South Tahoe Public Utility District

Tahoe South Subbasin (6-005.01) Annual Report

2020 Water Year

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CERTIFICATION

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GLOSSARY

2012-2016 Event: Statewide drought emergency declared under the California Emergency Services Act

2014 GMP: Groundwater Management Plan prepared by the District in accordance with Assembly Bill 3030 pursuant to CWC Section 10750 et *seq*.

AF: Acre-feet

AFY: Acre-feet per year

Alternative: Alternative to a GSP developed pursuant to Part 2.75 of the Water Code

Alternative Materials: Additional plans, reports and other documents related to the 2014 GMP

BMOs: Basin Management Objectives specified in the 2014 GMP

BHHRA: Baseline Human Health Risk Assessment

CASGEM: California State Groundwater Elevation Monitoring

Cleanup and Abatement Order: CAO

CMIP 5: Coupled Model Intercomparison Project Phase 5 (Taylor et al, 2012)

COC: Constituents of Concern

County Water Agency: El Dorado County Water Agency

CSLT: City of South Lake Tahoe

CWC: California Water Code

District: South Tahoe Public Utility District

DDW: California Division of Drinking Water

DRI: Desert Research Institute

DWR: California Department of Water Resources

EDC: El Dorado County

EPA: Environmental Protection Agency

Feasibility Study or FS: Engineering feasibility study of remedial alternatives to mitigate PCE groundwater contamination in the South Y Area

GAC: Granular Activated Carbon

GMP: Groundwater Management Plan

GSA: Groundwater Sustainability Agency

GSP: Groundwater Sustainability Plan

GSP Regulations: California Code of Regulations Title 23. Waters; Division 2. Department of Water Resources; Chapter 1.5. Groundwater Management; Subchapter 2. Groundwater Sustainability Plans

IRAP: Interim Remedial Action Plan; this is the preferred alternative of the Feasibility Study

LBWC: Lukins Brothers Water Company

LPA: Lakeside Park Association

LRWQCB: Lahontan Regional Water Quality Control Board

LTBMU: US Forest Service, Lake Tahoe Basin Management Unit

LTLW: Former Lake Tahoe Laundry Works site, 1024 Lake Tahoe Boulevard, South Lake Tahoe, CA

MCLs: maximum contaminant levels

MDD: Maximum daily demand

MGD: Million gallons per day

Model Domain: Areal extent of the South Tahoe Groundwater Model encompassing the TSS and the surrounding watersheds to the watershed divide.

MOU: Memorandum of Understanding

MT: Minimum Threshold; a minimum value, if exceeded, may cause an undesirable result

MtBE: Methyl tert-Butyl Ether

MT3DMS: Modular three-dimensional transport model

NRCS: National Resources Conservation Service

OW: Observation well

Parts per Billion: ppb, equivalent to micrograms per liter (µg/L)

Parts per Million: ppm, equivalent to milligrams per liter (mg/L)

PCA: Potential contaminating activity

PCE: Tetrachloroethylene

PDI: Groundwater investigation performed in support of the Feasibility Study

PTAS: Packed Tower Air Stripper

PWS: Public water system

RA: Recommended action; information that should be included in the first five-year update of the TSS Alternative and recommendations for improvement (DWR, 2019a).

SAG: Stakeholders Advisory Group

SCWS: Small community water system is a public water system that serves at least 15 service connections used by yearlong residents or regularly serves at least 25 yearlong residents.

SGMA: Sustainable Groundwater Management Act

SMCLs: Secondary maximum contaminant levels

SNOTEL: NRCS snow telemetry station

South Y: Intersection of US Route 50 and California State Highway 89, in the City of South Lake Tahoe, CA

South Y Area: General area within a one-mile radius of the South Y

South Y Plume: Groundwater plume characterized by high concentrations of dissolved tetrachloroethylene contamination, above maximum contaminant levels, generally located between the South Y and the Tahoe Keys lagoon, in South Lake Tahoe, CA

South Tahoe Groundwater Model: Groundwater flow model developed by DRI for the TSS and its surrounding watersheds using MODFLOW-NWT

Subbasin: Tahoe South Subbasin of the Tahoe Valley Groundwater Basin, Basin No. 6-005.01

SWRCB: California State Water Resources Control Board

SWRCB-DFA: SWRCB Division of Financial Assistance

Tahoe South Subbasin Alternative: 2014 GMP and Alternative Materials approved by DWR as an Alternative for the TSS

TKPOA: Tahoe Keys Property Owners Association

TKWC: Tahoe Keys Water Company

TRPA: Tahoe Regional Planning Agency

TSS: Tahoe South Subbasin of the Tahoe Valley Groundwater Basin, Basin No. 6-005.01

USGS: U.S. Geological Survey

UWMP: South Tahoe Public Utility District 2015 Urban Water Management Plan

Water Agency: El Dorado County Water Agency (aka El Dorado Water Agency)

WBZs: Water-bearing zones

WY: Water Year

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0 Executive Summary

The Tahoe South Subbasin of the Tahoe Valley Groundwater Basin, designated by DWR as Groundwater Basin 6-005.01 (TSS or Subbasin) is a discrete, highly productive sedimentary geologic basin located in the City of South Lake Tahoe (CSLT) and portions of El Dorado County, California (EDC). The 2020 Annual Report presents a management level summary of groundwater conditions within the TSS using collected groundwater production and hydrologic data and results from numerical hydrologic models. District progress on implementation of BMOs defined in Section 8 of its 2014 GMP (Kennedy-Jenks, 2014) is also reported.

In 2016, the 2014 Groundwater Management Plan (2014 GMP) and Alternative Materials were submitted by the District to California Department of Water Resources (DWR) for assessment as an existing plan Alternative under section 10733.6(b)(1) of the Water Code. On July 17, 2019, DWR formally accepted the District's 2014 GMP and Alternative Materials as an approved Alternative for the TSS. This is the fifth annual report issued since adoption of the 2014 GMP and third annual report submitted to DWR since the South Tahoe Public Utility District (District) submittal of the 2014 GMP and Alternative Materials to DWR. The District is currently preparing a five-year update to its Alternative, which it plans to adopt and submit to DWR by the end of this calendar year.

Groundwater Conditions

The 2020 Annual Report provides hydrologic data for the for the 2020 Water Year (WY), which is the 12-month period starting October 1, 2019 through September 30, 2020.

Water Year Classification. In terms of precipitation, 2020 WY was a below normal water year, which followed an above normal water year (2019 WY), a normal water year (2018 WY) and a very wet water year (2017 WY). A three year below normal water year period (2012 WY -2015 WY) occurred during the 2012-2016 Event.

Groundwater Recharge. For the 2020 WY, groundwater recharge for the model domain is calculated at 20,663 acre-feet (AF); groundwater recharge for the TSS is calculated at 2,078 AF.

Groundwater Levels. Measured groundwater elevations were above normal for the 2020 WY, compared to the 10-year base period for groundwater levels (2001 WY -2010 WY). Spring 2020 WY groundwater levels decreased on average about -1.8 feet compared to spring 2019 WY groundwater levels.

Groundwater Quality. Tetrachloroethylene (PCE) groundwater contamination continued to have an impact on groundwater supplies in the South "Y" Area. The South Y is a local reference to the intersection of US Route 50 and State Highway 89 located in the north central portion of the TSS. The South "Y" Plume extends for more than one mile north of this intersection to the Tahoe Keys

Lagoon. Groundwater contamination within this plume has impaired three public water system (PWS) wells and threatens one other active PWS well. The total source capacity of active PWS wells in the TSS presently exceeds the maximum day demand (MDD) minimum threshold for water quality by about 6 million gallons per day (MGD). Although source capacity has declined due to wells impaired by degraded water quality, these impairments have not risen to a level such that available source capacity cannot meet current potable water demands. To help satisfy LBWC water demands the District provided 32,000 gallons through its inter-tie connection to the LBWC water system. Recent detections of natural contaminants in Tahoe Keys Water Company (TKWC) wells are causing the District to also evaluate the volumes of emergency water that could be provided to TKWC through its existing inter-tie with the District's water system. During the 2020 WY, the District continued on-going work and completed the South Y Feasibility Study. The feasibility study included an Interim Remedial Action Plan (IRAP) which identified a preferred alternative to mitigate PCE contamination in the South Y Area. This work was completed under a funding agreement with the SWRCB using Groundwater Clean-up Program planning grant funds from Proposition 1 and cost share funding from the County Water Agency.

Groundwater Production. Metered groundwater production from PWS wells, which accounts for more than 90% of groundwater extractions in the TSS, totaled 6,791 AF; this is approximately 10% below the median value (7,556 AF) over the groundwater production period of record (2005 WY – 2020 WY).

Groundwater Storage. For the 2020 WY, the annual change in groundwater storage for the model domain is -24,303 AF; the annual change in groundwater storage for the TSS is -3,535 AF. Since the 2005 WY, the cumulative change in groundwater storage for the model domain is +34,040 AF; the cumulative change in groundwater storage for the TSS is +5,516 AF.

Basin Management Objectives

Groundwater management activities performed during the 2020 WY included items required for ongoing compliance with SGMA and other efforts to address Basin Management Objectives (BMOs) under the 2014 GMP. 2020 WY accomplishments included:

- Fulfilled the Alternative annual reporting requirements for the preceding water year for the TSS.
- Fulfilled monitoring entity groundwater level elevation monitoring and reporting requirements for the TSS under the CASGEM program.
- Continued conducting SAG workshops for collaboration around groundwater-related activities occurring within the TSS.
- Completed the South Y Feasibility Study including publication of the following technical reports;
    - Feasibility Study Report (KJ, May 2020)
    - Interim Remedial Action Plan (KJ, May 2020)
    - Groundwater Grant Program Final Report (D1712508) (STPUD, June 2020)

- Conducted administrative, technical and public engagement tasks for preparation of the TSS Alternative;
- Initiated technical studies to address Recommended Actions identified by DWR; and
- Conducted the second phase of the Private Well Owner Survey.

1 Introduction

The District has prepared this report for the TSS. The 2020 Annual Report presents a management level summary to assess groundwater conditions and supplies within the TSS, using groundwater production and hydrologic data collected from the Subbasin. Progress on implementation of BMOs defined in the 2014 GMP is also reported. BMOs are described in Section 8 of the 2014 GMP.

The 2014 GMP was prepared in accordance with Assembly Bill 3030 (AB 3030) pursuant to CWC Section 10750 et *seq*. The 2014 GMP was adopted by the District and an accompanying Groundwater Ordinance was added as Division 7 to the District's Administrative Code on December 4, 2014. On December 28, 2016, the District concurrently submitted (1) its 2014 GMP and Alternative Materials as an existing plan Alternative pursuant to Water Code section 10733.6(b)(1) and (2) an analysis of basin conditions as an analysis Alternative pursuant to Water Code section 10733.6(b)(2) to DWR for public comment and DWR review and evaluation.[1] On July 17, 2019, DWR determined that the existing plan Alternative satisfied the objectives of SGMA and approved it as an Alternative for the TSS (DWR, 2019a).

This report was prepared in compliance with both the annual reporting requirements of the 2014 GMP and the annual reporting requirements of a Groundwater Sustainability Agency (GSA) to submit an annual report by April 1 of each year (CWC §10728). Since 2016, DWR has required GSAs which have submitted Alternatives to DWR for evaluation to also submit annual reports. As described in more detail in section 3.3.3.1 of this 2020 Annual Report, the District is the GSA for the majority of the TSS, with the Water Agency acting as the GSA for the portions of the TSS outside of the District's jurisdiction.

The 2020 Annual Report is the sixth annual report issued since adoption of the 2014 GMP and the second annual report issued since DWR approved the District's existing plan Alternative for the TSS. Table 1-1 lists the components required for inclusion in annual reports submitted by a GSA to DWR. Also listed are the corresponding section(s) where this information is found in this report. Information about GSA Formation, development of the TSS Alternative and outreach efforts are described in Section 3.3 BMO #3 – Building Collaborative Relationships of this report.

§ 356.2	ANNUAL REPORT COMPONENT	SECTION(s)
(a)	General information, including an executive summary and a location map depicting the basin covered by the report	Executive Summary; Section 1.1; Fig. 1-1; Fig. 1-2
(b)	A detailed description and graphical representation of the following conditions of the basin managed in the Plan:	

[1] As part of its submittals, the District indicated its preference to DWR that the review be sequenced in such a manner that its existing plan Alternative be reviewed first, and should DWR agree that the existing plan Alternative is functionally equivalent to a GSP, review of the analysis Alternative would not be necessary.

(1)	Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows:	
(A)	Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions.	Section 2.4.2; Fig. 2-6
(B)	Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year.	Section 2.4; Fig. 2-4; Appendix A
(2)	Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector, and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions.	Section 2.6; Table 2-2; Fig. 2-8, Fig. 2-9. All reported water use in Section 2.6 is for single-family and multi-family residential, commercial and landscape uses.
(3)	Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describes the annual volume and sources for the preceding water year.	Not Applicable; surface water for recharge or in-lieu use is not used as a source of supply, except for Lakeside Park Association, since the SWRCB has not been processing water rights applications until recently. Now that the Truckee River Operating Agreement has been implemented, surface water may be used as a potential future source of supply. The annual volume of surface water used by this system is not provided in this report.
(4)	Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year.	Section 2.6.1; Table 2-3; The water use data provided in Section 2.6 is from the District's customer service database and is representative of more than 80% of the groundwater use in the TSS. These data are presented in calendar years.
(5)	Change in groundwater in storage shall include the following:	
(A)	Change in groundwater in storage maps for each principal aquifer in the basin.	Section 2.7- The annual change in groundwater storage is

		presented as a single value for the entire basin which is derived from the water budget calculated by the groundwater model for the TSS. As the model calculates groundwater storage for all layers within the principal aquifer (e.g. Basin-fill Aquifer), a storage map is not provided in this report. A graph depicting annual and cumulative change in groundwater storage is provided as Figure 2-10.
(B)	A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.	Section 2.7; Fig. 2-10. All water use, in terms of groundwater production, shown in Figure 2-10 is for residential, commercial and landscaping uses.
(c)	A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report.	Section 3.0[2]

Table 1-1. Component requirements of Annual Reports submitted to DWR by GSAs (§356.2).

1.1 TSS

The TSS is part of the larger Tahoe Valley Groundwater Basin, which is located within the Lake Tahoe Hydrologic Basin and incorporates the sediment-filled basins bordering Lake Tahoe. The Tahoe Valley Groundwater Basin is subdivided into three sub-basins: the TSS, the Tahoe Valley West Subbasin, and the Tahoe Valley North Subbasin (Figure 1-1). Of these three subbasins, the TSS is the largest and most productive.

Elevations within the TSS range from 6,225 feet at lake level, rising to above 6,500 feet within the groundwater basin. Elevations extend above 10,000 feet within the surrounding watersheds along the Carson Range and Sierra Nevada Range. Portions of seven watersheds overlie the TSS; the largest of these is the Upper Truckee River watershed. The Upper Truckee River flows north across the entire length of the TSS and drains into Lake Tahoe after crossing the Upper Truckee Marsh. The Upper Truckee River is joined by Grass Lake and Big Meadow Creeks along the southern extent of its course, Angora Creek centrally, and Trout Creek near Lake Tahoe.

[2] The discussion in Section 3.0 of this Annual Report applies to the 2014 GMP.

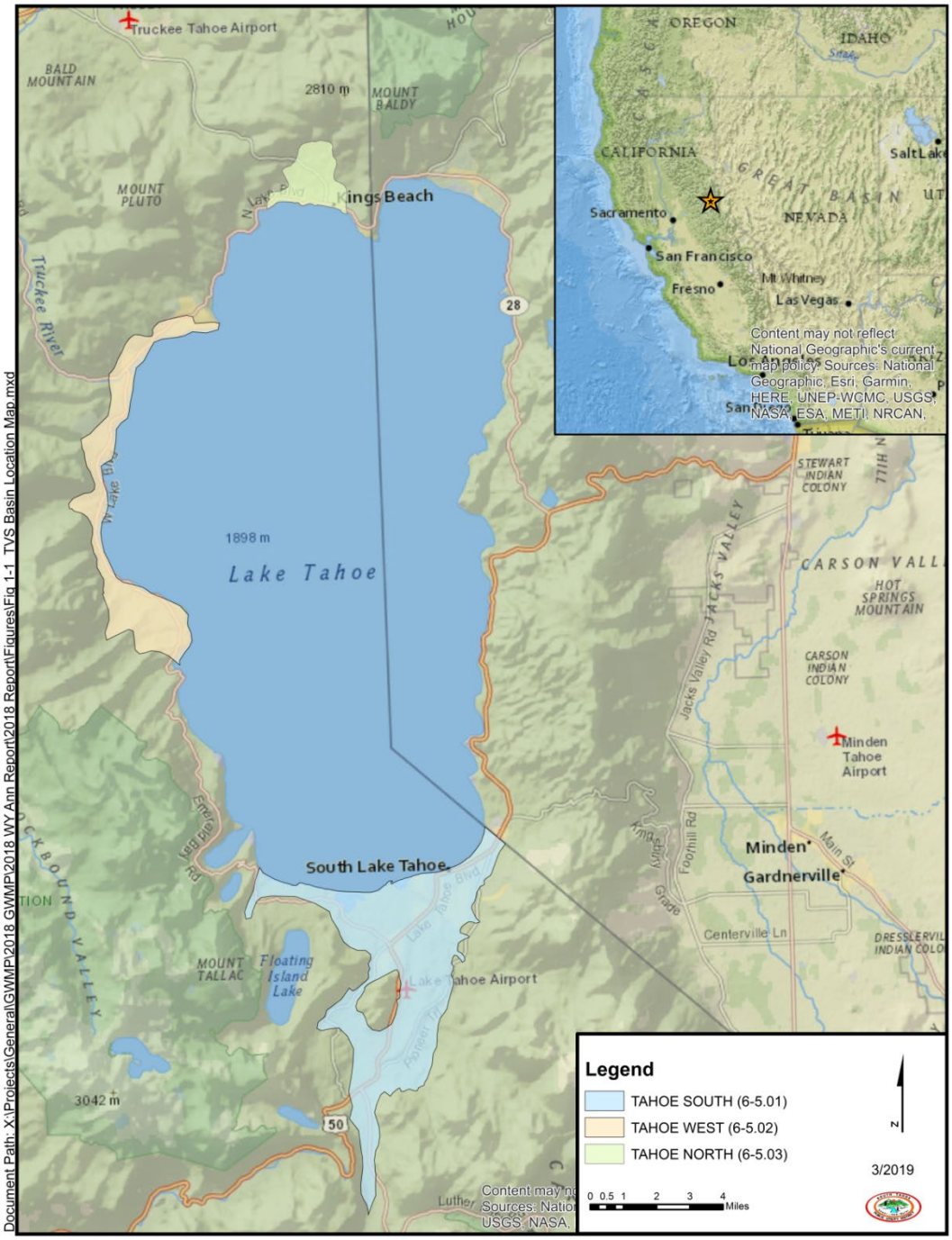

Figure 1-1. Lake Tahoe area regional map with DWR-designated groundwater subbasins.

The TSS has an area of approximately 23 square miles (14,814 acres) and is located in El Dorado County, California (Figure 1-2). The TSS is roughly triangular-shaped, bounded on the southwest by the Sierra Nevada Range, on the southeast by the Carson Range, and on the north by the southern shore of Lake Tahoe. The TSS generally conforms to the valleys of the Upper Truckee River and Trout Creek. The TSS does not share a boundary with any other DWR groundwater basin or sub-basin. The City of South Lake Tahoe (CSLT) overlies the northern portion of the TSS. The southern boundary extends about 3 miles south of the unincorporated town of Meyers. The northeast boundary of the TSS is defined by the California-Nevada state line. For ease of description, the TSS is subdivided into six geographically based sub-areas, referred to as the Tahoe Keys, South Lake Tahoe, Bijou, Angora, Meyers and Christmas Valley sub-areas. The location and extent of these sub-areas are shown on Figure 1-2.

The TSS includes the CSLT and portions of eastern EDC, which encompasses the unincorporated communities of Meyers, Angora Highlands and Christmas Valley. Within the greater South Lake Tahoe area, the majority of the land use is classified as Conservation area, followed by Residential, Recreation, Commercial and Public Service, and Tourist areas. The majority of the Conservation areas are federal lands managed by the United States Forest Service - Lake Tahoe Basin Management Unit (LTBMU). Most of the federally managed land is located outside of the TSS, but does include large areas around the Camp Richardson/Fallen Leaf Lake area within the northwest portion of the TSS; and along the basin margin on the east side of the TSS.

Groundwater is the primary source of drinking water for the communities overlying the TSS. Surface water for recharge or in-lieu use is not presently used, except by Lakeside Park Association (LPA), since the SWRCB has not been processing water rights applications until recently. Now that the Truckee River Operating Agreement (TROA) has been implemented, surface water may be used as a potential future source of supply. In January 2020 the District submitted Amended Application No. A023393 to the State Water Resources Control Board Division of Water Rights (SWRCB-DWR) in order to secure water rights based on a water demand analysis of future water needs for the greater South Lake Tahoe area (BHFS, 2020). This amended application is currently pending.

Most water wells drilled in the TSS are completed in basin-fill deposits that generally consist of unconsolidated glacial, lake and stream sediments. These sedimentary deposits fill the lower reaches of the canyons that drain toward Lake Tahoe and underlie the relatively flat lying valley floors. These deposits can be over 1,000 feet thick in the deeper portions of the TSS, but thin toward the basin margins where they cover shallow bedrock areas. Numerous water-bearing zones (WBZs) have been identified using lithologic and geophysical logs, and interpreted correlations to divide the basin-fill into multiple layers, representing regionally correlated units of high and low permeability. Units of relatively high permeability typically correspond to coarse-grained glacial outwash, fluvial and deltaic deposits forming the basin-fill aquifer. The laterally continuous fine-grained lacustrine (lake-bed) deposits form local confining layers or aquitards that affect groundwater flow between these higher permeability deposits.

Figure 1-3 is a conceptual hydrogeological cross section across the northern portion of the TSS used to illustrate the WBZs. The different WBZ designations are informal and are based on the local geographic area and the stratigraphic order in which the unit occurs. This is indicated as a subscript from deep to shallow depth (1 = lowermost zone; 5 = uppermost zone). The deepest zone (WBZ1) occurs in the deepest portions of the basin, generally at depths below 600 feet, and may act as a confined aquifer and show artesian conditions in some areas. The middle two zones (WBZ2 and WBZ3) represent the interval at depths between 200 to 600 feet and the shallowest two zones (WBZ4 and WBZ5) represent depths from 0 to 200 feet (Bergsohn, 2011).

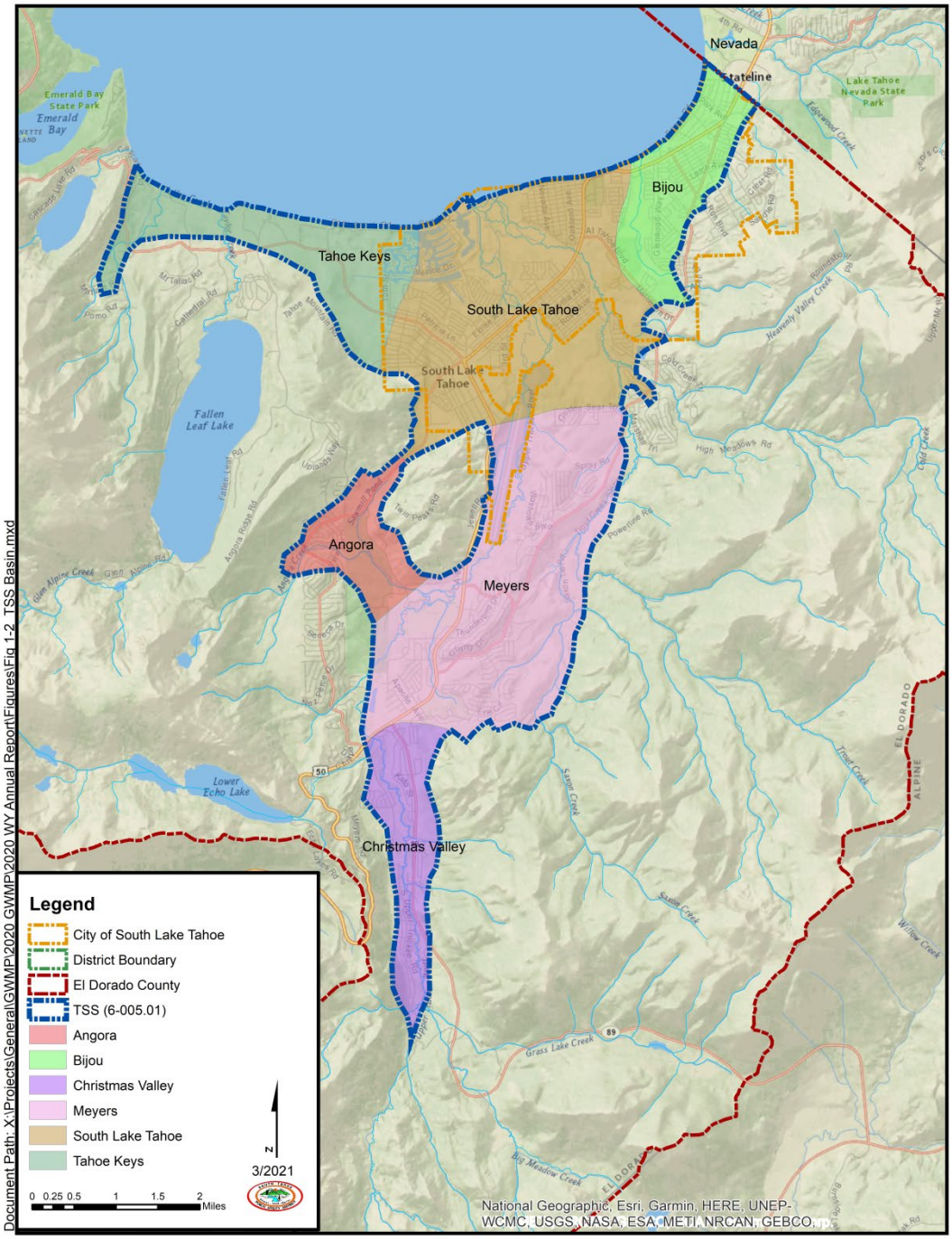

Figure 1-2. TSS showing jurisdictional boundaries and geographically-based sub-area designations used in this report.

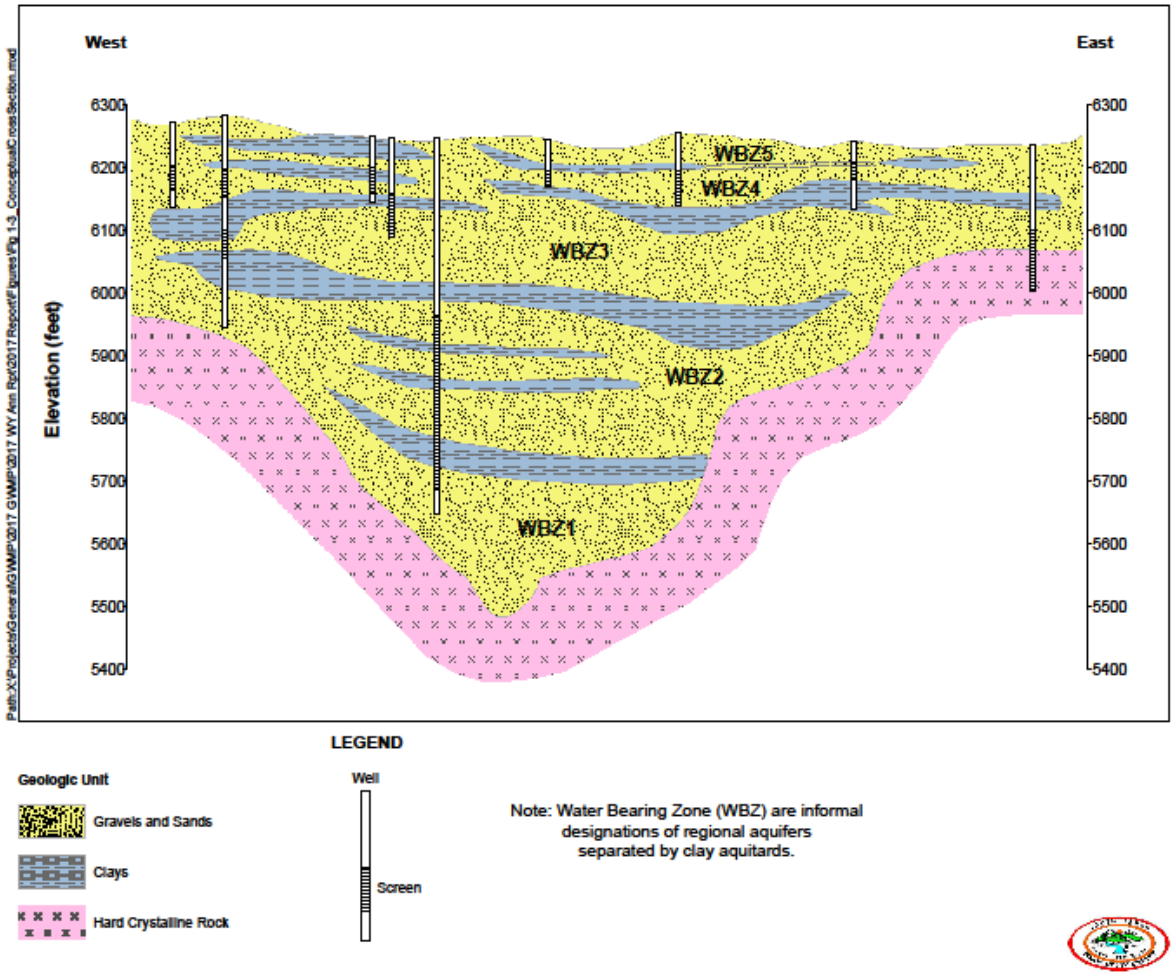

Figure 1-3. Conceptual geologic cross-section oriented east-west showing typical WBZs within the TSS (Adapted from Kennedy-Jenks, 2014).

1.2 Water Year Classification

In terms of precipitation, 2020 WY was a below normal water year using the water year classification developed for the TSS. Under the GSP Regulations, annual precipitation in a basin is required to be described in terms of water year type. DWR generally assigns water year type based on river flow indices or precipitation amounts and has developed water year classification systems for several hydrologic basins in California. For example, for the Sacramento Valley hydrologic basin, SWRCB developed five categories based on runoff forecasts and previous water year's index: 1) wet, 2) above normal, 3) below normal, 4) dry, and 5) critical (SWRCB, 1978).

During development of hydrologic tools for implementation of the 2014 GMP, the District requested the Desert Research Institute (DRI) to develop a water year classification for the TSS. The water year classification was created following development of the TSS water budget by DRI. During development of the water budget, a strong linear correlation was identified between simulated precipitation from the regional Groundwater Surface Water Flow Model for the Truckee River Basin and groundwater recharge to the TSS. Linear correlation was also found between groundwater recharge to model calculated change in groundwater storage. Using these relationships from the modeling analysis, total accumulated precipitation measured at four National Resources Conservation Service (NRCS) SNOTEL stations within the model area were further evaluated to find the SNOTEL station with the best correlation to the simulated precipitation from the Groundwater Surface Water Flow Model. SNOTEL 508: Hagan's Meadow, CA was found to have the best correlation with model simulated groundwater recharge and change in groundwater storage. Therefore, NRCS precipitation records for this station were used as a reference station to classify water year type for the TSS (Carroll et al., 2016b). The regression equation between annual total precipitations at SNOTEL 508: Hagan's Meadow, CA to groundwater recharge within the TSS and surrounding watersheds is shown below in Figure 1-4. The regression equation has an R-squared (R^2) of 0.92, which is a statistical measure of how close the data are to the fitted regression line.

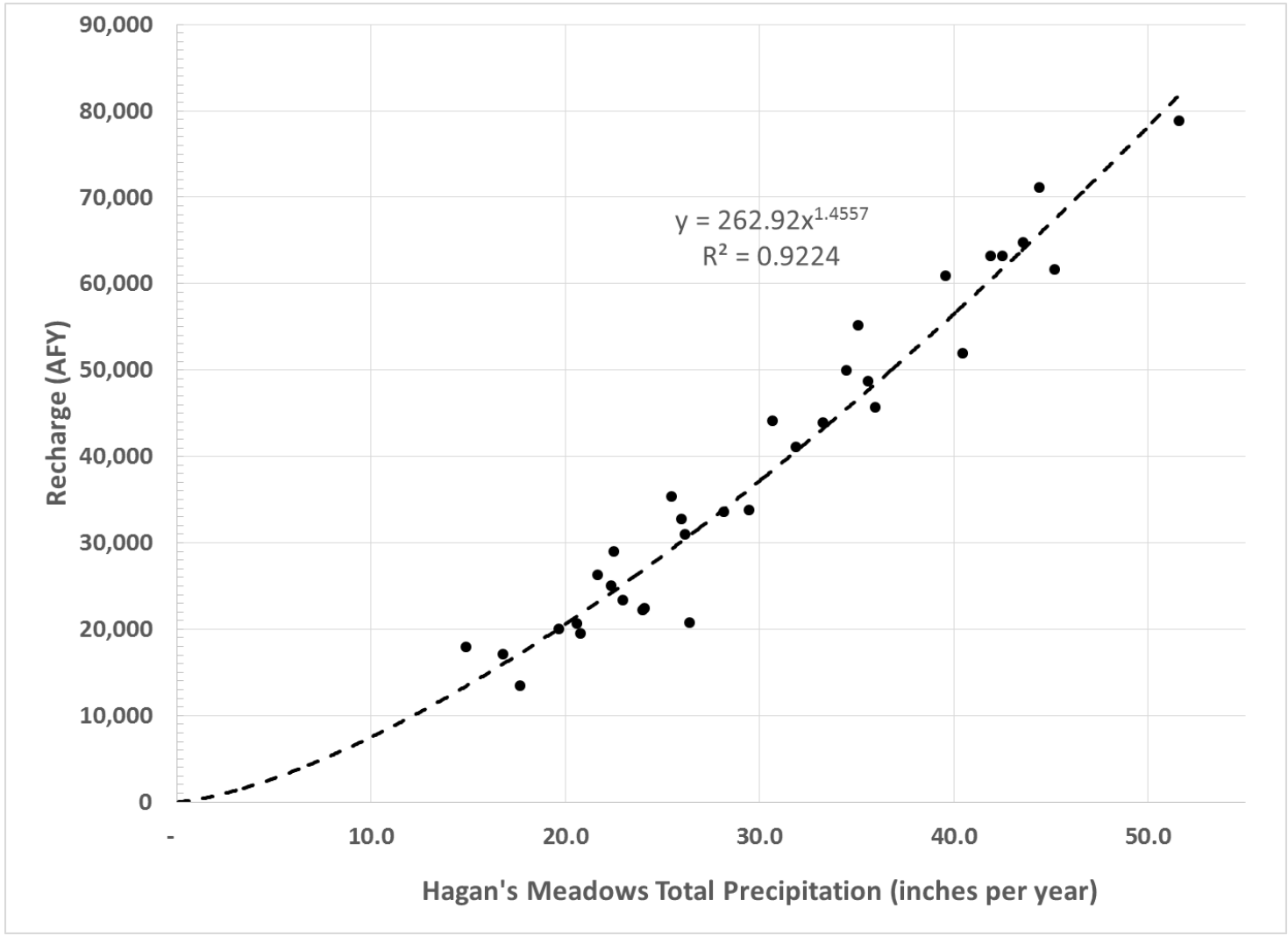

Figure 1-4. SNOTEL 508: Hagan's Meadow, CA annual precipitation versus modeled groundwater recharge within the model domain (G. Pohll et al., 2016)

For the TSS, water years 1979 – 2017 were categorically defined by assuming a normal distribution in precipitation and establishing ranges based on the z-statistics in Table 1-2. To allow more flexibility in WY type, seven categories were established: 1) very wet, 2) wet, 3) above normal, 4), normal, 5) below normal, 6) dry, and 7) critical. The very wet periods are indicated by a z-statistic > 1.5 and occur in 1982 WY, 2011 WY and 2017 WY. The critical water year is indicated by a z-statistic – 1.5 and occurs when total accumulated precipitation is less than 14 inches. During the 2020 WY, total accumulated precipitation measured at SNOTEL 508: Hagan's Meadow, CA was 20.4 inches, which was the fifth driest water year on record. Table 1-2 shows the z-statistics, the calculated precipitation range for each water year type, and the number of each water year type (Count) occurring over the period of record (1979 – 2020) for this station. Figure 1-5 shows a graphical representation of this record.

WY Type	z (upper)	Precipitation (in) (1979-2017)		Count (1979 -2020)
		>	≤	
Very Wet	> 1.5	49	-	3
Wet	1.5	43	49	4
Above Normal	1	37	43	5
Normal	0.5	26	37	13
Below Normal	-0.5	20	26	13
Dry	-1.0	14	20	4
Critical	-1.5	0	14	0

Table 1-2. Classification system for Water Year (WY) Type based on observed WY accumulated precipitation at SNOTEL 508: Hagan's Meadows, CA. Upper bound of z-statistic and ranges in precipitation (inches) (Adapted from Carroll *et al.,* 2016b).

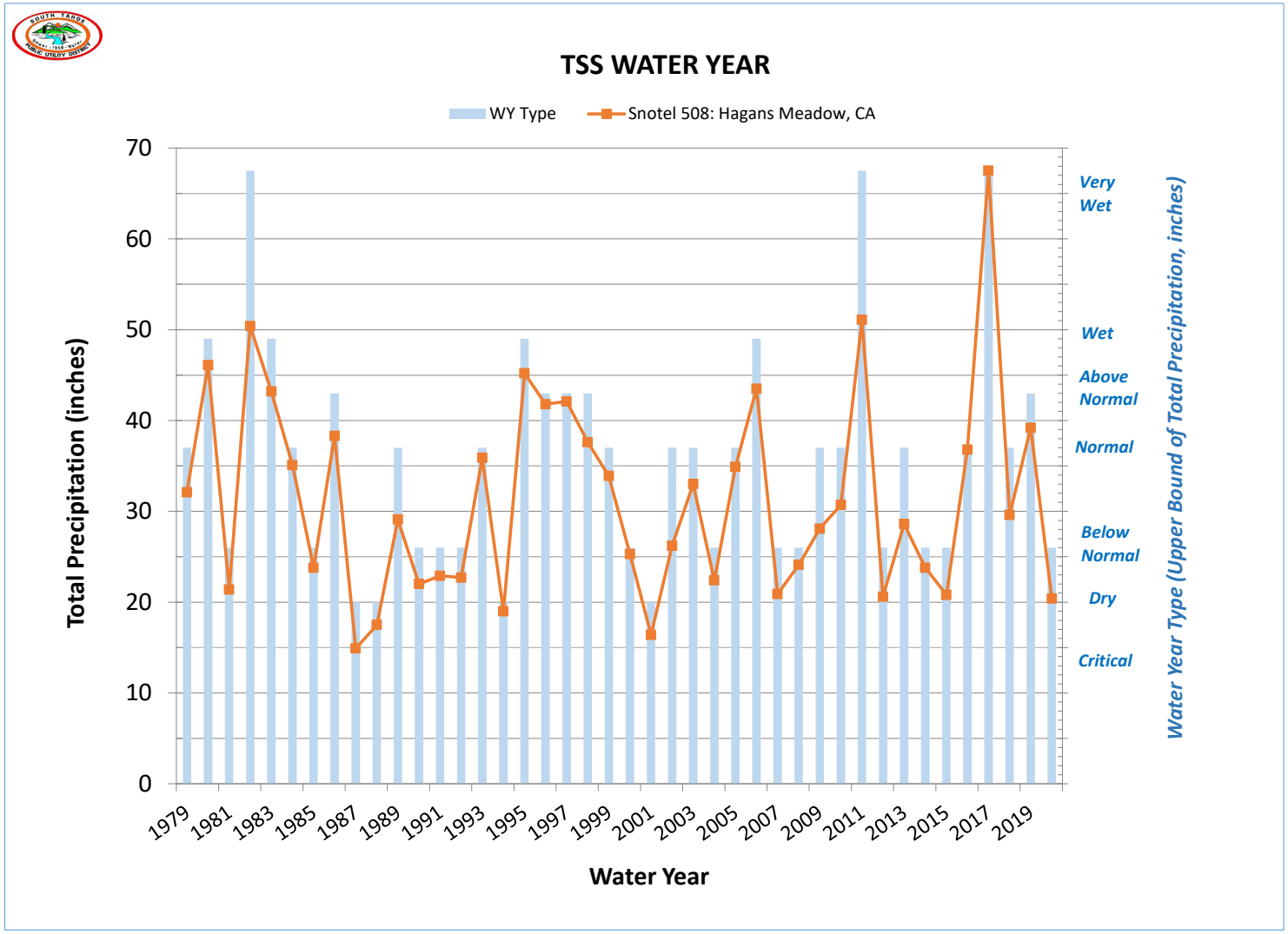

Figure 1-5. The annual accumulated precipitation measured at SNOTEL 508: Hagan's Meadow, CA and water year type indicated on the vertical axis along the right-side of the graph. Precipitation ranges for each water year type are listed in Table 1-2.

2 Groundwater Conditions

The following section presents data collected by the District and derived from numeric groundwater models to show the current state of the TSS. Hydrographs showing groundwater elevation trends across the TSS are provided in Appendix A.

2.1 South Tahoe Groundwater Model

The South Tahoe Groundwater Model was developed by DRI for the TSS and its surrounding watersheds to prepare a water budget, perform complex hydrologic analyses, and inform BMOs specified in the 2014 GMP (Carroll, *et al.*, 2016a). The South Tahoe Groundwater Model quantifies basin conditions using the U.S. Geological Survey (USGS) MODFLOW-NWT (Niswonger *et al.,* 2011) software. MODFLOW-NWT is the latest installment of the USGS modular program and relies on the Newton solution method and an unstructured, asymmetric matrix solver to calculate groundwater head. MODFLOW-NWT is specifically designed to work with the upstream weighted package to solve complex, unconfined groundwater flow simulations to maintain numerical stability during the wetting and drying of model cells.

The model grid for the South Tahoe Groundwater Model is oriented north-south and contains 342 rows and 251 columns. Horizontal cell size is 100 meters (328 feet) and is based on the need to capture steep topography, narrow canyons and potentially steep hydrologic gradients, which are present in the model domain (Figure 2-1). The model is subdivided into four subsurface layers to maintain reasonable computation time. Layers are determined based on production well screen intervals. Land surface elevations are based on 30 meter (98 ft) Digital Elevation Model aggregated to a 100 meter (328 ft) resolution. Layer thicknesses are 40 meters (131 ft) for layer 1 and layer 2, and 100 meters (328 ft) for layer 3. The layer 4 bottom elevation is set to a constant 1,600 meters (5,248 ft) to produce variable thickness ranging from approximately 114 meters (274 ft) along the northern boundary with Lake Tahoe to 1,300 meters (4,264 ft) at watershed divides.

The South Tahoe Groundwater Model simulates two distinct time periods. The first represents steady-state conditions prior to any significant groundwater production in the basin. Hydraulic conductivity was calibrated using the steady-state model configuration. The transient model simulates the period 1983-2020 to calculate changes in groundwater levels and flux due to variations in precipitation and groundwater extractions.

The South Tahoe Groundwater Model is constructed in a manner that allows reporting of the annual flow budget for both the model domain and the TSS. The model domain covers an area of approximately 156 square miles (99,907 acres) which includes the TSS and the seven surrounding watersheds (Figure 2-1). The TSS covers an area of 23 square miles (14,814 acres) confined to the valley

floor area designated by DWR as the extent of the groundwater basin. In this report, groundwater recharge, storage and cumulative change in storage are reported on an annual WY basis for both the model domain and the TSS.

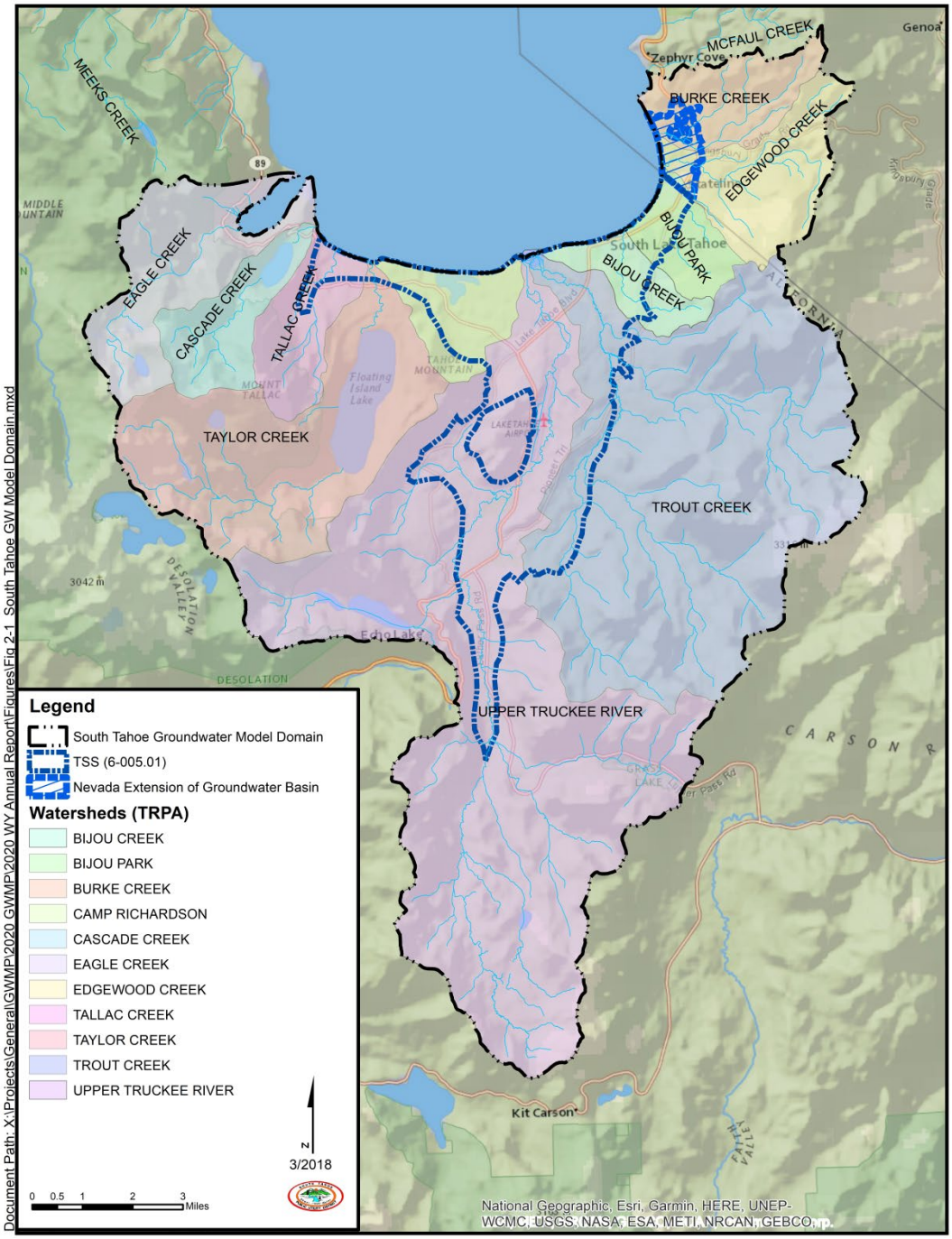

Figure 2-1. The model domain for the South Tahoe Groundwater Model encompasses the TSS, as well as the surrounding watersheds contributing recharge to the basin.

