

Owens Valley and Fish Slough Subbasins GSP Annual Report Water Year 2022

Submitted to



California Department of
Water Resources

Submitted by



OWENS VALLEY GROUNDWATER AUTHORITY

Prepared by



3916 State Street, Garden Suite

Santa Barbara, CA 93105

www.dbstephens.com

Project# DB23.1300.00

DRAFT

March 7, 2024

Certification

This report was prepared in accordance with generally accepted professional hydrogeologic principles and practices. This report makes no other warranties, either expressed or implied as to the professional advice or data included in it. This report has not been prepared for use by parties or projects other than those named or described herein. It may not contain sufficient information for other parties or purposes.

Douglas (Gus) Tolley, PhD
Project Hydrogeologist
gtolley@geo-logic.com
143E Spring Hill Dr.
Grass Valley, CA 95945

Tim Moore, PG, CHG
Senior Scientist - Hydrogeologist
tmoore@inyocounty.us
135 S Jackson St.
Independence, CA 93526

Date signed:

Table of Contents

| | |
|--|----|
| Certification | i |
| 1. Introduction | 1 |
| 2. Groundwater Elevations | 3 |
| 2.1 Fish Slough and Tri-Valley | 4 |
| 2.2 Owens Valley | 4 |
| 2.3 Owens Lake | 5 |
| 2.4 Groundwater SMC Status | 6 |
| 3. Groundwater Extractions | 7 |
| 3.1 Fish Slough and Tri-Valley | 7 |
| 3.2 Owens Valley | 8 |
| 3.3 Owens Lake | 9 |
| 4. Surface Water Supply | 9 |
| 4.1 Fish Slough and Tri-Valley | 9 |
| 4.2 Owens Valley and Owens Lake | 9 |
| 4.3 Surface Water SMC Status | 10 |
| 5. Total Water Use | 10 |
| 6. Change of Groundwater in Storage | 10 |
| 6.1 Fish Slough and Tri-Valley | 10 |
| 6.2 Owens Valley and Owens Lake | 11 |
| 7. Progress Towards GSP Implementation | 12 |
| 7.1 Project and Management Action #1 - Well Registration and Reporting Ordinance | 12 |
| 7.2 Project and Management Action #2 - Well Permit Review Ordinance | 12 |
| 7.3 Project and Management Action #3 - Increase Groundwater Level Monitoring Network | 13 |
| 7.4 Project and Management Action #4 - Tri-Valley Groundwater Model Development | 13 |
| 7.5 Additional OVGA Activities | 13 |
| 7.6 GSP Amendments | 14 |
| 8. References | 14 |

List of Tables

- Table 1. Groundwater Representative Monitoring Points SMC Status
- Table 2. Groundwater Extractions
- Table 3. Surface Water Use
- Table 4. Surface Water Representative Monitoring Point SMC Status
- Table 5. Total Water Use

List of Figures

- Figure 1. Location Map
- Figure 2. Spring Water Level Contours - Fish Slough and Tri-Valley Management Area
- Figure 3. Fall Water Level Contours - Fish Slough and Tri-Valley Management Area
- Figure 4. Spring Water Level Contours - Owens Valley Management Area Shallow Aquifer
- Figure 5. Spring Water Level Contours - Owens Valley Management Area Deep Aquifer
- Figure 6. Fall Water Level Contours - Owens Valley Management Area Shallow Aquifer
- Figure 7. Fall Water Level Contours - Owens Valley Management Area Deep Aquifer
- Figure 8. Spring Water Level Contours - Owens Lake Management Area Aquifer 1
- Figure 9. Spring Water Level Contours - Owens Lake Management Area Aquifer 3
- Figure 10. Spring Water Level Contours - Owens Lake Management Area Aquifer 5
- Figure 11. Fall Water Level Contours - Owens Lake Management Area Aquifer 1
- Figure 12. Fall Water Level Contours - Owens Lake Management Area Aquifer 3
- Figure 13. Fall Water Level Contours - Owens Lake Management Area Aquifer 5
- Figure 14. Example SMC Status Categories
- Figure 15. Groundwater Extractions - Fish Slough and Tri-Valley Management Area
- Figure 16. Groundwater Extractions - Owens Valley Management Area
- Figure 17. Groundwater Extractions - Owens Lake Management Area
- Figure 18. Groundwater Pumping and Change in Groundwater in Storage

List of Appendices

- Appendix A. Representative Monitoring Point Hydrographs

Acronyms and Abbreviations

| <u>Acronym/Abbreviation</u> | <u>Definition</u> |
|-----------------------------|---|
| AF | acre-feet |
| AFY | acre-feet per year |
| amsl | above mean sea level |
| Basins | Owens Valley and Fish Slough Subbasins |
| BLM | Bureau of Land Management |
| CASGEM | California Statewide Groundwater Elevation Monitoring |
| CCR | California Code of Regulations |
| CDFW | California Department of Fish and Wildlife |
| CIMIS | California Irrigation Management Information System |
| cfs | cubic feet per second |
| DMS | Database Management System |
| DWR | [CA] Department of Water Resources |
| eWRIMS | Electronic Water Rights Information Management System |
| ET | Evapotranspiration |
| ft | feet |
| GSA | Groundwater Sustainability Agency |
| GSP | Groundwater Sustainability Plan |
| LADWP | Los Angeles Department of Water and Power |
| LTWA | Inyo - Los Angeles Long Term Water Agreement |
| MO | Measurable Objective |
| MT | Minimum Threshold |
| OLGDP | Owens Lake Groundwater Development Project |
| OVGA | Owens Valley Groundwater Authority |
| RMP | Representative Monitoring Point |
| SGMA | Sustainable Groundwater Management Act |
| SMC | Sustainable Management Criteria |
| SWRCB | State Water Resources Control Board |
| TVGMD | Tri-Valley Groundwater Management District |
| WLE | water level elevation |
| WY | water year |

Executive Summary

The Owens Valley Groundwater Authority has prepared this annual report for water year 2022 (October 1 through September 30) for the Owens Valley and Fish Slough groundwater subbasins. It includes analysis of data, by management area, that have been collected since the GSP was submitted to DWR in January 2022.

Total water use in the Basins during WY 2022 was estimated to be 129,200 acre-feet (AF). Reported groundwater extractions for the Basins totaled 98,326 AF. Total surface water use in the Basins was estimated to be 30,874 AF. Total change in groundwater in storage for both subbasins over WY 2022 was estimated to be -4,575 AF. The estimated change in storage over WY 2022 was -17 AF for the Fish Slough subbasin and -7,162 AF for Tri-Valley. LADWP reported a change in groundwater in storage of +2,604 AF for their lands within Owens Valley.

The OVGA is working towards its sustainability goals through GSP management actions outlined in the GSP. A well registration and groundwater extraction program has been developed, and OVGA staff is now working with Inyo County Department of Environmental Health in reviewing well permits. The OVGA continues to gather data from its monitoring network that are imported periodically into its public-facing data management system. These easily accessible data and this annual report serve to keep the interested parties informed through GSP implementation.

1. Introduction

The Owens Valley and Fish Slough groundwater subbasins (the Basins) are designated low priority status by the California Department of Water Resources (DWR) and therefore are not required to be managed by a Groundwater Sustainability Agency (GSA). Groundwater management in the context of the Sustainable Groundwater Management Act (SGMA) is performed voluntarily by the Owens Valley Groundwater Authority ([OVGA](#)) for portions of the Basins within Inyo County, and by a combination of the Tri-Valley Groundwater Management District ([TVGMD](#)) and [Mono County](#) for portions of the Basins within Mono County. The Owens Valley Groundwater Authority (OVGA) submitted a Groundwater Sustainability Plan (GSP) for the Basins on January 26, 2022. After the GSP was submitted, the TVGMD and Mono county withdrew from the OVGA and petitioned DWR to become the GSAs for the portions of the Basins within Mono County. While the OVGA is not required to submit GSP annual reports to DWR since it is a low-priority basin, this GSP annual

report was voluntarily prepared to document groundwater conditions in the Basins for water year (WY) 2022.

This annual report provides a summary of hydrologic conditions and water use in the Basins (Figure 1) using observed data from monitoring networks and/or estimated using best available methods. It includes a summary of water use and changes in groundwater storage during the period from October 1, 2021, to September 30, 2022 (i.e., WY 2022), and provides context for conditions relative to the sustainable management criteria (SMC) developed for the Basins. Conditions are reported for each of the three management areas defined in the GSP: Tri-Valley & Fish Slough, Owens Valley, and Owens Lake (Figure 1). Analysis of Mono County portions of the basin (Tri-Valley & Fish Slough management area) and lands owned by the Los Angeles Department of Water and Power ([LADWP](#)) managed under the Long Term Water Agreement ([LTWA](#)) are included for completeness, but the OVGA has no management authority over these areas. This report has been prepared in accordance with the requirements for GSP annual reports as identified in the Sustainable Groundwater Management Act (SGMA, 23 CCR 356.2).

Owens Valley is the ninth largest groundwater subbasin in California in terms of total area and spans approximately 125 miles from north to south, the longest distance of any California subbasin. Ground surface elevations in the Basins range from a low of 3,529 ft above mean sea level (amsl) at Owens Lake to a high of 11,219 ft amsl near Mt. Perkins, a span of 7,690 ft. This results in practical challenges displaying information on figures such as water level contours or labels. Symbology and font sizes would need to be impractically small or figures could only present data for a portion of a given management area. To reduce the number of figures and potential confusion from a lack of geographic context, the most detailed information that could be displayed without making a figure illegible is presented.

Approximately 35% of the land area and the majority of water rights in the Basins are owned by LADWP. Because of the importance of surface water and groundwater supplied from Owens Valley to Los Angeles, LADWP has developed extensive facilities and monitoring for land management, water storage and export, groundwater production, groundwater recharge, surface water and groundwater monitoring, and dust control. Land and water management in the Tri-Valley portion of the Owens Valley Subbasin is primarily conducted by private landowners and is less well studied and monitored.

The main agencies or programs conducting groundwater monitoring and management in the Basins include: the City of Los Angeles (subject to the LTWA), Inyo County Water Department,

TVGMD, the California Statewide Groundwater Elevation Monitoring Program ([CASEGM](#)), the Groundwater Ambient Monitoring and Assessment Program ([GAMA](#)), local water providers (privately-owned public water systems, mutual water companies, community service districts or the City of Bishop), and the Owens Lake Groundwater Development Program ([OLGDP](#)). These agencies or programs monitor groundwater levels, water quality and/or extraction in areas throughout the Basins. In addition, LADWP is required to continue water deliveries for irrigation, mitigation, and for dust control, and conducts recharge operations in the Basin. Monitoring associated with these activities is routinely reported by LADWP.

For additional clarification or more detailed information on the basin plan area, monitoring network, or conditions, please refer to the [Owens Valley Groundwater Basin GSP](#), the [OVGA Database Management System](#), or the numerous documents and reports prepared by or in cooperation with the [Inyo County Water Department](#). As acknowledged by the Department of Water Resources, it is important to note that there are still many data gaps and missing information as the OVGA continues to gather information for better analysis and informed decision making.

2. Groundwater Elevations

Groundwater elevations and changes from the beginning to the end of the water year for each management area (Figure 1) are provided below. Contour maps of each principal aquifer within each management area are also provided. These maps depict the seasonal high (spring) and low (fall) water level elevations for each principal aquifer within the respective management area. Note that due to infiltration of snowmelt runoff from the Eastern Sierras and LADWP operations (e.g., ditch conveyance, surface water spreading, lease agreements, etc.) during the summer months, the typical spring high and fall low trend is often reversed for the portion of Owens Valley Management Area between Big Pine and Independence. In this area, observed seasonal highs in average and wet years can occur during the summer and early fall. Spring and fall water level elevations are defined as observations within a 180-day period centered on April 1 or October 1. If a well has multiple observations within this period, then the value collected nearest to April 1st or October 1st is used. Hydrographs for representative monitoring points (RMPs) in the Basin are shown in **Appendix A**. The Rio Tinto well is not included despite it being listed as a potential RMP in the GSP as there are no historical data and a field inspection revealed water level measurements could not be collected without significant modifications to the well. It will be removed from the RMP list in the GSP 5-year update.

2.1 Fish Slough and Tri-Valley

Observed spring groundwater elevations for the Fish Slough and Tri-Valley management area ranged from 4,159.42 to 5,312.60 ft above mean sea level (amsl), with an average elevation of 4,442.73 ft amsl (Figure 2). Fall groundwater elevations (Figure 3) ranged from 4,158.81 to 5,304.39 ft amsl, with an average elevation of 4,419.96 ft amsl. Observed groundwater elevation changes from Fall 2021 to Fall 2022 ranged from -2.85 to +0.07 ft, with an average change of -0.51 ft.

Groundwater flow in both subbasins is generally from north to south. Recharge along the margins of the basin and drawdown near high-capacity irrigation wells likely influences flows locally during certain times of the year in Tri-Valley. Groundwater levels near Chalfant Valley indicate some flow from the Tri-Valley is directed westward towards the Fish Slough subbasin. This is consistent with results from a geochemical study performed by Zdon and others (2019) that showed Northeast Spring in Fish Slough was partially sourced by water from Tri-Valley. Additionally, declines in flow from Northeast Spring began at the same time as groundwater level declines in Tri-Valley. This indicates a strong hydrologic connection between Tri-Valley and Fish Slough, likely via enhanced permeability through the Bishop Tuff along the Fish Slough fault zone. Increasing the number of groundwater monitoring wells in the Hammil and Chalfant Valley areas would help provide further evidence of a hydrologic connection between Tri-Valley and Fish Slough. A joint project with California Department of Fish and Wildlife, Bureau of Land Management, United States Geological Survey and California Department of Water Resources is in progress to drill two multi-completion monitoring facilities in the southerly Hammil Valley and one in northerly Fish Slough subbasin (see Section 7.3).

2.2 Owens Valley

The Owens Valley management area contains two principal aquifers: a shallow unconfined aquifer approximately 100 ft in thickness and a deep semi-confined to confined aquifer that extends to approximately 1,000 ft below ground surface. The shallow and deep aquifers are separated by confining units that are laterally discontinuous and primarily composed of volcanic flows and clays deposited in ancient lakes. Most groundwater pumping in the Owens Valley subbasin occurs within the Owens Valley management area, and therefore monitoring wells in this area experience the greatest magnitude of observed water level fluctuations.

Observed spring groundwater elevations for the Owens Valley management area shallow aquifer (Figure 4) ranged from 3,689.31 to 4,373.41 ft amsl, with an average elevation of 3,916.39 ft amsl. Spring water levels in the deep aquifer ranged from 3,654.34 to 4,970.84 ft amsl, with an average

elevation of 3,939.62 ft amsl (Figure 5). In the fall, shallow aquifer groundwater elevations ranged from 3,691.62 to 4,305.15 ft amsl (Figure 6) with an average elevation of 3,907.95, and from 3,654.29 to 4,971.59 ft amsl with an average elevation of 3,907.95 ft amsl in the deep aquifer (Figure 7). Average change in groundwater elevation in the shallow and deep aquifers from Fall 2021 to Fall 2022 was -0.14 ft and -0.20 ft, respectively.

While groundwater flow patterns between the shallow and deep aquifers are generally similar, flow direction varies widely across the Owens Valley management area. Groundwater flow near Bishop is generally to the east and changes direction to the south towards the eastern margin of the basin near Laws and some groundwater flow enters from the north from Tri-Valley. South of Bishop, the majority of recharge enters the basin from the west along Sierra creeks and their associated, coarse grained alluvial fans. Groundwater elevations and flow reflect this, with west to east flow towards the center of the basin. Along the comparatively flat valley floor in the vicinity of the Owens River, groundwater flow is from the north to the south. Localized variations from these prevailing patterns exist, notably near LADWP wellfields and/or areas with significant surface water recharge (either natural or managed). Interpolating groundwater elevation contours in the Owens Valley management area is especially challenging due to the complex basin geometry and most monitoring wells being located on the valley floor. In addition, many of the monitoring wells are located in a linear orientation parallel to the valley axis.

2.3 Owens Lake

The Owens Lake management area contains five principal aquifers named from shallowest to deepest as Aquifers 1-5 (MWH, 2011). Aquifers 1-4 generally transition from coarse sands and gravels along the margins of the management area into fine silts and clays near Owens Lake, resulting in laterally discontinuous aquifers. Aquifer 5 is more laterally continuous and is composed of silty sand with interbedded sands and occasional clays, interpreted to have formed from a flood plain or braided stream system that existed prior to the formation of Owens Lake. The Owens Lake aquifer system extends more than 1,500 ft below ground surface (bgs). Due to the closed nature of the Owens Valley in terms of both surface water and groundwater (i.e., no natural outflows except for evapotranspiration) and limited pumping in the Owens Lake management area, water levels are generally stable and most monitoring wells show less than 10 ft of natural long-term variations in water levels. Groundwater conditions for Aquifers 2 and 4 are not included in this report because meaningful water level contour maps could not be created due to a lack of sufficient data. However, conditions for both the overlying and underlying aquifers are reported. Since groundwater extractions are relatively small in the Owens Lake management

area, conditions in Aquifers 1, 3, and 5 are believed to be representative of those in Aquifers 2 and 4.

Observed spring groundwater elevations in Aquifer 1 (Figure 8) ranged from 3,577.36 to 3,643.37 ft above mean sea level (amsl), with an average elevation of 3,613.84 ft amsl. Aquifer 3 spring groundwater elevations (Figure 9) ranged from 3,585.97 to 3,653.86 ft amsl, with an average elevation of 3,625.87 ft amsl. Groundwater elevations in the spring for Aquifer 5 (Figure 10) ranged from 3,612.56 to 3,654.09 ft amsl, with an average elevation of 3,627.24 ft amsl. Fall conditions in the Owens Lake management area are generally similar to those observed in the spring. Aquifer 1 water levels in the fall (Figure 11) ranged from 3,577.42 to 3,641.91 ft amsl, with an average elevation of 3,613.65 ft amsl. Aquifer 3 spring groundwater elevations (Figure 12) ranged from 3,585.53 to 3,652.66 ft amsl, with an average elevation of 3,625.27 ft amsl. Groundwater elevations in the spring for Aquifer 5 (Figure 13) ranged from 3,612.62 to 3,653.36 ft amsl, with an average elevation of 3,627.06 ft amsl. The average change in groundwater elevations over WY 2022 for Aquifers 1, 3, and 5 was -0.27 ft, +0.05 ft, and +0.15 ft, respectively.

2.4 Groundwater SMC Status

The reporting metric “SMC Status” was developed to better compare groundwater elevations observed at RMPs in the context of their unique SMC. This metric describes groundwater elevations relative to the “sustainability range” of the well and allows for normalized reporting of groundwater elevations at RMPs. The sustainability range is defined as the elevation range between the measurable objective (MO) and minimum threshold (MT) for each RMP. SMC Status was classified into the following categories:

- Near or Above MO: Water levels equal to or greater than 75% of the sustainability range
- Between MO and MT: Water levels within 25% to 75% of the sustainability range
- Near MT: Water levels less than 25% of the sustainability range but above the MT
- At or Below MT: Water levels at or below the MT

Figure 14 shows an example of this metric applied to the hydrograph of well T001. Table 1 provides a summary of all of the water level elevation RMPs and their status in Fall 2022. The SMC status of some RMPs could not be determined for a variety of reasons (monitoring point was destroyed, collecting entity was unresponsive to data requests, etc.), but of the 44 wells that had sufficient data 70% were above or near the MO, 27% had water level elevations in the middle of the sustainability range, and only a single well (T480) was at or below the MT. T480 is located at

the south end of the Bishop Cone well field operated by LADWP and had a water level elevation of 3392.79 ft in October 2022, which was 0.21 ft below the MT. It should be noted that T480 completely recovered above the MO by April 2023.

3. Groundwater Extractions

The subsections below discuss estimated or measured groundwater extractions for each management area. High-capacity extraction wells are not metered in Tri-Valley but are in the Owens Lake and Owens Valley management areas. While the majority of metered pumping comes from LADWP wells that are reported to the OVGA, additional pumping occurs from public or private entities (e.g., City of Bishop, mutual water companies, Crystal Geysers). The OVGA has initiated a well registration program that requires all groundwater pumpers in the portions of the Basins over which the OVGA has authority (excluding de minimus users, who are encouraged to voluntarily register their wells) to report their groundwater use (see Section 8). The deadline for submitting well registration and reporting forms is April 1, 2024, and therefore this report does not quantify all known groundwater extractions in the Owens Valley and Owens Lake management areas. The currently unreported volumes in the Owens Valley and Owens Lake management areas are likely very small relative to the reported volumes, so their inclusion in future GSP annual reports is expected to have minimal impacts. Reported groundwater extractions for the Basins in WY 2022 totaled 98,326 AF (Table 2).

3.1 Fish Slough and Tri-Valley

Groundwater extractions in the Fish Slough and Tri-Valley management area were estimated using [OpenET](#) since pumping is not metered. OpenET is an online platform for mapping evapotranspiration (ET) at the scale of individual fields. Several different ET estimation methodologies are available, and the Satellite Irrigation Management Support (SIMS) model was used. It must be noted that underestimation of ET for small agricultural operations in very arid areas is currently a known limitation of OpenET due to the limited number of cropland in-situ flux stations located in these types of environments. Further complicating matters, surface water is applied to some fields in Tri-Valley. This means that groundwater extraction estimates in this report are likely overestimated, but the degree to which is currently unknown. All groundwater pumping occurs in the Tri-Valley with the exception of one known active domestic well located near the boundary between the Owens Valley and Fish Slough subbasins.

Estimated groundwater extractions in Tri-Valley for WY 2022 are shown in Table 2. Total groundwater use was estimated to be 13,147 AF, with irrigated agriculture accounting for 100% of total quantified extractions. Not included in Table 1 are extractions from Chalfant Valley West Mutual Water Company (CVMMWC), which services a population of approximately 45 people (15 connections). Pumping data from CVMMWV were unavailable at the time this report was prepared. It was assumed the remainder of the Tri-Valley population are de minimis users served by domestic wells and therefore exempt from SGMA regulations.

The spatial distribution of estimated groundwater pumping aggregated within each public land survey (PLSS) section (1 mi²) in the Fish Slough and Tri-Valley management area is shown in Figure 15. Pumping was assumed to occur within the same section an irrigated agricultural field was located within. If a field overlay more than one section, then pumping was assigned to the section with the largest overlap. Most groundwater pumping in the Fish Slough and Tri-Valley management area appears to be located near the center of Tri-Valley in Hammil Valley.

3.2 Owens Valley

Extraction volumes for each water use sector were provided to the OVGA by LADWP since contributions to each sector from specific wells are not tracked. In other words, LADWP quantifies how much groundwater is applied to each water use sector as part of their operations, but generally does not track which wells the water is sourced from. In some instances, wells are dedicated to a specific purpose so their contributions to a specific water use sector can be tracked. For example, wells W357 and W384 are used as the municipal supply for Independence so groundwater extractions from them were assigned to the municipal water use sector. Although the volumes reported for each water use sector in Table 1 for the Owens Valley management area could not be independently verified, total groundwater extraction volume reported by LADWP¹ was consistent with the total calculated using pumping data provided to the OVGA. The volume of groundwater used for each sector was calculated by multiplying the total water use for the sector by the ratio of total groundwater extractions to total water use reported by LADWP. For WY 2022 about 77% of total water use in the basin reported by LADWP was sourced from groundwater.

Groundwater extractions in the Owens Valley management area, including those on LADWP lands that are exempt from being covered under a SGMA GSP (see Footnote 1), totaled 82,785 AF (Table

¹ LADWP owned lands in Owens Valley are considered adjudicated under SGMA. Reports are required to be submitted annually for adjudicated areas: [Inyo County Basins Annual Report](#).

2). Agricultural irrigation accounted for approximately 46% of total extractions. Managed wetlands and native vegetation were about 33% of total extractions, while domestic and municipal uses made up about 14%. The remaining 7% of groundwater extractions were for Tribal uses or unspecified LADWP operations. Due to the commingling of pumped groundwater with surface water in ditches and canals that reach the Los Angeles Aqueduct, the amount of groundwater that was exported was not quantified. The spatial distribution of Owens Valley management area groundwater extractions is shown in Figure 16. The majority of groundwater is pumped by LADWP on lands that are not subject to SGMA.

3.3 Owens Lake

A total of 2,394 AF of groundwater was extracted from the Owens Lake management area (Table 2). This is a relatively small volume of water compared to the other two management areas, primarily due to very poor water quality. Pumping occurs along the margins of the playa (Figure 17) where water quality is generally better. Note that groundwater extraction volumes from the Crystal Geysers Roxane bottling plant and agricultural uses south of Owens Lake were unavailable at the time this report was prepared and therefore total groundwater extractions in the Owens Lake management area are likely greater than reported here. The OVGA Well Registration and Reporting Program aims to fill these data gaps (see Section 7.1).

4. Surface Water Supply

The subsections below describe surface water used in the Basins. Total surface water use in the Basins was estimated to be 30,874 AF.

4.1 Fish Slough and Tri-Valley

Surface water use in the Fish Slough and Tri-Valley management area was estimated using data reported to the State Water Resources Control Board (SWRCB) Electronic Water Rights Information Management System ([eWRIMS](#)). Approximately 8,844 AF of surface water was used in the Fish Slough and Tri-Valley management area (Table 2), with approximately 7,282 AF (82%) used for agriculture and about 1,562 AF (18%) used for various other purposes (e.g., domestic, power generation, in-stream dedications).

4.2 Owens Valley and Owens Lake

Nearly all surface water rights in the Owens Valley and Owens Lake management areas are owned by the City of Los Angeles. Smaller holders of water rights exist but the sum of private water rights

as a portion of the runoff into the management areas is negligible compared to LADWP water rights. LADWP does not currently differentiate between surface water used in different areas of the basin, but instead provides total water use for each sector. This precluded reporting surface water volumes used within each management area so instead they are presented jointly here.

The volume of surface water used for each sector was calculated by multiplying the total water use for the sector by the ratio of total surface water use to total water use reported by LADWP. For WY 2022 about 22,030 AF was sourced from surface water in the Owens Valley and Owens Lake management areas (Table 3).

4.3 Surface Water SMC Status

SW3208 measures discharge from the Fish Slough Northeast Spring and is the only surface-water RMP in the Basins. The SMC Status (see Section 2.4 for explanation) for SW3208 in Fall 2022 was below the minimum threshold of 0.1 cfs of average daily flow (Table 4). No flow at Northeast Spring was recorded from July 2022 through October 2022. The only other recorded time Northeast Spring went dry was September 2021. Discharge from Northeast Spring has consistently declined since the early 1990s. It should be noted that SW3208 flow was above the MT by March 2023.

5. Total Water Use

Total water use in the Basin grouped by management area, water use sector, and measurement method is shown in Table 3. Total water volume used in the Basin during WY 2022 was estimated to be 129,200 AF.

6. Change of Groundwater in Storage

The subsections below discuss the estimated change of groundwater in storage for the Basins. Total groundwater in storage change for both subbasins over WY 2022 was estimated to be -4,575 AF (Figure 17). Cumulative change in groundwater in storage for both subbasins relative to Fall 2019 conditions is estimated to be -150,901 AF (see Section 6.2 below).

6.1 Fish Slough and Tri-Valley

Change in groundwater in storage for both the Fish Slough subbasin and the Tri-Valley portion of Owens Valley subbasin was estimated using the equation:

$$\Delta S = \Delta b_{avg} * A * \phi \quad (6.1)$$

where ΔS = change in storage (AF)

Δb_{avg} = mean change in observed water levels (feet)

A = subbasin area (acres)

ϕ = mean effective aquifer porosity (-)

Mean change in water levels from Fall 2021 to Fall 2022 was -0.05 ft in the Fish Slough subbasin and -0.69 ft in Tri-Valley. The Fish Slough subbasin covers 2,944 acres and the Tri-Valley portion of the Owens Valley subbasin covers 72,100 acres. Assuming a 10% effective aquifer porosity for both areas, estimated change in storage over WY 2022 was -17 AF for the Fish Slough subbasin and -7,162 AF for Tri-Valley. Total combined change in groundwater in storage for the Fish Slough and Tri-Valley management area was -7,179 AF. Although this is the best method currently available for estimating change in groundwater in storage, these values have a very high degree of uncertainty associated with them due to limited data availability and spatial coverage. TVGMD plans to develop a numerical groundwater flow model for the Fish Slough and Tri-Valley portions of the Owens Valley groundwater basin in Mono County which will be available in the future for estimating change in storage (see Section 7.4).

6.2 Owens Valley and Owens Lake

As part of their SGMA reporting requirements for adjudicated basins ([CA Water Code Section 10720.8](#)), LADWP reports water use and estimated change in storage values for each water year to DWR ([WY2022 Inyo County Basins Annual Report](#)). Figure 18 shows both estimated annual and cumulative change in storage relative to Fall 2019 for the Basins, as the first year LADWP began SGMA reporting was 2020. The reported value is calculated according to a relatively complex set of equations outlined in Section IV Subsection C of the [Green Book](#), the technical appendix to the Inyo/Los Angeles Long Term Water Agreement.

LADWP reported a change in groundwater in storage of +2,604 AF for WY 2022. Since nearly all groundwater pumping and monitoring in the Inyo County portion of the Owens Valley subbasin occurs on LADWP lands, this is the best estimate available for the Owens Valley and Owens Lake management areas. It is assumed that most of this change in storage occurred in the Owens Valley management area since water levels in the Owens Lake management area are generally stable due to limited extractions.

7. Progress Towards GSP Implementation

The Owens Valley Groundwater Basin GSP identified four Projects or Management Actions that the OVGA Board of Directors would implement or consider implementing to facilitate the maintenance of sustainable conditions in the Basins (see Section 4 of the GSP). Below is a description of activities related to each project that occurred during WY 2022. The OVGA has focused its attention on Projects #1 and #2 since the GSP was submitted to DWR, while the TVGMD and Mono County have made progress on Projects #3 and #4. Updates on projects in the portions of the Basins in Mono County that the OVGA is involved with but not leading are also included.

7.1 Project and Management Action #1 - Well Registration and Reporting Ordinance

In August 2022, the OVGA passed [Ordinance No. 2022-01](#) which requires owners and users of groundwater extraction facilities located within the revised OVGA boundary² to register their wells with the OVGA and report groundwater extractions annually. This [Well Registration Program](#) is voluntary, but encouraged, for de minimus users which is defined as “a person who extracts, for domestic purposes, two acre-feet or less (of groundwater) per year.” The initial registration deadline was set for April 1, 2023, and later extended to April 1, 2024, to provide stakeholders with additional time to submit.

7.2 Project and Management Action #2 - Well Permit Review Ordinance

The Inyo County Department of Environmental Health is the permitting entity that issues well permits within the Inyo County portion of the Basins. Staff to the OVGA is working with the County to review applications for well permits within the Basins.

² After the GSP was submitted to DWR on January 26, 2022, the TVGMD and Mono County withdrew from the OVGA and petitioned DWR to become the GSAs for the portions of the Basins within Mono County. The [TVGMD](#) and [Mono County](#) were approved to be the GSAs for Mono County portions of the Owens Valley and Fish Slough groundwater subbasins on August 2, 2022.

7.3 Project and Management Action #3 - Increase Groundwater Level Monitoring Network

The TVGMD is currently exploring options for expanding the groundwater monitoring network in Tri-Valley utilizing existing wells, but no final decisions have been made. Inyo County Water Department installed pressure transducers and dataloggers in three monitoring wells located in the Fish Slough subbasin on May 11, 2023, in cooperation with the Bureau of Land Management (BLM) Bishop Field Office.

The California Department of Fish and Wildlife (CDFW), DWR, and United States Geologic Survey (USGS), in cooperation with the BLM Bishop Field Office propose to install two multi-completion groundwater monitoring facilities (i.e., well) in southern Hammil Valley in the Fish Slough and Tri-Valley management Area. A third multi-completion groundwater monitoring facility is planned to be installed on LADWP owned land in the Fish Slough subbasin. The monitoring well construction is scheduled to begin in 2024. The proposed project includes provision to equip the monitoring facilities with pressure transducers and dataloggers. The proposed project is a continued effort to assess groundwater conditions and movement in the Tri-Valley and Fish Slough management area.

7.4 Project and Management Action #4 - Tri-Valley Groundwater Model Development

In June 2022, a project proposal for developing a groundwater model of the Fish Slough and Tri-Valley portions of the Basins was approved by the Inyo-Mono Integrated Regional Water Management Program (IRWMP) to be put forward for funding by DWR. The requested project included an optional additive component for an isotope study. A description of the proposed scope of work and budget can be found in the July 13, 2022, TVGMD board meeting [minutes](#). The project is currently in the planning phase, and model development activities are anticipated to begin when a consultant is awarded the contract in 2024.

7.5 Additional OVGA Activities

The OVGA continues to update and refine its [Database Management System](#). Water-level and streamflow data for the GSP Representative Monitoring Points (RMPs) have also been uploaded to the [SGMA Portal](#) through September 2022 to align with the WY 2022 reporting period of this annual report.

7.6 GSP Amendments

No amendments to the GSP were necessary for the WY 2022 reporting period of this annual report.

