2022

SAN BENITO COUNTY WATER DISTRICT
ESTABLISHED NOV. 3, 1953
HOLLISTER, CA

Annual Groundwater Report

TODD GROUNDWATER

NORTH SAN BENITO ANNUAL GROUNDWATER REPORT 2022

FINAL March 2023

TODD GROUNDWATER

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SIGNATURE PAGE

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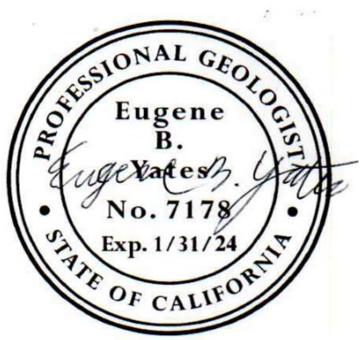

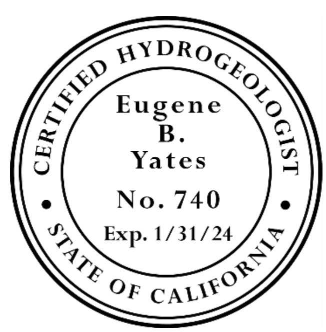

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EXECUTIVE SUMMARY

This Annual Groundwater Report describes groundwater conditions in the North San Benito Basin, a subbasin of the Gilroy-Hollister Basin. Consistent with Annual Groundwater Reports prepared by the San Benito County Water District for decades, this report fulfills requirements of the 1953 San Benito County Water District Act (California Water Code Appendix 70). This Annual Groundwater Report also fulfills requirements of the 2014 Sustainable Groundwater Management Act (SGMA). In brief, this report incorporates adaptive management; it strives to maintain consistency with past Annual Reports while fulfilling requirements for SGMA Annual Reports and supporting sustainable groundwater management into the future.

SGMA requires sustainable management of priority groundwater basins and empowers local Groundwater Sustainability Agencies (GSAs) to manage groundwater resources. San Benito County Water District GSA (SBCWD GSA), in partnership with Valley Water (known as Santa Clara Valley Water District prior to 2019) GSA has developed a Groundwater Sustainability Plan (GSP) for the North San Benito Basin. The North San Benito Basin is predominantly in San Benito County with small areas in Santa Clara County. The North San Benito GSP was adopted by SBCWD and Valley Water GSA and was submitted to the California Department of Water Resources (DWR) in January 2022. The 2022 GSP provides the basic information, analytical tools, and projects and management actions for continued groundwater management, guided by SGMA and by locally defined sustainability goals, objectives, and metrics.

This Annual Groundwater Report for San Benito County Water District (SBCWD or District) documents water sources and uses, groundwater elevations and storage, and management activities for Water Year 2021 and provides recommendations. This Report also details the six Sustainable Management Criteria and their respective Minimum Thresholds (MTs). While Water Year 2022 was the third year of dry conditions and was characterized by below average rainfall, historically low Central Valley Project (CVP) allocations and decreased groundwater storage in parts of the Basin. Regarding groundwater levels, while two Key Wells showed measurements below their individual MT levels, no MTs were triggered for an MA during the water year. For water quality, TDS and nitrate showed improvement in the percent of wells below the basin objective. However, TDS concentrations increased in San Juan MA. This reflects the increased monitoring of shallow wells to study farm practices and legacy loading in agricultural areas and does not reflect degradation of water quality from groundwater management activities.

Recognizing the potential in 2022 for zero CVP imported water allocations, the District successfully advocated to receive public health and safety delivery volumes to ensure that continued high quality drinking water remained available throughout the drought. Residents and businesses also responded to the Stage 2 water conservation measures and were able to decrease demand.

The District has effectively managed water resources in San Benito County for decades. Working collaboratively with other agencies, the District has eliminated historical overdraft, developed and managed multiple sources of supply, established an effective water conservation program, protected water quality, and provided annual reporting. Water Year 2022 witnessed completion of the GSP and continuation of collaborative efforts. This Annual Report includes an update on many of the Projects and Management Actions (PMAs) including managed aquifer recharge (MAR), monitoring program improvements, preparation of an Action Plan if an MT is triggered for an MA, pursuit of funding for various projects, and information about the District’s funding mechanisms.

1-INTRODUCTION

This Annual Groundwater Report describes groundwater conditions in the North San Benito Basin (**Figure 1-1**), a subbasin of the Gilroy-Hollister Basin. Consistent with Annual Groundwater Reports prepared for decades by the San Benito County Water District (SBCWD or District), this report fulfills requirements of the 1953 San Benito County Water District Act (California Water Code Appendix 70). The District Act authorizes the Board of Directors, at its discretion, to direct staff to prepare an annual investigation and report on groundwater conditions of the District and its zones of benefit, such as Zone 6, the area for distribution of Central Valley Project (CVP) water. As documented in **Appendix A**, the District Act specifies the minimum content of the report to be prepared at the direction of the District Board of Directors. This Annual Report fulfills the requirements for a District Annual Report, including a brief Annual Groundwater Memorandum Report prepared for the January 9, 2023, meeting of the Board of Directors (in Appendix A). This Annual Report also provides information to the Board of Directors on the status of the groundwater basin, estimated conditions in the next year, and management recommendations.

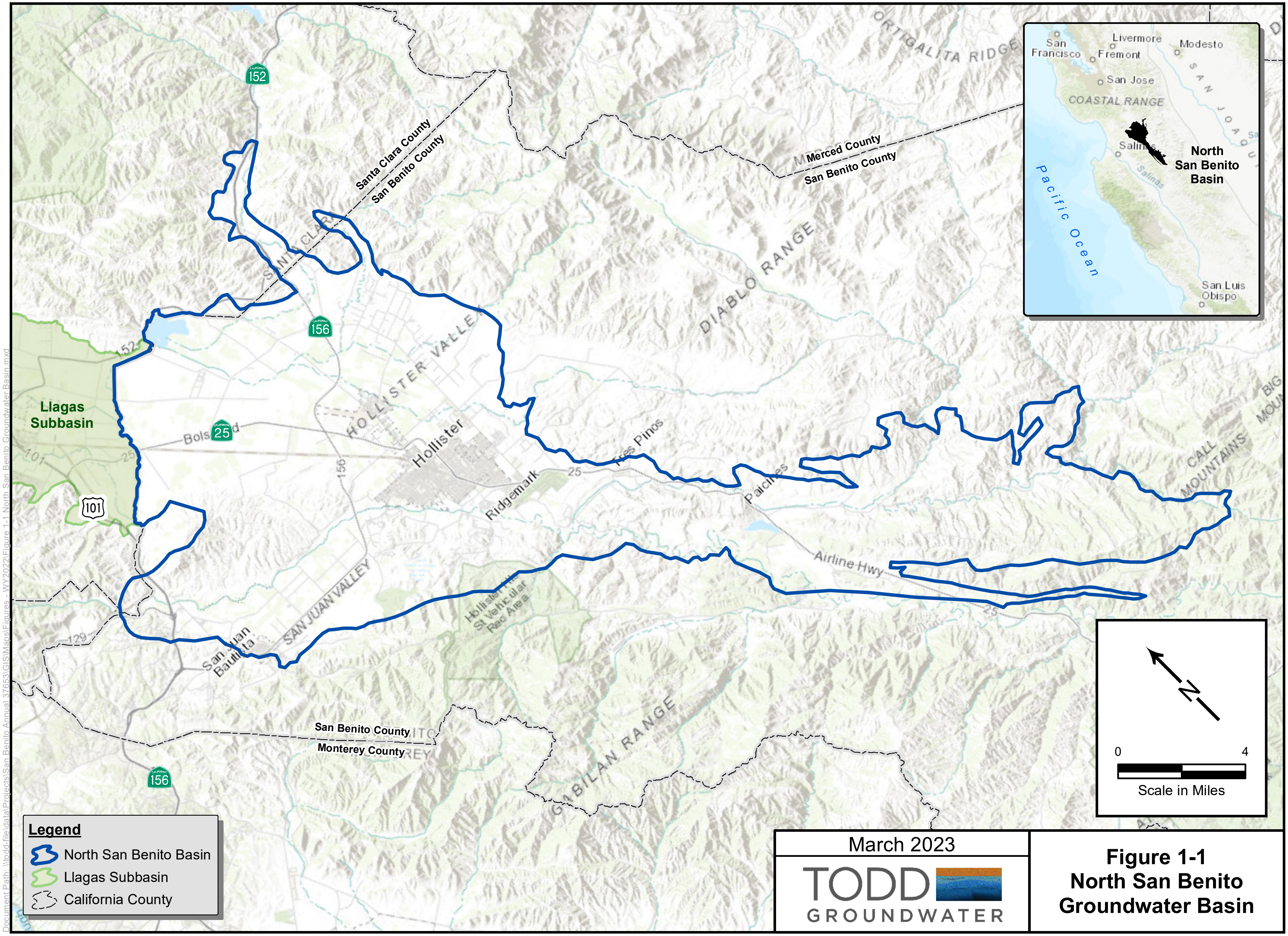
This Annual Groundwater Report fulfills requirements of the 2014 Sustainable Groundwater Management Act (SGMA). SGMA requires sustainable management of priority groundwater basins and empowers local Groundwater Sustainability Agencies (GSAs) to manage groundwater resources. San Benito County Water District GSA (SBCWD GSA), in partnership with Valley Water GSA (known as Santa Clara Valley District prior to 2019), has developed a Groundwater Sustainability Plan (GSP) for the North San Benito Basin, which encompasses the historically defined Bolsa, Hollister, and San Juan Bautista Subbasins of the Gilroy-Hollister Basin and the Tres Pinos Valley Basin. The North San Benito Basin is predominantly in San Benito County with small areas in Santa Clara County. As presented in the North San Benito Groundwater Sustainability Plan (Todd 2021), the North San Benito Groundwater Basin has been divided into four management areas, shown in **Figure 1-2**, which have been defined to facilitate implementation of the GSP.

In accordance with SGMA, this Annual Report documents water supply sources and use, groundwater elevations and storage, and management activities from October 2021 through September 2022. The SGMA elements guide, detailing the required SGMA components, is included in **Appendix A**. This Annual Report conveys considerable data, including tables and figures, which are provided largely in **Appendices B through G**. **Appendix F** provides information on water rates and charges and **Appendix H** contains a list of acronyms.

The 2022 Annual Groundwater Report incorporates adaptive management; it strives to maintain consistency with past Annual Reports while fulfilling requirements for SGMA Annual Reports and supporting sustainable groundwater management into the future.

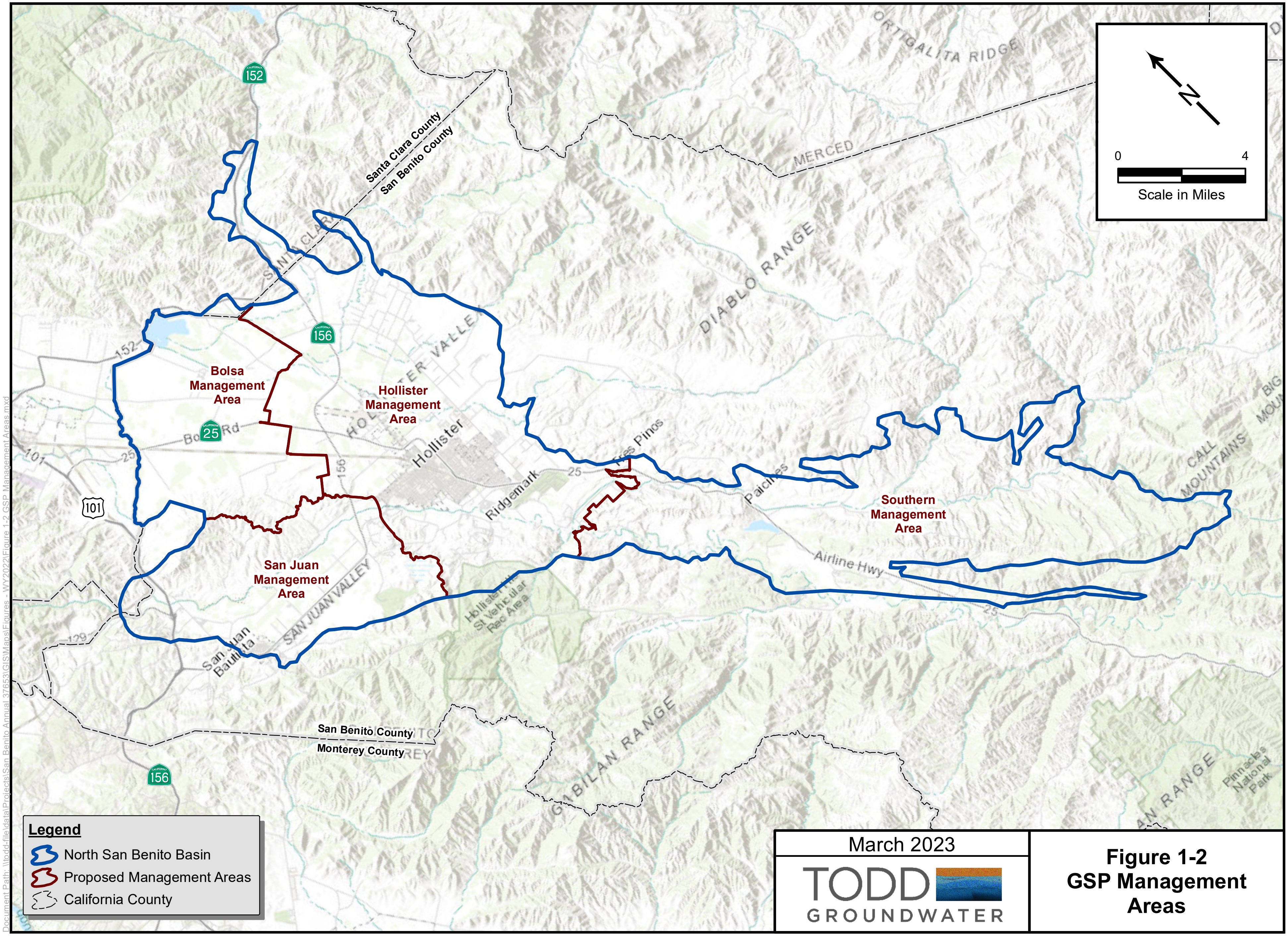
Acknowledgments

This report was prepared by Iris Priestaf, PhD, Maureen Reilly, PE, Gus Yates PG, CHG, Arden Wells, PG, and Chad Taylor, PG, CHG of Todd Groundwater. We appreciate the assistance of San Benito County Water District staff, particularly Jeff Cattaneo, Steve Wittry, Joyce Machado, and David Macdonald.



March 2023

Figure 1-1
North San Benito Groundwater Basin



March 2023

TODD GROUNDWATER

Figure 1-2
GSP Management Areas

Document Path: \\todd-file\data\Projects\San Benito Annual 37653\GIS\Maps\Figures - WY2022\Figure 1-2 GSP Management Areas.mxd

2 – GEOGRAPHIC AREA

This Annual Report describes conditions in the North San Benito Basin (Basin),[1] located predominantly in San Benito County with small areas in Santa Clara County. Consistent with the North San Benito GSP, it uses groundwater basin boundaries described in DWR Bulletin 118 (DWR 3-003.005), California's Groundwater Update 2020. In addition to Bulletin 118, the geographic areas and boundaries of local groundwater subbasins have been defined differently by SBCWD for its management purposes. The previous and current boundaries are described here to provide a bridge between previous annual reports and the current SGMA analyses and reporting.

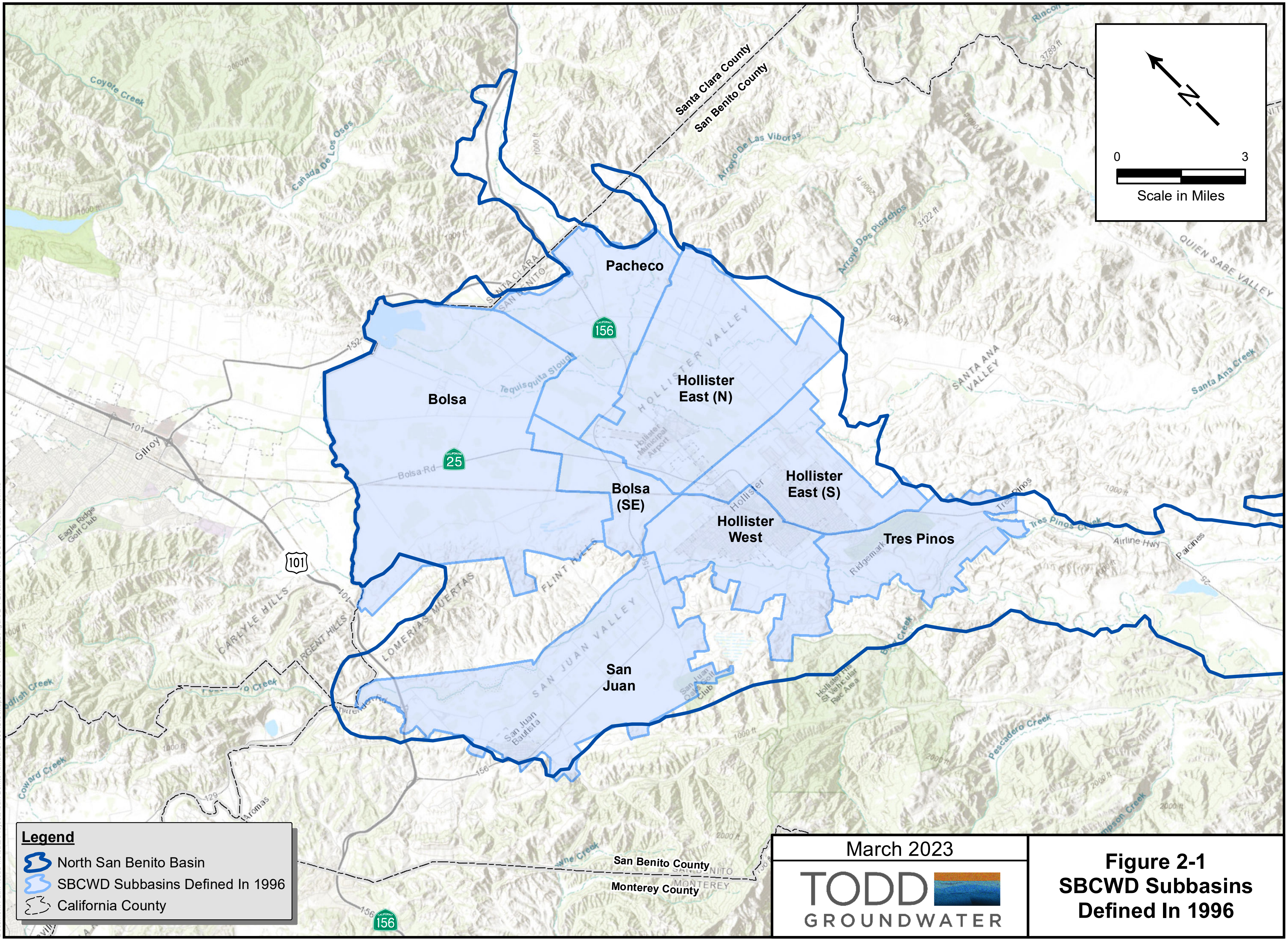
District-Defined Subbasins

Previous Annual Reports have used subbasins delineated in 1996 and based on hydrogeologic and other local factors, notably the boundaries of District zones of benefit (see Appendix A) including Zone 6, the area of benefit for importation of Central Valley Project (CVP) water. The 1996 SBCWD-defined subbasins are shown in **Figure 2-1**. Six of these subbasins were defined within Zone 6, including Bolsa Southeast (SE), Pacheco, Hollister East (North and South), Tres Pinos, Hollister West, and San Juan subbasins. The seventh is the Bolsa subbasin, the only 1996-defined subbasin that receives no direct CVP deliveries and relies on local groundwater. In this Annual Report, the SBCWD-defined subbasins are used to report data within Management Areas defined in the 2022 North San Benito GSP.

DWR-Defined Basin

As SGMA planning has proceeded, the area of focus for the annual reports has been changing from the 1996-defined subbasins to the North San Benito Basin area outlined in Figures 1-1 and 1-2. Next year, the 2022 Annual Report will report data only on the basis of the Management Areas (MAs), shown on Figure 1-2. The four MAs were defined in the North San Benito GSP to facilitate implementation. Major factors in defining the MAs within the Basin were watersheds and particularly, availability of water sources and zones of benefit. SBCWD provides local surface water from Hernandez and Paicines reservoirs to the zone of benefit, Zone 3, and provides CVP water to Zone 6. The District-defined subbasins also used Zone 6 as a boundary and thus generally fall within MA boundaries.

[1] The official name is North San Benito Subbasin of the Gilroy Hollister Basin, DWR Basin Number 3-003.05. For this report, it is referred to as North San Benito Basin to clearly differentiate it from previous DWR-defined and SBCWD-defined subbasins. As a matter of context, **Figure C-1** in **Appendix C** shows all DWR Bulletin 118 groundwater basins that are wholly or partially in San Benito County**.**



March 2023

TODD GROUNDWATER

Figure 2-1
SBCWD Subbasins Defined In 1996

The four Management Areas are listed below with the SBCWD-defined subbasins that they generally encompass:

- Southern MA
- Hollister MA (includes Tres Pinos, Hollister East and West, Bolsa SE, Pacheco subbasins)
- San Juan MA (includes almost all District-defined San Juan subbasin)
- Bolsa MA (includes almost all District-defined Bolsa subbasin)

Hollister and San Juan MAs include portions of Zone 6; Southern and Bolsa MAs do not.

Ongoing District Monitoring Programs

Data from monitoring programs undertaken by local, state, and federal agencies are summarized below as currently incorporated in the Annual Report. The District data compilation and monitoring programs are being expanded and revised as data needs are identified through the GSP process, for example to address topics such as potential groundwater dependent ecosystems, and to represent the entire North San Benito Basin with appropriate detail.

Climate. Climate data are regularly compiled from DWR's California Irrigation Management Information System (CIMIS) and include total solar radiation, soil temperature, air temperature/relative humidity, wind direction, wind speed, and precipitation. Additional precipitation data are available from the Western Regional Climate Center (WRCC) station at Hollister from 1934-2021 (WRCC, 2021). For the Annual Groundwater Reports, historical annual precipitation data have been compiled and reported using the Hollister rain gage for the long-term precipitation and the CIMIS San Benito station for recent monthly precipitation. Monthly precipitation and evapotranspiration for the Hollister #126 CIMIS station are tabulated in **Appendix B**.

Groundwater levels. SBCWD has had a semi-annual groundwater level monitoring program since Water Year (WY) 1977; groundwater level data gathered by the United States Geological Survey (USGS) and other agencies are available as early as 1913 (Clark, 1924). The Annual Groundwater Reports provide quarterly groundwater level data in **Appendix C** for each year. The data are the basis for groundwater hydrographs and for numerical model update with preparation of groundwater level contour maps, change maps, and storage change computations. The SBCWD monitoring program includes wells in the Pacheco Valley in Santa Clara County, while Valley Water's monitoring program has provided data for the southern Llagas Subbasin; the latter shared data are important to verify groundwater flow across the Llagas-North San Benito subbasin boundary. SBCWD reports water levels for SGMA Key Wells through the SGMA portal.

Reservoirs. The Annual Report summarizes reservoir water budget information for Hernandez, Paicines, and San Justo reservoirs and provides annual total releases from Hernandez and Paicines reservoirs from Water Year 1996 to present. Reservoir storage and release data are available in **Appendix D**.

Surface water flows and percolation. Surface water monitoring and percolation amounts are summarized in **Appendix D** of the Annual Groundwater Reports. For Water Year 1994 to present, percolation of imported CVP water is documented in **Table D-3** and percolation of wastewater is shown in **Tables D-4 and D-5**. The District temporarily suspended its surface water monitoring network but plans to relaunch surface water monitoring at selected sites as part of SGMA implementation.

Wells and groundwater pumping. SBCWD has monitored groundwater pumping in Zone 6 using electrical meters. Pumping amounts are calculated semiannually by metering the number of hours of pump operation and multiplying by the average discharge rate. However, other estimates of pumping have indicated that the power meters underestimate pumping. Irrigation pumping beyond Zone 6 is not monitored but has been estimated for regular water budget updates based on land use information and water use factors. This method of estimating groundwater pumping will be replaced as part of SGMA implementation. The District is currently investigating new water use monitoring programs (like OpenET) that will address the entire GSP area and will be documented in future Annual Reports. Estimation of groundwater pumping using the numerical model by major use category and MA is described in Section 5, which also provides information on CVP use in Zone 6 and recycled water use. **Appendix E** contains additional information on water use.

Water quality. In 1997, SBCWD initiated a program for monitoring nitrate and electrical conductivity (EC) in wells. In 2004, SBCWD established a comprehensive water quality database with records from all water systems and regulated facilities. State-wide sources of groundwater quality data include the Water Data Library (WDL), Geotracker/GAMA program, and the State Water Resources Control Board's Division of Drinking Water. The SBCWD database is updated and reviewed annually with detailed triennial assessment as described in the GSP; this Annual Report contains a section detailing the database update and a review of the water quality data. **Appendix F** contains additional information on water quality. Monitoring for the Salt and Nutrient Management Plan is closely coordinated with ongoing monitoring and Annual Report updates.

Units and accuracy. Throughout this report, water volumes and changes in storage are shown to the nearest acre-foot (AF). These values are accurate to one to three significant digits (depending on the measurement). All digits are retained in the text to maintain as much accuracy as possible during subsequent calculations, but results should be rounded appropriately.

3 – BASIN CONDITIONS

The Annual Report summarizes basin conditions including climate, groundwater elevations, groundwater storage, and groundwater level trends. Overall, Water Year 2022 was characterized by below average precipitation. As documented in Section 5, the allocations of imported CVP from the U.S. Bureau of Reclamation (USBR) also have been below average over the most recent two USBR water years (March 2021-February 2022 and March 2022-February 2023).

Climate

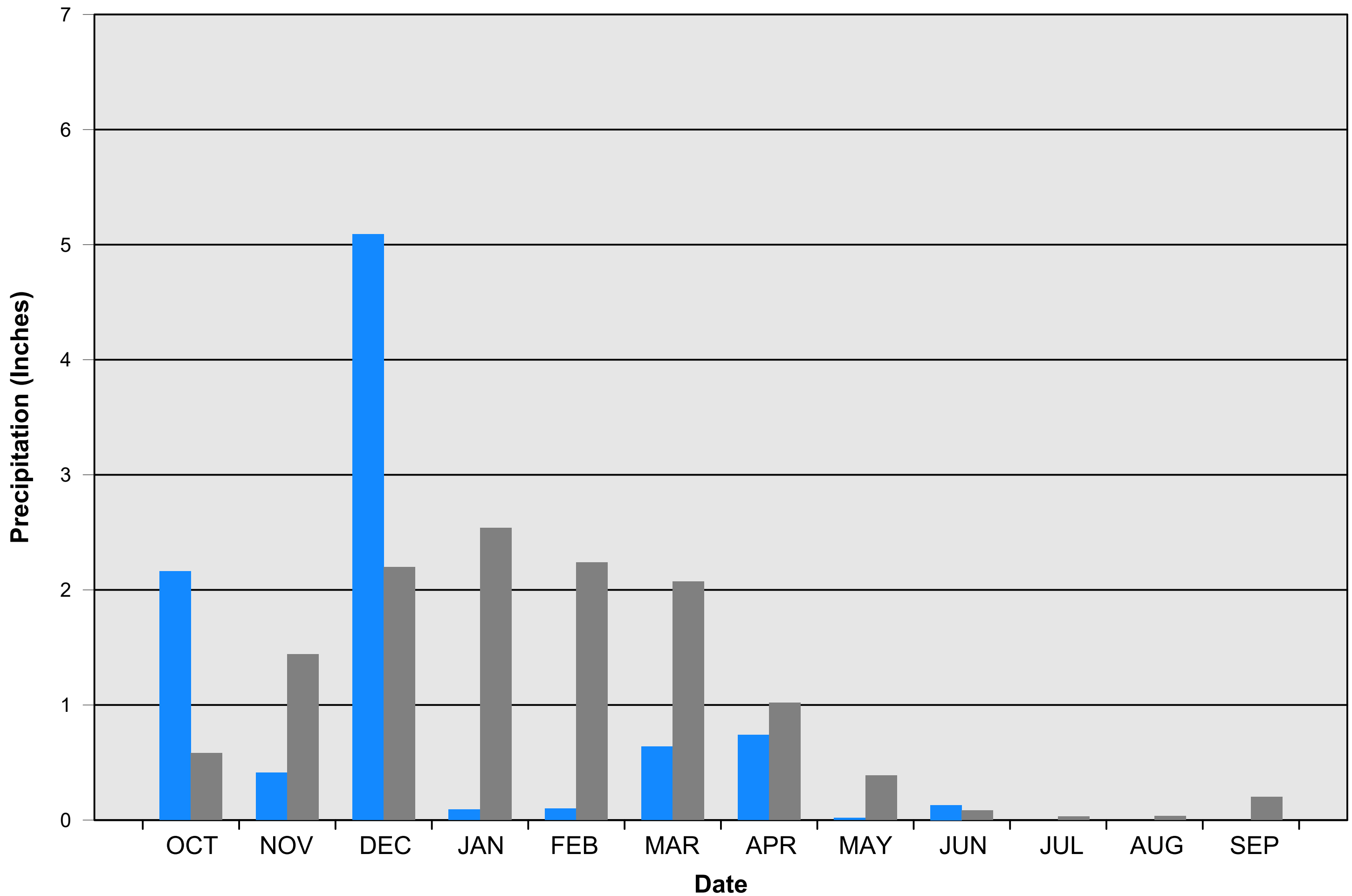
Assessment of climatic conditions begins with collection of climate data (rainfall and evapotranspiration), which are summarized in **Appendix B**. Local rainfall amounts are compiled on a monthly basis and reviewed as an increasingly variable factor that affects basin inflows (e.g., deep percolation) and outflows (groundwater pumping). Recognizing that drought often is extensive across Northern California, local dry years also may be indicative of regional drought and reduced CVP allocations. Dry years often are characterized by increased groundwater pumping for agricultural irrigation to offset lack of rainfall and CVP supply.

In 2022, overall precipitation was 9.38 inches; monthly totals are shown in **Figure 3-1.** October and December received higher than normal precipitation, but the rest of the months were very dry compared with expected totals. Monthly rainfall and evapotranspiration data from WY 1996 to WY 2022 are presented in **Appendix B**. Water year 2022 rainfall was below normal with only 73 percent of the long-term average, as illustrated in **Figure 3-2**, which shows annual precipitation and water year type from 1976 through 2022. Precipitation data collected to date (12.3 inches) indicate that WY 2023 may be an average or wet year. However, it is noteworthy that most of the precipitation occurred during a period of frequent and intense storm events. Consequently, the volume of precipitation may have resulted in more runoff that groundwater percolation.

Groundwater Elevations

In October 2022, SBCWD collected groundwater elevations in 168 wells from their existing network and 10 additional wells from Valley Water. **Figure 3-3** shows well locations in the current SBCWD monitoring network, and **Figures 3-4** through **3-8** show hydrographs for key wells in the basin with their respective minimum thresholds (MTs). Additional information is in Appendix C and water balance Section 5.

Over 2022, groundwater elevations declined slightly throughout most the Basin. This is the third year of groundwater declines. With two exceptions, groundwater elevations in key wells remained above their respective MT levels, and no MTs were triggered for an MA during the water year. The MTs, shown as red lines on the hydrographs, were developed in the GSP to assess sustainability and minimize any risk to nearby domestic wells of future low-water levels (see Section 7). This year’s declines in groundwater levels and storage signal continued drought conditions; groundwater levels may decline further with the reduced CVP allocations for this year and with uncertainty about next year’s allocations. SBCWD continues to implement projects that will speed recovery when water becomes available.



2022 - (9.38 in)

Average - (12.8 in)

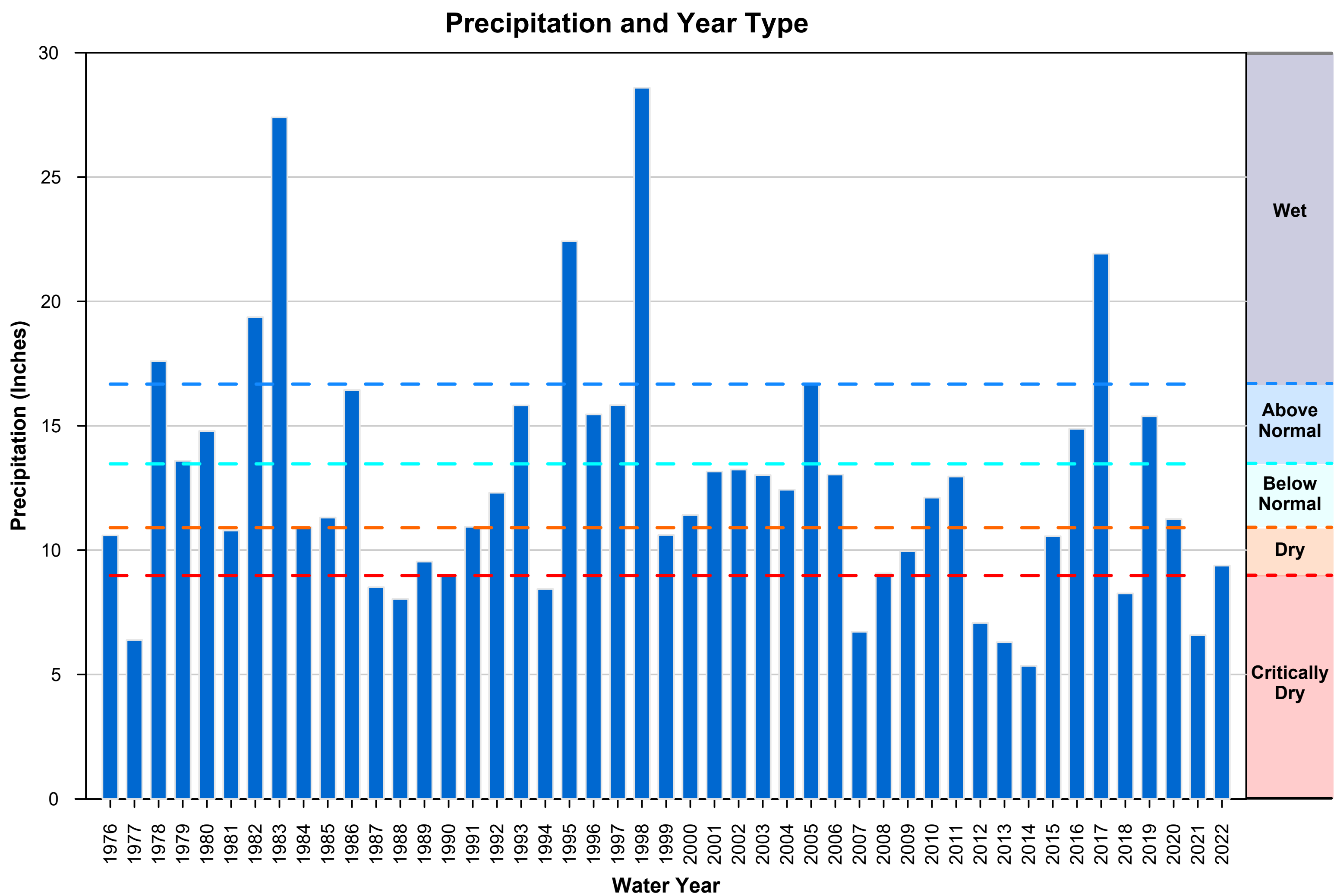
Source: CIMIS

March 2023

TODD GROUNDWATER

Figure 3-1
Water Year 2022
Precipitation

Path: \\todd-file\data\Projects\San Benito Annual 37653\GRAPHICS\WY2022\Figure 3-1 Water Year 2022 Precipitation.gpj



Source: WRCC Hollister 1 and Hollister 2 Stations

March 2023

TODD GROUNDWATER

Figure 3-2
Annual Precipitation
1976-2022

Path: \\todd-file\data\Projects\San Benito Annual 37653\GRAPHICS\WY2022\Figure 3-2 Annual Precipitation, 1976-2022.gpj

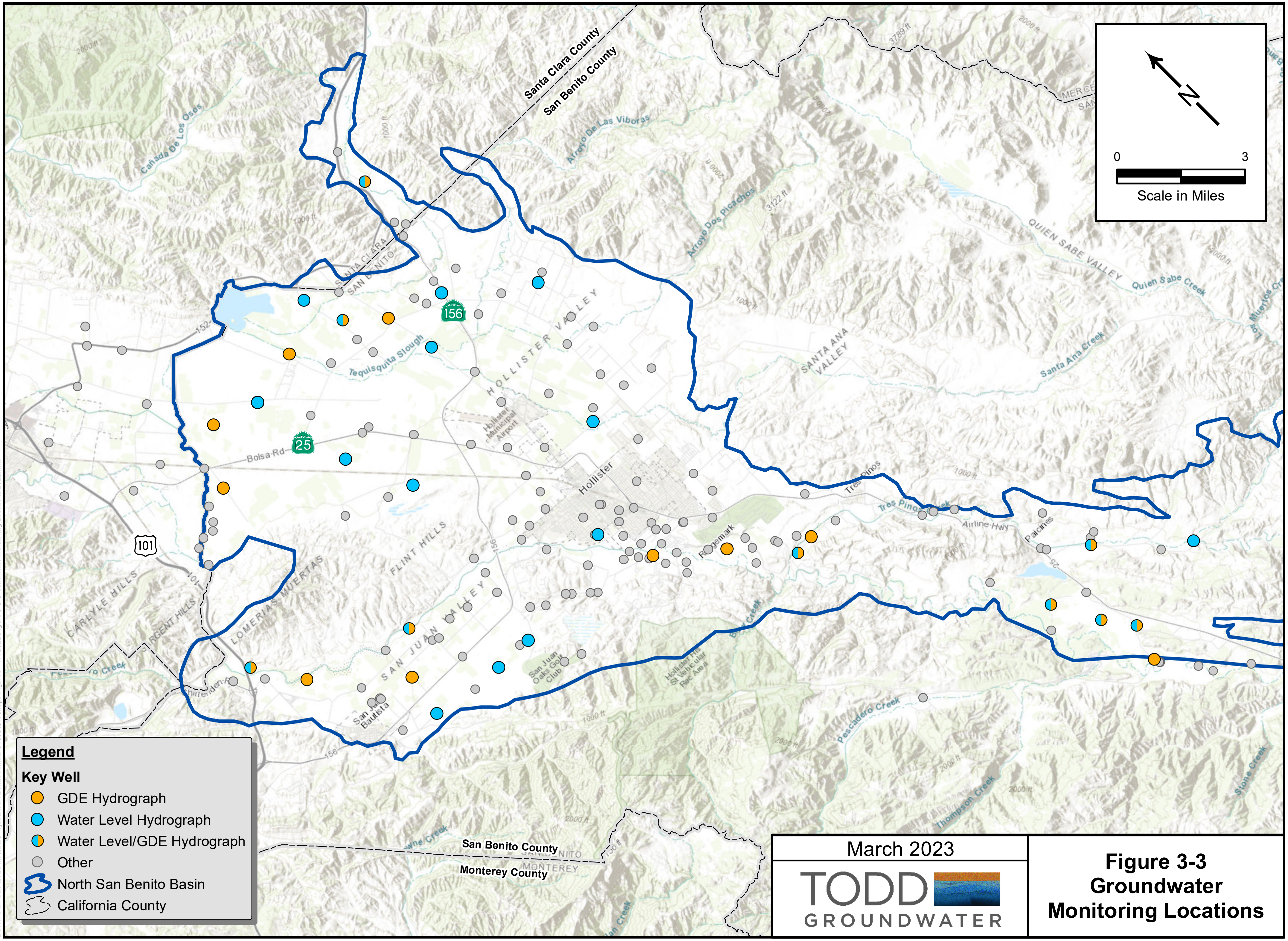


Figure 3-3
Groundwater Monitoring Locations

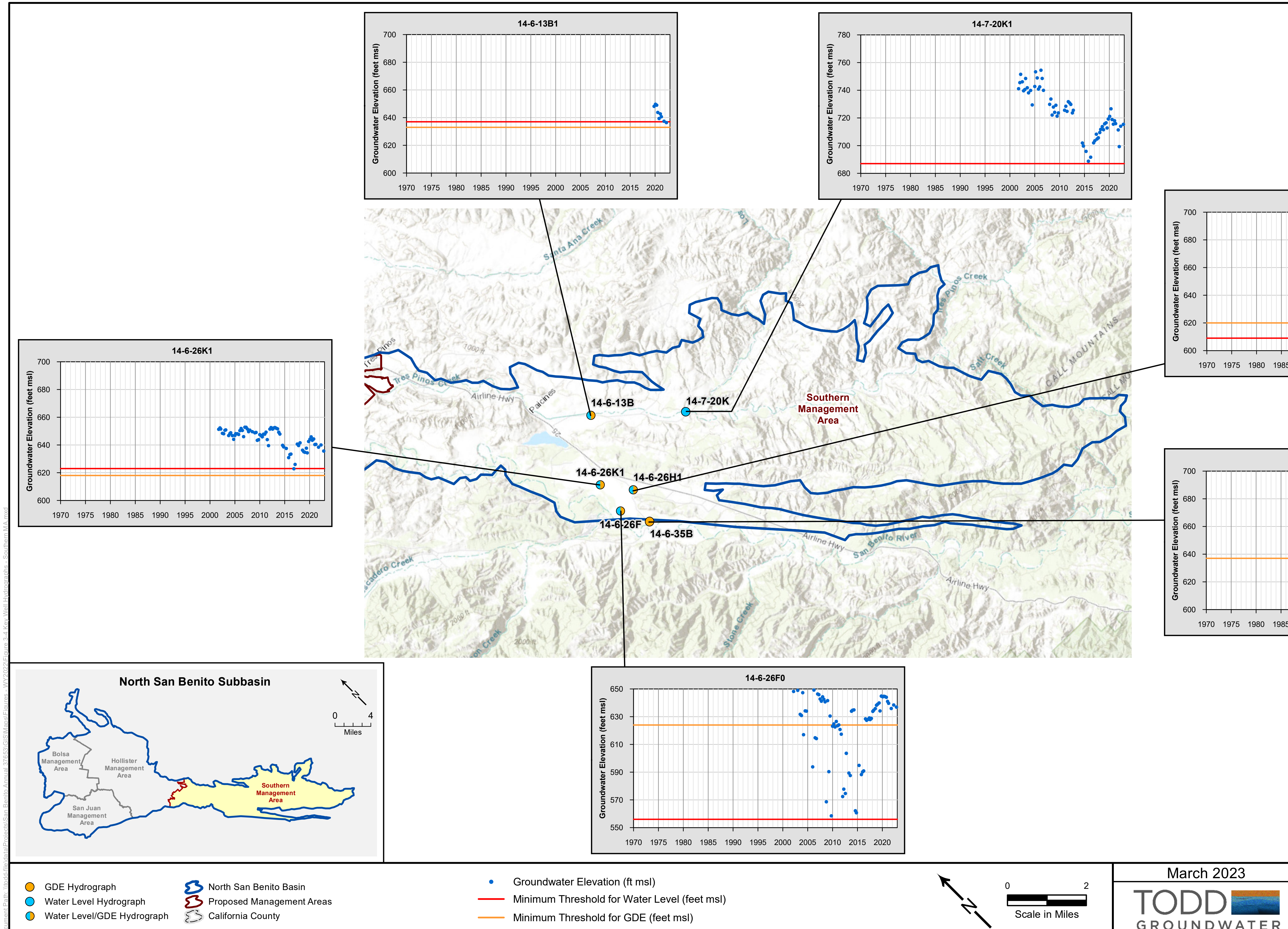
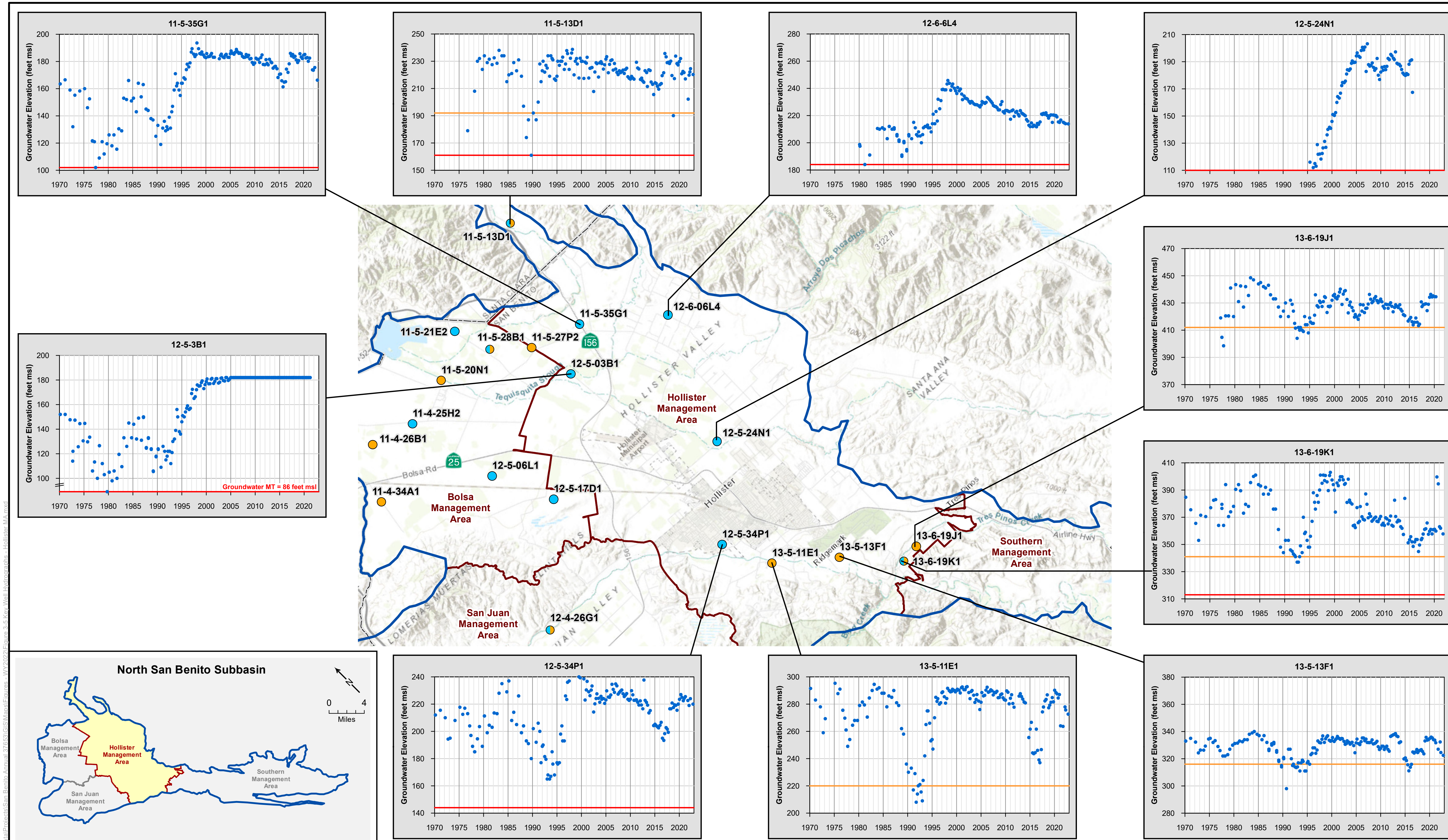


