Yolo Subbasin Groundwater Sustainability Plan

Board Draft 2027 Periodic Evaluation
Covering Water Years 2019 – 2024

34274 State Highway 16
Woodland, CA 95695

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Yolo Subbasin Groundwater Agency, Board Member Agencies and Affiliated Parties

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Technical Advisory Committee

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EXECUTIVE SUMMARY

Short Summary

The Yolo Subbasin Groundwater Agency (YSGA) is the exclusive Groundwater Sustainability Agency for the high-priority Yolo Subbasin. This Periodic Evaluation finds that Plan implementation during Water Years (WY) 2019–2024 maintained the Subbasin's sustainability goal and did not experience overdraft. Undesirable results did not occur for any applicable sustainability indicator which includes (1) chronic lowering of groundwater levels, (2) reduction of groundwater storage, (3) degradation of water quality, (4) land subsidence, and (5) depletion of interconnected surface water. Groundwater conditions declined during the WY 2020–WY 2022 drought, when surface-water supplies were sharply reduced and pumping increased. Groundwater conditions then recovered in wet WY 2023 and above-normal WY 2024. The YSGA Board adopted the Technical Advisory Committee recommendation not to amend the 2022 Groundwater Sustainability Plan (GSP) with this evaluation. This evaluation focuses on being responsive to DWR's recommended corrective actions that were provided with the approval of Yolo Subbasin GSP in 2023. Work that may support an amendment began after WY 2024 and will be documented with subsequent GSP Annual Reports and the 2032 Periodic Evaluation and an associated GSP amendment.

Long Summary

To be completed during final draft preparation.

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Acronyms and Abbreviations

1D	one-dimensional
AEM	airborne electromagnetic
AF	acre-feet
amsl	above mean sea level
ASR	Aquifer Storage and Recovery
BMP	Best Management Practice(s)
Board	Yolo Subbasin Groundwater Agency Board of Directors
CDFW	California Department of Fish and Wildlife
COC	constituent of concern
County	Yolo County
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
CVFPB	Central Valley Flood Protection Board
CVP	Central Valley Project
DDW	Division of Drinking Water
DEM	digital elevation model
District, YCFC&WCD	Yolo County Flood Control & Water Conservation District
DRP	Drought Resiliency Plan
DWD	Dunnigan Water District
DWR	California Department of Water Resources
EPA	U.S. Environmental Protection Agency
ET	evapotranspiration
ft	feet
ft/yr	feet per year
GAMA	Groundwater Ambient Monitoring and Assessment Program
GDE	groundwater-dependent ecosystems
GPS	global positioning system
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
HCM	hydrogeologic conceptual model
HRL	Healthy Rivers and Landscapes
ILRP	Irrigated Lands Regulatory Program
IM	interim milestone
InSAR	Interferometric Synthetic Aperture Radar
ISW	Interconnected surface water
MA	Management Area
MCL	maximum contaminant level
MNDWI	Modified Normalized Difference Water Index
MT	Minimum Threshold
MO	Measurable Objective
NCCAG	Natural Communities Commonly Associated with Groundwater
NISAR	NASA-ISRO Synthetic Aperture Radar
OSWCR	Online System of Well Completion Reports
PFAS	poly- and perfluoroalkyl substances
PMA	project and management action
ppb	parts per billion

RMW	representative monitoring well
SCWA	Solano County Water Agency
SGMA	Sustainable Groundwater Management Act
SMC	sustainable management criteria
TAF	thousand acre-feet
TCD	total completed depth
TDS	total dissolved solids
TNC	The Nature Conservancy
USBR	United States Bureau of Reclamation
WCR	well completion report
WDCWA	Woodland Davis Clean Water Agency
WRID	Water Resources Information Database
WY	water year
YSGA	Yolo Subbasin Groundwater Agency
YSGA TAC	Yolo Subbasin Groundwater Agency Technical Advisory Committee
Yuba Subbasins	North Yuba and South Yuba Subbasins

1. INTRODUCTION

GSP Emergency Regulations §356.4 state that:

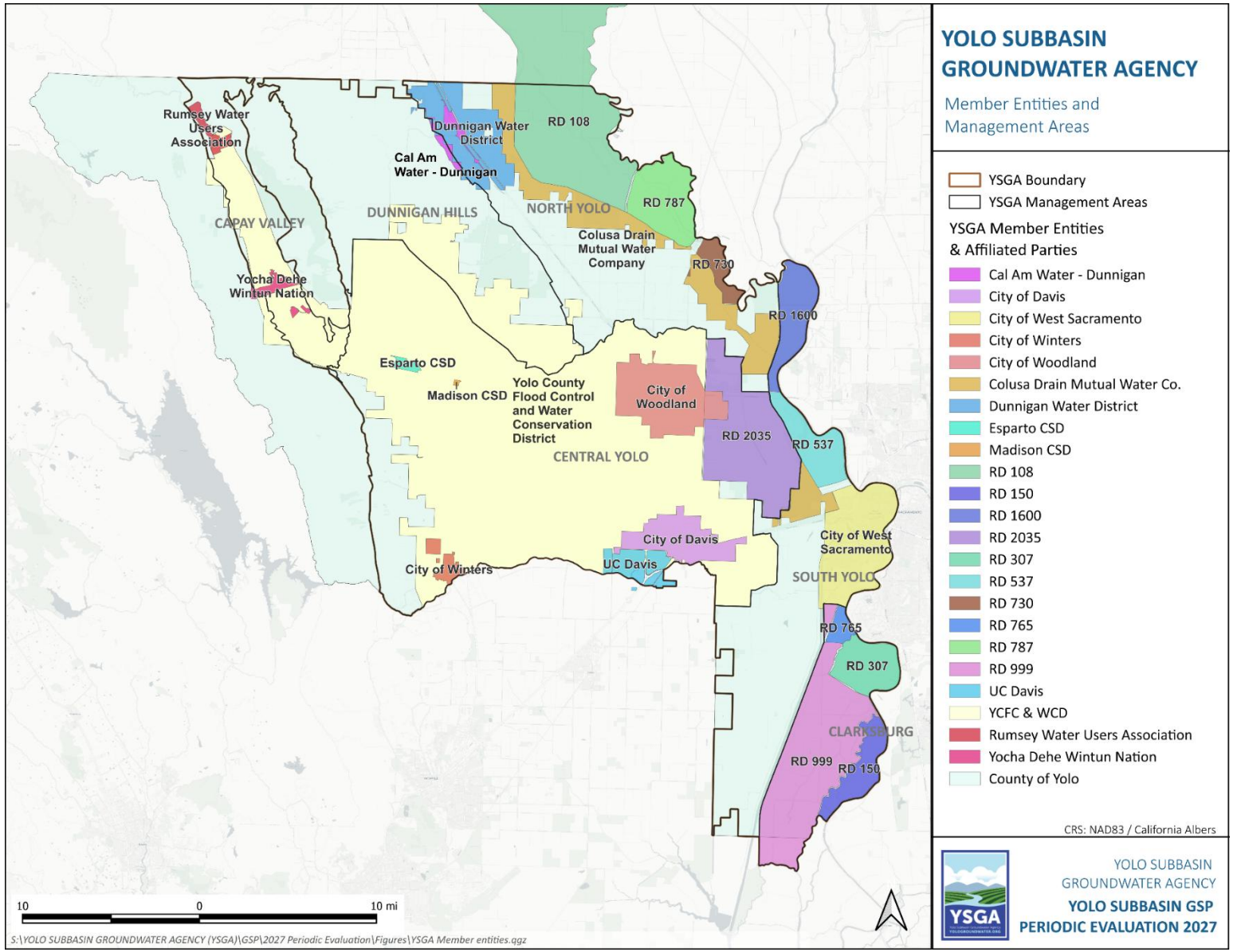
> *Each Agency shall evaluate its Plan at least every five years and whenever the Plan is amended, and provide a written assessment to the Department. The assessment shall describe whether the Plan implementation, including implementation of projects and management actions, are meeting the sustainability goal in the basin…*

1.1 Introduction and Plan Authority

The Sustainable Groundwater Management Act (SGMA), passed in 2014, requires the formation of local Groundwater Sustainability Agencies (GSAs) to oversee the development and implementation of Groundwater Sustainability Plans (GSPs), with the goal of achieving sustainable management of California's groundwater basins.

The California Department of Water Resources (DWR or Department) designated Yolo Subbasin as a high-priority basin. Under SGMA, the Subbasin was not identified as critically overdrafted and therefore was required to be managed by a GSP by January 31, 2022. The Yolo Subbasin Groundwater Agency (YSGA) prepared and submitted the Yolo Subbasin's GSP to DWR in January 2022, which DWR approved in October 2023. Yolo County Flood Control & Water Conservation District (District or YCFC&WCD) leads GSP development and implementation, working in conjunction with the YSGA Board of Directors (Board) that consists of 26 member agencies and affiliated parties. Figure 1 shows the location of the Yolo Subbasin GSA and member agencies. YSGA is the sole, exclusive GSA in Yolo Subbasin.

Figure 1: YSGA Member Entities and Management Areas



1.2 Purpose of the Periodic Evaluation

This Period Evaluation meets the five-year assessment requirement of the GSP Emergency Regulations §356.4, Periodic Evaluation by Agency, and assesses the GSP implementation period for Water Years (WYs) 2019 through 2024. The purpose of this Periodic Evaluation is to provide an update to DWR, interested parties, and the public on changing conditions in the Yolo Subbasin and the progress the YSGA has made on implementing the Yolo Subbasin GSP. This Periodic Evaluation assesses the progress made toward maintaining the Subbasin sustainability goals, which are as follows:

- Achieve sustainable groundwater management in the Yolo Subbasin by maintaining or enhancing groundwater quantity and quality through the implementation of projects and management actions (PMAs) to support beneficial uses and users.
- Maintain surface water flows and quality to support conjunctive use programs in the Subbasin that promote increased groundwater levels and improved water quality.
- Operate within the established sustainable management criteria (SMC) and maintain sustainable groundwater use through continued implementation of a monitoring and reporting program.
- Maintain sustainable operations to maintain sustainability over the implementation and planning horizon.

This Periodic Evaluation also provides DWR, interested parties, and the public with the progress the YSGA has made on implementing the GSP. This Periodic Evaluation summarizes and assesses the following:

- New and significant information;
- Groundwater conditions for each applicable sustainability indicator identified in the approved GSP;
- Actions taken to address recommended corrective actions issued by DWR;
- Status of PMAs;
- Updates to the basin setting;
- Monitoring network updates; and
- The authorities and actions taken by the YSGA during this evaluation cycle.

This Periodic Evaluation also documents progress in addressing DWR's recommended corrective actions to the Yolo Subbasin GSP submitted to DWR in January 2022. On October 26, 2023, DWR completed its evaluation of the 2022 GSP and approved the GSP (DWR, 2023b). DWR's recommended corrective actions are summarized in Section 3 and Section 6 below.

The organization of this Periodic Evaluation adheres to Section 3.3 of the Groundwater Sustainability Plan Implementation: A Guide to Annual Reports, Periodic Evaluations, & Plan Amendments (DWR, 2023a). The YSGA Board adopted the YSGA Ad-hoc Technical Advisory Committee's (YSGA TAC) recommendation not to prepare an amended GSP to accompany this Periodic Evaluation. This decision was made because most of the data collection, analysis, and interpretation work that may lead to material changes to the GSP that would warrant an amendment began after WY 2024. The YSGA TAC & Staff recommended to the YSGA Board that it prepare a GSP amendment to accompany the next Periodic Evaluation, due in 2032.

2. NEW INFORMATION COLLECTED

GSP Emergency Regulations §356.4(f) include a requirement that the Periodic Evaluation shall include:

> *A description of significant new information that has been made available since Plan adoption or amendment, or the last five-year assessment. The description shall also include whether new information warrants changes to any aspect of the Plan, including the evaluation of the basin setting, measurable objectives, minimum thresholds, or the criteria defining undesirable results.*

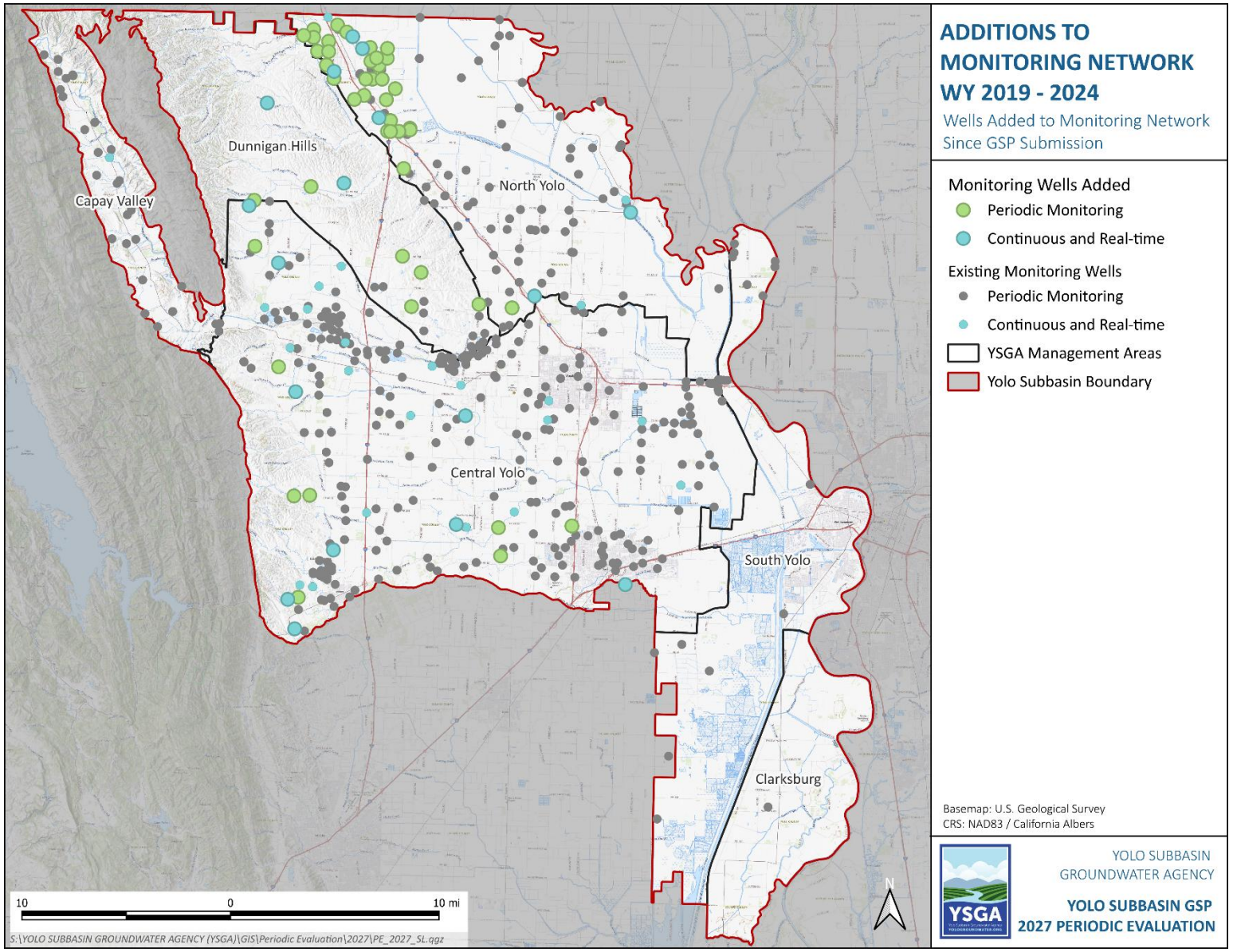
This section presents new and significant information acquired since the development of the 2022 GSP. Information deemed new and significant is summarized in Table 1.

Table 1: New Information Collected

Description	Aspect(s) of Plan Affected	Plan Amendment
Airborne electromagnetic data were collected in the Yolo Subbasin in April 2022 and published in *Data Report for Survey Area 6 Solano, South American, North American, Yolo, Sutter, South Yuba, and North Yuba Groundwater Subbasins* (DWR, 2023c). These data will serve to refine the Hydrogeologic Conceptual Model, model aquifer parameters, and develop recharge projects. See Section 5 - Basin Setting for more information.	Basin Setting (HCM), Projects and Management Actions	No – HCM will be revised as warranted by the 2032 GSP amendment
In summer 2024, the YSGA commissioned a Subbasin-wide GPS benchmark survey, including added benchmarks in Capay Valley. *Project Report: Yolo County Subsidence Network 2024 Reobservation* quantifies the total amount and rates of land subsidence since 2017, when the network was last surveyed (Frame, 2024). Results largely align with the subsidence observed by DWR's TRE Altamira interferometric synthetic aperture radar (InSAR) dataset over the same time period (Towill, 2024). See Section 3 - Groundwater Conditions Section for more information.	Basin Setting (Groundwater Conditions), Monitoring Network	No – GPS data aligns with InSAR data.
In 2023, the YSGA began collaborating with The Nature Conservancy (TNC) and Audubon to study environmental stakeholder outreach and engagement, monitoring networks for groundwater-dependent ecosystems (GDEs), and potential groundwater thresholds for GDE health. The results of this work will be published in a Technical Memo by TNC and Audubon anticipated before the end of 2026. In Spring-Summer 2024, the YSGA surveyed select polygons from the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset to confirm the presence of GDEs. The survey will conclude in 2026, and the results will be published in a report on the YSGA website.	Basin Setting (Groundwater Conditions), Monitoring Networks, Sustainable Management Criteria	No – GDE analysis and survey results will be evaluated in the 2032 Periodic Evaluation
Components of the YSGA Model are updated annually to incorporate the latest available data. Model results are used annually in Annual Report development and to support project and management action development. In addition, targeted improvements funded by the SGMA Implementation Grant and the WaterSMART Applied Science program were completed, including updated evapotranspiration and applied water assumptions, corrected managed wetland acreage and flooding schedules, increased spatial variability of groundwater pumping, and incorporation of additional scenarios. For more information, see Section 5.4 - Model Updates.	Basin Setting (Water Budget), Projects and Management Actions	No – updated model results and water budget values will be reported in subsequent annual reports and the 2032 Periodic Evaluation and Amendment

Description	Aspect(s) of Plan Affected	Plan Amendment
Since the submission of the GSP in 2022, YSGA has continued efforts to strengthen the groundwater monitoring network. Sixty-two wells have been added to the monitoring network, including 18 continuous monitoring wells. Three dedicated multi-completion monitoring wells were constructed along the western side of the Subbasin through DWR's Technical Support Services Program. Other monitoring wells were added to fill spatial data gaps in the network and improve monitoring coverage for drinking water wells. YSGA also launched a Citizen Science Program to allow rural well owners to borrow equipment and measure their own wells. Figure *2* shows monitoring sites added during WY 2019 - 2024.	Basin Setting (Groundwater Conditions), Monitoring Network	No – changes to monitoring network do not justify GSP amendment
Beginning in 2020, the YSGA launched an extensive data-gathering and stakeholder outreach effort focused on the Hungry Hollow area. Data collection included the installation of monitoring wells, t-TEM surveys, hydrogeologic investigations, and modeling. YSGA is working with stakeholders to develop and prioritize projects to improve groundwater conditions in the area. The results of this work will be presented in a Hungry Hollow White Paper anticipated to be completed before the end of 2026.	Basin Setting (HCM), Projects and Management Actions	No
In response to Governor Newsom's Executive Orders N-7-22 and N-3-23, as well as stakeholder concerns, the YSGA delineated "Focus Areas" to facilitate the well permit verification process. The Focus Areas encompass the "Areas of Special Concern" denoted in the 2022 GSP and represent areas with limited groundwater data, data that indicate groundwater level decline, and/or vulnerable drinking water systems. Appendix I of the Tiered Well Permit Review Technical Memorandum (West Yost, 2024) describes the process for delineating the Focus Areas. The YSGA will update the Focus Areas boundaries as needed based on new information and updated data. YSGA will continue to use the Focus Area boundaries to facilitate the well permit verification process and to plan projects and management actions to alleviate groundwater concerns in the areas. YSGA also will continue to coordinate with Yolo County Department of Environmental Health staff to conduct education and outreach on the well permitting process that's been established.	Basin Setting (HCM, Groundwater Conditions)	No

Figure 2: Additions to Monitoring Network During Evaluation Period



3. GROUNDWATER CONDITIONS RELATIVE TO SUSTAINABLE MANAGEMENT CRITERIA

GSP Emergency Regulations §356.4(a) state the Periodic Evaluation shall include:

> *A description of current groundwater conditions for each applicable sustainability indicator relative to measurable objectives, interim milestones and minimum thresholds.*

The following subsections are organized by sustainability indicator and evaluate current groundwater conditions (i.e. groundwater levels calculated as groundwater elevations) over the evaluation cycle for this Periodic Evaluation (WYs 2019 - 2024) relative to SMC established in the 2022 GSP, and demonstrate sustainable conditions have been maintained in the Yolo Subbasin. Where applicable, the following subsections also describe modifications to the SMC definitions or methods due to changes in the representative monitoring networks or recommended corrective actions from DWR's 2022 GSP determination letter.

3.1 Chronic Lowering of Groundwater Levels

3.1.1 WY 2019 – WY 2024 Groundwater Level Conditions

WY 2019 (Wet)

Wet conditions throughout the water year led to abundant surface water supplies in the Yolo Subbasin, which were beneficially used to achieve both managed and in-lieu groundwater recharge. During the irrigation season, YCFC&WCD provided unallocated surface water (i.e. unlimited) supplies from Clear Lake and Indian Valley Reservoir to its customers, while Central Valley Project (CVP) contractors, which include the Sacramento River Settlement Contractors (Settlement Contractors), received a 100% CVP allocation. Overall, surface water use accounted for roughly two-thirds of total water use in WY 2019; groundwater accounted for the remaining third, which translated to a relatively small seasonal average decline in groundwater levels from the spring high to fall low of about 9 feet (Figure 3).

WY 2020 (Dry)

WY 2020 saw the onset of dry hydrologic conditions throughout the Subbasin, as limited precipitation translated to reduced inflow to surface water reservoirs and reduced natural groundwater recharge. However, surface water remained available in the Subbasin during WY 2020, largely due to significant carryover storage from the wet conditions experienced the previous year. YCFC&WCD was able to again provide unallocated surface supplies. The Settlement Contractors received a 75% allocation of CVP supplies, and the Dunnigan Water District received a 50% CVP allocation. This meant that, even in a relatively dry year, surface water again accounted for over two-thirds of total water use within the in WY 2020, with the remaining third supplied by groundwater. The average seasonal groundwater level decline from the spring high to the fall low was about 8 feet, similar to that of the previous year. However, due to a decrease in groundwater recharge from below average precipitation and runoff, the average Fall 2020 groundwater levels were about 4 feet lower than those observed in fall 2019 (Figure 3).

WY 2021 (Critically Dry)

Critically dry conditions in WY 2021 led to limited surface water availability in the Subbasin. YCFC&WCD experienced its first allocated surface water (i.e. maximum allowed use) irrigation season since 2015 and delivered only about 30% of historical average. The Settlement Contractors received 75% of their contracted-for CVP supplies, while the Dunnigan Water District received only 5% of its CVP contract total but was able to purchase additional supplies from other entities. This shift sparked a significant increase in groundwater demand throughout the Subbasin, and groundwater use accounted for nearly half of overall water demand vs only a third in previous water years. The average seasonal groundwater level decline from the spring high to the fall low was about 18 feet, over double that from the previous year, due to a substantial increase in groundwater pumping from the year prior. Increased groundwater pumping and limited groundwater recharge from severely below average precipitation and runoff led to limited recovery in groundwater levels, and the average fall 2021 groundwater levels were about 13 feet lower than those observed in fall 2020 (Figure 3).

WY 2022 (Critically Dry)

Critically dry conditions persisted in WY 2022 leading to severely limited surface water supplies. After a third straight year of below-average precipitation, minimal water storage in Clear Lake and the Indian Valley Reservoir resulted in YCFC&WCD being unable to deliver any surface water in 2022. For the first time in history, the Settlement Contractors received less than 75% CVP supplies and instead received CVP supplies according to the seniority of water rights under Shasta Critical Year conditions. Dunnigan Water District was also allocated 0% of its CVP contract total yet was able to supply a very limited amount of surface water to its customers by purchasing from other entities. Due to these historically low surface water allocations, groundwater use increased to 60%, more than double WY 2019 or WY 2020. The average seasonal groundwater level decline from the spring high to the fall low was about 17 feet. The average fall 2022 groundwater level declined by another 5 feet from fall 2021. In total, over these three years with historically dry conditions, the average groundwater level declined by nearly 22 feet from fall 2019 to fall 2022 (Figure 3).

WY 2023 (Wet)

The wet winter in WY 2023 brought much-needed relief from the drought conditions of the previous three water years and allowed groundwater levels to recover as replenished surface water supplies became available. YCFC&WCD was able to provide unallocated surface water for irrigation, and Settlement Contractors were allocated 100% of CVP supplies. With the return of abundant surface water supplies, there also came significant groundwater recovery as demand on the aquifer decreased dramatically. Surface water was once again able to meet over two-thirds of overall water demand in the Subbasin, and the resulting average seasonal groundwater spring high to fall low decline was only around 6 feet. In addition, water agencies were able to reinitiate their managed recharge efforts (e.g. canal recharge by YCFCWCD), allowing infiltration of flood flows into the aquifer. Increased precipitation, recharge, and surface water supplies led to an average groundwater level recovery of 16 feet from fall 2019 to fall 2023 (Figure 3).

WY 2024 (Above Normal)

Groundwater conditions continued to recover into WY 2024 as surface water supplies were once again plentiful, with entities receiving full allocations similar to WY 2023. Natural and managed aquifer recharge events added to the benefits observed from in-lieu surface water use, helping to raise the average spring groundwater level in 2024 above the spring 2020 average at the onset of the historic three-year drought (Figure 3).

Sustainable Management Criteria Evaluation

Annual fall groundwater elevations in feet above mean sea level (amsl) at representative monitoring wells (RMWs) over the evaluation period are shown in Table 2. A summary of results relative to the SMC established in the GSP is shown in Table 3. Measured groundwater elevations must be less than the minimum threshold (MT) level in two consecutive fall measurements to violate the MT for the chronic lowering of groundwater levels SMC as defined in the GSP. In addition, an undesirable result occurs when the MT criteria described above is exceeded in 51 percent or more of RMWs in two (or more) Management Areas. The measurable objective (MO) is evaluated using the 5-year rolling average fall groundwater level.

At the start of the evaluation period in WY 2019, groundwater levels were largely above or near MO values at most RMWs. With the onset of dry conditions and increased groundwater use in WY 2020, water levels at one RMW in the Central Yolo Management Area dropped below the MT. However, one RMW dropping below the MT does not result in an MT exceedance nor an undesirable result. For most RMWs, groundwater conditions were still closer to the MO than the MT throughout WY 2020. Continued dry conditions in WY 2021 led to new MT exceedances at four RMWs within the Subbasin: one in the Capay Valley, one in the Dunnigan Hills, and two in Central Yolo. No measurement occurred in fall 2021 at the RMW in Central Yolo (10N02W26P0001M) that was in exceedance in WY 2020 due to access issues, so MT status was undeterminable.

A third consecutive dry year in WY 2022 brought about historic drought conditions in the Subbasin. Three new MT exceedance observations occurred in the Central Yolo MA, for a total of six RMWs in exceedance of the MT criteria. Three of the six RMWs had MT exceedances as defined in the GSP. In the other management areas (MAs), exceedances previously observed in WY 2021 remained for a second-straight year. Outside of the Central Yolo MA, no new exceedances were observed in WY 2022 that were not already present in WY 2021. Throughout this three-year dry period, no MT exceedances were observed in the North Yolo and South Yolo MAs.

With the return of wet conditions in WY 2023, groundwater levels in most RMWs that had been in exceedance returned to levels above the MT. The two RMWs that remained in exceedance in WY 2023 are in the Central Yolo and Dunnigan Hills MAs. Above average precipitation in WY 2024 allowed for continued recovery, and the groundwater levels in one RMW with an MT exceedance in the Dunnigan Hills recovered to levels above the MT, while the exceedance in Central Yolo remained. These isolated RMWs are in the hillslope areas experienced limited groundwater recovery and reflect localized issues that can persist even after drought conditions subside in the Subbasin. The YSGA is evaluating how to address this issue moving forward, likely by implementing targeted PMAs in these areas. As of the end of WY 2024, groundwater levels at most RMWs were above, or close to, their MOs. However, most RMWs did not meet their Interim Milestones (IMs) because IM compliance is evaluated using the 5-year running

average of fall groundwater elevations. This averaging period included three years of historic drought, which depressed the calculated average despite recent recovery (Table *2*).

While groundwater levels declined during the WY 2020 – WY 2022 drought, groundwater levels have recovered to near or above the MO levels throughout most of the Subbasin. For an undesirable result to occur, more than 51% of RMWs in two different MAs must exceed the MT. During WY 2022 at the peak of the drought, only three of 32 RMWs (9%) in Central Yolo MA exceeded both the groundwater level and temporal requirement of the MT criteria. One of three RMWs (33%) in Dunnigan Hills MA and one of 10 RMWs (10%) in Capay Valley exceeded only the groundwater level requirement of the MT criteria. No exceedances were observed in North Yolo and South Yolo MAs. Groundwater conditions from WY 2019 – WY 2024 did not trigger an undesirable result for chronic lowering of groundwater levels within the Subbasin (Table *3*).

Figure 3. Average Groundwater Levels within Yolo Subbasin (WY 1975 – WY 2024)

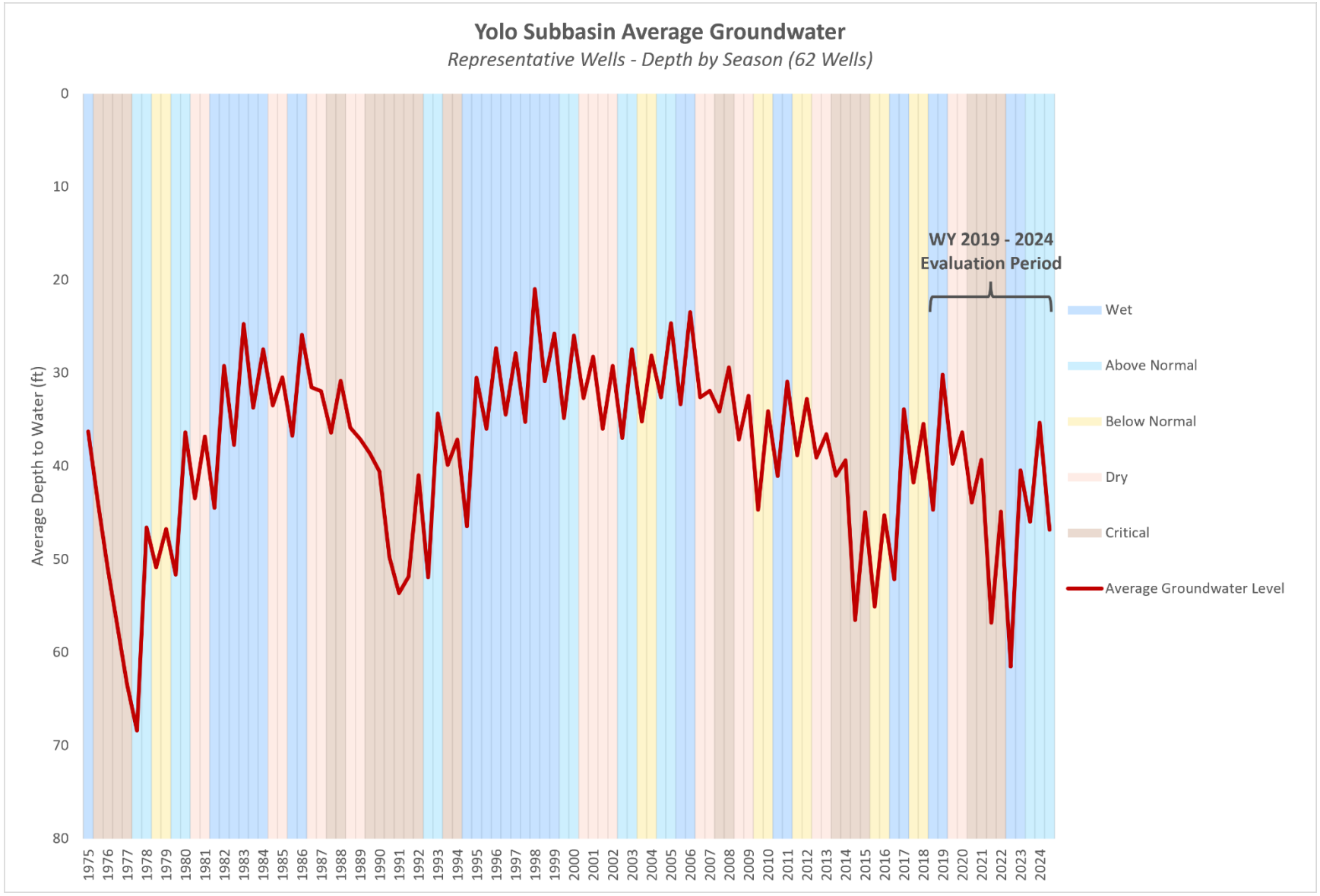


Table 2: Evaluation for Groundwater Elevations by Management Area (WY 2019 – WY 2024)

Capay Valley

State Well Number	RMW Number	MO[1] (ft-amsl)	MT (ft-amsl)	Fall 2019 (ft-amsl)	Fall 2020 (ft-amsl)	Fall 2021 (ft-amsl)	Fall 2022 (ft-amsl)	Fall 2023 (ft-amsl)	Fall 2024 (ft-amsl)	5 yr Fall Average[2] (ft-amsl)	Variance from Measurable Objective (ft-amsl)
10N02W16R001M	276	215.0	207.7	216.7↑	214.6	211.2	209.9	218.3↑	217.8↑	214.3	-0.7
10N02W18F001M	277	315.6	304.2	318.5↑	325.9↑	311.2	312.2	317.9↑	316.8↑	316.8	1.2
10N03W02R002M	280	319.5	308.2	316.6	313.3	309.3	310.2	314.1	316.5	312.7	-6.8
11N03W09Q001M	285	383.7	355.8	384.9↑	382.3	377.6	382.4	385.2↑	385.3↑	382.6	-1.1
11N03W23L001M	287	296.0	287.6	298.9↑	298.2↑	285.9↓	286.0↓	***	298.6↑	292.2	-3.9
11N03W23N001M	288	287.3	271.0	298.3↑	294.5↑	284.4	286.7	290.3↑	290.9↑	289.4	2.1
11N03W33F001M	289	351.1	341.2	351.6↑	351.3↑	344.4	345.8	352.5↑	352.2↑	349.3	-1.8
12N03W20D001M	293	382.8	376.4	382.4	382.0	380.0	378.0	381.2	383.4↑	380.9	-1.9
11N03W35D003M	415	280.7	273.0	282.1↑	281.2↑	275.9	278.1	286.9↑	285.7↑	281.5	0.9
10N03W24B002M	416	324.8	281.1	343.7↑	327.2↑	310.4	303.1	340.7↑	335.9↑	323.5	-1.3

Dunnigan Hills

State Well Number	RMW Number	MO[1] (ft-amsl)	MT (ft-amsl)	Fall 2019 (ft-amsl)	Fall 2020 (ft-amsl)	Fall 2021 (ft-amsl)	Fall 2022 (ft-amsl)	Fall 2023 (ft-amsl)	Fall 2024 (ft-amsl)	5 yr Fall Average[2] (ft-amsl)	Variance from Measurable Objective (ft-amsl)
10N01E18C001M	253	143.1	132.8	140.1	138.5	134.5	132.9	138.1	138.3	136.5	-6.6
10N01W02Q001M	260	128.3	73.6	86.0	79.8	46.2↓	46.1↓	73.0↓	76.0	64.2	-64.1
10N01E15D001M	402	17.5	-69.6	5.1	-2.3	-23.6	-26.6	-8.6	0.7	-12.1	-29.6

1 - Interim milestones for the Chronic Lowering of Groundwater Levels are set equal to the measurable objectives.
2- Performance of the measurable objective is measured as the five-year running average of the minimum fall (Sep. - Dec.) groundwater elevation.
Green text with an arrow pointing upwards indicates the measurement is above the measurable objective level at the RMW.
Red text with an arrow pointing downwards indicates the measurement is below the minimum threshold level at the RMW.
Asterisks (***) indicate no measurement.

Central Yolo

State Well Number	RMW Number	MO[1] (ft-amsl)	MT (ft-amsl)	Fall 2019 (ft-amsl)	Fall 2020 (ft-amsl)	Fall 2021 (ft-amsl)	Fall 2022 (ft-amsl)	Fall 2023 (ft-amsl)	Fall 2024 (ft-amsl)	5 yr Fall Average[2] (ft-amsl)	Variance from Measurable Objective (ft-amsl)
08N02E15A002M	114	-25.1	-61.3	0.4↑	-9.6↑	-28.6	-31.2	-31.2	-27.6	-25.6	-0.5
08N03E07N500M	132	-22.0	-78.0	***	***	-28.9	-32.3	-16.0↑	-19.1↑	-24.1	-2.0
09N03E33B002M	151	4.7	-35.3	3.6	-2.1	-4.2	-9.3	-4.0	-2.4	-4.4	-9.2
08N02E18M002M	170	20.4	1.5	27.7↑	20.9↑	8.9	5.5	9.6	10.0	11.0	-9.4
08N01E07R001M	220	82.3	16.5	74.1	***	46.5	42.5	53.5	57.5	50.0	-32.2
08N01W09C001M	222	110.9	40.3	78.2	85.4	69.0	51.9	67.7	77.4	70.3	-40.6
08N01W13G003M	224	80.0	47.8	78.4	71.8	58.8	53.3	69.0	68.7	64.3	-15.7
08N01W20R005M	229	72.8	36.4	60.9	45.0	31.2↓	26.1↓	40.4	40.9	36.7	-36.1
10N01E34A003M	430	27.6	-47.4	28.0↑	18.6	***	***	9.4	11.8	13.3	-14.4
09N01E07D001M	231	111.1	68.3	104.7	99.2	76.5	75.7	99.5	101.4	90.5	-20.6
09N01E20E001M	233	104.8	67.1	106.0↑	105.7↑	91.7	85.7	104.4	103.8	98.3	-6.5
09N01E24D001M	234	52.2	7.6	49.5	45.3	29.1	27.4	38.7	42.4	36.6	-15.6
09N01E31D001M	235	104.6	68.3	106.1↑	101.8	70.9	64.8↓	91.5	92.9	84.4	-20.3
09N01W08Q001M	239	185.1	152.2	184.7	184.5	172.9	161.1	181.7	181.3	176.3	-8.8
09N01W21E001M	240	163.4	144.7	153.7	162.4	149.5	141.9↓	152.1	156.4	152.5	-10.9
09N02E07L001M	246	24.7	-45.4	18.4	***	-19.6	-26.8	5.0	-2.3	-10.9	-35.6
09N02E32M001M	248	29.1	-7.0	27.1	21.6	-2.7	-18.1↓	6.2	6.0	2.6	-26.5
09N03E19R002M	250	6.7	-14.1	3.3	-0.6	-6.0	9.8↑	-3.7	13.3↑	2.6	-4.2
10N01E23Q002M	254	26.8	-43.0	31.7↑	23.0	-12.2	-25.0	18.1	19.4	4.7	-22.2
10N01E29K001M	256	77.8	58.4	81.8↑	80.2↑	77.2	77.5	81.5↑	79.5↑	79.1	1.3
10N01W08B001M	261	139.5	73.3	141.9↑	137.3	106.9	90.4	126.7	133.7	119.0	-20.6
10N01W21J001M	265	127.5	90.9	130.6↑	129.7↑	115.4	106.1	125.9	127.3	120.9	-6.7
10N01W32E001M	268	169.9	144.5	169.6	168.6	152.0	146.8	166.6	166.7	160.1	-9.8
10N01W35Q001M	269	120.5	93.0	124.0↑	123.3↑	104.8	98.8	120.6↑	118.3	113.1	-7.4
10N02W14A001M	275	137.8	91.1	138.4↑	137.2	104.8	91.3	129.7	135.6	119.8	-18.0
10N02W26P001M	279	241.7	212.7	219.7	211.2↓	***	207.0↓	***	209.8↓	209.3	-32.5
10N02E29A001M	406	35.7	9.9	35.9↑	***	***	23.7	26.6	30.0	26.7	-9.0
09N02E22H002M	400	22.9	-24.8	26.8↑	23.3↑	14.0	13.2	22.0	24.0↑	19.3	-3.6
10N02E36E001M	401	22.1	9.0	19.8	19.6	14.1	9.4	15.3	14.7	14.6	-7.5
09N01E26N001M	403	71.7	32.2	66.1	61.0	46.3	35.4	48.0	52.7	48.6	-23.1
09N01W23D001M	404	135.8	82.9	128.6	122.8	67.9↓	39.5↓	117.9	119.5	93.6	-42.3
08N01W22G500M	419	71.9	6.5	58.5	47.5	16.5	9.5	***	41.5	28.7	-43.2

North Yolo

State Well Number	RMW Number	MO[1] (ft-amsl)	MT (ft-amsl)	Fall 2019 (ft-amsl)	Fall 2020 (ft-amsl)	Fall 2021 (ft-amsl)	Fall 2022 (ft-amsl)	Fall 2023 (ft-amsl)	Fall 2024 (ft-amsl)	5 yr Fall Average[2] (ft-amsl)	Variance from Measurable Objective (ft-amsl)
11N01E02D001M	127	-13.3	-88.3	-10.3↑	-27.2	-37.1	-33.1	-10.9↑	-26.0	-26.9	-13.5
11N01E16P001M	128	-33.1	-129.8	-24.1↑	-25.9↑	-58.5	-86.9	-56.3	-65.5	-58.6	-25.5
12N01E03R002M	129	9.1	-44.3	3.5	-9.0	-32.8	-2.9	12.5↑	12.6↑	-3.9	-13.1
12N01E26A002M	131	-4.2	-46.1	-2.0↑	-12.5	-29.7	-8.6	-0.7↑	-8.9	-12.1	-7.9
10N03E33B011M	153	3.8	-73.3	7.5↑	3.1	1.7	-23.4	-11.2	***	-7.5	-11.3
12N01W14M001M	178	10.5	-30.9	-7.5	-14.9	-29.5	-28.5	-10.4	-10.7	-18.8	-29.3
12N01W26L002M	431	13.1	-43.8	-5.6	-16.3	-35.3	-41.7	-16.4	-16.3	-25.2	-38.3
10N01E02Q002M	251	32.1	-32.6	20.3	17.6	***	-6.4	21.4	14.4	11.7	-20.4
10N02E06B001M	405	26.0	-85.7	28.6↑	23.6	-8.1	1.7	20.5	24.1	12.3	-13.7
12N01W05B001M	411	49.5	-25.3	20.6	15.5	4.4	***	8.9	14.9	10.9	-38.6
10N02E09N001M	410	12.9	-63.7	23.0↑	17.1↑	-3.4	-11.3	16.2↑	15.4↑	6.8	-6.1
10N02E03R002M	420	12.2	-39.2	6.5	***	***	-36.7	5.4	-10.3	-13.9	-26.1
11N02E20K004M	421	28.8	-31.6	29.5↑	26.8	20.9	17.1	23.3	26.9	23.0	-5.8

South Yolo

State Well Number	RMW Number	MO[1] (ft-amsl)	MT (ft-amsl)	Fall 2019 (ft-amsl)	Fall 2020 (ft-amsl)	Fall 2021 (ft-amsl)	Fall 2022 (ft-amsl)	Fall 2023 (ft-amsl)	Fall 2024 (ft-amsl)	5 yr Fall Average[2] (ft-amsl)	Variance from Measurable Objective (ft-amsl)
08N03E32L001M	122	-1.9	-71.8	-56.5	-18.4	-31.1	***	***	***	-24.7	-22.8
06N03E07M001M	160	9.9	-10.8	-2.0	-5.4	-7.0	-7.9	-6.4	-6.8	-6.7	-16.6
08N03E31N001M	422	-7.0	-49.3	-9.0	-20.8	-34.2	-40.3	-28.1	-25.6	-29.8	-22.7
07N03E04Q001M	423	0.5	-27.1	-0.9	***	-7.7	-6.0	-14.4	-4.7	-8.2	-8.7

1 - Interim milestones for the Chronic Lowering of Groundwater Levels are set equal to the measurable objectives.
2- Performance of the measurable objective is measured as the five-year running average of the minimum fall (Sep. - Dec.) groundwater elevation.
Green text with an arrow pointing upwards indicates the measurement is above the measurable objective level at the RMW.
Red text with an arrow pointing downwards indicates the measurement is below the minimum threshold level at the RMW.
Asterisks (***) indicate no measurement.

Table 3: Minimum Threshold Evaluation for Chronic Lowering of Groundwater Levels

Water Year	Above MO	Below MO, Above MT	Below MT	Below MT in 2+ years	Not Measured	Undesirable Result Triggered
Capay Valley (10 RMWs)						
2019	8	2	0	0	0	No
2020	6	4	0	0	0	No
2021	0	9	1	0	0	No
2022	0	9	1	1	0	No
2023	7	2	0	0	1	No
2024	9	1	0	0	0	No
Dunnigan Hills (3 RMWs)						
2019	0	3	0	0	0	No
2020	0	3	0	0	0	No
2021	0	2	1	0	0	No
2022	0	2	1	1	0	No
2023	0	2	1	1	0	No
2024	0	3	0	0	0	No
Central Yolo (32 RMWs)						
2019	13	18	0	0	1	No
2020	7	20	1	0	4	No
2021	0	27	2	0	3	No
2022	1	24	6	3	1	No
2023	4	26	1	1	1	No
2024	4	27	1	1	0	No
North Yolo (13 RMWs)						
2019	7	6	0	0	0	No
2020	2	10	0	0	1	No
2021	0	11	0	0	2	No
2022	0	12	0	0	1	No
2023	4	9	0	0	0	No
2024	2	10	0	0	1	No
South Yolo (4 RMWs)						
2019	0	4	0	0	0	No
2020	0	3	0	0	1	No
2021	0	4	0	0	0	No
2022	0	3	0	0	1	No
2023	0	3	0	0	1	No
2024	0	3	0	0	1	No
Clarksburg						
There are no Representative Wells in the Clarksburg MA.						

3.1.2 WY 2019 – WY 2024 Impacts to Beneficial Uses and Users

Drought conditions during WYs 2020 – 2022 led to declines in groundwater levels throughout the Yolo Subbasin, with some locations falling below their historic lows. These declines caused some wells to go dry, requiring well owners either to lower their pumps, if possible, or drill a new well if water levels dropped below the total depth of their existing well. YSGA staff began receiving reports of dry wells in July 2021, mostly from domestic users. YSGA led coordination with the Yolo County Office of Emergency Services to provide trucked water deliveries to residents with dry wells, maintaining their access to potable water in the interim while waiting to drill a new well. Between 2021 and 2022, YSGA received 30 verified reports of dry wells, which were later replaced with new, deeper wells by landowners.

3.1.3 2022 GSP Definition of Undesirable Results

The GSP currently defines undesirable results for the chronic lowering of groundwater levels over the entire Subbasin as the following:

> *The point at which significant and unreasonable impacts over the planning and implementation horizon, as determined by depth or elevation of groundwater, affect the reasonable beneficial use of, and access to, groundwater by overlying users.*
>
> *An undesirable result occurs when the minimum threshold criteria is exceeded in 51% or more of representative monitoring wells in two MAs.*

MTs for groundwater levels are designed to indicate the groundwater elevation at which a depletion of water supply at a given location may lead to undesirable results (*§354.28.(c)(1)*). Along with the Subbasin-wide definition above, the GSP defines MOs and MTs for individual MAs, except for Clarksburg due to a lack of significant groundwater use. The GSP establishes MTs at each RMW based on historic groundwater elevations, with historic being defined as pre-2016 values. The GSP sets MOs equivalent to the average fall (September – December) groundwater elevation between 2000 – 2011 at each well. These MT and MO definitions are based on 62 RMWs from the Yolo Subbasin database, as listed in Table ES-2 of the GSP. RMWs are present in all MAs except Clarksburg. The GSP states that YSGA will continue to monitor groundwater conditions in Clarksburg for changes in conditions or usage and set an MT in the future, if necessary.

A well impact analysis is presented in Appendix I of the current GSP. The well impact analysis delineates the Subbasin by quarter range in each township, as derived from the Public Land Survey System, and utilizes well construction information from the Online System of Well Completion Reports (OSWCR). The analysis spatially interpolates RMWs' current MO and MT to assign unique MO and MT values across each quarter range. These interpolated values of historical low groundwater levels are then plotted against existing well construction information, specifically, well screen intervals. The objective was to analyze the potential impact on current groundwater access and use at the MO and MT levels. Additional discussion on the analysis follows in Section 3.1.6.

3.1.4 DWR Recommended Corrective Actions for Chronic Lowering of Groundwater Levels

DWR has requested a revision of the current SMC for chronic lowering of groundwater levels. More specifically, in the determination letter under Recommended Corrective Action 1, DWR requested the following:

a) *Clarify what significant and unreasonable effects for the chronic lowering of groundwater levels are in the Subbasin that the GSAs are managing the Subbasin to avoid.*
b) *Provide additional discussion and amend the definition of undesirable results. Specifically, the GSA should explain how local exceedances within just one management area are not considered an undesirable result. Further, the GSA should clearly define a time component for when an undesirable result will occur.*
c) *Describe how the selection of minimum thresholds of groundwater levels will avoid undesirable results for other sustainability indicators.*

While the GSP puts forth MTs and MOs, it has no explicit definition for the impact of exceeding these values. The GSP states that the 51% threshold "was established to allow for interim PMAs to take place to mitigate groundwater trends." Details are needed regarding how the 51% threshold was determined and why this condition must be present in two MAs before triggering further action. DWR notes that it is unclear when these conditions would occur and what their effects might be. Furthermore, the current undesirable results definition may neglect localized issues. To facilitate achieving sustainable management, DWR has requested that the GSA provide details on these conditions.

3.1.5 Approach to Address Recommended Corrective Actions for Chronic Lowering of Groundwater Levels

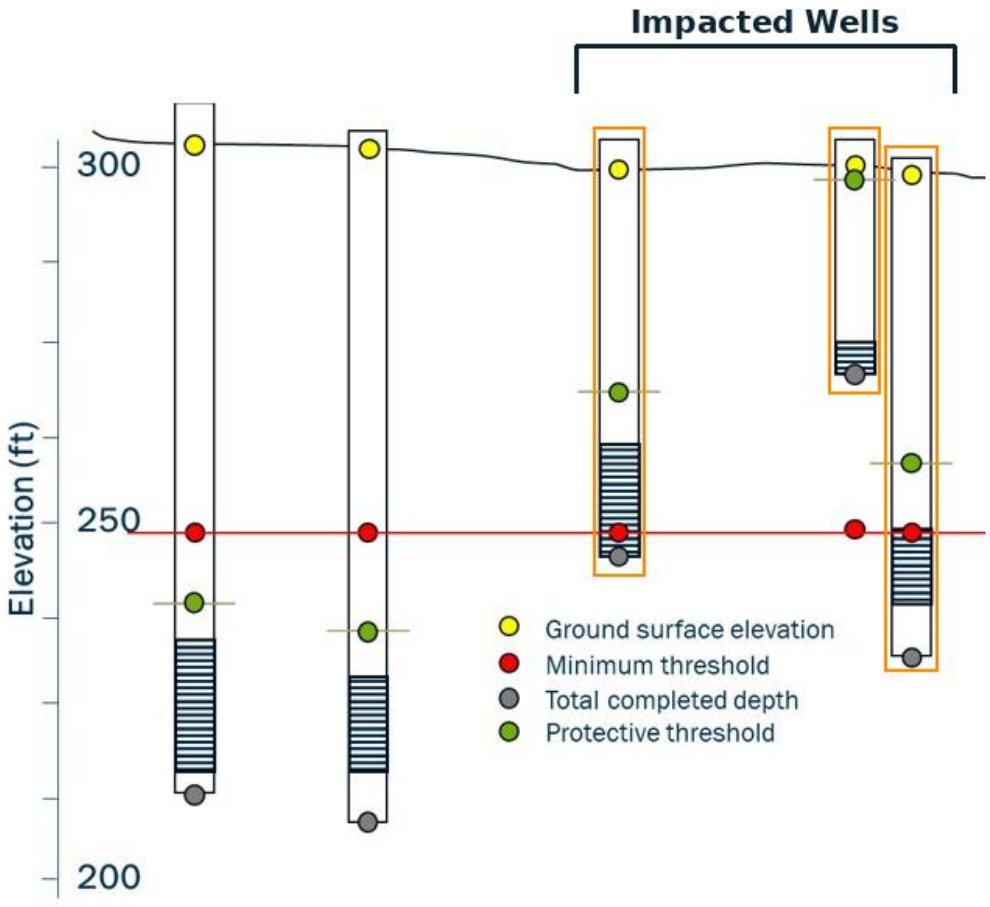
The given definition of undesirable results indicates that significant and unreasonable effects are determined by groundwater elevation and impacts on users. The comparison of MO and MT groundwater levels with existing wells, along with information on well use in the well impact analysis of Appendix I in the current GSP, can help to outline what constitutes significant and unreasonable effects on beneficial users.

To address the first two recommended corrective actions (a,b) on clarifying significant and unreasonable effects and undesirable results, YSGA used the existing well impact analysis as a baseline for an updated approach carried out with the following revisions:

- Evaluated all information using feet in elevation above sea level as the baseline datum (NAVD 88). Converted MO and MT values, including well depths and screened intervals, to elevation using information from a digital elevation model (DEM) of one-meter resolution obtained from the United States Geological Survey (U.S. Geological Survey, n.d.).
- Classified wells by use category—public supply, irrigation, industrial, and domestic—to outline the impacts of lowering groundwater levels on these user types.
- Set a protective threshold for each well: 30 feet above the total well depth or the bottom of well perforations, depending on available well data. This threshold is based on the fact that domestic wells, typically the most vulnerable well classification, are constructed with the well screens near the bottom of the casing; it is assumed that a minimum saturated screen interval of 30 feet is required to operate a pump properly, taking into account pumping drawdown and sufficient pump submergence to avoid cavitation. The protective threshold is a general groundwater level that, when exceeded, may render a well inoperable under lowering groundwater conditions. The protective threshold is not an MT but indicates the point at which supply from an individual well is at risk (i.e. vulnerable to being inoperable).

Our analysis used the raster surface of MT elevations generated in the original well impact analysis in Appendix I of the GSP, which was then compared against the well depths and protective threshold elevations. Wells with protective thresholds at a higher elevation than the established MT were flagged as potentially impacted, and wells with a total depth at a higher elevation than the established MT were flagged as dry. Figure 4 illustrates this logic—the three wells on the right of the graphic are considered impacted wells, one of these being dry.

Figure 4: Schematic of Updated Well Impact Analysis



To address the last recommended corrective action (c), the relationships between groundwater level MTs and the other sustainability indicators were assessed to demonstrate that chronic lowering of groundwater levels, as evaluated under the revised framework presented earlier, is unlikely to cause undesirable results for the other sustainability indicators. See Section 3.1.7 for the full discussion and suggested language.

3.1.6 Analysis to Address Recommended Corrective Actions for Chronic Lowering of Groundwater Levels

Table 4 summarizes the results from the updated well impact assessment, categorized by well type (public supply, irrigation, industrial, and domestic). The table presents the total number of (1) wells evaluated for each well type in each MA and (2) potentially impacted wells based on the following:

- The MT is below the total completed depth (TCD), indicating a well that may potentially be dry if the water level exceeds the MT.
- The MT is below the protective threshold (but above the TCD or bottom well screen depth), indicating a well that may potentially be inoperable.

We evaluated MO and MT groundwater levels using existing wells in the OSWCR database. The OSWCR dataset was filtered to include only those records with substantial construction information to compute the TCD, with completion dates of 1970 or later (assuming those constructed prior to 1970 had reached the end of their operational life), and any known defunct municipal supply wells. This helps minimize uncertainty in the well impact assessment by removing wells that are known to be decommissioned and those likely destroyed. However, there is still the possibility that wells are improperly located or destroyed without being recorded as such, which could inflate the number of wells used in the analysis. YSGA is currently working to refine and improve their WRID and confirm well construction and location data, which will improve this analysis in the future. The results of the well impact assessment are based on the best available information at this time.

Table 4: Well Impact Assessment Results for Relevant Wells

MA	Count of RMW	Total Count of Wells[1]	Count of Relevant Wells[2]	Public Supply				Irrigation			
				Total Count	MT Below TCD	MT Below Protective Threshold[3]	Potentially Impacted Wells	Total Count	MT Below TCD	MT Below Protective Threshold[3]	Potentially Impacted Wells
Capay Valley	10	373	319	8	1	0	1	122	11	8	19
Central Yolo	32	3351	2049	99	0	0	0	849	4	6	10
Clarksburg	0	212	188	6	0	0	0	14	0	0	0
Dunnigan Hills	3	284	228	2	0	0	0	144	3	4	7
North Yolo	13	1462	855	17	0	0	0	436	4	1	5
South Yolo	4	1171	252	18	0	0	0	89	1	4	5
Totals	**62**	**6853**	**3891**	**150**	**1**	**0**	**1**	**1654**	**23**	**23**	**46**

MA	Count of RMW	Total Count of Wells[1]	Count of Relevant Wells[2]	Industrial				Domestic			
				Total Count	MT Below TCD	MT Below Protective Threshold[3]	Potentially Impacted Wells	Total Count	MT Below TCD	MT Below Protective Threshold[3]	Potentially Impacted Wells
Capay Valley	10	373	319	1	0	0	0	188	20	11	31
Central Yolo	32	3351	2049	33	2	0	2	1068	32	42	74
Clarksburg	0	212	188	4	0	0	0	164	0	1	1
Dunnigan Hills	3	284	228	5	0	0	0	77	9	7	16
North Yolo	13	1462	855	14	0	0	0	388	10	12	22
South Yolo	4	1171	252	2	0	0	0	143	0	5	5
Totals	**62**	**6853**	**3891**	**59**	**2**	**0**	**2**	**2028**	**71**	**78**	**149**

Notes:

[1]Wells with available data to compute Total Completed Depth (TCD).

[2]Excluding Monitoring, Other, and Unknown well use categories.

[3]MT below the protective threshold but above the TCD

The results in Table 4 indicate that domestic wells are the well type most susceptible to groundwater levels dropping below the MT, with 149 wells (7% of all evaluated domestic wells) classified as potentially impacted. Domestic wells tend to be shallower than other well types, making them more susceptible to declining groundwater levels. Central Yolo and Capay Valley have the highest number of domestic wells, with an estimated 74 and 31 wells potentially impacted, respectively. The analysis identified a total of 46 potentially impacted Irrigation wells, primarily concentrated in Capay Valley (19 wells) and Central Yolo (10 wells).

In contrast, the analysis identified only one public supply well and two industrial wells as potentially impacted across the entire Subbasin. This is consistent with expectations, as these well types are typically drilled to greater depths, reducing the likelihood that their groundwater levels will fall below the MT or protective threshold.

To provide a broader perspective, Table 5 summarizes the well impact assessment results across the entire Yolo Subbasin, categorized by MA. The table summarizes the total number of wells, the percentage of wells with MTs below the TCD (i.e., potentially dry wells), and the percentage of wells with MTs below the protective threshold (i.e., potentially inoperable wells).

Table 5: Basin-Wide Well Impact Assessment Summary Results for Relevant Wells

				Summary					
MA	**Count of RMW**	**Total Count of Wells[1]**	**Count of Relevant Wells[2]**	**MT Below TCD (Dry Wells)**	**%**	**MT Below Protective Threshold[3] Wells**	**%**	**All Potentially Impacted Wells**	**%**
Capay Valley	10	373	319	32	10%	19	6%	51	16%
Central Yolo	32	3351	2049	38	2%	50	2%	86	4%
Clarksburg	0	212	188	0	0%	1	1%	1	1%
Dunnigan Hills	3	284	228	12	5%	11	5%	23	10%
North Yolo	13	1462	855	14	2%	13	2%	27	3%
South Yolo	4	1171	252	1	0%	9	4%	10	4%
Totals	**62**	**6853**	**3891**	**97**	**2%**	**103**	**3%**	**200**	**5%**

Notes:

[1]Wells with available data to compute Total Completed Depth (TCD).

