March 2025

Turlock Subbasin

Annual Report
WY 2024
Groundwater Sustainability Plan (GSP)

WEST TURLOCK SUBBASIN AND
EAST TURLOCK SUBBASIN
GROUNDWATER SUSTAINABILITY AGENCIES
(GSAs)

Turlock Subbasin
Groundwater Sustainability Plan (GSP)

Fourth Annual Report

Water Year 2024

(October 2023 through September 2024)

March 20, 2025

TODD GROUNDWATER

Woodard & Curran

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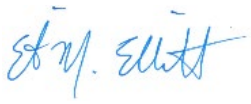

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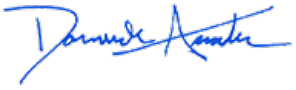

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Acronyms

AF	Acre-feet
AWWA	American Water Works Association
C2VSim	California Central Valley Groundwater-Surface Water Simulation Model
C2VSimTM	C2VSim-Turlock/Modesto; revised regional C2VSim model for Turlock and Modesto subbasins
CASGEM	California Statewide Groundwater Elevation Monitoring
CCR	California Code of Regulations
CDEC	California Data Exchange Center
CIMIS	California Irrigation Management Information System
COC	Constituent of Concern
CVRWQCB	Central Valley Regional Water Quality Control Board
DDW	Division of Drinking Water
DHS	Department of Health Services
DMS	Data Management System
DWR	Department of Water Resources, State of California
ETSGSA	East Turlock Subbasin Groundwater Sustainability Agency
ET	Evapotranspiration
ET_C	Crop Evapotranspiration
ET_O	Reference Evapotranspiration
eWRIMS	Electronic Water Rights Information Management System

GAMA	Groundwater Ambient Monitoring and Assessment
GNSS	Global Navigation Satellite Systems
GRAT	Groundwater Recharge Assessment Tool
GSA	Groundwater Sustainability Agency
GSE	Ground Surface Elevation
GSP	Groundwater Sustainability Plan
ID	Irrigation District
IDC	IWFM Demand Calculator
ILRP	Irrigated Lands Regulatory Program
IM	Interim Milestone
InSAR	Interferometric Synthetic Aperture Radar
ISA	Implementation Support Activity
IWFM	Integrated Water Flow Model
MA	Management Action
MCL	Maximum Contaminant Level
mg/L	milligrams per liter
MID	Merced Irrigation District
MO	Measurable Objective
msl	Mean Sea Level
MT	Minimum Threshold
NRCS	U.S. Natural Resources Conservation Service
OSU	Oregon State University
PCE	Tetrachloroethylene
pCi/L	Picocuries per liter
PEIR	Programmatic Environmental Impact Report
PMAs	Projects and Management Actions
PRISM	Parameter-elevation Regressions on Independent Slopes Model
RMW	Representative Monitoring Well in the GSP monitoring network
RP	Reference Point
RWQCB	Regional Water Quality Control Board
SCFCD	Sand Creek Flood Control District

SGMA	Sustainable Groundwater Management Act
SMC	Sustainable Management Criteria
SRWA	Stanislaus Regional Water Authority
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TCP	1,2,3-Trichloropropane
TDS	Total Dissolved Solids
TID	Turlock Irrigation District
TSS	DWR's Technical Support Services Program
ug/L	Micrograms per liter
USGS	United States Geological Survey
USBR	United States Bureau of Reclamation
VOC	Volatile Organic Compound
WTSGSA	West Turlock Subbasin Groundwater Sustainability Agency
WY	Water Year (October 1 through September 30)

EXECUTIVE SUMMARY

The West Turlock Subbasin Groundwater Sustainability Agency (WTSGSA) and the East Turlock Subbasin Groundwater Sustainability Agency (ETSGSA) jointly prepared this Fourth Annual Report (Annual Report) for the Turlock Subbasin (5-22.03), addressing groundwater and surface water conditions during Water Year (WY) 2024 and summarizing implementation of the Groundwater Sustainability Plan (GSP), as revised in 2024. The 2024 Revised GSP was approved by the Department of Water Resources (DWR) on February 27, 2025.

This Annual Report is being submitted to DWR by April 1, 2025, in accordance with regulatory requirements. Along with this annual report, the GSAs are submitting the DWR water use templates for groundwater extraction, groundwater extraction methods, surface water supply, and total water use for WY 2024.

This Annual Report includes an update of the local C2VSimTM model for WY 2024. This updated model provides the best available method for developing estimates of changes in groundwater in storage, groundwater extractions, and surface water-groundwater interaction. Data from WY 2024 were collected from the same public and private sources that provided historical data for the GSP and previous annual reports. The updated components of the model include precipitation, evapotranspiration, population, surface water operations, canal and reservoir recharge, groundwater pumping, stream inflow, and boundary conditions. Model results show that in WY 2024, the Turlock Subbasin experienced an increase in groundwater in storage of 80,600 AF, during above normal hydrologic conditions in WY 2024. During WY 2024, deep percolation from rainfall and applied irrigation water (combined total of 252,400 AF) were the largest groundwater inflows into the Turlock Subbasin, while groundwater production (363,000 AF) accounted for the largest outflow from the Turlock Subbasin.

Groundwater elevation data were compiled for this Annual Report for the GSP representative monitoring network wells (RMWs) in the three principal aquifers: Western Upper Principal Aquifer, Western Lower Principal Aquifer and Eastern Principal Aquifer. Groundwater level hydrographs were updated through WY 2024 (see **Appendix B)** and groundwater elevation contour maps were developed to illustrate seasonal low (Fall 2023) and seasonal high (Spring 2024) groundwater elevations during the reporting period.

In 2023, ETSGSA conducted a reference point (RP) elevation survey of 44 wells and identified significant differences at some wells between the new RP elevations – representing the best available data—and the RPs used to calculate historical water surface elevation (WSE) data and develop the sustainability management criteria (SMC). During 2024, ETSGSA conducted a review of historical reference point (RP) elevations used in groundwater monitoring data. In communication with and following guidance from DWR staff, ETSGSA systematically corrected historical WSE data for the resurveyed wells and adjusted the SMC (MTs, MOs, and IMs,) for seven of the RMWs and determined the SMC for three wells did not require adjustment. The corrected historical WSE data and RMWs are

used in groundwater elevation analyses in this Annual Report. The SMC for the remaining five RMWs will be adjusted after additional survey data are collected in 2025

WY 2024 was an above normal precipitation year, following a wet year (WY 2023) and two critically dry years (WY 2021 and WY 2022). Groundwater levels declined during WY 2020 through 2022, and they began to recover in WY 2023. In WY 2024, groundwater levels continued to increase throughout the Western Upper Principal Aquifer. Water levels showed slight recovery in the western portion of the Eastern Principal Aquifer, but continued declines were observed in the eastern portion of the aquifer. Water levels in the Western Lower Principal Aquifer RMWs generally increased by several feet from Spring 2023 to Spring 2024.

The hydrographs provided in **Appendix B** show available water level data from 1990 through the reporting period (WY 2024) for each RMW, along with the minimum thresholds (MTs) and measurable objectives (MOs), and in some cases the first interim milestone (IM), established for each well. The hydrographs for ETSGSA wells show WSE data and SMC that are corrected and updated in response to the resurveyed RP elevations.

Considering all three Principal Aquifers in Fall 2023, groundwater levels were below the MTs in 21 of the 33 RMWs that were measured and have MTs. MTs have not yet been set for 8 recently installed RMWs (due to lack of data) and measurements could not be taken in 3 wells. The Fall 2023 monitoring event is the second Fall GSP monitoring event used to evaluate undesirable results. An analysis of the SMC for past monitoring events (Fall 2022, Spring 2023, and Fall 2023), following the ETSGSA WSE corrections and SMC updates, was conducted and is included in this Annual Report. While the Spring events are not used to define undesirable results for groundwater level decline, these are intermediate monitoring events and are indicative of conditions after the rainy season. Moreover, the Spring measurements are compared to MTs with regard to potential undesirable results for subsidence (discussed later in this Executive Summary).

For the Western Upper Principal Aquifer, water levels were below the MT in 3 of 13 RMWs (23%) with MTs in Fall 2023, but the exceedances do not meet the definition of undesirable results, which is based on three consecutive Fall monitoring events with greater than 33% of RMWs exceeding their MT. Because of the positive results in Fall 2023, undesirable results will not be identified for at least three more years for the Western Upper Principal Aquifer. In addition, only one well showed levels below its IM in Fall 2023.

For the Western Lower Principal Aquifer in Fall 2023, groundwater levels were below the MT in 2 of 5 RMWs (60%) measured that have designated MTs, but the exceedances that occurred during this monitoring event do not meet the definition of undesirable results because this was the second Fall monitoring event. It is noted that undesirable results could be indicated in Fall 2024 if it represents the third consecutive Fall event with more than 33% of measured wells with levels below the MT. There were no exceedances of the IMs in the Western Lower Principal Aquifer in WY 2024.

For the Eastern Principal Aquifer in Fall 2023, groundwater levels were below the MT in 15 of 15 RMWs (100%) measured that have designated MTs. This is the second consecutive fall with more than 33% of wells with levels below the MT; in Fall 2022, 87% of wells had levels below the MT. These results do not meet the definition of undesirable results. Undesirable results could be indicated in Fall 2024 if it is the third consecutive Fall event with more than 33% of measured wells with levels below the MT. In WY 2024, wells with MT exceedances occurred throughout the Eastern Principal Aquifer, with a greater prevalence of exceedances at RMWs in the easternmost area.

As discussed in the Revised GSP, the GSAs have recognized that groundwater levels could temporarily decline below MTs in some areas during the period before projects and management actions are fully implemented. Accordingly, IMs have been set for selected wells to provide additional guidelines at five-year intervals, beginning with 2027, until groundwater levels rise above the MTs. IMs have been established for all three principal aquifers, including 14 IMs in the Eastern Principal Aquifer. In Water Year 2024, there was one exceedance of a 2027 IM, ETSGSA-08, in the Eastern Principal Aquifer. Per the Groundwater Demand Reduction Plan included as Appendix K of the Revised GSP, a Priority Action Area has been established to focus actions to expedite recovery of groundwater levels in this area.

The definition of undesirable results for interconnected surface waters along the Tuolumne, Merced, and San Joaquin rivers is when at least 50% of measured RMWs exceed the MT for a Principal Aquifer for two consecutive Fall monitoring events. In Fall 2023, groundwater levels at six out of 10 RMWs measured were below the MTs for interconnected surface water during Fall 2023. Two of these wells are along the Tuolumne River (67% of RMWs) and four are along the Merced River (100% of RMWs). No wells along the San Joaquin River had groundwater levels below the MTs during Fall 2023. This was the second consecutive Fall monitoring event with greater than 50% of RMWs for the Merced and Tuolumne Rivers below the MTs. Accordingly, in Fall 2023, undesirable results for interconnected surface water were defined to have occurred along the Tuolumne and Merced rivers.

As discussed in the Revised GSP, the GSAs recognized that groundwater levels could decline below MTs during the implementation period and that undesirable results could occur before groundwater levels recover. Accordingly, IMs have been set for selected wells to provide additional guidelines at five-year intervals, beginning with 2027 IMs. The Tuolumne River has three wells with IMs, and the Merced River has four wells with IMs. Water levels in all seven wells with IMs have remained above their 2027 IMs.

In Spring 2024, water levels were below the MT in 2 of 14 RMWs (13%) measured with designated MTs in the Western Upper Principal Aquifer, 1 of 4 RMWs (25%) measured with designated MTs in the Western Lower Principal Aquifer, and 9 of 15 RMWs (60%) measured with designated MTs in the Eastern Principal Aquifer. For interconnected surface water, Spring 2024 groundwater levels were below the MT in 0 of 3 RMWs (0%) along the San Joaquin River, 2 of 3 RMWs (67%) along the Tuolumne River, and 1 of 5 RMWs (20%) along the Merced River. MT Exceedances during Spring monitoring events are not considered

when assessing undesirable results for the chronic lowering of groundwater levels or interconnected surface water.

DWR has a Dry Well Reporting System for households not served by a public water system. Based on data from this system, two reports of dry wells were made in the Turlock Subbasin during WY 2024. Both remain open as outages. Owners of reported dry wells are referred to established non-governmental organizations (NGOs) for assistance.

In 2024, the GSAs developed a Well Mitigation Plan as part of the Revised GSP process. The 2024 Revised GSP includes description of water supply wells drilled in the Subbasin and an analysis of wells that could potentially go dry with additional groundwater level declines (see Revised GSP Section 6.3.1). An initial description of the Well Mitigation Program is provided in the Revised GSP (Section 8.1.3). The Program is focused on providing mitigation for drinking water wells that have experienced adverse impacts due to declining groundwater levels during the SGMA implementation period (i.e., since 2022). The Well Mitigation Plan prepared subsequently in 2024 describes a detailed process for mitigating impacts and was adopted by the GSAs on January 23, 2025, with implementation to commence in 2025.

Groundwater elevation contour maps show similar groundwater flow patterns in Fall 2023 and Spring 2024 (see **Figure ES-1**). Groundwater in the Turlock Subbasin generally flows to the west- northwest and toward a pumping depression that extends over most of the Eastern Principal Aquifer and the southeastern portion of the Western Upper Principal Aquifer. Based on available data, groundwater flows north from the Merced River and northeast toward the pumping depression in the eastern Subbasin. Near Delhi and Hilmar, water flows south toward the Merced River and toward the San Joaquin River in the western Subbasin. Groundwater generally flows south from the Tuolumne River toward the pumping depression in the eastern Subbasin and toward the Tuolumne River in the western Subbasin. In the northwestern Subbasin, groundwater flows to the northwest in the vicinity of Ceres and Modesto and toward the downgradient extent of the Subbasin.

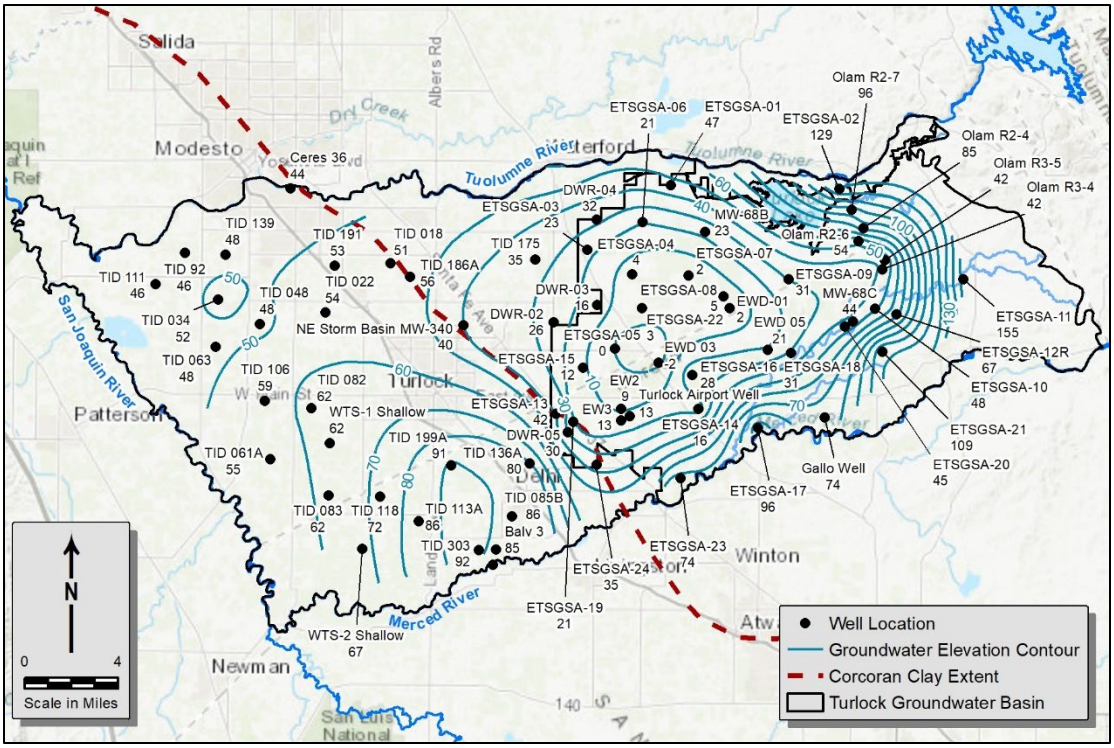

Figure ES-1 Groundwater Elevation Contours, Western Upper and Eastern Principal Aquifers, Spring 2024

Comparison of groundwater elevation contours in Fall 2023 and Spring 2024 showed a general increase in groundwater levels, averaging 2.3 feet in the Western Upper Principal Aquifer. Groundwater levels changed more in the Eastern Principal Aquifer than in the Western Upper Principal Aquifer, with an average increase of 8 feet over the year. This reflects a decrease in pumping during the rainy season and potentially the effect of recharge in areas with shallow depths to groundwater.

Total groundwater extractions in the Turlock Subbasin during WY 2024 were estimated to be 363,000 AF, which is slightly less than WY 2023 (336,900), a wet year, and much less than the total groundwater extractions in WY 2022 (554,400 AF), a critically dry year. These estimates are based on directly measured groundwater extraction data collected by local water agencies and estimates for private agricultural and domestic pumping made using the C2VSimTM model. During WY 2024, agricultural groundwater extraction accounted for about 91% (330,500 AF) of the total pumping in the Turlock Subbasin, while urban and industrial groundwater extraction accounted for about 9% (32,500 AF). No known groundwater extraction was used for maintaining managed wetlands, supplying managed recharge operations, or maintaining native vegetation in the Turlock Subbasin. **Figure ES-2** illustrates the distribution of groundwater extraction within the Turlock Subbasin during WY 2023. Because agricultural pumping accounts for 91% of the total groundwater extractions, the pumping distribution is generally higher in areas with greater irrigated acreage and in areas without a surface water supply.

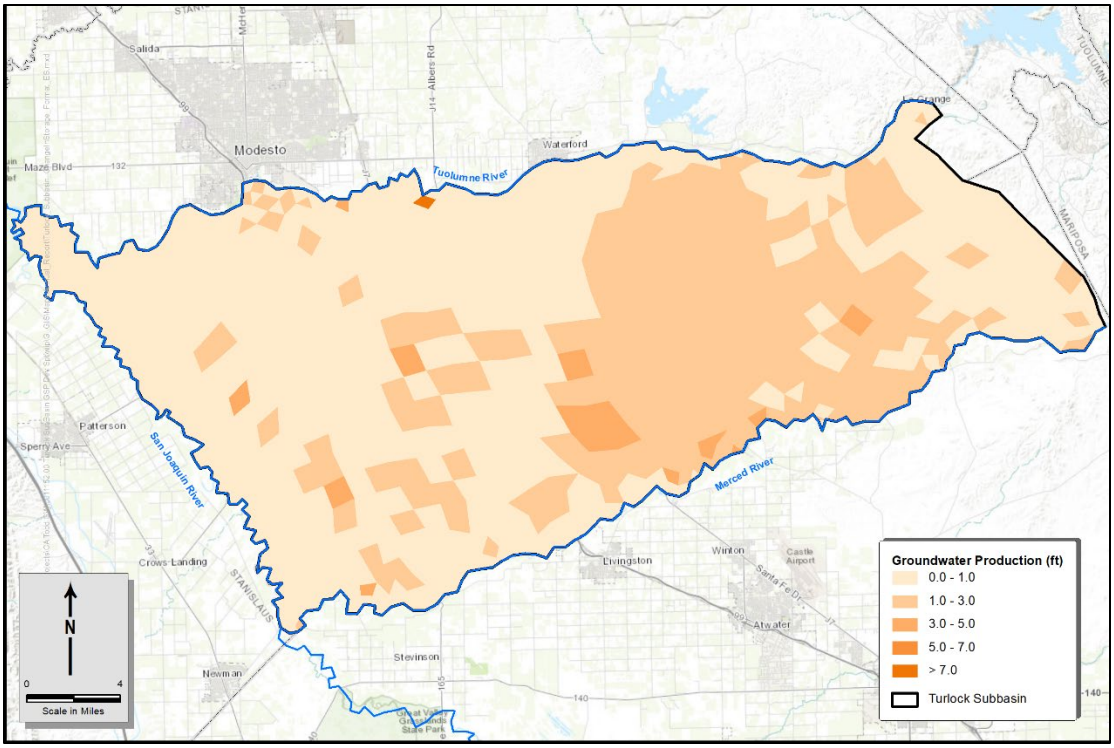

Figure ES-2 Groundwater Extraction, Turlock Subbasin WY 2024

Surface water supply in the Turlock Subbasin during WY 2024 was estimated to be 425,200 AF. This surface water supply includes Turlock Irrigation District (TID) and Merced Irrigation District (MID) deliveries, riparian diversions, and recycled water. Direct measurements of surface water deliveries were provided by TID and MID. The riparian diversions from the Tuolumne, Merced and San Joaquin rivers were estimated based on water rights described by the State Water Resources Control Board (SWRCB) Electronic Water Rights Information Management System (eWRIMS) and adjusted to meet the agricultural demand simulated by the C2VSimTM model. Recycled water includes water that is treated and used for either agricultural use or groundwater recharge originating from the Cities of Modesto and Turlock, as well as treated wastewater provided by Hilmar Cheese Company. **Figure ES-3** illustrates surface water delivery locations in the Turlock Subbasin.

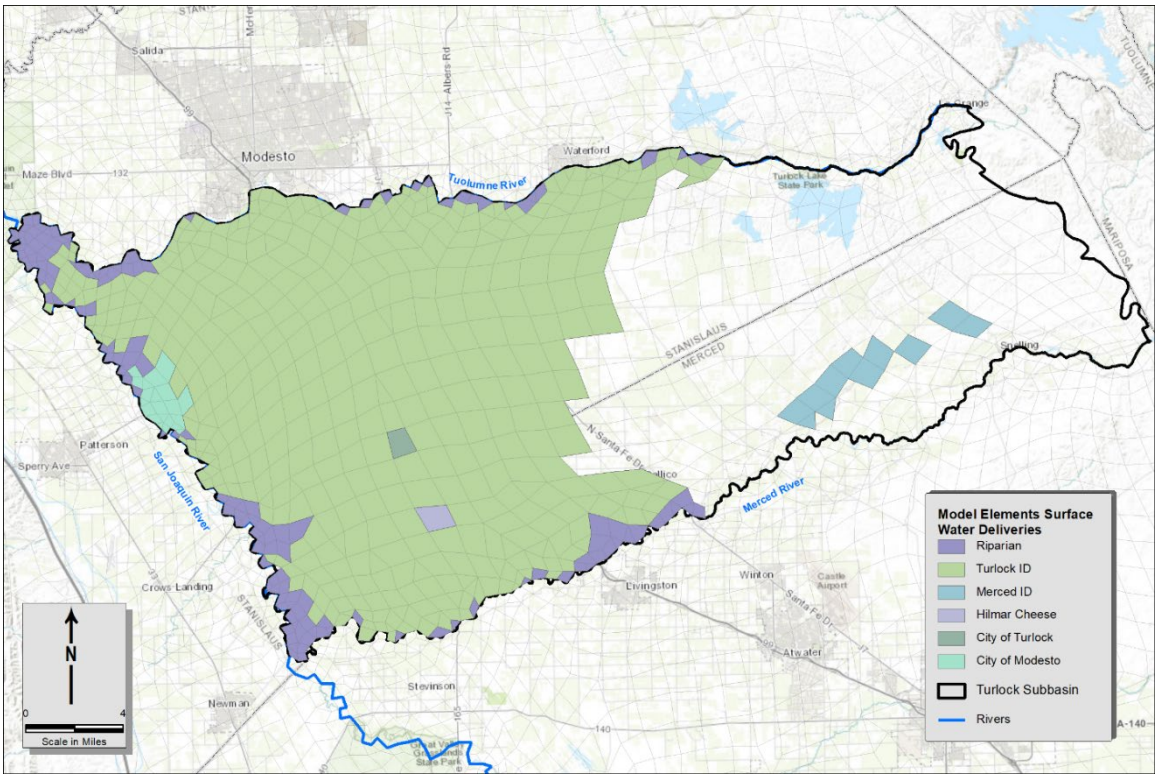

Figure ES-3 Surface Water Deliveries, Turlock Subbasin

During WY 2024, the total water use for the Turlock Subbasin was 788,200 AF, which is slightly more than in WY 2023 (774,800 AF), a critically dry year. Groundwater extraction represented about 46% of the total supplies (363,000 AF). Surface supply totaled 420,100 AF representing about 53% of total water supplies in WY 2024, an increase from WY 2023 (406,600 AF). Recycled water amounted to about 1% (5,100 AF). The total water supply for WY 2024 is summarized in **Table ES-1**.

Table ES-1: Total Water Use by Water Source Type for Water Year 2024 (in acre-feet)

	Groundwater[1]	Surface Water[2]	Recycled Water[3]	Total Water Use
2024	363,000	420,100	5,100	788,200

1. *Includes "Agency" and "Private" extractions described in Section 4.*
2. *Includes "Measured" and "Estimated" surface water supplies described in Section 5.*
3. *Includes water for agricultural use originating from the Cities of Modesto and Turlock, as well as treated wastewater provided by Hilmar Cheese.*

The total change in groundwater in storage for WY 2024 was estimated by the C2VSimTM model to be an increase of 80,600 AF. A change in groundwater in storage map for WY 2024 is provided as **Figure ES-4**. The figure is generated by calculating storage at the end of the

water year minus the storage at the beginning of the water year for each model cell. The resulting change in storage accounts for the various flows into and out of the cell throughout the water year. Change in storage is shown in feet, derived by dividing the volume of change in storage by the area of each cell. **Figure ES-4** shows increases in both the western and eastern sections of the Subbasin. The Western Upper Principal Aquifer experienced an increase of 30,100 AF of groundwater in storage, with the greatest gains being observed in the center of the region and some reductions in areas adjacent to the rivers. The Western Lower Principal Aquifer (**Figure 7-5**) experienced an increase of 33,100 AF of groundwater in storage, with a slight gain along the southeastern boundary of the aquifer. Gain of groundwater in storage totaled 17,400 AF in the Eastern Principal Aquifer, with increases simulated throughout most of the principal aquifer and a slight decrease along the subbasin's eastern boundary. We note that these changes in storage are compared to WY 2023, a wet year.

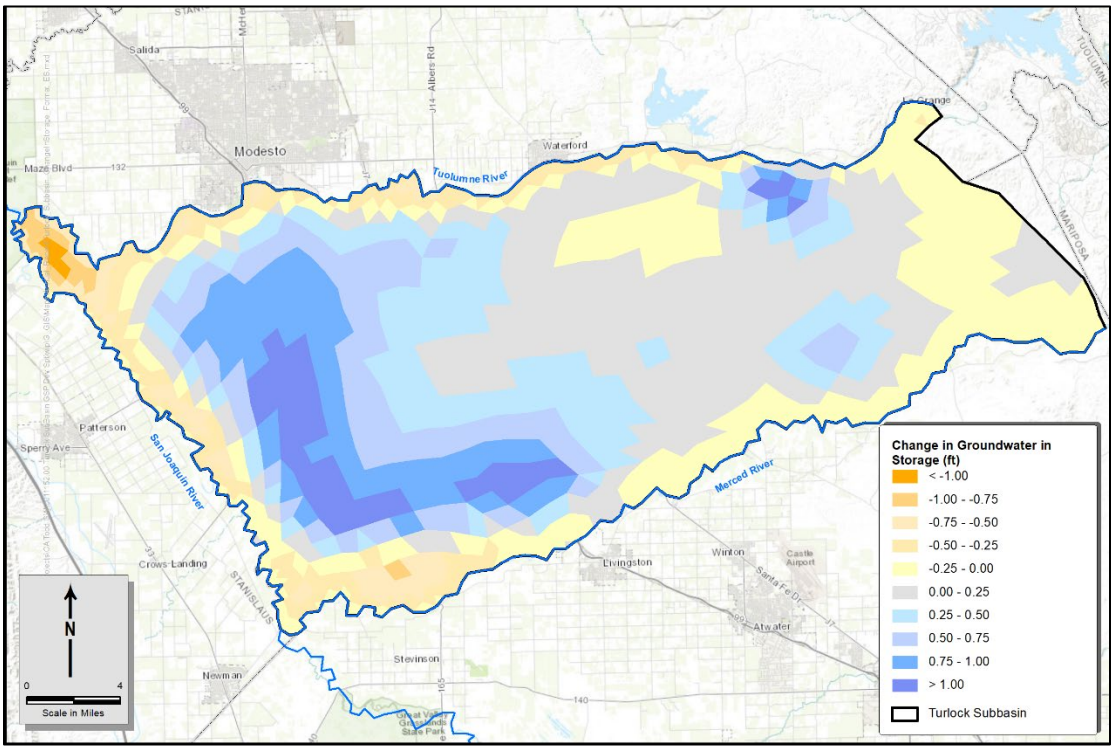

Figure ES-4 Change in Groundwater in Storage, Turlock Subbasin WY 2024

It is noted here that the definition of undesirable results for reduction of groundwater in storage is also defined by groundwater levels as a proxy. As explained in the Revised GSP, an undesirable result for storage will occur for each principal aquifer when at least 33% of representative monitoring wells exceed the MT for that principal aquifer in three consecutive Fall monitoring events. An undesirable result for reduction of groundwater storage has not occurred during WY 2024, but could occur when Fall 2024 measurements are considered.

As stated previously, the model indicates the Eastern Principal Aquifer gained 17,400 AFY during WY 2024. However, during Fall 2023, 100% of the RMWs were below the MTs and in Spring 2024, 60% of the RMWs were below the MTs. Although groundwater in storage increased in the Eastern Principal Aquifer, groundwater levels did not increase enough to reach MTs.

This Fourth Annual Report includes the third groundwater quality assessment following the baseline that was developed in the WY 2021 Annual Report. The Turlock Subbasin GSP defined that the MT is a new (first-time) exceedance of an MCL in a potable supply well in the representative monitoring network for any of the six constituents of concern (COC): arsenic, uranium, nitrate, 1,2,3-trichloropropane (TCP), tetrachloroethene (PCE), and total dissolved solids (TDS). An undesirable result would occur if this exceedance resulted in a well owner's increase in operational costs and is caused by GSA management activities.

Data collected during WY 2024 for the six COCs were downloaded from the State Groundwater Ambient Monitoring and Assessment Program (GAMA) Groundwater Information System through the State GeoTracker website. Water quality data collected during WY 2024 were compared to the baseline to determine if any new MCL exceedances of any of the COCs occurred. Five new (first-time) MCL exceedances occurred in WY 2024: one for arsenic, three for nitrate (two in the Western Upper and one in the Western Lower), and one for TDS. The map for nitrate in the Western Upper and Eastern Principal Aquifers is provided in **Figure ES-5 below**. The groundwater quality trends and local groundwater level conditions were examined for each of these exceedances. An examination of the WY 2024 arsenic, nitrate, and TDS concentration exceedances did not indicate a link between TDS concentrations and local water levels or management activities. Therefore, the MCL exceedances did not cause undesirable results.

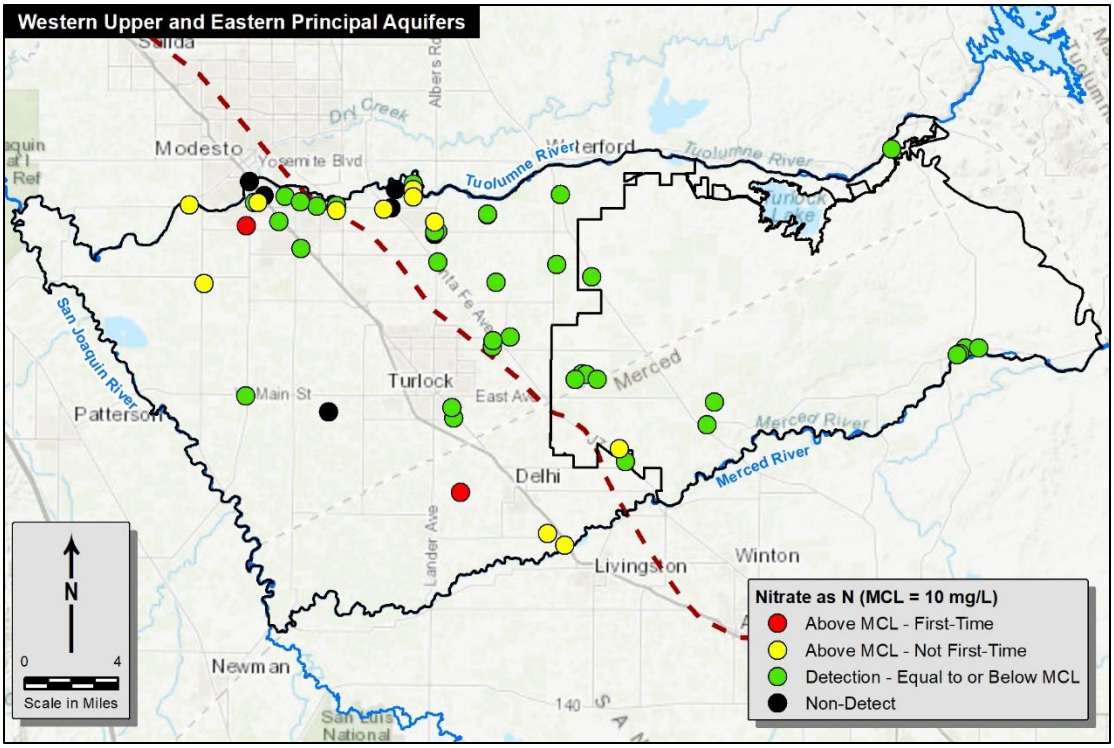

Figure ES-5 Nitrate in Groundwater, WY 2024

As explained in the GSP and verified during the current reporting period, the Turlock Subbasin has not experienced any known adverse impacts to land uses or critical infrastructure from land subsidence. Nonetheless, the GSP described the hydrogeologic setting for subsidence (with a focus on the area underlain by the Corcoran Clay) and established groundwater elevations as a proxy for the potential of subsidence to occur. This proxy designation recognized that groundwater level declines below historical lows could result in subsidence.

As described in the GSP, an undesirable result is defined as significant and unreasonable inelastic land subsidence, caused by groundwater extraction and associated water level declines, that adversely affects land uses or reduces the viability of the use of critical infrastructure. Using the groundwater level proxy, an undesirable result will occur in the Western Upper Principal Aquifer when 33% of representative monitoring wells exceed the MT for groundwater levels in three consecutive Spring monitoring events. As indicated in the discussion of groundwater levels, an undesirable result has not been indicated in the Western Upper Principal Aquifer. Spring 2024 water levels were below the MT in only 13% of measured wells. Using the groundwater level proxy, in the Western Lower Principal Aquifer, undesirable results are deemed to occur when 33% of representative monitoring wells exceed the MT in two consecutive Spring monitoring events. As of WY 2024, available groundwater level Spring data do not indicate an undesirable result for subsidence; only 25% of measured wells were below the MT.

Using the groundwater level proxy, in the Eastern Principal Aquifer, an undesirable result for subsidence is defined to occur when 33% of representative monitoring wells exceed the MT in three consecutive Fall monitoring events. As indicated in the above discussion of groundwater levels, this has not occurred in WY 2024 but could occur during the next reporting period.

The Revised GSP presents remote sensing information on subsidence, including vertical displacement based on Interferometric Synthetic Aperture Radar (InSAR) data, which are published annually by DWR on the SGMA Data Viewer. In the Revised GSP, cumulative subsidence was evaluated from June 2015 to September 2019 and showed a small amount of cumulative subsidence (up to approximately 0.2 to 0.3 feet) in the southwestern portion of the Subbasin, at average annual rates near the reported range of accuracy of 0.6 inches per year. The cumulative subsidence, although small, is greater than the limits of accuracy and consistent with the reported subsidence at the TRLK GPS station located southeast of the City of Turlock (approximately 2 inches during the same time). Given the likely occurrence of subsidence, the GSP also mandated ongoing annual review of InSAR data.

Consistent with the requirements of the GSP, the three previous Annual Reports included InSAR ground displacement mapping for the respective years; these indicated between 0 and -0.1 feet per year (as much as -1.2 inches per year) across much of the Subbasin in WY 2021 through WY 2023. In WY 2024, a positive vertical ground displacement (ground surface rise) of up to 0.05 ft (0.6 inches) was measured in most the Subbasin. A slight negative vertical ground displacement (0 to -0.06 inches) was measured in the eastern and southern portions of the Subbasin. This Annual Report includes an update and extension of this cumulative InSAR ground displacement mapping from June 2015 to September 2024. **Figure ES-6** shows that over the nine years, most of the Subbasin has been characterized by minimal to no subsidence. Localized subsidence is indicated in the southern Corcoran Clay extent in the Subbasin. Across this area, vertical displacement over the nine years has ranged from as little as -0.05 to -0.1 feet (-0.6 to -1.2 inches) to as much as -0.35 feet (-4.2 inches) near the edge of the Corcoran Clay east of Delhi and west of Cortez.

Although the amount of reported subsidence is not great and has not resulted in any reports of infrastructure damage, it is nevertheless an indication that subsidence is occurring and may continue if groundwater levels continue to fall in the area east of Delhi. The GSAs are addressing these observed trends with continued evaluation of groundwater levels, InSAR and GPS station data; planning for establishment of survey points along linear infrastructure and at specific locations across subsidence areas; and planning to focus demand reduction and recharge projects and management actions in this region. Several Projects and Management Actions, detailed in the Revised GSP, include plans for demand management in areas experiencing subsidence.

In the Western Lower Aquifer, the Corcoran Clay and other basin clay deposits may represent a risk of significant future subsidence. This region is overlain by extensive infrastructure (including canals, ditches, and municipal sewer systems) that could be disrupted if significant land subsidence were to occur. In the Eastern Principal Aquifer,

potentially compressible clay deposits and infrastructure that could be adversely affected by subsidence are present, but less extensive. Because no damage to infrastructure has been reported to date, the amount of subsidence reported from the InSAR data is small, and the compressibility of the underlying clay deposits has not been evaluated, it may be that use of groundwater levels as a proxy for subsidence alone is of limited effectiveness in the Turlock Subbasin. In recent years, InSAR has improved substantially in accuracy, availability, and dependability and is recommended by DWR. In addition, the establishment of survey points and subsidence monuments and the continued measurement of groundwater level responses to planned recharge and demand reduction projects will generate additional data that may allow the refinement of the definition of SMC and undesirable results based on additional criteria. Revising the definition of undesirable results for subsidence will be considered as part of the 2027 GSP Update.

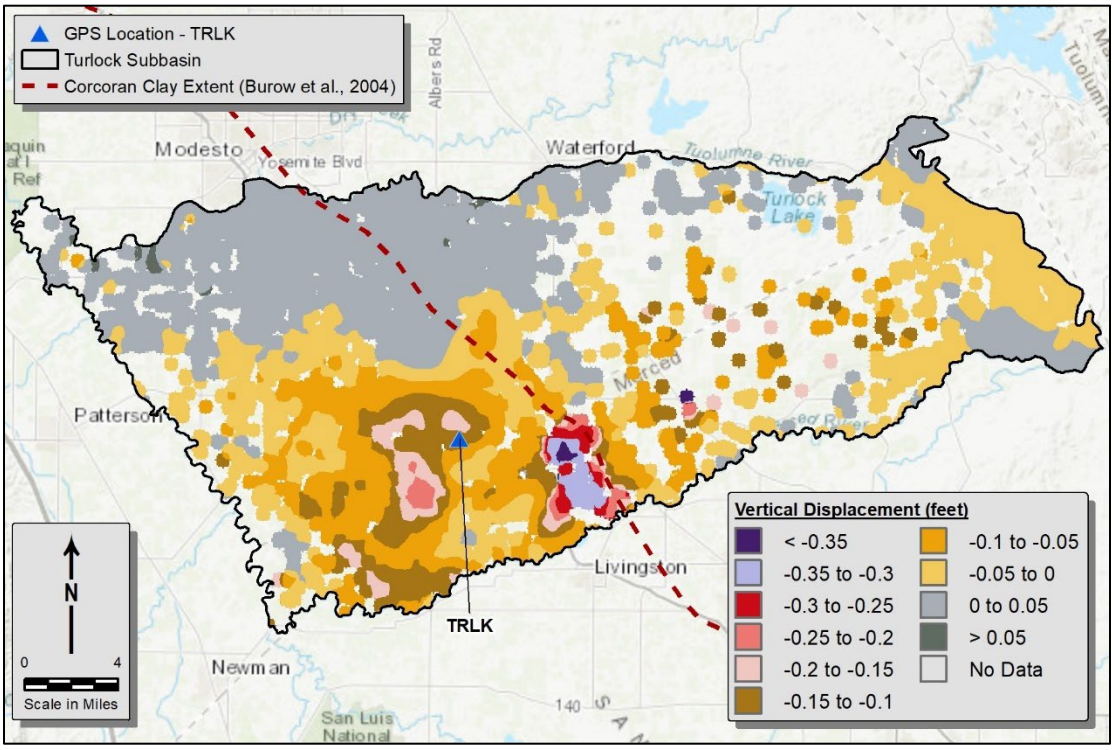

Figure ES-6 InSAR Vertical Displacement Data, June 2015 to September 2024

The C2VSimTM model was used to evaluate the interaction between groundwater and interconnected surface water during WY 2024. Model results show that during WY 2024, the Tuolumne River, Merced River, and San Joaquin River were net losing streams. In Spring WY 2024, groundwater levels at 3 out of 11 RMWs in the monitoring network for interconnected surface water were below the MTs. Two of these are along the Tuolumne River and one along the Merced River. The GSAs have recognized the need for improvements to this monitoring network and have planned for additional monitoring wells to support GSP implementation, with installation having begun in the fall of 2024.

This Annual Report provides an update on GSP implementation progress, as reported by the GSAs and/or their member agencies.

In January 2024, the GSAs received notification that DWR determined the GSP to be incomplete. DWR had identified two deficiencies in the original GSP that required more provision of information: the selection of SMC for the chronic lowering of groundwater levels and details on projects and management actions to mitigate overdraft. The GSAs successfully worked in consultation with DWR to develop corrective actions for these deficiencies and submitted the revised GSP on July 12, 2024. The Revised GSP was accepted by DWR on February 27, 2025.

During WY 2024, the GSAs and associated member agencies in the Subbasin conducted monitoring events in Fall 2023 and Spring 2024, continued public outreach and hosted a number of workshops on pumping management, projects and fees.

Significant work toward implementation, including projects to improve water supplies and increase recharge, was completed by the GSAs. During WY 2024, WTSGSA delivered treated Tuolumne River water in lieu of groundwater use for the City of Ceres and the City of Turlock's urban use as part of the Regional Surface Water Supply Project (GSP Project No. 1). Replenishment water was delivered from TID to ETSGSA for in lieu recharge (GSP Project No. 9) at an all-time high rate of 5,800 acre-feet. ETSGSA also conducted planning and feasibility studies for several demand reduction, surface water delivery and recharge projects. A reduction of pumping occurred within WTSGSA as a result of increased water captured at the Ceres Main Regulating Reservoir, and land fallowing within ETSGSA increased by approximately 1,600 acres during WY 2024, to a total of approximately 6,200 acres.

In 2024, the GSAs completed the MT Exceedance Action Plan, which provides a systematic action plan for responding to MT exceedances. The GSAs began development of a Well Mitigation Plan as part of the Revised GSP process, which was adopted in January 2025 and will be implemented by July 2025. The Well Mitigation Program will provide mitigation for drinking water wells that have experienced adverse impacts due to declining groundwater levels during the SGMA implementation period.

In 2024, ETSGSA developed and began implementation of a Groundwater Demand Reduction Program adopted as part of the Revised GSP. As part of the Demand Reduction Program, ETSGSA began development of a Multi-Benefit Land Repurposing Program with an $8.89 million grant awarded by the California Department of Conservation (DOC). With significant public input, ETSGSA also developed a framework for a Groundwater Use Fee under the adopted Groundwater Use Reduction Plan to fund the necessary projects and management actions, and initiated a Proposition 218 process to adopt the fee in early 2025. ETSGSA also began development of rules and regulations regarding groundwater use measurement, reporting and regulation, and developed a Groundwater Accounting Platform internet portal to allow tracking and management of groundwater use by the GSA and

growers. Further development of rules and regulations topics regarding credits and transfers are to be evaluated and developed in 2025

In July 2024, a Groundwater Accounting Structure Agreement between WTSGSA and ETSGSA was approved. This agreement will reduce overdraft in ETSGSA, provide for the use and payment for decreasing amounts of transitional water to ETSGSA by TID, provide replenishment water to ETSGSA when available to offset groundwater use, and use revenue from the use of transitional water under the agreement towards groundwater sustainability projects. This Agreement will allow for efficient collaboration between WTSGSA, TID and ETSGSA to achieve Subbasin sustainability.

1 INTRODUCTION

The Turlock Subbasin Groundwater Sustainability Plan (GSP or Plan) was submitted to the Department of Water Resources (DWR) on January 28, 2022, and on January 18, 2024, was determined to be incomplete (DWR, 2024). In 2024, the GSAs received an "Incomplete" determination from DWR. The primary issues involved quantification of potential effects of chronic lowering of groundwater and provision of additional information on projects and management actions. In July 2024, the GSAs submitted the Revised GSP, which addressed these issues with an analysis of impacts on wells of additional water level declines and with detailed documentation of implementation (described in Section 11). On February 27, 2025, DWR completed its review of the Revised GSP and released its approval of the GSP, finding that the sufficient action had been taken to correct deficiencies previously identified by DWR, such that the GSP satisfies the objectives of the Sustainable Groundwater Management Act (SGMA), and substantially complies with GSP Regulations.

This Revised GSP is not a GSP update, which will be submitted in January 2027. As documented in this Annual Report, the GSAs have continued to implement the GSP, in communication with DWR and responsive to DWR staff assessments and recommendations incorporated in the Revised GSP. An important part of ongoing GSP implementation is development of the GSP Annual Reports. The First, Second, and Third GSP Annual Reports were submitted to the DWR in 2022, 2023, and 2024, respectively. This Fourth GSP Annual Report (Annual Report) is being submitted to the DWR by April 1, 2025, in accordance with regulatory requirements.

This Annual Report is being prepared jointly by the West Turlock Subbasin Groundwater Sustainability Agency (WTSGSA) and the East Turlock Subbasin Groundwater Sustainability Agency (ETSGSA). Collectively, these two GSAs have been deemed exclusive GSAs and cover the entire Subbasin. The Annual Report covers the entire Turlock Subbasin as defined by DWR (5-22.03) and addresses groundwater and surface water conditions during Water Year (WY) 2023. The Turlock Subbasin and GSA boundaries are shown on **Figure 1-1**.

1.1 PURPOSE AND TIMING OF THE FOURTH ANNUAL REPORT

Annual reporting, required by the GSP regulations, provides an opportunity to update DWR and stakeholders on the state of the Subbasin relative to sustainability and to describe how the GSP is being implemented in a manner that will achieve the Subbasin Sustainability Goal. This Annual Report is being prepared under the guidance of Water Code Section 10728 and GSP regulations (in particular, 23 CCR, Article 7, §§356, *et seq*.) and generally follows the organization of the regulations to facilitate DWR review.

GSP regulations require an annual report that describes water conditions for the preceding water year to be submitted by April 1 of each year following GSP adoption (23 CCR §356.2). This Fourth Annual Report covers WY 2024, extending from October 1, 2023, to September 30, 2024 (reporting period).

Certain historical datasets are included to illustrate conditions prior to WY 2024. Specifically, regulations require groundwater elevation hydrographs and annual changes in groundwater storage to be based on "historical data to the greatest extent available including from January 1, 2015, to the current reporting year" (23 CCR §356.2 (b)(1)(B) and §356.2 (b)(5)(B)).

GSP implementation activities are underway. The GSAs and their member agencies have made progress on GSP Implementation Support Activities (ISAs), as well as projects and management actions (PMAs), as summarized in **Section 11** of this report.

1.2 APPROACH

For this fourth Annual Report, the GSAs have updated the local version of the California Central Valley Groundwater-Surface Water Simulation Model for the Turlock and Modesto subbasins (C2VSimTM) for WY 2024. This integrated water resources model was derived from the DWR regional C2VSim model and modified with local data from the Turlock and Modesto subbasins for application to GSPs in each of these subbasins. The model was updated for this Annual Report and is an integral tool to support meeting regulatory requirements for the historical period and to support ongoing evaluations in the Subbasin. It also supports ongoing coordination with the hydraulically connected Modesto Subbasin to the north, the Merced Subbasin to the south, and the Delta-Mendota Subbasin to the west.

The updated model provides the best currently available methodology for consistent estimates of changes in groundwater in storage (including comparison to historical estimates), groundwater extractions, and streamflow changes during these early stages of GSP implementation. A detailed description of the model update, including the datasets used, is provided in **Section 2**.

In addition to the model update, data from the various GSP monitoring networks were compiled for the Annual Report. Groundwater elevation hydrographs were prepared for the representative monitoring wells (RMWs) and compared to the GSP's sustainable management criteria. Groundwater elevation monitoring for Fall 2023 and Spring 2024 is the focus for GSP compliance in this Annual Report.

Significant data compilation and analyses were conducted for this fourth Annual Report as summarized below:

- compilation of groundwater level, groundwater quality, groundwater use, climate, land use, and subsidence data sets for WY 2024 from member agencies, state agencies, and other sources,
- update of the C2VSimTM integrated water resources model through WY 2024 to support ongoing analyses,
- preparation of groundwater elevation hydrographs for RMWs from WY 1991 through WY 2024 and comparison to sustainable management criteria,

- development of groundwater elevation contour maps for the seasonal low (Fall 2023) and high (Spring 2024) groundwater levels in each principal aquifer,
- tabulation of groundwater extractions, surface water supply, and total water use data for WY 2024 using DWR water use templates,
- mapping of groundwater extractions illustrating volumes and general locations (using results from C2VSimTM for preparation of the required maps),
- update of the analysis of water budgets, including graphical representations of annual and cumulative changes in groundwater in storage from WY 1991 through WY 2024,
- mapping of presentation of changes in groundwater in storage for WY 2024,
- additional analysis of sustainability indicators including:
    - degraded water quality analysis for WY 2024,
    - land subsidence analysis of groundwater elevations and sustainable management criteria; screening analysis of InSAR data for WY 2024, and
    - interconnected surface water and streamflow depletion analysis for WY 2024 using the updated C2VSimTM local model, and
- documentation of GSP implementation support activities and descriptions of progress on projects and management actions.

1.2.1 Data Compilation

Data were compiled from numerous sources. Climate data, water quality, land use, and remote sensing data were compiled primarily from state agencies and other public resources. Much of the groundwater level, surface water supply, groundwater extractions, and total water use information was provided by GSA member agencies, which are shown on **Figure 1-2** for reference. Specific data compiled for each of the required elements and analyses are further described in the relevant sections of the Annual Report.

1.2.2 DWR Water Use Templates

DWR has provided Microsoft Excel© templates to GSAs for reporting Subbasin-wide groundwater extraction and measurement methods, surface water supplies, and total water use; these templates support consistent statewide data reporting. Completed templates are being uploaded onto the Sustainable Groundwater Management Act (SGMA) online portal. Each template and associated data are also described in the Annual Report as summarized below:

- **Part A. Groundwater Extractions** – Description of groundwater extractions by water use sector data (23 CCR §356.2(b)(2)) is presented in **Section 4**.
- **Part B. Groundwater Extraction Methods** – Description of groundwater extraction measurement methods (23 CCR §356.2(b)(2)) is presented in **Section 4**.

- **Part C. Surface Water Supply** – Description of surface water supply by water source type (23 CCR §356.2(b)(3)) is presented in **Section 5.**
- **Part D. Total Water Use** – Description of total water supply and use (23 CCR §356.2(b)(4)) is presented in **Section 6**.

The summary in the text contains a more complete discussion of water supplies and source types for the Turlock Subbasin than provided in the templates.

1.2.3 Progress on GSP Implementation

As required by the regulations, **Section 11** describes progress on GSP implementation. The section includes a summary of ongoing GSP implementation support activities and implementation of specific projects and management actions. As demonstrated below, GSP implementation is underway.

1.3 REPORT ORGANIZATION

This Annual Report is organized by required components presented in Article 7 of the GSP regulations. These components include groundwater elevations (**Section 3**), groundwater extractions (**Section 4**), surface water supply (**Section 5**), total water use (**Section 6**), and change in groundwater in storage (**Section 7**). Additional monitoring for sustainable management criteria and focused technical analyses are included for several of the sustainability indicators including degraded water quality (**Section 8**), land subsidence (**Section 9**) and interconnected surface water (**Section 10**). As mentioned above, **Section 11** provides a narrative description of GSP implementation activities.

1.4 LIMITATIONS

Most RMWs have a good historical record but some wells in the network were installed or added during GSP preparation and do not have long historical records. For this reason, Minimum Thresholds, Measurable Objectives and Interim Milestones have not yet been developed for several wells that were only recently installed or replaced in the monitoring network and for which sufficient data are not yet available. Updates to the SMCs for several wells for which survey data for nearby wells is necessary are pending in 2025.

In addition, the GSP recognizes that the monitoring networks contain data gaps that are being addressed during the implementation period. Future annual reports will provide a more complete monitoring network, which will be developed over time as indicated in the GSP. Additional wells are planned to be installed in the next several years to address remaining data gaps in the monitoring networks, starting with construction of several monitoring wells funded under DWR's Technical Support Services (TSS) program in late 2024 and 2025.

It is further recognized that, as summarized in the GSP, additional data gaps exist in understanding Subbasin hydrogeologic conditions and are being addressed as

implementation of the GSP proceeds. Addressing these data gaps is expected to lead to updates and refinements to the C2VSimTM model, the Subbasin monitoring networks and applicable sustainable management criteria, and the development and implementation of additional projects and management actions. These will be reported in annual reports and GSP updates as work progresses.

In addition, and as stated in **Section 2**, the land use in the C2VSimTM model maintains 2015 cropping patterns because of the significant variance between spatial land use data available from the DWR SGMA Data Viewer and local planning documents. The GSAs are planning to refine the land use, as needed, in an upcoming model update. The GSAs are working with LandIQ to obtain local data sets to help inform GSP implementation and potential future model updates.

Notwithstanding these limitations, this report presents an adequate assessment of the current Subbasin groundwater and surface water conditions to inform GSP implementation activities. The Turlock Subbasin GSAs are collectively committed to successful GSP implementation and attainment of Subbasin Sustainability Goals.

1.5 ANNUAL REPORT PREPARATION AND SUBMITTAL

As required by 23 CCR §353.4, this 2024 Annual Report for the Turlock Subbasin is being submitted electronically to DWR through its online reporting system (SGMA Portal) at https://sgma.water.ca.gov/portal/, using forms and submittal instructions provided by DWR (23 CCR §353.2).

This Fourth Annual Report has been prepared by Todd Groundwater and Woodard & Curran on behalf of the Turlock Subbasin GSAs. Oversight and approval of the report on behalf of the GSAs was provided by the Technical Advisory Committees (TACs) appointed by each GSA and GSA management staff. This process was coordinated through the Ad Hoc Committee for the Annual Report, consisting of a subset of members from the two TACs and key staff for the GSAs. In brief, the Ad Hoc Committee informed the report development process, coordinated data requests, reviewed the approach for the technical analyses, and provided overall guidance for Annual Report preparation. The GSA Joint TACs reviewed and commented on the draft Annual Report and provided updates on Annual Report preparation to stakeholders at regular public meetings. Final approval and coordination of Annual Report submittal was conducted under the direction of Plan Manager Michael Cooke.

The Annual Report was presented to GSA member agency representatives, stakeholders, and the public in open meetings of the Joint TACs held on February 11, 2025, and March 11, 2025, prior to submittal to DWR by the April 1, 2025, deadline.

Detailed presentations will be provided at public GSA Board meetings following submittal to DWR. These presentations will provide additional opportunities to update and engage with stakeholders regarding Subbasin conditions and groundwater management activities.

2 C2VSIMTM UPDATE (WATER YEAR 2024)

The C2VSimTM integrated surface water-groundwater model was developed as part of the Turlock Subbasin Groundwater Sustainability Plan to simulate historical and projected hydrologic conditions for the surface, stream, and groundwater systems. The original model used to develop the GSP covered water years 1991-2015 and has subsequently been updated each year during the Annual Report cycle. For the 2024 update, data were collected from federal, state, and local sources. As a result of the model update, an extended historical water budget was produced, including refined estimates for stream-aquifer interaction, pumping, and change in groundwater in storage.

The extension of the historical water budget is intended to verify and further evaluate the aquifer system responses under a variety of hydrologic and anthropogenic conditions. This update is important to the management of the aquifer system as it reflects the conditions and operations of the Subbasin following GSP adoption and submittal. The annual groundwater budget for water years 1991-2024 is presented in **Section 7**.

Data Sources

Data were requested and received from the following urban water suppliers and irrigation districts within the Turlock Subbasin to complete the C2VSimTM update:

Local Water Agencies:

- Turlock Irrigation District
- Merced Irrigation District
- Modesto, City of
- Turlock, City of
- Ceres, City of
- Hughson, City of
- City of Waterford on behalf of the Community of Hickman
- Denair Community Services District
- Delhi County Water District
- Hilmar County Water District
- Keyes Community Services District

Additionally, publicly available data were downloaded from the following sources to complete the C2VSimTM update:

- DWR SGMA Data Viewer
- DWR California Data Exchange Center (CDEC)
- California Irrigation Management Information System (CIMIS)
- California State Water Resources Control Board (SWRCB)
- Oregon State University Climate Group (OSU)
- United States Natural Resources Conservation Service (NRCS)
- United States Geological Survey (USGS)
- United States Census Bureau

It should be noted that the model was also updated to include data in the Modesto Subbasin as part of the Modesto Subbasin WY 2024 Annual Report. The details of the model update for the Modesto Subbasin are documented in their Annual Report.

2.1 UPDATED COMPONENTS

The data needed to update the historical model to reflect the most recent conditions was acquired from the sources summarized above. The following components of the model were updated for the 2024 Annual Report.

Precipitation: Monthly precipitation in the Subbasin and its watersheds was derived on a four-kilometer grid using the Precipitation-Elevation Regressions on Independent Slopes Model (PRISM) dataset available online from Oregon State University, through a partnership with the U.S. Natural Resources Conservation Service (NRCS) National Water and Climate Center.

Evapotranspiration: Crop evapotranspiration (ET_C), or crop consumptive use, represents the volume of water that is lost to the atmosphere through both evaporation from the soil and transpiration from crop surfaces. Monthly ET_C for each land use category was calculated based on the sum product of local crop coefficients (K_C) and monthly reference evapotranspiration (ET_O). ET_O for the 2024 water year was calculated from the California Irrigation Management Information System (CIMIS) stations located in Modesto (#71) and Denair (#206).

Land Use: Each element within the C2VSimTM is composed of some fraction of 24 land use categories, including 20 agricultural crops, refuge, native vegetation, riparian vegetation, and urban. For the 2024 update, spatial land use data was downloaded from the DWR SGMA Data Viewer but were found to have significant variance when evaluated against local planning documents. As a result, the C2VSimTM maintains 2015 cropping patterns. The GSAs are planning to refine the land use, as needed, in an upcoming model update. Both GSAs are working with LandIQ to obtain local datasets that may be used to help inform this process.

Population: The population for each municipality was provided by that municipality for WY 2024. For the model development in the GSP, rural populations were extracted from census block data. However, at the time of data collection, these had not yet been updated by the US Census for 2024. For this model update, populations were projected based on historical trends and will be revised, if needed, when additional data becomes available.

Surface Water Operations: Monthly surface water flows were provided from October 2023 through September 2024 by Turlock Irrigation District (TID) and Merced Irrigation District (MID). These operational flows included diversions, deliveries, spills, seepage, and evaporative losses. Non-district water, including riparian diversions and recycled water supplies were provided by the California State Water Resources Control Board (SWRCB)

Electronic Water Rights Information Management System (eWRIMS) and the City of Modesto, respectively.

Groundwater Pumping: Pumping in the Turlock Subbasin is represented in the C2VSimTM model through a combination of distributed regional (elemental) and well-specific pumping. Well-specific pumping includes groundwater extractions by urban and agricultural agencies and were reported on a monthly-timestep for WY 2024. Private groundwater production from agricultural wells was derived from an analysis of agricultural land use and climate data to assess crop water demand in excess of reported surface water deliveries provided by TID, MID and riparian diverters. Groundwater pumping from private domestic wells was estimated as the product of population data from the US Census and historical unit water demand information from the C2VSimFG model published by DWR.

Streamflow: Monthly inflow to the Turlock Subbasin from the Tuolumne River was provided by TID and was downloaded for the Merced River and the San Joaquin River from CDEC and the USGS, respectively. Streamflow associated with small tributaries within and adjacent to the Subbasin were estimated using a combination of the Integrated Water Flow Model (IWFM) rainfall-runoff and small-watershed package.

Boundary Conditions: Groundwater elevation contours were downloaded from DWR's SGMA Data Viewer for Fall 2023 and used to update the groundwater elevation boundary conditions in the model. As groundwater level contours are only available in semiannual intervals, intermediary months were estimated though linear interpolation.

2.2 MODELED RESULTS: WY 2024 GROUNDWATER BUDGET

Evaluation of the 2024 water year shows that the Turlock Subbasin experienced 443,500 acre-feet (AF) of inflow and 363,000 AF of outflow. Deep percolation from rainfall and applied irrigation water (252,400 AF) is the largest contributor of groundwater inflow, followed by recharge from the irrigation canals and regulating reservoir system (93,600 AF), subsurface inflows from adjacent subbasins and the Sierra Nevada foothills (79,000 AF), and inflow from the stream system (18,500 AFY). Groundwater extractions (363,000 AF) account for the greatest outflow from the Turlock Subbasin. In WY 2024, the Turlock Subbasin experienced a storage increase of 80,600 AF.

3 GROUNDWATER ELEVATIONS

Historical groundwater elevations for GSP representative monitoring wells (RMWs) in the Turlock Subbasin have been compiled for the 2024 Annual Report for the following purposes:

- Preparation of groundwater level hydrographs to illustrate long-term trends and seasonal fluctuations and to compare groundwater levels to sustainable management criteria (included in **Appendix B**).
- Development of groundwater elevation contour maps for Turlock Subbasin principal aquifers illustrating the seasonal high and low groundwater levels during the reporting period (i.e., Fall 2023 and Spring 2024).

3.1 GROUNDWATER ELEVATION MONITORING NETWORK

The Turlock Subbasin GSAs developed monitoring networks for the five sustainability indicators applicable to the Subbasin[1]. Groundwater elevations are being used to define sustainable management criteria for four of the five sustainability indicators. In addition to the chronic lowering of groundwater levels, groundwater elevations were indicated in the GSP to be an appropriate proxy for reduction of groundwater in storage, land subsidence, and depletion of interconnected surface water. The use of groundwater levels as a proxy is subject to reconsideration in the 2027 GSP Update, when additional data and analyses will be available. Degraded water quality is the only applicable indicator that does not rely directly on groundwater elevations to define minimum thresholds (MTs) and measurable objectives (MOs). This reliance on groundwater elevations emphasizes the importance of the groundwater elevation monitoring network for GSP implementation.

Monitoring networks and groundwater elevation data are discussed for each principal aquifer in the Annual Report. As explained in the GSP, three principal aquifers have been identified for the Turlock Subbasin as listed in **Table 3-1**.

Table 3-1: Principal Aquifers in the Turlock Subbasin

Principal Aquifer	Subbasin Area
Western Upper Principal Aquifer	Western Subbasin above the Corcoran Clay
Western Lower Principal Aquifer	Western Subbasin below the Corcoran Clay
Eastern Principal Aquifer	Central and eastern Subbasin outside of the Corcoran Clay extent

[1] Seawater intrusion was determined to not be present and not likely to occur in the inland Turlock Subbasin (as explained in the Turlock Subbasin GSP, Section 6.5).

The two western principal aquifers lie above and below the Corcoran Clay and occur west of the eastern extent of the Corcoran Clay, which is shown by the dashed red line on the monitoring network maps referenced and described below.

Figures 3-1 through **3-4** illustrate the groundwater elevation monitoring networks and RMWs in each of the three principal aquifers. **Figures 3-1** through **3-3** represent networks for the Western Upper Principal Aquifer, the Western Lower Principal Aquifer, and the Eastern Principal Aquifer, respectively. Collectively, these figures also represent the groundwater elevation monitoring networks for the chronic lowering of groundwater levels, reduction of groundwater in storage, and land subsidence sustainability indicators. As explained in the GSP, monitoring sites are identical for these three sustainability indicators. **Figure 3-4** shows the groundwater elevation monitoring network for interconnected surface water and includes monitoring sites in both the Western Upper Principal Aquifer and the Eastern Principal Aquifer. A summary of these RMWs is provided on **Table 3-2**.

Four RMW clusters have been approved for construction by DWR under the TSS program (labeled "TSS Wells" on **Figures 3-3** and **3-4**). Locations for these wells have been selected in consultation with DWR based on access constraints and optimal locations to address the remaining data gaps in the existing monitoring networks. Installation of these wells commenced in late 2024 and will be completed in 2025 as DWR resources become available. The final set of wells is expected to be installed in the fall of 2025, after the nesting season for sensitive bird species. In addition, the GSAs are planning to construct up to 30 additional monitoring wells to fill data gaps in the monitoring networks. WTSGSA plans to install four to six of these wells during 2025. These future monitoring well locations are not shown on **Figures 3-1 through 3-4** but will be added to these maps once the wells are constructed and incorporated into the monitoring networks.

Each RMW label on the network maps (**Figures 3-1** through **3-4**) includes the MT and MO that have been assigned to each, as applicable. MTs and MOs have not yet been assigned to the RMWs that were installed in late 2021 and early 2022 with Proposition 68 funding from DWR because water level data are insufficient to set appropriate criteria at this time (**Figures 3-1** through **3-3**). ETSGSA has begun a systematic review of water level and hydrogeologic data to develop SMC at these wells, and the criteria are expected to be assigned in the WY 2025 Annual Report. SMC for several wells that were resurveyed by ETSGSA in 2023 are also being revised as discussed in **Section 3.3.1**.

Groundwater elevations are currently being monitored by various member agencies of the WTSGSA and by ETSGSA according to the adopted monitoring protocols documented in the Turlock Subbasin GSP. In accordance with these monitoring protocols, groundwater levels

Table 3-2: Representative Monitoring Network Wells

Well ID	Site Code	State Well Number	Station Code	Existing Well (Y/N)	Well Use / Status	Principal Aquifer	WTSGSA	ETSGSA	Latitude (NAD 83)	Longitude (NAD 83)	Well depth (ft bgs)	Screen Interval Depths (feet bgs)	Ground Surface Elevation (feet)	Reference Point Elevation (feet)	Minimum Threshold (MT)	Measurable Objective (MO)	Interim Milestone (IM)	Changes
Representative Monitoring Network Wells, Chronic Lowering of Groundwater Levels																		
TID 010	375360N1208841W001	05S10E04D001M	6516	Y	active drainage well	Western Upper	x		37.536582	-120.884755	45	0.5-25	99	100.79	63	69	53	
TID 018	375746N1208835W001	04S10E21E001M	3763	Y	active drainage well	Western Upper	x		37.5746	-120.8835	250	0.5-110	104.38	104.38	44	65		
TID 022	375441N1209343W001	04S09E36E001M	3031	Y	active drainage well	Western Upper	x		37.543932	-120.93413	49	0.5-27	86	88.69	52	64		
TID 048	375366N1209852W001	05S09E04C001M	4930	Y	active irrigation well	Western Upper	x		37.5366	-120.9852	110	0.5-87	67.43	67.43	36	47		
TID 061A	374527N1209768W001	05S09E33R001M	5643	Y	active drainage well	Western Upper	x		37.452717	-120.976569	225	0.5-195	63	64.61	40	49		
TID 063	375224N1210196W001	05S09E07B001M	4935	Y	active drainage well	Western Upper	x		37.5224	-121.0196	110	0.5-71	56.41	56.41	37	45		
TID 083	374305N1209321W001		48497	Y	active drainage well	Western Upper	x		37.430525	-120.931035	155	50-145	71	74.56	62	64		
TID 085B	374177N1207888W001	06S11E17C001M	28534	Y	active drainage well	Western Upper	x		37.41791	-120.787941	172	0.5-80	104	109.08	85	93		
TID 106	374891N1209810W001	05S09E21B001M	5630	Y	active drainage well	Western Upper	x		37.4891	-120.981	157	0.5-100	64.37	64.37	49	54		
TID 111	375607N1210671W001	04S08E27H001M	2176	Y	active irrigation well	Western Upper	x		37.561133	-121.06675	212	0.5-164	57	60.1	26	36		
TID 113A	374146N1208602W002	06S10E15F002M	6602	Y	active drainage well	Western Upper	x		37.414468	-120.860359	136	0.5-136	91	92.04	81	84	76	
TID 118	374296N1208907W001	06S10E08H001M	5909	Y	active drainage well	Western Upper	x		37.42986	-120.890656	242	0.5-105	81	81.29	65	69		
TID 136A	374507N1207741W001	05S11E33N003M	27312	Y	active drainage well	Western Upper	x		37.4507	-120.7741	115	0.5-43	117.32	117.32	79	88	76	
TID 139	375796N1210124W001	04S09E19A001M	2877	Y	active drainage well	Western Upper	x		37.5796	-121.0124	280	0.5-65, 78-189	74.42	74.42	40	53		
TID 191	375738N1209271W001	04S09E24G001M	26403	Y	active drainage well	Western Upper	x		37.573102	-120.92678	245	0.5-192	93	93.67	53	60		
TID 199A	374493N1208354W001	05S10E35Q001M	7237	Y	active drainage well	Western Upper	x		37.4493	-120.8354	60	40-52	97.3	98.3	88	92		
WTS-1 Shallow	374629N1209301W001		57362	Y	monitoring well	Western Upper	x		37.4629666	-120.930187	185	160-180	79	80.8				
WTS-2 Shallow	373973N1209044W001		57364	Y	monitoring well	Western Upper	x		37.397383	-120.904422	145	120-140	81	78.6				
Smyrna Park 4/233	375987N1209453W001		57315	Y	monitoring well	Western Lower	x		37.59878	-120.94533	233	218-228	98	100.4	20	30	10	
Denair NW-11 287	375145N1208073W001		57316	Y	monitoring well	Western Lower	x		37.514561	-120.807375	287	257-287	116.72	116.72	21	29		
Ferreira Ranch Park MW-347	375349N1208555W001		57317	Y	monitoring well	Western Lower	x		37.53495076	-120.855545	347	332-342	106	106	20	29		
SWW Reservoir MW-335	374887N1208756W001		57318	Y	monitoring well	Western Lower	x		37.48875726	-120.875632	335	320-330	89	89	20	27		
Blum 3-1	373877N1208027W001	06S11E30B008M	57319	Y	monitoring well	Western Lower	x		37.38773333	-120.802753	185	170-180	90.6	90.6	55	65		
MW-68A	374499N1207220W001		57366	Y	monitoring well	Western Lower		x	37.449966	-120.722067	160	148-158	146.88	148.94				
WTS-1 Deep	374629N1209302W001		57363	Y	monitoring well	Western Lower	x		37.46297	-120.93025	340	320-340	79	80.7				
WTS-2 Deep	373973N1209045W001		57365	Y	monitoring well	Western Lower	x		37.39737	-120.90457	295	280-290	81	78.5				

Table 3-2: Representative Monitoring Network Wells

Well ID	Site Code	State Well Number	Station Code	Existing Well (Y/N)	Well Use / Status	Principal Aquifer	WTSGSA	ETSGSA	Latitude (NAD 83)	Longitude (NAD 83)	Well depth (ft bgs)	Screen Interval Depths (feet bgs)	Ground Surface Elevation (feet)	Reference Point Elevation (feet)	Minimum Threshold (MT)	Measurable Objective (MO)	Interim Milestone (IM)	Changes
TID 175	375774N1207702W001	04S11E21D001M	5396	Y	active drainage well	Eastern	x		37.5774	-120.7702	180	36-120	151.36	151.36	36	56	31	
NE Storm Basin MW-340	375363N1208260W001		57323	Y	monitoring well	Eastern	x		37.53633129	-120.826089	340	325-335	116	116	45	70	20	
ETSGSA-01	376238N1206641W001	03S12E33N001M	57324	Y	inactive pumping well	Eastern		x	37.623842	-120.664148	445	223-445	193.89	197.52	60	86	38	
ETSGSA-02	376214N1205321W001	04S13E03D002M	57325	Y	active domestic well	Eastern		x	37.621302	-120.53268	350	250-310, 330-350	248.6	249.18	131	136	121	IM,MO,MT adjusted Jan 2025 - ETSGSA
ETSGSA-04	375681N1206945W001	04S12E19P001M	57339	Y	non-pumping irrigation well	Eastern		x	37.568125	-120.694495	370	90-370	248.47	252.23	-2	22	-14	IM,MO,MT adjusted Jan 2025 - ETSGSA
ETSGSA-05	375220N1207076W001	05S11E01Q001M	57326	Y	active domestic well	Eastern		x	37.521999	-120.707637	375	275-375	192.57	193.89	-5	24	-17	
ETSGSA-06	376013N1206863W001	04S12E07J001M	6816	Y	non-pumping irrigation well	Eastern		x	37.600904	-120.686178	375	120-244	191.73	195.2	30	56	11	
ETSGSA-08	375547N1206273W001	04S12E26M001M	57327	Y	active pumping fertigation well	Eastern		x	37.554709	-120.622813	658	188-474	255.77	257.87	15	42	5	IM,MO,MT adjusted Jan 2025 - ETSGSA
ETSGSA-09	375655N1205721W001	04S13E20N001M	57328	Y	non-pumping irrigation well	Eastern		x	37.565551	-120.572168	334	180-330	305.36	309.02	45	78	20	IM,MO,MT adjusted Jan 2025 - ETSGSA
ETSGSA-12R	375436N1204878W001	04S13E36G003M	59504	Y	non-pumping irrigation well	Eastern		x	37.543696	-120.48785	411	292-411	289.37	289.61				
ETSGSA-13	374815N1207537W001	05S11E22M001M	57340	Y	non-pumping irrigation well	Eastern		x	37.481496	-120.753773	600	300-600	172.6	176.34	30	47	26	
ETSGSA-14	374849N1206425W001	05S12E22F001M	57329	Y	non-pumping irrigation well	Eastern		x	37.484937	-120.642438	685	187-598, 602-685	219.98	223.72	14	47	-6	
ETSGSA-20	375359N1205282W001	05S13E03B001M	57331	Y	non-pumping irrigation well	Eastern		x	37.53593	-120.52823	580	125-580	202	205.7	55	97	14	
ETSGSA-21	375205N1204989W001	05S13E12D001M	57332	Y	non-pumping irrigation well	Eastern		x	37.520584	-120.498979	283	57-283	300.97	304.73	133	173	89	IM,MO,MT adjusted Jan 2025 - ETSGSA
EW3	374775N1207029W001	05S12E19N001M	57334	Y	monitoring well	Eastern		x	37.477573	-120.70295	170	130-170	161.23	163.73	10	37	-1	
Olam R2-4	375969N1205138W001	04S13E11N001M	57335	Y	irrigation well	Eastern		x	37.596959	-120.513878	1680	445-930, 1459-1680	253.17	254.29	79	114		
MW-68B	375946N1206458W001		57367	Y	monitoring well	Eastern		x	37.594534	-120.637417	395	332-342	203.29	205.05				
MW-68C	375392N1205219W001		57368	Y	monitoring well	Eastern		x	37.539238	-120.521983	195	180-190	200.5	201.89				

Table 3-2: Representative Monitoring Network Wells

Well ID	Site Code	State Well Number	Station Code	Existing Well (Y/N)	Well Use / Status	Principal Aquifer	WTSGSA	ETSGSA	Latitude (NAD 83)	Longitude (NAD 83)	Well depth (ft bgs)	Screen Interval Depths (feet bgs)	Ground Surface Elevation (feet)	Reference Point Elevation (feet)	Minimum Threshold (MT)	Measurable Objective (MO)	Interim Milestone (IM)	Changes
Interconnected Surface Water - San Joaquin River																		
TID 061A	374527N1209768W001	05S09E33R001M	5643	Y	active drainage well	Western Upper	x		37.4527	-120.977	225	0.5-195	63	64.61	40	49		
TID 063	375224N1210196W001	05S09E07B001M	4935	Y	active drainage well	Western Upper	x		37.5224	-121.02	110	0.5-71	56.41	56.41	37	45		
TID 111	375607N1210671W001	04S08E27H001M	2176	Y	active irrigation well	Western Upper	x		37.5611	-121.067	212	0.5-164	57	60.1	26	36		
Interconnected Surface Water - Tuolumne River																		
Ceres 36	376208N1209616W001		57314	Y	non-pumping irrigation well	Western Upper	x		37.6208	-120.962	230	120-230	92.7	94.6	31	36	26	
ETSGSA-01	376238N1206641W001	03S12E33N001M	57324	Y	inactive pumping well	Eastern		x	37.6238	-120.664	445	223-445	193.89	197.52	60	86	38	
ETSGSA-02	376214N1205321W001	04S13E03D002M	57325	Y	active domestic well	Eastern		x	37.6213	-120.533	350	250-310, 330-350	248.6	249.18	131	136	121	IM,MO,MT adjusted Jan 2025 - ETSGSA
Interconnected Surface Water - Merced River																		
TID 303	373968N1208146W001		48499	Y	active irrigation well	Western Upper	x		37.3967	-120.813	317	.5-100	102	99.33	85	89		
ETSGSA-14	374849N1206425W001	05S12E22F001M	57329	Y	non-pumping irrigation well	Eastern		x	37.4849	-120.642	685	187-598, 602-685	219.98	223.72	14	47	-6	
ETSGSA-17	374730N1205961W001	05S12E25H001M	57330	Y	non-pumping irrigation well	Eastern		x	37.4731	-120.596	390	146-178, 182-390	216.28	220.02	95	99	85	IM,MO,MT adjusted Jan 2025 - ETSGSA
ETSGSA-21	375205N1204989W001	05S13E12D001M	57332	Y	non-pumping irrigation well	Eastern		x	37.5206	-120.499	283	57-283	300.97	304.73	137	177	89	IM,MO,MT adjusted Jan 2025 - ETSGSA
ETSGSA-23	374416N1206561W001	06S12E04G001M	57333	Y	active pumping well - home and field	Eastern		x	37.4417	-120.656	228	132-212	174.87	178	71	78	61	IM,MO,MT adjusted Jan 2025 - ETSGSA
TSS-4				N											86	100		

were measured in most of the RMWs in WY 2024[2]. In addition, most of these measurements occurred within the two time periods established in the GSP monitoring protocols as follows:

- February 1st to April 15th represents the seasonal high groundwater levels.
- October 1st to November 15th represents the seasonal low groundwater levels.

These time periods have been established to provide flexibility for capturing the annual high and low groundwater levels over varying hydrologic and site access conditions. GSAs coordinate each monitoring event across the Subbasin within a relatively narrow window of the larger time periods above, as practical, based on then-current conditions and anticipated irrigation schedules and surface water deliveries. The timing of these activities can vary between wet and dry years to capture the seasonal high and low groundwater levels within the Subbasin and based on site accessibility.

3.2 WATER YEAR TYPE

To provide hydrologic context for the analysis of groundwater elevations over time, the natural hydrologic conditions from WY 1990 to WY 2024 are provided in **Table 3-3**. The water year type is based on the DWR San Joaquin Valley Index and covers the GSP historical Study period and subsequent years through the reporting period.

The water year type indices are also shown by color on **Figure 3-5** along with the annual precipitation data from stations in Turlock and Denair. The water year type is based on a regional runoff analysis conducted by DWR for the San Joaquin River and selected tributaries (including the Tuolumne and Merced rivers) and does not correlate directly to specific precipitation amounts in the Turlock Subbasin. However, a general correlation between precipitation and water year type (shown by color) is illustrated on **Figure 3-5**.

The water year type indices are also shown by color on **Figure 3-5** along with the annual precipitation data from stations in Turlock and Denair. The water year type is based on a regional runoff analysis for the San Joaquin River and selected tributaries (including the Tuolumne and Merced rivers) and does not correlate directly to specific precipitation amounts in the Turlock Subbasin. However, a general correlation between precipitation and water year type (shown by color) is illustrated on **Figure 3-5**.

[2] As summarized on Table 3-5, water level measurements were not made at TID 010 (Fall 2023 and Spring 2024), TID 061A (Fall 2023), TID 083 (Fall 2023) and TID 106 (Fall 2023)

Table 3-3: San Joaquin Valley Water Year Index

Water Year	Water Year Type San Joaquin Valley Water Year Index	Water Year*	Water Year Type San Joaquin Valley Water Year Index
1990	Critically Dry	**2008**	Critically Dry
1991	Critically Dry	**2009**	Below Normal
1992	Critically Dry	**2010**	Above Normal
1993	Wet	**2011**	Wet
1994	Critically Dry	**2012**	Dry
1995	Wet	**2013**	Critically Dry
1996	Wet	**2014**	Critically Dry
1997	Wet	**2015**	Critically Dry
1998	Wet	**2016**	Dry
1999	Above Normal	**2017**	Wet
2000	Above Normal	**2018**	Below Normal
2001	Dry	**2019**	Wet
2002	Dry	**2020**	Dry
2003	Below Normal	**2021**	Critically Dry
2004	Dry	**2022**	Critically Dry
2005	Wet	**2023**	Wet
2006	Wet	**2024**	Above Normal
2007	Critically Dry		

**Water Year is from October 1 through September 30.*

As described in the GSP, the period WY 1990 through WY 2015 includes a representative range of hydrologic conditions and is characterized by a series of wet and dry periods over a relatively long time interval (see **Table 3-3** and **Figure 3-5**). Since 2015, the water year types indicate a series of intervening wet/dry years, followed by an above normal year in WY 2024. With continued pumping and in the absence of consecutive wet years, overall groundwater elevations in some areas have continued to decline (from fall to fall), especially in the eastern portion of the Subbasin. Most of the monitoring wells in the western and central portions of the Subbasin experienced increases in groundwater levels in the last two years corresponding with a wet and above normal year, and the increased availability of surface water.

3.3 GROUNDWATER ELEVATIONS WY 1991 – WY 2024

Available groundwater level data from RMWs through WY 2024 have been compiled in DWR groundwater level templates and uploaded onto the SGMA portal. The data were used to develop hydrographs for this Annual Report. All monitoring data is stored in the Turlock Subbasin Data Management System (DMS). A summary of RMWs is presented in **Table 3-2**. Groundwater level data measured during WY 2024 are provided in **Appendix A**.

3.3.1 ETSGSA Reference Point Elevation and Sustainability Management Criteria Update

In April 2023, ETSGSA conducted a Global Navigation Satellite Systems (GNSS) survey of wells in their groundwater monitoring network. Reference point (RP) elevations and ground surface elevation (GSE) measurements were collected at each accessible location. A total of 44 wells were surveyed of the 45 wells in their monitoring network. The GNSS survey was conducted in accordance with the DWR guidance document titled "Sustainable Groundwater Management Program Monitoring Protocols, Standards, and Sites BMP," dated December 2016. One well, ETSGSA-20, was not accessible during the survey period because the access roads to the well were flooded and will be surveyed at a future date. The New RPs were used to calculate Spring 2023 data in the WY 2023 Annual Report.

The reference points collected during the monitoring network survey differed from previous reference points. The use of inaccurate RPs affects past WSE data and SMCs developed in the GSP. During 2024, ETSGSA conducted a review of historic RP elevations used in groundwater level monitoring to identify if physical changes at the monitoring wells had occurred and adjust the WSE data to reflect accurate RP elevations (**Appendix C**). The review identified 11 wells at which a riser pipe had been installed, which increased the physical RP by about a foot. The WSE data were updated for re-surveyed ETSGSA wells, with approximate RP elevations used for historical data with physical RP changes.

Following the update of WSE data and in communication with DWR, ETSGSA updated the SMC (MTs, MOs, and IMs) for seven RMWs (ETSGSA-02, -04, -08, -09, -17, -21, -23) to correct for RP elevation inaccuracies. The SMCs at three additional wells were found not to require modification and the SMCs at five wells will be updated after nearby wells area surveyed in 2025. The process to determine the new SMCs is outlined in **Appendix C**. These new SMCs are shown in Figures **3-2** through **3-14,** listed in **Table 3-4**, and compared to observed conditions in **Table 3-5**, and in the hydrographs in **Appendix B.**

3.3.2 Hydrograph Development

Groundwater elevation data described above were used to generate hydrographs for the RMWs. GSP regulations require that hydrographs use historical data to the greatest extent available, including from January 1, 2015, to the current reporting year (23 CCR §356.2(b)(1)(B)). For the 2024 Annual Report for the Turlock Subbasin, the time period from WY 1991 through WY 2024 (reporting period) was selected to meet GSP requirements and allow for consistent hydrograph development. As described previously, this 33-year period includes the historical Study period from the GSP (WY 1991 – WY 2015) and extends through the reporting period (WY 2016 – WY 2024).

Many of the RMWs do not have complete historical data for this entire time period. However, all hydrographs were developed with consistent horizontal scales to capture any water level data during the period and to facilitate comparisons of hydrographs across the Subbasin.

For this 2024 Annual Report, 55 hydrographs were developed and are presented in a consistent format in **Appendix B**. Hydrographs are organized into two groups: a) RMWs in the monitoring network for chronic lowering of groundwater levels, reduction of groundwater in storage, and land subsidence (44 hydrographs), and b) RMWs in the monitoring network for depletions of interconnected surface water (11 hydrographs). Hydrographs are not included for RMWs that were not yet installed during the reporting period (i.e., the four TSS wells and other new monitoring wells to be installed as described in **Section 3.1** above).

For each hydrograph, a solid black horizontal line shows the ground surface elevation (GSE). The MT is represented by a horizontal orange line, the MO is represented by a green line, and for wells with the 2027 Interim Milestone (IM)set below the MT, the IM is represented by a dashed blue line. Groundwater elevation data are shown in blue.

In compliance with GSP regulations (Article 4), the hydrographs are submitted electronically and labeled with a unique site identification number (State Well Number and Local Well name), and the GSE. In addition, hydrographs have incorporated the same datum and scaling (when practical) (23 CCR §352.4(e)). Horizontal scales are identical. Some vertical scales are adjusted to allow the GSE, MT, and MO to be displayed (**Appendix B**).

3.3.3 Groundwater Level Trends and Fluctuations

Figure 3-6 shows selected RMW hydrographs to illustrate long-term trends and seasonal fluctuations with examples from wells in the Western Upper Principal Aquifer and the Eastern Principal Aquifer. Hydrographs for the Western Lower Principal Aquifer are not included in this figure because there is less historical groundwater level data to show representative trends. However, all hydrographs are provided in **Appendix B.**

Historical trends and fluctuations throughout the Subbasin were discussed in detail in the GSP, including a recognition that historical low groundwater levels generally occurred around 2015, coinciding with the 2012-2016 drought. That discussion is incorporated by reference herein with summaries provided below as needed for historical context.

3.3.3.1 Western Upper Principal Aquifer

After the 2012-2016 drought, groundwater levels in the Western Upper Principal Aquifer recovered from historical low levels. But, in the dry conditions of WY 2020 and critically dry conditions of 2021 and 2022, groundwater levels again declined. However, groundwater levels at many of the Western Upper Principal Aquifer recovered to pre-2020 levels after the wet conditions of WY 2023. The Above Normal conditions of WY 2024 allowed these trends to further increase or stabilize. As shown on **Figure 3-6**, groundwater levels at TID 048 (in the central area of the Western Upper Principal Aquifer) recovered more than 20 feet after the 2012-2016 drought but then declined more than 17 feet since the Fall 2019 measurement. Wet conditions in WY 2023 and Above Normal conditions in WY 2024 caused groundwater level recovery, and levels rose above the MT. This is also observed in TID 018. In TID 136A, water levels continued to rise above the IM and toward the MO. Similar

patterns of post-drought recovery followed by additional recent declines and recovery are prevalent throughout the Western Upper Principal Aquifer (see hydrographs for the Western Upper Principal Aquifer in **Appendix B**).

3.3.3.2 Eastern Principal Aquifer

Figure 3-6 shows five representative hydrographs for the Eastern Principal Aquifer. The periods of record for hydrographs in the Eastern Principal Aquifer are variable in length and frequency of measurement (see **Appendix B**); nonetheless, the groundwater level data are sufficient to exhibit seasonal fluctuations and to illustrate a general long-term declining trend. As illustrated by the hydrograph for TID 175 in the western area of the Eastern Principal Aquifer (see **Figure 3-6**), groundwater levels were relatively stable during the 2017 to 2020 post-drought period but declined below the MT during WY 2021 and below the IM in WY 2022. In WY 2023 and 2024, a modest recovery was recorded. During WY 2024, groundwater levels remain above the IM but below the MT.

Reviewing hydrographs in **Figure 3-6** for wells ETSGSA-06, ETSGSA-09 and ETSGSA-20 shows that the magnitude of declines increases towards the east, with minimal groundwater level recovery evident in the easternmost Subbasin in WY 2024. Between Spring 2020 and Fall 2023, groundwater levels in ETSGSA-06 have declined by more than 18 feet. Groundwater levels measured in Spring 2023 had recovered by approximately 6 feet from the low of 16 feet above mean sea level (msl) in Fall 2023. While Fall 2023 groundwater elevations were higher than Fall 2022, Spring 2024 groundwater elevations were about equal to those of Spring 2023.

At ETSGSA-14, groundwater levels declined approximately 14 feet between Spring 2020 and Spring 2022 and then increased by 4 feet from Spring 2022 to Spring 2024. To the east at ETSGSA-20, groundwater levels declined more than 14 feet between Fall 2019 and Fall 2021. However, between Fall 2021 and Fall 2023, water levels have risen approximately 5 feet higher. To the south of Turlock Lake at ETSGSA-09, groundwater levels declined by 10 feet between Spring 2021 and Spring 2024, representing an overall trend on the hydrograph, with some seasonal fluctuations. Water levels in Fall 2023 were lower than in Fall 2022, and water levels in Spring 2024 were lower than those in Spring 2023.

Notably, groundwater levels in monitoring wells located near the Highline Canal, where replenishment water was provided in 2023 and 2024, generally increased in 2023 and 2024. This includes wells ETSGSA-13, EW3 and MW-68A (**Appendix B**).

3.3.3.3 Western Lower Principal Aquifer

Groundwater level trends in the Western Lower Principal Aquifer are less clear because of the lack of long-term historical groundwater level data in the RMWs and greater fluctuations between spring and fall measurements in the confined aquifer system. Hence, example hydrographs are not shown on **Figure 3-6,** but well locations are shown on **Figure 3-2** and hydrographs are provided in **Appendix B**. The Smyrna Park multi-completion well in Ceres has the longest, most complete record, and the hydrograph indicates a gradual rise of water

levels since Spring 2020. From Spring 2023 to Spring 2024, groundwater levels in the Western Lower Principal Aquifer increased by 18 feet at Ferreira Ranch Park MW-347 and 8 feet at Denair NW-11 287.

3.3.4 Compliance with Sustainable Management Criteria

A summary of the MTs and MOs for the five sustainability indicators applicable to the Turlock Subbasin is shown in **Table 3-4**. This table includes the SMC for the seven ETSGSA wells that were updated in response to the 2023 RP elevation survey and corrections. As shown in the table and explained in the GSP, the measured or inferred Fall 2015 groundwater elevations are the basis for the MTs for most RMWs in the monitoring networks. The MTs for wells in the monitoring network for interconnected surface water along the Merced River were based on measured or inferred Spring 2014 groundwater elevations. Nonetheless, definition of undesirable results for groundwater levels in all aquifers and interconnected surface water along all three rivers is based on measurements taken during Fall events.

The Fall 2023 and Spring 2024 groundwater elevations were compared to the GSP sustainable management criteria (MTs and IMs) for analysis in this Annual Report. That comparison is summarized in **Table 3-5.** Maps summarizing the comparison and highlighting MT exceedances during the Fall 2023 and Spring 2024 monitoring events are shown on **Figures 3-7** through **3-14**. As mentioned previously, hydrographs are shown in **Appendix B**.

The water levels collected during previous monitoring events (Spring 2022, Fall 2023, and Spring 2023) were analyzed for compliance with SMC using the corrected WSEs and updated SMC. The WSE corrections caused the Fall 2023 water levels to be below the MT at ETSGSA-05 and ETSGSA-13, increasing the percentage of wells with water levels below their MT to 100% (15 out of 15 wells). For both wells, their SMC development was based on measurements at nearby wells, and the SMC updates are pending an elevation re-survey at the nearby wells (**Appendix C**). For Spring 2024, the correction of historical WSE data and updated SMC caused the percentage of wells below the MT to change from 71% to 60%, due to water levels at ETSGSA-04 no longer being below the well's MT.

Table 3-4: Sustainable Management Criteria Summary

Sustainability Indicator	Minimum Thresholds (MTs)	Measurable Objectives (MOs)
Chronic Lowering of Water Levels	Low groundwater elevation observed in Fall 2015 at each representative monitoring site for each principal aquifer.	Midpoint between the MT and the high groundwater elevation observed over the historical Study Period WY 1991 - WY 2015 at each representative monitoring site for each principal aquifer.
Reduction of Groundwater in Storage	Low groundwater elevation observed in Fall 2015 at each representative monitoring site for each principal aquifer.	Midpoint between the MT and the high groundwater elevation observed over the historical Study Period WY 1991 - WY 2015 at each representative monitoring site for each principal aquifer.
Degraded Water Quality	Minimum thresholds are set as a new (first-time) exceedance of a drinking water quality standard (primary or secondary MCL) in a potable supply well in the representative Monitoring network for any of the Subbasin constituents of concern as listed below: Nitrate (as N) - 10 mg/L Arsenic - 10 ug/L Uranium - 20 pCi/L Total dissolved solids - 500 mg/L 1,2,3-TCP - 0.005 ug/L PCE - 5 ug/L.	No increase above the maximum historical concentration for any constituent of concern in a potable water supply well in the GSP monitoring program caused by GSA management activities.
Land Subsidence	Low groundwater elevation observed in Fall 2015 at each representative monitoring site.	Midpoint between the MT and the high groundwater elevation observed over the historical Study Period WY 1991 - WY 2015 at each representative monitoring site.
	Low groundwater elevation observed in Fall 2015 or the elevation of the top of the Corcoran Clay, whichever is shallower, at each representative monitoring site.	Midpoint between the MT and the historical high groundwater elevation at each representative monitoring site as above. If MT is set as the top of the Corcoran Clay (when shallower than the 2015 water level MT), the MO will be set as above, but no less than 20 feet above the Corcoran Clay.
	Low groundwater elevation observed in Fall 2015 at each representative monitoring site.	Midpoint between the MT and the high groundwater elevation observed over the historical Study Period WY 1991 - WY 2015 at each representative monitoring site.
Interconnected Surface Water	For the **San Joaquin River**, low groundwater elevation observed in Fall 2015 at each representative monitoring site.	Midpoint between the MT and the high groundwater elevation observed during the historical Study Period SY 1991 - WY 2015 at each representative monitoring site.
	For the **Tuolumne River**, low groundwater elevation observed in Fall 2015 at each representative monitoring site.	
	For the **Merced River**, the groundwater elevation observed in Spring 2014 at each representative monitoring site.	

Table 3-5 Comparison of Groundwater Elevations to Sustainable Management Criteria

			Fall 2023 Monitoring Event		Spring 2024 Monitoring Event	
Local Well Name	**Minimum Threshold (MT) (feet msl)**	**Interim Milestone (IM) (feet msl)**	**Groundwater Elevation Below MT? (yes/no)**	**Groundwater Elevation Below IM? (yes/no)**	**Groundwater Elevation Below MT? (yes/no)**	**Groundwater Elevation Below IM? (yes/no)**
Table 3-5a: Chronic Lowering of Groundwater Levels, Western Upper Principal Aquifer						
TID 010*	63	53	Yes	Yes	Yes	Yes
TID 018	44	--	No	--	No	--
TID 022	52	--	No	--	No	--
TID 048	36	--	No	--	No	--
TID 061A	40	--	NM	--	No	--
TID 063	37	--	No	--	No	--
TID 083	62	--	NM	--	Yes	--
TID 085B	85	--	Yes	--	No	--
TID 106	49	--	NM	--	No	--
TID 111	26	--	No	--	No	--
TID 113A	81	76	No	No	No	No
TID 118	65	--	No	--	No	--
TID 136A	79	76	No	No	No	No
TID 139	40	--	No	--	No	--
TID 191	53	--	Yes	--	No	--
TID 199A	88	--	No	--	No	--
WTS-1 Shallow	No MT	--	No MT	--	No MT	--
WTS-2 Shallow	No MT	--	No MT	--	No MT	--
Summary - Western Upper Principal Aquifer						
		Above	10	2	14	2
		Below	3	1	2	0
		Not Measured	3	0	0	0
		No MT	2	0	2	0
		% Below (includes measured wells)	23%	33%	13%	33%

Note: *TID-10 was dry in Fall 2023 and Spring 2024, the bottom of the well is at 54 feet msl. Therefore, water level is below the MT (63) and at or below the IM (53).

Table 3-5b: Chronic Lowering of Groundwater Levels, Western Lower Principal Aquifer						
Smyrna Park 4/233	20	10	No	No	No	No
Denair NW-11 287	21	--	No	--	No	--
Ferreira Ranch Park MW-347	20	--	Yes	--	No	--
SWW Reservoir MW-335	20	--	Yes	--	No	--
Blum 3-1	55	--	Yes	--	Yes	--
MW-68A	No MT	--	No MT	--	No MT	--
WTS-1 Deep	No MT	--	No MT	--	No MT	--
WTS-2 Deep	No MT	--	No MT	--	No MT	--
Summary - Western Lower Principal Aquifer						
		Above	2	1	4	1
		Below	3	0	1	0
		Not Measured	0	0	0	0
		No MT	3	0	3	0
		% Below (includes measured wells)	60%	0%	20%	0%

Note:

Table 3-5 Comparison of Groundwater Elevations to Sustainable Management Criteria

Local Well Name	Minimum Threshold (MT) (feet msl)	Interim Milestone (IM) (feet msl)	Fall 2023 Monitoring Event		Spring 2024 Monitoring Event	
			Groundwater Elevation Below MT? (yes/no)	Groundwater Elevation Below IM? (yes/no)	Groundwater Elevation Below MT? (yes/no)	Groundwater Elevation Below IM? (yes/no)
Table 3-5c: Chronic Lowering of Groundwater Levels, Eastern Principal Aquifer						
TID 175	36	31	Yes	No	Yes	No
NE Storm Basin MW-340	45	20	Yes	No	Yes	No
ETSGSA-01	60	38	Yes	No	Yes	No
ETSGSA-02	131	121	Yes	No	Yes	No
ETSGSA-04	-2	-14	Yes	No	No	No
ETSGSA-05	-5	-17	Yes	No	No	No
ETSGSA-06	30	11	Yes	No	Yes	No
ETSGSA-08	15	5	Yes	Yes	Yes	Yes
ETSGSA-09	45	20	Yes	No	Yes	No
ETSGSA-12R	No MT	--	No MT	--	No MT	--
ETSGSA-13	30	26	Yes	No	No	No
ETSGSA-14	14	-6	Yes	No	No	No
ETSGSA-20	55	14	Yes	No	Yes	No
ETSGSA-21	133	89	Yes	No	Yes	No
EW3	10	-1	Yes	No	No	No
Olam R2-4	79	--	Yes	--	No	--
MW-68B	No MT	--	No MT	--	No MT	--
MW-68C	No MT	--	No MT	--	No MT	--
Summary - Eastern Principal Aquifer						
		Above	0	13	6	13
		Below	15	1	9	1
		Not Measured	0	0	0	0
		No MT	3	0	3	0
		% Below (includes measured wells)	100%	7%	60%	7%

Note:

Table 3-5 Comparison of Groundwater Elevations to Sustainable Management Criteria

Local Well Name	Minimum Threshold (MT) (feet msl)	Interim Milestone (IM) (feet msl)	Fall 2023 Monitoring Event: Groundwater Elevation Below MT? (yes/no)	Fall 2023 Monitoring Event: Groundwater Elevation Below IM? (yes/no)	Spring 2024 Monitoring Event: Groundwater Elevation Below MT? (yes/no)	Spring 2024 Monitoring Event: Groundwater Elevation Below IM? (yes/no)
Table 3-5d: Interconnected Surface Water						
San Joaquin River						
TID 061A	40	--	NM	--	No	--
TID 063	37	--	No	--	No	--
TID 111	26	--	No	--	No	--
Tuolumne River						
Ceres 36	31	26	No	No	No	No
ETSGSA-01	60	38	Yes	No	Yes	No
ETSGSA-02	131	121	Yes	No	Yes	No
Merced River						
TID 303	85	--	No	--	No	--
ETSGSA-14	14	-6	Yes	No	No	No
ETSGSA-17	95	85	Yes	No	No	No
ETSGSA-21	137	89	Yes	No	Yes	No
ETSGSA-23	71	61	Yes	No	No	No
Summary - Interconnected Surface Water						
San Joaquin River						
Above			2	--	3	--
Below			0	--	0	--
Not Measured			1	--	0	--
% Below (includes measured wells)			0%	--	0%	--
Tuolumne River						
Above			1	3	1	3
Below			2	0	2	0
Not Measured			0	0	0	0
% Below (includes measured wells)			67%	0%	67%	0%
Merced River						
Above			1	4	4	4
Below			4	0	1	0
Not Measured			0	0	0	0
% Below (includes measured wells)			80%	0%	20%	0%

10

Notes:

highlight: groundwater elevation is below (exceeds) the MT or the IM

MT: Minimum Threshold

NM: water level not measured

No MT: MT has not been developed because there are not enough water level data.

3.3.4.1 Fall 2023 Monitoring Event

As shown in **Table 3-5**, water levels in the monitoring network for the chronic lowering of groundwater levels indicator were below the MTs in 21 of the 33 RMWs in all three Principal Aquifers that were measured in Fall 2023 and have MTs.

MTs have not yet been developed for 8 RMWs (MW-68A, 68B, 68C, WTS-1 Shallow and Deep, WTS-2 Shallow and Deep, and ETSGSA-12R) because insufficient groundwater level data exist to set an appropriate MT. MTs for these wells are still in development. Groundwater levels in RMWs TID 061A, TID 083 and TID 106 were not measured in Fall 2023. TID 010 was dry. TID-061, TID-083, and TID 106 could not be sampled because they were pumping at the time of measurement.

3.3.4.1.1 Western Upper Principal Aquifer

In the Western Upper Principal Aquifer (**Table 3-5a** and **Figure 3-7**), groundwater levels were below the MT in 3 of 13 RMWs (23%) with MTs during the Fall 2023 monitoring event. The MT exceedances occurred at TID 010, in northwest Turlock, TID 085B, south of Delhi, and at TID 191, between Ceres and Keyes. TID 010 was dry in Fall 2023 and Spring 2024, but the bottom of the well (54 ft msl) is deeper than the MT (63 ft msl) and the IM (53 ft msl), so it was identified as being lower than the MT and IM. TID 010 was the only well with a water level beneath its IM. The bottom of the screened interval at TID 010 is 54 ft msl. The Fall 2023 groundwater elevation for TID 010 was lower than the 63 ft msl MT and assumed to be at or below the 53 ft msl IM. The exceedances do not meet the definition of undesirable results, which is based on three consecutive Fall monitoring events with greater than 33% of RMWs exceeding their MT.

3.3.4.1.2 Western Lower Principal Aquifer

Groundwater levels in the Western Lower Principal Aquifer (**Table 3-5b** and **Figure 3-8**) during the Fall 2023 monitoring event were below the MT in 3 of 5 RMWs (60%) measured that have designated MTs. Two of the RMWs with MT exceedances are in the central region Western Lower Principal Aquifer within the outskirts of Turlock: Ferreira Ranch Park MW-347 and SWW Reservoir MW-335. The water level at Blum 3-1, located on the southern border of the Turlock Subbasin, west of Livingston, was also below the MT. There are now two consecutive Fall exceedances within the Western Lower Principal Aquifer (WY 2023 67% and WY 2024 60%), these exceedances do not meet the definition of undesirable results, which is based on three consecutive Fall monitoring events. It is noted that undesirable results would be indicated in Fall 2024 if it represents the third consecutive Fall event with more than 33% of measured wells with levels below the MT.

3.3.4.1.3 Eastern Principal Aquifer

Water levels in the Eastern Principal Aquifer (**Table 3-5c and Figure 3-9**) during the Fall 2023 monitoring event were below the MT at all 15 of the RMWs measured that have designated MTs. There are now two consecutive Fall exceedances (WY 2023 87% and WY 2024 100%). These exceedances do not yet meet the definition of undesirable results, which is based on three consecutive Fall monitoring events for chronic lowering of groundwater levels and

land subsidence. However, it is noted that undesirable results would be indicated in Fall 2024 if it represents the third consecutive Fall event with more than 33% of measured wells with levels below the MT.

As discussed in the Revised GSP, the GSAs have recognized that groundwater levels could decline below MTs during the period before projects and management actions are fully implemented. Accordingly, IMs have been set for selected wells to provide additional guidelines until groundwater levels rise above the MTs. As shown in **Table 3-5**, IMs have been established for all three principal aquifers, including 14 IMs in the Eastern Principal Aquifer. In Water Year 2024, there was one exceedance of an IM, ETSGSA-08, in the Eastern Principal Aquifer. As a result, ETSGSA has established a Priority Action Area to focus implementation of projects and management actions in the area surrounding this well in accordance with the Demand Reduction Plan included in the Revised GSP.

3.3.4.1.4 Interconnected Surface Water

Groundwater elevations measured during Fall 2023 in the interconnected surface water monitoring network were below the MTs in 0 of 2 RMWs (0%) along the San Joaquin River, 2 of 3 RMWs (67%) along the Tuolumne River, and 4 of 5 RMWs (80%) along the Merced River. A comparison of groundwater elevations to SMC is provided in **Table 3-5d** and MT exceedances are shown on **Figure 3-10**. These comparisons indicate that an undesirable result has not occurred along the San Joaquin River; the definition of undesirable for the San Joaquin requires that 50% of the representative monitoring sites for that river are below the MT in two (2) consecutive Fall monitoring events.

However, the comparison indicates that undesirable results have occurred along the Tuolumne and Merced rivers. Fall 2022 was marked by exceedances of 100% and 80% on the Tuolumne and Merced rivers, respectively, and Fall 2023 was marked by exceedances of 67% and 80% on the Tuolumne and Merced rivers, respectively. Accordingly, in Fall 2023, undesirable results for interconnected surface water were defined to have occurred along the Tuolumne and Merced rivers.

As discussed in the Revised GSP, the GSAs have recognized that groundwater levels could below MTs during the implementation period before projects and management actions start increasing groundwater levels. Accordingly, IMs have been set for selected wells to provide additional guidelines until groundwater levels rise above the MTs. The Tuolumne River has three wells with IMs, and the Merced River has four wells with IMs. The IMs shown in **Table 3-5d** are 2027 interim milestones, or the 5-year water level benchmarks. Water levels in all seven wells with IMs have remained above their 2027 IMs.

The GSPs recognize the importance of achieving sustainability for interconnected surface water and are implementing Projects and Management Actions to address groundwater levels near the Merced and Tuolumne Rivers. These are described in **Section 11** and include multi-benefit land repurposing, direct and in lieu groundwater recharge, and delivery of replenishment water. In addition, three sets of nested wells are being installed near the Tuolumne and Merced rivers under the DWR's TSS program.

3.3.4.2 Spring 2024 Monitoring Event

Spring 2024 is the fifth monitoring event following the submission of the GSP. **Table 3-5** and **Figures 3-11, 3-12, 3-13, and 3-14** provide a summary of MT exceedances during the Spring 2024 monitoring event in each Principal Aquifer as measured in the monitoring networks for the chronic lowering of groundwater levels and interconnected surface water. Water levels measured in the Spring monitoring events are not considered when evaluating undesirable results for chronic lowering of groundwater levels or interconnected surface water. They are considered when evaluating undesirable results for subsidence, which is discussed in **Section 9**.

During the Spring 2024 monitoring event, every RMW but TID 010 was measured. TID 010 was dry.

3.3.4.2.1 Western Upper Principal Aquifer

In the Western Upper Principal Aquifer (**Table 3-5a** and **Figure 3-11**), groundwater levels were below the MT in 2 of 16 RMWs (13%) with MTs during the Spring 2024 monitoring event. The MT exceedance at TID 083 occurred west of Turlock, near the Stanislaus and Merced County border. TID 010 was dry. The bottom of TID 010 is beneath the well's MT and near the IM, so the groundwater elevations were counted as being below the SMC. In the Western Upper Principal Aquifer, undesirable results for subsidence occur if 33% of representative monitoring wells exceed the MT in three consecutive Spring monitoring events. MT exceedances that occurred during this monitoring event do not meet the definition of undesirable results for chronic lowering of groundwater levels or subsidence.

3.3.4.2.2 Western Lower Principal Aquifer

Groundwater levels in the Western Lower Principal Aquifer (**Table 3-5b** and **Figure 3-12**) during the Spring 2024 monitoring event were below the MT in 1 of 5 RMWs (20%) measured that have designated MTs. The MT exceedance occurred at Blum 3-1. The MT exceedance that occurred during this monitoring event does not meet the definition of undesirable results. There were no exceedances of the IMs in the Western Lower Principal Aquifer.

3.3.4.2.3 Eastern Principal Aquifer

Water levels in the Eastern Principal Aquifer (**Table 3-5c and Figure 3-13**) during the Spring 2024 monitoring event were below the MT in 9 of 15 RMWs (60%) measured that have designated MTs. Wells with MT exceedances occurred throughout the aquifer, with a higher prevalence of exceedances at RMWs in the eastern region of the Eastern Principal Aquifer. The groundwater level measured at ETSGSA-08 was below the IM in the Eastern Principal Aquifer. As discussed in **Section 3.3.1**, the Spring 2023 GNSS survey of ETSGSA RMWs corrected the RPs used to calculate groundwater elevation in those wells, the SMCs have been adjusted to reflect these changes.

3.3.4.2.4 Interconnected Surface Water

Groundwater elevations measured during Spring 2024 in the interconnected surface monitoring network were below the MTs in 3 of 11 RMWs. A comparison of groundwater elevations to sustainable management criteria is provided in **Table 3-5d** and MT exceedances are shown on **Figure 3-14**. Two of the three RMWs along the Tuolumne River (ETSGSA-01 and ETSGSA-02) had groundwater levels below the MTs (67%). One RMW along the Merced River (ETSGSA-21) had groundwater levels below the MTs (20%). All of the RMWs with MT exceedances in the interconnected surface water monitoring network are in the Eastern Principal Aquifer. No RMWs were below their IM.

MT exceedances that occurred during Spring monitoring events are not considered when assessing whether they meet the definition of undesirable results for chronic lowering of groundwater levels and interconnected surface water, which is based on consecutive Fall monitoring events following GSP submittal. As noted above, the Fall 2023 monitoring event is the second Fall GSP monitoring event used to evaluate undesirable results for chronic lowering of groundwater.

Spring water levels are used to determine undesirable results for subsidence in the Western Upper and Western Lower Principal Aquifers. Undesirable results for subsidence are discussed in **Section 9**.

In Spring 2024, there was one exceedance of an IM in the Western Upper Principal Aquifer (TID 010), no IM exceedances in the Western Lower Principal Aquifer, and one IM exceedance (ETSGSA-08) in the Eastern Principal Aquifer. There were no IM exceedances for the ISW wells.

3.3.5 Reported Dry Wells

DWR has a Dry Well Reporting System for households not served by a public water system. Based on data downloaded from this system, 2 reports of dry wells were made in the Turlock Subbasin during WY 2024. These reported dry wells are shown on **Figure 3-15**. According to the Dry Well Reporting System, the two wells remain open and are referred to as outages (shown as yellow dots on **Figure 3-15**). In contrast, 14 dry wells were reported in WY 2023, with 6 of them remaining open as outages.

