2014

San Benito County Water District

Annual Groundwater Report

TODD GROUNDWATER

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ANNUAL GROUNDWATER REPORT

WATER YEAR 2014

DECEMBER 2014

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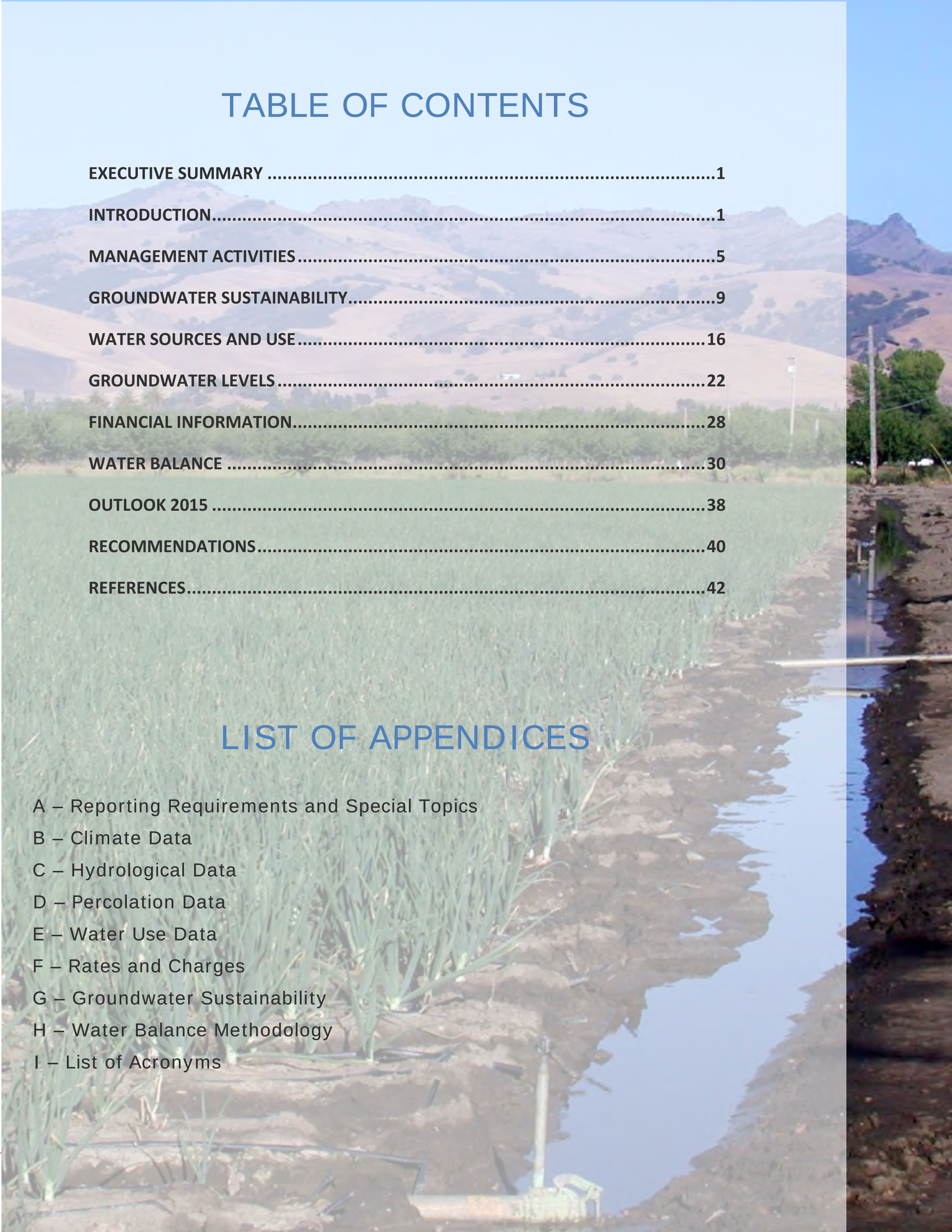

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EXECUTIVE SUMMARY

2014

WEATHERING THE DROUGHT

This Annual Groundwater Report for San Benito County Water District (District) describes groundwater conditions in the San Benito County portion of the Gilroy-Hollister basin. It documents water supply sources and use, groundwater levels and storage, and District management activities for water year 2014. Recommendations are provided with regard to groundwater replenishment, groundwater pumping, and the amount of water to import for water year 2015.

In water year 2014, California experienced state wide drought. Locally, rainfall was less than half the long-term average, for the third year in a row. Regionally, low precipitation and snowmelt in the Sierra Nevada's reduced imported water supplies. The agricultural allocation for the District was zero percent of its contract. Nonetheless, through transfers, exchanges, and reservoir storage, the District was able to deliver 8,000 AF of CVP imported water to its customers.

With limited imported water, water users continued to rely on groundwater. Groundwater pumping was similar to water year 2013, which was a 30 percent increase from the previous ten year average. Prolonged groundwater use has resulted in widespread groundwater declines of 10 to 20 feet, and up to 60 feet of decline in some areas. However, much of the basin remains above historic lows and groundwater storage appears to be available for short term use. If dry conditions persist, either the basin must be replenished with natural or imported water, or water demand must be decreased to prevent additional declines.

The recently passed Sustainable Groundwater Management Act will require the preparation of a Groundwater Sustainability Plan for the San Benito portion of the Gilroy-Hollister groundwater basin. This year's Annual Report includes a special section that provides the District with background information and a road map to comply with the new legislation.

In keeping with the triennial update, the basin water balance was updated through 2014. A new soil moisture balance model, utilizing the most recent land use information, was developed to better estimate irrigation and natural return flows and to provide an alternative estimate for groundwater use. Preliminary estimates from the soil moisture balance indicate that current monitoring may significantly underestimate groundwater use. This information will be used to update the numerical model of the basin.

Preliminary imported water allocations from the Central Valley Project (CVP) for Water Year 2015 are expected to remain at zero percent for agricultural uses, but may be increased if there is adequate supply. The District should prepare for another year of sustained groundwater pumping. Additional water level monitoring may help to determine areas sensitive to water level declines and provide information on where additional resources are necessary.

1 INTRODUCTION

REPORT OVERVIEW

The San Benito County Water District (District) was formed by a special act of the State with responsibility and authority to manage groundwater. The special act allows the Board of Directors to require an annual groundwater report and, as documented in Appendix A, specifies the minimum content of the report should the District choose to prepare one. The District, at its discretion, has also directed that specific Annual Reports include focused discussion of selected topics. This Annual Report, prepared at the request of the District, documents water supply sources and use, groundwater levels and storage, and District management activities from October 2013 through September 2014.

This report presents an overview of the state of the groundwater basin. Information on water use, groundwater levels, management activities, and rates are included in the report. This year, the report also includes special sections on the Sustainable Groundwater Management Act and the Water Balance Update. It also conveys considerable information, including tables and figures, which are provided largely in Appendices B through E. Appendix F provides information on water rates and charges, Appendix G provides information on the Sustainable Groundwater Management Act, Appendix H contains information for the Water Balance Update, and Appendix I is a list of acronyms.

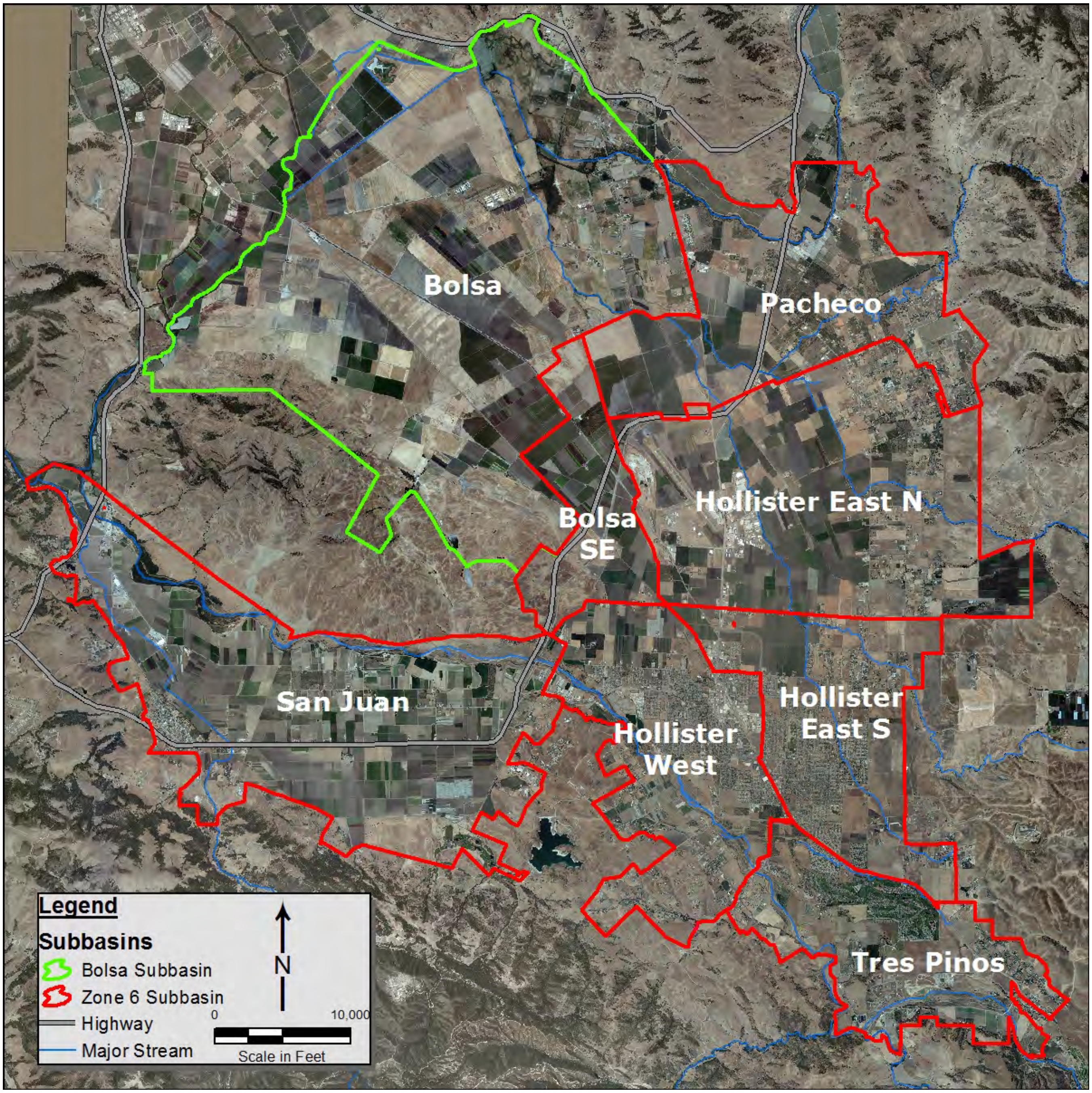
Throughout this report, water volumes and changes in storage are shown to the nearest acre-foot (AF). These values are accurate to one to three significant digits (depending on the measurement). All digits are retained in the text to maintain as much accuracy as possible during subsequent calculations,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

Acknowledgments: This report was prepared by Iris Priestaf, PhD, Maureen Reilly, PE, Chad Taylor, PG, CHG, Gus Yates, PG, CHG and Amber Ritchie, GIT of Todd Groundwater. We appreciate the assistance of San Benito County Water District staff, particularly Jeff Cattaneo and Dale Rosskamp.

Geographic Areas

This report focuses on the southern portion of the Gilroy-Hollister groundwater basin (Figure 1), which extends from San Benito County into southern Santa Clara County. The southern part of the basin includes the City of Hollister, City of San Juan Bautista, unincorporated residential areas, and expansive areas of irrigated agriculture.

Figure 1. Locations of SBCWD Subbasins



For the purposes of District groundwater management and annual reporting, seven subbasins were delineated in 1996: Bolsa, Bolsa Southeast (SE), Pacheco, Hollister East (North and South), Tres Pinos, Hollister West, and San Juan subbasins. It should be noted that these subbasins differ from the subbasins defined by DWR (see Figure C-1) and identified for compliance in the Sustainable Groundwater Management Act. Of the subbasins shown above, only the Bolsa subbasin receives no CVP deliveries and relies entirely on local groundwater.

This Annual Groundwater Report describes current groundwater conditions in the District and two of its three zones of benefit: Zone 3 and Zone 6. The District's zones of benefit are summarized below:

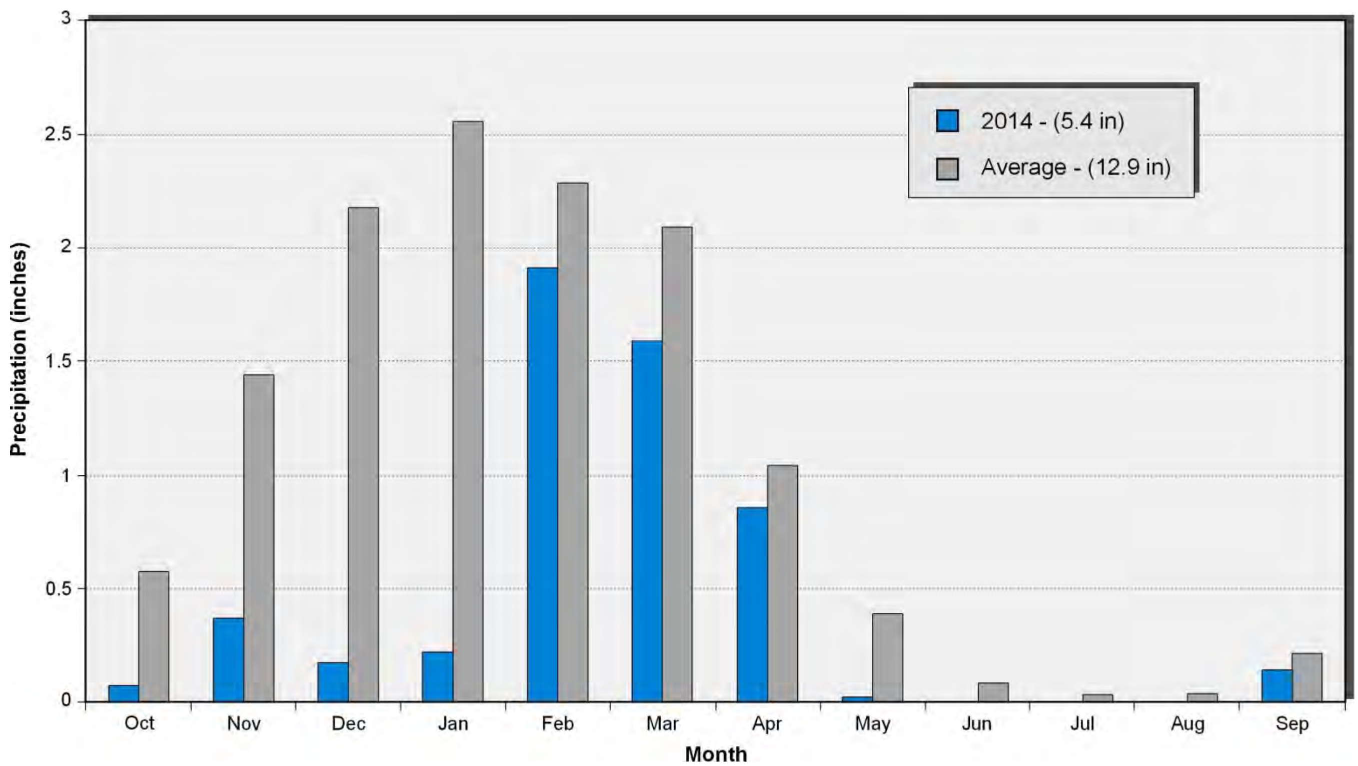
- Zone 1 encompasses the entire county and provides the funding base for specific District administrative expenses.
- Zone 3 includes the San Benito River Valley from south of Paicines to San Juan Bautista and the Tres Pinos Creek Valley from Paicines to the San Benito River. Zone 3 provides the funding base for operation of Hernandez and Paicines reservoirs and related groundwater recharge and management activities.
- Zone 6 includes most of the Gilroy-Hollister groundwater basin in San Benito County and provides the funding base for importation and distribution of CVP water and related groundwater management activities.

Hydrologic Conditions

Local rainfall is a useful indicator of hydrologic conditions in the basin. It provides insight into the relative amounts of specific basin inflows (e.g., deep percolation) and outflows (groundwater pumping). Dry years often entail significantly reduced CVP allocations (recognizing that drought often is extensive across California) and some increase in agricultural irrigation (to offset the lack of rainfall); both of these factors can result in increased groundwater pumping.

Extreme drought continued through Water Year 2014. Annual rainfall amounted to only 5.35 inches, which is 41 percent of average (approximately 13.0 inches). This marks the third year in a row that rainfall has been approximately half of the historical average (see Appendix B). Dry conditions also persist across the state; the CVP allocation was reduced to zero due in part to patchy snow pack in the Sierra. In addition, the CVP allocation is expected to remain at reduced levels for next year.

Figure 2. Monthly Precipitation in Water Year 2014



2 MANAGEMENT ACTIVITIES

PLANNING, CONSERVATION, AND PERCOLATION

The District has continued its participation in water management activities including water resources planning, water conservation, development of additional water sources, augmentation of groundwater resources, and distribution of CVP water, as addressed in this section. The District also maintains a comprehensive monitoring program, including regular measurement of groundwater pumping, annual evaluation of groundwater storage change, and assessment of regional water quality.

Water Resources Planning

In 2014, the District was engaged in various projects, programs and planning efforts that address water supply, water quality, and wastewater management. Most of these activities are focused on how to maximize CVP deliveries when available or to develop additional supplies to rely on when CVP imports are not available. It is expected that the recent variability in CVP allocations will continue in the future because of climate change and environmental policy.

- Lessalt Treatment Plant Upgrade. The Lessalt Water Treatment Plant (WTP) upgrade, which will expand treatment to an average of 2MGD (2,240 AFY), is expected to be complete by January 2015.

- West Hills Water Treatment Plant. The Hollister Urban Area (HUA) Water and Wastewater Master Plan (HDR 2008) recommended a second surface water treatment plant to treat CVP imports for delivery to urban areas currently not served by the Lessalt WTP. The plant will be located at the West Hills Site, near the San Juan subbasin north of Union Road, and will be designed to treat an average annual capacity of 3 MGD (based on a 4.5 MGD design capacity). It may be expanded in the future to a total annual capacity of 9.0 MGD. The District is currently working with state and federal agencies to obtain the necessary permits. Construction is expected to begin after an agreement is reached.

- North County Groundwater. In addition to development of local surface water supplies, the Master Plan also identified north county groundwater subbasins as sources of long-term supply. Current planning suggests the North County could produce an additional 1,400 AFY to 2,000 AFY of water supply by 2016.

- Sustainable Groundwater Management Act. The California legislature recently passed legislation that requires medium and high priority basins to develop plans to avoid or eliminate overdraft. The Gilroy-Hollister basin must comply and the District may take on the role of the Groundwater Sustainability Agency. Section 3 of this report provides a detailed look at what that entails.

Water Conservation

Water conservation is an important tool to manage demands on the groundwater basin. In dry times, water efficiency improvements can help meet water demands despite reduced supply. Water conservation efforts in San Benito County are conducted mostly through the Water Resources Association (WRA), composed of representatives from the District, City of Hollister, City of San Juan Bautista, and Sunnyslope County Water District (SSCWD).

Water Softener Rebate Programs. The Water Softener Rebate Program continues to provide rebates (between $150 and $300) to customers who agree to abandon and/or replace their pre-1999 inefficient water softener system with a newer, more efficient means of water softening. The District, on behalf of the WRA and in cooperation with SCVWD, has funded the program in part with a Water Use Efficiency Grant (part of the 2004 Proposition 50 grant program). The program provides a range of rebates. The grant began in May 2007 and was extended to March of 2014. Currently, the rebate program continues to be offered with local funding. In July of 2014, the City of Hollister enacted an ordinance that prohibits the installation of self-regulating water softeners (SRWS) that use salt and/or potassium. Accordingly, the rebate program was adjusted to issue rebates only to those water customers who demolish a SRWS without replacement ($300) or transition to an off-site exchange service ($250).

Irrigation Classes. The District, along with the WRA, has been offering a series of classes since 2009 on irrigation efficiency and other agriculture practices. Classes for 2014-2015 have been revised to meet the needs of agricultural customers. Irrigation water availability and water quality protection have emerged as critical issues for agriculture. These workshops will provide concepts, tools, and examples for optimizing irrigation and nitrogen management efficiency in row, tree, and greenhouse crop production. The classes will also focus on records and acquiring data needed for water quality regulation and reporting.

Turf Removal Program. In July of 2014 the WRA added a Turf Removal Program to encourage customers to remove turf areas at their homes because turf consumes so much water. This program complements the irrigation hardware rebates and free water efficient landscape plans. The program offers customers $1 per square foot of turf removed up to 500 square feet. The only land cover allowed in the area where the turf is removed includes: drought tolerant or native plants, permeable hardscapes and/or a combination. As of November 2014, over 16,000 feet of turf have been removed in the Hollister Urban Area.

Other ongoing water conservation programs include:

- Irrigation Rebate Program
- Green Business Committee
- Home water survey program
- Toilet replacement program
- High-efficiency clothes washer program
- Education program (classroom presentations, fieldtrips to reclamation plant and water treatment plant, Ag in the Classroom, Farm Day)
- Outreach programs including ads in local newspaper, bill inserts, newsletters, San Benito County Fair, Water Awareness Month (May), Water-wise demonstration garden, water conservation library for public use, WRA website, and web and print ads in the Hollister Free Lance newspaper and website.

Managed Percolation

Percolation of Local Surface Water. Local surface water from Hernandez and Paicines reservoirs is percolated along the San Benito River and Tres Pinos Creek. In recent years, releases of local surface water have been limited to percolation upstream of the confluence of San Benito River and Tres Pinos Creek. This has helped maintain groundwater levels without causing shallow groundwater problems and competing for available storage space with the City of Hollister wastewater percolation ponds.

This year, both Paicines and Hernandez were dry for the entire year due to ongoing drought conditions; there were no releases from either reservoir.

Percolation of Wastewater. Wastewater is percolated by the City of Hollister at its Domestic and Industrial plants, as well as the Sunnyslope Ridgemark Facilities and Tres Pinos Water District. Recent changes in the wastewater facilities have decreased the volume percolating to the groundwater. Information about the amount of groundwater recharge from these wastewater facilities is found in Appendix D.

Percolation of CVP Water. Direct in-stream recharge of CVP water is not expected to occur because of concerns for release of invasive Dreissenid mussels. In the past, CVP percolation was used to recharge the groundwater aquifer; CVP percolation peaked in 1997 and was reduced subsequently in response to the successful recovery of the groundwater basin from overdraft. A table of historical percolation is found in Appendix D.

More data on Management Activities can be found in Appendix D, including:

- Percolation from Reservoirs
- Wastewater Recharge
- Historical CVP Recharge

3 GROUNDWATER SUSTAINABILITY

ROAD MAP FOR FUTURE PLANNING

The Sustainable Groundwater Management Act (SGMA) of 2014 provides a framework for sustainable management of groundwater supplies by local agencies, such as San Benito County Water District. The SGMA applies directly to basins or subbasins designated by DWR as high- or medium priority basins. The DWR-defined Hollister Area, San Juan Bautista Area, and Bolsa Area subbasins of the Gilroy-Hollister Basin have been ranked as medium priority and thus are subject to the new law, which requires establishment of a Groundwater Sustainability Agency (GSA), development of a Groundwater Sustainability Plan (GSP) and achievement of groundwater sustainability within 20 years.

This section provides an overview of key provisions of the SGMA with a focus on the basins in San Benito County and next steps for the District. Selected informational materials developed by the Association of California Water Agencies (of which the District is a member) are reproduced in Appendix G.

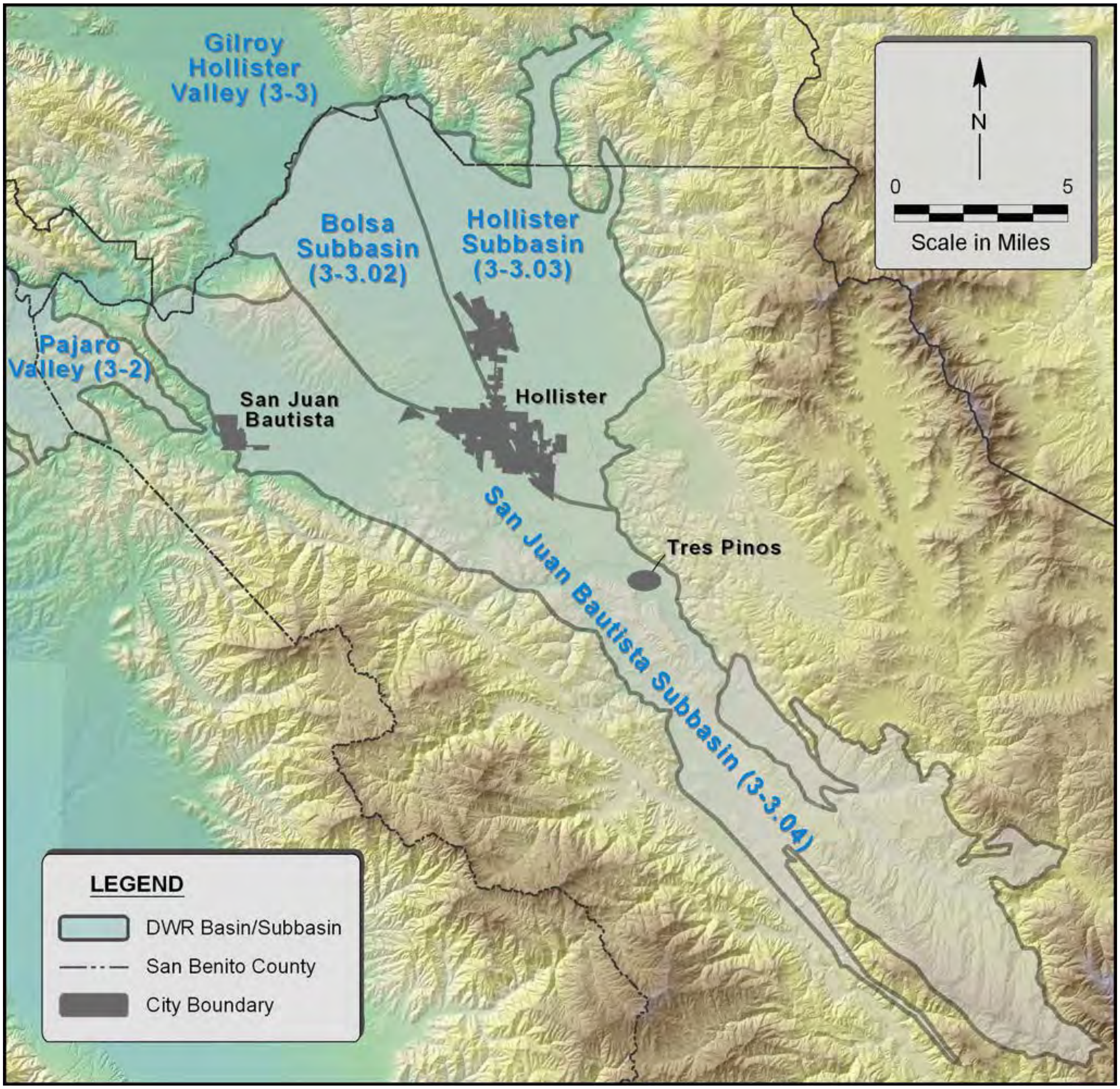
The SGMA consists of three bills — AB 1739, SB 1168 and SB 1319 that were passed by the State legislature and then signed into law by Governor Brown on September 16. Together the bills commit the state to locally controlled, sustainable groundwater management and provide tools and authorities for local agencies to achieve the sustainability goal over a 20-year implementation period. The SGMA lays out a process and timeline for local agencies to achieve sustainable groundwater management. A simplified schedule is shown on the next page. While the process seems long—extending out to 2042—significant issues will be involved and much work is to be done.

Affected Basins

Under the SGMA, DWR must rank all 515 California groundwater basins and subbasins identified in DWR Bulletin 118 as very low, low, medium or high priority. The ranking process will be finalized by January 31, 2015. Figure 3, on the next page, shows the medium-priority Gilroy-Hollister subbasins in the District's jurisdiction, plus portions of Pajaro Valley Basin and Gilroy-Hollister Basin.

DWR first developed criteria for such a ranking through CASGEM; criteria include factors such as number of public supply wells, total wells, irrigated acreage, population, reliance on groundwater, impacts on local streamflow and habitat, and occurrence of problems (e.g., overdraft, seawater intrusion, subsidence). Accordingly, a medium- or high-priority basin has State-wide importance, but may or may not be in trouble. Similarly, the ranking of a basin as low- or very-low priority is not intended to downplay its local significance. Compliance for low and very-low priority basins is not required, but an overlying water or land use agency may volunteer to be a GSA and prepare a GSP. Adjudicated basins are exempt, except for certain reporting requirements.

Figure 3. DWR Basins and Subbasins



Implementation Schedule

Jan. 31, 2015
DWR prioritizes basins

June 1, 2016
DWR adopts regulations for evaluating Groundwater Sustainability Plans

Dec. 31, 2016
DWR publishes report on water available for replenishment of groundwater in the state

Jan. 1, 2017
DWR publishes best managment practices for the sustainable management of groundwater

June 30, 2017
Groundwater Sustainability Agencies are formed

July 1, 2017
State may designate basin as probationary basin

January 31, 2020
Groundwater Sustainability Plans are adopted and implementation under way for basins in critical overdraft

Plans are submitted to DWR for adequacy review upon adoption

Interim milestones are reviewed by DWR every five years

January 31, 2022
Groundwater Sustainability Plans are adopted and implementation under way for basins not in overdraft

Plans are submitted to DWR for adequacy review upon adoption

Interim milestones are reviewed by DWR every five years

Jan. 31, 2040
Groundwater Sustainbility Agencies in critically overdrafted basin achieve sustainability goal

Jan. 31, 2042
Groundwater Sustainbility Agencies in basins not in overdraft achieve sustainability goal

Considerations for San Benito County Water District are discussed below.

Ranking of Medium-Priority Subbasins. The three subbasins of the Gilroy-Hollister Valley Basin have medium priority. While DWR will not finalize its rankings until January 31, 2015, the likelihood of a priority change for these basins is negligible; none is marginal relative to the ranking system.

Other Subbasins in San Benito County. All DWR-defined basins and subbasins in San Benito County are shown on Figure 3. Very low rankings were assigned to the following: Santa Ana, Upper Santa Ana, Quien Sabe, Tres Pinos, San Benito River, Dry Lake, Bitter Water, Hernandez, Panoche, and Vallecitos valley basins.

Basins and Subbasins Overlapping County Lines. The northern boundary dividing the Gilroy-Hollister Valley Basin into subbasins does not coincide neatly with the San Benito-Santa Clara county line. Most notably, a portion of the Hollister Subbasin (extending up Pacheco Creek) extends into Santa Clara County. Along the northern boundary, portions of the Hollister, Bolsa, and San Juan subbasins lap into Santa Clara County, and portions of the high-priority Llagas subbasin lap into San Benito County. The District, in collaboration with Santa Clara Valley Water District, should identify these areas clearly (e.g., on a parcel basis) and begin exploring means for their governance. Regulations for revising basin boundaries will be established by DWR by January 1, 2016; these may be relevant.

In addition, a portion of the high-priority, critically-overdrafted Pajaro Valley Basin laps into San Benito County. The District should begin discussing the governance of the Pajaro Valley Basin with Pajaro Valley Water Management Agency. It should be noted that Pajaro Valley was designated as critically overdrafted in Bulletin 118 (which is to be updated by DWR before 2017); this has ramifications for GSP preparation and implementation.