[2]Excluding Monitoring, Other, and Unknown well use categories.

[3]MT below the protective threshold but above the TCD

Capay Valley (16%) and Dunnigan Hills (10%) are the MAs with the highest percentages of potentially impacted wells. Meanwhile, Central Yolo, despite having the highest total number of potentially impacted wells (88), has a lower percentage (4%) because of its higher overall well count.

Across the entire Subbasin, only 5% of wells are classified as potentially impacted, highlighting that the current MT selection generally provides sufficient protection. However, under SGMA regulations, groundwater management decisions are based on MT exceedances in the RMW network rather than the total number of impacted wells.

To examine further how domestic well vulnerability varies across the Subbasin, Figure 5 through Figure 10b show the well construction details relative to MTs and protective thresholds for selected township ranges for each MA. Each figure highlights areas where domestic wells are most susceptible to declining groundwater levels. Note that the subplots excluded the well construction and exclude cross-sections. Summary results for all township ranges are included in **Appendix A**. This analysis classifies wells into three categories based on the relationship between protective thresholds, well depths, and MTs:

- Protected – the MT is above the protective threshold elevation
- Vulnerable – the MT is below the protective threshold (but above the TCD or bottom well screen depth)
- Unprotected – the MT is below the TCD or the bottom well screen depth

Wells that fall into either the Vulnerable or Unprotected categories are flagged as "impacted," meaning they are at higher risk of becoming inoperable under current MTs. This classification helps identify the wells with localized risk to beneficial users, particularly domestic well owners.

Figure 5: Well Impact Analysis for T12N R03W in Capay Valley

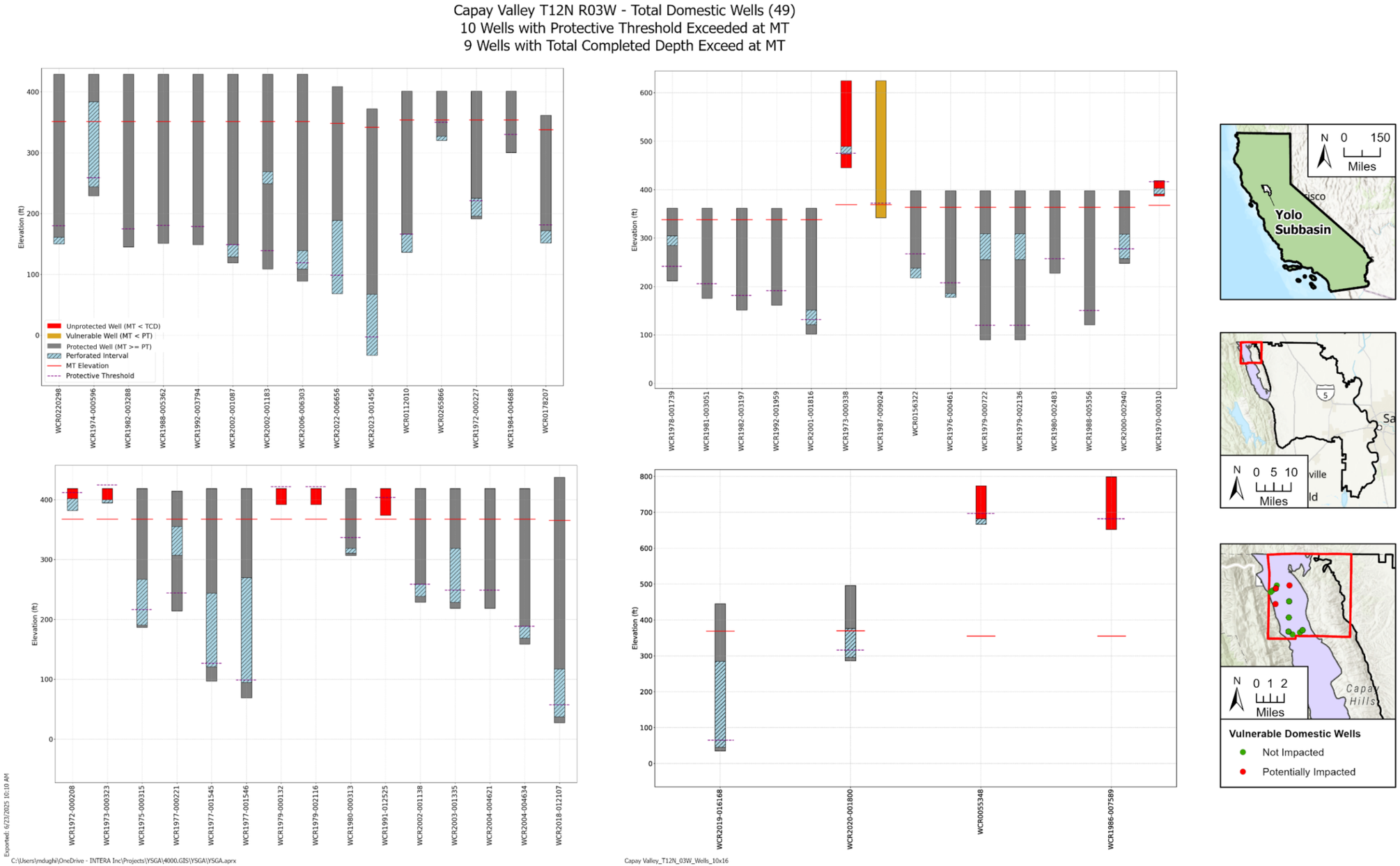


Figure 6: Well Impact Analysis for T08N R02E in Central Yolo

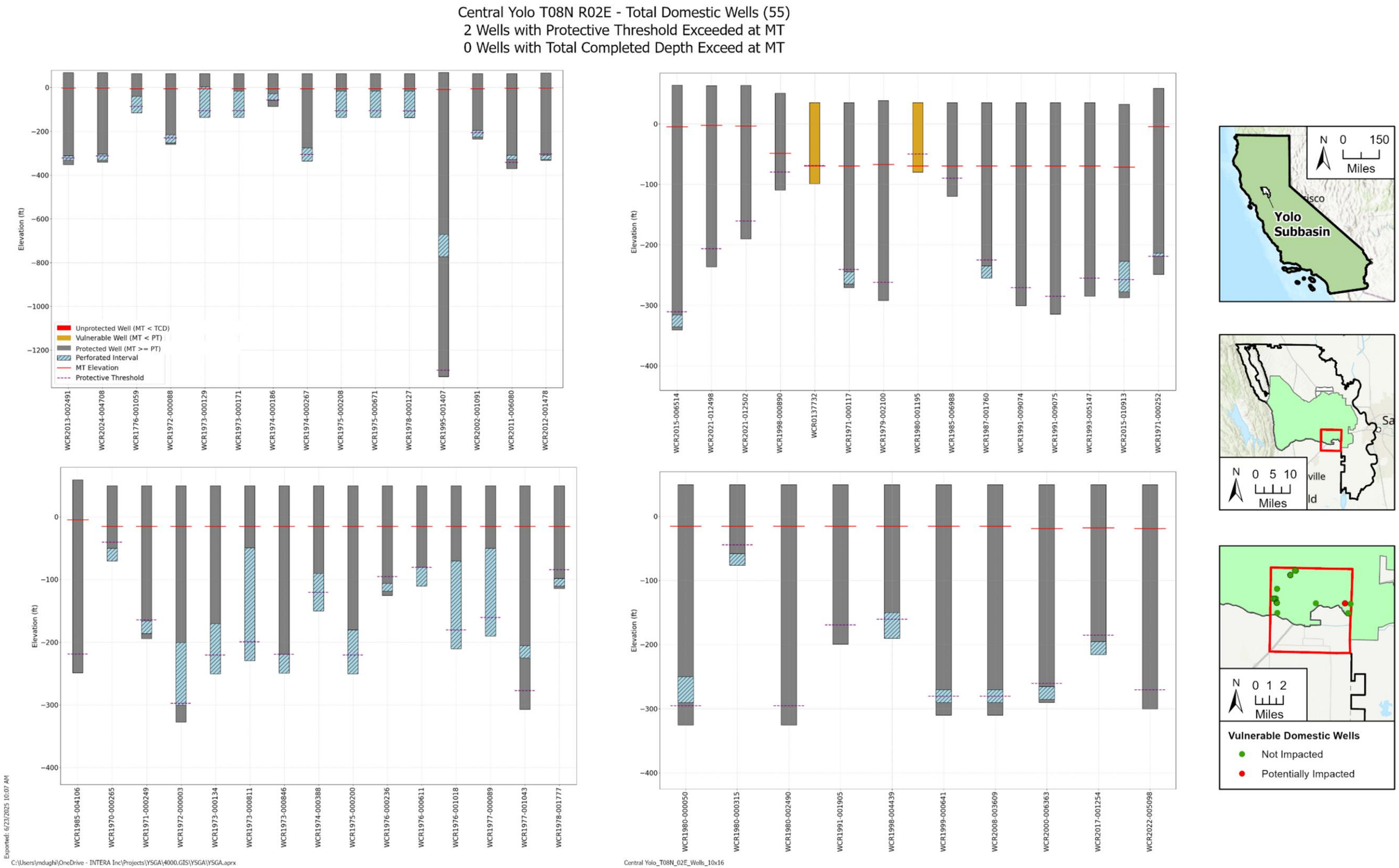


Figure 7: Well Impact Analysis for T06N R04E in Clarksburg

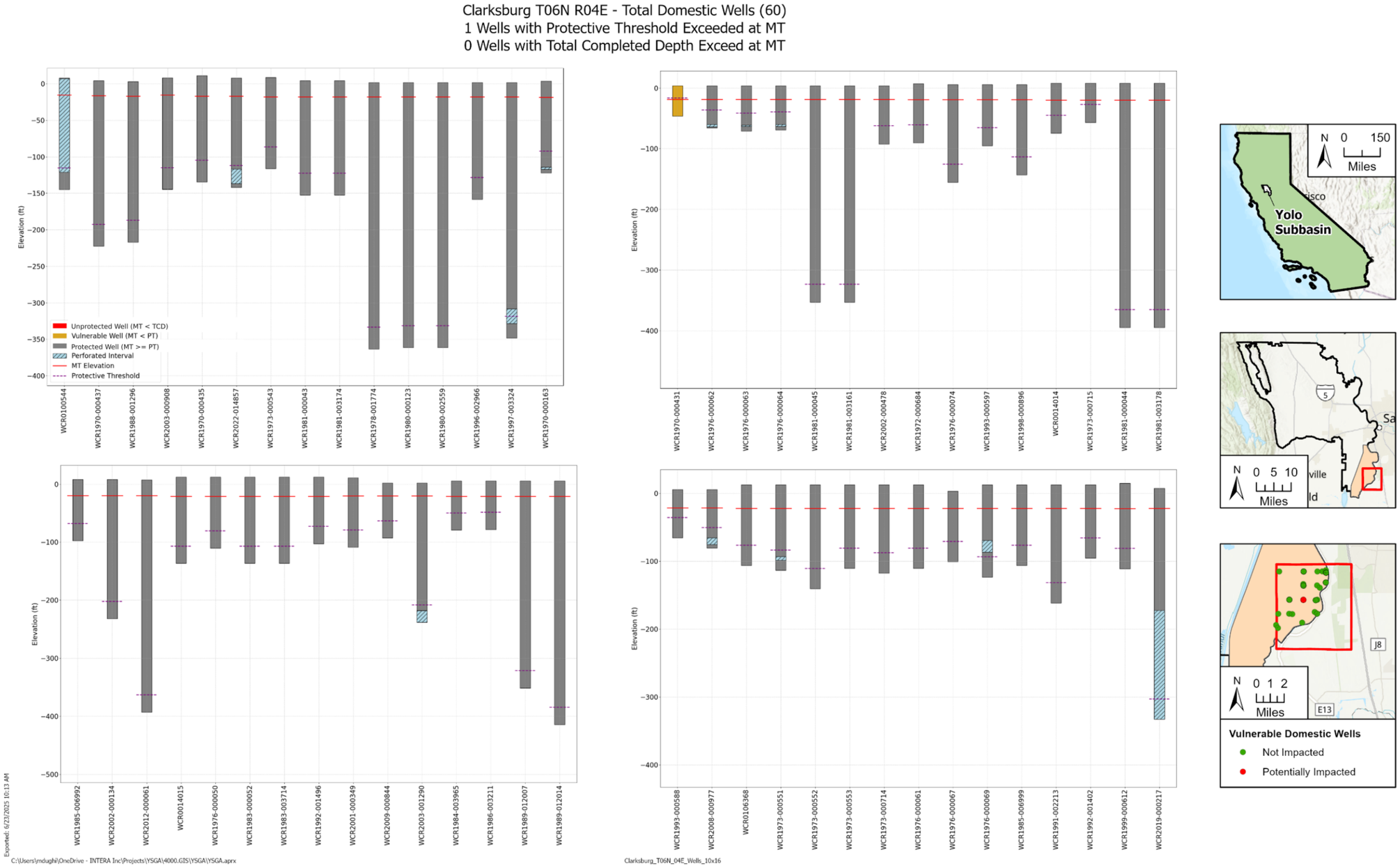


Figure 8: Well Impact Analysis for T10N R01E in Dunnigan Hills

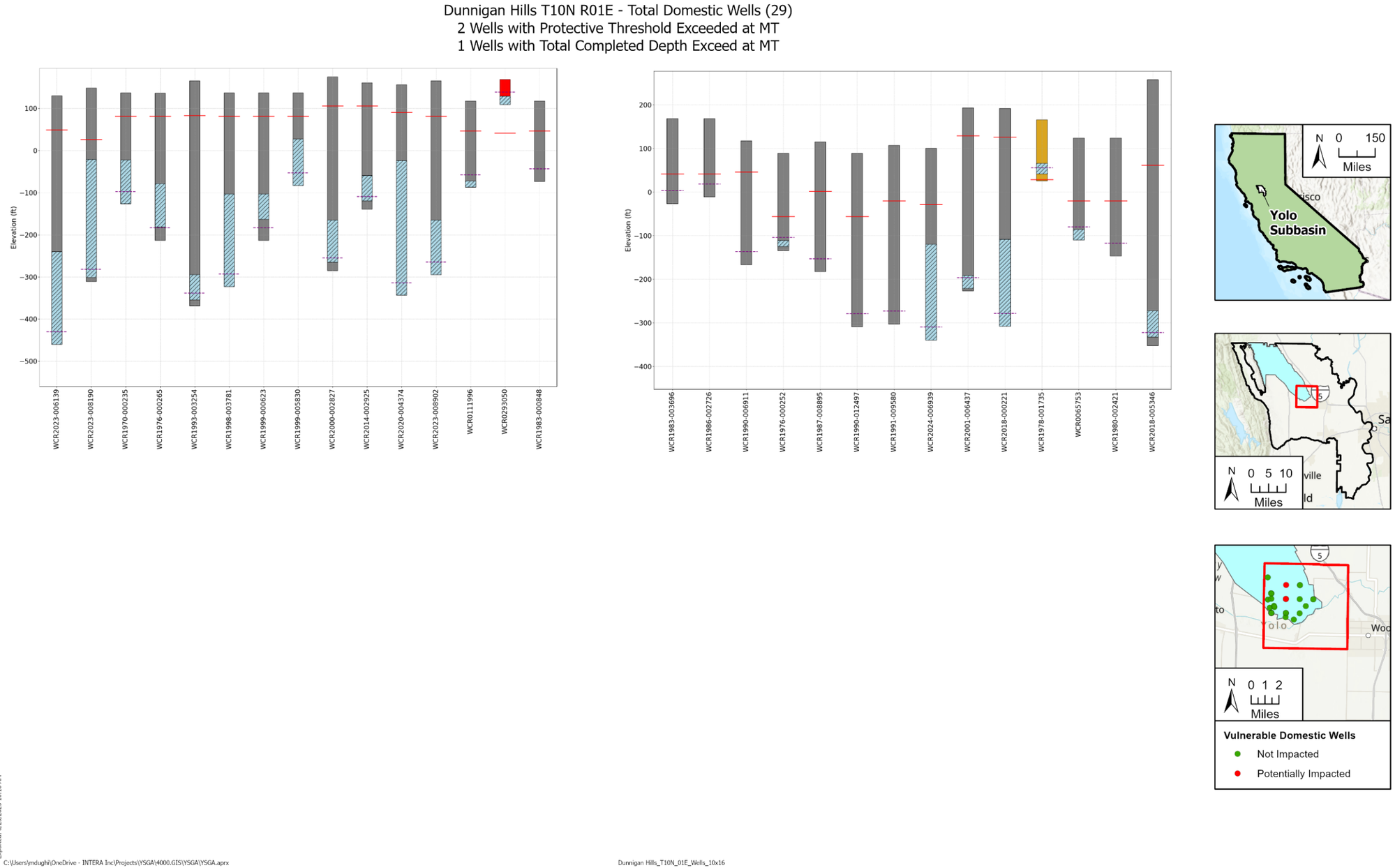


Figure 9: Well Impact Analysis for T11N R01E in North Yolo

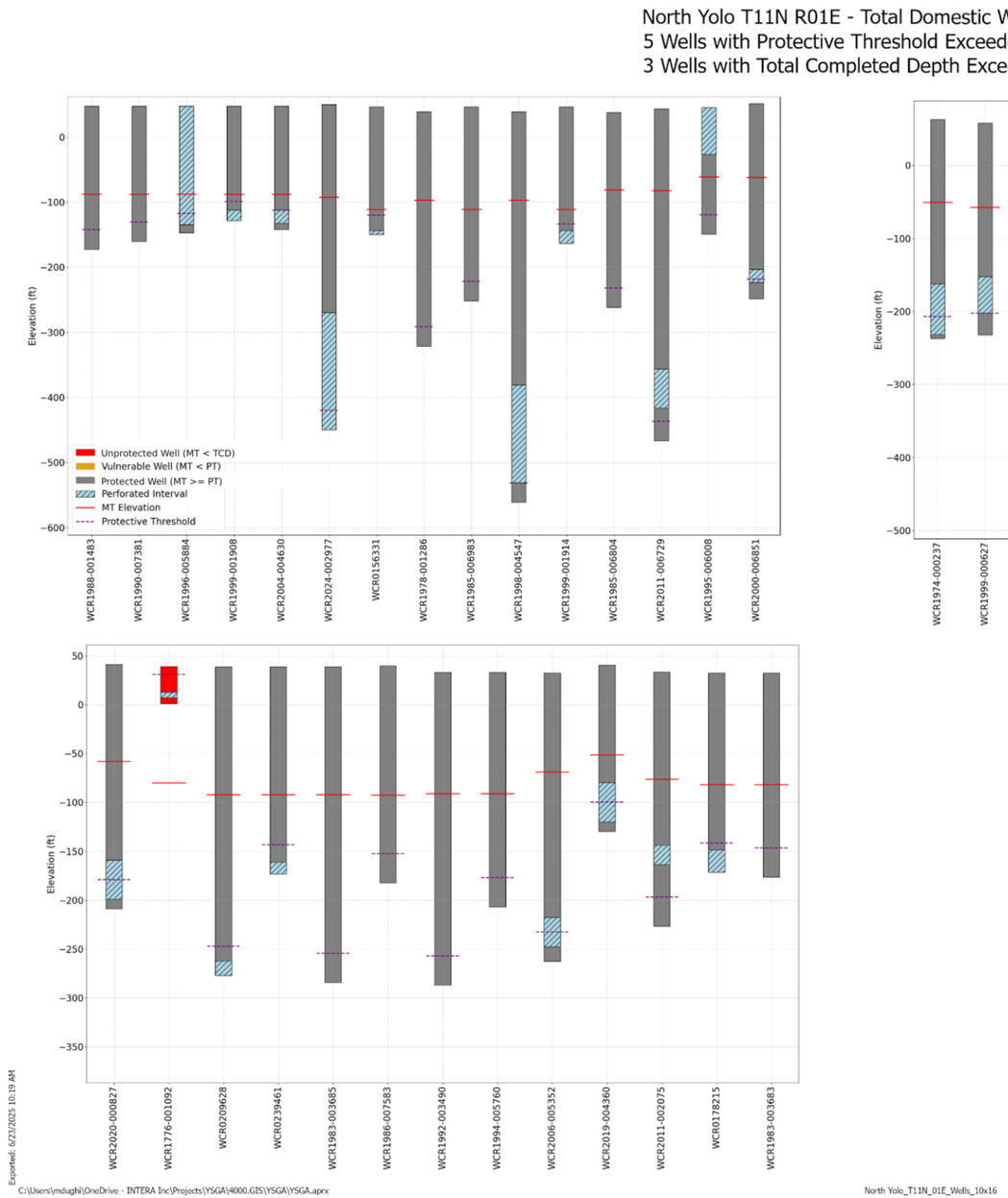


Figure 10a: Well Impact Analysis for T08N R04E in South Yolo

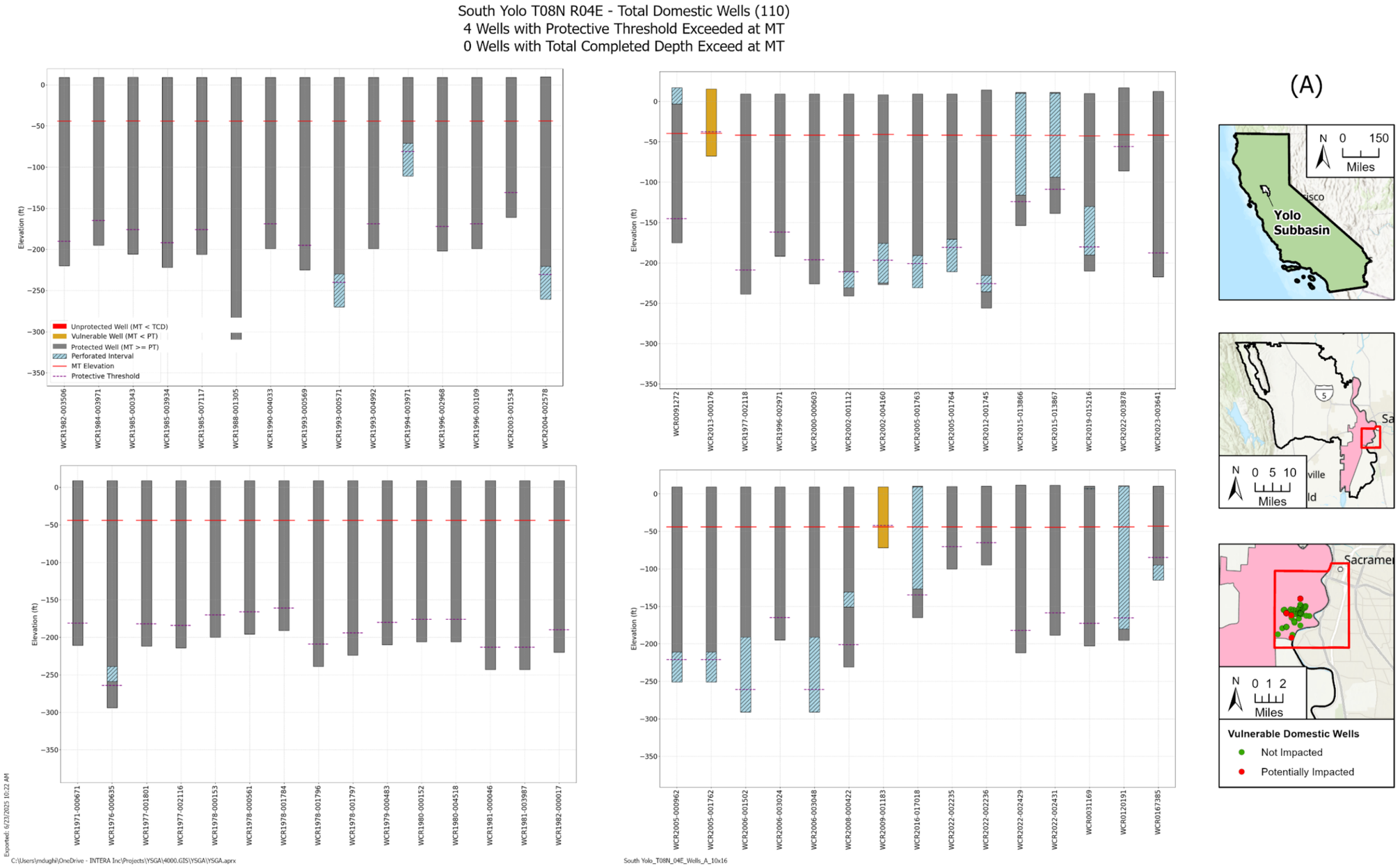
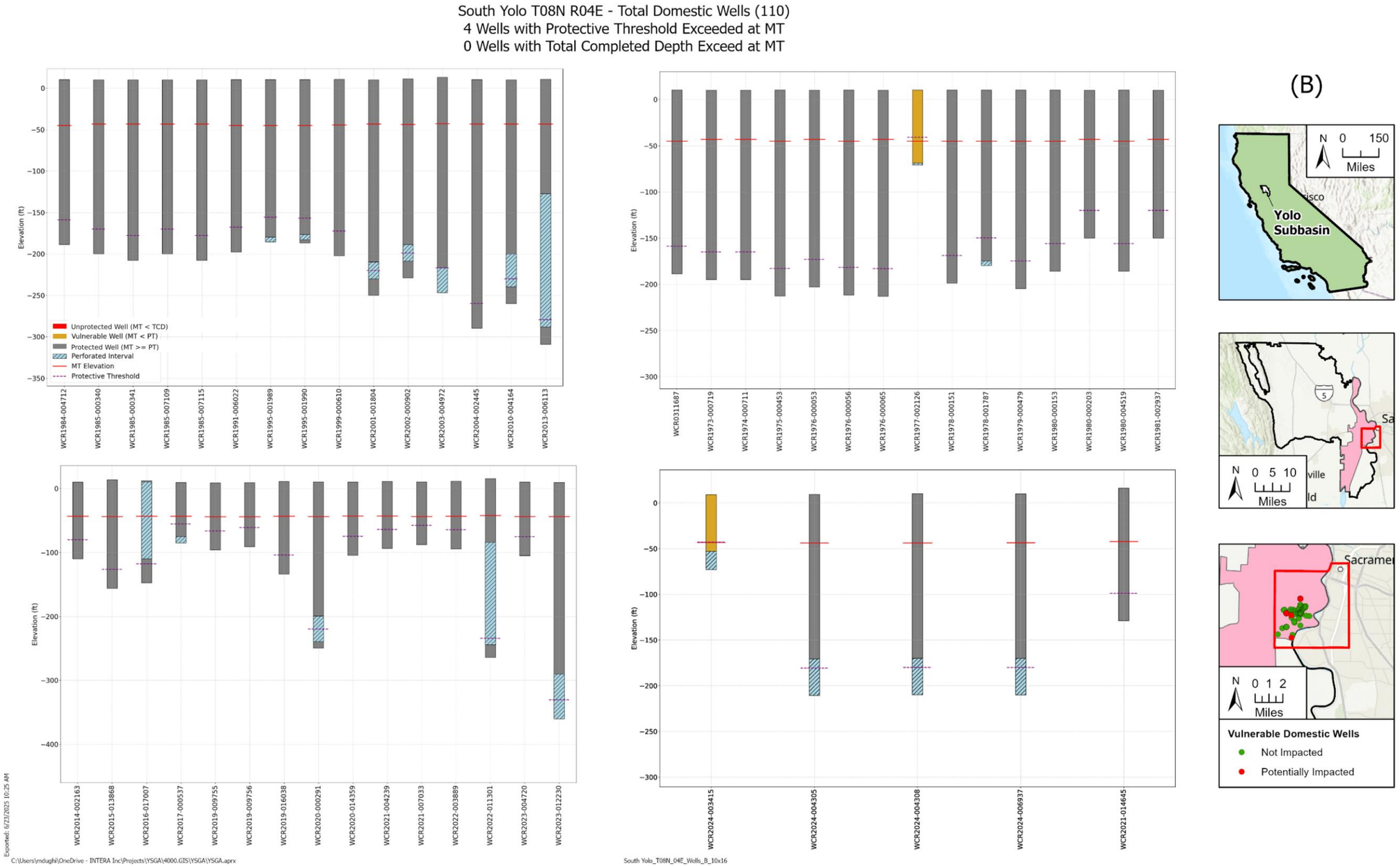


Figure 10b: Well Impact Analysis for T08N R04E in South Yolo



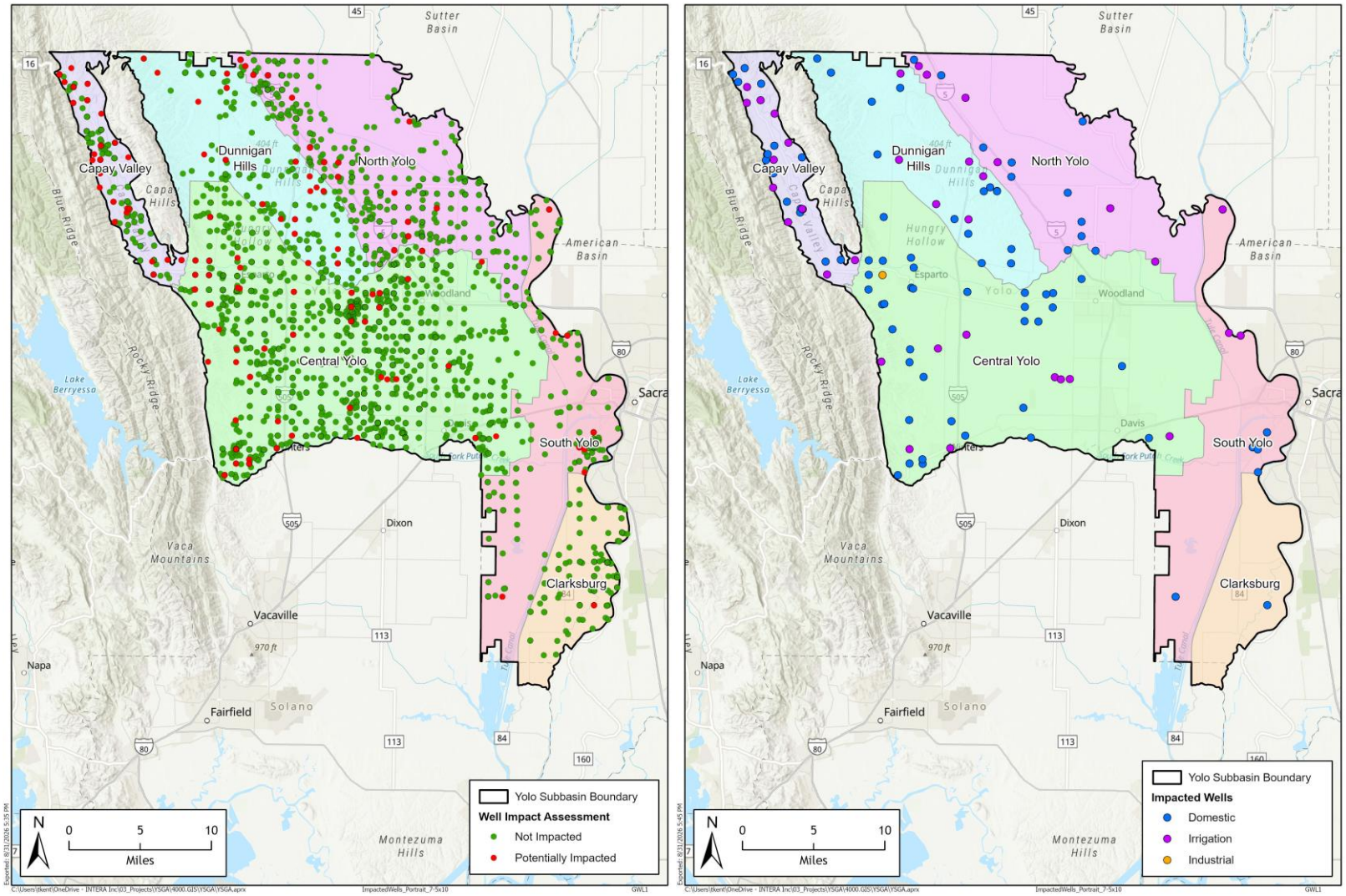
While the figures provide a spatial understanding of domestic well impacts, it's important to consider the underlying method used to establish MTs. In the Subbasin, MTs were determined by interpolating a groundwater surface elevation generated from historical low groundwater levels. This surface does not represent actual groundwater conditions at any given time. Rather, it represents a composite of the lowest levels recorded at each monitoring well, effectively depicting a hyper-conservative hypothetical scenario in which all wells simultaneously experience their historical low. Of note, uncertainty in the accuracy of well records in the OSWCR database with respect to well location, elevation, and construction details, leads to uncertainty in evaluation of the MT, likely overestimating the number of impacted wells. Furthermore, any well with a total completion depth shallower than 30 feet would be considered "unprotected" regardless of the MT.

This approach results in MTs that appear sufficiently protective of most wells. However, the updated well impact analysis indicates that, in a limited number of well locations, MT values fall below the bottom of the well screen or TCD. This raises localized concerns about the potential for well inoperability or dewatering under MT conditions. When considering the 30-foot protective threshold, additional wells are identified as potentially vulnerable, particularly domestic wells, which tend to be shallower.

Despite these localized concerns, the overall proportion of impacted wells across the Subbasin remains low. Our analysis flagged only 5% of all evaluated vulnerable wells as potentially impacted under the current MTs. This suggests that, while the MTs may provide incomplete protection for some beneficial uses and users—particularly in areas with shallow domestic wells—they generally align with SGMA's intent to avoid significant and unreasonable impacts Subbasin-wide.

Figure 11 presents a spatial overview of all impacted wells across the Subbasin, categorized by well use, and the distribution and density of impacted wells. As shown, domestic and shallow irrigation wells account for the most impacted wells, consistent with their typically shallower construction and greater susceptibility to declining levels. Public supply, irrigation wells, and industrial wells are less affected due to typically being drilled and constructed at greater depths.

Figure 11: Potentially Impacted Wells (Left) and Potentially Impacted Wells by Use (Right)



3.1.7 Changes Under Consideration to Address the Recommended Corrective Actions for Chronic Lowering of Groundwater Levels SMC

3.1.7.1 Revised Definition of Undesirable Results for Chronic Lowering of Groundwater Levels

As described in Section 3.1.4, DWR's Recommended Corrective Action 1 requested the following:

a) *Clarify what significant and unreasonable effects for the chronic lowering of groundwater levels are in the Subbasin that the GSAs are managing the Subbasin to avoid.*
b) *Provide additional discussion and amend the definition of undesirable results. Specifically, the GSA should explain how local exceedances within just one management area are not considered an undesirable result. Further, the GSA should clearly define a time component for when an undesirable result will occur.*
c) *Describe how the selection of minimum thresholds of groundwater levels will avoid undesirable results for other sustainability indicators.*

In response, the YSGA proposes the basin-wide definition of "undesirable results" for the chronic lowering of groundwater levels to be revised as follows to address Recommended Corrective Action 1a, 1b, and 1c comprehensively:

> *The point at which significant and unreasonable impacts over the planning and implementation horizon, as determined by depth or elevation of groundwater, affect the reasonable beneficial use of, and access to, groundwater by overlying users.*
>
> *An undesirable result occurs when groundwater depth or elevations fall below the minimum threshold in more than 51% of representative monitoring wells within two or more management areas, and those exceedances persist for two consecutive fall monitoring events. In this scenario, overlying groundwater users are likely to experience sustained persistent loss of access to groundwater, and impacted wells can no longer operate as designed.*
>
> *Two consecutive fall measurements are a reasonable duration to confirm that any MT exceedances are not due to seasonal variability or a short-term aberration. While localized or short-term exceedances do not automatically trigger a subbasin-wide undesirable result, they may warrant adaptive management actions and implementation of projects to protect beneficial uses and users and prevent subbasin-wide impacts over time.*

It's important to note that the RMW network is not uniformly distributed among the Management Areas (MAs), and some MAs have limited RMW coverage. Minimum threshold exceedances within a single MA may reflect localized conditions or may not provide sufficient spatial coverage to represent conditions across the Subbasin. Requiring exceedances in two or more MAs provides an interim measure for identifying a Subbasin-wide undesirable result. Such exceedances will be evaluated by the applicable GSA and Management Area Committee to assess their extent, cause, and potential effects and to determine

whether additional monitoring or management actions are warranted. Limitations in RMW coverage will be addressed through the Management Area Committees, with appropriate monitoring-network improvements and any resulting revisions to the undesirable-result criteria documented in a future Plan Amendment.

The YSGA recognizes that groundwater levels are related to other sustainability indicators and that groundwater-level minimum thresholds (MTs) should be considered in relation to their potential effects on those indicators. The relationships between the groundwater-level MTs and the other applicable sustainability indicators are described below.

- ***Reduction of Groundwater Storage*** *– The MTs and MOs for chronic lowering of groundwater levels are identical to those of chronic lowering of groundwater storage, as groundwater elevation serves as the proxy for groundwater storage. Therefore, a groundwater storage undesirable result occurs under the same definition as the chronic lowering of groundwater levels.*
- ***Degraded Groundwater Quality*** *– Legacy and naturally occurring groundwater quality issues are present in the Subbasin. While none of these conditions are attributed to groundwater management, SGMA requires GSAs to avoid degradation resulting from groundwater management activities. Changes in groundwater levels can influence water quality by altering flow directions, drawing poorer quality water from adjacent zones, or mobilizing constituents of concern. While groundwater quality and groundwater level data exist across the Subbasin, the correlation analyses for these two sustainability indicators are most appropriately analyzed at a localized, well-specific scale. Currently, a data gap exists between the groundwater-level and groundwater-quality monitoring networks. YSGA will increase the number of co-located groundwater-level and groundwater-quality monitoring sites to improve the ability to assess potential correlations between these indicators. YSGA will evaluate the available data to assess whether future adjustments or targeted management actions are needed.*
- ***Land Subsidence*** *– Inelastic subsidence can occur where groundwater levels decline below the critical head of compressible sediments. YSGA compared estimated critical heads with groundwater-level SMC at RMWs and found that most groundwater-level MOs are above estimated critical heads, while some MTs are below them. Therefore, groundwater-level MTs alone cannot presently be demonstrated to prevent all subsidence. YSGA will continue monitoring groundwater levels, subsidence, and estimated critical heads and will evaluate whether groundwater-level SMC or targeted management actions should be adjusted as additional data become available. The land-subsidence SMC provide an independent safeguard against significant and unreasonable subsidence.*
- ***Seawater Intrusion*** *– This sustainability indicator is* ***not*** *applicable to the Subbasin due to its inland location and lack of hydraulic connectivity with seawater sources.*
- ***Depletions of Interconnected Surface Water*** *– The future Periodic Evaluation will include a detailed evaluation of this sustainability indicator, developed in direct response to DWR's corrective actions and following DWR's release of the forthcoming Guidance Document: Managing for depletions of ISW.*

3.2 Reduction of Groundwater Storage

The SMC for the reduction of groundwater storage are tied to the criteria for chronic lowering of groundwater levels. The MTs and MOs for chronic lowering of groundwater levels are identical to those of chronic lowering of groundwater storage, because groundwater elevation serves as the proxy for groundwater storage. DWR provided no recommended corrective actions directly related to the groundwater storage SMC as defined in the 2022 GSP. However, three recommended corrective actions were identified to address the SMC for chronic groundwater level decline. The discussion of current conditions and approach to the recommended corrective actions for groundwater levels in Section 3.1 is also applicable to the sustainability indicator for reduction of groundwater storage.

3.3 Seawater Intrusion

Seawater intrusion has been determined to be an inapplicable sustainability indicator in the Yolo Subbasin, with no potential for seawater intrusion under water quality management objectives in the Sacramento-San Joaquin Delta or from changes in water management activities in the Subbasin. Accordingly, no definitions of undesirable results, MTs, or MOs have been developed.

3.4 Degraded Water Quality

3.4.1 WY 2019 – WY 2024 Water Quality Conditions

An assessment of current conditions related to degraded water quality MTs and MOs/IMs includes sample results using data from existing monitoring programs, with a focus on the Groundwater Ambient Monitoring and Assessment Program (GAMA), collected over the evaluation cycle for salinity (represented by total dissolved solids [TDS]). A map of the well locations with TDS data is shown in Figure *12*. The current representative monitoring network for groundwater quality in the GSP consists of 30 GAMA wells distributed across the six MAs in the Subbasin. Most of the wells are sampled annually, but some are not. For this evaluation cycle, most of the wells are located in Central Yolo due to a greater availability of water quality data in this region. In contrast, there are no RMWs for groundwater quality in Dunnigan Hills and only one well each in South Yolo and Clarksburg. With limited coverage in these areas, this is considered a data gap. Details for the groundwater quality RMWs and related data gaps are discussed in Section 6.1.2 and are found in Table 4-3 of the GSP.

Figure 12: Representative Monitoring Wells to Evaluate Groundwater Quality

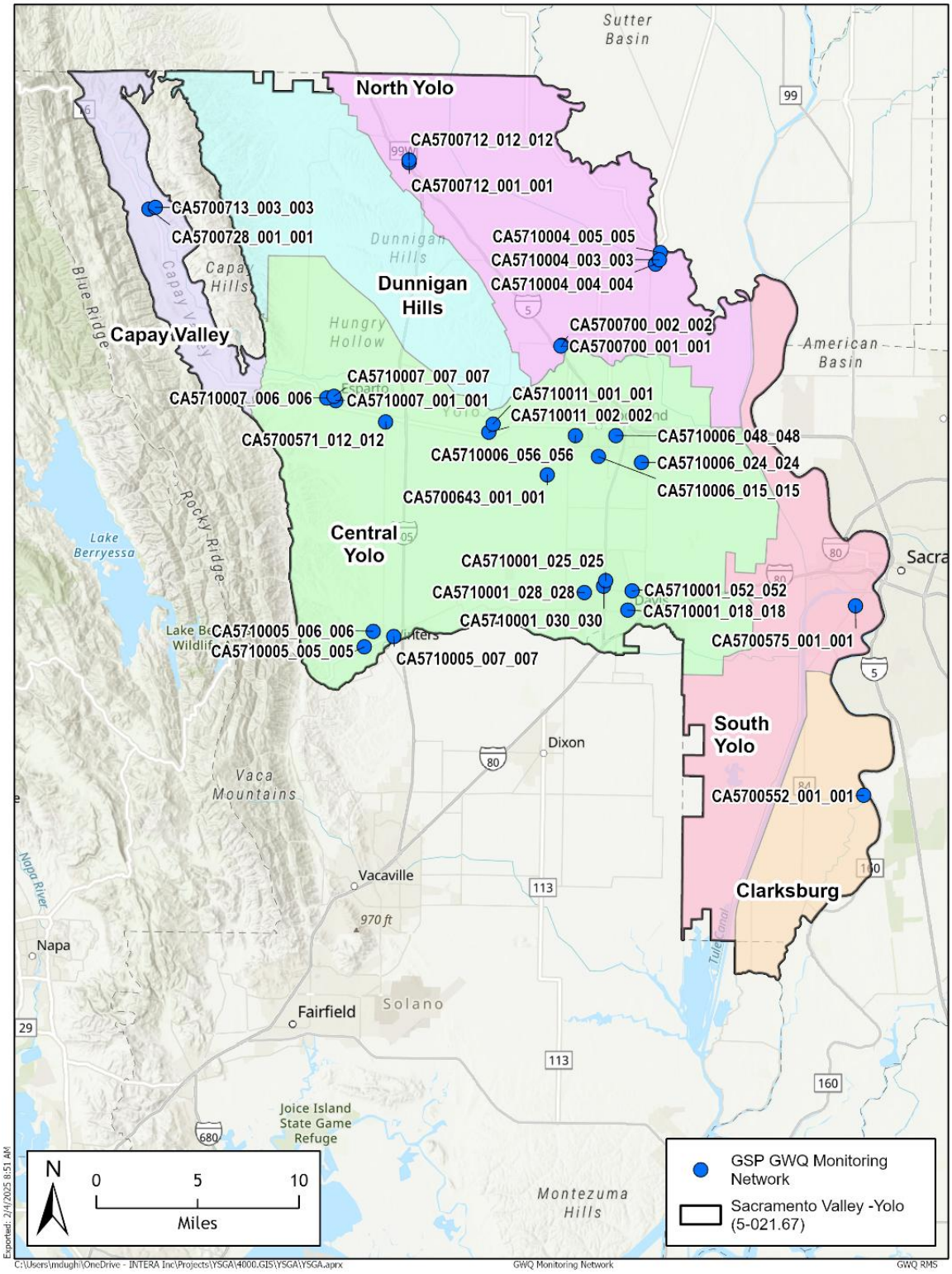


Table *6*. Minimum Threshold Evaluation for TDS Between WY 2015 – WY 2024 shows the TDS water quality MT and MO/IM evaluation results relative to the degraded water quality SMC. Across all GAMA wells analyzed, there were three wells that exceeded the MO between WY 2020 – WY 2024. Two of the wells are in Knights Landing and the other well is in Davis. Further analysis may be warranted to evaluate how the wells were sampled, the well perforation and pump bowl depth, and if the increase in TDS is related to an increase in pumping rates during the WY 2020 – WY 2022 drought. For an undesirable result to occur, more than 50% of the wells analyzed would need to exceed the MT. Since none of these wells exceeded the MT during the evaluation period, no undesirable results occurred.

Table 6. Minimum Threshold Evaluation for TDS Between WY 2015 – WY 2024

TDS Rolling Average Period	MO/IM Threshold (TDS, mg/L)	MT Threshold (TDS, mg/L)	Subbasin 3-year Average (TDS, mg/L)	Count MO Exceedances	Count MT Exceedances	Undesirable Result Occurred?
WY 2015 - WY 2017	750	1,000	444	0	0	N
WY 2016 - WY 2018	750	1,000	427	0	0	N
WY 2017 - WY 2019	750	1,000	428	0	0	N
WY 2018 - WY 2020	750	1,000	428	0	0	N
WY 2019 - WY 2021	750	1,000	426	1	0	N
WY 2020 - WY 2022	750	1,000	469	3	0	N
WY 2021 - WY 2023	750	1,000	462	3	0	N
WY 2022 - WY 2024	750	1,000	472	3	0	N

3.4.2 WY 2019 – WY 2024 Impacts to Beneficial Uses and Users

Drought conditions during WYs 2020 – 2022 led to declines in groundwater levels throughout the Yolo Subbasin, with some locations falling below their historic lows. Three wells experienced increased TDS above the MO within the Subbasin potentially due to drawing from a deeper part of the aquifer than previous years. In addition, YSGA didn't receive additional reports from landowners or other YSGA member agencies of water quality issues at wells.

3.4.3 2022 GSP Definition of Undesirable Results

The GSP currently defines undesirable results for groundwater quality over the entire Subbasin as the following:

> *The point at which water quality is degraded to the extent of causing significant and unreasonable impacts from groundwater management actions in the Yolo Subbasin, that affect the reasonable and beneficial use of, and access to, groundwater by overlying users.*
>
> *An undesirable result occurs when the minimum threshold criteria is exceeded in 50 percent or more of representative monitoring wells monitored for total dissolved solids.*

YSGA has characterized groundwater quality in the basin using data GAMA. The GSP uses data from GAMA and additional prior reports to identify constituents of concern (COCs), including arsenic, boron, hexavalent chromium, nitrate, and TDS. The GSP identified these constituents based on their presence, distribution, or concentrations that may be influenced by groundwater management activities within the Subbasin.

Based on these existing data, the GSP currently has an established SMC for TDS. For the remaining COCs, the GSP states, "the Subbasin will rely on current and future water quality standards established for drinking water and agricultural water uses by state and County regulatory agencies." This effectively sets existing regulatory limits as SMCs for the remaining identified COCs.

The GSP indicates YSGA will use data from existing programs for water quality monitoring. Currently, YSGA has selected a subset of GAMA wells within the basin as the representative well network for water quality monitoring (GSP Table 4-3). In addition to the GAMA network, monitoring programs include public water supply well monitoring implemented by the Division of Drinking Water (DDW), the Irrigated Lands Regulatory Program (ILRP), and the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS). The GSA states that annual reviews of water quality will take place to determine the effects of groundwater management on water quality and if changes are appropriate in the monitoring approach.

3.4.4 DWR Recommended Corrective Actions for Degraded Water Quality

DWR has requested a revision and clarification of the current SMC for degraded groundwater quality. In the determination letter, specifically Recommended Corrective Action 2, DWR requested the following:

a) *Revise the definition of undesirable results for degraded groundwater quality so that exceedances of minimum thresholds caused by groundwater extraction, whether the GSA has implemented projects or not, are considered in the assessment of undesirable results in the Subbasin.*
b) *The GSA should revise the GSP to provide the rationale to support their approach that TDS is the only quality constituent that requires the establishment of sustainable management criteria. Alternatively, the GSP should establish sustainable management criteria for all the constituents of potential concern identified in the Basin that have the potential to cause undesirable results.*

The current GSP only defines an SMC for TDS, while other COCs – arsenic, boron, hexavalent chromium, and nitrate – have no SMC. GSP provides no rationale for excluding other COCs. Further clarification is needed as to why no SMCs are established for other COCs that may cause undesirable results, as requested by DWR.

3.4.5 Approach to Address Recommended Corrective Actions for Degraded Water Quality

To address the first recommended corrective action (a), it was determined that a time-series analysis comparing COC concentrations with groundwater level fluctuations or pumping rates was the best approach to assess potential correlations between groundwater extraction and water quality changes. This type of analysis requires high-frequency data collection over a sufficiently long period to capture system dynamics and responses to specific events. While the Water Resources Information Database (WRID) contains extensive groundwater level measurements, the frequency of reported water quality data is sparse. These data limitations and potential improvements are discussed further in Section 6.1.2.

To support the evaluation of SMC development, YSGA reviewed the GSP and available groundwater quality data to assess whether SMCs should be established for the remaining identified COCs. YSGA generated concentration exceedance maps to visualize the spatial distribution of COC concentrations relative to their regulatory limits. These maps provide insight into areas of potential concern, helping to evaluate whether additional SMCs for other COCs may be warranted.

For the second recommended corrective action (b), YSGA used long-term time-series and statistical trend analyses of COC concentrations to evaluate SMC selection and determine if they are justified based on historical trends. Time-series analyses provide insights into concentration changes over time and can be performed without high-frequency measurements. To identify potential trends, YSGA applied a Mann-Kendall trend. A Mann-Kendall trend detects statistically significant increasing or decreasing trends in concentration, even with limited datasets; it typically requires at least four data points, though greater data availability improves trend detection.

To support these evaluations, YSGA obtained and compiled all available COC concentration data for RMWs in the GAMA network. Wells in the GAMA network are generally sampled at more regular intervals compared to local monitoring programs, resulting in more comprehensive datasets for time-series and trend analyses.

Findings discussed in Section 3.4.6 indicate the need for further understanding of the other COCs in the Subbasin before establishing additional SMCs. While the time-series analyses offer insight into the behavior of the naturally occurring constituents arsenic, boron, and hexavalent chromium—and whether groundwater management activities may influence their concentrations— the available data are both limited in spatial density and sampling frequency. YSGA will take further steps to assess the presence of additional COCs in the Subbasin and the impacts of groundwater management, through expanded monitoring and data collection, with the goal of further addressing groundwater quality and updating the SMCs in the 2032 GSP Periodic Evaluation & GSP Amendment.

3.4.6 Analysis to Address Recommended Corrective Actions for Degraded Water Quality

Table *7* summarizes the total number of wells within the GAMA dataset with available data for each COC, the number of these wells exceeding regulatory thresholds, and the date range of the samples analyzed. Among the COCs analyzed, nitrate is the only constituent with measurements in all RMWs and exhibits no exceedances of the California Primary Maximum Contaminant Level (MCL). Hexavalent chromium and boron, both naturally occurring, exhibit the highest number of regulatory threshold exceedances, affecting 54% and 52% of sampled wells, respectively. These COCs in the Subbasin are treated in public drinking water systems. However, private wells lack centralized treatment and present the greatest potential health risk to beneficial users in areas of exceedances.

Table 7: Total GAMA Well Count and Exceedances of Regulatory Thresholds

Constituent	MCL	MCL Units	Number of Wells with Data	Number of Wells with Exceedance	Percentage of Wells with Exceedance	Date Range
California Primary MCL (Health-Based Standards)						
Arsenic	10	µg/L	27	2	7%	12/4/1984 – 5/21/2024
Hexavalent Chromium	10	µg/L	24	13	54%	1/24/2000 – 5/21/2024
Nitrate-N	10	mg/L	30	0	0%	12/4/1984 – 5/21/2024
California Secondary MCL (Aesthetic/Non-Health Based Standards)						
TDS	1000	mg/L	26	1	4%	2/5/1986 – 5/21/2024
California Notification Limit (Non-Regulatory Health-Based Standards)[1]						
Boron	1	mg/L	23	12	52%	12/4/1984 – 3/7/2024

Notes:

[1] Boron is an unregulated chemical without an established MCL. The California State Notification Level (CA-NL) is 1 milligram per Liter (mg/L). The U.S. Environmental Protection Agency (EPA) also has established the Lifetime Health Advisory Level for children at 2.0 mg/L and at 5.0 mg/L for adults (SWRCB 2017).

µg/L = micrograms per liter

These results highlight the importance of distinguishing between naturally occurring and anthropogenic sources when interpreting exceedances. Nitrates are often associated with agricultural and wastewater inputs, while hexavalent chromium, boron, and arsenic are known to occur naturally in the Subbasin. Since hexavalent chromium is the most prominent naturally occurring COC that poses a risk to public

health if left unmanaged, this was further evaluated comparing pre- and post-SGMA GAMA datasets to determine if there's any influence from post-SGMA groundwater extraction or GSA management activities.

Figure 13 presents the maximum concentrations and percentage of MCL exceedances of hexavalent chromium in GAMA wells comparing pre- and post-SGMA GAMA datasets. The data show consistent exceedance patterns across both periods, with no significant changes in spatial distribution or exceedance percentage. Although the number of samples collected increased in the post-SGMA period, the percentage of exceedance remained stable. This suggests that hexavalent chromium concentrations are primarily influenced by natural geochemical conditions rather than groundwater extraction or GSA management activities. While the GSA is responsible for monitoring and maintaining water quality conditions, its regulatory authority over naturally occurring COCs is limited unless degradation is directly linked to groundwater pumping or other plan implementation activities, such as managed aquifer recharge.

Figure 13: Water Quality of Hexavalent Chromium Pre-SGMA (Left) And Post-SGMA (Right)

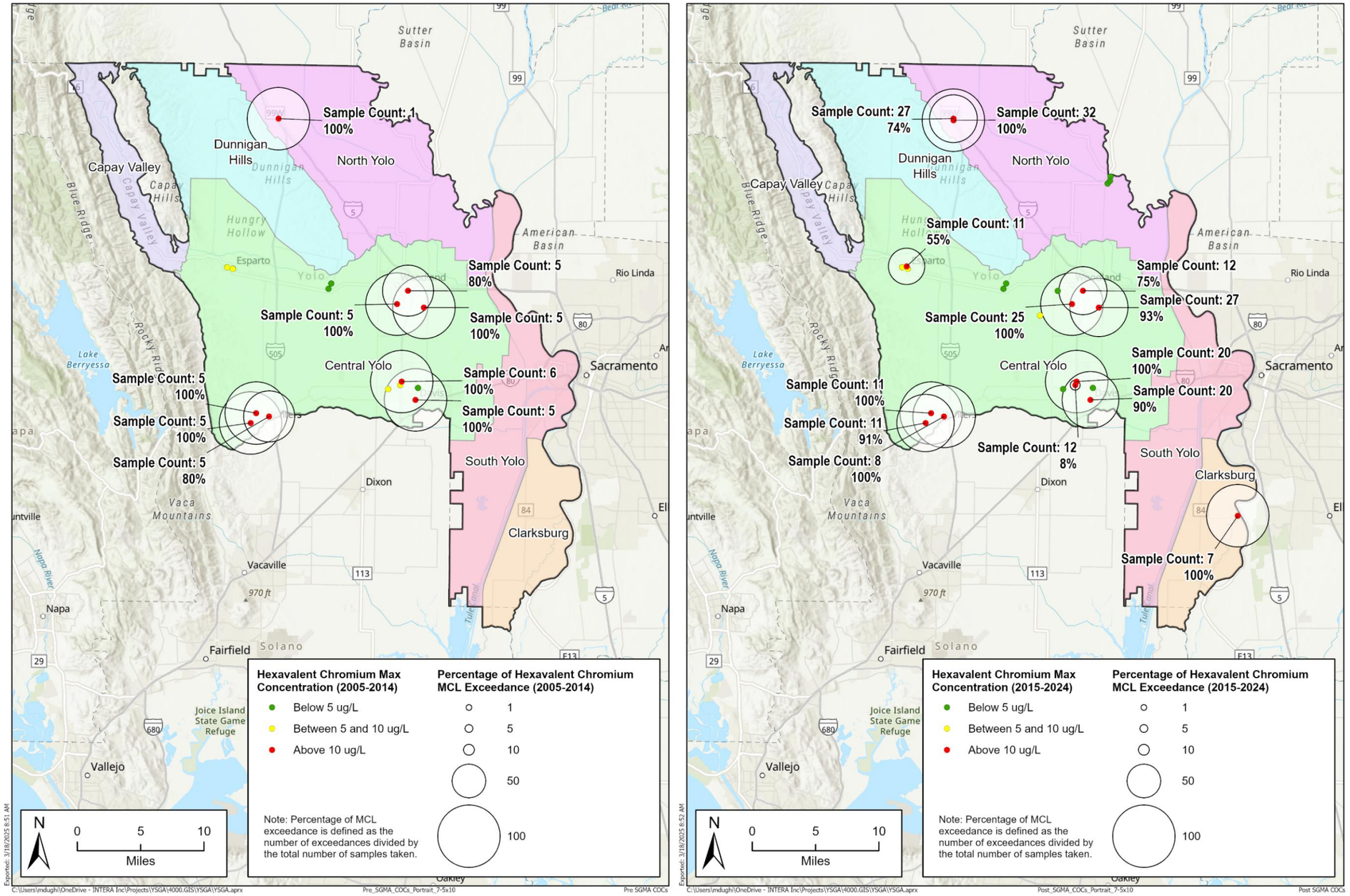


Figure 14 through Figure 18 present time-series plots for selected RMWs across each MA, mapping their locations and groundwater quality concentrations in time. The complete set of groundwater quality time-series results for all RMWs is included in Appendix B. These figures illustrate both concentration trends over time and notable data gaps in the current groundwater quality dataset. A summary of monitoring frequency for each RMW (categorized as less than annual, annual, near semi-annual, or semi-annual) is provided in Table *22* of Section 6.1.2.

Figure 14 presents data for the Capay Valley MA. This MA currently has only two RMWs, and the only water quality data are for nitrate concentrations, which are below the primary MCL. No data for other COCs are available for these wells. This represents a data gap for this MA.

Figure 15 presents data for the eastern portion of the Central Yolo MA and shows that most COCs have remained stable, with few exceptions. One exception is well CA5710001_025_025 in the Central Yolo MA, located near Davis. In 2016, the primary local water supply transitioned from groundwater to surface water. This change may explain the observed increase in several COC concentrations (arsenic, hexavalent chromium, nitrate, and TDS) in late 2016. The municipality must treat the water to meet drinking water standards before delivering it to the public, or rely on alternative sources unaffected by the noted COCs. Both wells (CA5710001_025_025 and CA5710006_024_024) in Figure 15 exhibit elevated hexavalent chromium concentrations above the primary MCL.