Figure 3-4
Key Well Hydrographs
Southern Management Area



GDE Hydrograph
Water Level Hydrograph
Water Level/GDE Hydrograph
North San Benito Basin
Proposed Management Areas
California County

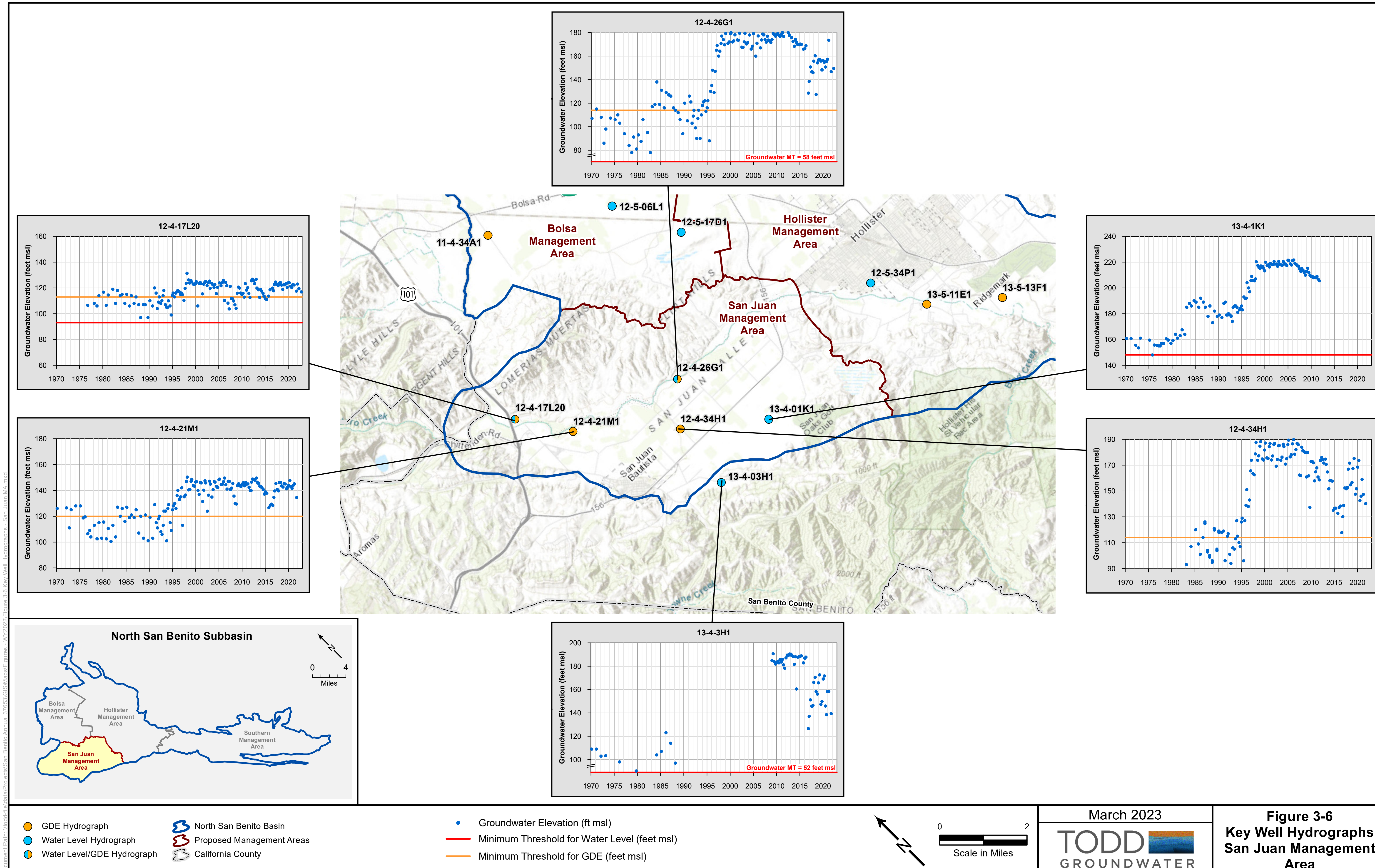
Groundwater Elevation (ft msl)
Minimum Threshold for Water Level (feet msl)
Minimum Threshold for GDE (feet msl)

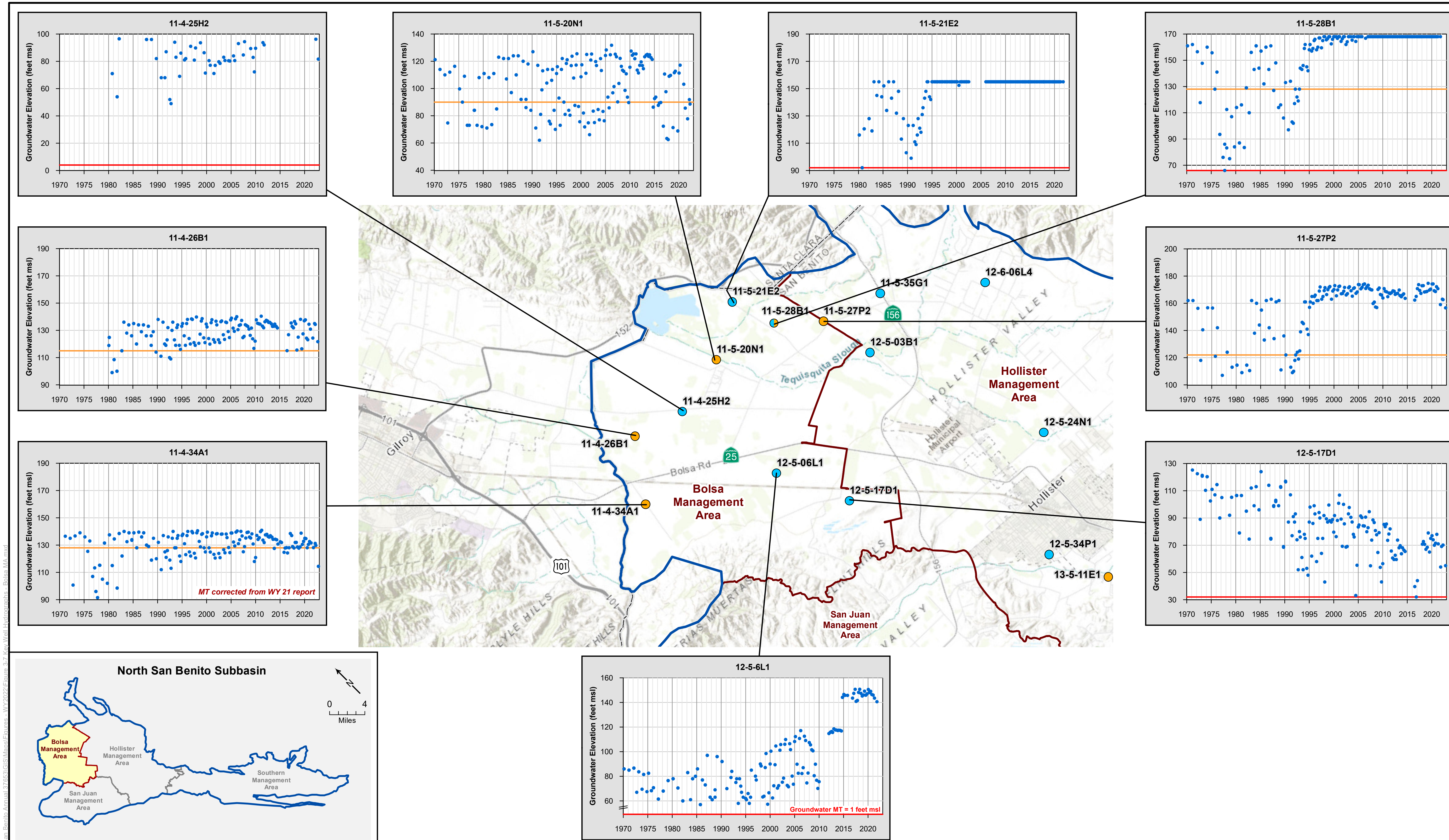
0 2
Scale in Miles

March 2023

TODD GROUNDWATER

Figure 3-5
Key Well Hydrographs
Hollister Management Area


12-4-26G1
Groundwater MT = 58 feet msl
12-4-17L20
12-4-21M1
13-4-1K1
12-4-34H1
13-4-3H1
Groundwater MT = 52 feet msl
Groundwater Elevation (feet msl)
12-5-06L1
11-4-34A1
12-5-17D1
Bolsa Management Area
Hollister Management Area
San Juan Management Area
12-5-34P1
13-5-11E1
13-5-13F1
12-4-26G1
12-4-17L20
12-4-21M1
12-4-34H1
13-4-01K1
13-4-03H1
San Juan Bautista
Hollister
San Benito County
North San Benito Subbasin
Bolsa Management Area
Hollister Management Area
San Juan Management Area
Southern Management Area
Miles
GDE Hydrograph
Water Level Hydrograph
Water Level/GDE Hydrograph
North San Benito Basin
Proposed Management Areas
California County
Groundwater Elevation (ft msl)
Minimum Threshold for Water Level (feet msl)
Minimum Threshold for GDE (feet msl)
Scale in Miles
March 2023
TODD GROUNDWATER
Figure 3-6
Key Well Hydrographs
San Juan Management Area



- GDE Hydrograph
- Water Level Hydrograph
- Water Level/GDE Hydrograph
- North San Benito Basin
- Proposed Management
- California County
- Groundwater Elevation (ft msl)
- Minimum Threshold for Water Level (feet msl)
- Minimum Threshold for GDE (feet msl)

0 2
Scale in Miles

March 2023

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Figure 3-7
Key Well Hydrographs
Bolsa Management Area

Groundwater Trends

Figures 3-4 through 3-7 shows hydrographs of key wells, illustrating long term groundwater elevation changes for the four MAs shown on the maps. As part of the GSP, a network of key wells was selected to monitor for sustainability. These wells were identified from the larger groundwater monitoring network based on length of record, location, continued monitoring, and proximity to water ways (for interconnected surface water key wells). There are 22 key wells to monitor regional groundwater levels (blue circles) and 19 key wells to monitor interconnected surface water / Groundwater Dependent Ecosystems (GDEs; orange circles). These two data sets overlap; eight wells are both groundwater level and interconnected surface water/GDE key wells (blue and orange circles). The MTs set in the GSP to determine chronic lowering of water levels are shown as red lines and MTs that serve as a proxy for interconnected surface water/GDEs are shown as orange lines.

Southern Management Area. Although the District has monitored selected wells in the Southern MA since 2001, elevation data remain limited throughout the MA. The five key wells for water levels and one key well for interconnected surface water are shown on **Figure 3-4**. Because of topography and groundwater flow direction, water levels in the Southern MA are about 400 feet higher than those in the Hollister MA, about nine miles away. Well 14-7-20K shows that water levels reached a local maximum during 2006, decreased to a local minimum during the drought in 2013-2015, and recovered through 2019. In 2022 groundwater levels declined slightly, but the decrease is within the range of normal fluctuations for this well. In general, the pattern of water level change over time observed in 14-7-20K, including decline since 2020, is similar to that of other wells in Southern MA.

Hollister Management Area. As shown on **Figure 3-5,** the Hollister MA has six key wells for tracking groundwater levels, three wells for tracking interconnected surface water, and one additional well serving both. One key well, 12-5-03B1, is a flowing artesian well under similar conditions as artesian wells in the Bolsa MA. The hydrographs for wells 11-5-35G and 12-5-24N1 in the north and central portions of the MA exemplify the recovery experienced in the 1990s and early 2000s with the introduction of CVP water for agricultural irrigation. Review of most of the hydrographs indicates that groundwater levels have generally plateaued, declining slightly in drought and rebounding in wet years with sufficient CVP allocation. Since 2020, and continuing through 2022, groundwater levels generally have declined but remain above historical lows. Well 12-6-06L4 near Pacheco Creek and Well 13-6-19K1 near Tres Pinos Creek show declining trends distinct from other wells in the MA. These trends could reflect decreased stream recharge or inflow from upgradient groundwater, or locally increased pumping. Well 13-6-13F1 shows recent declines such that groundwater levels are only slightly above the MT for interconnected surface water/GDEs.

San Juan Management Area. Figure 3-6 shows the locations in San Juan MA and hydrographs for six key wells two for tracking groundwater levels, two for interconnected surface water, and two for tracking both. Groundwater elevations generally peaked around 2005-2010 with subsequent declines especially in the eastern MA. Nonetheless, groundwater levels remain above historical lows. When available, managed recharge of CVP water at the ponds near the Hollister WRP will help in managing groundwater levels. The westernmost key well 12-4-17L20 (located along the San Benito River) shows more stable groundwater elevation with levels in WY 2022 showing a slight decrease but still remaining higher than observed lows during the previous drought (2015). However, groundwater levels in this well are close to the MT for interconnected surface water/GDEs and spring 2023 levels will be reviewed promptly.

Bolsa Management Area. As shown on **Figure 3-7**, the Bolsa MA has five key wells for tracking groundwater levels, four key wells for monitoring interconnected surface water/GDEs, a one for both purposes. Two key wells are currently flowing artesian wells (11-5-21E2 and 11-5-28B1). These artesian conditions reflect local confined conditions created by clay layers in the northern Bolsa and Hollister MAs. Groundwater elevations increased from 1992 until about 1998, when levels were pressurized to above the ground surface. While the groundwater pressure head above the ground surface elevation may vary in artesian wells, artesian groundwater levels are challenging to measure. Consequently, all artesian wells in the San Benito are recorded as having a groundwater elevation at ground surface elevation. Water levels in most of the key wells show a generally level trend, albeit with differing magnitudes of variability that likely reflect varying degrees of confinement and responses to pumping. While groundwater elevations in well 12-5-06L1 show an increasing trend, well 12-5-17D1 shows a gradual decreasing trend. The different trends in these wells, located within two miles from each other, likely reflect changing land use and pumping patterns. Groundwater levels in well 11-4-34A1 continues to show decreases; this is a key well for interconnected surface water/GDEs, and spring 2023 groundwater levels will be reviewed without delay.

District Act Determination of Overdraft. The District Act (see **Appendix A**) requires presentation of estimates of annual overdraft for the current water year and ensuing water year. Consistent with previous Annual Reports, this would be represented by long-term groundwater level declines with accounting for rainfall conditions and CVP imports. As of 2022, groundwater elevation trends do not indicate overdraft and overdraft is not anticipated for the remainder of 2022 and 2023.

Groundwater Quality

A water quality analysis is included in the North San Benito Annual Reports triennially. This analysis serves to provide a summary of the basin conditions and identify trends in water, in compliance with the Salt Nutrient Management Plan and the SGMA GSP. This is the first triennial groundwater quality analysis in a North San Benito Annual report since the implementation of the GSP.

The San Benito County Water District water quality database contains data from monitored wells, regulated facilities, and public water systems. This database was created in 2004 with a State Local Groundwater Assistance Grant, and it is updated every three years. Water quality data for 2020-2022 were added to the database from the District, Regional Water Quality Control Board (regulated facilities and the Ag Lands program), California State Water Resources Control Board Division of Drinking Water (Community Water Systems), United States Geologic Survey, and City of Hollister. The 2022 District Water Quality Database currently contains over 556,000 records (ranging from 1931 to December 2022) from over 2,000 monitored locations and 173 water systems or regulated facilities.

3 – BASIN CONDITIONS

To document how water quality has changed over time, the District has regularly monitored a distributed network of wells. **Figure 3-8** shows the locations of the monitored wells and Nested Well sampled by the District. Six SBCWD wells (Deep Well 1 through Deep Well 6) were drilled in 2021 as part of the SGMA Round 3 monitoring well installation program, and they have been added to the Monitoring Network.

As shown in **Figure 3-8**, SBCWD has monitored 20 existing dedicated monitoring wells (including all five depths of the nested well) and six new dedicated monitoring wells during 2020 through 2022. Additionally, SBCWD sampled water quality from 19 other wells in the Basin and the City of Hollister monitored three wells in the basin, shown as black dots in **Figure 3-8**. Data from the District's water quality monitoring program for TDS and nitrate is available in **Appendix F.**

Key Constituents

Groundwater quality in the North San Benito Basin reflects both native conditions and anthropogenic processes. Both the North San Benito GSP and the SNMP developed basin-specific plan objectives. Both plans identified Nitrate (as NO3) and Total Dissolved Solids (TDS) as the constituents of concern (COCs). These are used as indicators of overall groundwater quality in the Basin. Both TDS and nitrate concentration data are available for basin inflow and outflows. Total dissolved solids and nitrate concentrations vary with depth, temporally, and spatially, and they are indicators of the overall changes in groundwater quality throughout the Basin.

Total dissolved solids, a measurement of groundwater salinity, can indicate anthropogenic impacts, including the infiltration of urban runoff, agricultural return flows, and wastewater disposal. The North San Benito Basin naturally has an elevated TDS concentration in groundwater, with high concentrations reported since the 1930s. These salinity concentrations are likely due to marine sediments in the Basin.

Nitrate (NO_3) is the most common form of nitrogen detected in groundwater. Natural nitrate concentrations are typically low, and elevated nitrate concentrations are often due to agricultural activities, septic systems, confined animal facilities, landscape fertilization, and wastewater treatment facility discharges. Locally elevated nitrate concentrations are recognized as a long-term concern in the Basin. From 2020-2022, all nitrate measurements were reported as nitrate as nitrogen (Nitrate as N) and converted to nitrate as nitrate (Nitrate as NO3) for analyses.

While TDS and nitrate were selected as constituents of concern, several other constituents continue to be monitored given the possibility that future changes in basin management might affect concentrations. These include the perchlorate, selenium, hardness, boron, arsenic, hexavalent chromium, manganese, and iron. The source of each of these constituents varies. Perchlorate is an anthropogenic contaminant associated with regulated facilities. While selenium naturally occurs in North San Benito Basin groundwater at low concentrations, it has been affiliated with regulated facilities in the North San Benito Basin. The metals (i.e., arsenic, hexavalent chromium, manganese, and iron) are naturally occurring in groundwater. Hardness is closely affiliated with TDS concentrations, and boron concentrations are closely linked to geologic conditions. The water quality standards are listed in **Appendix F**.

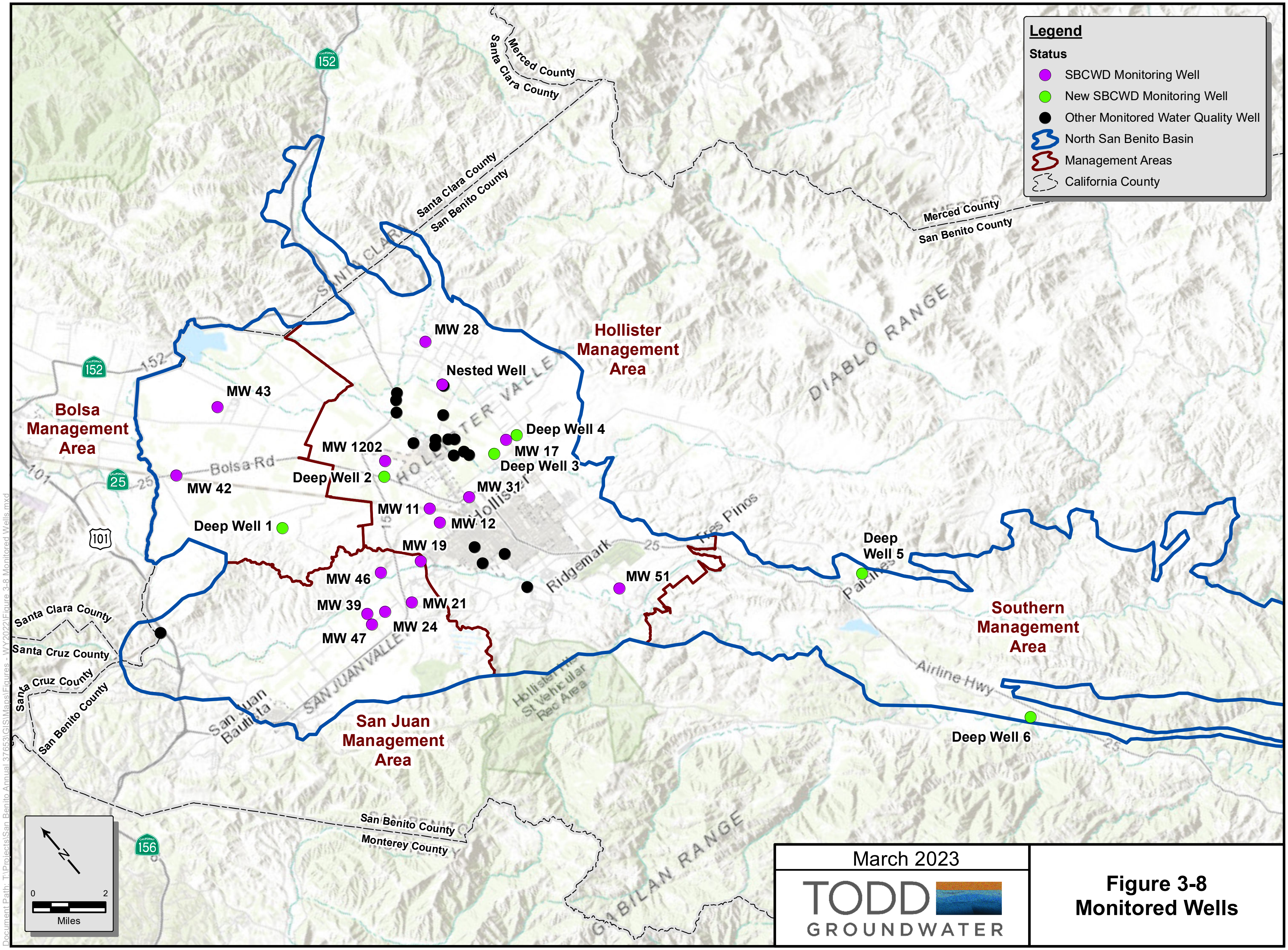

Figure 3-8
Monitored Wells

Sustainable Management Criteria for Groundwater Quality

Sustainable management, as defined by SGMA, is the use and management of groundwater without causing undesirable effects. For groundwater quality, SGMA defines undesirable results as significant and unreasonable adverse impacts to groundwater quality caused by GSA projects, management actions, or other management of groundwater such that beneficial uses are affected or well owners experience an increase in operational costs.

Management criteria for groundwater quality were developed within the context of historical, existing, and potential future conditions for each management area in North San Benito. The Basin has poor native conditions, with high levels of TDS, boron, iron, and manganese, due to its geologic setting. It also has a long history of salt and nitrate loading to shallow zones of the aquifer. North San Benito is a deep alluvial basin, and it could take several decades for solute loading at the land surface to noticably affect deep groundwater quality. Consequentially, observed changes in groundwater quality may not reflect current, improved land use practices or management activities.

The sustainability goal is to protect groundwater and prevent circumstances where future management activities may degrade groundwater quality. This could occur if groundwater levels change and thereby induce leaching or vertical migration of poor quality groundwater, if areal migration of poor quality groundwater is induced by pumping, or if groundwater quality degradation is associated with recharge or wastewater discharge projects.

Sustainable management of the North San Benito Basin focuses on the two key constituents, TDS and nitrate, as indicators of groundwater quality degradation. As described in the GSP, the triennial analysis of TDS and nitrate is used to determine if degradation is occurring. The GSP established Minimum Thresholds (MTs) for both TDS and nitrate based on the General Basin Plan Objectives developed in the SNMP.

The minimum threshold (MT) for TDS for each MA is defined in the GSP as the percentage of wells with concentration exceeding the TDS value of 1,200 mg/L, based on water year 2015 to 2017 conditions. The minimum threshold (MT) for nitrate for each MA is the percentage of wells with concentrations exceeding the nitrate (as NO_3) MCL (45 mg/L) based on 2015-2017 conditions. **Table 3-1** shows the minimum threshold for nitrate and TDS for each MA in 2015-2017. For wells with at least three measurements between 2015-2017, the median concentration of TDS or nitrate was used, and the average measurement was used for wells with two measurements.

As discussed in the GSP, if a triennial update shows that TDS or nitrate concentrations are greater than the minimum thresholds, it will lead to an evaluation of whether the degradation is likely caused by GSA management activities, legacy loading, or a changing dataset.

This Annual Report presents water quality results for 2020-2022 with comparison to the 2015-2017 MT concentrations, as documented in the GSP. Data for the intervening period, 2017-2019, are presented in the 2019 Annual Report.

3 – BASIN CONDITIONS

Table 3-1. Minimum Threshold- Percent Wells with Concentration over MCL, 2015-2017

Key Constituent	MCL and Plan Objective	Minimum Threshold- Percent Wells with Concentration over Objective 2015-2017			
		Bolsa MA	San Juan MA	Hollister MA	Southern MA
TDS	1,200 mg/L	26%	45%	24%	27%
Nitrate as NO3	45 mg/L	11%	26%	14%	5%

Key Constituents Results

In total, 171 wells were monitored for nitrate and 265 wells were monitored for TDS between 2020-2022 (**Table 3-2**). Water quality samples from regulated facilities were excluded from the analyses as these are generally from shallow wells that do not represent the regional trend. More wells are shown to have been sampled for TDS than nitrate. This is a consequence of using data from multiple sampling programs. In brief, many of the 212 wells sampled through the Irrigated Lands Regulatory Program (Aglands) were analyzed for combined nitrate and nitrite as nitrogen concentration instead of nitrate. While nitrate and nitrite as nitrogen can be used as a proxy for nitrate concentrations (nitrate is the dominant form of nitrogen in most groundwater environments), the nitrate analyses in this report only used nitrate as NO3 or nitrate as N measurements.

Table 3-2. Triennial Update Data Set, Number of Wells with Nitrate or TDS Data, 2020-2022

Constituent	Number of Wells with Data, 2020-2022				
	Bolsa MA	San Juan MA	Hollister MA	Southern MA	Total
Nitrate	8	61	85	17	171
Total Dissolved Solids	23	79	135	28	265

Figures 3-9 and **3-10** illustrate the distribution of TDS and nitrate concentrations, respectively, in the North San Benito Basin. The median concentration is shown for wells with at least three monitoring events from 2020-2022, and the average is shown for wells with two monitoring events during this period.

Average constituent concentrations can provide a snapshot of groundwater quality in each management area over the past three years (**Table 3-3**). To calculate these values, the median concentration was calculated for each well, and then the average of those values was calculated for each management area. In short, **Table 3-3** is the average of the values shown in **Figures 3-9** and **3-10** for each management area.

Table 3-3. Average Constituent Values in Management Areas, 2020-2022

Management Area	Total Dissolved Solids mg/L	Nitrate (As NO3) mg/L
Bolsa	717	11
Hollister	930	21
San Juan	1,273	30
Southern	800	3

Table 3-4 shows the percentage of wells with median TDS concentrations greater than 1,200 mg/L during 2020-2022 and the percentage of wells with nitrate (as NO3) concentrations greater than 45 mg/L. These values were calculated using the same methods used to calculate **Table 3-1**, and they can be directly compared to the minimum thresholds for groundwater quality set by the GSP.

Table 3-4. Percent Wells With Concentrations over Plan Objective, 2020-2022

Key Constituent	MCL and Plan Objective	Minimum Threshold- Percent Wells with Concentration over Plan Objective, 2020-2022			
		Bolsa MA	San Juan MA	Hollister MA	Southern MA
TDS	1,200 mg/L	9%	54%	22%	7%
Nitrate as NO3	45 mg/L	0%	20%	11%	0%

Time concentration plots in **Figure 3-11** and **3-13** show TDS and nitrate concentrations in selected monitored wells over the past 17 years. The monitored wells plotted were selected to represent the general water quality areas across the Basin and over the past 45 years; all water quality data collected by the District can be reviewed in **Tables F-1 and F-2** in **Appendix F**. It should be noted that some wells are characterized by very poor groundwater quality (e.g., Table F-2 Nitrate, MW-24 and MW-31) and are documented in Appendix F only because the poor quality is localized, attributed to a specific source or zone, and not representative.

Total Dissolved Solids

As shown in **Table 3-3** and illustrated in **Figure 3-9**, highest TDS concentrations generally are in the San Juan and Hollister Management Areas. These are also the MAs with the highest density of monitored wells, reflecting the intensity of groundwater development (including for domestic and municipal uses) and the recognition of TDS sources including wastewater discharges. The average TDS concentration was above the lower secondary maximum contaminant level (SMCL) of 500 mg/L in every MA. In the San Juan MA, the average TDS concentration (1,273 mg/L) was greater than the General Basin Plan Objective of 1,200 mg/L. However, this 2020-2022 average concentration is lower than the average TDS concentrations in the San Juan MA for 2015-2017 (1,806 mg/L) and 2017-2019 (1,417 mg/L). This suggests progressive improvement.

Figure 3-9 indicates that TDS concentrations are highest in western Hollister MA and along the San Benito River in Hollister and San Juan MAs, the latter reflect in part legacy municipal wastewater discharges. These discharges have been and are being addressed through the Hollister Urban Area Water and Wastewater Master Planning Project initiated in 2004 (see GSP Section 8.5.1 for project description). This project and the subsequent San Benito Regional Urban Area master planning have included major capital projects to improve wastewater treatment in the Hollister and San Juan MAs, improve quality of delivered municipal supply (thereby also improving wastewater quality) and expand water recycling (which also reduces wastewater discharges).

Figure 3-11 presents time-concentration plots for six District-monitored wells distributed across the Basin (see Figure 3-8). These wells do not show significant increases in TDS during the 2020-2022 period. TDS concentrations in the wells MW-43, MW-51, and MW-17 remained relatively steady from 2020-2022. The plot for Well MW-39, in the San Juan MA, shows an increasing trend since 2002 but a decreasing to stabilizing trend from 2017 to 2022.

With the exceptions of Wells MW-17 and MW-43, the TDS concentration plots for show high variance (e.g., plots for MW-19 and MW-28). The variance in TDS could be due to sampling methods, such as the length of time that the well is pumped prior to sampling. Some of the outlier low values (e.g., less than 400 mg/L) are anomalous as are several high values, such as the May 2021 value from MW-19. The District should adopt a Quality Control process to review data received from the laboratory. Water quality concentrations should be reviewed and if they represent a higher than anticipated value the District should confirm with the lab and resample the well immediately to confirm.

Figure 3-12 presents time-concentration plots for six SBCWD monitoring wells in the San Juan MA, which is characterized by relatively high TDS. Plots for several wells (MW-24, MW-47, MW-21) demonstrate improvement (lower TDS) over the period of record; this improvement reflects the capital projects of the Hollister Urban Area Water and Wastewater Master Planning Project. While acknowledging variance and several probable outliers, the plots indicate relatively stable TDS concentrations from 2017 to 2022.

A comparison of **Tables 3-1** and **3-4** show that the percent of wells in each MA with TDS concentrations greater than 1,200 mg/L was lower in the Bolsa, Hollister, and Southern MAs in 2020-2022 than in 2015-2017. The TDS concentrations in these MAs are in compliance with the MT defined by the GSP.

In San Juan MA, the percent of wells with TDS concentrations greater than 1,200 mg/L during 2020-2022 (54 percent) is greater than the MT (45 percent, based on 2015-2017 conditions). This presents an apparent inconsistency with the TDS plots for SBCWD monitoring wells that indicate improving water quality.

The difference between the TDS concentrations in 2020-2022 compared to those in 2015-2017 may be due to different datasets. During 2020-2022, 79 wells were sampled for TDS in the San Juan MA. In contrast, 63 wells were sampled for TDS in 2015-2017. Many of the wells sampled in the San Juan MA during 2020-2022 were part of the Irrigated Lands Program (Aglands), which primarily samples irrigation and domestic wells. Most of these wells were sampled only once during 2020-2022, and many were new to the database. While these wells are important to monitor, they are generally more shallow wells that are more likely to have high TDS concentrations than public supply wells or dedicated deep monitoring wells. During 2020-2022, 49 of the 79 wells in the San Juan MA that reported TDS concentrations were from the Aglands monitoring program. Out of the 43 wells in this MA with TDS concentrations greater than 1,200, 30 (70 percent) were from the Aglands monitoring program. Two out of six of the SBCWD monitoring program monitored wells (33 percent) showed TDS concentrations greater than 1,200 mg/L in the San Juan MA. This indicates a skew in the more recent data toward wells with relatively shallow, poor-quality water.

Figure 3-12 is a time-concentration plot for the six dedicated monitoring wells in the San Juan MA (MW-19, MW-21, MW-24, MW-39, MW-46, and MW-47). Plots for several wells (MW-24, MW-47, MW-21) indicate improvement (lower TDS) over the period of record and relatively stable TDS concentrations from 2015 to 2022. Some wells, like MW-19 and MW-24, show single measurements that are higher than recent years, but the overall concentrations do not show an increasing trend. Wells MW-24, MW-47, and MW-21 show decreasing trends over the past 20 years, with stable concentrations in recent years.

Most of the wells with high TDS concentrations in the San Juan MA were monitored through the Aglands program and are not regularly monitored, reflecting a changing dataset from the GSP analysis. The six dedicated SBCWD monitoring wells in the San Juan MA do not show increasing TDS concentrations. These two factors suggest that the MT exceedance is an artifact of the data and is not due to management actions.

Nonetheless, it remains important that most wells in the San Juan MA showed TDS concentrations greater than the 1,200 mg/L objective and that comprehensive monitoring is important to support basin management. Through the San Benito Regional Urban Area master plan, SBCWD and its agency partners (City of Hollister, City of San Juan Bautista, Sunnyslope County Water District) are implementing capital projects that will help improve local groundwater quality in terms of TDS.

Nitrate as NO3

Table 3-3 and **Figure 3-10** show that nitrate concentrations are lowest in the Southern MA and highest in the San Juan MA. None of the MAs have an average groundwater concentration greater than the 45 mg/L MCL. In total, 21 out of 171 wells (12 percent) in the Basin had a median nitrate concentration greater than 45 mg/L.

Elevated nitrate in groundwater is often due to fertilizer application and wastewater disposal, so shallow wells typically have higher nitrate concentrations than deeper wells. Many of the wells with high nitrate concentrations observed in the San Juan MA (Well MW-31, for example) are down-gradient of wastewater disposal.

Figure 3-13 shows Nitrate as NO3 concentrations over time for six District-monitored wells distributed across the Basin (see Figure 3-8). In 2020-2022, wells MW-19, MW-28, MW-43, and MW-51 showed stable nitrate concentrations. MW-39 has had decreasing nitrate concentrations since 2016, that appeared to stabilize at about 19 mg/L nitrate as NO3. The nitrate concentrations in MW 17 appeared to increase from May 2020 to May 2021 after showing declining nitrate concentrations from 2014 to November 2019. None of these SBCWD monitoring wells showed nitrate concentrations greater than the 45 mg/L MCL after 2017.[2]

Table 3-4 shows that the percent of wells with median nitrate concentrations over 45 mg/L was lower in every MA during 2020-2022 than in 2015-2017. All MAs are in compliance with the MT for nitrate. It is worth noting that the nitrate dataset during this triennial report is smaller than that of the 2015-2017 report. During 2020-2022, 171 wells had nitrate sampled, and during 2015-2017, 256 wells had nitrate sampled. The Bolsa MA had 35 wells with nitrate measurements in 2015-2017, while only 8 wells in the Bolsa MA reported nitrate measurements in the past 3 years. Because many of the Aglands wells did not have nitrate as NO3 measured during 2020-2022 (only nitrate and nitrite as N, which was excluded from nitrate analyses), this may have reduced the proportion in the dataset of shallow wells, which are more vulnerable to high nitrate concentrations. If Aglands data continues to be reported as Nitrate + Nitrite, future reports should consider using this data and converting the concentrations to Nitrate only for comparison.

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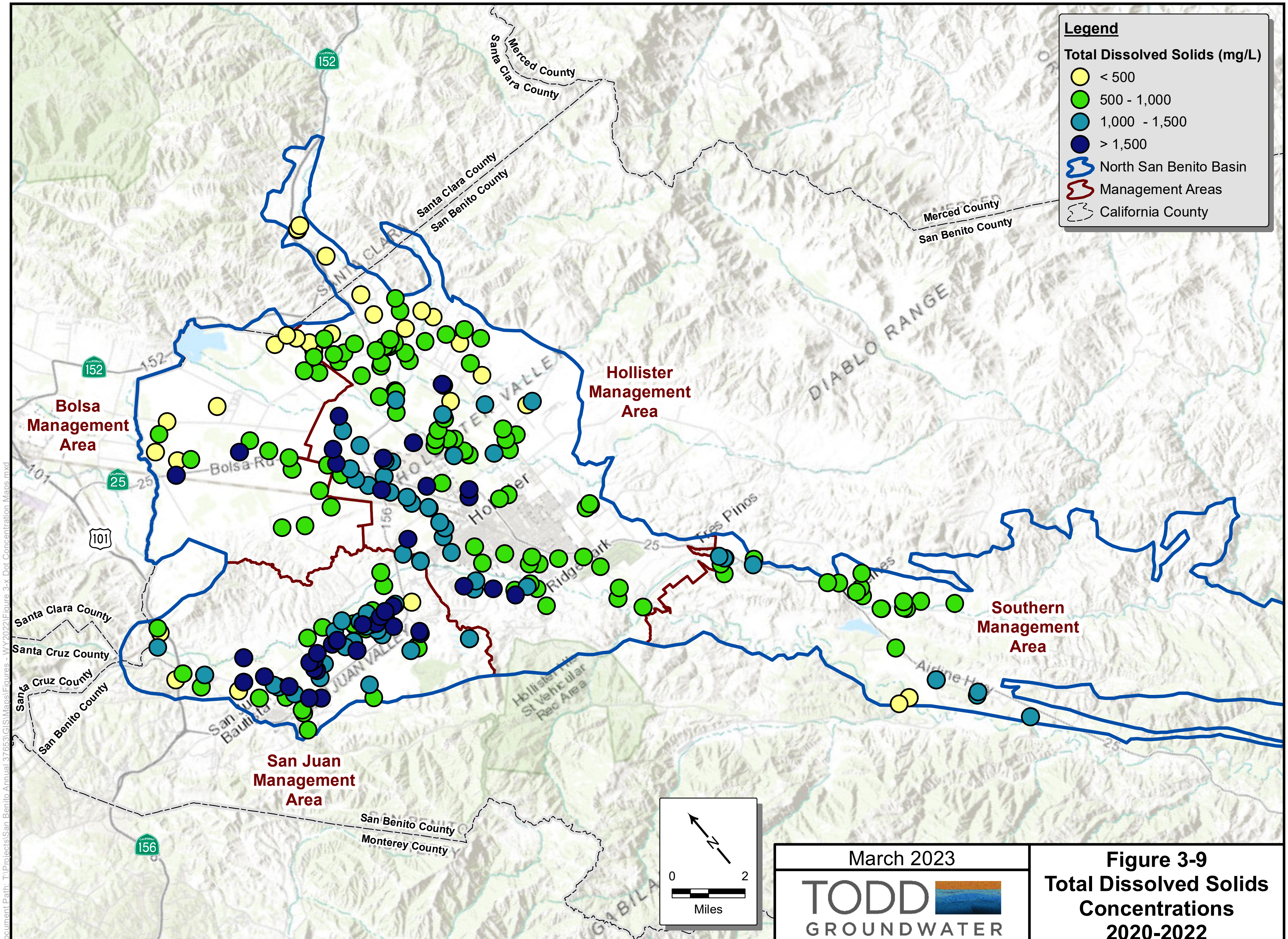
[2] Two wells (MW-24 and MW-31) documented in Appendix F Table F-2 show very high nitrate (>200 mg/L) but this poor quality is localized and attributed to a nearby specific source.

