AGENDA

SPADRA BASIN GSA

EXECUTIVE COMMITTEE MEETING

https://wvwd.webex.com/meet/spadra2
(Computer and Telephone Audio Accessible)

MONDAY, MAY 1, 2023, AT 3:30 P.M.

Commissioner Tang: Walnut Valley Water District - 271 S. Brea Canyon Road, Walnut, CA 91789

Any member of the public wishing to make any comments to the Committee may do so by accessing the above-referenced link where they may select the option to join via webcam or teleconference. The meeting Chair will acknowledge such individual(s) at the appropriate time in the meeting prior to making his or her comment.

1. Call to Order and Pledge of Allegiance

2. Roll Call

Party		Representatives		Alternates
City of Pomona	___	John Nolte	____	Victor Preciado
Walnut Valley Water District	___	Jerry Tang	____	Theresa Lee

3. Public Comment – The presiding officer of the Executive Committee may impose reasonable limitations on public comments to assure an orderly and timely meeting.

4. Review of Spadra Basin 2022 Annual Report (Information Only)

5. Future Discussion Items

6. Adjournment to Next Meeting – Advisory Committee Meeting on June 5, 2023 at 3:00 p.m.
(Next Executive Committee Meeting: Monday, July 3, 2023 at 3:30 p.m.)

FINAL REPORT | MARCH 2023

Spadra Basin Groundwater Sustainability Plan 2022 Annual Report

PREPARED PURSUANT TO

Sustainable Groundwater Management Act

PREPARED FOR

Spadra Basin Groundwater Sustainability Agency

PREPARED BY

West Yost

Spadra Basin Groundwater Sustainability Plan 2022 Annual Report

Prepared for

Spadra Basin Groundwater Sustainability Agency

Project No. 1067-80-20-22-01

PROFESSIONAL GEOLOGIST
ANDREW
EARL
MALONE
No. 8700
STATE OF CALIFORNIA

Project Manager: Veva Weamer	03-28-23 Date
QA/QC Review: Andy Malone, PG	03-28-23 Date

WEST YOST
Water. Engineered.

FINAL REPORT | MARCH 2023

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LIST OF ACRONYMS AND ABBREVIATIONS

µgl	Micrograms Per Liter
µmhos/cm	Micromhos Per Centimeter
1,1-DCE	1,1,-Dichloroethene
af	Acre-Feet
afy	Acre-Feet Per Year
CCR	California Code of Regulations
CDFM	Cumulative Departure from the Mean
CIMIS	California Irrigation Management Information System
CPP	California State Polytechnic University of Pomona
DIPAW	Deep Infiltration of Precipitation and Applied Water
DWR	Department of Water Resources
EPA	Environmental Protection Agency
ET	Evapotranspiration
ft-amsl	Feet Above Mean Sea Level
gpm	Gallons Per Minute
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
InSAR	Interferometric Synthetic-Aperture Radar
LACSD	Los Angeles County Sanitation Districts
MCL	Maximum Contaminant Level
Metropolitan	Metropolitan Water District of Southern Caledonia
MGD	Million Gallons Per Day
mgl	Milligrams Per Liter
MOU	Memorandum of Understanding
NTU	Nephelometric Turbidity Unit
PCE	Tetrachloroethene
Pomona	City of Pomona
RO	Reverse Osmosis
SGMA	Sustainable Groundwater Management Act
SWP	State Water Project
TCE	Trichloroethene
TDS	Total Dissolved Solids
TVMWD	Three Valleys Municipal Water District
VOCs	Volatile-Organic Compounds
WRP	Pomona Water Reclamation Plant
WVWD	Walnut Valley Water District
WY	Water Year

Spadra Basin Groundwater Sustainability Plan 2022 Annual Report

EXECUTIVE SUMMARY

This 2022 Annual Report for the Spadra Basin (Annual Report) (subbasin of the San Gabriel Valley Basin [Basin 4-013]) 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)[1], and DWR's Groundwater Sustainability Plan (GSP) Regulations[2], of the Title 23 California Code of Regulations (23 CCR), specifically Article 7, §356.2. This report was prepared by the Spadra Basin Groundwater Sustainability Agency (GSA), which was formed by the Walnut Valley Water District (WVWD) and the City of Pomona (Pomona) in February 2017 through a Memorandum of Understanding (MOU). The Spadra Basin GSA elected to prepare a GSP for the Spadra Basin, a subbasin of the San Gabriel Valley Basin with a "very low-priority" designation by the DWR. The Spadra Basin GSP was adopted by the GSA at a public hearing on May 2, 2022 and was submitted to DWR for review on August 1, 2022.

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 Spadra Basin which provides an update on the groundwater conditions as of Water Year (WY) 2022 (October 1, 2021 through September 30, 2022). The Plan Area for the GSP and this Annual Report is defined as the unadjudicated portion of the San Gabriel Valley Basin (Basin No. 4-013), which is shown in Figure 1. Table 1 is the reference guide that illustrates where each of the required annual reporting elements described in 23 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, the monitoring program for the GSP, overview of the sustainable management criteria, sustainability indicators, minimum thresholds, measurable objectives, and identified projects and management actions.

Section 2 – Basin Conditions. This section describes the characterization of current conditions for WY 2022 and trends in the Spadra Basin for precipitation, groundwater extractions, groundwater levels, groundwater storage, and change in groundwater storage. This assessment of basin conditions includes groundwater-level time series at key wells in the basin, groundwater elevation contour maps for seasonal high (spring 2022) and season low conditions (fall 2022), change in storage map for the past year, and time series chart of the annual change in groundwater storage with groundwater pumping and precipitation. Analysis of the data is Section 3 indicate that groundwater levels do not fluctuate much seasonally, and there was a slight increase in groundwater levels over the past year from WY 2021 to WY 2022. There was also an increase in groundwater storage over the past. The increase in groundwater levels and storage over the past year occurred when groundwater pumping was historically low in the basin, and it was a dry year with below average precipitation.

Section 3 – Water Use. The water purveyors of the Spadra Basin have a diverse water-supply portfolio to meet their demands which includes imported water, recycled water, local surface water, groundwater

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[1] SGMA was enacted in 2014 via a three-bill legislative package consisting of Assembly Bill 1739 (Dickinson), Senate Bill 1168 (Pavley), and Senate Bill 1319 (Pavley), Part 2.74 of Division 6 of the California Water Code, beginning with § 10720.

[2] 23 CCR, Division 2, Chapter 1.5, Subchapter 2, § 350 Et seq. which is commonly referred to as the Groundwater Sustainability Plan Regulations (GSP Regulations).

from the Spadra Basin, and groundwater from other basins. This section summarizes the surface water use and total water use volumes utilized by the water purveyors of the Spadra Basin within their service areas. In WY 2022, total water use by the Spadra Basin water purveyors was 40,900 acre-feet (af), which is slightly less than the previous year. Spadra Basin groundwater is the least utilized source of water supply by the Spadra Basin water purveyors and consisted of one percent of the total water supply in WY 2022, which is the lowest percentage historically since WY 2015. Imported water is the most utilized source of water supply by the water purveyors and consisted of 64 percent of the total water supply in WY 2022, which is the highest percentage historically since WY 2015.

Section 4 – GSP Implementation. This section describes progress on the implementation of the GSP, including conducting the monitoring program, evaluating and reporting conditions from the monitoring, comparing monitoring data against sustainable management criteria, and implementing projects and management actions. After the submittal of the GSP in August 2022, the Spadra Basin GSA began the steps to set up and initiate the GSP monitoring program and completed the set up by early January 2023 after the WY 2022 reporting period. Evaluation of the available data show that there have been no exceedances of Minimum Thresholds at the representative monitoring wells for chronic lowering of water levels (by proxy reduction of groundwater in storage and land subsidence) and degraded water quality. The Spadra Basin GSA has begun to refine and better develop the phased approach for planning and implementing the recommended Basin Optimization Scenario 3 in the GSP, which includes a combination of projects and management actions to initiate artificial groundwater recharge in the basin and expand desalination facilities to increase the local potable water supply in the region.

1.0 INTRODUCTION

The Spadra Basin is a small, non-adjudicated subbasin of the San Gabriel Valley Basin (Basin No. 4-013 defined by the California Department of Water Resources [DWR] in *Bulletin 118 California's Groundwater Update 2003* [DWR, 2016]). The DWR designated the San Gabriel Valley Basin as a "very low-priority" basin mainly because groundwater pumping rights across most of the basin have been adjudicated. The Sustainable Groundwater Management Act[3] (SGMA) does not require that a Groundwater Sustainability Plan (GSP) be prepared for the San Gabriel Valley Basin because of its priority, however the legislation "encourages and authorizes" basins designated as very low-priority to be managed under a GSP (California Water Code § 10720.7(b)).

The Walnut Valley Water District (WVWD) and the City of Pomona (Pomona) collectively formed the Spadra Basin Groundwater Sustainability Agency (GSA) in February 2017 through a Memorandum of Understanding (MOU) and elected to prepare and adopt a GSP for the Spadra Basin with the main objective of encouraging collaborative management of the basin between all pumpers and maximizing beneficial use of the basin in a sustainable fashion. In accordance with the DWR's GSP Regulations for SGMA defined in the Title 23 California Code of Regulations (23 CCR),[4] a final GSP for the Spadra Basin was completed in January 2022, adopted by the Spadra GSA on May 2, 2022, and was submitted to DWR on July 26, 2022 (West Yost, 2022a). On August 1, 2022, the DWR posted the GSP on the SGMA Portal website and initiated the public comment period for 75 days. The documents submitted to the DWR are available on the DWR's SGMA Portal website.

SGMA regulations require that an annual report be submitted to the DWR by April 1 of each year following the adoption of the GSP. This first Annual Report for the Spadra Basin GSP provides an update on the groundwater conditions and status of GSP implementation as of Water Year (WY) 2022 (October 1, 2021 through September 30, 2022) and includes specific requirements pursuant to GSP Regulations 23 CCR §356.2. Table 1 is a reference guide that illustrates where each of the required annual reporting elements described in GSP Regulations 23 CCR § 356.2 can be found within this report.

This introductory section provides background on: 1) the general description of the plan area; 2) the GSP monitoring program; the Sustainability Goal and Sustainable Management Criteria established in the GSP; and the recommended projects and management actions in the GSP to establish the Sustainability Goal.

[3] SGMA was enacted in 2014 via a three-bill legislative package consisting of Assembly Bill 1739 (Dickinson), Senate Bill 1168 (Pavley), and Senate Bill 1319 (Pavley), Part 2.74 of Division 6 of the California Water Code, beginning with § 10720.

[4] 23 CCR, Division 2, Chapter 1.5, Subchapter 2, § 350 Et seq. which is commonly referred to as the Groundwater Sustainability Plan Regulations (GSP Regulations).

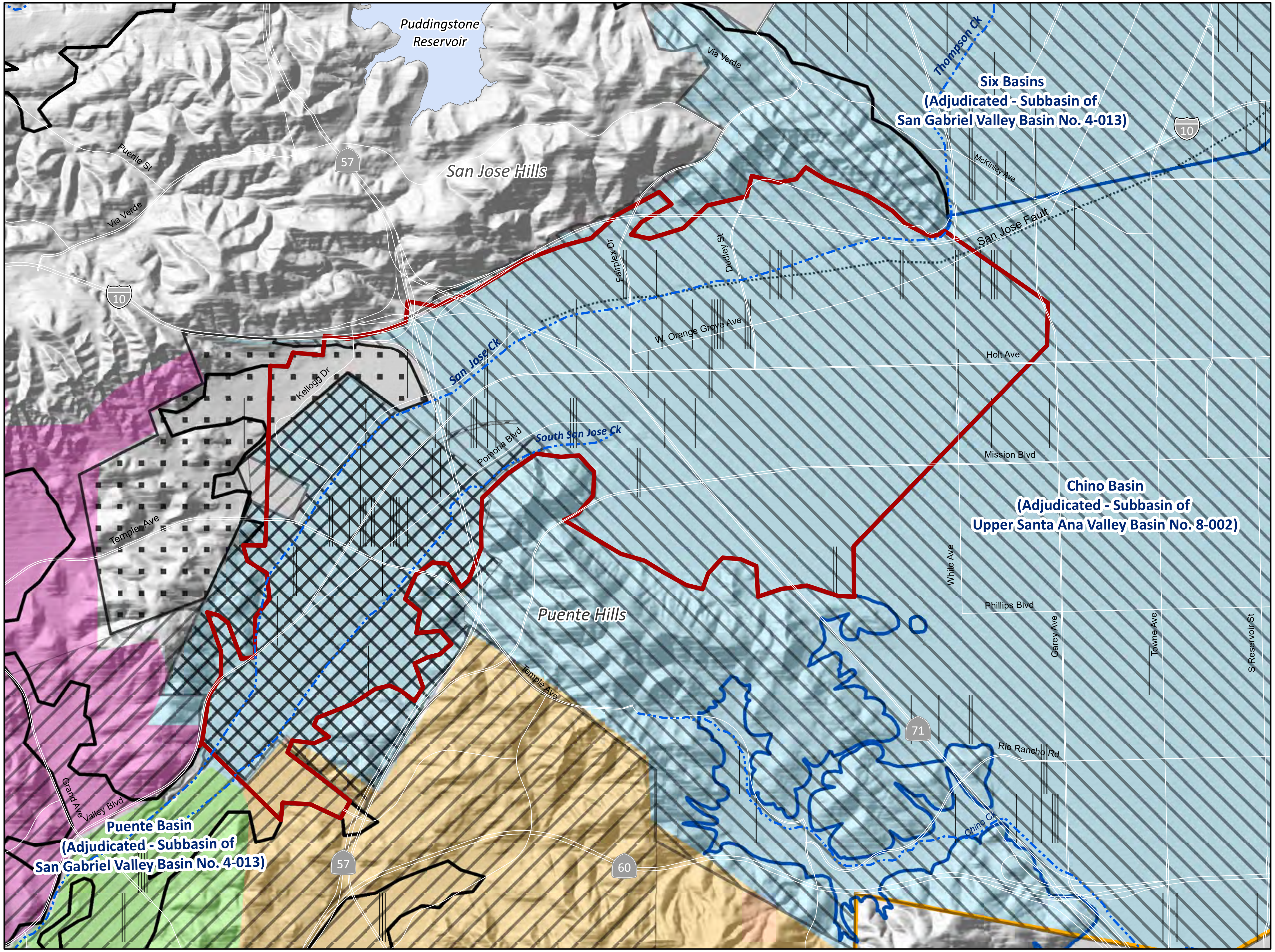
Table 1. Groundwater Sustainability Plan Annual Report Elements Guide for the Spadra Basin 2022 Annual Report		
CCR – GSP Regulation Sections	Groundwater Sustainability Plan Elements	Document Section(s), Figure(s), Page Number(s), that Address the Applicable GSP Element
Article 7	**Annual Reports and 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 • Section 1. Introduction and Plan Area: Pages 3- 6 • Location Map of Spadra Basin: Figure 1 (Page 7)
(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 2.3. Groundwater Level: Pages 20 - 25
(A)	Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.	• Fall 2021 contours: Figure 6 (Page 21) • Spring 2022 contours: Figure 7 (Page 22) • Fall 2022 contours: Figure 8 (Page 23)
(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 9 (Page 25)
(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 2.2. Groundwater Extractions: Page 18 • Groundwater Extraction by Sector: Table 5 (Page 18) • Map of Groundwater Extractions in Water Year (WY) 2022: Figure 5 (Page 19)
(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 3.1. Surface Water Use: Pages 30 – 31 • Surface Water Use in WY 2022: Table 7 (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	• Section 3.2. Total Water Use: Page 32 • Total Water Use by Spadra Basin Water Purveyors in WY 2022: Table 8 (Page 33) • Percentage of the Water Supply to the Total Water Use by the Spadra Basin Water Purveyors from WY 2015 to WY 2022: Table 9 (Page 33)

Table 1. Groundwater Sustainability Plan Annual Report Elements Guide for the Spadra Basin 2022 Annual Report		
CCR – GSP Regulation Sections	Groundwater Sustainability Plan Elements	Document Section(s), Figure(s), Page Number(s), that Address the Applicable GSP Element
	Management Plans within the basin may be used, as long as the data are reported by water year.	
(5)	Change in groundwater in storage shall include the following:	• Section 2.4. Groundwater Storage: Pages 26 – 29
(A)	Change in groundwater in storage maps for each principal aquifer in the basin.	• Map of Change in Groundwater Storage from WY 2021 to 2022: Figure 11 (Page 29)
(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.	• Annual and Cumulative Change in Storage for WY 2015 to WY 2022: Table 6 (Page 28) • Annual Precipitation, Groundwater Pumping, Change in Groundwater Storage, and Cumulative Change in Groundwater Storage for WY 1978 to WY 2022: Figure 10 (Page 27)
(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 4.0. GSP Implementation: Page 34 – 36 • Hydrographs of groundwater levels and Minimum Thresholds and Measurable Objectives at representative wells: Figures 12a through 12g (Pages 37-43)

1.1 Plan Area

The Spadra Basin is a relatively small groundwater basin, about seven square miles (4,200 acres), in eastern Los Angeles County in Southern California, situated between the San Jose Hills and Puente Hills. The Spadra basin is a subbasin of San Gabriel Valley Groundwater Basin (Basin No. 4-013) defined in the DWR's *Bulletin 118 California's Groundwater Update 2003* (DWR, 2003; 2016). Figure 1 shows the location of the Spadra Basin and nearby groundwater basins. The Spadra Basin is surrounded by four adjudicated groundwater basins: the Puente Basin, the Main San Gabriel Basin, and the Six Basins which are all subbasins of San Gabriel Valley Basin No. 4-013, and the Chino Basin which is a subbasin of the Upper Santa Ana Valley Groundwater Basin No. 8-002.01. The Spadra Basin boundary shown on Figure 1 is the Spadra Basin GSA boundary, which is defined as the unadjudicated portion of the San Gabriel Valley Basin (i.e., the portion of the San Gabriel Valley Basin exclusive of the adjudicated boundaries of the Main San Gabriel Basin, Six Basins, and Puente Basins). -There is no formal basin management plan for the water resources in the Spadra Basin and there are no defined restrictions on groundwater pumping.