Definition of Subbasins. The subbasins of the Gilroy-Hollister Valley Basin as defined by DWR differ from the subbasins defined for local management. The local definitions, established in 1996, account for locally significant factors (e.g., County and Zone 6 boundaries), are used for local water balances and other studies, and are summarized regularly in the Annual Groundwater Reports. Use of the DWR definitions is possible and in fact, DWR subbasins were used in the Salt Nutrient Management Plan (Todd, 2014). However, the DWR boundaries are less suitable for local management purposes for a variety of hydrogeologic, institutional and data collection reasons.

The SGMA provides for basin boundary adjustments; local agencies may request that DWR revise the boundaries of a basin, including establishing new subbasins. The request will be required to include information, to be defined in regulations adopted by DWR by January 1, 2016. The District should track DWR's development of these regulations, evaluate the pros and cons of requesting boundary revisions, or consider possible hybrid approaches to monitoring and reporting.

Groundwater Sustainability Agencies

The SGMA requires that a Groundwater Sustainability Agency (GSA) be established for all medium and high priority basins by June 30, 2017. Any local water or land use agency or combination of local agencies overlying a groundwater basin may elect to be a GSA. Agencies that have been created by statute to manage groundwater are deemed the exclusive agencies to comply with the Act within their boundaries, unless the agency elects to opt out. Both SCVWD and PVWMA are already identified in the legislation as exclusive agencies. Counties will be assumed the GSAs for unmanaged basins or unmanaged portions of basins.

Given its historical groundwater management leadership in San Benito County and its County-wide jurisdiction, the District should elect to be a GSA for the medium-priority subbasins within its jurisdiction. (It may also consider electing to be GSA for its other basins). It should also explore a legal agreement (e.g., joint powers agency or memorandum of agreement) to form a GSA with PVWMA for the Pajaro Valley high-priority basin and similarly begin discussions with SCVWD about governance of the subbasins that overlap the county line.

GSA Formation Process. The process of forming a GSA involves:

- developing a detailed description of the proposed boundaries of the basin or portion of the basin to be managed by the GSA
- preparing new bylaws, ordinances or authorities (including review of existing authorities/limitations in the District's founding act to identify potential contradictions)
- developing a list of stakeholders and preparing an explanation of how their interests will be considered in the GSP
- holding a properly-noticed hearing and passing a resolution
- providing a notice to DWR within 30 days (including documentation of the above items).

GSA Authorities and Tools. Once established, a GSA may adopt rules, regulations, ordinances, and resolutions for the purposes of the Act. Some of these tools would expand the authority of the District including the ability to:

- require the installation of water-measuring devices on all groundwater wells within the basin boundaries at the expense of the operator or owner
- require annual extraction statements or other reasonable methods to determine groundwater extractions
- impose well spacing requirements and control extractions by regulating, limiting or suspending extractions from individual groundwater wells
- require reporting of diversions of surface water to storage
- assess fees to establish and implement local groundwater management plans
- undertake enforcement actions for noncompliance.

GSA's may also adopt the following tools, many of which the District already uses:

- conduct investigations of water rights
- acquire property and water rights
- adopt rules, regulations and ordinances
- require the registration of wells
- reclaim water

Groundwater Sustainability Plans

The SGMA requires that GSAs create and implement a GSP in each high- and medium-priority basin in order to meet the sustainability goal. A plan may be a single plan covering an entire basin, a single plan covering an entire basin created by multiple agencies, or multiple plans created by multiple agencies.

As shown in the timeline, GSPs for high- and medium-priority basins (e.g., Llagas, Bolsa, Hollister and San Juan) must be adopted by January 31, 2022. The SGMA requires earlier (2020) adoption for critically overdrafted basins, currently including Pajaro Valley.

GSP Requirements. We note that a GSP includes many of the same components as an AB3030 Groundwater Management Plan and can build on such a plan. A GSP must include:

- A description of the physical setting and characteristics of the aquifer system
- Historical data, groundwater levels, groundwater quality, subsidence, groundwater/surface water interaction, a discussion of historical and projected water demands and supplies
- A map that details the area of the basin and boundaries
- A map identifying existing and potential recharge areas
- Measurable objectives, as well as interim milestones in increments of five years, to achieve the sustainability goal in the basin within 20 years
- A planning and implementing horizon (a 50-year horizon is mandated)

- The monitoring and management of groundwater levels, water quality, groundwater quality degradation, and inelastic land surface subsidence
- A summary of the type of monitoring
- The monitoring protocols
- A description of the consideration of other applicable local government plans and how the GSP may affect those plans (In addition, General Plans when updated must consider the GSP.)

DWR Review. As shown in the timeline, sustainability must be achieved in 20 years, although DWR may grant extensions upon a showing of good cause. DWR is mandated to review GSPs periodically to evaluate whether they conform to the Act and are likely to achieve sustainability. In addition, if multiple plans are created for a basin, DWR will evaluate whether the plans conform to the SGMA and together are likely to achieve sustainability.

DWR also will evaluate whether a GSP adversely affects the ability of an adjacent basin to implement its GSP or impedes achievement of the sustainability goals in an adjacent basin. We note that the District, SCVWD, and PVWMA already are coordinating their management efforts through the IRWMP and should be able to minimize such adverse impacts.

Probationary Status. In general, the State Water Resources Control Board may designate a basin as probationary if, after consulting with DWR, it is found that a GSA has not been formed, a GSP has not been created, the GSP is inadequate or the GSP is not being implemented in a way that will lead to sustainability. Sustainable groundwater management means the management and use of groundwater in a manner that can be maintained during the planning and implementation horizon without causing undesirable results. Undesirable results are:

- Chronic lowering groundwater levels
- Seawater intrusion
- Degraded water quality
- Land subsidence
- Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses

Probationary status requires a GSA to respond to the State Board and describe how it intends to rectify these shortcomings. A GSA has 180 days to respond; failure to respond to the deficiencies in the GSP could lead to limited state intervention and the development of a State Board-created interim plan.

Other Important Provisions

California Environmental Quality Act (CEQA). The formation of a GSA is subject to CEQA; however, the preparation of a GSP is exempt from CEQA. The implementation of projects under a GSP is subject to CEQA.

Water Rights. The SGMA states that "nothing in this part or in any groundwater management plan adopted pursuant to this part, determines or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights."

Benefits to the District

The SGMA will benefit the District and its mission to management groundwater in San Benito County in four major ways:

Expanded management authority and tools – Establishment as a GSA will enhance the District's authority for groundwater management and will allow access to additional management tools. In addition, by monitoring groundwater use, groundwater wells, and levels beyond Zone 6 limits, the District can provide consistent and comprehensive management for its jurisdiction. The SGMA also provides an opportunity to officially redefine the DWR subbasin boundaries that are not optimal for management.

Improved coordination among agencies –The SGMA provides known requirements and a standardized process for SBCWD, SCVWD and PVWMA; this provides a measure of certainty, supports access to information, and promotes coordinated regional groundwater management.

Information on replenishment water – DWR is tasked by the end of 2016 with providing California water agencies with a detailed assessment of surface water supplies that could serve to replenish groundwater aquifers. This report would provide the District with a better understanding of potential surface water or other imported water supplies that may supplement their groundwater resources.

Implementation funding – It is understood that additional funding through the Proposition 1 bond measure will be available to implement the SGMA. The District is in a good position to apply for these funds given its proven track record for groundwater management.

4

WATER SOURCES AND USE

WATER SUPPLY SUMMARY

For more data and graphs see Appendix E, including:
- Water Use Tables
- Graphs on Use by Water Type
- Subbasin specific data

San Benito County has four major sources of water supply for municipal, rural, and agricultural land uses.

Local Groundwater. Groundwater is withdrawn from the basin by private irrigation and domestic wells and by public water supply retailers. The District does not directly produce or sell groundwater, but is active in groundwater management throughout San Benito County. This report focuses on the southern part of the Gilroy-Hollister groundwater basin (DWR Basin 3-3) and reports data on seven subbasins located within the District's Zone 6 as well as the Bolsa subbasin (see Figure 1).

Local Surface Water. Surface water is not used directly for potable or irrigation use in the basin, but creek percolation is a significant source of groundwater recharge. The District owns and operates two reservoirs: Hernandez and Paicines (see Appendix C, Figure C-1). Hernandez Reservoir (capacity 17,200 AF) is located on the upper San Benito River in southern San Benito County. The smaller Paicines Reservoir (capacity 2,870 AF) is an offstream reservoir located between the San Benito River and Tres Pinos Creek.

Central Valley Project. The District also purchases CVP water from the U. S. Bureau of Reclamation (USBR). The District has a 40-year contract (extending to 2027) for a maximum of 8,250 AFY of M&I water and 35,550 AFY of agricultural water.

Recycled Water. Recycled water is in the initial phases of development as a source of irrigation water and is presently used to irrigate Brigantino Park and areas near the airport. Recycled water use was only 262 AF in WY 2014 but is expected to increase in the near future. This source is generally reliable through drought.

Water Use

Distribution of CVP Water

The District distributes CVP water to agricultural and M&I customers in Zone 6. In water year 2014, water allocations were reduced by USBR to 0 percent of the contract for agriculture and 50 percent of the historical use for M&I. However, the District was able to transfer, buy, and use water in storage to deliver over 8,000 AF of CVP imported water to Zone 6 customers.

Table 1 shows the contract entitlements and recent allocations (SLDMWA 2014). Note that USBR contract years are March through February, so water year 2013 overlapped two contract years.

The USBR shortage policy is triggered when agricultural allocations are reduced to 75 percent or below. Because the shortage policy was triggered this year, the District was allocated 50 percent of the historical use for M&I rather than 50 percent of the full contract. The historical use, based on the average of the last three full allocation years, was increased in 2011 to 5,556 AFY.

Table 1. CVP Entitlements and Allocations, USBR Contract Years 2013-2014

March 2013 - February 2014

	Shortage Year Adjustments (af)	% Allocation	Allocation Volume (af)
Agriculture	38,244	20%	9,561
M&I	5,556	70%	4,167
TOTAL	43,800		13,728

March 2014 - February 2015

	Shortage Year Adjustments (af)	% Allocation	Allocation Volume (af)
Agriculture	38,244	0%	0
M&I	5,556	50%	2,778
TOTAL	43,800		2,778

Because of drought and environmental conditions, agricultural allocations since 2007 have been significantly reduced. Agricultural allocations were last at 100 percent of the contract amount in 2006. Growers are fully aware of the uncertainty of the CVP allocations and often make decisions for planting (including low water use crops, using groundwater for irrigation, or fallowing their land) based on the assumption of reduced allocations.

Water Use in 2014

For the second year in a row, agricultural water users offset the low CVP allocation with higher groundwater pumping. However, in water year 2014, total water use decreased 15 percent from the previous year totals. Table 2 shows the total water deliveries from CVP, groundwater, and recycled water sources. While the use of CVP water for direct M&I use is usually limited by the available treatment capacity of the Lessalt treatment plant, this year the treatment plant was limited by CVP availability. Lessalt only treated 980 AF, 36 percent less than the average over the past ten years (1,522 AFY).

Table 2. Total Water Deliveries for Water Year 2014 (AF)

October 2013 - September 2014

	CVP		GW		RW		Total	
	2013	2014	2013	2014	2013	2014	2013	2014
Agriculture	12,914	7,545	24,896	21,189	-	-	37,810	28,734
M&I	2,652	1,599	6,191	9,403	357	262	9,200	11,264
TOTAL	15,566	9,144	31,087	30,592	357	262	47,010	39,998

Zone 6 includes the Bolsa Southeast, Pacheco, Hollister East, Hollister West, Tres Pinos, and San Juan subbasins. Total water use includes agricultural use and M&I use. M&I use includes SSCWD, the City of Hollister municipal system, Stonegate (a small water system), golf courses, and other domestic users. Table 3 shows Zone 6 water use by subbasin, user category, and water type for 2014. Water use from small unmetered groundwater wells is also included. These data are estimated by the water user and reported to the District.

Table 3. Zone 6 Water Use in Water Year 2014 (AF)

Subbasin	CVP Water		Groundwater		Recycled Water
	Agriculture	Domestic & Municipal	Agriculture	Domestic & Municipal	Domestic & Municipal
Bolsa South East	32	0	2,148	9	0
Hollister East	4,387	1,103	3,764	1,108	66
Hollister West	228	5	2,357	4,871	196
Pacheco	986	34	3,134	169	0
San Juan	1,818	166	9,365	654	0
Tres Pinos	93	291	421	2,593	0
TOTAL	7,545	1,599	21,189	9,403	262

Figure 3 shows total annual water use for water years 1988 through 2014. Water use in 2014 was lower than in 2013, reflecting lower agriculture water use and slightly higher M&I use. Overall total water use decreased 15 percent from water year 2013 but was very close to the average water use of the last eight years of 40,060 AF. Examination of Table 2 shows that groundwater use remained near 2013 levels, but CVP deliveries were decreased by 40 percent. While the District was able to procure additional imported water supplies, many growers made planting and water use decisions based on the zero allocation.

Figure 4. Total Water Use by Source 1988-2014 (AFY)

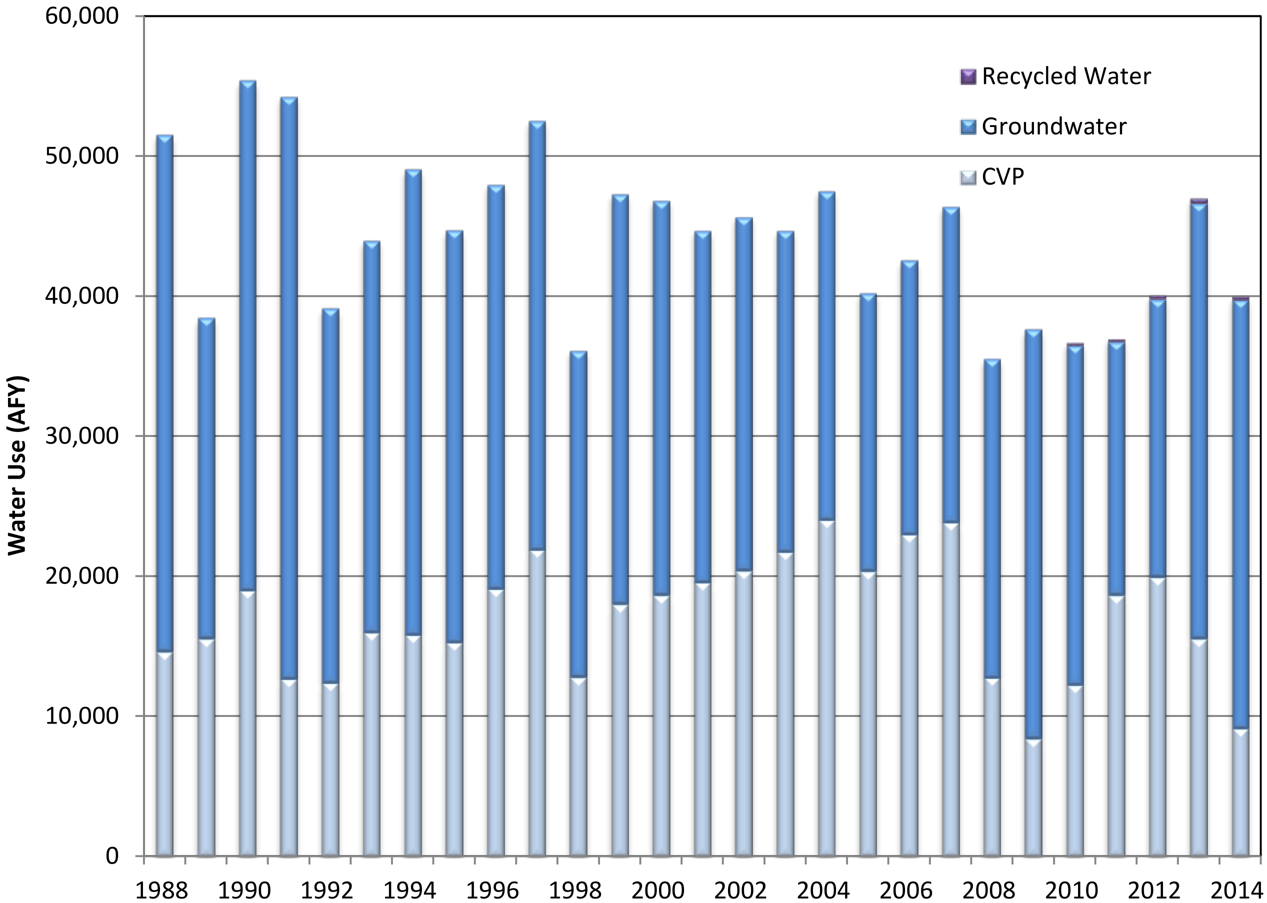
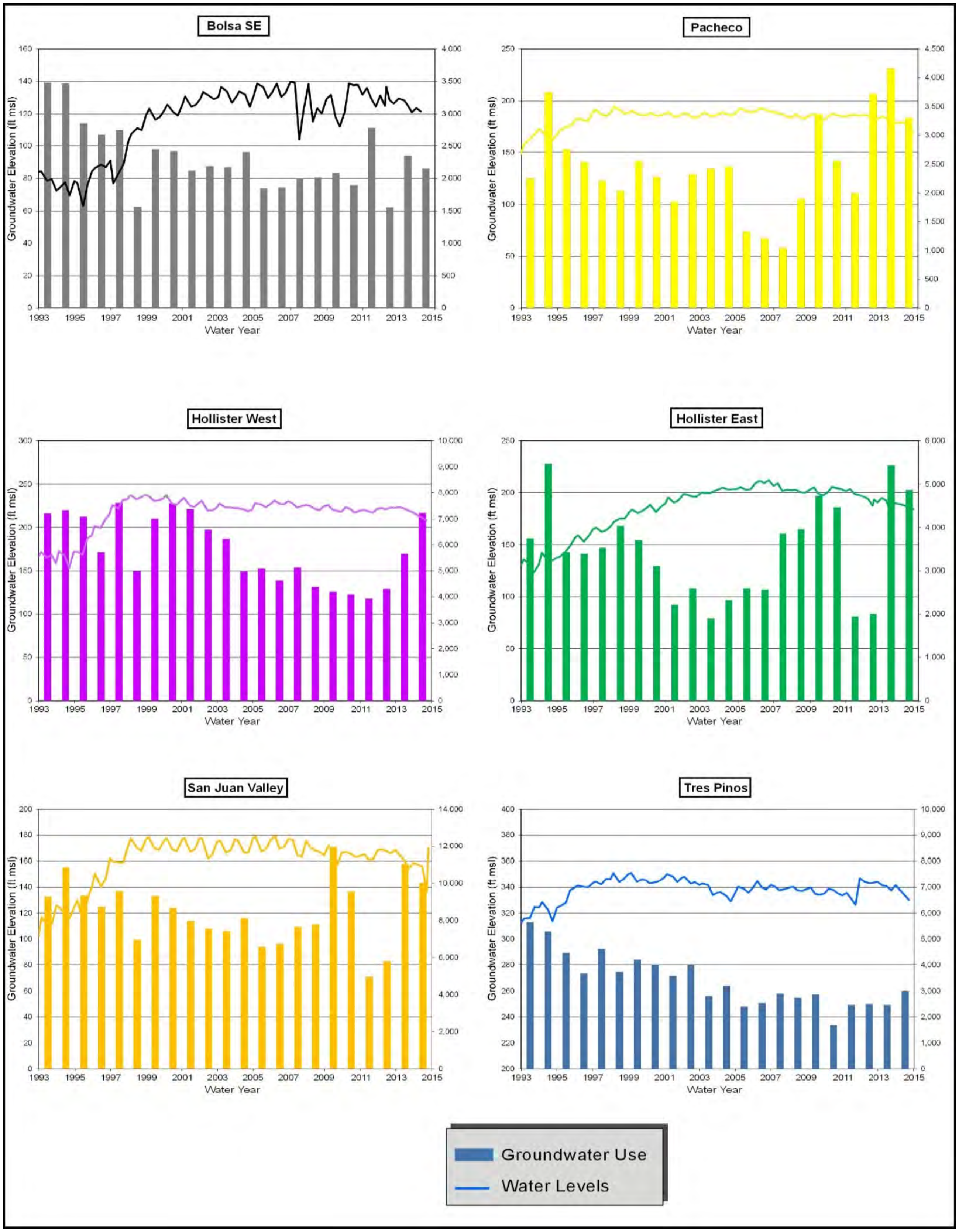


Figure 4 shows groundwater use and average water levels for each subbasin from 1993 through 2014.The volume of groundwater used in the 1990s was generally higher than the volumes used in the past 10 years. The period of the early 1990s followed a significant drought cycle but preceded extensive use of imported water. During the recent dry period of 2013 through 2014, similarly high groundwater volumes were used in much of the Basin. However, current groundwater elevations are significantly higher than those recorded in the 1990's. This reflects long standing District management programs and policies that recharged and replenished the Basin when imported water and reservoir releases were available. The high groundwater elevations indicate that sufficient groundwater remains in storage to weather another year of limited CVP allocation. However, prolonged, high rates of groundwater use can lead to significant and rapid decline of groundwater elevations. A continued focus on overall water demand management, careful groundwater use, and basin-wide groundwater elevation monitoring is essential to preventing overdraft.

Figure 5. Groundwater Elevations and Groundwater Use (1993-2014)



4 GROUNDWATER LEVELS

UPDATE ON GROUNDWATER STORAGE

In October 2014, groundwater levels were 10-20 feet lower than in October 2013 in much of the basin and up to 60 feet lower in the Bolsa subbasin. Increased groundwater pumping in most subbasins resulted in widespread groundwater elevation declines. However, groundwater elevations in most subbasins remain higher than historical minimum water levels. The basin has now sustained two years of decreasing groundwater elevations. As imported water is expected to be limited again next year, groundwater elevations across the basin will likely continue to decline. Groundwater elevation declines during a drought do not constitute overdraft; nevertheless, the continued reduced supplies of imported water in tandem with insufficiently reduced water demands are a warning of potential groundwater overdraft.

As indicated in the water use section, growers and other water users are relying on groundwater to compensate for reduced CVP allocation. Groundwater levels have decreased in all areas of the basin. In some areas such as San Juan and Hollister East, water levels remain well above historic lows. However, in other areas such as portions of the Bolsa, groundwater elevations are now at their lowest point since monitoring began (see Figure C-6). It appears that sufficient storage remains in the basin to accommodate additional dry conditions with limited imported water availability. However, if drought conditions persist, avoidance of significant impacts will require delivery of alternative supplies to sensitive areas or more rigorous water demand management.

The District should continue to manage the groundwater resource for substantial and rapid recovery in wet years, recognizing that most years are average to dry and wet years are less frequent. Fortunately, lower groundwater elevations represent increased storage space in the basin that may maximize recharge from precipitation events, streamflow, and reservoir releases when water is available. Additional information on groundwater elevations (including profiles of basin cross sections and depth to water contours) are included in Appendix C.

Groundwater Elevations

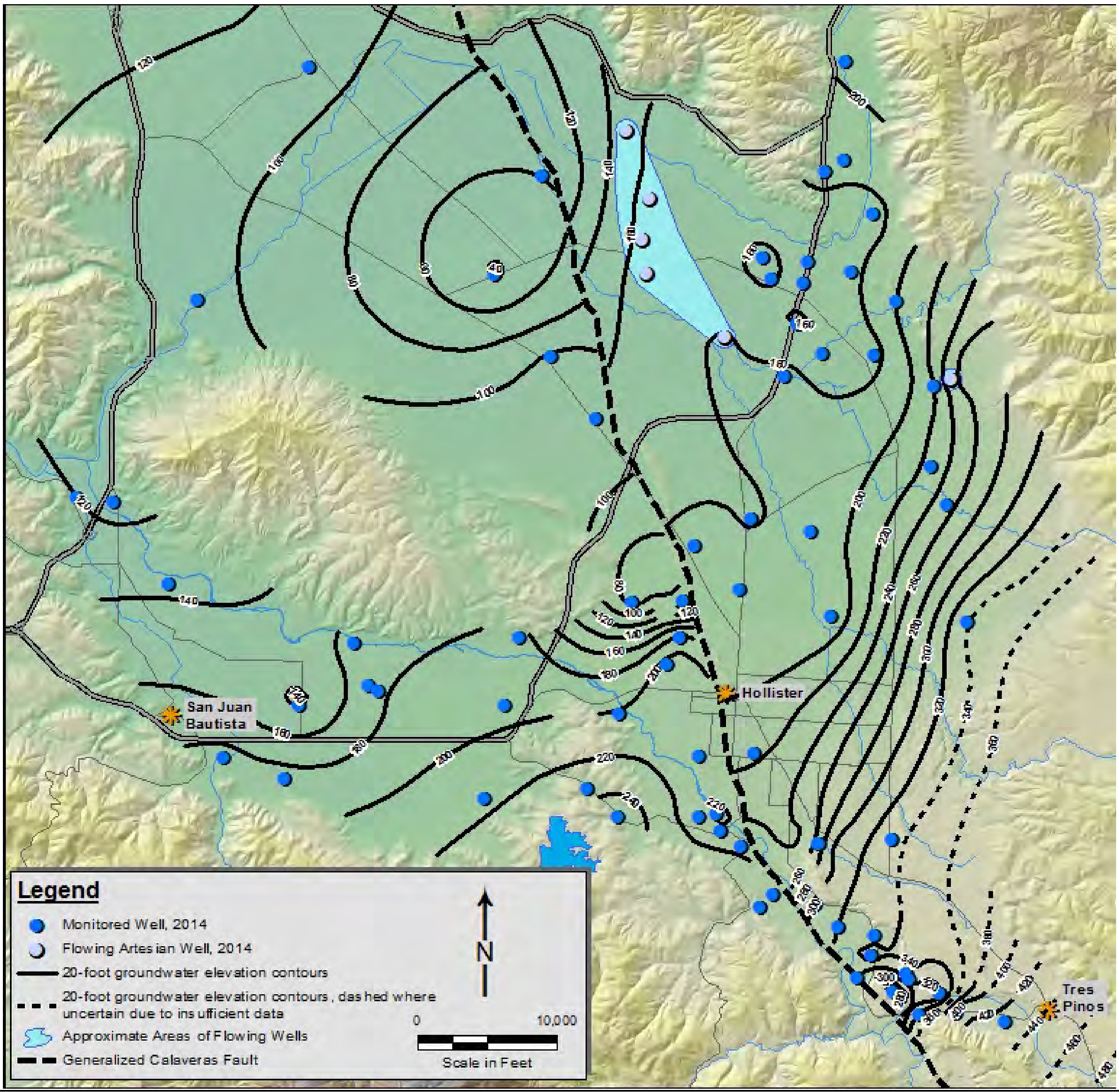
Groundwater elevation data were examined from 86 wells in the District's quarterly groundwater elevation monitoring program. The number of monitored wells with fall groundwater elevation data has decreased from previous years; last year fall season elevations were available from 100 wells. This is a 14 percent decline in one year. The decrease in groundwater elevation data, especially the decrease in the number of measurements available in the most variable areas (e.g., Bolsa), could lead to over or underestimating groundwater changes. As groundwater levels are declining, this is a critical management period; maintenance of the monitoring network is needed to minimize uncertainty and identify sensitive areas.

October groundwater elevation data are used for groundwater elevation contour generation. Groundwater elevations in the fall, including those shown in Figure 5, are assumed to represent the lowest levels for the water year.

The groundwater elevation contouring methods incorporate the effects of the Calaveras Fault on water levels by splitting the area into eastern and western portions and then generating contours for each. The resulting contours are then evaluated for consistency and reasonableness and any necessary refinements are made. The contours indicate a general flow from southeast to northwest.

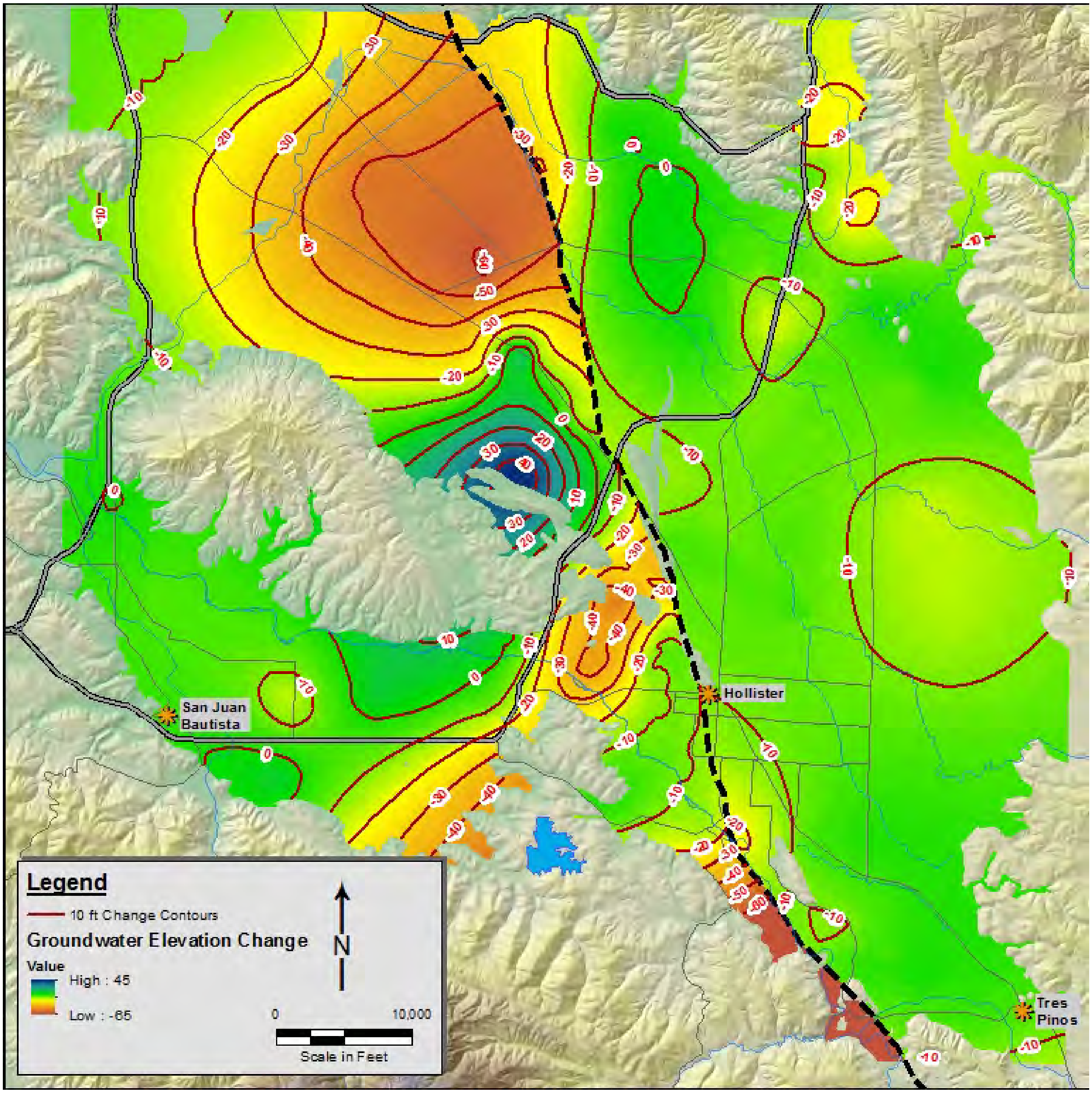
Additional groundwater level data are presented in Appendix C, including maps showing historical monitoring locations, depth to groundwater contours for October 2014, and groundwater elevation contours for October 2013. A table also is included of groundwater level data from October 2013 through October 2014.