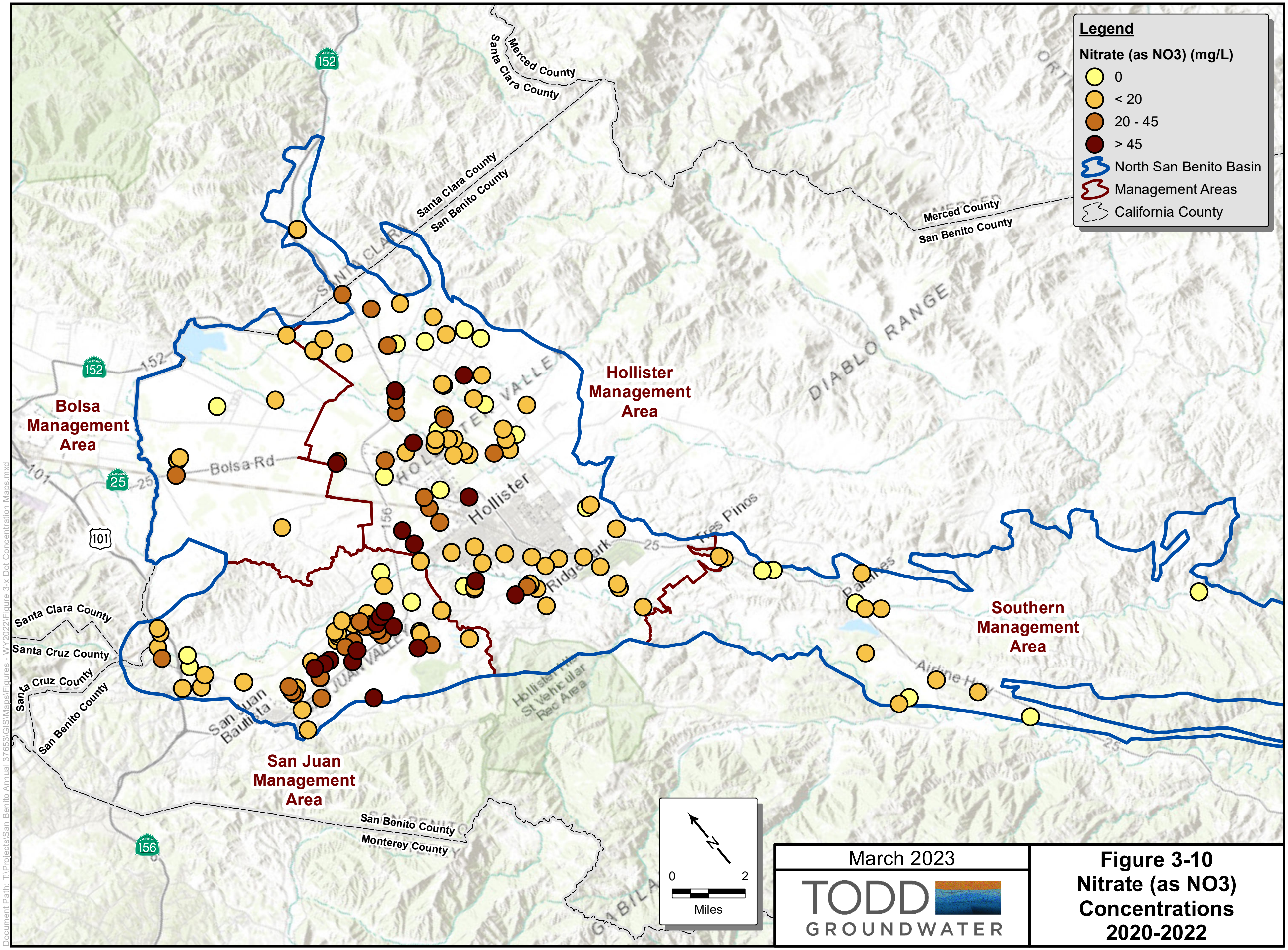


March 2023

TODD GROUNDWATER

Figure 3-9
Total Dissolved Solids Concentrations 2020-2022

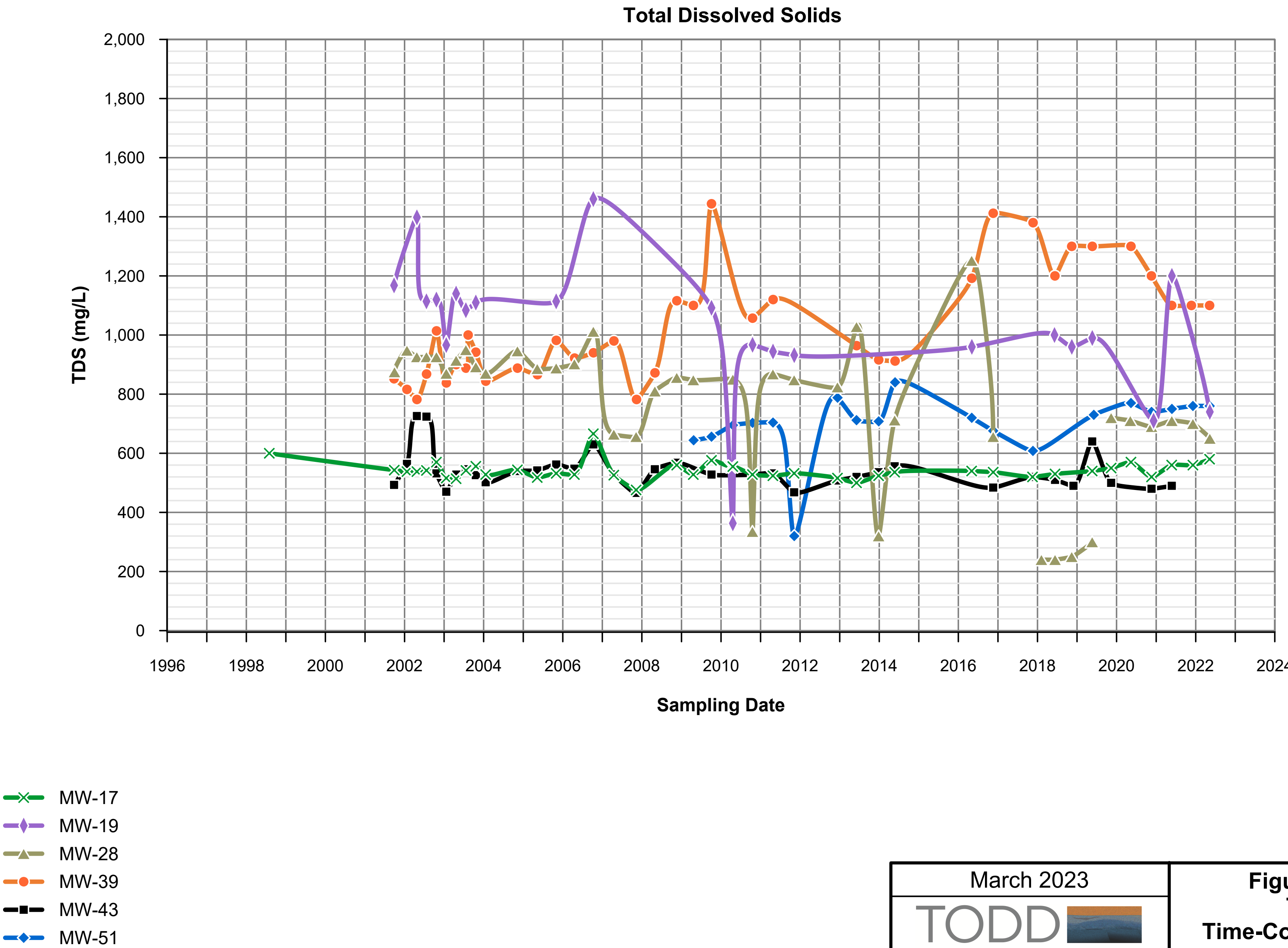
Document Path: T:\Projects\San Benito Annual 37653\GIS\Maps\Figures - WY2022\Figure 3-x Dot Concentration Maps.mxd



March 2023

TODD GROUNDWATER

Figure 3-10
Nitrate (as NO3) Concentrations
2020-2022

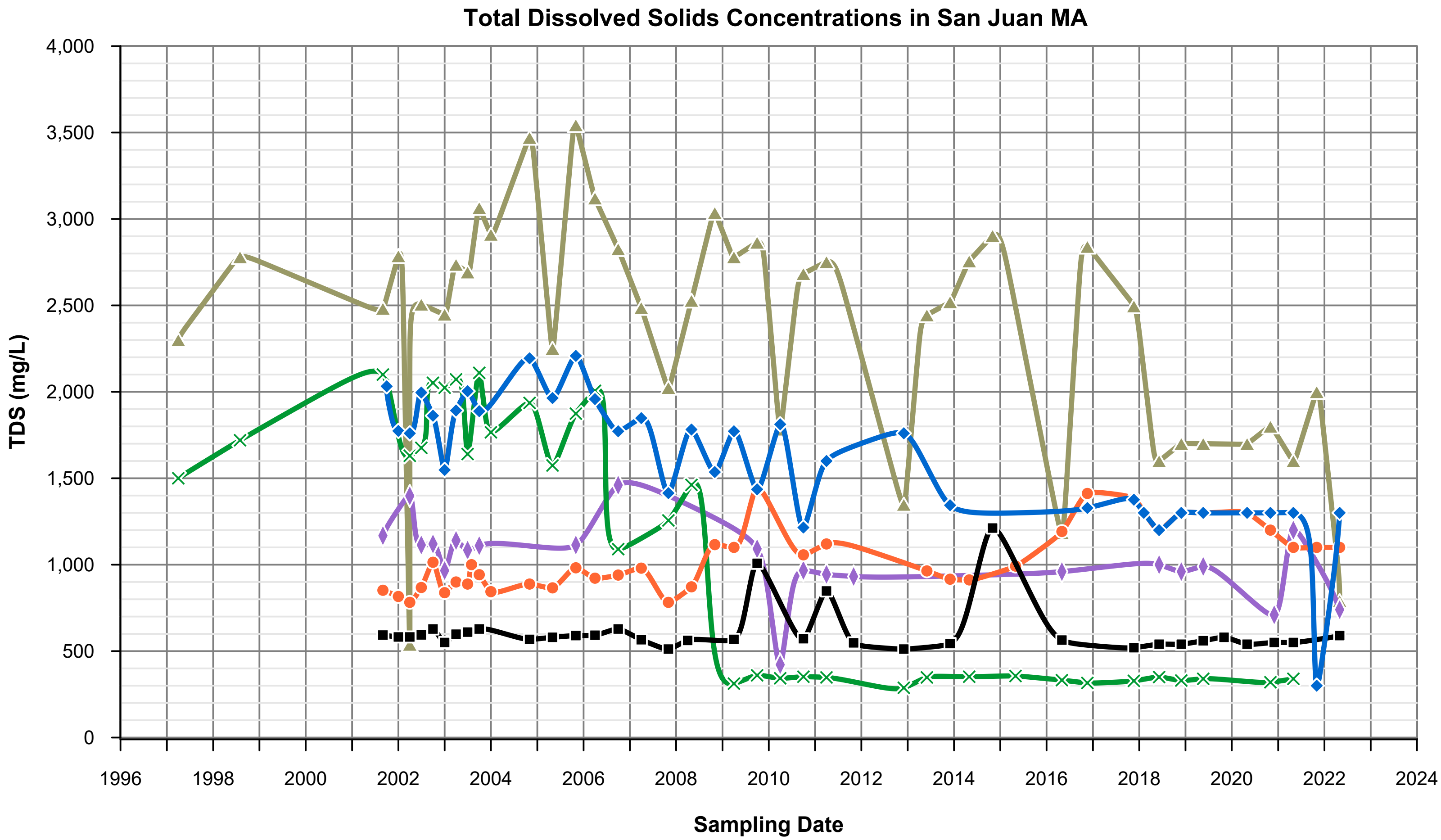


Path: \\todd-file\data\Projects\San Benito Annual 37653\GRAPHICS\WY2022\Figure 3-11 TDS Time-Concentration Plot.gpj

March 2023

TODD GROUNDWATER

Figure 3-11
TDS
Time-Concentration
Plot



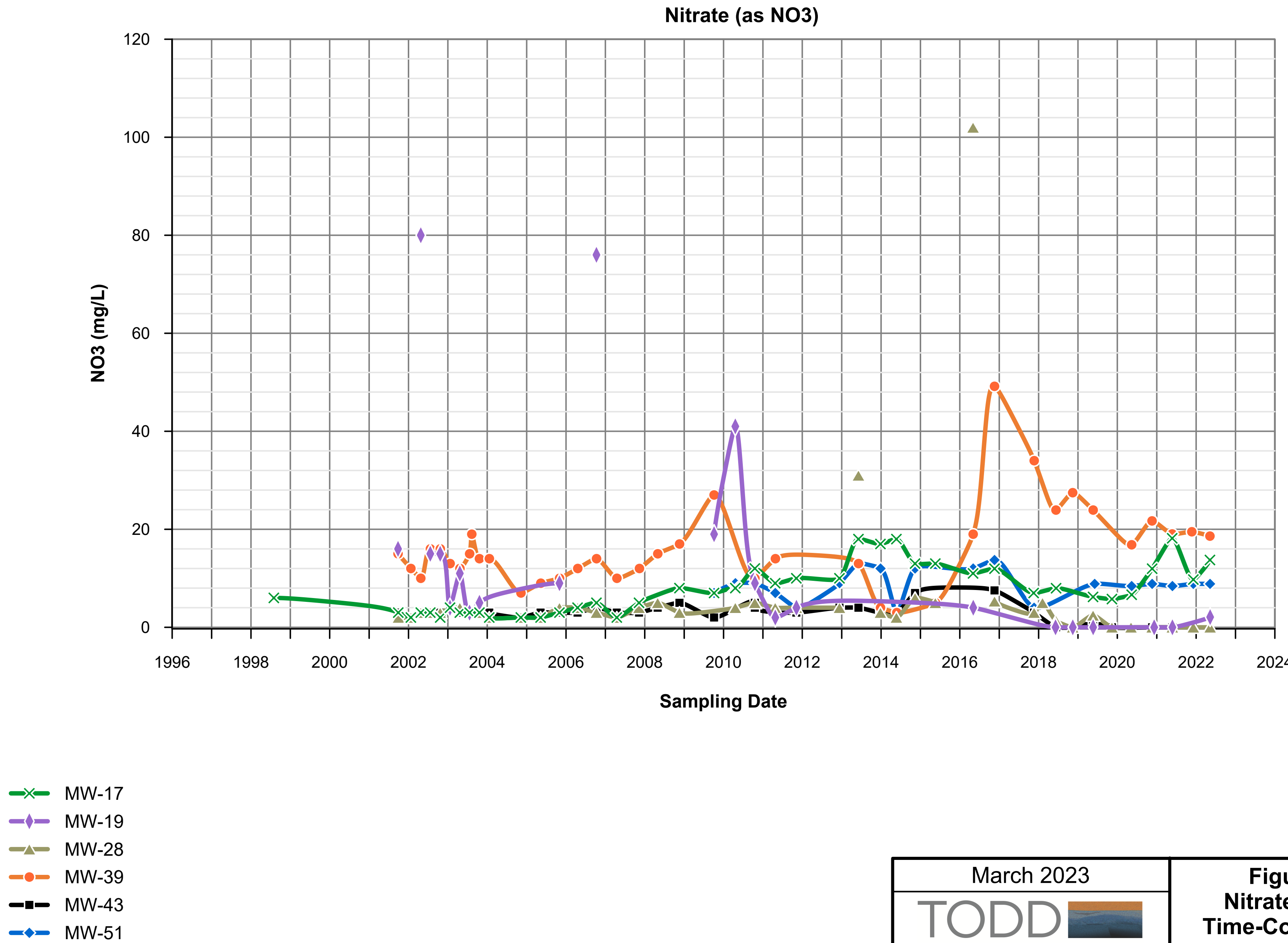
MW-19
MW-21
MW-24
MW-39
MW-46
MW-47

March 2023

TODD GROUNDWATER

Figure 3-12
TDS
Time-Concentration Plot
San Juan MA

Path: T:\Projects\San Benito Annual 37653\GRAPHICS\WY2022\Figure 3-12 TDS Time-Concentration Plot in San Juan MA.gpj



Path: T:\Projects\San Benito Annual 37653\GRAPHICS\WY2022\Figure 3-13 Nitrate (as NO3) Time-Concentration Plot.gpj

March 2023 TODD GROUNDWATER	**Figure 3-13** **Nitrate (as NO3)** **Time-Concentration Plot**

Other Constituents

While TDS and nitrate are the only CoCs defined in the GSP with MTs, several constituents are monitored in the event that future changes to basin management may affect concentrations. Maps of concentrations of these constituents are included in **Appendix F.** Appendix F also presents tables showing the percent wells with average concentrations over a respective MCL or "comparison concentration" and the average concentration of these constituents**.**

Boron (**Appendix F-1**) naturally occurs in the Basin. Some plants and crops are especially sensitive to boron, and agricultural standards are between 700 and 750 ug/L. Elevated boron concentrations in the Basin have contributed to orchard abandonment. In general, high boron concentrations occur in a north-south trending band in the Hollister MA. This is likely due to a fault plane, causing high boron concentrations at depth. In the Hollister MA, 81 percent of the 26 wells sampled for Boron in 2020-2022 had concentrations greater than 700 ug/L, and the average boron concentration in the Hollister MA was 1,966 ug/L.

Selenium (**Appendix F-2**) has been a CoC at two regulated facilities in North San Benito, and it can occur at low concentrations in native groundwater. No wells in the Basin had a median selenium measurement greater than the 50 ug/L MCL during 2020-2022.

Perchlorate (**Appendix F-3**), a byproduct of solid rocket fuel manufacturing and testing, munitions manufacturing, and flare and pyrotechnics manufacturing, has been associated with three facilities in the Basin. Most of the perchlorate monitoring and detections have been affiliated with these regulated facilities. Among wells monitoring ambient groundwater, perchlorate was only detected three times, and none of the detections were higher than the 6 ug/L MCL.

Arsenic (**Appendix F-4**) can enter groundwater from aquifer sediments when groundwater has low oxygen levels or a high pH. Median arsenic concentrations over the 10 ug/L MCL were measured in 13 wells, 12 of which are in the Hollister MA. Groundwater in this region frequently has high manganese concentrations, which suggests that it has low oxygen levels, or reducing conditions. The arsenic is likely derived from iron oxide on sediments, which dissolves in low-oxygen environments.

Hexavalent chromium (also known as CrVI or chromium VI) was considered a constituent of concern in the 2016 annual groundwater report. In 2017, the maximum contaminant level (MCL) for hexavalent chromium was increased from 10 ug/L to 20 ug/L. Because of this change, hexavalent chromium is no longer a designated constituent of concern in this basin, though it is still monitored in case a new MCL is established. During 2020-2022, eight wells in non-regulated facilities had median CrVI concentrations greater than 10 ug/L, and three of these wells had a median CrVI concentration greater than 20 ug/L. High chromium concentrations occur in the central portion of the Hollister MA; a map of maximum concentrations is shown as **Figure F-5** in the Appendix.

Manganese (**Appendix F-6**) is generally naturally occurring and associated with iron under anaerobic conditions where the more soluble forms may occur. In general, if water has more than 0.20 mg/L, manganese will precipitate upon encountering an oxidizing environment. This will cause an undesirable taste, deposition of black deposits in water mains, water discoloration, and laundry stains (WHO, 2017). The SMCL is 50 ug/L, and 32 recent wells have median concentrations exceeding this limit. They are located in areas of the Basin with high levels of naturally occurring iron and near other wells with high manganese concentrations, suggesting reducing conditions. More than 50 percent of the wells in the Bolsa and the Southern MAs have manganese concentrations greater than 50 ug/L.

Similar to manganese, iron is naturally occurring and is mobile in groundwater under reducing conditions. Its MCL is 300 ug/L, and twelve wells, including two of the new deep SBCWD monitoring wells, recorded iron concentrations greater than the MCL. High iron concentrations occur in at least 10 percent of wells in every MA.

Hardness (total hardness, as $CaCO_3$) is a widespread condition in the Basin indicating that high concentrations of calcium and magnesium ions in water will form insoluble residues with soap. It is a naturally occurring condition but can be impacted by anthropogenic sources that add calcium or magnesium to the groundwater. Hardness above about 120 to about 150 mg/L is considered hard water with objectionable properties for consumers. A value of more than 200 mg/L can result in scale deposition to pipes. Because there are no drinking water standards for hardness, the practical limitations of hard water (greater than 200 mg/L hardness) and very hard water (greater than 300 mg/L hardness) are used as guidelines for the analysis. Groundwater is considered very hard in every MA but the Bolsa MA. In the San Juan MA, 80 percent of all wells have a median hardness measurement greater than 300 mg/L.

Salt and Nutrient Management Plan

The San Benito SNMP was developed in 2014 to comply with the 2013 State Water Resources Control Board Recycled Water Policy. The SNMP identifies sources of salts and nutrients currently in the basin and addresses future sources and loading. The plan outlines salt and nutrient management actions to ensure that groundwater quality is appropriate for drinking and other beneficial uses. While the SNMP concluded that no additional implementation measures were necessary beyond existing management plans, water quality monitoring by the District is ongoing. Monitoring for the SNMP is intended to determine the effectiveness of implementation measures, with a focus on basin water quality near large, recycled water projects, recharge projects, and water supply wells.

Through its Annual Groundwater Reporting process and consistent with its SNMP, the District collects and compiles groundwater quality data on a semi-annual basis. These data have been analyzed and reported to the RWQCB in the District's triennial Groundwater Report and thus fulfills the SNMP-required discussion of TDS and nitrate concentrations in groundwater using the following analytical techniques:

- Time-Concentration Plots
- Evaluation of Vertical Variations in Groundwater
- Water Quality Concentration Maps
- Comparison to detections with basin-specific basin plan objectives (BSPOs)

The SNMP also requires analyses and a discussion of the status of recycled water use, stormwater capture projects, and stormwater capture implementation measures. Recycled water and stormwater are discussed in the next section.

Water quality did not change significantly during the period 2019 to 2022. This supports the conclusion in the SNMP that recycled water use would not adversely affect water quality. Nitrate and TDS concentrations have not increased in most wells in the Basin. Groundwater quality monitoring will be continued, transitioning from the Annual Groundwater Reports to SGMA Annual Reporting (which focuses on groundwater quantity issues but includes progress reporting and new information) and Five-Year Updates.

4-WATER BALANCE

For the GSP, a quantitative assessment of the water balance (or water budget) of the North San Benito Subbasin (or Basin) was developed, using the numerical model, and presenting estimates of inflows, outflows, and change in storage for the Management Areas (MAs). The North San Benito GSP numerical model was based on historical data for water years 1975-2017 and the Annual Report for WY 2021 updated the model. For this Annual Report, newly available data were used to improve and update analyses for recent years and results for 2019 through 2022 are shown here.

Method of Analysis

The water balance used for the GSP, and updated here, was developed using a rainfall-runoff-recharge model and a groundwater flow model. Complete, itemized surface water and groundwater balances were estimated by combining raw data (rainfall, stream flow, municipal pumping, wastewater percolation) with values simulated using models. Collectively, the models simulate the entire hydrologic system, but each model or model module focuses on part of the system, as described below. In general, the models were used to estimate flows in the surface water and groundwater balances that are difficult to measure directly or that depend on current groundwater levels. These include surface and subsurface inflows from tributary areas, percolation from stream reaches within the Basin, groundwater discharge to streams, subsurface flow from the Llagas Subbasin and between Management Areas, locations and discharges of flowing wells, consumptive use of groundwater by riparian vegetation, and changes in groundwater storage. The two separate models, collectively referred to as the North San Benito Numerical model, are described as follows.

Rainfall-Runoff-Recharge Model. This Fortran-based model simulates hydrologic processes that occur over the entire land surface, including precipitation, interception, infiltration, runoff, evapotranspiration, irrigation, effects of impervious surfaces, pipe leaks in urban areas, deep percolation below the root zone, and shallow groundwater flow to streams and deep recharge.

Groundwater Model. The groundwater flow model uses the MODFLOW 2005 code developed by the U.S. Geological Survey, with pre- and post-processing facilitated using Groundwater Vistas, a readily available commercial software package. The model produces linked simulation of surface water and groundwater, as described below. MODFLOW simulates subsurface flow by combining equations representing flow through porous sediments (the Darcy Equation) with equations that enforce conservation of mass. The equations are implemented numerically, which means they are applied simultaneously between all adjoining cells in a model grid through an iterative process.

The numerical model is the best tool to quantify the North San Benito water balance. The model will continue to be updated for future Annual Reports, providing a better understanding of the surface water-groundwater system and a tool to evaluate future conditions and management actions. Additional information about the model can be found in the GSP and the model documentation report found as Appendix G in the GSP. **Tables 4-1 through 4-4** show the updated water balances for each MA. **Figures 4-1 through 4-4** show the water balance for the entire model period.

4-WATER BALANCE

TABLE 4-1. WATER BALANCE UPDATE - SOUTHERN MA, AF

Water Balance Items	2019	2020	2021	2022
Groundwater Inflow				
Subsurface inflow from external basins	-	-	-	-
Percolation from streams	27,576	15,992	13,117	7,795
Bedrock inflow	2,291	914	486	33
Dispersed recharge from rainfall[1]	8,419	3,183	2,006	2,030
Irrigation deep percolation	547	604	694	754
Reclaimed water percolation	0	0	0	0
Inflow from Hollister MA	1,473	1,140	820	805
Total inflow	40,305	21,833	17,123	11,417
Groundwater Outflow				
Subsurface outflow to external basins	0	0	0	0
Wells - M&I and domestic	(143)	(143)	(143)	(143)
Wells - agricultural	(6,150)	(6,744)	(7,822)	(8,485)
Groundwater discharge to streams	(19,192)	(19,507)	(16,263)	(12,733)
Riparian evapotranspiration	(1,464)	(1,687)	(1,898)	(1,988)
Outflow to Hollister MA	(2,381)	(2,305)	(2,695)	(2,908)
Total outflow	(29,329)	(30,387)	(28,822)	(26,258)
Net Change in Storage	**10,976**	**(8,554)**	**(11,699)**	**(14,841)**

1. Dispersed recharge volumes adjusted from pre-processor to match model inflows

TABLE 4-2. WATER BALANCE UPDATE - HOLLISTER MA, AF

Water Balance Items	2019	2020	2021	2022
Groundwater inflow				
Subsurface inflow from external basins	-	-	-	-
Percolation from streams	25,203	16,536	12,870	9,896
Bedrock inflow	19,727	10,203	1,745	435
Dispersed recharge from rainfall[1]	22,071	12,060	7,274	5,296
Irrigation deep percolation	4,315	4,674	4,987	5,235
Reclaimed water percolation	327	291	248	226
Inflow from Southern MA	4,762	4,534	4,937	5,304
Total inflow	76,406	48,299	32,061	26,394
Groundwater Outflow				
Subsurface outflow to external basins	0	0	0	0
Wells - M&I and domestic	(1,808)	(2,056)	(3,748)	(3,517)
Wells - agricultural	(34,204)	(37,164)	(44,093)	(50,175)
Groundwater discharge to streams	(8,881)	(7,416)	(2,174)	(1,012)
Riparian evapotranspiration	(201)	(201)	(175)	(129)
Outflow to Bolsa and San Juan MAs	(11,293)	(10,854)	(10,229)	(9,771)
Total outflow	(56,386)	(57,691)	(60,419)	(64,605)
Net Change in Storage	**20,020**	**(9,392)**	**(28,358)**	**(38,212)**

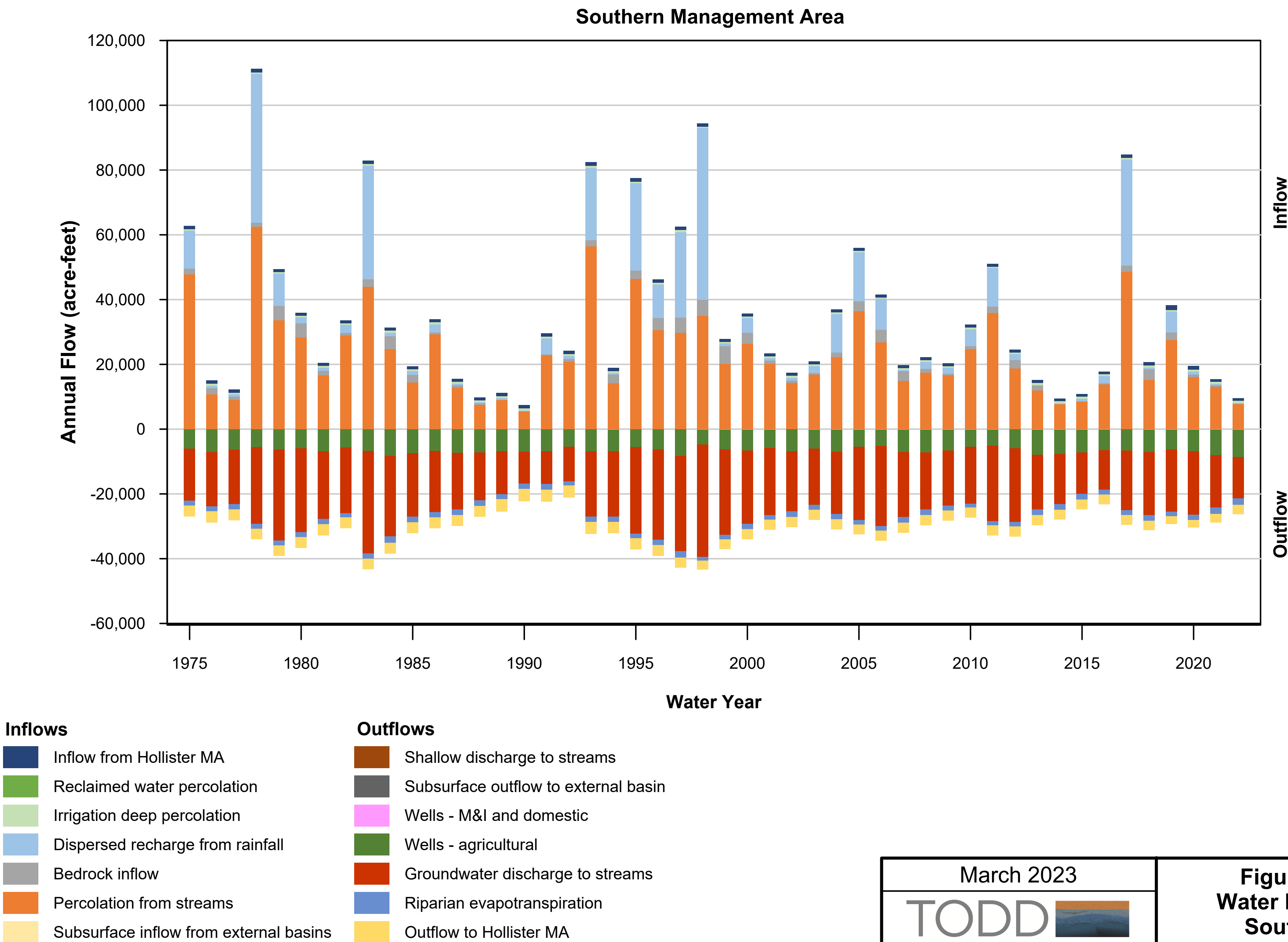
TABLE 4-3. WATER BALANCE UPDATE - SAN JUAN MA, AF

Water Balance Items	2019	2020	2021	2022
Groundwater Inflow				
Subsurface inflow from external basins	-	-	-	-
Percolation from streams	8,246	5,168	1,652	376
Bedrock inflow	707	558	364	93
Dispersed recharge from rainfall[1]	9,916	4,719	2,678	1,884
Irrigation deep percolation	2,025	2,252	2,355	2,476
Reclaimed water percolation	2,088	2,671	2,884	2,884
Inflow from Hollister and Bolsa MAs	5,251	5,371	5,549	5,676
Total inflow	28,234	20,739	15,483	13,389
Groundwater Outflow				
Subsurface outflow to external basins	0	0	0	0
Wells - M&I and domestic	(415)	(363)	(360)	(463)
Wells - agricultural	(17,605)	(19,579)	(22,144)	(24,803)
Groundwater discharge to streams	(1,227)	(1,036)	(646)	(330)
Riparian evapotranspiration	(995)	(1,133)	(1,260)	(1,292)
Outflow to Bolsa MA	(1,575)	(1,460)	(1,303)	(1,244)
Total outflow	(21,817)	(23,570)	(25,713)	(28,132)
Net Change in Storage	**6,417**	**(2,831)**	**(10,230)**	**(14,743)**

1. Dispersed recharge volumes adjusted from pre-processor to match model inflows

TABLE 4-4. WATER BALANCE UPDATE - BOLSA MA, AF

Water Balance Items	2019	2020	2021	2022
Groundwater Inflow				
Subsurface inflow from external basins	3,370	3,906	4,938	5,928
Percolation from streams	3,079	2,552	2,807	2,499
Bedrock inflow	0	-	-	-
Dispersed recharge from rainfall[1]	11,634	5,419	3,230	2,669
Irrigation deep percolation	1,399	1,459	1,574	1,631
Reclaimed water percolation	0	0	0	0
Inflow from Hollister and San Juan MAs	5,047	4,807	4,318	3,762
Total inflow	24,530	18,142	16,867	16,490
Groundwater Outflow				
Subsurface outflow to external basins	(50)	(0)	0	0
Wells - M&I and domestic	(25)	(25)	(25)	(25)
Wells - agricultural	(15,345)	(16,091)	(17,419)	(18,175)
Groundwater discharge to streams	(5,761)	(3,147)	(1,324)	(411)
Riparian evapotranspiration	(255)	(251)	(254)	(224)
Outflow to San Juan MA	(1,284)	(1,232)	(1,398)	(1,625)
Total outflow	(22,720)	(20,746)	(20,419)	(20,459)
Net Change in Storage	**1,809**	**(2,604)**	**(3,551)**	**(3,969)**

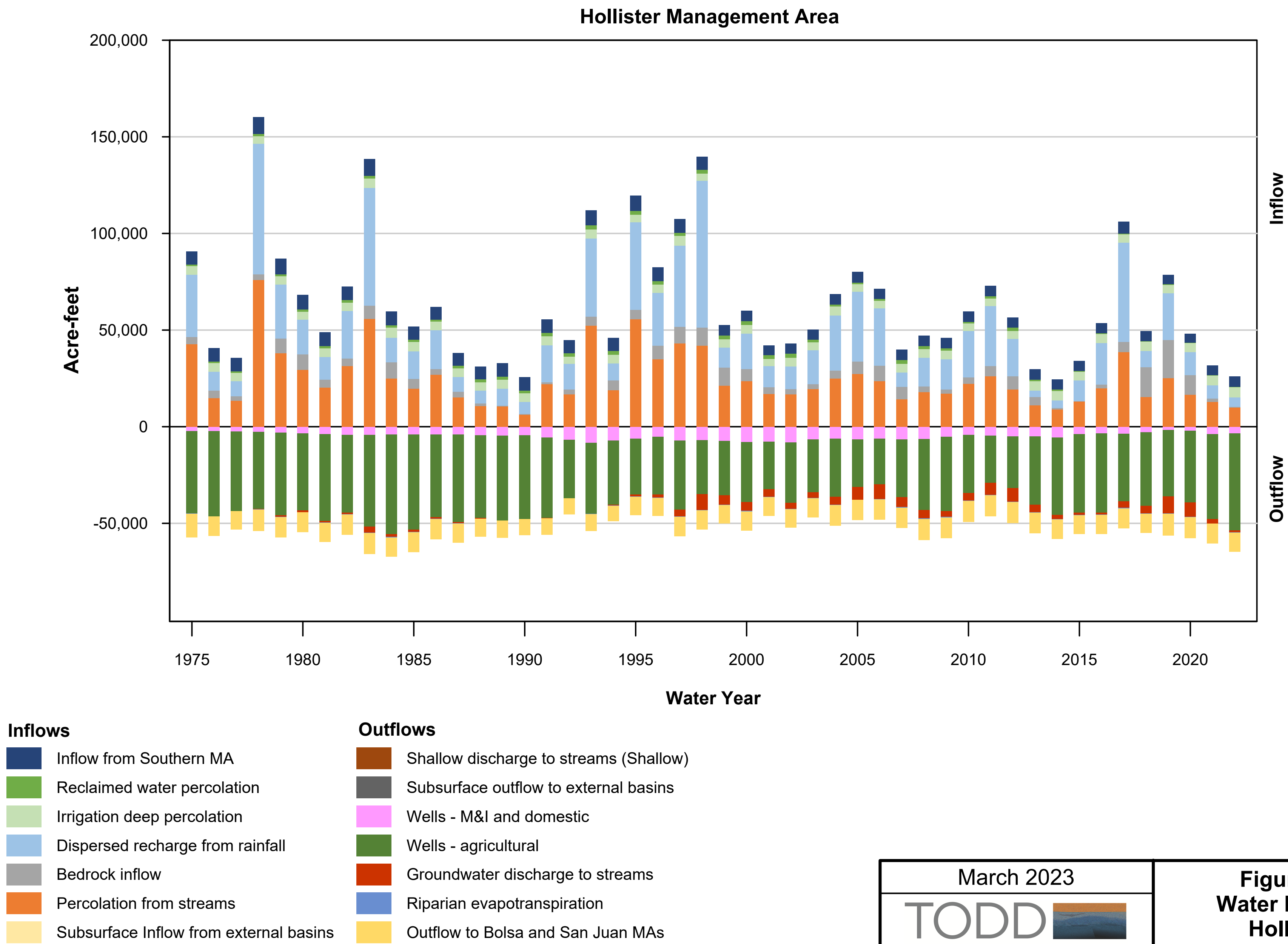


Path: T:\Projects\San Benito Annual 37653\GRAPHICS\Figure 4-2 Water Balance Southern Management Area.gpj

March 2023

TODD GROUNDWATER

Figure 4-1
Water Balance
Southern
Management Area



March 2023

TODD GROUNDWATER

Figure 4-2
Water Balance
Hollister
Management Area

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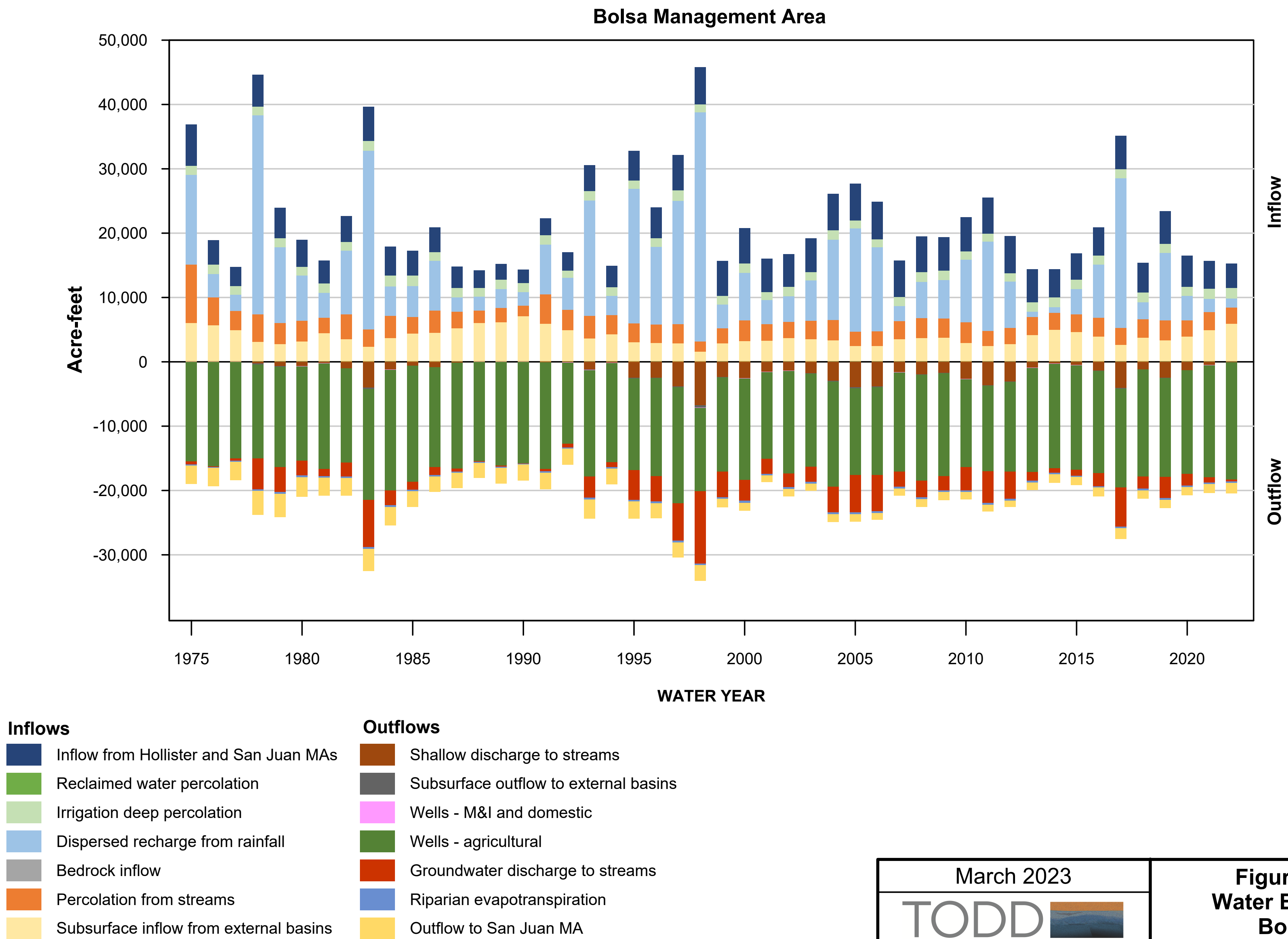
March 2023

TODD GROUNDWATER

Figure 4-3
Water Balance
San Juan
Management Area



March 2023

TODD GROUNDWATER

Figure 4-4
Water Balance
Bolsa
Management Area

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Inflows

The rainfall-runoff-recharge model and groundwater model were updated to reflect conditions from Water Years 2019-2022. Data, assumptions and calculations for individual hydrologic processes and groundwater inflows are described below.

Precipitation and Evaporation. Precipitation and evaporation on the land surface are accounted for in the rainfall-runoff-recharge model. Data are obtained from local climate stations.

CVP Imported Water. Two Management Areas (Hollister and San Juan) receive imported water from the CVP, which is delivered to municipal and agricultural users and to several percolation ponds to enhance groundwater recharge. CVP imported water stored in San Justo Reservoir seeps from the reservoir to the local groundwater. In addition, water evaporates from the surfaces. These seepage and evaporation losses remain consistent through the period of record and are included in the groundwater model.

Dispersed Recharge from Rainfall and Irrigation. Dispersed recharge from rainfall and applied irrigation water is estimated by the rainfall-runoff-recharge model. The model simulates soil moisture storage in the root zone, which derives from rainfall infiltration and irrigation, and outflows to evapotranspiration and deep percolation. Simulation is on a daily basis. In recharge zones with irrigated crops, irrigation is simulated by assuming water is applied when soil moisture falls below a certain threshold. When soil moisture exceeds the root zone storage capacity, any excess rainfall or irrigation becomes deep percolation. Rainfall and irrigation water comingle in the root zone and in deep percolation. In urban recharge zones, pipe leaks are included in the amount shown as rainfall recharge. The resulting net recharge is passed to the top layer of the groundwater model.

Percolation from Streams. Percolation from streams depends on the flow, stage, width, length, and bed permeability of stream reaches, as well as the elevation difference between the stream surface and groundwater in the underlying model cell. Point sources of recharge (such as wastewater percolation facilities) are entered into the top model layer as if they were injection wells. Surface inflows to the stream network in the surface water module of the groundwater model include a combination of gauged flows (for the San Benito River at the upstream end of the Southern MA only), simulated runoff from tributary watersheds and valley floor areas obtained from the rainfall-runoff-recharge model, and historical amounts of CVP water percolated in local streams. The effects of Hernandez Reservoir operation on San Benito River flows are included in the gauged flows, and the effects of Pacheco Reservoir on Pacheco Creek inflows were estimated by applying simple rules for seasonal storage and release. Valley floor areas are flatter than the tributary watersheds, and the amount of runoff per acre is consequently smaller. The rainfall-runoff-recharge model simulates runoff from valley floor areas, and those flows are added to the inflows of nearby stream segments in the groundwater model.

Reclaimed Water Percolation. Percolation of reclaimed water in wastewater disposal ponds occurs in two Management Areas (San Juan and Hollister) at facilities operated by the City of Hollister, SSCWD, and Tres Pinos County Water District. Discharges from the San Juan Bautista wastewater treatment plant flow are not included. Percolation is assumed to be the plant inflow less net evaporation and amounts of wastewater recycled for irrigation use. Additional percolation may occur around rural residential septic systems. For the numerical model, it is assumed to be negligible as the volumes would be small and spread out over the Basin.

Subsurface Groundwater Inflow. Three types of subsurface inflow are listed separately in the water balance tables. Subsurface inflow from external basins occurs only in the Bolsa MA, where flow enters from the adjacent Llagas Subbasin. This is simulated as a head-dependent flow that varies depending on simulated groundwater levels near the boundary (lower water levels increase the simulated inflow rate). Along the rest of the Basin perimeter, small amounts of subsurface inflow result from recharge percolating through fractured bedrock in tributary watershed areas. Bedrock inflow is simulated as shallow injection wells along the perimeter of the Basin.

Finally, subsurface flow occurs across the management area boundaries within the Basin. Although flow across MA boundaries is predominantly in one direction in most cases, local variations in boundary alignment relative to regional gradients can result in inflow at one location concurrent with outflow at another. For example, **Table 4-1** indicates inflow from Hollister to Southern MA although Southern MA is generally upgradient of Hollister MA. This reflects the zig-zag character of the boundary between the two MAs, such that groundwater flows from Hollister into portions of Southern MA and then flows out again.