Pomona, WVWD, and California State Polytechnic University of Pomona (CPP) are the local water purveyors with service area boundaries overlying the Spadra Basin. Figure 1 shows the location of the Spadra Basin and the water purveyors in the area. Pomona's service area overlies the majority of the Spadra Basin, WVWD's service area overlies a smaller portion of the Spadra Basin to the west, and CPP's service area overlies a small portion in the north. In the western portion of the Spadra Basin, there is an overlap of the Pomona and WVWD service areas where water is served by both purveyors. The Spadra Basin water purveyors obtain water supplies from multiple sources within and outside of the Spadra Basin including groundwater, local surface water, treated imported water from the State Water Project and Colorado River, and recycled water. The water purveyors purchase imported water from the Three Valleys Municipal Water District (TVMWD), a sub-agency of the Metropolitan Water District of Southern California (Metropolitan). The Spadra Basin lies within the TVMWD's service area.



Spadra Basin (GSP Boundary - A Subbasin of San Gabriel Valley Basin No. 4-013)

DWR Bulletin 118 California Groundwater Basin Boundaries
- San Gabriel Valley Basin No. 4-013
- Upper Santa Ana Valley Basin No. 8-002

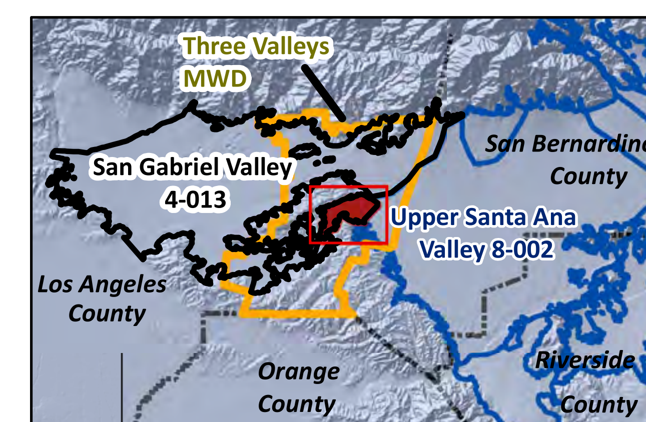
Boundaries of Water Purveyors in the Spadra Basin
- California State Polytechnic University of Pomona
- City of Pomona
- Walnut Valley Water District
- Area Mutually Served by City of Pomona and Walnut Valley Water District

City Boundaries
- City of Pomona
- City of Walnut
- City of Industry
- City of Diamond Bar

Three Valleys Municipal Water District (TVMWD) Boundary

Streams & Flood Control Channels

Faults
- Location Certain
- Location Concealed
- Location Approximate
- Location Uncertain



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Prepared by:

WEST YOST

Prepared for:

Spadra Basin Groundwater Sustainability Agency
Groundwater Sustainability Plan
2022 Annual Report

SPADRA BASIN GROUNDWATER SUSTAINABILITY AGENCY

Location of Spadra Basin

Figure 1

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1.2 Monitoring Program

The GSP monitoring program described in Section 4 of the GSP is intended to provide data to: 1) demonstrate seasonal and long-term conditions; 2) evaluate conditions relative to the Sustainable Management Criteria for Sustainability Indicators for the Spadra Basin; and 3) demonstrate that the basin is being sustainably managed. The monitoring program data will be used to support the reporting requirements of SGMA for these Annual Reports and for the five-year evaluations of the GSP.

The GSP monitoring program is the first coordinated monitoring effort in the Spadra Basin and includes monitoring of groundwater (production, levels, and quality), surface water (discharge and quality), and land subsidence (vertical ground movement).

1.2.1 Groundwater Levels

Groundwater monitoring is the primary component of the monitoring program and includes collecting groundwater data at all existing wells in the basin, including a newly constructed monitoring well (Spadra MW-1) to fill a data gap. Figure 2 shows the wells in the groundwater monitoring network.

The GSA monitors for groundwater levels at 12 wells spatially distributed throughout the Spadra Basin summarized in Table 2

Table 2. GSP Monitoring Wells for Groundwater Levels and Groundwater Quality

Well	Well Type	Well Owner	Representative Monitoring Site for Water Levels (proxy Storage and Land Subsidence)	Representative Monitoring Site for Water Quality
Industry	Production	WVWD	X	X
CPP-4	Production	CPP	X	X
CPP-3	Production	CPP		
CPP-2	Production	CPP		X
Valley	Monitoring	WVWD		
P-28	Production	Pomona	X	X
CPP-1	Production	CPP	X	X
P-19	Production	Pomona	X	X
P-31	Production	Pomona		
OMW-3	Monitoring	Calsol Inc.	X	
MW-5	Monitoring	Calsol Inc.	X	X
Spadra Monitoring Well 1 (MW-1)	Monitoring	Spadra GSA	(a)	(a)

(a) This monitoring well was constructed in September 2022 after the final GSP was prepared and adopted. After monitoring has been conducted at this for a few years it will be considered for inclusion as a representative monitoring site.

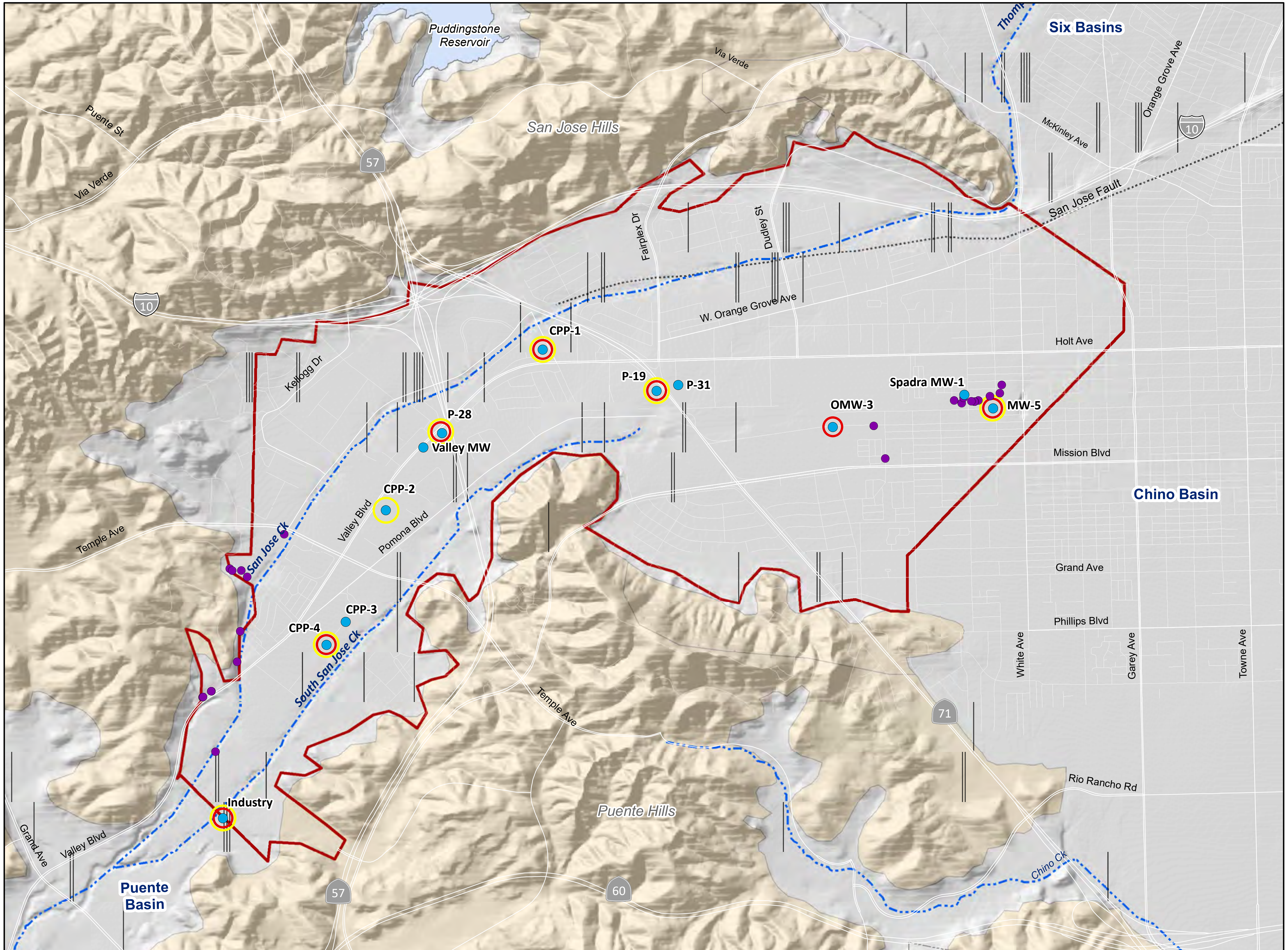
Seven of the 12 wells are representative monitoring sites for the Sustainability Indicators of chronic lowering of groundwater levels, and by proxy, reduced groundwater storage and land subsidence. The GSA monitors groundwater levels at each of these twelve wells a using pressure transducer that measures and records water levels once every 15 minutes. These data are retrieved in the field on a quarterly basis. The remaining wells shown in Figure 2 are dedicated monitoring wells primarily for the point-source contaminant monitoring at the Spadra Landfill and Calsol Inc. sites. Groundwater-level monitoring at these wells is performed at varying frequencies by the well owners, and the GSA collects this data from the well owners on an annual basis.

All measured and collected water-level data are processed, reviewed for QA/QC, and uploaded to the data management system for the Spadra Basin GSA.

1.2.2 Groundwater Quality

The GSA collects groundwater quality at the 12 wells monitored by the GSA shown in Figure 2 and listed in Table 2. Seven of the 12 wells are established as representative monitoring sites for the Sustainability Indicator of degraded water quality. Groundwater-quality sampling and analyses will occur at a minimum of every three years for the recommended analytes and laboratory analytical methods and detection limits listed in Table 3. The recommend analytes include general mineral and physical chemistry, VOCs, and perchlorate, which are necessary to assess current groundwater-quality conditions for contaminants of concern and compare to the Sustainable Management Criteria for degraded water quality. Groundwater-quality sampling will be performed by the well owners and the data will be provided to the GSA along with any other groundwater-quality data collected by the well owners. If well owners are unable to monitor for the recommended analytes and frequency desired by the GSA, then the GSA can opt to perform the monitoring. The GSA collects this data from the well owners on an annual basis.

All collected water quality data are processed, reviewed for QA/QC, and uploaded to the data management system for the Spadra Basin GSA.



Groundwater Monitoring

- Wells Monitored by the GSA for Groundwater Levels and Groundwater Quality
- Representative Monitoring Site for Groundwater Levels (by Proxy, Groundwater Storage and Land Subsidence)
- Representative Monitoring Site for Groundwater Quality
- Wells Sampled by Others and Data is Collected by the Spadra Basin GSA

- Streams & Flood Control Channels
- Spadra Basin (GSP Boundary)

Geology

Water-Bearing Sediments

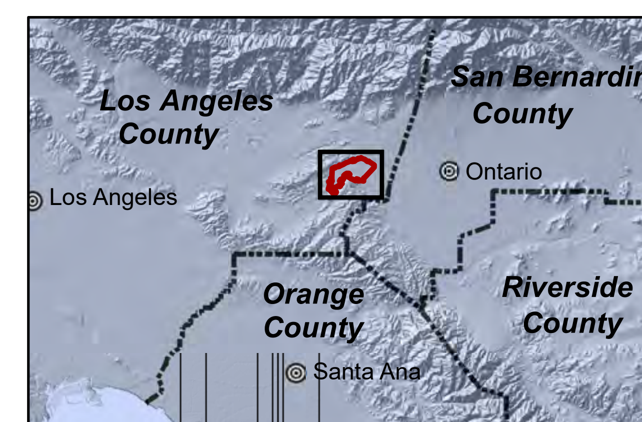
- Quaternary Alluvium

Consolidated Bedrock

- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults

- Location Certain
- Location Concealed
- Location Approximate
- Location Uncertain



WEST YOST - K:\Clients\1067 Spadra Basin Groundwater Sustainability Agency\00-00-00 Master\GIS\MXD\Annual Report\2022\Figure 2_Monitoring Network.mxd - vwaemer - 3/14/2023

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Prepared for:

Spadra Basin Groundwater Sustainability Agency
Groundwater Sustainability Plan
2022 Annual Report

SPADRA BASIN GROUNDWATER SUSTAINABILITY AGENCY

Groundwater Monitoring Network

Figure 2

Table 3. Analyte List for Groundwater Quality Monitoring		
Analyte	Method Detection Limit	Laboratory Analysis Method
Alkalinity in CaCO3 units	2 mgl	SM 2320B
Ammonia Nitrogen	0.05 mgl	EPA 350.1
Bicarbonate as HCO3	2 mgl	SM2330B
Calcium	1 mgl	EPA 200.7
Carbonate as CO3	2 mgl	SM2330B
Chloride	0.5 mgl	EPA 300.0
Hydroxide as OH	2 mgl	SM2330B
Magnesium, Total	0.1 mgl	EPA 200.7
Nitrate as Nitrogen	0.1 mgl	EPA 300.0
Nitrite as Nitrogen	0.05 mgl	EPA 300.0
Organic Nitrogen	0.2 mgl	EPA 351.2
pH	0.1	SM4500
Perchlorate	2 µgl	EPA 314.0
Potassium Total	1 mgl	EPA 200.7
Sodium Total	1 mgl	EPA 200.7
Specific Conductance, 25 Celsius	10 µmhos/cm	SM2510B
Sulfate	0.05 mgl	EPA 300.0
Total Dissolved Solids (TDS)	10 mgl	E160.1/SM2540C
Total Hardness as CaCO3	3 mgl	SM 2340B
Total Organic Carbon	0.2 mgl	SM 5310C
Turbidity	0.1 NTU	EPA 180.1
Volatile Organic Compounds (VOCs)	Variable	EPA 524.2
1,2,3-Trichloropropane (low detection of 0.005 µgl)	0.005 µgl	CASRL 524M-TCP[a]

(a) Can use this method or a comparable laboratory specific method with a method detection limit of 0.005 µgl
mgl = milligrams per liter
EPA = Environmental Protection Agency
NTU = nephelometric turbidity unit
µmhos/cm = micromhos per centimeter
µgl = micrograms per liter

1.2.3 Groundwater Production

Groundwater production data is collected at all production wells in the basin. Currently, there are eight active or inactive water supply wells, with meters that have been installed by the well owner. The GSA collects monthly production volumes measured at the water supply wells by the well owners on an annual basis. Data are processed, reviewed for QA/QC, and uploaded to the data management system for the Spadra Basin GSA.

1.2.4 Surface water

The surface water monitoring consists of collecting all available surface water monitoring data in the Spadra Basin. This includes the surface -water discharge and quality monitoring performed by Los Angeles County Sanitation Districts (LACSD) at the Pomona Water Reclamation Plant (WRP) for effluent discharged to the South San Jose Creek (see Figure 3 for location). The discharge from the Pomona WRP is a portion of the flow in the South San Jose Creek and is important to the GSA to track and understand the volume and quality of water that exits the Spadra Basin from this channel.

The LACSD surface -water discharge and quality monitoring data of the Pomona WRP effluent is collected by the GSA annually. Data are processed, reviewed for QA/QC, and uploaded to the data management system for the Spadra Basin GSA.

The GSA also collects the surface water supply data used by the water purveyors in the Spadra Basin for their water supply and reports it on an annual basis in the Annual Reports (refer to Section 3).

1.2.5 Land subsidence

The GSA will periodically review available Interferometric Synthetic-Aperture Radar (InSAR) data sets of vertical ground movement to observe if there is any notable downward vertical ground motion observed in the Spadra Basin. This will be done at a minimum of every five years during the five-year elevations of the GSP. As described in Section 4.1.3.2 of the GSP, the known existing InSAR data sets include:

- The TRE Altamira InSAR data made available by DWR available on the SGMA Data Viewer website (DWR, 2022).
- The InSAR data that is part of the neighboring Chino Basin's subsidence monitoring program (West Yost, 2022b).

The Sustainable Management Criteria set for chronic lowering of groundwater levels will be used as a proxy for assessing land subsidence; hence InSAR data will be collected and reviewed less frequent (at least every five years) and used to compare to the assessment of groundwater levels used as a proxy in the Annual Reports.

1.3 Sustainability Goal and Overview of Sustainable Management Criteria

The Sustainability Goal of the Spadra Basin described in the GSP is:

"In a collaborative effort between all Spadra Basin water purveyors, conjunctively use all water supplies available to the Spadra Basin to achieve and maintain groundwater sustainability, avoid Undesirable Results, maximize the beneficial use of the basin, and minimize cost."

The GSP included initial Sustainable Management Criteria, including Minimum Thresholds and Measurable Objectives, set to avoid Undesirable Results for the following Sustainability Indicators relevant to the Spadra Basin: Chronic Lowering of Groundwater Levels, Reduction of Groundwater in Storage, Degraded Water Quality, and Land Subsidence.

Tables 4 summarizes the Sustainability Indicators for Spadra Basin and the method to set initial Minimum Thresholds and Measurable Objectives for these Sustainability Indicators at representative monitoring wells.

Section 4 of this Annual Report list the specific Minimum Thresholds and Measurable Objectives values set at the representative wells and evaluates the status based on the monitoring data collected to date.