The reported dry wells are located primarily in the central and southern region of the Subbasin. In general, these areas experienced groundwater level declines in Fall 2023 followed by some recovery in Spring 2024. No well depths were provided for the reported dry wells, and they indicate that the well was dry and no longer producing water. Currently, the wells reported to the Counties are added to the DWR Dry Well reporting system and owners are referred to Self-Help or the Valley Water Collaborative for assistance. The GSAs' website (https://turlockgroundwater.org) also refers well owners to the NGOs. In January 2025, the GSAs approved a Well Mitigation Program. Full implementation of the program is scheduled to begin in July 2025.

3.4 GROUNDWATER ELEVATION CONTOUR MAPS

Groundwater elevation data were used to develop groundwater level contour maps for the principal aquifers in the Subbasin. The contour maps are based on measurements in RMWs and additional SGMA monitoring wells in the three principal aquifers. For this fourth GSP Annual Report, data were compiled and contoured for Fall 2023 and Spring 2024, as shown on **Figures 3-16** through **3-19** and described in the sections below.

3.4.1 Groundwater Elevations and Flow for Fall 2023

Groundwater elevations measured in Fall 2023 represent seasonal lows during WY 2024. Groundwater levels were measured in October and November, at the end of the irrigation season.

3.4.1.1 Western Upper Principal Aquifer and Eastern Principal Aquifer

Groundwater elevation contours in Fall 2023 in the Western Upper Principal Aquifer and the Eastern Principal Aquifer are illustrated on **Figure 3-16**. It should be noted that the wells used for contouring groundwater elevations in the Eastern Principal Aquifer are generally deeper and contain longer screen intervals than wells used for contouring groundwater elevations in the Western Upper Principal Aquifer. As a result, groundwater elevations in some of the wells may be correlated with elevations in the Western Lower Principal Aquifer, or a combination of the Western Upper and Lower Principal Aquifers. The extent and implications of this data gap will be investigated as additional monitoring data are collected and analyzed. A monitoring well cluster is proposed to be installed near the interface between the two aquifers under the TSS program. As such, the conclusions regarding groundwater flow across the boundary between the Upper Western Aquifer and Eastern Aquifer should be considered preliminary.

Groundwater elevation contours show that regional groundwater flow within the western part of the Turlock Subbasin is generally to the west-northwest. A relatively broad mound, or area with higher groundwater levels, is located between Hilmar and Delhi, extending north to the southern edge of Turlock. Flow is generally away from the high point of the mound in all directions. In the northwestern part of the Subbasin, groundwater flows to the northwest in the vicinity of Ceres and Modesto and toward the downgradient extent of the Subbasin.

Groundwater flow in the east is largely towards the center of a depression in the central Subbasin, about five miles east of the Corcoran Clay. EWD 03, at the center of this depression, has the lowest groundwater elevation in the Subbasin in Fall 2023 (-14 ft msl). The cone of depression is relatively well defined by a closed 30-foot groundwater elevation contour. This depression affects groundwater flow directions in the East Principal Aquifer and the southeast portion of the Western Upper Principal Aquifer. Groundwater flow directions in the eastern, central, and west-central portions of the Subbasin are generally toward the pumping depression.

Based on the available data and contours, groundwater flows north from the Merced River toward the pumping depression in the eastern Subbasin. Near Delhi and Hilmar, water flows toward the San Joaquin River in the western Subbasin. Groundwater generally flows south from the Tuolumne River towards the pumping depression in the eastern Subbasin and north toward the Tuolumne River in the western Subbasin.

Near the center of the pumping depression in the east-central portion of the Subbasin groundwater is -14 feet below sea level. The cone of depression is relatively well defined by a closed 40-foot groundwater elevation contour. As indicated by the closely-spaced contours, hydraulic gradients are relatively steep around the edge of the eastern pumping depression. In the western Subbasin, the hydraulic gradient is steepest flowing from the groundwater mound towards the cone of depression and is less steep to the west and north of the mound.

As illustrated on **Figure 3-16**, groundwater level data east of Turlock Lake are limited.

3.4.1.2 Western Lower Principal Aquifer

Figure 3-17 shows Fall 2023 groundwater levels measured in seven wells in the Western Lower Principal Aquifer. Groundwater elevations range from 12 feet-msl north of California State University Stanislaus to 39 feet msl west of Turlock. Groundwater contours for the Western Lower Principal Aquifer show broad areas with a relatively flat hydraulic gradient south and west of the City of Turlock. The hydraulic gradient is steeper between Ceres and Turlock, with the lowest groundwater elevations centered in the northern portion of Turlock. Due to the absence of data in the western portion of the Aquifer, contours may not represent conditions throughout the aquifer.

3.4.2 Groundwater Elevations and Flow for Spring 2024

Groundwater elevations measured in Spring 2024 represent seasonal highs during the reporting period. Groundwater levels were measured in March and April, either before or slightly after the irrigation season began. In general, groundwater elevations in the Western Upper Principal Aquifer and Eastern Principal Aquifer recovered from the seasonal low measurements in Fall 2023.

3.4.2.1 Western Upper Principal Aquifer and Eastern Principal Aquifer

Figure 3-18 shows groundwater elevation contours in Spring 2024 in the Western Upper Principal Aquifer and Eastern Principal Aquifer.

During this monitoring event, groundwater elevations ranged from 155 feet msl (ETSGSA-11) in the eastern Subbasin to -2 feet msl in the center of the pumping depression (EWD-03). On average, groundwater elevations increased throughout the Subbasin from Fall 2023 to Spring 2023.

In the Western Upper Principal Aquifer, there are 22 wells with measured groundwater elevations in both Fall 2023 and Spring 2024. During this time, the average increase in groundwater elevation was 2.3 feet with increases ranging from 0 feet to 9 feet. There were 4 water level declines recorded in Western Upper Principal Aquifer monitoring wells between the Fall 2023 and Spring 2024 monitoring events. The largest decrease in groundwater elevation from Fall 2023 to Spring 2024 was observed in TID 022, at -6 feet.

In the Western Lower Aquifer between Fall 2023 and Spring 2024, the largest increase was seen in Blum 1-3, with water levels increasing by 24 feet.

Groundwater levels increased more in the Eastern Principal Aquifer than in the Western Upper Principal Aquifer. There are 41 wells in the Eastern Principal Aquifer with groundwater level measurements in Fall 2023 and Spring 2023. On average, groundwater elevations increased by 8 feet in the Eastern Principal Aquifer monitoring wells from Fall 2023 to Spring 2024, with the largest increase occurring in wells within the pumping depression. The maximum increase was 23 feet in DWR-05.

Groundwater flow directions and hydraulic gradients are generally similar to Fall 2023 (see **Figure 3-16**). The addition of measured data in the eastern Subbasin as part of the Spring 2024 monitoring resulted in greater resolution of the hydraulic gradient and cone of depression as defined by the 30-foot contour in **Figure 3-18**. The center of the pumping depression was shown to be broader than previously depicted but remained in a similar position as in Fall 2023. Groundwater levels were higher around the center of the cone. West of the pumping depression, groundwater generally flows to the northwest toward the downgradient extent of the Subbasin. Less pumping deflection is observed in the Spring 2024 contours. The groundwater mound near Hilmar and Delhi, as defined by the 90-foot contour, is at approximately the same elevation and position as in Fall 2023.

The notes in **Section 3.4.1.1** regarding the correlation between groundwater elevations measured in the Eastern Principal Aquifer and the Western Principal Aquifers also apply to the Spring 2024 dataset.

3.4.2.2 Western Lower Principal Aquifer

Figure 3-19 shows groundwater elevations in the Western Lower Principal Aquifer in Spring 2024 based on measurements at seven RMWs. Based on groundwater level data at these wells, groundwater generally flows to the west/southwest. Seven monitoring wells have data in both Fall 2023 and Spring 2024, and monitoring indicates water levels increasing on average by 18.14 feet. The largest recovery, 27 feet, was recorded in Ferreira Ranch Park MW-347.

The notes in **Section 3.4.1.1** regarding the correlation between groundwater elevations measured in the Eastern Principal Aquifer and the Western Principal Aquifers also apply to this dataset.

4 GROUNDWATER EXTRACTIONS

The volume of groundwater extraction in the Turlock Subbasin is provided for the preceding water year (WY 2024) per SGMA Annual Report requirements in 23 CCR §356.2(b)(2). Data presented in this section follow DWR reporting requirements for groundwater extractions by water use sector and include the method of measurement and accuracy of measurements. A map of groundwater extractions (**Figure 4-1**) is provided to illustrate the general location and volume of groundwater extractions in the Turlock Subbasin.

4.1 GROUNDWATER EXTRACTION DATA METHODS

Total groundwater extractions for the Subbasin for the preceding water year (WY 2024) were compiled and are summarized in this section. The data were collected using the "best available measurement methods." For the Turlock Subbasin, the groundwater extraction data were compiled using two methods:

- Directly measured groundwater extraction data collected by local water agencies and irrigation districts.
- Estimated groundwater extractions based on available land use and climatic data using the C2VSimTM model, an application of the Integrated Water Flow Model (IWFM) developed by DWR (Dogrul, Kadir and Brush, 2017).

Directly measured groundwater extractions were collected using meters and other appropriate comparable measuring devices by local water agencies in accordance with the monitoring protocols of the respective local agency. These data were compiled and provided to support this Annual Report by the local agency. These directly measured data were obtained using "high accuracy" measuring devices and methodologies (see **Section 4.4**).

Groundwater extractions from private irrigators and domestic wells are estimated using the C2VSimTM for each model element based on factors including land use (cropping), evapotranspiration, surface water supply, population, and per-capita water use. Evapotranspiration of native vegetation is simulated in the C2VSimTM, but the Turlock Subbasin does not extract or apply surface or groundwater for the management of native vegetation.

Details about the C2VSimTM model can be found in the GSP, while recent updates to the model are described in **Section 2** of this Annual Report. A map illustrating the general location and volume of groundwater extractions as estimated by the C2VSimTM for water year 2024 can be found in **Figure 4-1**. These estimated data are expected to have a medium level of accuracy.

4.2 SUMMARY OF GROUNDWATER EXTRACTIONS WATER YEAR 2024

Using the methods described above, the total groundwater extractions in the Turlock Subbasin for WY 2024 were tabulated. **Table 4-1** summarizes the Turlock Subbasin groundwater extractions by water use type and measurement method for WY 2024.

Table 4-1: Groundwater Extractions for WY 2024 (AF)

WY	Agricultural Extractions (Agency)[1]	Agricultural Extractions (Private)[2]	Urban Extractions (Agency)[1]	Urban Extractions (Private)[3]	Total
2024	38,800	291,700	25,200	7,300	363,000

1. *"Agricultural/Urban Extractions (Agency)" indicates direct measurements of volumes of pumped groundwater reported by agricultural water purveyors and urban water suppliers. Directly measured data are expected to have a high level of accuracy.*
2. *"Agricultural Extractions (Private)" is estimated by C2VSimTM based on land use, evapotranspiration, soil, operational, and surface water data. See Section 2 – C2VSimTM Update (Water Year 2024). These estimated data are expected to have a medium level of accuracy.*
3. *"Urban Extractions (Private)" represents domestic extractions and small water systems. This is estimated by C2VSimTM based on census data for population multiplied by a volumetric water use factor averaged from the urban regions. See Section 2 – C2VSimTM Update (Water Year 2024). These estimated data are expected to have a medium level of accuracy.*

The data show that an estimated 363,000 AF of groundwater extractions occurred in WY 2024. Following the DWR templates, the groundwater extractions are presented by water use sector. For the Turlock Subbasin, the water use sectors are described as follows:

- **Agricultural** – groundwater extractions used to meet irrigation demands and supplement surface water operations. Agency-reported data are provided by local agricultural water purveyors with metered data. Non-reported data, or private agricultural extractions are derived from a combination of land use, evapotranspiration, soil, operational, and surface water supply data through use of the C2VSimTM groundwater model. The total agricultural groundwater extraction in the Turlock Subbasin for WY 2024 is 330,500 AF which accounts for about 91% of the total groundwater extractions in the Turlock Subbasin.
- **Urban** – groundwater extractions for all urban uses including residential, commercial, municipal, industrial, landscaping, and other uses. Reported data are provided by urban water purveyors with metered data. Non-reported data representing domestic extractions and small water systems are derived from a combination of land use, population, and per-capita water use within the C2VSimTM groundwater model. The total urban groundwater extraction in the Turlock Subbasin for WY 2024 is 32,500 AF which accounts for about 9% of the total groundwater extractions in the Turlock Subbasin.

- **Industrial** – current data does not allow for tabulation of groundwater extraction of industrial water use on a consistent basin-wide basis; therefore, industrial water use is included in the urban water use sector for WY 2024.
- **Managed Wetlands** – currently, no known groundwater extraction is used for maintaining managed wetlands in the Turlock Subbasin.
- **Managed Recharge** – currently, no known groundwater extractions are used to supply managed recharge operations in the Turlock Subbasin.
- **Native Vegetation** – currently, no groundwater extractions are used for maintaining native vegetation in the Turlock Subbasin.

In accordance with 23 CCR §356.2(b)(2), the user must define the method of measurement (direct or indirect) and the accuracy of measurements. As shown on **Table 4-1**, the groundwater extractions are categorized into two of the methods listed by DWR. These include:

- **Measured (Metered)** – direct measurement of groundwater extraction collected by local water agencies using meters and other appropriate measurement devices or methodology. The total groundwater extraction from measured data in the Turlock Subbasin for WY 2024 is 64,000 AF which accounts for about 18% of the total groundwater extractions.
- **Estimated (Modeled)** – indirect estimate of groundwater extractions based on the simulation of urban and agricultural operations in the Turlock Subbasin using the C2VSimTM model, an application of the IWFM software package (Dogrul, Kadir and Brush, 2017). The C2VSimTM model estimates private groundwater production in addition to metered pumping based on a combination of land use, evapotranspiration, surface water supply, and urban water use factors. The total private groundwater extraction estimated by the C2VSimTM model for the Turlock Subbasin for WY 2024 is 299,000 AF which accounts for about 82% of the total groundwater extractions in the Subbasin.

Groundwater extractions presented here represent the current best estimate of groundwater pumping in the Turlock Subbasin. The use of C2VSimTM provides a consistent, basin-wide method for estimating the unmeasured pumping in the Subbasin.

4.3 GROUNDWATER EXTRACTIONS MAPPING

In accordance with 23 CCR §356.2(b)(2), a map (**Figure 4-1**) illustrating the general distribution and density of groundwater extractions has been developed for this Annual Report. For WY 2024, a total groundwater extractions map was derived from the C2VSimTM simulation results. The specified metered pumping is directly input into C2VSimTM, and the IWFM framework estimates the unmeasured portion of agricultural and urban pumping based on land use calculations (Maley and Brush, 2020).

Figure 4-1 shows the distribution of total groundwater extractions over the Turlock Subbasin. Since agricultural pumping accounts for 91% of the total groundwater extractions, the pumping distribution generally corresponds to irrigated areas, where demand is not met by surface water supplies.

4.4 PART A AND B DWR TEMPLATES

As part of the Annual Report submittal, DWR requires that a series of Excel spreadsheets be completed to summarize key water supply and use volumes for WY 2024 for the entire Subbasin. For groundwater extraction, DWR requires two spreadsheets be submitted along with the Annual Report in accordance with 23 CCR §356.2(b)(2):

- **Part A. Groundwater Extractions** - groundwater extractions for WY 2024 by water use sector (23 CCR §356.2(b)(2))
- **Part B. Groundwater Extraction Methods** - the volume of groundwater extractions for WY 2024 by different measurement methods (23 CCR §356.2(b)(2)).

Data summarized in **Table 4-1** follow the Part A and B DWR Template reporting requirements for groundwater extractions and were collected using the best available measurement methods. Accordingly, the data for WY 2024 on **Table 4-1** is submitted separately in the DWR templates.

The accuracy of measurement is required on the DWR templates. For the Turlock Subbasin, the groundwater extractions are based on either reported metered pumping data or from the C2VSimTM simulation results. The measured data were collected by experienced staff from agricultural, urban, and county agencies in accordance with their monitoring protocols. The measuring devices used by these agencies are properly installed, well maintained and consistently monitored; therefore, reported data meet high accuracy levels in compliance with AWWA (2006, 2012) and other relevant standards. In accordance with these standards, meter accuracy is considered high.

Estimated groundwater extractions are based on simulation results of the C2VSimTM model. The water balance information used in the analysis includes the data presented in **Section 2.1** and is based on historical land use (cropping) data, ET and climatic data from CIMIS, and surface water delivery data from Turlock Irrigation District, Merced Irrigation District and the City of Modesto. The accuracy of the groundwater model is considered medium. It is expected that the accuracy of this data can be improved as more information becomes available and the model is refined.

5 SURFACE WATER SUPPLY

The volume of surface water supplies delivered to the Turlock Subbasin is provided for WY 2024 per GSP Regulations (23 CCR §356.2(b)(3)). Data are summarized in a table that follows DWR reporting requirements for surface water supplies by water supply source and identifies the method used to determine the reported volume.

5.1 SURFACE WATER DATA METHODS

Surface water supply estimates for the Subbasin during WY 2024 were derived from data collected using the "best available measurement methods." These tables report total surface water farm gate deliveries as reported by the purveying agency. Direct measurements of surface water deliveries were provided by TID and MID. Directly measured data are expected to have a high level of accuracy. Riparian deliveries in the Turlock Subbasin are not metered, rather they are estimated based on diversion reporting data described by the California State Water Resources Control Board (SWRCB) Electronic Water Rights Information Management System (eWRIMS) and adjusted to meet the agricultural demand simulated by the C2VSimTM model. It is anticipated that some of these data will be refined in future reports, as data becomes available due to increased compliance with Senate Bill 88 (2015). Direct measurements of recycled water supplies originating from the Cities of Turlock and Modesto, as well as recycled water provided by Hilmar Cheese Company, were provided. The contribution of these sources to the Subbasin is included in the calculation of the change in groundwater in storage based on the C2VSimTM model provided in **Section 2**.

5.2 SURFACE WATER BY SOURCE TYPE

Using the methods described above, the surface water supplies by source in the Turlock Subbasin for WY 2024 were tabulated and summarized in **Table 5-1**. A map showing the primary surface water delivery areas in the Turlock Subbasin is provided on **Figure 5-1**.

Table 5-1: Surface Water Supplies for WY 2024 (AF)

Water Year	TID and MID Agricultural Deliveries (Measured)[1]	SRWA Urban Deliveries (Measured)	Riparian Deliveries (Estimated)[2]	Recycled Water (Measured)[3]	Total
2024	399,900	3,700	16,500	5,100	425,200

1. *Includes Turlock ID and Merced ID deliveries to their respective growers.*
2. *Includes riparian deliveries off the Tuolumne, Merced, and San Joaquin rivers based on water rights from the SWRCB eWRIMS database and adjusted to agricultural demands estimated by the C2VSimTM model.*
3. *Includes water that is treated and used for either agricultural use or groundwater recharge originating from the Cities of Modesto and Turlock, as well as treated wastewater provided by Hilmar Cheese. In WY 2024, 5,100 AFY was used in the Turlock Subbasin, representing about 1% of total surface water supplies.*

The surface water supplies in the Turlock Subbasin can vary from year-to-year due to water year type, statewide water demand and operational considerations. WY 2024 was an above normal year according to the San Joaquin Valley Index.

5.3 PART C DWR TEMPLATE

As part of the Annual Report submittal, DWR requires that a series of Excel spreadsheets be completed to summarize key water supply and use volumes for WY 2024 for the Subbasin. The volume of surface water in the template is reported by water source type. For the surface water supply, DWR requires one spreadsheet to be submitted along with the Annual Report in accordance with 23 CCR §356.2(b)(3):

- **Part C. Surface Water Supply** – the surface water supply for WY 2024 based on quantitative data and listed by water source type (23 CCR §356.2(b)(3)).

Data summarized in **Table 5-1** for WY 2024 are used in the DWR template.

The GSAs have reviewed the options for water source types on the DWR template and determined that the TID and MID agricultural deliveries on **Table 5-1** best fit within ***Water Source Type: Other***. In addition, the GSAs have determined that the estimated riparian diversions shown on **Table 5-1** also best fit the "***Other***" category. Accordingly, all surface water supplies in the Turlock Subbasin are categorized as either a ***Water Source Type: Recycled Water*** or a ***Water Source Type: Other***.

Measurement of surface water supplies for the Turlock Subbasin consists of a variety of measurement methods, but all are considered reliable and accurate. Water agencies typically measure surface water deliveries with a combination of weirs and meters that are read and reported by agency staff. Senate Bill x7-7 (SBx7-7) requires flow measurement devices to be maintained within an acceptable range of accuracy that is defined as a volumetric flow measurement within +/- 12% (23 CCR §597.3(a)(1)). Weirs and meters used in the Turlock Subbasin have been documented to conform to the SBx7-7 volumetric accounting standards (ITRC, 2012, USBR, 2001, AWWA 2006, 2012) in local water district agricultural water management plans. Procedures employed by water agencies have been standardized to further reduce potential sources of error to range between 1% to 10% depending on the measurement device. An error range of 5% to 10% is a conservative assumption for this Annual Report.

6 TOTAL WATER USE

The total water supply and use for the Turlock Subbasin is provided for WY 2024 per GSP Regulations 23 CCR §356.2(b)(4).

6.1 TOTAL WATER USE BY SOURCE

The total water supply uses the same data compiled for WY 2024 groundwater extractions and surface water supplies as presented in **Sections 4 and 5**. The data show total water use for the Turlock Subbasin was 788,200 AF in WY 2024. The total water supply for water year 2024 is summarized in **Table 6-1.** The water supply types shown on **Table 6-1** are described as follows:

- **Groundwater** includes groundwater extractions for all uses. In WY 2024, the groundwater supply totaled 363,000 AF representing about 46% of total water supplies in WY 2024.
- **Surface water** includes surface water deliveries for all uses (except recycled water, which is reported separately below). In WY 2024, the surface water supply totaled 420,100 AF representing about 53% of total water supplies in WY 2024.
- **Recycled water** includes treated wastewater and stormwater for all uses. In WY 2024, recycled water supply totaled 5,100 AF representing about 1% of total water supplies.
- **Other Water Source Type** - No *other* water source type has been identified for the Turlock Subbasin.

Table 6-1: Total Water Use by Water Source Type for WY 2024 (AF)

	Groundwater[1]	Surface Water[2]	Recycled Water[3]	Total Water Use
2024	363,000	420,100	5,100	788,200

4. *Includes "Agency" and "Private" extractions described in Section 4.*
5. *Includes "Measured" and "Estimated" surface water supplies described in Section 5.*
6. *Includes water for agricultural use originating from the Cities of Modesto and Turlock, as well as treated wastewater provided by Hilmar Cheese.*

The total surface water supply from **Section 5** that is shown distributed by water source in **Table 5-1** is presented in **Table 6-1** distributed by water supply type. The total surface water supply shown on **Table 5-1** is distributed among surface water and recycled water in **Table 6-1**.

6.2 TOTAL WATER USE BY WATER USE SECTOR

The data show that total water use for the Turlock Subbasin was 788,200 AF in WY 2024. The total water supply is summarized in **Table 6-1** and the water use sectors shown on **Table 6-2** are described as follows:

- **Agricultural** includes total water use for all agricultural water uses. In WY 2024, agricultural water use totaled 752,000 AF, representing about 95% of the total water use in the Turlock Subbasin.
- **Urban** includes total water use for all urban water uses including residential, commercial, municipal, industrial, landscaping, and other uses. In WY 2024, urban water use totaled 36,200 AF, representing about 5% of the total water use in the Turlock Subbasin.
- **Industrial** includes total water use for industrial use. Because many industrial water users in the Subbasin receive their water from municipal agencies, current data does not allow for separate tabulation of industrial water use on a consistent basin-wide basis; therefore, industrial water use is included in the urban water use sector for WY 2024.
- **Managed Wetlands** would include groundwater extractions or surface water deliveries to manage local wetlands. In WY 2024, no known groundwater extractions or surface water deliveries were used to maintain managed wetlands in the Turlock Subbasin.
- **Managed Recharge** includes total water use for all managed recharge projects. In WY 2024, no groundwater extractions or surface water deliveries were used for managed recharge operations in the Turlock Subbasin; however, several pilot projects were implemented as discussed in **Section 11**.
- **Native Vegetation** includes total water use for maintaining native vegetation. In WY 2024, no known groundwater extractions or surface water deliveries were used to maintain native vegetation in the Turlock Subbasin.

  Other Water Use includes total water use for uses other than those listed above or from unspecified uses. In WY 2024, no known groundwater extractions or surface water deliveries were used for other uses in the Turlock Subbasin.

Table 6-2: Total Water Use by Sector for WY 2024 (AF)

	Agricultural	Urban	Other	Total Water Use
2024	752,000	36,200	0	788,200

6.3 PART D DWR TEMPLATE

As part of the Annual Report submittal, DWR requires that a series of Excel spreadsheets be completed to summarize key water supply and use volumes for WY 2024 for the Subbasin. For the total water use, DWR requires one spreadsheet be submitted along with the Annual Report in accordance with 23 CCR §356.2(b)(4):

- **Part D. Total Water Use** – the total water supply by water use type and total water uses by water use sector for the preceding water year (WY 2024) for the entire Turlock Subbasin (23 CCR §356.2(b)(4)).

Data summarized in **Table 6-1** and **Table 6-2** follow the Part D DWR Template reporting requirements for total water supply and use and were collected using the best available measurement methods.

7 CHANGE IN GROUNDWATER IN STORAGE

GSP regulation §356.2(b)(5) requires inclusion of the following maps and graphs in the Annual Report for the Turlock Subbasin:

(A) Change in groundwater in storage maps for each principal aquifer in the basin.

(B) A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year.

This section provides a description of the methodology used to develop the required annual change in groundwater in storage maps and graphs.

7.1 METHODOLOGY

For the Turlock Subbasin, the change in groundwater in storage maps and graphs are based on the updated C2VSimTM model results. Between the Turlock GSP and the Annual Report, the C2VSimTM model was used to estimate changes in groundwater in storage for water years 1991-2023. The most recent update extends the simulation period though WY 2024 to support quantification of change in groundwater in storage for this Annual Report.

The methodology and data used to update the C2VSimTM for 2024 is consistent with the historical water budget analysis presented in the GSP. A summary of the C2VSimTM update is provided in **Section 2**; model development is discussed in more detail in Appendix C of the Turlock Subbasin GSP.

7.2 GRAPHICAL REPRESENTATION OF CHANGE IN GROUNDWATER IN STORAGE

GSP Regulations require that the Annual Report include graphs of the changes in groundwater in storage for historical data, to the greatest extent available, including from January 1, 2015, to the current reporting year (23 CCR §356.2(b)(5)(B)). For the 2024 Annual Report, the change in groundwater in storage is presented for the GSP historical Study Period (WY 1991 – WY 2015) and appended with updated changes in groundwater in storage from WY 2016 through WY 2024. Regulations also require the graphs to provide the following information:

- Water Year Type (Wet, Above Normal, Below Normal, Dry, Critically Dry)
- Groundwater Use
- Annual Change in groundwater in storage
- Cumulative change in groundwater in storage

7.2.1 Change in Groundwater in Storage Graph

Figure 7-1 shows the simulated annual and cumulative changes in groundwater in storage over the 34-year period from WY 1991 through WY 2024. Over the historical period, the Turlock Subbasin experienced an average annual decline of groundwater storage of 62,300 AFY, with single-year variation ranging from a decline of 341,00 AF in 2015 to an increase of 272,400 AF in 2017. Since SGMA went into effect in 2015, water years 2016-2024 have experienced an average decline in groundwater storage of 23,600 AFY.

The updated C2VSimTM results for change in groundwater in storage for the Turlock Subbasin are compared to the water year type based on the San Joaquin Valley Index (CDEC, 2024a, 2024b, see **Table 3-3**) as follows:

- WY 2024, designated as an above normal year, had an **increase** of 80,600 AF.

7.2.2 Groundwater Use Graph

Figure 7-2 shows the simulated groundwater use based on C2VSimTM model results. Between the water years 1991 and 2024, the Turlock Subbasin had an average groundwater use of 419,500 AFY. As a result of variations in local operations and hydrology, pumping ranges from a low of 334,900 AF in WY 2001 to a high of 581,300 AF in WY 2015.

The updated C2VSimTM simulation results for groundwater use in the Turlock Subbasin and the water year type based on the San Joaquin Valley Index (see **Table 3-3**, CDEC, 2024a, 2024b) are summarized as follows:

- WY 2024, designated as an above normal year, had a total groundwater use of 363,000 AF, of which 91% was for agricultural use and 9% for urban use.

7.3 SUBBASIN MAP FOR CHANGE IN GROUNDWATER IN STORAGE

GSP regulation 23 CCR §356.2(b)(5)(A) requires an annual change in groundwater in storage map for the Turlock Subbasin be included in the Annual Report.

7.3.1 Change in Groundwater in Storage Map

Figures 7-3 through **7-6** show the total change in groundwater in storage for WY 2024 for the Subbasin and by principal aquifer in a spatial distribution format as estimated by the C2VSimTM model. The change in groundwater in storage is shown in units of feet, obtained from the change in volume per area of each model element.

The figures show that in WY 2024 the Turlock Subbasin gained 80,600 AF of groundwater in storage (**Figure 7-3)**, with gains occurring in both the western and eastern sections of the Subbasin. The Western Upper Principal Aquifer (**Figure 7-4**) experienced an increase of 30,100 AF of groundwater in storage, with the greatest gains being observed in the center of the region and reductions in areas adjacent to the rivers. The Western Lower Principal

Aquifer (**Figure 7-5**) experienced an increase of 33,100 AF of groundwater in storage, with a slight gain along the southeastern boundary of the aquifer. Gain of groundwater in storage totaled 17,400 AF in the Eastern Principal Aquifer, with increases being simulated throughout most of the principal aquifer and a slight decrease along the Subbasin's eastern boundary (**Figure 7-6**).

It is noted here that the definition of undesirable results for significant and unreasonable reduction of groundwater in storage is defined by groundwater levels as a proxy. An undesirable results indicates that the volume of groundwater supply is at risk of depletion and/or may not be accessible for beneficial use. An undesirable result is also defined as long-term overdraft, based on projected water use and average hydrologic conditions. An undesirable result is defined to occur for each principal aquifer when at least 33% of representative monitoring wells exceed the MT for that principal aquifer in three (3) consecutive Fall monitoring events.

As stated previously, the model indicates the Eastern Principal Aquifer gained 17,400 AFY during WY 2024. However, during Fall 2023, 100% of the RMWs were below the MTs and in Spring 2024, 60% of the RMWs were below the MTs. Based on the WY 2024 data, the definition for undesirable results associated with groundwater storage depletion were not reached, but may be reached in WY 2025.

7.3.2 Accuracy of Change in Groundwater in Storage Maps

Using WY 1991 to WY 2015 as the base period, C2VSimTM results show declining groundwater levels and long-term reduction of groundwater in storage. During this period, C2VSimTM results show an average-annual decline in groundwater in storage of 62,300 AFY. The modeling work in support of the GSP estimated these data to have a medium level of accuracy. Since there has not been significant improvement to accuracy of the model calibration, it is expected that the WY 2024 results maintain comparable levels of accuracy. For additional information regarding calibration and uncertainty in the C2VSimTM model, please refer to Appendix C of the Turlock Subbasin GSP. The level of accuracy of storage reduction estimates is expected to improve as additional monitoring wells are installed near the rivers and near the boundary between the Eastern and Western Principal Aquifers, updated land use data is available, and the model is refined (if necessary).

8 GROUNDWATER QUALITY MONITORING

The Turlock Subbasin GSP defined undesirable results for degraded groundwater quality as significant and unreasonable adverse impacts to groundwater quality caused by GSA projects, management actions, or other management of groundwater such that beneficial uses are affected and well owners experience an increase in operational costs. This could occur if groundwater levels decline in areas where poor groundwater quality occurs at depth, poor quality groundwater is spread into un-impacted areas due to pumping, or if impacted water is associated with a GSP project.

As noted in the GSP, groundwater quality is currently regulated under a variety of federal, state and local regulatory programs administered by a variety of agencies, including the State Water Resources Control Board, Regional Water Quality Control Board, County environmental health agencies, and the US EPA. It is not the intention of the GSP to displace these programs. Rather, activities under the GSP to address the prevention of undesirable results related to groundwater quality degradation are focused on the management of water levels, projects, management actions and implementation support activities in a way that does not promote further water quality degradation, migration of contamination, or interference with ongoing cleanup efforts. The responsibility to investigate the extent of groundwater quality impacts or to clean up contamination is addressed by the responsible parties under a variety of other regulatory programs.

To ensure that GSA management is not causing a degradation of groundwater quality, the GSP established a tracking and analysis process to screen for this possibility for inclusion in annual reports. The WY 2021 Annual Report provided a baseline of existing conditions in the Subbasin, which is being used to evaluate potential degradation. This WY 2024 Annual Report includes the third annual groundwater quality monitoring assessment against this baseline.

Groundwater quality monitoring in the Turlock Subbasin focuses on six regionally important constituents that have been identified in the GSP as having the highest potential to cause undesirable results. These are used as indicator constituents for analyzing the potential for groundwater quality degradation. Three of the constituents of concern (COCs) are anthropogenic: nitrate, tetrachloroethene (PCE), and 1,2,3-trichloropropane (TCP). Nitrate and TCP result primarily from agricultural activities, whereas PCE results from industrial and commercial activities. Two of the COCs are naturally occurring metals (geogenic): arsenic and uranium. The remaining constituent, total dissolved solids (TDS), can be both anthropogenic and geogenic. Elevated TDS concentrations are known to be naturally occurring at depth in the Turlock Subbasin, while human activities appear to have contributed to elevated values of TDS, as evidenced by TDS concentrations in shallow groundwater in some parts of the Subbasin. Together, the six COCs provide a representative cross section of potential anthropogenic, geogenic, surface, subsurface, point-source and distributed contaminants that could occur in the area.

As described in the Turlock Subbasin GSP, an annual analysis of the COCs is used as an indicator to determine if groundwater quality degradation is occurring in excess of the applicable Maximum Contaminant Levels (MCLs) for the six representative COCs. As defined in the GSP, an MT is defined as a new (first-time) exceedance of an MCL in a potable supply well in the representative monitoring network for any of the Subbasin COCs. If the detected exceedance concentration is flagged as an MT, an evaluation is conducted to determine whether the degradation is caused by GSA projects or management activities, and if the degradation could rise to the level of an undesirable result. An undesirable result is defined as occurring when an MT results in increased operational costs or treatment costs for a potable well owner caused by GSA management activities. If the MT is not related to the activities of a GSA, it is not considered within the purview of the GSA to address under the GSP regulations, but the well in which the MT was defined would be monitored for potential future changes. In summary, this screening analysis focuses on public and domestic water supply wells that have new exceedances of the MCL for any of the six representative COCs. If there is a new first-time exceedance of an MCL in a potable supply well, then there is a subsequent analysis to determine whether this exceedance could have been caused by GSA management activities. For such an analysis, the technical team uses available information regarding water quality trends, water levels, management activities and other data to evaluate if MCL exceedances could be caused by GSA management activities.

The monitoring network makes best use of data from existing groundwater quality monitoring programs that are regulated by the State Water Resources Control Board (SWRCB) and the Regional Water Quality Control Board (RWQCB). As stated in the GSP, the RWQCB and other agencies have the primary regulatory responsibility for water quality. The GSAs do not intend to duplicate this authority. Rather, the analysis focuses on linkages of potential groundwater quality degradation to GSA management. The publicly available groundwater quality data are downloaded from the SWRCB GeoTracker Groundwater Ambient Monitoring and Assessment (GAMA) portal website and are updated annually.

Although the definition of undesirable results specifies that only potable water supply wells are potential indicators of groundwater quality degradation, the baseline monitoring network also includes data from monitoring wells at regulated facilities to better characterize groundwater quality.

8.1 Approach and Data Compilation

As described above, the Turlock Subbasin GSP determined that the MT is a new (first-time) exceedance of an MCL in a potable supply well in the representative monitoring network for any of the Subbasin COCs. An undesirable result may be triggered by a new (first-time) exceedance of the MCL for any COC in a potable water supply well that affects beneficial uses, increases operational costs for well owners and is caused by GSA management. The MCL for each of the six constituents of concern are as follows:

- Arsenic – 10 micrograms per liter (ug/L)[3]
- Uranium – 20 picocuries per liter (pCi/L) or 30 ug/L
- Nitrate (as N) – 10 milligrams per liter (mg/L)
- 1,2,3-Trichloropropane (TCP) – 0.005 ug/L
- Tetrachloroethene (PCE) – 5 ug/L
- Total dissolved solids (TDS) – 500 mg/L

In each annual report, new exceedances of the MCLs are evaluated in relation to GSA management of water levels and extractions, GSA projects, and GSA management actions to determine if the potential groundwater degradation is caused by GSA activities and an undesirable result has been triggered. Starting with the WY 2022 Annual Report, each annual report compares measurements of each COC to the maximum historical concentrations since WY 1991 for baseline wells in all three principal aquifers, established in the WY 2021 Annual Report.

To establish baseline conditions in the WY 2021 Annual Report, a database was created by downloading water quality data from the Statewide GAMA Groundwater Information System accessed through the State GeoTracker website for the six constituents of concern, from WY 1991 to WY 2021. This 31-year period began with the historical GSP study period (WY 1991 through WY 2015) and extended through WY 2021. The monitoring network for each constituent of concern is composed of the wells that were sampled for that constituent during WY 2021; those baseline wells are the designated RMWs for water quality.

There are 345 RMWs in the monitoring network for water quality. The RMWs include 159 public supply wells monitored by the Division of Drinking Water[4] (DDW, formerly Department of Health Services (DHS)), 29 wells monitored by the USGS, 32 monitoring wells at regulated facilities monitored by the Central Valley Regional Water Quality Control Board (CVRWQCB), and 125 domestic wells monitored under the CVRWQCB Irrigated Lands Regulatory Program (ILRP). Of these, the 284 public supply and domestic wells are considered potable water supply wells that could potentially be indicators of groundwater quality degradation.

All wells were classified by principal aquifer based on screen depth or well depth, depending upon data availability. The 345 wells in the water quality monitoring network were subdivided as follows: 137 wells in the Eastern Principal Aquifer, 26 wells in the Western Upper Principal Aquifer, 34 wells in the Western Lower Principal Aquifer, and 148 wells in the western principal aquifers (western wells screened in both the upper and lower principal aquifers or without screen information). In each Annual Report, the maximum historical concentration for COCs at each RMW is updated to include measurements collected during

[3] California's revised arsenic MCL of 10 ug/L went into effect in 2008.

[4] Water quality data from public supply wells are based on samples of raw water (untreated and unblended groundwater) and may not reflect drinking water quality provided to customers. See Consumer Confidence Reports for information about the quality of drinking water.

the previous water year. The maximum historical concentration for each well in this Annual Report is the maximum concentration of a given constituent of concern from WY 1991 to WY 2024. A table summarizing these RMWs and their maximum concentration for each COC is provided in **Appendix D**.

In this Annual Report, water quality conditions from WY 2024 are compared to the maximum historical concentrations (WY 1991 to WY 2023) for potable water supply wells and monitoring wells. Data collected in WY 2024 were downloaded from GAMA for each COC. For each RMW, the maximum concentration of each COC during WY 2024 was compared to the MCL**.** The maximum values for each COC in WY 2024 are provided in **Appendix D.**

A measurement in a potable water supply well is considered an indicator of groundwater degradation if it exceeds the MCL for the first time at that well, in which case, an MT is designated for that well. For those wells, historical water quality data are analyzed, along with changes in water quality or water levels in nearby wells, to determine if degradation is likely attributable to GSA management and is resulting in costs to well owners, in which case it would represent an undesirable result.

The MO for water quality is defined as no increase above the historical maximum concentration for any COC in a potable water supply well in the GSP monitoring program caused by GSA management activities. It was the GSAs' intent to set an MO of historical maximum concentration so that the GSAs' actions do not contribute to significant worsening of groundwater quality. Although it is recognized that certain groundwater quality impacts are beyond the control of the GSAs and beyond their purview or authority to address, this method was selected as an overall goal for characterization of water quality in the Subbasin.

8.2 GROUNDWATER QUALITY ANALYSIS

The groundwater quality monitoring network consists of publicly available data downloaded from GAMA through the State GeoTracker website. In WY 2024, 161 RMWs (out of the 345 baseline RMWs in the baseline water quality network) had at least one measurement of a COC (**Figure 8-1**). The RMWs with data in WY 2024 include 141 municipal wells, 3 domestic wells monitored under the CVRWQCB Irrigated Lands Regulatory Program, and 17 monitoring wells at regulated facilities. Most of the WY 2024 RMWs are located in the Western Principal Aquifers. In total, 46 RMWs are in the Eastern Subbasin Principal Aquifer, 24 are in the Western Upper Principal Aquifer, and 28 are in the Western Lower Principal Aquifer. In addition, 63 RMWs are classified in the western principal aquifers. In WY 2024, 184 of the baseline RMWs were not monitored for their respective COCs. These wells were monitored in WY 2021, but state monitoring plans do not require annual sampling and reporting.

The maximum values for each COC during WY 2024 were compared to the MCLs and the maximum historical values listed in **Appendix D. Figures 8-2** through **8-7** show the status of WY 2023 water quality, compared with baseline conditions. Each figure is divided by

principal aquifer and shows the RMWs that were monitored for that constituent in WY 2024. **Figures 8-2** through **8-7** show both potable water supply wells and monitoring wells at regulated facilities. The monitoring wells at regulated facilities often occur in clusters and some wells on the map may be obscured by the clusters due to the scale of the map.

On **Figures 8-2** through **8-7**, wells with a first-time exceedance of the MCL in WY 2024 are shown as a red dot. Potable water supply wells in this category are considered potential indicators of groundwater quality degradation and are the focus for the sustainable management criteria. The context of each potable water supply well in this category is assessed to determine if groundwater degradation due to GSA management actions is occurring. Monitoring wells at regulated discharge or contamination sites with a first-time MCL exceedance or value above their historical maximum are not considered potential indicators of groundwater quality degradation.

Time-concentration plots for public supply wells with new (first-time) MCL exceedances were developed and examined to see if concentrations were increasing prior to GSP implementation or if WY 2024 COC concentrations were a departure from previous trends. These plots are provided in **Appendix E,** in the order in which they are discussed in the text. Hydrographs from local monitoring wells were also examined to assess groundwater levels near these wells.

Wells shown on **Figures 8-2** through **8-7** as yellow, green, or black dots do not indicate groundwater quality degradation. The wells marked as yellow dots had a maximum concentration in WY 2024 greater than the MCL, but concentrations above the MCL had previously been detected at this well (not a first-time MCL exceedance). Wells shown as green dots had concentrations below the MCL. Wells shown as black dots did not detect the COC at concentrations above the laboratory reporting limit.

8.2.1 Arsenic

Arsenic is a naturally occurring trace element in Central Valley groundwater. Its occurrence depends on local and regional geology, groundwater pH, and groundwater redox conditions (anoxic vs. oxic). Even though arsenic is naturally occurring, arsenic concentrations can be related to groundwater management. Declining water levels corresponding with subsidence can lead to higher arsenic concentrations in some cases (e.g., Smith, Knight, and Fendorf, 2018). Lateral and vertical gradients caused by pumping can induce arsenic migration or can induce arsenic mobilization due to changes in aquifer redox conditions (Jurgens et al., 2008).

In WY 2024, 69 of the 113 RMWs established in the First Annual Report reported measurements of arsenic (**Figure 8-2**). All of these measurements were at municipal supply wells.

In WY 2024, 32 RMWs (30 percent) had maximum arsenic concentrations above the 10 ug/L MCL (yellow dots shown on **Figure 8-2**). Wells with arsenic concentrations above the MCL were located in each of the principal aquifers. Out of the 69 RMWs sampled for arsenic in WY 2024, one well, 5000273-002 reported a first-time exceedance of the 10 ug/L MCL.

Well 5000273-002 is a public supply well at a school north of Denair in the eastern Principal Aquifer (shown as a red dot in Figure **8-2**). The time-concentration plot, shown in **Appendix E**, shows that arsenic concentrations were between 8 and 9 ug/L from 2017 through Fall 2023. In May 2024, arsenic concentrations were 10 ug/L and rose to 11 ug/L in August 2024. The hydrograph for the nearby water elevation RMW TID 175 (**Appendix B**) shows that groundwater levels dropped below the 30 ft msl IM in Fall 2023. They were above the IM in WY 2024, but remained below the MT.

A recent study of arsenic trends in the San Joaquin Valley (Haugen et al., 2021) did not identify a relationship between arsenic concentrations and declining water levels. However, it did find that decreasing arsenic trends are more common than increasing arsenic trends, and decreasing arsenic concentrations may be due to downward moving oxidized water in areas with high volumes of groundwater production. One mechanism through which groundwater level declines in aquifers could mobilize arsenic is through the release of arsenic in water flowing from clays into the aquifer. The area near Well 5000273-002 has not experienced measurable land subsidence during 2015 through 2024 that would indicate significant dewatering of clays (**Section 9; Figure 9-2**). Because there is not a clear mechanism by which low groundwater levels could exacerbate arsenic concentrations in this region and the groundwater level trends do not correspond with arsenic concentration trends, it is unlikely that the WY 2024 increase in arsenic concentrations at Well 5000273-002 is related to groundwater management.

8.2.2 Uranium

In the Turlock Subbasin, uranium is a naturally occurring groundwater contaminant derived from granitic rocks in the Sierra Nevada. In the eastern San Joaquin Valley, it typically occurs in shallow, oxic (containing dissolved oxygen or having oxidizing conditions) groundwater that is rich in calcium and bicarbonate associated with modern recharge (Jurgens et al., 2008; Lopez et al., 2020). Uranium concentrations can be related to management activities through several processes. Vertical gradients from pumping or intra-borehole flow through wells screened at multiple intervals could cause shallow water with higher uranium concentrations to migrate into deeper aquifer zones. Pumping can also draw modern recharge with elevated bicarbonate alkalinity deeper into the aquifer system, where it mobilizes sorbed uranium. Uranium can also be mobilized by increased recharge of water with high bicarbonate alkalinity through agricultural soils, so processes like irrigation return flow or field flooding for managed aquifer recharge could contribute to higher uranium concentrations (Lopez et al., 2020).

Wells are required to be monitored for uranium less frequently than for other COCs, so the uranium monitoring network is smaller. The baseline monitoring network for uranium includes 54 RMWs, all municipal wells. In WY 2024, 15 of these RMWs were sampled for uranium (**Figure 8-3**). These wells are located in the Western Principal Aquifers.

No RMWs had a first-time exceedance of the 20 pCi/L MCL for uranium. One well was above its historical maximum concentration for uranium in WY 2024. Five wells reported uranium concentrations above the MCL (yellow dots shown on **Figure 8-3**).

8.2.3 Nitrate

Most nitrate in Turlock Subbasin groundwater is from anthropogenic sources, such as nitrogen fertilizer, feedlot and dairy drainage, septic systems, or wastewater drainage. Nitrate concentrations are generally highest at shallow depths in the unconfined aquifer system but can reach deeper portions of aquifers by downward vertical hydraulic gradients, which can be exacerbated by pumping, or by intra-borehole flow through wells screened at multiple aquifer depths. Increases of nitrate concentrations in wells can also occur with declining water levels.

In WY 2024, 142 of the 318 RMWs in the monitoring network were sampled for nitrate (**Figure 8-4**). This includes 122 municipal wells, three domestic wells, and 17 monitoring wells. Of these, three wells had first-time exceedances of the MCL (red dots on **Figure 8-4**). All three of these wells are municipal wells. Of sampled wells, 78 percent of RMWs had maximum concentrations beneath the MCL in WY 2024, and 77 percent of RMWs had their WY 2023 maximum nitrate concentration beneath their historical maximum.

From north to south, the first well with a first-time exceedance of the 10 mg/L MCL for nitrate as N is 5010010-051. This well is screened in the Western Upper Principal Aquifer. Its nitrate concentrations have hovered below 10 mg/L since 2010. Nitrate as N was measured at this well 34 times in WY 2024. Six of those measurements were above 10 mg/L, with a maximum of 13 mg/L. Since April, all 20 concentrations have been below 5 ug/L. The closest water level RMW is TID 139. Its water levels have remained above its MT since 2019. The Fall 2023 decrease in water levels did not correspond with an increase in nitrate concentrations. Water management by the GSA does not appear to be the cause of increased nitrate concentrations at this well.

Well 5000382-004 is located in the Western Unknown Principal Aquifer. Nitrate concentrations in this well began increasing in 2020. Its nitrate as N concentrations increased to 12 mg/L in October 2023 but then decreased to 8.4 mg/L in July 2024. The hydrograph for the nearby RMW TID 106 (**Appendix B**) shows that water levels increased in WY 2024 and are above the MT. There are no nearby water level RMW for the Western Lower Principal Aquifer. It does not appear that groundwater level declines are the cause of increased nitrate concentrations in Well 5000038-004.

Furthest south, well 2410012-006 (Well 06 “Jake”) is located between Hilmar and Delhi and screened in the Western Upper Principal Aquifer. This well is owned by Hilmar County Water District. Prior to June 2023, this well was typically monitored once a month. After June 2023, its nitrate concentrations were measured every other day. Most of the measurements were less than 10 mg/L, but some were as high as 32.5 mg/L. Water levels in TID 199A (in the Western Upper Principal Aquifer) have remained above the MT since 2019.

In summary, the nitrate trends and groundwater conditions observed near the wells with a first-time exceedance of the nitrate MCL do not suggest that undesirable results have occurred. For wells 5010010-051, 5000382-004, and 2410012-006, nearby water levels monitored at RMWs are above their MTs and relatively stable. First-time exceedances of

the MCL for nitrate in WY 2024 do not appear to be linked to water level declines or groundwater management by the GSAs.

8.2.4 1,2,3-Trichloropropane (TCP)

1,2,3-Trichloropropane (TCP) is a chlorinated hydrocarbon with a high chemical stability that often occurs as an intermediate in chemical manufacturing. It was a constituent of several soil fumigants that were widely used in the San Joaquin Valley (SWRCB, 2023). It has also been documented at industrial or hazardous waste sites. This chemical was banned from pesticides in the 1990s, but it has been found in groundwater in agricultural areas of the Central Valley (Shelton et al., 2008). As with many agricultural pesticides that were applied to the land surface, upper portions of the aquifer are more vulnerable to TCP contamination. In addition, TCP can reach lower portions of the aquifer by downward vertical hydraulic gradients, which can be exacerbated by pumping.

In WY 2024, 66 of the monitoring network's 110 RMWs were sampled for TCP, all municipal wells (**Figure 8-5**). No wells had first-time MCL exceedances, but 27 of the wells had at least one TCP measurement greater than the 0.005 ug/L MCL in WY 2024 (yellow dots on **Figure 8-5**). In WY 2024, 92 percent of wells had TCP concentrations less than their historical maximum concentration.

8.2.5 Tetrachloroethene (PCE)

PCE is a regulated volatile organic compound (VOC) that has been associated with point-source releases from dry cleaning operations, textile facilities, and metal degreasing processes. PCE is typically released onto or near the ground surface and, as such, affects mostly shallow groundwater. However, it can reach deeper portions of aquifers by downward vertical hydraulic gradients, which can be exacerbated by pumping.

In WY 2024, 25 of the 79 RMWs were sampled for PCE. Only municipal wells were sampled. No wells reported a first-time MCL exceedance. One well (a municipal well in Ceres) reported a PCE concentration above the MCL, but this was not a first-time exceedance (see yellow dot on **Figure 8-6**). No RMWs reported a concentration above their historical high concentration.

8.2.6 Total Dissolved Solids (TDS)

TDS is used as an indicator of overall salinity in groundwater. Elevated concentrations of TDS have been documented in deep Turlock Subbasin groundwater, sourced from marine sediments, but wells in the Subbasin are not deep enough to be affected by the deep saline water. Human activities can also contribute to elevated TDS concentrations and in general, shallow groundwater is vulnerable to added salts from surface activities, including irrigation return flows, wastewater discharges, regeneration of water softeners, industrial processes, or other recharge of more saline water sources. In the Turlock Subbasin, shallow groundwater generally has a higher TDS concentration than deeper groundwater.

In WY 2024, 42 of the 84 RMWs were sampled, including 25 municipal wells and 17 monitoring wells. One RMW, 5010028-038 reported a first-time MCL exceedance for TDS (see red dot on **Figure 8-7**). Most of the RMWs (67%) had maximum concentrations greater than the 500 mg/L MCL in WY 2024 (see yellow dots on **Figure 8-7**). In WY 2024, 88 percent of RMWs had TDS concentrations less than their historical maximum concentrations.

Well 50100278-038 is a municipal well located just east of the Corcoran Clay boundary. Its TDS concentrations have typically been near or below 400 mg/L, though TDS concentrations did reach 490 mg/L in 2020. In WY 2024, TDS was sampled five times. The maximum concentration was 560 mg/L in July 2024, followed by a measurement of 360 mg/L one week later. The other TDS concentrations measured were below 400 mg/L. The 560 mg/L concentration appears to be an outlier, possibly due to the amount of time that the well was pumping prior to sample collection. Due to the well's proximity to the Corcoran Clay boundary and unknown construction details, it could be influenced by groundwater level trends in any of the Western or Eastern Principal Aquifers. Eastern Principal Aquifer data is not readily nearby, but groundwater levels in the Western Lower Principal Aquifer near Ceres increased dramatically in WY 2024 (shown in Smyrna Park 4/233 hydrograph, **Appendix B**), likely due to the above normal hydrologic conditions and decreased production. The high TDS measurement in WY 2024 appears to be an outlier and does not appear to be due to groundwater management by the GSAs.

8.3 LIMITATIONS

The water quality monitoring network contains several limitations, including the distribution of wells and the disproportionate number of monitoring wells for particular constituents at active investigation sites; nonetheless, it makes best use of a wide variety of existing water quality data collected under a regulated program and approved protocols. The review presented herein represents a screening-level analysis. A few additional limitations are discussed below.

The monitoring network is limited to the baseline wells that were monitored in WY 2021 in order to maintain a consistent network that allows for comparisons to this baseline over time. Although not all wells are sampled for all constituents of concern every year, the large number of wells with water quality data allows for a reasonable distribution in the urban areas and other areas where groundwater is relied on for drinking water supply. Although monitoring wells at regulated facilities are not potable wells, they are included in the baseline to better characterize groundwater quality trends across the Subbasin.

The wells in the monitoring network may be skewed towards areas with higher concentrations of the constituents of concern. Wells may be measured more frequently for a chemical if they have reported or are at risk of high concentrations of that contaminant. For example, wells at a regulated facility with PCE contamination will be regularly monitored for PCE, but these conditions are reflective of a relatively small area around the contamination site and not of the entire Turlock Subbasin. Similarly, wells with higher

arsenic or uranium concentrations may be monitored and reported more frequently than wells that have never had high concentrations of these COCs.

WY 2024 represents the third year where potential groundwater quality degradation is evaluated. It is difficult to identify the relationship between water quality and GSA management in the short period of time since GSP implementation began. Most potable water supply wells have few monitoring events per year, making trend detection difficult. Contaminant transport from shallow to deep groundwater can take years or even decades and current concentrations can indicate legacy problems prior to GSP management. A more comprehensive review (both geographic and temporal) of trends and exceedances may be conducted as part of the GSP Five-Year Update.

Notwithstanding these limitations, the large number of monitoring sites allows for tracking trends in concentrations in the same wells (or nearby wells) over time and will provide valuable information on the potential for degradation of groundwater quality in the Subbasin. The GSAs and member agencies will continue to coordinate with the Central Valley Regional Water Quality Control Board and other agencies with primary responsibility for regulation of water quality on any local groundwater quality issues.

9 SUBSIDENCE MONITORING

As explained in the GSP, the Turlock Subbasin has not experienced any known impacts to the land surface, infrastructure or land uses from land subsidence. The GSP focused on the potential for groundwater extractions to lower water levels such that regional clays are depressurized or dewatered and compress, causing the ground surface to subside. If this type of land subsidence causes impacts to land uses or adversely affects the viability of critical infrastructure such as canals, transportation corridors, or utilities/pipelines (among other impacts), then land subsidence can lead to undesirable results as defined in the GSP.

Because of the absence of routine land subsidence monitoring at the time of GSP writing combined with the absence of any known impact from land subsidence in the Subbasin, it was difficult to determine a rate or extent of subsidence to define sustainability criteria and undesirable results. Accordingly, groundwater elevations have been used as a proxy for a rate or extent of subsidence by setting MTs at or above historical low groundwater elevations because subsidence risk is generally recognized to be initiated when groundwater levels fall below historical low levels. Given that the greatest risk for land subsidence in the Turlock Subbasin is likely the dewatering/depressurization of the Corcoran Clay and other deeper regional clay layers in the confined Western Lower Principal Aquifer, MTs are set at historical low groundwater levels to minimize future land subsidence in these and other areas in the Subbasin. In the Western Lower Principal Aquifer, MTs are set at the historical low groundwater level (Fall 2015) or the elevation of the top of the Corcoran Clay, whichever is shallower.

As described in the GSP, an undesirable result is defined as significant and unreasonable inelastic land subsidence, caused by groundwater extraction and associated groundwater level declines, that adversely affects land uses or adversely affects the use of critical infrastructure. Under the groundwater level proxy, an undesirable result will occur in the Western Upper Principal Aquifer when 33% of representative monitoring wells exceed the MT in three consecutive Spring monitoring events. In the Western Lower Principal Aquifer, undesirable results are deemed to occur when 33% of representative monitoring wells exceed the MT in two consecutive Spring monitoring events. An undesirable result will occur in the Eastern Principal Aquifer when 33% of representative monitoring wells exceed the MT in three consecutive Fall monitoring events.

To supplement groundwater elevation data, remote sensing data are used as direct measurements to evaluate land subsidence. Vertical displacement data collected using Interferometric Synthetic Aperture Radar (InSAR) by TRE Altamira Inc., under contract with DWR, are published and available each year on the SGMA Data Viewer. In addition, a GPS station, TRLK, provides measurements over time at an established ground station in the area of subsidence south of Turlock. These data for WY 2024 are discussed below.

Although the potential for future land subsidence is most likely to occur within the extent of the Corcoran Clay, the potential for land subsidence elsewhere in the Subbasin is recognized. As such, groundwater elevations and InSAR data are evaluated over the entire

Turlock Subbasin. In addition, survey points and monuments are planned to be surveyed to assess and verify observations from remote sensing data.

9.1 GROUNDWATER ELEVATION MONITORING

In light of the sustainability criteria, this section reviews groundwater elevation data from Spring 2022 through Spring 2024 for the three principal aquifers: Western Upper, Eastern, and Western Lower. As discussed in **Section 3**, the SMC were analyzed every monitoring event using the corrected WSE and revised SMC for ETSGSA that were re-surveyed in Spring 2023. These wells are summarized in **Table 3-2**.

Spring 2024 marks the third Spring monitoring event for Turlock Subbasin. In the Western Upper Principal Aquifer, undesirable results for subsidence occur when 33% of representative monitoring wells exceed the MT in three consecutive Spring monitoring events. More than 33% of wells were below their MT in Spring 2022 and Spring 2023 but in Spring 2024, only 13% of wells had water levels below their MT. Because less than 13% of wells were below their MT in Spring 2024, undesirable results were not deemed to have occurred.

The areas within the Corcoran Clay extent are considered most vulnerable to future land subsidence. Undesirable results for subsidence are deemed to occur in the Western Lower Principal Aquifer when 33% of RMWs exceed the MT in two consecutive Spring monitoring events. The definition uses two consecutive years instead of three (used for the Western Upper Principal Aquifer) as a conservative measure, recognizing the aquifer's relative vulnerability. Undesirable results for subsidence did not occur in the Western Lower Principal Aquifer in WY 2024. In Spring 2023, 25% of wells were below the MT and in Spring 2024, 20% had water levels below the MT, so undesirable results were deemed to not have occurred.

In the Eastern Principal Aquifer, undesirable results for subsidence occur after three consecutive Fall events with more than 33% of wells below their MT. In Fall 2022, 87% of the measured RMWs with designated MTs were below the MT. In Fall 2023, all 15 wells (100%) were below the MT. These two consecutive Fall exceedances do not meet the definition of undesirable results, which is based on three consecutive Fall monitoring events for land subsidence.

In the Western Lower Aquifer, the Corcoran Clay and other basin clay deposits may represent a risk of significant future subsidence. This region is overlain by extensive infrastructure (including canals, ditches, and municipal sewer systems) that could be disrupted if significant land subsidence were to occur. In the Eastern Principal Aquifer, potentially compressible clay deposits and infrastructure that could be adversely affected by subsidence are present, but less extensive. Because no damage to infrastructure has been reported to date, the amount of subsidence reported from the InSAR data is small (as noted below), and the compressibility of the underlying clay deposits has not been evaluated, it may be that use of groundwater levels as a proxy for subsidence alone is of limited

effectiveness in the Turlock Subbasin. In recent years, InSAR has improved substantially in accuracy, availability, and dependability and is recommended by DWR. In addition, the establishment of survey points and subsidence monuments and the continued measurement of groundwater level responses to planned recharge and demand reduction projects will generate additional data that may allow the refinement of the definition of SMC and undesirable results based on additional criteria. Revising the definition of undesirable results for subsidence will be considered as part of the 2027 GSP Update.

Recognizing the potential utility of InSAR, the GSP has mandated regular compilation and review of data from direct subsidence monitoring stations. These data are not used at this time as a basis for determining undesirable results but, as described in the next section, have demonstrated the occurrence of subsidence with reasonable consistency since 2015.

9.2 SUBSIDENCE MONITORING

The GSP included review of InSAR data available at the time, documented the occurrence of subsidence (despite no known adverse effects) and mandated annual screening of InSAR data. Presented below is a review of recent subsidence rates and cumulative subsidence since 2015 as documented by InSAR data. In addition, ground surface elevation trends are evaluated from the TRLK GPS monitoring station. The GSP also has mandated additional investigation if subsidence is indicated to be increasing and has directed a reevaluation as part of the five-year update when more data is available.

Vertical displacement data from InSAR were published by DWR for WY 2024 as presented on **Figure 9-1**. The figure provides color-coded pixels of the magnitude of vertical displacement in WY 2023 as indicated in the legend. The yellow and orange shading indicates either no vertical displacement or negative vertical displacement (indicative of subsidence) and the light gray shading indicates either no vertical displacement or positive vertical displacement (ground surface rise). InSAR data are sparse in some areas, primarily in the eastern Subbasin, as indicated by the lack of shading.

As shown in **Figure 9-1**, most of the western and northern Subbasin had measured a positive vertical ground displacement (ground surface rise) in WY 2024 between 0 and 0.05 feet (0.6 inches). In contrast, the average vertical ground displacement in WY 2023 was 0 to -0.05 feet (-0.6 inches), indicative of subsidence, although the magnitude was within the range of error of the technology. The eastern and southern portion of the Subbasin had measured vertical ground displacement of 0 and -0.05 feet (-0.6 inches), a subsidence rate similar to the rate observed in WY 2023. Overall, in WY 2024 there was less displacement compared to previous years. The reported error in these measurements is +/- 0.8 inches (Towill, 2024), so these observations are within the range of measurement error. Nevertheless, they show distinct spatial trends and the cumulative trend discussed below is almost uniformly downwards, which suggests the reported values are not the result of measurement errors. While the WY 2023 mapping showed significantly limited areas of ground surface rise in the east, WY 2024 mapping indicated land surface rise in areas of the central and western

Subbasin and some limited areas in the east, and land surface decline across the location of the cone of depression the central-eastern part of the Subbasin.

Responding to the GSP mandate, additional evaluation of InSAR information has been conducted. As a matter of context, the InSAR data provided in the GSP (Figure 4-61 in the GSP) for the four years from June 2015 to September 2019, indicated similar rates of subsidence (up to -0.6 inches per year) over much of the Subbasin. Both **Figure 9-2** and mapping in the GSP indicate that no subsidence occurred in the northwestern Subbasin. Similar geographic patterns were observed for the 2015-2019 data summarized in the GSP and the WY 2023 and WY 2024 maps. These showed the higher rates of downward vertical displacement south of Turlock and east of Delhi.

Figure 9-2 provides an update of the GSP InSAR map that shows the cumulative vertical displacement over the nine years from June 2015 to September 2024. Comparing the GSP map (from June 2015 to September 2019) to the updated map (from June 2015 to September 2024) indicates that the overall pattern of vertical displacement is similar, as described below.

- The area of zero subsidence in the northwestern Subbasin from June 2015 to September 2019 has persisted but its lateral extent is reduced.
- Areas of subsidence south and southwest of the City of Turlock have expanded and increased in magnitude to up to -3 inches.
- The area of subsidence east of Delhi and along the edge of the Corcoran Clay extent has expanded and increased in magnitude to over -4.2 inches.

The area of greatest subsidence, east of Delhi, has expanded since WY 2023. In contrast, the area of subsidence south and southwest of the City of Turlock has gotten smaller and decreased in magnitude.

A study conducted by Towill, Inc. and TRE Altamira, Inc., under contract with DWR, showed that InSAR vertical displacement data is accurate (Towill, 2024). The study compared vertical ground surface displacement data from InSAR to elevation data from continuously operating global positioning system (CGPS) base stations (Towill, 2024). The study found that the two data sets had a high degree of correlation and concluded that InSAR data accurately measured vertical displacement to within +/- 20 mm (0.8 inches) between January 1, 2015, and October 1, 2023.

In addition to the InSAR data, a GPS station, TRLK, was identified in the Subbasin near the City of Turlock, which provides measurements over time at an established ground station in the area of subsidence south of Turlock (**Figure 9-2**). The graph on **Figure 9-3** illustrates vertical ground displacement from 2013 to December 2024 at the TRLK station. The GPS data from TRLK shows a short-term seasonal pattern that indicates a repeated pattern of elastic compression and relaxation that is generally about 1 inch or less.

Figure 9-2 shows an overall long-term trend of subsidence at an average rate of about 0.018 ft (0.021 in) per year, calculated using the September 2013 average and September 2024

average elevations. This reflects the cumulative amount of inelastic subsidence at this location over the last 11 years. Review of the GPS data with respect to water year types (shown along the horizontal axis) indicates that after 2015, subsidence rates slowed during the period WY 2017 through WY 2019, which included two wet years, and then increased during the dry and critically dry years of WY 2020 through WY 2022. During the wet WY 2023, subsidence again slowed. During the above normal WY 2024, subsidence slightly increased.

The area of subsidence east of Delhi along the edge of the Corcoran Clay extent was further evaluated based on groundwater elevations at RMW MW-68A, screened in the Western Lower Principal Aquifer. Based on the well completion log for MW-68A, the Corcoran Clay is at a depth of 108 to 120 feet below ground surface, which corresponds to an elevation of 39 to 27 feet msl. MW-68A was constructed in December 2021 with Proposition 68 grant funding and only a few groundwater elevation measurements are available. These groundwater elevations show that in Spring 2023 and Spring 2024, groundwater elevations were below the top of the Corcoran Clay and in Fall 2023, the groundwater elevation was below the base of the Corcoran Clay.

The long-term declining trend at TRLK confirms the long-term subsidence indicated by the InSAR data and is consistent with the observed groundwater level elevations at MW-68A relative to the Corcoran Clay. Although the amount of subsidence is not great and has not resulted in any reports of infrastructure damage, it is nevertheless an indication that subsidence is occurring and may continue if groundwater levels continue to fall in the area west of Cortez and east of Delhi. The Revised GSP directs the installation of subsidence monuments at key locations and along potentially sensitive infrastructure in areas where InSAR data indicates subsidence may be occurring. In addition, ETSGSA intends to remeasure ground surface elevations adjacent to monitoring wells at key locations that were surveyed in 2023 to further assess ongoing subsidence rates and extents.

Several Projects and Management Actions, detailed in the Revised GSP, include plans for demand management and recharge projects in areas experiencing subsidence. The Groundwater Demand Reduction Plan identified the area in ETSGSA west of Cortez and east of Delhi as a Priority Action Area where demand management will be escalated and recharge projects will be prioritized. The discussion of the Land Retirement Program (Management Action 2) in the revised GSP notes that the initial implementation will be on a case-by-case basis to address potential problem areas, specifically those experiencing subsidence.

10 INTERCONNECTED SURFACE WATER MONITORING

As discussed previously, the C2VSimTM model is an integrated surface water-groundwater flow model that was developed for the GSP and was updated with current water budget data for the previous three Annual Reports and this Fourth Annual Report. That model was used to evaluate interconnected surface water in the GSP and to assess the connection between groundwater elevations and surface water depletions. Model results justified the use of groundwater levels along the rivers as a proxy for streamflow depletions.

There are 11 existing RMWs in the monitoring network for interconnected surface water along the three river boundaries (**Figure 3-4**). These wells are relatively close to the rivers, have been demonstrated to be connected directly to the rivers, and are screened in aquifers where extractions have led to streamflow depletion. Accordingly, these wells are used in the GSP monitoring network for interconnected surface water. Three clusters of multi-depth RMWs in this monitoring network (TSS-1, TSS-2, and TSS-3) are planned monitoring well locations along the Tuolumne River and Merced River anticipated for construction using funds from the DWR Technical Support Services (TSS) program. Planned depths range from 100 to 270 feet. Additional monitoring wells are planned near the rivers to further address existing data gaps and improve our understanding of groundwater-surface water interaction in these areas.

Water levels alone are insufficient to quantify streamflow depletions along the river reaches without additional assistance from the C2VSimTM model. As summarized below, both are used in the ongoing monitoring program.

10.1 GROUNDWATER ELEVATION MONITORING

As discussed in **Section 3.3.4**, groundwater levels at the RMWs are compared to the sustainable management criteria for interconnected surface water. The definition of undesirable results at a river is for at least 50% of RMWs to exceed their MTs for two consecutive Fall monitoring events. These comparisons indicate that an undesirable result has not occurred along the San Joaquin River, where no RMWs had groundwater levels at or below their respective MTs in Fall 2023 or Fall 2023.

However, undesirable results for interconnected surface water are indicated to have occurred along the Tuolumne River and Merced River.

During Fall 2023, groundwater levels at six out of 10 RMWs measured were below the MTs. Two of these RMWs are along the Tuolumne River (ETSGSA-01 and ETSGSA-02; 67% of all wells) and four are along the Merced River (ETSGSA-14, ETSGSA-17, ETSGSA-21 and ETSGSA-23; 80% of all wells). In Fall 2023, every well monitored along the Tuolumne River was beneath its MT and 80% of wells along the Merced River were beneath their MT. Fall 2023 marks the second consecutive year with more than 50% of ISW wells beneath their MT for the Tuolumne and Merced Rivers.

During Spring 2024, groundwater levels at three out of 11 RMWs were below their respective MTs. Two of these RMWs are along the Tuolumne River (ETSGSA-01 and ETSGSA-02) and one is along the Merced River (ETSGSA-21). No RMWs along the San Joaquin River had groundwater levels at or below the MTs in Spring.

As discussed previously, these declining groundwater levels below MTs have been anticipated. Hence, interim thresholds (IMs) were established for all three wells along the Tuolumne River and for four of the five wells along the Merced River. These IMs serve as an interim guidelines for 2027 water levels, with the expectation that Projects and Management Actions require some time to be implemented.

The GSAs have also recognized the need for improvements to this monitoring network and have planned for additional monitoring wells to support GSP implementation. An implementation support activity, ISA-2, is included in the GSP to improve the monitoring network and provides for additional shallow and nested monitoring wells to be installed along the rivers over time (see GSP Section 9.2.2). The GSAs conducted a project to site and design monitoring wells throughout the Subbasin, and a project to construct additional monitoring wells is underway. As noted above, several well clusters are anticipated to be installed near the rivers and funded under DWR's TSS program.

10.2 Model Estimates for Stream-Aquifer Interaction

For the GSP, the C2VSimTM model was applied to Subbasin water budgets covering the historical Study Period (WY 1991 – WY 2015) including an analysis of the stream-aquifer interaction. The First Annual Report provided an update of this analysis for WY 2016 through WY 2021 and the previous two Annual Report provided an update for WY 2022 and WY 2023, respectively. As reported in the Annual Report for WY 2023, net streamflow losses to the aquifer system was approximately 61,800 AFY for the Tuolumne River, 45,600 AFY for the Merced River, and 1,200 AFY for the San Joaquin River from the Turlock Subbasin. As explained in **Section 2**, this Annual Report includes an update of the C2VSimTM model and water budgets for WY 2024 and provides estimates for stream gains and losses during WY 2024 as shown below in **Table 10-1**.

Table 10-1: Net Gain to Groundwater from Streamflow WY 2024

Water Year	Net Gain to Groundwater from Streamflow (AFY)		
	Tuolumne River	San Joaquin River	Merced River
2024	15,000	-29,300	32,800

Notes:

1. Positive numbers represent water flowing from the stream to the groundwater system (i.e., net losing stream or recharge).
2. Negative numbers represent water flowing from the groundwater system to the stream (i.e., net gaining stream or baseflow).

As shown on **Table 10-1**, streamflow losses to the aquifer system continued during WY 2024 along the Tuolumne River (15,000 AF) and the Merced River (32,800 AF).

During WY 2024, streamflow loss along the Tuolumne River was slightly greater than the average from WY 2016 to WY 2021 (12,200 AFY). The Tuolumne River was a net gaining stream in WY 2020 and WY 2021, and in WY 2022 it switched to a net losing stream. Prior to WY 2016, the Tuolumne River was typically a net gaining stream, even during the drought years from WY 2013 to WY 2015. From WY 2016 to WY 2021, the gains/losses on the Tuolumne River varied significantly, with net losing conditions.

Streamflow loss along the Merced River during WY 2024 is slightly less than the average from WY 2016 to WY 2021 (44,700 AFY). The Merced River has been a net losing stream with relatively similar streamflow losses from WY 2016 to WY 2021. Streamflow losses decreased approximately 28 percent along the Merced River from WY 2023 (45,600 AF) to WY 2023 (32,800 AF).

The San Joaquin River switched from a net losing stream in WY 2023 to a net gaining stream in WY 2024, with streamflow gains of 29,300 AF. The San Joaquin River had previously been a net gaining stream (since 2016) until its switch to a losing stream in WY 2023. This was attributed to higher than average discharge rates in the stream.

The combination of groundwater elevation monitoring and updates to the C2VSimTM model provides complementary tools for monitoring and quantifying interconnected surface water for future Annual Reports. Future model upgrades will consider further calibration to groundwater elevation monitoring data as the monitoring network is improved over time.

11 PROGRESS ON GSP IMPLEMENTATION

GSP regulations (23 CCR §356.2(c)) require GSAs to include a description of progress toward implementing a GSP in the Annual Report, "including achieving interim milestones, and implementation of projects or management actions." To comply with this requirement, GSAs and/or their member agencies have provided brief progress reports regarding GSP implementation.

11.1 COMPLIANCE WITH SUSTAINABLE MANAGEMENT CRITERIA

Regulations require Annual Reports to contain a discussion on sustainable management criteria (SMC) to demonstrate how GSP implementation is progressing. This discussion is organized by the topics specifically listed in the regulations (23 CCR §356.2(c)), as shown below.

Some of the information has already been addressed in **Section 3**, including a comparison of groundwater elevations to sustainable management criteria in **Table 3-5**, maps showing where MT exceedances occurred (**Figures 3-7** through **3-14**), and the hydrographs, which also show MTs and MOs, in **Appendix B**. A brief summary of the relevant details is provided below.

11.1.1 Compliance with MTs and MOs

Groundwater level monitoring networks were developed to observe and document the chronic lowering of groundwater levels, reduction of groundwater in storage, land subsidence, and depletions in interconnected surface water.

Fall water level monitoring data are used to evaluate chronic lowering of groundwater level SMC. As described in **Section 3.3.4**, undesirable results for the chronic lowering of groundwater levels are defined to occur when 33% of RMWs exceed the MT for a Principal Aquifer for three consecutive Fall monitoring events. Fall 2023 was the second consecutive Fall monitoring event. Groundwater levels during the Fall 2023 monitoring event were below the MTs in 21 out of 33 RMWs that were measured and have designated MTs. MTs have not yet been developed for 8 RMWs (MW-68A, 68B, 68C, WTS-1 Shallow and Deep, WTS-2 Shallow and Deep, and ETSGSA-12R) because insufficient groundwater level data exist to set an appropriate MT. Water levels were not measured in Fall 2023 at TID 086 and TID 106. TID 010 was dry, but was listed as having levels below the MT and IM because the bottom of its screened interval is lower than the IM.

Of the 21 MT exceedances, three are in the Western Upper Principal Aquifer, three are in the Western Lower Principal Aquifer, and 15 are in the Eastern Principal Aquifer. As noted in **Section 11.1.2**, Fall 2023 groundwater levels were below the designated IMs in two RMWs: ETSGSA 08 and TID 010. In contrast, water levels were below their IM at 5 wells in Fall 2022. Groundwater levels at TID-136A, TID-175, NE Storm Basin MW-340, and ETSGSA-02 were below their IMs in Fall 2022 but were above their IMs in Fall 2023.

As discussed in Section 3.3.4.1, exceedances in the Western Upper Principal Aquifer and Western Lower Aquifer do not indicate the occurrence of undesirable results as defined in the GSP. For the Eastern Principal Aquifer, undesirable results also are not indicated by Fall 2022 and Fall 2023 data; however, if Fall 2024 water levels continue along the same trend they could indicate undesirable results occurring in the Eastern Principal Aquifer during WY 2025.

As discussed in **Section 9**, the sustainable management criteria for chronic lowering of groundwater levels are also used as a proxy for land subsidence. Spring water level monitoring is used to evaluate the subsidence SMC. In the Western Upper Principal Aquifer, 13% of wells had water levels above their MT in Spring 2024, and undesirable results did not occur. Similarly, in the Western Lower Principal Aquifer, 20% had water levels below the MT In Spring 2024 and undesirable results for subsidence did not occur.

In the Eastern Principal Aquifer, undesirable results for subsidence occur after three consecutive Falls with more than 33% of wells below their MT. WY 2024 included the second consecutive Fall.

In addition, remote sensing data have been used to evaluate land subsidence as a supplement to the groundwater elevation data. The InSAR vertical displacement data show that from September 2023 to September 2024, ground surface elevations in much of the Basin have risen up to 0.05 ft (0.6 inches). Land subsidence up to 0.05 ft (0.6 inches) still occurred in the eastern portion of the subbasin, and net land subsidence throughout the basin has occurred since Jun 2015 in the southern half of the subbasin. Data from the GPS station, TRLK, confirm that low magnitude inelastic subsidence has occurred since September 2013. Groundwater elevations at RMW MW-68A, located in the Western Lower Principal Aquifer at the eastern extent of the Corcoran Clay near Delhi, were below the top of the Corcoran Clay in Fall 2023 but above the top of the clay in Spring 2024. The GSAs have targeted locations with higher rates of subsidence for demand management implementation and recharge projects.

The sustainable management criteria for chronic lowering of groundwater levels are used as a proxy for the reduction of groundwater in storage. While a significant number of wells remained below MTs in the Eastern Principal Aquifer during this time period, modeling indicated that groundwater storage increased in the Subbasin in WY 2024 by 80,600 AF. Although groundwater in storage increased in the Eastern Principal Aquifer, groundwater levels did not increase enough to reach MTs.

As mentioned previously and discussed in **Section 8**, this Annual Report updates the evaluation of the degraded water quality sustainability indicator for WY 2024. Water quality data for the six representative COCs were downloaded from the SWRCB GeoTracker GAMA database website. There were 161 wells in the baseline monitoring network that were sampled for one or more of the constituents of concern in WY 2024. New (first-time) MCL exceedances occurred for nitrate, arsenic, and total dissolved solids (TDS), and they are discussed in **Section 8**. These new MCL exceedances do not appear to be the result of GSP projects and management actions, and therefore do not trigger undesirable results.

Fall water levels are used to determine undesirable results for interconnected surface water. The definition of undesirable results for interconnected surface waters is when at least 50% of RMWs exceed the MT for a Principal Aquifer for two consecutive Fall monitoring events. Undesirable results occurred in WY 2024. As discussed in **Section 10**, groundwater levels at six out of 10 RMWs measured were below the MTs for interconnected surface water during Fall 2023. Two of these wells are along the Tuolumne River (67% of RMWs) and four are along the Merced River (100% of RMWs). No wells along the San Joaquin River had groundwater levels below the MTs during Fall 2023.

11.1.2 Progress in Achieving Interim Milestones

Interim Milestones (IMs) were identified in Chapter 6 (Sustainable Management Criteria) of the GSP and provided in tabular form in GSP Table 7-1 (Summary of Monitoring Network, Chronic Lowering of Groundwater Levels) and GSP Table 7-2 (Summary of Monitoring Network, Interconnected Surface Water). These Interim Milestones are anticipated to be achieved over the course of the GSP implementation in increments of five years, pursuant to the regulations (CCR 23, §351(q)).

Fewer wells were below their IMs in WY 2024, compared to WY 2023. Progress toward achieving IMs during WY 2023 are shown on **Table 3-5** and the hydrographs in **Appendix B**. During both Fall 2023 and Spring 2024 monitoring events, groundwater levels were above their IMs in all but 2 wells, TID 010 and ETSGSA-08. No wells were below their IMs for Interconnected Surface Waters. Three wells that were below their IMs in WY 2023 were above their IMs in WY 2024: TID-136A in the Western Upper Principal Aquifer and TID-175 and NE Storm Basin MW-340 in the Eastern Principal Aquifer. (We note that the area surrounding ETSGSA-02 was proposed for designation as a Level 1 Priority Action Area under the Groundwater Demand Reduction Plan included in the Revised GSP, but further analysis of survey data indicated an IM exceedance had not occurred at this well during WY 2023, so the Priority Action Area designation was dropped.) Analysis of survey data and adjustment of the SMC for ETSGSA-08 indicated this well was below the IM in 2023 and 2024, so a Priority Action Area was established around this well. As described in **Section 3.3.3**, TID-10 was dry in Fall 2023 and Spring 2024; however, data from recent measurements indicate a few feet of silt at the bottom of the well. Therefore, it is unclear if the water level is below the IM. Detailed assessments of the estimated IMs will be provided in the first Five Year Update of the Turlock Subbasin GSP, with status checks provided in future annual reports.

11.2 Implementation Support Activities

The GSAs have actively worked towards the goals of arresting groundwater levels declines by 2027 and bringing the basin into sustainable conditions in compliance with SGMA. During WY 2024, the GSAs consulted closely with DWR to revise the GSP and to implement projects and management actions to augment water supply and reduce groundwater demand. Highlights of work completed in WY 2024 are described below. The status of projects and management actions and updates are detailed in **Tables 11-1, 11-2, 11-3, and 11-4**.

11.2.1 GSP Revisions

In January 2024, the GSAs received notification that DWR had determined the GSP to be incomplete. DWR identified two deficiencies in the GSP that required provision of more information regarding the selection of SMC for the chronic lowering of groundwater levels and more details on projects and management actions to mitigate overdraft. The GSAs worked alongside DWR to develop corrective actions for these deficiencies and submitted the Revised GSP on July 12, 2024. The Revised GSP was approved by DWR on February 27, 2025.

11.2.2 Public Outreach and Workshops

During WY 2024, and throughout the GSP revision process, the GSAs continued public outreach. Regular meetings of the WTSGSA and ETSGSA TACs, as well as joint TAC meetings, have been open to the public and subject to the Ralph M. Brown Act. ETSGSA held five public workshops throughout WY 2024. These included workshops to support development of a pumping management framework and to develop Proposition 218 assessment funding strategies for ongoing implementation of the GSP as well as planned projects and management actions, and public workshops on groundwater use management and use of ET data for groundwater accounting.

11.2.3 Implementation of GSP Monitoring Network

The GSAs and associated member agencies in the Subbasin conducted the fourth and fifth GSP monitoring events in Fall 2023 and Spring 2024. The water levels measured during these monitoring events were uploaded to the SGMA portal before the January 1 and July 1 deadlines.

The GSP groundwater elevation monitoring network is composed of 52 RMWs. The monitoring network for chronic lowering of groundwater levels includes 47 RMWs and the monitoring network for interconnected surface water includes 12 RMWs, with 7 RMWs that overlap both monitoring networks. The network for chronic lowering of water levels is also the same network for reduction of groundwater in storage, subsidence and interconnected surface water.

The monitoring network is composed of both existing and proposed monitoring wells. Existing wells include selected California Statewide Groundwater Elevation Monitoring (CASGEM) wells, municipal multi-completion wells in the Cities of Ceres and Turlock and the town of Denair, USGS monitoring wells, a City of Ceres inactive irrigation well, and a series of active and inactive production wells and monitoring wells in the eastern Subbasin developed as part of the ETSGSA monitoring program. During late 2021 and early 2022, seven additional monitoring wells were constructed with Proposition 68 grant funding from DWR. The GSAs are planning to install up to 30 additional monitoring wells beginning in 2025. In addition, ETSGSA worked with DWR to plan and permit four clusters of monitoring wells along the Tuolumne River and Merced River and near the boundary between the

Eastern and Western Principal Aquifers through DWR's Technical Support Services (TSS) program. The monitoring networks are illustrated on **Figures 3-1** through **3-4**.

The GSAs measured water levels in 46 RMWs during each monitoring event during WY 2024 and uploaded the data to the SGMA portal. TID 010 could not be measured because it was dry, but the bottom of its screened interval is lower than its MT and IM. Therefore, it was considered to be below its SMC. In Fall 2023, TID 061A, TID 083, and TID 106 were not monitored because of nearby pumping, but they were monitored in Spring 2024.

In April 2023, ETSGSA conducted a survey of their monitoring network wells. As expected, differences in reference point (RP) and ground surface elevations were recorded; some changes were significant. Reference point elevation corrections ranged from -16.1 feet to 7.1 feet, with most wells seeing a downward correction of the RP. In WY 2024, with guidance from DWR, ETSGSA conducted an analysis to correct historical groundwater elevation data. The SMC for seven wells were adjusted, to correct for the changes in RPs and SMC. Five wells had SMC determined by data from a nearby out-of-network well. Their historical water elevation data was corrected, but their SMCs will be determined after the additional wells are surveyed in 2025. The corrected WSEs and SMCs were incorporated into the analyses in this Annual Report.

The water quality monitoring network incorporates numerous existing groundwater quality monitoring programs conducted by others and overseen by the RWQCB and other agencies with primary responsibility for regulating water quality in the State. As discussed in **Section 8**, a baseline monitoring network was established in the First Annual Report based on water quality data compiled from WY 1991 through WY 2021. Water quality data collected from baseline monitoring network wells during WY 2024 for the six constituents of concern were downloaded from the SWRCB GeoTracker GAMA database website. There were 161 RMWs in the baseline monitoring network that were sampled for one or more of the constituents of concern during WY 2024, as shown on **Figure 8-1** and tabulated in **Appendix D**. New (first-time) MCL exceedances occurred for arsenic, nitrate, and TDS, but not for the other COCs, as discussed in **Section 8**. These first-time MCL exceedances do not appear to be related to GSA management.

11.2.4 Projects

Sections 8.1 through 8.3 of the GSP provide a list of 23 projects[5] identified for implementation within the Subbasin. Projects sufficiently developed for near-term implementation are categorized as Group 1 and Group 2 projects. Additional projects, which will be implemented as needed as planning development efforts proceed, are identified as Group 3 projects. For this Fourth Annual Report, there are no revisions to the project list; however, several Group 3 projects in ETSGSA are advancing. The details regarding some

[5] The GSP (Section 8.1, page 8-2) states that "…a final list of 24 possible projects was identified for inclusion in the GSP". The final number was 23 as indicated by the numbering on Table 8-2 of the GSP.

other projects have changed as planning and engineering studies have been completed. Additional project changes (i.e., revisions, expansions, etc.) may occur as the GSP is implemented. These changes are envisioned to be included in the Opti (see **Table 11-4**, ISA#11) project database, and described in future Annual Reports.

Table 11-1 contains a summary of updated project information for Group 1 and 2 projects. **Table 11-2** includes a brief update of the Group 3 projects. Major project accomplishments in WY 2024 are described below.

- The Regional Surface Water Supply Project, led by the Stanislaus Regional Water Authority (SRWA) delivers treated Tuolumne River water in lieu of groundwater use for the City of Ceres and the City of Turlock's urban use. This project delivered on average 10 MGD in 2024 (about 11,208 AFY in lieu groundwater recharge in 2024).

- Replenishment water delivered to ETSGSA from WTSGSA increased from approximately 4,000 AF in 2023 to approximately 6,000 AF in 2024. Funding was approved to continue and expand replenishment projects.

- Increased purchase and delivery of MID water to Dry Creek landowners for recharge on Dry Creek of approximately 2,000 AF, the highest total to date.

- Over 300 AF of replenishment water was delivered for on-farm recharge and 181 AF of replenishment water delivered through Idle Lands Project in 2024. Approximately 225 AF of replenishment water delivered to property owners with on-farm micro/drip basins in 2024. The GSAs continue to evaluate opportunities for on-farm recharge.

- In 2024, approximately 8,000 AF of water was captured in TID's Ceres Main Regulating Reservoir. This resulted in a reduction in groundwater pumping from 2023 to 2024 in Service Area 6 by over 50% and in Service Area 7 by over 90%.

11.2.5 Management Actions

The Turlock Subbasin GSP includes seven Management Actions (MAs). Management Actions refer to non-structural programs and policies designed to incentivize actions and strategies to support the sustainability of the Subbasin. Not all MAs are designed to be implemented consistently throughout the Subbasin. MAs are designed to be implemented as needed by the GSAs to achieve sustainability. The MAs are described in Section 8.4 of the GSP.

An update on the implementation of the MAs is provided in **Table 11-3** with selected MAs described below.

In 2024, the GSAs completed the **MT Exceedance Action Plan**, which is provided in **Appendix F**. This document describes the initial definition of MTs and provides a systematic action plan responding to exceedances. This action plan involves investigation of causes,

identification of impacts, management or mitigation measures, outreach and coordination, and documentation.

In 2024, the GSAs began development of a **Well Mitigation Plan** as part of the Revised GSP process. This Plan, provided in **Appendix G**, describes the purpose of the Well Mitigation Program, which is to provide mitigation for drinking water wells that have experienced adverse impacts due to declining groundwater levels during the SGMA implementation period. Potential adverse impacts are primarily focused on declining well yield or wells going dry as a result of chronic groundwater level decline. Potential adverse impacts may also include resulting land subsidence and/or degraded groundwater quality, which are considered unlikely to occur, but are nevertheless addressed in the Program. This Program provides emergency, interim, and long-term mitigation measures for drinking water wells that have experienced adverse impacts due to declining groundwater levels occurring after January 6, 2022, the date of adoption of the Joint GSP. Mitigation for other supply wells (e.g., agricultural irrigation, municipal, industrial or stock wells) may be considered under this Program on a case-by-case basis, based on the extent to which adverse impacts are caused by actions under the management of the GSAs. The Well Mitigation Plan describes a detailed process for mitigating impacts on drinking water wells adversely affected by declining groundwater levels while the GSAs are implementing the Subbasin GSP. It describes a well mitigation committee, potential partnerships with NGOs, and the mitigation process (including eligibility, application process, mitigation measures, and outreach). The Plan also discusses funding and anticipated costs of the program. The Mitigation Plan was adopted by the GSAs on January 23, 2025, with implementation to commence in 2025.

In July 2023, the ETSGSA, on behalf of both GSAs, submitted a grant application to the DOC to develop and implement a **Multi-Benefit Land Repurposing Program** (MLRP) that provides multibenefit strategies to repurpose agricultural land to non-irrigated use. The work is focused primarily in ETSGSA, but will have applicability across the Subbasin. DOC awarded the Subbasin a grant of $8.89 million to develop and implement an MLRP with support from the local Resource Conservation Districts, California Farmland Trust, Stanislaus and Merced Counties, TID, MID, Dry Creek Flood Control District, Sustainable Conservation and Self Help Enterprises. In WY 2024, ETSGSA began development of the MLRP.

In 2024, ETSGSA developed and began implementation of a **Groundwater Demand Reduction Program** adopted as part of the Revised GSP. This includes demand reduction strategies, supply and recharge projects, rules and regulations, a grower-facing management portal, monitoring, and adaptive management and adoption of funding mechanisms. With significant public input, ETSGSA developed a framework for a Groundwater Use Fee under the adopted Groundwater Use Reduction Plan to fund the necessary projects and management actions and initiated a Proposition 218 process to adopt the fee in early 2025. ETSGSA also began development of rules and regulations regarding groundwater use measurement, reporting and regulation, and identified rules and regulations topics regarding credits and transfers to be evaluated and developed in 2025. The Groundwater Accounting Platform, a grower-facing internet portal used for grower and GSA tracking and management of groundwater use, was developed and launched late in WY

2024. We note that basin-wide ET analysis was conducted to support this portal and approximately 1,600 acres of land were newly fallowed in WY 2024, bringing the total fallowed acreage to approximately 6,000 acres.

11.2.6 Additional Implementation Support Activities

Implementation support activities (ISAs) are a set of activities and actions that will be implemented over the course of GSP implementation. The 11 initial ISAs identified in Chapter 9 of the GSP focused on the formative activities anticipated for the first 5 years. **Table 11-4** provides a list of the ISA activities and a brief update for each.

In July 2024, a **Groundwater Accounting Structure Agreement** between WTSGSA and ETSGSA was approved. This agreement will reduce overdraft in ETSGSA, provide for the use and payment for decreasing amounts of transitional water to ETSGSA by TID, provide replenishment water to ETSGSA when available to offset groundwater use, and use revenue from the use of transitional water under the agreement towards groundwater sustainability projects. This Agreement will allow for efficient collaboration between WTSGSA, TID and ETSGSA to achieve Subbasin sustainability.

Table 11-1: Group 1 and 2 Projects - Projects Developed for Near-Term Implementation

Number	Proponent(s)	Project Name	Primary Mechanism(s)[1,2]	Partner(s)	Group	Included in GSP Modeling Scenarios	IMPLEMENTATION UPDATE
WTSGSA – Urban and Municipal Projects							
1	Cities of Turlock and Ceres	Regional Surface Water Supply Project	In-lieu Groundwater Recharge	Turlock Irrigation District	1	×	SRWA has continued normal operations. Plant capacity remains at 15 MGD, with monthly surface water deliveries during 2024 varying by seasonal demand and averaging approximately 10 MGD. Volumetric demand planned for 2025 will be similar to 2024.
2	Community of Hickman	Waterford/Hickman Surface Water Pump Station and Storage Tank	In-lieu Groundwater Recharge	City of Modesto, Modesto Irrigation District	2	×	Grant for transmission line from Waterford to Hickman has been approved but not funded due to FY 24/25 State budget constraints. The new FY 25/26 State budget may possibly fund grant in July 2025. Waterford made a formal request and offer to purchase treated water from the City of Modesto in August 2024 and is awaiting a response.
3	City of Turlock	Dianne Storm Basin	Direct Groundwater Recharge	Turlock Irrigation District	2	×	TID and City entered into an MOU to allow use of Basin for recharge starting in 2023. The MOU is setup to allow recharge activities to continue in future years when Replenishment Water is available. In 2024, 640 acre-feet of Replenishment Water was delivered to the Dianne Storm Basin.
4	California State University - Stanislaus	Stanislaus State Stormwater Recharge	Direct Groundwater Recharge	N/A	2	×	No additional information available at this time.
5	City of Modesto	Advanced Metering Infrastructure Project (AMI)	Water Conservation	N/A	2	×	A consultant has been retained and preliminary work begun for developing a financial model, and preparing an RFP for solicitation and deployment of a new AMI system and related infrastructure. A WaterSmart Grant application was submitted to help fund a SCADA system which will support the AMI project.

Table 11-1: Group 1 and 2 Projects - Projects Developed for Near-Term Implementation

Number	Proponent(s)	Project Name	Primary Mechanism(s)[1,2]	Partner(s)	Group	Included in GSP Modeling Scenarios	IMPLEMENTATION UPDATE
WTSGSA – Agricultural Water Supply Projects							
6	Turlock Irrigation District	TID On-Farm Recharge Project (in WTSGSA)	Direct or In-lieu Groundwater Recharge	N/A	2	×	Continuing to use GRAT to evaluate program opportunities. TID Board approved to continue the project in the future. In 2024, 306 acre-feet of Replenishment Water delivered using winter Flood-MAR and winter in-lieu water, as well as 181 acre-feet of Replenishment Water delivered through the Idle Lands Project.
7	Turlock Irrigation District	Recycled Water from City of Turlock	In-lieu Groundwater Recharge	City of Turlock	2	×	RWQCB decided against amending Turlock's existing wastewater NPDES permit because Turlock's NPDES permit is up for renewal in January 2026. Recycled water to the Lateral 5 1/2 Regulating Reservoir will be included in Turlock's renewed NPDES permit, which is anticipated to be renewed in June 2026.
8	Turlock Irrigation District	TID Ceres Main Regulating Reservoir	In-lieu Groundwater Recharge	N/A	2	×	In 2024, 7,900 AF of water was captured in the Ceres Main Regulating Reservoir. Groundwater pumping decreased by 53% in Service Area 6 and 91% in Service Area 7 from 2023 to 2024.

Table 11-1: Group 1 and 2 Projects - Projects Developed for Near-Term Implementation

Number	Proponent(s)	Project Name	Primary Mechanism(s)[1,2]	Partner(s)	Group	Included in GSP Modeling Scenarios	IMPLEMENTATION UPDATE
ETSGSA - Agricultural Water Supply Projects							
9	Eastside Water District/ Ballico-Cortez Water District/ ETSGSA	Agricultural Recharge Project (in ETSGSA)	Direct or In-lieu Groundwater Recharge		2	×	Upgraded infrastructure and connected more than 2,500 acres in EWD and BCWD to sidegates on the Highline Canal and Main Canal. Increased delivery of replenishment water from 3,938 acre-feet in 2023 to 5,887 acre-feet in 2024. EWD worked with TID to adopt design standards for new sidegates and worked with growers to plan installation of new side gates to expand replenishment water delivery. Worked with TID to complete conceptual design of a pipeline project to deliver 20,000 acre-feet of replenishment water to growers in the cone of depression and into the Sand Creek and Mustang Creek drainages. The pipeline is planned for a capacity of 50 cfs and will also be capable of delivering flood water from the Tuolumne River for direct recharge. Ongoing funding is budgeted at $200,000/year to fund continuation and expansion.
10	Eastside Water District	Mustang Creek Flood Control Basin Project (Previously Mustang Creek Flood Control Recharge Project)	Direct or In-Lieu Groundwater Recharge	Stanislaus County, Turlock Irrigation District	2	×	Worked with TID on planning to upgrade the exit gates of the flood control basin store up to approximately 100 acre-feet of water for early season irrigation and in lieu recharge. Further evaluation of dry well pilot study results is continuing to determine if recharge using the flood control basin is a viable alternative.
11	Eastside Water District/ ETSGSA	Upland/Waterford Pipeline Project	Direct or In-lieu Groundwater Recharge	Merced Irrigation District	2	×	Increased delivery of MID water to Dry Creek land owners for recharge on Dry Creek to 1,790 acre-feet, the highest level since the contract was in place. Working with MID and group of growers to identify projects for expansion of surface water delivery for in lieu recharge and recharge in Dry Creek. Worked with MID to develop concepts for expansion of surface water delivery by constructing a regulating reservoir to increase spill from the Northside Canal, and for optimization of water delivery capacity in conjunction with an ongoing flume replacement project.

Table 11-1: Group 1 and 2 Projects - Projects Developed for Near-Term Implementation

Number	Proponent(s)	Project Name	Primary Mechanism(s)[1,2]	Partner(s)	Group	Included in GSP Modeling Scenarios	IMPLEMENTATION UPDATE
12	ETSGSA	Development of Diffused Stormwater Project	Direct or In-Lieu Groundwater Recharge	EWD, BCWD, MID, Stanislaus County, Merced County, East Stanislaus RCD, East Merced RCD	2		Conducted a GIS analysis to assess the capacity for construction of stormwater storage and recharge basins throughout ETSGSA. Worked on development of a permitting plan and standard designs as part of the MLRP program. Conducted outreach to landowners and received applications for eight recharge basin projects for implementation starting summer 2025.
13	Eastside Water District/ ETSGSA	Sand Creek Watershed Flood Attenuation and Recharge Project	Direct Groundwater Recharge	EWD, SCFCD, Turlock Irrigation District	2		EWD acquired land and began construction of a direct recharge project on repurposed farm land that will receive water from Sand Creek and a new side gate from the Highline Canal. Investigated soil conditions and constructed an approximately 20 acre-foot capacity recharge basin that will be connected to the Highline Canal, and prepared approximately 10 acres of land for spreading and direct recharge of flood flows of recharge from Sand Creek by Flood MAR. Began design and permitting of flood flow diversion structures on Sand Creek.
14	ETSGSA	Dry Creek Hydrology Restoration, Floodplain Reconnection, and Recharge Project	Direct or In-Lieu Groundwater Recharge	EWD, MID, Merced County, East Merced RCD	2		Conducted outreach and GIS analysis, and began working with a group of growers in the Dry Creek watershed to identify opportunities for floodplain reconnection and recharge projects in concert with Project 11, above. Began development of standard designs and development standards and preparation of a permitting plan under the MLRP program.

[1]The primary mechanism of the Project as conceptualized. Projects may be used for multiple functions to support groundwater sustainability and multiple other benefits during implementation.

[2] Demand Management is a category of Management Action strategies described in Section 8.4 of the GSP. This action will be implemented as needed, along with projects and management actions within each GSA to achieve sustainability.

Table 11-2: Group 3 Projects - Other Projects to be Implemented as Needed

Number	Proponent(s)	Project Name	Primary Mechanism(s)[1]	Partner(s)	IMPLEMENTATION UPDATE
WTSGSA – Group 3 Urban and Municipal Water Supply Projects					
12	City of Modesto	San Joaquin River Flood Diversions	Direct or In-Lieu Groundwater Recharge	N/A	Cities of Modesto and Ceres and TID are continuing to explore opportunities to capture stormwater, wastewater, and other flows for use within the subbasin.
WTSGSA – Group 3 Agricultural Water Supply Projects					
13	Turlock Irrigation District	La Grange Recharge Project (Within TID Irrigation Service Area)	Direct Groundwater Recharge	N/A	No additional information available at this time.
14	Turlock Irrigation District	TID Lateral 5 ½ Regulating Reservoir	In-Lieu Groundwater Recharge	N/A	Applied for a grant to construct the Lateral 5 1/2 Regulating Reservoir and award notification is expected to come out April 2025. If the grant is awarded, then construction will start November 2025 and be completed by February 2026 in time for the start of the 2026 irrigation season.
15	Turlock Irrigation District	Additional TID Regulating Reservoirs	Direct or In-Lieu Groundwater Recharge	N/A	Lower Lateral 3 Regulating Reservoir is in TID's Capital Improvement Plan and is scheduled for 2035.
16	Turlock Irrigation District	Recharge from TID Conveyance System	Direct Groundwater Recharge	N/A	TID worked with private property owners who installed on-farm micro/drip basins on a parcel with an existing sidegate for Replenishment Water deliveries when available. In 2024, 225 acre-feet of recharge water was applied to these basins.
17	Turlock Irrigation District	Intertie Projects	In-Lieu Groundwater Recharge	N/A	No additional information available at this time.

Table 11-2: Group 3 Projects - Other Projects to be Implemented as Needed

Number	Proponent(s)	Project Name	Primary Mechanism(s)[1]	Partner(s)	IMPLEMENTATION UPDATE
ETSGSA – Group 3 Agricultural Water Supply Projects					
18	Eastside Water District/ETSGSA	Rouse Lake Pipeline Project	Direct and In-Lieu Groundwater Recharge	TBD	Continued outreach and coordination with growers about potential strategies to divert replenishment water and stormwater to Rouse Lake. As part of Project No. 9, maintained the objective of potential future connection of Rouse Lake to a pipeline that will deliver water from the TID Main Canal to the cone of depression.
19	Eastside Water District	Conveyance Improvements Project	Direct or In-Lieu Groundwater Recharge	Merced Irrigation District	Continued quarterly coordination discussions with MID to identify potential opportunities and constraints.
20	Eastside Water District/ETSGSA	Direct Recharge in Agriculture Areas	Direct Groundwater Recharge	TBD	Continued quarterly coordination discussions with TID to identify potential opportunities and constraints for expansion of replenishment and flood water through identification of strategic side gate connections in the Upper Main and Main Canal, and along the Highline Canal near BCWD.
21	Eastside Water District/ETSGSA	Main Canal Replenishment Water Project	In-Lieu Groundwater Recharge	Turlock Irrigation District	Conceptual design completed under Project No. 9, which will have capacity to deliver both replenishment water and flood water to the cone of depression, the Sand Creek Watershed and the Mustang Creek watershed for direct recharge. Considering combining with the Rouse Lake Project.

[1]The primary mechanisms of the Project as conceptualized. Projects may be used to support groundwater sustainability and other benefits during implementation.

Table 11-3: Management Actions

Number	Project Name	Primary Mechanism(s)[1,2]	Proponent(s)	IMPLEMENTATION UPDATE
Demand Reduction Strategies				
1	Multi-Benefit Land Repurposing Program (Previously Voluntary Conservation and/or Land Fallowing)	Demand Management	WTSGSA	Not deemed necessary at this time.
			ETSGSA[3,4]	Under a grant from DOC continued outreach, investigation, and development of an MLRP plan. Evaluated and developed MLRP options and incentive payment structures with focus on land repurposing to non-irrigated use that is expected to eventually expand to between 20,000 and 30,000 acres. MLRP concepts developed include on farm retention and storage basins, orchard swale rewilding, stream hydrology restoration, flood plain reconnection, off stream recharge and storage basins, flood flow dispersal, flood MAR and rotational fallowing. Issued an open call for projects and received over 30 applications. Identified four projects for implementation as part of an MLRP pilot program starting in summer 2025, with other projects anticipated to start in fall and winter of 2025.
2	Conservation Practices	Demand Management	WTSGSA	Member agencies implementing UWMPs & AWMP. No additional implementation is deemed necessary at this time.
			ETSGSA[3]	Evaluated and adopted rules and regulations for cover cropping to increase soil water moisture retention and recharge. Updated the Groundwater Accounting Platform to include cover cropping benefits to irrigation efficiency. As part of the MLRP program, conducted outreach to educate growers about the potential benefits of cover cropping on irrigation efficiency.
Pumping Management Framework				
3	Groundwater Extraction Reporting Program	Pumping Reduction	WTSGSA	TID contract with LandIQ began with the 2023 irrigation season. Working with LandIQ to understand datasets.
			ETSGSA[3]	Continued contract with LandIQ to conduct ET consumptive use measurement and reporting. Developed rules and regulations for consumptive groundwater use measurement and reporting. Developed a Groundwater Accounting Platform as a grower facing tool to report and manage groundwater consumptive use at the parcel and water account scale.

Table 11-3: Management Actions

Number	Project Name	Primary Mechanism(s)[1,2]	Proponent(s)	IMPLEMENTATION UPDATE
4	Groundwater Allocation and Pumping Management Program	Pumping Reduction	WTSGSA	Not deemed necessary at this time.
			ETSGSA[3]	Developed and began implementation of a Groundwater Demand Reduction Plan adopted as part of the updated GSP. Developed the Groundwater Accounting Platform (see MA 3) to support program implementation. Worked with growers to develop rules and regulations for groundwater accounting and use management. Established Priority Action Areas where the implementation of the Groundwater Demand Reduction Plan will be escalated based on monitoring data. Conducted grower, community and stakeholder outreach to inform the public of these programs and gather input during their development.
5	Groundwater Extraction Fee	Pumping Reduction	WTSGSA	Not deemed necessary at this time.
			ETSGSA[3]	Developed a framework for a Groundwater Use Fee under the adopted Groundwater Use Reduction Plan to fund the necessary projects and management actions. Conducted a Fee and initiated a Proposition 218 process to adopt the fee in early 2025. Conducted public workshops to inform the public and gather community input.
6	Groundwater Pumping Credit Market and Trading Program	Pumping Reduction	WTSGSA	No additional information available at this time.
			ETSGSA[3]	Began development of rules and regulations regarding groundwater use measurement, reporting and regulation, and identified rules and regulations topics regarding credits and transfers to be evaluated and developed in 2025.
Domestic Well Mitigation				
7	Domestic Well Mitigation Program	Pumping Reduction	WTSGSA	Developed and approved a Well Mitigation Program in January 2025. Full implementation of the program will begin July 2025.
			ETSGSA	

Table 11-3: Management Actions

Notes:

[1]The primary mechanism of the Project as conceptualized. Projects may be used for multiple functions to support groundwater sustainability and multiple other benefits during implementation.

[2] Demand Management is a category of Management Action strategies described in Section 8.4 of the GSP. This action will be implemented as needed, along with projects and management actions within each GSA to achieve sustainability.

[3] ETSGSA activities focused on development and early implementation of a Groundwater Demand Reduction Plan as part of the Revised GSP adopted on July 11, 2024. The work focused primarily on refinement and implementation of demand management strategies, development of Rules and Regulations, development a Groundwater Use Fee Program, and development of a Groundwater Accounting Platform portal for growers and GSA management. Work on other ISA's was advanced to support these goals.

[4] ETSGSA worked on development of Multibenefit Land Repurposing Program (MLRP) under a grant from the California Department of Conservation Block Grant program during this reporting period. Because the three year grant funding period includes both planning and implementation, DOC has agreed to fund early implementation of projects as the plan is being developed, so ETSGSA has focused on planning as well as the identification of projects and pilot projects for early implementation starting in 2025.

Table 11-4: Implementation Support Activities

Number	Project Name	Proponent(s)	IMPLEMENTATION UPDATE
1	Monitoring and Reporting Groundwater Data	WTSGSA	Ongoing monitoring and reporting to DWR of spring and fall water level measurements. Compiling data and preparing Annual Report for WY 2024. Review and analysis of data to inform Subbasin management and implementation of ETSGSA's Groundwater Demand Reduction Plan. Corrected historical groundwater elevation data and updated SMC for resurveyed ETSGSA reference point elevations.
		ETSGSA	
2	Addressing Identified Data Gaps including Expanding & Implementing the Existing Monitoring Networks	WTSGSA	Planning for installation of up to 30 additional monitoring wells utilizing GSA funding beginning in 2025. Wells have been sited with preliminary designs completed. Conducted planning and permitting for installation of nested monitoring wells in ETSGSA under the DWR's Technical Support Services (TSS) program and installed a cluster of three monitoring wells in the northwest portion of ETSGSA, near the Tuolumne River and a second cluster near the Merced River. Two other TSS well clusters are scheduled to be installed in early 2025, one near the Merced River and the other near the boundary between the Eastern and Western Principal Aquifers to further assess the hydrogeology of this transition zone. Additional monitoring wells, likely 4-6, will be installed in WTSGSA by the end of 2025.
		ETSGSA	
3	Accounting Mechanism for Water Supplies within the Subbasin	WTSGSA	The Groundwater Accounting Structure Agreement between ETSGSA, WTSGSA, and TID was approved in July 2024. The agreement underlies and helps to guide and clarify the implementation of management actions under ETSGSA's Groundwater Demand Reduction Plan and Groundwater Use Fee Program. ETSGSA agrees to reduce overdraft by 71,000 AFY through demand management over the GSP's 20-year timeframe. Transitional water provided by WTSGSA will be allocated to ETSGSA to allow ETSGSA to overcome its deficit over time, cushioning the impact of reduced pumping. Transitional water will be purchased at $50/AF, and TID agrees to use this revenue on projects and programs that further groundwater sustainability in the Turlock Subbasin. TID will also continue its practice of providing Replenishment Water up to 35,000 AFY to ETSGSA in years when TID growers receive a full allotment of surface water (48 inches). ESTGSA, WTSGSA and TID have met regularly since execution of the agreement to work on the implementation of infrastructure projects to expand delivery of replenishment water in ETSGSA.
		ETSGSA	
4	Refining and Implementing Projects and Management Actions (Adaptive Management)	WTSGSA	Implementing the Projects and Management Actions identified in the GSP (see project tables). Additional projects to bolster recharge and water supplies being evaluated for inclusion into GSP in future. No additional adaptive management actions needed at this time.
		ETSGSA	Member agencies EWD and BCWD continued implementing Project No. 2 (Group 2 Agricultural Recharge Project) and are working with ETSGSA to transition implementation once a funding mechanism is in place. ETSGSA is working with TID and MID on conceptual designs to expand the delivery of surface water for in lieu and direct recharge, and have engaged growers in project planning activities. Development of a Multibenefit Agricultural Land Repurposing Plan (MALRP) in cooperation with local partners (East Stanislaus RCD, East Merced RCD, Stanislaus and Merced Counties, Sustainable Conservation, Self Help Enterprises and other consultants). Outreach to growers has resulted in applications for over 30 potential MLRP projects and selection of four for early implementation as pilot projects. Priority Action Areas were identified under the Groundwater Demand Reduction Plan for escalation of demand reduction and implementation of MLRP and other projects.