Most groundwater inflows to the Basin are controlled by hydrologic conditions. Natural stream percolation and deep percolation from rainfall are related to the volume and distribution of rainfall. The availability of imported water similarly reflects wet and dry conditions in the source area, which for CVP water is the Sierra Nevada. Because they are related to rainfall, almost all Basin inflows are higher in wet years and lower in dry years. In contrast, deep percolation of applied irrigation water (irrigation return flow) is generally similar from year to year.

Outflows

Major outflows from the Basin are pumping (agricultural, municipal, industrial, and domestic), groundwater seepage into streams, subsurface outflow, and evapotranspiration by riparian vegetation.

Pumping by Wells. Agricultural pumping is much larger than the other types and is listed separately in the water balance tables and shown in green on the water balance bar charts. Agricultural pumping is dependent not only on cropping patterns and irrigation practices, but also on the volume of CVP imports and the amount and timing of rainfall. Spring rains decrease total irrigation demand, and growers adjust pumping to compensate for wet weather and the availability of CVP imports. Agricultural groundwater pumping in the model and water balance tables is simulated by the rainfall-runoff-recharge model. When simulated soil moisture falls below a specified threshold in a recharge zone with irrigated crops, irrigation is assumed to be applied and to refill soil moisture to capacity. Irrigation not derived from CVP water or recycled water is assumed to be from groundwater.

Agricultural pumping in Zone 6 is also monitored by SBCWD by recording the operating time of pump motors and multiplying that by a measured discharge rate. Previous studies have found that the pumping estimates obtained by this method are significantly smaller than the estimates obtained by simulating crop water demand and soil moisture. The simulation approach improved model calibration during the 2014 model update, and that approach is retained in the current model.

Reliable measurements of agricultural pumping are a recognized data gap. Given the large range or uncertainty and the model sensitivity to the volume and location of agricultural pumping, evaluation is currently underway of alternative methodologies for accurately evaluating agricultural pumping.

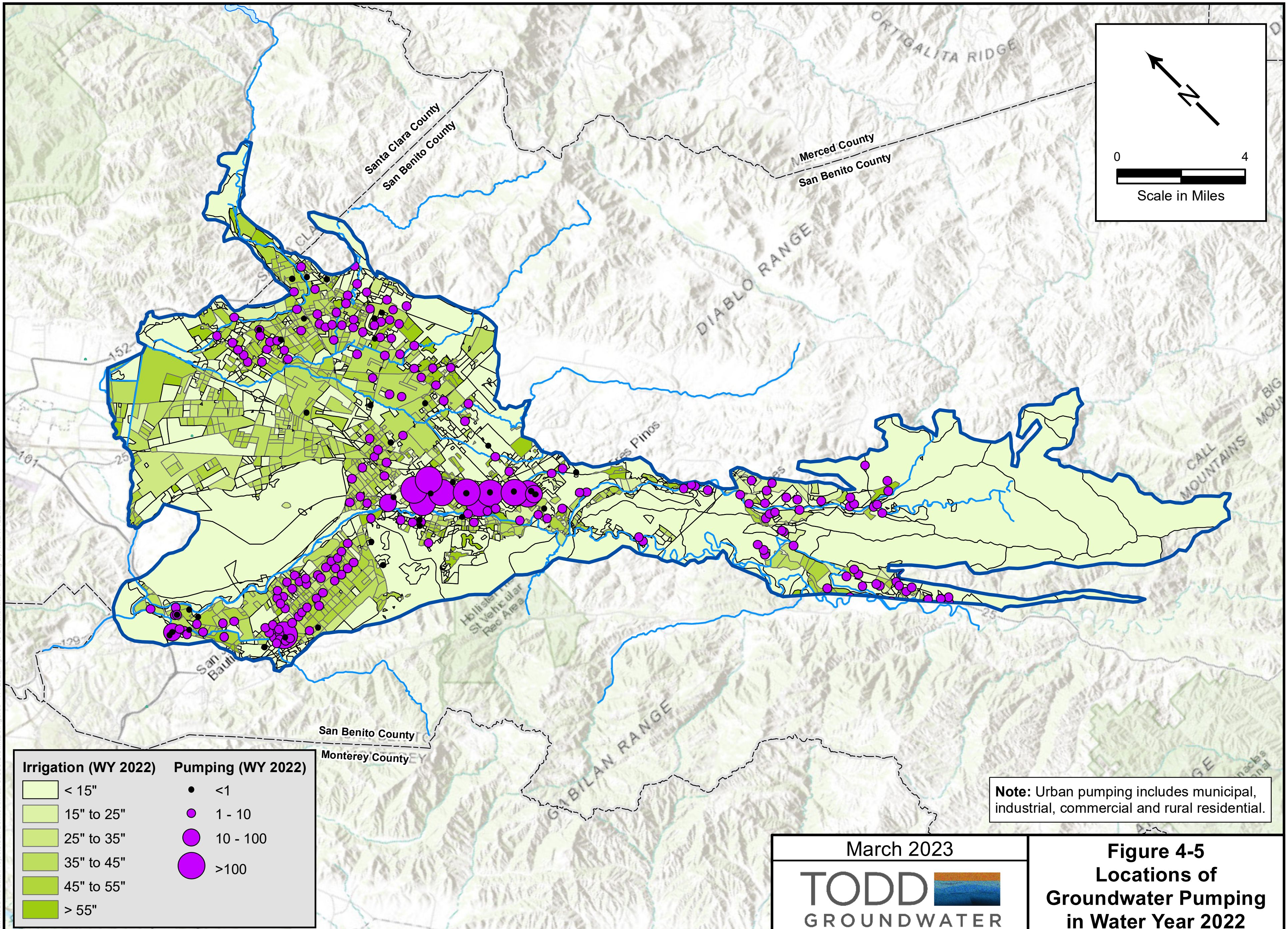
Municipal pumping by City of Hollister and SSCWD is in the Hollister MA, with additional pumping by San Juan Bautista in the San Juan MA. Pumping by major municipal providers is measured, as is pumping by smaller community water systems and self-supplied commercial and industrial facilities within Zone 6. Actual pumping and well locations are used in the numerical model. Additional pumping for potable use at rural residences and agricultural buildings was estimated by inventorying the number and locations of those buildings on aerial photos. This domestic pumping is assigned to 200 hypothetical wells near building locations.

A map showing the locations of agricultural and municipal, commercial, industrial, and domestic pumping is presented in **Figure 4-5**. Irrigation pumping is shown as a one-dimensional annual groundwater application rate on the irrigated fraction of each recharge analysis polygon. Use of CVP water and recycled water has already been subtracted from total irrigation demand to obtain these estimates of groundwater-supplied irrigation. Monthly one-dimensional rates are multiplied by irrigated area and entered into the groundwater model as a hypothetical irrigation well located at the centroid of each irrigated recharge polygon. Municipal, commercial, industrial, and domestic wells are displayed as circles with areas proportional to annual pumping in 2021. Points representing the first three categories are actual well locations, and the pumping is measured and reported to the District. The small dots representing rural domestic pumping are located where rural residences are visible in aerial photographs, and a uniform production rate was assumed at all those locations.

Subsurface Outflow. Subsurface outflows to other basins and other Management Areas were calculated using the groundwater model by the same methods used to simulate subsurface inflows.

Groundwater Discharge to Streams. Discharges from the groundwater basin to surface water bodies are simulated by the groundwater model based on stream bed wetted area and permeability and on the amount by which the simulated groundwater elevation in a model stream cell is higher than the simulated surface water elevation. This occurs in all Management Areas, but notably where Pacheco Creek and Tequisquita Slough approach the Calaveras Fault, where the Pajaro River approaches the downstream end of the Bolsa MA, and along the San Benito River at the downstream end of the San Juan MA. The relatively large amounts of simulated groundwater discharge to streams in the Southern MA is balanced by high amounts of percolation from streams. The San Benito River and Tres Pinos Creek transition between gaining and losing at various locations in the Southern MA.

Riparian Evapotranspiration. The presence of dense, vigorous trees and shrubs along a stream channel is often a sign that the roots of the vegetation extend to the water table and have access to groundwater throughout the dry season. Plants that draw water directly from groundwater are called phreatophytes. In the groundwater model, riparian ET is a function of water table depth, decreasing from unrestricted water use when the water table is at the ground surface to zero when it is 15 feet or more below the ground surface. This reflects a reasonable range of root depth distribution for a mix of riparian shrub and tree species.



March 2023

TODD GROUNDWATER

Figure 4-5
Locations of Groundwater Pumping in Water Year 2022

4-WATER BALANCE

The Management Area water balances for 2022 are easiest to interpret in the context of balances in prior years (see **Figures 4-1 through 4-4**). In the Southern MA, total inflows and total outflows were very low in 2022 and had been declining over the previous three years. In the Hollister MA, total inflows were lower than in almost all other years of the past three decades for the second year in a row. Outflows continued to increase – reflecting the reduced imported water for agriculture and municipal supply. Total inflows in the San Juan MA continued to decrease over the past two years and total outflows were above average, similar to Hollister. In the Bolsa MA, total inflows were remained above average. Total outflow remained the same, agricultural pumping increased but was offset by increased subsurface inflow from the Llagas Subbasin.

Simulated Groundwater Elevations

In previous annual reports, contours of groundwater elevation surfaces in a portion of the Basin were constructed using measurements from monitored wells with refinement to account for the effects on groundwater of faults and other hydrogeologic conditions. These previous groundwater elevation surfaces were highly influenced by variability in data available from the monitoring network.

One of the changes to the annual reports associated with SGMA compliance is the inclusion of groundwater contours for the entire Basin. A consequence of this basin-wide approach is inclusion of areas with limited or no groundwater monitoring. As a result, contouring with relatively simple software or by hand is more difficult and subjective. However, the calibrated groundwater model, which will now be updated annually, provides simulation of groundwater elevations for every month of the model period in a way that is internally consistent with the hydrogeologic conceptualization of the Basin and the water budget. Using contours from the model produces groundwater surface elevation representations that are consistent with the water budget and change in storage estimates.

Figure 4-6 shows contours of groundwater elevations in March 2022, representing seasonal high conditions, while **Figure 4-7** shows groundwater elevations in September 2022, representing seasonal low conditions. These are contours of elevations simulated by the calibrated groundwater model, which provides estimates of water levels throughout the Basin. They are from model layer 3, which is within the typical range of screened intervals for irrigation and municipal wells. The general pattern of contours is similar for both seasons, but March water levels are up to 20 ft higher. Groundwater in the Southern MA flows northwest toward the Hollister MA. On the east side of the Calaveras Fault, flow is northward and westward, converging toward San Felipe Lake, where groundwater that hasn't leaked through the fault emerges into surface waterways and crosses the fault as stream base flow. On the west side of the Calaveras Fault, inflow from the Southern MA flows northwest beneath the San Benito River and bends west to enter the San Juan MA. In the latter area, flow is toward the west end of the MA, where groundwater exits by emerging as surface flow in San Juan Creek, the San Benito River or the Pajaro River. In the Southern MA, simulated water levels have steep gradients beneath the hilly areas between and around the Paicines and Tres Pinos Creek Valleys and relatively flat gradients within those valleys. This reflects the relatively low estimated transmissivity of the Purisima Formation in the hills relative to the alluvial materials in the valleys.

Figure 4-8 shows contours of the net change in groundwater elevation during the water year from September 2021 to September 2022. For the third consecutive year, the net change was negative almost everywhere, reflecting decreased recharge and increased pumping due to below-average rainfall and

CVP imports. The net decline was 5 feet or more throughout the Bolsa, Hollister and San Juan MAs and 10-15 feet in parts of the Bolsa and Hollister MAs. Declines in the Southern MA were mostly around 5 feet but were up to 15 feet toward the upstream end of the Paicines Valley. A few contour bullseyes are visible where individual wells had much different pumping amounts in 2021 and 2022.

Change in Storage

Figure 4-9 shows the cumulative change in storage from the model for the four Management Areas for 1975-2022. The change in storage for each MA for the model update period (2018-2022) is documented in **Tables 4-1 through 4-4**. In **Appendix E, Figures E-1** through **E-4** illustrate the annual storage change, cumulative storage change, and estimated groundwater pumping for each MA from 1975 to present**.** The water year type is indicated with the first letter of the types: Wet, Above normal, Below normal, Dry, and Critically dry (see Figure 3-2).

Storage decreased in all four Management Areas for the third consecutive year in 2022. However, total storage is far above the 1975 amounts in the Southern, Hollister and San Juan MAs. Storage tends to change very little in the Bolsa MA, probably due to the influence of subsurface inflow simulated at the model boundaries along the Calaveras Fault and the border with the Llagas Subbasin. Storage declined slightly in 2022 and is about equal to the amount of storage in 1975.

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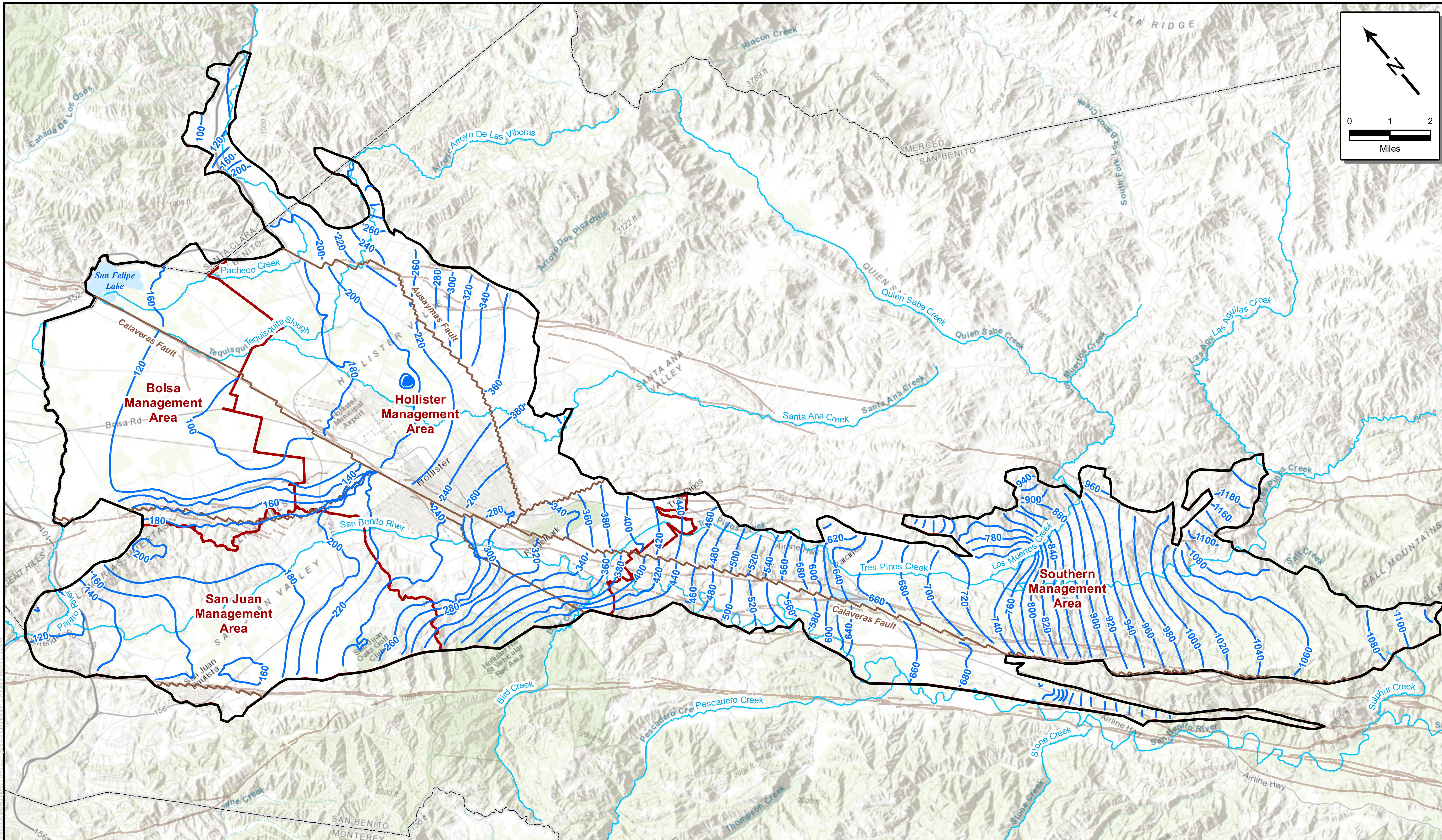


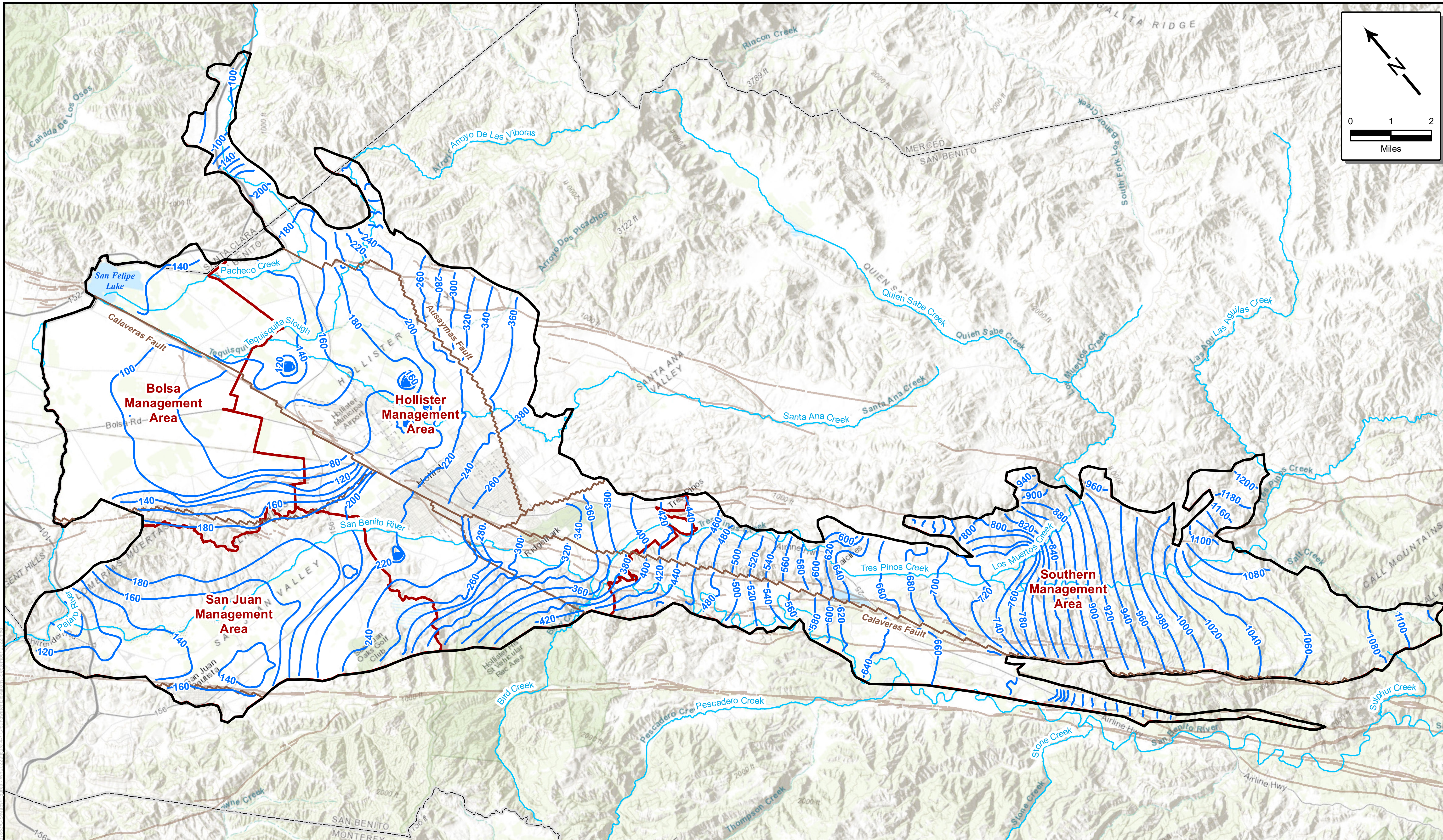
Groundwater Elevation Contour (feet msl)
Faults
Major Streams and Rivers
Management Areas
North San Benito Basin
San Benito County

Note:
Groundwater discharge from the Basin occurs as discharge to streams, subsurface outflow, and groundwater pumping from wells. The distribution of active wells changes over time, so wells are not shown on this map.

March 2023

TODD GROUNDWATER

Figure 4-6
Groundwater Elevations (ft msl)
March 2022



Groundwater Elevation Contour (feet msl)

Faults

Major Streams and Rivers

Management Areas

North San Benito Basin

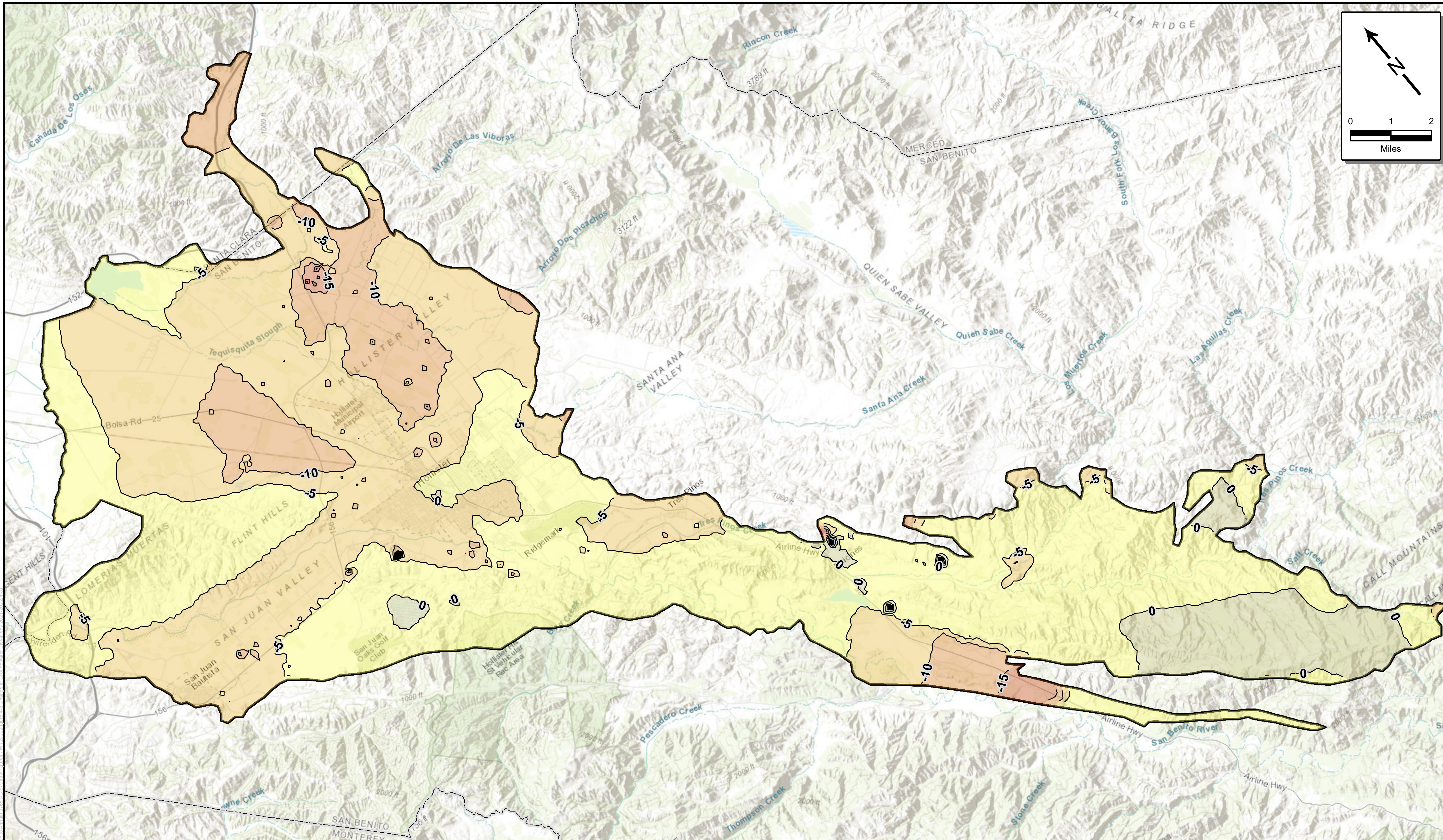
San Benito County

Note:
Groundwater discharge from the Basin occurs as discharge to streams, subsurface outflow, and groundwater pumping from wells. The distribution of active wells changes over time, so wells are not shown on this map.

March 2023

TODD GROUNDWATER

Figure 4-7
Groundwater Elevations in September 2022



1 Year Change in Groundwater Level

< -20'	-10' to -5'
-20' to -15'	-5' to 0'
-15' to -10'	0' to 5'
5' to 10'	
10' to 15'	
> 15'	

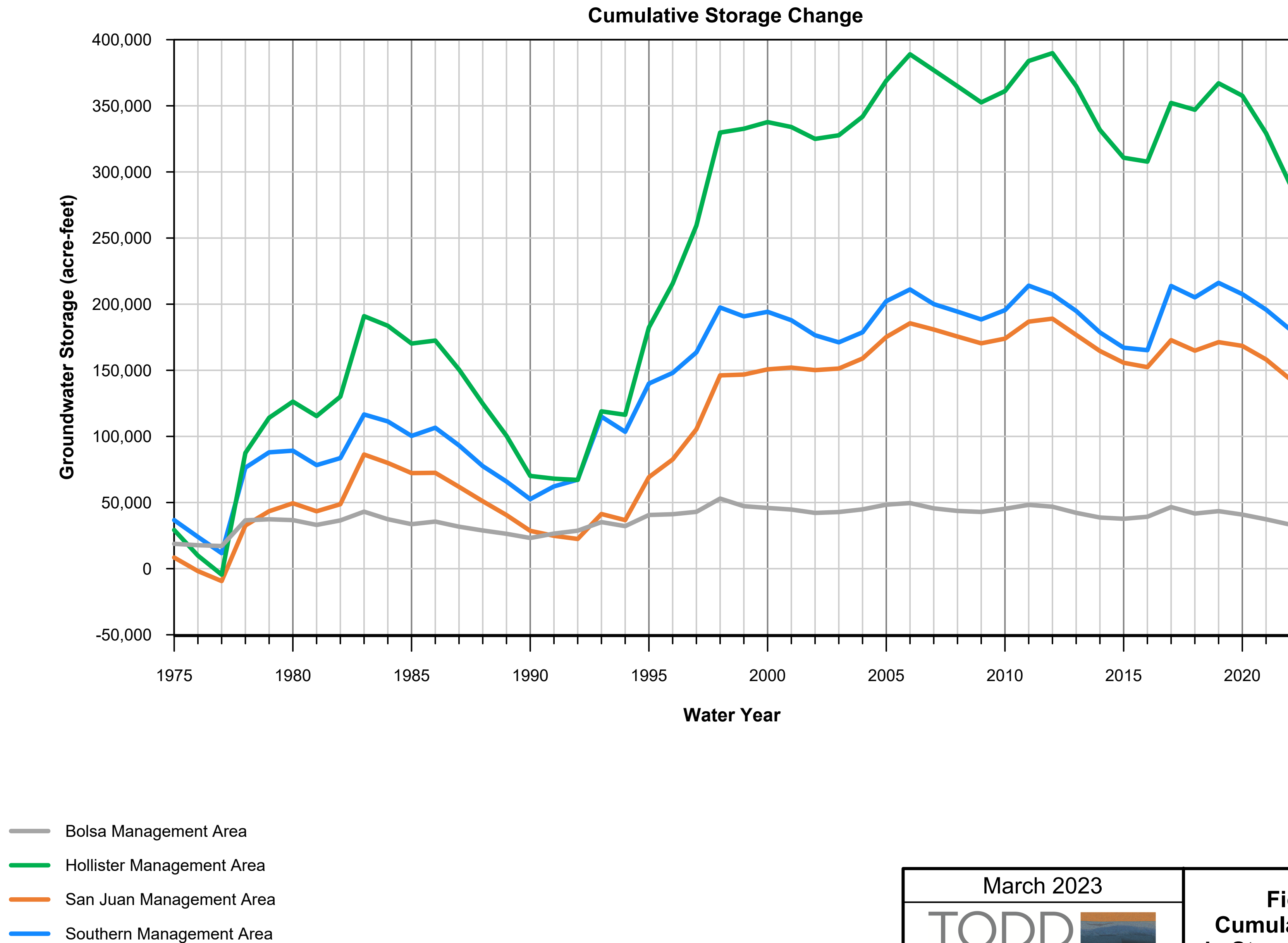
Change in GWE Sep2021-Sep2022_contours
North San Benito Basin
San Benito County

Note:
Groundwater discharge from the Basin occurs as discharge to streams, subsurface outflow, and groundwater pumping from wells. The distribution of active wells changes over time, so wells are not shown on this map.

March 2023

TODD GROUNDWATER

Figure 4-8
Change in Groundwater Elevations Sep. 2021 to Sep. 2022



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March 2023

TODD GROUNDWATER

Figure 4-9
Cumulative Change in Storage, 1975-2022

5-WATER SUPPLY AND USE

Water Supply Sources

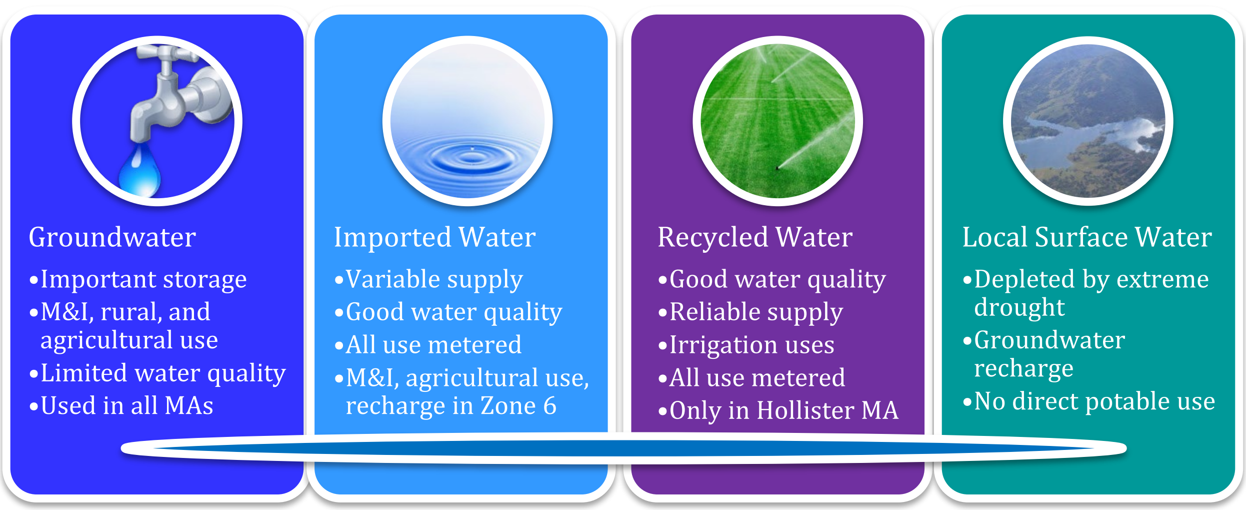
Four sources of water supply are available for municipal, rural, and agricultural water demands in the Basin. Each is summarized below; for more data and graphs, see **Appendix E.** Local groundwater and imported water are described in detail in the following sections.

Local Groundwater. Groundwater is pumped by private irrigation and domestic wells and by public water supply retailers. The District does not directly produce or sell groundwater but has the responsibility and authority to manage groundwater throughout San Benito County.

Imported Water. The District purchases Central Valley Project (CVP) water from the U.S. Bureau of Reclamation (USBR) and distributes to customers in Zone 6. Some CVP water has also been released for groundwater recharge. The District has a contract with no expiration for a maximum of 8,250 AFY of municipal and industrial (M&I) water and 35,550 AFY of agricultural water. CVP water is not available in the Bolsa or Southern MAs.

Recycled Water. Water recycling began in 2010 with landscape irrigation at Riverside Park. The system was expanded in 2014, including infrastructure and treatment capability for the purpose of agricultural irrigation. Recycled water currently is provided to approximately 865 acres for agricultural production and landscape irrigation. This source is reliable during drought and helps maintain sustainable water supply. Recycled water is only available in the Hollister MA.

Local Surface Water. Surface water is not used directly for potable or irrigation use in the Basin, but channel percolation is a significant source of groundwater recharge. In 2022, releases from the District's Hernandez and Paicines reservoirs were below average, reflecting continued drought. Stormwater capture currently is limited to some diversion by the City of Hollister to the Hollister Industrial WWTP (via a combined sewer system) with subsequent treatment and discharge to percolation and evaporation ponds.



5-WATER SUPPLY AND USE

Groundwater

Groundwater is a critical water resource in North San Benito Basin, not only providing water supply in all four MAs, but also water storage. In Hollister and San Juan MAs, the Basin continues to provide a reserve in times of dry hydrologic conditions, like WY 2021 when CVP allocations are reduced. In Bolsa and Southern MAs, it is the sole source of supply.

The North San Benito Basin groundwater resource has been actively managed since 1953 when the San Benito County Water District was established. This Annual Report reflects the changing scope of groundwater management in the Basin and thus involves adapted methods, for example, to estimate agricultural groundwater pumping, which is the largest use of groundwater supply. It builds on the GSP (which includes extensive update and application of the numerical model) and presents an estimate of groundwater pumping simulated by the numerical model. This represents a departure from previous Annual Reports and a first step toward basin-wide and more accurate assessment of agricultural pumping.

As described in the water balance section, the simulated estimate relies on the 2014 land use map and applies a crop coefficient to identified agricultural parcels. Annual crop evapotranspiration (ET) is calculated by applying the crop coefficient to the daily observed reference ET from the CIMIS station. Groundwater pumping is then estimated based on the crop ET and an irrigation efficiency assumption less the available CVP and recycled water delivered to agricultural customers in the MA. The volume is simulated as a well in the center of the identified parcel.

In previous annual reports, the water use patterns for Zone 6 were presented using the reported pumping from available power meters. Pumping amounts have been calculated semiannually by metering the number of hours of pump operation and multiplying by the average discharge rate. This monitoring program began in about 1990 (soon after CVP imports started) but was not applied to irrigation pumping beyond Zone 6. This historical method of estimating groundwater pumping based on power consumption has drifted from original calibration and is now considered insufficiently accurate; it is being replaced as part of SGMA implementation. Accordingly, the pumping indicated by these meters is not shown in this annual report.

The District is currently developing a new water use monitoring program that will address the entire basin area and will be documented in future SGMA Annual Reports. One method currently identified to evaluate agricultural water use is termed OpenET. OpenET is a tool developed by a consortium of private and public partners and led by Environmental Defense Fund, NASA, Desert Research Institute, and HabitatSeven. The tool utilizes satellite-based estimates of the total ET by month by parcel. The data will be available at a spatial resolution of 30 meters by 30 meters (0.22 acres per pixel). As of March 2023, the District is running a pilot program where measured water use from selected agricultural wells (linked to specific parcels) is compared to ET data available in the beta version of the program. To date, the pilot program shows the OpenET estimates are similar to the observed data but more analysis will be needed to improve estimates of irrigation efficiency. Assuming a successful pilot program, these data—ET by parcel over time—will be available for import into the numerical model to improve the model simulation of groundwater pumping.

Imported Water – Zone 6

The District distributes CVP water to agricultural and M&I customers in Zone 6. The allocation of the contract for each year is variable and contingent on total available supply of the CVP system. In dry years, the allocation may be zero and in wet years, it may be 100 percent of the contract amount. The USBR contract years are March through February, so Water Year 2021 (Oct 2020-Sept 2021) overlapped two contract years. Both years were below-average hydrological conditions, which resulted in extremely low allocations. **Table 5-1** shows the contract entitlements and recent allocations for both USBR contract years that overlap Water Year 2022 (SLDMWA 2021).

TABLE 5-1. ALLOCATION FOR USBR WATER YEARS 2021-2022

March 2021 - February 2022

	Contract	% Allocation	Allocation Volume (AF)
Agriculture	35,550	0%	0
M&I	8,250	25%	2,063
TOTAL	43,800		2,063

March 2022 - February 2023

	Contract	% Allocation	Allocation Volume (AF)
Agriculture	35,550	0%	0
M&I	8,250	33%*	2,766
TOTAL	43,800		2,766

*Public Health and Safety Needs

As shown in **Table 5-1**, USBR contract year 2021 (March 2021- February 2022) allocations were 0 percent and 25 percent for agricultural users and M&I users respectively. For USBR contract year 2022 (March 2022 - February 2023), allocations were 0 percent for agricultural users. For M&I users, the initial allocation was also 0 percent but agencies had the opportunity to request water to serve public health and safety (PHS) needs. The District prepared a memorandum to USBR summarizing the demands and supplies of the retailers consistent with the "Central Valley Project Municipal and Industrial Water Shortage Policy Guidelines and Procedures" (WSP Guidelines). The District documented that—without any CVP imports —the unmet PHS demand would be 2,968 AF. USBR granted the District 2,766 AF, equivalent to 33.5 percent of their contract. The PHS memo is included in **Appendix A**.

Over the last ten years (2012-2021), the average allocations were 31 percent and 62 percent for agricultural users and M&I users respectively. More information on the past years' allocations can be found in **Appendix E**.

Municipal Use

Figure 5-1 shows the municipal water supply for the City of Hollister, SSCWD, San Juan Bautista, and Tres Pinos County Water District. Municipal demand was satisfied entirely by groundwater prior to 2003. The completion of Lessalt Water Treatment Plant (WTP) in 2003, expansion of Lessalt in 2016, and completion of West Hills WTP in 2018 have significantly increased the availability and use of CVP water for the Hollister and SSCWD municipal systems. In **Figure 5-1**, annual water supply provided through the Lessalt WTP is shown in grey and West Hills WTP in blue. In 2022, these two treatment plants served about 43 percent of the municipal supply, an increase from last water year when CVP imports provided 39 percent of the municipal supply. In WY 2019, imported water made up 71 percent of supply; this shows that additional treatment capacity stands ready when imported water is available. The retailers continue to rely on the groundwater reserve when CVP allocations are low. When CVP allocations are higher, the retailers can return to delivering treated imported water to their customers. This ability to maximize CVP use increase flexibility for local water users to use groundwater or CVP. CVP also provides better quality water for delivery to municipal customers and results in improved wastewater quality, which supports water recycling. The City of San Juan Bautista Regional Water and Wastewater Solution project, described in the GSP and currently being implemented, will allow the City of San Juan Bautista to have these benefits.

Agricultural Use

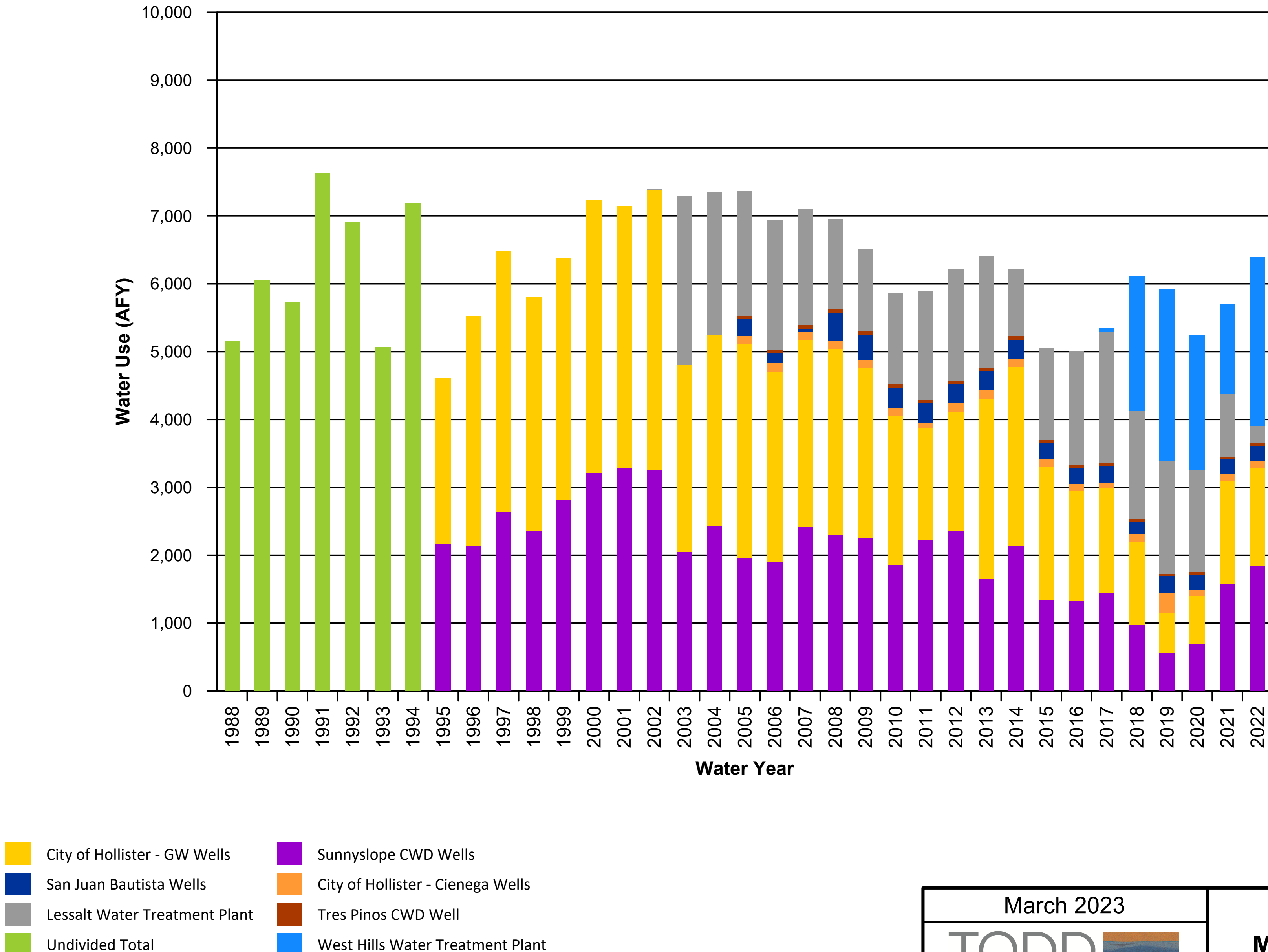
Figure 5-2 shows the annual volume of CVP imported water by use. Review of **Figure 5-2** reveals the drastic diminution in CVP supply for agriculture (shown in green). With zero allocation for USBR Water Year 2021-2022 and Water Year 2022-2023, the total CVP volume delivered to agricultural users was only 1,095 AF (from water stored in San Justo and previous years' allocations). This amounts, for example, to only five percent of the volume delivered to agricultural users in 1997 (21,061 AF). The available CVP supply in WY 2022 was the lowest since CVP imports were brought into the Basin. If allocations continue to remain low, agricultural users will have to pump more groundwater, plant less water intensive crops, or fallow land.

5-WATER SUPPLY AND USE

Total Water Use

Table 5-2 shows the total water use in the Basin by source and user type for Water Years 2019- 2022. CVP and recycled water uses are measured directly. Municipal groundwater use also is metered, and M&I and domestic groundwater uses are included in the model simulated pumping.

