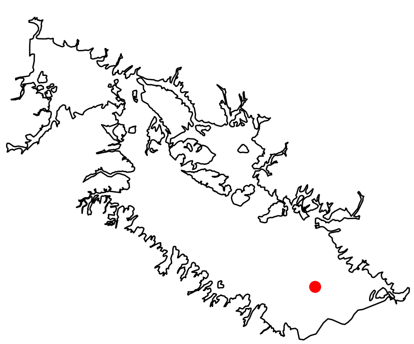
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1208217
Well Name: Wood Well
State Well ID: 06S04W19F01

Figure A-35



Location of Well in Elsinore Valley

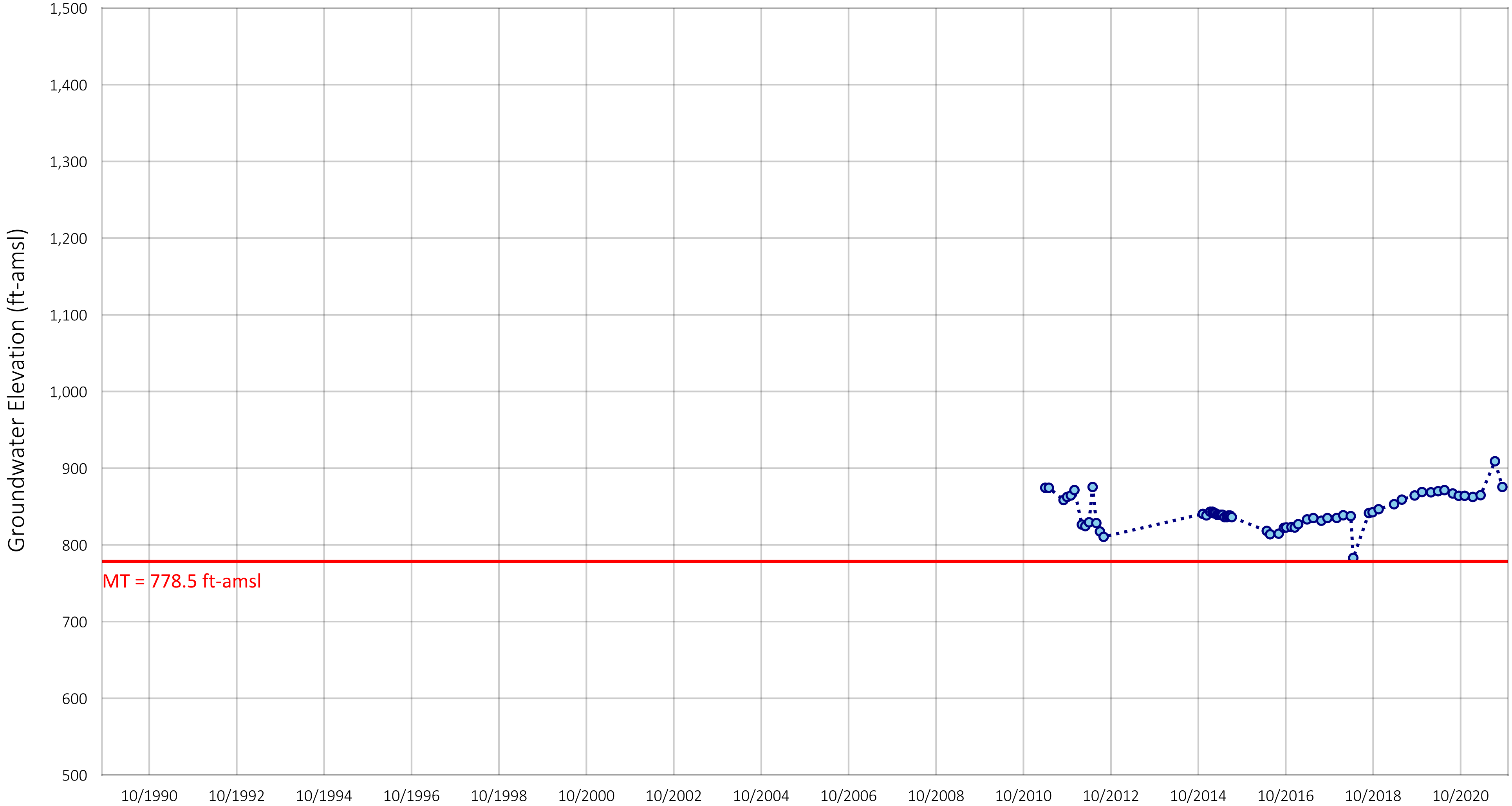


Prepared by:

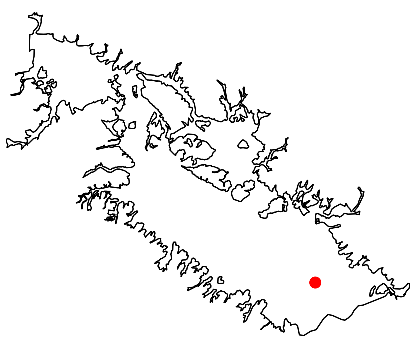
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232300
Well Name: MW1 Shallow

Figure A-36



Location of Well in Elsinore Valley

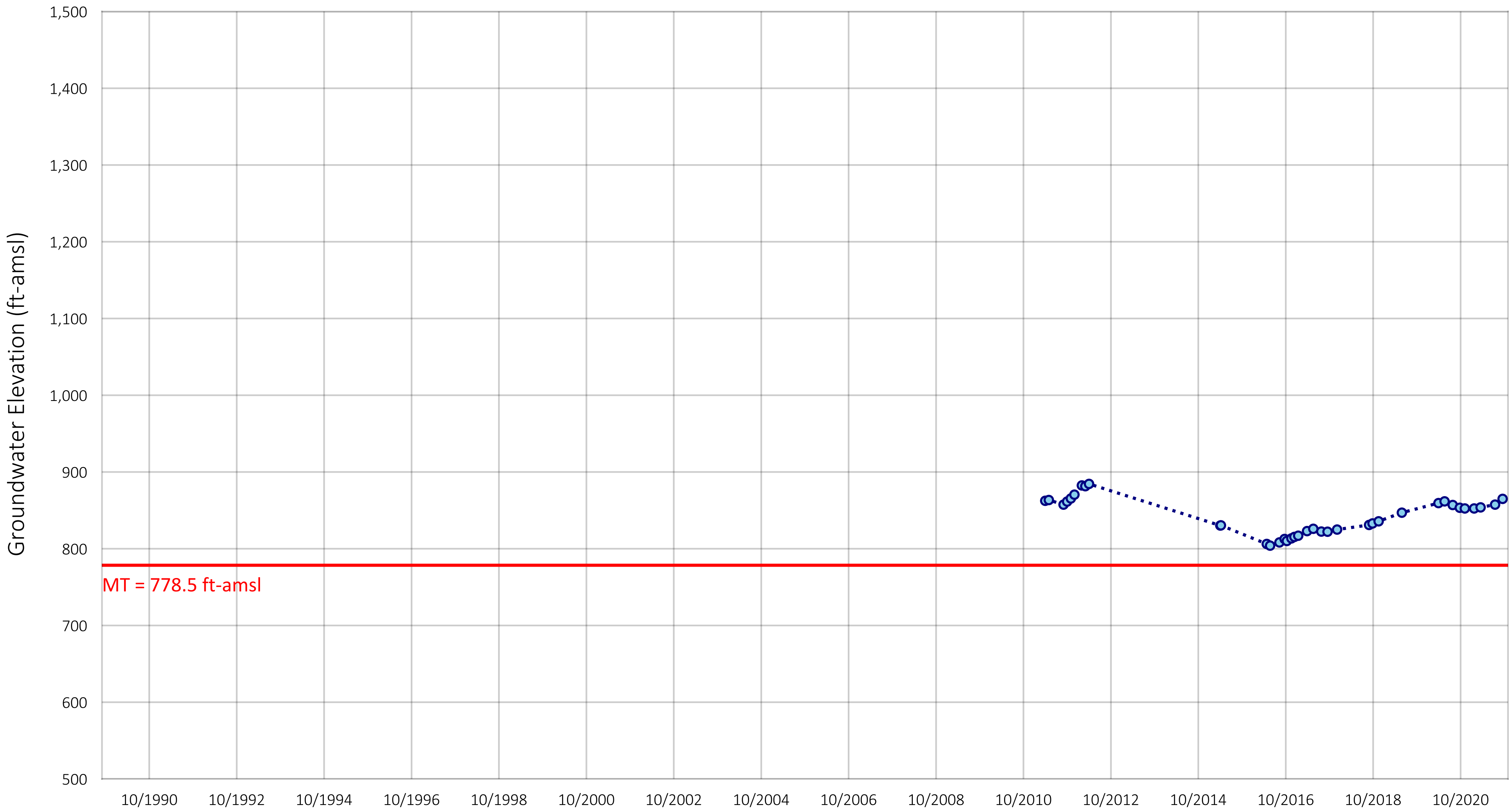


Prepared by:

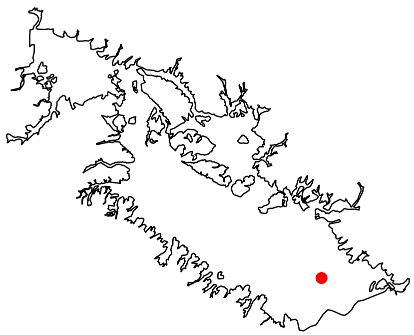
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232299
Well Name: MW1 Deep