Table 11-4: Implementation Support Activities

Number	Project Name	Proponent(s)	IMPLEMENTATION UPDATE
5	Refine Groundwater Model Incorporating New Data & Studies	WTSGSA	Refinements to the model were delayed due to the timing of LandIQ data availability, budget constraints, need for processing/validation, and revisions to the GSP required in 2024. Model refinements are now planned for 2025-2026 in preparation for the 5 year update.
		ETSGSA	
6	Develop Action Plan for Exceedance of Minimum Thresholds (MTs) which May Result in Undesirable Results	WTSGSA	GSAs reviewed and finalized the draft Action Plan and included it in the Revised GSP that was adopted in June 2024. The Action Plan includes enhanced monitoring, a land fallowing/repurposing program in ETSGSA starting fiscal year 24/25, prioritizing MLRP projects near subsidence or IM exceedance areas, prioritization of recharge project opportunities near subsidence or IM exceedance areas, and triggers for program escalation and enforcement of pumping restrictions.
		ETSGSA	
7	Data Management System Improvements	WTSGSA	Considering data management needs. Grant Application submitted to DWR in December 2022 includes funding data management systems. Grant funding was not approved.
		ETSGSA	
8	Coordination and Planning Integration	WTSGSA	Monthly meetings with GSA Technical Advisory Committees to discuss coordination on implementation of ISA's. Quarterly meetings between member agency boards to coordinate on projects and ISA's are ongoing. Several meetings were held to coordinate with GSAs in adjacent subbasins.
		ETSGSA	
9	Well Registration and Management Program	WTSGSA	Deemed not necessary within WTSGSA at this time. Utilizing LandIQ combined with surface water delivery information to inform groundwater demand/use for management purposes.
		ETSGSA	Developed and began implementation of a Groundwater Demand Reduction Program to monitor, manage and decrease groundwater use. Groundwater use is measured using ET data; however, an option was developed for metering of irrigation wells, in addition, non-irrigation production wells are required to be metered. Rules and regulations were developed for registration and reporting of groundwater use data associated with these metered wells. In addition, the Groundwater Accounting Platform developed to manage and report groundwater use was modified to include an option to enter meter data from registered wells.
10	Developing Financial Strategies, including Seeking Grant Funding to Implement the GSP	WTSGSA	Budgeting for implementation activities. Coordinating on joint projects with ETSGSA. Submitted grant application to DWR to help fund projects and implementation activities. Will continue to evaluate possible grant opportunities.
		ETSGSA	Adopted and began implementing a Proposition 218 SGMA Operational Assessment to fund the GSA's operational and compliance costs. Developed a Groundwater Use Fee Program, conducted a Fee Study and began implementation of a Proposition 218 process to adopt a Groundwater Use Fee intended to fund projects and management actions beginning in 2025. Continued work on development of an MLRP program under a grant from the DOC.
11	Updating Opti to include GSP Projects	WTSGSA	Completed in 2023. Provided training for agencies and project proponents to include groundwater projects into Opti.
		ETSGSA	

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FIGURES

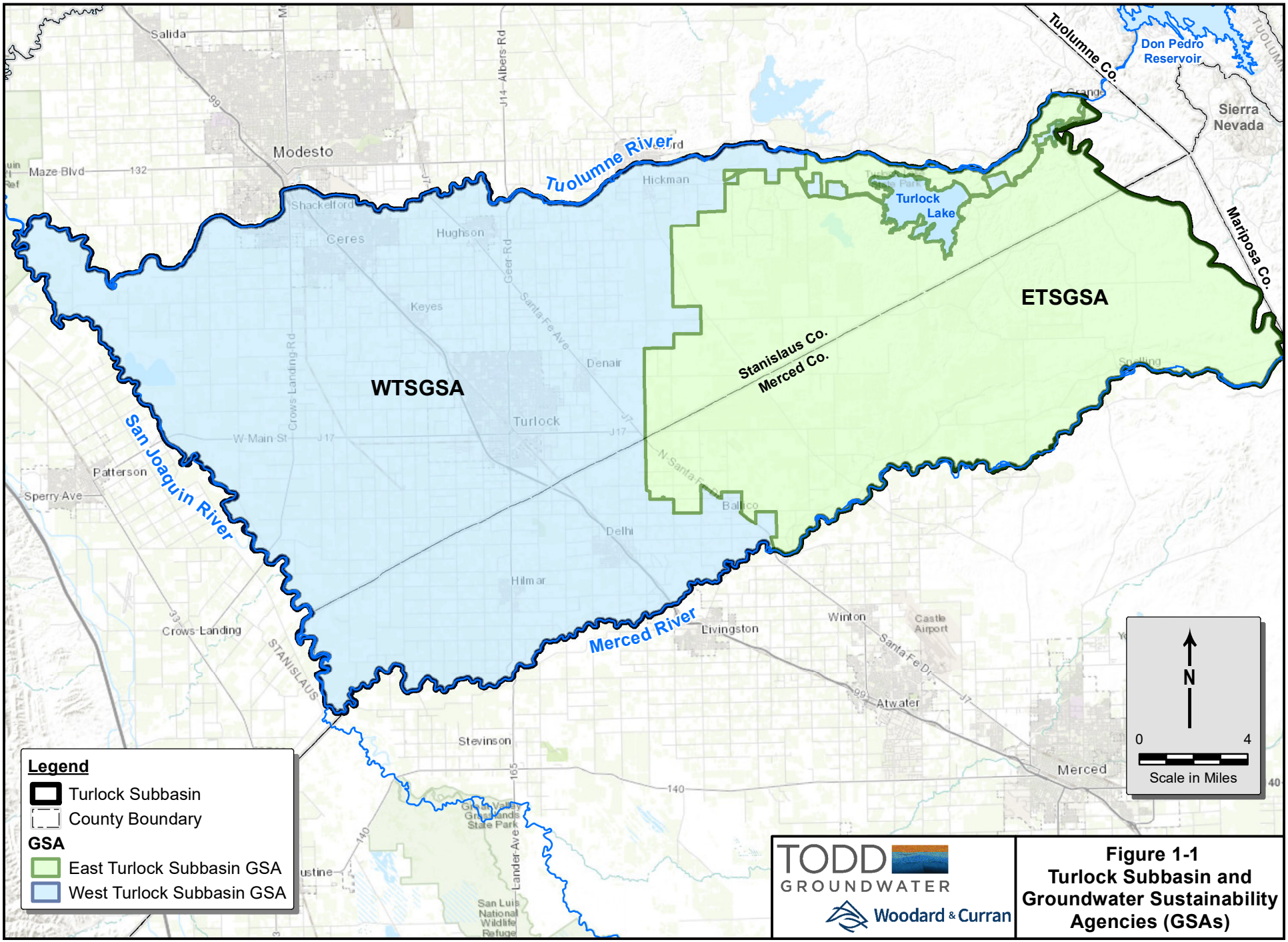


Figure 1-1
Turlock Subbasin and Groundwater Sustainability Agencies (GSAs)

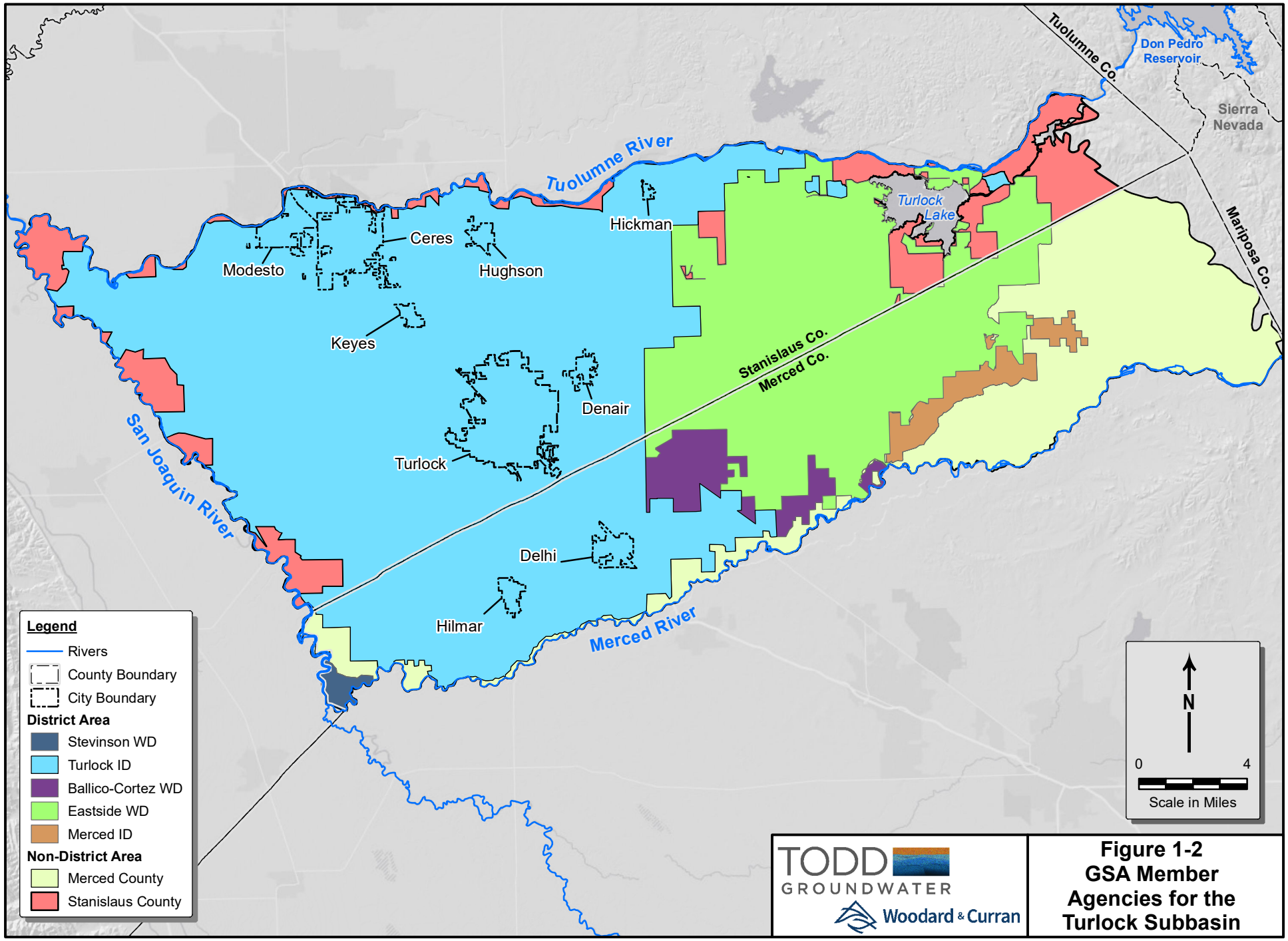
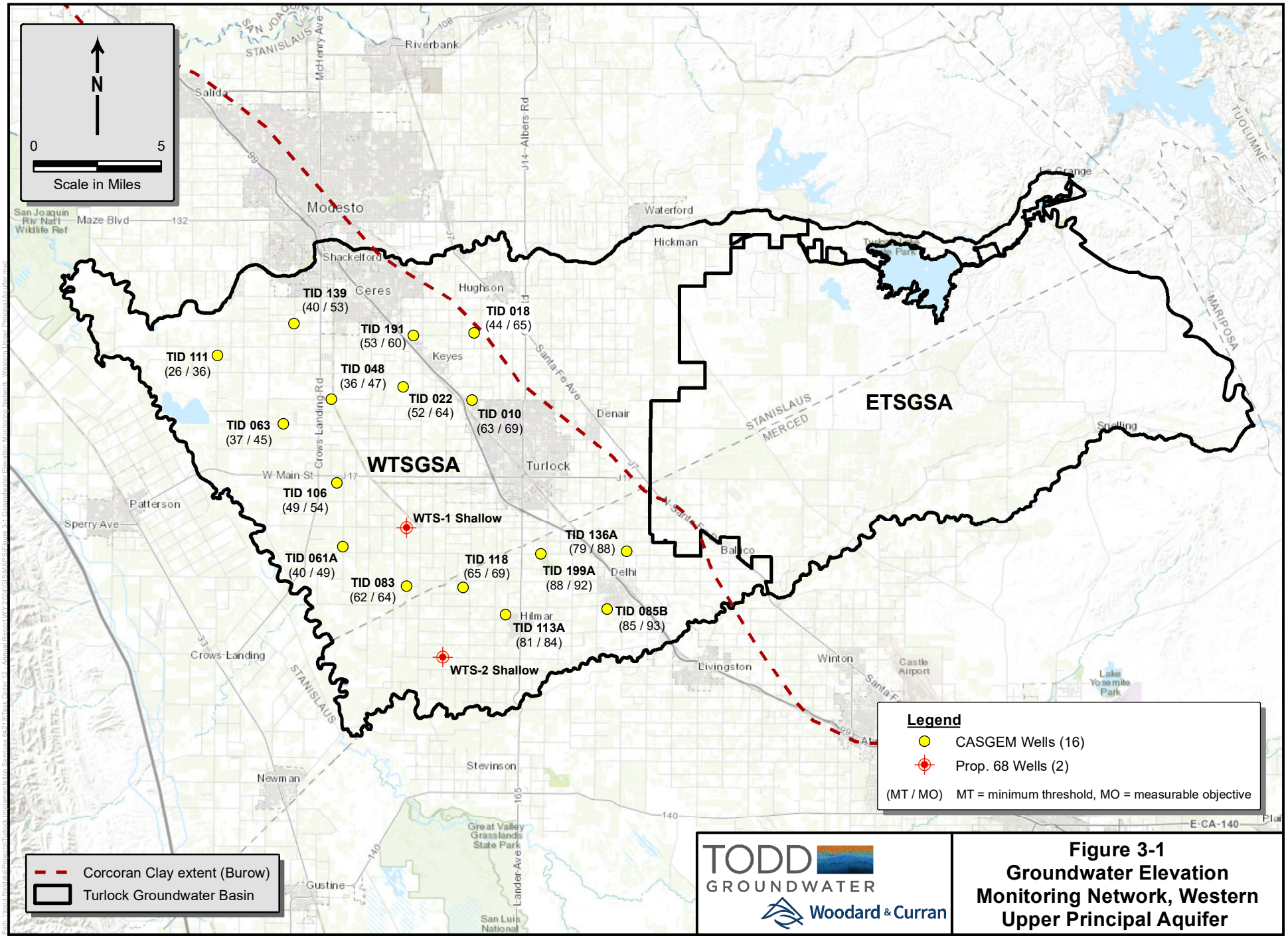


Figure 1-2
GSA Member Agencies for the Turlock Subbasin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(36 / 47)
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(52 / 64)
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(63 / 69)
TID 063
(37 / 45)
TID 106
(49 / 54)
WTS-1 Shallow
TID 061A
(40 / 49)
TID 083
(62 / 64)
TID 118
(65 / 69)
TID 136A
(79 / 88)
TID 199A
(88 / 92)
TID 085B
(85 / 93)
TID 113A
(81 / 84)
WTS-2 Shallow
WTSGSA
ETSGSA
Modesto
Riverbank
Waterford
Hickman
Hughson
Ceres
Keyes
Denair
Turlock
Patterson
Crows Landing
Newman
Stevinson
Gustine
Livingston
Winton
Delhi
Hilmar
Santa Fe Ave
Crows Landing Rd
Lander Ave
Albers Rd
Maze Blvd
W Main St
Sperry Ave
STANISLAUS
MERCED
TUOLUMNE
MARIPOSA
Legend
CASGEM Wells (16)
Prop. 68 Wells (2)
(MT / MO) MT = minimum threshold, MO = measurable objective
Corcoran Clay extent (Burow)
Turlock Groundwater Basin
TODD GROUNDWATER
Woodard & Curran
Figure 3-1
Groundwater Elevation Monitoring Network, Western Upper Principal Aquifer

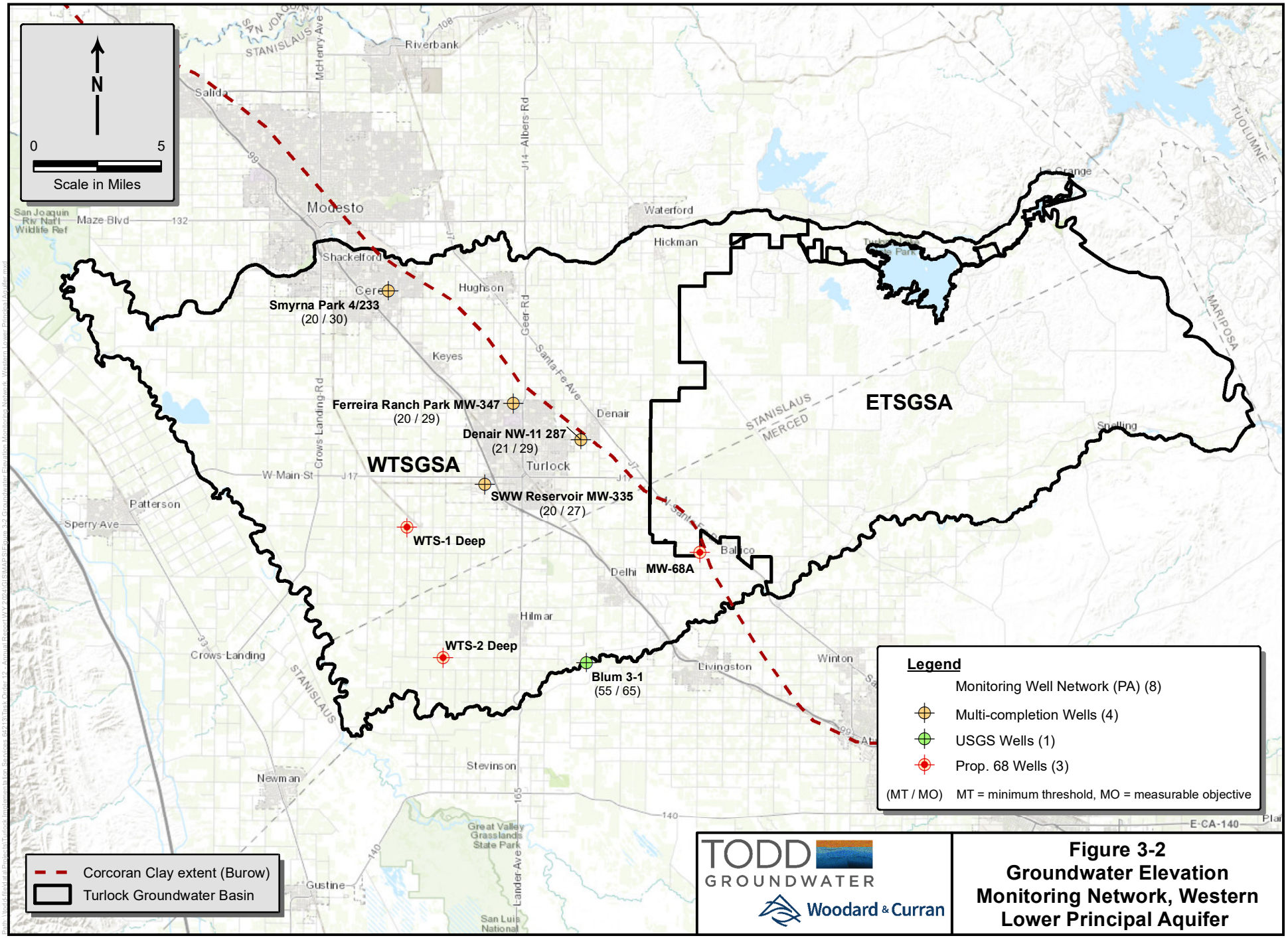
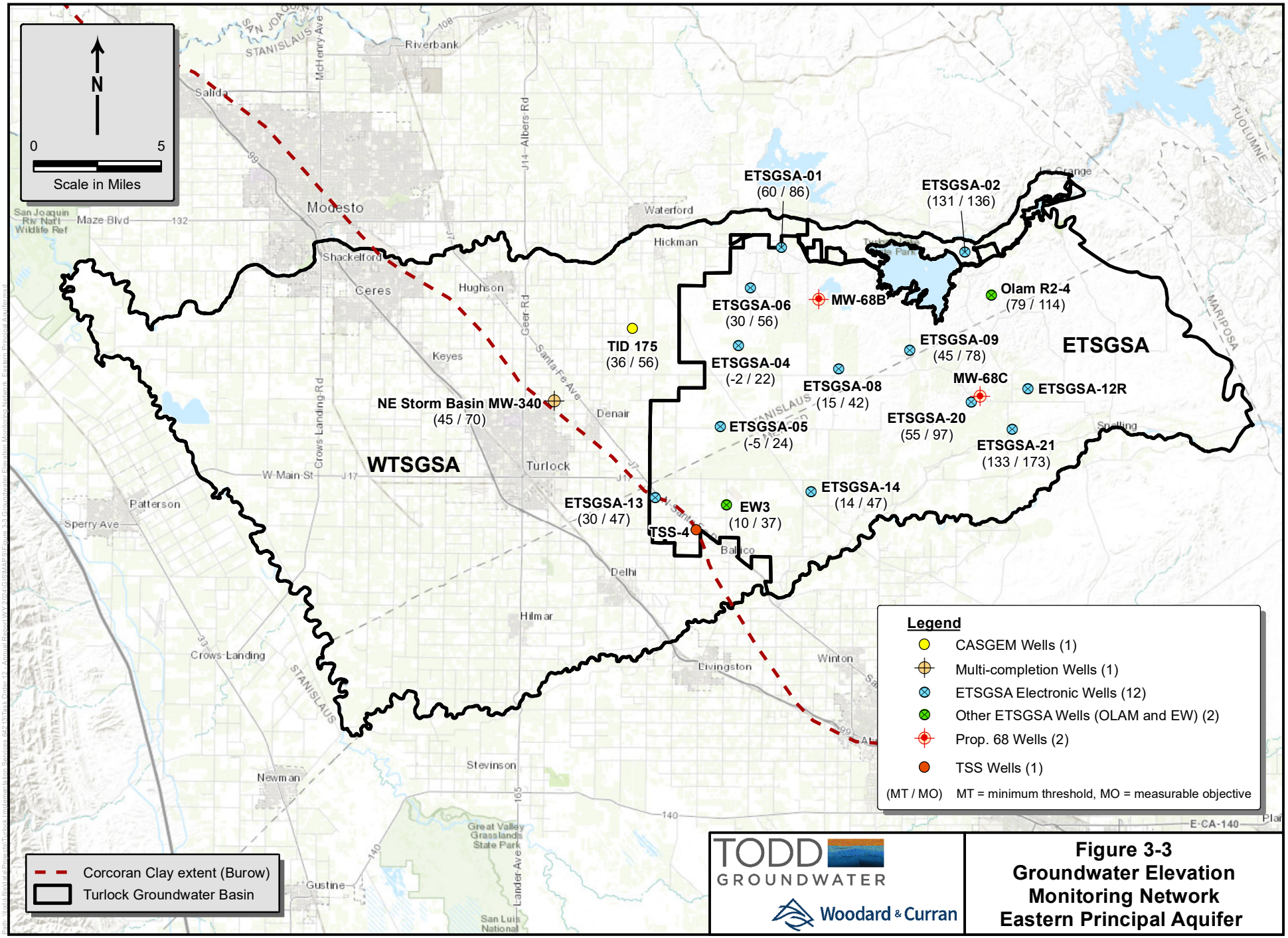


Figure 3-2
Groundwater Elevation Monitoring Network, Western Lower Principal Aquifer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ETSGSA-02
(131 / 136)
ETSGSA-06
(30 / 56)
MW-68B
Olam R2-4
(79 / 114)
TID 175
(36 / 56)
ETSGSA-04
(-2 / 22)
ETSGSA-09
(45 / 78)
ETSGSA
ETSGSA-08
(15 / 42)
MW-68C
ETSGSA-12R
NE Storm Basin MW-340
(45 / 70)
ETSGSA-20
(55 / 97)
ETSGSA-05
(-5 / 24)
ETSGSA-21
(133 / 173)
WTSGSA
ETSGSA-14
(14 / 47)
ETSGSA-13
(30 / 47)
EW3
(10 / 37)
TSS-4
Riverbank
Salida
Modesto
Waterford
Hickman
Shackelford
Ceres
Hughson
Keyes
Denair
Turlock
Patterson
Delhi
Hilmar
Crows Landing
Livingston
Winton
Newman
Stevinson
Gustine
Great Valley Grasslands State Park
San Luis National
Maze Blvd
W Main St
Sperry Ave
Santa Fe Ave
Geer Rd
Crows Landing Rd
McHenry Ave
J14 Albers Rd
Lander Ave
Legend
CASGEM Wells (1)
Multi-completion Wells (1)
ETSGSA Electronic Wells (12)
Other ETSGSA Wells (OLAM and EW) (2)
Prop. 68 Wells (2)
TSS Wells (1)
(MT / MO) MT = minimum threshold, MO = measurable objective
Corcoran Clay extent (Burow)
Turlock Groundwater Basin
TODD GROUNDWATER
Woodard & Curran
Figure 3-3
Groundwater Elevation
Monitoring Network
Eastern Principal Aquifer

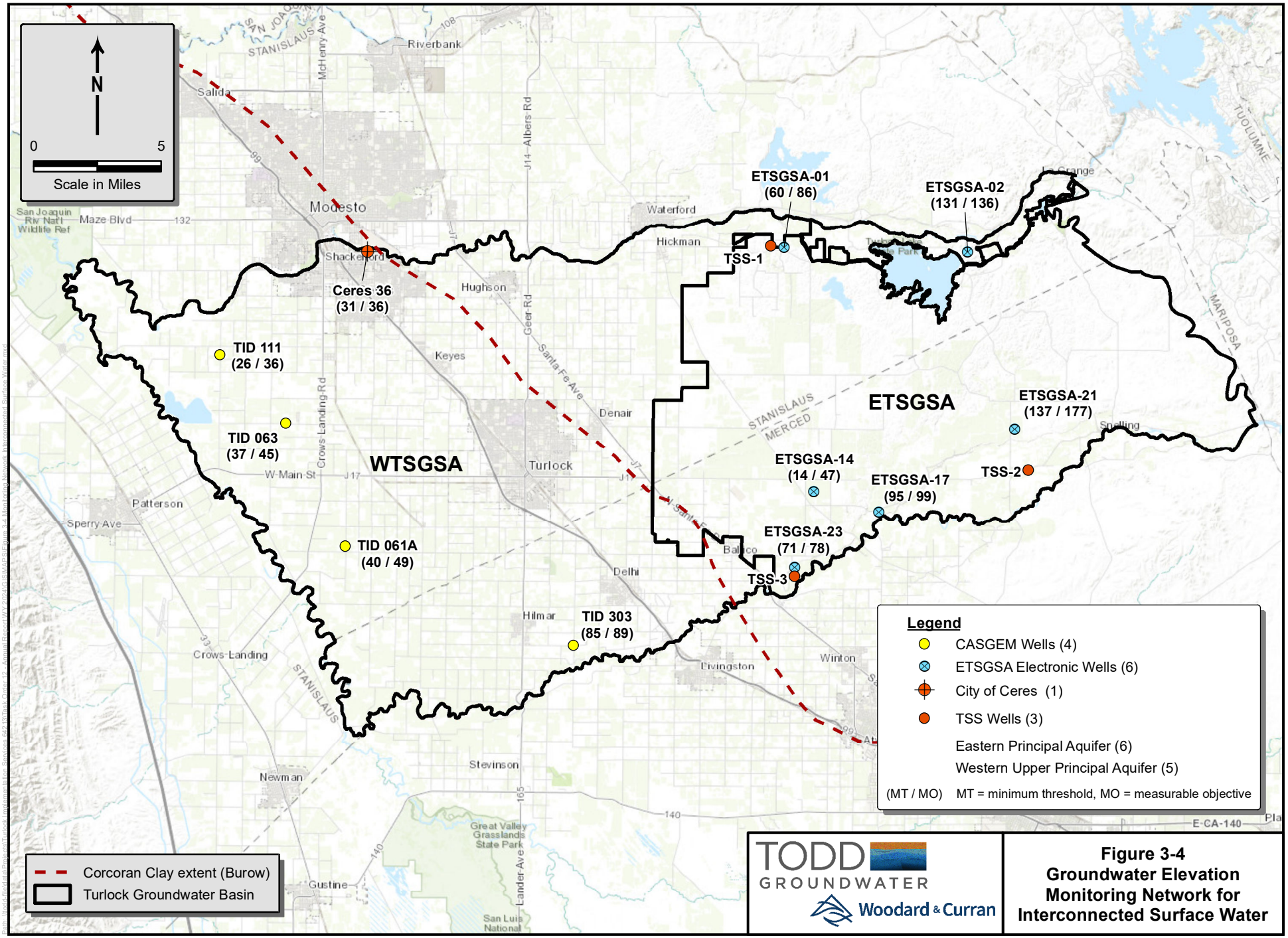
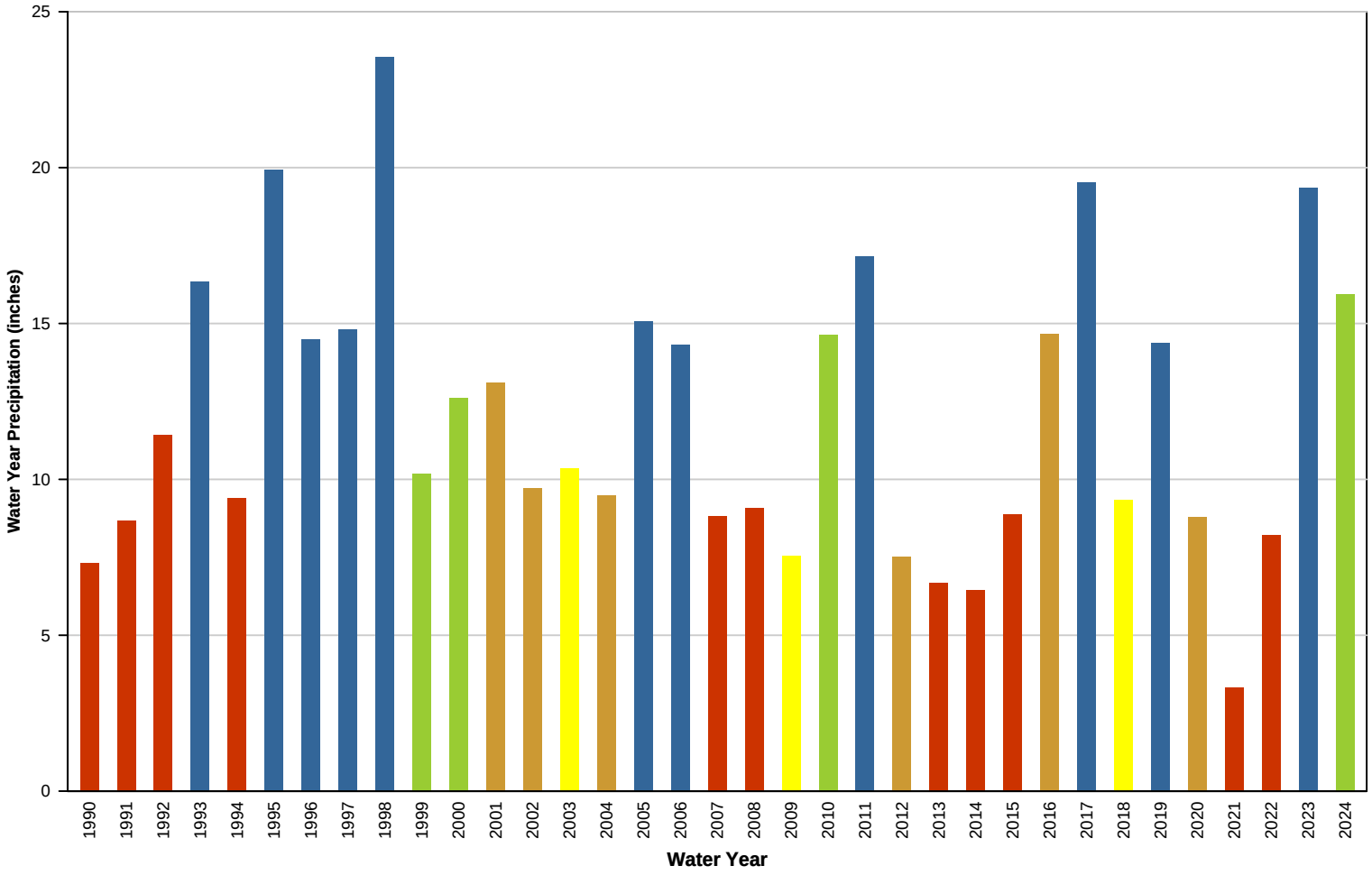


Figure 3-4
Groundwater Elevation Monitoring Network for Interconnected Surface Water



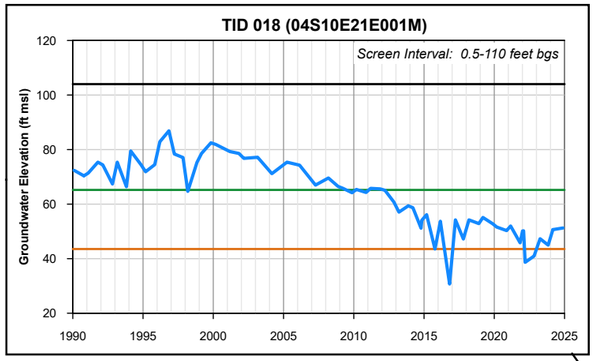
Water Year Type

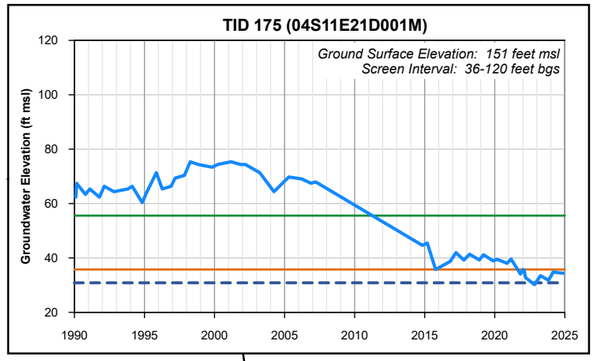
- Wet
- Above Normal
- Below Normal
- Dry
- Critically Dry

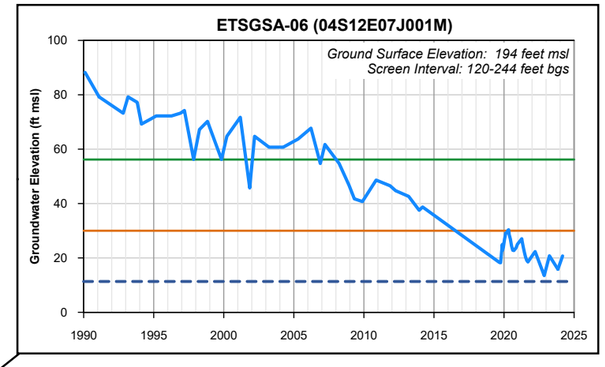
Notes:
Sources - NOAA Turlock #2 Site 049073
CIMIS, Denair Station 168 and Denair II Station 206
Water Year - October 1 through September 30.
Water year type is from the DWR San Joaquin Valley Index.

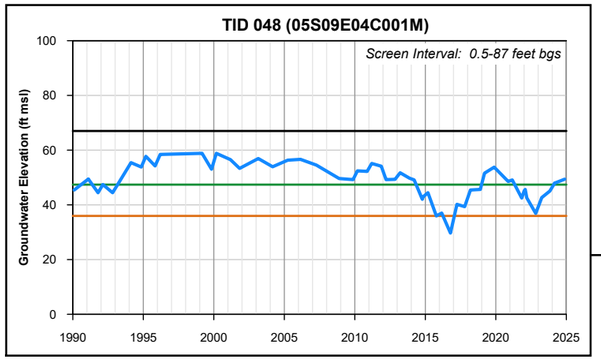
TODD GROUNDWATER
Woodard & Curran

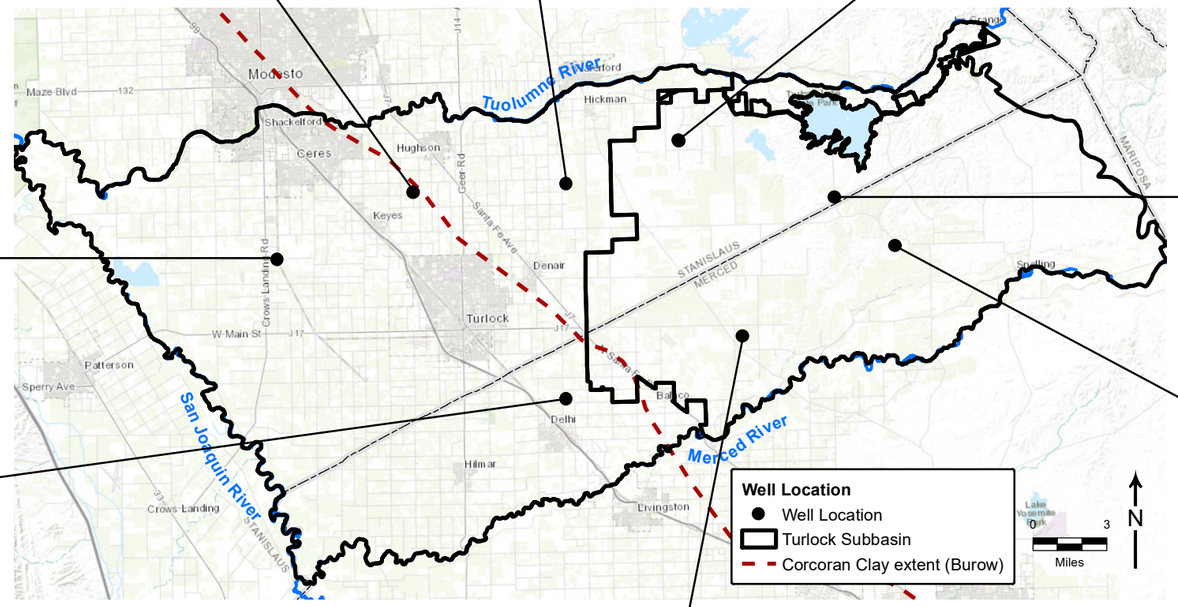
Figure 3-5
Annual Precipitation and Water Year Type
WY 1990-2024

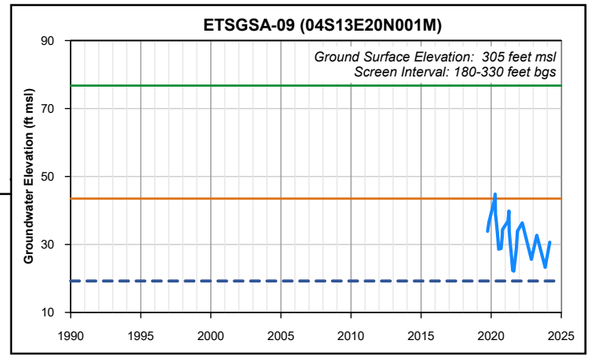


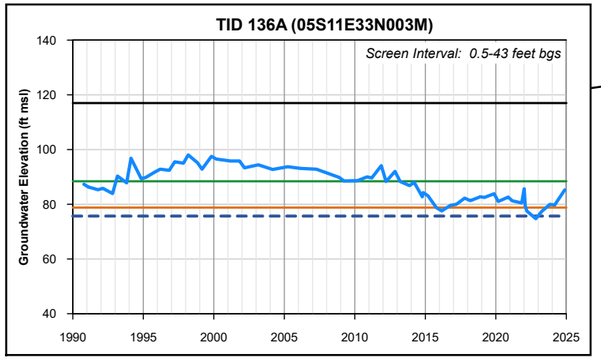


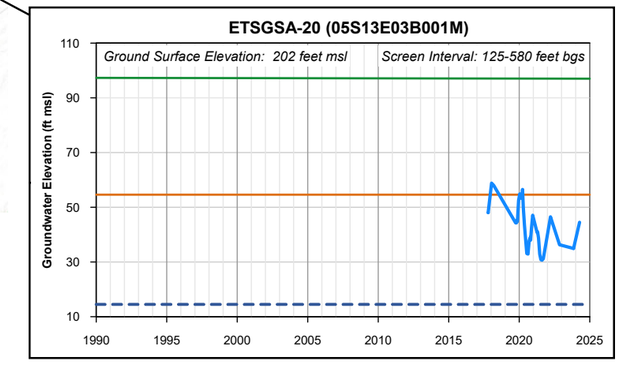


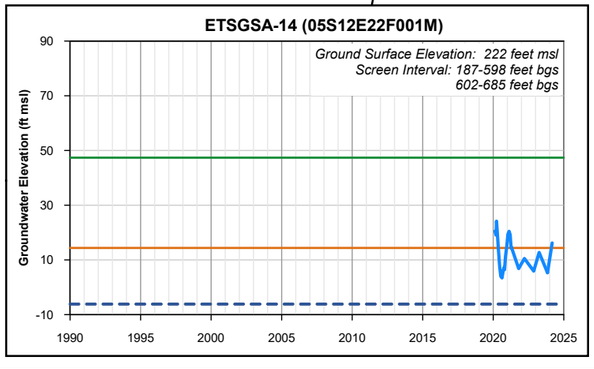








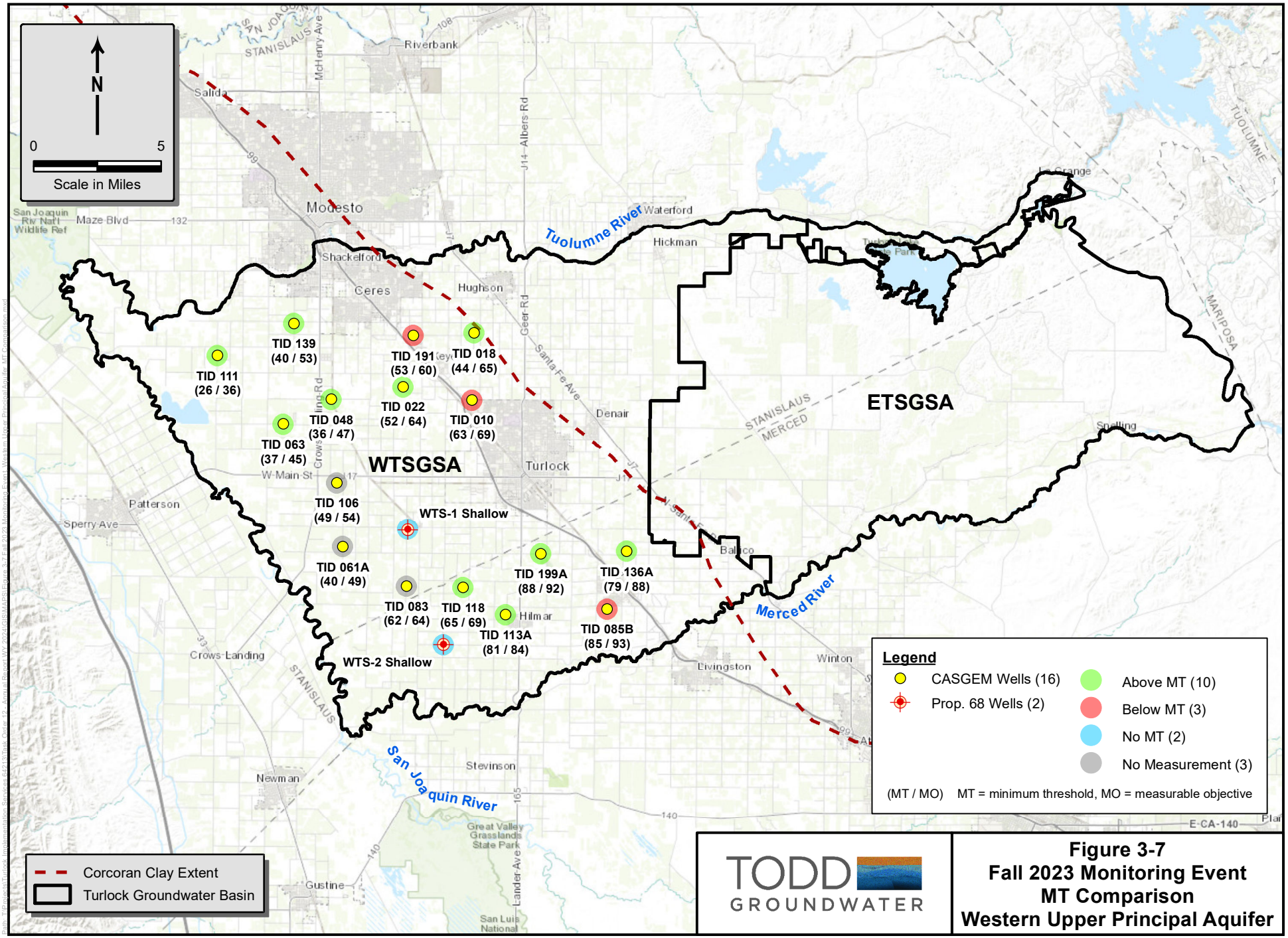




- Ground Surface Elevation (ft msl)
- Groundwater Elevation (ft msl)
- Measureable Objective
- Measureable Threshold
- Interim Milestone

TODD GROUNDWATER
Woodard & Curran

Figure 3-6
Example Hydrographs Across Subbasin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Modesto
Riverbank
Salida
Ceres
Hughson
Shackelford
Waterford
Hickman
Denair
Turlock
Patterson
Crows Landing
Newman
Gustine
Stevinson
Hilmar
Livingston
Winton
Atwater
Delhi
Snelling
Tuolumne River
San Joaquin River
Merced River
Stanislaus River
WTSGSA
ETSGSA
TID 139 (40 / 53)
TID 111 (26 / 36)
TID 191 (53 / 60)
TID 018 (44 / 65)
TID 022 (52 / 64)
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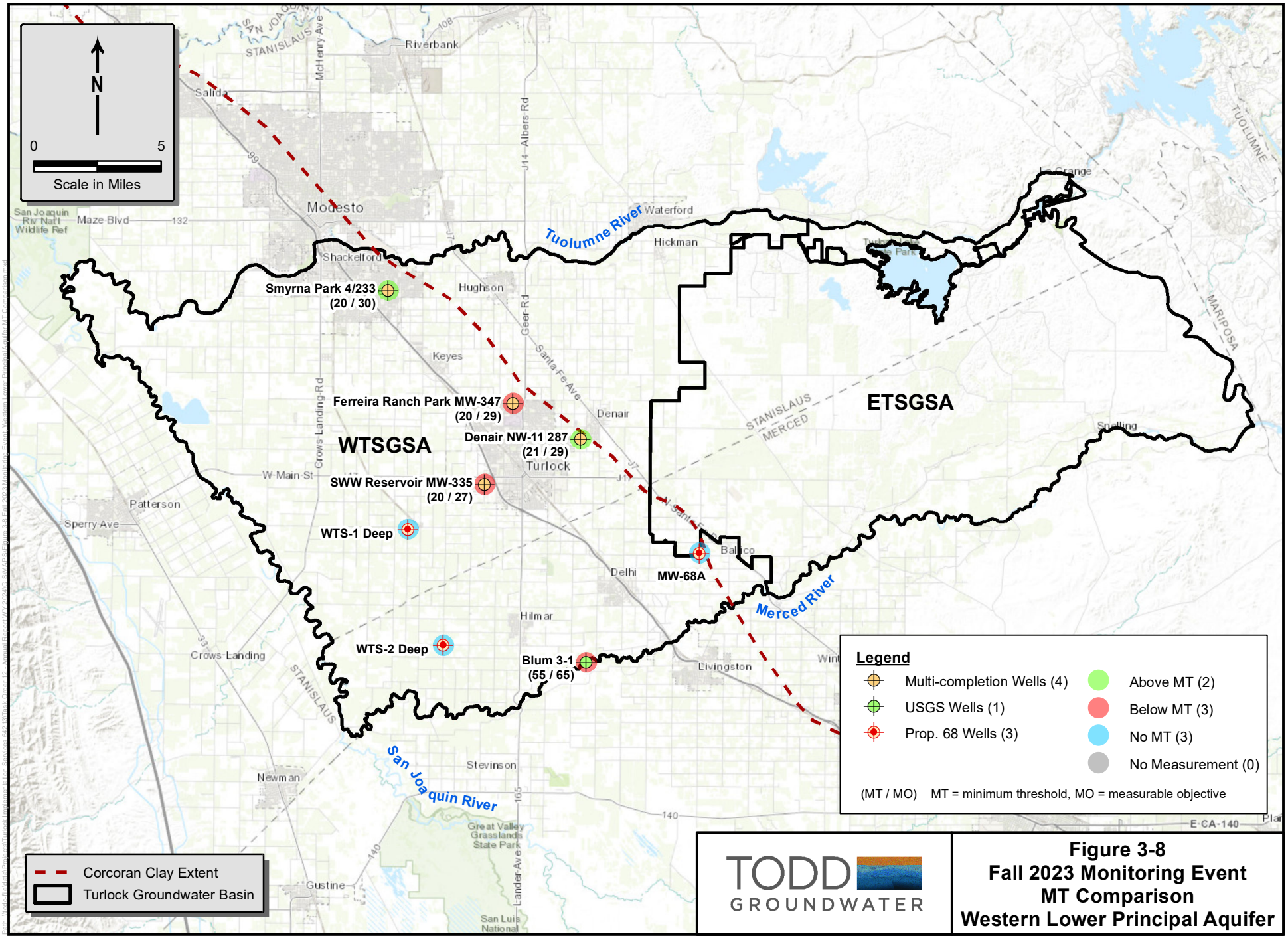
WTS-1 Shallow
TID 061A (40 / 49)
TID 199A (88 / 92)
TID 136A (79 / 88)
TID 083 (62 / 64)
TID 118 (65 / 69)
TID 113A (81 / 84)
TID 085B (85 / 93)
WTS-2 Shallow
Legend
CASGEM Wells (16)
Prop. 68 Wells (2)
Above MT (10)
Below MT (3)
No MT (2)
No Measurement (3)
(MT / MO) MT = minimum threshold, MO = measurable objective
Corcoran Clay Extent
Turlock Groundwater Basin
TODD GROUNDWATER
Figure 3-7
Fall 2023 Monitoring Event
MT Comparison
Western Upper Principal Aquifer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(20 / 29)
Denair NW-11 287
(21 / 29)
SWW Reservoir MW-335
(20 / 27)
WTS-1 Deep
WTS-2 Deep
Blum 3-1
(55 / 65)
MW-68A
WTSGSA
ETSGSA
Tuolumne River
Merced River
San Joaquin River
Modesto
Riverbank
Salida
Waterford
Hickman
Shackelford
Hughson
Keyes
Denair
Turlock
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Newman
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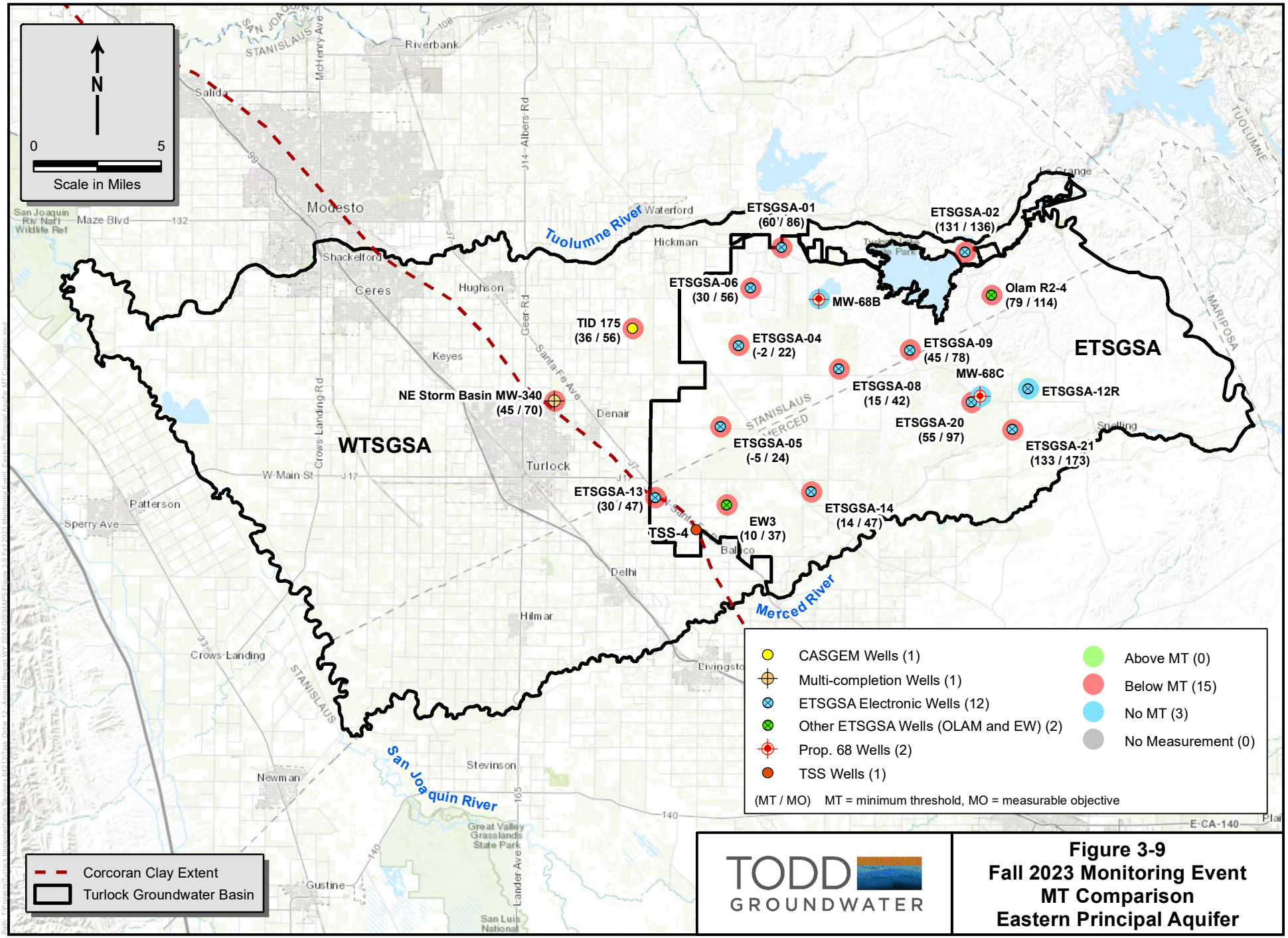
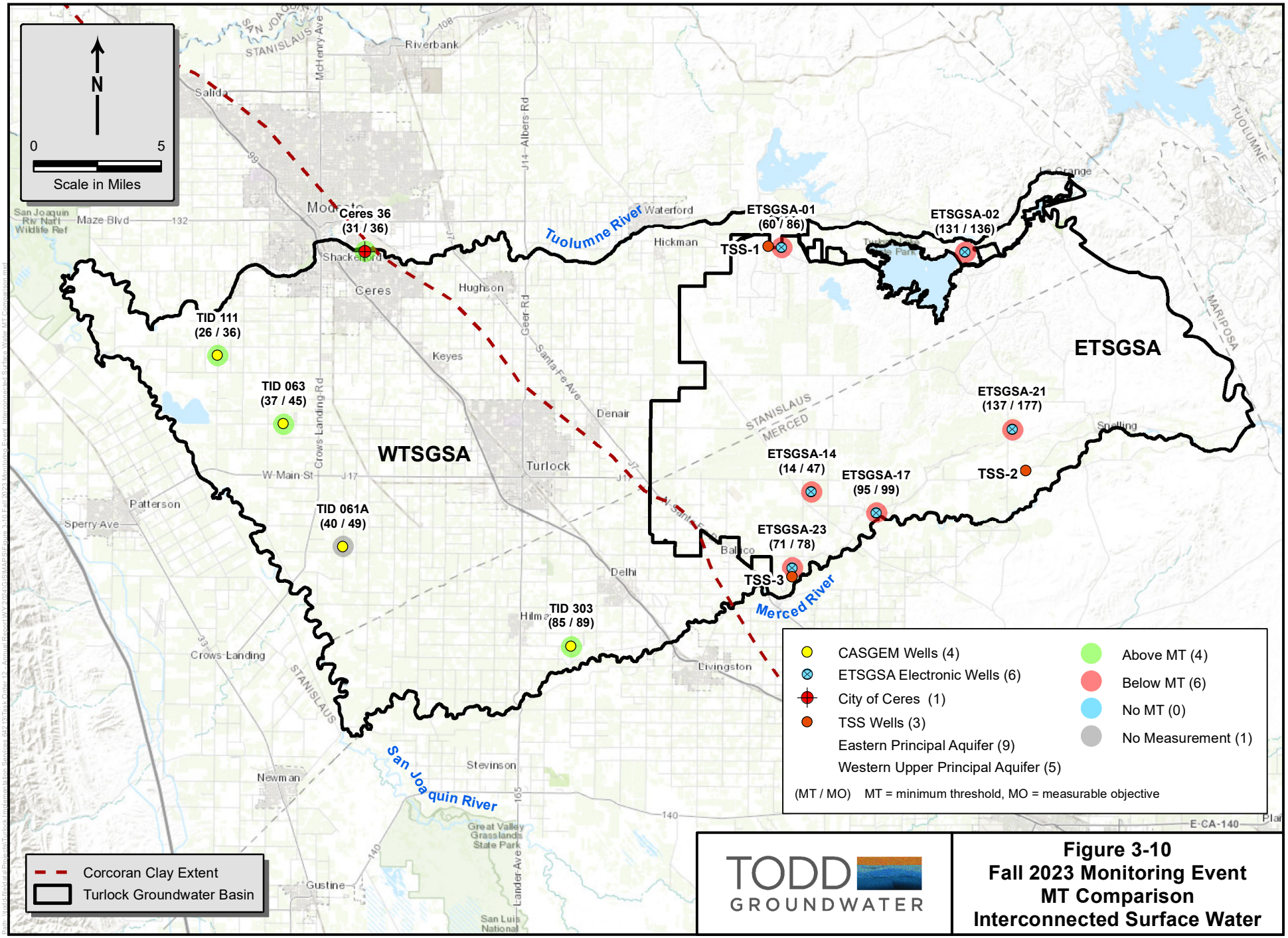
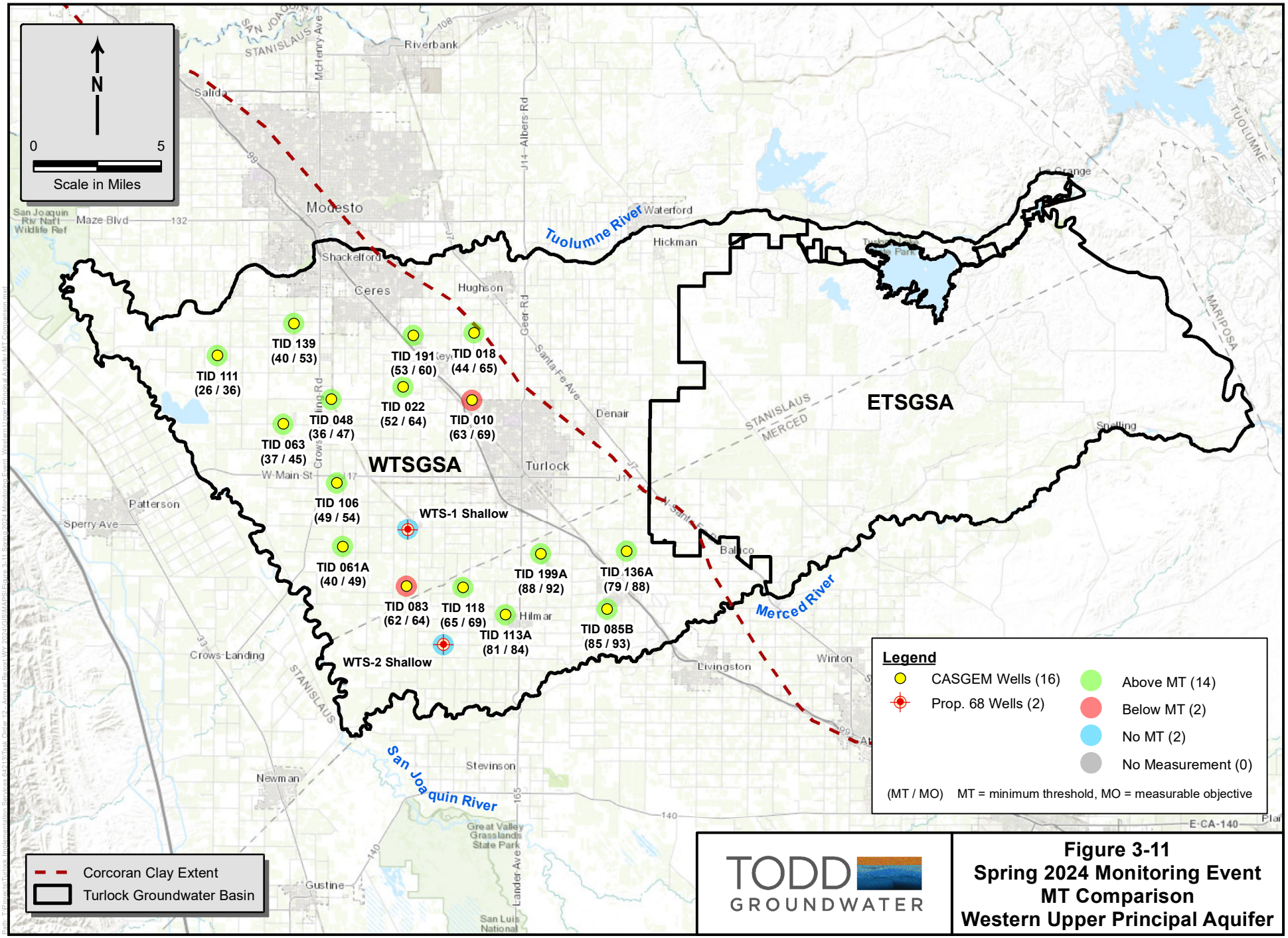
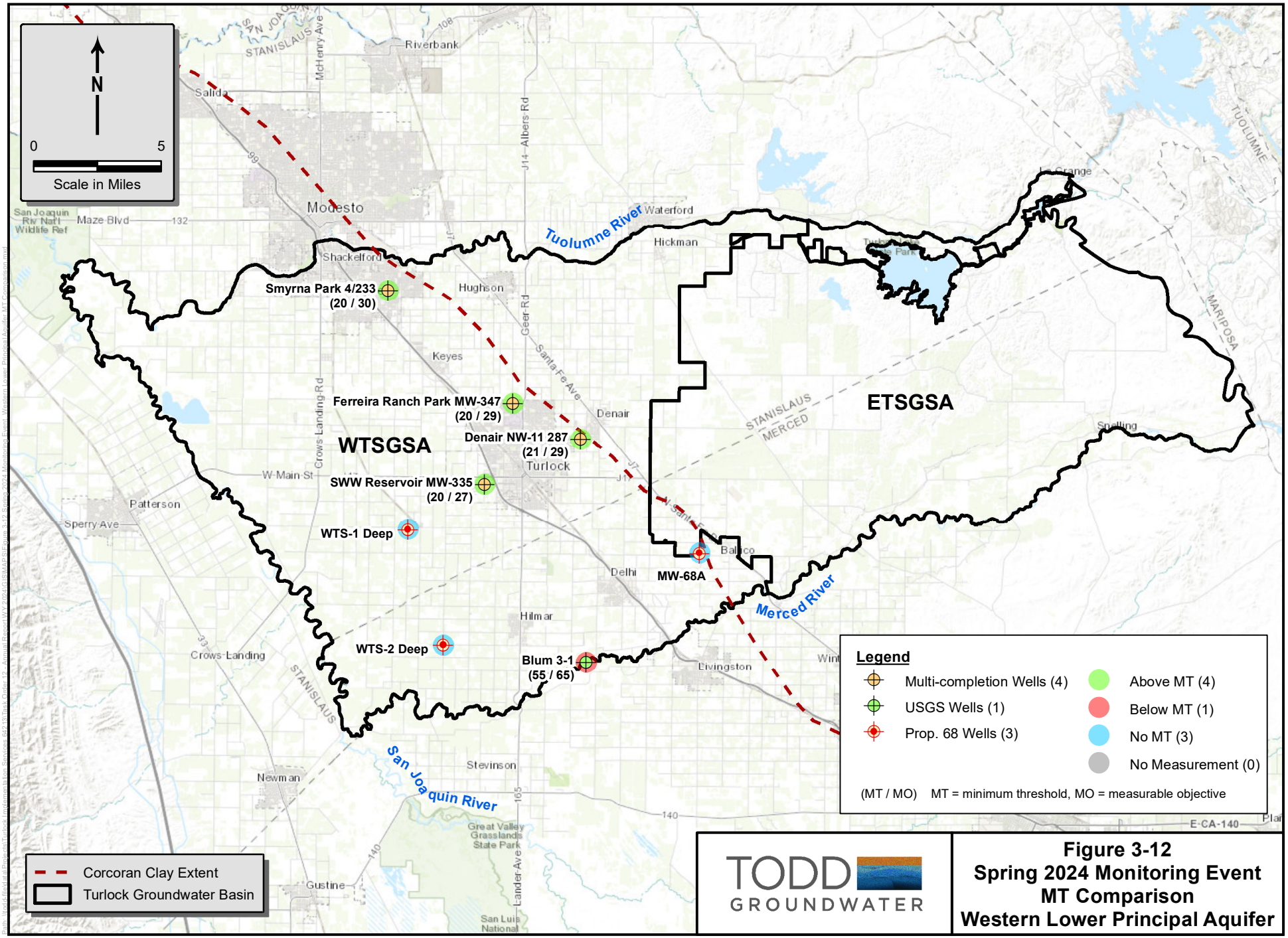
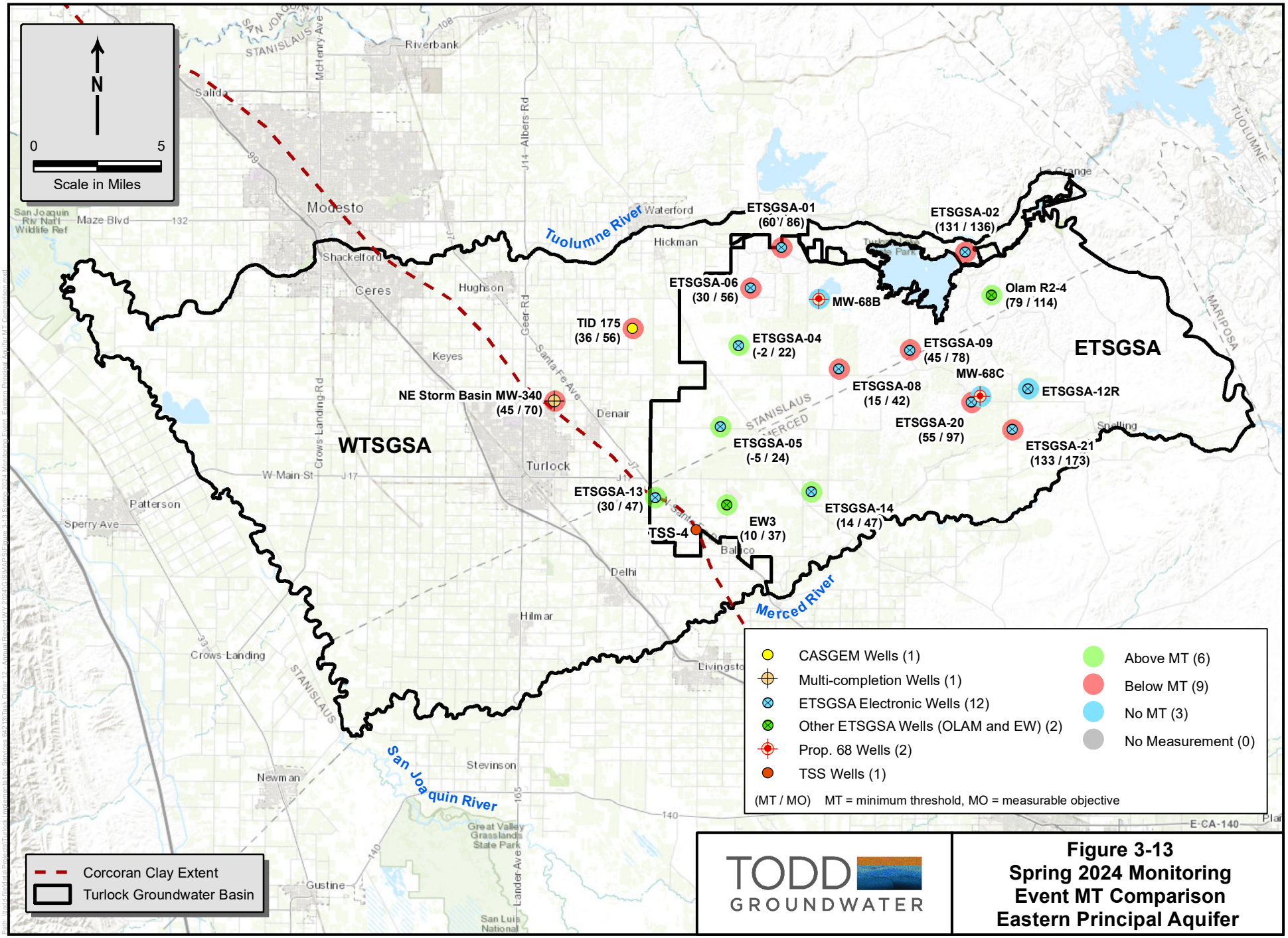
Ballico
Snelling
Maze Blvd
McHenry Ave
J14 Albers Rd
Geer Rd
Santa Fe Ave
Crows Landing Rd
W Main St
Sperry Ave
Lander Ave
STANISLAUS
TUOLUMNE
MERCED
MARIPOSA
Legend
Multi-completion Wells (4)
USGS Wells (1)
Prop. 68 Wells (3)
Above MT (2)
Below MT (3)
No MT (3)
No Measurement (0)
(MT / MO) MT = minimum threshold, MO = measurable objective
Corcoran Clay Extent
Turlock Groundwater Basin
TODD GROUNDWATER
Figure 3-8
Fall 2023 Monitoring Event
MT Comparison
Western Lower Principal Aquifer

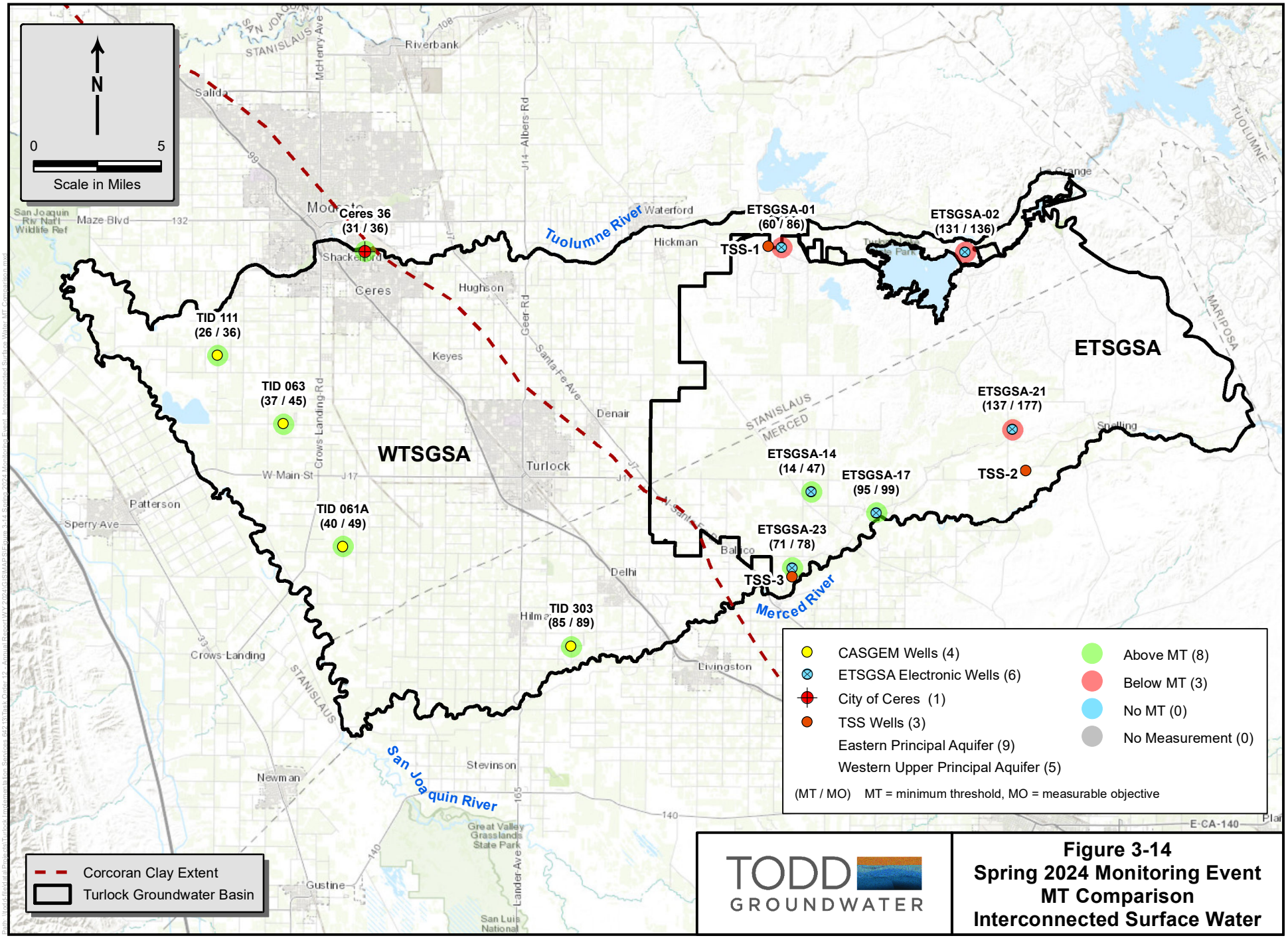

N
0
5
Scale in Miles
ETSGSA-01
(60' / 86)
ETSGSA-02
(131 / 136)
ETSGSA-06
(30 / 56)
MW-68B
Olam R2-4
(79 / 114)
TID 175
(36 / 56)
ETSGSA-04
(-2 / 22)
ETSGSA-09
(45 / 78)
ETSGSA
MW-68C
ETSGSA-08
(15 / 42)
ETSGSA-12R
NE Storm Basin MW-340
(45 / 70)
ETSGSA-20
(55 / 97)
ETSGSA-05
(-5 / 24)
ETSGSA-21
(133 / 173)
WTSGSA
ETSGSA-13
(30 / 47)
ETSGSA-14
(14 / 47)
EW3
(10 / 37)
TSS-4
Tuolumne River
Merced River
San Joaquin River
Modesto
Riverbank
Waterford
Hickman
Ceres
Hughson
Keyes
Denair
Turlock
Patterson
Crows Landing
Hilmar
Delhi
Stevinson
Newman
Gustine
Salida
Shackelford
Maze Blvd
Geer Rd
Santa Fe Ave
Crows Landing Rd
W Main St
Sperry Ave
J14 Albers Rd
McHenry Ave
Lander Ave
Great Valley Grasslands State Park
San Luis National
Spalding
CASGEM Wells (1)
Multi-completion Wells (1)
ETSGSA Electronic Wells (12)
Other ETSGSA Wells (OLAM and EW) (2)
Prop. 68 Wells (2)
TSS Wells (1)
Above MT (0)
Below MT (15)
No MT (3)
No Measurement (0)
(MT / MO) MT = minimum threshold, MO = measurable objective
Corcoran Clay Extent
Turlock Groundwater Basin
TODD GROUNDWATER
Figure 3-9
Fall 2023 Monitoring Event
MT Comparison
Eastern Principal Aquifer


N
0
5
Scale in Miles
Ceres 36
(31 / 36)
TID 111
(26 / 36)
TID 063
(37 / 45)
TID 061A
(40 / 49)
TID 303
(85 / 89)
ETSGSA-01
(60 / 86)
ETSGSA-02
(131 / 136)
TSS-1
TSS-2
TSS-3
ETSGSA-14
(14 / 47)
ETSGSA-17
(95 / 99)
ETSGSA-21
(137 / 177)
ETSGSA-23
(71 / 78)
WTSGSA
ETSGSA
Tuolumne River
Merced River
San Joaquin River
Riverbank
Salida
Modesto
Ceres
Hughson
Waterford
Hickman
Keyes
Denair
Turlock
Patterson
Crows Landing
Delhi
Livingston
Newman
Stevinson
Gustine
Maze Blvd
W Main St
Sperry Ave
Santa Fe Ave
Geer Rd
Albers Rd
Lander Ave
Crows Landing Rd
McHenry Ave
STANISLAUS
TUOLUMNE
MERCED
MARIPOSA
CASGEM Wells (4)
ETSGSA Electronic Wells (6)
City of Ceres (1)
TSS Wells (3)
Eastern Principal Aquifer (9)
Western Upper Principal Aquifer (5)
Above MT (4)
Below MT (6)
No MT (0)
No Measurement (1)
(MT / MO) MT = minimum threshold, MO = measurable objective
Corcoran Clay Extent
Turlock Groundwater Basin
TODD GROUNDWATER
Figure 3-10
Fall 2023 Monitoring Event
MT Comparison
Interconnected Surface Water


N
0
5
Scale in Miles
Modesto
Riverbank
Salida
Ceres
Hughson
Shackelford
Waterford
Hickman
Denair
Turlock
Patterson
Crows Landing
Newman
Stevinson
Gustine
Hilmar
Livingston
Winton
Snelling
Delhi
Tuolumne River
Merced River
San Joaquin River
WTSGSA
ETSGSA
TID 139 (40 / 53)
TID 111 (26 / 36)
TID 191 (53 / 60)
TID 018 (44 / 65)
TID 022 (52 / 64)
TID 048 (36 / 47)
TID 010 (63 / 69)
TID 063 (37 / 45)
TID 106 (49 / 54)
WTS-1 Shallow
TID 061A (40 / 49)
TID 199A (88 / 92)
TID 136A (79 / 88)
TID 083 (62 / 64)
TID 118 (65 / 69)
TID 113A (81 / 84)
TID 085B (85 / 93)
WTS-2 Shallow
Legend
CASGEM Wells (16)
Prop. 68 Wells (2)
Above MT (14)
Below MT (2)
No MT (2)
No Measurement (0)
(MT / MO) MT = minimum threshold, MO = measurable objective
Corcoran Clay Extent
Turlock Groundwater Basin
TODD GROUNDWATER
Figure 3-11
Spring 2024 Monitoring Event
MT Comparison
Western Upper Principal Aquifer


N
0
5
Scale in Miles
Modesto
Riverbank
Salida
Waterford
Hickman
Shackelford
Hughson
Keyes
Denair
Turlock
Patterson
Crows Landing
Newman
Gustine
Stevinson
Hilmar
Delhi
Livingston
Tuolumne River
Merced River
San Joaquin River
STANISLAUS
MERCED
TUOLUMNE
MARIPOSA
WTSGSA
ETSGSA
Smyrna Park 4/233
(20 / 30)
Ferreira Ranch Park MW-347
(20 / 29)
Denair NW-11 287
(21 / 29)
SWW Reservoir MW-335
(20 / 27)
WTS-1 Deep
WTS-2 Deep
Blum 3-1
(55 / 65)
MW-68A
Legend
Multi-completion Wells (4)
USGS Wells (1)
Prop. 68 Wells (3)
Above MT (4)
Below MT (1)
No MT (3)
No Measurement (0)
(MT / MO) MT = minimum threshold, MO = measurable objective
Corcoran Clay Extent
Turlock Groundwater Basin
TODD GROUNDWATER
Figure 3-12
Spring 2024 Monitoring Event
MT Comparison
Western Lower Principal Aquifer


N
0
5
Scale in Miles
ETSGSA-01
(60' / 86)
ETSGSA-02
(131 / 136)
ETSGSA-06
(30 / 56)
MW-68B
Olam R2-4
(79 / 114)
TID 175
(36 / 56)
ETSGSA-04
(-2 / 22)
ETSGSA-09
(45 / 78)
ETSGSA
MW-68C
ETSGSA-08
(15 / 42)
ETSGSA-12R
NE Storm Basin MW-340
(45 / 70)
ETSGSA-20
(55 / 97)
ETSGSA-05
(-5 / 24)
ETSGSA-21
(133 / 173)
WTSGSA
ETSGSA-13
(30 / 47)
ETSGSA-14
(14 / 47)
EW3
(10 / 37)
TSS-4
Tuolumne River
Merced River
San Joaquin River
Modesto
Riverbank
Waterford
Hickman
Ceres
Hughson
Keyes
Denair
Turlock
Patterson
Delhi
Hilmar
Crows Landing
Newman
Stevinson
Gustine
Salida
Shackelford
Maze Blvd
Geer Rd
Santa Fe Ave
Crows Landing Rd
W Main St
Sperry Ave
J14 Albers Rd
McHenry Ave
Lander Ave
Great Valley Grasslands State Park
San Luis National
Snelling
Livingston
CASGEM Wells (1)
Multi-completion Wells (1)
ETSGSA Electronic Wells (12)
Other ETSGSA Wells (OLAM and EW) (2)
Prop. 68 Wells (2)
TSS Wells (1)
Above MT (6)
Below MT (9)
No MT (3)
No Measurement (0)
(MT / MO) MT = minimum threshold, MO = measurable objective
Corcoran Clay Extent
Turlock Groundwater Basin
TODD GROUNDWATER
Figure 3-13
Spring 2024 Monitoring
Event MT Comparison
Eastern Principal Aquifer


N
0
5
Scale in Miles
Ceres 36
(31 / 36)
TID 111
(26 / 36)
TID 063
(37 / 45)
TID 061A
(40 / 49)
TID 303
(85 / 89)
ETSGSA-01
(60 / 86)
ETSGSA-02
(131 / 136)
TSS-1
ETSGSA-21
(137 / 177)
ETSGSA-14
(14 / 47)
ETSGSA-17
(95 / 99)
TSS-2
ETSGSA-23
(71 / 78)
TSS-3
WTSGSA
ETSGSA
Tuolumne River
Merced River
San Joaquin River
Riverbank
Salida
Modesto
Ceres
Hughson
Keyes
Waterford
Hickman
Denair
Turlock
Patterson
Crows Landing
Delhi
Livingston
Newman
Stevinson
Gustine
Great Valley Grasslands State Park
San Luis National
Shackelford
Maze Blvd
W Main St
Sperry Ave
Santa Fe Ave
Geer Rd
Crows Landing Rd
McHenry Ave
J14 Albers Rd
Lander Ave
Snelling
CASGEM Wells (4)
ETSGSA Electronic Wells (6)
City of Ceres (1)
TSS Wells (3)
Eastern Principal Aquifer (9)
Western Upper Principal Aquifer (5)
Above MT (8)
Below MT (3)
No MT (0)
No Measurement (0)
(MT / MO) MT = minimum threshold, MO = measurable objective
Corcoran Clay Extent
Turlock Groundwater Basin
TODD GROUNDWATER
Figure 3-14
Spring 2024 Monitoring Event
MT Comparison
Interconnected Surface Water

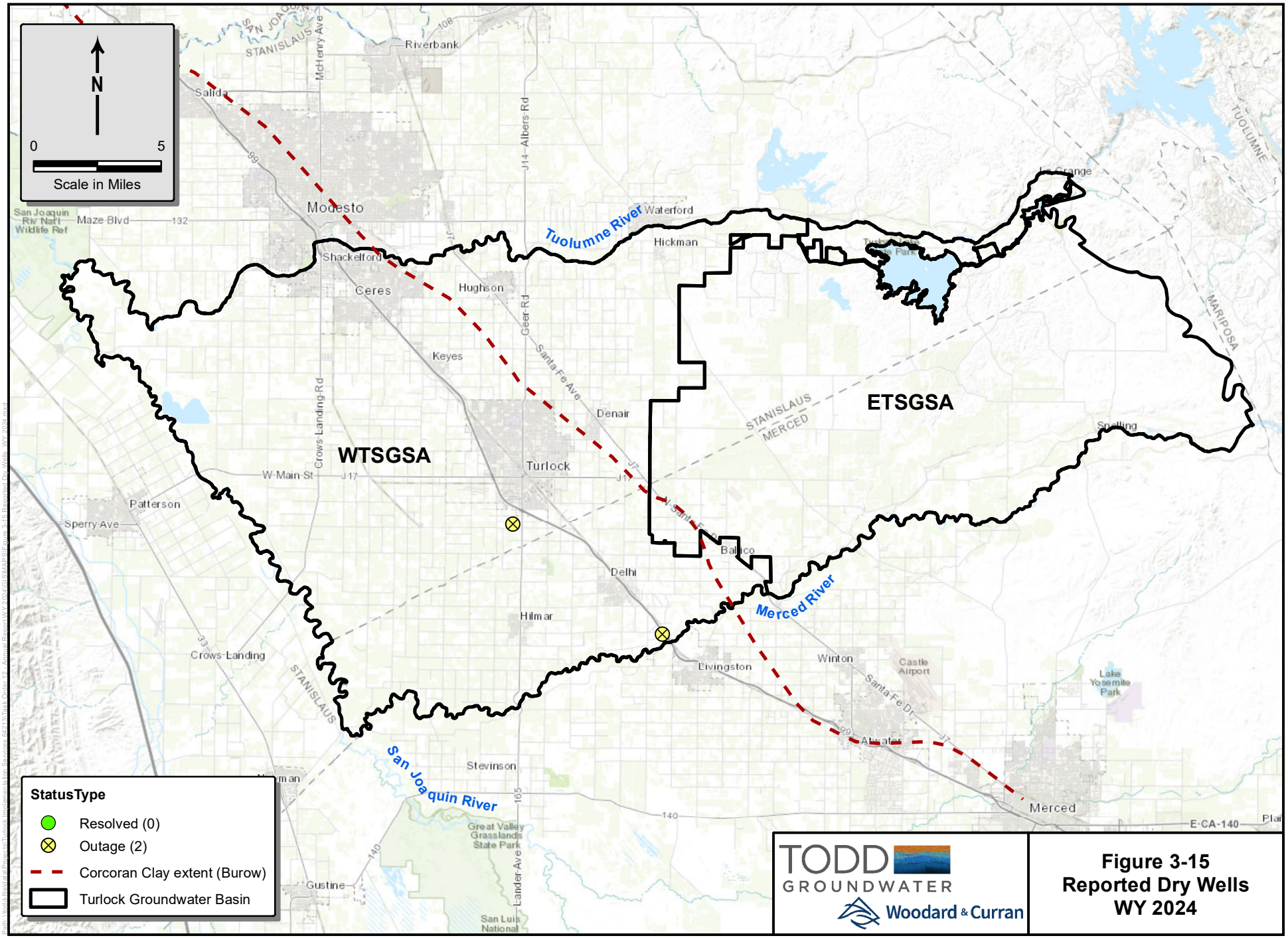


Figure 3-15
Reported Dry Wells
WY 2024

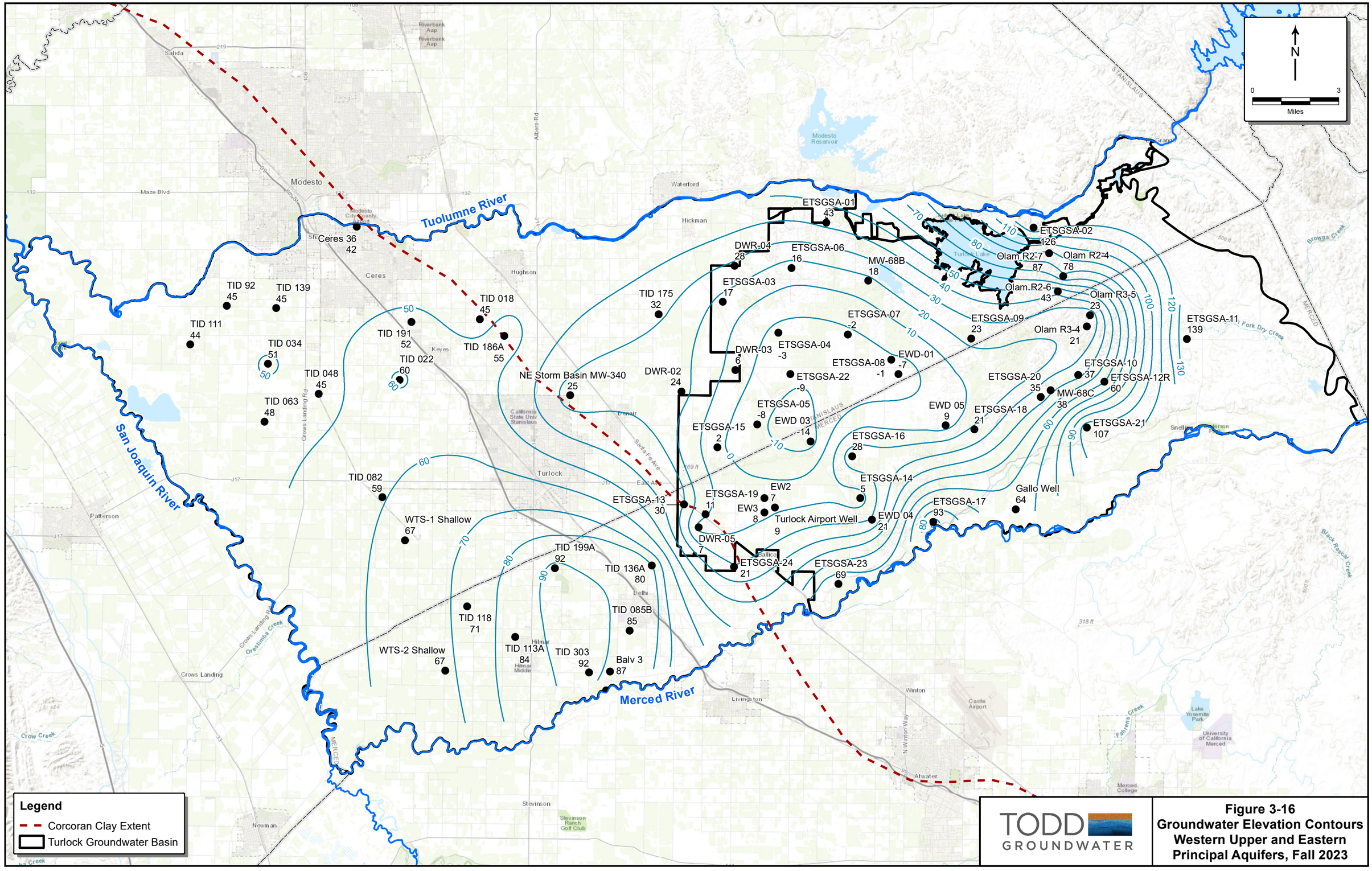


Figure 3-16
Groundwater Elevation Contours
Western Upper and Eastern
Principal Aquifers, Fall 2023

N

0 3
Miles

Tuolumne River

Smyrna Park 4/233
37

Ferreira Ranch Park MW-347
12

Denair NW-11 287
22

SWW Reservoir MW-335
14

WTS-1 Deep
39

WTS-2 Deep
37

Blum 3-1
28

MW-68A
25

30'

20'

San Joaquin River

Merced River

Modesto

Salida

Ceres

Hughson

Keyes

Waterford

Hickman

Turlock

Turlock Lake

Modesto Reservoir

Patterson

Crows Landing

Newman

Delhi

Hilmar

Livingston

Winton

Atwater

Stevinson

Legend

Corcoran Clay Extent

Turlock Groundwater Basin

TODD GROUNDWATER

Figure 3-17
Groundwater Elevation Contours
Western Lower Principal Aquifer, Fall 2023

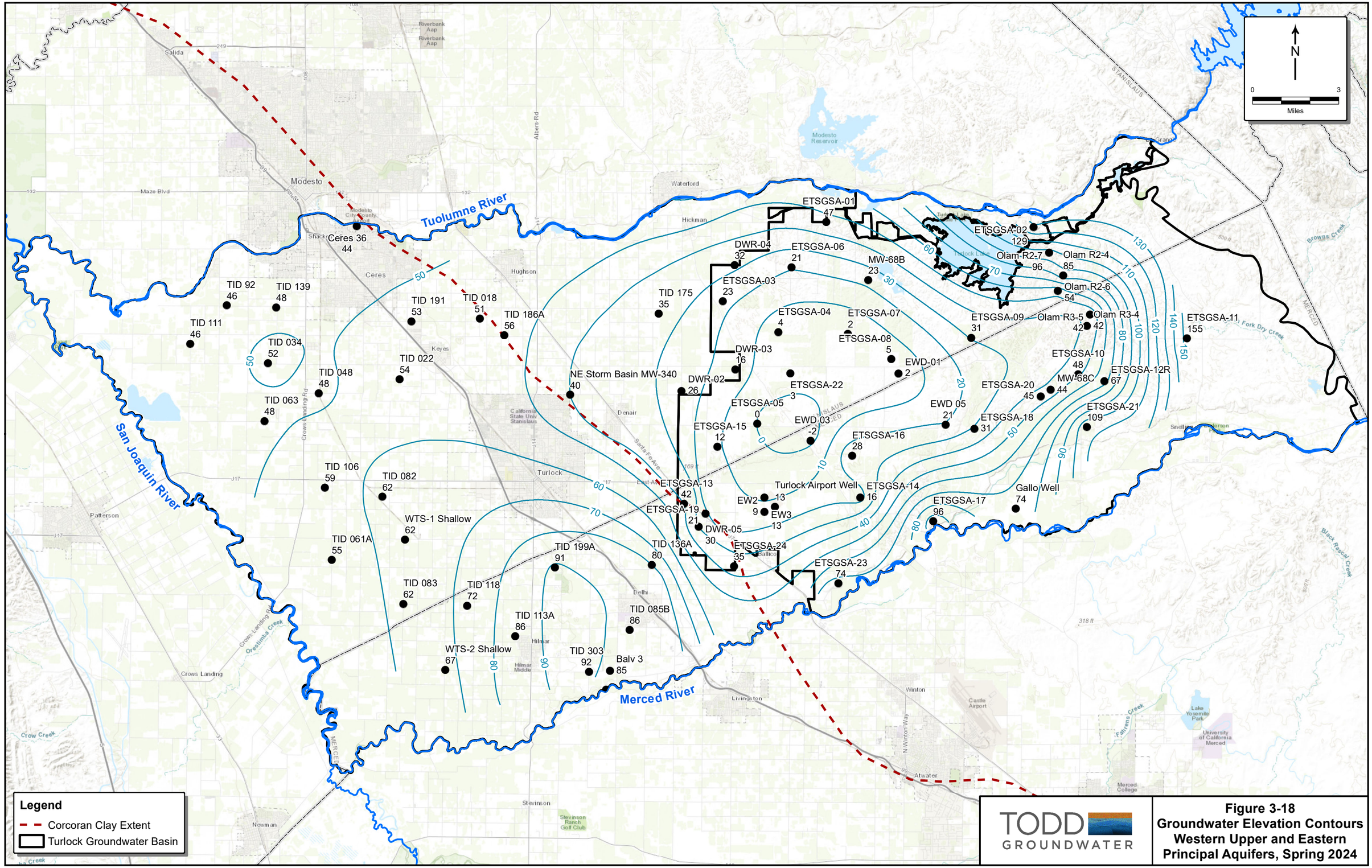


Figure 3-18
Groundwater Elevation Contours
Western Upper and Eastern
Principal Aquifers, Spring 2024

N

0 3
Miles

Tuolumne River

Smyrna Park 4/233
48

Ferreira Ranch Park MW-347
39

Denair NW-11 287
39

SWW Reservoir MW-335
37

WTS-1 Deep
51

WTS-2 Deep
50

Blum 3-1
52

San Joaquin River

Merced River

50

40

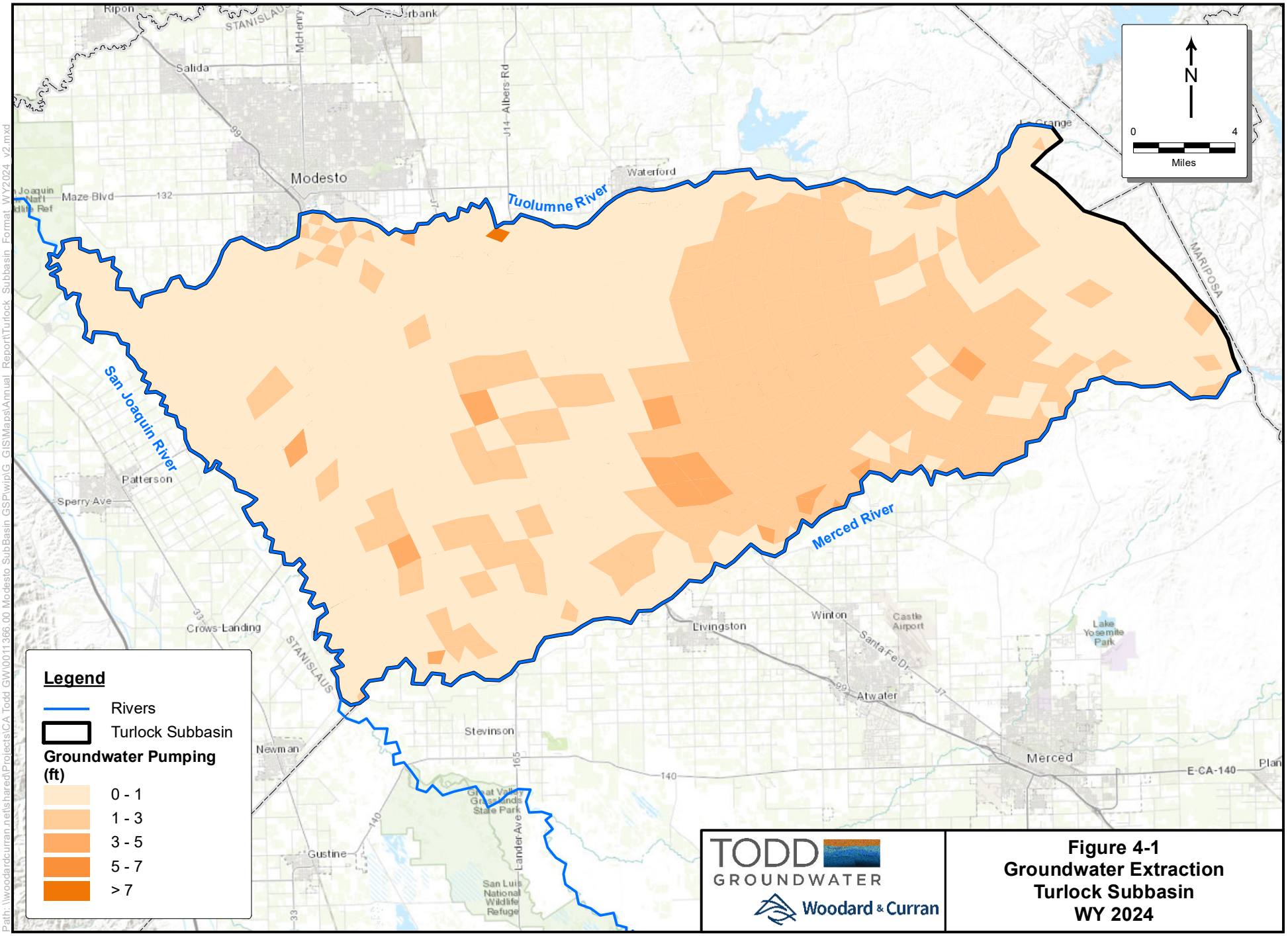
Modesto
Salida
Riverbank Aap
Modesto Reservoir
Waterford
Hickman
Turlock Lake
Ceres
Hughson
Keyes
Albers Rd
Maze Blvd
Shackelford
Modesto City-County Airport
Crows Landing Rd
California State Univ Stanislaus
Turlock
East Ave
Santa Fe Ave
Ballico
Delhi
Hilmar
Hilmar Middle
Crows Landing
Patterson
Newman
Stevinson
Stevinson Ranch Golf Club
Livingston
Winton
N Winton Way
Castle Airport
Atwater
Merced College
Lake Yosemite Park
University of California Merced
Snelling
Merced
Orestimba Creek
Crow Creek
Fahrens Creek
Browns Creek
South Fork Dry Creek
Black Rascal Creek
169 ft
318 ft
STANISLAUS
MERCED

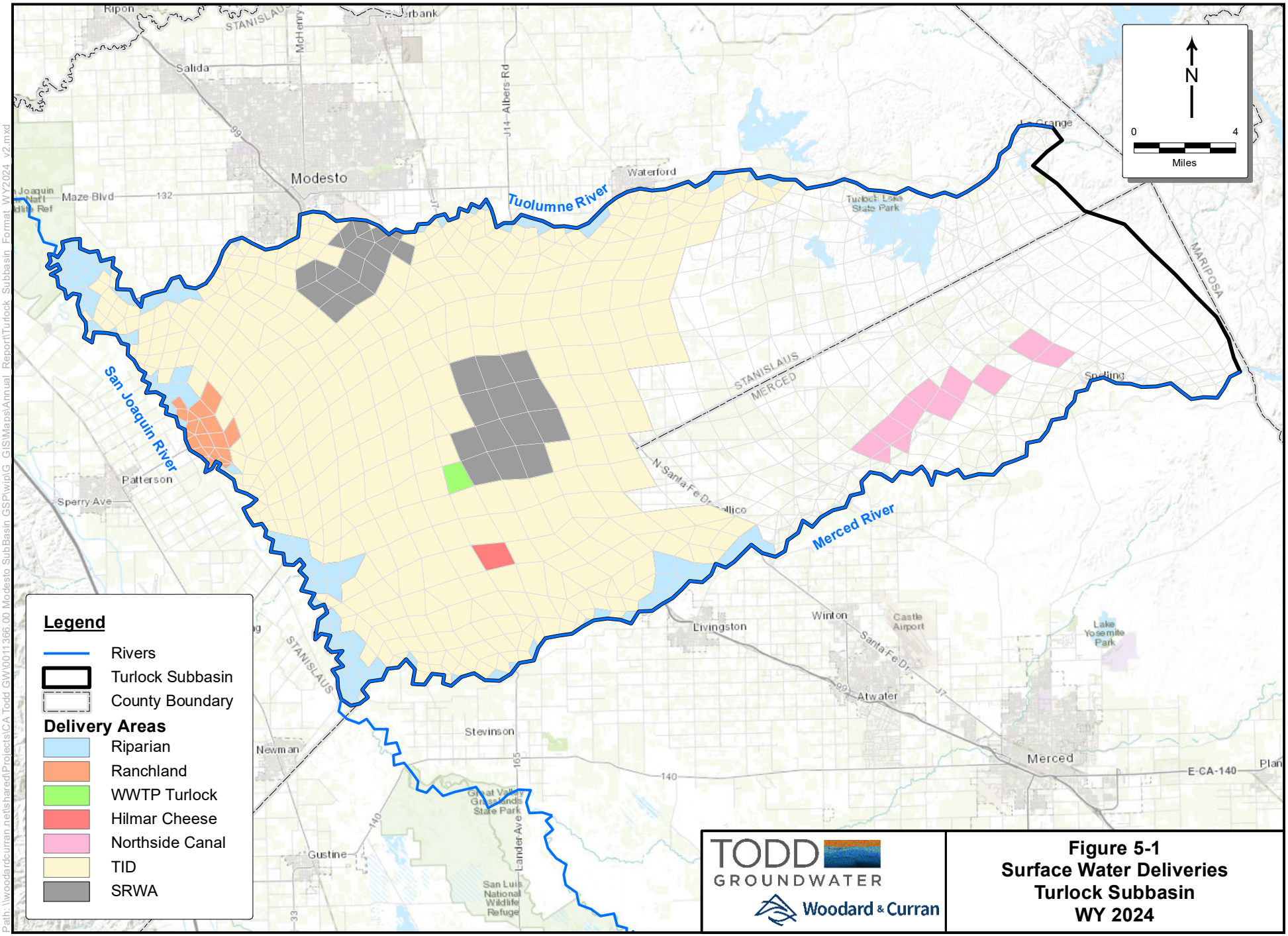
Legend

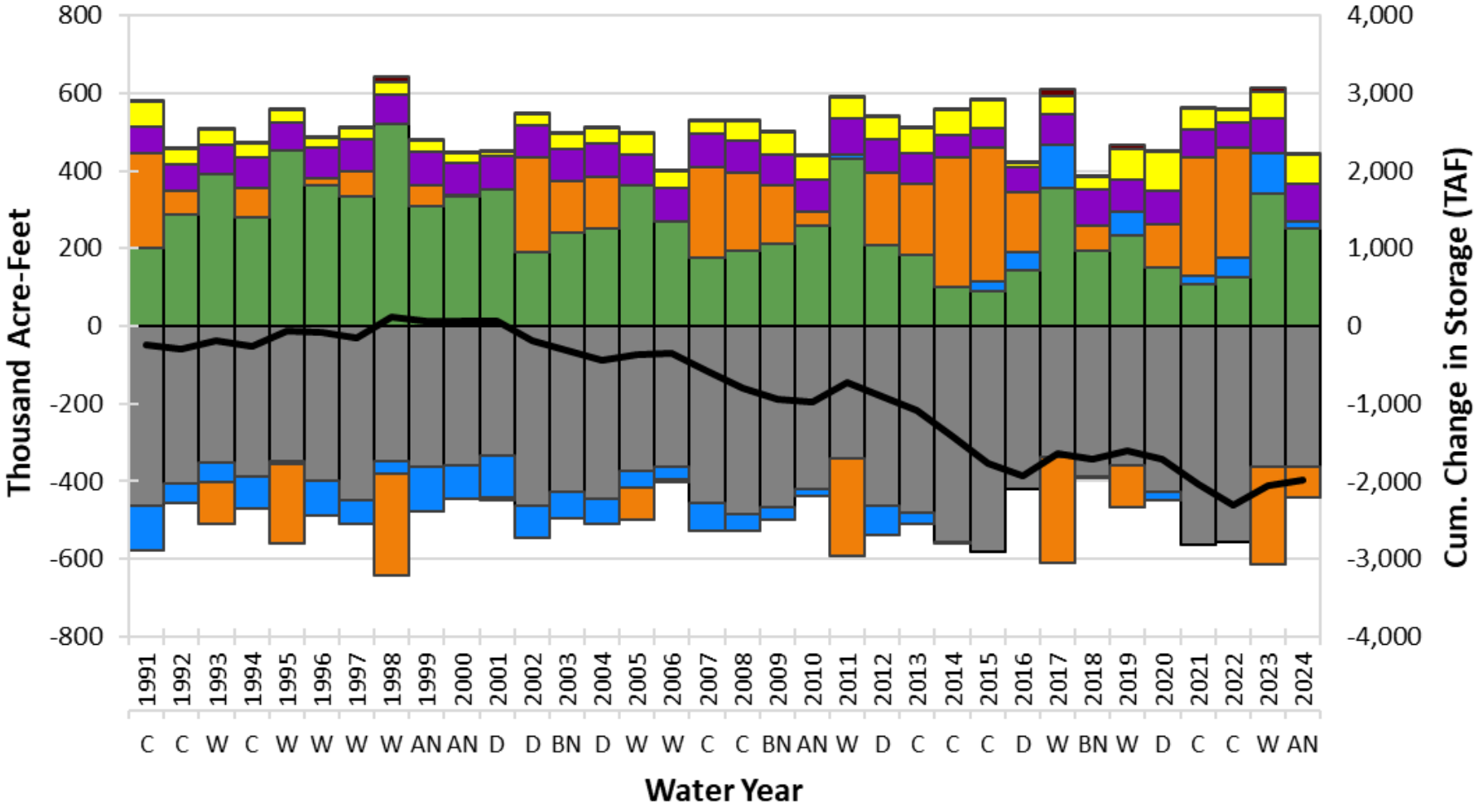
- Corcoran Clay Extent
- Turlock Groundwater Basin

TODD GROUNDWATER

Figure 3-19
Groundwater Elevation Contours
Western Lower Principal Aquifer, Spring 2024


Legend
Rivers
Turlock Subbasin
Groundwater Pumping (ft)
0 - 1
1 - 3
3 - 5
5 - 7
> 7
Tuolumne River
San Joaquin River
Merced River
Modesto
Waterford
Patterson
Crows Landing
Newman
Gustine
Stevinson
Livingston
Winton
Atwater
Merced
Lake Yosemite Park
Castle Airport
Santa Fe Dr
Albers Rd
McHenry
Maze Blvd
Sperry Ave
Lander Ave
MARIPOSA
STANISLAUS
N
0
4
Miles
TODD GROUNDWATER
Woodard & Curran
Figure 4-1
Groundwater Extraction
Turlock Subbasin
WY 2024

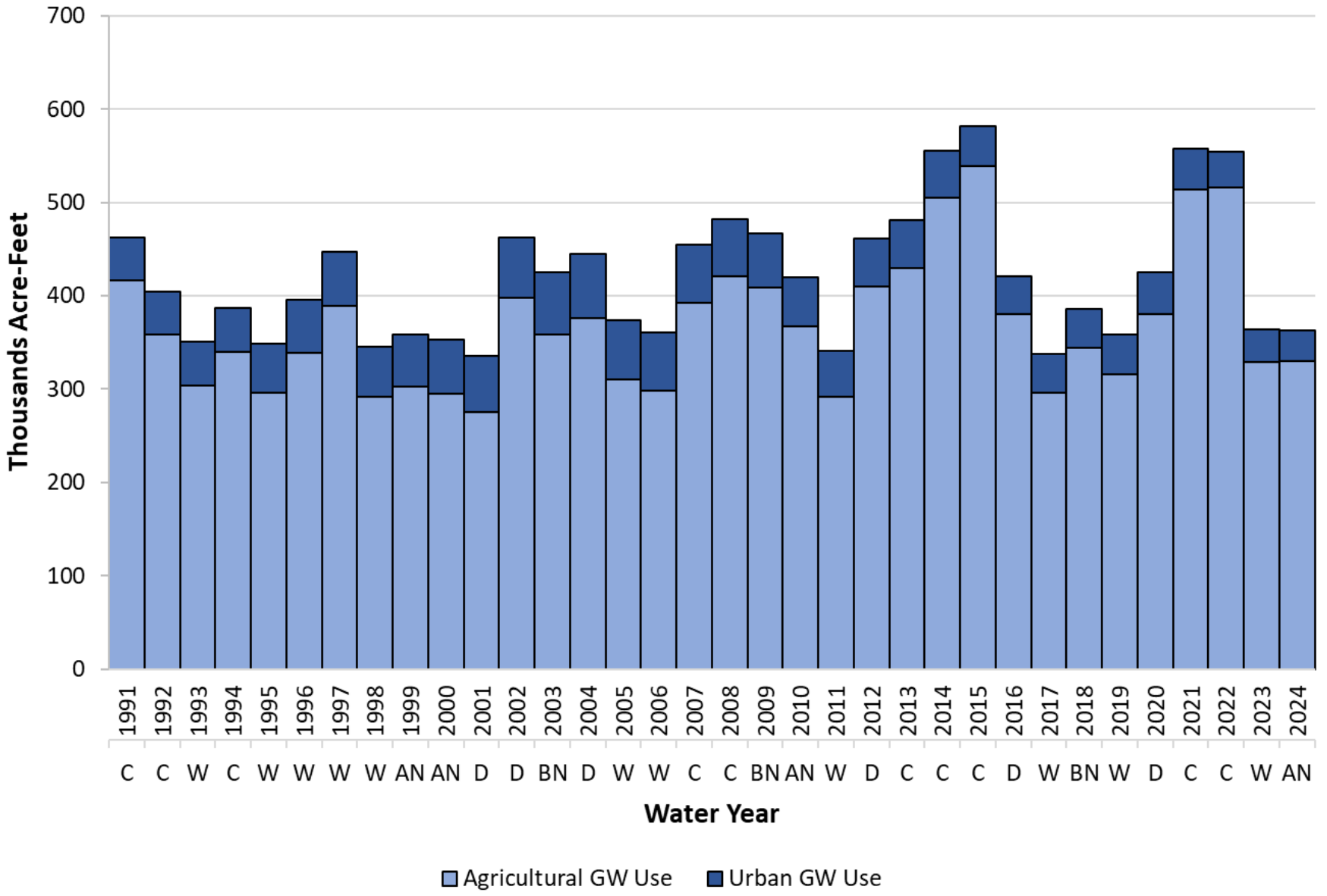

Legend
Rivers
Turlock Subbasin
County Boundary
Delivery Areas
Riparian
Ranchland
WWTP Turlock
Hilmar Cheese
Northside Canal
TID
SRWA
Tuolumne River
San Joaquin River
Merced River
Modesto
Waterford
Patterson
Newman
Gustine
Stevinson
Livingston
Winton
Atwater
Merced
Salida
Ripon
Oakdale
Turlock Lake State Park
Lake Yosemite Park
Castle Airport
San Luis National Wildlife Refuge
Great Valley Grasslands State Park
N
0
4
Miles
TODD GROUNDWATER
Woodard & Curran
Figure 5-1
Surface Water Deliveries
Turlock Subbasin
WY 2024