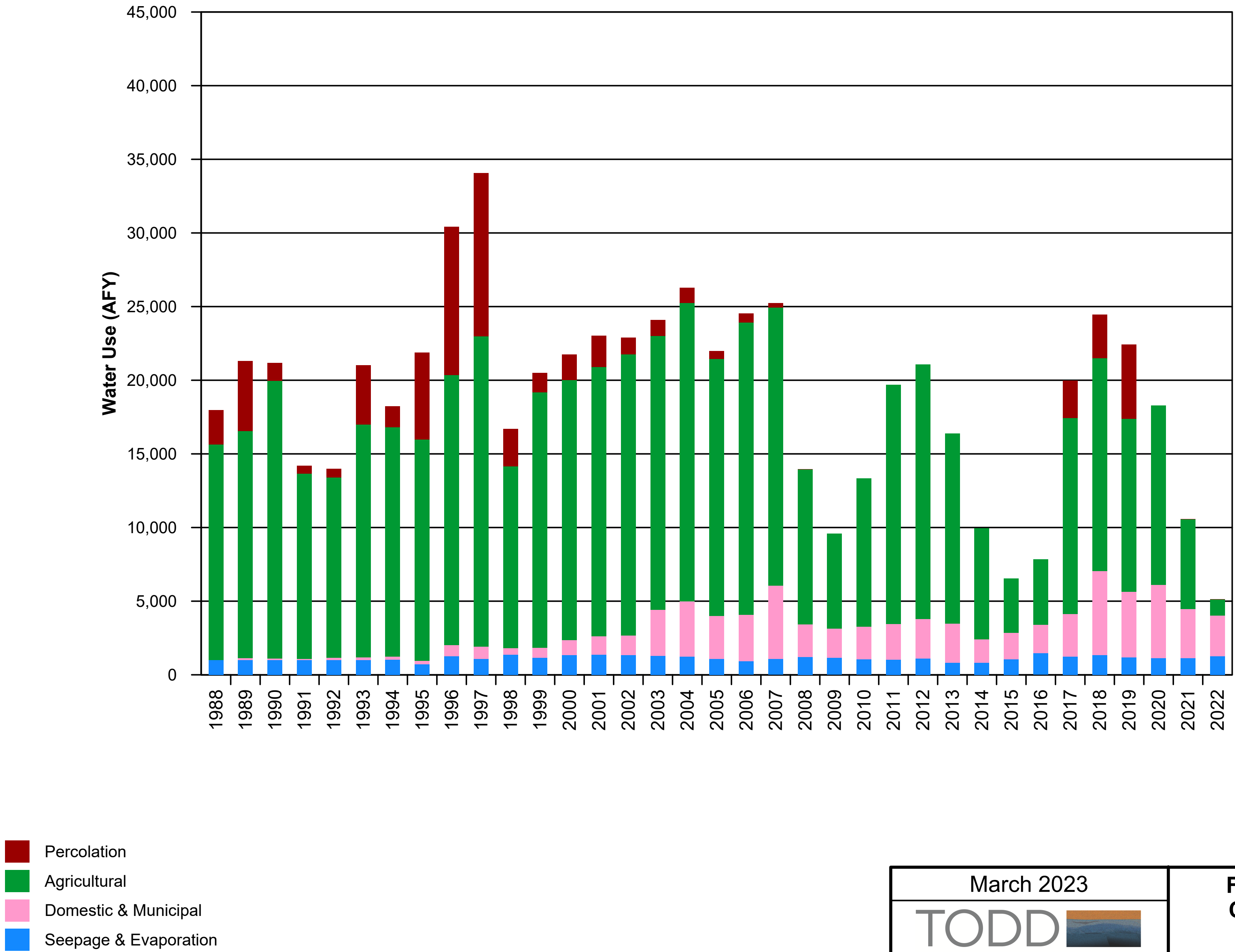
In WY 2022, total water use was higher than 2021 as simulated. The CVP imports were greatly reduced (down 91 percent from WY 2021) recognizing this year was the third dry year in a row. As a result, groundwater pumping increased significantly. Groundwater continues to be a reserve that is heavily relied on during multiple year droughts. However, the simulated agricultural pumping may over-represent irrigated areas and may not have accounted for land that was fallowed or converted to urban uses in recent years. In WY 2022, groundwater pumping patterns across the Basin were affected by local dry hydrologic conditions and persistent COVID pandemic that affected labor and market conditions. In Zone 6, the reduced allocation of CVP water continued to prompt some growers to fallow land or to increase groundwater pumping. Additional analysis of changing crop patterns and an update of the model is recommended for the next periodic evaluation. Water use information will be uploaded to DWR as part of the Annual Report. The tables are included in Appendix A, following the Elements Guide.



March 2023

TODD GROUNDWATER

Figure 5-1
Municipal Water Supply by Source



March 2023

TODD GROUNDWATER

Figure 5-2 Total CVP Water Use by Type 1976-2022

Path: T:\Projects\San Benito Annual 37653\GRAPHICS\WY2022\Figure 5-2 Total CVP Water Use by Type 1976-2022.grf

TABLE 5-2. TOTAL WATER USE, AF

Management Area	Water Type	User Type	2019	2020	2021	2022	Method
Southern	Groundwater	M&I and Domestic	143	143	143	143	Simulated
		Agricultural	6,150	6,744	7,822	8,485	Simulated
Hollister	Groundwater	M&I and Domestic	1,808	2,056	3,748	3,517	Simulated
		Agricultural	34,204	37,164	44,093	50,175	Simulated
	CVP	M&I and Domestic	4,334	3,937	3,314	298	Reported Flow Meters
		Agricultural	7,864	8,564	4,519	805	Reported Flow Meters
	RW	M&I and Domestic	108	97	21	21	Reported Flow Meters
		Agricultural	461	428	405	590	Reported Flow Meters
San Juan	Groundwater	M&I and Domestic	415	363	360	463	Simulated
		Agricultural	17,605	19,579	22,144	24,803	Simulated
	CVP	M&I and Domestic	123	1,016	27	2,488	Reported Flow Meters
		Agricultural	3,867	3,602	1,561	291	Reported Flow Meters
Bolsa	Groundwater	M&I and Domestic	25	25	25	25	Simulated
		Agricultural	15,345	16,091	17,419	18,175	Simulated
Total	**Groundwater**	**All**	**75,694**	**82,165**	**95,753**	**105,787**	**Simulated**
	CVP	**All**	**16,188**	**17,119**	**9,421**	**3,882**	**Reported Flow Meters**
	RW	**All**	**569**	**526**	**426**	**611**	**Reported Flow Meters**
	TOTAL	**ALL**	**92,451**	**99,810**	**105,600**	**110,279**	**Various**

6-WATER MANAGEMENT ACTIVITIES

As presented in the North San Benito GSP, the GSAs have been actively managing their local groundwater resources for decades with various projects and management actions. The GSP summarizes ongoing efforts, indicates supplementary work on those efforts, and identifies potential future projects and management actions. This Annual Report provides an update on significant progress.

As defined in the GSP, *Projects* are substantial efforts that involve an increase in water supply or a reduction in demand for the GSP Area. Projects outlined in the GSP include:

- Develop Surface Water Storage (e.g., Pacheco Reservoir Expansion Project)
- Expand Managed Aquifer Recharge (MAR)
- Enhance Conjunctive Use
    - Hollister Urban Area Water and Wastewater Project
    - City of San Juan Bautista Regional Water and Wastewater Solution
    - North County Project
    - Zone 3 Operations Planning Tool
- Enhance Water Conservation.

Actions provide a framework for groundwater management and include establishing GSP procedures or policies, filling data gaps with scientific studies or improved monitoring, and providing for funding. Management Actions identified in the GSP include:

- Improve Monitoring Program and Data Management System (DMS)
- Measure agricultural groundwater extraction
- Improve monitoring well network and DMS
    - Improve water quality monitoring program
    - Enhance surface water gaging
- Develop Response Plans
- Enhance Water Quality Improvement Programs
- Reduce Potential Impacts to Groundwater Dependent Ecosystems (GDEs)
- Provide Long-term Basin-wide Funding Mechanism
- Provide GSP Administration, Monitoring, and Reporting.

The projects and management actions are presented in the GSP with an Implementation Plan that extends to 2045 in five-year intervals; the last interval includes the 2042 deadline for the 20-year implementation to achieve and demonstrate sustainability. Not all projects and management actions are updated specifically in this first Annual Report. This recognizes that the GSP was just adopted in January 2022; consequently, this Report focuses on projects and management actions with active implementation.

It is noted that the District monitoring program is summarized in Section 2, presenting the basis for subsequent information and analyses. Importation and distribution of CVP water in Zone 6 are described in Section 5. Sources of revenue to support District operations are presented in this section.

6-WATER MANAGEMENT ACTIVITIES

Surface Water Storage

Pacheco Reservoir Expansion Project. The surface water storage project with the most advanced planning is the Pacheco Reservoir Expansion (PRE) Project. PRE Project is a collaborative effort of Valley Water, San Benito County Water District, and Pacheco Pass Water District. The project would establish a new dam and expanded reservoir on the North Fork of Pacheco Creek that would store local watershed inflows and CVP supplies for use by the involved agencies. Recent progress includes completion and release in November 2021 of the Draft Environmental Impact Report (EIR), public meeting on the project January 2022, and closure of the public comment period in February 2022. The next step would be preparation of a Final EIR that addresses public comments. The PRE project is eligible to received funding from the Water Storage Investment Program (WSIP) and in April 2022, Valley Water applied for a Water Infrastructure Finance and Innovation Act (WIFIA) loan. Construction is expected to begin in 2024.

Managed Percolation

Ongoing North San Benito Basin management includes percolation of local surface water, wastewater, and CVP water. Considering climate change and potential growth in urban and agricultural water demand, the GSP recognizes the importance of continued percolation activities and future expansion.

Percolation of Local Surface Water. In most years, local surface water is released from Hernandez and Paicines reservoirs for percolation along the San Benito River and Tres Pinos Creek (see **Appendix D**). Releases are managed to maximize percolation along the stream channels of the San Benito River and Tres Pinos Creek and to avoid any losses out of the Basin. Hernandez Reservoir releases in 2022 were below average (reflecting the below normal rainfall), amounting to 3,279 AF. Releases from Paicines were 210 AF, also below average for the second year in a row.

Percolation of Wastewater. Wastewater is percolated by the City of Hollister at its Domestic and Industrial plants, by SSCWD at its Ridgemark Facilities, and by Tres Pinos County Water District. While the City of San Juan Bautista wastewater treatment plant also discharges wastewater, the flows are not considered to percolate to the groundwater basin because of local hydrogeologic conditions that result in outflow to San Juan Creek. As described in the next section, the City of San Juan Bautista Regional Water and Wastewater Solution (now being built) will convey San Juan Bautista wastewater to the City of Hollister WWTP. Recent changes in operation of the wastewater facilities (including increased water recycling) and decreased municipal water use have decreased the volume percolating to the groundwater. Information about the amount of groundwater recharged from wastewater facilities is found in **Appendix D**.

Percolation of CVP Water. In Water Year 2022, the District percolated only 2 AF of CVP water because CVP allocations were severely reduced. In normal and wet years, the District percolates in four dedicated off-stream basins; locations are shown in **Figure 6-1.** The managed recharge of the imported water was critical in replenishing the Basin in the 1980s and 1990s; however, the threat of zebra mussel contamination and low CVP allocations prevented the practice from 2008 to 2016. Given available CVP supply, the District has resumed recharge at dedicated basins adjacent to streams.

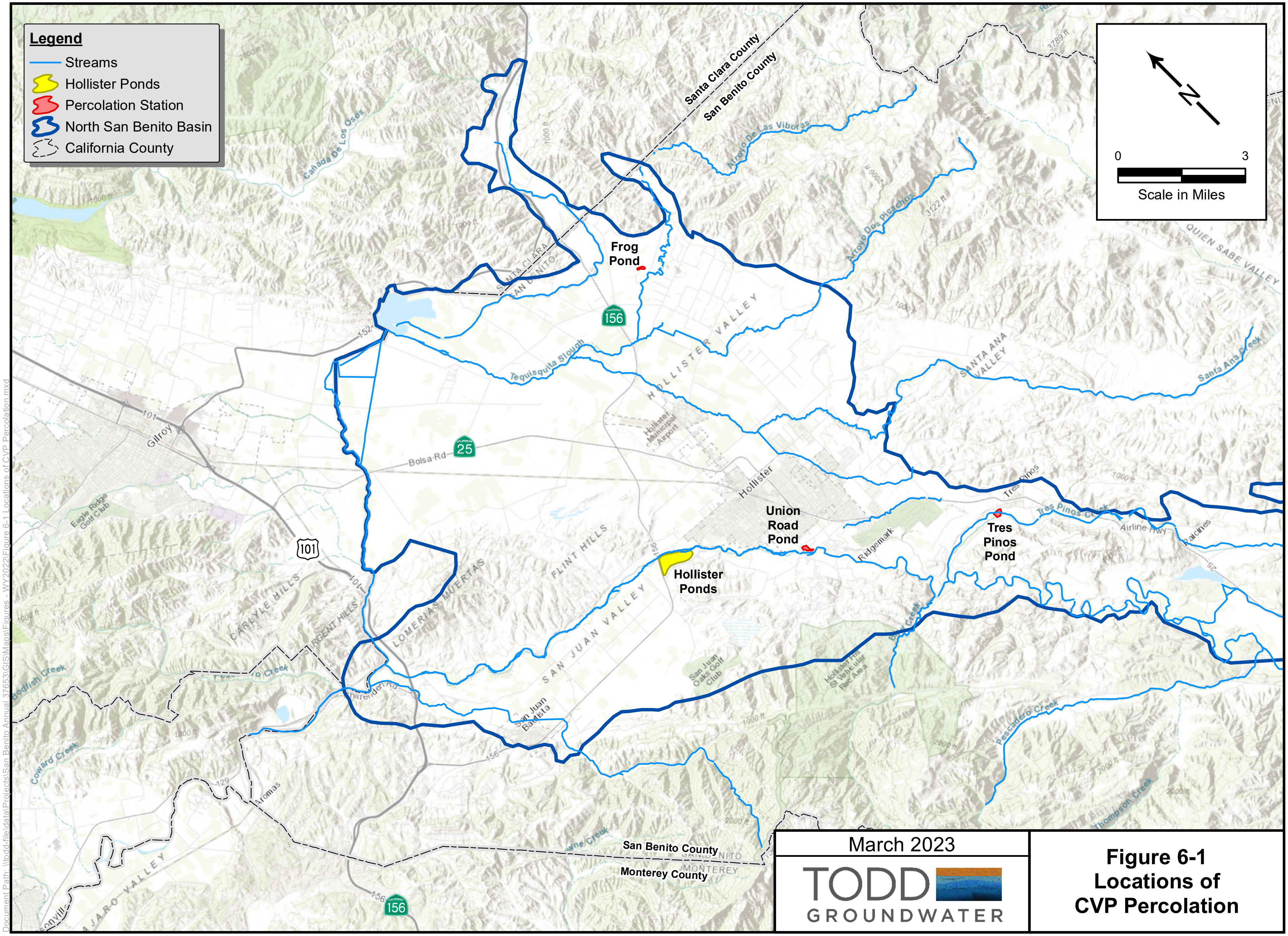
Managed Aquifer Recharge Study

A managed aquifer recharge (MAR) study has been conducted as part of GSP development to evaluate potential locations, general methods of recharge, and multiple sources of water throughout the entire Basin. To evaluate locations, the MAR study used best available information on recharge parameters and applied a detailed geographic information system (GIS) index-overlay method to evaluate potential locations. Numerical modeling also was applied to assess issues such as mounding, migration, and recovery of recharge water. The combination of water source, method, and location that currently appears to have the greatest advantages and the fewest disadvantages involves recharge of CVP water using injection or Aquifer Storage Recovery (ASR) wells in the Hollister MA.

Injection wells were selected as the best method for implementing MAR in the Basin. Disadvantages (including relatively high installation and operation and maintenance costs) are outweighed by advantages, including low land costs, avoidance of percolation rate limitations, and a long potential recharge season. Injection wells also have two important water quality benefits. First, injection avoids moving poor-quality shallow groundwater down to deep water-supply aquifers, and second, it dilutes the mineral content of native groundwater and thereby improves the quality of water pumped from nearby downgradient water supply wells. ASR wells are advantageous in providing recovery/production capabilities in addition to recharge. The MAR feasibility study was completed in July 2022 with subsequent planning for test drilling at two sites in the next few years.

SBCWD has continued with ASR planning through the 2022 San Benito Urban Area Water Supply and Treatment Master Plan Update (2022 Master Plan; HDR, June 2022), which evaluated reliability of existing CVP supply and documented the ASR strategy for optimizing the use of available CVP supply, which includes approximately 6,000 AFY of CVP contract supply that is currently unused in wet years. The overall ASR project will have the capacity to inject, store, and recover up to 6,000 AF of water and is planned for installation of 11 ASR wells, expansion of the WHWTP in Hollister, and construction of a new dedicated water treatment plant (WTP) and associated transmission and conveyance pipelines.

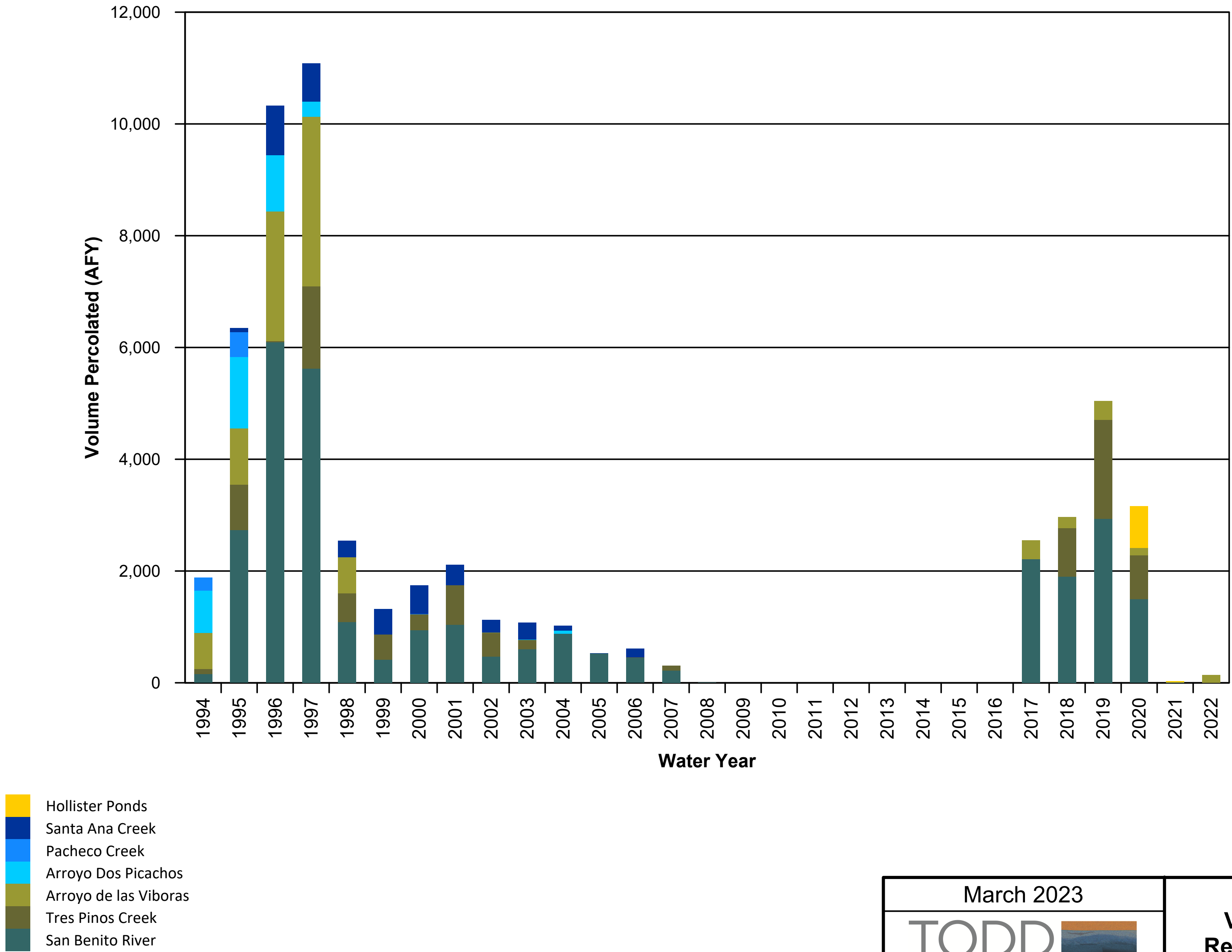
In December 2022, the District progressed with ASR implementation by applying for three grant funding opportunities. The District applied to DWR for a SGMA Implementation Grant and an Integrated Water Resource Management Grant and to USBR for a Small Storage Grant. These grant applications focused on an accelerated phase of the ASR project, termed Accelerated Drought Response Project or ADRoP. The District will be notified in 2023 of the grant funding decisions.



March 2023

TODD GROUNDWATER

Figure 6-1
Locations of
CVP Percolation



Path: T:\Projects\San Benito Annual 37653\GRAPHICS\WY2022\Figure 6-2 Volume of CVP Recharge by Major Waterway over Time.gpj

March 2023

TODD GROUNDWATER

Figure 6-2
Volume of CVP Recharge by Major Waterway over Time

6-WATER MANAGEMENT ACTIVITIES

Water Resources Planning and Conjunctive Use

As presented in the GSP, SBCWD is engaged in several conjunctive use projects; significant updates and recent accomplishments are summarized below.

Urban Water Management Plan (UWMP) and Agricultural Water Management Plan (AWMP). The District, in collaboration with Sunnyslope County Water District (SSCWD) and the City of Hollister, developed the 2020 UWMP for the Hollister Urban Area, which was submitted to DWR in 2021. The agencies continue to implement the Plan. The UWMP provides detailed information on the current and future water supply and demand for the Hollister Urban Area and provides a comparison of supply and demand in normal years plus single-year and multi-year droughts. To address drought and other water shortages, the UWMP promotes water conservation, conjunctive use, and water recycling.

The 2020 Agricultural Water Management Plan (Todd Groundwater, Sept 2021) describes and evaluates water deliveries and uses, sources of supply, water quality, water delivery measurements, water rates and charges, water shortage allocation policies, drought management, and reasonable and practical efficient water management practices. The USBR accepted the AWMP in October 2022.

Hollister Urban Area Water and Wastewater Master Planning Project. This project has represented an ongoing collaborative effort of SBCWD, City of Hollister, and Sunnyslope County Water District to provide a secure and stable water supply to the region. The project has involved provision of water treatment for CVP water, which allows its direct use for municipal and industrial (M&I) purposes. It also allows delivery of improved quality water to customers. While recent USBR allocations for M&I users have been reduced because of drought (see Section 5), the availability of water treatment capacity remains an important element of sustainability. This planning process was updated in 2022 with the San Benito Urban Area Water Supply and Treatment Master Plan Update (HDR, June 2022); this planning is expanded to include City of San Juan Bautista. The Master Plan Update evaluated the reliability of the existing CVP supply and assessed various water supply alternatives to increase the resiliency of the water supply by providing storage of water available in wet years for later use during dry years. The highest-ranking alternative in the 2022 Master Plan is the ASR Project described in the preceding section.

City of San Juan Bautista Regional Water and Wastewater Solution. As described in the GSP, the Regional Solution involves importing high quality water from the West Hills WTP to San Juan Bautista, replacing groundwater use, removing residential self-generating water softeners, reducing industrial salt loading to the City wastewater, and then conveying San Juan Bautista wastewater to the City of Hollister WWTP. The City of San Juan Bautista raised water rates in December 2021 to in part fund this project. In March 2022, the project received federal funding up to $1 million. The Regional Solution is in planning stages; next steps include preparation of the preliminary design report for the sanitary sewer force main project, a sewer rate study, and CEQA compliance. Water deliveries may start in 2024.

North County Project. Test wells drilled in March 2021 as part of the North County Project were added to the North San Benito GSP groundwater level and quality monitoring program. Information about the wells (including ground surface elevation, screened intervals, and baseline conditions) are currently being collected.

Zone 3 Operations Planning Tool. The Zone 3 Operations Planning Tool is continuing to be updated annually and applied to guide Hernandez and Paicines reservoir operations.

Water Recycling. Water recycling is an ongoing conjunctive use project with the City of Hollister. Recycled water currently is provided to approximately 865 acres for agricultural production and landscape irrigation. Recycled water use is documented in Section 5 and Appendix D.

Water Conservation

Water conservation is an important tool to manage demands on the groundwater basin particularly during drought. Water conservation efforts in San Benito County are conducted through the Water Resources Association (WRA). WRA is a cooperative effort among the District, City of Hollister, City of San Juan Bautista, and Sunnyslope County Water District. Following two dry winters and the Governor's proclamations of drought emergencies, Stage 2 -Mandatory Water Conservation was initiated for customers of the City of Hollister, City of San Juan Bautista, and the Sunnyslope County Water District. The water demand measures for stage 2 are detailed in the Water Supply Contingency Plan (WSCP) updated with the UWMP in 2021. While the UWMP was only prepared for the HUA, the WRA encourages the water demand measures Basin-wide.

Retailers are reporting water savings resulting from the demand management measures. Sunnyslope's total water usage was down 15 percent in September 2022 as compared to September 2020. Overall, water demand is 12 percent lower than in 2013, despite a 5 percent population growth.

The WRA added a Turf Removal Program in May 2022 in response to the continued drought. The program has used state funding of $150,000 to pay customers to replace turf. The program pays$2 per square foot of turf removed up to 1,000 square feet ($2,000 maximum rebate). The program requires that participants use materials that are permeable and allow water to infiltrate through the soil. In addition, 25 percent of the area where the turf has been removed needs to be low-water use plants. Applicants have four months to complete their projects after their plans are approved.

As of October 2022, 62,000 square feet of turf were removed, and in December 2022, additional funds were authorized for the program. WRASBC is applying to various grants to continue the Turf Removal Program.

The public education program had been growing steadily over the past several years. The in-person program, which included school visits and guided field trips, have resumed after a pause during the pandemic. Public outreach has also continued on virtual platforms including Facebook. WRA staff continues to author news articles for the online news sites that serve San Benito County. The articles provided water conservation and efficiency tips that were seasonal in nature and they continue to provide timely advice for water use. To supplement this effort, the WRA is developing a series of water conservation videos for distribution to the local news media and the newly updated WRA website.

WRA has been monitoring changes in water use sectors that have occurred over time. With more residential water use and less water use in the agricultural and business sector, they are focusing their conservation message to residential customers. This focus extends to new residential development in the City. WRA reviews landscape plans for the City of Hollister to make sure that new homes comply with the State's Model Water Efficient Landscape Ordinance (MWELO) and follows up with a post inspection after the landscape materials are installed to ensure the landscape plans were followed.

Finally, WRA continues to provide various rebates (toilets, landscape hardware, etc.). The most popular rebate program is the water softener demolishing/replacement program. With provision of CVP supply for municipal use, the delivered water quality has improved, and customers are willing to abandon unneeded water softeners. This program has the benefit of improving the water quality of municipal wastewater and recycled water.

Monitoring Program and DMS

The GSP recognized that a single, reliable, and consistent method of measuring agricultural pumping is needed for the entire Basin. This was identified as a high-priority action, noting that it is required specifically for annual reporting. SBCWD is conducting a pilot study to test the remote sensing services offered by OpenET. OpenET uses satellites to estimate water consumed by crops and other plants and provides free ET data to public water managers throughout the western states. SBCWD will analyze the results of the OpenET pilot and, if applicable, incorporate it into the evaluation of groundwater pumping in North San Benito.

In addition, the GSP's monitoring network assessment provided recommendations for the DMS well inventory, including prompt development of a unique well identification for monitored wells that discontinues use of well names as identifiers. Well identifications were updated to be consistent with DWR site IDs used in the SGMA Portal's Monitoring Network Module (MNM). All wells are identified in this report by State Well Number. Another recommendation was to enhance the DMS with cross-referencing of monitoring sites (groundwater and surface water) relative to location and monitoring for regional groundwater level, groundwater quality, shallow groundwater, subsidence, or managed aquifer recharge. The DMS was updated for groundwater levels, pumping, CVP deliveries, water quality, and reservoir water balances, and cross referencing has been initiated.

6-WATER MANAGEMENT ACTIVITIES

Monitoring Well Network

The GSP's assessment of the monitoring network identified data gaps including the uneven distribution of monitored wells across the Basin, reliance on private production wells, and insufficient groundwater level data on vertical gradients. Installation of new dedicated monitoring wells in the Basin was identified as a top priority to enhance the existing groundwater monitoring network. This need reflected historical data gaps in the Basin related to water level and water quality monitoring and newly identified data gaps related to monitoring groundwater elevations in areas of interconnected surface water and GDEs. In 2022, new monitoring wells were added to the monitoring program, including six shallow and six deep monitoring wells. The wells are entered in the DMS and are sampled as part of the regular monitoring. Additional information about these wells including the reference point and well depths will be added to the DMS when available. These wells will continue to be monitored by SBCWD for inclusion in future annual reports and periodic GSP updates.

Develop Response Plans

The GSP concludes that the Basin is managed sustainably relative to groundwater levels, but nonetheless, recognizes that declining groundwater levels could occur rapidly and approach an MT level during drought. Regular groundwater level monitoring and annual reporting were identified to provide an early warning system. WY 2022 provided real-time experience; groundwater level data and hydrographs were reviewed as they came available. Some changing trends in groundwater levels noted in 2021 may be due in part to land use and pumping changes; more information should be gathered about the volume and location of agricultural pumping. Similarly, the GSP review of water quality data has indicated the potential for rapid increases in some constituents. While likely indicating a local problem and not a basin-wide sustainability issue, the usefulness of prompt and systematic examination was recognized. An Action Plan has been prepared to guide the District's response in the event of rapid and potentially problematic changes. The Plan, included in **Appendix A,** details a four-step process to respond to potentially problematic changes relative to groundwater level or water quality thresholds is triggered. These steps include:

1. Identify exceedance and investigate the representative monitoring well area
2. Determine contributing factors
3. Evaluate implementation of specific management actions and/or projects
4. Adopt Outreach and Enforcement Plan

Water Quality Improvement Programs

The GSP identified potential management actions to enhance water quality including collaboration with UC Extension and other organizations toward reduced nitrate and salt loading by agriculture, support to farmers for use of remote sensing to optimize fertilizer applications, and cooperation with the County and local agencies on regulation of water softeners and wastewater treatment/disposal including onsite wastewater treatment systems. As noted above, the most popular rebate program for the WRA is the water softener demolishing / replacement program.

Reduce Potential Impacts to GDEs

A recommended management action is to reduce potential impacts to GDEs. Foremost among specific actions is installation of dedicated shallow monitoring wells to measure water table depth at locations where riparian vegetation might potentially be impacted by pumping. In 2021, six shallow monitoring wells were installed at selected locations near the Pajaro River, Pacheco Creek, San Benito River (three sites), and Tres Pinos Creek. These continue to be monitored and will be included in future annual reports and periodic GSP updates.

Long-term Funding

Groundwater sustainability necessitates the continuation of activities including monitoring, data compilation, data analysis, numerical model update, public outreach and annual reporting, five-year GSP updates, investigations, coordination with other agencies, and program administration. While SBCWD has conducted such activities, SGMA requirements are more comprehensive and rigorous. In addition, the extent of activities encompasses the entire North San Benito Groundwater Basin. Accordingly, the GSP identifies management actions to provide for long-term, basin wide funding.

This section describes SBCWD's ongoing sources of operating revenue for Zone 6 and presents an update on establishment of a groundwater management fee for the entire North San Benito Basin.

Financial Information

The District derives its operating revenue from charges levied on landowners and water users. Non-operating revenue is generated from property taxes, interest, standby and availability charges, and grants. District zones of benefit are listed in **Appendix A**. Zone 6 charges, relating to the importation and distribution of CVP water, are the focus of this section. A brief Annual Groundwater Memorandum Report (Appendix A) was presented to the SBCWD Board of Directors on January 9, 2023, including the recommended groundwater rates and presenting the technical justification for the rates.

Table 5-1 presents the groundwater charges for Zone 6 water users, which reflect costs associated with monitoring and management. A full worksheet of how groundwater charges are determined can be found in **Appendix G**. Groundwater charges are adjusted annually in March. For March 2022 – February 2023, District rates are $13.55 for agricultural use and $40.55 for M&I use. The District adopts rates on a three-year cycle. For next year, March 2023 through February 2024, adopted groundwater rates are the same for Agriculture and M&I users at $13.75.

TABLE 6-1. ADOPTED GROUNDWATER CHARGES

Year	Agriculture ($/AF)	M&I ($/AF)
2021-2022	$13.55	$40.55
2022-2023	$13.55	$40.55

CVP rates (provided by the USBR) include the cost of service, restoration fund payment, charges for maintenance of San Luis Delta Mendota Water Authority facilities, and other fees (the breakdown is found in **Appendix G**). The District's blue valve rates (paid by users of CVP water) include a water charge and a power charge. Additionally, the standby and availability charge is a $6 per-acre charge assessed on all parcels with access to CVP water (an active or idle turnout from the distribution system). **Table 5-2** shows the CVP water charge and **Table 5-3** shows the CVP power charge.

TABLE 6-2. ADOPTED BLUE VALVE WATER CHARGES

	Blue Valve Water Charge ($/AF)				
	Agricultural			Municipal & Industrial	
Year	Non - Full Cost	Full Cost (1a)	Full Cost (1b)	Small Parcel & Contract	Wholesale
2021-2022	$274.00	$411.00	$433.00	$424.00	$424.00
2022-2023	$274.00	$411.00	$433.00	$424.00	$647.00

TABLE 6-3. ADOPTED BLUE VALVE POWER CHARGES

Blue Valve Power Charge ($/AF)	Subsystem 2	Subsystem 6H	Subsystem 9L	Subsystem 9H	All other subsystems
2021-2022	$85.35	$41.50	$93.55	$138.25	$35.75
2022-2023	$85.35	$41.50	$93.55	$138.25	$35.75

Recycled water charges (**Table 5-4**) are set to recover current operating and maintenance costs related to the water service. Recycled water rates include those associated with water supply, water quality, and infrastructure.

TABLE 6-4. ADOPTED RECYCLED WATER CHARGES

	Recycled Water ($/AF)	
Effective	Agriculture Rate	Power Charge
4/1/2022	$211.00	$63.09
3/1/2023	$294.70	$101.10

6-WATER MANAGEMENT ACTIVITIES

Groundwater Management Fee

The District is authorized by California Water Code Section 10730(a), to collect fees to recover costs for GSP development, monitoring, and GSP Annual Reports. In July 2021, the SBCWD Board of Directors passed two resolutions respectively to levy a groundwater management fee and to request that the County of San Benito collect the groundwater management fee on the property tax rolls. The groundwater management fee is based on assessor's parcels and acreage, as the most appropriate way to ensure property owners are paying their fair share toward cost recovery. The annual rates are shown in **Table 6-5**.

Land categories as outlined below have been identified as the basis for application of fees to land within the Basin:

- Valley areas overlying productive portions of the Basin and benefitting significantly from GSP development and implementation, including major municipal and industrial areas, will be charged a land-based fee.
- Upland areas (UA) with less access to groundwater and insignificant benefit of groundwater management and GSP development will not be charged a fee.

TABLE 6-5. GROUNDWATER MANAGEMENT FEE

Groundwater Management Fee ($/Acre)	
2021-2022	$5.77
2022-2023	$5.92
2023-2024	$6.07
2024-2025	$6.23
2025-2026	$6.39

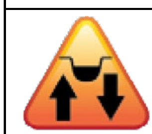
Those who receive their water through municipal agencies pay fees to their respective agencies. All other landowners are charged a fee as part of their San Benito County tax bill. It is expected that the District will have sufficient data to revise the Groundwater Management Fee to account for cost-recovery of extraction measurements during the Periodic Update of the GSP, in five years.

7-GROUNDWATER SUSTAINABILITY

SGMA Indicators

Of the six sustainability criteria developed by DWR, five are relevant to North San Benito Basin (seawater intrusion is not relevant). As documented in the GSP, the Basin has been and is being managed sustainably relative to all criteria. Accordingly, sustainability does not need to be achieved, but it does need to be maintained through the planning and implementation horizon. This will involve continuation and improvement of existing management actions—most notably import of Central Valley Project (CVP) water and its conjunctive use with groundwater. It also will include improvement and expansion of management actions and monitoring.

TABLE 7-1. SGMA INDICATORS

	Indicator	Status of Minimum Threshold
	Groundwater-Level Declines	Compile water level data. Compare key wells elevations with MTs
	Groundwater-Storage Reductions	Compute groundwater storage using the numerical model.
	Water-Quality Degradation	Compile water quality data. Summarize the findings for the triennal review.
	Land Subsidence	Download and review DWR InSar data
	Interconnected Surface-Water Depletions	Review key shallow wells elevations with MTs

While the North San Benito Basin has been managed sustainably, the following sustainability criteria were defined in the GSP because potential exists for undesirable results.

- The Minimum Threshold relative to **chronic lowering of groundwater levels** is defined at designated Key Wells by historical groundwater low levels adjusted to provide reasonable protection to nearby wells. Undesirable results are indicated when two consecutive exceedances occur in each of two consecutive years, in 60 percent or more of the key wells (e.g., three of five wells) in each Management Area. The Measurable Objective is to maintain groundwater levels above the MTs and to maintain groundwater levels within the historical operating range.

- The Minimum Threshold for **reduction of storage** for all Management Areas is fulfilled by the minimum threshold for groundwater levels as proxy. The Measurable Objective for storage is fulfilled by the MT for groundwater levels, which maintains groundwater levels within the historical operating range.
- The Minimum Threshold for **land subsidence** is defined as a rate of decline equal to or greater than 0.2 feet in any five-year period. This has been considered in terms of a potential cumulative decline equal to or greater than one foot of decline since 2015; 2015 represents current conditions and the SGMA start date. The extent of cumulative subsidence across the Basin will be monitored and evaluated using InSAR and UNAVCO data. Subsidence is closely linked to groundwater levels, and it is unlikely that significant inelastic subsidence would occur if groundwater levels remain above minimum thresholds.
- The Minimum Thresholds for **degradation of water quality** address nitrate and TDS for each MA. The MT for nitrate is defined initially as the percentage of wells with concentrations exceeding the nitrate Maximum Contaminant Limit (MCL) (45 mg/L) based on current conditions (2015-2017). The MT for TDS is defined initially as the percentage of wells with concentrations exceeding the TDS value of 1,200 mg/L based on current conditions. The Measurable Objectives for both are defined as maintaining or reducing the percentage of wells with median concentrations exceeding the MTs.
- The Minimum Threshold for **depletion of interconnected surface water** is the amount of depletion associated with the lowest water levels during the 1987-1992 drought, with some adjustments made for wells with groundwater levels lower in 2016 than in 1992. Undesirable results would occur if more than 25 percent of monitored wells within 1 mile of a shallow water table reach along the Pajaro River, Pacheco Creek, San Benito River, or Tres Pinos Creek had static spring water levels lower than the lowest static spring water level during 1987-1992.

Updates on SGMA Indicators

Chronic lowering of groundwater levels. Sustainability criteria (minimum thresholds and measurable objectives) for groundwater levels rely on a network of representative monitoring wells (Key Wells). The MT for a Key Well was based on its historical low levels and adjusted as needed to minimize any risk to nearby domestic wells of future low-water levels. For each Management Area, **Figures 3-4 through 3-7** show the Key Well hydrographs and their respective MTs for groundwater levels. Current water levels are above the MT in all key wells. **Table 7-3** lists the 22 key wells and their respective MTs, as well as the minimum groundwater elevation for WY 2022. Groundwater elevations were measured above the MT in 17 wells, one well was flowing artesian wells (and thus above the MT), and two wells were listed as temporarily inaccessible. Two wells (one in San Juan and one Southern) had groundwater elevations drop below the MT. In San Juan MA, Well 13-5-6L1 was first measured below the MT in October 2021 and reported in last year's annual report. This represents the second year remaining below the MT. The MT is triggered if 60 percent of wells in the MA are below the threshold – for now this well represents 25 percent of the monitored wells in San Juan. While no action is required, this area should be considered for targeted management. In Southern MA, Well 14-6-13B1 was lower than the threshold for the first time and no action is required. The last three years have been dry and marked with record low CVP allocations, resulting in lowering water levels. If hydrologic conditions improve next water year, these water levels will also likely improve. Overall, the data indicate that the Basin is not currently affected by undesirable results due to chronic lowering of groundwater levels but continue monitoring especially in these areas is recommended.

TABLE 7-2. KEY WELLS

Groundwater Level Key Well	MA	Minimum Threshold Depth to Water (ft-bgs)	Minimum Threshold Elevation ft (NAVD 88)	Min Groundwater Elevation WY 2022	Above MT	Years Below MT
11-4-25H2	Bolsa	145	4.0	77.7	Y	
11-5-21E2	Bolsa	63	92.0	155	Y	
11-5-28B1	Bolsa	102	66.0	168	Y	
12-5-06L1	Bolsa	176	1.0	140.61	Y	
12-5-17D1	Bolsa	185	32.0	54	Y	
11-5-13D1	Hollister	97	161.0	202.17	Y	
11-5-35G1	Hollister	104	102.0	166.28	Y	
12-5-03B1	Hollister	96	86.0	Artesian	Y	
12-5-24N1	Hollister	160	110.0	Temporarily inaccessible	Y	
12-5-34P1	Hollister	150	144.0	220	Y	
12-6-06L4	Hollister	64	184.0	213.88	Y	
13-6-19K1	Hollister	109	313.0	357.75	Y	
12-4-17L20	San Juan	47	93.0	116.9	Y	
12-4-26G1	San Juan	152	58.0	146.69	Y	
13-4-01K1	San Juan	75	148.0	Temporarily inaccessible	Y	
13-4-03H1	San Juan	155	52.0	123.2	Y	
13-5-6L1	San Juan	110	131.5	105.55	N	2
14-6-13B1	Southern	59	637.0	631.18	N	1
14-6-26F0	Southern	45	556.0	635.9	Y	
14-6-26H1	Southern	136	609.0	626.5	Y	
14-6-26K1	Southern	73	623.0	635.63	Y	
14-7-20K1	Southern	79	687.0	711.35	Y	

Reduction of storage. This indicator is tracked using the groundwater levels at key wells as a proxy. In addition, the change in groundwater in storage is estimated by the numerical model (Section 4). The groundwater level data indicate that the Basin is not currently affected by undesirable results due to depletion of groundwater storage.

Land Subsidence. Land subsidence is tracked using the regional InSAR data and the site-specific UNAVCO station data provided by DWR) on its SGMA Data Viewer (DWR 2022). The most recent InSAR maps (change in elevation over WY 2022) show localized areas of displacement. A small area in San Juan and four non-contiguous areas in northwest Bolsa show declines up to 0.15 feet. These declines are less than the 0.2 feet cited in the MT. The UNAVCO data from Station 242 in northwest Bolsa also indicate ground surface decline. A more comprehensive analysis of the potential for subsidence will be included in the five-year GSP update.

Degradation of water quality. Water quality (TDS, nitrate) continues to be monitored in the SBCWD Water Quality Monitoring Program. As discussed in Section 3, this year was the detailed analysis and comparison of triennial data with the Minimum Thresholds. For 2020-2022, the Southern, Hollister and Bolsa MAs showed decreases in the percent of wells that exceeded the respective basin objectives (based on 2015-2017) established in the GSP.

For 2020-2022, the San Juan MA showed an increase in the percent of wells with TDS concentrations greater than 1,200 mg/L basin objective, amounting to 54 percent, which is greater than the MT (45 percent). However, this exceedance appears to be an artifact of the data. In brief, the number of wells sampled in San Juan MA during 2020-2022 increased between the two time periods. Most of these wells (part of the Irrigated Lands Program (Aglands), were only sampled once during 2020-2022, and generally are more shallow wells likely with relatively high TDS concentrations. Accordingly, the higher percent reflects a change in the number and type of wells sampled and not a regional shift in water quality. The SBCWD monitoring program, while reporting fewer wells, is more consistent and showed only two out of six monitored wells (33%) in the San Juan MA with TDS concentrations greater than 1,200 mg/L.

This particular increase in the San Juan MA does not represent a regional change in groundwater quality; continued monitoring and expanded dedicated monitoring in San Juan MA is recommended.

Depletion of interconnected surface water. Nineteen wells are currently monitored for water levels within 1 mile of stream reaches where springtime depth to water is typically 20 feet or less (and the Key Wells are not separated from the reach by a fault). The locations of the wells are shown as orange dots in **Figure 3-4** through **3-7** for each MA. The MT for these wells is based on spring 1992 water levels or in some cases Spring 2016, whichever was lower. **Table 7-3** lists the nineteen wells and their respective MTs, as well as the groundwater elevation for Spring 2022. Based on spring water levels, 16 wells had groundwater elevations measured above the MT and one well was a flowing artesian and thus above the MT. Two wells were listed as temporarily inaccessible. Only one of the key wells for surface water interconnection was below the MT level. Well 11-5-20N1 located in the Bolsa MA on Tequisquita Slough showed a depth to water of 61.43 feet bgs, slightly lower than the 61 feet bgs threshold. Additional data and analysis are needed at this well to understand the seasonal variation. Future monitoring will include monthly measurements to provide more baseline data for the spring season. This one well represents six percent of the total monitored in Spring 2022. To represent an undesirable result, the MT indicates that 25 percent of wells would show levels below the MT. This has not occurred as of 2022.

