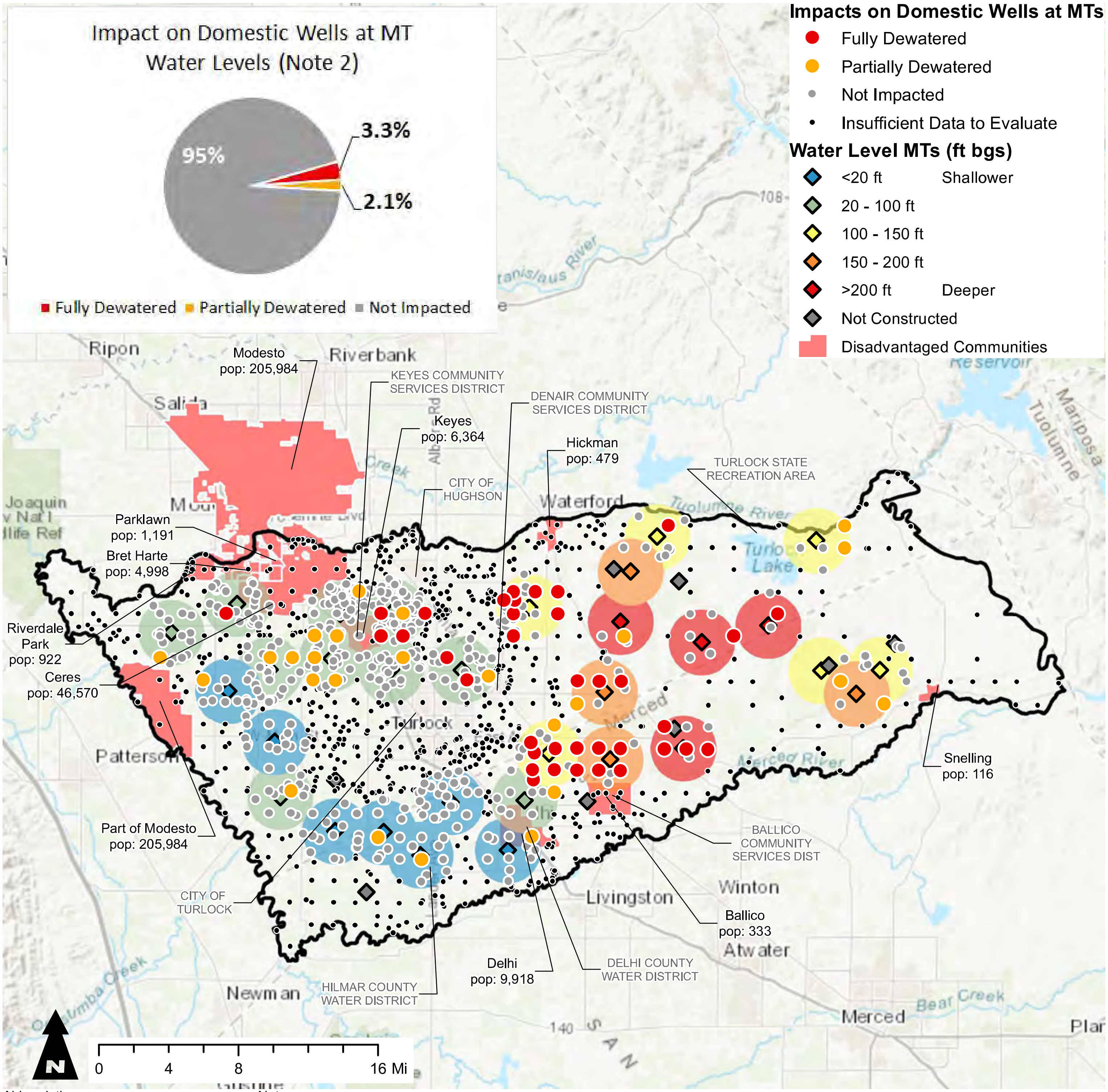
Figure 3 - Impact on Domestic Wells at MT Water Levels

West and East Turlock Subbasin GSA



Abbreviations

CWC = Community Water Center
DAC = disadvantaged community
GSA = Groundwater Sustainability Agency
GSP = Groundwater Sustainability Plan
MT = minimum threshold

Notes

1. All locations are approximate.
2. A well is identified as fully dewatered if the MT is below the midpoint of the screen well screen interval, and partially dewatered if the MT is below the top of the screen interval. For domestic wells with incomplete well screen information, it is assumed that the well screen extends 40 feet above the bottom of the well. Where available, the bottom of the screen interval of a domestic well was used for this assessment, and the bottom of the well depth was used for the remaining domestic wells. Wells with insufficient data and/or wells outside of the 1.5-mile buffer were not evaluated.

References

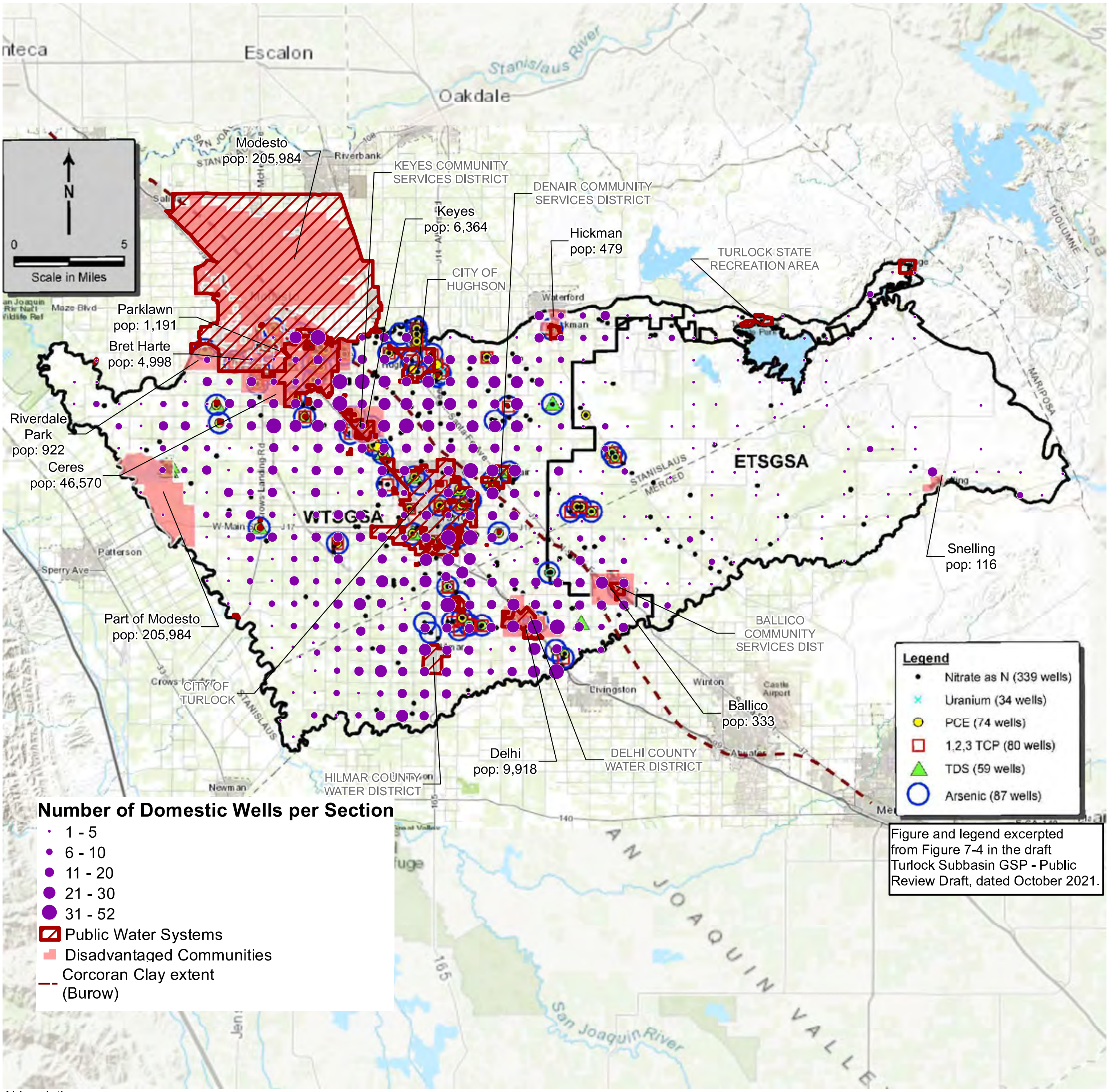
1. Domestic well data: Research to develop the CWC Vulnerability Tool draft as of 16 May 2019 and 6 August 2019.
2. Disadvantaged community data (place): downloaded on 6 August 2019 from the DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/.
3. Public Water System data: downloaded on 6 August 2019 from Tracking California: https://trackingcalifornia.org/water/map-viewer.
4. MT values are from Table 7-1 in the Turlock Subbasin GSP - Public Review Draft, dated October 2021.

Self-Help Enterprises

Leadership Counsel for Justice & Accountability

Figure 4 - Monitoring Network for Groundwater Quality Relative to Domestic Wells, DACs, and Public Water Systems

West and Turlock Subbasin GSA



Abbreviations
CWC = Community Water Center
DAC = disadvantaged community
GSA = Groundwater Sustainability Agency
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Notes
1. All locations are approximate.

References
1. Domestic Well data: Research to develop the CWC Vulnerability Tool draft as of 16 May 2019 and 6 August 2019.
2. Disadvantaged community data (place): downloaded on 6 August 2019 from the DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/.
3. Community Water System data: downloaded on 6 August 2019 from Tracking California: https://trackingcalifornia.org/water/map-viewer.
4. Figure 7-4 (Water Quality Monitoring Sites, January 2020 to May 2021) reproduced from the draft Turlock Subbasin GSP - Public Review Draft, dated October 2021 and presented as a basemap here.

Self-Help ENTERPRISES

LEADERSHIP COUNSEL FOR JUSTICE & ACCOUNTABILITY

Herb S. Smart

From:	M. Trieweiler [redacted]
Sent:	Saturday, December 11, 2021 11:43 AM
To:	turlockgroundwater@gmail.com
Subject:	Public Comments on the Draft GSP by MiltTrieweiler

Public Comments on the Draft GSP on Dec 11 2021

Milt Trieweiler
[redacted]
Turlock CA 95381[redacted]

I have attended almost all the GSA workshops and TAC meeting on the East and West Subbasin since the initial meetings in 2015.

My biggest concern is how to make the GSA mandates equitable for all farmers regardless of their acreage or wealth. Water is a natural resource and must be shared. Climate scientists have proven that the available water in the Turlock East and West Subbasin will be less and less overtime because of climate change. To assure that it is equitable, all parties should reduce their water usage by the scientific method described below. It should not be based on farm size or the farm crops that are planted. Some stake holders because of financial backing maybe able to drill deeper and larger wells and pump a larger volume of water from the aquifer. This would result in a cone of depression and the inability of some farmers to operate their wells. The amount of water extracted by all stakeholders must be based on the natural input of water from natural rainfall in any given year. These rainfall amounts should be based on the rainfall in the area of the Subbasin that the stakeholder's farmland is located in the entire Subbasin. To insure water usage is equitable it will require scientific monitoring of rainfall and water usage in all areas of both the East and West Subbasins.