8. References

- Danskin, W. R. 1998. Evaluation of the hydrologic system and selected water-management alternatives in the Owens Valley, California. Reston, VA, USA: US Geological Survey. <https://pubs.usgs.gov/wsp/2370h/report.pdf>
- Inyo County and City of Los Angeles. 1990. Green Book for the Long Term Groundwater Management Plan for the Owens Valley and Inyo County. <https://www.inyowater.org/wp-content/themes/rttheme16child/documents/Greenbook.pdf>
- Los Angeles Department of Water and Power and County of Inyo. (1991). Agreement Between the County of Inyo and the City of Los Angeles and its Department of Water and Power on a Long Term Groundwater Management Plan for Owens Valley and Inyo County, Stipulation and Order for Judgement, Inyo County Superior Court, Case no. 1. 95pp. <https://www.inyowater.org/documents/governing-documents/water-agreement/>
- MWH. 2011. Updated Conceptual Model Report (Final). Appendix H of Final Report on the Owens Lake Groundwater Evaluation Project (2012).
- Owens Valley Groundwater Authority. 2021. Owens Valley Groundwater Basin Final Groundwater Sustainability Plan. https://ovga.us/wp-content/uploads/2021/12/OVGA_groundwater_sustainability_plan_Final-120921.pdf
- Zdon, A., Rainville, K., Buckmaster, N., Parmenter, S., & Love, A. H. (2019). Identification of source water mixing in the fish slough spring complex, Mono County, California, USA. Hydrology, 6(1), 26. <https://www.mdpi.com/2306-5338/6/1/26>

Table 1. Groundwater Representative Monitoring Points SMC Status.

| Representative Monitoring Point | Management Area | Water Level Elevation (ft amsl) | Date | MT (ft amsl) | MO (ft amsl) | SMC Status Fall 2022 |
|-------------------------------------|----------------------------|---------------------------------|------------|--------------|--------------|----------------------|
| BT-MW1 | Fish Slough and Tri-Valley | 5,303.55 | 2022-10-31 | 5,301 | 5,309 | Middle of MO and MT |
| CH-MW2 | Fish Slough and Tri-Valley | 4,208.49 | 2022-10-31 | 4,204 | 4,211 | Middle of MO and MT |
| DELTA W(3)_10 ¹ | Owens Lake | | | 3,562 | 3,563 | Undetermined |
| DVF North MW | Owens Lake | 3,645.13 | 2022-10-01 | 3,643 | 3,645 | Near or Above MO |
| DVF South Lower | Owens Lake | 3,642.22 | 2022-10-01 | 3,640 | 3,643 | Middle of MO and MT |
| DVF South Middle | Owens Lake | 3,642.23 | 2022-10-01 | 3,639 | 3,643 | Near or Above MO |
| DVF South Upper | Owens Lake | 3,640.21 | 2022-10-01 | 3,636 | 3,641 | Near or Above MO |
| FS-2 | Fish Slough and Tri-Valley | 4,215.29 | 2022-09-21 | 4,214 | 4,217 | Middle of MO and MT |
| FS-3D ² | Fish Slough and Tri-Valley | 4,180.22 | 2022-10-01 | 4,179 | | Undetermined |
| Fault Test T3 | Owens Lake | 3,624.02 | 2022-10-01 | 3,620 | 3,623 | Near or Above MO |
| Fault Test T5 | Owens Lake | 3,625.00 | 2022-10-01 | 3,617 | 3,623 | Near or Above MO |
| Hammil 2 ² | Fish Slough and Tri-Valley | 4,412.80 | 2022-10-23 | 4,401 | | Undetermined |
| I10(7)_4 ³ | Owens Lake | | | 3,568 | 3,570 | Undetermined |
| ICWCSD 4 ³ | Owens Valley | | | 4,249 | 4,254 | Undetermined |
| KCSD ³ | Owens Lake | | | 3,612 | 3,613 | Undetermined |
| Keeler-Swansea Lower | Owens Lake | 3,619.56 | 2022-10-01 | 3,618 | 3,618 | Near or Above MO |
| O6(5)_4 ¹ | Owens Lake | | | 3,567 | 3,569 | Undetermined |
| OL92-2 | Owens Lake | 3,607.25 | 2022-10-01 | 3,605 | 3,607 | Near or Above MO |
| River Production Lower ⁴ | Owens Lake | 3,631.34 | 2022-10-01 | | | Undetermined |
| River Site Lower | Owens Lake | 3,634.00 | 2022-10-01 | 3,594 | 3,633 | Near or Above MO |
| SFIP MW | Owens Lake | 3,618.66 | 2022-10-01 | 3,511 | 3,613 | Near or Above MO |
| T001 | Owens Valley | 3,880.49 | 2022-10-31 | 3,867 | 3,880 | Near or Above MO |

| Representative Monitoring Point | Management Area | Water Level Elevation (ft amsl) | Date | MT (ft amsl) | MO (ft amsl) | SMC Status Fall 2022 |
|---------------------------------|----------------------------|---------------------------------|------------|--------------|--------------|----------------------|
| T348 | Owens Lake | 3,632.50 | 2022-10-01 | 3,630 | 3,633 | Near or Above MO |
| T362 | Owens Valley | 4,068.05 | 2022-09-21 | 4,047 | 4,072 | Near or Above MO |
| T364 | Owens Valley | 3,899.29 | 2022-10-13 | 3,898 | 3,903 | Middle of MO and MT |
| T384 | Owens Valley | 4,168.38 | 2022-10-20 | 4,165 | 4,168 | Near or Above MO |
| T389 | Owens Valley | 4,229.61 | 2022-10-01 | 4,216 | 4,224 | Near or Above MO |
| T391 | Owens Valley | 4,305.15 | 2022-10-06 | 4,296 | 4,303 | Near or Above MO |
| T397 | Fish Slough and Tri-Valley | 4,200.37 | 2022-10-01 | 4,199 | 4,201 | Middle of MO and MT |
| T480 | Owens Valley | 3,993.79 | 2022-10-20 | 3,994 | 3,995 | At or Below MT |
| T513 | Owens Valley | 4,117.48 | 2022-10-20 | 4,113 | 4,117 | Near or Above MO |
| T574 | Owens Valley | 4,069.17 | 2022-09-19 | 4,067 | 4,071 | Middle of MO and MT |
| T588 | Owens Lake | 3,693.48 | 2022-10-11 | 3,685 | 3,693 | Near or Above MO |
| T750 ³ | Owens Valley | | | 4,357 | 4,360 | Undetermined |
| T751 ³ | Owens Valley | | | 4,373 | 4,379 | Undetermined |
| T808 | Owens Valley | 3,839.90 | 2022-09-19 | 3,834 | 3,846 | Middle of MO and MT |
| T809 | Owens Valley | 3,827.25 | 2022-09-19 | 3,823 | 3,829 | Middle of MO and MT |
| T858 | Owens Lake | 3,668.70 | 2022-10-11 | 3,666 | 3,670 | Middle of MO and MT |
| T860 | Owens Lake | 3,712.77 | 2022-10-11 | 3,708 | 3,711 | Near or Above MO |
| T869 | Owens Valley | 3,986.00 | 2022-10-05 | 3,983 | 3,985 | Near or Above MO |
| T871 | Owens Valley | 3,856.51 | 2022-09-20 | 3,850 | 3,852 | Near or Above MO |
| T872 | Owens Valley | 3,950.10 | 2022-10-04 | 3,946 | 3,955 | Middle of MO and MT |
| T873 | Owens Valley | 4,971.59 | 2022-10-04 | 4,954 | 4,963 | Near or Above MO |
| T899 | Owens Lake | 3,617.49 | 2022-09-14 | 3,617 | 3,618 | Middle of MO and MT |
| T901 | Owens Lake | 3,610.41 | 2022-09-14 | 3,607 | 3,610 | Near or Above MO |
| T902 | Owens Lake | 3,633.17 | 2022-10-01 | 3,631 | 3,632 | Near or Above MO |

| Representative Monitoring Point | Management Area | Water Level Elevation (ft amsl) | Date | MT (ft amsl) | MO (ft amsl) | SMC Status Fall 2022 |
|---------------------------------|-----------------|---------------------------------|------------|--------------|--------------|----------------------|
| T904 | Owens Lake | 3,628.98 | 2022-10-01 | 3,626 | 3,629 | Near or Above MO |
| T908 | Owens Lake | 3,627.29 | 2022-10-01 | 3,625 | 3,627 | Near or Above MO |
| T910 | Owens Lake | 3,609.33 | 2022-10-01 | 3,607 | 3,608 | Near or Above MO |
| T916 ⁵ | Owens Lake | 3,653.36 | 2022-10-11 | 3,704 | 3,704 | Undetermined |
| T917 ⁵ | Owens Lake | 3,652.66 | 2022-10-11 | 3,704 | 3,705 | Undetermined |
| T920 | Owens Lake | 3,601.52 | 2022-09-26 | 3,600 | 3,601 | Near or Above MO |
| T922 ⁴ | Owens Lake | 3,579.37 | 2022-10-01 | | | Undetermined |
| T924 | Owens Lake | 3,592.45 | 2022-09-26 | 3,590 | 3,592 | Near or Above MO |
| T925 ⁴ | Owens Lake | 3,621.10 | 2022-10-01 | | | Undetermined |
| T929 ⁴ | Owens Lake | 3,623.47 | 2022-10-01 | | | Undetermined |
| V016GB | Owens Valley | 3,883.07 | 2022-10-21 | 3,880 | 3,882 | Near or Above MO |
| V151 | Owens Valley | 3,832.58 | 2022-07-21 | 3,827 | 3,834 | Near or Above MO |
| V299 | Owens Valley | 3,926.35 | 2022-10-21 | 3,909 | 3,914 | Near or Above MO |
| WCCSD 2 ³ | Owens Valley | | | 6,020 | 6,023 | Undetermined |
| WCCSD 4 ³ | Owens Valley | | | 6,263 | 6,274 | Undetermined |

Notes:

1. Reported destroyed by LADWP.
2. Newly established representative monitoring point or data not currently available. MO will be established in GSP 5-yr update.
3. Fall 2022 data unavailable.
4. Newly established representative monitoring point or data not currently available. SMCs will be established in GSP 5-yr update.
5. MT and MO values based on incorrect water level elevations that were recently corrected. MT and MO will be amended in GSP 5-yr update.

Table 2. Groundwater Extractions

| Management Area | Sector | Method | GW Extraction Volume (AF) | Accuracy (%) | Range (AF) |
|-------------------------------------|--------------------------|-----------|---------------------------|--------------|-------------------------|
| Fish Slough and Tri-Valley | Agricultural | OpenET | 13,147 | ± 20 | 10,518 - 15,776 |
| | Municipal and Industrial | Totalizer | 0 | ± 5 | 0 - 0 |
| Fish Slough and Tri-Valley Subtotal | | | 13,147 | | 10,518 - 15,776 |
| Owens Valley | Agricultural | Totalizer | 37,713 | ± 5 | 35,827 - 39,599 |
| | Domestic | Totalizer | 732 | ± 5 | 695 - 769 |
| | Managed Recharge | Totalizer | 0 | ± 5 | 0 - 0 |
| | Managed Wetlands | Totalizer | 19,467 | ± 5 | 18,494 - 20,440 |
| | Municipal and Industrial | Totalizer | 10,726 | ± 5 | 10,190 - 11,262 |
| | Native Vegetation | Totalizer | 8,030 | ± 5 | 7,628 - 8,432 |
| | Other | Totalizer | 2,260 | ± 5 | 2,147 - 2,373 |
| | Tribes | Totalizer | 3,857 | ± 5 | 3,664 - 4,050 |
| Owens Valley Subtotal | | | 82,785 | | 78,645 - 86,925 |
| Owens Lake | Agricultural | Totalizer | 0 | ± 5 | 0 - 0 |
| | Municipal and Industrial | Totalizer | 2,394 | ± 5 | 2,274 - 2,514 |
| Owens Lake Subtotal | | | 2,394 | | 2,274 - 2,514 |
| Total | | | 98,326 | | 91,437 - 105,215 |

Table 3. Surface Water Use

| Management Area | Surface Water Source | Sector | Method | Annual Volume Used (AF) | Accuracy (%) | Range (AF) |
|--------------------------------------|----------------------|-------------------|------------------|-------------------------|--------------|------------------------|
| Fish Slough and Tri-Valley | Local Supplies | Agricultural | Totalizer | 1,969 | ± 5 | 1,871 - 2,067 |
| | | | Unknown | 2,163 | ± 33 | 1,449 - 2,877 |
| | | Other | Weir | 3,150 | ± 5 | 2,992 - 3,308 |
| | | | Totalizer | 667 | ± 5 | 634 - 700 |
| | | | Weir | 895 | ± 5 | 850 - 940 |
| Fish Slough and Tri-Valley Subtotal | | | | 8,844 | | 7,796 - 9,892 |
| Owens Valley and Owens Lake | Local Supplies | Agricultural | Weirs and Flumes | 11,530 | ± 5 | 10,954 - 12,106 |
| | | Domestic | Weirs and Flumes | 224 | ± 5 | 213 - 235 |
| | | Managed Recharge | Weirs and Flumes | 0 | ± 5 | 0 - 0 |
| | | Managed Wetlands | Weirs and Flumes | 5,951 | ± 5 | 5,653 - 6,249 |
| | | Native Vegetation | Weirs and Flumes | 2,455 | ± 5 | 2,332 - 2,578 |
| | | Other | Weirs and Flumes | 691 | ± 5 | 656 - 726 |
| | | Tribes | Weirs and Flumes | 1,179 | ± 5 | 1,120 - 1,238 |
| Owens Valley and Owens Lake Subtotal | | | | 22,030 | | 20,928 - 23,132 |
| Total | | | | 30,874 | | 28,724 - 33,024 |

Table 4. Groundwater Representative Monitoring Points SMC Status

| Representative Monitoring Point | Management Area | Average Daily Flow Rate (cfs) ¹ | Month | MT (cfs) | MO (cfs) | SMC Status Fall 2022 |
|---------------------------------|----------------------------|--|----------------|----------|----------|----------------------|
| SW3208 | Fish Slough and Tri-Valley | 0 | September 2022 | 0.1 | 0.5 | At or Below MT |

Notes:

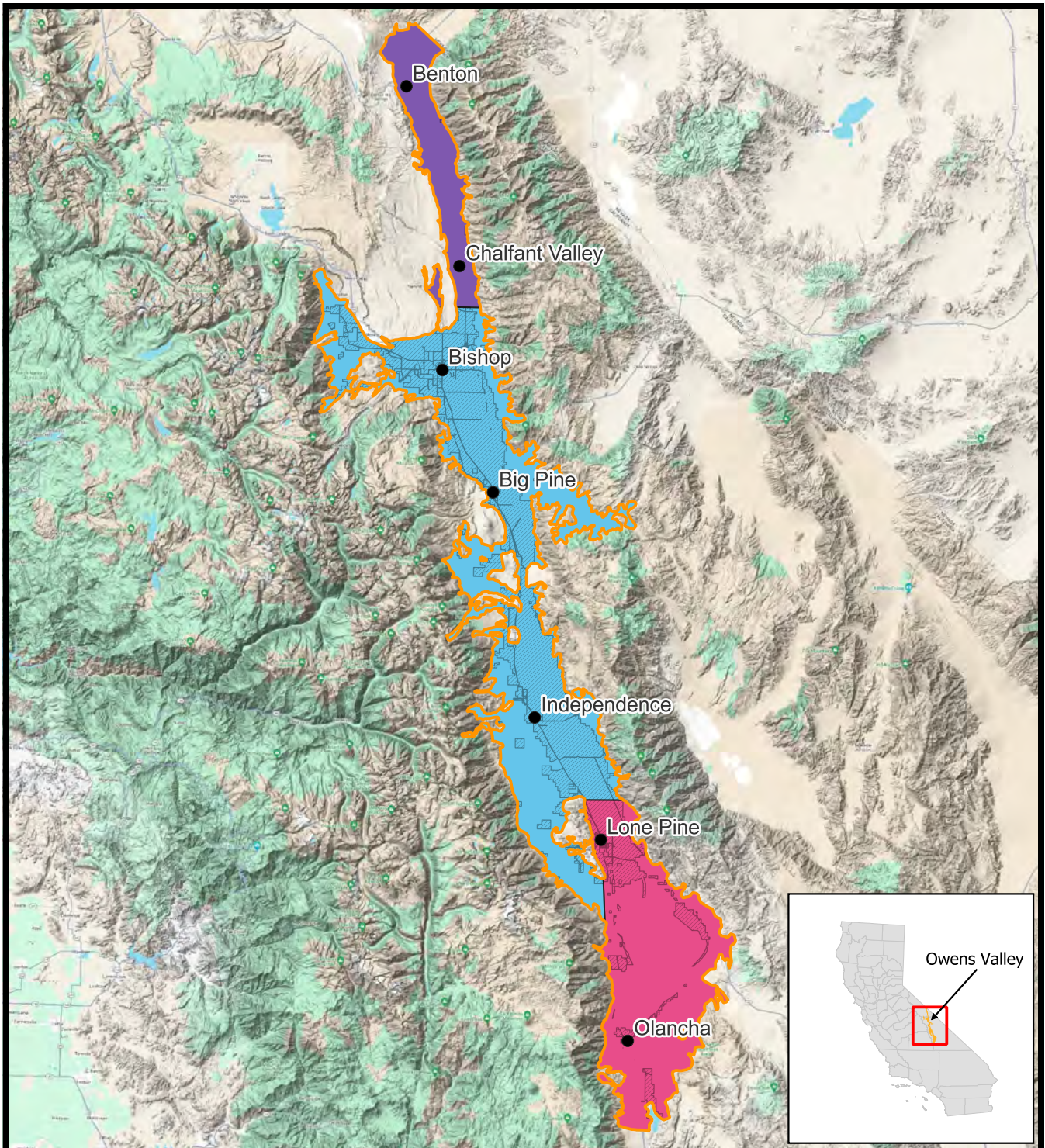
1. LADWP reports total flow volume in AF for the month, which is multiplied by a factor of 0.016563 to convert to average daily flow rate in cfs.

DRAFT

Table 5. Total Water Use

| Management Area | Sector | Method | Total Annual Volume (AF) | Accuracy (%) | Range (AF) |
|--------------------------------------|--------------------------|------------------|--------------------------|--------------|--------------------------|
| Fish Slough and Tri-Valley | Agricultural | OpenET | 13,147 | ± 20 | 10,518 - 15,776 |
| | Agricultural | Totalizer | 1,969 | ± 5 | 1,871 - 2,067 |
| | Agricultural | Unknown | 2,163 | ± 33 | 1,449 - 2,877 |
| | Agricultural | Weir | 3,150 | ± 5 | 2,992 - 3,308 |
| | Municipal and Industrial | Totalizer | 0 | ± 5 | 0 - 0 |
| | Other | Totalizer | 667 | ± 5 | 634 - 700 |
| | Other | Weir | 895 | ± 5 | 850 - 940 |
| Fish Slough and Tri-Valley Subtotal | | | 21,991 | - | 18,314 - 25,668 |
| Owens Valley | Agricultural | Totalizer | 37,713 | ± 5 | 35,827 - 39,599 |
| | Domestic | Totalizer | 732 | ± 5 | 695 - 769 |
| | Managed Recharge | Totalizer | 0 | ± 5 | 0 - 0 |
| | Managed Wetlands | Totalizer | 19,467 | ± 5 | 18,494 - 20,440 |
| | Municipal and Industrial | Totalizer | 10,726 | ± 5 | 10,190 - 11,262 |
| | Native Vegetation | Totalizer | 8,030 | ± 5 | 7,628 - 8,432 |
| | Other | Totalizer | 2,260 | ± 5 | 2,147 - 2,373 |
| | Tribes | Totalizer | 3,857 | ± 5 | 3,664 - 4,050 |
| Owens Valley Subtotal | | | 82,785 | - | 78,645 - 86,925 |
| Owens Lake | Agricultural | Totalizer | 0 | ± 5 | 0 - 0 |
| | Municipal and Industrial | Totalizer | 2,394 | ± 5 | 2,274 - 2,514 |
| Owens Lake Subtotal | | | 2,394 | - | 2,274 - 2,514 |
| Owens Valley and Owens Lake | Agricultural | Weirs and Flumes | 11,530 | ± 5 | 10,954 - 12,106 |
| | Domestic | Weirs and Flumes | 224 | ± 5 | 213 - 235 |
| | Managed Recharge | Weirs and Flumes | 0 | ± 5 | 0 - 0 |
| | Managed Wetlands | Weirs and Flumes | 5,951 | ± 5 | 5,653 - 6,249 |
| | Native Vegetation | Weirs and Flumes | 2,455 | ± 5 | 2,332 - 2,578 |
| | Other | Weirs and Flumes | 691 | ± 5 | 656 - 726 |
| | Tribes | Weirs and Flumes | 1,179 | ± 5 | 1,120 - 1,238 |
| Owens Valley and Owens Lake Subtotal | | | 22,030 | - | 20,928 - 23,132 |
| Total | | | 129,200 | | 120,161 - 138,239 |

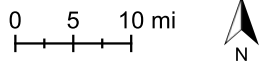
C:\Users\500\Documents\Local_Project_Files\DB23.1300.00 OVGA WY2023 Annual Reports\Docs\WY2022\GIS\GZs\Owens Valley Annual Report WY2022.qgz



Source: <https://gis.water.ca.gov/>

Explanation

- | | |
|----------------------------|----------------------------|
| Management Areas | SGMA Exempt Lands |
| Fish Slough and Tri-Valley | Groundwater Basin Boundary |
| Owens Valley | City or Town |
| Owens Lake | |

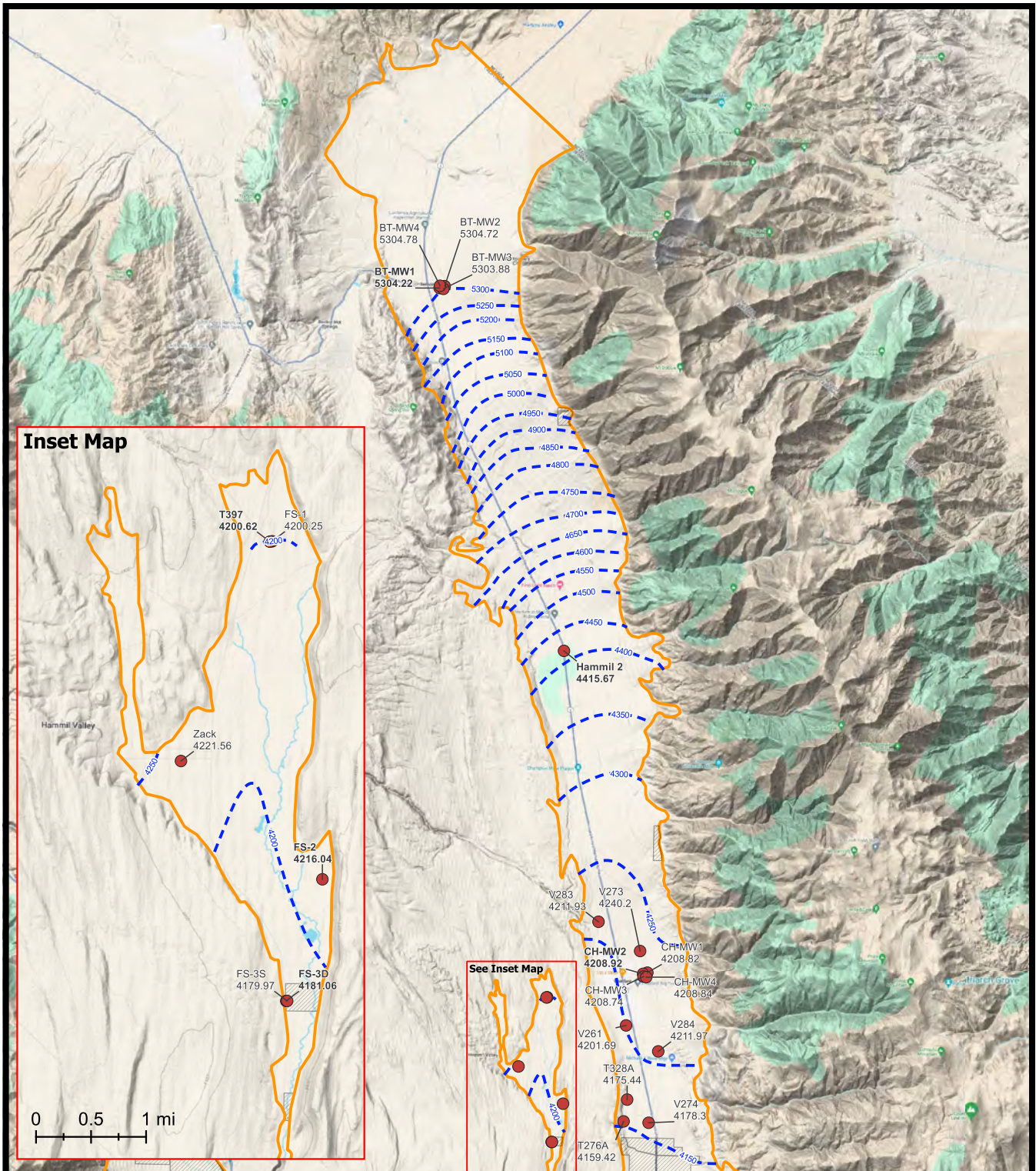


OWENS VALLEY GROUNDWATER AUTHORITY

01/22/2024

OWENS VALLEY GSP ANNUAL REPORT WY 2022 Location Map and Groundwater Basin Boundary

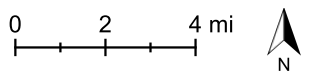
Figure 1



Explanation

- Well Name
- Water Level Elevation (ft amsl)
- Water Level Contour (ft amsl)
- Groundwater Basin Boundary
- SGMA Exempt Lands

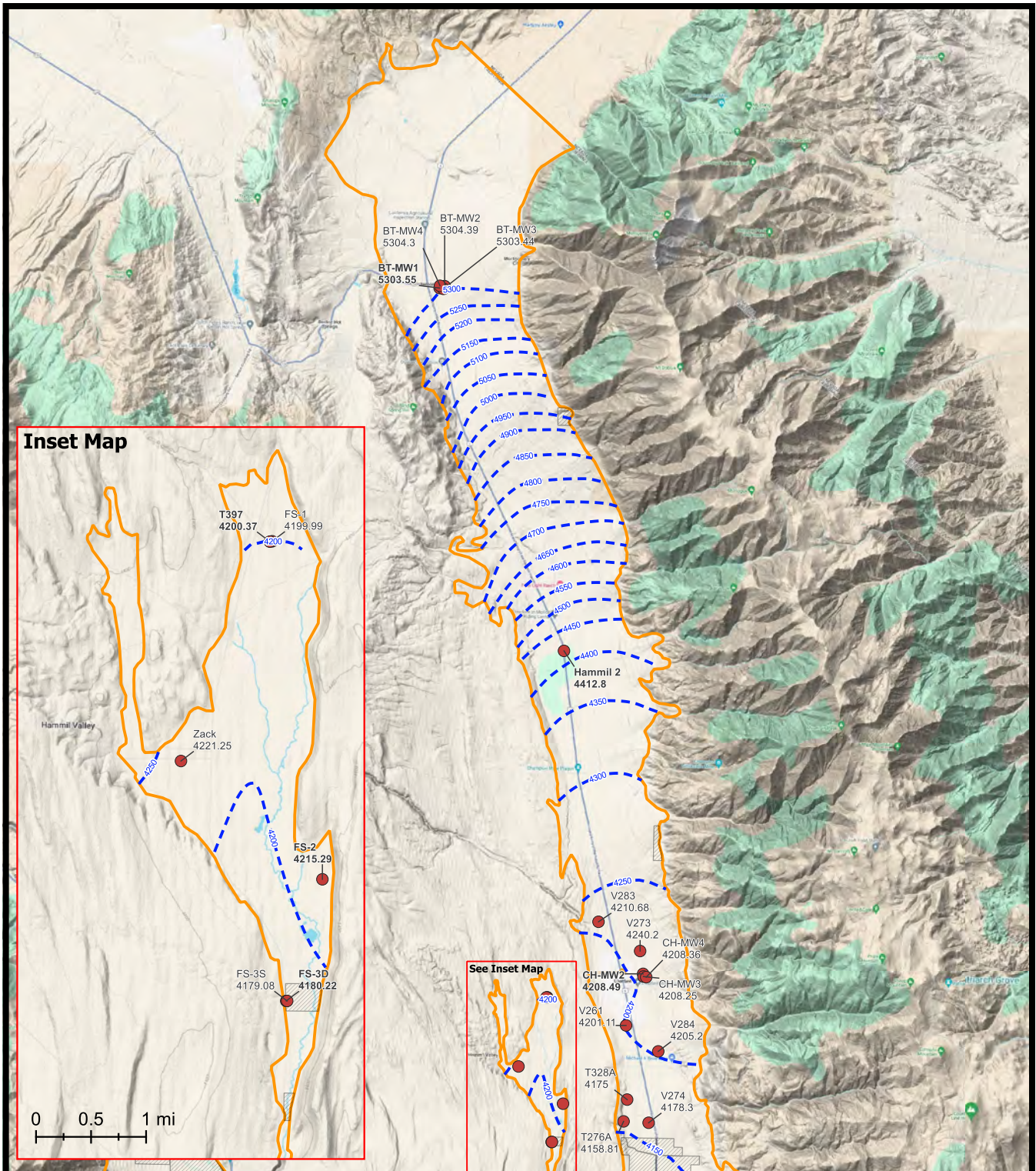
Notes:
1. Bold labels indicate RMPs.



**OWENS VALLEY GSP ANNUAL REPORT WY 2022
Spring Groundwater Elevations
Fish Slough and Tri-Valley Management Area**

03/04/2024

Figure 2

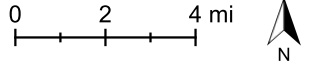


Source: <https://owens.gladata.com>

Explanation

- Well Name
- Water Level Contour (ft amsl)
- SGMA Exempt Lands
- Groundwater Basin Boundary

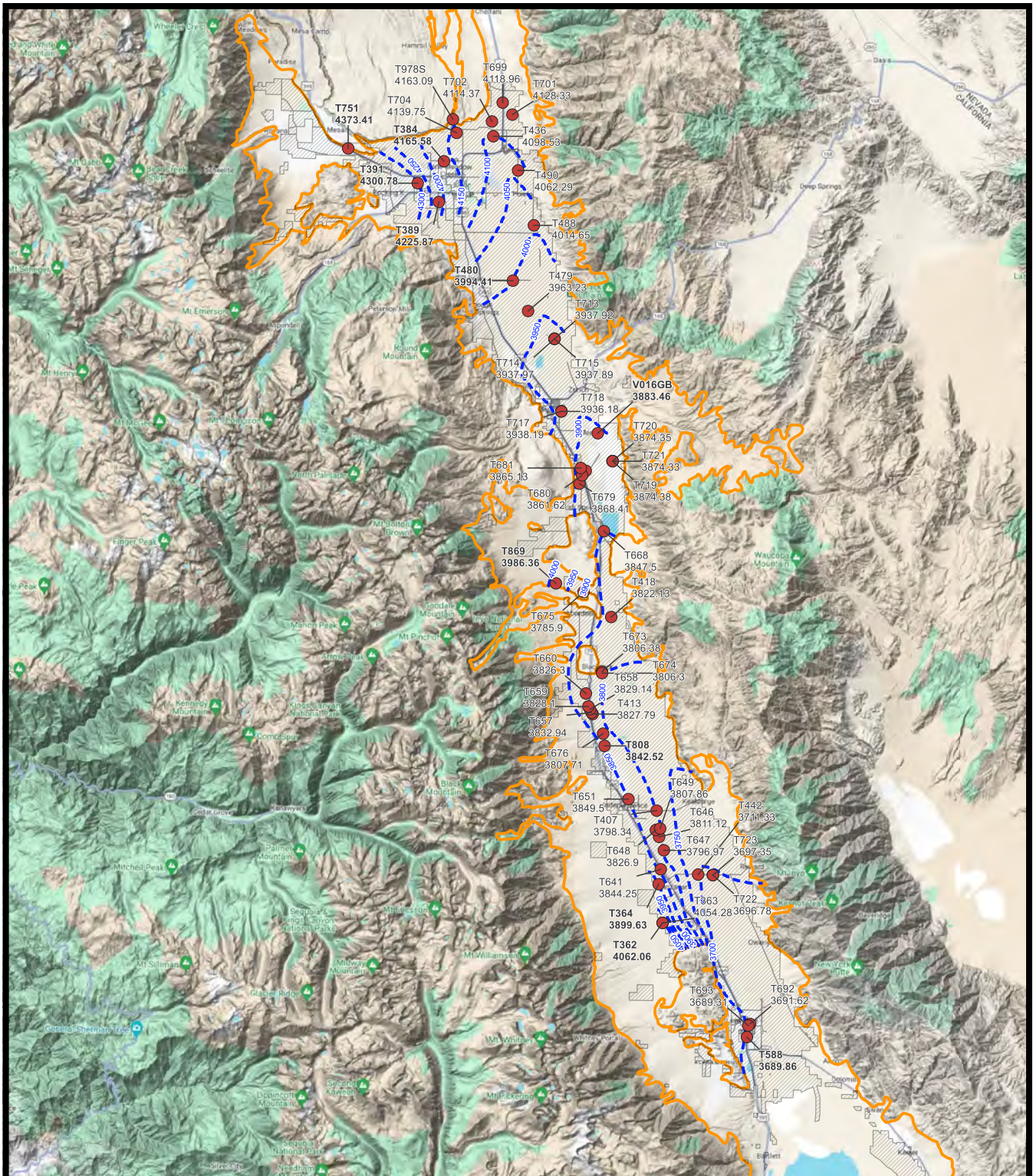
Notes:
1. Bold labels indicate RMPs.