TABLE 7-3. INTERCONNECTED SURFACE WATER WELLS

Surface Water / GDE Key Well	Spring MT Groundwater Elevation (ft NAVD88)	Depth to Water (ft)	Groundwater Elevation Spring 2022	Above MT	Years Below MT
11-4-26B1	127.0	18.0	134.35	Y	
11-4-34A1	128.0	14.0	129.75	Y	
11-5-13D1	214.0	44.0	224.55	Y	
11-5-20N1	90.0	61.0	88.57	N	2
11-5-27P2	122.0	64.0	162.65	Y	
11-5-28B1	128.0	39.0	Artesian	Y	
12-4-17L20	113.0	27.0	119.3	Y	
12-4-21M1	120.0	51.0	137.46	Y	
12-4-26G1	114.0	96.0	149.5	Y	
12-4-34H1	117.0	82.0	145.19	Y	
13-5-11E1	220.0	87.0	275.7	Y	
13-5-13F1	316.0	31.0	324.6	Y	
13-6-19J1	412.0	38.0	Temporarily inaccessible		
13-6-19K1	341.0	81.0	Temporarily inaccessible		
14-6-13B1	633.0	63.0	636.4	Y	
14-6-26F0	624.0	68.0	638.43	Y	
14-6-26H1	620.0	62.0	633.25	Y	
14-6-26K1	618.0	50.0	640	Y	
14-6-35B1	637.0	69.0	654.05	Y	

8-RECOMMENDATIONS

District policies and programs have served to effectively manage water resources for many years. The District, working collaboratively with other agencies, has eliminated historical overdraft through importation of CVP water, has developed and managed multiple sources of supply to address drought, has established an active and effective water conservation program, has initiated programs to protect water quality, and has improved delivered water quality to many municipal customers. The District also has provided consistent reporting and outreach. The following recommendations are responsive to the District Act and support effective management consistent with SGMA.

Monitoring Programs

Through GSP implementation, the monitoring programs will continue to be improved to provide the SBCWD Board of Directors with information to support management of the groundwater supplies of the District and its zones. Detailed monitoring recommendations are being developed as part of the GSP, including accurate measurement of agricultural groundwater pumping, which has been identified as an important data gap. Accurate groundwater production data is consistent not only with SGMA but also with the District Act, by which the Board of Directors can order an Annual Report, which reports on total production of water from the groundwater supplies of the District during the water year. This supports the following recommendations, provided in response to the District Act, as to the quantity of water needed for surface delivery and for replenishment of groundwater supplies, and whether or not a groundwater charge should be levied and if so, what rate per acre-foot.

Groundwater Production and Replenishment

Past District percolation operations helped to reverse historical overdraft and then accumulate a water supply reserve. The District currently manages groundwater storage and surface water to minimize excessively high or low groundwater elevations on a temporal and geographic basis. The District should continue to operate Hernandez and Paicines to improve downstream groundwater conditions. In 2022, the District provided off-channel percolation of CVP water; this too should be continued, albeit recognizing the limited availability of CVP water. Persistent, local low groundwater levels will be noted. Basin-wide analysis of opportunities for additional percolation is being conducted as part of the Round 3 Managed Aquifer Recharge Study to develop additional percolation capacity to capture and store available imported water when available; such replenishment operations are critical to sustainable groundwater supply.

CVP Purchase Recommendation

CVP imports continue to be a critical source of supply for agricultural users and M&I. The water retailers rely on continued CVP water, treated through Lessalt or West Hills WTP, to provide quality drinking water to their customers. This ability to maximize CVP use will increase flexibility for local water users to use groundwater or CVP. CVP also provides better quality water for delivery to municipal customers and results in improved wastewater quality, which supports water recycling. In addition, the District is pursuing projects to store CVP imports in wet years through ASR and can continue to percolate the water through off-stream channels. As such, the District should continue to purchase the maximum available volume allocated during the upcoming contract year.

Groundwater Charges

The groundwater charge for the USBR contract year (March 2022-February 2023) is recommended to be $13.55 per AF for agricultural use in Zone 6 and a groundwater charge of $40.55 per AF is recommended for M&I use. For March 2023 – February 2024, District rates are proposed to be $13.75 for agricultural use and $13.75 for M&I use. The District adopts rates on a three-year cycle. Current water rates were adopted January 30, 2019.

9-REFERENCES

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San Luis & Delta-Mendota Water Authority (SLDMWA), Water Supply Reports, November 2021, http://www.sldmwa.org/operations/water-supply-reports/

State Water Resources Control Board (SWRCB), 2012, Water Quality Order 2012-0010, General Waste Discharge Requirements for Aquifer Storage and Recovery Projects that Inject Drinking Water into Groundwater, available at https://www.waterboards.ca.gov/board_decisions/adopted_orders/water_quality/2012/wqo2012_0010_with%20signed%20mrp.pdf

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Todd Groundwater, San Benito County Salt and Nutrient Management Plan, 2014.

Todd Groundwater, 2021, North San Benito Groundwater Sustainability Plan, November 2021.

Todd Groundwater, North Hollister Test Well Drilling, Construction, and Testing, January 2022.

Western Regional Climate Center (WRCC) https://wrcc.dri.edu/cgi-bin/cliMAIN.pl?ca4025

APPENDIX A REPORTING REQUIREMENTS

List of Tables

List of Attachments

APPENDIX A REPORTING REQUIREMENTS

The San Benito County Water District Act (1953) is codified in California Water Code Appendix 70. Section 70-7.6 (District Act) authorizes the District Board of Directors to require the District to prepare an annual groundwater report. This Annual Report satisfies both the requirements of a SGMA Annual Report and report detailed in the District Act. The District Act requires that the report address the District and its zones of benefit (**Table A-1**) for the water year. While section 70-7.2 defines the water year as March through February, the same as the USBR contract year, Section 70-7.6 identifies data sets to be documented for the hydrologic water year, October through September.

Table A-1. District Zones of Benefit

Zone	Area	Provides
1	Entire County	Specific District administrative expenses
3	San Benito River Valley (Paicines to San Juan) and Tres Pinos River Valley (Paicines to San Benito River)	Operation of Hernandez and Paicines reservoirs and related groundwater recharge and management activities
6	Hollister and San Juan Management Areas of North San Benito Groundwater Basin (previously San Juan, Hollister East, Hollister West, Pacheco, Bolsa SE, and Tres Pinos subbasins)	Importation and distribution of CVP water and related groundwater management activities

The Board has consistently ordered preparation of Annual Reports, and the reports have included the contents specified Section 70-7.6. The following table shows the contents specified by the Act and the section of the Annual Report where the information is available.

The full text of Appendix 70, Section 70-7.6 through 7.8 is enclosed in this appendix.

Table A-2. District Act Requirements

District Act Requirements		Annual Report Section	Notes
Overdraft	An estimate of the annual overdraft for the current water year and for the ensuing water year. Information for the consideration of the Board in its determination of the annual overdraft and accumulated overdraft as of September 30 of the current year	4	The water balance is simulated for the continuous period from January 1976 through September 2022. The basin is not in overdraft over the contract year (March 2021 through February 2022) or the water year (October 2021 through September 2022).
Total Production	A report as to the total production of water from the groundwater supplies of the District and its zones as of September 30 of the current year.	5	CVP imports, groundwater pumping, and recycled water use are reported for agricultural and other uses for the hydrologic water year ending September 30
	Information for the consideration of the Board in its determination of the estimated amount of agricultural water and the estimated amount of water other than agricultural water to be withdrawn from the groundwater supplies of the District and its zones		
Future Purchase	The amount of water the District is obligated to purchase during the ensuing water year.	5, 8	The allocations for the contract years covered by the report are shown in Tables 5-1 and 5-2. Recommendations to purchase the full amount available are provided.
	A recommendation as to the quantity of water needed for surface delivery and for replenishment of the groundwater supplies of the District and its zones during the ensuing water year.		
Rate	A recommendation as to whether or not a groundwater charge should be levied in any zone(s) of the District in the ensuing water year and if so, a rate per acre-foot for all water other than agricultural water for such zone(s)	6, Appendix G, and Engineer's Report	Rate information is provided by the contract (USBR) year
Other	Any other information the Board requires.	1-9	The report includes SGMA implementation, financial information, and other content requested by staff and Board.

Water Code Appendix 70 Excerpts

Sec. 7.6. the board by resolution require the district to annually prepare an investigation and report on groundwater conditions of the district and the zones thereof, for the period from October 1 of the preceding calendar year through September 30 of the current year and on activities of the district for protection and augmentation of the water supplies of the district and the zones thereof. The investigation and report shall include all of the following information:

(a) Information for the consideration of the board in its determination of the annual overdraft.

(b) Information for the consideration of the board in its determination of the accumulated overdraft as of September 30 of the current calendar year.

(c) A report as to the total production of water from the groundwater supplies of the district and the zones thereof as of September 30 of the current calendar year.

(d) An estimate of the annual overdraft for the current water year and for the ensuing water year.

(e) Information for the consideration of the board in its determination of the estimated amount of agricultural water and the estimated amount of water other than agricultural water to be withdrawn from the groundwater supplies of the district and the zones thereof for the ensuing water year.

(f) The amount of water the district is obligated to purchase during the ensuing water year.

(g) A recommendation as to the quantity of water needed for surface delivery and for replenishment of the groundwater supplies of the district and the zones thereof the ensuing water year.

(h) A recommendation as to whether or not a groundwater charge should be levied in any zone or zones of the district during the ensuing year.

(i) If any groundwater charge is recommended, a proposal of a rate per acre-foot for agricultural water and a rate per acre-foot for all water other than agricultural water for such zone or zones.

(j) Any other information the board requires.

(Added by Stats. 1965, c. 1798, p.4167, 7. Amended by Stats.1967,c.934, 5, eff. July27,1967; Stats. 1983, c. 402, 1; Stats. 1998, c. 219 (A.B.2135), 1.)

Section 70-7.7. Receipt of report; notice of hearing; contents; hearing

Sec. 7.7. (a) On the third Monday in December of each year, the groundwater report shall be delivered to the clerk of the board in writing. The clerk shall publish, pursuant to Section 6061 of the Government Code, a notice of the receipt of the report and of a public hearing to be held on the second Monday of January of the following year in a newspaper of general circulation printed and published within the district, at least 10 days prior to the date at which the public hearing regarding the groundwater report shall be held. The notice shall include, but is not limited to, an invitation to all operators of water producing facilities within the district to call at the offices of the district to examine the groundwater report.

(b) The board shall hold, on the second Monday of January of each year, a public hearing, at which time any operator of a water-producing facility within the district, or any person interested in the condition of the groundwater supplies or the surface water supplies of the district, may in person, or by representative, appear and submit evidence concerning the groundwater conditions and the surface water supplies of the district. Appearances also may be made supporting or protesting the written groundwater report, including, but not limited to, the engineer's recommended groundwater charge.

(Added by Stats. 1965, c. 1798, p. 4167, 8. Amended by Stats. 1983, c. 02,2; Stats. 1998, c. 219 (A.B.2135,2.)

Section 70-7.8. Determination of groundwater charge; establishment of rates; zones; maximum charge; clerical errors

Sec. 7.8. (a) Prior to the end of the water year in which a hearing is held pursuant to subdivision (b) of Section 7.7, the board shall hold a public hearing, noticed pursuant to Section 6061 of the government Code, to determine if a groundwater charge should be levied, it shall levy, assess, and affix such a charge or charges against all persons operating groundwater- producing facilities within the zone or zones during the ensuing water year. The charge shall be computed at fixed and uniform rate per acre-foot for agricultural water, and at a fixed and uniform rate per acre-foot for all water other than agricultural water. Different rates may be established in different zones. However, in each zone, the rate for agricultural water shall be fixed and uniform and the rate for water other than agricultural water shall be fixed and uniform. The rate for agricultural water shall not exceed one-third of the rate for all water other than agricultural water.

(b) The groundwater charge in any year shall not exceed the costs reasonably borne by the district in the period of the charge in providing the water supply service authorized by this act in the district or a zone or zones thereof.

(c) Any groundwater charge levied pursuant to this section shall be in addition to any general tax or assessment levied within the district or any zone or zones thereof.

(d) Clerical errors occurring or appearing in the name of any person or in the description of the water-producing facility where the production of water there from is otherwise properly charged, or in the making or extension of any charge upon the records which do not affect the substantial rights of the assesse or assesses, shall not invalidate the groundwater charge.

(Added by Stats. 1965, c. 1798, p. 4168, 9. Amended by Stats. 1983, c. 402, 3; Stats.1983, c. 402, 3; Stats. 1998, c. 219 (A.B.2135), 3.)

APPENDIX A REPORTING REQUIREMENTS

SGMA Annual Elements Guide

Groundwater Sustainability Plan Annual Report Elements Guide

Basin Name			
GSP Local ID			
California Code of Regulations - GSP Regulation Sections	***Groundwater Sustainability Plan Elements***	**Document *page number(s) that address the applicable GSP element.***	***Notes: Briefly describe the GSP element does not apply.***
Article 5	**Plan Contents**		
Subarticle 4	***Monitoring Networks***		
§ 354.40	**Reporting Monitoring Data to the Department**		
	Monitoring data shall be stored in the data management system developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department.	14-37;133-134	
	Note: Authority cited: Section 10733.2, Water Code. Reference: Sections 10728, 10728.2, 10733.2 and 10733.8, Water Code.		
Article 7	**Annual Reports and Periodic Evaluations by the Agency**		
§ 356.2	**Annual Reports**		
	Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year:		
	(a) General information, including an executive summary and a location map depicting the basin covered by the report.	8-13	
	(b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan:		
	(1) Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:		
	(A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.	61-66	
	(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.	21-28	
	(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.	67; 109-112	
	(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.	70-71	

California Code of Regulations - GSP Regulation Sections	*Groundwater Sustainability Plan Elements*	**Document** *page number(s) that address the applicable GSP element.*	*Notes: Briefly describe the GSP element does not apply.*
	(4) Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.	68-75	
	(5) Change in groundwater in storage shall include the following:		
	(A) Change in groundwater in storage maps for each principal aquifer in the basin.	65	
	(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.	150-154	
	(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.	89-93	

APPENDIX A REPORTING REQUIREMENTS

SGMA Annual Report Data Upload

Basin Number	**3-003.05**
Water Year	2022 (Oct. 2021 - Sept. 2022)
Total Groundwater Extractions (AF)	105,787
Water Use Sector Urban (AF)	4,148
Water Use Sector Industrial (AF)	
Water Use Sector Agricultural (AF)	101,639
Water Use Sector Managed Wetlands (AF)	
Water Use Sector Managed Recharge (AF)	-
Water Use Sector Native Vegetation (AF)	-
Water Use Sector Other (AF)	
Water Use Sector Other Description	Urban includes all municipal and industrial uses

Basin Number	3-003.05
Water Year	2022 (Oct. 2021 - Sept. 2022)
Meters Volume (AF)	-
Meters Description	
Meters Type	
Meters Accuracy (%)	
Meters Accuracy Description	
Electrical Records Volume (AF)	
Electrical Records Description	
Electrical Records Type	
Electrical Records Accuracy (%)	
Electrical Records Accuracy Description	
Land Use Volume (AF)	
Land Use Description	
Land Use Type	
Land Use Accuracy (%)	
Land Use Accuracy Description	
Groundwater Model Volume (AF)	105,787.0
Groundwater Model Description	Numerical Model developed for the GSP and updated for the Annual Report
Groundwater Model Type	MODFLOW
Groundwater Model Accuracy (%)	UNK
Groundwater Model Accuracy Description	Without data on the actual water use it is impossible to calculate the % accuracy
Other Method(s) Volume (AF)	
Other Method(s) Description	
Other Method(s) Type	
Other Method(s) Accuracy (%)	
Other Method(s) Accuracy Description	

Basin Number	3-003.05
Water Year	2022 (Oct. 2021 - Sept. 2022)
Methods Used To Determine	Meters
Water Source Type Central Valley Project (AF)	3,882
Water Source Type State Water Project (AF)	-
Water Source Type Colorado River Project (AF)	-
Water Source Type Local Supplies (AF)	-
Water Source Type Local Imported Supplies (AF)	-
Water Source Type Recycled Water (AF)	611
Water Source Type Desalination (AF)	-
Water Source Type Other (AF)	-
Water Source Type Other Description	-

Basin Number	3-003.05
Water Year	2022 (Oct. 2021 - Sept. 2022)
Total Water Use (AF)	110,279
Methods Used To Determine	
Water Source Type Groundwater (AF)	105,787
Water Source Type Surface Water (AF)	
Water Source Type Recycled Water (AF)	611
Water Source Type Reused Water (AF)	
Water Source Type Other (AF)	3,882
Water Source Type Other Description	CVP
Water Use Sector Urban (AF)	6,955
Water Use Sector Industrial (AF)	
Water Use Sector Agricultural (AF)	103,324
Water Use Sector Managed Wetlands (AF)	
Water Use Sector Managed Recharge (AF)	
Water Use Sector Native Vegetation (AF)	-
Water Use Sector Other (AF)	
Water Use Sector Other Description	Urban includes all municipal and industrial use.

APPENDIX A REPORTING REQUIREMENTS

Memorandum Report:

San Benito County Water District Annual Groundwater Report
for January 9, 2023 Meeting of the Board of Directors

TODD GROUNDWATER

December 15, 2022

MEMORANDUM REPORT

To: Jeff Cattaneo and Steve Wittry, San Benito County Water District

From: Iris Priestaf, PhD and Maureen Reilly, PE

Re: San Benito County Water District Annual Groundwater Report for January 11, 2023 Meeting of the Board of Directors

The San Benito County Water District (District or SBCWD) was formed in 1953 by a special act (District Act) of the State with responsibility and authority to manage groundwater. The District Act authorizes the Board of Directors, at its discretion, to direct staff to prepare an annual report on groundwater conditions of the District and its zones of benefit, such as Zone 6, the area for distribution of Central Valley Project (CVP) water. The groundwater report (addressing the previous water year from October 1 through September 30) also summarizes activities of the District for protection and augmentation of water supplies and provides management recommendations. Annual Groundwater Reports have been prepared since the 1970s and District Act requirements are listed in Appendix A of recent reports.

In response to the 2014 Sustainable Groundwater Management Act (SGMA), the District has become the exclusive Groundwater Sustainability Agency (GSA) for the North San Benito Groundwater Basin (Basin) in San Benito County, led preparation of a Groundwater Sustainability Plan (GSP) for the basin and submitted it to DWR in January 2022. The District has initiated preparation of the second Annual Report in accordance with SGMA and consistent with the District Act. The SGMA Annual Report is planned for completion before April 1, 2023.

This brief Memorandum Report has been prepared at the direction of the SBCWD Board of Directors to address requirements of the District Act, while recognizing that the SGMA Annual Report will provide the substantial documentation that has been presented in previous Annual Groundwater Reports.

Groundwater Basin Conditions

As documented in the GSP, the Basin is not in overdraft. Historical overdraft was halted through importation of CVP water and other management actions. In Water Year 2021-2022 State-wide drought conditions prevailed, and in March 2022, CVP allocations were reduced to zero for agricultural uses and to Public Health and Safety needs for M&I uses. Consistent with the coordinated use of available surface water supplies and groundwater, Zone 6 groundwater production increased in 2020-2021 relative to previous years (Table 1).

Table 1. Groundwater Production in Zone 6 by Water Year, acre-feet per year

	2018-2019*	2019-2020*	2020-2021*	2021-2022*
Agriculture	15,423	17,021	22,614	23,945
Municipal & Industrial	2,660	3,514	6,067	5,840

* based on power meters in Zone 6

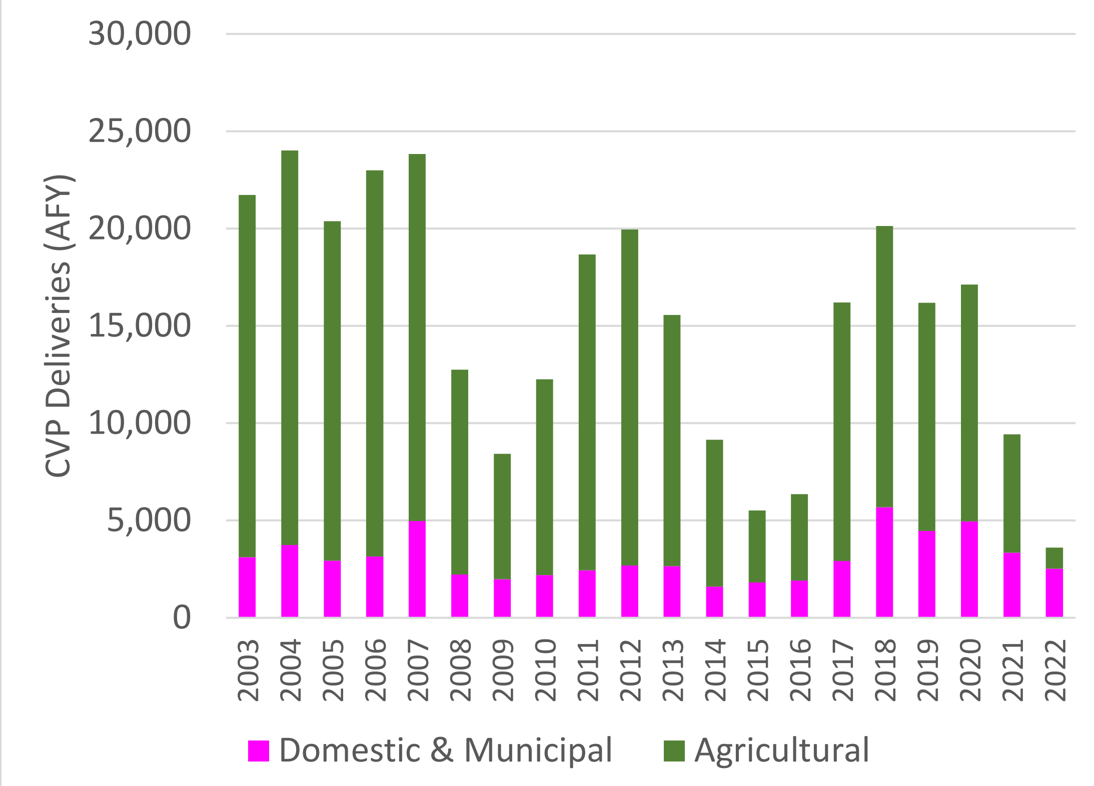
While a drought year such as 2021-2022 may be characterized by increased pumping, short-term groundwater level decline, and storage depletion, North San Benito Basin groundwater levels and storage reserves are managed to stay above quantitative minimum thresholds that are protective of beneficial uses of groundwater.

Water Supplies and Management Activities

As described in the previous Annual Reports, water supply sources available in Zone 6 include local groundwater, imported CVP water, recycled water, and local surface water. These are used conjunctively with the groundwater basin providing important storage. Management actions (also described in the GSP Chapter 8) involve water importation, local water storage, managed aquifer recharge, and water recycling. SBCWD has a contract with USBR for 35,550 and 8,250 AFY of imported water for agricultural and for M&I use, respectively. CVP allocations were reduced to zero for agricultural uses and to Public Health and Safety needs M&I uses in March. In April 2022, SBCWD sent a letter to USBR advocating for additional Public Health and Safety water for M&I users based on total demand, groundwater availability, and water quality needs. Using the guidelines set forth in the "Central Valley Project Municipal and Industrial Water Shortage Policy Guidelines and Procedures" (WSP Guidelines), SBCWD identified a PHS need of approximately 4,483 AF in 2022. Total non-CVP supplies are 1,515 AF, leaving 2,968 AF unmet by non-CVP supplies. SBCWD received a Public Health and Safety allocation of 2,766 AF (33.5 percent of the M&I contract).

The overall delivery of CVP to users was the lowest since the CVP system was expanded into the basin. Figure 1 shows the delivered CVP water by user type over the last 20 years.

Figure 1. CVP Deliveries by User Type (WY 2003- WY 2022)



Ongoing activities include monitoring, data compilation and analysis, numerical modeling, water conservation, water quality improvement programs, stakeholder outreach, reporting, and administrative activities among others that contribute to long-term sustainability.

Recommendations

The following recommendations are responsive to the District Act:

- The District should continue to purchase and supply all imported CVP water available under the SBCWD contract and any additional supplies that can reasonably be attained.
- The District should continue to operate Hernandez and Paicines reservoirs for downstream percolation to improve downstream groundwater conditions.
- The District should continue off-channel percolation of CVP water as available and expand percolation capabilities.
- A groundwater charge should be levied in Zone 6 as substantiated and recommended in the 2022 Annual Groundwater Report. The groundwater charge for the USBR contract year (March 2023-February 2024) is recommended to be \$13.75 per AF for agricultural use in Zone 6 and a groundwater charge of \$13.75 per AF is recommended for M&I use.

APPENDIX A REPORTING REQUIREMENTS

Memorandum Report:

DRAFT North San Benito Groundwater Basin Action Plan

TODD GROUNDWATER

DRAFT

January 25, 2023

MEMORANDUM

To: Steve Wittry, San Benito County Water District

From: Maureen Reilly, PE and Iris Priestaf, PhD, Todd Groundwater

Re: North San Benito Groundwater Basin Action Plan

The North San Benito Groundwater Basin (Basin) Groundwater Sustainability Plan (GSP) set Minimum Thresholds (MTs) for chronic lowering of groundwater levels and interconnected surface water based on groundwater elevations. The GSP concludes that such undesirable results are not occurring in North San Benito and that the Basin is managed sustainably relative to groundwater levels. Nonetheless, declining groundwater levels are likely to occur at times due to drought and climate change and may approach Minimum Thresholds. Similarly, review of water quality data indicates the potential for rapid increases in some constituents. MTs for water quality were also developed based on available water quality monitoring programs and are reviewed triennially. While likely indicating a local problem and not a basin-wide sustainability issue, the usefulness of a systematic response program was recognized. The actions indicated here avoid MTs and help maintain the measurable objectives relative to groundwater levels and groundwater quality.

As a Groundwater Sustainability Agency (GSA), San Benito County Water District (SBCWD) continues to monitor their groundwater level and quality monitoring network and prepares annual SGMA reports that provide an early warning system; however, a response plan is warranted.

WATER LEVELS

A response program for declining groundwater levels would be based on the groundwater level monitoring program and linked to monitoring of the Key Wells shown on **Figure 1**. As groundwater level declines are tracked, if an MT is exceeded or shows a continued decreasing trend then the action plan would be triggered. The action plan has a four-step process:

1. Identify exceedance and investigate the representative monitoring well area
2. Determine contributing factors
3. Evaluate implementation of specific management actions and/or projects
4. Adopt Outreach and Enforcement Plan

Together these four steps provide a framework to take prompt action and respond to undesirable conditions. Response efforts would be developed specific to the management area (MA) and situation.

1. Identify Exceedance and Investigate the Representative Monitoring Well Area

The first step is to review available data (including hydrographs and maps) and identify which well or wells have approached or exceeded the MT. A quality assurance check will be performed to ensure the data represent current conditions. The measured depth to water will be confirmed with those responsible for providing the data along with any reference point information used to calculate the water level elevation.

Next, local conditions will be documented. Information on the local hydrology (precipitation, streamflow, inflow from other basins, etc.) will be collected and reviewed to understand current conditions. Information from nearby wells will be reviewed to determine any potential changes in water levels, pumping, or new wells in the area.

2. Determine Contributing Factors

After the MT exceedance has been verified and local data collected, the contributing factors will be evaluated. Any changes in groundwater management in this area will be documented. This may include changes in recharged volumes or availability of imported water or recycled water to satisfy demand.

Additional local pumping may indicate reduced availability of other water supplies and increased reliance on groundwater, or increased demand including new uses or users. If an increase in pumping is indicated due to increased demand, demand information used in the GSP will be reviewed to determine if demand assumptions need to be updated.

3. Evaluate Implementation of Specific Management Actions and/or Projects

The GSP identifies several Projects and Management Actions (PMAs) to achieve sustainability. The specific PMA that would need to be implemented or increased in the affected area depends on the contributing factors and local conditions. Each MA has unique hydrogeologic, hydrologic, demand, and supply conditions. A specific mitigation plan will be developed in the context of each MA based on the results of the previous two steps.

For the Southern MA, SBCWD would assess availability of local surface water to support additional recharge along the San Benito River and/or Tres Pinos Creek. This could involve application of the Zone 3 Operations Planning Tool (see GSP Section 8.5.4) to surface water reservoir management and percolation to increase groundwater in storage for the Southern MA agricultural areas and Paicines community. This action would include consideration of downstream conditions in the Hollister and San Juan MAs.

For the Hollister and San Juan MAs, responses would likely involve more active/focused conjunctive use operations. These would include additional recharge along the San Benito River and/or Tres Pinos Creek, additional purchases or local provision of imported water (as available) with active percolation or in-lieu recharge, and acceleration of projects such as the MAR project.

For the Bolsa MA, supplemental water sources are not readily available. Following the initial response actions listed above, specific measures to manage water demand should be identified (for example, a tiered pricing structure) and classified to provide staged responses to problems of increasing severity.

In addition to the above, focused water conservation measures relevant to each MA also would be considered.

4. Adopt Outreach and Enforcement Plan

Initial responses would involve intensified outreach and educational efforts by the GSA (or WRA) and promotion of voluntary efforts. Responses may involve implementing the Water Shortage Contingency Plan for a specific area to reduce local demand and therefore local pumping.

WATER QUALITY

A response program is presented here to address rapid, potentially adverse changes in groundwater quality. This program is based on the water quality monitoring program with links to the Water Quality Key Wells and other available water quality data from other ongoing programs. The program is focused on detecting local sources of degradation that impact groundwater quality significantly and rapidly. This is distinct from the ongoing water quality improvement programs that already address the typically slow, dispersed loading of salts and nitrates from agricultural, rural, and urban activities. The intent is early detection of local impacts and implementation of appropriate actions to address local contamination before impacts become severe or widespread. As with the water level program, a four-stage approach is recommended.

The action plan has a four-step process:

1. Identify exceedance and investigate changes in water quality
2. Determine contributing factors
3. Evaluate implementation of specific management actions and/or projects
4. Adopt Outreach and Enforcement Plan

1. Identify Exceedance and Investigate Changes in Water Quality

As with water levels, the first step is to review the data and identify the area of concern. The MT for water quality was developed based on the percentage of monitored wells above a target concentration for total dissolved solids (TDS) and nitrate. This triennial calculation relies on available data from the SBCWD monitoring program as wells as other ongoing regulatory programs such as irrigated lands. If the MT in a MA has been exceeded, it would indicate several wells have shown an increase in the constituent. Trends in SBCWD-monitored wells could provide additional information in the interim years. All wells that have exceeded the MT will be identified and data for all water quality parameters will be compiled. A quality assurance check will be performed to ensure that all water quality data represent current conditions. While TDS and nitrate are the only two parameters with MTs in the GSP, additional constituents could provide information on potential groundwater quality changes.

Other constituents are regularly monitored but occurrences of these are either under regulation by the Regional Water Quality Control Board (RWQCB) (e.g., perchlorate) or are naturally occurring with no recent exceedances of maximum contaminant levels (MCLs) and limited potential for mobilization due to management actions (e.g., arsenic, chromium, iron, and manganese). However, if preliminary data show increasing trends in other constituents, those data could trigger the action plan as well.

2. **Determine Contributing Factors**

As with groundwater levels, local conditions will be reviewed to determine the contributing factors for the changes in water quality. While the natural water quality of groundwater in the Basin is characterized as highly mineralized (reflecting natural hydrogeologic processes), changes in groundwater quality will be most likely affected by human activities including agricultural, rural, urban, and industrial land uses. Contributing factors for increased TDS may include infiltration of urban runoff, agricultural return flows, and wastewater disposal. Elevated concentrations of nitrate are associated with agricultural activities, septic systems, confined animal facilities, landscape fertilization, and wastewater treatment facility discharges.

In some areas, past agricultural uses may result in legacy loading of both TDS and nitrate. In other words, constituents historically applied through fertilizers and irrigation are still held up in the vadose zone and will eventually contribute to TDS and nitrate in the groundwater. To the extent possible, data on historical practices in the area and water quality in the shallow zone will be assessed to determine if this is a contributing factor.

Changes in groundwater management (e.g., recharge and water supply distribution) and its effect on the local wells with increased TDS and nitrate conditions will also be documented as and where they have the potential to contribute to changes in groundwater quality.

3. **Evaluate Implementation of Specific Management Actions and/or Projects**

The GSP identified several Projects and Management Actions to achieve sustainability. The specific PMA that would need to be implemented or increased in the affected area depends on the contributing factors and local conditions. Each MA has unique natural water quality conditions, potential sources of contamination, and possible PMAs to implement. A specific mitigation plan will be developed in the context of each MA based on the previous two steps. Actions applicable to all MAs would include additional water quality sampling and identification of potential point sources of water quality degradation such as septic tank failures, confined animal facilities, and industrial or commercial sites. Actions would include collaboration with appropriate state and local agencies.

For the Southern MA, SBCWD could assess additional recharge along the San Benito River and Tres Pinos Creek, to increase high quality groundwater in storage for the agricultural areas and Paicines community.

For the Hollister and San Juan MAs, responses would likely involve more active/focused conjunctive use operations with better quality imported water. In Hollister MA, the quality of recycled water produced will be assessed to determine any potential effects or application for non-potable uses to offset the use of poor-quality groundwater.

For the Bolsa MA, supplemental water sources are not readily available. Potential sources of increased TDS and nitrate should be identified as soon as possible to protect the groundwater supply. Also, domestic well users should monitor their wells to ensure continued safe drinking water.

4. **Adopt Outreach and Enforcement Plan**

As many of the potential sources for water quality contamination are already regulated under other programs, the initial response would include notification of appropriate agencies of potential water quality concerns and proposed implementation actions.

In addition, public outreach is critical to keep the public informed and provide support as needed to the users of the groundwater basin. If nitrate levels in a local area have exceeded the MCL, the GSA should work with other regulatory agencies to ensure that domestic wells relying on groundwater for potable supply have proper treatment or other sources of supply.

Each response action may involve specific and more intensive outreach and noticing efforts, as described above. Thereafter, the response programs will be ongoing, and implemented when needed. It is anticipated that the rapid response programs would be implemented within the existing authorities and water management roles of the GSA and thus would not trigger any permitting requirements, environmental review, or regulatory processes. The MTs have been established with direct reference to regulatory standards, most notably the Basin Plan Objectives set by the RWQCB, while recognizing that current nitrate and TDS concentrations in many wells do not meet regulatory standards. Because of legacy loading, improvements relative to regulatory standards may be difficult to demonstrate.

AREA OF JURISDICTION

The response actions described above are applicable throughout the North San Benito Groundwater Basin. However, the focus here is the San Benito County portion of the Basin, within the jurisdiction of the SBCWD GSA. For the small Basin area in Santa Clara County (3,354 acres), SCVWD GSA can utilize or develop its own or similar programs applicable to its jurisdiction. Data sharing—including discussion of any significant groundwater level declines—is ongoing between the GSAs.

APPENDIX B CLIMATE DATA

List of Tables and Figures

Table B-1. Monthly Precipitation at the SBCWD CIMIS Station (inches)

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	% Normal
1996	0.12	0.01	2.21	4.38	4.52	1.56	1.33	1.32	0.00	0.01	0.00	0.00	15.46	121%
1997	0.96	3.16	4.26	6.84	0.21	0.09	0.19	0.02	0.10	0.00	0.00	0.03	15.86	124%
1998	0.16	3.78	2.59	4.94	9.06	2.70	2.31	2.40	0.09	0.02	0.00	0.08	28.13	220%
1999	0.54	1.93	0.79	2.54	2.49	1.52	0.67	0.06	0.07	0.00	0.00	0.00	10.61	83%
2000	0.14	0.98	0.11	4.05	4.53	0.68	0.40	0.45	0.10	0.00	0.00	0.02	11.46	89%
2001	3.54	0.80	0.23	2.86	2.77	0.62	2.20	0.01	0.01	0.03	0.02	0.00	13.09	102%
2002	0.70	11.48	11.93	0.66	1.15	1.57	0.37	0.28	0.00	0.00	0.00	0.00	28.14	220%
2003	0.00	1.67	5.04	0.77	1.41	1.06	3.05	0.06	0.00	0.00	0.06	0.00	13.12	102%
2004	0.20	0.60	5.25	1.31	4.21	0.59	0.27	0.08	0.01	0.00	0.00	0.01	12.53	98%
2005	1.95	0.54	3.46	2.49	2.89	3.42	0.83	0.64	0.43	0.00	0.00	0.04	16.69	130%
2006	0.07	0.27	3.08	1.49	1.01	4.96	1.73	0.39	0.01	0.00	0.02	0.01	13.04	102%
2007	0.20	0.73	1.69	0.57	2.22	0.29	0.55	0.02	0.00	0.02	0.00	0.43	6.72	52%
2008	0.71	0.67	0.92	4.56	2.06	0.09	0.06	0.00	0.00	0.00	0.00	0.00	9.07	71%
2009	0.28	1.05	1.89	0.35	3.73	1.83	0.20	0.47	0.00	0.00	0.00	0.15	9.95	78%
2010	0.50	0.02	1.31	2.29	2.19	1.74	3.44	0.61	0.00	0.01	0.00	0.00	12.11	95%
2011	0.72	1.85	2.59	1.57	2.63	2.33	0.19	0.78	0.30	0.00	0.00	0.00	12.96	101%
2012	0.69	0.96	0.07	0.81	0.46	2.34	1.39	0.26	0.09	0.00	0.00	0.00	7.07	55%
2013	0.01	2.23	1.15	1.35	0.64	0.46	0.30	0.02	0.01	0.00	0.03	0.10	6.30	49%
2014	0.07	0.37	0.17	0.22	1.91	1.59	0.86	0.02	0.00	0.00	0.00	0.14	5.35	42%
2015	1.57	0.48	5.78	0.02	1.20	0.22	0.24	0.87	0.00	0.01	0.09	0.08	10.56	82%
2016	0.22	3.65	1.58	3.98	0.57	3.72	0.79	0.05	0.08	0.08	0.06	0.10	14.88	116%
2017	1.77	2.48	3.33	4.66	6.05	1.70	1.09	0.50	0.32	0.00	0.02	0.00	21.92	171%
2018	0.20	1.12	0.19	2.39	0.29	2.74	1.33	0.00	0.00	0.00	0.00	0.00	8.26	64%
2019	0.17	2.52	1.48	2.24	4.02	2.55	0.25	1.95	0.20	0.00	0.00	0.00	15.38	120%
2020	0.00	1.40	3.69	1.39	0.00	2.78	1.18	0.42	0.24	0.13	0.02	0.00	11.25	85%
2021	0.00	0.42	0.77	3.82	0.28	1.28	0.01	0.00	0.00	0.00	0.00	0.00	6.58	50%
2022	2.16	0.41	5.09	0.09	0.10	0.64	0.74	0.02	0.13	0.00	0.00	0.00	9.38	73%
AVG	0.62	1.79	2.59	2.35	2.49	1.73	1.01	0.47	0.08	0.01	0.01	0.05	12.81	103%

Note: The average precipitation is based on the period of record (1875-2018).
-The CIMIS value for September 2017 (2.4") includes measurement error due to irrigation overspray. The corrected District value is 0".
-The CIMIS value for February, May, June, and August 2018 (0.8", 2.6", 0.1", 0.03") includes measurement error due to irrigation overspray. The corrected District value is 0.3" for February and 0" for all other months.
-The CIMIS value for October and November 2018 included measurement error due to irrigation overspray. The corrected District value is 0.17" for October and 2.52" for November (WRCC Hollister2 Station)

Table B-2. Reference Evapotranspiration at the SBCWD CIMIS Station (inches)

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	% Normal
1996	3.88	2.24	1.22	1.48	1.88	3.67	5.10	6.06	6.73	7.39	6.68	4.71	51.04	104%
1997	3.84	1.84	1.37	1.38	2.48	4.27	5.84	7.51	7.13	7.18	6.71	5.67	55.22	112%
1998	3.85	1.84	1.52	1.29	1.38	2.82	4.26	4.53	5.27	6.91	6.83	4.72	45.22	92%
1999	3.51	1.73	1.52	1.54	1.84	3.01	4.72	5.80	6.66	6.92	5.91	4.67	47.83	97%
2000	4.00	1.98	1.89	1.22	1.62	3.69	5.14	6.04	6.73	6.74	6.19	4.74	49.98	101%
2001	2.91	1.71	1.47	1.47	1.81	3.07	3.90	6.15	6.54	6.02	6.23	4.75	46.03	93%
2002	3.51	1.91	1.24	1.53	2.26	3.66	4.21	6.37	7.05	7.24	6.14	5.39	50.51	102%
2003	3.57	1.94	1.25	1.56	1.80	3.87	3.79	6.00	6.47	7.29	6.15	5.07	48.76	99%
2004	4.11	1.73	1.24	1.32	1.72	3.98	5.19	6.38	6.71	6.63	5.98	5.32	50.31	102%
2005	3.08	1.69	1.44	1.30	1.69	2.95	4.38	5.74	6.36	6.86	6.13	4.55	46.17	94%
2006	3.59	2.00	1.19	1.43	2.18	2.43	3.00	5.49	6.41	7.02	5.60	4.38	44.72	91%
2007	3.28	1.69	1.37	1.77	1.77	4.11	4.76	6.29	6.89	6.79	6.46	4.65	49.83	101%
2008	3.48	2.21	1.44	1.25	2.03	3.76	5.17	5.97	6.88	6.74	6.31	5.00	50.24	102%
2009	3.82	1.87	1.36	1.70	1.72	3.51	4.83	5.53	6.31	7.08	6.31	5.30	49.34	100%
2010	3.45	2.21	1.71	1.26	1.80	3.49	3.87	5.37	6.71	6.29	5.88	4.98	47.02	95%
2011	3.02	1.86	1.05	1.59	2.05	2.71	4.43	5.34	5.99	6.56	5.74	4.64	44.98	91%
2012	3.27	1.89	1.83	1.84	2.46	3.34	4.39	6.39	6.81	6.63	6.00	4.60	49.45	100%
2013	3.25	1.82	1.16	1.50	2.10	3.71	5.39	6.26	6.36	6.46	5.98	4.83	48.82	99%
2014	3.51	2.02	1.80	2.08	1.85	3.58	4.89	6.83	6.61	6.43	6.02	4.74	50.36	102%
2015	3.90	1.86	1.45	1.80	2.16	4.13	5.12	5.01	6.41	6.52	6.49	5.34	50.19	102%
2016	4.11	2.05	1.39	1.32	2.72	3.40	4.65	5.71	7.54	7.22	5.74	5.15	51.00	103%
2017	3.40	2.11	1.47	1.55	1.76	3.73	4.45	6.29	6.82	7.62	6.03	5.16	50.39	102%
2018	4.15	1.93	1.98	1.57	2.66	3.25	4.81	5.83	7.29	7.65	6.60	5.15	52.87	107%
2019	3.85	2.20	1.54	1.58	1.91	3.42	4.81	5.17	6.68	7.15	6.54	5.36	50.21	102%
2020	4.24	2.31	1.37	1.60	2.78	3.15	4.54	6.53	7.17	6.96	6.23	4.78	51.66	105%
2021	4.16	2.24	1.82	1.79	2.45	3.79	5.27	6.54	7.09	7.15	6.18	5.27	53.75	109%
2022	3.66	2.23	1.21	1.78	2.73	4.02	5.36	6.91	7.73	7.30	6.45	5.42	54.80	111%
AVG	3.62	1.95	1.45	1.52	2.02	3.47	4.63	5.94	6.66	6.89	6.20	4.95	49.29	100%

Note: The averages are for the available period of record, 1995 for reference evapotranspiration.