My second concern is a lack of understanding of what the effects of climate change will have on the Turlock East and West Subbasins. Climate scientists are warning us of a diminishing supply of water in the Subbasins due to decreased amounts of rain and snow in the Western United States. There is still talk of building more dams and reservoirs for storage. This would be an economic disaster by spending billions on reservoirs that will seldom if ever be filled up with water. The focus on storage should be on the recharging of the aquifer in the Subbasins. We already have a water storage capacity in the aquifer equal to the size of the Don Pedro reservoir. In the few years we have above average rainfall we should add that water to the aquifer in the winter months by flood irrigating farmlands in the irrigation districts. We should also be investing in pipe lines to distribute this water for recharging to the areas in the Subbasins with the best recharging capacities. This aquifer recharging will provide water for pumping in the summer and will prevent are Subbasin land areas from subsidence.

Milt Trieweiler
Save our water, every drop counts.

California Poultry Federation
4640 Spyres Way, Suite 4 | Modesto, CA 95356 | Phone: (209) 576-6355 | www.cpif.org

December 13, 2021

VIA E-MAIL (turlockgroundwater@gmail.com)

Turlock Subbasin GSP Comments
c/o Turlock Irrigation District
PO Box 949
Turlock, California 95381

Dear Directors of the East Turlock Subbasin and of the West Turlock Subbasin GSAs:

The California Poultry Federation ("CPF") appreciates this opportunity to comment on the draft Turlock Subbasin Groundwater Sustainability Plan (the "Draft GSP"). CPF is the trade association for California's diverse and dynamic poultry industry. Our members include growers, hatchers, breeders, and processors from across the industry that work with chickens, turkeys, ducks, game birds, and squab. Water is essential for all of them --both for nutrition and for maintaining sanitary conditions. CPF therefore supports effective measures to assure reliable water supplies.

In this regard, CPF commends the Draft GSP for emphasizing the development of projects to augment available water supplies. We encourage the Turlock Subbasin Groundwater Sustainability Agencies to continue identifying and implementing measures to increase groundwater recharge and obtain additional surface water.

To the extent demand reductions may be necessary, CPF trusts the public will have a meaningful opportunity to participate fully in their development, including by submitting written comments on the proposals and supporting data. It will be particularly important to consider all of the associated costs, which, as the Draft GSP recognizes (e.g., at Table 9-1), are still being developed.

CPF appreciates your consideration of these comments. Please let me know if you need any further information.

Very truly yours,

Bill Mattos

Bill Mattos
President

Herb S. Smart

From:	Squarespace <form-submission@squarespace.info>
Sent:	Monday, December 13, 2021 3:14 PM
To:	Herb S. Smart
Subject:	Form Submission - GSP Comment

Sent via form submission from *The Turlock Subbasin*

Name: Allison Boucher

Your Organization (If applicable): Tuolumne River Conservancy, Inc.

Email: feathersfurflowers@comcast.net

Message: After reviewing the Special Meeting December 9, 2021, we are dismayed at the projected future for the Tuolumne River. The Stream-Aquifer Interaction Historical Simulation 2006-2015 map marks 11 spots with a losting scenario for the Tuolumne River. But that increases to 32 losing spots into the future. There is also risk in those spots mapped as mixed, both losing and gaining. We expect to see Projects and Management Actions to prevent the further deterioration for the Tuolumne River flows. The increase in the number of losing spots is unacceptable and a violatation of the public trust.

Does this submission look like spam? Report it here.

December 15, 2021

East Turlock Subbasin GSA and West Turlock Subbasin GSA
PO Box 949
Turlock, CA 95381-0949

Submitted via email: turlockgroundwater@gmail.com

Re: Public Comment Letter for Turlock Subbasin Draft GSP

Dear Kevin Kauffman,

On behalf of the above-listed organizations, we appreciate the opportunity to comment on the Draft Groundwater Sustainability Plan (GSP) for the Turlock Subbasin being prepared under the Sustainable Groundwater Management Act (SGMA). Our organizations are deeply engaged in and committed to the successful implementation of SGMA because we understand that groundwater is critical for the resilience of California's water portfolio, particularly in light of changing climate. Under the requirements of SGMA, Groundwater Sustainability Agencies (GSAs) must consider the interests of all beneficial uses and users of groundwater, such as domestic well owners, environmental users, surface water users, federal government, California Native American tribes and disadvantaged communities (Water Code 10723.2).

As stakeholder representatives for beneficial users of groundwater, our GSP review focuses on how well disadvantaged communities, drinking water users, tribes, climate change, and the environment were addressed in the GSP. While we appreciate that some basins have consulted us directly via focus groups, workshops, and working groups, we are providing public comment letters to all GSAs as a means to engage in the development of 2022 GSPs across the state. Recognizing that GSPs are complicated and resource intensive to develop, the intention of this letter is to provide constructive stakeholder feedback that can improve the GSP prior to submission to the State.

Based on our review, we have significant concerns regarding the treatment of key beneficial users in the Draft GSP and consider the GSP to be **insufficient** under SGMA. We highlight the following findings:

1. Beneficial uses and users **are not sufficiently** considered in GSP development.
    a. Human Right to Water considerations **are not sufficiently** incorporated.
    b. Public trust resources **are not sufficiently** considered.
    c. Impacts of Minimum Thresholds, Measurable Objectives and Undesirable Results on beneficial uses and users **are not sufficiently** analyzed.
2. Climate change **is not sufficiently** considered.

3. Data gaps **are not sufficiently** identified and the GSP **needs additional plans** to eliminate them.
4. Projects and Management Actions **do not sufficiently consider** potential impacts or benefits to beneficial uses and users.

Our specific comments related to the deficiencies of the Turlock Subbasin Draft GSP along with recommendations on how to reconcile them, are provided in detail in **Attachment A.**

Please refer to the enclosed list of attachments for additional technical recommendations:

Attachment A	GSP Specific Comments
Attachment B	SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users
Attachment C	Freshwater species located in the basin
Attachment D	The Nature Conservancy's "Identifying GDEs under SGMA: Best Practices for using the NC Dataset"
Attachment E	Maps of representative monitoring sites in relation to key beneficial users

Thank you for fully considering our comments as you finalize your GSP.

Best Regards,

Ngodoo Atume
Water Policy Analyst
Clean Water Action/Clean Water Fund

J. Pablo Ortiz-Partida, Ph.D.
Western States Climate and Water Scientist
Union of Concerned Scientists

Samantha Arthur
Working Lands Program Director
Audubon California

Danielle V. Dolan
Water Program Director
Local Government Commission

E.J. Remson
Senior Project Director, California Water Program
The Nature Conservancy

Melissa M. Rohde
Groundwater Scientist
The Nature Conservancy

Attachment A

Specific Comments on the Turlock Subbasin Draft Groundwater Sustainability Plan

1. Consideration of Beneficial Uses and Users in GSP development

Consideration of beneficial uses and users in GSP development is contingent upon adequate identification and engagement of the appropriate stakeholders. The (A) identification, (B) engagement, and (C) consideration of disadvantaged communities, drinking water users, tribes,[1] groundwater dependent ecosystems, streams, wetlands, and freshwater species are essential for ensuring the GSP integrates existing state policies on the Human Right to Water and the Public Trust Doctrine.

A. Identification of Key Beneficial Uses and Users

Disadvantaged Communities and Drinking Water Users

The identification of Disadvantaged Communities (DACs) and drinking water users is **sufficient**. The GSP provides information on DACs, including identification by name, location on a map (Figure 3-1), and description of the size of each DAC population. The GSP also identifies specific water sources for DACs, severely disadvantaged communities (SDACs), and economically distressed areas, including the population dependent on groundwater.

The GSP provides the necessary information on domestic wells to understand the distribution of shallow and vulnerable drinking water wells within the subbasin. The GSP provides a density map of domestic wells (Figure 2-11), as well as a separate map of domestic wells color coded by depth (Figure 2-13).

Interconnected Surface Waters

The identification of Interconnected Surface Waters (ISWs) is **insufficient**, due to lack of supporting information provided for the ISW analysis. The GSP describes the use of a groundwater model, the C2VSim-TM model, to analyze the interaction between groundwater and surface water within the subbasin. The model is briefly described in the Water Budget section of the GSP which refers to model documentation included in Appendix X, but this appendix was not provided as part of the draft GSP. The GSP could be improved by including a summary of the model in the main GSP text, including groundwater level monitoring well data and stream gauge data that were incorporated into the model, the screening depths of wells used in the groundwater model, and description of the temporal (seasonal and interannual) variability of the data used to calibrate the model.

The GSP provides general statements regarding the connected nature of reaches. The GSP states (p. 4-48): *"In the Turlock Subbasin, each of the three Subbasin river boundaries have been characterized as interconnected surface water (Phillips, et al., 2015; Durbin, 2003). Given the varying conditions of the river stage and groundwater levels – both seasonally and over time – groundwater-surface water interaction is dynamic and can alternate between losing and gaining conditions along various river reaches."* However, the GSP does not provide a map of these

[1] Our letter provides a review of the identification and consideration of federally recognized tribes (Data source: SGMA Data viewer) within the GSP from non-tribal members and NGOs. Based on the likely incomplete information available to our organizations for this review, we recommend that the GSA utilize the California Department of Water Resources' "Engagement with Tribal Governments" Guidance Document (https://water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents) to comprehensively address these important beneficial users in their GSP.

reaches to illustrate the conclusions of the modeling analysis regarding which reaches are connected to groundwater.

RECOMMENDATIONS

- Provide a map showing all the stream reaches in the subbasin, with reaches clearly labeled as interconnected (gaining/losing) or disconnected. Consider any segments with data gaps as potential ISWs and clearly mark them as such on maps provided in the GSP.

- In the main text of the GSP, summarize the groundwater elevation data and stream flow data used in the modeling analysis. Discuss temporal (seasonal and interannual) variability of the data used to calibrate the model.

- To confirm and illustrate the results of the groundwater modeling, overlay the subbasin’s stream reaches with depth-to-groundwater contour maps to illustrate groundwater depths and the groundwater gradient near the stream reaches. Show the location of groundwater wells used in the analysis.

- For the depth-to-groundwater contour maps, use the best practices presented in Attachment D. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a Digital Elevation Model (DEM) to estimate depth-to-groundwater contours across the landscape. This will provide accurate contours of depth to groundwater along streams and other land surface depressions where GDEs are commonly found.

Groundwater Dependent Ecosystems

The identification of Groundwater Dependent Ecosystems (GDEs) is **insufficient**. The GSP took initial steps to identify and map GDEs using the Natural Communities Commonly Associated with Groundwater dataset (NC dataset). However, we found that some mapped features in the NC dataset were improperly disregarded. NC dataset polygons were incorrectly removed if Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI) data did not correlate with groundwater level trends. This is an incorrect method, since a lack of a relationship does not preclude that groundwater is providing some of the ecosystem's water needs. If the ecosystem is accessing groundwater, then the ecosystem should be categorized as a GDE. If there are no data to characterize groundwater conditions underlying the GDE, then the GDE should be retained as a potential GDE and data gaps reconciled in the Monitoring Network section of the GSP.