Figure 6. Groundwater Elevations, October 2014



The relative changes in groundwater elevations from October 2013 to October 2014 are shown on Figure 6. The map was prepared by calculating and contouring the differences between mapped groundwater elevations for the two periods. The accuracy of this map was checked by examining water level changes in individual wells that were monitored in the fall quarter (October) of both years.

Figure 7. Change in Groundwater Elevations



Groundwater elevation changes from October 2013 to October 2014 were used to determine the change in storage, which is the net volume of water added to or removed from the basin over the water year. The change in storage was calculated by using the change in groundwater elevations (feet) and multiplying by the total area (acres) to determine the total bulk volume of change. This bulk volume of change is then multiplied by the average storativity of the subbasin to represent the amount of water that a given volume of aquifer will produce. The storativity values for each subbasin were derived from a numerical model of the basin developed by Yates and Zhang (2001). This methodology and the storativity values may be updated next year as part of the current update to and calibration of the numerical model.

The total change in groundwater storage for Zone 6 was a decrease of 19,268 AF, while the total change for the basin, including the Bolsa subbasin, was a decrease of 24,380 AF. These large decreases in storage, while expected, are significant. This magnitude of the change this year is highlighted when compared to the relative stability seen in the recent past. Figure 7 illustrates the change in storage by subbasin for the past eight years.

Long term changes in groundwater elevations in the basin are illustrated in the hydrographs on Figure 8. These hydrographs are generated by averaging elevations from key wells from each subbasin for each monitoring event. The key well locations are shown on the inset map. It should be noted that these subbasin hydrographs represent average conditions in each subbasin and illustrate long-term trends, but do not show localized variations in groundwater elevations. Groundwater levels have remained relatively constant in most subbasins over the past five years. However, elevations do show a continued decrease in water year 2014, consistent with the increased pumping and decreased storage. Overall, groundwater elevations do not indicate overdraft conditions as of 2014.

Figure 8. Change in Storage by Subbasin (2006-2014)

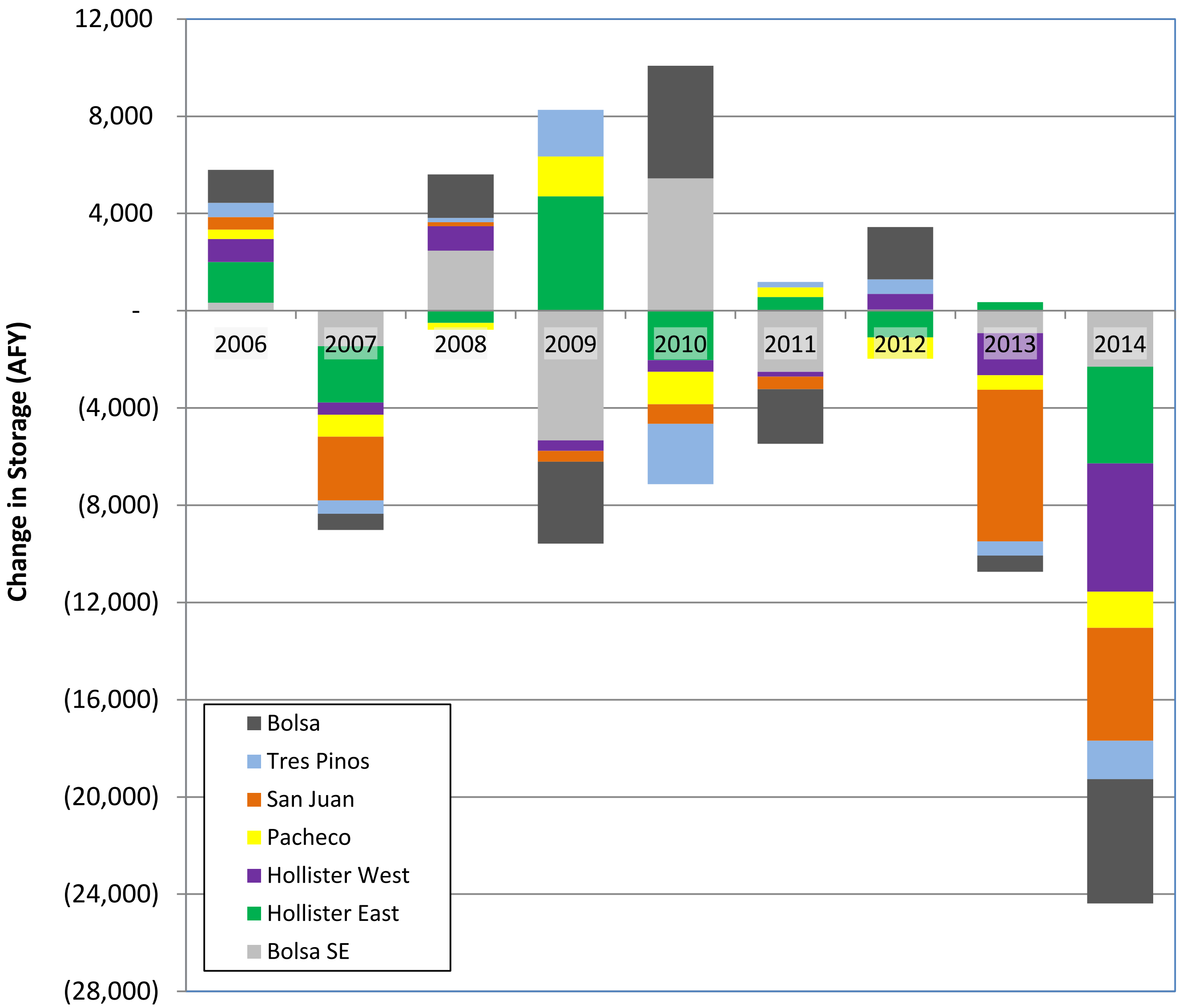
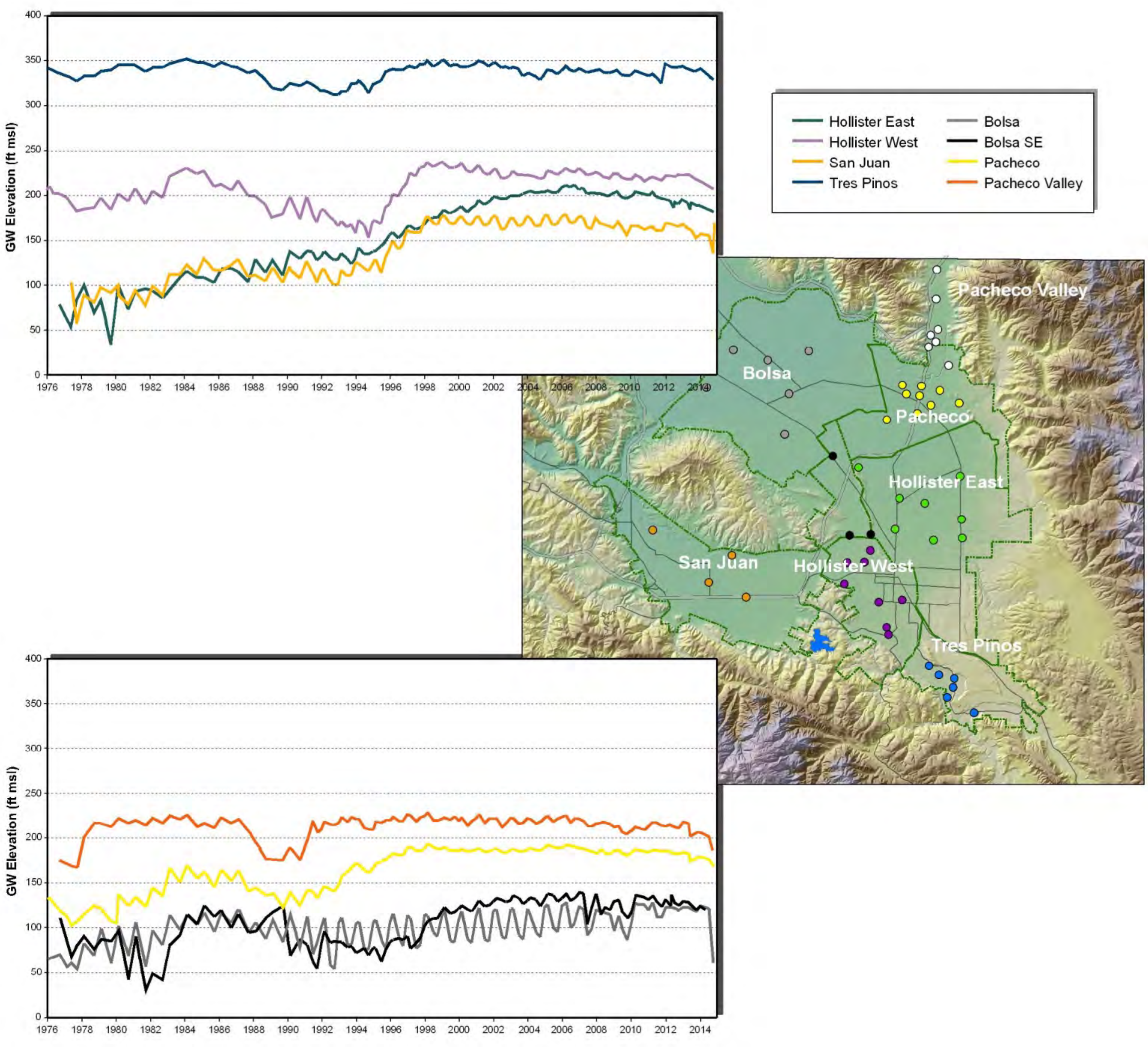


Figure 9. Hydrographs of Key Wells (inset map of well locations)



More groundwater Level data can be found in Appendix C. Look for:

- Depth to groundwater maps
- Groundwater level measurements

5

FINANCIAL INFORMATION

RATES AND CHARGES

The District derives its operating revenue from charges levied on landowners and water users. Non-operating revenue is derived 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.

Table 4, on the following page, summarizes District charges for Zone 6 water users. These include a standby and availability charge, groundwater charge, and charges for CVP water including water service charges and power charges. The standby and availability charge is a uniform per-acre charge assessed on all parcels with access to CVP water (an active or idle turnout from the distribution system). The groundwater charge reflects costs associated with groundwater monitoring and management, including the cost of purchasing CVP water and power charges associated with percolation. The per-acre-foot charge is determined by dividing these costs by the volume of groundwater usage. Groundwater charges are adjusted annually in March.

CVP rates include the cost of service, restoration fund payment, charges for maintenance of San Luis Delta Mendota Water Authority facilities, and others fees (the breakdown is found in Appendix F).

More financial data can be found in Appendix F:

- Itemized USBR rates
- Historical charges

Table 4. Charges for Zone 6 Water Users, March 2014 - February 2015

Charge	Unit	Agricultural			Municipal & Industrial
		Non--Full Cost	Full Cost (1a)	Full Cost (1b)	
Standby and Availability	$/acre	$6.00	$6.00	$6.00	$6.00
Groundwater	$/acre-foot	$3.60	$3.60	$3.60	$23.25
CVP (Blue Valve)					
Water charge (3)	$/acre-foot	$170.00	$303.00	$313.00	$238.00
Power charge					
Subsystem 2	$/acre-foot	$41.55	$41.55	$41.55	$41.55
Subsystem 6H	$/acre-foot	$30.15	$30.15	$30.15	$30.15
Subsystem 9H	$/acre-foot	$44.35	$44.35	$44.35	$44.35
Subsystem 9L	$/acre-foot	$94.30	$94.30	$94.30	$94.30
All other subsystems	$/acre-foot	$23.10	$23.10	$23.10	$23.10

1. Full-cost rates for agricultural users apply to landholders who have exceeded the respective non full-cost entitlement. Applies to Section 202(3) and Section 205(a)(3).
2. For parcels 10 acres or smaller in size, the water charge is $28.30 and $19.85 monthly for agriculture and M&I, respectively.
3. Monthly charges are based on 2 AF annually for agriculture and 1 AF annually for M&I.

6 WATER BALANCE

The water balance provides a quantitative assessment of the state of the basin, including estimates of specific inflows and outflows for each individual subbasin. This detailed understanding of the groundwater system can serve as a basis to evaluate changes in the basin over time and develop tools for groundwater basin management. This year, a new soil moisture balance model based on the recently updated land use was employed to estimate various water balance inflows and confirm outflows. In the future, the numerical model for the basin can be updated and recalibrated to the most recent data to better quantify each element of the water balance. The estimated water balance from 2012 through 2014 is shown in Tables 5 through 7. Details on the water balance methodology can be found in Appendix H.

Inflows

Many inflows to the basin are controlled by hydrologic conditions. Natural stream percolation and deep percolation from rainfall are directly related to the volume and distribution of rainfall. Flow into reservoirs is controlled by stream discharge rates, and releases from reservoirs are also partly a function of stream flow and available storage. Because they are related to rainfall, these three inflows are generally higher in wet years and lower in dry years. There are five major sources of inflow to the subbasins in Zone 6 and the wider groundwater basin. These include:

- Natural stream percolation – Natural stream percolation occurs in every subbasin except Bolsa Southeast and is most significant in subbasins with large streams, such as Pacheco, Hollister West and San Juan. Stream percolation can vary considerably from year to year depending on rainfall and groundwater levels. Stream percolation is controlled primarily by the permeable channel area of the waterway and the rate of infiltration. These two variables change over time in response to factors including depth to groundwater. Reduced availability of groundwater storage space has decreased the volume of inflow that can percolate to the aquifer.

- Percolation of reservoir releases – Reservoir releases from Hernandez and Paicines Reservoir flow to Zone 3 and Zone 6 via Tres Pinos Creek and the San Benito River. The river percolation amounts in the Tres Pinos, Hollister West, and San Juan subbasin are estimated separately. Relative to natural percolation, percolation from reservoir releases is less affected by seasonal conditions because it occurs during the dry season after natural streamflow has ceased. However, it ceases entirely in prolonged drought when releases stop, as in recent years.

- Deep percolation (from rainfall and/or irrigation) – Deep percolation from the root zone to the water table is estimated separately for rainfall and irrigation. Rainfall percolation varies significantly on an annual basis, while irrigation percolation remains relatively steady. Rainfall deep percolation is dependent on the volume of rainfall, temporal and areal distribution of rainfall, crop type/land cover, and soil type. Percolation from irrigation depends on crop type and irrigation efficiency; it generally does not change significantly from year to year. However, sustained trends in cropping patterns and irrigation techniques could have a noticeable effect over time.

- Percolation of reclaimed water – Percolation of reclaimed water in wastewater disposal ponds occurs in three subbasins (Hollister West, Tres Pinos, and San Juan) at facilities operated by the City of Hollister, SSCWD, and Tres Pinos County Water District. Over the past four years, reclaimed water percolation has decreased slightly because of changes in the water treatment plant and residential and industrial water conservation measures.

- Subsurface groundwater inflow –Groundwater can also flow between adjacent subbasins. While there is a large amount of uncertainty in calculating subsurface flow, water level gradients were used to help estimate the volumes of flow into and between each subbasin. As groundwater flow directions have not changed significantly over the past few years, estimated groundwater inflow and outflow also have not changed significantly.

In the past, managed percolation of CVP water was also a major inflow; however, as previously discussed, this has not occurred since 2007.

Outflows

Major outflows from the subbasins in Zone 6 and surrounding area are groundwater pumping (agricultural, M&I, and domestic) and subsurface outflow.

- Agricultural groundwater pumping – The relative amount of agricultural pumping varies based on CVP allocations and deliveries. Agricultural pumping is dependent on the volume of CVP imports and the amount and timing of rainfall; spring rains decrease total irrigation demand, and growers adjust pumping to compensate for changes in the availability of CVP imports.

- Municipal pumping is largely concentrated in the Hollister West, Hollister East, and Tres Pinos subbasins.

- Groundwater subsurface outflow was calculated along with subsurface inflow. As with subsurface inflow, volumes did not change significantly over time.

- River and Creek outflow – Discharges from the aquifer to water ways generally occur only during wet years along the San Benito River in San Juan Subbasin.

Agricultural groundwater pumping is currently measured using hour meters on irrigation wells in Zone 6 and is estimated for surrounding areas based on the soil moisture balance and crop water demands. The duration of pumping at each well is multiplied by the pumping rate of the well to obtain the volume pumped. Previous annual reports have used the production estimates obtained from the hour meters. However, those pumping estimates have consistently been substantially less than estimates based on the soil moisture balance and crop water demands, which is the estimate that has always been used to estimate pumping outside of Zone 6. For this annual report, agricultural pumping for all parts of the basin was estimated using the soil moisture balance simulator, and the results were scaled down to be consistent with pumping estimates in prior years.

Change in Storage

The water balance tables (**Tables 5 through 7**) include two estimates of storage change: the calculated difference between inflows and outflows and the previously-described estimate based on changes in measured water levels. Both methods rely on assumptions; the inflows and outflows approach is the sum of all the individual estimated water balance components and the water level difference approach relies on the quality of the groundwater elevation data and on general estimates of storativity. The potential inaccuracy in these methodologies is illustrated by the difference between the estimates of change in storage that result from each.

As a matter of perspective over the past three years, water conditions in the basin have changed significantly in response to drought and data collection has diminished; these changes combine to reduce the reliability of both analytical methods and increase uncertainty. In order to improve the water balance and conceptual understanding of the basin, additional data collection and quality control—along with a comprehensive numerical model to test assumptions—would provide tools for increasing the reliability of the change in storage estimates.

Water Balance Conclusions

The trends of the water balance are similar to the hydrologic trends in the basin. In wet years, there is more recharge and less groundwater pumping and in dry years, the reverse is true. During the past three years, precipitation averaged only 48 percent of normal and CVP deliveries averaged 20 percent of contract volumes, representing one of the most severe droughts on record. Outflow, mainly groundwater pumping, was significantly higher during the last three years than in previous three year periods while total inflow, controlled by irrigation return flow, was similar to past years. The natural component of inflow (stream flow and natural deep percolation) was lower in the last three years in response to drought. Overall, there was a significant decrease in storage, particularly in 2014. Tables 5 through 7 show the individual components of the water balance from Water Years 2012, 2013, and 2014. Figure 9 shows the water balance components over time.

The process of preparing the water balance provides powerful feedback on the availability and accuracy of the data collected and managed by the District. The water balance for 2012 through 2014 highlighted two important data quality issues:

1. The soil moisture budget used to calculate return flows for agricultural and natural areas relies on reference evapotranspiration, crop types, crop coefficients, soil type and irrigation efficiency to determine the volume of water that percolates to the aquifer in each subbasin. As an intermediate step, the process also calculates the irrigation water demand of the irrigated lands. The calculated water demand is significantly greater than the reported groundwater use and CVP delivery data. Because the reported groundwater use is based on estimated power use and appears to be far lower than the water demand for the reported crops, the actual groundwater use may be significantly greater than the values reported.

2. The number of wells in the groundwater elevation program has decreased over time. Without a robust, spatially distributed network, the change in storage values may not represent the local or regional state of the subbasins.

The quality of collected data is critical at this time as the District continues to weather the drought, makes plans to comply with the Sustainable Groundwater Management Act, and works toward updating the groundwater model to aid in long term groundwater management. Maintenance of a monitoring program that provides high-quality water demand data and comprehensive and consistent groundwater elevation data is especially important at this time. These two key datasets are fundamental to assessing the state of the basin and form the conceptual basis on which management decisions are made. These datasets are also fundamental to maintenance and updating of the existing numerical model.

Figure 10. Water Balance for Zone 6 and the Bolsa (2006-2014)

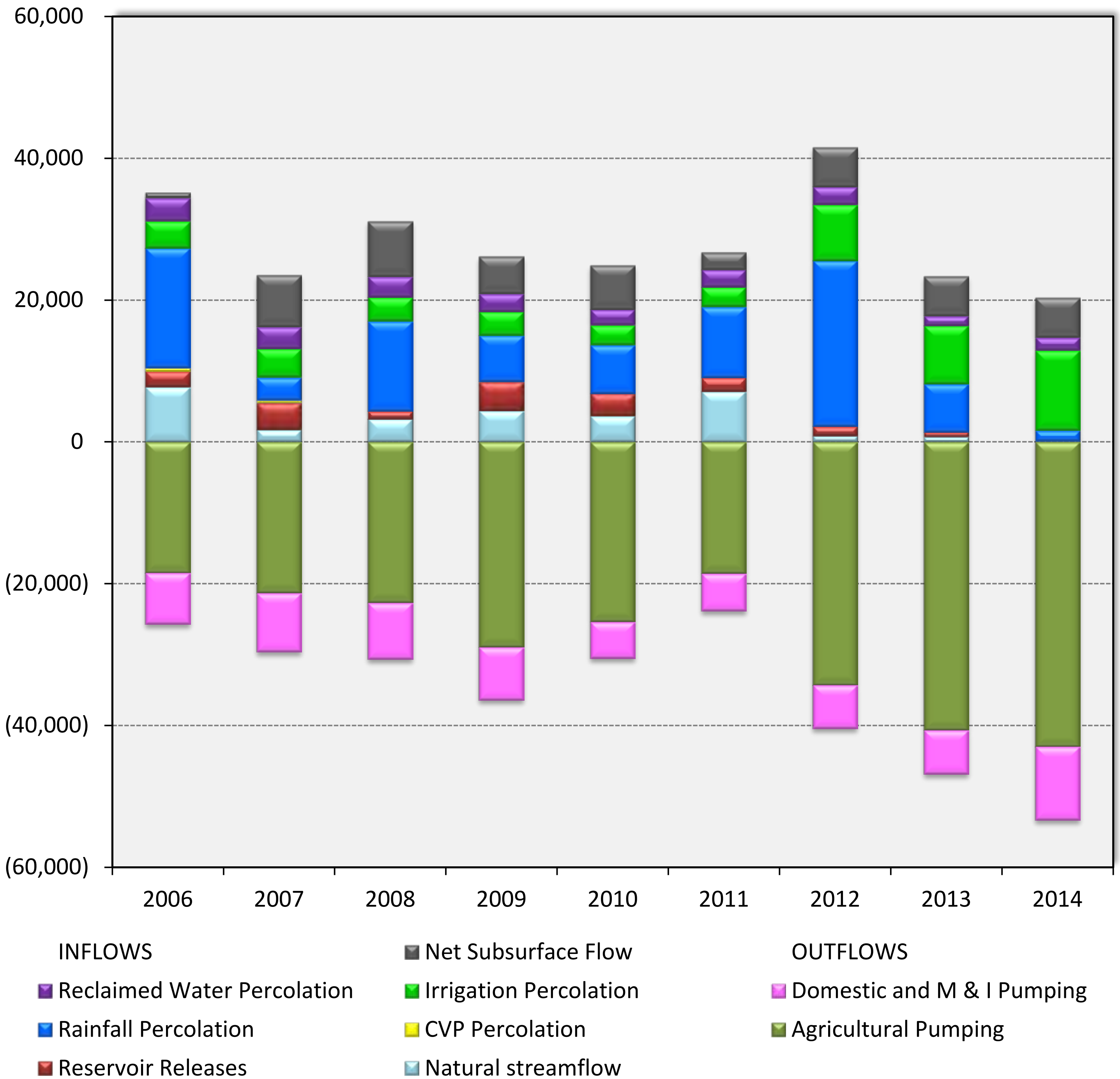


Table 5. Water Balance for Water Year 2012

	Pacheco	Bolsa Southeast	San Juan	Hollister West	Hollister East	Tres Pinos	Zone 6 Subtotal	Bolsa	Paicines	Tres Pinos Creek Valley	Grand Total
Inflows											
Stream percolation											
Natural streamflow	564	0	42	0	261	0	867	0	24	429	1,320
Reservoir releases	0	0	0	0	0	1,321	1,321	0	122	0	1,443
CVP Percolation	0	0	0	0	0	0	0	0	0	0	0
Deep percolation through soils											
Rainfall	3,560	944	4,804	1,779	4,752	1,013	16,852	6,529	799	129	24,309
Irrigation	1,096	364	1,687	492	2,049	278	5,964	1,928	107	43	8,043
Reclaimed water percolation	0	0	2,043	303	0	196	2,541	0	0	0	2,475
Groundwater inflow	3,109	2,476	132	2,024	980	1,849	10,571	6,676	0	--	17,791
Total	8,257	4,363	8,673	4,522	7,962	4,817	38,594	15,133	1,053	601	55,381
Outflows											
Wells											
Agricultural	5,303	1,546	5,205	2,589	5,217	1,590	21,450	12,847	1,072	432	35,800
Domestic and M & I	167	6	530	2,572	634	2,233	6,142	0	0	0	6,142
Groundwater outflow	2,766	1,324	1,213	2,476	1,926	2,000	11,705	0	0	2,003	17,349
Total	8,661	3,052	9,335	8,216	7,851	5,823	42,937	12,847	1,072	2,435	59,291
Storage change											
Inflows - outflows	(404)	1,311	(662)	(3,693)	112	(1,005)	(4,343)	2,285	(19)	(1,834)	(3,911)
Water level change	(882)	53	0	640	(1,096)	601	(683)	2,144	0	0	1,461

Adjustments

Agriculutral pumping is calculated based on irrigation demand less CVP delivieries not the reported groundwater use

Table 6. Water Balance for Water Year 2013

	Pacheco	Bolsa Southeast	San Juan	Hollister West	Hollister East	Tres Pinos	Zone 6 Subtotal	Bolsa	Paicines	Tres Pinos Creek Valley	Grand Total
Inflows											
Stream percolation											
Natural streamflow	340	0	214	0	163	0	716	0	69	246	1,031
Reservoir releases	0	0	0	0	0	677	677	0	151	0	828
CVP Percolation	0	0	0	0	0	0	0	0	0	0	0
Deep percolation through soils											
Rainfall	1,036	248	1,530	549	1,210	313	4,886	1,891	293	24	7,094
Irrigation	1,134	375	1,681	515	1,970	312	5,987	2,231	140	64	8,422
Reclaimed water percolation	0	0	1,055	166	0	209	1,430	0	0	0	2,475
Groundwater inflow	3,109	2,476	132	2,024	980	1,849	10,571	6,676	0	--	17,791
Total	5,547	3,678	5,565	3,316	4,243	3,507	25,856	10,798	654	334	37,641
Outflows											
Wells											
Agricultural	6,129	1,672	7,037	2,919	6,284	1,776	25,816	14,869	1,404	639	42,728
Domestic and M & I	101	4	2,656	1,009	548	1,872	6,191	0	0	0	6,191
Groundwater outflow	2,766	1,324	1,213	2,476	1,926	2,000	11,705	0	0	2,003	17,349
Total	9,421	3,176	13,294	6,983	8,832	5,648	47,353	14,869	1,404	2,642	66,267
Storage change											
Inflows - outflows	(3,873)	502	(7,729)	(3,667)	(4,589)	(2,141)	(21,497)	(4,071)	(750)	(2,309)	(28,627)
Water level change	(597)	(918)	(6,239)	(1,730)	351	(586)	(9,718)	(674)	0	0	(10,392)

Adjustments

Agriculutral pumping is calculated based on irrigation demand less CVP delivieries not the reported groundwater use

Table 7. Water Balance for Water Year 2014

	Pacheco	Bolsa Southeast	San Juan	Hollister West	Hollister East	Tres Pinos	Zone 6 Subtotal	Bolsa	Paicines	Tres Pinos Creek Valley	Grand Total
Inflows											
Stream percolation											
Natural streamflow	86	0	0	0	40	0	126	0	0	66	192
Reservoir releases	0	0	0	0	0	0	0	0	0	0	0
CVP Percolation	0	0	0	0	0	0	0	0	0	0	0
Deep percolation through soils											
Rainfall	319	0	0	297	0	122	737	812	248	20	1,817
Irrigation	1,439	545	2,357	580	3,610	381	8,913	2,343	126	56	11,438
Reclaimed water percolation	0	0	1,595	43	0	200	1,838	0	0	0	2,475
Groundwater inflow	3,109	2,476	132	2,024	980	1,849	10,571	6,676	0	--	17,791
Total	4,881	3,600	4,498	3,129	4,550	2,708	23,366	9,831	374	142	33,713
Outflows											
Wells											
Agricultural	6,373	1,997	7,647	3,107	6,359	1,878	27,362	15,614	1,256	558	44,789
Domestic and M & I	169	9	4,871	2,087	654	2,593	10,382	0	0	0	10,382
Groundwater outflow	2,766	1,324	1,213	2,476	1,926	2,000	11,705	0	0	2,003	17,349
Total	9,732	3,506	16,118	8,249	9,013	6,471	53,089	15,614	1,256	2,561	72,520
Storage change											
Inflows - outflows	(4,851)	94	(11,620)	(5,120)	(4,463)	(3,763)	(29,723)	(5,783)	(882)	(2,420)	(38,807)
Water level change	(1,490)	(2,300)	(4,653)	(5,267)	(3,985)	(1,574)	(19,268)	(5,112)	0	0	(24,380)

Adjustments

Agriculutral pumping is calculated based on irrigation demand less CVP delivieries not the reported groundwater use

7 OUTLOOK 2015

Water use in 2014 departed from the record low levels of the preceding five years, with a large increase in agricultural water use. It is not clear yet the extent to which this represents a short-term response to drought or the beginning of a long-term response to a new reality of climate change and reduced CVP supply among other factors. A conservative estimate would be that water use in 2015 will approximately equal water use in 2014. Water supply for 2015 will be influenced by factors including weather, CVP conditions, and local surface water and groundwater storage.

Weather

According to the National Weather Service (NWS), precipitation in water year 2015 is expected to be average for the critical winter and early spring months. A weak El Nino is forming, with an increased probability of above-normal precipitation. As of December 8, , total rainfall at the San Benito CIMIS station for the current water year has amounted to 3.30 inches. This is 61 percent of the precipitation from the entire water year 2014.

CVP Deliveries

The annual allocation of CVP water remains uncertain. Many factors affect the allocation, including environmental considerations in the Delta, seniority of CVP water rights on water ways, reduced snowpack due to climate change, and other factors. The District must continue to use their existing tools (and continue to develop new management tools) to ensure a consistent water supply in spite of variable CVP allocations.

While uncertainty remains about the 2015 allocation, the San Luis & Delta Mendota Water Authority (SLDMWA) has forecasted a lower CVP allocation for 2015 than the projection for 2014. The allocation takes into account the storage in Northern California CVP reservoirs, expected hydrologic conditions, and pumping restrictions for endangered species protection. SLDMWA expects that it will be able to meet moderate water demands from its customers even with the pumping restrictions required for species protection. Table 8 shows the SLDMWA forecasted allocation based on a range of possible hydrologic conditions. For reference, the average allocation over the past eight years has been 34 percent and 76 percent for agriculture and M&I respectively.

Table 8. Contract Year 2014-2015 CVP Agriculture and Urban Water Supply Outlook

Hydrologic Conditions	Reductions Due to Fish Species	% Ag Allocation	% Urban Allocation
Average	minimal	0-20	50
	moderate	0-20	50
Dry	minimal	0	50

Source: SLDMWA November 2014

Groundwater

In 2014, groundwater storage was reduced significantly in parts of the basin due to increased groundwater use. Current groundwater storage is sufficient to accommodate water demand in the short term with negative water budgets, and the capacity for groundwater recovery in subsequent wet years is sufficient to balance moderate increases in groundwater pumping without causing long-term overdraft. However, persistence of drought and reduced CVP supply entails a real risk of overdraft.