Table 4. Minimum Thresholds and Measurable Objectives Set for the Sustainability Indicators for the Spadra Basin

Sustainability Indicator	Minimum Threshold	Measurable Objective
Chronic Lowering of Groundwater Levels	Set as the lowest historical groundwater elevation at seven representative wells over the period of 1978-2018. Minimum Thresholds: MW-5: 655 feet above mean sea level (ft-amsl) OMW-3: 647 ft-amsl P-19: 630 ft-amsl P-28: 611 ft-amsl CPP-1: 621 ft-amsl CPP-4: 607 ft-amsl Industry: 568 ft-amsl	Set as the highest historical groundwater elevation at seven representative wells over the period of 1978-2018. Measurable Objectives: MW-5: 691 ft-amsl OMW-3: 682 ft-amsl P-19: 683 ft-amsl P-28: 650 ft-amsl CPP-1: 667 ft-amsl CPP-4: 638 ft-amsl Industry: 615 ft-amsl
Reduction of Storage	By proxy, the Minimum Thresholds set for Groundwater Levels	By proxy, the Measurable Objectives set for Groundwater Levels
Degraded Water Quality	Established for seven representative wells for six contaminants of concern: TDS, nitrate, trichloroethene [TCE], tetrachloroethene [PCE], 1,1-dichloroethene [1,1-DCE], and perchlorate. Minimum Thresholds were set dependent on the type of contaminant, historical concentrations, and the beneficial uses of groundwater from a well. **Potable Well (P-28):** TDS = 800 mgl Nitrate-Nitrogen = 10 mgl Perchlorate = 6 µgl TCE & PCE = 5 µgl 1,1-DCE = 6 µgl **Non-Potable Wells (Industry, CPP-4, CPP-2, P-19, and MW-5) and Non-Potable Well Treated to Potable (CPP-1):** TDS = 1,500 mgl Nitrate-Nitrogen = 20 mgl Perchlorate = 12 µgl TCE & PCE = 5 µgl 1,1-DCE = 6 µgl	Established for seven representative wells for six contaminants of concern: TDS, nitrate, TCE, PCE, 1,1-DCE, and perchlorate. Measurable Objectives were set dependent on the type of contaminant and what is the current concentration at the time of the GSP development (2018). **TDS, Nitrate & Perchlorate:** Set at the lowest detected concentration historically between all representative wells in the basin. TDS = 310 mgl Nitrate-Nitrogen = 1 mgl Perchlorate = 2 µgl **TCE, PCE, and 1,1-DCE:** Set as the 2015 concentration for wells where the current (2018) concentration is above the Primary maximum contaminant level (MCL); and non-detect concentration at the wells where the current concentration (2018) is below the Primary MCL. See Table 3-4 in the GSP for the various Measurable Objectives set at the individual wells for TCE, PCE, and 1,1-DCE.
Land Subsidence	By proxy, the Minimum Thresholds set for Groundwater Levels	By proxy, the Measurable Objectives set for Groundwater Levels

1.4 Project and Management Actions

The GSP identifies projects and management actions that the GSA identified to help avoid Undesirable Results and achieve the Sustainability Goal for the Spadra Basin. To do this, the GSA first developed and evaluated a Baseline Scenario that included the future expected water demands, water-supply plans, and groundwater management plans of the Spadra Basin water purveyors to understand the sustainability of expected future groundwater conditions in the absence of projects or management actions. The Spadra Basin Groundwater Model was used to simulate the Baseline Scenario and estimate the response of the groundwater basin over a 60-year planning period. The model results of the Baseline Scenario indicated that groundwater levels are projected to decline over the planning horizon by 20-25 feet, which would be below the Minimum Thresholds set at the representative wells for groundwater levels and was therefore not considered sustainable.

Spadra Basin GSA and stakeholders used the model results of the Baseline Scenario to guide the development of several proposed projects and management actions to achieve sustainability. Combinations of the proposed projects and management actions were used to develop three “Basin Optimization Scenarios” that could achieve sustainability in the Spadra Basin over the planning period and/or maximize the beneficial use of the basin. The Spadra Basin Groundwater Model was used to simulate the three Basin Optimization Scenarios to estimate the response of the groundwater basin over the 60-year planning period and evaluate sustainability. The conclusions of this analysis were that all Basin Optimization Scenarios are hydrologically feasible, avoid Undesirable Results, and achieve and maintain sustainability. In addition, Class-5 engineering cost estimates were developed for each scenario to assess economic feasibility.

Basin Optimization Scenario 3 is the recommended scenario in the GSP for implementation to achieve sustainability and maximize the beneficial use of the Spadra Basin. Basin Optimization Scenario 3 includes artificial recharge of 3,500 acre-feet per year (afy) of recycled water from the Pomona WRP in Spadra Basin, increasing production by a similar amount, and expansion of the CPP reverse osmosis (RO) plant. The pumped groundwater will be treated at the RO plant and used for potable water supplies, which reduces the demands for imported water and increases potable water-supply reliability.

1.5 Report Organization

This remainder of this report describes all the specific requirements pursuant to GSP Regulations and is organized as follows:

- **Section 2.0 – Basin Conditions.** This section describes the data used to characterize and understand current basin conditions, trends, and to evaluate the basin response to GSP implementation in WY 2022.
- **Section 3.0 – Water Use.** This section describes the surface water and total water use and trends within the basin in WY 2022.
- **Section 4.0 – GSP Implementation.** This section describes steps taken by the GSA to implement the GSP in WY 2022.
- **Section 5.0 – References.** This section includes the references consulted for the analyses and writing of this Annual Report.

2.0 BASIN CONDITIONS

This section describes the characterization of current conditions and trends in the Spadra Basin to evaluate the basin during GSP implementation in WY 2022, pursuant to the requirements in the GSP Regulations 23 CCR §356.2. Data presented in this section includes climate and precipitation, groundwater extractions, groundwater levels, groundwater storage, and change in groundwater storage.

2.1 Climate and Precipitation

The climate in the Spadra Basin is characteristic of a semi-arid Mediterranean climate with generally dry summers and comparatively wet winters. Figure 3 shows the surface water features and climate monitoring stations located within the basin. Three active climate stations exist within the basin to monitor precipitation and evapotranspiration (ET). Two of these stations, the Spadra Landfill and Pomona WRP, monitor precipitation and are owned and operated by the LACFCD. The third station, Pomona, monitors ET and is owned and operated by the California Irrigation Management Information System (CIMIS).

Precipitation that falls on pervious areas outside of the Spadra Basin within the San Jose Hills and Puente Hills can combine with any applied water in the soils, infiltrate past the root zone, and recharge groundwater as underflow. Precipitation that falls on pervious areas overlying the basin can combine with any applied water in the soils, infiltrate past the root zone, and recharge groundwater directly. Stormwater and dry-weather runoff in the basin and from the sub-watersheds in the hills typically enter concrete lined flood-control storm drains and channels that exit the basin via the San Jose Creek and South San Jose Creek and flow about 13 miles downstream into the San Gabriel River. In addition to stormwater and dry-weather runoff, wastewater treated at Pomona WRP is either discharged into South San Jose Creek or is reused for irrigation or commercial processes at sites within the basin.

Monthly precipitation estimates from the PRISM Climate Group[5] gridded data (an 800-meter by 800-meter grid) were computed as a spatial average across the hydrologic area of Spadra Basin shown in Figure 3 to characterize precipitation in the basin. Figure 4 shows the annual precipitation time-history, the long-term average annual precipitation, and the cumulative departure from the mean (CDFM) precipitation for this hydrologic area of the Spada Basin for the 127-year period from WY 1895 to 2022. The CDFM plot is a useful way to characterize the occurrence and magnitude of wet and dry periods. When the slope of the CDFM plot trends downward from left to right, the annual precipitation is less than the average precipitation, and when the slope continues downward for more than one year, the CDFM indicates a dry period. When the slope of the CDFM plot trends upward from left to right, annual precipitation is greater than average precipitation, and when the slope continues upward for more than one year, the CDFM indicates a wet period. The wet and dry periods are labeled at the bottom of the chart.

The average annual precipitation for the Spadra Basin for the period of record is 16.9 inches. Precipitation in WY 2022 was 13.4 inches, which is 3.6 inches lower than the average and is thus considered a dry year. Based on the CDFM curve, WY 2022 is part of a 24-year dry period that has been persistent since WY 1999. Over the 127-year period, there have been 36 wet years where the annual precipitation was above the mean (approximately 32 percent of the precipitation record), and 87 dry years where annual precipitation was below the mean (approximately 68 percent of the precipitation record).

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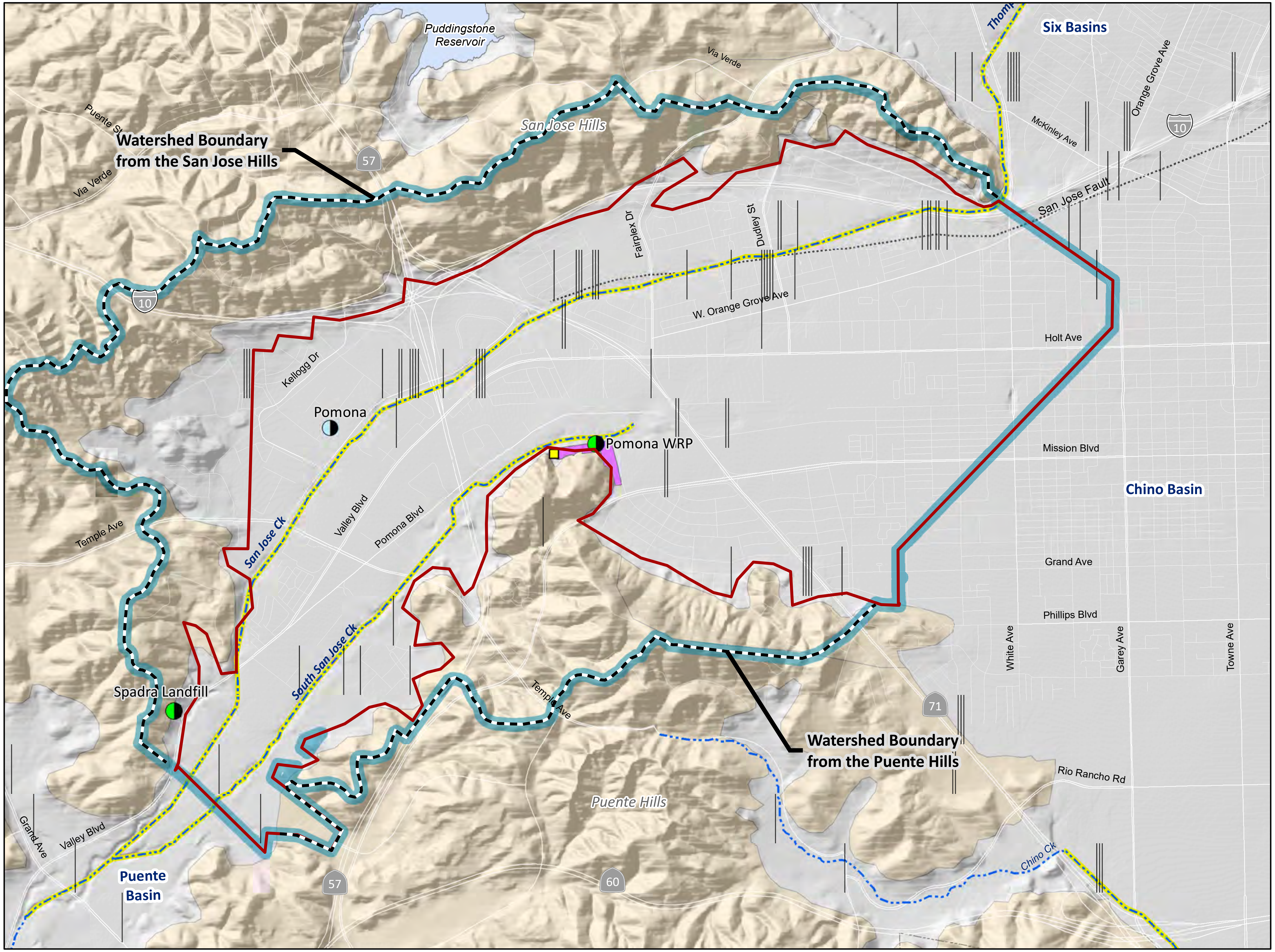
[5] https://prism.oregonstate.edu/



Climate Stations
- CIMIS (ET)
- LACFCD (Precipitation)

Surface Water Monitoring
- Pomona Water Reclamation Plant (WRP)
- Pomona WRP Effluent Discharge

Hydrology
- Spadra Basin Watershed Boundary in Hills
- Hydrologic Area used to Extract Gridded Precipitation Data (800 x 800-meter) from PRISM Climate Group and NEXRAD
- Unlined Streams & Flood Control Channels
- Lined Streams & Flood Control Channels

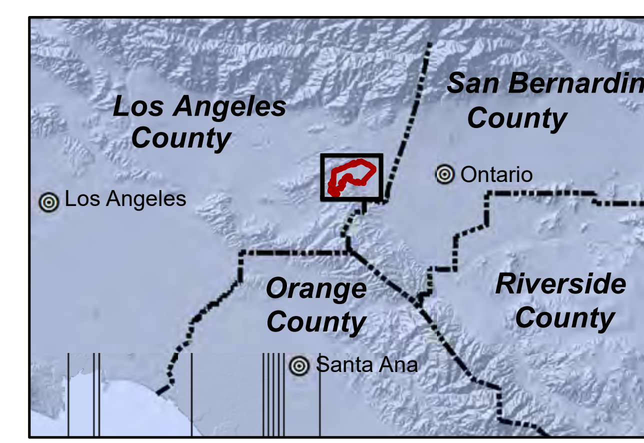
- Spadra Basin (GSP Boundary)

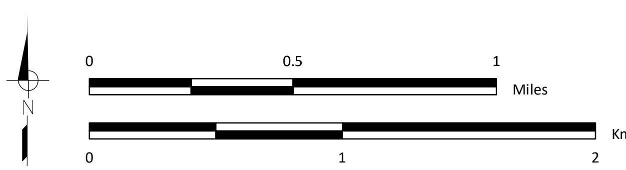
Geology

Water-Bearing Sediments
- Quaternary Alluvium

Consolidated Bedrock
- Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

Faults
- Location Certain
- Location Concealed
- Location Approximate
- Location Uncertain





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Prepared for:

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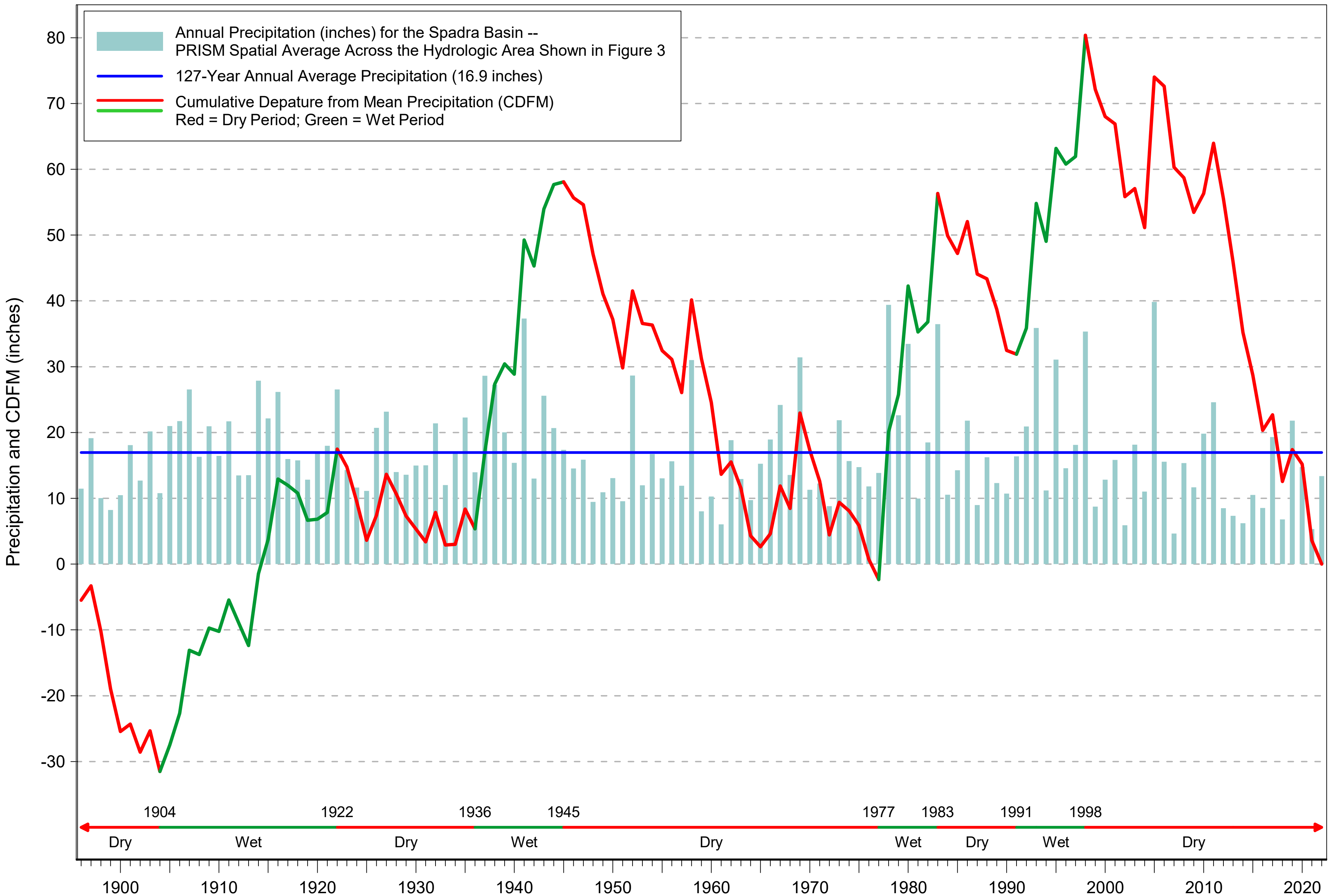
Surface Water Features and Climate Monitoring

Figure 3

WEST YOST - K:\Clients\1067 Spadra Basin Groundwater Sustainability Agency\00-00-00 Master\GIS\MXD\Annual Report\2022\Figure 3_Surface Water Features and Climate Monitoring.mxd - vweamer - 3/20/2023

Figure 4. Annual Precipitation and CDFM - Spadra Basin and Tributary Watersheds - Water Year 1896 to 2022



2.2 Groundwater Extractions

The primary sectors that extract groundwater in the Spadra Basin include:

- **Agriculture**. Agricultural pumping is primarily used to irrigate crops and citrus associated with lands owned by the State of California and utilized by CPP for growing various crops for the university's horticultural program.
- **Urban**. Urban pumping by CPP, Pomona, and WVWD is primarily used for non-potable supply and/or supplemental supply for the recycled water reuse system that uses effluent from the Pomona WRP for urban residential, commercial, and industrial uses.