The GSP uses depth-to-groundwater data from a wet year (1998) and a critically dry year (2015) to characterize areas where the depth to groundwater was less than 30 feet. While we recognize that use of data from wet and dry periods is appropriate, we recommend using more recent groundwater data, where available, over multiple seasons and water year types to determine the range of depth-to-groundwater underlying NC dataset polygons. We also recommend showing the location of wells used in the analysis on both the GDE map (Figure 4-64. Potential Vegetation and Wetland GDEs) and depth-to-groundwater map (Figure 4-63. Areas with Depth to Water within 30 feet in 1998) so that proximity of groundwater data to GDEs can be readily determined.

The GSP does not provide an inventory of flora and fauna in the subbasin, nor is any discussion of threatened or endangered species provided.

RECOMMENDATIONS
● Re-evaluate the NC dataset polygons that were incorrectly removed based on NDVI and NDMI trends. Refer to Attachment D of this letter for best practices for using local groundwater data to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer. ● Use depth-to-groundwater data from multiple seasons and water year types (e.g., wet, dry, average, drought) to determine the range of depth to groundwater around NC dataset polygons. We recommend that a baseline period (10 years from 2005 to 2015) be established to characterize groundwater conditions over multiple water year types. Show the location of wells used in the analysis on the GDE map and depth-to-groundwater contour map. ● Refer to Attachment B for more information on TNC's plant rooting depth database. Deeper thresholds are necessary for plants that have reported maximum root depths that exceed the averaged 30-ft threshold, such as Valley Oak (*Quercus lobata*). We recommend that the reported max rooting depth for these deeper-rooted plants be used. For example, a depth-to-groundwater threshold of 80 feet should be used instead of the 30-ft threshold, when verifying whether Valley Oak polygons from the NC Dataset are connected to groundwater. It is important to emphasize that actual rooting depth data are limited and will depend on the plant species and site-specific conditions such as soil and aquifer types, and proximity to other water sources. ● Discuss data gaps for GDEs. If insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons as "Potential GDEs" in the GSP until data gaps are reconciled in the monitoring network. ● Provide a complete inventory, map, or description of fauna (e.g., birds, fish, amphibian) and flora (e.g., plants) species in the subbasin and note any threatened or endangered species (see Attachment C in this letter for a list of freshwater species located in the Turlock Subbasin).

Native Vegetation and Managed Wetlands

Native vegetation and managed wetlands are water use sectors that are required to be included in the water budget.[2,3] The integration of native vegetation into the water budget is **sufficient**. We commend the GSA for including the groundwater demands of this ecosystem in the historical, current and projected water budgets. Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the subbasin.

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[2] "'Water use sector' refers to categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation." [23 CCR §351(al)]

[3] "The water budget shall quantify the following, either through direct measurements or estimates based on data: (3) Outflows from the groundwater system by water use sector, including evapotranspiration, groundwater extraction, groundwater discharge to surface water sources, and subsurface groundwater outflow." [23 CCR §354.18]

RECOMMENDATION
● State whether or not there are managed wetlands in the subbasin. If there are, ensure that their groundwater demands are included as separate line items in the historical, current, and projected water budgets.

B. Engaging Stakeholders

Stakeholder Engagement During GSP Development
Stakeholder engagement during GSP development is **insufficient**. SGMA's requirement for public notice and engagement of stakeholders is not fully met by the description in the Notice and Communication section (Chapter 3) of the GSP.[4]

Chapter 3 of the Draft GSP appears to be under development at the time of publication, due to highlighted sections and missing appendices (including Appendix 3-1: Turlock Subbasin Communications Plan). Ensure that as this section is finalized, it addresses the following deficiencies with the overall stakeholder engagement process as currently presented in the GSP:

- The GSP documents opportunities for public involvement and engagement in very general terms for listed stakeholders. Public notice and engagement activities include public meetings, GSA meetings made available on YouTube, Technical Advisory Committee meetings, GSP technical and community workshops, adjacent subbasin coordination meetings, email notifications to an interested parties list, updates to the GSA website, sharing information over social media and flyers, and outreach to local media. The GSP does not state whether there was direct engagement with DACs and environmental stakeholders or representatives, or whether these stakeholders are represented on the Technical Advisory Committee.

- The plan does not include documentation on how stakeholder input from the above-mentioned outreach and engagement was solicited, considered, and incorporated into the GSP development process.

- The GSP states (p. 3-22): *"GSAs will inform the public on Plan implementation utilizing the same successful engagement strategies described in the sections above, including email notifications to Interested Parties List, posting information on the Turlock Groundwater website, sharing information via social media channels, distributing flyers where appropriate, outreach to local media, and hosting public meetings (e.g. GSA meetings, TAC meetings, meetings of GSA member agencies and workshops)."* However, the GSP does not include a detailed plan for continual opportunities for engagement through the implementation phase of the GSP that is specifically directed to DACs, domestic well owners, and environmental stakeholders within the subbasin.

[4] "A communication section of the Plan shall include a requirement that the GSP identify how it encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin." [23 CCR §354.10(d)(3)]

RECOMMENDATIONS

- Include the missing Chapter 3 appendices in the Final GSP.
- Describe active and targeted outreach to engage DACs, drinking water users, and environmental stakeholders throughout the GSP development and implementation phases. Refer to Attachment B for specific recommendations on how to actively engage stakeholders during all phases of the GSP process.
- Clearly identify which stakeholders the members of the Technical Advisory Committee represent (e.g., DACs, environmental) and how their input was incorporated into the GSP.
- Utilize DWR's tribal engagement guidance to comprehensively identify, involve, and address all tribes and tribal interests that may be present in the subbasin.[5]

C. Considering Beneficial Uses and Users When Establishing Sustainable Management Criteria and Analyzing Impacts on Beneficial Uses and Users

The consideration of beneficial uses and users when establishing sustainable management criteria (SMC) is **insufficient**. The consideration of potential impacts on all beneficial users of groundwater in the basin are required when defining undesirable results and establishing minimum thresholds.[6,7,8]

Disadvantaged Communities and Drinking Water Users

For chronic lowering of groundwater levels, the GSP provides discussion of the impact on water supply wells, including domestic wells, from the recent drought. Minimum thresholds are set to the low groundwater elevation observed in Fall 2015 at each representative monitoring site in each principal aquifer. The GSP justifies this in part with the following statement (p. 6-15): *"The large number of deeper domestic wells drilled since 2015 can be reasonably assumed to accommodate 2015 water levels, with some tolerance for future droughts."* However, despite the discussion of impacts to domestic wells during the previous drought, no quantitative data is provided on the impact to current domestic wells, including those that may not have been recently replaced. The GSP does not sufficiently describe whether minimum thresholds will avoid significant and unreasonable loss of drinking water to domestic well users. In addition, the GSP does not sufficiently describe or analyze direct or indirect impacts on DACs or drinking water users when defining undesirable results, nor does it describe how the groundwater level minimum

[5] Engagement with Tribal Governments Guidance Document. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/Guidance-Doc-for-SGM-Engagement-with-Tribal-Govt_ay_19.pdf

[6] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results." [23 CCR §354.26(b)(3)]

[7] "The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

[8] "The description of minimum thresholds shall include [...] how state, federal, or local standards relate to the relevant sustainability indicator. If the minimum threshold differs from other regulatory standards, the agency shall explain the nature of and the basis for the difference." [23 CCR §354.28(b)(5)]

thresholds are consistent with the Human Right to Water policy and will avoid significant and unreasonable impacts on these beneficial users.[9]

The GSP establishes an undesirable result to be when at least 33% of representative monitoring wells exceed the minimum threshold for a principal aquifer in three consecutive fall semi-annual monitoring events. Using this definition of undesirable results for groundwater levels, significant and unreasonable impacts to beneficial users experienced during dry years or periods of drought will not result in an undesirable result. This is problematic since the GSP is failing to manage the subbasin in such a way that strives to minimize significant adverse impacts to beneficial users, which are often felt greatest in below-average, dry, and drought years. Furthermore, the requirement that one-third of monitoring wells exceed the minimum threshold before triggering an undesirable result means that areas with high concentrations of domestic wells may experience impacts significantly greater than the established minimum threshold because the one-third threshold isn't triggered.

For degraded water quality, minimum thresholds are set as the primary or secondary California maximum contaminant level (MCL) for water quality constituents of concern (COCs), which include both anthropogenic and naturally-occurring COCs. The GSP establishes measurable objectives as follows (p. 6-45): *"Measurable objectives are defined as no increase above the maximum historical concentration for any constituent of concern in a potable water supply well in the GSP monitoring program caused by GSA management activities."* The GSP establishes undesirable results as follows (p. 6-35): *"The undesirable result will occur if a new (first-time) exceedance of an MT is observed in a potable water supply well in the representative monitoring network that results in a well owners increase on operational costs and is caused by GSA management activities as listed above."*

The minimum thresholds for degraded water quality for each of the identified key water quality constituents are based on their MCLs. According to the state's anti-degradation policy,[10] high water quality should be protected and is only allowed to worsen to the MCL if a finding is made that it is in the best interest of the people of the State of California. No analysis has been done and no such finding has been made.

The GSP only includes a very general discussion of impacts on drinking water users when defining undesirable results and evaluating the impacts of proposed minimum thresholds for degraded water quality. The GSP does not, however, mention or discuss direct and indirect impacts on DACs when defining undesirable results for degraded water quality, nor does it evaluate the cumulative or indirect impacts of proposed minimum thresholds on these stakeholders.

RECOMMENDATIONS
Chronic Lowering of Groundwater Levels ● Describe direct and indirect impacts on drinking water users and DACs when describing undesirable results and defining minimum thresholds for chronic lowering of groundwater levels. Include information on the impacts during prolonged periods of below average water years.

[9] California Water Code §106.3. Available at: https://leginfo.legislature.ca.gov/faces/codes_displaySection.xhtml?lawCode=WAT&sectionNum=106.3
[10] Anti-degradation Policy https://www.waterboards.ca.gov/board_decisions/adopted_orders/resolutions/1968/rs68_016.pdf

- Consider and evaluate the impacts of selected minimum thresholds and measurable objectives on drinking water users and DACs within the subbasin. Further describe the impact of passing the minimum threshold for these users. For example, provide the number of domestic wells that would be fully or partially de-watered at the minimum threshold.

- Consider minimum threshold exceedances during single dry years when defining the groundwater level undesirable result across the subbasin.

Degraded Water Quality

- Describe direct and indirect impacts on drinking water users and DACs when defining undesirable results for degraded water quality.[11] For specific guidance on how to consider these users, refer to "Guide to Protecting Water Quality Under the Sustainable Groundwater Management Act."[12]

- Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on drinking water users and DACs.