APPENDIX C GROUNDWATER DATA

List of Tables and Figures

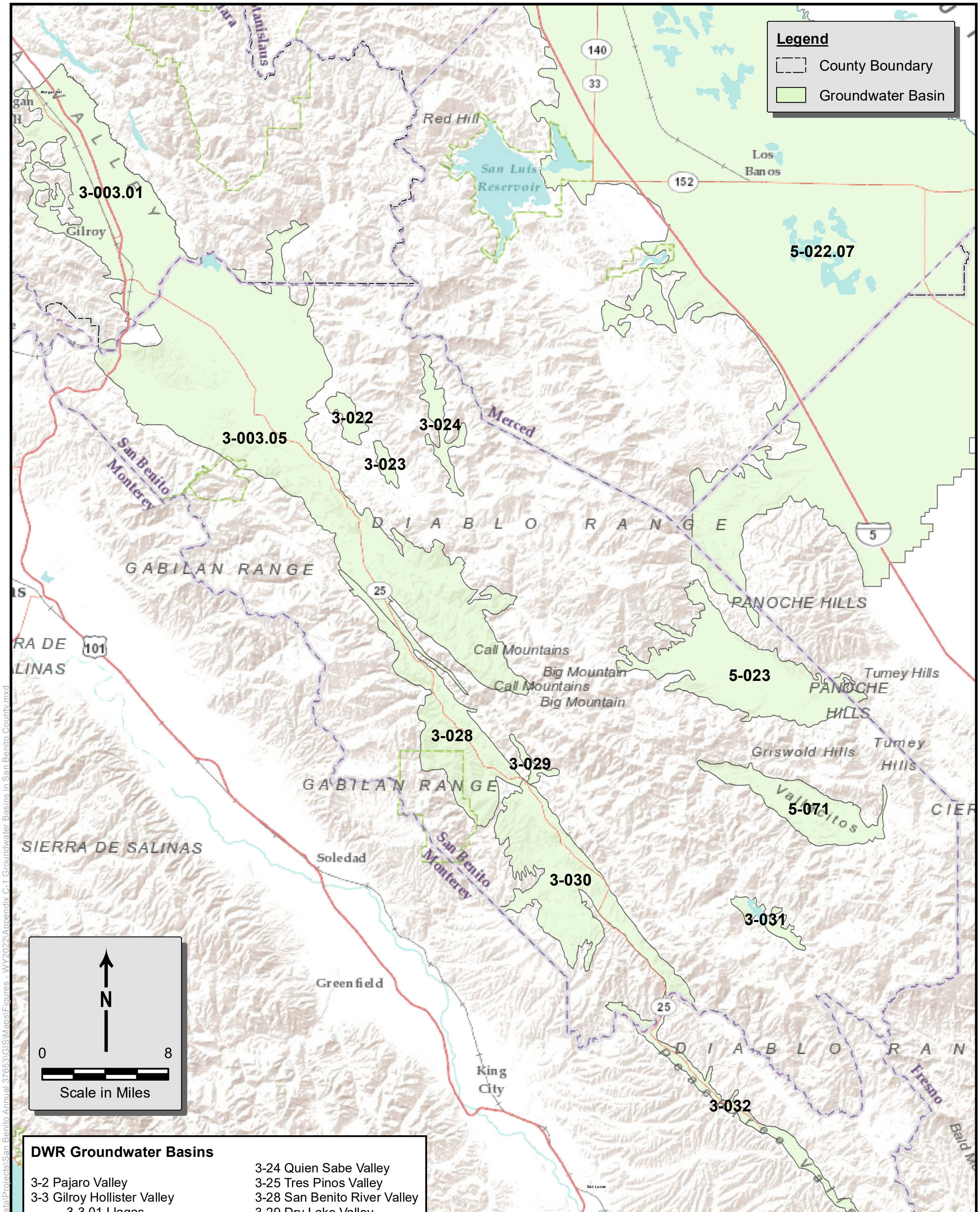
Table C-1. Groundwater Elevations October 2021 through October 2022

Well Number	Well Depth (feet)	Depth to Top of Screens (feet)	1996 Defined Subbasin	Groundwater Elevations (feet MSL)		
				Oct-20	Apr-21	Oct-21
Southern Management Area						
13-5-12D3	UNK	UNK	Southern	NM	NM	NM
13-6-19L0	UNK	UNK	Southern	297.1	303.7	296.6
13-6-19L1	UNK	UNK	Southern	306.2	316.3	310.3
14-6-13B1	UNK	UNK	Southern	637.4	636.4	631.2
14-6-14Q0	UNK	UNK	Southern	631.9	634.4	633.0
14-6-26F0	UNK	UNK	Southern	635.9	638.4	636.9
14-6-26H1	UNK	UNK	Southern	626.5	633.3	632.2
14-6-26K1	UNK	UNK	Southern	638.4	640.0	635.6
14-6-35B1	UNK	UNK	Southern	650.6	654.1	652.9
14-6-36D0	UNK	UNK	Southern	639.0	644.0	646.5
14-7-19G0	UNK	UNK	Southern	702.8	705.5	707.7
14-7-20K1	UNK	UNK	Southern	711.4	714.0	715.4
San Juan Management Area						
12-4-17L20	UNK	UNK	SJ	117.5	119.3	116.9
12-4-18J1	UNK	UNK	SJ	120.0	120.8	127.6
12-4-21M1	250	UNK	SJ	134.5	137.5	132.7
12-4-26G1	876	240	SJ	146.7	149.5	NM
12-4-34H1	387	120	SJ	140.2	145.2	116.7
12-4-35A1	325	110	SJ	161.2	162.1	141.6
12-5-30H1	240	UNK	SJ	196.3	201.0	199.3
12-5-31H1	UNK	UNK	SJ	189.4	190.6	185.1
13-4-3H1	312	168	SJ	139.3	141.2	123.2
13-4-4A3	195	48	SJ	179.2	181.1	171.4
13-5-6L1	UNK	UNK	SJ	127.1	105.6	113.6
Bolsa Management Area						
11-4-25H1	UNK	UNK	B	77.7	96.2	81.6
11-4-26B1	642	149	B	124.3	134.4	121.7
11-4-34A1	100	UNK	B	128.2	129.8	114.4
11-5-20N1	300	UNK	B	77.8	88.6	45.0
11-5-21E2	220	100	B	Artesian	Artesian	Artesian
11-5-27P2	331	67	B	159.0	162.7	156.6
11-5-28B1	198	125	B	168.0	Artesian	Artesian
11-5-28P4	140	80	B	165.0	Artesian	Artesian
11-5-31F1	515	312	B	67.4	79.9	68.4
11-5-33B1	125	UNK	B	169.0	Artesian	Artesian
12-5-17D1	950	314	B	54.0	70.1	55.0
12-5-5G1	500	150	B	97.3	115.3	109.5
12-5-5M1	UNK	UNK	B	44.8	62.6	55.0
12-5-6L1	UNK	UNK	B	140.6	144.1	140.7
12-5-7P1	750	360	B	33.3	52.8	33.5
Llagas - SCVWD						
11-4-10D4	UNK	UNK	SCVWD	129.4	146.6	119.9
11-4-15J2	UNK	UNK	SCVWD	118.3	130.4	100.4
11-4-17N4	UNK	UNK	SCVWD	129.3	153.8	127.6
11-4-21P3	UNK	UNK	SCVWD	125.3	133.8	116.9
11-4-22N1	UNK	UNK	SCVWD	115.0	129.9	108.0
11-4-2D8	UNK	UNK	SCVWD	135.1	137.6	118.6
11-4-2N1	UNK	UNK	SCVWD	131.2	143.3	112.5
11-4-32R2	UNK	UNK	SCVWD	105.8	123.7	96.7
11-4-3J2	UNK	UNK	SCVWD	133.6	135.9	117.2
11-4-8K2	UNK	UNK	SCVWD	133.5	150.9	127.6

Table C-1. Groundwater Elevations October 2021 through October 2022

Well Number	Well Depth (feet)	Depth to Top of Screens (feet)	1996 Defined Subbasin	Groundwater Elevations (feet MSL)		
				Oct-20	Apr-21	Oct-21
Hollister Management Area						
12-5-22N1	372	250	BSE	163.3	167.6	165.2
11-5-26N2	232	95	P	165.0	171.5	157.0
11-5-26R3	225	65	P	168.5	172.9	169.1
11-5-35C1	180	UNK	P	173.8	175.5	166.3
11-5-35G1	230	UNK	P	NM	NM	NM
11-5-35Q3	UNK	UNK	P	184.1	188.0	183.3
11-5-36C1	98	UNK	P	NM	NM	NM
11-5-36M1	UNK	UNK	P	NM	NM	NM
11-6-31M2	188	155	P	225.0	226.8	226.0
12-5-13H1	UNK	UNK	HE	179.8	176.1	175.8
12-5-1G2	300	UNK	P	171.9	174.5	167.0
12-5-22C1	237	102	HE	191.3	192.5	190.3
12-5-22J2	355	120	HE	181.0	159.0	155.5
12-5-23A20	862	178	HE	200.7	202.2	196.3
12-5-27E1	175	UNK	HW	213.0	211.9	207.2
12-5-28J1	220	UNK	HW	218.0	218.4	195.5
12-5-28N1	408	168	HW	181.6	181.8	179.2
12-5-2H5	128	42	P	NM	NM	NM
12-5-2L2	170	UNK	P	215.7	217.3	221.7
12-5-33E2	121	81	HW	222.7	224.0	220.0
12-5-34P1	195	153	HW	193.7	193.2	195.2
12-5-36B20	500	430	HE	Artesian	Artesian	Artesian
12-5-3B1	128	100	P	NM	NM	NM
12-5-9M1	240	105	BSE	260.9	262.3	258.6
12-6-18G1	198	70	HE	NM	NM	NM
12-6-19N1	UNK	UNK	HE	347.0	345.0	343.8
12-6-30E1	UNK	UNK	HE	Artesian	Artesian	Artesian
12-6-6K1	260	16	P	215.0	214.0	213.9
12-6-6L4	235	50	P	238.3	240.3	233.3
12-6-7P1	147	UNK	HE	215.0	212.5	215.0
13-5-10B1	UNK	UNK	HW	263.6	275.7	272.6
13-5-11E1	UNK	UNK	HW	291.7	248.6	247.9
13-5-11Q1	178	61	TP	NM	NM	NM
13-5-12D4	UNK	UNK	TP	NM	NM	NM
13-5-12K1	UNK	UNK	TP	NM	NM	NM
13-5-12N20	352	301	TP	327.0	324.6	322.5
13-5-13F1	134	30	TP	337.8	335.5	329.7
13-5-13H1	252	112	TP	334.1	331.7	328.3
13-5-13J2	180	UNK	TP	329.3	328.1	326.5
13-5-13Q1	185	44	TP	288.5	289.0	287.8
13-5-14C1	UNK	UNK	TP	231.8	227.1	221.5
13-5-3L1	126	UNK	HW	NM	NM	NM
13-5-4B	UNK	UNK	HW	268.0	272.9	271.6
13-5-4P1	UNK	UNK	HW	231.5	233.4	230.9
13-5-5J0	UNK	UNK	HW	407.3	405.1	407.0
13-5-5J0	UNK	UNK	HW	231.5	233.4	230.9
13-6-19K1	211	UNK	TP	335.2	336.7	336.3
13-6-20K1	UNK	UNK	TP	NM	NM	NM
13-6-7D2	UNK	UNK	HE	NM	NM	NM

UNK - Unknown
NM - Not Monitored
Figure 2-1 for 1996 Defined Subbasins



DWR Groundwater Basins

3-2 Pajaro Valley
3-3 Gilroy Hollister Valley
  3-3.01 Llagas
  3-3.05 North San Benito
3-22 Santa Ana Valley
3-23 Upper Santa Ana Valley
3-32 Peachtree
3-24 Quien Sabe Valley
3-25 Tres Pinos Valley
3-28 San Benito River Valley
3-29 Dry Lake Valley
3-30 Bitter Water Valley
3-31 Hernandez Valley
5-22.7 Delta Mendota
5-23 Panoche Valley
5-71 Vallecitos Valley

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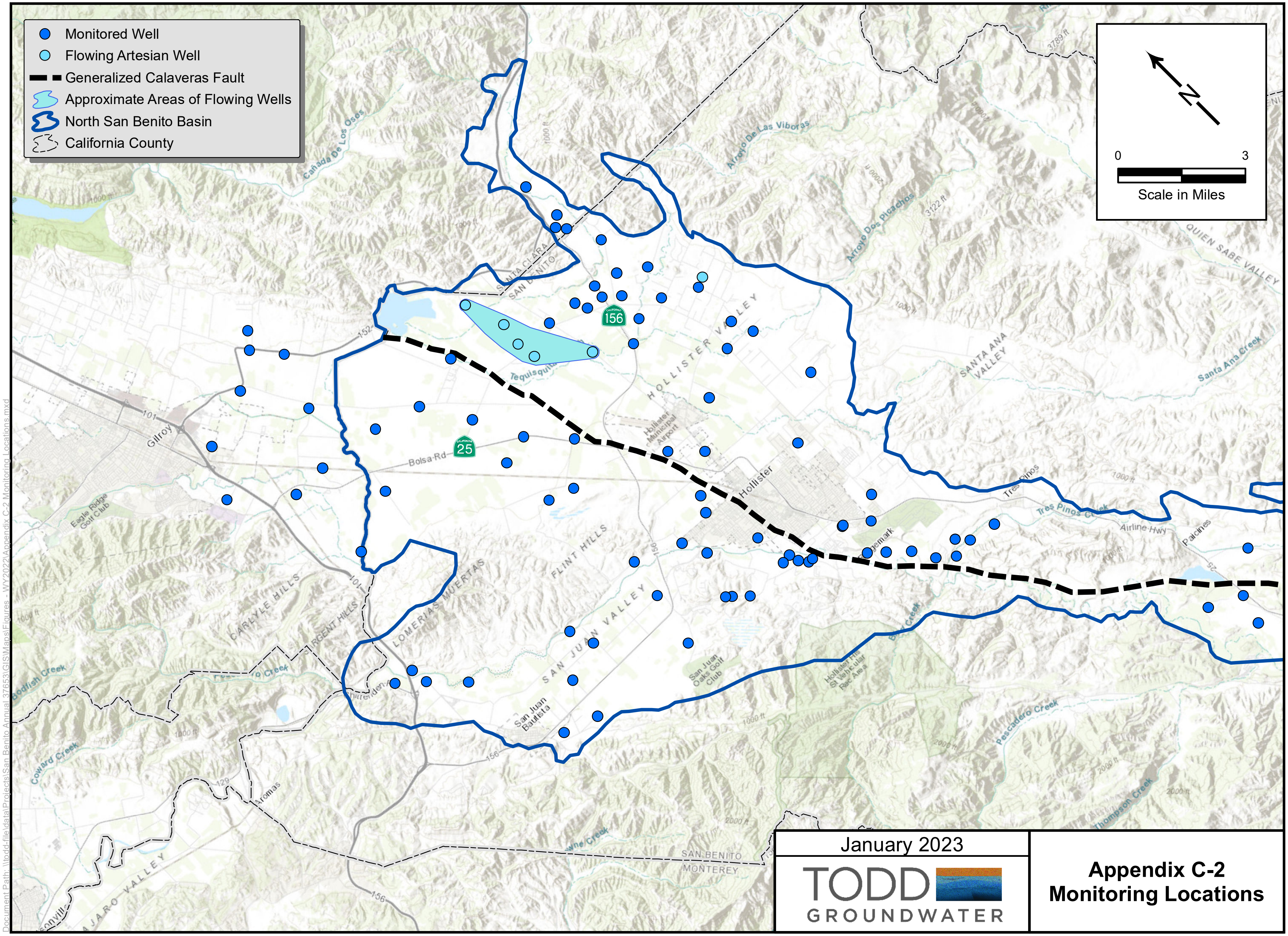
Appendix C-1
Groundwater Basins in San Benito County

Document Path: \\todd-file\data\Projects\San Benito Annual 37653\GIS\Maps\Figures - WY2022\Appendix C-1 Groundwater Basins in San Benito County.mxd



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Appendix C-2
Monitoring Locations

APPENDIX D PERCOLATION DATA

List of Tables and Figures

Table D-1. Reservoir Water Budgets for Water Year 2022 (acre-feet)

	Hernandez	Paicines	San Justo	
Observed Storage				
Starting Storage (Oct 2020)	496	300	7,566	
Ending Storage (Sept 2020)	496	300	7,373	
Inflows				
Rainfall	60	8	149	
San Benito River	3,829	0	n.a.	
Hernandez-Paicines transfer	n.a.	323	n.a.	
San Felipe Project*	n.a.	n.a.	4,879	*
Total Inflows	**3,889**	**331**	**5,028**	
Outflows				
Hernandez spills	0	n.a.	n.a.	
Hernandez-Paicines transfer	323	n.a.	n.a.	
Tres Pinos Creek percolation releases	n.a.	210	n.a.	
San Benito River percolation releases	3,279	0	n.a.	
CVP Deliveries*	n.a.	n.a.	3,613	*
Evaporation and seepage (less interceptor wells)	444	111	1,254	
Total Outflows	**4,046**	**321**	**4,867**	
Change in Storage				
Observed storage change (Ending - Starting)	**0**	**0**	**-193**	
Calculated net storage change (Inflow - Outflows)	**-157**	**10**	**161**	
Unaccounted for Water (Observed - Calculated)**	**157**	**-10**	**-354**	
Reservoir Information				
Reservoir capacity	17,200	2,870	11,000	
Maximum storage	12,572	2,580	10,308	
Minimum storage	558	250	4,573	

* Reflects imported water for beneficial use, not all stored in reservoir

** Negative value is water shortage, positive value is water surplus

Table D-2. Historical Reservoir Releases (AFY)

WY	Hernandez	Paicines	TOTAL
1996	13,535	6,139	19,674
1997	3,573	2,269	5,842
1998	26,302	450	26,752
1999	12,084	1,293	13,377
2000	13,246	2,326	15,572
2001	12,919	3,583	16,502
2002	9,698	310	10,008
2003	5,434	0	5,434
2004	3,336	0	3,336
2005	19,914	677	20,591
2006	14,112	196	14,308
2007	12,022	1,254	13,276
2008	7,646	495	8,141
2009	4,883	0	4,883
2010	8,484	4,147	12,631
2011	9,757	2,397	12,154
2012	6,341	1,321	7,662
2013	3,963	677	4,640
2014	0	0	0
2015	0	0	0
2016	0	0	0
2017	23,191	2,407	25,597
2018	6,054	384	6,438
2019	15,924	2,045	17,969
2020	9,473	2,037	11,510
2021	7,480	504	7,984
2022	3,279	210	3,489
AVG	**9,357**	**1,301**	**10,658**

Table D-3. Historical Percolation of CVP Water (AFY)

		Arroyo de las Viboras			Arroyo Dos Picachos			Santa Ana Creek					San Benito River		
Water Year[1]	Pacheco Creek	Road	Creek 1 (Frog Ponds)	Creek 2	Fallon Road	Jarvis Lane	Creek	John Smith Road	Maranatha Road	Airline Highway	Ridgemark	Tres Pinos Creek (and Pond)	Union Road Pond	Hollister Ponds	Total
1994	232	136	515	0	0	550	209	0	0	0	0	85	158	0	1,885
1995	444	238	770	2	0	654	622	73	0	0	0	809	2,734	0	6,345
1996	0	494	989	832	67	235	708	531	197	134	25	21	6,097	0	10,330
1997	0	447	601	1,981	77	0	200	17	353	286	29	1,477	5,619	0	11,087
1998	0	132	109	403	0	0	0	65	0	158	74	518	1,084	0	2,543
1999	0	0	0	0	0	0	4	256	48	141	10	452	413	0	1,322
2000	1	0	0	6	0	0	3	236	21	240	12	285	938	0	1,740
2001	0	0	0	0	0	0	0	161	17	186	1	703	1,041	0	2,110
2002	0	0	0	2	0	0	1	78	2	143	0	426	470	0	1,122
2003	0	0	0	0	0	0	5	119	9	172	0	163	605	0	1,074
2004	0	0	0	0	0	0	52	83	0	0	0	1	882	0	1,018
2005	0	0	0	0	0	0	0	0	0	0	0	0	527	0	527
2006	0	0	0	0	0	0	7	156	0	0	0	1	451	0	614
2007	0	0	0	0	0	0	0	0	0	0	0	88	216	0	304
2008	0	0	0	0	0	0	0	0	0	0	0	0	6	0	6
2009	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2010	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2011	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2012	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2013	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2014	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2015	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2016	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2017	0	0	340	0	0	0	0	0	0	0	0	0	2,209	0	2,549
2018	0	0	199	0	0	0	0	0	0	0	0	867	1,899	0	2,965
2019	0	0	335	0	0	0	0	0	0	0	0	1,775	2,932	0	5,043
2020	0	0	134	0	0	0	0	0	0	0	0	780	1,499	747	3,161
2021	0	0	2	0	0	0	0	0	0	0	0	2	3	20	28
2022	0	0	0	0	0	0	0	0	0	0	0	2	0	0	2

1. 2017-2022 percolation occurred only to recharge basins adjacent to the listed streams.

Table D-4. Percolation of Municipal Wastewater during Water Year 2022

	Pond Area[1] (acres)	Effluent Discharge (acre-feet)	Evaporation[2] (acre-feet)	Percolation (acre-feet)
Hollister - domestic	93	2,884	266	2,618
Hollister - industrial	39	0	0	0
Ridgemark Estates I & II	7	175	21	155
Tres Pinos	2	21	5	16
Total	141	3,080	292	2,788

Notes:

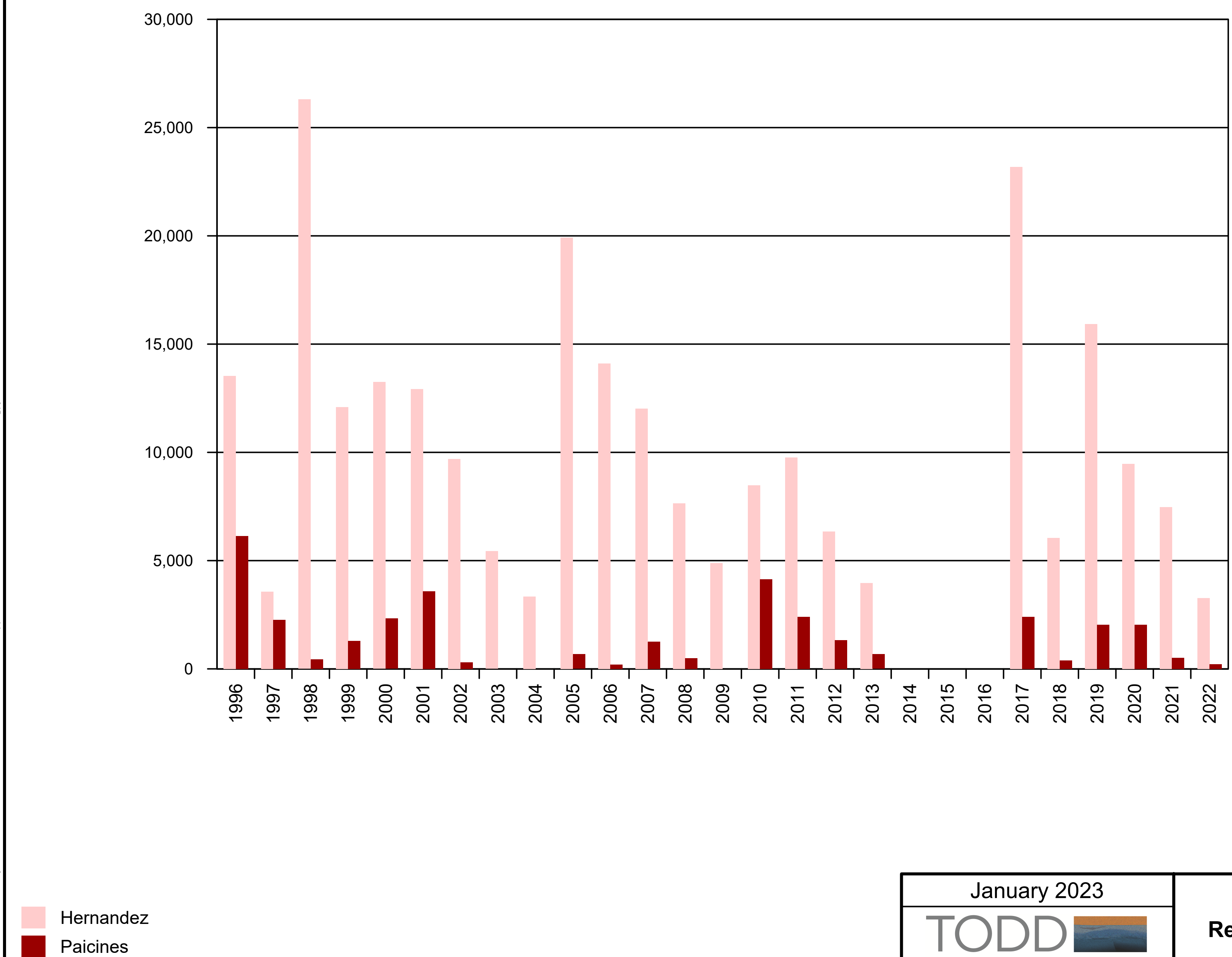
1. Hollister pond areas are from Dickson and Kenneth D. Schmidt and Associates (1999) and include treatment ponds in addition to percolation ponds at the domestic wastewater treatment plant. Assumes 80% of total pond area in use at any time (Rose, pers. comm.). These areas should be updated as operations change.

2. Average evaporation less precip = 43 inches (56 in/yr evaporation (DWR Bulletin 73-79) less 13 in/yr precip (CIMIS) The IWTP evaporation was adjusted to account only for when the ponds are in use.
The San Juan Bautista plant is not included because the unnamed tributary of San Juan Creek that receives its effluent usually gains flow along the affected reach and is on the southwest side of the San Andreas Fault. These conditions prevent the effluent from recharging the basin.

Table D-5. Historical Percolation of Municipal Wastewater (AFY)

	Hollister Reclamation Plant - Domestic	Hollister - industrial wastewater and stormwater	Ridgemark Estates I & II	Tres Pinos	TOTAL
1994	1,775	665	155	5	2,600
1995	1,935	610	180	10	2,735
1996	2,020	689	207	14	2,930
1997	1,965	909	201	17	3,092
1998	2,490	518	231	17	3,256
1999	1,693	1,476	156	12	3,337
2000	2,110	1,136	293	24	3,563
2001	1,742	1,078	303	24	3,147
2002	1,884	1,545	283	24	3,736
2003	2,009	1,432	279	24	3,744
2004	1,787	1,536	268	21	3,612
2005	1,891	1,323	227	26	3,468
2006	1,797	1,211	216	33	3,257
2007	1,740	1,228	139	19	3,126
2008	1,580	1,257	139	19	2,996
2009	1,976	428	172	19	2,594
2010	1,922	37	172	19	2,150
2011	1,807	466	183	19	2,476
2012	1,740	605	177	19	2,541
2013*	889	332	188	21	1,430
2014	1,552	86	179	21	1,838
2015	1,816	344	161	21	2,342
2016	1,923	305	154	21	2,402
2017	1,945	57	154	20	2,177
2018	1,365	57	150	15	1,587
2019	1,822	0	149	16	1,986
2020	2,392	0	155	6	2,553
2021	2,405	0	161	16	2,582
2022	2,618	0	155	16	2,788

*Potential missing data



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Appendix D-1
Reservoir Releases for Percolation

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APPENDIX E WATER USE DATA

List of Tables and Figures

Table E-1. Recent CVP Allocation and Use

Water Year	Municipal and Industrial (M&I) CVP				Agricultural CVP			
	Percent of Contract Allocation[1]	Percent of Historic Average[2]	Contract Amount Used (AF)	Contract Amount Used (%)	Percent of Contract Allocation[3]	Percent of Contract and M&I Adjustment[2]	Contract Amount Used (AF)[4]	Contract Amount Used (%)
	(USBR Water Year Mar-Feb)		(Hydrologic Water Year Oct-Sep)		(USBR Water Year Mar-Feb)		(Hydrologic Water Year Oct-Sep)	
2006	100%		3,152	38%	100%		19,840	56%
2007	100%		4,969	60%	40%		18,865	53%
2008	37%	75%	2,232	27%	40%	45%	10,514	30%
2009	29%	60%	1,978	24%	10%	11%	6,439	18%
2010	37%	75%	2,197	27%	45%	50%	10,061	28%
2011	100%		2,433	29%	80%		16,234	46%
2012	51%	75%	2,683	33%	40%	40%	17,267	49%
2013	47%	70%	2,652	32%	20%	22%	12,914	36%
2014	34%	50%	1,599	29%	0%	0%	7,545	21%
2015	25%		1,810	22%	0%		3,697	10%
2016	55%		1,914	23%	5%		4,434	12%
2017	100%		2,909	35%	100%		15,837	45%
2018	75%		5,679	69%	50%		17,418	49%
2019	100%		4,457	54%	75%		16,774	47%
2020	65%		4,953	60%	15%		15,327	43%
2021	65%		3,341	40%	0%		6,108	17%
2022[5]	33%		2,786	34%	0%		1,098	3%
Average (13-22)	60%				27%			

Notes: 1 Total contract (100% allocation) M&I 8,250 AFY
2 Shortage Policy Adjustments
3 Total contract (100% allocation) Ag 35,550 AFY
4 Includes water percolated
5 Public Health Safety volumes

Table E-2. Historical CVP and RW Use by MA in Zone 6 (AFY)

MA:	San Juan MA	Hollister MA		Total Zone 6	
Source:	CVP	CVP	RW	CVP	RW
1993	4,300	11,333	0	15,633	0
1994	3,836	11,155	0	14,990	0
1995	4,554	11,576	0	16,130	0
1996	5,187	13,636	0	18,823	0
1997	6,191	14,858	0	21,048	0
1998	4,099	8,697	0	12,796	0
1999	5,990	12,048	0	18,038	0
2000	6,372	12,301	0	18,673	0
2001	7,232	12,170	0	19,402	0
2002	7,242	13,169	0	20,411	0
2003	7,127	14,607	0	21,734	0
2004	7,357	16,653	0	24,010	0
2005	6,245	14,139	0	20,384	0
2006	7,200	15,792	0	22,992	0
2007	6,160	15,955	0	22,115	0
2008	3,160	9,586	0	12,745	0
2009	1,605	6,599	0	8,204	0
2010	3,452	8,532	151	11,984	151
2011	5,623	13,045	183	18,667	183
2012	5,976	13,973	230	19,949	230
2013	4,134	11,431	357	15,566	357
2014	1,984	7,160	262	9,144	262
2015	975	4,532	101	5,507	101
2016	819	5,528	499	6,347	499
2017	5,853	10,344	366	16,197	366
2018	6,383	13,748	471	20,131	471
2019	3,990	12,198	569	16,188	569
2020	4,618	12,501	526	17,119	526
2021	1,587	7,859	472	9,446	472
2022	2,779	1,102	611	3,882	611
AVG 93-22	4,734	11,208	160	15,942	160

* No Recycled Water is used in San Juan MA

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Table E-3. Municipal Water Use by Major Purveyor for Water Year 2022 (AF)

	WY 2022	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Groundwater													
Sunnyslope CWD	**1,839**	208	133	128	36	66	84	125	138	237	222	240	222
City of Hollister	**1,449**	157	104	73	52	53	107	138	165	156	163	139	142
City of Hollister - Cienega Wells	**97**	8	8	8	7	8	8	8	9	8	8	8	8
San Juan Bautista	**229**	22	17	25	22	18	17	19	18	16	19	18	18
Tres Pinos CWD	**34**	3	2	2	2	2	4	3	3	3	3	3	3
Groundwater Subtotal	**3,647**	**398**	**264**	**236**	**120**	**147**	**220**	**292**	**333**	**420**	**415**	**408**	**393**
CVP Imported Water													
Lessalt Treatment Plant	**258**	10	9	27	34	40	29	24	21	23	14	19	9
West Hills Treatment Plant	**2,488**	156	158	192	237	265	209	178	186	236	197	252	223
Imported Water Subtotal	**2,746**	**167**	**167**	**220**	**271**	**304**	**238**	**201**	**207**	**259**	**211**	**270**	**231**
Municipal Total													
TOTAL Municipal Water Supply	**6,394**	**565**	**431**	**456**	**391**	**452**	**458**	**493**	**540**	**679**	**627**	**679**	**624**

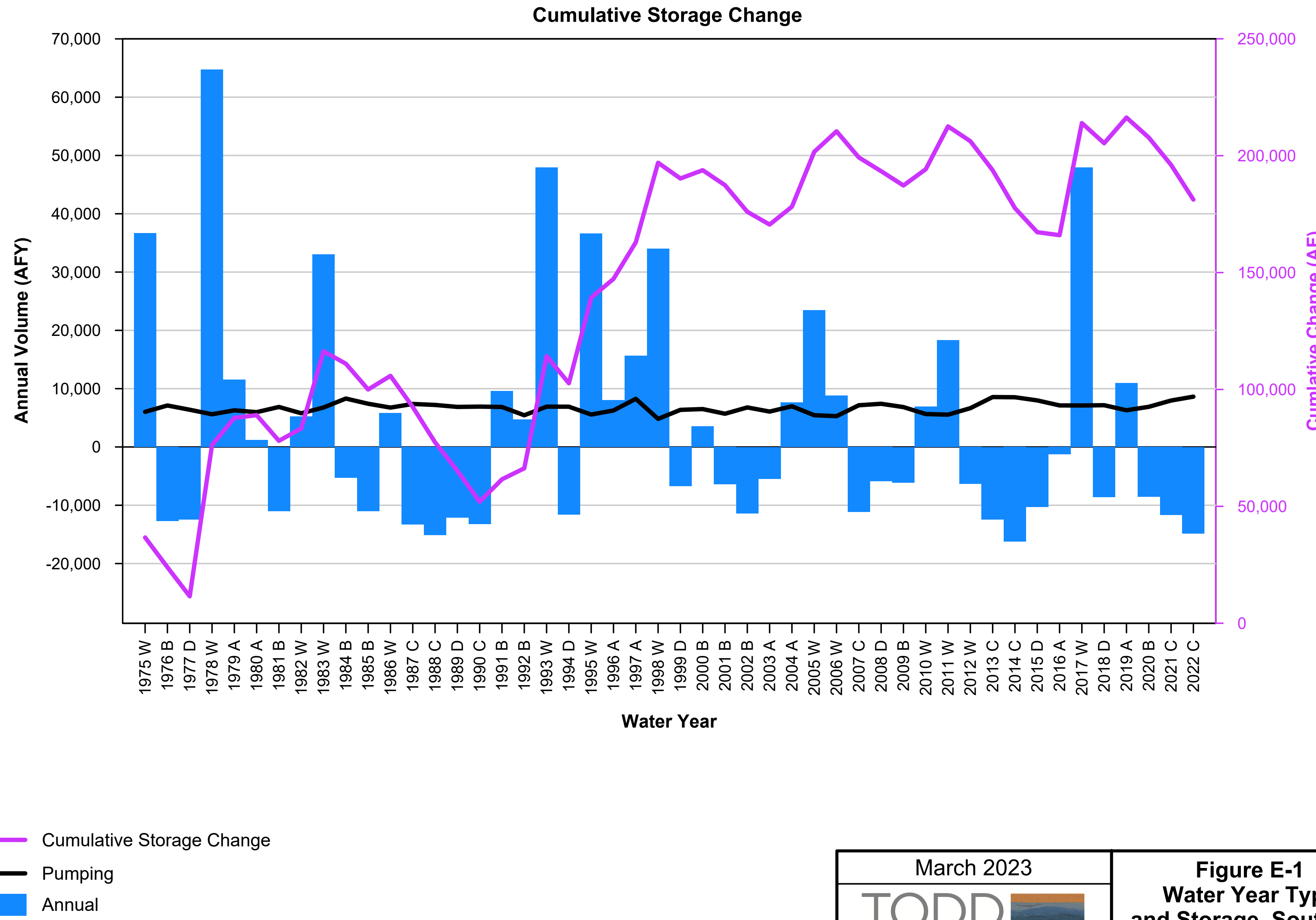
Todd Groundwater 1/30/2023

Table E-4. Historical Municipal Water Use by Major Purveyor (AFY)

WY	Sunnyslope CWD - GW	City of Hollister - GW	City of Hollister - Cienega Wells[1]	San Juan Bautista	Tres Pinos CWD	Lessalt Treatment Plant	West Hills Treatment Plant	Undivided Total	TOTAL
1988						0	0	5,152	5,152
1989						0	0	6,047	6,047
1990						0	0	5,725	5,725
1991						0	0	7,631	7,631
1992						0	0	6,912	6,912
1993						0	0	5,066	5,066
1994						0	0	7,186	7,186
1995	2,167	2,446				0	0		4,613
1996	2,139	3,386				0	0		5,525
1997	2,638	3,848				0	0		6,486
1998	2,357	3,441				0	0		5,798
1999	2,820	3,558				0	0		6,378
2000	3,214	4,021				0	0		7,235
2001	3,290	3,851				0	0		7,141
2002	3,256	4,120				21	0		7,398
2003	2,053	2,754				2,494	0		7,302
2004	2,426	2,828				2,101	0		7,356
2005	1,959	3,147	123	247	49	1,843	0		7,368
2006	1,907	2,801	123	150	49	1,900	0		6,930
2007	2,413	2,758	123	47	49	1,719	0		7,108
2008	2,294	2,746	123	417	47	1,323	0		6,949
2009	2,251	2,503	123	373	47	1,212	0		6,509
2010	1,861	2,194	108	308	47	1,344	0		5,861
2011	2,225	1,651	80	292	47	1,593	0		5,887
2012	2,360	1,761	130	267	45	1,657	0		6,219
2013	1,655	2,655	120	281	46	1,648	0		6,405
2014	2,134	2,646	114	285	49	979	0		6,207
2015	1,348	1,960	114	225	49	1,364	0		5,060
2016	1,331	1,615	105	232	49	1,682	0		5,014
2017	1,449	1,543	79	249	32	1,940	51		5,344
2018	978	1,217	121	184	34	1,596	1,990		6,119
2019	565	588	283	257	33	1,660	2,524		5,912
2020	694	707	95	224	35	1,503	1,990		5,248
2021	1,576	1,517	101	224	35	931	1,314		5,698
2022	1,839	1,449	97	229	34	258	2,488		6,394

1. Data from Hollister Cienega Wells for 2005-2008 was estimated to be the same as WY 2009
Cells with no data indicate that the information is unavailable, while years with no use are shown explicitly as 0's.

Todd Groundwater 1/30/2023

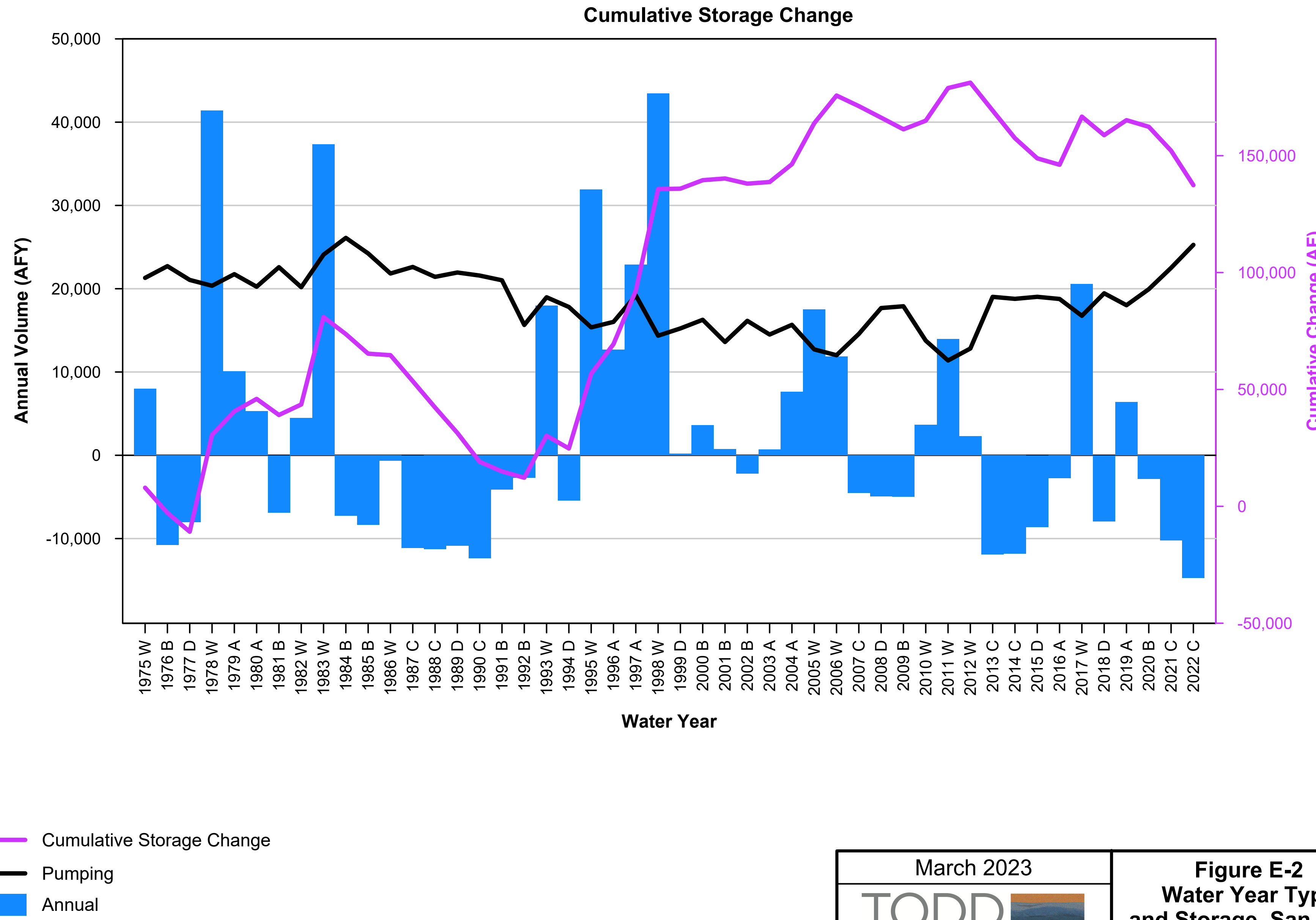


Path: \\todd-file\data\Projects\San Benito Annual 37653\GRAPHICS\WY2022\Figure E-1 Water Type Storage - Southern.gpj

March 2023

TODD GROUNDWATER

Figure E-1
Water Year Type and Storage, Southern Management Area

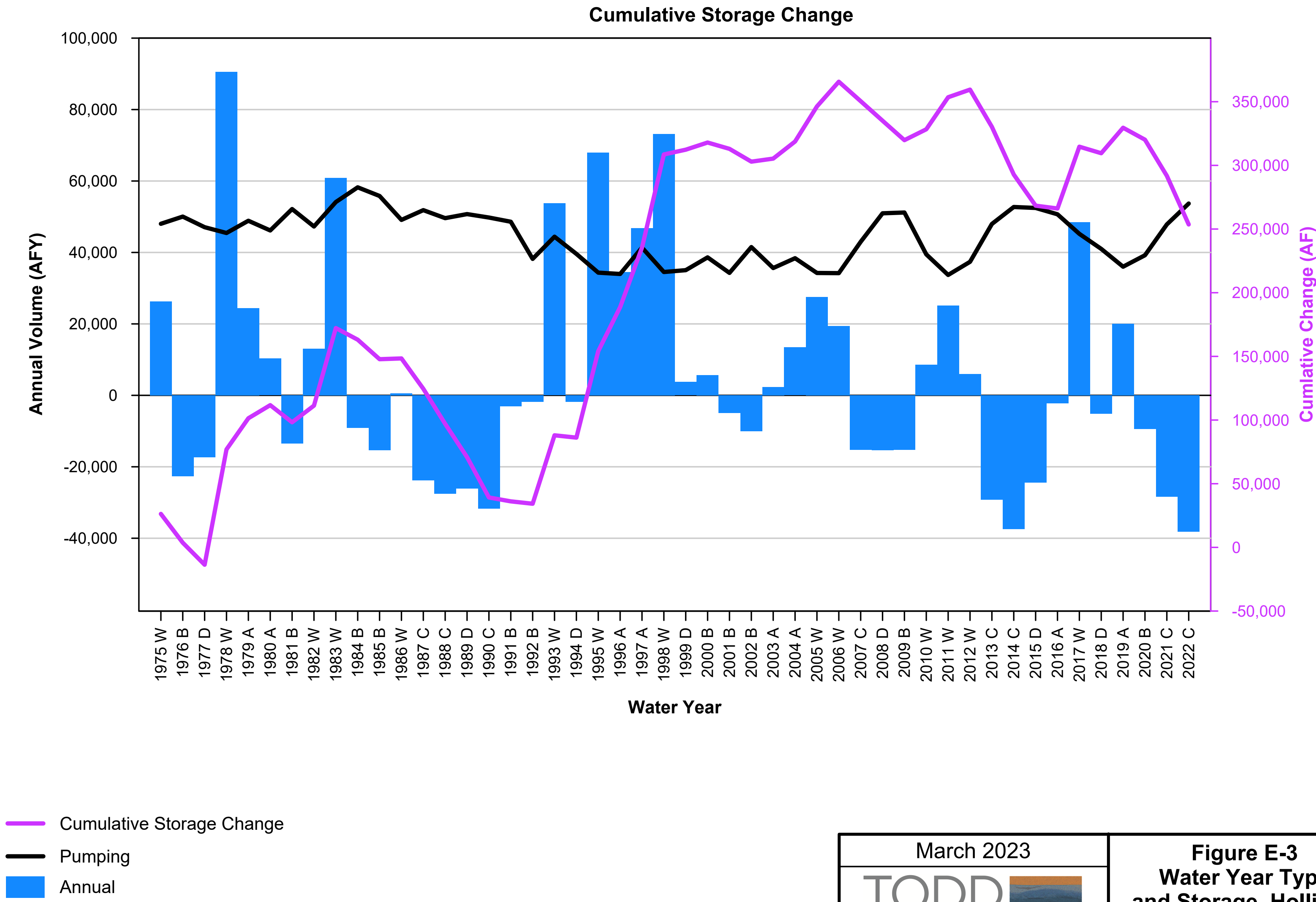


Path: \\todd-file\data\Projects\San Benito Annual 37653\GRAPHICS\WY2022\Figure E-2 Water Type Storage - San Juan.gpj