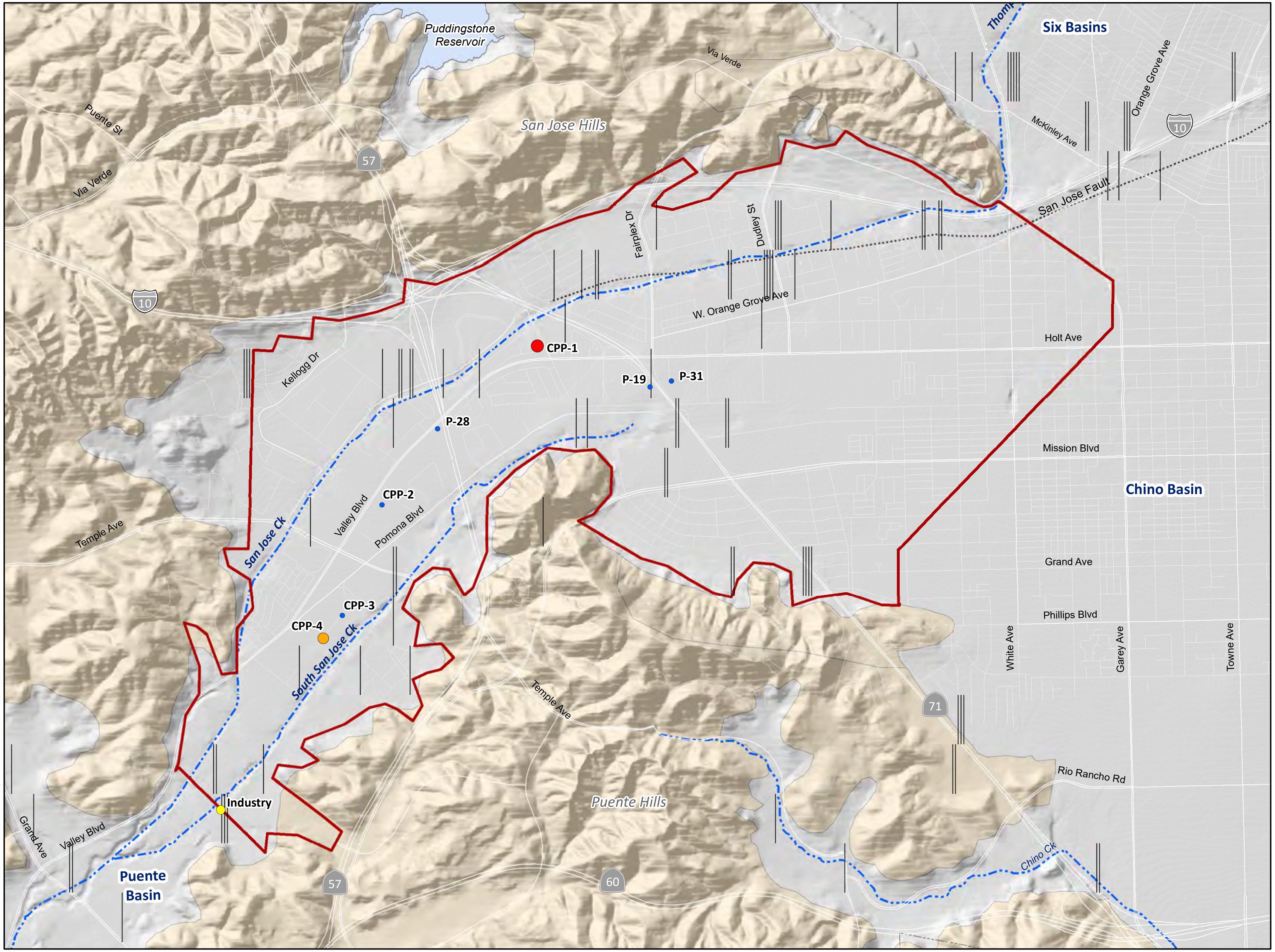
The general locations and magnitude of groundwater pumping at wells within the basin are shown on Figure 5. Three of the eight production wells located within the basin pumped groundwater in WY 2022. This included pumping at the Industry well for non-potable urban municipal and industrial uses, CPP-1 well for potable municipal use after treatment at the CPP RO Plant, and CPP-4 well for agricultural use.

Table 5 summarizes the groundwater extractions in the Spadra Basin by sector that occurred from WY 2015 (period required for groundwater use and storage analysis in the Annual Report[6]) through WY 2022 (current). Pumping is metered at all wells in the basin. Pumping capacities at these wells are relatively low ranging from 200 to 400 gallons per minute (gpm). The total annual volume of groundwater extracted in the Spadra Basin has been generally decreasing over the last eight years, and in WY 2022, was the lowest volume at 533 af.

Table 5. Groundwater Extractions by Sector from the Spadra Basin-WY 2015 to 2022

Groundwater Use Sector	Annual Groundwater Extraction, acre-feet							
	2015	2016	2017	2018	2019	2020	2021	2022
Agricultural	447	408	434	576	238	495	302	201
Urban	331	323	445	534	377	281	303	334
Total Groundwater Extraction	**778**	**731**	**879**	**1,110**	**615**	**776**	**606**	**533**

[6] The DWR requires an analysis in the Annual Report of the annual change in groundwater storage, cumulative change in groundwater storage, groundwater use and water year type for historical data including from January 1, 2015 to current year (Section 2.4 of Annual Report). January 1, 2015 is in WY 2015 (October 1, 2014 to September 30, 2015).



WEST YOST - K:\Clients\1067 Spadra Basin Groundwater Sustainability Agency\00-00-00 Master\GIS\MXD\Annual Report\2022\Figure 5_Groundwater Extraction in WY2022.mxd - vweamer - 3/14/2023

Groundwater Extraction in Water Year 2022 (af)

- 0
- 0.1 - 50
- 50 - 100
- 100 - 250
- 250 - 500
- > 500

Streams & Flood Control Channels

Spadra Basin (GSP Boundary)

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

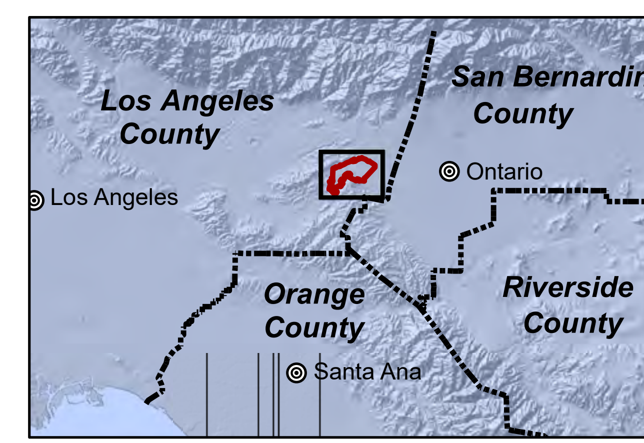
Faults

Location Certain

Location Concealed

Location Approximate

Location Uncertain



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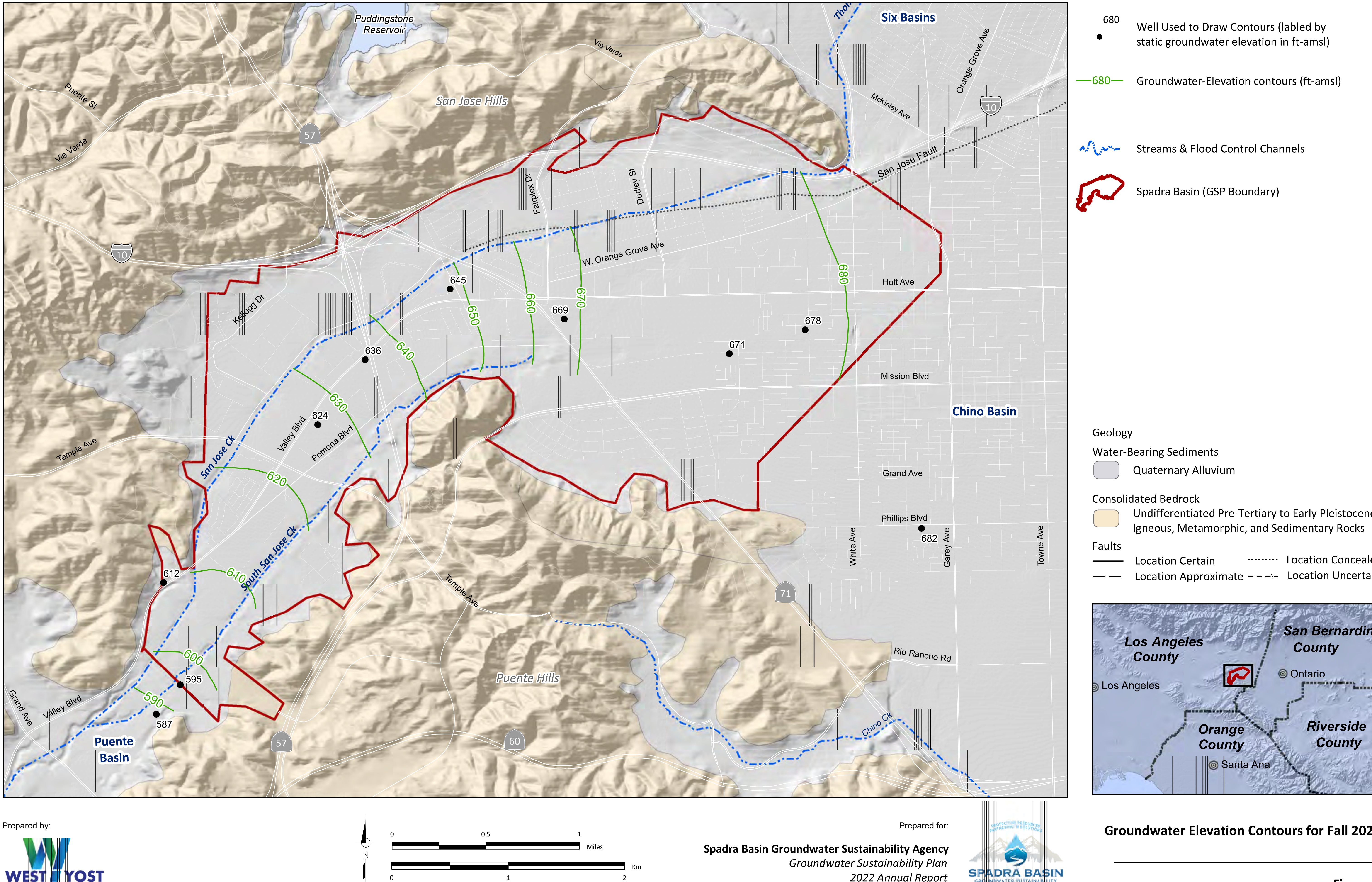
Groundwater Extraction in Water Year 2022

Figure 5

2.3 Groundwater Levels

Figures 6, 7, and 8 are maps of equal groundwater-elevation contours for fall 2021 (conditions at the end of the previous WY 2021); spring 2022 (the seasonal high conditions for WY 2022); and fall 2022 (the seasonal low conditions for WY 2022). These groundwater-elevation contours were prepared by selecting representative key wells in the study area with reliable groundwater-elevation measurements and selecting representative static groundwater elevation measurements for the target periods of fall 2021 (September), spring 2022 (March 2022) and fall 2022 (September 2022) for each well. For each period, the selected groundwater elevation measurements were used to generate a raster-grid of the groundwater surface elevation using Topo-to-Raster interpolation function in ArcMap. The raster is used to generate groundwater elevation contours which were reviewed, smoothed, and clipped at the general boundary of available data in the main portion of the basin. These contours maps show:

- The direction of groundwater flow in the Spadra Basin interpreted from the groundwater elevation contours is from east to west across the basin (groundwater flows perpendicular to the groundwater elevation contours from higher elevation to lower elevation). The shape and orientation of the contours are similar between the maps in Figures 6, 7, and 8 indicating that groundwater flow direction is consistent during the seasonal high and low conditions.
- Groundwater levels from WY 2021 (Figure 6) to WY 2022 (Figure 8) have slightly increased, predominantly in the central portion of the basin. This increase in groundwater elevation is consistent with the estimated increase in groundwater storage described in Section 2.4 of this Annual Report.
- The difference in groundwater elevation from the WY 2022 seasonal high (Figure 7) and seasonal low (Figure 8) is minimal. Groundwater elevations from spring to fall 2022 remained relatively stable or slightly changed by up to two feet throughout most of the basin and changed the most at the well in the center of the basin by four feet.



WEST YOST - K:\Clients\1067 Spadra Basin Groundwater Sustainability Agency\00-00-00 Master\GIS\MXD\Annual Report\2022\Figure 6_Spadra Fall 2021 contours_new.mxd - talonzo - 3/15/2023

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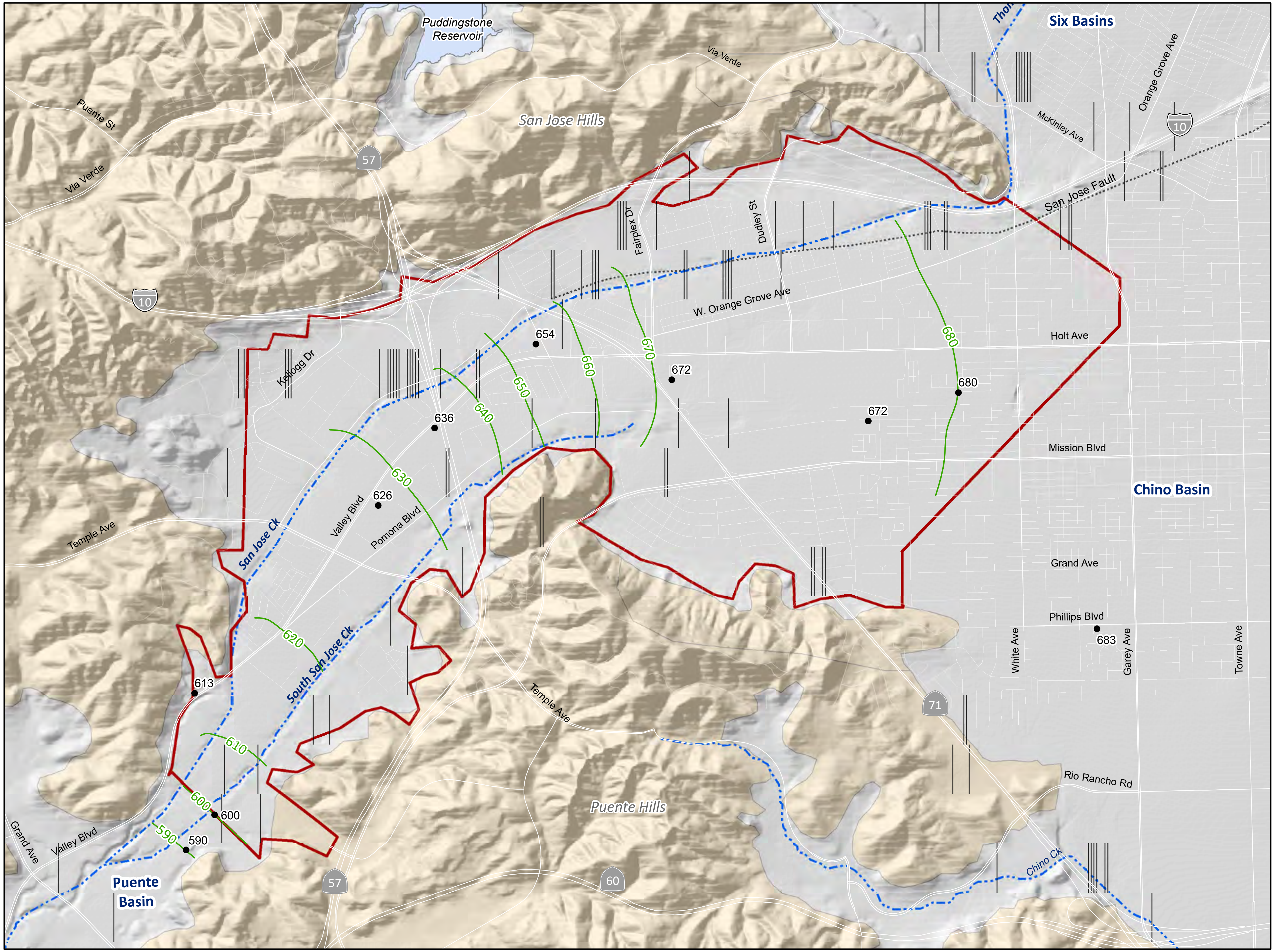
Groundwater Elevation Contours for Fall 2021

Figure 6



680 ● Well Used to Draw Contours (labled by static groundwater elevation in ft-amsl)

—680— Groundwater-Elevation contours (ft-amsl)

Streams & Flood Control Channels

Spadra Basin (GSP Boundary)