Groundwater Dependent Ecosystems and Interconnected Surface Waters

Sustainable management criteria for chronic lowering of groundwater levels provided in the GSP do not consider potential impacts to environmental beneficial users. Since GDEs are present in the subbasin, they must be considered when developing SMC for chronic lowering of groundwater levels. The GSP neither describes nor analyzes direct or indirect impacts on environmental users of groundwater when defining undesirable results. This is problematic because without identifying potential impacts on GDEs, minimum thresholds may compromise, or even destroy, these environmental beneficial users. The GSP justifies the consideration of impacts to GDEs for only the depletion of interconnected surface water sustainability indicator by stating that GDEs are primarily located near surface water features. However, Figure 4-62 (Vegetation Commonly Associated with Groundwater and Wetlands) shows GDEs in areas of the subbasin that are non-adjacent to surface water.

Sustainable management criteria for depletion of interconnected surface water are established by proxy using groundwater levels. For the Tuolumne and San Joaquin Rivers, the minimum threshold is the low groundwater elevation observed in Fall 2015 at each representative monitoring site. For the Merced River, the minimum threshold is the groundwater elevation observed in Spring 2014 at each representative monitoring site. The GSP notes that the minimum thresholds along the Merced River are set at the slightly higher Spring 2014 groundwater elevations to maintain interconnectedness along the river and reduce the potential for future streamflow depletion. Undesirable results are established as follows (p. 6-62): *"An undesirable result will occur on one of the three monitored rivers when 50% of the representative monitoring sites for that river exceed the MT in two consecutive Fall monitoring events."* However, if minimum thresholds are set to drought-level low groundwater levels (for the Tuolumne and San Joaquin Rivers) and the subbasin is allowed to operate at or close to those levels over many years, there is a risk of causing catastrophic damage to ecosystems that are more adverse than

[11] "Degraded Water Quality [...] collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues." [23 CCR §354.34(c)(4)]

[12] Guide to Protecting Water Quality under the Sustainable Groundwater Management Act https://d3n8a8pro7vhmx.cloudfront.net/communitywatercenter/pages/293/attachments/original/1559328858/Guide_to_Protecting_Drinking_Water_Quality_Under_the_Sustainable_Groundwater_Management_Act.pdf?1559328858.

what was occurring at the height of the 2012-2016 drought. This is because California ecosystems, which are adapted to our Mediterranean climate, have some drought strategies that they can utilize to deal with short-term water stress. However, if the drought conditions are prolonged, the ecosystem can collapse. No analysis or discussion is presented to describe how the SMC will affect beneficial users, and more specifically GDEs, or the impact of these minimum thresholds on GDEs in the subbasin. Furthermore, the GSP makes no attempt to evaluate how the proposed minimum thresholds and measurable objectives avoid significant and unreasonable effects on surface water beneficial users in the subbasin (see Attachment C for a list of environmental users in the subbasin), such as increased mortality and inability to perform key life processes (e.g., reproduction, migration).

RECOMMENDATIONS

- When establishing SMC for the subbasin, consider that the SGMA statute [Water Code §10727.4(l)] specifically calls out that GSPs shall include "impacts on groundwater dependent ecosystems."

- When defining undesirable results for chronic lowering of groundwater levels, provide specifics on what biological responses (e.g., extent of habitat, growth, recruitment rates) would best characterize a significant and unreasonable impact to GDEs. Undesirable results to environmental users occur when 'significant and unreasonable' effects on beneficial users are caused by one of the sustainability indicators (i.e., chronic lowering of groundwater levels, degraded water quality, or depletion of interconnected surface water). Thus, potential impacts on environmental beneficial uses and users need to be considered when defining undesirable results in the subbasin.[13] Defining undesirable results is the crucial first step before the minimum thresholds can be determined.[14]

- When defining undesirable results for depletion of interconnected surface water, include a description of potential impacts on instream habitats within ISWs when minimum thresholds in the subbasin are reached.[15] The GSP should confirm that minimum thresholds for ISWs avoid adverse impacts on environmental beneficial users of interconnected surface waters as these environmental users could be left unprotected by the GSP. These recommendations apply especially to environmental beneficial users that are already protected under pre-existing state or federal law.[8,16]

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[13] "The description of undesirable results shall include [...] potential effects on the beneficial uses and users of groundwater, on land uses and property interests, and other potential effects that may occur or are occurring from undesirable results". [23 CCR §354.26(b)(3)]

[14] The description of minimum thresholds shall include [...] how minimum thresholds may affect the interests of beneficial uses and users of groundwater or land uses and property interests." [23 CCR §354.28(b)(4)]

[15] "The minimum threshold for depletions of interconnected surface water shall be the rate or volume of surface water depletions caused by groundwater use that has adverse impacts on beneficial uses of the surface water and may lead to undesirable results." [23 CCR §354.28(c)(6)]

[16] Rohde MM, Seapy B, Rogers R, Castañeda X, editors. 2019. Critical Species LookBook: A compendium of California's threatened and endangered species for sustainable groundwater management. The Nature Conservancy, San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/Critical_Species_LookBook_91819.pdf

2. Climate Change

The SGMA statute identifies climate change as a significant threat to groundwater resources and one that must be examined and incorporated in the GSPs. The GSP Regulations require integration of climate change into the projected water budget to ensure that projects and management actions sufficiently account for the range of potential climate futures.[17] The effects of climate change will intensify the impacts of water stress on GDEs, making available shallow groundwater resources especially critical to their survival. Condon *et al.* (2020) shows that GDEs are more likely to succumb to water stress and rely more on groundwater during times of drought.[18] When shallow groundwater is unavailable, riparian forests can die off and key life processes (e.g., migration and spawning) for aquatic organisms, such as steelhead, can be impeded.

The integration of climate change into the projected water budget is **insufficient**. The GSP incorporates climate change into the projected water budget using DWR change factors for 2070. However, the GSP does not indicate whether multiple climate scenarios (e.g., the 2070 extremely wet and extremely dry climate scenarios) were considered in the projected water budget. The GSP would benefit from clearly and transparently incorporating the extremely wet and dry scenarios provided by DWR into projected water budgets or select more appropriate extreme scenarios for the subbasin. While these extreme scenarios may have a lower likelihood of occurring and their consideration is not required (only suggested) by DWR, their consequences could be significant and their inclusion can help identify important vulnerabilities in the subbasin's approach to groundwater management.

The GSP integrates climate change into key inputs (e.g., changes in precipitation, evapotranspiration, and surface water flow) of the projected water budget. However, the sustainable yield is based on the projected baseline water budget, instead of the projected water budget with climate change incorporated. If the water budgets are incomplete, including the omission of extremely wet and dry scenarios and the omission of climate change projections in the sustainable yield calculations, then there is increased uncertainty in virtually every subsequent calculation used to plan for projects, derive measurable objectives, and set minimum thresholds. Plans that do not adequately include climate change projections may underestimate future impacts on vulnerable beneficial users of groundwater such as ecosystems, DACs, and domestic well owners.

RECOMMENDATIONS

- Integrate climate change, including extreme climate scenarios, into all elements of the projected water budget to form the basis for development of sustainable management criteria and projects and management actions.
- Calculate sustainable yield based on the projected water budget with climate change incorporated.
- Incorporate climate change scenarios into projects and management actions.

[17] "Each Plan shall rely on the best available information and best available science to quantify the water budget for the basin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow." [23 CCR §354.18(e)]

[18] Condon et al. 2020. Evapotranspiration depletes groundwater under warming over the contiguous United States. Nature Communications. Available at: https://www.nature.com/articles/s41467-020-14688-0

3. Data Gaps

The consideration of beneficial users when establishing monitoring networks is **insufficient**, due to lack of specific plans to increase the Representative Monitoring Sites (RMSs) in the monitoring network that represent shallow groundwater elevations around DACs and domestic wells in the subbasin. These beneficial users may remain unprotected by the GSP without adequate monitoring and identification of data gaps in the shallow aquifer. While we note that the plan states (p. 7-11): *"Data gaps in the monitoring network will be addressed with a Management Action to improve future GSP monitoring,"* this Management Action was not included in the Draft GSP. The Plan therefore fails to meet SGMA's requirements for the monitoring network.[19]

Figure 7-4 (Water Quality Monitoring Sites) shows sufficient representation of DACs and drinking water users for the water quality monitoring network. Maps of shallow and deep wells within the subbasin (Figures 7-1 to 7-3) show insufficient spatial representation of DACs and drinking water users for the groundwater elevations monitoring network, particularly in areas with the highest density of drinking water wells. Refer to Attachment E for maps of these monitoring sites in relation to key beneficial users of groundwater. Note that we were only able to map groundwater elevation RMSs with information provided in the Draft GSP.

RECOMMENDATIONS

- Provide maps that overlay current and proposed monitoring well locations with the locations of DACs, domestic wells, and GDEs to clearly identify monitored areas.
- Increase the number of RMSs in the shallow aquifer across the subbasin as needed to map ISWs and adequately monitor all groundwater condition indicators across the subbasin and at appropriate depths for *all* beneficial users. Prioritize proximity to DACs, domestic wells, GDEs, and ISWs when identifying new RMSs.
- Ensure groundwater elevation and water quality RMSs are monitoring groundwater conditions spatially and at the correct depth for *all* beneficial users - especially DACs, domestic wells, and GDEs.
- Describe biological monitoring that can be used to assess the potential for significant and unreasonable impacts to GDEs or ISWs due to groundwater conditions in the subbasin.

4. Addressing Beneficial Users in Projects and Management Actions

The consideration of beneficial users when developing projects and management actions is **incomplete**. The GSP identifies benefits and impacts of identified projects and management actions to beneficial users of groundwater. However, while the GSP describes multiple recharge projects (e.g., Dianne Storm Basin, Stanislaus State Stormwater Recharge, and the Mustang Creek Flood Control Project), it fails to describe the explicit environmental benefits for these or other projects and management actions within the subbasin. Therefore, potential project and management actions may not protect environmental beneficial

[19] "The monitoring network objectives shall be implemented to accomplish the following: [...] (2) Monitor impacts to the beneficial uses or users of groundwater." [23 CCR §354.34(b)(2)]

users. Groundwater sustainability under SGMA is defined not just by sustainable yield, but by the avoidance of undesirable results for *all* beneficial users.

We note that the GSP includes a domestic well mitigation program (Section 8.4.3) to monitor and protect drinking water wells. We recommend that the GSP provide an explicit timeline for planned implementation of the domestic well mitigation program.

RECOMMENDATIONS

- Describe the projected timeline for implementation of the domestic well mitigation program in Chapter 8 of the GSP.

