2020 Agricultural Water Management Plan

TODD GROUNDWATER

SAN BENITO COUNTY WATER DISTRICT

2020 Agricultural Water Management Plan

September 2021

TODD GROUNDWATER

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List of Acronyms

AF	Acre-feet
AFY	Acre-feet per year
AWMP or Plan	Agricultural Water Management Plan
cfs	cubic feet per second
CIMIS	California Irrigation Management Information System
City or Hollister	City of Hollister
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
DDW	California Water Resources Control Board Division of Drinking Water
District	San Benito County Water District
DWR	California Department of Water Resources
DWRF	Domestic Waste Reclamation Facility
ET	Evapotranspiration
Eto	Reference Evapotranspiration
EWMP	Efficient Water Management Practice
gpm	Gallons per minute
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HUA	Hollister Urban Area
ILRP	Irrigated Lands Regulatory Program
M&I	Municipal and Industrial
MCL	Maximum Contaminant Level
mg/L	Milligrams per liter
NRCS	Natural Resources Conservation Service
ppt	parts per trillion
RWQCB	Regional Water Quality Control Board
SBX7-7	Steinberg Water Conservation Act of 2009
SGMA	Sustainable Groundwater Management Act
SLDMWD	San Luis Delta Mendota Water District
SMCL	Secondary Maximum contaminant Level
SSURGO	Soil Survey Geographic Database
TDS	Total Dissolved Solids
ug/L	Micrograms per liter
USBR	U.S. Bureau of Reclamation
USDA	U.S. Department of Agriculture
UWMP	Urban Water Management Plan
WAP	Water Allocation Policy
WRA	Water Resources Association
WTP	Water Treatment Plants
WWTP	Wastewater Treatment Plant
WY	Water Year, Hydrologic October 1 through September 30
WMO	Water management objectives

1 PLAN PREPARATION AND ADOPTION

The San Benito County Water District (SBCWD or District) is a contractor with the U.S. Bureau of Reclamation (USBR) for imported water from the Central Valley Project (CVP). The CVP water is provided from San Luis Reservoir through the San Felipe Division[1], which provides water to SBCWD and Valley Water (Santa Clara Valley Water District).

The Central Valley Project Improvement Act (CVPIA) is federal legislation establishing rules and regulations for the Central Valley Project (CVP). The CVPIA outlines criteria for contractors who receive water from the CVP to report their water supply, water demand, and water efficiency measures. The latest criteria update was released by USBR in the "2020 Standard Criteria" (USBR 2020).

In addition to the federal legislation, the California Water Code requires that agricultural water suppliers (providing water to 10,000 or more irrigated acres) prepare and adopt an Agricultural Water Management Plan (AWMP) and submit that Plan to the California Department of Water Resources (DWR). The Plan is required to describe and evaluate 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. Adoption of an AWMP and implementation of efficient water management practices (EWMPs) are required in order for the agricultural water supplier to be eligible for any State water loans or grants.

SBCWD receives CVP water and has over 20,000 irrigated acres within its Zone 6 area of benefit for CVP water. Accordingly, this AWMP has been prepared in accordance with the requirements of USBR's Standard Criteria and DWR's SBX7-7 (Water Conservation Act of 2009) and new legislation. It follows the recommendations in both the "2020 Standard Criteria" prepared by USBR and *A Guidebook to Assist Agricultural Water Suppliers to Prepare a 2020 Agricultural Water Management Plan* (Guidebook) prepared by DWR.

AWMPs are to be prepared every five years. SBCWD last updated its AWMP in 2015 (SBCWD, 2015). The 2020 AWMPs must be adopted by April 1, 2021 and submitted to DWR within 30 days of adoption. However, SBCWD also participates in the Urban Water Management Plan for the Hollister Urban Area, which overlaps the Zone 6 area. The development of the AWMP began after the adoption of the UWMP by the three agencies (June 2021) in order to integrate the two planning documents. Moreover, in compliance with California's Sustainable Groundwater Management Act (SGMA), preparation of a Groundwater Sustainability Plan (GSP) for the North San Benito Basin has been underway and has allowed coordination among the planning efforts.

[1] CVP water supply commonly also is termed San Felipe water.

This 2020 AWMP updates information in the 2015 AWMP and addresses additional content requirements pursuant to new legislation including AB 1668 (Water Management Planning) and California Water Code §10820 (AWMP). These include:

- An annual water budget with specific components on a water-year basis
- Identification of water management objectives based on the water budget to improve system efficiency or to meet other water management objectives
- Quantification of water use efficiency using methods identified in *A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use* (DWR, 2012)
- Drought Plan with actions for drought preparedness.

This 2020 AWMP updates the structure and many of the tables from the 2015 AWMP to ensure compliance with the Federal criteria and California Water Code, consistency with other plans, and increased readability. Appendix A includes the checklists for USBR plans and DWR plans to indicate where the required information can be located in the document.

The water use, supply, and budget tables have been revised from representative years to a five-year period extending from Water Year[2] (WY) 2016 to WY 2020.

1.1 WATER MANAGEMENT ACTIVITIES

SBCWD has broad powers for the acquisition, storage, and distribution of water for irrigation, domestic, fire protection, municipal, commercial, industrial, and all other beneficial uses, as follows:

- to store water in surface or underground reservoirs
- to conserve and reclaim water
- to appropriate and acquire water and water rights, import water, and conserve it
- to control flood and storm waters of streams that flow into the district, and to conserve such waters for beneficial purposes by spreading, storing, retaining, and causing to percolate
- to carry on technical and other necessary investigations, make measurements, collect data, make analyses, studies, and inspections pertaining to water supply, water rights, control of flood and storm waters, and use of water.

The District has led preparation, in collaboration with Valley Water, of the GSP for the entire North San Benito Groundwater Basin and will submit the GSP to DWR in January 2022 in compliance with the Sustainable Groundwater Management Act (SGMA) (Todd, 2021). The GSP provides for cooperative management of the shared groundwater resources in the Basin. The GSP sustainability goal is to manage groundwater sustainably to support

[2] A Water Year (WY) is defined as October 1 through September 30. For example, WY 2016 extends from October 2015 through September 2016.

beneficial uses and to optimize conjunctive use of surface water, imported water, and groundwater. Annual reporting demonstrates the implementation of the GSP including monitoring and management in accordance with the plan. The GSP is re-evaluated every five years to determine if additional actions are needed to meet the sustainability goal. In addition to these activities, the District also implements best management practices to improve water use efficiency for agricultural users. These Efficient Water Management Practices (EWMPs) are described in Section 7.

The District has prepared Annual Groundwater Reports since the 1990s, at the direction of the Board of Directors, to fulfill the requirements set forth in SBCWD's formation act (California Water Code Appendix 70). Previously the Annual Groundwater Report has focused on the Zone 6 area but will be expanded to encompass the North San Benito Groundwater Basin to meet SGMA requirements. Appendix 70 requires preparation of the report (summarizing the water year October 1 through September 30) in December and presentation to the Board of Directors in January. Appendix 70 states that the annual report will provide documentation of groundwater levels and pumping, groundwater storage change, and overdraft (if any); an estimate of next-year conditions, agricultural pumping, and water purchases; and the required recommendations for surface water deliveries, groundwater replenishment, and groundwater charges. In recent years, Annual Reports have been prepared with triennial updates on water budgets and on water quality conditions, and planning for the transition to SGMA compliance (Todd, 2020).

1.2 COORDINATION ACTIVITIES

Within San Benito County, and the District's Zone 6 encompasses the City of Hollister, City of San Juan Bautista, and unincorporated County land. The District actively coordinates with the cities and Sunnyslope County Water District (SSCWD or Sunnyslope) on management of municipal water supply. The District, in cooperation with Hollister and Sunnyslope, prepared an Urban Water Management Plan (UWMP) that details the municipal water supply of the Hollister Urban Area (HUA).

Table 1 summarizes the efforts SBCWD has taken to involve appropriate agencies and the general public in the District's AWMP update process. The City, County, and interested Parties were notified that the AWMP would be revised. Notifications included location where the AWMP can be viewed, time and place of the public hearing, and contact information. Public notices were published before the public hearing in accordance with Government Code §6066. Copies of notifications and public notices are included in **Appendix B**.

A public hearing was held on October 27, 2021 for SBCWD Board consideration of adoption of this Plan. The Resolution of Adoption is included as **Appendix C**. A summary of notice is provided below.

- Notification was sent to Interested Parties (see **Table 1**) on intent to update SBCWD AWMP on August 25, 2021,

- Notice in local newspaper on October 8, 2021 and October 15, 2021 of Public Hearing to adopt the 2020 AWMP (per Gov. Code §6066),
- Posted Draft AWMP on District's website (www.sbcwd.org) and a hard copy was available at District offices October 28, 2021 and
- Electronic version of the Draft Plan was submitted to entities that requested such drafts (see **Table 1)**.

Table 1. Summary of Coordination, Adoption, and Submittal Activities

Potential Interested Parties	Notified of AWMP	Notified of Public Meetings	Attended Public Meetings	Copy of Adopted AWMP/ Amendment Sent
City of Hollister	8/25/21			10/28/21
Sunnyslope County Water District	8/25/21			10/28/21
City of San Juan Bautista	8/25/21			10/28/21
San Benito County	8/25/21			10/28/21
San Benito County Water District GSA				10/28/21
DWR				10/28/21
San Benito Weekly		10/8/21, 10/15/21		
California State Library				
Website				10/8/21

1.3 AWMP ADOPTION, SUBMITTAL AND AVAILABILITY

The SBCWD 2020 AWMP was adopted by the District Board at a public hearing conducted at a regular meeting of the Board of Directors on October 27, 2021.The Board unanimously voted to consider and incorporate comments received prior to and at the public hearing. A copy of the resolution adopting the AWMP is included in **Appendix C**.

The District posted a Final version of the 2020 AWMP on its website and made available to the appropriate entities per California Water Code §10843 (see **Table 1**) within 30 days of adoption by the District.

The AWMP was uploaded to the DWR Water Use Efficiency Portal on October 28, 2021and a thumb drive with an electronic copy mailed to the State Library on October 28, 2021.

1.4 AWMP IMPLEMENTATION SCHEDULE

Following adoption, the 2020 AWMP will be in effect for five years; the next AWMP update will occur in early 2026. The 2020 AWMP provides details on its EWMPs along with an implementation schedule in Section 7 of this Plan.

1.5 AWMP CHECKLIST AND USBR CROSSWALK

Appendix A contains a multipage checklist provided in the Draft AWMP Guidebook developed from the California Water Code requirements for plan content and plan preparation and adaption. Completion of this table supports preparation of the AWMP and provides DWR and the public with the AWMP sections where required elements can be found.

Appendix A also contains the crosswalk provided by USBR to allow for UWMP to be used to supplement some of the Standard Criteria requirements.

1.6 CONTACT INFORMATION

This AWMP was prepared by Todd Groundwater on behalf of San Benito County Water District. The SBCWD contact overseeing the plan was:

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2 DESCRIPTION OF SERVICE AREA

2.1 History

San Benito County Water District is a special district formed in 1953 under State law (California Water Code Appendix 70) pursuant to the San Benito County Water District Act. It originally was formed as the San Benito County Water Conservation and Flood Control Act. The name was changed from the San Benito County Water Conservation and Flood Control District to San Benito County Water District in 1989.

2.2 Location and Facilities

SBCWD is the county-wide manager of water resources, the owner and operator of local surface water reservoirs (Hernandez and Paicines) and associated recharge operations, and the wholesaler for Central Valley Project (CVP) supplies from the U.S. Bureau of Reclamation (USBR). The District's area encompasses the entire San Benito County area of approximately 1,396 square miles.

2.2.1 Size and Location of Service Area

SBCWD has established three Zones of Benefit reflecting the responsibilities described in **Table 2**. While Zone 1 is the entire San Benito County, the extents of Zones 3 and 6, and the North San Benito Basin are shown in **Figure 1.** Zone 6 is the area designated for the importation and distribution of CVP water and related groundwater management activities. The remaining areas rely on groundwater wells. **Table 3** summarizes the water supplier information for SBCWD.

Table 2. SBCWD Zones of Benefit

Zone	Area	Provides	Area (acres)
1	Entire County	Specific District administrative expenses	893,440
3	San Benito River Valley (Paicines to San Juan) and Tres Pinos Creek Valley (Paicines to San Benito River)	Operation of Hernandez and Paicines reservoirs and related groundwater recharge and management activities	35,745
6	GSP Management Areas Hollister and San Juan	Importation and distribution of CVP water and related groundwater management activities	47,614

Table 3. Water Supplier Information

Description	Summary
Date of District Formation	1953
Source of Water	
Local Surface Water	indirect
Local Groundwater	✓
Recycled Water	✓
USBR CVP water	✓
Service Area Gross Acreage	47,614
Service Area Developed as Irrigated Agricultural Acreage (2016 includes idle land)	23,215
Service Area Irrigated Acreage (2016)	21,124

Land use source DWR Land Use Mapping Portal, 2021

The Hollister Urban Area (HUA) is also located within Zone 6 and includes 13,411 acres of urban area, outlined on **Figure 2**. The District, along with the two retailers Hollister and Sunnyslope prepared and submitted an UWMP for this area in June 2021. Municipal water demand and supply for this area is not included in this AWMP. For detailed information about the demand, supply, and water contingency plan please refer to the HUA UWMP (Todd, 2021).

2.2.2 Water Management Facilities

The District's water conveyance and storage facilities include the main Hollister conduit, laterals, and local reservoirs. Facilities are shown on **Figure 3** and summarized in **Table 4**. Percolation ponds are shown on **Figure 4**. In addition, SBCWD, City of Hollister, and SSCWD have collaborated on construction and operation of two municipal water treatment plants (WTPs) for the City of Hollister, the Lessalt and West Hills WTPs that allow for treatment and direct domestic use of CVP water. The urban use of CVP is discussed in detail in the HUA UWMP. With the exception of expanded recycled water deliveries, no changes are expected in the next five years. Brief descriptions of the facilities are included below.