March 2023

TODD GROUNDWATER

Figure E-2
Water Year Type and Storage, San Juan Management Area

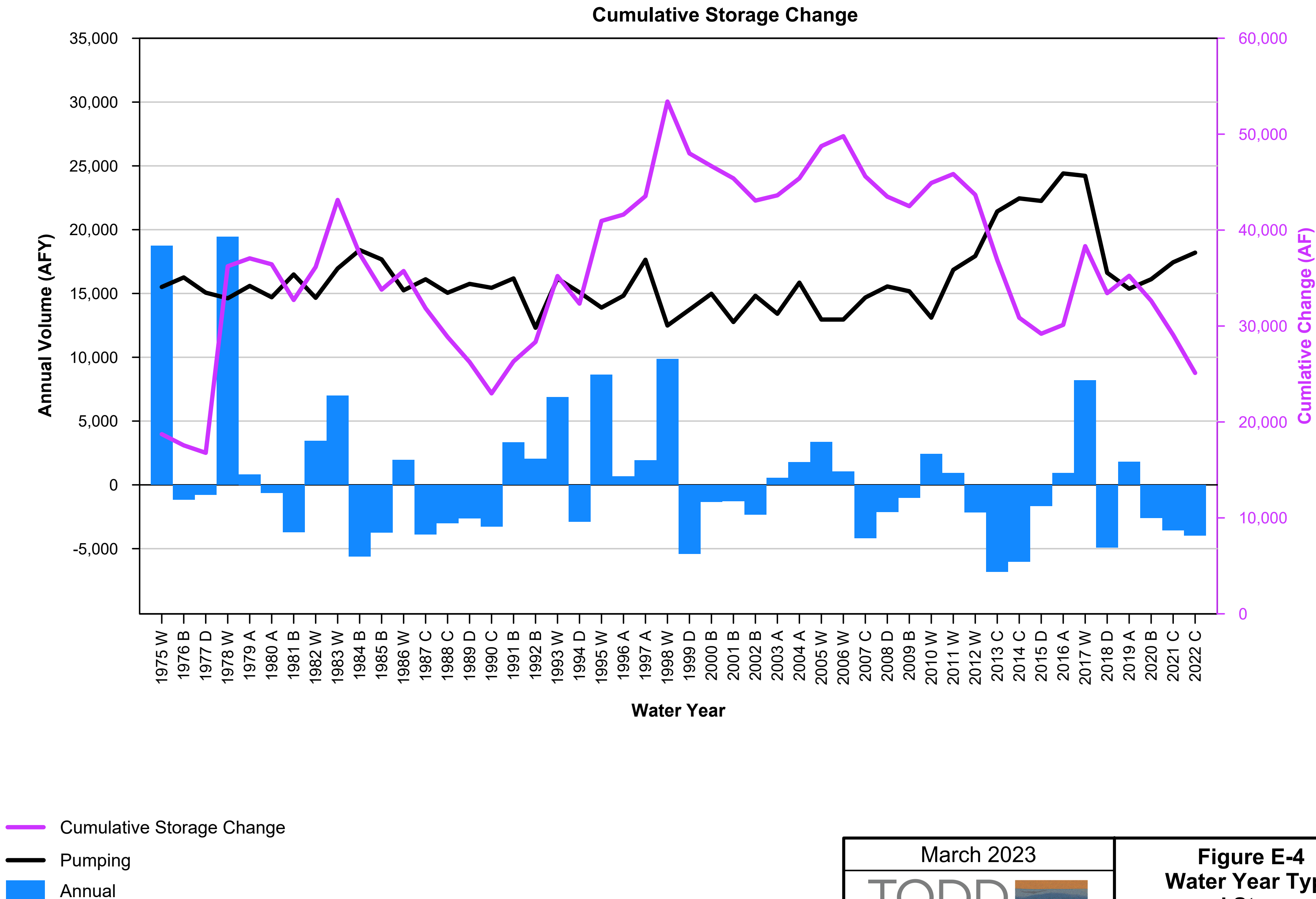


March 2023

TODD GROUNDWATER

Figure E-3
Water Year Type and Storage, Hollister Management Area

Path: \\todd-file\data\Projects\San Benito Annual 37653\GRAPHICS\WY2022\Figure E-3 Water Type Storage - Hollister.grpj



Path: \\todd-file\data\Projects\San Benito Annual 37653\GRAPHICS\WY2022\Figure E-4 Water Type Storage - Bolsa.grf

March 2023

TODD GROUNDWATER

Figure E-4
Water Year Type and Storage
Bolsa Management Area

APPENDIX F WATER QUALITY DATA

List of Tables and Figures

Table F-1. SBCWD Monitoring Well Water Quality Data - Total Dissolved Solids (mg/L)

	Brian's Nested Wells																										MW
Date	A	B	C	D	E	MW 11	MW 12	MW 17	MW 18	MW 19	MW 21	MW 24	MW 28	MW 31	MW 36	MW 39	MW 41	MW 42	MW 43	MW 45	MW 46	MW 47	MW 48	MW 49	MW 51	MW 52	1202
Total Dissolved Solids (TDS)																											
Apr-97											1,500	2,300															
Aug-98						1,010	1,160	600	800		1,720	2,780								840							
Sep-01						1,175	1,220	543	810	1,168	2,100	2,482	875		1,173	852	2,135	347	493	845	593		1,098				
Oct-01														1,360								2,032					
Jan-02						1,156	1,292	538				2,786	948	1,376	1,178	816	2,032	360	564	836	582	1,774		1,084			
Mar-02																							1,078				
Apr-02						1,180	1,266	538		1,398	1,630	538	926	1,352	1,152	782	1,964	368	726	824	582	1,760	1,090	932			
Jul-02						1,216	1,216	542		1,114	1,676	2,506	926	1,386	1,170	868	2,014	354	724	806	594	1,996		1,078			
Oct-02						1,178	1,186	570		1,120	2,052		926	1,326	1,178	1,014		394	532	834	628	1,862	1,084	1,020			
Jan-03						1,056	1,086	516		966	2,024	2,448	870	1,198	1,094	838	1,970	346	470	768	550	1,548	1,046	746			
Apr-03						1,182	1,294	514		1,140	2,072	2,736	914	1,444	1,132	900	2,092	362	528	818	598	1,892	1,076	976			
Jul-03						1,244	1,312	542		1,084	1,640	2,692	950	1,376	1,180	888	2,144	372	546	802	610	2,004	856	1,004			
Aug-03																1,000											
Oct-03						1,188	1,164	556		1,110	2,110	3,064	892	1,424	1,200	942	2,144	394	526	836	628	1,888	966	948			
Jan-04						1,218	1,316	528	774		1,766	2,910	870	1,282	1,156	844	2,074	380	502	798			1,058	902			
Nov-04						1,302	1,372	544	740		1,936	3,470	946	1,336	1,202	888	2,128	368	540	854	568	2,194		1,012			
May-05						1,168	1,308	518	706		1,574	2,250	886	1,178	1,112	866	2,092	374	542	874	580	1,964		768			
Nov-05						1,246	1,398	532	774	1,114	1,874	3,544	888	1,390	1,232	982	2,110	386	562	854	590	2,208	1,034	876			
Apr-06						1,184		528	818		2,006	3,120	902	1,280	1,178	922	2,076	372	548	902	592	1,958		904			
Oct-06						1,292	1,294	666	786	1,460	1,090	2,826	1,012	1,374	1,074	940	1,924	440	630	758	628	1,772	676				
Feb-07	2,440	1,302	1,372	1,128	1,410																						
Apr-07						1,088		526	762			2,486	664	1,242	1,096	980	2,030	264	528	780	566	1,848					
Nov-07						882		476	616		1,256	2,024	656	900	886	782	1,434	316	466	696	512	1,414		654			
Apr-08						1,076							810	970				370	546		562						
May-08											1,462	2,528			1,102	872				814		1,782					
Nov-08						1,064		560				3,036	856	2,152	868	1,116	2,400	372	568	860		1,536		400			
Apr-09						1,112	916	528			312	2,780	848	2,068	2,428	1,100	860	346		780	568	1,772		728	644		
Oct-09						1,024	548	576		1,092	360	2,864		2,088	848	1,444	1,040	352	528	656	1,008	1,436			656	768	
Nov-09	1,136	1,140	1,160	1,108	1,148																						
Apr-10						955	955	555		422	343	1,783	850	2,032	330			363		815		1,812		688	695	794	
Oct-10	1,105	887		1,000	753	1,168		528		967	352	2,683	335	1,928		1,057		368	528	815	572	1,215			703	843	
Apr-11						1,192	1,168	524		944	348	2,752	868	1,784	732	1,120		376	532	560	848	1,600		660	704	764	
Jun-11	772	1,028	644	2,764	724																						
Nov-11								532		932			848	1,648				368	468	796	548			232	320	704	
Dec-12						1,096	1,580	516			288	1,348	824	1,648	720			376	508	892	512	1,760			788	1,032	
Jun-13	796	600	624	936	2,784	1,124		500			348	2,444	1,028	1,820	480	964		368	520					1,028	712	840	
Dec-13						1,012		524				2,520	320	1,704		916			536	800	544	1,344		552	708	744	
Jan-14	928	792	992	1,112	2,868																						
May-14	808	568	1,004	1,564	2,880	1,208	1,232	536			352	2,756	712	1,720		912		388	556	856				540	840		
Nov-14	900	820	888	1,816	2,880			548				2,904	704	2,000				1,484	532	876	1,212				724	740	
May-15	916	812	856	1,696	2,860	1,160	1,204	560			356		708	1,960		992		798		868						900	
May-16	832	652	520	1,592	2,788	1,152	2,276	540		960	332	1,184	1,252	1,696		1,192		420			564				720	1,304	
Nov-16								536			316	2,840	656			1,412		1,900	484			1,328			676	684	
Nov-17						1,616		520			328	2,496	2,496	1,572		1,380		632	520	788	520	1,376			680	656	
Feb-18													240									1,300					
Jun-18						1,500	1,300	530		1,000	350	1,600	240	1,200		1,200		1,600	510		540	1,200				740	1,700
Nov-18						1,200	1,300			960	330	1,700	250	1,700		1,300			490		540	1,300		720			820
Dec-18	850	540	660	1,300	2,700																						
May-19				1,200		1,300	1,300	540		990	340	1,700	300	2,100		1,300		5,600	640		560	1,300					1,900
Jun-19	920	540	630		1,700																				730	400	
Nov-19	890	700	570	1,100	2,300	1,200		550					720	2,000				4,200	500		580			720			
Dec-19		540																									
May-20	910	510	550	1,100	2,500			570				1,700	710			1,300					540	1,300			770		
Nov-20								520			320	1,800	690			1,200			480			1,300			740		
Dec-20						1,100	520			710				1,800							550						
Jan-21																		390									
May-21						1,100	1,300	560		1,200	340	1,600	710	1,700		1,100			490		550	1,300			750		1,100
Jun-21																		400									
Jul-21	920	480	640	1,100	2,000																						
Nov-21						1,100						2,000		1,800		1,100						300					
Dec-21	960	490	590	1,200	960			560					700												760		
May-22	900	780	610	1,400	2,600	1,100	1,300	580		740		790	650	1,800		1,100		455			590	1,300			760		

Note: Shading indicates values that exceed water quality goals (light green > 500 mg/L and dark green > 1,000 mg/L)

Table F-2. SBCWD Monitoring Well Water Quality Data - Nitrate as NO3 (mg/L)

	Brian's Nested Wells																										
Date	A	B	C	D	E	MW 11	MW 12	MW 17	MW 18	MW 19	MW 21	MW 24	MW 28	MW 31	MW 36	MW 39	MW 41	MW 42	MW 43	MW 45	MW 46	MW 47	MW 48	MW 49	MW 51	MW 52	MW 1202
Apr-97											32	170															
Aug-98							7	6	12		46	220								16							
Sep-01						15	14	3	17	16	83	228	2		8	15	4	31	3	24	3		12				
Oct-01														57								86					
Jan-02						21	13	2				242	2	53	8	12	2	30	2	20	2	124		106			
Mar-02																							32				
Apr-02						19	13	3		80	33	3	3	53	7	10	3	28	3	21	3	114	10	112			
Jul-02						17	14	3		15	37	199	3	54	9	16	3	30	3	24	3	122		111			
Oct-02						20	18	2		15	80		3	55	9	16		35	3	28	3	129	13	112			
Jan-03						17	17	4		4	66	336	4	56	11	13	4	35	4	22	4	122	13	104			
Apr-03						21	20	3		11	83	327	4	69	9	12	3	36	3	27	3	114	13	116			
Jul-03						20	17	3		3	37	108	3	57	7	15	3	33	3	22	3	123	3	98			
Aug-03																19											
Oct-03						19	18	3		5	75	228	3	53	8	14	3	33	4	25	3	120	8	94			
Jul-05																19											
Jan-04						15	15	2	24		33	513	2	44	13	14	5	31	3	22			17	81			
Nov-04						16	19	2	8		61	259	2	44	5	7	2	35	2	20	2	101		82			
May-05						21	24	2	10		45	161	2	44	6	9	2	34	3	24	3	110		88			
Nov-05						19	23	3	14	9	57	321	4	47	7	10	3	33	3	23	4	103	11	78			
Apr-06						24		4	24		82	393	4	63	12	12	4	43	3	35	4	120		94			
Oct-06						22	18	5	22	76	47	501	3	53	8	14	4	35	4	25	5	140	14				
Feb-07	5	1	7	1	1																						
Apr-07						20		2	14			321	2	49	6	10	2	32	3	26	2	98					
Nov-07						23		5	14		42	295	4	31	9	12	4	33	3	29	3	128		74			
Apr-08						26							5	31				31	4		5						
May-08											36	225			17	15				25		99					
Nov-08						26		8				332	3	216	20	17	40	42	5	36		73		6			
Oct-09						30	2	7		19	23	3		175	8	27	44	32	2	7	12	53			7	2	
Nov-09	2	2	2	2	2																						
Apr-10						19	19	8		35	4	3	3	208	3			41		29		3		65	9	3	
Oct-10	4	5		4	4	30		13		10	5	301	5	225		11		39	5	27	4	36			10	4	
Apr-11						29	17	10		3	4	230	4	179	10	15		36	4	3	24	67		44	8	3	
Jun-11	7	4	4	17	3																						
Nov-11								11		5			4	170				33	4	26	4			4	5	5	
Dec-12						18	17	11			5	23	4	74	9			24	5	17	5	7			10	5	
Jun-13	6	5	6	5	25	28		19			6	180	31	211	9	14		36	5					31	14	6	
Dec-13						30		17				283	3	222		4			3	27	3	42		30	12	3	
Jan-14	3	3	3	2	15																						
May-14	3	3	3	2	18	30	16	18			2	302	2	212		3		35	3	24				13	3		
Nov-14	6	6	7	7	18			13				247	6	205				29	7	21	25				12	7	
May-15	5	5	5	8	19	26	18	13			5		5	215		5		23		25						6	
May-16	3	3	3	6	4	29	89	11		4	4	38	102	198		19		17	42		4				12	4	
Nov-16								12			6	302	5					34	8	10		42			14	4	
Nov-17						63		7			4	240	3	206		49		36	3		3	36			18	3	
Feb-18													5			34				22		36					
Jun-18						42	20	8		1	1	155	1	234				34	1		1	34				1	93
Nov-18						26				1	1	168	1	226		27			1		1	37		9			19
Dec-18	3	1	1	1	1																						
May-19				1		31	20	6		1	1	155	2	243		24		27	1		1	33					89
Jun-19	3	1	1		1																				9	8	
Nov-19																								9			
Dec-19		1																									
May-20	5	0	0	0	0			7				124	0			17		0			0	44			8		
Nov-20								12			0	195	0			22			0			32			9		
Dec-20						23	5			0				235							0						
Jan-21																		35									
May-21						25	22	18		0	0	106	0	213		19			0		0	27			8		26
Jun-21																		36									
Jul-21	7	0	0	0	0																						
Nov-21												279		230		19						32					
Dec-21	13	1	1	2	4			10					1												9		
May-22	11	39	1	1	10	31	24	14		2		9	1	222		19		4			1	2			9		

Note: Shading indicates values that exceed the primary MCL for drinking water

Table F-3. Water Quality Goals and Standards

Constituents of Concern	Units	Drinking Water Standards Maximum Contaminant Levels (MCLs)				Other Standards				
		State Water Resources Control Board		USEPA		California DHS			RWQCB Basin Plan Water Quality Objectives for Irrigation	
		Primary	Secondary	Primary	Secondary	Public Health Goal (PHG)	Action Level (AL)	Agricultural Water Quality	Irrigation Supply	Livestock Watering
MAJOR CATIONS:										
calcium	mg/L	–	–	–	–	–	–	–	–	–
magnesium	mg/L	–	–	–	–	–	–	–	–	–
sodium	mg/L	–	–	–	–	–	–	69	–	–
potassium	mg/L	–	–	–	–	–	–	–	–	–
MAJOR ANIONS:										
chloride	mg/L	–	250	–	250	–	–	106	–	–
sulfate	mg/L	–	250	500	250	–	–	–	–	–
bicarbonate	mg/L	–	–	–	–	–	–	–	–	–
carbonate	mg/L	–	–	–	–	–	–	–	–	–
MINOR IONS:										
hydroxide (as CaCO3)	mg/L	–	–	–	–	–	–	–	–	–
iron	mg/L	–	0.3	–	0.3	–	–	0.5	5	–
manganese	mg/L	–	0.05	–	0.05	–	0.5	0.2	0.2	–
fluoride*	mg/L	2	–	4	2	1	–	1	1	2
nitrate as NO3 –	mg/L	45	–	–	–	–	–	–	–	–
nitrate as nitrogen	mg/L	–	–	10	–	10	–	–	–	–
nitrite (NO2 –) as nitrogen	mg/L	1	–	1	–	1	–	–	–	10
nitrate + nitrite as nitrogen	mg/L	10	–	10	–	10	–	–	–	100
PHYSICAL PROPERTIES:										
apparent color	Color Units	–	15	–	15	–	–	–	–	–
conductivity		–	900	–	–	–	–	700	–	–
odor	TON@60°C	–	3	–	3	–	–	–	–	–
total alkalinity (as CaCO3)	mg/L	–	–	–	–	–	–	–	–	–
total dissolved solids (TDS)	mg/L	–	500	–	500	–	–	450	–	–
total hardness (as CaCO3)	mg/L	–	–	–	–	–	–	–	–	–
turbidity	NTU	1/5**	5	1/5**	–	–	–	–	–	–
pH	SU	–	–	–	6.5 to 8.5	–	–	6.5 to 8.4	5.5 to 8.3	–
TRACE IONS:										
aluminum	mg/L	1	0.2	–	0.050 to 0.2	0.6	–	5	5	5
antimony	mg/L	0.006	–	0.006	–	0.02	–	–	–	–
arsenic	mg/L	0.05	–	0.01	–	0.000004	–	0.1	0.1	0.2
barium	mg/L	1	–	2	–	2	–	–	–	–
beryllium	mg/L	0.004	–	0.004	–	0.001	–	0.1	0.1	–
boron	mg/L	–	–	–	–	–	1	0.700/0.750†	0.5	5
cadmium	mg/L	0.005	–	0.005	–	0.00004	0.00007	–	0.01	0.05
chromium vi	ug/L	20		0.1		0.02			0.1	1
cobalt	mg/L								0.05	1
copper	mg/L	1.3		1.3	1	0.3		0.2		
lead	mg/L	1.015		0.015		0.0002		5	5	0.1
lithium	mg/L								2.5	
mercury	mg/L	0.002		0.002		0.0012				
molybdenum	mg/L								0.01	0.5
nickel	mg/L	0.1				0.012		0.2	0	
selenium	mg/L	0.05		0.5				0.002		
silver	mg/L				0.1				0.02	0.05
thallium	mg/L	0.002		0.002		0.0001				
uranium	ug/L	30		30		0.5				
vanadium	mg/L	–	–	–	–	–	0.05	0.1	0.1	0.1
zinc	mg/L	–	5	–	5	–	–	2	2	25

Table F-3. Water Quality Goals and Standards

Constituents of Concern	Units	Drinking Water Standards Maximum Contaminant Levels (MCLs)				Other Standards				
		State Water Resources Control Board		USEPA		California DHS			RWQCB Basin Plan Water Quality Objectives for Irrigation	
		Primary	Secondary	Primary	Secondary	Public Health Goal (PHG)	Action Level (AL)	Agricultural Water Quality	Irrigation Supply	Livestock Watering
VOCs:										
1,1,1-trichloroethane	mg/L	1000	–	0.2	–	200	–	–	–	–
1,1,2-trichloro-1,2,2-trifluoroethane	mg/L	4000	–	1.2	–	1200	–	–	–	–
1,1,2-trichloroethane	mg/L	5	–	0.005	–	0.3	–	–	–	–
1,1-dichloroethane	mg/L	5	–	0.005	–	3	–	–	–	–
1,1-dichloroethene	mg/L	6	–	0.006	–	10	–	–	–	–
1,2,3-trichlorobenzene	mg/L	–	–	0	–	–	–	–	–	–
1,2,4-trichlorobenzene	mg/L	–	–	0.005	–	–	–	–	–	–
1,2-dichlorobenzene	mg/L	0.5	–	0.6	–	0.4	–	–	–	–
1,2-dichloroethane	mg/L	–	–	0.0005	–	–	–	–	–	–
1,2-dichloropropane	mg/L	–	–	0.005	–	–	–	–	–	–
1,3-dichlorobenzene	mg/L	–	–	0.6	–	–	0.6	–	–	–
chlorobenzene	mg/L	–	–	0.07	–	–	–	–	–	–
di(2-ethylhexyl)phthalate	mg/L	–	–	0.004	–	–	–	–	–	–
dichlorodifluoromethane	mg/L	–	–	1	–	–	–	–	–	–
PCE	mg/L	–	–	0.005	–	–	–	–	–	–
TCE	mg/L	0.005	–	0.005	–	0.0017	–	–	–	–
trans-1,2-dichloroethene	mg/L	–	–	0.01	–	–	–	–	–	–
trichlorofluoromethane	mg/L	–	–	0.15	–	–	–	–	–	–
vinyl chloride	mg/L	0.5	–	0.0005	–	0.05	–	–	–	–
BTEX:										
MTBE	mg/L	–	–	0.013	–	–	–	–	–	–
Benzene	mg/L	–	–	0.001	–	–	–	–	–	–
Toluene	mg/L	150	–	0.15	–	150	–	–	–	–
Ethylbenzene	mg/L	300	–	0.7	–	300	–	–	–	–
Total xylenes	mg/L	1750	–	1.75	–	1800	–	–	–	–
OTHER:										
MBAS (Surfactants)	mg/L	–	500	–	500	–	–	–	–	–
perchlorate	mg/L	6	–	–	–	1	0.006	0.006	–	–

Notes:
All concentrations in milligrams per liter (mg/L) or parts per million (ppm) except where noted.
Dash (–) indicates no current standard or no available information.
USEPA = U.S. Environmental Protection Agency.
California DHS = California Department of Health Services, now Department of Public Health
MBAS = Methylene Blue Active Substances.
NTU = Nephalometric Turbidity Units.
TON = Threshold Odor Number.
SU = Standard Units
* Optimal fluoride level and (range) vary with average of maximum daily temperature:
50.0 to 53.7 degrees F – 1.2 (1.1 to 1.7) mg/L; 53.8 to 58.3 degrees F – 1.1 (1.0 to 1.7) mg/L
58.4 to 63.8 degrees F – 1.0 (0.9 to 1.5) mg/L; 63.9 to 70.6 degrees F – 0.9 (0.8 to 1.4) mg/L
70.7 to 79.2 degrees F – 0.8 (0.7 to 1.3) mg/L; 79.3 to 90.5 deg

** Systems that use conventional or direct filtration may not exceed 1 NTU at any time or 0.3 NTU for 95th percentile value; systems that use other "alternative" filtration systems may not exceed 5 NTU at any time or 1 NTU for 95th percentile value.

† USEPA recommended agricultural limit for boron is 0.750 mg/L.
References:
Current USEPA and California DHS drinking water standards from California

Table F-4. Percent of Wells Over Comparison Concentration

Constituent	Comparison Concentration	Minimum Threshold- Percent Wells with Concentration over Comparison, Current Conditions, 2020-2022			
		Bolsa MA	Hollister MA	San Juan MA	Southern MA
Arsenic	10 ug/L	20%	18%	0%	0%
Boron	700 ug/L	0%	81%	0%	100%
Hexavalent Chromium	10 ug/L	0%	33%	0%	0%
Manganese	50 ug/L	50%	28%	41%	57%
Perchlorate	6 ug/L	0%	0%	0%	0%
Selenium	50 ug/L	0%	0%	0%	0%
Iron	300 ug/L	25%	11%	15%	17%
Hardness	300 mg/L	0%	58%	80%	60%

Table F-5. Average Concentration by Management Area

Constituent	Comparison Concentration	Average Concentration by Management Area			
		Bolsa MA	Hollister MA	San Juan MA	Southern MA
Arsenic	10 ug/L	2	3	2	1
Boron	700 ug/L	285	1966	1	1035
Hexavalent Chromium	10 ug/L	0	9	2	1
Manganese	50 ug/L	35	52	75	80
Perchlorate	6 ug/L	0	0	0	0
Selenium	50 ug/L	2	6	6	3
Iron	300 ug/L	243	250	185	544
Hardness	300 mg/L	155	376	459	423

APPENDIX G RATES AND CHARGES

List of Tables and Figures

Table G-1. 2023 Net Operations and Maintenance Allocation

Line Item	Test Year	Ground-water	San Felipe							Power Charge		Finished	Recycled	
			SF - Stored & Acquired[1]											
		All	*COW/USBR*	*Semitropic*	*SLDMWA*	*SCVWD*	*SBCWD*	*SBCWD Ag Only*	*SBCWD M&I Only*	All	Sub9	Water	Water	Power
O&M	$15,410,208	$776,783	$1,689,541	$40,000	$215,232	$567,000	$5,394,314	$0	$249,862	$643,175	$129,137	$5,454,055	$200,235	$50,873
Revenue Offsets														
Other Operating Revenue	-$28,826	-$3,008	$0	$0	$0	$0	-$20,888	$0	-$968	-$2,490	-$500	$0	-$775	-$197
Finished Water	-$5,454,055	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	-$5,454,055	$0	$0
Cost of Water [1]	-$1,689,541	$0	-$1,689,541	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
Taxes & Assessment	-$4,448,387	-$507,703	$0	$0	$0	$0	-$3,743,260	$0	$0	$0	$0	$0	-$197,424	$0
Other Non-Operating	-$349,414	-$36,460	$0	$0	$0	$0	-$253,191	$0	-$11,728	-$30,188	-$6,061	$0	-$9,398	-$2,388
Grants	-$87,400	-$9,120	$0	$0	$0	$0	-$63,331	$0	-$2,933	-$7,551	-$1,516	$0	-$2,351	-$597
Change in Funds Available	$361,099	$37,679	$0	$0	$0	$0	$261,658	$0	$12,120	$31,198	$6,264	$0	$9,713	$2,468
Net O&M Rev. Req.	$3,713,684	$258,171	$0	$40,000	$215,232	$567,000	$1,575,302	$0	$246,354	$634,143	$127,324	$0	$0	$50,159

[1] This is a pass-through cost.

Table G-2. 2023 Net Capital- Related Allocation

Line Item	Test Year	Ground Water		San Felipe						Power Charge		Finished	Recycled
		Ag Only	M&I Only	*Stored & Acquired [1]*	*SLDMWA*	*SCVWD*	*SBCWD*	*SBCWD Ag Only*	*SBCWD M&I Only*	All	Sub9	Water	Water
WIIN Debt Service	$226,227	$0	$0	$0	$0	$0	$0	$183,244	$42,983	$0		$0	$0
Citi National DS	$463,117	$0	$0	$0	$0	$0	$0	$0	$0	$0		$336,812	$126,305
UAL Sterling	$243,190	$993	$198	$0	$0	$0	$0	$47,213	$1,349	$26,011		$160,791	$6,634
RW Repayment	$231,003	$0	$0	$0	$0	$0	$0	$0	$0	$0		$0	$231,003
Cash Funded Capital	$983,567	$4,017	$802	$0	$0	$0	$0	$190,951	$5,455	$105,199		$650,310	$26,832
Reach 1 Major R&R	$437,976	$0	$0	$0	$0	$437,976	$0	$0	$0	$0		$0	$0
Supply-Reliability Capital	$5,941,352	$0	$0	$0	$0	$0	$0	$0	$5,941,352	$0		$0	$0
Revenue Offsets													
Finished Water	-$2,552,337	$0	$0	$0	$0	$0	$0	$0	-$1,484,567	$0		-$1,067,770	$0
Taxes & Assessments	-$4,588,538	-$4,516	-$902	$0	$0	$0	$0	$0	-$4,341,866	$0		$0	-$241,255
Interest Income	-$213,248	-$871	-$174	$0	$0	$0	$0	-$41,400	-$1,183	-$22,808		-$140,994	-$5,817
Supply-Reliability Charge [2]	-$114,919	$0	$0	$0	$0	$0	$0	$0	-$114,919	$0		$0	$0
Change in Funds Available	$92,035	$376	$75	$0	$0	$0	$0	$17,868	$510	$9,844		$60,851	$2,511
Net Capital-Related Rev. Req.	$1,149,424	$0	$0	$0	$0	$437,976	$0	$397,876	$49,114	$118,245	$0	$0	$146,212

[1] This is a pass-through cost from USBR.

[2] Charge to cover supply reliability projects for the benefit of existing customers.

Table G-3. FY 2023 Unit of Cost-of-Service

		Groundwater			*San Felipe*							Power Charge		Recycled	
					Stored & Acquired [1]					*SBCWD*					
Line Item	**Test Year**	**All**	**Ag Only**	**M&I Only**	***COW/USBR***	***Semitropic***	***SLDMWA***	***SCVWD***	***SBCWD***	***Ag Only***	***M&I Only***	**All**	**Subsystem 9**	**Water**	**Power**
Units, AF		*18,776*	*15,740*	*3,036*			*18,701*	*18,701*	*18,701*	*13,176*	*5,525*	*18,705*	*2,367*	*496*	496
Net O&M Rev. Req.	$3,713,684	$258,171	$0	$0	$0	$40,000	$215,232	$567,000	$1,575,302	$0	$246,354	$634,143	$127,324	$0	$50,159
Net Capital-Related Rev. Req.	$1,149,424	$0	$0	$0	$0	$0	$0	$437,976	$0	$397,876	$49,114	$118,245	$0	$146,212	$0
Total	$4,863,108	$258,171	$0	$0	$0	$40,000	$215,232	$1,004,976	$1,575,302	$397,876	$295,468	$752,389	$127,324	$146,212	$50,159
Unit Cost, $/AF		$13.75	$0.00	$0.00			$11.51	$53.74	$84.24	$30.20	$53.47	$40.22	$53.78	$294.70	$101.10
Total Unit Cost, $/AF			**$13.75**	**$13.75**		**$7.24**	**$11.51**	**$53.74**		**$114.43**	**$137.71**	**$40.22**	**$94.01**	**$294.70**	**$101.10**

[1] This is a pass-through cost.

Table G-4 Historical and Current San Benito County Water District CVP (Blue Valve) Water Rates (dollars/af)

USBR Water Year	Standby & Availability Charge (dollars/acre)	Water Charge			Power Charge					Groundwater Charge (dollars/af)			Recycled Water (per AF)	
		Agricultural	Municipal & Industrial		Distribution Subsystem					Agricultural	Municipal & Industrial		Agricultural	Power Charge
			Small Parcel & Contract	Wholesale	2	6H	9L	9H	Others					
1987	$8.00	$34.00	n.c.							n.i.	n.i.			
1988	$2.00	$34.00	n.c.							n.i.	n.i.			
1991	$4.00	$38.00	$110.00							$6.25	$22.00			
1992	$4.00	$45.00	$120.00							$2.00	$10.00			
1994	$4.50	$77.61	$168.92							$1.00	$5.00			
1995	$4.50	$77.61	$168.92							$1.00	$15.75	First 100 af		
											$36.70	Next 500 af		
											$54.60	Over 600 af		
1996	$6.00	$75.00	$150.00							$1.50	$33.00			
1997	$6.00	$75.00	$157.00							$1.50	$33.00			
1998	$6.00	$75.00	$155.00							$1.50	$33.00			
2000	$6.00	$75.00	$155.00							$1.50	$11.50			
2001	$6.00	$75.00	$155.00							$1.50	$25.00			
2004	$6.00	$75.00	$150.00	$150.00	$24.30	$46.75	$25.05	$53.70	$15.25	$1.50	$10.00			
2005	$6.00	$80.00	$150.00	$150.00	$26.15	$49.40	$35.00	$66.90	$17.10	$1.50	$21.50			
2006	$6.00	$85.00	$160.00	$160.00	$23.60	$36.05	$34.70	$65.75	$18.40	$1.50	$21.50			
2007	$6.00	$85.00	$160.00	$160.00	$23.60	$36.05	$34.70	$65.75	$18.40	$1.50	$21.50			
2008	$6.00	$100.00	$170.00	$170.00	$17.25	$19.40	$32.60	$62.75	$14.85	$1.50	$21.50			
2009	$6.00	$115.00	$180.00	$180.00	$17.50	$20.25	$42.55	$74.85	$16.30	$2.50	$22.50			
2010	$6.00	$135.00	$200.00	$200.00	$22.00	$27.30	$49.75	$84.35	$21.75	$2.50	$22.50			
2011	$6.00	$155.00	$220.00	$220.00	$22.70	$28.15	$51.25	$86.90	$22.40	$2.50	$22.50			
2012	$6.00	$170.00	$235.00	$235.00	$23.35	$29.00	$52.80	$89.50	$23.10	$2.50	$22.50			
2013	$6.00	$170.00	$235.00	$235.00	$40.30	$29.25	$43.05	$91.55	$22.40	$3.25	$23.25			
2014	$6.00	$170.00	$238.00	$238.00	$41.55	$30.15	$44.35	$94.30	$23.10	$3.60	$23.25			
2015	$6.00	$179.00	$247.00	$247.00	$42.75	$31.05	$45.70	$97.15	$23.80	$3.95	$23.25			
2016	$6.00	$272.00	$363.00	$363.00	$123.10	$75.65	$109.95	$162.55	$66.05	$4.95	$24.25		$182.55	$57.70
2017	$6.00	$191.00	$363.00	$363.00	$126.80	$77.90	$113.25	$167.45	$68.05	$6.45	$24.25		$183.45	$59.45
2018	$6.00	$209.00	$363.00	$363.00	$130.60	$80.25	$116.25	$172.45	$70.10	$7.95	$24.25		$183.45	$59.45
2019	$6.00	$254.00	$404.00	$404.00	$80.45	$39.30	$88.15	$130.30	$33.70	$12.75	$38.25		$183.45	$59.45
2020	$6.00	$265.00	$415.00	$415.00	$82.85	$40.45	$90.80	$134.10	$34.75	$13.15	$39.40		$208.00	$60.64
2021	$6.00	$274.00	$424.00	$424.00	$85.35	$41.50	$93.55	$138.25	$35.75	$13.55	$40.55		$210.00	$61.85
2022	$6.00	$274.00	$424.00	$647.00	$85.35	$41.50	$93.55	$138.25	$35.75	$13.55	$40.55		$211.00	$63.09
2023	$6.00	$294.68	$653.70	$653.70	$40.22	$40.22	$94.01	$94.01	$40.22	$13.75	$13.75		$294.70	$101.10

Notes:
af = acre-feet.
n.c. = no classification.
n.i. = not implemented
All rates effective March 1 through following February.

Table G-5. Recent US Bureau of Reclamation Charges per Acre-Foot for CVP Water

User Category and Cost Item	Irrigation[1]						Municipal & Industrial					
	Cost of service (non-full cost)	Restoration fund[3]	SLDMWA[4]	Trinity PUD Assessment	Total	Contract rate[5]	Cost of service[2] (non-full cost)	Restoration fund[3]	SLDMWA[4]	Trinity PUD Assessment	Total	Contract rate[5]
1994	$71.68	$6.20	n.a.		$77.88	$17.21	$165.67	$12.40	n.a.		$178.07	$85.86
1995	$66.47	$6.35	n.a.		$72.82	$17.21	$132.90	$12.69	n.a.		$145.59	$85.86
1996	$65.63	$6.53	n.a.		$72.16	$27.46	$127.40	$13.06	n.a.		$140.46	$85.86
1997	$69.57	$6.70	n.a.		$76.27	$27.46	$143.27	$13.39	n.a.		$156.66	$85.86
1998	$61.58	$6.88	$5.00		$73.46	$27.46	$130.88	$13.76	$5.00		$149.64	$85.86
1999	$60.30	$6.98	$2.73		$70.01	$27.46	$127.91	$13.96	$2.73		$144.60	$85.86
2000	$64.24	$7.10	$6.43		$77.77	$27.46	$129.59	$14.20	$6.43		$150.22	$85.86
2001	$69.50	$7.28	$2.65		$79.43	$27.46	$129.40	$14.56	$4.15		$148.11	$85.86
2002	$68.71	$7.54	$6.61		$82.86	$24.30	$130.32	$15.08	$6.61		$152.01	$79.13
2003	$72.20	$7.69	$5.46		$85.35	$24.30	$129.07	$15.38	$5.46		$149.91	$79.13
2004	$74.52	$7.82	$6.61		$88.95	$24.30	$134.86	$15.64	$6.61		$157.11	$79.13
2005	$77.10	$7.93	$7.99		$93.02	$24.30	$132.01	$15.87	$7.99		$155.87	$79.13
2006	$91.13	$8.24	$9.31		$108.68	$30.93	$214.41	$16.49	$9.31		$240.21	$77.12
2007	$93.53	$8.58	$9.99	$0.11	$112.21	$30.93	$215.32	$17.15	$9.99	$0.11	$242.46	$80.08
2008[6]	$28.12	$8.79	$10.95	$0.07	$47.93	$30.93	$33.34	$17.57	$10.95	$0.07	$61.68	$33.34
2009	$30.20	$9.06	$11.49	$0.07	$50.82	$30.20	$32.77	$18.12	$11.49	$0.07	$62.45	$32.77
2010	$33.27	$9.11	$11.91	$0.11	$54.40	$33.27	$36.11	$18.23	$11.91	$0.11	$66.36	$36.11
2011	$38.92	$9.29	$9.51	$0.05	$57.77	$38.92	$42.58	$18.59	$9.51	$0.05	$70.73	$42.58
2012	$39.71	$9.39	$15.20	$0.05	$64.35	$39.71	$37.95	$18.78	$15.20	$0.05	$71.98	$37.95
2013	$40.39	$9.79	$17.29	$0.05	$67.52	$39.91	$38.71	$19.58	$17.29	$0.05	$75.63	$40.92
2014	$46.87	$9.99	$28.81	$0.23	$85.90	$46.87	$29.70	$19.98	$28.81	$0.23	$78.72	$29.70
2015	$53.82	$10.07	$30.66	$0.23	$94.78	$53.82	$34.74	$20.14	$30.66	$0.23	$85.77	$34.74
2016	$85.12	$10.21	$30.66	$0.30	$126.29	$38.28	$61.24	$20.41	$30.66	$0.30	$112.61	$23.42
2017	$66.17	$10.23	$14.15	$0.30	$90.85	$39.90	$49.50	$20.45	$14.15	$0.30	$84.40	$22.85
2018	$79.09	$10.47	$20.39	$0.30	$110.25	$48.35	$43.74	$20.94	$20.39	$0.30	$85.37	$17.45
2019	$67.32	$10.63	$20.26	$0.30	$98.51	$40.14	$37.54	$21.26	$20.26	$0.30	$79.36	$17.98
2020	$72.24	$10.91	$27.57	$0.12	$110.84	$52.76	$37.18	$21.82	$27.57	$0.12	$86.69	$17.87
2021	$72.61	$11.11	$38.52	$0.15	$122.39	$48.42	$35.47	$22.23	$38.52	$0.15	$96.37	$35.47
2022	$46.07	$11.23	$39.19	$0.15	$96.64	$28.46	$45.07	$22.46	$39.19	$0.15	$106.87	$27.50

Notes:

(1) Total USBR rate given for non-full cost users only, as they represent the majority of water users.

(2) Cost-of-service for agricultural and municipal and industrial users includes a capital repayment rate and an operation and maintenance (O&M) rate. For municipal and industrial customers, cost-of-service also includes a deficit charge, which includes interest on unpaid O&M and interest on capital and on unpaid deficit.

(3) Restoration fund charges apply October 1 through September 30. All other rates effective March 1 through following February.

(4) Beginning in 1998, the San Luis-Delta Mendota Water Authority instituted this charge to "self-fund" costs associated with maintaining the Delta-Mendota Canal and certain other facilities, which were formerly funded directly by the Bureau of Reclamation. SLDMWA issues preliminary rates in December for the upcoming contract year (March-February). These rates are used for rate-setting purposes; actual rates may vary.

(5) The contract rate is the minimum rate CVP contractors are allowed to pay. To the extent that the contract rate does not cover interest plus actual operation and maintenance costs, a contractor deficit is accumulated that is charged interest at the current-year treasury borrowing rate.

(6) Per the amendatory contract with the USBR "out of basin" capital costs that were previously included in the cost of service are now under a separate repayment contract.

(7) Cost of service rates are inclusive of USBR direct pumping and Project Use Energy costs.

List of Acronyms

AF or A/F	acre-foot
AFY	acre-foot per year
AG	agriculture
BMP	Best Management Practices
CASGEM	California Statewide Groundwater Elevation Monitoring
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CIMIS	California Irrigation Management Information System
COC	Constituent of Concern
CVP	Central Valley Project
District or SBCWD	San Benito County Water District
CWD	County Water District
DDW	Division of Drinking Water
DWR	California Department of Water Resources
DWTP	Domestic Wastewater Treatment Plant
ET	evapotranspiration
ft	feet
GAMA	Groundwater Ambient Monitoring and Assessment
GICIMA	Groundwater Information Center Interactive Map
GPBO	General Basin Plan Objective
gpd	gallons per day
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GW	groundwater
HUA	Hollister Urban Area
IRWMP	Integrated Regional Water Management Plan
ITRC	Irrigation Training and Research Center, California Polytechnic State University
IWTP	Industrial Wastewater Treatment Plant
M&I	Municipal and Industrial
MA	Management Area
MCL	Maximum Contaminant Level
MGD	million gallons per day
msl	mean sea level
MT	Minimum Threshold
MW	Monitored well
NGVD	National Geodetic Vertical Datum
pdf	Adobe Acrobat Portable Document Format
PPWD	Pacheco Pass Water District
PVWMA	Pajaro Valley Water Management Agency
RW	recycled water
RWQCB	Regional Water Quality Control Board

List of Acronyms (cont.)

SCVWD	Santa Clara Valley Water District
SEIR	Supplemental Environmental Impact Report
SGMA	Sustainable Groundwater Management Act
SLDMWA	San Luis & Delta-Mendota Water Authority
SMCL	Secondary Maximum Contaminant Levels
SSCWD	Sunnyslope County Water District
USBR	U.S. Bureau of Reclamation
UWMP	Urban Water Management Plan
WRA	Water Resources Association of San Benito County
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant
WY	water year