Geology

Water-Bearing Sediments

Quaternary Alluvium

Consolidated Bedrock

Undifferentiated Pre-Tertiary to Early Pleistocene Igneous, Metamorphic, and Sedimentary Rocks

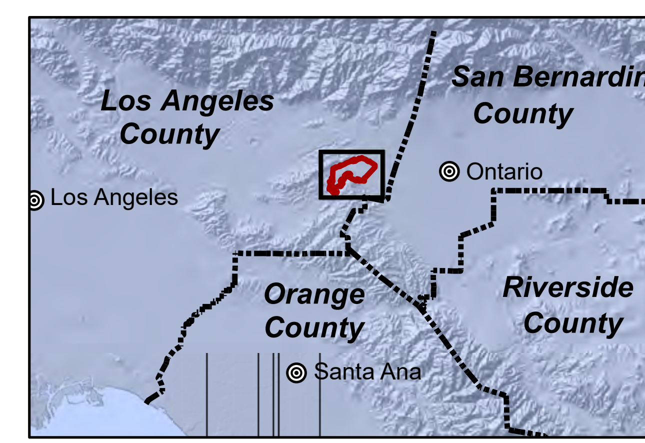
Faults

Location Certain

Location Concealed

Location Approximate

Location Uncertain



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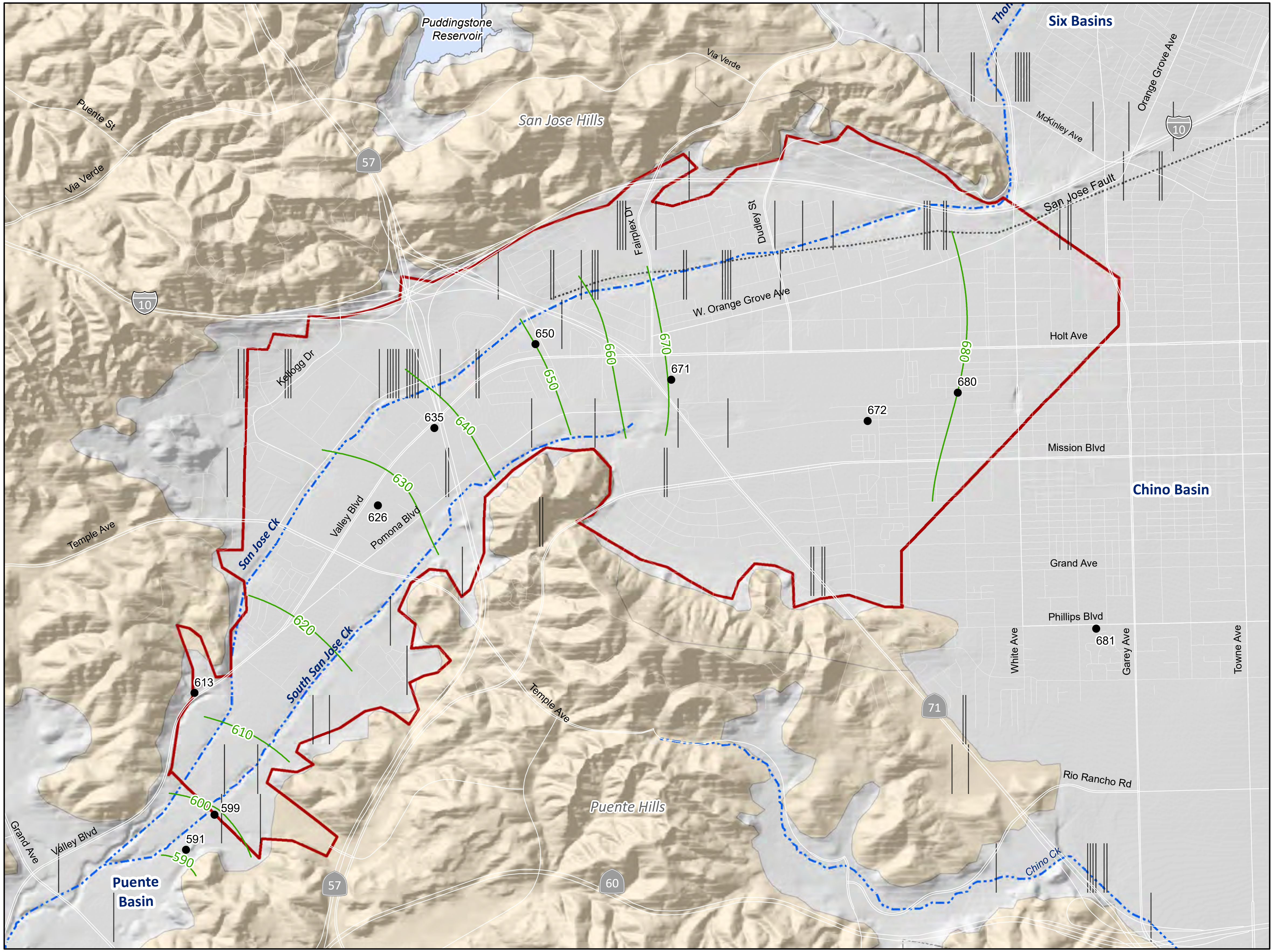
SPADRA BASIN GROUNDWATER SUSTAINABILITY AGENCY

Groundwater Elevation Contours for Spring 2022

Figure 7

WEST YOST - K:\Clients\1067 Spadra Basin Groundwater Sustainability Agency\00-00-00 Master\GIS\MXD\Annual Report\2022\NEWFigure 7_Spadra Spring 2022 contours.mxd - talonzo - 3/15/2023



680 ● Well Used to Draw Contours (labled by static groundwater elevation in ft-amsl)

—680— Groundwater-Elevation contours (ft-amsl)

Streams & Flood Control Channels

Spadra Basin (GSP Boundary)

Geology

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Quaternary Alluvium

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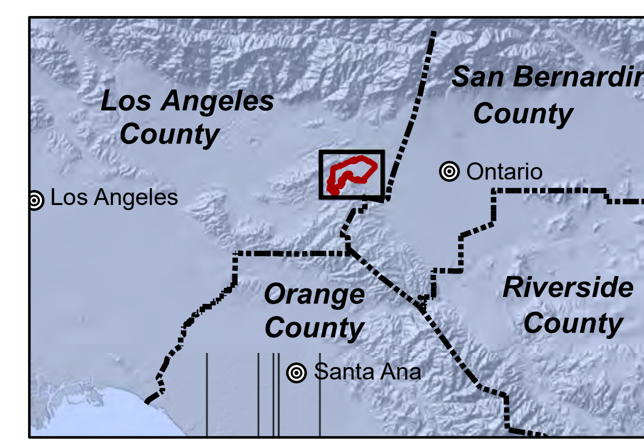
Faults

Location Certain

Location Approximate

Location Concealed

Location Uncertain



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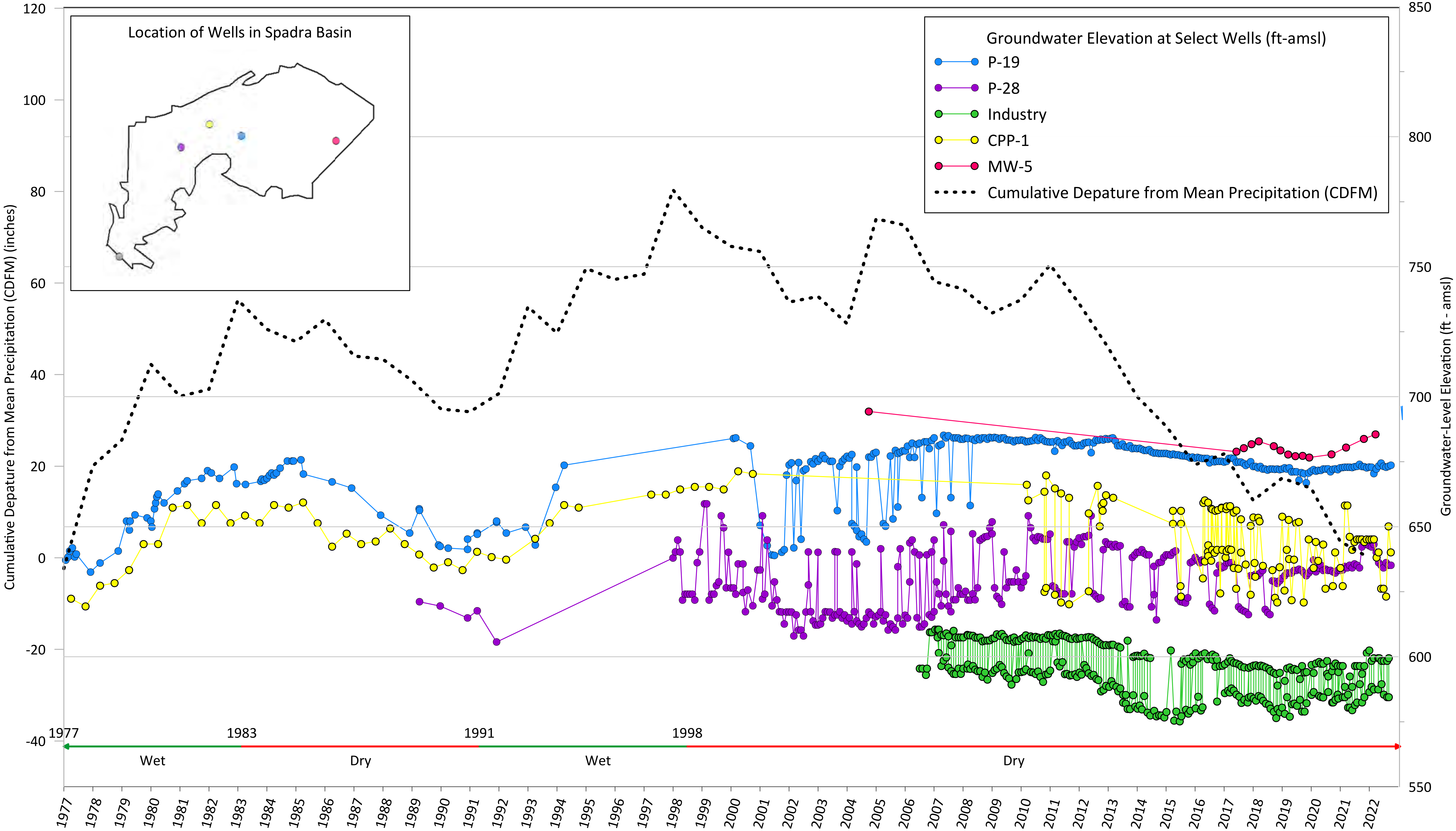
Groundwater Elevation Contours for Fall 2022

Figure 8

Figure 9 shows time series charts of groundwater elevations at five wells located across the Spadra Basin from WY 1977 to WY 2022 with the water year type (illustrated by CDFM plot) and the wet and dry periods over this duration. The time-series charts indicate:

- There are short-term groundwater-level fluctuations caused by pumping at some of the wells. When the pumps are turned on, water-levels decrease temporarily and return back to non-pumping levels once the pumps are turned off.
- Seasonal changes in groundwater levels at all wells are minimal, and do not exceed a few feet of seasonal change.
- The long-term trends in groundwater levels appear to be consistent at all wells across the basin, suggesting that all wells are being influenced by the same regional stresses of recharge and pumping.
- Groundwater levels in the Spadra Basin tend to rise during wet periods and decline in dry periods.
- During the dry-period of WY 1999 to WY 2022, groundwater levels generally decreased by about 10–20 feet.

Changes in groundwater elevations and how they relate to changes in groundwater storage are described in Section 2.4.



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Groundwater Sustainability Plan
2022 Annual Report

SPADRA BASIN GROUNDWATER SUSTAINABILITY AGENCY

Groundwater Level Trends and Water Year Type in the Spadra Basin

Figure 9

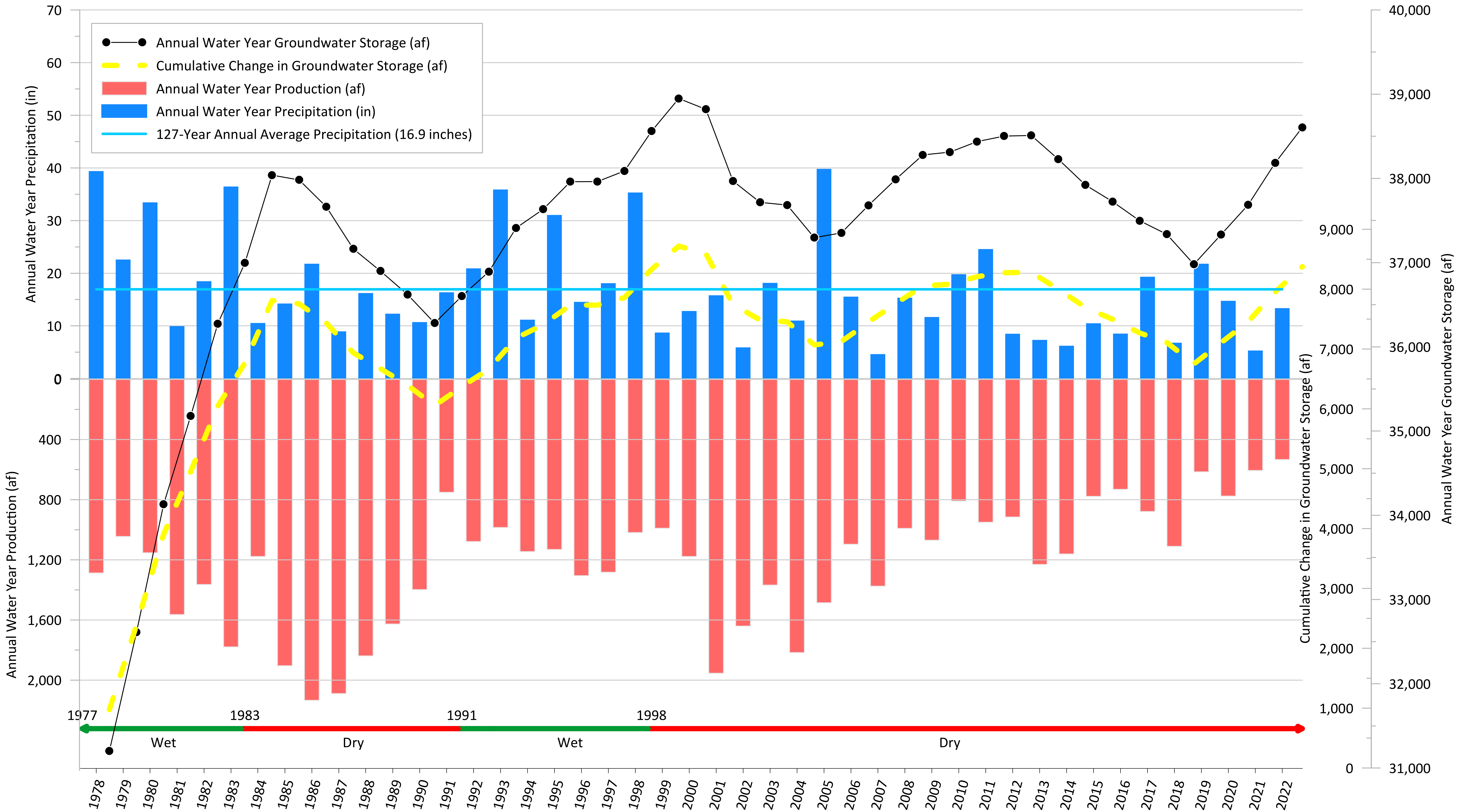
2.4 Groundwater Storage

The changes in groundwater levels described above resulted in changes in groundwater storage. Groundwater in storage and change in groundwater storage for the WY 2022 Annual Report were estimated using the Spadra Basin Groundwater Model that was constructed and calibrated to assist with the development of the GSP (West Yost, 2022a). During the development of the GSP, the model was used to prepare a water budget for a historical period of 1978 through 2018 (calibration period) and a projected period of 2019 through 2079 for a Baseline Scenario and three Basin Optimization Scenarios. The water budget provides estimates of annual change in groundwater storage and cumulative change in groundwater storage for these periods (see Tables 2-7, 5-6a, 5-6b, and 5-6c of the GSP [West Yost, 2022a]). To estimate the annual change in storage through WY 2022, the projected pumping was replaced with actual values for July 2018 to September 2022, and the projected recharge to the basin was replaced with estimate recharge[7] based on the actual precipitation for July 2018 to September 2022. The model was re-run with the updated pumping and recharge values through WY 2022 and produced a water budget to determine the annual and cumulative change in groundwater storage through WY 2022.

Figure 10 shows time series charts of the annual and average precipitation, groundwater production, groundwater storage, and cumulative change in groundwater storage for the Spadra Basin from WY 1978 to WY 2022. Precipitation and groundwater pumping are the primary regional stresses that impact groundwater levels and storage in the basin. The time series chart shows that groundwater production is generally higher during dry years (below average precipitation) and lower during wet years (above average precipitation). Over the period of analysis (WY 1978 to WY 2022), the annual and cumulative change in groundwater storage fluctuated in response to precipitation and groundwater pumping, with a cumulative change in storage of about +8,300 af. From WY 1978 to WY 2004, the changes in groundwater storage follow the trend of the long-term wet and dry periods. Within the current 24-year dry period that has been persistent since WY 1999, there are periods of both increasing and decreasing trends in groundwater storage; the increasing trends correlate to periods of wet years (above average precipitation) and decreased groundwater pumping.

Figure 10 shows that pumping in the Spadra Basin overall has gradually decreased; from WY 1978 to WY 2005 the average annual pumping is about 1,400 afy, and from WY 2006 to WY 2022 the average annual pumping is about 900 afy. Over the last four years from WY 2018 to WY 2022, the pumping in the Spadra Basin is lowest over the analysis period averaging about 600 afy and likely contributing to the gradual increase in groundwater storage of +1,600 af during this time.