Water Conveyance and Delivery System

The USBR facilities that import water to SBCWD and Valley Water from San Luis Reservoir through Pacheco Pass include the Pacheco Tunnel, Pacheco Pumping Plant, and Pacheco Conduit. The CVP distribution system within San Benito County is composed of eight pressure-reducing turnouts, four pumping facilities, four active percolation sites, and the 10,000 acre-foot San Justo Reservoir. A computerized telemetry system aids in delivering water through over 150 miles of buried pipe. The District does not operate any agricultural drains.

Table 4. Water Conveyance and Delivery System

Conveyance System	Number of Miles
Unlined Canal	0
Lined Canal	0
Pipelines	158
Drains	0
Total	**158**

Source: SBCWD, 2015

Storage Facilities

San Justo Reservoir, **Figure 3**, is a federal facility and the main storage reservoir for CVP imported water in San Benito County with a capacity is 10,308 AF. Many challenges are associated with the operation of San Justo Reservoir including managing storage, seepage, and eliminating invasive zebra mussels. San Justo is used by the District as a part of its distribution system. It is estimated about 10 percent of the water stored in San Justo is lost due to seepage and evaporation, but some of this seepage is recovered by SBCWD through pumping four recovery wells downgradient of the reservoir. The water produced by these wells is returned to the Reservoir.

The District also operates Paicines and Hernandez reservoirs on the San Benito River for local surface water storage. Releases from these reservoirs are used to recharge the groundwater basin with benefits to Zone 3 (see Figure 1)

Groundwater Recharge Basins

The District operates off-stream recharge basins to replenish the groundwater basin with CVP water. These ponds are shown on **Figure 4** and listed in **Table 5**are off-stream ponds.

Table 5. Groundwater Recharge Basins

Recharge Basin	Size (acres)
Union Pond	10.4
Frog Pond	4.6
Tres Pinos Pond	12.4
Hollister Ponds	135.0
Total	**162.3**

Groundwater Wells
With the exception of the seepage recovery wells, SBCWD does not currently own and operate production wells. Groundwater is produced for beneficial uses from numerous wells in Zone 6 including 177 private agricultural wells, 552 domestic wells, and 33 other wells (including community water systems or industrial uses) with power meters that the District monitors. Municipal purveyors (cities of Hollister and San Juan Bautista, SSCWD, and Tres Pinos Water District) operate 11 wells and report their production to the District.

2.3 Service Area Terrain and Soils

The topography of northern San Benito County, including the North San Benito Basin and Zones 3 and 6, includes a series of valleys along the San Benito and Pajaro rivers and their respective tributaries. These valleys are separated by hills and low mountains with elevations up to 3,500 feet above mean sea level. The topography of the area limits irrigated agriculture to the valleys, including the Hollister and San Juan valleys in Zone 6.

The North San Benito GSP documents the topography and drainage features in detail, including maps of local streams and surface water features. The GSP identifies springs, seeps, and wetlands supported by groundwater within the Basin as identified from the (Natural Communities Commonly Associated with Groundwater) NCCAG geodatabase. NCCAG compiled the sites from other databases based on the frequency of flooding. About half of the features are classified as seasonally flooded, which is more likely to be associated with localized ponding of rainfall runoff than discharge of regional groundwater.

Figure 5 shows soil hydrologic group data from the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO) (NRCS, 2018). The soil hydrologic group is an assessment of soil infiltration rates determined by the water transmitting properties of the soil, which include hydraulic conductivity and percentage of clays in the soil, relative to sands and gravels. The groups are defined as:

- Group A – High Infiltration Rate: water is transmitted freely through the soil; soils typically less than 10 percent clay and more than 90 percent sand or gravel.
- Group B – Moderate Infiltration Rate: water transmission through the soil is unimpeded; soils typically have between 10 and 20 percent clay and 50 to 90 percent sand.
- Group C – Slow Infiltration Rate: water transmission through the soil is somewhat restricted; soils typically have between 20 and 40 percent clay and less than 50 percent sand.
- Group D – Very Slow Infiltration Rate: water movement through the soil is restricted or very restricted; soils typically have greater than 40 percent clay, less than 50 percent sand.

The hydrologic group of the soil generally correlates with the potential for infiltration of water to the subsurface, although the hydrologic characteristics of the underlying geology may differ.

Annual water budgets, historically focused on Zone 6, have been provided on a triennial basis in the SBCWD Annual Groundwater Reports, which are prepared at the direction of the SBCWD Board of Directors. The North San Benito GSP provides a detailed discussion of water budget elements (inflows, outflows, and change in groundwater storage) for water years 1975-2017. Consistent with SGMA, Annual Reports beginning in 2022 will include annual water budgets.

2.4 CLIMATE

San Benito County has a moderate California coastal climate, with a hot and dry summer season typically lasting from May through October. Average annual rainfall ranges from 7 inches in the drier eastern portion of the County to 27 inches per year in high elevations to the south (PRISM, 2010). The City of Hollister, some 30 miles inland from the coast and separated from it by the Gabilan Range, receives an annual average rainfall of about 13 inches. Snowfalls in the mountains are infrequent and relatively light. A comparatively long growing season of 265 days or more per year prevails, and year-round cropping is practiced to some extent. The area has a high percentage of sunny days, particularly in summer. Most rainfall occurs in the late fall, winter, and early spring, generally between November and April. Therefore, significant irrigation is required during summer months (HDR 2017).

Table 6. Average Monthly Climate Information – Hollister #126

Month	Average Precipitation inches	Average Reference Evapotranspiration (Et_o) inches	Average Minimum Temperature °F	Average Maximum Temperature °F
January	2.88	1.52	39.01	61.42
February	2.45	2.02	40.44	63.19
March	1.86	3.46	41.64	66.59
April	1.00	4.63	43.51	69.30
May	0.55	5.92	47.44	73.70
June	0.08	6.67	50.77	78.67
July	0.01	6.93	53.70	81.20
August	0.01	6.22	53.85	82.09
September	0.05	4.95	52.17	82.08
October	0.65	3.65	47.46	77.26
November	1.77	1.96	42.16	67.87
December	2.52	1.47	38.43	61.15
Annual Total or Average	**13.82**	**4.11**	**45.88**	**72.04**

Period of Record June 1994 to July 2021
Source: CIMIS

Figure 6 is a graph of annual rainfall in Hollister from 1975 to 2020. While rainfall data have been collected monthly since 1875, precipitation and other weather data have been collected since June 1994 from a California Irrigation Management Information System (CIMIS) station located by the San Benito County Water District office in Hollister (Station #126). As shown, annual precipitation is subject to wide annual variations. Data from the Hollister CIMIS station is summarized on **Table 6.**

Evapotranspiration (ET) is the loss of water to the atmosphere by evaporation from soil and plant surfaces and transpiration from plants. It is an indicator of how much water is needed by plants (e.g., crops and landscaping) for healthy growth and productivity. ET from a standardized well-watered grass surface is the common reference, denoted as ETo. The least ET occurs in the cool wet winter months and greatest ET occurs during the hot dry summer months. This results in peak monthly water demands in summer that are three times the comparable winter demand. Average annual ETo in Zone 6 is 49 inches, peaking at 6.2 to 6.9 inches per month in June, July, and August.

Average monthly temperatures in Zone 6 range from approximately 48 degrees Fahrenheit in January and December to near 65 degrees in July and August. In these two months, daily maximum temperatures typically reach as high as 86 degrees.

Other key physical parameters that control irrigation needs include wind speed and number of frost-free days. The average wind velocity is 3.3 miles per hour but varies seasonally, **Table 6**. Zone 6 experiences an average of 9.9 days per year when temperatures are below freezing, for 355.1 frost-free days (WRCC, 2021).

2.4.1 Impact of microclimates on water management within the District

Several microclimates exist across the North San Benito area. As a result, crop water demands and cultural practices are variable. San Juan Valley represents the largest microclimate in the District area with more fog, lower temperatures, afternoon winds, and a more temperate climate. A CIMIS station for this area was installed in 1999, and data from the San Juan Valley CIMIS station is summarized on **Table 7.**

Table 7. Average Monthly Climate Information – San Juan Valley #143

Month	Average Precipitation inches	Average Reference Evapotranspiration (Et_o) inches	Average Minimum Temperature °F	Average Maximum Temperature °F
January	2.08	1.56	37.72	62.01
February	2.20	2.04	39.08	63.12
March	1.90	3.52	40.73	66.17
April	1.23	4.70	42.33	68.33
May	0.71	6.06	45.76	72.35
June	0.24	6.77	49.04	77.96
July	0.14	7.15	51.88	80.00
August	0.13	6.37	52.07	80.61
September	0.22	5.04	50.44	80.78
October	0.73	3.64	46.01	76.73
November	1.11	1.92	40.72	67.90
December	2.05	1.45	37.01	61.18
Annual Total or Average	**12.75**	**4.19**	**44.40**	**71.43**

Period of Record Jan 1998 to July 2021

Source: CIMIS

2.5 NATURAL AND CULTURAL RESOURCES

Natural and cultural resources of northern San Benito County include its mild climate, streams, and fertile valleys. Before the arrival of the first European settlers, the San Benito county area was inhabited by the Mutsun group of the Ohlone Native Americans. In 1797 Spanish missionaries founded the first European settlement in the county as Mission San Juan Bautista. The town of Hollister was next founded in 1868 and San Benito County was organized in 1874. Agriculture is San Benito County's largest industry, currently including extensive vegetable and row crops, orchards, and vineyards, as well as pasture and rangeland.

2.6 OPERATIONAL INFORMATION

2.6.1 Operating Rules and Regulations

The District documents all operation information for users in the *San Benito County Water District Water Users Handbook* (**Appendix D**). In addition, **Appendix E** provides sample forms and bills for water users.

Agricultural Water Allocation Policy (WAP)

The Handbook (**Appendix D)** includes the Agricultural Water Allocation Policy (WAP) in the Regulations Section (R-1) pages 1-4. The WAP documents eligibility for CVP imported water, entitlement amounts, and distribution details.

CVP water is supplemental to local groundwater. Only a portion of Zone 6 has access to CVP through the surface water distribution system. Each parcel served from the distribution system has a per acre entitlement to contract for water:

- 1.2 Acre-feet per acre for Agricultural land with less than 1.5mg/l of Boron
- 2.0 Acre-feet per acre for Agricultural land with 1.5 mg/l or more of Boron in the groundwater.

Water orders and shut-offs

In addition, the Handbook also includes official and actual lead times necessary for water orders and shut-off (Section 2 Page 1-3 & Section 3, Page 2). Water orders are to be placed through the District office Monday – Friday from 8:30 a.m. – 12:30 p.m.at least twenty-four hours in advance. Water is not to be turned on until the order is approved by the District. As the District is a completely piped and pressurized system, there is no actual lead time that is required to turn water on. Water is always available at the turnouts; however, low pressure may occur for users if deliveries are not scheduled in advance.

When the system needs to be shut down for repairs, water users are notified approximately 10 days in advance of the shutdown. When emergency shutdowns do occur, District staff contacts the affected water users.

Surface and subsurface drainage from farms

The District's rules and regulations require water users to "take reasonable steps to re-use or control tailwater." It is desired that tailwater be prohibited from leaving the parcel to which San Felipe water is delivered. If damage to property of the District or neighboring farms occurs, the District may discontinue water service to that property if steps are not taken to alleviate the situation. This information is included in more detail in the Handbook (Section 6 Page 1 & Regulations Section Page 6).

The District has no policy regarding subsurface drainage.

Water transfers by the district and its customers

The District's rules and regulations provide for customer transfers under certain conditions and subject to the District's Board of Directors approval regarding impacts on the system, water supply, and geographic area. The District encourages and facilitates these water market transfers. More information can be found in the Handbook Regulations Section Page 4-5, and Resolution of the San Benito County Water District Establishing a Policy for Inter-Subsystem Transfers For The 2016-2017 Water Contract Year (**Appendix D**).

2.6.2 Water Delivery Measurements/Calculations

The District delivers CVP water to 635 agricultural customers over 997 parcels. There are 1,068 delivery points (commonly called blue valves) where imported water is accessed by 568 agricultural users, 483 M&I and small parcels, and 17 District facilities. Water deliveries are measured using propeller and turbine meters. The water delivery devices area summarized in **Table 8**. The full CVP system has 1,068 Zenner Direct Read Turbine meters ranging from size 2 inches to 12 inches in diameter.

In addition to measuring imported water, the District monitors private groundwater pumping in Zone 6. Pumping amounts are calculated semiannually by metering the number of hours of pump operation and multiplying by the average discharge rate, which is measured a few times per year. This monitoring program began in about 1990 (soon after CVP imports started) and currently about 285 agricultural customers that are monitored for groundwater production, most through power meters and some through private flow meters. Hour meters are read every six months. The power meters are not calibrated and are replaced on average of once every other year.

Alternative methods of measuring agricultural groundwater extraction have been evaluated as part of the GSP, with input from the GSP Technical Advisory Committee (TAC) and stakeholders. Alternative methods considered for North San Benito have included 1) use of pump hour meters, 2) use of in-line discharge meters on wells, and 3) remote sensing techniques.

Table 8. Water Delivery Measurement Devices (Agricultural Customers Only)

Measurement Device	Number of Delivery Points (Meters)	Frequency of Maintenance (Months)	Frequency of Calibration (Months)	Reading Frequency (Days)	Estimated Level of Accuracy (%)
Propeller Meters	635	60	60	30	+/- 3%
Other (Power Meters at Wells)	285	24	-	180	+/- 20%

2.7 WATER RATE SCHEDULES AND BILLING

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. Zone 6 charges, relating to the importation and distribution of CVP water, are the focus of this section. SBCWD rates and documentation can be found in **Appendix F**.

Table 9 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 the most recent Annual Groundwater Report (**Appendix G**). Groundwater charges are adjusted annually in March. For March 2020 – February 2021, District rates are $13.15 for agricultural use and $39.40 for M&I use. The District adopts rates on a three-year cycle. Current water rates were adopted January 30, 2019.