Figure 16 depicts the western portion of Central Yolo MA and highlights data limitations for well CA5710011_001_001, which has only two samples for hexavalent chromium and infrequent data for most other COCs post-2016, except for arsenic, which begins around 2019. Arsenic and boron concentrations have remained stable, with arsenic at or above the regulatory level and boron above the non-regulatory thresholds. The second well in this figure (CA5710005_006_006) shows sparse pre-SGMA data (indicated by a vertical black dashed line), with no boron data post-SGMA. Observed sampling frequency for remaining COCs ranges from annual (hexavalent chromium, nitrate) to less than annual (TDS, arsenic). This well shows stable hexavalent chromium concentrations above the primary MCL. Sampling frequency for all RMWs is summarized in Table *22* of Section 6.1.2.

18 presents wells from the North Yolo MA. Well CA5700712_001_001 lacks pre-SGMA data for all COCs except nitrate, while well CA5710004_005_005 shows sparse data for all COCs except arsenic, which has some post-2016 results. CA5700712_001_001 shows stable elevated hexavalent chromium levels above the primary MCL, while CA5710004_005_005 shows only a single hexavalent chromium sample, representing a data gap for this location.

Figure 18 includes wells from the South Yolo and Clarksburg MAs, each with only a single RMW. The South Yolo MA well has nitrate data only, with sparse results post-SGMA. The Clarksburg MA well has limited data for nitrate, hexavalent chromium, and arsenic, with no hexavalent chromium or arsenic data before SGMA implementation. The available hexavalent chromium data are above the primary MCL.

The data gaps identified in Figure 14 through Figure 18 align with broader network gaps and variable monitoring frequencies discussed in Section 6.1.2. Improving the water quality dataset and sampling consistency for COCs in these MAs will strengthen trend analyses.

Figure 14: Water Quality for Select RMWs in Capay Valley

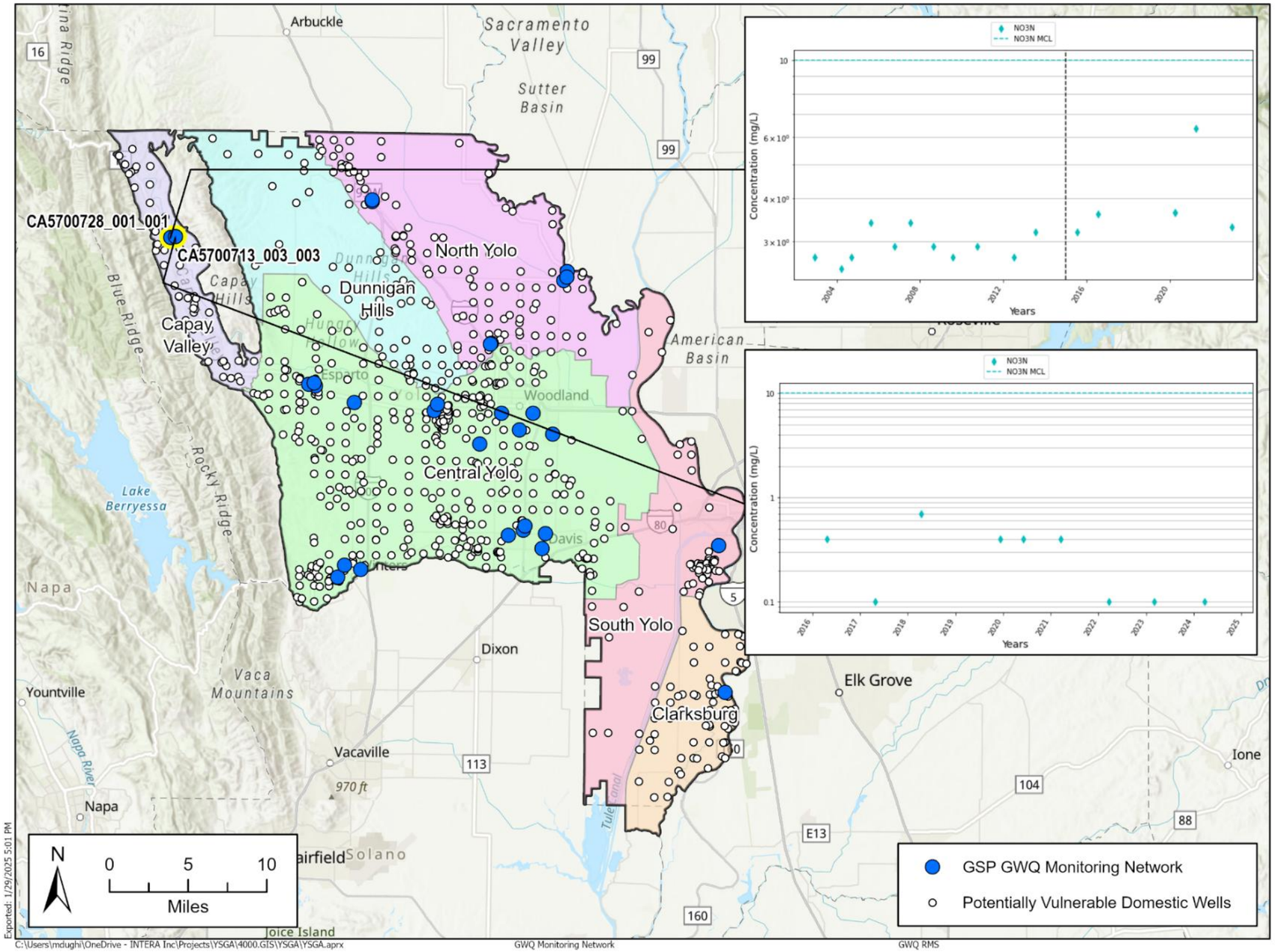


Figure 15: Water Quality for Select RMWs in the Eastern Portion of Central Yolo

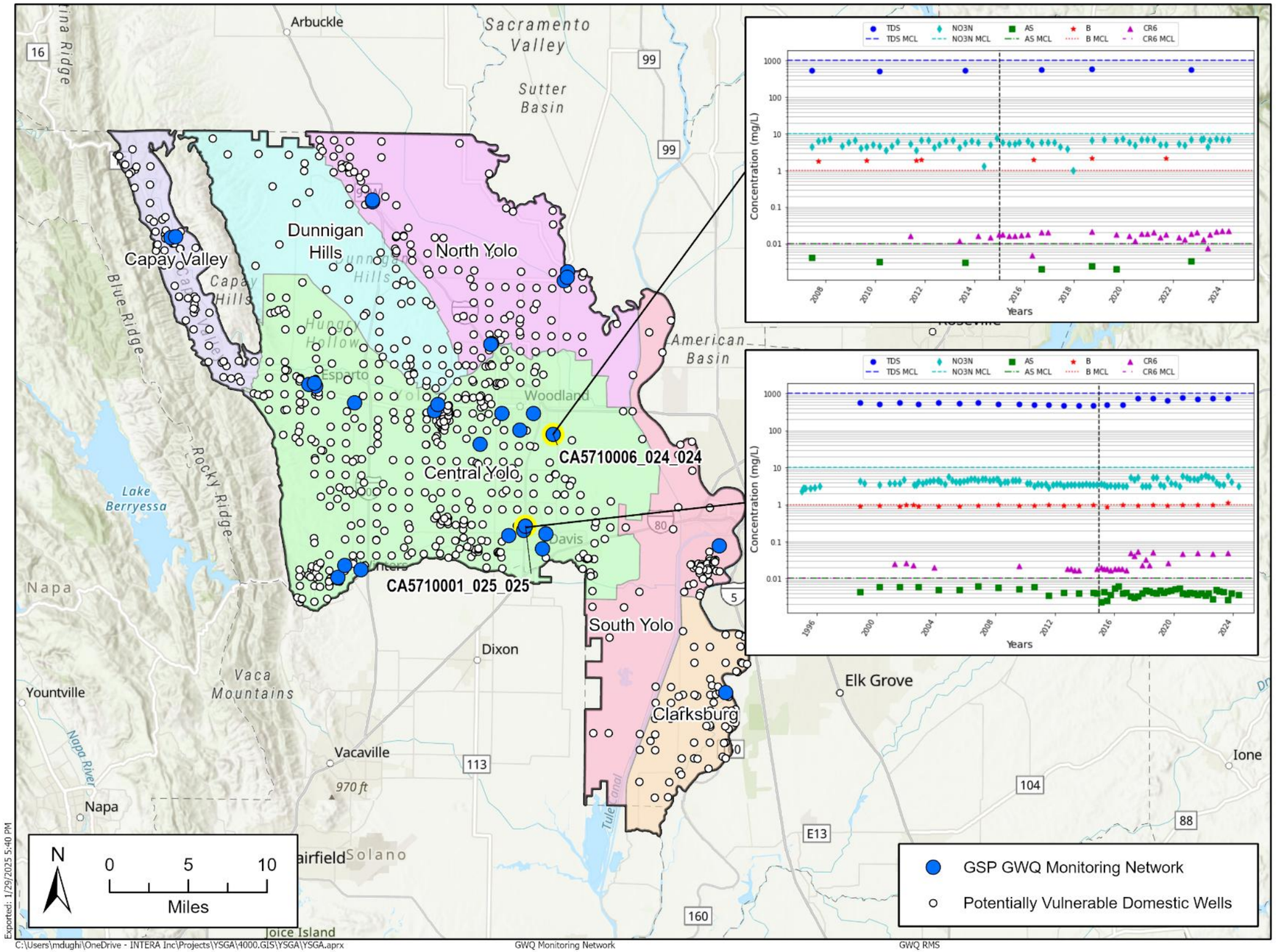


Figure 16: Water Quality for Select RMWs in the Western Portion of Central Yolo

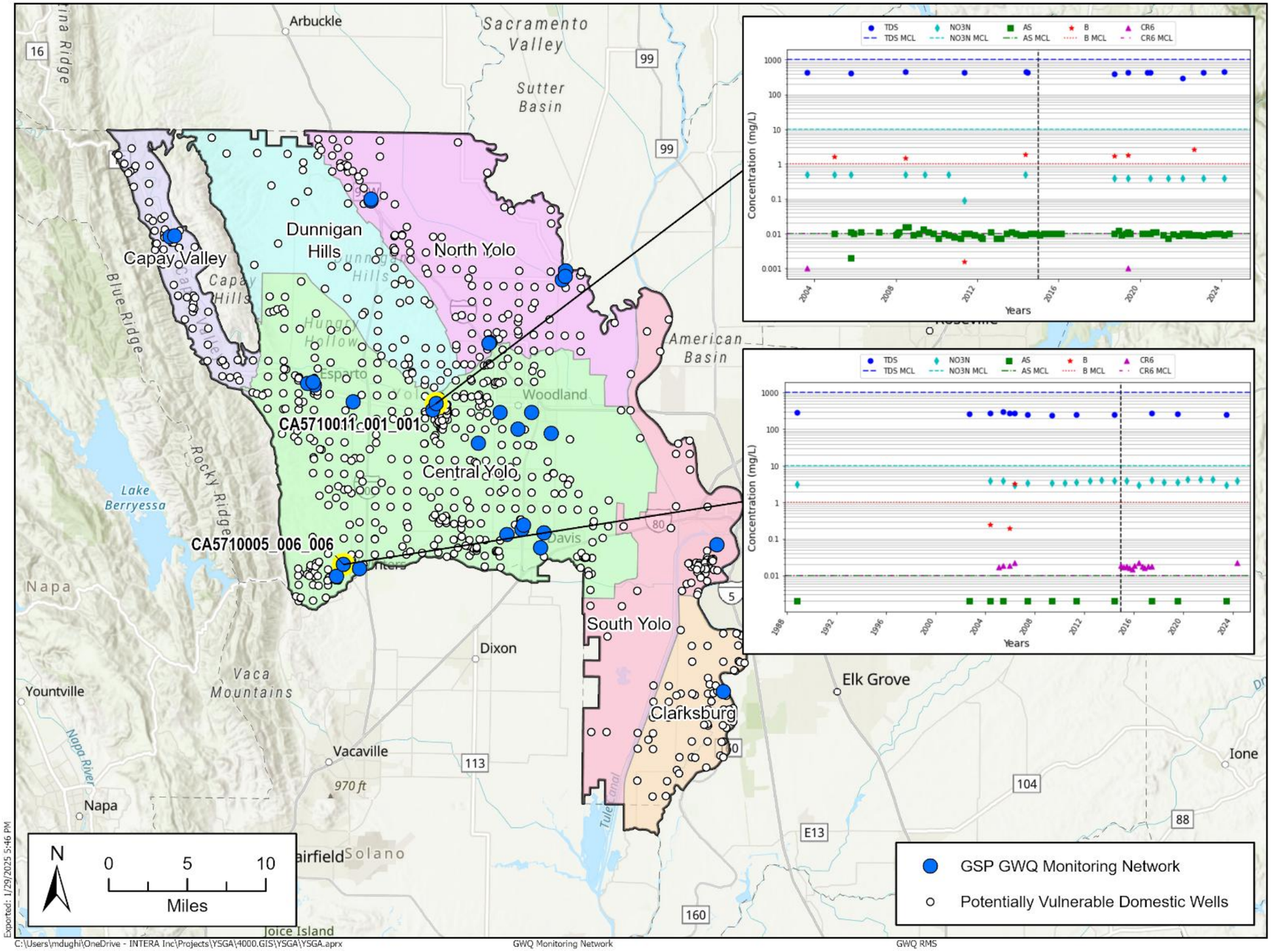


Figure 17: Water Quality Time-Series for Select RMWs in North Yolo

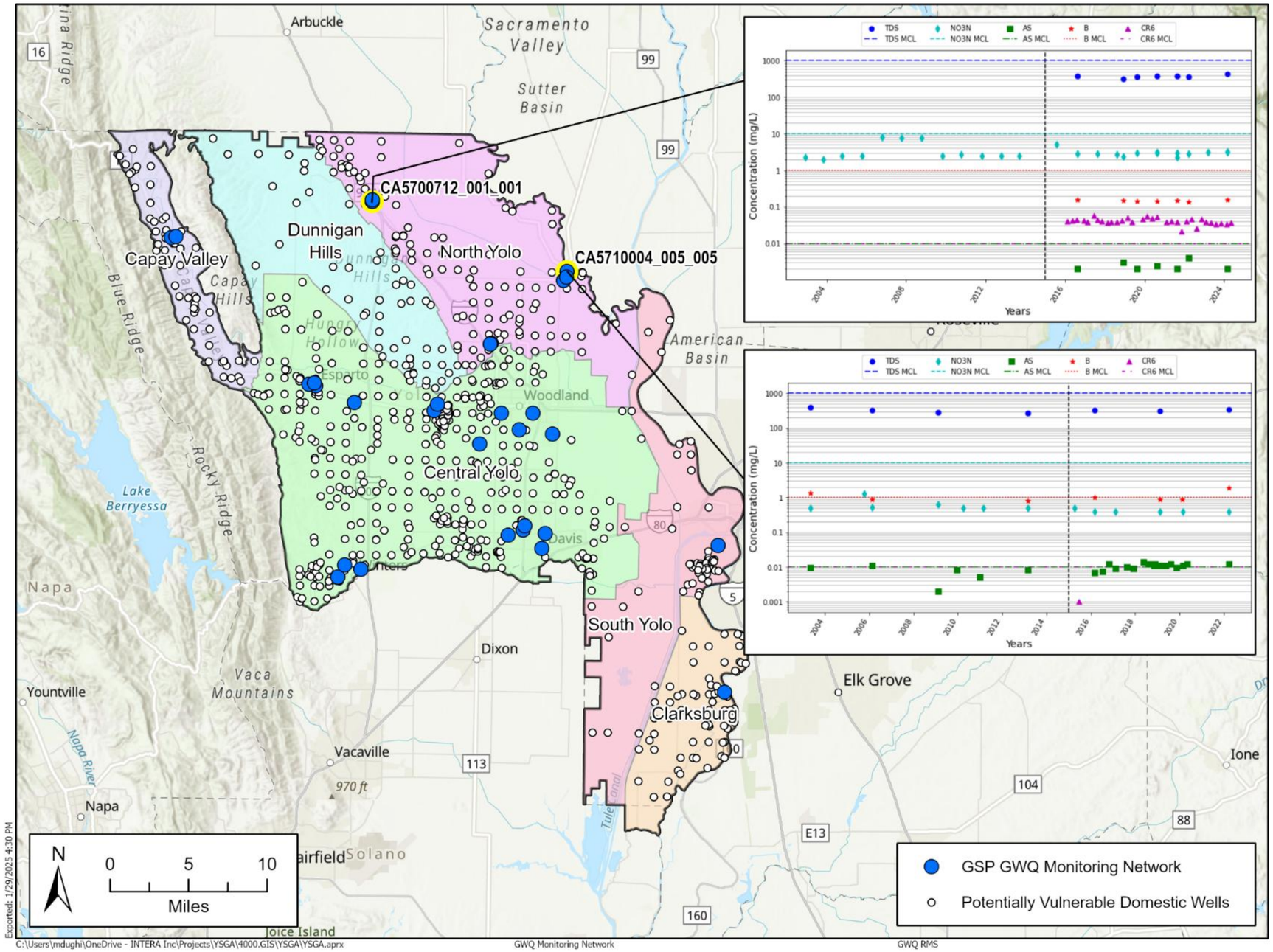
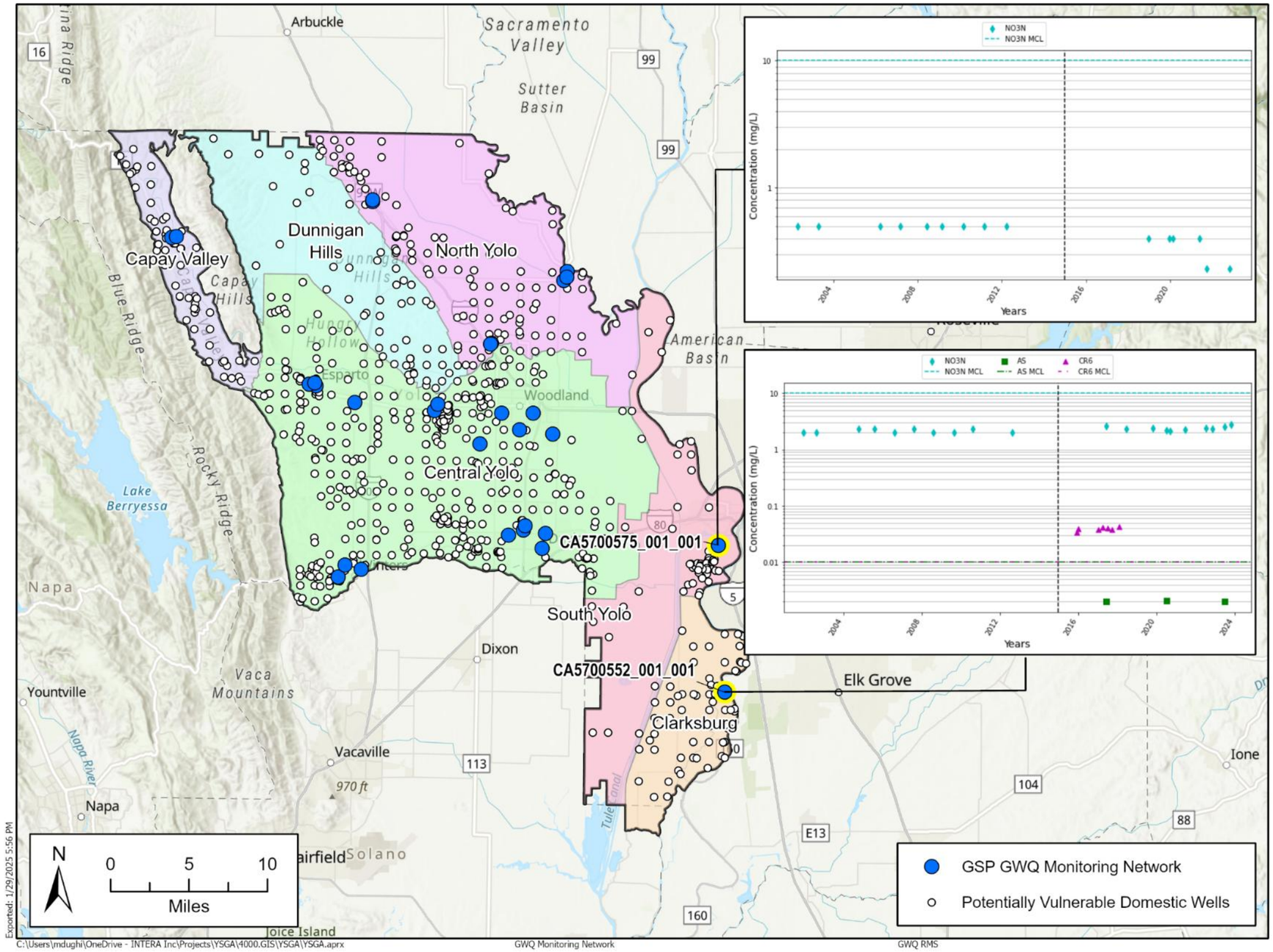


Figure 18: Water Quality Time-Series for Select RMWs In South Yolo and Clarksburg



YSGA also performed a Mann-Kendall trend analysis for each COC to evaluate long-term trends in groundwater quality. Table 9 and Table *9* summarize the number of wells with COC concentrations that increased, decreased, or showed no trend for the pre-SGMA (before 2015) and post-SGMA (2015 and after) periods. Additionally, wells with insufficient or limited data are categorized. Wells with insufficient data are defined as having fewer than four total water quality samples, or all samples being non-detects. Wells with limited data are defined as having more than four total samples, but fewer than four are above detection limits. Across the pre- and post-SGMA datasets, few wells exhibit statistically significant trends in COC concentrations. However, many wells lack sufficient data to detect trends, particularly for boron, arsenic, and TDS.

Table 8: Well Count for Pre-SGMA Trend Analysis

Constituent	Total	Increasing	Decreasing	No Trend	Insufficient	Limited Data
Arsenic	20	-	1	7	10	2
Boron	19	1	-	6	12	-
Hexavalent Chromium	16	-	-	10	6	-
Nitrate-N	26	2	1	14	5	4
TDS	19	-	1	12	6	-

Table 9: Well Count for Post-SGMA Trend Analysis

Constituent	Total	Increasing	Decreasing	No Trend	Insufficient	Limited Data
Arsenic	27	1	1	9	12	4
Boron	18	-	-	10	8	-
Hexavalent Chromium	24	1	1	11	10	1
Nitrate-N	30	1	1	18	7	3
TDS	26	1	-	12	13	-

3.4.7 Changes Under Consideration to Address Recommended Corrective Actions for Degraded Water Quality SMC

3.4.7.1 Revised Definition of Undesirable Results for Degraded Water Quality

As described in Section 3.4.4, DWR's Recommended Corrective Action 2 requested the following:

a) Revise the definition of undesirable results for degraded groundwater quality so that exceedances of minimum thresholds caused by groundwater extraction, whether the GSA has implemented projects or not, are considered in the assessment of undesirable results in the Subbasin.

b) The GSA should revise the GSP to provide the rationale to support their approach that TDS is the only quality constituent that requires the establishment of sustainable management criteria. Alternatively, the GSP should establish sustainable management criteria for all the constituents of potential concern identified in the Basin that have the potential to cause undesirable results.

With regard to Recommended Corrective Action 2a, DWR's determination letter noted that the GSP's definition of undesirable results for degraded water quality is too narrow, as it limits consideration to impacts caused directly by GSA-implemented actions. SGMA requires that GSAs avoid groundwater quality degradation resulting from any groundwater extraction or condition that affects the reasonable

and beneficial use of water, which applies beyond impacts directly caused by a GSA's implementation of physical projects or management actions in the Subbasin. To address DWR's comment and align with SGMA, YSGA proposes the following revision to the definition of undesirable results for groundwater quality:

> *An undesirable result occurs when the minimum threshold criteria for TDS is exceeded in 50 percent or more of representative monitoring wells due to groundwater extraction, regardless of whether specific GSA-led projects or management actions have been implemented.*

The 50 percent threshold is intended to reflect a Subbasin-wide condition rather than isolated exceedances. This approach is consistent with how undesirable results are defined for other sustainability indicators in the Subbasin and confirms that the trigger reflects a persistent and spatially significant decline in groundwater quality affecting multiple areas of the Subbasin.

With regard to Recommended Corrective Action 2b, DWR requested that YSGA either provide a rationale for establishing SMCs only for TDS or revise the GSP to include SMC for all COCs that have the potential to cause undesirable results. In response, YSGA proposes maintaining the current SMC for TDS only, given the limited nature of the existing water quality dataset and monitoring network for understanding the impacts of groundwater management on other COCs in the Subbasin. The GSP originally identified COCs based on their occurrence, potential to affect the reasonable and beneficial use of groundwater, and the availability of long-term data through the GAMA program and other regulatory sources. The naturally occurring constituents—arsenic, boron, and hexavalent chromium—exhibit localized exceedances that are typically geochemically driven rather than the result of land-use or groundwater management activities and require thoughtful consideration in establishing SMCs.

As part of addressing DWR's recommended corrective actions, YSGA conducted a Subbasin-wide groundwater quality analysis to evaluate spatial patterns, exceedances, and long-term trends for each COC. Section 3.4.6, through the time-series plots and Mann-Kendall trend analyses, demonstrates that most COC concentrations have remained stable over time, with no substantial evidence of post-SGMA groundwater quality degradation related to groundwater management activities. Water quality will continue to be monitored for TDS, which will serve as a proxy for potential changes in other water quality constituents where there's a correlative relationship.

Furthermore, COCs within the Subbasin will continue to be managed by the appropriate regulatory agency and applicable MCLs, including Title 22 of the California Code of Regulations (Title 22). This provides a level of protection to beneficial users of groundwater, as, under Title 22, public water providers must treat water to applicable standards prior to delivery. Additional programs, such as the ILRP and the CV-SALTS Nitrate Control Program, will be leveraged to expand monitoring and groundwater data within the Subbasin, reduce duplicative water quality monitoring efforts, and provide additional protection for groundwater users.

The water quality data within the Subbasin are limited, and there are data gaps in the existing monitoring network, both spatially and in sampling frequency. YSGA will continue to develop the water quality monitoring network by installing new wells, further leveraging existing water quality monitoring and sampling programs, and expanding the sampling frequency of existing RMWs.

Expansion of the water quality monitoring network and dataset through 2032 will serve to inform YSGA's GSP update and re-evaluation of the water quality SMCs at that time. Trend analysis, along with comparison of time-series data with groundwater level trends, will help determine whether SMCs are appropriate for other COCs within the Subbasin. Should additional SMCs be determined as necessary, the YSGA will work with member agencies and stakeholders to determine the appropriate SMC thresholds. The GSA has no regulatory authority to change or improve water quality conditions in the Subbasin unless water quality degradation is linked to groundwater management activities by the YSGA. The GSA's role under SGMA is to monitor and preserve existing water quality conditions for long-term groundwater sustainability. YSGA may consider developing an exceedance plan and mitigation policy, should additional SMC be established, to guide the GSA's response to water-quality SMC exceedances. However, if opportunities arise to improve water quality, the GSA may pursue aspirational goals to reduce concentrations of identified COCs where feasible.

3.5 Land Subsidence

3.5.1 WY 2019 – WY 2024 Land Subsidence Conditions

An assessment of current conditions related to land subsidence MTs and MOs/IMs using data from InSAR displacement time-series provided by DWR (California Natural Resources Agency, 2025) and on Global Positioning System (GPS) surveys collected by YSGA is presented below. In this section and subsequent sections in Section 3.5, YSGA assessed InSAR weekly point displacement time series processed by TRE Altamira, as they allow exploration of the subsidence data at higher spatial and temporal resolutions (near-weekly 100-meter pixels) than the raster datasets. It's important to note that due to the processing schemes employed by TRE Altamira, time-series data are not always temporally continuous and may be reset to zero following a data gap. Spatially, this may result in discontinuities in displacement rate and total amount estimates that are not physically based. To address temporal discontinuities, the time series are reconstructed by differencing sequential observations and then applying a median spatial interpolation filter (500-meter radius). Spatial interpolation generates displacement estimates for pixels that may experience temporal data gaps. The interpolated results are then cumulatively summed to reconstruct the displacement time series without the "reset" artifact, which is then used to estimate subsidence rates and extent for the Yolo Subbasin.

InSAR data spanning from 2015 to 2024 was reconstructed to a weekly time-series point dataset to investigate spatial-temporal subsidence patterns in the Subbasin and by each MA. Note that, for the Central Yolo MA, this analysis did not distinguish between West and East Central Yolo sub-MAs due to the similarity in subsidence rates. YSGA assessed displacement data over each water year (beginning on October 1) and for the period spanning WY 2016 through WY 2024. These years contain state-wide dry/drought conditions (WYs 2016, 2018, 2020, 2021, and 2022) and wet conditions (WYs 2017, 2019, 2023, and 2024). Maps for these years are shown in Figure *19* and Figure 20.

Annualized displacement maps highlight consistent subsidence patterns across the Subbasin, with variations in magnitude over time (Figure *19*). The central and southern parts of the North Yolo MA consistently exhibit the greatest subsidence. WY 2022—following a drought period—shows the most widespread and intense subsidence, extending into the Central Yolo, Dunnigan Hills, and North Yolo MAs. Long-term displacement rates from InSAR align closely with GPS survey data both within and beyond subsidence zones, supporting the accuracy of InSAR-based historical subsidence estimates (Figure 20).

Figure 19: Annual Surface Displacement Rates Over the Subbasin for WY 2016 – WY 2024

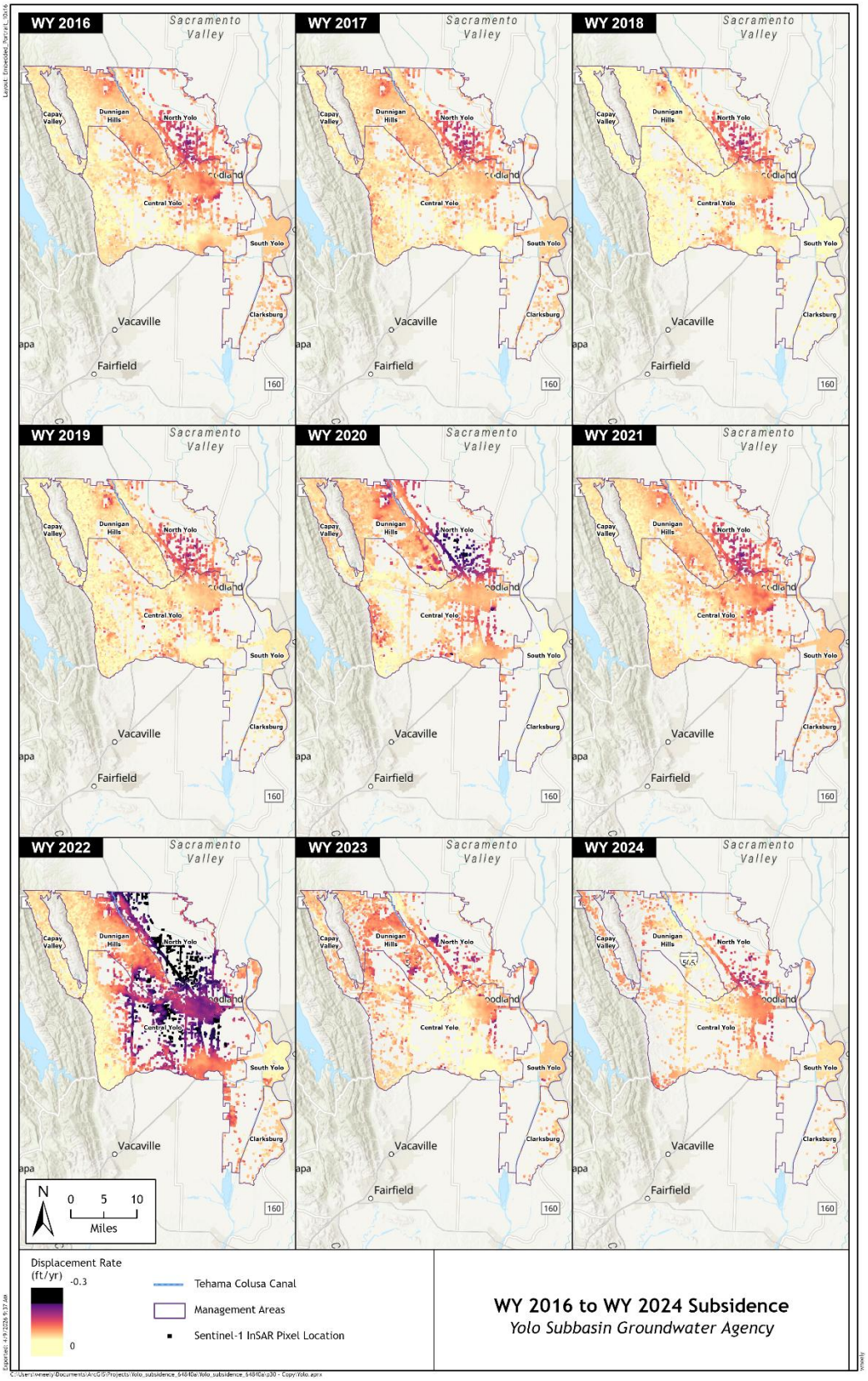
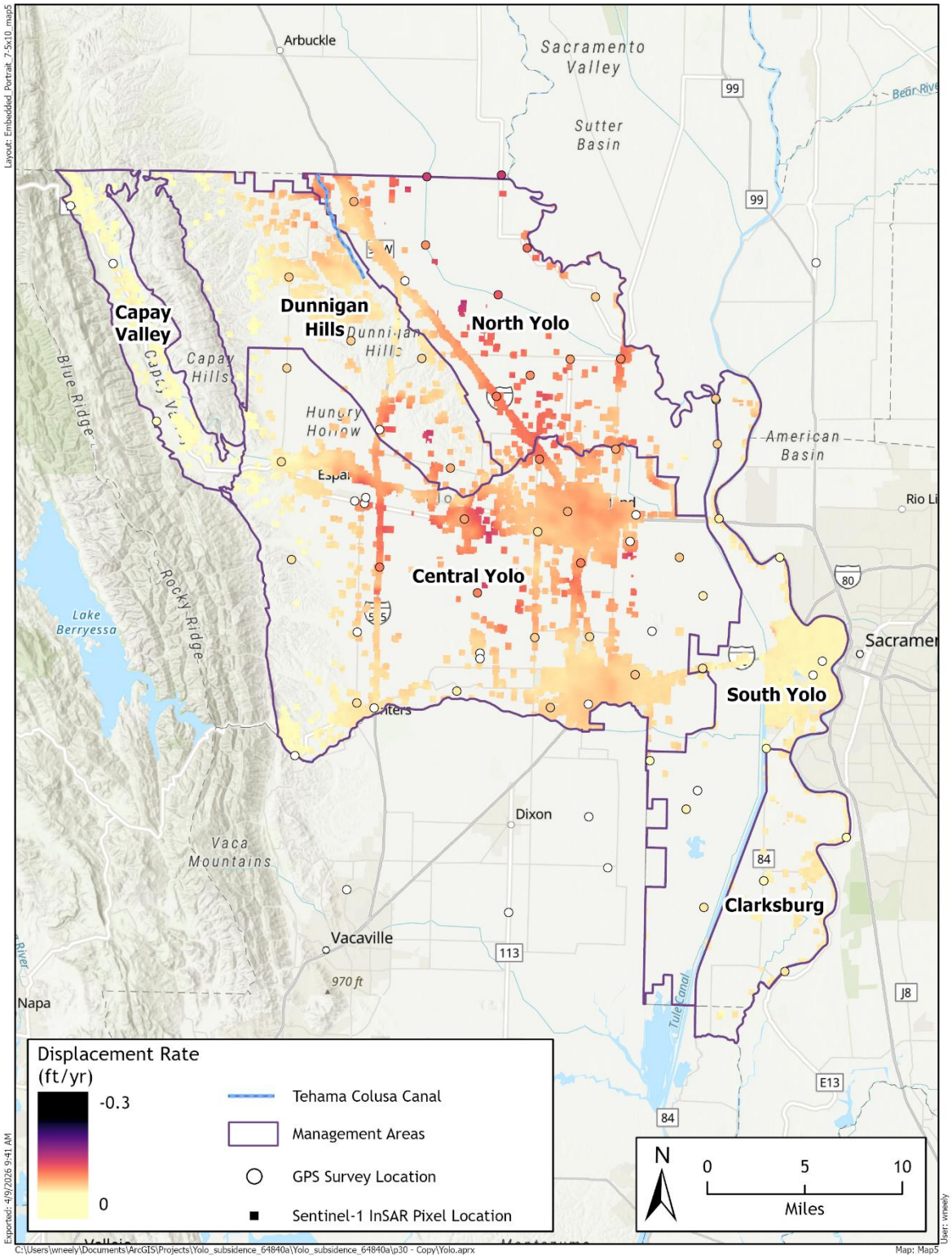


Figure 20: Surface Displacement Rates Over the Subbasin from Fall 2015 – Fall 2024



Individual years have more spatial "speckle" (pixel-scale spatial discontinuities in the rate field), likely due to the relatively small number of observations to estimate displacement rates compared to the smoother-looking nine-year average. An important consideration is the magnitude of displacements compared to the reported accuracy of the data. The InSAR displacement observations are often comparatively small (less than 0.15 foot per year [ft/yr]), while the reported accuracy is 0.066 ft (Towill, 2024). This may contribute to the "speckle" in individual years with fewer data to average across. Further, baseline displacement rates vary from year to year. For example, Capay Valley MA, the western portion of Western Central Yolo MA, and the eastern portion of South Yolo MA, occasionally exhibit broad-scale subsidence near the reported InSAR accuracy in years (e.g., WYs 2017, 2023, and 2024) when groundwater use is reduced due to wet conditions (Figure 20).

Using the same dataset from Figure *19* that provides spatial pixel coverage across all years evaluated, the 5-year MT and 3-year MO/IM subsidence rates and the proportion of pixel area and respective rate relative to the MT and MO/IM were calculated to evaluate trends in land subsidence and assess if an undesirable result occurred during the evaluation period. Table *12* shows the 5-year MT averages calculated and the total percent area where an exceedance of the MT rate occurred for each MA/Sub-MA. Table *11* shows the 3-year MO/IM averages calculated and the total percent area where an exceedance of the MO/IM rate occurred for each MA/Sub-MA. Both tables show which period evaluated had either 1) subsidence rate is greater than the max rate allowed for the MA/Sub-MA or 2) percent of pixel area within the MA/Sub-MA where the subsidence rate was greater than the max rate allowed is greater than 25%.

Table *10* shows that 5-year average subsidence rates across most of the MAs/Sub-MAs have increased due to the WY 2020 – WY 2022 drought. Table *11* shows that 3-year average subsidence rates across all MA/Sub-MAs plateaued during the WY 2020 – WY 2023 period and have started to decline. YSGA Staff anticipate the MT and MO/IM calculated averages will continue to decline with each passing year absent of a drought. Across the evaluation period for both the MT and MO/IM, even during the WY 2020 – WY 2022 drought, no undesirable results related to land subsidence occurred.

Currently, the land subsidence SMC for Capay Valley is currently unspecified, and South Yolo and Clarksburg which have a MT and MO/IM rate of zero. These three MAs require adjustments to make their MT and MO/IM rates realistic to monitor and track that considers InSAR data coverage and measurement error limitations. Improvements made to the land subsidence SMC to address these potential areas of improvement are in Sections 3.5.6 and 3.5.7.

Table 10. Minimum Threshold Evaluation for Land Subsidence Between WY 2016 – WY 2024

Management / Sub-Management Area	Max Rate Allowed (ft/yr)	WY 2016–2020 Rate (% MA)		WY 2017–2021 Rate (% MA)		WY 2018–2022 Rate (% MA)		WY 2019–2023 Rate (% MA)		WY 2020–2024 Rate (% MA)	
Capay Valley	Unspecified	Unspecified		Unspecified		Unspecified		Unspecified		Unspecified	
Dunnigan Hills	0.059	0.015*	(0.9%)	0.016*	(1.4%)	0.02*	(4.8%)	0.026*	(6.2%)	0.031*	(3.8%)
North Yolo	0.098	0.031*	(0.0%)	0.046*	(0.2%)	0.077	(6.5%)	0.096	(9.4%)	0.082	(5.5%)
Eastern Central Yolo	0.082	0.01*	(0.1%)	0.023*	(0.2%)	0.055*	(5.2%)	0.075	(14.4%)	0.068	(9.7%)
West Central Yolo	0.059	0.009*	(0.1%)	0.012*	(0.2%)	0.022*	(6.2%)	0.038*	(8.7%)	0.048*	(6.7%)
South Yolo	0	**0.011***	**(26.4%)**	**0.007***	(24.7%)	**0.009***	(25.0%)	**0.01***	(23.4%)	**0.009***	(21.7%)
Clarksburg	0	**0.016***	(19.3%)	**0.009***	(16.7%)	**0.009***	(16.3%)	**0.01***	(13.9%)	**0.011***	(12.1%)
Count of MAs/Sub-MAs > 25%	**-**	**1**		**0**		**0**		**0**		**0**	
Undesirable Result Occurred?	**-**	**No**		**No**		**No**		**No**		**No**	

* InSAR measurement less than measurement error of 0.066 ft (Towill, 2024).

Table 11. Measurable Objective/Interim Milestone Evaluation for Land Subsidence Between WY 2016 – WY 2024

Management / Sub-Management Area	Max Rate Allowed (ft/yr)	WY 2016–2018 Rate (% MA)		WY 2017–2019 (% MA)		WY 2018–2020 (% MA)		WY 2019–2021 (% MA)		WY 2020–2022 (% MA)		WY 2021–2023 (% MA)		WY 2022–2024 (% MA)	
Capay Valley	Unspecified	Unspecified		Unspecified		Unspecified		Unspecified		Unspecified		Unspecified		Unspecified	
Dunnigan Hills	0.059	0.016*	(1.3%)	0.006*	(0.8%)	0.019*	(1.8%)	0.027*	(5.9%)	0.02*	(9.0%)	0.032*	(8.2%)	0.031*	(3.8%)
North Yolo	0.098	0.031*	(0.0%)	0.023*	(0.1%)	0.045*	(0.3%)	0.08	(7.9%)	**0.12***	(14.0%)	**0.117**	(12.0%)	0.082	(5.5%)
Eastern Central Yolo	0.082	0.008*	(0.1%)	0.005*	(0.1%)	0.02*	(0.3%)	0.047*	(2.8%)	**0.099**	**(30.6%)**	**0.099**	**(26.9%)**	0.068	(9.7%)
West Central Yolo	0.059	0.008*	(0.4%)	0.004*	(0.6%)	0.014*	(0.4%)	0.021*	(2.3%)	0.031*	(11.9%)	0.056*	(11.7%)	0.048*	(6.7%)
South Yolo	0	**0.013***	**(30.2%)**	**0.005***	**(26.0%)**	**0.012***	**(26.0%)**	**0.006***	(18.5%)	**0.007***	(16.7%)	**0.018***	(23.4%)	**0.009***	(21.7%)
Clarksburg	0	**0.018***	**(29.4%)**	**0.009***	**(26.0%)**	**0.016***	(18.8%)	**0.006***	(15.3%)	0.003*	(12.3%)	**0.018***	(13.9%)	**0.011***	(12.1%)
Count of MAs/Sub-MAs > 25%	**-**	**2**		**2**		**1**		**0**		**1**		**1**		**0**	

* InSAR measurement less than measurement error of 0.066 ft (Towill, 2024).

3.5.2 WY 2019 – WY 2024 Impacts to Beneficial Uses and Users

Drought conditions during WYs 2020 – 2022 led to declines in groundwater levels throughout the Yolo Subbasin, with some locations falling below their historic lows. This caused land subsidence rates to escalate beyond what's typical (0.0 to 0.1 ft/year) and primarily found in North Yolo MA. In WY 2021 and WY 2022, land subsidence became more geographically prominent in the West Central Yolo and East Central Yolo Sub-MAs in addition to the North Yolo MA. Despite the drought conditions and land subsidence occurrence most prominent between WY 2020 – WY 2022, YSGA didn't receive reports from landowners or other YSGA member agencies maintaining critical infrastructure like levees, roads, etc. that had damage attributable to land subsidence.

3.5.3 2022 GSP Definition of Undesirable Results

The GSP currently defines undesirable results for land subsidence over the entire Subbasin as the following:

> *The point at which the rate and total amount of subsidence in the Subbasin cause significant and unreasonable impacts to surface land uses or critical infrastructure.*
>
> *An undesirable result occurs when the minimum threshold value is exceeded over 25 percent of the management or sub-management areas in three (3) or more management or sub-management areas in the same reporting year.*

Within the Subbasin, a management or sub-management area is considered an undesirable watch area when it exceeds its MT value. If three or more undesirable result watch areas are identified in the same reporting year, the Subbasin is considered to be experiencing an undesirable result for land subsidence.

Land subsidence can result from long-term depressurization of aquifers, leading to compaction of compressible strata and a lowering of the land surface. While subsidence is often associated with declining groundwater levels, the GSP relies on studies that show subsidence in the Subbasin has occurred at a steady rate, even during periods when groundwater levels were stable or increasing. The GSP suggests that other non-groundwater activities may contribute to observed subsidence trends.

YSGA developed MTs and MOs for land subsidence based on historical subsidence rates and stakeholder input. Land subsidence monitoring has documented steady levels of subsidence in North Yolo and eastern Central Yolo MAs, while observing slight uplift in western Central Yolo. Given this variability, the GSP sets MTs and MOs at levels generally consistent with historical subsidence rates derived from Sentinel-1 interferometric synthetic aperture radar (InSAR) displacement observations (see Tables 3-2 and 3-3 of the GSP).

3.5.4 DWR Recommended Corrective Actions for Land Subsidence

DWR has requested a revision of the current SMC for land subsidence. In the determination letter, specifically Recommended Corrective Action 3, DWR requested the following:

a) *Identify critical infrastructure susceptible to land subsidence and describe what constitutes significant and unreasonable effects.*
b) *Revise the operational definition of undesirable results to consider localized instances of subsidence and how they would be determined to be significant and unreasonable. This should include describing how minimum thresholds being exceeded in multiple management areas or a*

quarter of one management area does not constitute an undesirable result. Provide additional discussion and justification on the quantitative definition of undesirable results of subsidence: a) How the value of "25 percent of the management or sub-MA" mean was determined, and whether it means 25 percent of monitoring sites or 25 percent of area, and b) how to address local or regional undesirable results by requiring three (3) or more management areas or sub-MAs experiencing the minimum threshold exceedances.

c) *Include a cumulative metric for land subsidence in the definition of the minimum threshold (such as 0.5 foot of land subsidence within a five-year period, or the maximum cumulative subsidence amount a specific structure can withstand) to ensure small amounts of annual land subsidence are not wrongly classified as measurement error within the InSAR dataset, or, theoretically, to prevent unlimited or large amounts of subsidence from occurring as a result of the cumulative impact of many successive years of incremental subsidence. The GSA should elaborate on how the proposed management will avoid or minimize the land subsidence that has been occurring in the Subbasin. In addition, the GSA should establish a minimum threshold for the Capay Valley Management Area.*
d) *Revise the measurable objective and interim milestones for land subsidence to a value that achieves the sustainability goal for the basin within 20 years of Plan implementation and reflects sustainable management of the groundwater basin while also meeting the intent of SGMA (i.e., minimizing or avoiding land subsidence).*

DWR has advised YSGA to provide a clear rationale supporting its approach to defining significant and unreasonable conditions for land subsidence. This includes an explanation of how localized exceedances are evaluated in relation to Subbasin-wide undesirable results, as well as a justification for the cumulative metric and its role related to long-term sustainability. Additionally, YSGA should provide the basis for selecting specific quantitative thresholds and sustainability criteria. Alternatively, the YSGA should establish revised SMC that better reflect the potential risks posed by land subsidence to critical infrastructure and long-term groundwater sustainability in the Subbasin.

3.5.5 Approach to Address Recommended Corrective Actions for Land Subsidence

YSGA is currently working to improve understanding of subsidence in the Subbasin through analysis of available data, coordination with partners and interested parties in the Subbasin, and integration of subsidence guidance and BMPs from DWR. The issue of subsidence and how best to monitor and manage it as a result of groundwater management is an ongoing area of investigation statewide. The approach presented by YSGA aims to address most of DWR's recommended corrective actions by re-evaluating subsidence SMC using the best available Subbasin data and updated analytical methods based on DWR's Best Management Practices (BMPs). However, some of the recommended corrective actions (a & b) require ongoing public outreach and input from interested parties (e.g. YSGA member agencies and others that manage water, flood, and other infrastructure). Results are used to address most of DWR's recommended corrective actions and provide a foundation to address the remaining recommendations in the future.

To address the first recommended corrective action (a), YSGA will rely primarily on public outreach and input from interested parties over the next five years, along with a comparison of Subbasin infrastructure to recent subsidence maps. YSGA and member agencies will identify infrastructure of interest through outreach and input from interested parties and may consider and include municipal wells, canals, water

conveyance pipelines, roads, drains, flood control levees, and water treatment facilities, or other critical infrastructure identified by interested parties. Critical infrastructure includes any infrastructure, land use, or property interest for which subsidence impacts would substantially harm beneficial uses and users. These impacts may include physical damage, effects on the designed operating conditions, increased maintenance, reduced operation flexibility and control, and effects on other subbasins reliant upon that infrastructure. Determination of critical infrastructure will consider local conditions, infrastructure dependencies, stakeholder input, and public health and safety concerns. After identifying critical infrastructure, YSGA will determine metrics for subsidence tolerance (e.g., allowable differential subsidence and/or subsidence total amount). Historical rates and total amounts will help assess locations where infrastructure may be at risk from absolute and differential subsidence.

To address the second recommended corrective action (b), YSGA may develop specific subsidence SMC for critical infrastructure, where necessary, to account for the impacts of local subsidence. For example, infrastructure such as the Tehama-Colusa Canal and the surrounding area may have in the future its own subsidence SMC independent of other MAs and sub-management areas (sub-MAs). Further details regarding the quantitative definition of undesirable results will be provided, along with metrics of the availability of subsidence data (Section 3.5.6).

To address the third recommended corrective action (c), land subsidence SMCs will include MTs, MOs, and IMs represented as subsidence rates and cumulative amounts for each MA and sub-MA. These values may be used, along with identified critical infrastructure and subsidence SMC established by neighboring subbasins, to demonstrate the full extent of subsidence allowable by 2042. Additionally, YSGA analyzed historical subsidence in the Capay Valley MA to assess subsidence trends for SMC establishment.

To address the fourth recommended corrective action (d), the SMCs for the chronic lowering of groundwater levels was evaluated against current estimates of critical head, the groundwater level below which inelastic (permanent) subsidence can occur. This assessment was used to determine whether and to what extent the groundwater level SMCs are protective of subsidence caused by groundwater management and activities (e.g., groundwater withdrawal). Because SMC for groundwater levels are developed to reflect sustainable groundwater management conditions, this comparison will help predict the potential for permanent subsidence within the GSP framework.

Analysis and results to address each of these recommended corrective actions described below in Section 3.5.6 relied on InSAR displacement time-series provided by DWR (California Natural Resources Agency, 2025) and GPS surveys collected by YSGA.

3.5.6 Analysis to Address Recommended Corrective Actions for Land Subsidence

3.5.6.1 Evaluation of Historical Land Subsidence in Yolo Subbasin Relative to Critical Infrastructure

YSGA evaluated subsidence along local and regional infrastructure, identified by YSGA and member agencies, using a nine-year average dataset (October 2015 – October 2024), as well as for WY 2022, which recorded the most subsidence during the period. Five infrastructure classes were identified: Canals, Pipelines, Levees, Roads, and Small Water Systems (21). Table *12* presents summary statistics for subsidence observed in areas overlapping with the five infrastructure classes.

Table 12: Land Subsidence Rates for Local and Regional Infrastructure

Feature Class	2015 – 2024					WY 2022				
	Pixels[1]	Mean[2] (ft/yr)	Min (ft/yr)	Max (ft/yr)	Median (ft/yr)	Pixels	Mean (ft/yr)	Min (ft/yr)	Max (ft/yr)	Median (ft/yr)
Canals										
YCFC & WCD	771	-0.04	-0.12	0.00	-0.03	1513	-0.13	-0.42	0.05	-0.14
RD108	36	-0.08	-0.12	-0.03	-0.08	153	-0.19	-0.41	-0.08	-0.14
Other Local	33	-0.04	-0.12	-0.01	-0.01	89	-0.17	-0.40	0.01	-0.21
Federal	66	-0.04	-0.09	0.00	-0.04	116	-0.13	-0.31	0.00	-0.13
Pipelines										
WDCWA	195	-0.04	-0.10	-0.01	-0.03	272	-0.15	-0.40	-0.03	-0.14
DWD	261	-0.04	-0.09	-0.02	-0.03	334	-0.18	-0.32	-0.09	-0.18
Levees										
Non-Federal	476	-0.03	-0.14	0.00	-0.02	833	-0.09	-0.44	0.03	-0.06
Federal	1437	-0.03	-0.12	0.00	-0.01	2245	-0.09	-0.42	0.01	-0.04
Roads										
TIGER/Line 2024	27808	-0.03	-0.15	0.02	-0.02	34490	-0.10	-0.51	0.09	-0.08
Small Water Systems										
Yolo County	56	-0.03	-0.11	0.00	-0.02	65	-0.11	-0.36	0.02	-0.08

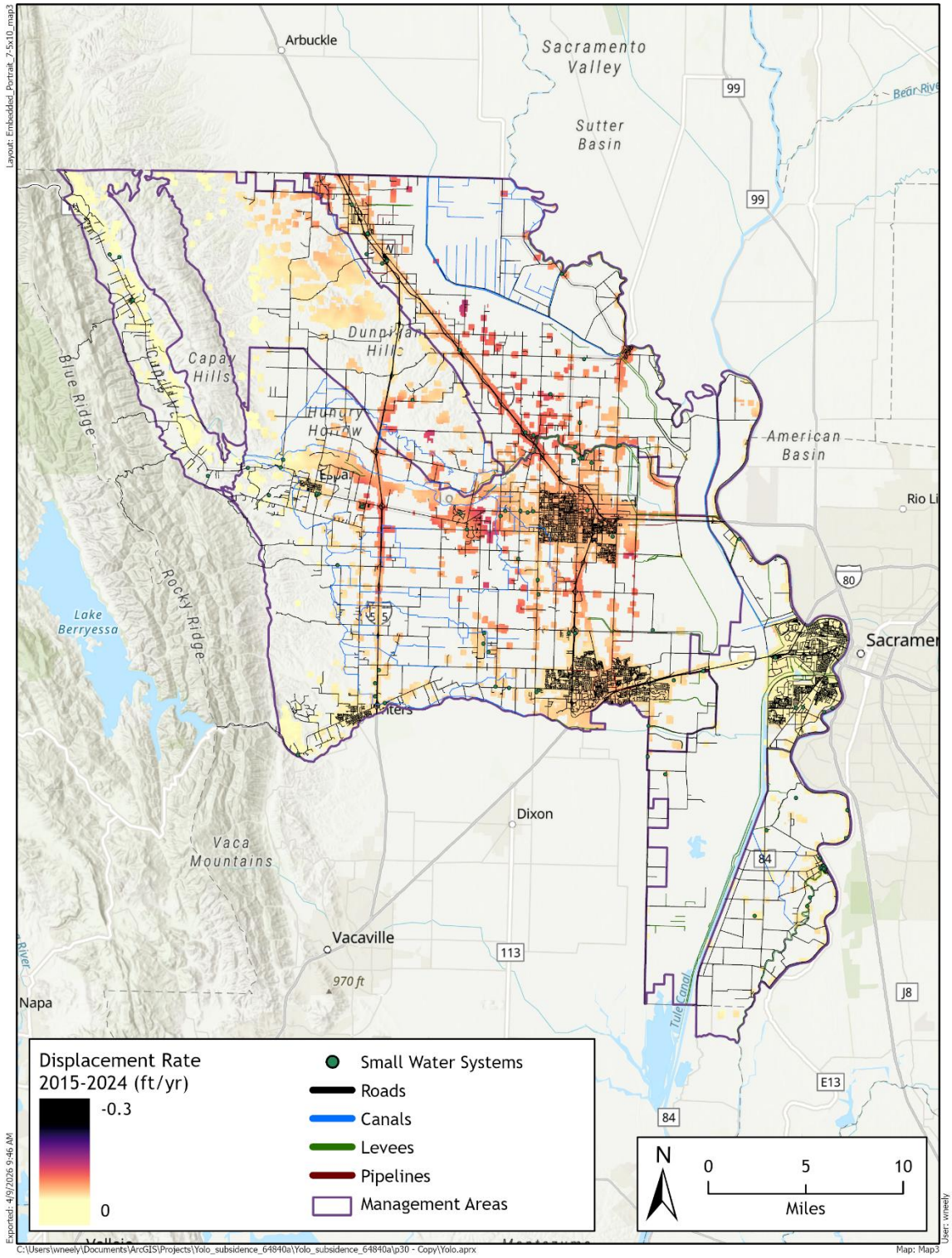
Notes:

[1]Pixels refer to available collocated InSAR data over the observational time periods.

[2]Values presented are represented as displacements. Negative values indicate subsidence. Presented values are rounded to the nearest hundredth decimal place.

TIGER = Topologically Integrated Geographic Encoding and Referencing database

Figure 21: Land Subsidence Rates Near Infrastructure October 2015 - October 2024



In general, there is minimal mean subsidence at or along critical infrastructure for the nine-year span (2015 – 2024) of Sentinel-1 InSAR. Except for RD108 canals, the mean subsidence rates are within the reported accuracy of the InSAR dataset (0.066 ft) (Towill, 2024). RD108 canals, located in North Yolo, marginally exceed that accuracy threshold with mean displacement rates of -0.08 ft/yr. The largest magnitude subsidence rates for each infrastructure class (shown in the "Min [ft/yr]" column in Table 12) range from 0.09 – 0.15 ft/yr, representing a cumulative displacement of 0.81 – 1.35 ft over a nine-year period at localized regions. Using WY 2022 as an extreme case for subsidence, mean subsidence rates range between 0.09 – 0.19 ft/yr. Subsidence rates are 2 to 4 times greater along infrastructure during this year than in the longer nine-year span.

In addition to the spatial extent of subsidence, differential subsidence can also impact infrastructure. Differential subsidence refers to the non-uniform subsidence along different sections of the infrastructure that may result in the rupture of pipelines, loss of slope for gravity-flow systems, structural stress, and cracking of rigid structures, etc. YSGA determined the gradient of the subsidence over the historical Sentinel InSAR time-series (2015 – 2024) using the "Slope" geoprocessing tool in ArcGIS Pro (Figure 22). Over this nine-year time span, the average change in slope across the Subbasin was generally less than 0.1 vertical foot per 1,000 horizontal feet (less than 0.01% change per year). While more information may be needed to assess the Subbasin-wide subsidence impacts on specific infrastructure, the rates of differential subsidence are low relative to typical tolerances for common infrastructure (0.02% – 0.2%) and near the reported accuracy of the data.

YSGA will rely on absolute and differential subsidence in conjunction with determination of critical infrastructure by YSGA and interested parties, to evaluate subsidence rates that present significant and unreasonable impacts to operation of infrastructure. In turn, undesirable results and SMC will be established based on the findings. Further details regarding subsidence data coverage and monitoring are in Section 6.1.3. Proposed clarifying language for the quantitative definition of undesirable results is in Section 3.5.7 below.