[7] Recharge to the Spadra Basin occurs from the deep infiltration of precipitation and applied water (DIPAW) and subsurface inflow from the saturated alluvium and fractures within the bordering bedrock hills (San Jose and Puente Hills). There is no managed aquifer recharge. DIPAW and subsurface inflow is determined using the HDPF and R4 watershed models (see the GSP Appendix I describing the Spadra Basin Groundwater Model construction and calibration). These models will be re-run with actual precipitation data to determine DIPAW and subsurface inflow recharge components for the Spadra Basin.



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SPADRA BASIN GROUNDWATER SUSTAINABILITY AGENCY

Annual Precipitation, Groundwater Pumping, Change in Groundwater Storage, and Cumulative Change in Groundwater in Storage, for Water Year 1978 to 2022

Figure 10

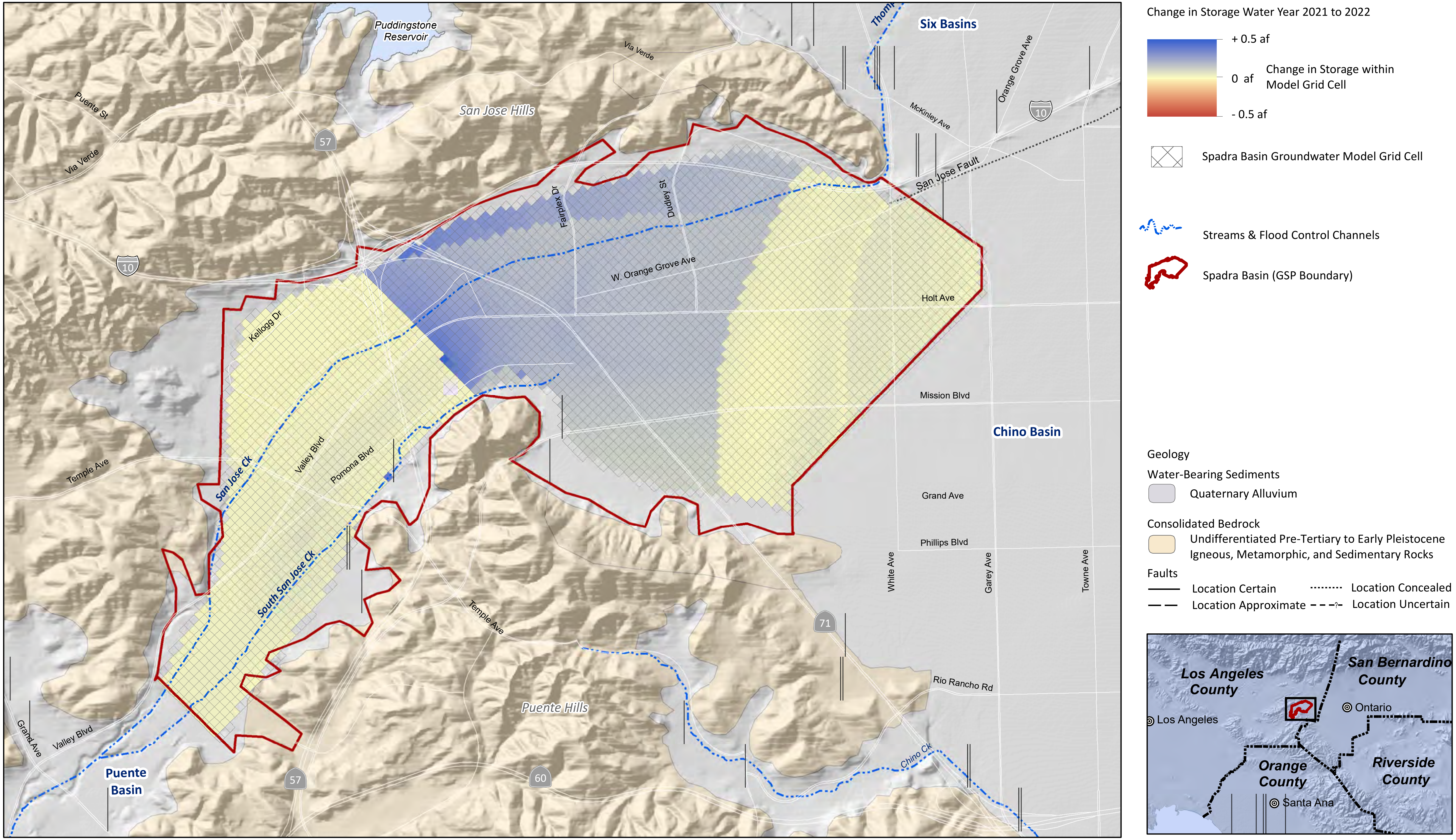
Table 6 summarizes the annual and cumulative change in groundwater storage in the Spadra Basin from for WY 2015 (period required for groundwater use and storage analysis in the Annual Report[8]) through WY 2022. Since WY 2015, the volume of groundwater in storage in the basin decreased from WY 2015 to WY 2018 followed by an increase from WY 2018 to WY 2022, with a net increase of 919 af through WY 2022. As demonstrated in Figure 10 and discussed above, annual groundwater pumping since WY 2018 is much less on average than historical pumping in the basin and has contributed to the increase in groundwater storage since WY 2018.

Table 6. Annual and Cumulative Change in Groundwater Storage in the Spadra Basin- WY 2015 to 2022

Storage Change	Annual Storage, acre-feet							
	2015	2016	2017	2018	2019	2020	2021	2022
Groundwater in Storage	37,724	37,496	37,337	36,980	37,332	37,686	38,184	38,605
Change in Groundwater Storage	-198	-228	-159	-357	352	354	498	420
Cumulative Change in Groundwater Storage Since WY 2015	**--**	**-228**	**-387**	**-516**	**-5**	**706**	**852**	**919**

Figure 11 shows the spatial distribution of change in groundwater storage within the Spadra Basin from WY 2021 to WY 2022 (September 30 [fall], 2021 to September 30 [fall], 2022), estimated with the Spadra Basin Groundwater Model. As shown in Figure 10 and Table 6, the change in groundwater storage from WY 2021 to WY 2022 is +420 af. Most of the increase in groundwater storage in the basin occurred in the central portion of the basin, likely due to the decrease in pumping in this area of the basin.

[8] The DWR requires an analysis in the Annual Report of the annual change in groundwater storage, cumulative change in groundwater storage, groundwater use and water year type for historical data including from January 1, 2015 to current year. January 1, 2015 is in WY 2015 (October 1, 2014 to September 30, 2015).



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Prepared for:
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Groundwater Sustainability Plan
2022 Annual Report

SPADRA BASIN GROUNDWATER SUSTAINABILITY AGENCY

Change in Groundwater Storage Water Year 2021 to 2022

Figure 11

3.0 WATER USE

This section summarizes the surface water use and total water use by the Spadra Basin water purveyors for WY 2022. The volumes of surface water and total water use summarized in this section are the total volumes utilized by the water purveyors of the Spadra Basin within their service areas. Pomona, WVWD, and CPP all have service areas that extend outside of the Spadra Basin, and the proportion of the total surface water and total water use in the Spadra Basin only is not quantified.

3.1 Surface Water Use

The surface water supplies used by the Spadra Basin water purveyors include imported water, recycled water and local surface water. The following is a summary of each surface water supply, its sources, and use in WY 2022.

- **Imported Water**. Imported water delivered to the Spadra Basin water purveyors (Pomona, WVWD, and CPP) comes from treated imported water from the State Water Project (SWP) and Colorado River. The water purveyors purchase imported water from TVMWD and are all member agencies of TVMWD. TVMWD serves imported water to its member agencies, including the Spadra Basin water purveyors, from Metropolitan's Weymouth Water Treatment Plant (Weymouth WTP) or from its Miramar Water Treatment Plant (Miramar WTP).

  Most of the water treated by Weymouth WTP originates from the Colorado River, with a small amount originating from the SWP. The Spadra Basin water purveyors receive water from the Weymouth WTP via the Pomona-Walnut-Rowland Joint Water Line.

  The Miramar WTP receives untreated SWP water from the Metropolitan's Foothill Feeder and treats it for potable use. Water deliveries from the Miramar WTP are supplemented with Six Basins groundwater produced by TVMWD. Currently, groundwater makes up about 4 percent of the total water deliveries from TVMWD's Miramar system. The City of La Verne and Golden State Water Company (for their Claremont and San Dimas systems) have a 50/50 share of the available water from the Miramar WTP, but they currently do not utilize the total water available. Excess water can be delivered to Pomona, WVWD, and Rowland Water District on an interruptible basis.

  In WY 2022, 26,187 af of imported water from TVMWD was used to meet the combined potable water supply demand for WVWD, Pomona, and CPP.

- **Recycled Water**. Recycled water that's available for reuse within the Spadra Basin is produced from the Pomona WRP owned and operated by the LACSD. Domestic and commercial wastewater originating in an 82-square mile area in eastern Los Angeles County, inclusive of the Spadra Basin is treated at the Pomona WRP. The Pomona WRP has a treatment capacity of up to 15 million gallons per day (MGD). Flows may vary from 4 to 15 MGD and average 9 MGD depending on total wastewater generated within the Pomona WRP sewershed. LACSD has agreements to deliver up to one-third of its recycled water available from the Pomona WRP to the WVWD and two-thirds to the Pomona (Carollo Engineers, 2009). Based on this agreement and the average plant production at the time, the amount of recycled water available to the WVWD is about 3,300 afy and the amount available to Pomona is 6,700 afy. A portion of Pomona's recycled water is purchased by CPP for use at the university campus, and the Forest Lawn Cemetery located just outside the Spadra Basin boundary.

Recycled water that is not utilized by the WVWD and Pomona is discharged to the concrete-line South San Jose Creek channel that runs through Spadra Basin. It flows in the channel to the San Gabriel River about 15 miles downstream where the water is then diverted for groundwater recharge at the spreading grounds in the Montebello Forebay overlying the Central Basin.

In WY 2022, 5,321 af of recycled water was used collectively by WVWD, Pomona, and CPP.

- **Local Surface Water**. Local surface water from San Antonio Creek originates in the San Gabriel Mountains flows into the Six Basins. The San Antonio Dam at the edge of the mountains impounds surface water from the San Gabriel mountains and releases surface water into San Antonio Creek. Flows into San Antonio Creek are diverted by several parties based on surface water rights that were assigned in the early 1900s. Most of the surface water runoff generated in the San Antonio Creek watershed enters a “60/40” splitter box where flow is split and diverted to San Antonio Water Company and Pomona conveyance facilities. Approximately 60 percent of the flow is diverted by the San Antonio Water Company, approximately 40 percent of the flow is diverted by the City of Pomona, and if there are excess flows available the water flows downstream and is impounded behind San Antonio Dam.

  Surface water diverted by Pomona at the 60/40 splitter box is combined with surface water flows diverted from Evey Canyon and flows by gravity in a shallow underground pipeline called the Canon Pipeline to Pomona’s Pedley Treatment Plant. Water at the Pedley Treatment Plant is treated and served for direct potable use. The Pedley Treatment Plant is located adjacent to the Pedley Spreading Grounds. The surface water diverted to the Canon Pipeline generally exceeds the treatment capacity of the Pedley Treatment Plant. Excess water is recharged at the San Antonio Spreading Grounds or the Pedley Spreading Grounds.

  In WY 2022, 1,373 af of local surface water from San Antonio Creek was used by the Pomona to meet potable water supply demand.

Table 7 summarizes imported water, recycled water, and local surface water use by the Spadra Basin water purveyors in WY 2022.

Table 7. Surface Water Use by Spadra Basin Water Purveyors in WY 2022

Water Type	Primary Water Use	Annual Water Use, acre-feet 2022
Imported Water[(a)]	Potable	26,187
Recycled Water[(b)]	Non-Potable	5,321
Local Surface Water[(c)]	Potable	1,373
	Total Surface Water Use	**32,881**

(a) Imported water purchased from TVMWD.
(b) Recycled water treated at Pomona WRP and distributed to WVWD and Pomona. It's also available for purchase by CPP from Pomona.
(c) Native water from San Antonio Creek. Pomona is the only water purveyor within the Spadra Basin that has surface water rights to flows from San Antonio Creek.

The total surface water use in WY 2022 was 32,881 af, which is about 3,600 af higher than the previous WY 2021 (surface water use of 29,237 af) and about 4,800 af higher than the average surface water use observed since WY 2015 (average of 28,072 afy for WY 2015 to WY 2022). The next section describes how these surface water sources are part of the total water use by the water purveyors in the Spadra Basin.

3.2 Total Water Use

The water purveyors of the Spadra Basin have a diverse water-supply portfolio to meet their demands, of which groundwater from the Spadra Basin is a small portion of the total supply. In addition to groundwater from the Spadra Basin, water supplies include groundwater from other basins, imported water, local surface water, and recycled water. Pomona and WVWD both pump groundwater from other nearby groundwater basins (Six Basins, Chino Basin, and Puente Basin) and these other groundwater sources are described in detail in Section 5.1.3.1 of the GSP (West Yost, 2022a). Imported water, recycled water, and local surface water are described in detail in Section 3.1 of this Annual Report and Section 5.1.3.1 of the GSP. Table 8 summarizes the total water use by the Spadra Basin water purveyors in WY 2022, by each agency and supply source.

Table 8. Total Water Use by the Spadra Basin Water Purveyors in WY 2022

Spadra Basin Member Agency	Annual Water Use, acre-feet					
	Spadra Basin Groundwater[(a)]	Groundwater from Other Basins[(b)]	Imported Water[(c)]	Recycled Water[(d)]	Local Surface Water[(e)]	Total Water Use
WVWD	51	365	16,227	1,772	0	18,415
Pomona	0	7,120	9,844	2,162	1,373	20,500
CPP	482	0	115	1,388	0	1,985
WY 2022 Totals	**533**	**7,486**	**26,187**	**5,321**	**1,373**	**40,900**

(a) Groundwater extracted from the Spadra Basin.
(b) Groundwater extracted from Six Basins, Chino Basin, and Puente Basin.
(c) Imported water purchased from TVMWD.
(d) Recycled water treated at Pomona WRP and distributed to WVWD and Pomona. It's also available for purchase by CPP from Pomona.
(e) Native water from San Antonio Creek. Pomona is the only water purveyor within the Spadra Basin that has surface water rights to flows from San Antonio Creek.

In WY 2022, total water use by the Spadra Basin water purveyors was 40,900 af; this includes: 533 af of groundwater from Spadra Basin, 7,486 af of groundwater from other basins, 26,187 af of imported water, 5,321 af of recycled water, and 1,373 af of local surface water.

The total water use in WY 2022 is about 1,900 af lower than the previous WY 2021 (total water use of 42,773 af), and about 1,000 af higher than the average total water use observed since WY 2015 (average of 39,809 afy for WY 2015 to WY 2022).

Table 9 summarizes the percentage of a water supply sources to total water use for WY 2022 and the average and range of those percentages from WY 2015 to WY 2022. Spadra Basin groundwater is the least utilized source of water supply by the Spadra Basin water purveyors and consisted of one percent of the total water supply in WY 2022, which is the lowest percentage historically since WY 2015. Imported water is the most utilized source of water supply by the water purveyors and consisted of 64 percent of the total water supply in WY 2022, which is the highest percentage historically since WY 2015.

Table 9. Percentage of the Water Supply to the Total Water Use by the Spadra Basin Water Purveyors from WY 2015 to WY 2022

Water Supply	Percentage of Total Water Use		
	In WY 2022, percent	Average WY 2015 to WY 2022, percent	Range from WY 2015 to WY 2022, percent
Spadra Basin Groundwater	1	2	1 - 3
Groundwater from Other Basins	18	27	18 - 34
Imported Water	64	55	50 - 64
Recycled Water	13	11	9 - 13
Local Surface Water	3	4	2 - 7

4.0 GSP IMPLEMENTATION

The Spadra Basin GSA adopted the GSP on May 2, 2022, submitted the GSP to the DWR on July 26, 2022 and started in its first year of implementation during this WY 2022 reporting period. Implementation of the GSP includes conducting the monitoring program, evaluating and reporting conditions from the monitoring, comparing against sustainable management criteria, and implementing projects and management actions.

4.1 Implementation of GSP Monitoring Program

After the submittal of the GSP in August 2022, the Spadra Basin GSA began the steps to set up and initiate the GSP monitoring program described in Section 4 of the GSP and summarized in Section 1.2 of this Annual Report. The primary implementation task for the first year is the setup of the monitoring well network of the 12 GSP monitoring wells shown in Table 2 to be monitored by the GSA for groundwater level and groundwater quality. The setup of the monitoring well network includes:

- Coordination with the well owners of the 12 wells to: verify the status of well; schedule and conduct field visits to each site with the well owners; collect additional well information if needed; obtain future access to well site and the well; establish the monitoring protocols; and coordinate on the frequency of water quality monitoring and laboratory analytical methods used.
- Performing site visits at each well to ascertain access to the well site and the well; the physical possibility to install a transducer; the depth-to-groundwater and the proper depth for the transducer in the well; and the proper hardware, direct read cable, and transducer to purchase for installation.
- Purchase of all transducers, direct read cables, and installation hardware.
- Installation of the transducers at each well. The transducers were installed via direct-read cables to allow the transducer to always remain in the well, which prevents transducer displacement and damage and allow for efficient data downloads. During installation, well sketches were drawn that includes the well location, well construction in relation to the ground surface, location of the designated reference point for measuring depth-to-water, and measured distance from the ground to the designated reference point. Pictures of the well and well site were also taken.
- Set up of the wells information in the GSA data management system. This includes any required updates to the well location, reference point measurement location and reference point elevation; and photos and well sketches.

The setup of the monitoring at the 12 GSP monitoring wells began in November 2022 after the WY 2022 reporting period and was completed in early 2023. Hence, high-frequency groundwater levels are now measured at the GSP monitoring wells using transducers, and this data will be available to evaluate the conditions for the next Annual Report for WY 2023. During the initial site visits at the 12 GSP monitoring wells it was discovered that at one of the wells, CPP-2, it is not possible to install a transducer or measure manual water levels.