8 RECOMMENDATIONS

NEXT STEPS AND FOLLOW UPS

The water supply outlook for 2015 is similar to conditions for 2014. If 2015 is dry, CVP allocations are expected to remain at record lows for agricultural uses. If needed, substantial water supply reserves exist in the groundwater basin. With regard to water demand, growers may adjust the type of crops grown and irrigation practices in ways that increase water use, if additional CVP imports are available. Variables—including irrigation practices, crop choice, and infrastructure improvements—control groundwater use. Groundwater use could remain at this year's rate or decline to lower rates.

Groundwater Sustainability. It is recommended the District assume the responsibilities of a Groundwater Sustainability Agency and prepare a groundwater sustainability plan for the subbasins of the Gilroy-Hollister Basin in San Benito County.

Groundwater Model. The District has used a numerical model developed by Gus Yates for various studies in the past. It is recommended that the model be updated and used to confirm the water balance components, especially reported groundwater pumping. It is also recommended that the Annual Groundwater Report for Water Year 2015 include a special section that describes and documents the model. Having an updated regional model will allow the District to quickly and cost effectively simulate a variety of management scenarios.

Groundwater Use. The water balance calculations indicate that there may be more irrigation demand than accounted by reported groundwater and CVP use. One possible reason may be the current use of indirect measurements (i.e., power usage data); we recommend a focused program to check the accuracy of current monitoring. In addition, we note that estimation of Bolsa groundwater use is critical in understanding why groundwater levels are below historic lows.

Groundwater Elevation Monitoring. The District has decreased the number of wells used in its groundwater elevation monitoring program over the past five years. In this critical time of increased groundwater use, the wells used in the monitoring program should be consistent and the number of wells should be maintained. The maintenance of the groundwater elevation monitoring network is essential to identifying sensitive areas in the basin and opportunities for augmenting supply and reducing demand. Additional wells beyond those required for the CASGEM program can be added for use in the Annual Report only, as needed.

Groundwater Charges. In 2006, the District revised its methodology for determining groundwater charges. This new methodology is straightforward, reasonable and justifiable. Based on this method, the 2015 groundwater charge of $3.95 is recommended for agricultural use in Zone 6 and a groundwater charge of $23.25 is recommended for M&I use in Zone 6.

Groundwater Production and Replenishment. District percolation operations helped reverse historical overdraft and then accumulated a substantial water supply reserve. The District currently manages groundwater storage and surface water to minimize excessively high or low water levels on a temporal and geographic basis. In 2015, it is recommended—insofar as possible—that storage in Hernandez Reservoir be replenished as much as possible. Percolation of available local water supplies should be focused on portions of the basin with groundwater level declines.

9 REFERENCES

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A REPORTING REQUIREMENTS

AND SPECIAL TOPICS

The San Benito County Water District Act (1953) is codified in California Water Code Appendix 70. Section 70-7.6 authorizes the District Board of Directors to require the District to prepare an annual groundwater report; this report addresses groundwater conditions of the District and its zones of benefit for the water year, which begins October 1 of the preceding calendar year and ends September 30 of the current calendar year. The Board has consistently ordered preparation of Annual Reports, and the reports have included the contents specified Section 70-7.6:

- An estimate of the annual overdraft for the current water year and for the ensuing water year
- Information for the consideration of the Board in its determination of the annual overdraft and accumulated overdraft as of September 30 of the current year
- A report as to the total production of water from the groundwater supplies of the District and its zones as of September 30 of the current year
- Information for the consideration of the Board in its determination of the estimated amount of agricultural water and the estimated amount of water other than agricultural water to be withdrawn from the groundwater supplies of the District and its zones
- The amount of water the District is obligated to purchase during the ensuing water year
- A recommendation as to the quantity of water needed for surface delivery and for replenishment of the groundwater supplies of the District and its zones during the ensuing water year
- A recommendation as to whether or not a groundwater charge should be levied in any zone(s) of the District in the ensuing water year and if so, a rate per acre-foot for all water other than agricultural water for such zone(s)
- Any other information the Board requires.

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

Each water year a special topic is identified for further consideration. These topics have included water quality, salt loading, shallow wells, and others. Additional analyses and documentation provided in previous annual reports are summarized in the following table.

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Table A-1. Special Topics in Previous Annual Reports

Water Year	Additional Analyses and Reporting
1996	Inclusion of Paicines and Tres Pinos sub-basins and sub-basin water budgets
1997	Seasonal water use, irrigation water duties, long-term water quality trends
1998	Irrigation water duties, contamination sites, management plan summary
1999	Wastewater dischargers, management strategies for sub-basin water budgets
2000	Methodology to calculate water supply benefits of Zone 3 and 6 operations
2001	Preliminary salt balance
2002	Investigation of individual salt loading sources
2003	Documentation of nitrate in supply wells, drains, monitor wells, San Juan Creek
2004	Documentation of depth to groundwater in shallow wells
2005	Tabulation of waste discharger permit conditions and recent water quality monitoring results
2006	Rate study
2007	Water quality update
2008	Water budget update
2009	Water demand and supply
2010	Water quality update
2011	Water budget update
2012	Land use update
2013	Water quality update
2014	Water balance update and Groundwater Sustainability

Water Code Appendix 70 Excerpts

Section 70-7.6. Groundwater; investigation and report: recommendations San Benito County

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

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

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

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

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

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

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

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

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

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

(j) Any other information the board requires.

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

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

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

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

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

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

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

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

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

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

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

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B

CLIMATE DATA

RAINFALL AND EVAPOTRANSPIRATION

List of Tables and Figures

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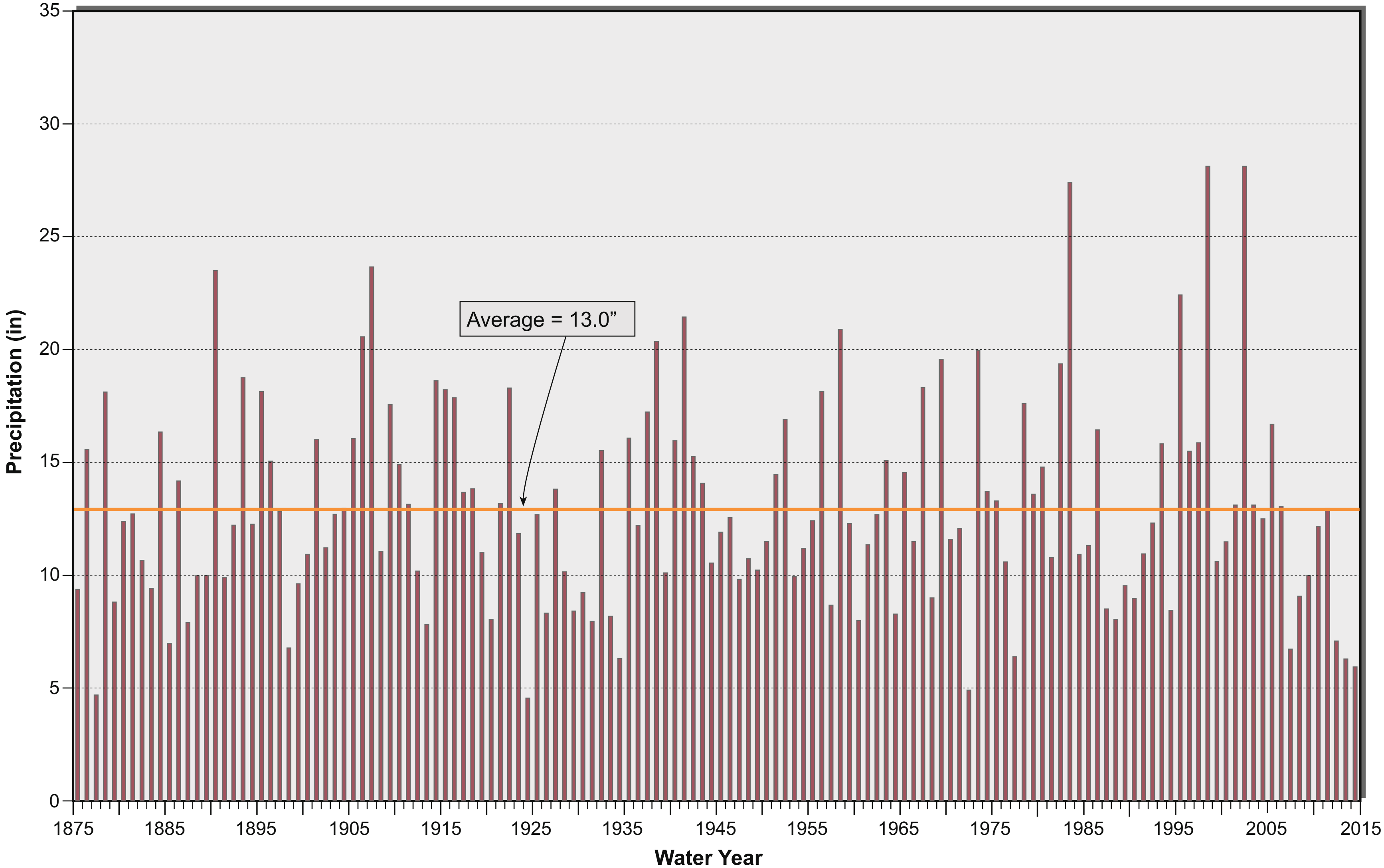
Table B-1a. Monthly Precipitation at the SBCWD CIMIS Station (inches)

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	% Normal
1996	0.1	0	2.2	4.4	4.5	1.6	1.3	1.3	0	0	0	0	**15.5**	**119%**
1997	1.0	3.2	4.3	6.8	0.2	0.1	0.2	0	0.1	0	0	0	**15.9**	**122%**
1998	0.2	3.8	2.6	4.9	9.1	2.7	2.3	2.4	0.1	0	0	0.1	**28.1**	**216%**
1999	0.5	1.9	0.8	2.5	2.5	1.5	0.7	0.1	0.1	0	0	0	**10.6**	**81%**
2000	0.1	1.0	0.1	4.1	4.5	0.7	0.4	0.5	0.1	0	0	0	**11.5**	**88%**
2001	3.5	0.8	0.2	2.9	2.8	0.6	2.2	0	0	0	0	0	**13.1**	**100%**
2002	0.7	11.5	11.9	0.7	1.2	1.6	0.4	0.3	0	0	0	0	**28.1**	**216%**
2003	0.0	1.7	5.0	0.8	1.4	1.1	3.1	0.1	0	0	0.1	0	**13.1**	**101%**
2004	0.2	0.6	5.3	1.3	4.2	0.6	0.3	0.1	0	0	0	0	**12.5**	**96%**
2005	2.0	0.5	3.5	2.5	2.9	3.4	0.8	0.6	0.4	0	0	0	**16.7**	**128%**
2006	0.1	0.3	3.1	1.5	1.0	5.0	1.7	0.4	0	0	0	0	**13.0**	**100%**
2007	0.2	0.7	1.7	0.6	2.2	0.3	0.6	0	0	0	0	0.4	**6.7**	**52%**
2008	0.7	0.7	0.9	4.6	2.1	0.1	0.1	0	0	0	0	0	**9.1**	**70%**
2009	0.3	1.1	1.9	0.4	3.7	1.8	0.2	0.5	0	0	0	0.2	**10.0**	**76%**
2010	0.5	0	1.3	2.3	2.2	1.7	3.4	0.6	0	0	0	0	**12.1**	**93%**
2011	0.7	1.9	2.6	1.6	2.6	2.3	0.2	0.8	0	0	0	0	**13.0**	**99%**
2012	0.7	1.0	0.1	0.8	0.5	2.3	1.4	0.3	0	0	0	0	**7.1**	**54%**
2013	0.0	2.2	1.2	1.4	0.6	0.5	0.3	0.0	0	0	0	0	**6.3**	**48%**
2014	0.1	0.4	0.2	0.2	1.9	1.6	0.9	0.0	0.0	0.0	0.0	0.1	**5.4**	**41%**
AVG	**0.6**	**1.7**	**2.6**	**2.3**	**2.6**	**1.5**	**1.1**	**0.4**	**0.1**	**0.0**	**0.0**	**0.1**	**13.0**	**100%**

Table B-1b. Reference Evapotranspiration at the SBCWD CIMIS Station (inches)

Water Year	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	TOTAL	% Normal
1996	3.9	2.2	1.2	1.5	1.9	3.7	5.1	6.1	6.7	7.4	6.7	4.7	**51.0**	**105%**
1997	3.8	1.8	1.4	1.4	2.5	4.3	5.8	7.5	7.1	7.2	6.7	5.7	**55.2**	**113%**
1998	3.9	1.8	1.5	1.3	1.4	2.8	4.3	4.5	5.3	6.9	6.8	4.7	**45.2**	**93%**
1999	3.5	1.7	1.5	1.5	1.8	3.0	4.7	5.8	6.7	6.9	5.9	4.7	**47.8**	**98%**
2000	4.0	2.0	1.9	1.2	1.6	3.7	5.1	6.0	6.7	6.7	6.2	4.7	**50.0**	**103%**
2001	2.9	1.7	1.5	1.5	1.8	3.1	3.9	6.2	6.5	6.0	6.2	4.8	**46.0**	**94%**
2002	3.5	1.9	1.2	1.5	2.3	3.7	4.2	6.4	7.1	7.2	6.1	5.4	**50.5**	**104%**
2003	3.6	1.9	1.3	1.6	1.8	3.9	3.8	6.0	6.5	7.3	6.2	5.1	**48.8**	**100%**
2004	4.1	1.7	1.2	1.3	1.7	4.0	5.2	6.4	6.7	6.6	6.0	5.3	**50.3**	**103%**
2005	3.1	1.7	1.4	1.3	1.7	3.0	4.4	5.7	6.4	6.9	6.1	4.6	**46.2**	**95%**
2006	3.6	2.0	1.2	1.4	2.2	2.4	3.0	5.5	6.4	7.0	5.6	4.4	**44.7**	**92%**
2007	3.3	1.7	1.4	1.8	1.8	4.1	4.8	6.3	6.9	6.8	6.5	4.7	**49.8**	**102%**
2008	3.5	2.2	1.4	1.3	2.0	3.8	5.2	6.0	6.9	6.7	6.3	5.0	**50.2**	**103%**
2009	3.8	1.9	1.4	1.7	1.7	3.5	4.8	5.5	6.3	7.1	6.3	5.3	**49.3**	**101%**
2010	3.5	2.2	1.7	1.3	1.8	3.5	3.9	5.4	6.7	6.3	5.9	5.0	**47.0**	**96%**
2011	3.0	1.9	1.1	1.6	2.1	2.7	4.4	5.3	6.0	6.6	5.7	4.6	**45.0**	**92%**
2012	3.3	1.9	1.8	1.8	2.5	3.3	4.4	6.4	6.8	6.6	6.0	4.6	**49.5**	**101%**
2013	3.3	1.8	1.2	1.5	2.1	3.7	5.4	6.3	6.4	6.5	6.0	4.8	**48.8**	**100%**
2014	3.5	2.0	1.8	2.1	1.9	3.6	4.9	6.8	6.6	6.4	6.0	4.7	**50.4**	**103%**
AVG	3.5	1.9	1.4	1.5	1.9	3.5	4.6	6.0	6.6	6.8	6.2	4.9	**48.7**	**100%**

Todd Groundwater 12/11/2014



* Historical Data from 2005 Annual Report
* 1996 - 2013 from SBCWD CIMIS Station

December 2014

TODD GROUNDWATER

Figure B-1
Annual Precipitation in Hollister

C

HYDROLOGICAL DATA

STREAMFLOW AND GROUNDWATER LEVELS

List of Tables and Figures

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Table C-1. Miscellaneous Streamflow Measurements during Water Year 2014

	Streamflow Measurement Site	Flow (cfs)				
		Oct-13	Jan-14	Apr-14	Jul-14	Oct-14
1	Tres Pinos Cr - Southside Road Bridge	0	0	0	0	0
2	San Benito River - KT Road Bridge	0	0	0	0	0
3	San Benito River - Hospital Road	0	0	0	0	0
4	San Benito River - Cienega Road	0	0	0	0	0
5	San Benito River - Nash Road	0	0	0	0	0
6	San Benito River - old Highway 156	0	0	0	0	0
7	San Benito River - near Flint Road	0	0	0	0	0
8	San Benito River - near Mitchell Road	0	0	0	0	0
9	San Benito River - upstream of Bixby Road	0	0	0	0	0
10	San Benito River - Y Road	0	0	0	0	0
11	San Juan Creek - San Juan-Hollister Road	0	0	0	0	0
12	San Juan Creek - Highway 156	0	0	0	0	0
13	San Juan Creek - Anzar Road	0	0	0	0	0
14	San Juan Creek - 2000 ft downstream of HWY 101					
15	Pacheco Creek - Walnut Avenue	0	0	0	0	0
16	Pacheco Creek - Highway 156	0	0	0	0	0
17	Pacheco Creek - Lovers Lane	0	0	0	0	0
18	Arroyo de las Viboras - Hawkins Ranch driveway	0	0	0	0	0
19	Arroyo de las Viboras - Fairview Road	0	0	0	0	0
26	Arroyo Dos Picachos - Lone Tree Road	0	0	0	0	0
20	Arroyo Dos Picachos - Fallon Road	0	0	0	0	0
21	Arroyo Dos Picachos - Aquistapace Road	0	0	0	0	0
22	Santa Ana Creek - Fairview Road	0	0	0	0	0
23	Santa Ana Creek - Fallon Road	0	0	0	0	0
24	Tequisquita Slough - San Felipe Road	0	0	0	0	0
25	Millers Canal - 2000 ft downstream of San Felipe Lake	Locked Out	Locked Out	Locked Out	Locked Out	Locked Out
27	Pajaro River - above Millers Canal					
28	Pajaro River - Highway 25					
29	Pajaro River - below Carnadero Cr					
30	Carnadero Cr - above Pajaro River					

Notes:

See Figure C-3 for numbered site locations

~ = streamflow estimated visually or by relatively inaccurate methods (e.g., width x depth x estimated centerline surface velocity)

Sites were monitored within days in the cited month;
Most sites along any individual stream were measured on the same day.

Todd Groundwater 12/11/2014

Table C-2. Groundwater Elevations October 2013 through October 2014

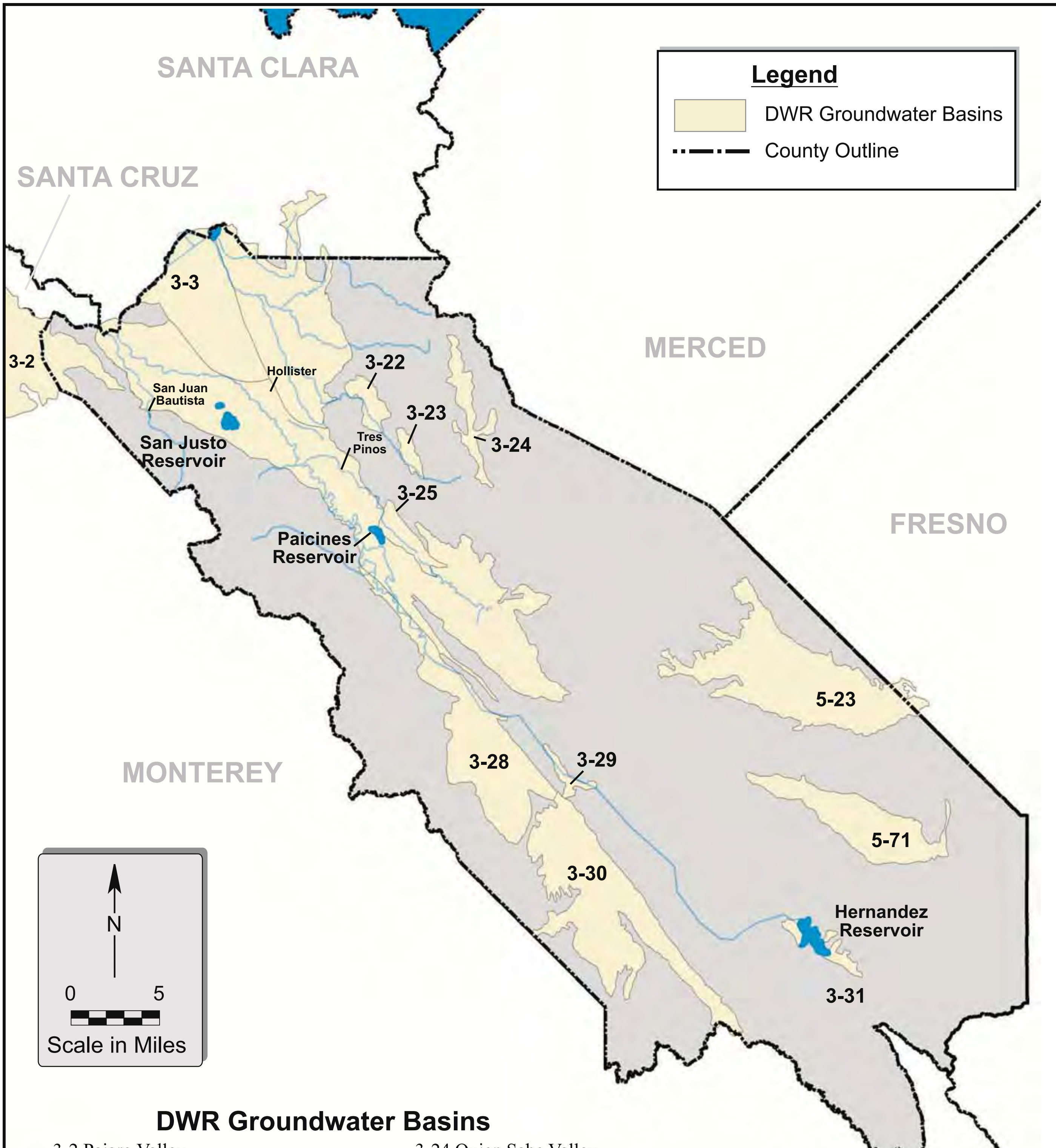
Well Number	Well Depth (feet)	Depth to Top of Screens (feet)	Ground Surface Elevation (feet MSL)	Subbasin	Key Well	Groundwater Elevations (feet MSL)				
						Oct-13	Jan-14	Apr-14	Jul-14	Oct-14
Bolsa SE										
12-5-09M1	240	105	207	BSE	*	132.35	132.87	131.82	129.82	121.56
12-5-21Q1	500	0	260	BSE	*	121.87	125.64	122.62	120.44	70.58
12-5-22N1	372	250	265	BSE	*	108.24	112.09	109.88	108.88	86.9
Hollister East										
12-5-09K1	195	88	200	HE	*	185.32	183.77	183.32	181.41	
12-5-14N1	0	0	229	HE	*	187.64	186.15	185.97	183.95	178.85
12-5-22C1	237	102	236	HE		193.56	192.35	193.02	188.75	186.27
12-5-22J2	355	120	250	HE	*	194.84	193.73	192.66	190.58	188.62
12-5-23A20	862	178	239	HE	*	193.74	194.05	193.72	190.97	187.87
12-5-24N1	300	182	270	HE	*	188.08	186.87	184.28	181.64	180.54
12-6-07P1	147	0	266	HE		234.87	235.25	238.16	228.1	225.86
12-6-18G1	198	70	303	HE		269.24	268.86	267.59	255.05	252.54
12-6-30E1	0	0	375	HE		355.31	355.26	354.44	353.1	341.19
13-6-07D2	0	0	500	HE		336.06	335.97	335.22	335.78	334.62
2317	0	0	299.5	HEN		232.16	233.42	232.14	230.97	227.64
Hollister West										
12-5-27E1	175	0	270	HW	*	198.51	198.69			190.88
12-5-28J1	220	0	276	HW	*	216.66	216.12			206.92
12-5-28L1	425	0	275	HW	*	215.35	214.88			
12-5-28N1	408	168	253.66	HW		220.53	221.19			
12-5-33E2	121	81	266	HW	*	220.32	219.71			201.05
12-5-34P1	195	153	294	HW	*	213.57	215.26			204.24
12-5-35N2	612	288	305	HW	*	226.23	226.54			215.75
13-5-03L1	126	0	303	HW	*	235.9	216.76			224.54
13-5-04B	0	0	285	HW		221.62	219.32			207.76
13-5-10B1	0	0	305	HW	*	230.32	229.88			216.86
13-5-11E1	0	0	309	HW		281.54	280.88			255.49
San Justo 4 (INDART)	0	0	318	HW		259.94	259.13	258.71	259.67	256.68
San Justo 6 (ROSE)	0	0	338	HW		236.64	234.22	233.76	233.42	232.62
Pacheco										
11-5-26N2	232	95	198	P	*	162.99	166.69	165.67	159.86	155.28
11-5-26R3	225	65	208	P	*	173.49	172.54	171.94	172.12	169.49
11-5-35C1	180	0	198	P	*	169.06	167.84	168.42	164.34	158.49
11-5-35G1	230	0	206	P	*	175.09	176.05	176.45	174.64	168.23
11-5-35Q3	0	0	203	P	*	177.31	175.68	174.88	172.35	157
11-5-36C1	98	0	223	P	*	183.99	188.35	188.9	187.61	176.1
11-5-36M1	0	0	223	P	*	181.74	180.9	180.97	176.31	
11-6-31M2	188	155	284	P	*	201.66	202.87	203.71	202.87	201.36
12-5-01G2	300	0	215	P		179.39	178.76	177.8	176.24	174.32
12-5-02H5	128	42	210	P		176.26	175.99	175.71	172.77	170.5
12-5-02L2	170	0	202	P		196.83	194.85	193.82	186.68	186.04
12-6-06L4	235	50	248	P		220.55	219.87	217.07	215.89	212.88

Table C-2. Groundwater Elevations October 2013 through October 2014

Well Number	Well Depth (feet)	Depth to Top of Screens (feet)	Ground Surface Elevation (feet MSL)	Subbasin	Key Well	Groundwater Elevations (feet MSL)				
						Oct-13	Jan-14	Apr-14	Jul-14	Oct-14
San Juan										
12-4-17L20	0	0	140	SJ		112.68	118.89	117.55	115.88	113.63
12-4-18J1	0	0	150	SJ		123.11	124.38	123.17	122.57	120.79
12-4-21M1	250	0	170	SJ	*	143.28	143.09	142.01	140.68	137.2
12-4-26G1	876	240	210	SJ	*	168.35	174.06	171.61	169.64	169.62
12-4-34H1	387	120	199	SJ	*	151.69	158.02	158.03	157.64	135.16
12-4-35A1	325	110	216	SJ		165.89	174.61	173.62	171.35	168.12
12-4-36D2	0	0	219	SJ		170.58	178.61	177.62	175.82	177.88
12-5-30H1	240	0	250	SJ		185.22	191.46	189.84	188.68	189.42
12-5-31H1	0	0	248	SJ		200.68	200.68	198.12	197.44	192.11
13-4-03H1	312	168	206.25	SJ		181.68	188.12	160.49	187.72	188.24
13-4-04A3	195	48	210	SJ		186.35				
San Justo (TELEDYNE)	0	0	323	SJ		270.36	269.26	268.44	267.97	
San Justo 3 (BRIGANTINO)	0	0	384	SJ		295.35	293.64	331.77		
Tres Pinos										
13-5-11Q1	178	61	324	TP		246.68	247.32			235.51
13-5-12D4	0	0	360	TP		250	250	187	242	240
13-5-12N20	352	301	332	TP	*	317.86	317.44			308.83
13-5-13F1	134	30	348	TP	*	331.78	332.44			319.88
13-5-13H1	252	112	400	TP	*	336.54	334.19			327.64
13-5-13J2	180	0	375	TP	*	359.14	359.32			355.75
13-5-13Q1	185	44	360	TP	*	322.76	321.88			316.22
13-6-19J1	340	128	450	TP		421.41	420.68			416.72
13-6-19K1	211	0	422	TP	*	357.35	383.88			351.23
13-6-20K1	0	0	440	TP		430.85	430.04			426.73
LEMOS (Ridgemark)	0	0	522	TP		342.31	341.79	340.42	341.2	339.26
POSEY (Ridgemark)	0	0	521	TP		335.54	333.87	332.67	331.93	330.42
Bolsa										
11-4-25H1	0	0	148	B		113.35	113.29	110.88	106.64	
11-4-26B1	642	149	143	B	*	133.02	134.59	132.89	131.76	
11-4-34A1	100	0	142	B	*	127.59	134.31	133.89	130.76	
11-5-20N1	300	0	150	B	*	123.61	124.75	122.68	121.35	86.32
11-5-27P2	331	67	185	B		164.86	166.15	166.93	163.62	
11-5-31F1	515	312	159	B	*	97.76	104.41	103.31	101.71	36.3
12-5-05G1	500	150	175	B		118.11	126.27	125.32	123.79	102.99
12-5-05M1	0	0	175	B		80.99				
12-5-06L1	0	0	177	B	*	117.24				
12-5-17D1	950	314	217	B		63.74	68.13	66.44	65.42	

Table C-2. Groundwater Elevations October 2013 through October 2014

Well Number	Well Depth (feet)	Depth to Top of Screens (feet)	Ground Surface Elevation (feet MSL)	Subbasin	Key Well	Groundwater Elevations (feet MSL)				
						Oct-13	Jan-14	Apr-14	Jul-14	Oct-14
Paicines										
OAK HILL RANCH 1	0	0	745	Paicines		660.84	659.83	664.48	659.14	656.73
RFP Vineyard 3 (FRANCHIONI)	0	0	706.67	Paicines		660.82	660.51	622.33	657.76	645.63
RIDGEMARK 5	0	0	668	Paicines		649.16	647.88	586.63	639.76	638.64
RIDGEMARK 7	0	0	692	Paicines		633.96	634.68	634.88	562.16	560.74
RIDGEMARK 8	0	0	0	Paicines		534.68	533.33			
SCHIELDS 2	0	0	737	Paicines		679.68	678.69			
SCHIELDS 4 (vineyard)	0	0	682	Paicines		641.56	639.62	641.63	632.76	628.38
Pacheco Creek										
11-5-12E1	103	52	277	PC	*					
11-5-13D1	125	0	258	PC	*	223.68	223.21	214.76	213.04	205.57
11-5-24C2	165	70	249	PC	*	212.15	211.86	211.99	210.6	
11-5-24L1	70	0	234	PC	*	194.12	194.91	195.61	191.37	183.3
11-5-25G1	225	0	244.33	PC	*	196.17	197.21	197.38	195.1	171.95
Tres Pinos Creek Valley										
DONATI 2	0	0	696	TPCV		655.56	653.68	653.35	643.19	641.35
GRANITE ROCK WELL 1	0	0	0	TPCV		301.37	302.98	300.88	301.69	300.47
GRANITE ROCK WELL 2	0	0	0	TPCV		332.51	331.61	330.88	330.53	328.54
P BERTUCCIO 4	0	0	753	TPCV		674.35	676.58	674.15		
WILDLIFE CENTER 5	0	0	766	TPCV					701.89	699.72
Llagas										
11S04E02D008	0	0	229	SCVWD			149.81	132.68	109.1533	
11S04E02N001	0	0	174.9	SCVWD			147.91	143.57	90.295	
11S04E03J002	0	0	196	SCVWD		138.835	150.2	130.33	104.84	
11S04E08K002	0	0	178.1	SCVWD			148.32	148.145	130.81	
11S04E10D004	0	0	169.9	SCVWD		137.91	147.7	141.00333	114.284	124.22
11S04E15J002	0	0	144	SCVWD		130.89	140.9	126.45	95.44	111.33
11S04E17N004	0	0	180.1	SCVWD			147.07	149.06	132.0833	
11S04E21P003	0	0	154.9	SCVWD			139.77	131.325		
11S04E21P004	0	0	154.9	SCVWD						
11S04E22N001	0	0	149.9	SCVWD			136.2	125.885	103.4133	
11S04E32R002	0	0	140.1	SCVWD			129.55	122.86	102.9833	105.51