Figure A-37



Location of Well in Elsinore Valley

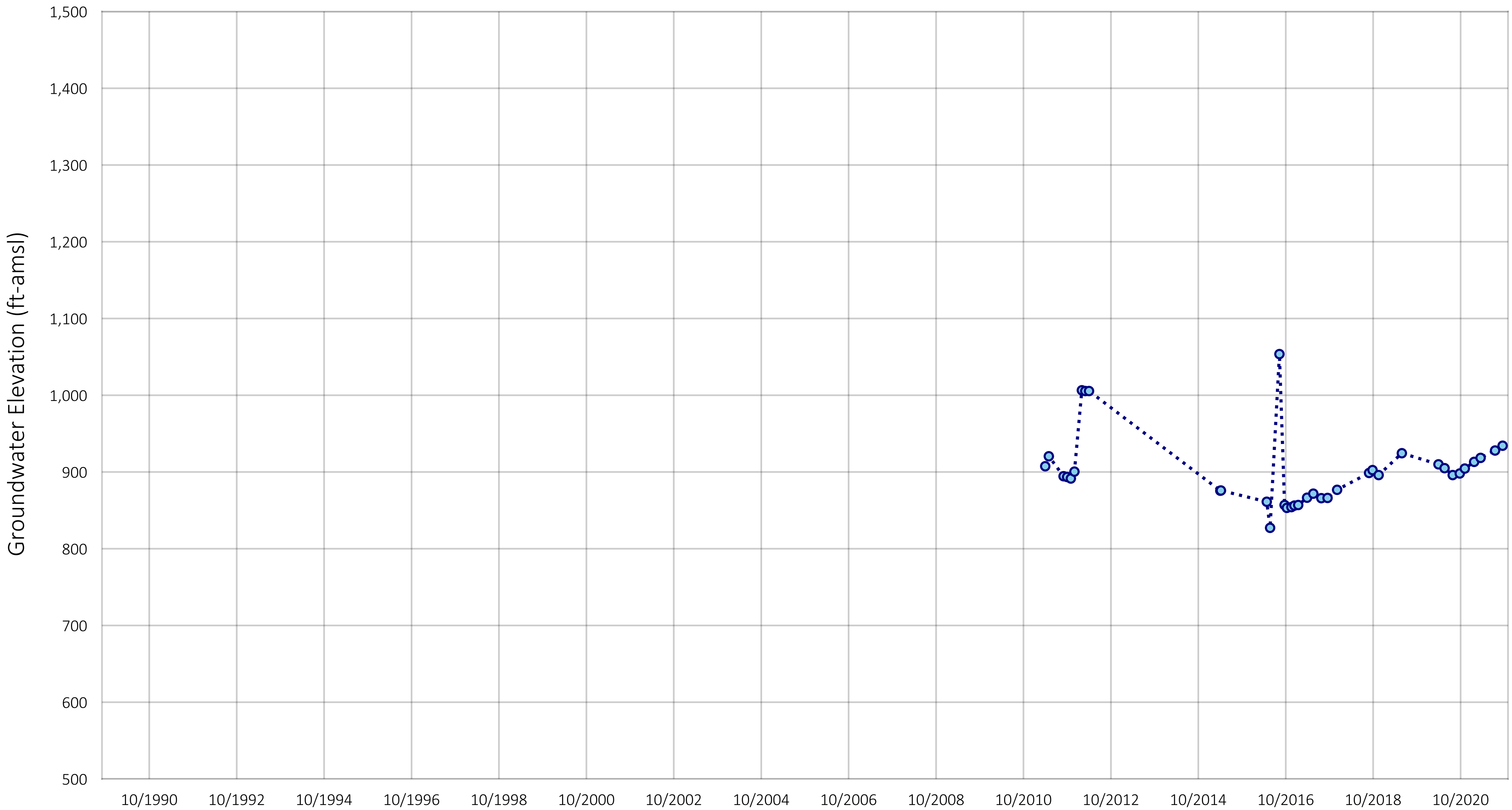


Prepared by:

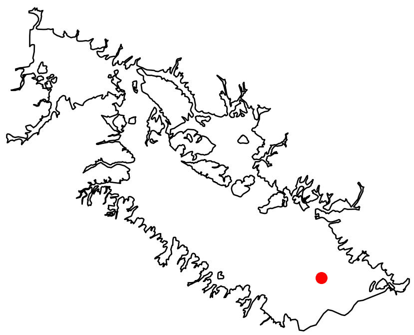
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232301
Well Name: MW2 Deep

