Sierra Valley Groundwater Basin GSP Annual Report Water Year 2022

Sierra Valley Groundwater Management District

PLUMAS COUNTY CALIFORNIA 1854

Certification

The Sierra Valley Groundwater Basin Groundwater Sustainability Plan Annual Report for water year 2022 was prepared in accordance with generally accepted professional hydrogeologic principles and practices and makes no other warranties, either expressed or implied as to the professional advice or data included in it. The Annual Report has not been prepared for use by parties or projects other than those named or described herein and may not contain sufficient information for other parties or purposes.

DANIEL B. STEPHENS & ASSOCIATES, INC.

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

REGISTERED GEOLOGIST
TONY MORGAN
No. 159
CERTIFIED HYDROGEOLOGIST
STATE of CALIFORNIA

Tony Morgan, PG, CHG
VP / Principal Hydrogeologist
tmorgan@geo-logic.com
3916 State Street, Garden Suite
Santa Barbara, CA 93105

Date signed: March 28th, 2023

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Acronyms and Abbreviations

Acronym	Definition
AF	acre-feet
AFY	acre-feet per year
amsl	above mean sea level
Basin	Sierra Valley groundwater basin
CCR	California Code of Regulations
CDFW	California Department of Fish and Wildlife
DBS&A	Daniel B. Stephens & Associates, Inc.
DWR	[CA] Department of Water Resources
ft	feet
GSA	Groundwater Sustainability Agency
GDE	Groundwater Dependent Ecosystem
GSP	Groundwater Sustainability Plan
LWA	Larry Walker Associates
MFFR	Middle Fork Feather River
mi	mile
MO	Measurable Objective
MT	Minimum Threshold
PLSS	Public Land Survey System
PMA	Project and Management Action
RMP	Representative Monitoring Point
SGMA	Sustainable Groundwater Management Act
SMC	Sustainable Management Criteria
SVGMD	Sierra Valley Groundwater Management District
SVHSM	Sierra Valley Hydrogeologic System Model
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
WLE	water level elevation
WCR	Well Completion Report
WY	water year

Executive Summary

Water year (WY) 2022 was a critically dry year for California. Precipitation for WY 2022 in the Sierra Valley groundwater basin (the Basin) totaled 14.50 inches, or approximately 63.5% of the historical average. Groundwater resources are typically relied upon more heavily in dry years than wet years. Observed changes in upper aquifer water levels ranged from -35.90 to +7.00 ft, with lower aquifer water level changes ranging from -12.60 to +14.54 ft. Change in groundwater in storage was estimated to be -8,817 acre-ft (AF) using the Sierra Valley Hydrogeologic System Model (SVHSM). Groundwater extractions in the Basin totaled 11,484 AF. An estimated 20,591 AF of surface water was used, with approximately 8,566 AF (42%) imported into the Basin from the Little Truckee River diversion. A total of 32,075 AF of water was used beneficially in the basin during WY 2022.

Progress has been made on multiple Projects and Management Actions (PMAs) that move the basin towards implementation of the Groundwater Sustainability Plan (GSP), as well as securing funding for PMAs identified in the GSP. These activities include:

- Preparation and successful submission of a Round 2 GSP Implementation Grant
- Agricultural well flow meter replacement and standardization
- Irrigation efficiency improvements
- Expansion of the land subsidence and shallow groundwater monitoring networks
- Groundwater recharge opportunity analysis

1. Introduction

The Sierra Valley groundwater basin (the Basin) is comprised of the Sierra Valley subbasin (5-012.01) and Chilcoot subbasin (5-012.02). Both subbasins are managed as a single basin cooperatively by the Sierra Valley Groundwater Management District (SVGMD) and Plumas County, which act as the Groundwater Sustainability Agencies (GSAs) for the Basin. Since its inception in 1980, the SVGMD has monitored groundwater levels and installed flow meters to monitor pumping on all high-capacity wells (those capable of pumping 100 gallons/minute (gpm) or more). Additionally, the District requires permits for constructing new wells or repairing existing wells. New wells may not cause adverse impacts to groundwater in the Basin; new wells are prohibited in a designated area of the Basin where groundwater levels are declining. Similarly, development projects in the Basin that will extract groundwater must obtain a determination by SVGMD that sufficient groundwater is available for the proposed project.

Following the submittal of the Sierra Valley Groundwater Sustainability Plan (GSP) on January 28th, 2022, the GSAs are required to submit an annual report for the preceding water year (October 1 through September 30) to DWR by April 1st (23 CCR §356.2). The annual report provides a summary of hydrologic conditions and water use in the Basin (Figure 1) using observed data from monitoring networks and/or estimated using best available methods. This WY 2022 annual report provides a brief summary of Basin water use and changes in groundwater storage during the period from October 1st, 2021 to September 30th, 2022 and context for conditions relative to sustainable management criteria (SMC).

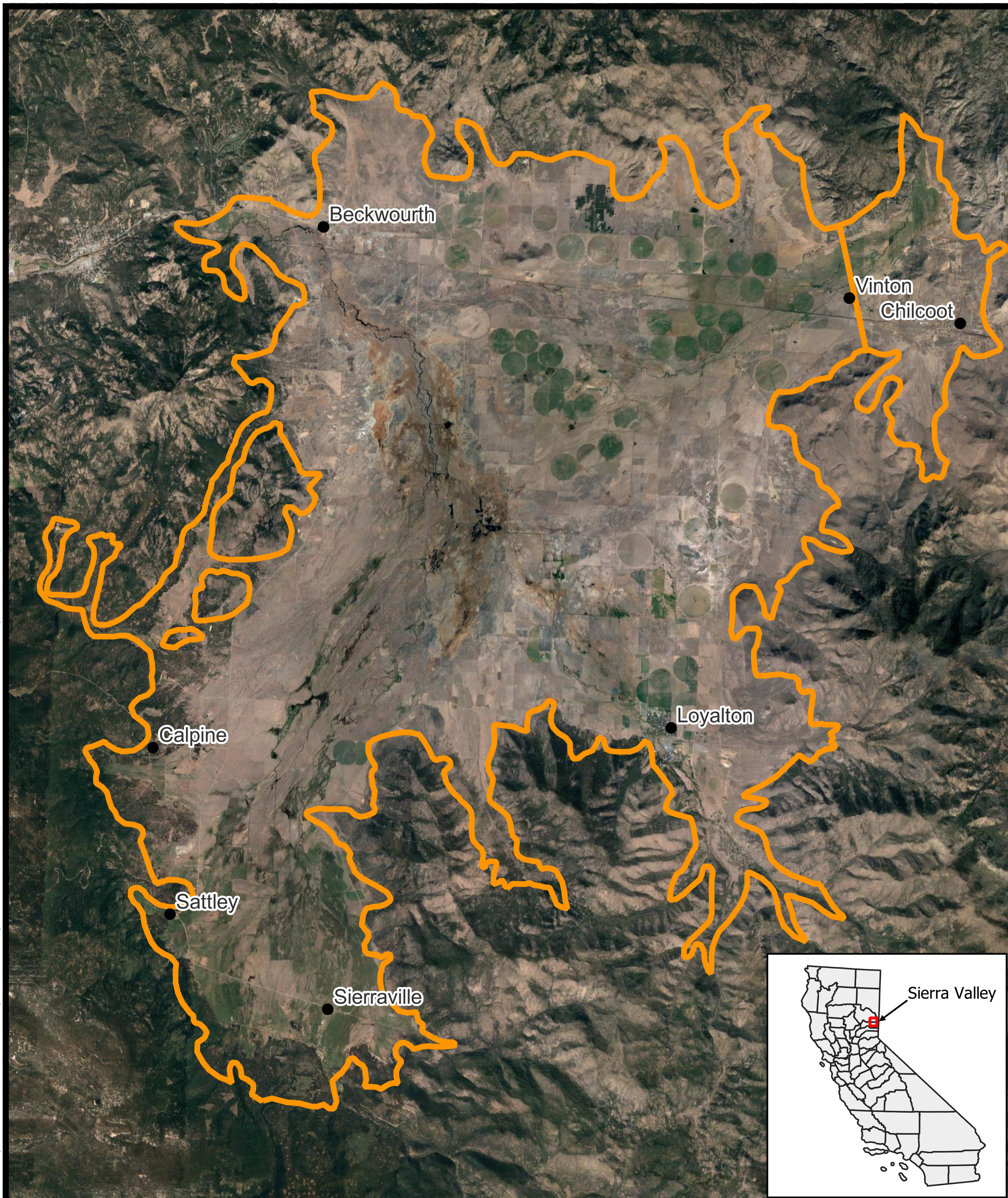
This document has been prepared in accordance with the requirements for annual reports as identified in the Sustainable Groundwater Management Act (SGMA). More detailed analysis and discussion of long-term hydrologic trends will be included in the periodic evaluation of the GSP the GSAs are required to perform at least every five years (23 CCR §356.2).

For additional clarification or more detailed information on the basin plan area or conditions, please refer to the Sierra Valley GSP (https://sgma.water.ca.gov/portal/gsp/preview/125). It is important to note that data gaps and missing information continue to be a focus as the GSAs gather additional information for better analysis and decisions.

2. Groundwater Elevations

Groundwater elevation contour maps for the upper and lower aquifers in the spring of 2022 are shown in Figure 2 and Figure 3, respectively, and for the upper and lower aquifers in the fall of 2022 in Figure 4 and Figure 5, respectively. These maps depict the seasonal high (spring) and low (fall) water level elevations for the two principal aquifers (upper and lower) in the Basin. Spring and Fall water level elevations are defined as observations within a 42-day period centered on April 1st or October 1st. If a well has multiple observations within this period, then the value collected nearest to April 1st or October 1st is used.

Observed spring groundwater elevations in the upper aquifer (Figure 2) ranged from 4,815.58 to 5,177.91 ft above mean sea level (amsl), with an average elevation of 4,931.51 ft amsl. Spring groundwater elevations for the lower aquifer (Figure 3) ranged from 4,789.13 to 5,107.83 ft amsl, with an average elevation of 4,902.33 ft amsl. Groundwater elevations in the fall for the upper aquifer (Figure 4) ranged from 4,736.78 to 5,172.41 ft amsl, with an average elevation of 4,918.36 ft amsl. Fall observations from the lower aquifer (Figure 5) showed groundwater elevations ranged from 4,736.78 to 5,092.93 ft amsl, with an average elevation of 4,876.92 ft amsl.



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

Explanation

● City or Town

Groundwater Basin Boundary

0 1 2 mi

N

Sierra Valley Groundwater Management District

Sierra Valley Annual Report WY 2022

Location Map and Groundwater Basin Boundary

Figure 1

03/08/2023

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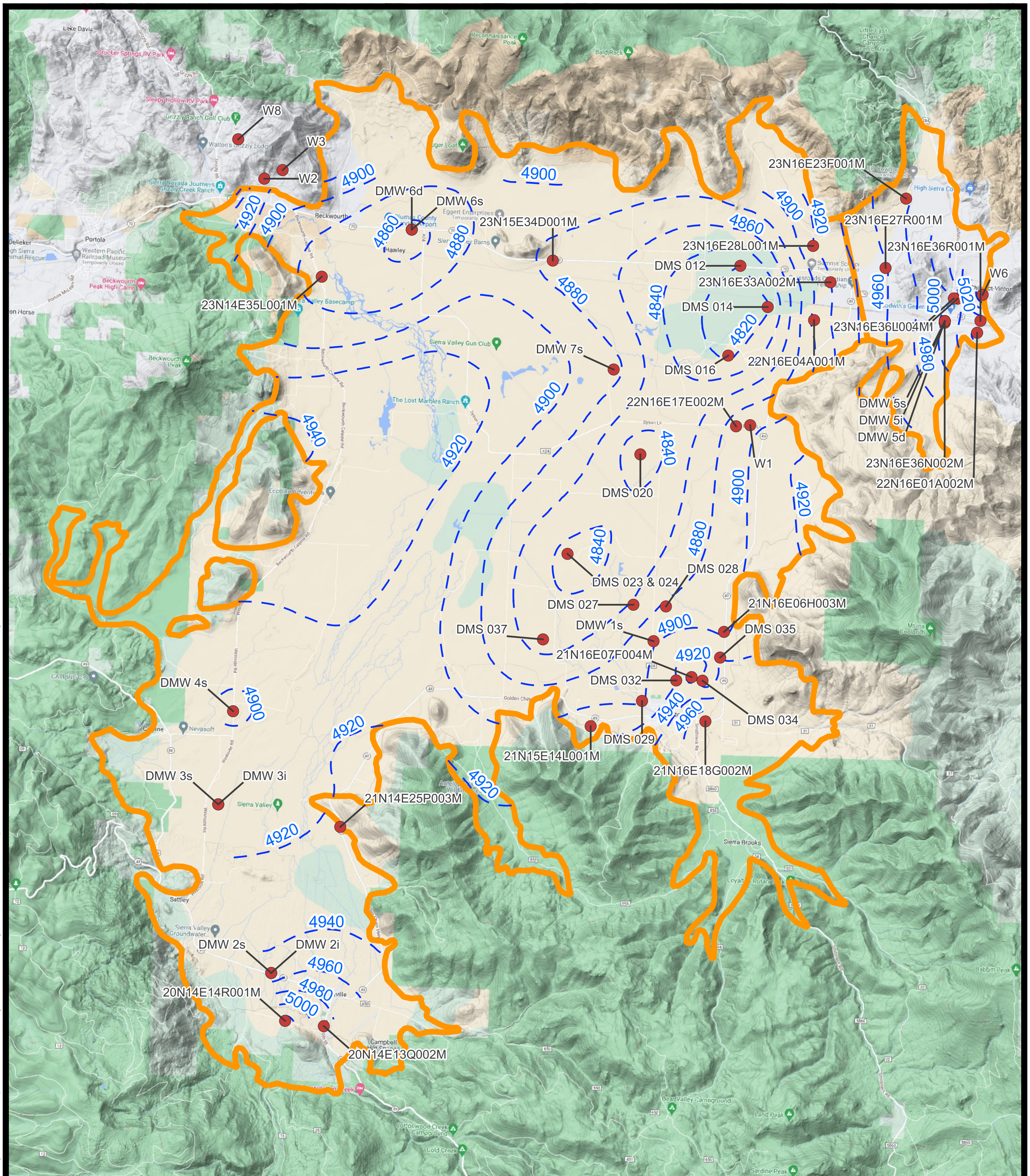

Source: https://sierra-valley.gladata.com

Explanation

- Monitoring Well
- Groundwater Basin Boundary
- Water Level Contour (ft amsl)

0 1 2 mi

N

Sierra Valley Groundwater Management District

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Sierra Valley Annual Report WY 2022

Groundwater Elevations
Upper Aquifer Spring 2022

Figure 2

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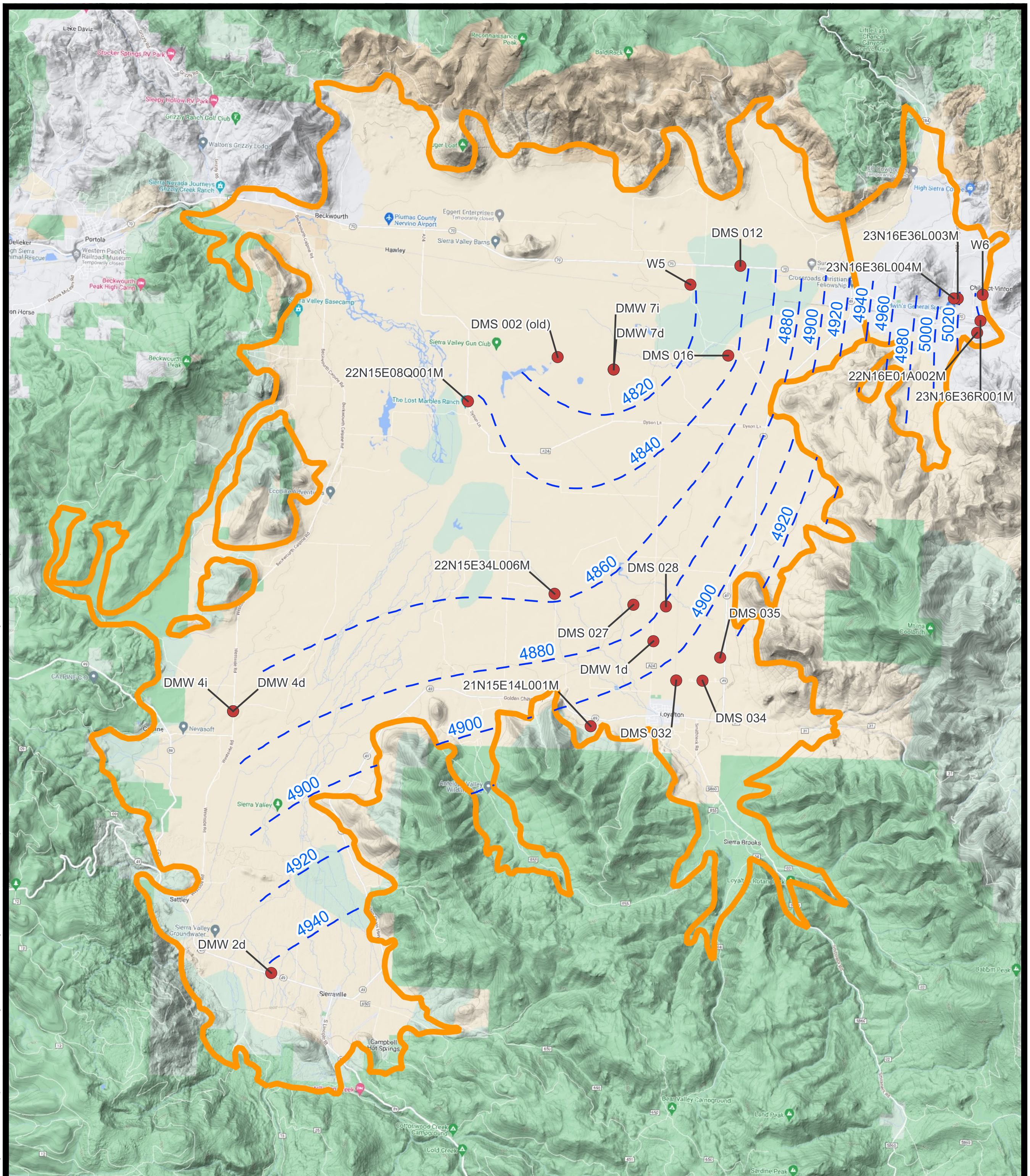

Source: https://sierra-valley.gladata.com

Explanation

- Monitoring Well
- Water Level Contour (ft amsl)
- Groundwater Basin Boundary

0 1 2 mi

N

Sierra Valley Groundwater Management District

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Groundwater Elevations

Lower Aquifer Spring 2022

Figure 3

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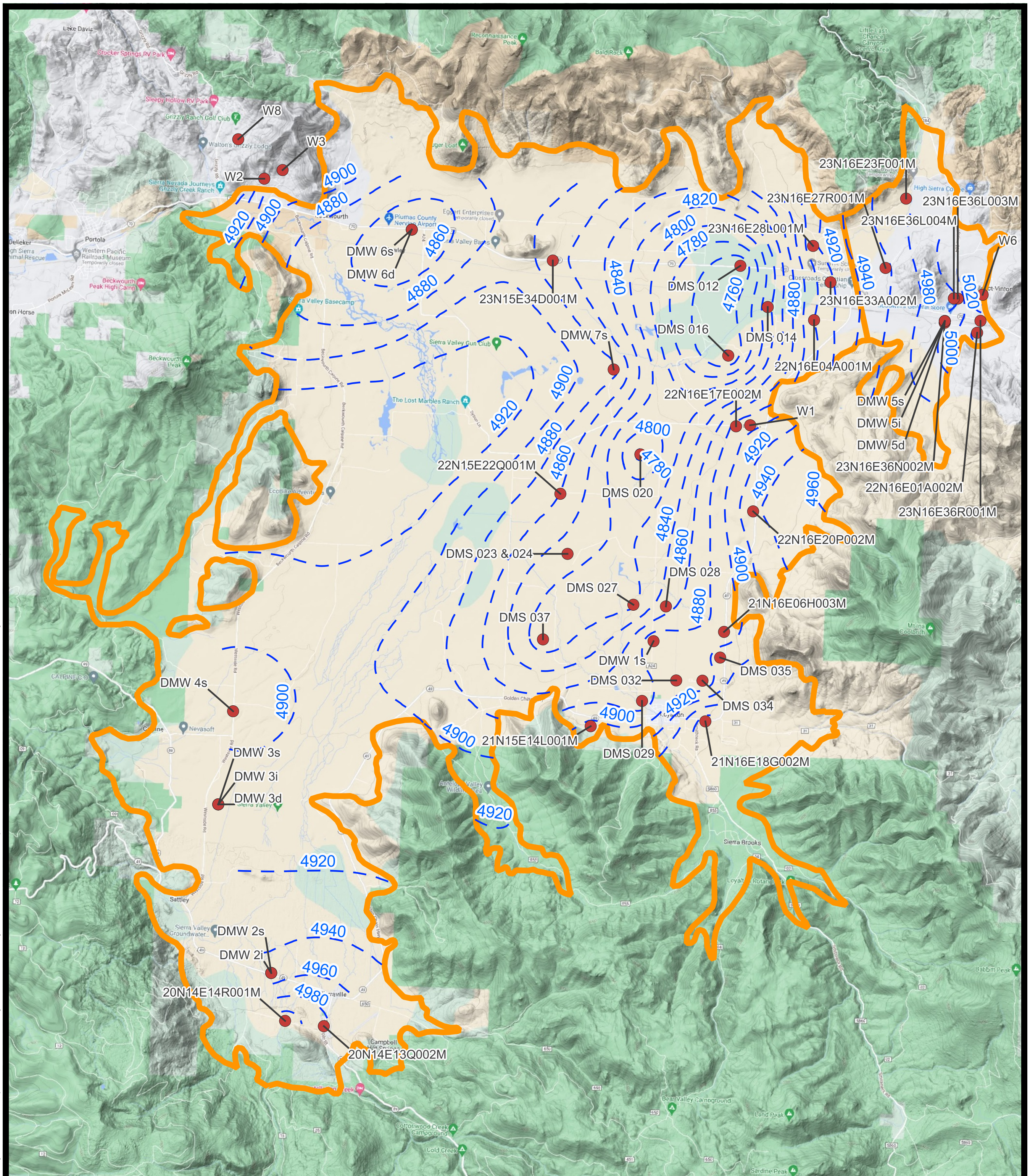

Explanation

- Monitoring Well
- Groundwater Basin Boundary
- Water Level Contour (ft amsl)

0 1 2 mi

N

Sierra Valley Annual Report WY 2022

Groundwater Elevations
Upper Aquifer Fall 2022

Sierra Valley Groundwater Management District

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Figure 4

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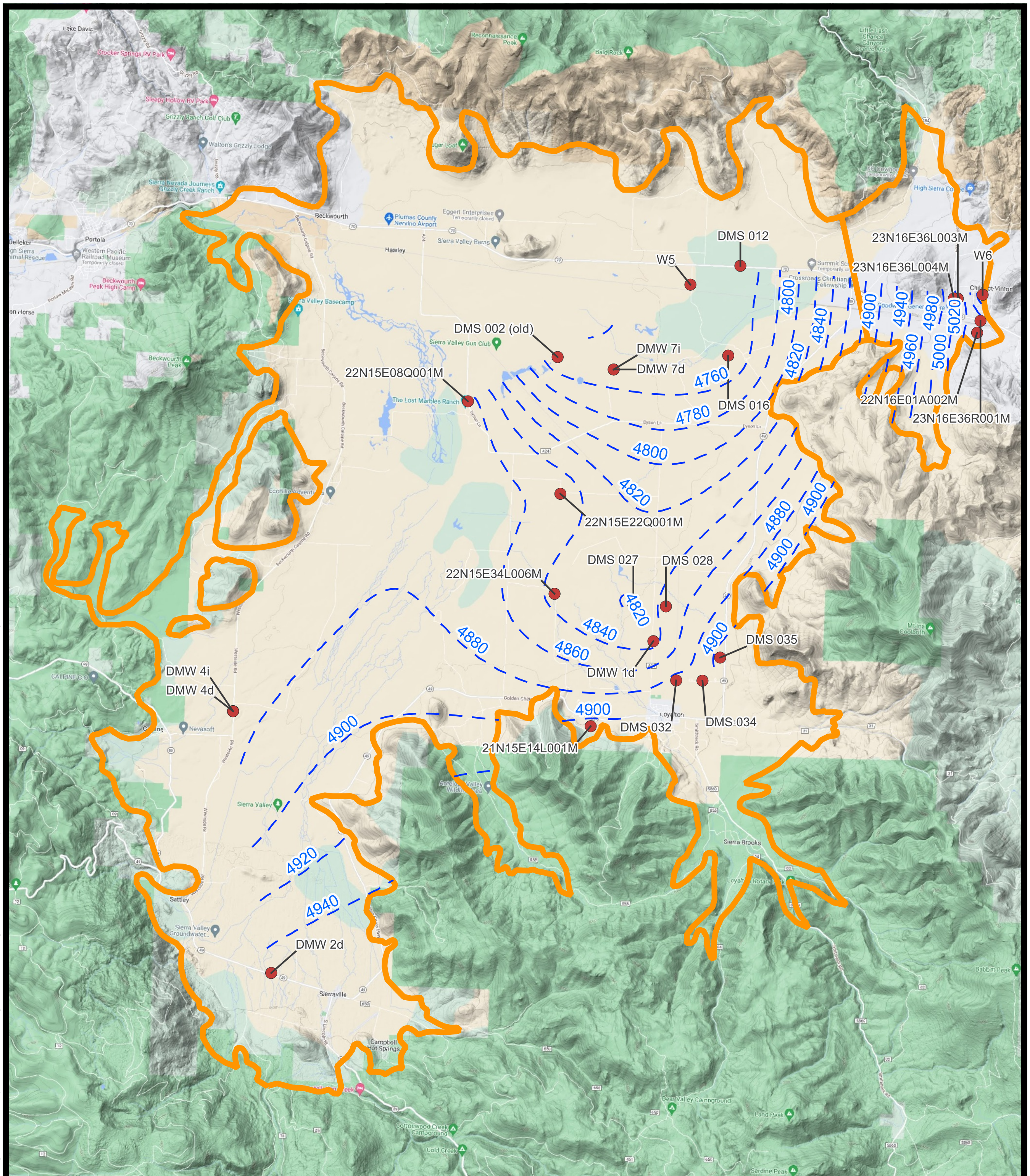

Source: https://sierra-valley.gladata.com

Explanation

- Monitoring Well
- Water Level Contour (ft amsl)
- Groundwater Basin Boundary

0 1 2 mi

N

Sierra Valley Groundwater Management District

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Groundwater Elevations
Lower Aquifer Fall 2022

Figure 5

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Flow patterns in the Basin are complex and heavily influenced by the spatial distribution of recharge, spatial distribution of aquifer hydraulic properties, location and orientation of faults that act as groundwater flow barriers, and groundwater pumping. On the west side of the Basin flow is generally from south to north, towards the surface water outlet of the Basin located to the northwest, which is the headwaters of the Middle Fork Feather River (MFFR). Flow on the east side of the Basin is generally from the margins of the Basin towards the pumping center located in the vicinity of wells W5 and DMW 7 (see Figure 3 for location or search via the online database management system (DMS) at https://sierra-valley.gladata.com/).