OWENS VALLEY GSP ANNUAL REPORT WY 2022
Fall Groundwater Elevations
Fish Slough and Tri-Valley Management Area

03/04/2024

Figure 3

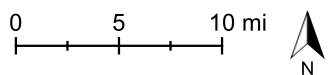


Source: <https://owens.gladata.com/>

Explanation

- Well Name
- Water Level Elevation (ft amsl)
- Water Level Contour (ft amsl)
- Groundwater Basin Boundary
- SGMA Exempt Lands

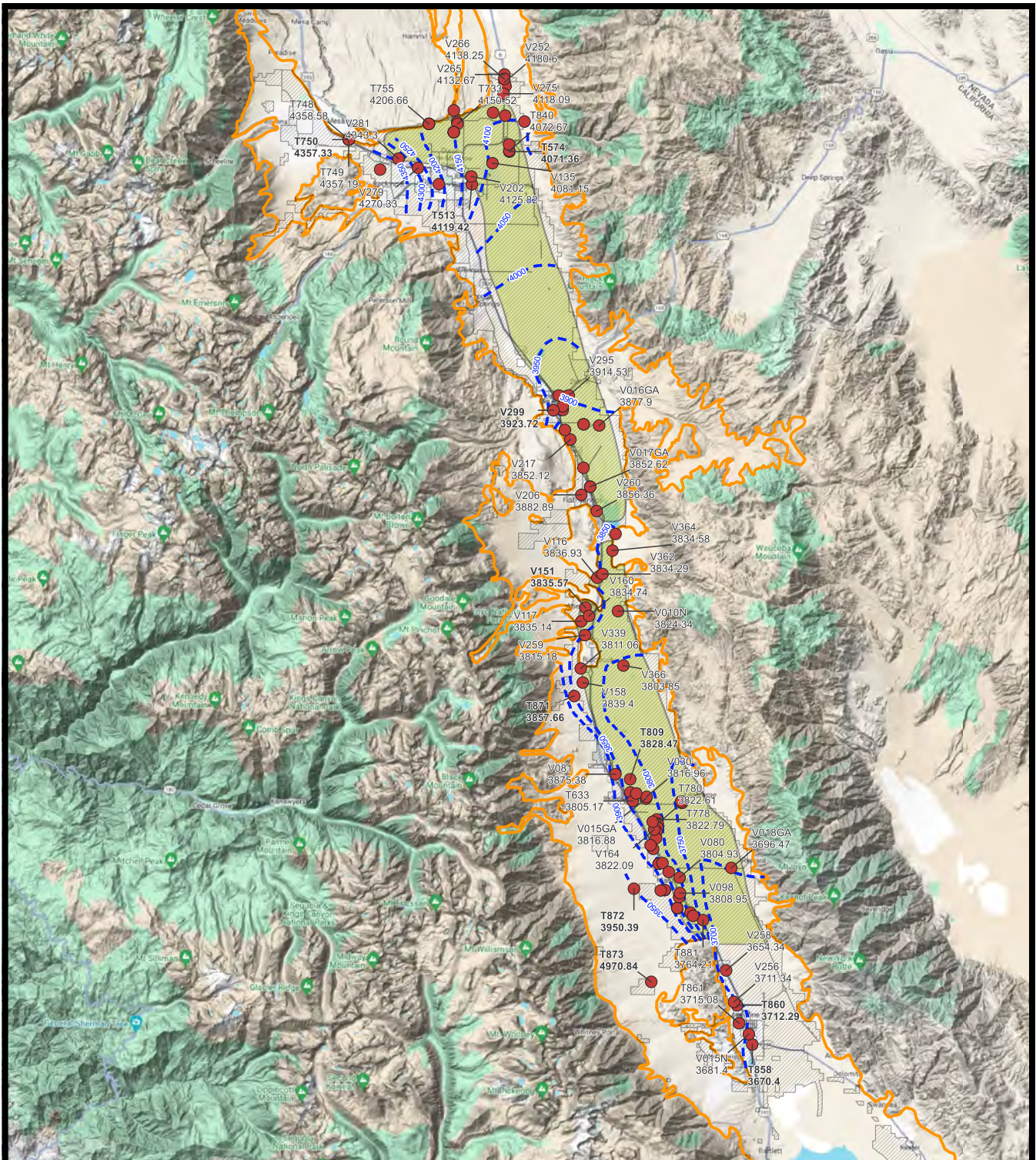
- Notes:**
1. Bold labels indicate RMP.
 2. Not all labels shown.



OWENS VALLEY GSP ANNUAL REPORT WY 2022
Spring Groundwater Elevations
Owens Valley Management Area - Shallow Aquifer

03/04/2024

Figure 4

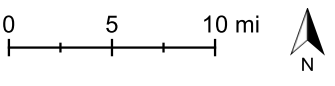


Sources: Danskin (1998); <https://owens.gladata.com/>

Explanation

- Well Name
- Water Level Elevation (ft amsl)
- Water Level Contour (ft amsl)
- Approximate Area of Confinement
- Groundwater Basin Boundary
- SGMA Exempt Lands

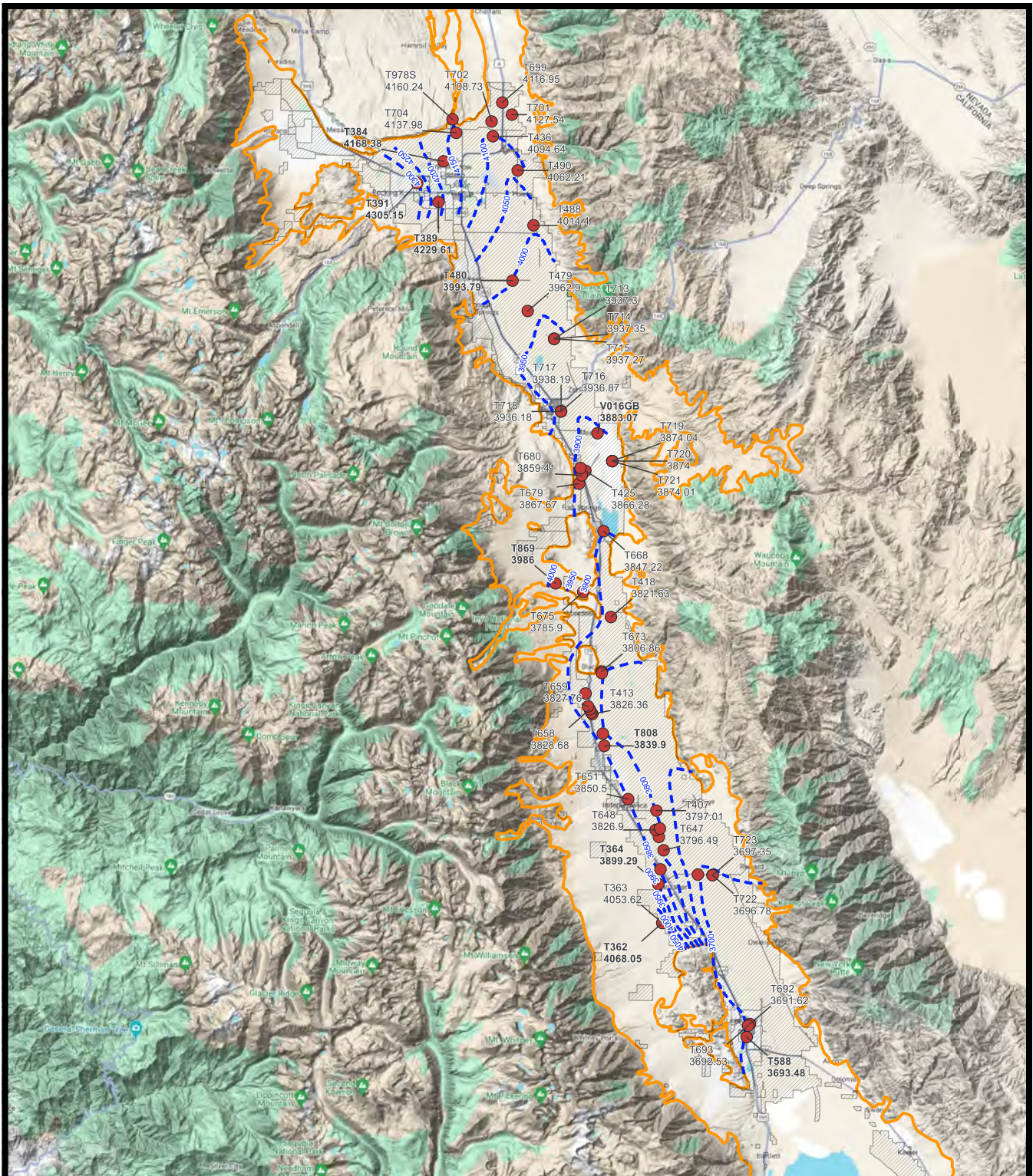
- Notes:**
1. Bold labels indicate RMPs.
 2. Not all labels shown.



OWENS VALLEY GSP ANNUAL REPORT WY 2022
Spring Groundwater Elevations
Owens Valley Management Area - Deep Aquifer

03/04/2024

Figure 5

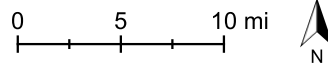


Source: <https://owens.gladata.com/>

Explanation

- Well Name
Water Level Elevation (ft amsl)
- Water Level Contour (ft amsl)
- ▨ SGMA Exempt Lands
- ▭ Groundwater Basin Boundary

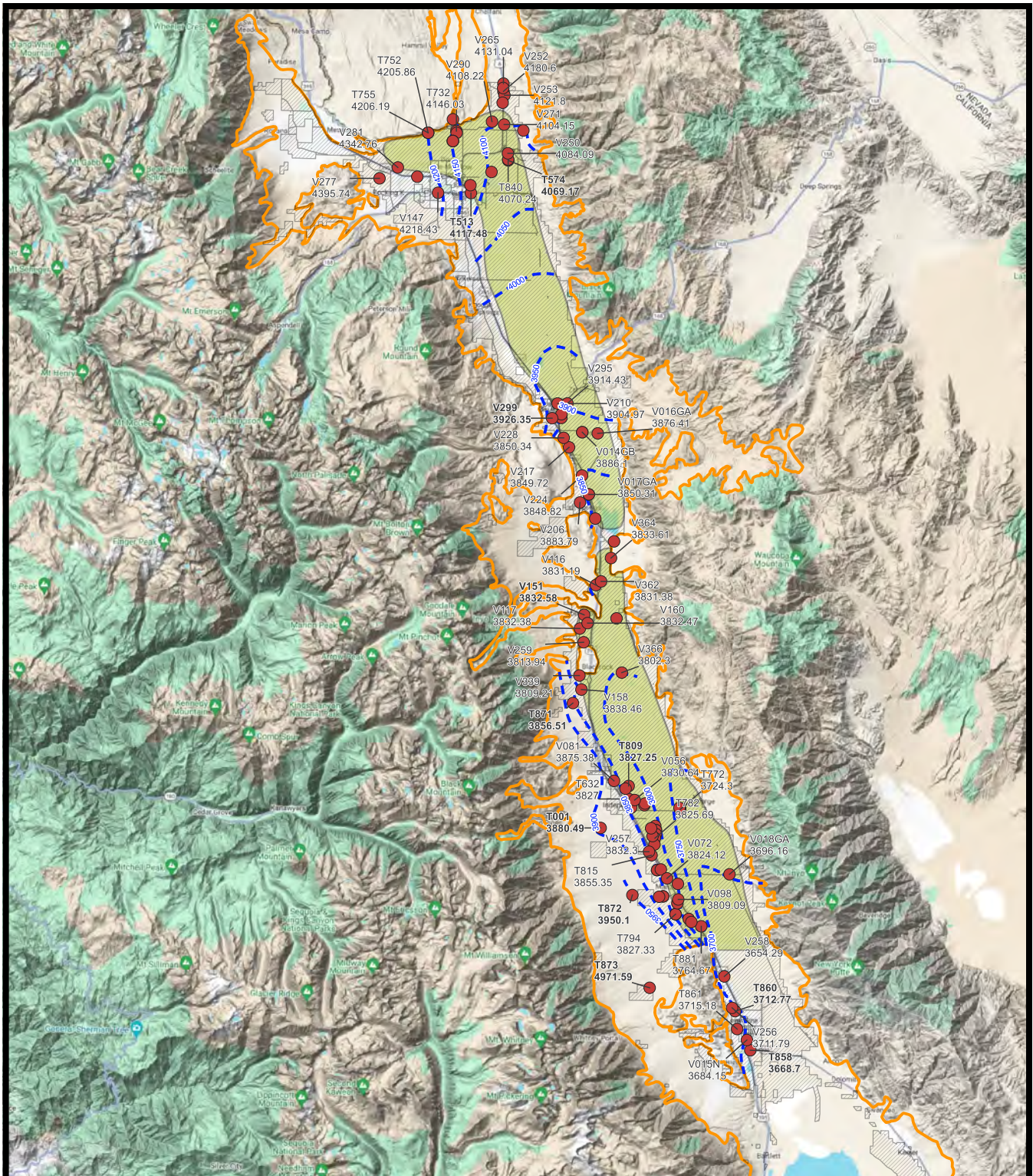
- Notes:
1. Bold labels indicate RMPs.
 2. Not all labels shown.



OWENS VALLEY GSP ANNUAL REPORT WY 2022
Fall Groundwater Elevations
Owens Valley Management Area - Shallow Aquifer

03/04/2024

Figure 6

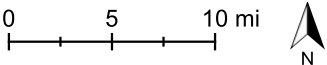


Explanation

- Well Name
- Water Level Elevation (ft amsl)
- **Water Level Contour (ft amsl)**
- **SGMA Exempt Lands**
- Approximate Area of Confinement
- Groundwater Basin Boundary

Sources: Danskin (1998); <https://owens.gldata.com/>

- Notes:**
1. Bold labels indicate RMPs.
 2. Not all labels shown.

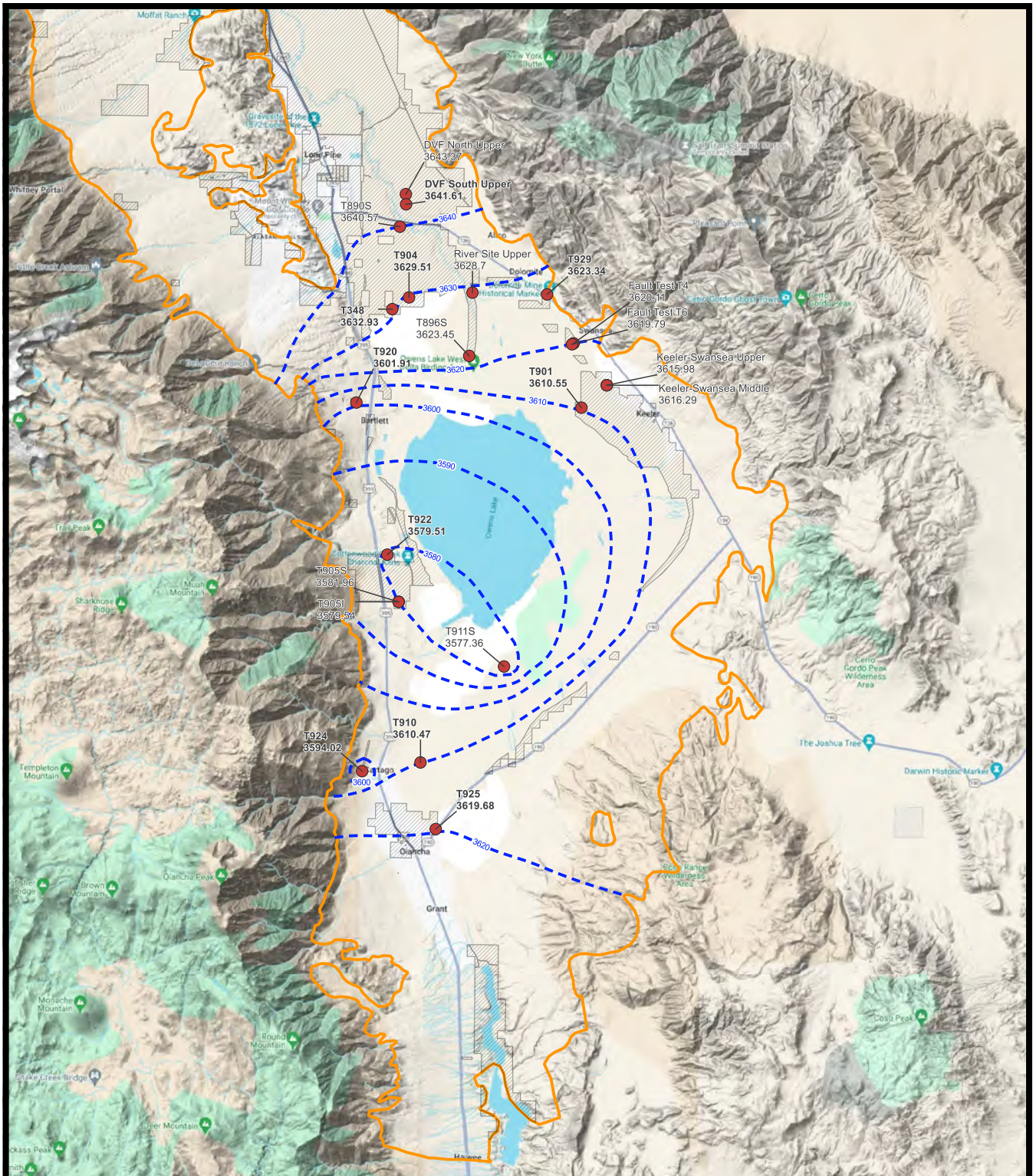


OWENS VALLEY GSP ANNUAL REPORT WY 2022
Fall Groundwater Elevations
Owens Valley Management Area - Deep Aquifer

03/04/2024

Figure 7

C:\Users\5001\Documents\Local_Project_Files\DB23.1300.00\OVGA WY2023 Annual Reports\Docs\WY2022\GIS\GZs\Owens Valley Annual Report WY2022.qgz

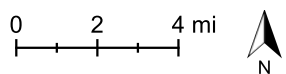


Explanation

- Well Name
- Water Level Contour (ft amsl)
- SGMA Exempt Lands
- Groundwater Basin Boundary

Notes:
1. Bold labels indicate RMPs.

Source: <https://owens.gldata.com/>

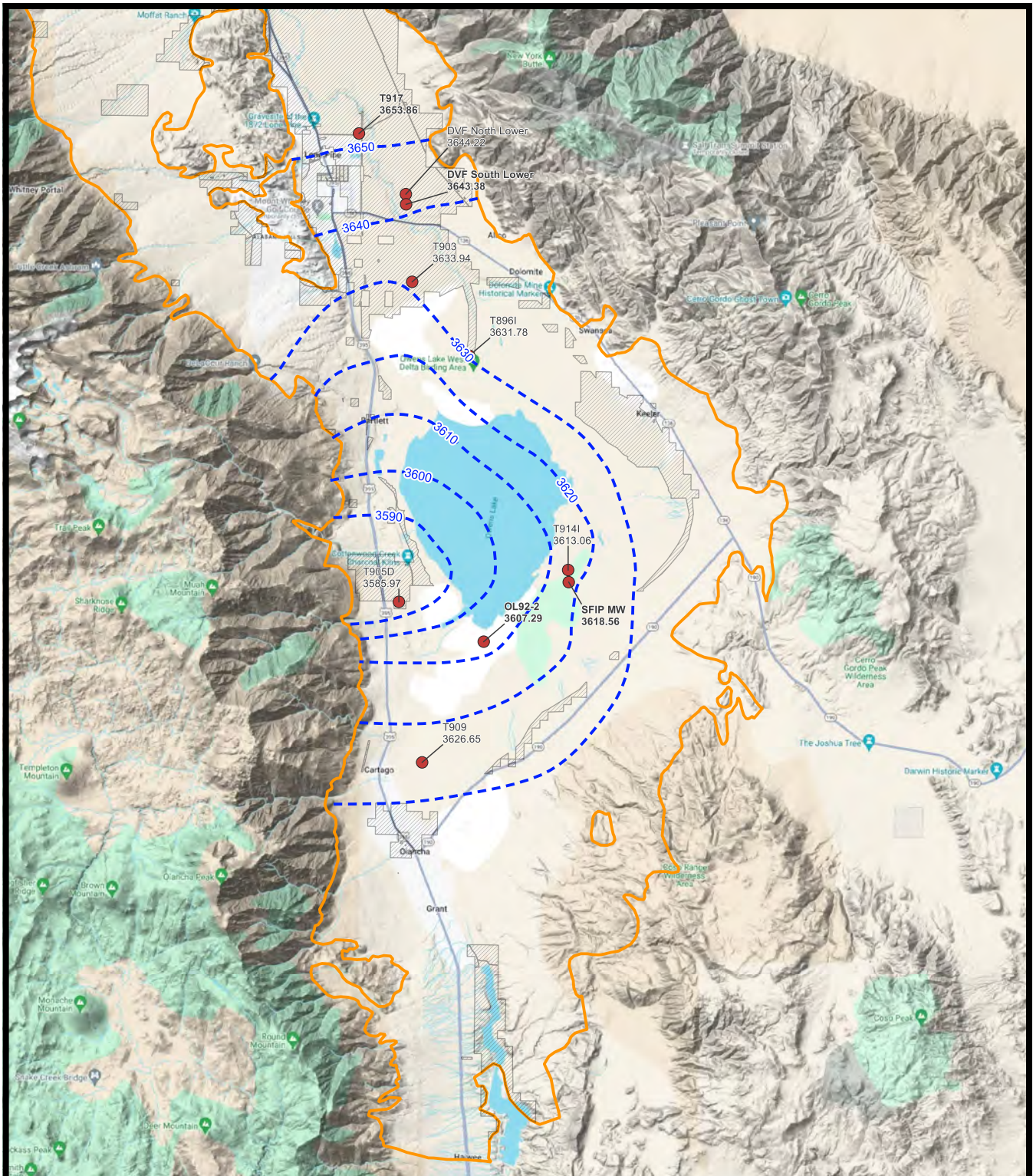


OWENS VALLEY GSP ANNUAL REPORT WY 2022
Spring Groundwater Elevations
Owens Lake Management Area - Aquifer 1

03/04/2024

Figure 8

C:\Users\5001\Documents\Local_Project_Files\DB23.1300.00\OVGA WY2023 Annual Reports\GIS\IGZs\Owens Valley Annual Report WY2022.qgz

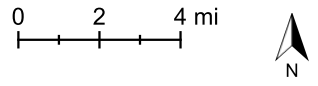


Source: <https://owens.gldata.com/>

Explanation

- Well Name
Water Level Elevation (ft amsl)
- Water Level Contour (ft amsl)
- SGMA Exempt Lands
- Groundwater Basin Boundary

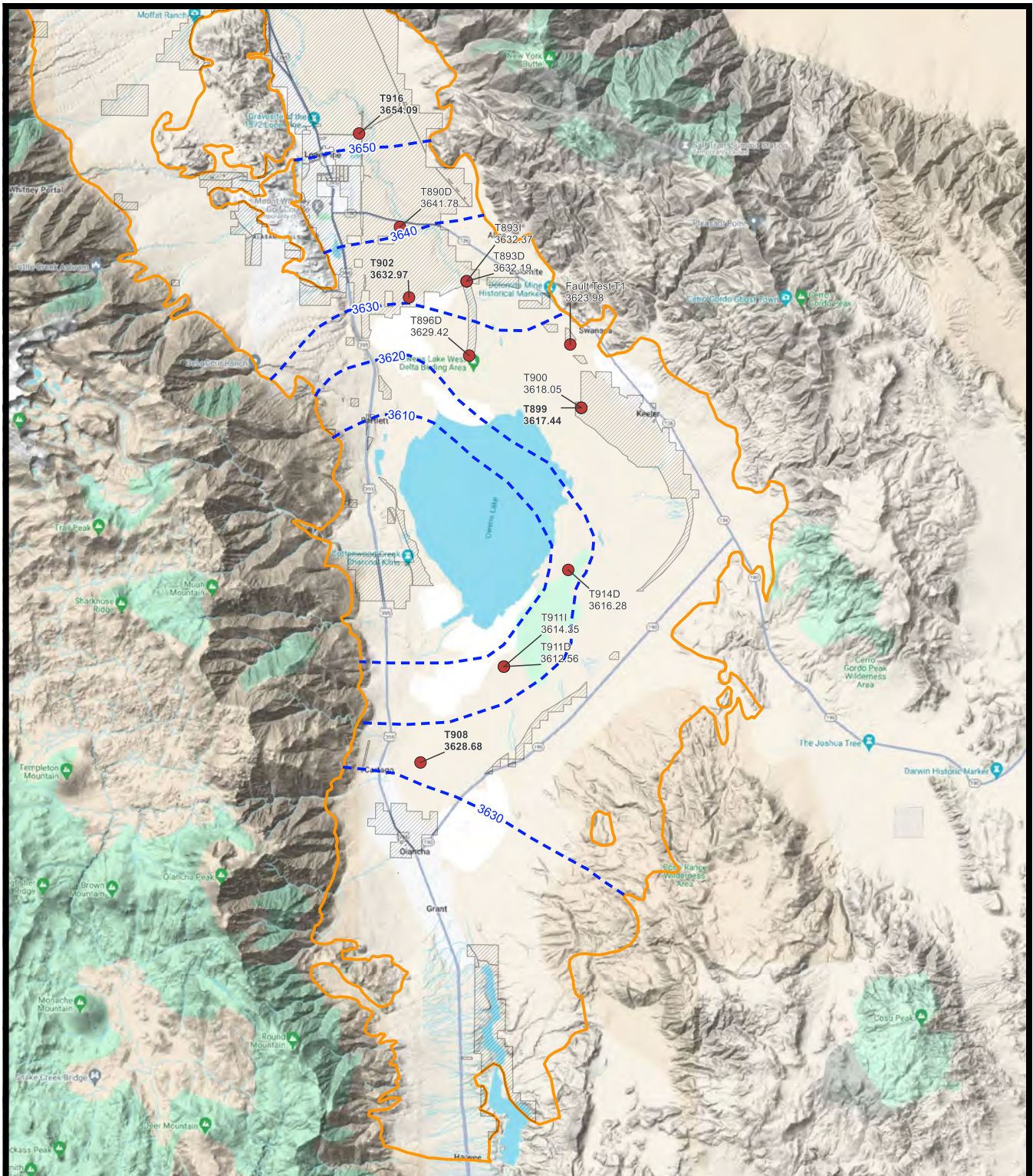
Notes:
1. Labels indicate RMPs.



OWENS VALLEY GSP ANNUAL REPORT WY22
Spring Groundwater Elevations
Owens Lake Management Area - Aquifer 3

03/04/2024

Figure 9

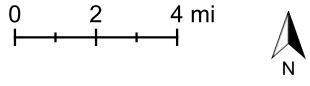


Source: <https://owens.gladata.com>

Explanation

- Well Name
- Water Level Elevation (ft amsl)
- Water Level Contour (ft amsl)
- Groundwater Basin Boundary
- SGMA Exempt Lands

Notes:
1. Bold labels indicate RMPs.

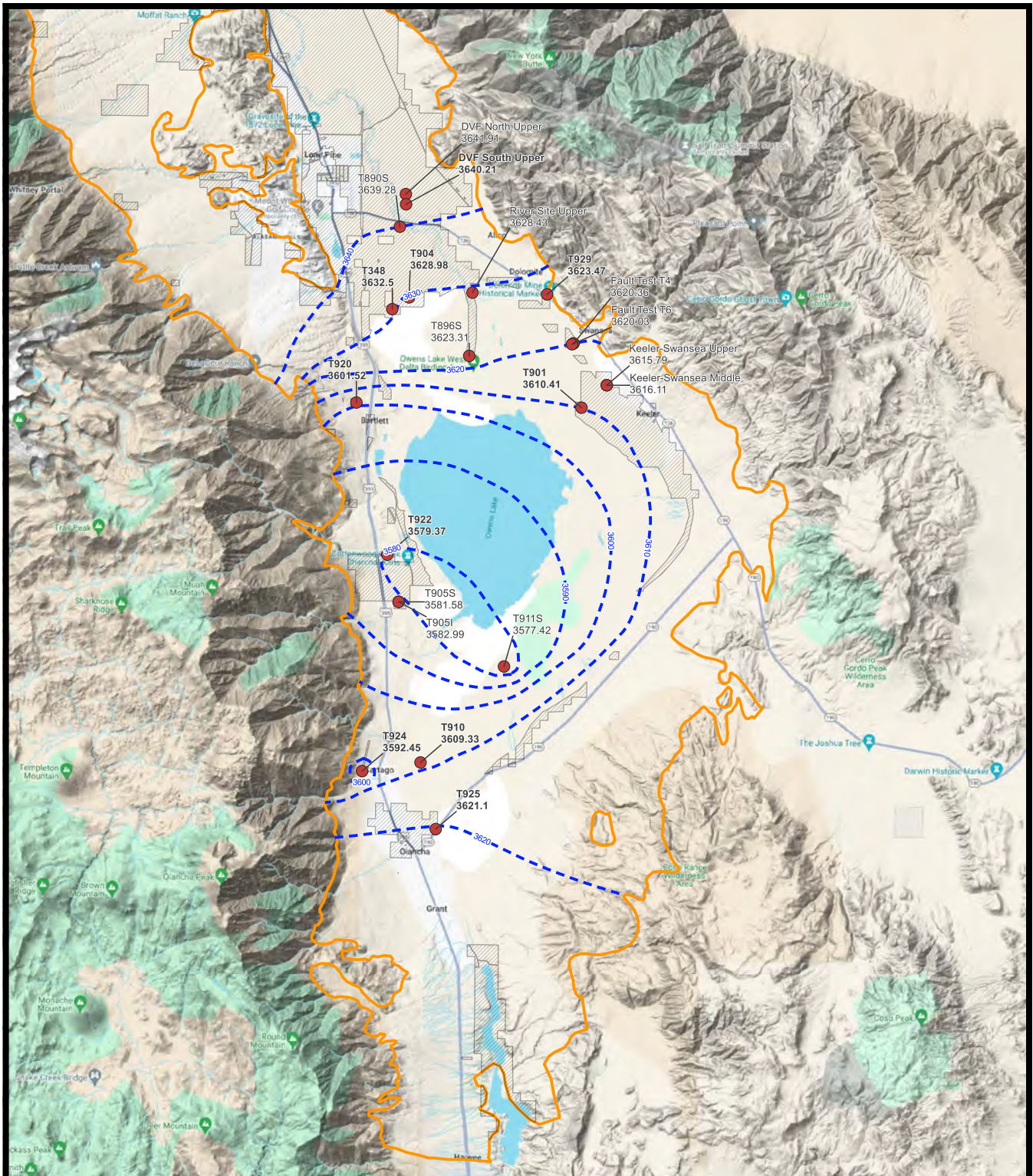


OWENS VALLEY GSP ANNUAL REPORT WY 2022
Spring Groundwater Elevations
Owens Lake Management Area - Aquifer 5

03/04/2024

Figure 10

C:\Users\1500\Documents\Local_Project_Files\DB23.1300.00\OVGA WY2023 Annual Reports\Docs\WY2022\GIS\GZs\Owens Valley Annual Report WY2022.qgz

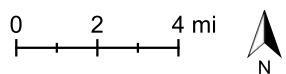


Source: <https://owens.gladata.com>

Explanation

- Well Name
- Water Level Elevation (ft amsl)
- Water Level Contour (ft amsl)
- SGMA Exempt Lands
- Groundwater Basin Boundary

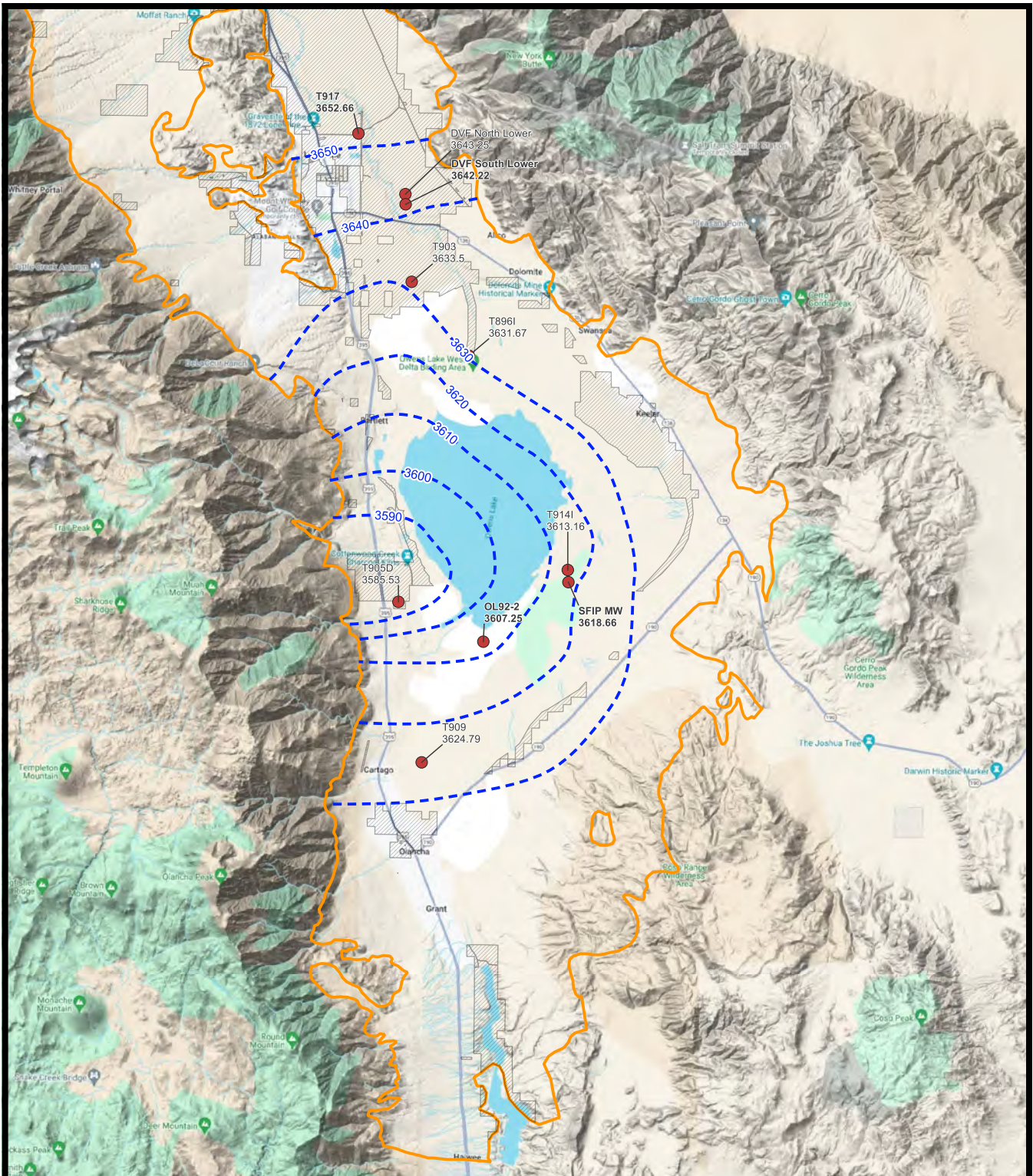
Notes:
1. Bold labels indicate RMPs.