DWR Groundwater Basins

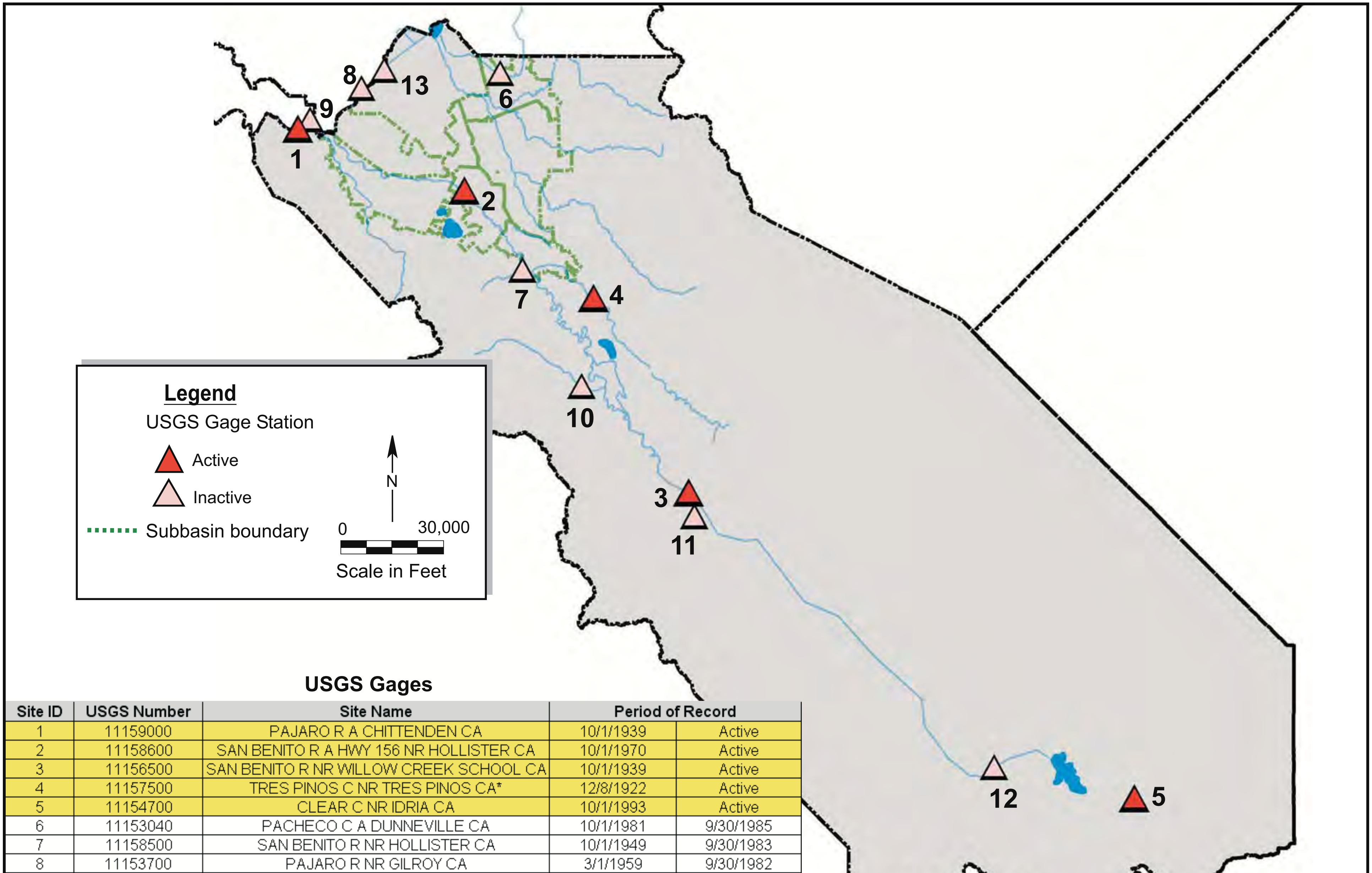
3-2 Pajaro Valley
3-3 Gilroy Hollister Valley
- 3-3.02 Bolsa Area
- 3-3.03 Hollister Area
- 3-3.04 San Juan Bautista Area

3-22 Santa Ana Valley
3-23 Upper Santa Ana Valley
3-24 Quien Sabe Valley
3-25 Tres Pinos Valley
3-28 San Benito River Valley
3-29 Dry Lake Valley
3-30 Bitter Water Valley
3-31 Hernandez Valley
5-23 Panoche Valley
5-71 Vallecitos Valley

December 2014

TODD GROUNDWATER

Figure C-1
Groundwater Basins in San Benito County



USGS Gages

Site ID	USGS Number	Site Name	Period of Record	
1	11159000	PAJARO R A CHITTENDEN CA	10/1/1939	Active
2	11158600	SAN BENITO R A HWY 156 NR HOLLISTER CA	10/1/1970	Active
3	11156500	SAN BENITO R NR WILLOW CREEK SCHOOL CA	10/1/1939	Active
4	11157500	TRES PINOS C NR TRES PINOS CA*	12/8/1922	Active
5	11154700	CLEAR C NR IDRIA CA	10/1/1993	Active
6	11153040	PACHECO C A DUNNEVILLE CA	10/1/1981	9/30/1985
7	11158500	SAN BENITO R NR HOLLISTER CA	10/1/1949	9/30/1983
8	11153700	PAJARO R NR GILROY CA	3/1/1959	9/30/1982
9	11158900	PESCADERO C NR CHITTENDEN CA	9/11/1970	9/30/1981
10	11156700	PESCADERO C NR PAICINES CA	7/1/1959	10/7/1970
11	11156450	WILLOW C TRIB NR SAN BENITO CA	7/1/1964	9/30/1969
12	11156000	SAN BENITO R BL M C NR HERNANDEZ CA	10/1/1949	9/30/1963
13	11154500	PAJARO R A SARGENT CA	10/1/1940	9/30/1941

* WY 2006 data for gage height only

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Figure C-2
Location of Streamflow Stations

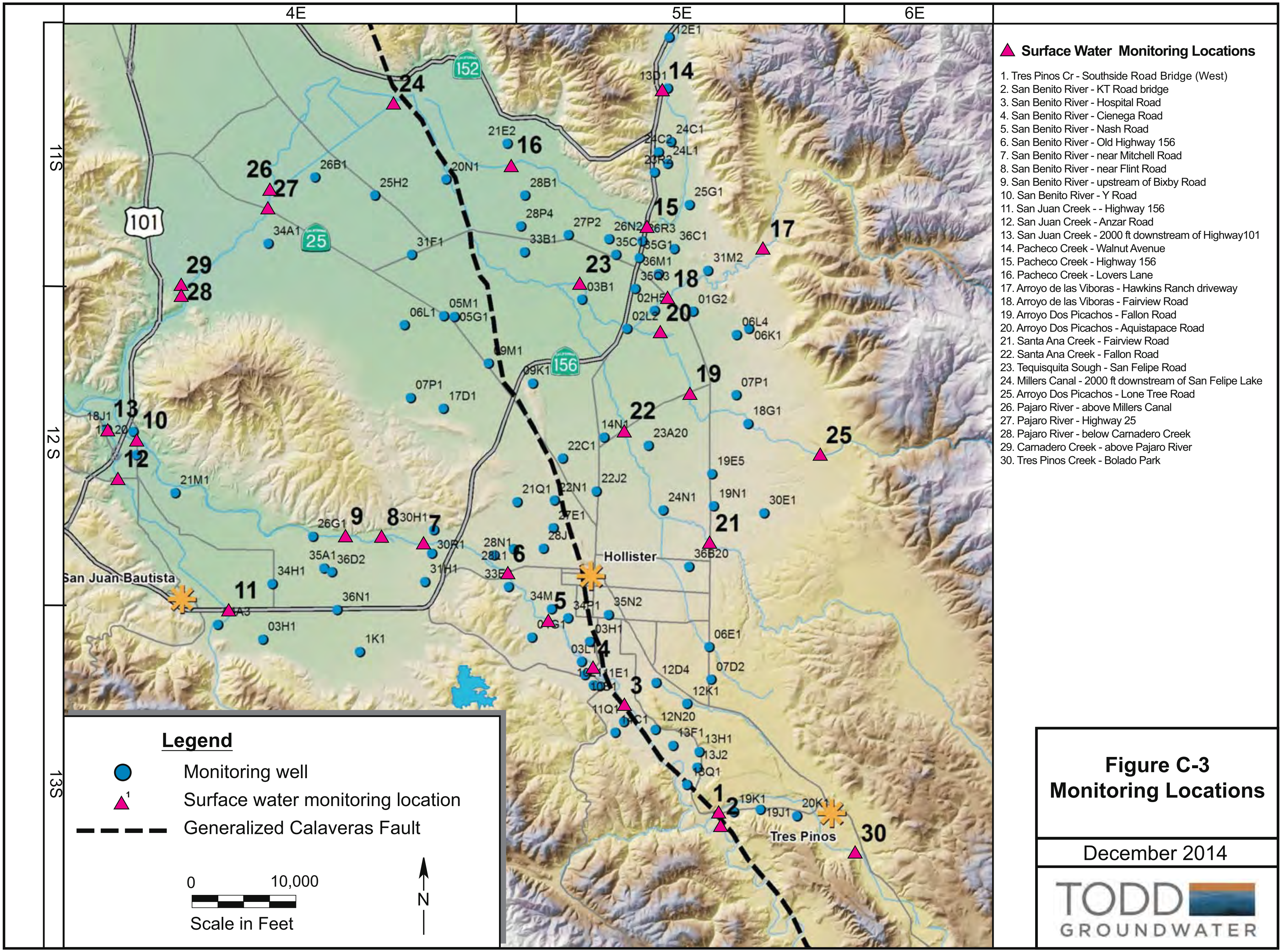


Figure C-3
Monitoring Locations

December 2014

Path: T:\Projects\San_Benito_Annual_37629\2014\GIS\Maps\Figure C-4 - Depth to Water Map Oct 2014.mxd

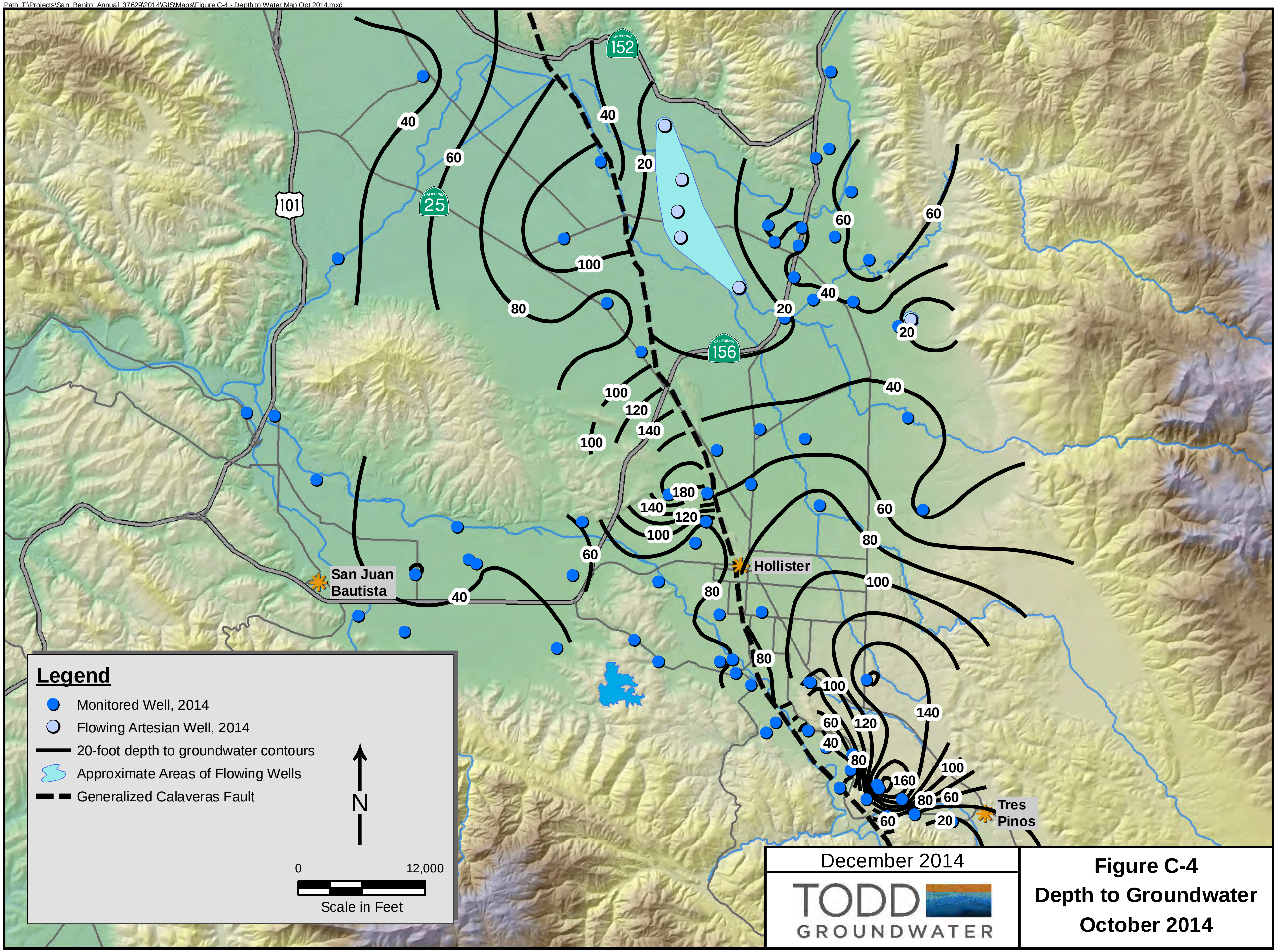
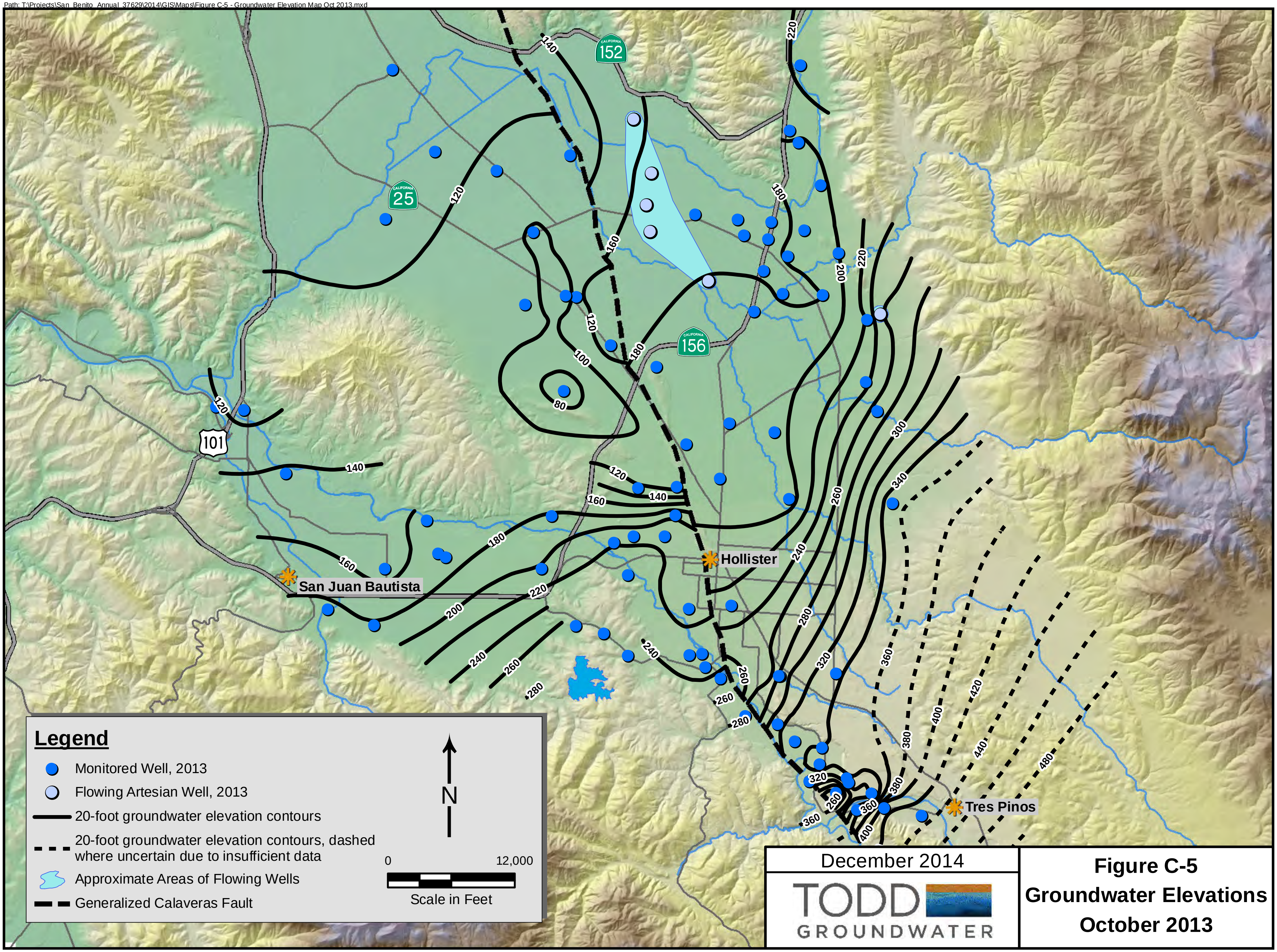


Figure C-4
Depth to Groundwater
October 2014

Path: T:\Projects\San_Benito_Annual_37629\2014\GIS\Maps\Figure C-5 - Groundwater Elevation Map Oct 2013.mxd



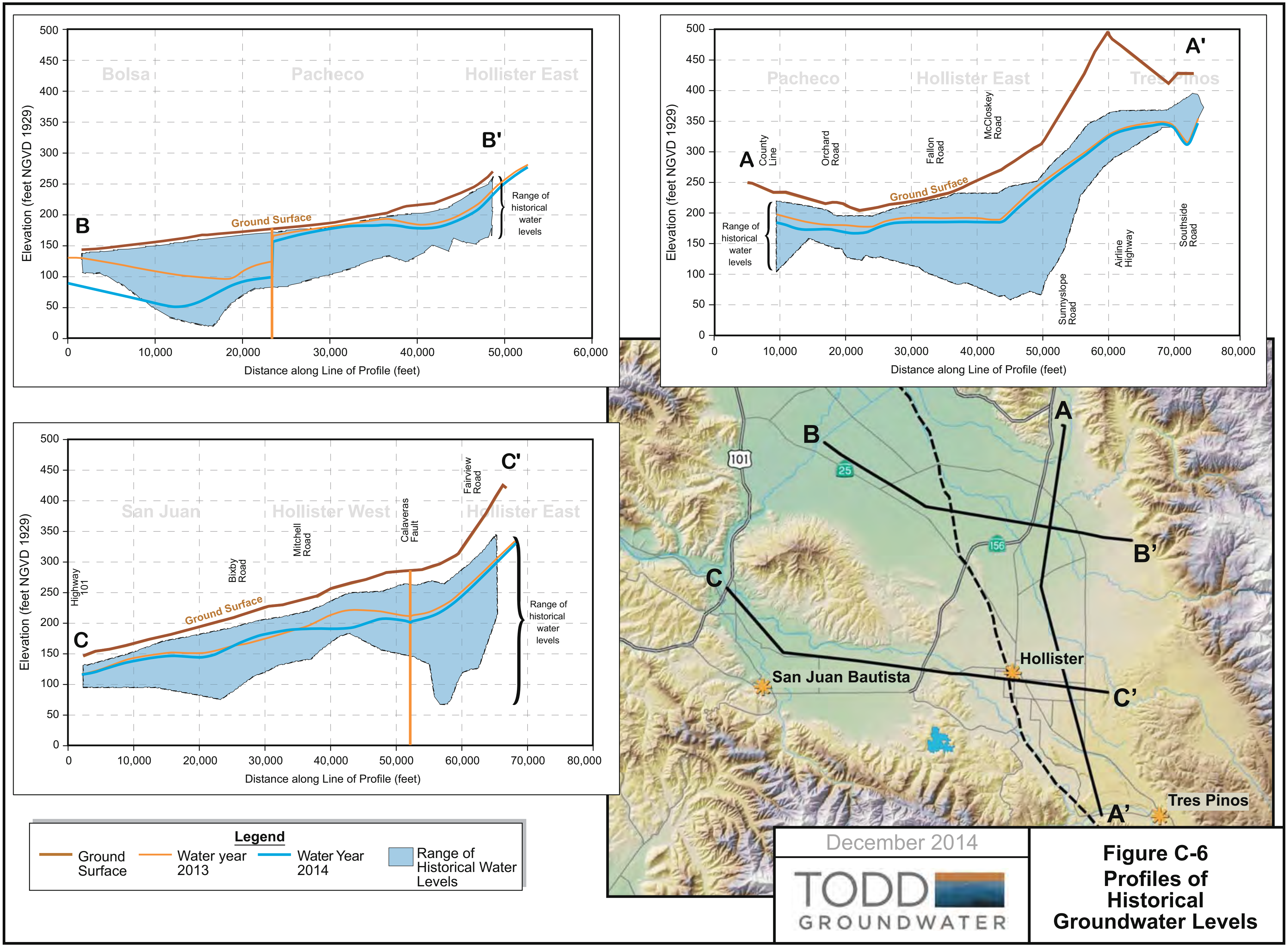


Figure C-6
Profiles of Historical Groundwater Levels

D

PERCOLATION DATA

List of Tables and Figures

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Table D-1. Reservoir Water Budgets for Water Year 2013 (acre-feet)

	Hernandez	Paicines	San Justo
Inflows			
Rainfall	0	n.a.	4
San Benito River	0	0	n.a.
Hernandez-Paicines transfer	n.a.	0	n.a.
San Felipe Project	n.a.	n.a.	4,574
Total Inflows	**0**	**0**	**4,579**
Outflows			
Hernandez spills	0	n.a.	n.a.
Hernandez-Paicines transfer	0	n.a.	n.a.
Tres Pinos Creek percolation releases	n.a.	0	n.a.
San Benito River percolation releases	0	n.a.	n.a.
CVP Deliveries	n.a.	n.a.	5,729
Evaporation and seepage	405	133	1,854
Total Outflows	**405**	**133**	**7,583**
Storage Change			
Reservoir capacity	17,200	2,870	11,000
Maximum storage	645	275	10,246
Minimum storage	353	0	4,203
Net water year storage change	**0**	**0**	**0**
Unaccounted for Water	**405**	**133**	**3,005**

Table D-2. Historical Reservoir Releases (AFY)

WY	Hernandez	Paicines	TOTAL
1996	13,535	6,139	19,674
1997	3,573	2,269	5,842
1998	26,302	450	26,752
1999	12,084	1,293	13,377
2000	13,246	2,326	15,572
2001	12,919	3,583	16,502
2002	9,698	310	10,008
2003	5,434	-	5,434
2004	3,336	-	3,336
2005	19,914	677	20,591
2006	14,112	196	14,308
2007	12,022	1,254	13,276
2008	7,646	495	8,141
2009	4,883	-	4,883
2010	8,484	4,147	12,631
2011	9,757	2,397	12,154
2012	6,341	1,321	7,662
2013	3,963	677	4,640
2014	-	-	-
AVG	**9,855**	**1,449**	**11,304**

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

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

Table D-4. Percolation of Municipal Wastewater during Water Year 2014

	Pond Area[1] (acres)	Effluent Discharge (acre-feet)	Evaporation[2] (acre-feet)	Percolation (acre-feet)
Hollister - domestic*	92.9	1,818	266	1,552
Hollister - industrial*	39.0	198	112	86
Ridgemark Estates I & II	7.2	200	21	179
Tres Pinos[3]	1.8	26	5	21
Total	141	2,241	404	1,838

Notes:

* Hollister WW data ununavailable as of Dec 10, 2013. 2012 data is used as a placeholder until the data becomes available

1. Hollister pond areas are from Dickson and Kenneth D. Schmidt and Associates (1999) and include treatment ponds in addition to percolation ponds at the domestic wastewater treatment plant. Assumes 80% of total pond area in use at any time (Rose, pers. comm.). These areas should be updated as operations change.
2. Average evaporation less precip = 43 inches (56 in/yr evaporation (DWR Bulletin 73-79) less 13 in/yr precip (CIMIS)
3. Values for Tres Pinos were based on WY 2008 values, as current data was not available

The San Juan Bautista plant is not included because the unnamed tributary of San Juan Creek that receives its effluent usually gains flow along the affected reach and is on the southwest side of the San Andreas Fault. These conditions prevent the effluent from recharging the San Juan Subbasin.

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

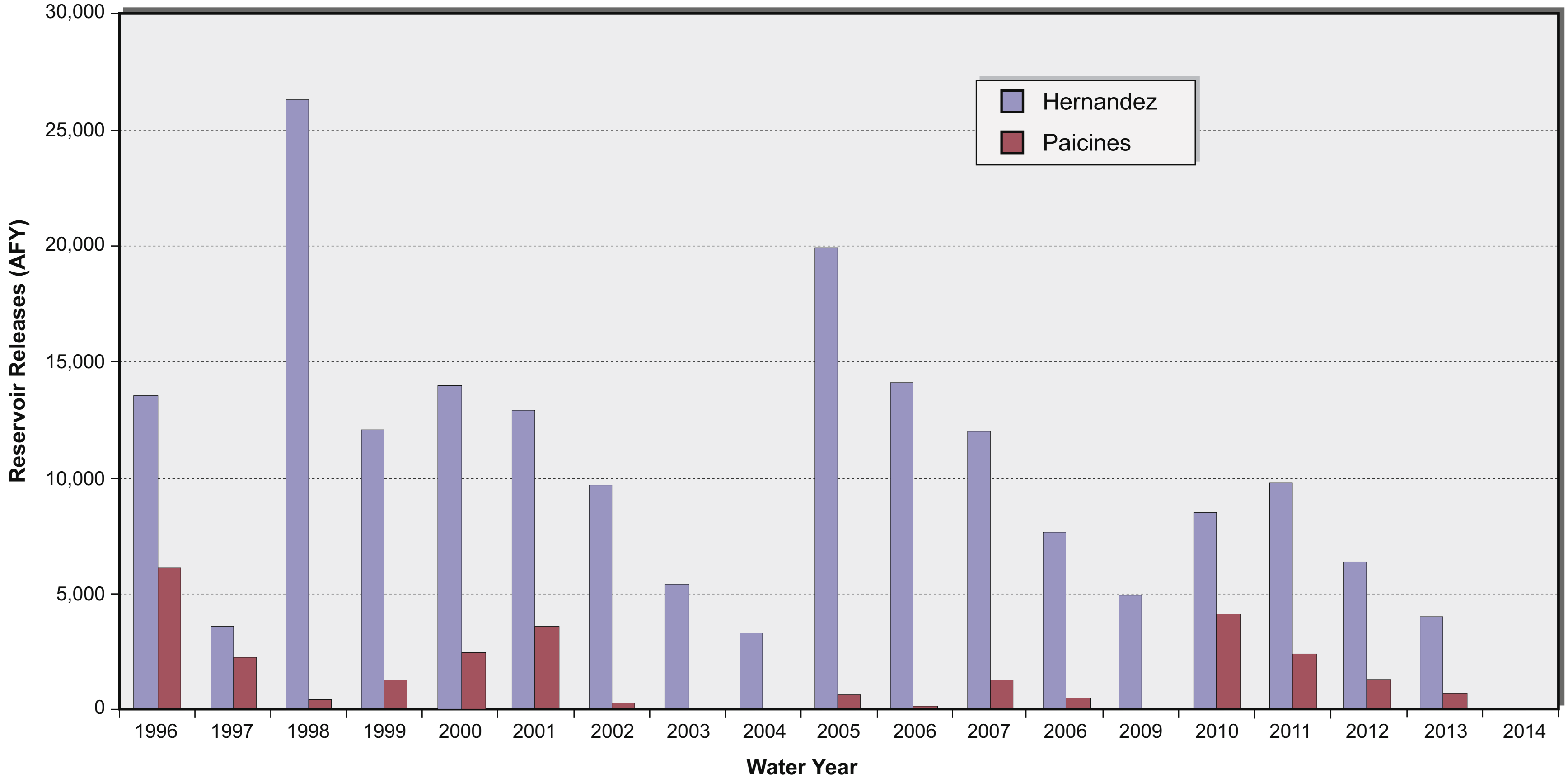
	Hollister Reclamation Plant - Domestic	Hollister - industrial	Ridgemark Estates I & II	Tres Pinos	TOTAL
1994	1,775	665	155	5	2,600
1995	1,935	610	180	10	2,735
1996	2,020	689	207	14	2,930
1997	1,965	909	201	17	3,092
1998	2,490	518	231	17	3,256
1999	1,693	1,476	156	12	3,337
2000	2,110	1,136	293	24	3,563
2001	1,742	1,078	303	24	3,147
2002	1,884	1,545	283	24	3,736
2003	2,009	1,432	279	24	3,744
2004	1,787	1,536	268	21	3,612
2005	1,891	1,323	227	26	3,468
2006	1,797	1,211	216	33	3,257
2007	1,740	1,228	139	19	3,126
2008	1,580	1,257	139	19	2,996
2009	1,976	428	172	19	2,594
2010	1,922	37	172	19	2,150
2011	1,807	466	183	19	2,476
2012	1,740	605	177	19	2,541
2013*	889	332	188	21	1,430
2014	1,552	86	179	21	1,838

* Hollister WW data for 2013 updated with new data

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

	Hollister Reclamation Plant - Domestic	Hollister - industrial	Ridgemark Estates I & II	Tres Pinos	TOTAL
1994	1,775	665	155	5	2,600
1995	1,935	610	180	10	2,735
1996	2,020	689	207	14	2,930
1997	1,965	909	201	17	3,092
1998	2,490	518	231	17	3,256
1999	1,693	1,476	156	12	3,337
2000	2,110	1,136	293	24	3,563
2001	1,742	1,078	303	24	3,147
2002	1,884	1,545	283	24	3,736
2003	2,009	1,432	279	24	3,744
2004	1,787	1,536	268	21	3,612
2005	1,891	1,323	227	26	3,468
2006	1,797	1,211	216	33	3,257
2007	1,740	1,228	139	19	3,126
2008	1,580	1,257	139	19	2,996
2009	1,976	428	172	19	2,594
2010	1,922	37	172	19	2,150
2011	1,807	466	183	19	2,476
2012	1,740	605	177	19	2,541
2013*	889	332	188	21	1,430
2014	1,552	86	179	21	1,838

* Hollister WW data for 2013 updated with new data



December 2014

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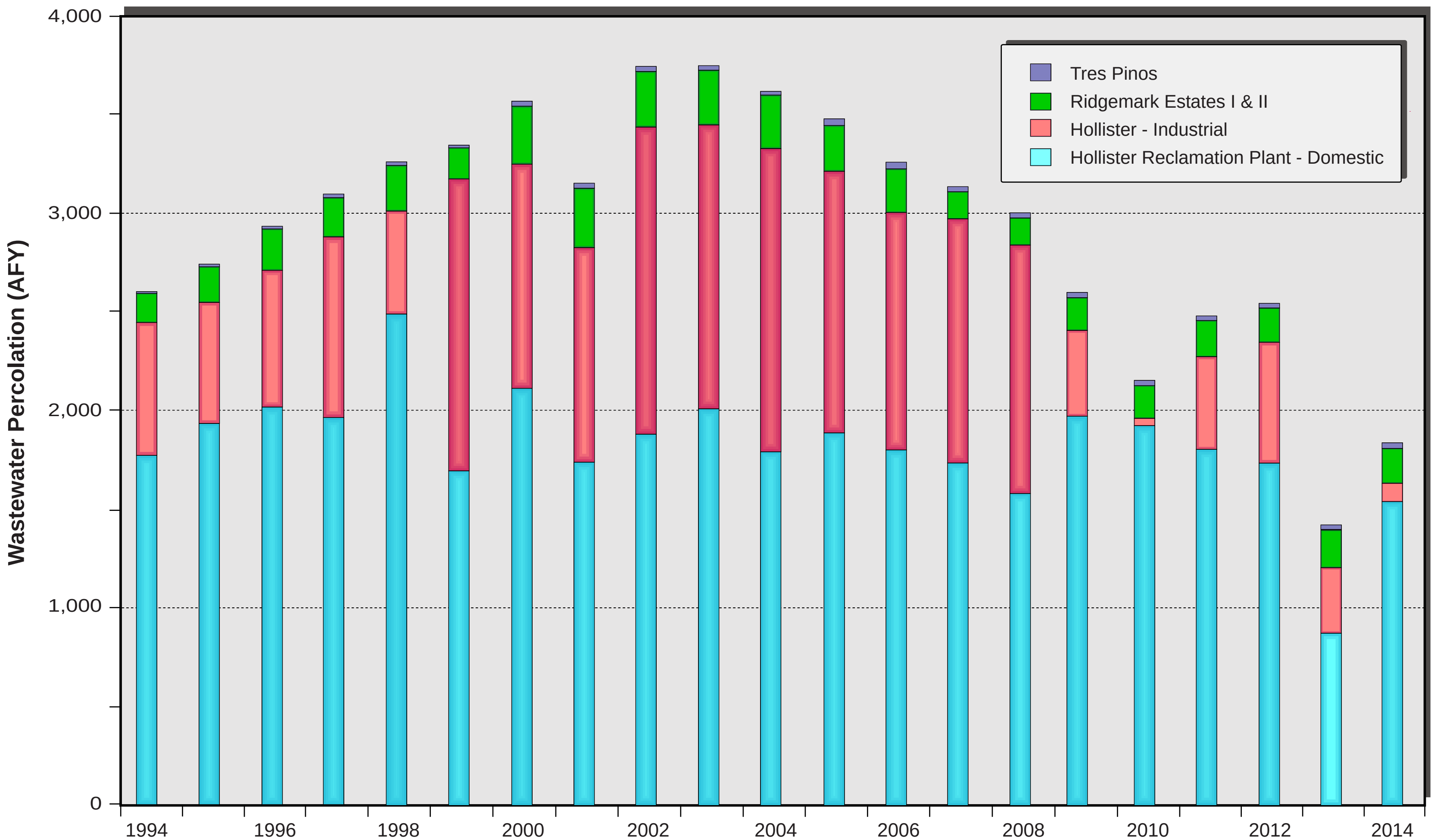
Figure D-1
Reservoir Releases for Percolation



December 2014

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Figure D-2
Wastewater Percolation by Facility

E

WATER USE DATA

List of Tables and Figures

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Table E-1. Recent CVP Allocation and Use

Water Year	Municipal and Industrial (M&I) CVP				Agricultural CVP			
	Percent of Contract Allocation	Percent of Historic Average	Contract Amount Used (AF)	Contract Amount Used (%)	Percent of Contract Allocation	Percent of Contract and M&I Adjustment[1]	Contract Amount Used (AF)	Contract Amount Used (%)
	(USBR Water Year Mar-Feb)		(Hydrologic Water Year Oct-Sep)		(USBR Water Year Mar-Feb)		(Hydrologic Water Year Oct-Sep)	
2006	100%		3,152	38%	100%		19,840	56%
2007	100%		4,969	60%	40%		18,865	53%
2008	37%	75%	2,232	27%	40%	45%	10,514	30%
2009	29%	60%	1,978	24%	10%	11%	6,439	18%
2010	37%	75%	2,197	27%	45%	50%	10,061	28%
2011	100%		2,433	29%	80%		16,234	46%
2012	51%	75%	2,683	33%	40%	40%	17,267	49%
2013	47%	70%	2,652	32%	20%	22%	12,914	36%
2014	34%	50%	1,599	29%	0%	0%	7,545	21%

Notes:

[1] If the M&I allocation is 75 percent or less, the difference between the M&I contract amount and M&I allocation is added to the agricultural contract amount. The agricultural percentage is multiplied by that sum to obtain the agricultural allocation.