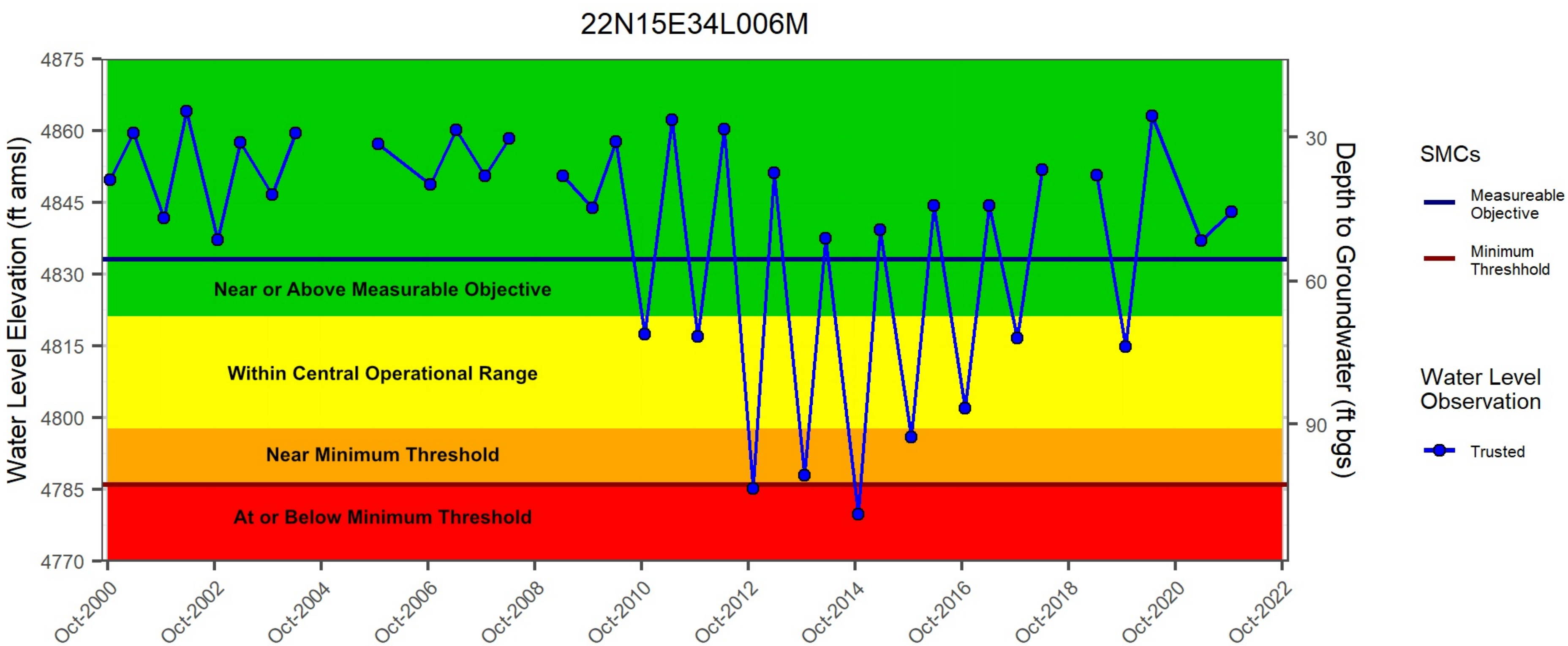
Observed groundwater elevation changes from October 2021 to October 2022 in the upper aquifer ranged from -35.90 to +7.00 ft. For the lower aquifer, groundwater elevation changes ranged from -12.60 to +14.54 ft.

The reporting metric "SMC Status" was developed to better compare groundwater elevations observed at representative monitoring points (RMP) in the context of their unique SMC. This metric describes groundwater elevations relative to the "operational range" of the well and allows for normalized reporting of groundwater elevations at RMPs. The operational 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 operational range
- Within Central Operational Range: Water levels within 25% to 75% of operational range
- Near MT: Water levels less than 25% of operational range but above MT
- At or Below MT: Water levels at or below MT

Figure 6 shows an example of this metric applied to the hydrograph of well 22N15E34L006M. Figure 7 and Figure 8 show the spatial distribution of SMC Status for spring water level observations in the upper and lower aquifer, respectively. Fall SMC Status for the upper and lower aquifer is shown in Figure 9 and Figure 10, respectively. Hydrographs for all RMPs can be found in Appendix A.

Groundwater conditions in the spring were generally near or above the MO for each RMP in both the upper and lower aquifers. Decreases in groundwater levels due to the critically dry water year resulted in fall conditions for the upper aquifer where 33% of RMPs were near or above the MO, 37% were within the central operational range, 19% were near the MT, and 11% of RMPs were at or below the MT. Fall conditions for the lower aquifer showed 38% of RMPs were near or above the MO, 31% were within the central operational range, 15% near the MT, and 15% of RMPs were at or below the MT.There did not appear to be a definitive spatial pattern in SMC Status in the spring or fall nor for the upper or lower aquifer.



Sierra Valley Groundwater Management District

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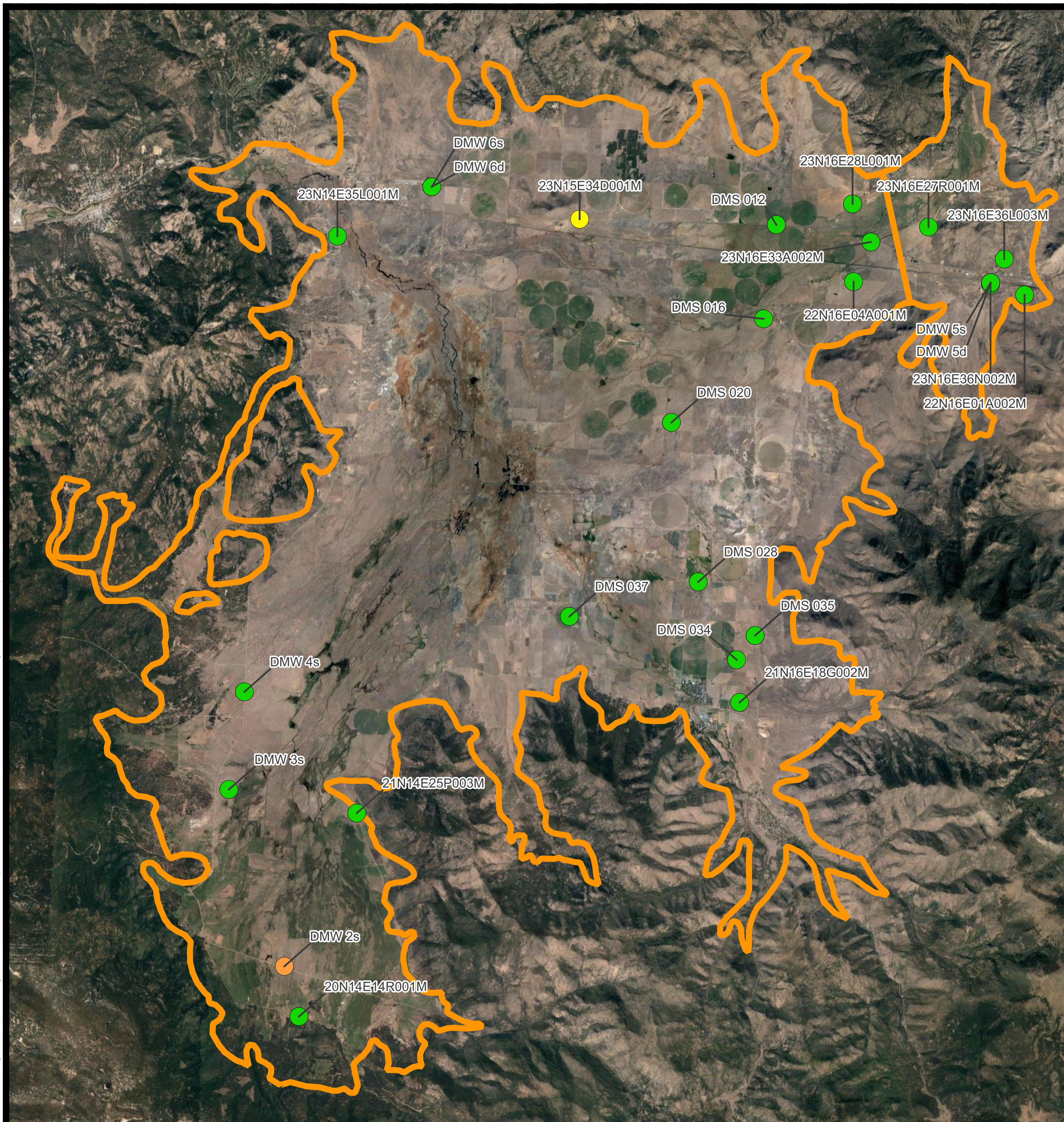
Figure 6

Sierra Valley Annual Report WY 2022

Example SMC Status Categories



Explanation

SMC Status

- Near or Above Measureable Objective
- Within Central Operational Range
- Near Minimum Threshold
- At or Below Minimum Threshold

Groundwater Basin Boundary

N

0 1 2 mi

Notes:
1. See Figure 6 for SMC Status definition

Sierra Valley Annual Report WY 2022

Sustainable Management Criteria Status
Upper Aquifer Spring 2022

Sierra Valley Groundwater Management District

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Figure 7

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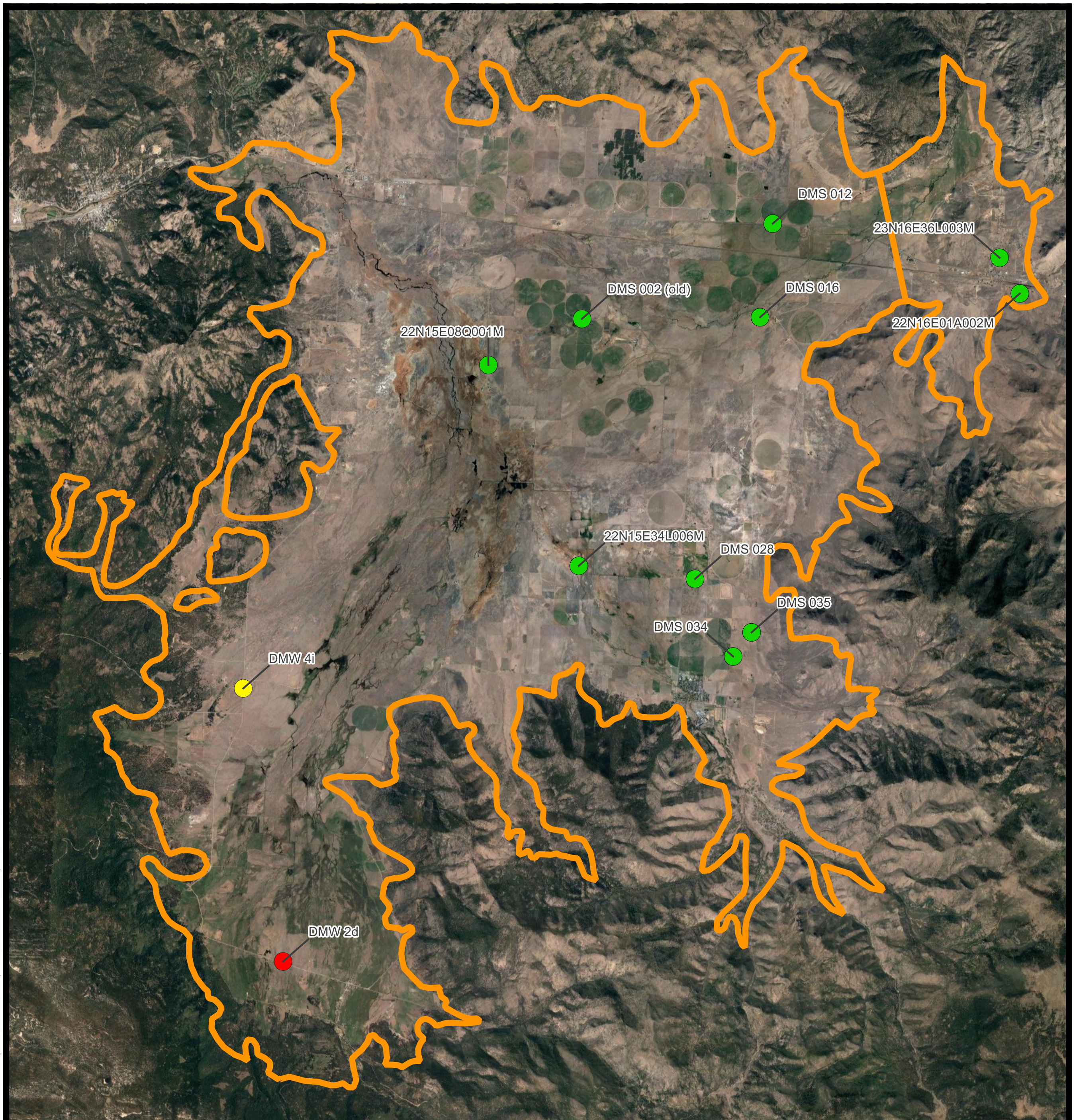

Explanation

SMC Status

- Near or Above Measureable Objective
- Within Central Operational Range
- Near Minimum Threshold
- At or Below Minimum Threshold

Groundwater Basin Boundary

N

0 1 2 mi

Notes:
1. See Figure 6 for SMC Status definition

Sierra Valley Groundwater Management District

Sierra Valley Annual Report WY 2022

Sustainable Management Criteria Status
Lower Aquifer Spring 2022

Figure 8

03/24/2023

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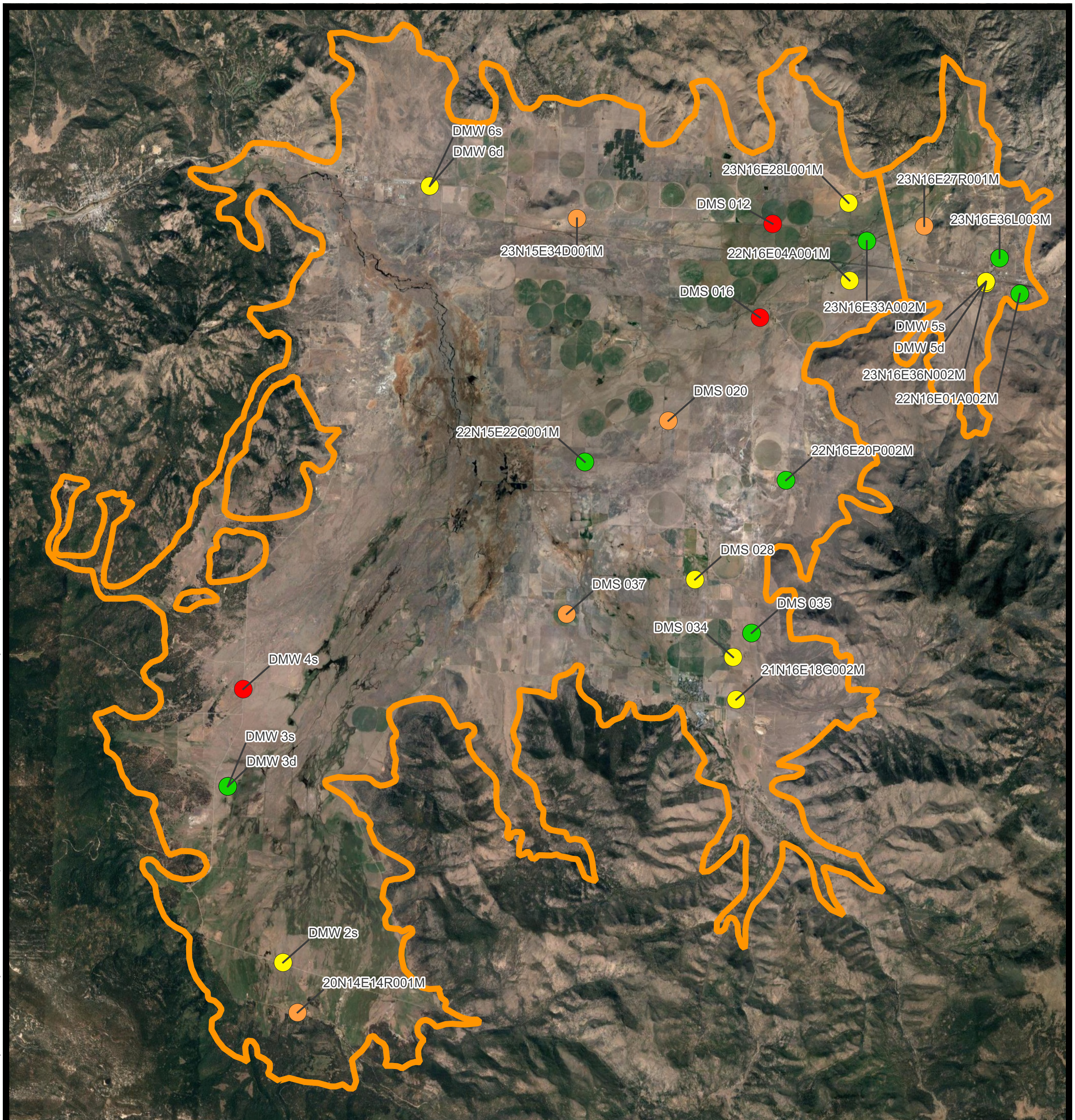

Explanation

SMC Status Fall Upper Aquifer

- Near or Above Measureable Objective
- Within Central Operational Range
- Near Minimum Threshold
- At or Below Minimum Threshold

Groundwater Basin Boundary

N

0 1 2 mi

Notes:
1. See Figure 6 for SMC Status definition

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Sustainable Management Criteria Status
Upper Aquifer Fall 2022

Figure 9

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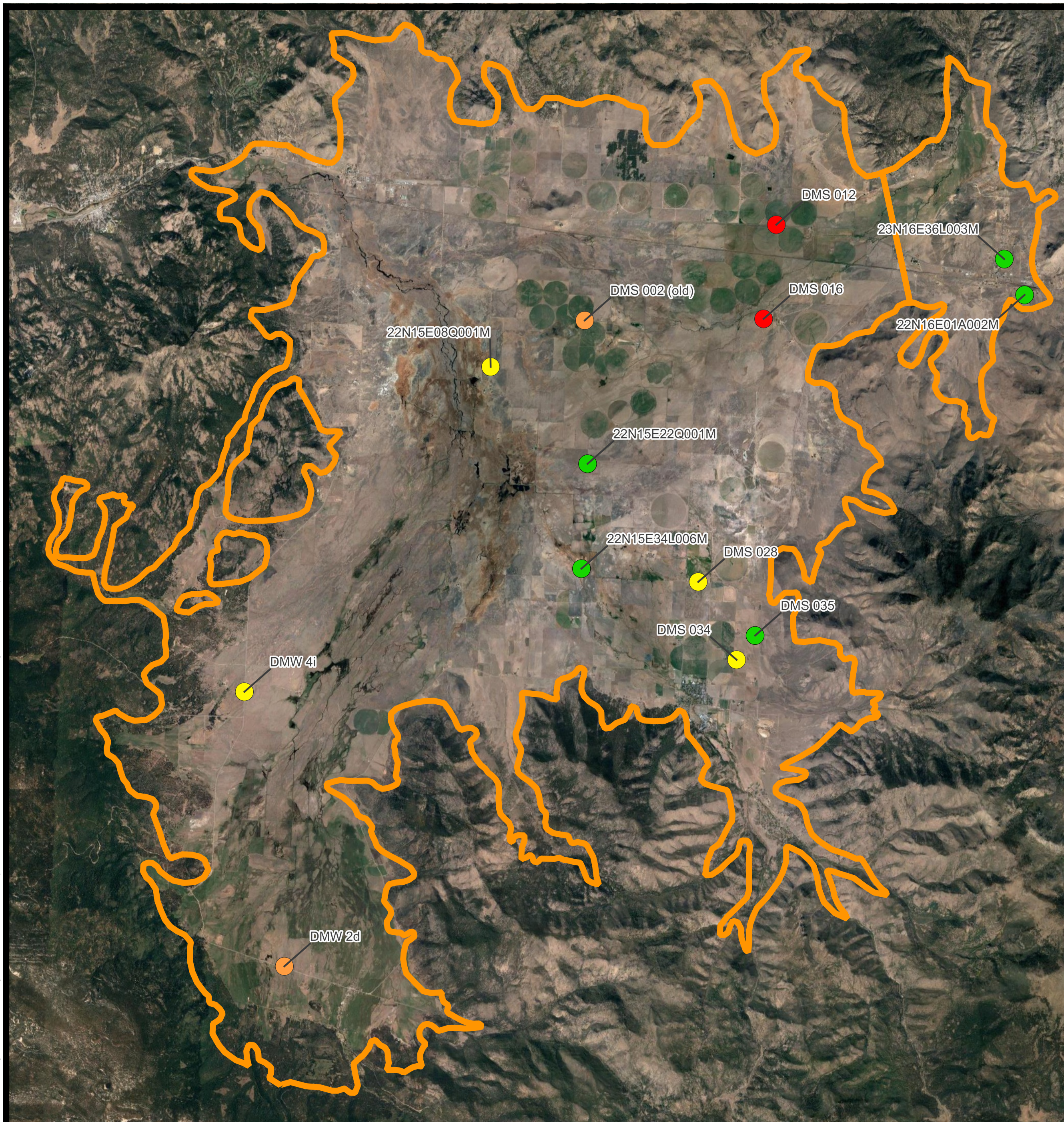

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Explanation

SMC Status

- Near or Above Measureable Objective
- Within Central Operational Range
- Near Minimum Threshold
- At or Below Minimum Threshold

Groundwater Basin Boundary

N

0 1 2 mi

Notes:
1. See Figure 6 for SMC Status definition

Sierra Valley Groundwater Management District

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Sierra Valley Annual Report WY 2022

Sustainable Management Criteria Status
Lower Aquifer Fall 2022

Figure 10

3. Groundwater Extractions

The Sierra Valley Groundwater Management District (SVGMD) meters all active large-capacity non-municipal wells (defined as wells that produce 100+ gallons per minute or wells with a casing diameter of 6 inches or greater) in the Basin.