OWENS VALLEY GSP ANNUAL REPORT WY 2022
Fall Groundwater Elevations
Owens Lake Management Area - Aquifer 1

03/04/2024

Figure 11

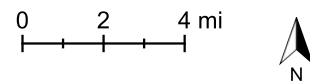


Source: <https://owens.gladata.com>

Explanation

- Well Name
- Water Level Elevation (ft amsl)
- Water Level Contour (ft amsl)
- SGMA Exempt Lands
- Groundwater Basin Boundary

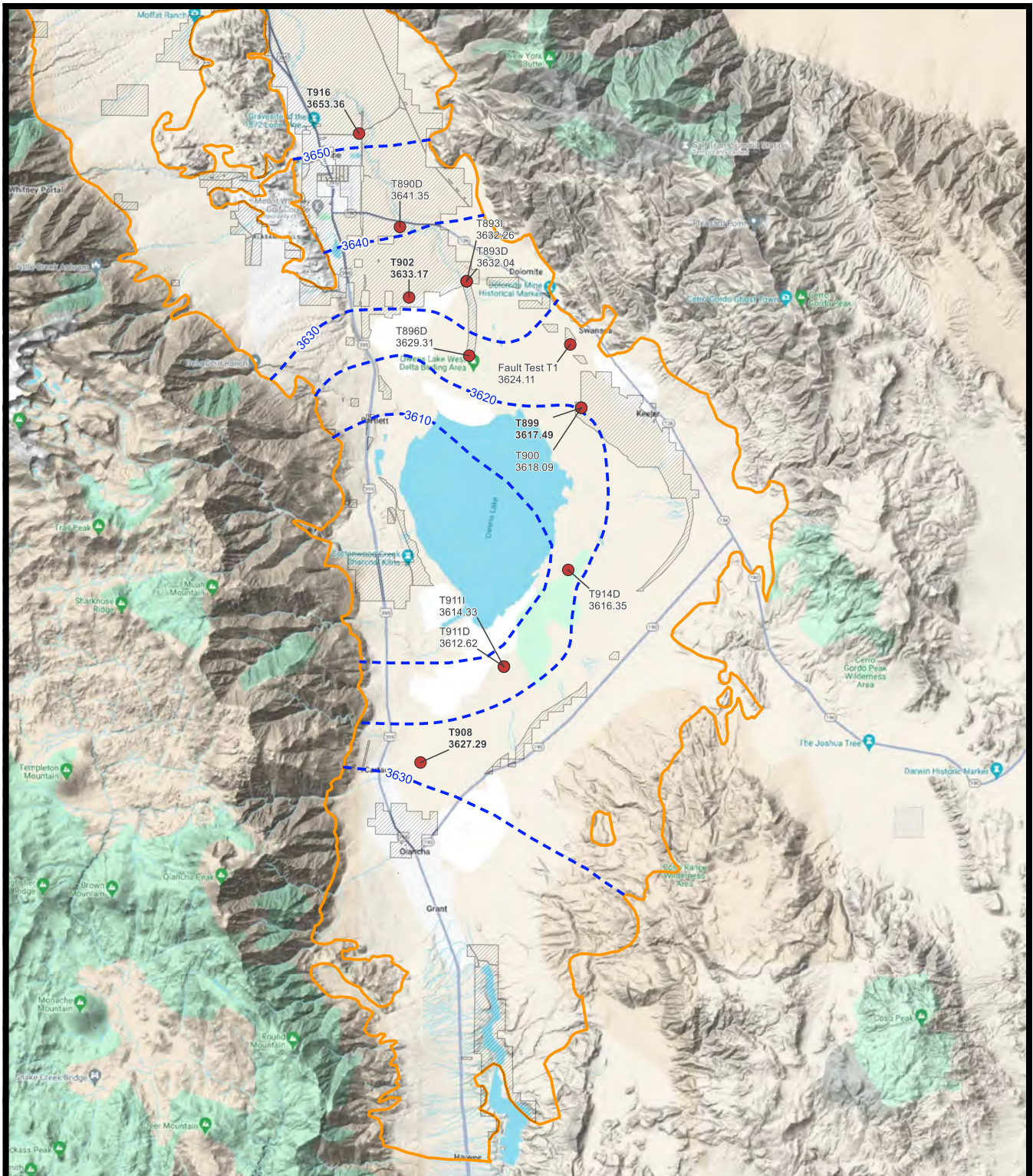
Notes:
1. Bold labels indicate RMPs.



03/04/2024

**OWENS VALLEY GSP ANNUAL REPORT WY 2022
Fall Groundwater Elevations
Owens Lake Management Area - Aquifer 3**

Figure 12

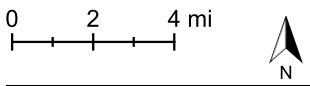


Source: <https://owens.gladata.com>

Explanation

- Well Name
- Water Level Elevation (ft amsl)
- Water Level Contour (ft amsl)
- Groundwater Basin Boundary
- SGMA Exempt Lands

Notes:
1. Bold labels indicate RMPs.



OWENS VALLEY GSP ANNUAL REPORT WY 2022
Fall Groundwater Elevations
Owens Lake Management Area - Aquifer 5

03/04/2024

Figure 13

T001

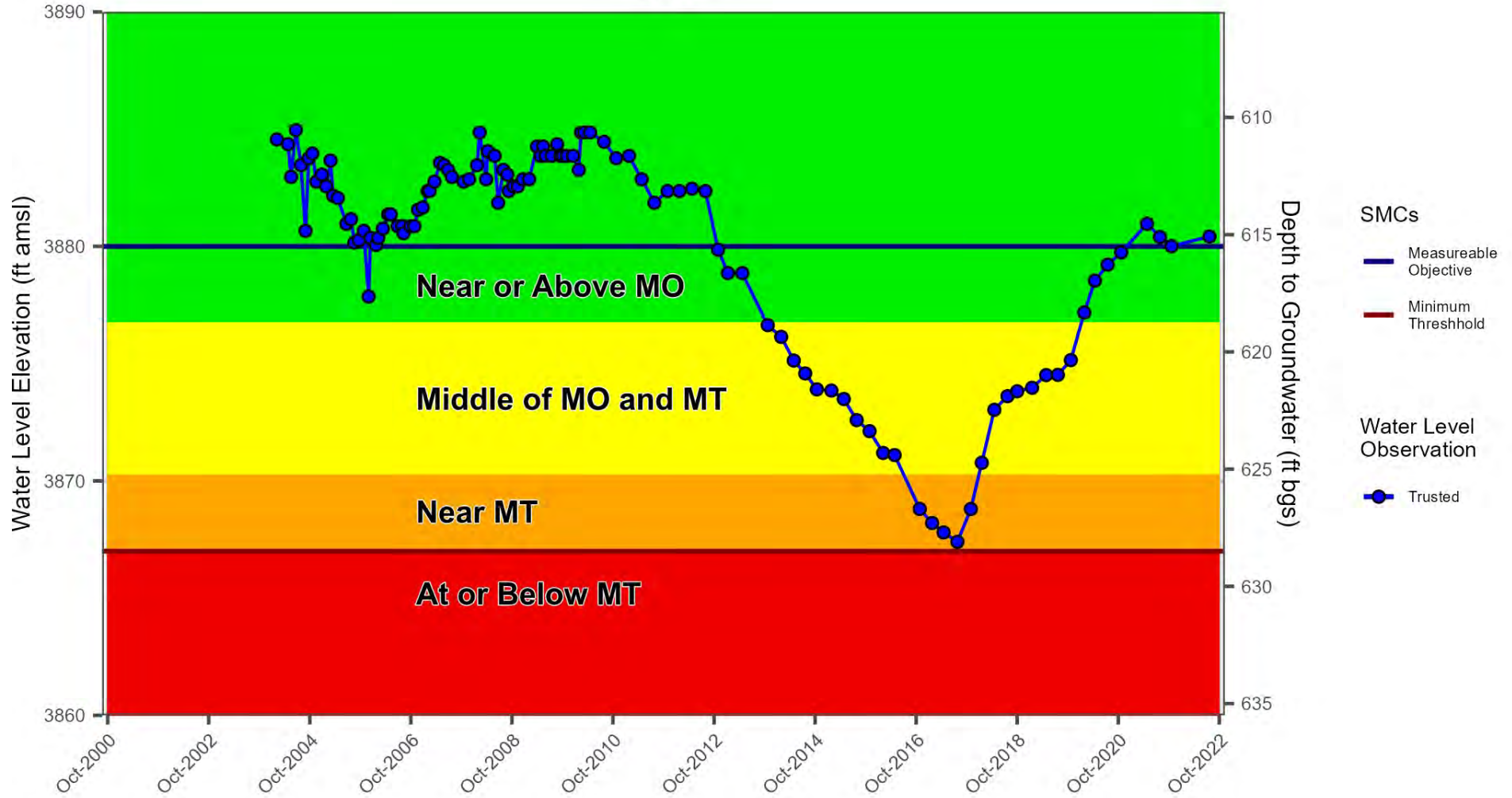
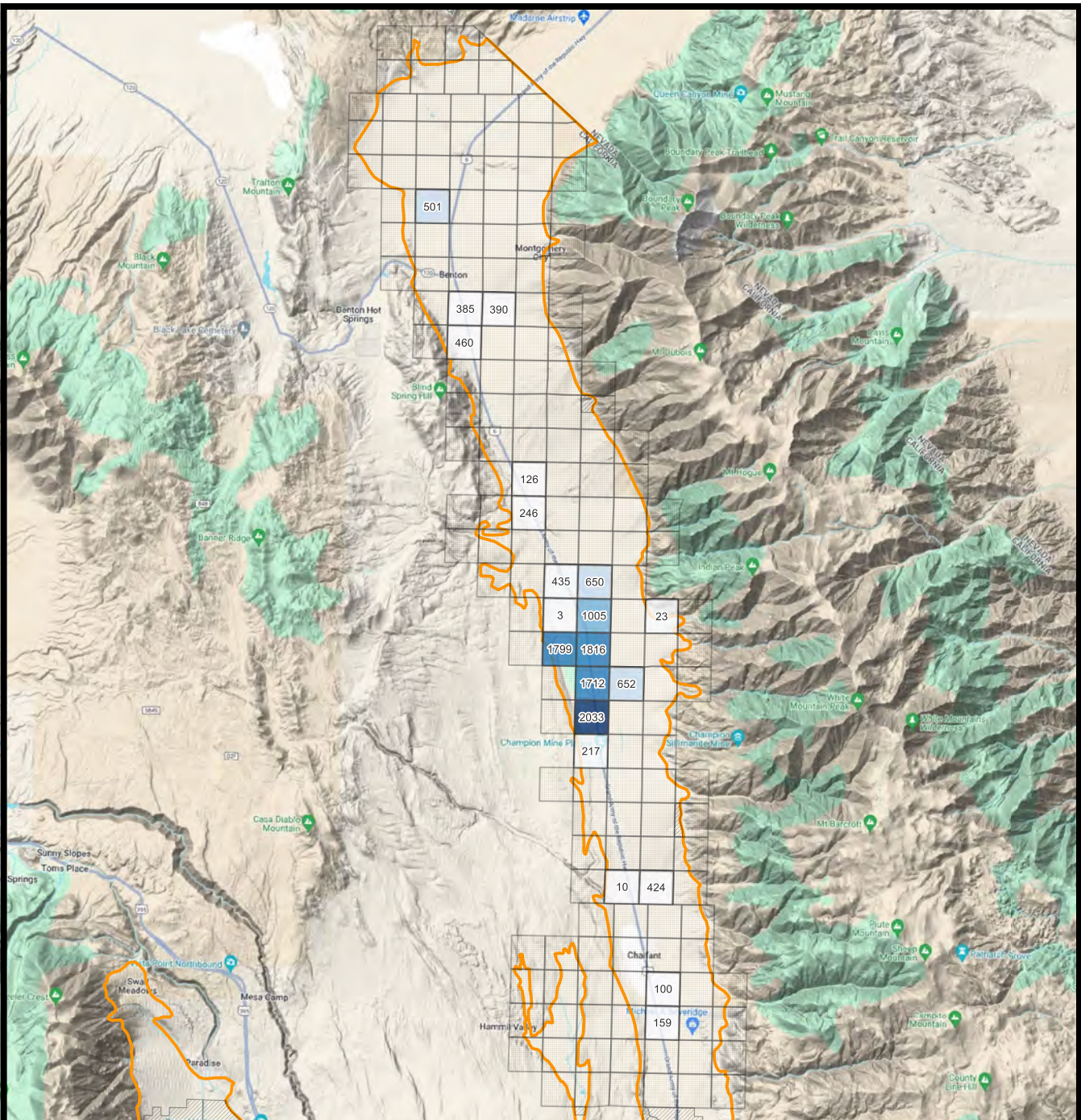


Figure 14





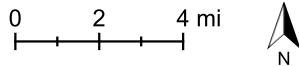
Sources: <https://openetdata.org>; <https://owens.gladata.com>

Explanation

- Extraction Volume (AF)
- No Extractions
- 0 - 500
- 500 - 1,000
- 1,000 - 1,500
- 1,500 - 2,000
- 2,000 - 2,500
- SGMA Exempt Lands
- Groundwater Basin Boundary

Notes:

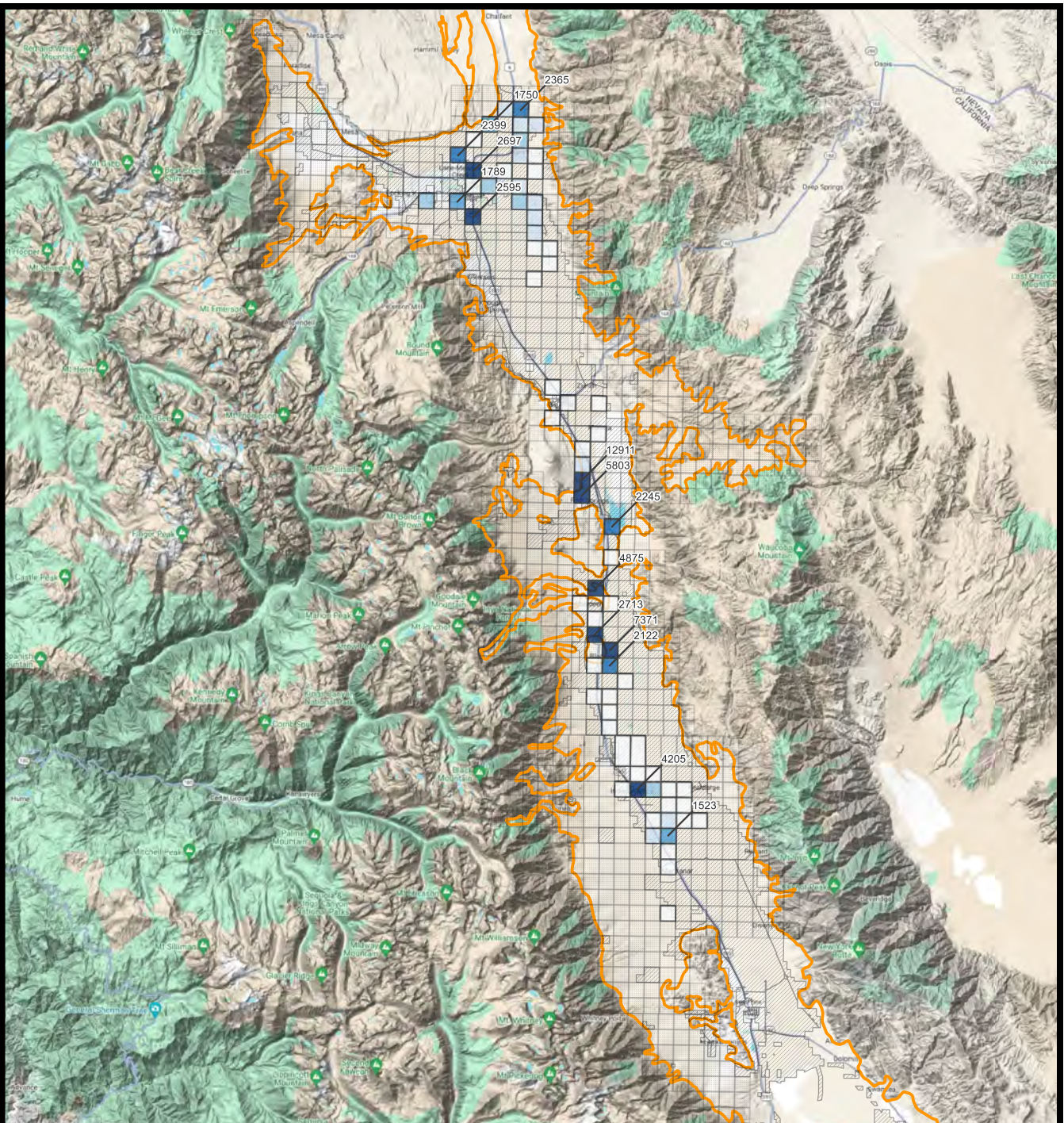
1. No extraction data available. Volumes and locations estimated from Open ET and are assumed to represent agricultural uses.
2. Reported groundwater extractions likely overestimated due to unknown application volume of surface water on some fields.
3. Pumping from Chalfant Valley West MWC not included.
4. Estimated extraction volumes aggregated by public land survey system (PLSS) section.
5. Labels indicate estimated extraction volume in acre-ft (AF).



02/27/2024

**OWENS VALLEY GSP ANNUAL REPORT WY 2022
Estimated Groundwater Extractions
Fish Slough and Tri-Valley Management Area**

Figure 15



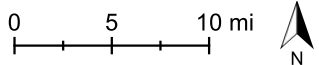
Sources: <https://gis.conservation.ca.gov/>; <https://owens.gladata.com>

Explanation

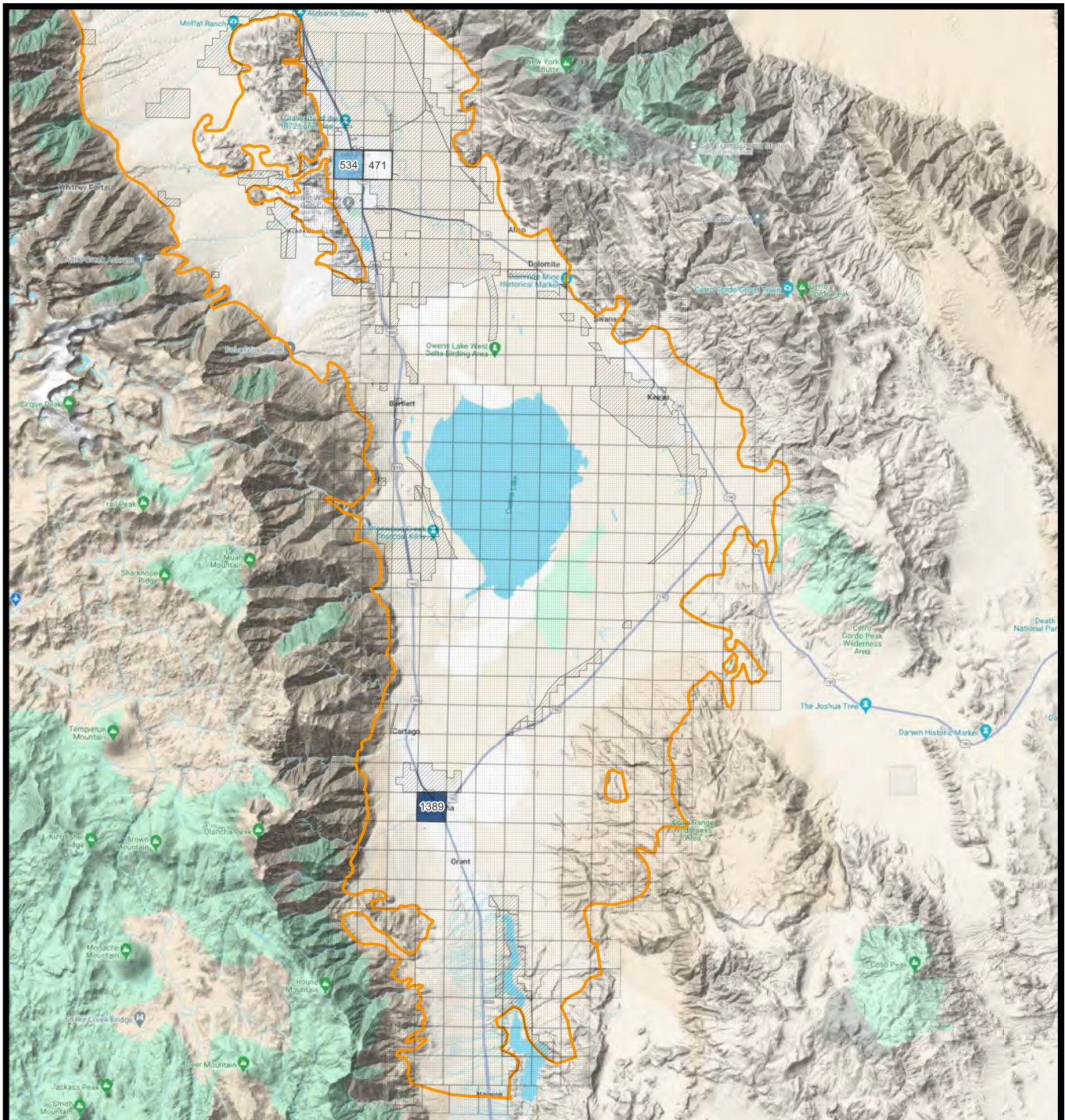
- Extraction Volume (AF)
- No Extractions
- < 500
- 500 - 1,000
- 1,000 - 1,500
- 1,500 - 2,000
- 2,000 - 2,500
- > 2,500
- SGMA Exempt Lands
- Groundwater Basin Boundary

Notes:

1. LADWP extracts the majority of groundwater in the Owens Valley under the Long-Term Water Agreement. Well-specific contributions to each water-use sector reported in Table 1 are not measured by LADWP.
2. Estimated extraction volumes aggregated by public land survey system (PLSS) section.
3. Labels indicate estimated extraction volume in acre-ft (AF). Only labels for sections with more than 1,500 AF of extraction shown for readability.



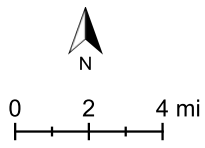
**OWENS VALLEY GSP ANNUAL REPORT WY 2022
Measured Groundwater Extractions
Owens Valley Management Area**



Sources: <https://gis.conservation.ca.gov/>; <https://owens.gladata.com>

Explanation

- | | |
|--|--|
| <p>Extraction Volume (AF)</p> <ul style="list-style-type: none"> No Extractions 0 - 500 500 - 1,000 1,000 - 1,500 | <ul style="list-style-type: none"> SGMA Exempt Lands Groundwater Basin Boundary |
|--|--|



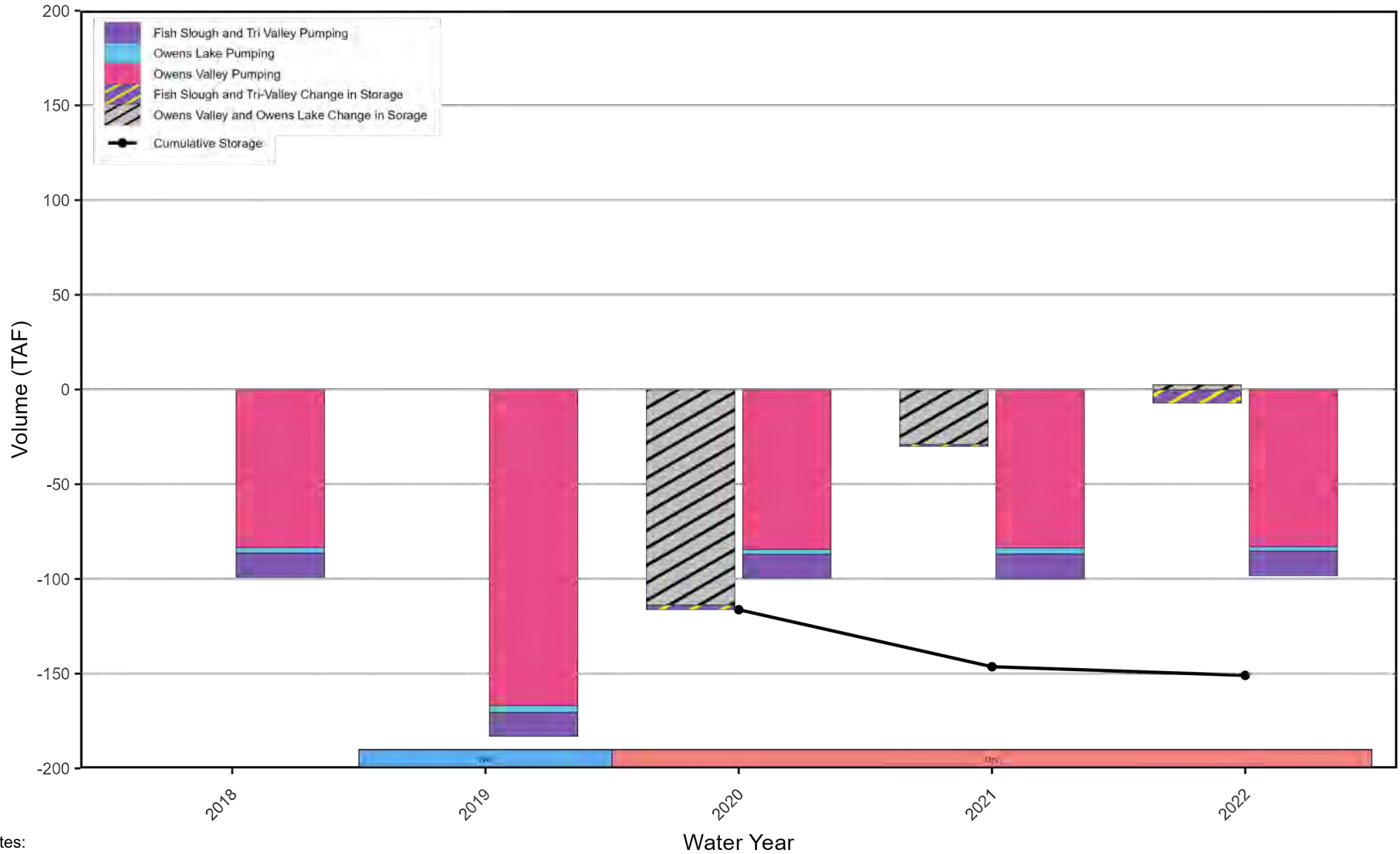
Notes:

1. LADWP extracts the majority of groundwater in the Owens Lake management area under the Long-Term Water Agreement. Well-specific contributions to each water-use sector reported in Table 1 are not measured by LADWP.
2. Estimated extraction volumes aggregated by public land survey system (PLSS) section.
3. Labels indicate estimated extraction volume in acre-ft (AF).

**OWENS VALLEY GSP ANNUAL REPORT WY 2022
Measured Groundwater Extractions
Owens Lake Management Area**



Annual Groundwater Pumping and Change in Storage



- Notes:
1. TAF = thousand acre-ft.
 2. Negative GW pumping values indicate extractions from groundwater aquifer.
 3. Positive storage values indicate increasing groundwater levels.
 4. Cumulative storage is relative to Fall 2019 conditions since WY 2020 was the first year it was reported by LADWP.