2.2 Groundwater Recharge

Recharge for the TSS was extracted from the transient model of the South Tahoe Groundwater Model. Figure 2-2 shows annual groundwater recharge over the simulation period of the transient model (1983 WY- 2020 WY). During the 2020 WY, the groundwater recharge for the model domain is 20,663 AF. The groundwater recharge for the TSS is 2,073 AF. This is about 40% of the average groundwater recharge to the TSS (5,241 AF) over the simulation period of the transient model (1983 WY through 2020 WY).

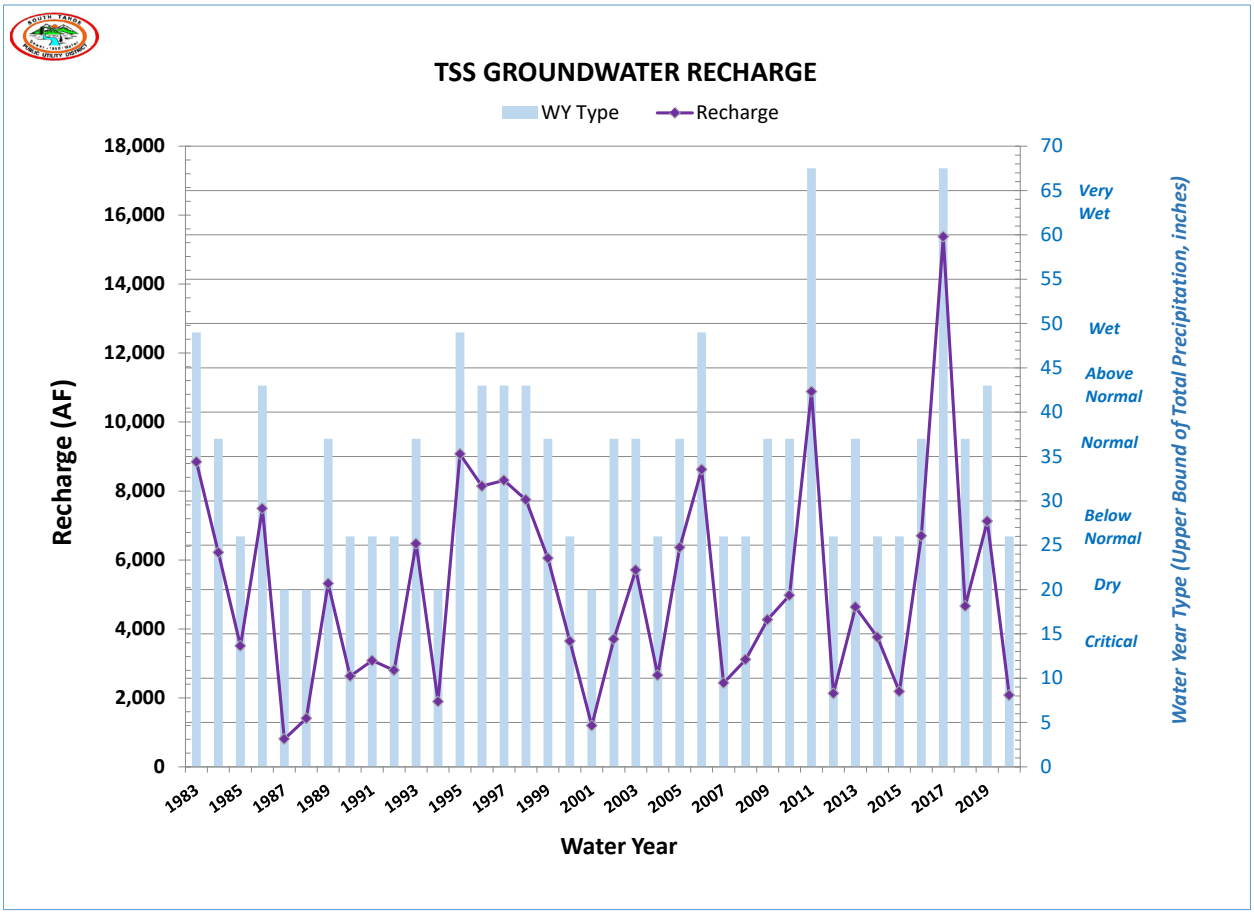

Figure 2-2. Model recharge (AFY) for the TSS (1983 WY – 2020 WY). Water year type using the TSS classification from total precipitation measured at SNOTEL 508 Hagan's Meadow, CA is indicated on the secondary vertical axis on the far right-side of the graph.

2.3 Groundwater Level Monitoring

The District is the designated monitoring entity for the TSS under the CASGEM program. As such, groundwater level elevation monitoring data is reported semi-annually to DWR through the CASGEM online reporting system. These data were reported to DWR in November 2019 and May 2020 for the 2020 WY.

Groundwater levels are regularly measured in forty-seven (47) wells located throughout the TSS. The District well network includes thirty-two (32) observation wells and fifteen (15) PWS wells (Figure 2-3). The majority of the PWS wells (11 of 15) are actively used for drinking water supply. Four of these wells are on stand-by status, used only for emergency purposes. The observation wells include monitoring wells, sentinel wells and test wells, as well as former drinking water supply wells that have been removed from service and are no longer connected to the District's water distribution system. Only the observation wells are used for reporting to the CASGEM program.

Construction details for selected wells for which hydrographs are provided (Appendix A) are set forth in Table 2-1. The sub-areas, shown in Table 2-1, are informal designations using the geographically-based designations (Christmas Valley, Meyers, Angora, South Lake Tahoe, Tahoe Keys and Bijou) shown in Figure 1-2. The Christmas Valley sub-area is in the southernmost portion of the TSS, south of Lake Valley and US Route 50. The Meyers sub-area is located in the southern portion of Lake Valley from US Route 50 north to Twin Peaks. The Angora sub-area is located in the northern portion of Lake Valley west of Twin Peaks. The South Lake Tahoe sub-area is located north of Lake Valley. The Tahoe Keys sub-area is located at the north end of the TSS, west of the South Lake Tahoe sub-area; while the Bijou sub-area is located east of the South Lake Tahoe sub-area.

Basin monitoring generally involves the collection, compilation and evaluation of groundwater level, groundwater quality, groundwater production and climate data from numerous sources for the TSS. A detailed description of the groundwater monitoring conducted in the TSS is provided in Section 9.0 of the 2014 GMP. As part of the groundwater level monitoring effort, the District uses both hand and continuous readings to monitor groundwater elevation trends across the TSS. Hand readings are collected from each of the TSS groundwater elevation monitoring wells in the fall and spring of each water year. Hand readings from active PWS wells are collected a minimum of 12 hours after well pumps are turned-off for static water level measurements. A smaller number of observation wells (13) are fitted with dedicated water-level monitoring equipment. The data loggers are programmed to collect pressure head and temperature readings at 6:00 AM and 6:00 PM on a daily basis to provide a continuous record of groundwater levels in the TSS.

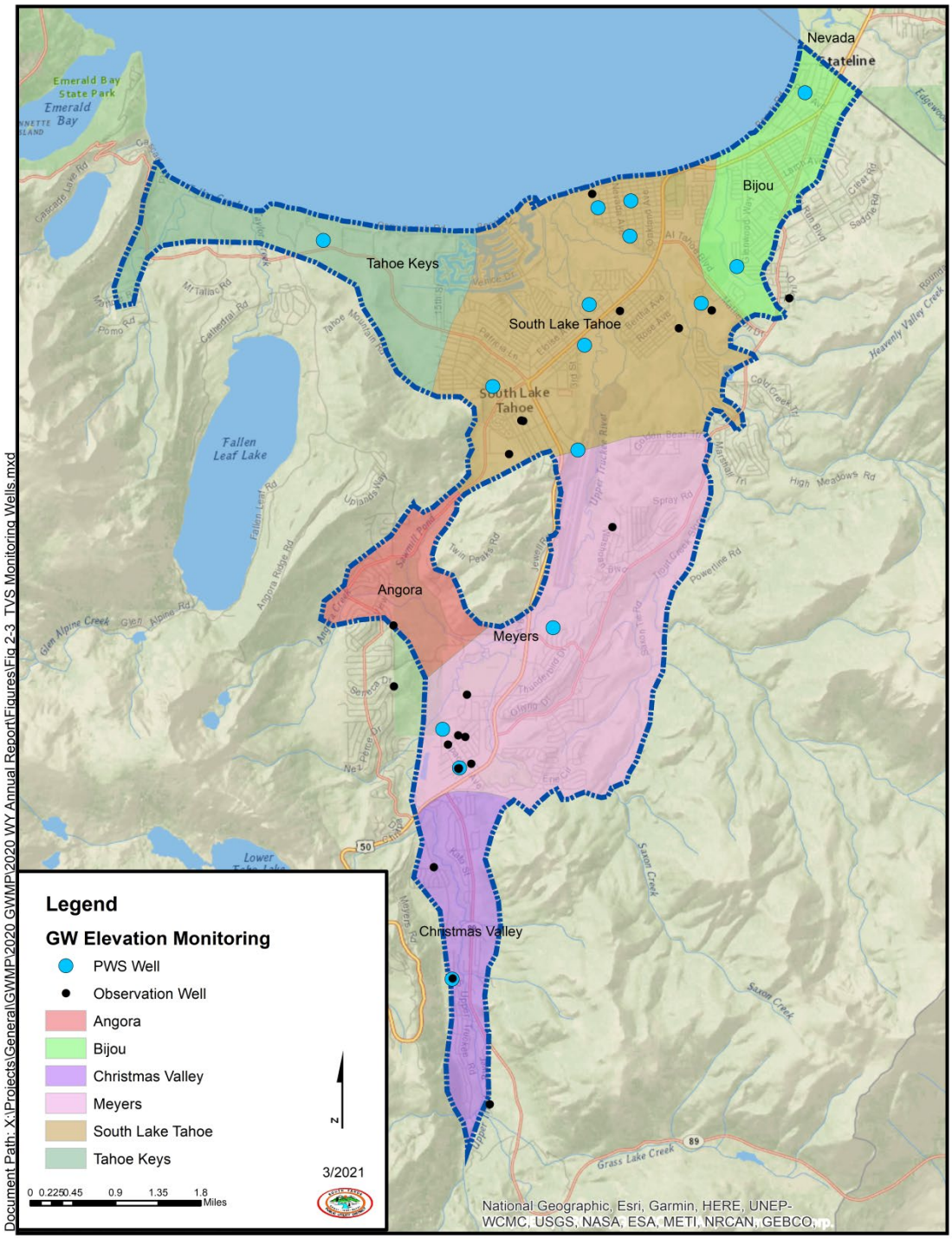

Figure 2-3. Locations of wells used for monitoring changes in groundwater elevation within the TSS.

Well	Sub-Area	Reference Point Elevation (ft msl)	Top of Screen Depth (ft bgs)	Bottom of Screen Depth (ft bgs)
Mountain View	Angora	6313.14	95	164
Blackrock Well #1	Bijou	6242.72	168	180
Glenwood Well #3	Bijou	6261.68	112	192
Henderson OW	Christmas Valley	6369.78	79	100
			142	205
Bakersfield	Meyers	6310.50	130	170
			180	240
Elks Club Well #1	Meyers	6284.63	110	142
Washoan OW	Meyers	6307.84	102	144
			165	186
			207	228
			249	270
CL-1	South Lake Tahoe	6278.37	104	114
CL-3	South Lake Tahoe	6278.49	39	49
Paloma	South Lake Tahoe	6267.10	188	248
			268	408
Sunset	South Lake Tahoe	6249.00	275	430
Martin OW	South Lake Tahoe	6262.42	95	115
			125	145
			160	180
			200	240
USGS TCF-1-1	South Lake Tahoe	6296.48	325	340
USGS TCF-1-2	South Lake Tahoe	6296.47	245	260
USGS TCF-1-3	South Lake Tahoe	6296.65	158	163
USGS TCF-1-4	South Lake Tahoe	6296.63	130	140
USGS TCF-1-5	South Lake Tahoe	6296.63	88	98
Lily OW	South Lake Tahoe	6236.08	35	37.5
Valhalla	Tahoe Keys	6256.50	110	170

NOTES:
feet msl: Elevation in feet above mean sea level (NAVD88).
ft bgs: Depth in feet below ground surface.

Table 2-1. Screen intervals for selected groundwater elevation wells within the TSS. Hydrographs for these wells showing groundwater level trends within each sub-area are provided in Appendix A.

2.4 Groundwater Levels

Hydrographs of continuous groundwater elevation readings collected from four observation wells across the TSS are provided below in Figure 2-4. The Henderson Observation Well (OW) is located near the south end of the TSS at the north end of the Christmas Valley sub-area. The Washoan OW is located near the center of the TSS, within the north half of the Meyers sub-area. The Martin OW and Lily OW are both located at the north end of the TSS, within the South Lake Tahoe sub-area. The Martin OW is located near the east margin of the TSS within the south half of the sub-area; and the Lily OW is located nearest the south shore of Lake Tahoe within the north half of the sub-area.

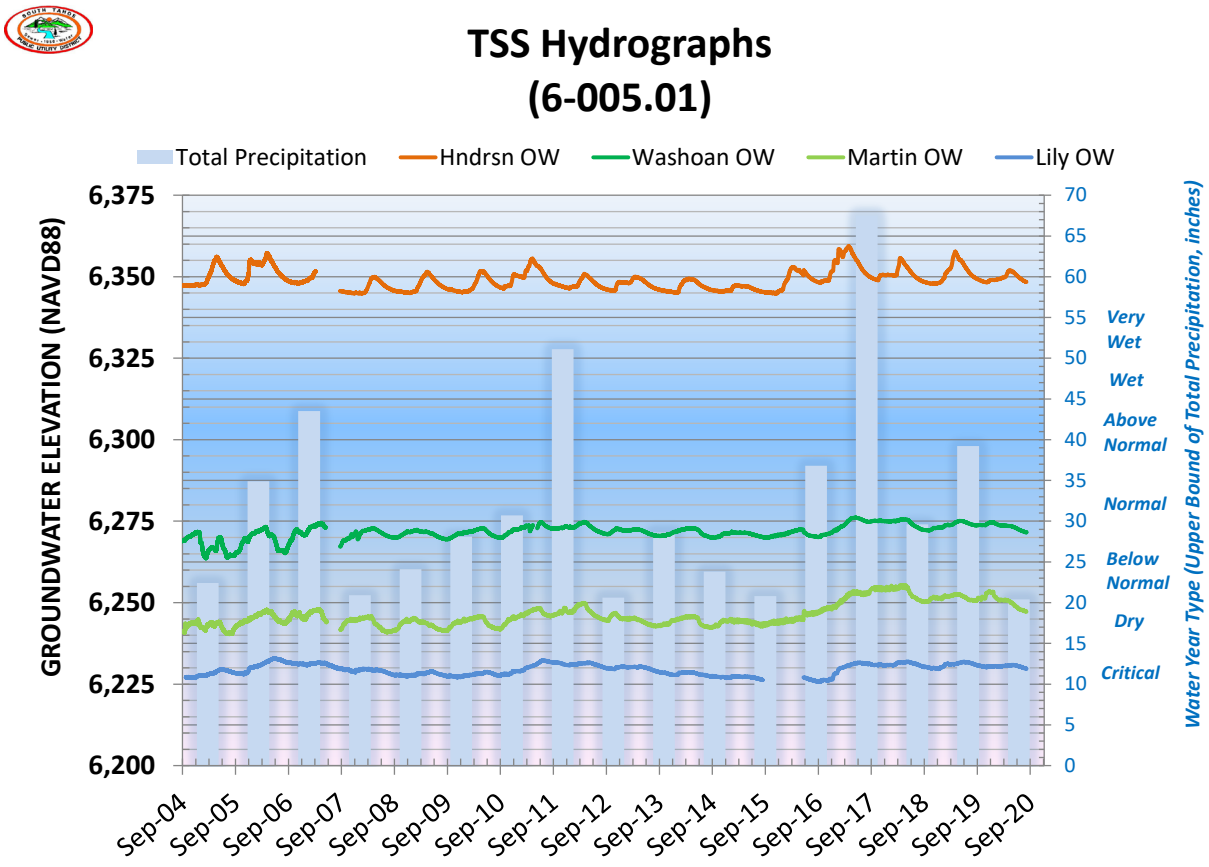

Figure 2-4. Continuous groundwater level readings collected from selected wells distributed across the TSS.

Over the period of record (2005 WY – 2020 WY), the continuous readings show that groundwater elevations have been relatively stable. During this period, there were six below normal water years; six normal water years; one above normal water year; one wet water year; and two very wet water years (*see* Figure 1-5). Regular fluctuations representing seasonal changes in groundwater elevations are most pronounced in the Henderson OW. This may be due to its remote location, away from the pumping

influence of neighboring wells and away from the groundwater elevation influence of Lake Tahoe. Groundwater elevations tend to rise during the winter storm season when precipitation exceeds evaporation, plant transpiration (evapotranspiration) is at its lowest and groundwater production is at or near seasonal low water demands. As a result, seasonal high groundwater levels typically occur between early-April through mid-June. Groundwater levels then tend to decline during the summer and into the fall, when evapotranspiration exceeds precipitation and groundwater production is at or near seasonal high water demands. Seasonal low groundwater elevations typically occur at the end of this seasonal cycle, between mid-September through mid-November.

Groundwater elevations within the TSS declined from between the 2012 WY through 2015 WY and then recovered during the 2016 WY (normal) and 2017 WY (very wet). Groundwater elevations during the 2018 WY (normal) declined compared to 2017 WY levels. During the 2019 WY (above normal), groundwater elevations increased slightly compared to 2018 WY levels. . During the 2020 WY (below normal), groundwater elevations decreased on average about 1.8 feet compared to 2018 WY levels The magnitude of these changes is relatively minor and ascertained by comparing inter-annual changes in seasonal high groundwater levels (May readings) measured from all of the groundwater elevation monitoring wells.

2.4.1 Basin Condition (Groundwater Levels)

Hand readings collected from the groundwater elevation monitoring wells in May of each water year are compared to hand readings collected during a 10-year period (2001 WY- 2010 WY) prior to the 2012-2016 Event. This was the most recent statewide drought emergency declared in California during a 5-year event spanning water years 2012 through 2016 (https://water.ca.gov/Water-Basics/Drought).

This analysis is used to ascertain the current condition of groundwater levels compared to the 10-year base period (2001 WY- 2010 WY) selected for the TSS. This base period was selected as groundwater level data for the basin monitoring wells are relatively complete and were collected prior to the 2012-2016 Event. During the base period accumulated precipitation measured at SNOTEL 508: Hagan's Meadow, CA averaged 29.3 inches, which is within the normal range of precipitation for the TSS. During the base period for groundwater levels there were: one dry water year; three below normal water years; five normal water years; and one wet water year (see Figure 1-5).

Hand readings collected during the May 2020 WY were used to define current basin conditions as being either normal, above normal, or below normal with respect to the record of groundwater levels collected during the base period (2001 WY – 2010 WY). The percentile rank of the groundwater elevation measured during the May 2020 monitoring event at each well was determined for more than thirty (30) of the groundwater elevation monitoring wells using the record of hand readings collected for that well during the base period. The percentile rank of the May 2020 groundwater elevation for each well was then plotted on a cumulative frequency diagram to show the current state of the TSS in terms of groundwater levels (Figure 2-5).

Figure 2-5 shows the distribution of groundwater elevations measured during the May 2015, May 2016, May 2017, May 2018, May 2019 and May 2020 monitoring events using their respective percentile ranks within the record of groundwater levels measured for the same wells during the base period. The 2015 WY was a below normal water year near the end of the 2012-2016 Event. During 2015 WY, the median for the May 2015 groundwater elevations was in the middle of the normal range (52%) of the base period elevations and seven wells had below normal groundwater elevations. During 2016 WY, the median for the May 2016 groundwater elevations was at the lower end of the above normal range (86%) of the base period elevations and only one well had below normal groundwater elevations. This well (Seneca Observation Well) is located outside the west boundary of the TSS. During 2017 WY, the median for the May 2017 groundwater elevations was at the higher end of the above normal range (97%) of the base period elevations and all wells were in the above normal range, with the exception of the Sunset Well (48%) which was within the normal range. During the 2018 WY, the median for the May 2018 groundwater elevations was near the center of the above normal range (93%) of the base period elevations with six wells in the normal and thirty-one wells in the above normal range. Groundwater elevations in the Sunset Well further declined compared to the base period elevations to near the bottom of the normal range (28%). During the 2019 WY, the median for the May 2019 groundwater elevations was near the center of the above normal range (93%) of the base period elevations with one well in the normal and thirty-six wells in the above normal range. Groundwater elevations in the Sunset Well increased during the 2019 WY compared to the base period elevations to near the middle of the normal range (48%). During the 2020 WY, the median for the May 2020 groundwater elevations was near the bottom of the above normal range (85%) of the base period elevations with two (2) wells in the below normal range (Sunset and South Upper Truckee #3); thirteen (13) wells in the normal range; and eighteen (18) wells in the above normal range. Groundwater elevations in the Sunset Well decreased compared to the base period elevations to the middle of the below normal range (18%); while groundwater elevations in the South Upper Truckee #3 Well decreased compared to the base period elevations to the upper part of the below normal range (25%) .

Between May 2011 and May 2015, the difference in groundwater elevations decreased an average of 3.98 feet. Between May 2015 and May 2016, the difference in groundwater elevations increased an average of 2.21 feet; and between May 2016 and May 2017, the difference in groundwater elevations increased 4.70 feet. Using these averages, groundwater levels across the TSS appear to have fully recovered from the total decline in groundwater levels that occurred during the2012-2016 event. Between May 2017 and May 2018, the difference in groundwater elevations decreased an average of -1.89 feet. Between May 2018 and May 2019, the difference in groundwater elevations increased slightly by an average of 0.04 feet. Between May 2019 and May 2020, the difference in groundwater elevations decreased an average of 1.82 feet. The annual changes in field measured differences in groundwater elevation readings are consistent with the annual changes in total precipitation measured at the TSS reference station (Snotel 508); and the simulated changes in groundwater recharge observed in the flow budgets derived from the South Tahoe Groundwater model.

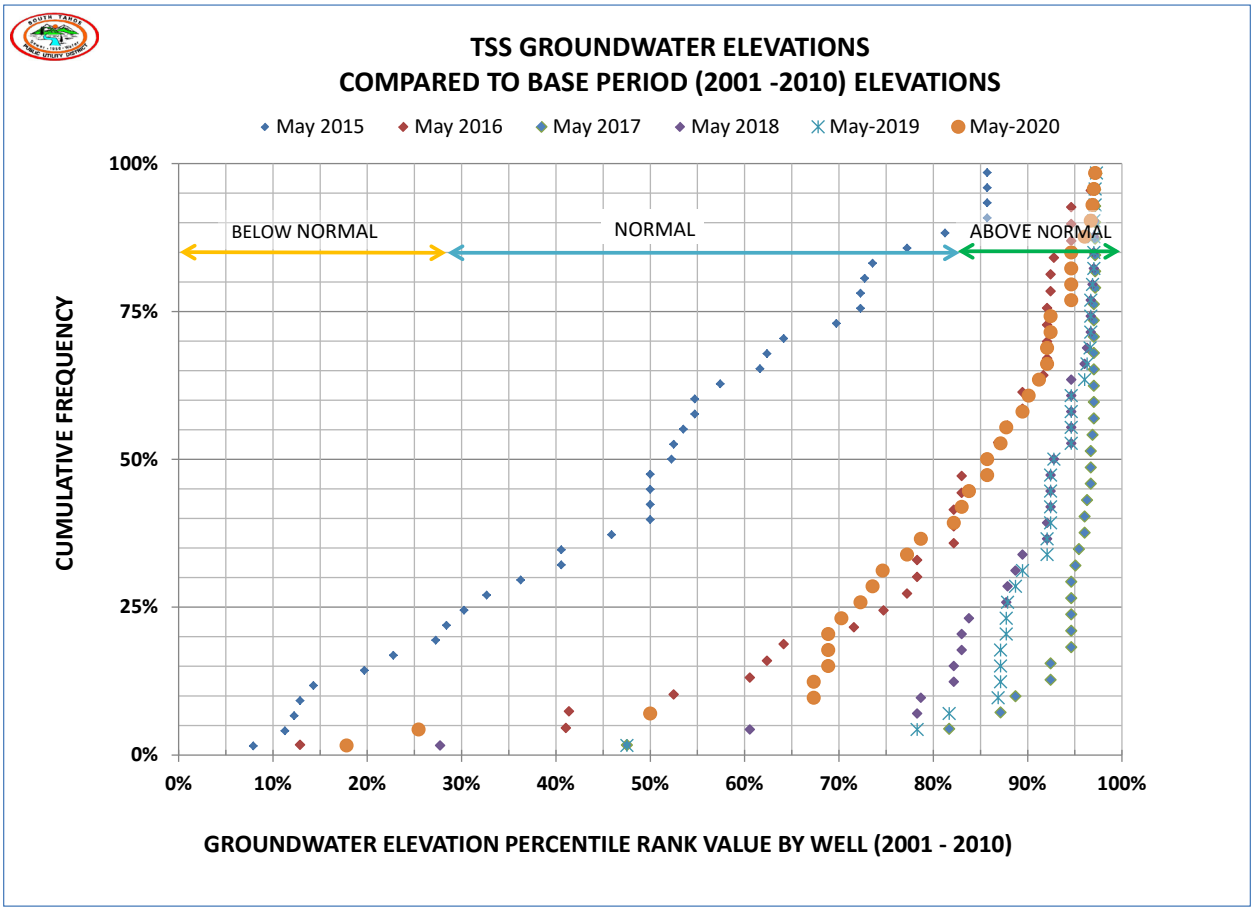

Figure 2-5. Hand readings collected during the May groundwater elevation monitoring event for the 2015 WY through 2020 WY compared to the record of hand readings for the same wells collected during the 2001 WY through 2010 WY base period for groundwater elevations.

2.4.2 Groundwater Elevation Contours

Isocontours of groundwater elevations for October 2019 and May 2020 are presented in Figure 2-6 and represent seasonal low and seasonal high groundwater elevation conditions. The typical pattern is for seasonal low groundwater conditions to occur in the late summer and early fall due to low recharge following the relatively dry summer months and increased groundwater pumping to meet high water demands. Seasonal high groundwater conditions typically occur in the spring following the spring snowmelt and runoff and lower groundwater pumping needed to meet low water demands.

The groundwater model for the TSS simulates the period 1983-2020 to calculate changes in groundwater levels and flux due to variations in precipitation and groundwater extractions. Model simulated groundwater levels were used to generate the groundwater elevation contours presented in

Figure 2-6. These contours are considered appropriate to illustrate the general pattern of groundwater flow in the TSS.

Comparison of contours shows that the generalized pattern of groundwater flow remains very similar between October 2019 and May 2020. This is consistent with the hydrograph data (Appendix A) that shows the typical variation in groundwater levels is on the order of only a few feet. In the 2019 WY Annual Report, a local groundwater depression was defined by the 6227 contour along the north margin of the TSS, within the South Lake Tahoe sub-area. This groundwater depression noted in 2019 in the groundwater elevation contours is not present in the 2020 WY groundwater elevation contours (Figure 2-6).

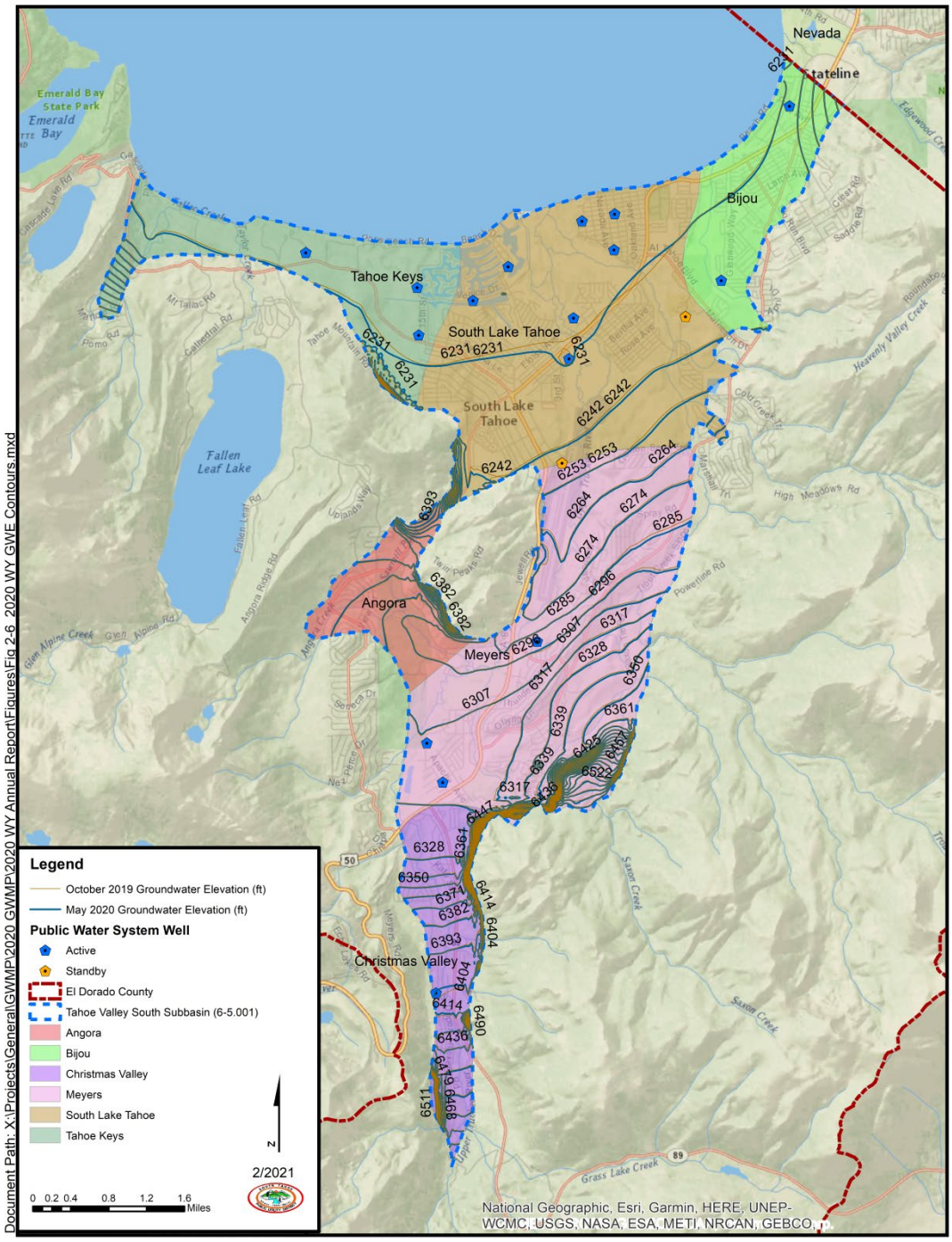

Figure 2-6. Model simulated groundwater elevations (upper 300 ft) for the TSS, representing seasonal low (October 2019 and seasonal high (May 2020) groundwater conditions. Contour interval is 10 ft.

2.5 Groundwater Quality

Groundwater in the TSS is typically of excellent quality; however, there is a history of groundwater contamination from regulated industrial and commercial chemicals impairing drinking water sources within the basin. Over the past ten years, arsenic, iron, and radionuclides (uranium, Gross Alpha particle activity) have been found in both PWS wells and private wells at concentrations exceeding primary or secondary maximum contaminant levels (MCLs) (Pohll *et al.,* 2016). Well head treatment is presently used to remove arsenic from groundwater produced at one active District well (Arrowhead Well No. 3). Two other District wells are currently on stand-by status due to concentrations of arsenic (Airport Well) and radionuclides (College Well) in groundwater above MCLs. In July 2020, TKWC detected uranium at MCLs in the TKWC Well #3 (TKWC #3); and uranium and arsenic at or above MCLs in the TKWC Well #2 (TKWC #2). The detection of these contaminants at or near MCLs caused TKWC to begin quarterly monitoring to determine compliance with MCLs; and restricted the use of these two wells as a drinking water source. TKWC is currently reliant on the TKWC Well #1 (TKWC #1) as its primary water source and is conducting a Phase 1 Long Term Facilities Plan to prevent entry of uranium, arsenic and PCE from entering into its water distribution system.

Man-made contaminants which have occurred in the TSS include petroleum hydrocarbon and chlorinated hydrocarbon compounds. Of these, the two most prominent constituents of concern (COC) are Methyl tert-Butyl Ether (MtBE) and PCE. Well head treatment (Granular Activated Carbon) is presently used to remove PCE from groundwater at TKWC #2. A second GAC treatment system is currently under construction to remove PCE from groundwater at the LBWC Well #5 (LBWC #5). In 1991, the District installed a centrally located Packed Tower Air Stripper (PTAS) to remove PCE from groundwater pumped from its Clement, Julie, Tata Well No. 4 and South Y wells. The Clement Well and its accompanying PTAS is presently inactive. In 2006, the District destroyed the Julie, Tata Well No. 4 and South Y wells. All of these active, inactive or destroyed wells and water treatment systems are or were situated near or within the South Y Area along the west side of the South Lake Tahoe sub-area.

During the 2020 WY, MtBE and PCE were not detected in any groundwater samples collected from District drinking water wells.

Low levels of PCE (below MCLs) were detected in groundwater samples collected from TKWC #1 and TKWC#3. TKWC #3 is presently off-line for confirmation sampling due to detections of uranium above MCLs. TKWC #1 is active and has been placed as a lead well due to the impairment of water quality in TKWC# 3 and TKWC#2. Elevated levels of PCE (above MCLs) were detected in groundwater samples collected from TKWC#2 (up to 31 ppb); and from LBWC #5 (64 ppb). TKWC#2 uses a GAC treatment system for the removal of PCE from groundwater which has been in operation since 2012. TKWC #2 is presently off-line for confirmation sampling due to detections of uranium and arsenic above MCLs. LBWC #5 was removed from service in 2014 due to water quality impairment. This well is expected to be brought back on-line when the construction and commissioning of a GAC treatment system for the

removal of PCE from groundwater has been completed and approved by DDW. The treatment system is anticipated to be operational starting in April 2021

In March 2019 the Lahontan Regional Water Quality Control Board (LRWQCB) was awarded a $4.6 million grant under the Site Cleanup Subaccount Program (SCAP) to investigate the South Y Plume (Figure 2-7). The South Y Plume is believed to have resulted from spills and releases associated with the use of commercial grade dry cleaning solvents in the South Y Area during the 1970's. During 2019, the LRWQCB undertook a regional plume characterization that involved the drilling and sampling of sixty-four (64) borings to determine the lateral and vertical extent of PCE contamination; identify contaminant pathways; and using detailed graphics show the current distribution of PCE in groundwater. During the 2020 WY, the LRWQCB continued regional plume characterization activities that involved the drilling and sampling of an additional 15 borings (79 borings total during 2019 and 2020 WY). In June 2020, impaired public water supply well, LBWC #4 (situated within the PCE plume) was identified as a vertical conduit and was properly destroyed using SCAP grant funding.

Review of preliminary data collected during the regional plume characterization shows that the South Y Plume extends more than 7,200 feet north from the South Y towards the south shore of Lake Tahoe. Within this plume, PCE concentrations above the MCL (5 ppb) were detected in groundwater samples collected from subsurface depths to 185 feet below ground surface. PCE concentrations in groundwater samples collected from within the plume ranged from below the detection limit of 0.5 ppb to greater than 500 ppb. Isoconcentration map showing the distribution of PCE within the South Y Plume show a broad area of PCE groundwater contamination greater than 50 ppb extending from the south end of the plume (near inferred source areas) to the north end of the South Y Plume (near the leading edge of the plume front).

Regulatory activities and environmental data for the South Y Regional Contamination investigation (T10000007984) are available online through the SWRCB GeoTracker website at;

https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=T10000007984

The South Y Plume has impaired three PWS wells (LBWC #2, LBWC #5 and TKWC #2) with a combined source capacity of 3.25 MGD. Potential impairment of TKWC #1 would further reduce the total production capacity of area drinking water sources by an additional 1.44 MGD. Two other PWS wells (LBWC #1 and TKWC #3) west of the South Y Plume are presently non-detect (LBWC#1) or below MCLs (TKWC#3)for PCE. However, the recent impairment of TKWC #2 and TKWC #3 by natural contaminants (uranium and arsenic) has further reduced source capacity for the TKWC water system to below its water system maximum day demand (2.383 MGD). TKWC is currently working on a long-term facilities plan to address this apparent deficit of available water supply for its water system.

The District has mutual aid and assistance agreements for the emergency provision of drinking water using inter-tie connections from its water distribution system to both the LBWC and TKWC water systems. During the 2020 WY, the District provided 32,000 gallons of drinking water to LBWC through its

inter-tie connection, which is less than 1% of LBWC's total water production for the 2020 WY. The District is also working with TKWC to confirm the volume of flow that the District's water system can currently supply to TKWC.

A file review of District and El Dorado County records indicated that as many as 24 private wells and 14 small community water system wells may be located within or in close proximity to the South Y Plume (KJ, 2019). A majority of these wells are relatively shallow, constructed to total depths of less than 100 feet and are believed to be susceptible to water quality impairment from this plume.

Groundwater management actions taken to mitigate the South Y Plume are described in Section 3.7 of this report.

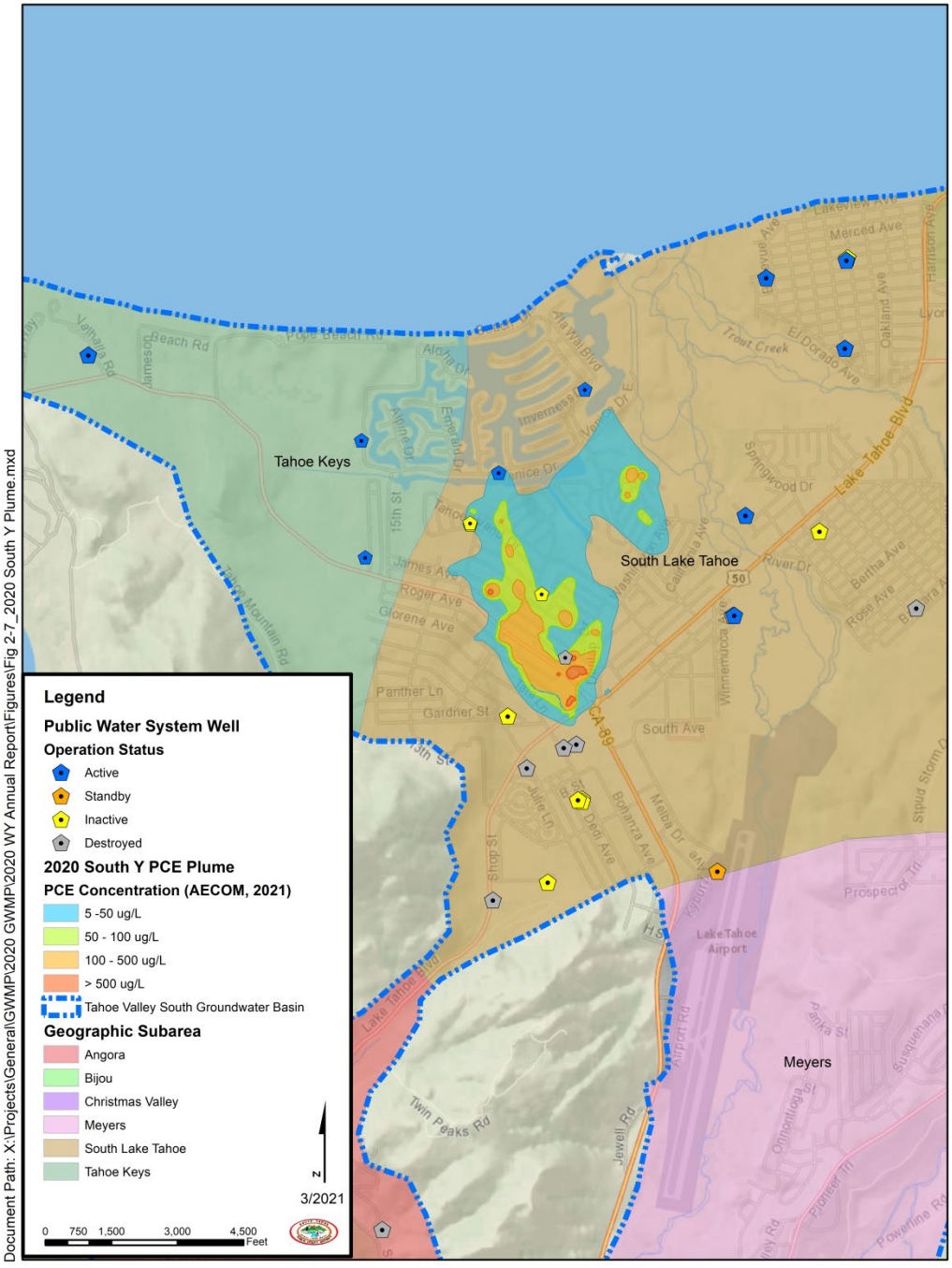

Figure 2-7. . Location of the South Y Plume within the TSS, as defined by PCE in groundwater detected above 5 micrograms per liter (µg/L), provisional data provided by LRWQCB..

High reliance on groundwater requires that PWS wells must have sufficient source capacity to meet water system demands within the TSS. Because of this reliance and susceptibility of groundwater sources to contamination, the total source capacity of active PWS wells is used as an indicator to describe current basin conditions with respect to groundwater quality (Pohll *et al.,* 2016). During the 2020 WY, the total source capacity of PWS wells operating within the TSS is estimated at 19.885 MGD. The minimum threshold for groundwater quality within the TSS is the total MDD requirement for all beneficial users of groundwater within the TSS (Pohll *et al.,* 2016). Using the maximum day demand for the District, TKWC and LBWC water systems calculated using monthly water production data over the past ten years (2011 WY – 2020 WY) the MDD requirement is 14.166 MGD. As the total source capacity of PWS wells exceeds the MDD requirement for all beneficial users, the impact from the water quality impairments of PWS Wells in the South Y Area has not reached the level where existing source capacity can no longer satisfy potable water demands. At present, the total source capacity of PWS wells exceeds the MDD requirement by about 5.72 MGD.

In 2016, the District, in partnership with LBWC and the TKWC, undertook renewed investigations to describe the extent of PCE contamination and identify remedial measures that may be used to remove PCE contamination from groundwater to protect existing groundwater sources used for drinking water supply. This included completion of an engineering assessment of an inactive water supply well (LBWC #4) for use as a potential extraction well (GEI, 2016a); compilation of historical data to show the spatial and temporal distribution of PCE contamination near the South Y GEI, 2016b); and initial development of a modular three-dimensional transport model (MT3DMS) that could be used to evaluate the effectiveness of various remedial alternatives designed to mitigate contamination from the South Y Plume. During 2017, water quality data was collected to better understand the current extent of PCE contamination in PWS wells; the preliminary MT3DMS model (South Y Fate and Transport Model) was completed, and negotiations were initiated with the SWRCB –DFA to conduct a Feasibility Study under a Proposition 1 Groundwater Planning Grant, addressing this groundwater contaminant problem. An agreement with the SWRCB-DFA to conduct the Feasibility Study was executed in 2018 (Agreement D1712508). The Feasibility Study included performance of a groundwater investigation (referred to as the PDI) in the mid-section of the South Y Plume. Information from the PDI was used to inform the preliminary engineering design of extraction wells for the removal of PCE from groundwater. As part of the Feasibility Study, water quality data collected during 2018 was used to update the South Y Fate and Transport Model and initial management scenarios were developed for evaluation.

During the 2019 WY, the District continued on-going activities to complete the Feasibility Study. Initial management scenarios were refined to define interim remedial alternatives to manage on-going contamination from the South Y Plume. Six interim remedial alternatives were developed and initially screened for effectiveness using the South Y Fate and Transport Model. The alternatives were also reviewed and screened for ease of implementation using input from the water purveyors. Based on this screening three interim remedial alternatives were selected for detailed analysis, including 20-year project life cost analysis, to select a preferred remedy. Technical reports presenting information from

the PDI; Baseline Human Health Risk Assessment; and South Y Fate and Transport Modeling were completed and were posted on the District's website (https://stpud.us).