- Recharge ponds, reservoirs, and facilities for managed aquifer recharge can be designed as multiple-benefit projects to include elements that act functionally as wetlands and provide a benefit for wildlife and aquatic species. For guidance on how to integrate multi-benefit recharge projects into your GSP, refer to the "Multi-Benefit Recharge Project Methodology Guidance Document."[20]

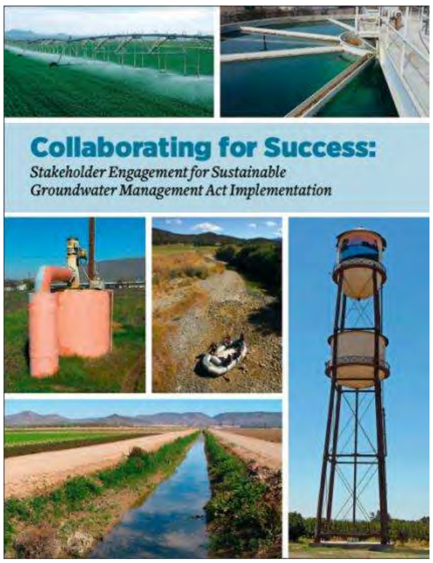
- Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.

[20] The Nature Conservancy. 2021. Multi-Benefit Recharge Project Methodology for Inclusion in Groundwater Sustainability Plans. Sacramento. Available at: https://groundwaterresourcehub.org/sgma-tools/multi-benefit-recharge-project-methodology-guidance/

Attachment B

SGMA Tools to address DAC, drinking water, and environmental beneficial uses and users

Stakeholder Engagement and Outreach



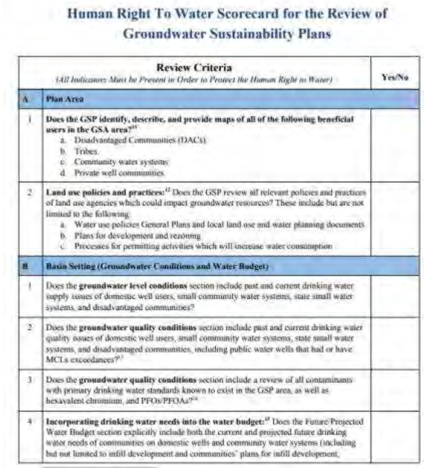
Clean Water Action, Community Water Center and Union of Concerned Scientists developed a guidance document called Collaborating for success: Stakeholder engagement for Sustainable Groundwater Management Act Implementation. It provides details on how to conduct targeted and broad outreach and engagement during Groundwater Sustainability Plan (GSP) development and implementation. Conducting a targeted outreach involves:

- Developing a robust Stakeholder Communication and Engagement plan that includes outreach at frequented locations (schools, farmers markets, religious settings, events) across the plan area to increase the involvement and participation of disadvantaged communities, drinking water users and the environmental stakeholders.

- Providing translation services during meetings and technical assistance to enable easy participation for non-English speaking stakeholders.

- GSP should adequately describe the process for requesting input from beneficial users and provide details on how input is incorporated into the GSP.

The Human Right to Water

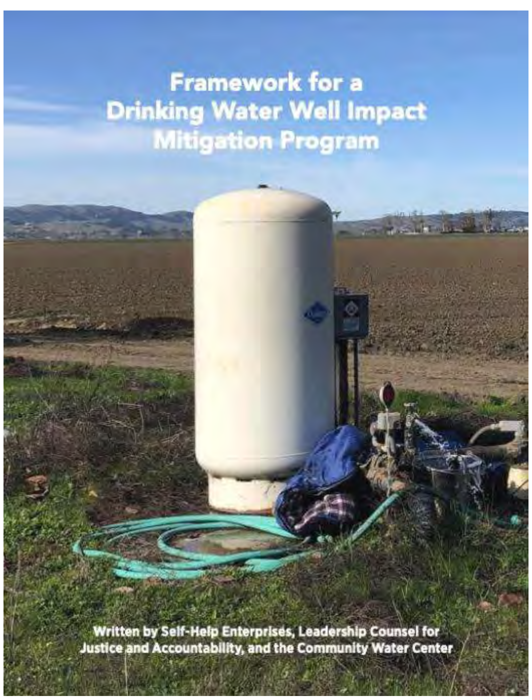


Human Right To Water Scorecard for the Review of Groundwater Sustainability Plans

	Review Criteria (All Indicators Must be Present in Order to Protect the Human Right to Water)	Yes/No
A	**Plan Area**	
1	**Does the GSP identify, describe, and provide maps of all of the following beneficial users in the GSA area?**[11] a. Disadvantaged Communities (DACs) b. Tribes. c. Community water systems d. Private well communities	
2	**Land use policies and practices:**[12] Does the GSP review all relevant policies and practices of land use agencies which could impact groundwater resources? These include but are not limited to the following: a. Water use policies General Plans and local land use and water planning documents b. Plans for development and rezoning c. Processes for permitting activities which will increase water consumption	
B	**Basin Setting (Groundwater Conditions and Water Budget)**	
1	Does the **groundwater level conditions** section include past and current drinking water supply issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities?	
2	Does the **groundwater quality conditions** section include past and current drinking water quality issues of domestic well users, small community water systems, state small water systems, and disadvantaged communities, including public water wells that had or have MCLs exceedances?[13]	
3	Does the **groundwater quality conditions** section include a review of all contaminants with primary drinking water standards known to exist in the GSP area, as well as hexavalent chromium, and PFOs/PFOAs?[14]	
4	**Incorporating drinking water needs into the water budget:**[15] Does the Future/Projected Water Budget section explicitly include both the current and projected future drinking water needs of communities on domestic wells and community water systems (including but not limited to infill development and communities' plans for infill development,	

The Human Right to Water Scorecard was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid Groundwater Sustainability Agencies (GSAs) in prioritizing drinking water needs in SGMA. The scorecard identifies elements that must exist in GSPs to adequately protect the Human Right to Drinking water.

Drinking Water Well Impact Mitigation Framework



The Drinking Water Well Impact Mitigation Framework was developed by Community Water Center, Leadership Counsel for Justice and Accountability and Self Help Enterprises to aid GSAs in the development and implementation of their GSPs. The framework provides a clear roadmap for how a GSA can best structure its data gathering, monitoring network and management actions to proactively monitor and protect drinking water wells and mitigate impacts should they occur.

Groundwater Resource Hub

The Nature Conservancy has developed a suite of tools based on best available science to help GSAs, consultants, and stakeholders efficiently incorporate nature into GSPs. These tools and resources are available online at GroundwaterResourceHub.org. The Nature Conservancy's tools and resources are intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Rooting Depth Database

The Plant Rooting Depth Database provides information that can help assess whether groundwater-dependent vegetation are accessing groundwater. Actual rooting depths will depend on the plant species and site-specific conditions, such as soil type and availability of other water sources. Site-specific knowledge of depth to groundwater combined with rooting depths will help provide an understanding of the potential groundwater levels are needed to sustain GDEs.

How to use the database

The maximum rooting depth information in the Plant Rooting Depth Database is useful when verifying whether vegetation in the Natural Communities Commonly Associated with Groundwater (NC Dataset) are connected to groundwater. A 30 ft depth-to-groundwater threshold, which is based on averaged global rooting depth data for phreatophytes[1], is relevant for most plants identified in the NC Dataset since most plants have a max rooting depth of less than 30 feet. However, it is important to note that deeper thresholds are necessary for other plants that have reported maximum root depths that exceed the averaged 30 feet threshold, such as valley oak (*Quercus lobata*), Euphrates poplar (*Populus euphratica*), salt cedar (*Tamarix spp.*), and shadescale (*Atriplex confertifolia*). The Nature Conservancy advises that the reported max rooting depth for these deeper-rooted plants be used. For example, a depth-to groundwater threshold of 80 feet should be used instead of the 30 ft threshold, when verifying whether valley oak polygons from the NC Dataset are connected to groundwater. It is important to re-emphasize that actual rooting depth data are limited and will depend on the plant species and site-specific conditions such as soil and aquifer types, and availability to other water sources.

The Plant Rooting Depth Database is an Excel workbook composed of four worksheets:

1. California phreatophyte rooting depth data (included in the NC Dataset)
2. Global phreatophyte rooting depth data
3. Metadata
4. References

How the database was compiled

The Plant Rooting Depth Database is a compilation of rooting depth information for the groundwater-dependent plant species identified in the NC Dataset. Rooting depth data were compiled from published scientific literature and expert opinion through a crowdsourcing campaign. As more information becomes available, the database of rooting depths will be updated. Please Contact Us if you have additional rooting depth data for California phreatophytes.

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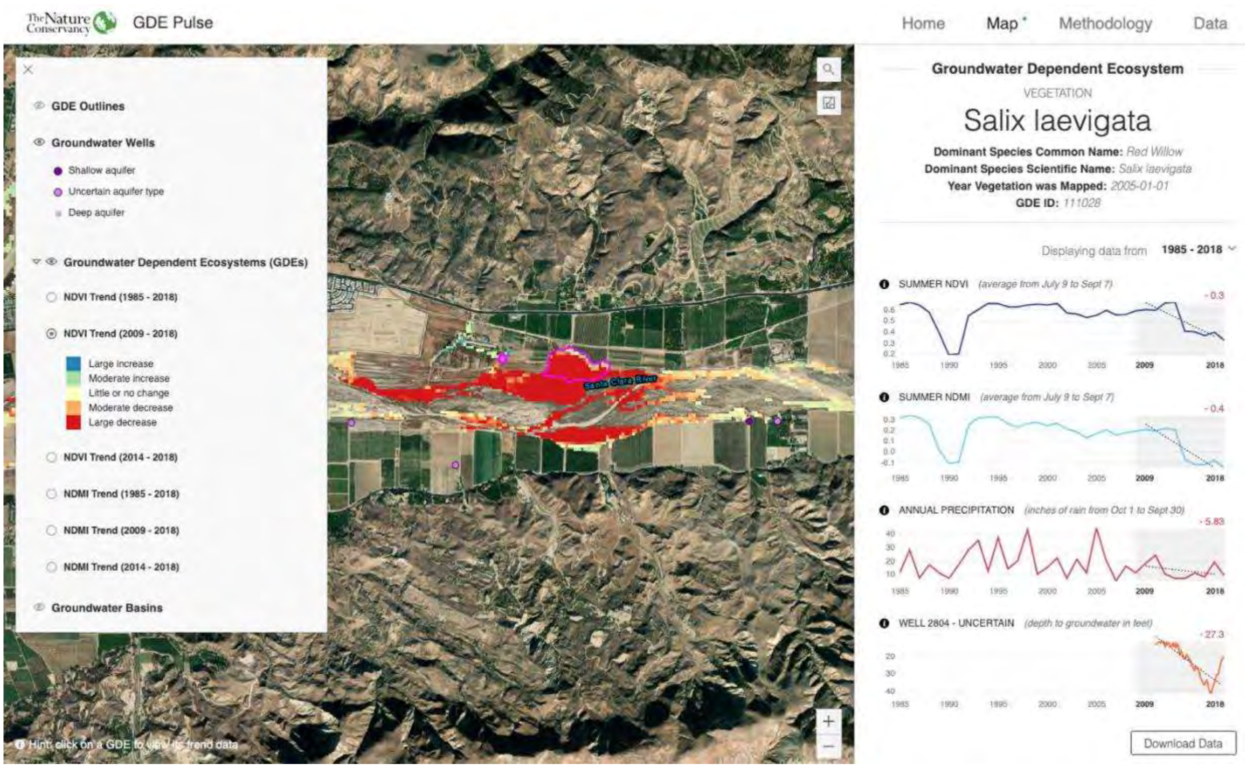
[1] Canadell, J., Jackson, R.B., Ehleringer, J.B. et al. 1996. Maximum rooting depth of vegetation types at the global scale. Oecologia 108, 583–595. https://doi.org/10.1007/BF00329030

GDE Pulse



[GDE Pulse](#) is a free online tool that allows Groundwater Sustainability Agencies to assess changes in groundwater dependent ecosystem (GDE) health using satellite, rainfall, and groundwater data. Remote sensing data from satellites has been used to monitor the health of vegetation all over the planet. GDE pulse has compiled 35 years of satellite imagery from NASA's Landsat mission for every polygon in the Natural Communities Commonly Associated with Groundwater Dataset. The following datasets are available for downloading:

Normalized Difference Vegetation Index (NDVI) is a satellite-derived index that represents the greenness of vegetation. Healthy green vegetation tends to have a higher NDVI, while dead leaves have a lower NDVI. We calculated the average NDVI during the driest part of the year (July - Sept) to estimate vegetation health when the plants are most likely dependent on groundwater.