Table 9. Groundwater Charges

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

Source: Annual Report 2020

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 F**). 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 10** shows the CVP water charge and **Table 11** shows the CVP power charge.

Table 10. CVP Water Charge

Blue Valve Water Charge ($/AF)				
	Agricultural			Municipal & Industrial
Year	Non - Full Cost	Full Cost (1a)	Full Cost (1b)	
2021-2022	274	411	433	424

Source: Annual Report 2020

Table 11. CVP Power Charge

Blue Valve Power Charge	Subsystem 2	Subsystem 6H	Subsystem 9L	Subsystem 9H	All other subsystems
($/AF)					
2021-2022	85.35	41.5	93.55	138.25	35.75

Source: Annual Report 2020

Recycled water charges (**Table 12**) 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 12. Recycled Water Charge

Recycled Water ($/AF)		
Effective	Agriculture Rate	Power Charge
3/1/2021	210	61.85

Source: Annual Report 2020

Water-use data accounting procedures

The District's water-use data accounting procedures are described in the SBCWD Accounting Policies and Procedures Manual. The customers' records are kept on the District's accounting software database for a five-year period and are readily available for review by the customer. Sample Water Bills are included as **Appendix E**.

2.8 WATER SHORTAGE ALLOCATION POLICIES AND DROUGHT PLAN

The District's Drought Plan is included as **Appendix H**. The Drought Plan includes the District's water shortage allocation policies, information on drought vulnerability, and drought responses. The foundation of SBCWD's Drought Plan includes optimization of conjunctive water resource management including groundwater recharge and and best use of supplemental source water (such as recycled water) as available. In brief, District landowners are incentivized to rely on surface water resources when available to preserve groundwater resources for use in drought conditions, in case of imported water reductions. The Drought Plan for agricultural uses is set up with a similar structure to the Water Shortage Contingency Plan developed for municipal users in the UWMP. Additional details of these policies and strategies of the Drought Plan are provided in **Appendix H**.

3 INVENTORY OF WATER RESOURCES

The major water supply sources for Zone 6 include imported water from CVP, recycled water, and groundwater. Local surface water indirectly replenishes the groundwater system.

3.1 IMPORTED WATER

The Central Valley Project (CVP) is a Federal water system operated by the U.S. Bureau of Reclamation (USBR) with multiple uses including irrigation water supply for agricultural and urban uses, flood control, navigation improvement on the Sacramento River, water quality enhancement, hydroelectric power, fish and wildlife, and recreation. The CVP consists of 20 dams and reservoirs, 11 power plants, and 500 miles of major canals, conduits, and tunnels. The San Felipe Division diverts water supply from San Luis Reservoir (shared with the State Water Project or SWP) through the Pacheco Tunnel and Pacheco Conduit to Santa Clara and San Benito counties. The Santa Clara Conduit conveys water to the Santa Clara Valley and the San Benito (Hollister) Conduit conveys water to San Justo Dam, an offstream storage reservoir in San Benito County.

SBCWD has a 40-year contract (to February 29, 2028 with options for renewal) for a maximum of 8,250 AFY of M&I water and 35,550 AFY of agricultural water (Contract number: 8-07-20-W0130). Actual CVP deliveries are modified on an annual basis by USBR, reflecting hydrologic conditions (e.g., drought), reservoir storage, and the environmental status of the Sacramento-San Joaquin Delta.

SBCWD distributes CVP water to agricultural, municipal, and industrial customers in Zone 6 through 12 subsystems containing approximately 158 miles of pressurized pipeline laterals (SBCWD, 2015). Such distribution of CVP water “in lieu” of groundwater pumping has been instrumental in reversing historical overdraft and preventing future overdraft. The Hollister Conduit, CVP distribution systems, and San Justo Reservoir (where CVP water is stored in the basin) are shown on **Figure 3**. SBCWD also has recharged groundwater with CVP water through offstream recharge ponds.

The City of Hollister and Sunnyslope purchase CVP water as the primary M&I CVP customers. Other M&I uses of CVP water include urban irrigation, golf courses, and potable supply for the Stonegate community. Treatment of CVP water for potable M&I supplies within the Hollister Urban Area (HUA) is provided by the Lessalt and West Hills Water Treatment Plants (WTPs) on the east and west sides of Hollister, respectively. The municipal water supply and demand is documented in the 2020 UWMP.

Table 13, on the following page, documents the CVP delivery by type for the past 10 USBR water years. The contract year extends from April through March. It should be noted that this report (and the Annual Groundwater Report) documents supply and demand in hydrologic water October through September. In addition, total delivery to customers may differ from water delivered to the District due to in-District storage and transfers.

Table 13. CVP Allocations and Deliveries by Type

Bureau Water Year	WY 2011-12		WY 2012-13		WY 2013-14		WY 2014-15		WY 2015-16		WY 2016-17		WY 2017-18		WY 2018-19		WY 2019-20		WY 2020-21	
April - March	**M&I**	**Ag**	**M&I**	**Ag**	**M&I**	**Ag**	**M&I**	**Ag**	**M&I**	**Ag**	**M&I**	**Ag**	**M&I**	**Ag**	**M&I**	**Ag**	**M&I**	**Ag**	**M&I**	**Ag**
CVP Allocation	8,250	28,440	4,167	15,298	3,889	7,649	2,778	0	2,063	0	4,538	1,778	8,250	35,550	6,188	17,775	8,250	26,663	5,775	8,760
Water Delivery By																				
CVP Delivery	8,250	11,640	4,167	12,673	3,889	3,802	2,778	0	1,546	0	2,317	1,778	8,250	12,558	3,688	11,130	8,250	12,833	5,775	5,203
Rescheduled Water	0	859	0	2,757	0	2,625	0	2,147	0	1,433	517	0	2,221	0	0	3,693	0	376	0	4,268
SCVWD Transfer	0	0	0	0	0	2,159	0	0	0	0	0	0	0	0	0	0	0	0	0	0
SCVWD Transfer (in SLR as stored water)	0	0	0	0	0	0	0	2,644	0	0	0	0	0	0	0	0	0	0	0	0
Surplus USBR	0	1,451	0	0	0	721	0		0	0	0	0	0	0	0	0	0	0	0	0
Exchange Contractors thru SLDMW	0	0	0	0	0	0	0	0	0	0	4,085	1,298	125	327	2,500	1,028	0	1,140	250	1,505
Yuba	0	0	0	0	0	840	0	905	0	192	0	553	0	0	0	612	0	0	0	812
Suppllemental OID/SSJID	0	0	0	0	0	0	0	0	0	0	0	939	0	154	0	0	0	0	0	0
North of Delta	0	0	0	0	0	220	0	180	0	0	0	1,910	0	0	0	0	0	0	0	0
TOTAL DELIVERED TO DISTRICT	**8,250**	**13,950**	**4,167**	**15,430**	**3,889**	**10,367**	**2,778**	**5,876**	**1,546**	**1,625**	**6,919**	**6,478**	**10,596**	**13,039**	**6,188**	**16,463**	**8,250**	**14,349**	**6,025**	**11,788**

3.2 GROUNDWATER

Groundwater represents about half of the total water supply for Zone 6 and more than 70 percent the agricultural water supply in an average water year and provides an essential reserve for additional supply during droughts. In Zone 6, the relative proportions of groundwater and CVP water use are affected primarily by the availability of CVP water from USBR; in the past 10 years, CVP supply has ranged from 44 percent to 89 percent of the Zone 6 supply to agriculture.

Zone 6 overlies the North San Benito Subbasin (Basin) of the Gilroy-Hollister Groundwater Basin (DWR, 2019a), which covers approximately 200 square miles situated between and including portions of the Diablo Range to the east and the Gabilan Range to the west. To manage this basin sustainably, the District and the Santa Clara Valley Water District, now Valley Water, have prepared a GSP (Todd, 2021). The public draft of the GSP is available from the SBCWD website.

The Basin consists of a series of connected valleys and intervening uplands in the Coast Ranges. It is characterized by unconsolidated to semi-consolidated sediments that were deposited in alluvial fan and stream environments from a variety of source rocks and directions. These deposits interfinger in the subsurface so that regional zones of low or high permeability have not been distinguished. The valley portions contain unconsolidated alluvial deposits—clay, silt, sand, and gravel—that store and transmit significant quantities of groundwater. These geologic deposits also underlie some upland areas (such as the Lomerias Muertas, Flint Hills, and hills in the southern portion of the Basin) but generally are more consolidated and less permeable than in the valley areas. The Principal aquifers include the unconsolidated alluvial deposits in the valley areas and generally range from 0 to 300 feet thick. Secondary aquifers include the older, less permeable deposits that underlie the valleys at depth, crop out in portions of the valley areas, and occur in upland areas with thickness up to several thousand feet.

The Basin boundaries are defined mostly by geology (contacts with relatively impermeable consolidated rocks) and by faults that may form barriers to groundwater flow. Faults crossing the Basin, most notably the Calaveras Fault, are partial barriers to groundwater and also are important because they may offset bedrock and affect the local depth of the Basin.

As discussed in section 2.2.2, the District maintains recharge basins. In addition, the District owns and operates two reservoirs upgradient of the groundwater basin with releases for replenishment of the basin.

3.3 RECYCLED WATER

Water recycling is a cooperative effort of SBCWD and the City of Hollister. Recycled water has been provided by the City of Hollister for landscape irrigation since 2010. The system was expanded in 2014, including infrastructure and treatment capability to improve water quality for the purpose of agricultural irrigation. The system was further improved in 2015 when the District installed 1.65 miles of additional distribution system piping and 30 metered deliveries to provide water for agricultural customers for approximately $1,000,000. In 2016, the Recycled Water Storage Pond was installed in “Pond 2” at the Domestic Waste Reclamation Facility (DWRF) to improve distribution system water quality and to store surplus supply during high agricultural demand periods when the DWRF is not producing enough recycled water. In 2019, the District installed a series of sand media filters upstream of the Recycled Water Distribution System to improve water quality to allow agricultural customers the ability to use drip irrigation and minimize backwash waste. These upgrades to the Recycled Water Storage Pond and distribution system cost approximately $1,500,000. Recycled water currently is provided to approximately 865 acres for agricultural production and landscape irrigation. Recycled water use is a relatively small but increasing supply. In WY 2020, recycled water to agricultural users in Zone 6 was 428 AF.

3.4 LOCAL SURFACE WATER

SBCWD owns and operates two reservoirs along the San Benito River. Hernandez Reservoir (capacity 17,200 AF) is located on the upper San Benito River in southern San Benito County. Paicines Reservoir (capacity 2,870 AF) is an offstream reservoir between the San Benito River and Tres Pinos Creek. It is filled by water diverted from the San Benito River, with some of the diversions consisting of natural runoff and some consisting of water released from Hernandez Reservoir. Water stored in the two reservoirs is released for percolation in Tres Pinos Creek and the San Benito River to augment groundwater recharge during the dry season.

3.5 SOURCE WATER QUALITY

Water provided by the District for agricultural uses is considered non-potable. However, water quality of the water supply is conducted regularly and documented in Section 5.2. Additional information about the M&I water supply to the Hollister Urban Area is found in the HUA UWMP (Todd, 2021).

4 DESCRIPTION OF QUANTITY OF WATER USES

Water use within Zone 6 varies from year to year and is dependent upon precipitation, cropping patterns, fallowed acreage, and available surface water supplies. This section describes water uses during the previous five water years (WY 2016 to WY 2020).

4.1 BASIS FOR REPORTING WATER QUANTITIES

Analysis of water uses during the previous five water years is required for the annual budget (Section 5). This time period, extending from WY 2016 through WY 2020, was also selected to be representative of District recent water uses and includes both dry and wet years. Normal, wet, and dry conditions are generally determined by the CVP allocations. 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 2020 (Oct 2019-Sept 2020) overlapped two contract years.

The year types are described below in **Table 14**, for the WY 2016 through WY 2020 time period. The water use information in this section is provided on a water year basis for the overall water budget unless indicated otherwise.

Table 14. Water Year Types, CVP Allocations, and Annual Rainfall

WY	Year Type[1]	CVP allocation[2]	Rainfall (in)[3]
2016	Average	5%	14.88
2017	Wet	100%	21.92
2018	Critically Dry	50%	8.26
2019	Average	75%	15.38
2020	Dry	20%	11.25

1. From GSP based on precipitation
2. Based on contract year (Mar to April)
3. CIMIS Hollister Station

4.2 AGRICULTURAL WATER DEMAND

Annual agricultural water demand by source in the District Zone 6 is shown in **Table 15** for WY 2016 – WY 2020. Agricultural demand was estimated based on estimated crop irrigation requirements and cropping patterns from the most recent land use map. As discussed below, uncertainty exist in both the calculation of agricultural water demand and pumping, and some assumptions were made to balance the water budget.

Crops and associated acreages were compiled from the DWR Land Use Portal for 2016, the most recent data available. **Figure 7** illustrates the 2016 cropping patterns across Zone 6 from the (DWR, 2021). The model recent land use map is 2016 and the same acreage was assumed for the five year period 2016 – 2020. However, cropping patterns in Zone 6 can be dynamic and responsive to available water supply and other factors including labor and market demand. In dry years, some crops are fallowed to reduce water use or because water at the needed quality is not available. In addition, cropping decisions and water allocations are generally made in the beginning of the growing season and the effects of dry years are seen the following year in agricultural demand. To simulate some of these cropping variations in the water use analysis, it was assumed that improved pasture and hay parcels were unirrigated in years when CVP deliveries were lower than average.

Crop consumptive use was calculated using reference evapotranspiration (ET), area of crop, and crop specific multipliers (Kc). Monthly ET for the period was available from local CIMIS stations. The monthly crop specific multipliers are developed from a Microsoft Excel application developed by DWR and referred to as the Consumptive Use Program PLUS (CUP+) (2011). This program accounts for regional and seasonal differences in the growing season of over 60 types of crops.