W: Wet
AN: Above Normal
BN: Below Normal
D: Dry
CD: Critically Dry

TODD GROUNDWATER
Woodard & Curran

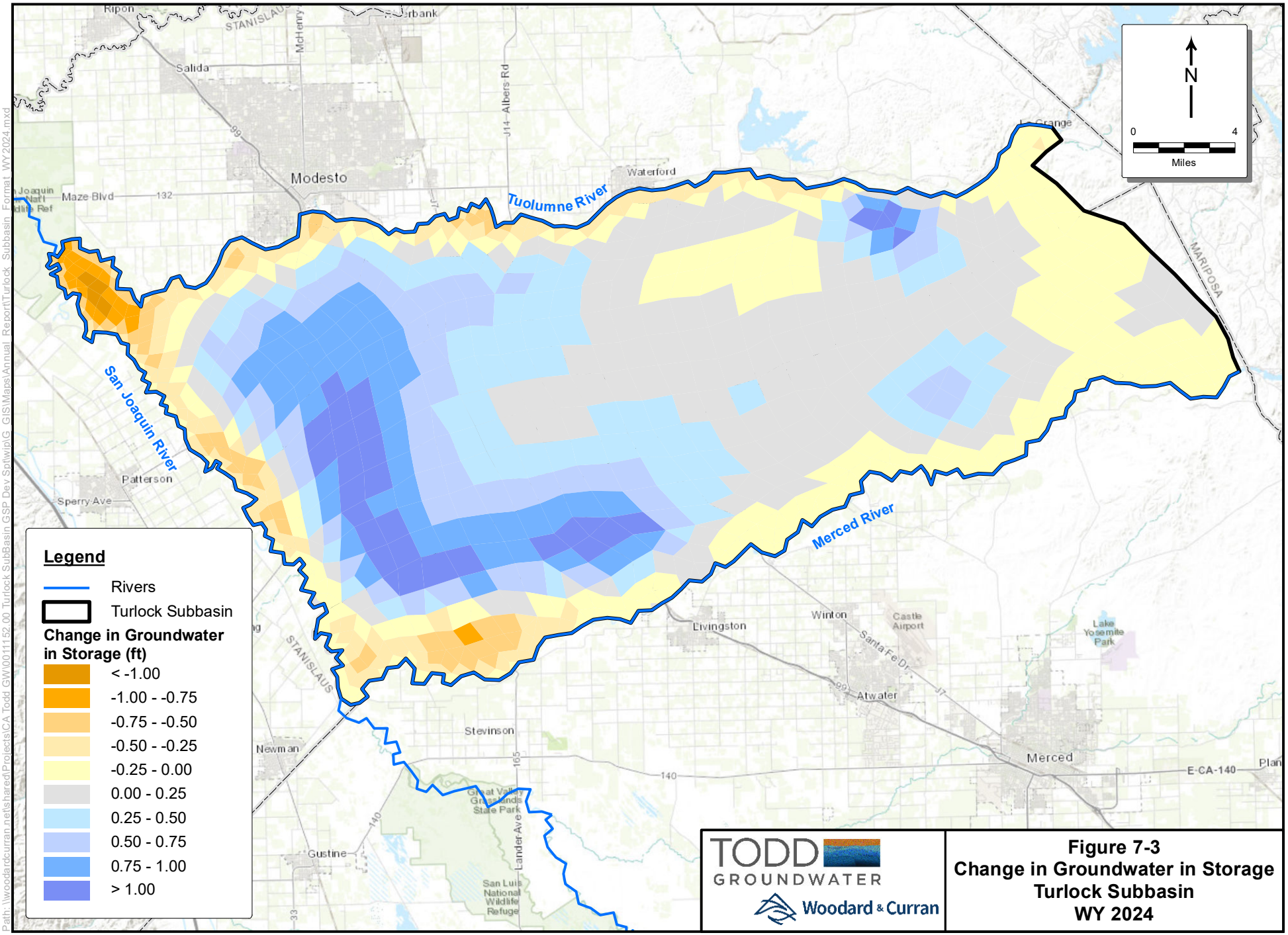
Figure 7-1
Groundwater Budget
Turlock Subbasin
WY 1991 - 2024

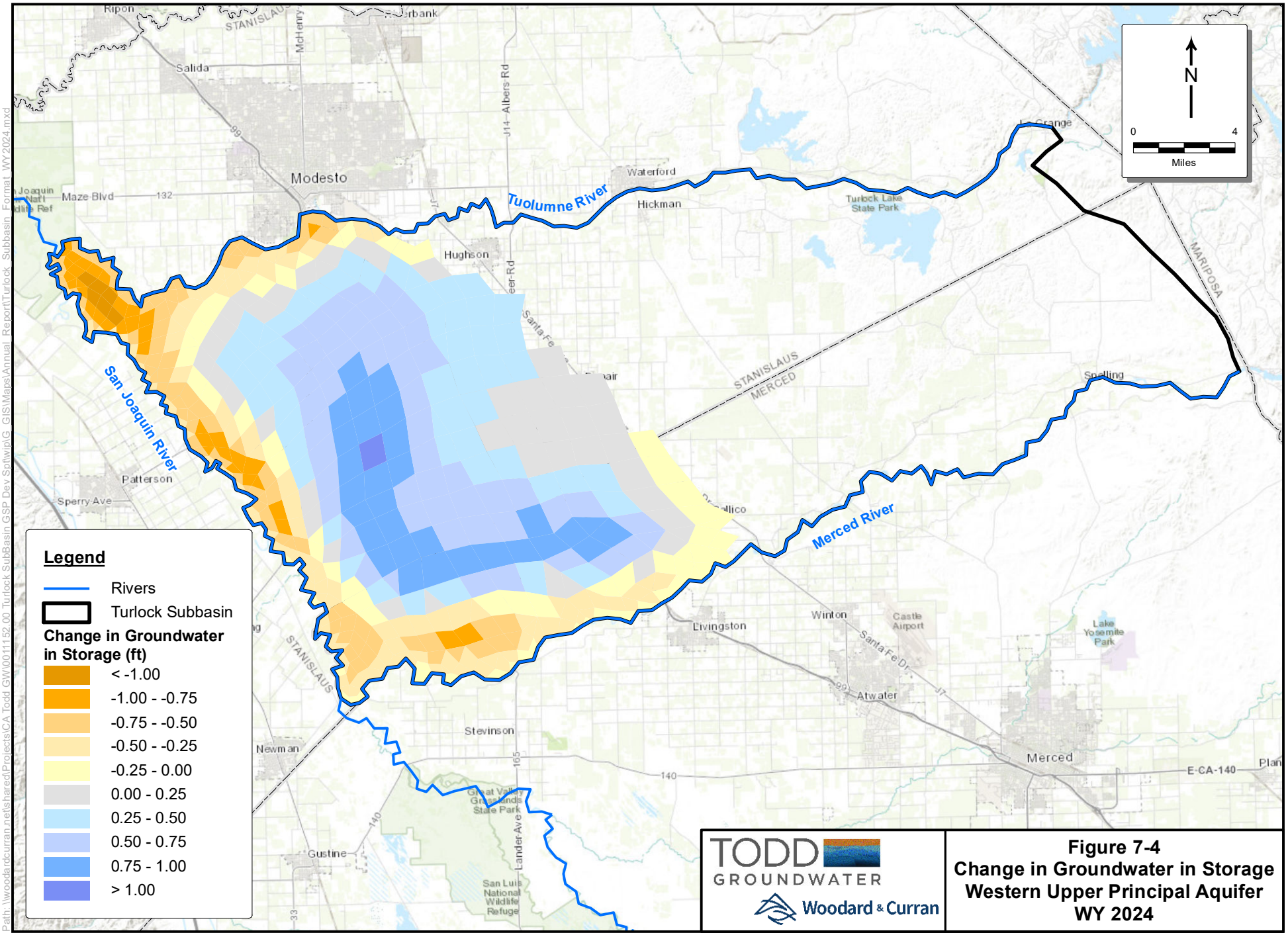


W: Wet
AN: Above Normal
BN: Below Normal
D: Dry
CD: Critically Dry

TODD GROUNDWATER
Woodard & Curran

Figure 7-2
Groundwater Use
Turlock Subbasin
WY 1991 - 2024


Legend
Rivers
Turlock Subbasin
Change in Groundwater in Storage (ft)
< -1.00
-1.00 - -0.75
-0.75 - -0.50
-0.50 - -0.25
-0.25 - 0.00
0.00 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
> 1.00
Tuolumne River
San Joaquin River
Merced River
Modesto
Ripon
Salida
Waterford
Patterson
Newman
Gustine
Stevinson
Livingston
Winton
Atwater
Merced
La Grange
MARIPOSA
N
0
4
Miles
TODD GROUNDWATER
Woodard & Curran
Figure 7-3
Change in Groundwater in Storage
Turlock Subbasin
WY 2024


Legend
Rivers
Turlock Subbasin
Change in Groundwater in Storage (ft)
< -1.00
-1.00 - -0.75
-0.75 - -0.50
-0.50 - -0.25
-0.25 - 0.00
0.00 - 0.25
0.25 - 0.50
0.50 - 0.75
0.75 - 1.00
> 1.00
N
0
4
Miles
Tuolumne River
San Joaquin River
Merced River
Modesto
Waterford
Hickman
Hughson
Turlock Lake State Park
Patterson
Sperry Ave
Maze Blvd
Salida
Ripon
Albers Rd
Santa Fe
STANISLAUS
MERCED
MARIPOSA
Spelling
Livingston
Winton
Castle Airport
Lake Yosemite Park
Santa Fe Dr
Atwater
Merced
E CA-140
Stevinson
Newman
Gustine
Great Valley Grasslands State Park
San Luis National Wildlife Refuge
Lander Ave
TODD GROUNDWATER
Woodard & Curran
Figure 7-4
Change in Groundwater in Storage
Western Upper Principal Aquifer
WY 2024

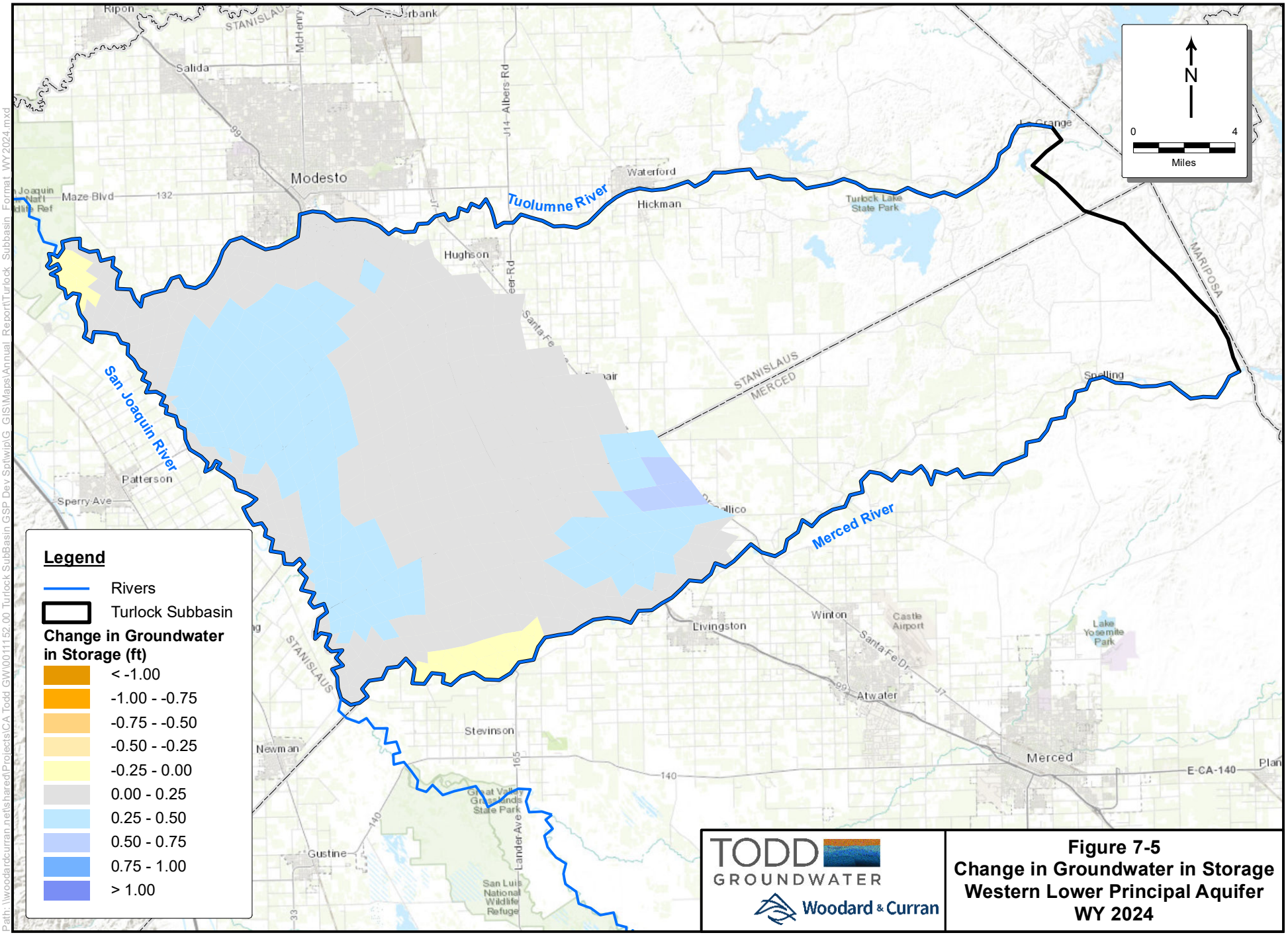


Figure 7-5
Change in Groundwater in Storage
Western Lower Principal Aquifer
WY 2024

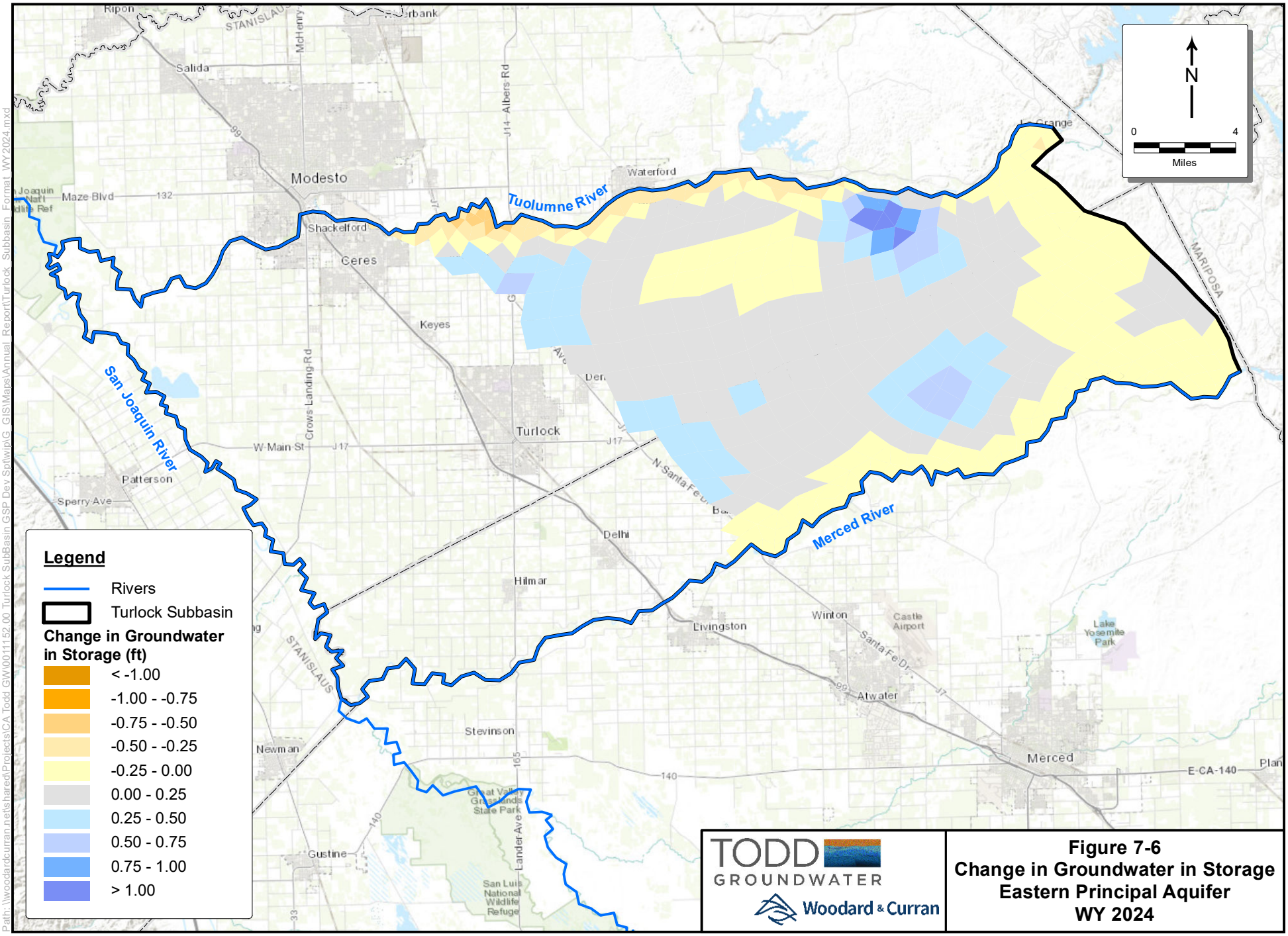
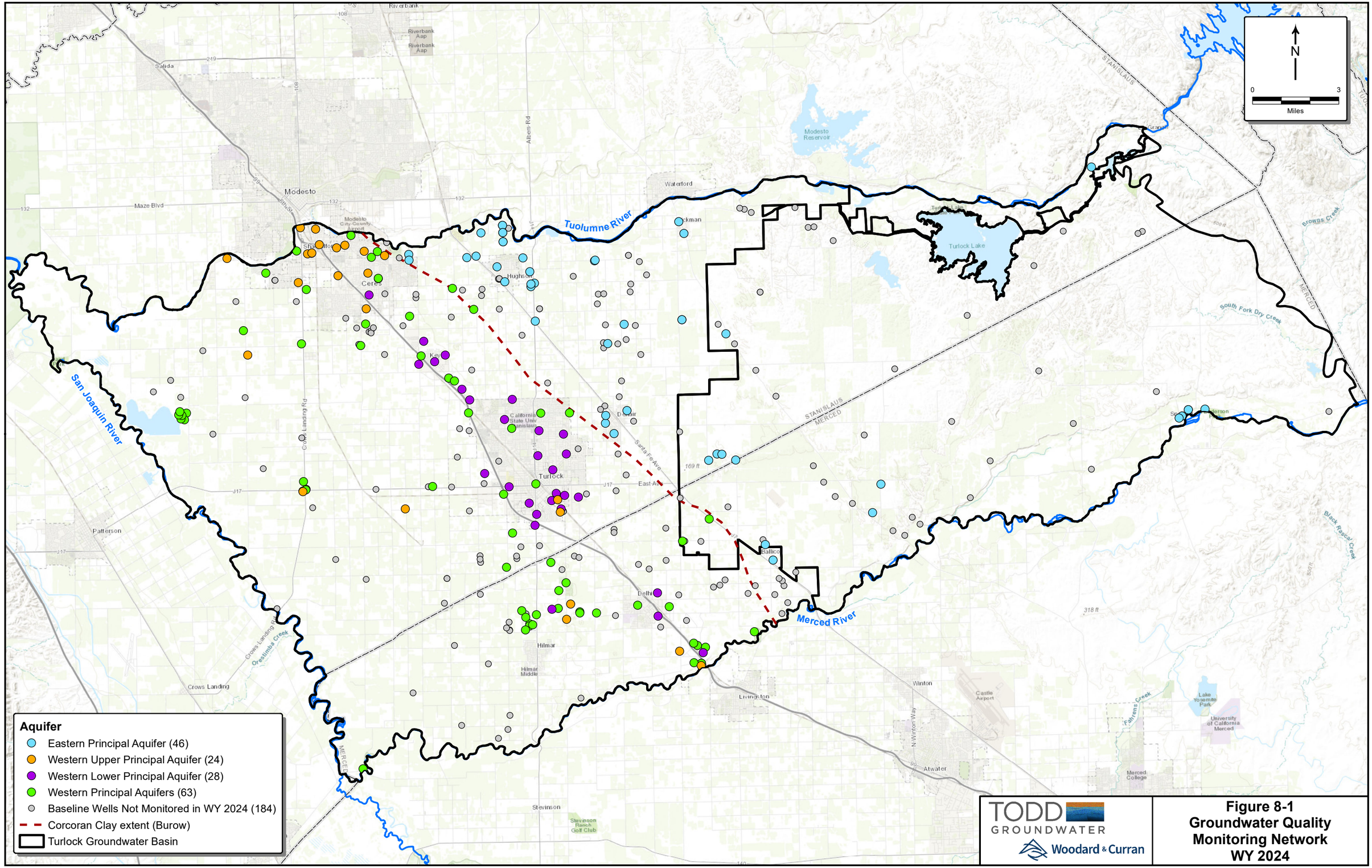
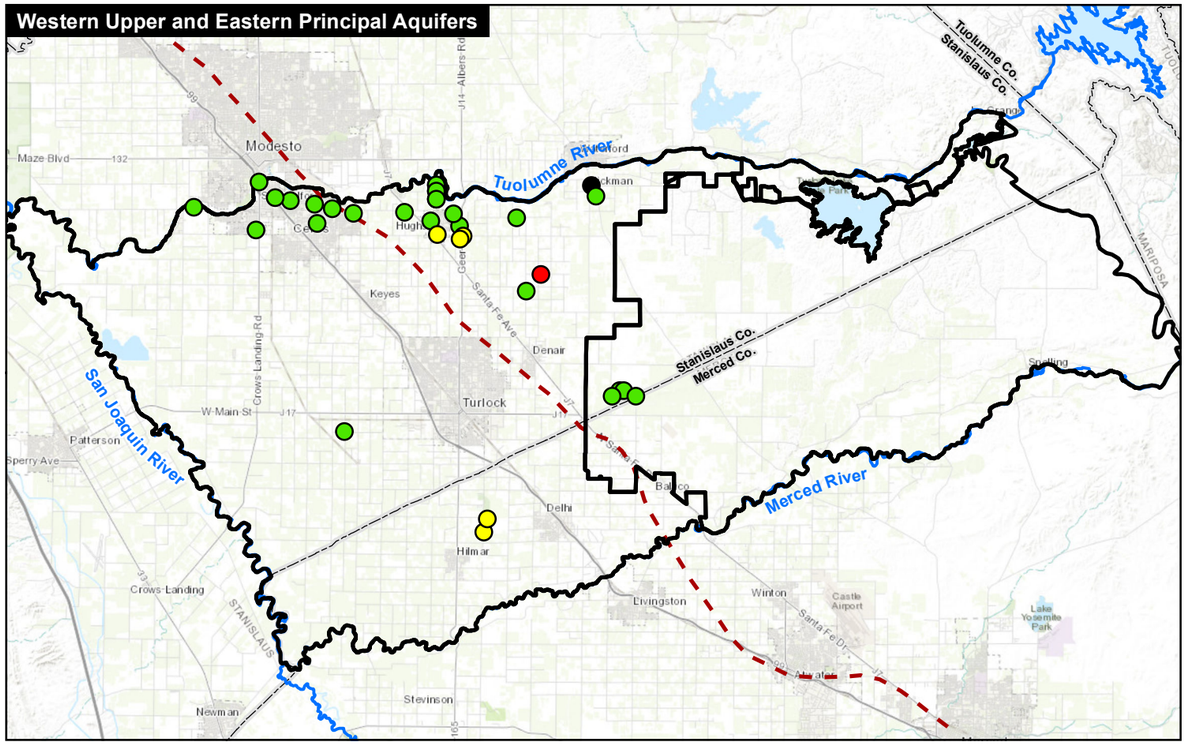
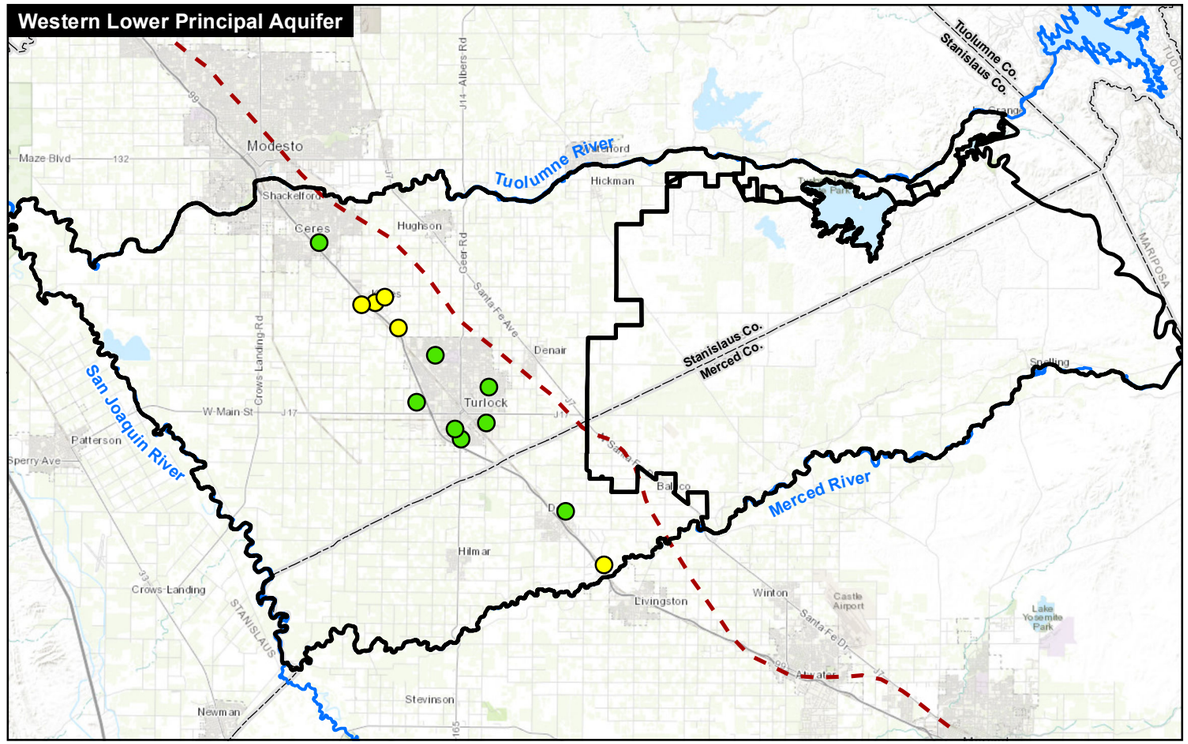
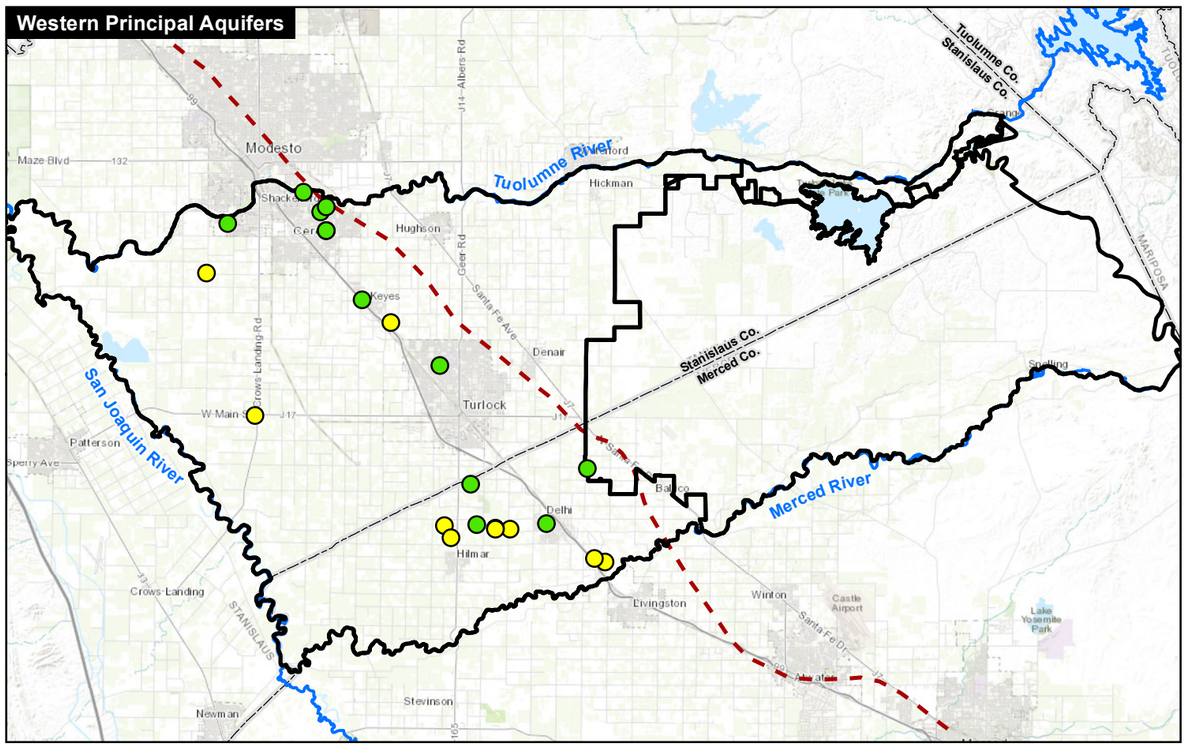


Figure 7-6
Change in Groundwater in Storage
Eastern Principal Aquifer
WY 2024


N
0
3
Miles
Tuolumne River
San Joaquin River
Merced River
Modesto
Riverbank
Salida
Waterford
Hughson
Ceres
Turlock
Patterson
Delhi
Hilmar
Crows Landing
Livingston
Winton
Atwater
Stevinson
Ballico
Denair
Keyes
Modesto Reservoir
Turlock Lake
Maze Blvd
Albers Rd
Santa Fe Ave
Crows Landing Rd
Orestimba Creek
Browns Creek
South Fork Dry Creek
Black Rascal Creek
Fahrens Creek
STANISLAUS
MERCED
Aquifer
Eastern Principal Aquifer (46)
Western Upper Principal Aquifer (24)
Western Lower Principal Aquifer (28)
Western Principal Aquifers (63)
Baseline Wells Not Monitored in WY 2024 (184)
Corcoran Clay extent (Burow)
Turlock Groundwater Basin
TODD GROUNDWATER
Woodard & Curran
Figure 8-1
Groundwater Quality
Monitoring Network
WY 2024







N

0 6

Miles

Arsenic (MCL = 10 ug/L)

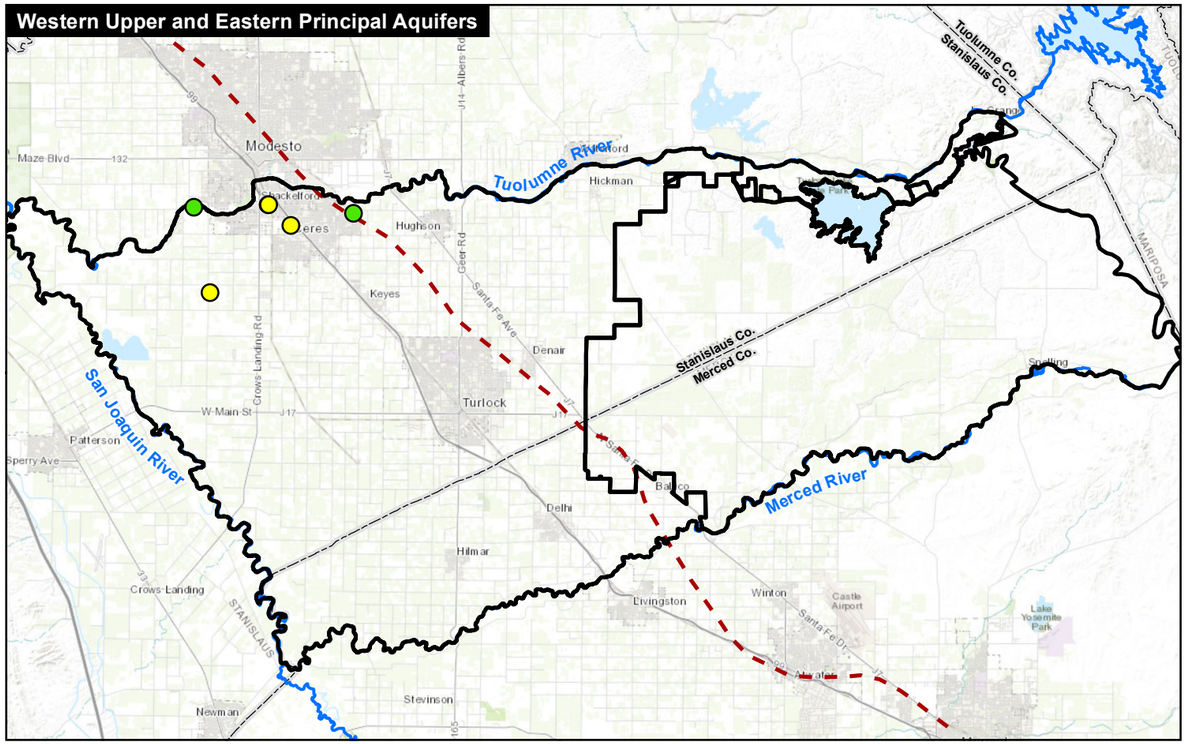
- Above MCL - First-Time (1)
- Above MCL - Not First-Time (20)
- Detection - Equal to or Below MCL (45)
- Non-Detect (3)

TODD GROUNDWATER

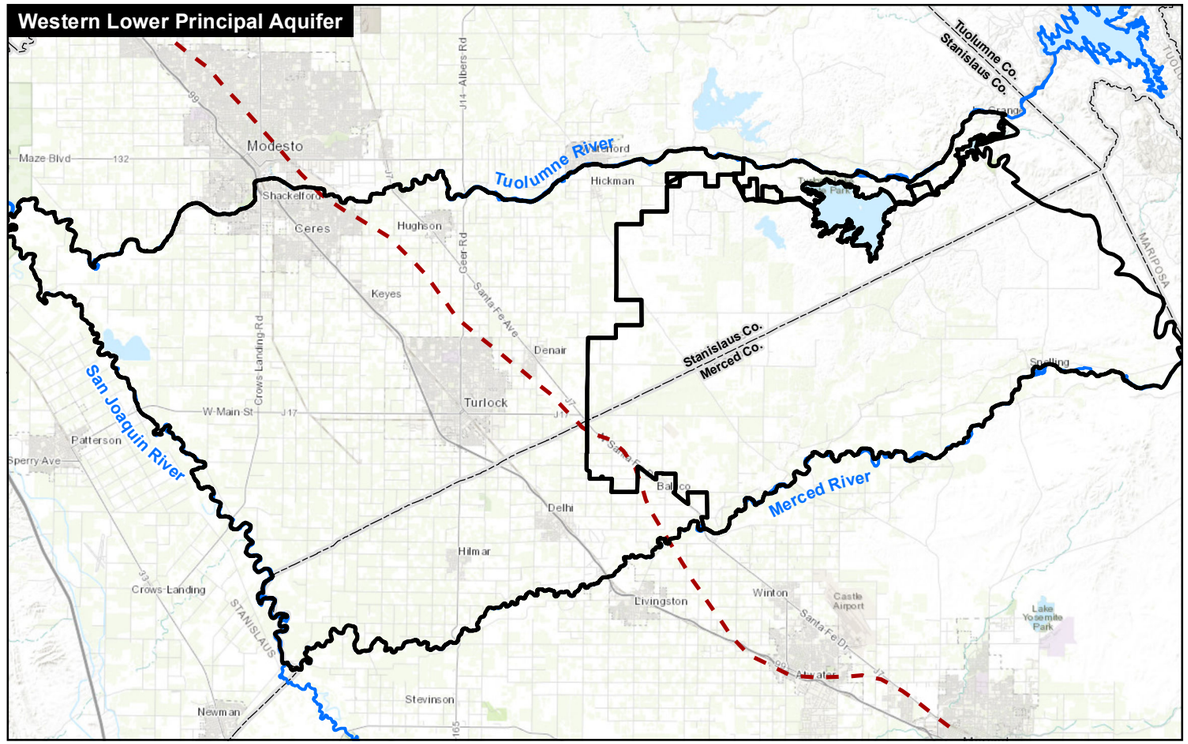
Woodard & Curran

Figure 8-2
Arsenic in Groundwater
WY 2024

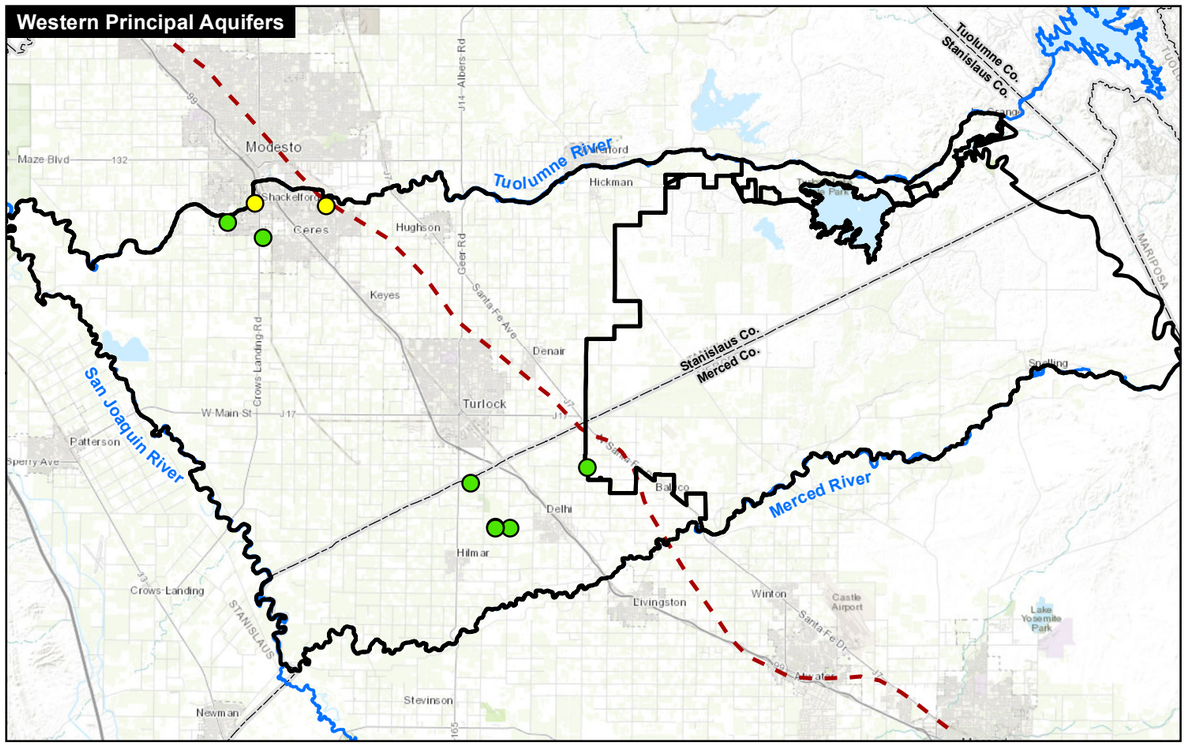
Western Upper and Eastern Principal Aquifers



Western Lower Principal Aquifer



Western Principal Aquifers



N

0 6

Miles

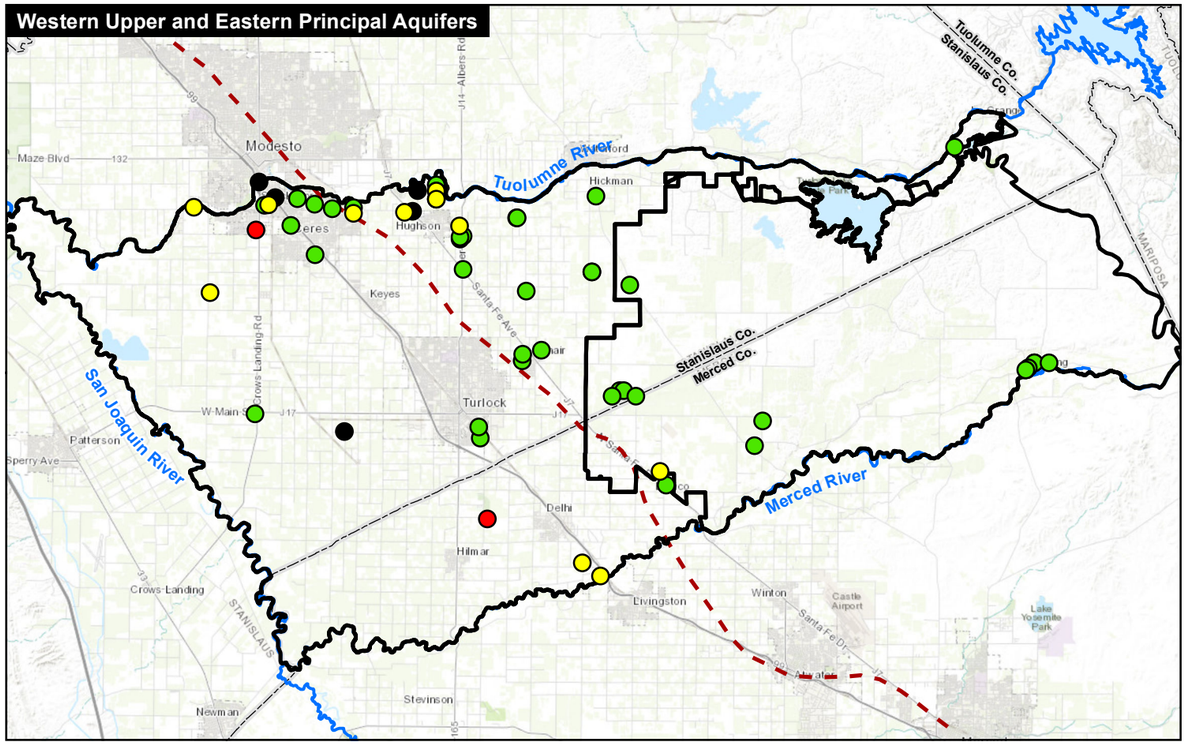
Uranium (MCL = 20 pCi/L)

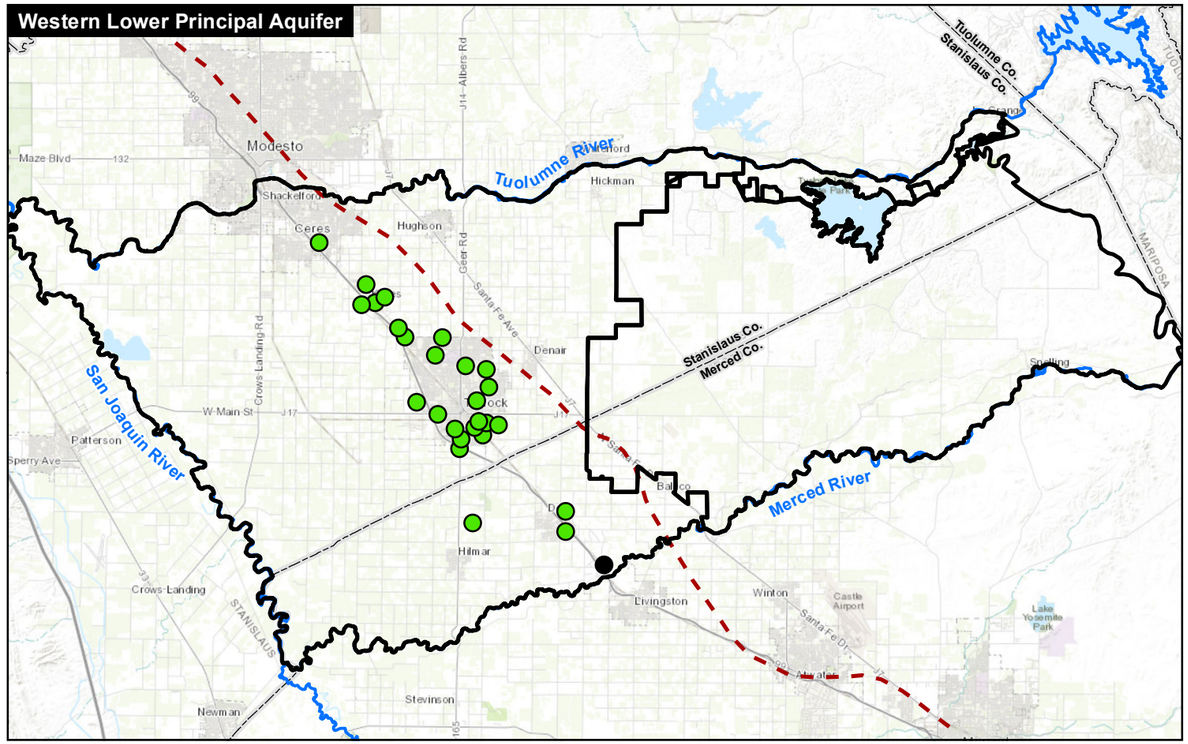
- Above MCL - First-Time (0)
- Above MCL - Not First-Time (5)
- Detection - Equal to or Below MCL (10)
- Non-Detect (0)

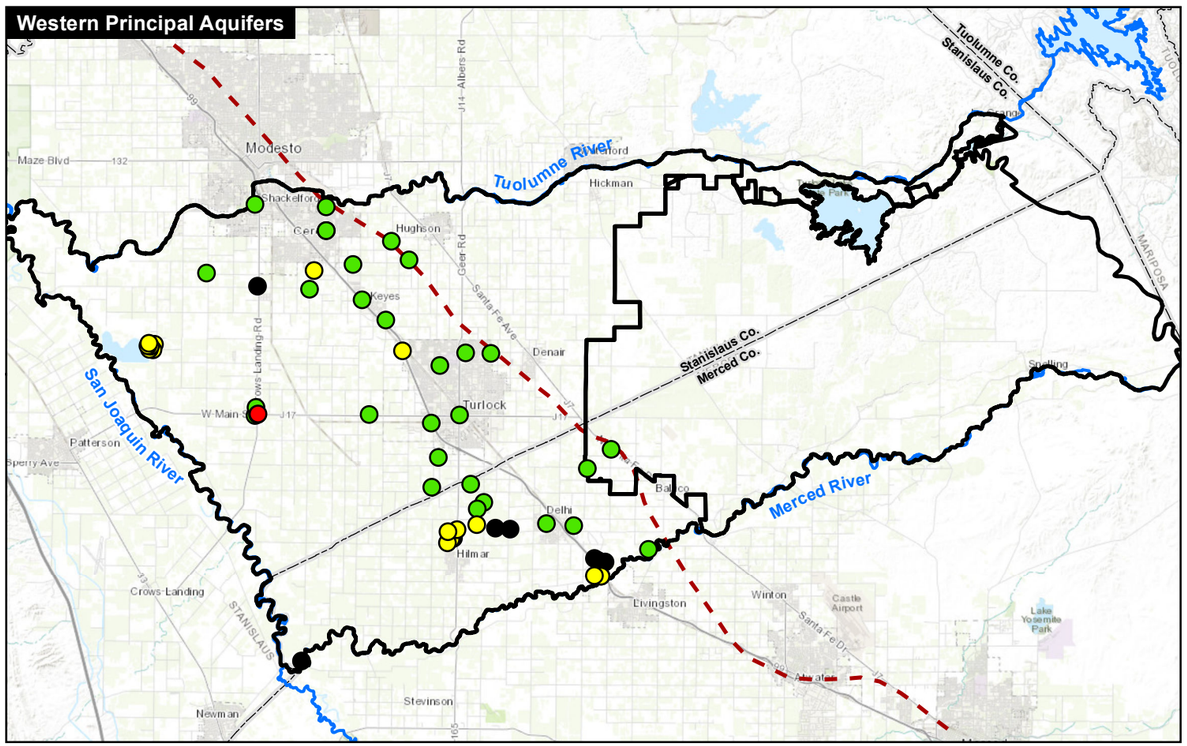
TODD GROUNDWATER

Woodard & Curran

Figure 8-3
Uranium in Groundwater
WY 2024







N

0 6

Miles

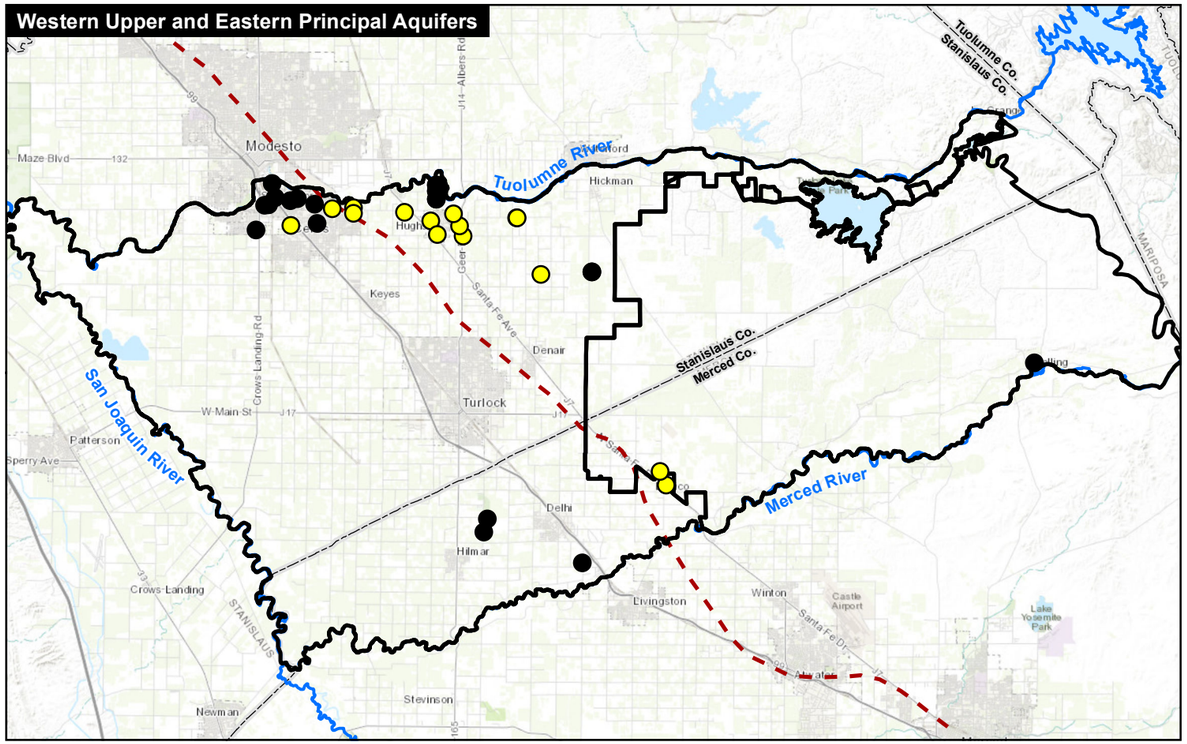
Nitrate as N (MCL = 10 mg/L)

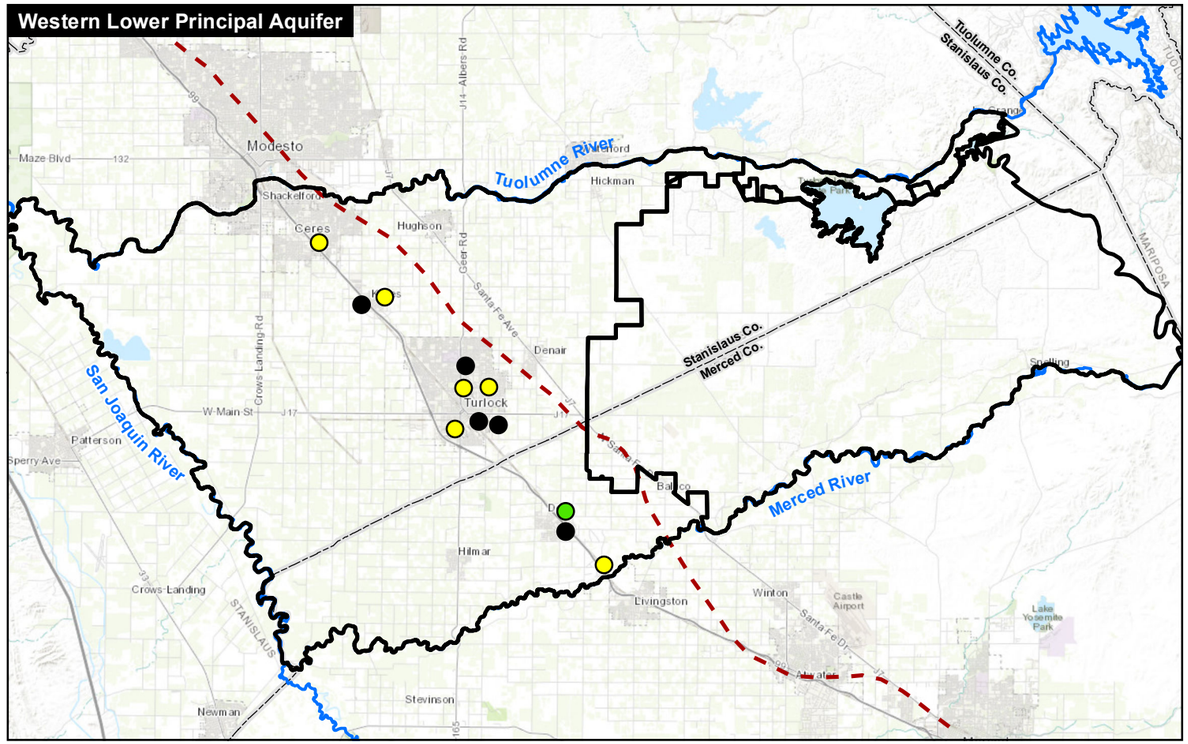
- Above MCL - First-Time (3)
- Above MCL - Not First-Time (28)
- Detection - Equal to or Below MCL (95)
- Non-Detect (16)

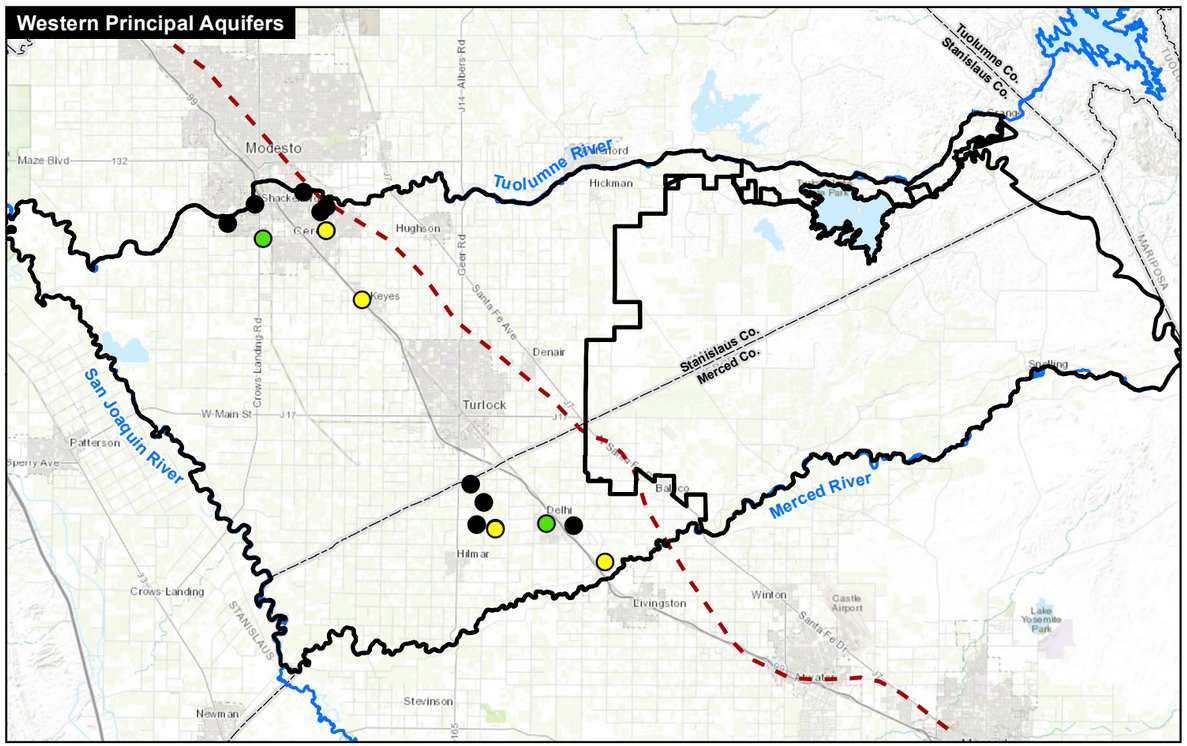
TODD GROUNDWATER

Woodard & Curran

Figure 8-4
Nitrate in Groundwater
WY 2024







N

0 6

Miles

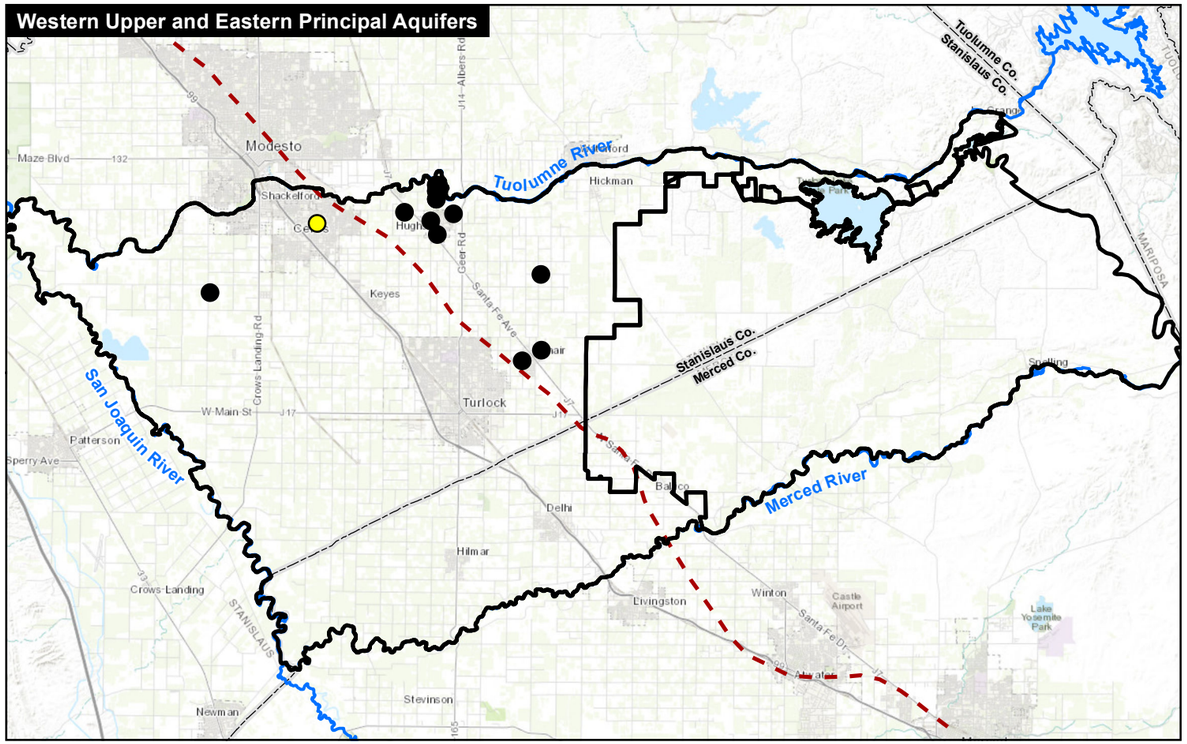
TCP (MCL = 0.005 ug/L)

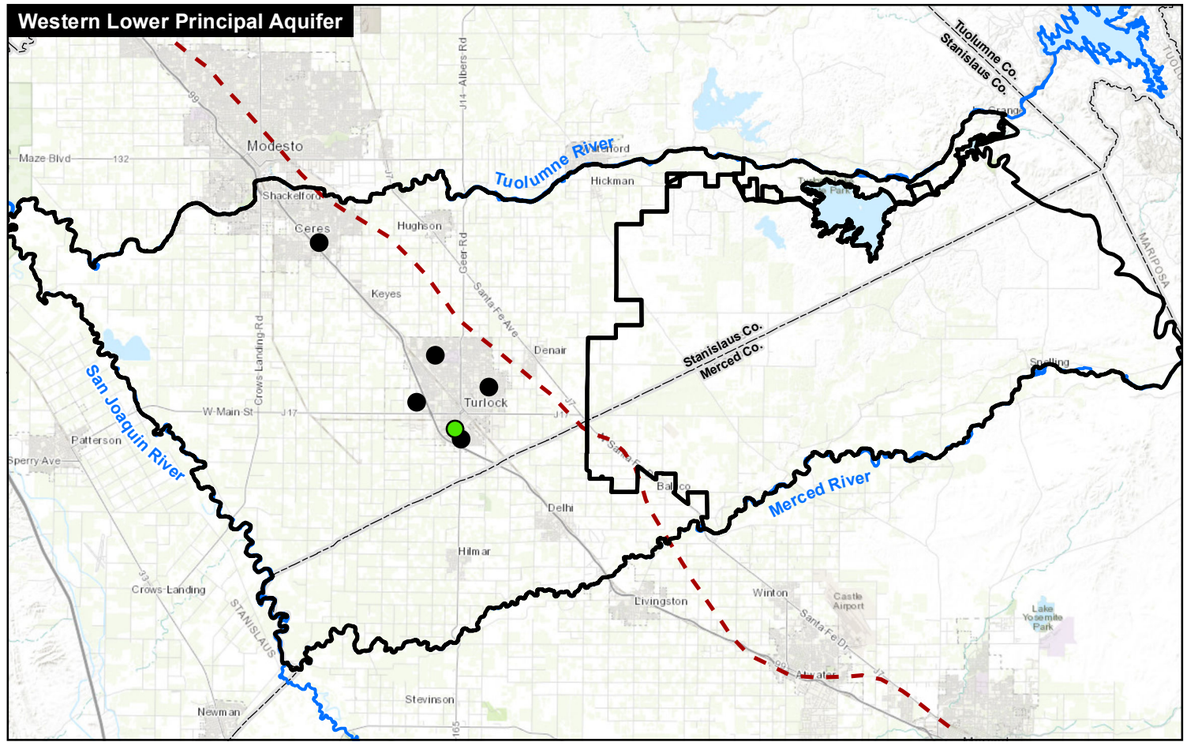
- Above MCL - First-Time (0)
- Above MCL - Not First-Time (27)
- Detection - Equal to or Below MCL (3)
- Non-Detect (36)

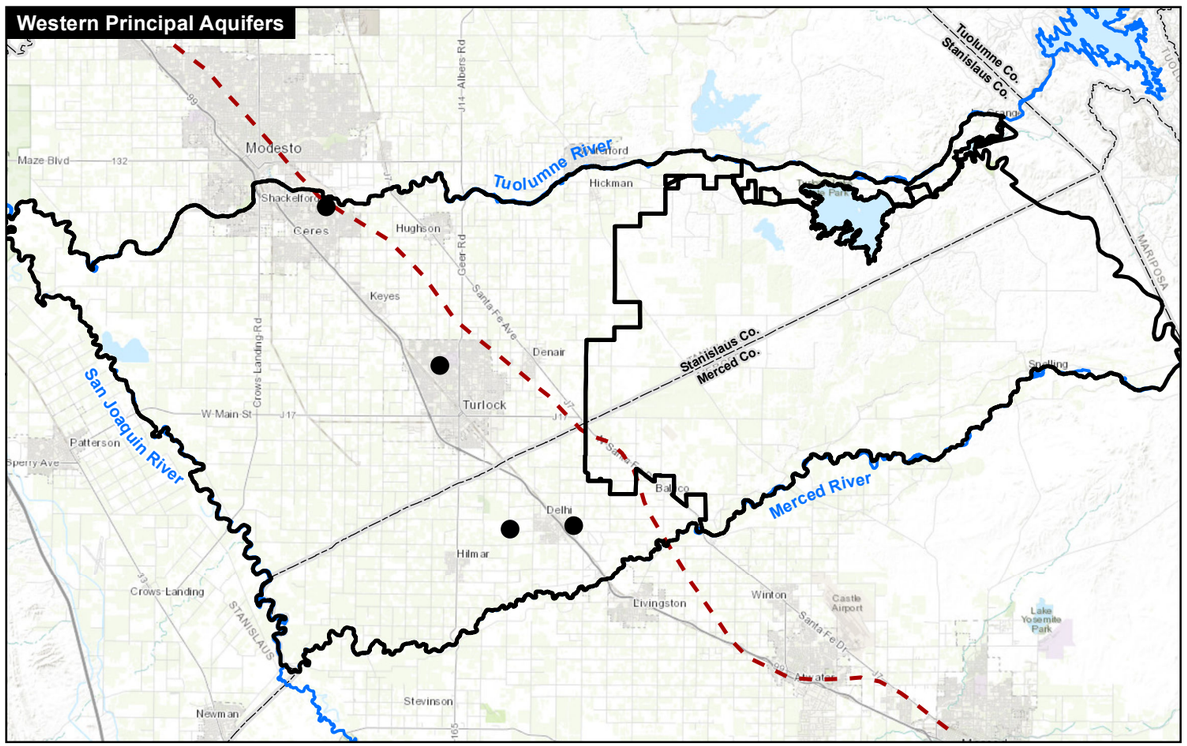
TODD GROUNDWATER

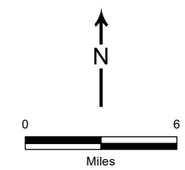
Woodard & Curran

Figure 8-5
TCP in Groundwater
WY 2024







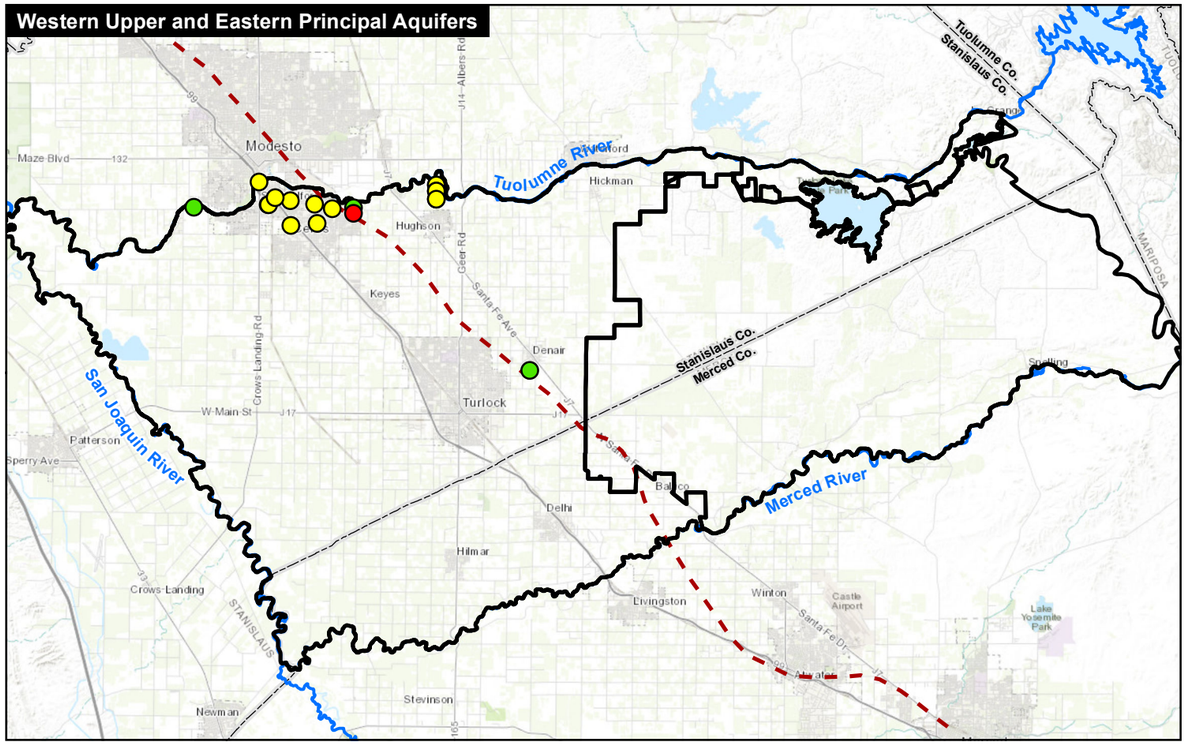


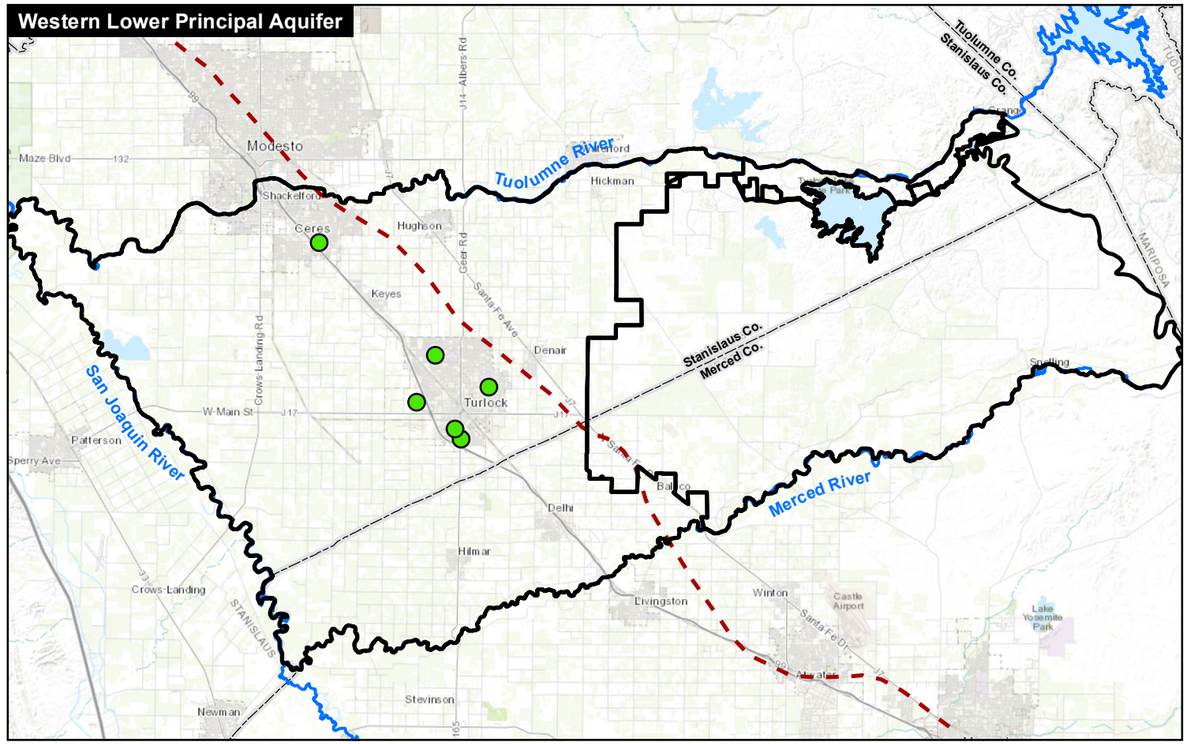
PCE (MCL = 5 ug/L)

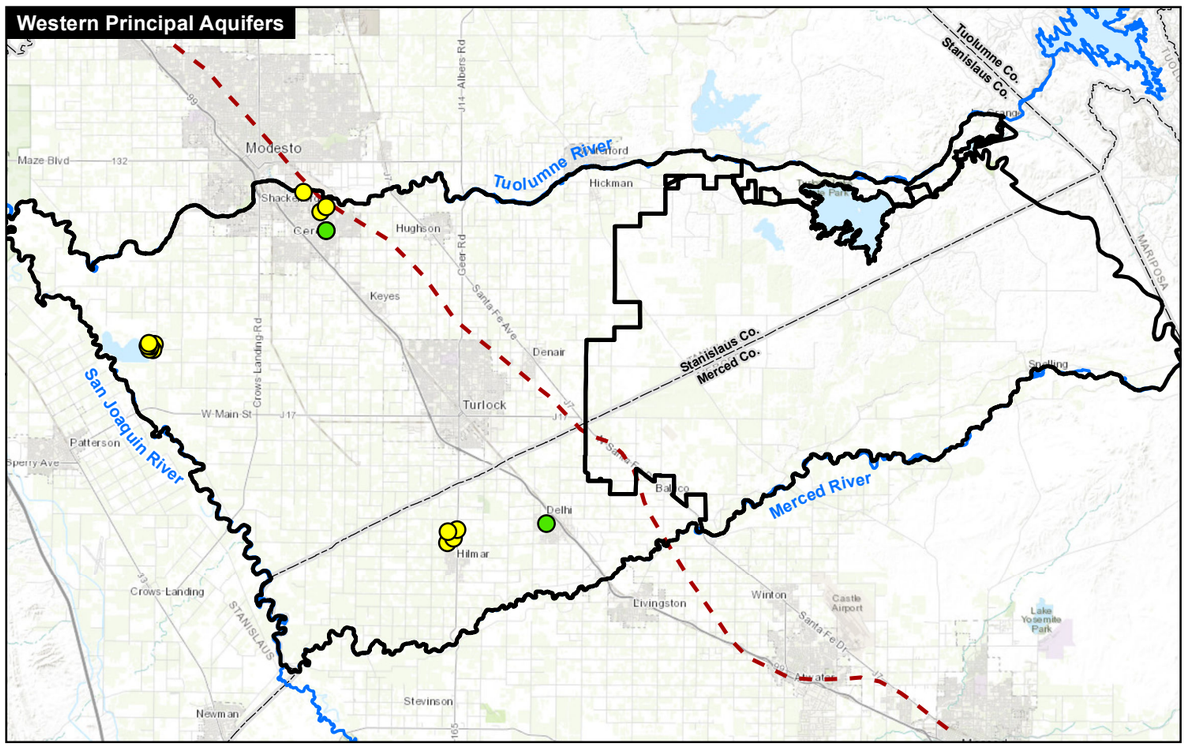
- Above MCL - First-Time (0)
- Above MCL - Not First-Time (1)
- Detection - Equal to or Below MCL (1)
- Non-Detect (23)

TODD GROUNDWATER
Woodard & Curran

Figure 8-6
PCE in Groundwater
WY 2024







N

0 6

Miles

TDS (MCL = 500 mg/L)

- Above MCL - First-Time (1)
- Above MCL - Not First-Time (27)
- Detection - Equal to or Below MCL (14)
- Non-Detect (0)

TODD GROUNDWATER

Woodard & Curran

Figure 8-7
TDS in Groundwater
WY 2024

Legend

- GPS Location - TRLK
- Turlock Subbasin
- County Line
- Corcoran Clay Extent (Burow et al., 2004)

Vertical Displacement (feet)

- < -0.35
- -0.35 to -0.3
- -0.3 to -0.25
- -0.25 to -0.2
- -0.2 to -0.15
- -0.15 to -0.1
- -0.1 to -0.05
- -0.05 to 0
- 0 to 0.05
- > 0.05
- No Data

TRLK

Source: DWR SGMA Data Viewer, TRE Altamira InSAR Data (https://gis.water.ca.gov/arcgisimg/rest/services/SAR/Vertical_Displacement_TRE_ALTAMIRA_Annual_Rate_20231001_20241001/ImageServer)

N

0 1 2 3

Scale in Miles

TODD GROUNDWATER

Woodard & Curran

Figure 9-1
InSAR Vertical Displacement Data
WY 2024

Path: T:\Projects\Turlock Implementation Services 6421\Task Order 12 - Annual Report WY 2024\GIS\MAPS\Figure 9-1 Vertical Displacement from InSAR Data.mxd

Legend

- GPS Location - TRLK
- Turlock Subbasin
- County Line
- Corcoran Clay Extent (Burow et al., 2004)

Vertical Displacement (feet)

- < -0.35
- -0.35 to -0.3
- -0.3 to -0.25
- -0.25 to -0.2
- -0.2 to -0.15
- -0.15 to -0.1
- -0.1 to -0.05
- -0.05 to 0
- 0 to 0.05
- > 0.05
- No Data

TRLK

Source: DWR SGMA Data Viewer, TRE Altamira InSAR Data (https://gis.water.ca.gov/arcgisimg/rest/services/SAR/Vertical_Displacement_TRE_ALTAMIRA_Total_Since_20150613_20241001/ImageServer)

N

0 1 2 3

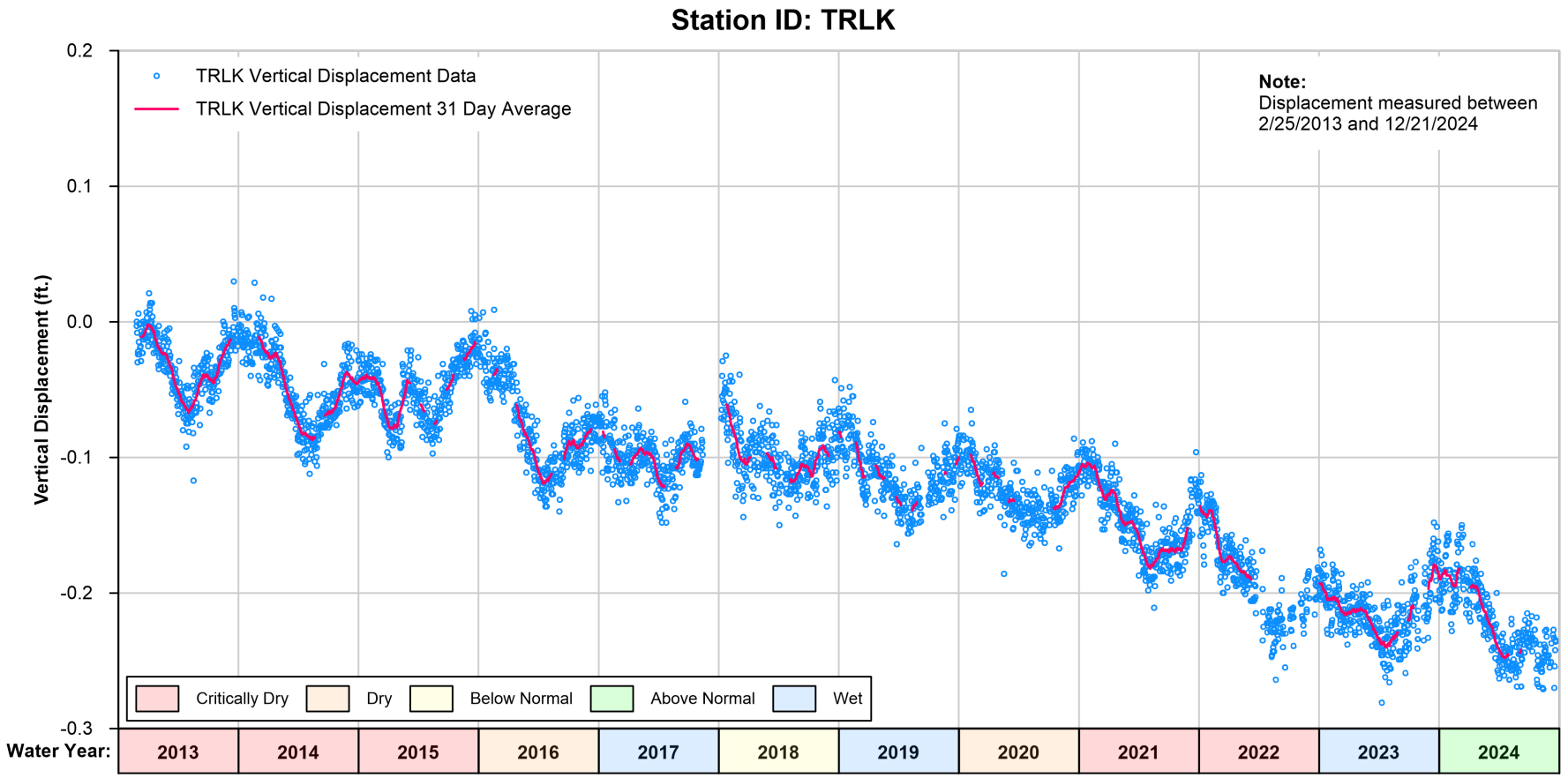
Scale in Miles

TODD GROUNDWATER

Woodard & Curran

Figure 9-2
InSAR Vertical Displacement Data
June 2015 to Sept. 2024

Path: T:\Projects\Turlock Implementation Services 64213\Task Order 12 - Annual Report WY 2024\GIS\MAPS\Figure 9-2 Vertical Displacement from InSAR Data_June 2015 - September 2024.mxd



Source:
https://sgma.water.ca.gov/SGMAMapServices/report/gpsstation?station_id=TRLK

TODD GROUNDWATER
Woodard & Curran

Figure 9-3
Historical Ground Surface Elevation from GPS Station TRLK

APPENDIX A

WY 2024 Groundwater Elevation Data

Appendix A - WY 2024 Groundwater Elevation Data

Local Well Name	Measurement Date	Measurement Time (PST 24-Hour)	No Measurement Code	Questionable Measurement Code	Reading at Reference Point (feet)	Reading at Water Surface (feet)	Reference Point Elevation (feet)	Ground Surface Elevation (feet)	WSE	Measurement Method Code	Measurement Accuracy	Collecting/ Co-op Agency	Water Level Measurement Comments
Balv 1	11/2/2023	12:24			22.84	0	110	110	87.16	ES	0.01 Ft	West Turlock Subbasin GSA	
Balv 1	3/5/2024	11:53			24.79	0	110	110	85.21	ES	0.01 Ft	West Turlock Subbasin GSA	
Balv 2	11/2/2023	12:25			22.76	0	110	110	87.24	ES	0.01 Ft	West Turlock Subbasin GSA	
Balv 2	3/5/2024	11:54			24.84	0	110	110	85.16	ES	0.01 Ft	West Turlock Subbasin GSA	
Balv 3	11/2/2023	12:26			22.75	0	110	110	87.25	ES	0.01 Ft	West Turlock Subbasin GSA	
Balv 3	3/5/2024	11:55			24.86	0	110	110	85.14	ES	0.01 Ft	West Turlock Subbasin GSA	
Balv 4	11/2/2023	12:26			22.94	0	110	110	87.06	ES	0.01 Ft	West Turlock Subbasin GSA	
Balv 4	3/5/2024	11:56			25.04	0	110	110	84.96	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 1-1	11/2/2023	12:10			16.75	0	90.1	90.1	73.35	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 1-1	3/5/2024	12:12			9.07	0	90.1	90.1	81.03	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 1-2	11/2/2023	12:11			16.91	0	90.1	90.1	73.19	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 1-2	3/5/2024	12:13			9.19	0	90.1	90.1	80.91	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 1-3	11/2/2023	12:11			17.31	0	90.1	90.1	72.79	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 1-3	3/5/2024	12:13			8.06	0	90.1	90.1	82.04	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 1-4	11/2/2023	12:12			16.11	0	90.1	90.1	73.99	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 1-4	3/5/2024	12:14			6.71	0	90.1	90.1	83.39	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 2-1	11/2/2023	12:05			17.77	0	91.2	91.2	73.43	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 2-1	3/5/2024	12:15			8.58	0	91.2	91.2	82.62	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 2-2	11/2/2023	12:06			28.62	0	91.2	91.2	62.58	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 2-2	3/5/2024	12:15			7.14	0	91.2	91.2	84.06	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 3-1	11/2/2023	12:08			62.31	0	90.6	90.6	28.29	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 3-1	3/5/2024	12:17			38.81	0	90.6	90.6	51.79	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 3-2	11/2/2023	12:08			17.62	0	90.6	90.6	72.98	ES	0.01 Ft	West Turlock Subbasin GSA	
Blum 3-2	3/5/2024	12:18			6.38	0	90.6	90.6	84.22	ES	0.01 Ft	West Turlock Subbasin GSA	
Ceres 36	11/15/2023	14:43			53	0	94.6	92.7	41.60	ES	0.01 Ft	West Turlock Subbasin GSA	
Ceres 36	3/21/2024	11:12			51	0	94.6	92.7	43.60	ES	0.01 Ft	West Turlock Subbasin GSA	
Denair NW-11 287	11/8/2023	7:39			94.51	0	116.72	116.72	22.21	ES	0.01 Ft	West Turlock Subbasin GSA	
Denair NW-11 287	3/7/2024	8:49			77.28	0	116.72	116.72	39.44	ES	0.01 Ft	West Turlock Subbasin GSA	
Denair NW-11 443	11/8/2023	7:39			97.56	0	116.72	116.72	19.16	ES	0.01 Ft	West Turlock Subbasin GSA	
Denair NW-11 443	3/7/2024	8:49			79.72	0	116.72	116.72	37.00	ES	0.01 Ft	West Turlock Subbasin GSA	
Denair NW-11 605	11/8/2023	7:39			97.36	0	116.72	116.72	19.36	ES	0.01 Ft	West Turlock Subbasin GSA	
Denair NW-11 605	3/7/2024	8:51			87.4	0	116.72	116.72	29.32	ES	0.01 Ft	West Turlock Subbasin GSA	
DWR-02	11/6/2023	11:32			126.4	0	150.67	149.67	24.27	ES	0.1 Ft	East Turlock Subbasin GSA	
DWR-02	3/6/2024	16:23			124.4	0	149.94	149.67	25.54	ES	0.01 Ft	East Turlock Subbasin GSA	
DWR-03	11/7/2023	15:02			194.6	0	201	200.73	6.40	ES	0.1 Ft	East Turlock Subbasin GSA	
DWR-03	3/6/2024	16:37			185.3	0	201	200.73	15.70	ES	0.1 Ft	East Turlock Subbasin GSA	
DWR-04	11/6/2023	15:04		8	139.7	0	168.15	167.95	28.45	ES	0.1 Ft	East Turlock Subbasin GSA	
DWR-04	3/7/2024	17:38			135.95	0	168.15	167.95	32.20	ES	0.1 Ft	East Turlock Subbasin GSA	
DWR-05	11/6/2023	10:02			129.9	0	136.9	136.67	7.00	ES	0.1 Ft	East Turlock Subbasin GSA	
DWR-05	3/6/2024	11:59			107.2	0	136.9	136.67	29.70	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-01	11/7/2023	9:13			154.93	0	197.52	193.89	42.59	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-01	3/7/2024	18:29			150.62	0	197.52	193.89	46.90	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-02	11/8/2023	8:18			123.1	0	249.18	248.6	126.08	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-02	3/7/2024	16:41			120.37	0	249.18	248.6	128.81	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-03	11/6/2023	14:44		8	175	0	191.65	191.43	16.65	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-03	3/7/2024	17:17		8	169	0	191.65	191.43	22.65	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-04	11/6/2023	14:11			255.4	0	252.23	248.47	-3.17	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-04	3/6/2024	17:32			247.75	0	252.23	248.47	4.48	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-05	11/6/2023	12:04			202.1	0	193.89	192.57	-8.21	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-05	3/6/2024	15:42		2	194.12	0	193.89	192.57	-0.23	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-06	11/6/2023	15:22			179.37	0	195.2	191.73	15.83	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-06	3/7/2024	18:02		2	174.48	0	195.2	191.73	20.72	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-07	11/7/2023	10:21			255	0	253.26	250.49	-1.74	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-07	3/6/2024	18:01			250.98	0	253.26	250.49	2.28	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-08	11/7/2023	10:46			259	0	257.87	255.77	-1.13	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-08	3/7/2024	11:30			253.13	0	257.87	255.77	4.74	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-09	11/8/2023	9:59			285.7	0	309.02	305.36	23.32	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-09	3/7/2024	11:59			278.36	0	309.02	305.36	30.66	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-10	11/7/2023	13:43			249.8	0	286.71	282.35	36.91	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-10	3/7/2024	13:05			238.37	0	286.71	282.35	48.34	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-11	11/7/2023	14:14			133.1	0	272.15	269.42	139.05	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-11	3/7/2024	14:15			117.4	0	272.15	269.42	154.75	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-12R	11/7/2023	13:24			229.9	0	289.61	289.37	59.71	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-12R	3/7/2024	13:20			222.8	0	289.61	289.37	66.81	ES	0.1 Ft	East Turlock Subbasin GSA	

Appendix A - WY 2024 Groundwater Elevation Data

Local Well Name	Measurement Date	Measurement Time (PST 24-Hour)	No Measurement Code	Questionable Measurement Code	Reading at Reference Point (feet)	Reading at Water Surface (feet)	Reference Point Elevation (feet)	Ground Surface Elevation (feet)	WSE	Measurement Method Code	Measurement Accuracy	Collecting/ Co-op Agency	Water Level Measurement Comments
ETSGSA-13	11/6/2023	10:22			146.5	0	176.34	172.6	29.84	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-13	3/6/2024	12:42			133.85	0	176.34	172.6	42.49	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-14	11/6/2023	13:13			218.4	0	223.72	219.98	5.32	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-14	3/6/2024	14:02			207.53	0	223.72	219.98	16.19	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-15	11/8/2023	12:07		8	204.3	0	206.2	205.55	1.90	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-15	3/6/2024	16:03		8	194.7	0	206.2	205.55	11.50	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-16	11/6/2023	12:41			165.44	0	193.28	191.25	27.84	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-16	3/6/2024	14:27			164.86	0	193.28	191.25	28.42	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-17	11/7/2023	8:24			126.78	0	220.02	216.28	93.24	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-17	3/7/2024	8:45			123.75	0	220.02	216.28	96.27	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-18	11/7/2023	11:43			180.4	0	201.56	200.34	21.16	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-18	3/7/2024	10:24			170.6	0	201.56	200.34	30.96	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-19	11/6/2023	9:43			131	0	141.81	139.25	10.81	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-19	3/6/2024	12:20			120.87	0	141.81	139.25	20.94	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-20	11/8/2023	10:27			170.76	0	205.7	202	34.94	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-20	4/12/2024	8:05			161.2	0	205.7	202	44.50	ES	0.01 Ft	East Turlock Subbasin GSA	well was not accessible in March 2024
ETSGSA-21	11/7/2023	13:09			197.71	0	304.73	300.97	107.02	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-21	3/7/2024	13:35			195.45	0	304.73	300.97	109.28	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-22	11/6/2023	13:45			232.3	0	223.78	222.03	-8.52	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-22	3/8/2024	9:10			221	0	223.78	222.03	2.78	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-23	11/6/2023	8:24			108.8	0	178	174.87	69.20	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-23	3/6/2024	10:20			104.3	0	178	174.87	73.70	ES	0.01 Ft	East Turlock Subbasin GSA	
ETSGSA-24	11/8/2023	11:32			127.1	0	147.9	147.15	20.80	ES	0.1 Ft	East Turlock Subbasin GSA	
ETSGSA-24	3/6/2024	10:49		8	112.9	0	147.9	147.15	35.00	ES	0.1 Ft	East Turlock Subbasin GSA	
EW2	11/6/2023	10:59			158.39	0	165.06	162.91	6.67	ES	0.01 Ft	East Turlock Subbasin GSA	
EW2	3/6/2024	13:25			155.9	0	165.06	162.91	9.16	ES	0.01 Ft	East Turlock Subbasin GSA	
EW3	11/6/2023	10:54			155.5	0	163.73	161.23	8.23	ES	0.01 Ft	East Turlock Subbasin GSA	
EW3	3/6/2024	13:12			150.51	0	163.73	161.23	13.22	ES	0.01 Ft	East Turlock Subbasin GSA	
EWD 03 (identified as EWD-05 in ETSGSA)	3/8/2024	8:52		4	217.9	0	216.11	215.13	-1.79	ES	0.1 Ft	East Turlock Subbasin GSA	
EWD 03 (identified as EWD-05 in ETSGSA)	11/6/2023	12:22		8	230.1	0	216.11	215.13	-13.99	ES	0.1 Ft	East Turlock Subbasin GSA	
EWD 04	11/7/2023	8:02			175.5	0	196.44	196.44	20.94	ES	0.1 Ft	East Turlock Subbasin GSA	
EWD 04	3/7/2024	0:00	6				196.44	196.44				East Turlock Subbasin GSA	Casing collapsed & scheduled for destruction per owner
EWD 05	11/7/2023	11:28			195.8	0	205.21	204.66	9.41	ES	0.1 Ft	East Turlock Subbasin GSA	
EWD 05	3/7/2024	9:54			184.6	0	205.21	204.66	20.61	ES	0.1 Ft	East Turlock Subbasin GSA	
EWD-01 (identified as EWD-13 in ETSGSA)	11/7/2023	11:06			267.8	0	260.97	260.67	-6.83	ES	0.1 Ft	East Turlock Subbasin GSA	
EWD-01 (identified as EWD-13 in ETSGSA)	3/7/2024	10:58			259.1	0	260.97	260.67	1.87	ES	0.1 Ft	East Turlock Subbasin GSA	
Ferreira Ranch Park MW-210	11/7/2023	10:30			74	0	106	106	32.00	ES	0.01 Ft	West Turlock Subbasin GSA	
Ferreira Ranch Park MW-210	3/7/2024	13:00			61.5	0	106	106	44.50	ES	0.01 Ft	West Turlock Subbasin GSA	
Ferreira Ranch Park MW-347	11/7/2023	10:30			94	0	106	106	12.00	ES	0.01 Ft	West Turlock Subbasin GSA	
Ferreira Ranch Park MW-347	3/7/2024	13:00			67.1	0	106	106	38.90	ES	0.01 Ft	West Turlock Subbasin GSA	
Ferreira Ranch Park MW-443	11/7/2023	10:30			97	0	106	106	9.00	ES	0.01 Ft	West Turlock Subbasin GSA	
Ferreira Ranch Park MW-443	3/7/2024	13:00			67.5	0	106	106	38.50	ES	0.01 Ft	West Turlock Subbasin GSA	
Ferreira Ranch Park MW-535	11/7/2023	10:30			98	0	106	106	8.00	ES	0.01 Ft	West Turlock Subbasin GSA	
Ferreira Ranch Park MW-535	3/7/2024	13:00			67.6	0	106	106	38.40	ES	0.01 Ft	West Turlock Subbasin GSA	
Gallo Well	11/7/2023	12:21			112.2	0	176	175.14	63.80	ES	0.1 Ft	East Turlock Subbasin GSA	
Gallo Well	3/7/2024	9:20			101.9	0	176	175.14	74.10	ES	0.1 Ft	East Turlock Subbasin GSA	
MW-68A	11/6/2023	9:06		2	123.5	0	148.94	146.88	25.44	ES	0.01 Ft	East Turlock Subbasin GSA	
MW-68A	3/6/2024	11:07			109.16	0	148.94	146.88	39.78	ES	0.01 Ft	East Turlock Subbasin GSA	
MW-68B	11/7/2023	9:50			187.55	0	205.05	203.29	17.50	ES	0.01 Ft	East Turlock Subbasin GSA	
MW-68B	3/8/2024	9:38			182.34	0	205.05	203.29	22.71	ES	0.01 Ft	East Turlock Subbasin GSA	
MW-68C	11/7/2023	14:39			164.03	0	201.89	200.5	37.86	ES	0.01 Ft	East Turlock Subbasin GSA	
MW-68C	3/7/2024	12:28			158.34	0	201.89	200.5	43.55	ES	0.01 Ft	East Turlock Subbasin GSA	
NE Storm Basin MW-280	11/7/2023	10:45			91	0	116	116	25.00	ES	0.01 Ft	West Turlock Subbasin GSA	
NE Storm Basin MW-280	3/7/2024	12:30			75.7	0	116	116	40.30	ES	0.01 Ft	West Turlock Subbasin GSA	
NE Storm Basin MW-340	11/7/2023	10:45			91	0	116	116	25.00	ES	0.01 Ft	West Turlock Subbasin GSA	
NE Storm Basin MW-340	3/7/2024	12:30			75.8	0	116	116	40.20	ES	0.01 Ft	West Turlock Subbasin GSA	
NE Storm Basin MW-505	11/7/2023	10:45			92	0	116	116	24.00	ES	0.01 Ft	West Turlock Subbasin GSA	
NE Storm Basin MW-505	3/7/2024	12:30			75	0	116	116	41.00	ES	0.01 Ft	West Turlock Subbasin GSA	
Olam R2-4	11/8/2023	9:04			175.8	0	254.29	253.17	78.49	ES	0.1 Ft	East Turlock Subbasin GSA	
Olam R2-4	3/7/2024	15:47			168.8	0	254.29	253.17	85.49	ES	0.1 Ft	East Turlock Subbasin GSA	
Olam R2-6	11/17/2023	9:43		4	248.5	0	291.22	288.7	42.72	ES	0.1 Ft	East Turlock Subbasin GSA	
Olam R2-6	3/7/2024	15:34			237.4	0	291.22	288.7	53.82	ES	0.1 Ft	East Turlock Subbasin GSA	
Olam R2-7	11/17/2023	9:56		4	154.9	0	241.52	238.73	86.62	ES	0.1 Ft	East Turlock Subbasin GSA	
Olam R2-7	3/7/2024	16:06			145.8	0	241.52	238.73	95.72	ES	0.1 Ft	East Turlock Subbasin GSA	

Appendix A - WY 2024 Groundwater Elevation Data

Local Well Name	Measurement Date	Measurement Time (PST 24-Hour)	No Measurement Code	Questionable Measurement Code	Reading at Reference Point (feet)	Reading at Water Surface (feet)	Reference Point Elevation (feet)	Ground Surface Elevation (feet)	WSE	Measurement Method Code	Measurement Accuracy	Collecting/ Co-op Agency	Water Level Measurement Comments
Olam R3-4	11/17/2023	9:14		4	248.7	0	270.02	269.71	21.32	ES	0.1 Ft	East Turlock Subbasin GSA	
Olam R3-4	3/7/2024	14:59			227.7	0	270.02	269.71	42.32	ES	0.1 Ft	East Turlock Subbasin GSA	
Olam R3-5	11/17/2023	9:24		4	237.9	0	260.87	259.71	22.97	ES	0.1 Ft	East Turlock Subbasin GSA	
Olam R3-5	3/7/2024	15:18			218.55	0	260.87	259.71	42.32	ES	0.1 Ft	East Turlock Subbasin GSA	
Smyrna Park 1/335	11/15/2023	15:05			63	0	100.4	98	37.40	ES	0.01 Ft	West Turlock Subbasin GSA	
Smyrna Park 1/335	3/5/2024	8:42			51	0	100.4	98	49.4	ES	0.01 Ft	West Turlock Subbasin GSA	
Smyrna Park 2/293	11/15/2023	15:08			63	0	100.4	98	37.40	ES	0.01 Ft	West Turlock Subbasin GSA	
Smyrna Park 2/293	3/5/2024	8:38			51	0	100.4	98	49.40	ES	0.01 Ft	West Turlock Subbasin GSA	
Smyrna Park 3/275	11/15/2023	15:09			63	0	100.4	98	37.40	ES	0.01 Ft	West Turlock Subbasin GSA	
Smyrna Park 3/275	3/5/2024	8:36			51	0	100.4	98	49.4	ES	0.01 Ft	West Turlock Subbasin GSA	
Smyrna Park 4/233	11/15/2023	15:10			63	0	100.4	98	37.40	ES	0.01 Ft	West Turlock Subbasin GSA	
Smyrna Park 4/233	3/5/2024	8:32			52	0	100.4	98	48.40	ES	0.01 Ft	West Turlock Subbasin GSA	
Stav 1	11/1/2023		6				98.8	98.8				West Turlock Subbasin GSA	Well has been destroyed
Stav 1	3/5/2024		6				98.8	98.8				West Turlock Subbasin GSA	Well has been destroyed
Stav 2	11/1/2023		6				98.8	98.8				West Turlock Subbasin GSA	Well has been destroyed
Stav 2	3/5/2024		6				98.8	98.8				West Turlock Subbasin GSA	Well has been destroyed
Stav 3	11/1/2023		6				98.8	98.8				West Turlock Subbasin GSA	Well has been destroyed
Stav 3	3/5/2024		6				98.8	98.8				West Turlock Subbasin GSA	Well has been destroyed
Stav 4	11/1/2023		6				98.8	98.8				West Turlock Subbasin GSA	Well has been destroyed
Stav 4	3/5/2024		6				98.8	98.8				West Turlock Subbasin GSA	Well has been destroyed
SWW Reservoir MW-235	11/7/2023	9:51			75	0	89	89	14.00	ES	0.01 Ft	West Turlock Subbasin GSA	
SWW Reservoir MW-235	3/7/2024				51	0	89	89	38.00	ES	0.01 Ft	West Turlock Subbasin GSA	
SWW Reservoir MW-335	11/7/2023	9:51			75	0	89	89	14.00	ES	0.01 Ft	West Turlock Subbasin GSA	
SWW Reservoir MW-335	3/7/2024				52	0	89	89	37.00	ES	0.01 Ft	West Turlock Subbasin GSA	
SWW Reservoir MW-417	11/7/2023	9:51			76	0	89	89	13.00	ES	0.01 Ft	West Turlock Subbasin GSA	
SWW Reservoir MW-417	3/7/2024				52	0	89	89	37.00	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 010	11/2/2023	16:42	D				100.79	99				West Turlock Subbasin GSA	Dry well (water level is below base of well)
TID 010	3/4/2024	16:04	D				100.79	99				West Turlock Subbasin GSA	Dry well (water level is below base of well)
TID 018	11/2/2023	16:20			59.4	0	104.38	104.38	44.98	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 018	3/4/2024	11:21			53.73	0	104.38	104.38	50.65	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 022	11/1/2023	9:39			28.49	0	88.69	86	60.20	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 022	3/4/2024	14:46			34.24	0	88.69	86	54.45	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 034	11/1/2023	11:19			18.5	0	69.7	68	51.20	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 034	3/4/2024	14:07			17.53	0	69.7	68	52.17	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 048	11/1/2023	11:30			22.37	0	67.43	67.43	45.06	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 048	3/4/2024	14:18			19.49	0	67.43	67.43	47.94	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 061A	11/1/2023	15:08	7				64.61	63				West Turlock Subbasin GSA	No measurement because well was pumping
TID 061A	3/5/2024	14:28			9.19		64.61	63	55.42	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 063	11/1/2023	11:39		8	8.64	0	56.41	56.41	47.77	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 063	3/4/2024	15:28		8	8.36	0	56.41	56.41	48.05	ES	0.01 Ft	West Turlock Subbasin GSA	Oil in casing
TID 082	11/2/2023	10:00			14.43	0	73.55	73	59.12	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 082	3/5/2024	14:52			11.76	0	73.55	73	61.79	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 083	11/1/2023	15:12	7				74.56	71				West Turlock Subbasin GSA	No measurement because well was pumping
TID 083	3/5/2024	14:05			12.87	0	74.56	71	61.69	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 085B	11/2/2023	12:36			24.36	0	109.08	104	84.72	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 085B	3/5/2024	10:59			22.79	0	109.08	104	86.29	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 106	11/2/2023	10:12	7				64.37	64.37				West Turlock Subbasin GSA	No measurement because well was pumping
TID 106	3/5/2024	14:38			5.21	0	64.37	64.37	59.16	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 111	11/1/2023	11:05			15.98	0	60.1	57	44.12	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 111	3/4/2024	13:53			14.07	0	60.1	57	46.03	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 113A	11/2/2023	11:29			8.07	0	92.04	91	83.97	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 113A	3/4/2024	10:46			6.24	0	92.04	91	85.80	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 118	11/1/2023	15:27			9.85	0	81.29	81	71.44	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 118	3/5/2024	13:50			9.7	0	81.29	81	71.59	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 136A	11/2/2023	14:02			37.36	0	117.32	117.32	79.96	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 136A	3/5/2024	9:35			37.57	0	117.32	117.32	79.75	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 139	11/1/2023	10:28			29.72	0	74.42	74.42	44.70	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 139	3/4/2024	12:58			25.95	0	74.42	74.42	48.47	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 175	11/2/2023	15:37			119.58	0	151.36	151.36	31.78	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 175	3/4/2024	10:32			116.58	0	151.36	151.36	34.78	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 186A	11/2/2023	16:08			56.06	0	111.37	111.37	55.31	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 186A	3/4/2024	11:14			55.7	0	111.37	111.37	55.67	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 189	11/2/2023	15:19			51.3	0	133.96	132	82.66	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 189	3/4/2024	10:04			51.02	0	133.96	132	82.94	ES	0.01 Ft	West Turlock Subbasin GSA	

Appendix A - WY 2024 Groundwater Elevation Data

Local Well Name	Measurement Date	Measurement Time (PST 24-Hour)	No Measurement Code	Questionable Measurement Code	Reading at Reference Point (feet)	Reading at Water Surface (feet)	Reference Point Elevation (feet)	Ground Surface Elevation (feet)	WSE	Measurement Method Code	Measurement Accuracy	Collecting/ Co-op Agency	Water Level Measurement Comments
TID 191	11/2/2023	16:27			41.32	0	93.67	93	52.35	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 191	3/4/2024	11:31			40.21	0	93.67	93	53.46	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 199A	11/2/2023	12:51			6.27	0	98.3	97.3	92.03	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 199A	3/5/2024	10:05			7.09	0	98.3	97.3	91.21	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 303	11/2/2023	11:52			7.42	0	99.33	102	91.91	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 303	3/5/2024	12:35			7.62	0	99.33	102	91.71	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 92	11/1/2023	10:50			24.07	0	69.44	68	45.37	ES	0.01 Ft	West Turlock Subbasin GSA	
TID 92	3/4/2024	13:22			23.44	0	69.44	68	46.00	ES	0.01 Ft	West Turlock Subbasin GSA	
Turlock Airport Well	11/6/2023	11:13			149.8	0	158.43	158.33	8.63	ES	0.1 Ft	East Turlock Subbasin GSA	
Turlock Airport Well	3/6/2024	13:36		3	145.9	0	158.43	158.33	12.53	ES	0.1 Ft	East Turlock Subbasin GSA	
WTS-1 Deep	11/1/2023	15:02			41.62	0	80.7	79	39.08	ES	0.01 Ft	West Turlock Subbasin GSA	
WTS-1 Deep	3/5/2024	14:15			29.8	0	80.7	79	50.9	ES	0.01 Ft	West Turlock Subbasin GSA	
WTS-1 Shallow	11/1/2023	15:03			14.13	0	80.8	79	66.67	ES	0.01 Ft	West Turlock Subbasin GSA	
WTS-1 Shallow	3/5/2024	14:17			18.94	0	80.8	79	61.86	ES	0.01 Ft	West Turlock Subbasin GSA	
WTS-2 Deep	11/2/2023	11:03			41.56	0	78.5	81	36.94	ES	0.01 Ft	West Turlock Subbasin GSA	
WTS-2 Deep	3/5/2024	13:35			28.76	0	78.5	81	49.74	ES	0.01 Ft	West Turlock Subbasin GSA	
WTS-2 Shallow	11/2/2023	10:59			11.52	0	78.6	81	67.08	ES	0.01 Ft	West Turlock Subbasin GSA	
WTS-2 Shallow	3/5/2024	13:33			11.74	0	78.6	81	66.86	ES	0.01 Ft	West Turlock Subbasin GSA	

No Measurement Code Glossary
0 - Measurement Discontinued
1 - Pumping
2 - Pump house locked
3 - Tape hung up
4 - Can't get tape in casing
5 - Unable to locate well
6 - Well has been destroyed
7 - Special/Other
8 - Casing leaking or wet
9 - Temporarily inaccessible
D - Dry well
F - Flowing artesian well

Questionable Measurement Code Glossary
0 - Caved or deepened
1 - Pumping
2 - Nearby pump operating
3 - Casing leaking or wet
4 - Pumped recently
5 - Air or pressure gauge measurement
6 - Other
7 - Recharge or surface water effects near well
8 - Oil or foreign substance in casing
9 - Acoustical sounder
E - Recently flowing
F - Flowing
G - Nearby flowing
H - Nearby recently flowing

Measurement Method Glossary
ES - Electric sounder measurement
ST - Steel tape measurement
AS - Acoustic or sonic sounder
PG - Airline measurement, pressure gage, or manometer
TR - Electronic pressure transducer
OTH - Other
UNK - Unknown