Municipal pumping is measured on a monthly basis by the respective entity and reported to SVGMD. Municipal pumping from Sierra County Water Works District #1 (Calpine) is included in the groundwater extraction volumes presented in this Annual Report despite the wells being located just outside of the Basin boundary and predominantly screened in bedrock. Inclusion or exclusion of annual groundwater extractions from the Calpine wells would not materially change any conclusions due to the relatively small annual extraction volume of approximately 50 acre-ft/yr (AFY).

The number of domestic wells has been estimated using two methods:

- Well Completion Reports (WCRs) – available from DWR
- County Parcel Coverage with Use Code Indicator and Description

For the first method, some assumptions were made because the well completion reports do not differentiate between inactive and active wells. The number of wells has been assessed based on assumed useful well life of 31 and 40 years.

For the second method, county parcel coverage was provided by Sierra and Plumas counties and it identifies 'residential' parcels. Assumptions included counting for one domestic well per residential parcel. Parcels within a public water supply system boundary have been excluded.

Comparing the two methods, a preliminary estimate of domestic wells provided about 500 domestic wells active in the basin. The majority of domestic wells are located along the margins of the valley and based on available well log information, typically screened in fractured bedrock. Therefore, estimated domestic groundwater extraction volume was not included in the groundwater or total water use calculations. Using the assumption of 2 AFY of water use (maximum amount to be classified as a de minimis user), the estimated domestic water use is about 1000 af/yr in the valley. This number and the underlying assumptions will need to be further refined during GSP implementation.

Estimated groundwater extractions for WY 2022 grouped by water use sector and measurement method are shown in Table 1. Groundwater pumping within each public land survey system (PLSS) section (1 mi^2) shows the spatial distribution of agricultural (Figure 11), municipal and industrial (Figure 12), and total (Figure 13) groundwater extractions within the Basin. In total, groundwater pumping equaled 11,484 AF, compared to 15,702 AF of extractions in WY 2021. Agricultural beneficial uses accounted for about 94% of total groundwater extractions for WY 2022.

Table 1. Groundwater Extractions

Sector	Method	GW Extraction Volume (AF)	Accuracy (%)	Range (AF)
Agriculture	Totalizer	10,766	± 5	10,228 - 11,305
Municipal and Industrial	Totalizer	718	± 5	682 - 754
Total		**11,484**		**10,910 - 12,059**

4. Surface Water Supply

Surface water used in the Basin is grouped by source and measurement method and summarized in Table 2. Surface water is sourced from streams that enter Sierra Valley along the margin, releases from Frenchman Reservoir and Lake Davis, and imported water from the Little Truckee River. Observed flow rates for releases from Lake Davis and Frenchman Reservoir, and imports from the Little Truckee River, are available from the Sierra Valley Watermaster.

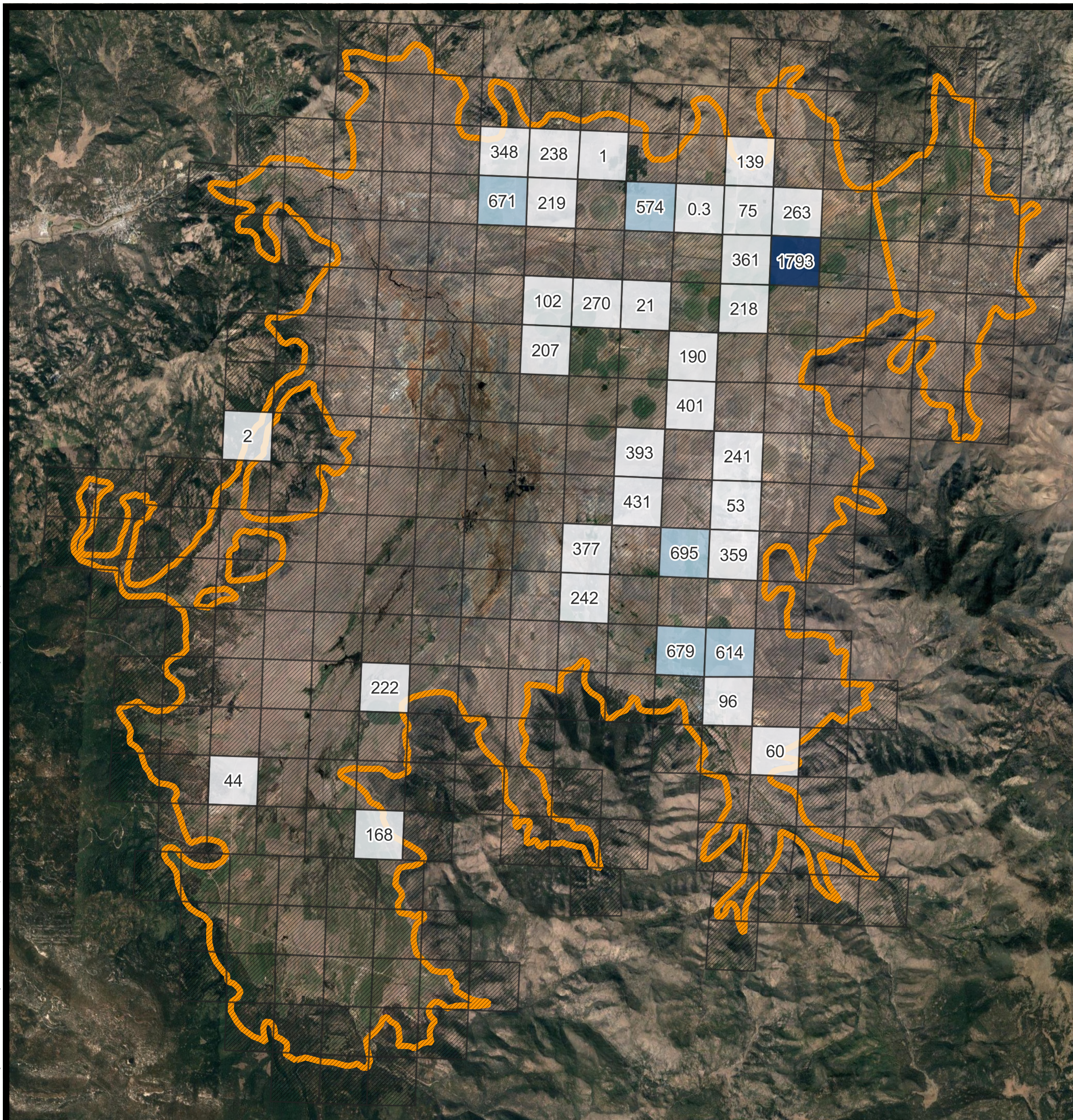
All imported water from the Little Truckee River diversion is used beneficially for agricultural purposes, as are all contract and water right releases from Frenchman Reservoir (diverted from Little Last Chance Creek). Up to 800 AFY is diverted from Big Grizzly Creek (fed by releases from Lake Davis) to flood irrigate the Ramelli Ranch, owned by the Plumas National Forest. Specific diversion

Table 2. Surface Water Use

Surface Water Source	Method	Annual Volume Used (AF)	Accuracy (%)	Range (AF)
Local Imported Supplies	Weir	8,566	± 5 %	8,138 - 8,995
Local Supplies	Weir	7,775	± 5 %	7,387 - 8164
	Estimated from model results and reported diversion data[1]	3,450	± 20 %	2,760 - 4,139
	Estimated from previously reported diversions	800	± 33 %	536 - 800[b]
Total		**20,591**		**18,821 - 22,098**

1. Total diversion volume from ungauged local streams not estimated in WY 2021 GSP annual report

a. Upper limit established as 800 AFY



Explanation

Extraction Volume (AF)

- No Extractions
- 0 - 500
- 500 - 1000
- 1000 - 1500
- 1500 - 2000

GroundwaterBasin Boundary

0 1 2 mi

N

Notes:
1. Annual groundwater pumping aggregated by 1 mi^2 PLSS sections
2. Labels indicate volume pumped in AF
3. Total agricultural pumping totaled 10,766 AF

Sierra Valley Groundwater Management District

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Sierra Valley Annual Report WY 2022
Agricultural Groundwater Extractions

Figure 11

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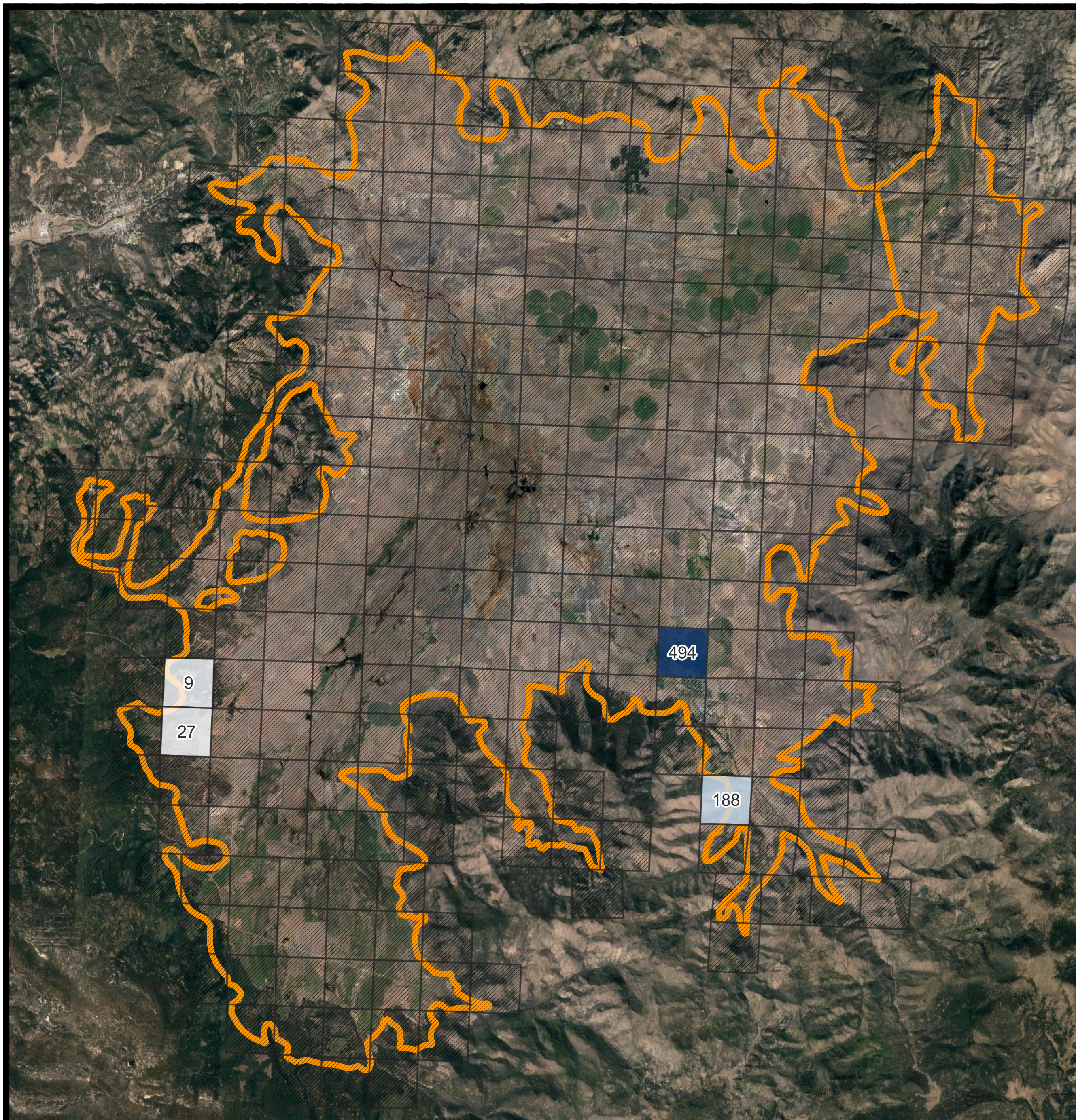

Explanation

Extraction Volume (AF)
- No Extractions
- 0 - 100
- 100 - 200
- 200 - 300
- 300 - 400
- 400 - 500

Groundwater Basin Boundary

0 1 2 mi

N

Notes:
1. Annual groundwater pumping aggregated by 1 mi^2 PLSS sections
2. Labels indicate volume pumped in AF
3. Total municipal and industrtial pumping totaled 718 AF

Sierra Valley Groundwater Management District

Sierra Valley Annual Report WY 2022

Municipal and Industrial Groundwater Extractions

Figure 12

03/08/2023

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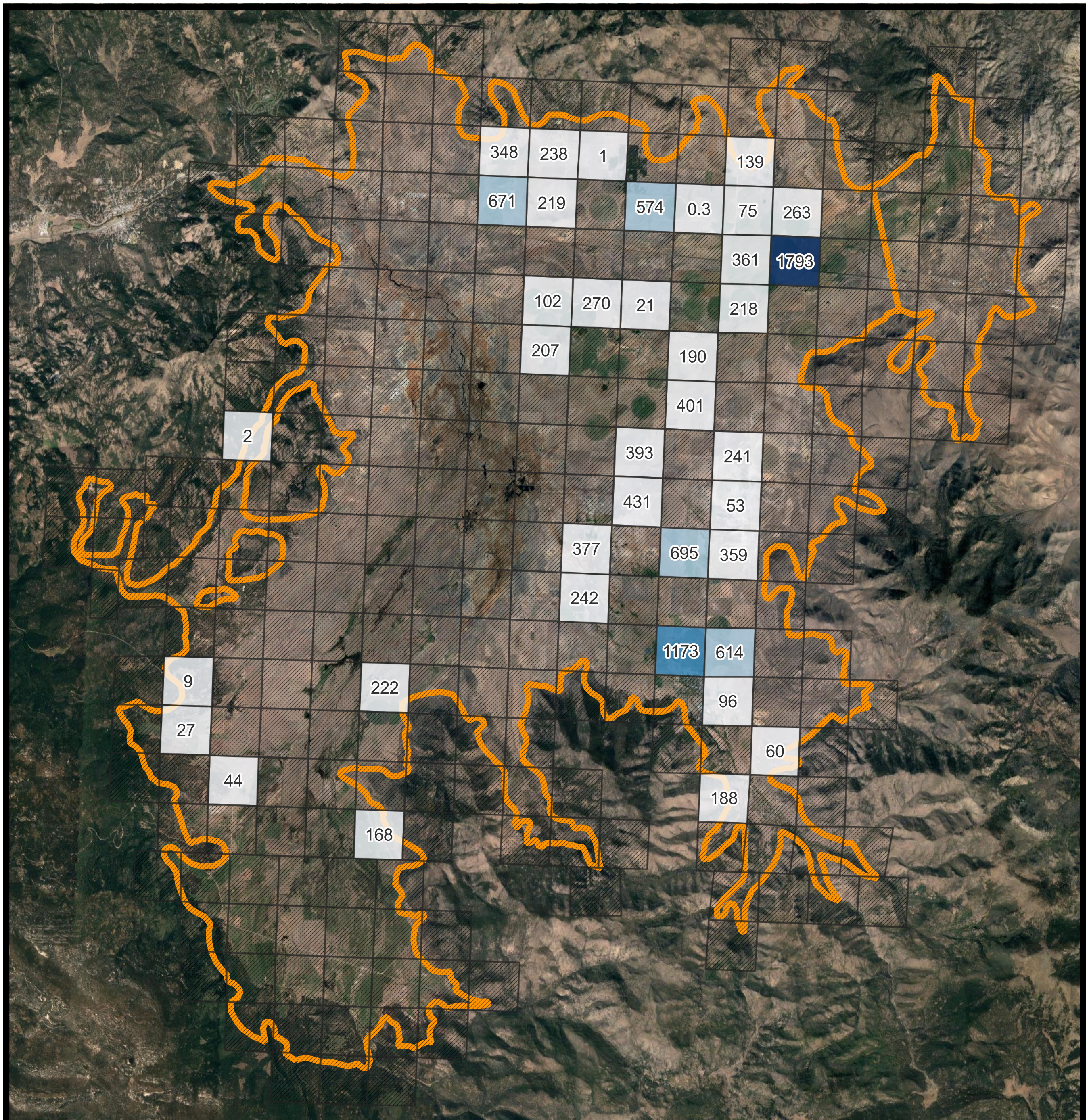

Explanation

Pumping (Total)
- No Extractions
- 0 - 500
- 500 - 1000
- 1000 - 1500
- 1500 - 2000

GroundwaterBasin Boundary

0 1 2 mi

N

Notes:
1. Annual groundwater pumping aggregated by 1 mi^2 PLSS sections
2. Labels indicate volume pumped in AF
3. Total groundwater pumping totaled 11,484 AF

Sierra Valley Groundwater Management District

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Sierra Valley Annual Report WY 2022
Total Groundwater Extractions

Figure 13

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data for Ramelli Ranch are not currently available, but reduction of the diversion volume is not common (Joe Hoffman, personal communication).

Flow data for streams entering Sierra Valley are sporadic and diversion volumes are generally not reported. Total diversion volume from ungauged local streams was calculated as the difference between total surface water use estimated using SVHSM and reported inflows from the Little Truckee River diversion, Frenchman Reservoir, and Lake Davis.

Imports from the Little Truckee River diversion totaled approximately 8,566 AF for WY 2022. Contract and water right releases from Frenchman Reservoir and Lake Davis were about 7,775 AF and 800 AF, respectively. Diversions from ungauged streams entering the Basin were estimated to be 3,450 AF. Total volume of surface water used in the Basin during WY 2022 was estimated to be 20,591 AF. Surface water use is uncertain due to lack of flow and diversion data for most streams that enter Sierra Valley, which limits model calibration efforts. Improvement of surface water diversion observations from local streams would help fill this data gap.

5. Total Water Use

Total water use in the Basin is grouped by water use sector and measurement method and shown in Table 3. Total water volume used in the Basin during WY 2022 was estimated to be 32,075 AF.

As discussed in Section 4 above, flow data for streams entering Sierra Valley are sporadic and surface water diversion volumes are not well-reported. Therefore, total water use is estimated using the best available data and tools.

Table 3. Total Water Use

Sector	Method	Total Annual Volume (AF)	Accuracy (%)	Range (AF)
Agriculture	Totalizer	10,766	± 5 %	10,228 - 11,305
	Weir	16,341	± 5 %	15,525 - 17,159
	Estimated from model results and reported diversion data[1]	3,450	± 20 %	2,760 - 4,139
	Estimated from previously reported diversions	800	± 33 %	536 - 800[a]
Agriculture Subtotal	-	31,357	-	29,049 - 33,403
Municipal and Industrial	Totalizer	718	± 5 %	682 - 754
Total		**32,075**		**29,731 - 34,157**

1. Total diversion volume from ungauged local streams not estimated in WY 2021 GSP annual report

a. Upper limit established as 800 AFY

6. Change in Groundwater Storage

Observed changes in water levels from Fall 2021 to Fall 2022 for the upper and lower aquifers are shown in Figure 14 and Figure 15, respectively. Volumetric change in groundwater storage for the Basin was estimated using the Sierra Valley Hydrogeologic System Model (SVHSM). Estimated change in storage presented in this annual report differs from that presented in the GSP and the WY 2021 annual report for two reasons. First, WY 2021 conditions were simulated by repeating WY2020 conditions due to their hydrologic similarity and limited time available to properly update SVHSM. The model update presented in this annual report used WY 2021 and WY 2022 climate and pumping data, and therefore is a more accurate representation of boundary conditions that drive the model. Second, the original model runs presented in the GSP were accidentally removed from a shared server and had to be recreated from pre-processing scripts. There were likely some parameter adjustments made during the calibration process that were not completely transferred over. Therefore, while trends and general interpretations remain the same, specific numeric values (e.g., estimated change in storage) may differ. A decision of how best to address this issue moving forward is being reserved until after GSP Round 2 Grant (see Section 7.1) awards have been announced, as funds for model updates and refinements were included in the Sierra Valley application.

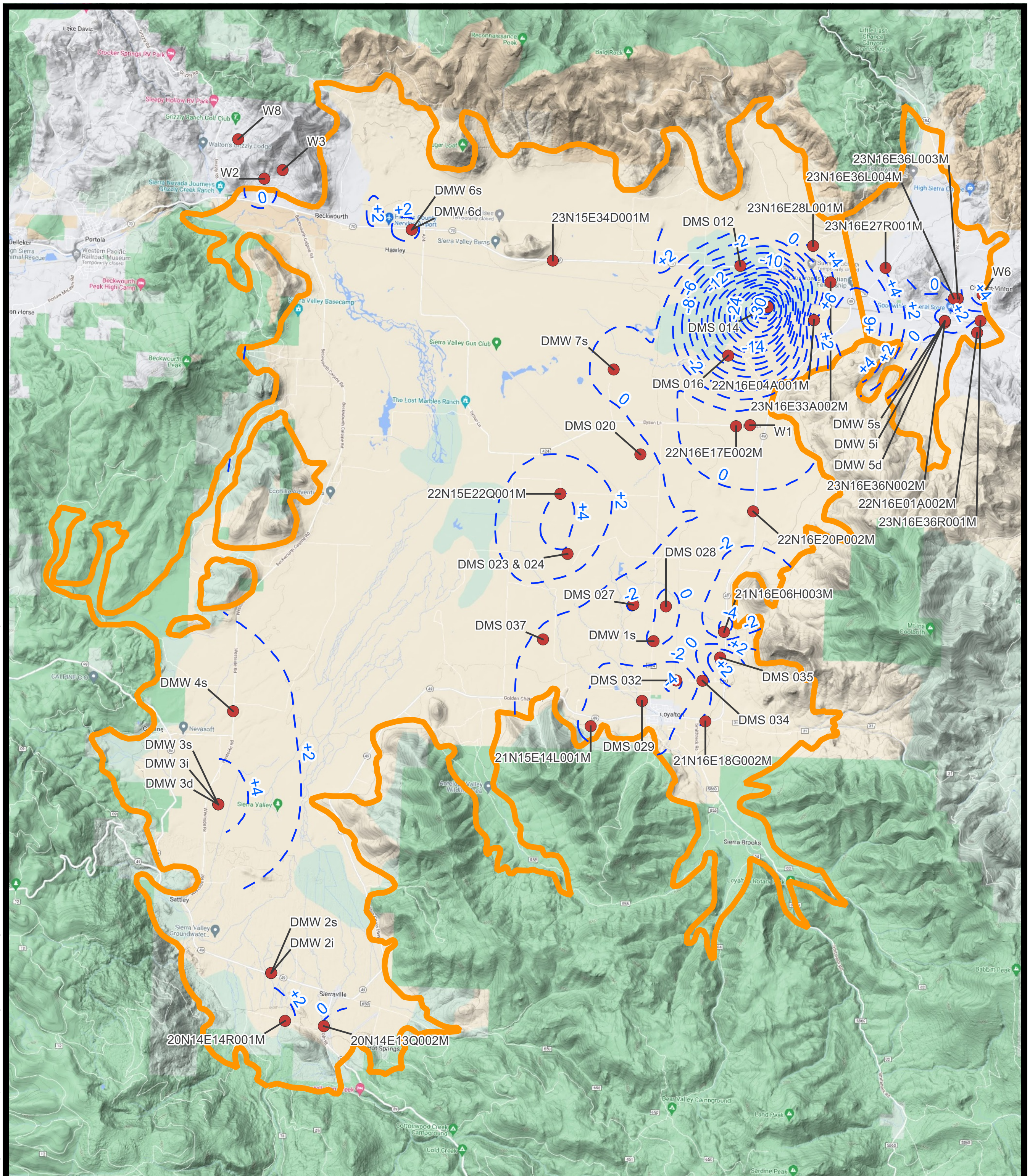
Total change in groundwater in storage in the Basin over WY 2022 was estimated to be -8,817 AF. A negative change in annual storage is expected due to critically dry conditions for WY 2022. Figure 16 shows annual groundwater pumping and change in storage, along with cumulative storage since WY 2000. Cumulative storage is reported as the total change in storage relative to October 1st, 1999, which is the beginning of the SVHSM historical simulation period. Through WY 2022, cumulative change in groundwater in storage since WY 2000 is estimated to be -41,713 AF.