Agricultural irrigation is designed to slightly exceed the crop consumptive use of the crop. Irrigation efficiency is the ratio of crop consumptive use to the applied irrigation volume. In Zone 6, this irrigation efficiency indicates that about 10 to 20 percent of the applied irrigation for agricultural irrigation infiltrates surficial soils past the root zone and percolates to the water table, providing groundwater recharge. It is assumed that water applied in excess of the crop consumptive use results in deep percolation to the groundwater aquifer.

For SBCWD, water use for agriculture can also be estimated using the available data on water deliveries (CVP, recycled water, and groundwater extraction). The total water delivered was compared to the calculated consumptive use. To reflect the wide range of water use in the miscellaneous truck crops, the consumptive use was calibrated to achieve an average irrigation efficiency of approximately 80 to 90 percent, an estimate consistent with recent surface water-groundwater modeling.

Table 15. Annual Agricultural Water Demand (AF)

	Area[1] (Acres)	Crop Consumptive[2] (AFY)					Avg Crop Demand (ft/yr)
Crop		2016	2017	2018	2019	2020	
Apples	122	377	375	390	375	380	3.1
Bush Berries	255	372	379	390	375	371	1.5
Cherries	348	1,134	1,144	1,170	1,125	1,134	3.3
Citrus	50	225	222	234	222	228	4.5
Cole Crops	591	818	813	815	756	834	1.4
Nursery and Other	339	1,658	1,638	1,718	1,632	1,679	4.9
Grapes	610	1,465	1,463	1,517	1,445	1,477	2.4
Greenhouse	6	28	28	29	27	28	4.9
Lettuce/Leafy Greens	2,868	4,740	4,775	4,757	4,500	4,733	1.6
Miscellaneous Deciduous	66	204	203	211	203	206	3.1
Miscellaneous Grain and Hay	2,598	-	7,637	8,013	-	7,830	1.8
Miscellaneous Grasses	190	505	501	525	505	505	2.7
Miscellaneous Truck Crops	9,693	19,372	19,756	20,033	19,095	19,553	2.0
Mixed Pasture	1,334	-	3,921	4,114	-	4,020	1.8
Olives	26	90	89	94	89	92	3.5
Plums, Prunes and Apricots	131	428	432	441	424	428	3.3
Tomatoes	240	495	498	516	486	497	2.1
Walnuts	1,540	4,768	4,735	4,932	4,734	4,807	3.1
Young Perennials	115	356	354	369	354	359	3.1
Total	**21,124**	**37,037**	**48,963**	**50,268**	**36,346**	**49,160**	**2.8**

1. Area from DWR 2016 Land Use Mapping
2. Crop Consumptive Use from CUP Kc, CIMIS ET
3. In dry years (2016 and 2019), improved pasture and hay fields assumed to be fallowed.

4.2.1 Multiple Cropping Information

The DWR/Land IQ land use for San Benito County does not record if any of the parcels use multiple cropping. However, because the District monitors private well extraction, the water use for crops was calibrated to account for multiple cropping practices.

4.2.2 Future Land Use Changes

Land use in the Zone 6 area is not excepted to significantly change in the near future.

4.3 Environmental Water Use

There are no environmental uses that are supported by the District's water supplies.

4.4 Recreational Water Use

There are no recreational uses that are supported by the District's water supplies.

4.5 Municipal and Industrial Use

The District is a wholesale urban water supplier and supplies water on a wholesale basis to Sunnyslope County Water District and the City of Hollister. It does not have retail urban customer in the form of multi- or single-family connections. Other non-agricultural water demands supplied by the District include golf courses, schools, and landscape-only meters, etc. All municipal and industrial uses within the Hollister Urban Area are detailed in the UWMP and not included in the AWMP (Todd, 2021).

4.6 Groundwater Recharge Use

The District recharges surplus CVP water for groundwater replenishment and conjunctive management through District-constructed recharge basins shown in **Figure 4**.

SBCWD owns and operates two reservoirs along the San Benito River. Hernandez Reservoir (capacity 17,200 AF) is located on the upper San Benito River in southern San Benito County. Paicines Reservoir (capacity 2,870 AF) is an offstream reservoir between the San Benito River and Tres Pinos Creek. It is filled by water diverted from the San Benito River, with some of the diversions consisting of natural runoff and some consisting of water released from Hernandez Reservoir. Water stored in the two reservoirs is released for percolation in Tres Pinos Creek and the San Benito River to augment groundwater recharge during the dry season. More information on the operation and location of recharge is available in the most recent Annual Report (**Appendix G**). **Table 16** presents a summary of the District's groundwater recharge for WY 2016 - WY 2020.

Table 16. Groundwater Recharge (AF)

Location	Water Year 2016	Water Year 2017	Water Year 2018	Water Year 2019	Water Year 2020
District Recharge Basins	-	2,549	2,965	5,043	3,161
Reservoir Releases	-	25,597	6,438	17,969	11,510
Total	**0**	**28,146**	**9,404**	**23,012**	**14,671**

Source: Annual Report 2020

4.7 OTHER WATER USE

No other transfers or exchanges have occurred in WY 2016 - WY 2020.

4.8 OUTFLOWS FROM THE DISTRICT

Outflow from the agricultural system includes crop consumptive use and deep percolation of applied irrigation. It is assumed most agricultural area are designed to increase their irrigation efficiency and have limited field runoff. The District does not operate a drain system and there are no other managed outflows.

In regards to the groundwater basin, wells are by far the largest outflows from the Basin, and they are abundant in the urban and agricultural areas. Natural outflow from the Basin consists of groundwater discharge into creeks and rivers. The primary exit points are groundwater seepage into the lower ends of the Pajaro and San Benito Rivers as they approach the northwestern end of the basin and enter the bedrock canyon leading to the coast. Locations of gaining reaches of streams are mapped and discussed in the GSP.

5 DESCRIPTION OF QUANTITY AND QUALITY OF WATER RESOURCES

Water supply for SBCWD includes CVP imported water, recycled water, and groundwater. A summary of these water sources and associated uses are provided below.

5.1 WATER SUPPLY QUANTITY

5.1.1 Surface Water Supply

Table 17 shows a summary of the District's surface water deliveries for agriculture in WY 2016-WY 2020**.** It should be noted that these values are slightly different that then CVP supplies into the basin (**Table 13**), as water is stored in San Justo and not necessarily delivered in the same water year. CVP supply is measured directly at each delivery point (blue valves). The 635 blue value delivery points for agricultural users are fitted with propeller and turbine meters to accurately measured delivered supply. As documented in section 2.1.1, actual CVP deliveries are modified on an annual basis by USBR, reflecting hydrologic conditions (e.g., drought), reservoir storage, and the environmental status of the Sacramento-San Joaquin Delta.

Table 17. Agricultural Water Supplies (AF)

Source	Water Year 2016	Water Year 2017	Water Year 2018	Water Year 2019	Water Year 2020
CVP Ag Deliveries	4,434	13,288	14,453	11,731	12,166
Recycled Water	246	258	364	461	428
Groundwater	27,912	14,727	20,218	15,423	17,021
Total	**32,591**	**28,273**	**35,035**	**27,616**	**29,616**

Source: Annual Report 2020

5.1.2 Groundwater Supply

Pumping amounts are calculated semiannually by metering the number of hours of pump operation and multiplying by the average discharge rate, which is measured a few times per year. This monitoring program began in about 1990 and approximately 285 agricultural customers have their groundwater wells monitored by hour meters. Measured groundwater pumping within the District for WY 2016-WY 2020 is shown in **Table 17**.

5.1.3 Recycled Water Supply

Treated effluent from the City of Hollister's DWRF is used for irrigation on land within Zone 6. The amount of applied treated effluent ranged between 246 and 461 AFY between WY 2016 and WY 2020 (**Table 16**).

5.1.4 Drainage

Irrigation practices and groundwater management practices are such that with minor exceptions no surface or subsurface drainage waters leave Zone 6. The District does not manage agricultural drains nor monitor drain flow for water quality or volume.

5.2 WATER SUPPLY QUALITY

While CVP and recycled water is generally of excellent quality, groundwater from the North San Benito Groundwater Basin is highly mineralized. The sections below provide information on CVP, groundwater, and recycled water quality.

5.2.1 Surface Water Quality

Imported water from CVP is generally good water quality. The most recent water quality sample from San Justo Reservoir (May 2021) is shown in **Table 18**. Total Dissolved Solids (TDS) is 290 mg/L, below the Secondary Maximum Contaminant Level (SMCL) of 1,000 mg/L and lower than the other sources of water available to growers.

Table 18. Water Quality

SBCWD Source Water Quality					
Parameter	Units	CVP Water Quality[1]	Recycled Water Quality[2]	Groundwater Quality – Hollister[3]	Groundwater Quality - San Juan
Total Dissolved Solids (TDS)	mg/L	290	1,200	952	1,369
Nitrate (as N)	mg/L	0.53	5	5.9	5.4
Calcium	mg/L	22	NA	65	83
Magnesium	mg/L	13	NA	65	92
Sodium	mg/L	59	200	189	188
Potassium	mg/L	3.4	NA	4	4
Chloride	mg/L	85	150	185	203
Sulfate	mg/L	38	250	207	251
Arsenic	ug/L	2.2	NA	29	3
Boron	mg/L	NA	1,500	1,341	873

1. May 2021 sampling at San Justo
2. RWQCB Regulatory Order R3-2008-0069, reports Total Nitrogen as N
3. average data from wells 2015-2020 (regulatory facilities excluded)

5.2.2 Groundwater Quality

Groundwater quality conditions are described in the GSP; this discussion focuses on the Hollister and San Juan management areas of the GSP, which were defined in part by Zone 6 boundaries.

The quality of groundwater in the North San Benito Basin has been described as highly mineralized and of marginal water quality for drinking and agricultural purposes. The mineralized water quality is typical of other relatively small Coast Range groundwater basins and reflects the geologic formations in the Central Coast watersheds (e.g., marine sediments) and the relatively low permeability of groundwater basin sediments, which leads to long contact time with groundwater.

Total Dissolved Solids

TDS concentrations are generally high throughout the Basin and the average TDS concentrations exceed the secondary MCL for drinking water (1,000 mg/L). While concentrations are high (e.g., exceeding 500 mg/L), recent years (2014 through 2017) are characterized by TDS concentrations that are stable or decreasing. For example, in the San Juan Valley, some wells downstream of the wastewater treatment ponds show a general decrease in concentrations, possibly due to the reduced percolation of wastewater in recent years. Generally, the eastern and northern edges of the Basin show lower concentrations of TDS. Higher TDS areas reflect geology (e.g., fault zones and older sediments) and historical wastewater disposal among other factors. Average TDS values for the Hollister and San Juan Management Areas are shown in **Table 18**.

Nitrate

Nitrate, long identified as a COC in the Basin, has multiple and widespread sources including fertilizer application and wastewater disposal (both municipal and domestic). Given that these sources are on or near the ground surface, shallow groundwater typically is characterized by higher concentrations than deep groundwater. In fact, the highest recent concentrations occurred in shallow wells in the eastern San Juan area. Nitrate concentrations are elevated above natural concentrations (typically less than 10 mg/L), but most samples have indicated nitrate concentrations below the MCL of 45 mg/L. With some exceptions, concentrations are relatively stable over time. Additional review of basin nitrate concentrations was performed for the Irrigated Lands program. The report indicated that, for the 1,105 wells used in analysis of nitrate concentrations in the Gilroy-Hollister Valley Basin, 26 percent had average concentrations over the MCL of 45 mg/L (this includes Llagas Subbasin in Santa Clara County, LSCE, 2015). Average nitrate values for the Hollister and San Juan Management Area are shown in **Table 18**.

TDS and nitrate are recognized as constituents of concern in the GSP, and sustainability criteria (e.g., minimum thresholds) have been defined to guide management for both. Other constituents will continue to be monitored in the event that future basin management could affect concentrations and therefore agricultural water supply. These include the following:

- **Hardness.** 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. The natural hardness of the groundwater indirectly relates to increases in groundwater salinity in localized areas due to the use of water softeners.

- **Boron.** Boron is naturally occurring in the Basin and associated with marine clays, thermal springs, and closed basin evaporates; clay deposited from marine waters contains 400 to 600 mg/L of boron (Reynolds, 1972). Plants are especially sensitive to boron, and agricultural standards are set at 0.7 mg/L (700 ug/L) to 0.75 mg/L (750 ug/L). Some damage can occur to crops at even lower concentrations. Boron has been identified as a COC in the Basin because elevated concentrations historically contributed to abandonment of orchards in Hollister Valley (Eaton et al., 1941). The highest concentrations are associated with a north-south trending band in the Hollister Valley, which is thought to be controlled by geologic conditions and may be related to changing water chemistry along a fault plane at depth. The WAP for CVP requires monitoring of Boron concentrations as more imported water was supplied to growers with groundwater impacted by higher boron concentrations.

5.2.3 Recycled Water Quality

Treated effluent quality is monitored and reported to the Regional Water Quality Control Board (RWQCB). Recycled water quality data from the Master Reclamation Requirements (MRR) (Order Number R3-2008-0069) is listed in **Table 18**.

5.2.4 Additional Water Quality Monitoring

In addition to the District's regular monitoring programs, groundwater quality is also sampled in compliance with the State Water Board Long-Term Irrigated Lands Regulatory Program (ILRP). This program provides for waste discharge requirements from irrigated lands through surface water and groundwater monitoring. Owners or operators of irrigated lands may comply with the program either as individuals or through coalition groups.

The Central Coast Groundwater Coalition (CCGC) was founded in July 2013 to represent landowners and growers who operate in Monterey, San Benito, Santa Clara, Santa Cruz, San Luis Obispo and Santa Barbara counties, and the northern portion of Ventura County. CCGC is a non-profit organization whose primary function is to fulfill groundwater quality regulatory requirements in the ILRP of the RWQCB.

CCGC developed a plan for groundwater monitoring that was approved by RWQCB in July 2013. A key component of the plan is sampling of drinking water wells with a focus on nitrate. In June 2015, CCGC submitted to a groundwater characterization report (LSCE, 2015) for the northern counties, including the Salinas, Pajaro, and Gilroy-Hollister valleys. This report, documenting nitrate concentrations in groundwater, was approved by the RWQCB in 2015. Subsequent sampling occurred in 2017 and 2019.