During the 2020 WY, the South Y Feasibility Study was completed. The Feasibility Study (FS) and an accompanying Interim Remedial Action Plan (IRAP) were issued and are posted on the District's website. The Feasibility Study/Interim Remedial Action Plan (FS/IRAP) Report is one of the principal technical documents prepared for the South Y Feasibility Study. The FS includes a description of historical and current studies used to describe hydrologic conditions, water systems infrastructure, groundwater production, groundwater quality and inferred extent of PCE contamination in the South Y Area. The FS also includes a description of the remedial alternatives developed and selected for detailed analysis, the selection criteria used for analysis and the results used to select a preferred interim remedial alternative. A planning level description and design of the preferred alternative is presented in the accompanying IRAP. Public outreach for the FS/IRAP report included;

- Publication of a Notice of Availability (NOA) in the March 20, 2020 edition of the Tahoe Daily Tribune announcing a 30-day public comment period, availability of the draft IRAP and FS Report, and a March 31, 2020 webinar presenting the draft IRAP;
- Presentation of the draft IRAP during a webinar on March 31, 2020; and
- Posting of all final technical documents and recordings of public workshops and meetings completed for the South Y Feasibility Study project on the District's web site.

Comments received during the public comment period were reviewed and addressed in a Responsiveness Summary. Needed changes and/or clarifications to the draft FS/IRAP were performed and provided in the final FS/IRAP issued in May 2020. All grant requirements under Grant Agreement (D1712508) were completed to the satisfaction of the SWRCB-DFA .

In May 2017, the LRWQCB issued a Clean Up and Abatement Order (CAO No. R6T-2017-0022) requiring remediation and additional investigation of PCE groundwater contamination resulting from historic PCE release from the former Lake Tahoe Laundry Works (LTLW) site, located at 1024 Lake Tahoe Boulevard, South Lake Tahoe, CA (Case No. SL0601754315). During the 2018 WY, consultants for the working parties (Seven Springs Limited Partnership and Fox Capital Management Corporation), prepared work plans, planning reports and conducted initial contaminant investigations required in the CAO. During the 2019 WY, the working parties conducted Phase II and Phase III off-site groundwater investigations; Phase 1 (on-site) and Phase 2 (off-site) Preferential Pathway Evaluations; and completed a work plan to conduct an on-site chemical oxidation pilot test. These tasks are summarized in two Investigation Summary Reports issued for this site (EKI, 2019a, 2019b). During the 2020 WY, the working parties filed a lawsuit challenging CAO No. R6T-2017-0022 on the grounds that the cost burden/benefit analysis presented in the CAO was defective. In June 2020, El Dorado Superior Court vacated the order as to Fox Capital Management Corporation. In response to this ruling, LRWQCB agreed with the working parties to review the CAO in order to correct the cost burden/benefit analysis, while the working parties continue to do groundwater monitoring and remediation at the former LTLW site. Groundwater monitoring was performed on a quarterly basis. A summary of laboratory analytical results for groundwater samples

collected during the 2020 WY are included with the historical data in Table 3 of the Third Quarter 2020 Monitoring Report (PES Environmental Inc., December 2020). Review of Table 3 shows the highest levels of PCE detected in groundwater monitoring wells used for this site were collected on August 12, 2020. During the August 2020 groundwater monitoring event, PCE was detected at 170 ppb in a groundwater sample collected from on-site shallow monitoring well LW-MW-9s; and was detected at 270 ppb in a groundwater sample collected from off-site monitoring well OS-2M.

A full list of documents describing the regulatory activities performed at this site can be found online through the SWRCB GeoTracker website at;

https://geotracker.waterboards.ca.gov/profile_report.asp?global_id=SL0601754315)

During 2019, the LRWQCB initiated technical meetings with the water purveyors and working parties to discuss recent work completed by all parties involved with the investigation and clean-up of the South Y Plume. South Y PCE Technical meetings were convened in May and September 2019. During 2020, a technical meeting was convened in February 2020.

2.6 Groundwater Production

Groundwater is the primary source of drinking water throughout the TSS, provided primarily for residential and commercial water uses (see Section 2.6.1). About 92 percent of groundwater produced from the TSS is from PWS wells operated by the District, TKWC, LBWC and Lakeside Park Association (LPA). The remaining eight (8) percent of groundwater production is pumped from Noncommunity Water System wells (4%); Domestic wells (3%); and Nontransient Noncommunity Water System and State Small Water System wells (about 1%). Groundwater extractions from the PWS wells are metered using propeller or turbine type flowmeters with a register for total flow and a flow rate indicator. Totalizer readings are recorded on a daily basis by the District and on a monthly basis by TKWC and LBWC. Accuracy of measurement for these flow meters is typically on the order of +/- 2%. Groundwater extractions from Noncommunity Water System, Domestic, Nontransient Noncommunity Water System, and State Small Water System wells are typically not metered.

Table 2-2 shows the monthly and total pumping volumes of groundwater produced by PWS wells during the 2020 WY. During the 2020 WY, a total of sixteen (16) PWS wells were active, an additional four (4) wells were on stand-by status, but not used (restricted for emergency use only).

PUBLIC WATER SYSTEM (PWS)	UNITS	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JLY	AUG	SEPT	2020 WY
South Tahoe Public Utility District (District)	AF	351	290	340	313	284	273	274	519	651	796	757	649	5,498
Tahoe Keys Water Company (TKWC)	AF	44	12	16	15	14	14	28	119	145	169	227	170	972
Lukins Brothers Water Company (LBWC)	AF	16	14	15	16	13	13	16	33	42	49	47	41	313
Lakeside Park Association (LPA)	AF	0.4	0.2	0.6	0.3	0.5	0.2	0.1	0.2	0.6	1.2	1.5	0.7	6.4
TSS PWS TOTALS		412	316	371	344	312	300	318	671	838	1,015	1,032	861	6,791

Table 2-2. Monthly pumping volumes for PWS wells in the TSS during the 2020 water year, reported in AF.

Annual groundwater production from each of the PWS included in Table 2-2 above is shown below in Figure 2-8. Since the 2005 WY, annual groundwater production from the pumping of PWS wells has

ranged from a low of approximately 6,306 AF in 2015 WY to a high of approximately 9,652 AF in 2007 WY, with a median value of 7,556 AF. During the 2020 WY, total groundwater production (6,791 AF) was about 10% below the median value. Figure 2-9 shows the locations of the active PWS wells and their pumping volumes for the 2020 WY. Slightly more than 70% of the total groundwater used in the TSS is produced from the South Lake Tahoe sub-area.

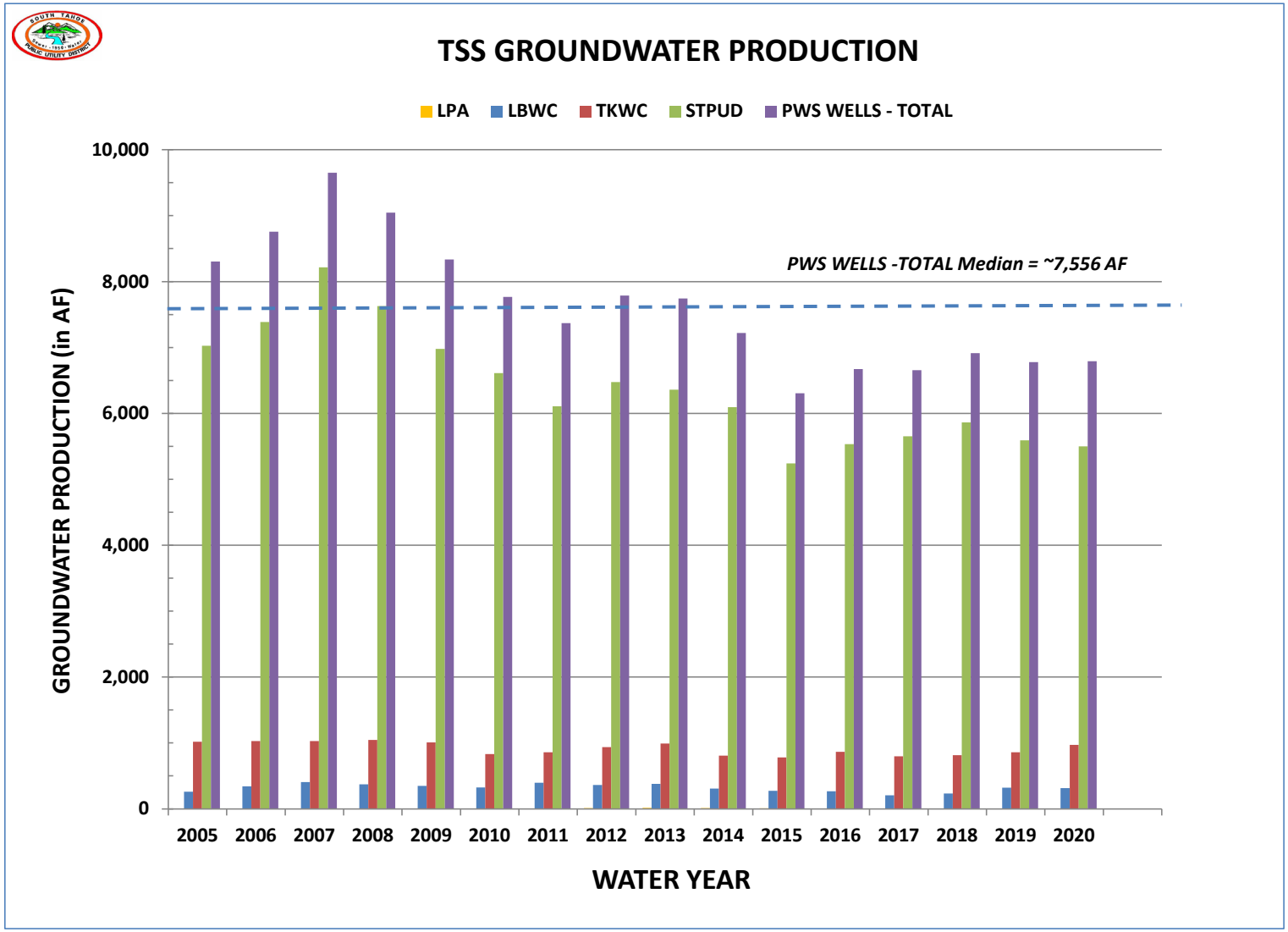

Figure 2-8. Groundwater production trends for public water system wells in the TSS since the 2005 WY, in AF.

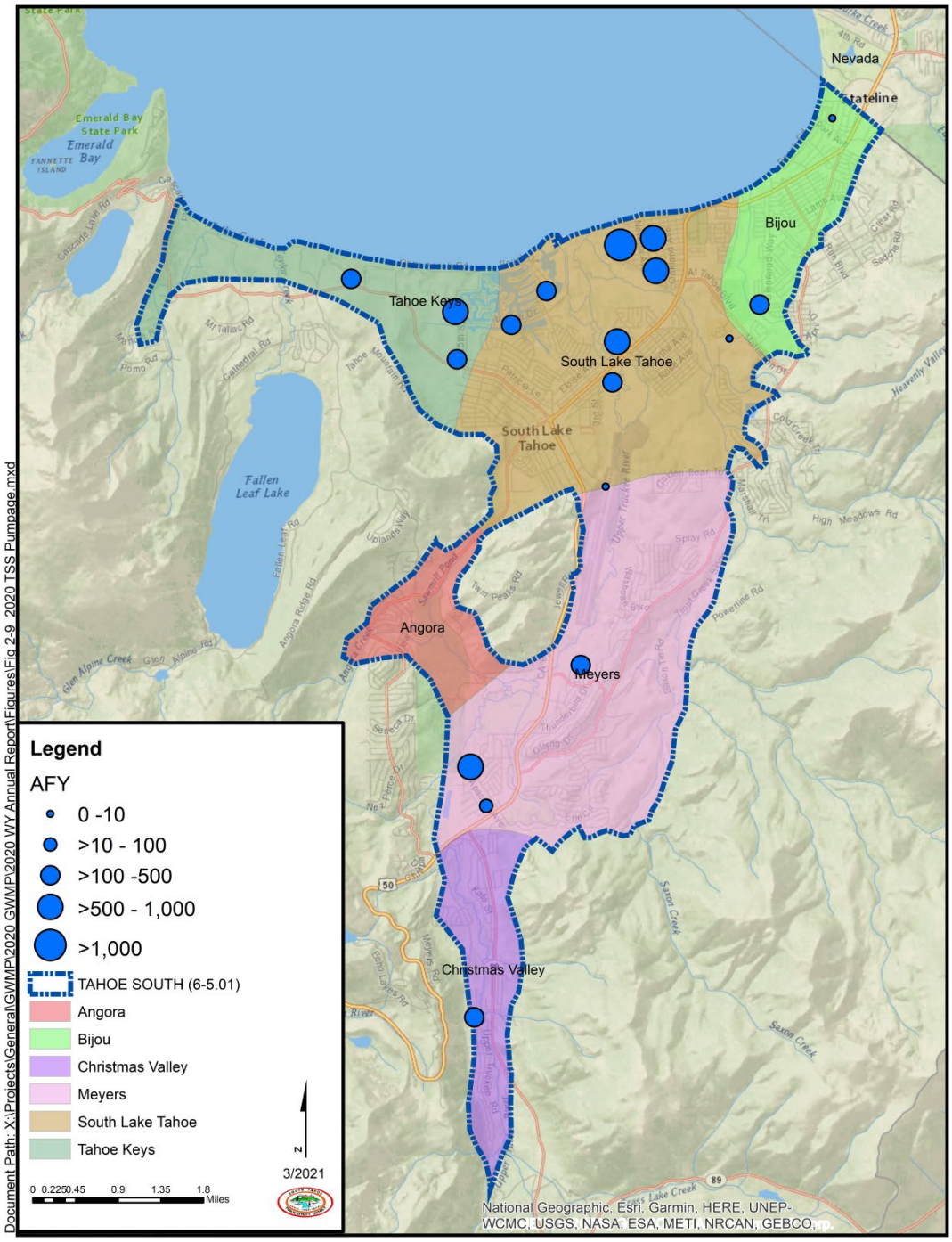

Figure 2-9. Groundwater production from PWS wells during the 2020WY, in AF. Production from PWS wells accounts for more than 90% of the groundwater extracted from the TSS.

2.6.1 Water Use

Water use information provided in this section is from the District's customer service database. As indicated in Table 2-2, the District produces the majority of drinking water used within the TSS, typically accounting for more than 80% of total groundwater production. Although not complete, information from the District's customer service database is believed to be adequate to show the general pattern of water use within the TSS.

Table 2-3 shows water use by sector from metered data for the District's water system during the 2020 calendar year. The District is in the process of installing meters on all connections and is planned to be fully metered by 2022. The 2020 data captures about 97% of the total number of water accounts in the District's water system. The majority of the District's customers are residential. The District's commercial category includes office and retail,resorts including hotels, restaurants, and snowmaking and government customers. The "Other" category is for water transfers through the District's intertie to the LBWC water system under its Mutual Aid and Assistance Agreement. "Losses" are the non-revenue water system losses calculated from the difference between total groundwater production from District wells and consumption from the District meter data. .

Use Type *(Add additional rows as needed)*	2020 Actual		
	Additional Description *(as needed)*	Level of Treatment When Delivered	Volume, AF
Single Family	RES	Drinking Water	3,258.7
Multi-Family	MFR	Drinking Water	739.38
Commercial	COM +MHT+ GOV	Drinking Water	703.00
Other	Mutual Aid Transfers	Drinking Water	0.10
Losses	non-revenue water	Drinking Water	1,076.82
		TOTAL	**5,778**

Table 2-3. 2018 water use by sector for the District water system, in acre feet. The total volume accounts for about 97% of the Districts total water accounts which were metered in 2020. Losses were estimated using the difference between District groundwater production and consumption from the meter data .

Because use of recycled water within the Lake Tahoe basin is prohibited by the Porter-Cologne Act there is no recycled water use in the TSS.

2.7 Groundwater Storage

The annual change in groundwater storage is the difference in the volume of water in an aquifer from one year to the next. Figure 2-10 shows the annual trends of groundwater extractions from PWS wells and the changes in groundwater storage, as derived from the annual water budget calculated by the South Tahoe Groundwater Model from 2005 WY through 2020 WY. The main components of the water budget include groundwater recharge; groundwater discharge to streams (baseflow); groundwater flux to Lake Tahoe; and groundwater pumping. Changes in groundwater storage are calculated from the differences in total inflow (recharge) and total outflows (baseflow, flux to Lake Tahoe and groundwater pumping) to the modeled region over a specified period (Carroll, *et al.*, 2016a).

Groundwater storage changes in response to changes in precipitation and groundwater production. During the 2020 WY, the change in groundwater storage for the model domain was -24,303 AF. The change in groundwater storage for the TSS was -3,535 AF. Figure 2-10 shows that the annual change in groundwater storage for the TSS ranged from -2,870 AF during the 2015 WY (below normal) to +7,725 AF during the 2011 WY (very wet). During water years when the annual change in groundwater storage is negative, groundwater levels decrease slightly. During water years when the annual change in groundwater storage is positive, groundwater levels increase slightly. As the trend in annual groundwater production has generally been declining since 2007, the variation in groundwater storage after 2007 likely reflects annual changes that have occurred in response to changes in total precipitation and groundwater recharge.

Long-term reductions in groundwater storage within the TSS are not occurring. This is evidenced by stable groundwater levels (*see* Section 2.4) and the cumulative change in groundwater storage. Since the 2005 WY, the cumulative change in groundwater storage for the model domain is + 34,040 AF. The cumulative change in groundwater storage for the TSS is +5,516 AF.

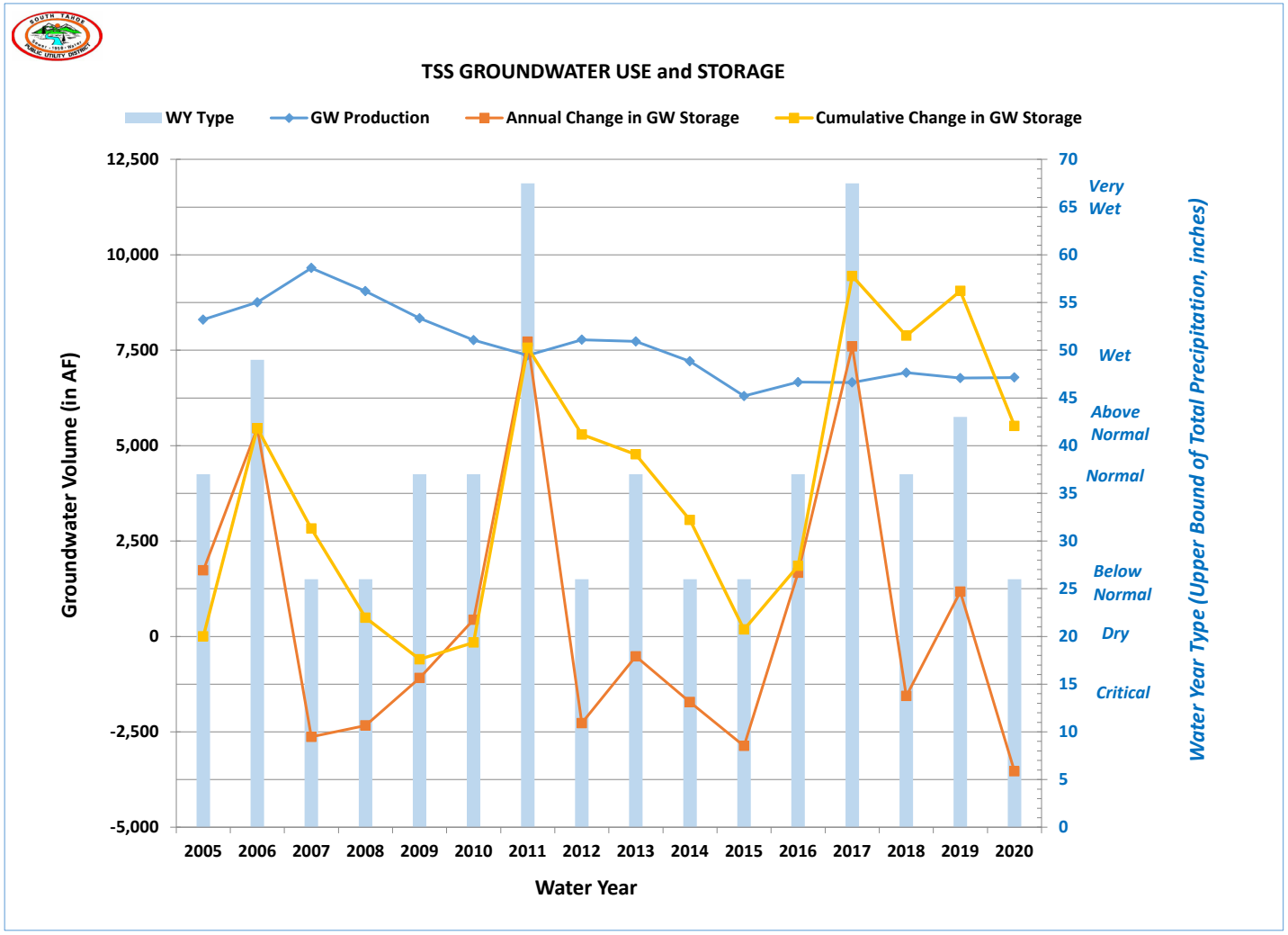

Figure 2-10. Annual groundwater production from public water supply wells and modeled annual and cumulative change in groundwater storage, in AFY, for the TSS (2005 WY through 2020 WY). Water year type using the TSS classification is indicated on the vertical axis along the right-side of the graph. Positive annual changes in groundwater storage indicate periods of rising groundwater level.

3 Basin Management Objectives

BMOs are flexible guidelines for the management of groundwater resources that describe specific actions to be taken by the District to meet locally developed objectives at the basin or sub-area scale. Under the 2014 GMP, eight BMOs have been defined for groundwater management of the TSS.

- BMO #1 – Maintain a sustainable long-term groundwater supply.
- BMO #2 – Maintain and protect groundwater quality.
- BMO #3 – Strengthen collaborative relationships with local water purveyors, governmental agencies, businesses, private property owners and the public.
- BMO #4 – Integrate groundwater quality protection into local land use planning activities.
- BMO #5 – Assess the interaction of water supply activities with environmental conditions.
- BMO #6 – Convene an ongoing Stakeholder's Advisory Group (SAG) as a forum for future groundwater issues.
- BMO #7 – Conduct technical studies to assess future groundwater needs and issues.
- BMO #8 - Identify and obtain funding for groundwater projects.

The following section describes the implementation of projects and management actions taken during the 2019 WY.

3.1 BMO #1- Maintain a Sustainable Supply

The purpose of BMO #1 is to implement measures to manage the groundwater levels for long term sustainability and reliability of the water supply for all users within the TSS. The measurable goal for tracking groundwater levels is to sustain groundwater levels within the normal range of groundwater levels during the base period (2001 WY – 2010 WY) for groundwater levels (Section 2.2.1). If long-term groundwater levels show a consistent declining trend that falls below the normal range, then an assessment of the cause for the decline would be conducted. If excessive groundwater pumping is found to be the cause, then measures would need to be taken to either redistribute the pumping to other portions of the basin, or reduce pumping at the implicated well(s). No action would be required if the condition described above is not observed.

During the 2020 WY, the median for the May 2020 groundwater elevations was near the bottom of the above normal range (85%) of the base period. Groundwater levels will continue to be monitored in accordance with the District's DWR-approved Groundwater Elevation Monitoring Plan (STPUD, 2011).

3.2 BMO #2 – Maintain and Protect Groundwater Quality

Groundwater in the TSS is typically of excellent quality; however, the South Y Plume remains from past use of commercial grade dry cleaning solvents (PCE) in the South Y Area, which continues to impair groundwater sources (see Section 2.5).

The purpose of BMO #2 is to implement measures to maintain and protect groundwater quality in order to sustain the beneficial use of groundwater resources. These measures would address contamination from man-made contaminants and not natural constituents intrinsic to the aquifer. This would include setting measurable goals and continuing proactive measures to protect groundwater quality. The groundwater quality measurable goals are consistent with existing regulations and policies. These would include:

- All groundwater supply wells will meet drinking water standards as defined by the SWRCB Division of Drinking Water.
- Groundwater quality in the TSS will not be impaired so as to affect its beneficial use of current or potential future use of groundwater for public water supply as defined by the LRWQCB Basin Plan.
- Detection of contaminants from regulated industrial and commercial chemicals in any well within the TSS will be evaluated as to its potential as an emerging groundwater quality threat to the water supply.
- Information on areas of degraded water quality will be collected and maintained in order to consider its effect on available water supply and the development of future groundwater supplies.

The objective of setting quantitative goals for BMO #2 is to provide a means for assessing the relative threat of contamination. The goals are tied to the regulatory requirements, but also make the detection of any man-made contaminant require review and analysis. In this manner, the goals establish a mechanism to be proactive in addressing contamination issues before they reach levels that threaten the beneficial use of groundwater sources within the TSS.

3.2.1 Source Capacity

The measurable goal for BMO #2 is that degraded water quality within the TSS should not rise to a level that threatens the ability of groundwater sources (PWS Wells) to meet water system demands. Demand requirements for public water systems are calculated in accordance with methods described under Section 64554 of the California Waterworks Standards. Under these standards, a PWS's sources shall

have the capacity to meet the system's MDD calculated using water system's daily, monthly or annual water use data, as available. These standards also include a water system's requirements for peak hourly demand; however, these requirements are directed toward the adequacy of the water system's distribution system to provide sufficient flows. As the goal for BMO #2 is to prevent degraded water quality from impairing groundwater sources to a point where water demands can no longer be met and that the PWS wells account for more than 90% of the groundwater use, only the MDD for the PWS wells are used to establish a minimum threshold for degraded water quality in the TSS.

More than 90% of the total water demand is satisfied by the PWS wells operated by the District, TKWC and LBWC. To account for the beneficial users of groundwater not connected to these water systems, a 10 percent safety factor is added to the MDD derived for these water systems to determine the minimum threshold for the TSS. During the 2020 WY, the MDD was recalculated using monthly groundwater production data from the District, TKWC and LBWC water systems collected over the past ten (10) years (2011 WY – 2020 WY). Results of these calculations provide a revised minimum threshold (MT)of 14.166 MGD needed to meet the MDD for all beneficial users in the TSS.

The current state of the TSS with regard to groundwater quality is indicated below in Figure 3-1. The total production capacity for all active PWS wells currently operating within the TSS is 19.855 MGD. This exceeds the MDD minimum threshold for water quality by 5.689 MGD. However, total source capacities have declined since 2011 and continue to be of concern if capacity is not replaced. Groundwater management actions taken to mitigate this groundwater concern are described in Sections 3.7 and 3.8.

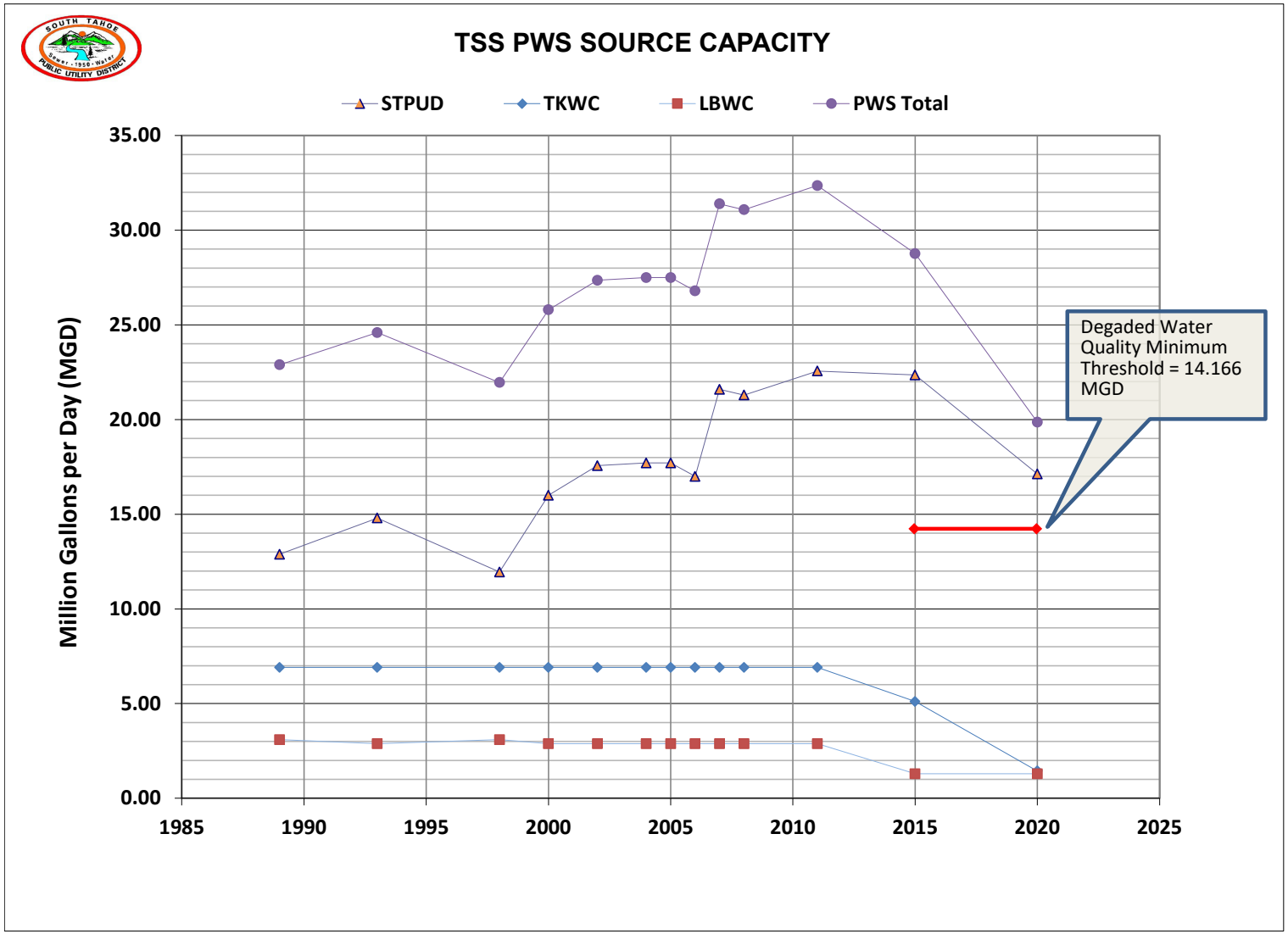

Figure 3-1. Source capacity, in million gallons per day, for active public water system wells operating within the TSS from 1989 through 2020.

3.3 BMO #3 – Building Collaborative Relationships

The TSS includes a wide range of stakeholders in addition to the District, including smaller water companies and domestic well owners. Government agencies, local business interests, environmental groups and private citizens also have interests in local groundwater management. Collaboration and coordination with other local agencies and stakeholders for implementation of the 2014 GMP is achieved through the SAG. SAG members during the 2020 WY are listed in Table 3-1.

Member	Title	Affiliation
Jason Burke	Storm Water Coordinator	City of South Lake Tahoe
Ken Payne, PE	General Manager	El Dorado County Water Agency
Robert Lauritzen, PG	Geologist	El Dorado County Environmental Management Division
Brian Grey, PG	Engineering Geologist	Lahontan Regional Water Quality Control Board
Joey Keely	Ecosystem Staff Officer	USFS-Lake Tahoe Basin Management Unit
Jennifer Lukins	Manager	Lukins Brothers Water Company
Daniel Larson,	Water Systems Manager	Tahoe Keys Water Company
Nakia Foskett	Water Systems Manager	Lakeside Mutual Water Company
Scott Carroll	Environmental Planner	California Tahoe Conservancy/Real Property Owner
Michael Conger	Senior Long Range Planner	Tahoe Regional Planning Agency
Harold Singer	Retired	Non-Business Community Rate Payer

Table 3-1. 2020 WY Stakeholder Advisory Group members.

3.3.1 GSA Formation

The TSS lies entirely within EDC, and largely within the jurisdiction of the District. Since November 17, 2015, the District has been recognized as the exclusive GSA for the portion of the TSS within its jurisdiction (South Tahoe Public Utility District GSA 1). During the summer of 2016, the El Dorado County Water Agency (Water Agency) and the District began discussing options to form a GSA in the portion of the TSS outside of the District's jurisdiction. Pursuant to these discussions—as well as additional conversations with DWR—the Water Agency and the District determined that it would be appropriate for the District to become the GSA for the portion of the TSS outside of its jurisdiction (i.e., within the Water Agency's jurisdiction). Concurrent with this decision, the Water Agency and the District drafted an MOU setting forth the Water Agency's and the District's agreement to cooperatively manage and coordinate implementation and enforcement of SGMA in this portion of the Basin. The Water Agency and the District subsequently entered into this MOU and the District submitted a groundwater sustainability agency formation notice (GSA Formation Notice) to DWR on September 16, 2016 for the portion of the TSS outside of its jurisdiction (2016 GSA Formation Notice).

On December 28, 2016, the District was recognized as the exclusive GSA for the portion of the TSS located outside of its service area jurisdiction (South Tahoe Public Utility District GSA-2). In March 2017, discussions with the SWRCB raised concerns about an agency forming a GSA outside of its jurisdiction. These concerns raised the risk that the South Tahoe Public Utility District GSA-2 may be considered invalid and that the TSS could potentially be designated as "probationary" by the SWRCB and be put under state management. To ensure that the Water Agency and the District are able to retain local control of the TSS's groundwater resources, the District agreed to rescind its 2016 GSA Formation Notice and the Water Agency agreed to act as the GSA for the portion of the TSS covered by the District's 2016 GSA Formation Notice.

On May 4, 2017, the District adopted a resolution rescinding its 2016 GSA Formation Notice. The withdrawal notice had no effect on formation of the South Tahoe Public Utility District GSA -1 or its status as the exclusive GSA for the portion of the TSS within its service area. On June 14, 2017, the Water Agency held a public hearing and elected to become the GSA for the portion of the TSS outside of the District's service area; and the District submitted to DWR its notice of intent to withdraw the South Tahoe Public Utility District GSA-2 for the portion of the TSS outside of its service area. On June 15, 2017, the Water Agency GSA formation notice for the El Dorado Water Agency GSA was posted on the DWR website through the SGMA Portal.

Concurrent with the Water Agency GSA formation notice for the Water Agency GSA and the District's notice of intent to withdraw the South Tahoe Public Utility District GSA-2, the District and Water Agency entered into an Amended and Restated MOU to work collaboratively to sustainably manage groundwater resources and implement SGMA throughout the TSS. With execution of the MOU (on June 14, 2017), the TSS is in full compliance with GSA formation requirements.

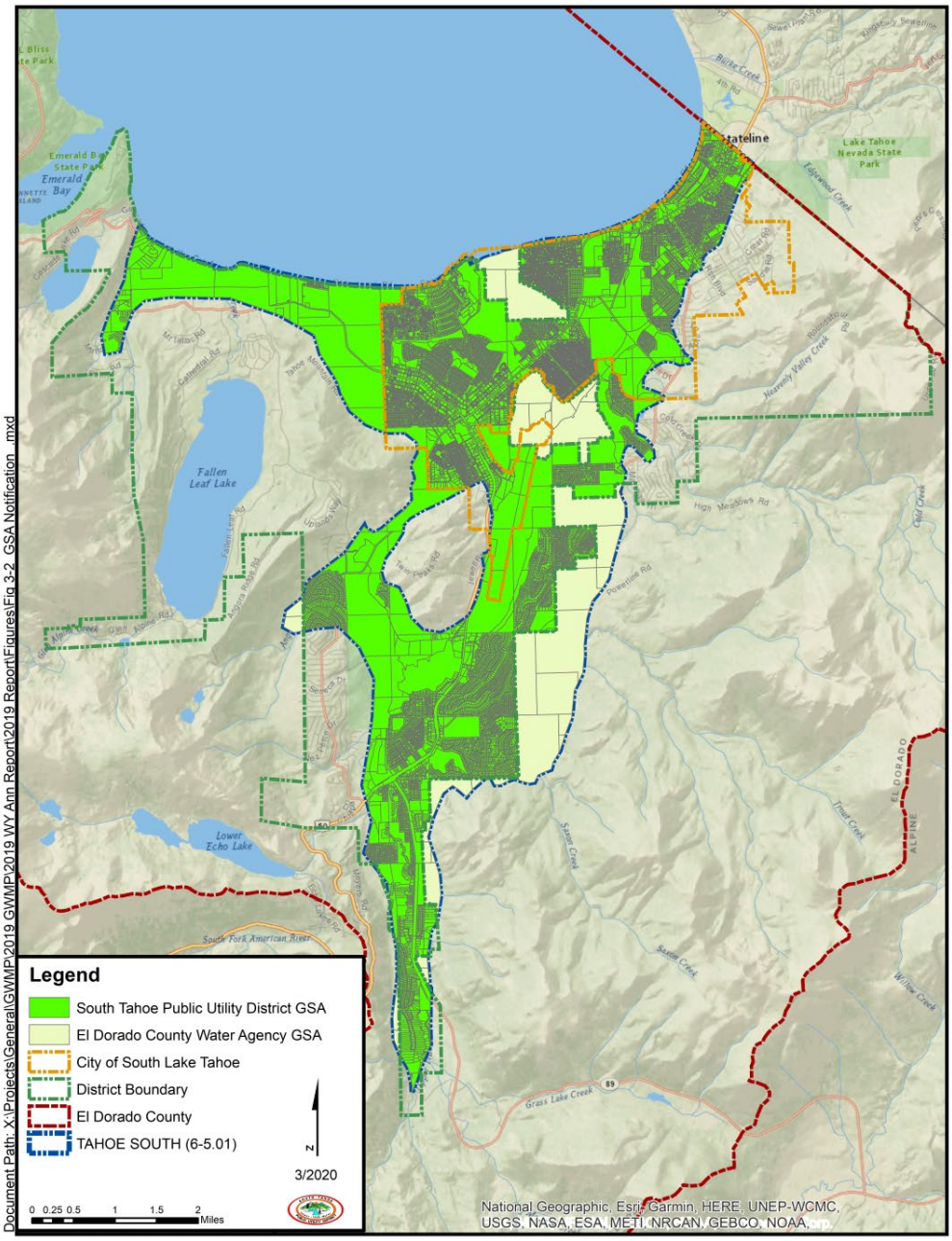

Figure 3-2. GSA boundaries for the TSS. The District is regarded as the exclusive GSA for portions of the basin within its service area. The Water Agency is regarded as the exclusive GSA for portions of the basin outside the District' service area. Through an MOU, the District and Water Agency GSAs implement SGMA across the full extent of the TSS.

3.3.2 Tahoe South Subbasin Alterative

In addition to completing GSA formation requirements for the TSS, the District and County Water Agency are required under SGMA to adopt either a GSP or GSP Alternative by January 31, 2022.

During the 2016 WY, the District: conferred with the SAG about submitting the 2014 GMP and Alternative Materials to DWR as a GSP Alternative; compared the 2014 GMP and Alternative Materials to SGMA requirements to demonstrate functionally equivalency to a GSP; completed an analysis of basin conditions to demonstrate that the TSS had operated within its sustainable yield for a minimum 10-year period; and completed DWR's Alternative Elements Guide to demonstrate that the analysis of basin conditions is functionally equivalent to a GSP.

In December 2016, the District concurrently submitted both the 2014 GMP and Alternative Materials as an existing plan Alternative; and the analysis of basin conditions as an analysis Alternative for public comment and DWR review and evaluation. As part of its submittals, the District indicated its preference to DWR that the review be sequenced in such a manner that its existing plan Alternative be reviewed first and should DWR agree that the existing plan Alternative is functionally equivalent to a GSP, review of the analysis of basin conditions would not be necessary. Acceptance of the existing plan Alternative would allow the District and Water Agency to continue groundwater management of the TSS under the 2014 GMP in accordance with SGMA and amend this plan in compliance with SGMA and AB3030.

On July 17, 2019, DWR determined that the District's existing plan Alternative satisfied the objectives of SGMA and was approved as a GSP Alternative for the TSS, herein referred to as the Tahoe South Subbasin Alternative (TSS Alternative). Under SGMA, approved Alternatives are required to submit annual reports to DWR on April 1 of each year; and to resubmit the alternative by January 1 every five years (CWC § 10733.6 (c)). The first five year update of the TSS Alternative is required to be resubmitted to DWR by January 1, 2022.

During Alternative Assessment of the TSS Alternative, DWR staff reported a number of Recommended Actions (RAs) which are information that should be included in the first five-year update of the TSS Alternative and recommendations for improvement (DWR, 2019a). A summary of these RAs are provided below in Table 3-2.

Recommended Action	Description
RA-1	Provide water budget information in Tabular Form for historical, current and projected water budgets.
RA-2	Provide a projected water budget over the 50-year planning and implementation horizon, incorporating climate change effects.
RA-3	Reconcile the different future water demand projections between the Groundwater Management Plan (GMP) and Urban Water Management Plan (UWMP) and incorporate the reconciliation in the projected water budget.
RA-4	To understand change in groundwater storage for the Subbasin, the water budget calculated by the South Tahoe Groundwater Model should be calculated within the Subbasin boundary rather than the surrounding watershed area inclusive of the Subbasin.
RA-5	Provide additional explanation in the first five-year update for how pumping may impact plume migration or cause degraded water quality.
RA-6	Provide estimates of the quantity and timing of depletions of interconnected surface water; define what would cause depletions to become significant and unreasonable.
RA-7	Define quantitative criteria for groundwater levels, storage and depletion of interconnected surface water that can be used to objectively determine compliance of the Plan with the objectives of SGMA on an on-going basis.
RA-8	Provide a description of how the data gaps identified will be addressed; specifically the projects identified in Table 10-1 for BMO 5 - dependent upon District funding.

Table 3-2. Summary of Recommended Actions presented in the Alternative Assessment Staff Report for the TSS Alternative (DWR, 2019a).

During the 2020 WY, the District and EDWA started the procedural, technical and public outreach activities needed for the first five-year update of the TSS Alternative. In April, the District and DRI met with DWR staff (conference call) to discuss RAs presented in the DWR Alternatives Assessment and approaches being considered by the District to address the RAs. In May, the District developed Resolution 3140-20 establishing its intent to update the 2014 Groundwater Management Plan as the TSS Alternative for implementation within the portion of the TSS lying within the District's service area boundary. In June, the District submitted a Notice of Intent (NOI) to DWR informing DWR of its intent to

draft an update to the 2014 Groundwater Management Plan for preparation of the first five-year update of the TSS Alternative (STPUD, 2020). In June the District and Water Agency worked to develop a Second Amended and Restated MOU between the District and Water Agency to continue to coordinate and cooperate in the implementation of the SGMA within their respective jurisdictions of the TSS. In July, the Water Agency adopted its own Resolution WA-6-2020 establishing its intent to draft an updated 2014 Groundwater Management Plan for implementation within the portion of the TVS Basin lying within El Dorado County and outside the District's service area boundary. In July, the Water Agency submitted an NOI to DWR informing DWR of the its intent to draft an update to the 2014 Groundwater Management Plan for preparation of the first five-year update of the TSS Alternative (EDWA, 2020). In accordance with GMP regulatory requirements both the District and Water Agency Resolutions were submitted with the NOIs to DWR for posting on its web site.

Technical activities for preparation of the first five-year update of the TSS Alternative involved review of the climate projections used in the original groundwater management plan with DWR staff to determine whether they are appropriate for the 50 year planning horizon; previous estimates of water demand and long-term (50-year) projections of population growth for El Dorado County developed by the California Department of Finance to develop annual pumping rates for future 50-year water budget projections. In order to consider climate change effects, six climate scenarios were developed based on future annual temperature and precipitation changes predicted using the CMIP 5 climate model. Future precipitation changes from the climate model will be represented in the South Tahoe Groundwater Model by the recharge term. Future water budgets being developed for the TSS Alternative are also being used by the District for its update to 2020 Urban Water Management Plan (UWMP) in order to reconcile the water demand and supply projections between these two water planning documents.

Planning for public outreach involved the development of lists of potential stakeholders in accordance with SGMA interest group requirements (§ 10723.2); drafting of a public notice in accordance with SGMA public notification and participation requirements (§ 10727.8);developing a primer in the form of a power point presentation explaining the update process and opportunities for engagement; preparing revisions to the District's Groundwater Web page for the first five-year update of the TSS Alternative.

3.3.3 GMP Outreach

Over the past year, the District convened the following presentations, public hearings and/or workshops to inform the interested public and agencies of groundwater management activities being performed in the TSS.

1. March 31, 2020: Public Webinar: South Y: Draft Interim Remedial Action Plan Preferred Alternative.
2. April 16, 2020: Public Hearing: Groundwater Management Plan 2019 Water Year Annual Report.
3. May21, 2020: Public Hearing: Groundwater Management Plan Update – Resolution No. 3140-20; Intention to draft an update to the 2014 Groundwater Management Plan.
4. June 4, 2020: Board Meeting: Groundwater Management Plan Update – Authorization to enter into a Second Amended and Restated MOU with the El Dorado Water Agency.
5. July 1, 2020: SAG Workshop No. 1.
6. August 12, 2020: County Water Agency Board of Directors: TSS Groundwater Management (2019/2020) Cost Share Projects.
7. December 2, 2020: SAG Workshop No. 2.
8. December 17, 2020: Board Meeting: Groundwater Management Plan Update – Staff Report

In addition to these public meetings, the District regularly updates its website which includes a Groundwater Page used to post information about current groundwater management issues within the TSS and activities being performed by the GSAs (https://stpud.us/groundwater/). 2014 GMP documents, workshop agendas, meeting materials and meeting notes are linked to this web page, which are available for download at http://stpud.us/news/groundwater-management-process/.