There was no GSA coordinated monitoring for water quality at the 12 GSP monitoring wells during WY 2022, and water quality data sampling that did occur was by the well owners for their individual needs. During WY 2023 the GSA will initiate the process to coordinate with the well owners to ensure that the wells are being sampled at least every three years for the recommend analytes, laboratory analytical methods and detection limits listed in Table 3.

In September 2022, the GSA completed the construction of a new monitoring well Spadra MW-1 in the eastern portion of the Spadra Basin. The objective of the well is to fill a data gap identified in the hydrogeologic conceptual model of the Spadra Basin developed for the GSP and the calibrated groundwater-flow model for the Spadra Basin. The new well has been integrated into the monitoring network and is one of the 12 GSP monitoring wells.

4.2 Compliance with Sustainable Management Criteria

Progress of GSP implementation is measured by assessing the status of conditions relative to Minimum Thresholds and achievement of Interim Milestones. Tables 10 provides a summary of the status of the Minimum Thresholds for the Spadra Basin Sustainability Indicators, and if any Minimum Thresholds were exceeded. The Interim Milestones are set at five-year intervals starting in 2027, and the status of Interim Milestones will be evaluated in future Annual Reports and five-year assessments.

Table 10. Sustainably Indicators and Status of and Minimum Thresholds

Sustainability Indicator	2022 Status of Minimum Thresholds
Chronic Lowering of Groundwater Levels, and by proxy Reduction of Groundwater Storage and Land Subsidence	• There have been no exceedances of Minimum Thresholds at the seven representative monitoring wells. Groundwater water levels have remined relatively stable or slightly increased since the GSA began to develop the GSP. • See hydrographs in Figures 12a through 12g
Degraded Water Quality	• There have been no exceedances of Minimum Thresholds at the seven representative monitoring wells for the six contaminants of concerns TDS, nitrate, perchlorate, TCE, PCE, 1,1-DCE. • Water quality data is limited since the GSA began to develop the GSP. The available water quality data does not show an increase in concentrations for any of the contaminants of concerns and an exceedance of the Minimum Thresholds.

Figure 12a through 12g are hydrographs of groundwater levels from 1978 to 2022 and show the Minimum Thresholds and Measurable Objectives for the seven representative wells for lowering of groundwater levels (and proxy for reduction of groundwater storage and land subsidence). An exceedance of a Minimum Threshold occurs if the lowest static fall groundwater elevation measurement at a representative monitoring well is below the respective Minimum Threshold. There were no exceedances of the Minimum Thresholds for the lowering of groundwater levels during the reporting period or the entire period of record shown.

As described in Section 3.3.1 of the GSP and Section 1.3 of this Annual Report, the Minimum Thresholds and Measurable Objectives were set as the lowest and highest historical groundwater elevations, respectively, at each well between 1978 to 2018. During the setup of the monitoring well network in late 2022, the well reference point elevations were modified in the GSA data management system to establish the point of reference for all groundwater level measurements using a consistent vertical datum.[9] The historical

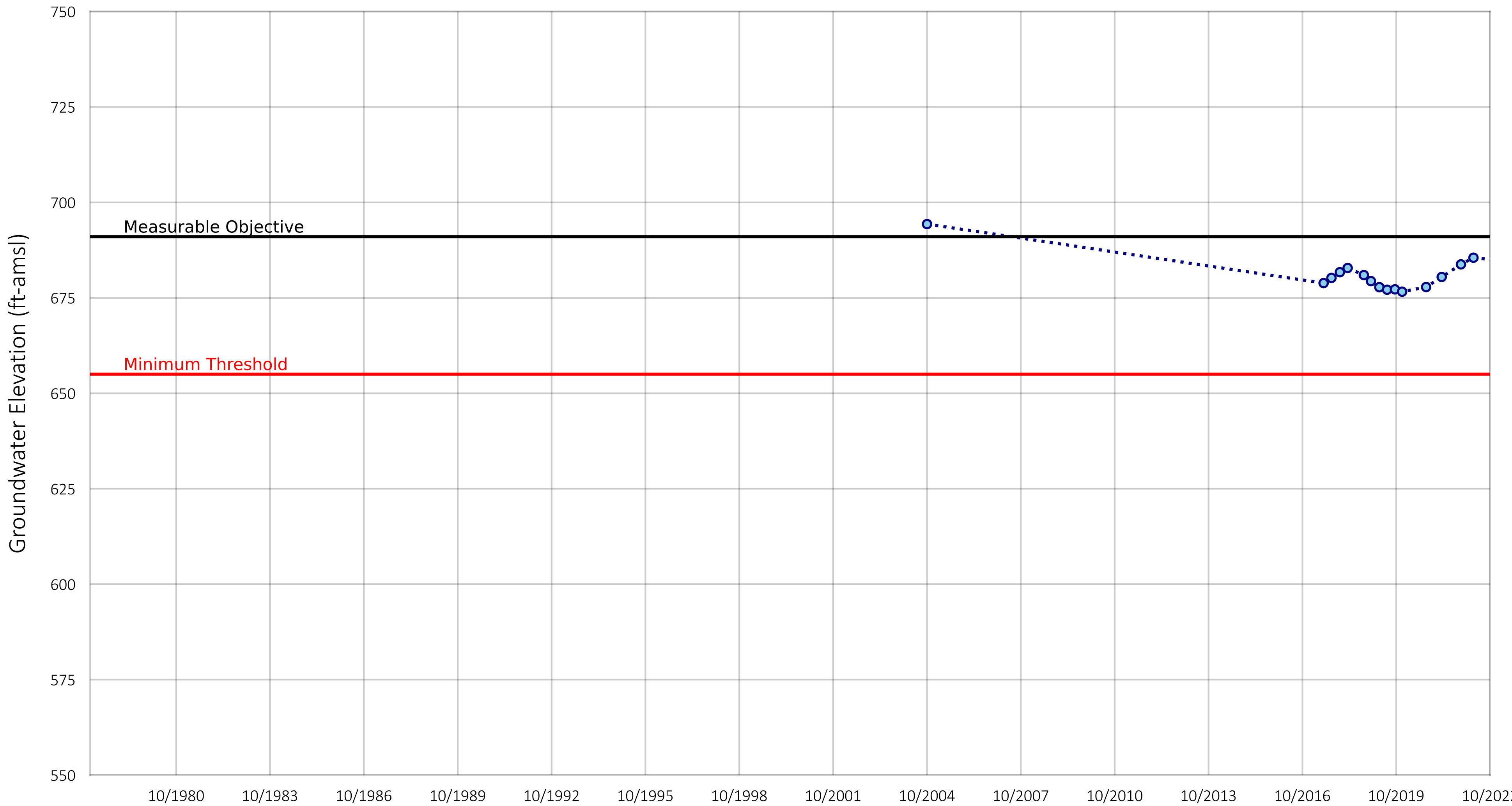
[9] National Geodetic Vertical Datum of 1929 (NGVD 29).

groundwater elevation data was adjusted to the modified reference point elevations, but the Minimum Thresholds and Measurable Objectives established in the GSP are based on historical data that used the old reference point elevations. Because of this adjustment to the well reference point elevation, the Minimum Thresholds and Measurable Objectives may not match up to the lowest and highest historical groundwater elevations in the hydrographs. The Minimum Thresholds and Measurable Objectives for groundwater levels will be reevaluated and updated as needed in the first five-year assessment in 2027 and will include any adjustments to the criteria based on the reference point elevation modifications.

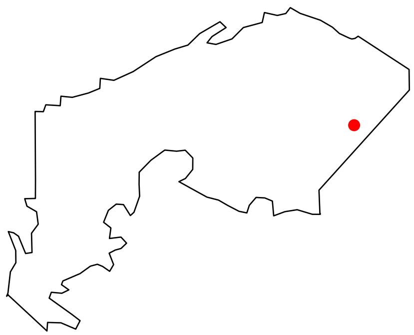
4.3 Projects and Management Actions

Basin Optimization Scenario 3 as described in Section 3.5 of the GSP and summarized in Section 1.4 of this Annual Report, is the recommended scenario for GSP implementation to achieve sustainability and maximize the beneficial use of the Spadra Basin. Basin Optimization Scenario 3 is a combination of projects and management actions to initiate artificial groundwater recharge in the basin and expand desalination facilities to increase the local potable water supply in the region.

After the submittal of the GSP in July 2022, the Spadra Basin GSA began refining the phased approach for planning and implementing the Basin Optimization Scenario 3 projects described in Section 6.1.5 of the GSP. The phased approach includes both institutional and engineering activities to proceed in parallel to plan, design, build, and operate facilities. The institutional process defines the management agenda, directs the engineering process, and builds consensus to permit, fund, deliver, and operate facilities. The engineering activities refine the technical understanding of the basin and feasibility of the projects, develops technical data and cost estimates, designs facilities and monitors construction activities. The GSA is in discussions on how to proceed with this approach, establish project partners and roles, develop a current and future funding structure and allocation of project cost and benefits, and identify grant funding opportunities.



Location of Well in Spadra Basin



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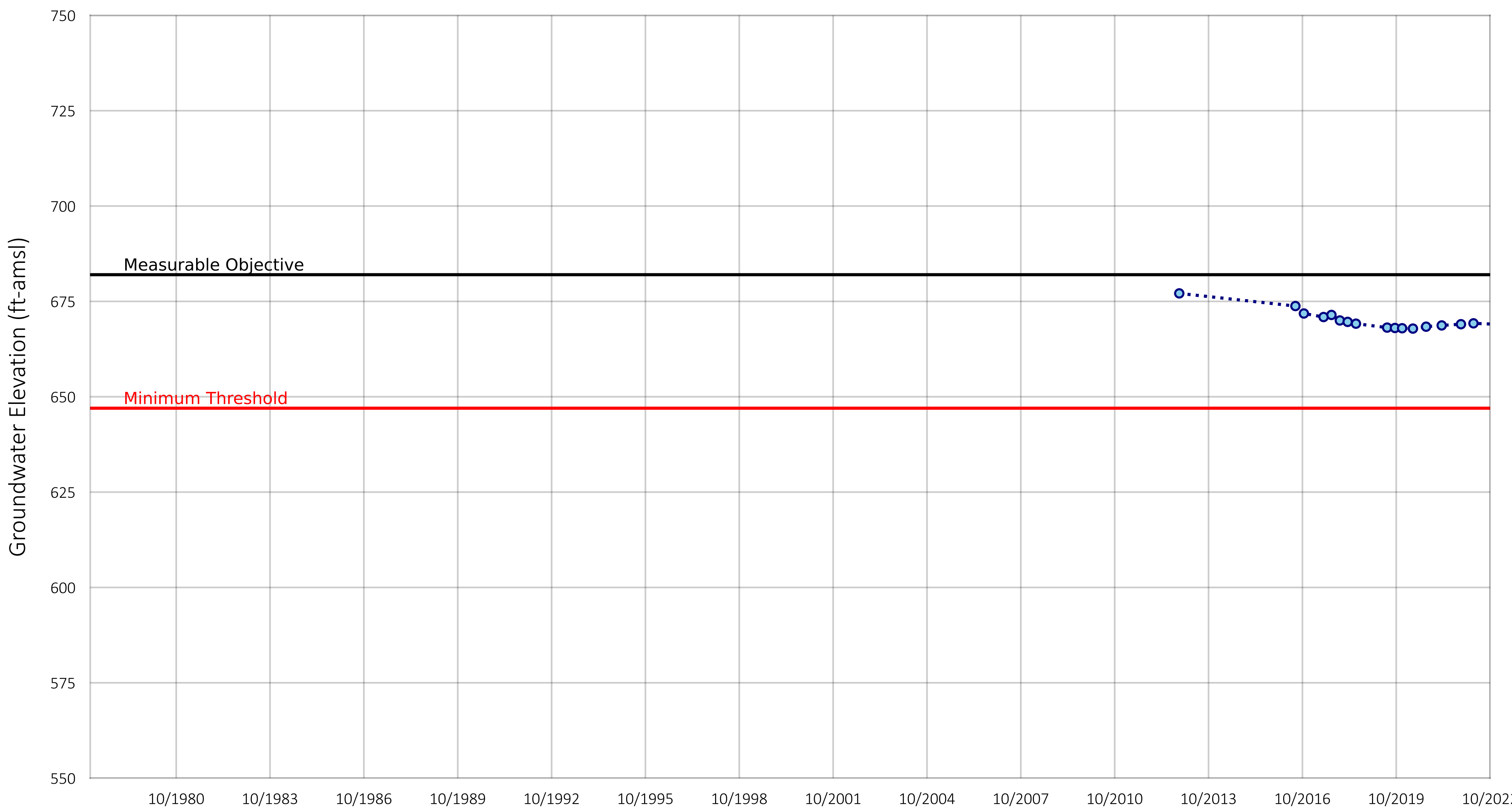
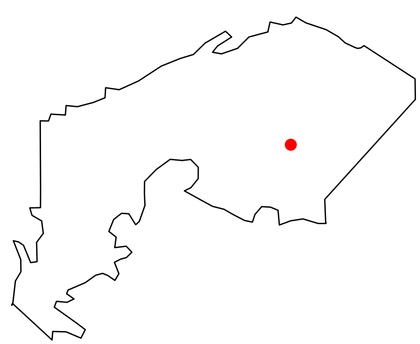
Groundwater Elevation
and Sustainable Management Criteria
at Well MW-5

Figure 12a



Location of Well in Spadra Basin



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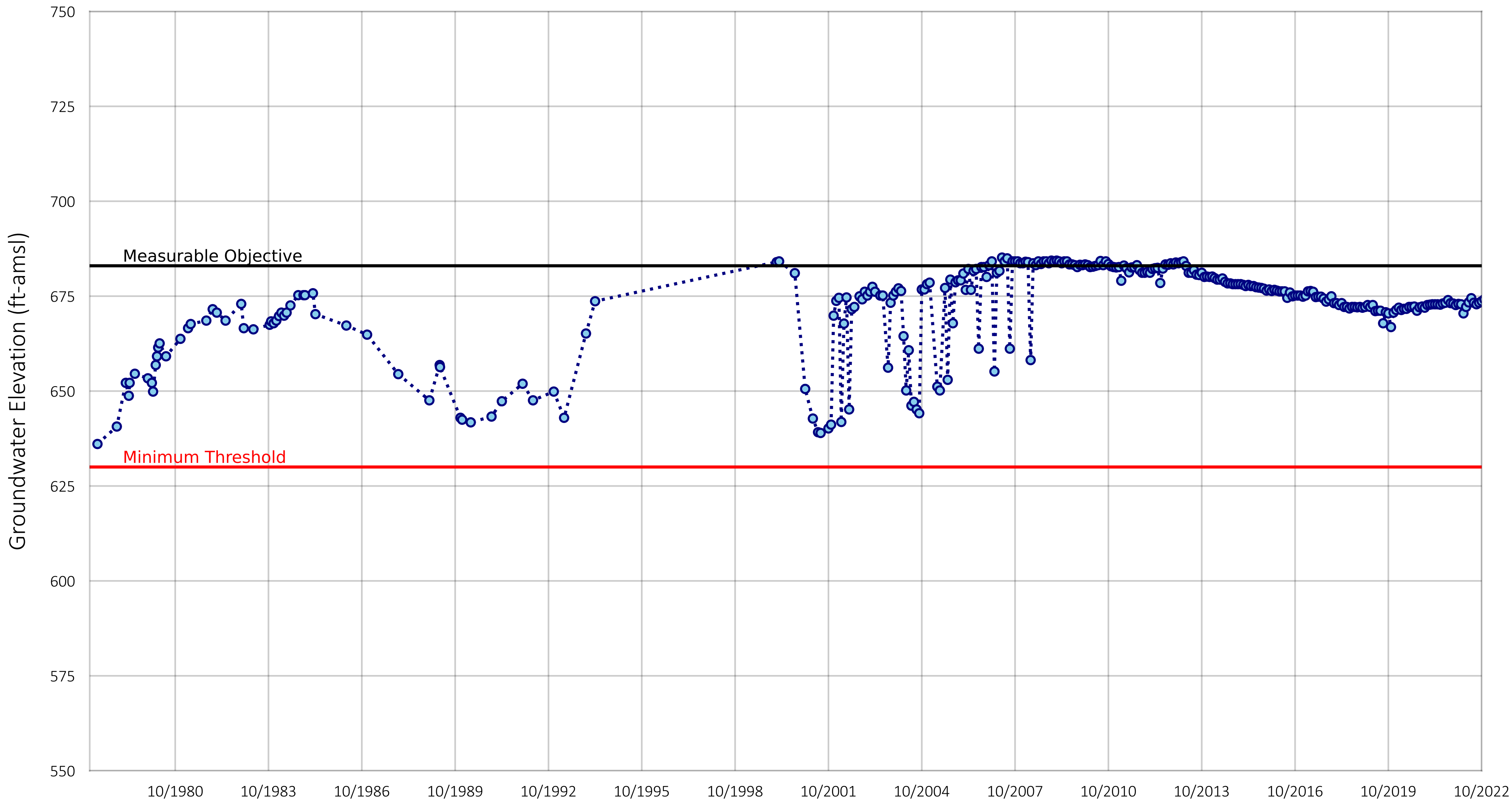
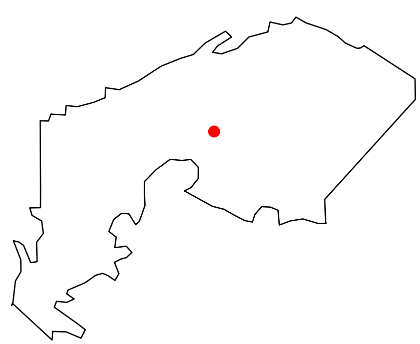
Groundwater Elevation
and Sustainable Management Criteria
at Well OMW-3