6 WATER BUDGET

This section summarizes the Zone 6 water use and supply for the WY 2016 – WY 2020 time period. This water budget provides an overall picture of water use within the District and the ability of the available supplies to meet these water demands. A discussion of water management objectives follows the water budget section, and at the end of the section, the efficiency of agricultural water use is quantified.

6.1 ANNUAL WATER BUDGET

Water budget inflows are summarized in **Table 19**. Inflows include all the water delivered to agricultural customers. It does not include groundwater recharge because the recharge components would be considered both an inflow (surface water into the District) and an outflow (recharged to the groundwater basin). In addition, M&I pumping is also not included in the inflow and outflow tables because it would also be considered an inflow (pumping within District) and an outflow (delivery for M&I use) and is documented separately in the UWMP.

2.1.1. Inflows

Inflows to the agricultural system includes water supply from the three major sources (CVP, groundwater, and recycled water), as well as effective precipitation, shown on **Table 19**. Effective precipitation is defined here as the portion of precipitation that satisfies crop consumptive demands.

The daily ET needs of a crop can be satisfied by either applied irrigation or through natural precipitation. Total irrigation was estimated to be the ET demand of the crop minus precipitation. The portion of precipitation that satisfies ET demand, effective precipitation, is controlled by the intensity and distribution of the precipitation. The estimated amount of precipitation available to satisfy crop ET was evaluated on a monthly basis. This estimate indicated that 24 percent of total rainfall may be available to contribute to the required amount of applied water.

Table 19. Water Budget Inflows (AF)

Inflow Component	AWMP Location for Supporting Calculations	How Quantified?	Uncertainty	Water Year 2016	Water Year 2017	Water Year 2018	Water Year 2019	Water Year 2020
Effective Precipitation	Section 5.1	Estimated	+/- 10%	7,153	6,675	6,929	6,878	3,101
CVP Ag Allocation	Sections 4.1.1	Measured	+/- 3%	4,434	13,288	14,453	11,731	12,166
Recycled Water	Sections 4.1.3	Measured	+/- 3%	246	258	364	461	428
Private groundwater pumping	Section 4.1.2	Measured	+/- 20%	28,474	37,211	41,175	27,968	46,740
Total				**40,306**	**57,433**	**62,921**	**47,039**	**62,435**

Outflows

Outflows are shown on **Table 20** and include crop consumptive use and deep percolation of applied water. There are no quantified surface water outflows. The deep percolation term was calculated and is the difference between total inflows used for agriculture (**Table 19**) minus crop consumptive use (**Table 15**) and is a balancing term for the water budget. The magnitudes of deep percolation values for 2015 to 2019 are similar to the values generated with the model update (Todd, 2021).

Table 20. Water Budget Outflows (AF)

Outflow Component	AWMP Location for Supporting Calculations	How Quantified?	Uncertainty	Water Year 2016	Water Year 2017	Water Year 2018	Water Year 2019	Water Year 2020
Crop Consumptive Use[1]	Section 3.2	Calculated and Estimated	+/- 20%	37,037	48,963	50,268	36,346	49,160
Surface Outflows	NA	NA	NA	0	0	0	0	0
Deep Percolation[2]	Section 3.2	Estimated	+/- 20%	3,270	8,470	12,653	10,693	13,275
Total				**40,306**	**57,433**	**62,921**	**47,039**	**62,435**

6.2 IDENTIFY WATER MANAGEMENT OBJECTIVES

SBCWD has developed water management objectives (WMOs) to improve long-term planning and resiliency, adapt to climate change, and improve regional self-reliance. These WMOs are listed and discussed below. The District is actively implementing each of these four WMOs. Additional information on implementation of the EWMPs is provided in Section 7.

- Encourage more efficient water use at the farm level
- Optimize conjunctive management of imported CVP water with groundwater resources through direct use and groundwater banking and recovery
- Implement GSP projects and management actions

Encourage More Efficient Water Use at the Farm Level
Efficient water use by landowners can reduce water demands if growers are made aware of more efficient practices and these practices are cost effective. The District encourages efficient water use at the farm level in many ways and will continue to do so as technology and new methods or options becomes available.

The District measures all water delivered to customers and water pricing is generally based on quantity delivered. The customers can use this as a benchmark to track reduced water use and save money. The District contributes to the Water Resource Association (WRA) which provides technical assistance to landowners to allow them to make the best use of their land and irrigation water. Landowners can receive technical assistance regarding improvements to on-farm irrigation systems through the WRA.

Optimize Conjunctive Management of Imported CVP Water with Groundwater Resources Through Direct Use and Groundwater Banking and Recovery
Climate change and growth in urban and agricultural water demand will both tend to undermine the sustainability of groundwater conditions in the North San Benito Basin by increasing groundwater declines during dry periods. Those declines can be offset by increasing the amount of recharge during wet periods, provided that the recharged water remains in storage until the next drought. Funded by a Sustainable Groundwater Planning (SGWP) Grant as part of this GSP, a feasibility study has been conducted for Managed Aquifer Recharge (MAR). Documentation of this study is provided in the Technical Memorandum (TM), North San Benito Managed Aquifer Recharge Feasibility and Location Assessment Study (Todd, 2021b).

Injection wells have been 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.

Implement North San Benito Groundwater Sustainability Agency Projects and Management Actions

The North San Benito Basin GSP (Todd, 2021) identifies projects and management actions to maintain groundwater sustainability. *Projects* are substantial efforts that involve an increase in water supply or a reduction in demand for the GSP Area. *Actions* provide a framework for groundwater management including establishing GSP procedures or policies, filling data gaps with scientific studies or improved monitoring, and providing for funding. Additional description of the following projects and management actions is provided in the GSP.

Projects

- Develop Surface Water Storage (Pacheco Reservoir Expansion Project)
- Expand Managed Aquifer Recharge (MAR)
- Enhance Conjunctive Use
- Enhance Water Conservation.

Management Actions

- Improve Monitoring Program and Data Management System (DMS)
- Develop Response Plans
- Enhance Water Quality Improvement Programs
- Reduce Potential Impacts to groundwater dependent ecosystems (GDEs) (Steelhead and Riparian Vegetation)
- Provide Long-term Basin-wide Funding Mechanism
- Provide Administration, Monitoring, and Reporting.

6.3 QUANTIFY THE EFFICIENCY OF AGRICULTURAL WATER USE

For the AWMP, each supplier is to quantity the efficiency of agricultural water use within its service area using one or more of the four provided water use efficiency quantification methods developed by DWR and documented in *A Proposed Methodology for Quantifying the Efficiency of Agricultural Water Use* (DWR, 2012). The method chosen must account for all of the applicable water uses:

Method 1: Crop Water Use
Method 2: Agronomic Water Use
Method 3: Environmental Water Use
Method 4: Recoverable Flows

Method 1 (Crop Water Use) and Method 4 (Recoverable Flows) are applicable to SBCWD and are provided below. SBCWD has little agronomic or environmental water use within its service area.

Method 1: Crop Consumptive Use Fraction

The Method 1 calculation quantifies the efficiency of applied irrigation water consumed directly for crop growth. The crop consumptive use fraction (CCUF) for WY 2016- WY 2020 are shown in **Table 21**. The CCUFs range from 77 to 92 percent, a reasonable irrigation efficiency for crops within SBCWD.

Method 4: Water Management Fraction

Method 4 documents the amount of water that is recoverable for reuse. For SBCWD, this includes deep percolation of irrigation water, reservoir releases, and groundwater recharge. The water management fraction (WMF) for WY 2016- WY 2020 are shown in **Table 22**. The WMF ranges from 0.92 in dry years to 1.34 in wet years, with an average of 1.10. This is indicative of the positive water management, primarily as a result of the intentional groundwater recharge that occurs when CVP supplies are available.

Table 21. Crop Consumptive Use Fraction

Water Year	Evapotranspiration of Applied Water (ETAW)[1] (Acre-feet/Year)	Applied Water (AW)[2] (Acre-feet/Year)	Crop Consumptive Use Fraction (No units)
WY 2016	37,037	40,306	92%
WY 2017	48,963	57,433	85%
WY 2018	50,268	62,921	80%
WY 2019	36,346	47,039	77%
WY 2020	49,160	62,435	79%

1. From Table 15 Ag Demand
2. From Table 19 Inflows

Table 22. Water Management Fraction

Water Year	Evapotranspiration of Applied Water (ETAW)[1] (Acre-Feet per Year)	Recoverable Flows (RF)[2] (Acre-Feet per Year)	Applied Water (AW)[3] (Acre-Feet per Year)	Water Management Fraction (No units)
WY 2015	37,037	0	40,306	0.92
WY 2016	48,963	28,146	57,433	1.34
WY 2017	50,268	9,404	62,921	0.95
WY 2018	36,346	23,012	47,039	1.26
WY 2019	49,160	14,671	62,435	1.02
Average	**44,355**	**15,046**	**54,027**	**1.10**

1. From Table 15 Ag Demand
2. From Table 16 Recharge
3. From Table 19 Inflow

7 CLIMATE CHANGE

Climate change factors with the potential to affect the District's ability to meet water demands include:

- Changes in water demand
- Decreased water supply
- Extreme weather events.

7.1.1 Changes in Water Demand

Climate change can affect projected water demand. Climate change is likely to increase temperatures and ET and may also increase the duration of high temperature/ET periods ("heat waves"). This would increase water demand for agricultural irrigation, with particular ramifications for summer months. Public outreach will be critical to reduce demand in the high-water use summer months. The WRA has programs to improve efficient irrigation practices and reduce water waste and these programs have and will continue to reduce potential impacts from climate change.

7.1.2 Decreased imported water supply

Climate change is likely to affect water supply as well as demand (see Section 4.6). The most significant impact to supply will be the availability of imported water. Snowpack is expected to decrease as the climate warms and CVP allocations will likely decrease and become more variable as a result. In addition, CVP relies in part on the Delta, which is a climate-sensitive habitat where environmental requirements may also reduce CVP allocation.

According to the Intergovernmental Panel on Climate Change, global warming could significantly alter California's hydrologic cycles and water supply. These impacts could include decreased Sierra snowpack, increased temperatures, more severe droughts, sea level rise, and increased floods. Climate models indicate that precipitation as rainfall is expected to increase as snowfall decreases over the Sierra Nevada and Cascade mountain ranges. By the end of this century, the Sierra snowpack is projected to be 48 to 65 percent less than the historical average (DWR 2021b). This reduction would directly impact the volume of imported water available for all the District CVP customers, including the District. Sierra snowmelt feeds rivers that flow to the Delta, the source of CVP imported water. The Delta is also at risk from the predicted increases in climate variability associated with climate change. More severe flooding and rising sea levels threaten the waterways that serve as a vital link in the CVP system within the Delta.

Future CVP supply and contract allocations are estimated by Cal Sim II, a DWR tool used to simulate California State Water Project (SWP)/Central Valley Project (CVP) operations. The 2017 Cal Sim results use current operations to determine the allocations for the Santa Clara/San Benito Water Districts based on various hydrology (as observed 1922-2003). These estimates have been used in the GSP and UWMP to assess the future availability of CVP supply to the District. This analysis showed continued reductions in allocations, for a projected average of 36 percent of CVP contract allocation for agricultural supply, compared to 54 percent of CVP contract allocation for agricultural supply observed over the same 20-year hydrology.

7.1.3 Decreased local water supply

As discussed in the North San Benito Basin GSP, local climate change (as of 2070) is projected to be warmer and wetter than the current climate. Precipitation and rainfall recharge are expected to increase in winter, and crop water demands are expected to increase in summer. Climate change also may cause more variable weather patterns, including longer and more severe droughts and more intense rainfall and runoff events that make managed aquifer recharge operations more difficult, including managing local reservoir releases for percolation.

Climate Change is already taken into account for future supply projections for all sources to Zone 6. Water use efficiency will be critical to continue to meet the agricultural needs with limited supply.

8 WATER USE EFFICIENCY INFORMATION

8.1 EFFICIENT WATER MANAGEMENT PRACTICES IMPLEMENTATION AND REPORTING (EWMP)

EWMPs are best management practices (BMPs) implemented to improve water use efficiency. The Federal Standard Criteria requires AWMPs to describe 5 Critical BMPs and 12 Exemptible BMPs. The California Water Code mandates that AWMPs address a specific list of 16 EWMPs: 2 critical and 14 conditional practices. There is overlap between these sets of BMPs and **Table 23** lists summarizes the EWMPs and the corresponding BMP. Additional BMPs for urban use are discussed in the UWMP (Todd, 2021).

Table 24 presents the estimates of water use efficiency improvements that have occurred since the 2015 AWMP and estimates of water use efficiency improvements for 5 and 10 years in the future.