3.3.3.1 Survey of Well Owners

As part of its outreach efforts, the District conducted a survey of SCWS and domestic well owners and users of wells not connected to municipal water services within the TSS. The purposes of this well survey were to;

1. Inform well owners of groundwater management planning and implementation efforts within the TSS;
2. Encourage participation of well owners in the SAG; and
3. Confirm the inferred location and use of SCWS and domestic wells within the TSS.

The initial phase of the well survey spanned a two-month period from August through October 2017. Planning for the survey involved the development of the survey questionnaire, survey team recruitment, preparation of outreach materials and compilation of available well owner lists from the District and

SAG members, including El Dorado County and the United States Forest Service –Lake Tahoe Basin Management Unit. From these lists a total of 578 domestic and 56 SCWS potential wells were inferred to be located on parcels located within or surrounding the TSS (Figure 3-3).

The well survey was advertised using local media, public service announcements, direct mail notification letters, door hangers and the District's website. Participation in the well survey was made available through a URL for direct access to the survey online, through paper copy on request from the District, and through direct door-to-door survey performed by a dedicated 3-member survey team. The well survey was successful in collecting information from a total of 370 respondents. Of these respondents, 247 confirmed the presence of a well on their parcel; 77 indicated that there was no well on the parcel; and 2 were uncertain if a well was located on their parcel. Figure 3-3 shows the locations of the inferred wells and the confirmed locations from the well survey. Results from this survey are provided in Appendix B of the 2017 WY Annual Report (STPUD, 2018a).

During the 2018 WY, a final report documenting the well survey was completed (Allegro Communications, December 2018); and made available to the public through the District's website (http://stpud.us/news/groundwater-management-process/).

Major findings from the *TVS Groundwater Basin Survey of Well Owners* report include;

- Private well geographic distribution reflects travel and settlement patterns of the one hundred year period prior to South Tahoe Public Utility District formation, from 1845 to 1950;
- The majority of respondents to the well survey were property owners (72%). Most of these properties were used as "secondary" residences.
- The majority of respondents (61%) indicated that the well on their property is currently in-use. The majority of this use is either daily or more than 90 days out of the year.
- Private well owners overwhelmingly "like" perceived "purity" of well water. "Taste, color and odor" of well water are perceived favorably. Well owners enjoy features of private well water such as "cold temperature", "low cost", "quality" and "absence of chlorine". They highly value well water while the system consistently delivers high quality water; and
- Well owners indicating concern about well systems mention "pumps", "wellhead connections", "water production" and "system maintenance;

Recommendations developed based on the information gathered during this survey include;

1. Create capacity within the groundwater community to make technical support available to private well owners;
2. Complete the assessment of the status of private wells;
3. Assess risk to groundwater resources from private wells;
4. Cultivate capacity to create and maintain collaborative ties in the groundwater community;
5. Communicate with private well owners;

Collaborate with national and state programs that support source water protection; and7. Share survey findings with Tahoe Basin partner agencies.

During the 2019 WY, the District started planning to complete the survey of private well owners started in 2017. During the 2020 WY, , the District initiated the second phase of the Well Owner Survey to reach the nearly 300 Private Well Owners that were not contacted during the 2017 Survey. The Phase II Survey was started at the end of June with a direct mailer to property owners believed to have private wells on their property. Because of the COVID-19 Public Health Emergency, the Phase II Survey is dependent on Direct Mail with follow-up telephone calls and emails to encourage property owners to complete the well survey questionnaire. In appreciation for responding to the Phase II Well Survey, the District offered;

- Guidance on maintaining Private Wells through the El Dorado County Water Well Program website;
- Visual well checks to help property owners identify and prevent contamination from entering their well head; and
- General water quality testing to check the well water quality.

The Phase II well survey continued through the end of the 2020 Calendar Year. The results of the second phase of the well owner's survey will be included in the next annual update of this report.

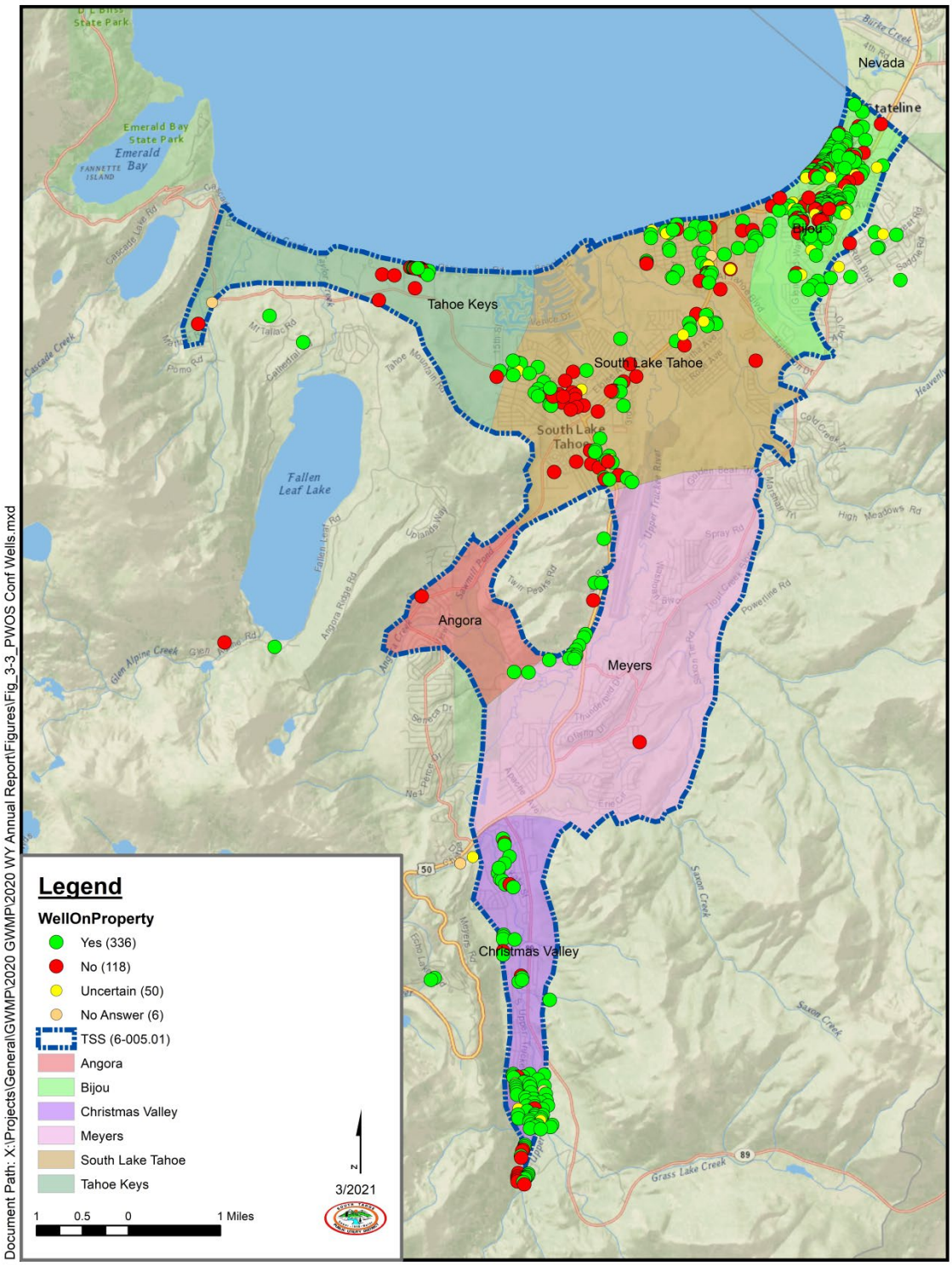

Figure 3-3. Confirmed locations of private wells identified by the 2017 and 2020 surveys of well owners.

3.4 BMO #4 – Integrating Groundwater Quality Protection and Land Use Planning

A key element of the 2014 GMP is an ongoing program of monitoring groundwater conditions and the potential threat of groundwater contamination within the TSS. In order to better understand this potential threat, the locations of potential contaminating activity (PCA) sites operating within the TSS were updated in 2017 and compared to source water production zones surrounding active PWS wells, defined using the modified calculated fixed radius method (CDHS- DDW, 1999). Descriptions of these zones are as follows:

- **Zone A: Microbial/Direct Chemical Contamination Zone.** Protects the drinking water supply from viral, microbial and direct chemical contamination and is defined by the surface area overlying the portion of the aquifer that contributes water to the well within a two-year time-of-travel.
- **Zone B5: Chemical Contamination Zone.** Prevents chemical contamination of the water supply, and to protect the drinking water source for the long term; encompassing the area between the two- and five-year time-of-travel. This zone provides for more response time for chemical spills.
- **Zone B10: Chemical Contamination Zone.** Prevents chemical contamination of the water supply, and to protect the drinking water source for the long term; encompassing the area between the five- and ten-year time-of-travel. This zone allows for some attenuation or remediation of contaminant sites, or if necessary, time to develop alternate sources of water supply.

The number and types of PCA found within each source water protection zone are summarized in Table 3-3. The 2017 Drinking Water Source Assessment and Protection map for the TSS is presented as Figure 3-4.

Potential Contaminating Activity Sites		
Number of sites (count)	**Type(s)**	**Potential Contaminants (CDPH, 1999)**
Zone A		
2	Sewer Pump Station	Sewage, treatment chemicals
1	Wastewater Treatment Plant	Municipal wastewater; sludge; treatment chemical; nitrates; heavy metals; coliform and non-coliform bacteria; nonhazardous wastes
1	Wells(such as water supply, monitoring well)	Treatment chemicals

Potential Contaminating Activity Sites		
Number of sites (count)	**Type(s)**	**Potential Contaminants (CDPH, 1999)**
Zone B5		
4	Gas Stations	Gasoline, Diesel fuel, Oils; solvents; miscellaneous wastes
2	Cleaners	Soaps; detergents, waxes; miscellaneous chemicals, hydrocarbons
2	Automotive Repair	Waste oils; solvents; acids; paints; automotive wastes; miscellaneous cutting oils.
1	Sewer Pump Station	Sewage, treatment chemicals
Zone B10		
3	Sewer Pump Station	Sewage, treatment chemicals
2	Automotive Repair	Waste oils; solvents; acids; paints; automotive wastes; miscellaneous cutting oils.
2	Gas Stations	Gasoline, Diesel fuel, Oils; solvents; miscellaneous wastes
1	Auto Body	Waste oils; solvents; acids; paints; automotive wastes; miscellaneous cutting oils
1	Boat Building and Repair	Diesel fuels; oil; sewage from boat waste disposal area; wood preservative and treatment chemicals; paints; waxes; varnishes; automotive wastes
1	Car Wash	Soaps; detergents, waxes; miscellaneous chemicals, hydrocarbons
1	Dry Cleaners	Solvents (perchloroethylene, petroleum solvents, Freon); spotting chemicals (trichloroethane, methylchloroform, ammonia, peroxides, hydrochloric acid, rust removers, amyl acetate)
1	Hardware/lumber/parts stores	Hazardous chemical products in inventories; heating oil and fork lift fuel from storage tanks; wood-staining and treating products such as creosote; paints; thinners; lacquers; varnishes
1	Medical/dental offices and clinics	Various chemical substances.

Table 3-3. The numbers and types of potential contaminating activity sites found within source water protection zones delineated within the TSS.

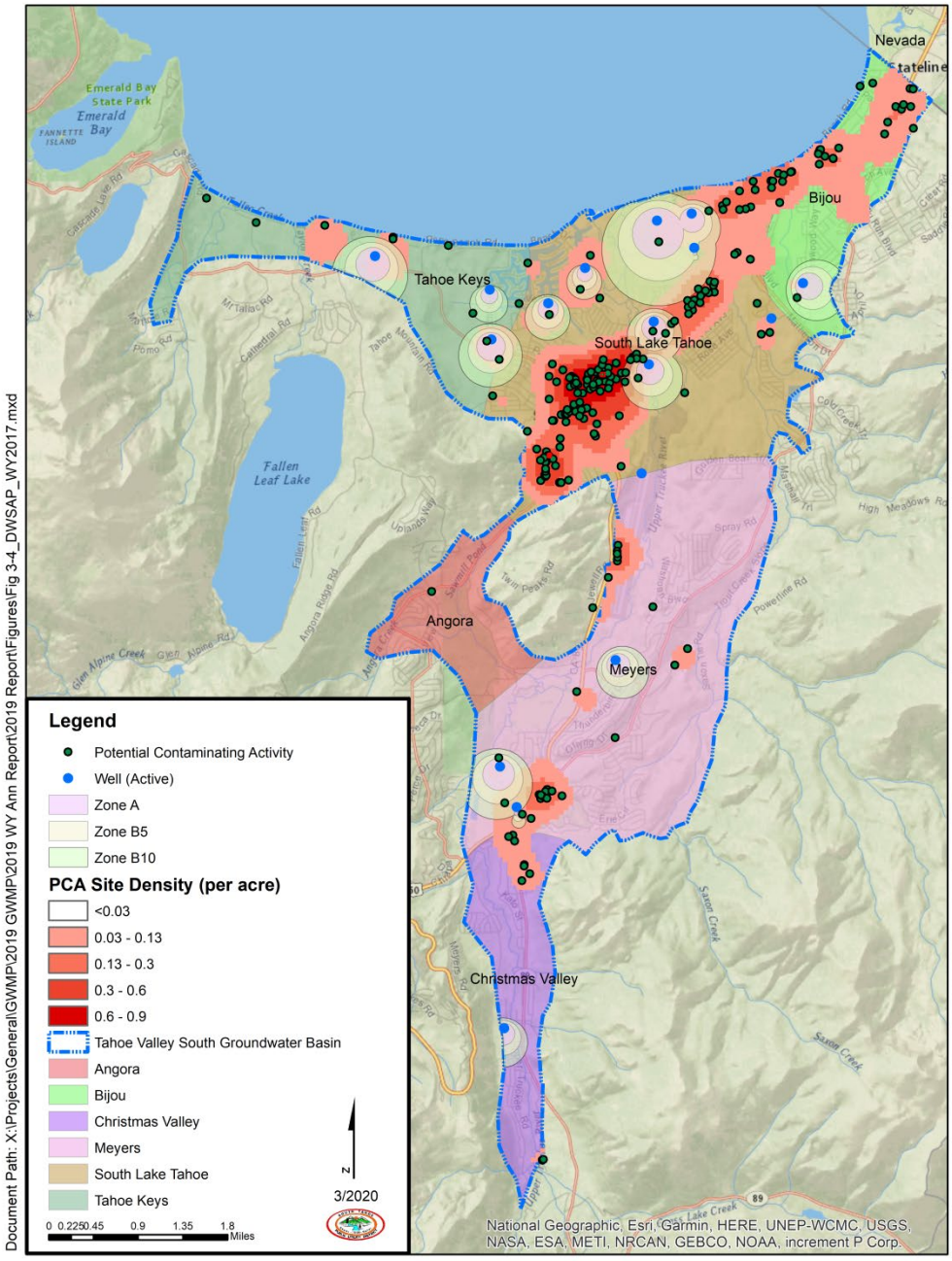

Figure 3-4. Drinking water protection areas for PWS wells in the TSS. Drinking water protection areas surrounding these wells are generated using the modified calculated fixed radius method (CDHS- DDW, 1999) and the average groundwater production rate for each active well (2008 WY -2017 WY).

3.5 BMO #5 – Interaction of Water Supply Extractions on Environmental Conditions

The TSS is located in a unique environmental setting. Water supply operations using groundwater may affect environmental conditions or be affected by changes in the environment. Groundwater – surface water interactions with Lake Tahoe and rivers and streams serve as both groundwater discharge and recharge locations depending on their location and the time of year. Understanding the interactions is a necessary part of providing sound groundwater management for the TSS.

During the 2017 WY, additional analyses of the hydrologic system were completed using recently developed hydrologic modeling tools developed by DRI (Pohll, *et al.,* 2018). Two types of calculations were performed to address pumping effects on surface water (BMO #5, Action 1). The first approach involved evaluating model simulated groundwater levels with and without pumping at individual wells to determine the reduction in groundwater flows to surface water over time. The second approach used the model to produce maps of surface water depletion within the TSS. These maps are referred to as "capture maps" which are useful for illustrating the effects of pumping locations on surface water depletion over a large set of possible pumping locations within an aquifer (Leake *et al,* 2010).

Figure 3-5 presents the results of evaluation from the first approach used to assess the impacts of pumping effects on surface waters. The analysis shows that as pumping rates increased during the 1980s, depletion rates for streams steadily increased from a few hundred AFY in 1983 to an average of 2,500 AFY from 2000 – 2015. Following 2000, the baseflow reduction from streams represents about 2 percent of the average annual runoff (124,000 AFY). This is well below the minimum threshold defined as baseflow depletions in excess of 10 percent of average annual runoff (Pohll *et al.,* 2016).

Capture maps from Lake Tahoe and local streams revealed two areas where the sources of water withdrawal are different. North of the Lake Tahoe Airport, most of water withdrawal is from Lake Tahoe. South of the Lake Tahoe Airport, most of water withdrawal is from streams. To ensure that depletion rates to surface waters at the south end of the TSS do not cause harm to stream ecology, DRI recommended that pumping rates do not exceed 12,400 AFY south of the Lake Tahoe Airport (Pohll, *et al,* 2018). During the 2019 WY, four active wells were operating south of the Lake Tahoe Airport having a combined total pumping rate of about 1,171 AFY, which is less than 10% of the recommended maximum.

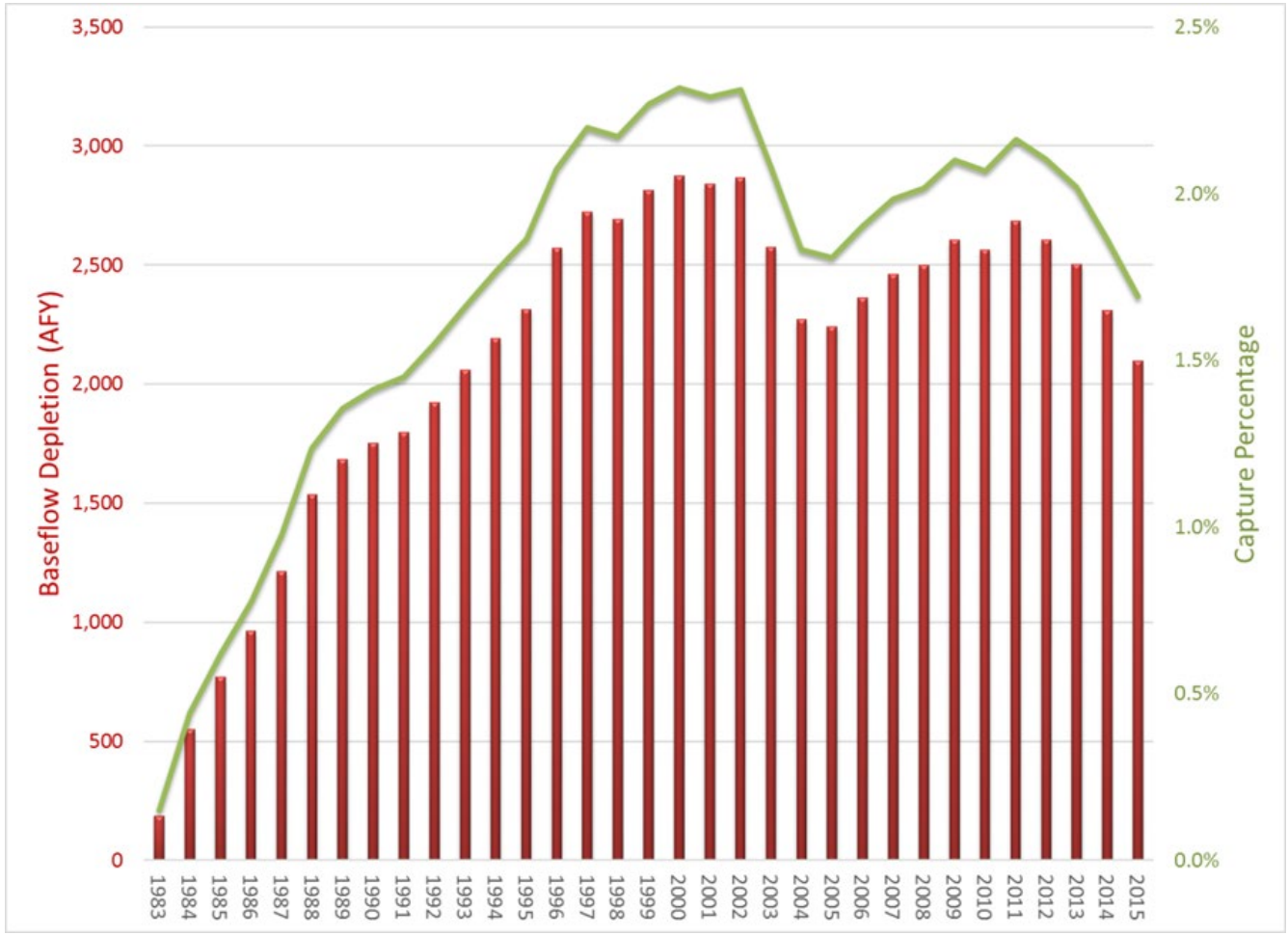

Figure 3-5. The effect of groundwater pumping on baseflow depletion for the TSS as calculated using modeled differences in groundwater levels with and without pumping. The capture percentage is calculated as the ratio of baseflow depletion and average annual runoff for the model domain (124,000 AFY) (Adapted from Pohll, *et al*. 2018).

3.6 BMO #6 – Stakeholders Advisory Group (SAG)

The purpose of BMO #6 is to provide guidance regarding the role of the SAG in plan implementation. This includes hosting regular SAG workshops in order to provide a forum for discussion of groundwater management issues in the TSS and receive a regional perspective from different members of the community (*see* Table 3-1). Other important functions of the SAG include:

1. Facilitation for interagency collaboration;
2. Assessing groundwater supply issues;
3. Assessing groundwater protection issues;
4. Data sharing; and
5. Developing regional support for groundwater projects.

During the 2019 WY, SAG workshops were convened in July and November. Major topics discussed during these workshops are listed in Table 3-4. Minutes from these workshops are provided in Appendix B.

WORKSHOP 1 (July 2^{9th}, 2020)	**TOPICS**
	Private vWell Owners Survey – Phase II LRWQCB Regional Plume Characterization DRI Model Evaluation – 50-Year Water Budget Update to the 2014 Groundwater management Plan
WORKSHOP 2 (December 17th, 2020)	**TOPICS**
	South Y PCE Contamination Update Tahoe South Subbasin Alternative – Public Outreach Tahoe South Subbasin Alternative – Implementation Plan

Table 3-4. Major discussion topics for SAG Workshops convened during the 2020 WY.

3.7 BMO #7 – Technical Studies

Understanding the factors that control groundwater conditions in the TSS is important for long-term management. Several studies have been conducted over the years, but additional work is needed to help address emerging issues. The District and/or other local water purveyors and well owners will need to conduct various studies to support groundwater management decision makers. The projects reported under BMO #7 outline some of the studies being conducted by the District to further the understanding of the groundwater basin to help support groundwater management.

3.7.1 South Tahoe Groundwater Model

During the 2016 WY, DRI completed the initial phase (Phase 1) of development of groundwater models and hydrologic modeling tools for implementation of the 2014 GMP. Phase 1 generally involved: acquiring the data to update the District's existing groundwater flow model and DRI's existing integrated GSFLOW hydrologic model for the South Tahoe watersheds; constructing and calibrating a steady-state groundwater flow model for the TSS; constructing and calibrating a transient integrated hydrologic model for the South Tahoe watersheds; and calculating a water budget for the TVS groundwater system (Carroll *et al*., 2016a).

DRI completed work on Phase 1 in February 2016 and completed work on Phase 2 in February 2018. Phase 2 work completed by DRI extended all boundary stresses through 2015 WY for Phase 2 modeling analysis and provided detailed analysis concerning the spatial and temporal distribution of recharge across the model domain for the TSS Model. During initial work on Phase 2, DRI also defined a threshold between recharge and groundwater storage at approximately 43,200 AFY (Carroll *et al*., 2016b). Recharge below this threshold results in negative changes in groundwater storage and falling groundwater levels, while recharge above this threshold results in positive changes in groundwater storage and rising groundwater levels.

Results of the Phase 2 modeling work are documented in the South Lake Tahoe Groundwater Model Update (Carroll *et al.,* 2016b) and in the report Addressing Basin Management Objectives for the Tahoe Valley South (6-5.01) Groundwater Basin, California, Desert Research Institute (BMO Report) (Pohll et al., 2018). Both the South Lake Tahoe Groundwater Model Update and BMO Report are available for download from the District's website (http://stpud.us/news/groundwater-management-process/).

The District successfully updated the South Lake Tahoe Groundwater Model through the end of the 2020 WY. Groundwater recharge and change in groundwater storage derived from the updated model flow budgets were reported for both the model domain and TSS.

3.7.2 South Y Investigations

As part of the work for the Feasibility Study, the District collected additional groundwater samples from inactive drinking water source wells in the vicinity of the South Y including the LBWC #2 Well (Offline, impaired), the LBWC #4 Well (Offline, abandoned), the LBWC #5 Well (Offline, impaired), the Rockwater Apartment Well (Offline, abandoned) and the Tahoe Valley Elementary School Well (Offline, abandoned). Groundwater samples were also collected from CL-1, a deep monitoring well located at the District's Clement Well Site. Groundwater samples were collected from these wells during four sampling events from between December 2016 through October 2017 to provide up to date information on the extent of PCE concentrations for use during the Feasibility Study. TKWC provided water quality monitoring results through June 2017 for each of their three wells to supplement this data set.

In October 2016, the District entered into an agreement with DRI to add a fate and transport model to the existing groundwater model framework developed for the TSS. It was recognized that a fate and transport groundwater model would be needed to simulate PCE migration of the South Y Plume and evaluate the effectiveness of varying remedial alternatives, in terms of their capacity to remove PCE contaminant mass and inhibit the further movement of the contaminant plume. Results from this alternatives analysis would then be used to refine the Feasibility Study by identifying the likely best alternative(s) for mass removal and cleanup time, thereby reducing the number of remedial alternatives requiring further engineering evaluation for the Feasibility Study.

During the 2017 WY, hydrologic information was compiled and DRI developed the fate and transport model grid by extracting a section of the original model grid covering the area of the South Y Plume and extending northward to Lake Tahoe. The fate and transport model grid was further refined in the area of the existing plume and along the expected plume migration path. model boundary conditions were established for local areal recharge, streams (Upper Truckee River and Trout Creek), Lake Tahoe, and groundwater pumping from area wells.

Review of the groundwater production data from South "Y" Area wells showed that substantial changes in the location and magnitude of groundwater pumping across the South "Y" Area have occurred since at least 2008. A transient model was subsequently developed to adequately simulate the response of the groundwater system to changing pumping conditions. Flow simulations were run using MODFLOW-NWT. Fate and transport simulations were run using MT3DMS. MT3DMS is a modular three-dimensional transport model for the simulation of advection, dispersion, and chemical reactions of dissolved constituents in groundwater systems (Zheng and Wang, 1999).

In April 2017, the preliminary model was presented to stakeholders, along with a matrix of remedial alternatives proposed for fate and transport modeling evaluation. During the meeting it was determined that simulations of remedial alternatives should be postponed until after additional groundwater sampling planned during the 2017 WY was completed.

During the 2018 WY, the District successfully negotiated and executed an Agreement with the SWRCB-DFA to complete a Feasibility Study of Remedial Alternatives to Mitigate Tetrachloroethylene Contamination (Agreement D1712508). As part of the Feasibility Study, Agreement D1712508 requires the District to perform numerous activities including but not limited to: conducting a PDI; completing a Baseline Human Health Risk Assessment (BHHRA); conducting groundwater modeling for the purposes of evaluating potential implementation projects that will prevent or clean-up groundwater contamination; completing a feasibility study to develop interim remedial alternatives that prevent or clean contamination of groundwater that serves or has served as a source of drinking water; develop an Interim Remedial Action Plan (IRAP) that will lead to the implementation of the preferred remedial action alternative; complete environmental analysis checklists and identify mitigation measures required for implementation of the preferred alternative; and perform public outreach to inform the public concerning the progress of these activities.

Following approval of the PDI Workplan, the District and Kennedy Jenks Consultants (KJC) conducted the groundwater investigation at 953 Eloise Avenue, near the intersection of Eloise Avenue and 5th Street, situated within the middle-section of the South Y Plume. The groundwater investigation involved the drilling and logging of a borehole to a total depth of 150 feet; the drilling and construction of two test wells; aquifer testing, soil and groundwater testing and collection of groundwater elevation readings. The data collection was used to characterize the vertical extent of PCE contamination in groundwater and inform the development of design strategies for hydraulic control and/or removal of PCE contamination from groundwater. As extra work for this project the District also updated its Well Owners Survey for the South Y Area. The update was performed in order to gather information on private wells situated within or neighboring the South Y Plume in order to: identify potential wells that may serve as vertical conduits for contaminant migration; and identify property owners with active wells that may be impacted by PCE groundwater contamination.

Following performance of the PDI, KJC conducted a screening level Human Health Risk Assessment (HHRA) addressing risks associated with PCE impacted groundwater at PWS wells in the South Y Area. The HHRA was completed and submitted to the SWRCB-DFA in January 2019.

Groundwater modeling for the Feasibility Study resumed in 2018. During 2018, the South Y PCE Model was updated through 2018 and used to evaluate management scenarios developed for the feasibility study. Modeling evaluation used best- and worst-case conditions to forecast the effectiveness of management scenarios to prevent or clean-up groundwater contamination over the next twenty years, through 2038. Scenarios evaluated using the South Y PCE Model included: 1) No Action; 2) Use of new extraction wells to clean-up the PCE plume; 3) Use of new PWS wells to prevent groundwater contamination and provide replacement water supply; and 4) Use of existing PWS wells to clean-up the South Y Plume.

During the 2019 WY, the District continued on-going activities to complete the Feasibility Study. Initial management scenarios were refined to interim remedial alternatives to manage on-going contamination from the PCE Plume. Six interim remedial alternatives were developed and initially screened for effectiveness using the South Y Fate and Transport Model. The alternatives were also reviewed and screened for implementability using input from the water purveyors. Based on this screening three interim remedial alternatives were selected for detailed analysis, including 20-year project life cost analysis, to select a preferred remedy. Technical reports presenting information from the PDI; Baseline Human Health Risk Assessment; and South Y Fate and Transport Modeling were completed and are posted on the District's website (https://stpud.us) . The Feasibility Study Report and accompanying Interim Remedial Action Plan were started and are expected to be completed by April 2020.

Public outreach completed for the Feasibility Study involved the development of press releases, flyers and public announcements; and the presentation of three Public Workshops convened at the City Council Chambers, in South Lake Tahoe, CA. These workshops were available by live stream. Video

recording from these workshops are also available on the District's website: http://stpud.us/groundwater/.

The South Y Feasibility Study is expected to be completed by June 2020.

3.8 BMO #8 – Funding

Groundwater projects require funding. In addition to funding from local sources, there are state and federal grants and other funding programs available. These types of opportunities require effort to prepare and process grant funding applications.

3.8.1 Proposition 1 GSP

During the 2016 WY, the District in collaboration with the SAG identified potential projects for funding to address the PCE groundwater contamination in the South "Y" Area. Using the findings of the South Y Investigations (Section 3.7.2), the District in partnership with the LBWC and TKPOA, prepared pre-applications and a full proposal (FAAST # 36772) requesting funding through the Proposition 1 Groundwater Sustainability Program to conduct an engineering feasibility study of remedial alternatives to mitigate PCE groundwater contamination in the South Y Area. The total project budget for this request is $588,540.00 with a 50% funding match of $294,270.00 and a grant request of $294,720.00. Expenditures for supporting studies (e.g., South "Y" Investigations) and technical planning used to develop the feasibility study are used for the funding match.

On March 30, 2017, the District received notice of preliminary grant award of up to $294,270.00, conditioned on the successful negotiation of an agreement with SWRCB-DOFA. On May 18, 2017, the District Board adopted Resolution No. 3059-17 to accept the grant award. Following adoption of the Resolution, the District entered into negotiations with SWRCB-DOFA staff considering changes to the scope of work and budget presented in the proposal. During these negotiations, current groundwater quality data for the South Y Plume was available and a Pre-Design Investigation was developed which was subsequently added to the scope of work. The Pre-Design Investigation involves installing a test well that can be used for data collection to identify the vertical extent of PCE contamination and which could be used as a pumping well during added field tests to define aquifer properties for engineering design. Inclusion of the Pre-Design Investigation increased total project budget to $1,008,590.00 with a 50% funding match of $504,295.00 and a grant request of $504,295.00. Expenditures for supporting studies (e.g., South Y Investigations) and technical planning used to develop the PDI and Feasibility Study are used for the funding match. This will also include County Water Agency funds through the County Water Agency Cost Share Grant Program.

On March 20, 2018, SWRCB-DFA and the District executed Agreement D1712508 funding a feasibility study of remedial alternatives to mitigate PCE contamination. Agreement D1712508 is funded at a level 0f $504,295, with a work completion date of June 30, 2019. The Proposition 1 Groundwater Planning Grant is for the purpose of conducting the PDI and Feasibility Study to evaluate whether existing and/or new wells can be used to provide hydraulic control and removal of PCE from groundwater in the South Lake Tahoe Basin.

Work to complete the South Y Feasibility Study continued through the 2019 WY. During the course of this project, extra work was required to satisfy the purpose and requirements of the Grant Agreement that were not anticipated in the original work scope. Completion of this extra work resulted in changes to the project schedule and adjustments to the project budget. A Request for Time Extension prepared by the District was approved by the SWRCB in November 2019 which changed the project completion date from June 30, 2019 to June 30 2020. An accompanying Deviation Request addressing the cumulative budget impact of extra work to the South Y Feasibility Study ($78,140) was also approved.

The South Y Feasibility Study was completed during the 2020 WY. This involved completion of the public draft FS/IRAP Report; publication of an NOA announcing the availability of the public draft FS/IRAP for public review and comment; presentation of the public draft IRAP during a public webinar; and preparation of a Responsiveness Summary addressing comments received on the public draft document during the 30-day public comment period. The final FS/IRAP was issued in May 2020. All grant requirements under Agreement D1712508 were completed to the satisfaction of the SWRCB-DFA. Copies of all technical documents prepared as deliverables for the South Y Feasibility Study are available for download from the Groundwater web page of the Districts web site: (https://stpud.us/groundwater/).

3.8.2 GMP Costs

Costs for implementation of the 2014 GMP are accounted from the District's Water Enterprise Fund. Development and implementation costs for groundwater management activities have been supported by the County Water Agency under its Cost Share Grant program. Under this program, the County Water Agency assists projects eligible under Section 96-11 of the El Dorado County Water Agency Act and Board Expenditure Priority Policy (No. B-1003). Grants used for these projects are typically at a 50% matching fund level.

Figure 3-6 shows the 2014 GMP expenditures during the calendar year ending December 31, 2020. Costs for groundwater management projects and activities totaled $312,915. A cost summary of major items expended during the 2020 calendar year is provided below (Table 3-5). Over the first 6-years of implementation; the total cost of GMP implementation is $2,211,843.

ITEM	DESCRIPTION	APPROXIMATE COST ($)
Groundwater Sustainability Agency	• SAG Workshops • Basin Monitoring • Reporting	$30,111
Technical Studies	• South Y Investigation • Groundwater Modeling	$242,947
GMP Outreach	• Private Well Owner Survey	$39,857
2020 CY Total		***$312,915***

Table 3-5. Summary of costs for major groundwater management activities expended during the 2020 calendar year.

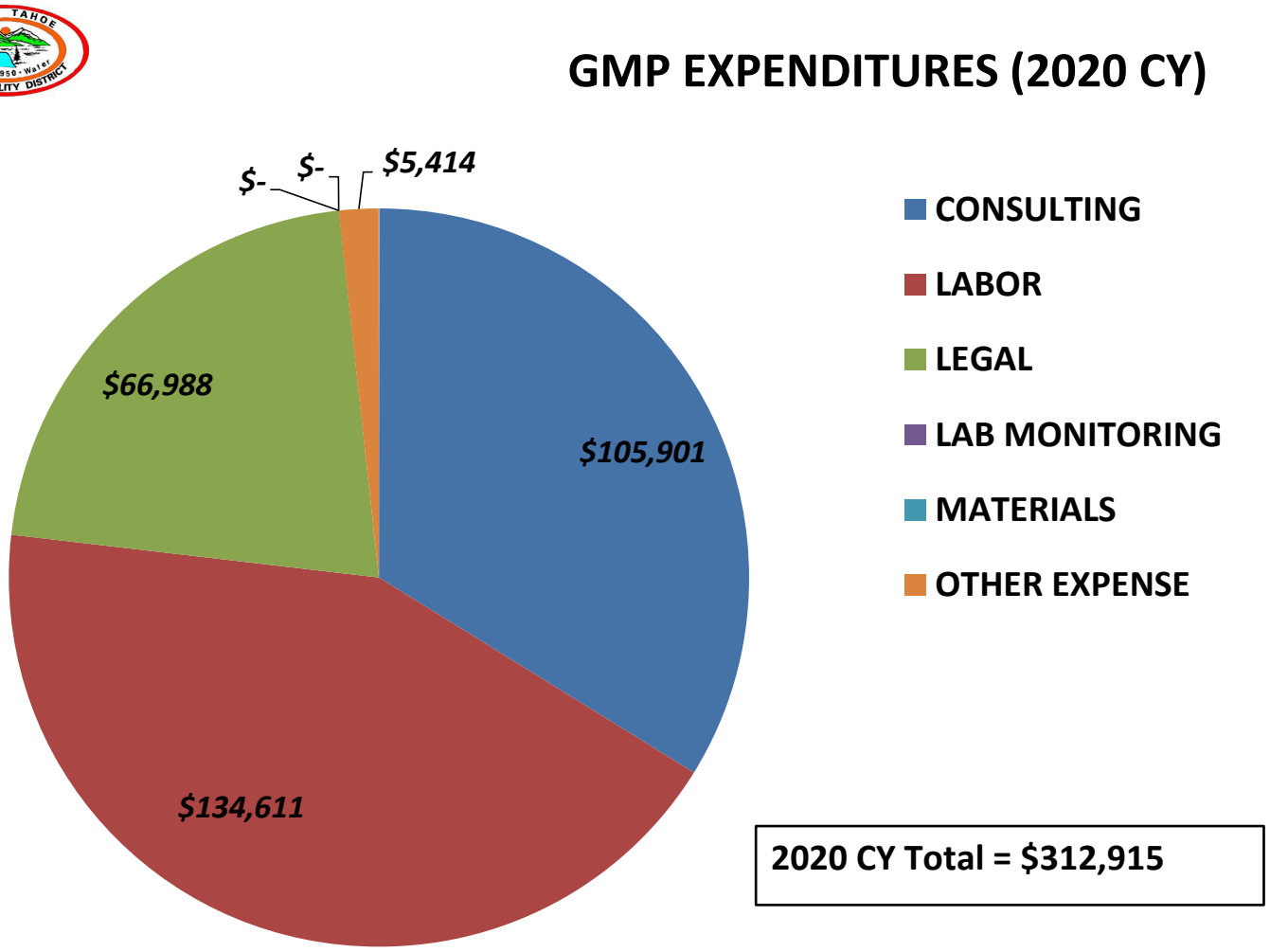

Figure 3-6. GMP implementation costs for CY 2020.

4 Proposed Actions (2021 WY)

Groundwater management activities for the 2021 WY will generally involve continuing the progress of on-going work from the 2020 WY and the proposed actions listed below;

1. Continue to monitor new regulations and Basin Monitoring Program guidance issued by the DWR and SWRCB for implementation of SGMA;
2. Continue to monitor basin conditions and groundwater supplies;
3. Continue to update the SAG on the progress of 2014 GMP-related activities, seeking active participation of its members;
4. Continue to inform the public of groundwater management activities through public hearings, SAG workshops, notifications through its interested parties list, and the District's web page;
5. Complete the 2020 Phase II survey of private well owners;
6. Maintain the contacts list of stakeholders interested in receiving notices regarding plan preparation, meeting announcements and availability of draft documents developed for the first five-year update of the TSS Alternative.
7. Complete hydrologic investigations to address recommended actions from DWR for the Tahoe South Subbasin Alternative (Section 3.3.2);
8. Evaluate new findings from the investigations, hydrologic conditions , management actions and activities;
9. Prepare a public draft of the first five-year update of the TSS Alternative;
10. Prepare a NOA announcing the availability of the public draft for review and comment;
11. Notice and hold a Public Hearing to consider any protests and whether to adopt the TSS Alternative;
12. Pending the outcome of the Public Hearing, adopt the TSS Alternative;
13. Resubmit the adopted TSS Alternative to DWR for Alternative Assessment by January 1, 2022; and
14. Continue groundwater management actions and activities presented in the adopted TSS Alternative.

5 2014 GMP Changes

The 2014 GMP was last updated in late 2014 to be fully compliant with DWR requirements (AB3030 Plan; Water Code § 10750 et seq.). Under SGMA, existing groundwater management plans remain in effect until a GSP or GSP Alternative is adopted (CWC § 10750.1). As DWR has determined that the 2014 GMP and Alternative Materials satisfied the objectives of SGMA and was approved as an Alternative for

the TSS, the District will continue updating the 2014 GMP, started during the 2020 WY, to complete the first five-year update of the TSS Alternative during the 2021 WY.

There were no plan component changes, including addition or modification of BMOs, during the period covered by this report.