APPENDIX B

Hydrographs

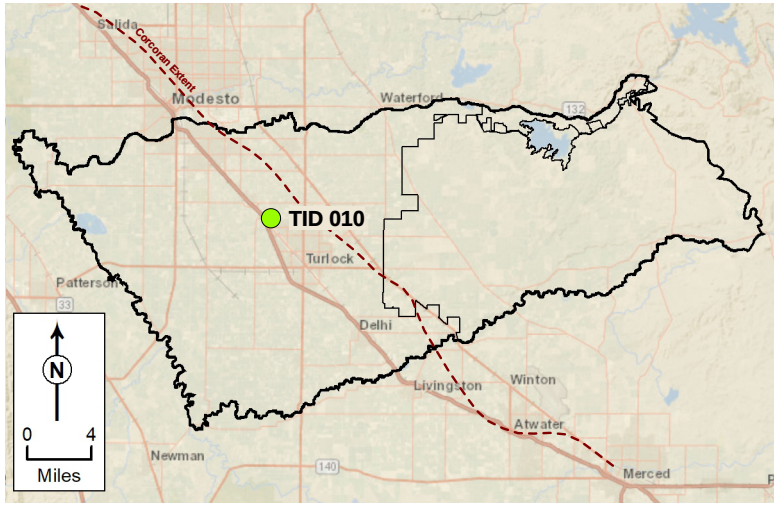
Representative Monitoring Wells

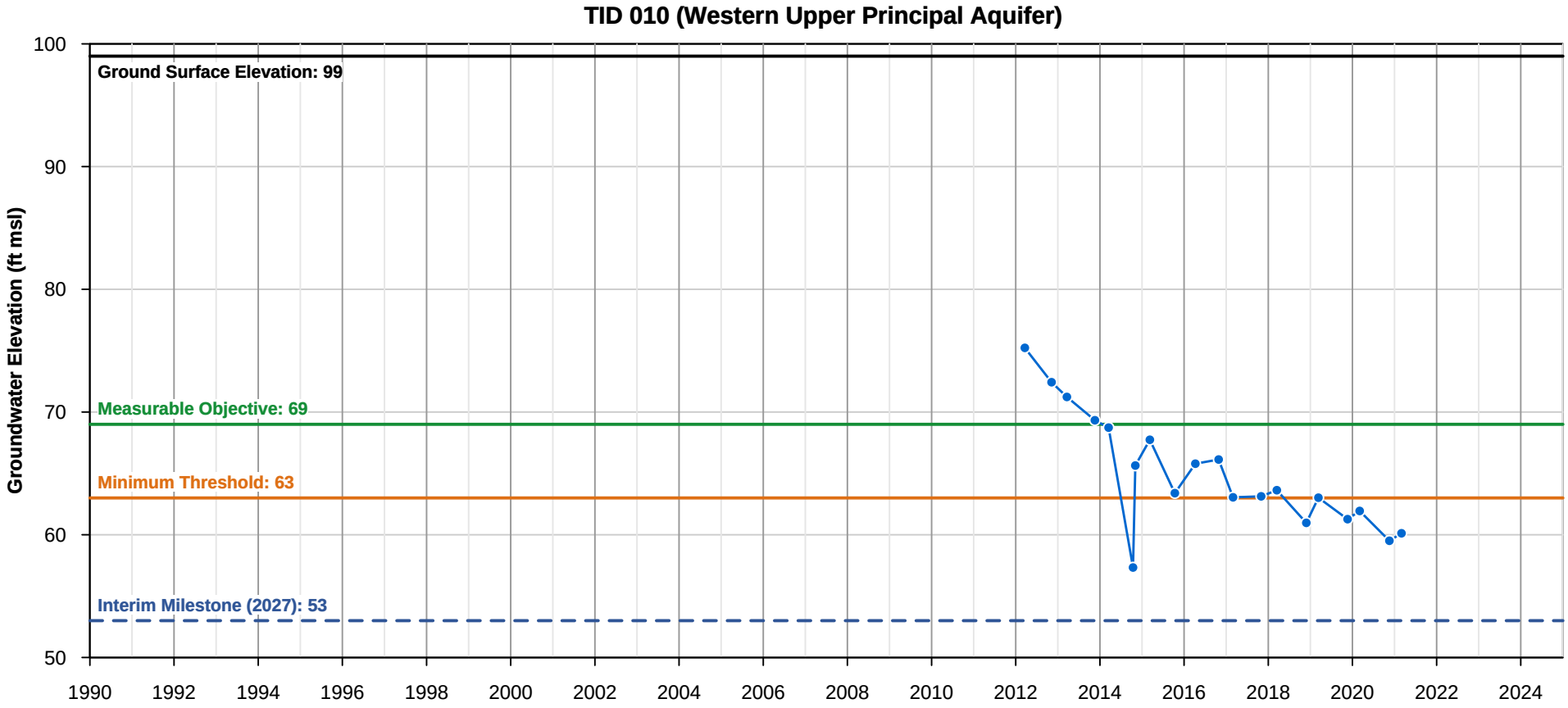
GSP Groundwater Elevation Monitoring Network

Western Upper Principal Aquifer

Well Information

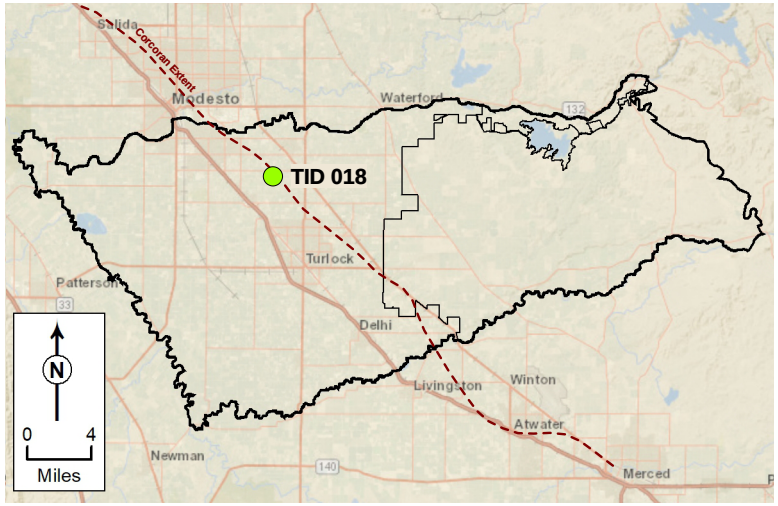
Site Code:	375360N1208841W001
Local Well Name:	TID 010
State Well Name:	05S10E04D001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	6516
Latitude:	37.5366
Longitude:	-120.885
Well Depth (feet bgs):	45
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	25
Ground Surface Elevation:	99
Reference Point Elevation:	100.79
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

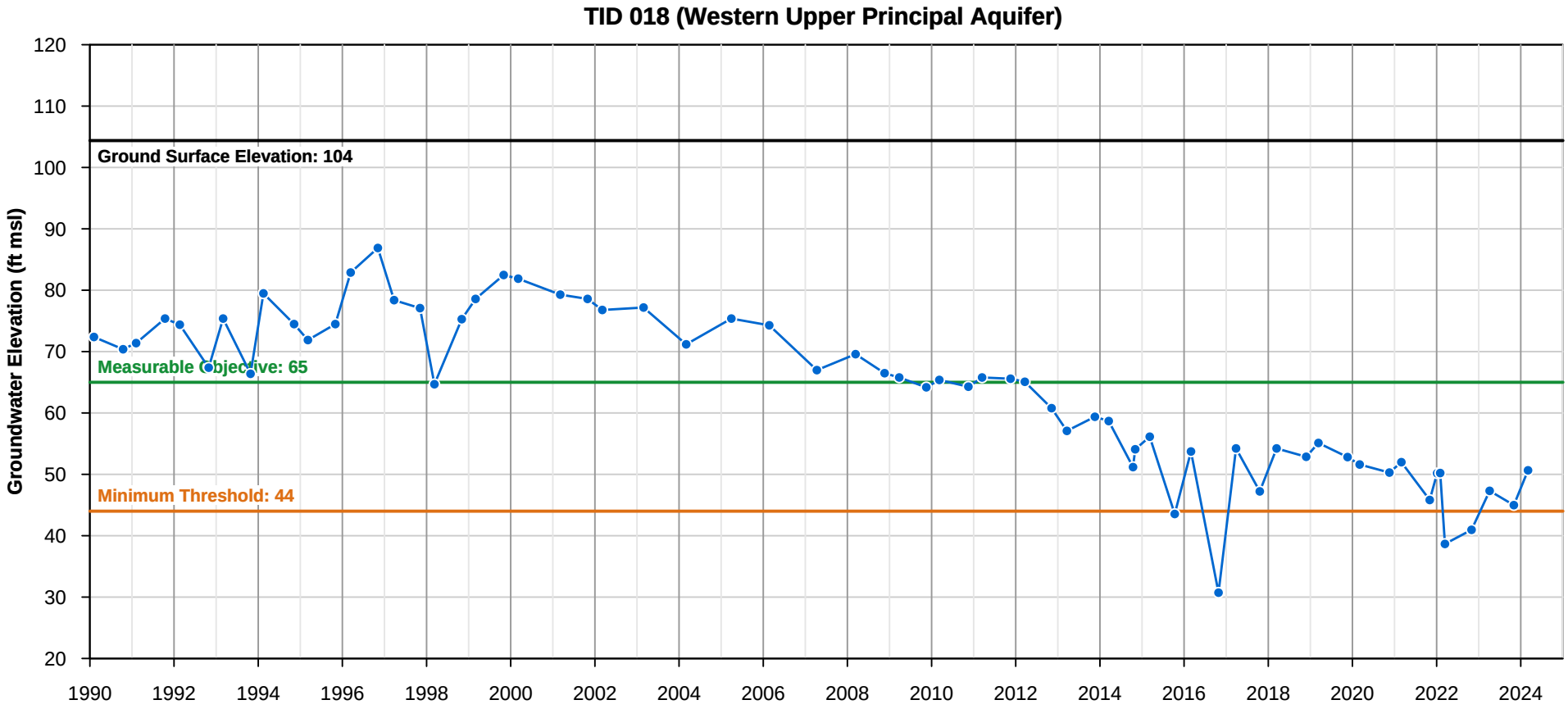




Well Information

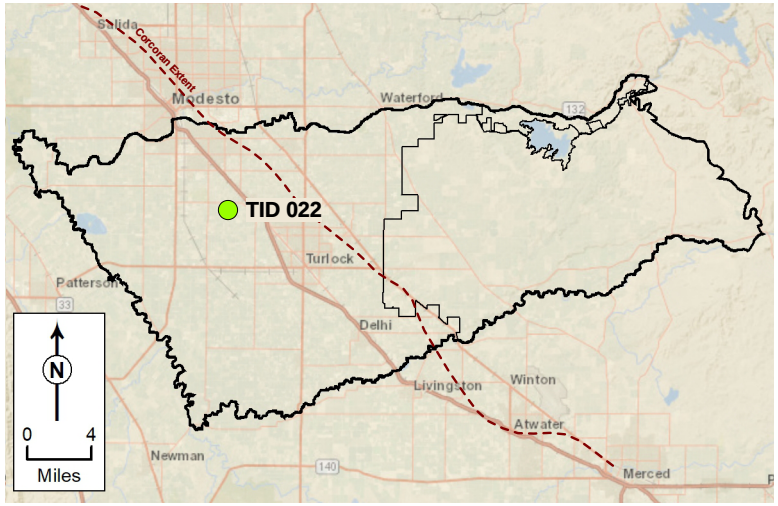
Site Code:	375746N1208835W001
Local Well Name:	TID 018
State Well Name:	04S10E21E001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	3763
Latitude:	37.5746
Longitude:	-120.883
Well Depth (feet bgs):	250
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	110
Ground Surface Elevation:	104.38
Reference Point Elevation:	104.38
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

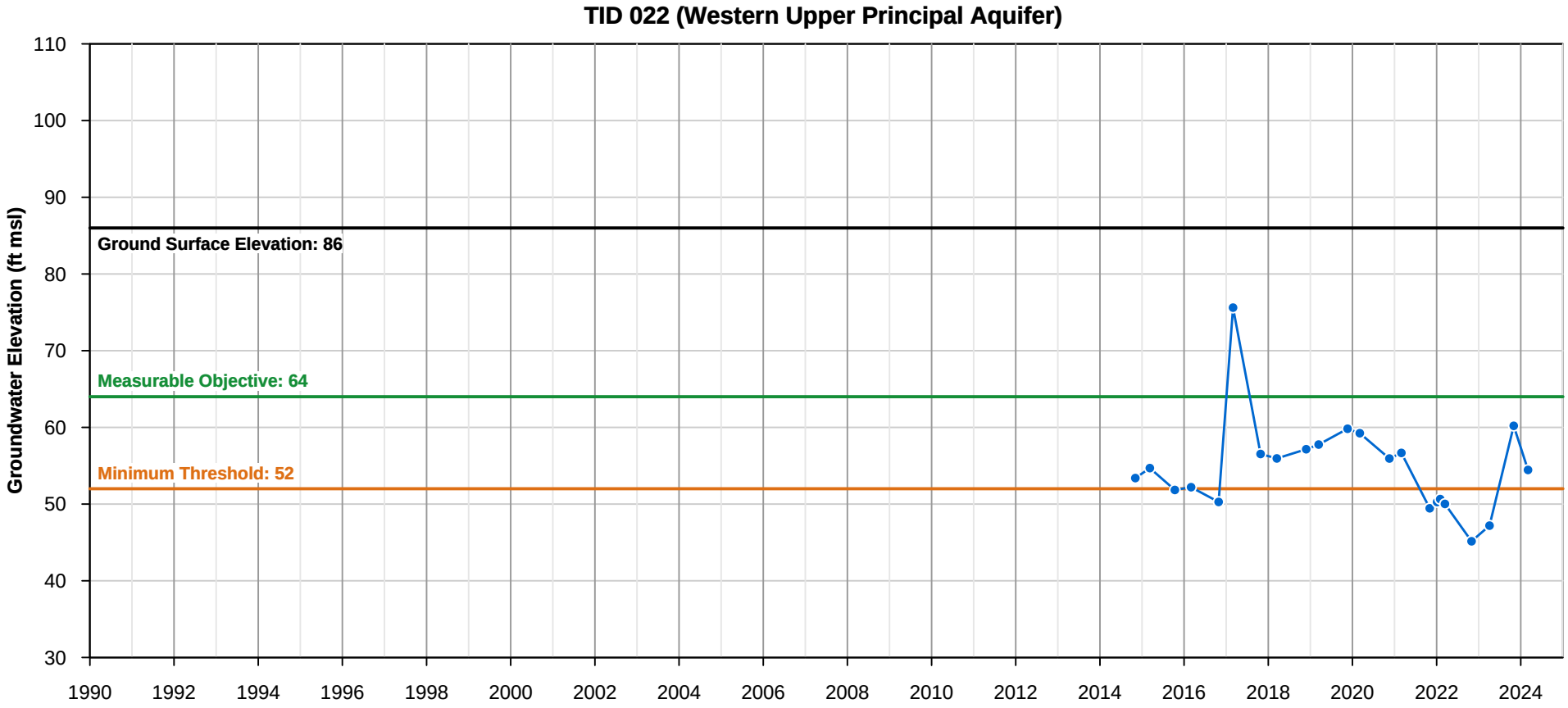




Well Information

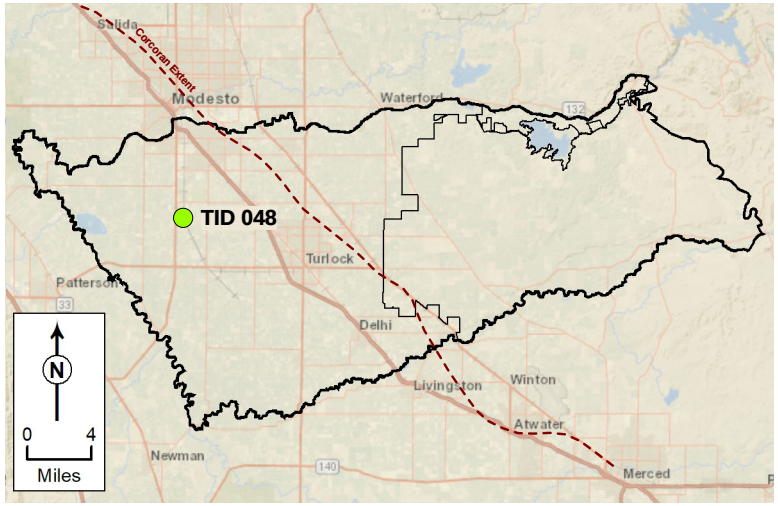
Site Code:	375441N1209343W001
Local Well Name:	TID 022
State Well Name:	04S09E36E001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	3031
Latitude:	37.5439
Longitude:	-120.934
Well Depth (feet bgs):	49
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	27
Ground Surface Elevation:	86
Reference Point Elevation:	88.69
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

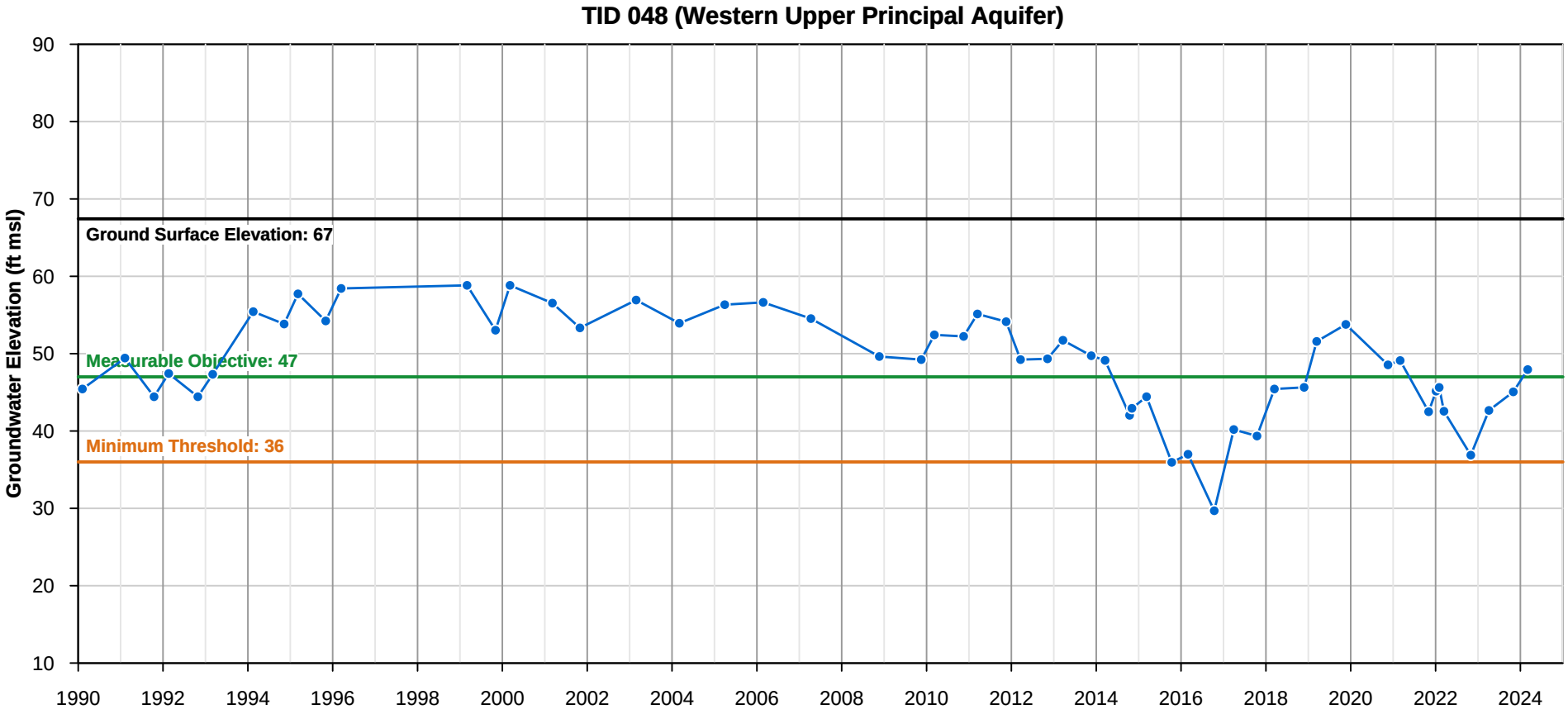




Well Information

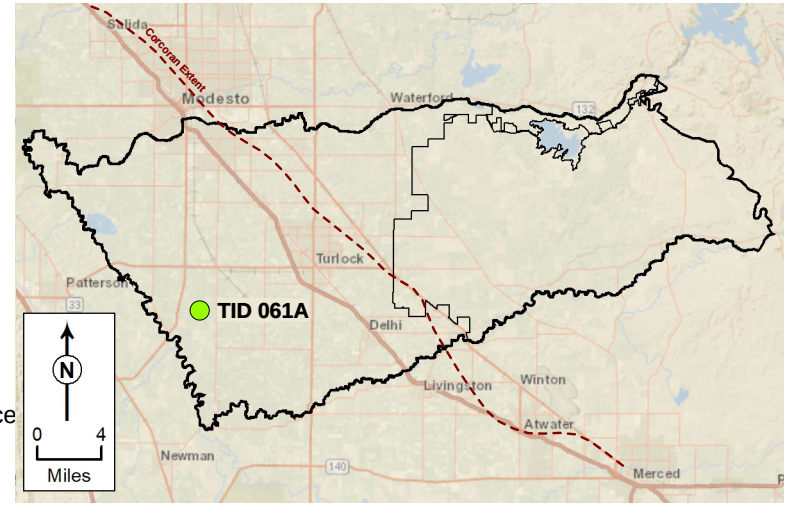
Site Code:	375366N1209852W001
Local Well Name:	TID 048
State Well Name:	05S09E04C001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	4930
Latitude:	37.5366
Longitude:	-120.985
Well Depth (feet bgs):	110
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	87
Ground Surface Elevation:	67.43
Reference Point Elevation:	67.43
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

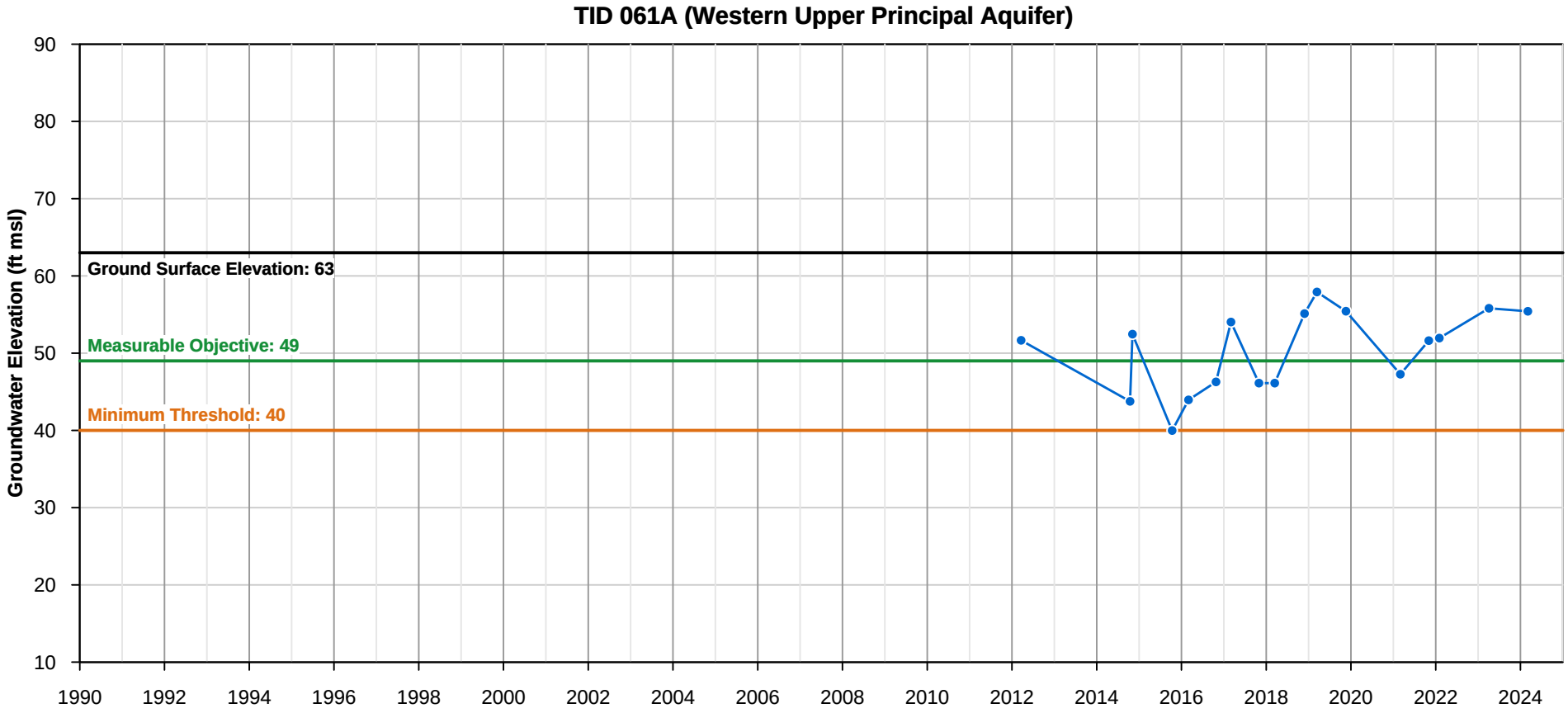




Well Information

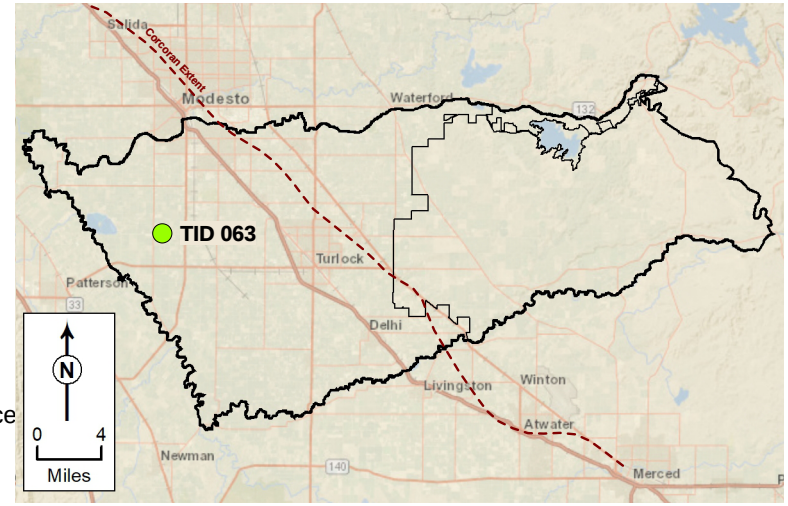
Site Code:	374527N1209768W001
Local Well Name:	TID 061A
State Well Name:	05S09E33R001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	5643
Latitude:	37.4527
Longitude:	-120.977
Well Depth (feet bgs):	225
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	195
Ground Surface Elevation:	63
Reference Point Elevation:	64.61
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Land Subsidence

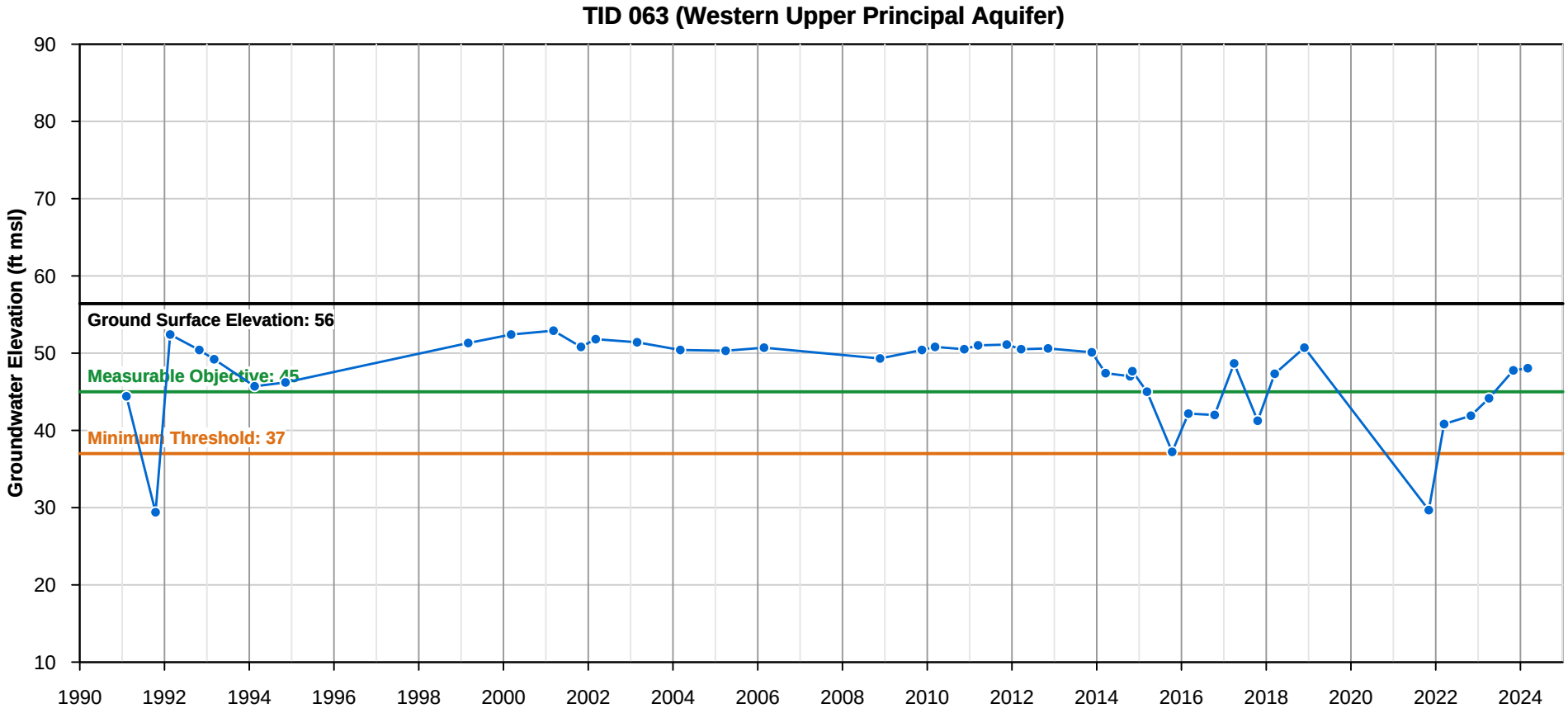




Well Information

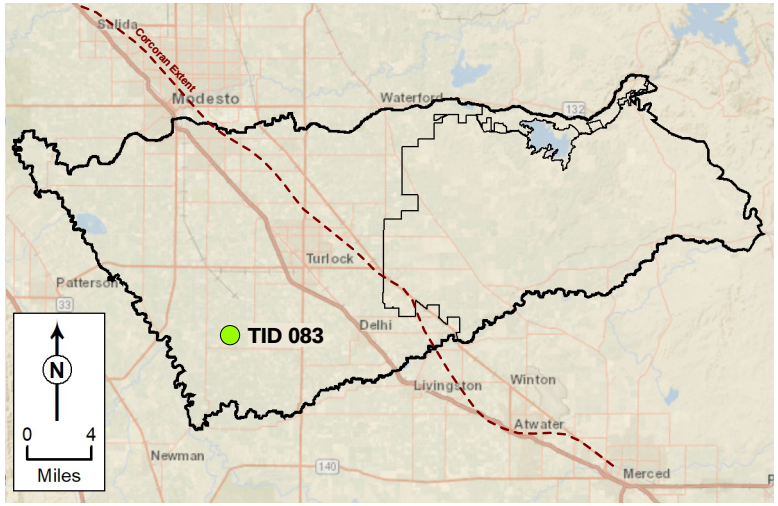
Site Code:	375224N1210196W001
Local Well Name:	TID 063
State Well Name:	05S09E07B001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	4935
Latitude:	37.5224
Longitude:	-121.02
Well Depth (feet bgs):	110
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	71
Ground Surface Elevation:	56.41
Reference Point Elevation:	56.41
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Water,Land Subsidence

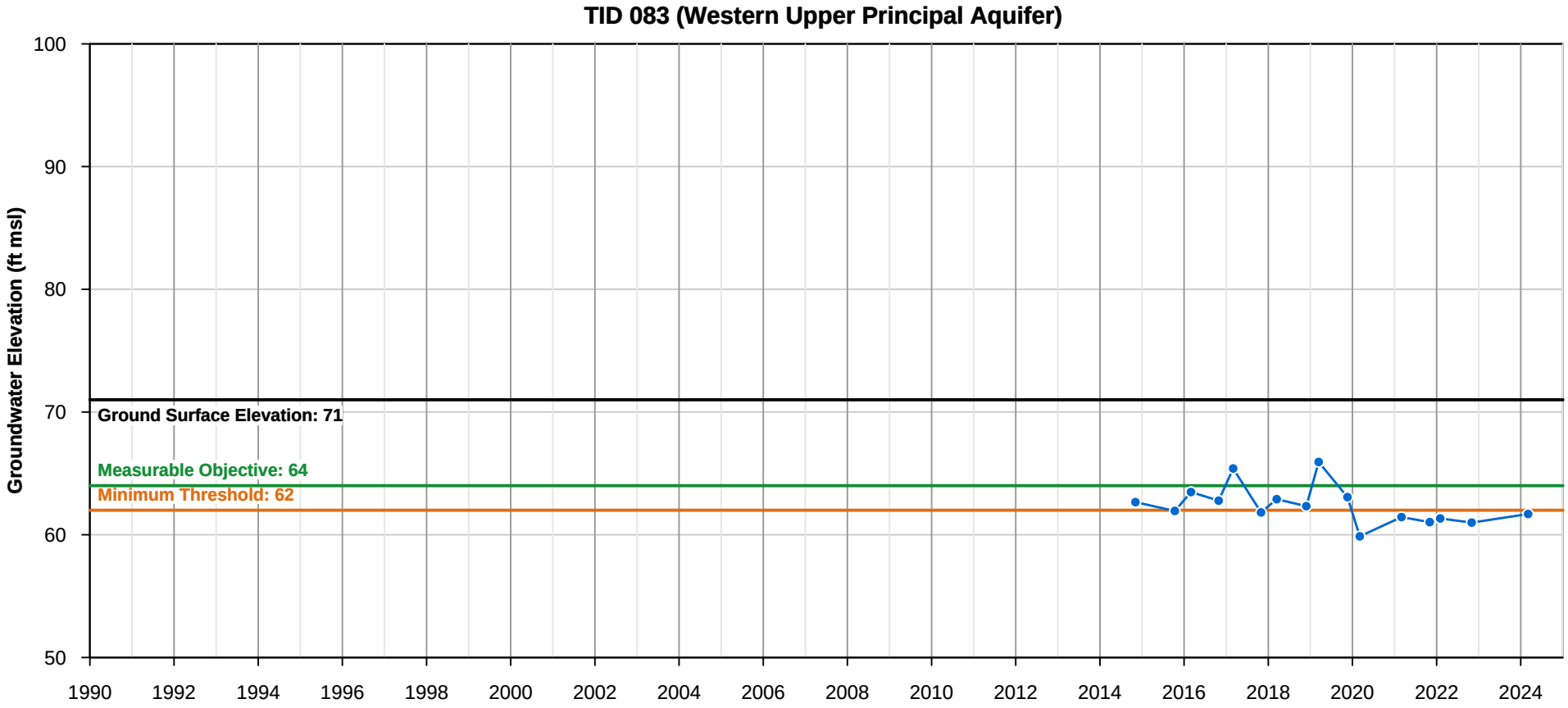




Well Information

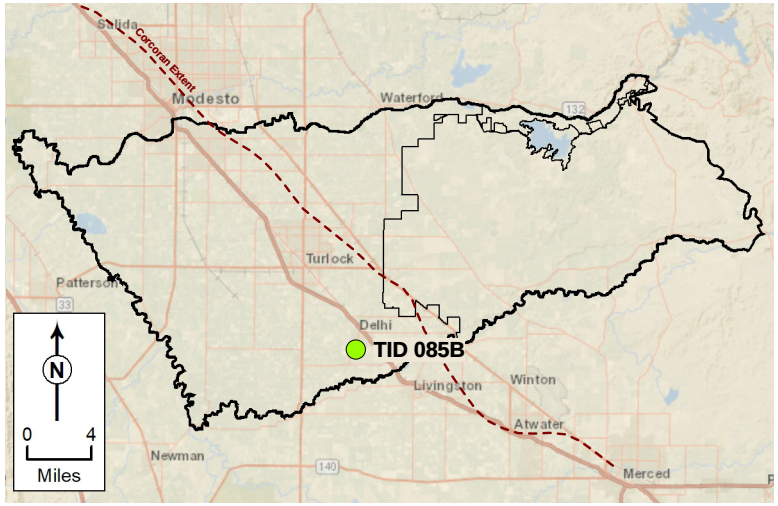
Site Code:	374305N1209321W001
Local Well Name:	TID 083
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	48497
Latitude:	37.4305
Longitude:	-120.931
Well Depth (feet bgs):	155
Top Perforation (feet bgs):	50
Bottom Perforation (feet bgs):	145
Ground Surface Elevation:	71
Reference Point Elevation:	74.56
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

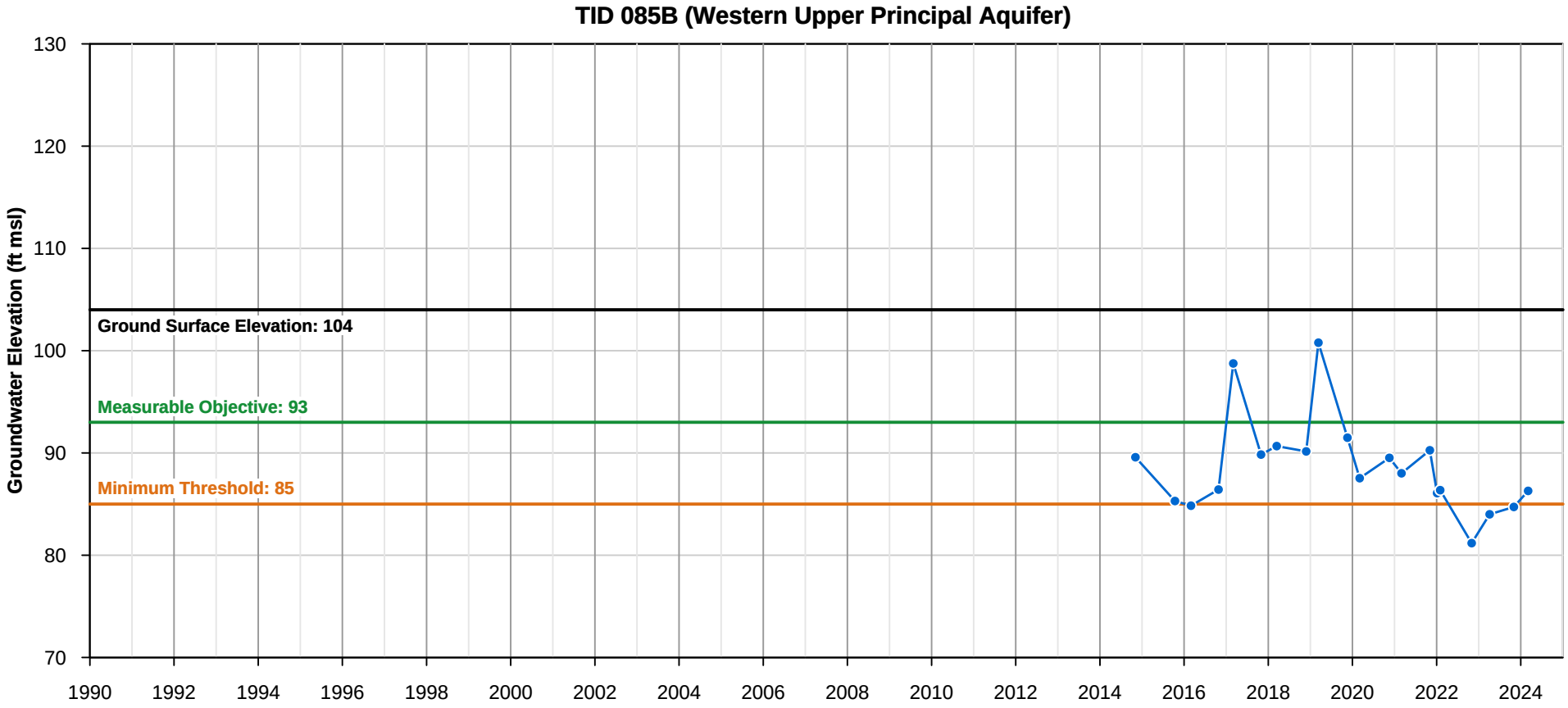




Well Information

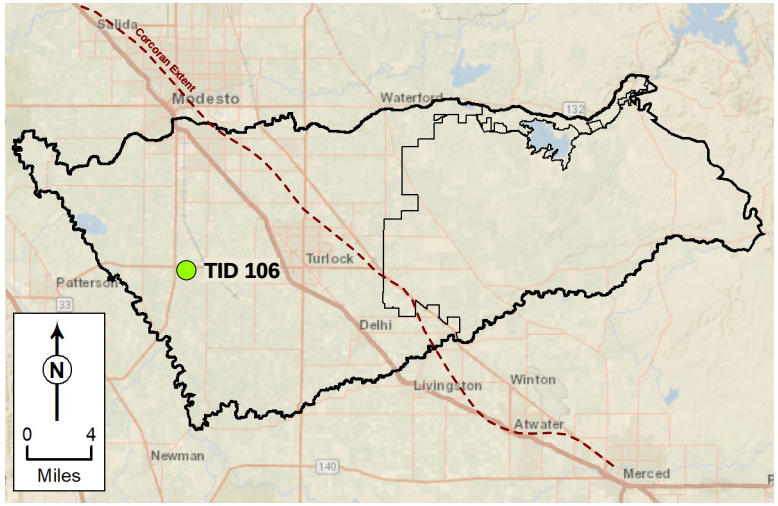
Site Code:	374177N1207888W001
Local Well Name:	TID 085B
State Well Name:	06S11E17C001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	28534
Latitude:	37.4179
Longitude:	-120.788
Well Depth (feet bgs):	172
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	80
Ground Surface Elevation:	104
Reference Point Elevation:	109.08
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

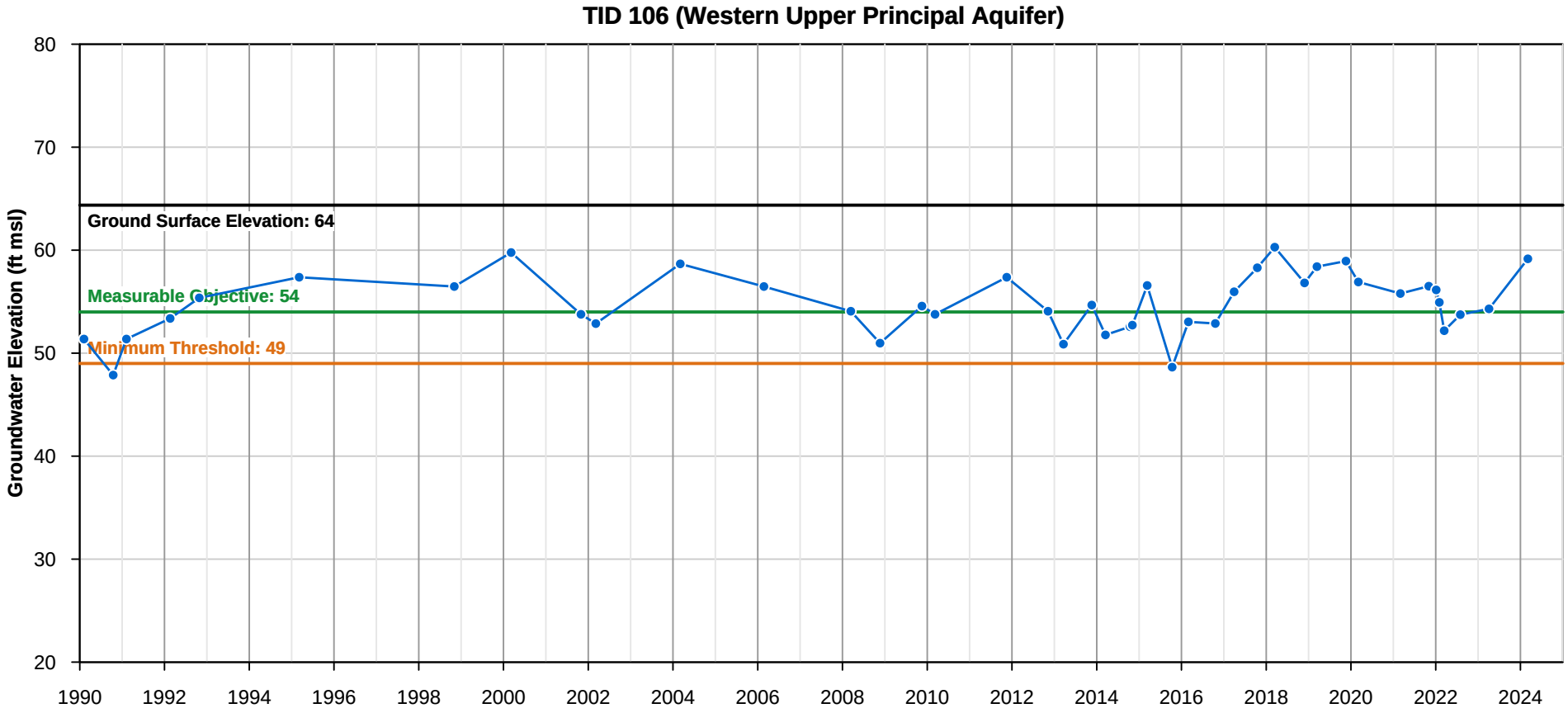




Well Information

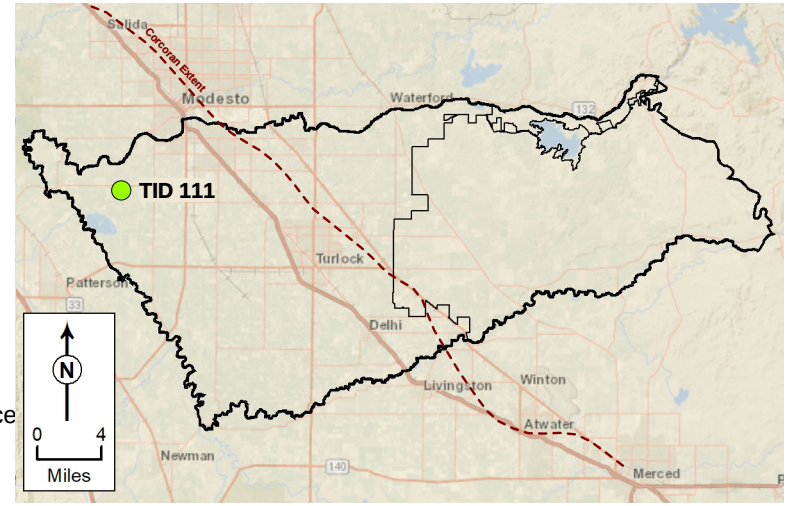
Site Code:	374891N1209810W001
Local Well Name:	TID 106
State Well Name:	05S09E21B001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	5630
Latitude:	37.4891
Longitude:	-120.981
Well Depth (feet bgs):	157
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	100
Ground Surface Elevation:	64.37
Reference Point Elevation:	64.37
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

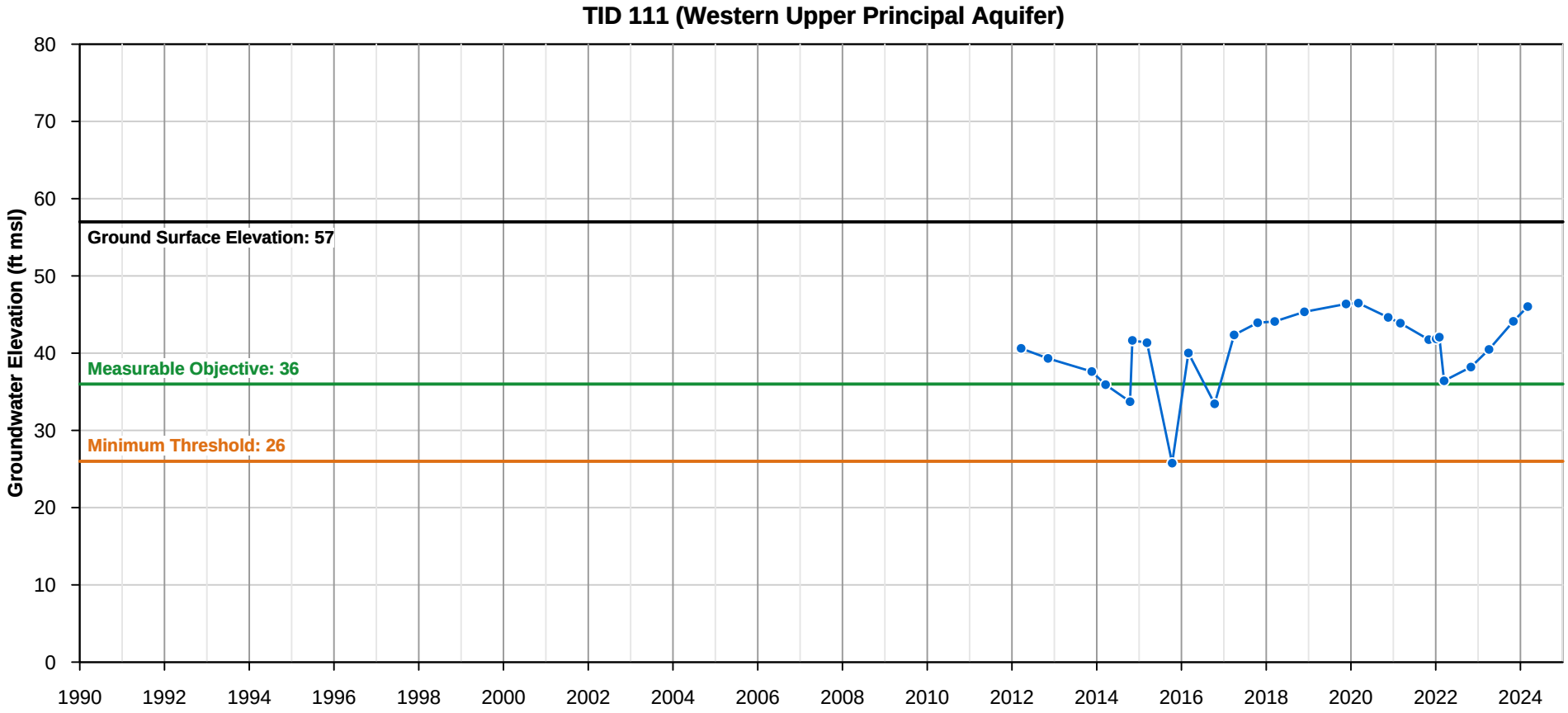




Well Information

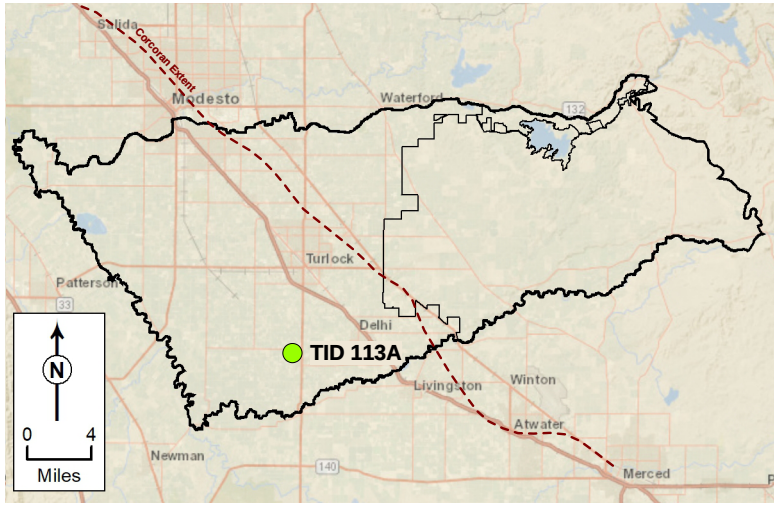
Site Code:	375607N1210671W001
Local Well Name:	TID 111
State Well Name:	04S08E27H001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	2176
Latitude:	37.5611
Longitude:	-121.067
Well Depth (feet bgs):	212
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	164
Ground Surface Elevation:	57
Reference Point Elevation:	60.1
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Land Subsidence

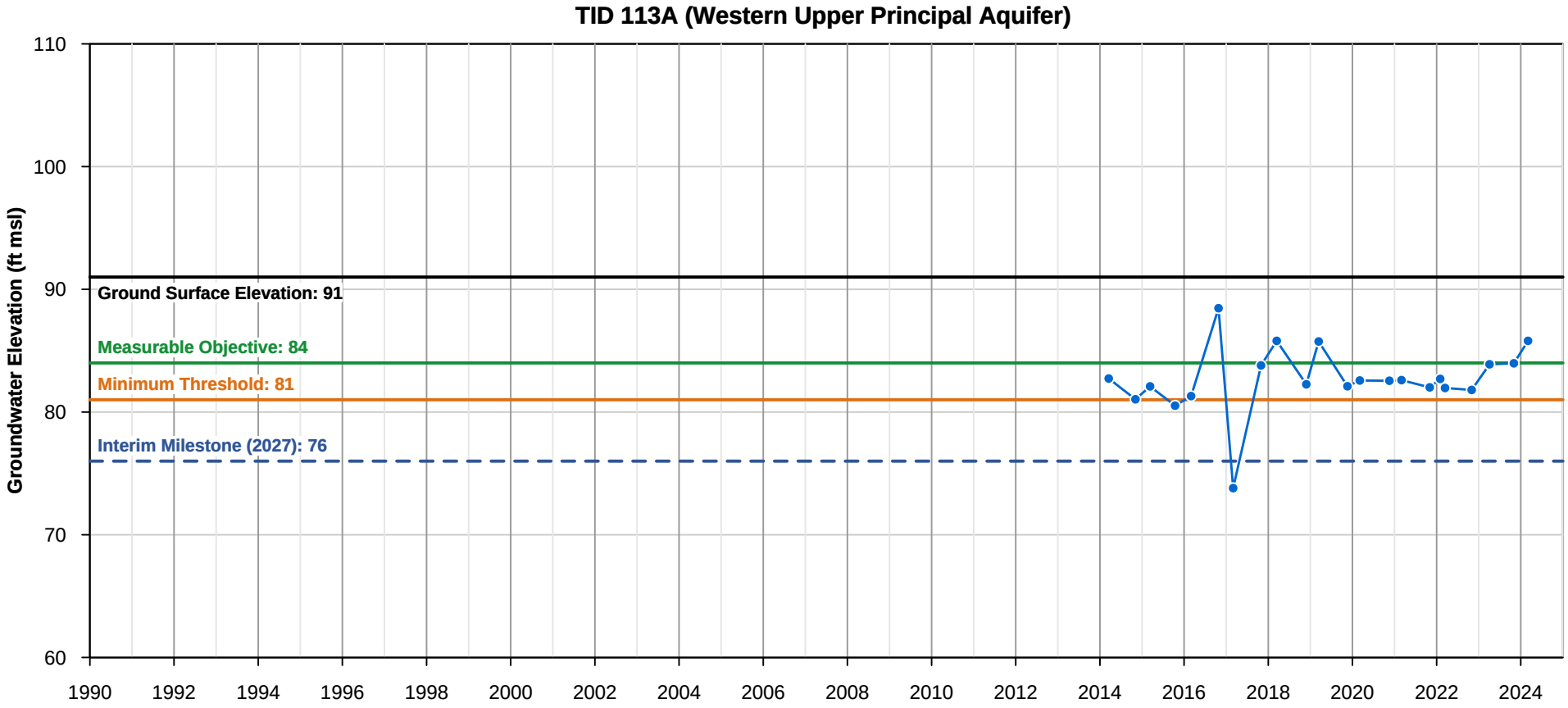




Well Information

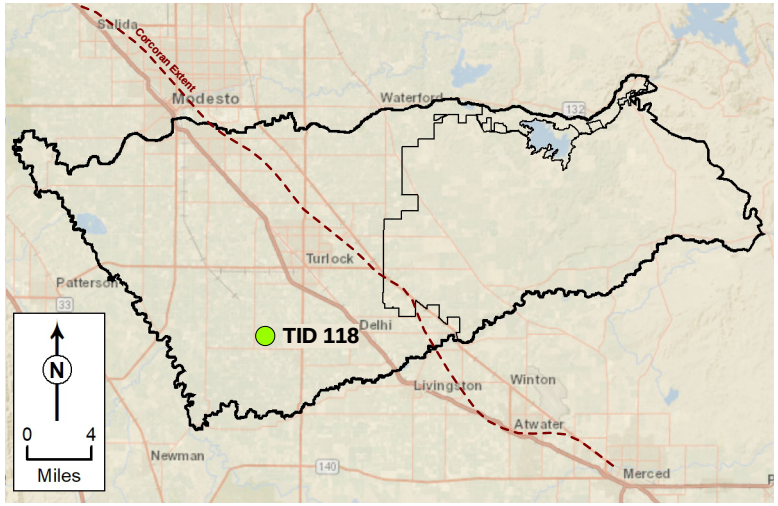
Site Code:	374146N1208602W002
Local Well Name:	TID 113A
State Well Name:	06S10E15F002M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	6602
Latitude:	37.4145
Longitude:	-120.86
Well Depth (feet bgs):	136
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	136
Ground Surface Elevation:	91
Reference Point Elevation:	92.04
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

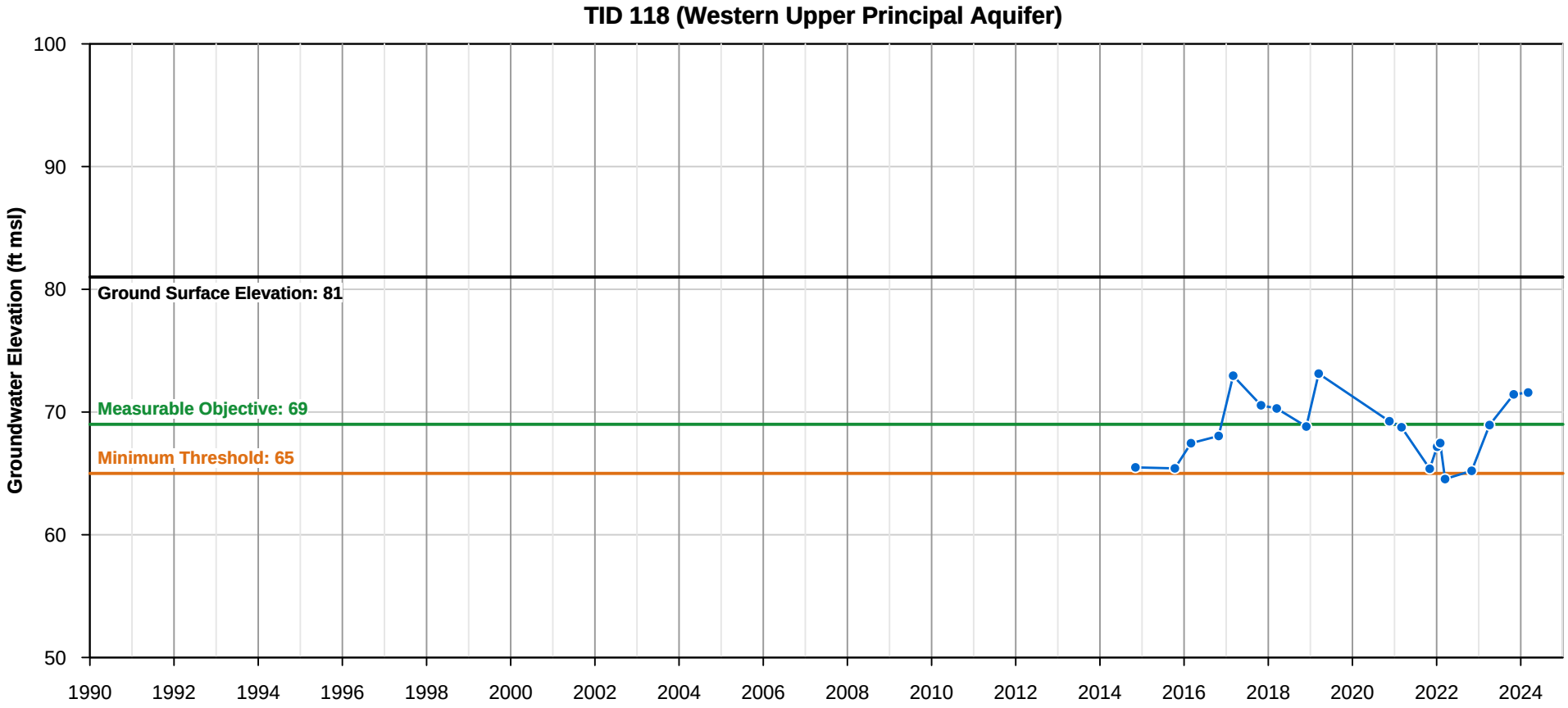




Well Information

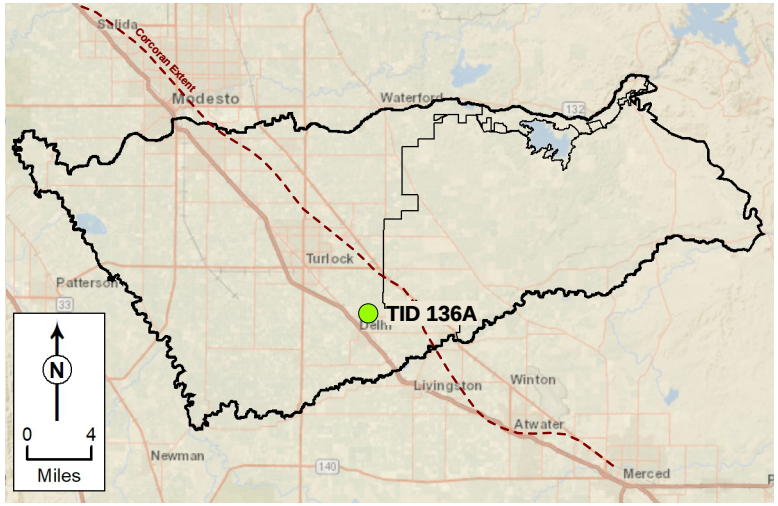
Site Code:	374296N1208907W001
Local Well Name:	TID 118
State Well Name:	06S10E08H001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	5909
Latitude:	37.4299
Longitude:	-120.891
Well Depth (feet bgs):	242
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	105
Ground Surface Elevation:	81
Reference Point Elevation:	81.29
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

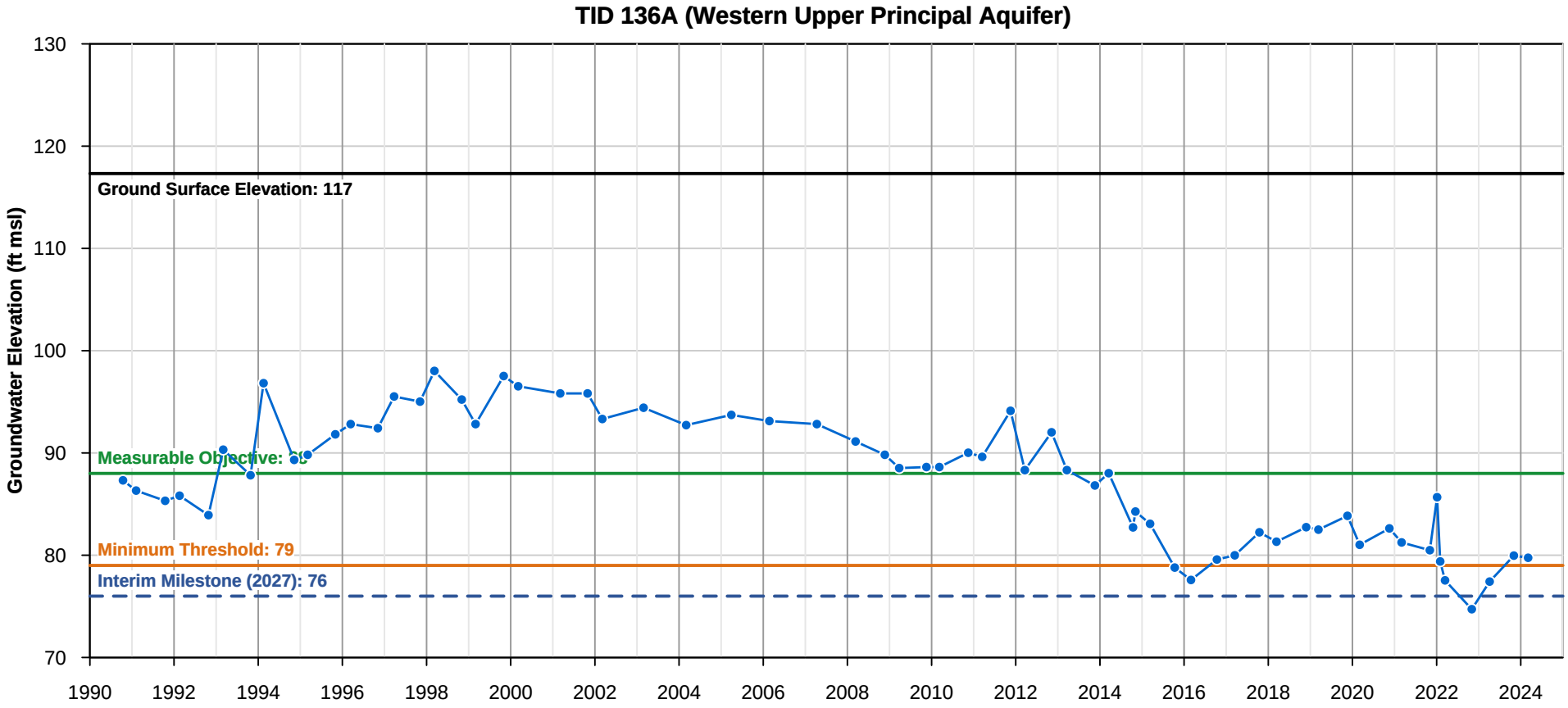




Well Information

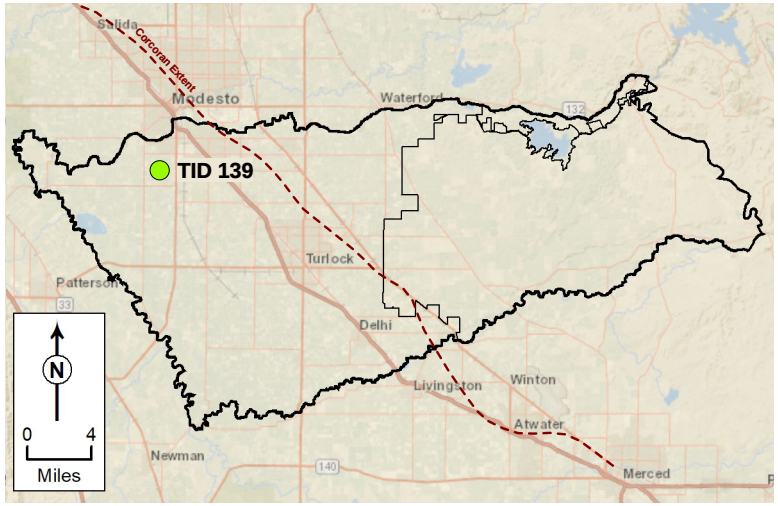
Site Code:	374507N1207741W001
Local Well Name:	TID 136A
State Well Name:	05S11E33N003M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	27312
Latitude:	37.4507
Longitude:	-120.774
Well Depth (feet bgs):	115
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	43
Ground Surface Elevation:	117.32
Reference Point Elevation:	117.32
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

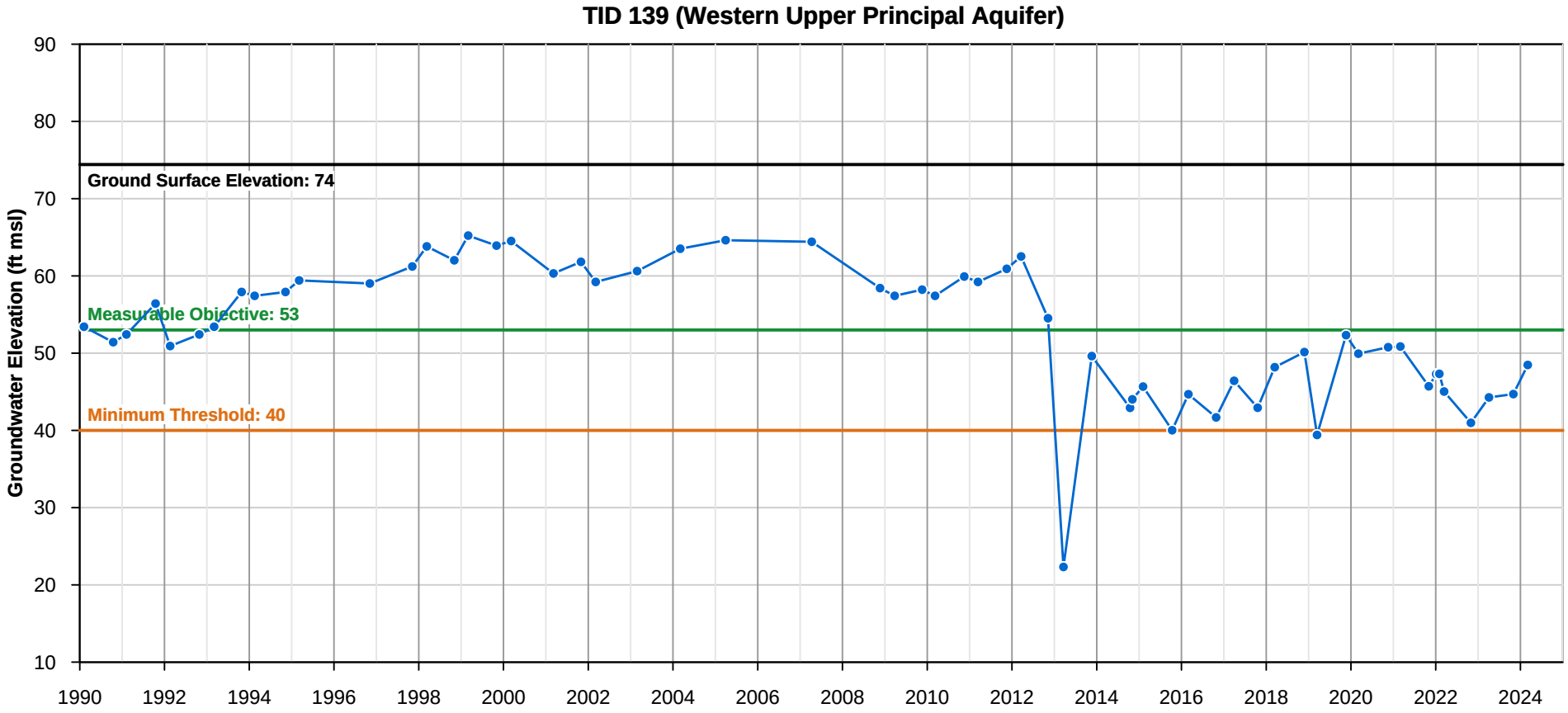




Well Information

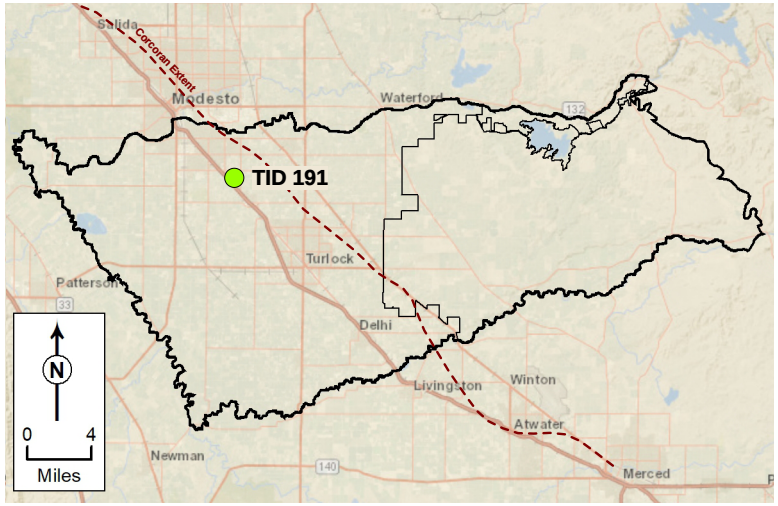
Site Code:	375796N1210124W001
Local Well Name:	TID 139
State Well Name:	04S09E19A001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	2877
Latitude:	37.5796
Longitude:	-121.012
Well Depth (feet bgs):	280
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	189
Ground Surface Elevation:	74.42
Reference Point Elevation:	74.42
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

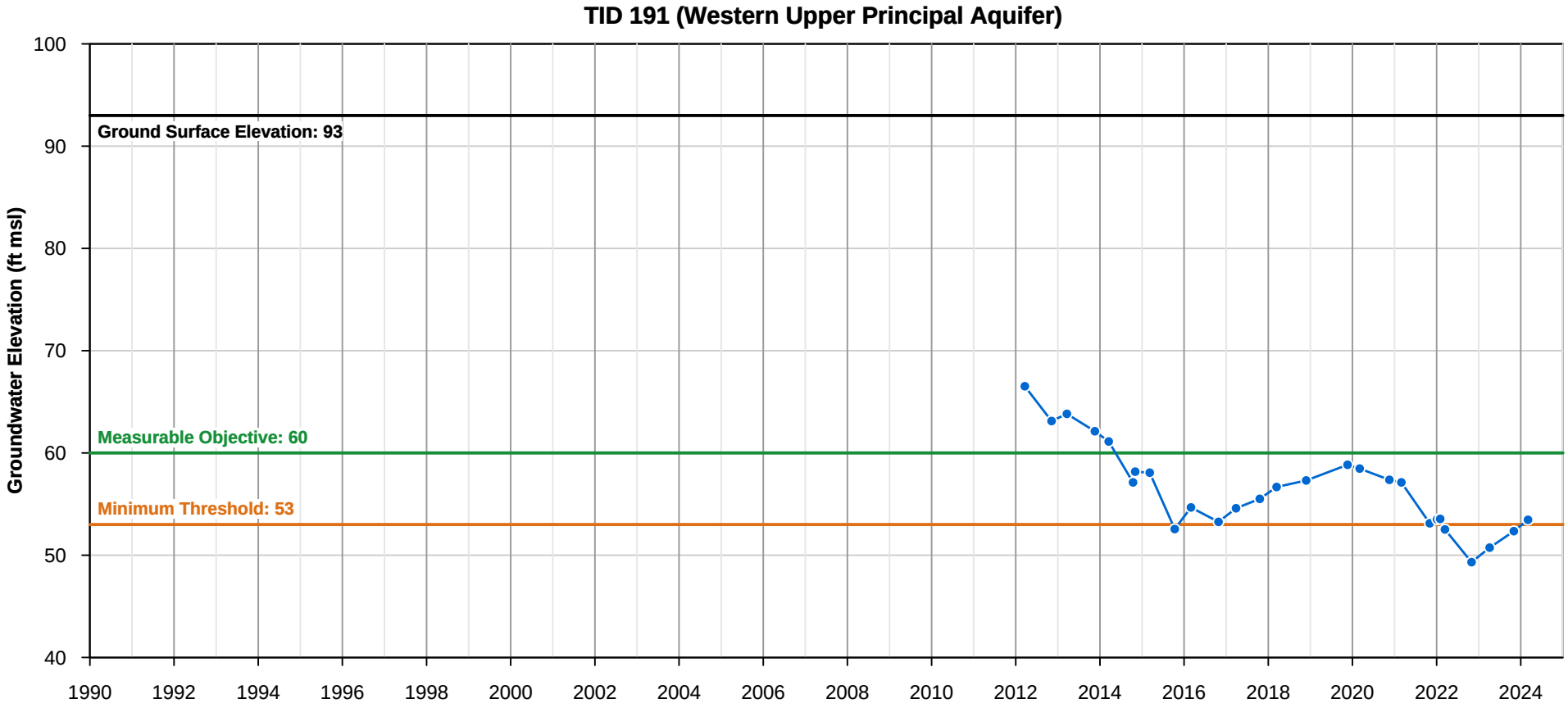




Well Information

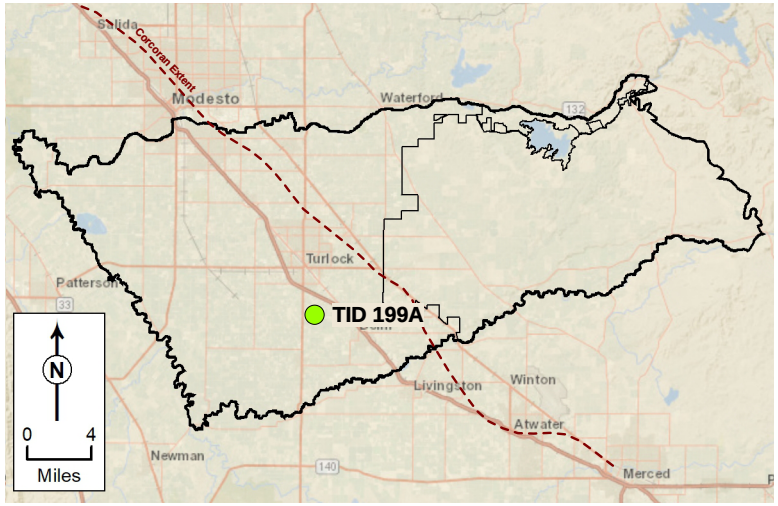
Site Code:	375738N1209271W001
Local Well Name:	TID 191
State Well Name:	04S09E24G001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	26403
Latitude:	37.5731
Longitude:	-120.927
Well Depth (feet bgs):	245
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	192
Ground Surface Elevation:	93
Reference Point Elevation:	93.67
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

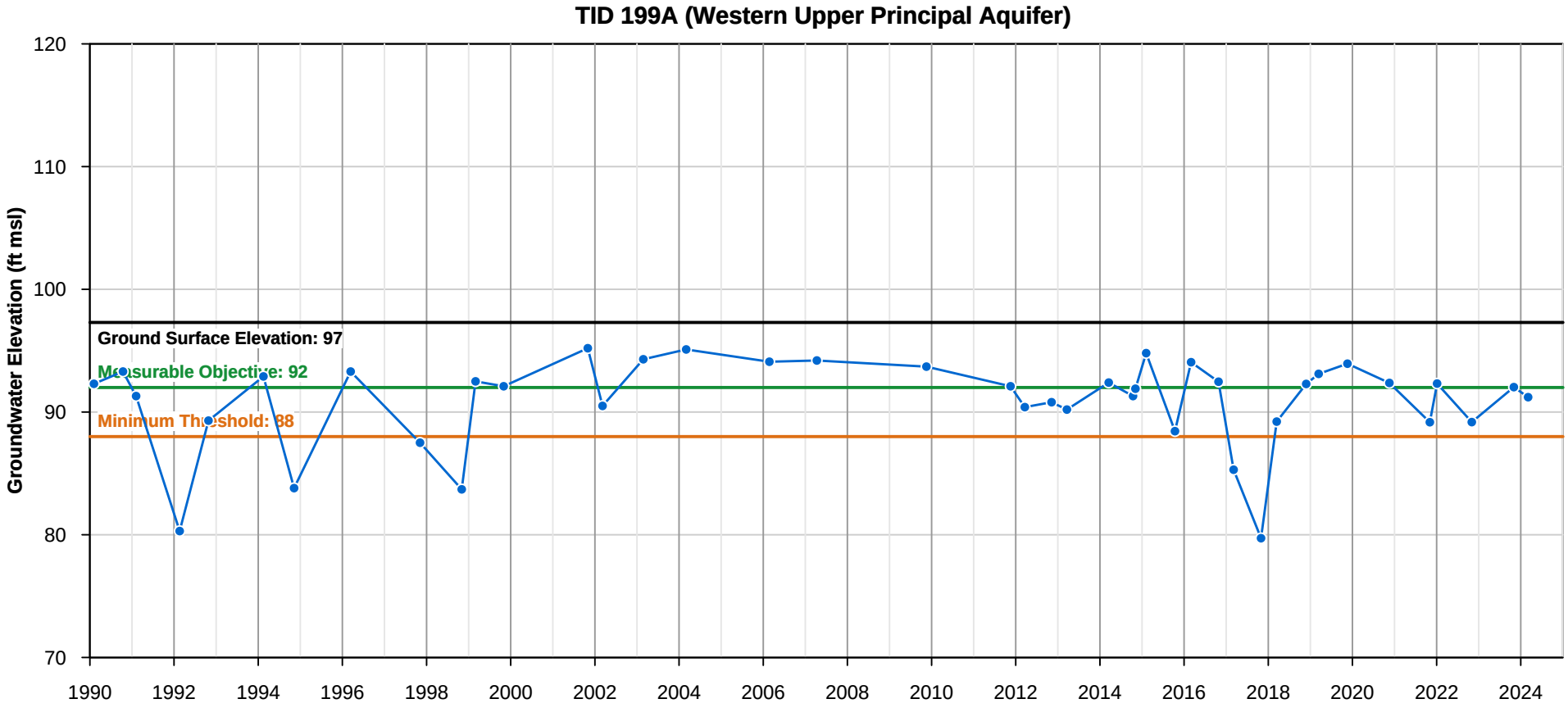




Well Information

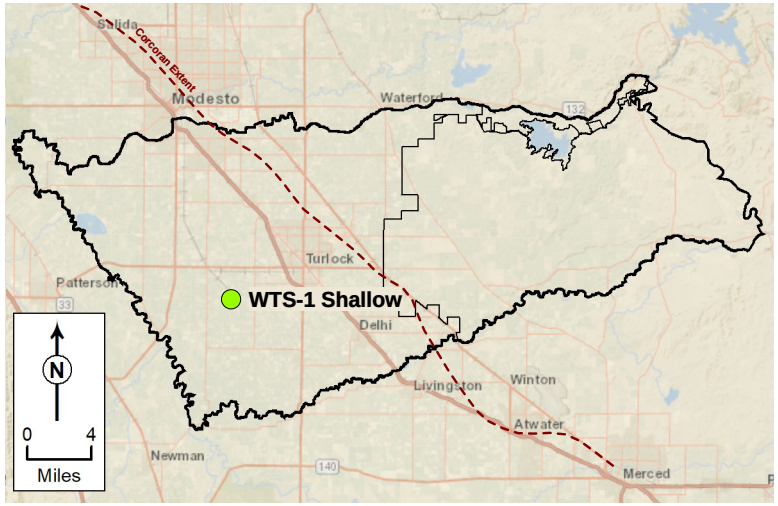
Site Code:	374493N1208354W001
Local Well Name:	TID 199A
State Well Name:	05S10E35Q001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	7237
Latitude:	37.4493
Longitude:	-120.835
Well Depth (feet bgs):	60
Top Perforation (feet bgs):	40
Bottom Perforation (feet bgs):	52
Ground Surface Elevation:	97.3
Reference Point Elevation:	98.3
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

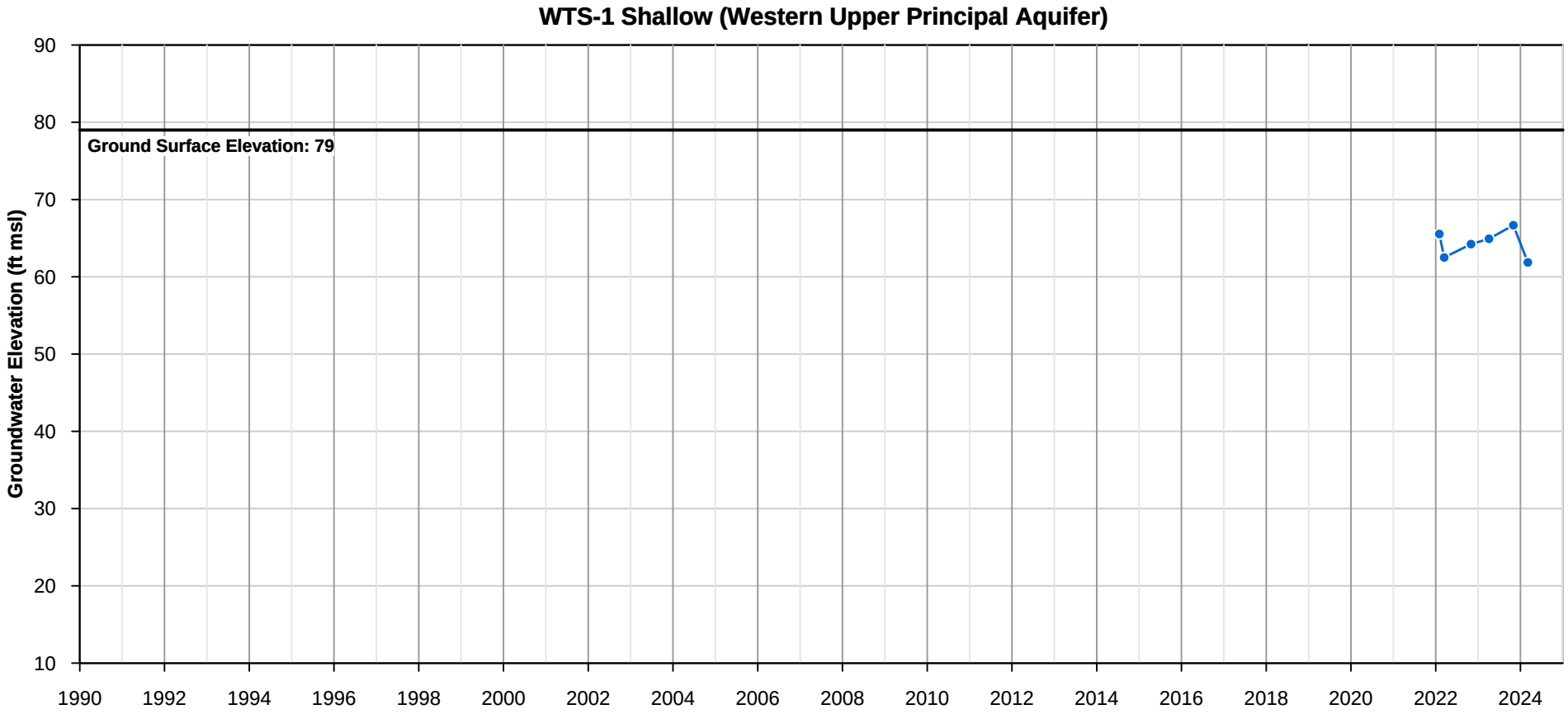




Well Information

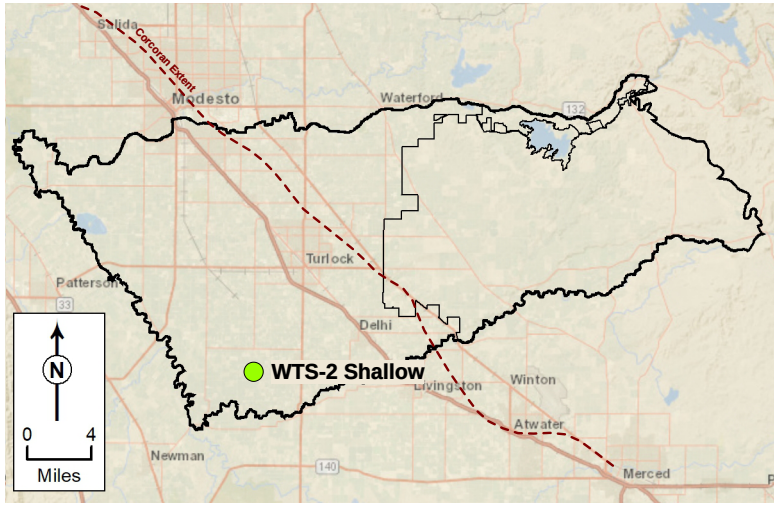
Site Code:	374629N1209301W001
Local Well Name:	WTS-1 Shallow
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	57362
Latitude:	37.463
Longitude:	-120.93
Well Depth (feet bgs):	185
Top Perforation (feet bgs):	160
Bottom Perforation (feet bgs):	180
Ground Surface Elevation:	79
Reference Point Elevation:	80.8
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

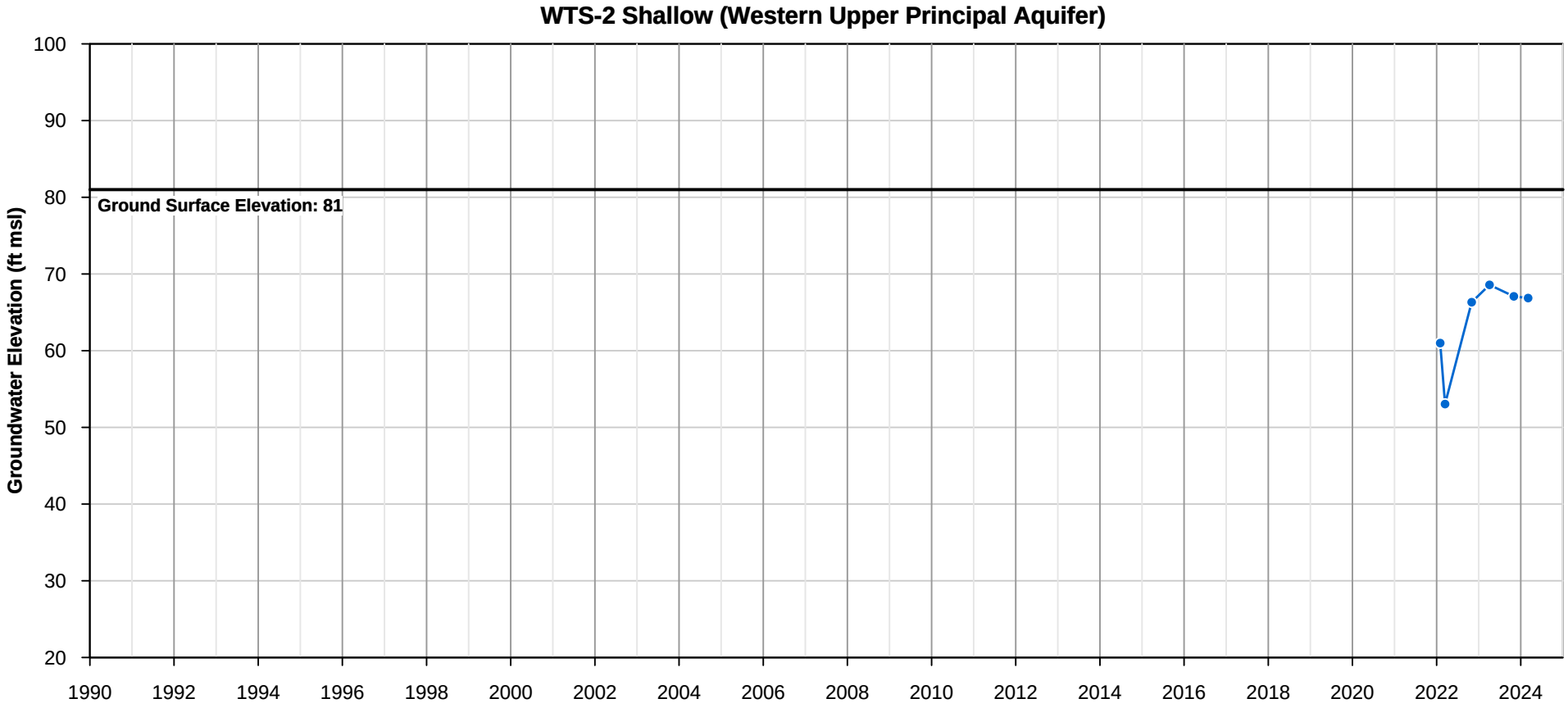




Well Information

Site Code:	373973N1209044W001
Local Well Name:	WTS-2 Shallow
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	57364
Latitude:	37.3974
Longitude:	-120.904
Well Depth (feet bgs):	145
Top Perforation (feet bgs):	120
Bottom Perforation (feet bgs):	140
Ground Surface Elevation:	81
Reference Point Elevation:	78.6
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

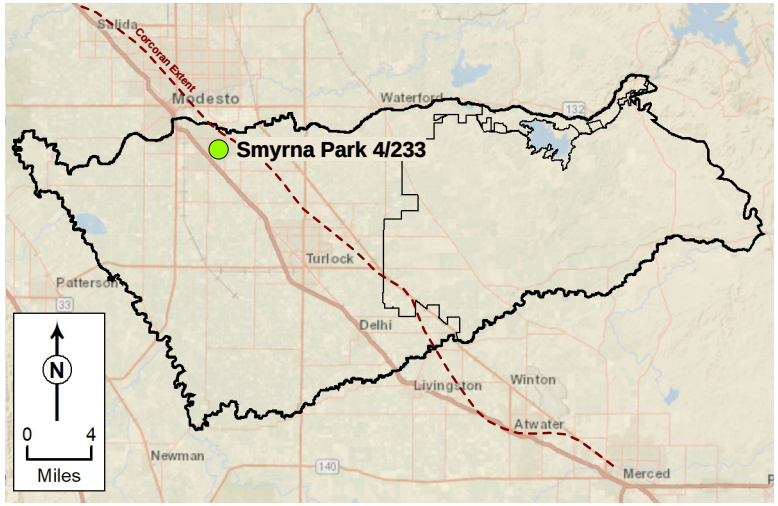


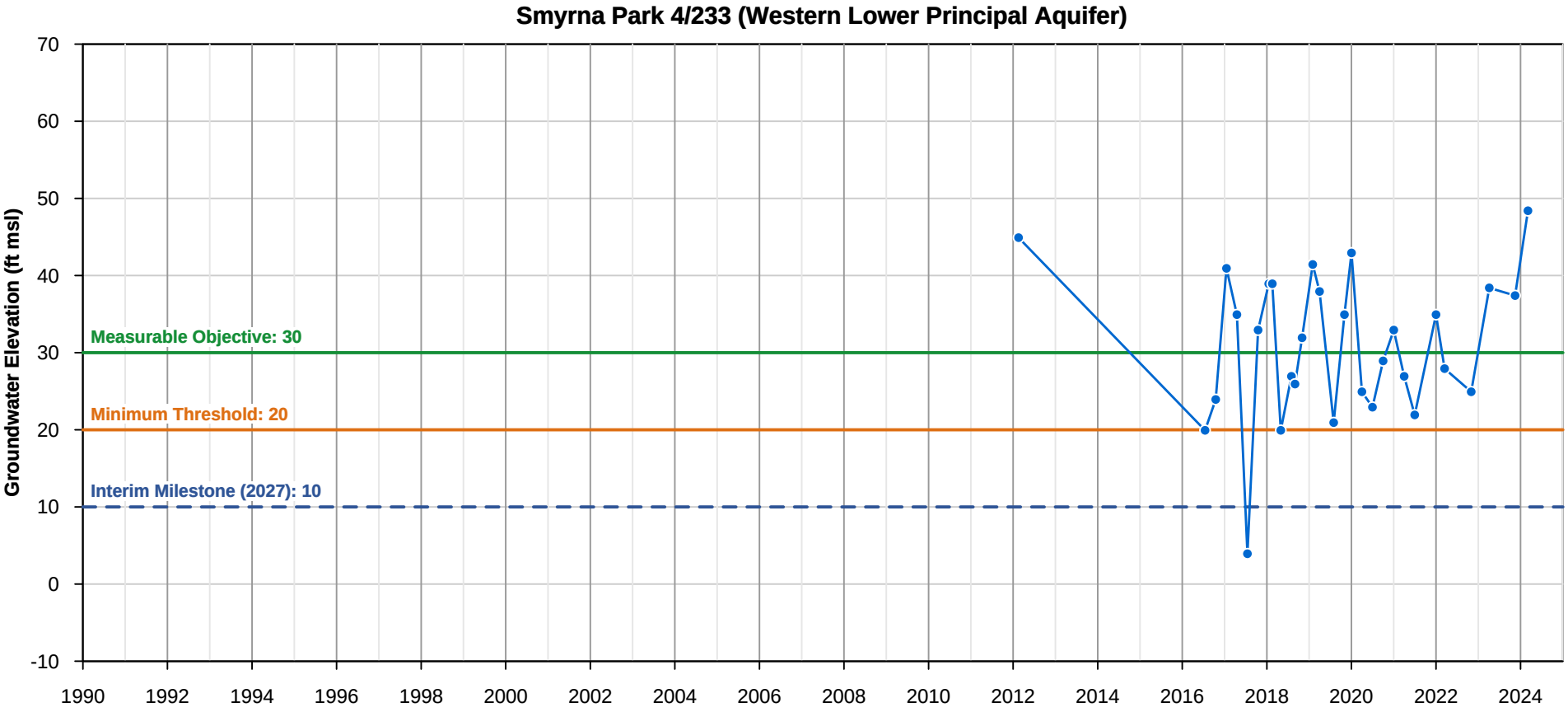


Western Lower Principal Aquifer

Well Information

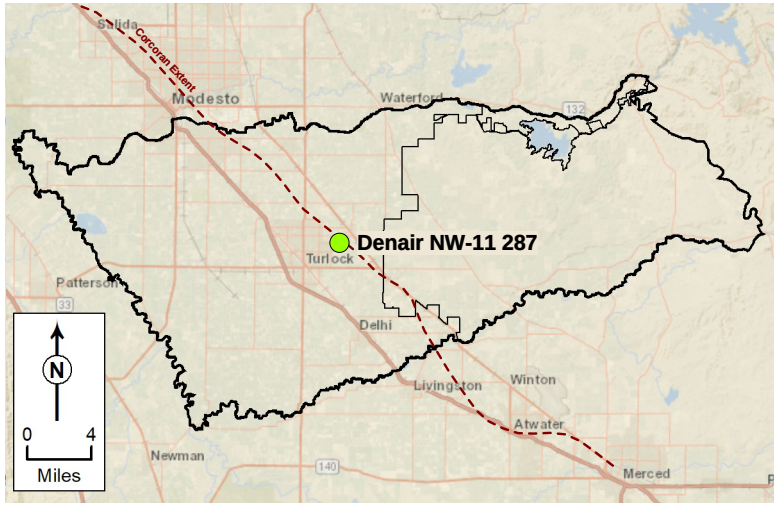
Site Code:	375987N1209453W001
Local Well Name:	Smyrna Park 4/233
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Lower
Station ID:	57315
Latitude:	37.5988
Longitude:	-120.945
Well Depth (feet bgs):	233
Top Perforation (feet bgs):	218
Bottom Perforation (feet bgs):	228
Ground Surface Elevation:	98
Reference Point Elevation:	100.4
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

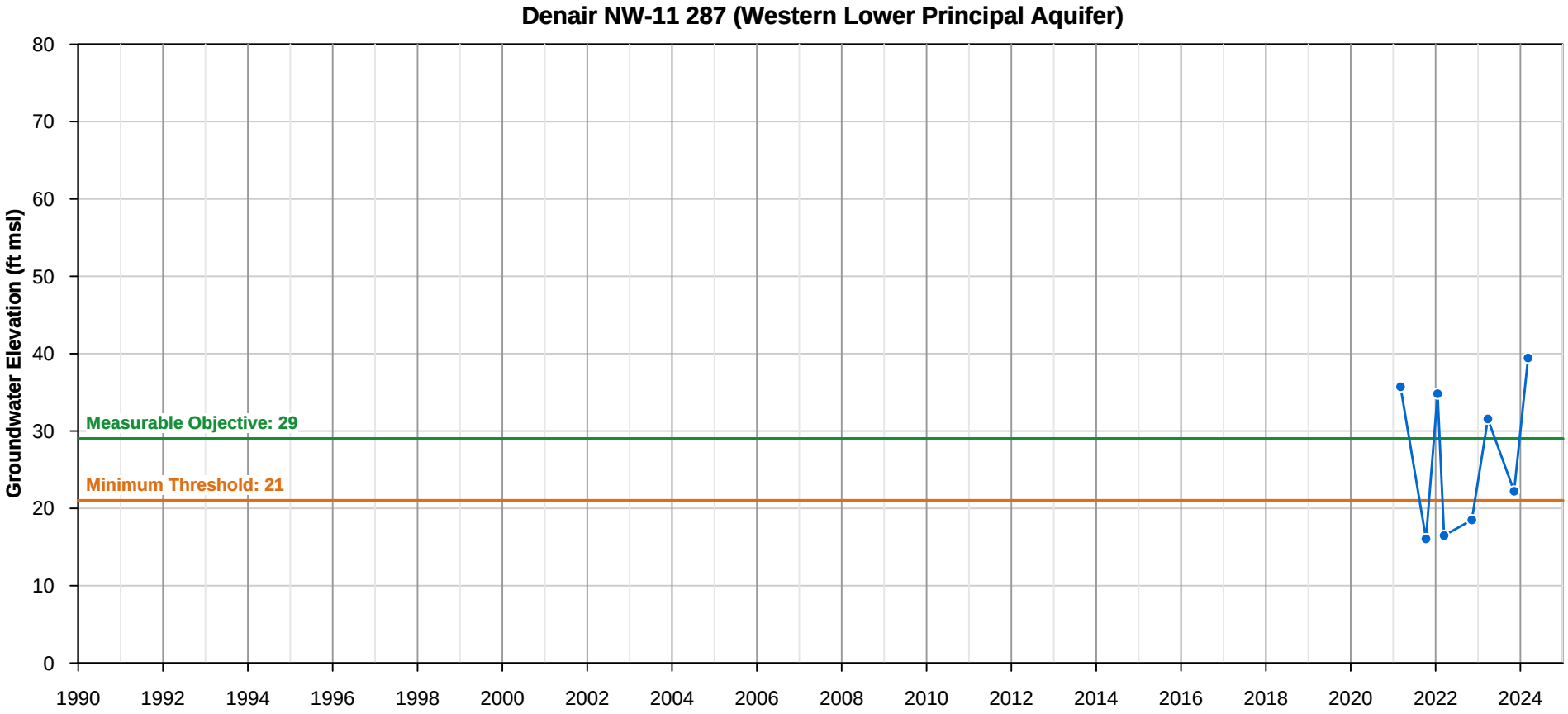




Well Information

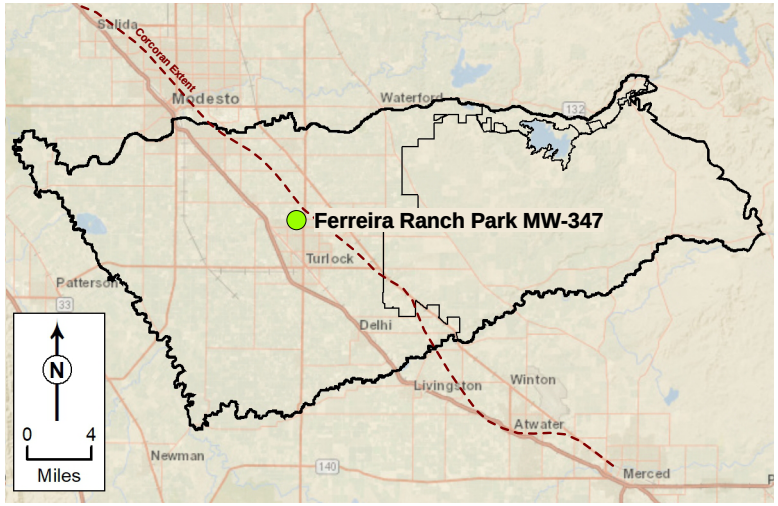
Site Code:	375145N1208073W001
Local Well Name:	Denair NW-11 287
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Lower
Station ID:	57316
Latitude:	37.5146
Longitude:	-120.807
Well Depth (feet bgs):	287
Top Perforation (feet bgs):	257
Bottom Perforation (feet bgs):	287
Ground Surface Elevation:	116.72
Reference Point Elevation:	116.72
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

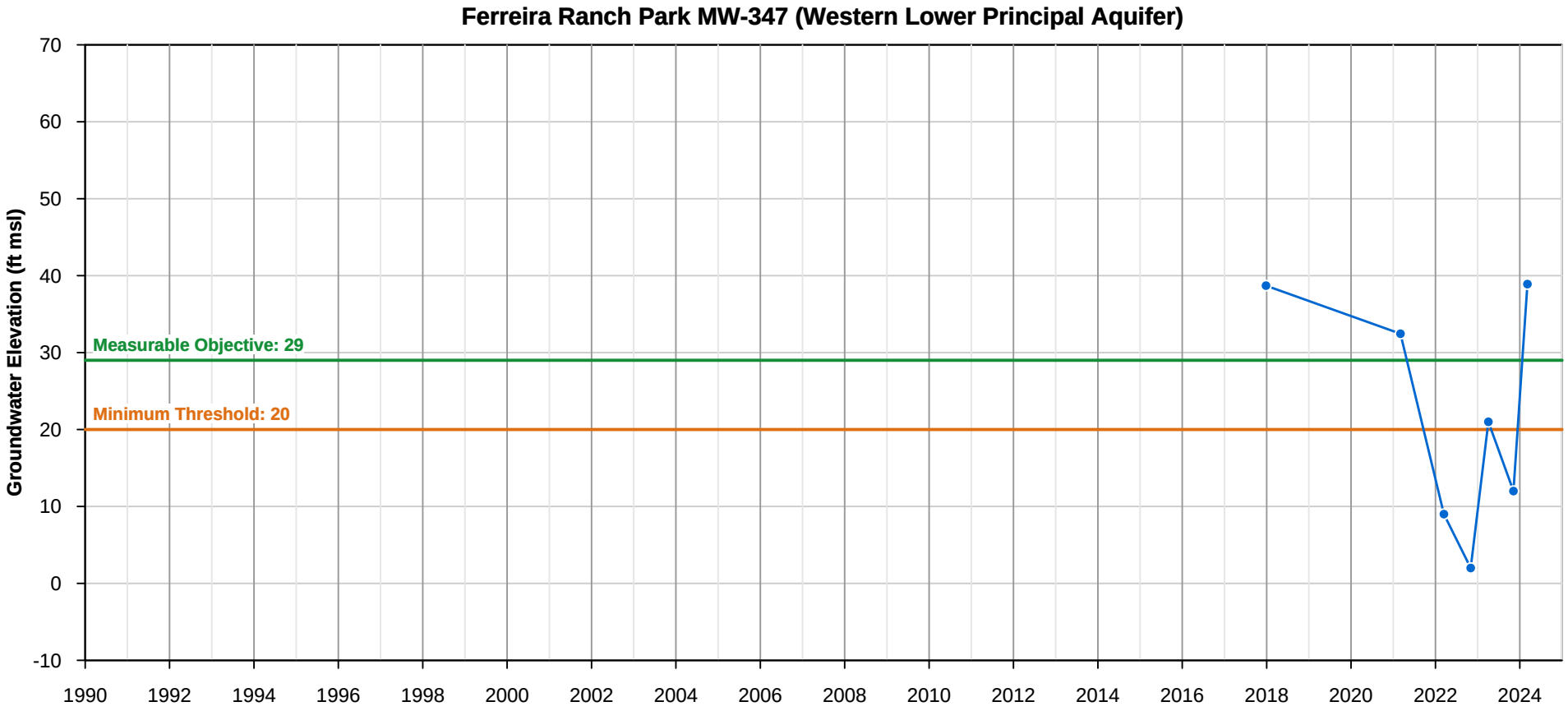




Well Information

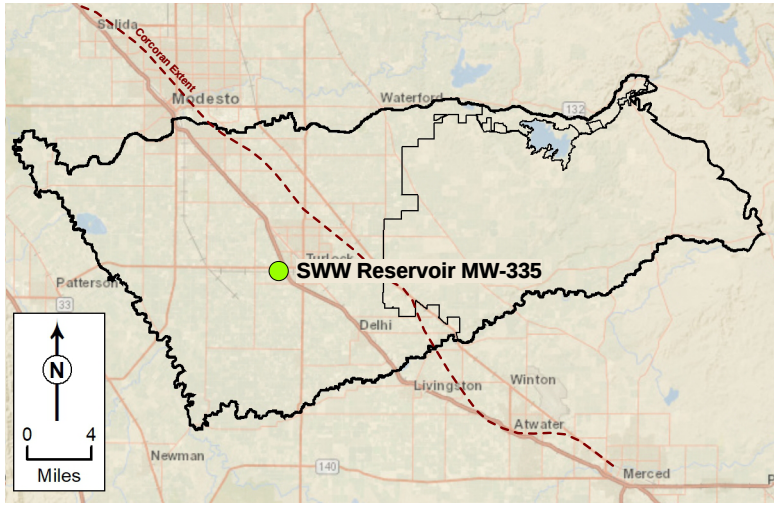
Site Code:	375349N1208555W001
Local Well Name:	Ferreira Ranch Park MW-347
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Lower
Station ID:	57317
Latitude:	37.535
Longitude:	-120.856
Well Depth (feet bgs):	347
Top Perforation (feet bgs):	332
Bottom Perforation (feet bgs):	342
Ground Surface Elevation:	106
Reference Point Elevation:	106
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

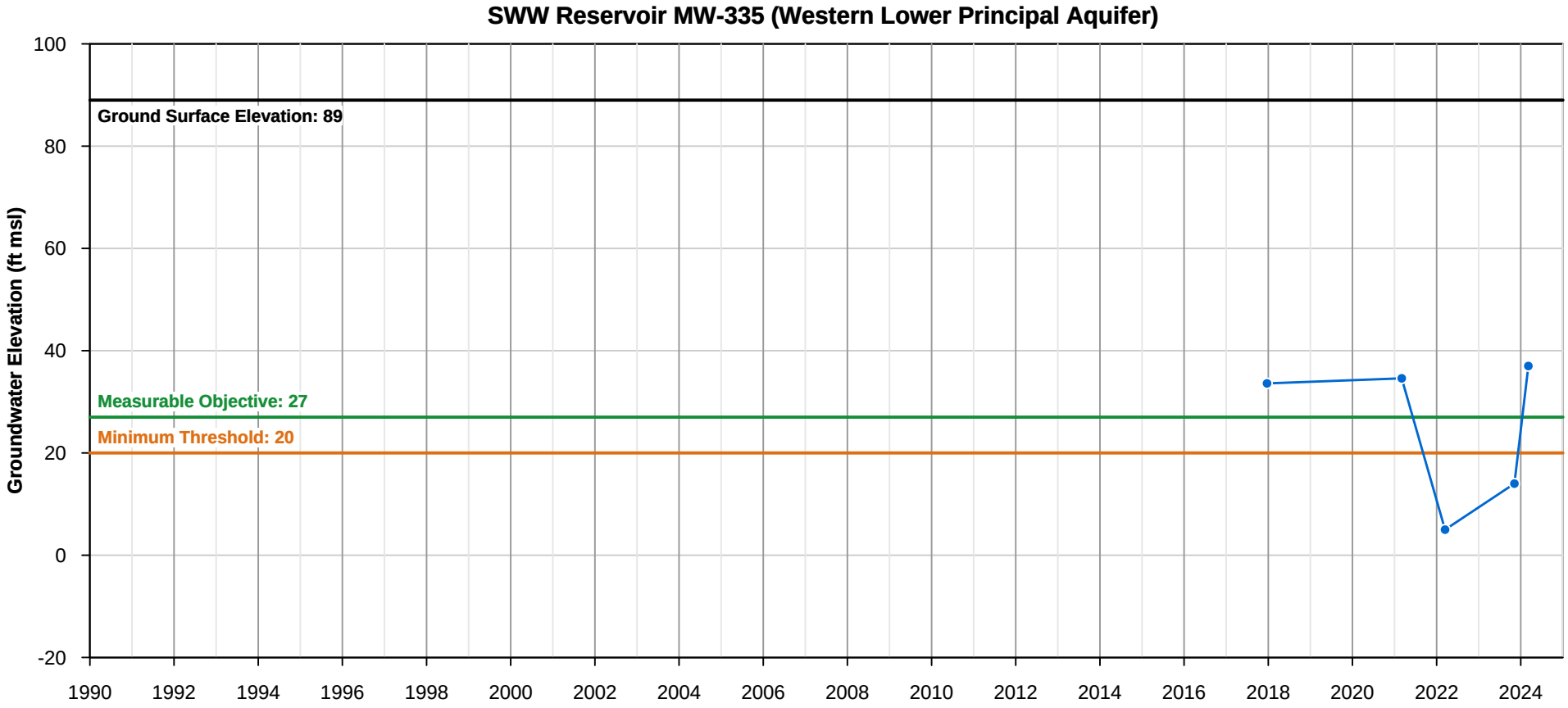




Well Information

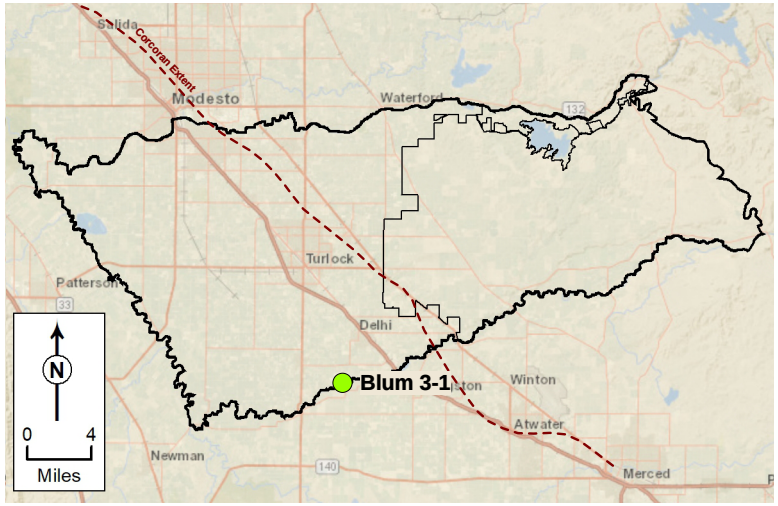
Site Code:	374887N1208756W001
Local Well Name:	SWW Reservoir MW-335
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Lower
Station ID:	57318
Latitude:	37.4888
Longitude:	-120.876
Well Depth (feet bgs):	335
Top Perforation (feet bgs):	320
Bottom Perforation (feet bgs):	330
Ground Surface Elevation:	89
Reference Point Elevation:	89
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