Figure 22: Differential Land Subsidence Near Infrastructure in the Subbasin

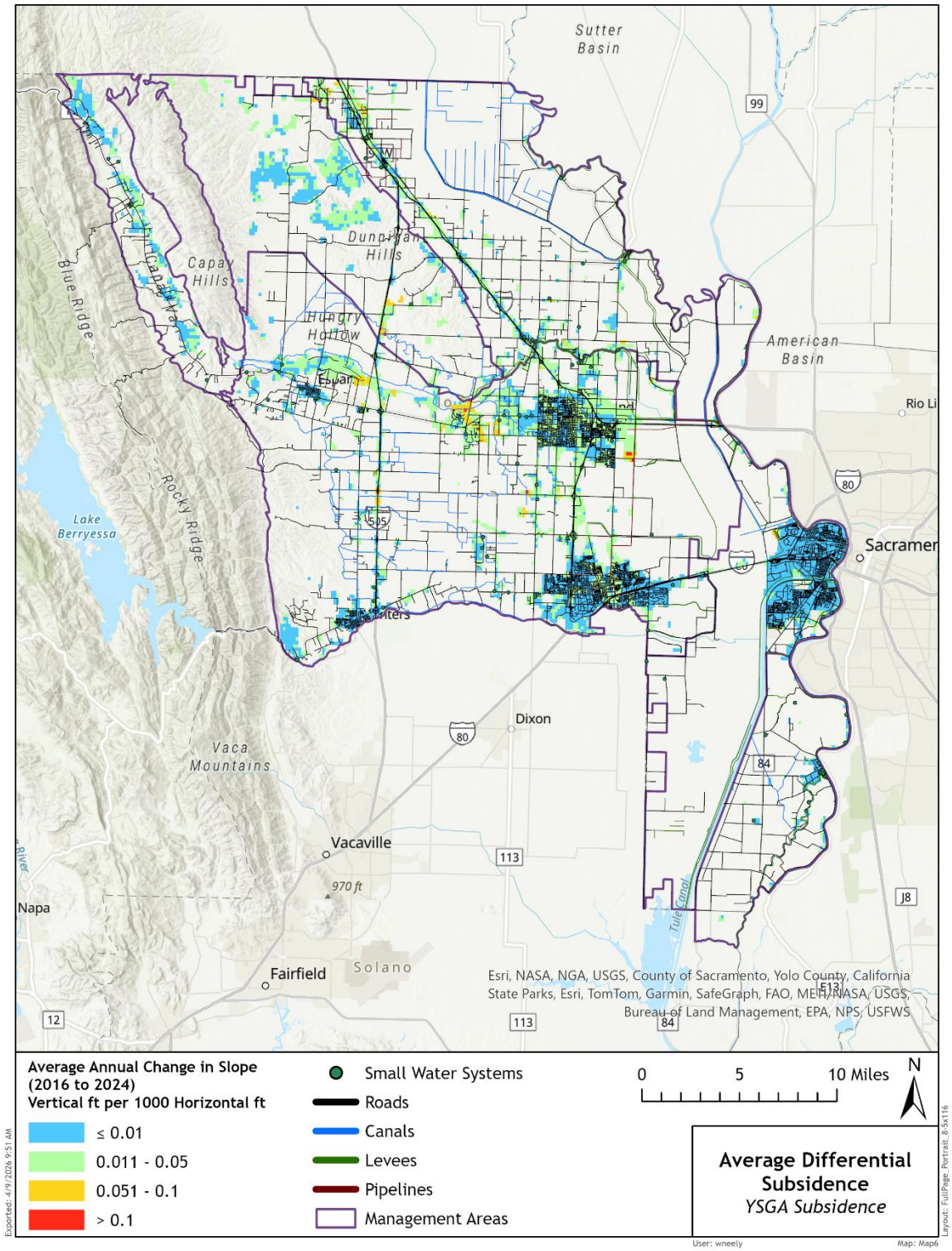


Table *13* summarizes subsidence rates and total amounts for each MA using the InSAR data spanning the nine-year period from October 2015 to October 2024. The Tehama-Colusa Canal, and a 2-mile buffer around the canal, was also evaluated to identify any significant differences in subsidence along the Tehama Colusa Canal compared to the Dunnigan Hills and North Yolo MAs as a whole. The historical subsidence rates are also used to project the subsidence totals during implementation horizon, assuming the rate is held constant.

Table 13: Historical Land Subsidence Rates and Totals

Sub-MA/MA	2015 – 2024 Rate (ft/yr)[2,3]	Rate Min (ft/yr)	Rate Max (ft/yr)	2015 – 2024 Total (ft)	Total Min (ft)	Total Max (ft)	Projected 2025 – 2040 Total (ft)[4]	Projected Total Min (ft)[4]	Projected Total Max (ft)[4]
Capay Valley	0.00	-0.02	0.02	0.00	-0.14	0.18	0.01	-0.23	0.30
Dunnigan Hills[1]	-0.02	-0.14	0.02	-0.21	-1.26	0.15	-0.36	-2.10	0.24
North Yolo[1]	-0.07	-0.15	0.00	-0.60	-1.38	-0.01	-0.99	-2.30	-0.01
Central Yolo	-0.04	-0.15	0.01	-0.33	-1.32	0.09	-0.55	-2.19	0.14
South Yolo	-0.01	-0.05	0.01	-0.08	-0.45	0.10	-0.13	-0.75	0.17
Clarksburg	-0.01	-0.03	0.00	-0.10	-0.24	0.00	-0.17	-0.41	0.00
Tehama-Colusa Canal (TCC)	-0.03	-0.16	-0.01	-0.30	-1.41	-0.08	-0.50	-2.36	-0.13

Notes:

[1]Excludes the TCC and 2-mile buffer.

[2]Values presented in table are rounded to the nearest hundredth decimal.

[3]Values are average for the Sub-MAs/MAs.

[4]Values are projections using the observed average rates scaled by 15 years.

Part of DWR's Corrective Action 3c was to establish a SMC for the Capay Valley MA. Analyses of historical subsidence observations (2015 – 2024 InSAR) in the Capay Valley MA show stable land surface elevations. Mean rates of displacement are ~0.00 ft/yr, with a range of ~-0.02 and 0.02 ft/yr. These values are within the reported accuracy of the InSAR data (~0.066 ft) for a given measurement and were used to develop the proposed SMCs presented in 3.5.7.

3.5.6.2 Critical Head Estimation in Yolo Subbasin

Inelastic (permanent) subsidence occurs after groundwater levels fall below the critical head. Information regarding the critical head allows assessment of whether the groundwater level SMC is protective of inelastic subsidence; this would be the case if the critical head elevation is above the groundwater level MT. Critical head estimates can be derived from a calibrated one-dimensional (1D) model and/or displacement and groundwater level time-series (see Appendix C, SGMA Subsidence BMP Public Draft 1D Compaction Models – Yolo Subbasin). The evaluation presented herein employs an empirical methodology that utilizes periods of land surface rebound identified through InSAR data, alongside available groundwater level records in a two step process, described as follows:

1. **Identifying Time Periods with Sufficient Rebound above Historical Subsidence Minimum.** The occurrence of rebound (i.e., surface uplift; aquifer system expansion), which demonstrates elastic (reversible) deformation, could indicate that groundwater levels rise above the critical head. To

determine the rebound time periods, YSGA first estimated the historical subsidence maximum in time to create a baseline (Figure *23*). Then, for each point in time, YSGA evaluated the displacement value relative to the historical subsidence maximum. As observed, rebound may be minimal and/or within the uncertainty of the displacement data, thus YSGA employed a threshold to prevent "falsely" identifying periods of rebound. YSGA selected a rebound threshold of 0.066 ft (20 millimeters; the reported uncertainty for the dataset) for the TRE Altamira weekly InSAR time-series. The identified periods where the rebound is above this threshold (Figure 23) suggest groundwater levels are at or above the critical head.

2. **Identifying Groundwater Level Measurements during Rebound.** Using the identified rebound periods, YSGA assessed all groundwater levels during those periods (Figure 24). YSGA linearly interpolated groundwater level measurements between observations to estimate groundwater levels during rebound. For each period of rebound, YSGA recorded the lowest groundwater level (observed or interpolated). From this subset of groundwater records, YSGA tracked the historical groundwater low. This historical groundwater low time-series (with respect to the period of rebound) can serve as a critical head proxy (Figure 24).

Figure 23: Example of Displacement, Displacement Minimum, and Uplift Analysis

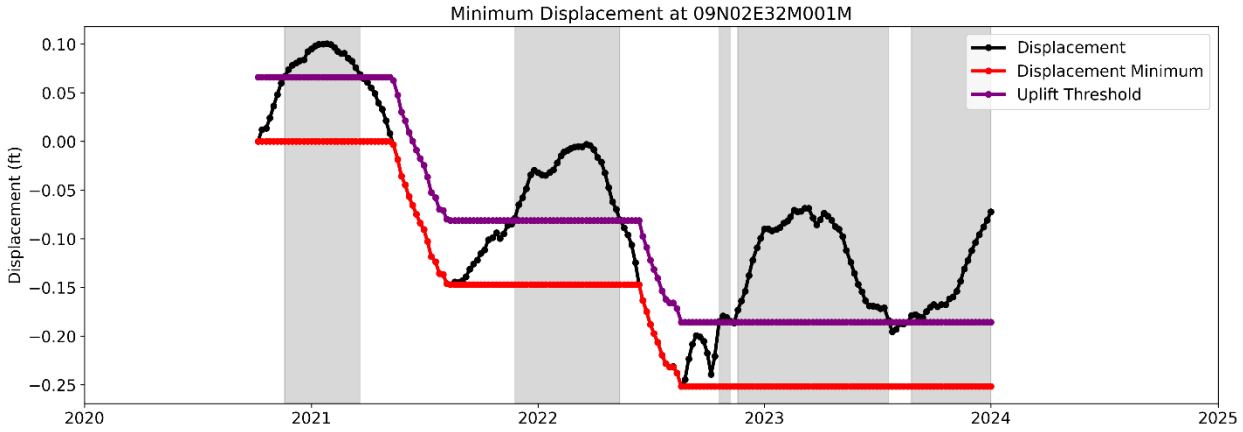
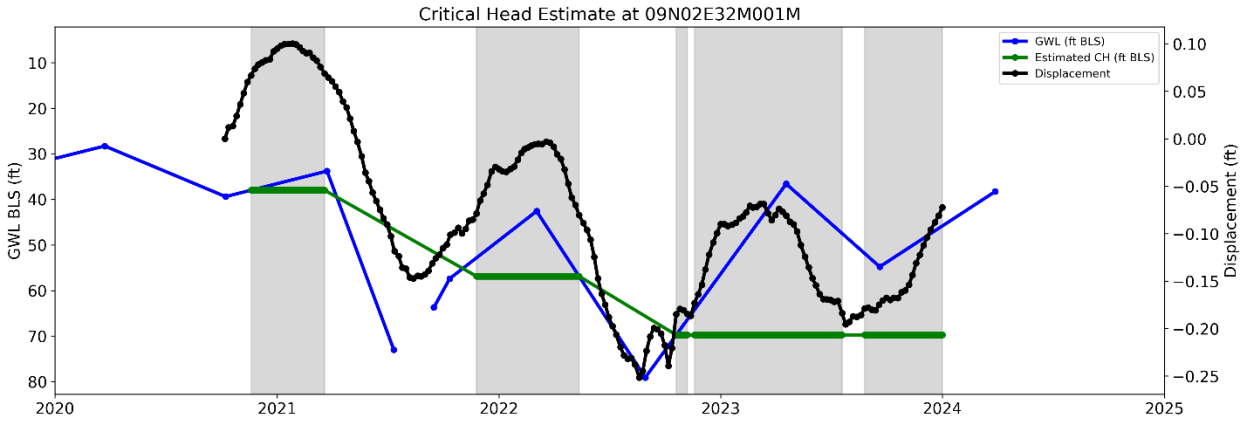
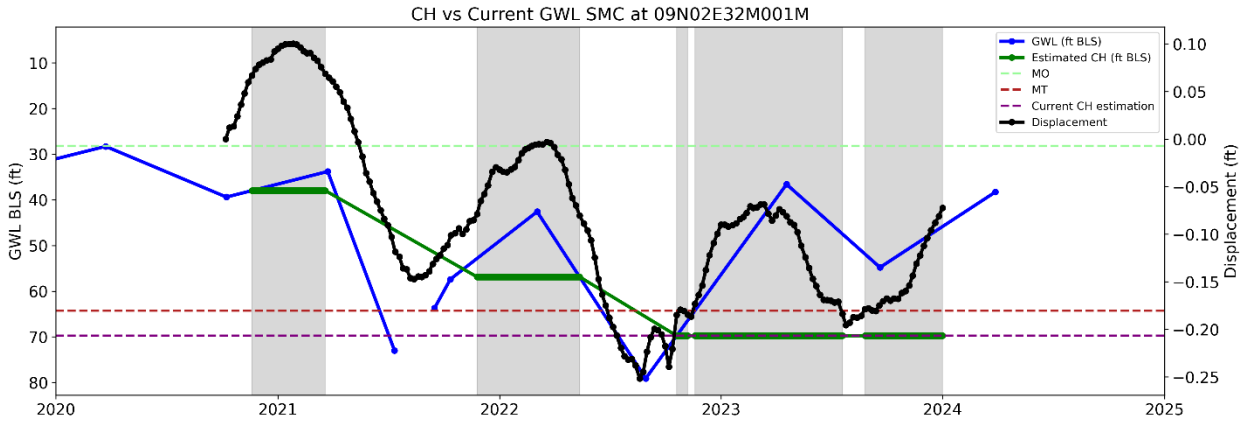


Figure 24: Example of Critical Head Estimate and Groundwater Levels



YSGA compared the estimated critical head to the groundwater level SMC (Figure 25), allowing evaluation of whether the groundwater level SMC remains protective (i.e., stays above the critical head) and, if so, to what degree. In Figure 25, this example shows that the MT/MO are above the critical head, which suggests that the groundwater level SMC is protective of inelastic subsidence.

Figure 25: Example of Critical Head Estimate and Chronic Lowering of Groundwater Level SMC



For the Subbasin, there are 62 RMWs in the monitoring network for the chronic lowering of groundwater levels SMC. Only 34 of the RMW sites classified as “intermediate” or “deep” were evaluated for critical head, because only wells with perforations intercepting the confining portions of aquifers are required to express poroelastic deformation from groundwater changes. Of the 34 sites, YSGA successfully used 22 to estimate critical head empirically. The remaining 12 sites were unusable for estimating critical head because local displacement values either did not overlap with groundwater level records or there was insufficient uplift to suggest a transition into an elastic regime of poroelastic deformation. Where the critical head was successfully estimated, those values were compared to the groundwater level MOs and MTs. Figure 25 and 27 show the locations of RMWs as circles, with blue symbols indicating wells classified as “shallow” well perforations, white symbols indicating wells classified as “intermediate” or “deep” well perforations that were unusable wells for estimating critical head, and red or green symbols indicating wells used successfully to estimate critical head.

In 27, where sites are green, the MO is above the estimated critical head. This suggests that MOs would be protective of future permanent subsidence. Conversely, sites that are red have MOs that fall below the estimated critical head. In general, most sites where a comparison was possible show MOs being higher than the estimated critical head. MOs range from as low as ~17 ft below the critical head to up to ~61 ft above the critical head. Figure 27 shows the same comparison made for MTs. Here, results suggest that more wells have MTs lower than the estimated critical head. These values range from as low as ~89 ft below the critical head to up to ~6 ft above the critical head. This may lead to potential permanent subsidence if groundwater levels approach the groundwater level MTs.

Figure 26: Critical Head Estimate Compared to Chronic Lowering of Groundwater Level MO

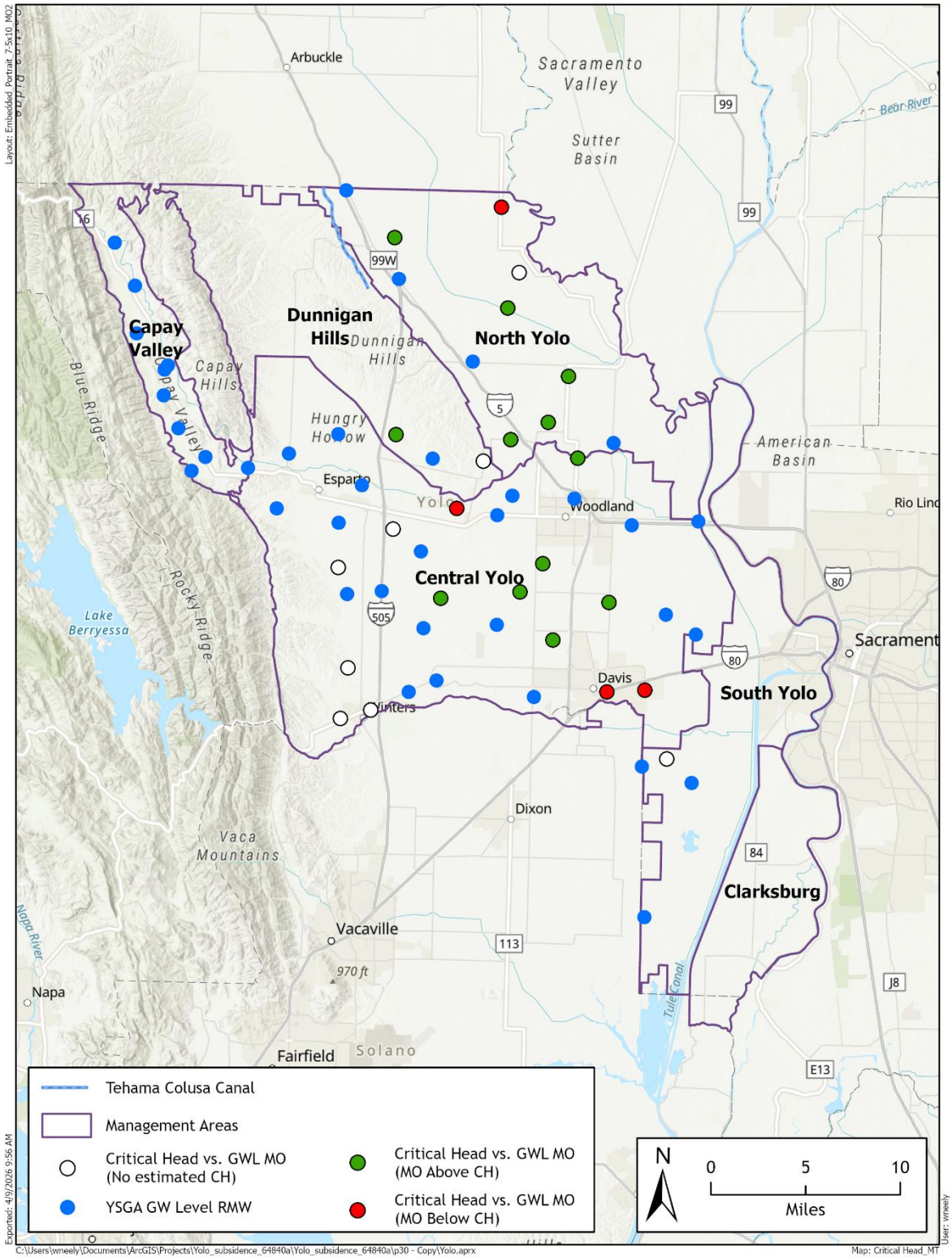
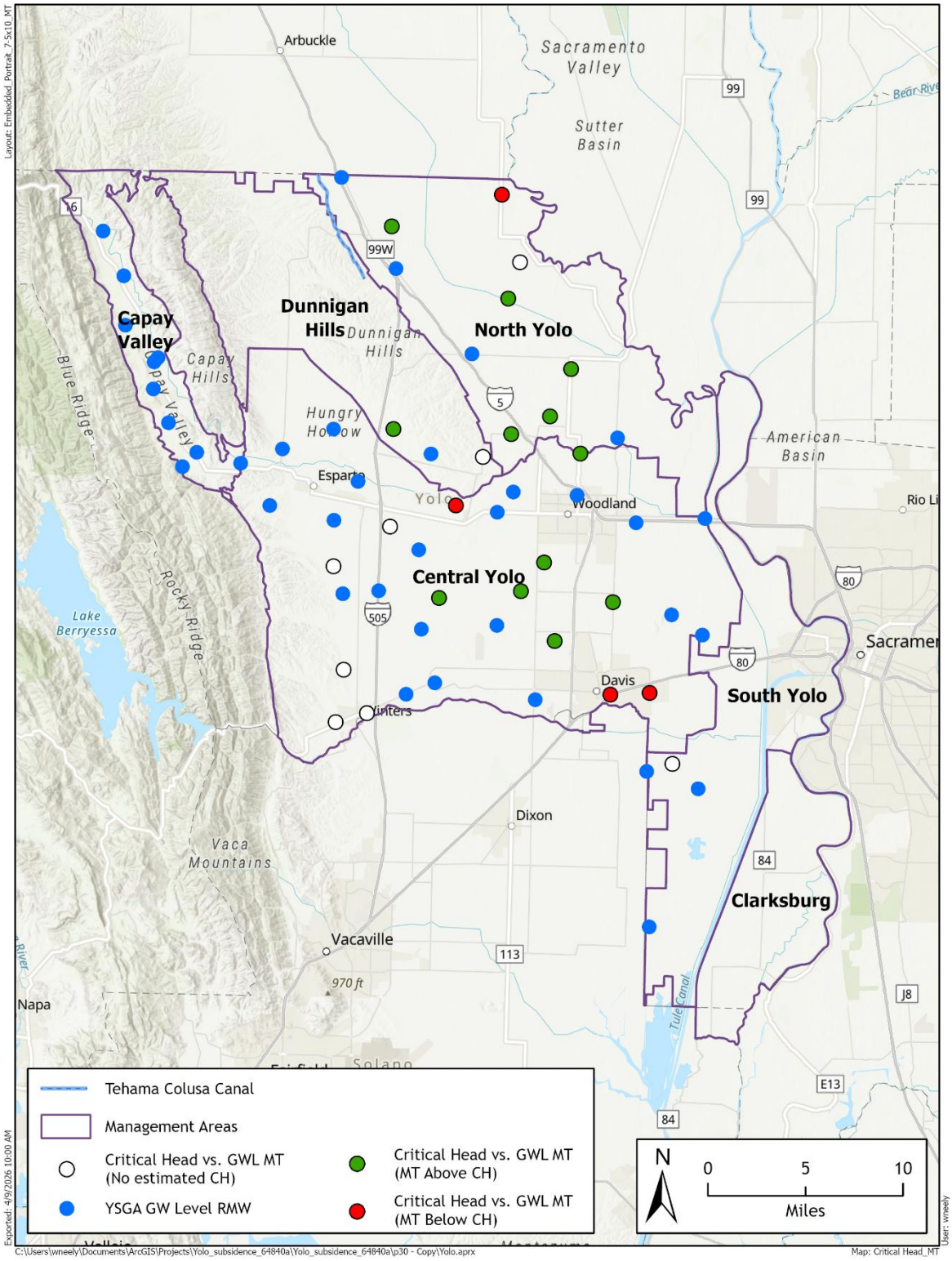


Figure 27: Critical Head Estimate Compared to Chronic Lowering of Groundwater Level MT



While these results can be a useful management tool, there are several important considerations to keep in mind. First, if inelastic deformation did not occur over the time-series and all displacement was elastic in nature, then critical head estimates would likely be elevated to the true value. Second, the frequency of groundwater level observations may impact the critical head estimate. For groundwater level time series with relatively sparse observations, interpolating or comparing with the displacement time series may introduce aliasing effects. This could lead to an inability to capture the groundwater level at the assumed transition between permanent and recoverable subsidence. Third, the depth and magnitude of compaction may contribute significantly to the critical head estimate. Here, there was an implicit assumption that only RMWs with perforation zones characterized as "intermediate" and "deep" would be suitable for this type of analysis. It's possible that shallower depths may be considered if compaction occurs over those intervals. Alternatively, the "intermediate" and "deep" perforation zones may insufficiently capture the intervals over which compaction is occurring. The analysis is further confounded by groundwater level records containing multiple perforation zones. These considerations should be weighed before determining whether to update the SMC.

3.5.7 Changes Under Consideration to Address Recommended Corrective Actions for Land Subsidence SMC

3.5.7.1 Revised Definition of Undesirable Results for Land Subsidence

As described in Section 3.5.3, DWR's Recommended Corrective Action 3 requested the following:

a) *Identify critical infrastructure susceptible to land subsidence and describe what constitutes significant and unreasonable effects.*
b) *Revise the operational definition of undesirable results to consider localized instances of subsidence and how they would be determined to be significant and unreasonable. This should include describing how minimum thresholds being exceeded in multiple management areas or a quarter of one management area does not constitute an undesirable result. Provide additional discussion and justification on the quantitative definition of undesirable results of subsidence: a) How the value of "25 percent of the management or sub-MA" mean was determined, and whether it means 25 percent of monitoring sites or 25 percent of area, and b) how to address local or regional undesirable results by requiring three (3) or more management areas or sub-MAs experiencing the minimum threshold exceedances.*
c) *Include a cumulative metric for land subsidence in the definition of the minimum threshold (such as 0.5 foot of land subsidence within a five-year period, or the maximum cumulative subsidence amount a specific structure can withstand) to ensure small amounts of annual land subsidence are not wrongly classified as measurement error within the InSAR dataset, or, theoretically, to prevent unlimited or large amounts of subsidence from occurring as a result of the cumulative impact of many successive years of incremental subsidence. The GSA should elaborate on how the proposed management will avoid or minimize the land subsidence that has been occurring in the Subbasin. In addition, the GSA should establish a minimum threshold for the Capay Valley Management Area.*
d) *Revise the measurable objective and interim milestones for land subsidence to a value that achieves the sustainability goal for the basin within 20 years of Plan implementation and reflects sustainable management of the groundwater basin while also meeting the intent of SGMA (i.e., minimizing or avoiding land subsidence).*

With regard to DWR Corrective Action 3a, DWR requested that YSGA identify critical infrastructure susceptible to land subsidence and provide details on what constitutes significant and unreasonable effects. In response, YSGA proposes introducing the following text at the start of GSP Section 3.6.

> *Significant and unreasonable effects occur when land subsidence materially impacts the function of Subbasin critical infrastructure..*

This definition provides a qualitative basis for establishing undesirable results and reflects the YSGA's intent to prevent Subbasin-wide impacts.

Over the next Periodic Evaluation period, YSGA members and interested parties will work together to identify critical infrastructure, consider redefining undesirable results based on identified critical infrastructure, and identify impacts that may lead to infrastructure becoming materially impacted. This evaluation may refer to the subsidence analysis presented in Section 3.5.6 that suggests minimal absolute and differential subsidence at or along Subbasin infrastructure. While subsidence rates from InSAR observations are, on average, low and near the reported accuracy of the data, cumulative effects may result in localized impacts. Further information regarding local conditions, infrastructure dependencies, stakeholder input, and public health and safety concerns may be needed to develop infrastructure-specific subsidence tolerances (e.g., reasonable absolute and differential subsidence) and mitigation measures if exceeded.

With regard to DWR Corrective Action 3b, The current GSP defines an undesirable result as:

> *The point at which the rate and total amount of subsidence in the Subbasin causes significant and unreasonable impacts to surface land uses or critical infrastructure.*
>
> *An undesirable result occurs when the minimum threshold value is exceeded over 25 percent of the management area or sub-management area in three (3) or more management or sub-management area in the same reporting year.*

DWR's determination letter requested further detail regarding "25 percent of the management or sub-MA," along with details about how YSGA would address local or regional undesirable results by requiring three (3) or more MAs or sub-MAs experiencing MT exceedance. The subbasin-wide definition remains appropriate, but YSGA proposes supplementing with clarifying language. The following language is proposed:

> *An undesirable result occurs when the minimum threshold value exceeds more than 25 percent of available displacement data coverage (i.e., InSAR data provided by DWR) for the management area or sub-management area in three (3) or more management or sub-management areas in the same reporting year.*
>
> *Exceedances in three (3) or more management or sub-management areas in the same reporting year represent Subbasin-wide impacts. As historical subsidence rates are near or less than the reported accuracy of the InSAR, the use of multiple management or sub-management areas will help corroborate the accuracy of observed subsidence across the Subbasin and subsequent determination of the occurrence of an undesirable result. Subsidence in management areas and sub-management areas with SMC set to zero subsidence will be assessed over a 2-year period to determine whether subsidence*

is elastic or inelastic and/or exceeds measurement accuracy. Although MT exceedances in only one or two management or sub-management areas do not constitute an undesirable result, YSGA will conduct additional monitoring and assessment of the total magnitude and spatial extent of subsidence to identify potential impacts to critical infrastructure within these management and sub-management areas. Localized exceedances occurring within a single management area do not constitute an undesirable result unless the associated critical infrastructure impacts are determined to be significant and unreasonable. YSGA remains committed to identifying and managing localized impacts to critical infrastructure proactively. While isolated or short-term exceedances do not automatically trigger a Subbasin-wide undesirable result, they may warrant adaptive management actions to protect beneficial uses and users and prevent the potential for widespread impacts over time.

Proposed modifications to the language defining undesirable results are driven primarily by the availability of high-quality data to evaluate subsidence in the Subbasin, including the need for exceedances across multiple MA or sub-MAs. Due to the sparsity of InSAR data, the 25% criterion represents a relatively small fraction of the total MA and sub-MA (<10%), leading to potentially localized subsidence that could initiate exceedance. Furthermore, identification of critical infrastructure by YSGA and interested parties may lead to modifications of the undesirable result, should displacement data inaccurately cover the infrastructure in question. YSGA will continue to evaluate subsidence SMCs throughout GSP implementation.

With regard to DWR Corrective Action 3c, DWR requests that YSGA include details of the total amounts in the definition per *§ 354.28(b)(1)* and establishment SMC for the Capay Valley MA. To address this concern, YSGA proposes an update to the previous land subsidence SMC table to the following (Table 14):

Table 14: Revised Land Subsidence SMCs per MA

Management Areas	MT Rate (ft/yr)[1]	MT Total (ft)[2]	MO Rate (ft/yr)	MO Total (ft)[3]	IM 2027 (ft)[4]	IM 2032 (ft)	IM 2037 (ft)
Capay Valley	0.00*	0.00*	0.00	0.00	0.00	0.00	0.00
Dunnigan Hills	-0.10	-2.00	-0.05	-1.00	-0.35	-0.60	-0.80
North Yolo	-0.10	-2.00	-0.05	-1.00	-0.35	-0.60	-0.80
Central Yolo[5]	-0.10	-2.00	-0.05	-1.00	-0.35	-0.60	-0.80
South Yolo	0.00*	0.00*	0.00	0.00	0.00	0.00	0.00
Clarksburg	0.00*	0.00*	0.00	0.00	0.00	0.00	0.00

Notes:

[1] Displacement values are rounded to the nearest hundredth. Negative values indicate subsidence.

[2] MT total is defined as the cumulative amount of vertical subsidence (in feet) that would occur from 2022 – 2042 at the MT rate.

[3] MO total is 50% of the MT.

[4] IM totals are 35%, 60% and 80% of the MO totals for 2027, 2032 and 2037, respectively.

[5] West and Central Yolo Sub-MAs no longer apply.

**Subsidence in MAs with MT rates and totals set to zero will be assessed over a 2-year period during and after droughts to determine if subsidence is elastic or inelastic and/or if it is greater than the measurement accuracy (0.066 ft/yr) prior to classification of exceedance.*

Table 14 establishes defined subsidence goals over the GSP implementation horizon to proactively manage land subsidence to avoid negative impacts to critical infrastructure within the subbasin. MT rates

are generally consistent with rates in the GSP but converted to ft/yr. MT total represents the total cumulative subsidence allowed through 2042 using the MT rate. MO rates are set to 50 percent of the MT rate, with the MO total representing the cumulative subsidence through 2042 using the MO rate. The IM value represents the cumulative subsidence through 2032 and 2037 using the MO rate. YSGA will consider adjustments to SMC values based on additional analysis of critical infrastructure tolerances, impacts to beneficial uses and users, and input from YSGA member agencies and stakeholders during GSP implementation.

As presented in Section 3.5.1, analysis of historical subsidence (2015 – 2024 InSAR observations) in the Capay Valley MA indicates relatively stable land surface elevations. As such, YSGA proposes to establish the subsidence SMC for the Capay Valley, South Yolo, and Clarksburg MAs as 0 ft/yr and 0 ft cumulatively. The sub-MAs of Western Central Yolo and Eastern Central Yolo are combined into the Central Yolo MA, consistent with MAs for other sustainability indicators.

With regard to DWR Corrective Action 3d, DWR requested that YSGA revise the land subsidence MOs and IMs so that the basin achieves sustainability during Plan implementation. To address this request, YSGA proposes the following:

- Introduce the empirical critical head analysis, described in Section 3.5.6, to demonstrate that the MOs for the chronic lowering of groundwater levels are generally protective of future permanent land subsidence.
- Update the land subsidence SMC, as described in Section 3.5.7. This includes the MO and IM rates and totals to provide quantitative limits on subsidence in the Subbasin over the Plan implementation.
- Introduce the one-dimensional (1D) modeling analysis, provided in Appendix C, to estimate the critical head of the aquifer systems in the Subbasin and better understand forecast subsidence rates at various groundwater level scenarios.

These proposed actions, along with other proposed responses to recommended corrective actions, sufficiently address recommended corrective action 3d, align with GSP regulations, and support long-term evaluation of land subsidence conditions across the Subbasin.

3.6 Depletion of Interconnected Surface Water

3.6.1 WY 2019 – WY 2024 Interconnected Surface Water Conditions

YSGA monitors eight wells along Cache Creek, six wells along the Sacramento River, and three wells along Putah Creek to monitor groundwater-surface water interaction and potential depletions of interconnected surface water using shallow groundwater wells and their groundwater elevations (Figure *28*). The Cache Creek and Sacramento River are split into “Upper” and “Lower” reaches and Putah Creek is one reach to monitor for depletions of interconnected surface water in “ISW Management Zones”. An assessment of current conditions related to depletion of interconnected surface water MTs and MOs/IMs in each ISW Management Zone was completed and the results are shown in Table *15*. For this evaluation cycle, most of the wells located along the Lower Cache Creek (which spans from east of Capay Dam to the Yolo Bypass east of Woodland) did see varying degrees of depletion of interconnected surface water between Spring 2020 and Spring 2024. Four of the five wells that experienced depletions of interconnected surface water during the WY 2020 – WY 2022 drought recovered above their respective

MTs by Spring 2024. In all other ISW Management Zones, no depletion of interconnected surface water occurred. Across the evaluation period for both the MT and MO/IM, even during the WY 2020 – WY 2022 drought, no undesirable results related to depletion of interconnected surface water occurred.

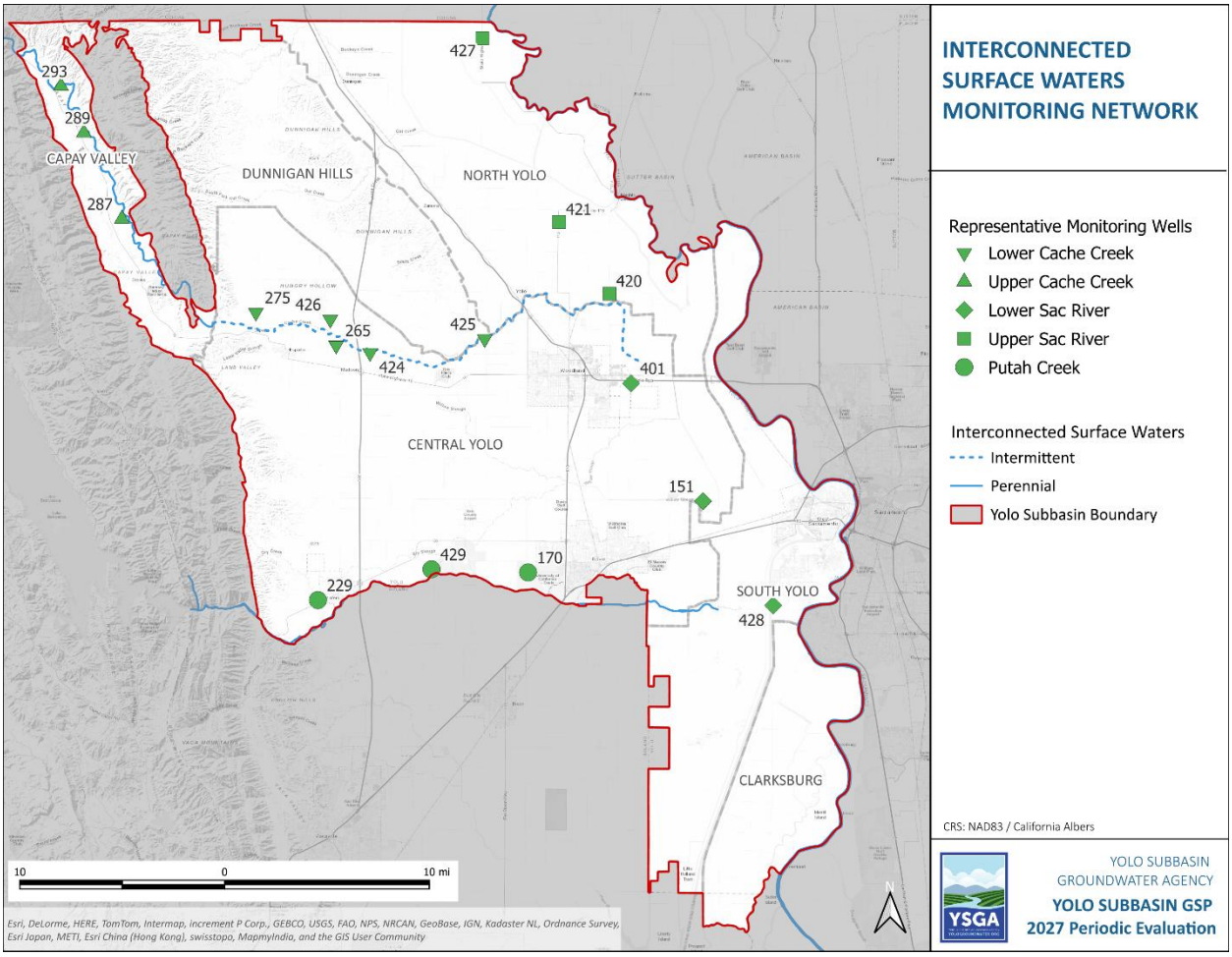


Figure 28. Interconnected Surface Waters Monitoring Network

Table 15. Minimum Threshold Evaluation for Interconnected Surface Water Between WY 2019 – WY 2024

ISW Management Zone	State Well Number	RMW Number	MO[1] (ft-amsl)	MT (ft-amsl)	2019 (ft-amsl)	2020 (ft-amsl)	2021 (ft-amsl)	2022 (ft-amsl)	2023 (ft-amsl)	2024 (ft-amsl)	Years Below MT Value	5 yr Spring Average[2] (ft-amsl)	Variance from Measurable Objective (ft-amsl)
Upper Cache Creek	11N03W23L001M	287	298.7	287.6	301.0↑	298.7↑	***	298.6	301.6↑	301.9↑	0	300.2	1.5
Upper Cache Creek	11N03W33F001M	289	354.3	341.2	356.2↑	352.0	351.2	351.4	356.4↑	358.3↑	0	353.9	-0.4
Upper Cache Creek	12N03W20D001M	293	385.2	376.4	387.1↑	383.6	382.4	383.6	386.8↑	387.3↑	0	384.7	-0.5
Lower Cache Creek	10N01W21J001M	265	132.7	131.6	137.0↑	131.2↓	129.3↓	-36.9↓	126.9↓	133.8↑	4	96.9	-35.9
Lower Cache Creek	10N02W14A001M	275	145.4	143.2	148.7↑	138.8↓	134.1↓	-82.2↓	128.6↓	141.8↓	5	92.3	-53.2
Lower Cache Creek	10N01W23P001M	424	115.8	116.7	118.4↑	112.2↓	115.7↓	-31.2↓	116.8↑	118.0↑	3	86.3	-29.5
Lower Cache Creek	10N01E22H500M	425	61.2	55.1	65.5↑	57.3	50.1↓	-43.2↓	58.8	65.5↑	2	37.7	-23.4
Lower Cache Creek	10N01W16G500M	426	138.0	132.6	139.5↑	133.0	130.2↓	-45.4↓	127.1↓	133.5	3	95.7	-42.3
Upper Sac River	10N02E03R002M	420	23.9	-39.2	31.8↑	22.3	15.7	4.4	22.0	28.1↑	0	18.5	-5.4
Upper Sac River	12N01E03R003M	427	29.3	-35.4	28.7	23.4	20.6	18.6	24.3	28.1	0	23.0	-6.3
Upper Sac River	11N02E20K004M	421	33.5	-31.6	33.4	32.9	29.1	24.4	28.9	51.3↑	0	33.3	-0.2
Lower Sac River	09N03E33B002M	151	15.7	-35.3	19.0↑	15.0	12.9	11.4	14.1	12.9	0	13.2	-2.5
Lower Sac River	10N02E36E001M	401	26.8	9.0	28.7↑	25.8	23.6	22.0	24.4	24.7	0	24.1	-2.8
Lower Sac River	08N04E19N001M	428	8.7	-1.3	11.2↑	7.5	6.9	7.1	10.0↑	10.6↑	0	8.4	-0.3
Putah Creek	08N02E18M002M	170	29.7	1.5	30.1↑	***	22.5	14.1	15.4	17.8	0	17.5	-12.2
Putah Creek	08N01W20R005M	229	91.6	36.4	75.4	72.0	59.6	47.2	48.0	56.0	0	56.6	-35.0
Putah Creek	08N01E17F001M	429	76.0	56.1	78.5↑	***	64.4	***	62.6	66.9	0	64.6	-11.3

1 - Interim milestones for Interconnected Surface Waters are set equal to the measurable objectives.
2- Performance of the measurable objective is measured as the five-year running average of the maximum spring (March - May) groundwater elevation.
Green text with an arrow pointing upwards indicates the measurement is above the measurable objective level at the RMW.
Red text with an arrow pointing downwards indicates the measurement is below the minimum threshold level at the RMW.
Asterisks (***) indicate no measurement.

3.6.2 WY 2019 – WY 2024 Impacts to Beneficial Uses and Users

Drought conditions during WYs 2020 – 2022 led to declines in groundwater levels throughout the Yolo Subbasin, with some locations falling below their historic lows. This caused shallow groundwater RMWs along the Lower Cache Creek ISW Management Zone to temporarily drop below their respective MT values. Despite the drought conditions and temporary occurrence of depletion of interconnected surface water most prominent between WY 2020 – WY 2022, YSGA didn't receive reports from landowners or other YSGA member agencies of adverse impacts to beneficial uses along Lower Cache Creek.

3.6.3 2022 GSP Definition of Undesirable Results

The GSP currently defines undesirable results for interconnected surface water (ISW) over the entire Subbasin as the following:

> *The point at which significant and unreasonable impacts to the surface waters affect the reasonable and beneficial use of those surface waters by overlying users, including associated ecosystems.*
>
> *An undesirable result occurs when the Minimum Threshold is exceeded in over 50 percent of the interconnected surface water representative monitoring wells in two (2) or more interconnected surface water management areas in the same reporting year.*

ISW Management Zones were defined for specific stream reaches within the Subbasin, including:

- Upper Cache Creek – cache Creek upstream of Capay Dam (coincident with the Capay Valley MA)
- Lower Cache Creek – Cache Creek downstream of Capay Dam to the Cache Creek Settling Basin, including RMWs up to 1 mile away from Cache Creek.
- Upper Sacramento River Reach – Sacramento River from the northern Subbasin boundary to the southern boundary of the North Yolo MA, including RMWs up to 5 miles away from the river. Also includes the Colusa Basin Drain.
- Lower Sacramento River Reach – Sacramento River from the southern boundary of the North Yolo MA to the southern Subbasin boundary, including RMWs up to 5 miles away from the river.
- Putah Creek – Putah Creek from the western Subbasin boundary to its drainage in the Yolo Bypass Wildlife Area, including wells up to 2 miles away from the creek. Note: YSGA Coordinates with Solano GSA that monitors the south side of Putah Creek.

Within the Subbasin, an ISW management zone will be considered an "*undesirable result watch area"* when 50 percent or more of the RMWs in that management zone exceed their MT value, identified in Table 3-4 of the GSP. If multiple undesirable result watch areas meet the criteria for depletion of ISW undesirable result, as defined previously, the Subbasin will be experiencing an undesirable result relative to the depletion of ISW.

3.6.4 DWR Recommended Corrective Actions for Depletions of Interconnected Surface Water

DWR's GSP Determination Letter acknowledged that ISW and stream depletion due to groundwater withdrawal is complex, and that tools and guidance are under development by the DWR to support GSAs

and groundwater basins in effectively managing for this sustainability indicator. DWR has released three papers on aspects of ISW but has yet to release the guidance document for managing ISW depletion. YSGA will continue to utilize these references and resources as the Subbasin's approach to managing ISW is further developed and refined. However, DWR requested the following recommended corrective actions, under Recommended Corrective Action 4, for ISW:

a) *Provide additional discussion and amend the definition of undesirable results. Specifically, the GSA should explain how local exceedances within just one management area are not considered an undesirable result.*
b) *Identify specific beneficial users and uses of ISW for each reach and describe specifically what constitutes significant and unreasonable effects on depletion of interconnected surface water, and use this information to potentially revise the sustainable management criteria.*
c) *Consider utilizing the ISW guidance, as appropriate, when issued by the Department to establish quantifiable minimum thresholds, measurable objectives, and management actions.*
d) *Continue to fill data gaps, collect additional monitoring data, and implement the current strategy to manage depletions of ISW and define segments of interconnectivity and timing.*
e) *Prioritize collaborating and coordinating with local, state, and federal agencies as well as interested parties to better understand the full suite of beneficial uses and users that may be impacted by pumping induced surface water depletion within the GSA's jurisdictional area.*

While the GSP quantifies the rate and volume of depletions due to groundwater pumping using the groundwater model developed for the Subbasin, the model and subsequent results are unused in the SMCs for ISW. As described in Section 3.8 of the GSP, the model contains uncertainties that render the model inappropriate to use for setting SMCs for ISW . For this reason, near-stream groundwater levels are used as a proxy for depletions of ISW. However, this methodology provides neither the rate or volume of surface water depletions nor location and timing of depletions, making it difficult to understand impacts to beneficial users and uses.

DWR's guidance documents for estimating surface water depletion identify numerical and analytical methodologies for determining surface water depletion estimates, including the use of numerical models. YSGA is working to develop modeling capabilities further to improve understanding of ISW depletion and address DWR's recommended corrective actions (Section 5.4). Over the next five years, YSGA will continue to develop modeling capabilities, enhance the existing monitoring network, and further quantify and understand surface water depletion because of groundwater pumping. YSGA will continue to review DWR's guidance on evaluating and managing ISW as it is released and will incorporate findings and best practices into the approach.

YSGA conducted preliminary analysis to address DWR's recommended corrective actions, support modeling efforts and model development, and further understand impacts of groundwater management on ISW. Results of these initial efforts are presented in this section to illustrate what has been completed, and what analyses are ongoing, and to describe how the findings will inform future investigations and GSP implementation.

3.6.5 Approach to Address Recommended Corrective Actions for Depletions of Interconnected Surface Water

Since the adoption of the GSP in 2022, YSGA has undertaken several efforts to improve its understanding of ISW in the Subbasin. This includes further investigation into beneficial users and uses of surface water within the basin, imagery analysis, and updates to the model to quantify depletions due to groundwater pumping. Results of this work, and its role in helping address the recommended corrective actions and further defining SMCs, are described in Section 3.6.6.

It's the YSGA's understanding that DWR provided the same recommended corrective action language to all GSAs and that their guidance is anticipated to come out in the future. In anticipation of DWR's guidance document on ISW's, the YSGA is working towards the following:

- To address the first recommended corrective action (a), YSGA's future modeling improvement efforts between 2026 and 2032 will inform an updated definition of undesirable results based on new SMCs and an understanding of current and historical surface water conditions (i.e., connection to groundwater). It's anticipated model runs will be compared against groundwater conditions near surface water bodies where data is available between 1971 – 2014 that represent pre-SGMA conditions. Based on this data and other additional data that may be pertinent to improving the model to reliably model depletion of ISWs, YSGA will evaluate post-SGMA and future pumping scenarios and potential depletion of ISWs. Then undesirable results will be determined based on the modeling results where appropriate.
- To address the second recommended corrective action (b), YSGA completed a survey (during the preparation of this Periodic Evaluation) of beneficial uses and users for each ISW management zone, corresponding to a surface water stream reach. Identification of users and uses was conducted by evaluating existing reports and management plans from surface water managers in the Subbasin (i.e., the Yolo Basin Foundation and the Putah Creek Council) and other data sources to quantify their surface water use and the timing of that use.
- The third (c) and fourth (d) recommended corrective actions will be addressed as YSGA continues to develop an updated approach to evaluating ISW and impacts from groundwater management. The updated approach will incorporate DWR's guidance on ISW management as it is finalized and released, along with input from interested parties and local, state, and federal agencies. Data gaps identified throughout this process will be addressed, as appropriate, through additional data collection and monitoring.

3.6.6 Analysis to Address Recommended Corrective Actions for Depletions of Interconnected Surface Water

YSGA conducted a focused literature review to further define beneficial users and uses of ISW, and the impacts of depletion of ISW as a result of groundwater management. The literature review focused on water resource management plans and information provided in reports and on websites from surface water users and managers. Findings are summarized based on ISW reaches, as defined in the GSP, and discuss beneficial users of surface water, water use, timing of surface water supply, and potential impacts. Table *16* summarizes these findings.

Table 16: Evaluation of Beneficial Users and Uses by ISW Reach

ISW Reach	Beneficial User	Beneficial Uses	Timing	Potential Impacts
Upper Cache Creek (Capay Valley – Capay Dam)	Agriculture (private landowners/growers)	Irrigation (i.e. agriculture)	Seasonal. Managed by YCFCWCD releases at Cache Creek Dam for irrigation and flood control	Lowering of groundwater levels & reduction in groundwater in storage
	Tribal (Yocha Dehe Wintun Nation)	Domestic (private) Municipal (public) Recreational (golf course) Fish & Wildlife Preservation and Enhancement (tribal ecological resources)	Seasonal. Managed by YCFCWCD releases at Cache Creek Dam for irrigation and flood control	Increased groundwater use Loss of habitat
	Rumsey Water Users Association	Irrigation (i.e. agriculture) Domestic (private)	Seasonal. Managed by YCFCWCD releases at Cache Creek Dam for irrigation and flood control	Increased groundwater use
	Private Well Owners	Irrigation (i.e. agriculture) Domestic (private)	Seasonal. Managed by YCFCWCD releases at Cache Creek Dam for irrigation and flood control	Lowering of groundwater levels & reduction in groundwater in storage

	Recreational Users	Recreational Fishing Whitewater Rafting	Seasonal. Managed by YCFCWCD releases at Cache Creek Dam for irrigation and flood control	Reduction in available fishing and/or rafting
	Environmental Users	Riparian Habitat	Seasonal. Managed by YCFCWCD releases at Cache Creek Dam for irrigation and flood control	Loss of habitat
Lower Cache Creek (Capay Dam – Cache Creek Settling Basin)	Environmental Users	Fish & Wildlife Preservation and Enhancement	Seasonal. Managed by YCFCWCD releases at Cache Creek Dam for irrigation and flood control	Loss of habitat
	YCFC&WCD	Agriculture Municipal (public) Fish & Wildlife Preservation and Enhancement	Seasonal. Managed by YCFCWCD releases at Cache Creek Dam for irrigation and flood control	Reduction in surface water supply Lowering of groundwater levels & reduction in groundwater in storage Loss of habitat

	Private Well Owners	Irrigation (i.e. agriculture) Domestic (private)	Seasonal. Managed by YCFCWCD releases at Cache Creek Dam for irrigation and flood control	Lowering of groundwater levels & reduction in groundwater in storage
Putah Creek (Western Subbasin Boundary – Yolo Bypass)	Agricultural Users	Agriculture	Intermittent, flow maintained by Putah Diversion Dam	Reduction in surface water supply and increase in groundwater use
	Recreational Users	Recreational fishing	Seasonal, some sections run dry	Dry river runs reduce available fishing
	Aquatic Habitat	Rainbow Trout Habitat Salmon Run	Seasonal	Loss of habitat
	Putah Creek Riparian Reserves	Riparian habitat and wildlife management	Seasonal	Loss of habitat
	Yolo Bypass Wildlife Area	Seasonal Wetland habitat Flood control Agriculture Recreation	Seasonal, some areas run dry	Loss of habitat
	Solano County Water Agency	Irrigation Domestic Supply	Seasonal Annual	Increased groundwater use

	Private Well Owners	Domestic supply Agriculture	Annual Seasonal	Lowering of groundwater levels & reduction in groundwater in storage
Upper Sacramento River (Northern Subbasin Boundary to Southern Boundary of North Yolo MA)	Woodland-Davis Clean Water Agency	Municipal supply	Long-term (greater than 1 year)	Reduction in surface water supply and increase in groundwater use
	Reclamation Districts	Irrigation	Seasonal	Reduction in surface water supply and increase in groundwater use
	Private Well Owners	Domestic supply Agriculture	Annual Seasonal	Lowering of groundwater levels & reduction in groundwater in storage
	Yolo Bypass Wildlife Area	Seasonal wetland habitat Flood control Agriculture	Seasonal	Loss of habitat

		Recreation		
Lower Sacramento River (Southern boundary of the North Yolo MA to the Southern Subbasin Boundary)	City of West Sacramento	Municipal Supply	Long-term (greater than 1 year)	Reduction in surface water supply and increase in groundwater use
	Reclamation Districts	Irrigation	Seasonal	Reduction in surface water supply and increase in groundwater use
	Private Wells	Domestic Supply Agriculture	Annual	Lowering of groundwater levels & reduction in groundwater in storage
	Yolo Bypass Wildlife Area	Seasonal wetland habitat Flood control Agriculture Recreation	Annual	Loss of habitat
	Woodland-Davis Clean Water Agency	Municipal Supply	Long-term (greater than 1 year)	Reduction in surface water supply and increase in groundwater use

As part of this Periodic Evaluation, YSGA assessed ISW along Cache Creek. The purpose of this assessment was to evaluate the current ISW monitoring network's ability to monitor ISW and groundwater management impacts accurately. The assessment was conducted in two phases. The first phase recreated the ISW stream classifications described in Section 2.2.6 of the GSP using the current ISW RMS network and nearby shallow monitoring wells. The second phase was to compare groundwater levels and stream classifications with imagery analysis to identify any areas of Cache Creek that may go dry. Both phases were performed for the spring and fall of 2019 through 2021. This period was selected based on the water years assessed as part of annual reporting and GSP implementation in the Subbasin and on the availability of a complete groundwater level dataset.

Stream classifications developed for the first phase of this analysis followed the approach used in the GSP, which was modified from the Nature Conservancy (TNC) ICONS: Interconnected Surface Water in the Central Valley dataset (TNC, 2021). This approach compares groundwater levels from nearby shallow groundwater monitoring wells with the streambed elevation. The hydraulic connection between groundwater and surface water is estimated from the difference between streambed elevation and groundwater elevation, using the modified ICON categorization metrics described in Table *17* below and Table 2-17 in the GSP.

Table 17: Classification of Interconnected Surface Waters

Reach Classification	Perennial Streams	Intermittent/Ephemeral Streams
Connected – Gaining	Groundwater elevation at or above the streambed surface	Groundwater elevation at or above the streambed surface
Connected – Losing	Groundwater elevation 0 – 20 ft below streambed surface	Groundwater elevation 0 – 5 ft below streambed surface
Uncertain	Groundwater elevation 20 – 50 ft below streambed surface	Groundwater elevation 5 – 20 ft below streambed surface
Disconnected	Groundwater elevation >50 ft below streambed surface	Groundwater elevation >20 ft below streambed surface

As Cache Creek is an intermittent stream, the “Intermittent/Ephemeral Streams” categorization metrics were used. The streambed surface was estimated from a 1-meter DEM for the Cache Creek thalweg, generated in 2019. Because the DEM provides an estimate of the stream surface rather than the actual thalweg of the streambed, the thalweg elevation was determined by subtracting 5-feet from the DEM elevations.

Groundwater surface elevation was generated for both spring and fall from 2019 through 2021, using data from the ISW RMS wells and, when available, shallow near-stream aggregate mining wells. The groundwater elevation surface was then plotted against the Cache Creek thalweg elevation to classify areas of the creek. Classifications would later be used to compare against groundwater-dependent ecosystems (GDEs) and dry areas of Cache Creek in both spring and fall as part of the second phase of analysis. Figure 29 through Figure 40 show the dataset used and subsequent stream classifications for spring and fall of 2019 through 2021.