7. Progress Towards GSP Implementation

The Sierra Valley GSP provided seven Tier I (existing) and 12 Tier II (potential) Projects and Management Actions (PMAs) to achieve sustainability goals (see Chapter 4 of the Sierra Valley GSP: https://www.sierravalleygmd.org/files/e88626a57/Chapter+4+Projects+and+Management+Actions.pdf). While the GSP is still being reviewed by DWR, implementation progress is underway. The sections below describe actions taken for securing funding, starting, continuing, or completing PMAs identified in the GSP during WY 2022.

7.1 SGM Round 2 Grant Application

SVGMD submitted an application for $5.45M in grant funding through DWR's SGM Implementation Grant program in December 2022. The proposal includes activities associated with implementation



Explanation

- Monitoring Well
- Groundwater Basin Boundary
- Water Elevation Change (ft)

0 1 2 mi

N

Sierra Valley Groundwater Management District

03/24/2023

Sierra Valley Annual Report WY 2022

Change in Groundwater Elevations
Upper Aquifer Fall 2021 - Fall 2022

Figure 14

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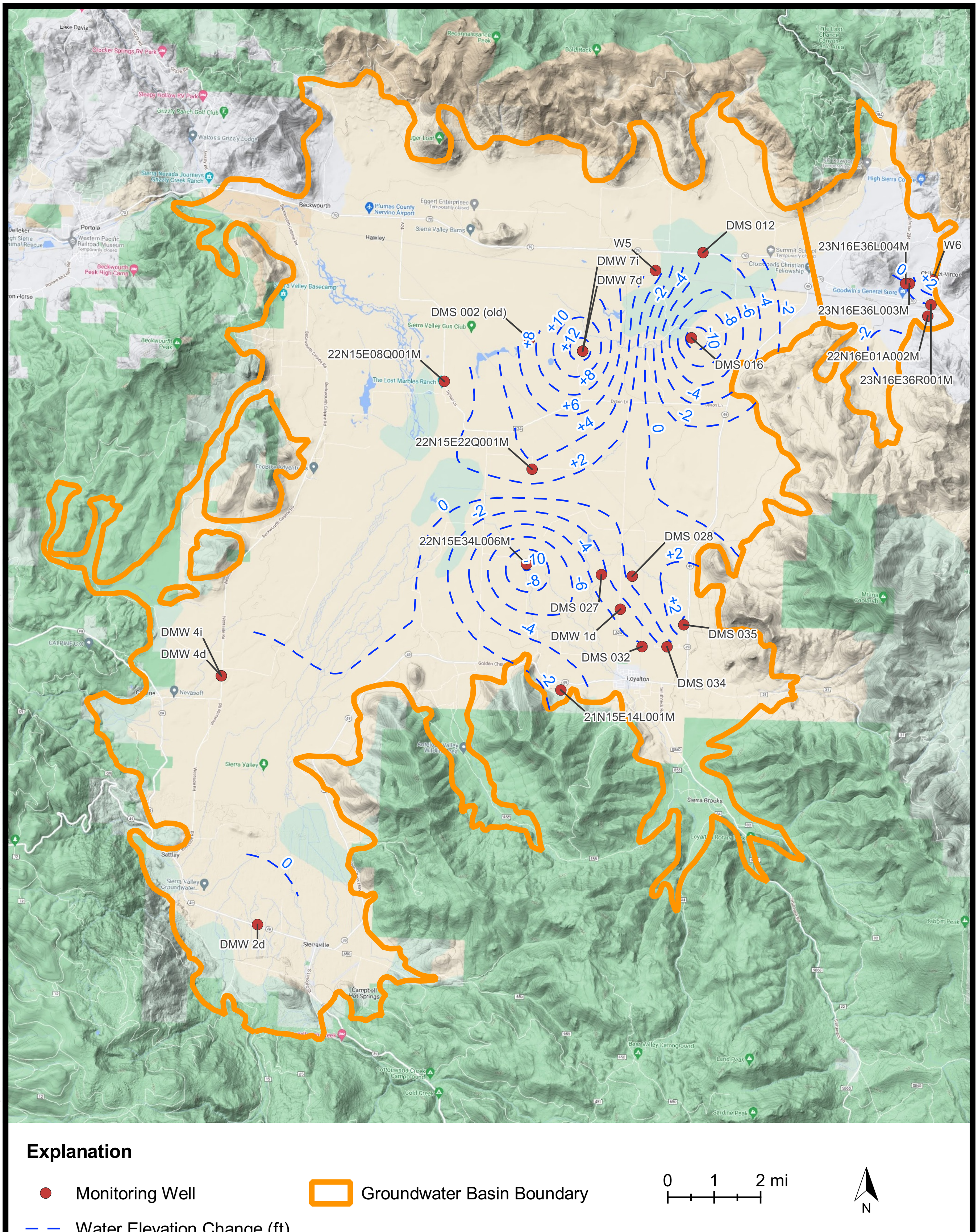

Sierra Valley Groundwater Management District

Sierra Valley Annual Report WY 2022

Change in Groundwater Elevations Lower Aquifer Fall 2021 - Fall 2022

Figure 15

03/24/2023

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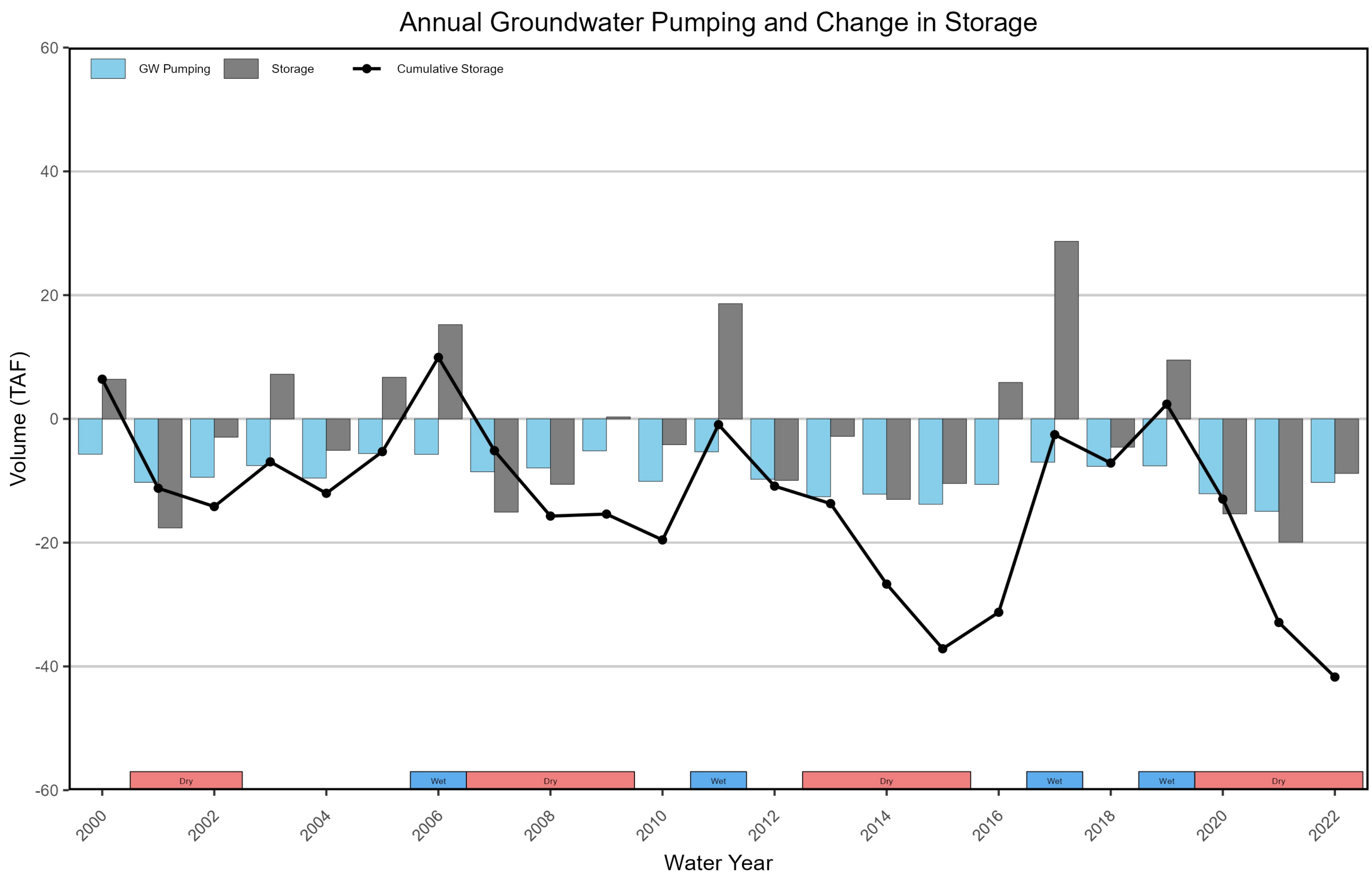


Notes:
1. Negative GW pumping values indicate extractions from groundwater aquifer.
2. Positive storage values indicate increasing groundwater levels.
3. Change in storage values estimated using Sierra Valley Hydrogeologic System Model (SVHSM)

Sierra Valley Groundwater Management District

03/27/2023

Sierra Valley Annual Report WY 2022

Groundwater Pumping and Change in Storage

WY 2000-2022

Figure 16

and continued planning, development, and updating of the GSP for the Sierra Valley Groundwater Basin (Basin). The resulting updated GSP and implementation projects will incorporate appropriate Best Management Practices (BMPs) as developed by DWR, and will result in a more complete understanding of the groundwater basin to support long-term sustainable groundwater management.

The Work Plan includes five components:

- Component 1: Grant Administration
- Component 2: GSP Updates
- Component 3: Well Inventory
- Component 4: Irrigation Efficiency and Conjunctive Use
- Component 5: Groundwater Recharge

7.2 Agricultural Well Flow Meter Replacement and Standardization

SVGMD continues to maintain a list of large-capacity wells in the Sierra Valley Subbasin, including active metered wells and inactive wells. All active large-capacity agricultural wells are now and will continue to be fitted with flow meters owned and monitored by SVGMD.

In the past year, all large-capacity agricultural well meters were evaluated; a subset were retrofitted or replaced. All large-capacity agricultural well meter installations have been confirmed to be up to manufacturer's specifications. GPS coordinates were also documented for all active large-capacity agricultural wells to support use in the monitoring network as needed.

7.3 Agricultural Irrigation Efficiency Improvements

SVGMD conducted a review of irrigation practices in Sierra Valley and initiated a low elevation precision application (LEPA) Irrigation Efficiency Demonstration Project. A technical memorandum was prepared by McGinley & Associates (2022c) that summarizes existing irrigation practices in Sierra Valley and potential irrigation efficiency improvements to reduce groundwater pumping. It contains details of the newly installed LEPA demonstration project at the Roberti Ranch, including guidelines for data collection.

7.4 Expansion of Shallow Groundwater and Land Subsidence Monitoring Network

A 2022 Monitoring Networks Expansion O&M Manual (McGinley & Associates, 2022b) was prepared that summarizes new equipment installations and provides guidance for monitoring, maintenance, and operation, including flow meters, four GDE monitoring sites, and four new land surface elevation (subsidence) monuments. Engineering packet with drawings, details, and specifications (i.e., Standard Operating Procedures or SOPs) is included.

In addition to adding the four new subsidence monuments, existing elevation monuments were identified for use in the network with the purpose of monitoring subsidence to facilitate determination of significant and unreasonable effects.

An initial Groundwater Dependent Ecosystems (GDE) Monitoring Network was installed and consists of four shallow monitoring wells with transducers and telemetry.

7.5 Groundwater Recharge Opportunity Analysis

A technical memorandum, *Review of Potential Water Supply Augmentation Projects and Management Actions* (McGinley & Associates, 2022a), was prepared and provides an overview of surface water resources, surface water resource management, and recommendations for next steps in developing a groundwater recharge pilot project. Two areas of Sierra Valley have been identified as candidates for conducting these projects:

- a region in the south east corner of the Subbasin where excess winter flows from Smithneck Creek would be diverted for recharge
- a region in the north east corner of the Subbasin where excess winter flows from Little Last Chance Creek would be diverted for recharge.

SVGMD is pursuing grant funding to conduct both of these projects and will be working with ranchers and other stakeholders to identify feasible recharge sites in 2023.

8. References

McGinley & Associates. 2022a. Review of Potential Water Supply Augmentation Projects and Management Actions, Sierra Valley, Sierra and Plumas County, California. Technical Report. https://bit.ly/40mgIfS

McGinley & Associates. 2022b. Sierra Valley Groundwater Management Plan 2022 Monitoring Networks Expansion O&M Manual, Sierra Valley, Sierra and Plumas County, California. Technical Report. https://bit.ly/3K9ZoVM

McGinley & Associates. 2022c. Sierra Valley Irrigation Review & LEPA Irrigation Efficiency Demonstration Program, Sierra Valley, Sierra and Plumas County, California. Technical Report. https://bit.ly/3lLVljO

Sierra Valley Groundwater Management District (SVGMD). 2022a. Sierra Valley Subbasin Groundwater Sustainability Plan. https://sgma.water.ca.gov/portal/gsp/preview/125

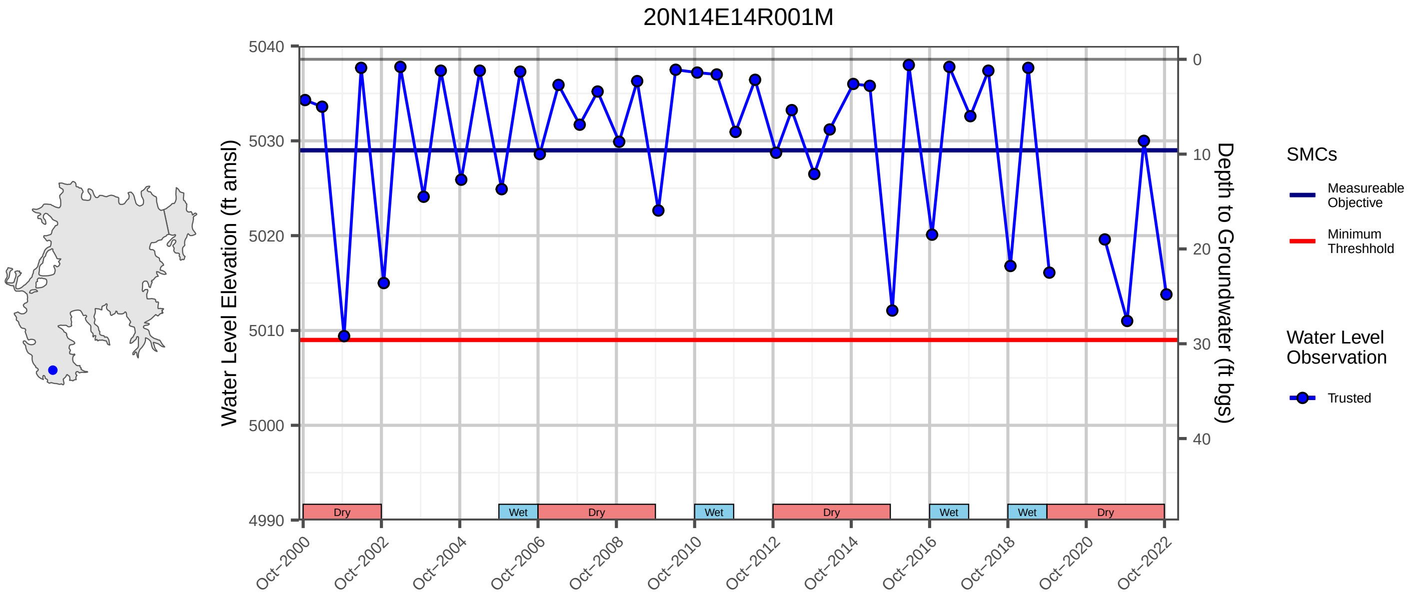
Sierra Valley Groundwater Management District (SVGMD). 2022b. DMS Technical Memorandum. Appendix 2-1 of Sierra Valley Subbasin Groundwater Sustainability Plan. https://www.sierravalleygmd.org/files/51e7b778f/Appendix+2-1+DMS+Tech+Memo.pdf

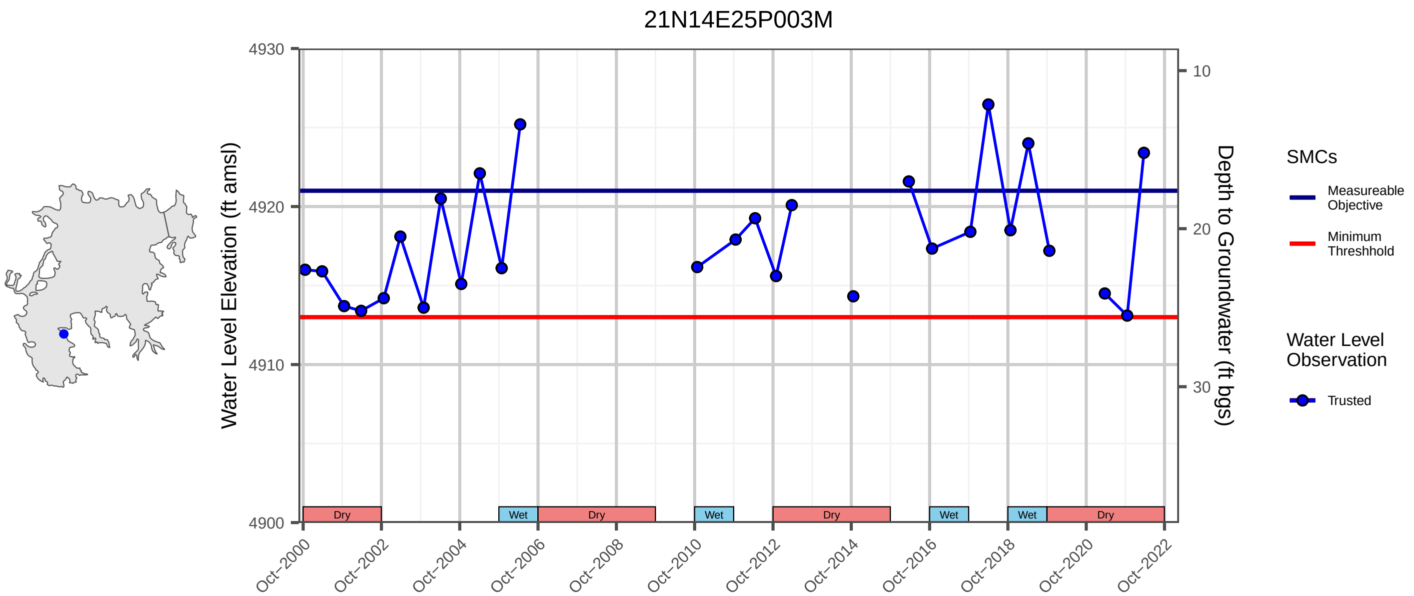
Sierra Valley Groundwater Management District (SVGMD). 2022c. Sierra Valley Hydrogeologic System Model and Water Budget Report. Appendix 2-7 of Sierra Valley Subbasin Groundwater Sustainability Plan. https://www.sierravalleygmd.org/files/5e6d7e8c6/Appendix+2-7+SVHSM+Model_Water+Budget+Report.pdf

Sierra Valley Groundwater Management District (SVGMD). 2022d. Sierra Valley Groundwater Basin GSP Annual Report Water Year 2021. Technical Report. https://www.sierravalleygmd.org/files/f538cd202/Submitted+Annual+Report+4-1-22.pdf

Appendix A

Representative Monitoring Point Hydrographs


20N14E14R001M
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
Dry
Wet
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022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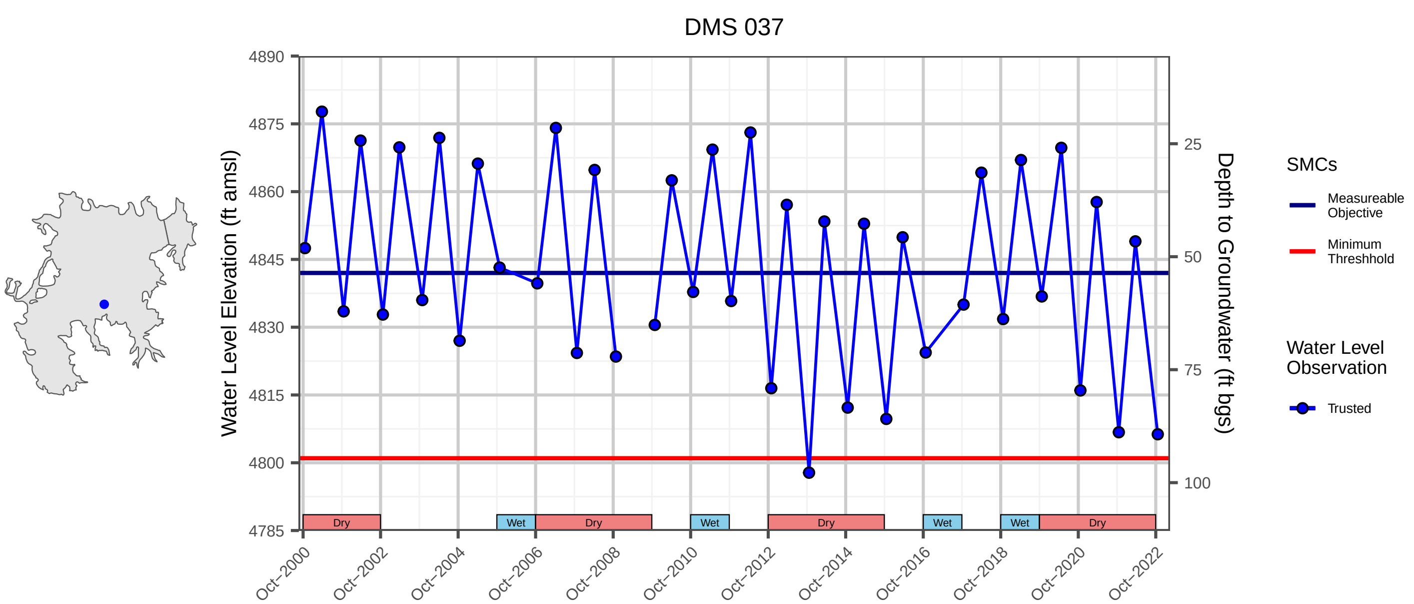
Depth to Groundwater (ft bgs)
Dry
Wet
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022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Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
Dry
Wet
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
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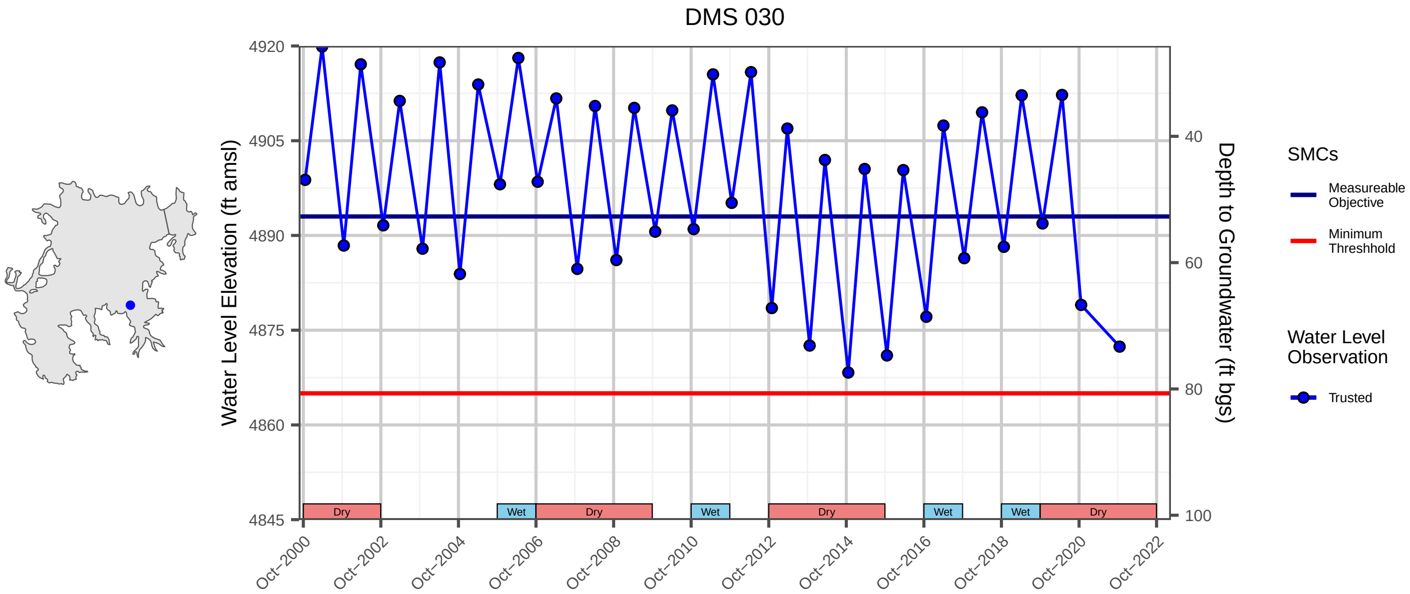
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022