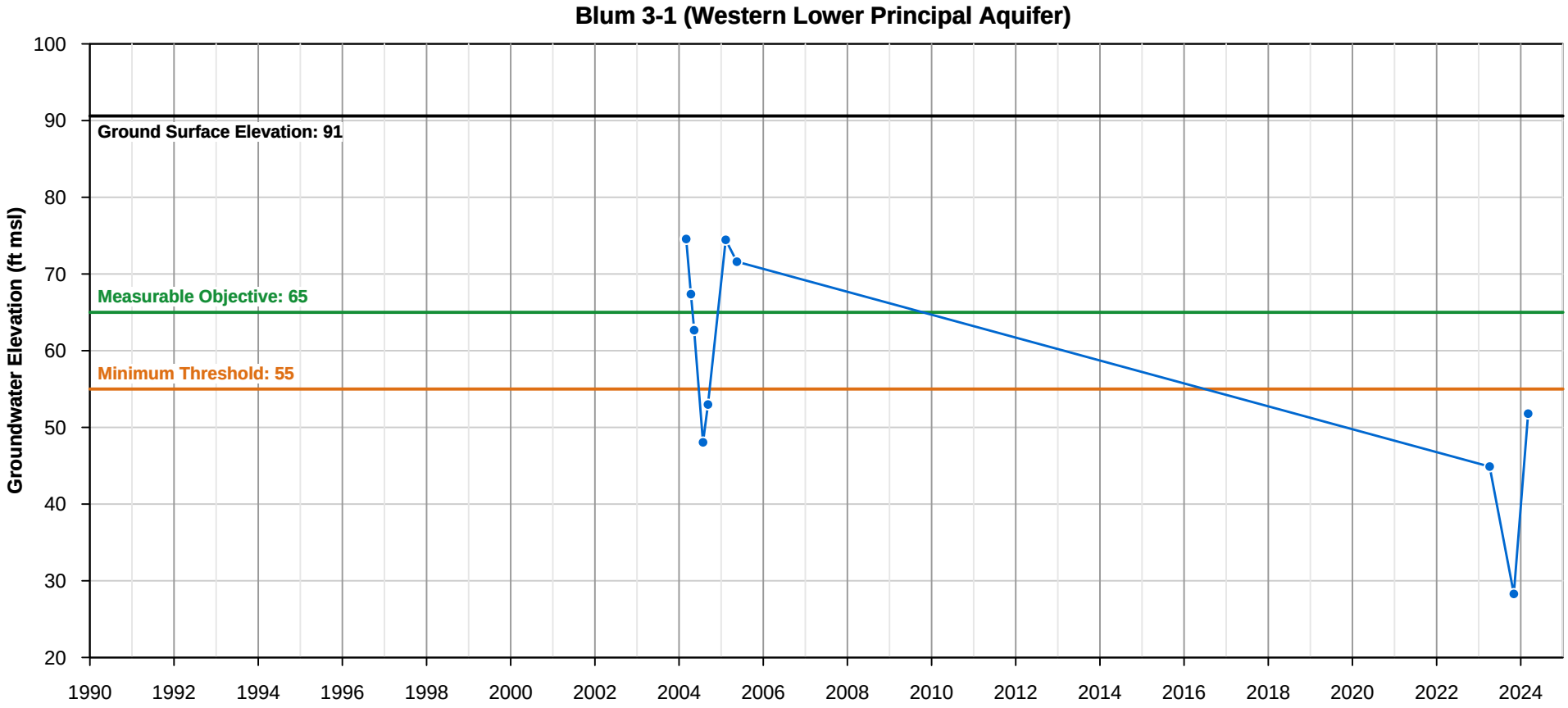




Well Information

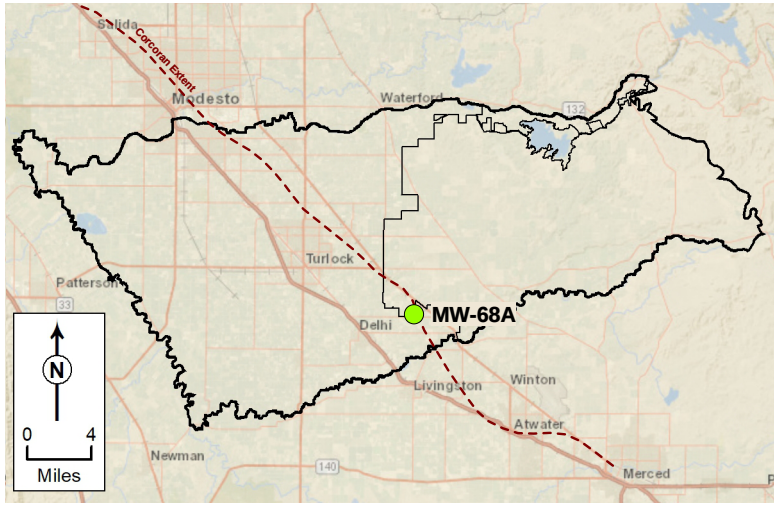
Site Code:	373877N1208027W001
Local Well Name:	Blum 3-1
State Well Name:	06S11E30B008M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Lower
Station ID:	57319
Latitude:	37.3877
Longitude:	-120.803
Well Depth (feet bgs):	185
Top Perforation (feet bgs):	170
Bottom Perforation (feet bgs):	180
Ground Surface Elevation:	90.6
Reference Point Elevation:	90.6
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

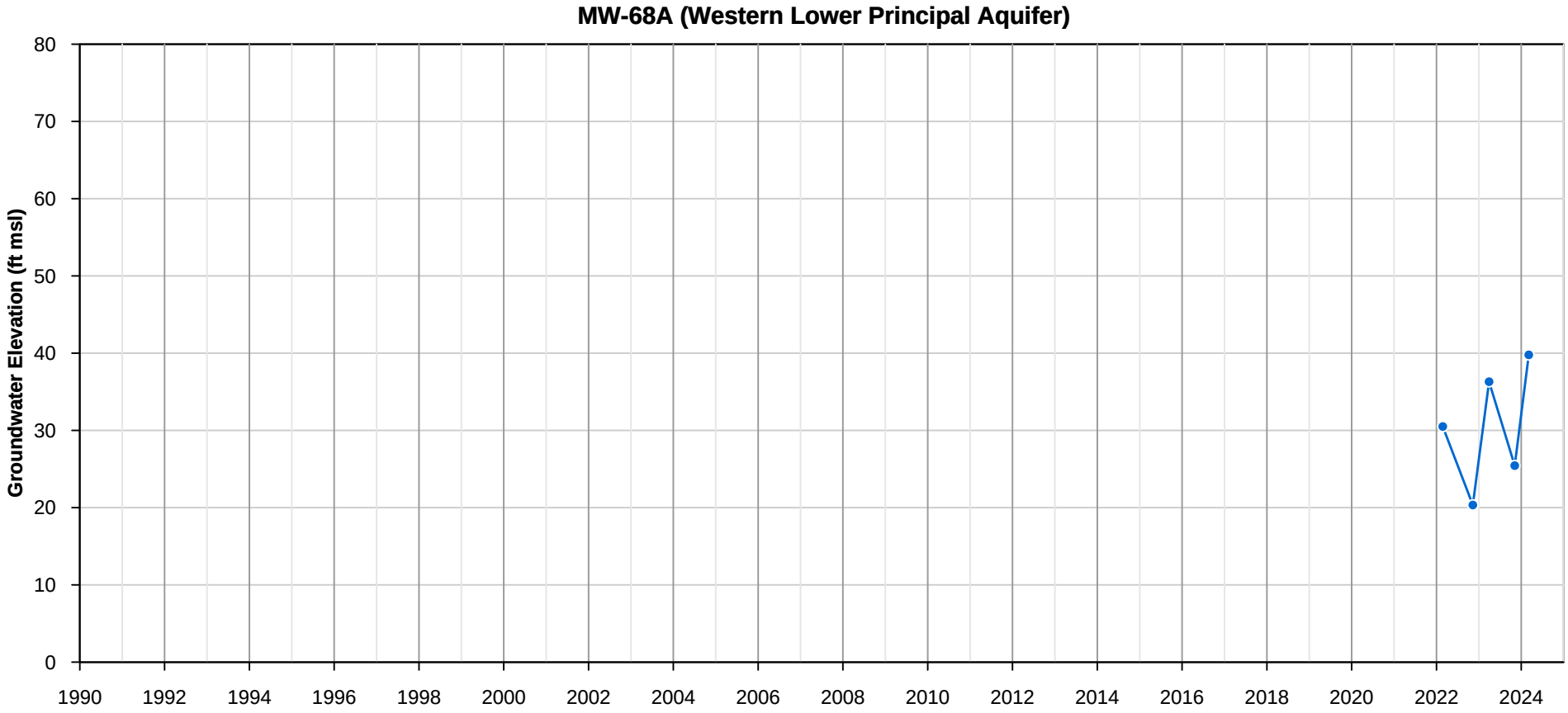




Well Information

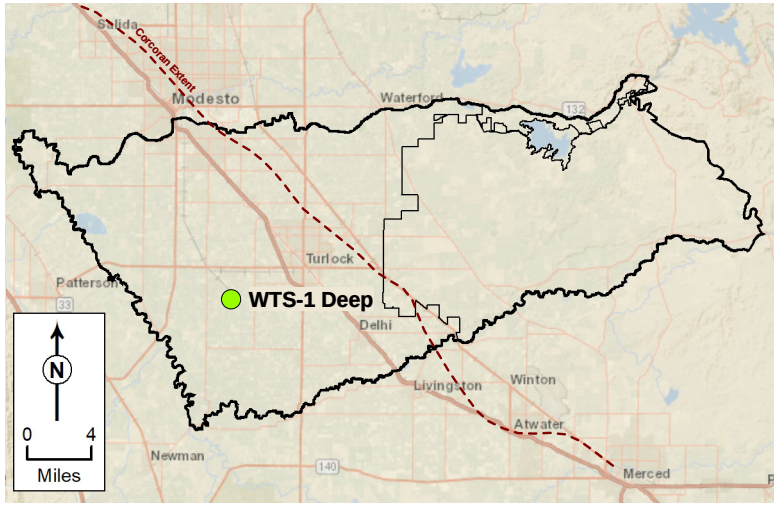
Site Code:	374499N1207220W001
Local Well Name:	MW-68A
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Lower
Station ID:	57366
Latitude:	37.45
Longitude:	-120.722
Well Depth (feet bgs):	160
Top Perforation (feet bgs):	148
Bottom Perforation (feet bgs):	158
Ground Surface Elevation:	146.88
Reference Point Elevation:	148.94
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

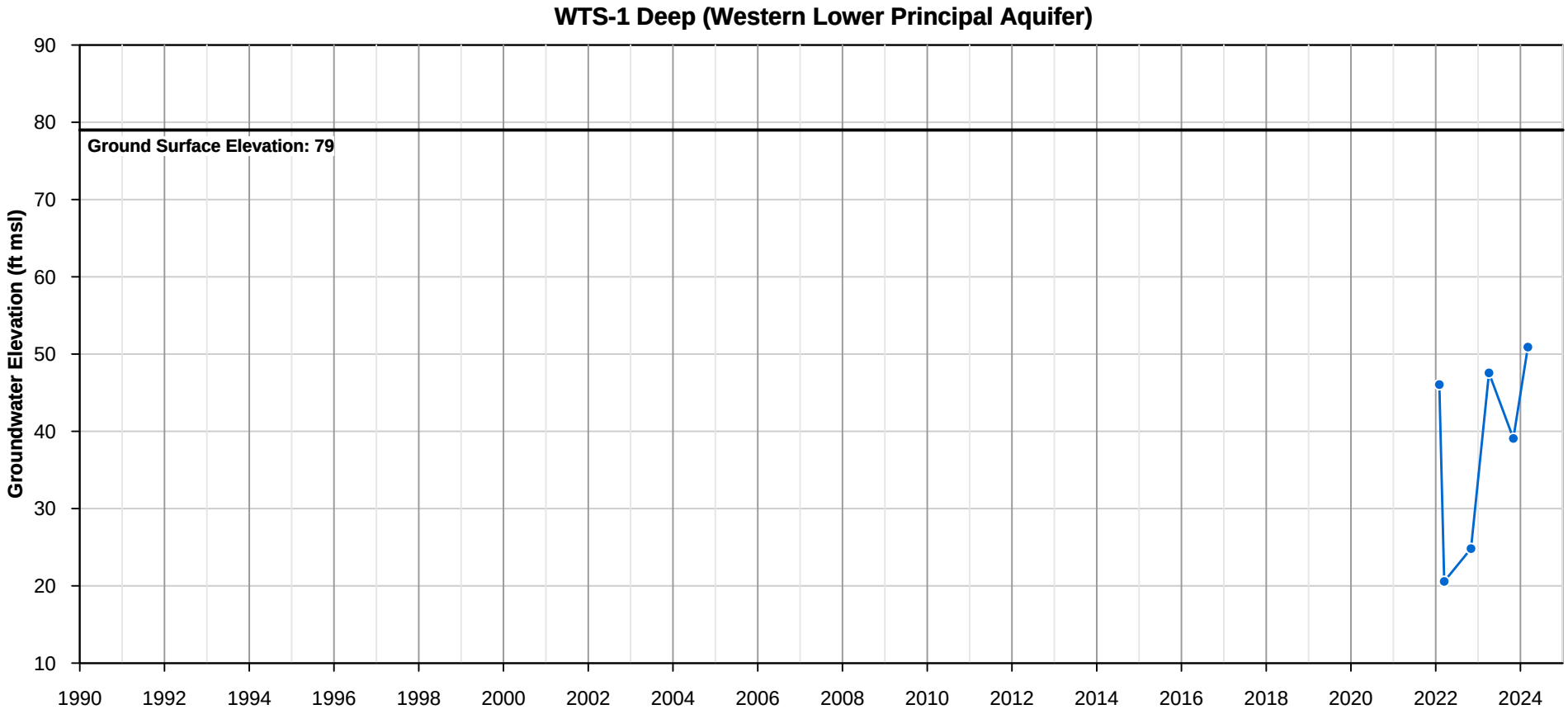




Well Information

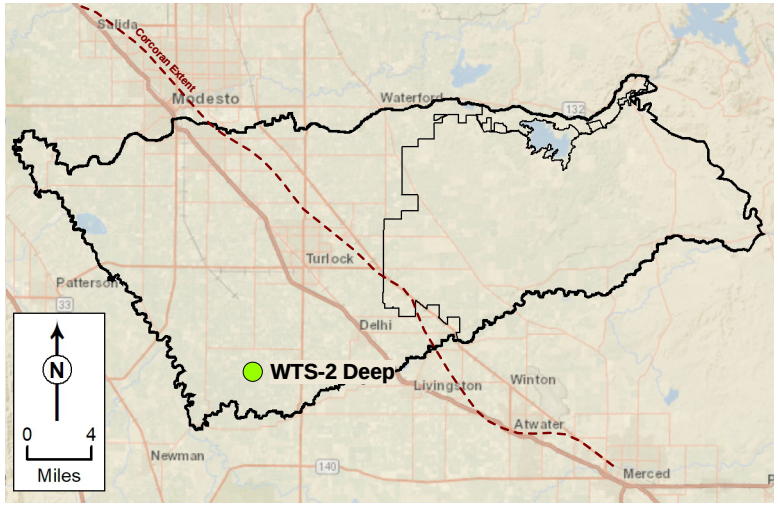
Site Code:	374629N1209302W001
Local Well Name:	WTS-1 Deep
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Lower
Station ID:	57363
Latitude:	37.463
Longitude:	-120.93
Well Depth (feet bgs):	340
Top Perforation (feet bgs):	320
Bottom Perforation (feet bgs):	340
Ground Surface Elevation:	79
Reference Point Elevation:	80.7
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

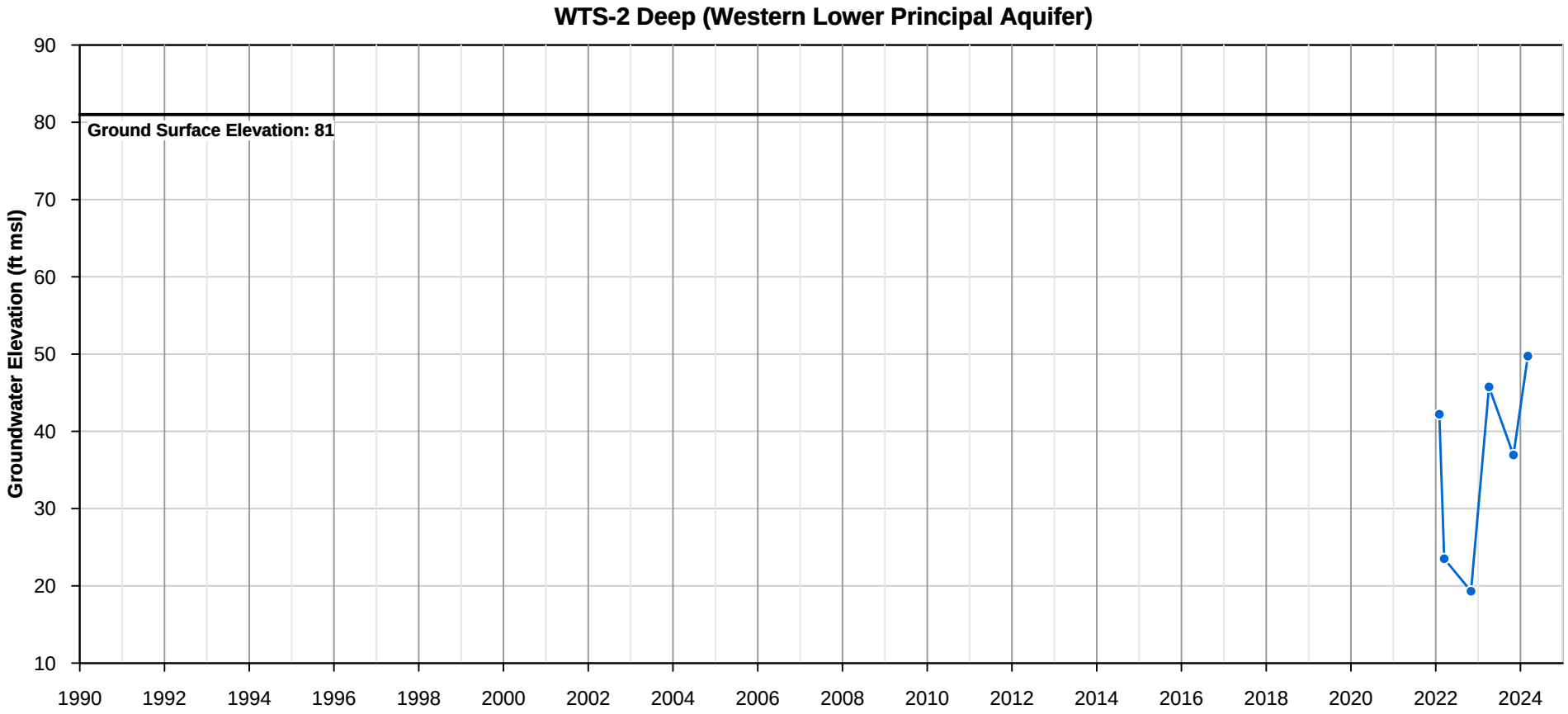




Well Information

Site Code:	373973N1209045W001
Local Well Name:	WTS-2 Deep
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Lower
Station ID:	57365
Latitude:	37.3974
Longitude:	-120.905
Well Depth (feet bgs):	295
Top Perforation (feet bgs):	280
Bottom Perforation (feet bgs):	290
Ground Surface Elevation:	81
Reference Point Elevation:	78.5
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

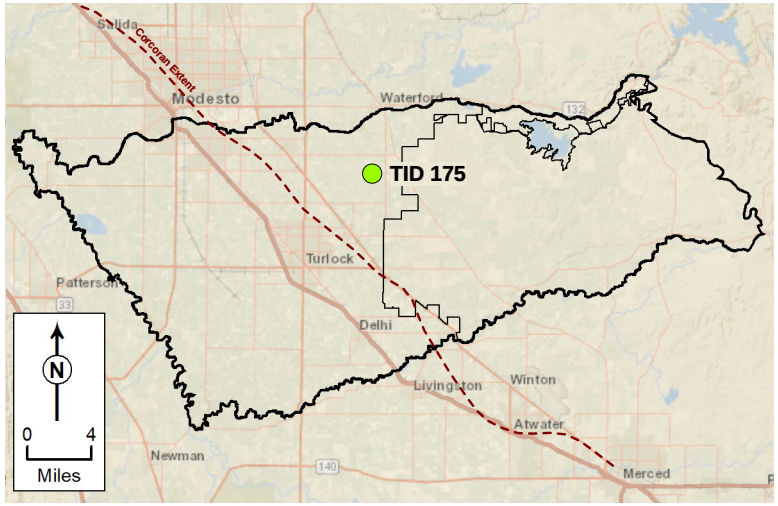


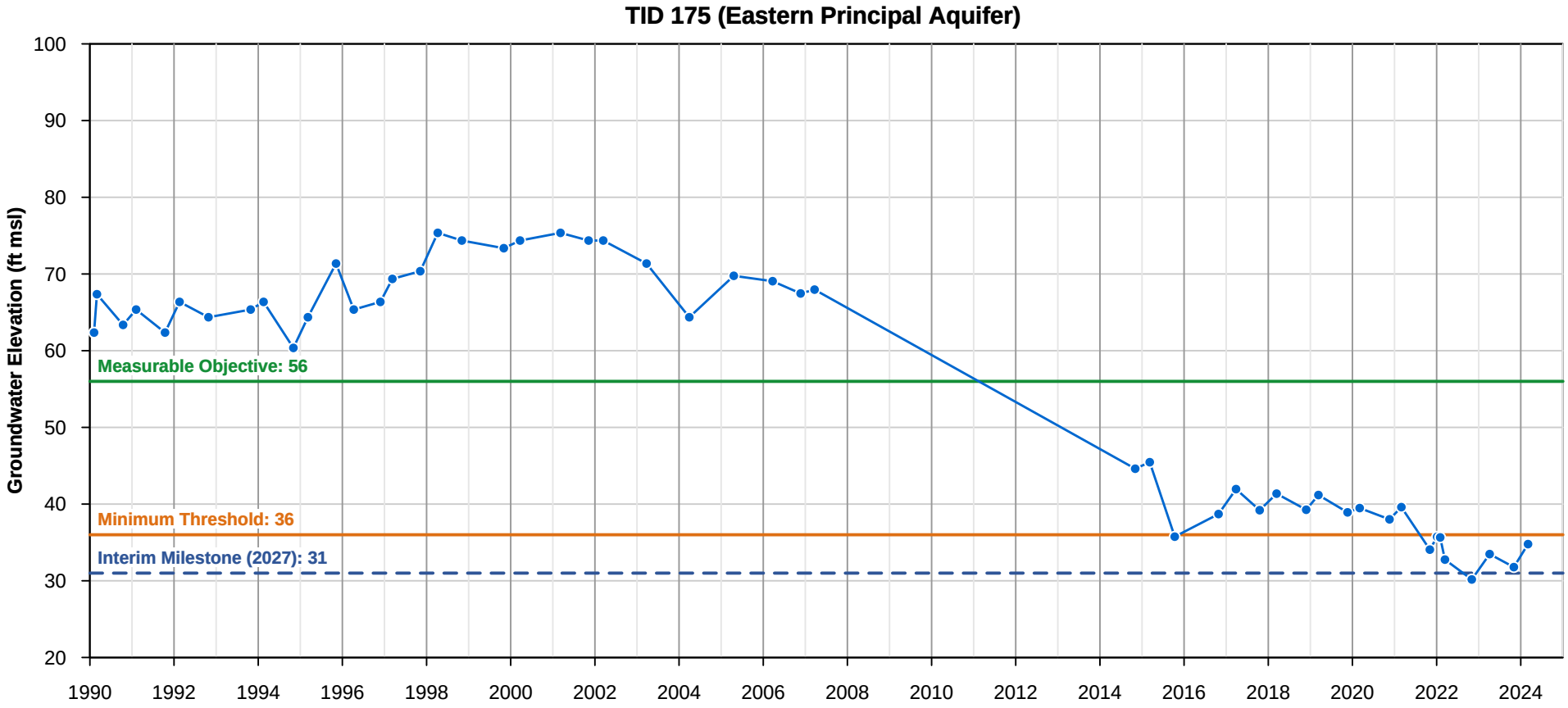


Eastern Principal Aquifer

Well Information

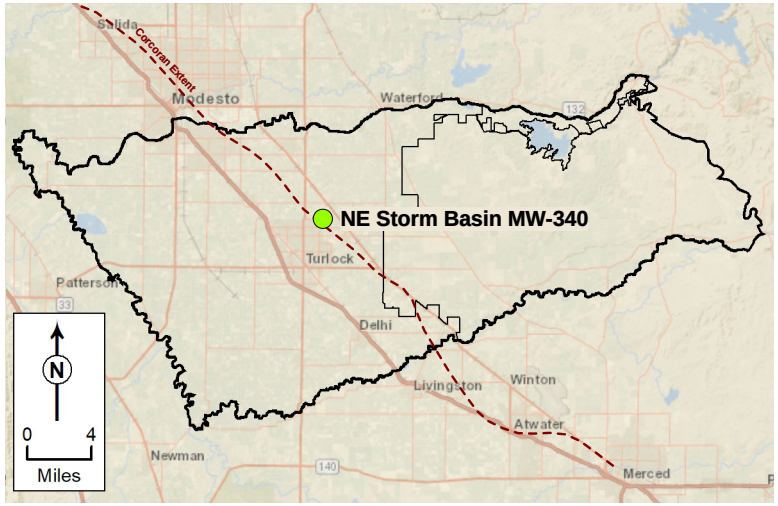
Site Code:	375774N1207702W001
Local Well Name:	TID 175
State Well Name:	04S11E21D001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	5396
Latitude:	37.5774
Longitude:	-120.77
Well Depth (feet bgs):	180
Top Perforation (feet bgs):	36
Bottom Perforation (feet bgs):	120
Ground Surface Elevation:	151.36
Reference Point Elevation:	151.36
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

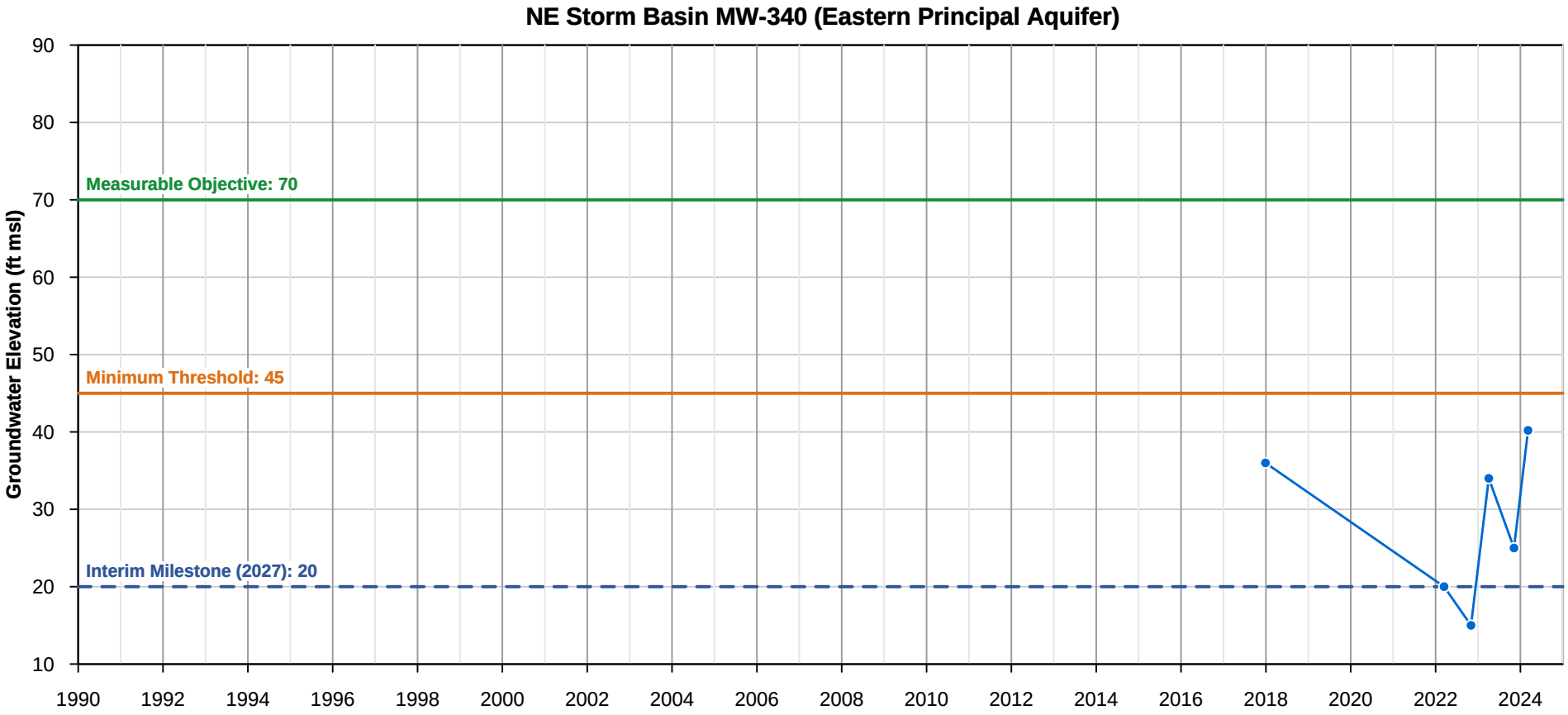




Well Information

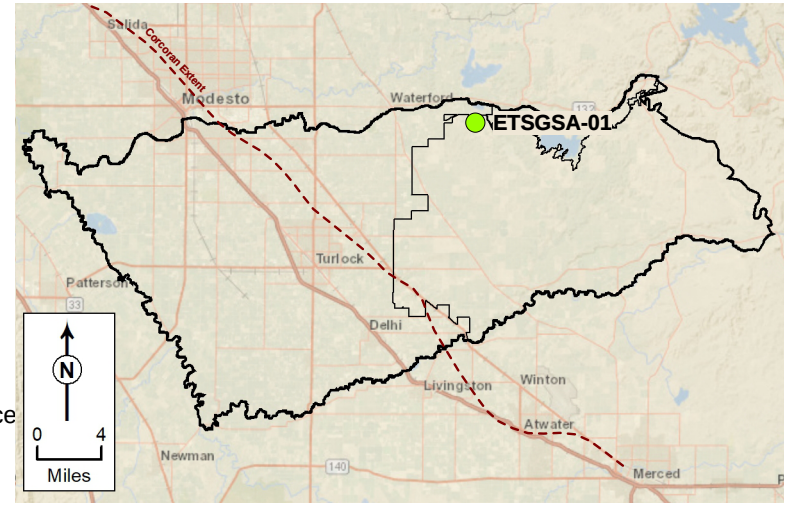
Site Code:	375363N1208260W001
Local Well Name:	NE Storm Basin MW-340
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57323
Latitude:	37.5363
Longitude:	-120.826
Well Depth (feet bgs):	340
Top Perforation (feet bgs):	325
Bottom Perforation (feet bgs):	335
Ground Surface Elevation:	116
Reference Point Elevation:	116
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

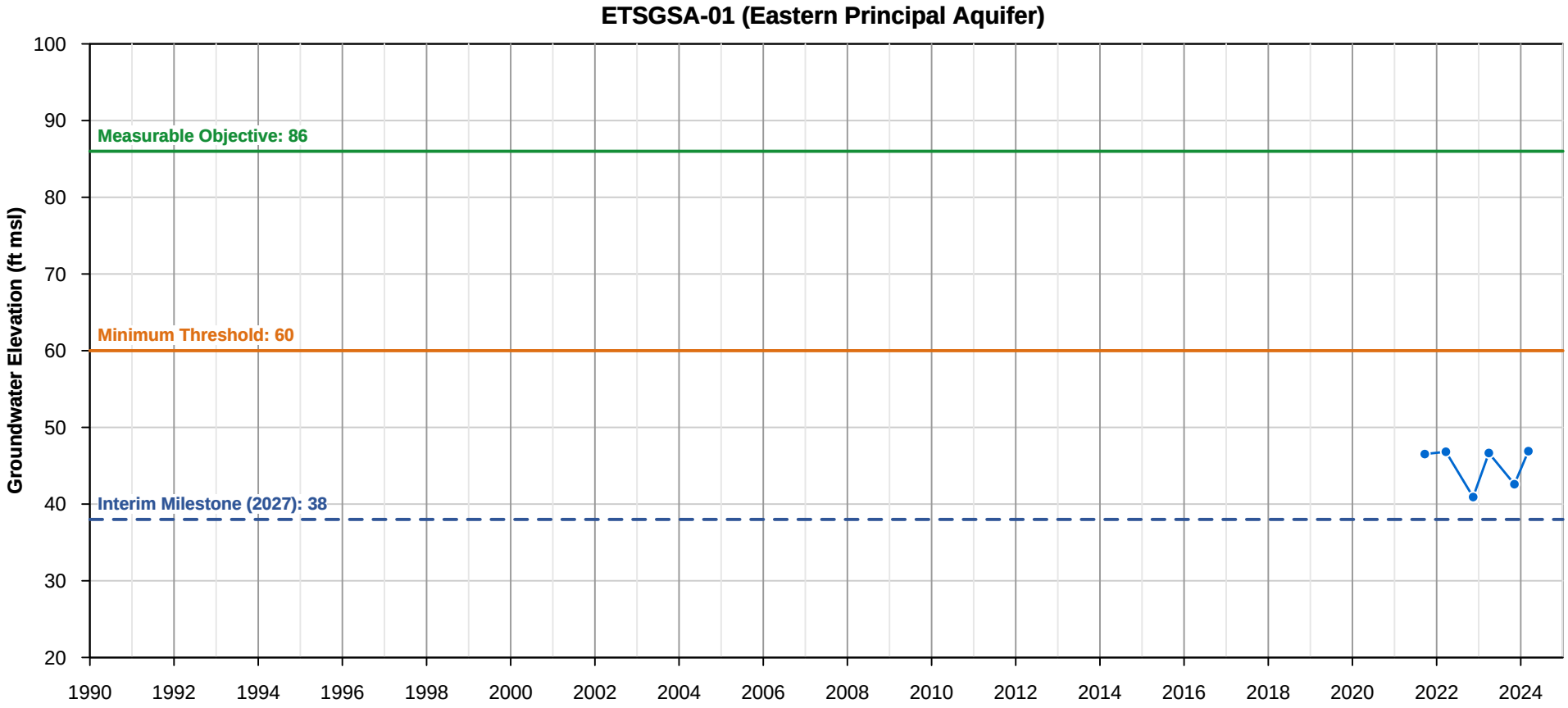




Well Information

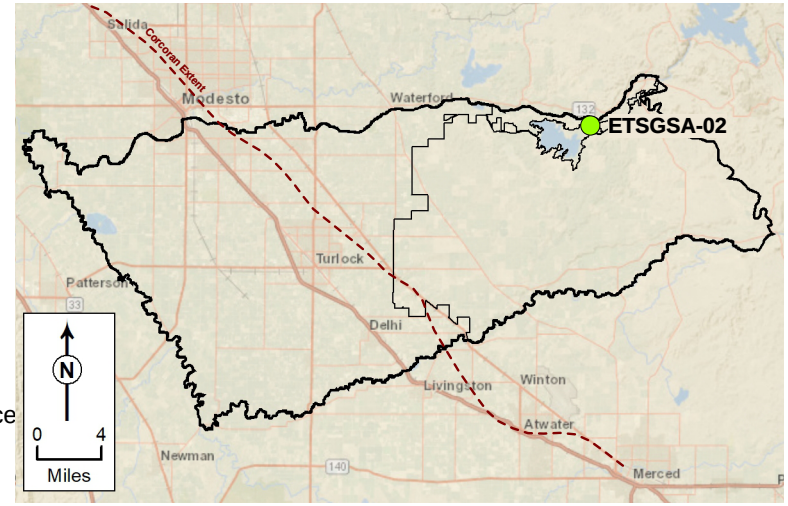
Site Code:	376238N1206641W001
Local Well Name:	ETSGSA-01
State Well Name:	03S12E33N001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57324
Latitude:	37.6238
Longitude:	-120.664
Well Depth (feet bgs):	445
Top Perforation (feet bgs):	223
Bottom Perforation (feet bgs):	445
Ground Surface Elevation:	193.89
Reference Point Elevation:	197.52
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Water,Land Subsidence

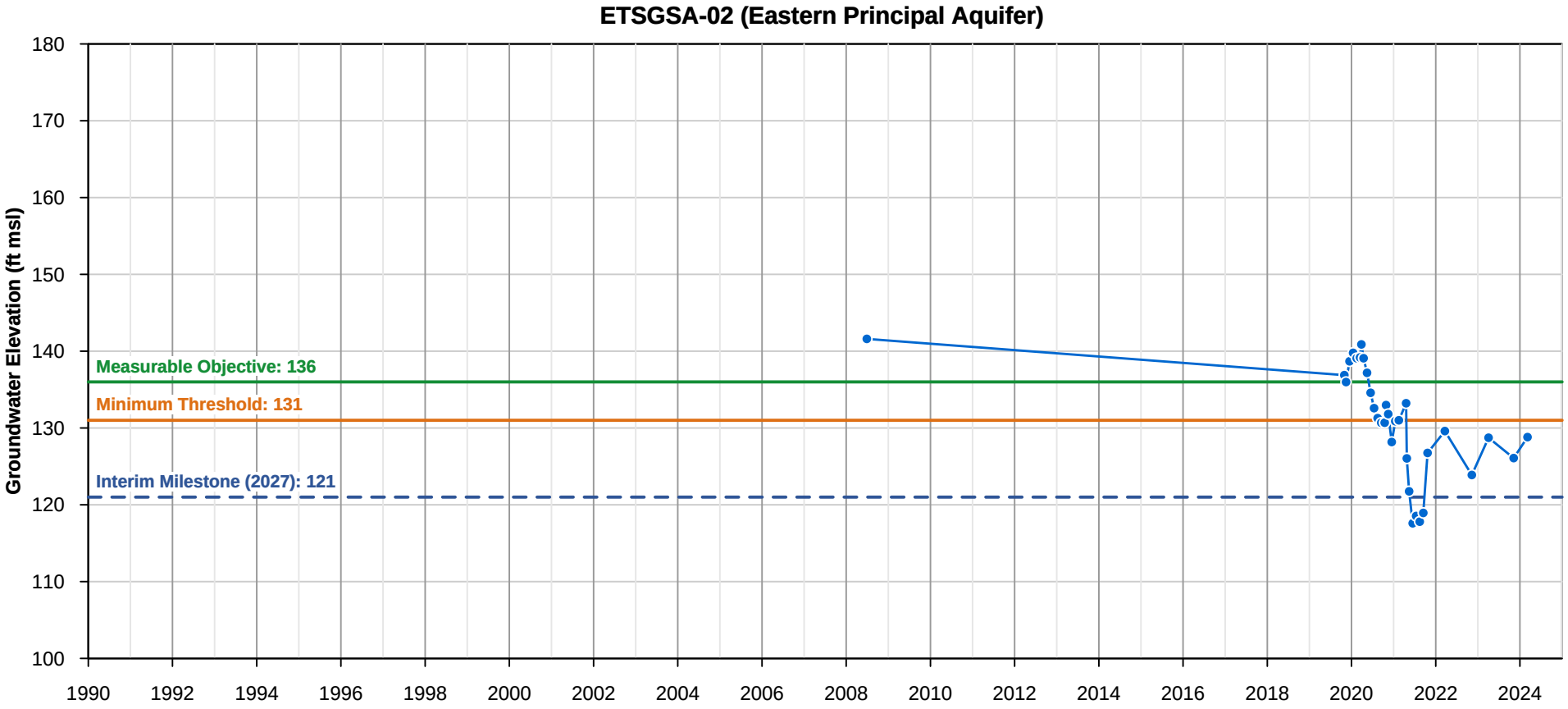




Well Information

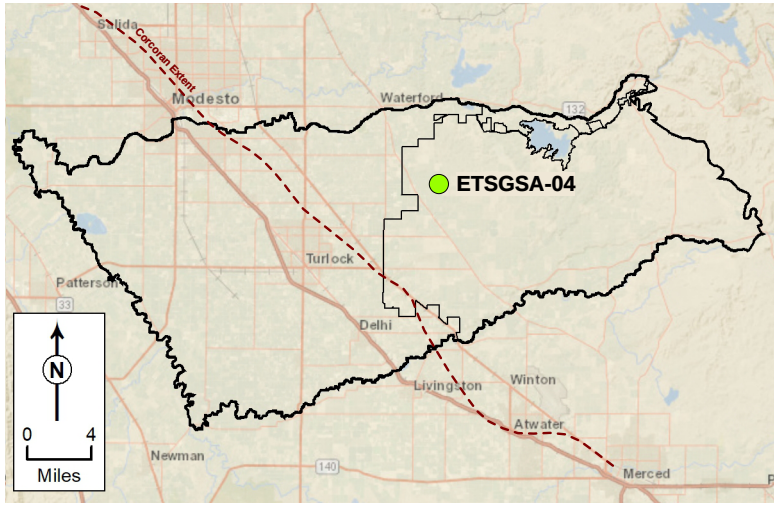
Site Code:	376214N1205321W001
Local Well Name:	ETSGSA-02
State Well Name:	04S13E03D002M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57325
Latitude:	37.6213
Longitude:	-120.533
Well Depth (feet bgs):	350
Top Perforation (feet bgs):	250
Bottom Perforation (feet bgs):	350
Ground Surface Elevation:	248.6
Reference Point Elevation:	249.18
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Water,Land Subsidence

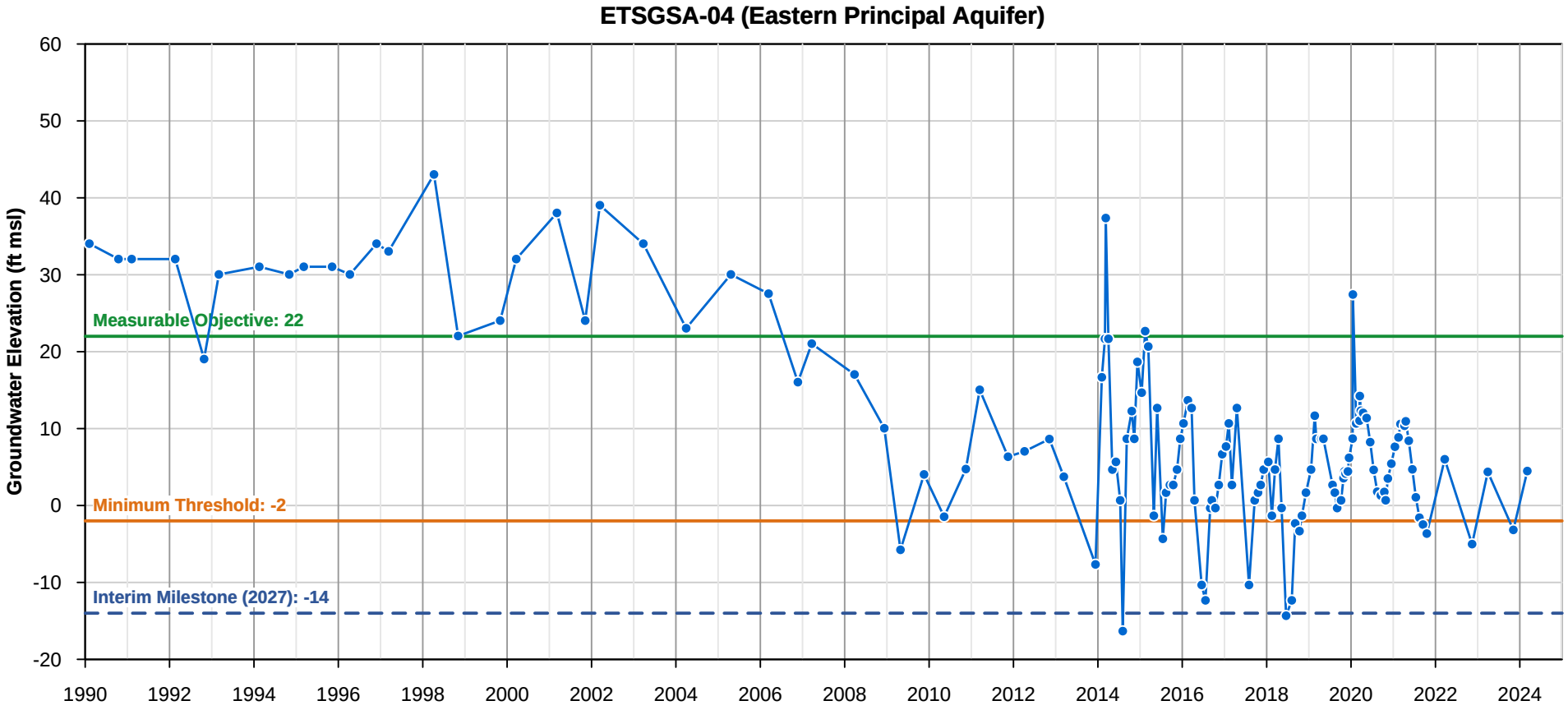




Well Information

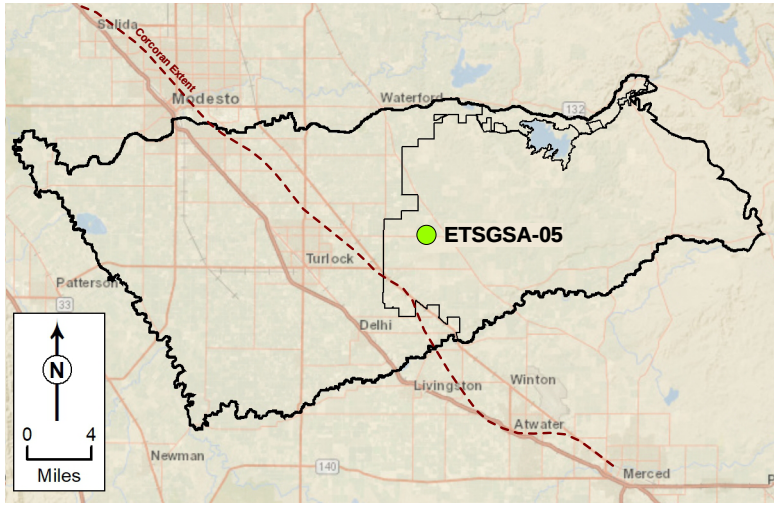
Site Code:	375681N1206945W001
Local Well Name:	ETSGSA-04
State Well Name:	04S12E19P001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57339
Latitude:	37.5681
Longitude:	-120.694
Well Depth (feet bgs):	370
Top Perforation (feet bgs):	90
Bottom Perforation (feet bgs):	370
Ground Surface Elevation:	248.47
Reference Point Elevation:	252.23
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

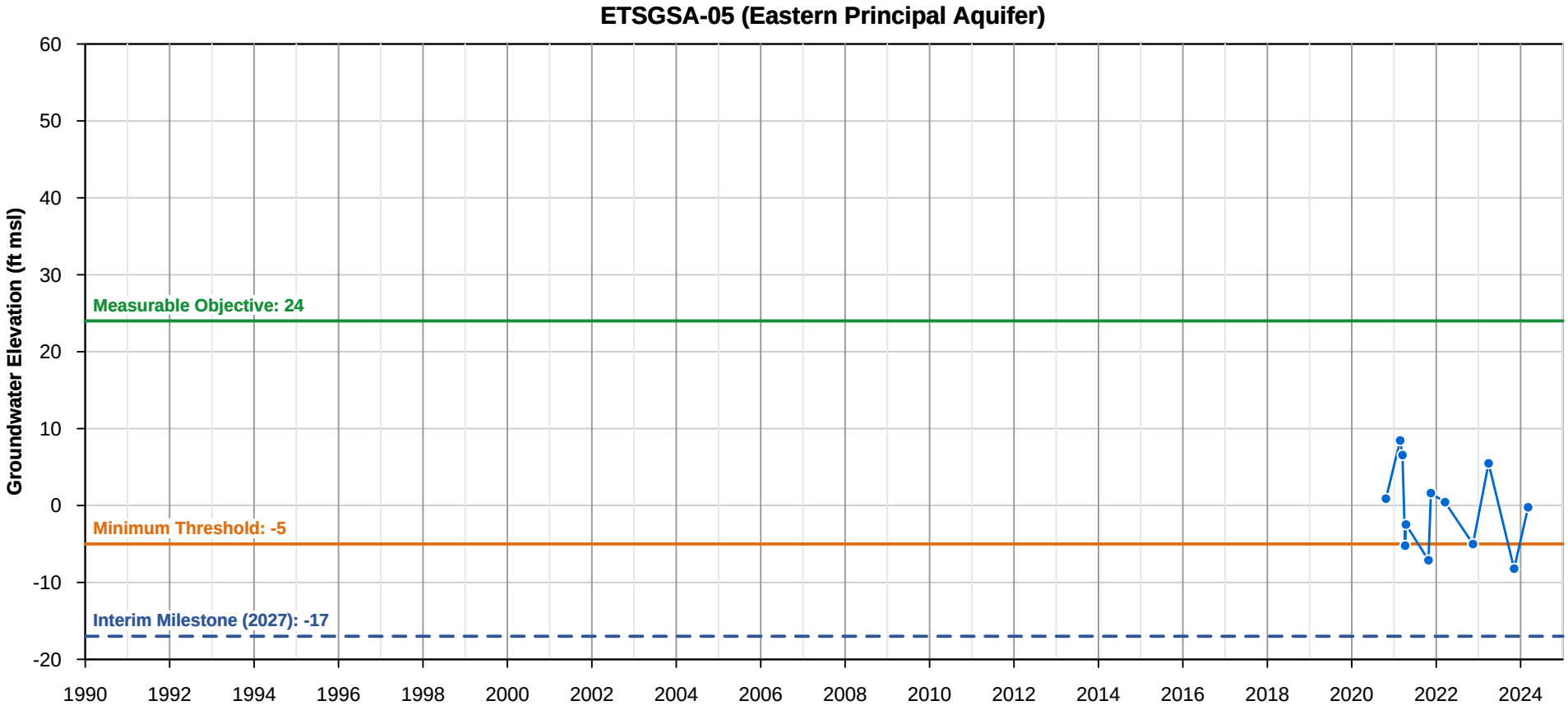




Well Information

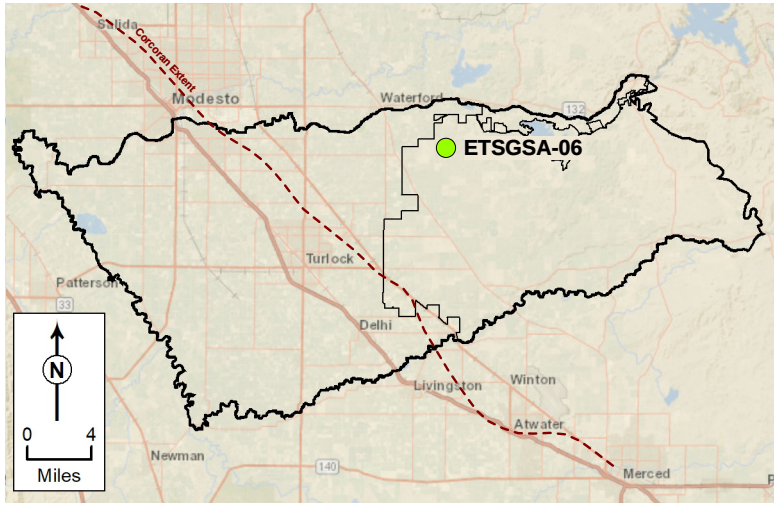
Site Code:	375220N1207076W001
Local Well Name:	ETSGSA-05
State Well Name:	05S11E01Q001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57326
Latitude:	37.522
Longitude:	-120.708
Well Depth (feet bgs):	375
Top Perforation (feet bgs):	275
Bottom Perforation (feet bgs):	375
Ground Surface Elevation:	192.57
Reference Point Elevation:	193.89
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

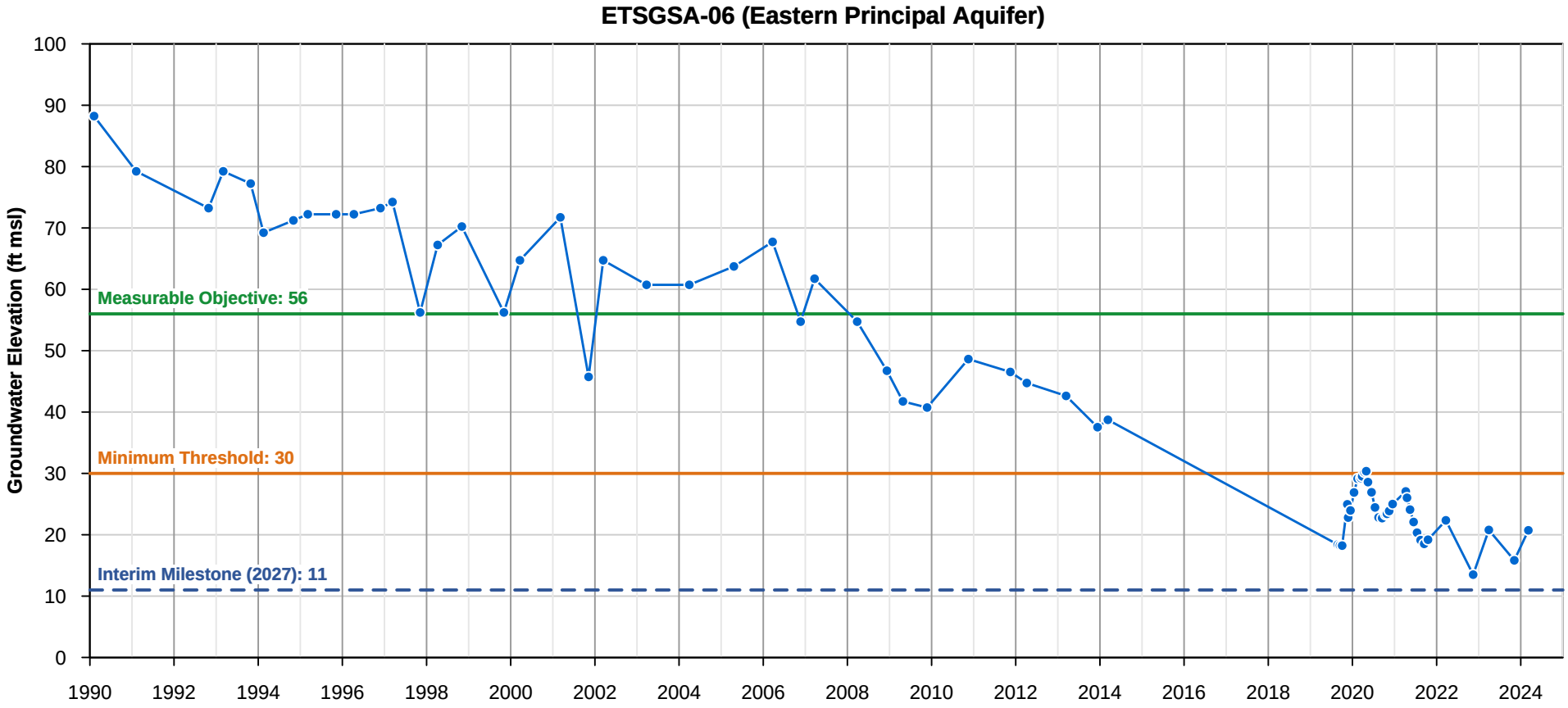




Well Information

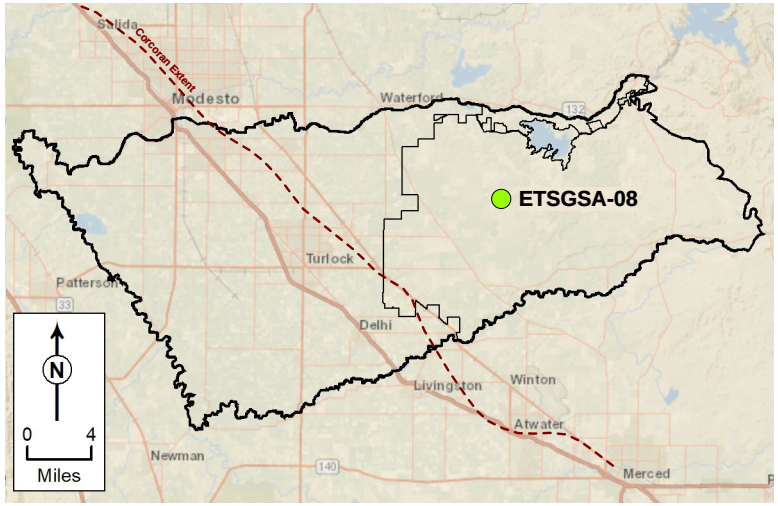
Site Code:	376013N1206863W001
Local Well Name:	ETSGSA-06
State Well Name:	04S12E07J001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	6816
Latitude:	37.6009
Longitude:	-120.686
Well Depth (feet bgs):	375
Top Perforation (feet bgs):	120
Bottom Perforation (feet bgs):	244
Ground Surface Elevation:	191.73
Reference Point Elevation:	195.2
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

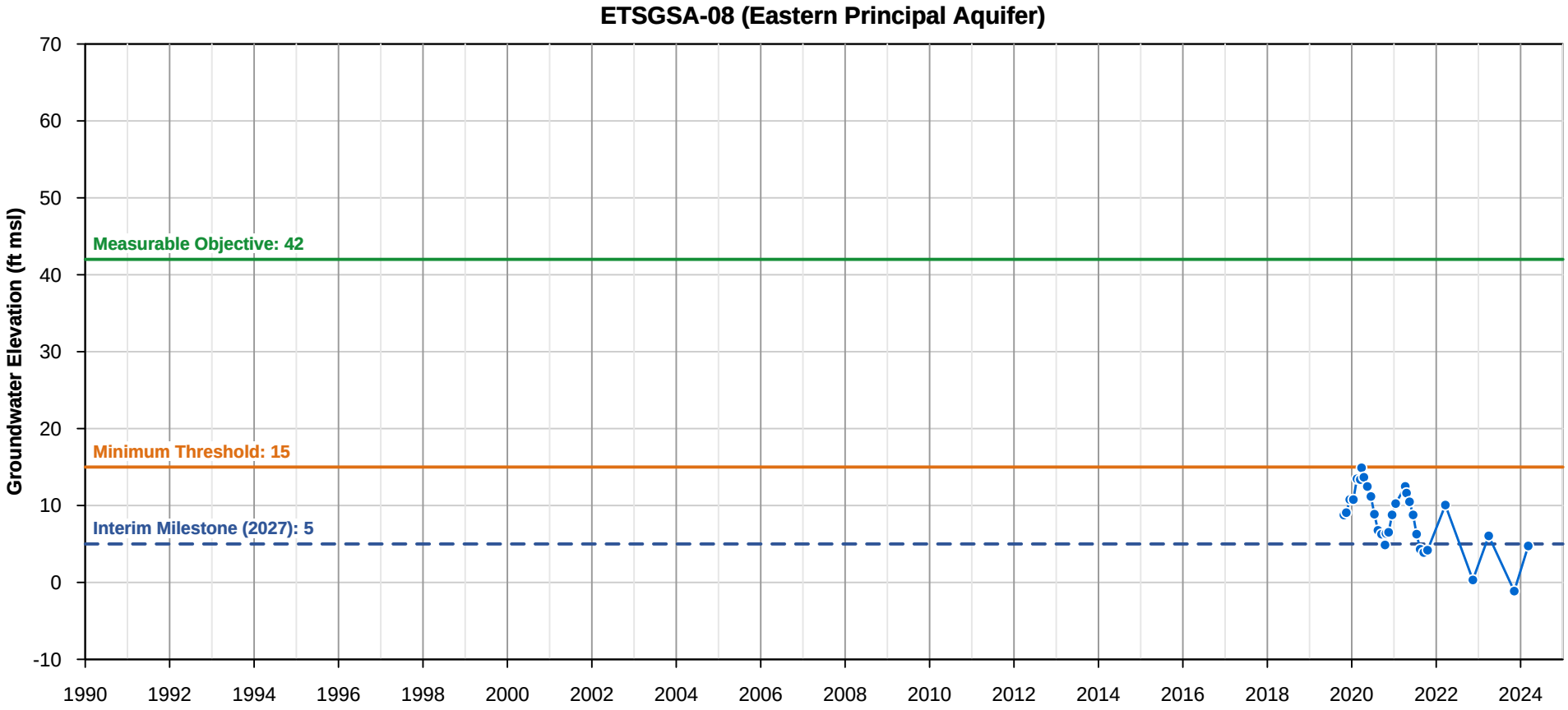




Well Information

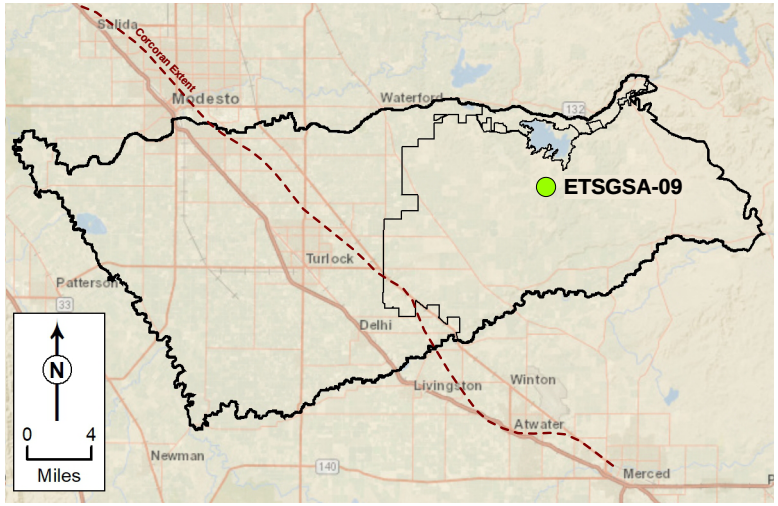
Site Code:	375547N1206273W001
Local Well Name:	ETSGSA-08
State Well Name:	04S12E26M001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57327
Latitude:	37.5547
Longitude:	-120.623
Well Depth (feet bgs):	658
Top Perforation (feet bgs):	188
Bottom Perforation (feet bgs):	474
Ground Surface Elevation:	255.77
Reference Point Elevation:	257.87
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

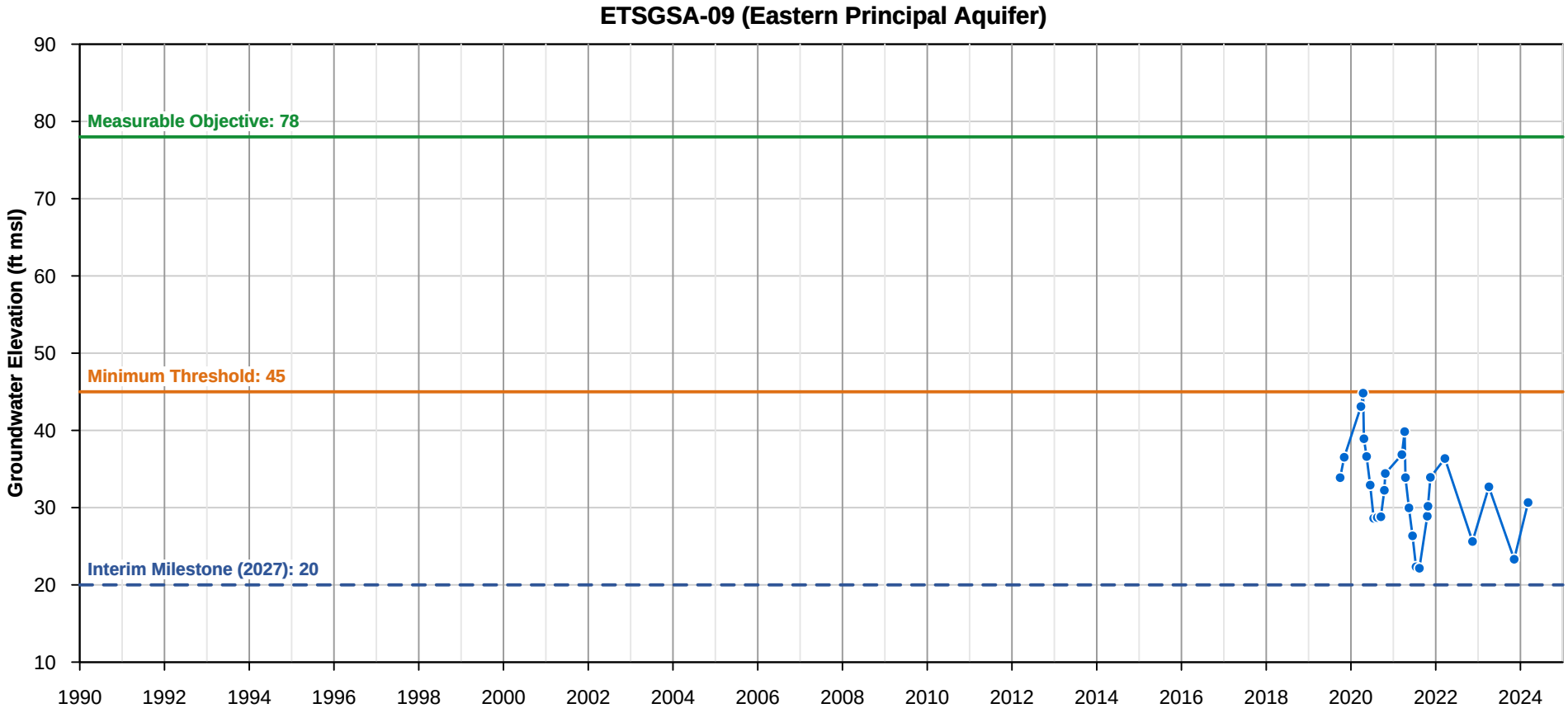




Well Information

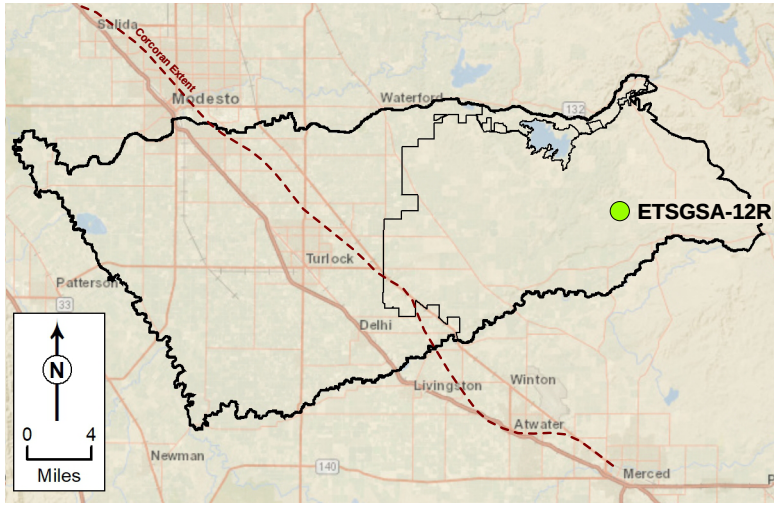
Site Code:	375655N1205721W001
Local Well Name:	ETSGSA-09
State Well Name:	04S13E20N001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57328
Latitude:	37.5656
Longitude:	-120.572
Well Depth (feet bgs):	334
Top Perforation (feet bgs):	180
Bottom Perforation (feet bgs):	330
Ground Surface Elevation:	305.36
Reference Point Elevation:	309.02
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

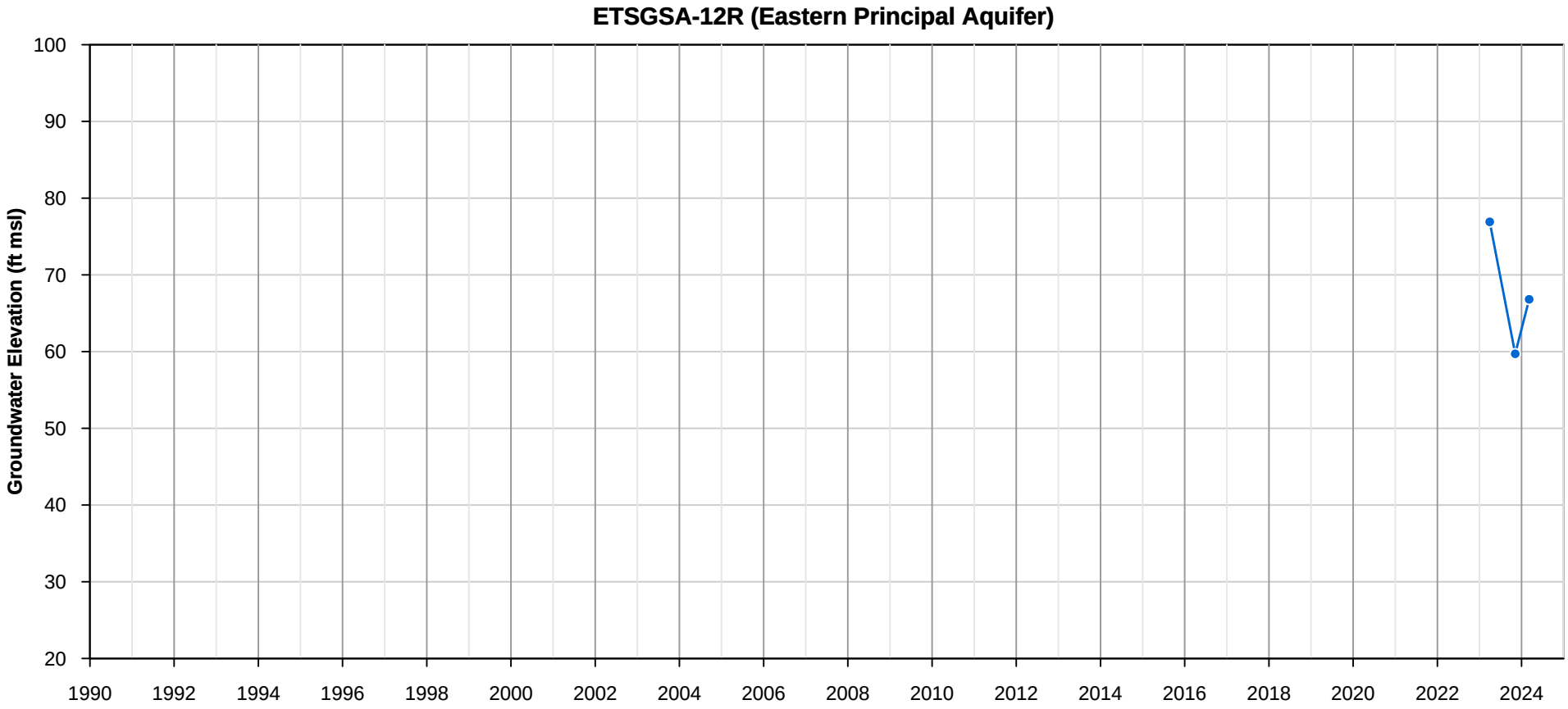




Well Information

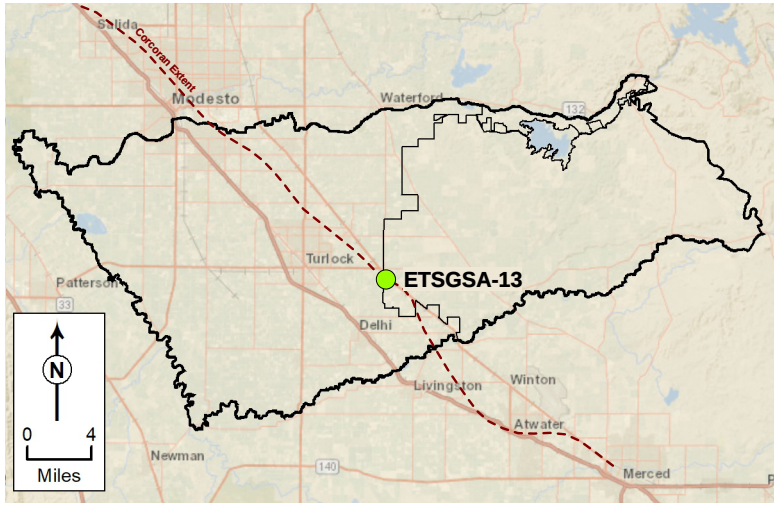
Site Code:	375436N1204878W001
Local Well Name:	ETSGSA-12R
State Well Name:	04S13E36G003M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	59504
Latitude:	37.5437
Longitude:	-120.488
Well Depth (feet bgs):	411
Top Perforation (feet bgs):	292
Bottom Perforation (feet bgs):	411
Ground Surface Elevation:	289.37
Reference Point Elevation:	293.32
Sustainability Indicators:	Groundwater Levels

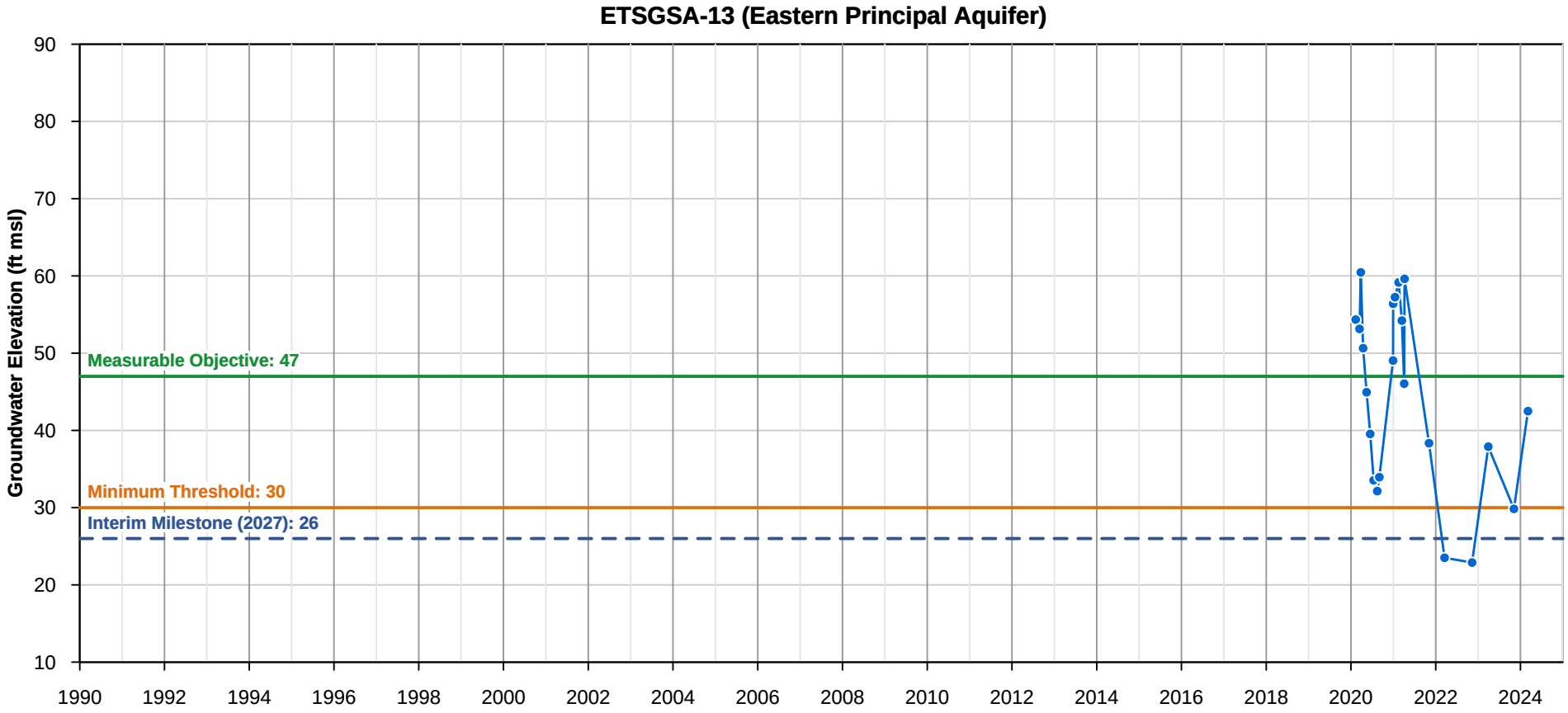




Well Information

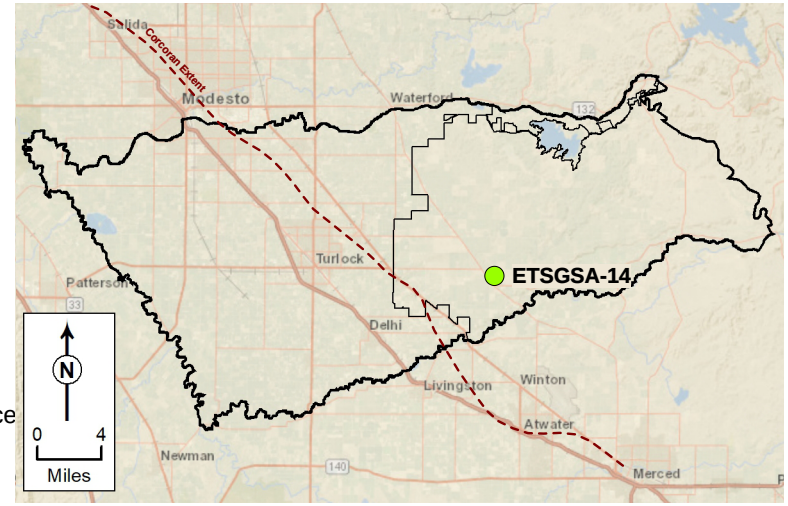
Site Code:	374815N1207537W001
Local Well Name:	ETSGSA-13
State Well Name:	05S11E22M001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57340
Latitude:	37.4815
Longitude:	-120.754
Well Depth (feet bgs):	600
Top Perforation (feet bgs):	300
Bottom Perforation (feet bgs):	600
Ground Surface Elevation:	172.6
Reference Point Elevation:	176.34
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

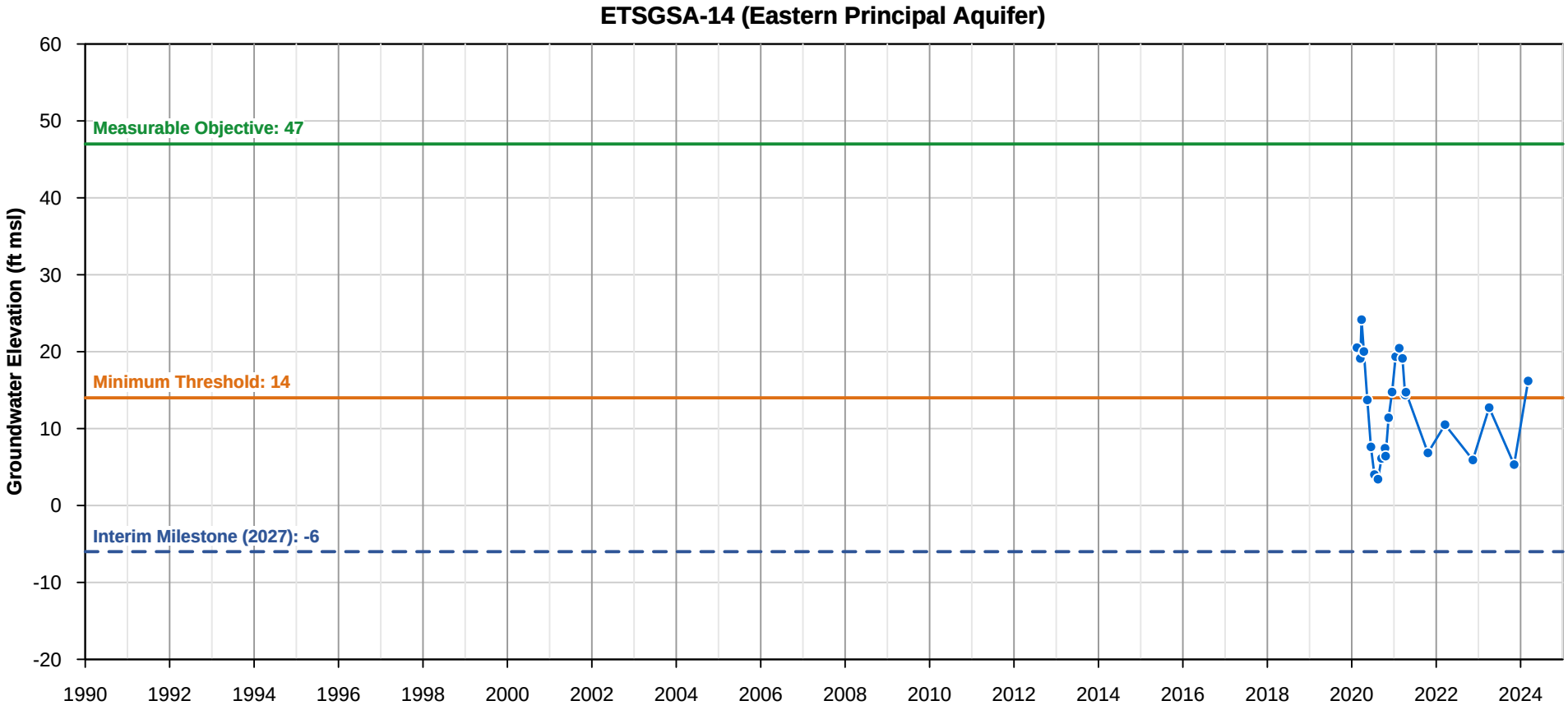




Well Information

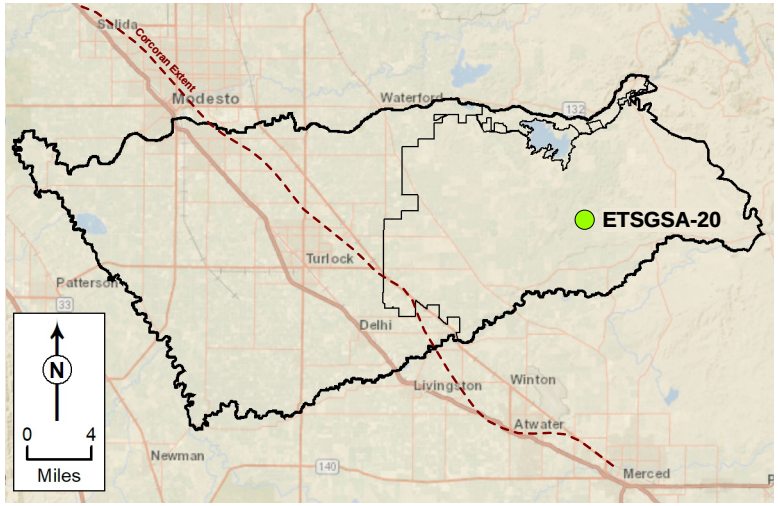
Site Code:	374849N1206425W001
Local Well Name:	ETSGSA-14
State Well Name:	05S12E22F001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57329
Latitude:	37.4849
Longitude:	-120.642
Well Depth (feet bgs):	685
Top Perforation (feet bgs):	187
Bottom Perforation (feet bgs):	685
Ground Surface Elevation:	219.98
Reference Point Elevation:	223.72
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Land Subsidence

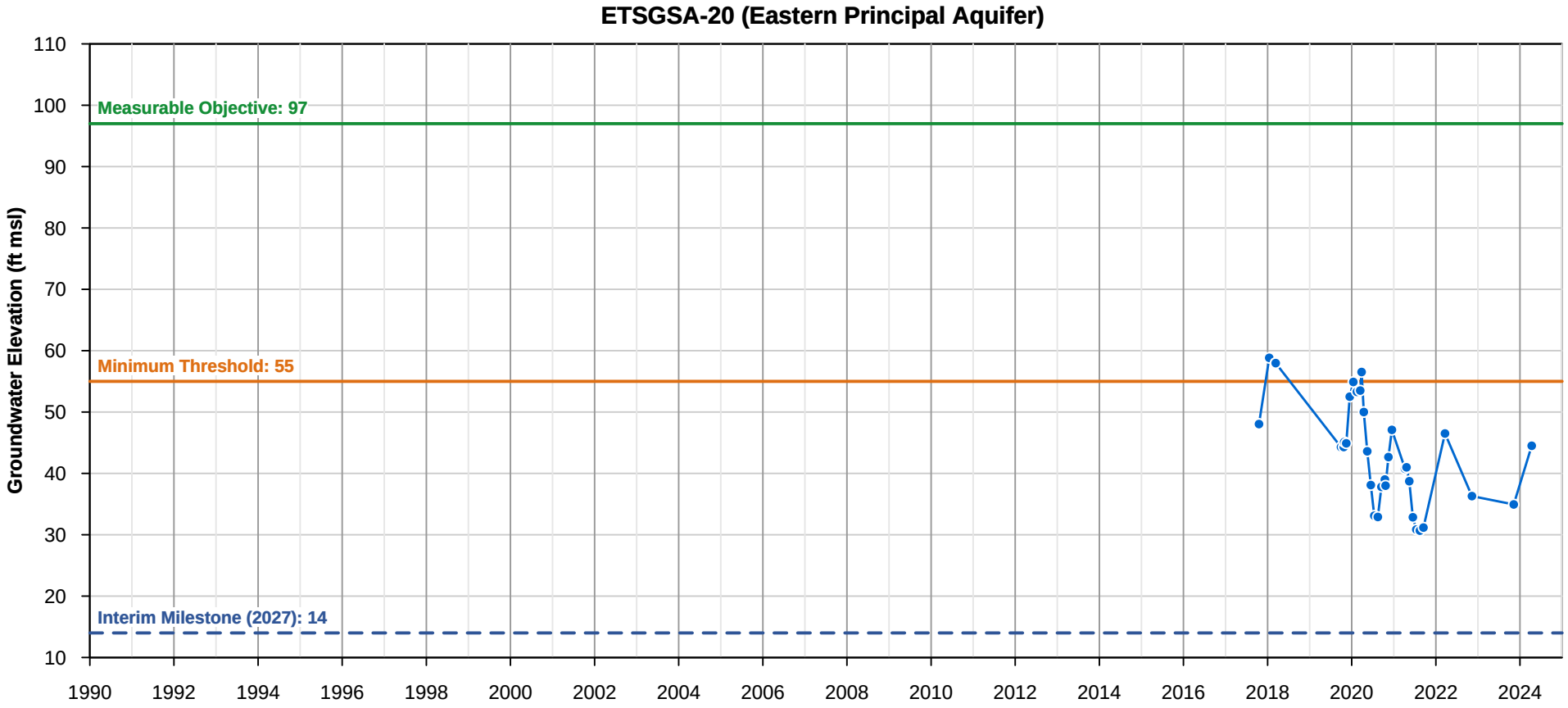




Well Information

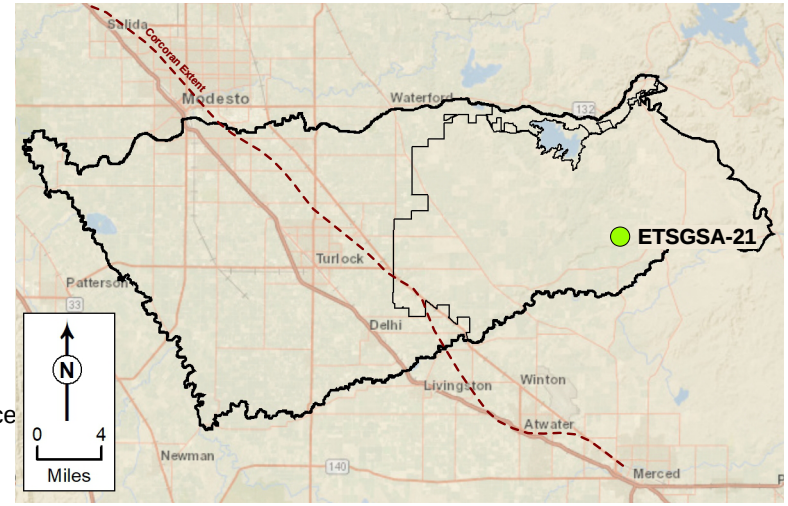
Site Code:	375359N1205282W001
Local Well Name:	ETSGSA-20
State Well Name:	05S13E03B001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57331
Latitude:	37.5359
Longitude:	-120.528
Well Depth (feet bgs):	580
Top Perforation (feet bgs):	125
Bottom Perforation (feet bgs):	580
Ground Surface Elevation:	202
Reference Point Elevation:	205.7
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

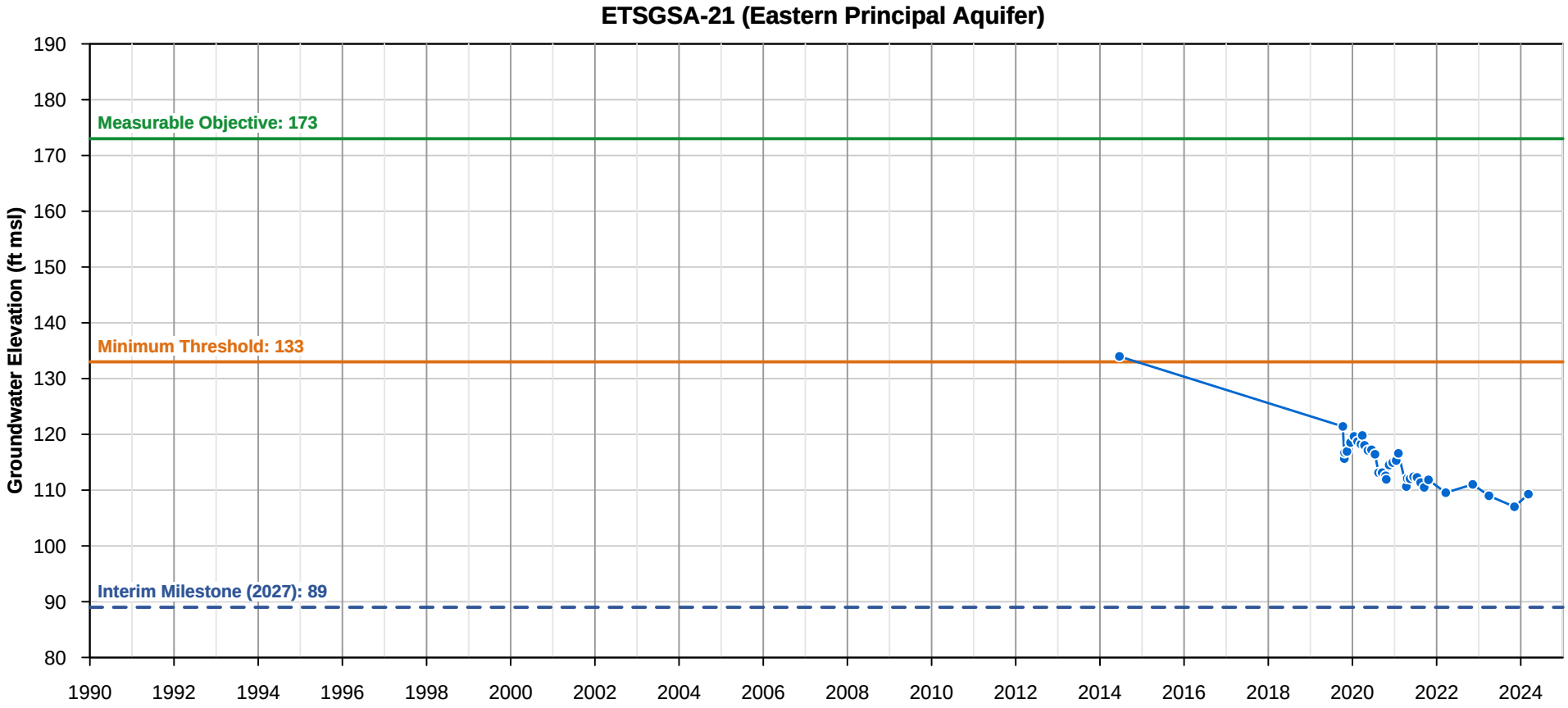




Well Information

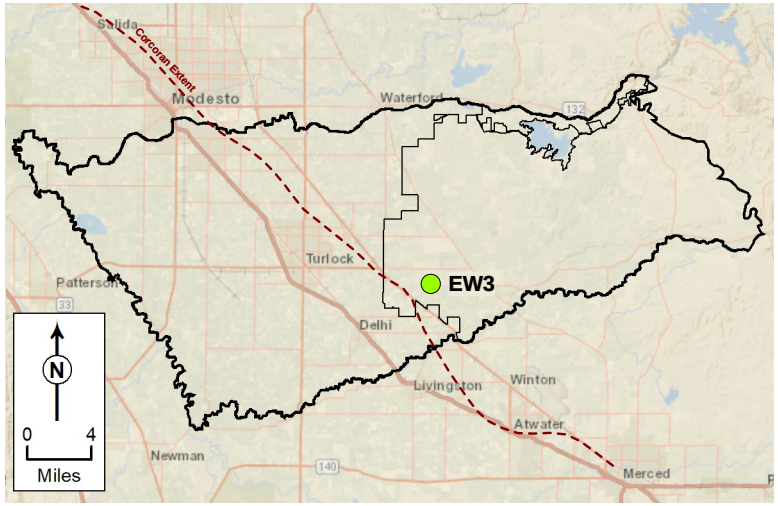
Site Code:	375205N1204989W001
Local Well Name:	ETSGSA-21
State Well Name:	05S13E12D001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57332
Latitude:	37.5206
Longitude:	-120.499
Well Depth (feet bgs):	283
Top Perforation (feet bgs):	57
Bottom Perforation (feet bgs):	283
Ground Surface Elevation:	300.97
Reference Point Elevation:	304.73
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Land Subsidence

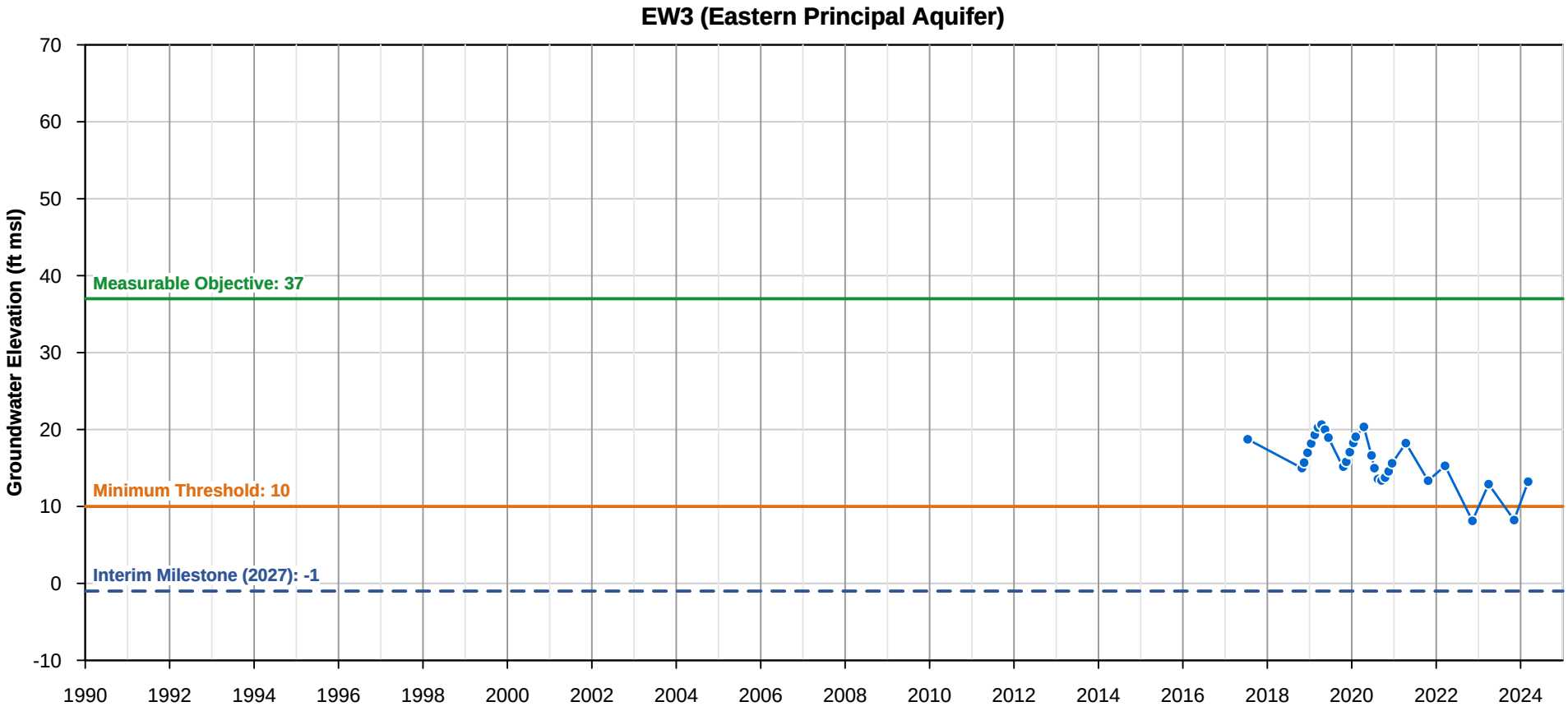




Well Information

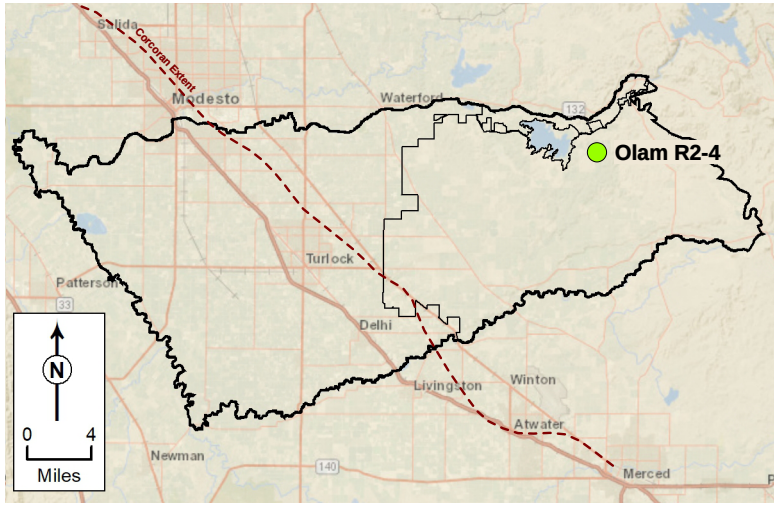
Site Code:	374775N1207029W001
Local Well Name:	EW3
State Well Name:	05S12E19N001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57334
Latitude:	37.4776
Longitude:	-120.703
Well Depth (feet bgs):	170
Top Perforation (feet bgs):	130
Bottom Perforation (feet bgs):	170
Ground Surface Elevation:	161.23
Reference Point Elevation:	163.73
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

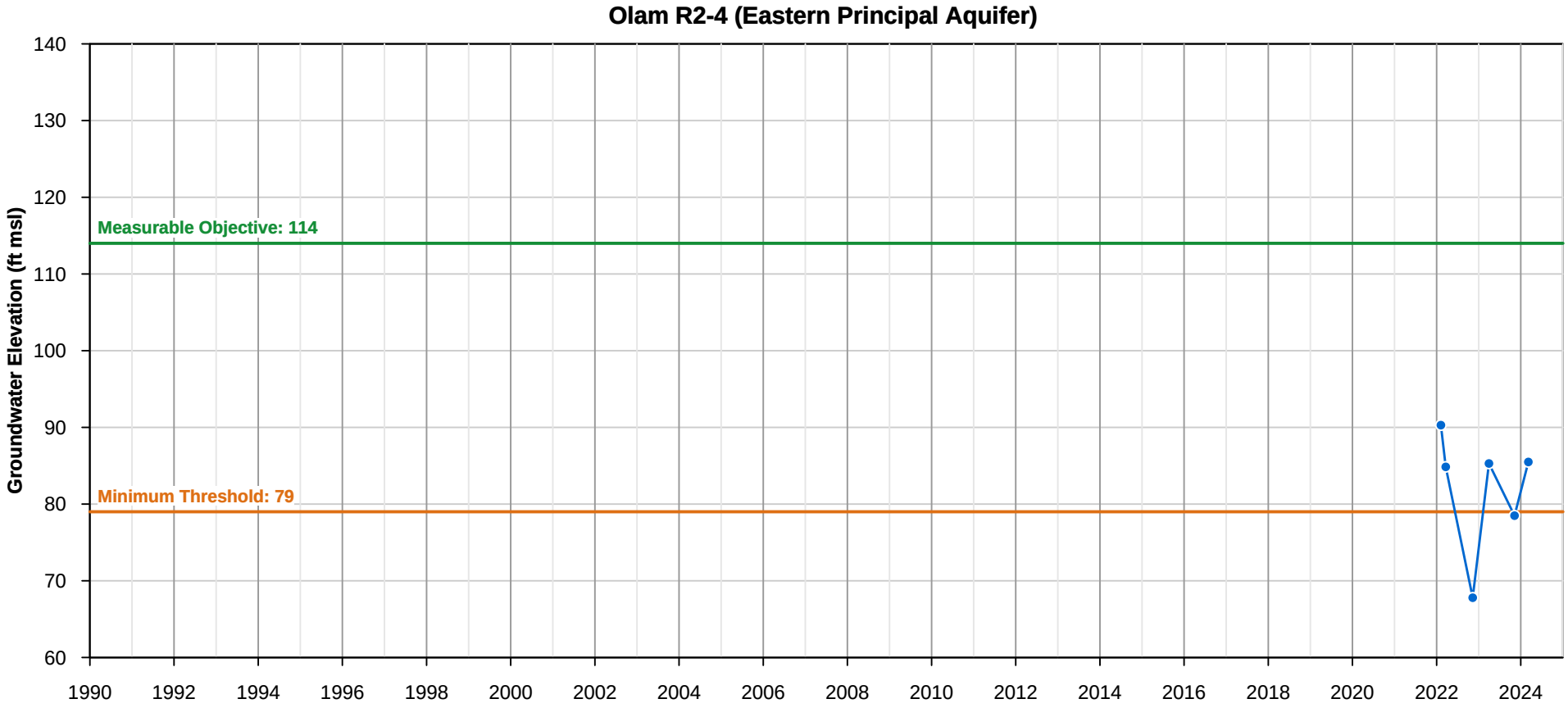




Well Information

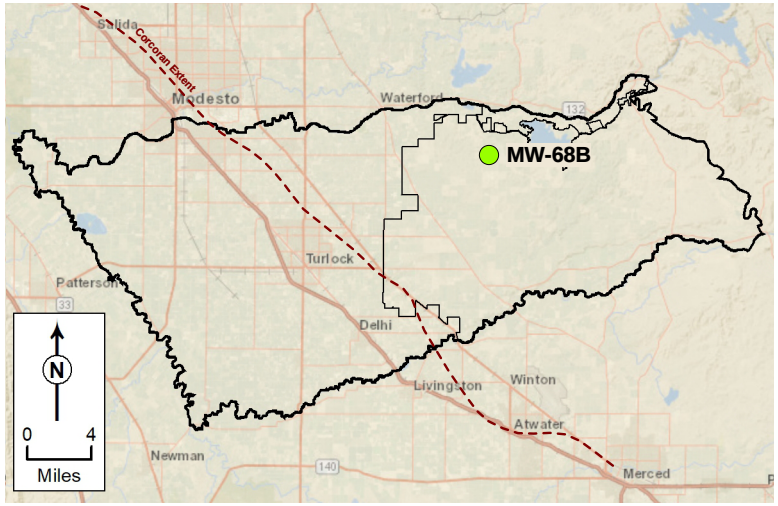
Site Code:	375969N1205138W001
Local Well Name:	Olam R2-4
State Well Name:	04S13E11N001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57335
Latitude:	37.597
Longitude:	-120.514
Well Depth (feet bgs):	1680
Top Perforation (feet bgs):	445
Bottom Perforation (feet bgs):	1680
Ground Surface Elevation:	253.17
Reference Point Elevation:	254.29
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

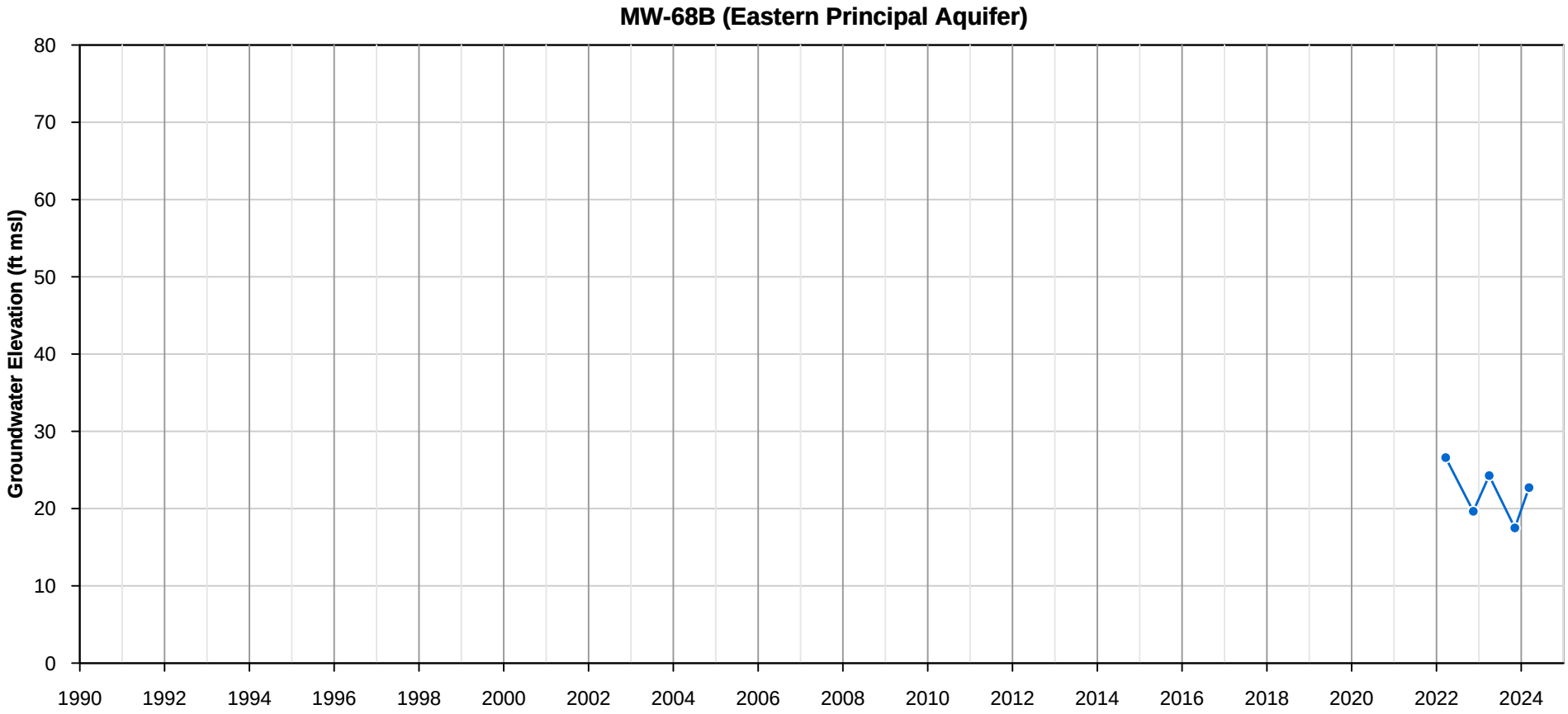




Well Information

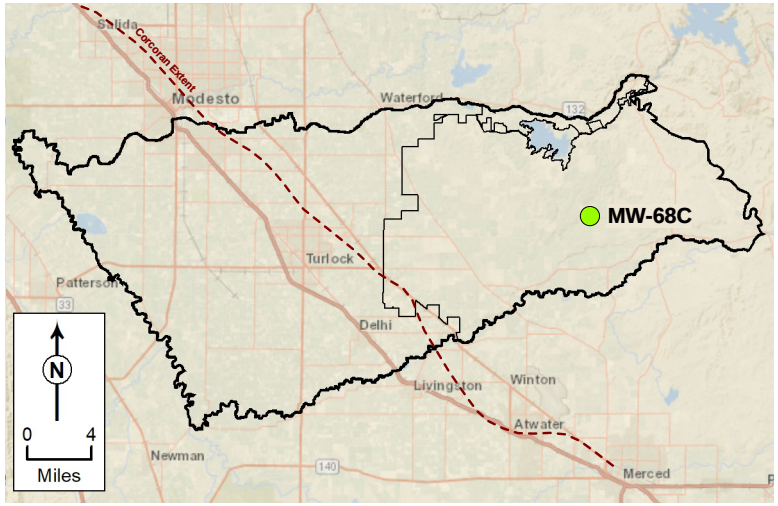
Site Code:	375946N1206458W001
Local Well Name:	MW-68B
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57367
Latitude:	37.5945
Longitude:	-120.637
Well Depth (feet bgs):	395
Top Perforation (feet bgs):	332
Bottom Perforation (feet bgs):	342
Ground Surface Elevation:	203.29
Reference Point Elevation:	205.05
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

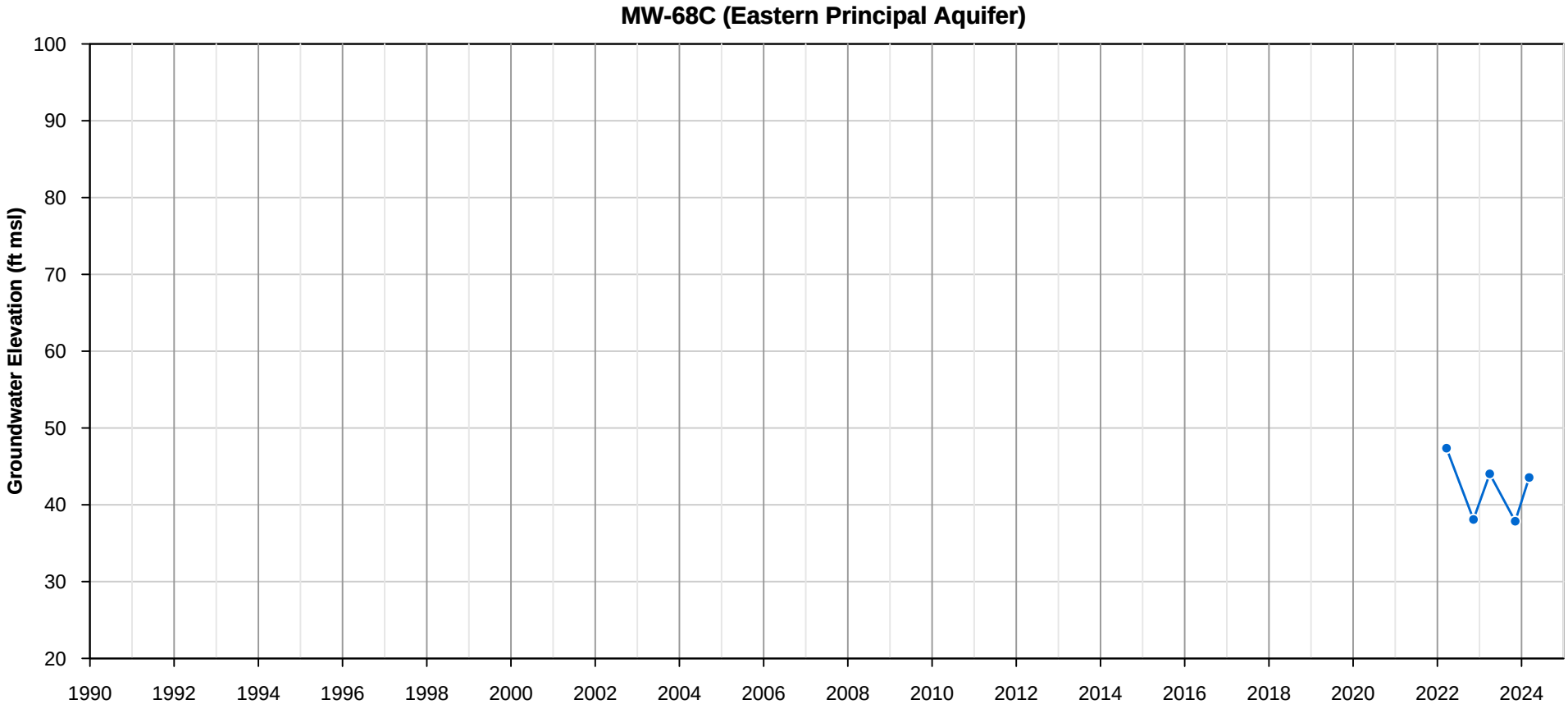




Well Information

Site Code:	375392N1205219W001
Local Well Name:	MW-68C
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57368
Latitude:	37.5392
Longitude:	-120.522
Well Depth (feet bgs):	195
Top Perforation (feet bgs):	180
Bottom Perforation (feet bgs):	190
Ground Surface Elevation:	200.5
Reference Point Elevation:	201.89
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Land Subsidence