Figure 29: Interconnected Surface Water Dataset, Spring 2019

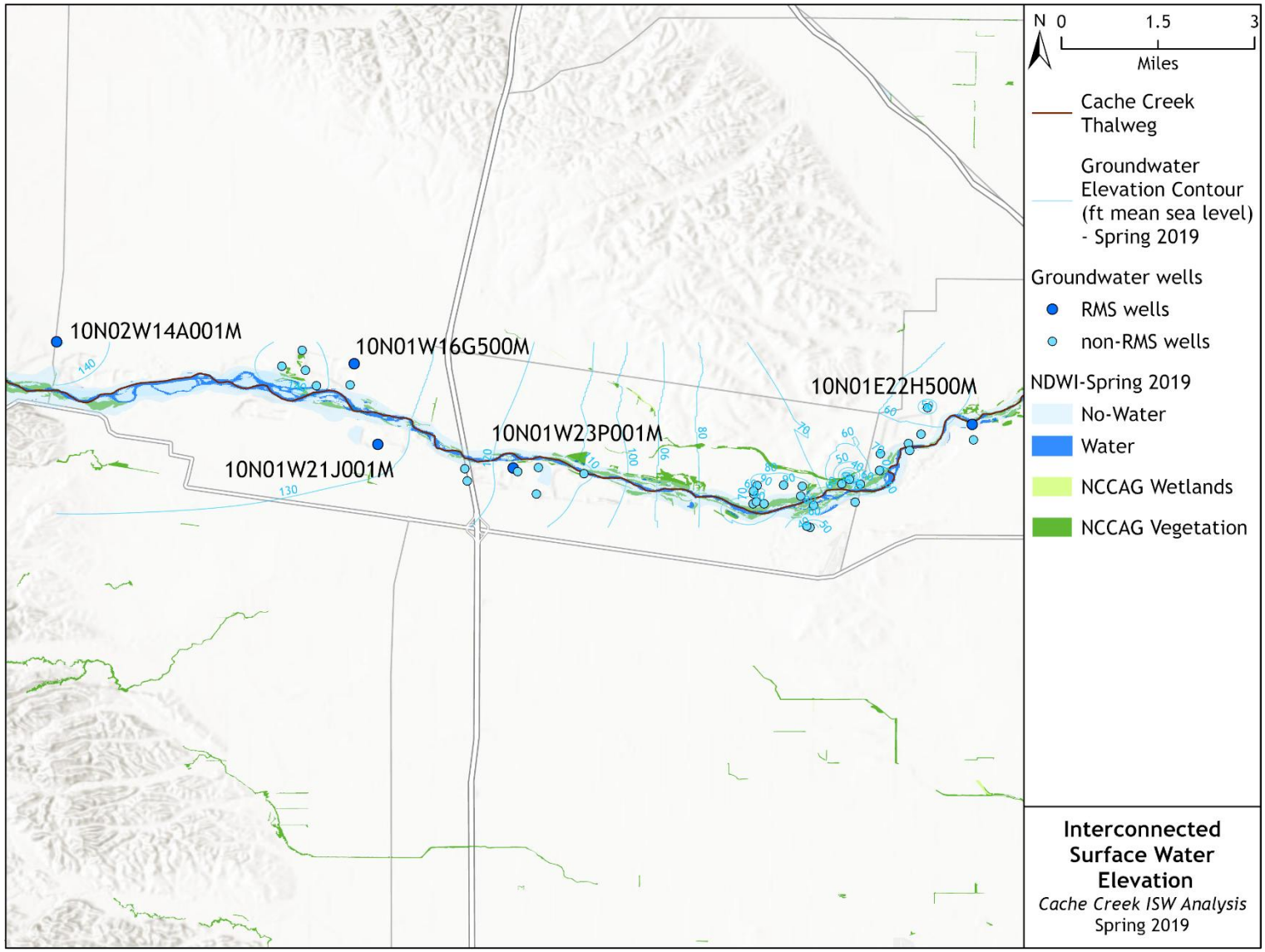


Figure 30: Cache Creek Interconnected Surface Water Classifications, Spring 2019

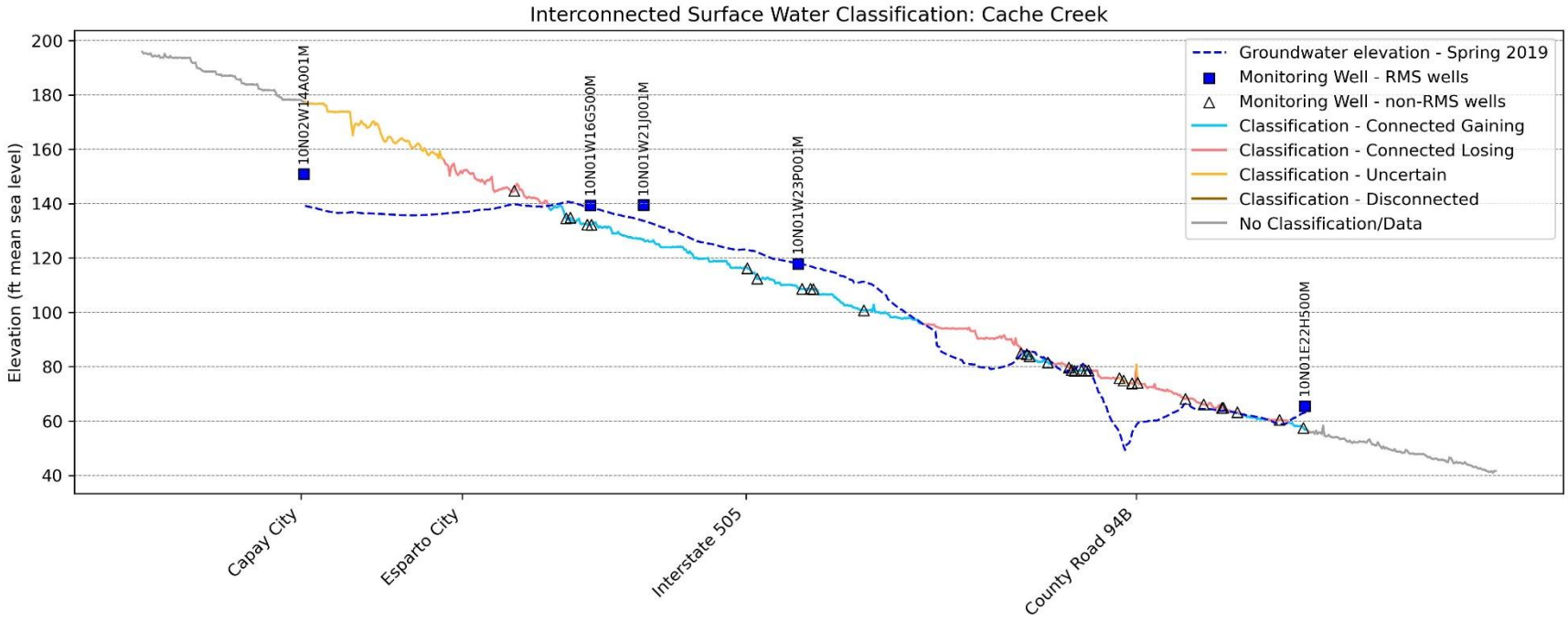


Figure 31: Interconnected Surface Water Dataset, Fall 2019

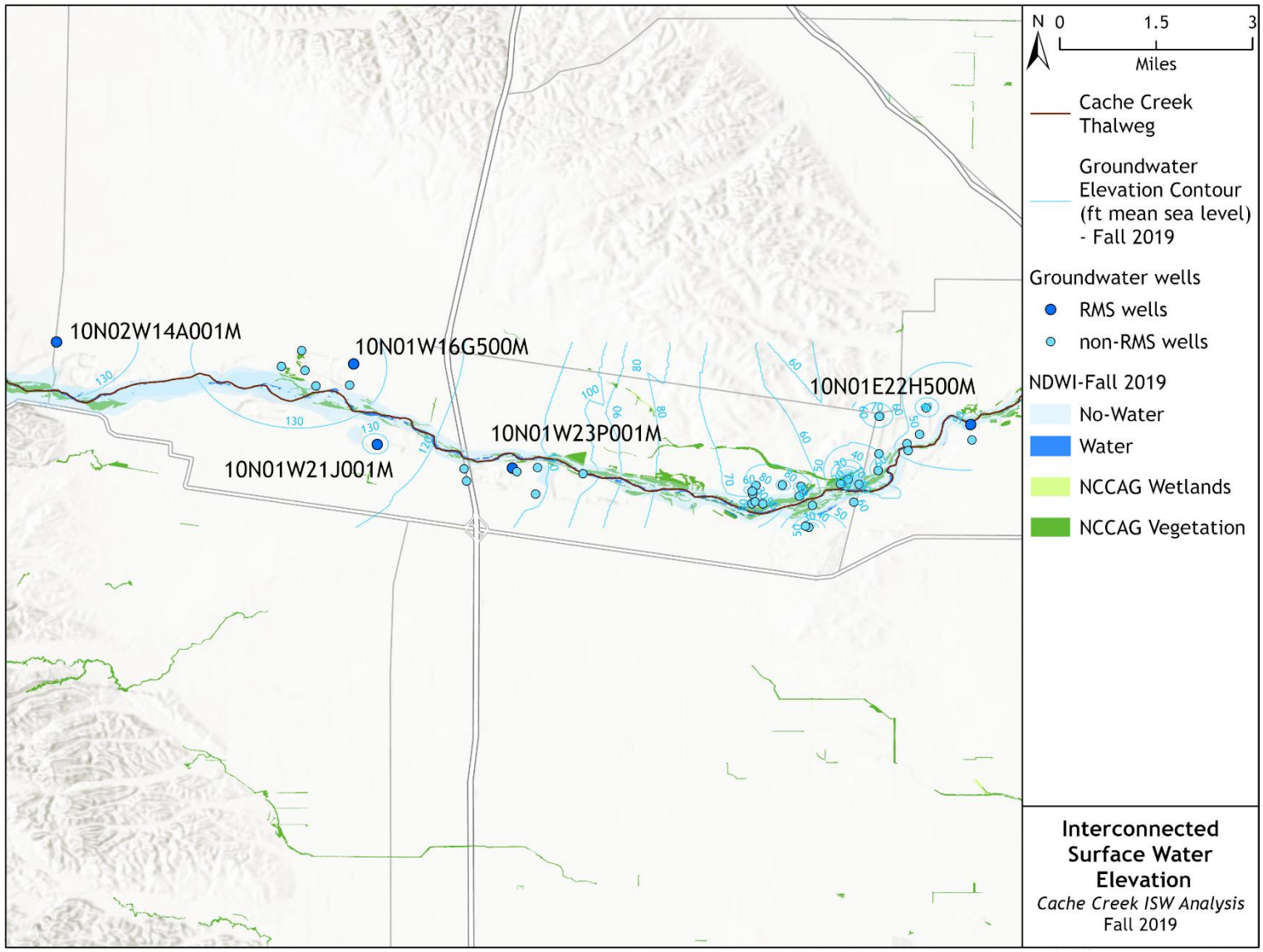


Figure 32: Cache Creek Interconnected Surface Water Classifications, Fall 2019

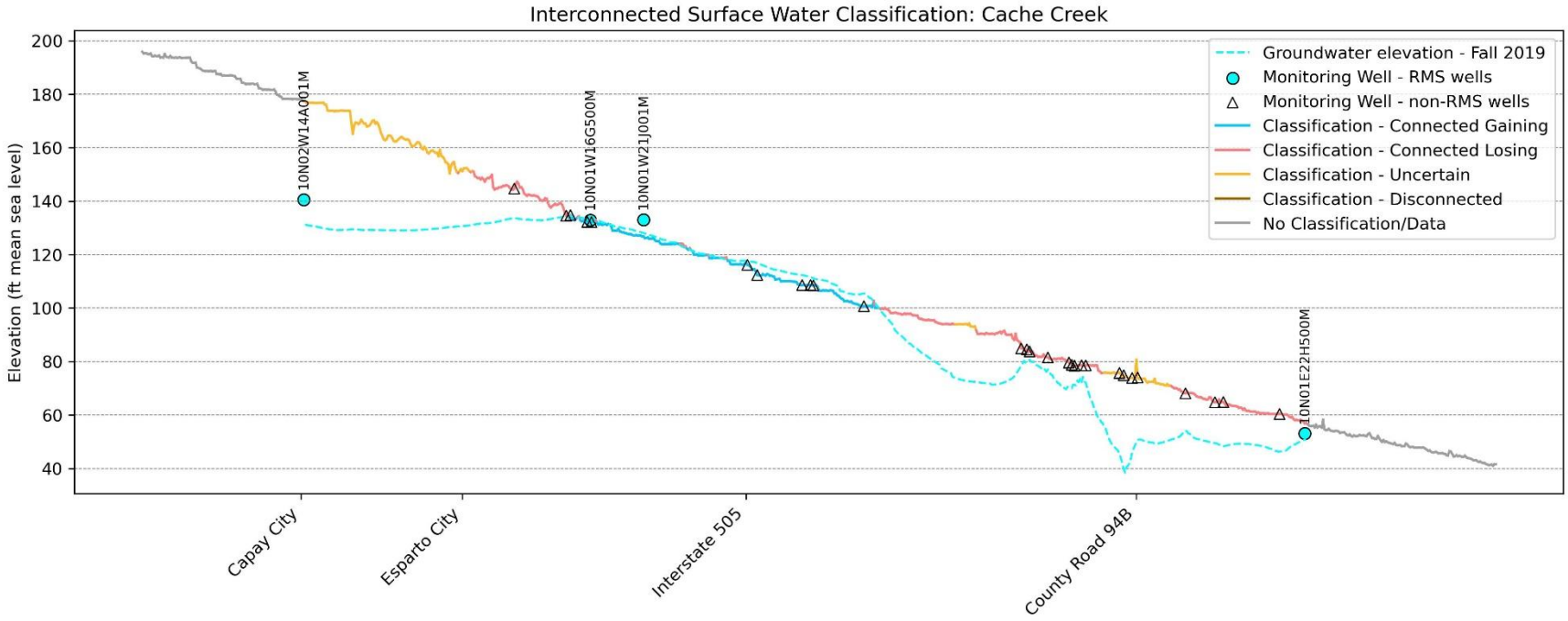


Figure 33: Interconnected Surface Water Dataset, Spring 2020

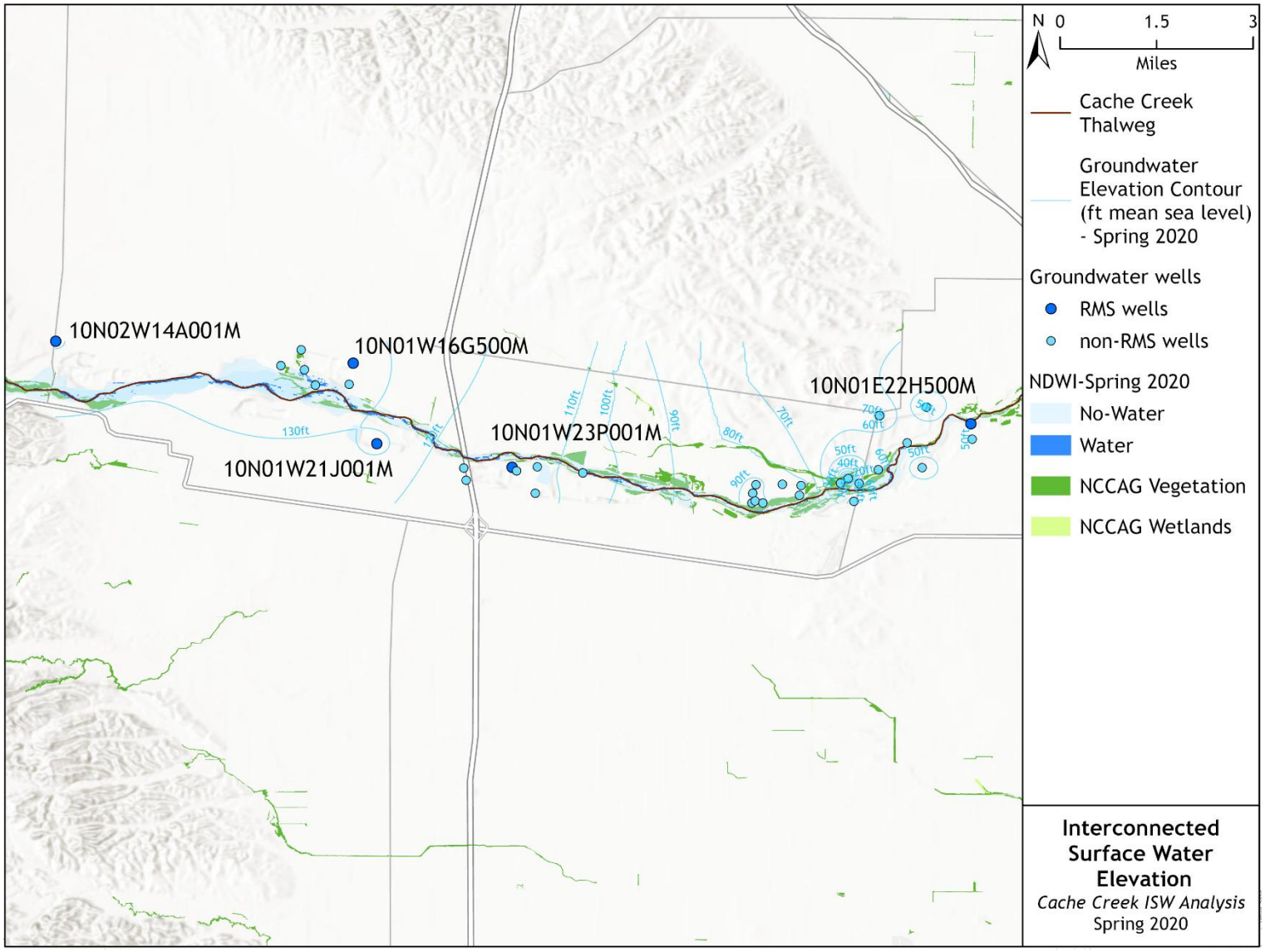


Figure 34: Cache Creek Interconnected Surface Water Classifications, Spring 2020

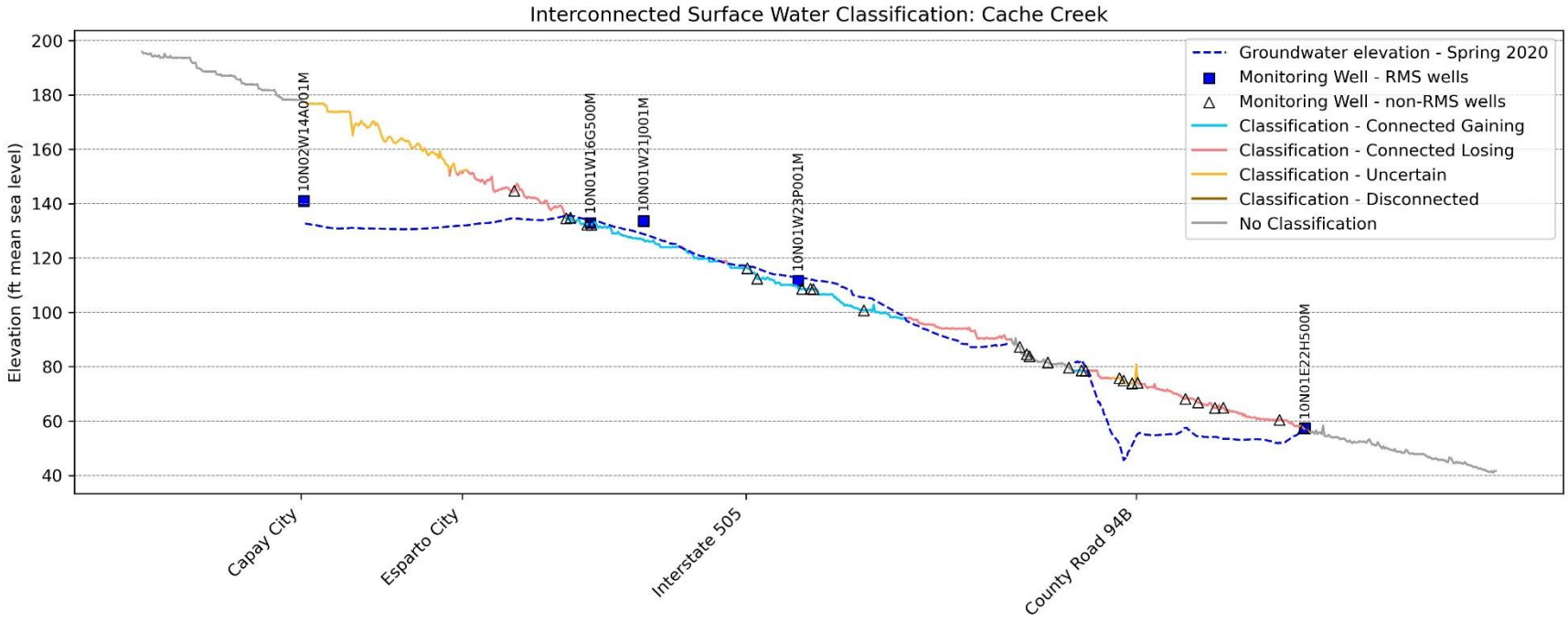


Figure 35: Interconnected Surface Water Dataset, Fall 2020

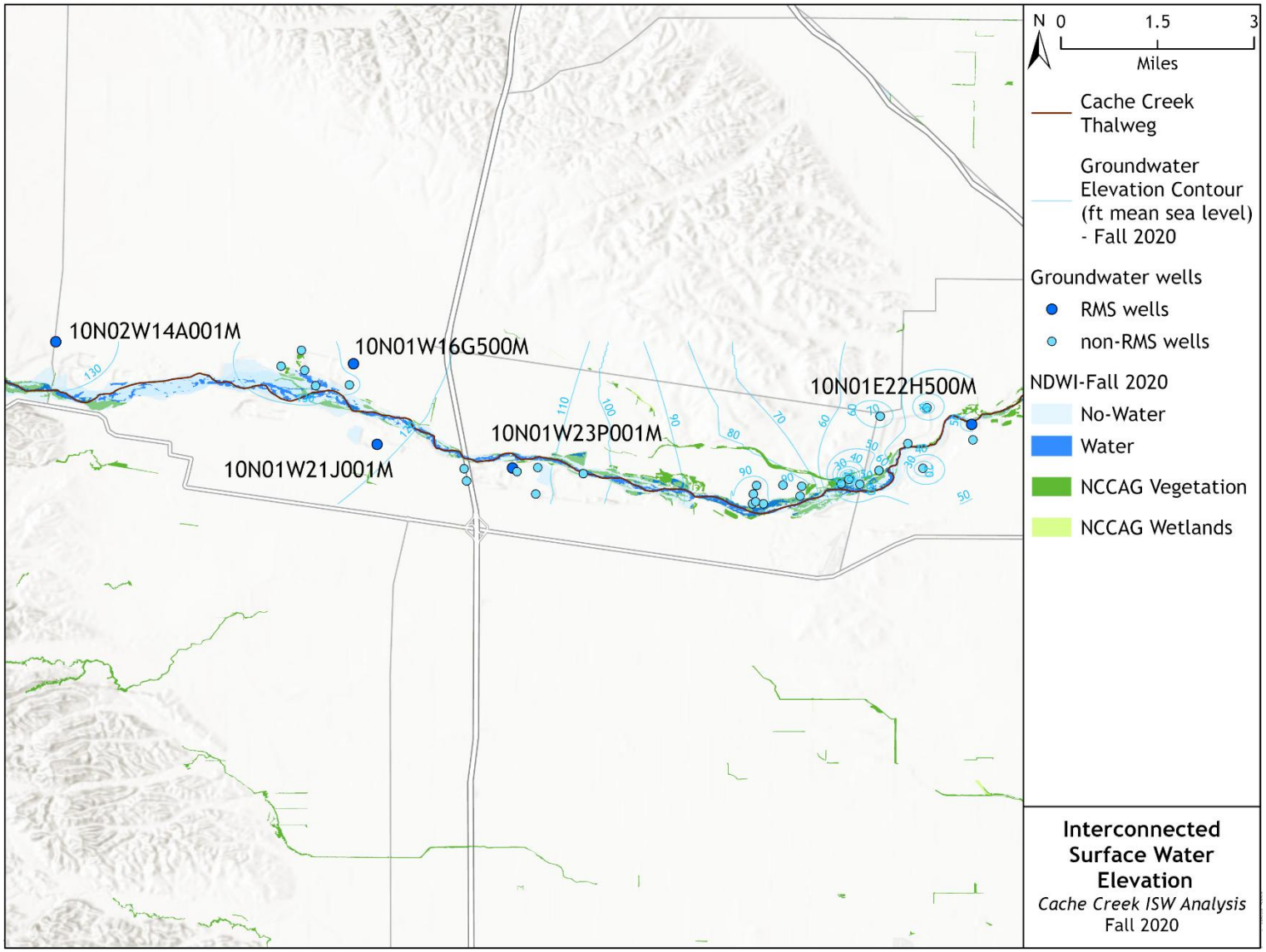


Figure 36: Cache Creek Interconnected Surface Water Classifications, Fall 2020

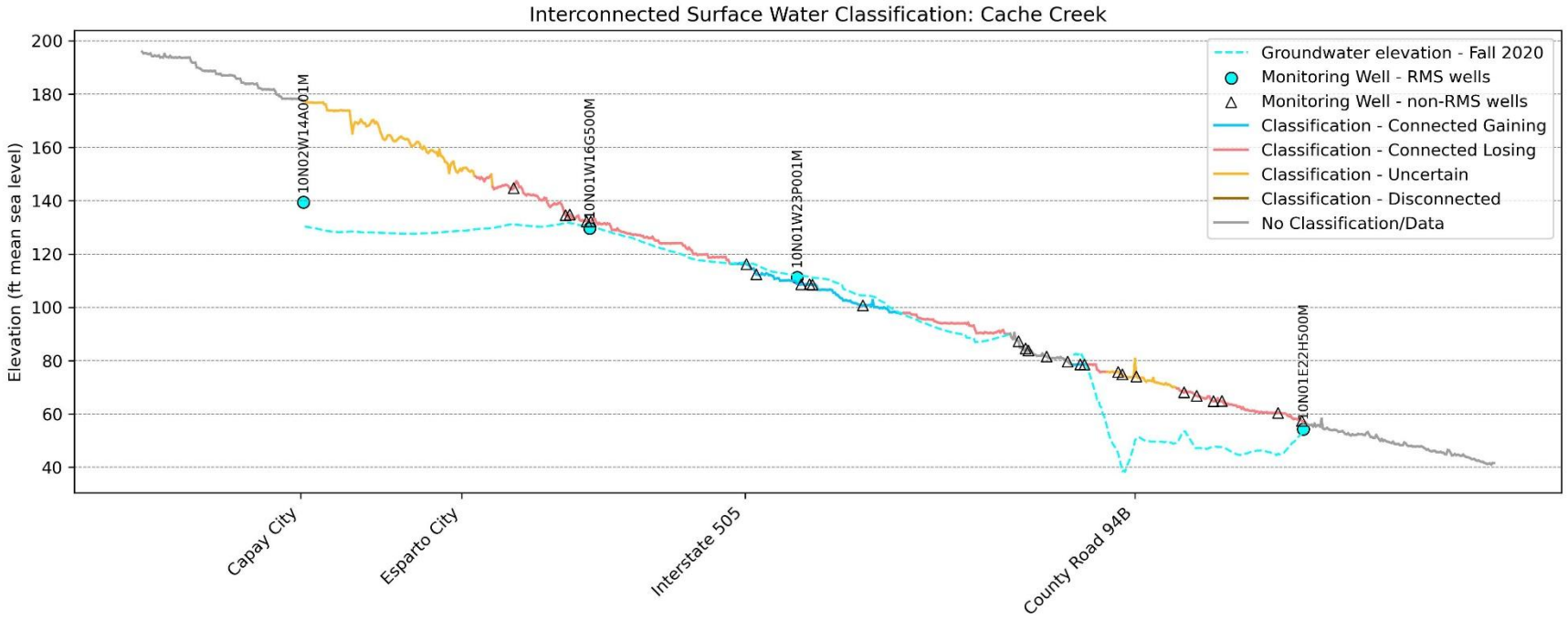


Figure 37: Interconnected Surface Water Dataset, Spring 2021

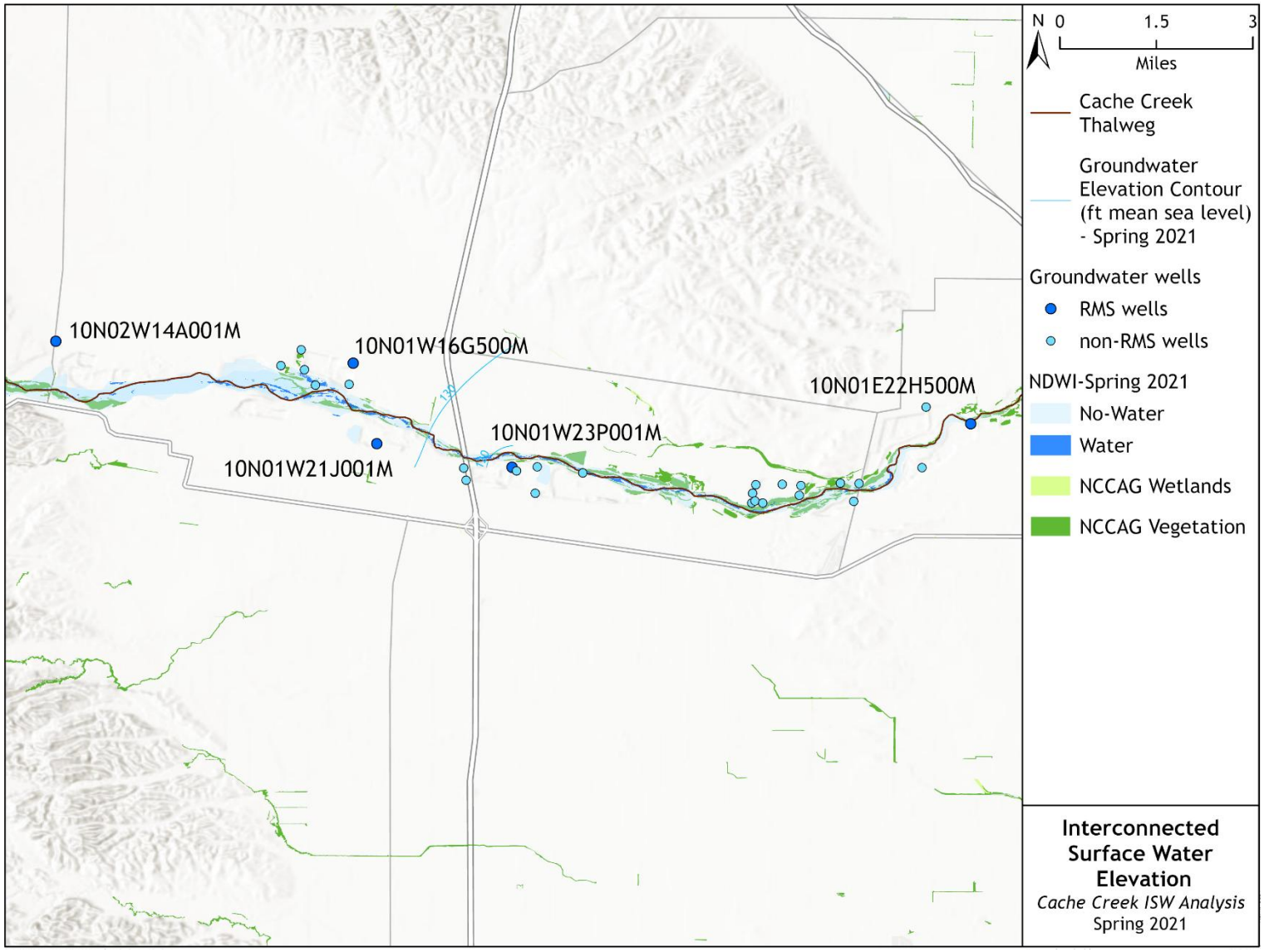


Figure 38: Cache Creek Interconnected Surface Water Classifications, Spring 2021

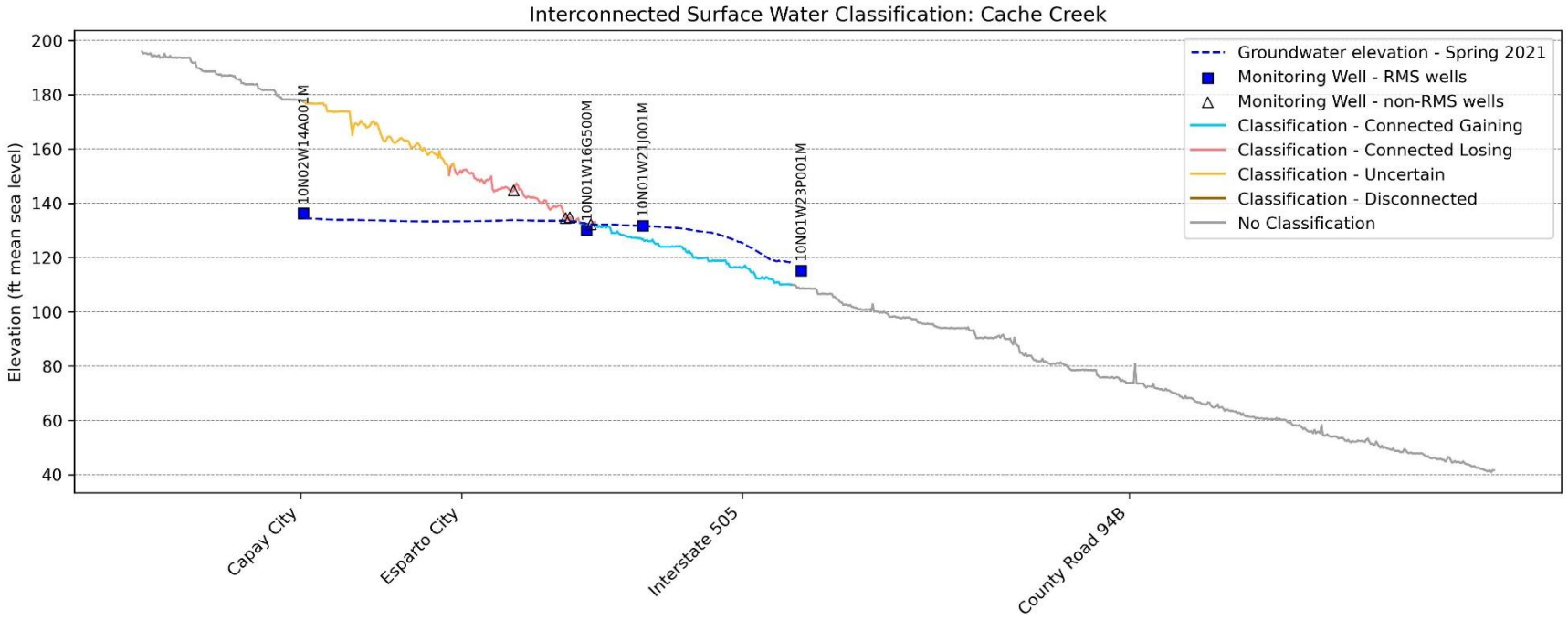


Figure 39: Interconnected Surface Water Dataset, Fall 2021

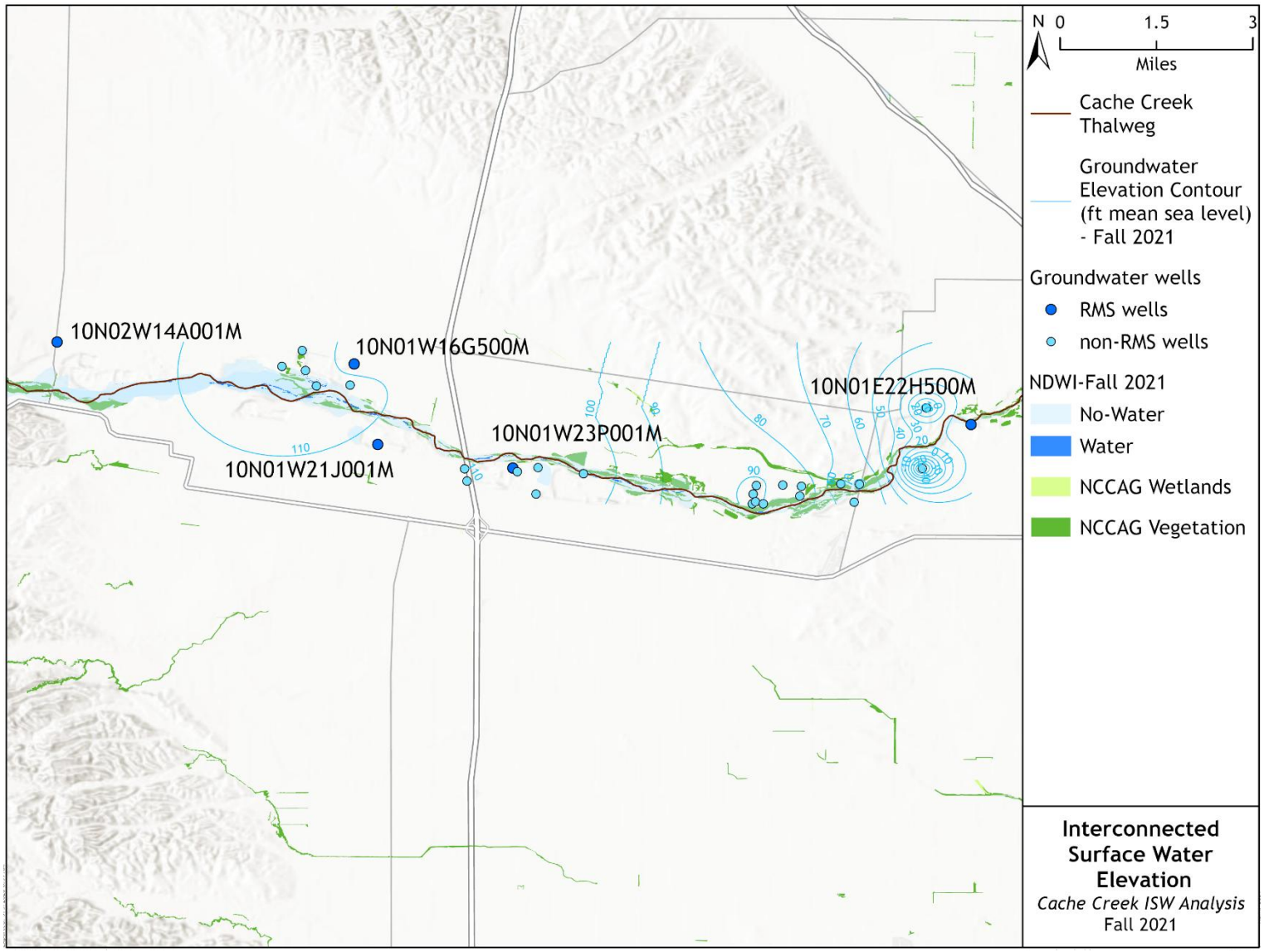
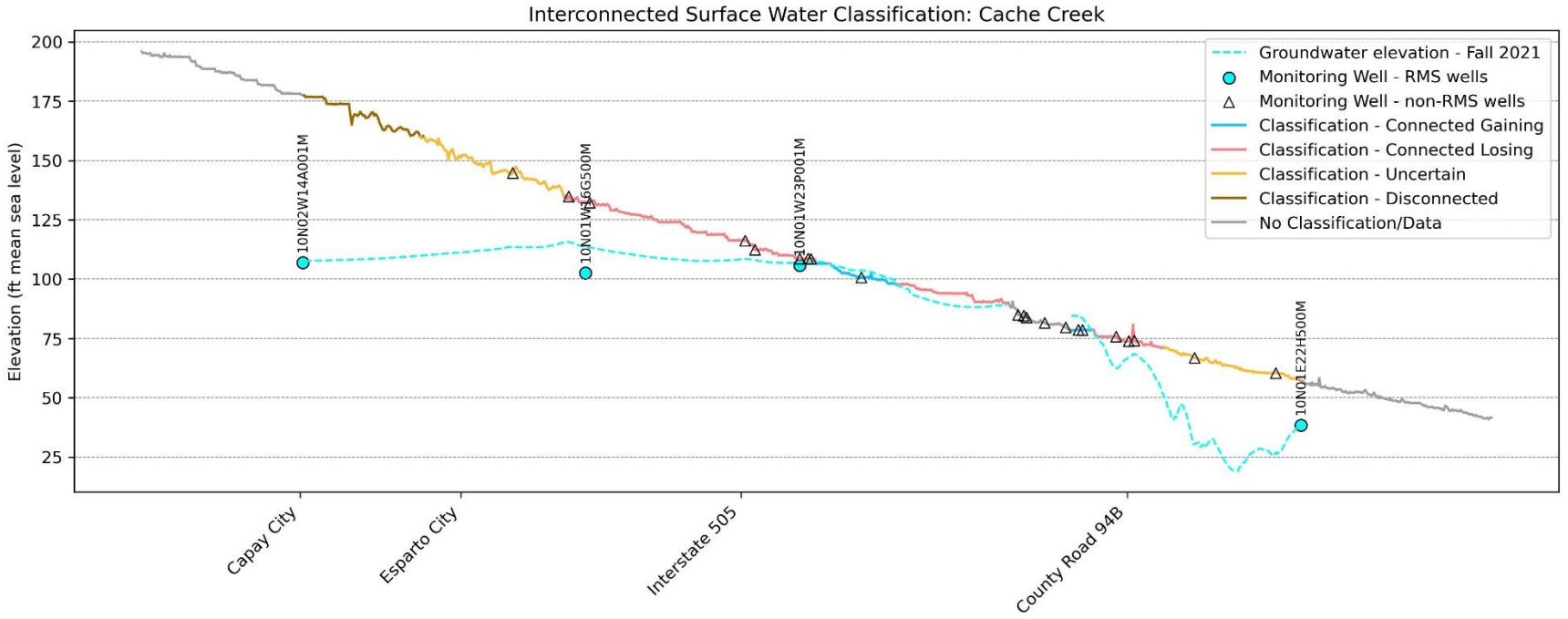


Figure 40: Cache Creek Interconnected Surface Water Classifications, Fall 2021



A relatively consistent dataset was available for all three years of analysis, which consisted of five ISW RMWs, located both north and south of Cache Creek. To provide a more detailed groundwater elevation surface, these RMWs were supplemented with shallow monitoring wells located at aggregate mines (gravel pits). These monitoring wells were primarily located in the lower area of Cache Creek, to the west and to the north of the creek. Comparing groundwater elevation profiles to ISW RMW groundwater elevations in Figure 29 through Figure 40, it is evident that the ISW RMWs may be insufficient to accurately portray the groundwater elevations and, subsequently, Cache Creek ISW classifications from approximately Interstate 505 to the end of the project east of County Road 94B. Furthermore, the limited data from the aggregate monitoring wells in the western portion of Cache Creek led to some minor uncertainties about groundwater elevation profiles in that portion of the stream. Data collection for the ISW RMWs is also inconsistent. Future monitoring network improvements should focus on providing a consistent density of monitoring groundwater elevation around identified ISW streams in the Subbasin and on consistent data collection to capture seasonal trends.

There are consistent trends in ISW classification on Cache Creek. The upper area east of Esparto is generally categorized as Uncertain or Disconnected, while east of Esparto is generally categorized as Connected – Gaining or Connected – Losing. The gaining areas of Cache Creek are centered around Interstate 505 and expand in the spring and contract in the fall. Spring 2021 had a very limited dataset, and ISW Classifications were generated solely from water levels at the ISW RMWs.

The second phase of analysis compared the results of the Cache Creek ISW categorization to GDEs and areas of the creek identified as dry. GDEs were identified using the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset, modified using a normalized difference vegetation index to exclude areas that were classified improperly.

Dry areas of the creek were identified using aerial imagery evaluated with the Modified Normalized Difference Water Index (MNDWI). The MNDWI approach uses near-infrared and green wavelengths to detect water. A surface was developed with values ranging from -1 to 1, with positive values indicating water. YSGA compared the MNDWI results with photo imagery to further reduce the results to 0 or 1, with 0 indicating dry stream reaches.

Figure *41* through Figure *46* present a comparison of Cache Creek ISW categorization to GDEs and the MNDWI analysis for spring and fall from 2019 through 2021.

Figure 41: Cache Creek Stream Classification Evaluation, Spring 2019

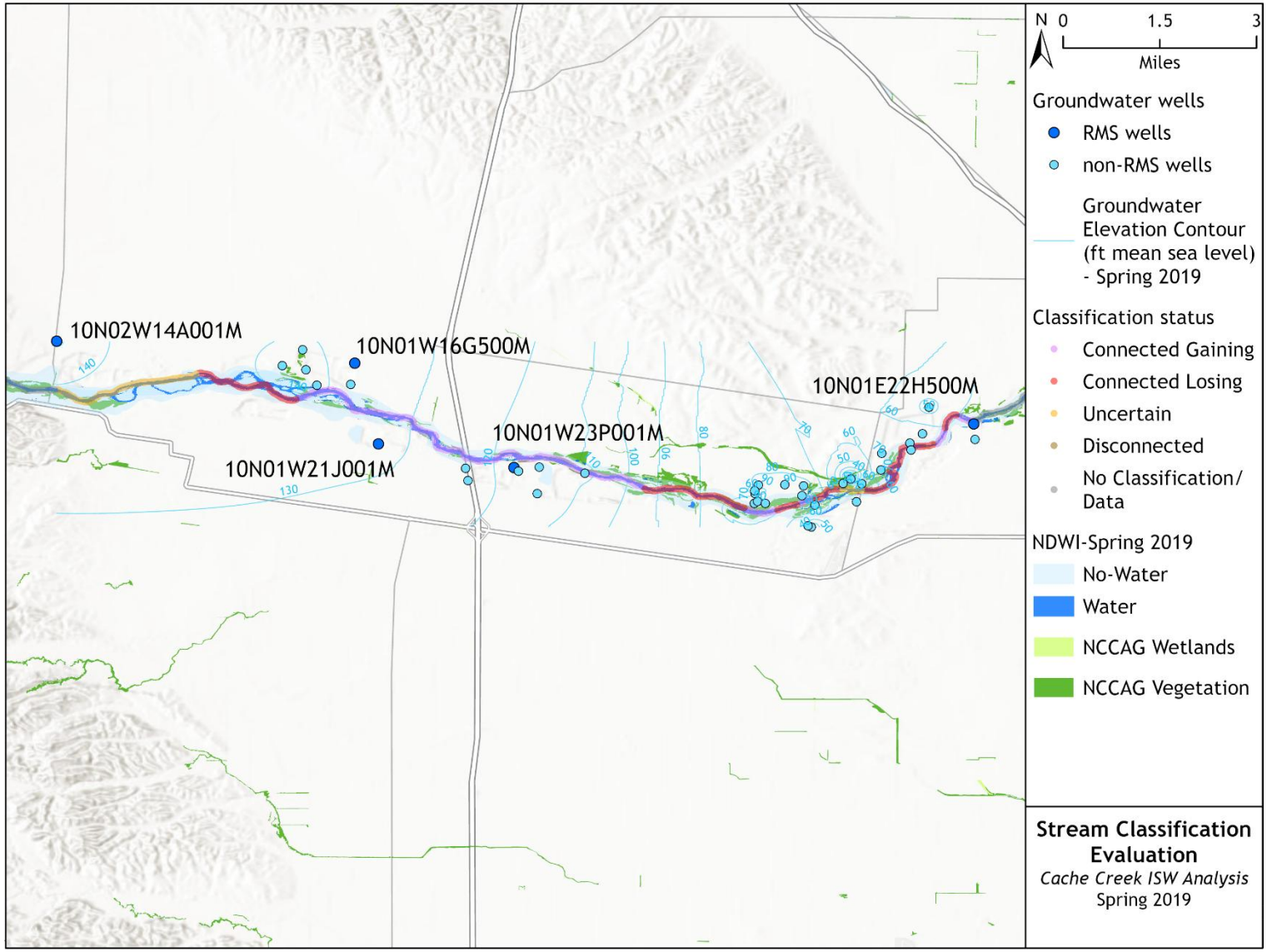


Figure 42: Cache Creek Stream Classification Evaluation, Fall 2019

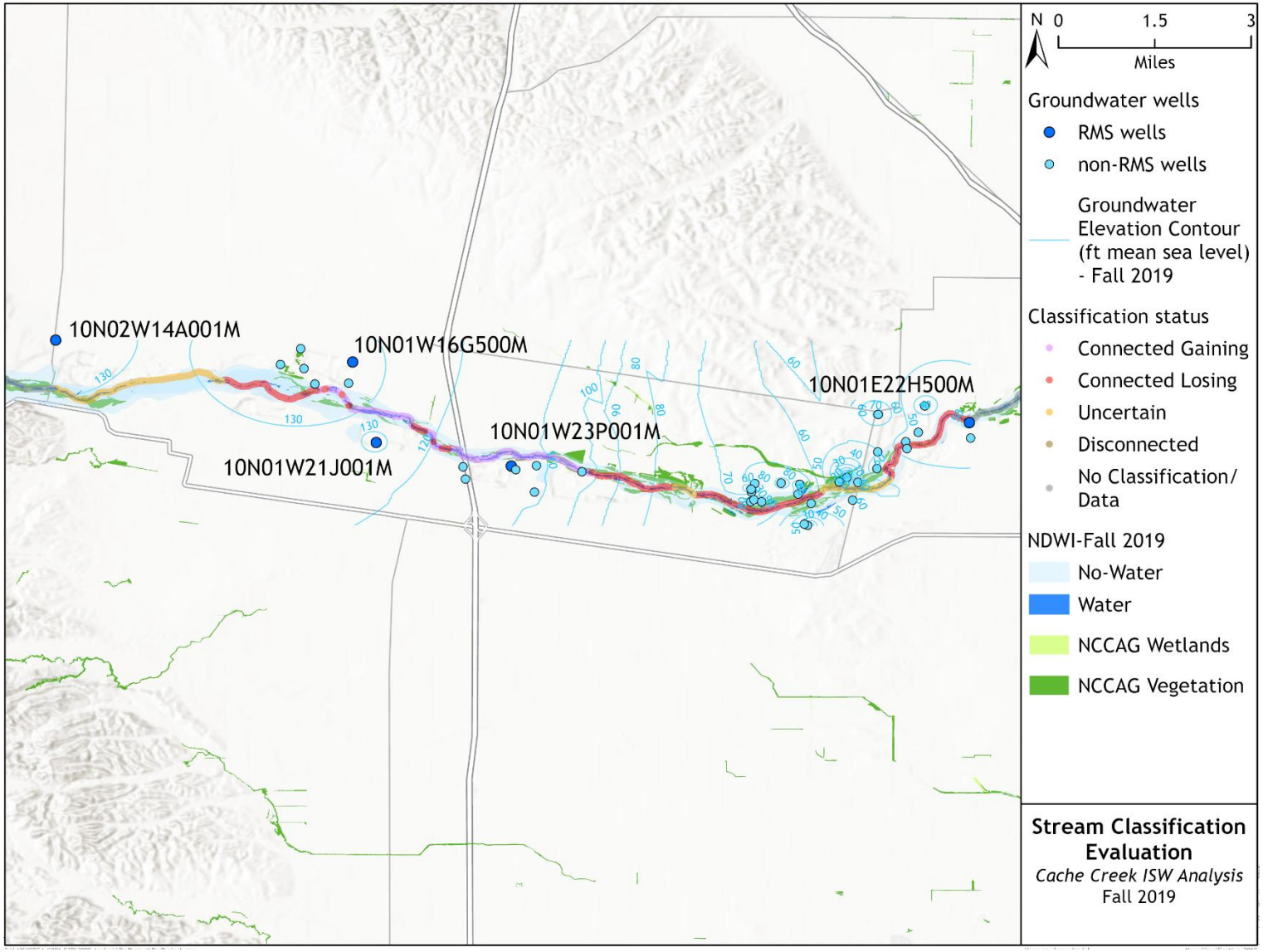


Figure 43: Cache Creek Stream Classification Evaluation, Spring 2020

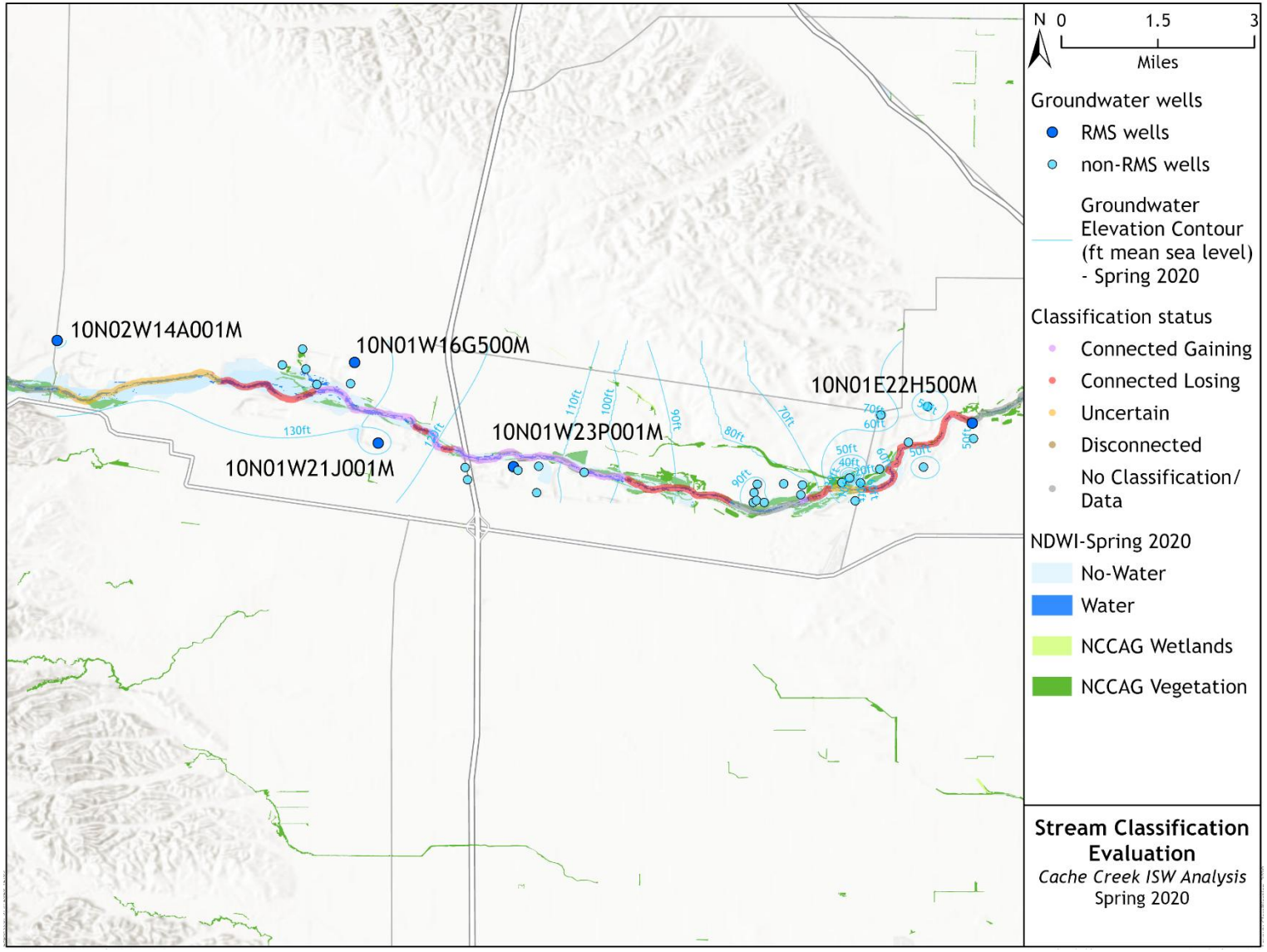


Figure 44: Cache Creek Stream Classification Evaluation, Fall 2020

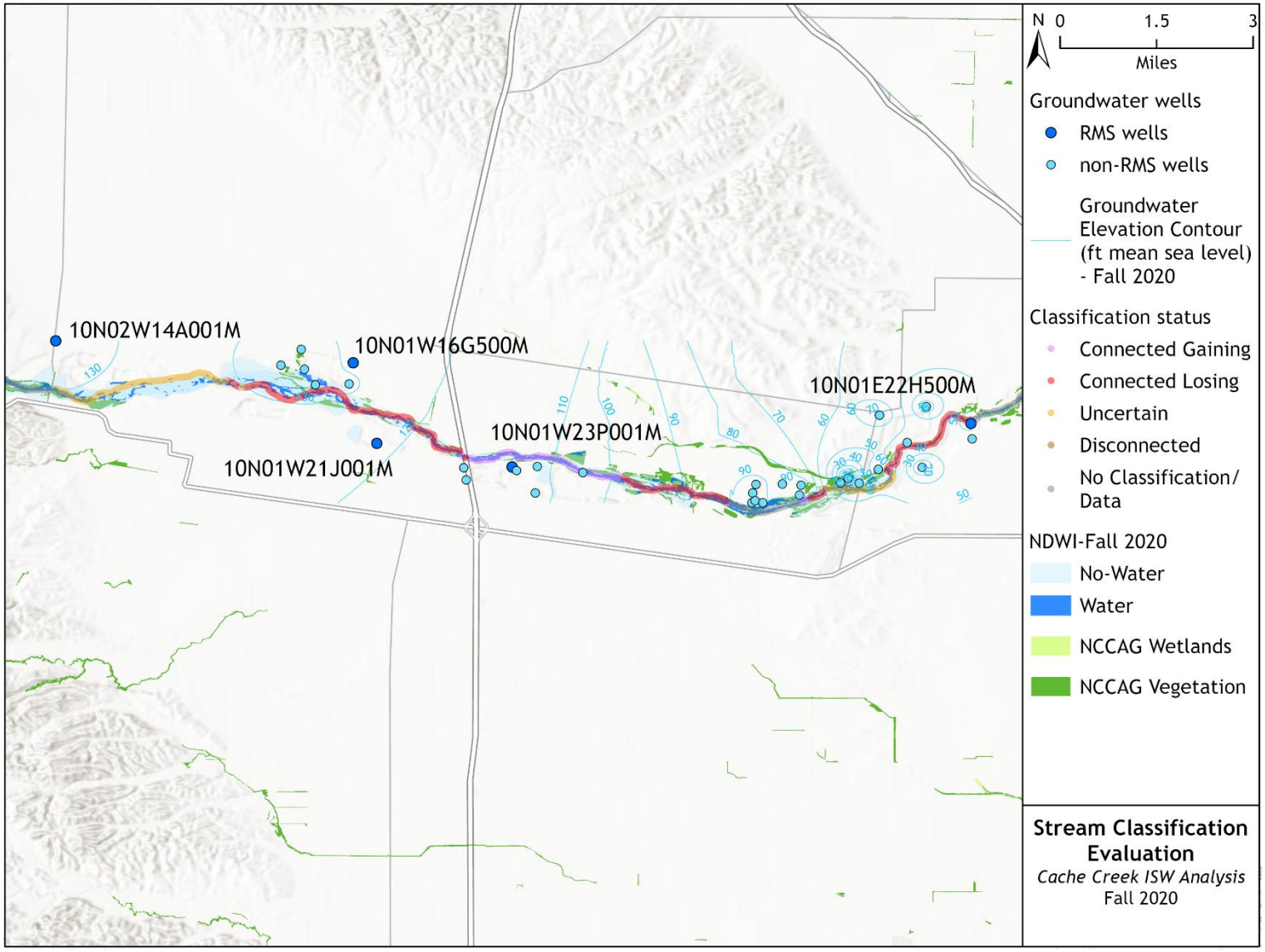


Figure 45: Cache Creek Stream Classification Evaluation, Spring 2021

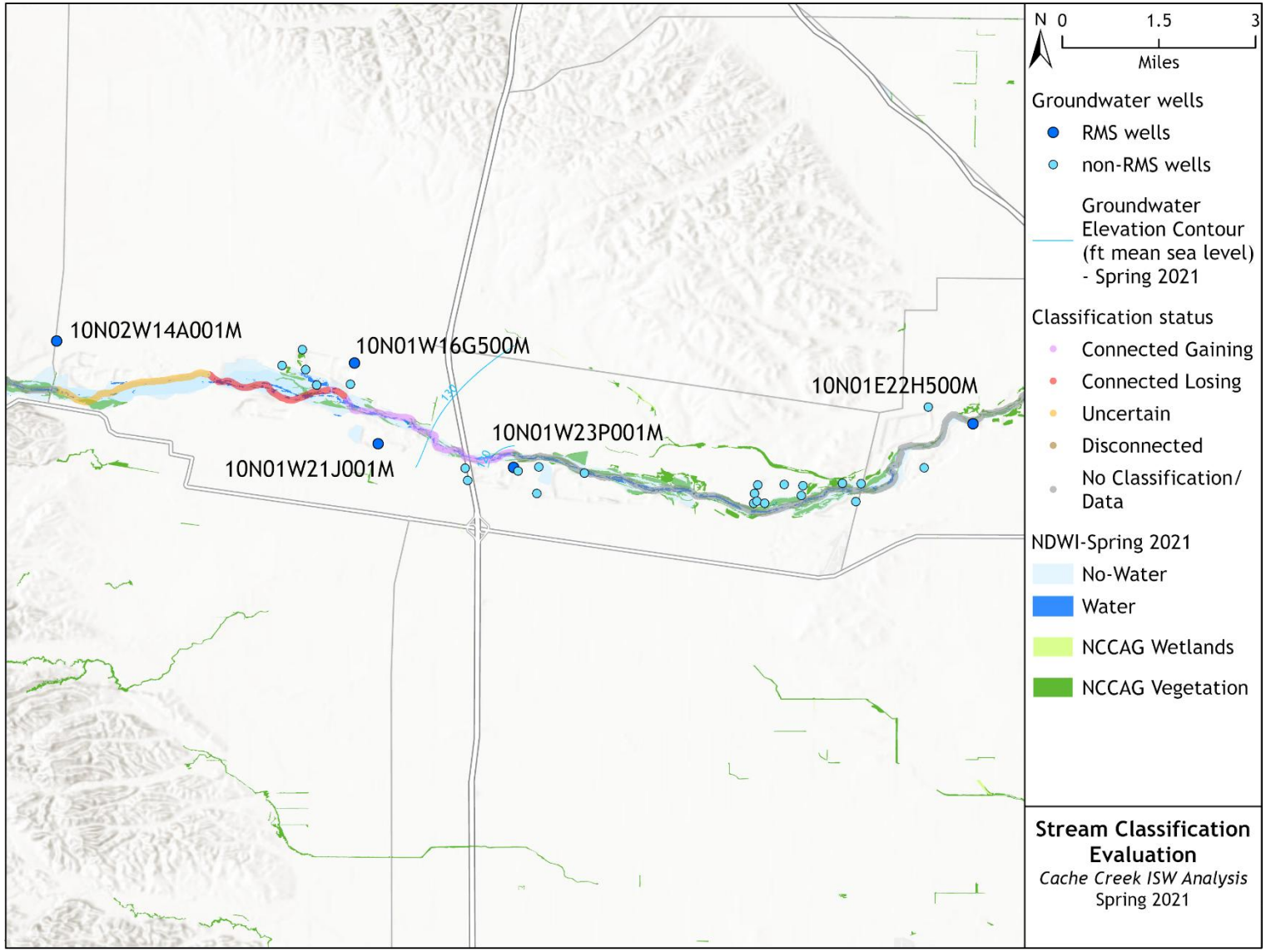
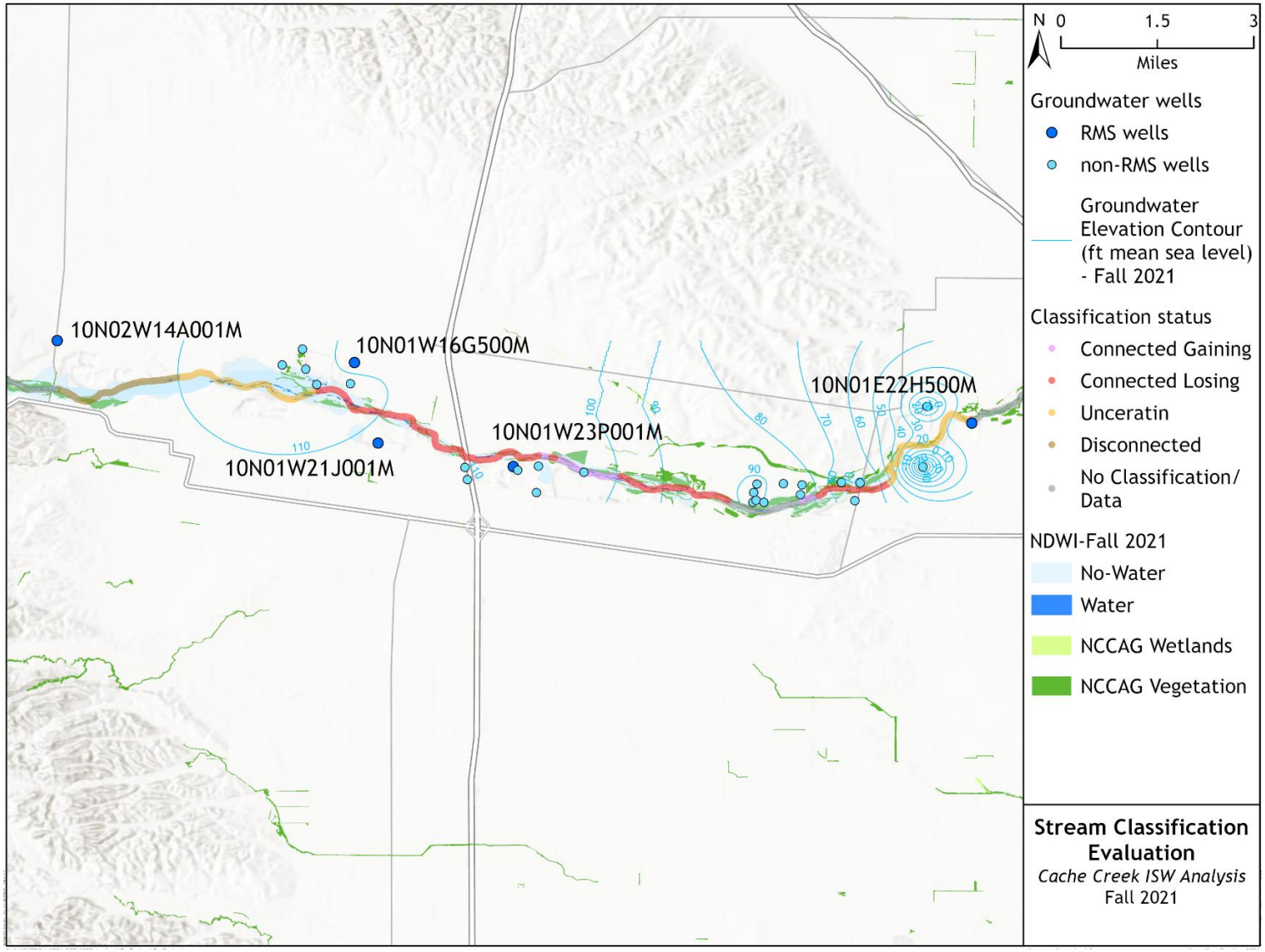


Figure 46: Cache Creek Stream Classification Evaluation, Fall 2021



During the spring of 2019 and 2020, water was generally present throughout the entirety of Cache Creek. In the spring of 2021, following the extreme drought conditions in 2020, there was little to no water in Cache Creek. Fall trends in 2019 and 2020 show areas in the western portions of Cache Creek, between Capay and Madison, going dry. None of these areas are near identified GDEs; however, they should be monitored. Fall 2021 shows little to no water in Cache Creek after two of the driest years on record in California.