The schedule and budget to implement EWMPs appears in **Table 25.**

Table 23. EWMPs Implemented or Planned

Report of EWMPs Implemented/Planned (Water Code §10608.48(d), §10608.48 (e), and §10826 (e))			
EWMP No.	**Description of EWMP Implemented**	**Description of EWMPs Planned**	**2020 Standard Criteria BMPs**
Critical EWMPs			
1	*Measure the volume of water delivered to customers with sufficient accuracy to comply with subdivision (a) of Section 531.10 and to implement paragraph (2) (10608.48(b)).*	All deliveries to District customers are measured using either metered or gated turnouts (see Sections 2.2.2 and Appendix E).	C-1
2	*Adopt a pricing structure for water customers based at least in part on quantity delivered (10608.48(b)).*	Water pricing is based on the volume of water delivered (see Section 2.2.3 and Appendix E).	C-4
Conditionally Required EWMPs (locally cost-effective and technically feasible EWMPs)			
1	*Facilitate alternative land use for lands with exceptionally high water duties or whose irrigation contributes to significant problems, including drainage.*	The District continues to provide technical assistance to landowners to allow them to make the best use of their land and irrigation water.	E-1
2	*Facilitation of use of available recycled water that otherwise would not be used beneficially, meets health and safety criteria, and does not harm crops or soils. The use of recycled urban wastewater can be an important element in overall water management.*	Recycled urban wastewater is currently used for agricultural irrigation within the District.	E-2
3	*Facilitate the financing of capital improvements for on-farm irrigation systems.*	The District sponsors workshops each year that address irrigation efficiency. Experts from the field meet with area growers each year to teach new techniques and technologies that assist in the efficient use of water. The District also works with the Hollister branch of the USDA Natural Resource Conservation District (NRCD). The NRCD has opportunities to improve soil, water, plant, animal, air and related resources on agricultural land. Conservation practices include water-saving micro-irrigation systems and irrigation water management, watering facilities for livestock, pipelines, fencing, brush management, and nutrient management.	E-3
4	*Implement an incentive pricing system that promotes one of the following goals (A) more efficient water use at the farm level such that it reduces waste, (B) conjunctive use of groundwater, (C) Appropriate use of groundwater recharge, (D) Reduction in problem drainage (E) Improved management of environmental resources (F) Effective management of all water sources throughout the year by adjusting seasonal pricing structures based on current conditions.*	The District provides a 1.2 AF/ac maximum supply for most parcels, which is not sufficient to sustain most crops. The District has a transfer program that allows farmers to transfer water from parcel to parcel, regardless of ownership, but dependent upon location in the District. A water transfer program is in place for customers to use if they are short or long on water. An over-use charge or penalty fee has also been established for those users who go over their allocation amounts.	E-4

Table 23. EWMPs Implemented or Planned

Report of EWMPs Implemented/Planned (Water Code §10608.48(d), §10608.48 (e), and §10826 (e))			
EWMP No.	**Description of EWMP Implemented**	**Description of EWMPs Planned**	**2020 Standard Criteria BMPs**
5	*Expand line or pipe distribution systems, construct regulatory reservoirs to increase distribution system flexibility and capacity, decrease maintenance, and reduce seepage.*	The District has developed a capital improvement program to address the sustainability and modernization of its water delivery system. In addition, the District is working collaboratively with the City of Hollister and the Sunnyslope County Water District to continue to bring higher quality water to the the Hollister urban area.	E-5
6	*Increase flexibility in water ordering by, and delivered to, water customers within operational limits.*	See Appendix G – District Agricultural Water Order form. Maximum flexibility is available with the exception of about two weeks per year. Flexibility constraints include the USBR delivery system and some District facilities. Economics will dictate if and when the USBR delivery system is expanded, if full contractual amounts are available, and if District customers are willing or able to pay for these expansions	E-6
7	*Construct and operate supplier spill and tail-water systems.*	The District does not operate spill and tail- water systems.	E-7 and E-8
8	*Increase planned conjunctive use of surface water and groundwater within the supplier service area.*	Since the development of the CVP San Felipe Project, groundwater overdraft has been corrected. Based on this corrective action, conjunctive use is now a possibility. Some growers already use CVP water and groundwater conjunctively. It has been suggested by the District's Groundwater Management Plan that blended CVP and groundwater be made readily available to the District's users. Given that the mission of the District is to optimize the water supplies available, in order to preserve the wealth and maintain the well-being of the community, having available a conjunctive use of surface and groundwater that meets consumer quality requirements, is high on the list of priorities. The Hollister Urban Area Water Project will assist the District in meeting part of this objective. See: http://hollisterwaterproject.com/	E-9
9	*Automate canal control devices.*	District is completely piped and automated.	E-10
10	*Facilitate or promote customer pump testing and evaluation.*	The District coordinates with PG&E to offer pump test/evaluations to their customers. In addition, workshops have been held at the District to teach participants basic concepts of pump performance and how to specify and maintain an efficient pump. The District coordinates with the Center for Irrigation Technology, CSUF to offer these classes. The Center has Pumping Mobile Education Centers, which are enclosed trailers with self-contained pumping plants.	C-5

Table 23. EWMPs Implemented or Planned

Report of EWMPs Implemented/Planned (Water Code §10608.48(d), §10608.48 (e), and §10826 (e))			
EWMP No.	**Description of EWMP Implemented**	**Description of EWMPs Planned**	**2020 Standard Criteria BMPs**
11	*Designate a water conservation coordinator who will develop and implement the water management plan and prepare progress reports.*	The Water Conservation Coordinator for the District is Shawn Novack. His job duties are to administer and implement water management conservation programs, analyzes and evaluates water management and conservation programs, program cost, water consumption figures and patterns, and other statistical data and estimates of water savings and and./or demand reduction. Conduct interior and exterior water audits for a variety of water customer classes; meet with and respond to customer inquiries and interpret agency policy. Train, oversee, check and evaluate employees under direct supervision. Provide liaison with member agencies on public information and educational programs to promote efficient use of water and to eliminate waste. Develop agency budget and recommends new equipment purchases and special appropriations. Prepare a variety of written material relating to water conservation, including water management plans, brochures, press releases, bill inserts, newsletters, news articles, videos, flyers and staff reports.	C-2
12	*Provide for the availability of water management services to water users. These services may include, but are not limited to, all of the following: A. On-farm irrigation and drainage system evaluations, B. Normal year and real-time irrigation scheduling and crop evapotranspiration information, C. Surface water, groundwater, and drainage water quantity and quality data, D. Agricultural water management educational programs and materials for farmers, staff, and the public.*	The District provides access to CIMIS on its website and CIMIS data is used for irrigation scheduling. See Appendix C, Water User's Handbook (Rules and Regulations). The District also sponsors workshops for growers that emphasize efficient water management. IN addition, the District works with the UC Extension and refers growers to their offices or website for technical question regarding their crops, water efficiency and nutrient management: http://www.ipm.ucdavis.edu/PMG/crops-agriculture.html	C-3

Table 23. EWMPs Implemented or Planned

Report of EWMPs Implemented/Planned (Water Code §10608.48(d), §10608.48 (e), and §10826 (e))			
EWMP No.	**Description of EWMP Implemented**	**Description of EWMPs Planned**	**2020 Standard Criteria BMPs**
13	*Evaluate the policies of agencies that provide the supplier with water to identify the potential for institutional change to allow more flexible water deliveries and storage.*	The District has always tried to be responsive to its water users, encouraging their comments and suggestions. Suggestions from these individuals are discussed directly with the District Manager and openly with the Board of Directors. All District Board of Directors meetings are open to the public and are announced well in advance. Additionally, the District operators maintain close personal contact with water users. Over the years this personal contact has benefited both the District and its water users. The District is nearly entirely dependent on the Central Valley Project (CVP) for its water supply. The CVP has historically been, and is expected to continue to be, subject to delivery deficiencies. As environmental and urban water demands continue to increase, the reliability of the CVP decreases for all CVP contractors. Delivery deficiencies are related to both the reduced quantity of water available and the increased frequency that shortages are imposed. The District continues to look at ways to further stabilize, or firm up, the reliability of the water supply so that production agriculture can continue to flourish in the District. One method of stabilizing the water supply that the District has initiated is recycled water and groundwater banking. These are both components of the Hollister Urban Area Water Project (see: http://www.hollisterwaterproject.com).	E-9
14	*Evaluate and improve the efficiencies of the supplier's pumps.*	The District is implementing this EWMP by evaluating and improving the efficiency of its pumps by performing periodic pump efficiency tests to identify cost effective energy and/or water conservation improvements.	E-11
Other EWMPs			
1999 AWMC MOU A-4:	*Improve communication and cooperation among water suppliers, users, and other agencies.*	The District is working with the City of Hollister and the Sunnyslope County Water District to coordinate and operate the regional water treatment plants (WTP). Collectively, they produce the UWMP for the Hollister Urban Area. The District is also a member of the Water Resources Association of San Benito County (WRASBC) to mission is to foster and encourage better communication and cooperation among area water utilities. The WRA leds the public outreach for municiapl and agricultural users during drought. In addition, the District is working with the Santa Clara Valley Water District (SCVWD) on implementing the North San Benito Groundwater Sustainability Plan (GSP).	
1999 AWMC MOU B-4:	*Facilitate voluntary water transfers.*	The District encourages water transfers whenever feasible.	
2020 AWMC	*Mapping - Develop Geographic Information System (GIS) maps of the district's distribution system and drainage system.*	The District has GIS maps of district facilities, inflow/outflow points, conveyance system, etc. as well as base datasets such as soils and hydrography. These are stored a geodatabases and are considered part of the GSP Data Management System (DMS).	E-12

Table 24. EWMPs Efficiency Improvements

Report of EWMPs Efficiency Improvements EWMP No.	Estimate of Water Use Efficiency Improvements That Occurred Since Last Report (Quantitative or Descriptive)	Estimated Water Use Efficiency Improvements 5 and 10 years (Quantitative or Descriptive)	2020 Standard Criteria BMPs
Critical			
1 -Water Measurement	No change since last AWMP	Moderate Improved monitoring of groundwater pumping is expected as part of the GSP	C-1
2 - Volume-Based Pricing	Slight	Slight	C-4
Conditional			
1 – Alternate Land Use	Slight Conversion of agricultural land to urban	Slight Conversion of agricultural land to urban	E-1
2 – Recycled Water Use	Slight	Moderate Improvements to water quality will increase recycled water demand for irrigation	E-2
3 – On-Farm Irrigation Capital Improvements	No change since last AWMP	Moderate	E-3
4 – Incentive Pricing Structure	None	None	E-4
5 – Infrastructure Improvements	No change since last AWMP	None	E-5
6 – Order/Delivery Flexibility	None	None	E-6
7 – Supplier Spill and Tailwater Systems	Not applicable. No change since last AWMP	None. Not applicable	E-7 and E-8
8 – Conjunctive Use	Moderate Groundwater recharge, Pacheco Creek Reservoir Expansion	Moderate GSP implementation measures, when available, recharge expansion	E-9
9 – Automated Canal Controls	None. Not applicable	None. Not applicable	E-10
10 – Customer Pump Test/Eval.	Slight	Slight	C-5
11 – Water Conservation Coordinator	Slight	Slight	C-2
12 – Water Management Services to Customers	Slight	Slight	C-3
13 – Identify Institutional Changes	Slight	Moderate GSP implementation measures	E-9
14 – Supplier Pump Improved Efficiency	Slight	Slight	E-11
Other			
Improve communication	Slight	Slight	
Facilitate voluntary water transfers.	Slight	Slight	
Mapping	Slight	Slight	E-12

Table 25. Schedule to Implement EWMPs

EWMP	Implementation Schedule	Finance Plan	Budget Allotment FY 14 / 15	Budget/Allotment FY 21/22	2020 Standard Criteria BMPs
Critical					
1 – Water Measurement	Implemented	Budgeted	$15,000	$600,000	C-1
2 - Volume-Based Pricing	Implemented	Completed	$0.00	$0.00	C-4
Conditional					
1 – Alternate Land Use	NA	NA	$0.00	$0.00	E-1
2 – Recycled Water Use	Implemented/Ongoing	Budgeted	$1.5M	$0.00	E-2
3 – On-Farm Irrigation Capital Improvements	Implemented	Budgeted	$5,000	$0.00	E-3
4 – Incentive Pricing Structure	Disincentive for overuse	Resolution	$0.00	$0.00	E-4
5 – Infrastructure Improvements	Ongoing	Budgeted	$20M	$0.00	E-5
6 – Order/Delivery Flexibility	Implemented	Completed	$0.00	$0.00	E-6
7 – Supplier Spill and Tailwater Systems	NA	NA	$0.00	$0.00	E-7 and E-8
8 – Conjunctive Use	Implemented	Budgeted	$10M	$1,758,950	E-9
9 – Automated Canal Controls	Completed	Closed Piped system	$0.00	$0.00	E-10
10 – Customer Pump Test/Eval.	Implemented/Ongoing	Budgeted	$5,000	$1,400	C-5
11 – Water Conservation Coordinator	Completed	Budgeted	$80,000	$90,000	C-2
12 – Water Management Services to Customers	Implemented/Ongoing	Budgeted	$0.00	$11000	C-3
13 – Identify Institutional Changes	Implemented	Budgeted	$0.00	$0.00	E-9
14 – Supplier Pump Improved Efficiency	Implemented	Budgeted	$44,000	$25,000	E-11
Other EWMPs:					
1999 AWMC MOU A-4: Improve communication and cooperation among water suppliers, users, and other agencies.	Implemented	Budgeted	$0.00	$0.00	
1999 AWMC MOU B-4: Facilitate voluntary water transfers.	Implemented	Budgeted	$0.00	$0.00	
2020: Mapping	Implemented	Budgeted	$0.00	$0.00	E-12
Grand Total all EWMPs			**$31,605,000**	**$2,486,350**	

9 SUPPORTING DOCUMENTATION

9.1 AGRICULTURAL WATER MEASUREMENT REGULATION DOCUMENTATION

CVP Water is delivered to customers via 158 miles of a closed pipe distribution system. Growers receive their water at the blue valve delivery points along this system. Approved connections to San Benito County Water District delivery facilities are designed to protect the District's distribution system, minimize maintenance costs, ensure continuous water service, and provide safe working conditions for water users and District employees. In addition, all piping within eight feet of the delivery must be watertight. At these delivery sites, meters are installed to measure water by volume as it is transferred to the customer. The District uses water meters manufactured by Zenner Direct Read Turbine Meters. The manufacturer states that their meters are accurate to +/- 2% of reading at the time of purchase.

The District has an extensive testing program to maintain the accuracy of the blue valve meters. All meters are pulled from their sites and brought to the District maintenance shop and tested for accuracy on a regular basis. District maintenance personnel have been trained on the testing equipment and the District Engineer reviews each test result. Each meter is tested and if a meter is +/- 10% of reading they are rebuilt and retested to make sure they fall below this baseline. If the meter fails after being rebuilt, they are sent back to the manufacturer. The District's current maintenance program goal for 4 inch and larger meters is to test 10% of the meters annually. Based on a 25-year lifecycle for the 4 inch and larger flow meters, and a 15-year lifecycle for the 3 inch and smaller flow meters the SBCWD invests about $160,000 per year in flow meter replacements.