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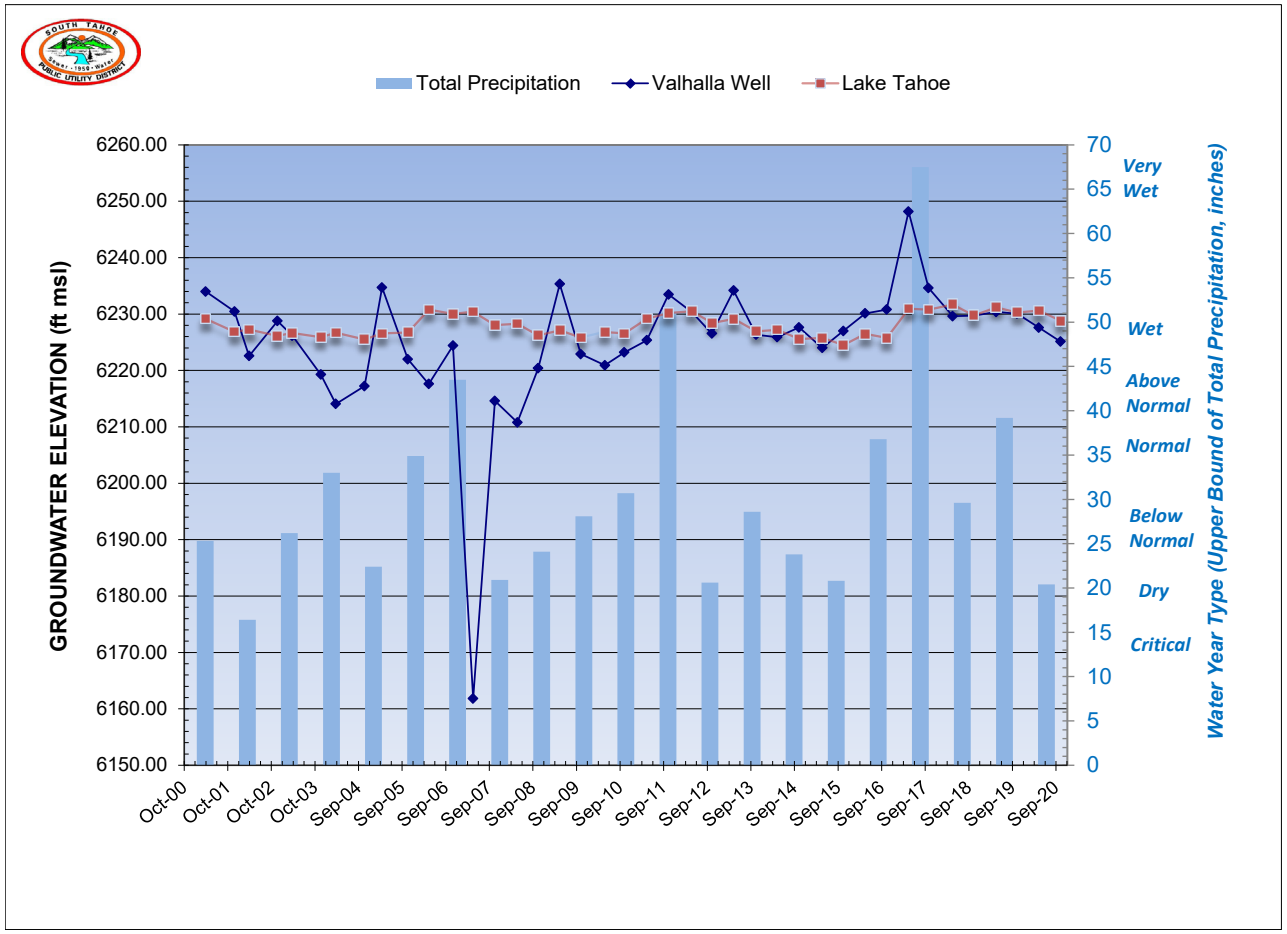
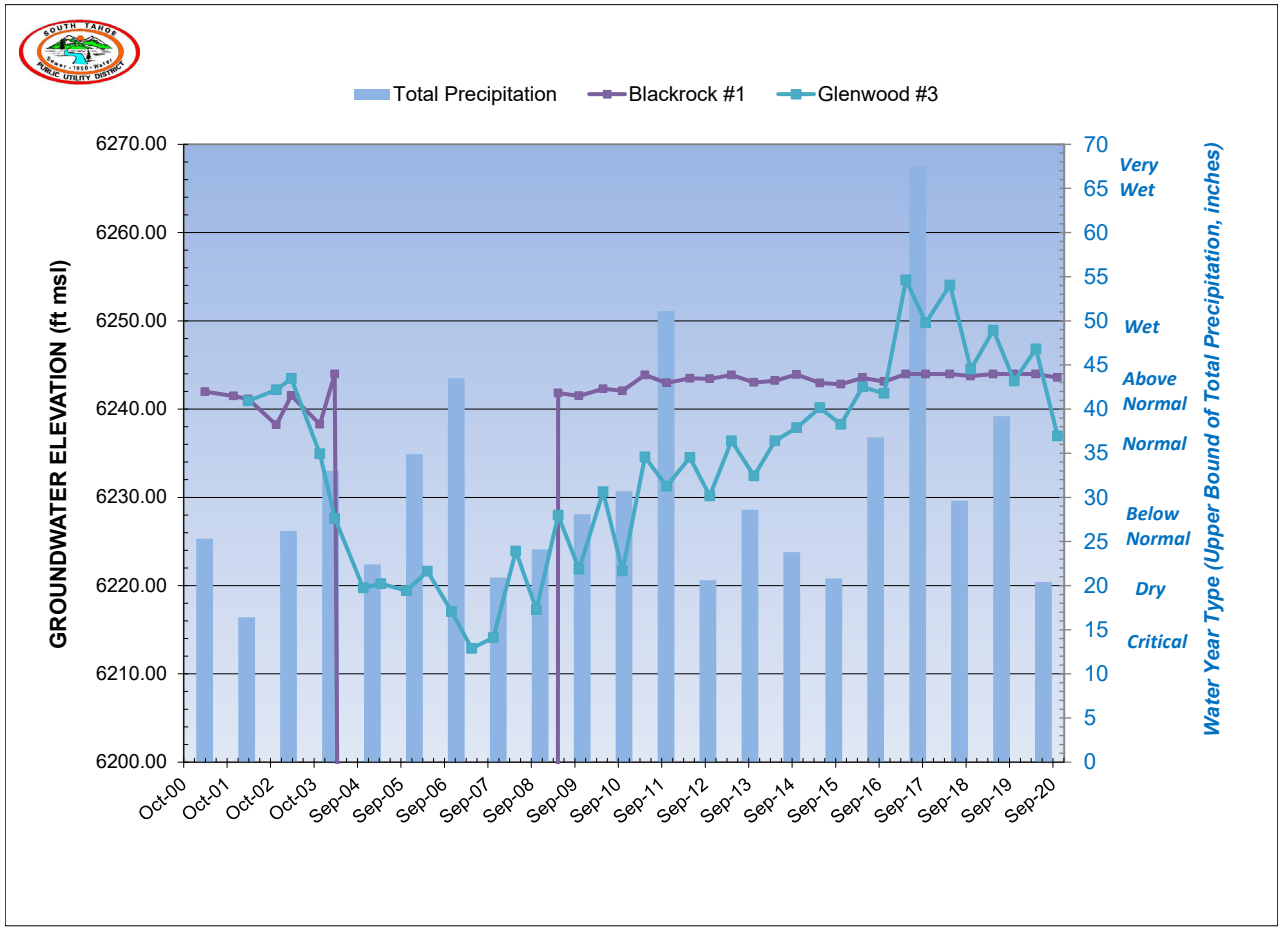
APPENDIX A

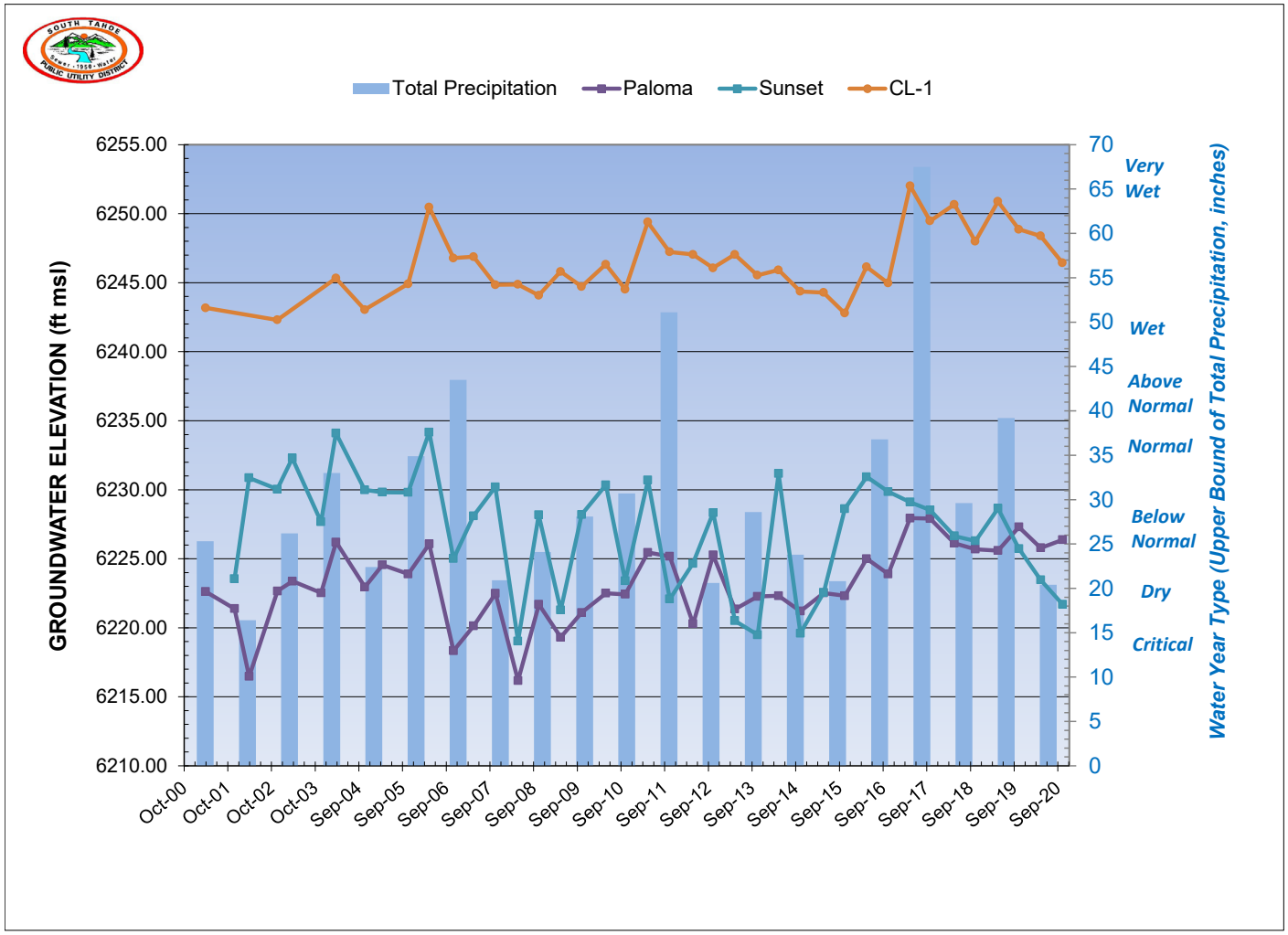
TSS Hydrographs



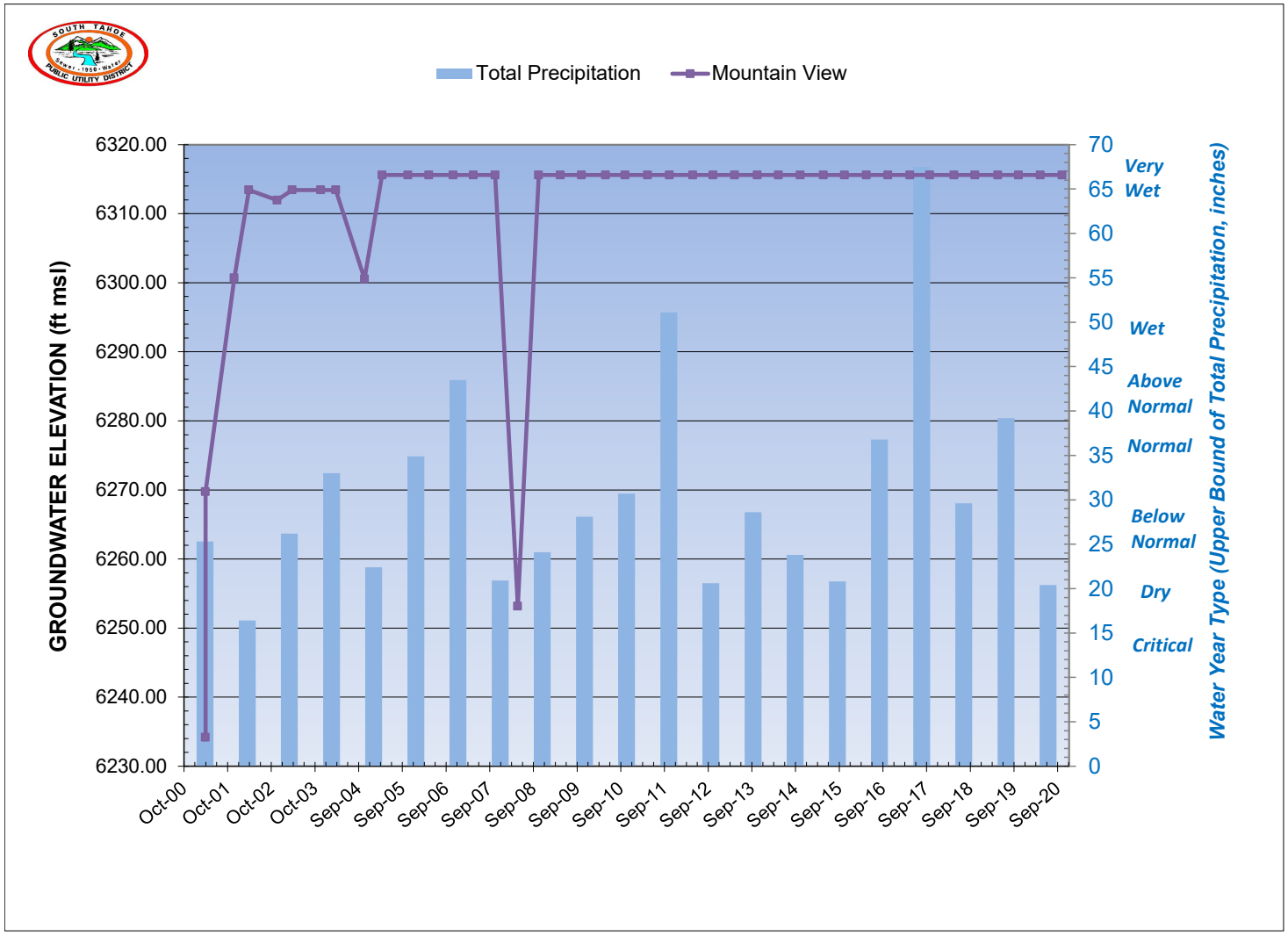
Appendix A – 1. Groundwater hydrograph for the Valhalla Well (6,257 feet msl) within the Tahoe Keys sub-area. Also shown is the water level (stage) of Lake Tahoe measured at USGS 10337000. All readings are static water levels collected following a minimum 12-hour recovery time, with the exception of the May 2007 reading, which is a pumping water level measured at a well pumping rate of 700 gallons per minute(gpm). Water year type using the TSS Water Classification is indicated using the bar chart and upper bound of total precipitation displayed on the secondary-y axis.



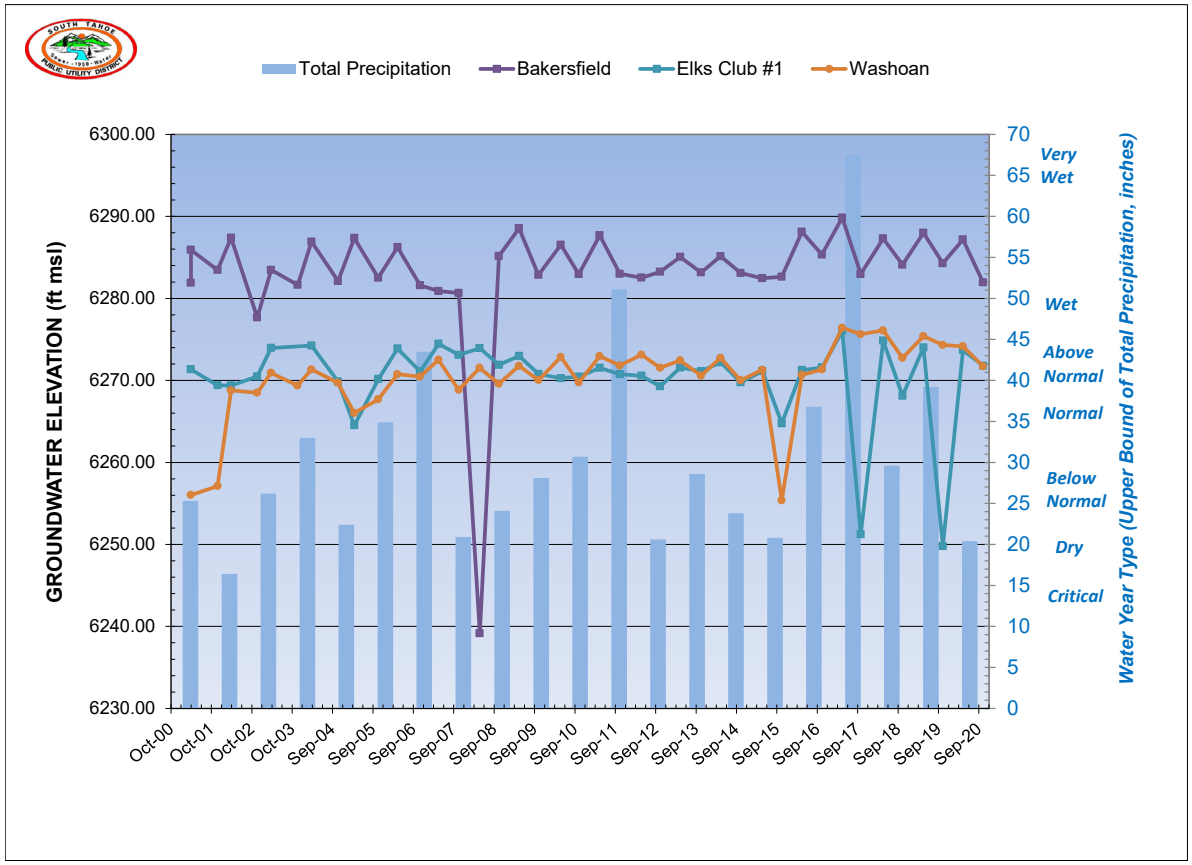
Appendix A – 2. Groundwater hydrograph for the Blackrock #1 (6,241 feet msl) and Glenwood #3 (6,260 feet msl) wells within the Bijou sub-area. Static water levels in the Blackrock #1 well are stable and slightly rise above ground surface (6,240 feet msl). The Glenwood #3 well is used to monitor water levels near an active PWS well (Glenwood #5). In 2007, the District restricted water production from Glenwood #5 in order to sustain groundwater production from this sub-area. The water level response in Glenwood #3 shows that this change in operation has been successful in allowing groundwater levels to recover to sustainable levels.



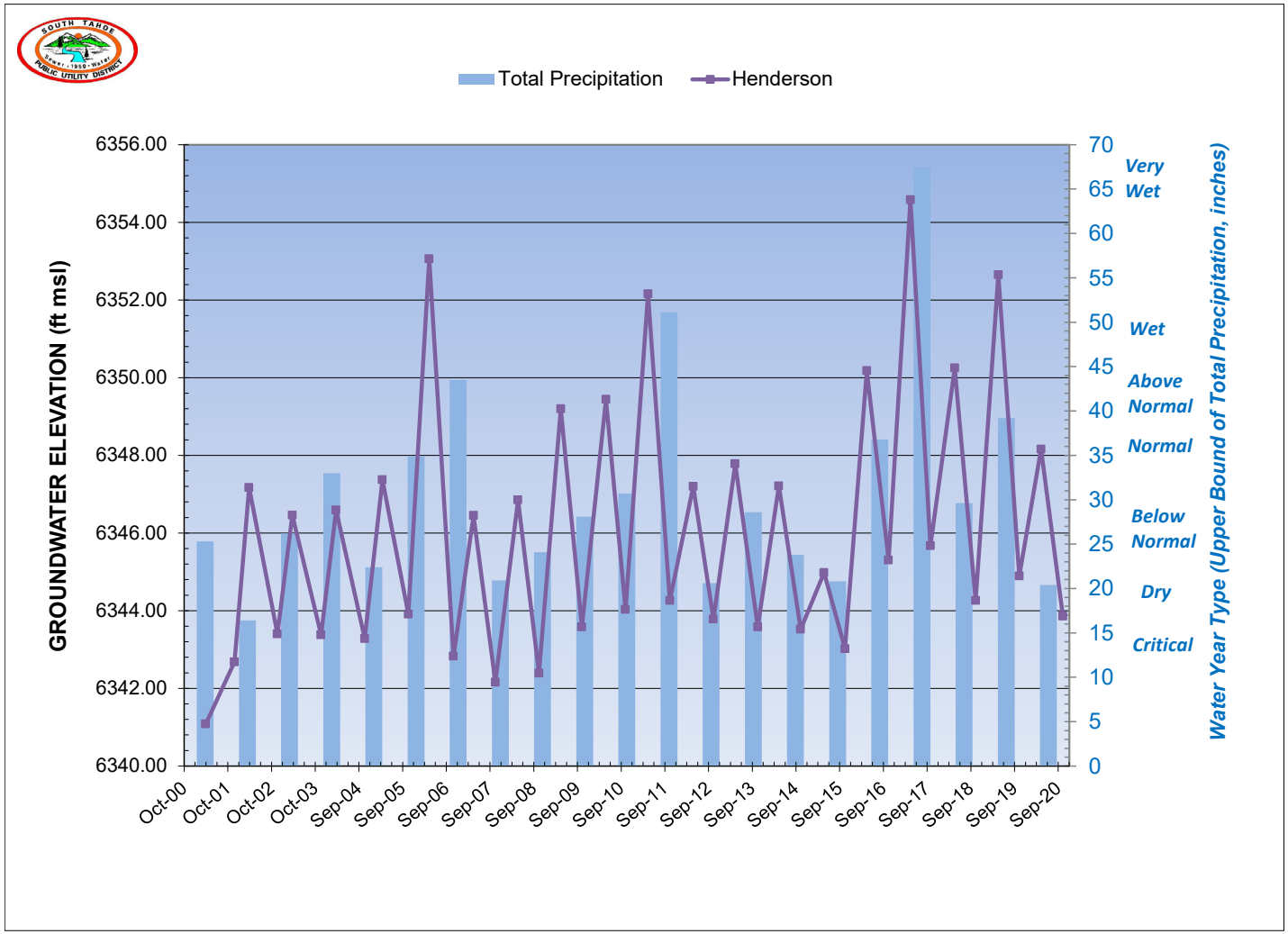
Appendix A – 3. Groundwater hydrograph for the Paloma (6,267 feet msl); Sunset (6,249 feet msl) and CL-1 (6,279 feet msl) wells in the South Lake Tahoe sub-area. Groundwater levels in these wells appear stable. Since 2017, groundwater production from the Sunset well has increased by about 59 million gallons per annum. Groundwater levels for the Sunset Well are on-watch for possible groundwater production restrictions.



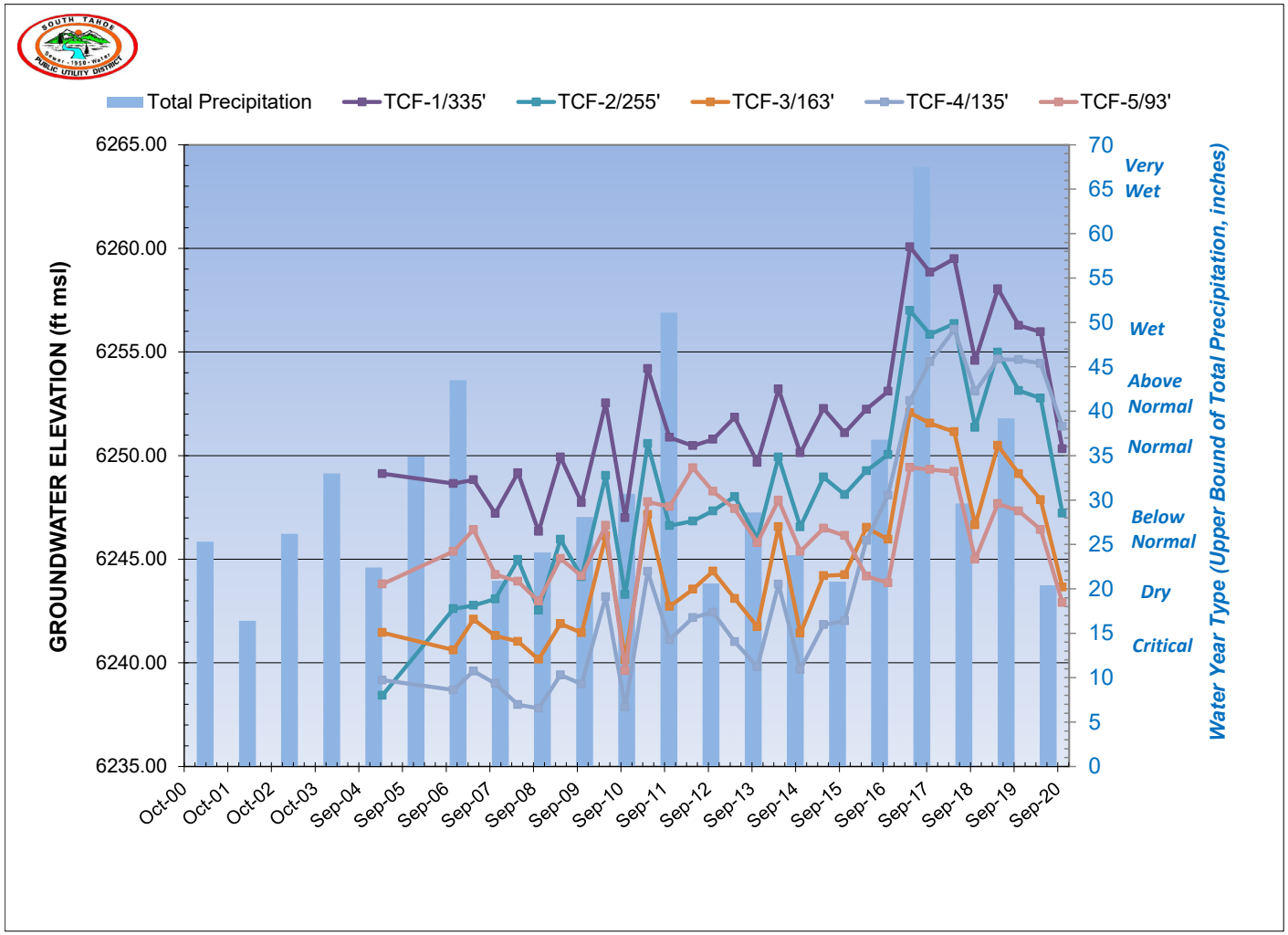
Appendix A – 4. Groundwater hydrograph for the Mountain View (6,313 feet msl) well (artesian flowing well) in the Angora sub-area.



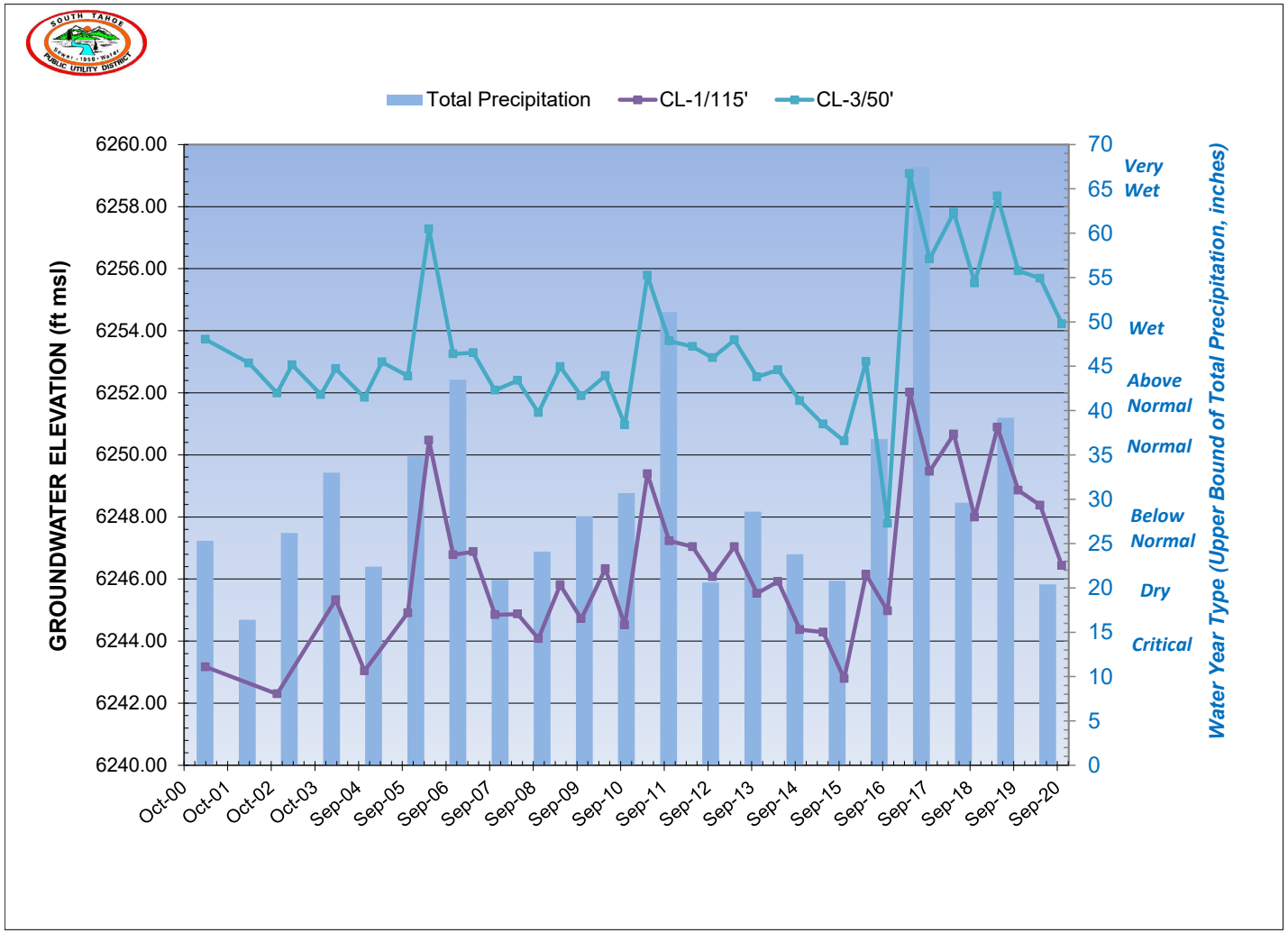
Appendix A - 5. Groundwater hydrograph for the Bakersfield (6,311 feet msl); Elks Club #1 (6,283 feet msl) and Washoan (6,308 feet msl) wells in the Meyers sub-area. Groundwater levels in the Meyers sub-area are relatively stable with short periods of declining water levels in response to increased pumping rates. Static water levels collected from the Bakersfield Well are following a minimum 12-hour recovery time, with the exception of the May 2008 reading which is a pumping water level measured at a well pumping rate of 1,500 gallons per minute(gpm). The Elks Club #1 Well is situated in close proximity to an active pumping well (Elks Club Well #2). Static water levels collected from the Elks Club #1 are typically collected when the Elks Club Well #2 is off. The October 2017 and November 2019 readings are water levels measured when the Elks Club #2 Well was pumping at a rate of 310 gpm and 389 gpm, respectively.



Appendix A-6. Groundwater hydrograph for the Henderson Well (6,366 feet msl) within the Christmas Valley sub-area. Groundwater levels in this well are stable and do not exhibit a long-term downward trend.



Appendix A – 7. Groundwater hydrograph for the USGS TCF nested well (6,296 feet msl) within the South Lake Tahoe sub-area. Total well depths for the observation wells completed within the common borehole are as indicated. The complex vertical flow directions indicated by differences in groundwater levels in this well are believed to result from lowered head in WBZ 4 induced by pumping of the Glenwood #5 well.



Appendix A - 8. Groundwater hydrograph for the Clement Well cluster (6,279 feet msl) within the South Lake Tahoe sub-area. Total well depths for the observation wells comprising the well cluster are as indicated. Both CL-1 and CL-3 monitor groundwater levels from the uppermost water-bearing zone (TKZ5). Vertical flow is directed downward indicative of recharge adjacent to Tahoe Mountain.

APPENDIX B

SAG Workshop Minutes

Workshop 1 (July 29, 2020)

Workshop 2 (December 17, 2020)

AGENDA

DATE	Wednesday, July 29th, 2020; 1:30 PM – 4:30 PM (PDT)
LOCATION	https://global.gotomeeting.com/join/923348325; Call-In: 1(866) 899-4679; Access Code: 923-348-325
STAKEHOLDER ADVISORY GROUP LIST	Ken Payne, P.E., (El Dorado County Water Agency); Robert Lauritzen, P.G., Karen Bender, REHS, RD (El Dorado County -EMD); Jason Burke (City of South Lake Tahoe); Scott Carroll (CA Tahoe Conservancy); Andrea Buxton (Tahoe Resource Conservation District); Brian Grey, P.G. (Lahontan Regional Water Quality Control Board); Paul Nielsen (TRPA); Joey Keely, Nicole Bringolf (USFS – LTBMU); Nakia Foskett (Lakeside Park Water Co.); Jennifer Lukins (Lukins Brothers Water Co); Daniel Larson (Tahoe Keys Water Co.); Harold Singer (Community Rate Payer); and John Thiel, PE (South Tahoe PUD)
PLAN MANAGER	Ivo Bergsohn, PG, HG (South Tahoe PUD)

BASIN MANAGEMENT OBJECTIVES (BMO)

1. Maintain a sustainable long-term groundwater supply.
2. Maintain and protect groundwater quality.
3. Strengthen collaborative relationships with local water purveyors, governmental agencies, businesses, private property owners and the public.
4. Integrate groundwater quality protection into local land use planning activities.
5. Assess the interaction of water supply activities with environmental conditions.
6. Convene an on-going Stakeholders Advisory Group (SAG) as a forum for future groundwater issues.
7. Conduct technical studies to assess future groundwater needs and issues.
8. Identify and obtain funding for groundwater projects.

WORKSHOP OBJECTIVES

OBJECTIVES

1. Learn about the current Private Well Owner Survey – Phase II being performed by the District for the TVS Basin.
2. Learn about the South Y PCE Regional Plume Characterization being conducted by the LRWQCB during the 2020 Field Season.
3. Consider DRI plans for groundwater model evaluation in support of the first 5-Year Update of the 2014 Groundwater Management Plan.
4. Review the current status of the 2014 GMP Implementation Plan (Table 10-1).

SEE REVERSE FOR AGENDA

AGENDA

Time	Description	
1:30	**Roll call**	**SAG**
1:40	**TVS Basin (6-005.01) - Open Forum** **Opportunity for members to briefly raise topics within the subject matter of the SAG and not listed on the Agenda.**	**Round Robin**
1:50	**Private Well Owner Survey – Phase II** • **Purpose** • **Scope** • **Questions**	**I. Bergsohn** **STPUD**
2:10	**LRWQCB Regional Plume Characterization** • **2020 Planned Field Activities** • **Discussion**	**A. Cazier** **LRWQCB**
2:50	**DRI Model Evaluation – 50-Year Water Budget** • **Recommended Actions** • **Approach** • **Discussion**	**S. Rybarski,** **M. Hausner** **DRI**
3:30	**5-minute BREAK**	
3:35	**Update to 2014 Groundwater Management Plan (2014 GMP)** • **Public Notification/Participation** • **DWR Facilitation Support Services (FSS)** • **Status Review - 2014 Implementation Plan (Table 10-1)** • **Discussion**	**SAG**
4:30	**Adjourn**	

Tahoe Valley South Subbasin (6-005.01) Groundwater Management Plan
MEETING NOTES
Wednesday, July 29th, 2020; 1:30 pm - 4:30 pm
Location: On-Line Meeting

SAG ATTENDEES:
John Thiel, PE; Ivo Bergsohn, PG, HG (STPUD); Ken Payne, PE (El Dorado Water Agency); Brian Grey, PG (Lahontan Regional Water Quality Control Board); Michael Conger (Tahoe Regional Planning Agency); Robert Lauritzen, PG; Karen Bender, REHS, RD (El Dorado County Environmental Management Department); Jason Burke (City of South Lake Tahoe); Joe Keely; Nicole Bringolf (USFS- Lake Tahoe Basin Management Unit); Andrea Buxton (Tahoe Resource Conservation District); Jennifer Lukins (Lukins Brothers Water Co); Danial Larson (Tahoe Keys Water Co.); Nakia Foskett (Lakeside Mutual Water Company); Harold Singer (Ratepayer)

Participants: 26

BASIN MANAGEMENT OBJECTIVES:
1. Maintain a sustainable long-term groundwater supply.
2. Maintain and protect groundwater quality.
3. Strengthen collaborative relationships with local water purveyors, governmental agencies, businesses, private property owners and the public.
4. Integrate groundwater quality protection into local land use planning activities.
5. Assess the interaction of water supply activities with environmental conditions.
6. Convene an on-going Stakeholders Advisory Group (SAG) as a forum for future groundwater issues.
7. Conduct technical studies to assess future groundwater needs and issues.
8. Identify and obtain funding for groundwater projects.

WORKSHOP OBJECTIVES
1. Learn about the current Private Well Owner Survey – Phase II being performed by the District for the TVS Basin.
2. Learn about the South Y PCE Regional Plume Characterization and activities planned by the LRWQCB during the 2020 Field Season.
3. Consider DRI plans for groundwater model evaluation in support of the first 5-Year Update of the 2014 Groundwater Management Plan (2014 GMP).
4. Review the current status of the 2014 GMP Implementation Plan (Table 10-1).

Roll Call
Roll-Call Sheet

TVS Basin (6-5.01) - Open Forum (Group)
Current groundwater-related topics outside of the Agenda

I. Bergsohn, STPUD
- Welcome Bridget Gibbons, SGMA Liaison for CDFW North Central Region and thank you for CDFW Groundwater Planning Considerations document (emailed to SAG);
- Draft EIR/EIS for Tahoe Keys Lagoon Aquatic Weeds Control Methods Test is out for Public Comment; TRPA is hosting an On-line Meeting; Wednesday, August 12, 9:30 am; Comments due September 3, 2020; For more information contact: https://tahoekeysweeds.org/
- Welcome Katy Janes, SGMA Point of Contact for DWR; seeking project descriptions for groundwater-related projects within the North Lahontan Region; Projects may be highlighted in the update to Bulletin 118 being prepared by DWR.

- 2020 WY through July 1: Total ppt. at TVS Basin Reference Station = 20"; average = 30.31"; should trend continue, expect a Below Normal WY; Comparison of May 2019 to May 2020 groundwater levels shows an average decline of 1.8 feet.

J. Lukins, LBWC – LBWC Well #5 GAC Treatment System

- Started construction May 2020; currently on-schedule
- Majority of UG piping work completed; Storage Tank construction starting this week
- Carson Pump completed well modifications on LBWC 5; updated well construction diagrams for LBWC 5 to be forwarded to LRWQCB and STPUD

Private Well Owner Survey – Phase II

Private Well Owner Survey- Phase II (I. Bergsohn, PG HG, STPUD)

Ivo provided a brief update on the progress of the second phase of the Private Well Owner Survey (PWOS-II) being conducted by the South Tahoe Public Utility District (District). PWOS-II is being performed to contact the remaining (~246) private well owners not contacted during the initial well owner survey completed in 2017. There are believed to be more than 600 private wells used for drinking water supply within the TVS Basin. The Private Well Survey is part of an outreach effort to inform private well owners of the establishment of GSAs and their responsibility to develop and implement a groundwater management plan for the TVS Basin. A second objective is to encourage private well owners to participate in the groundwater management process. A third objective is to gather information using a questionnaire to better inform the GSAs about: well ownership, water usage, well condition, water quality and well owner concerns. PWOS-II started at the end of June; through July 27, 46 well owners have been contacted with 43 surveys completed.

Handouts: June 29, 2020 STPUD News Release; Private Well Owner Survey- Phase II (2 slides/page)

LRWQCB Regional Plume Characterization

Site Cleanup Subaccount Program (SCAP) Regional PCE Investigation Update (A. Cazier, PE, LRWQCB)

Abby gave an update on the progress of the Site Cleanup Subaccount Program (SCAP) Regional PCE Investigation currently being conducted by the Lahontan Regional Water Quality Control Board (LRWQCB). This is a multi-year groundwater investigation being funded by the SWRCB through SCAP (Total Value = $4.6 M). PCE groundwater contamination in the South Y area has impaired public and domestic water supplies for over 30 years. Investigation tasks include; records review and potential source area inventory, regional PCE plume delineation, vertical conduit evaluation, private well sampling, soil gas sampling, sentry/monitoring well installations, and potential source area investigation (s).

The records review identified approximately one hundred parcels in the South Y Area that may be potential source areas of PCE contamination (Tier 1 Inventory). These parcels are commercial properties with past history of PCE use associated with dry-cleaning facilities, carpet cleaning businesses, auto repair shops; and auto paint and body shops. Questionnaires from LRWQCB 13267 Investigative Orders are being reviewed along with results from the Regional Plume Characterization (RPC) to help identify suspected source areas.

Well inventory is being performed to identify water supply wells; and relict monitoring wells (Swiss Mart, Hurzel Property) in the South Y area. The status of many water supply wells (active/inactive/destroyed) cannot be confirmed by current property owners. The well inventory will be updated pending results from the District's current private well owner's survey. The well inventory will then be compared to results from the RPC to identify wells which may act as vertical conduits for the movement of PCE groundwater contamination.

The RPC is the major task executed in 2019. Primary objectives were to estimate the lateral and vertical extent of PCE contamination; understand regional subsurface lithologies; estimate depths where PCE contaminant mass enters water supply wells; identify preferential pathways; and provide a "snapshot" of current distribution of PCE within the contaminant plume to support evaluation of potential remedial and receptor protection options. A total of 13 Sonic Borings (TD to 300 feet) and 51 CPT Borings (TD to 100 feet) were arranged along radial transects for collection of groundwater quality samples (8 samples/location) and analyzed for VOCs. A total of 110 groundwater samples were collected from the Sonic Borings; sonic cores were collected and lithology logged (USCS). A total of 408 groundwater samples were collected from the CPT Borings. Tip resistance and sleeve friction were used to estimate soil types. Data gaps from the 2019 RPC occurred in 5 areas; 1. Define Northern Extent; 2. Define Vertical Extent – north end; 3. Define Eastern Extent; 4. Define Vertical Extent – southwest margin; 5. Investigate clay layer & vertical extent- south central portion of plume. A data gap investigation consisting of 9 Sonic Borings and 6 CPT Borings is planned to address these data gaps (expected July/August 2020).

Vertical conduit evaluation is being used to prioritize wells that may be serving as pathways for PCE groundwater contamination. Wells that have a high potential (location within plume; susceptible well construction) have been identified and are being selected for potential well destruction. LBWC #4 was identified as a high potential well during 2019 RPC; this well was destroyed (Mud-rotary drilled to 195 feet to clear gravel fill from open hole below bottom of well casing; Blast perforate 12" Casing and 10" Liner ; and filled to surface with neat cement) during week of June 22, 2020.

Private well sampling- eight domestic wells were sampled in 2019; TV Elementary School Well (Inactive) had detectable levels (0.5 μg/L) of PCE; remaining 7 wells (Active) PCE was not detected (RL= 0.5 μg/L).

Soil Gas Sampling involving the installation of 15 shallow (<5 ft) soil vapor probes in areas of known groundwater contamination and near sensitive receptors; and 5 deep (10 ft) soil vapor probes is planned for September/October 2020.

Sentry Wells (2) are being sited and designed for installation up-gradient of LBWC #1 and TKWC #1. Monitoring Wells (2) are being sited and designed for installation up-gradient of LBWC #5 and TKWC #2. Construction for these four wells is being planned for September/October 2020. Under SCAP, both the Sentry and Monitoring Wells will be sampled following construction during four semi-annual monitoring events.

Source Area Investigations are anticipated to occur in 2021 (Contract Value $380 K)

Handouts: Site Cleanup Subaccount Program (SCAP) Regional PCE Investigation Update (2 slides/page)

Q & A (Group)

- What is difference between Sentry Wells and Monitoring Wells? : Difference is in location with respect to plume: Sentry Wells are sited outside the plume; Monitoring Wells are sited within the plume.
- What have we learned from this work that may help improve how future site investigations are performed? : Need to do a better job holding RPs responsible for defining the vertical extent and depth of contamination.
- How can this work be used to make policy changes that would insure a more thorough investigative process and saving the costs needed in identifying responsible parties? : Lesson Learned - Contamination assessments should be completed with full delineation of the groundwater contamination; before remedial action(s) are approved.
- Has LRWQCB been successful in negotiating access agreements to conduct the Source Area Investigations; and if not, how is this going to impact the approach for these investigations?: LRWQCB is requesting that the PRPs conduct the investigation on their own properties; if not possible, SCAP could possibly be used; if access denied, most source area investigation work will be conducted in down-gradient areas.

DRI Model Evaluation – 50 Year Water Budget

GWMP 5-Year Update Groundwater Model Evaluation (S. Rybarski, M. Hausner, DRI)

Susie described the Recommended Actions (RAs) identified by DWR and the DRI modeling tasks planned to develop the information needed to address the RAs as part of the update to the 2014 Groundwater Management Plan. This included developing 50-year water budgets to address RA-1, RA-2 and RA-3; summarizing findings from the South Y PCE Fate and Transport model to address RA-5; delineating a Groundwater Management Area (GMA) along with sustainability indicators and minimum thresholds to address RA-6; developing sustainability goals, indicators and minimum thresholds to address RA-7; and through this work identifying any remaining data gaps to address RA-8.

The 50-Year Water Budgets need to account for climate change effects and changes in pumping. Climate scenarios will be developed using DWR-accepted climate models (CIMP5) to help address uncertainties inherent in climate models. The climate scenarios will be used to assess the effects of climate change on groundwater recharge (rate and timing). These simulations will be compared to standard climate model simulations to develop a range of potential variability of impacts due to climate change. Pumping rates will be projected using future water demand estimates recently completed for the District's service area by Kennedy Jenks; and 50—year population growth estimates for El Dorado County (2010-2060) developed by the California Department of Finance.

In order to demonstrate how pumping may impact plume migration or cause degrade water quality DRI will summarize results from the South Y PCE Fate and Transport model report completed for the South Y Feasibility Study. Remedial scenarios showing the effects of varying pumping rates and pumping locations will be highlighted for incorporation into the update of the 2014 Groundwater Management Plan (2014 GMP).

A base 1-year transient model with no pumping will be developed for comparison with climate scenarios. A depletion analysis will be performed to evaluate reductions in stream base flow. Results from the depletion analysis will be compared to the base 1-year transient model to identify the seasonal timing and conditions that may cause an undesirable depletion of interconnected surface waters. Using conservative pumping rates and the most conservative climate scenario (e.g., hot and dry scenario) a capture analysis will also be performed to delineate the GMA as defined by model cells with greater than 50% stream capture in any model layer.

Modeling results from the 50-year water budget simulations, depletion analysis and capture analysis will be used to identify recommended monitoring sites and quantitative criteria for groundwater levels, storage and depletion of interconnected surface waters that can be used to determine compliance. Minimum thresholds will be set within the range of historical variability derived from the South Tahoe Groundwater Model. Proposed indicators, thresholds and monitoring sites identified through this process will be presented to the SAG for review and comment prior to finalizing.

Data gaps identified as this work proceeds will be noted for incorporation into the updated 2014 GMP.

Handouts: GWMP 5-Year Update Groundwater Model Evaluation (2 slides/page)

Q & A (Group)

- DWR has required that the District report its water budget strictly for the area of the TVS Basin, as defined by DWR, would this affect the depletion analysis and capture analysis?: Let me think about this.
- El Dorado Water Agency and Placer County Water Agency are in the process of performing an American River Basin (ARB) Study. The ARB Study also includes use of climate change scenarios, similar as described for DRI's modeling work the 2014 GMP; are you aware of this on-going study; if not consider contacting this group for more information on the climate change assumptions being used in the ARB Study effort: Not aware good point, Rick will follow-up with contact information to District and DRI.
- Would changes in Lake Level during drought affect the capture analyses and delineation of the GMA during Task 3?: DRI is currently discussing how best to model Lake Level changes in the simulations. If Lake Level changes are significant, influence could be important.
- What is the schedule for completion of the proposed work? : Contract completion date is June 30, 2021.
- Are you able to explore antecedent conditions which may follow drought conditions by shifting the starting point for groundwater pumpage during the following year? Reply: Hard to predict; pumping rates are currently envisioned to vary based on population growth rate, seasonal and pumping distribution trends.
- Would Kennedy Jenks have an interest in re-examining water use projections, in light of potential increases in water use resulting from the increased need for washing due to COVID-19? : Interesting question, uncertain how this event can be applied to the groundwater predictive models; uncertain how long COVID-19 will continue.
- Are there any plans to update the South Y PCE Fate and Transport Model incorporating results from the current South Y PCE RPC? : For now, plans are to summarize previous reports; updating the model with the RPC results is not in the scope of work.

Update to 2014 Groundwater Management Plan (2014 GMP)

5-Year Update to 2014 GMP (I. Bergsohn, STPUD)

Ivo provided a presentation on the progress of the five-year update the 2014 GMP, due to DWR by January 1, 2022. The focus of the presentation was on: 1) identifying ways to improve public outreach during the update process; and 2) walking through a portion of the status review of Table 10-1 Implementation Plan from the 2014 GMP. A brief review of the administrative items completed for the 5-year update since the last Workshop in November 2019 was also discussed and copies of Resolutions and MOU from the District and El Dorado Water Agency were provided in the handouts.