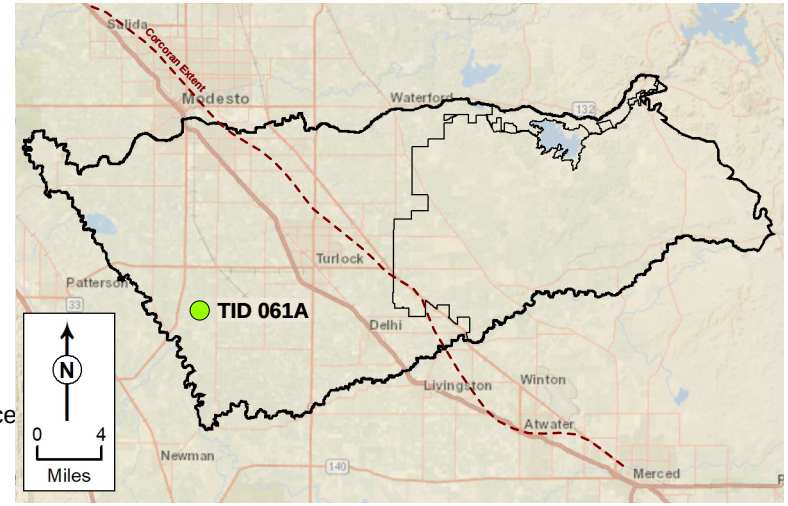


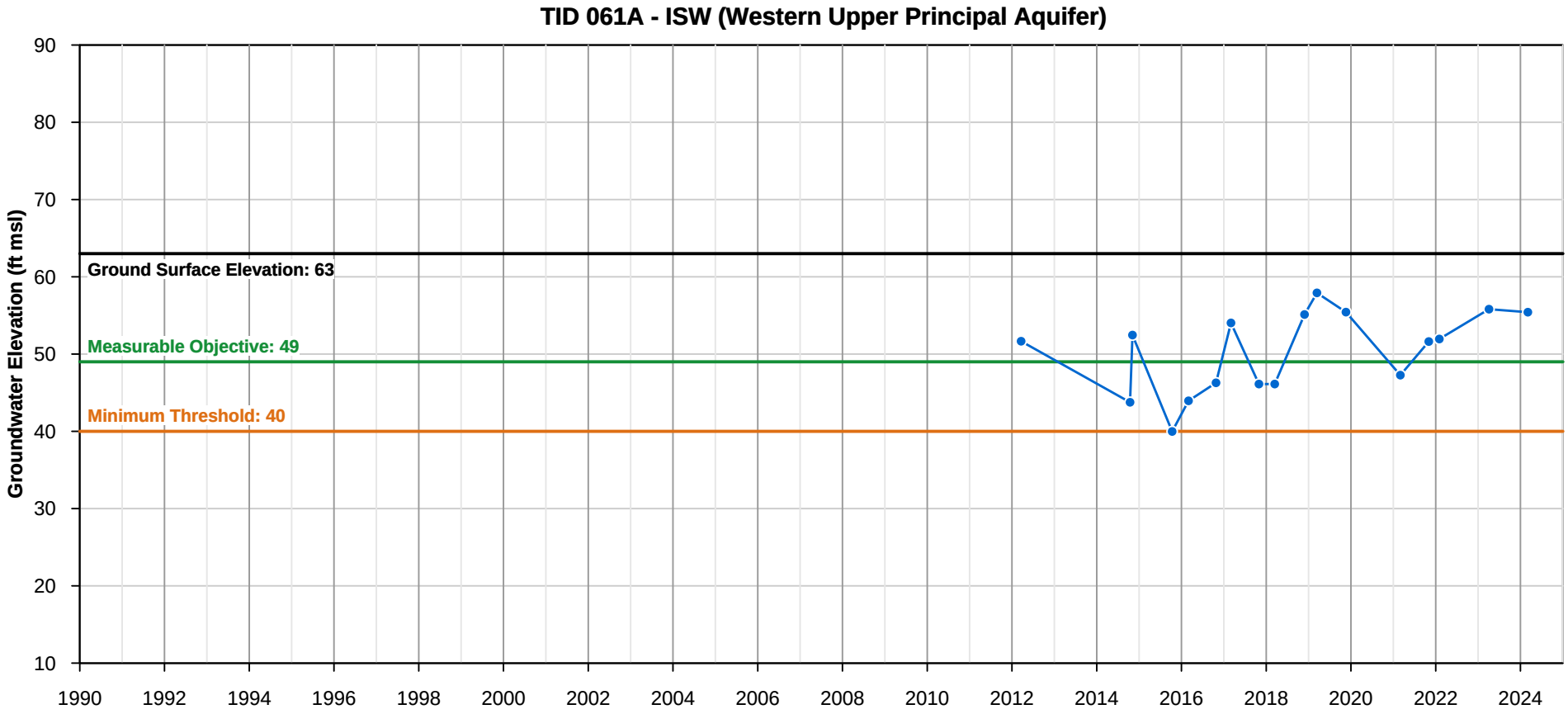


Interconnected Surface Water

Well Information

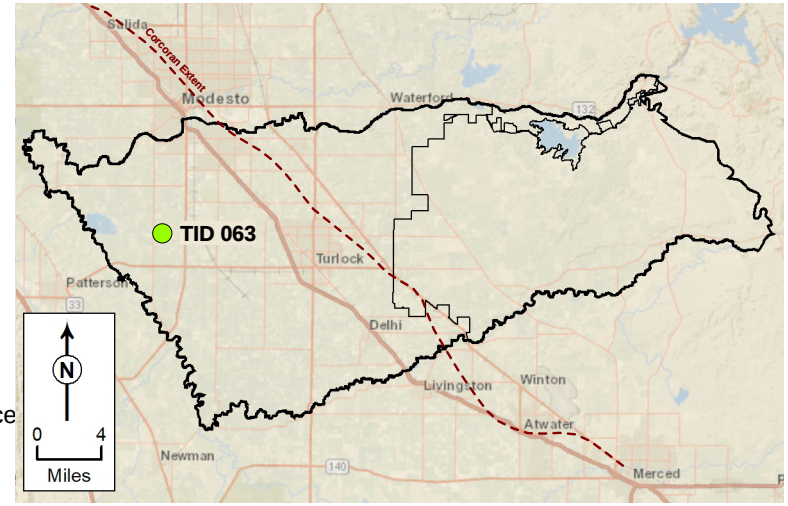
Site Code:	374527N1209768W001
Local Well Name:	TID 061A
State Well Name:	05S09E33R001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	5643
Latitude:	37.4527
Longitude:	-120.977
Well Depth (feet bgs):	225
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	195
Ground Surface Elevation:	63
Reference Point Elevation:	64.61
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Water,Land Subsidence

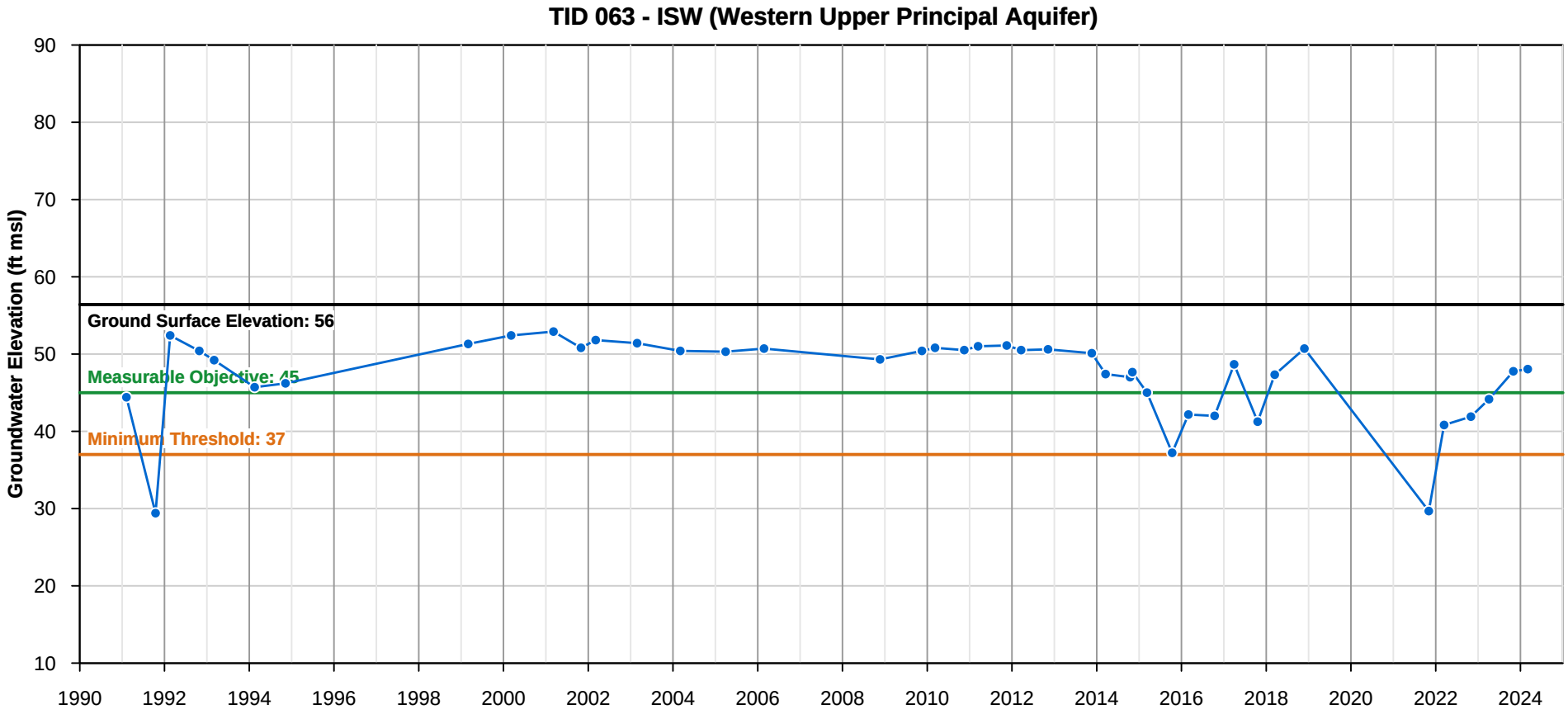




Well Information

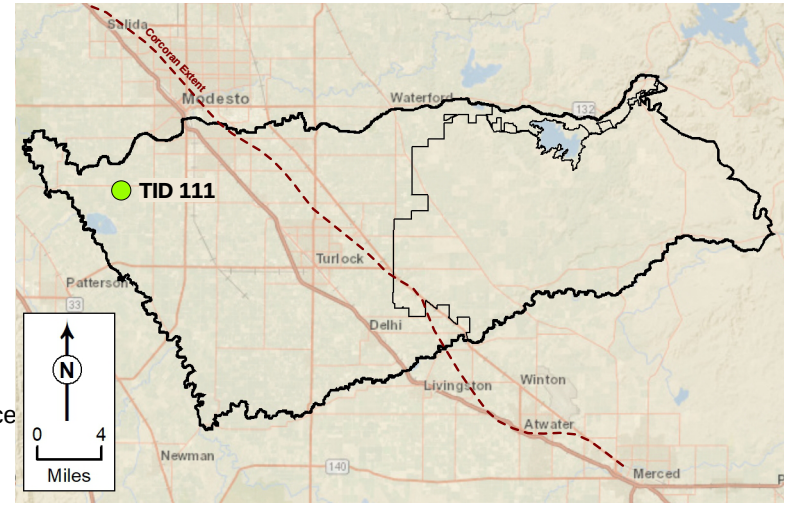
Site Code:	375224N1210196W001
Local Well Name:	TID 063
State Well Name:	05S09E07B001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	4935
Latitude:	37.5224
Longitude:	-121.02
Well Depth (feet bgs):	110
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	71
Ground Surface Elevation:	56.41
Reference Point Elevation:	56.41
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Land Subsidence

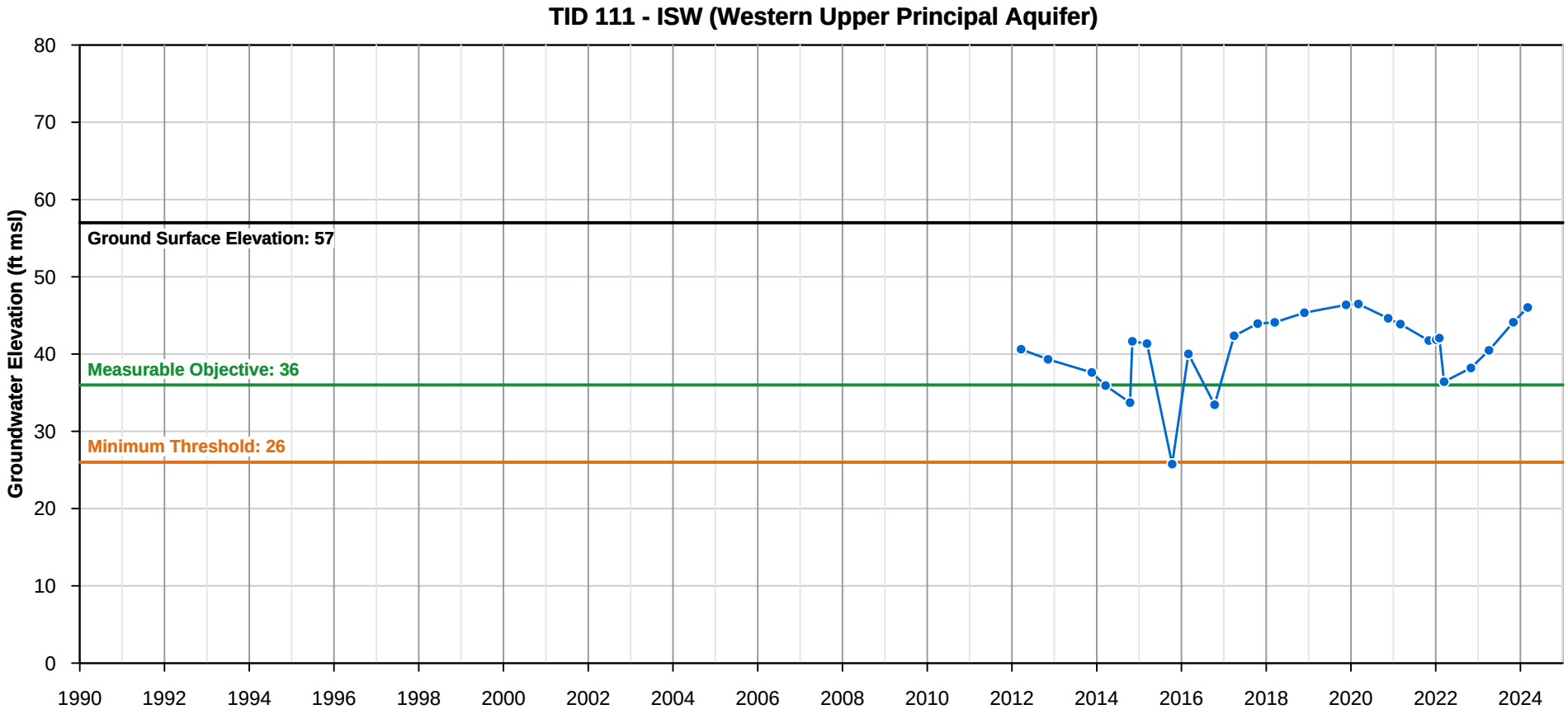




Well Information

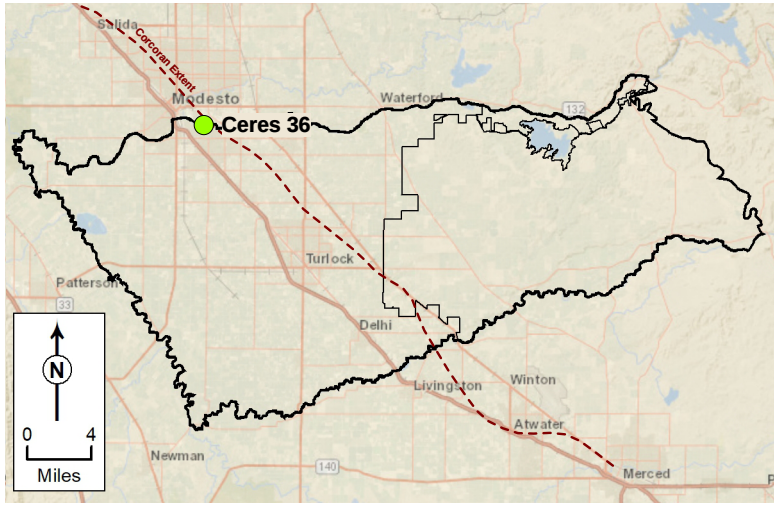
Site Code:	375607N1210671W001
Local Well Name:	TID 111
State Well Name:	04S08E27H001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	2176
Latitude:	37.5611
Longitude:	-121.067
Well Depth (feet bgs):	212
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	164
Ground Surface Elevation:	57
Reference Point Elevation:	60.1
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Land Subsidence

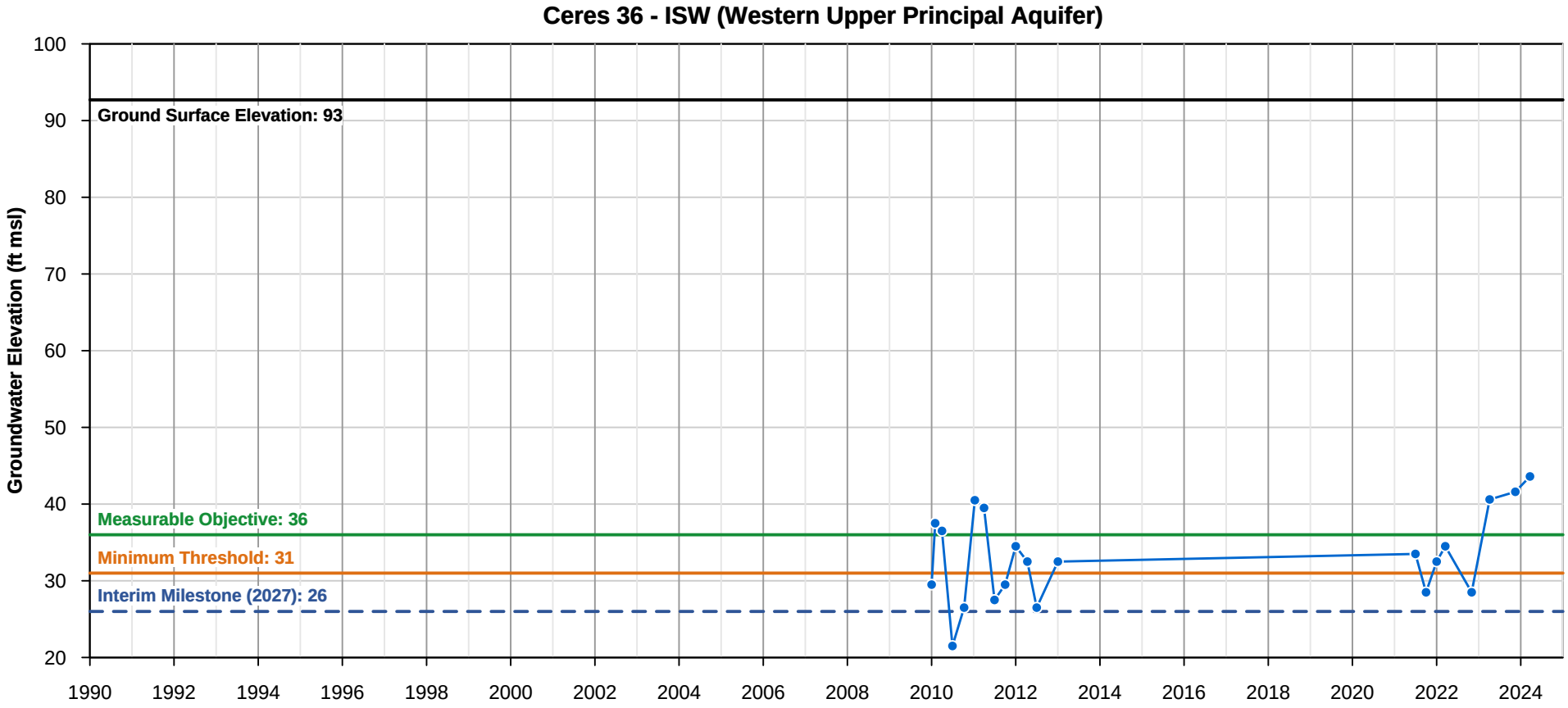




Well Information

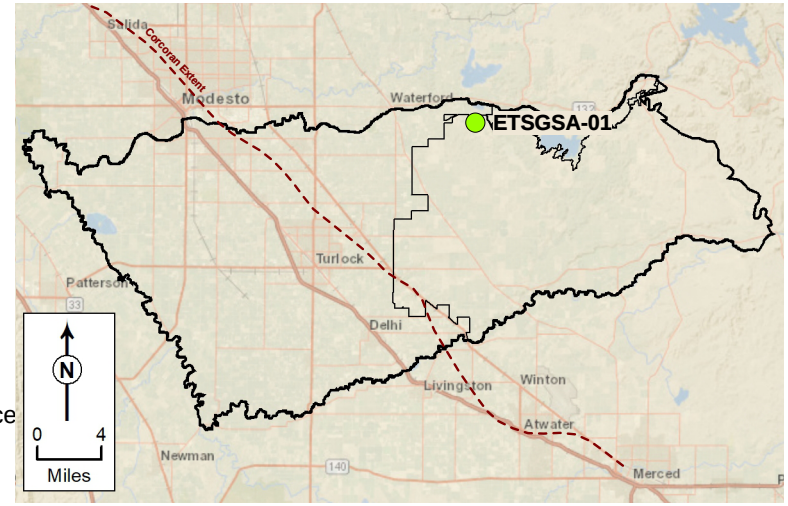
Site Code:	376208N1209616W001
Local Well Name:	Ceres 36
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	57314
Latitude:	37.6208
Longitude:	-120.962
Well Depth (feet bgs):	230
Top Perforation (feet bgs):	120
Bottom Perforation (feet bgs):	230
Ground Surface Elevation:	92.7
Reference Point Elevation:	94.6
Sustainability Indicators:	Groundwater Levels,Interconnected Surface Waters

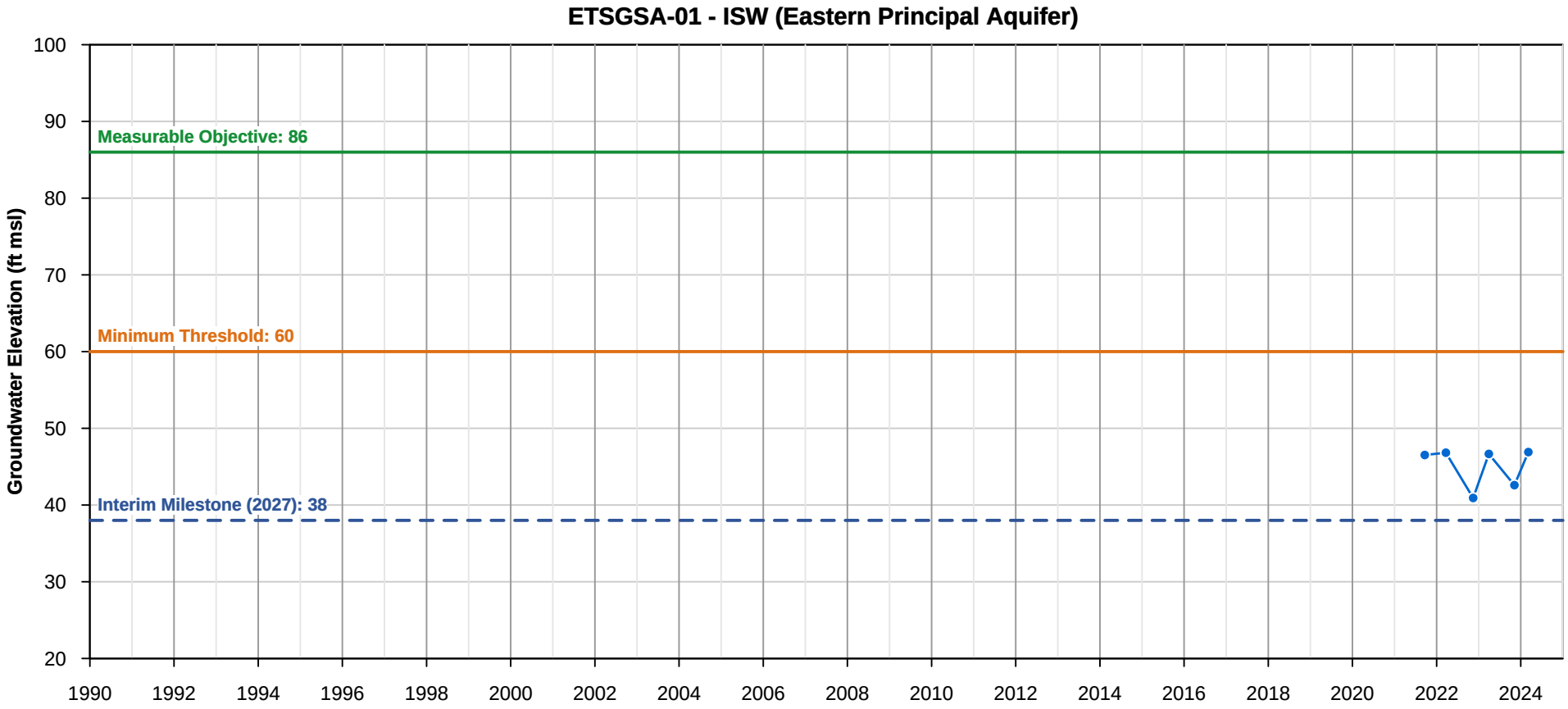




Well Information

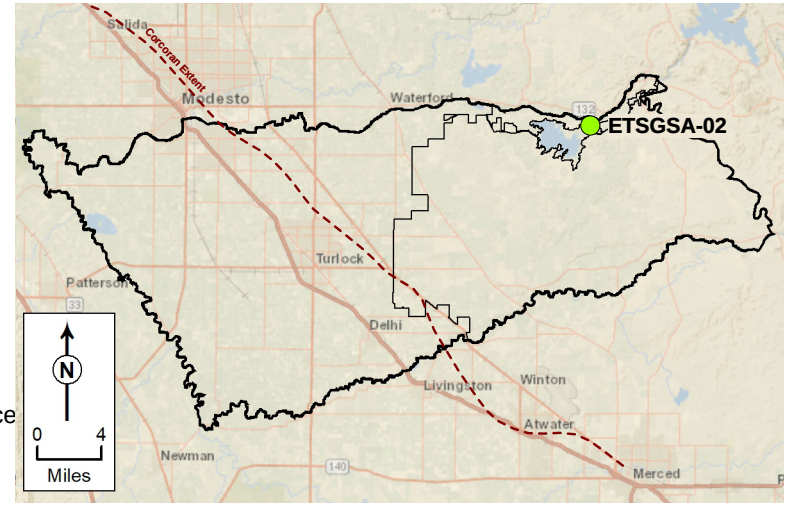
Site Code:	376238N1206641W001
Local Well Name:	ETSGSA-01
State Well Name:	03S12E33N001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57324
Latitude:	37.6238
Longitude:	-120.664
Well Depth (feet bgs):	445
Top Perforation (feet bgs):	223
Bottom Perforation (feet bgs):	445
Ground Surface Elevation:	193.89
Reference Point Elevation:	197.52
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Water,Land Subsidence

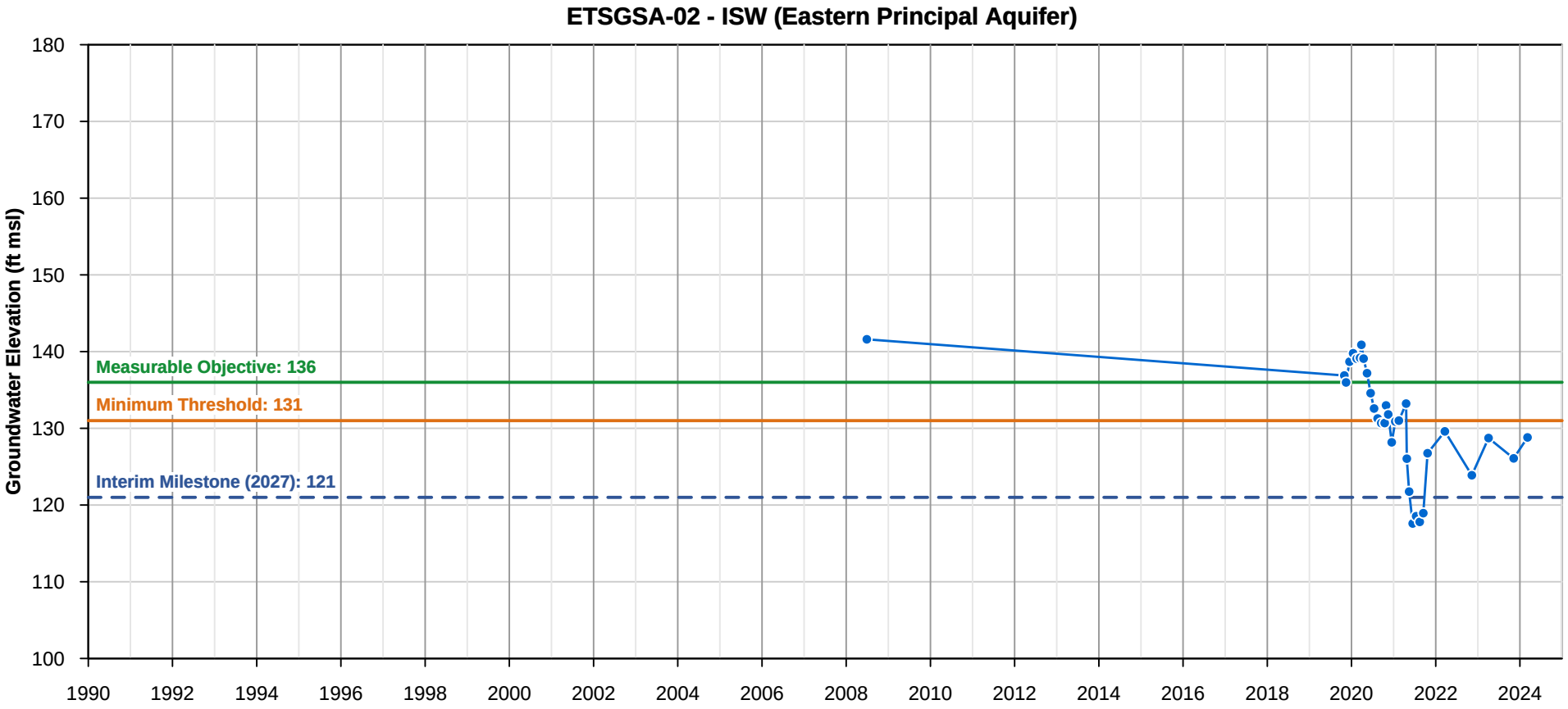




Well Information

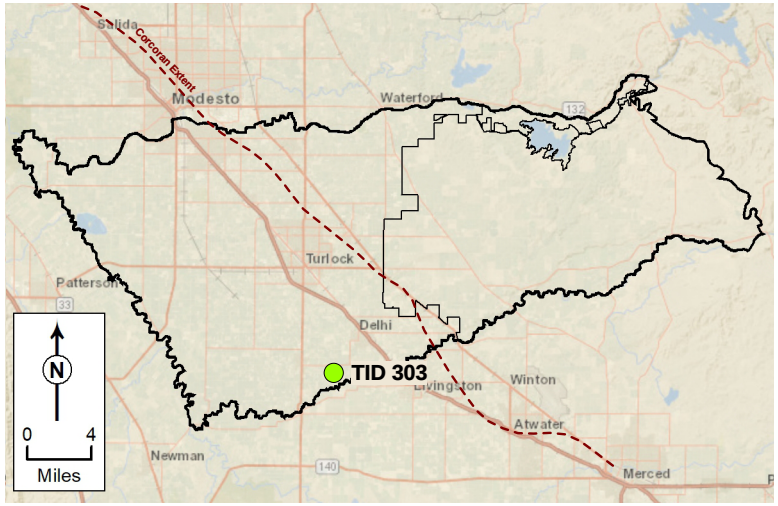
Site Code:	376214N1205321W001
Local Well Name:	ETSGSA-02
State Well Name:	04S13E03D002M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57325
Latitude:	37.6213
Longitude:	-120.533
Well Depth (feet bgs):	350
Top Perforation (feet bgs):	250
Bottom Perforation (feet bgs):	350
Ground Surface Elevation:	248.6
Reference Point Elevation:	249.18
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Land Subsidence

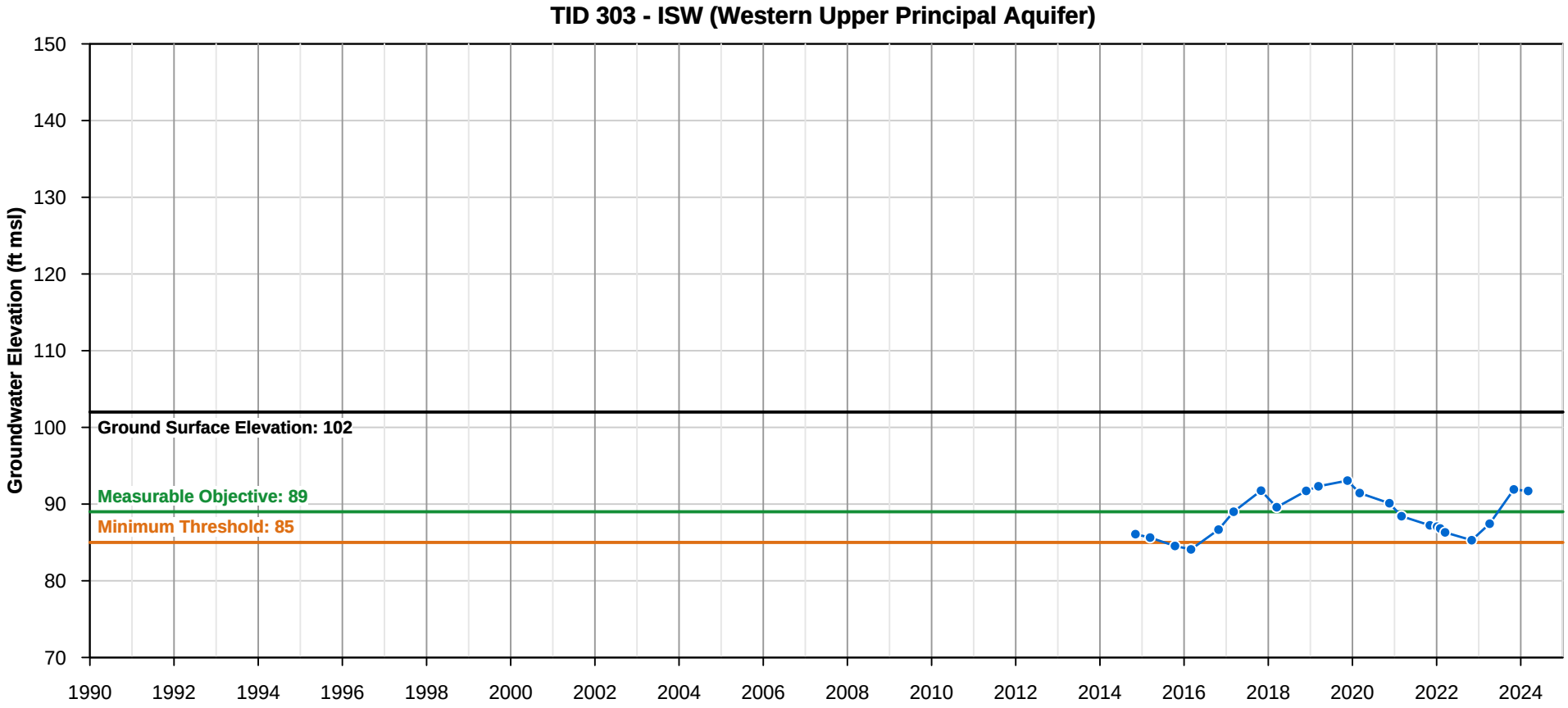




Well Information

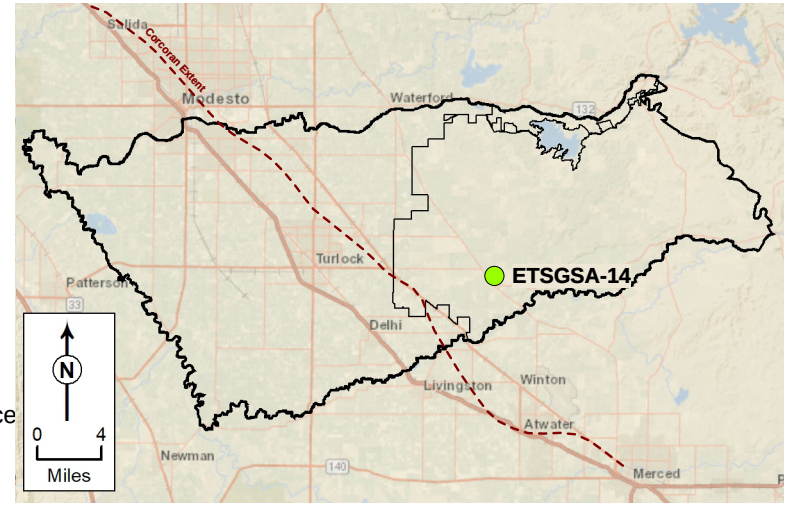
Site Code:	373968N1208146W001
Local Well Name:	TID 303
State Well Name:	
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Western Upper
Station ID:	48499
Latitude:	37.3967
Longitude:	-120.813
Well Depth (feet bgs):	317
Top Perforation (feet bgs):	0.5
Bottom Perforation (feet bgs):	100
Ground Surface Elevation:	102
Reference Point Elevation:	99.33
Sustainability Indicators:	Groundwater Levels,Interconnected Surface Waters

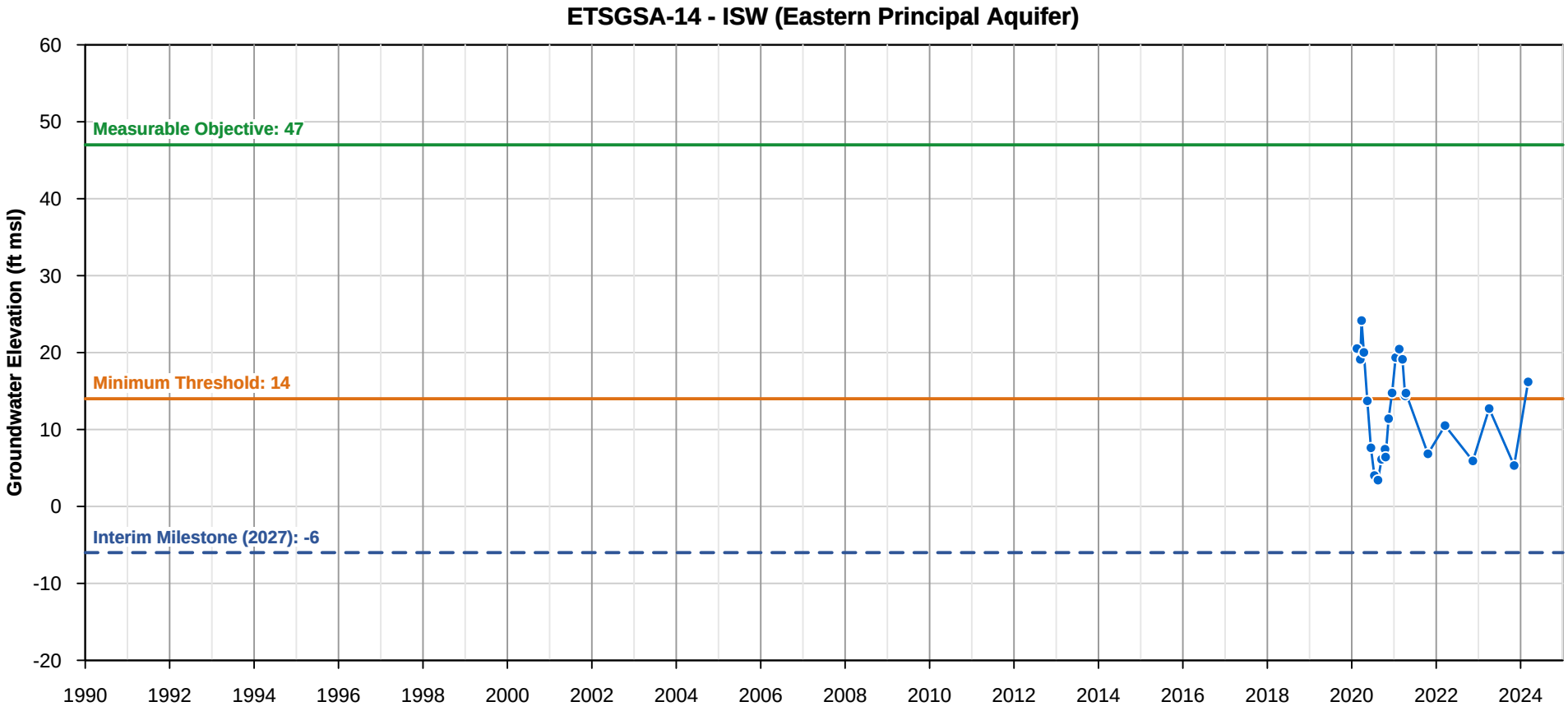




Well Information

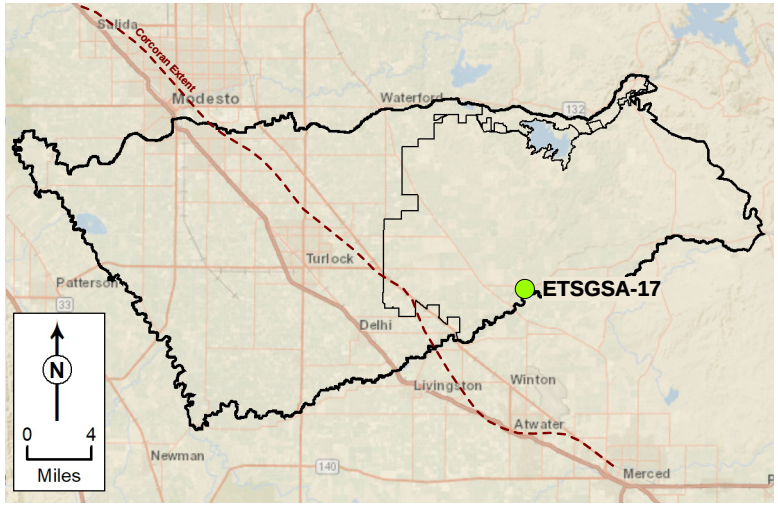
Site Code:	374849N1206425W001
Local Well Name:	ETSGSA-14
State Well Name:	05S12E22F001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57329
Latitude:	37.4849
Longitude:	-120.642
Well Depth (feet bgs):	685
Top Perforation (feet bgs):	187
Bottom Perforation (feet bgs):	685
Ground Surface Elevation:	219.98
Reference Point Elevation:	223.72
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Water,Land Subsidence

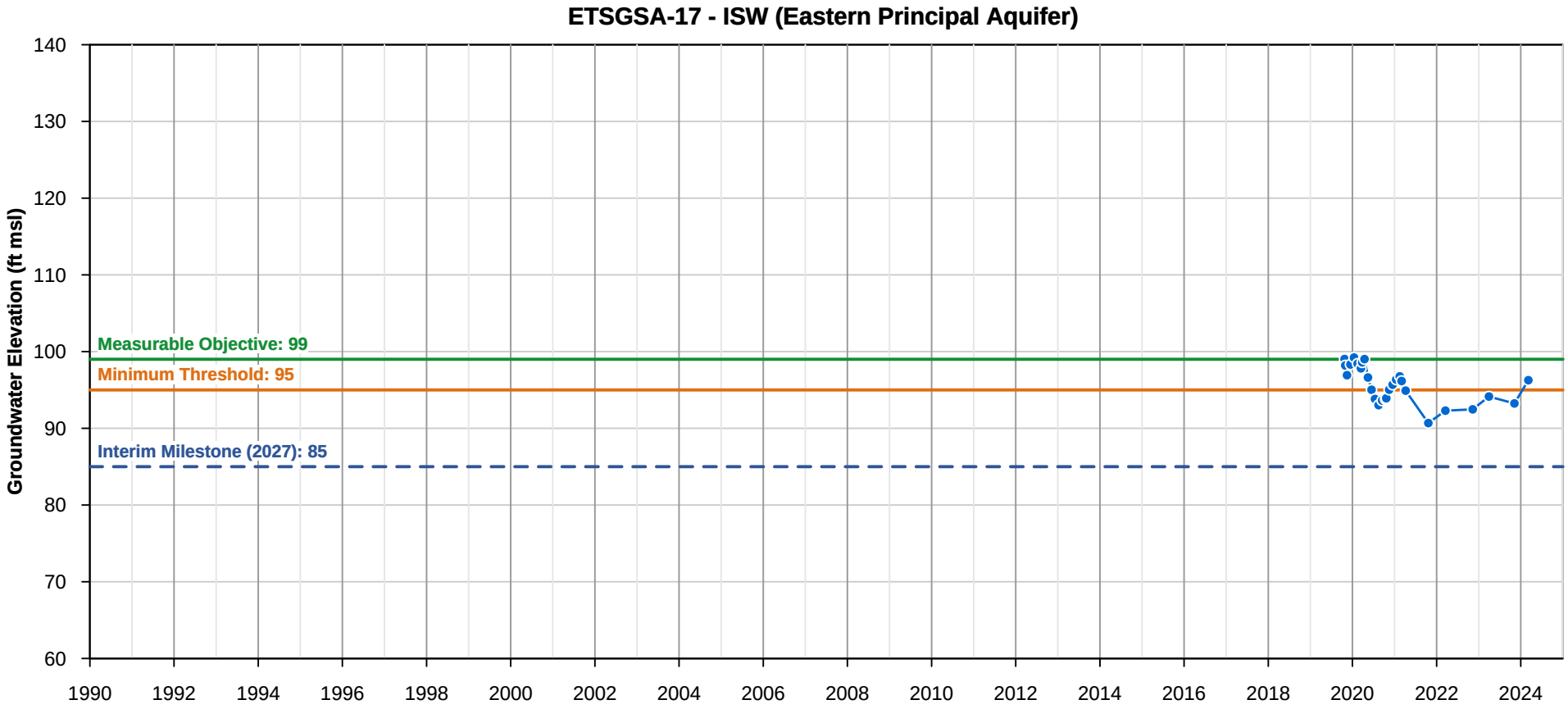




Well Information

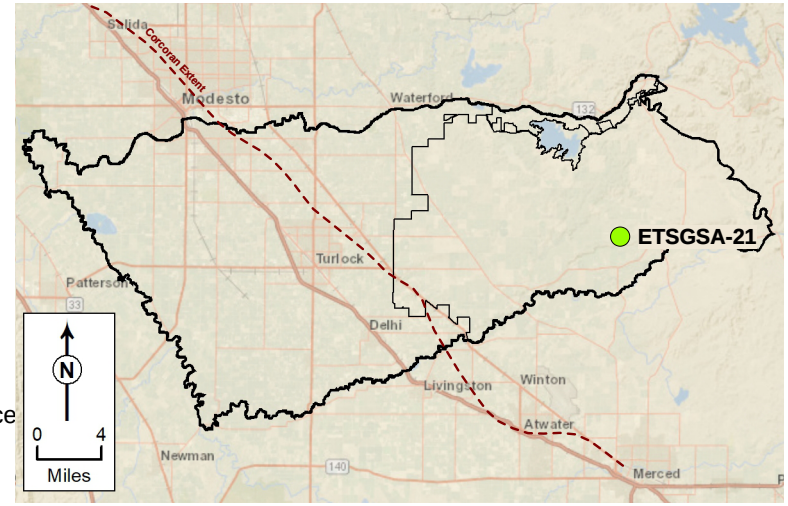
Site Code:	374730N1205961W001
Local Well Name:	ETSGSA-17
State Well Name:	05S12E25H001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57330
Latitude:	37.4731
Longitude:	-120.596
Well Depth (feet bgs):	390
Top Perforation (feet bgs):	146
Bottom Perforation (feet bgs):	390
Ground Surface Elevation:	216.28
Reference Point Elevation:	220.02
Sustainability Indicators:	Groundwater Levels,Interconnected Surface Waters

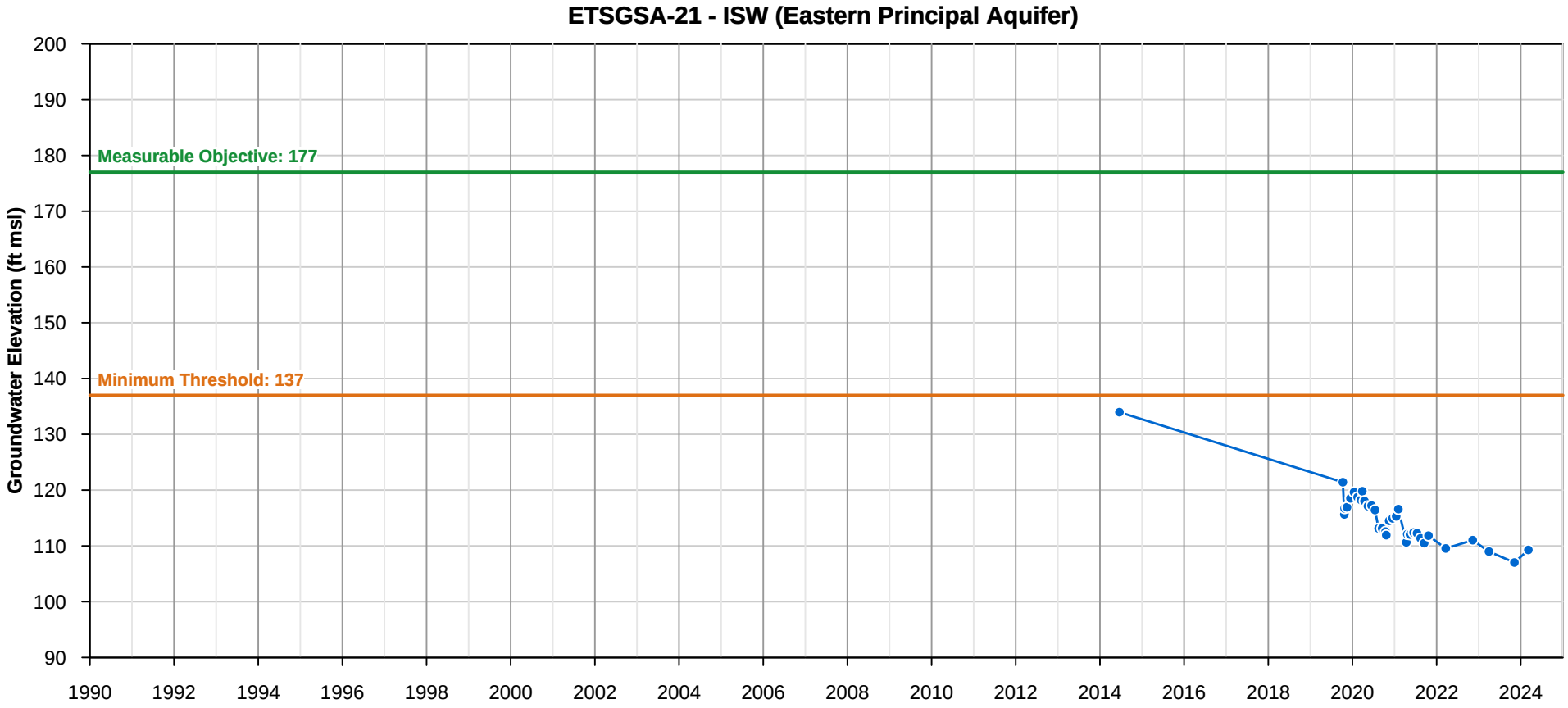




Well Information

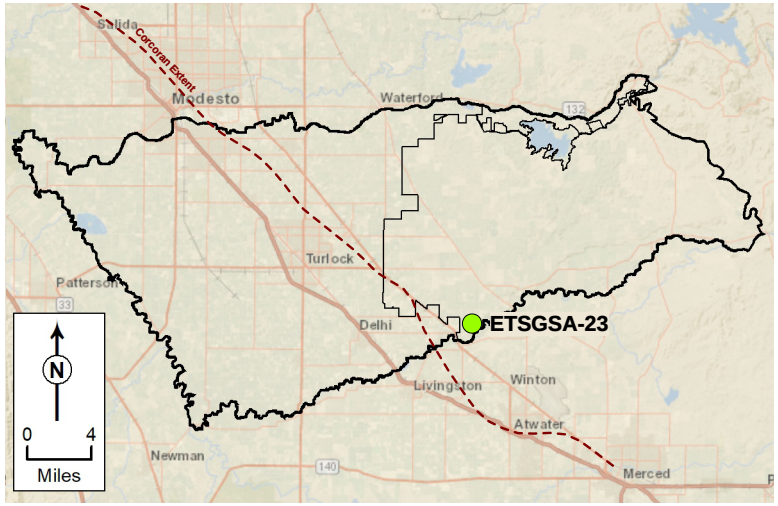
Site Code:	375205N1204989W001
Local Well Name:	ETSGSA-21
State Well Name:	05S13E12D001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57332
Latitude:	37.5206
Longitude:	-120.499
Well Depth (feet bgs):	283
Top Perforation (feet bgs):	57
Bottom Perforation (feet bgs):	283
Ground Surface Elevation:	300.97
Reference Point Elevation:	304.73
Sustainability Indicators:	Groundwater Levels,Groundwater Storage,Interconnected Surface Land Subsidence

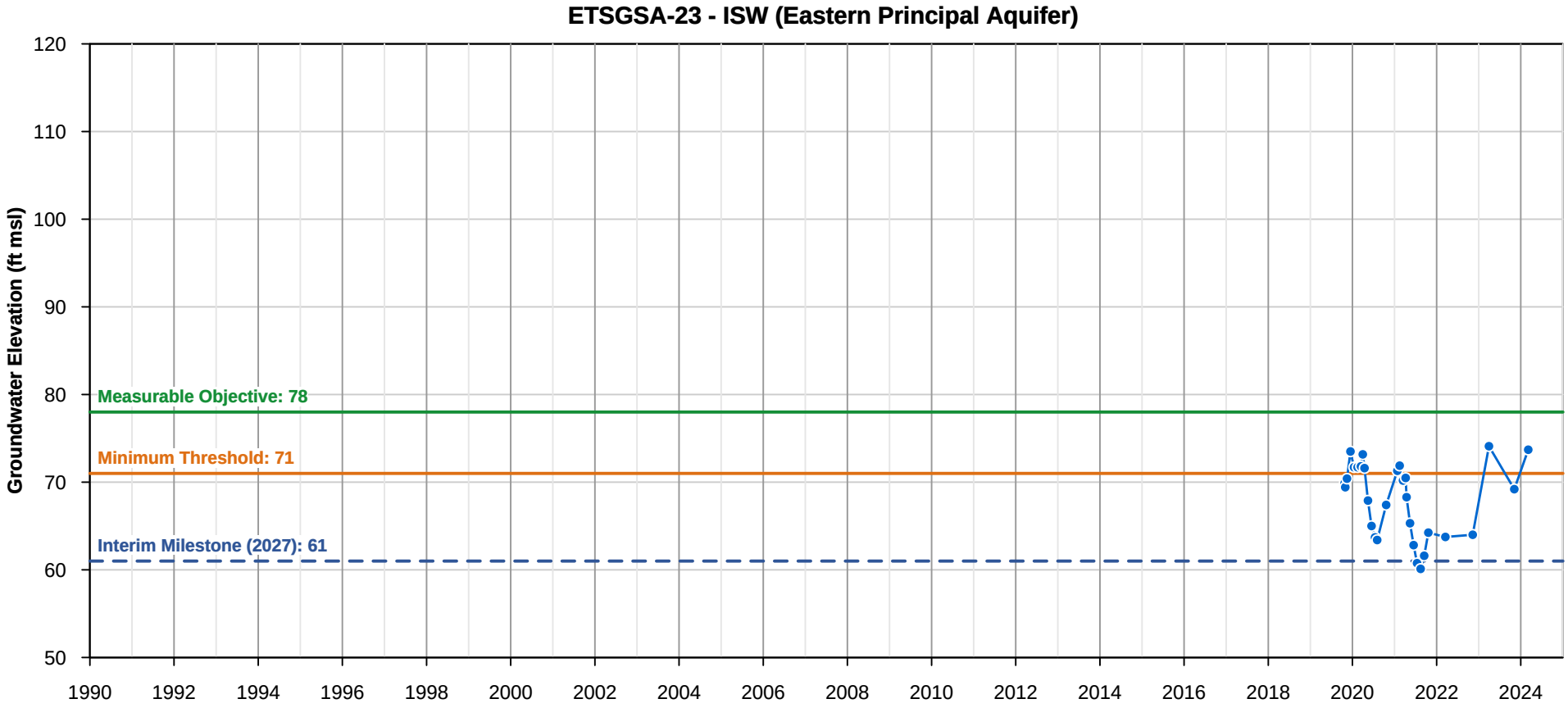




Well Information

Site Code:	374416N1206561W001
Local Well Name:	ETSGSA-23
State Well Name:	06S12E04G001M
Montoring Network Type:	SGMA Representative
Principal Aquifer:	Eastern
Station ID:	57333
Latitude:	37.4417
Longitude:	-120.656
Well Depth (feet bgs):	228
Top Perforation (feet bgs):	132
Bottom Perforation (feet bgs):	212
Ground Surface Elevation:	174.87
Reference Point Elevation:	178
Sustainability Indicators:	Groundwater Levels,Interconnected Surface Waters





APPENDIX C

Memorandum

Updated SMC for East Turlock Subbasin GSA

Monitoring Network

PROVOST&PRITCHARD
CONSULTING GROUP

455 W Fir Ave, Clovis, CA 93611 • (559) 449-2700
www.provostandpritchard.com

MEMORANDUM

To:	East Turlock Subbasin GSA
From:	Darylyn Tachella, PG
Subject:	Updated SMC for East Turlock Subbasin GSA Monitoring Network
Date:	February 24, 2025

COMMENTS:

This memorandum has been prepared by Provost & Pritchard Consulting Group (Provost & Pritchard) on behalf of the East Turlock Subbasin Groundwater Sustainability Agency (ETSGSA) to summarize the changes made to the original Sustainable Management Criteria (SMC) for the chronic lowering of groundwater levels and interconnected surface water. In April 2023, the ETSGSA commissioned a survey of the representative monitoring wells and SGMA monitoring wells in the GSA's groundwater monitoring network. Representative well ETSGSA-20 was inaccessible at the time of the survey and will be surveyed at a later date. The wells were surveyed for horizontal and vertical datum. Vertical measurements included surveys of the ground surface elevation (GSE) and reference point elevation (RPE). Initially, non-surveyed RPEs were used during development of the Turlock Subbasin Groundwater Sustainability Plan (GSP) (Todd Groundwater, 2022) to calculate water surface elevations (WSE) and to develop SMCs for the representative wells. While most of the resurveyed RPEs were within approximately +/- 2 feet of their original elevations, the 2023 survey revealed differences in a range of -16.1 feet to +7.1 feet from those elevations used in the 2022 GSP. Due to the significant differences in surveyed and non-surveyed RPEs, it was determined that historical WSEs and SMCs needed to be adjusted. It should be noted that the information used from the 2022 GSP for this update was not modified in the July 2024 Revised GSP (Todd Groundwater, 2024).

Available information and photographs of the well head constructions were reviewed to determine if the reference points had physically changed through the history of water level measurements at the wells. Many of the network wells have had the pumping equipment removed and a blue riser pipe installed on top of the casing, 11 of which were installed prior to the April 2023 survey. No other current monitoring network wells had indications that the well head reference point had physically changed prior to the 2023 survey. For the 11 wells that had riser pipes installed prior to the 2023 survey, the RPE prior to the riser pipe installation was assumed to be 1 foot above the 2023 surveyed GSE. This assumption approximated where the top of an empty casing or the top of a sounding port may have been prior to riser pipe installation. The approximated RPEs were used for WSE calculations through the time that the reference point change is documented, and the surveyed RPEs were used for WSE calculations from that time forward. For wells that do not have reference point changes indicated prior to the 2023 survey, WSE calculations used the surveyed RPE from the beginning of water level collection. The newly calculated WSEs are presented in the Turlock Subbasin 2024 Annual Report and will be utilized in future reporting. Provost & Pritchard will work with the Department of Water Resources to update the SGMA Portal with the updated WSEs and SMCs.

A summary of the SMC adjustments is presented in the attached SMC Update Summary table. Prior to adjusting the SMCs, the methodology used in the GSP to initially establish SMCs for these wells was

reviewed, including Tables 6-4 and 6-10 of the 2024 Revised GSP (Todd Groundwater, 2024). Adjustments were made as follows:

- SMC for three of the wells (ETSGSA-06, EW3, Olam R2-4) were established using estimated WSEs from the fall 2015 contour map included in the 2024 Revised GSP (Figure 4-30a). The Subbasin groundwater contour maps submitted in the GSP will not be reevaluated with the ETSGSA 2023 survey information. The wells in question were not included in the data used to develop the contour maps, thus their original RPEs did not affect the SMCs. Therefore, the SMC at these three wells will not be adjusted.
- Five of the wells had SMC based on data from a nearby well (ETSGSA-01, -05, -08, -13, & -14). Only one of these nearby wells is included in the ETSGSA network and was surveyed (ETSGSA-08 is based on EWD-01). ETSGSA-20 and the four out-of-network wells, if still existing, will be surveyed at a later date, currently scheduled for spring 2025. The data will be used to update the applicable SMC when available.
- Six of the wells had SMC based on data collected directly from those wells (ETSGSA-02, -04, -09, -17, -21, -23). The SMC at these wells were adjusted by the change in the RPE at those wells, except for ETSGSA-02 which was found to have historical discrepancies in the RPE as discussed further below. ETSGSA-21 has different SMC for the chronic lowering of water levels and interconnected surface water, so both sets were adjusted by the difference in RPE.
- SMC for ETSGSA-02 and -08 were recalculated using updated WSEs rather than adjusting by the difference in RPE. This was done because during WSE updates it was found that the RPE values for ETSGSA-02 and EWD-01 were not consistent through the historical measurements. The RPE value variations do not appear to be related to a physical RPE change and varied up and down, so were assumed to be entry errors. The SMC for ETSGSA-02 are based on measurements in the well and for ETSGSA-08 are based on measurements in nearby SGMA well EWD-01 (identified as EWD-13 in ETSGSA). The Minimum Thresholds (MT) were calculated from observed low water level measurements. The Measurable Objectives (MO) were calculated as the midpoint between the MT and the highest water level observed. The measurement dates used for MT and MO calculations for these two wells are consistent with those used in the GSP. The updated 2032 Interim Milestone (IM) is equal to the MT, while the updated 2037 IM is the midpoint between the 2032 IM and the MO, per the methodology outlined in the GSP. In the GSP, the original 2027 IM was calculated based on a downward trend projection of water levels. In lieu of recreating the projections, the difference between the original 2027 IM and 2032 IM of 10 feet for both ETSGSA-02 and -08 was maintained in the updated IMs.
    - For ETSGSA-02, the updated MT is based on the observed non-pumping low WSE measured in the well by the datalogger on 10/12/2020 and the highest water level used to calculate the MO was a manual measurement collected in the well on 3/27/2020.
    - For ETSGSA-08, the MT is based on the manually measured low WSE from EWD-01 on 8/14/2015 and the highest water level used to calculate the MO was a manual measurement collected from EWD-01 on 3/20/2000.

Currently, SMC are not established for representative wells ETSGSA-12R (which replaced the collapsed ETSGSA-12), MW-68A, -68B, and -68C. SMC development is in progress and expected to be complete for the 2025 Annual Report that will be submitted in 2026.

Attachments:

SMC Update Summary table

East Turlock Subbasin GSA

SMC Update Summary

Represen-tative Well	Reference Point Elevation (ft			Original Sustainable Management Criteria (ft amsl)						Updated Sustainable Management Criteria (ft amsl)						
	GSP Elevation	Surveyed Elevation	Elevation Difference	IM 2027	IM 2032	IM 2037	MO	MT	GSP Basis for Original	SMC Update Status	IM 2027	IM 2032	IM 2037	MO	MT	Basis for Revision
ETSGSA-01	199.0	197.52	-1.48	38	60	73	86	60	No 2015 data for the well, so used Fall 2015 water level for nearby DWR WDL well 04S12E03G001M. Based MO on based on historic high in nearby well.	Will be updated pending re-survey of 04S12E03G001M in Spring 2025	TBD	TBD	TBD	TBD	TBD	To be adjusted by difference in RPE of 04S12E03G001M
ETSGSA-02	262.0	249.18	-12.82	138	148	150	153	148	No 2015 data for this well and no nearby wells. For MT used minimum of measured data (Fall 2020); for MO used historic high of measured data.	Complete	121	131	133	136	131	Calculated with new RPE; MT: non-pumping datalogger low DTW on 10/12/20, MO: calculated using high manual DTW on 3/27/20. Note: SMC decreased more than RPE change because original SMC used RPE of 266'
ETSGSA-04	258.8	252.23	-6.57	-7	5	17	29	5	Based on measured Fall 2015 data at the well.	Complete	-14	-2	10	22	-2	Adjusted by difference in RPE
ETSGSA-05	196.0	193.89	-2.11	-17	-5	10	24	-5	No 2015 data for this well. Based on Fall 2015 data from nearby voluntary well 05S11E01G001M. MT: October 2015 water level, which is similar to the April 2021 level at this well (-3 ft msl). MO: based on historic high in March 2006	Will be updated pending re-survey of 05S11E01G001M	TBD	TBD	TBD	TBD	TBD	To be adjusted by difference in RPE of 05S11E01G001M
ETSGSA-06	195.9	195.2	-0.70	11	30	43	56	30	No water level data between 2014 and 2019, MT based on Oct 2015 contour map. MO based on historic high.	To remain as in GSP	N/A	N/A	N/A	N/A	N/A	Insufficient data to base an adjustment at this location to Fall 20215 contour map.
ETSGSA-08	274.0	257.87	-16.13	8	18	31	43	18	No 2015 data for this well. Based on nearby CASGEM 04S12E35C001M (EWD 13, old EWD-01): MT: 2015 non-pumping low, MO: historic high	Complete	5	15	29	42	15	Calculated with new RPE; MT: manual low DTW on 8/14/15, MO: calculated using high manual DTW on 3/20/2000. Note: original SMCs did not use a consistent RPE
ETSGSA-09	308.2	309.02	0.82	19	44	60	77	44	No 2015 data for this well and no nearby wells, MT: backward to fall 2015 based on rate of change from fall 2019 to fall 2020 (2 ft/yr), MO: 1998 contour map.	Complete	20	45	61	78	45	Adjusted by difference in RPE
ETSGSA-13	183.7	176.34	-7.36	26	30	39	47	30	No 2015 data for this well, so based on data for nearby DWR WDL well 05S11E22B001M. MT: 2015 low, MO: based on historic high	Will be adjusted based on re-survey of 05S11E22B001M in Spring 2025	TBD	TBD	TBD	TBD	TBD	To be adjusted by difference in RPE of 05S11E22B001M
ETSGSA-14	225.8	223.72	-2.08	-6	14	31	47	14	nearby DWR WDL well 05S12E22H001M used for both Water Level and ISW SMC; Water Level MT: 2015 low, MO: based on historic high; ISW MT = spring 2014 (estimated 14), MO = based on historic high	Will be adjusted based on re-survey of 05S12E22H001M in Spring 2025	TBD	TBD	TBD	TBD	TBD	To be adjusted by difference in RPE of 05S12E22H001M

East Turlock Subbasin GSA

SMC Update Summary

Representative Well	Reference Point Elevation (ft			Original Sustainable Management Criteria (ft amsl)						Updated Sustainable Management Criteria (ft amsl)						
	GSP Elevation	Surveyed Elevation	Elevation Difference	IM 2027	IM 2032	IM 2037	MO	MT	GSP Basis for Original	SMC Update Status	IM 2027	IM 2032	IM 2037	MO	MT	Basis for Revision
ETSGSA-17	221.1	220.02	-1.08	86	96	98	100	96	No 2015 data for this well. MT: spring 2021 water level; MO: based on measured historic high.	Complete	85	95	97	99	95	Adjusted by difference in RPE
ETSGSA-20	205.7	TBD	TBD	14	55	76	97	55	No 2015 data for this well. MT: fall 2015 level estimated based on backward extrapolation of the rate of water level decline (3.3 ft/yr) from fall 2017 (48 ft) to fall 2020 (38 ft) ; MO: based on 1998 water level in DWR WDL 4S13E28Q001M (on 1998 contour map)	SMCs will be updated pending re-survey of ETSGSA-20 in Spring 2025	TBD	TBD	TBD	TBD	TBD	To be adjusted by difference in RPE for ETSGSA-20
ETSGSA-21	312.2	304.73	-7.47	96	140	160	180	140	Chronic lowering of groundwater levels - MT: extrapolated Fall 20215 from available water level data at this well. Note: water levels higher than at nearby ETSGSA wells; based on operational range (~40 ft) between MT and MO at ETSGSA-20	Complete	89	133	153	173	133	Adjusted by difference in RPE
				96	144	164	184	144	Interconnected Surface Water MT: estimated from available water level data at this well in spring 2014. Note: water levels higher than at nearby ETSGSA wells; based on operational range (~40 ft) between MT and MO at ETSGSA-20	Complete	89	137	157	177	137	Adjusted by difference in RPE
ETSGSA-23	178.1	178	-0.10	61	71	74	78	71	No 2015 data for this well. MT: spring 2021 measurement; MO: based on historic high at nearby DWR WDL well 05S12E33N001M	Complete	61	71	74	78	71	Adjusted by difference in RPE, which is negligible
EW3	164.1	163.73	-0.37	-1	10	23	37	10	No 2015 data for this well, but close to DWR WDL well 05S11E25A001M (water level data from 1990-Nov 2011). MT: based on Oct 2015 contour map, between 0 and 20 ft contours; MO: based on historic high at DWR WDL well.	To remain as in GSP	N/A	N/A	N/A	N/A	N/A	Insufficient data to base an adjustment at this location to Fall 20215 contour map.
Olam R2-4	256.0	254.29	-1.71	N/A	N/A	N/A	114	79	No 2015 data for this well, but close to Olam R2-2 (water level data from 11/2006 - 11/2017 provided by Wood Rodgers for GSP); MT: 2015 low (on 2015 contour map), MO: historic high of available data. Interim milestones below MTs do not appear to be needed in this well at this time because long-term declines below the MTs are not anticipated.	To remain as in GSP	N/A	N/A	N/A	N/A	N/A	Insufficient data to base an adjustment at this location to Fall 20215 contour map.

APPENDIX D

Water Quality Monitoring Network

Water Year 2024

Appendix D - Water Quality Monitoring Network, WY 2024

								Arsenic			Nitrate as N			PCE			TCP			TDS			Uranium		
Well ID	Latitude	Longitude	Principal Aquifer	Well Type	Dataset Name[1]	Alternative Well ID	Alternative Well ID 2	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date
2400014-001	37.430000	-120.840000	Western Lower	Municipal	DHS	2400014-001	WELL-S.W. OF OFFICE/CAFE				0.7	19.00	2/15/2006												
2400028-001	37.399815	-120.746611	Western Upper	Municipal	DHS	2400028-001	WELL NO. 1: LAUNDRY ROOM WELL				11	19	40585												
2400028-002	37.400972	-120.746388	Western Unknown	Municipal	DHS	2400028-002	WELL NO. 2: CLUBHOUSE WELL				16	14.00	1/8/2015												
2400062-001	37.522527	-120.434388	Eastern	Municipal	DHS	2400062-001	WELL NO. 1- N.OF CAFETERIA/GYMNASIUM				0.62	3.80	2/11/2015	0			0	0.00	6/1/2021						
2400066-001	37.522528	-120.434389	Eastern	Municipal	DHS	2400066-001	WELL 1-S.E.CORNER OF SCHL GRNDS				4.7	4.95	5/8/2012												
2400078-002	37.443086	-120.830741	Western Unknown	Municipal	DHS	2400078-002	WELL NO. 2				0.29	6.70	12/30/2016				0	0	44369						
2400088-002	37.400972	-120.746389	Western Unknown	Municipal	DHS	2400088-002	WELL 2 EAST WELL				1	1.10	9/3/2019												
2400088-004	37.522521	-120.423883	Eastern	Municipal	DHS	2400088-004	WELL 3				1	1.20	9/24/2018												
2400128-011	37.439280	-120.835458	Western Unknown	Municipal	DHS	2400128-011	WELL 2-MAIN WELL-20 FROM RD.				3.3	5.26	8/26/2009												
2400162-012	37.605198	-120.807895	Eastern	Municipal	DHS	2400162-012	WELL 04	5.3	7	39710	3.8	3.30	9/15/2020				0.05	0.044	44567						
2400165-001	37.406277	-120.745055	Western Lower	Municipal	DHS	2400165-001	WELL 1-S.E. OF OFFICE/SHOP BUILDING	19	20.00	11/7/2019	0	14.50	4/4/2011				0.0061	0.01	7/9/2003				0		
2400165-003	37.409090	-120.743523	Western Unknown	Municipal	DHS	2400165-003	WELL NO. 3	19			0	0.00	7/15/2021		0.00	7/15/2021	0.046	0.042	43685					2.60	11/7/2019
2400166-001	37.407248	-120.759878	Western Upper	Municipal	DHS	2400166-001	WELL 1- S. OF PRESSURE TANK	19			11	43.00	6/28/2018				0	0.005	42095						
2400167-001	37.452086	-120.699515	Eastern	Municipal	DHS	2400167-001	WELL 1-PARK ST. NEAR BROADWAY		2.775	44216	8.14	10.20	12/19/2017				0.046	0.045	43852						
2400170-013	37.429640	-120.859160	Western Unknown	Municipal	DHS	2400170-013	WELL 4 - RAW OSLO	38	140.00	9/11/2012	0														
2400170-016	37.422825	-120.854312	Western Unknown	Municipal	DHS	2400170-016	WELL 5 - RAW	230	150.00	1/14/2020		0.00	7/20/2021	0											
2400226-002	37.460013	-120.704073	Eastern	Municipal	DHS	2400226-002	WELL 2				14.6	20	44789	0			0.1476	0.29	9/1/2021						
2400245-001	37.401300	-120.751121	Western Unknown	Municipal	DHS	2400245-001	WELL 1				18.5	31.80	5/3/2016												
2400254-001	37.473621	-120.739185	Western Unknown	Municipal	DHS	2400254-001	WELL 01				3.98	3.23	1/27/2022												
2400304-001	37.519402	-120.438543	Eastern	Municipal	DHS	2400304-001	WELL 01				1.8	2.2	43020												
2400322-001	37.518462	-120.440370	Eastern	Municipal	DHS	2400322-001	WELL 01				0.45	7.00	7/27/2022												
2400329-001	37.489012	-120.630030	Eastern	Municipal	DHS	2400329-001	WELL NO. 1				0.7	1.10	10/17/2018												
2400330-001	37.474787	-120.635759	Eastern	Municipal	DHS	2400330-001	WELL NO. 1				0.6	0.90	10/17/2018												
2400335-002	37.427633	-120.811971	Western Unknown	Municipal	DHS	2400335-002	WELL NO. 2	64	68	44159	0	0	44369	0	0	44369		0.00	6/22/2021				0	0	44369
2400339-001	37.462815	-120.754986	Western Unknown	Municipal	DHS	2400339-001	WELL NO. 1 INACTIVE					26.00	5/27/2021		0	44203								15	44231
2400339-002	37.462755	-120.756489	Western Unknown	Municipal	DHS	2400339-002	WELL NO. 2	9.5	12.00	3/15/2018	1.6	3.80	5/8/2018				0						0	0	44231
2400341-002	37.409982	-120.748617	Western Unknown	Municipal	DHS	2400341-002	WELL NO. 2				0	0.00	6/15/2021												
2400342-002	37.411175	-120.750914	Western Unknown	Municipal	DHS	2400342-002	WELL NO. 2	32	43	44235	0	0.00	6/15/2021		0	44362									
2400343-001	37.428355	-120.822499	Western Unknown	Municipal	DHS	2400343-001	WELL NO. 1	23.5	33	43775	0	0.00	7/15/2021		0	44392	0.013	0.021	43649				0	22	43377
2400343-002	37.427824	-120.822437	Western Unknown	Municipal	DHS	2400343-002	WELL NO. 2	26.8	30.09	8/8/2018	0				0	44392	0.0087	0.017	43649				0	1.32	1/31/2017
2400347-001	37.453616	-120.840160	Western Unknown	Municipal	DHS	2400347-001	WELL NO. 1	8.6	7.9	44060	3.4	6.30	6/23/2022		0	44215	0	0	44215				3.1	7.4	44060
2410006-005	37.436975	-120.773042	Western Lower	Municipal	DHS	2410006-005	WELL 05 - RAW	8.47	10.90	5/19/2022	8.13	14.00	11/27/1996				0.0047	0.04	2/4/2003						
2410006-006	37.431239	-120.785757	Western Lower	Municipal	DHS	2410006-006	WELL 06 - DESTROYED		6	37488															
2410006-007	37.425244	-120.773096	Western Lower	Municipal	DHS	2410006-007	WELL 07 - RAW				3.48	7.50	6/23/2009				0	0	44336						
2410006-016	37.429951	-120.765863	Western Unknown	Municipal	DHS	2410006-016	WELL 10 -RAW				9.99	10.00	2/25/2020	0	0	44370	0	0.0048	44427						
2410006-018	37.431059	-120.785770	Western Unknown	Municipal	DHS	2410006-018	WELL 6A - RAW	4.37	4.5	44271	5.1	5.27	3/29/2022		0	44369	0.0011	0.00	2/17/2022	248	270	44271		9.59	44571
2410012-004	37.424672	-120.830838	Western Upper	Municipal	DHS	2410012-004	WELL 04 (COX) - RAW - STANDBY	18.2			0			0			0	0.006	42577						
2410012-006	37.432434	-120.828215	Western Upper	Municipal	DHS	2410012-006	WELL 06 (JAKE) - RAW	13.5	16.6	40269	31.5	9.93	4/6/2021				0	0.00	6/22/2021						
2410012-011	37.430274	-120.836016	Western Unknown	Municipal	DHS	2410012-011	WELL 07 (WOODY) RAW	6.44	9.75	44110	34.3	21.20	4/6/2021				0	0	44369						
2410301-002	37.416332	-120.712354	Western Unknown	Municipal	DHS	2410301-002	MCCONNEL STATE PARK WELL				2.18	5.60	5/16/2006												
2410302-001	37.351634	-120.961555	Western Unknown	Municipal	DHS	2410302-001	HATFIELD STATE PARK WELL				0	3.80	8/19/2003												
5000003-002	37.583503	-120.953268	Western Upper	Municipal	DHS	5000003-002	SOUTH				10	11.60	5/11/2020												
5000019-003	37.610488	-121.040912	Western Upper	Municipal	DHS	5000019-003	WELL 03 WEST	7.2	7.20	12/12/2007	11	11.00	3/26/2013							360	441	41815	14	28	40893
5000020-001	37.616666	-120.939444	Eastern	Municipal	DHS	5000020-001	WELL 01					9.98	4/23/2012												
5000033-002	37.594581	-120.846329	Eastern	Municipal	DHS	5000033-002	NEW NORTH	12	32	39352	8.8	9.40	8/22/2022				0.067	0.10	8/22/2022						
5000035-001	37.574606	-120.930172	Western Unknown	Municipal	DHS	5000035-001	WELL 01 - INACTIVE					9.40	10/4/2021												
5000054-003	37.566526	-120.917292	Western Lower	Municipal	DHS	5000054-003	WEST NEW				2.5	2.50	6/24/2020												
5000072-001	37.565631	-120.958556	Western Lower	Municipal	DHS	5000072-001	NORTH PRIM					2.80	8/2/2021												
5000072-002	37.480401	-120.832671	Western Lower	Municipal	DHS	5000072-002	SOUTH WELL				8.4	7.27	8/20/2015	0			0								
5000080-003	37.573928	-121.031348	Western Unknown	Municipal	DHS	5000080-003	LIL SIMON WELL - UNTREATED	24	31.00	4/27/2011	0.47	7.40	9/3/2019							1200			16		
5000095-001	37.625111	-120.993972	Western Upper	Municipal	DHS	5000095-001	EAST WELL	4.2	3.70	6/22/2012	0	2.42	6/23/2015							1000	1700.00	3/31/2004		2.30	6/8/2021
5000101-001	37.482259	-120.931274	Western Upper	Municipal	DHS	5000101-001	WELL 01	6.56	7.25	7/15/2021	0	7.12	1/6/2004					0.00	7/15/2021						
5000109-002	37.561478	-121.028938	Western Upper	Municipal	DHS	5000109-002	WELL 02				15	16.00	3/15/2007	0	0.00	7/14/2021							64	81.00	9/23/2013
5000116-001	37.488961	-120.797800	Western Unknown	Municipal	DHS	5000116-001	WELL 01		4.00	2/28/2005		90.40	11/5/2018											31.00	7/5/2018
5000136-003	37.493330	-120.848411	Western Unknown	Municipal	DHS	5000136-003	WELL #3				0.7	1.30	5/9/2018												
5000218-004	37.592824	-120.848645	Eastern	Municipal	DHS	5000218-004	NORTH WELL	21	25.00	6/28/2013	0	0.99	6/28/2010												
5000225-001	37.479232	-120.831378	Western Unknown	Municipal	DHS	5000225-001	WELL 01 - INACTIVE					10.10	10/23/2012												
5000239-001	37.492067	-120.995916	Western Upper	Municipal	DHS	5000239-001	WELL #2 LOWER WELL				1.9	2.00	1/17/2013												
5000255-002	37.492351	-120.995838	Western Unknown	Municipal	DHS	5000255-002	WELL 02	15.2	16.87	8/10/2020	1.07	2.10	1/4/2016								730.00	12/15/2020		3.20	5/26/2020
5000273-002	37.572831	-120.790191	Eastern	Municipal	DHS	5000273-002	2013 WELL	11	9.00	5/6/2021	0			0	0.00	7/27/2021	0.006	0.01	8/8/2019						
5000307-003	37.565108	-120.957222	Western Unknown	Municipal	DHS	5000307-003	WELL 02				6.3	6.80	6/6/2022												
5000319-001	37.575833	-120.953888	Western Unknown	Municipal	DHS	5000319-001	WELL 01				12	11.30	5/11/2020												
5000332-001	37.478861	-120.833416	Western Upper	Municipal	DHS	5000332-001	WELL #1				8.6	9.00	6/9/2008												
5000382-004	37.493127	-120.993891	Western Unknown	Municipal	DHS	5000382-004	NEW WELL 2012				12	9.80	10/4/2021												
5000395-001	37.646172	-120.491686	Eastern	Municipal	DHS	5000395-001	WELL				1.4	1.60	1/17/2012												
5000400-001	37.530000	-120.890000	Western Unknown	Municipal	DHS	5000400-001	WELL 01				11	12.00	1/4/2021												
5000402-002	37.468792	-120.863839	Western Unknown	Municipal	DHS	5000402-002	2019 WELL				8.8	7.50	12/21/2021												
5000414-001	37.484805	-120.838611	Western Lower	Municipal	DHS	5000414-001	WELL				2.5	4.30	3/17/2010												
5000439-001	37.536472	-120.889085	Western Lower	Municipal	DHS	5000439-001	WELL #1				6	7.70	1/19/2021							280					
5000440-001	37.506361	-120.733361	Eastern	Municipal	DHS	5000440-001	CORTEZ WELL	3.44	7.15	1/20/2021	9.91	8.26	9/28/2017					0.00	1/20/2021						
5000440-002	37.506155	-120.730324	Eastern	Municipal	DHS	5000440-002	YOSEMITE WELL	3.56	8.33	6/10/2020	9.94	7.97	5/26/2020					0.00	1/20/2021						
5000440-003	37.503063	-120.738879	Eastern	Municipal	DHS	5000440-003	BACK UP (SW)		4.93	4/7/2021															
5000440-004	37.503036	-120.721516	Eastern	Municipal	DHS	5000440-004	EAST BACK-UP WELL #4	3.4	8.28	6/10/2020	10	5.24	7/24/2014					0.00	1/20/2021					28.00	7/15/2020
5000440-005	37.503153	-120.738711	Eastern	Municipal	DHS	5000440-005	2015 WELL	3.46	7.12	1/20/2021	2.59	0.94	1/23/2019					0.00	1/20/2021						
5000443-001	37.472557	-120.849573	Western Lower	Municipal	DHS	5000443-001	WELL 1 TRUCK STOP				5.8	11.00	2/5/2010												
5000454-001	37.485093	-120.834783	Western Upper	Municipal	DHS	5000454-001	LPA REPORTED PRIMARY SOURCE		10.83	12/2/2020	9.97	11.50	8/1/2022					0.01	3/14/2018	450					
5000465-003	37.608234	-120.888782	Eastern	Municipal	DHS	5000465-003	LAB WELL	9.5	25.00	4/4/2011	15	15.00	11/2/2020	0	0.00	11/2/2020	0.044	0.05	11/5/2018						
5000470-004	37.620564	-120.879550	Eastern	Municipal	DHS	5000470-004	LEEDOM WELL				0	9.30	7/14/2015				0								
5000487-002	37.594223	-120.848676	Eastern	Municipal	DHS	5000487-002	2009 WELL				6	8.63	4/30/2015												
5000490-003	37.497123	-120.995331	Western Unknown	Municipal	DHS	5000490-003	WELL #3				1.6	6.60	7/5/2016												
5000498-001	37.541861	-120.893888	Western Lower	Municipal	DHS	5000498-001	LPA REPORTED PRIMARY SOURCE	15	13.00	4/1/2019	1.4	1.40	12/1/2020				0.011								
5000501-002	37.608868	-120.883001	Eastern	Municipal	DHS	5000501-002	2012 WELL				0	8.20	9/13/2022												
5000502-001	37.575416	-120.846388	Eastern	Municipal	DHS	5000502-001	LPA REPORTED PRIMARY SOURCE				1.03	2.62	5/2/2006												
5000505-002	37.492805	-120.901666	Western Lower	Municipal	DHS	5000505-002	NEW EAST WELL					2.93	3/9/2021												
5000525-002	37.492820	-120.994008	Western Unknown	Municipal	DHS	5000525-002	PARKING LOT WELL				17	16.00	6/29/2023												
5000527-002	37.563202	-120.800802	Eastern	Municipal	DHS	5000527-002	WELL #2	6.07			3.49	10.40	1/20/2021												
5000532-001	37.579313	-120.925924	Western Unknown	Municipal	DHS	5000532-001	WELL				5.6	7.50	3/11/2008												

Appendix D - Water Quality Monitoring Network, WY 2024

								Arsenic			Nitrate as N			PCE			TCP			TDS			Uranium		
Well ID	Latitude	Longitude	Principal Aquifer	Well Type	Dataset Name[1]	Alternative Well ID	Alternative Well ID 2	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date
5000547-001	37.547646	-120.901954	Western Unknown	Municipal	DHS	5000547-001	WELL				6.5	10.10	4/27/2015												
5000548-001	37.566749	-120.725903	Eastern	Municipal	DHS	5000548-001	WELL				5	7.50	6/30/2017												
5000554-001	37.605393	-120.807667	Eastern	Municipal	DHS	5000554-001	WELL		5.00	4/14/2008	8.7	11.00	10/4/2022				0.02	0.04	7/6/2022						
5000555-002	37.546209	-120.898340	Western Unknown	Municipal	DHS	5000555-002	2012 WELL	16	15.00	5/23/2018	2.2						0								
5000570-001	37.547095	-120.901738	Western Unknown	Municipal	DHS	5000570-001	WELL		19.17	8/10/2020		1.30	6/19/2012					0.00	4/7/2021						
5000578-001	37.433326	-121.013823	Western Unknown	Municipal	DHS	5000578-001	PICNIC WELL					0.80	8/29/2022												
5000579-001	37.574403	-120.753576	Eastern	Municipal	DHS	5000579-001	D5B-WEST (25HP)				0	4.34	3/9/2009		0.00	6/17/2021	0	0.00	6/17/2021						
5000579-002	37.574407	-120.753409	Eastern	Municipal	DHS	5000579-002	D5A-EAST (15HP)		8.00	3/20/2017	3.2	4.50	7/10/2017		0.00	6/7/2021	0	0.00	6/7/2021					23.06	7/8/2013
5000582-001	37.566572	-120.994693	Western Unknown	Municipal	DHS	5000582-001	WELL 01				0	2.00	7/13/2015												
5000595-002	37.451671	-120.868173	Western Unknown	Municipal	DHS	5000595-002	2015 WELL				6.8	8.70	10/4/2018												
5000600-001	37.600435	-120.849084	Eastern	Municipal	DHS	5000600-001	WELL	4.6	5.31	7/15/2021	12.4	13.10	8/1/2022		0.00	3/3/2021	0.051	0.05	7/15/2021						
5010008-003	37.603280	-120.869809	Eastern	Municipal	DHS	5010008-003	WELL 03	6	17.00	1/4/2005	9.7			0	0.00	7/20/2021	0.0572	0.08	4/7/2020	460			14.9		
5010008-005	37.595622	-120.865047	Eastern	Municipal	DHS	5010008-005	WELL 04	17	19.87	7/14/2020	4.9			0	0.00	7/20/2021	0.0431	0.05	7/6/2021	270					
5010008-014	37.607495	-120.853311	Eastern	Municipal	DHS	5010008-014	WELL 08	9.22	29.79	5/4/2021	8.8			0	0.00	7/20/2021	0.0832	0.07	7/6/2021	420					
5010009-005	37.559221	-120.919119	Western Unknown	Municipal	DHS	5010009-005	WELL NO. 07 - RAW	8.74	26.60	2/14/1994	9.99	10.20	6/16/2015				0.1226	0.20	8/20/2002						
5010009-006	37.556070	-120.910728	Western Lower	Municipal	DHS	5010009-006	WELL NO. 08 - RAW	15.8	27.30	2/14/1994	0.91	3.40	4/18/2017					0.06	4/18/2017						
5010009-007	37.555011	-120.920734	Western Lower	Municipal	DHS	5010009-007	WELL NO. 09 - RAW	13.2	21.50	1/27/1995	1.6	7.05	1/20/2015				0	0.09	1/20/2015						
5010009-012	37.559400	-120.903900	Western Lower	Municipal	DHS	5010009-012	WELL NO. 10 - RAW	13.7	19.00	3/19/2019	0.87	4.54	3/20/2012				0.0157	0.18	3/19/2019						
5010010-032	37.613490	-120.996630	Western Unknown	Municipal	DHS	5010010-032	WELL 030				9.8	22.00	7/8/1991				0	0.00	2/16/2021				24	24.00	6/19/1991
5010010-040	37.593860	-120.990960	Western Unknown	Municipal	DHS	5010010-040	WELL 038					13.00	12/2/2009				0.0047	0.01	7/11/2018				16	29.00	8/7/2007
5010010-051	37.597520	-120.995990	Western Upper	Municipal	DHS	5010010-051	WELL 049	9.3	14.00	6/6/2006	13	10.00	7/10/2019		0.00	6/9/2021	0	0.00	6/9/2021		400.00	1/6/2005			
5010010-132	37.612110	-120.987130	Western Upper	Municipal	DHS	5010010-132	WELL 305				3.2	17.00	11/13/2018				0	0.00	7/13/2021	940	1100.00	5/12/2020	8.9	45.00	11/8/2017
5010010-133	37.611950	-120.989770	Western Upper	Municipal	DHS	5010010-133	WELL 287 - SCHOOL				5	3.00	2/14/2018				0	0.50	10/3/2000		1400.00	9/8/2020			
5010010-134	37.614560	-120.971240	Western Upper	Municipal	DHS	5010010-134	WELL 284 - MUSICK	4.2	6.00	11/1/2005		5.83	2/28/2006				0	0.50	3/10/1994	780	790.00	3/24/2009			
5010010-135	37.612240	-120.986980	Western Upper	Municipal	DHS	5010010-135	WELL 223 - ALAMO				11	21.00	11/13/2018				0	0.00	2/16/2021	700	6240.00	11/13/2007	51	53.00	12/8/2020
5010010-136	37.624260	-120.984250	Western Upper	Municipal	DHS	5010010-136	WELL 217 - BYSTROM					4.59	3/16/2011				0	0.50	3/10/1994						
5010010-137	37.616330	-120.982070	Western Upper	Municipal	DHS	5010010-137	WELL 216 - PECOS	2.8	6.00	4/17/2003	0	2.30	4/17/2003				0	0.50	3/10/1994	1000	1000.00	5/12/2021			
5010010-138	37.615890	-120.965970	Western Upper	Municipal	DHS	5010010-138	WELL 214				7.1	10.50	4/11/2007				0	0.50	3/10/1994						
5010010-236	37.602571	-121.016501	Western Unknown	Municipal	DHS	5010010-236	WELL 66	4.9	15.00	5/16/2008							0	0.00	5/12/2021				5.2	13.00	3/9/2016
5010019-004	37.505265	-120.871507	Western Lower	Municipal	DHS	5010019-004	WELL NO. 04		20.00	3/30/1994		8.80	1/8/2020		0.00	4/7/2021		0.19	11/7/2019		331.00	4/6/2015			
5010019-008	37.508155	-120.828732	Western Lower	Municipal	DHS	5010019-008	WELL NO. 08 - INACTIVE	5.7	7.00	9/16/2009	6.72	5.60	1/7/2015	0	0.00	1/26/2021	0.251	0.38	2/4/2021	209	277.00	9/12/2012	0		
5010019-013	37.500295	-120.837400	Western Lower	Municipal	DHS	5010019-013	WELL NO. 13				3.9	6.60	5/5/1997				0.009							11.10	4/18/2012
5010019-015	37.492282	-120.865397	Western Lower	Municipal	DHS	5010019-015	WELL NO. 15				3.68	3.25	11/18/2014	1.49											
5010019-020	37.521570	-120.862909	Western Unknown	Municipal	DHS	5010019-020	WELL NO. 20	9.58	11.00	8/11/1995	3.91	15.30	6/20/2012	0	0.00	4/7/2021									
5010019-022	37.478061	-120.848278	Western Lower	Municipal	DHS	5010019-022	WELL NO. 22	6.78	9.50	11/9/1994	5.25	5.90	11/14/2006	0	0.00	6/28/2021				219	340.00	6/18/2012			
5010019-024	37.510613	-120.821181	Western Lower	Municipal	DHS	5010019-024	WELL NO. 24		6.70	7/10/2003		12.70	12/16/2008		0.00	6/9/2021					260.00	10/31/1997		10.70	10/21/2004
5010019-027	37.528929	-120.844186	Western Unknown	Municipal	DHS	5010019-027	WELL NO. 27				9.38	7.70	7/19/2006												
5010019-029	37.507520	-120.846683	Western Lower	Municipal	DHS	5010019-029	WELL NO. 29		7.90	7/22/2008	5.47						0.0074	0.01	11/7/2019						
5010019-030	37.483806	-120.852888	Western Lower	Municipal	DHS	5010019-030	WELL NO. 30	4.08	8.00	3/11/2004	7.88	9.10	12/9/2009	3.35	4.04	7/12/2018	0.0058	0.01	11/7/2019	258	372.00	4/23/2015			
5010019-031	37.526208	-120.867383	Western Lower	Municipal	DHS	5010019-031	WELL NO. 31	9.1	12.00	10/20/2009	7.8	6.97	5/5/2021	0	0.00	2/4/2021				227	261.00	2/21/2018			
5010019-032	37.518120	-120.830282	Western Lower	Municipal	DHS	5010019-032	WELL NO. 32				5.73	11.20	8/3/2015												
5010019-033	37.487303	-120.830422	Western Lower	Municipal	DHS	5010019-033	WELL NO. 33	4.21	5.90	2/15/2007	8.49	7.84	4/14/2021												
5010019-034	37.499165	-120.880688	Western Lower	Municipal	DHS	5010019-034	WELL NO. 34	8.74	10.00	4/24/2013	7.45	6.35	10/20/2009	0	0.00	4/7/2021				284	374.00	7/29/2009			
5010019-035	37.520949	-120.889889	Western Lower	Municipal	DHS	5010019-035	WELL NO. 35		12.00	7/29/2009		8.45	6/25/2014		0.00	4/7/2021		0.03	11/7/2019		308.00	4/23/2018			
5010019-037	37.536250	-120.862028	Western Lower	Municipal	DHS	5010019-037	WELL NO. 37				4.05	4.50	2/9/2005												
5010019-039	37.528722	-120.826028	Western Unknown	Municipal	DHS	5010019-039	WELL NO. 39				9.86	8.81	7/1/2020												
5010019-040	37.488500	-120.869000	Western Unknown	Municipal	DHS	5010019-040	WELL NO. 40				6.41	6.30	12/6/2010												
5010021-007	37.523135	-120.803480	Eastern	Municipal	DHS	5010021-007	WELL 07				9.54	10.60	8/23/2012	0	0.00	10/8/2020							4.48		
5010021-008	37.529245	-120.789577	Eastern	Municipal	DHS	5010021-008	WELL 08				8.71	9.41	2/22/2021	0	0.00	10/8/2020									
5010021-009	37.517786	-120.798117	Eastern	Municipal	DHS	5010021-009	WELL PW-9		5.41	6/22/2021	3.61									198	230.00	4/20/2006			
5010021-010	37.527070	-120.803250	Eastern	Municipal	DHS	5010021-010	WELL PW-10				8.26	9.02	2/22/2021							238					
5010023-001	37.488310	-120.835690	Western Lower	Municipal	DHS	5010023-001	WELL 255 - COTTONWOOD				1.5	4.30	7/10/2013				0	0.00	5/12/2021						
5010023-002	37.486240	-120.821720	Western Lower	Municipal	DHS	5010023-002	WELL 275 - BRIER				5.5	5.80	6/8/2022				0	0.00	5/12/2021				13		
5010026-001	37.623830	-120.754060	Eastern	Municipal	DHS	5010026-001	WELL NO. 272	0	3.00	10/7/1997	6.9						0			180					
5010026-003	37.617820	-120.750820	Eastern	Municipal	DHS	5010026-003	WELL 309 - RAW	2.26	3.00	11/2/2010	4.26	8.54	10/15/2014				0			140					
5010028-014	37.601483	-120.951761	Western Upper	Municipal	DHS	5010028-014	WELL 14 - RAW	4.3	8.70	10/6/2020				6.5	7.30	11/7/2017	0	0.00	4/6/2021	596	710.00	11/18/2004	8.12		
5010028-016	37.610147	-120.940866	Western Upper	Municipal	DHS	5010028-016	WELL 16 - RAW	3.5			9.83	12.00	10/30/2015		2.70	11/3/2020	0.0073	0.04	10/6/2020	647	640.00	1/16/2019			
5010028-021	37.590832	-120.941204	Western Upper	Municipal	DHS	5010028-021	WELL 21 - ROEDING HGTS - INACTIVE					10.00	11/4/2015					0.01	10/6/2015						
5010028-022	37.600482	-120.970632	Western Upper	Municipal	DHS	5010028-022	WELL 22 - RAW - IX - U				6.73	9.10	9/8/1999				0.0328	0.05	4/6/2016	578	660.00	7/9/2019	25.6	39.00	9/10/2009
5010028-023	37.609525	-120.949239	Western Unknown	Municipal	DHS	5010028-023	WELL 23 - RAW	6.1	12.00	10/6/2015							0	0.04	9/11/2018	580	860.00	9/8/2010			
5010028-025	37.608862	-120.931656	Western Upper	Municipal	DHS	5010028-025	WELL 25 (BOOTHE ROAD WELL)					12.00	4/7/2010					0.14	10/6/2020						
5010028-027	37.590515	-120.951229	Western Lower	Municipal	DHS	5010028-027	WELL 27 - RAW	7.75	16.00	9/18/2007	1.8	5.90	4/6/2005	0	0.00	4/6/2021	0.0057	0.01	1/17/2018	422	490.00	12/10/2019			
5010028-028	37.610556	-120.925556	Eastern	Municipal	DHS	5010028-028	WELL 28 - RAW TO GAC				7.88	9.10	10/6/2015				0.0437	0.12	7/9/2015	353	430.00	10/6/2020			
5010028-032	37.579007	-120.966352	Western Unknown	Municipal	DHS	5010028-032	WELL 32 - RAW - MN & AS		19.00	12/1/2020		4.24	10/15/2009					0.07	5/4/2021		519.00	3/12/2019			
5010028-034	37.620719	-120.961892	Western Unknown	Municipal	DHS	5010028-034	WELL 34 - RAW	3.23	7.10	2/10/2010	6.81						0	0.00	4/6/2021	1050	1600.00	7/7/2020			
5010028-035	37.587925	-120.997504	Western Unknown	Municipal	DHS	5010028-035	WELL 35- RAW					13.00	11/22/2021					0.00	1/5/2021		370.00	10/6/2020			
5010028-038	37.607516	-120.925565	Eastern	Municipal	DHS	5010028-038	WELL 38 - RAW TO GAC	4.52	7.50	7/10/2012	12.9	13.00	11/2/2021	0			0.1267	0.13	8/7/2018	560	490.00	10/6/2020	5.3	6.57	11/9/2020
5010028-039	37.598607	-120.945336	Western Unknown	Municipal	DHS	5010028-039	WELL 39 - RAW	5.31	8.70	2/16/2012	9.04	9.00	8/19/2019	0			0.2831	0.27	9/13/2022	432	510.00	10/29/2014			
5010028-040	37.598732	-120.945336	Western Unknown	Municipal	DHS	5010028-040	WELL 40 - RAW	5.33	8.11	4/12/2017	4.3	4.00	6/8/2021				0.039	0.05	3/2/2021	391	555.00	10/6/2020			
5010028-041	37.612238	-120.945483	Western Unknown	Municipal	DHS	5010028-041	WELL 41 - RAW	4.07	6.80	9/13/2017	7.97	9.60	10/6/2020	0	0.79	9/13/2017	0	0.00	4/6/2021	1110	1700.00	6/11/2019	22.3	22.20	10/6/2020
5010031-001	37.612590	-120.953800	Western Upper	Municipal	DHS	5010031-001	WELL 213 - WALNUT MANOR	2.8	3.40	5/12/2021	2.1	3.40	5/12/2021				0	0.50	10/4/2000	740	830.00	5/9/2018			
5010034-002	37.520180	-120.845540	Western Lower	Municipal	DHS	5010034-002	WELL 256 - HAYES				9.9	9.70	7/10/2019				0	0.00	5/12/2021						
AGW080010234-ROEDING	37.588329	-120.806049	Eastern	Domestic	AGLAND	ROEDING	ROEDING					0.54	6/24/2021												
AGW080010235-WHITMORE	37.592939	-120.785350	Eastern	Domestic	AGLAND	WHITMORE	WHITMORE					9.65	6/24/2021												
AGW080010525-HOME	37.629305	-120.712343	Eastern	Domestic	AGLAND	HOME	HOME					1.19	3/13/2019												
AGW080010531-HOME	37.369915	-120.869460	Western Unknown	Domestic	AGLAND	HOME	HOME					3.30	3/4/2021												
AGW080010533-3607	37.480500	-120.890800	Western Unknown	Domestic	AGLAND	3607	3607					5.52	2/19/2019												
AGW080010536-HOME	37.469484	-120.766781	Western Unknown	Domestic	AGLAND	HOME	HOME					8.80	1/12/2021												
AGW080010537-SHOP	37.365480	-120.875720	Western Unknown	Domestic	AGLAND	SHOP	SHOP					16.50	11/3/2020												
AGW080010538-HOME	37.439076	-120.692895	Eastern	Domestic	AGLAND	HOME	HOME					0.49	6/28/2022												
AGW080010542-BARN	37.441631	-120.694072	Eastern	Domestic	AGLAND	BARN	BARN					3.10	6/28/2022												
AGW080010543-HOME	37.597547	-120.821764	Eastern	Domestic	AGLAND	HOME	HOME					1.24	2/27/2019												
AGW080010547-MINT	37.412770	-120.902190	Western Unknown	Domestic	AGLAND	MINT	MINT					0.20	12/8/2020												
AGW080010559-HOME	37.519800	-120.584300	Eastern	Domestic	AGLAND	HOME	HOME					1.51	10/6/2021												
AGW080010560-LEE	37.479700	-120.648500	Eastern	Domestic	AGLAND	LEE	LEE					4.54	2/14/2019												
AGW080010561-MAIN WELL	37.604244	-120.779648	Eastern	Domestic	AGLAND	MAIN WELL	MAIN WELL					11.40	2/11/2022												
AGW080010575-4212	37.454358	-120.884530	Western Unknown	Domestic	AGLAND	4212	4212					5.72	11/29/2021												