YSGA performed this initial analysis to begin assessing the existing monitoring methods capacity to track ISW conditions around Cache Creek, identify potential data gaps, and inform future modeling and monitoring network expansion. YSGA may expand this analysis to other streams in the Subbasin to further assess pre- and post-SGMA impacts to ISW and changes in depletion.

3.6.7 Changes Under Consideration to Address Recommended Corrective Actions for Depletions of Interconnected Surface Water

YSGA is currently working to address DWR's recommended corrective actions for depletions of ISW through multiple efforts. The primary effort is to improve the existing monitoring network, both through the collection of surface water data and near-stream groundwater levels, and improving the Subbasin model to better quantify ISW and changes in depletion caused by groundwater pumping. These improvements will provide a greater understanding of the timing and magnitude of surface water depletions resulting from pumping. Second, YSGA is assessing the current ISW RMW network, identifying data gaps, and determining where additional monitoring is needed to capture ISW conditions in the Subbasin accurately. Monitoring network improvements will be informed in part by the modeling effort and the model data needs. Furthermore, YSGA will continue to incorporate DWR's guidance and BMPs as they are released.

4. STATUS OF PROJECTS AND MANAGEMENT ACTIONS

GSP Emergency Regulations §356.4(b) include a requirement that the Periodic Evaluation shall include:

> *A description of the implementation of any projects or management actions, and the effect on groundwater conditions resulting from those projects or management actions.*

4.1 Projects and Management Actions Summary

The 2022 Yolo Subbasin GSP identifies 77 projects and 12 management actions that will help meet and maintain the sustainability goal for the Yolo Subbasin. The list of PMAs continues to be evaluated and updated to reflect progress in implementation and to incorporate new project opportunities.

During the WY 2019 – WY 2024 GSP implementation period, the YSGA focused primarily on continuing the implementation of PMAs already underway as of the adoption of the GSP in 2022, as well as those that received funding through the $7.9 million SGMA Implementation Grant awarded to the YSGA in September 2023. Projects that received funding through this grant include:

- **GSP Implementation Projects**
  - MA3: Subsidence Monitoring Program
  - P2: Groundwater Model Enhancement Program/YSGA Model Improvements
  - P3: Water Resources Information Database Project
  - P6: Vegetative and aquatic surveys related to groundwater-dependent ecosystems
- **P47: YCFC&WCD Winter Recharge Program**
- **City of Winters Feasibility Studies**
  - P35: Development of Surface Water Source for the City of Winters
  - P48: City of Winters Recycled Water Utilization
- **Yolo-Zamora Groundwater Recharge Pilot Project**
  - P13: Zamora area winter recharge from Cache Creek via China Slough
  - P22: Conjunctive Use/groundwater recharge/surface water delivery extension to the area around Zamora
- **Dunnigan Area Recharge Program**
  - P17: Bird Creek, Oat Creek, Buckeye Creek, 2047 Canal groundwater recharge infrastructure improvements
  - P18: Hardwood Subdivision Recharge
  - P19: Schaad Ranch/Buckeye Creek Recharge
  - P20: Trickle Flow Recharge at Buckeye and Bird Creeks

SGMA Implementation Grant projects will be completed by April 2027. The YSGA intends to pursue additional grant funding when available to continue implementation of PMAs.

Relevant updates on the implementation of PMAs that occurred during the evaluation period are included in Table 18. In preparing this Periodic Evaluation, YSGA Staff worked with YSGA Member Agencies to review the current list of PMAs for which each agency was listed as the responsible implementing agency. Based on that review, some PMAs were identified as “Completed” in the “Project Status” column (light green highlighted rows); some were identified for removal (light orange highlighted rows) due to being

no longer viable; and some new PMAs were identified and added ("*" and "**" listed with PMA number) based on updated understanding of needs, data, and funding opportunities. All PMAs in Table 18 are expected to be completed during the period noted in the "Updates and Expected Schedule" column.

Overall, groundwater conditions throughout the Subbasin during WY 2019 – WY 2024 were sustainable based on the fact undesirable results didn't occur for any SMCs. However, during the WY 2020 – WY 2022 drought, a historic reduction in surface water supplies in the Sacramento Valley triggered temporary, localized groundwater overdraft in areas where surface water was inaccessible or scarce leading to groundwater being the only water source available for irrigation, domestic, or municipal uses. Following the drought starting in WY 2023, groundwater conditions across the subbasin for all SMCs, even those that are locally more sensitive to drought conditions relative to others, substantially improved. The YSGA has and will continue to invest resources to further investigate the groundwater dynamics in upland areas of the subbasin and the west valley margin which are the most sensitive to drought conditions and in some wells, have continued to show declines in groundwater levels. Throughout this document, we describe the above observation of groundwater conditions between WY 2019 – WY 2024 in these locally sensitive areas as "temporally variable localized overdraft conditions" meaning localized areas that temporarily experience overdraft during droughts, but have the potential to recover after drought conditions cease to persist. PMAs can assist in enhancing management capability and improving understanding of the aquifer system and groundwater conditions. Most PMAs will be implemented on an as-needed/opportunistic basis, partly dependent on funding availability and urgency at the time. PMAs deemed to have greater near-term benefits have been assigned a more accurate implementation estimate. YSGA Staff intend to complete a prioritization, ranking, and cost-refinement review of the PMAs and to provide more detailed information by the next Periodic Evaluation.

Table *18* lists the benefits resulting from the current and projected implementation of these PMAs. The status of each project and management action is designated as follows:

- **Conceptual:** The project or management action is identified but has undergone no significant planning, engineering, or feasibility analyses.
- **Planning:** The project or management action has undergone initial planning and feasibility assessments and is being advanced to implementation.
- **Ongoing:** The project or management action is part of an ongoing effort and will continue to be implemented to meet the YSGA's sustainability goals.
- In Progress: The project is being implemented or constructed and working towards completion.
- **Completed:** The project or management action has been fully implemented in accordance with the description outlined in the GSP. Project benefits will continue to be monitored to ensure continued contribution to groundwater sustainability.
- **Removed:** The project or management action was removed from the plan because it is no longer viable due to lack of funding or deemed infeasible relative to other project alternatives.

Table 18: PMA Updates Since Submission of 2022 GSP

PMA Number	Project or Management Action Name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Updates and Expected Schedule	Benefits Observed to Date/ Estimated Accrued Benefits at Completion
MA 1	Continued and Improved Groundwater Monitoring Program	Several groundwater monitoring programs exist within the Yolo Subbasin. Efforts to aggregate these monitoring programs include the Yolo County Water Resources Information Database (WRID) and DWR's Water Data Library. The WRID also receives well water level data from the cooperating agencies, monitoring about 550 wells distributed Countywide semiannually. Most groundwater level data received or collected in the WRID are submitted to the State's Water Data Library. Existing programs monitor both water quality and water levels. Continuing to monitor groundwater conditions in the Yolo Subbasin is a critical component of a sustainable future. Improvements can be made to the current program by expanding monitoring efforts to address data gaps, improving coordination across programs, and establish sustainable funding for monitoring.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Ongoing	Ongoing throughout GSP implementation	Improved ability to observe how groundwater levels are changing in real-time in response to hydrologic conditions. Better ability to ground truth model outputs with additional groundwater level data points. Improve calibration of model based on new data. Fill data gaps as new monitoring wells are made available throughout implementation.
MA 2	Continue coordination efforts with other management and monitoring entities	Coordination efforts are ongoing related to groundwater management and monitoring in the Yolo Subbasin. Continuing these coordination efforts will yield better information and enable a collaborative, conjunctive decision-making process. This includes evaluating well permit applications and working with Yolo County on the well permitting process.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Ongoing	Some data gaps have already been filled through coordination with entities who provided historic groundwater level data. This MA will be ongoing throughout GSP implementation.	The goal of this MA is to improve outside agencies' understanding of the YSGA's role and improve data sharing and efficiency.
MA 3	Subsidence Monitoring Program	Continue to investigate subsidence and the causes of subsidence in the Yolo Subbasin.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☑ Land subsidence ☐ Depletions of interconnected surface water	Ongoing	Two new GPS monitoring stations have been installed in the Yolo Subbasin as well as additional corner reflector stations that will lead to increased spatial coverage of InSAR subsidence data. Project is ongoing as the causes of subsidence and how to avoid it are increasingly understood in the Yolo Subbasin.	Improve YSGA's ability to understand and manage land subsidence; prevent undesirable results.
MA 4	Preparedness through Increased Groundwater Recharge and Managed Aquifer Recharge Projects	This project encompasses all efforts to increase groundwater recharge in the Yolo Subbasin. This includes diverting winter flows for groundwater recharge and increasing groundwater infiltration from precipitation, aquifer storage, and recovery projects, for example. Increased groundwater recharge efforts and winter diversions may result in the creation of seasonal wetlands in some scenarios. YCFC&WCD proposes to divert winter flows from Cache Creek into the canal system to increase groundwater recharge. Groundwater recharge and recovery are central to good conjunctive management of surface and groundwater resources. Currently, by YCFC&WCD policy, 160 miles of surface water canals remain unlined, providing summertime groundwater recharge services that benefit the aquifer and riparian habitat. The recharged groundwater is used by beneficial users in the Subbasin. Utilizing TNC's Multi-Benefit Recharge Project Methodology Guidance Document will help make these projects successful. Managed wetlands within the Subbasin already provide multi-benefit recharge services, and increased coordination with	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Conceptual	YCFC&WCD, Dunnigan Water District, and the City of Woodland have all expanded their recharge programs to increase recharge capacity so that excess surface water can be infiltrated into the groundwater basin when available. These efforts have all led to improved groundwater levels in the project vicinity, benefitting all users of groundwater, including environmental users. Additional recharge	Increased groundwater levels and groundwater in storage. Over 36,000 acre-feet were recharged in WYs 2019-2024.

PMA Number	Project or Management Action Name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Updates and Expected Schedule	Benefits Observed to Date/ Estimated Accrued Benefits at Completion
		wetland managers will enable information sharing and potential managed aquifer recharge (MAR) projects.			projects will be identified throughout the duration of GSP implementation, so that potential benefits from groundwater recharge can be maximized.	
MA 5	Conjunctive Water Use Program	This conjunctive water-use project envisions using a variety of methods (recharge/recovery, off-stream storage, and canal system modernization) to store groundwater effectively and use it conjunctively within the District's service area. The new water that will be developed can be used to benefit agriculture, the environment, and municipal interests. A significant amount of work has already been completed on this project, including the establishment of a groundwater monitoring program as part of MA 1.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☑ Land subsidence ☐ Depletions of interconnected surface water	Ongoing	Ongoing throughout GSP implementation	Improved groundwater supply by recharging excess surface water flows when they are available.
MA 6	Increased outreach and information sharing of groundwater resources and knowledge within the Yolo Subbasin.	Information sharing, collaboration, and communication will be important to groundwater sustainability in the Yolo Subbasin. This project relates to the Communication and Engagement Plan that the YSGA has created for the Yolo Subbasin.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Ongoing	Ongoing throughout GSP implementation. During the evaluation period, Board of Directors meetings were held bimonthly to communicate GSP implementation updates such as annual report results and the status of various grant-funded projects. YSGA Working Group meetings were held in 2022 to develop a prioritized list of projects to pursue grant funding. By the end of WY 2024, the YSGA began convening the now-formalized Hungry Hollow Working Group to conduct a similar process within that subarea. The YSGA Website (yologroundwater.org) was also used as a resource to inform the public of GSP implementation updates, meeting dates, and newly-available groundwater data via sgma.yologroundwater.org.	This project will convey information, best practices, funding opportunities, data, and observations to communities and beneficial users within the Subbasin.
MA 7	Domestic Well Impact Mitigation Program	The YSGA is working to create a domestic well impact mitigation program to mitigate any potential impacts to domestic well users. This program will identify potential funding sources for both temporary and permanent domestic water solutions in cases where domestic well users are affected by changing groundwater conditions resulting from groundwater management actions. The minimum thresholds (MTs) and measurable objectives (MOs) established in this document are generally protective of domestic well users in the Yolo Subbasin. The Domestic Well Impact Mitigation Program will provide	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Planning	Domestic well locations are currently being identified through an effort to sort through DWR's OSWCR database and improve location accuracy of well completion reports beyond the township/range/section. YSGA recognizes that the	The Domestic Well Impact Mitigation Program, once fully developed, will provide resources and information in cases where management actions result in impacts to domestic well users.

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		resources and information in cases where management actions result in impacts to domestic well users.			OSWCR database is missing many existing domestic wells, so the list generated of domestic wells in the Subbasin will be incomplete, and additional outreach to domestic well owners will be required. Ongoing throughout GSP implementation. Development of a domestic well mitigation framework is expected by 2032.	
MA 8	Surface Water Monitoring Program	There is no coordinated Countywide surface water monitoring program at present. However, ongoing monitoring programs are in place across various waterways, and many smaller temporary investigations have been conducted over the years. These individual surface water monitoring efforts need to be consolidated to improve the value of the data for the implementation of actions identified in this GSP.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Ongoing	New stream gages have been installed on Buckeye and Bird Creeks with SGMA implementation grant funds. Member agencies continue to explore all possible funding mechanisms to support the addition of new surface water monitoring stations for improved data collection.	Improve ability to quantify depletions of ISW, forecast and mitigate flood risks, and streamline redundant efforts.
MA 9	Management Consideration of Gray Areas in the Yolo Subbasin	During the formation of the GSA for the Yolo Subbasin, eligible entities were identified in accordance with SGMA's definition. Irrigated areas outside of water or irrigation district service areas were known as "white areas" because they had no eligible entity (other than the County) to form or become a GSA. The YSGA was formed in June 2017, with Yolo County serving as a member of the Joint Powers Authority to cover these "white areas". The YSGA now has the authority and responsibility for this area; however, there is still no formal mechanism for receiving revenues for SGMA implementation, which has made these areas slightly complicated, or now known as "gray areas." There is a desire for the YSGA to work closely with landowners in these "gray areas" to determine the best way to implement the GSP and ensure future sustainability. Ideas for these areas include: annexing the property into an existing irrigation or reclamation district (maybe as an "Area B" or an Improvement District); creating or forming a new water district; or simply implementing a county-wide assessment for all properties in the Yolo Subbasin.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Planning	Gray areas have been identified, and additional study is underway to better characterize these areas. SGMA implementation grant funding for Yolo-Zamora initialized a water availability analysis for the area to understand what options may be feasible to augment current groundwater supply with surface water. YSGA is planning a fee study to address the funding issues described in WY 2026. Water district boundaries will be a consideration within this fee study, with "gray areas" paying a higher amount into the Agency to recognize the historic contribution of water districts towards management of surface and groundwater resources.	Increase drought resilience by reducing groundwater dependence, provide governance framework for landowner-led projects, and prevent the occurrence of undesirable results.
MA 10	Coordination Efforts with Land Use Planning Entities	The YSGA and member entities will work on an as-needed basis with Yolo County and municipalities within the Yolo Subbasin to promote the sustainable use and protection of groundwater resources, including GDEs and	☑ Chronic lowering of groundwater levels & storage ☑ Water quality	Ongoing	Ongoing throughout GSP implementation	Coordination with Yolo County has primarily centered around the response to the Governor's executive orders pertaining to well permitting. Through this process, the

PMA Number	Project or Management Action Name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Updates and Expected Schedule	Benefits Observed to Date/ Estimated Accrued Benefits at Completion
		interconnected surface water bodies. These coordination efforts will include input into future general plan updates.	☑ Land subsidence ☑ Depletions of interconnected surface water			YSGA adopted a tiered approach to well permit verification that is based on groundwater levels, quality, land subsidence, and interconnected surface water. The YSGA continues to coordinate with the County on potential inputs to future general plan policy updates.
MA 11	Continued Investigation of subsurface geology and aquifer properties in the Yolo Subbasin	There are portions of the Yolo Subbasin where the aquifer's geologic properties are well understood. Conversely, there are areas where geologic conditions are poorly described or understood. This Management Action would work to improve geologic information in areas of the subbasin where the aquifer is poorly described. This includes looking at existing geologic cross-sections, AEM surveys, and investigation of drillers' reports.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Ongoing	Ongoing throughout GSP implementation	Significant effort has been undertaken by DWR and the YSGA to collect additional data to better characterize the aquifer, particularly in data gap areas where new wells have been drilled since the hydraulic parameters were developed for the model. Several new geologic cross-sections for Hungry Hollow and Yolo-Zamora are being developed with this data. Once all available data are compiled and digitized, a full update of the model's hydraulic parameters will be completed.
MA 12	Coordinated Response to Minimum Threshold Exceedances	The YSGA will coordinate responses to MT exceedances. When a single well MT is exceeded, the YSGA will verify the exceedance, analyze causes and trends, and evaluate mitigation. When multiple wells exceed MTs, causes and trends will be evaluated by MA entities, and potential mitigation actions (projects and management actions) will be identified. When wells exceed the MT for an MA, causes and trends will be evaluated, potential mitigation actions (projects and management actions) will be evaluated, and a plan for implementation will be developed. This will involve basin wide coordination.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Ongoing	Ongoing throughout GSP implementation	MA committees will be established by 2029 so that projects and management actions can be identified to mitigate any future exceedances.
P 1	Identification of Locations Vulnerable to Damage from Subsidence - Catalog of Infrastructure Damage Reports	This project would improve the ability to define and quantify the sustainable management criteria for subsidence. Sustainability indicators for subsidence could be better informed if the impacts caused by potential subsidence were catalogued. The sustainable management criteria for subsidence would be improved by identifying infrastructure that subsidence would negatively impact.	☐ Chronic lowering of groundwater levels & storage ☐ Water quality ☑ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	Estimated completion in 2032	Improved knowledge of critical infrastructure and understanding of potential impacts from subsidence in the Yolo Subbasin.
P 2	Groundwater Model Enhancement Program/YSGA Model Improvements	Better understanding of groundwater conditions in the Yolo Subbasin is attainable by using the YSGA model. This project would continue working with the YSGA model to calibrate and refine model inputs, outputs, and parameterization. Improved evapotranspiration (ET) data could be used to enhance the total water balance in the Subbasin. A primary groundwater model enhancement could be to improve crop ET accuracy by developing local crop coefficients based on remote sensing and energy-balance analyses. This project would include incorporating improved land-use datasets for future scenarios and revising "managed wetlands" classifications in the current YSGA model. Additionally, there are other existing models at finer scales, specifically in the Capay Valley, that might be useful for calibrating and parameterizing the YSGA model. This will be a continuous project, and updates to the model can be made when improved input datasets become available or are created.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Ongoing	Ongoing throughout GSP Implementation.	Several improvements were made to the land use inputs for the YSGA model to increase accuracy. LandIQ datasets were incorporated into the 2023. 2024 and 2025 annual report model runs to quantify more accurately land use data for the Subbasin. Subject matter experts were consulted to adjust particular crop coefficients to make them more accurate to the Sacramento Valley as well as vary the coefficients based on crop age for certain perennial crops. Managed wetland acreage was quantified through collaboration with wetland managers, satellite imagery, and incorporated into the model.
P 3	Water Resources Information Database Project	This project would include updates to the existing WRID system and potential additional projects related to data storage and sharing. This project would improve the hosting, visualization, and storage of data related to the YSGA and the Yolo GSP.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	In Progress	Ongoing.	The sgma.yologroundwater.org website was launched, allowing stakeholders to access groundwater level data online (and in real-time at certain monitoring stations). Additional data were added to the WRID through collaboration and data sharing with member entities. Future improvements are planned, including the incorporation of water quality and land subsidence data to the public portal.

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P 4	Topographic Mapping (LiDAR Project)	This project would improve topographic mapping of the Yolo Subbasin, including surface water bodies.	☐ Chronic lowering of groundwater levels & storage ☐ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Conceptual	Planning.	This project was not a high priority during this implementation period; however, it may receive more attention in the coming years. Potential benefits would include improved understanding of the extent and magnitude of subsidence, as well as surface water flows.
P 5	Additional monitoring wells along ephemeral streams, interconnected surface water bodies, and near GDEs.	Additional monitoring wells along ephemeral streams in the subbasin may improve the YSGA's understanding of the surface water/groundwater of ephemeral streams in the subbasin.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☑ Depletions of interconnected surface water	In Progress	YSGA applied to DWR's Technical Support Services program to construct additional monitoring wells along Putah Creek, parallel to existing sites monitored by Solano County Water Agency. As of WY 2024, site planning efforts were still underway, but design and construction are anticipated in 2026.	Increased data related to interconnected surface waters.
P 6	Vegetative and aquatic surveys in relation to groundwater dependent ecosystems.	This project would Improve the ecological inventory of GDEs in the Yolo Subbasin	☐ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☑ Depletions of interconnected surface water	In Progress	YSGA staff and interns began a ground-truthing effort to visit and collect data on polygons identified in the NCCAG dataset. Expected completion in 2027.	Once complete, YSGA will gain an improved understanding of the true spatial extent of GDEs within the Subbasin, allowing for more informed decision making when setting minimum thresholds for all beneficial users of groundwater.
P 7	AEM Flights to improve subsurface geology data	Airborne Electromagnetic (AEM) surveys can provide useful information about subsurface geology. This data could potentially improve understanding of aquifer conditions in the Yolo Subbasin. The YSGA is proposing to partner with DWR to implement AEM surveys in areas where the data obtained will be particularly useful. According to DWR's AEM Survey datasheet, "During an AEM survey, a helicopter tows electronic equipment that sends signals into the ground, which bounce back. The process has been compared to taking an MRI of the ground's subsurface. The collected data are used to create continuous images that are interpreted to characterize underground geology. The resulting information will provide a standardized, statewide dataset that improves the understanding of aquifer structures. It can also help with the development or refinement of hydrogeologic conceptual models and can help identify areas for recharging groundwater."	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Complete	Completed in 2023.	YSGA will use data published in the AEM survey reports in future model updates to better characterize the geology of the Subbasin. AEM data can also serve to identify areas that may be more conducive for groundwater recharge activities.
P 8	Abandoned Well Incentive Program	Creation of an incentive program that would pay for the destruction of old, abandoned wells. There are other existing programs that could be the foundation for this proposal. The objectives of this program would be to provide landowners with an incentive-based, volunteer program with the intent of protecting the quality of groundwater, eliminating the safety hazard of open wells to humans and livestock, and promoting the importance of water quality within the Yolo Subbasin. Requires coordination with Yolo County Department of Environmental Health for proper permitting.	☐ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	Expected completion in 2032.	If implemented, this project may improve groundwater quality by eliminating any potential improperly abandoned wells.
P 9	Modernization Project: Integrated Precision Water Management	The district will modernize 16 miles of its main canal. Automatic water control gates will allow the District to operate its main system with more flexibility.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence	Ongoing	Eight automated gates have been added to the Hungry Hollow, East Adams, and Acacia Canals. More	Increased efficiency in coordinating groundwater recharge efforts. Automated gates also reduce water waste in the system and encourage surface water use when available.

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			☐ Depletions of interconnected surface water		automation will be added as funding allows.	
P 10	Exchanges between CVP or SWP system and Cache Creek System	Surface water transfers between the CVP or SWP and the Yolo Subbasin. Potentially Sites Reservoir.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	TBD	If implemented, this project would increase surface water supply reliability.
P 11	Flood Monitoring Network Project	This project would install flow-monitoring stations in canals and sloughs to optimize conveyance capacity for both agricultural operations and during rain events, which could occur simultaneously. It is currently unknown how much flow sloughs contribute to the canal systems during rain events- the project would fill this data gap.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	In Progress	Expected completion in 2032.	Increased data collection related to surface water availability within the Subbasin.
P 12	Yolo County Drains and Sloughs - Governance and Maintenance Study	YCFC&WCD and the County will work together to develop a governance and maintenance study that will assist in providing effective rural stormwater management responsibilities based on the defined governing bodies. Plan/investigation will initiate a legitimate stormwater management program in Yolo County.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	Planning.	Improved stormwater management and infiltration capacity.
P 13	Zamora area winter recharge from Cache Creek via China Slough	This project would develop groundwater recharge capacity by utilizing China Slough and conveying water to the Zamora area. Utilizing existing YCFC&WCD infrastructure would allow for water to reach China Slough and be conveyed to the Zamora area. This project is related to another proposed project—West Adams Canal Renovation and China Slough Rehabilitation (P 29). The rehabilitation of China Slough would likely need to occur prior to any successful groundwater recharge events occurring.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☑ Land subsidence ☐ Depletions of interconnected surface water	Planning	As of the end of WY 2024, the feasibility study and water availability analysis had been initialized. Permitting requirements will continue to be evaluated, and a Lake Streambed Alteration permit will likely be required for rehabilitation activities. Project completion is expected in 2028.	Increased recharge capacity in the Yolo-Zamora area with the introduction of surface water supplies via China Slough, leading to improvements in groundwater levels and easing land subsidence.
P 14	Dunnigan Hills Winter Runoff Capture for Recharge	Runoff water from the Dunnigan Hills and Hungry Hollow could be diverted into the N Adams Canal and sent to Yolo-Zamora for winter recharge. This project would utilize excess water in Dunnigan Hills and Hungry Hollow and send it east towards the Yolo Zamora area.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	Expected completion in 2032.	If implemented, this project would decrease the risk of downstream flooding and improve groundwater recharge capacity.
P 15	Winter Diversions from Tehama-Colusa Canal	This project would divert excess winter water from the Tehama Colusa Canal to the Yolo-Zamora area for winter recharge.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	Removed	
P 16	Bird Creek surface water storage	160 TAF of potential storage exists in the Bird Creek basin. Installing a dam along Bird Creek would potentially decrease North Yolo MAs' reliance on groundwater. Developing a reliable surface water supply would be beneficial	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence	Conceptual	Removed	

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		to users in white areas of the Subbasin and could be particularly beneficial to water users whose reliance on groundwater is high.	☐ Depletions of interconnected surface water			
P 17	Bird Creek, Oat Creek, Buckeye Creek, 2047 Canal groundwater recharge infrastructure improvements	This project is a proposal to improve groundwater recharge in the North Yolo MA. There are a couple of options for doing this. The installation of small weirs could increase the retention time of surface water in the Creeks. Additionally, surface water that remains in the 2047 Canal during winter could be rediverted to a ditch with better percolation properties. Areas with high infiltration rates are known by local entities and operators; diversions for groundwater recharge could be directed to these areas.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	In Progress	Stream gages will be installed on Buckeye and Bird Creeks in WY 2025. Additional infrastructure improvements will be completed as needed.	Stream gages will increase surface water data collection and inform what amount of trickle flow is appropriate for ensuring applied water is infiltrated into the groundwater basin.
P 18	Hardwood Subdivision Recharge	CalTrans utilized a parcel on the southwest side of the Hardwood Subdivision of Dunnigan to build the County Road 6 overpass of I-5. This parcel is owned by stakeholders in the Yolo Zamora area and may be suitable for recharge. The parcel is currently unutilized for agricultural production and may be an ideal location to develop a groundwater recharge site.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☑ Land subsidence ☐ Depletions of interconnected surface water	Planning	Construction of recharge basin expected to be completed in 2026.	Improved recharge capacity within Dunnigan Water District, leading to increases in nearby groundwater levels.
P 19	Schaad Ranch/Buckeye Creek Recharge	Buckeye Creek runs through Schaad Ranch at approximately County Rd 88, where Buckeye Creek crosses the roadway. There is a Dunnigan Water District turnout near the stream course and several monitoring wells, including a DWR well. "215" water or other waters could be diverted into the stream course and small, temporary weirs placed or created to slow it and enable recharge.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Ongoing	Ongoing	Benefits observed are described in P 20 below.
P 20	Trickle Flow Recharge at Buckeye and Bird Creeks	The Tehama-Colusa Canal has several side gates used to dewater sections of the canal. These drain into ephemeral streams like Buckeye Creek and Bird Creek in Yolo County. Dunnigan Water District successfully piloted this concept in Buckeye Creek during 2023 and 2024. Additional infrastructure to support recharge diversions, including stream gages to monitor flows, will be installed in 2025. Trickle flows will be sent through Buckeye and Bird Creeks whenever water conditions are favorable to do so.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Ongoing	Ongoing	1,240 acre-feet (AF) was recharged through Buckeye Creek in 2023, and an additional 310 AF was recharged in 2024. Upon full project buildout, additional recharge capacity would be achieved via ephemeral streams in the North Yolo MA, leading to improvements in local groundwater levels.
P 21	Extension of Tehama Colusa Canal	This project would extend the existing Tehama Colusa (TC) Canal south. By extending the TC canal, water users south of Bird Creek in the Yolo Zamora area of the North Yolo MA may be able to access additional surface water supplies in certain years. Easements may already exist on properties south of Bird Creek that would facilitate the extension of the TC canal.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	This concept will be incorporated in the feasibility study described in P 13, with expected completion in 2028.	Introduction of surface water supplies in the Yolo-Zamora area, thereby augmenting current groundwater supplies and contributing to in-lieu recharge.
P 22	Conjunctive Use/groundwater recharge/surface water delivery extension to the area around Zamora	Determine the most feasible source of surface water supplies for the Yolo-Zamora area, whether from Cache Creek or the Sacramento River.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☑ Land subsidence ☐ Depletions of interconnected surface water	Planning	This concept will be incorporated in the feasibility study described in P 13, with expected completion in 2028.	Introduction of surface water supplies in the Yolo-Zamora area, thereby augmenting current groundwater supplies and contributing to in-lieu recharge.
P 23	Additional Extensometers in North Yolo MA	DWR installed one Continuous Global Navigation Satellite System (CGNSS) station and two corner reflectors on RD108 land to help improve land subsidence monitoring accuracy and fill in data gaps.	☐ Chronic lowering of groundwater levels & storage ☐ Water quality ☑ Land subsidence ☐ Depletions of interconnected surface water	Ongoing	Three new monitoring stations were completed in 2025. Additional stations will be added as needed and where feasible.	One additional GPS subsidence monitoring station and two new corner reflectors that allow for improved spatial coverage of InSAR data and overall improved subsidence monitoring capability.

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P 24	Add real-time static level monitoring equipment to the Washington Street well in Yolo	To react better to changes in available water and provide constant historical data that are shared directly to the GSA.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☑ Land subsidence ☐ Depletions of interconnected surface water	Complete	Real-time monitoring equipment installed on Cacheville CSD well in 2021.	Improved groundwater level data collection to measure real-time response to changing hydrologic conditions. Data available at https://sgma.yologroundwater.org/#40518
P 25	Add real-time static level monitoring equipment to the Ridgecut well in Knights Landing	To react better to changes in available water and provide constant historical data that are shared directly to the GSA.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☑ Land subsidence ☐ Depletions of interconnected surface water	Complete	Real-time monitoring equipment installed on Ridge Cut well in 2021.	Improved groundwater level data collection to measure real-time response to changing hydrologic conditions. Data available at https://sgma.yologroundwater.org/#40357
P 26	Sites West Sac. Valley Water Filtration System	Domestic Water Use Filtration System for Sites Reservoir Sphere of Influence in West Sac Valley. Project could focus on Colusa and North Yolo Counties or extend northward into Shasta County.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	TBD	Additional surface water supplies available to augment groundwater use.
P 27	Sutter Buttes and Willows Fault Arsenic and Saltwater Study	This is a proposed US Geological Survey study to follow up on "Future Work" detailed in the Master's Thesis of Stephen Springhorn entitled "Stratigraphic Analysis and Hydrogeologic Characterization of Cenozoic Strata in the Sacramento Valley Near the Sutter Buttes."	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Removed		
P 28	Forbes Ranch Regulating Pond	This project would develop and construct a 200-AF regulating pond to reduce drainage and flood waters through the town of Madison and District canal system. Divert stormwater flows to the pond through the existing conveyance. The regulating pond would provide storm water retention during the winter and would allow for groundwater recharge in the spring and summer when capacity and water is available. The regulating pond would provide water quality benefits.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Planning	Expected to be completed by 2032.	Dual benefit project with increased flood control and groundwater recharge capacity.
P 29	West Adams Canal Renovation and China Slough Rehabilitation.	This project would result in the enlargement and improvement of the YCFC&WCD's West Adams, East Adams, and Acacia Canal system, and rehabilitation and improvement of China Slough (a natural storm drainage channel). YCFC&WCD's canal system could be modernized to allow for a "demand" system and to ensure no spills. The project would require cleaning China Slough, constructing an operating road, and installing about eight check structures. Improvement of this system would increase capacity for groundwater recharge, both in-lieu and actual.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	In Progress	As of the end of WY 2024, four automated gates and one upgraded check structure have been installed on the East Adams and Acacia canals. A feasibility study for rehabilitation of China Slough has been initialized, with expected completion in 2028.	Automated control of canal system will improve efficiency of surface water conveyance and groundwater recharge canal operation during the winter months, leading to increased recharge capacity within the District and overall increases in groundwater levels.
P 30	Diaz in-line reservoir	The Diaz in-line reservoir project would include the creation of an in-line reservoir on Clover Canal. This would help improve water-use efficiency and encourage greater conjunctive use by making surface water easier to use. This location could also possibly be used for increased groundwater recharge.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2042.	Increased groundwater recharge capacity and conjunctive use benefits

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P 31	Magnolia Canal Loss Reduction and Extension Project	A proposed 1.5 miles of pipeline to extend and reduce loss in the Magnolia Canal system. Currently, Magnolia Canal has high losses to groundwater, so this loss reduction project would likely decrease the current amount of surface water to groundwater recharge. Extending the canal, however, may allow for decreased reliance on groundwater at the end of Magnolia Canal. A cost-benefit analysis will be conducted prior to project implementation. Quantification of the changes in groundwater recharge will need to be made to determine the benefits of this proposed project.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2042.	Increased efficiency in surface water delivery
P 32	Demand Delivery on Yolo Central and Pleasant Prairie Canals	This project would Increase surface water usage by making it easier and more convenient for water users to use surface water on the Yolo Central and Pleasant Prairie Canals. This project should result in lower groundwater demands and lower reliance on groundwater. Infrastructure would need to be developed on these canals to allow water users to utilize surface water supplies more easily.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion expected by 2035.	Increased efficiency in surface water delivery
P 33	North of Winters multi-use, stormwater, and water storage pond, "Winters North Area Stormwater Pond"	This project proposes developing and constructing a 5,000-AF storm water retention pond in the north area of Winters to reduce drainage and flood waters from the Chickahominy Slough. Similar to the District's Chapman Reservoir, the project would install automated gates and monitoring devices at the retention pond that would be connected to the District's Supervisory Control and Data Acquisition (SCADA) system for real-time management.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2032.	The retention pond would also be used for groundwater recharge and flood control. The retention pond would provide water quality benefits by allowing the sediments in the runoff to settle and lessening the transfer of pollutants and chemicals downstream. The surrounding area would have native vegetation that would promote benefits for wildlife habitat, and the property would allow groups to visit and learn about the multi-beneficial, multi-agency partnership.
P 34	West Winters Aquifer Storage and Recovery Well Field	Surface water from Putah Creek, or the YCFC&WCD canal system, could be injected west of Winters and extracted to blend with City of Winters wells exceeding arsenic or hex-chrome. Other City wells could be pumped directly to Putah Creek as in-lieu exchange for water injected to SARs field.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2032.	Increased groundwater recharge via injection and in-lieu benefits. Water quality would be improved through blending groundwater with surface water sources.
P 35	Development of Surface Water Source for the City of Winters	Winters could purchase water from Solano Project, treat, and blend with groundwater. Blending would reduce water quality issues, and use of surface water would reduce reliance on groundwater. Long-term contracts would be required and, because Winters historically declined Solano Project water rights, this could be problematic.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Planning	Feasibility study funded by the SGMA implementation grant was initialized in 2024, expected completion in 2027.	Improvements to groundwater levels via in-lieu recharge.
P 36	City of Davis - Aquifer Storage and Recovery (ASR)	This project would include researching the potential for ASR—placing treated surface water into the intermediate aquifer during winter months and using the stored water to augment surface water supplies in summer months. A feasibility study has been completed, and pilot testing is underway.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Complete	The City has completed the ASR feasibility study and is now in the process of designing and pilot testing three ASR wells.	Upon completion, ASR wells will increase water supply resiliency by storing surface water when available for later use during drought conditions.
P 37	Upstream Flow Management to Prevent Madison Flooding and to Facilitate GW Recharge	YCFC&WCD proposes to manage high flows from Lamb Valley, Cottonwood, and S. Fork Willow Sloughs using the existing canal system as well as other means such as upstream check dams. During storm events, Willow Slough floods the town of Madison. The Canal system can be used to convey water away from the town of Madison and reduce flood levels while also managing peak flows through use of check dams, particularly in Lamb Valley Slough. This project would increase groundwater recharge during winter storm events.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2032.	Dual-benefit project with increased flood control and groundwater recharge capacity within the District.

PMA Number	Project or Management Action Name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Updates and Expected Schedule	Benefits Observed to Date/ Estimated Accrued Benefits at Completion
P 38	Madison Farmer Field Stormwater Capture and Groundwater Recharge	This is a proposed modification of farmer fields around Madison, specifically those next to Highway 16 and those that will capture upstream flows. The two options considered include (1) 1,200 acres of farmer field modification for rainfall capture (8-inch berm) and (2) modification of a farmer field near Cache Creek for rainfall and storm water runoff capture, a 3-foot high storm water detention basin. This project will require farmer participation and advanced planning for field modification.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2032.	Dual-benefit project with increased flood control and groundwater recharge capacity within the District.
P 39	City of Davis -Site Survey for Hardscape Conversion to Pervious Pavement	This project proposes surveying public parking lots that currently have impervious surfacing to assess the practicality of converting these locations to pervious pavement when they next need resurfacing, maintenance or redesign. Portions of the pathways near the sites could potentially highlight permeable pavers in addition to the parking lots. Projects could be planned with improvements to incorporate bioswales, low-water-use plants, and other low-impact design measures into any landscape changes.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Removed		
P 40	City of Davis - West Area Pond Redesign	This would be a redesign of the West Area Pond (detention basin) to utilize agricultural summer flows to enhance aquatic wildlife habitat and improve water quality. This proposal involves redirecting existing agricultural runoff through the Stonegate drainage pond and pumping it into the West Area Pond.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	TBD	Enhance aquatic habitat while improving any water discharges through retention, enhancing opportunities for infiltration, transpiration and evaporation.
P 41	Sac River Water to Davis/Woodland	This project has already been implemented. The Woodland-Davis Clean Water Agency will continue to use Sacramento River water when available and supplement with groundwater when needed.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Complete	Completed prior to GSP implementation	The average surface water utilization is around 40,000 AF/year, providing in-lieu benefits to groundwater recharge. The effects of this project are being studied.
P 42	City of Woodland - Well 31 ASR Project	The project involves the design and construction of a new municipal ASR well #31 near the site of the existing Well #6. The new ASR well will facilitate groundwater recharge by injecting treated surface water into the gravel layer approximately 500 feet below the surface when surplus Sacramento River water is available during winter months.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	In Progress	Expected completion in 2027	Additional 2,000 gallons per minute (gpm) of surface water storage capacity within the City of Woodland's ASR system
P 43	City of Davis Leak Detection Survey	This project proposes hiring a consultant to use acoustical listening technology to survey water mains and laterals within the City of Davis water distribution area to detect and locate leaks. Prioritize leaks based on severity. Purchase leak detection equipment to install within the distribution system to continuously monitor for potential leaks at key areas identified through the leak detection survey.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Ongoing	Ongoing	Reduce water waste and, by identifying and repairing leaky pipes, thereby improve overall water supply in the long run.
P 44	Woodland Recycled Water Utility Expansion Project (Phase II)	The City of Woodland currently has tertiary treated Title 22 effluent from the City's Water Pollution Control Facility (WPCF) providing a firm capacity of approximately 2,700 gpm for recycled water. Woodland has an existing recycled water utility serving 2 City parks and a large industrial user in the industrial area northwest of the WPCF. The City has planned for an expansion of the recycled water utility into the Spring Lake Area of the City, which will also serve the planned Woodland Research & Technology Park. There are several existing large water users that would use the recycled water for irrigation of parks and roadside landscaping. Businesses in the Research Park would utilize recycled water for cooling buildings. In addition, recycled water	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Complete	Completed in 2024	Additional 110 AF/year of recycled water supply available for landscape and industrial uses.

PMA Number	Project or Management Action Name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Updates and Expected Schedule	Benefits Observed to Date/ Estimated Accrued Benefits at Completion
		would be available to extend into new development areas for landscape irrigation. Portions of recycled water pipelines in Spring Lake have already been constructed by development projects. Providing recycled water to these areas would reduce demand on the potable water distribution system and on the groundwater aquifer. The recycled water pipeline would be constructed in the City's existing right of way. The City has recently completed a Mitigated Negative Declaration for the project. The expected initial demand for recycled water would exceed 110 AF/year. The Capital Cost for the Project is approximately $2.5M. The recycled water project includes construction of approximately 10,000 feet of 8-inch diameter purple pipe and a 100,000-gallon storage tank. The project also provides recycled water for expansion (Phase III) to west of Highway 113.				
P 45	Woodland Recycled Water Utility Expansion Project (Phase III)	The City of Woodland currently has tertiary treated Title 22 effluent from the City's WPCF, providing a firm capacity of approximately 2,700 gpm for recycled water. Woodland has an existing recycled water utility serving 2 City parks and a large industrial user in the industrial area northwest of the WPCF. The City has planned for an expansion of the recycled water utility into the Sports Park Area of the City, which would also serve the planned SP1B and SP1C areas in the City's General Plan. There are several existing large water users that would use the recycled water for irrigation of parks and roadside landscaping. In addition, recycled water would be available to extend into new development areas for landscape irrigation. Providing recycled water to these areas would reduce demands on the potable water distribution system and reduce the demand on the groundwater aquifer. The recycled water pipeline would be constructed in the City's existing right of way. The City has recently completed a Mitigated Negative Declaration for the project. The expected initial demand for recycled water would exceed 70 AF/year. The Capital Cost for the Project is approximately $925,000. The recycled water project includes construction of approximately 4,300 feet of 8-inch diameter purple pipe.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Planning	Estimated completion in 2035.	Additional 70 AF/year of recycled water supply available for landscape and industrial uses.
P 46	City of Davis - Recycled Water Pump Station	With the completion of secondary and tertiary improvements, the City's Wastewater Treatment Plant is now capable of producing tertiary disinfected effluent that meets the requirements of Title 22 of the California Code of Regulations for recycled water.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Complete	Completed in 2024.	Recycled wastewater has increased water supply availability for landscape and industrial uses within the City. However, a final component of these upgrades is a means of delivering the recycled water produced at the wastewater treatment plant to potential future customers. New infrastructure will be necessary to deliver this recycled water.
P 47	YCFC&WCD Winter Recharge	This project increases winter recharge by utilizing YCFC&WCD sloughs and canals. This is an ongoing project and can only be conducted under certain circumstances. The water diverted into unlined district canals varies on an annual basis between a minimum of 0 AF/year and a maximum of around 30,000 AF/year.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Ongoing	The District has applied for temporary permits from State Water Resources Control Board (SWRCB) in each of the past ten years to conduct winter diversions from Cache Creek. To ensure stable operation of this project, the District is working on a long-term water right application, which will be submitted in 2026. SWRCB may take between 7 – 10 years to	Since 2016, this project has recharged about 40,000 AF into the aquifer through the District's unlined canal system. As on-farm recharge and dedicated recharge basins are incorporated into the project, total recharge capacity will increase as will the potential benefits to nearby groundwater levels.

PMA Number	Project or Management Action Name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Updates and Expected Schedule	Benefits Observed to Date/ Estimated Accrued Benefits at Completion
					decide on the long-term application, so the District will continue to submit temporary permits during the interim period to maintain project operations. Infrastructure improvements specific to groundwater recharge continue to be evaluated and constructed as funding is made available.	
P 48	City of Winters Recycled Water Utilization	The City of Winters Waste Water Treatment Facility is secondary treatment. This water is currently discharged to 170 acres on two spray fields. No water leaves the facility, and none of the effluent comes into contact with any surface waterway. In 2020, 267.4 AF of water was discharged for percolation and evaporation. In 2019, 240 AF was discharged for percolation and evaporation. This project is ongoing. There may be opportunities to develop the groundwater recharge aspect of this project.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Planning	Feasibility study funded by the SGMA implementation grant was initialized in 2024, expected completion in 2027.	Improvements to groundwater levels via in-lieu recharge
P 49	Citrona Ditch Pressurization Project	This project would increase the adoption of surface water over groundwater when available. This is a 10 – 15 cubic feet per second (cfs) supply, for four customers on 10 fields.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2042.	Improvements to groundwater levels via in-lieu recharge
P 50	RD 2035 - Groundwater Studies	Reclamation District 2035's Ground Studies Project will consist of the identification and analysis of issues, if any, surrounding the quality and availability of groundwater within their district.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Planning	If initialized, completion is expected by 2042.	Data collection and improved knowledge of basin conditions
P 51	RD 2035 - Floodway Corridor Project	The project consists of piping (or lining) the Cross Bypass Canal and installing flow-control and measurement devices to improve the conveyance system and increase water-use efficiency.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2042.	Increased efficiency in surface water delivery
P 52	RD 2035 - Conjunctive Use Study	The project consists of the study and analysis of the coordinated use of surface and groundwater that could benefit the agricultural, urban, and environmental interests within, nearby and downstream of Yolo County, especially the North Delta region.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2042.	Increased efficiency and better understanding of the benefits of conjunctive use operations within RD 2035.
P 53	Water Hexavalent Chromium (Cr6) Compliance Project	City of Winters Hexavalent Chromium-related projects to improve water quality.	☐ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence	Planning	Completion expected by 2026 to comply with the new MCL.	Provides pathway for compliance with the new Hexavalent Chromium (Cr6) MCL.

PMA Number	Project or Management Action Name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Updates and Expected Schedule	Benefits Observed to Date/ Estimated Accrued Benefits at Completion
			☐ Depletions of interconnected surface water			
P 54	UC Davis Arboretum Waterway Wetland Restoration and Enhancement	UC Davis is proposing to enhance the Arboretum Waterway, which captures stormwater discharge from 900 acres of the UC Davis campus, by establishing a wetland area to treat stormwater discharge and recycled water prior to discharge to Putah Creek.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Complete	Completed in 2024.	Dual-benefit project with increased flood control and groundwater recharge capacity within the UC Davis Arboretum.
P 55	City of Woodland - North Regional Pond and Pump Station	This project involves the design and construction of an approximate 75-acre sedimentation pond and a pump station able to eventually accommodate a 120-cfs design flow. Project repurposes an existing City evaporation pond that is no longer in use for any purpose. There may be some groundwater recharge benefits as a result of this project. The primary benefit is stormwater treatment and retention. This project is operational and is substantially completed.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Complete	Completed in 2023.	Additional stormwater capacity within the re-purposed retention basin. Stormwater that ends up in the North Regional Pond either evaporates or infiltrates into the groundwater basin.
P 56	Improved hydrologic flows, increased runoff retention, and improved watershed health in the Capay Valley	These projects would improve groundwater levels, groundwater quality, and surface water-groundwater Interaction in the Capay Valley MA. This would include the creation of demonstration sites for capturing hillside run-off, process-based restoration in selected tributaries of Cache Creek, and improvement of overall watershed health to improve overall groundwater conditions.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☑ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2035.	Increased recharge capacity in the Capay Valley, leading to improvements in groundwater levels.
P 57	Enhanced water infiltration via grazing management and crop production practices in the Capay Valley	For every 1% increase in soil organic matter, water holding capacity can increase by 20,000 gallons per acre. Some crop production practices are known to improve water infiltration and water holding capacity. Pilot projects, scaling, and community adoption are all components of these projects.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2035.	Increased recharge capacity in the Capay Valley, leading to improvements in groundwater levels.
P 58	Oak woodland, riparian, and chaparral restoration in the Capay Valley	Develop a restoration plan and demonstration sites. Then scale up the demonstration sites to other areas in the Capay Valley MA. Improving the health of oak woodlands, riparian areas, and chaparral can improve the hydrological and ecological function of these areas.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☑ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2035.	Increased recharge capacity in the Capay Valley, leading to improvements in groundwater levels.
P 59	Establish an equipment and knowledge hub in the Capay Valley	A one-stop-service Equipment and Knowledge Hub will be established to make available services and equipment that support the projects described above and their application into perpetuity. Services and equipment will be tailored to the needs of livestock managers, crop producers, and habitat restorationists. The aim will be to make available the knowledge and tools that are not yet readily available and are necessary for farmers/ranchers/others to adopt practices for improving groundwater management.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2035.	Improved data collection and sharing within the Capay Valley Management Area.
P 60	Rumsey and Guinda Ditch Winter Recharge	Development of groundwater recharge capacity by utilizing Rumsey and Guinda ditch and conveying water to the Capay Valley.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2035.	Increased recharge capacity in the Capay Valley, leading to improvements in groundwater levels.

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P 61	Guinda Ditch summer irrigation and pipelines from Cache Creek to other side of HWY 16	Guinda ditch could be reactivated to provide additional Cache Creek water during the irrigation season to Capay Valley.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2035.	Connect additional farm fields to surface water supplies from Cache Creek, leading to increases in groundwater levels from in-lieu recharge.
P 62	Yocha Dehe Wintun Nation - expansion of Surface Water Diversion	This is the continuation of an existing project that allows the Yocha Dehe Wintun Nation to utilize surface water resulting in in-lieu recharge of groundwater.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2035.	Improved surface water diversion capacity for Yocha Dehe Wintun Nation, leading to increases in groundwater levels from in-lieu recharge.
P 63	Improve Subsidence data collection and analysis in the Capay Valley management area	This encompasses projects to improve the understanding of subsidence in the Capay Valley. This can be done by installing extensometers or securing funding to better understand land subsidence in the Capay Valley.	☐ Chronic lowering of groundwater levels & storage ☐ Water quality ☑ Land subsidence ☐ Depletions of interconnected surface water	Complete	Since the 2022 GSP, InSAR land subsidence data has been made available in the Capay Valley. Sustainable management criteria for are established in this Periodic Evaluation.	Improved data collection and sharing within the Capay Valley MA specific to land subsidence.
P 64	Incorporation of Capay IGSM into the YSGA Model	This falls under the "Updates to the YSGA Model" project that is applicable to the entire subbasin. The Capay Integrated Groundwater Surface water Model was developed by WRIME in 2010 and updated by RMC in 2016. Components of this model may be incorporated into the YSGA Model to improve overall understanding of groundwater in the Capay Valley.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2035.	More accurate representation of the Capay Valley within the YSGA model.
P 65	Yolo Bypass Conservation Projects	These are projects that relate to changes in land use, surface water flows, and groundwater use in the Yolo Bypass.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☑ Depletions of interconnected surface water	Ongoing	Completion expected by 2042.	Improvements in groundwater levels in the South Yolo MA, including benefits to interconnected surface water bodies, wetlands, and groundwater dependent ecosystems.
P 66	Revisions to the YSGA Model for Urban Groundwater usage in the South Yolo MA	This project would ensure that the water budget for the South Yolo MA accurately reflects changes in urban groundwater usage in this area moving forward.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Conceptual	Completion expected by 2042.	More accurate representation of the South Yolo MA within the YSGA model.
P 67	Methylmercury Impacts analyses for the Yolo Bypass	Yolo County proposes to collect data and analyze changes in methyl mercury production and bioaccumulation that could result from (1) a proposed Bay Delta Conservation Plan (BDCP) project to enhance fisheries habitat in the Yolo Bypass; and (2) a Central Valley Flood Protection Plan proposal to expand the Yolo Bypass to improve flood capacity	☐ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	Completion expected by 2042.	Improved understanding of water quality changes in the Yolo Bypass.
P 68	West Sacramento ASR Feasibility Study	Groundwater recharge and extraction project for groundwater storage, groundwater quality management, and system redundancy.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence	Conceptual	Estimated completion in 2035	Increased water supply resiliency by storing surface water when available for later use during drought conditions.

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			☑ Depletions of interconnected surface water			
P 69	West Sacramento and City of Sacramento Intertie	Coordinate conjunctive use activities and provide emergency water supplies.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Ongoing	Estimated completion in 2035	Increased water supply resiliency by having an additional source of backup supply to call upon when surface water is curtailed.
P 70	Dry well groundwater recharge on California Olive Ranch	With olives being more sensitive to Flood-MAR projects, this project proposes the construction of dry wells to facilitate on-farm recharge at the California Olive Ranch. Excess surface water would be supplied by YCFC&WCD and infiltrated into the groundwater basin via these dry wells.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If implemented, completion is expected by 2042.	Increased recharge capacity within the District, leading to improvements in groundwater levels.
P 71	Projects to improve understanding of surface water/groundwater interaction around Oat Creek and Buckeye Creek/others in Dunnigan/North Yolo areas.	Additional streamflow monitoring and dedicated groundwater monitoring wells are proposed to improve understanding of groundwater levels and surface water-groundwater interaction in the surface water bodies in the Dunnigan Hills area.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☑ Depletions of interconnected surface water	In Progress	Stream gages will be installed on Buckeye and Bird Creeks by 2027. Additional infrastructure improvements will be completed as needed.	Stream gages will improve surface water data collection and inform a better understanding of the surface-groundwater interaction at these creeks.
P 72	Additional groundwater monitoring wells in the Dunnigan Hills MA	There are currently very few groundwater monitoring wells in the Dunnigan Hills MA. The addition of dedicated monitoring wells will improve the understanding of groundwater in this area. Few wells in this Management Area have long records, but the YSGA has identified wells and landowners who would like to be involved in the groundwater monitoring program.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☑ Depletions of interconnected surface water	Ongoing	Seven monitoring wells in the Dunnigan Hills MA were incorporated into the YSGA network, with most records beginning in 2021 and 2022. Going forward, measurements will be taken biannually in the spring and fall. Additional monitoring wells will be added as they become available.	Increased data collection and understanding of groundwater levels within data gap areas.
P 73	O'Halloran off-stream reservoir site	A proposed off-stream reservoir that would improve surface water delivery efficiency and conjunctive use. This project would also likely be utilized to generate peak-hour electricity.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Removed		
P 74	Additional groundwater monitoring wells in the Clarksburg MA	There are currently very few groundwater monitoring wells in the Clarksburg MA. The addition of dedicated monitoring wells will improve the understanding of groundwater in this area. This monitoring network would include water quality measurements in this area. There are few wells in this area with long periods of record, but monitoring could start now. Wells and landowners have been identified with interest in improving the groundwater monitoring network program.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☑ Depletions of interconnected surface water	Ongoing	One new monitoring well was incorporated into the YSGA network, with records going back to 2010. Going forward, measurements will be taken biannually in the spring and fall. Additional monitoring	Increased data collection and understanding of groundwater levels within data gap areas.