Table E-2. Historical Water Use by Subbasin and Water Source (AFY)

Subbasin	Pacheco		Bolsa Southeast		San Juan		Hollister West		Hollister East		Tres Pinos		Total Zone 6		
Source	GW	CVP	GW	CVP	GW	CVP	GW	CVP	GW	CVP	GW	CVP	GW	CVP	RW
1993	2,251	3,210	3,474	533	9,278	4,300	7,213	90	3,744	7,275	5,658	224	31,618	15,633	-
1994	3,748	3,394	3,467	602	10,859	3,836	7,327	87	5,475	6,808	5,294	263	36,169	14,990	-
1995	2,756	3,474	2,855	720	9,328	4,554	7,092	460	3,428	6,647	4,475	275	29,935	16,130	-
1996	2,533	3,500	2,682	782	8,726	5,187	5,717	679	3,396	8,267	3,695	408	26,748	18,823	-
1997	2,209	4,205	2,755	997	9,587	6,191	7,602	907	3,534	8,284	4,620	466	30,307	21,048	-
1998	2,035	2,165	1,561	361	6,963	4,099	4,991	591	4,037	5,291	3,751	289	23,338	12,796	-
1999	2,553	3,219	2,453	433	9,312	5,990	7,013	726	3,701	7,279	4,199	391	29,231	18,038	-
2000	2,270	3,256	2,418	355	8,681	6,372	7,590	869	3,108	7,279	4,006	542	28,073	18,673	-
2001	1,848	3,443	2,126	411	7,977	7,232	7,377	685	2,213	7,010	3,599	621	25,140	19,402	-
2002	2,322	3,840	2,193	497	7,571	7,242	6,577	706	2,588	7,390	3,994	737	25,244	20,411	-
2003	2,425	3,277	2,175	493	7,434	7,127	6,222	720	1,897	9,329	2,805	788	22,958	21,734	-
2004	2,461	3,607	2,405	740	8,121	7,357	4,971	614	2,321	10,726	3,204	966	23,484	24,010	-
2005	1,320	3,106	1,849	514	6,608	6,245	5,084	680	2,586	9,198	2,378	642	19,825	20,384	-
2006	1,208	3,495	1,864	661	6,741	7,200	4,633	579	2,555	10,253	2,537	803	19,538	22,992	-
2007	1,034	3,832	2,005	572	7,658	6,160	5,118	553	3,867	10,194	2,908	804	22,590	22,115	-
2008	1,900	1,568	2,014	333	7,796	3,160	4,375	399	3,962	6,792	2,743	493	22,789	12,745	-
2009	3,370	1,257	2,082	179	11,956	1,605	4,186	19	4,733	4,697	2,871	447	29,199	8,204	-
2010	2,553	1,771	1,897	207	9,561	3,452	4,081	10	4,460	6,056	1,686	488	24,238	11,984	151
2011	1,992	2,420	2,781	229	4,987	5,623	3,940	394	1,947	9,575	2,454	427	18,102	18,667	183
2012	3,723	2,652	1,556	288	5,782	5,976	4,298	549	2,004	9,917	2,492	568	19,855	19,949	230
2013*	4,157	1,976	2,348	292	11,044	4,134	5,656	374	5,430	8,224	2,452	565	31,087	15,566	357
2014	3,303	1,020	2,157	32	10,018	1,984	7,227	233	4,872	5,490	3,014	384	30,592	9,144	262
AVG 03-14	2,454	2,498	2,094	378	8,142	5,002	4,983	427	3,386	8,371	2,629	615	23,688	17,291	99

GW = groundwater, CVP = Central Valley Project, RW = recycled water

* Hollister RW data updated for 2013 based on new data

Table E-3. Recent Water Use by Subbasin and User Type, not including recycled water (AFY)

SUBBASIN	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Agriculture										
Bolsa SE	2,352	2,517	2,570	2,334	2,252	2,103	3,004	1,837	2,635	2,180
Hollister East	8,543	9,526	10,685	8,012	6,860	8,315	9,067	9,453	10,832	8,151
Hollister West	2,128	1,936	2,145	1,509	1,708	1,888	2,190	2,228	3,324	2,584
Pacheco	4,190	4,469	4,573	3,220	4,304	4,242	4,279	6,148	5,990	4,121
San Juan	11,496	12,622	12,185	9,581	12,397	11,960	10,009	10,964	14,376	11,183
Tres Pinos	800	1,004	954	655	670	640	471	641	652	514
TOTAL	29,509	32,074	33,112	25,310	28,192	29,148	29,020	30,980	37,810	28,734
M&I										
Bolsa SE	12	8	7	13	9	0	6	6	4	9
Hollister East	3,241	3,280	3,203	2,742	2,570	2,201	2,455	2,469	2,822	2,211
Hollister West	3,636	3,168	3,361	3,265	2,710	2,477	2,144	2,619	2,705	4,876
Pacheco	235	234	293	248	323	83	133	227	144	203
San Juan	1,356	1,320	1,640	1,375	1,164	1,053	601	793	803	820
Tres Pinos	2,220	2,336	2,748	2,581	2,648	3,048	2,410	2,710	2,365	2,884
TOTAL	10,700	10,345	11,252	10,225	9,424	8,862	7,749	8,825	8,843	11,002

Table E-4. Historical Water Use by User Type (AFY)

WY	Agricultural	Municipal, and Industrial	Total	% Ag
1988	45,366	5,152	50,518	90%
1989	32,387	6,047	38,434	84%
1990	49,663	5,725	55,388	90%
1991	46,640	7,631	54,271	86%
1992	32,210	6,912	39,122	82%
1993	38,878	5,066	43,944	88%
1994	41,854	7,186	49,040	85%
1995	36,399	8,272	44,671	81%
1996	39,575	8,338	47,913	83%
1997	41,482	11,117	52,599	79%
1998	27,526	8,650	36,176	76%
1999	37,203	10,110	47,313	79%
2000	36,062	10,811	46,873	77%
2001	34,035	10,687	44,722	76%
2002	34,354	11,347	45,701	75%
2003	33,533	11,206	44,739	75%
2004	35,597	11,944	47,541	75%
2005	29,509	10,700	40,209	73%
2006	32,074	10,345	42,419	76%
2007	33,112	11,252	44,364	75%
2008	25,310	10,225	35,535	71%
2009	28,192	9,424	37,616	75%
2010	29,148	8,862	38,010	77%
2011	29,020	7,749	36,769	79%
2012	31,270	8,825	40,095	78%
2013	37,810	8,843	46,653	81%
2014	28,734	11,226	39,960	72%
AVERAGE	**35,072**	**9,024**	**44,096**	**79%**

Table E-5. Municipal Water Use by Purveyor for Water Year 2014 (AF)

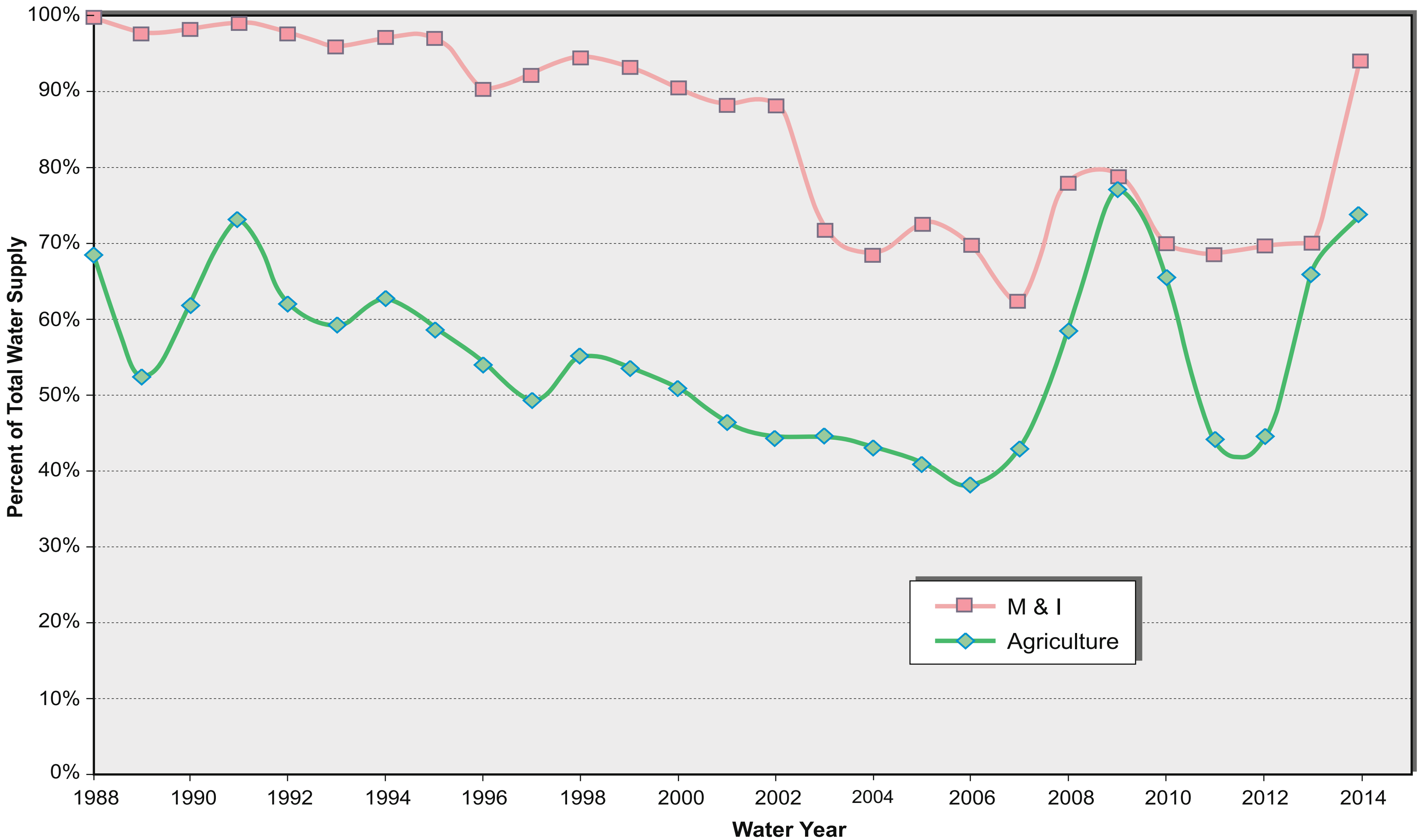
	WY 2014	Oct	Nov	Dec	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep
Groundwater													
Sunnyslope CWD	**2,134**	198	150	101	144	82	91	108	173	324	301	223	238
City of Hollister	**2,646**	360	149	140	119	79	121	133	197	256	365	377	351
City of Hollister - Cienega Wells	**114**	10	9	10	9	9	9	9	9	9	10	11	9
San Juan Bautista	**285**	26	21	18	15	20	20	22	39	25	32	23	24
Tres Pinos CWD	**49**	4	4	3	3	3	2	3	4	5	5	4	8
Groundwater Subtotal	**5,228**	**598**	**332**	**273**	**292**	**193**	**243**	**276**	**422**	**618**	**712**	**638**	**631**
CVP Imported Water													
Lessalt Treatment Plant	**979**	55	55	135	104	166	92	160	141	71	0	0	0
Imported Water Subtotal	**979**	**55**	**55**	**135**	**104**	**166**	**92**	**160**	**141**	**71**	**-**	**-**	**-**
Municipal Total													
Municipal Water Supply Total	**6,207**	**653**	**387**	**408**	**396**	**358**	**335**	**436**	**563**	**689**	**712**	**638**	**631**

Table E-6. Historical Municipal Water Use by Purveyor (AFY)

WY	Sunnyslope CWD - GW	City of Hollister - GW	City of Hollister - Cienega Wells[1]	San Juan Bautista	Tres Pinos CWD	Lessalt Treatment Plant	Undivided Total	TOTAL
1988						0	5,152	**5,152**
1989						0	6,047	**6,047**
1990						0	5,725	**5,725**
1991						0	7,631	**7,631**
1992						0	6,912	**6,912**
1993						0	5,066	**5,066**
1994						0	7,186	**7,186**
1995	2,167	2,446				0		**4,613**
1996	2,139	3,386				0		**5,525**
1997	2,638	3,848				0		**6,486**
1998	2,357	3,441				0		**5,798**
1999	2,820	3,558				0		**6,378**
2000	3,214	4,021				0		**7,235**
2001	3,290	3,851				0		**7,141**
2002	3,256	4,120				21		**7,398**
2003	2,053	2,754				2,494		**7,302**
2004	2,426	2,828				2,101		**7,356**
2005	1,959	3,147	123	247	49	1,843		**7,368**
2006	1,907	2,801	123	150	49	1,900		**6,930**
2007	2,413	2,758	123	47	49	1,719		**7,108**
2008	2,294	2,746	123	417	47	1,323		**6,949**
2009	2,251	2,503	123	373	47	1,212		**6,509**
2010	1,861	2,194	108	308	47	1,344		**5,861**
2011	2,225	1,651	80	292	47	1,593		**5,887**
2012	2,360	1,761	130	267	45	1,657		**6,219**
2013	1,655	2,655	120	281	46	1,648		**6,405**
2014	2,134	2,646	114	285	49	979		**6,207**

1. Data Hollister Cienega Wells for 2005-2008 estimated to be the same as WY 2009

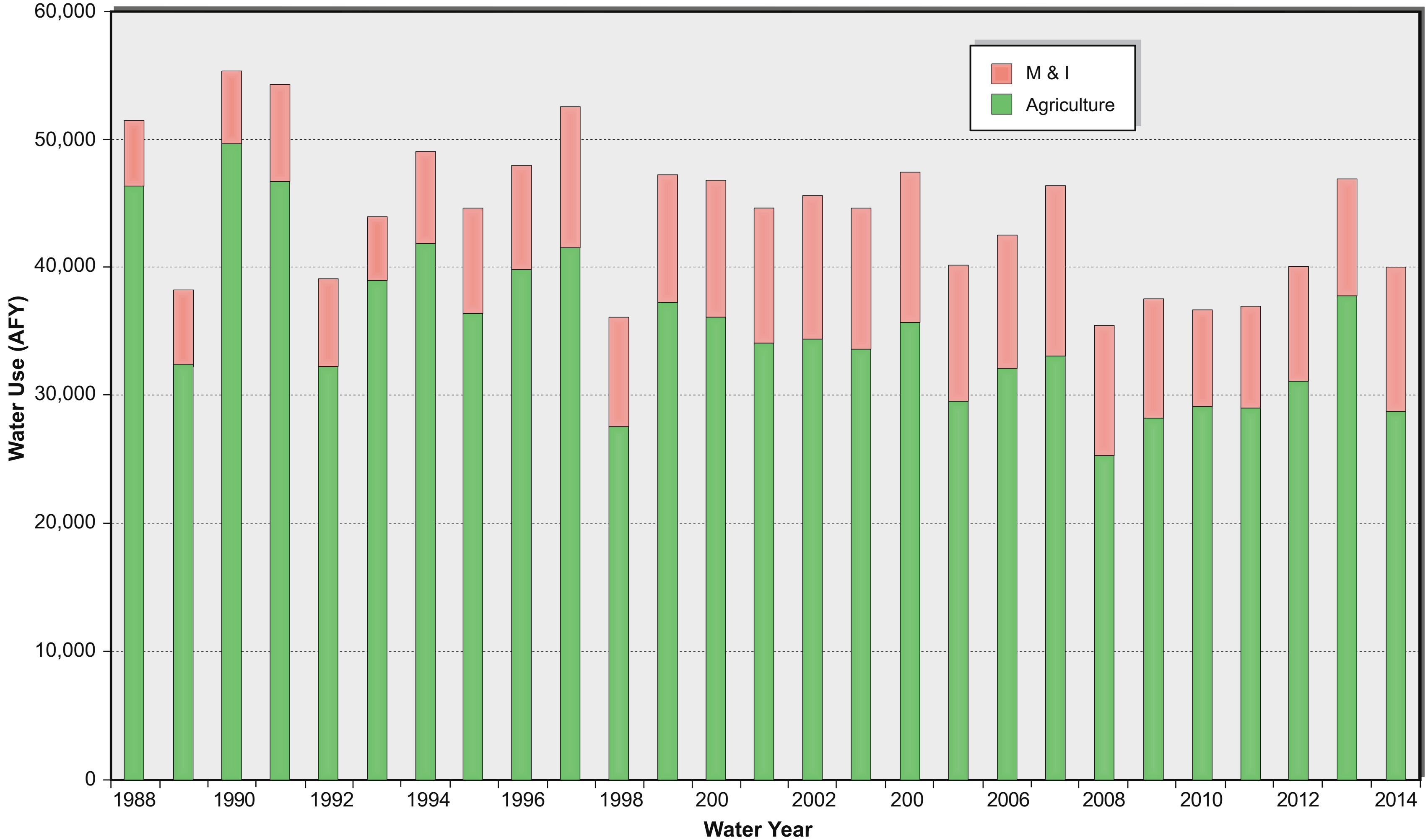
Cells with no data indicate that the information is unavaialble, while years with no use are shown explicity as 0's.