Figure A-38



Location of Well in Elsinore Valley

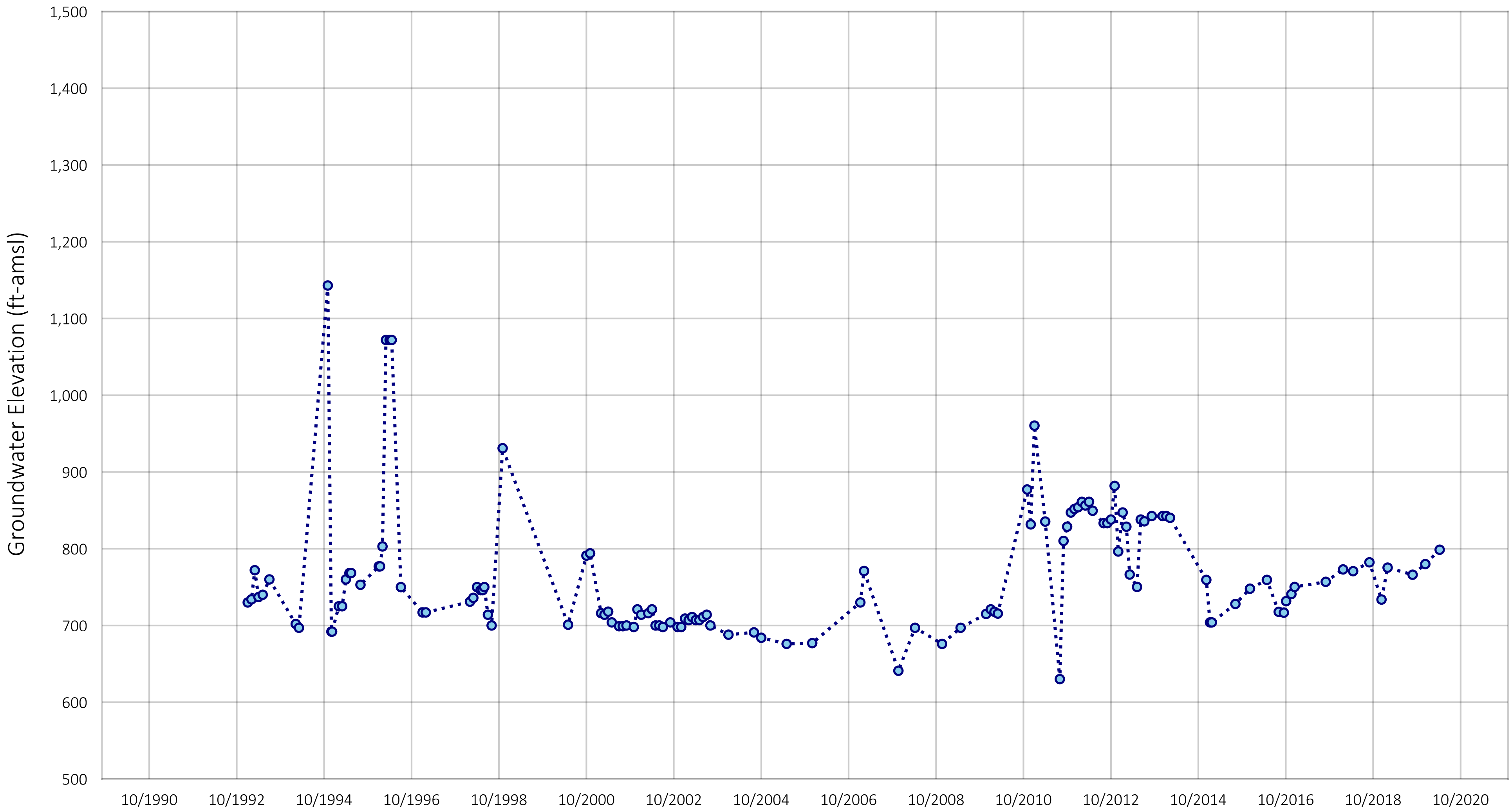


Prepared by:

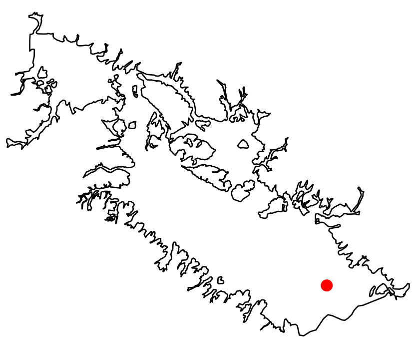
WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1232302
Well Name: MW2 Shallow