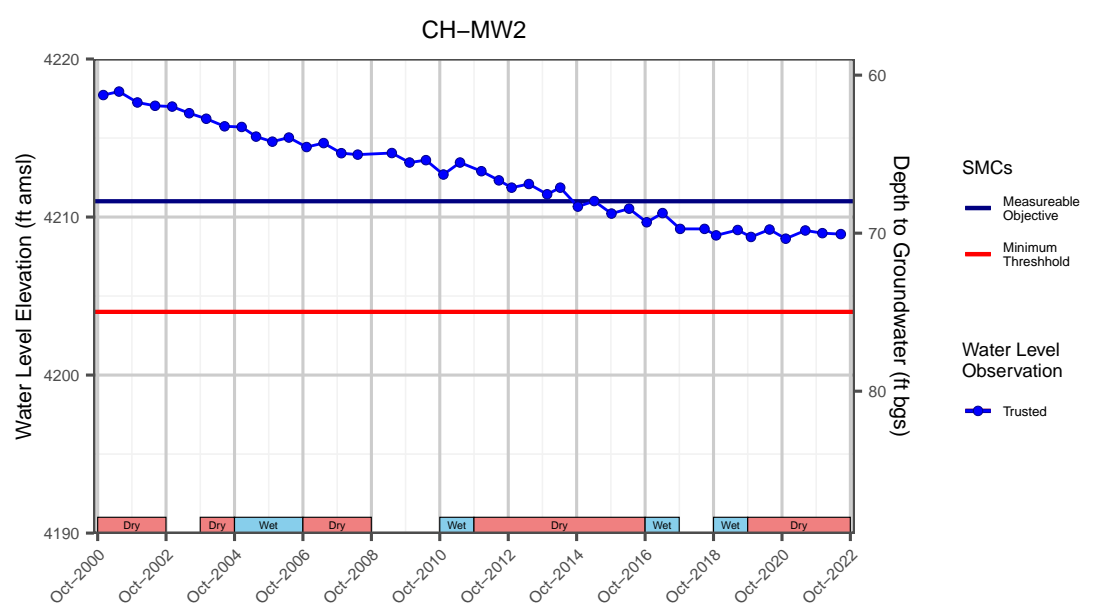
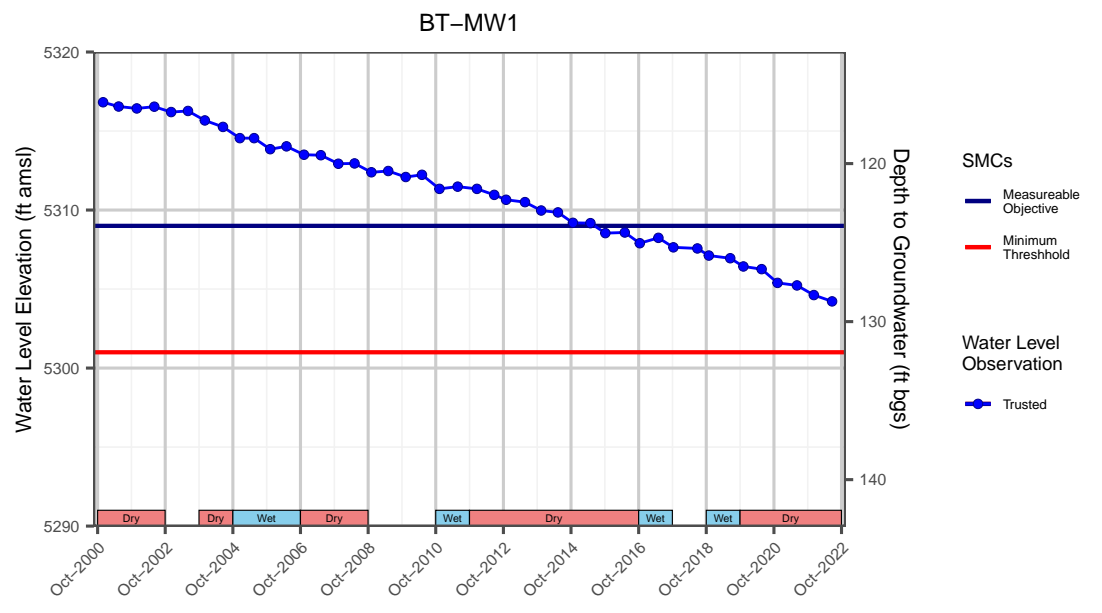
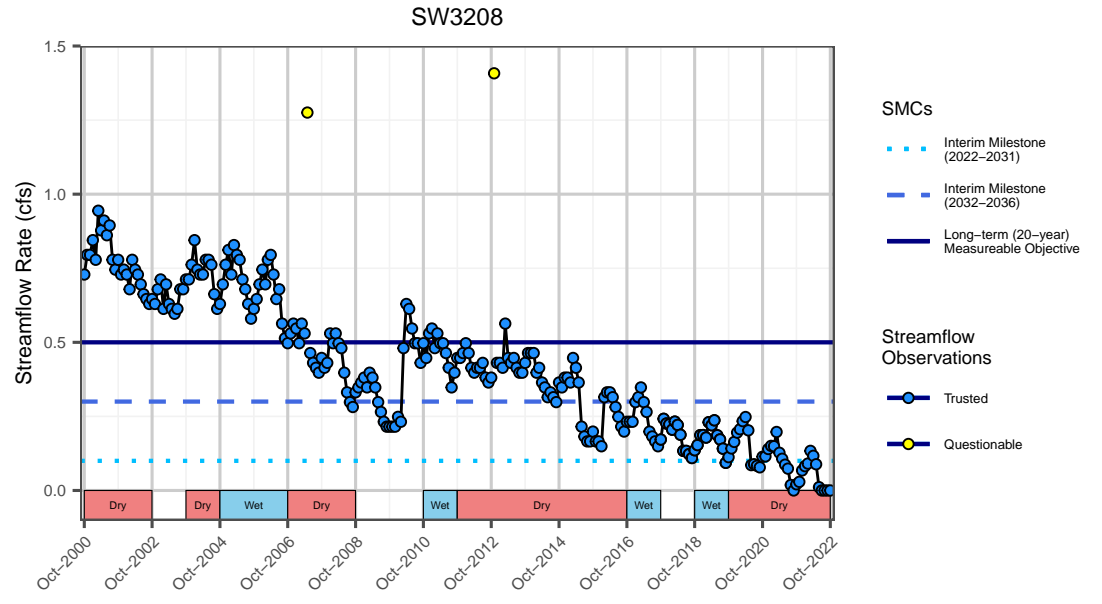
OWENS VALLEY GSP ANNUAL REPORT WY 2022
Groundwater Pumping and Change in Storage
 WY 2018-2022

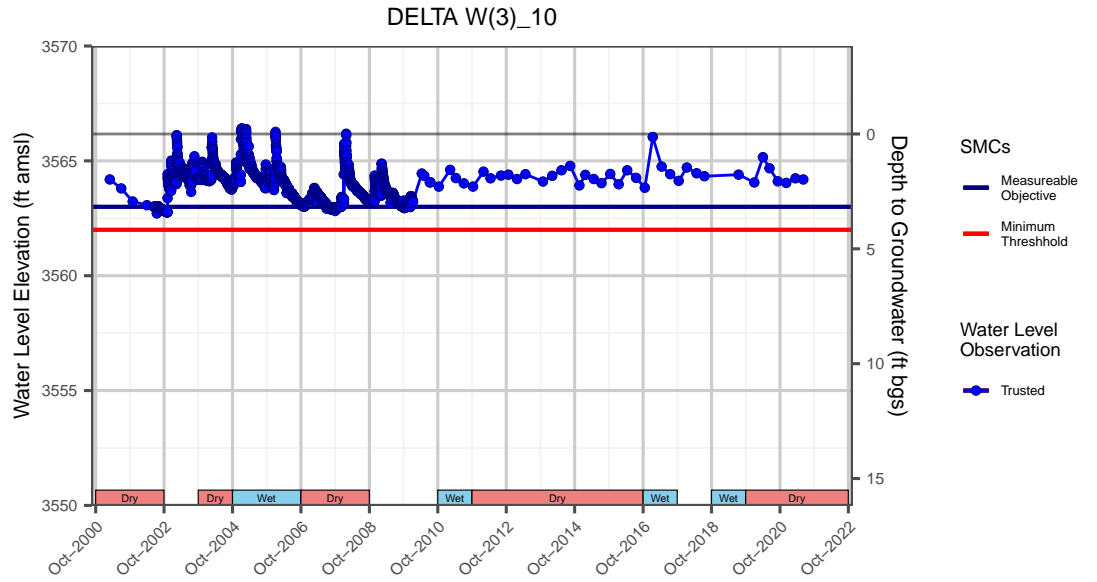
Figure 18



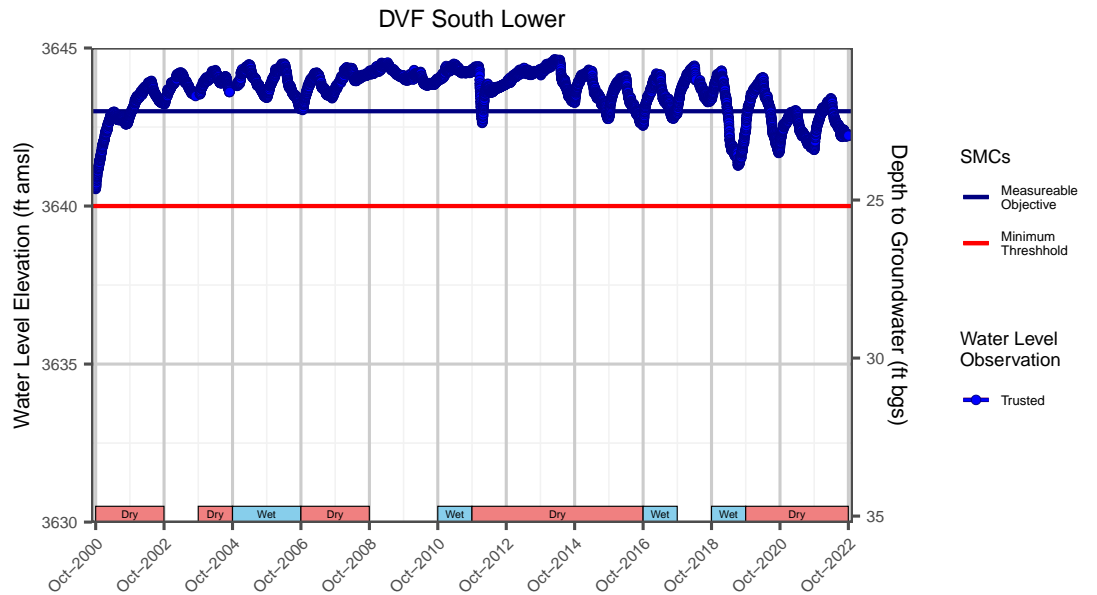
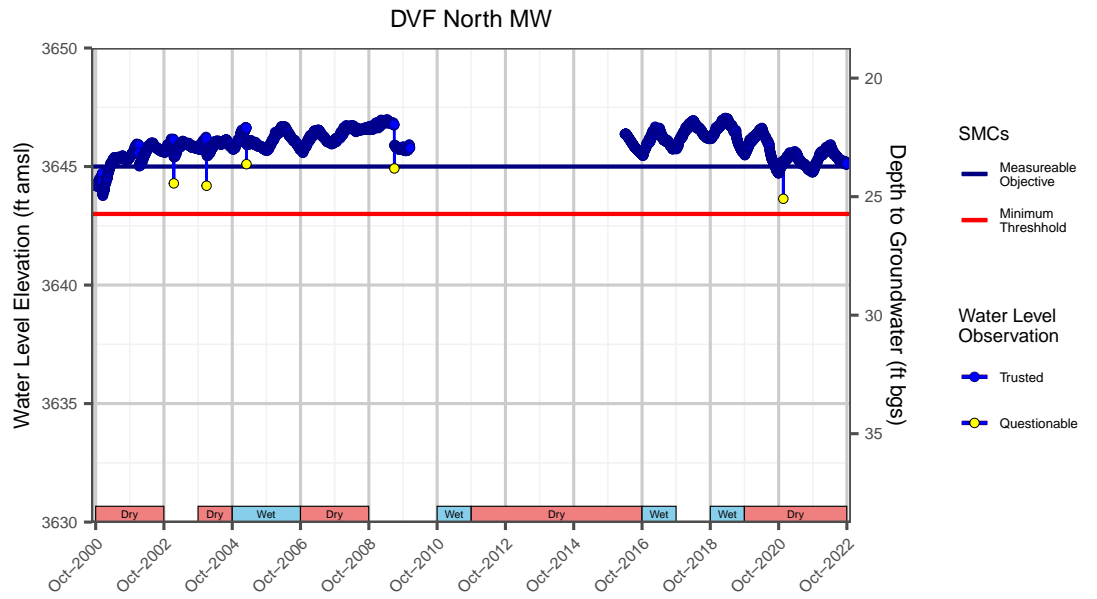
Appendix A

Representative Monitoring Point Hydrographs



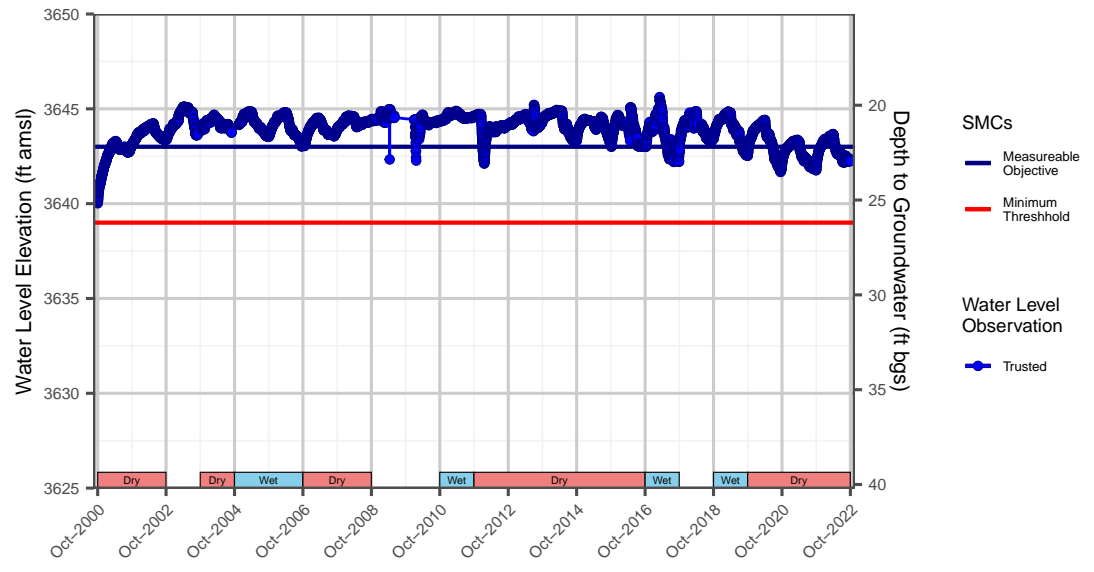


Notes: Reported destroyed by LADWP.

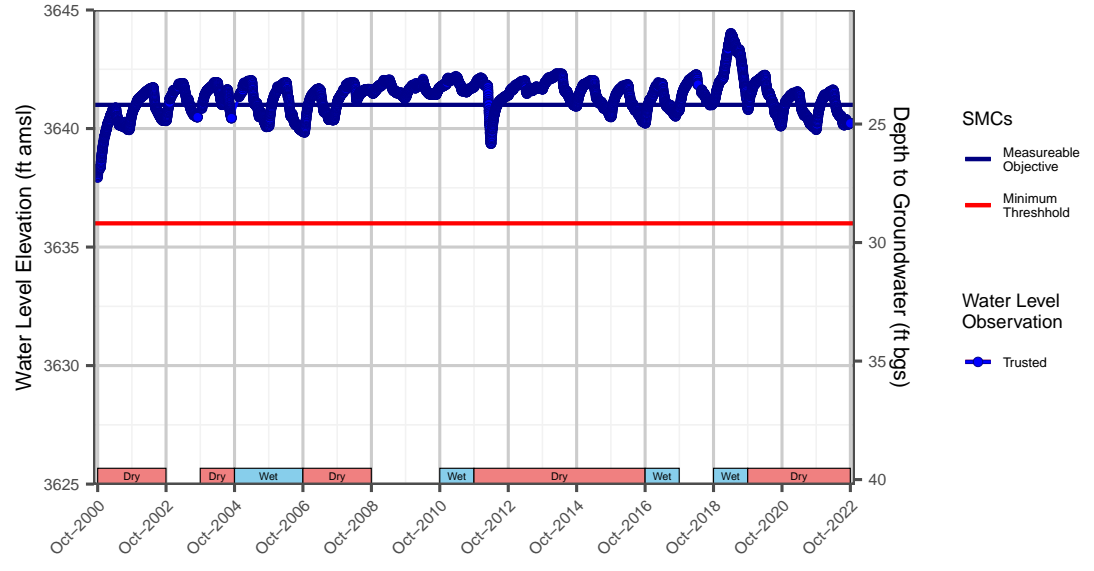




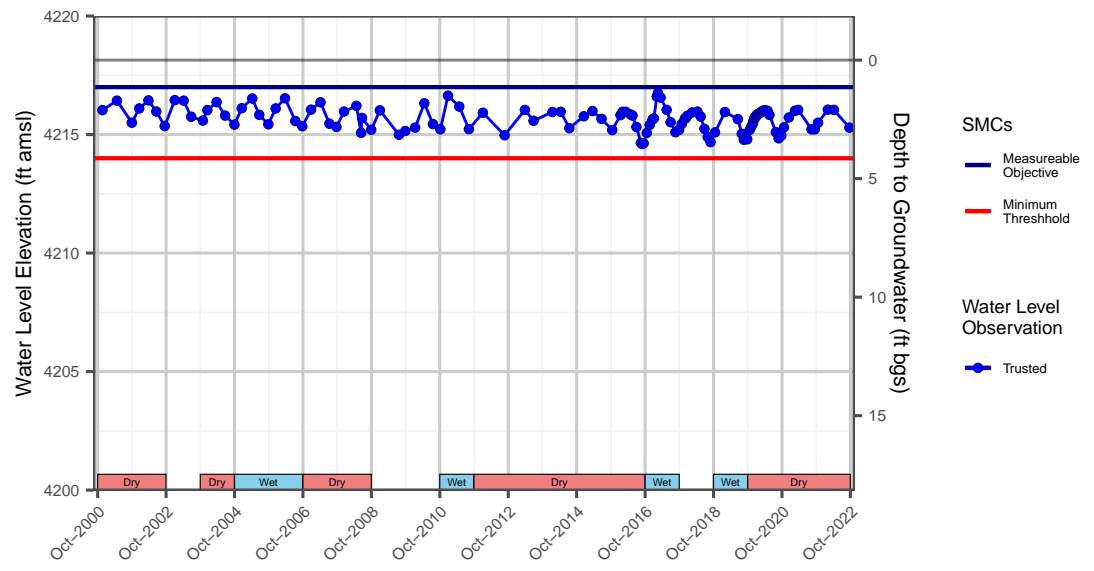
DVF South Middle



DVF South Upper

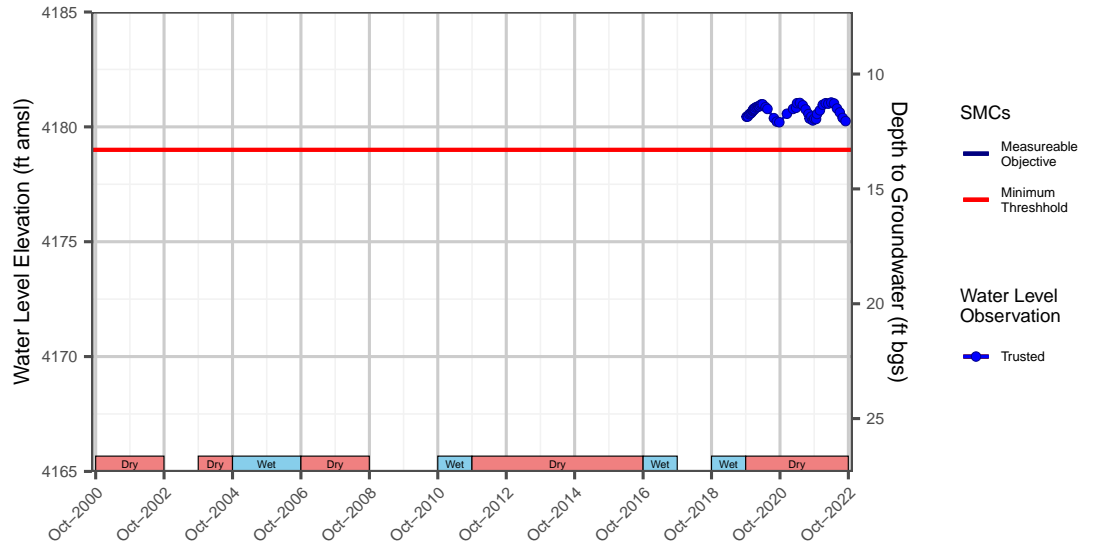


FS-2





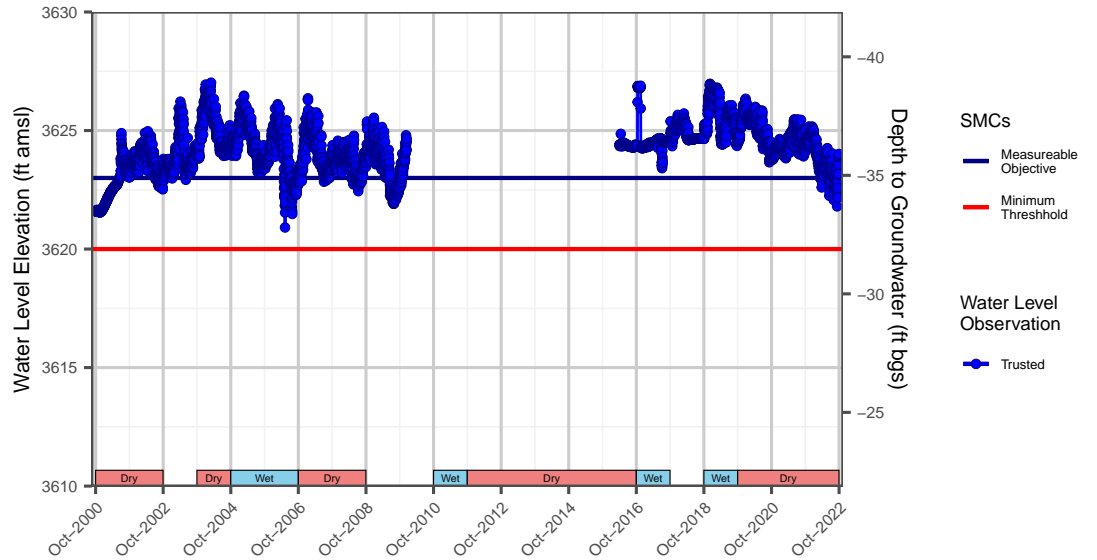
FS-3D



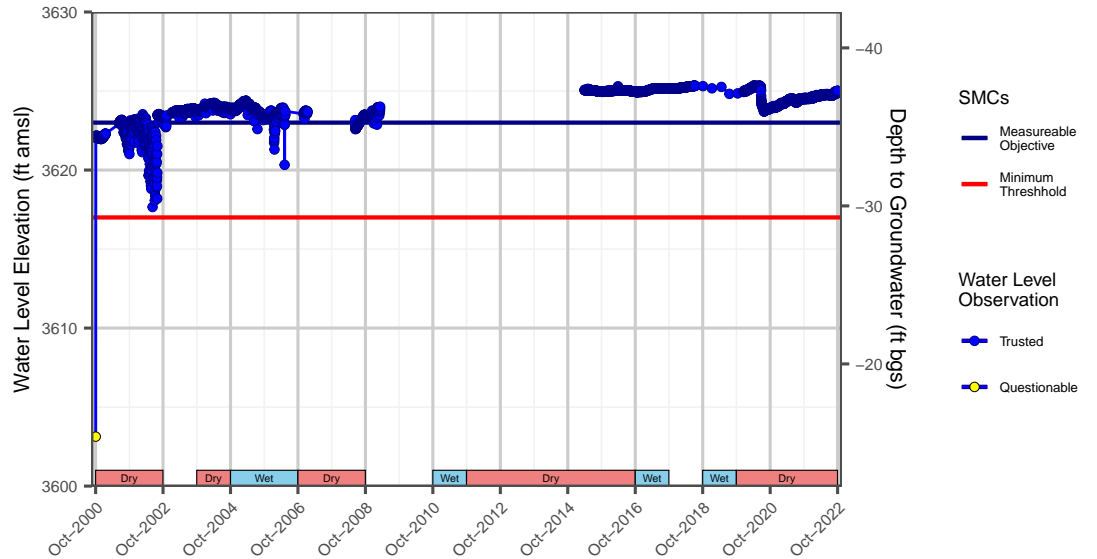
Notes: Newly established representative monitoring point or data not currently available. MO will be established in future GSP updates.

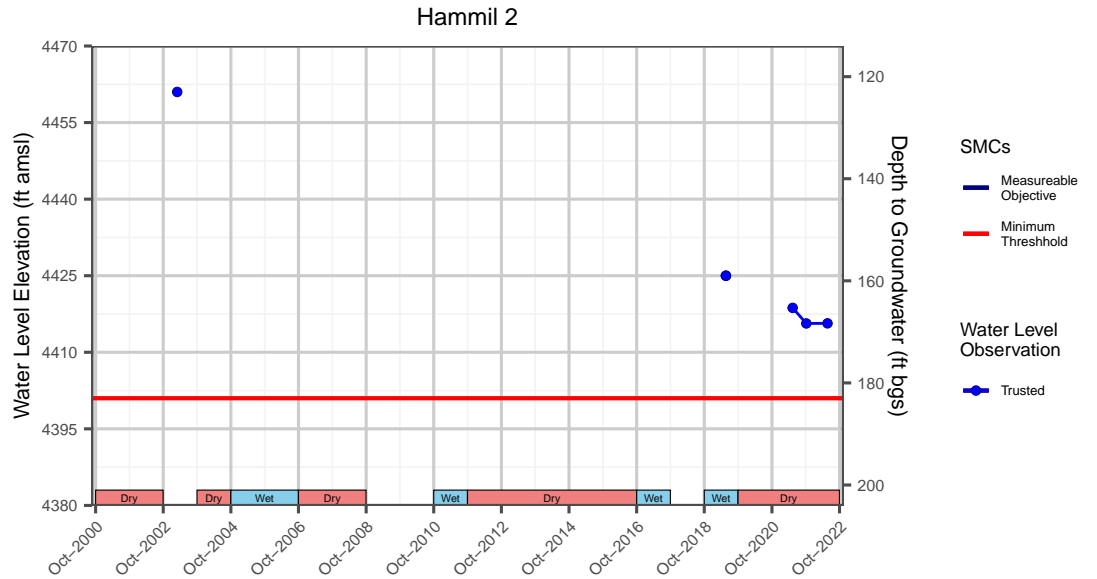


Fault Test T3

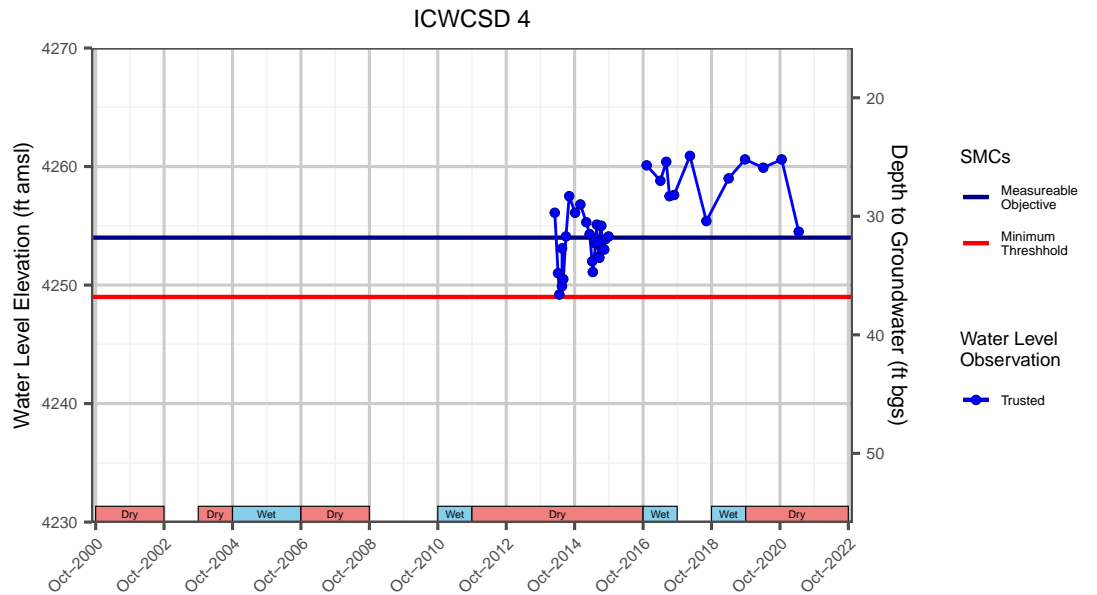
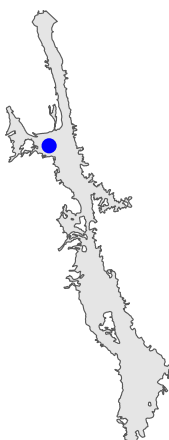
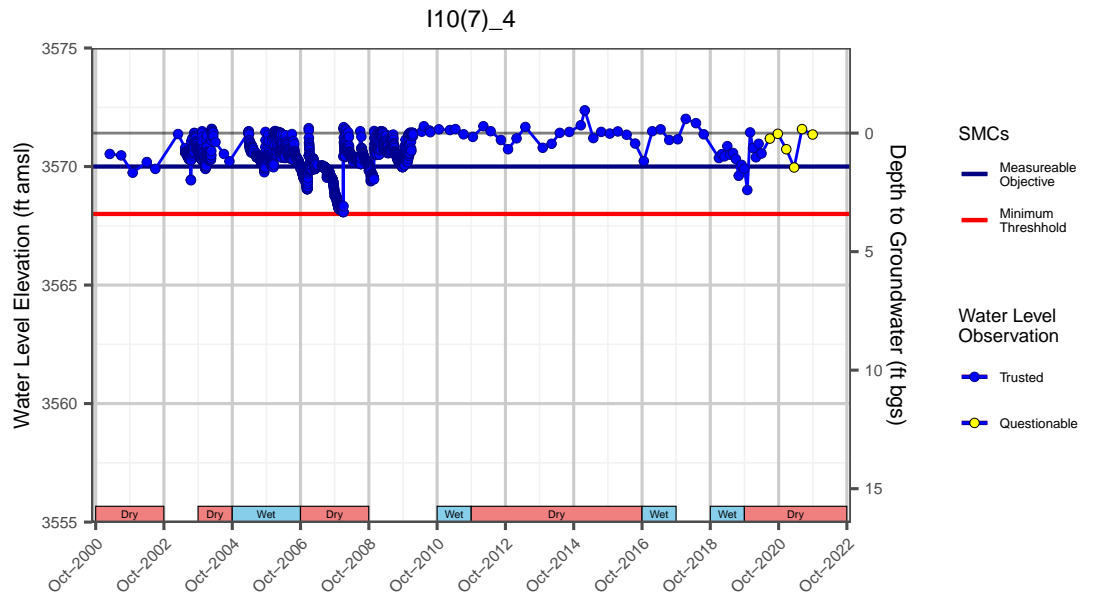


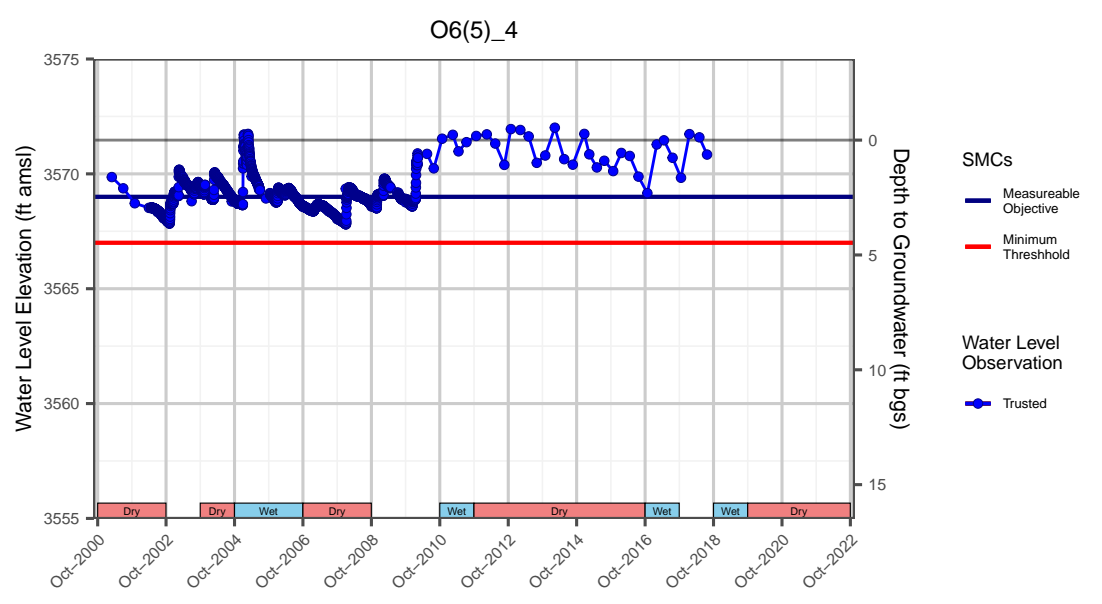
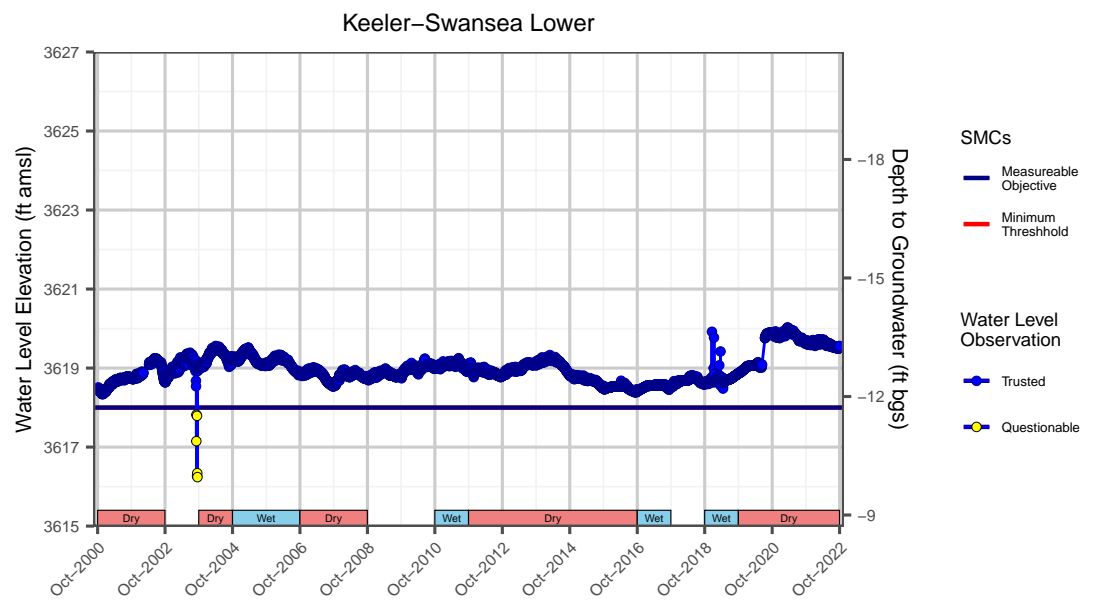
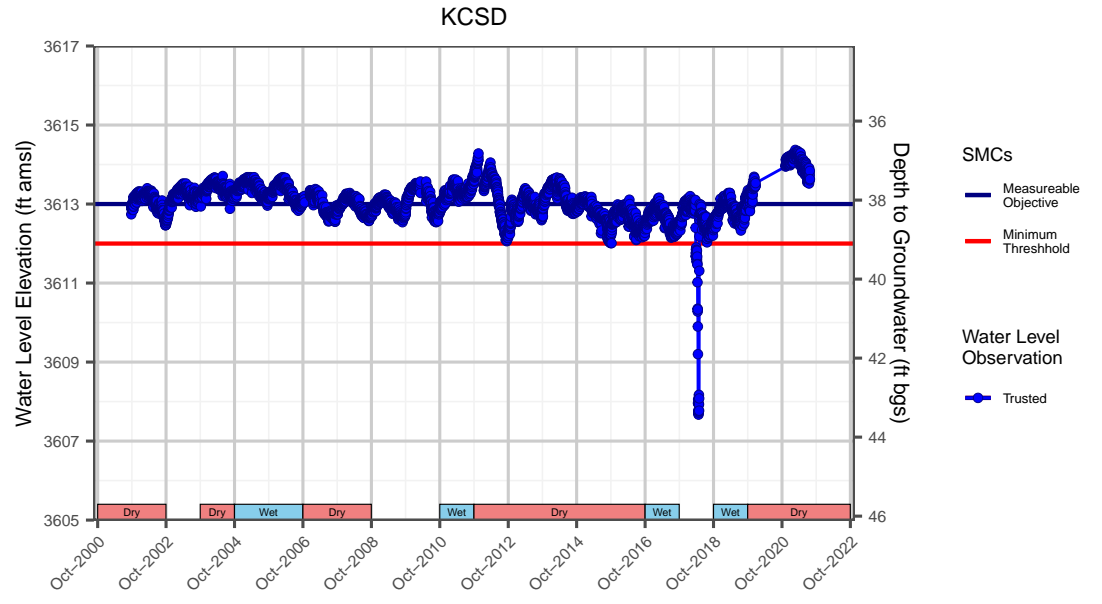
Fault Test T5



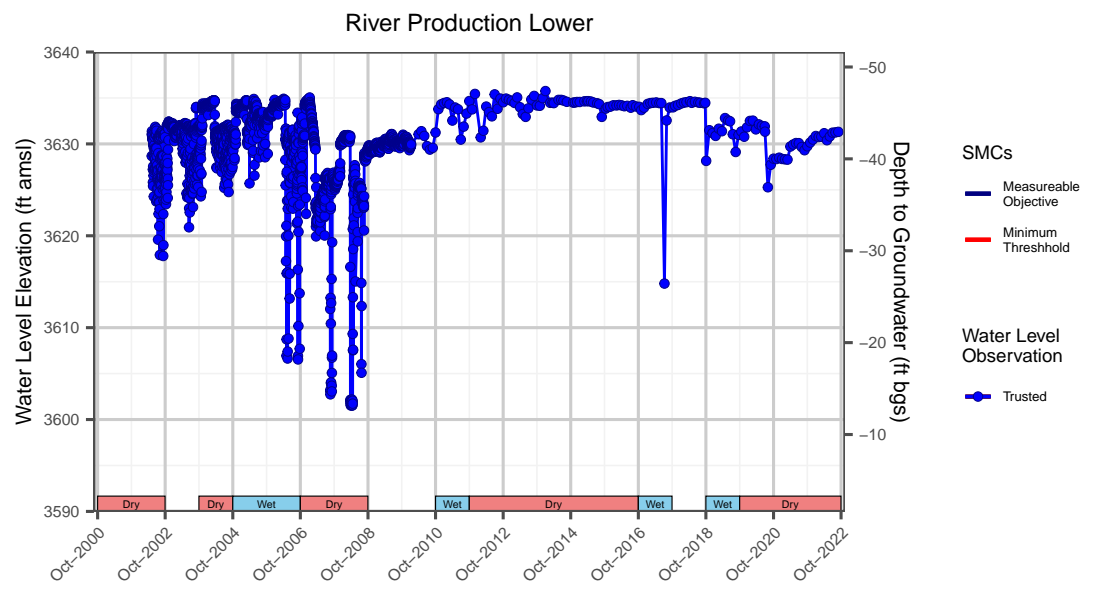
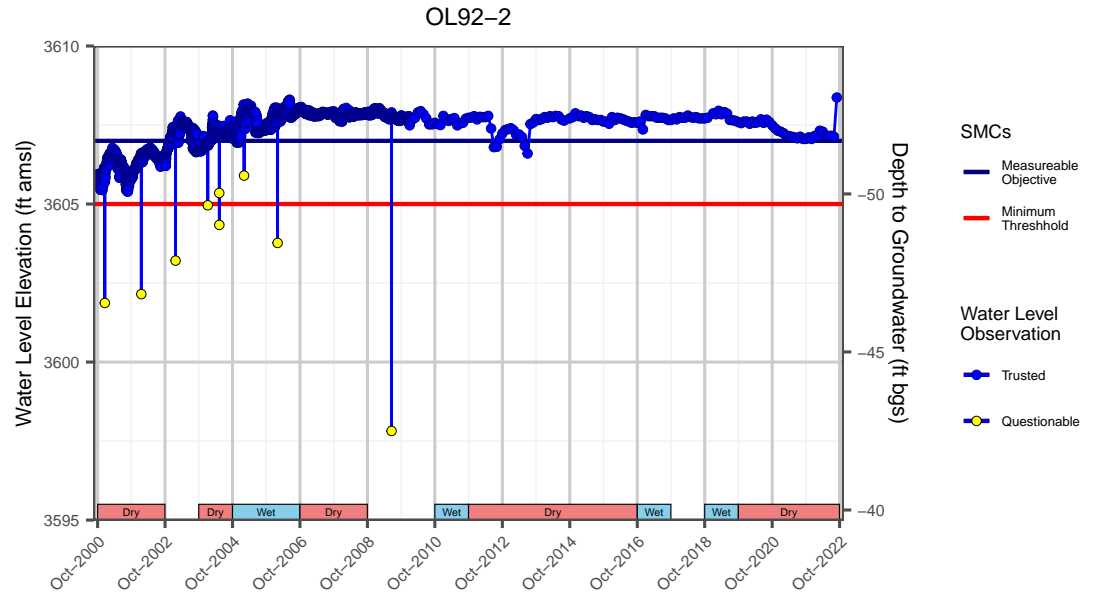


Notes: Newly established representative monitoring point or data not currently available. MO will be established in future GSP updates.