Appendix D - Water Quality Monitoring Network, WY 2024

								Arsenic			Nitrate as N			PCE			TCP			TDS			Uranium		
Well ID	Latitude	Longitude	Principal Aquifer	Well Type	Dataset Name[1]	Alternative Well ID	Alternative Well ID 2	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date
AGW080010660-HOME	37.544179	-120.839542	Eastern	Domestic	AGLAND	HOME	HOME					21.10	12/5/2020												
AGW080010869-3812	37.457813	-120.884758	Western Unknown	Domestic	AGLAND	3812	3812					8.21	2/9/2021												
AGW080010870-4018	37.456025	-120.884768	Western Unknown	Domestic	AGLAND	4018	4018					0.94	4/3/2019												
AGW080010881-2124	37.557366	-120.780000	Eastern	Domestic	AGLAND	2124	2124					1.86	5/3/2019												
AGW080010890-HOUSE	37.522000	-120.895800	Western Unknown	Domestic	AGLAND	HOUSE	HOUSE					17.70	11/11/2020												
AGW080010958-NEWN	37.523894	-120.785593	Eastern	Domestic	AGLAND	NEWN	NEWN					2.55	11/6/2020												
AGW080010984-6975	37.471932	-120.610719	Eastern	Domestic	AGLAND	6975	6975					9.16	11/5/2019												
AGW080010985-7310	37.462952	-120.615741	Eastern	Domestic	AGLAND	7310	7310					2.59	11/5/2019												
AGW080010986-4166	37.499424	-120.560559	Eastern	Domestic	AGLAND	4166	4166					5.23	11/5/2019												
AGW080010987-1999	37.462587	-120.705583	Eastern	Domestic	AGLAND	1999	1999					9.52	11/5/2019												
AGW080010995-HOME	37.581965	-120.868989	Eastern	Domestic	AGLAND	HOME	HOME					9.41	8/26/2019												
AGW080011001-HOME	37.469500	-120.799600	Western Unknown	Domestic	AGLAND	HOME	HOME					7.63	9/13/2019												
AGW080011002-HOME	37.468000	-120.799700	Western Unknown	Domestic	AGLAND	HOME	HOME					6.63	1/3/2021												
AGW080011003-2	37.403100	-120.881000	Western Unknown	Domestic	AGLAND	2	2					0.00	10/28/2020												
AGW080011019-DW1	37.588366	-120.802569	Eastern	Domestic	AGLAND	DW1	DW1					0.00	4/12/2021												
AGW080011026-R1N	37.629535	-120.680159	Eastern	Domestic	AGLAND	R1N	R1N					0.98	5/12/2021												
AGW080011027-R2	37.619413	-120.672018	Eastern	Domestic	AGLAND	R2	R2					0.00	5/12/2021												
AGW080011028-L & J	37.619659	-120.668481	Eastern	Domestic	AGLAND	L & J	L & J					0.00	5/12/2021												
AGW080011030-ETV	37.532023	-120.454282	Eastern	Domestic	AGLAND	ETV	ETV					1.46	5/14/2021												
AGW080011036-1106	37.607577	-120.786471	Eastern	Domestic	AGLAND	1106	1106					8.94	7/2/2021												
AGW080011037-1113	37.607577	-120.786471	Eastern	Domestic	AGLAND	1113	1113					9.54	6/4/2021												
AGW080011038-RAM	37.578455	-120.899430	Western Unknown	Domestic	AGLAND	RAM	RAM					7.90	6/22/2020												
AGW080011050-DW1	37.462142	-120.846957	Western Unknown	Domestic	AGLAND	DW1	DW1					5.19	11/22/2021												
AGW080011059-9844	37.581592	-120.843487	Eastern	Domestic	AGLAND	9844	9844					0.50	5/21/2019												
AGW080011060-9840	37.581592	-120.843487	Eastern	Domestic	AGLAND	9840	9840					0.46	10/28/2021												
AGW080011074-5231	37.561137	-120.803503	Eastern	Domestic	AGLAND	5231	5231					6.50	6/22/2020												
AGW080011075-5131	37.563826	-120.803506	Eastern	Domestic	AGLAND	5131	5131					5.94	12/8/2020												
AGW080011076-5024	37.562955	-120.794392	Eastern	Domestic	AGLAND	5024	5024					5.91	6/4/2021												
AGW080011078-CORT	37.439231	-120.737584	Western Unknown	Domestic	AGLAND	CORT	CORT					8.49	6/4/2019												
AGW080011149-OLD	37.446749	-120.906006	Western Unknown	Domestic	AGLAND	OLD	OLD					6.73	11/10/2020												
AGW080011150-NEW	37.446749	-120.906006	Western Unknown	Domestic	AGLAND	NEW	NEW					2.83	10/14/2021												
AGW080011153-BDOM	37.435743	-120.759730	Western Unknown	Domestic	AGLAND	BDOM	BDOM					6.66	12/23/2020												
AGW080011279-6118	37.376900	-120.868000	Western Unknown	Domestic	AGLAND	6118	6118					3.75	2/8/2021												
AGW080011371-GRAY	37.565097	-120.789199	Eastern	Domestic	AGLAND	GRAY	GRAY					5.89	4/15/2021												
AGW080011435-DOMESTIC	37.507551	-120.795933	Western Unknown	Domestic	AGLAND	DOMESTIC	DOMESTIC					5.23	12/28/2021												
AGW080011438-HOME	37.494053	-120.881201	Western Unknown	Domestic	AGLAND	HOME	HOME					3.75	11/4/2019												
AGW080011476-SFRDW	37.484500	-120.757300	Eastern	Domestic	AGLAND	SFRDW	SFRDW					6.06	4/6/2021												
AGW080011477-DW6	37.453300	-120.767200	Western Unknown	Domestic	AGLAND	DW6	DW6					1.65	4/6/2021												
AGW080011488-2520	37.587446	-120.703530	Eastern	Domestic	AGLAND	2520	2520					2.54	11/18/2021												
AGW080011491-2650	37.587446	-120.703530	Eastern	Domestic	AGLAND	2650	2650					2.82	11/18/2021												
AGW080011753-HOME	37.622599	-120.861976	Eastern	Domestic	AGLAND	HOME	HOME					13.80	1/22/2021												
AGW080011765-TODD	37.572712	-120.801952	Eastern	Domestic	AGLAND	TODD	TODD					7.07	12/11/2020												
AGW080011853-DW1	37.597430	-120.775194	Eastern	Domestic	AGLAND	DW1	DW1					3.56	12/14/2020												
AGW080012002-HOME	37.372386	-120.898798	Western Unknown	Domestic	AGLAND	HOME	HOME					0.00	11/30/2020												
AGW080012046-GARY	37.447091	-120.957022	Western Unknown	Domestic	AGLAND	GARY	GARY					31.80	11/13/2020												
AGW080012048-4512	37.549568	-121.078133	Western Unknown	Domestic	AGLAND	4512	4512					5.80	11/20/2019												
AGW080012049-1754	37.504060	-121.020683	Western Unknown	Domestic	AGLAND	1754	1754					5.85	11/20/2019												
AGW080012050-5000	37.543952	-121.089285	Western Unknown	Domestic	AGLAND	5000	5000					5.82	11/20/2019												
AGW080012062-3939	37.588482	-120.921637	Western Unknown	Domestic	AGLAND	3939	3939					5.26	11/21/2019												
AGW080012063-3119	37.590252	-120.921638	Western Unknown	Domestic	AGLAND	3119	3119					9.38	9/20/2021												
AGW080012065-1008	37.434698	-120.698960	Eastern	Domestic	AGLAND	1008	1008					4.56	11/17/2020												
AGW080012150-HOME	37.589069	-120.785863	Eastern	Domestic	AGLAND	HOME	HOME					3.16	11/21/2019												
AGW080012187-4854	37.568418	-120.854961	Eastern	Domestic	AGLAND	4854	4854					4.62	9/27/2021												
AGW080012188-9951	37.490812	-120.666255	Eastern	Domestic	AGLAND	9951	9951					0.28	11/26/2019												
AGW080012189-9995	37.483440	-120.659168	Eastern	Domestic	AGLAND	9995	9995					0.42	10/25/2021												
AGW080012190-2426	37.572946	-120.572870	Eastern	Domestic	AGLAND	2426	2426					0.39	10/25/2021												
AGW080012257-SN	37.481100	-120.573700	Eastern	Domestic	AGLAND	SN	SN					0.00	12/21/2020												
AGW080012264-SCH	37.426100	-120.799900	Western Unknown	Domestic	AGLAND	SCH	SCH					0.00	12/21/2020												
AGW080012280-HOME	37.384916	-120.823033	Western Unknown	Domestic	AGLAND	HOME	HOME					0.00	11/30/2020												
AGW080012407-5518	37.547004	-120.619613	Eastern	Domestic	AGLAND	5518	5518					2.95	6/14/2021												
AGW080012998-HOUSE 1	37.493817	-120.496787	Eastern	Domestic	AGLAND	HOUSE 1	HOUSE 1					0.00	5/12/2021												
AGW080013008-TJ	37.513991	-120.639849	Eastern	Domestic	AGLAND	TJ	TJ					2.93	12/23/2019												
AGW080013009-CJ	37.534777	-120.695175	Eastern	Domestic	AGLAND	CJ	CJ					1.74	12/17/2020												
AGW080013010-DA1	37.499239	-120.672505	Eastern	Domestic	AGLAND	DA1	DA1					8.78	12/23/2019												
AGW080013011-TSJ	37.465473	-120.623176	Eastern	Domestic	AGLAND	TSJ	TSJ					1.93	12/17/2020												
AGW080013012-SG	37.479481	-120.727192	Eastern	Domestic	AGLAND	SG	SG					8.63	12/16/2020												
AGW080013014-ME	37.487661	-120.816474	Western Unknown	Domestic	AGLAND	ME	ME					8.65	12/23/2019												
AGW080013016-SH	37.571687	-120.730600	Eastern	Domestic	AGLAND	SH	SH					1.22	12/24/2019												
AGW080013075-2406	37.571895	-120.951792	Western Unknown	Domestic	AGLAND	2406	2406					9.82	1/11/2021												
AGW080013076-2800	37.560314	-120.942291	Western Unknown	Domestic	AGLAND	2800	2800					9.07	11/16/2020												
AGW080013077-2454	37.572307	-120.950467	Western Unknown	Domestic	AGLAND	2454	2454					7.99	1/11/2021												
AGW080013078-2513	37.571262	-120.950495	Western Unknown	Domestic	AGLAND	2513	2513					6.79	12/26/2019												
AGW080013079-2537	37.573955	-120.948982	Western Unknown	Domestic	AGLAND	2537	2537					1.67	12/26/2019												
AGW080013203-PD WELL	37.455854	-120.861547	Western Unknown	Domestic	AGLAND	PD WELL	PD WELL					1.10	12/16/2020												
AGW080013204-PD WELL	37.457214	-120.861550	Western Unknown	Domestic	AGLAND	PD WELL	PD WELL					15.00	12/16/2020												
AGW080013787-5925	37.582081	-120.885266	Western Unknown	Domestic	AGLAND	5925	5925				6.14	8.40	3/10/2020												
AGW080013788-5142	37.592903	-120.898373	Western Unknown	Domestic	AGLAND	5142	5142				8.79	9.26	3/10/2020												
AGW080013789-EAST	37.531885	-120.803630	Eastern	Domestic	AGLAND	EAST	EAST					19.30	5/25/2021												
AGW080013790-WEST	37.530143	-120.806444	Eastern	Domestic	AGLAND	WEST	WEST					22.20	5/25/2021												
AGW080015008-KENS	37.451643	-120.784680	Western Unknown	Domestic	AGLAND	KENS	KENS					2.14	12/2/2021												
AGW080015009-JASN	37.449078	-120.778076	Western Unknown	Domestic	AGLAND	JASN	JASN					2.06	12/2/2021												
AGW080015010-CLAU	37.456483	-120.825073	Western Unknown	Domestic	AGLAND	CLAU	CLAU					45.10	10/28/2020												
AGW080015011-YNST	37.455781	-120.822151	Western Unknown	Domestic	AGLAND	YNST	YNST					39.10	10/28/2020												
AGW080015021-HOME	37.629974	-120.715143	Eastern	Domestic	AGLAND	HOME	HOME					0.29	11/13/2020												
AGW080015023-HOME	37.583325	-120.806816	Eastern	Domestic	AGLAND	HOME	HOME					23.70	11/12/2020												
AGW080015024-HOME	37.551464	-120.887411	Western Unknown	Domestic	AGLAND	HOME	HOME					24.40	10/28/2020												
AGW080015335-HOUSE	37.468419	-120.606007	Eastern	Domestic	AGLAND	HOUSE	HOUSE					2.10	11/10/2020												

Appendix D - Water Quality Monitoring Network, WY 2024

								Arsenic			Nitrate as N			PCE			TCP			TDS			Uranium		
Well ID	Latitude	Longitude	Principal Aquifer	Well Type	Dataset Name[1]	Alternative Well ID	Alternative Well ID 2	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date
AGW080016043-MONT	37.521939	-121.052140	Western Unknown	Domestic	AGLAND	MONT	MONT					50.10	12/26/2019												
AGW080016044-CARP	37.540109	-121.031234	Western Unknown	Domestic	AGLAND	CARP	CARP					26.20	12/9/2020												
AGW080016089-WELL	37.483876	-120.989930	Western Unknown	Domestic	AGLAND	WELL	WELL					35.10	12/17/2020												
AGW080016294-JOES	37.598875	-121.010777	Western Unknown	Domestic	AGLAND	JOES	JOES					24.40	10/26/2020												
AGW080016297-DADS	37.598873	-121.010605	Western Unknown	Domestic	AGLAND	DADS	DADS					20.90	10/26/2020												
AGW080016380-806	37.461767	-120.858739	Western Unknown	Domestic	AGLAND	806	806					24.60	11/24/2020												
AGW080016622-HOME	37.440150	-120.733550	Western Unknown	Domestic	AGLAND	HOME	HOME					28.80	12/21/2020												
AGW080016899-4104	37.627663	-120.707883	Eastern	Domestic	AGLAND	4104	4104					0.15	11/24/2020												
AGW080017055-HOME	37.425010	-120.694740	Eastern	Domestic	AGLAND	HOME	HOME					2.42	12/30/2020												
AGW080017184-STG	37.517845	-120.756615	Eastern	Domestic	AGLAND	STG	STG					16.70	12/18/2020												
AGW080017265-HOME	37.439491	-120.711176	Eastern	Domestic	AGLAND	HOME	HOME					9.08	1/14/2021												
AGW080017270-HOME	37.449883	-120.833154	Western Unknown	Domestic	AGLAND	HOME	HOME					35.80	12/30/2020												
AGW080017272-WOOD	37.573880	-120.959530	Western Unknown	Domestic	AGLAND	WOOD	WOOD					20.10	12/21/2020												
AGW080017733-WHITE	37.517167	-120.507340	Eastern	Domestic	AGLAND	WHITE	WHITE					0.00	5/12/2021												
AGW080017795-HOME	37.434300	-120.907900	Western Unknown	Domestic	AGLAND	HOME	HOME					20.90	12/11/2020												
AGW080018045-JONS	37.493170	-120.913824	Western Unknown	Domestic	AGLAND	JONS	JONS				0.42	0.00	2/8/2021												
AGW080018046-MIKE	37.507762	-120.897625	Western Unknown	Domestic	AGLAND	MIKE	MIKE					20.10	2/8/2021												
AGW080018047-FRAN	37.493180	-120.916412	Western Unknown	Domestic	AGLAND	FRAN	FRAN					21.70	2/8/2021												
AGW080018519-NAVE	37.442742	-120.730063	Western Unknown	Domestic	AGLAND	NAVE	NAVE					24.50	3/23/2021												
AGW080020081-SHED	37.410195	-120.749260	Western Unknown	Domestic	AGLAND	SHED	SHED					0.00	4/19/2021												
AGW080020082-TJR	37.442707	-120.695989	Eastern	Domestic	AGLAND	TJR	TJR					2.56	4/19/2021												
AGW080020083-SHLO	37.430433	-120.690908	Eastern	Domestic	AGLAND	SHLO	SHLO					1.05	4/15/2021												
AGW080020084-EC85	37.435577	-120.715855	Western Unknown	Domestic	AGLAND	EC85	EC85					5.12	4/14/2021												
L10005824413-MW-28D	37.624046	-120.865806	Eastern	Monitoring	EDF	MW-28D	MW-28D	2.1	4.90	2/17/2015	7.1	14.00	11/3/2014	0	0.00	5/12/2021	0	0.00	5/12/2021	350	550.00	11/3/2014			
L10005824413-MW-28S	37.624062	-120.865806	Eastern	Monitoring	EDF	MW-28S	MW-28S	4.3	15.00	11/12/2018	10	12.00	12/1/2021	0	1.20	2/8/2017	0	0.00	5/12/2021	600	660.00	5/12/2021			
L10005824413-MW-29D	37.620449	-120.865761	Eastern	Monitoring	EDF	MW-29D	MW-29D	3.9	13.00	11/12/2018	13	12.00	8/13/2013	0	0.00	5/12/2021	0	0.00	5/12/2021	530	620.00	8/15/2012			
L10005824413-MW-29S	37.620463	-120.865762	Eastern	Monitoring	EDF	MW-29S	MW-29S	0	2.90	2/9/2016	21	34.00	8/8/2017	0	0.33	5/13/2014	0	0.00	5/12/2021	840	1100.00	8/8/2017			
L10005824413-MW-30D	37.615793	-120.865692	Eastern	Monitoring	EDF	MW-30D	MW-30D	0	4.10	5/21/2013	2.3	14.00	10/3/2012	0	0.30	8/18/2015	0	0.00	5/12/2021	160	530.00	8/15/2012			
L10005824413-MW-30S	37.615809	-120.865692	Eastern	Monitoring	EDF	MW-30S	MW-30S	2	3.20	8/15/2012	15	22.00	8/15/2012	0	1.00	5/13/2014	0	0.00	5/12/2021	600	660.00	8/15/2012			
S12-TU02	37.544139	-120.528278	Eastern	Municipal	USGS	S12-TU02	S12-TU02		2.50	10/21/2020		5.13	10/21/2020		0.00	10/21/2020		0.00	10/21/2020		166.00	10/21/2020		0.14	10/21/2020
S12-TU03-U	37.536333	-120.794361	Eastern	Municipal	USGS	S12-TU03-U	S12-TU03-U		3.20	10/22/2020		11.70	10/22/2020		0.00	10/22/2020		0.00	10/22/2020		286.00	10/22/2020		5.42	10/22/2020
S12-TU04	37.588556	-121.035778	Western Unknown	Municipal	USGS	S12-TU04	S12-TU04		4.10	11/2/2020		20.20	11/2/2020		0.00	11/2/2020		0.00	11/2/2020		515.00	11/2/2020		21.30	11/2/2020
S12-TU05	37.591972	-120.892056	Eastern	Municipal	USGS	S12-TU05	S12-TU05		3.30	11/2/2020		22.20	11/2/2020		0.00	11/2/2020		0.00	11/2/2020		461.00	11/2/2020		12.10	11/2/2020
S12-TU06-U	37.564186	-121.057347	Western Unknown	Municipal	USGS	S12-TU06-U	S12-TU06-U		3.70	11/3/2020		7.24	11/3/2020		0.00	11/3/2020		0.00	11/3/2020		521.00	11/3/2020		28.40	11/3/2020
S12-TU07	37.561611	-120.720472	Eastern	Municipal	USGS	S12-TU07	S12-TU07		7.30	11/4/2020		1.72	11/4/2020		0.00	11/4/2020		0.00	11/4/2020		131.00	11/4/2020		0.19	11/4/2020
S12-TU08	37.588889	-120.880139	Eastern	Municipal	USGS	S12-TU08	S12-TU08		10.30	11/5/2020		6.48	11/5/2020		0.00	11/5/2020		0.00	11/5/2020		238.00	11/5/2020		0.49	11/5/2020
S12-TU09-U	37.572058	-120.783128	Eastern	Municipal	USGS	S12-TU09-U	S12-TU09-U		4.00	11/16/2020		9.27	11/16/2020		0.00	11/16/2020		0.00	11/16/2020		320.00	11/16/2020		4.32	11/16/2020
S12-TU10-U	37.479194	-120.831361	Western Unknown	Municipal	USGS	S12-TU10-U	S12-TU10-U		8.20	11/16/2020		7.08	11/16/2020		0.00	11/16/2020		0.00	11/16/2020		367.00	11/16/2020		18.60	11/16/2020
S12-TU11	37.519611	-120.345389	Eastern	Municipal	USGS	S12-TU11	S12-TU11		0.20	11/17/2020		0.00	11/17/2020		0.00	11/17/2020		0.00	11/17/2020		208.00	11/17/2020		0.00	11/17/2020
S12-TU12	37.492467	-120.949633	Western Unknown	Municipal	USGS	S12-TU12	S12-TU12		14.20	11/17/2020		31.60	11/17/2020		0.00	11/17/2020		0.00	11/17/2020		531.00	11/17/2020		43.10	11/17/2020
S12-TU13	37.540944	-121.071917	Western Unknown	Municipal	USGS	S12-TU13	S12-TU13		2.30	11/19/2020		10.80	11/19/2020		0.00	11/19/2020		0.00	11/19/2020		657.00	11/19/2020		128.00	11/19/2020
S12-TU14	37.438389	-120.885083	Western Unknown	Municipal	USGS	S12-TU14	S12-TU14		18.90	12/1/2020		69.30	12/1/2020		0.00	12/1/2020		0.00	12/1/2020		946.00	12/1/2020		21.40	12/1/2020
S12-TU15	37.519139	-120.995806	Western Unknown	Municipal	USGS	S12-TU15	S12-TU15		5.30	12/2/2020		16.90	12/2/2020		0.00	12/2/2020		0.00	12/2/2020		642.00	12/2/2020		49.90	12/2/2020
S12-TU16	37.389375	-120.928928	Western Unknown	Municipal	USGS	S12-TU16	S12-TU16		1.50	12/2/2020		19.60	12/2/2020		0.00	12/2/2020		0.00	12/2/2020		912.00	12/2/2020		182.00	12/2/2020
S12-TU17	37.548000	-120.707472	Eastern	Municipal	USGS	S12-TU17	S12-TU17		6.90	1/11/2021		2.81	1/11/2021		0.00	1/11/2021		0.00	1/11/2021		152.00	1/11/2021		0.15	1/11/2021
S12-TU18	37.445789	-120.685283	Eastern	Municipal	USGS	S12-TU18	S12-TU18		1.30	1/12/2021		33.80	1/12/2021		0.00	1/12/2021		0.02	1/12/2021		570.00	1/12/2021		17.20	1/12/2021
S12-TU19-U	37.592083	-120.879583	Eastern	Municipal	USGS	S12-TU19-U	S12-TU19-U		3.50	1/14/2021		13.70	1/14/2021		0.02	1/14/2021		0.10	1/14/2021		476.00	1/14/2021		18.60	1/14/2021
S12-TU20-U	37.496806	-120.791222	Western Unknown	Municipal	USGS	S12-TU20-U	S12-TU20-U		3.10	1/26/2021		14.20	1/26/2021		0.00	1/26/2021		0.00	1/26/2021		519.00	1/26/2021		37.40	1/26/2021
S12-TU21	37.457433	-120.975972	Western Unknown	Municipal	USGS	S12-TU21	S12-TU21		5.40	1/26/2021		28.80	1/26/2021		0.00	1/26/2021		0.00	1/26/2021		1710.00	1/26/2021		116.00	1/26/2021
S12-TU22	37.419778	-120.771667	Western Unknown	Municipal	USGS	S12-TU22	S12-TU22		42.10	2/10/2021		0.00	2/10/2021		0.00	2/10/2021		0.01	2/10/2021		154.00	2/10/2021		0.00	2/10/2021
S12-TU23-U	37.422722	-120.755083	Western Unknown	Municipal	USGS	S12-TU23-U	S12-TU23-U		5.80	2/23/2021		4.46	2/23/2021		0.00	2/23/2021		0.05	2/23/2021		175.00	2/23/2021		1.18	2/23/2021
S12-TU24	37.544272	-120.792697	Eastern	Municipal	USGS	S12-TU24	S12-TU24		2.20	2/23/2021		24.20	2/23/2021		0.00	2/23/2021		0.00	2/23/2021		490.00	2/23/2021		9.50	2/23/2021
S12-TU25	37.462386	-120.744764	Western Unknown	Municipal	USGS	S12-TU25	S12-TU25		2.40	2/24/2021		84.80	2/24/2021		0.00	2/24/2021		0.51	2/24/2021		1410.00	2/24/2021		155.00	2/24/2021
S12-UP02	37.612417	-120.656528	Eastern	Municipal	USGS	S12-UP02	S12-UP02		2.80	10/20/2020		1.67	10/20/2020		0.00	10/20/2020		0.00	10/20/2020		166.00	10/20/2020		0.07	10/20/2020
S12-UP05	37.597139	-120.529778	Eastern	Municipal	USGS	S12-UP05	S12-UP05		3.50	1/13/2021		2.12	1/13/2021		0.00	1/13/2021		0.00	1/13/2021		167.00	1/13/2021		0.37	1/13/2021
S12-UP07-U	37.613056	-120.460417	Eastern	Municipal	USGS	S12-UP07-U	S12-UP07-U		2.40	3/8/2021		3.28	3/8/2021		0.00	3/8/2021		0.00	3/8/2021		127.00	3/8/2021		0.03	3/8/2021
S12-UP08	37.614278	-120.510639	Eastern	Municipal	USGS	S12-UP08	S12-UP08		4.70	3/9/2021		4.21	3/9/2021		0.00	3/9/2021		0.00	3/9/2021		231.00	3/9/2021		0.29	3/9/2021
S12-UP09-U	37.612028	-120.463194	Eastern	Municipal	USGS	S12-UP09-U	S12-UP09-U		4.40	3/9/2021		5.39	3/9/2021		0.00	3/9/2021		0.00	3/9/2021		203.00	3/9/2021		0.08	3/9/2021
SL0604737007-DW-25	37.423879	-120.867277	Western Unknown	Water Supply, Other	EDF	DW-25	DW-25		2.10	8/26/2014		52.00	9/14/2022								1200.00	9/14/2022			
SL0604737007-DW-27A	37.420036	-120.867092	Western Unknown	Water Supply, Other	EDF	DW-27A	DW-27A		5.60	5/19/2008		41.00	9/14/2022								1100.00	8/13/2021			
SL0604737007-DW-29A	37.419763	-120.866988	Western Unknown	Water Supply, Other	EDF	DW-29A	DW-29A		6.30	5/13/2008		39.00	8/13/2021								1500.00	9/14/2022			
SL0604737007-DW-58	37.427920	-120.856455	Western Unknown	Water Supply, Other	EDF	DW-58	DW-58		4.70	10/24/2017		49.00	8/13/2021								870.00	7/21/2020			
SL0604737007-DW-99	37.421022	-120.869018	Western Unknown	Water Supply, Other	EDF	DW-99	DW-99		5.40	5/14/2008		34.70	8/4/2015								980.00	9/14/2022			
SL0604737007-MW-01	37.421856	-120.854402	Western Unknown	Monitoring	EDF	MW-01	MW-01				41	80.20	11/9/2011							790	1160.00	4/15/2015			
SL0604737007-MW-05	37.419822	-120.856996	Western Unknown	Monitoring	EDF	MW-05	MW-05				53	35.00	10/10/2018							1200	888.00	4/3/2012			
SL0604737007-MW-07	37.422398	-120.852389	Western Unknown	Monitoring	EDF	MW-07	MW-07				0	0.45	4/5/2022							880	1720.00	10/15/2012			
SL0604737007-MW-13	37.427445	-120.849933	Western Unknown	Monitoring	EDF	MW-13	MW-13				46	159.00	11/9/2011							730	3140.00	11/9/2011			
SL0604737007-MW-15	37.426261	-120.856623	Western Unknown	Monitoring	EDF	MW-15	MW-15				78	102.00	10/12/2016							890	1420.00	11/9/2011			
T0609907848-MW-1	37.596957	-120.868610	Eastern	Monitoring	EDF	MW-1	MW-1								0.00	3/31/2021									
T0609907848-MW-10	37.597057	-120.868407	Eastern	Monitoring	EDF	MW-10	MW-10								0.00	3/31/2021									
T0609907848-MW-2	37.596940	-120.868923	Eastern	Monitoring	EDF	MW-2	MW-2								0.00	3/31/2021									
T0609907848-MW-3	37.597018	-120.868617	Eastern	Monitoring	EDF	MW-3	MW-3								0.00	3/31/2021									
T0609907848-MW-4	37.597054	-120.868708	Eastern	Monitoring	EDF	MW-4	MW-4								0.00	3/31/2021									
T0609907848-MW-5	37.597143	-120.868806	Eastern	Monitoring	EDF	MW-5	MW-5								0.00	3/31/2021									
T0609907848-MW-6	37.597153	-120.868695	Eastern	Monitoring	EDF	MW-6	MW-6								0.00	3/31/2021									
T0609907848-MW-7	37.597290	-120.868704	Eastern	Monitoring	EDF	MW-7	MW-7								0.00	3/31/2021									
T0609907848-MW-8	37.597157	-120.869147	Eastern	Monitoring	EDF	MW-8	MW-8								0.00	3/31/2021									
T0609907848-MW-9	37.597320	-120.868461	Eastern	Monitoring	EDF	MW-9	MW-9								0.00	3/31/2021									
T10000010311-MW-16	37.532792	-121.068599	Western Unknown	Monitoring	EDF	MW-16	MW-16				18	25.00	5/10/2021							1300	1200.00	2/10/2020			
T10000010311-MW-17	37.529613	-121.069876	Western Unknown	Monitoring	EDF	MW-17	MW-17				40	24.00	11/29/2021							1100	1000.00	11/18/2019			
T10000010311-MW-18	37.530049	-121.072148	Western Unknown	Monitoring	EDF	MW-18	MW-18				45	44.00	11/23/2020							1100	1400.00	11/23/2020			
T10000010311-MW-19	37.531706	-121.071433	Western Unknown	Monitoring	EDF	MW-19	MW-19				13	16.00	8/24/2020							1200	1200.00	8/24/2020			
T10000010311-MW-20	37.532036	-121.073432	Western Unknown	Monitoring	EDF	MW-20	MW-20				26	21.00	11/29/2021							1600	1500.00	2/10/2020			
T10000010311-MW-9	37.533587	-121.072639	Western Unknown	Monitoring	EDF	MW-9	MW-9				100	82.00	2/1/2021							2100	2000.00	11/23/2020			

Appendix D - Water Quality Monitoring Network, WY 2024

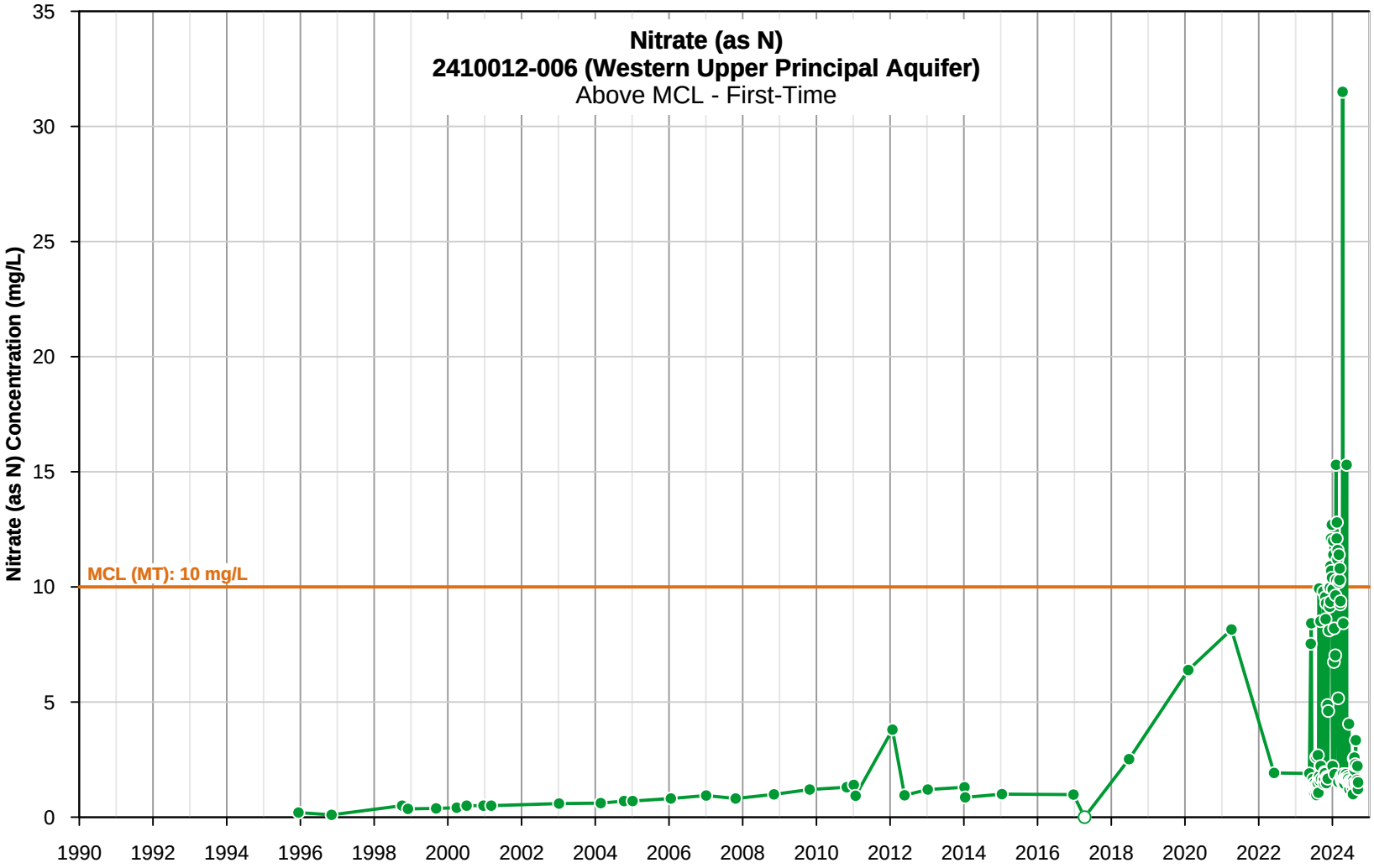
								Arsenic			Nitrate as N			PCE			TCP			TDS			Uranium		
Well ID	Latitude	Longitude	Principal Aquifer	Well Type	Dataset Name[1]	Alternative Well ID	Alternative Well ID 2	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date	WY 2024 Max	Historical Max Conc (ug/L) in Consideration of the MO	Date

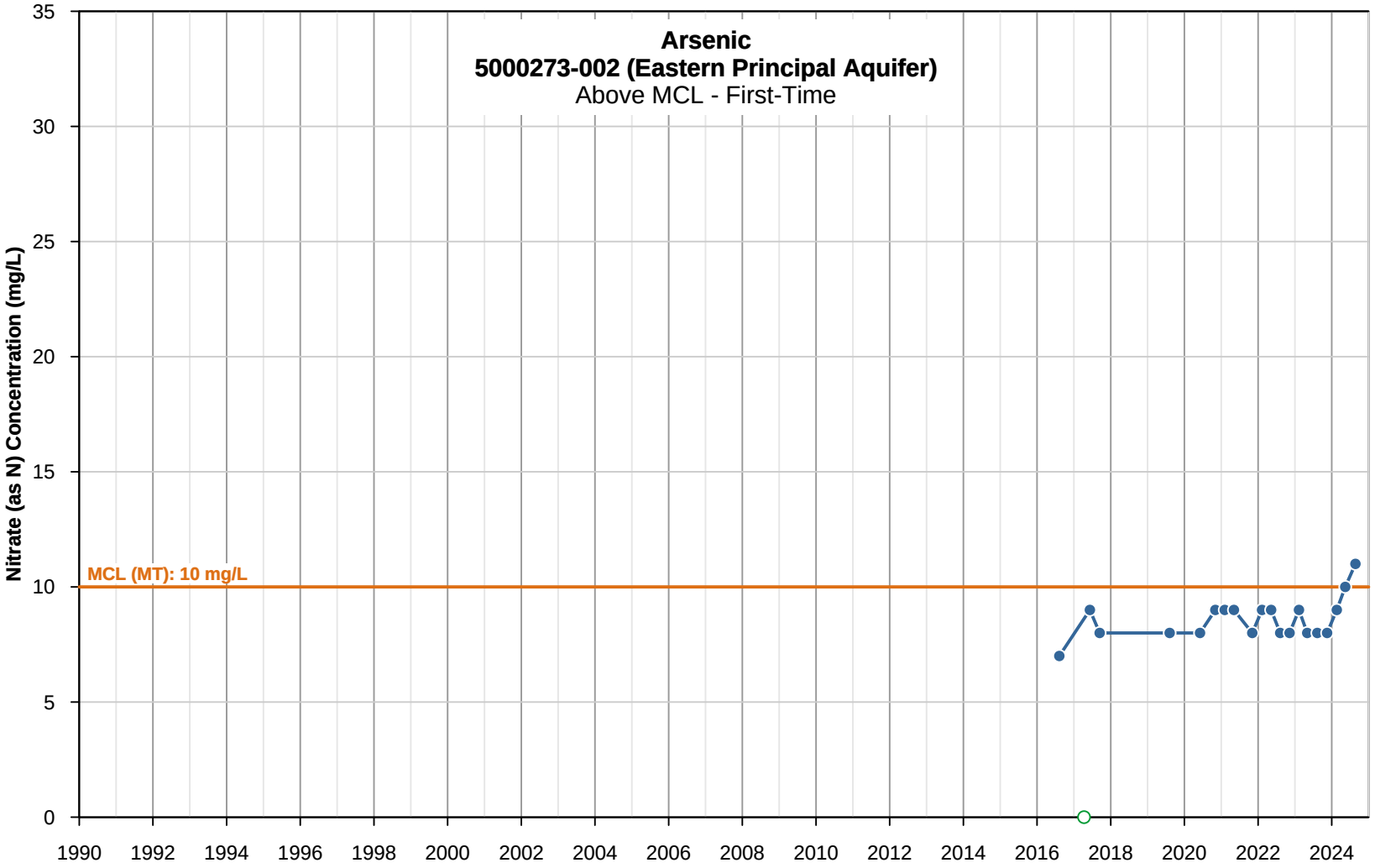
Abbreviations:

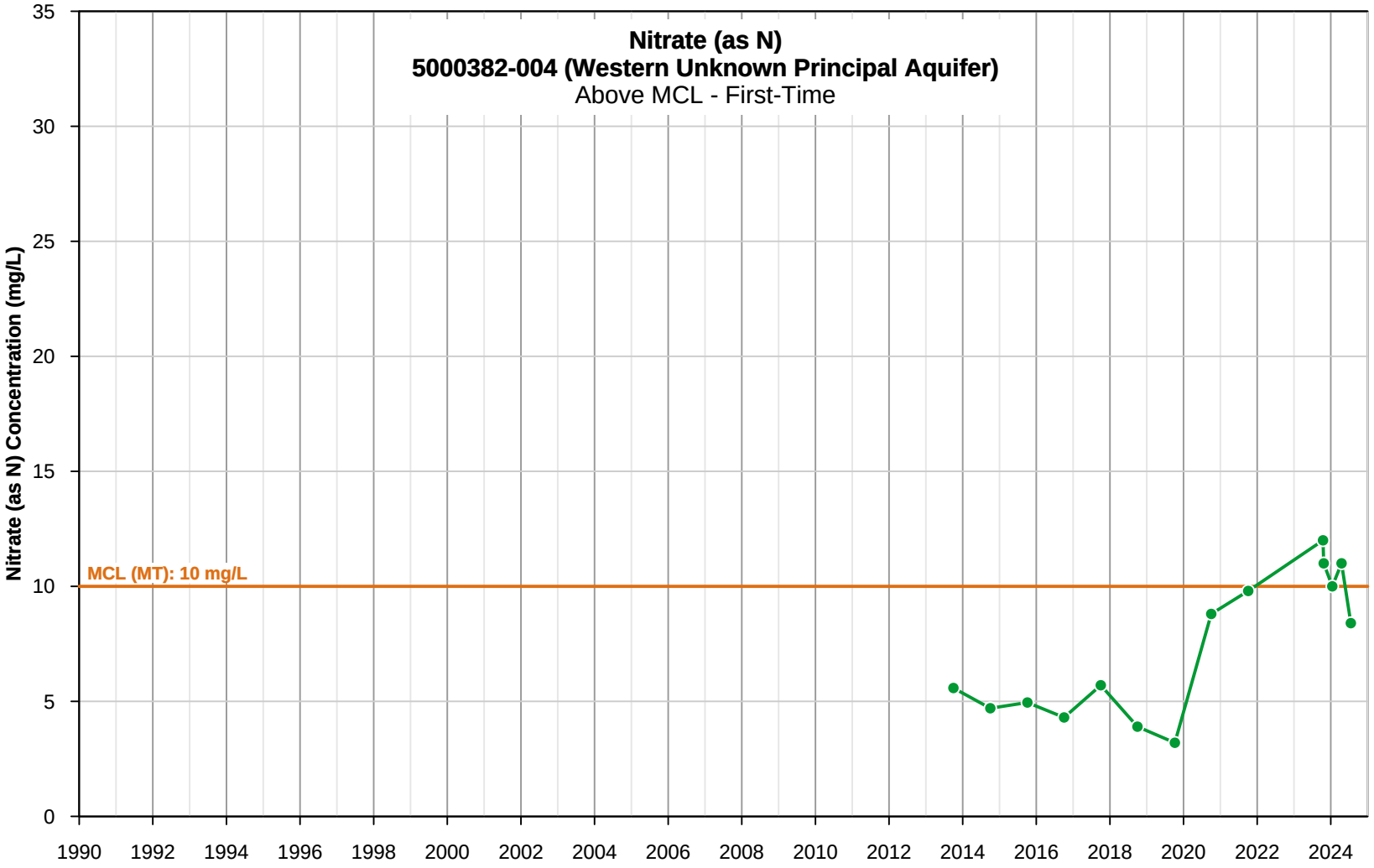
AGLAND- Domestic wells monitored by the SWRCB Irrigated Lands Regulatory Program
DHS- Untreated and unblended groundwater sampled from public supply wells and reported to the Division of Drinking Water, formerly Department of Health Services
EDF- Monitoring wells at regulated facilities reported by State Water Resources Control Board, submitted in Electronic Deliverable Format
USGS- Wells monitored by United States Geological Survey Groundwater Ambient Monitoring and Assessment (USGS-GAMA) program

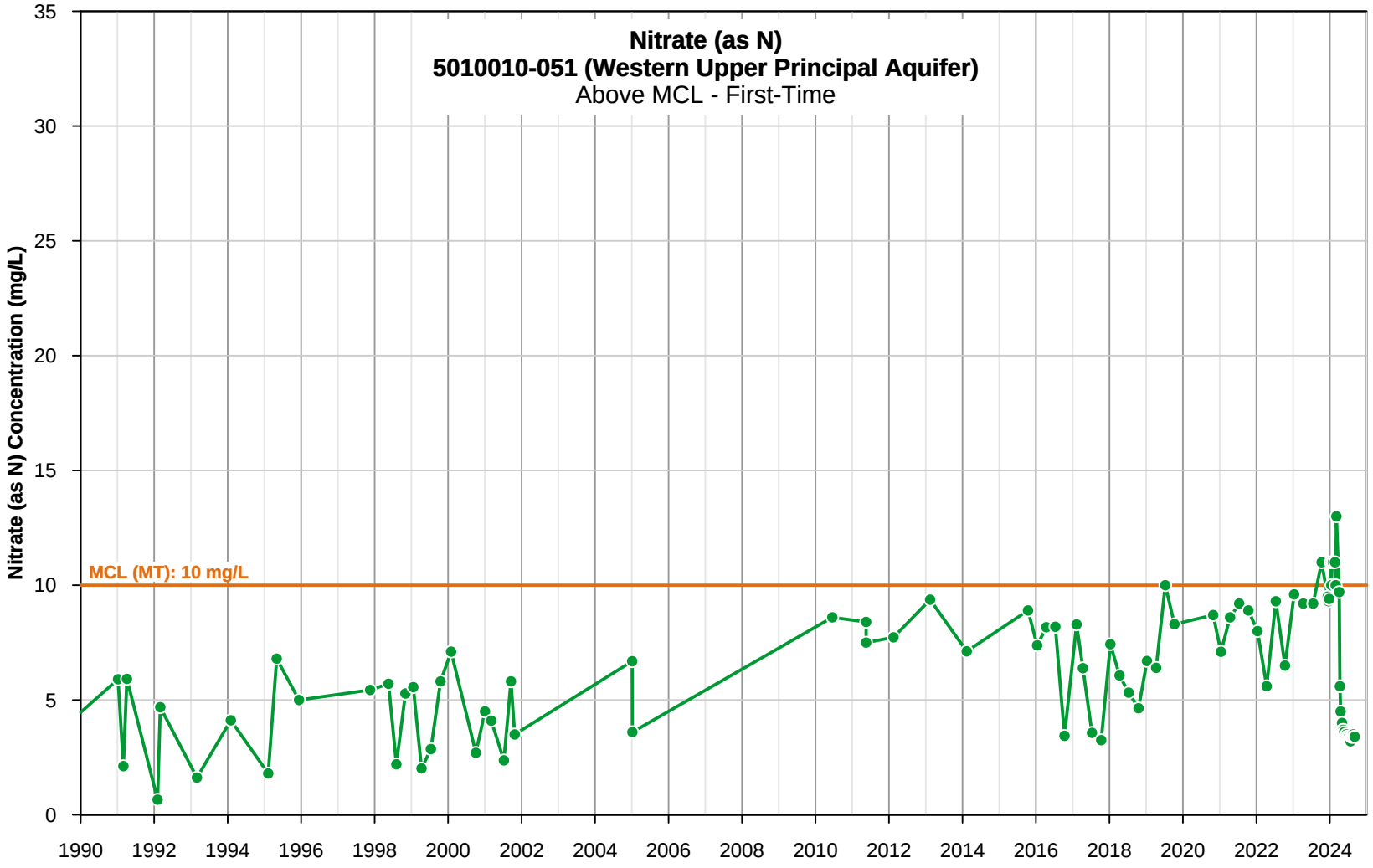
APPENDIX E

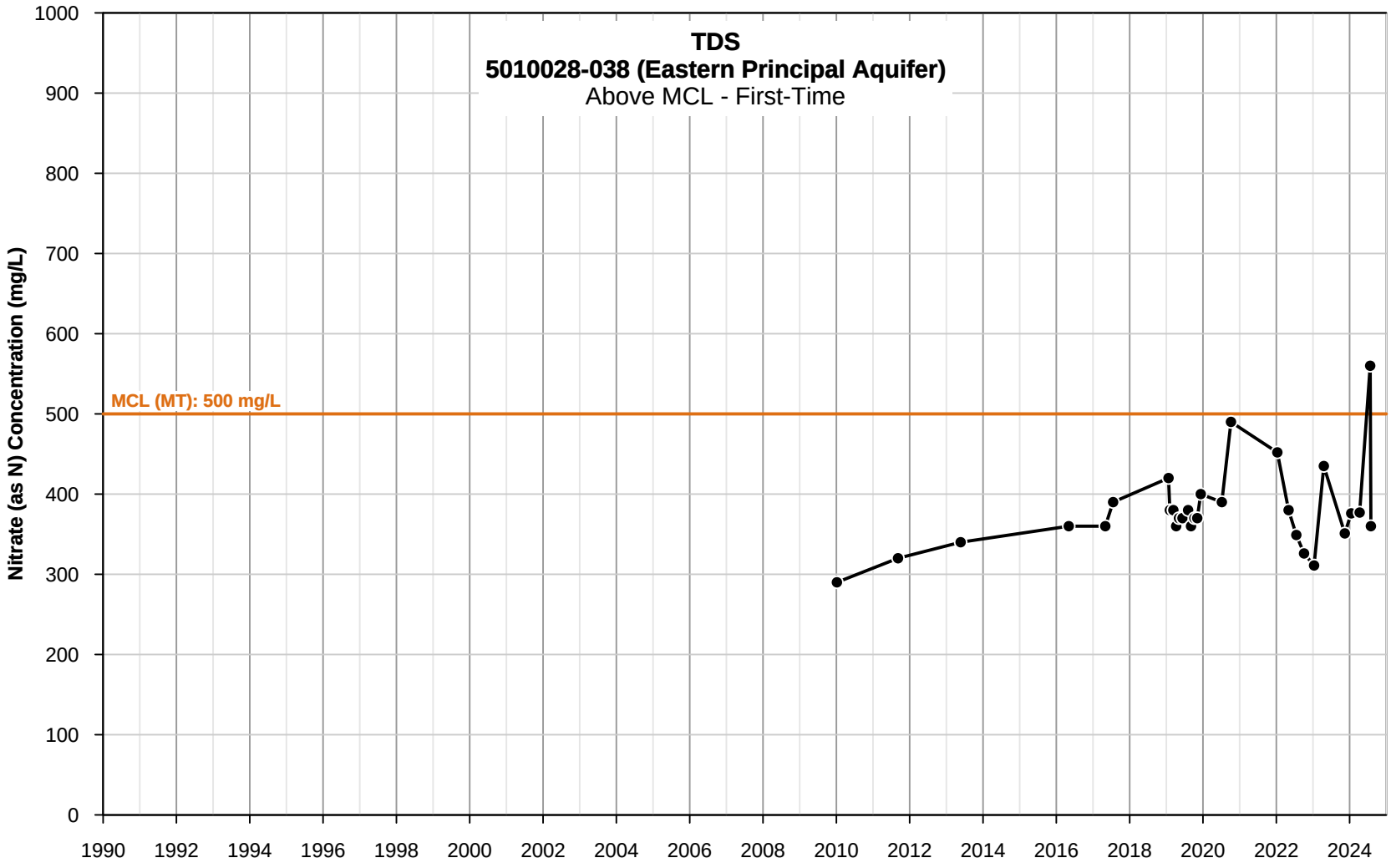
Water Quality Time-Concentration Plots


Nitrate (as N)
2410012-006 (Western Upper Principal Aquifer)
Above MCL - First-Time
Nitrate (as N) Concentration (mg/L)
MCL (MT): 10 mg/L
0
5
10
15
20
25
30
35
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024


Arsenic
5000273-002 (Eastern Principal Aquifer)
Above MCL - First-Time
Nitrate (as N) Concentration (mg/L)
MCL (MT): 10 mg/L
35
30
25
20
15
10
5
0
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024


Nitrate (as N)
5000382-004 (Western Unknown Principal Aquifer)
Above MCL - First-Time
Nitrate (as N) Concentration (mg/L)
MCL (MT): 10 mg/L
0
5
10
15
20
25
30
35
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024


Nitrate (as N)
5010010-051 (Western Upper Principal Aquifer)
Above MCL - First-Time
Nitrate (as N) Concentration (mg/L)
MCL (MT): 10 mg/L
0
5
10
15
20
25
30
35
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024


TDS
5010028-038 (Eastern Principal Aquifer)
Above MCL - First-Time
Nitrate (as N) Concentration (mg/L)
MCL (MT): 500 mg/L
1000
900
800
700
600
500
400
300
200
100
0
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020
2022
2024

APPENDIX F

MT Exceedance Action Plan

TODD GROUNDWATER

October 2, 2024

TECHNICAL MEMORANDUM

To: West Turlock Subbasin Groundwater Sustainability Agency (WTSGSA)
East Turlock Subbasin Groundwater Sustainability Agency (ETSGSA)
Michael Cooke, GSP Plan Manager

From: Liz Elliott, Principal Hydrogeologist
Iris Priestaf, President

Re: Guidance for Tracking, Assessing, and Responding to MT Exceedances
Turlock Subbasin Groundwater Sustainability Plan (GSP) Implementation

The WTSGSA and the East Turlock Subbasin GSA (ETSGSA) are coordinating on GSP semi-annual groundwater elevation monitoring events and Annual Reports as part of the implementation of the Turlock Subbasin Groundwater Sustainability Plan (GSP). To evaluate ongoing compliance with the GSP, semi-annual monitoring results are compared to sustainable management criteria as defined in the GSP, including minimum thresholds (MTs), measurable objectives (MO) and interim milestones (IMs). These criteria were established for representative monitoring wells (RMWs) to assist with ongoing assessments of sustainable groundwater management.

The primary basis for selection of the sustainable management criteria is to avoid GSP-defined undesirable results related to each of five sustainability indicators, which include chronic lowering of groundwater levels, reduction of groundwater in storage, degradation of groundwater quality, depletion of interconnected surface water, and inelastic land subsidence. Except for degradation of water quality, these sustainability indicators are based on groundwater elevation measurements in the RMWs as a proxy. Although exceedance of an MT[1] in one RMW during one semi-annual groundwater elevation monitoring event does not constitute an undesirable result, tracking each MT exceedance provides an early-warning system to allow a proactive response to support sustainable groundwater management.

Accordingly, the GSAs would like to establish consistent Subbasin-wide procedures for tracking, assessing, and responding to MT exceedances in order to manage groundwater conditions in a coordinated and systematic manner. To assist the GSAs with this request, Todd Groundwater developed an Action Plan with specific steps for consistent and ongoing

[1] For purposes of this memorandum, an *exceedance of an MT* occurs when groundwater elevations fall below the established elevation of the MT in any single representative monitoring well (RMW) during any GSP semi-annual monitoring event.

evaluation of and response to MT exceedances that occur during semi-annual monitoring events.

This technical memorandum (TM) summarizes the background and process for development of the Action Plan. The Action Plan and associated Tracking Table are provided in **Attachment A** and **Attachment B**, respectively.

BACKGROUND

Since the preparation and submittal of the Turlock Subbasin GSP in January 2022 and the revised GSP in July 2024, the GSAs have been coordinating GSP implementation. The GSP identified a series of activities to support GSP implementation, referred to as GSP Implementation Support Activities (ISA). ISA #5 envisioned the development of an *Action Plan for Exceedance of Minimum Thresholds Which May Result in Undesirable Results*[2].

This Action Plan (ISA #5) is linked to another important implementation step by the GSAs that includes the initiation of the GSP monitoring and reporting program (ISA #1). As described in the GSP, the monitoring network has been designed to monitor groundwater conditions that relate to the five sustainability indicators that were determined to be applicable to the Turlock Subbasin[3]. These five sustainability indicators and the type of monitoring network for each indicator are summarized in **Table 1** below.

Table 1: Applicable Sustainability Indicators and Monitoring Network

				
Chronic Lowering of Groundwater Levels (GWLs)	**Reduction of Groundwater in Storage**	**Inelastic Land Subsidence**	**Depletion of Interconnected Surface Water**	**Degraded Water Quality**
Monitoring Network				
Groundwater elevations in RMWs for each Principal Aquifer	**Groundwater elevations in same network as the Chronic Lowering of GWLs**	**Groundwater elevations in same network as the Chronic Lowering of GWLs**	**Groundwater elevations; network along the river boundaries of the Subasin**	**Water quality data from existing monitoring programs by others**

[2] Turlock Subbasin Groundwater Sustainability Plan, January 2022 and the revised Turlock Subbasin Groundwater Sustainability Plan, July 2024, West Turlock Subbasin Groundwater Sustainability Agency (WTSGSA) and East Turlock Subbasin Groundwater Sustainability Agency (ETSGSA), Section 9.5, ISA 5, p. 9-9.

[3] GSP regulations identify six sustainability indicators including Seawater Intrusion. As explained in the Turlock Subbasin GSP, seawater intrusion is not applicable to the inland conditions of the Turlock Subbasin.

As indicated in **Table 1**, groundwater elevations are monitored for four of the five sustainability indicators. Semi-annual monitoring results, representing spring and fall conditions, are submitted to the Department of Water Resources (DWR) online Monitoring Network Module (MNM) by July 1 and January 1, respectively, in compliance with GSP regulations. Five GSP monitoring events have been conducted to date – Spring 2022, Fall 2022, Spring 2023, Fall 2023, and Spring 2024. Groundwater elevations measured during these monitoring events were submitted to DWR before the applicable deadlines.

Minimum Thresholds (MT) are defined in the GSP regulations as "a numeric value for each sustainability indicator used to define undesirable results" (§ 351 (t)). For the Turlock Subbasin, MTs are based on the low groundwater elevations observed during the severe drought conditions during Water Years (WYs) 2013 through 2016. Since groundwater levels in Fall 2015 were at historical lows across the Turlock Subbasin for most of the RMWs at the time of GSP adoption (in January 2022), Fall 2015 groundwater elevations were selected as the MTs for all sustainability indicators except depletion of interconnected surface water. For depletion of interconnected surface water, Fall 2015 groundwater elevations were selected as the MTs along the Tuolumne River and San Joaquin River, and Fall 2014 groundwater elevations were selected as the MTs along the Merced River.

Criteria were developed to define undesirable results based on a combination of the number and duration of MT exceedances in RMWs in each of the three Principal Aquifers for multiple fall monitoring events. This strategy recognizes that an MT exceedance in only one RMW during a single monitoring event may not be sufficient to determine that undesirable results are likely to occur. Nonetheless, the tracking of each single MT exceedance provides time to develop appropriate responses to manage declining groundwater levels prior to reaching undesirable results.

Widespread and persistent MT exceedances could lead to adverse impacts to beneficial users, especially existing well-owners. Eventually, these MT exceedances could contribute to undesirable results as defined by the GSP. Addressing local conditions early during the implementation process may increase the GSA's ability to avoid future undesirable results.

Todd Groundwater presented potential concepts and portions of a draft framework for an MT Exceedance Action Plan for the Turlock Subbasin at a meeting of the Ad Hoc Planning Committee[4] in a "brainstorming" work session on July 25, 2022.

An Action Plan for tracking and managing MT exceedances in the Turlock Subbasin has been prepared. This TM summarizes some of the technical considerations on which the Action Plan has been developed. The **Action Plan** is provided as **Attachment A** to this TM and can be employed as a stand-alone document.

In order to provide a mechanism for tracking the exceedances, the Action Plan envisions a process whereby MT exceedances are recorded on an official tracking table, which will

[4] The Ad Hoc Planning Committee consists of representatives of the two Technical Advisory Committees (TACs) – which represent each of the two Turlock Subbasin GSAs.

provide documentation and transparency for local groundwater management decisions. A ***Tracking Table*** to accompany the Action Plan is attached to this TM as **Attachment B**.

This Action Plan (ISA #5) is also linked to the Demand Reduction Plan adopted by ETSGSA on July 11, 2024, and included as an appendix in the revised GSP. The Demand Reduction Plan includes an adaptive management framework that triggers the formation of Priority Action Areas when IMs are exceeded or are at risk of potentially being exceeded. Implementation of the MT Exceedance Action Plan will be coordinated with implementation of the adaptive management framework by ETSGSA as described further below and in Attachment A.

APPROACH TO THE ACTION PLAN

The description of the Action Plan in the GSP (ISA #5) lists potential considerations:

- Identify the monitoring well(s) where an exceedance occurred, and investigate the area,
- Communicate with the other GSA within the Turlock Subbasin, and with the adjacent subbasin if the MT exceedance occurs near the Subbasin boundary,
- Determine if undesirable results are actually occurring or may potentially occur in the future,
- Select an appropriate management strategy for further investigation and/or mitigation as necessary,
- Consider institutional changes for future mitigation,
- Consider if there is a need to improve monitoring. Is the monitoring well providing appropriate data to evaluate the respective SMC or should an alternative monitoring well or method be considered?
- Determine if an adjustment to the MT is appropriate, and
- Recommend changes in the Five-Year GSP Assessment Report, if appropriate.

These actions were considered in the development of the Action Plan. The Action Plan incorporates the first four bullets directly. For the remaining four bullets, the Action Plan develops data and documentation that can be used to support changes/additions to management actions or projects, to identify improvements for groundwater monitoring, and to modify sustainable management criteria, if needed, during future GSP updates.

The approach for an MT exceedance policy for the Turlock Subbasin GSAs considers factors contributing to MT exceedances and how best to respond or mitigate the potential for MT exceedances to cause adverse impacts in the Subbasin.

The Action Plan in **Attachment A** describes a list of five steps, as shown in the following graphic. These steps are based, in part, on the considerations above and input from the July 2022 brainstorming session.

1. Investigate causes of MT exceedance,
2. Identify the potential for impacts from the MT exceedance
3. Manage or mitigate conditions, as appropriate,
4. Coordinate with adjacent member agencies and GSAs,
5. Document conditions and actions.

The Action Plan (**Attachment A**) is organized around a series of questions to assist with decisions on how best to manage the MT exceedances. A brief description of the basis for each step above and the associated questions included in the Action Plan are described briefly below for context and background. The workflow process of these five steps is the focus of the Action Plan.

1. Investigate the Cause of Groundwater Level Declines

The exceedance of an MT indicates that groundwater levels in the RMW have declined to levels that could lead to undesirable results in the Subbasin. To the extent practical, the cause(s) of such declines should be investigated and assessed. This investigation is used to determine whether the MT exceedance is related to the RMW, local nearby wells, a larger concentrated area of pumping creating drawdowns in a portion of the Subbasin, and/or widespread groundwater level declines associated with over-pumping and/or drought conditions. Differentiating between these conditions may allow for different responses.

In the Turlock Subbasin, active pumping wells extract large volumes of groundwater and likely have the largest influence on groundwater level declines. A pumping well causes a decline or *drawdown* of the water table in an unconfined aquifer (or the potentiometric surface of a confined aquifer), which extends radially outward from the well (depending on the local dynamics and hydraulic properties of the aquifer system); the largest declines occur at the well. When the pump is shut off groundwater levels will rise until the groundwater surface has recovered back to local ambient groundwater conditions – referred to as static groundwater levels. The static groundwater level is representative of conditions in the aquifer rather than in the active pumping well but may still be affected by regional pumping.

If the RMW is an active production well that was pumping during or prior to the groundwater measurement such that the groundwater has not recovered to static conditions, then measurements in that RMW may be more reflective of local drawdown in

the well rather than actual conditions in the aquifer. This can result in groundwater levels falling below the MT in the well.

The GSAs have included production wells in the GSP monitoring network as a matter of necessity but are working to replace them with dedicated monitoring wells over time to avoid this issue. Field personnel are aware of the conditions at each RMW and note if the well is actively pumping, or was recently pumping, to the extent such information is available. However, it can be difficult to determine how long a pumping well has been off, and whether the water level in the well has reached static conditions. Some wells are monitored continuously using recording pressure transducers, and the data from these transducers can be used to assess the extent to which groundwater levels measured during a monitoring event are representative of aquifer conditions.

Even if the RMW is not an active production well, nearby pumping wells could be creating local drawdown in the aquifer at the RMW, a process referred to as well interference. To assess the likelihood of well interference, the active pumping wells closest to the RMW would need to be evaluated. Stanislaus County has recently implemented a method for evaluating the potential for well interference that could be applied to conditions in the Turlock Subbasin (https://www.stancounty.com/er/pdf/well_permit_9B.pdf). In addition, the hydrographs for RMWs and nearby monitoring wells can be evaluated to help make this determination.

Groundwater level declines at the RMW could also be influenced by regional long-term pumping declines, which are more relevant when assessing the potential for undesirable results. These can be identified on Subbasin-wide groundwater elevation contour maps as either local or widespread cones of depression, and on regional or subregional groundwater level hydrographs.

The ETSGSA Groundwater Demand Reduction Plan includes groundwater level trend triggers used to determine whether implementation of "Level 1 Priority Action Areas" is warranted for evaluation of groundwater levels or trends that could lead to exceedances of IMs, and for implementation of investigations to adequately understand these trends and management course corrections if necessary. The evaluation procedures discussed in Step 1 of this Action Plan will contribute to this evaluation.

2. Identify Potential Impacts

Even if groundwater level declines do not meet the criteria to trigger *undesirable results* as defined in the GSP, local groundwater level declines can cause adverse impacts. For example, adverse impacts could occur to shallow drinking water wells that may serve as the supply for households or small water systems.

Groundwater level declines can be associated with degradation of groundwater quality, especially if constituents of concern occur at higher concentrations with depth. Alternatively, higher concentrations in shallow groundwater could also impact drinking

water supplies; wells with declining groundwater levels could carry shallow constituents closer to a deep well screen that had not previously been affected by those constituents.

Other potential impacts include streamflow depletions if water level declines are associated with RMWs near the rivers. Finally, water level declines in the Western Lower Principal Aquifer could depressurize the Corcoran Clay and potentially lead to land subsidence. The potential for these adverse conditions to develop as a result of the identified MT exceedances and associated groundwater level trends will be evaluated in this step.

As with Step 1, the findings of Step 2 of this Action Plan will be used to contribute to the evaluation of potential course corrections for Level 1 Priority Action Areas identified pursuant to ETSGSA's Demand Reduction Plan.

3. Develop Response to Manage Water Levels or Mitigate Potential Impacts

Based on the results of the first two steps, the GSAs will decide whether actions should be taken to manage or mitigate the groundwater level declines that resulted in the MT exceedance. As provided in the Action Plan, a series of considerations for a management response are provided, including modifications to local pumping schedules or distribution. As with Steps 1 and 2, the findings of Step 3 will be used to contribute to the evaluation of potential course corrections for Level 1 Priority Action Areas identified pursuant to ETSGSA's Demand Reduction Plan.

4. Coordinate with Agencies and Conduct Outreach Activities

The Action Plan contains multiple considerations for coordinating with stakeholders in response to the MT exceedances. In addition to informing others of potential impacts from the groundwater level declines and proposed response actions, the outreach activities may serve as a key step in contributing to mitigation or management of the exceedances. Local agencies should be made fully aware of the MTs selected for nearby RMWs and the GSA's evaluation results under Steps 1, 2 and 3, and may be able to modify operations to assist the GSAs with MT compliance.

5. Document the Process

To allow for consistent documentation and tracking of MT exceedances over time, a tracking table has been developed (**Attachment B**). Some considerations regarding the development of the tracking table are summarized below.

APPROACH TO TRACKING TABLE

An MT exceedance ***tracking table*** is attached as **Attachment B** to document local conditions and any local investigations or response actions. The tracking table follows the Action Plan process and records information relevant to the Action Plan steps described above. The goal of the tracking table is to document the process of identifying and responding to each MT exceedance.

The tracking table is meant to document relevant conditions that may be compared over time such as well status, Principal Aquifer, screen interval, and relevant well issues. The table also documents details on factors relevant to declining water levels such as possible RMW pumping, nearby pumping/well interference, and/or regional water level declines. Information on potential local adverse impacts due to water level declines will also be documented. For example, the table will document if the RMW is located near domestic wells, in an area susceptible to subsidence, or in an area potentially affecting local surface water.

The table is also meant to document response actions taken by the GSAs, including potential mitigation measures identified for future action. The categories of information to be documented on the tracking table may be revised over time as it is used. Ideally, the tracking table should contain sufficient information on the rationale leading to the management response to MT exceedances. In order to keep the tracking table a manageable size, written documentation may be filed separately from the table and referenced therein.

This table will be maintained as part of the GSA's records supporting GSP compliance and annual reports. For ETSGSA, the table will be completed as part of its Demand Reduction Plan implementation records. Because each GSA is responsible for implementing the GSP monitoring network with its service area, there may be a need to maintain one tracking table for each GSA. Tracking tables would be shared between the GSAs periodically to coordinate groundwater management and to maintain consistency.

The table will be updated following each semi-annual monitoring event. This update would coincide with the generation of hydrographs, analysis of compliance with sustainable management criteria, and the generation of a summary table identifying the RMWs with MT exceedances. A summary table for Water Year 2023 is provided as **Attachment C**.

This process will provide updated tracking and documentation for all MT exceedances and GSA responses. The updated tracking table will support and assist with prioritization of improvements needed to the GSP monitoring network. The tracking table could also provide documentation and support for adaptive management decisions or revisions of MTs during future GSP updates.

PROPOSED PROCESS

Additional details on the workflow and proposed process of tracking and managing MT exceedances are provided in the Action Plan (**Attachment A**). A Tracking Table is provided in **Attachment B**.

CONSIDERATIONS FOR FUTURE REVISIONS AND USE

The Action Plan may require adjustments over time as GSP monitoring and implementation continues. The Action Plan will be included as an attachment to the next Annual Report,

and updated versions may be attached to future annual reports or to the five-year GSP update, as appropriate.

ATTACHMENTS

Attachment A Action Plan for Exceedances of Minimum Thresholds (MTs) in Representative Monitoring Wells (RMWs), Turlock Subbasin

Attachment B Tracking Table – MT Exceedance Documentation

Attachment C Comparison of Groundwater Elevations to Sustainable Management Criteria (WY 2023)

Attachment A

Action Plan for Exceedances of Minimum Thresholds (MTs) in Representative Monitoring Wells (RMWs), Turlock Subbasin

ATTACHMENT A:

ACTION PLAN FOR EXCEEDANCES OF MINIMUM THRESHOLDS (MTs) IN REPRESENTATIVE MONITORING WELLS (RMWs), TURLOCK SUBBASIN

This ***Action Plan*** was developed collaboratively by the West Turlock Subbasin Groundwater Sustainability Agency (WTSGSA) and the East Turlock Subbasin Groundwater Sustainability Agency (ETSGSA) to coordinate sustainable groundwater management as provided in the Turlock Subbasin Groundwater Sustainability Plan (GSP). The Action Plan was prepared by the GSAs in 2024 to fulfill a GSP Implementation Support Activity (ISA #5) included in the January 2022 Turlock Subbasin GSP and the July 2024 Revised Turlock Subbasin GSP.

A technical memorandum prepared by Todd Groundwater provides background and context for this Action Plan. This Action Plan may be modified by the GSAs from time to time, based on Subbasin conditions and experience gained through ongoing groundwater management activities.

1.1. PUPOSE AND OBJECTIVES

The purpose of this Action Plan is to help the GSAs manage groundwater in a coordinated, systematic, and sustainable manner by providing consistent Subbasin-wide procedures for tracking, assessing, and responding to MT exceedances. The Action Plan supports compliance with sustainable management criteria and serves as an early-warning framework for avoiding undesirable results. Use of the Action Plan will also meet the following objectives:

- Provide early response to avoid and/or mitigate adverse local adverse impacts to beneficial uses and users of groundwater,
- Prioritize areas of the groundwater Subbasin for development and/or implementation of additional management actions,
- Identify improvements for the GSP monitoring network and procedures, and
- Document conditions when MTs are exceeded to support both adaptive management and revisions to sustainable management criteria during GSP updates.

1.2. PROCESS

The Action Plan contains five steps organized around a series of guiding questions to evaluate each MT exceedance. The questions are meant to assist in defining the nature and extent of the water level declines, identifying potential adverse impacts in the area, and providing options for possible responses. The graphic below summarizes the five steps and some of the key questions for guiding actions associated with each step. Questions are provided as examples and are not comprehensive, additional local circumstances may need to be considered. Additional details regarding the actions and example questions follow the graphic.

5-Step Action Plan for Managing MT Exceedances

STEP 1. INVESTIGATE THE CAUSE OF GROUNDWATER LEVEL DECLINES

An MT exceedance occurs when the groundwater elevation measured in an RMW has declined below the selected MT elevation for that well, as defined in the GSP. This step assists in determining why the groundwater decline is occurring, recognizing that there may be more than one factor for any MT exceedance that should be considered in its interpretation. This and subsequent sections of the Action Plan are organized around a group of guiding questions followed by specific response actions.

- Is the MT exceedance in an active production well? If so, is the pump running? If not, how long was the pump off before the water level was measured? How long and at what rate was the well pumping prior to measurement? Are continuous transducer data available to help assess whether groundwater levels are static or still recovering?

Identify whether the RMW is an active production well. If the well was actively pumping, no measurement should have been taken. If the pump had been turned off but the aquifer did not have sufficient time to recover, the groundwater level measurement may still be below static groundwater levels. This determination requires professional knowledge to evaluate pumping duration, rates, and aquifer parameters for that well and can be informed by continuous pressure transducer data, if available.

The GSA representative or field personnel should communicate with the well owner to see if measurements and pumping schedules can be coordinated such that static water levels can be recorded. If the RMW is not equipped with a pump, local groundwater conditions should be further assessed as described below.

- Where are the closest groundwater production wells and what rates are being pumped? Could the declines in the RMW be associated with local well interference?

Other nearby production wells can create drawdown at the RMW with the MT exceedance, even if the RMW is not a pumping well. Locations of nearby pumping wells should be investigated and recorded on the tracking table. Stanislaus County implemented a method for evaluating the potential for well interference that would be applicable to the Turlock Subbasin (https://www.stancounty.com/er/pdf/well_permit_9B.pdf). Groundwater elevation data from transducers deployed in the RMW or nearby monitoring wells should be evaluated.

- Is the MT exceedance in an area of concentrated over pumping? Are water levels declining in nearby wells? If so, how large of an area is affected? Is the area close to new or increasing groundwater extraction? Is the problem related to drought conditions?

Local groundwater level declines will likely occur during persistent dry conditions and may be the result of declines throughout the Subbasin. Local conditions such as numbers of wells with MT exceedances, rates of decline in nearby wells, and water year type will provide information on regional versus localized declines.

STEP 2. IDENTIFY POTENTIAL IMPACTS

- Are there vulnerable domestic wells or small water systems nearby?

Domestic wells and small water system wells, and the associated well construction details, as available, should be identified within a reasonable radius around the RMW with the MT exceedance. Rates of decline in the RMW should be compared to well construction in the nearby domestic wells and small water system wells, if available, to identify potential for impacts. In accordance with the July 2024 Revised GSP, the GSAs will develop and implement a well mitigation program by January 31, 2025. Locations of reported impacted wells as part of the well mitigation program will be checked to see if impacts have already occurred in the area. Statewide databases with susceptible or reported dry domestic wells should also be checked[1].

- Are there impacts to local water quality in drinking water wells?

An analysis of water quality in the July 2024 Revised GSP indicated that no clear relationship exists between concentrations of the chemicals of concern (COCs) and groundwater levels. However, potential for localized impacts will need to be continually evaluated in response to MT exceedances. Have water quality analyses in recent Annual Reports identified increasing trends of constituents of concern with declining groundwater levels?

Steps should be taken to see if declining water levels have potentially impacted water quality in nearby potable supply wells. An analysis of drinking water well impacts to potable water supply wells based on water quality data from the Statewide GAMA database is conducted as part of Annual Report development.

- Is the MT exceedance in an area of historical subsidence or in aquifers associated with higher risk for subsidence? Does the MT exceedance represent a historical low groundwater level for the RMW?

Areas of historical and current subsidence are discussed in the GSP and Annual Reports, respectively. Pumping wells in the Western Lower Principal Aquifer were identified in the GSP as having the potential to trigger land subsidence from depressurizing/dewatering the Corcoran Clay and underlying compressible clay layers. Although land subsidence can potentially occur in any area of the Subbasin with compressible clays, the confined aquifer below the Corcoran Clay was judged to have the highest potential based on historical land subsidence in other subbasins in the San Joaquin Valley. If groundwater elevations are maintained above their historical low levels, there is less potential for triggering inelastic land subsidence.

- Are there potential impacts to Interconnected Surface Water?

If the MT exceedance occurs in an RMW in the interconnected surface water monitoring network, there may be potential impacts to surface water depletions. The issue should be noted

[1] California's Groundwater Live; https://mydrywell.water.ca.gov/report/publicpage Drinking Water Well Resources (ca.gov)

on the tracking table, but further investigation or modeling analysis is needed to determine potential impacts. Information from the most recent Annual Report should be considered.

STEP 3. DEVELOP RESPONSE TO MANAGE WATER LEVELS OR MITIGATE POTENTIAL IMPACTS

Based on the results of Steps 1 and 2, the GSAs may decide that a management action or mitigation measure would be an appropriate response to avoid adverse impacts and the potential for future undesirable results. Assuming that the causes of the groundwater elevation declines are the result of over-pumping, the following list of potential response actions should be considered.

- Implement additional investigations or course corrections pursuant to Level 1 Priority Action Ares designated under ETSGSA's Demand Reduction Plan.
- Modify local pumping/monitoring schedules.
- Consider redistribution or reductions in pumping.

At a minimum, GSAs should work with local RMW well owners to determine if monitoring can be coordinated with pumping schedules to ensure that static groundwater levels are being measured. If this is not possible, a replacement well should be identified for the monitoring network.

If well interference has the potential to cause adverse impacts, the GSAs should determine if well owners with multiple wells could redistribute pumping such that local groundwater level declines could be lessened. Even if pumping rates could be reduced in the local area of decline and increased elsewhere, the rebalancing could have local benefits in avoiding impacts. For potential impacts to inelastic land subsidence, a redistribution of pumping from wells in the Western Lower Principal Aquifer to wells in the Western Upper Principal Aquifer or Eastern Principal Aquifer should be considered as long as the redistribution of pumping does not create other potential adverse impacts. For interconnected surface water, redistributing pumping farther away from a river could have local benefits.

- Identify potential for local recharge (including in lieu) or demand reduction.

The GSAs should also consider the potential for demand reduction or increasing recharge in the area, assuming recharge water is available, infrastructure is in place for distributing the recharge water, and that recharge could reach the aquifer zones in decline. Demand reduction or in lieu recharge, if surface water is available for use, could be the quickest way to halt groundwater level declines and encourage recovery. Either response action should be accompanied by increased monitoring to document the timing and duration of benefits to the area of groundwater level declines.

- Consider the need for management actions and/or increased monitoring.
- Identify mitigation measures to reduce the potential for adverse impacts directly.

If the potential for impacts is sufficiently high and other response actions are determined to be ineffective, the GSAs should consider additional measures to mitigate the potential impacts directly, if it is not feasible to respond to groundwater declines. As mentioned above, the GSAs will develop and implement a well mitigation program by January 31, 2025.

STEP 4. COORDINATE WITH AGENCIES AND CONDUCT OUTREACH ACTIVITIES

Step 4 of the Action Plan considers the need and benefits of coordinating among the GSAs and with other agencies.

- Coordinate among Subbasin and hydraulically adjacent GSAs and local agencies

The GSAs will communicate the occurrence of MT exceedances with each other and with local agencies in the affected area. If MT exceedances occur near the Subbasin boundary, the GSAs may communicate the exceedances with the adjacent subbasin. Local agencies with drinking water wells should be made aware of the MTs selected for nearby RMWs and may be able to modify operations to assist the GSAs with MT compliance.

- Explain investigations and actions in public TAC meetings, GSA Board meetings and/or other meetings.

The GSAs in the Turlock Subbasin have been transparent regarding their activities and sustainable management goals. This transparency should continue through the public meetings with the individual and Joint TACs, GSA Board meetings, and meetings with local stakeholders.

STEP 5. DOCUMENT THE PROCESS

The investigations and responses included in this Action Plan should be routinely documented and shared between the GSAs. To assist in that process, a tracking table has been developed (**Attachment B**). The GSAs will want to modify the table to meet their specific groundwater management needs and take advantage of their collective experience in managing the Subbasin.

The tracking table will be maintained by the GSAs and updated after each semi-annual monitoring event to document conditions and re-evaluate the potential for causes, impacts, and potential responses to MT exceedances as they occur across the Subbasin.

Attachment B

Tracking Table - MT Exceedance Documentation

ATTACHMENT B: TRACKING TABLE - MT EXCEEDANCE DOCUMENTATION
Turlock Subbasin
Last Update *(initials/date)* **:**

WELL AND MT EXCEEDANCE INFORMATION										CAUSES OF WATER LEVEL DECLINES						NEARBY ACTIVE WELLS AND POTENTIAL IMPACTS				POTENTIAL IMPACTS FROM DECLINING WATER LEVELS						MITIGATION AND RESPONSE	
RMW with MT Exceedance	MM Site Code	Principal Aquifer	Well Use	Exceedance Date	Water Year	Measured Groundwater Elevation (ft msl)	MT	Difference between groundwater elevation and MT? (ft)	Does the RMW have an IM? If so, what is the IM? Was it exceeded?	Is RMW an Active Production Well? (Y/N)	Problems with Access due to Pumping? (Y/N/NA)	Closest Pumping Wells (well / distance / pumping rate)	Likely Well Interference? (Y/N/NA)	Water Level Declines in which Nearby RMWs? (Well Names)	Regional Declines in Subbasin? (Y/N)	RMW Location Notes (Describe area, wells, estimated pumping)	Nearby Domestic Wells (Well/distance)	Closest Small Water System (System, ft)	Vulnerable Wells? (Y/N/Wells)	Aquifer Vulnerable to Subsidence?	Near Identified Area with Groundwater Quality Concerns? If yes, describe	Interconnected Surface Water RMW? Y/N	Distance from River? (feet)	Indications of Adverse Impacts in Area?	Potential Impacts from current WL declines?	Potential Applicable Mitigation Measures	Selected Actions

Attachment C

Comparison of Groundwater Elevations to Sustainable Management Criteria (WY 2023)

Attachment C
Comparison of Groundwater Elevations to Sustainable Management Criteria (WY 2023)

Local Well Name	Minimum Threshold (MT) (feet msl)	Interim Milestone (IM) (feet msl)	Fall 2022 Monitoring Event: Groundwater Elevation Below MT? (yes/no)	Fall 2022 Monitoring Event: Groundwater Elevation Below IM? (yes/no)	Spring 2023 Monitoring Event: Groundwater Elevation Below MT? (yes/no)	Spring 2023 Monitoring Event: Groundwater Elevation Below IM? (yes/no)
Table 3-5a: Chronic Lowering of Groundwater Levels, Western Upper Principal Aquifer						
TID 010	63	53	Yes	Yes [1]	Yes	Yes [1]
TID 018	44	--	Yes	--	No	--
TID 022	52	--	Yes	--	Yes	--
TID 048	36	--	No	--	No	--
TID 061A	40	--	NM	--	No	--
TID 063	37	--	No	--	No	--
TID 083	62	--	Yes	--	NM	--
TID 085B	85	--	Yes	--	Yes	--
TID 106	49	--	No	--	No	--
TID 111	26	--	No	--	No	--
TID 113A	81	76	No	No	No	No
TID 118	65	--	No	---	No	--
TID 136A	79	76	Yes	Yes	Yes	No
TID 139	40	--	No	--	No	--
TID 191	53	--	Yes	--	Yes	--
TID 199A	88	--	No	--	NM	--
WTS-1 Shallow	No MT	--	No MT	--	No MT	--
WTS-2 Shallow	No MT	--	No MT	--	No MT	--
Summary - Western Upper Principal Aquifer						
		Above	8	1	9	2
		Below	7	2	5	1
		Not Measured	1	0	2	0
		No MT	2	0	2	0
		% Below (includes measured wells)	47%	67%	36%	33%

Note:

1. TID-10 was dry in Fall 2022 and Spring 2023, the bottom of the well is at 54 feet msl. Therefore, water level is below the MT (63) and at or below the IM (53).

Local Well Name	Minimum Threshold (MT) (feet msl)	Interim Milestone (IM) (feet msl)	Fall 2022 Monitoring Event: Groundwater Elevation Below MT? (yes/no)	Fall 2022 Monitoring Event: Groundwater Elevation Below IM? (yes/no)	Spring 2023 Monitoring Event: Groundwater Elevation Below MT? (yes/no)	Spring 2023 Monitoring Event: Groundwater Elevation Below IM? (yes/no)
Table 3-5b: Chronic Lowering of Groundwater Levels, Western Lower Principal Aquifer						
Smyrna Park 4/233	20	10	No	No	No	No
Denair NW-11 287	21	--	Yes	--	No	--
Ferreira Ranch Park MW-347	20	--	Yes	--	No	--
SWW Reservoir MW-335	20	--	NM	--	NM [1]	--
Blum 3-1	55	--	NM	--	Yes	--
MW-68A	No MT	--	No MT	--	No MT	--
WTS-1 Deep	No MT	--	No MT	--	No MT	--
WTS-2 Deep	No MT	--	No MT	--	No MT	--
Summary - Western Lower Principal Aquifer						
		Above	1	1	3	1
		Below	2	0	1	0
		Not Measured	2	0	1	0
		No MT	3	0	3	0
		% Below (includes measured wells)	67%	0%	25%	0%

Note:

1. The Spring 2023 measurement at SWW Reservoir MW-335 was questionable, and therefore not used in the analysis.

Attachment C
Comparison of Groundwater Elevations to Sustainable Management Criteria (WY 2023)

Local Well Name	Minimum Threshold (MT) (feet msl)	Interim Milestone (IM) (feet msl)	Fall 2022 Monitoring Event: Groundwater Elevation Below MT? (yes/no)	Fall 2022 Monitoring Event: Groundwater Elevation Below IM? (yes/no)	Spring 2023 Monitoring Event: Groundwater Elevation Below MT? (yes/no)	Spring 2023 Monitoring Event: Groundwater Elevation Below IM? (yes/no)
Table 3-5c: Chronic Lowering of Groundwater Levels, Eastern Principal Aquifer						
TID 175	36	31	Yes	Yes	Yes	No
NE Storm Basin MW-340	45	20	Yes	Yes	Yes	No
ETSGSA-01	60	38	Yes	No	Yes	No
ETSGSA-02	148	138	Yes	Yes	Yes	Yes *
ETSGSA-04	5	-7	Yes	No	Yes *	No
ETSGSA-05	-5	-17	No	No	No	No
ETSGSA-06	30	11	Yes	No	Yes	No
ETSGSA-08	18	8	Yes	No	Yes *	Yes *
ETSGSA-09	44	19	Yes	No	Yes	No
ETSGSA-12R	No MT	--	No MT	--	No MT	--
ETSGSA-13	30	26	No	No	No	No
ETSGSA-14	14	-6	Yes	No	Yes *	No
ETSGSA-20	55	14	Yes	No	NM	NM
ETSGSA-21	140	96	Yes	No	Yes	No
EW3	10	-1	Yes	No	No	No
Olam R2-4	79	--	Yes	--	No	--
MW-68B	No MT	--	No MT	--	No MT	--
MW-68C	No MT	--	No MT	--	No MT	--
Summary - Eastern Principal Aquifer						
		Above	2	11	4	11
		Below	13	3	10	2
		Not Measured	0	0	1	1
		No MT	3	0	3	0
		% Below (includes measured wells)	87%	21%	71%	15%

Note:
*Would be above MT or IM without RP change. (RPs for ETSGSA wells were revised based on Spring 2023 survey.)

Attachment C
Comparison of Groundwater Elevations to Sustainable Management Criteria (WY 2023)

Local Well Name	Minimum Threshold (MT) (feet msl)	Interim Milestone (IM) (feet msl)	Fall 2022 Monitoring Event: Groundwater Elevation Below MT? (yes/no)	Fall 2022 Monitoring Event: Groundwater Elevation Below IM? (yes/no)	Spring 2023 Monitoring Event: Groundwater Elevation Below MT? (yes/no)	Spring 2023 Monitoring Event: Groundwater Elevation Below IM? (yes/no)
Table 3-5d: Interconnected Surface Water						
San Joaquin River						
TID 061A	40	--	NM	--	No	--
TID 063	37	--	No	--	No	--
TID 111	26	--	No	--	No	--
Tuolumne River						
Ceres 36	31	26	Yes	No	No	No
ETSGSA-01	60	38	Yes	No	Yes	No
ETSGSA-02	148	138	Yes	Yes	Yes	Yes *
Merced River						
TID 303	85	--	No	--	No	--
ETSGSA-14	14	-6	Yes	No	Yes *	No
ETSGSA-17	96	86	Yes	No	Yes	No
ETSGSA-21	144	96	Yes	No	Yes	No
ETSGSA-23	71	61	Yes	No	No	No
Summary - Interconnected Surface Water						
San Joaquin River						
Above			2	--	3	--
Below			0	--	0	--
Not Measured			1	--	0	--
% Below (includes measured wells)			0%	--	0%	--
Tuolumne River						
Above			0	2	1	2
Below			3	1	2	1
Not Measured			0	0	0	0
% Below (includes measured wells)			100%	33%	67%	33%
Merced River						
Above			1	4	2	4
Below			4	0	3	0
Not Measured			0	0	0	0
% Below (includes measured wells)			80%	0%	60%	0%

Notes:

highlight: groundwater elevation is below (exceeds) the MT or the IM

* Would be above MT or IM without RP change. (RPs for ETSGSA wells were revised based on Spring 2023 survey.)

MT: Minimum Threshold

NM: water level not measured

No MT: MT has not been developed because there are not enough water level data.

APPENDIX G

Well Mitigation Implementation Plan

West Turlock Subbasin
Groundwater Sustainability Agency
and
East Turlock Subbasin
Groundwater Sustainability Agency

Turlock Subbasin
Well Mitigation Implementation Plan

January 23, 2025

TODD GROUNDWATER

TABLE OF CONTENTS

ACRONYMS

Ag	Agriculture
bgs	below ground surface
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
DWR	Department of Water Resources
ETSGSA	East Turlock Subbasin Groundwater Sustainability Agency
ft	feet
gpm	gallons per minute
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
M&I	Municipal and Industrial
MO	Measurable Objective
MT	Minimum Threshold
SAFER	Safe and Affordable Funding for Equity and Resilience
SHE	Self-Help Enterprises
SGMA	Sustainable Groundwater Management Act
SMC	Sustainable Management Criteria
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
TGBA	Turlock Groundwater Basin Association
TID	Turlock Irrigation District
WTSGSA	West Turlock Subbasin Groundwater Sustainability Agency
WY	Water Year (October 1 through September 30)
VWC	Valley Water Collaborative

1. INTRODUCTION

1.1. BACKGROUND

In September 2014, the Governor signed legislation creating the Sustainable Groundwater Management Act (SGMA) "to provide local groundwater sustainability agencies with the authority and technical and financial assistance necessary to sustainably manage groundwater" (Wat. Code, § 10720.1(d)). The Turlock Subbasin (5-22.03) (Subbasin) is a high-priority basin as defined by the Department of Water Resources (DWR).

Groundwater management of the Turlock Subbasin is being coordinated and overseen by two Groundwater Sustainability Agencies (GSAs): the West Turlock Subbasin Groundwater Sustainability Agency (WTSGSA) and the East Turlock Subbasin Groundwater Sustainability Agency (ETSGSA), collectively, the GSAs. Both GSAs have formed separate Technical Advisory Committees (TACs) that have also been conducting joint meetings to facilitate coordination for the joint Subbasin GSP development and implementation process. All GSA Board of Directors and TAC meetings are public meetings held in accordance with the Ralph M. Brown Act (California Government Code sections 54950 *et seq*.).

Each GSA is responsible for implementing projects and management actions, conducting stakeholder engagement, coordinating annual reporting, and other actions in support of achieving groundwater sustainability in the Subbasin through the 2042 planning horizon. The GSAs jointly prepared a GSP for the Subbasin, adopted it on January 6, 2022, and submitted it to the DWR on January 28, 2022.

In January 2024, DWR determined the joint GSP to be incomplete and identified two deficiencies. The first of these involves provision of sufficient information to support the selection of sustainable management criteria (SMCs) for chronic lowering of groundwater levels (particularly, analysis of potential impacts on wells). The second involves provision of sufficient details on the proposed projects and management actions to mitigate overdraft and provide a feasible path to achieve sustainability.

The GSAs submitted a revised joint GSP to DWR on July 12, 2024 (Revised GSP). The Revised GSP is responsive to DWR-defined Corrective Actions and incorporates additional details, analyses, projects, and management actions. These include implementation of a Well Mitigation Program no later than January 31, 2025, and implementation of management actions, as contained in the Revised GSP, no later than January 31, 2026. The management actions are expected to arrest chronic groundwater level decline by 2027 and achieve sustainable groundwater management by 2042. This Well Mitigation Implementation Plan (Plan) implements the **Well Mitigation Program** management action described in the Revised GSP, as it may be revised or amended from time to time (Program).

Initial development of the Program is described in the Revised GSP (see Section 6.3.1; https://turlockgroundwater.org/gsp). This description addresses the domestic wells drilled in the Subbasin, the SMCs (including Minimum Thresholds) that define undesirable results based

on wells affected by groundwater level declines, and an analysis of additional wells that could potentially go dry with additional groundwater level declines. An initial description of the Program is provided in the Revised GSP Section 8.1.3 and a Draft Memorandum of Understanding Adopting a Well Mitigation Program is provided in Appendix I of the Revised GSP.

1.2. PURPOSE

The purpose of the Well Mitigation Program is to provide mitigation for drinking water wells that have experienced adverse impacts due to declining groundwater levels during the SGMA implementation period. Drinking Water Wells are defined herein as any well used to supply potable water to a household, including domestic wells that supply water for potable, minor irrigation and other domestic purposes to a single home or parcel. It may also include "State small water system" wells that provide water to multiple connections or parcels, as defined by California law.[1] Potential adverse impacts are primarily focused on declining well yield or wells going dry as a result of chronic groundwater level decline. Potential adverse impacts may also include resulting land subsidence and/or degraded groundwater quality, which are considered unlikely to occur, but are nevertheless addressed in the Program. This Program provides emergency, interim, and long-term mitigation measures for Drinking Water Wells that have experienced adverse impacts due to declining groundwater levels occurring after January 6, 2022, the date of adoption of the Joint GSP. Mitigation for other supply wells (e.g., agricultural irrigation, municipal, industrial or stock wells) may be considered under this Program on a case-by-case basis, based on the extent to which adverse impacts are caused by actions under the management of the GSAs.

The purpose of this Plan is to describe a detailed process for mitigating impacts on Drinking Water Wells adversely affected by declining groundwater levels while the GSAs are implementing the Subbasin GSP, as may be revised and amended from time to time. Domestic well owners and State small water systems reliant on groundwater are the most vulnerable groundwater users in the Subbasin because their wells are generally shallower than agricultural irrigation, municipal, or industrial wells, and their owners generally have more limited means to respond to potential well failures.

[1] "State small water system" means a system for the provision of piped water to the public for human consumption that serves at least 5, but not more than 14, service connections and does not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year. (Health & Saf. Code § 116275(n).)

2. PROGRAM MANAGEMENT

The Turlock Subbasin Well Mitigation Program establishes Subbasin-wide criteria for implementation by the GSAs, with standardized information and processes to coordinate affected parties and stakeholders. This Plan establishes a framework for mitigation of Drinking Water Wells demonstrated to have been adversely affected by declining groundwater levels during the SGMA implementation period.

2.1. WELL MITIGATION COMMITTEE

The GSAs will establish a Well Mitigation Committee (Committee). This Committee will include representatives from both TACs and may include additional stakeholders and consulting experts. The GSAs will appoint Committee members at their discretion. This Committee will further develop and refine the Well Mitigation Plan and submit a final Plan to the GSA TACs for discussion. The GSA TACs may recommend approval by the respective GSA Boards, and upon approval by the GSA Boards (at a publicly noticed meeting), the Committee will implement the Program as defined in the Plan. The Plan includes an initial implementation phase in early 2025 as follows:

- By February 2025, the Well Mitigation Committee will assign GSA staff or representatives (collectively "staff") to engage in planning and public outreach, and select the preferred pathway for implementation of the Program including which components of the Program may be performed by GSA staff (if any) and which may be better performed by contracting with an outside entity, including existing experienced non-governmental organizations (NGOs)..
- By March 2025, the Well Mitigation Committee will seek proposals or bids from and initiate negotiations with NGOs (and other outside consultants or contractors, as appropriate) to support the GSAs in a coordinated response to failed wells. Negotiations will define respective roles and responsibilities, terms of the Well Mitigation Program, staffing, eligibility requirements, application process (including application forms, access and well owner agreements etc.
- In March 2025, the Well Mitigation Committee and the designated staff will also initiate public outreach with regular updates regarding the Well Mitigation Program at public joint TAC meetings and as part of the Annual Reporting process, and will initiate development of flyers and a webpage.
- By May 2025, the Well Mitigation Committee will complete negotiated draft agreements with NGOs, consultants and contractors, as applicable.
- In June 2025, the Well Mitigation Committee will select or finalize draft application forms for well owners, procedures and documents for well owner agreements, and procedures for documenting and reporting the Program results.
- In June 2025, the Well Mitigation Committee will prepare a summary of the refined

implementation approach based for review by the TACs.

- No later than June 30, 2025, the Committee will develop and recommend an annual funding framework, which will be reviewed by the TACs and approved by the GSA Boards of Directors.
- No later than June 30, 2025, and June 30 of every year thereafter, the Well Mitigation Committee will present the proposed implementation activities, budgets, schedules, and contracts planned for the next fiscal year to the GSAs' Boards of Directors for consideration and approval.

For ongoing Well Mitigation Program implementation, the Committee will:

- Work with applicable County Office of Emergency Services and Department of Environmental Health Services where the well is located;
- Work with NGOs and other programs, or directly with pre-approved vendors (e.g., well drillers and pump contractors) to provide an emergency water supply to applicants as needed; and
- Regularly review procedures and eligibility criteria for the Well Mitigation Program and revise as necessary from time to time, as may be appropriate (see Section 3).

During implementation, the Committee will conduct the following application process (see Section 3 for details):

- Per the Program requirements, conduct its own investigation of evidence pertaining to the conditions and circumstances of the applicant well;
- Make and document any determinations regarding eligibility of an application;
- For an eligible application, recommend complete or partial payment for mitigation based on the Committee's determination pursuant to the Plan criteria ; and
- Forward its documentation and recommendation regarding funding/mitigation to the joint TACs at their next regularly scheduled joint TAC meeting.

2.2. PARTNERSHIPS WITH EXISTING MITIGATION PROGRAMS

During development of this Plan, the GSAs coordinated with Valley Water Collaborative (VWC) and Self-Help Enterprises (SHE), which implement local programs that offer mitigation support for those affected by impaired access to drinking water within the Turlock Subbasin and the San Joaquin Valley. During implementation of the Well Mitigation Program, including outreach, additional agencies or NGOs may be identified for potential collaboration that have interest in and authority over drinking water. VWC was formed to address nitrate contamination of groundwater in private domestic wells used for drinking water in the Modesto and Turlock subbasins. VWC provides well testing and replacement water or water treatment systems for nitrate contamination to all qualifying applicants, regardless of income level. SHE offers

emergency drinking water supplies, long-term mitigation support, and well stewardship educational resources for those who qualify under their separate program in Stanislaus and Merced Counties.

3. MITIGATION PROGRAM PROCESS

3.1. ELIGIBILITY

The Well Mitigation Program is intended to address impacts to drinking water wells. Drinking Water Wells are defined herein as any well used to supply potable water to a household, including domestic wells that supply water for potable, landscape irrigation and other domestic purposes to a single home or parcel. It may also include State small water system wells that provide water to multiple connections or parcels, as defined by state law.[2] Mitigation for other types of supply wells (e.g., agricultural irrigation, municipal, industrial or stock wells) or for non-domestic uses of a well will be considered under this Plan on a case-by-case basis.

At this time, emergency drinking water supplies can generally be requested in Stanislaus and Merced counties (and elsewhere in San Joaquin Valley) via online request or telephone call to a NGO, such as VWC or SHE, which establishes basic information (e.g., well location) and eligibility to receive emergency bottled water under those programs and then requires additional information in an application.

This Program will be coordinated with such non-governmental efforts, in an effort to avoid duplication of assistance. This Program is focused on well failures due to declining groundwater levels attributable to sustainable groundwater management under the Subbasin GSP. To be eligible for mitigation assistance from the GSAs' Program, the Committee will require a separate application from the well owner and will review the application to determine that:

- The cause for well failure has not been previously addressed; and
- The cause of the well failure is declining water levels resulting from overdraft pumping that occurred on or after January 6, 2022, and is attributable to sustainable groundwater management under the Subbasin GSP; or
- The cause of diminished well yields (such that reasonable demands can no longer be met) is overdraft pumping that occurred on or after January 6, 2022, and is attributable to sustainable groundwater management under the Subbasin GSP.

The GSAs manage groundwater levels in the Turlock Subbasin in accordance with the Subbasin GSP, as it may be amended or revised from time to time. Wells eligible for the Program are those that have experienced adverse impacts due to declining groundwater levels. It is important to note that well performance may be affected by other factors (e.g., well age, construction, maintenance, or pumping interference from nearby wells), and well performance

[2] "State small water system" means a system for the provision of piped water to the public for human consumption that serves at least 5, but not more than 14, service connections and does not regularly serve drinking water to more than an average of 25 individuals daily for more than 60 days out of the year. (Health & Saf. Code § 116275(n).)

may or may not be affected by the GSAs' groundwater management. The Well Mitigation Committee will take such performance factors into account when determining the degree to which a well is eligible for the Program or for cost reimbursement.

The well owner must complete and file an application. As described in Section 3, the application will be reviewed by the Well Mitigation Committee to determine if the applicant qualifies for GSA mitigation. Through the Well Mitigation Committee, GSAs will ensure that emergency water supply requests are addressed and, if warranted, will then investigate whether the impact is attributed to the GSAs' groundwater management,. Section 3 provides details on the Application Process.

3.2. APPLICATION PROCESS

Outreach by the Turlock Subbasin GSAs will provide information about the Well Mitigation Program and how to participate therein. Application forms will be available online (https://turlockgroundwater.org/) or from an outside consultant or NGO, through agreement with the GSAs. If requested, designated GSA staff or technical representatives of the Committee will assist applicants with filing the applications. The GSAs may also contract with other entities to assist with filing applications.

The Application Process itself involves the following steps that begin with completion and submittal of an application by the well owner.

1. **Completion and Submittal of Application.** The well owner will fill out an application form and submit it to the Well Mitigation Committee. The application shall include, but may not be limited to, the following information:

    - Well owner and contact information;
    - Well location and age;
    - Date the well first failed to provide adequate water;
    - Well construction information such as location and access, total well depth, screen interval depths, annual seal depth, and pump type and depth;
    - Well testing reports;
    - Information on water use;
    - Inspection reports from a licensed well driller or pump and well contractor identifying the cause of the well failure; and
    - Any other evidence in applicant's possession that the well failure was caused by overdraft pumping since January 6, 2022 (e.g., depth to water measurements from nearby wells, etc.).

To be eligible for assistance, applicants that do not own the well and/or the land where the well is located must provide signed consent from the landowner and well owner for access and onsite inspection of the well facilities by Well Mitigation Committee representatives.

2. **Assessment of Eligibility.** The Well Mitigation Committee and its designated technical representatives will be responsible for reviewing applications (including attachments) to assess the extent of the applicant's eligibility to receive mitigation under the Program (see Section 3.1). Through the GSAs, the Committee will have the authority to conduct an independent investigation of the evidence at the GSAs' expense, including but not limited to well inspection and testing, research of records, and requesting records from the applicant. Within 15 days of receipt of the completed application (including any additional information requested by the Well Mitigation Committee , the Committee will provide written documentation of its determination regarding the applicant's eligibility for mitigation and a summary of the mitigation authorized.

3. **Approval of Mitigation Funding.** The Well Mitigation Committee will present the completed application and determination to the joint TACs at their next regularly scheduled meeting. The Committee may recommend and the Joint TACs may approve complete or partial funding for mitigation for a particular application. In making its determination, the TACs will consider the extent to which overdraft contributed to the well's failure compared to other contributing factors, such as the age, condition, or use of the well or pumping equipment. The TACs will determine the appropriate mitigation actions (see Section 3 for details) and will recommend the relative cost share between the GSAs. The TACs will make a decision (Decision) on the application at the meeting. Notification of the TAC's Decision will promptly be provided to the applicant.

4. **Well Owner Agreement.** No long-term mitigation shall commence until the well owner has executed an agreement with the GSA(s) or GSA authorized representatives. The agreement shall includes several components, including but not limited to:
    - Mitigation assistance (how will the costs of mitigation be reviewed and approved);
    - Recordation of mitigation assistance;
    - Post-mitigation responsibility (property owner to be responsible for operations, maintenance and repair of water well);
    - Indemnification of the GSAs and their staff, contractors and agents; and
    - Easement or land access permissions, as appropriate.

5. **Appeals.** An applicant may appeal a decision by submitting a written appeal to the applicable GSA Board where the well is located. This must occur within 30 days of the date that the applicant is notified of the decision. The appeal must contain a copy of the original application and GSA's decision and state the basis for the appeal. The GSA will investigate the appeal as necessary over a period not to exceed 30 days and include the appeal for the

Board's consideration at the next GSA Board Meeting after conclusion of its investigation. The GSA will provide written notice and the agenda to the appellant consistent with the Brown Act. The GSA Board will determine whether to grant the appeal, and the GSA will issue a written decision. The decision of the GSA Board of Directors will be final.

6. **Application Privacy.** Once an application and subsequent information is provided to the GSAs, it may become subject to the California Public Records Act, which may allow certain information provided to become public. If an applicant is concerned about sensitive information requested in the Application, the applicant should contact the GSAs to discuss data and information sharing confidentiality solutions.

3.3. Process for Establishing GSA-Related Well Impacts

The purpose of the Well Mitigation Program is to address the adverse impacts of declining groundwater levels on domestic water supply wells. As described in the Turlock Subbasin Revised GSP (Section 6.3.3), an analysis was conducted that showed potential impacts to water supply wells due to groundwater levels declining below established Minimum Thresholds (MTs), which is expected to be limited to an interim period before planned Projects and Management Actions are fully implemented.

In addition to direct impacts (i.e., diminished yield or wells going dry), the Revised GSP analysis considered potential impacts to water quality and land subsidence. The analysis indicated that groundwater levels declining below the MTs during the interim implementation period would not be likely to have an impact on groundwater quality or on land subsidence. Accordingly, this Well Mitigation Program focuses on the direct impacts of wells going dry, and not water quality or subsidence issues. In general, a well is considered to be going dry when water can no longer be pumped in sufficient quantity to meet domestic water demands because groundwater levels have fallen too low for the well to produce the required groundwater quantities. While the well is going dry, this results in diminished well yield or unreliable productivity. Once groundwater levels have fallen below the pump intake, the well is dry and does not produce any water. In some cases, it may be possible to lower the pump to restore sufficient yield, but in other cases the well must be deepened or a new, deeper well must be installed.

As described in Section 3, the Well Mitigation Committee will review information provided by an applicant and, with the authority to conduct an independent investigation, will provide a recommendation about the condition of the well and the cause(s) of the well failure. The Well Mitigation Committee will make a recommended determination of whether or not declining groundwater levels resulting from groundwater basin management renders an application eligible for mitigation, which the joint TAC may adopt in its Decision. The Committee and joint TACs may also consider other contributing factors, such as the age, condition and use of the well, or the condition of pumping equipment, in determining the degree to which an applicant

is eligible for mitigation. If appealed to the GSA Board, the GSA may take all relevant factors into consideration in making a final decision.

3.4. Process for Implementing Mitigation Measures

Mitigation measures for domestic and small community water system wells affected by groundwater level declines may include emergency water supply, interim solutions, and long-term solutions. Emergency water supplies will be provided upon receiving an eligible request. In order to continue emergency water supply or to access interim or long-term solutions, the well owner must submit an application and provide authorization from the landowner to access the well, if the well owner is a separate person or entity. The application may be provided and processed by a non-governmental organization that can provide the full scope of emergency supplies, interim solutions or long-term solutions for an eligible failed well, pursuant to an agreement with the GSAs. As described below, the GSAs also are implementing long-term preventive management actions and projects.

3.4.1. Emergency Water Supply

Emergency water supply will be provided when a drinking water well has failed because of decreased groundwater levels during the SGMA implementation period. The TACs (or Well Mitigation Committee) will work with the applicable County Office of Emergency Services where the well is located, with other non-governmental agencies and programs, or directly with pre-approved vendors to provide an emergency water supply, namely two weeks' supply of bottled drinking water delivered at the time of well assessment to address immediate needs.

3.4.2. Interim Solution

Interim solutions may include ongoing deliveries of bottled drinking water provided by vendor (for consumption) and/or temporary provision and filling of a water tank (hauled water) to meet drinking water, hygiene and cooking needs while the application is reviewed and processed. The application may be provided and reviewed by the Well Mitigation Committee in cooperation with a NGO or outside contractor that can provide interim solutions through agreement with the TACs. Every effort will be made to process applications in a timely manner and to provide adequate domestic water supply to applicants while applications are verified, site specific mitigation requirements are determined, contracts are signed as needed, and contractors are scheduled. If the application is verified as eligible for GSA mitigation, the GSAs or their designees will ensure that an interim solution will continue until the selected mitigation is complete. Alternatively, if the application is found to be ineligible under this plan, the TACs will refer the incident to another agency or program for additional assistance, if possible.

3.4.3. Long-term Solutions

Following review and initial approval of the application, the most appropriate long-term mitigation measure will be selected and implemented by the TACs, with the advice of the Well Mitigation Committee, in cooperation with a NGO or outside consultant that can provide interim solutions through agreement with the TACs. Long-term mitigation measures may include setting the well pump at a deeper depth, replacing or adjusting the pump controls, maintaining or adjusting the well control switches or pressure control system, replacing the well pump (if damaged by declining groundwater levels), deepening the well, or replacing the well. A mitigation measure also could involve connection to a nearby public water system or provision of point-of-use water treatment, if feasible. As described in Section 3.2, the Well Mitigation Committee and the TACs will recommend the criteria and procedures to approve an application and implement a long-term mitigation measure.

4. LONG-TERM PREVENTIVE MANAGEMENT ACTIONS AND PROJECTS

The GSP's projects and management actions are intended to reduce the potential for more wells to go dry. For example, management actions to reduce net groundwater demand will be focused around areas found to be vulnerable to wells going dry and demand reduction will be prioritized where most needed to protect potable beneficial uses. Projects involving managed aquifer recharge or in lieu recharge may be designed to increase benefits to areas found to be vulnerable to wells going dry. Management actions may also involve collaborating with and providing support to organizations providing point of use or point of entry water treatment systems for potable water users.

5. MITIGATION PLAN OUTREACH

The GSAs will assign staff to engage in public outreach to inform well owners and residents of the opportunity to request assistance under the Program. GSA staff or authorized agents will conduct outreach to populations most likely to require assistance under this Program and will create fliers, mailers, social media posts, website links, and other materials as needed to publicize this Program. The fliers will be posted at appropriate locations (such as County Environmental Health Departments, offices of the GSAs and member agencies, Farm Bureau locations, community organizations and City and County Public Works and Utility Offices) and will be provided to local well drillers and pump and well contractors. The GSAs may also contract with non-governmental organizations to assist with outreach.

Outreach during development of the Well Mitigation Implementation Plan will include, but is not limited to the following:

- Establishment of a webpage on the Turlock Groundwater website (English and Spanish, https://turlockgroundwater.org/);
- Discussion of the Draft Well Mitigation Implementation Plan at public joint TAC meetings; and
- Public notification and circulation of the Draft Well Mitigation Implementation Plan prior to approval by the GSAs' Board of Directors.

Outreach during Plan implementation will be more intensive and will include information about when and how to submit an application. It will include the following:

- Preparation and distribution of flyers using the GSAs' mailing lists;
- Hand delivery and/or public posting of flyers in English, Spanish, and other languages necessary based on the demographics of the Subbasin at selected public locations to ensure Severely/Disadvantaged Communities are reached effectively;
- Maintenance of the Well Mitigation Program website;
- Update and discussion as a regular agenda item of monthly joint TAC meetings; and
- Regular reporting in Annual Reports of mitigation efforts and accomplishments.

6. FUNDING AND ANTICIPATED COSTS

The purpose of the Fund is twofold: to support implementation of the Program as described above, and to provide funding for well mitigation in response to eligible applications at the discretion of the GSAs as described below.

Initial Funding. The Program is initially being funded by the GSAs as part of their respective annual budget and apportioned between the GSAs using the existing cost share allocations adopted by the GSAs in their cost share agreement.

Annual Funding. The GSAs agree to fund the Program on an annual basis as may be required to address the needs of the mitigation program until groundwater sustainability is achieved. The Well Mitigation Committee shall develop and recommend an annual funding framework, which shall be reviewed by the respective TACs and approved by the GSAs' Boards of Directors no later than June 30, 2025 (or when the initial funding is exhausted). A target minimum fund level will be established based on analysis of dry well susceptibility for Turlock Subbasin. The Fund may be replenished during the year as needed by using reserves, additional GSA fees and assessments, or funds generated through implementation of other management actions. The GSAs have various funding mechanisms in place and/or are in the process of securing additional revenue to continue to fund the Program in the future. Additionally, it is anticipated that future Program funding may be supplemented by County, state, or federal funding, as available.

Accounting. The Fund shall be placed in an interest-bearing account that is separate from all other accounts and will be managed by one of GSAs.

Funding Cycle. The budget cycle of the Program shall be on a fiscal year basis (July 1 – June 30).

Funding and Implementation Review. Not less than once per year, the GSAs shall convene a joint meeting of their respective TACs to review Program implementation progress in that year and plan for Program implementation in the subsequent year.

In-Kind Services. Each GSA is likely to provide in-kind services and subsequently incur in-kind costs as part of continued Program development and management. Said costs shall be the responsibility of each GSA unless otherwise agreed to in writing.

To initiate implementation of the Program, the GSAs will establish by January 31, 2025, a Joint Well Mitigation Fund (Fund) with an initial funding target in the amount of two hundred thousand dollars ($200,000).

The Well Mitigation Program will provide mitigation for well failures caused by overdraft pumping since January 6, 2022. To estimate potential costs of the Well Mitigation Program, this Plan has used the following information:

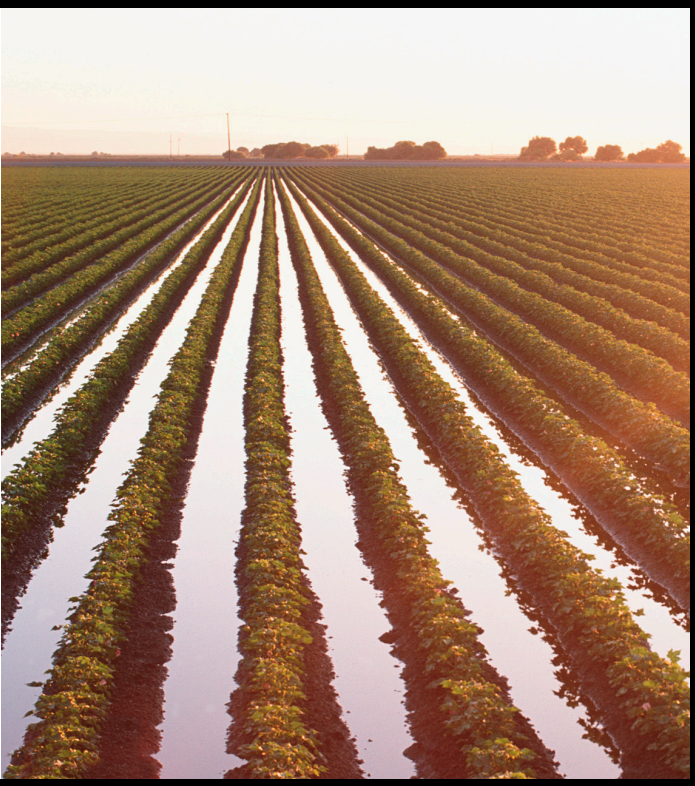
- Analysis in the Revised GSP. As described in the Revised GSP, analysis was conducted to gain perspective on potential impacts to water supply wells due to groundwater levels declining below Minimum Thresholds (MTs) to Interim Milestones (IMs) established for the interim period before 2027 and before GSP Projects and Management Actions are fully implemented. This analysis suggested the potential for an additional 85 wells to go dry. This analysis, based on comparison of well construction data (i.e., well depth) and the MT and IM groundwater levels, presents a hypothetical worst case and does not account for the positive effects of GSP implementation or for hydrologic conditions in any given year, or the fact that many of the well completion reports considered were for older wells that may no longer be in service. Limitations to the analysis are stated in the Revised GSP.
- Historical data from the DWR Dry Well Reporting System. The Dry Well Reporting System provides the annual number of wells reported as going dry. Historical annual data are not considered to be predictive because most historical failed wells in the Subbasin were less than 100 feet deep and more than 50 years old, and have been replaced with new, generally deeper wells. Given that and GSP implementation, annual rates can be expected to decrease in the future.
- Recent data from the Dry Well Reporting System. These data are summarized in the Annual Reports for Water Year (WY) 2022 and WY 2023 and indicate that cases of well failure have continued, with 28 dry wells reported in the critically dry WY 2022 and 14 dry wells in the wet WY 2023. These latest well failures have not been evaluated in terms of their potential eligibility for the Well Mitigation Program. GSP sustainable management addresses the long term, including wet and dry years, but the dry well reports for these two disparate years suggests that the Well Mitigation Program may need to address between 14 and 28 well failures per year.
- Considering information from other GSAs that have developed well mitigation programs, our experience with well mitigation locally, our analysis of historical well failures and conditions in the area, and our knowledge of drilling costs in this area, we estimate that the cost to provide emergency, interim and long-term mitigation will average approximately $40,000 (in 2025 dollars) per impacted well. Based on

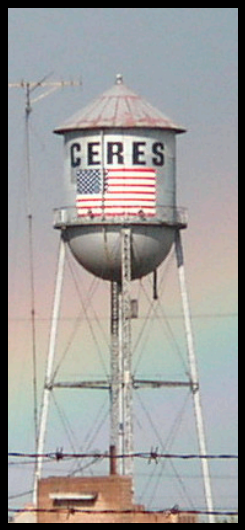
the analysis presented in the GSP and discussed above, we estimate that up to 60 well users may experience adverse impacts and require funding under the Well Mitigation Program before groundwater levels recover to 2015 levels in approximately 2032, at which point the need for well mitigation is assumed to be relatively isolated. For general budgeting purposes, we assume that the maximum number of wells that require mitigation under the Program will be approximately the same as in 2022, which was a critically dry year. As such, for preliminary budgeting purposes, we project that the total cost to implement the Well Mitigation Program for general budgeting purposes (in 2025 dollars) will be approximately $2.4 million for 60 wells, with a maximum annual cost of $1.2 million for 30 wells in a critically dry year.

- In developing the annual budget, the Well Mitigation Committee will consider current groundwater level trends and the type of water year. The Well Mitigation Committee will reevaluate the budget and remaining amounts in the fund by the end of the calendar year and may recommend that the GSAs increase the budget from reserves, if necessary, for the remainder of the Fiscal Year.

7. SCHEDULE

TO BE ATTACHED WHEN ADOPTED





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