As part of Public Outreach - GSAs are required to provide notice describing the manner in which interested parties may participate in the development and implementation of Groundwater Sustainability Plans. A copy of the draft Public Notice prepared for the 5-year update was considered. Opportunities for participation cited in the draft Notice included;

- Joining the GMP Interested Parties Email List (at last count about 70 members);
- Attending and providing comments at Public meetings/Workshops;
- Mailing comments directly to the District; and
- Visiting the District's Groundwater Management web page.

Are there other tools that should be considered to encourage participation in this process?

DWR's Stakeholder Engagement Chart was presented as a tool to identify the different Categories of Interest associated Stakeholder Groups for the TVS Basin.

- General Public- EDWA Board includes three County Board of Supervisors; should we more actively engage City Counsel, others?
- Private Users – The District is currently using the Public Well Owners Survey (PWOS) as an outreach tool to Private Well Owners; mailing addresses and emails compiled during the well survey could be used to directly notify private well owners through email and direct Mailers.
- Environmental and Ecosystem – SAG includes reps from USFS, CTC and TRCD; are there other groups that we should be engaging, such as Ca State Parks, others?
- Human Right to Water- Small Community Systems included in PWOS
- Integrated Water Management - Tahoe Sierra IRWM- BMO #3, Action 3 – Participate in IRWMP Process; how best to achieve this objective?

A copy of Table 10-1 Implementation Plan Review was provided to the SAG. Ivo walked through the last section of Table 10-1 focused on the "Projects Dependent on Outside Funding" specifically called-out by DWR in RA-8. The purpose of the exercise is to: 1) Consider the status of each item; and 2) Determine whether the item needs to be expanded or revised for the updated 2014 GMP. A .doc file of Table 10-1 will be distributed to the SAG for fielding SAG comments (comments requested by Friday, August 28th).

BMO#4 - Groundwater Vulnerability is a term used to represent the natural characteristics that determine the ease with which groundwater may be contaminated by human activities. Vulnerability assigned to a site or an area is based on the relative ease with which infiltrating water and potential contaminants may reach groundwater in a vertical or sub-vertical direction. It is evident from the history of groundwater contamination in the TVS Basin that groundwater is very susceptible to contamination from petroleum hydrocarbons, MtBE and PCE spills and releases at land surface or in the shallow subsurface above the water table. However, the District has not moved forward with conducting a formal vulnerability assessment of the TVS Basin.

DRI delineated recharge areas across the TVS Basin as part of the Phase II modeling work completed in 2018. Groundwater Recharge is often used to help rank the degree of vulnerability within an area (i.e,, high recharge = high vulnerability). This work could be built upon along with soils mapping and groundwater elevations to conduct a groundwater vulnerability assessment of the Basin.

Would a Vulnerability Assessment be found useful for planning purposes by TRPA, El Dorado County or City of South Lake Tahoe.

Is this worth maintaining as a future project in the updated 2014 GMP?

BMO #5- DRI assessed the effects of groundwater pumping on surface waters and the potential effects of climate change on groundwater conditions as part of the Phase II modeling work completed in 2018. DRI is going to further address this Action as part of their groundwater modeling work for the updated 2014 GMP. This Action is On-Going.

BMO #7 - Groundwater Sustainability Agencies have the power and authority to conduct investigations for the a number of purposes, including but not limited to:

- To determine the need for groundwater management.
- To prepare and adopt a groundwater sustainability plan and implementing rules and regulations.
- To propose and update fees; and
- To monitor compliance and enforcement.

The District currently provides letters of support for projects that improve the understanding of hydrologic processes, groundwater quality and groundwater quantity in the TVS Basin; and makes its groundwater data readily available for public use.

Should this Action be expanded to include the powers and authorities granted to GSAs under SGMA?

BMO #7 - The existing TVS Basin Groundwater Model was initially updated by DRI in 2015 and is updated annually to calculate and track groundwater storage presented in the TVS Basin WY Annual Report. Future updates and recalibration of the groundwater model may be needed as new hydrogeological data becomes available. This Action is On-Going.

BMO #7- DRI provided recommendations to improve the existing Basin Monitoring Network. This included adding an Observation Well or using existing Public Water Supply Wells in the South Y Area to monitor changes in groundwater elevations. DRI also recommended use of a new or existing Observation Well in the southeast portion of the Basin near (> ¼-mile) from Saxon Creek. A new well in this area would likely be located outside the District's service area and within the jurisdiction of the EDWA GSA. LRWQCB is also seeking parties to take responsibility for new sentinel/monitoring wells be planned in the South Y Area.

Should this Action be expanded to pursue the LRWQCB option?

BMO #7 - This Action was included in the 2014 GMP in case of increased pumping or occurrence of an extended drought in the TVS Basin. Further information on the potential impacts from increased pumping and changing climate conditions, including an extended drought will be provided as part of the work being performed by DRI in developing the 50-year water budgets. This Action is On-going

This information may be helpful in assessing the potential need for considering projects that may enhance groundwater recharge within the Basin. However, current groundwater elevation data and water budgets suggest that groundwater recharge is adequate; and the likelihood that groundwater replenishment facilities would be needed is very low.

Should this Action be continued or removed from the updated GMP?

Handouts: District Resolution 3140-20; EDWA Resolution WA-6-2020; District & EDWA MOU; Public Notice of Opportunities; Stakeholders Engagement Chart; Table 10-1 Implementation Plan Review; 5-Year Update to 2014 GMP (2 slides/page)

MEETING ADJOURNED (4:00 pm)

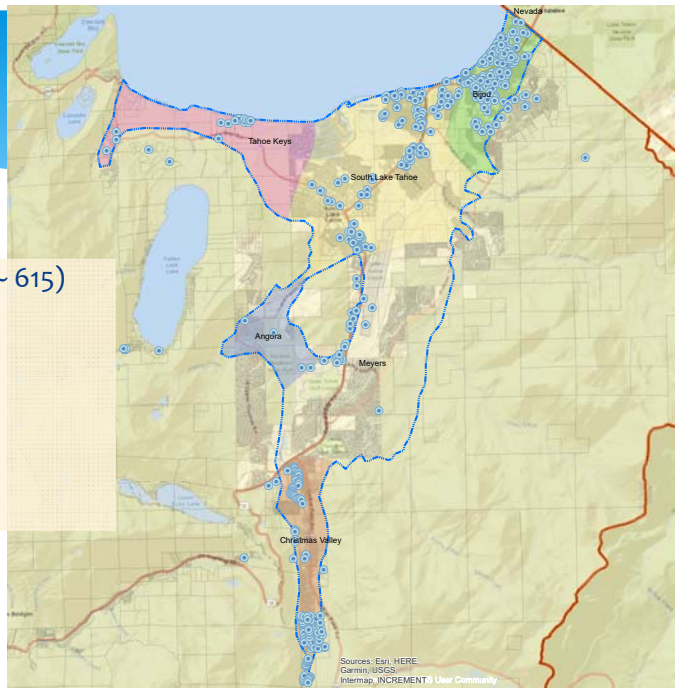
TAHOE SOUTH SUBBASIN (6-005.01)
SAG WORKSHOP 1
July 29,2020

Private Well Owner Survey – Phase II

I. Bergsohn, STPUD

Private Wells

* Wells - inferred (~ 615)
* Types
  * Domestic
  * CWS
  * NTNC
  * TNC
  * SSWS

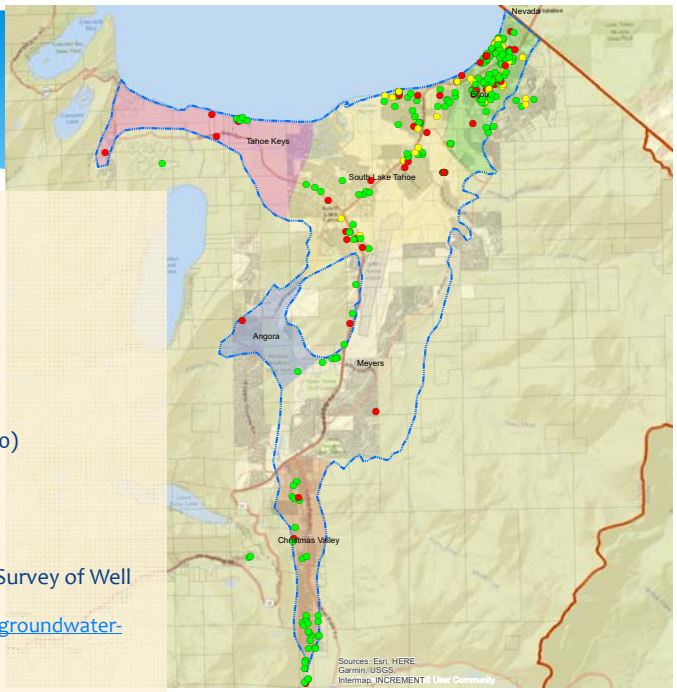


OBJECTIVES

- Inform Private Well Owners of GSAs & Groundwater Management
- Encourage Private Well Owners to participate in the SAG
- Reach-out to Private Well Owners to better understand:
  - Well Ownership
  - Water Usage
  - Well Condition
  - Water Quality
  - Well Owner Concerns

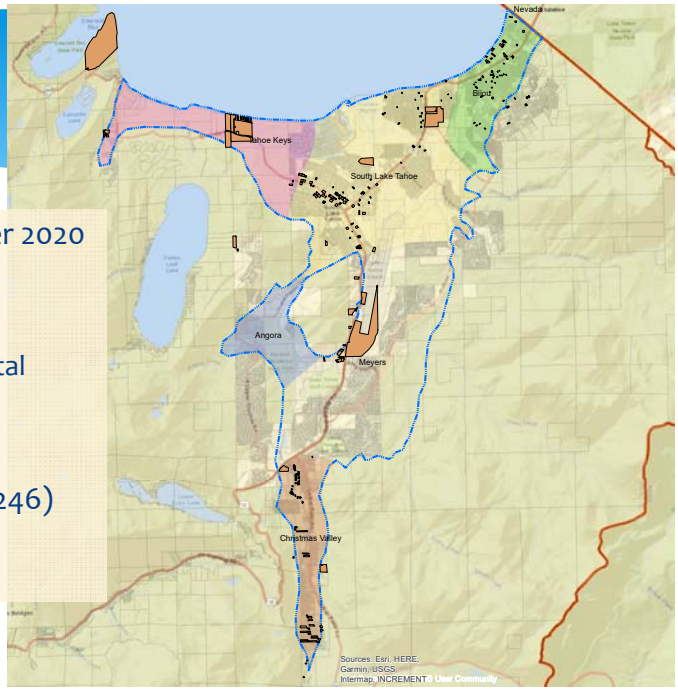
PWOS I

- August – October 2017
- Methods
  - Direct Mail
  - Door to Door
  - Online/Web Portal
  - Telephone
- Confirmed Well Sites (370)
  - Yes (247)
  - No (77)
  - Uncertain (46)
- TVS Groundwater Basin Survey of Well Owners (Allegro, 2018)
  - https://stpud.us/news/groundwater-management-process/



PWOS II

- June – September 2020
- Methods
  - Direct Mail
  - Online/Web Portal
  - Telephone
- Inferred Wells (~246)



PWOSII Status

- GOAL – 246
  - Contacted - 46
  - Survey Complete - 43

Tahoe Valley South Subbasin Groundwater Management Plan Stakeholder Advisory Group Workshop July 29, 2020

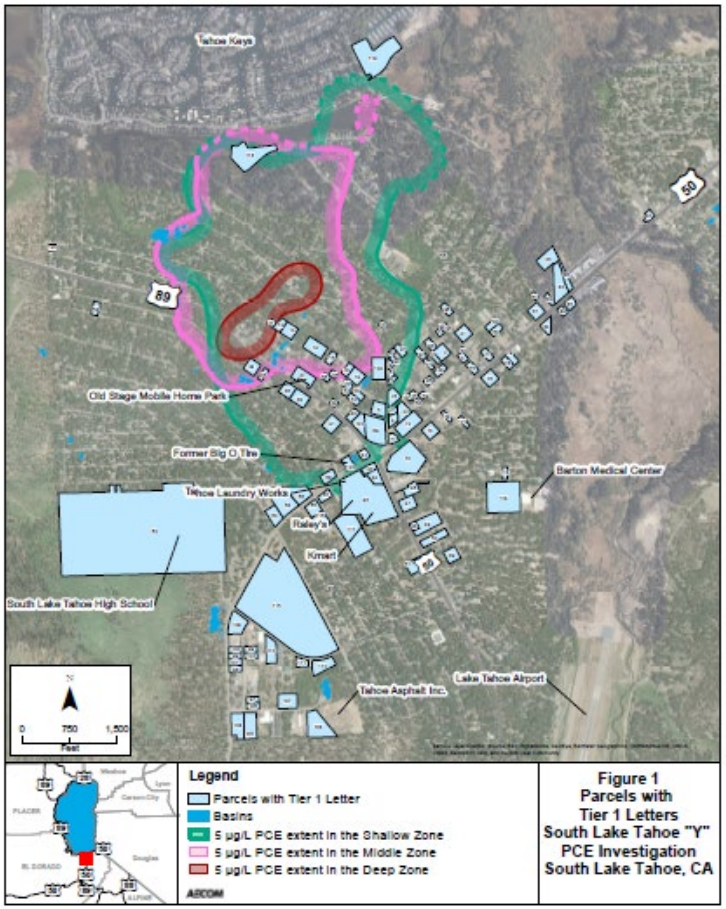
Site Cleanup Subaccount Program (SCAP) Regional PCE Investigation Update

Abby Cazier, PE
Water Resource Control Engineer

Introduction

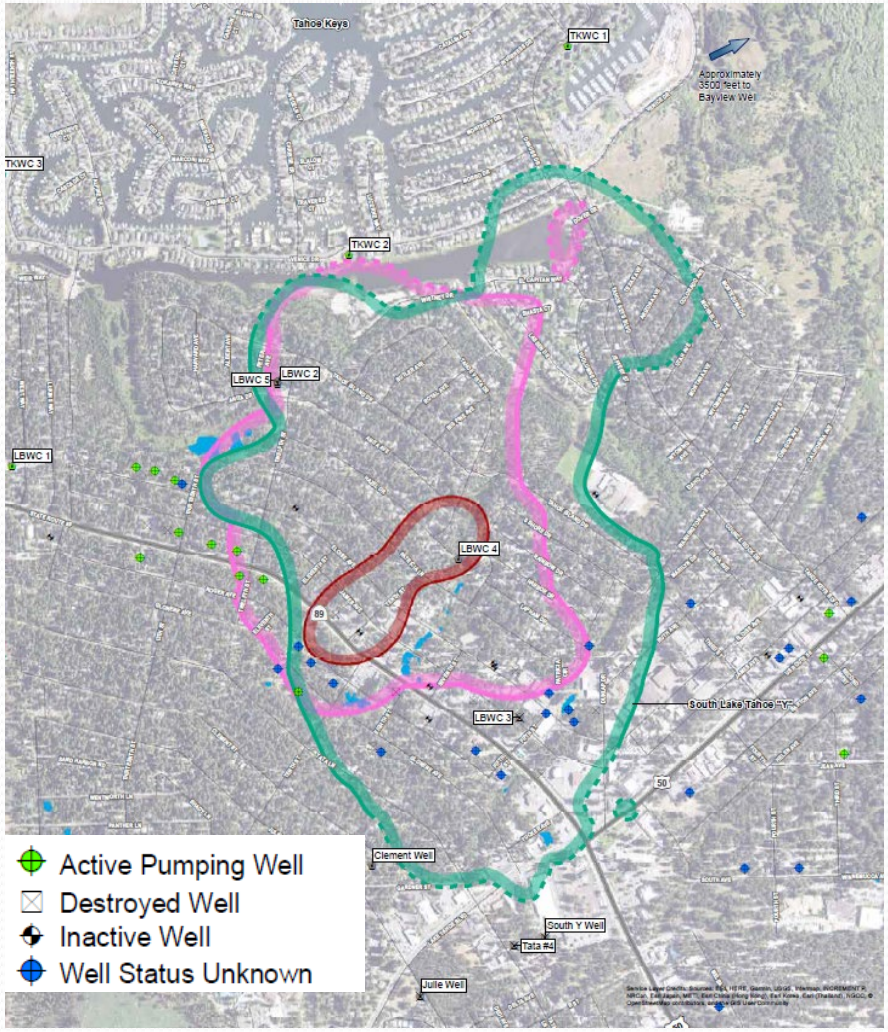
- Site Cleanup Subaccount Program (SCAP) Regional Investigation Tasks
  - Records Review and Inventory Development
  - Regional PCE Contamination Investigation
  - Vertical Conduit Evaluation and Destruction
  - Non-Municipal Water Supply Well Sampling
  - Soil Gas Sampling
  - Sentry and Monitoring Well Network Installation
  - Source Area Investigation

Source Area Inventory



- Review records to develop Tier 1 Inventory
- Over 200 13267 Investigative Orders (Order) issued requiring the submittal of Chemical Use and Site History Questionnaire
- Tier 1 Inventory, questionnaire responses, and Regional Contamination Investigation results being evaluated to identify potential responsible parties

Well Inventory



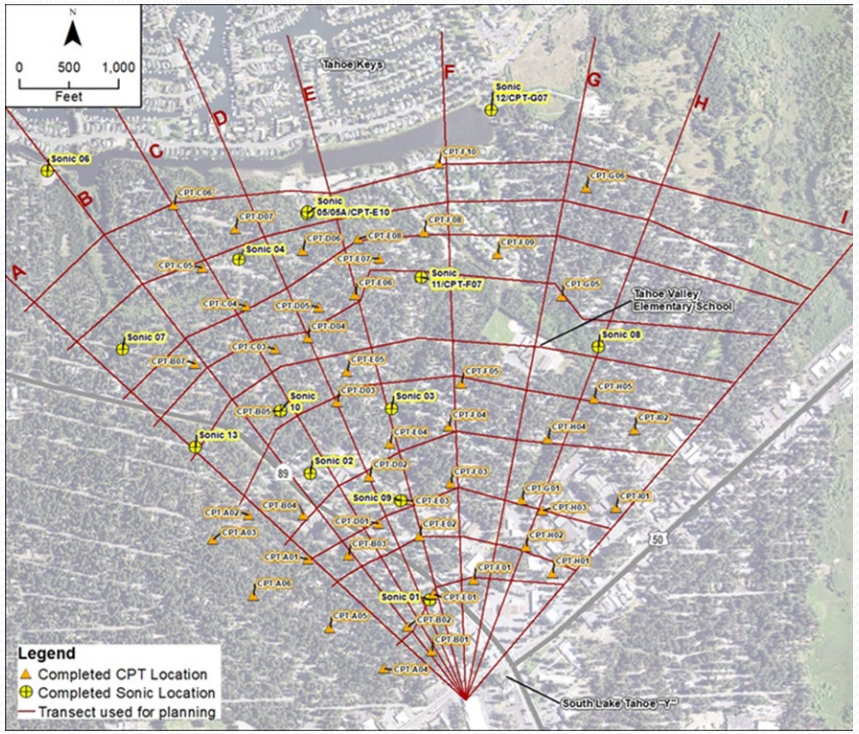
- Identify supply wells (active/inactive)
- Identify monitoring wells
- Locate supply well DWR Well Completion Reports
- Locate boring logs for monitoring wells
- Review El Dorado Co. Environmental Management's records
- Tabulate well construction detail
- Verify well status
- Evaluate inventory relative to Regional Contamination area lithology and PCE contamination

Regional PCE Contamination Investigation

- Task Objectives
  - Estimate lateral and vertical extent of PCE contamination
  - Understand regional subsurface lithology
  - Estimate depth where contaminant mass enters water supply wells
  - Identify preferential pathways contributing to contaminant transport
  - Provide “Snapshot” of the Regional PCE Contamination to support and evaluate feasibility of potential remedial and receptor protection options

Regional PCE Contamination Investigation

- Groundwater Investigation 2019
  - Radial transect approach selected for boring placement
  - 13 sonic borings advanced to 300 feet bgs
  - 51 Cone Penetration Test (CPT) borings advanced to 100 feet
  - Approximately 8 groundwater samples collected per location

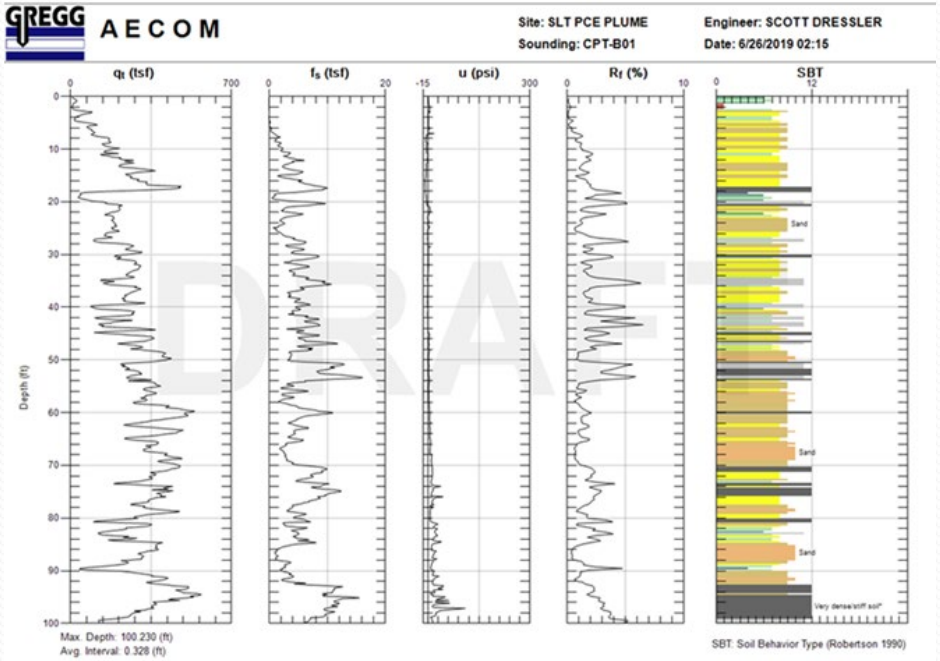


Sonic Drilling Activities

- 7 borings advanced near inactive/active supply wells
- 6 borings advanced within the contamination and near contamination area boundaries
- 110 groundwater samples were collected
- Core logged using Unified Soil Classification System
- Soil samples analyzed physical parameters (i.e. grain size) and TOC analysis

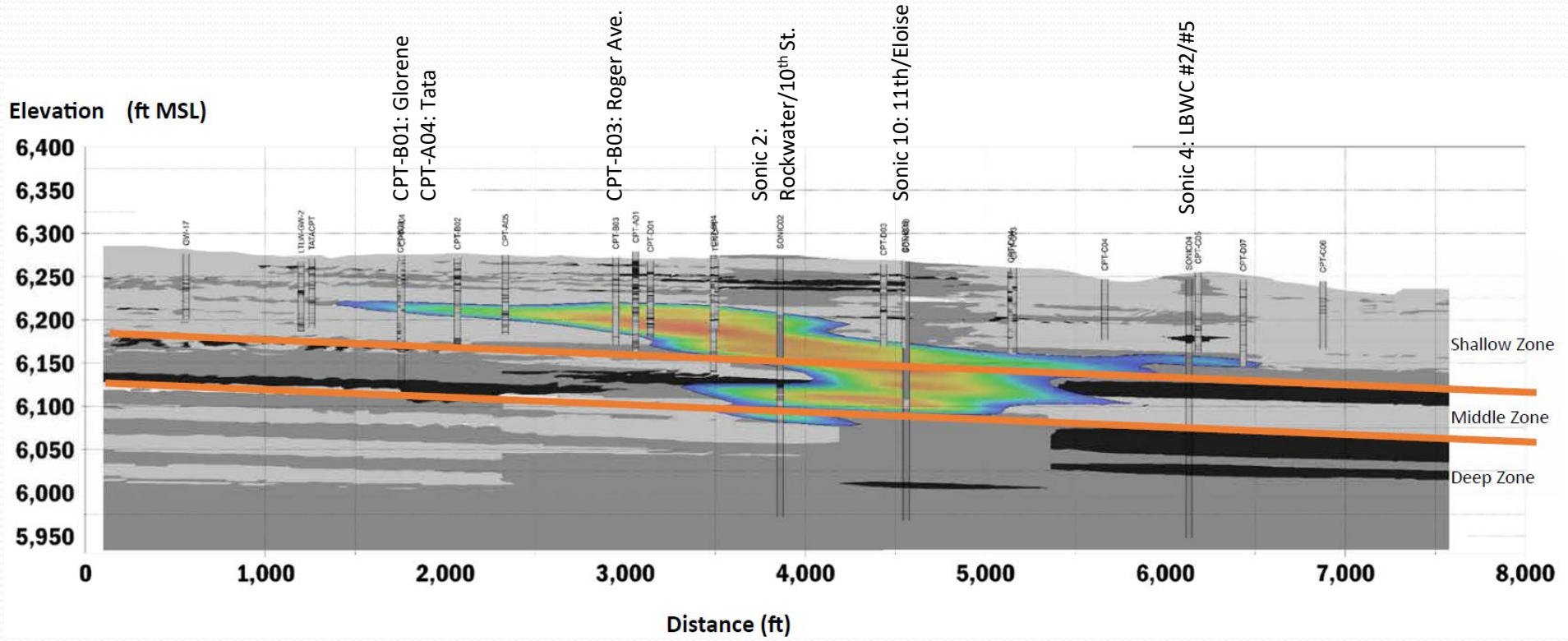
Cone Penetration Test Drilling Activities

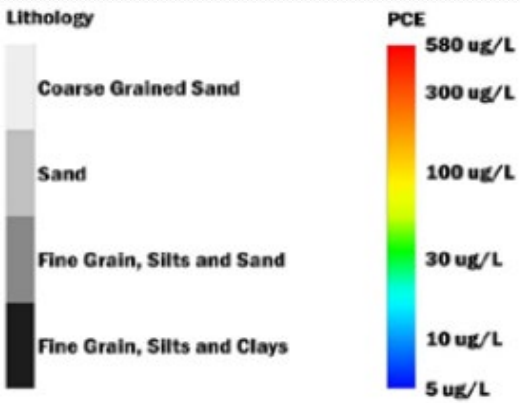
- Cone pushed through subsurface to apx. 100 feet bgs
- Tip resistance and sleeve friction used to estimate soil type
- 1st CPT push to evaluate lithology and determine sampling intervals
- Co-located CPT pushes advanced to collect groundwater samples
- 408 groundwater samples were collected