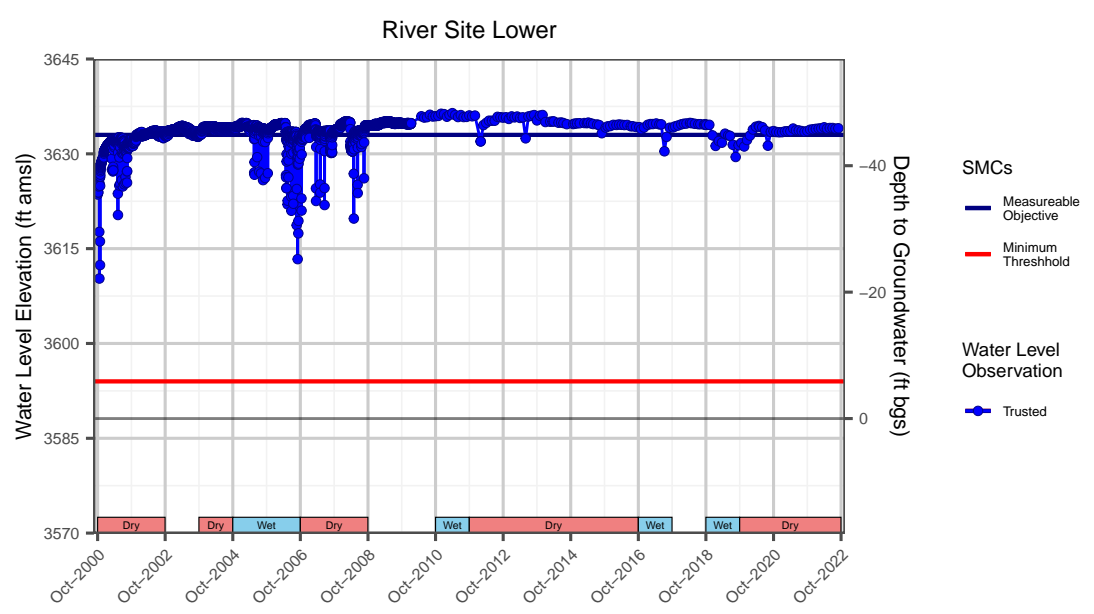


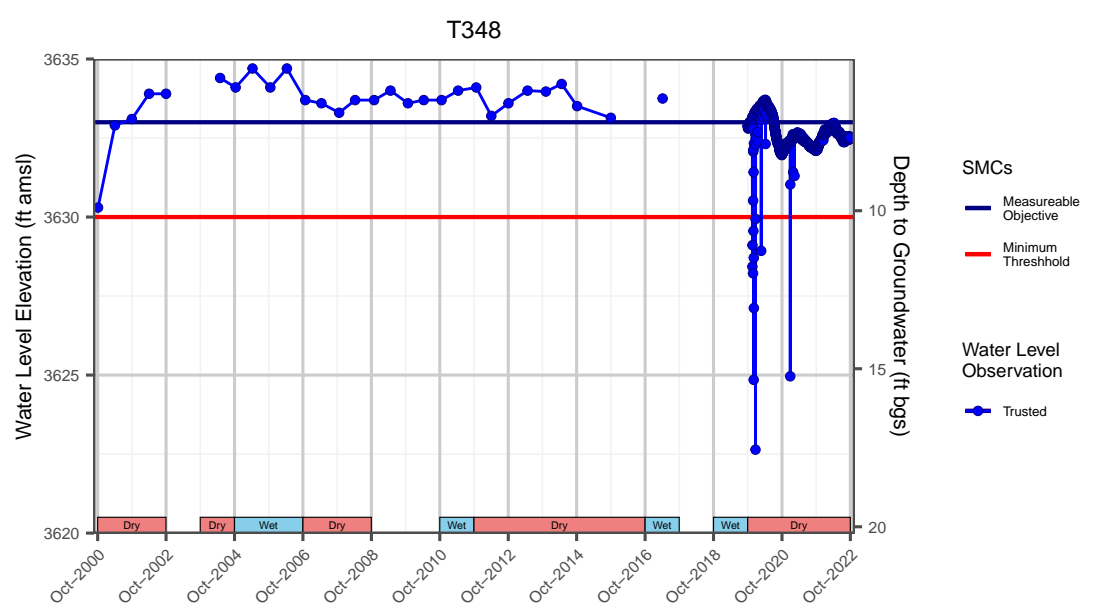
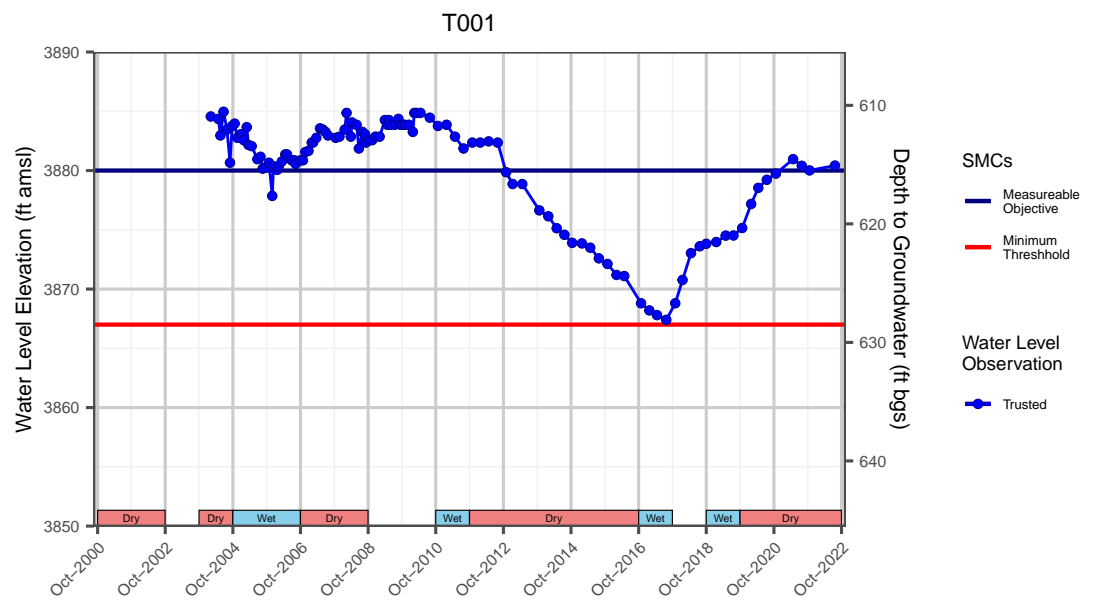
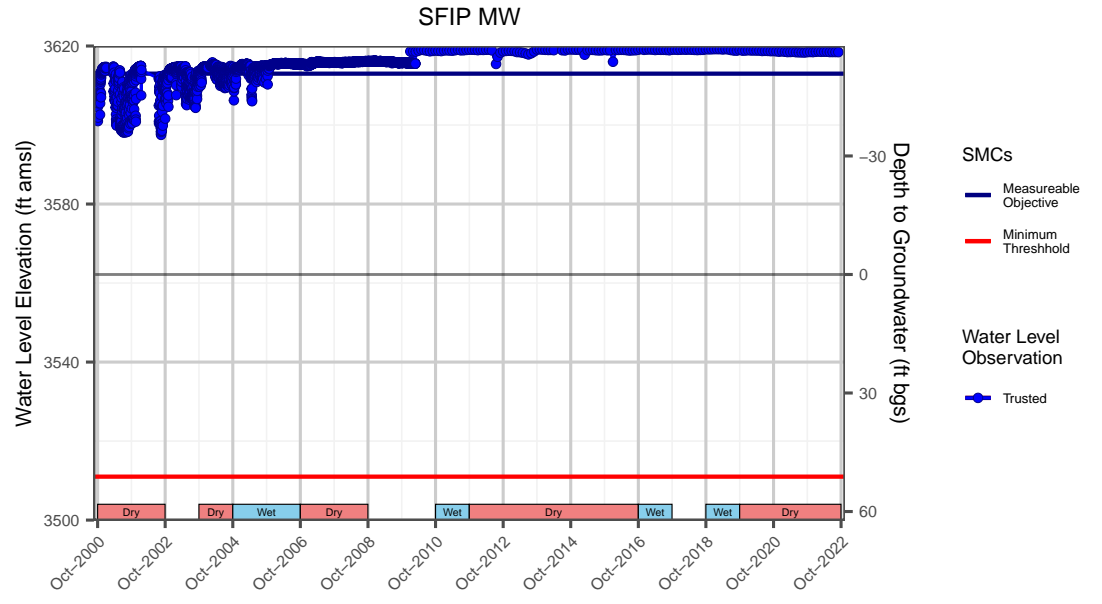


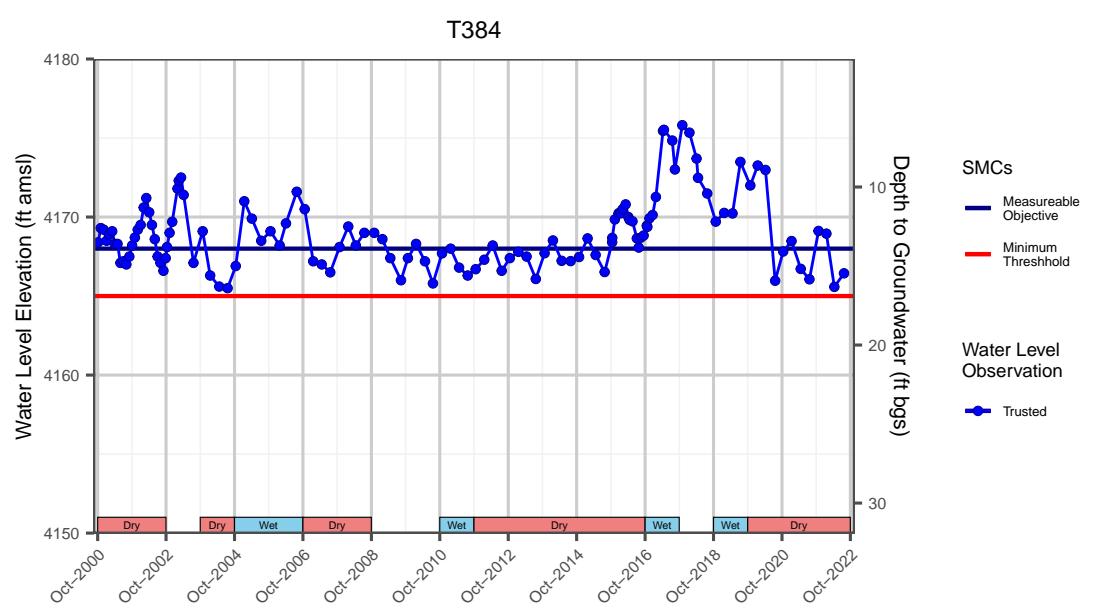
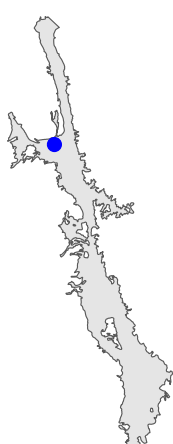
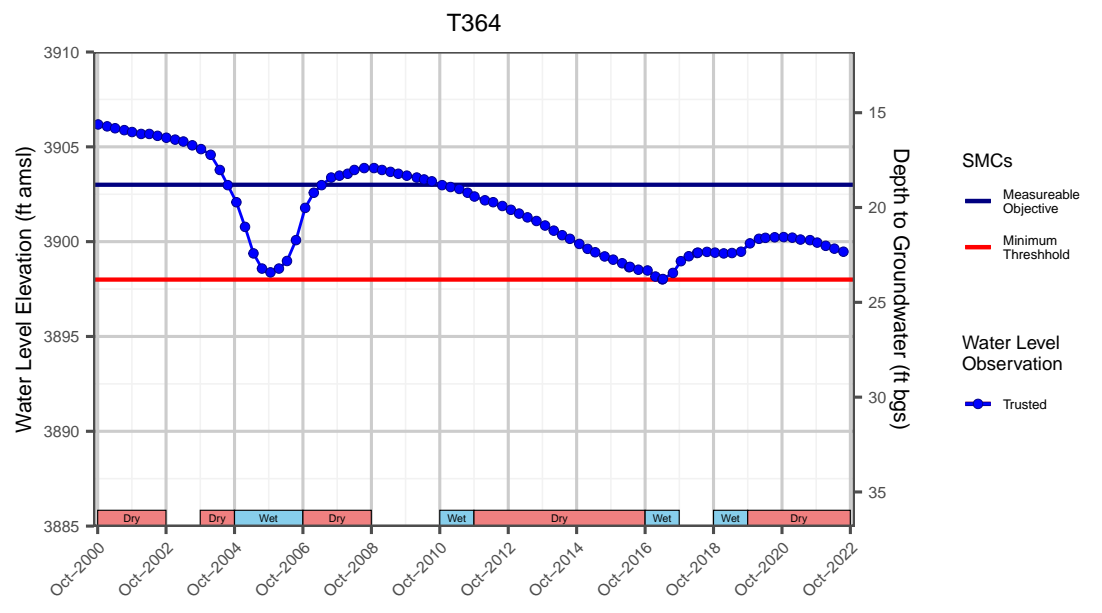
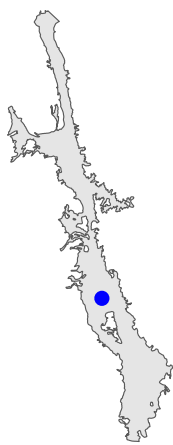
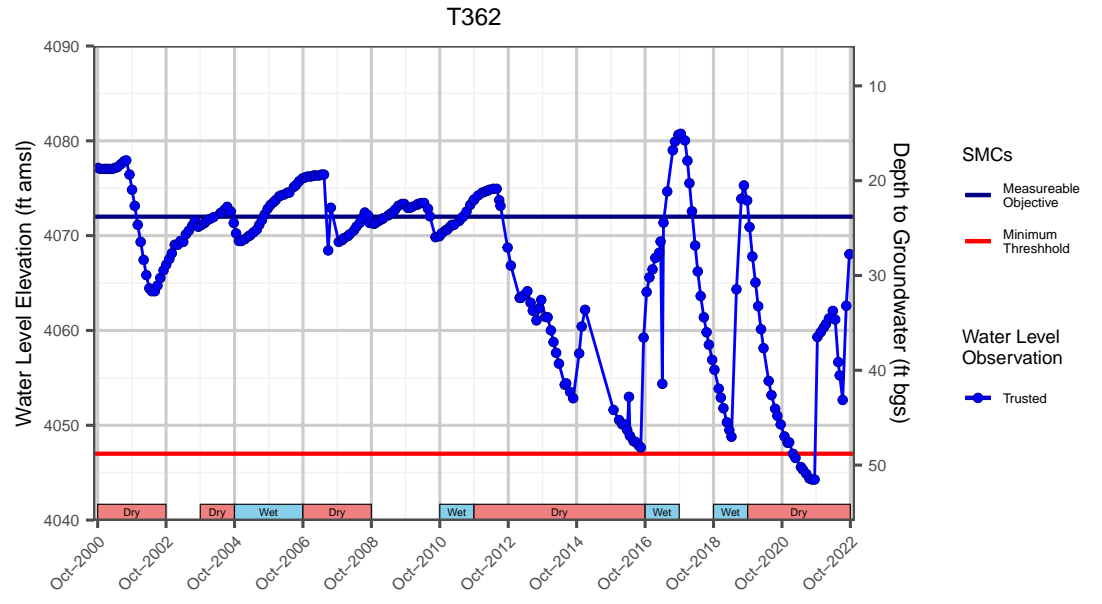
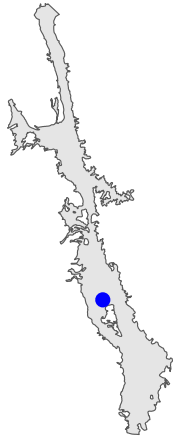
Notes: Reported destroyed by LADWP.

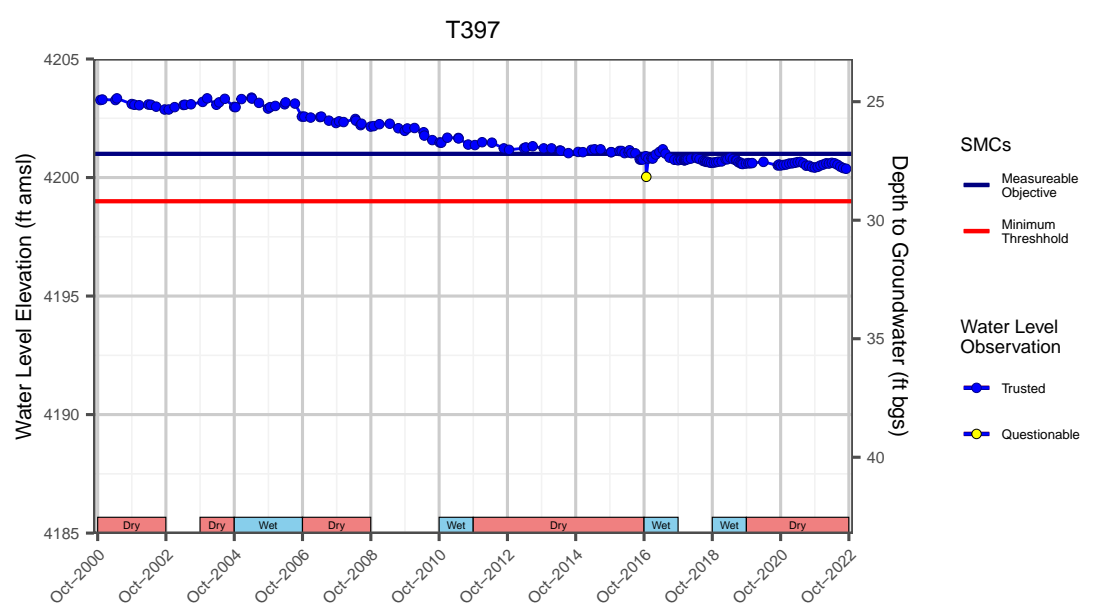
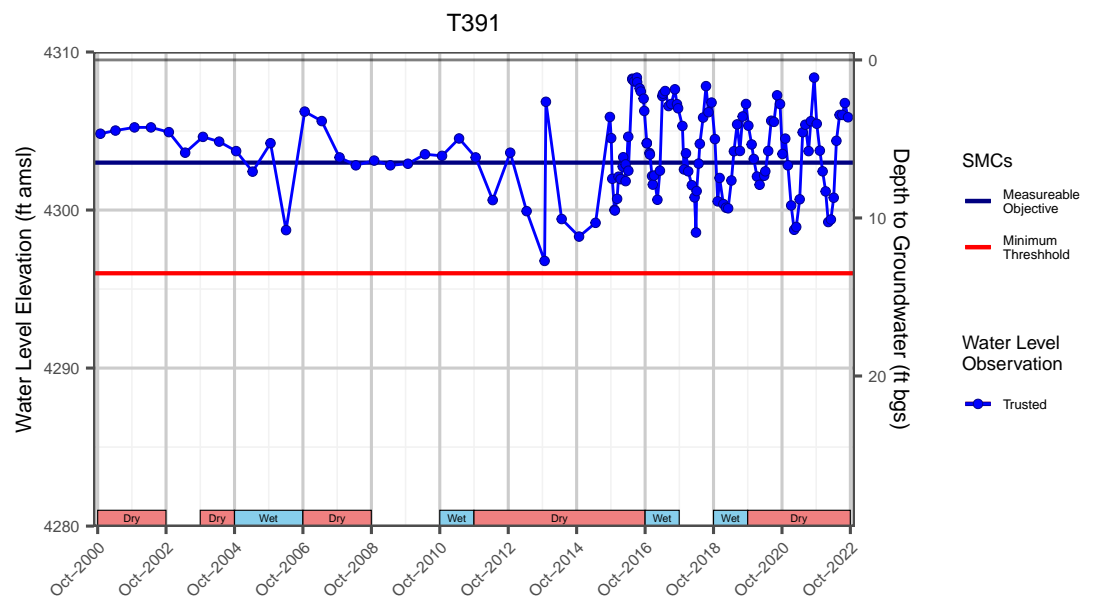
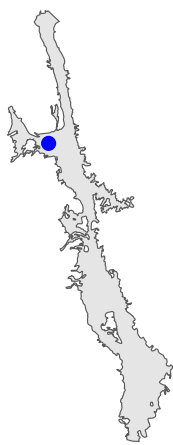
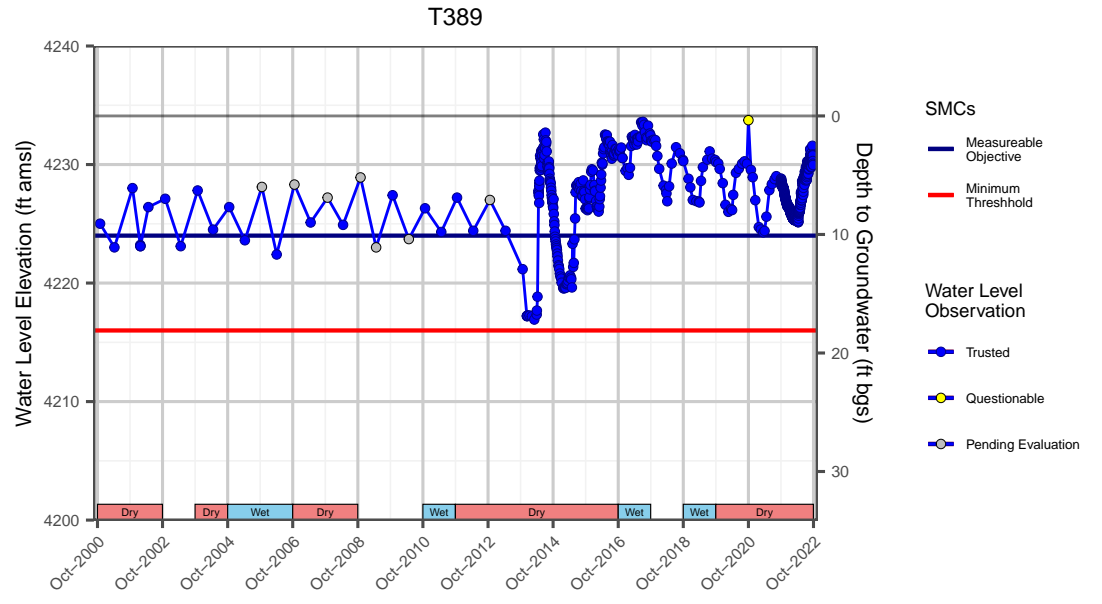
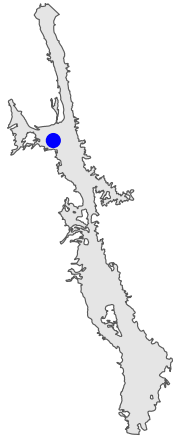


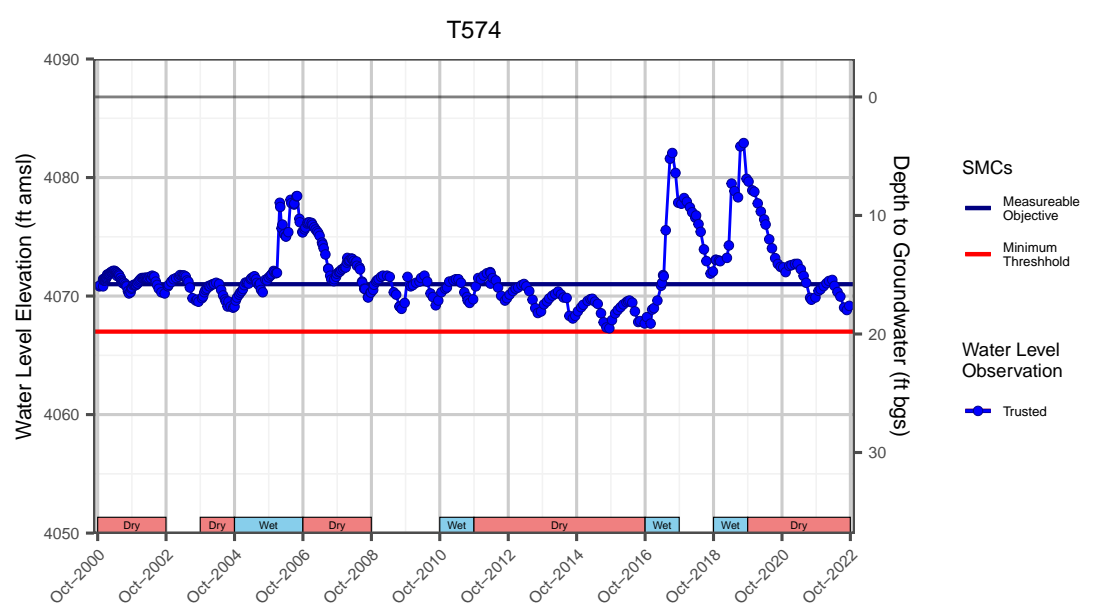
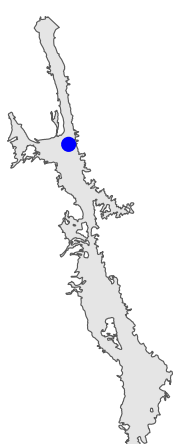
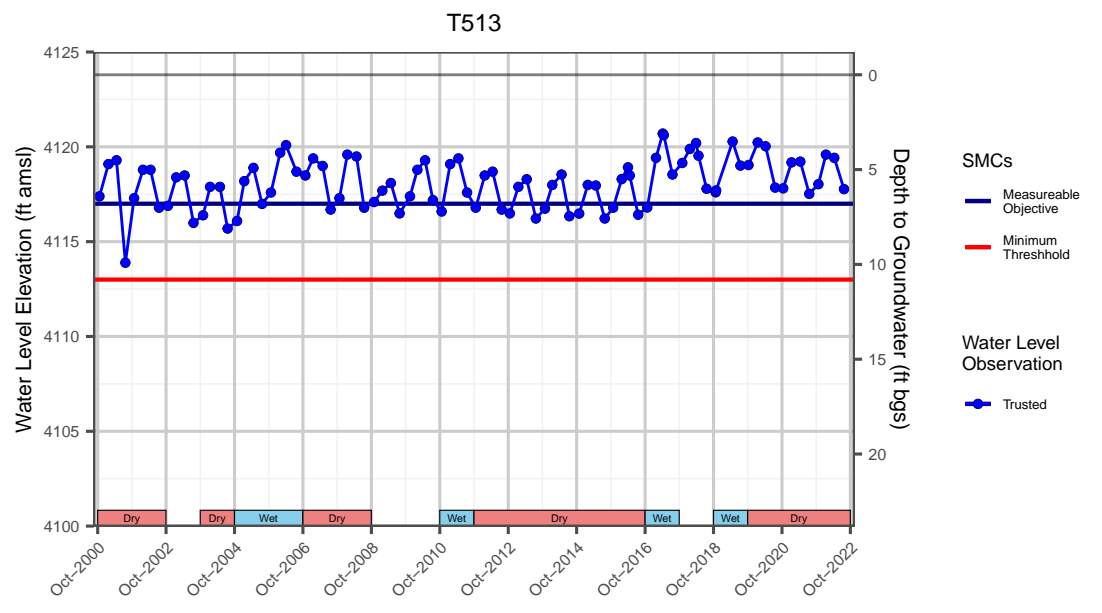
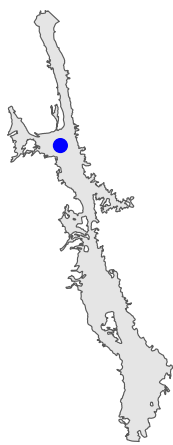
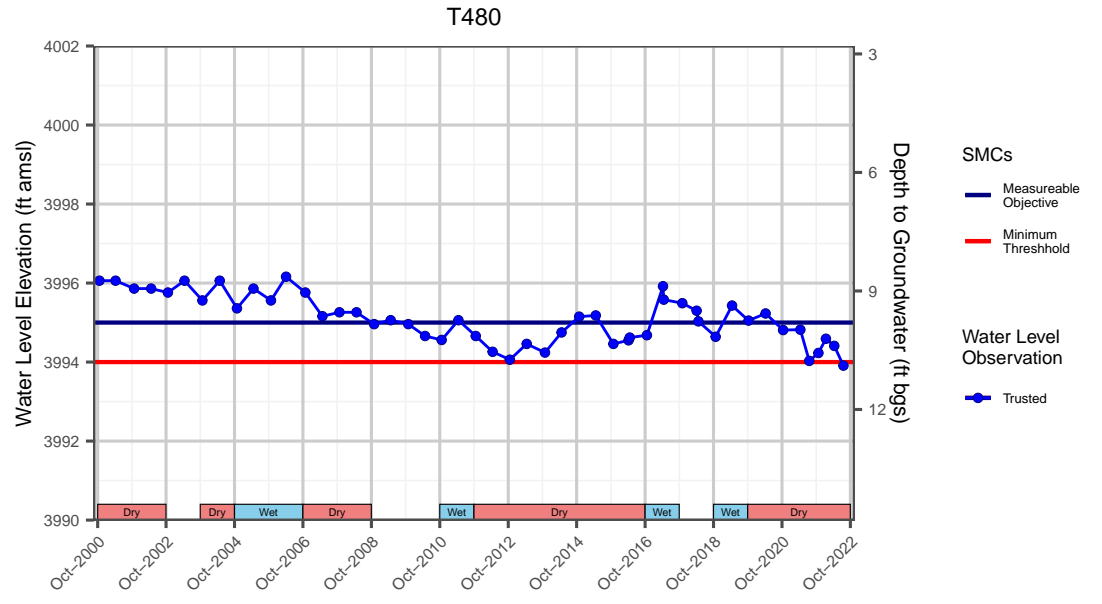
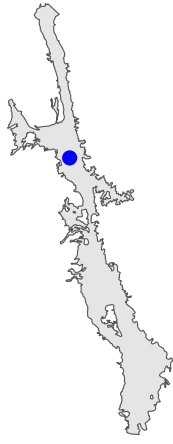
Notes: Newly established representative monitoring point or data not currently available. MT and MO will be established in future GSP updates.