Figure A-39



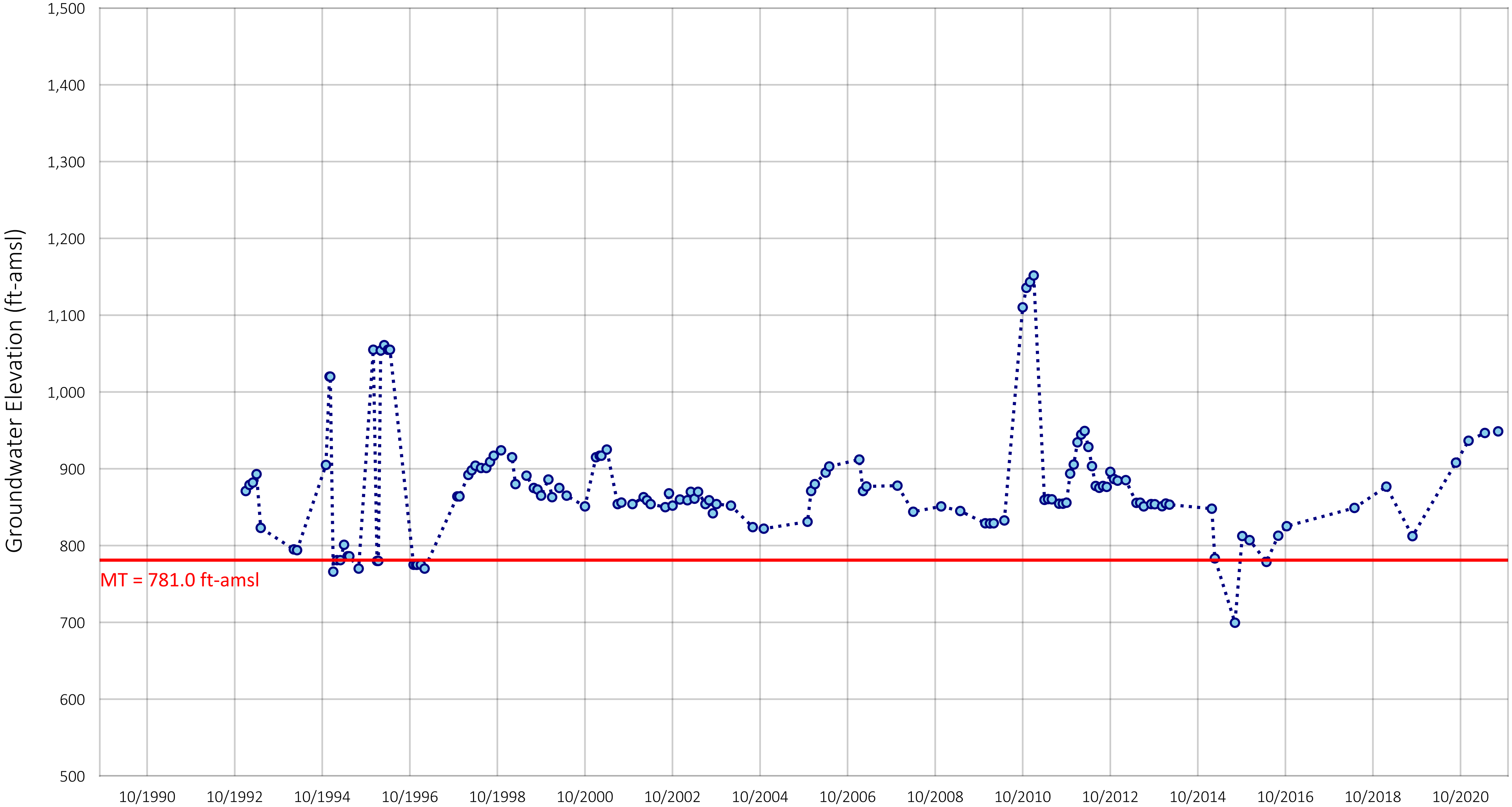
Location of Well in Elsinore Valley



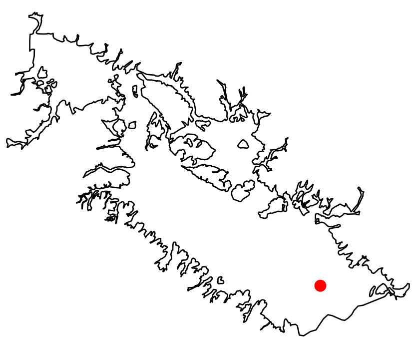
Prepared by:

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1203675
Well Name: Corydon
State Well ID: 06S04W22M08

Figure A-40



Location of Well in Elsinore Valley



Prepared by:

WEST YOST
Water. Engineered.

Historical Groundwater Level Elevation
Elsinore Valley Well ID: 1005916
Well Name: Cereal 1
State Well ID: 06S04W21J03

Figure A-41

Concord

1001 Galaxy Way, Suite 310
Concord CA 94520
925-949-5800

Davis

2020 Research Park Drive, Suite 100
Davis CA 95618
530-756-5905

Eugene

1650 W 11th Avenue, Suite 1-A
Eugene OR 97402
541-431-1280

Lake Forest

23692 Birtcher Drive
Lake Forest CA 92630
949-420-3030

Lake Oswego

5 Centerpointe Drive, Suite 130
Lake Oswego OR 97035
503-451-4500

Oceanside

804 Pier View Way, Suite 100
Oceanside CA 92054
760-795-0365

Olympia

825 Legion Way SE, Suite A6
Olympia WA 98501
360-350-4523

Phoenix

4505 E Chandler Boulevard, Suite 230
Phoenix AZ 85048
602-337-6110

Pleasanton

6800 Koll Center Parkway, Suite 150
Pleasanton CA 94566
925-426-2580

Sacramento

8950 Cal Center Drive, Bldg. 1, Suite 363
Sacramento CA 95826
916-306-2250

San Diego

11939 Rancho Bernardo Road, Suite 100
San Diego CA 92128
858-505-0075

Santa Rosa

2235 Mercury Way, Suite 105
Santa Rosa CA 95407
707-543-8506