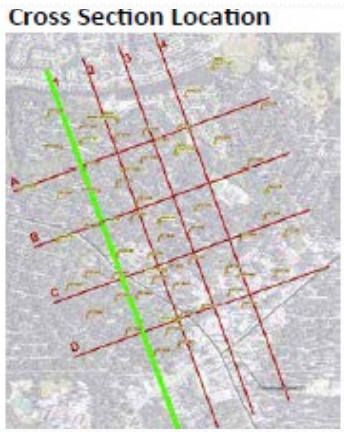


Boring and Cross Section Location Map

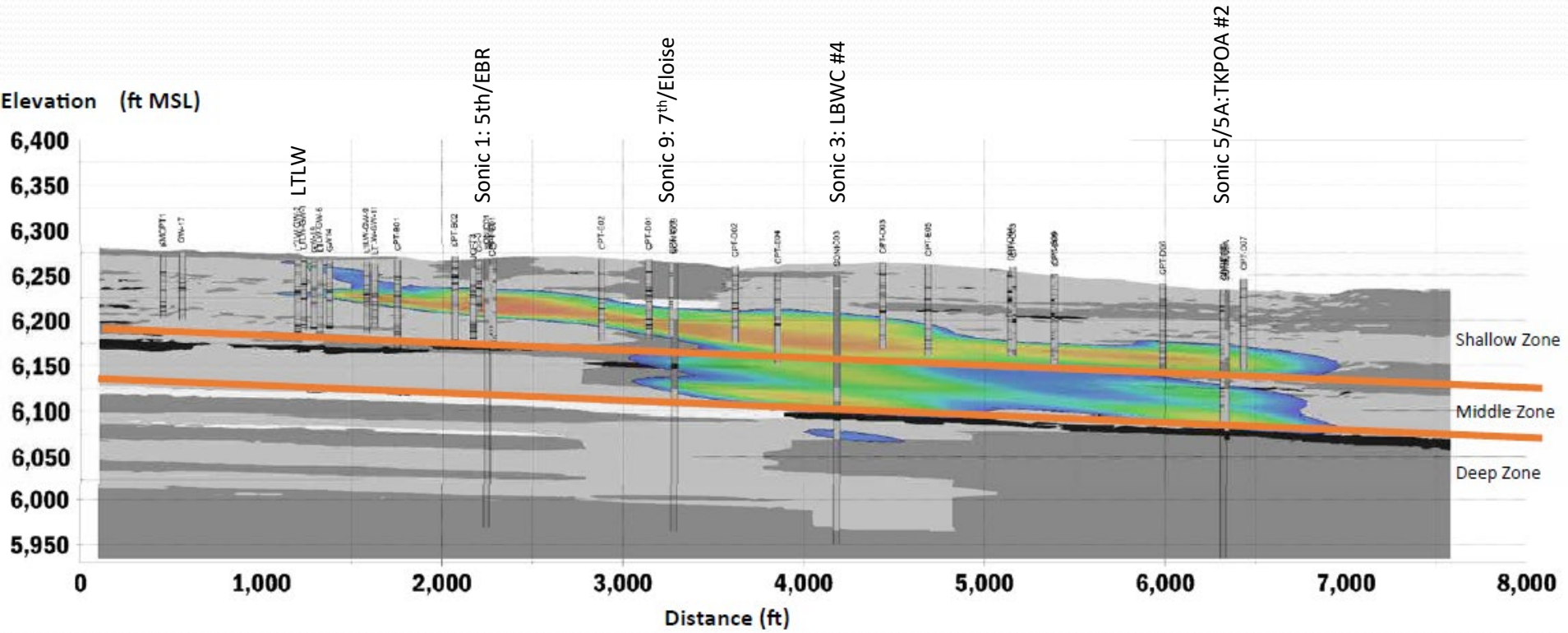
Cross Section 1 – South to North

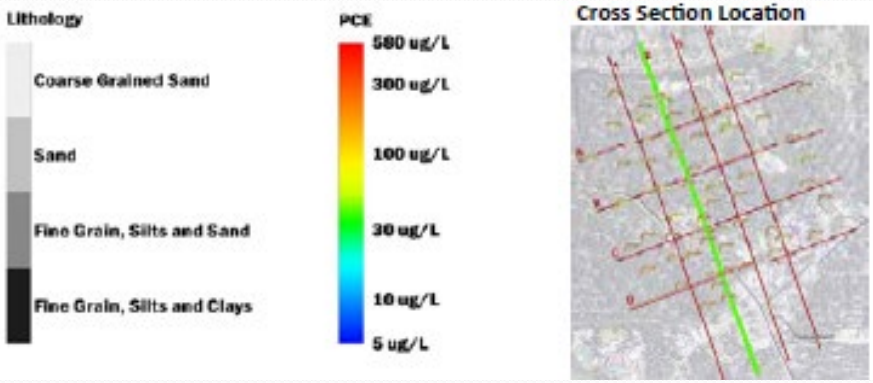




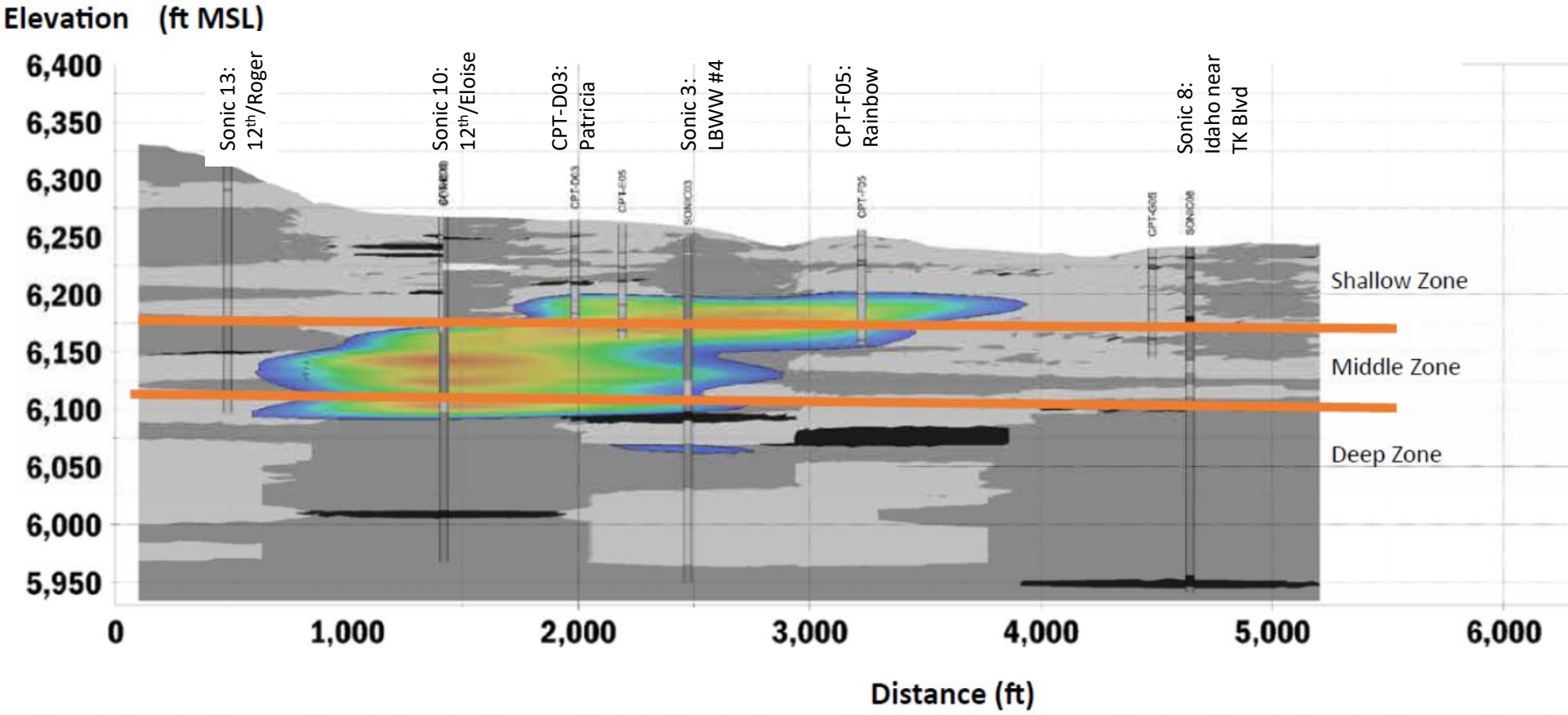


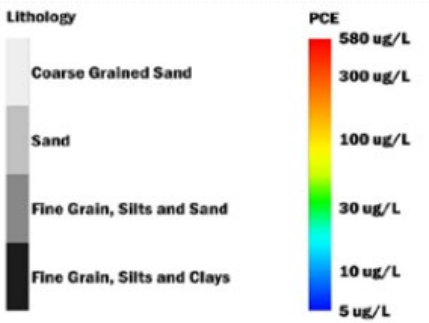
Cross Section 2 – South to North

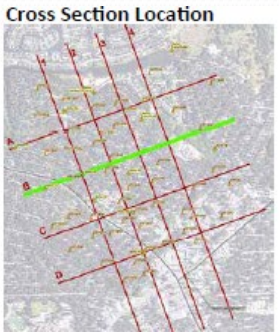




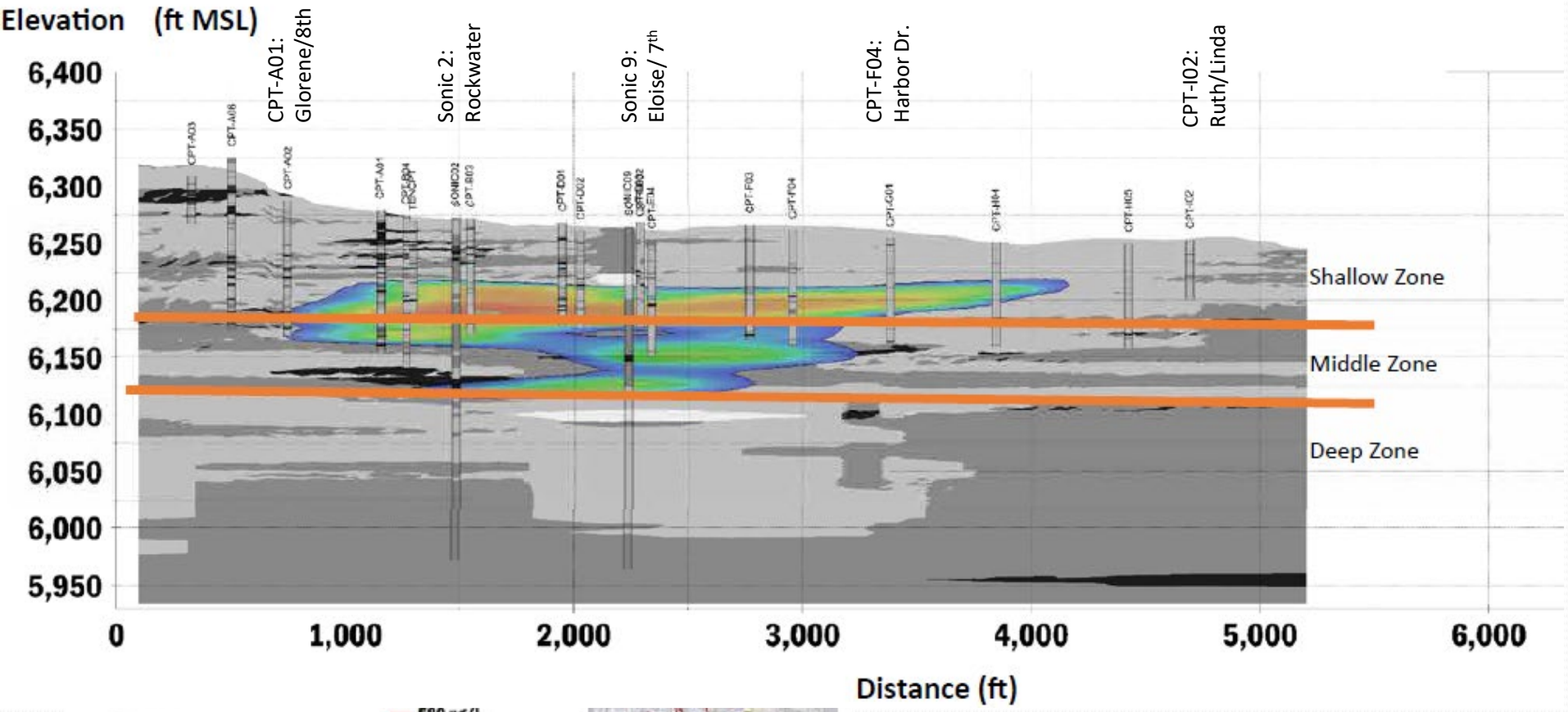
Cross Section B – West to East

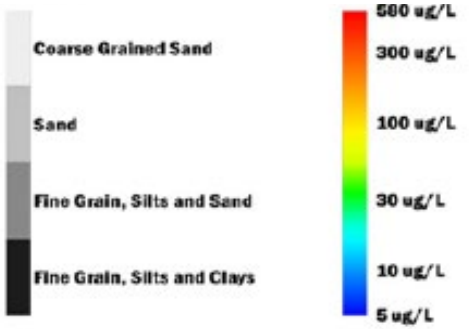


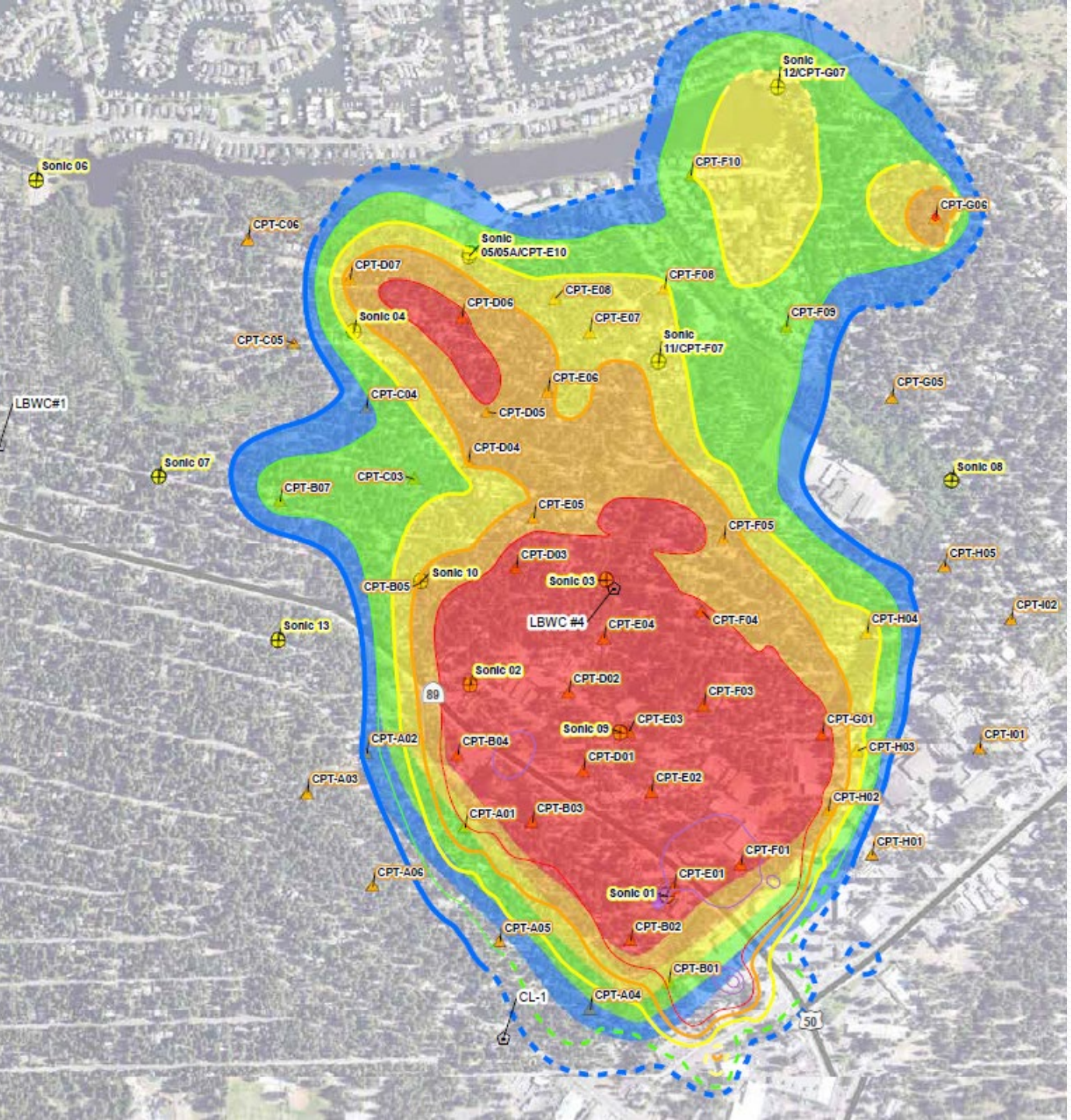




Cross Section C – West to East

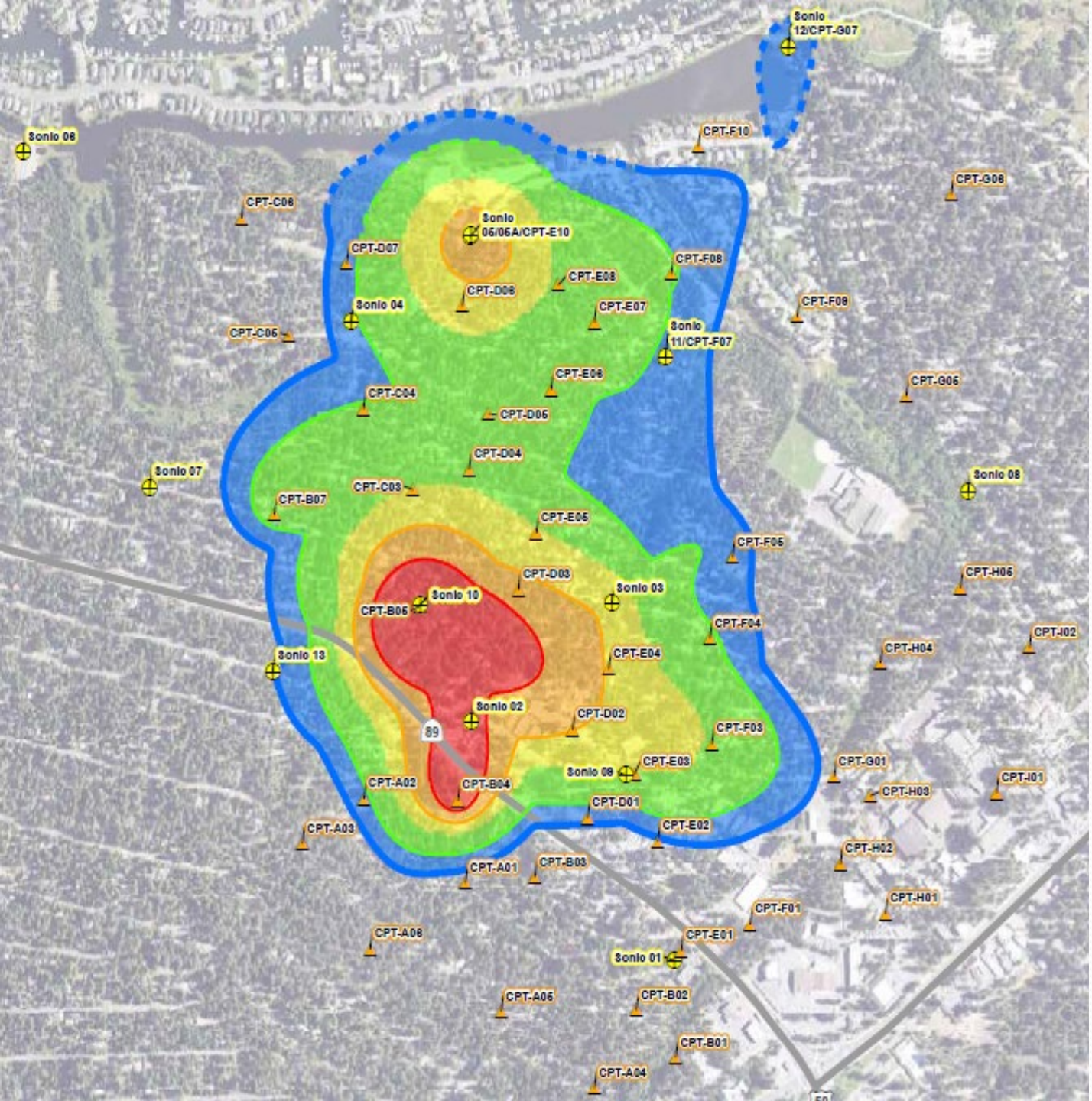


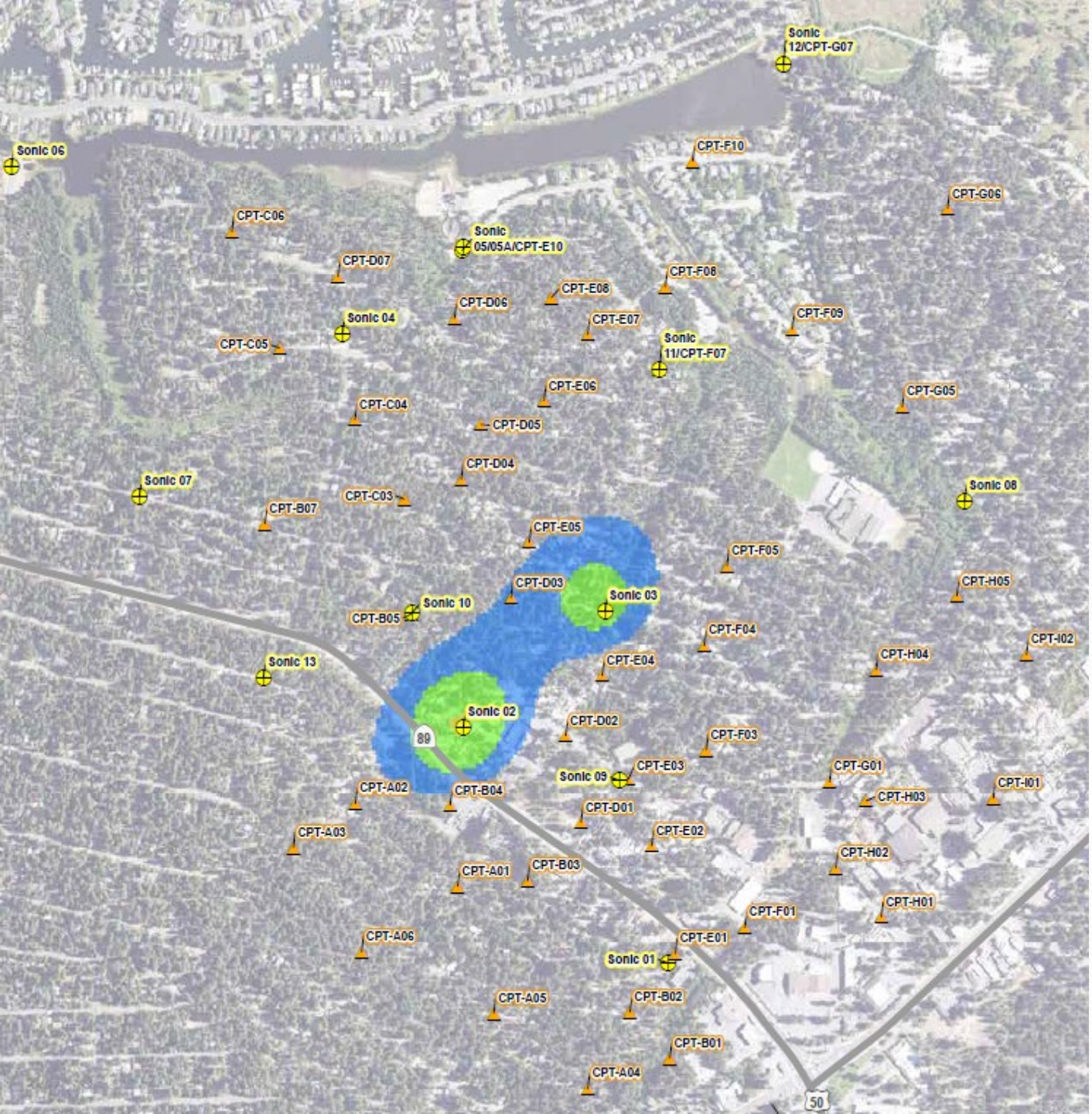




Shallow Zone PCE Map

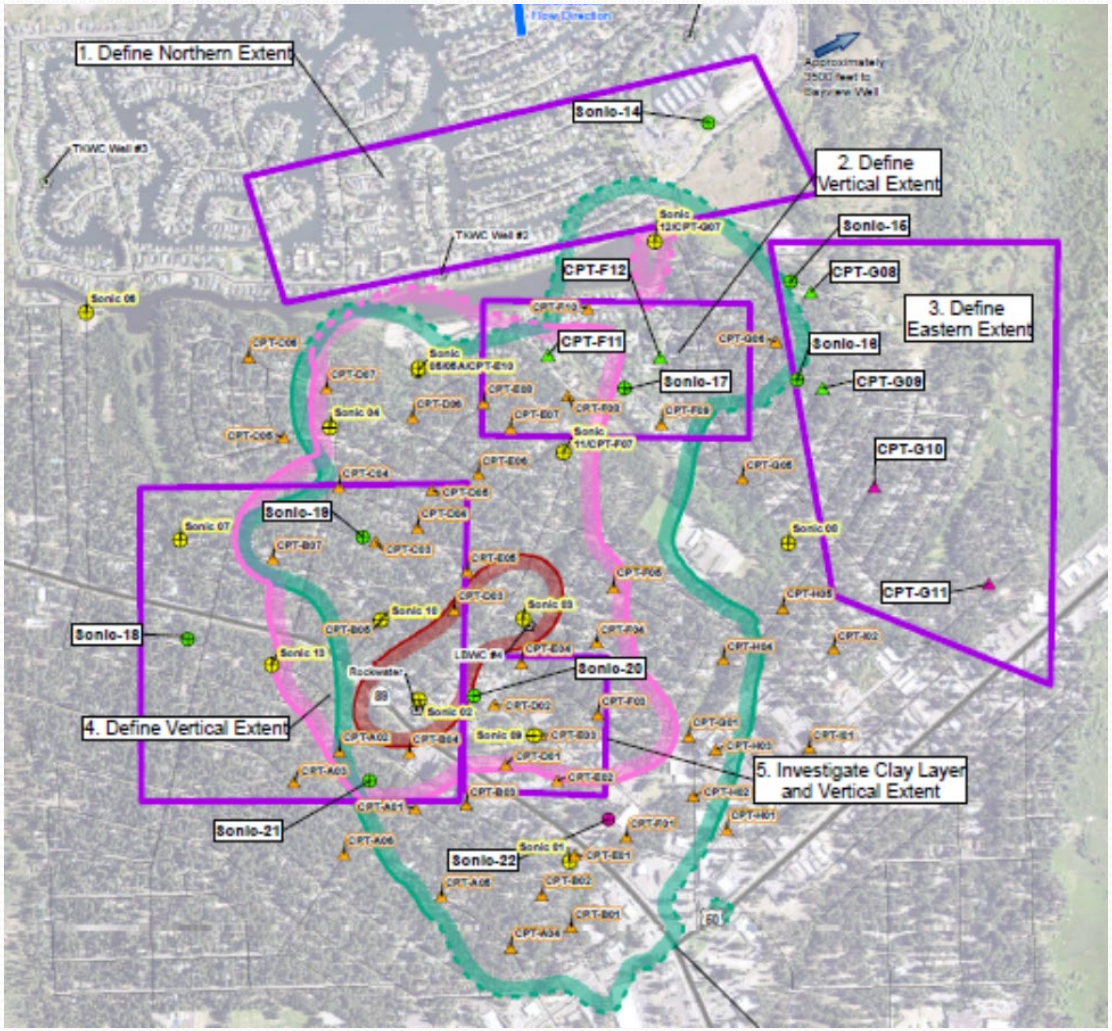
Middle Zone PCE Map





Deep Zone PCE Map

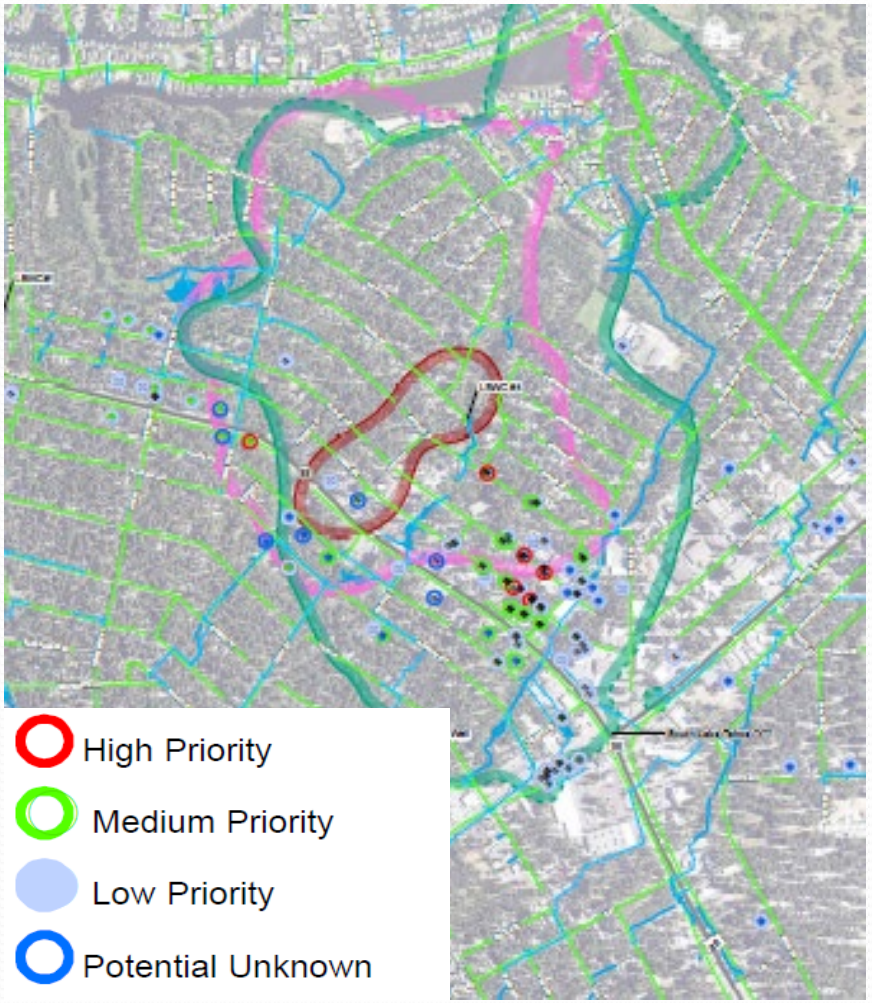
Data Gaps Identified in 2019



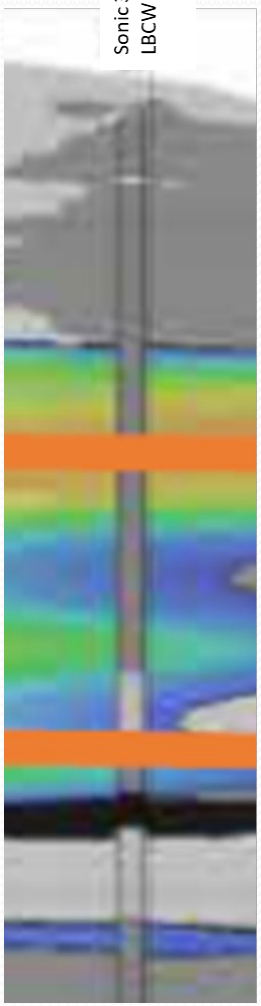
- Data gaps identified in 5 areas
- Address priority data gaps by advancing:
  - 9 Sonic borings
  - 6 CPT borings
- Data gap investigation began in July and expected to be completed in August 2020

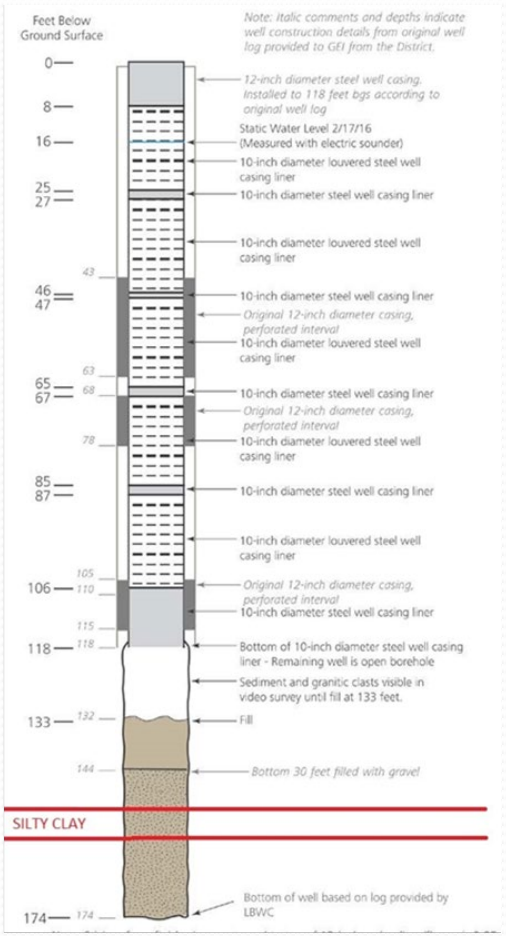
Vertical Conduit Evaluation

- Task Objective: Identify potential vertical conduits responsible for PCE migration
- Vertical conduit evaluation criteria
  - Well located within Regional Contamination
  - Well screened across clay or silt aquitard
  - Well filter pack intercepts clay or silt aquitard
- Preliminary evaluation
  - Red indicates well is high potential vertical conduit priority
    - LBWC #4, 5 Swiss Mart MWs, and two active domestic wells
- Continued evaluation is required to prioritize wells selected for destruction



LBWC #4 Vertical Conduit Evaluation





- Well destroyed during the week of June 22, 2020
- Well penetrated silty clay aquitard
- PCE was detected below the silty clay at 18 ug/L
- Over drilled borehole using a mud rotary drill rig to remove fine gravel
- Installed down-hole explosives, borehole/casing filled with neat cement, and detonated charges to blast perforate casings
- Blast perforations displaced grout into the formation, sealing annular space

Non-Municipal Water Supply Well Sampling

- Task Objective: Identify and sample domestic wells
  - 8 domestic wells sampled in October 2019
  - PCE was not detected above the RL of 0.5 ug/L in the 7 active wells and detected at 0.5 ug/L in well at Tahoe Valley Elementary
  - Two active wells were identified and property owners did not allow access
- Second round of sampling anticipated to occur in September 2020

Soil Gas Sampling

- Task Objective: Evaluate potential threat to human health from vapor intrusion
  - Install 15 shallow soil vapor probes (5 feet bgs) in areas of known shallow groundwater contamination and near sensitive receptors (preschool, high school, elementary school, private residences)
  - Install 5 deep soil vapor probes (10 feet bgs) at select locations to determine vertical extent
  - Soil vapor samples will be collected in accordance with the Active Soil Gas Investigation Advisory
  - Conduct a Tier 1 Human Health Risk Assessment using soil gas investigation data
- Soil gas sampling anticipated to occur in September/October 2020

Sentry Well Network Installation

- Task Objective: Install sentry well network upgradient from threatened receptors

LBWC #1

- Siting
  - Within capture zone of LBWC #1
  - Selected location: 560 James Avenue
- Design
  - 3 wells targeting the screened interval of LBWC #1 (132 -182 feet bgs)
  - Considered data from Sonic 7
  - Well 1: Screen from 110 - 115 feet bgs
  - Well 2: Screen from 135 - 150 feet bgs
  - Well 3: Screen interval TBD

TKPOA #1

- Siting
  - Within capture zone of TKPOA #1
  - Proposed location: 2411 Venice Drive
  - Location contingent on Data Gap Investigation results
- Design
  - 3 wells targeting the screened interval of TKPOA #1 (125 -312 feet bgs)
  - Consider data from Sonic 12/Sonic 14
  - Well 1: TBD
  - Well 2: TBD
  - Well 3: TBD

- Sentry well network installation anticipated to occur in September/October 2020
- Contract task includes four semi-annual monitoring events

Monitoring Well Network Installation

- Task Objective: Install up to 3 monitoring wells upgradient from LBWC #5 and TKPOA #2 to monitor contamination migration
  - Siting
    - Location/s TBD
  - Design Considerations
    - LBWC #5 screened interval: 141 – 180 feet bgs
    - TKPOA #2 screened interval: 138 – 188 feet bgs, 348 - 414 feet bgs, and 426 – 491 feet bgs
    - Monitoring well screened interval to consider lithology and PCE concentrations detected in the Regional Investigation
- Monitoring well network installation anticipated to occur September/October 2020
- Contract task includes four semi-annual monitoring events

Source Area Investigation

- Task Objective: Identify and investigate potential sources that may be contributing to the Regional PCE Contamination
  - Scope of Work is currently being developed by AECOM
    - Identify potential source areas from Tier 1 Inventory
    - Implement passive and/or active soil gas, groundwater, and soil investigations
    - Evaluate contaminant transport along preferential pathways
- Source Area Investigation anticipated to occur in 2021

SCAP Schedule Summary for 2020

- **July – August**: Conduct Data Gap Groundwater Investigation
- **September – October**: Install Sentry/Monitoring Wells
- **October**: Conduct first semi-annual monitoring event
- **September:** Complete 2nd Non-Municipal Supply Well Sampling Event
- **September – October:** Conduct Soil Gas Investigation
- **TBD:** Destroy Priority Vertical Conduits

Questions?

GWMP 5-Year Update
Groundwater Model Evaluation

Susie Rybarski
Mark Hausner
(7/29/2020)

DWR RECOMMENDED ACTIONS TO BE ADDRESSED

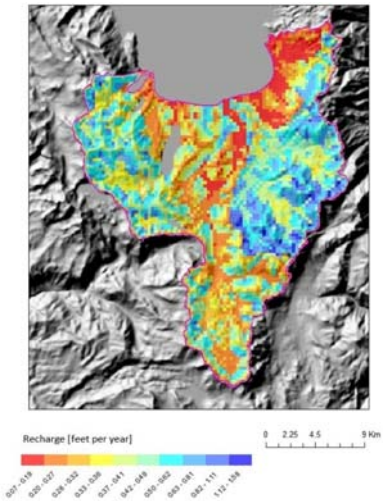
- **RA-1:** Provide water budget information in tabular form for the historical, current, and projected water budgets.
- **RA-2:** Provide a projected water budget incorporating climate change over the planning and implementation horizon of 50 years. Address the apparent discrepancy between the Groundwater Management Plan indicating a shift from snow to rain and the Urban Water Management Plan indicating no detrimental effects on the Subbasin.
- **RA-3:** Reconcile the differing future water demand trend projections between the Groundwater Management Plan, Urban Water Management Plan, and incorporate the reconciliation into the projected water budget.
- **RA-5:** Provide additional explanation for how pumping may impact plume migration or cause degraded water quality.
- **RA-6:** Provide estimates of the quantity and timing of depletions of interconnected surface water and further define what would cause depletions to become significant and unreasonable for the Subbasin.
- **RA-7:** Define quantitative criteria for groundwater levels, storage, and depletion of interconnected surface water that can be used to objectively determine compliance of the Plan with the objectives of SGMA on an ongoing basis.
- **RA-8**: Provide a description of data gaps and how they will be addressed

DRI TASKS TO ADDRESS RECOMMENDED ACTIONS

- **Task 1:** Develop updated water budgets for the 50-year planning horizon, including climate change and population growth (Addresses RA-1, RA-2, RA-3).
- **Task 2:** Summarize findings from the South Y PCE Model for inclusion in the plan (Addresses RA-5).
- **Task 3:** Delineate a Groundwater Management Area (GMA) based on the capture of water from streams and develop area-specific sustainability indicators and minimum thresholds for the undesirable results "depletion of interconnected surface water" (Addresses RA-6).
- **Task 4:** Develop recommended quantitative sustainability goals, indicators and minimum thresholds for undesirable results (chronic lowering of groundwater levels, reduction of groundwater storage, degraded water quality, and depletion of interconnected surface water) and reconcile those recommended goals to the guidance provided by DWR in draft Sustainable Management Criteria BMP guidelines (Addresses RA-7).
- **Task 5:** Identify data gaps that arise in addressing these issues and make recommendations on how to address those gaps (Addresses RA-8).

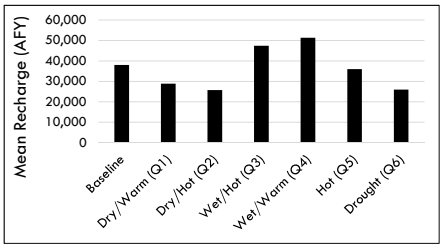
TASK 1: DEVELOP 50-YEAR WATER BUDGETS

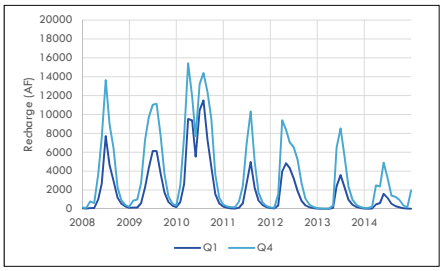
- Addresses RA-1, RA-2, and RA-3
- Predictive water budgets must incorporate climate effects and changes in pumping
- Extend climate projections previously developed to address 2014 GWMP BMOs to 2099 (existing models simulate 33 years, we need at least 50)
- Project annual pumping rates according to projections of population growth and water demand (KJ, 2019; California Dept of Finance, 2020) following historical seasonal distribution
- Update existing South Tahoe groundwater model with revised recharge rates and projected pumping; generate simulated water budgets for 6 climate scenarios through 2099



TASK 1: DEVELOP 50-YEAR WATER BUDGETS

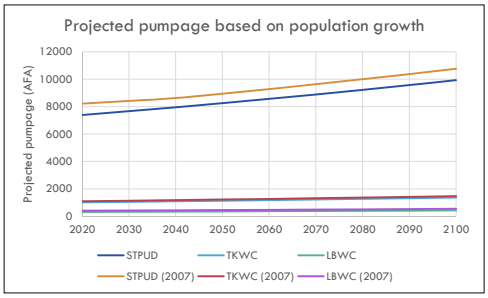
- Five climate scenarios previously developed using global climate models (CMIP5) for 2075-2099 and a historically-based drought scenario
  - Q1 – warm and dry
  - Q2 – hot and dry
  - Q3 – hot and wet
  - Q4 – warm and wet
  - Q5 – hot with no change in precipitation
  - Q6 – historically-based drought scenario (1987-1994 and 2012-2015)
- GW recharge calculated in GSFLOW for each climate scenario allows for spatial and temporal variability in recharge rates based on precipitation and temperature
- Climate scenarios assume warming/precipitation changes begin immediately; compare to historical baseline to create an envelope for predicted changes to flow budgets





TASK 1: DEVELOP 50-YEAR WATER BUDGETS

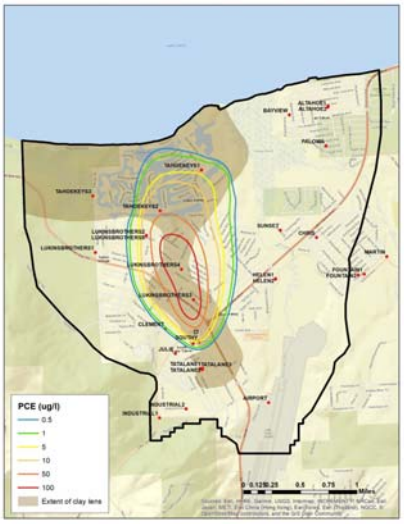
- Projecting pumping to future demand
  - Water demand analysis (KJ, 2020)
    - Uses parcel development, land use, occupancy rates, climatic and economic conditions, to predict 'future' demand spatially
  - Population projections (El Dorado County, 2020)
    - Estimated El Dorado County population growth rate for 2010-2060 = 0.37%
- Baseline (initial) pumping defined by KJ baseline estimate or by 2007 pumpage (most conservative).
- Total estimated pumpage will be distributed across wells in each system according to the ratio of use in 2019, and according to historical seasonal distribution to allow for monthly stress periods (LBWC 5 assumed to be online starting 2022).
- Pumpage to be estimated at private well locations
- Pumping projections to be coordinated with KJ to ensure consistency between GWMP and UWMP



System	KJ Future Rate (AFA)
STPUD	8410
LBWC	353
TKWC	1046

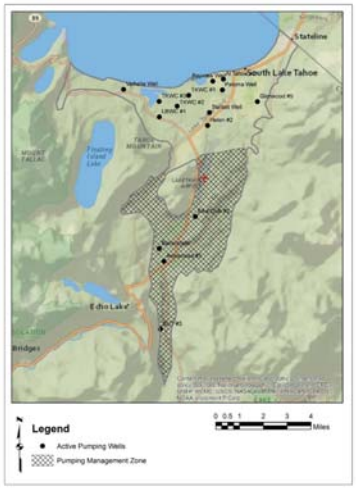
TASK 2: SUMMARIZE SOUTH Y PCE MODEL FINDINGS

- Addresses RA-5
- Summarize results from South Y PCE model report (Rybarski et al, 2019)
  - South Y PCE model is a subsection of the larger TVS groundwater
  - Demonstrate how groundwater pumping may impact PCE plume migration or cause degraded water quality within the subbasin.
  - Discuss alternatives for pumping rates/locations and various remediation options.



TASK 3: DELINEATE A GROUNDWATER MANAGEMENT AREA/DEVELOP SUSTAINABILITY INDICATORS AND MINIMUM THRESHOLDS FOR THIS AREA

- Addresses RA-6
- Develop a 1-yr transient groundwater model with no pumping (i.e. dynamic steady-state) for comparison with climate scenarios to produce monthly/annual depletion analyses.
- GMA will be delineated using a capture map analysis, defined by cells expressing greater than 50% stream capture in any model layer.
- Recommend for the GMA a set of quantitative sustainability indicators, representative monitoring sites, and minimum thresholds designed to prevent the undesirable result “significant and unreasonable depletion of interconnected surface water that has significant or unreasonable adverse impacts on beneficial uses of the surface water.”



Proposed Pumping Management area which is based on simulated stream depletions in excess of 50 percent (from Pohll et al, 2018)

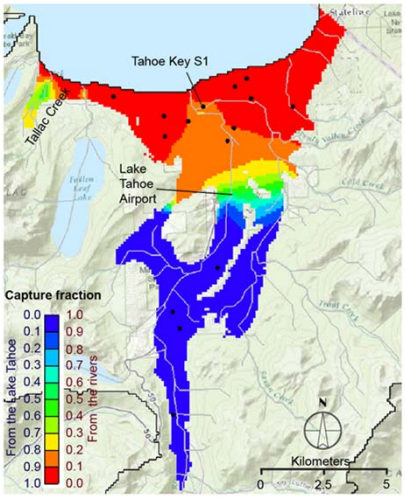
TASK 3: DELINEATE A GROUNDWATER MANAGEMENT AREA/DEVELOP SUSTAINABILITY INDICATORS AND MINIMUM THRESHOLDS FOR THIS AREA

- Addresses RA-6
- Develop a 1-year transient model with no pumping to represent 'dynamic steady-state', with monthly stress periods using mean monthly recharge rates from 1983-2011.
- Difference in flow budgets between this model and each month/year of the climate scenarios developed in Task 1 is defined as depletion
- Depletion to be calculated separately for baseflow (groundwater flow to rivers/streams) and flow to Lake Tahoe
- This method allows for analysis of total annual depletions for a variety of basin conditions, as well as the timing of depletions on a monthly basis

Baseflow depletion for the TVS Basin caused by groundwater pumping. The capture percentage is calculated as the ratio of baseflow depletion and average annual runoff (124,000 acre-ft/yr) (from Pohll et al, 2018)

TASK 3: DELINEATE A GROUNDWATER MANAGEMENT AREA/DEVELOP SUSTAINABILITY INDICATORS AND MINIMUM THRESHOLDS FOR THIS AREA

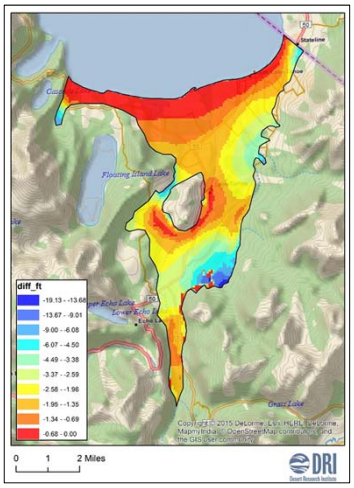
- Addresses RA-6
- Used to show spatially where a hypothetical well would be expected to cause an increase in aquifer recharge due to losses from interconnected surface-water features (capture).
- Capture analysis will be run on the steady-state model, with all municipal wells pumping at their most conservative (i.e. highest) rate from future projected rates.
- The same analysis will also be run on a steady-state model with the recharge rates defined by the most conservative climate scenario (hot/dry) to provide a worst-case end member.
- GMA will be defined by any cells expressing greater than 50% stream capture in any model layer



Simulated capture fractions from Lake Tahoe and from all rivers in the model domain as a function of well locations in the TVS groundwater basin (from Pohll et al, 2018)

TASK 4: RECOMMEND QUANTITATIVE SUSTAINABILITY GOALS, INDICATORS, AND MINIMUM THRESHOLDS FOR UNDESIRABLE RESULTS

- Addresses RA-7
- Recommend for the entire basin a set of quantitative sustainability indicators, representative monitoring sites, and minimum thresholds designed to prevent the undesirable results:
  - Chronic lowering of groundwater levels indicating a significant and unreasonable depletion of supply if continued over the planning and implementation horizon
  - Significant and unreasonable reduction of groundwater storage
  - Significant and unreasonable degraded water quality, including the migration of contaminant plumes that impair water supplies
  - Depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water
- Goal is to set thresholds within the range of historic variability; dependent on model results.
- Proposed thresholds/indicators will be presented to stakeholders to solicit feedback prior to finalization of recommendations to the District.



Simulated changes in groundwater levels between the baseline and Scenario Q4 (warmer/wetter) at the end of the 33 year simulation (from Pohll et al, 2018)

TASK 5: IDENTIFY DATA GAPS AND RECOMMEND METHODS TO ADDRESS THEM

- Addresses RA-8
- Data gaps will be identified as work proceeds!

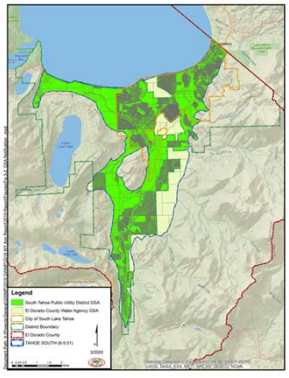
TAHOE SOUTH SUBBASIN (6-005.01)
SAG WORKSHOP 1
July 29,2020

5-Year Update to 2014 GMP

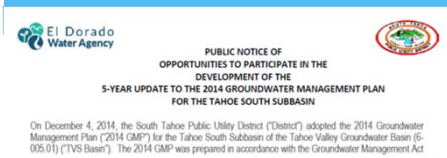
I. Bergsohn, STPUD

2014 GMP Process

* 7/17/2019 – DWR approves Alternative for TVS Basin
* 11/22/2019 – 2019 SAG Workshop II
* 4/9/2020 – Follow-Up Meeting with DWR
* 5/21/2020 – District Resolution 3140-20
* 6/4/2020 – 2nd Amended and Restated MOU
* 6/25/2020 – Resolution 3140-20 to DWR
* 7/8/2020 - WA Resolution WA-6-2020
* 7/23/2020 – Resolution WA-6-2020 to DWR
* 7/29/2020 – 2020 SAG Workshop I



Public Notification and Participation



El Dorado Water Agency

PUBLIC NOTICE OF
OPPORTUNITIES TO PARTICIPATE IN THE
DEVELOPMENT OF THE
5-YEAR UPDATE TO THE 2014 GROUNDWATER MANAGEMENT PLAN
FOR THE TAHOE SOUTH SUBBASIN

On December 4, 2014, the South Tahoe Public Utility District ("District") adopted the 2014 Groundwater Management Plan ("2014 GMP") for the Tahoe South Subbasin of the Tahoe Valley Groundwater Basin (6-005.01) ("TVS Basin"). The 2014 GMP was prepared in accordance with the Groundwater Management Act

* Add email to the GMP Interested Parties list.
* Attend and provide comments at public meetings/workshops.
* Send inquiries and/or comments to the South Tahoe Public Utility District GSA.
* Visit the District's Groundwater Management Webpage.
* OTHER ?

Facilitation Support Services (FSS)

6) Please explain the scope of any active professional facilitation;

10) Which beneficial uses and users of groundwater has the applicant established a venue for engagement, or plans to establish avenue for engagement? (List all applicable uses and users of groundwater)

11) Please explain the key challenges the applicant has encountered that has led to the need for professional facilitation.

12) DWR's FSS program requires applicants to have a well-defined goal for the requested services. What is the applicant's goal for professional facilitation?

17) Please summarize anticipated tasks, deliverables, and completion dates to be completed with support of DWR FSS.

Stakeholder Engagement

- General Public
- Private Users
- Environmental and Ecosystem
- Human Right to Water
- Integrated Water Management

Stakeholder Engagement Chart for GSP Development

Category of Interest	Examples of Stakeholder Groups
General Public	• Citizens groups • Community leader
Land Use	• Municipalities (City, County planning departments) • Regional land use agencies
Private users	• Private pumpers • Domestic users • Schools and colleges • Hospitals
Urban/ Agriculture users	• Water agencies • Irrigation districts • Municipal water companies • Resource conservation districts • Farmers/Farm Bureaus
Industrial users	• Commercial and industrial self-supplier • Local trade association or group
Environmental and Ecosystem	• Federal and State agencies (Fish and Wildlife) • Wetland managers • Environmental groups
Economic Development	• Chambers of commerce • Business groups/associations • Elected officials (Board of Supervisors, City Council membe) • State Assembly members • State Senators
Human right to water	• Disadvantaged Communities • Small community systems • Environmental Justice Groups
Tribes	• Tribal Government
Federal and State lands	• Military bases/Department of Defense • Forrest service • National Park Service • Bureau of Land Management • California Department of Fish and Wildlife
Integrated Water Management	• Regional water management groups (IRWM regions) • Flood agencies • Recycled water coalition

California Department of Water Resources
SGMA Stakeholder Communication and Engagement Digital Toolkit

Status Review
2014 GMP Implementation Plan

- Table 10-1 Implementation Plan Review
  - RA-8: Provide a description of how the data gaps identified will be addressed; specifically the projects identified in Table 10-1 for BMO 5 - dependent upon District funding.

BMO #4 – Integrate Groundwater Quality Protection into Local Land Use Planning Activities

ACTION	STATUS	DESCRIPTION
Conduct a regional groundwater vulnerability assessment of the Basin	On-Going	District and Water Agency Cost Share funding was used to support a study performed by DRI using hydrologic models to identify recharge areas, amounts, and capture zones for municipal wells (BMO #4, Action 2). Results from this work needs to be assessed for possible incorporation into the next update of the Drinking Water Source Assessment and Protection Map for the TVS Basin

BMO #5 – Assess the Interaction of Water Supply Activities with Environmental Conditions

ACTION	STATUS	DESCRIPTION
Assess the effects of groundwater pumping on habitats in lakes, streams and wetlands	On-Going	District and Water Agency Cost Share funding was used to support a study performed by DRI using hydrologic models to determine the effects of groundwater pumping on surface water (BMo #5, Action 1). DRI is building on this study to provide estimates on the quantity and timing of depletions of interconnected surface water and define minimum thresholds to prevent undesirable results. This new work will also be used to address RA-3 for the five-year update to the 2014 GMP

BMO #5 – Assess the Interaction of Water Supply Activities with Environmental Conditions

ACTION	STATUS	DESCRIPTION
Assess potential effects of climate change on groundwater conditions	On-Going	District and Water Agency Cost Share funding was used to support a study performed by DRI using hydrologic models to evaluate the impacts of climate change on groundwater conditions (BMo #5, Action 3). DRI is building on this study to incorporate climate change effects as part of the development of 50-year water budgets for the five-year update to the 2014 GMP

BMO #7 – Address Planned or Potential Future Water Supply Needs and Issues

ACTION	STATUS	DESCRIPTION
Support future groundwater studies in the Basin	?	Continue to review proposals for groundwater-related studies in the TVS Basin. Provide letters of support for outside studies that improve overall understanding of the hydrology and sustainable management of groundwater within the TVS Basin and contributing watersheds. Review the list of Projects Dependent Upon Obtaining Outside Funding in the Implementation Plan as part of the status review for the update to the 2014 GMP.

BMO #7 – Address Planned or Potential Future Water Supply Needs and Issues

ACTION	STATUS	DESCRIPTION
Update the existing TVS Basin groundwater model	Completed, On-Going	District and Water Agency Cost Share funding was used to update the existing TVS Basin groundwater model (BM #7, Action 3). In 2015, the groundwater model was updated by DRI to calculate a water budget for the TVS groundwater system in which annual water budget terms are established for water years 1983 to 2014. In 2016, DRI extended boundary stresses through the 2015 WY. Since 2016, the District has been updating this groundwater flow model on an annual basis to calculate and track water budget terms for the TVS Basin.

BMO #7 – Address Planned or Potential Future Water Supply Needs and Issues

ACTION	STATUS	DESCRIPTION
Expand monitoring well network to evaluate recharge and other key areas	On-Going	Add DRI Monitoring Network Recommendations: 1) South Y Area; and 2) Southeast portion of TVS Basin as project as part of update to 2014 GMP.

BMO #7 – Address Planned or Potential Future Water Supply Needs and Issues

ACTION	STATUS	DESCRIPTION
Assess potential future need and feasibility of groundwater replenishment facilities	Remove (?)	Current groundwater level monitoring and hydrologic analysis indicate that groundwater recharge is sufficient to prevent declining groundwater levels in the TVS Basin. The potential need for future groundwater replenishment facilities in the TVS Basin is questionable. Consider removing this item from the Implementation Plan.

AGENDA

DATE	Thursday, December 17th, 2020; 9:00 am – 11:00 am (PST)
LOCATION	https://global.gotomeeting.com/join/971623325; Call-In: 1 (877) 568-4106; Access Code: 971-623-325
STAKEHOLDER ADVISORY GROUP LIST	Ken Payne, P.E., (El Dorado Water Agency); Karen Bender, REHS, RD (El Dorado County - EMD); Jason Burke (City of South Lake Tahoe); Scott Carroll (CA Tahoe Conservancy); Andrea Buxton (Tahoe Resource Conservation District); Brian Grey, P.G. (Lahontan Regional Water Quality Control Board); Paul Nielsen (TRPA); Joey Keely, Nicole Bringolf (USFS – LTBMU); Nakia Foskett (Lakeside Park Water Co.); Jennifer Lukins (Lukins Brothers Water Co); Daniel Larson (Tahoe Keys Water Co.); Harold Singer (Community Rate Payer); and John Thiel, PE (South Tahoe PUD)
PLAN MANAGER	Ivo Bergsohn, PG, HG (South Tahoe PUD)

BASIN MANAGEMENT OBJECTIVES (BMO)

1. Maintain a sustainable long-term groundwater supply.
2. Maintain and protect groundwater quality.
3. Strengthen collaborative relationships with local water purveyors, governmental agencies, businesses, private property owners and the public.
4. Integrate groundwater quality protection into local land use planning activities.
5. Assess the interaction of water supply activities with environmental conditions.
6. Convene an on-going Stakeholders Advisory Group (SAG) as a forum for future groundwater issues.
7. Conduct technical studies to assess future groundwater needs and issues.
8. Identify and obtain funding for groundwater projects.

WORKSHOP OBJECTIVES

OBJECTIVES

1. Learn about current activities related to PCE groundwater contamination in the South Y Area.
2. Review outreach materials developed for the Tahoe South Subbasin Alternative.
3. Discuss SAG input received on 2014 GMP Table 10.1 - Implementation Plan Review.
4. Review the proposed contents for the updated Alternative technical report.
5. Discuss potential project ideas for the updated Alternative.

SEE REVERSE FOR AGENDA

AGENDA

Time	Description	
9:00	**Roll call (5-Minutes)**	**SAG**
9:05	**TVS Basin (6-005.01) - Open Forum (10-Minutes)** **Opportunity for members to briefly raise topics within the subject matter of the SAG and not listed on the Agenda.**	**Round Robin**
9:15	**South Y PCE Contamination – Update (5-minutes per person)** • **J. Lukins, LBWC** • **D. Larson, TKWC** • **I. Bergsohn, STPUD** • **B. Grey, LRWQCB** • **A. Cazier, LRWQCB**	**Round Robin**

9:45	**Tahoe South Subbasin Alternative (6-005.1) – Part I**
	• **SAG Discussion**
	  ○ **Outreach Materials**
	  ○ **2014 GMP Table 10.1**
		Round Robin

10:15	**5-minute BREAK**	

10:20	**Tahoe South Subbasin Alternative (6-005.1) - Part II**
	• **SAG Discussion**
	  ○ **Tahoe South Subbasin Alternative (TOC)**
	  ○ **Potential Projects**
		Round Robin

11:00	**Adjourn**	

Tahoe Valley South Subbasin (6-005.01) Groundwater Management Plan
MEETING NOTES
Thursday, December 17th, 2020; 9:00 am - 11:00 am
Location: On-Line Meeting
https://global.gotomeeting.com/join/971623325;

SAG ATTENDEES:
John Thiel, PE; Ivo Bergsohn, PG, HG (STPUD); Ken Payne, PE (El Dorado Water Agency); Rick Lind (El Dorado Water Agency); Brian Grey, P.G., Abby Cazier (Lahontan Regional Water Quality Control Board); Michael Conger (Tahoe Regional Planning Agency); Jason Burke (City of South Lake Tahoe); Nicole Bringolf (USFS- Lake Tahoe Basin Management Unit); Andrea Buxton (Tahoe Resource Conservation District); Jennifer Lukins (Lukins Brothers Water Co); Daniel Larson (Tahoe Keys Water Co.); Nakia Foskett (Lakeside Mutual Water Company)

Participants: 21

BASIN MANAGEMENT OBJECTIVES:
1. Maintain a sustainable long-term groundwater supply.
2. Maintain and protect groundwater quality.
3. Strengthen collaborative relationships with local water purveyors, governmental agencies, businesses, private property owners and the public.
4. Integrate groundwater quality protection into local land use planning activities.
5. Assess the interaction of water supply activities with environmental conditions.
6. Convene an on-going Stakeholders Advisory Group (SAG) as a forum for future groundwater issues.
7. Conduct technical studies to assess future groundwater needs and issues.
8. Identify and obtain funding for groundwater projects.

WORKSHOP OBJECTIVES
1. Learn about the current Private Well Owner Survey – Phase II being performed by the District for the TVS Basin.
2. Learn about the South Y PCE Regional Plume Characterization and activities planned by the LRWQCB during the 2020 Field Season.
3. Consider DRI plans for groundwater model evaluation in support of the first 5-Year Update of the 2014 Groundwater Management Plan (2014 GMP).
4. Review the current status of the 2014 GMP Implementation Plan (Table 10-1).

Roll Call
Roll-Call Sheet

TVS Basin (6-5.01) - Open Forum (Group)
Current groundwater-related topics outside Agenda

I. Bergsohn, STPUD
- SGMA Implementation Grants (Prop 68): Prop 68 Grant Round 1 Solicitations ($26 million) Opened for COBs (recording of December 3 webinar available on SGM Grant Program web page); Round 2 Solicitations ($77 million) for High & Medium Basins anticipated opening early 2022.;
- Year-end 2020WY: Total ppt. at TVS Basin Reference Station (Hagan's Meadow) = 20.4"; average = 30.31"; Below Normal WY; Total Groundwater Pumpage from PWS Wells (including LMWC, thank you Nakia) = 6,791 AF (~90% of long-term median value (7,556 AF)).

Comparison of May 2019 to May 2020 groundwater levels shows an average decline of 1.8 feet.