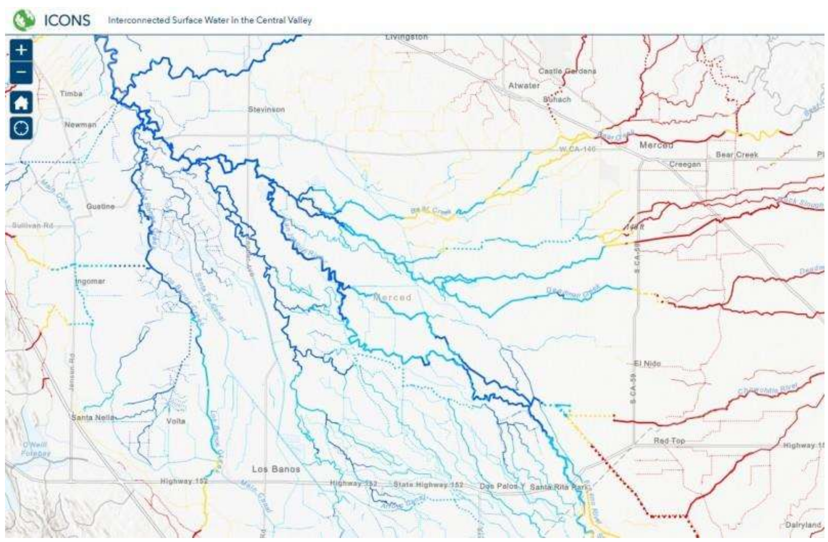
Normalized Difference Moisture Index (NDMI) is a satellite-derived index that represents water content in vegetation. NDMI is derived from the Near-Infrared (NIR) and Short-Wave Infrared (SWIR) channels. Vegetation with adequate access to water tends to have higher NDMI, while vegetation that is water stressed tends to have lower NDMI. We calculated the average NDVI during the driest part of the year (July–September) to estimate vegetation health when the plants are most likely dependent on groundwater.

Annual Precipitation is the total precipitation for the water year (October 1st – September 30th) from the PRISM dataset. The amount of local precipitation can affect vegetation with more precipitation generally leading to higher NDVI and NDMI.

Depth to Groundwater measurements provide an indication of the groundwater levels and changes over time for the surrounding area. We used groundwater well measurements from nearby (<1km) wells to estimate the depth to groundwater below the GDE based on the average elevation of the GDE (using a digital elevation model) minus the measured groundwater surface elevation.

ICONOS Mapper

Interconnected Surface Water in the Central Valley



ICONS maps the likely presence of interconnected surface water (ISW) in the Central Valley using depth to groundwater data. Using data from 2011-2018, the ISW dataset represents the likely connection between surface water and groundwater for rivers and streams in California's Central Valley. It includes information on the mean, maximum, and minimum depth to groundwater for each stream segment over the years with available data, as well as the likely presence of ISW based on the minimum depth to groundwater. The Nature Conservancy developed this database, with guidance and input from expert academics, consultants, and state agencies.

We developed this dataset using groundwater elevation data available online from the California Department of Water Resources (DWR). DWR only provides this data for the Central Valley. For GSAs outside of the valley, who have groundwater well measurements, we recommend following our methods to determine likely ISW in your region. The Nature Conservancy's ISW dataset should be used as a first step in reviewing ISW and should be supplemented with local or more recent groundwater depth data.

Attachment C

Freshwater Species Located in the Turlock Basin

To assist in identifying the beneficial users of surface water necessary to assess the undesirable result "depletion of interconnected surface waters", Attachment C provides a list of freshwater species located in the Turlock Basin. To produce the freshwater species list, we used ArcGIS to select features within the California Freshwater Species Database version 2.0.9 within the basin boundary. This database contains information on ~4,000 vertebrates, macroinvertebrates and vascular plants that depend on fresh water for at least one stage of their life cycle. The methods used to compile the California Freshwater Species Database can be found in Howard et al. 2015[1]. The spatial database contains locality observations and/or distribution information from ~400 data sources. The database is housed in the California Department of Fish and Wildlife's BIOS[2] as well as on The Nature Conservancy's science website[3].

Scientific Name	Common Name	Legal Protected Status		
		Federal	State	Other
BIRDS				
Actitis macularius	Spotted Sandpiper			
Aechmophorus clarkii	Clark's Grebe			
Aechmophorus occidentalis	Western Grebe			
Agelaius tricolor	Tricolored Blackbird	Bird of Conservation Concern	Special Concern	BSSC - First priority
Aix sponsa	Wood Duck			
Anas acuta	Northern Pintail			
Anas americana	American Wigeon			
Anas clypeata	Northern Shoveler			
Anas crecca	Green-winged Teal			
Anas cyanoptera	Cinnamon Teal			
Anas discors	Blue-winged Teal			
Anas platyrhynchos	Mallard			
Anas strepera	Gadwall			
Anser albifrons	Greater White-fronted Goose			
Ardea alba	Great Egret			
Ardea herodias	Great Blue Heron			
Aythya affinis	Lesser Scaup			
Aythya americana	Redhead		Special Concern	BSSC - Third priority

[1] Howard, J.K. et al. 2015. Patterns of Freshwater Species Richness, Endemism, and Vulnerability in California. PLoSONE, 11(7). Available at: https://journals.plos.org/plosone/article?id=10.1371/journal.pone.0130710

[2] California Department of Fish and Wildlife BIOS: https://www.wildlife.ca.gov/data/BIOS

[3] Science for Conservation: https://www.scienceforconservation.org/products/california-freshwater-species-database

Aythya collaris	Ring-necked Duck			
Aythya marila	Greater Scaup			
Aythya valisineria	Canvasback		Special	
Botaurus lentiginosus	American Bittern			
Bucephala albeola	Bufflehead			
Bucephala clangula	Common Goldeneye			
Butorides virescens	Green Heron			
Calidris alpina	Dunlin			
Calidris mauri	Western Sandpiper			
Calidris minutilla	Least Sandpiper			
Chen caerulescens	Snow Goose			
Chen rossii	Ross's Goose			
Chlidonias niger	Black Tern		Special Concern	BSSC - Second priority
Chroicocephalus philadelphia	Bonaparte's Gull			
Cistothorus palustris palustris	Marsh Wren			
Cygnus columbianus	Tundra Swan			
Egretta thula	Snowy Egret			
Empidonax traillii	Willow Flycatcher	Bird of Conservation Concern	Endangered	
Fulica americana	American Coot			
Gallinago delicata	Wilson's Snipe			
Gallinula chloropus	Common Moorhen			
Geothlypis trichas trichas	Common Yellowthroat			
Grus canadensis	Sandhill Crane			
Haliaeetus leucocephalus	Bald Eagle	Bird of Conservation Concern	Endangered	
Himantopus mexicanus	Black-necked Stilt			
Icteria virens	Yellow-breasted Chat		Special Concern	BSSC - Third priority
Limnodromus scolopaceus	Long-billed Dowitcher			
Lophodytes cucullatus	Hooded Merganser			
Megaceryle alcyon	Belted Kingfisher			
Mergus merganser	Common Merganser			
Mergus serrator	Red-breasted Merganser			
Numenius americanus	Long-billed Curlew			
Numenius phaeopus	Whimbrel			
Nycticorax nycticorax	Black-crowned Night-Heron			
Oxyura jamaicensis	Ruddy Duck			
Pandion haliaetus	Osprey		Watch list	

Pelecanus erythrorhynchos	American White Pelican		Special Concern	BSSC - First priority
Phalacrocorax auritus	Double-crested Cormorant			
Phalaropus tricolor	Wilson's Phalarope			
Plegadis chihi	White-faced Ibis		Watch list	
Pluvialis squatarola	Black-bellied Plover			
Podiceps nigricollis	Eared Grebe			
Podilymbus podiceps	Pied-billed Grebe			
Porzana carolina	Sora			
Rallus limicola	Virginia Rail			
Recurvirostra americana	American Avocet			
Riparia riparia	Bank Swallow		Threatened	
Setophaga petechia	Yellow Warbler			BSSC - Second priority
Tachycineta bicolor	Tree Swallow			
Tringa melanoleuca	Greater Yellowlegs			
Tringa semipalmata	Willet			
Tringa solitaria	Solitary Sandpiper			
Vireo bellii pusillus	Least Bell's Vireo	Endangered	Endangered	
Xanthocephalus xanthocephalus	Yellow-headed Blackbird		Special Concern	BSSC - Third priority
CRUSTACEANS				
Branchinecta conservatio	Conservancy Fairy Shrimp	Endangered	Special	IUCN - Endangere d
Branchinecta lynchi	Vernal Pool Fairy Shrimp	Threatened	Special	IUCN - Vulnerable
Lepidurus packardi	Vernal Pool Tadpole Shrimp	Endangered	Special	IUCN - Endangere d
Linderiella occidentalis	California Fairy Shrimp		Special	IUCN - Near Threatened
Branchinecta coloradensis	Colorado Fairy Shrimp			
Hyalella spp.	Hyalella spp.			
Stygobromus spp.	Stygobromus spp.			
FISH				
Oncorhynchus mykiss irideus	Coastal rainbow trout			Least Concern - Moyle 2013
Pogonichthys macrolepidotus	Sacramento splittail		Special Concern	Vulnerable - Moyle 2013
Mylopharodon conocephalus	Hardhead		Special Concern	Near-Threatened