PMA Number	Project or Management Action Name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Updates and Expected Schedule	Benefits Observed to Date/ Estimated Accrued Benefits at Completion
					wells will be added as they become available.	
P 75	Reclamation District 999 - Elk Slough Groundwater Quality Improvement and Flood Protection Project	Elk Slough is currently closed to the fresh water of the Sacramento River and is maintained by tidal inflows from Sutter Slough. Elk Slough water quality is typically similar to that of the river; however, when salinity intrusion increases during droughts, the slough water quality declines.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2042.	Improvements to nearby surface and groundwater quality.
P 76	Boards In Program	This would be a voluntary or financially incentivized program to have landowners keep the spill boards in their rice fields during the winter. This would increase groundwater recharge in the subbasin and would be a multi-benefit project. Even though these fields tend to have low infiltration, there would still be benefits from this sort of program.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	If initialized, completion is expected by 2042.	Improved groundwater recharge capacity within the Yolo Subbasin, leading to improvements in groundwater levels and storage.
P 77	Cover cropping, rangeland improvements, and other agricultural practices to improve groundwater recharge	Educational efforts to message the benefits of cover cropping for agricultural operations.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	These practices will be highlighted as opportunities arise. Ultimately, it will be up to individual growers to implement these practices on their land.	Cover cropping can lead to increases in soil pore space which allows more water to infiltrate, further facilitating groundwater recharge.
P 78*	North Davis Meadows Water Consolidation Project*	The Project will extend the City of Davis municipal water distribution system to the North Davis Meadows residential community, which has historically been served by two drinking water supply wells that now have significant water quality issues (Nitrate, Aluminum, and Iron consistently over the maximum contaminant level). The Project includes the installation of meters and backflow prevention devices on all service connections. North Davis Meadows will cease to exist as a public water system upon completion of the project, and all service connections will be customers of the City of Davis.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Ongoing	Completion expected in 2025.	Improved water quality for residential customers in the North Davis Meadows neighborhood upon project completion. In-lieu recharge benefits would also be realized as the neighborhood would no longer rely on groundwater supplies and would instead receive Sacramento River water via Woodland-Davis Clean Water Agency.
P 79*	Madison Community Drinking Water System Replacement Project*	The Madison Community Drinking Water System Replacement Project (Project) is comprised of replacing existing leaky water distribution system pipelines to ensure the unincorporated community of Madison has a reliable water supply during future droughts. Madison CSD's water distribution system is leaking excessively, leading to water loss during drought conditions. The soil is mainly clayey, and drought conditions lead to clay contraction that causes frequent catastrophic pipeline failures. The Project is located in Madison, an unincorporated community in Yolo County. The system serves Madison Community High School, 230 housing units, and 10 commercial connections, all of which are affected by frequent pipeline failures. The Project includes design for a new pipe distribution system, a booster pump, and a water storage tank as well as construction of the new pipe distribution system.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Complete	Design completed in 2024, construction is expected to be complete in 2026.	Eliminate disruptions to the water supply due to pipeline breaks by reducing leaks and overall water waste by 20 – 25%
P 80**	City of Davis - Core Area Pond Improvements	Retrofit and improvements to the Core Area detention pond, which serves as stormwater detention for Davis's downtown area.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	Estimated completion by 2028.	Improvements will increase urban stormwater runoff retention, provide stormwater quality treatment, and increase infiltration to groundwater.

PMA Number	Project or Management Action Name	Project or Management Action Description	Targeted Sustainability Indicator	Project Status	Updates and Expected Schedule	Benefits Observed to Date/ Estimated Accrued Benefits at Completion
P 81**	City of Davis - ASR Design & Construct Three Wells	This project would Plan/Permit/Design/Construct three ASR Wells in the City of Davis that inject treated surface water into the intermediate aquifer during winter months and would use the stored water to augment surface water supplies in spring and summer months. A feasibility study has been completed, and a second pilot at two well sites are underway.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Conceptual	Planning/Design projected to start in January 2027.	Increased water supply resiliency by storing surface water when available for later use during drought conditions.
P 82**	West Sacramento-Well Field Rehabilitation	This project involves replacing two inactive public supply wells with new wells to increase the City's drought resiliency. Another existing site will be refurbished into an emergency-only supply source.	☐ Chronic lowering of groundwater levels & storage ☑ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	In Progress	Well rehabilitation complete by 2026, and the two replacement wells complete by 2028.	Together, these projects will reestablish and modernize critical groundwater infrastructure to ensure continued access to potable water during drought conditions or emergencies when the City's surface water supply from the Sacramento River is curtailed.
P 83**	Dunnigan Water District - Reverse tile drain recharge system	A tile drainage system will be installed beneath a field that will be planted with tree crops. Once installed, District water will be put through the drainage system for it to infiltrate into the groundwater basin.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Complete	Completed in 2025.	Additional recharge capacity within Dunnigan Water District. This system allows for recharge to occur beneath the root zone while keeping the overlying land in production.
P 84**	Dunnigan Water District - Surface water extension and recirculation	Install conveyance system to connect a large property at the southern edge of the Dunnigan Water District Boundary to allow for conjunctive use and groundwater recharge on the property.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Ongoing	Estimated completion in 2027.	Augment groundwater use with addition of surface water supplies for the property. Additional groundwater recharge capacity within Dunnigan Water District
P 85**	Dunnigan Water District - Recharge Basin Development and Construction	Plan, design and construct up to six groundwater recharge basins within the Dunnigan Water District service area. Recharge basins will be located to maximize potential benefits to the aquifer and surrounding areas.	☑ Chronic lowering of groundwater levels & storage ☐ Water quality ☐ Land subsidence ☐ Depletions of interconnected surface water	Ongoing	Estimated completion in 2026.	Additional year-round groundwater recharge capacity in Dunnigan Water District through the construction of dedicated recharge basins.
P 86***	Cache Creek Groundwater Recharge and Habitat Restoration Program	Plan, design, and construct necessary infrastructure and habitat improvements to connect existing reclaimed gravel pits to YCFCWCD's canal system to enhance groundwater recharge and habitat to improve groundwater levels, groundwater quality, and offset negative impacts from land subsidence and depletion of interconnected surface water. This project has strong support from local and national environmental partners.	☑ Chronic lowering of groundwater levels & storage ☑ Water quality ☑ Land subsidence ☑ Depletions of interconnected surface water	Conceptual	Estimated completing by 2042.	Long-term improvement in groundwater levels and water quality. Potential to offset negative impacts to land subsidence and depletion of interconnected surface waters.

**YSGA board approved adding these projects to the GSP at the September 16, 2024, Board of Directors Meeting.*
***These projects were added during the 2025 solicitation for the Periodic Evaluation.*
****YSGA Board approved? adding these projects to the GSP at the November XX, 2026 Board of Directors Meeting.*

5. BASIN SETTING BASED ON NEW INFORMATION OR CHANGES IN WATER USE

GSP Emergency Regulations §356.4(d) include a requirement that the Periodic Evaluation shall include:

> *An evaluation of the basin setting in light of significant new information or changes in water use, and an explanation of any significant changes. If the Agency's evaluation shows that the basin is experiencing overdraft conditions, the Agency shall include an assessment of measures to mitigate that overdraft.*

The basin is not in overdraft; therefore, there is no assessment of measures to mitigate that overdraft.

5.1 Hydrogeologic Conceptual Model

The hydrogeologic conceptual model (HCM) presented in the 2022 GSP discussed the physical setting, characteristics, and processes that govern groundwater within the Yolo Subbasin. This section discusses new information gathered during the evaluation cycle (WY 2019 – WY 2024) that may result in updating the HCM in a future Amended GSP. New data and analyses conducted during this evaluation cycle are described in the following subsections.

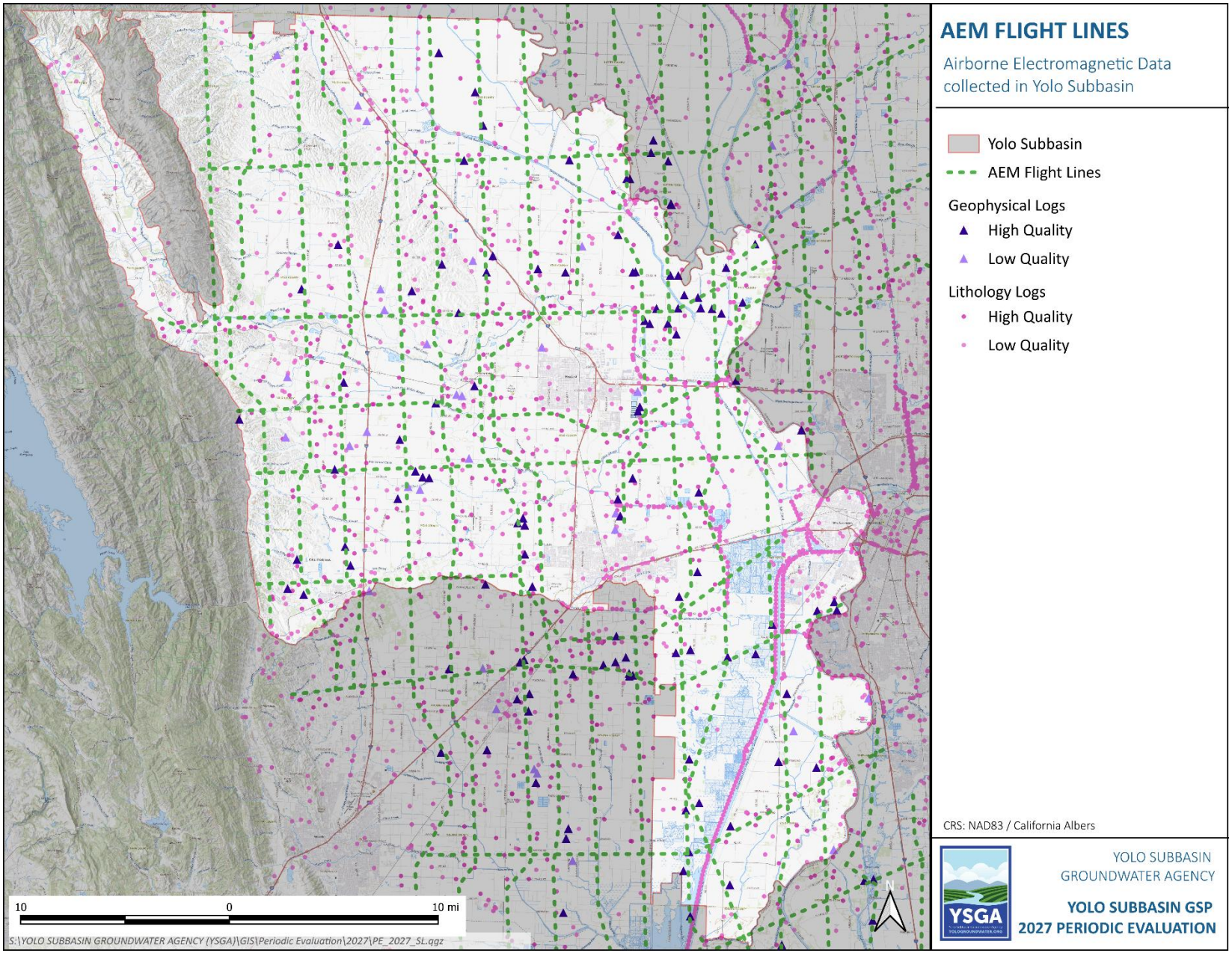
5.1.1 Airborne Electromagnetic (AEM) Data Survey

On May 19, 2023, DWR published the *Data Report for Survey Area 6, Solano, South American, North American, Yolo, Sutter, South Yuba, and North Yuba Groundwater Subbasins (Data Report)* (DWR, 2023c). The Data Report discussed the acquisition, processing, inversion, and lithology transform for the AEM survey conducted in the Area 6 Subbasins and provided a description of the well data collected along the planned flight lines and the project's data management system. The survey included flight line planning, local coordination and public outreach, data collection and processing, and lithology modeling.

Lithologic data, resistivity logs, water level measurements, and water quality measurements from wells were compiled across the planned flight lines prior to being flown. Both high-quality and low-quality logs were compiled across the study area. High-quality electrical resistivity logs were compiled from wells within the PLSS sections in which the flight lines crossed. Depth to groundwater, TDS, and electrical conductivity data were assembled from state databases. DWR then used an Accumulated Clay Thickness transform method in conjunction with texture descriptions from well completion report lithology logs to map the resistivity of a depth interval to the amount of coarse material, referred to as the coarse fraction, in each layer. AEM survey data results provided the GSAs with additional information to better refine the hydrogeologic conceptual model. Figure *47* shows the flight lines and boring log locations within the Yolo Subbasin.

The YSGA will use these survey results in conjunction with digitized well logs and other hydrogeologic information to refine the HCM over the next evaluation period. The AEM results will also be used to evaluate lithology and prioritize areas for groundwater recharge or other projects.

Figure 47: AEM Flight Lines Within Yolo Subbasin



5.1.2 Cross-Sections

The GSP currently relies on geologic cross-sections developed prior to the submission of the GSP in 2022 to inform the YSGA's understanding of the HCM. Using SGM Implementation Grant funds received starting in the first half of 2024, the YSGA started developing hydrogeologic cross-sections. Two different areas of the subbasin were identified as priority areas of further study and investigation where detailed hydrogeologic cross-sections should be developed; the two areas are (1) a subsection of Central Yolo MA known as "Hungry Hollow" and (2) a subsection of North Yolo MA known as "Yolo-Zamora". These areas were prioritized due to temporally variable localized overdraft because of the severely limited surface water supplies WY 2020 – WY 2022 drought that has led to domestic well owners lowering their pumps or drilling deeper replacement wells and elevated land subsidence rates.

These cross-sections will be used better to inform landowners, drillers, and YSGA staff of the groundwater conditions, geologic structure, and aquifer differences that exist within both areas. These data will also be used to inform the development of PMAs being considered to address localized groundwater issues. PMAs being developed in these areas are primarily driven by landowners' interest in proactively improving groundwater conditions in their areas.

The YSGA also intends to develop additional detailed hydrogeologic cross-sections in other areas where localized groundwater conditions are of concern between 2024 and 2030. These cross-sections and their insights will be described in the 2032 periodic evaluation and, if applicable, in any accompanying amendment.

5.1.3 Data Gaps and Next Steps

The following were identified in the 2022 GSP as data gaps in the hydrogeologic conceptual model:

- *Due to the Yolo Subbasin being redefined in 2016 and 2018 by combining portions of four different subbasins, additional research needs to be conducted to assess the connectivity of these different regions and the continuity of the three aquifer zones as described in this HCM.*
- *The delineation of the different aquifer zones and their corresponding aquifer characteristics is a data gap of this HCM. More research is required to study the lithology in the uppermost 1,500 feet of the upper nonmarine deposits and to assess if any regional aquitards are present and create district separation between the different zones for groundwater management purposes.*
- *The hydrogeology of the Dunnigan Hills area is not well defined due to the limited number of wells in the area and availability of data.*
- *Data gaps exist relating to the [base of freshwater] in the Yolo Subbasin. Reviewing upcoming and recent studies may yield beneficial information about the [base of freshwater].*

In addition, since the 2022 GSP, the YSGA has identified the following data gaps in the hydrogeologic conceptual model:

- The current YSGA Model and HCM are based on geologic information from DWR's OSCWR in the early 2000s. Due to DWR's efforts in recent years to digitize Well Completion Reports (WCRs) over the last decade, there are more WCRs available that will improve YSGA's understanding of the groundwater system and inform updates to the HCM. In addition, WCRs found on OSCWR are often spatially located within the centroid of the Township Range Section, rather than the precise

well site. This leads to a lack of detailed understanding of where wells have been drilled, groundwater depths, and how lithologic layers are connected. Compiling, reviewing, and updating all available WCR data within the Subbasin will support future improvements to the HCM.

- There are some areas within the Subbasin that experience temporally variable localized overdraft (e.g. Yolo Zamora) or longer-term declines in groundwater levels (e.g. western hills/upland areas). Further data collection and investigation will support improvements to the HCM and development of PMAs. Additional data collection in these areas may include: groundwater levels, geophysical surveys (t-TEM and seismic), pumping tests, and recharge pilot studies. Refinements to the HCM will result in an improved understanding of the groundwater dynamics with focus on resolving local vs. Subbasin scale recharge and pumping effects.

Over the next 5 years (WY 2025 – WY 2029), YSGA plans to undertake a significant data collection effort to refine the HCM and address the above data gaps. First, a well completion report database will be created, digitizing and organizing all available lithology and resistivity logs from both statewide and local sources. T-TEM and other geophysical data will be collected in Focus Areas and other areas of interest. Historical hydrogeologic cross-sections will also be compiled in the database. The database will be integrated into the publicly available WRID used by the YSGA to store and manage data.

In combination with the AEM data, these data will be used to create detailed, two-dimensional hydrogeologic cross-sections throughout the Subbasin that contain information usable by the YSGA, drillers, landowners, and the public to understand the aquifer system better. Data will be used to substantially update the HCM and inform updates to the Yolo Subbasin model (detailed in Section 5.4). This effort will lead to a better understanding of groundwater conditions throughout the Subbasin and improved model scenarios to evaluate the implementation of PMAs.

5.2 Groundwater Conditions

Since the adoption of the 2022 GSP, YSGA has transitioned the subsidence monitoring network to rely mainly on InSAR data. A GPS Survey completed in summer 2023 provided comparable results to the InSAR data over the same time period (detailed in Section 3.5), increasing confidence in the remotely sensed data. In addition, YSGA is working with DWR to install three additional continuous GPS stations and one corner reflector in the Subbasin to help increase the coverage and accuracy of InSAR data. More details about the planned subsidence monitoring network are provided in Section 6.1.3.

Throughout the 2020 – 2022 drought period, YSGA used the statewide Dry Well Reporting System[1] in conjunction with County-wide reporting to track the occurrence of dry wells in the Subbasin. More information about drought impacts is provided in Section 3.1. The YSGA continues to provide data to DWR databases to support the development of tools such as California's Groundwater Live[2].

Effective October 1, 2024, California adopted a hexavalent chromium (Cr6) maximum contaminant level (MCL) of 10 parts per billion (ppb) for drinking water. As described in the 2022 GSP and in Section 3.4, hexavalent chromium is prevalent both now and historically in the Yolo Subbasin at levels at or above the MCL. Public water systems are considering treatment and/or alternative water supplies to meet the newly established standards. YSGA will continue to coordinate closely with these systems throughout the

[1] https://mydrywatersupply.water.ca.gov/report/
[2] https://calgwlive.water.ca.gov/

planning and implementation process. In April 2024, MCLs for poly- and perfluoroalkyl substances (PFAS) in drinking water were finalized by the U.S. Environmental Protection Agency (EPA). Public water systems have begun testing for PFAS, and YSGA will compile the data as they become available.

Additional analysis is in progress to identify, characterize, and determine protective thresholds for GDEs. YSGA partnered with TNC and Audubon to provide technical assistance and stakeholder outreach support. The technical analysis was led by TNC and focused on (1) assessment of the monitoring network and (2) identifying potential groundwater thresholds for GDE health. Stakeholder outreach was led by Audubon and focused on identifying environmental stakeholders, gathering feedback on GSP development, and holding public workshops. The results of this work are currently being compiled by YSGA, TNC, and Audubon. Results will be provided when completed in a technical memo published by TNC and Audubon and incorporated into the next Periodic Evaluation.

In addition, YSGA is conducting ground-truth surveys on the NCCAG dataset. YSGA staff are visiting select polygons from the statewide dataset and collecting observations such as species present and potential surface water sources. The results of this survey will be provided in a report on the YSGA website when completed. Over the next 5 years, YSGA will analyze the results of the GDE work described above and consider adjustments to SMC to support continued GDE health. YSGA is also planning to conduct additional analysis to better quantify the location, quantity, and timing of depletions of interconnected surface water in response to DWR Corrective Actions and the release of guidance documents by DWR (Details provided in Section 3.6)

5.3 Water Use Changes and Associated Water Budget

Conditions in WY 2019 were wet, filling reservoirs and allowing for plentiful surface water supplies. Surface water supplies remained sufficient into the dry conditions of WY 2020, allowing for relatively little groundwater pumping in both years (256 and 225 TAF, respectively). In WY 2021, surface water supplies were critically limited, but demand remained normal, leading to elevated groundwater use estimated at 395 TAF. WY 2022 was another critically dry year, with extremely limited surface water availability, resulting in elevated groundwater use, estimated at 359 TAF. Approximately two thirds of the rice acreage in the Subbasin was fallowed, along with some fields of annual crops, leading to less groundwater extraction despite more severe drought conditions. Wet and above-normal conditions in WY 2023 and 2024 replenished surface water supplies, allowing groundwater use to return to more typical conditions. Variations in surface water availability mainly impact the water use of agricultural rather than urban uses; urban water use remained relatively steady throughout the evaluation period at around 40 TAF. Table *19* summarizes the estimated water use by category for the evaluation period.

Table 19: Water Use Summary for WY 2019 – WY 2024

	WY 2019	WY 2020	WY 2021	WY 2022	WY 2023	WY 2024
Agricultural Water Use, AF						
Agricultural SW Diversion	466,700	505,300	369,000	221,700	509,900	547,600
Agricultural GW Extraction	256,300	226,300	378,900	347,200	259,100	293,700
Agricultural Managed Recharge	5,600	-	-	200	6,800	12,300
Agricultural Total Water Use	723,000	731,600	747,900	568,900	769,000	841,300
Urban Water Use, AF						
Urban SW Diversion	29,700	30,800	26,600	29,000	27,600	29,900
Urban GW Extraction	10,200	12,100	15,900	11,700	12,400	11,900
Urban Aquifer Storage	2,200	2,400	1,400	2,600	1,800	1,100
Urban Total Water Use	39,800	42,900	42,500	40,700	40,000	41,800
Total Water Use, AF						
Total SW Diversion	496,000	536,100	395,600	250,700	537,500	577,500
Total GW Extraction	266,500	238,400	394,800	358,900	271,600	305,600
Total Managed Recharge	7,800	2,400	1,400	2,800	8,600	13,400
Total Water Use	762,800	774,500	790,400	609,600	809,100	883,100

5.3.1 Surface Water Supply Uncertainty

The implementation of the proposed California State Water Board Bay-Delta Plan update through its primary regulatory pathway introduces notable surface water supply uncertainty for water users due to its reliance on a percentage-based unimpaired flow requirement. Under this approach, water right holders not participating in the alternative pathway must generally maintain 55% of unimpaired flows (with an adaptive range of 45 – 65%, potentially lowered to 35 – 45% in drier conditions based on water supply adjustments), calculated as a proportion of the estimated natural flow absent human alterations like dams or diversions. Because the actual volume of water corresponding to this fixed percentage fluctuates with variable hydrologic conditions, reservoir operations, and real-time unimpaired flow estimates—which can change frequently—the precise diversion limits remain difficult to forecast far in advance. This creates planning challenges for agricultural districts, municipal suppliers, and State Water Project/Central Valley Project operators, who may face shifting operational constraints throughout the year, potentially exacerbating supply shortfalls during critical dry periods without the benefit of fixed-volume predictability.

By contrast, the Healthy Rivers and Landscapes (HRL) proposal—also known as the Voluntary Agreements—generally reduces surface water supply uncertainty for participating agencies by establishing specific, fixed flow volume commitments tied to distinct water year types (wet, above normal, below normal, dry, or critical), determined only a few times annually. This allows water users to anticipate their exact flow contributions in advance and plan diversions, storage, and deliveries with greater reliability than under the variable percentage-based regulatory alternative. While the HRL pathway incorporates adaptive management, habitat restoration, and water purchases for added flexibility and ecological benefits, it still carries implementation uncertainties—such as whether purchased flows will reliably reach the Delta, potential federal policy shifts affecting CVP operations, or the risk that insufficient

ecological outcomes could trigger termination of the pathway and reversion to the stricter regulatory backstop. Overall, however, HRL's structured volumes and collaborative governance provide participating water agencies with more supply predictability than the regulatory pathway's inherent volumetric variability.

The YCFC&WCD is now a listed agency within the HRL proposal. The YCFC&WCD HRL proposal calls for providing up to 5,000 acre-feet (AF) of water into Putah Creek to support water supply and environmental flows in certain water year types instead of being subject to 55% unimpaired flow requirements under the proposed Bay Delta Plan update. If the State Water Board Adopts the HRL pathway, the surface water budget is unanticipated to be impacted significantly. However, if the State Water Board does not adopt the HRL pathway, there will be limited surface water supplies available during certain water year types, which will lead to a greater reliance on groundwater supply within the Subbasin to make up the difference. In addition, this may also force the YSGA to move to a groundwater extraction allocation system specifically to manage groundwater extractions during 55% unimpaired flow years. In this scenario, there will be significant economic burdens felt by small to large landowners and agricultural operations that may need to take land out of agricultural production causing significant depreciation of land values.

The YSGA is monitoring the situation closely and will be ready to adapt in either scenario.

5.3.2 Land Use & Crop Conversions

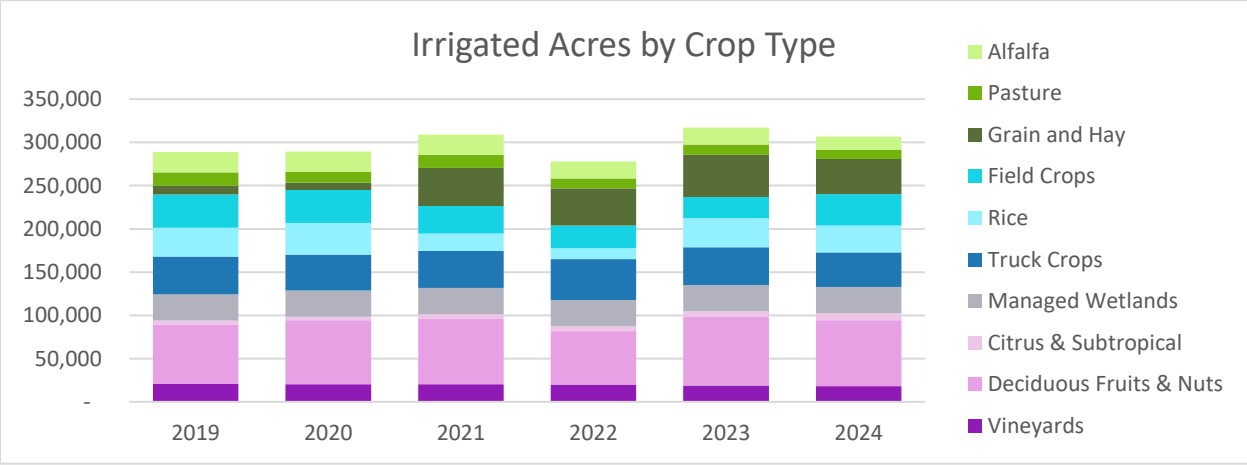
Land use changes described in this section primarily relate to changes in cropping patterns throughout the Yolo Subbasin. Cropping patterns are heavily influenced by commodity pricing and other economic factors which directly impact grower expenses and revenue. Table 20 and Figure 47 estimate the land use coverage of the Subbasin over the evaluation period. Land use is estimated by LandIQ from satellite data each year and may contain inaccuracies. However, the estimates below represent the best available data for cropping patterns in the Yolo Subbasin. As mentioned previously, significant fallowing of agricultural land occurred in 2021 and 2022 due to severely limited surface water supplies. Notably, rice acreage fell from 35,500 acres in 2020 to 24,200 acres in 2021, then decreased to only 12,400 acres in 2022. Additional fallowing of alfalfa and field crops contributed to an overall reduction in irrigated land of about 10,000 acres in 2021 and 25,000 acres in 2022.

In the 2022 GSP, the increasing acreage of perennial crops was noted as an important trend. This is notable because the conversion of annual to perennial crops represents a hardening of water demand, and the planting of new areas creates increased water demand during drought periods. Since 2016, the most recent year for which data were available at the time of the GSP, this trend has slowed significantly likely due to economic factors. Deciduous fruits and nuts increased slightly from about 71,000 acres to 76,000 acres over the 6-year evaluation period, compared to an increase of almost 10,000 acres in the 3-year period between 2016-2019.

Table 20: Land Use Summary for WY 2019 – WY 2024

	2019	2020	2021	2022	2023	2024
	Acres	*Acres*	*Acres*	*Acres*	*Acres*	*Acres*
Native Vegetation & Fallow Land	314,973	314,200	294,400	325,300	287,100	297,300
Urban	29,627	30,000	30,200	30,400	29,500	29,900
Open Water	5,400	5,400	5,400	5,400	5,400	5,400
Total Irrigated Acres	289,100	289,500	309,100	278,000	317,100	306,600
Alfalfa	23,700	23,600	23,600	19,600	19,700	15,000
Deciduous Fruits & Nuts	68,900	73,900	75,700	61,600	79,200	76,200
Almonds	*39,300*	*40,800*	*44,000*	*46,500*	*46,200*	*46,100*
Pistachios	*4,900*	*5,600*	*7,200*	*8,400*	*10,800*	*12,100*
Other	*24,700*	*27,500*	*24,500*	*6,700*	*22,200*	*18,000*
Field Crops	38,500	38,300	31,900	26,000	24,500	36,100
Corn	*6,300*	*10,300*	*8,800*	*6,700*	*10,000*	*20,800*
Sunflower & Safflower	*31,200*	*26,300*	*22,900*	*19,000*	*4,000*	*6,800*
Other	*1,000*	*1,700*	*200*	*300*	*10,500*	*8,600*
Grain	9,900	8,200	43,900	43,000	48,600	40,700
Managed Wetlands	30,200	30,200	30,200	30,300	30,300	30,300
Pasture	15,600	12,600	15,000	11,600	11,900	10,900
Rice	33,400	36,400	19,900	12,700	33,500	31,200
Subtropical Fruits & Nuts	4,300	4,200	5,500	5,800	6,600	8,100
Truck Crops	43,800	41,600	43,100	47,300	43,800	39,800
Cucurbits	*5,500*	*5,000*	*5,500*	*5,600*	*3,800*	*4,800*
Tomatoes	*34,000*	*31,200*	*32,400*	*36,500*	*34,700*	*30,500*
Other	*4,300*	*5,400*	*5,200*	*5,200*	*5,300*	*4,500*
Vineyards	20,800	20,500	20,300	20,100	19,000	18,300

Figure 48: Irrigated Acres by Crop Type

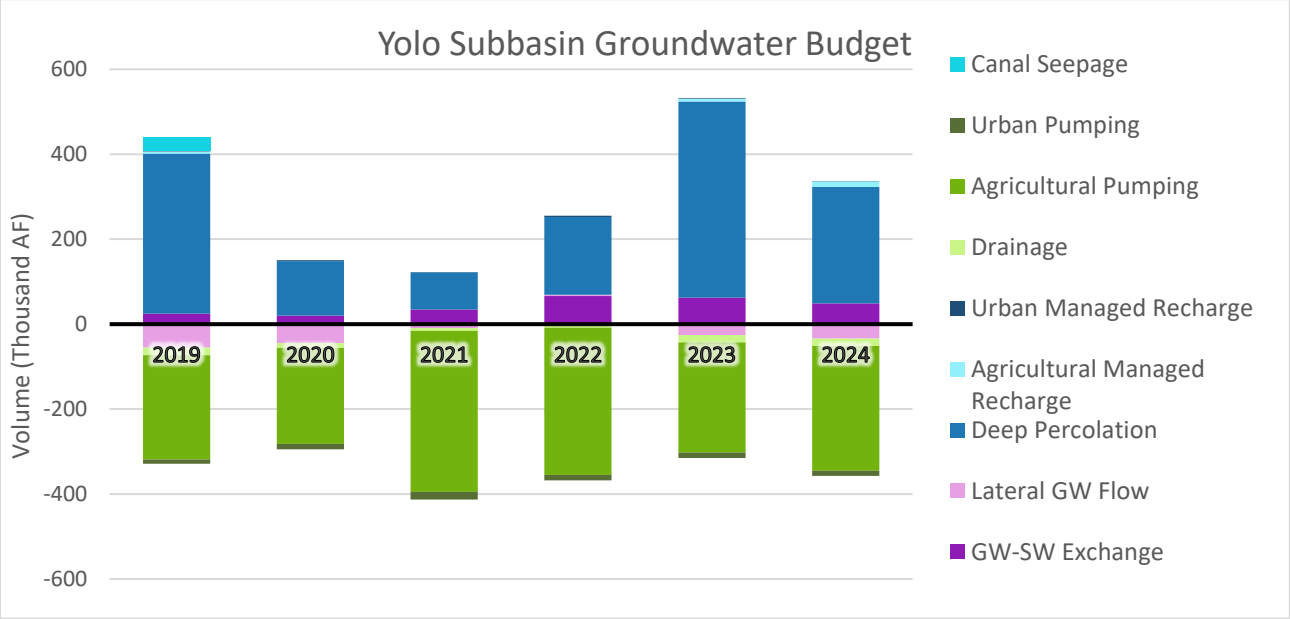


5.3.3 Groundwater Budget & Change in Storage

Figure *49* shows the 2019 – 2024 groundwater budget for the Yolo Subbasin. The major findings are as follows:

- Inflows to the groundwater system are dominated by deep percolation. Deep percolation decreased substantially during the 2020 – 2022 drought but returned to more typical levels in 2023 and 2024.
- Groundwater pumping (urban and irrigation) is the largest groundwater outflow. Groundwater pumping was higher than average during 2021 and 2022, then decreased to more typical volumes in 2023 and 2024.
- Groundwater-surface water exchange changes from year to year but is positive in most years, meaning more water is lost to groundwater than gained by the modeled streams.
- Lateral exchange with neighboring basins varies from year to year but is negative in most years; on average, lateral flow is leaving the Subbasin. This pattern continued except for in 2022, when lateral flow was slightly positive, indicating water entering the Subbasin.
- Agricultural and urban managed recharge were implemented starting in 2017 and 2018, respectively, adding volume to the positive side of the water budget.

Figure 49: Yolo Subbasin Groundwater Budget from WY 2019 – WY 2024



The Yolo Subbasin is not currently, or projected to be, in overdraft. As shown in Figure *50*, groundwater extraction has remained, on average, less than or equal to the sustainable yield over the evaluation period, which implies groundwater inflows remain equal to or greater than groundwater outflows.

Figure *51* shows the cumulative historical change in storage for the Subbasin. Subbasin groundwater storage tracks wet and dry years consistently over the 50+ years of modeling. In severe droughts (1976 – 1977 and 2020 – 2022, for example) and in extended droughts (late 1980s and 2011 – 2015), groundwater storage trends downwards. In wet years, Subbasin groundwater storage has historically

recovered and showed recovery in WY 2023 after three years of dry conditions. In WY 2024, groundwater storage recovered only slightly above that of WY 2023, and storage has still not returned to pre-drought WY 2019 conditions.

As an estimate of the Subbasin's condition relative to the GSP's sustainability goal, annual groundwater extraction can be compared to the sustainable yield. Sustainable yield represents the amount of groundwater that can be withdrawn annually without causing undesirable results. The estimated annual pumping in the Subbasin varies widely over the historical period, from 197 – 519 TAF/year. Note that SGMA does not incorporate sustainable yield estimates directly into SMC. "Basinwide pumping within the sustainable yield estimate is neither a measure of, nor proof of, sustainability. Sustainability under SGMA is only demonstrated by avoiding undesirable results for the six sustainability indicators" (DWR, 2017). The results of the water budget model indicate that 346 TAF is still a reasonable estimate of sustainable yield for the Subbasin.

Figure 50: Groundwater Extraction Relative to Sustainable Yield

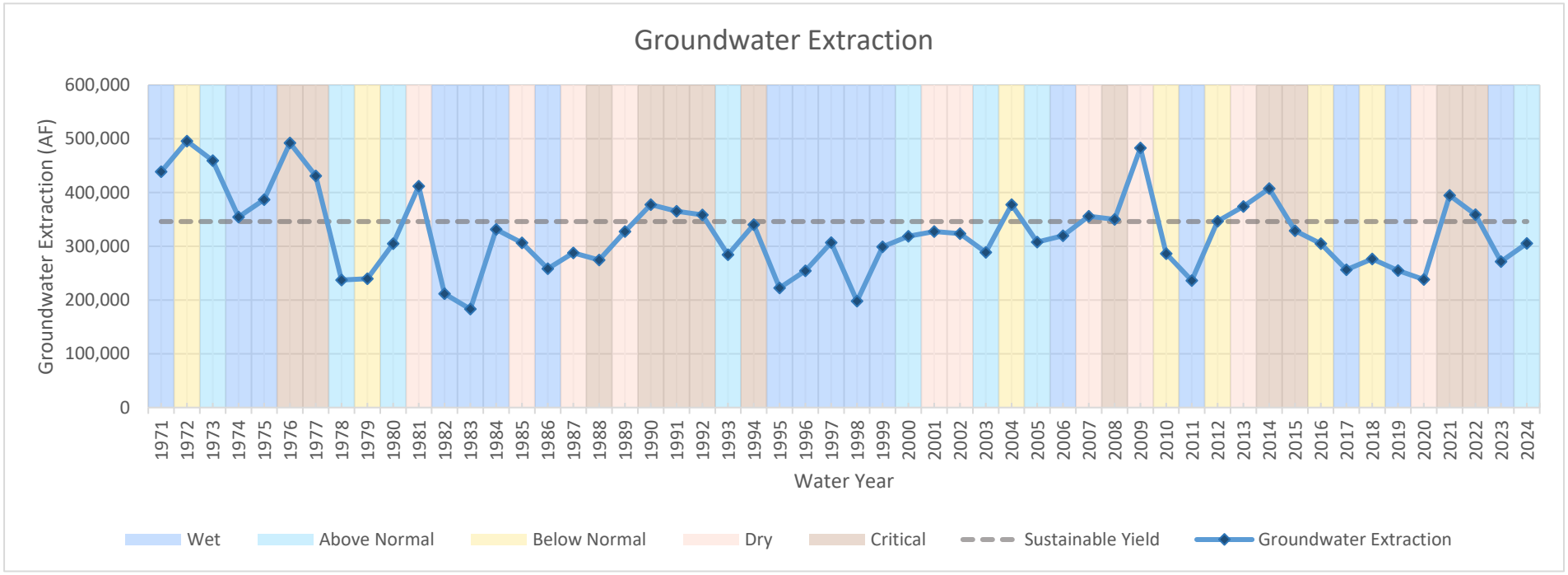
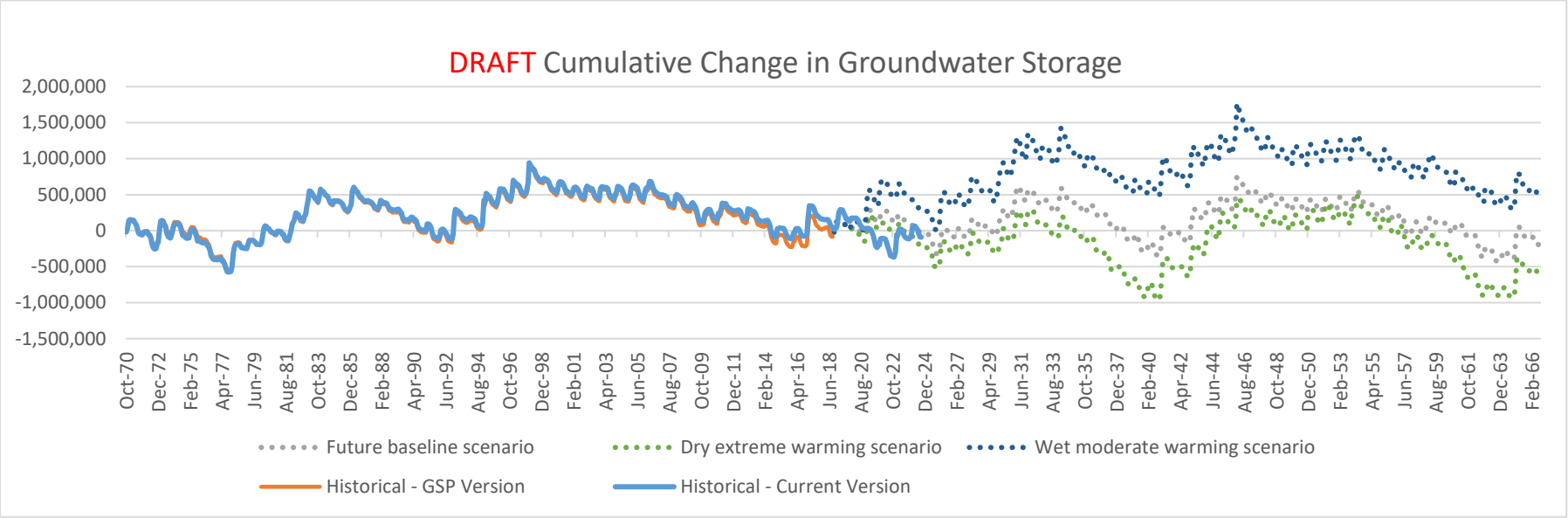


Figure 51: Cumulative vs Projected Change in Storage



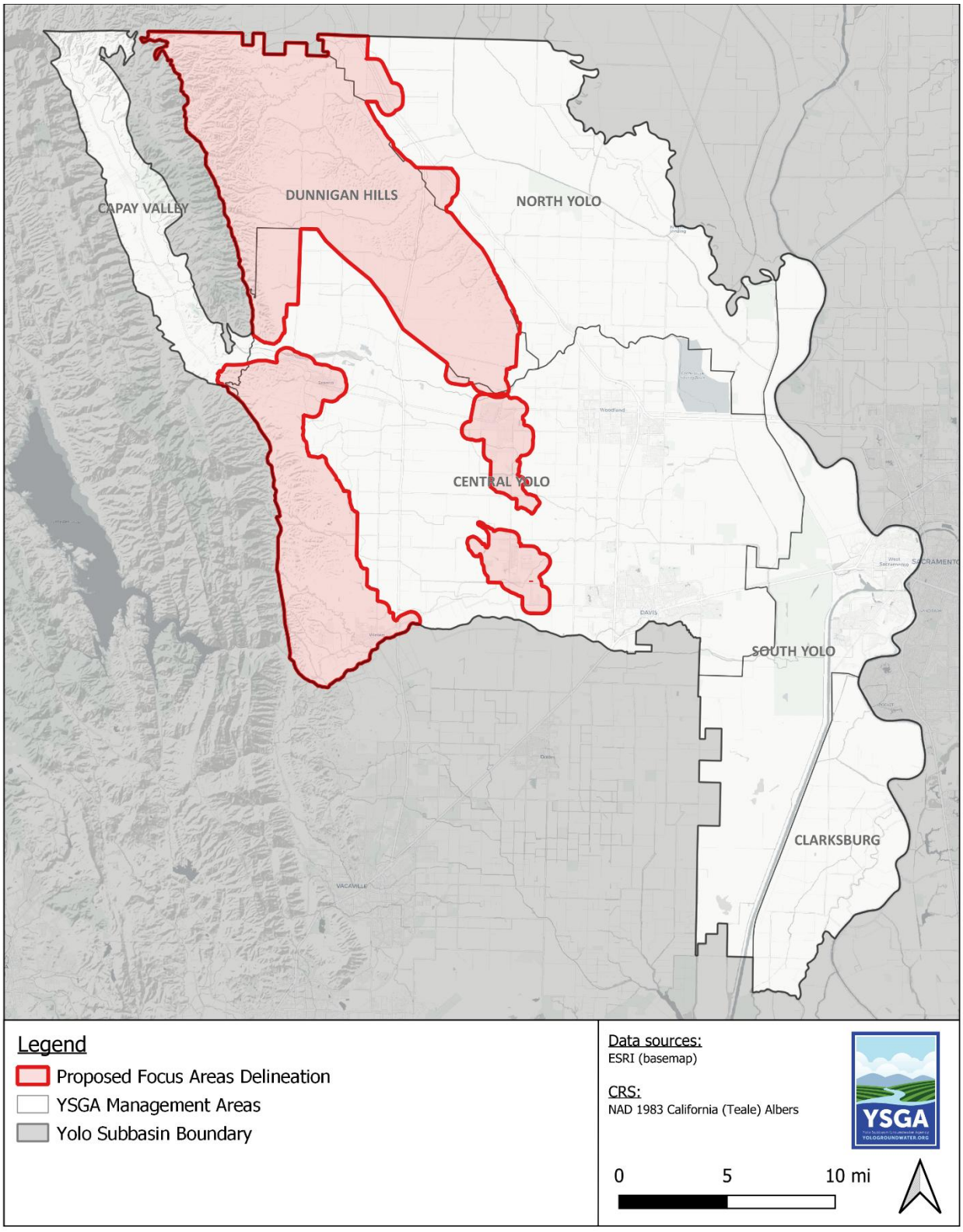
5.3.4 Groundwater Well Permitting

In recent years, some areas within the Subbasin have been experiencing temporally variable localized overdraft. In response to Governor Newsom's Executive Orders N-7-22 and N-3-23, as well as stakeholder concerns, the YSGA delineated "Focus Areas" where localized overdraft has occurred or is anticipated to occur. The Focus Areas encompass the "Areas of Special Concern" denoted in the 2022 GSP. Within these Focus Areas, new agricultural well permits proposed to be drilled in these areas would undergo a tiered review process to comply with Executive Orders N-7-22 and N-3-23 (West Yost, 2024). The intent of the tiered review process is to evaluate proposed new agricultural wells to verify their potential impacts in Focus Areas without infringing upon the landowners overlying water right.

Figure *52* displays the YSGA Focus Areas at the time of preparation of this document. Focus Areas were delineated based on the following technical criteria:

- Groundwater levels in Spring 2023 were below MTs defined in the Yolo Subbasin GSP.
- Groundwater levels have declined more than 25 feet over 10 years (Spring 2013 – Spring 2023). Note: Two wells within the Subbasin, where there was a decline of more than 25 feet over 10 years, were in areas where the Tehama Formation was absent at the surface and where no other wells within the vicinity experienced the same (or greater) level of decline. These two wells were excluded to prevent delineation of an area around a single well point, which would not appropriately represent a broader area of groundwater decline.
- Dry wells and citizen concerns are reported.
- Domestic well densities are high. A 2,000-foot buffer that corresponds to the County's maximum setback distance requirement was added around areas of high domestic well density.
- Small water systems are present.
- Permeability and recharge potential is low.
- Groundwater data are limited.

Figure 52: Delineated Focus Areas Within Yolo Subbasin



The YSGA will update the Focus Areas boundaries as needed based on new information and updated data. Any updates to the Focus Areas and/or the well permit verification process will be provided on the YSGA's website. YSGA will continue to use the Focus Area boundaries to facilitate the well permit verification process and to plan projects and management actions to alleviate groundwater concerns.

The YSGA is working collaboratively with the County to identify ways to improve the well permitting review process, data collection and sharing, and PMA options to address temporally variable groundwater overdraft. The YSGA has also been working with landowners in Focus Areas to increase data collection and move towards collaborative solutions beyond well permitting to address temporally variable groundwater overdraft. This work is partly being completed under the SGMA Implementation Grant and will be documented and shared in future annual reports and the 2032 Periodic Evaluation.

5.4 Model Updates

The YSGA model covers the entirety of the Yolo Subbasin to support groundwater management. The following updates to the YSGA Model have been completed since the development of the 2022 GSP.

Changes to land use or cropping patterns

- Adjusted "young perennial" classification based on the "Year Planted" field provided by LandIQ. Acreages were adjusted for each year going back to the first year that LandIQ data was incorporated into the model (2014), so as not to confuse differing crop acreage sources. Acreage figures were adjusted based on the age of the tree crop (less than 5 years old for almonds and walnuts and less than 8 years old for pistachios), which was validated in conversations with LandIQ developers and orchard managers in the Subbasin. These orchards are immature and use less water than fully developed tree crops.
- Compared modeled evapotranspiration (ET) estimates to ET estimates provided by OpenET for alfalfa, almonds, other deciduous, tomato, winter grain, and young perennial. OpenET was found to be significantly lower than modeled ET estimates for the alfalfa, almond, other deciduous, and young perennial categories. After discussions, local growers concurred that the OpenET values were likely more accurate. For this reason, irrigation management parameters for alfalfa and orchards were adjusted starting in 2018 to allow soil moisture to decrease below the management allowable depletion, resulting in reduced ET and modeled ET estimates closer to those of OpenET.
- The GSP team assembled data on existing managed wetlands from different sources and experts, assisted by a working group of researchers and practitioners who work on wetlands in different capacities and organizations. A spatial dataset of current wetlands was assembled. Data on water sources, supplies, and target depth were sought from wetland managers. When these data were not readily and comprehensively available, the team interviewed experts and cross-checked information. The team was assisted by a spreadsheet model commissioned by Audubon. The team also used radar-based satellite information to fill gaps in the temporal variability of flooding. In total, 30,267 acres were modeled as current wetland habitat. The previous model version included only 400 acres of managed wetlands.

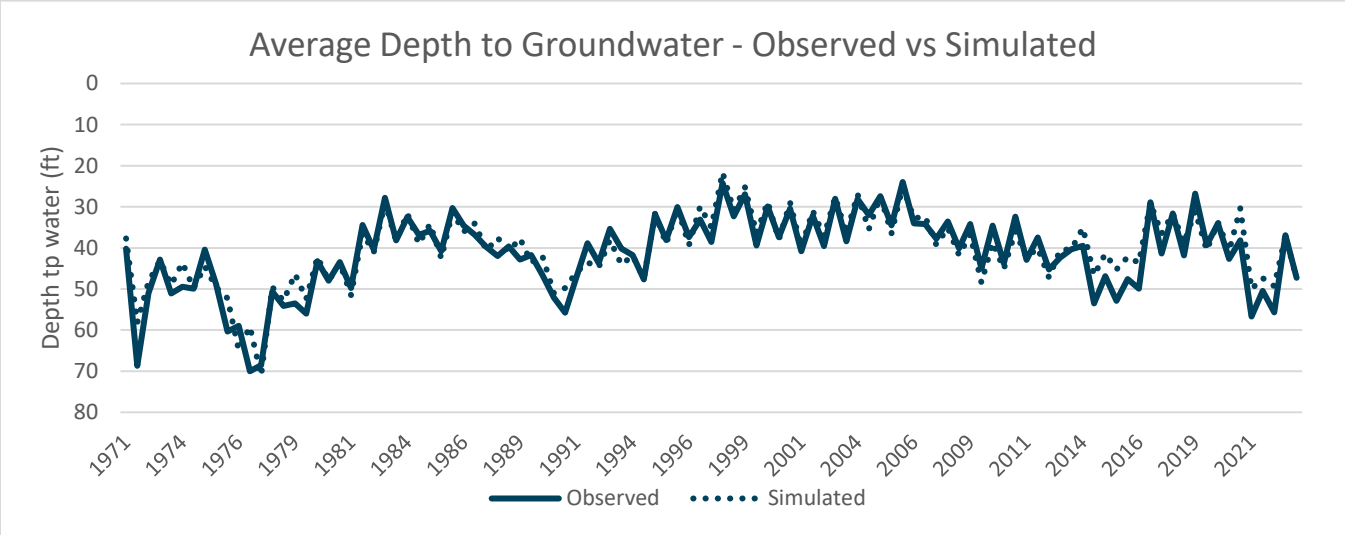
Precipitation

During analysis of model results, it was observed that the model showed little groundwater level recovery during WY 2019. This was in contradiction to the large recovery seen in the observation wells. Analysis of the precipitation input data revealed that PRISM data in the eastern portion of the Subbasin for WY 2018 – WY 2022 were unusually dry compared to nearby CIMIS data. For this reason, the model now uses CIMIS-derived precipitation data for WY 2018 – WY 2022 in the eastern portion of the Subbasin.

Updated Model Performance

Figure *53* demonstrates the performance of the model after these updates. When calibrated against the representative monitoring network, the model performs very well on average. Additional work is planned to improve the spatial scale of the model and improve performance at individual wells.

Figure 53: Observed vs Simulated Groundwater Levels



The following YSGA Model updates are anticipated to be completed between WY 2025 – WY 2029 and will be described in the 2032 Periodic Evaluation and upcoming annual reports as they are completed:

- Refine the location, depth, and thickness of sands and gravels relative to silts and clay layers and geologic structures (faults and folds) using updated Well Completion Reports, Oil & Gas well logs, t-TEM, AEM, and seismic data. Use these data and the updated HCM to substantially update the MODFLOW aquifer parameters and integration of the WEAP and MODFLOW model.
- Update well locations and construction information for calibration wells and add new calibration wells where applicable
- Update modeled groundwater pumping and recharge
- Update model grid cell size and aquifer parameters
- Update model calibration
- Extend simulation period using newly available data

- Develop model scenarios to evaluate the expansion of recharge and surface water supply projects and theoretical implementation of demand management actions
- Refine representation of ISW based on new data and knowledge, and develop ISW scenarios in line with DWR guidance on ISW.

The YSGA Model is used across a broad range of water planning efforts and ongoing updates, and refinements are critical to maintaining the model as a useful tool for water planning. GSP implementation will create information over time that will support YSGA Model refinements. This information will assist with further refinement of the YSGA Model, which was determined to be suitable for water budget development during the development of the 2022 GSP. Annual updates and refinements to the YSGA Model have been implemented since 2018 and will continue to be performed as needed.

The monitoring networks identified in the 2022 GSP have known data gaps, and efforts have been made to make progress in filling in those data gaps, which will result in an improved YSGA Model. The monitoring network revisions described in Section 6 highlight progress in filling data gaps currently affecting the YSGA model.

6. MONITORING NETWORK

GSP Emergency Regulations §356.4(e) include a requirement that the Periodic Evaluation shall include:

> *A description of the monitoring network within the basin, including whether data gaps exist, or if any areas within the basin are represented by data that does not satisfy the requirements of Sections 352.4 and 354.34(c). The description shall include the following:*
>
> > *(1) An assessment of monitoring network function with an analysis of data collected to date, identification of data gaps, and the actions necessary to improve the monitoring network, consistent with the requirements of Section 354.38.*
> >
> > *(2) If the Agency identifies data gaps, the Plan shall describe a program for the acquisition of additional data sources, including an estimate of the timing of that acquisition, and for incorporation of newly obtained information into the Plan.*
> >
> > *(3) The Plan shall prioritize the installation of new data collection facilities and analysis of new data based on the needs of the basin.*

6.1 Summary of Changes to Monitoring Network

This section discusses changes to the monitoring networks established in the GSP.

6.1.1 Groundwater Levels

The groundwater levels monitoring network, described in the 2022 GSP, comprises 62 RMWs spread across the six MAs in the Subbasin. As part of the Annual Report process, the monitoring network is reviewed and updated as necessary, replacing wells that can no longer be measured accurately or consistently, or adding wells to address data gaps and expand monitoring network coverage. Since the adoption of the GSP, two (2) wells have been removed and subsequently replaced due to issues with

access and reporting accuracy. The total list of RMWs, including wells replaced, is presented in Table *21* and Figure *54*.

In 2021, RMW 230 was removed from the monitoring network due to pump equipment issues or obstructions that prevented groundwater level measurements. This well was replaced with RMW 430, located 1.25 miles northwest of RMW 230. In 2022, RMW 180 was removed from the monitoring network due to oil-related issues, resulting in questionable groundwater level measurements. The well was removed from the monitoring network and replaced with RMW 431, located 1.3 miles northeast of RMW 180.

In addition to the RMW sites, the YSGA continually updates monitoring sites within the Subbasin as appropriate. New monitoring sites, site details, and associated data are stored in the WRID (wrid.facilitiesmap.com), with data available on the YSGA's groundwater mapping site (sgma.yologroundwater.org). Monitoring sites from the WRID with sufficient data will be selected, as appropriate, as RMW locations to address data gaps and areas of special concern. Since 2019, 65 sites have been added to the groundwater level monitoring network. Of these sites, 17 are equipped with real-time monitoring units. Three of these sites were constructed as part of DWR's Technical Support Services (TSS) program in strategic locations along the west side of the Subbasin. Each site is a multi-completion (triple or quadruple completion) wells and are slated for inclusion as RMW sites. Figure 54 shows these sites. The Dunnigan Hills, South Yolo, and Clarksburg MAs have room for improvement for groundwater monitoring. South Yolo and Clarksburg MAs primarily rely on surface water and in comparison to other areas, generally lack wells that are used for groundwater extraction. For this reason, improving RMW coverage in these two MAs will be dependent on available wells in areas where there's no existing coverage. As for the Dunnigan Hills MA, there are areas that contain wells that will be evaluated for potential addition as a RMW.