Tahoe Valley South Subbasin (6-005.01) Groundwater Management Plan
MEETING NOTES
Thursday, December 17th, 2020; 9:00 am - 11:00 am
Location: On-Line Meeting
https://global.gotomeeting.com/join/971623325;

South Y PCE Contamination – 5-Minute Updates

J. Lukins, LBWC

- The Treatment Plant is going well. They will finish putting in the lighting this week, and then will start on the indoor piping, which should be finished by the beginning of January. Title 22 testing should be done in February, and then there will be no obstacles to having it online in May.
- Jennifer has been working with the Division of Drinking Water (DDW) so that the plant can operate while the permit is in-process. She is really excited and offered to give a tour if anyone wants to come and see it.
- The Treatment Plant work includes; an upgrade to Well #5 (installed casing liner); proper abandonment of Well #2 and new construction of: a 98,000-gallon storage tank; a 250 kW emergency power generator; two 8,800 –gallon GAC Treatment Vessels; and 4 booster pumps (2 x 15 Hp; 2 x 30 Hp) with redundancy. The GAC treatment system is designed to remove PCE to non-detect levels from groundwater produced by LBWC Well #5 at a design flow rate of up to 700 gpm at PCE concentrations up to 300 ppb.
- Jennifer will send out a press release and news letter to all of LBWC's customers in the Spring, barring the pandemic, to have a ribbon cutting ceremony.
- Dan Larson asked if LBWC will have treatment for iron (Fe) and manganese (Mn). Jennifer replied that at this time, water quality results do not show a need for Fe/Mn treatment. Ivo indicated that water quality results presented in the Feasibility Study shows that Fe/Mn treatment would likely be required should a future groundwater treatment system be installed for a Replacement Well (R1) constructed at the former LBWC #4 well site (843 Hazel Drive).
- John Thiel asked what the expected treatment level would be. Jennifer confirmed that the treatment system will be operated such that PCE levels will be removed to non-detect levels (<0.5 ppb). The MCL for PCE is 5 ppb.

D. Larson, TKWC

- The highest PCE contamination levels have been at TKWC Well#1 (3.6 ppb). It goes down as the volume of water goes down. One hit at Well #3 in April was 1.2 ppb. Well #2 has GAC, but is currently offline for the Winter months. The highest level at Well #2 while online was detected in the raw water at 27 ppb.
- Ivo inquired whether the 3.6 at Well 1 was the historically highest PCE concentration detected in groundwater pumped from this well. Dan yes it is and it appears to be progressively increasing with use.

I. Bergsohn, STPUD

- Prop 1 GW Clean-Up Program has a current balance of $170 M for Round 3 Funding;
- $100 M is earmarked to fund projects benefitting designated Disadvantaged Communities (DACs);
- Round 3 Funding is being held in reserve to allow Prop1 Planning Projects (such as the South Y Feasibility Study) to compete for Implementation Grant funding;
- Solicitations are anticipated to start Summer of 2021;
- Seeking to schedule a conference call with TKWC and LBWC after the Holidays to talk about potential Implementation Projects and level of interest in pursuing this funding.

- **Brian Grey, LRWQCB**
- Brian provided a brief update on site-specific projects. The sources of PCE contamination that have been identified to date are Lake Tahoe Laundry Works (LTLW), Big O, and Hurtzel Properties.
    - Lake Tahoe Laundry Works LTLW) filed a lawsuit in June stating that the Cleanup and Abatement Order (CAO) was defective under the SWRCB Porter Cologne Water Quality Control Act Subsection 13267 (Investigations:inspections) as to whether they had knowledge at the time. The case was relegated back to Lahontan to determine liability, and if the CAO was defective under

Subsection 13267. Subsection 13267 related to cost burden/benefit analysis, and on 12/8 Lahontan provided the same ruling as to the defective cost/benefit analysis. The current agreement is for Lahontan to review the CAO while LTLW will continue to do on site groundwater tests and remediation until the analysis is complete.

- Big O provided a summary of passive gas activities on 11/11. The report showed elevated levels of PCE mass at 3 site locations: storm drain inlet; hydraulic lifts; and a floor drain in the area. A Work Plan for additional work should be in by the end of the week. PES Environmental provided comments on 12/15. All reports available on Geo Tracker
- Hurzel Property did passive soil gas investigation work in October of 2020. PES Environmental similarly provided comments without report dated 11/3. Lahontan has not received the report as of yet, but the initial conversation with the consultant indicated elevated PCE around the former excavation area; the soil gas survey did not find indicators of PCE near the storm drain. Anticipate report by end of year.

Abby Cazier, LRWQCB

- During the last SAG Meeting on July 29, 2020 Abby described several paths anticipated for the 2020 season using the SCAP funds from SWRCB. These projects were not completed due to significant delays that have indirectly affected getting things done in a timely fashion. Abby has been working with the Contractor to make sure that the project is successful and that the tasks need to be completed, but she has not seen an updated cross section. One will be provided as soon as it is submitted. Abby reviewed the SCAP construction tasks with the group.
- Task 3
  - Define extent of PCE Contamination, completed September 2020
  - Update subsurface sections, anticipated January 2021;
  - Complete Technical Report, anticipated April 2021
- Destroy Priority Conduits
  - LBWC #4, destroyed June 2020
  - Destroy Inactive Monitoring Wells, in-progress, identify priority MWs
- 2021 Field Season (anticipated)
  - Preferential Pathways investigation;
  - Destruction of Inactive Monitoring Wells;
  - Sentry Well Installations; LBWC #1, TKWC #3;
  - Soil Gas Investigation Planning: Identify appropriate sample locations
- Task 8 – South Y Contamination Historical Database, in-progress

Tahoe South Subbasin Alternative – Part 1

Outreach Materials

- Ivo would like to receive feedback from the SAG group on the outreach materials included in the Materials Package for this Workshop after the Year's Holiday at the latest. Outreach items are planned to be rolled out later this month.

Public Notice to Participate

Handouts: Public Notice to Participate

- Notice prepared to announce development of the 5-year Update to the 2014 GMP;
- To be posted on Groundwater Management Plan Web Page;
- To be included in Direct Mailer to selected Stakeholder Groups(see Stakeholder Engagement Chart);

- For use as a general Flyer
- Round Robin to field Questions/Comments/Suggested Changes
  - Rick Lind (EDWA) inquired whether the Participation Notice is on the EDWA Web Site. Ivo responded that as EDWA GSA is collaborating on this update, it is expected that the Public Notice would also be posted on the EDWA web page (The Participation Notice includes logos from both Agencies).
  - R. Lind suggested EDWA web site to include link to Groundwater Management Plan Web Page.
  - The District would appreciate if TKWC and LBWC would also include links from their web sites to the District's Groundwater Management web page to access the Notice and for more information on the 5-year Update.
  - R. Lind suggested that the District prepare a Media Release for roll-out of the Participation Notice; Ivo Agreed.

TSS Stakeholder Survey
Handouts: TSS Stakeholder Survey

- Stakeholder Survey adapted from DWR Survey Template;
- Used to identify water and land managers; groundwater concerns; recommendations for groundwater management ; and familiarity with SGMA, GSAs and SAG
- To be included in Direct Mailer to selected Stakeholder Groups (see Stakeholder Engagement Chart)
- Should this be posted on Groundwater Management Plan Web Page; other media;?
- Round Robin to field Questions/Comments/Suggested Changes
  - None

2014 GMP Update Presentation (PowerPoint)
Handouts: TSS Alternative Presentation

- PowerPoint Presentation developed as a Primer for Interested Parties to learn more about the 5-year Update to the Groundwater Management Plan (herein referred to as the Tahoe South Subbasin Alternative);
- Planned to be posted on the Groundwater Management Plan Web Page
- Posted as –is; or as a video recording?
- Round Robin to field Questions/Comments/Suggested Changes
  - Rick Lind asked if there might be a use for a summary that could be distributed to the press as a downsized version, and of course leaving the Primmer on the website. He would also like to have the Primmer on the Water Agency website, or a hyperlink, and if there be a press release prior to the Primmer.
  - Ivo will work with Shelly Thompsen, STPUD Public Affairs & Conservation Manager on putting together a media release to circulate announcing the presentation as well as availability.

Stakeholder Engagement Chart
Handouts: TSS Stakeholder Engagement Chart

- Potential Stakeholders identified for the update to the Groundwater Management Plan, based on the Engagement Chart developed by DWR for GSP Development;
- Stakeholders are organized into Three Tiers to show the differing types of Methods and Outreach Materials that will be used to engage these differing Stakeholder Groups.
- Any thoughts, questions/comments on the Stakeholders and Organization of this Chart?
  - John Thiel said that this looks like great list.
  - Rick Lind asked if the School Districts are on the list as well.

  - Ivo will have to go back to the list to confirm, he believes that they are, but will make sure. The School Districts have been very motivated to get away from using their own wells and getting connected to a public water system.
  - Jason Burke said that John Friedrich, new City Council member, has put together a multi-cultural panel that may be helpful with public outreach to the Hispanic community. He will email the Council Man and put him in touch with Ivo.
- Round Robin to field Questions/Comments/Suggested Changes
  - See above

2014 GMP Table 10.1

Handouts: Table 10. Implementation Plan Review

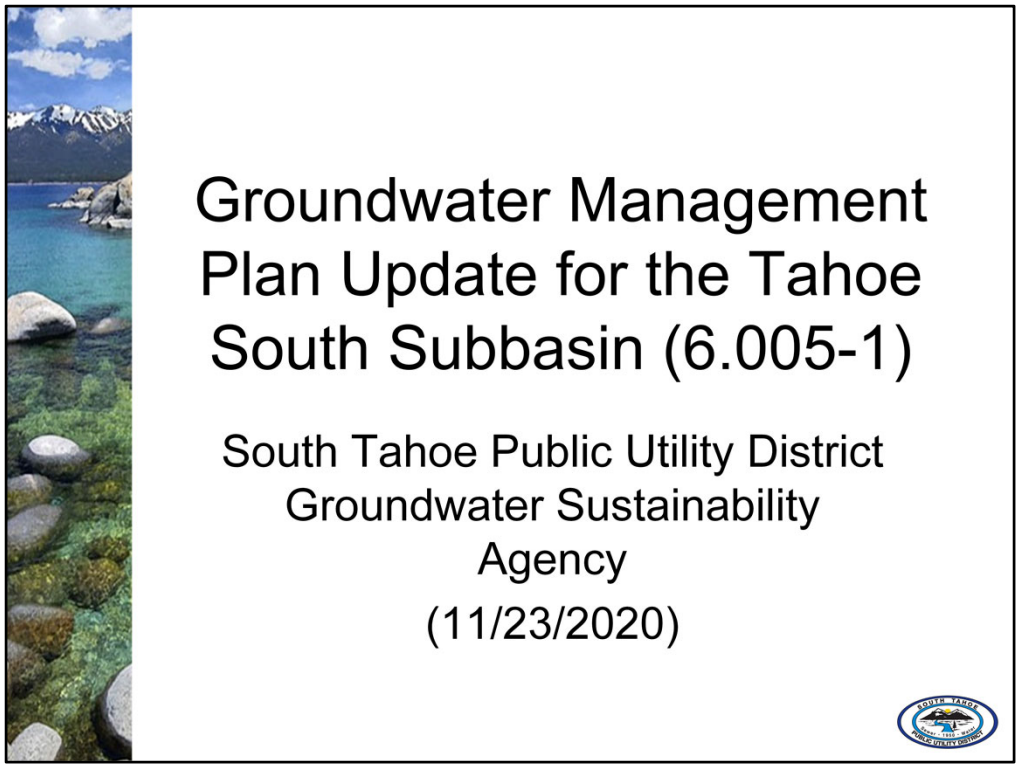
- Ivo apologized for not getting the .docx file for this item to the group earlier.
- Table 10-1 was developed from the Implementation Plan presented in Section 10 of the 2014 GMP;
- Columns were added showing the current status and description of these items for the group's review and comment.
- Ivo is seeking input on items that may need to be modified, or are obsolete, and can be removed from the Tahoe South Subbasin Alternative. He is also seeking thoughts about any items that are missing and should be added to the Implementation Plan.
- Round Robin to field Questions/Comments/Suggested Changes
  - None
  - Ivo is not looking to finalize this right away. He asked the group to look through this and send feedback and comments through March; prior to the next SAG Meeting.

Tahoe South Subbasin Alternative – Part 2

Tahoe South Subbasin Alternative – Table of Contents

Handouts: Tahoe South Subbasin Alternative – Table of Contents (11/20/2020)

- Ivo is working on a draft of the Table of Contents developed for the TSS Alternative;
- The outline was developed from the 2014 GMP Outline
- Added items recommended by DWR for inclusion in the TSS Alternative; and
- Items to maintain functional equivalency of the TSS Alternative to a GSP
- Round Robin to field Questions/Comments/Suggested Changes
  - Ivo would like to add logos for STPUD and EDWA. He would be identified as the Plan Manager and primary point of contact for DWR.
  - Ivo reviewed the sections of the working draft. A lot of this is being brought over from the existing GWMP, but it is likely to change as we start getting information from DRI.
  - If anyone has concerns they should get them to Ivo as soon as possible. Although the Alternative is not due until January 1, 2022, we probably need to get it completed by early 2021 due to the need for public comments and Board review and adoption.
  - Rick Lind asked if Ivo had followed up about the information that was out there on El Dorado and Placer County's American River Basin Plan, which was updated in 2014.
  - Ivo did get in touch with them and had a conversation about the information that was out there about that effort. It was determined that the assumptions that they used were similar and that they were using the same set of models. Although we were never able to get a meeting together with the group, the research that we did showed that the drought and climate change simulations were very similar. The discussion will be included in the alternatives documents.

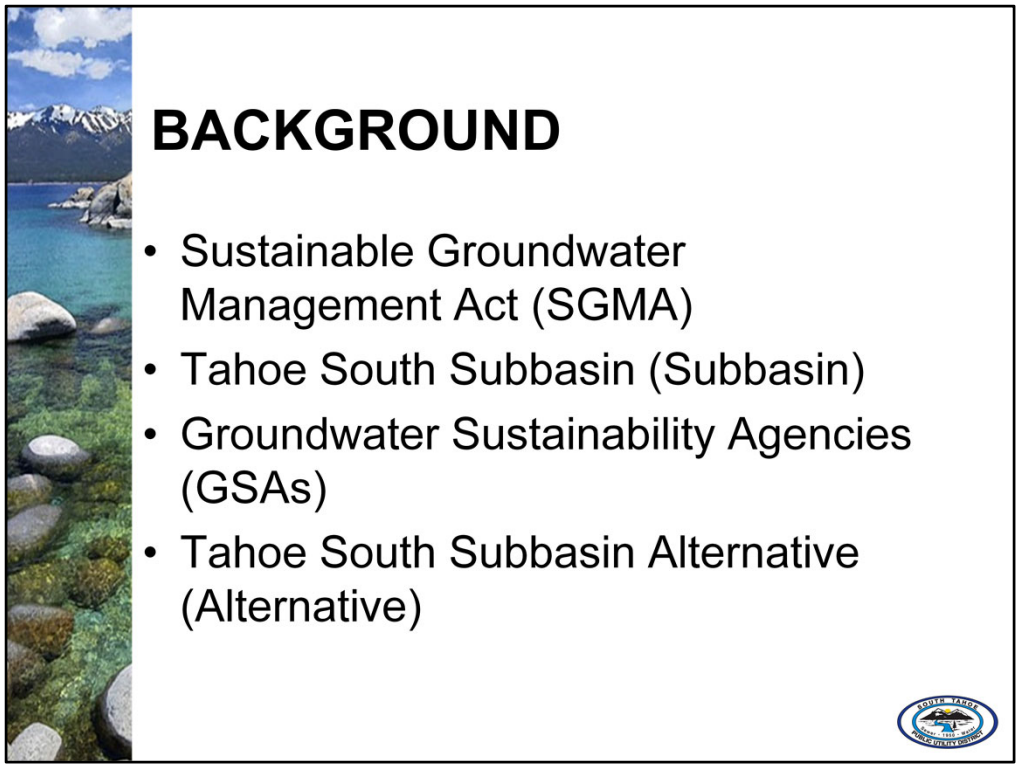


The District and El Dorado Water Agency are in the process of developing the first five year update of the 2014 Groundwater Management Plan (2014 GMP) for the Tahoe South Subbasin, herein referred to as the Tahoe South Subbasin Alternative (Alternative).

The Tahoe South Subbasin (Subbasin) covers an area of about twenty-three (23) square miles underlying the City of South Lake Tahoe and the neighboring communities of Angora, Meyers and Christmas Valley in El Dorado County, CA.

The following presentation provides;

- Background information on the current 2014 GMP;
- A description of the update process; and
- How you can get involved with this process.

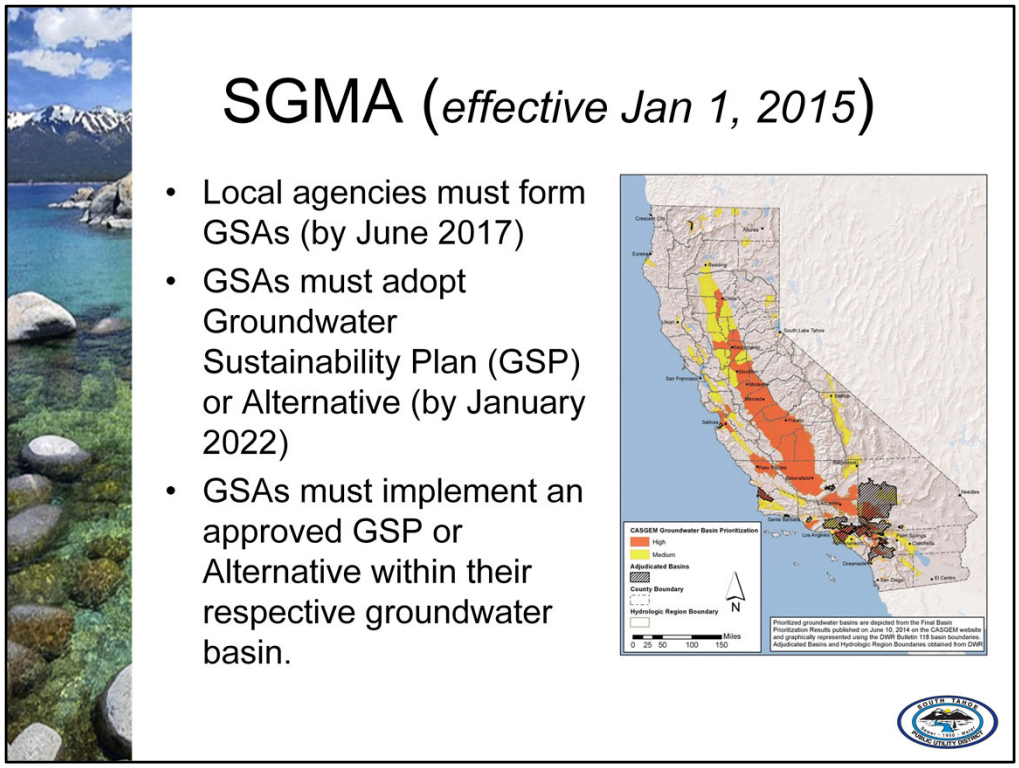


BACKGROUND

Groundwater Sustainability Agencies (GSAs) are local agencies recognized by the California Department of Water Resources (DWR) for managing groundwater on behalf of all beneficial uses and users of groundwater within their respective groundwater basins.

The following section provides general background information on;

- The Sustainable Groundwater Management Act (SGMA);
- The Tahoe South Subbasin (Subbasin);
- GSAs within the Subbasin; and
- The Tahoe South Subbasin Alternative (Alternative).

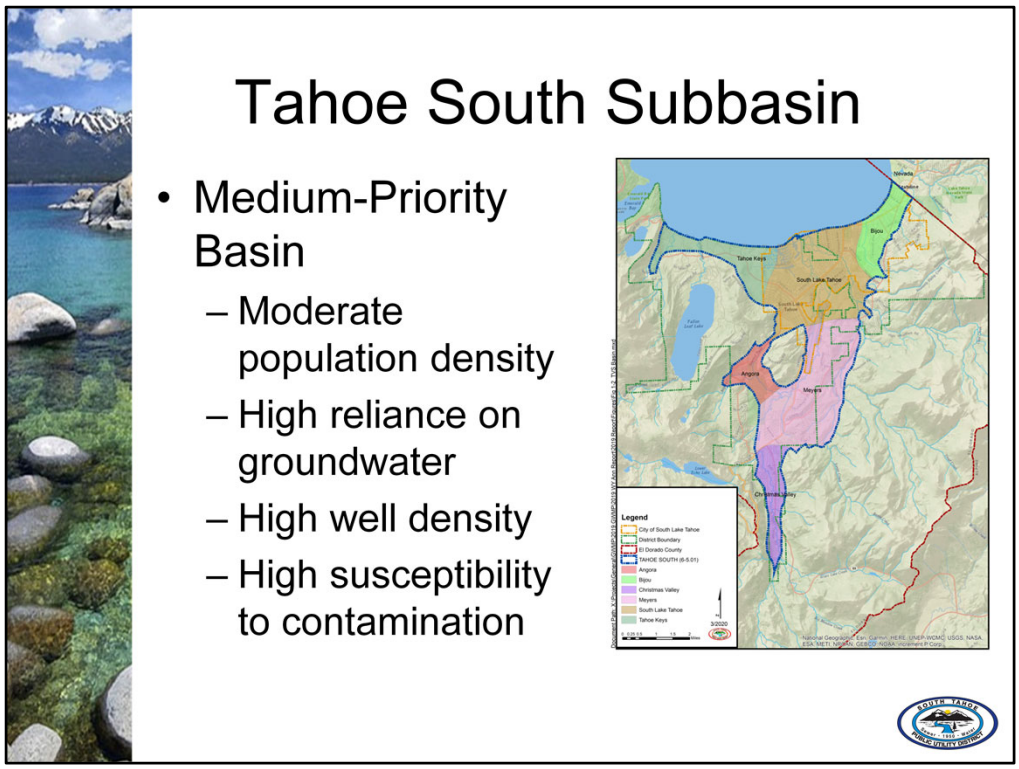


Under SGMA, GSAs are required to develop and adopt a Groundwater Sustainability Plan (GSP) or Alternative to sustainably manage groundwater within a basin.

These plans are developed by GSAs so that the local community has a stake in determining what are local groundwater conditions and defining the basins desired state.

GSAs must also implement the adopted plan to maintain or improve groundwater conditions in order to attain the basins desired state within 20-years of implementation.

To insure GSAs are making progress towards this goal, DWR will regularly review these plans every 5-years.



During 2015 and 2018, DWR conducted Basin Prioritizations to identify those groundwater basins subject to new groundwater management requirements under SGMA.

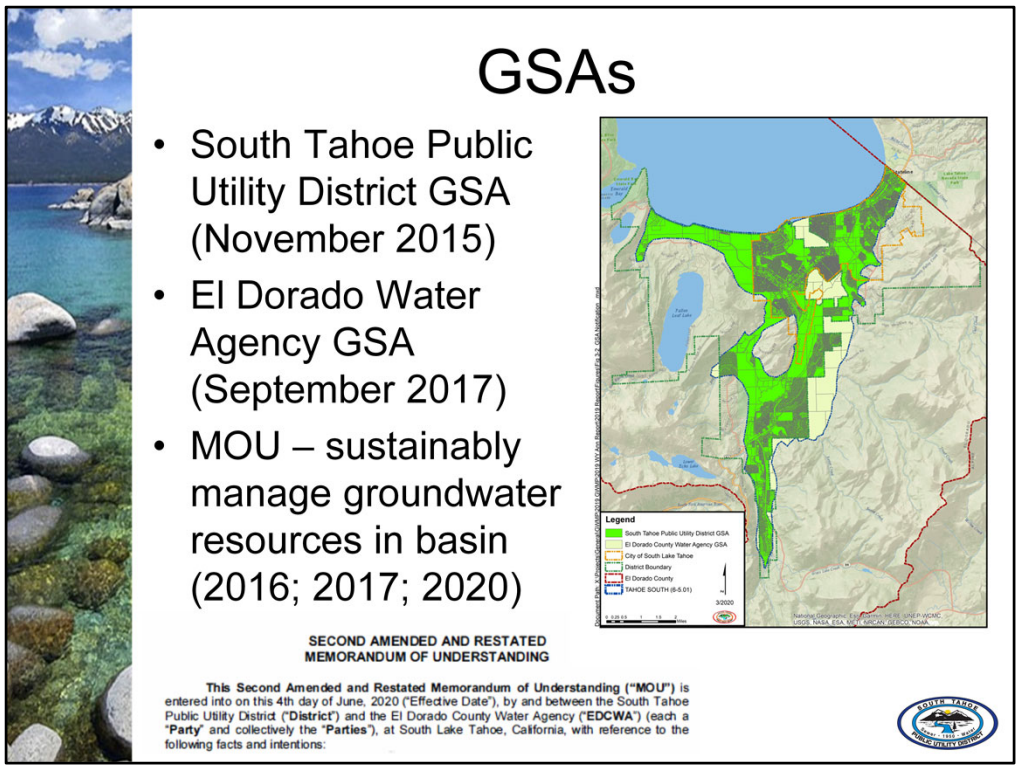
Through this process, the Subbasin was ranked as a Medium-Priority Basin; and under SGMA, subject to new groundwater management requirements.

The Subbasin was found subject to these new groundwater management requirements as;

- The Subbasin has a moderate population density with a very high reliance on groundwater for drinking water (more than 90% of the drinking water used in the Subbasin is from groundwater);

- Along with this high reliance, there is a high density of both public and private drinking water wells within the Subbasin (recent surveys conducted by the District indicate that there may be more than 400 active drinking water wells currently within the Subbasin); and

- Groundwater within the Subbasin is very susceptible to contamination (as evidenced by the history of local groundwater contaminant plumes and the impairments of public and private drinking water wells).



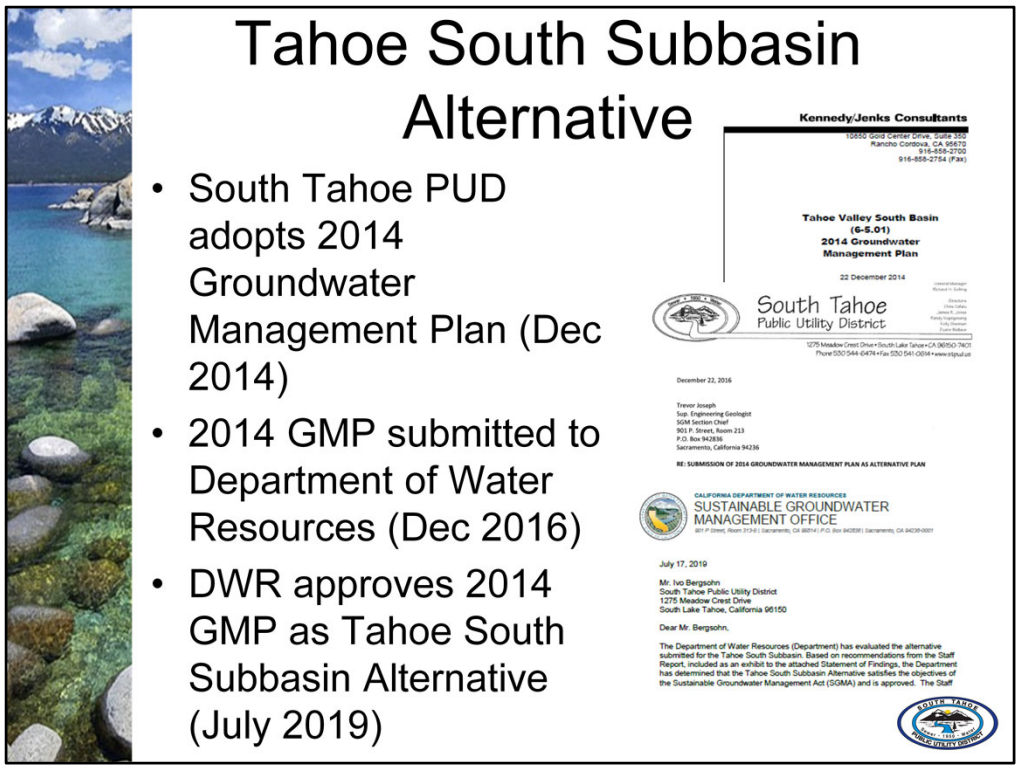
GSAs in the Subbasin include the South Tahoe Public Utility District (District) and the El Dorado Water Agency (Water Agency).

The District has been recognized as the exclusive GSA for the portion of the Subbasin lying within it's service area boundary (area shown in Green), since November 2015.

In September 2016, the District and the Water Agency entered into a Memorandum of Understanding (MOU) to cooperatively manage groundwater resources and coordinate implementation of SGMA (on the Water Agency's behalf) for the portions of the Subbasin within El Dorado County, outside of the District's service area (area shown in yellow).

This MOU was later modified as an Amended and Restated MOU in June 2017. At that time, the Water Agency submitted a GSA Notification of its intent to serve as the GSA for the County portion of the Subbasin lying outside the District's service area boundary; and the District withdrew it's earlier 2016 GSA Notification submitted for this area.

The Amended and Restated MOU was later modified as a Second Amended and Restated MOU in June 2020. The Second Amended and Restated MOU was modified to acknowledge the District's 2014 GMP as an approved Alternative for the Subbasin; and coordinate implementation of the Alternative across the full extent of the Subbasin.

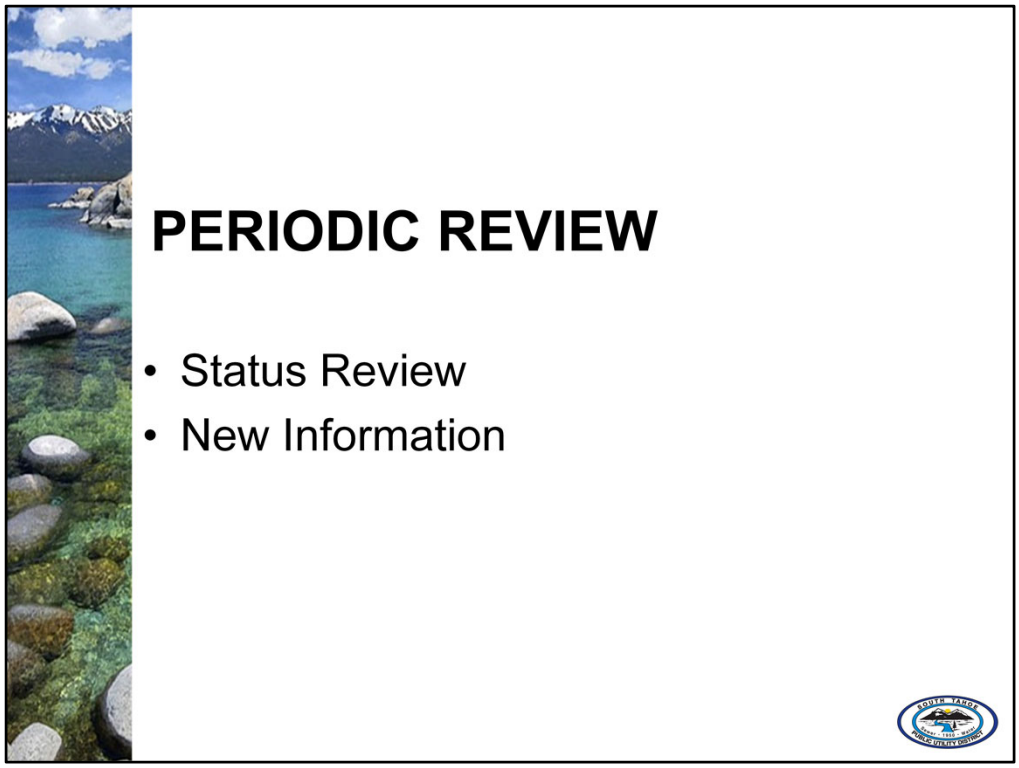


The District has a long history of groundwater management within the Tahoe South Subbasin. In 2000, the District enacted its first groundwater ordinance and adopted an accompanying Groundwater Management Plan focused on protecting District drinking water wells from man-made groundwater contaminants.

In 2014, this groundwater management plan was updated in accordance with the Groundwater Management Act which then defined the regulatory requirements for Local Groundwater Management Plans.

In 2016, the District with support of the Water Agency, submitted the 2014 GMP along with other related plans, reports and documents to DWR for consideration as an Alternative for the Subbasin.

In July 2019, DWR approved the 2014 GMP as an Alternative for the Subbasin and required that the District complete the first 5-year update of this Alternative by January 1, 2022.

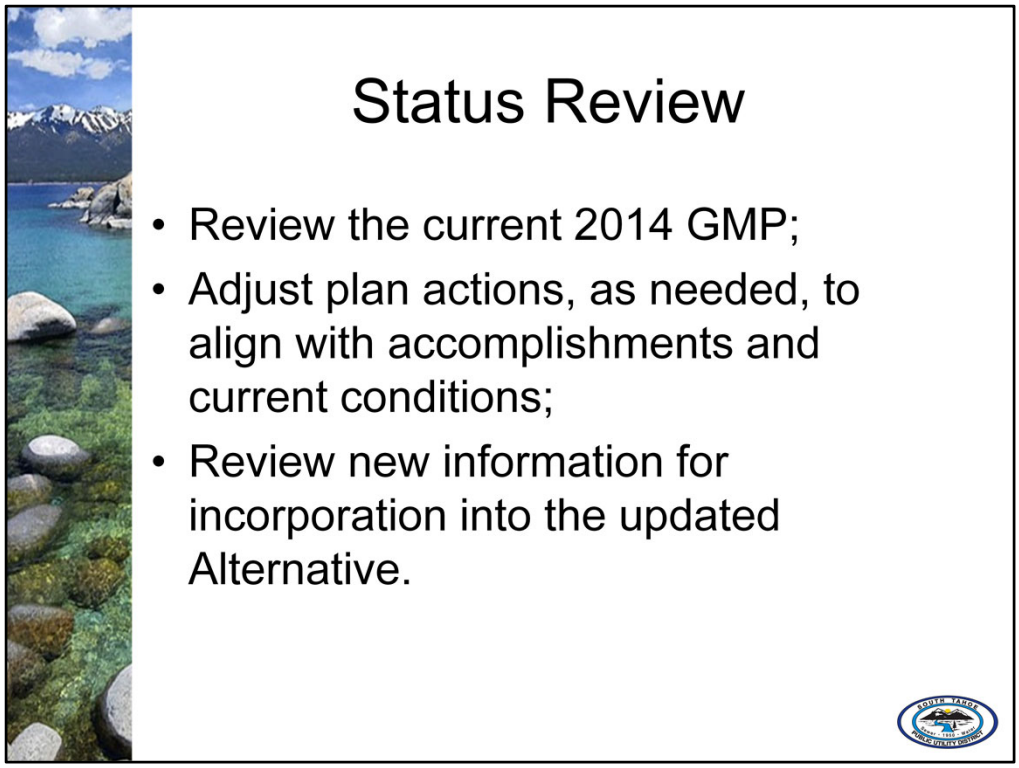


PERIODIC REVIEW

Under SGMA, GSA's with approved GSP's or Alternatives are required to periodically review and assess their plans every 5 years.

The first 5-year update is planned to include a:

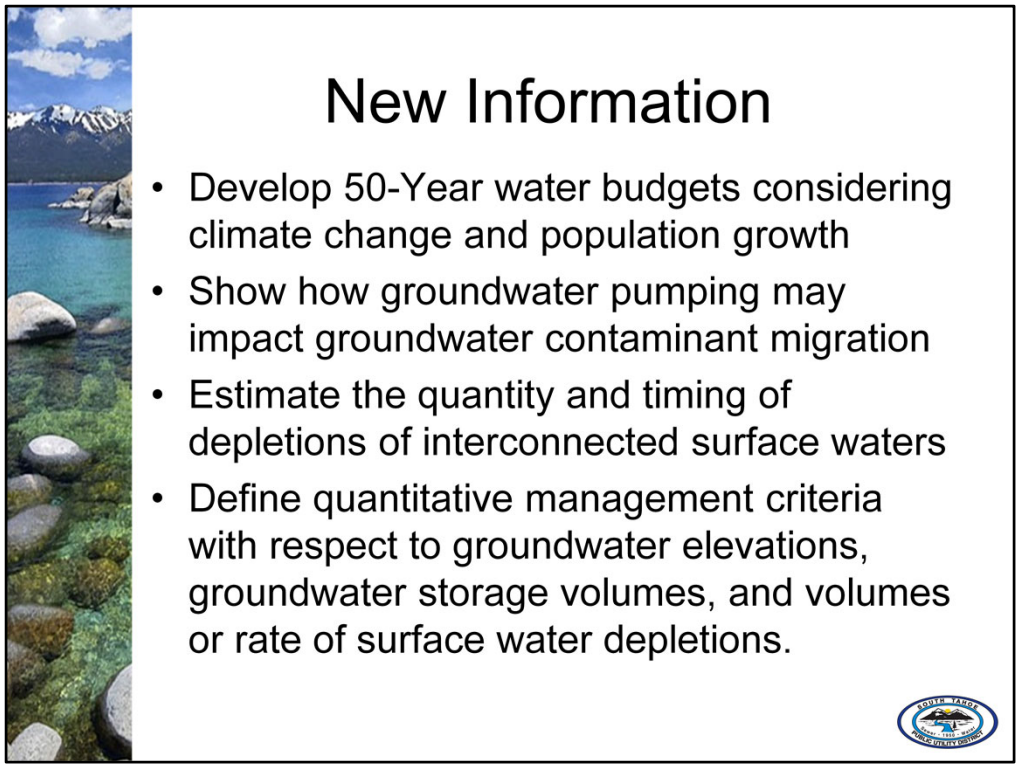
- Status Review of the current Alternative; and
- Updating the current Alternative using new information developed since initial adoption of the 2014 GMP.



The Status Review is planned to include;

- Review of the current 2014 GMP;
    - In light of new regulatory requirements under SGMA; and
    - Actions completed since adoption of the 2014 GMP.

- New information developed since adoption of the 2014 GMP will also be reviewed for incorporation into the updated Alternative.



DWR recommended that the following information be included in the updated Alternative:

- 50-year water budgets for the groundwater basin considering both climate change and population growth;
- Examples of how groundwater pumping may impact the movement of groundwater contaminants within the Subbasin;
- Estimates of the quantity and timing of potential depletions of surface waters from groundwater pumping; and
- Management criteria that can be used to prevent unreasonable declines in groundwater elevation; volume reductions in groundwater storage; and unreasonable volumes or rates of surface water depletions within the Subbasin.

PUBLIC PARTICIPATION

The District is committed to providing an on-going process for public participation and coordination with local agencies in support of sustainable groundwater management. As such, the District is actively seeking your input and invites you to get involved in the first 5-year update of the Alternative.

To keep you up-to-date during this process the District will;

- Provide regular updates to the District's Groundwater Management Plan Web Page;
- Offer on-line meetings and workshops to inform the public and solicit input; and
- Provide a public comment period for formal review and input on the draft Alternative.

The District's web site is being used as an information clearinghouse for updating the Alternative.

Important Public Notices; Plan Documents; and Technical Reports related to the Alternative are posted on the District's Groundwater Management Plan Web Page.

Announcements of upcoming on-line meetings and workshops are being posted under Plan Notices.

Links to the current Alternative (the 2014 Groundwater Management Plan) and related documents including the MOUs between the District and El Dorado Water Agency are provided under Plan Documents.

Additional technical information in the form of related reports and documents are provided under Technical Reports; and

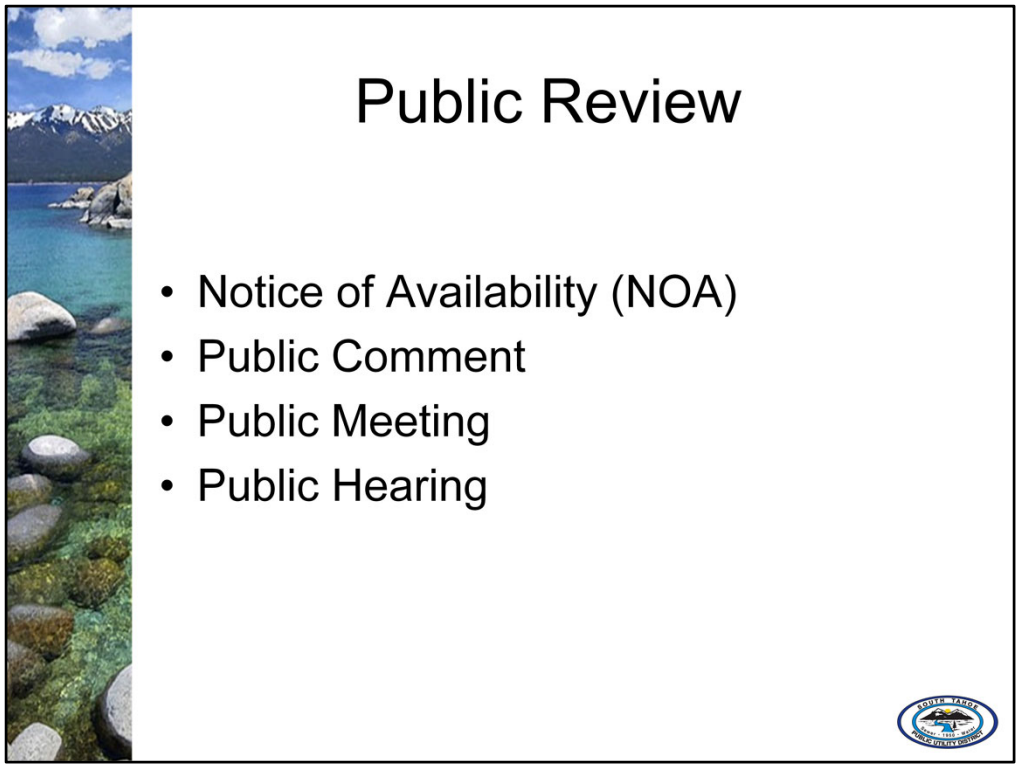
Finally meeting notes and presentations from past Stakeholder Advisory Group (SAG) Workshops are posted to provide further information on groundwater issues and concerns being addressed under the current Alternative.

Public Meetings and Workshops will be used to inform and solicit comment from the public, interested parties and stakeholders during development of the updated Alternative.

Brief status reports will be provided during Regular Meetings of the District's Board of Directors;

Status review of the current Alternative and on-going work for the updated Alternative are being discussed during Stakeholder Advisory Group (SAG) Workshops. These on-line meetings are also open to the public.

Lastly, the District will meet with specific stakeholder groups, such as Private Well Owners and Environmental users of groundwater, outside SAG Workshops to help identify and discuss specific groundwater concerns unique to these stakeholder groups.



Near the end of the review period, a Notice of Availability (NOA) will be issued announcing the release of the public draft of the updated Alternative and the start of the public comment period.

The NOA will include a link to download a copy of the public draft Alternative, and will include details of an online meeting to be hosted by the District presenting the draft Alternative.

Comments received during the public comment period will be compiled and reviewed by District staff. Significant comments will be highlighted and brought to the attention of the District's Board of Director's.

During the Public Hearing the Board will consider these comments and determine in what form the District shall adopt the updated Alternative.

TAHOE SOUTH SUBBASIN ALLTERNATIVE

The first five year update of the Tahoe South Subbasin Alternative is due to DWR by January 1, 2022.

The following section presents a general list of meetings and workshops to be scheduled over the coming year for the updated Alternative;

Sources of additional information are provided at the end of this presentation.

Status reports on the progress of the updated Alternative will be provided to the District's Board of Directors on a Quarterly Basis or as needed to inform the Board on issues raised during the update process.

These updates are planned to be provided during Regular Board Meetings. The District's Board regularly meets on the 1st and 3rd Thursdays of every month.

The District hosts workshops with the SAG at least two times per year. These meetings are also open to the public and will be used to discuss the Status Review and the findings of current work being conducted for the updated Alternative.

SAG Workshops are planned to be scheduled during the 1st and 3rd Quarters of 2021.

The District is planning to complete a Public Draft of the updated Alternative by October 2021.

The Public Meeting presenting the public Draft will be scheduled near the middle of the public comment period in November 2021;

A Public Hearing to consider public comments and adopt the updated Alternative will be scheduled in early December 2021.

For further Information about this process, your invited to:

Contact the Plan Manager;

- Should you have questions about the current 2014 GMP and/or development of the Tahoe South Subbasin Alternative; and
- Add your email to the Interested Parties List.

The Interested Parties List is being used to send notifications of public meetings, workshops and information updates related to development of the updated Alternative to your email.

Lastly, please visit the GMP Web Page to download Public Notices, Plan Documents and Technical Information being posted for the updated Alternative.

Tahoe Valley South Subbasin (6-005.01) Groundwater Management Plan
MEETING NOTES
Thursday, December 17th, 2020; 9:00 am - 11:00 am
Location: On-Line Meeting
https://global.gotomeeting.com/join/971623325;

Potential Projects

Handouts: None

- Initial Brainstorming Session for any potential groundwater management projects that should be included in the TSS Alternative.
- Potential Projects:
    - Illicit Stormwater Discharges : Develop education materials highlighting the drinking water impacts of Illicit Discharges (IDs) to groundwater (South Y Area Example) ;
        - This would be a great opportunity to work with Storm Water Managers.
    - South Y Sentinel Wells: Identify wells constructed as part of the Regional Plume Characterization for incorporation into the Groundwater Elevation Monitoring Program;
        - Lahontan is planning on installing sentinel wells as part of the SCAP program work. Ivo has brought this item up with Abby about incorporation of at least one of the wells into the monitoring network
        - There may also be opportunities to incorporate existing Monitoring Wells in the South East portion of the Basin near the Super Fund Site by the County Landfill.
    - Grant Funding: Prepare Prop 1 Implementation Grant Application;
        - Ivo is working to organize a meeting of the affected water purveyors to gage interest in pursuing grant funding for an implementation project to address PCE groundwater contamination in the South Y area.
        - The Nature Conservancy – Nevada and DRI are starting a project to quantify environmental water requirements for GDEs beingfunded by the Bureau of Reclamation through a Water Smart Program Grant. This study may help provide values that could be incorporated into the South Tahoe Basin Groundwater Model in order to recognize environmental water demands in the groundwater budget. The District has provided a letter of support and is planning to stay engaged with this effort.
- Round Robin to field Questions/Comments/Suggested Changes
    - Ivo asked the group to feel free to send any ideas, specifically to table 10.1, to add to the Potential Project List. We will keep this running for the next few months and see what projects we can implement for incorporation into the alternative.
    - Ivo would like to have at least 4 workshops this year due to the amount of work, with the updates to the GWMP and Alternative, to keep everyone up to date. The next meeting will be scheduled toward the end of the first quarter of 2021.