December 2014

TODD GROUNDWATER

Figure E-1
Groundwater Percentage of Total Water Use

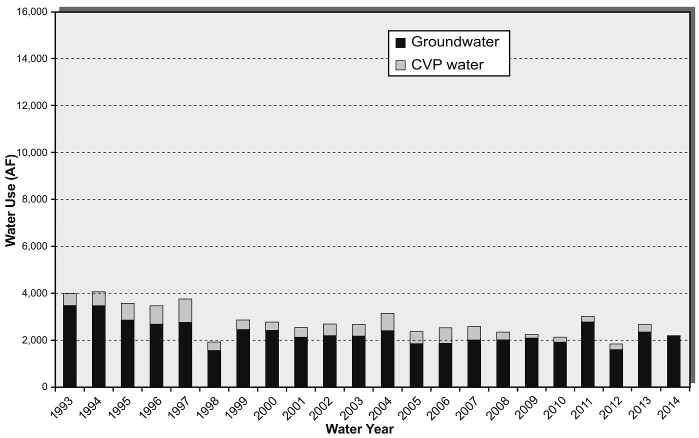


December 2014

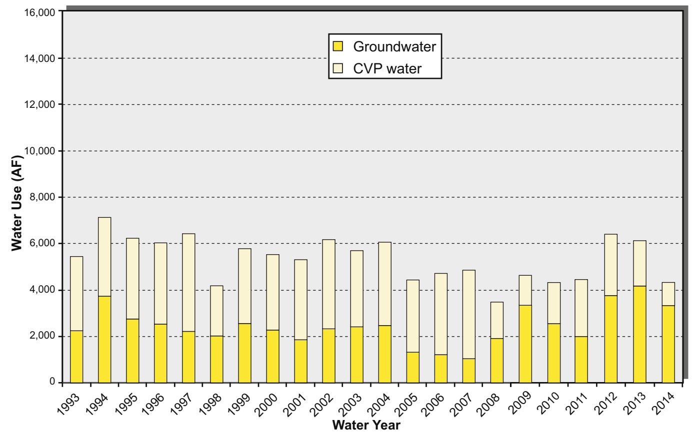
TODD GROUNDWATER

Figure E-2
Water Use in Zone 6
by User Category

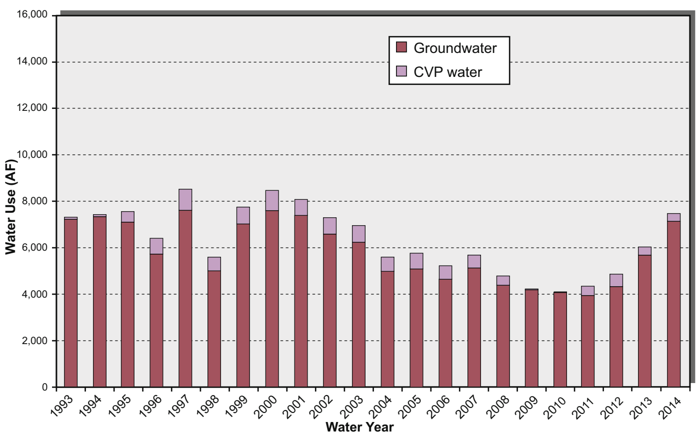
Bolsa SE



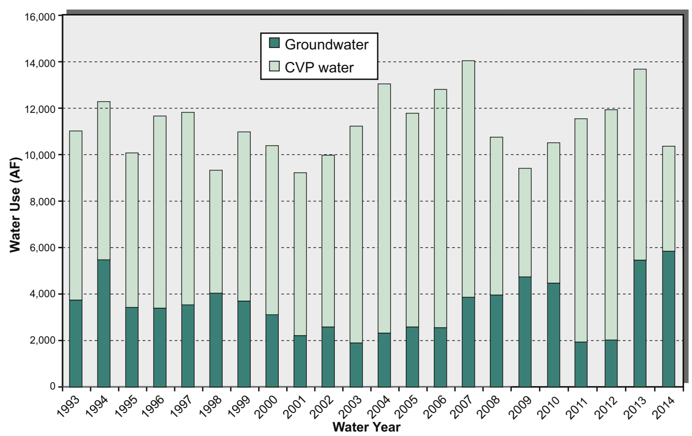
Pacheco



Hollister West

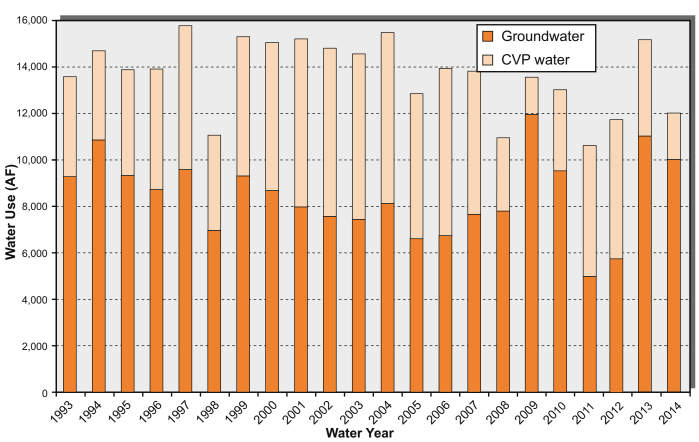


Hollister East

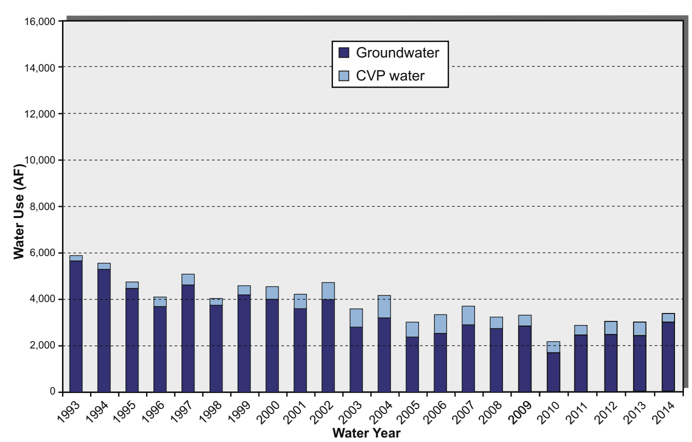


* 2007 Values Corrected From Previous Annual Report

San Juan Valley



Tres Pinos

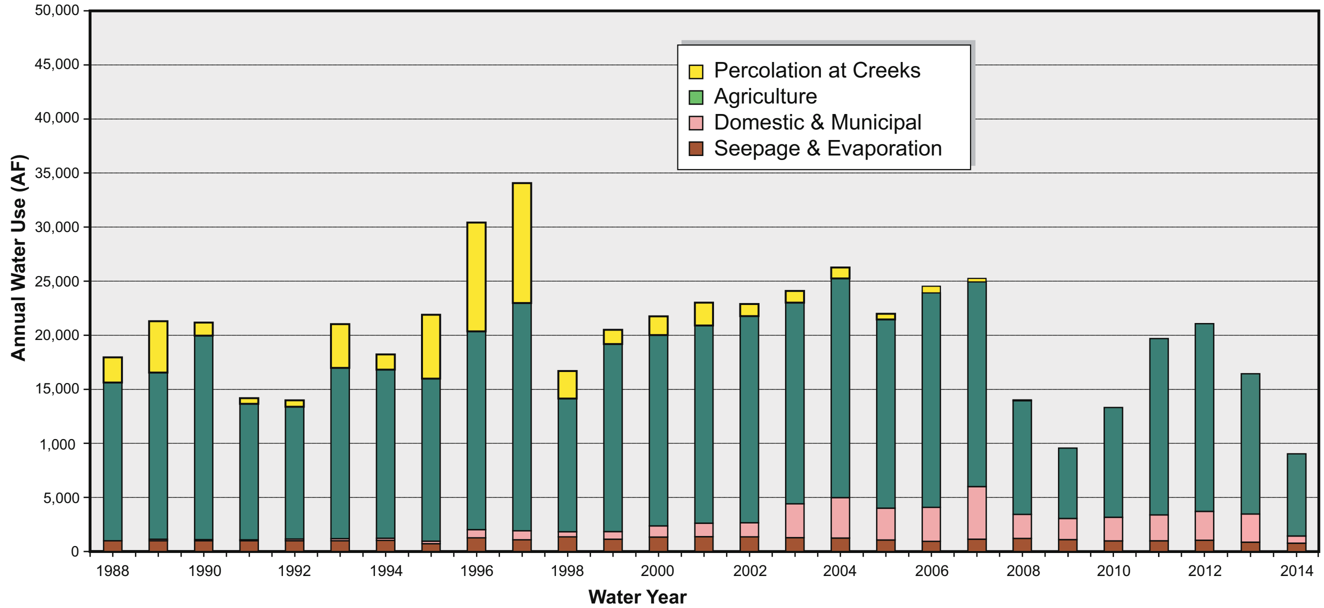


December 2014

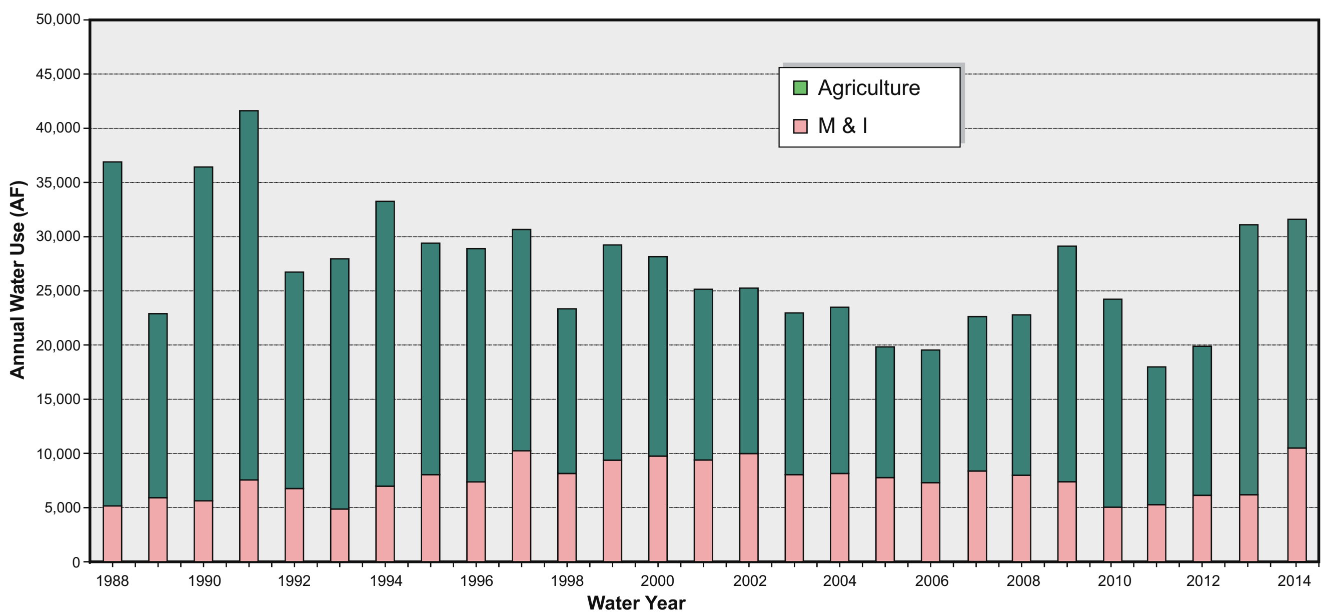
TODD GROUNDWATER

Figure E-3
Total Subbasin Water Use by Water Type

CVP Water



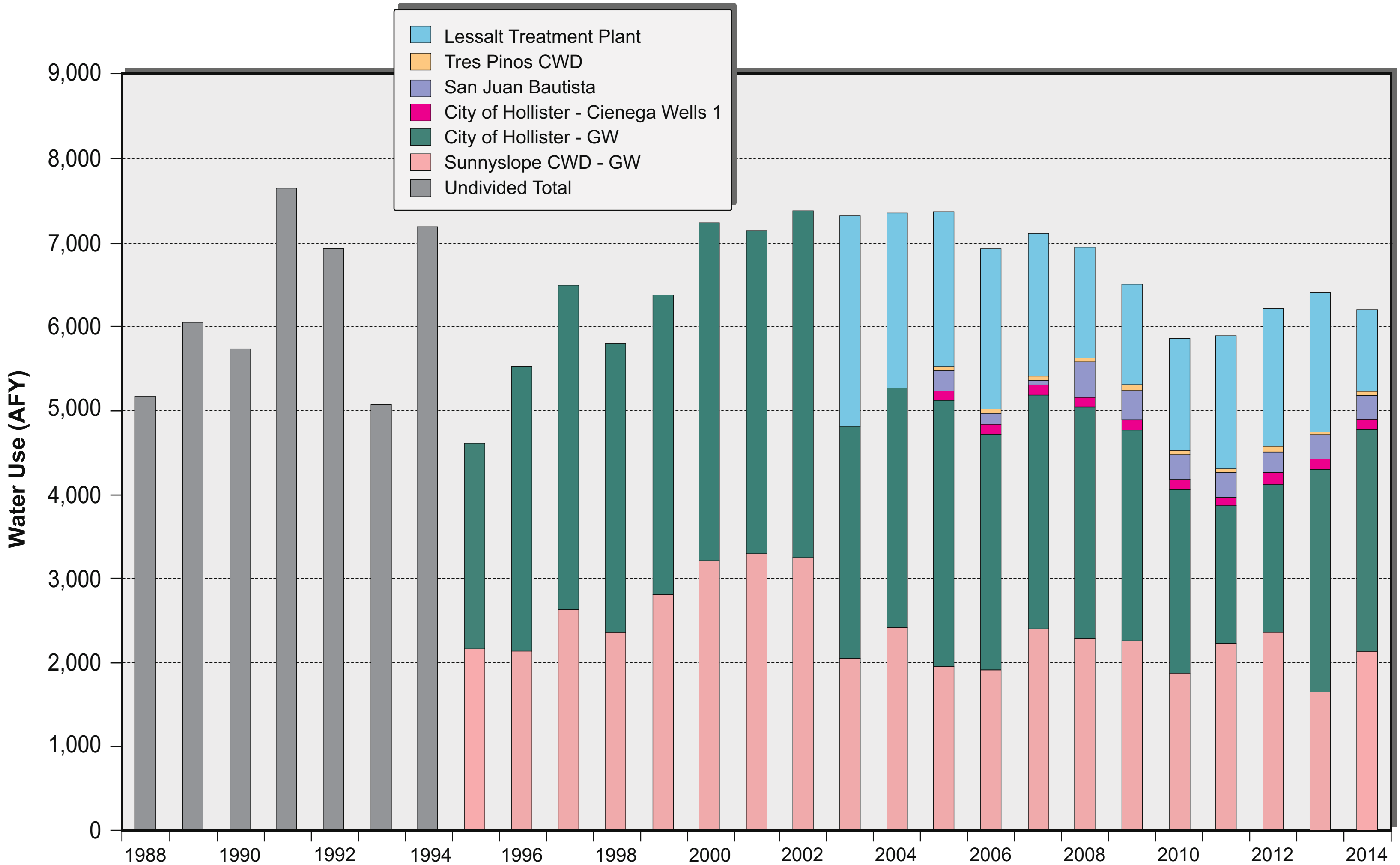
Groundwater



December 2014

TODD GROUNDWATER

Figure E-4
Annual Total of CVP and Groundwater Use by Type



December 2014

TODD GROUNDWATER

Figure E-5
Municipal Water Use by Purveyor

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F

RATES AND CHARGES

List of Tables and Figures

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Table F-1. Historical and Current San Benito County Water District CVP (Blue Valve) Water Rates (dollars/af)

USBR Water Year	Standby & Availability Charge (dollars/acre)	Water Charge		Power Charge					Groundwater Charge (dollars/af)		
		Agricultural	Municipal & Industrial	Distribution Subsystem					Agricultural	Municipal & Industrial	
				2	6H	9H	9L	Others			
1987	$8.00	$34.00	n.c.						n.i.	n.i.	
1988	$2.00	$34.00	n.c.						n.i.	n.i.	
1991	$4.00	$38.00	$113.00						$6.25	$22.00	
1992	$4.00	$45.00	$120.00						$2.00	$10.00	
1994	$4.50	$77.61	$168.92						$1.00	$5.00	
1995	$4.50	$77.61	$168.92						$1.00	$15.75	First 100 af
										$36.70	Next 500 af
										$54.60	Over 600 af
1996	$6.00	$75.00	$150.00						$1.50	$33.00	
1997	$6.00	$75.00	$157.00						$1.50	$33.00	
1998	$6.00	$75.00	$155.00						$1.50	$33.00	
2000	$6.00	$75.00	$155.00						$1.50	$11.50	
2001	$6.00	$75.00	$155.00						$1.50	$25.00	
2004	$6.00	$75.00	$150.00	$24.30	$46.75	$53.70	$25.05	$15.25	$1.50	$10.00	
2005	$6.00	$80.00	$150.00	$26.15	$49.40	$66.90	$35.00	$17.10	$1.50	$21.50	
2006	$6.00	$85.00	$160.00	$23.60	$36.05	$65.75	$34.70	$18.40	$1.50	$21.50	
2007	$6.00	$85.00	$160.00	$23.60	$36.05	$65.75	$34.70	$18.40	$1.50	$21.50	
2008	$6.00	$100.00	$170.00	$17.25	$19.25	$62.75	$32.60	$14.85	$1.50	$21.50	
2009	$6.00	$115.00	$180.00	$17.50	$20.25	$42.55	$74.85	$16.30	$2.50	$22.50	
2010	$6.00	$135.00	$200.00	$22.00	$27.30	$49.75	$84.35	$21.75	$2.50	$22.50	
2011	$6.00	$155.00	$220.00	$22.70	$28.15	$51.25	$86.90	$22.40	$2.50	$22.50	
2012	$6.00	$170.00	$235.00	$23.35	$29.00	$52.80	$89.50	$23.10	$2.50	$22.50	
2013	$6.00	$170.00	$235.00	$40.30	$29.25	$43.05	$91.55	$22.40	$3.25	$23.25	
2014	$6.00	$170.00	$238.00	$41.55	$30.15	$44.35	$94.30	$23.10	$3.60	$23.25	

Notes:

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

Table F-2. 2015/2016 Recommended Groundwater Revenue Requirement/Charges

REVENUE REQUIREMENTS						Rates [2]	
	Component	Rate ($/AF)	Quantity[1] (af)	Amount		Ag	M & I
Source of Supply							
Ag	Source of Supply Costs	$9.75	17,124	$ 166,956		$ 9.75	
M&I	Source of Supply Costs	$29.26	5,664	$ 165,729			$ 29.26
Percolation Costs							
Ag	CVP Water Rate[3]	$199.07	300	$ 59,721		$ 3.49	
M&I	CVP Water Rate[3]	$279.57	157	$ 43,905			$ 7.75
Ag	Power Charge for Percolation	$0.00	300	0		$ -	
M&I	Power Charge for Percolation	$0.00	157	0			$ -
Calculated Total						$ 13.24	$ 37.01
Previous Groundwater Charge (per acre foot)						$ 3.60	$ 23.25
CURRENT AND RECOMMENDED CHARGES (per acre foot)						**$ 3.95**	**$ 23.25**

1 Assumed Volumes
Percolation (based on average of last 3 years of recharge
Groundwater Usage (based on average of past 3 years)
2 Rates=Revenue Requirement/projected usage
3 CVP water rate basis for 2014-2015 water year

Note: Section 70-7.8 (a) of the District Act states that the agricultural rate shall not exceed one-third of the rates for all water other than agricultural water.

Table F-3. Recent US Bureau of Reclamation Charges per Acre-Foot for CVP Water

User Category and Cost Item	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008		2009	2010	2011	2012	2013	2014
Irrigation[1]																				
Cost of service																				
Non-Full Cost	$65.63	$69.57	$61.58	$60.30	$64.24	$69.50	$68.71	$72.20	$74.52	$77.10	$91.13	$93.53	$28.12	(6)	$30.20	$33.27	$38.92	$39.71	$40.39	$46.87
Restoration fund[3]	$6.53	$6.70	$6.88	$6.98	$7.10	$7.28	$7.54	$7.69	$7.82	$7.93	$8.24	$8.58	$8.79		$9.06	$9.11	$9.29	$9.39	$9.79	$9.99
SLDMWA[4]	n.a.	n.a.	$5.00	$2.73	$6.43	$2.65	$6.61	$5.46	$6.61	$7.99	$9.31	$9.99	$10.95		$11.49	$11.91	$9.51	$15.20	$17.29	$28.81
Trinity PUD Assessment												$0.11	$0.07		$0.07	$0.11	$0.05	$0.05	$0.05	$0.23
Total	$72.16	$76.27	$73.46	$70.01	$77.77	$79.43	$82.86	$85.35	$88.95	$93.02	$108.68	$112.21	$47.93		$50.82	$54.40	$57.77	$64.35	$67.52	$85.90
Contract rate[5]	$27.46	$27.46	$27.46	$27.46	$27.46	$27.46	$24.30	$24.30	$24.30	$24.30	$30.93	$30.93	$30.93		$30.20	$33.27	$38.92	$39.71	$39.91	$46.87
Municipal & Industrial																				
Cost of service[2]																				
Non-Full Cost	$127.40	$143.27	$130.88	$127.91	$129.59	$129.40	$130.32	$129.07	$134.86	$132.01	$214.41	$215.32	$33.34	(6)	$32.77	$36.11	$42.58	$37.95	$38.71	$29.70
Restoration fund[3]	$13.06	$13.39	$13.76	$13.96	$14.20	$14.56	$15.08	$15.38	$15.64	$15.87	$16.49	$17.15	$17.57		$18.12	$18.23	$18.59	$18.78	$19.58	$19.98
SLDMWA[4]	n.a.	n.a.	$5.00	$2.73	$6.43	$4.15	$6.61	$5.46	$6.61	$7.99	$9.31	$9.99	$10.95		$11.49	$11.91	$9.51	$15.20	$17.29	$28.81
Trinity PUD Assessment												$0.11	$0.07		$0.07	$0.11	$0.05	$0.05	$0.05	$0.23
Total	$140.46	$156.66	$149.64	$144.60	$150.22	$148.11	$152.01	$149.91	$157.11	$155.87	$240.21	$242.46	$61.68		$62.45	$66.36	$70.73	$71.98	$75.63	$78.72
Contract rate[5]	$85.86	$85.86	$85.86	$85.86	$85.86	$85.86	$79.13	$79.13	$79.13	$79.13	$77.12	$80.08	$33.34		$32.77	$36.11	$42.58	$37.95	$40.92	$29.70

Notes:

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

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

(3) Restoration fund charges apply October 1 through September 30.

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

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

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

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G GROUNDWATER SUSTAINABILITY

List of Attachments

from Association of California Water Agencies (ACWA)

- Sustainable Groundwater Management Act Fact Sheet
- Sustainable Groundwater Management Act Brochure
- Sustainable Groundwater Management Act Implementation Deadlines

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Fact Sheet

The Sustainable Groundwater Management Act of 2014 is a comprehensive three-bill package that provides a framework for sustainable management of groundwater supplies by local authorities, with a limited role for state intervention only if necessary to protect the resource.

The act requires the formation of local groundwater sustainability agencies (GSAs) that must assess conditions in their local water basins and adopt locally-based management plans. The act provides substantial time – 20 years – for GSAs to implement plans and achieve long-term groundwater sustainability. It protects existing surface water and groundwater rights and does not impact current drought response measures.

ACWA supported the legislation, which was substantially consistent with recommendations developed by the association's Groundwater Sustainability Task Force and adopted by the ACWA Board of Directors. ACWA's recommendations, together with recommendations from the California Water Foundation and input from other stakeholders, helped shape many provisions to protect local control and empower local agencies to achieve the sustainability goal.

The Sustainable Groundwater Management Act of 2014 is considered just one part of a statewide, comprehensive water plan for California that includes investments in water conservation, water recycling, expanded water storage, safe drinking water, wetlands and watershed restoration. The plan is intended to ensure a reliable water supply for California for years to come.

GSAs and Local Sustainability Plans

The Sustainable Groundwater Management Act provides local GSAs with tools and authority to:

- Require registration of groundwater wells
- Measure and manage extractions
- Require reports and assess fees
- Request revisions of basin boundaries, including establishing new subbasins

GSAs responsible for high- and medium-priority basins must adopt groundwater sustainability plans within five to seven years, depending on whether the basin is in critical overdraft. Agencies may adopt a single plan covering an entire basin or combine a number of plans created by multiple agencies. Preparation of groundwater sustainability plans is exempt from CEQA.

Plans must include a physical description of the basin, including groundwater levels, groundwater quality, subsidence, information on groundwater-surface water interaction, data on historical and projected water demands and supplies, monitoring and management provisions, and a description of how the plan will affect other plans, including city and county general plans.

Plans will be evaluated every five years.

State Involvement and Technical Assistance

The California Department of Water Resources (DWR) has several tasks under the Sustainable Groundwater Management Act. It must:

- Designate basins as high, medium, low or very low priority by Jan. 31, 2015
- Adopt regulations for basin boundary adjustments by Jan. 1, 2016
- Adopt regulations for evaluating adequacy of GSPs and GSA coordination agreements by June 1, 2016
- Publish a report estimating water available for groundwater replenishment by Dec. 31, 2016
- Publish groundwater sustainability best management practices by Jan. 1, 2017

State Review and Intervention

The State Water Resources Control Board may intervene if a GSA is not formed or it fails to adopt or implement compliant plans by certain dates.

DWR is tasked with reviewing GSPs for adequacy after they are adopted at the local level. If DWR determines in its review that a GSP is not adequate, the State Board may designate the basin as "probationary." If the local agency does not respond within 180 days, the State Board is authorized to create an interim plan that will remain in place until a local GSA is able to reassume responsibility with a compliant plan.

Financial Assistance

If approved by voters, Proposition 1 would provide $100 million in funding to GSAs to develop and implement sustainable groundwater management plans.

Key Implementation Dates

- **June 30, 2017:** Local groundwater sustainability agencies formed.
- **Jan. 31, 2020:** Groundwater sustainability plans adopted for critically overdrafted basins.
- **Jan. 31, 2022:** Groundwater sustainability plans adopted for high- and medium-priority basins not currently in overdraft.
- **20 years after adoption:** All high- and medium-priority groundwater basins must achieve sustainability.

October 2014

SUSTAINABLE GROUNDWATER MANAGEMENT ACT

A Framework for Sustainability

The California Legislature enacted comprehensive legislation aimed at strengthening local control and management of groundwater basins throughout the state. Gov. Jerry Brown signed the three-bill package into law on Sept. 16, 2014.

Known as the Sustainable Groundwater Management Act of 2014, the legislation provides a framework for sustainable management of groundwater supplies by local authorities, with a limited role for state intervention when necessary to protect the resource.

Multiple discussions and a public stakeholder process that began in late 2013 helped shape the legislation, which the Brown Administration identified as a top priority for 2014. It is considered one element of a comprehensive water action plan advanced by the Administration that also includes investment in water conservation, water recycling, expanded water storage, safe drinking water, wetlands and watershed restoration.

The Act at a Glance

The Sustainable Groundwater Management Act of 2014 consists of three bills — AB 1739 (Dickinson), SB 1168 (Pavley) and SB 1319 (Pavley). Together the bills commit the state to locally controlled, sustainable groundwater management and provide tools and authorities for local agencies to achieve the sustainability goal over a 20-year implementation period.

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Key Steps on the Road to Sustainability

The legislation lays out a process and a timeline for local authorities to achieve sustainable management of groundwater basins. It also provides tools, authorities and deadlines to take the necessary steps to achieve the goal. For local agencies involved in implementation, the requirements are significant and can be expected to take years to accomplish.

- **Step one:** Local agencies must form local groundwater sustainability agencies (GSAs) within two years.
- **Step two:** Agencies in basins deemed high- or medium-priority must adopt groundwater sustainability plans (GSPs) within five to seven years, depending on whether a basin is in critical overdraft.
- **Step three:** Once plans are in place, local agencies have 20 years to fully implement them and achieve the sustainability goal.
- **State role:** The State Water Resources Control Board may intervene if locals do not form a GSA and / or fail to adopt and implement a GSP.

Timeline for Sustainability

June 30, 2017: Local groundwater sustainability agencies formed.

Jan. 31, 2020: Groundwater sustainability plans adopted for critically overdrafted basins.

News Tools for Local Agencies

The legislation gives local agencies new tools to manage groundwater sustainably. For example, groundwater sustainability agencies may:

- Require registration of wells and measurement of extractions
- Require annual extraction reports
- Impose limits on extractions from individual groundwater wells
- Assess fees to implement local groundwater management plans
- Request a revision of basin boundaries, including establishing new subbasins

Creation of Groundwater Sustainability Plans

The legislation provides options for local agencies to develop the required groundwater sustainability plans. Agencies may opt to create a single plan covering the entire basin, or knit together multiple plans created by multiple agencies.

A plan must include measurable objectives and interim milestones to achieve the sustainability goal for the basin within a 20-year time frame. The plan also must include a physical description of the basin, including information on groundwater levels, groundwater quality, subsidence and groundwater-surface water interaction; historical and projected data on water demands and supplies; monitoring and management provisions; and a description of how the plan will affect other plans, including county and city general plans.

SUSTAINABLE GROUNDWATER MANAGEMENT ACT

State Technical and Financial Assistance

The California Department of Water Resources (DWR) has several tasks under the Sustainable Groundwater Management Act. It must:

- Designate basins as high, medium, low or very low priority by Jan. 31, 2015
- Adopt regulations for basin boundary adjustments by Jan. 1, 2016
- Adopt regulations for evaluating adequacy of GSPs and GSA coordination agreements by June 1, 2016
- Publish a report estimating water available for groundwater replenishment by Dec. 31, 2016
- Publish groundwater sustainability best management practices by Jan. 1, 2017

State Review and Intervention

The State Water Resources Control Board may intervene if a GSA is not formed or fails to adopt or implement compliant plans by certain dates.

DWR reviews the GSAs for adequacy after they are adopted at the local level. If DWR determines that an adequate groundwater sustainability plan is not in place, the State Board may designate the basin as "probationary." If the local agency does not respond within 180 days, the State Board is authorized to create an interim plan that will remain in place until a local GSA is able to assume responsibility with a compliant plan.

Financial Assistance

If approved by voters, Proposition 1 would provide $100 million in funding to GSAs to develop and implement sustainable groundwater management plans.

Jan. 31, 2022: Groundwater sustainability plans adopted for high- and medium-priority basins not currently in overdraft.

By 2040:
All high- and medium-priority groundwater basins must achieve sustainability.

Probationary Status

In general, the State Water Resources Control Board may designate a basin as "probationary" if, after consulting with DWR, it is found that a groundwater sustainability plan has not been created, the plan is inadequate, or the plan is not being implemented in a way that will lead to sustainability.

Specifically, the State Board may designate a basin as probationary if:

- No local agency has formed a groundwater sustainability agency for the basin by the June 30, 2017, deadline
- No groundwater sustainability plan has been adopted for a high- or medium-priority basin in critical overdraft by the Jan. 31, 2020, deadline
- No groundwater sustainability plan has been adopted for a high- or medium-priority basin not currently in critical overdraft by the Jan. 31, 2022, deadline
- After Jan. 31, 2020, the groundwater sustainability plan for a basin in critical overdraft is found to be inadequate or is not being implemented to achieve sustainability
- After Jan. 31, 2022, the groundwater sustainability plan for any other high- or medium-priority basin is found to be inadequate, or is not being implemented to achieve sustainability, and the State Board determines the basin is in a condition of long-term overdraft
- After Jan. 31, 2025, a groundwater sustainability plan is found to be inadequate, or is not being implemented to achieve sustainability, and the State Board determines that groundwater extractions are resulting in significant depletions of interconnected surface waters

If a local agency fails to respond to a deficiency within 180 days, the State Board is authorized to create and develop an interim plan that would remain in place until a local groundwater sustainability agency is able to take over and manage the basin sustainably.

About "High-Priority" and "Medium-Priority" Groundwater Basins

The Sustainable Groundwater Management Act applies to basins or subbasins designated by the Department of Water Resources as high- or medium-priority basins, based on a statewide ranking that uses criteria including population and extent of irrigated agriculture dependent on groundwater. Final basin prioritization by DWR is due by Jan. 31, 2015.

It is anticipated that about 125 basins throughout the state will be designated as high- or medium-priority basins for which a plan must be developed. Those basins account for about 90% of California's annual groundwater use. DWR's California Groundwater Bulletin 118 identifies a total of 515 alluvial groundwater basins and subbasins in California.

The Sustainable Groundwater Management Act does not apply to adjudicated basins that are managed by the courts, or to basins deemed by DWR to be low or very low priority.

Implementation Schedule

Jan. 31, 2015
DWR prioritizes basins

June 1, 2016
DWR adopts regulations for evaluating Groundwater Sustainability Plans

Dec. 31, 2016
DWR publishes report on water available for replenishment of groundwater in the state

Jan. 1, 2017
DWR publishes best managment practices for the sustainable management of groundwater

June 30, 2017
Groundwater Sustainability Agencies are formed

July 1, 2017
State may designate basin as probationary basin

January 31, 2020
Groundwater Sustainability Plans are adopted and implementation under way for basins in critical overdraft

Plans are submitted to DWR for adequacy review upon adoption

Interim milestones are reviewed by DWR every five years

January 31, 2022
Groundwater Sustainability Plans are adopted and implementation under way for basins not in overdraft

Plans are submitted to DWR for adequacy review upon adoption

Interim milestones are reviewed by DWR every five years

Jan. 31, 2040
Groundwater Sustainbility Agencies in critically overdrafted basin achieve sustainability goal

Jan. 31, 2042
Groundwater Sustainbility Agencies in basins not in overdraft achieve sustainability goal

ACWA's Path on Advancing Sustainability

In response to mounting concerns about groundwater overdraft and subsidence in some areas of the state, ACWA's Board of Directors acted in November 2013 to establish a Groundwater Sustainability Task Force to help identify ways to address the issue.

Drawing on the expertise of ACWA Board members from across the state, the task force developed a series of recommendations on groundwater to build on the association's Statewide Water Action Plan as well as its 2011 Groundwater Framework.

The task force's work led to a suite of recommendations adopted by the ACWA Board in March 2014 as discussions intensified in the regulatory and legislative arenas to address groundwater.

ACWA's recommendations, issued formally on April 7, 2014, made a strong policy statement in support of sustainable, locally controlled management of the state's groundwater basins and called for new tools and authorities to help local agencies take action. At the same time, the recommendations recognized the need for a limited state backstop role in cases where locals cannot accomplish the goal.

ACWA's recommendations, together with recommendations from the California Water Foundation, provided the basis for many key provisions of the groundwater sustainability legislative package that ultimately emerged and was signed by Gov. Jerry Brown on Sept. 16, 2014.

Resources:

ACWA's Recommendations for Achieving Groundwater Sustainability
http://www.acwa.com/content/groundwater/acwa-recommendations-achieving-groundwater-sustainability

California Department of Water Resources Groundwater Information Center
http://www.water.ca.gov/groundwater/

California Water Foundation Information / Recommendations on Groundwater Sustainability
www.californiawaterfoundation.org

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SUSTAINABLE GROUNDWATER MANAGEMENT ACT OF 2014

Implementation Deadlines

When	Who	What
January 31, 2015	Department of Water Resources (DWR)	Categorize and prioritize basins as high, medium, low, or very low [§ 10722.4(a)]
January 1, 2016	DWR	Adopt regulations for basin boundary adjustments and accept adjustment requests from local agencies [§ 10722.2(4)(b)]
April 1, 2016	Local water agencies or water-masters in adjudicated areas	Submit final judgment /order / decree and required report to DWR (report annually thereafter) [§ 10720.8(f)]
June 1, 2016	DWR	Adopt regulations for evaluating adequacy of Groundwater Sustainability Plans (GSPs) and Groundwater Sustainability Agency (GSA) coordination agreements [§ 10733.2]
December 31, 2016	DWR	Publish report estimating water available for groundwater replenishment [§ 10729(c)]
January 1, 2017	DWR	Publish groundwater sustainability best management practices [§ 10729(d)]
By June 30, 2017	Local agencies	Establish GSAs [§ 10735.2(a)(1)]
After July 1, 2017	State Water Resources Control Board (SWRCB)	Designate basins as probationary where GSAs have not been formed [§ 10735.2(1)]
After July 1, 2017	Groundwater users in probationary basins	File annual groundwater extraction report with SWRCB by December 15 each year [§ 5202]
January 31, 2020	GSAs in medium- and high-priority basins in critical overdraft	Adopt GSPs and begin managing basins under GSPs [§ 10720.7(a)(1)] or alternative [§ 10733.6]
After January 31, 2020	SWRCB	Designate basins as probationary where GSPs have not been adopted in medium- and high-priority basins in critical overdraft [§ 10735.2(1)]
January 31, 2022	GSAs in other medium- and high- priority basins	Adopt GSPs and begin managing basins under GSPs [§ 10720.7(a)(2)]
After January 31, 2022	SWRCB	Designate basins as probationary where GSPs have not been adopted in other medium- and high-priority basins [§ 10735.2(1)]
After January 31, 2025	SWRCB	Designate basins as probationary where GSPs are inadequate or not being implemented, and extractions result in significant depletions of interconnected surface waters [§ 10735.2(a)(5)(B)]
After January 31, 2040	GSAs (in medium- and high-priority basins in critical overdraft)	Achieve groundwater sustainability goals (DWR may grant two five-year extensions upon a showing of good cause) [§ 10727.2(3)(A)]
After January 31, 2042	GSAs (in other medium and high priority basins)	Achieve groundwater sustainability goals (DWR may grant two five-year extensions upon a showing of good cause) [§ 10727.2(3)(A)]

Prepared by the Association of California Water Agencies www.acwa.com
October 2014

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H

WATER BALANCE

List of Attachments

List of Tables and Figures

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WATER BALANCE METHODOLOGY

Annual groundwater balances for water years 2012, 2013 and 2014 were developed for the 2014 annual report. The water balance table for each year lists inflows and outflows by subbasin in the same format as in prior annual reports. However, the procedures used to develop the numbers were substantially revised. For the current effort, an integrated set of spreadsheets, Fortran programs and GIS tools was used that offers several advantages:

- Continuous simulation over multiple years (in this case, water years 1975-2014 were simulated).
- The ability to account for evolving land use during the simulation period.
- Simulation of land use at a parcel scale, which enabled the procedure to simulate groundwater pumping for irrigation while accounting for concurrent surface water use (which is tracked on a parcel basis).
- Automated preparation of recharge and agricultural pumping files for input to the regional groundwater model, aggregating daily output to stress periods that can be unequal in duration if desired.
- Improved ability to simulate the effects of ground slope and shallow bedrock on rainfall runoff, root depth and groundwater recharge.
- Inclusion of shallow groundwater discharge to streams in upland areas, where appropriate.

Water balance information is a prerequisite for effective water resources management. The relative magnitude of each water balance element and its changes over time illustrate the mechanisms at work in the basin. The water balance supports decisions related to groundwater replenishment and withdrawals. Line items in the water balance tables are estimated using various independent methods, and combining the estimates into a single table can reveal errors in assumptions or data.

As an additional check on consistency, the tables include two estimates of net annual change in groundwater storage. One estimate equals the difference between total inflows and total outflows, and the other is a volumetric calculation based on aquifer storativity values and changes in observed groundwater levels. Comparison of the two change-in-storage values allows consideration of the accuracy of the overall water balance estimate.

For future water balances, a numerical model would help provide a comprehensive simulation that would allow the conceptual model (and estimated water balance elements) to be confirmed or adjusted based on the difference between the simulated and observed water levels and flows.

Inflows

There are five major sources of inflow to the subbasins in Zone 6 and surrounding areas. These include natural stream percolation, percolation from Hernandez/Paicines releases, deep percolation (from rainfall and/or irrigation), percolation of reclaimed water, and subsurface groundwater inflow. The budget tables include a sixth inflow item, which is direct percolation of imported CVP water by means of releases to local creek channels. That practice was common during 1992-2005 but was discontinued indefinitely due to the full condition of the basin and potential for release of invasive mussels from the imported water system.

Stream Percolation

Percolation along local stream channels provides groundwater recharge in many parts of the basin. Percolation can occur from natural flows, releases of imported water or releases from Hernandez Reservoir in the headwaters of the San Benito River watershed. During 2012-2014, which included two very dry years, natural flows and reservoir releases were both below average. Percolation is estimated based on the amount of natural flow in the waterway, the distance that the waterway transverses a subbasin, and the channel percolation capacity. Percolation capacities were estimated from synoptic surveys of changes in flow along each creek completed in the late 1990's (Yates, 2008). The overall percolation capacity and the length of the "losing" reach decrease when groundwater levels are high (a phenomenon called rejected recharge). Since the percolation estimates are based on static values for these variables there is some uncertainty in the amount of stream flow that percolates in any given year. Flow and percolation rates for local creeks and the San Benito River are shown in **Table H-1**.