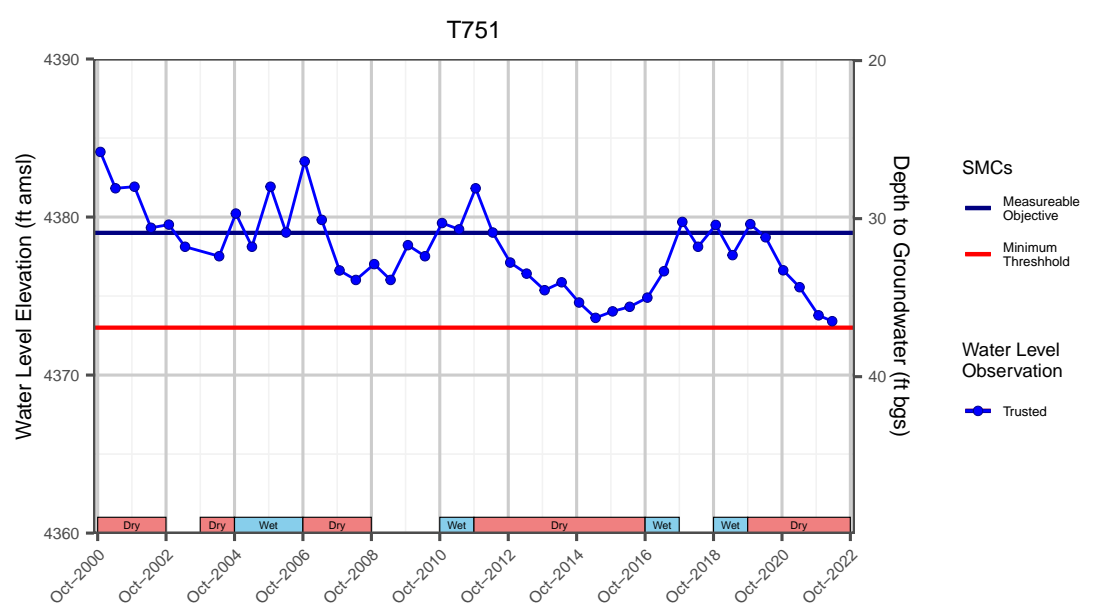
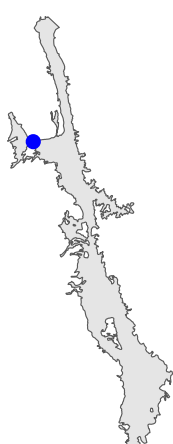
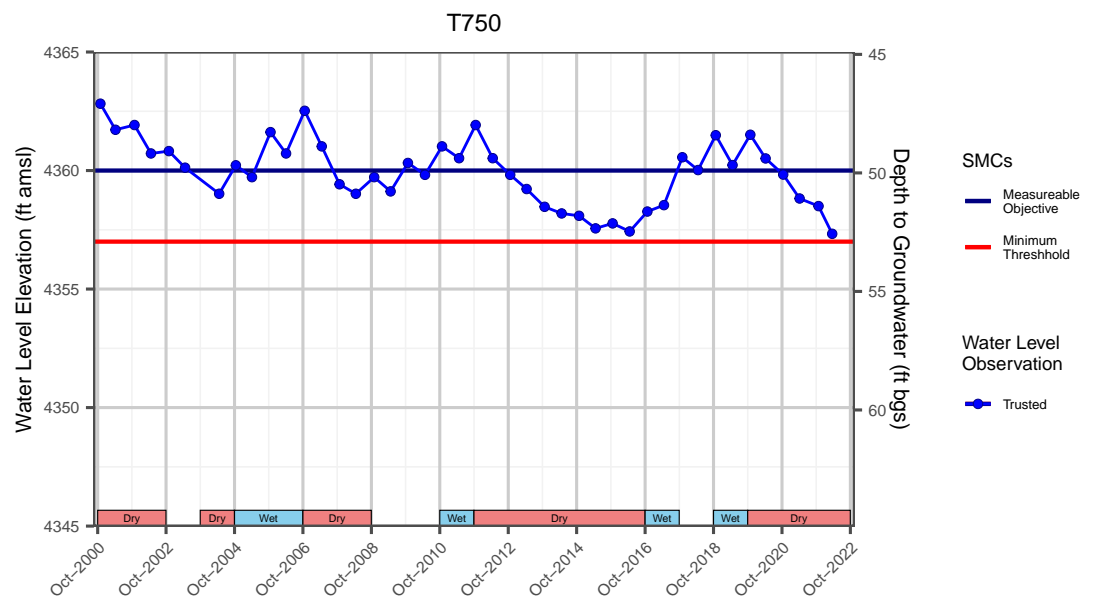
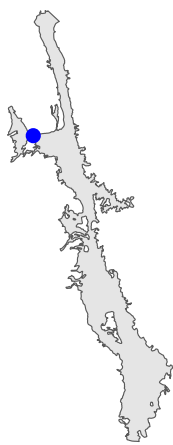
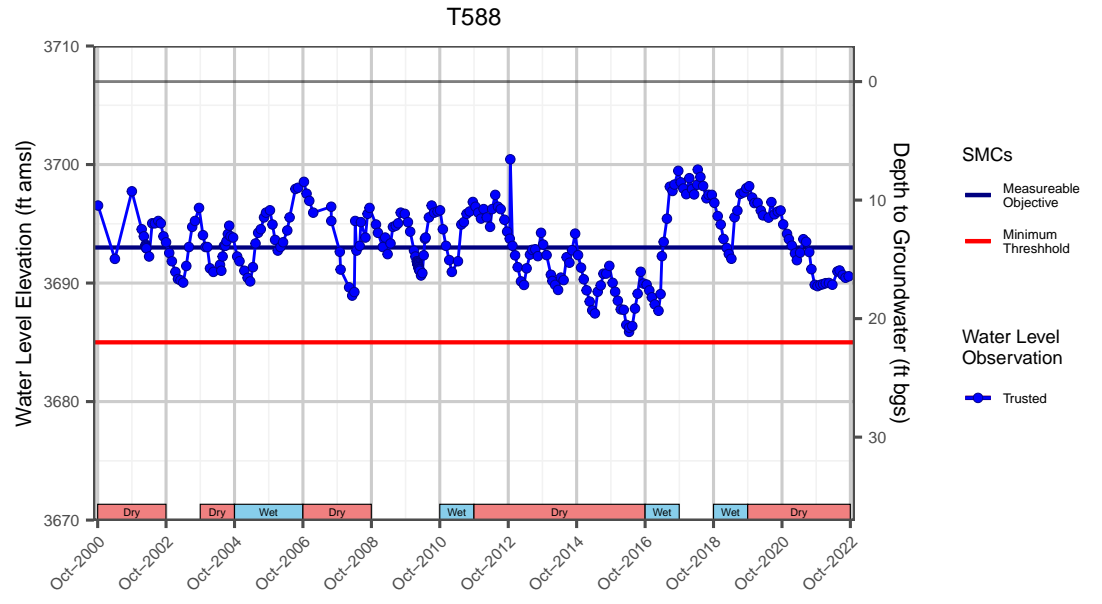


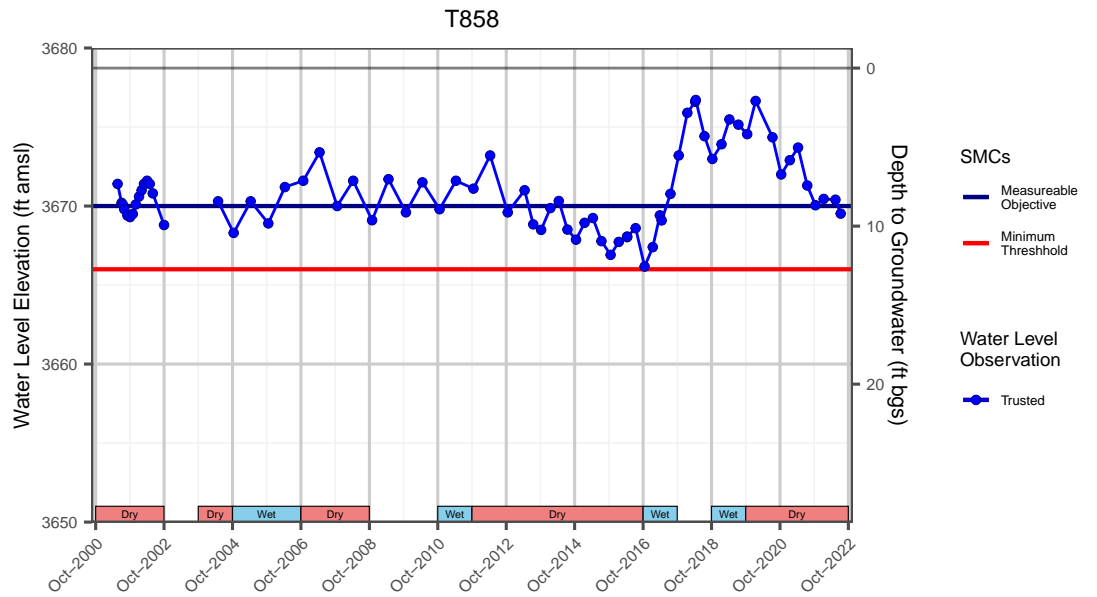
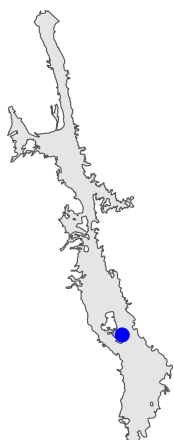
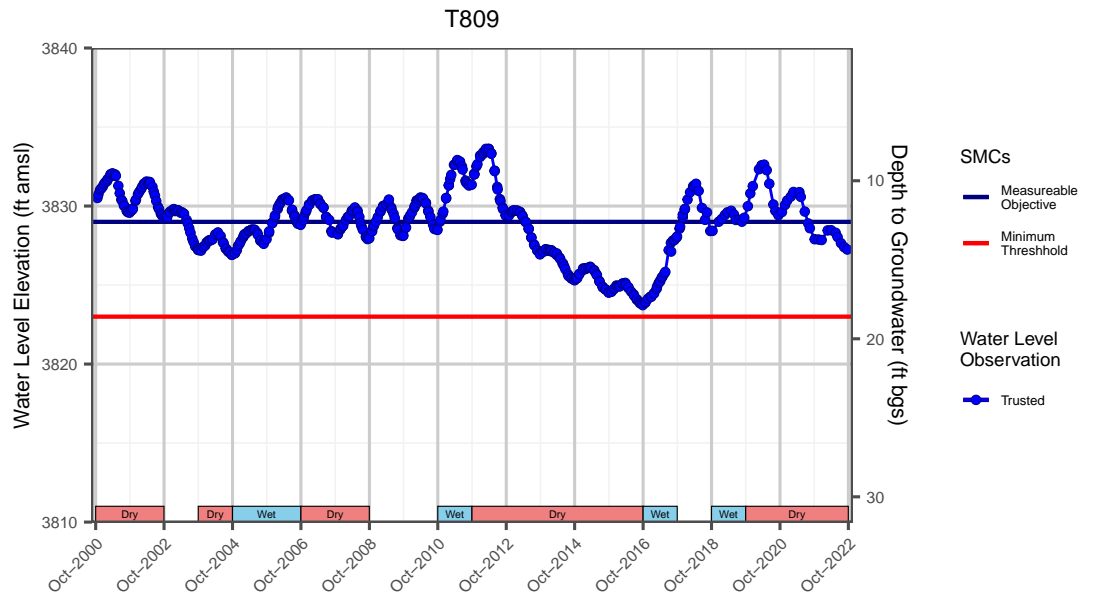
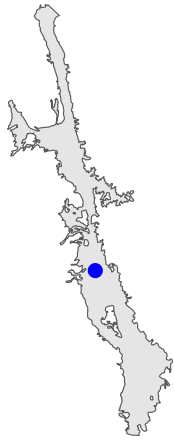
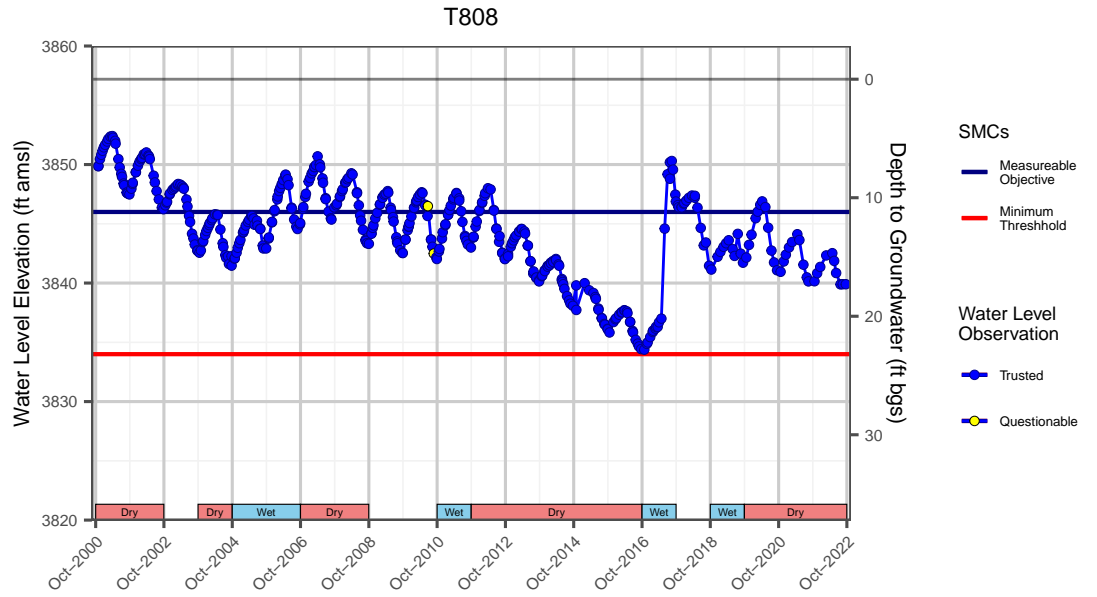
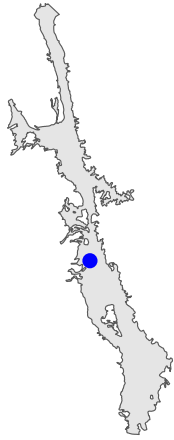


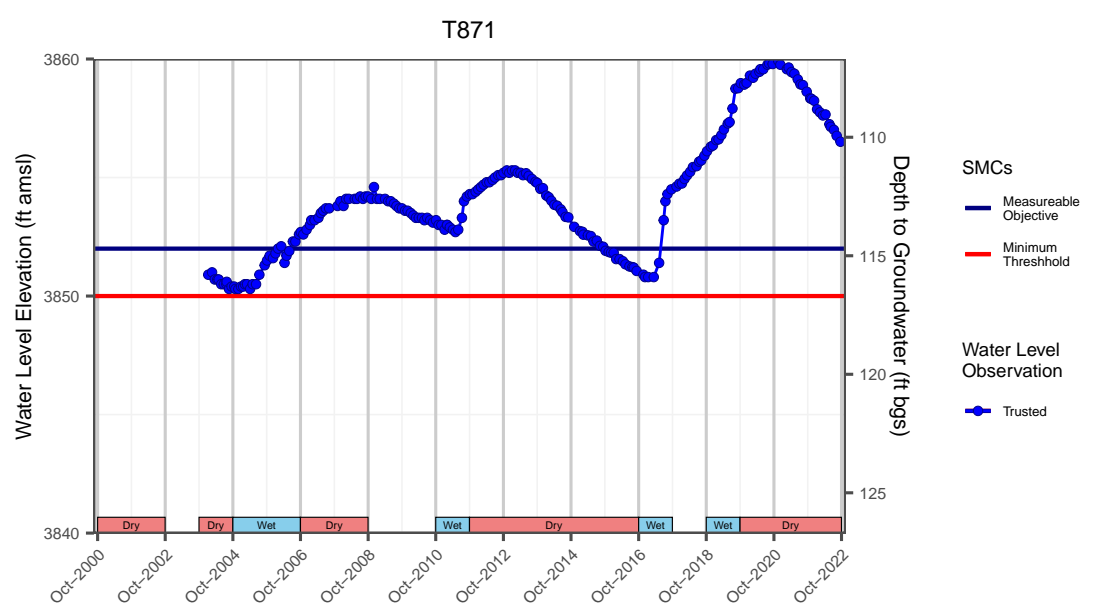
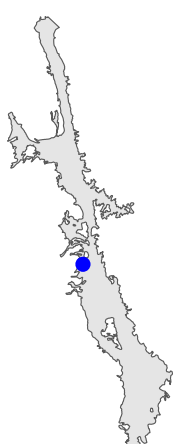
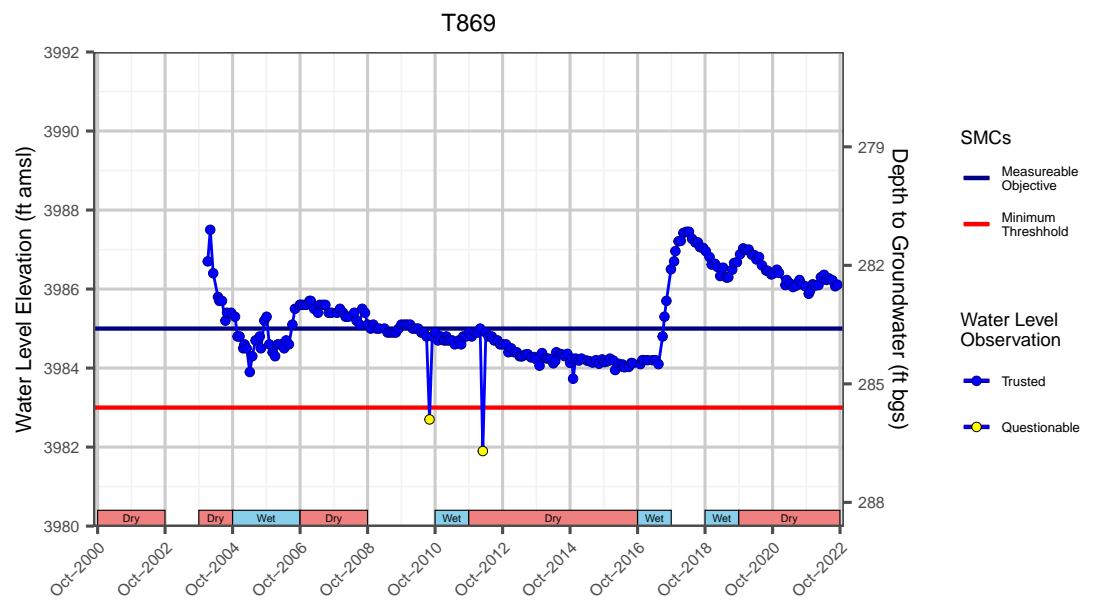
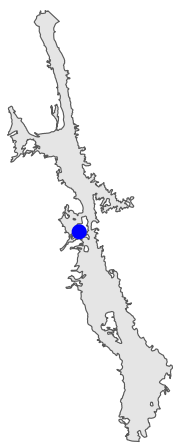
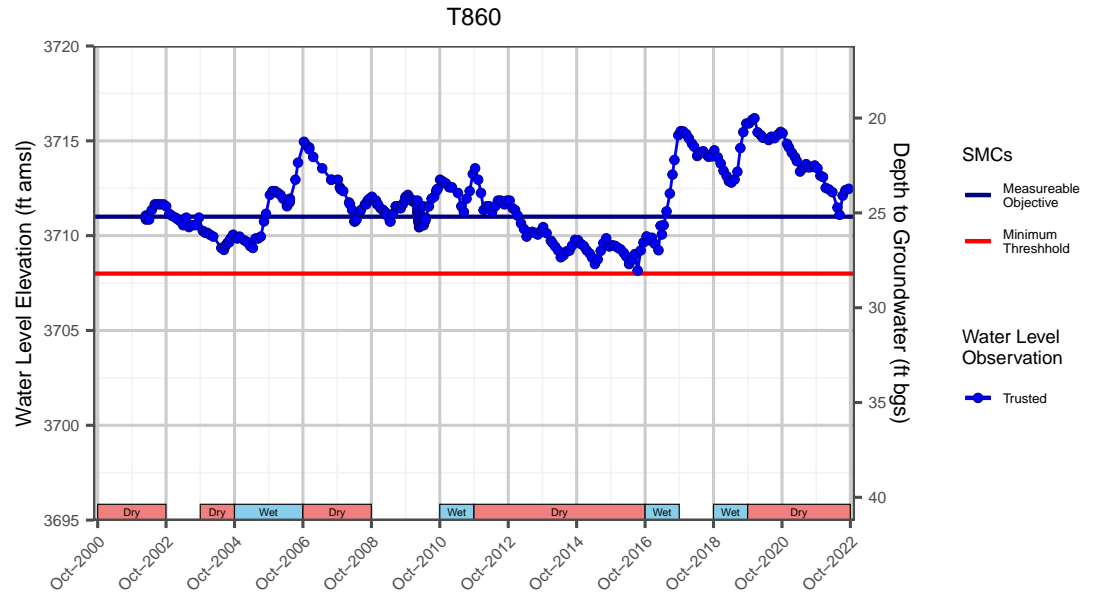


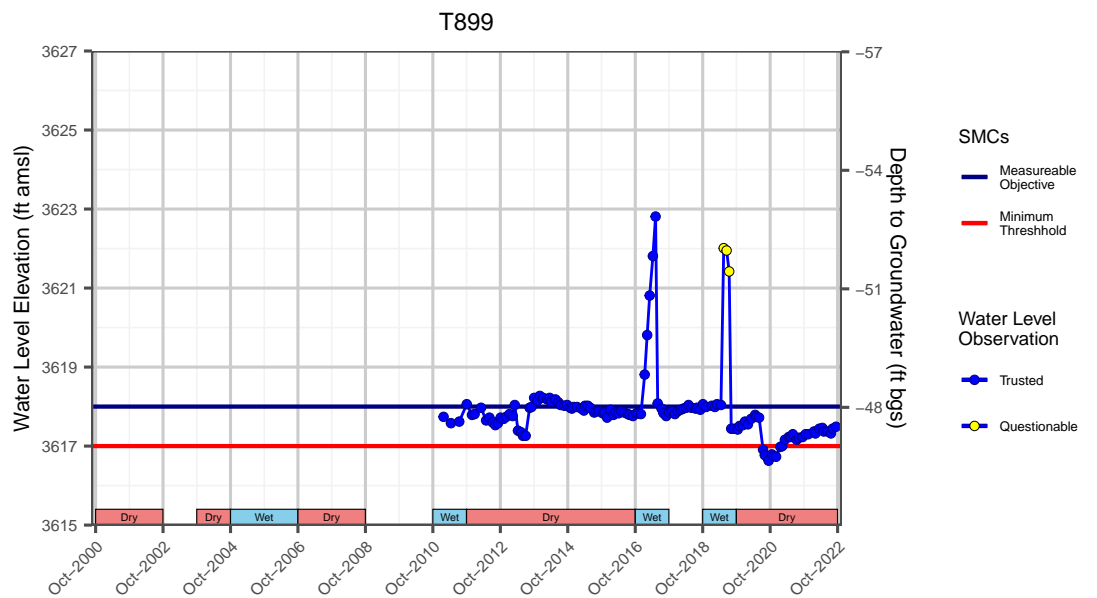
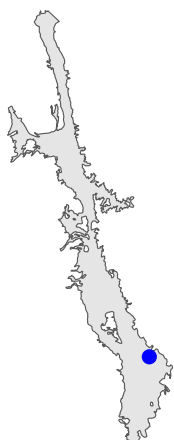
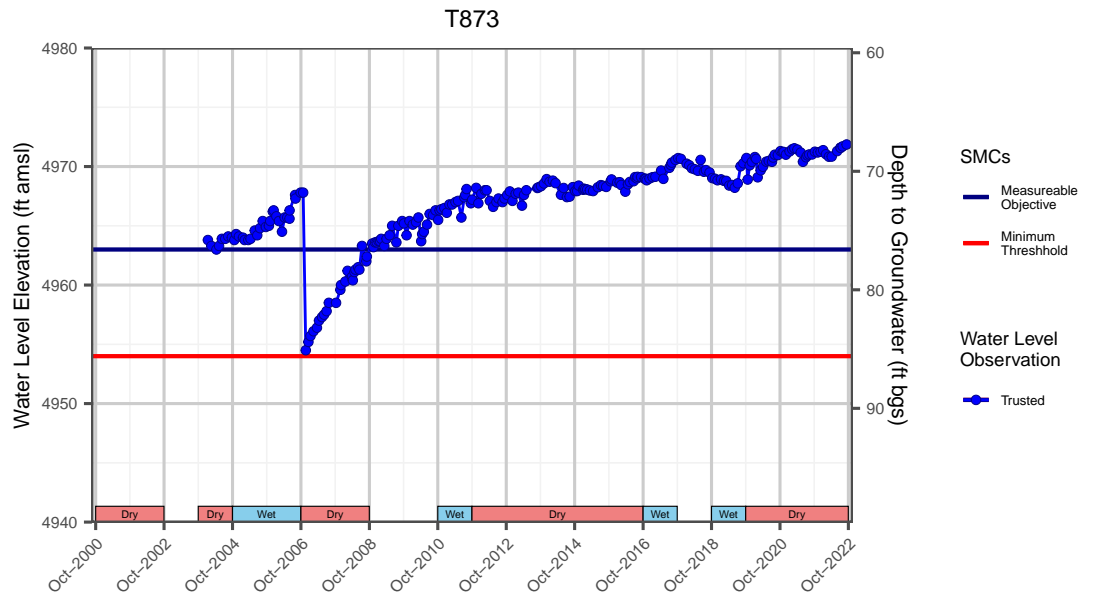
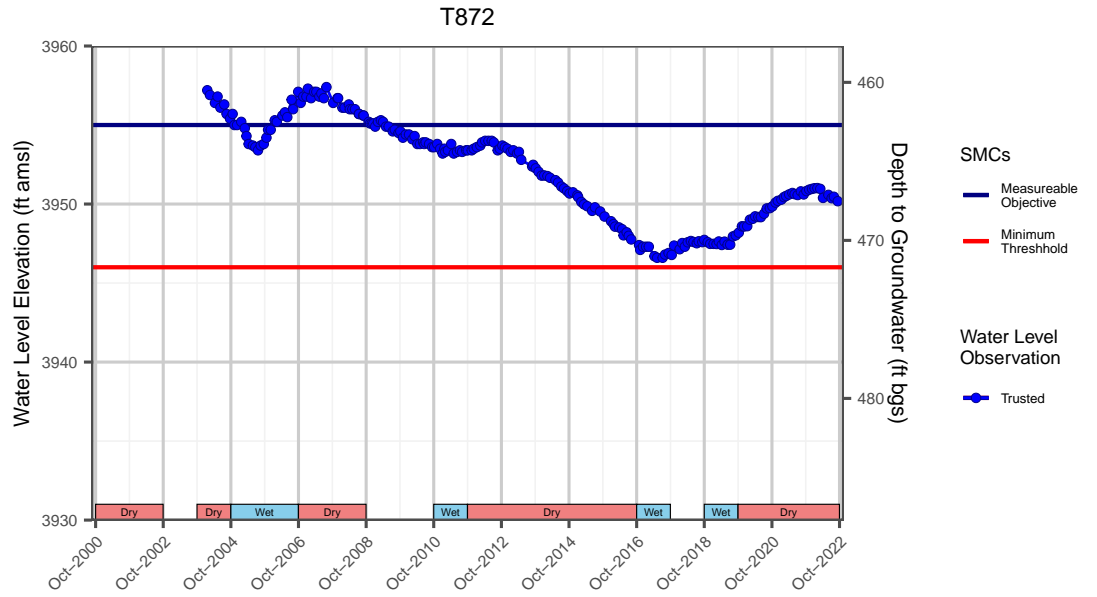
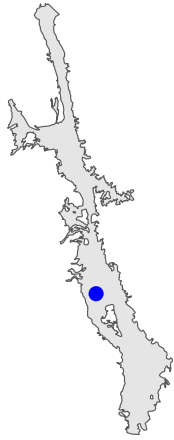


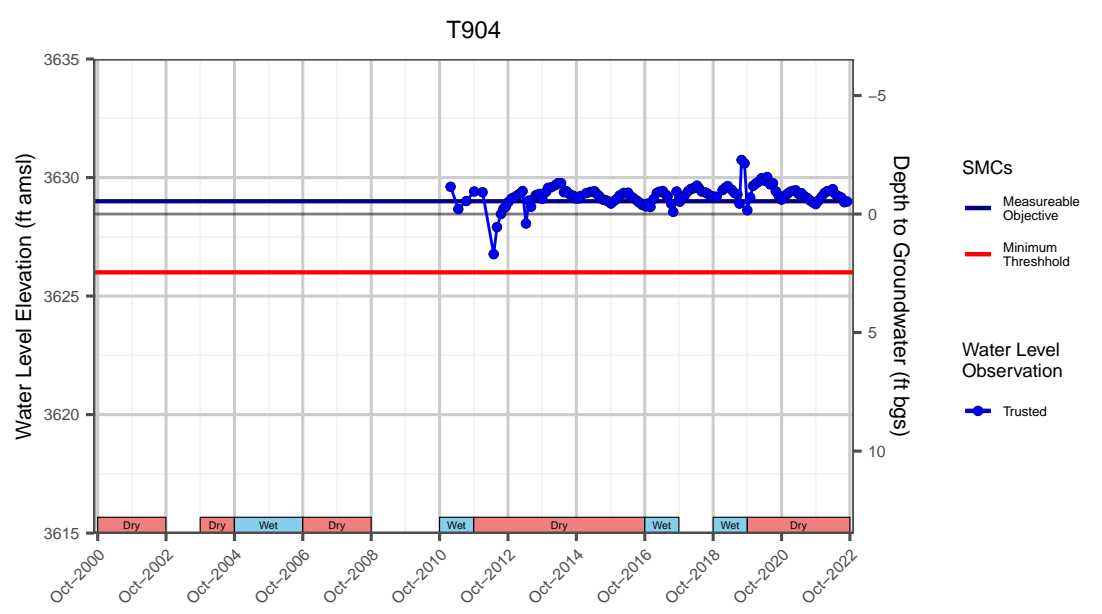
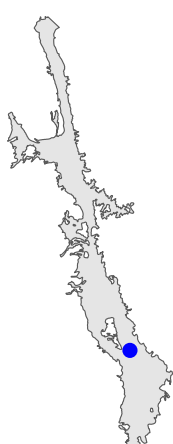
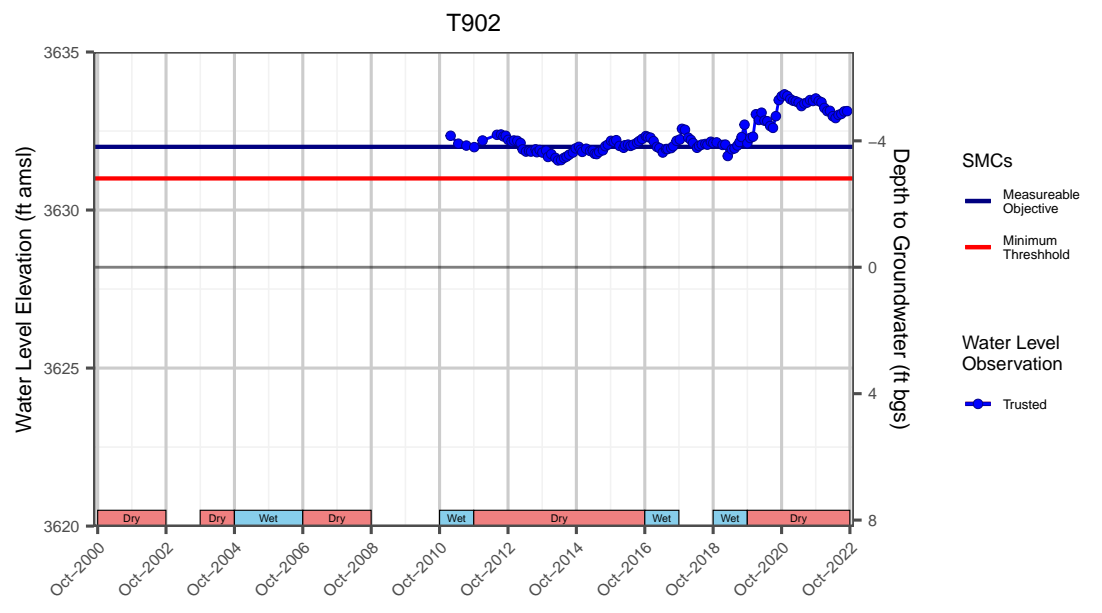
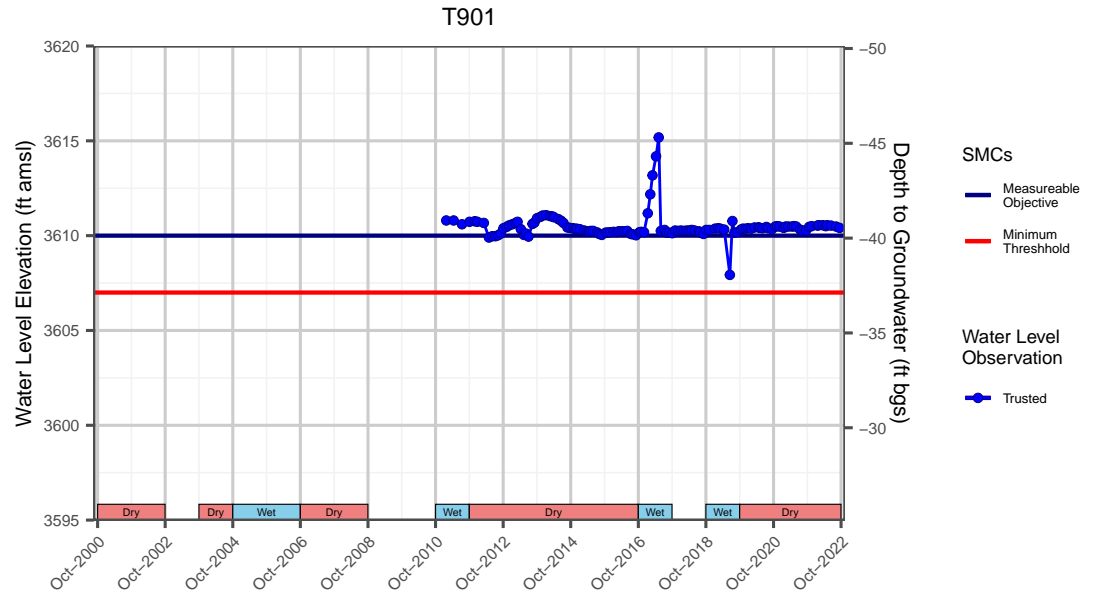