				- Moyle 2013
Oncorhynchus mykiss - CV	Central Valley steelhead	Threatened	Special	Vulnerable - Moyle 2013
HERPS				
Actinemys marmorata marmorata	Western Pond Turtle		Special Concern	ARSSC
Ambystoma californiense californiense	California Tiger Salamander	Threatened	Threatened	ARSSC
Anaxyrus boreas boreas	Boreal Toad			
Rana draytonii	California Red-legged Frog	Threatened	Special Concern	ARSSC
Spea hammondii	Western Spadefoot	Under Review in the Candidate or Petition Process	Special Concern	ARSSC
Thamnophis gigas	Giant Gartersnake	Threatened	Threatened	
Thamnophis sirtalis sirtalis	Common Gartersnake			
Anaxyrus boreas halophilus	California Toad			ARSSC
INSECTS & OTHER INVERTS				
Acentrella turbida	A Mayfly			
Apedilum spp.	Apedilum spp.			
Argia spp.	Argia spp.			
Baetis tricaudatus	A Mayfly			
Camelobaetidius warreni	A Mayfly			
Cardiocladius spp.	Cardiocladius spp.			
Chironomidae fam.	Chironomidae fam.			
Cricotopus spp.	Cricotopus spp.			
Dubiraphia spp.	Dubiraphia spp.			
Enallagma spp.	Enallagma spp.			
Ephemerellidae fam.	Ephemerellidae fam.			
Fallceon quilleri	A Mayfly			
Glossosomatidae fam.	Glossosomatidae fam.			
Gumaga griseola	A Bushtailed Caddisfly			
Heptageniidae fam.	Heptageniidae fam.			
Hydropsyche spp.	Hydropsyche spp.			
Hydropsychidae fam.	Hydropsychidae fam.			
Hydroptila spp.	Hydroptila spp.			
Ischnura gemina	San Francisco Forktail		Special	IUCN - Vulnerable
Mystacides alafimbriatus	A Caddisfly			
Nectopsyche spp.	Nectopsyche spp.			
Ordobrevia nubifera				Not on any status lists
Pantala flavescens	Wandering Glider			

Petrophila spp.	Petrophila spp.			
Phaenopsectra spp.	Phaenopsectra spp.			
Polypedilum spp.	Polypedilum spp.			
Protoptila spp.	Protoptila spp.			
Rheotanytarsus spp.	Rheotanytarsus spp.			
Serratella spp.	Serratella spp.			
Simulium spp.	Simulium spp.			
Sperchon spp.	Sperchon spp.			
Tanytarsus spp.	Tanytarsus spp.			
Tricorythodes spp.	Tricorythodes spp.			
MAMMALS				
Castor canadensis	American Beaver			Not on any status lists
Lontra canadensis canadensis	North American River Otter			Not on any status lists
Neovison vison	American Mink			Not on any status lists
Ondatra zibethicus	Common Muskrat			Not on any status lists
MOLLUSKS				
Anodonta californiensis	California Floater		Special	
Ferrissia spp.	Ferrissia spp.			
Gonidea angulata	Western Ridged Mussel		Special	
Gyraulus spp.	Gyraulus spp.			
Margaritifera falcata	Western Pearlshell		Special	
Menetus opercularis	Button Sprite			CS
Physa spp.	Physa spp.			
PLANTS				
Castilleja campestris succulenta	Fleshy Owl's-clover	Threatened	Endangered	CRPR - 1B.2
Downingia pusilla	Dwarf Downingia		Special	CRPR - 2B.2
Eryngium spinosepalum	Spiny Sepaled Coyote-thistle		Special	CRPR - 1B.2
Neostapfia colusana	Colusa Grass	Threatened	Endangered	CRPR - 1B.1
Orcuttia inaequalis	San Joaquin Valley Orcutt Grass	Threatened	Endangered	CRPR - 1B.1
Orcuttia pilosa	Hairy Orcutt Grass	Endangered	Endangered	CRPR - 1B.1
Tuctoria greenei	Green's Awnless Orcutt Grass	Endangered	Rare	CRPR - 1B.1
Alnus rhombifolia	White Alder			
Arundo donax	NA			
Bidens tripartita	NA			

Callitriche longipedunculata	Longstock Water-starwort			
Cephalanthus occidentalis	Common Buttonbush			
Cyperus erythrorhizos	Red-root Flatsedge			
Cyperus squarrosus	Awned Cyperus			
Datisca glomerata	Durango Root			
Downingia bicornuta	NA			
Elatine californica	California Waterwort			
Elatine rubella	Southwestern Waterwort			
Eleocharis flavescens flavescens	Pale Spikerush			
Eleocharis palustris	Creeping Spikerush			
Eryngium vaseyi vaseyi	Vasey's Coyote-thistle			Not on any status lists
Euphorbia hooveri	NA			Not on any status lists
Gratiola ebracteata	Bractless Hedge-hyssop			
Helenium puberulum	Rosilla			
Isoetes howellii	NA			
Juncus acuminatus	Sharp-fruit Rush			
Juncus dubius	Mariposa Rush			
Juncus usitatus	NA			Not on any status lists
Juncus xiphioides	Iris-leaf Rush			
Lasthenia ferrisiae	Ferris' Goldfields		Special	CRPR - 4.2
Lasthenia fremontii	Fremont's Goldfields			
Limnanthes douglasii rosea	Douglas' Meadowfoam			
Limnanthes douglasii striata				Not on any status lists
Lipocarpha micrantha	Dwarf Bulrush			
Ludwigia palustris	Marsh Seedbox			
Marsilea vestita vestita	NA			Not on any status lists
Mimulus guttatus	Common Large Monkeyflower			
Mimulus ringens	Square-stem Monkeyflower			
Myosurus minimus	NA			
Myriophyllum aquaticum	NA			
Najas guadalupensis guadalupensis	Southern Naiad			
Navarretia intertexta	Needleleaf Navarretia			
Navarretia leucocephala leucocephala	White-flower Navarretia			
Navarretia leucocephala minima	Least Navarretia			

Panicum acuminatum acuminatum				Not on any status lists
Panicum dichotomiflorum	NA			
Persicaria maculosa	NA			Not on any status lists
Phacelia distans	NA			
Plagiobothrys austiniae	Austin's Popcorn-flower			
Plantago elongata elongata	Slender Plantain			
Pogogyne douglasii	NA			
Potamogeton foliosus foliosus	Leafy Pondweed			
Potamogeton illinoensis	Illinois Pondweed			
Potamogeton nodosus	Longleaf Pondweed			
Psilocarphus brevissimus brevissimus	Dwarf Woolly-heads			
Ranunculus sceleratus	NA			
Salix exigua exigua	Narrowleaf Willow			
Salix gooddingii	Goodding's Willow			
Salix laevigata	Polished Willow			
Salix lasiandra lasiandra				Not on any status lists
Salix lasiolepis lasiolepis	Arroyo Willow			
Salix melanopsis	Dusky Willow			
Sidalcea hirsuta	Hairy Checker-mallow			
Symphyotrichum lentum	Suisun Marsh Aster		Special	CRPR - 1B.2

Attachment D

The Nature Conservancy

July 2019

IDENTIFYING GDEs UNDER SGMA

Best Practices for using the NC Dataset

The Sustainable Groundwater Management Act (SGMA) requires that groundwater dependent ecosystems (GDEs) be identified in Groundwater Sustainability Plans (GSPs). As a starting point, the Department of Water Resources (DWR) is providing the Natural Communities Commonly Associated with Groundwater Dataset (NC Dataset) online[1] to help Groundwater Sustainability Agencies (GSAs), consultants, and stakeholders identify GDEs within individual groundwater basins. To apply information from the NC Dataset to local areas, GSAs should combine it with the best available science on local hydrology, geology, and groundwater levels to verify whether polygons in the NC dataset are likely supported by groundwater in an aquifer (Figure 1)[2]. This document highlights six best practices for using local groundwater data to confirm whether mapped features in the NC dataset are supported by groundwater.

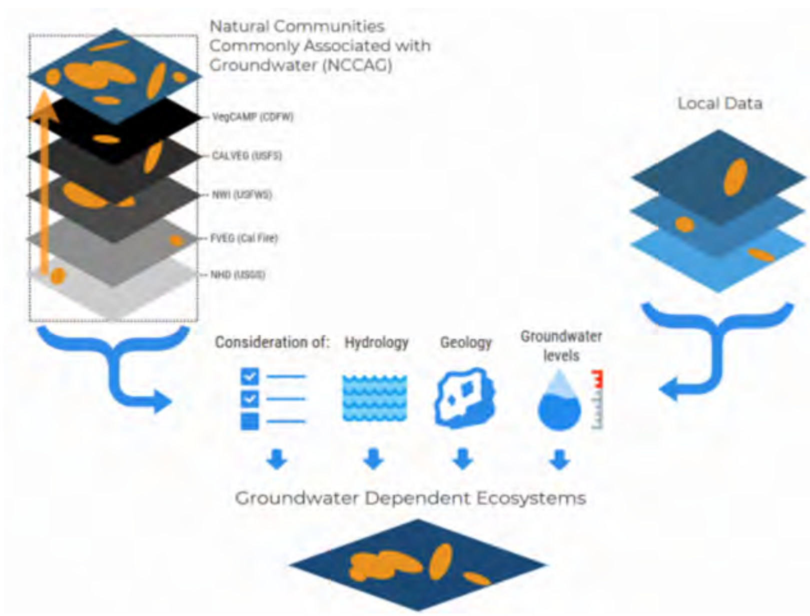


Figure 1. Considerations for GDE identification.
Source: DWR[2]

[1] NC Dataset Online Viewer: https://gis.water.ca.gov/app/NCDatasetViewer/
[2] California Department of Water Resources (DWR). 2018. Summary of the "Natural Communities Commonly Associated with Groundwater" Dataset and Online Web Viewer. Available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Data-and-Tools/Files/Statewide-Reports/Natural-Communities-Dataset-Summary-Document.pdf

The NC Dataset identifies vegetation and wetland features that are good indicators of a GDE. The dataset is comprised of 48 publicly available state and federal datasets that map vegetation, wetlands, springs, and seeps commonly associated with groundwater in California[3]. It was developed through a collaboration between DWR, the Department of Fish and Wildlife, and The Nature Conservancy (TNC). TNC has also provided detailed guidance on identifying GDEs from the NC dataset[4] on the Groundwater Resource Hub[5], a website dedicated to GDEs.

BEST PRACTICE #1. Establishing a Connection to Groundwater

Groundwater basins can be comprised of one continuous aquifer (Figure 2a) or multiple aquifers stacked on top of each other (Figure 2b). In unconfined aquifers (Figure 2a), using the depth-to-groundwater and the rooting depth of the vegetation is a reasonable method to infer groundwater dependence for GDEs. If groundwater is well below the rooting (and capillary) zone of the plants and any wetland features, the ecosystem is considered disconnected and groundwater management is not likely to affect the ecosystem (Figure 2d). However, it is important to consider local conditions (e.g., soil type, groundwater flow gradients, and aquifer parameters) and to review groundwater depth data from multiple seasons and water year types (wet and dry) because intermittent periods of high groundwater levels can replenish perched clay lenses that serve as the water source for GDEs (Figure 2c). Maintaining these natural groundwater fluctuations are important to sustaining GDE health.