9.2 IMPROVEMENTS FROM GSP

GSP Regulations require annual reporting of groundwater extractions except for those of de minimis users. Municipal pumping is regularly metered and reported, and SBCWD has measured agricultural pumping in Zone 6 using power meter records. However, the GSP has indicated that a single, reliable, and consistent method of measuring agricultural pumping is needed for the San Benito County portion of the basin. (The Santa Clara County portion includes about 3,300 acres and pumping in that area is being addressed by Valley Water).

Alternative methods of measuring agricultural groundwater extraction have been evaluated as part of the North San Benito GSP, including 1) use of pump power meters, 2) use of in-line discharge meters on wells, and 3) remote sensing techniques. Criteria to evaluate the three alternatives have included:

- Accuracy and reliability relative to purpose
- Costs and allocation of costs between the GSA and well owner
- Feasibility and timing of implementation
- Ease of ongoing data collection and maintenance
- Well owner acceptability and cooperation.

Use of power meters has been removed from further consideration because it is not sufficiently accurate and reliable. Use of in-line meters may be a viable option because it is relatively accurate (with regular checking/maintenance), understood by well owners, and gives growers direct access to their pumping data. Drawbacks of meters include a possible lack of acceptance by owners, slow implementation as hundreds of meters are installed by well owners, the probable need for SBCWD to establish access to each well for verification, the cost of the meter to the well owner, and the need for SBCWD staff time and ongoing access to the meter.

Remote sensing can overcome many of the drawbacks of the other methods, but it is a relatively new and evolving technology. To further explore this option, SBCWD initiated a one-year pilot study in February 2021 to test the remote sensing services offered by a private vendor. The method integrates spectral information from multiple satellites to track soil moisture, evapotranspiration (ET), and crop nutrient status (nitrogen and phosphorus) on a daily basis. Applied irrigation water can be estimated from increases in soil moisture not related to rainfall. Artificial intelligence algorithms are used to relate the directly-measured variables to the output variables of interest to growers and SBCWD. The spatial resolution of the raw data is 10 meters, but the results are averaged or subtotaled to the scale of a field for the growers. SBCWD is provided raster data sets of monthly subtotals of ET and applied water. The five farms participating in the pilot program also have in-line flow meters that record water use. At the end of the pilot study, the remotely sensed data will be compared with metered water use and ground-based estimates of ET (from nearby CIMIS stations) to evaluate the accuracy and reliability of the different monitoring techniques. Depending on the outcome of the pilot project, a next step would be extension of remote sensing tracking across agricultural areas of the basin.

10 REFERENCES

California Department of Water Resources, 2011, Consumptive Use Program PLUS (CUP+), https://water.ca.gov/Programs/Water-Use-And-Efficiency/Land-And-Water-Use/Agricultural-Water-Use-Models last accessed December 2020.

California Department of Water Resources, 2020, Agricultural Water Management Plan Guidebook, August.

California Department of Water Resources, 2021, DWR Land Use Viewer, accessed August https://gis.water.ca.gov/app/CADWRLandUseViewer/

HDR, 2017, Hollister Urban Area Water and Wastewater Master Plan Update, June. http://www.sbcwd.com/reports/Hollister%20Urban%20Area%20Master%20Plan%20Update%20%20July%202017.pdf

Luhdorff & Scalmanini Consulting Engineers (LSCE), 2015, Northern Counties (Monterey, Santa Cruz, Santa Clara, San Benito Counties) Characterization Report, June 1, 2015.

Natural Resources Conservation Service (NRCS), 2018, SSURGO soil survey on-line map database available at http://websoilsurvey.nrcs.usda.gov/app/WebSoilSurvey.aspx, last accessed December 2018.

Parameter-Elevation Regressions on Independent Slopes Model (PRISM) Climate Group, 2021, Oregon State University, http://prism.oregonstate.edu last accessed June 2021.

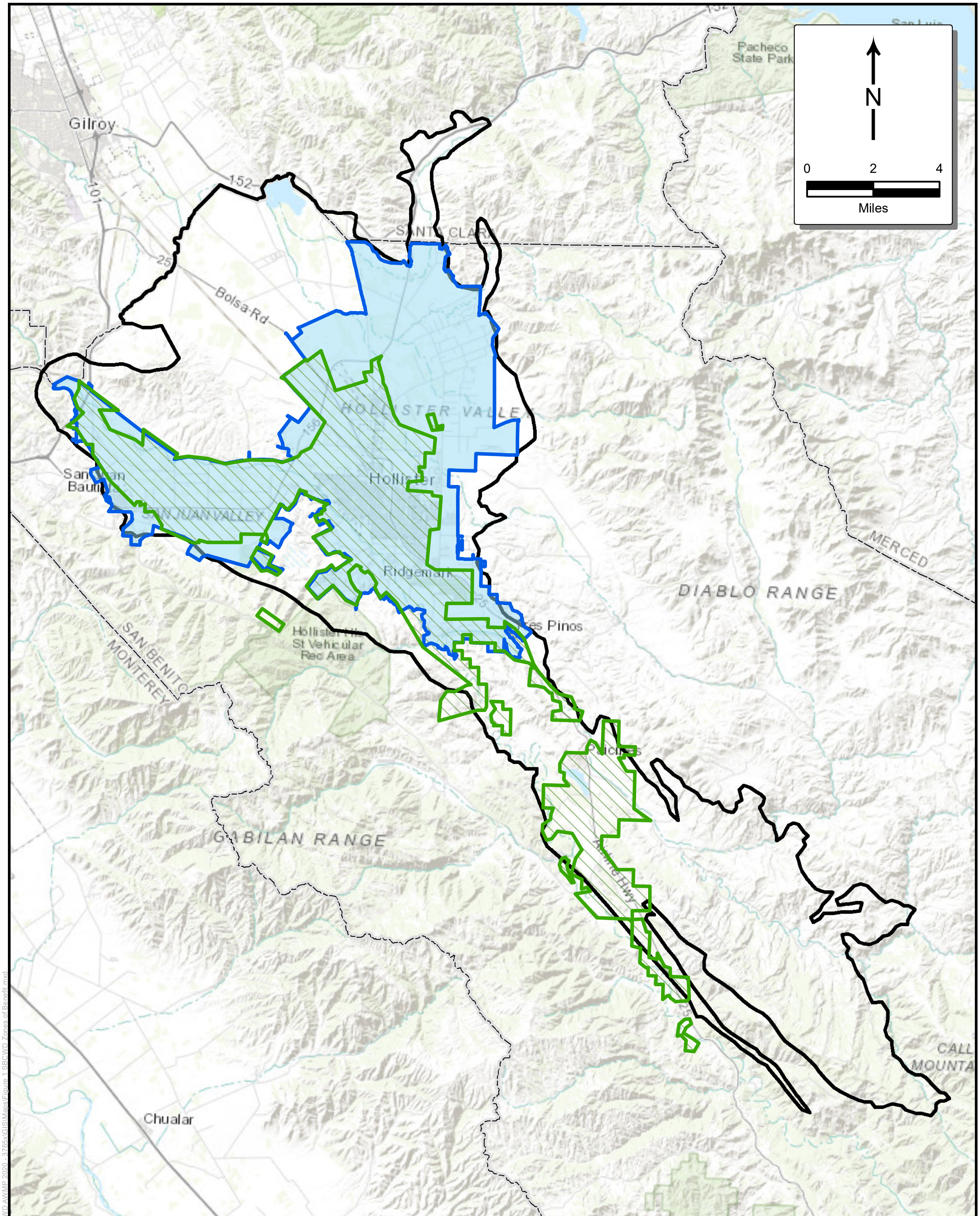
San Benito County Water District, 2015, Agricultural Water Management Plan, June.

Todd Groundwater, 2020, Annual Groundwater Report WY 2020, December.

Todd Groundwater, 2021, Hollister Urban Area Urban Water Management Plan, July.

Todd Groundwater, 2021, North San Benito Managed Aquifer Recharge Feasibility and Location Assessment Study.

Todd Groundwater, 2022, Final Groundwater Sustainability Plan (GSP) North San Benito Groundwater Basin, January.