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Depth to Groundwater (ft bgs)
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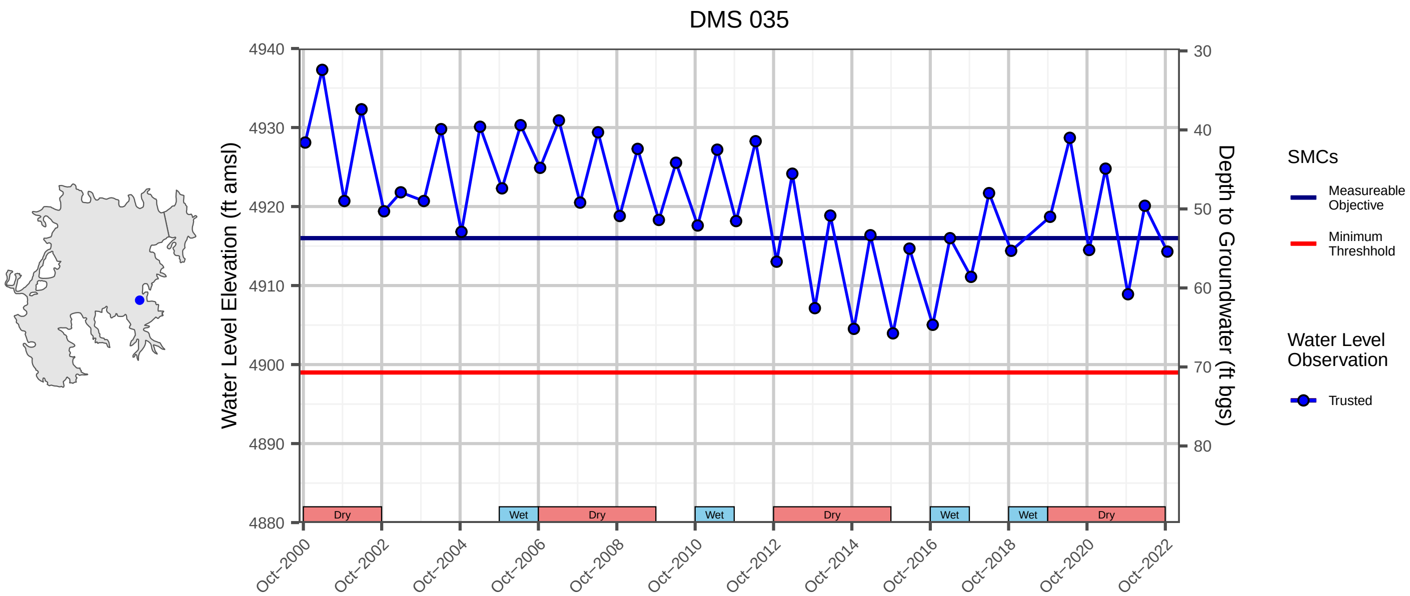
4905
4890
4875
4860
4845
40
60
80
100
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct–2000
Oct–2002
Oct–2004
Oct–2006
Oct–2008
Oct–2010
Oct–2012
Oct–2014
Oct–2016
Oct–2018
Oct–2020
Oct–2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted



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Depth to Groundwater (ft bgs)
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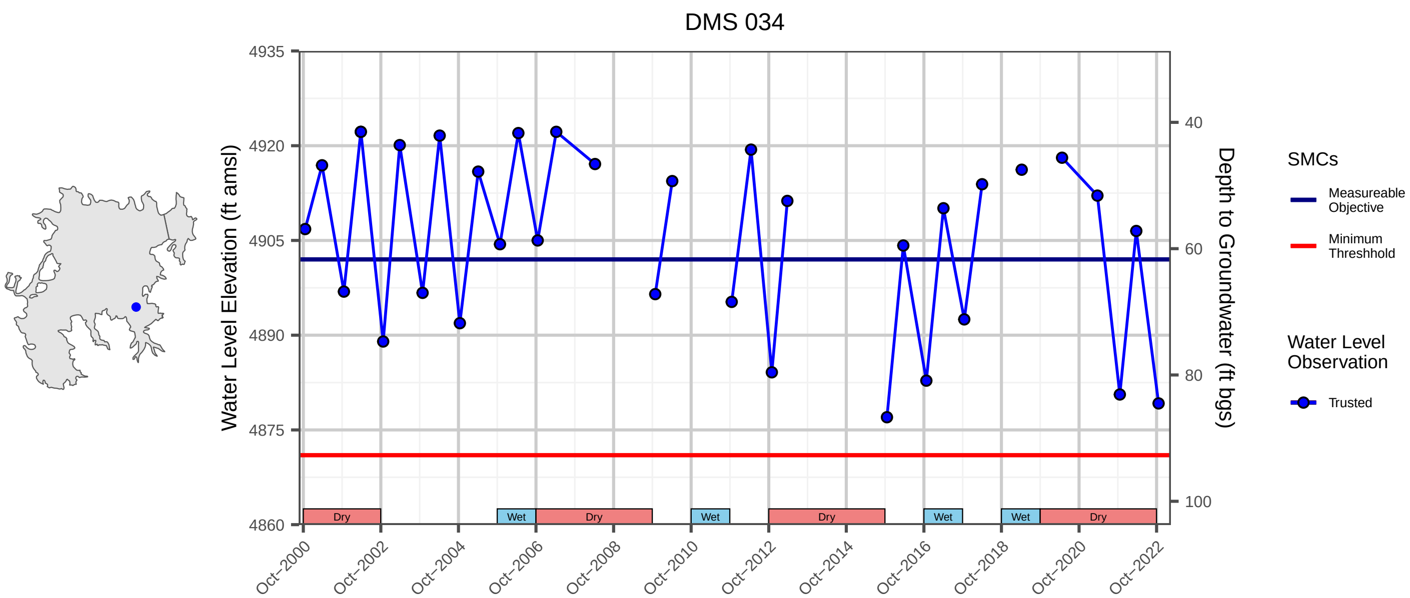
4930
4920
4910
4900
4890
4880
30
40
50
60
70
80
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct–2000
Oct–2002
Oct–2004
Oct–2006
Oct–2008
Oct–2010
Oct–2012
Oct–2014
Oct–2016
Oct–2018
Oct–2020
Oct–2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted



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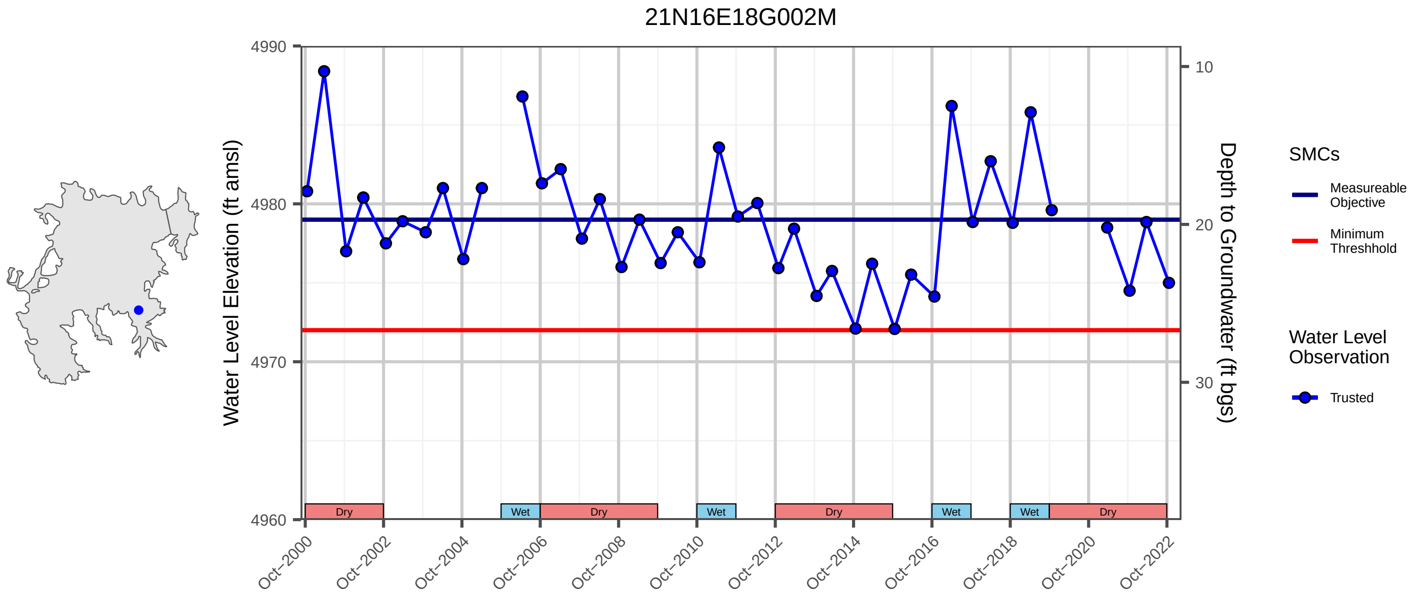
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
4935
4920
4905
4890
4875
4860
40
60
80
100
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct–2000
Oct–2002
Oct–2004
Oct–2006
Oct–2008
Oct–2010
Oct–2012
Oct–2014
Oct–2016
Oct–2018
Oct–2020
Oct–2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted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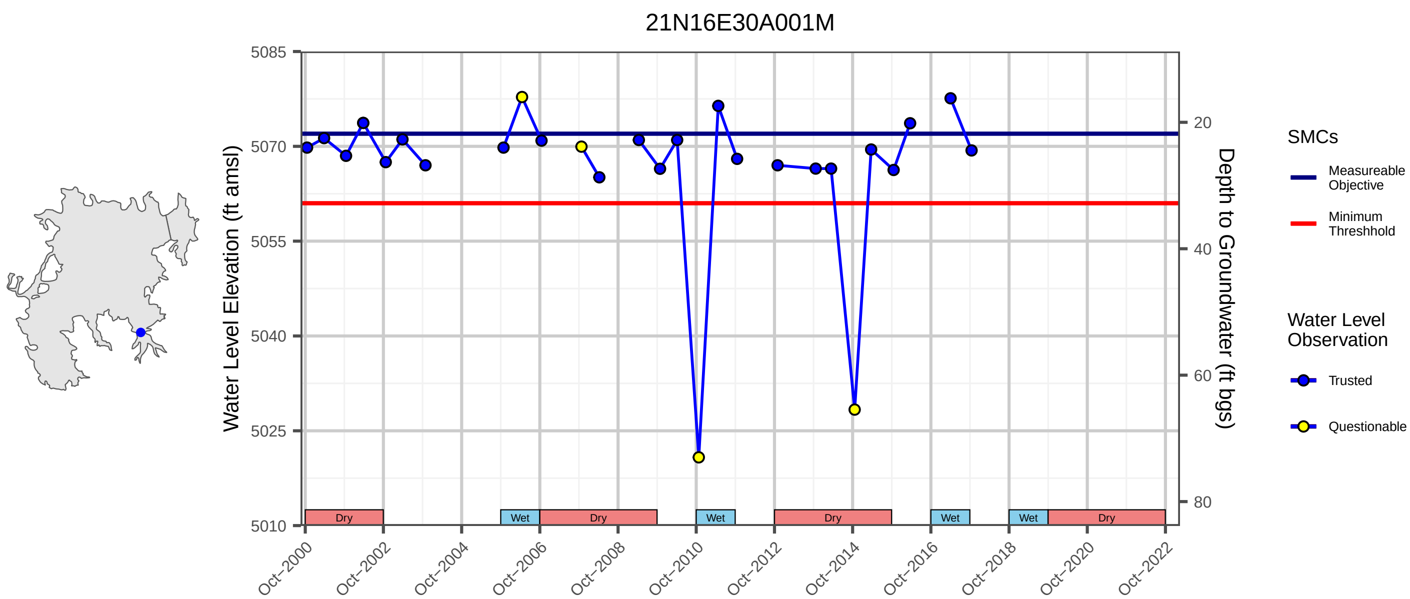
4980
4970
4960
10
20
30
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted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5070
5055
5040
5025
5010
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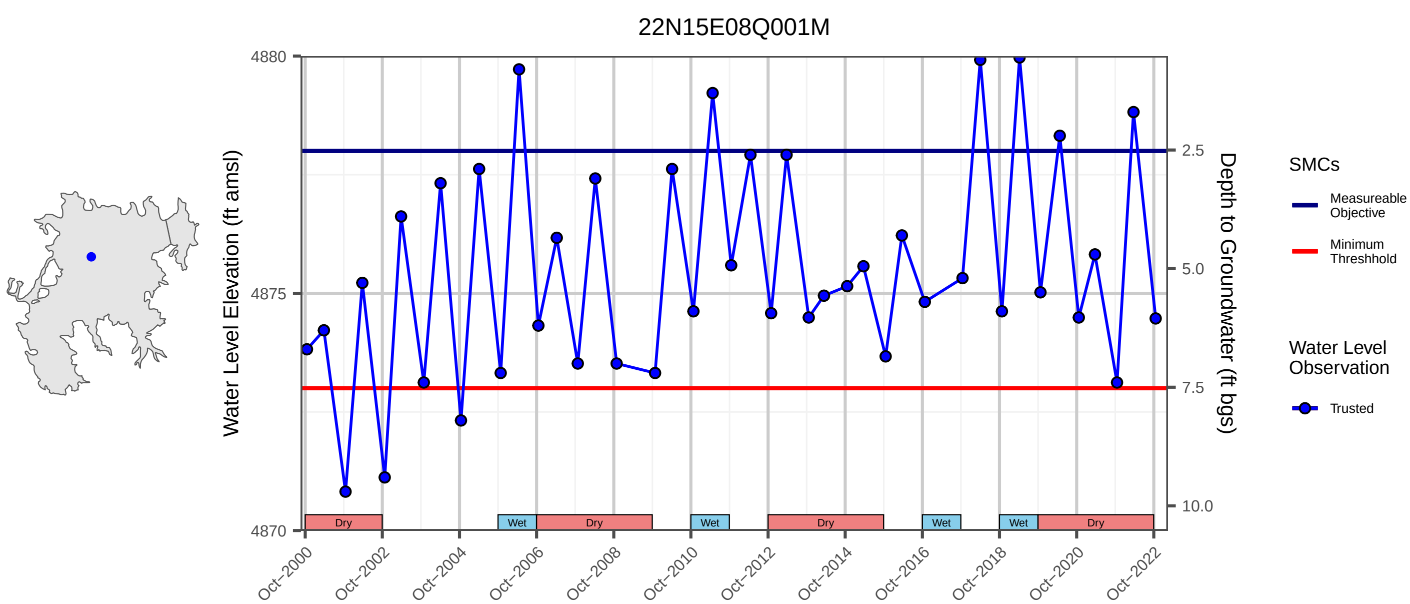
40
60
80
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable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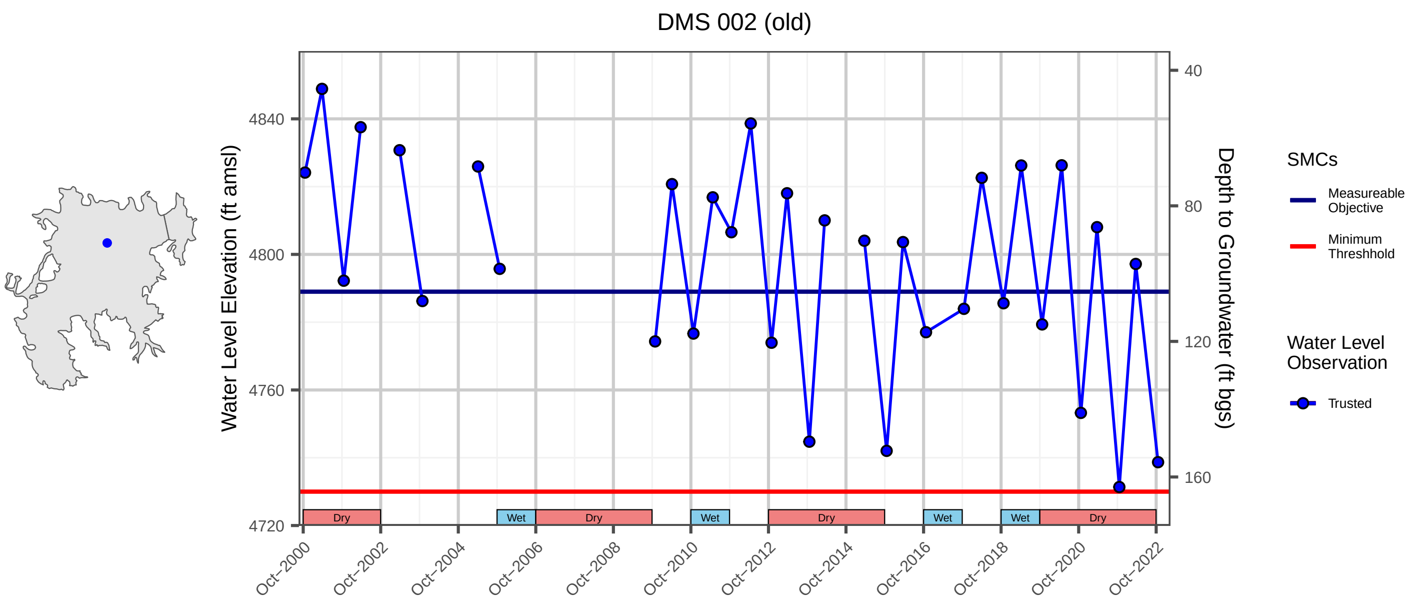
Depth to Groundwater (ft bgs)
4880
4875
4870
2.5
5.0
7.5
10.0
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted


DMS 002 (old)
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
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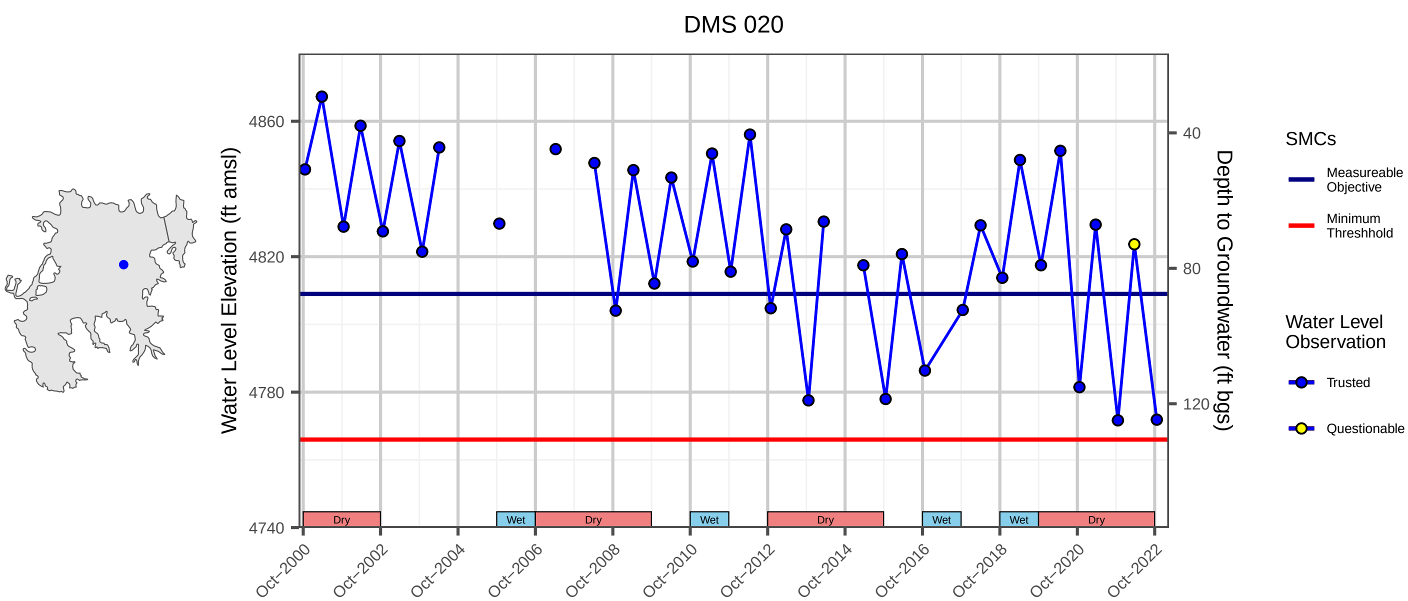
4800
4760
4720
40
80
120
160
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted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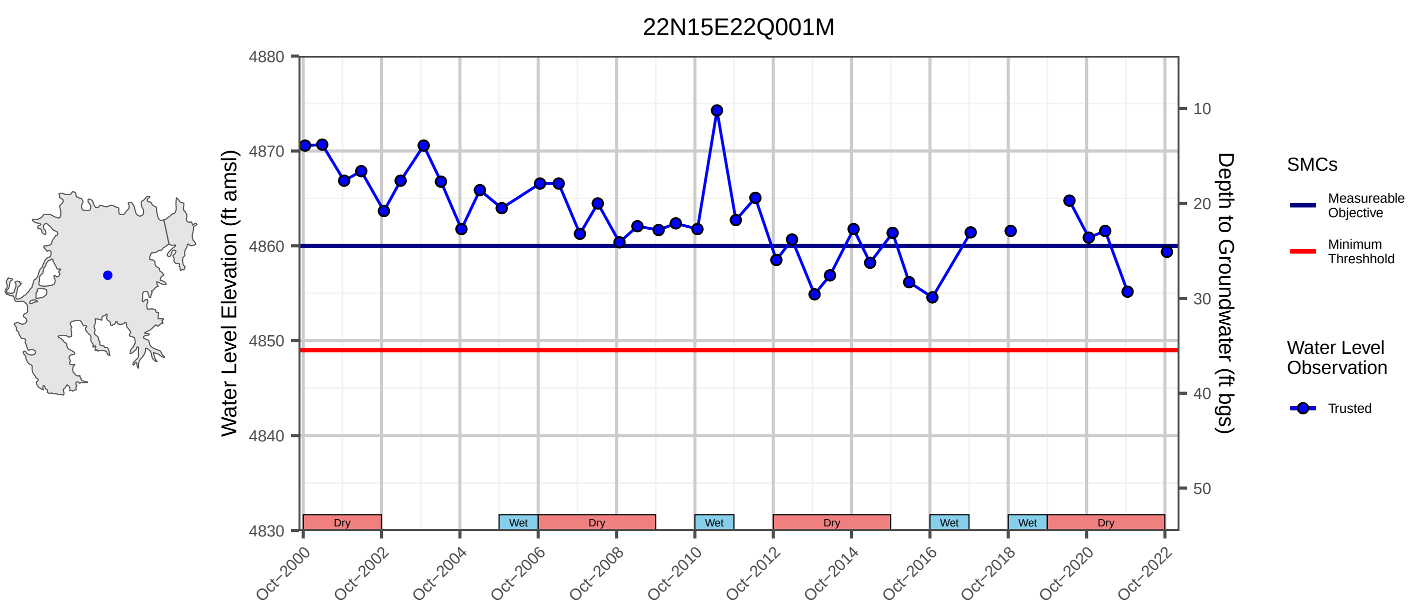
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
4860
4820
4780
4740
40
80
120
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable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Depth to Groundwater (ft bgs)
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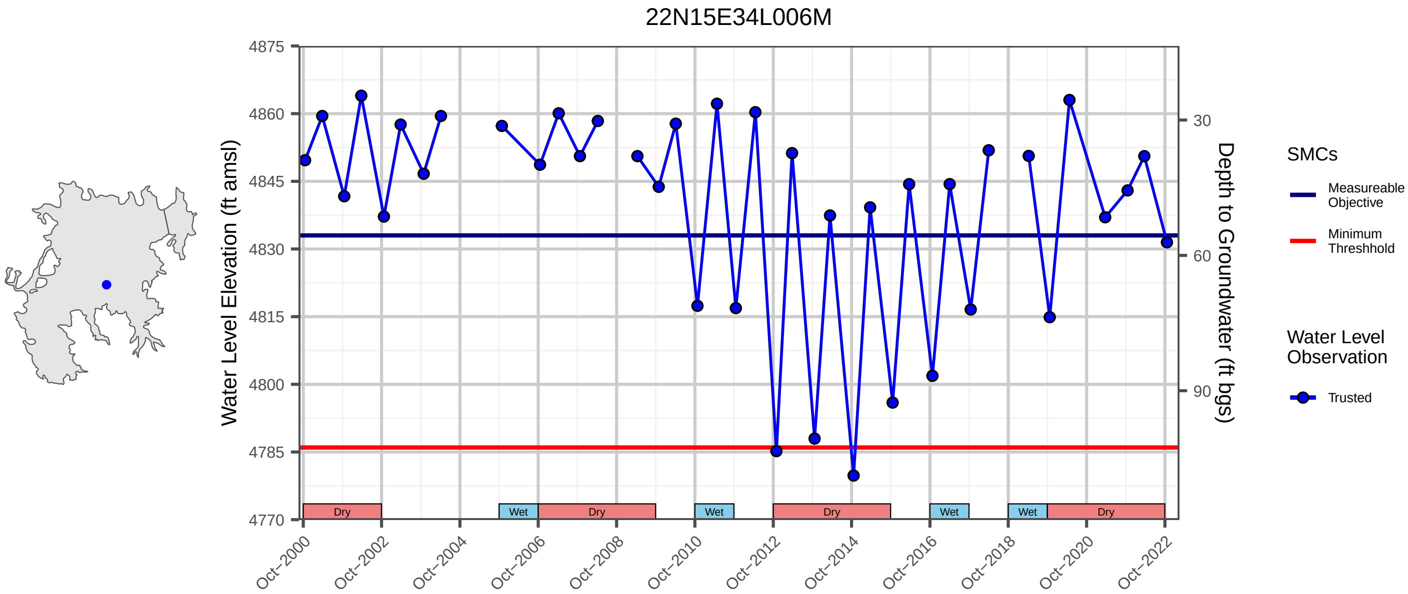
4870
4860
4850
4840
4830
10
20
30
40
50
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted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Depth to Groundwater (ft bgs)
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4860
4845
4830
4815
4800
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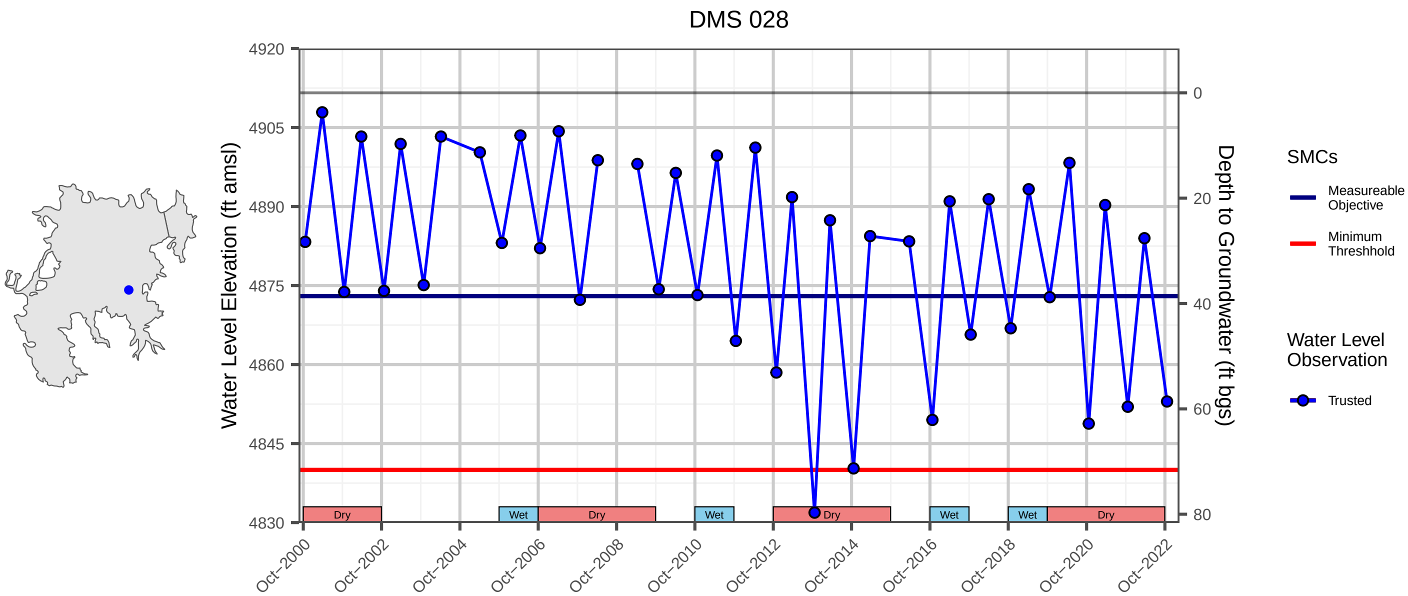
4770
30
60
90
Dry
Wet
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted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Depth to Groundwater (ft bgs)
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4890
4875
4860
4845
4830
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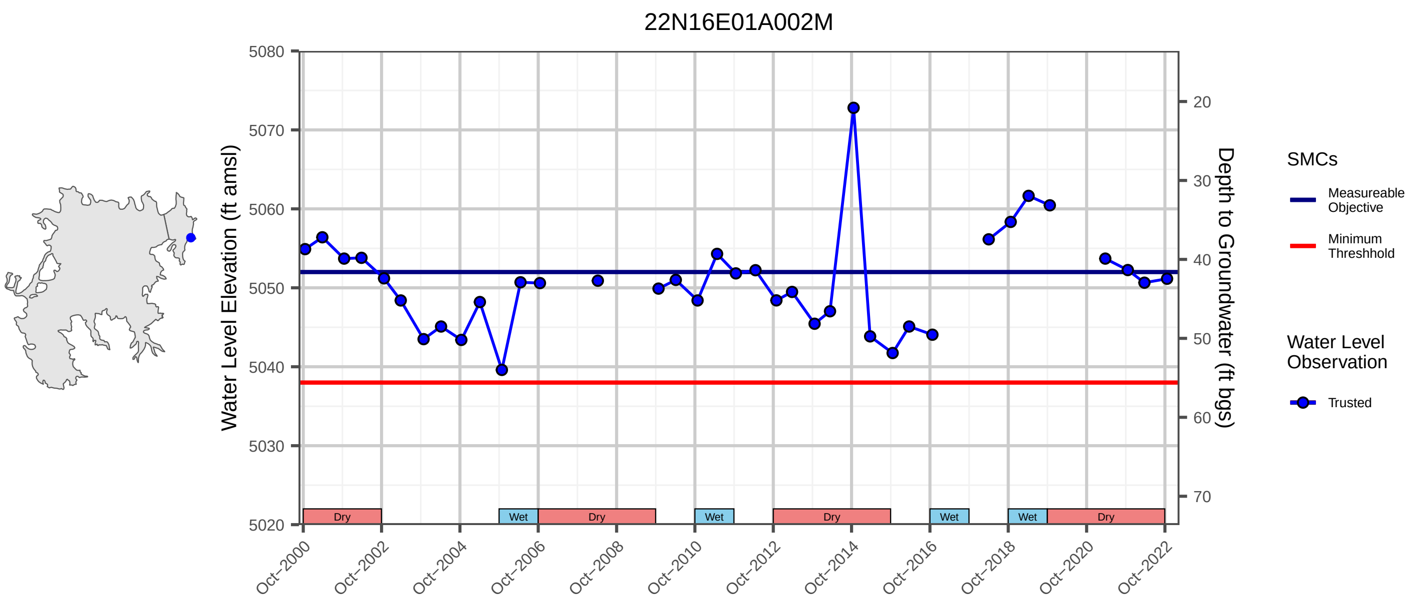
40
60
80
Dry
Wet
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted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50
60
70
Dry
Wet
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
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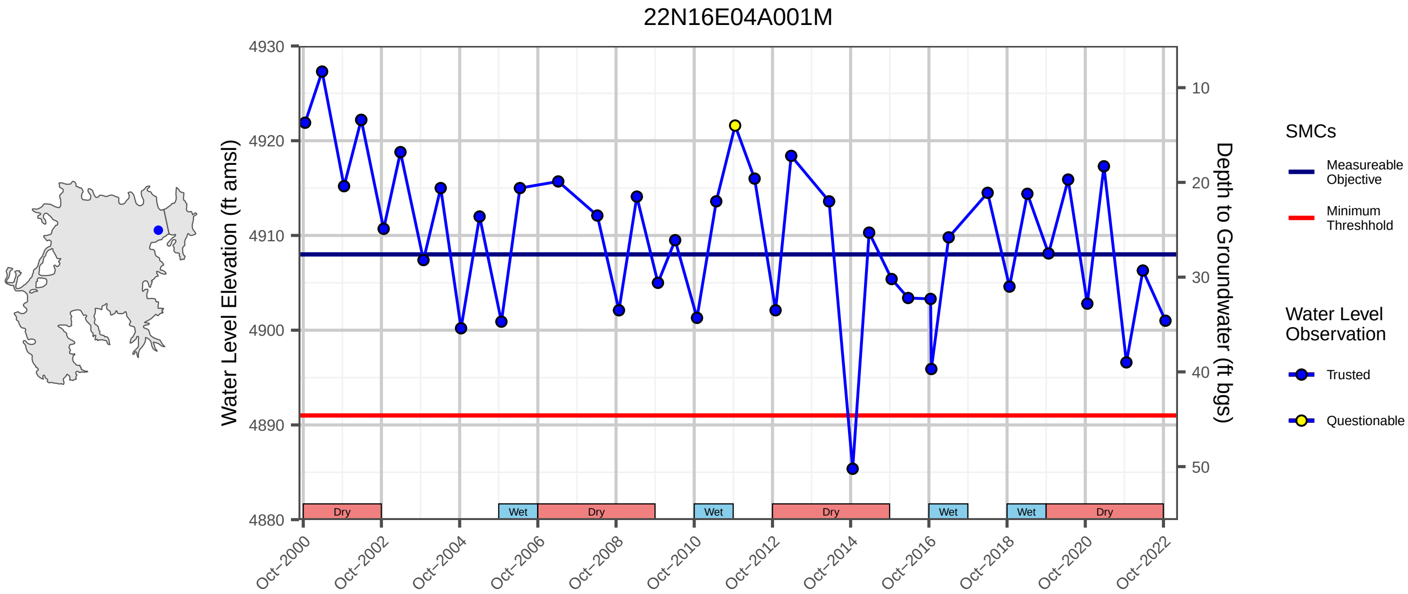
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted



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Depth to Groundwater (ft bgs)
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4900
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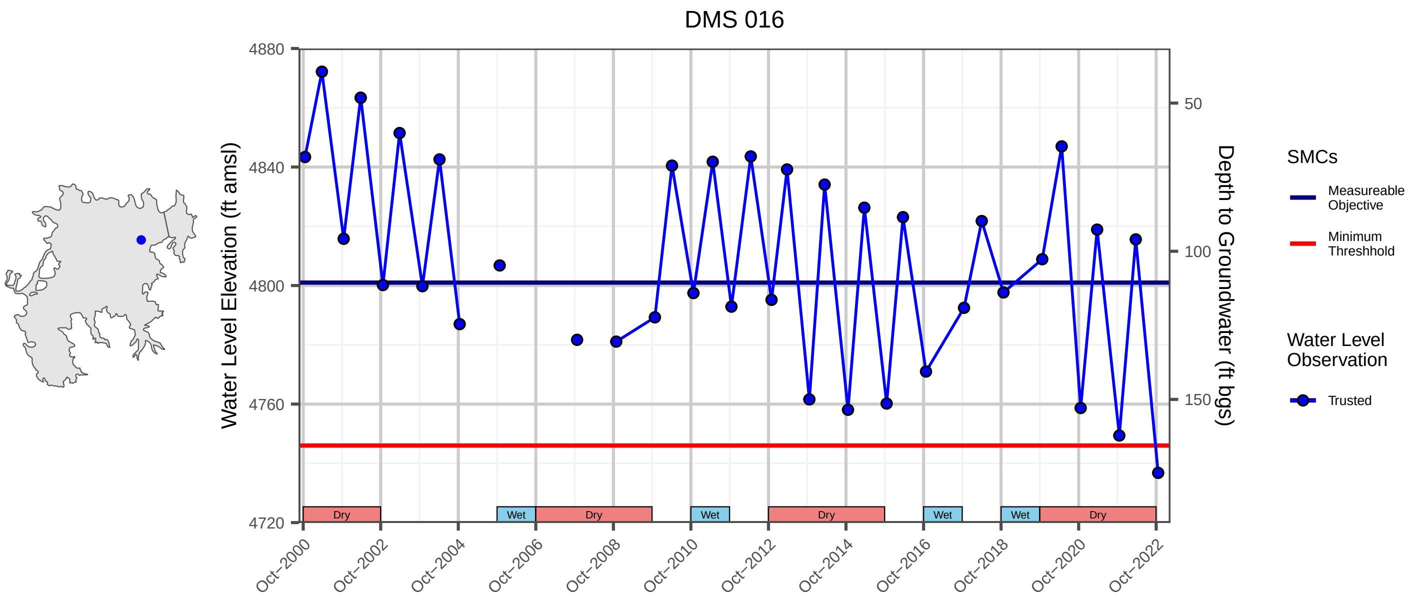
40
50
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable



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Depth to Groundwater (ft bgs)
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4800
4760
4720
50
100
150
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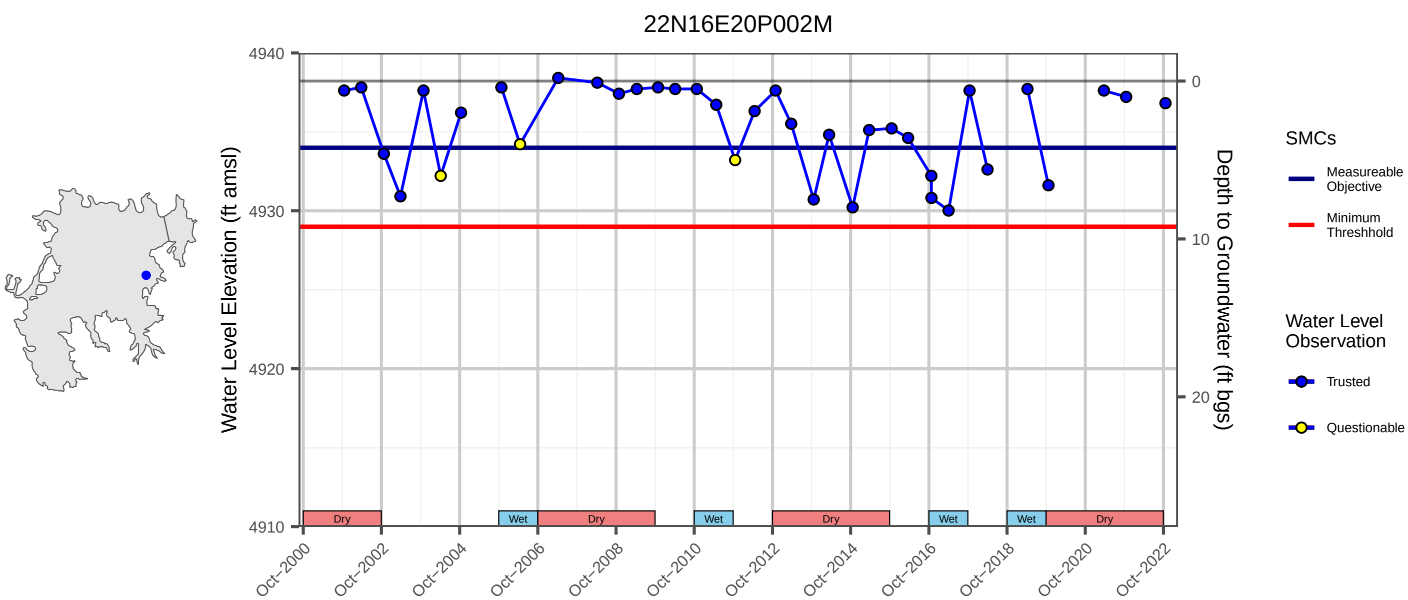
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted



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Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
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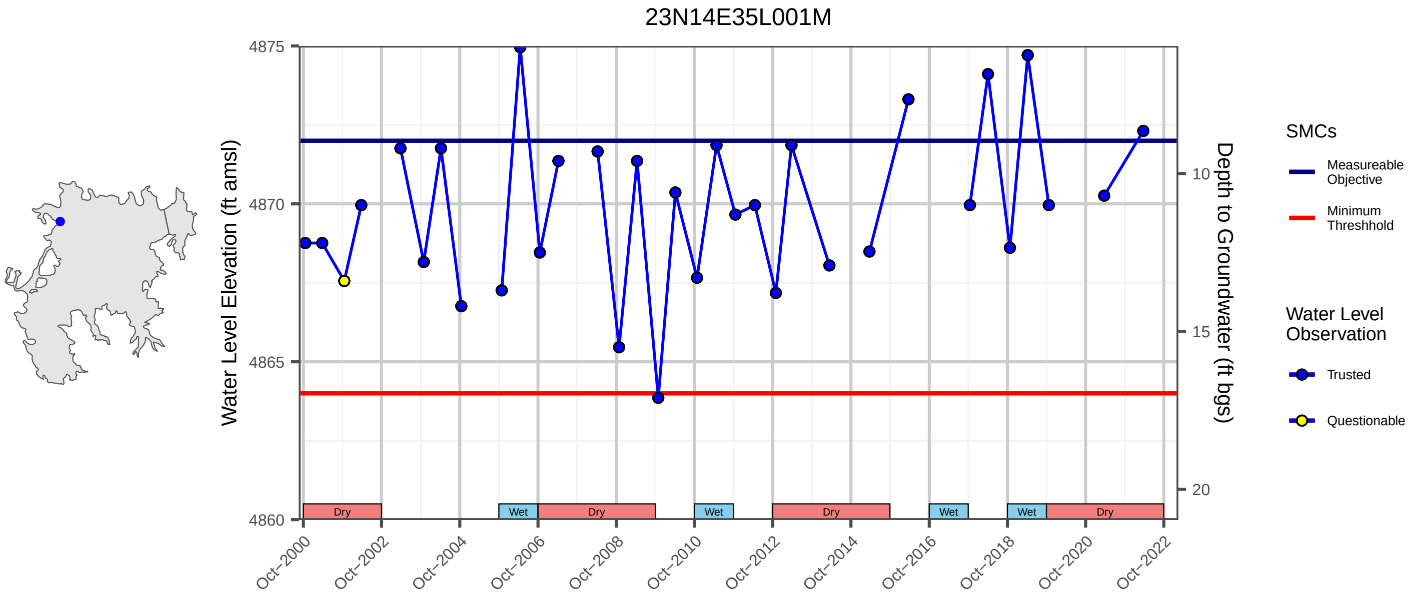
4930
4920
4910
0
10
20
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable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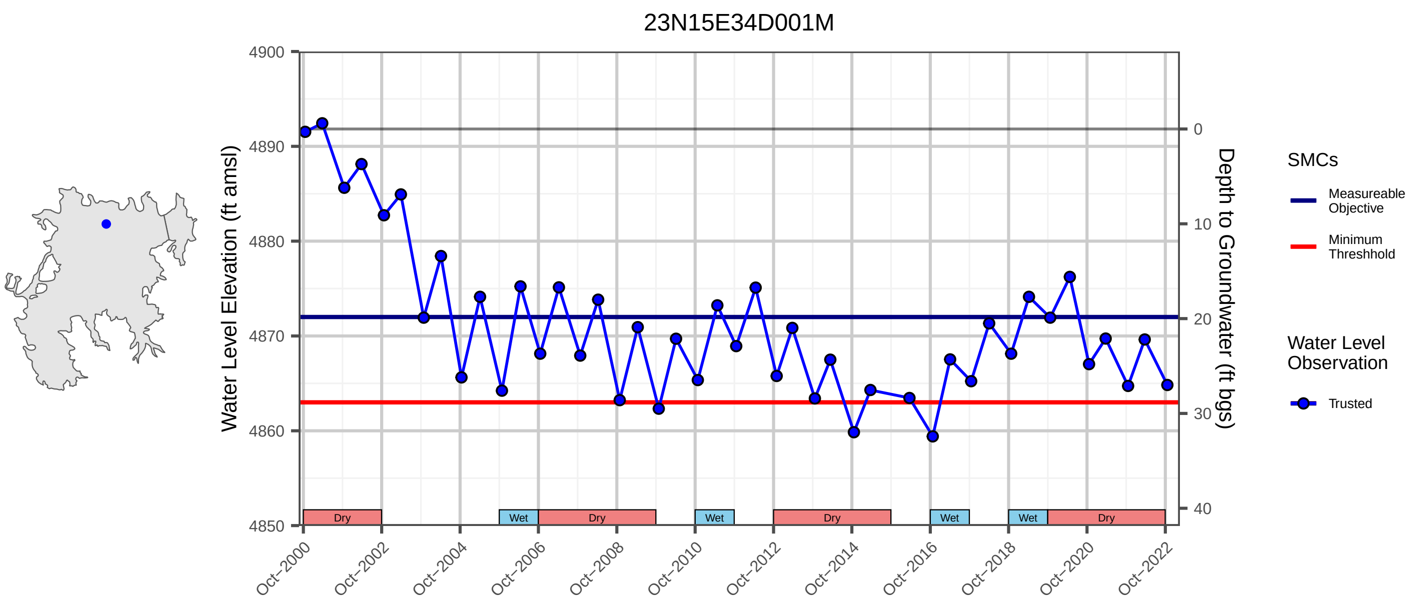
Depth to Groundwater (ft bgs)
4875
4870
4865
4860
10
15
20
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable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Depth to Groundwater (ft bgs)
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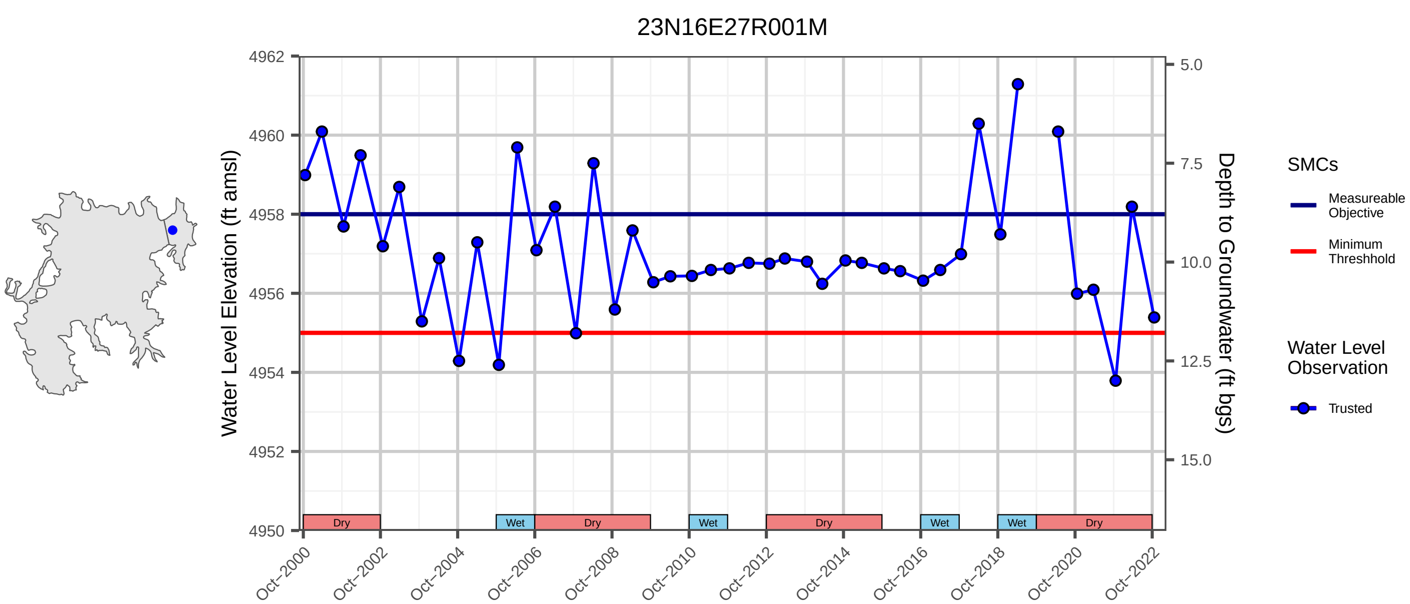
4890
4880
4870
4860
4850
0
10
20
30
40
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted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Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
4962
4960
4958
4956
4954
4952
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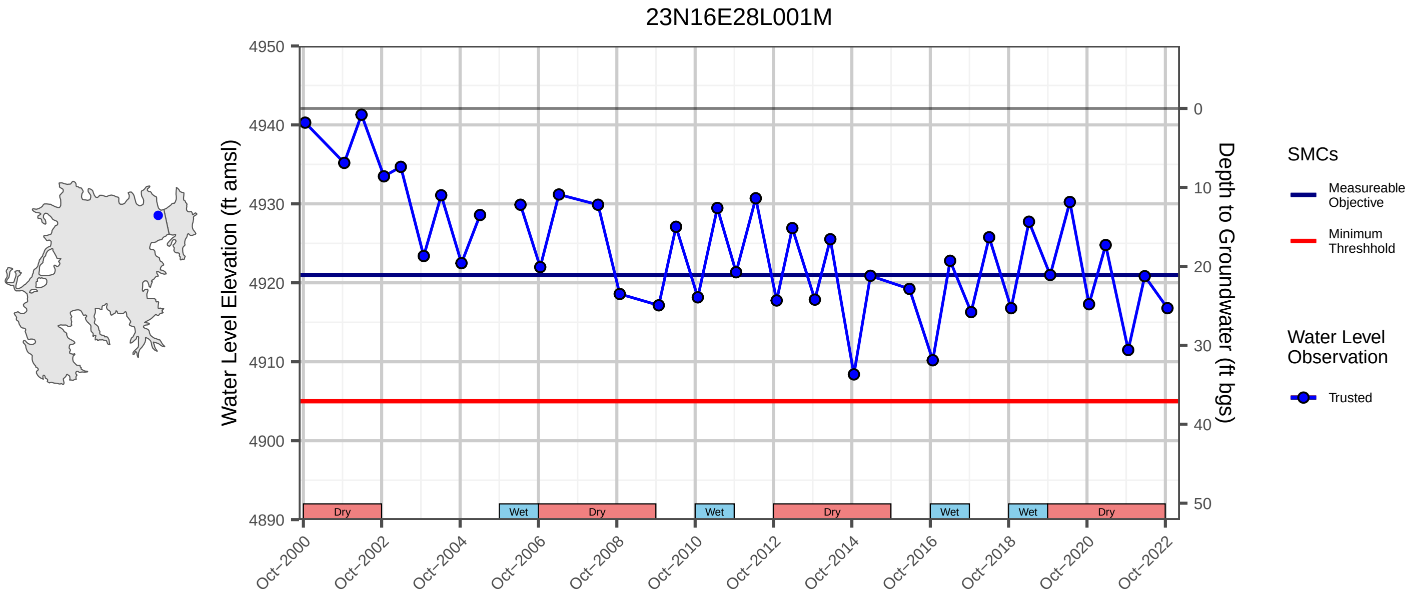
5.0
7.5
10.0
12.5
15.0
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted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Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Dry
Wet
Oct-2000
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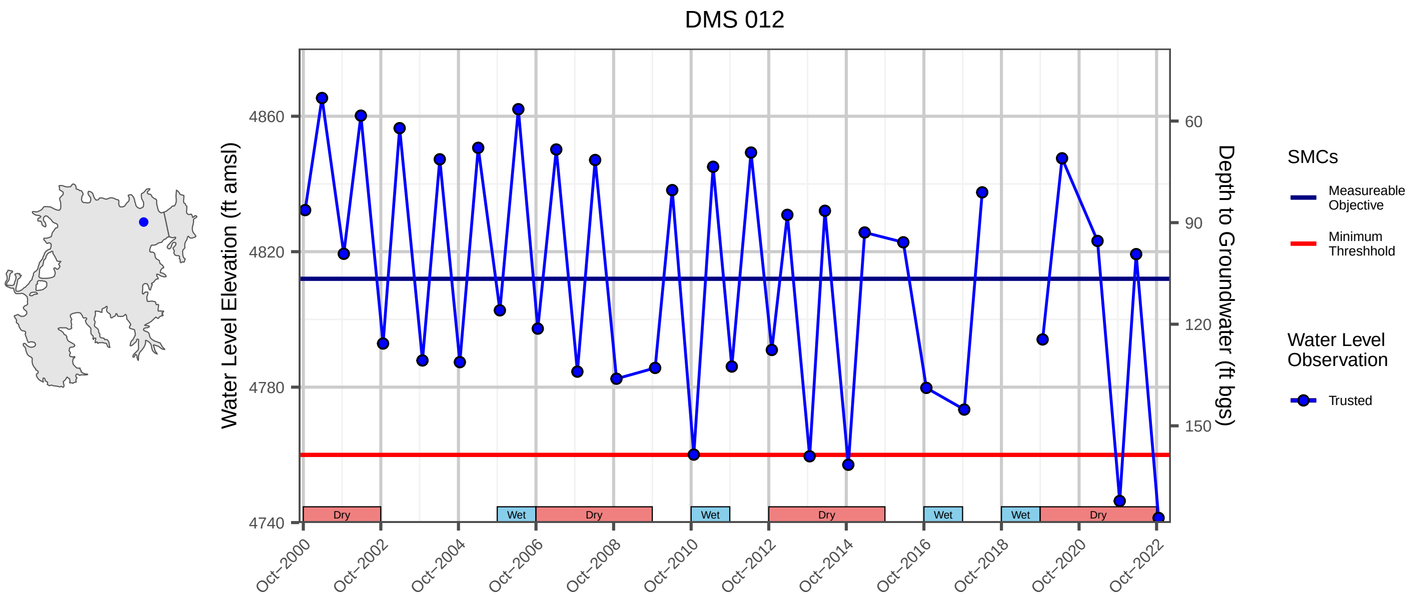
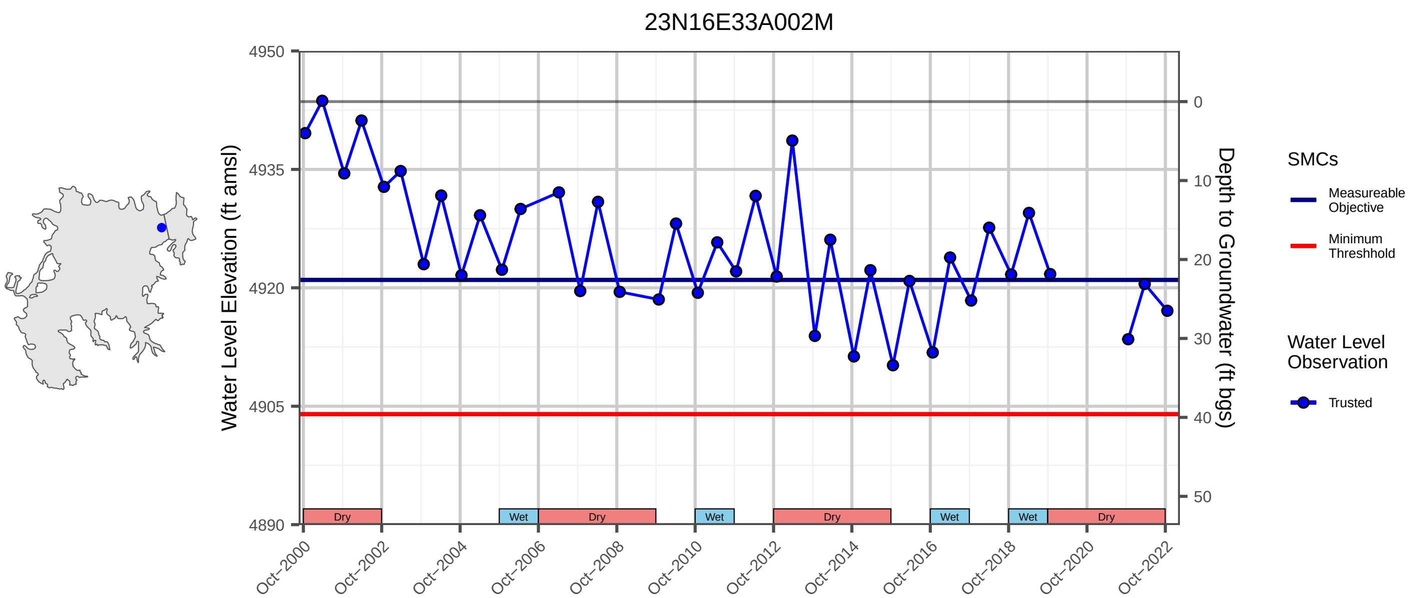
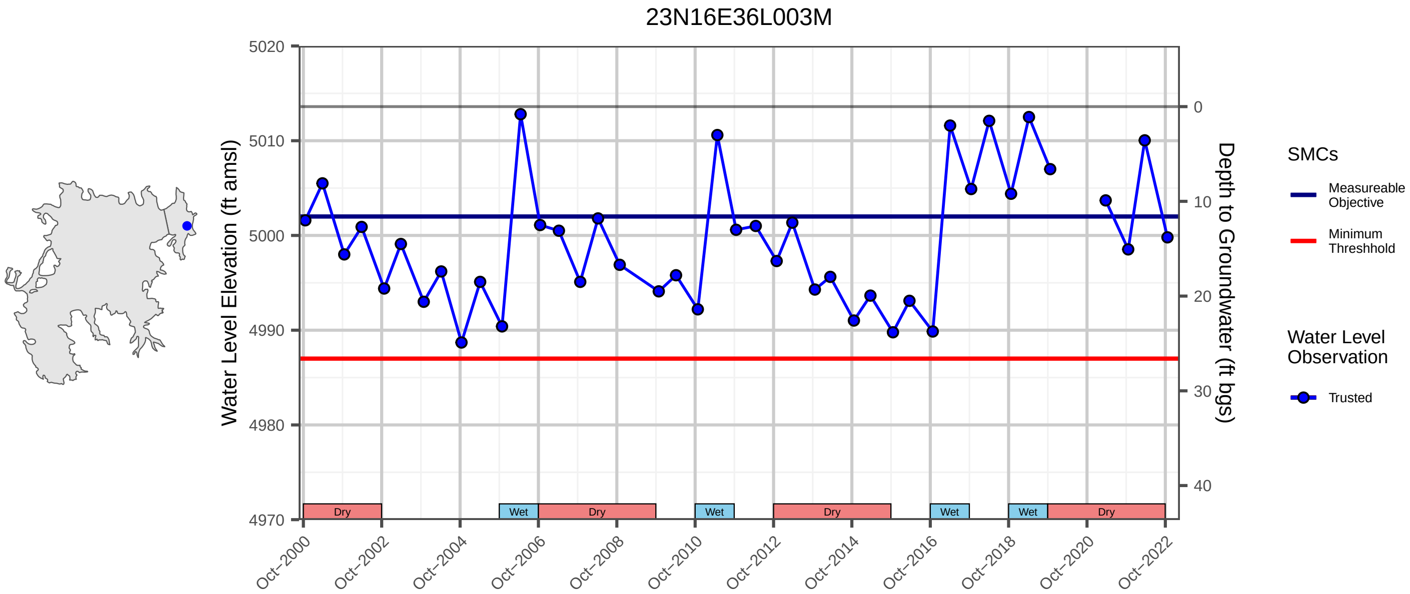
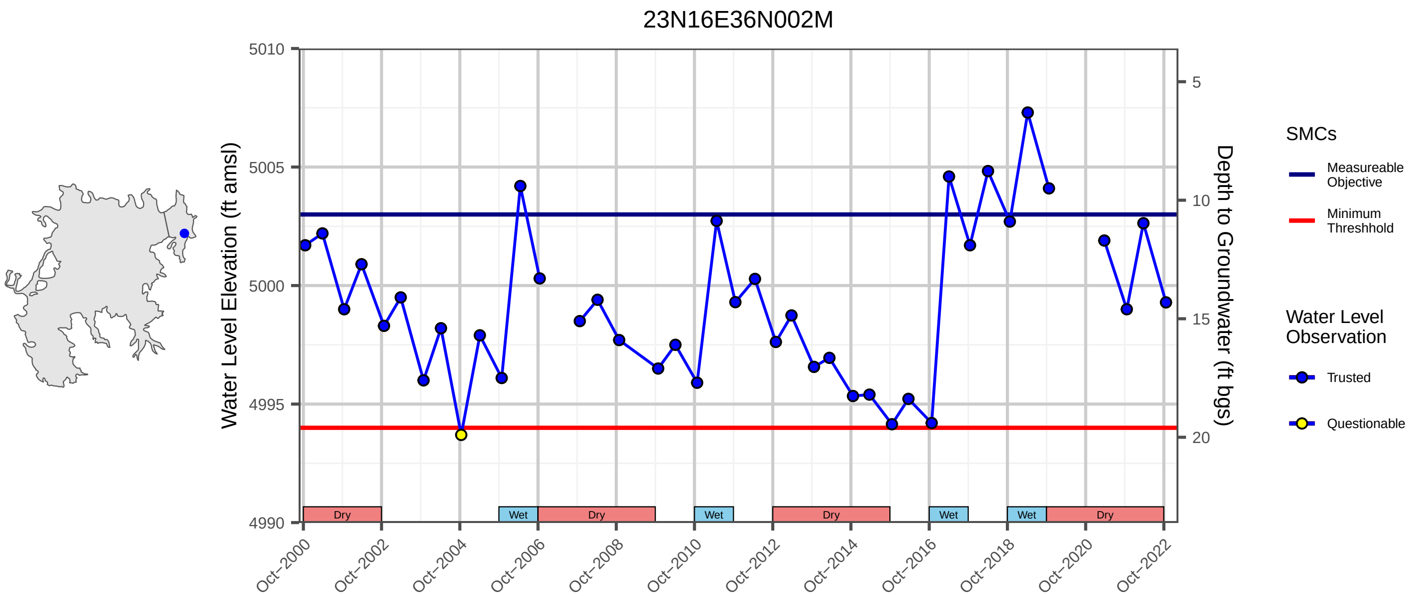
Oct-2018
Oct-2020
Oct-2022


DMS 012
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Dry
Wet
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022

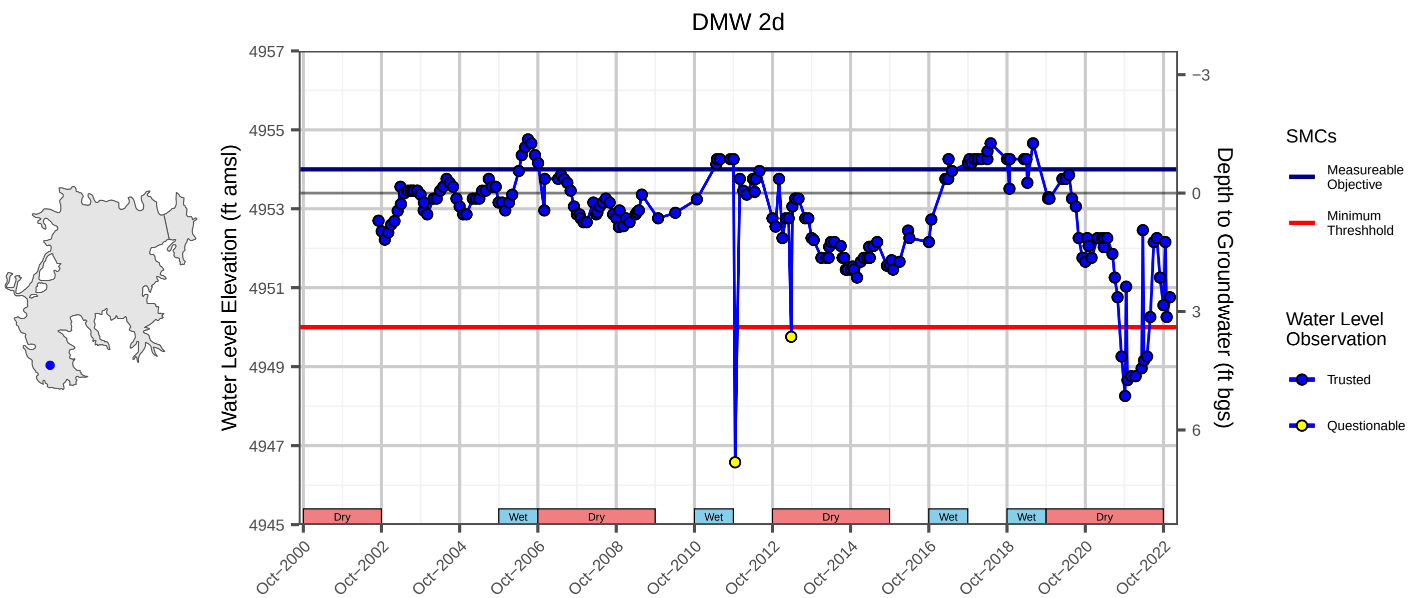

23N16E33A002M
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Dry
Wet
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022



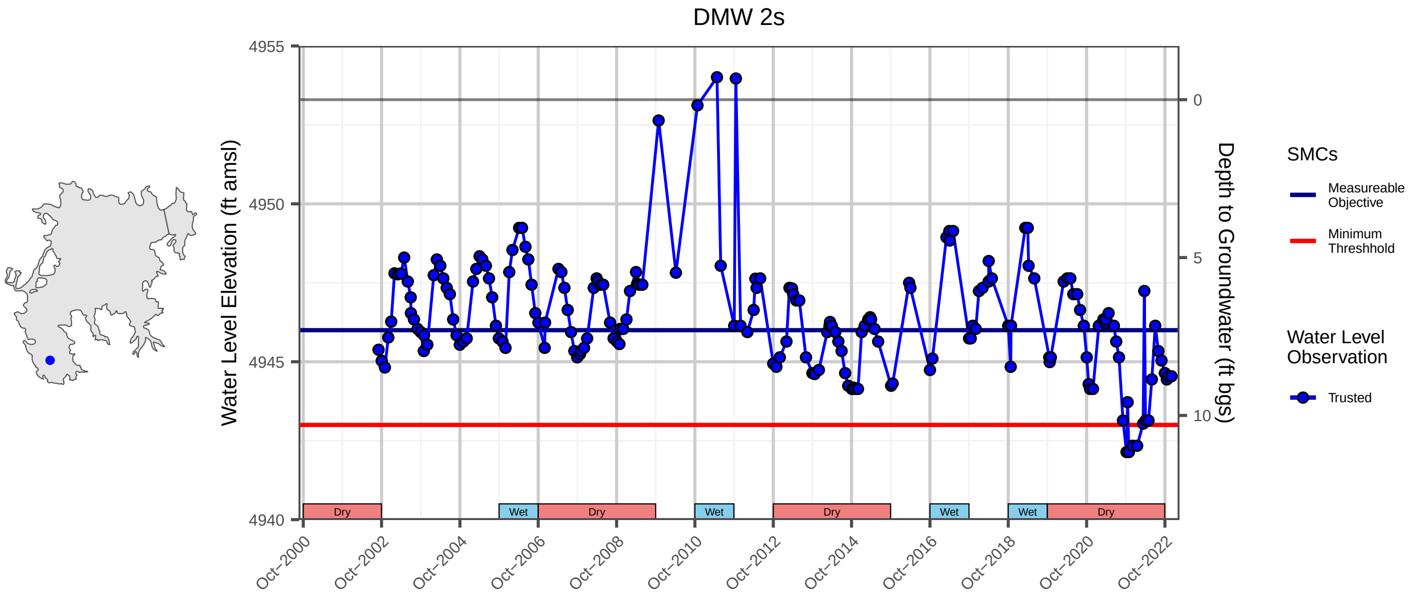
23N16E36L003M
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Dry
Wet