Figure 12b



Location of Well in Spadra Basin



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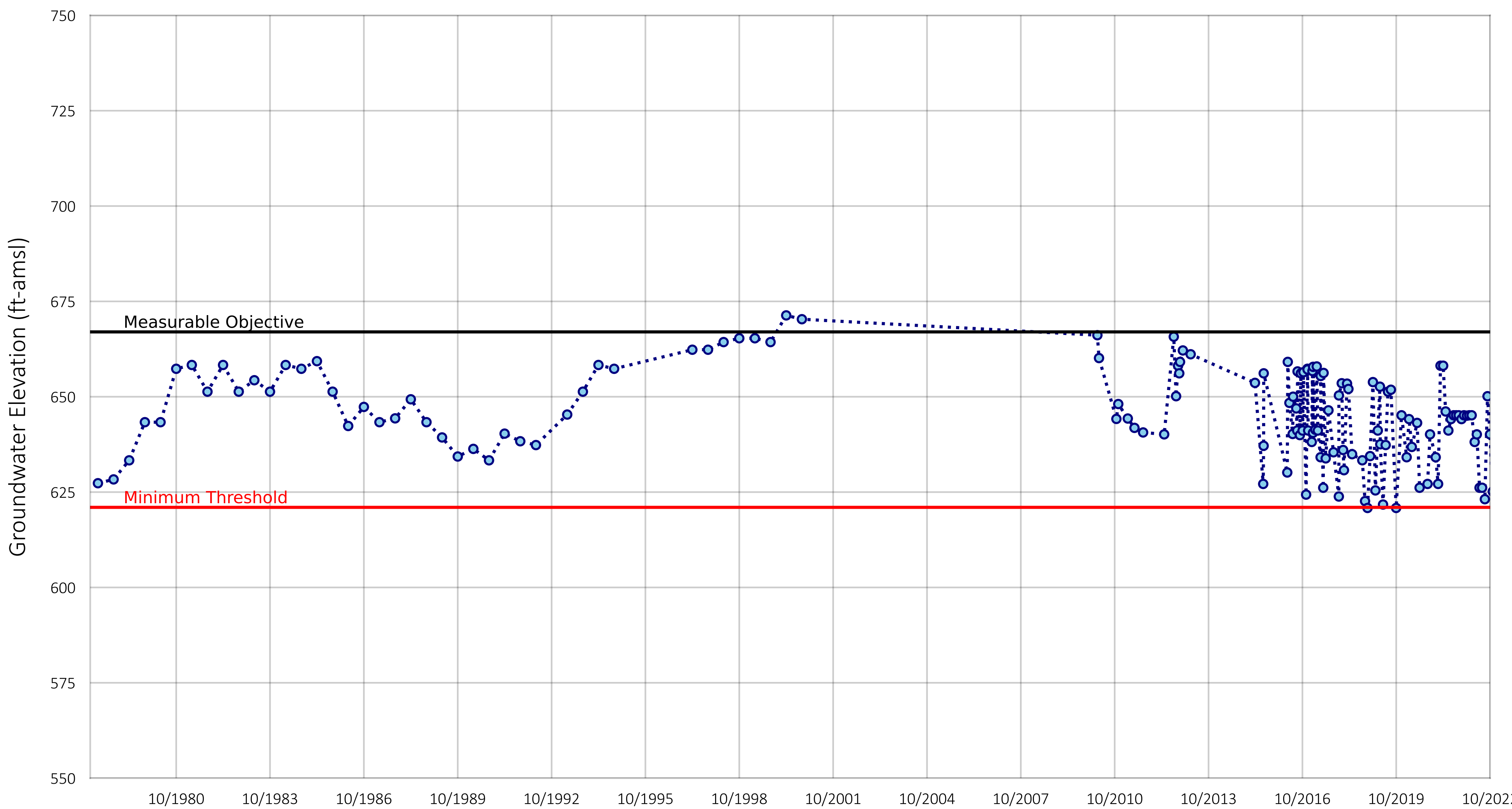
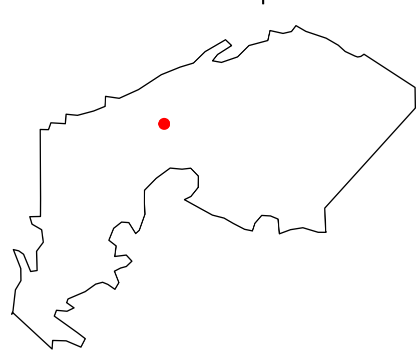
Groundwater Elevation
and Sustainable Management Criteria
at Well P-19

Figure 12c



Location of Well in Spadra Basin



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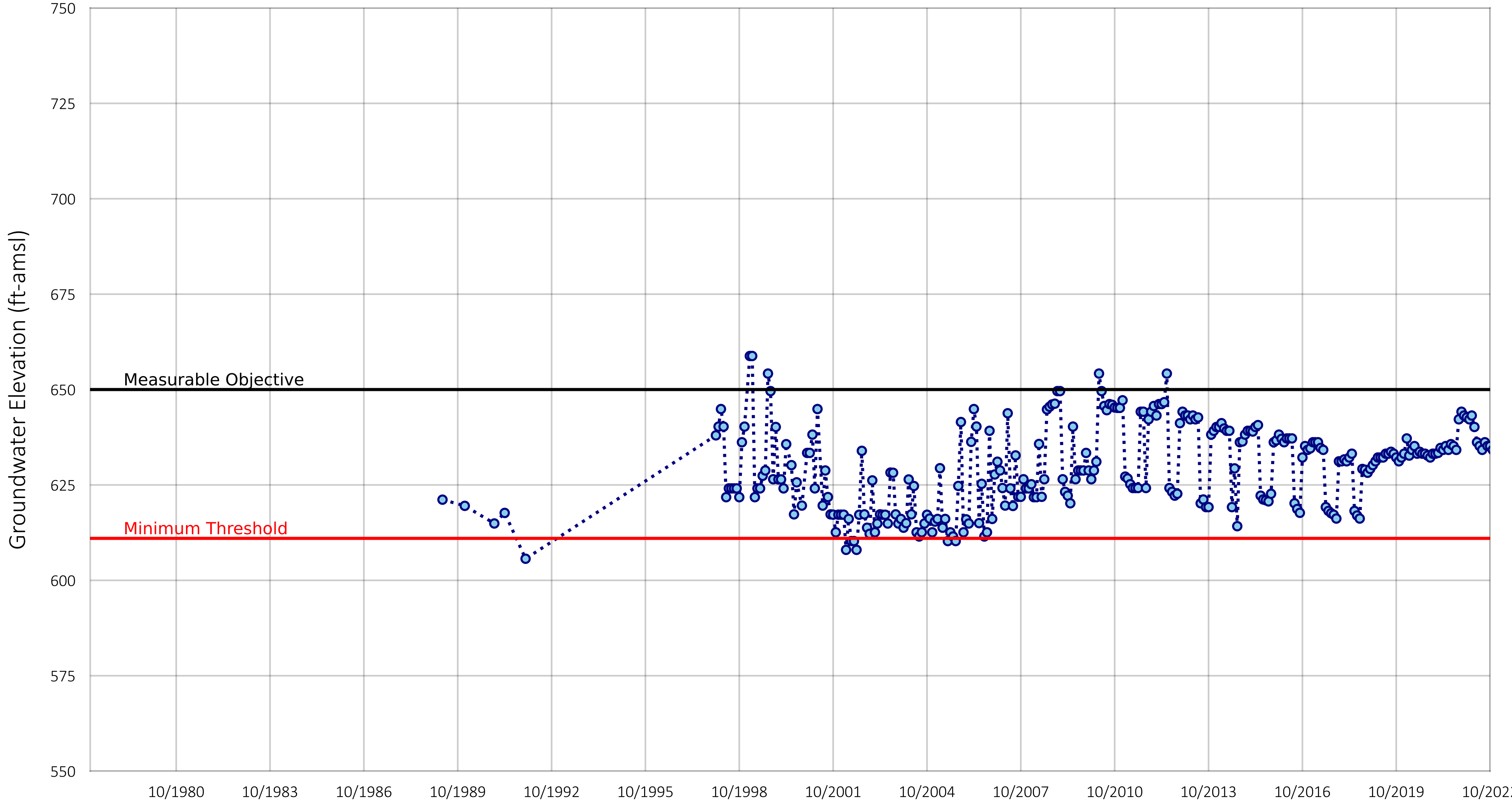
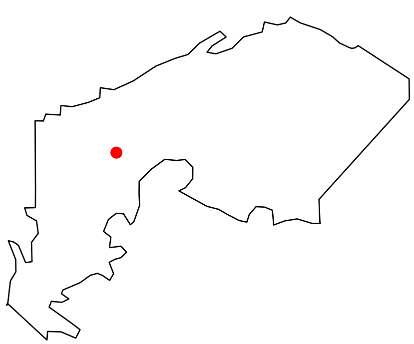
Groundwater Elevation
and Sustainable Management Criteria
at Well CPP-1

Figure 12d



Location of Well in Spadra Basin



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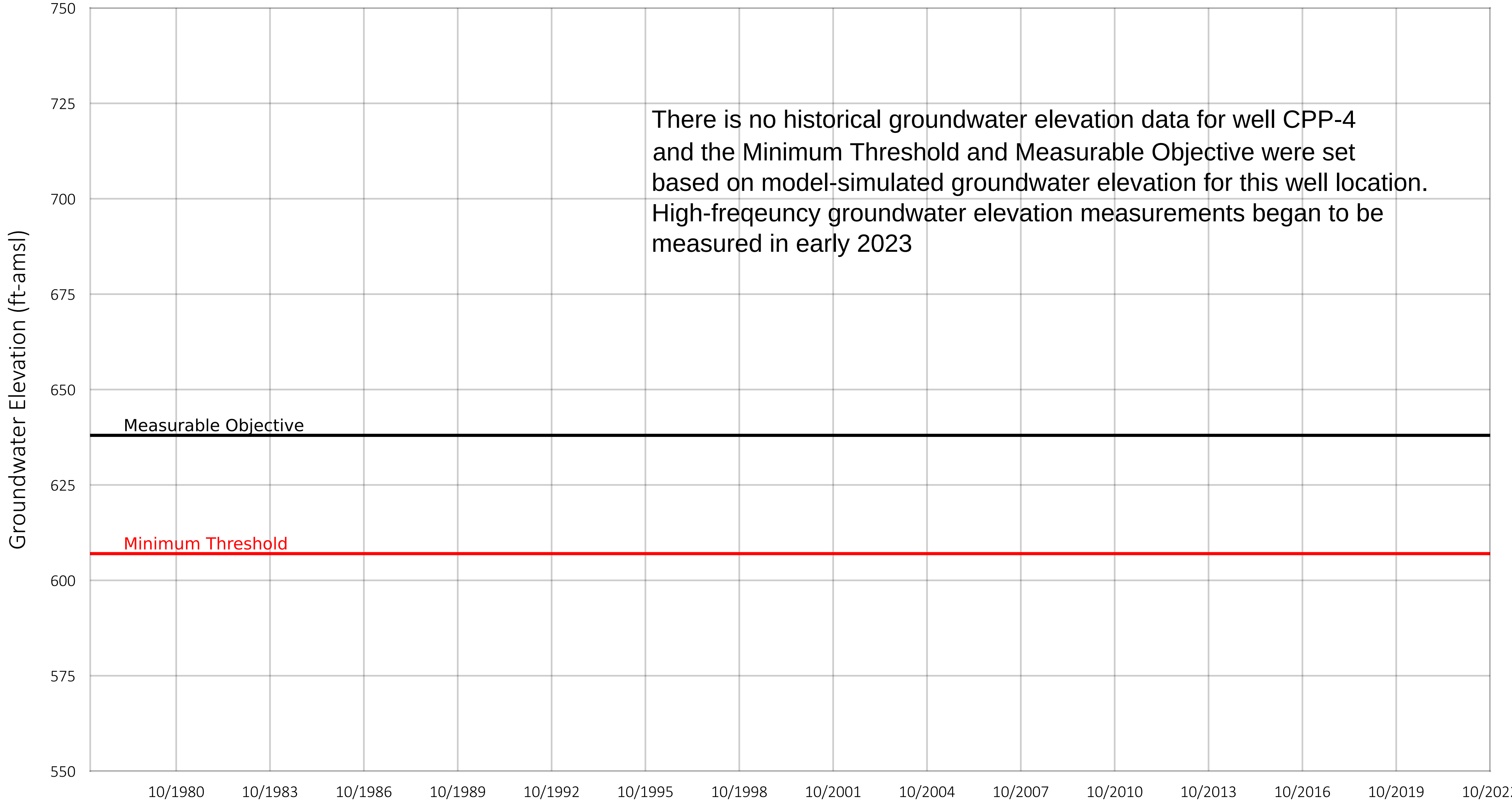
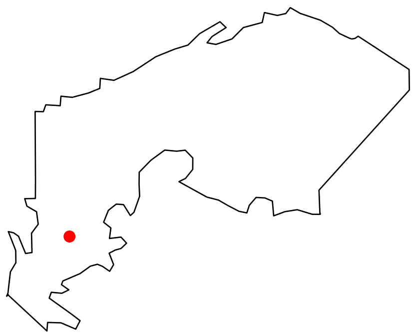
Groundwater Elevation
and Sustainable Management Criteria
at Well P-28

Figure 12e



Location of Well in Spadra Basin



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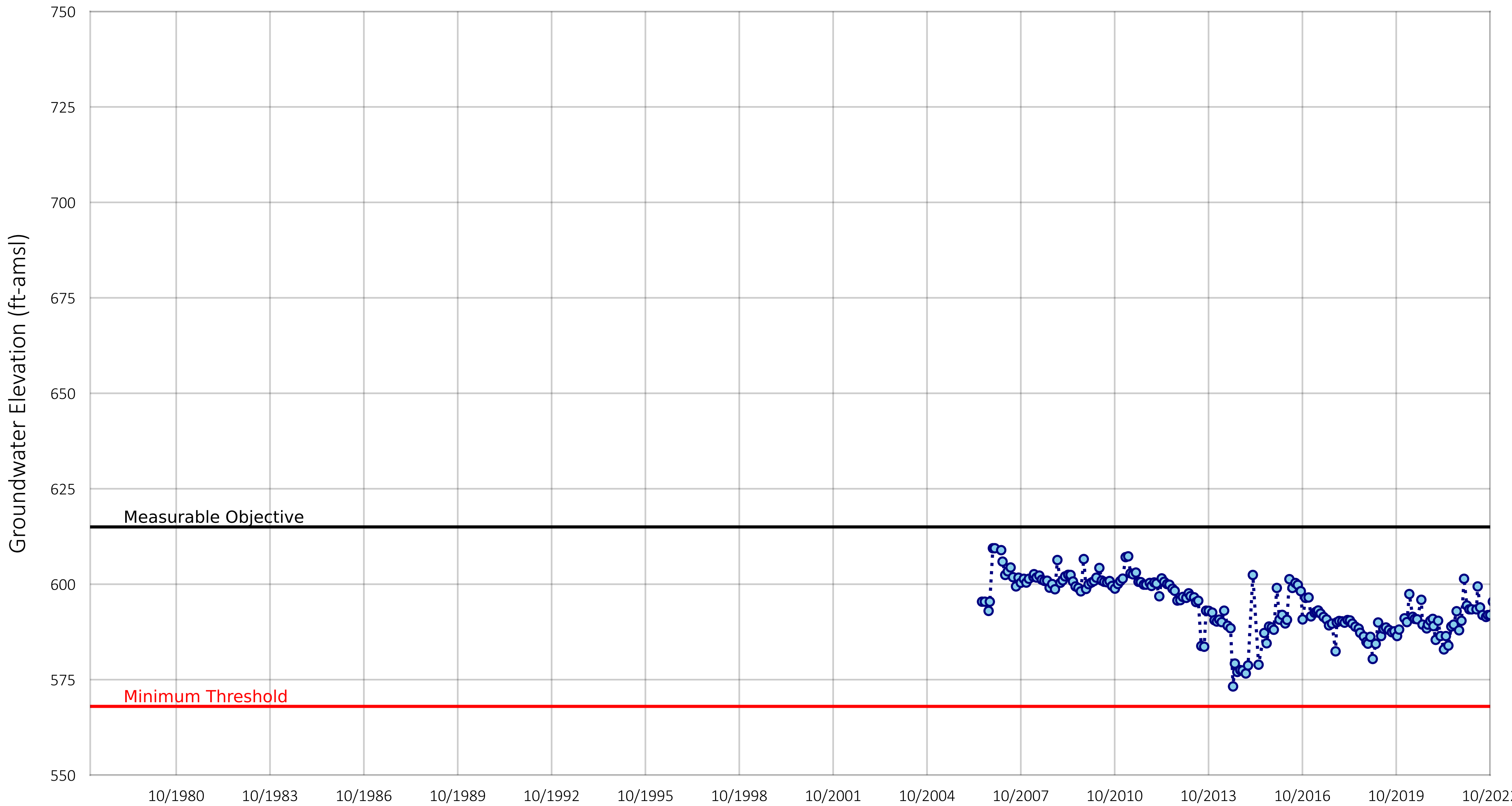
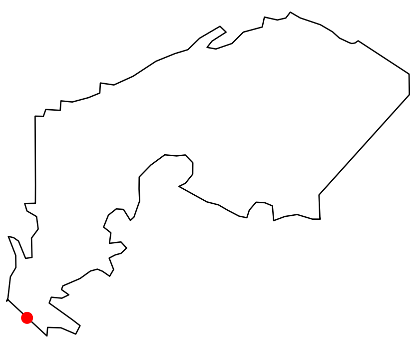
Groundwater Elevation
and Sustainable Management Criteria
at Well CPP-4

Figure 12f



Location of Well in Spadra Basin



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Groundwater Elevation
and Sustainable Management Criteria
at Well Industry

Figure 12g

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