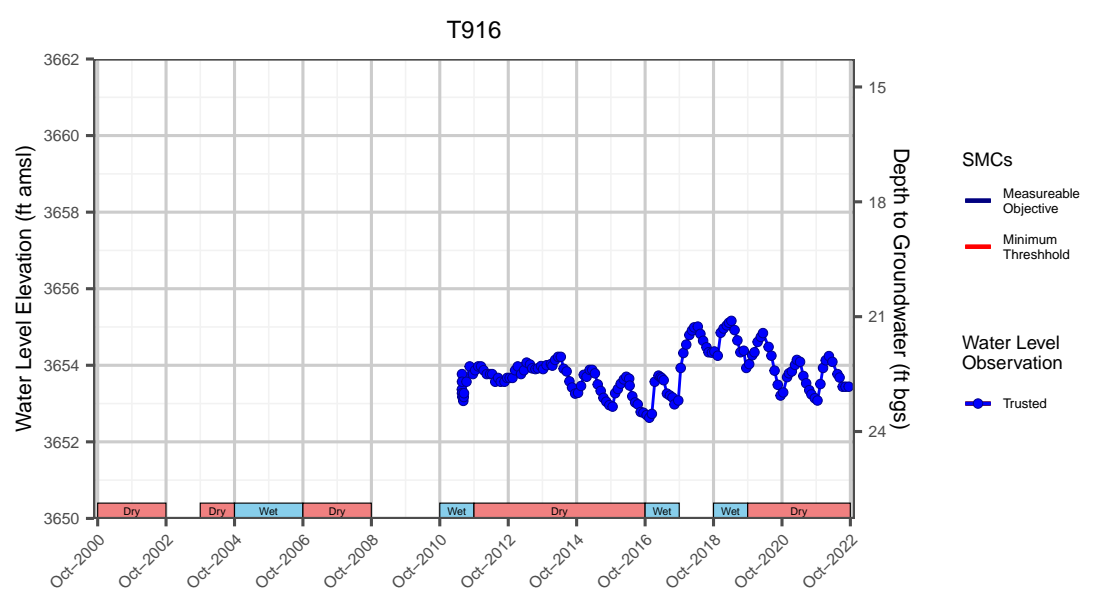
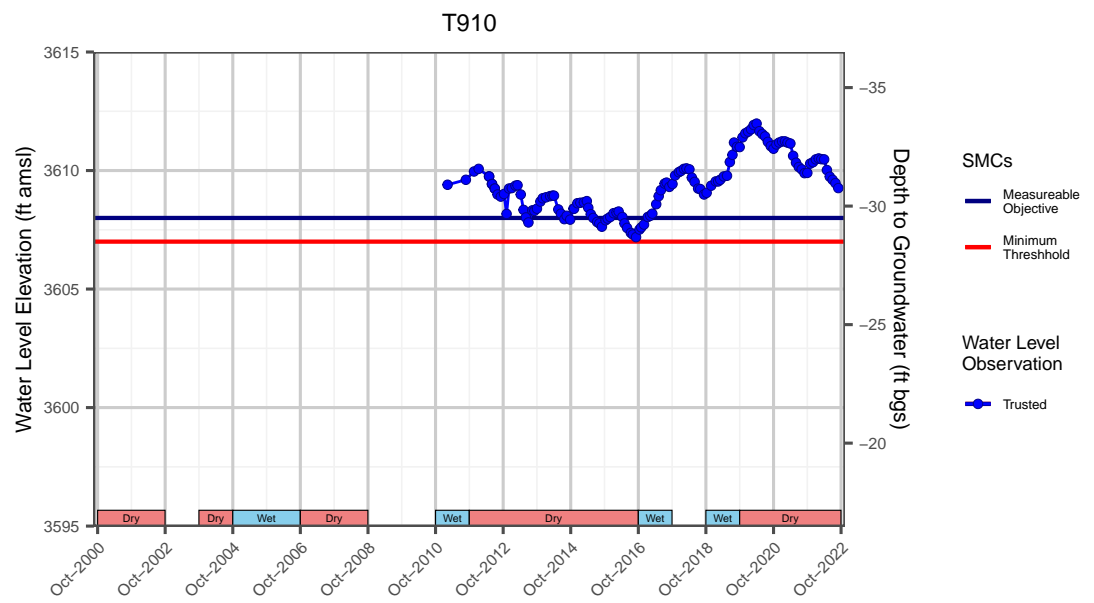
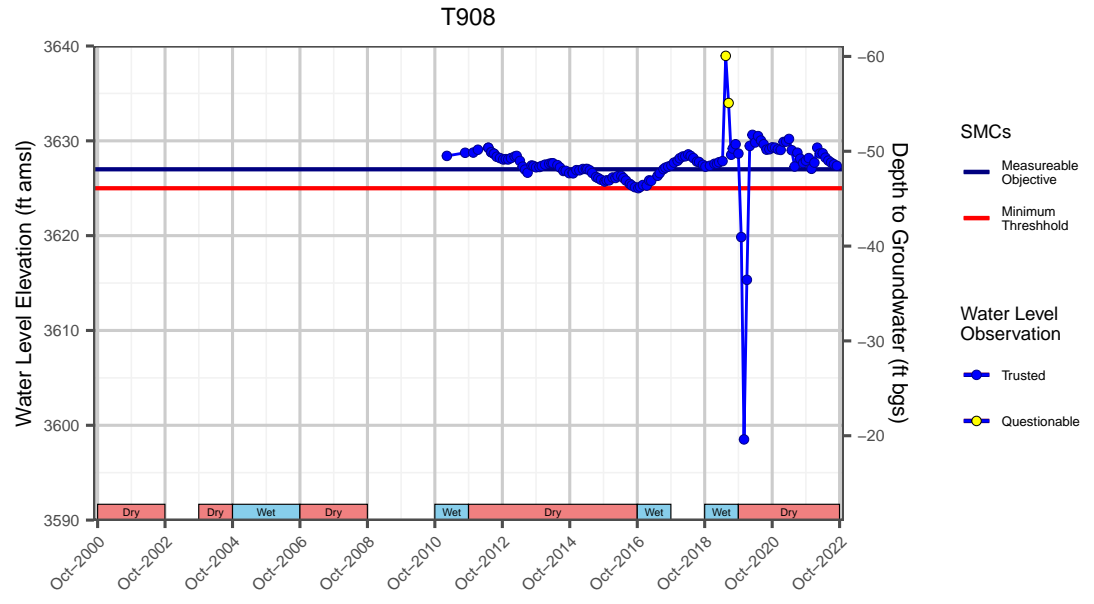






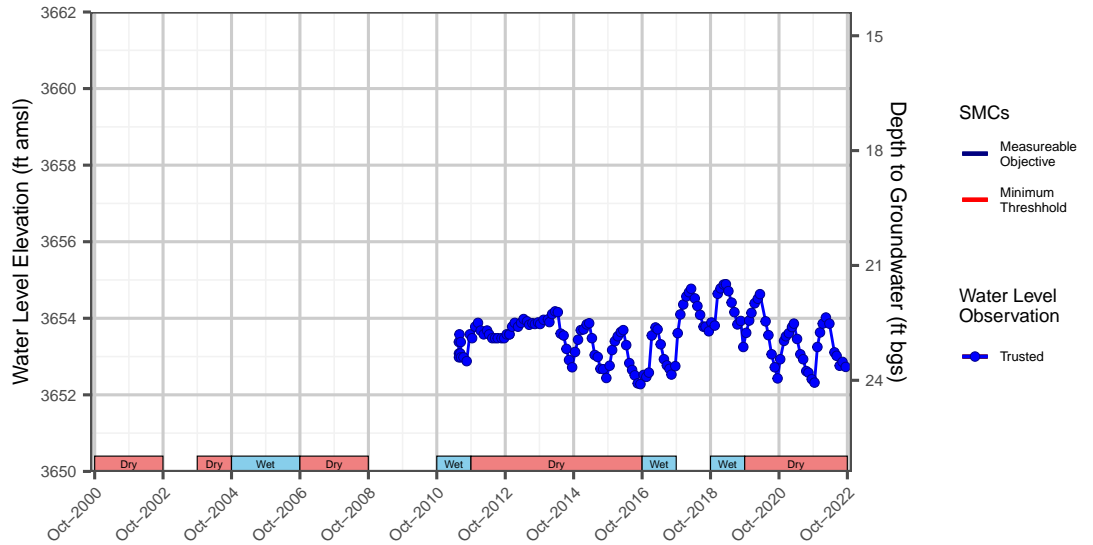






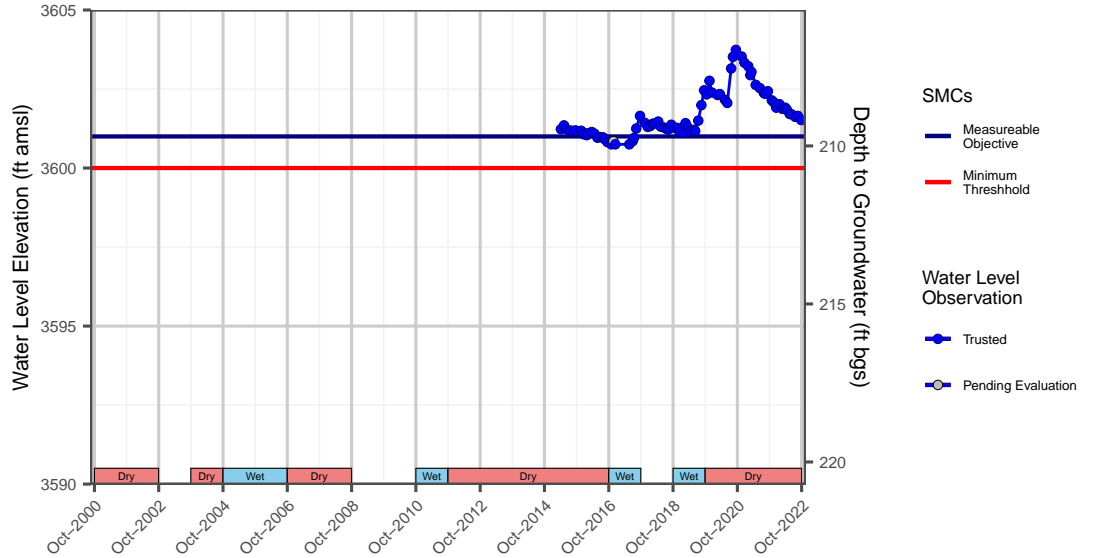
Notes: MT and MO values based on incorrect water level elevations that were recently corrected. MT and MO will be amended in the GSP 5-yr update

T917

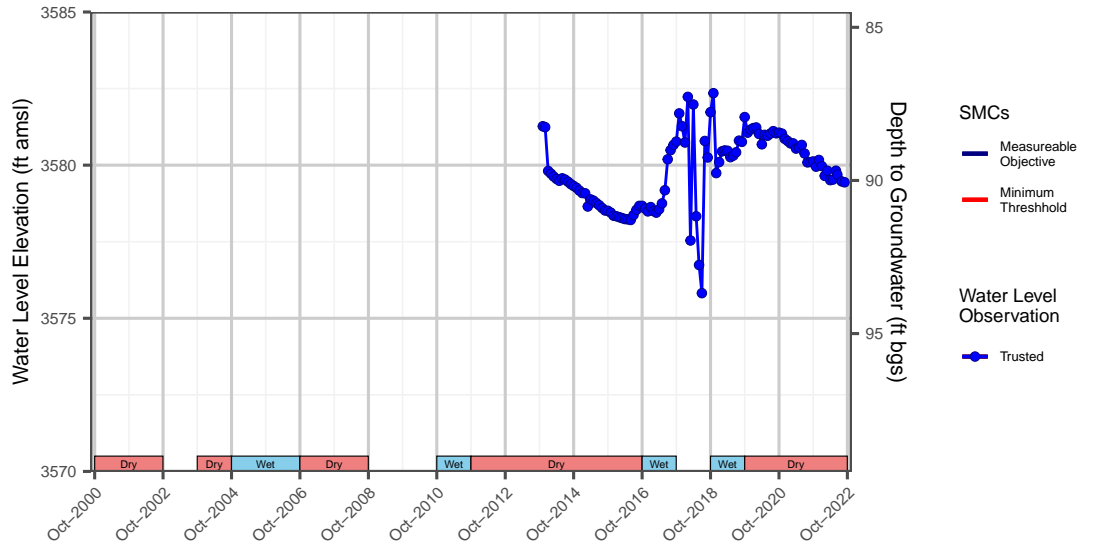


Notes: MT and MO values based on incorrect water level elevations that were recently corrected. MT and MO will be amended in the GSP 5-yr update

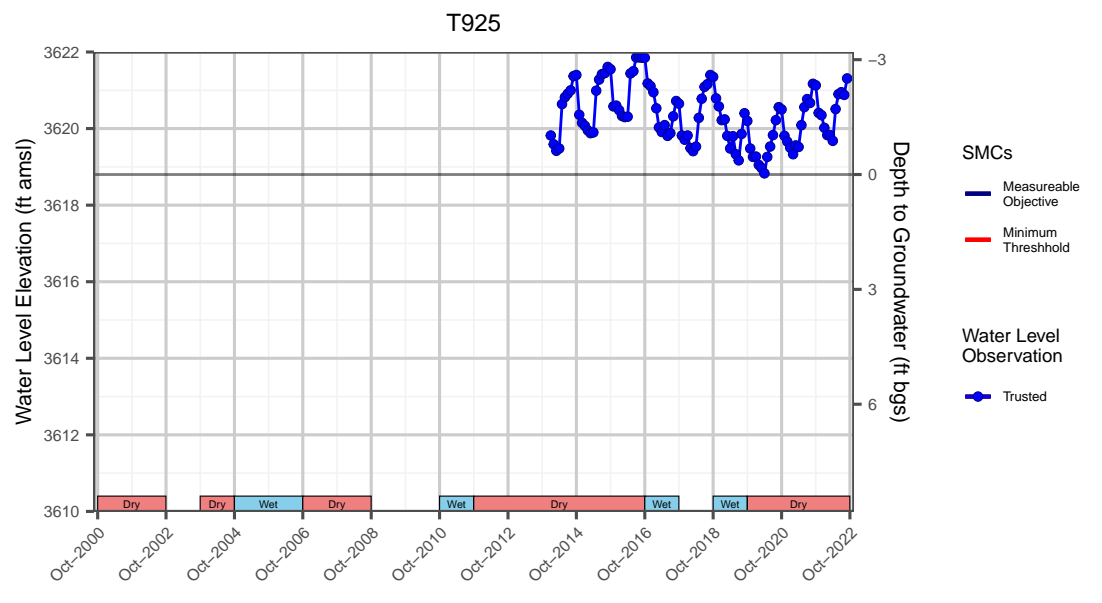
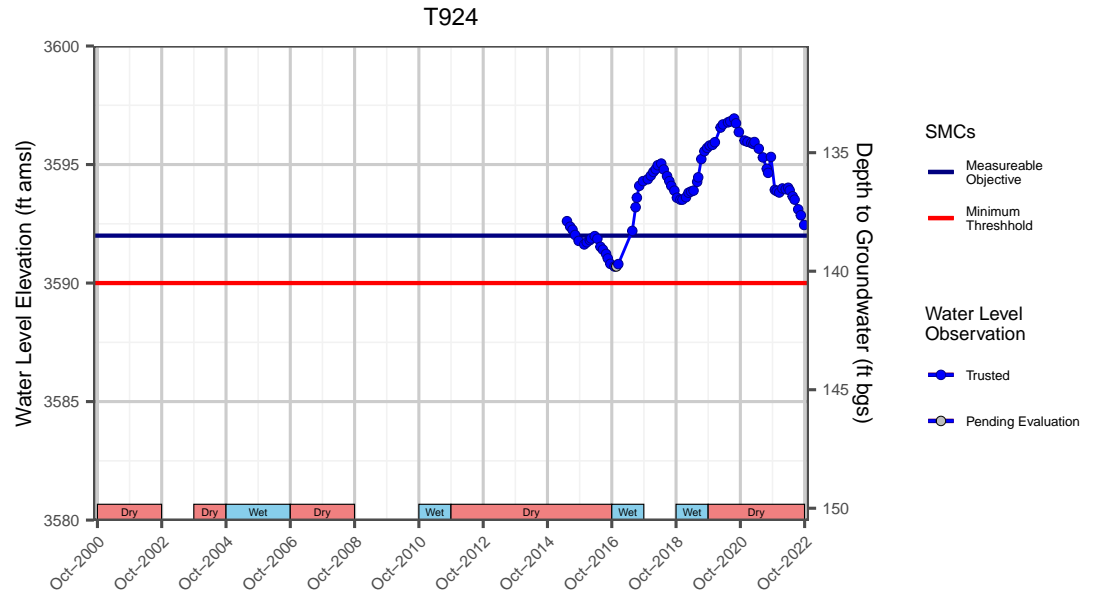
T920



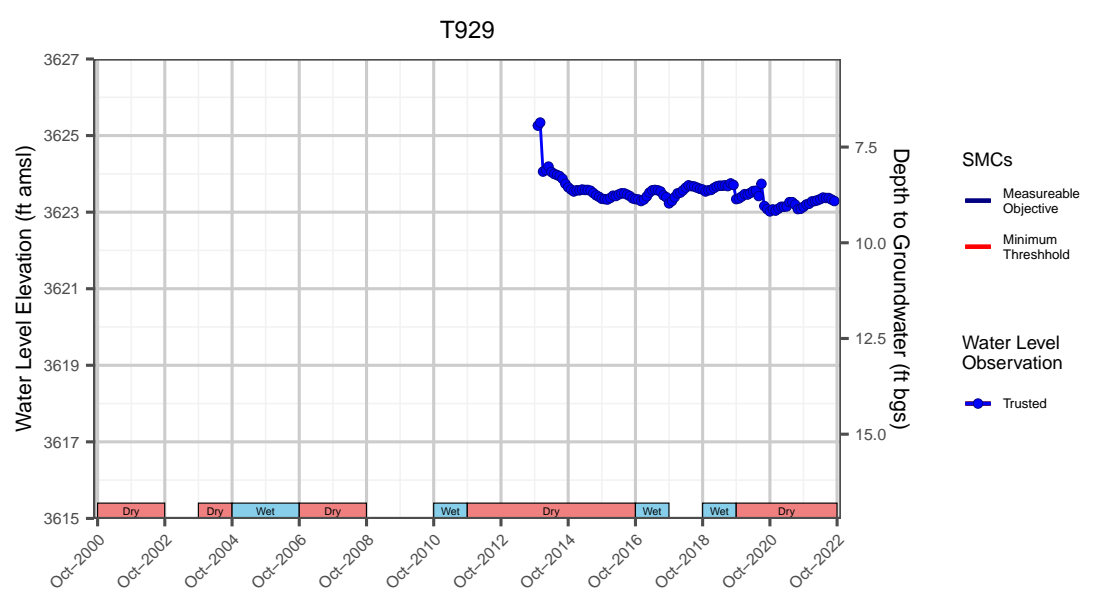
T922



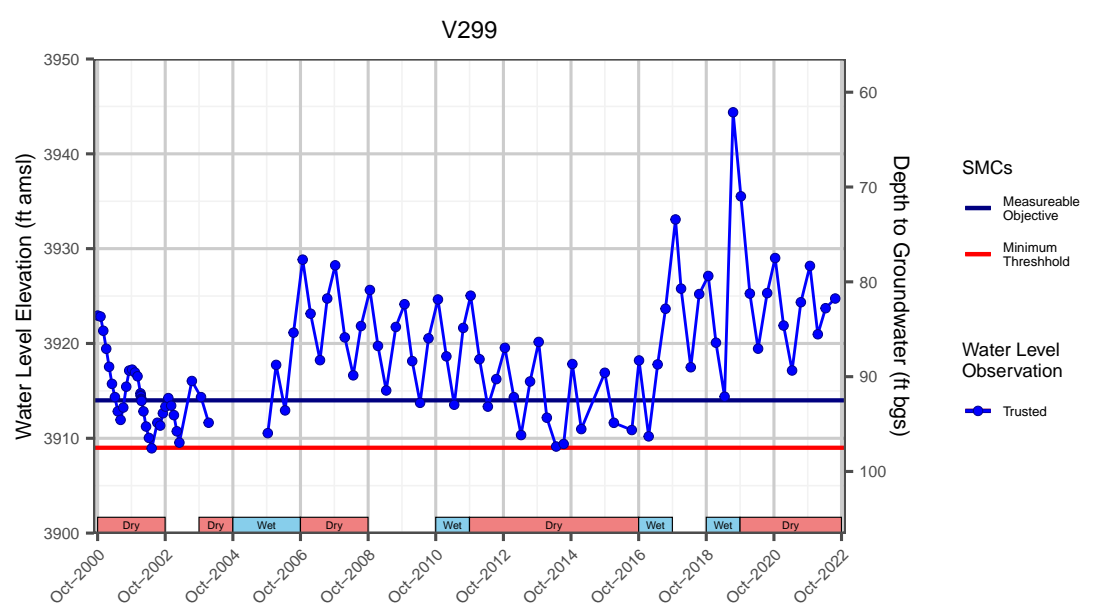
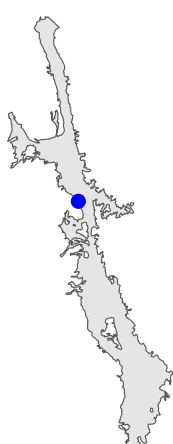
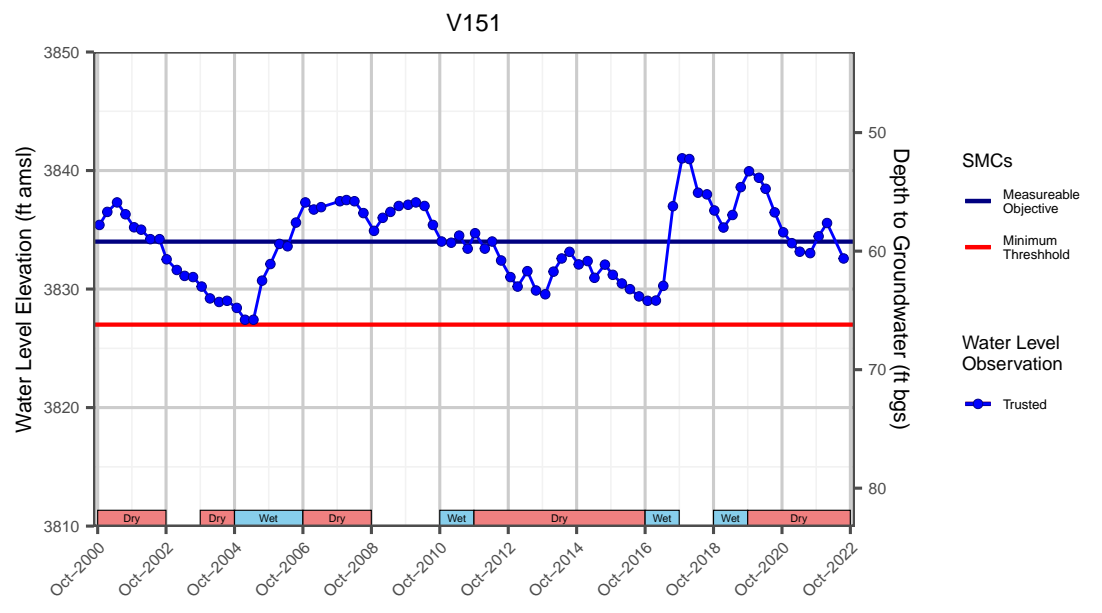
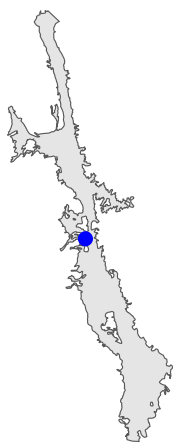
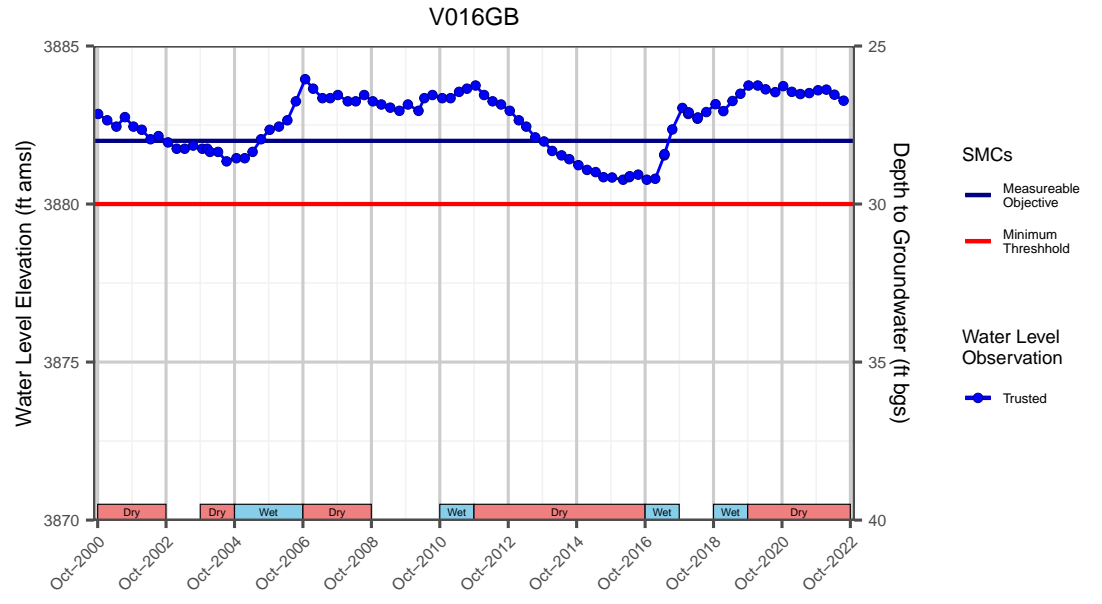
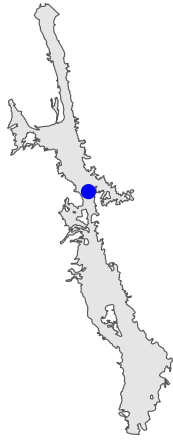
Notes: Newly established representative monitoring point or data not currently available. SMCs will be established in future GSP updates.

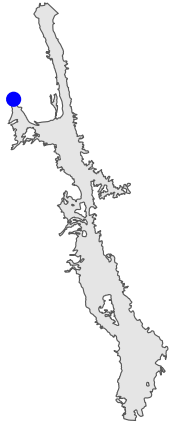


Notes: Newly established representative monitoring point or data not currently available. SMCs will be established in future GSP updates.

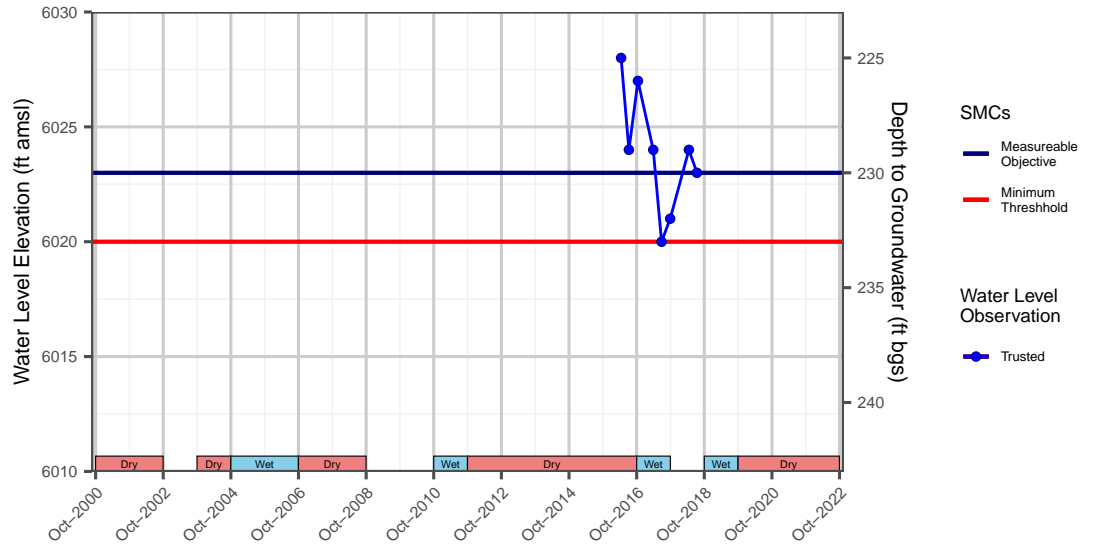


Notes: Newly established representative monitoring point or data not currently available. SMCs will be established in future GSP updates.





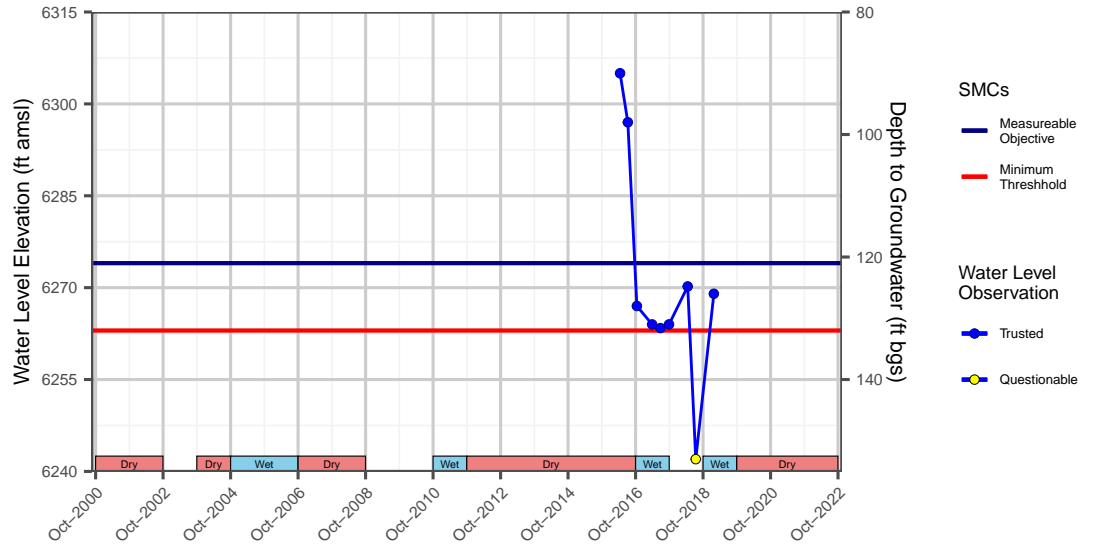
WCCSD 2



Notes: Wheeler Crest CSD (within Mono County and outside the revised OVGA boundary) has not responded to data requests.



WCCSD 4



Notes: Wheeler Crest CSD (within Mono County and outside the revised OVGA boundary) has not responded to data requests.