Table 21: Representative Monitoring Wells for Groundwater Levels and Storage

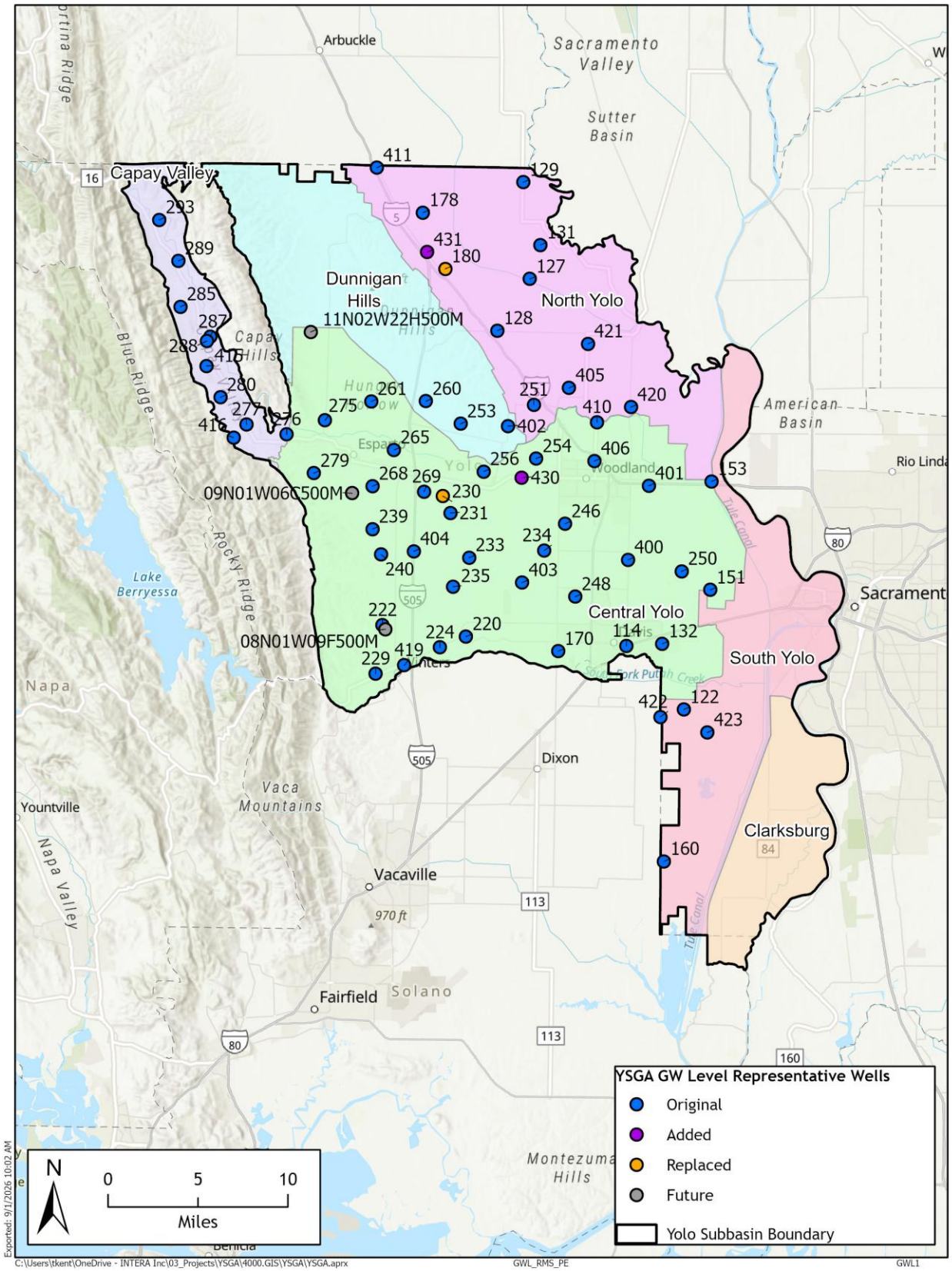
RMW #	State Well Number	Management Area	Latitude	Longitude	Well Type	Agency	GSE (ft)	Well Depth (ft bgs)	Screen Top (ft bgs)	Screen Bottom (ft bgs)
276	10N02W16R001M	Capay Valley	38.71002	-122.08604	Domestic	YCFC	229.6	--	--	--
277	10N02W18F001M	Capay Valley	38.71746	-122.12804	Domestic	YCFC	335.5	--	--	--
280	10N03W02R002M	Capay Valley	38.73891	-122.15528	Domestic	YCFC	337.5	55	--	--
285	11N03W09Q001M	Capay Valley	38.81071	-122.19826	Irrigation	YCFC	402.7	55	40	52
287	11N03W23L001M	Capay Valley	38.78706	-122.16686	Irrigation	YCFC	311	66	--	--
288	11N03W23N001M	Capay Valley	38.78376	-122.17025	Irrigation	YCFC	320	136	--	--
289	11N03W33F001M	Capay Valley	38.84729	-122.201	Domestic	YCFC	367.9	75	--	--
293	12N03W20D001M	Capay Valley	38.87989	-122.22154	Irrigation	YCFC	406.9	26	--	--
415	11N03W35D003M	Capay Valley	38.76381	-122.17044	Domestic	YCFC	307.9	162	140	162
416	10N03W24B002M	Capay Valley	38.70677	-122.14119	Domestic	YCFC	389.5	207	60	180
114	08N02E15A002M	Central Yolo	38.54418	-121.73123	Public	City of Davis	43.3	460	208	447
132	08N03E07N500M	Central Yolo	38.54607	-121.6942	Irrigation	YSGA	33	471	237	455
151	09N03E33B002M	Central Yolo	38.58942	-121.64492	Monitoring	WDCWA	18	280	150	260
170	08N02E18M002M	Central Yolo	38.53939	-121.80201	Irrigation	USBR	68.5	156	--	--
220	08N01E07R001M	Central Yolo	38.55034	-121.89763	Irrigation	YCFC	107.2	143	119	143
222	08N01W09C001M	Central Yolo	38.5589	-121.98421	Irrigation	YCFC	167.7	386	--	--
224	08N01W13G003M	Central Yolo	38.54147	-121.92454	Irrigation	YCFC	117.5	127	--	--
229	08N01W20R005M	Central Yolo	38.51991	-121.99079	Domestic	YCFC	152.4	300	--	--
230	~~09N01E03C003M~~	~~Central Yolo~~	~~38.66226~~	~~-121.85337~~	~~Irrigation~~	~~YCFC~~	~~102~~	~~567~~	~~50~~	~~524~~
231	09N01E07D001M	Central Yolo	38.64889	-121.91521	Irrigation	YCFC	123.7	432	160	205
233	09N01E20E001M	Central Yolo	38.61334	-121.89521	Irrigation	YCFC	113.8	401	--	--
234	09N01E24D001M	Central Yolo	38.61955	-121.81759	Irrigation	YCFC	69.2	300	--	--
235	09N01E31D001M	Central Yolo	38.59012	-121.91147	Irrigation	YCFC	117.9	52	--	--
239	09N01W08Q001M	Central Yolo	38.63529	-121.99581	Irrigation	YCFC	197.4	425	--	--
240	09N01W21E001M	Central Yolo	38.61509	-121.98666	Domestic	DWR	174.9	100	89	99
246	09N02E07L001M	Central Yolo	38.6412	-121.79617	Irrigation	YCFC	69.7	425	37	419

RMW #	State Well Number	Management Area	Latitude	Longitude	Well Type	Agency	GSE (ft)	Well Depth (ft bgs)	Screen Top (ft bgs)	Screen Bottom (ft bgs)
248	09N02E32M001M	Central Yolo	38.58308	-121.78487	Irrigation	YCFC	60.7	358	132	358
250	09N03E19R002M	Central Yolo	38.60408	-121.67467	Monitoring	DWR/YCFC	23.7	295	110	290
254	10N01E23Q002M	Central Yolo	38.69293	-121.82681	Irrigation	YCFC	91.1	216	100	216
256	10N01E29K001M	Central Yolo	38.68219	-121.8811	Irrigation	YCFC	112.5	336	--	--
261	10N01W08B001M	Central Yolo	38.73716	-121.99871	Other	YCFC	180.5	133	--	--
265	10N01W21J001M	Central Yolo	38.69859	-121.97439	Irrigation	YCFC	161.3	196	25	152
268	10N01W32E001M	Central Yolo	38.66951	-121.99637	Irrigation	YCFC	188.8	188	--	--
269	10N01W35Q001M	Central Yolo	38.66564	-121.94282	Irrigation	YCFC	141.4	240	88	240
275	10N02W14A001M	Central Yolo	38.7216	-122.04649	Irrigation	YCFC	207.5	135	76	128
279	10N02W26P001M	Central Yolo	38.67933	-122.05744	Domestic	YCFC	352.6	205	174	204
406	10N02E29A001M	Central Yolo	38.69144	-121.76625	Residential	DWR	55.8	120	39	79
400	09N02E22H002M	Central Yolo	38.61279	-121.73051	Domestic	YCFC	38.1	317	--	--
401	10N02E36E001M	Central Yolo	38.67204	-121.70959	Monitoring	DWR	28.5	150	90	150
403	09N01E26N001M	Central Yolo	38.59394	-121.83991	Irrigation	YCFC	78.9	174	99	174
404	09N01W23D001M	Central Yolo	38.61791	-121.95272	Irrigation	YCFC	146.3	362	219	362
419	08N01W22G500M	Central Yolo	38.52699	-121.96131	Public	Winters	131.5	300	170	300
430	**10N01E34A003M**	**Central Yolo**	**38.67768**	**-121.84157**	**Irrigation**	**YCFCWCD**		**235**	**100**	**235**
253	10N01E18C001M	Dunnigan Hills	38.72009	-121.90559	Stockwatering	YCFC	194.4	110	--	--
260	10N01W02Q001M	Dunnigan Hills	38.73784	-121.94187	Domestic	YCFC	194.3	350	250	270
402	10N01E15D001M	Dunnigan Hills	38.71869	-121.8562	Irrigation	YCFC	94.3	518	70	518
127	11N01E02D001M	North Yolo	38.83623	-121.83517	Monitoring	DWR	27.5	690	603	683
128	11N01E16P001M	North Yolo	38.79472	-121.86838	Domestic	DWR	52.5	172	156	172
129	12N01E03R002M	North Yolo	38.91333	-121.84313	Monitoring	DWR	30.6	580	560	570
131	12N01E26A002M	North Yolo	38.86348	-121.82446	Monitoring	DWR	25.1	490	400	480
153	10N03E33B011M	North Yolo	38.6759	-121.64463	Monitoring	DWR	23.9	285	140	280
178	12N01W14M001M	North Yolo	38.88824	-121.9471	Irrigation	USBR	46	594	428	594
180	~~12N01W36K002M~~	~~North Yolo~~	~~38.8436~~	~~-121.92333~~	~~Irrigation~~	~~DWR~~	~~39.5~~	~~633~~	~~301~~	~~633~~

RMW #	State Well Number	Management Area	Latitude	Longitude	Well Type	Agency	GSE (ft)	Well Depth (ft bgs)	Screen Top (ft bgs)	Screen Bottom (ft bgs)
251	10N01E02Q002M	North Yolo	38.73586	-121.82968	Irrigation	YCFC	76.8	235	--	--
405	10N02E06B001M	North Yolo	38.74962	-121.79326	Irrigation	YCFC	61.2	300	--	--
411	12N01W05B001M	North Yolo	38.92376	-121.99583	Other	DWR	140.4	150	--	--
410	10N02E09N001M	North Yolo	38.72252	-121.7638	Irrigation	YCFC	61.4	490	--	--
420	10N02E03R002M	North Yolo	38.73473	-121.72877	Irrigation	YCFC	41.8	83.5	--	--
421	11N02E20K004M	North Yolo	38.78492	-121.77417	Domestic	DWR	52.5	232	220	232
431	**12N01W26L002M**	**North Yolo**	**38.85679**	**-121.94223**	**Irrigation**	**USBR**		**240**		
122	08N03E32L001M	South Yolo	38.49378	-121.67139	Irrigation	DWR	27.5	420	164	420
160	06N03E07M001M	South Yolo	38.37848	-121.6916	Irrigation	YSGA	15.8	91	--	--
422	08N03E31N001M	South Yolo	38.4881	-121.6952	Other	YSGA	32.5	89	--	--
423	07N03E04Q001M	South Yolo	38.4757	-121.6466	Irrigation	YSGA/DWR	21.5	88	--	--

Notes: GSE – Ground Surface Elevation, -- = No Data, ft bgs = feet below ground surface, ~~well removed from network~~, ***well added to network***

Figure 54: Groundwater Levels Representative Monitoring Sites



Three multi-completion monitoring wells were drilled through the DWR's Technical Support Services program to enhance the groundwater level monitoring network. These wells are located on the west side of the Subbasin and have 11 discrete completions. Each site is outfitted with real-time monitoring and has been added to the WRID monitoring network. These wells will be added as RMWs once sufficient data have been collected and SMCs can be established appropriately.

No new data gaps have been identified since the GSP was developed in 2022. Data are collected at RMW locations, at a minimum, semi-annually (spring and fall). Semi-annual measurements comply with DWR guidance for Monitoring Networks and Identification of Data Gaps Best Management Practice (DWR, 2016b) and are of sufficient frequency to capture groundwater level trend and minimum/maximum groundwater levels in the Subbasin. The Dunnigan Hills MA and Clarksburg MA continue to be spatial data gaps for groundwater level monitoring wells. Additional monitoring wells for the Dunnigan Hills MA will be selected from the WRID once sufficient data have been collected to establish SMC. A total of 11 wells in the Dunnigan Hills MA have been added to the WRID monitoring network since 2019 and are being monitored for potential RMW locations. The Clarksburg MA, as discussed in the 2022 GSP, is not a priority data gap for the YSGA due to limited groundwater use. Should changes in land use or increases in groundwater production necessitate additional RMW sites, YSGA will site new monitoring wells in the Clarksburg MA.

Data gaps will continue to be filled, and RMWs added, following the procedures outlined in the 2022 GSP. New RMWs will be selected from the WRID once sufficient data have been collected and SMCs can be established. YSGA will continue to add monitoring locations to the WRID as opportunities arise, such as through grant programs or coordination with local well owners.

6.1.2 Degraded Water Quality

The water quality monitoring network, described in the 2022 GSP, relies on existing programs within the Subbasin to monitor and track changes in groundwater quality. This includes existing regulatory programs and monitoring through the State Water Board's DDW, Yolo County Environmental Health, the ILRP, and the CV-SALTS Nitrate Control Program. A dedicated Subbasin-specific monitoring network and program were not developed as part of the 2022 GSP because the YSGA uses data from the existing groundwater quality monitoring programs in the Subbasin. YSGA regularly reviews publicly available groundwater quality data and monitoring sites with sufficient historical data to evaluate changes in Subbasin water quality. Groundwater quality data are evaluated for arsenic, boron, hexavalent chromium, nitrate, and TDS. SMCs were established for TDS only. Hexavalent chromium was added to the monitoring list in the 2024 WY Annual Report. Since the adoption of the 2022 GSP, there have been no exceedances of the MT for TDS and very few (7) exceedances of the MO.

Because there is no established network of groundwater quality RMWs, the sites evaluated annually can vary with sampling frequency and data availability. Table *22* presents GAMA wells that have been used as RMW for water quality, along with data availability for each identified COC in the Subbasin. These wells are also discussed in Section 3.4.

Table 22: Data Source and Category for GAMA Wells Currently Used as Representative Monitoring Wells

GAMA ID	Data Source	Well Category	Constituent of Concern Data Availability				
			Arsenic	Boron	Hexavalent Chromium	Nitrate	TDS
CA5700552_001_001	DDW	Municipal	X	--	X	X	--
CA5700571_012_012	DDW	Municipal	X	X	--	X	X
CA5700575_001_001	DDW	Municipal	--	--	--	X	--
CA5700643_001_001	DDW	Municipal	X	X	X	X	X
CA5700700_001_001	DDW	Municipal	X	--	--	X	X
CA5700700_002_002	DDW	Municipal	X	--	--	X	X
CA5700712_001_001	DDW	Municipal	X	X	X	X	X
CA5700712_012_012	DDW	Municipal	X	X	X	X	X
CA5700713_003_003	DDW	Municipal	--	--	--	X	--
CA5700728_001_001	DDW	Municipal	--	--	--	X	--
CA5710001_018_018	DDW	Municipal	X	X	X	X	X
CA5710001_025_025	DDW	Municipal	X	X	X	X	X
CA5710001_028_028	DDW	Municipal	X	X	X	X	X
CA5710001_030_030	DDW	Municipal	X	X	X	X	X
CA5710001_052_052	DDW	Municipal	X	X	X	X	X
CA5710004_003_003	DDW	Municipal	X	X	X	X	X
CA5710004_004_004	DDW	Municipal	X	X	X	X	X
CA5710004_005_005	DDW	Municipal	X	X	X	X	X
CA5710005_005_005	DDW	Municipal	X	--	X	X	X
CA5710005_006_006	DDW	Municipal	X	--	X	X	X
CA5710005_007_007	DDW	Municipal	X	--	X	X	X
CA5710006_015_015	DDW	Municipal	X	X	X	X	X
CA5710006_024_024	DDW	Municipal	X	X	X	X	X
CA5710006_048_048	DDW	Municipal	X	X	X	X	X
CA5710006_056_056	DDW	Municipal	X	X	X	X	X
CA5710007_001_001	DDW	Municipal	X	--	X	X	X
CA5710007_006_006	DDW	Municipal	X	--	X	X	X
CA5710007_007_007	DDW	Municipal	X	--	X	X	X
CA5710011_001_001	DDW	Municipal	X	X	X	X	X
CA5710011_002_002	DDW	Municipal	X	X	X	X	X

Information on well construction details is limited within GAMA and incomplete or missing for some of the wells that make up the groundwater quality RMW network. Sampling frequency is also unreported in the GAMA database. All RMWs are reported as municipal wells, which have sampling requirements ranging from annual to semi-annual, depending on whether constituents show consistent upward trends, as outlined in Chapter 15, Article 4 of the CCR Title 22 regulations (22 CCR ***§ 64431 to 64432.8***). Table *23* provides information on the period of record and the total sample count for each COC through 2024. Only

some wells monitor for all COCs, and nitrate is the only constituent for which every well in the network monitors.

Table *24* provides the average annual sampling frequency reported for data starting in 2014 through the end of 2024. Average annual sampling frequency was determined by averaging the number of sampling events, by chemical constituent, by year. Results were used to group into the following categories: are rounded and grouped into categories based on sampling frequency:

- Less than annual: annual sampling frequency of less than one
- Annual: annual sampling frequency between 1 and 1.5
- Near semi-annual: annual sampling frequency between 1.5 and 2
- Semi-annual: annual sampling frequency of greater than 2

Because all RMWs used for water quality assessment are drinking water wells, differences in sampling frequency for a given constituent among wells are partly due to variations resulting from regulatory sampling requirements. However, for the purposes of SGMA and more comprehensive Subbasin characterization, DWR BMPs suggest seasonal (semi-annual) sampling to determine potential seasonal variations in water quality.

For all COCs, monitoring frequency has varied over time, with increased frequency in recent years. However, the majority of sites across all constituents fail to meet the recommended semi-annual sampling frequency. Over half the sites where TDS is monitored have a sampling frequency less than annual. The same is generally true for sites where arsenic and boron are sampled. Hexavalent chromium and nitrate monitoring sites have 7 out of 24 sites being sampled annually, and 6 out of 30 sites sampled semi-annually. While sampling intervals have increased in frequency over time, this represents a data gap for monitoring in the Subbasin.

As discussed in Section 3.4, YSGA evaluated historical water quality data for the other COCs in the Subbasin (arsenic, boron, hexavalent chromium, and nitrate) to assess whether it was appropriate to establish SMCs for chemical constituents other than TDS. Findings indicated that, among the RMWs with historical data for the COCs of the Subbasin, many had too limited or insufficient datasets to establish trends in concentrations or to correlate with groundwater management. For this reason, YSGA is working to increase the frequency of groundwater quality sampling at existing monitoring sites and to add additional monitoring sites to assess whether establishing additional SMCs by the 2032 GSP update is warranted for other water quality constituents (e.g., arsenic). This includes coordinating with regulatory agencies to increase sampling frequency and working with willing landowners to increase the number of monitored wells. YSGA will document ongoing progress toward semi-annual sampling frequency during SGMA implementation and as part of GSP Periodic Evaluations.

Table 23: Data Range and Sample Count for Constituents of Concern in Wells Obtained from GAMA Through 2024

GAMA ID	Arsenic		Boron		Hexavalent Chromium		Nitrate		TDS	
	Date Range	Count	Date Range	Count	Date Range	Count	Date Range	Count	Date Range	Count
5700552-001	2017 - 2023	3	--	--	2015 - 2018	7	2001 - 2023	20	--	--
5700571-012	2019 - 2022	2	2019 - 2022	2	--	--	2018 - 2022	4	2018 - 2018	1
5700575-001	--	--	--	--	--	--	2002 - 2022	15	--	--
5700643-001	2003 - 2022	6	2003 - 2022	6	2003 - 2016	3	2002 - 2024	25	2003 - 2016	2
5700700-001	2000 - 2022	4	--	--	--	--	2000 - 2023	22	2016 - 2022	3
5700700-002	2016 - 2022	3	--	--	--	--	2004 - 2023	21	2016 - 2022	3
5700712-001	2016 - 2024	7	2016 - 2024	7	2016 - 2024	32	2002 - 2024	26	2016 - 2024	7
5700712-012	2013 - 2022	7	2016 - 2022	6	2013 - 2023	28	2011 - 2022	9	2013 - 2021	6
5700713-003	--	--	--	--	--	--	2016 - 2024	9	--	--
5700728-001	--	--	--	--	--	--	2002 - 2022	17	--	--
5710001-018	1984 - 2023	29	1984 - 2023	30	2000 - 2023	31	1984 - 2024	103	1986 - 2023	28
5710001-025	1998 - 2024	52	1998 - 2023	25	2001 - 2023	30	1994 - 2024	104	1998 - 2023	23
5710001-028	2002 - 2024	20	2002 - 2023	20	2002 - 2023	15	2002 - 2023	22	2002 - 2023	19
5710001-030	2004 - 2023	19	2004 - 2023	18	2005 - 2023	19	2004 - 2023	20	2004 - 2023	19
5710001-052	2007 - 2024	44	2007 - 2023	17	2012 - 2023	16	2007 - 2023	18	2007 - 2023	17
5710004-003	1990 - 2022	25	2003 - 2022	7	2015 - 2015	1	1990 - 2023	18	1990 - 2022	10
5710004-004	1990 - 2022	15	2003 - 2022	7	2015 - 2016	2	1990 - 2023	17	1990 - 2022	10
5710004-005	2003 - 2022	23	2003 - 2022	7	2015 - 2015	1	2003 - 2022	13	2003 - 2022	7
5710005-005	1989 - 2024	12	2004 - 2006	3	2005 - 2024	16	1989 - 2024	58	1989 - 2024	13
5710005-006	1988 - 2023	11	2004 - 2006	3	2005 - 2024	16	1988 - 2024	21	1988 - 2023	13
5710005-007	2002 - 2023	10	2004 - 2006	3	2005 - 2024	13	2004 - 2024	56	2002 - 2023	11
5710006-015	1986 - 2023	11	1994 - 2021	11	2002 - 2024	32	1986 - 2024	82	1986 - 2021	14
5710006-024	2007 - 2022	7	2007 - 2021	7	2011 - 2024	32	2007 - 2024	62	2007 - 2022	6
5710006-048	2009 - 2021	8	2011 - 2021	5	2011 - 2019	17	2009 - 2023	31	2009 - 2021	8
5710006-056	2018 - 2023	6	2022 - 2023	2	2018 - 2023	3	2018 - 2023	6	2018 - 2023	6
5710007-001	1988 - 2023	10	2005 - 2005	1	2005 - 2023	6	1988 - 2023	23	1988 - 2023	11
5710007-006	1989 - 2023	10	2005 - 2005	1	2005 - 2023	6	1989 - 2023	23	1989 - 2023	11

GAMA ID	Arsenic		Boron		Hexavalent Chromium		Nitrate		TDS	
	Date Range	Count	Date Range	Count	Date Range	Count	Date Range	Count	Date Range	Count
5710007-007	2015 - 2023	4	--	--	2015 - 2023	11	2015 - 2023	8	2015 - 2023	4
5710011-001	2004 - 2024	67	2004 - 2022	7	2003 - 2019	3	2003 - 2024	19	2003 - 2024	13
5710011-002	2003 - 2024	39	2003 - 2022	8	2003 - 2019	3	2003 - 2023	20	2003 - 2023	12

Table 24: Average Sampling Frequency from Available GAMA Data Post-SGMA

GAMA ID	Arsenic	Boron	Hexavalent Chromium	Nitrate	TDS
CA5700552_001_001	Less than Annual	--	Near Semi-annual	Annual	--
CA5700571_012_012	Less than Annual	Less than Annual	--	Less than Annual	Annual
CA5700575_001_001	--	--	--	Annual	--
CA5700643_001_001	Less than Annual	Less than Annual	Annual	Annual	Annual
CA5700700_001_001	Less than Annual	--	--	Annual	Less than Annual
CA5700700_002_002	Less than Annual	--	--	Annual	Less than Annual
CA5700712_001_001	Less than Annual	Less than Annual	Semi-annual	Annual	Less than Annual
CA5700712_012_012	Less than Annual	Less than Annual	Semi-annual	Annual	Less than Annual
CA5700713_003_003	--	--	--	Annual	--
CA5700728_001_001	--	--	--	Less than Annual	--
CA5710001_018_018	Annual	Annual	Semi-annual	Semi-annual	Annual
CA5710001_025_025	Semi-annual	Annual	Semi-annual	Semi-annual	Annual
CA5710001_028_028	Annual	Near Semi-annual	Near Semi-annual	Annual	Near Semi-annual
CA5710001_030_030	Annual	Less than Annual	Annual	Annual	Annual
CA5710001_052_052	Semi-annual	Annual	Annual	Annual	Annual
CA5710004_003_003	Semi-annual	Less than Annual	Annual	Less than Annual	Less than Annual
CA5710004_004_004	Annual	Less than Annual	Annual	Less than Annual	Less than Annual
CA5710004_005_005	Semi-annual	Less than Annual	Annual	Less than Annual	Less than Annual
CA5710005_005_005	Less than Annual	--	Annual	Semi-annual	Less than Annual
CA5710005_006_006	Less than Annual	--	Annual	Annual	Less than Annual
CA5710005_007_007	Less than Annual	--	Less than Annual	Semi-annual	Less than Annual
CA5710006_015_015	Less than Annual	Less than Annual	Semi-annual	Semi-annual	Less than Annual
CA5710006_024_024	Less than Annual	Less than Annual	Semi-annual	Semi-annual	Less than Annual
CA5710006_048_048	Less than Annual	Less than Annual	Semi-annual	Near Semi-annual	Less than Annual

GAMA ID	Arsenic	Boron	Hexavalent Chromium	Nitrate	TDS
CA5710006_056_056	Annual	Annual	Less than Annual	Annual	Annual
CA5710007_001_001	Less than Annual	--	Less than Annual	Annual	Less than Annual
CA5710007_006_006	Less than Annual	--	Less than Annual	Annual	Less than Annual
CA5710007_007_007	Less than Annual	--	Annual	Less than Annual	Less than Annual
CA5710011_001_001	Semi-annual	Less than Annual	Annual	Less than Annual	Annual
CA5710011_002_002	Semi-annual	Less than Annual	Annual	Annual	Annual

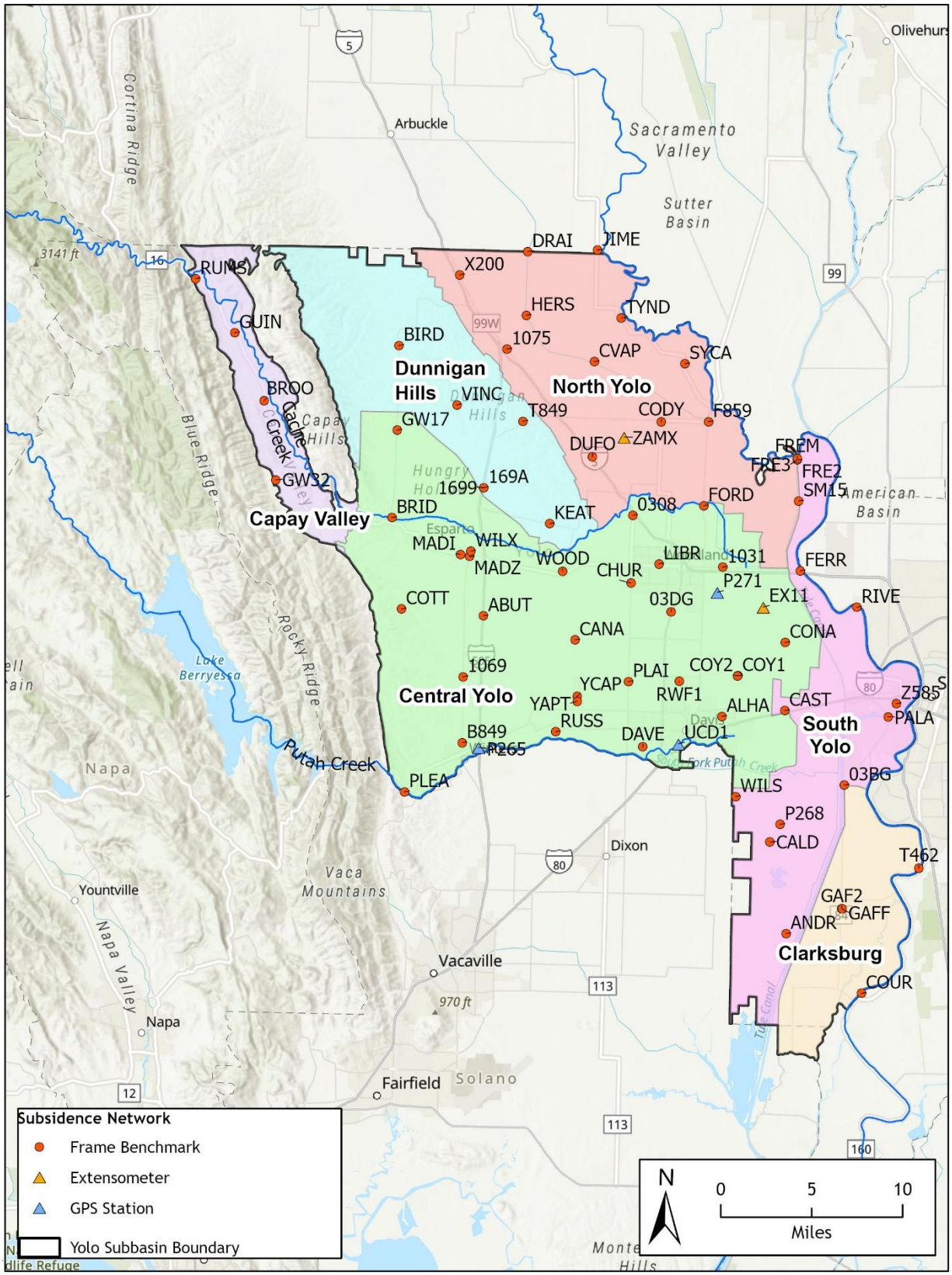
Notes: Shading indicates current sampling frequency meets GSP objectives

6.1.3 Land Subsidence

The land subsidence monitoring network, described in the 2022 GSP, comprises three continuous GPS stations, two extensometers, survey benchmarks as part of the Yolo County GPS Subsidence Network, and DWR InSAR mapping. Locations of the GPS stations, extensometers, and Yolo County GPS Subsidence Network benchmarks are shown in Figure 55. YSGA added seven additional benchmarks to the monitoring network in 2024. The monitoring network developed for the GSP was based on the best available data and guidance from DWR's BMP documents *Monitoring Protocols Standards and sites* and *Monitoring Networks and Identification of Data Caps BMP* (DWR, 2016a, b). Since then, DWR has released updated guidance on addressing land subsidence under SGMA, *Best Management Practices of the Sustainable Management of Groundwater: Land Subsidence* (DWR, 2026). As YSGA continues to develop the management approach for land subsidence under the GSP, the monitoring network will be updated accordingly and will incorporate guidance from the DWR's BMPs as appropriate.

Monitoring and reporting of subsidence data under SGMA has relied almost exclusively on TRE Altamira InSAR Vertical Displacement dataset provided by DWR and has a reported accuracy of 0.066 ft (Towill, 2024). InSAR data have been used to evaluate subsidence against the MTs and MOs by analyzing annual displacement, as well as 3- and 5-year averages. A modified approach will be used moving forward, as described in Section 3.5, to evaluate subsidence based on the rate and cumulative amount of subsidence. Data coverage for the DWR InSAR point dataset in the MA in the Subbasin is minimal compared to the total area and may provide insufficient coverage to capture SMC exceedances—and therefore undesirable results—accurately. To help address these data gaps and correct for time-series artifacts, spatial filtering (a median filter with a 500-meter radius) was applied to the InSAR dataset. Despite improvement in InSAR data coverage, coverage in the MAs from 2015 to 2024 ranged between approximately 16% to 30% (Table 25). In 2024, a GPS survey of the Yolo County GPS Subsidence Network took place (Frame, 2024). Results of the GPS survey showed general agreement in total magnitude and spatial extent of vertical displacement in the Subbasin. YSGA will continue to conduct periodic GPS surveys of the GPS Subsidence Network benchmarks to evaluate the effectiveness of using InSAR data or other available displacement datasets to monitor subsidence.

Figure 55. Subsidence Representative Monitoring Sites



Subsidence monitoring to date has used the best available science and data to capture ground-surface displacement within the Subbasin. The current monitoring network and associated dataset captured both subsidence and uplift within the Subbasin, with localized areas exceeding the MTs. To determine the area requirements to trigger an SMC exceedance, undesirable results for land subsidence occur when the MT is exceeded by 25% in three of the MAs. Calculating 25% of the available displacement data corresponds to an area ranging from 1.8 to 25.9 square miles. With the total area of each MA ranging from 43.6 to 341.2 square miles, this represents a small percentage of the total acreage, between approximately 3% to 8%. Table *25* summarizes available InSAR and GPS coverage for each MA.

Furthermore, identification of critical infrastructure is planned through public outreach through YSGA MA Public Advisory Committees and coordination with YSGA member agencies. Once critical infrastructure is identified, and infrastructure-specific subsidence risk assessed, additional monitoring may be needed to assess undesirable results and support sustainable groundwater management within the Subbasin.

As of this Periodic evaluation, the current methodologies for monitoring and tracking subsidence are consistent with DWR's BMP guidance documents and are appropriate based on the current understanding of the Subbasin and best available science. YSGA will continue to evaluate the data and methodologies used to assess land subsidence within the Subbasin, as required under SGMA, and may incorporate findings and recommendations from the Land Subsidence BMP (DWR, 2026) to update the monitoring network as appropriate. Additionally, YSGA will evaluate additional datasets as they become available, such as the NASA-ISRO Synthetic Aperture Radar (NISAR) dataset, to increase spatial coverage and accuracy in monitoring land subsidence.

Table 25: Displacement Coverage by MA

MA	Area (sq mi)[1]	InSAR coverage (sq mi)	InSAR coverage (%)	Requirement for SMC Exceedance (sq mi)	Requirement for SMC Exceedance (%)	GPS Survey Site Count	GPS Survey Site Count (2016 – 2024)
Capay Valley	43.57	12.98	29.79	3.25	7.45	4	1
Dunnigan Hills	119.17	30.59	25.67	7.65	6.42	6	4
North Yolo	163.10	27.30	16.74	6.83	4.18	14	11
Central Yolo	341.28	103.46	30.32	25.87	7.58	32	23
South Yolo	117.52	25.65	21.83	6.41	5.46	10	3
Clarksburg	60.13	7.37	12.26	1.84	3.06	3	3

Notes:
[1]Values presented in table are rounded to the nearest hundredth decimal.
Sq mi = square miles

6.1.4 Interconnected Surface Water

The ISW monitoring network, as described in the 2022 GSP, comprises 17 near-stream shallow groundwater monitoring wells. Groundwater monitoring wells were selected as RMWs for each surface water management zone. RMWs and their associated ISW management zones are presented in Table *26* and on Figure *56*.

As described in Section 3.6, YSGA is currently re-evaluating and updating the management approach and the subsequent SMC for ISW. This includes using the updated model to evaluate the impacts of groundwater management on surface water supplies and depletion of ISW within the Subbasin. Updating

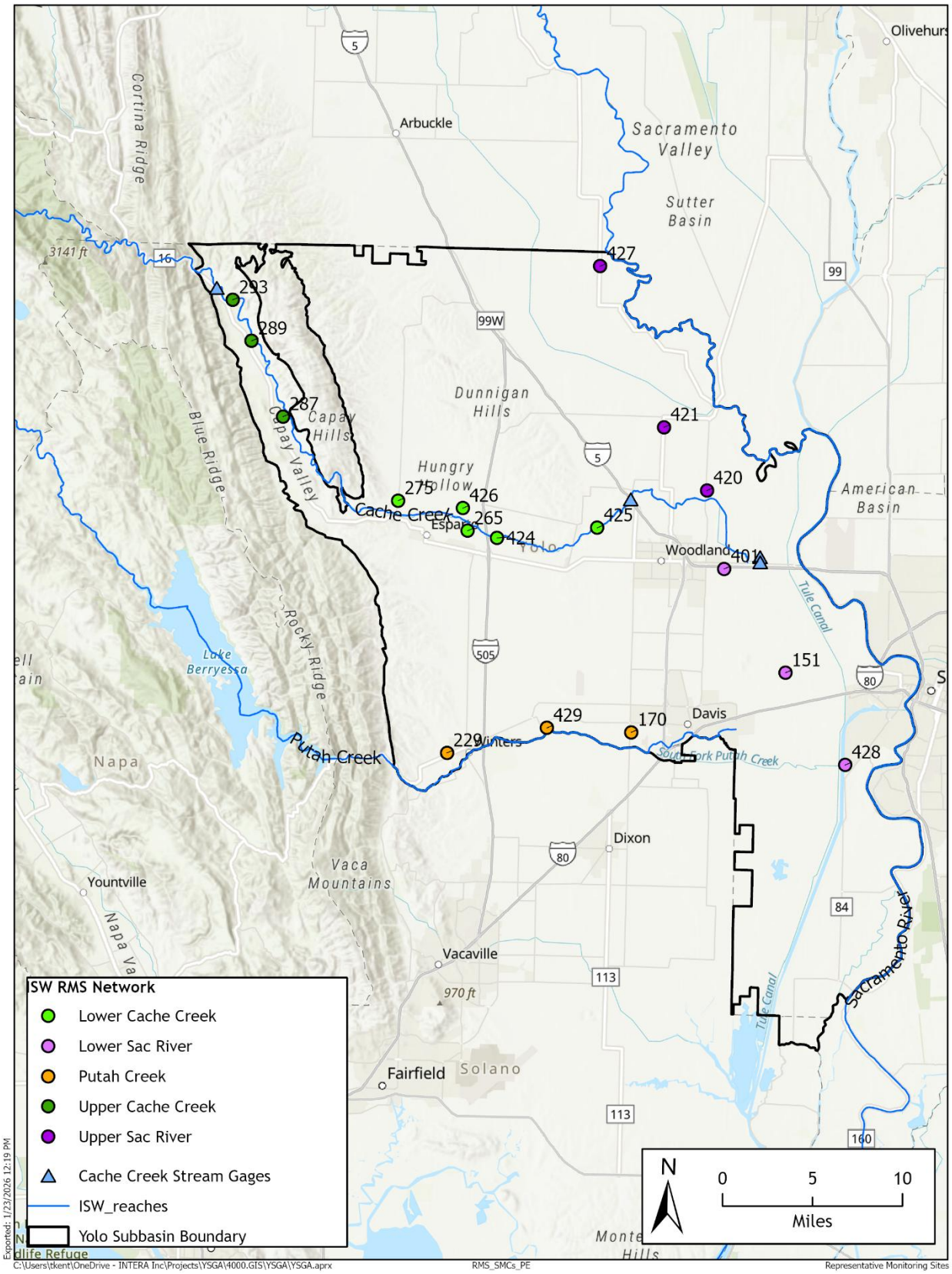
of the model is underway, and the final updates will account for DWR's forthcoming guidance on managing ISW. The ISW monitoring network will be evaluated and updated accordingly. It is expected that the current ISW RMW locations will remain as part of the monitoring network, but additional groundwater monitoring wells and surface water gages could be added.

Table 26: Representative Monitoring Sites, Interconnected Surface Water

RMW #	State Well Number	ISW Management Zone	Latitude	Longitude	Well Type	Monitoring Agency	GSE (ft)	Well Depth (ft bgs)	Screen Top (ft bgs)	Screen Bottom (ft bgs)
287	11N03W23L001M	Upper Cache Creek	38.78706437	-122.1668614	Irrigation	YCFCWCD	311	66	--	--
289	11N03W33F001M	Upper Cache Creek	38.8472892	-122.2010046		YCFCWCD	367.94	75	--	--
293	12N03W20D001M	Upper Cache Creek	38.87988544	-122.2215404	Irrigation	YCFCWCD	406.86	25	--	--
420	10N02E03R002M	Upper Sac River	38.73471151	-121.7288343	Irrigation	YCFCWCD	37.99	83.5	--	--
427	12N01E03R003M	Upper Sac River	38.91333	-121.84313	Monitoring	YCFCWCD	30.6	350	330	340
421	11N02E20K004M	Upper Sac River	38.7849213	-121.7741716		DWR	52.47	232	220	232
151	09N03E33B002M	Lower Sac River	38.58941781	-121.6449239	Monitoring	RD 2035	17.96	265	150	260
401	10N02E36E001M	Lower Sac River	38.67203553	-121.7095896	Monitoring	RD 2035	28.52	150	90	150
428	08N04E19N001M	Lower Sac River	38.5162	-121.58183	Domestic	DWR	17.53	260	--	--
170	08N02E18M002M	Putah Creek	38.53938689	-121.8020099		USBR	66.78	156	--	--
229	08N01W20R005M	Putah Creek	38.51990682	-121.9907886	Domestic	YCFCWCD	152.4	300	--	--
429	08N01E17F001M	Putah Creek	38.54156	-121.88879	Domestic	USBR	103.7	200	20	200
265	10N01W21J001M	Lower Cache Creek	38.69859495	-121.9743883	Irrigation	YCFCWCD	161.32	152	25	152
275	10N02W14A001M	Lower Cache Creek	38.72160423	-122.0464847	Irrigation	YCFCWCD	207.54	135	76	128
424	10N01W23P001M	Lower Cache Creek	38.69336	-121.94394	Irrigation	YCFC	145.19	80	35	44
425	10N01E22H500M	Lower Cache Creek	38.70308	-121.84093	Monitoring	Teichert	84.4	60	30	60
426	10N01W16G500M	Lower Cache Creek	38.71671	-121.97966	Monitoring	Teichert	168.6	65	45	65

Notes:
GSE: Ground Surface Elevation
ft bgs: feet below ground surface

Figure 56: Interconnected Surface Water Representative Monitoring Sites



6.1.5 Other Sustainability Indicators

Reduction in groundwater storage is monitored using the groundwater levels RMWs as a proxy for changes in storage, and thus, the monitoring network for groundwater storage is the same as the monitoring network for groundwater levels. Discussion of the changes to the groundwater level monitoring network and plans to address data gaps (described in Section 6.1.1) also applies to the reduction in storage SMC.

Seawater intrusion is an inapplicable sustainability indicator for the Subbasin and, as such, no monitoring network was established for this SMC.

7. GSA AUTHORITIES AND ENFORCEMENT ACTIONS

GSP Emergency Regulations §356.4 include additional requirements that the Periodic Evaluation shall include:

> *(g) A description of relevant actions taken by the Agency, including a summary of regulations or ordinances related to the Plan.*
>
> *(h) Information describing any enforcement or legal actions taken by the Agency in furtherance of the sustainability goal for the basin.*

7.1 GSA Enforcement or Legal Actions

The YSGA has taken no enforcement or legal action as part of GSP implementation since adoption of the 2022 GSP. The Yolo Subbasin continues to maintain sustainable conditions due to decades of proactive water management by the YSGA and its Member Agencies.

In 2026, the YSGA plans to complete a GSA Administrative Fee Study to provide a more robust and sustainable funding strategy for the YSGA to implement the GSP and continue regulatory compliance with SGMA.

7.2 GSA Activities in Support of Other Regulations and Orders

7.2.1 Well Permitting

In March 2022, Governor Newsom issued Executive Order (EO) N-7-22, setting certain requirements for well permit issuance. The EO required, in relevant part, that—before issuing a well permit—the permitting authority (i.e., the County of Yolo) must obtain a written verification from the Groundwater Sustainability Agency (here, YSGA) that: "The groundwater extraction by the proposed well would not be inconsistent with any sustainable groundwater management program established in the GSP for that area; and the groundwater extraction by the proposed well would not decrease the likelihood of achieving a sustainability goal for the basin covered by such a plan." Separately, the EO required the permit-issuing agency to make a determination that extraction of groundwater from the proposed well was (1) unlikely to interfere with the production and functioning of existing nearby wells, and (2) unlikely to cause subsidence that would adversely impact or damage nearby infrastructure.

Table *27* summarizes the actions taken by the Governor, YSGA, and the County of Yolo in relation to well permitting. Between September 18, 2023, and March 18, 2024, the YSGA worked with Yolo County to revise well permitting procedures substantially in response to stakeholder concerns. The revised procedures consider designated Focus Areas where additional analysis is needed to determine the

impacts of a proposed well. YSGA continues to collaborate with the County Environmental Health Division to ensure the processes for well permit review remain coordinated.

Table 27: Actions Taken by The Governor, YSGA, and the County of Yolo in Relation to Well Permitting

Acting Body	Date	Action Summary
Governor Newsom	March 28, 2022	Issued Executive Order N-7-22
YSGA	May 6, 2022	Adopted Resolution 22-01: Procedures for Compliance with Executive Order N-7-22
County of Yolo	December 14, 2022	Enacted temporary well permitting procedures for compliance with Executive Order N-7-22
Governor Newsom	February 13, 2023	Issued Executive Order N-3-23
County of Yolo	September 26, 2023	Adopted 45-day well permit moratorium in North Yolo and Central Yolo Management Areas
YSGA	September 18, 2023 – March 18, 2024	Developed and adopted YSGA Focus Areas and tiered well permit review process
County of Yolo	September 26, 2023 – April 9, 2024	Developed and approved revised temporary well permitting procedures for agricultural wells
Governor Newsom	September 5, 2024	Issued Executive Order N-3-24, rescinding the well permitting procedures required by EO N-3-23
County of Yolo	October 22, 2024	Adopted Urgency Ordinance 1569, temporarily extending the well permitting procedures which were enacted in compliance with EOs N-7-22 and N-3-23
YSGA	November 18, 2024	Approved revised well permit review procedures, reflecting change from EOs N-7-22 and N-3-23 to County Ordinance 1569

7.2.2 Senate Bill 552

Senate Bill 552, "Drought Planning: Small Water Suppliers: Nontransient Noncommunity Water Systems," passed and signed by Governor Gavin Newsom in September 2021, imposed requirements for small water systems and county governments to improve drought planning. Specifically, the regulation required each county to develop a standing drought task force and a plan demonstrating the potential drought and water shortage risk and proposed interim and long-term solutions for state small water systems and domestic wells within the county.

Within Yolo County, the YSGA is a member of the Drought Task Force and is providing input on the development of the Drought Resiliency Plan (DRP) to ensure both the DRP and GSP utilize the best available information and a coordinated plan for assuring the region remains resilient to drought hazards.

8. OUTREACH, ENGAGEMENT, AND COORDINATION WITH OTHER AGENCIES

GSP Emergency Regulations §356.4(j) include a requirement that the Periodic Evaluation shall include:

> *Where appropriate, a summary of coordination that occurred between multiple Agencies in a single basin, Agencies in hydrologically connected basins, and land use agencies.*

8.1 Outreach and Engagement

During the initial GSP development process, a complete draft GSP was distributed to the YSGA Board of Directors and to an interested persons list and published to the YSGA website. The public comment period was open from August 25 to October 27, 2021, and yielded nearly 300 individual comments. Comment letters came from Audubon California, California Department of Fish and Wildlife, Capay Valley Regeneration, Groundwater Leadership Forum, National Marine Fisheries Service, the City of West Sacramento, and several private landowners. The received comments and corresponding YSGA response are included as a summary table in Appendix C to the 2022 GSP.

Following the submittal of the 2022 GSP, comment letters were received from the following individuals and entities during the GSP evaluation period:

- California Department of Fish and Wildlife (CDFW)
- Central Valley Flood Protection Board (CVFPB)
- National Marine Fisheries Service (NMFS)
- Farmland Reserve, Inc.
- Audubon California
- The Nature Conservancy, Union of Concerned Scientists, American Rivers, CivicWell, and Clean Water Action
- Jackie Lundy, Lomita Farm*
- Grant Davids*

*These comment letters were received after the close of the formal GSP comment period on April 30, 2022.

YSGA staff reviewed these comment letters and incorporated feedback into the periodic evaluation process where feasible. Multiple comments, including those from Audubon and CDFW, highlighted the need to account for managed wetlands within the water budget. To address this, YSGA staff conducted outreach to several agencies, including CDFW and the Cities of Davis and Woodland, as well as private duck clubs, to account properly for managed wetland acreage within the Yolo Subbasin and to incorporate this water demand into the groundwater model. Many commenters also expressed the need for a more robust well impact analysis, which has been completed and is detailed in Section 3.1.6. Comments from CVFPB requested that the YSGA consider potential impacts on critical infrastructure when developing the SMC for land subsidence. The cumulative amount of subsidence allowed under the revised subsidence SMC is lower than the smallest levee freeboard value identified in the letter from CVFPB (3 feet) and therefore will be protective of levees within the subbasin.

Targeted stakeholder outreach has been conducted thoughtfully throughout this GSP implementation period. During initial GSP development, a Communication and Engagement Plan was developed for the YSGA and is included as Appendix B to the 2022 GSP. The plan identifies several strategies for stakeholder

engagement, including physical venues, the YSGA website, and the interested persons list. YSGA Board of Directors meetings were held bimonthly, with opportunities given for public comment at the beginning of each meeting. The YSGA website was regularly updated with relevant information such as annual reports, new data collected, project updates, and meeting notifications. This information was also provided to the interested parties list via email.

Public outreach related to PMAs was focused primarily on projects in the Hungry Hollow and Yolo-Zamora areas funded through the SGMA Implementation Grant. In water year 2024, three landowner workshops took place in the Yolo-Zamora area, during which YSGA staff solicited local knowledge and feedback that helped shape the design of a pilot groundwater recharge program involving the conveyance of excess storm flows and the rehabilitation of canal and slough infrastructure. Landowner outreach in Hungry Hollow was already underway during GSP development, as it had been identified as an area of special concern due to an observed declining trend in groundwater levels, and the discussion focused primarily on domestic well impacts and the existing data gaps in the area. However, with the new grant funding made available specifically for the Hungry Hollow area, the focus of this outreach expanded to include the development of a PMAs white paper that would be informed by landowner feedback, identifying viable project options. As of the end of WY 2024, the newly formalized "Hungry Hollow Groundwater Working Group" had met twice, primarily to identify group goals and to review SGMA, the YSGA, and the data collection effort in the area to date.

8.2 Responsibilities of GSA Boards

The Yolo Subbasin is governed by a single groundwater sustainability agency, the YSGA. The YSGA Board of Directors is comprised of 20 member agencies, consisting of cities, community service districts, reclamation districts, and water districts, as well as six affiliated parties, for a total of 26 Directors. There are several subcommittees of the Board, notably the Executive Committee and various Ad Hoc committees. The Executive Committee consists of the Chairperson, Vice-Chairperson, one rural member, one urban member, and an at-large member. Executive Committee members serve for two years, or until a successor is elected. Ad Hoc committees include the Drought Contingency Planning Committee, the Funding Committee, and the Working Group. There is also a Technical Advisory Committee, made up of member agency staff and technical consultants, dedicated to developing the 2027 periodic evaluation. Meetings of the YSGA Board and various committees since the adoption of the 2022 GSP are summarized in Table *28* below.

Table 28: YSGA Board and Committee Meetings from February 2022 – September 2024

Date	Location	Purpose
YSGA Board of Directors Meetings		
March 21, 2022	Hosted via teleconference due to COVID-19 pandemic	Approve WY 2019 – 2021 annual report, discuss Management Area advisory committee's formation
April 6, 2022	Hosted via teleconference due to COVID-19 pandemic	Discuss YSGA response to Executive Order N-7-22
May 6, 2022	Hosted via teleconference due to COVID-19 pandemic	Adopt Resolution #22-01, establishing a well permitting review and verification process pursuant to Executive Order N-7-22

Date	Location	Purpose
June 20, 2022	Hosted via teleconference due to COVID-19 pandemic	Adopt fiscal year (FY) 2022 – 2023 Budget, receive update on well permitting and other GSP implementation items
September 19, 2022	Woodland Community and Senior Center	Adopt Resolution #22-03 amending the YSGA Joint Powers Agreement to merge the functions of the Water Resources Association of Yolo County into the YSGA
November 21, 2022	Yolo County Department of Community Services, Cache Creek Room	Adopt Resolution #22-04 Directing and Authorizing the Executive Officer to Prepare and Submit a SGMA Implementation Grant Application
January 23, 2023	Hosted via teleconference due to COVID-19 pandemic	Appoint 2023 Board officers, receive update on GSP implementation items
March 20, 2023	Woodland Police Department Community Room	Review and adopt WY 2022 Annual Report
June 19, 2023	Woodland Police Department Community Room	Adopt FY 2023 – 2024 budget and services agreements, review GSP implementation items and discuss SGMA implementation grant award
September 18, 2023	Woodland Police Department Community Room	Adopt Resolution #23-01, directing preparation of updated well permit review procedures, adopt Resolution #23-02 directing preparation of a WaterSMART applied science grant application
October 27, 2023	Woodland Police Department Community Room	Approve a draft focus areas map identifying areas for additional well permit review, opening a 2-week public comment period for stakeholder feedback
November 20, 2023	Woodland Police Department Community Room	Adopt Focus Areas map and open public comment period for Draft Hydrogeology Report Criteria for well permits
January 22, 2024	Woodland Fire Station #3	Enter into service agreements for SGMA Implementation Grant projects, approve draft two-tier well permit review procedures within the Focus Areas
March 18, 2024	Woodland Fire Station #3	Approve updated well permitting procedures and public comment period for draft technical memorandum and focus areas map
May 20, 2024	Woodland Fire Station #3	Adopt FY 2024 – 2025 budget, receive an update on implementation of well permit review procedures, discussion of WaterSMART grant award
July 31, 2024	Woodland Police Department Community Room	Receive updates on GSP implementation and well permitting review, enter into services agreement for GSP update

Date	Location	Purpose
September 16, 2024	Woodland Police Department Community Room	Discuss Proposition 4, receive update on state water quality programs (CV-SALTS and impending Hexavalent Chromium MCL)
YSGA Executive Committee Meetings		
February 15, 2022	Hosted via teleconference due to COVID-19 pandemic	Public forum opportunity and update on YSGA activities including GSP implementation
March 14, 2022	Hosted via teleconference due to COVID-19 pandemic	Public forum opportunity and update on YSGA activities including GSP implementation and the annual report
April 18, 2022	Hosted via teleconference due to COVID-19 pandemic	Public forum opportunity and update on YSGA activities including GSP implementation and response to E.O. N-7-22
May 17, 2022	Hosted via teleconference due to COVID-19 pandemic	Public forum opportunity and update on YSGA activities including GSP implementation and response to E.O. N-7-22
June 13, 2022	Hosted via teleconference due to COVID-19 pandemic	Public forum opportunity and update on YSGA activities including GSP implementation and response to E.O. N-7-22
July 25, 2022	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation and project prioritization for SGMA Implementation Grant application
August 16, 2022	Hosted via teleconference due to COVID-19 pandemic	Public forum opportunity and update on YSGA activities including GSP implementation
September 12, 2022	Hosted via teleconference due to COVID-19 pandemic	Public forum opportunity and update on YSGA activities including GSP implementation
October 11, 2022	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation
November 9, 2022	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation
December 19, 2022	Hosted via teleconference due to COVID-19 pandemic	Public forum opportunity and update on YSGA activities including GSP implementation
January 17, 2023	Hosted via teleconference due to COVID-19 pandemic	Public forum opportunity and update on YSGA activities including GSP implementation
February 22, 2023	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation and the annual report
April 10, 2023	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation

Date	Location	Purpose
May 30, 2023	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation, recommend approval of three-year audit proposal
July 24, 2023	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation and well permitting
August 21, 2023	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation and well permitting
September 28, 2023	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation and well permitting
October 19, 2023	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation and well permitting
November 14, 2023	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation and well permitting. Recommend Board authorize Project Initiation & Work orders for Multi-completion monitoring wells
January 12, 2024	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation and well permitting
February 21, 2024	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation and well permitting
April 4, 2024	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation and well permitting
May 13, 2024	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation
June 26, 2024	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation, review responses to GSP update RFQ
August 21, 2024	Yolo County Flood Control & Water Conservation District Boardroom	Public forum opportunity and update on YSGA activities including GSP implementation
Ad Hoc Working Group Meetings		
March 2, 2022	Hosted via teleconference due to COVID-19 pandemic	Public forum opportunity, discuss approach to drought planning and SB 552, framework for management area advisory committee

Date	Location	Purpose
August 3, 2022	Winters Fire Department	Public forum opportunity, discuss approach to drought planning and SB 552, begin project solicitation and prioritization process for SGMA Implementation Grant
August 31, 2022	Winters Fire Department	Public forum opportunity, discuss approach to drought planning and SB 552, review projects received during solicitation for SGMA Implementation Grant application
October 13, 2022	Hosted via teleconference	Review project prioritization ranking for SGMA Implementation Grant application

8.3 Coordination with Other Agencies

As the sole groundwater sustainability agency for the Yolo Subbasin, the YSGA remained focused on coordinating with member agencies to facilitate data sharing, acquiring funding and implementing projects included in the GSP, and meeting new legislative and regulatory requirements.

8.3.1 YSGA Member Agencies

The YSGA continues to coordinate with YCFC&WCD, Dunnigan Water District, and the City of Winters on implementation of their projects funded by the SGMA Implementation Grant (Components 3, 4, and 6). The grant-funded projects also involve intensive coordination with landowners to gather input and direction to guide implementation.

Existing groundwater level data gaps in the North Yolo and Dunnigan Hills MAs were partially filled through coordination with the Dunnigan Water District, which provided groundwater level readings from about 40 wells, in some cases with records dating back to 1990. Yocha Dehe Wintun Nation provided data from their wells in the Capay Valley MA, some going back to 2005. YSGA staff also coordinated with several member agencies to conduct an initial inventory of critical infrastructure within the Subbasin, including water conveyance infrastructure, public supply wells, and levees. This information was considered in the development of the cumulative subsidence threshold for the 2027 GSP update.

8.3.2 Neighboring Subbasins

Inter-basin coordination was a consistent, structured component of YSGA's outreach throughout the evaluation period, driven by the SGMA requirement that adjacent groundwater sustainability agencies coordinate on shared boundary conditions, data, and management approaches. Inter-basin coordination efforts during the GSP development period included several meetings with staff and technical consultants from the Colusa, Sutter, North American, South American, and Solano Subbasins in 2020 and 2021 to share data and agree on consistent boundary conditions within each Subbasin's groundwater model.

After GSP adoption, coordination efforts shifted to communicating updates to neighboring basins on GSP implementation activities in the Yolo Subbasin. YSGA staff met with staff from Solano County Water Agency (SCWA) on multiple occasions to review data collection along Putah Creek, including the YSGA's effort to install multi-completion monitoring wells along Putah Creek directly across from SCWA's monitoring wells to improve understanding of ISW along Putah Creek. There was also coordination related to SCWA's Northwest Focus Area during the delineation of the YSGA's own Focus Areas, as YSGA's West Side Focus Area borders the Northwest Focus Areas for nearly 8 miles along Putah Creek. In the Colusa

Subbasin, YSGA staff continue to coordinate with RD108 staff in the South Colusa-North Yolo group to stay informed of recharge projects the group may implement voluntarily to address declining groundwater levels and land subsidence.

8.3.3 New Legislative and Regulatory Requirements

In 2023 and 2024, the YSGA was proactive in complying with drought emergency executive orders related to well permitting (N-7-22 and N-3-23). These orders required significant coordination efforts with the Yolo County Division of Environmental Health, the details of which are described in Section 7.2.1. YSGA staff were also in regular communication with neighboring subbasins in response to the executive orders, holding coordination meetings with staff from Solano, Colusa, and Sutter subbasins to review each agency's approach to addressing the new requirements.

9. OTHER INFORMATION

GSP Emergency Regulations §356.4(k) include a requirement that the Periodic Evaluation shall include:

> *Other information the Agency deems appropriate, along with any information required by the Department to conduct a periodic review as required by Water Code Section 107033.*

9.1 Consideration of Adjacent Basins

YSGA evaluated neighboring subbasin SMC MTs, MOs, and IMs as part of the approach to address DWR Recommended Corrective Actions. Out of the five SMCs that apply to the Yolo Subbasin (chronic lowering of groundwater levels, reduction in groundwater in storage, degradation of water quality, land subsidence, and depletion of ISW), only chronic lowering of groundwater levels and land subsidence were identified for further review.

With regard to adjacent subbasins chronic lowering of groundwater level SMC, one RMW (#411) located in North Yolo MA has been identified to have an MT that is less protective than the revised Colusa Subbasin GSP MT criterion established for wells located within Focus Areas. These Focus Areas within the Colusa Subbasin represent areas where domestic wells have gone dry, and land subsidence occurred during the 2020 – 2022 drought. In response, the revised Colusa GSP changed the MT criterion for wells located within these Focus Areas (i.e., Focus RMS Wells) to be set at the 2020 – 2022 minimum groundwater elevation. Due to the location of RMW #411 being in proximity to the subbasin boundary where the Colusa Subbasin Focus Area boundary has been defined, the YSGA will consider revising the MT for RMW #411 to be equal to or similar to the 2020 – 2022 minimum groundwater elevation to be protective of wells north of the subbasin boundary.

With regard to adjacent subbasins' land subsidence SMC, Solano, Sutter, North American, and South American, all of which are neighboring subbasins, defined a land subsidence MT rate equal to 0.1 ft/year, which was determined to be protective of neighboring levees. In the revised Colusa GSP, Colusa also set a land subsidence rate equal to 0.1 ft/yr and a cumulative subsidence threshold of two feet to be protective of the Tehama-Colusa Canal. As a result, YSGA has proposed in this 2027 Periodic Evaluation a revised land subsidence SMC as described in Section 3.5 to be in alignment with adjacent subbasins, best available science, and guidelines described in the Land Subsidence BMP.

9.2 Challenges Not Previously Discussed

YSGA has been funded by existing Member Agencies since the formation of the GSA and as called for in the Joint Power Authority; it was envisioned for the YSGA to transition its funding sources from the Member Agencies to the beneficiaries. As part of the SGMA Implementation Grant, the YSGA started work on a fee study to identify which regulatory pathway provisioned by SGMA (Proposition 26 or 218), fee structure, and funding level would be appropriate. This work is ongoing, and it is anticipated that the YSGA will have a fee adopted by 2026 and provide a long-term sustainable funding sources for YSGA administrative and regulatory activities.

YSGA has been coordinating closely with the County on concerns related to crop conversion on land that was did not historically rely on groundwater or surface water for irrigation for crops. The County's General Plan considers a conversion of land to be a change from agricultural land use to a non-agricultural or urban land use. If the County decides to proceed with updates to its General Plan policies that dictate crop conversion, YSGA staff intend to be proactive in providing feedback on proposed changes to the General Plan so that it aligns with SGMA and YSGA efforts to maintain sustainable groundwater resources within the subbasin.

9.3 Legal Challenges or Adjudication

There have been no legal challenges or matters involving the YSGA as it relates to implementation of the Yolo Subbasin GSP, nor has there been any indication of a potential adjudication.

10. SUMMARY OF PROPOSED OR COMPLETED REVISIONS TO PLAN ELEMENTS

GSP Emergency Regulations §356.4(i) include a requirement that the Periodic Evaluation shall include:

> *A description of completed or proposed Plan amendments.*

10.1 Proposed Revisions to Plan Elements

YSGA has no revisions to plan elements at this time as part of this Periodic Evaluation cycle. The YSGA is planning to have plan revisions described and documented in the 2032 Periodic Evaluation and amended GSP due to the significant data collection, analysis, and implementation efforts currently underway and anticipated to be completed or ongoing by 2032.

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