North San Benito Basin

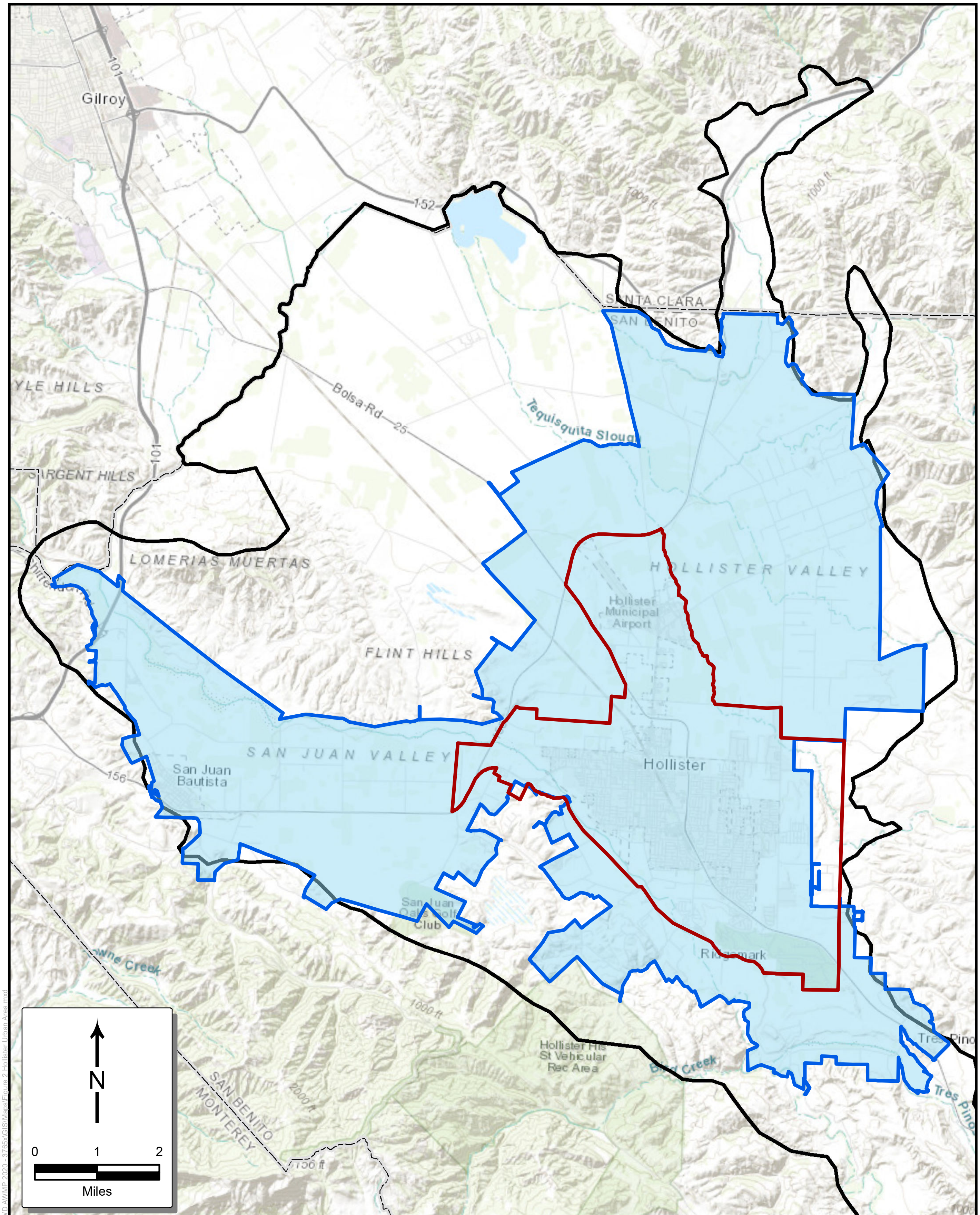
SBCWD Zone of Benefit 3

SBCWD Zone of Benefit 6

August 2021

TODD GROUNDWATER

Figure 1
SBCWD
Zones of Benefit

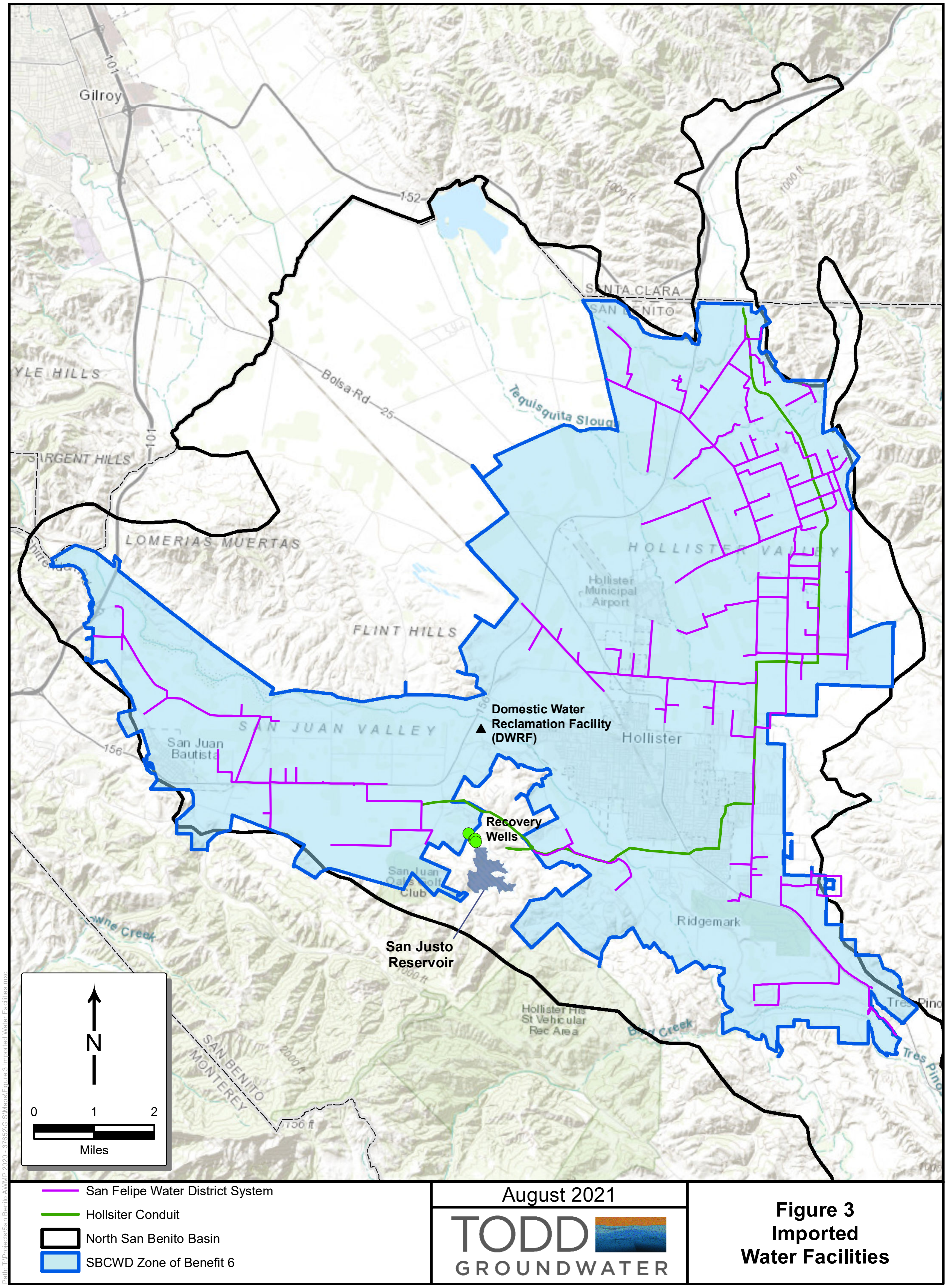


Hollister Urban Area
North San Benito Basin
SBCWD Zone of Benefit 6

August 2021

TODD GROUNDWATER

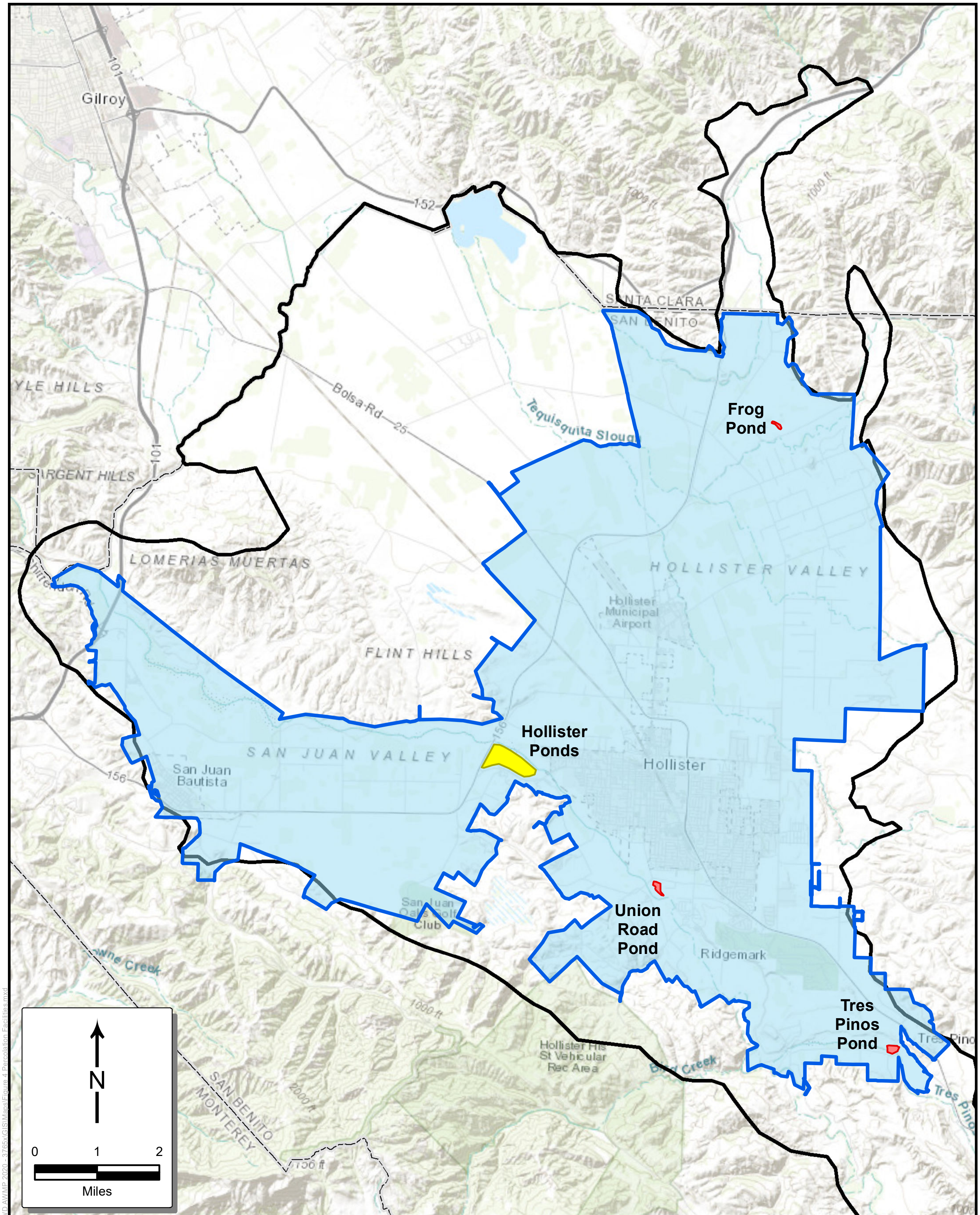
Figure 2
Hollister Urban Area



August 2021

TODD GROUNDWATER

Figure 3
Imported Water Facilities

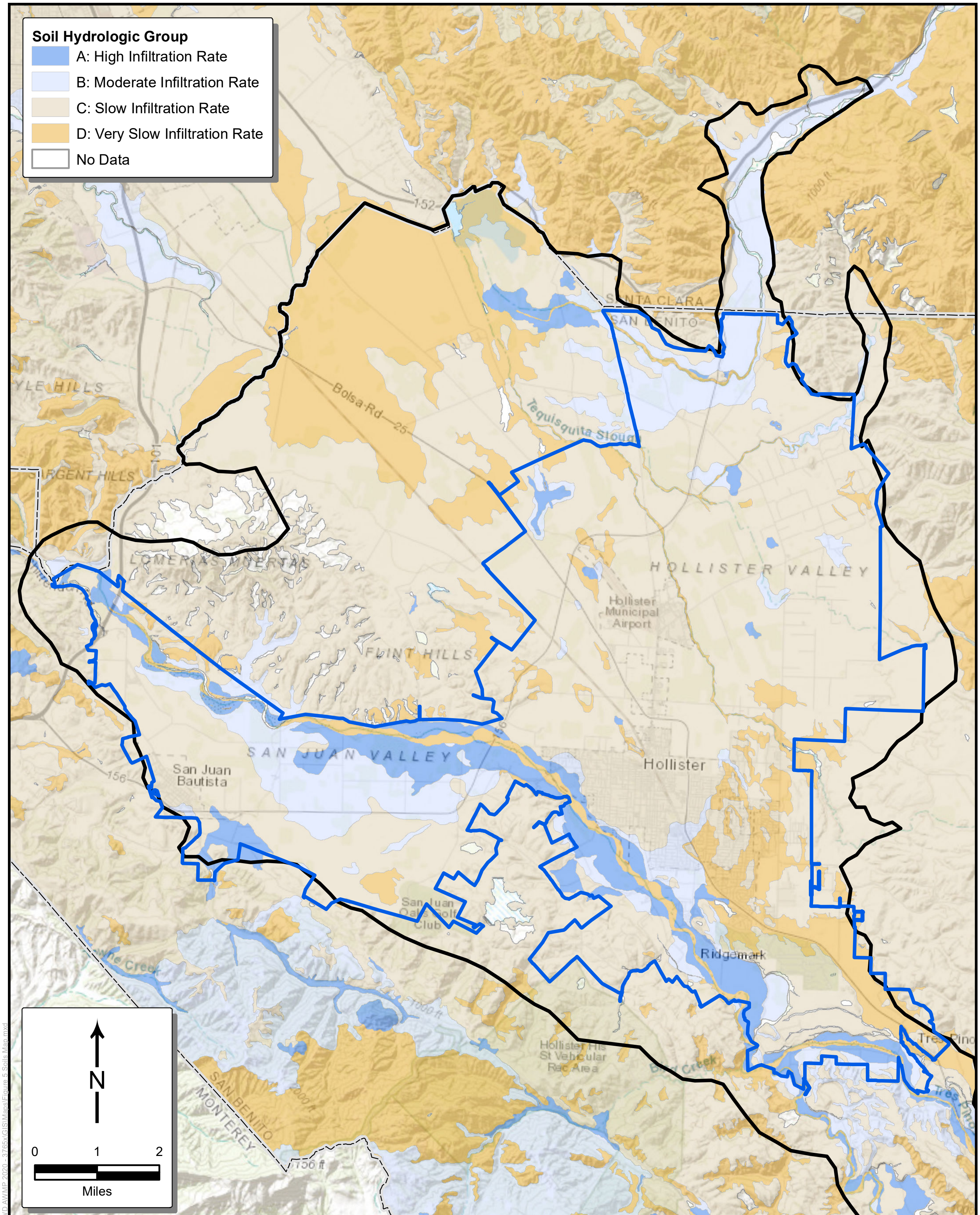


Hollister Ponds	
Percolation Station	
North San Benito Basin	
SBCWD Zone of Benefit 6	

August 2021

TODD GROUNDWATER

Figure 4
Percolation Facilities

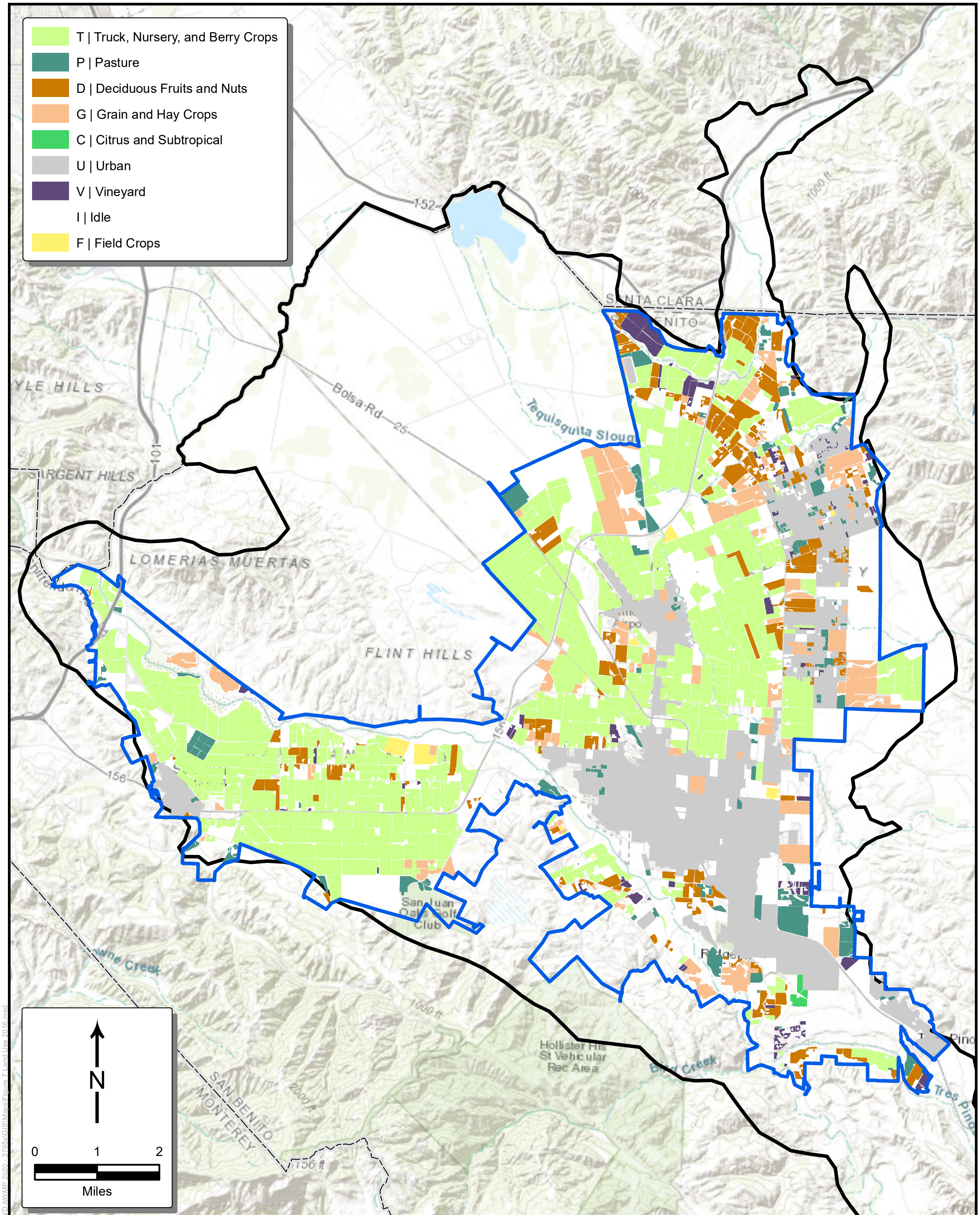


North San Benito Basin
SBCWD Zone of Benefit 6

August 2021

TODD GROUNDWATER

Figure 5
Soils Map



North San Benito Basin
SBCWD Zone of Benefit 6

August 2021

TODD GROUNDWATER

Figure 7
Land Use 2016