Table H-1. Estimated parameters for stream percolation

Name	Watershed Area (ac)	Annual Precip (in)	Calibration+	Subbasin	Length of Perc (mi)	Maximum Perc Rate (cfs/mi)
Pacheco Creek	145.0	18	1	Pacheco	2	5.34
Arroyo de las Viboras	22.1	22	1	Pacheco	2.28	6.29
Arroyo Dos Picachos	16.2	20	1	Hollister East	1.31	1.02
Santa Ana Creek	36.5	19	1	Hollister East	7.58	6
Bird Creek*+	15.0	18	0.15	Hollister West Tres Pinos	--	--
Pescadero Creek*+	38.3	18	0.15	Hollister West Tres Pinos	--	--
Tres Pinos Creek*	--	--	1	Tres Pinos	--	--
San Benito River*	--	--	1	San Juan, Hollister West, Tres Pinos	--	--

*Percolation along these streams is calculated using a combination of USGS gage data and Hernandez/Paicines release information

+Pescadero and Bird Creek flows were reduced by a calibration factor to remain consistent with observed flows

Stream flow gages are only present on Pacheco Creek, Tres Pinos Creek and the San Benito River. Daily flows in ungaged streams are estimated from gaged flows in four reference streams outside the basin. These streams are listed in **Table H-2**. This regional approach avoids potential errors associated with anomalous rainfall or stream flow conditions at any single reference gage. For each of the local ungaged streams, a daily unit flow was determined by normalizing stream flow by watershed area and annual average precipitation. The unit flows of the four streams were averaged to determine a reference unit flow per day that could be applied to streams within the basin. The unit flow was multiplied by each stream's watershed area and annual average precipitation, **Table H-1**, to develop a daily estimate of flow. The maximum portion of estimated daily flow that could result in recharge was determined by multiplying the length of the percolation reach in the subbasin by the maximum percolation rate in cfs per mile.

Table H-2. Reference streams used to estimate daily flow on ungaged streams.

Name	Watershed Area (ac)	Annual Precip (in)	USGS Station ID	Location	Latitude	Longitude
Gabilan Creek	36.7	18	11152600	Salinas, CA	36.755792	-121.610501
Cantua Creek	46.4	11	11253310	San Joaquin Valley	36.402174	-120.43349
Los Gatos Creek	95.8	16	11224500	Coalinga, CA	36.2146772	-120.470712
Corralitos Creek	27.8	35	11159200	Watsonville, CA	36.9393968	-121.770507

Percolation on the San Benito River can be estimated using two available USGS gages and available percolation rate data from synoptic surveys. However, flow in the river at these gages consists of a combination of natural sources and reservoir releases. In order to estimate the contribution of each source to the stream flow percolation, a more detailed analysis is required and described in the Reservoir Releases section below.

Because of changing conditions, high groundwater levels, antecedent moisture conditions, and intensity of precipitation, the percolation rate, volume, and the portion of the stream recharging groundwater also change over time. Because the simple method developed to estimate percolation is based on one set of percolation data (length and rate) and assumes available groundwater storage, it represents a maximum amount of percolation. In past Annual Reports, “rejected recharge” was roughly estimated between 0 and 50 percent. The adjustments made to the calculated stream percolation values are discussed in the water balance section of the report.

Reservoir Releases

San Benito River and Tres Pinos Creek flows are augmented by releases from the upstream Hernandez and Paicines Reservoirs. The flow from natural sources (e.g., rainfall) and from reservoir releases were estimated separately to determine the contribution of flow and percolation by source. For the San Benito River, the USGS has continuous gages at two locations: Willow Creek School (upstream of Paicines Valley) and Old Highway 156 (near Hollister). Since reservoir releases from Hernandez and flow at Willow Creek School are both observed, the contribution of the releases to the total flow can be determined by assuming any flow up to the volume of the release is from a reservoir release. The remaining flow can be considered the natural flow component. This simple analysis sometimes leads to a more variable natural flow than expected under the current conceptual model. In previous water balances (water year 2008 and earlier) a regression was used to smooth the streamflow data and reduce variability. However, for this report it was determined on an annual scale that this approach adequately estimates the natural percolation and reservoir release percolation.

Percolation from the San Benito River occurs along the four subbasins it traverses: Paicines Valley, Tres Pinos, Hollister West and San Juan. The first three of those are between the two USGS gages, and the overall flow loss between the gages is apportioned among the subbasins based on groundwater conditions, taking into account additional flow from Pescadero and Bird Creeks (estimated by the reference stream method discussed above).

Percolation is assumed to be satisfied first by reservoir release flows, because the releases are managed to percolate entirely before leaving the inter-gage reach. The remainder of flow and percolation is assumed to be from natural sources. Flow past the Highway 156 gage is assumed to percolate at a maximum rate of 8 cfs based on synoptic surveys performed in the late 1990's (Yates, 2008).

The portion of percolation that occurs in Paicines Valley is determined through a water budget that estimates groundwater storage depletion during the preceding dry season. River percolation reliably refills the deficit in all but very dry years. The remaining percolation upstream of the Highway 156 gage is apportioned between the Tres Pinos and Hollister West subbasins based on their respective reach lengths and flow and groundwater conditions. The drought that commenced in 2013 has resulted in decreased CVP imports, increased groundwater pumping, lower groundwater levels and very low local stream flow. Accordingly, percolation was not reduced by rejected recharge (as was the case in the early 2000s). Proceeding in downstream order, each subbasin was allowed to percolate up to the amount of available flow or the channel percolation capacity, whichever was smaller. During 2012-2014, the Paicines subbasin was able to percolate all of the San Benito River flow.

Percolation releases from Paicines Reservoir were assumed to completely infiltrate along Tres Pinos Creek in the Tres Pinos subbasin. Finally, flow in the San Benito River occasionally reached the gage at old Highway 156, even though the annualized percolation calculations indicated that all river water should have percolated upstream of the gage. The discrepancy results from transient events when flashy river flows temporarily exceed the percolation capacity, and possibly also errors in estimated percolation capacity. Highway 156 flows up to a maximum of 8 cfs were assumed to percolate in the San Juan subbasin.

Deep Percolation

Deep percolation refers to the portion of water applied to the basin (either through precipitation or irrigation) that percolates through the soil to the groundwater aquifer. A soil moisture budget was prepared to examine the portion of the daily volume of precipitation and irrigation that percolates to the aquifer. A soil moisture budget accounts for several factors including daily precipitation, interception, runoff, infiltration, soil moisture storage, evapotranspiration, and the amount and efficiency of applied irrigation water. The basic concept of a soil moisture budget is that deep percolation is expected to occur only when the maximum moisture-holding capacity of the soil is reached. The budget calculations update soil moisture storage and deep percolation on a daily time step for each recharge zone.

New recharge zones were delineated based on a GIS coverage of land use in 2010, which was developed by updating a 2002 survey (California Department of Water Resources, 2002) using aerial photography from 2010 (Todd Engineers, 2012). Recharge was estimated for individual fields, which commonly coincide partially or entirely with land parcels. This enabled imported water use by parcel to be reflected in the estimate of groundwater pumping (groundwater pumping equals total irrigation demand minus imported water). This produced a total of 3,685 recharge zones within the groundwater model area, which includes the San Benito County part of the Gilroy-Hollister basin and surrounding hillsides but excludes Paicines and Tres Pinos Creek Valleys. In prior years, only 27 broad recharge zones were simulated.

Recharge zones were assigned to one of 22 land use categories, which included six categories of natural vegetation, seven categories of urban or developed uses, and seven categories of irrigated crops. The crop categories reflected groups sharing similar root depths, crop coefficients and growing seasons: pasture, grain, field crops, truck crops (vegetables), deciduous orchard, citrus, and vineyard.

The daily soil moisture capacity can be expressed as:

Soil Moisture Storage = Precipitation– Interception - Runoff –ET demands + Irrigation + Previous Day's Soil Moisture Storage

If the calculated soil moisture storage is greater than the maximum, then deep percolation occurs:

Deep Percolation = Soil Moisture Storage – Maximum Soil Moisture Capacity

Deep percolation accrues to a shallow groundwater storage zone from which groundwater leaks downward to the regional aquifer system at a constant rate or seeps laterally into a creek channel at a rate proportional to shallow groundwater storage. Each of the variables and how they were estimated are discussed below:

- **Precipitation** – Daily rainfall (in inches) was obtained from the National Climatic Data Center precipitation station "Hollister 2".

- **Interception**— Interception is rain that adheres to leaves and never reaches the ground. It was assumed to range from 0 inches for unvegetated areas to 0.02 inches for deciduous vegetation to as much as 0.08 inches for perennial broad-leaf shrubs and trees. Interception was subtracted from from rainfall on each rainy day.

- **Runoff** – The amount of rainfall that results in runoff was estimated using a linear equation. Runoff was assumed to commence when daily rainfall exceeded a threshold amount. This threshold was estimated to range from 0.3 inches for urban industrial zones to 1.1 inches for all categories of cropland and natural vegetation on level ground. Above the threshold, 90-96 percent of daily rainfall was assumed to infiltrate, while the remainder became direct runoff, depending on land use category. These values were based on model calibration studies in another central coast groundwater basin (HydroFocus, 2012).

- **Evapotranspiration (ET)**– Evapotranspiration refers to the evaporation of water from soil (evaporation) and leaves (transpiration). It was calculated using the common method of multiplying a reference value of ET by a crop coefficient that reflects differences in physical characteristics between the type of vegetation in a recharge zone and the reference conditions. Measured daily reference evapotranspiration (ETo) was downloaded from the California Irrigation Management Information System (CIMIS) for the San Benito station located at the District's offices on the eastern outskirts of Hollistrer (Station # 126).

  Monthly ET crop coefficients (Kc) for each crop type were adapted from several sources (California Department of Water Resources, 1975; Snyder and others, 2007; Williams, 2001; U.N. Food and Agriculture Organization) and are shown in **Table H-3** (located at the end of the section). Note that each recharge zone was assumed to be comprised of impervious, irrigated and nonirrigated land cover, with the corresponding percentages reflecting the primary land use (residential, industrial, natural, cropland).

- **Irrigation** – For irrigated areas, irrigation demand is estimated based on the accumulated soil moisture deficit since the last rainfall or irrigation event. Irrigation is triggered on the day when soil moisture drops below a threshold, which was set to 80 percent of soil moisture capacity for most crops. The amount of irrigation water applied was calculated as the accumulated soil moisture deficit (in inches) divided by the irrigation efficiency. Irrigation efficiency was assumed to be 85 percent for all commercial crops except vineyards. The over-applied water (15 percent of the application in this case) causes the soil moisture profile to over-fill, and the excess becomes deep percolation. Inefficiency due to evaporation of sprinkler spray, overspray onto impervious surfaces, or ruonff is not considered.

  Vineyards are drip irrigated and typically grown under a "regulated deficit irrigation" (RDI) regimen during mid-July through harvest. RDI deliberately under-irrigates the vines and imposes mild water stress. Drip irrigation was assumed to be 95 percent efficient outside the RDI season and 100 percent efficient during the season.

  Growers in Zone 6 generally use a combination of groundwater and imported water for irrigation. The proportion of imported water used on a field varies tremendously from month to month and crop to crop. Use of imported water is recorded by the District on a monthly basis for all agricultural parcels in Zone 6. Parcel water use was aggregated or pro-rated to recharge zones based on the amount of overlapping area (calculated from polygon intersections in GIS). For each recharge zone, groundwater irrigation was calculated by summing daily irrigation demand over a month and then subtracting the monthly contributions of imported irrigation water from all overlying parcels.

- **Soil Moisture Capacity** - The maximum soil moisture capacity is the total amount of water that can be stored in the root zone of a specific soil with a given land cover. Any additional water introduced into the root zone results in deep percolation to the shallow groundwater zone. Maximum soil moisture capacity is derived from the available capacity of a soil (the moisture range between field capacity and permanent wilting point, in inches per inch) and the rooting depth of the land cover/crop. The rooting depths were compiled from a variety of sources including Blaney and others (1963) for native vegetation, United Nations FAO Irrigation and Drainage Paper No. 56 for crops (2006), and Dunne and Leopold (1978) for bare soils. The available water capacity was based on the Natural Resources Conservation Service soil survey. The soil moisture budget simulation is continuous, so the ending soil moisture for one year becomes the initial soil moisture balance for the following year.

Parameters for the shallow groundwater zone were set to allow all of the deep percolation from the root zone to become regional groundwater recharge, with no seepage into local stream channels. Accretions to small stream base flow typically occur only when peripheral watershed areas are being simulated.

The soil moisture budget accounting comingles rainfall infiltration and applied irrigation water. For the purposes of the annual report, deep percolation from natural and irrigation sources are reported separately in the water balance tables. The irrigation component is calculated as:

Irrigation deep percolation = Applied irrigation water * (1 – irrigation efficiency)

The natural component equals the remainder of the total deep percolation.

Paicines and Tres Pinos Creek Valleys are outside the area covered by the groundwater model and were not included in the simulated recharge zones. Irrigation demand and groundwater recharge for those areas were estimated from simulation results for a mix of zones with similar crops within Zone 6.

The recharge program also includes leaks from water and sewer pipes, which can be significant sources of recharge in urban areas. Unaccounted for water averages about 7 percent of total water production in the City of Hollister and Sunnyslope County Water District service areas (Todd Engineers, 2011). All of this was assumed to be water leaked from water mains, and all of it was assumed to become groundwater recharge. The sewer leak rate was assumed to be half of the water main leak rate, and the leaked water was similarly added to recharge.

Reclaimed Water Percolation

Several municipalities have wastewater treatment plants (WWTPs) within the basin, including the Tres Pinos, Cielo Vista, and San Juan Bautista WWTPs, two sites operated by Sunnyslope County Water District near Ridgemark, and the City of Hollister domestic and industrial plants (DWTP and IWTP, respectively). Tres Pinos, SSCWD and the City of Hollister have percolation ponds where treated wastewater is allowed to percolate to the groundwater aquifer. The total volume percolated is reported by facility in **Appendix D** for water years 2012 through 2014. The percolation from each facility is assigned to one or more subbasins. The distribution of reclaimed water percolation is shown in **Table H-4**. The proportions of IWTP recharge percolating into the San Juan and Hollister West subbasins are estimated and can change over time.

Table H-4. Percent of WW percolating in each subbasin

	San Juan	Hollister West	Tres Pinos
Hollister -- domestic	100		
Hollister -- industrial	50	50	
Ridgemark Estates I & II			100
Tres Pinos			100

Subsurface Inflow

Subsurface groundwater flow to and from individual subbasins was previously calculated for 2009-2011 using Darcy's Law. Although conceptually correct, the accuracy of the method was limited by the amount and accuracy of water-level data to define the gradients. Regional scale gradients tend to change gradually, but local water-level fluctuations at the monitoring wells produced flow estimates that varied substantially from year to year. For the current annual report, groundwater flows to and from subbasins in 2012-2014 were set equal to the average flows during 2009-2011. In prior years, minor adjustments to groundwater inflows and outflows were made if they were consistent with general changes in water levels and also reduced the discrepancies between the two estimates of storage change for the subbasin. Adjustments were not made for 2012-2014 because other variables dominated the uncertainty in the water balance calculations.

Outflows

The major outflows from the subbasins in Zone 6 and surrounding areas are groundwater pumping (agricultural and M&I plus domestic) and surface and subsurface outflow.

Pumping

Groundwater pumping in Zone 6 is metered by means of hour meters on irrigation wells that are read three times per water year in early spring, summer, and early fall. Groundwater meters are categorized as agriculture use, domestic use, or municipal use. Monthly data for municipal wells are also received directly from the City of Hollister, SSCWD, the City of San Juan Bautista, and Tres Pinos Water District. For areas outside of Zone 6 (Bolsa, Pacheco, Tres Pinos Creek Valley), agricultural pumping is estimated using the soil moisture budget. The irrigation needs of the subbasins are based on land use, crop evapotranspiration coefficient, and irrigation efficiency. Domestic and municipal use in the Bolsa, and Pacheco subbasins are assumed negligible.

Agricultural pumping is also calculated using the soil moisture balance described in the inflow section. The calculated pumping (the estimated groundwater needed to meet the applied water demand of the specific crops) is significantly different than the reported pumping. It is unclear why this discrepancy exists and the District is investigating the accuracy of their meters. For purposes of this annual report, the reported groundwater use was used to remain consistent with previous years.

Groundwater Outflow

Subsurface outflow is determined by the same method as groundwater inflow. The Darcy's Law estimates for 2009-2011 were averaged, and the averages were used throughout 2012-2011.

Change in Storage

The change in groundwater storage can be estimated two ways. The first is simply:

Inflows- Outflows = Change in Storage

The second method, described in detail in the groundwater levels section of the report, involves analysis of the change in water levels and the regional storavity values.

Conclusion

The water balance analysis provides independent estimation of each element with consistent methodology, and thereby provides a useful check on the current basin conceptualization. The water balance can be used to help illustrate and document changes in groundwater basin conditions, and can indicate changes in groundwater use, hydrologic conditions, or groundwater management. The water balance should continue to be updated regularly. In addition, estimation of selected water balance elements can be improved with further data and analysis as described in the previous section.

Appendix H References Cited

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Table H3. Monthly Crop Coefficients for Vegetation Types Simulated by the Recharge Program

JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Crop
1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	1.00	NV-grass
0.75	0.75	0.75	0.75	0.85	1.00	1.10	1.10	1.10	0.95	0.85	0.75	NV-riparian
0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	NV-brush and trees
1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	1.13	Water
0.90	0.80	0.50	0.30	0.20	0.20	0.20	0.20	0.20	0.30	0.50	0.90	Bare soil
0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	0.80	Lawn
0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	0.92	Pasture
0.81	1.05	1.05	0.90	0.50	0.20	0.20	0.20	0.20	0.24	0.33	0.57	Grain, nonirrigated
0.81	1.05	1.05	0.90	**0.80**	**0.92**	**0.92**	**0.85**	**0.75**	**0.65**	**0.55**	0.57	Melons, squash, cukes
0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	0.75	Small vegetables
0.20	0.20	0.20	0.20	0.50	0.63	0.91	0.82	0.49	0.46	0.20	0.20	Field crops, irrigated
0.81	1.05	1.05	0.90	0.50	0.35	0.45	0.50	0.50	0.20	0.33	0.57	Vineyard, 10-ft rows
0.70	0.70	0.70	0.69	0.67	0.65	0.65	0.65	0.67	0.69	0.70	0.70	Citrus
0.20	0.20	0.25	0.35	0.50	1.10	1.10	1.10	1.10	0.65	0.20	0.20	Deciduous orchard

Sources: adapted from DWR (1975), Wililiams (2001), UNFAO (2006), Snyder and others (2007).

Table H-5. Water Balance for Water Year 2006

	Pacheco	Bolsa Southeast	San Juan	Hollister West	Hollister East	Tres Pinos	Zone 6 Subtotal	Bolsa	Paicines	Tres Pinos Creek Valley	Grand Total
Inflows											
Stream percolation											
Natural streamflow*	1,659	0	1,410	1,134	2,681	378	7,263	500	238	2,521	10,522
Reservoir releases	0	0	587	1,222	0	407	2,217	0	0	0	2,217
CVP Percolation	0	0	0	451	0	1	452	0	0	0	452
Deep percolation through soils											
Rainfall+	1,763	699	5,499	1,396	2,859	842	13,059	3,853	451	110	17,472
Irrigation	447	252	1,262	194	953	100	3,207	623	102	32	3,964
Reclaimed water percolation	0	0	2,402	606	0	249	3,257	0	0	0	3,257
Groundwater inflow	4,000	3,750	500	2,750	1,250	4,000	16,250	6,000	500	500	23,250
Total	7,869	4,700	11,660	7,753	7,743	5,978	45,704	10,976	1,290	3,162	61,133
Outflows											
Wells											
Agricultural	1,029	1,856	5,822	1,422	1,263	842	12,234	6,234	1,016	316	19,800
Domestic and M & I	180	8	919	3,211	1,292	1,645	7,255	0	0	49	7,304
Groundwater outflow	4,250	2,000	2,000	3,750	1,500	2,750	16,250	5,250	500	500	22,500
Total	5,458	3,864	8,741	8,383	4,055	5,238	35,739	11,484	1,516	865	49,603
Storage change											
Inflows - outflows	2,411	837	2,919	(630)	3,688	741	9,965	(508)	(225)	2,298	11,530
Water level change	410	245	442	770	1,539	409	3,815	1,195	0	0	5,010

*rejected recharge was assumed to be 50 % for Pacheco, natural percolation in San Juan subbasin was also decreased by 50 percent to represent rejected recharge
+Deep percolation from rainfall was decreased by 20 percent to account for additional runoff and rejected recharge during wet times

Table H-6. Water Balance for Water Year 2007

	Pacheco	Bolsa Southeast	San Juan	Hollister West	Hollister East	Tres Pinos	Zone 6 Subtotal	Bolsa	Paicines	Tres Pinos Creek Valley	Grand Total
Inflows											
Stream percolation											
Natural streamflow*	799	0	25	73	319	24	1,241	500	34	2,673	4,448
Reservoir releases	0	0	767	2,297	0	766	3,830	0	0	0	3,830
CVP Percolation	0	0	0	216	0	88	304	0	0	0	304
Deep percolation through soils											
Rainfall	378	179	1,166	287	402	66	2,478	759	96	17	3,350
Irrigation	457	257	1,218	214	1,069	95	3,311	709	116	35	4,170
Reclaimed water percolation	0	0	2,354	614	0	158	3,126	0	0	0	3,126
Groundwater inflow	4,500	3,000	250	3,000	1,250	3,000	15,000	6,000	500	500	22,000
Total	6,135	3,436	5,781	6,701	3,040	4,197	29,290	7,968	746	3,224	41,228
Outflows											
Wells											
Agricultural	810	1,998	6,562	1,662	2,366	849	14,247	7,086	1,156	350	22,839
Domestic and M & I	224	7	1,096	3,456	1,501	2,013	8,297	0	0	46	8,343
Groundwater outflow	4,250	2,000	500	2,750	1,500	1,250	12,250	1,500	500	500	14,750
Total	5,284	4,005	8,158	7,868	5,367	4,112	34,794	8,586	1,656	896	45,932
Storage change											
Inflows - outflows	851	(569)	(2,377)	(1,168)	(2,327)	85	(5,504)	(618)	(910)	2,328	(4,703)
Water level change	(958)	(1,466)	(2,530)	(400)	(2,909)	(220)	(8,482)	(862)	0	0	(9,344)

*no rejected recharge removed

Table H-7. Water Balance for Water Year 2008

	Pacheco	Bolsa Southeast	San Juan	Hollister West	Hollister East	Tres Pinos	Zone 6 Subtotal	Bolsa	Paicines	Tres Pinos Creek Valley	Grand Total
Inflows											
Stream percolation											
Natural streamflow*	1,131	0	496	275	726	92	2,719	500	146	2,669	6,035
Reservoir releases	0	0	412	564	0	188	1,164	0	0	0	1,164
CVP Percolation	0	0	0	6	0	0	6	0	0	0	6
Deep percolation through soils											
Rainfall	1,111	556	4,414	898	2,150	594	9,723	2,928	224	41	12,916
Irrigation	322	233	958	151	801	66	2,531	789	126	37	3,483
Reclaimed water percolation	0	0	2,209	629	0	158	2,996	0	0	0	2,996
Groundwater inflow	4,750	4,000	250	3,000	1,000	3,500	16,500	7,000	500	500	24,500
Total	7,314	4,790	8,739	5,522	4,678	4,597	35,639	11,217	996	3,247	51,099
Outflows											
Wells											
Agricultural	1,703	2,001	6,744	1,143	2,639	567	14,796	7,889	1,255	372	24,313
Domestic and M & I	197	13	1,053	3,232	1,323	2,130	7,947	0	0	47	7,993
Groundwater outflow	5,500	1,250	250	3,500	1,500	2,500	14,500	1,250	500	500	16,750
Total	7,400	3,264	8,046	7,875	5,462	5,197	37,243	9,139	1,755	919	49,056
Storage change											
Inflows - outflows	(85)	1,525	693	(2,353)	(784)	(600)	(1,604)	2,078	(759)	2,328	2,043
Water level change	(298)	2,483	174	1,009	(403)	(158)	2,807	1,796	0	0	4,603

*no rejected recharge removed

Table H-8. Water Balance for Water Year 2009

	Pacheco	Bolsa Southeast	San Juan	Hollister West	Hollister East	Tres Pinos	Zone 6 Subtotal	Bolsa	Paicines	Tres Pinos Creek Valley	Grand Total
Inflows											
Stream percolation											
Natural streamflow	771	0	666	1,517	449	506	3,910	500	0	413	4,823
Reservoir releases	0	0	1,013	2,318	0	773	4,104	0	0	0	4,104
CVP Percolation	0	0	0	0	0	0	0	0	0	0	0
Deep percolation through soils											
Rainfall	767	424	2,515	676	748	185	5,314	1,185	182	31	6,712
Irrigation	494	185	910	340	577	111	2,618	721	114	34	3,488
Reclaimed water percolation	0	0	2,190	214	0	191	2,594	0	0	0	2,594
Groundwater inflow	3,422	1,500	260	2,032	1,000	1,644	9,858	4,000	0	--	13,858
Total	5,454	2,109	7,554	7,098	2,774	3,409	28,398	6,407	296	478	35,579
Outflows											
Wells											
Agricultural	3,106	2,073	10,943	1,495	3,535	600	21,753	7,213	1,140	344	30,451
Domestic and M & I	264	9	1,013	2,691	1,198	2,271	7,446	0	0	0	7,446
Groundwater outflow	2,000	1,000	19	1,500	2,159	2,000	8,678	0	0	1,644	10,322
Total	5,370	3,082	11,975	5,686	6,892	4,871	37,877	7,213	1,140	1,988	48,218
Storage change											
Inflows - outflows	84	(974)	(4,421)	1,412	(4,118)	(1,462)	(9,478)	(807)	(845)	(1,510)	(12,639)
Water level change	1,639	(5,338)	(437)	(431)	4,710	1,913	2,055	(3,372)	(343)	(366)	(2,026)

Adjustments

Adjusted Bolsa SE/Hollister West subsurface flow

Adjusted Bolsa/Pacheco subsurface flow

Adjusted Bolsa/Bolsa SE subsurface flow

Assumed all San Benito River flows percolate within the basin

Table H-9. Water Balance for Water Year 2010

	Pacheco	Bolsa Southeast	San Juan	Hollister West	Hollister East	Tres Pinos	Zone 6 Subtotal	Bolsa	Paicines	Tres Pinos Creek Valley	Grand Total
Inflows											
Stream percolation											
Natural streamflow	671	0	701	993	467	331	3,164	500	0	(316)	3,348
Reservoir releases	0	0	829	1,755	0	585	3,169	0	0	0	3,169
CVP Percolation	0	0	0	0	0	0	0	0	0	0	0
Deep percolation through soils											
Rainfall	806	407	2,611	749	717	152	5,444	1,403	231	43	7,121
Irrigation	433	150	766	301	472	88	2,210	629	103	33	2,975
Reclaimed water percolation	0	0	1,940	18	0	191	2,150	0	0	0	2,150
Groundwater inflow	2,870	2,874	36	2,021	1,041	1,901	10,742	6,600	0	--	17,341
Total	4,780	3,431	6,883	5,837	2,698	3,248	26,877	9,132	334	(240)	36,103
Outflows											
Wells											
Agricultural	2,517	1,896	8,745	1,614	3,739	575	19,087	6,294	1,032	326	26,740
Domestic and M & I	36	0	816	2,467	721	1,111	5,152	0	0	0	5,152
Groundwater outflow	3,108	1,473	19	2,874	1,619	2,000	11,093	0	0	1,901	12,994
Total	5,661	3,370	9,580	6,955	6,079	3,686	35,332	6,294	1,032	2,227	44,885
Storage change											
Inflows - outflows	(881)	61	(2,697)	(1,118)	(3,382)	(438)	(8,455)	2,838	(698)	(2,467)	(8,782)
Water level change	(1,335)	5,443	(811)	(477)	(2,032)	(2,485)	(1,696)	4,631	(2,036)	(1,067)	(168)

Adjustments

- Bolsa SE not adjusted due to uncertainty in the observed groundwater levels
- Reduced Pacheco and Hollister East stream flow to 25 % of calculated
- Reduced subsurface outflow from Pacheco
- Reduced subsurface inflow from Pacheco outside basin
- Reduced subsurface inflow into Tres Pinos
- Assumed 50% of San Benito River flows out of the basin

Table H-10. Water Balance for Water Year 2011

	Pacheco	Bolsa Southeast	San Juan	Hollister West	Hollister East	Tres Pinos	Zone 6 Subtotal	Bolsa	Paicines	Tres Pinos Creek Valley	Grand Total
Inflows											
Stream percolation											
Natural streamflow	896	0	2,272	1,948	693	812	6,622	500	1,304	3,003	11,428
Reservoir releases	0	0	846	764	0	318	1,929	0	511	0	2,440
CVP Percolation	0	0	0	0	0	0	0	0	0	0	0
Deep percolation through soils											
Rainfall	1,627	475	3,034	1,383	1,230	348	8,097	1,919	452	120	10,588
Irrigation	435	150	767	301	446	88	2,187	577	101	32	2,898
Reclaimed water percolation	0	0	2,040	233	0	202	2,475	0	0	0	2,475
Groundwater inflow	3,037	3,055	100	2,019	900	2,003	11,115	6,676	0	--	17,791
Total	5,995	3,680	9,059	6,648	3,269	3,772	32,424	9,672	2,369	3,155	47,620
Outflows											
Wells											
Agricultural	1,910	2,775	4,664	1,801	1,247	390	12,786	5,775	1,013	322	19,896
Domestic and M & I	82	6	322	2,139	700	2,064	5,315	0	0	0	5,315
Groundwater outflow	3,191	1,500	3,600	3,055	2,000	2,000	15,346	0	0	2,003	17,349
Total	5,183	4,281	8,587	6,995	3,947	4,454	33,447	5,775	1,013	2,325	42,560
Storage change											
Inflows - outflows	812	(601)	473	(347)	(678)	(682)	(1,023)	3,897	1,356	830	5,060
Water level change	389	(2,508)	(523)	(198)	570	228	(2,042)	(2,239)	852	2,334	(1,095)

Adjustments

- Reduced Pacheco stream flow to 25% of calculated
- Assumed 58% of San Benito River flows out of the basin
- Reduced deep peroclation in San Juan and parts of Bolsa
- Adjusted Holliseter West/Tres Pinos interaction
- Reduced subsurface inflow from Pacheco outside basin and Holliser East
- Increased groundwater outflow from San Juan

I LIST OF ACRONYMS

AF	acre-foot
AFY	acre-foot per year
ag	agriculture
CASGEM	California Statewide Groundwater Elevation Monitoring
CDHSPH	California Department of Public Health
CEQA	California Environmental Quality Act
cfs	cubic feet per second
CIMIS	California Irrigation Management Information System
COC	Constituent Of Concern
CVP	Central Valley Project
District or SBCWD	San Benito County Water District
DWR	California Department of Water Resources
DWTP	Domestic Wastewater Treatment Plant
ET	evapotranspiration
ft	feet
gpd	gallons per day
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
gw	groundwater
IRWMP	Integrated Regional Water Management Plan
ITRC	Irrigation Training and Research Center, California Polytechnic State University
IWTP	Industrial Wastewater Treatment Plant
M&I	Municipal And Industrial
MGD	million gallons per day
OCR	Optical Character Recognition
pdf	Adobe Acrobat Portable Document Format
PVWMA	Pajaro Valley Water Management Agency
RW	recycled water
RWQCB	Regional Water Quality Control Board
SCVWD	Santa Clara Valley Water District
SEIR	Supplemental Environmental Impact Report
SGMA	Sustainable Groundwater Management Act
SLDMWA	San Luis & Delta-Mendota Water Authority
SSCWD	Sunnyslope County Water District
USBR	U.S. Bureau of Reclamation
UWMP	Urban Water Management Plan
WRA	Water Resources Association of San Benito County
WTP	Water Treatment Plant
WWTP	Wastewater Treatment Plant
WY	water year

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