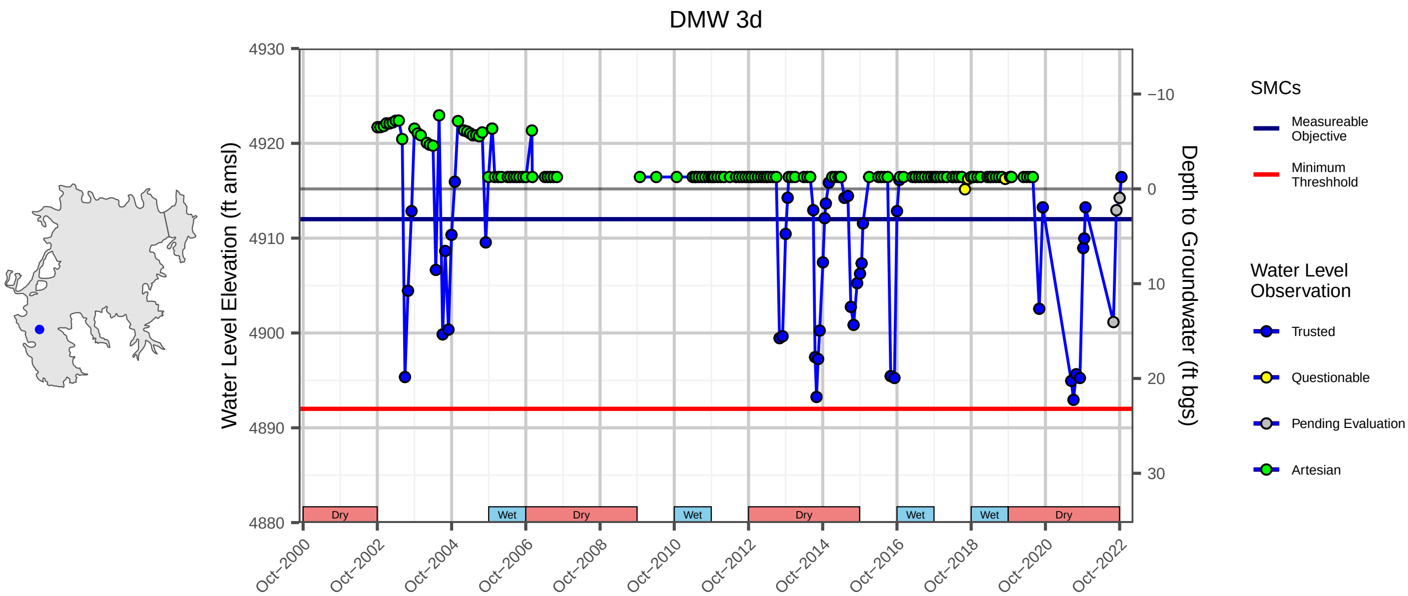


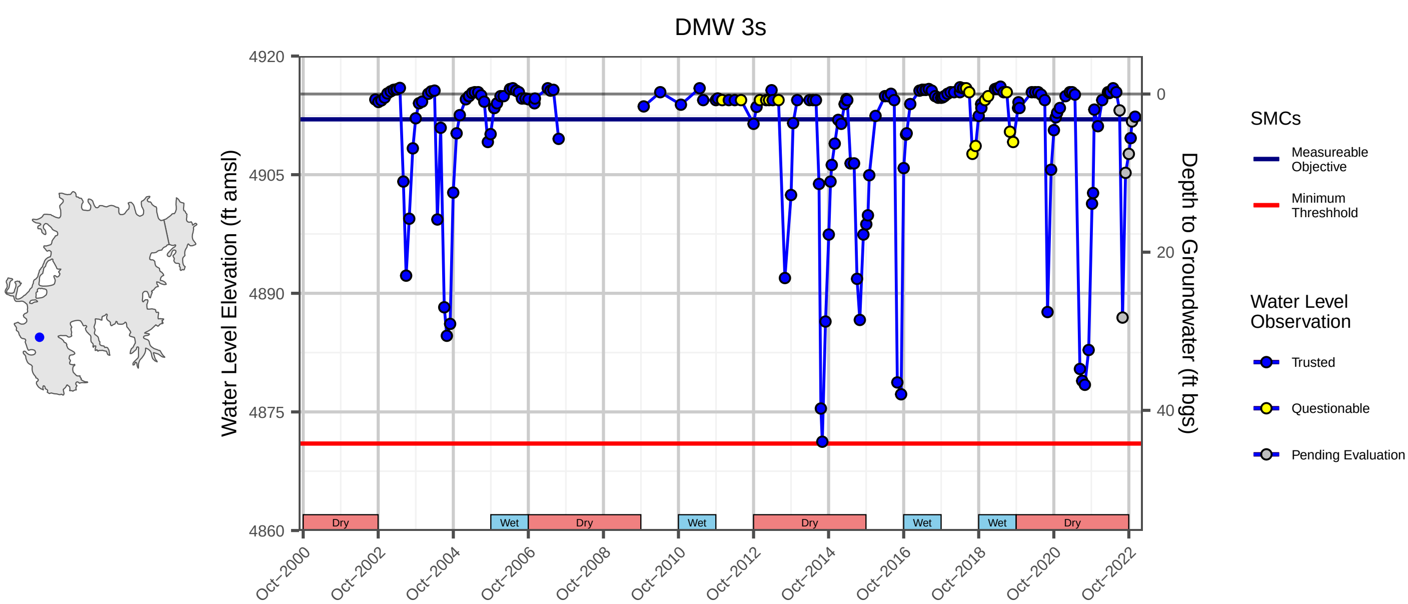
23N16E36N002M
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable
Dry
Wet

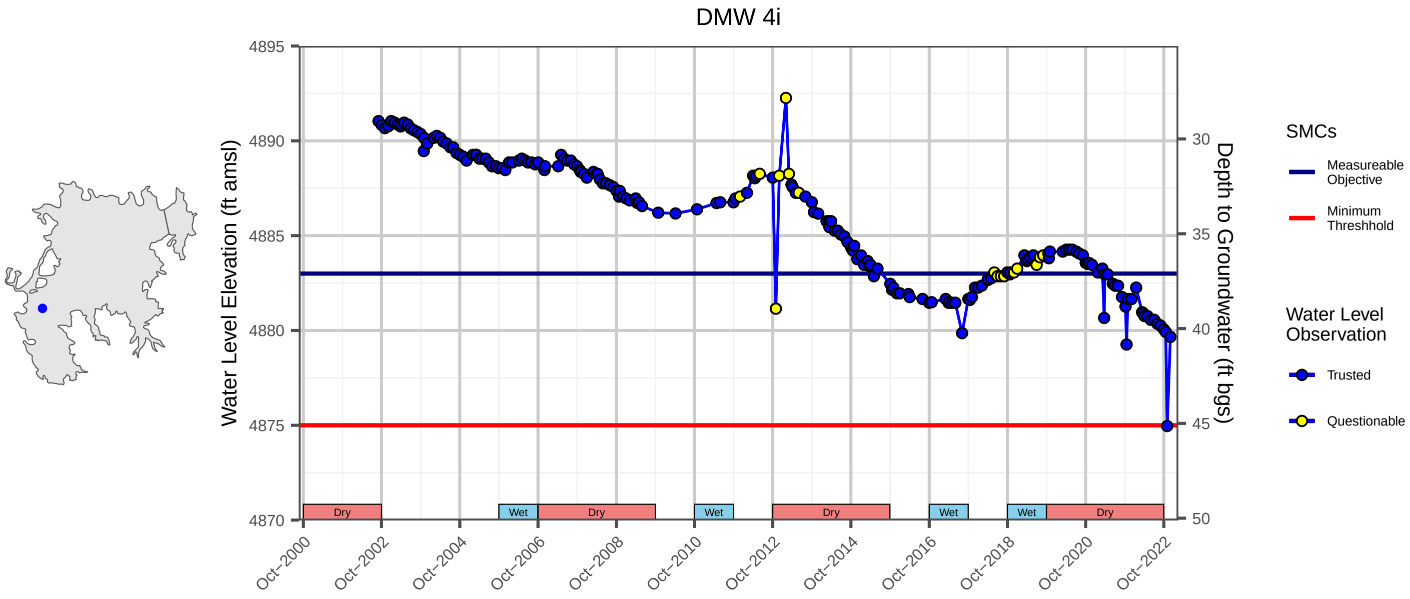


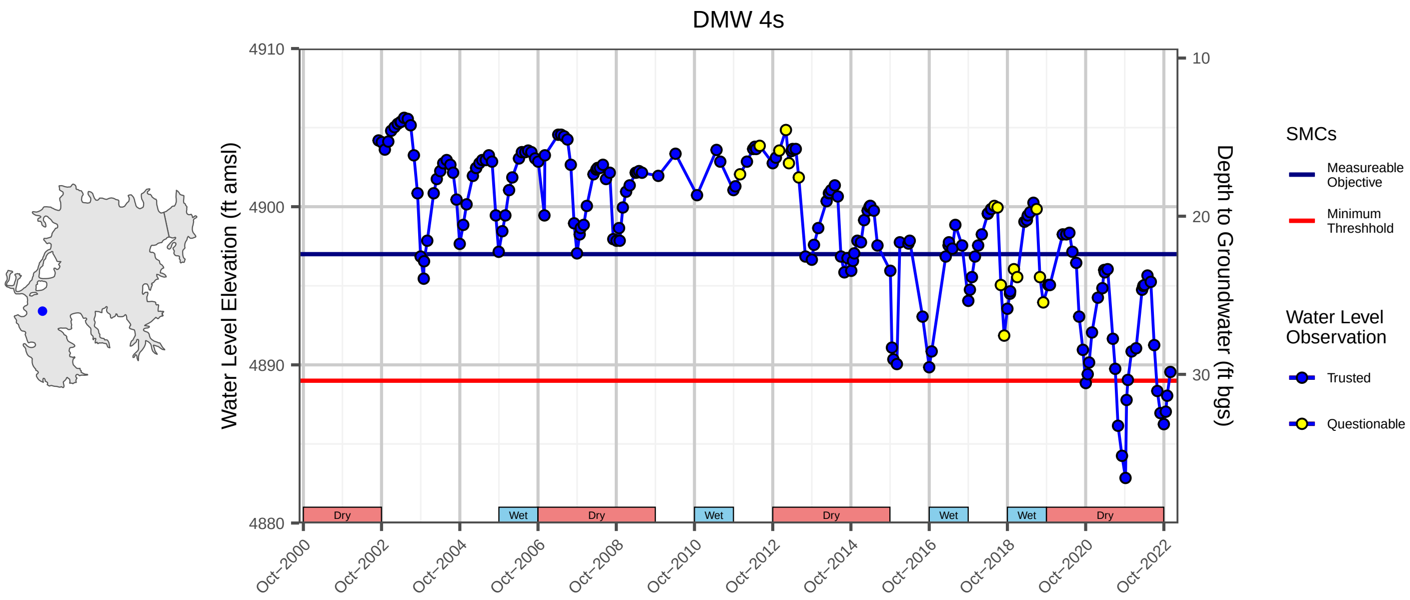
DMW 2d
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable
Dry
Wet

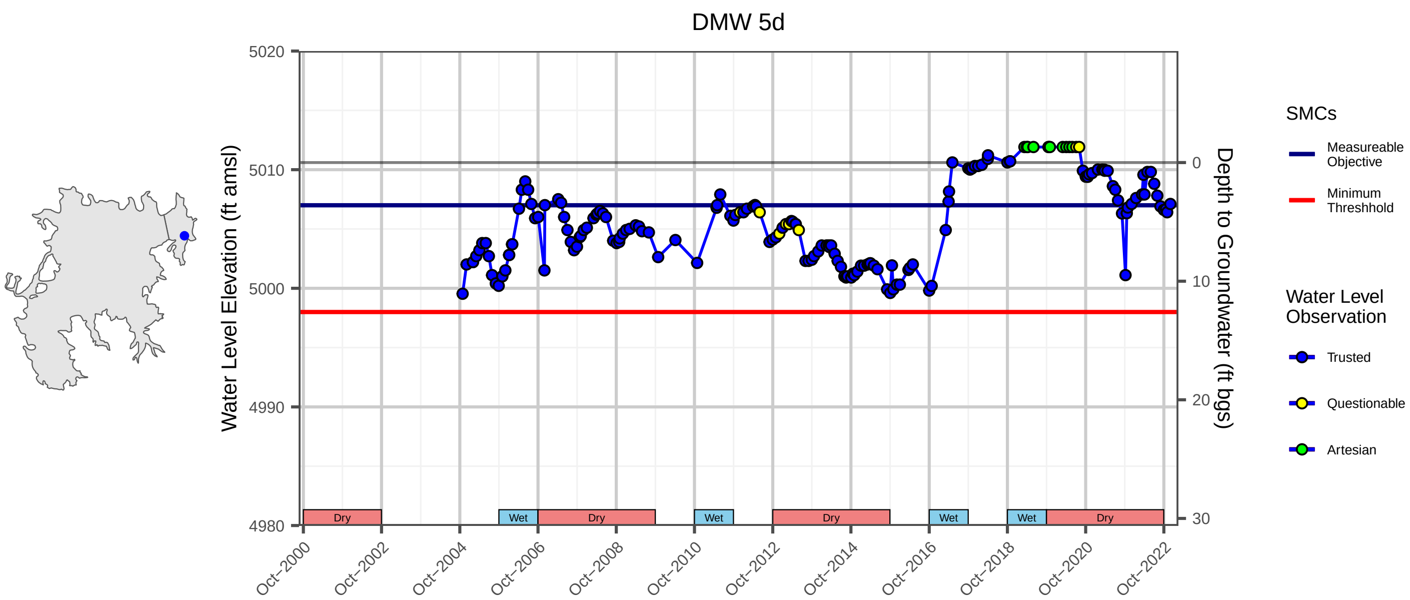

DMW 2s
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
4955
4950
4945
4940
0
5
10
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct−2000
Oct−2002
Oct−2004
Oct−2006
Oct−2008
Oct−2010
Oct−2012
Oct−2014
Oct−2016
Oct−2018
Oct−2020
Oct−2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted


DMW 3d
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
4930
4920
4910
4900
4890
4880
−10
0
10
20
30
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct−2000
Oct−2002
Oct−2004
Oct−2006
Oct−2008
Oct−2010
Oct−2012
Oct−2014
Oct−2016
Oct−2018
Oct−2020
Oct−2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable
Pending Evaluation
Artesian

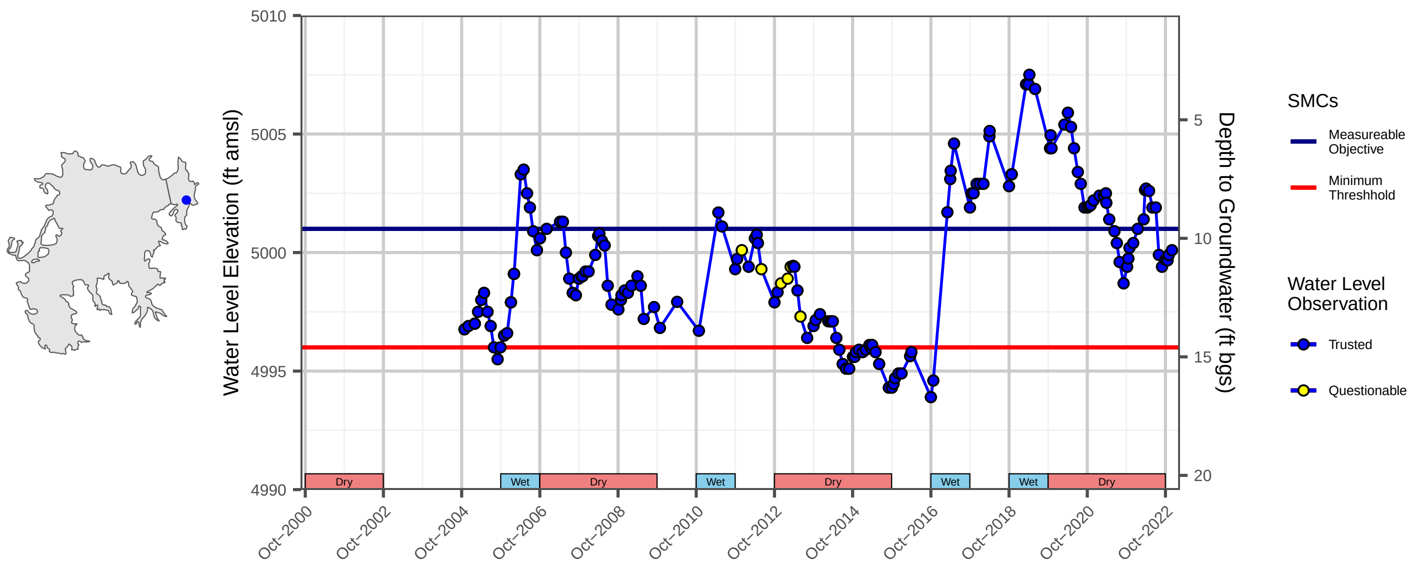

DMW 3s
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
4920
4905
4890
4875
4860
0
20
40
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct−2000
Oct−2002
Oct−2004
Oct−2006
Oct−2008
Oct−2010
Oct−2012
Oct−2014
Oct−2016
Oct−2018
Oct−2020
Oct−2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable
Pending Evaluation


DMW 4i
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
4895
4890
4885
4880
4875
4870
30
35
40
45
50
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable

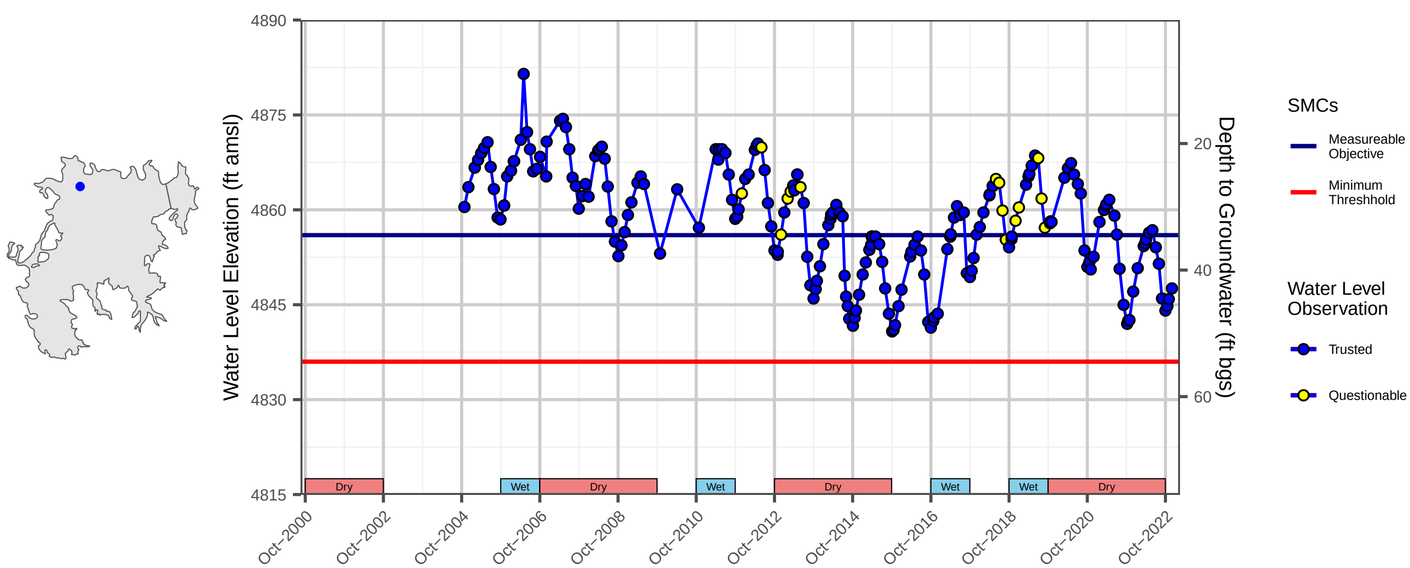

DMW 4s
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
4910
4900
4890
4880
10
20
30
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable


DMW 5d
Water Level Elevation (ft amsl)
Depth to Groundwater (ft bgs)
5020
5010
5000
4990
4980
0
10
20
30
Dry
Wet
Dry
Wet
Dry
Wet
Wet
Dry
Oct-2000
Oct-2002
Oct-2004
Oct-2006
Oct-2008
Oct-2010
Oct-2012
Oct-2014
Oct-2016
Oct-2018
Oct-2020
Oct-2022
SMCs
Measureable Objective
Minimum Threshhold
Water Level Observation
Trusted
Questionable
Artesian

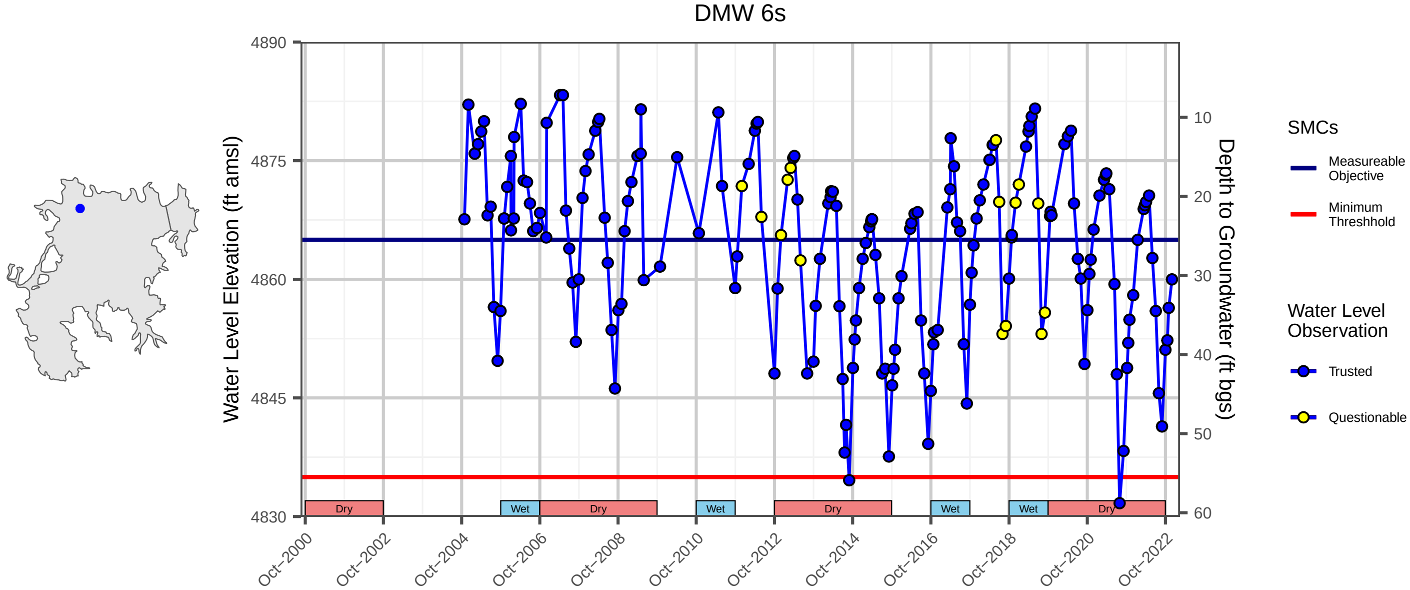
DMW 5s

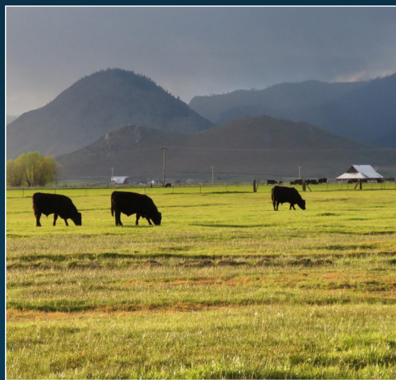


DMW 6d



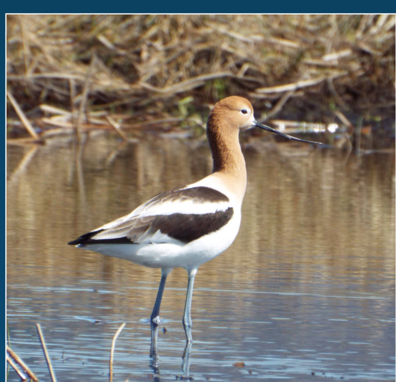
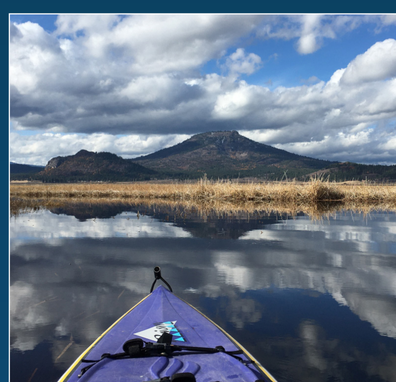
DMW 6s










Groundwater Sustainability Agencies Contact Information

Sierra Valley Groundwater Management District
PO Box 88
Chilcoot CA 96105
530-414-6831
www.sierravalleygmd.org

Plumas County
520 Main Street, Room 309
Quincy, CA 95971
530-283-6170
www.plumascounty.us