Basins with a stacked series of aquifers (Figure 2b) may have varying levels of pumping across aquifers in the basin, depending on the production capacity or water quality associated with each aquifer. If pumping is concentrated in deeper aquifers, SGMA still requires GSAs to sustainably manage groundwater resources in shallow aquifers, such as perched aquifers, that support springs, surface water, domestic wells, and GDEs (Figure 2). This is because vertical groundwater gradients across aquifers may result in pumping from deeper aquifers to cause adverse impacts onto beneficial users reliant on shallow aquifers or interconnected surface water. The goal of SGMA is to sustainably manage groundwater resources for current and future social, economic, and environmental benefits. While groundwater pumping may not be currently occurring in a shallower aquifer, use of this water may become more appealing and economically viable in future years as pumping restrictions are placed on the deeper production aquifers in the basin to meet the sustainable yield and criteria. Thus, identifying GDEs in the basin should done irrespective to the amount of current pumping occurring in a particular aquifer, so that future impacts on GDEs due to new production can be avoided. A good rule of thumb to follow is: *if groundwater can be pumped from a well - it's an aquifer.*

[3] For more details on the mapping methods, refer to: Klausmeyer, K., J. Howard, T. Keeler-Wolf, K. Davis-Fadtke, R. Hull, A. Lyons. 2018. Mapping Indicators of Groundwater Dependent Ecosystems in California: Methods Report. San Francisco, California. Available at: https://groundwaterresourcehub.org/public/uploads/pdfs/iGDE_data_paper_20180423.pdf

[4] "Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans" is available at: https://groundwaterresourcehub.org/gde-tools/gsp-guidance-document/

[5] The Groundwater Resource Hub: www.GroundwaterResourceHub.org

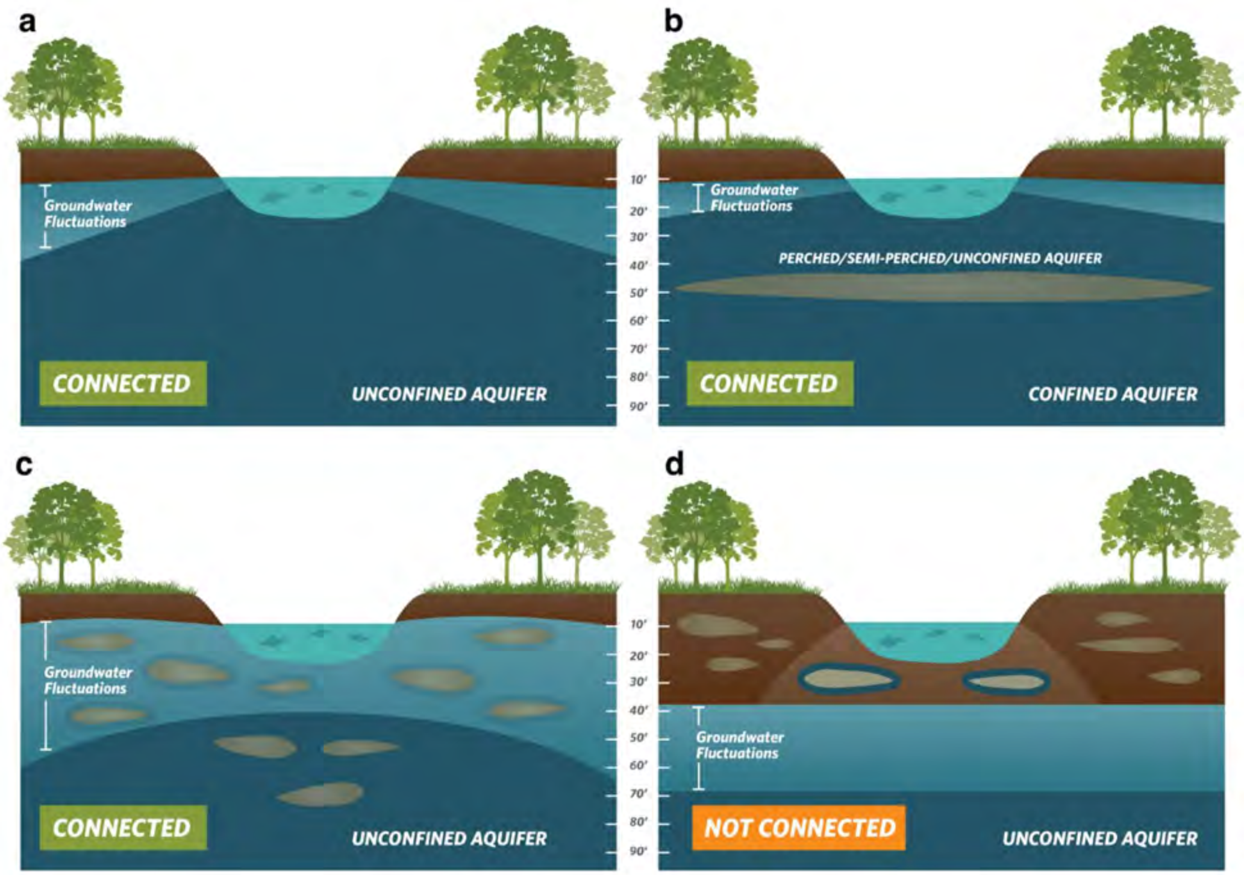


Figure 2. Confirming whether an ecosystem is connected to groundwater. Top: (a) Under the ecosystem is an unconfined aquifer with depth-to-groundwater fluctuating seasonally and interannually within 30 feet from land surface. **(b)** Depth-to-groundwater in the shallow aquifer is connected to overlying ecosystem. Pumping predominately occurs in the confined aquifer, but pumping is possible in the shallow aquifer. **Bottom: (c)** Depth-to-groundwater fluctuations are seasonally and interannually large, however, clay layers in the near surface prolong the ecosystem's connection to groundwater. **(d)** Groundwater is disconnected from surface water, and any water in the vadose (unsaturated) zone is due to direct recharge from precipitation and indirect recharge under the surface water feature. These areas are not connected to groundwater and typically support species that do not require access to groundwater to survive.

BEST PRACTICE #2. Characterize Seasonal and Interannual Groundwater Conditions

SGMA requires GSAs to describe current and historical groundwater conditions when identifying GDEs [23 CCR §354.16(g)]. Relying solely on the SGMA benchmark date (January 1, 2015) or any other single point in time to characterize groundwater conditions (e.g., depth-to-groundwater) is inadequate because managing groundwater conditions with data from one time point fails to capture the seasonal and interannual variability typical of California's climate. DWR's Best Management Practices document on water budgets[6] recommends using 10 years of water supply and water budget information to describe how historical conditions have impacted the operation of the basin within sustainable yield, implying that a baseline[7] could be determined based on data between 2005 and 2015. Using this or a similar time period, depending on data availability, is recommended for determining the depth-to-groundwater.

GDEs depend on groundwater levels being close enough to the land surface to interconnect with surface water systems or plant rooting networks. The most practical approach[8] for a GSA to assess whether polygons in the NC dataset are connected to groundwater is to rely on groundwater elevation data. As detailed in TNC's GDE guidance document[4], one of the key factors to consider when mapping GDEs is to contour depth-to-groundwater in the aquifer that is supporting the ecosystem (see Best Practice #5).

Groundwater levels fluctuate over time and space due to California's Mediterranean climate (dry summers and wet winters), climate change (flood and drought years), and subsurface heterogeneity in the subsurface (Figure 3). Many of California's GDEs have adapted to dealing with intermittent periods of water stress, however if these groundwater conditions are prolonged, adverse impacts to GDEs can result. While depth-to-groundwater levels within 30 feet[4] of the land surface are generally accepted as being a proxy for confirming that polygons in the NC dataset are supported by groundwater, it is highly advised that fluctuations in the groundwater regime be characterized to understand the seasonal and interannual groundwater variability in GDEs. Utilizing groundwater data from one point in time can misrepresent groundwater levels required by GDEs, and inadvertently result in adverse impacts to the GDEs. Time series data on groundwater elevations and depths are available on the SGMA Data Viewer[9]. However, if insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons in the GSP <u>until</u> data gaps are reconciled in the monitoring network (see Best Practice #6).

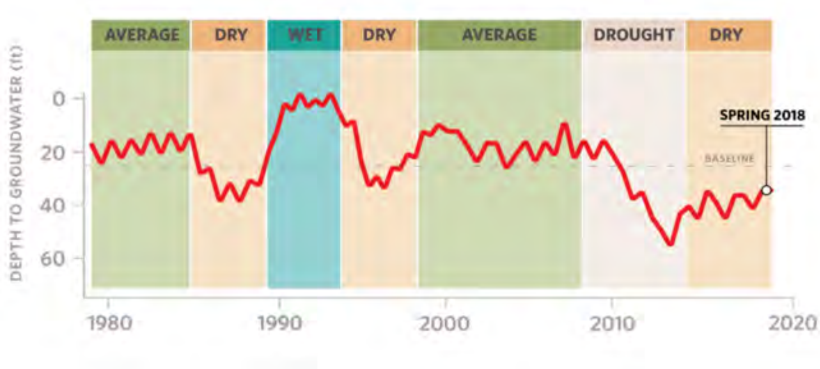


Figure 3. Example seasonality and interannual variability in depth-to-groundwater over time. Selecting one point in time, such as Spring 2018, to characterize groundwater conditions in GDEs fails to capture what groundwater conditions are necessary to maintain the ecosystem status into the future so adverse impacts are avoided.

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6 DWR. 2016. Water Budget Best Management Practice. Available at: https://water.ca.gov/LegacyFiles/groundwater/sgm/pdfs/BMP_Water_Budget_Final_2016-12-23.pdf

7 Baseline is defined under the GSP regulations as "historic information used to project future conditions for hydrology, water demand, and availability of surface water and to evaluate potential sustainable management practices of a basin." [23 CCR §351(e)]

8 Groundwater reliance can also be confirmed via stable isotope analysis and geophysical surveys. For more information see The GDE Assessment Toolbox (Appendix IV, GDE Guidance Document for GSPs[4]).

9 SGMA Data Viewer: https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer

BEST PRACTICE #3. Ecosystems Often Rely on Both Groundwater and Surface Water

GDEs are plants and animals that rely on groundwater for all or some of its water needs, and thus can be supported by multiple water sources. The presence of non-groundwater sources (e.g., surface water, soil moisture in the vadose zone, applied water, treated wastewater effluent, urban stormwater, irrigated return flow) within and around a GDE does not preclude the possibility that it is supported by groundwater, too. SGMA defines GDEs as "ecological communities and species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" [23 CCR §351(m)]. Hence, depth-to-groundwater data should be used to identify whether NC polygons are supported by groundwater and should be considered GDEs. In addition, SGMA requires that significant and undesirable adverse impacts to beneficial users of surface water be avoided. Beneficial users of surface water include environmental users such as plants or animals[10], which therefore must be considered when developing minimum thresholds for depletions of interconnected surface water.

GSAs are only responsible for impacts to GDEs resulting from groundwater conditions in the basin, so if adverse impacts to GDEs result from the diversion of applied water, treated wastewater, or irrigation return flow away from the GDE, then those impacts will be evaluated by other permitting requirements (e.g., CEQA) and may not be the responsibility of the GSA. However, if adverse impacts occur to the GDE due to changing groundwater conditions resulting from pumping or groundwater management activities, then the GSA would be responsible (Figure 4).

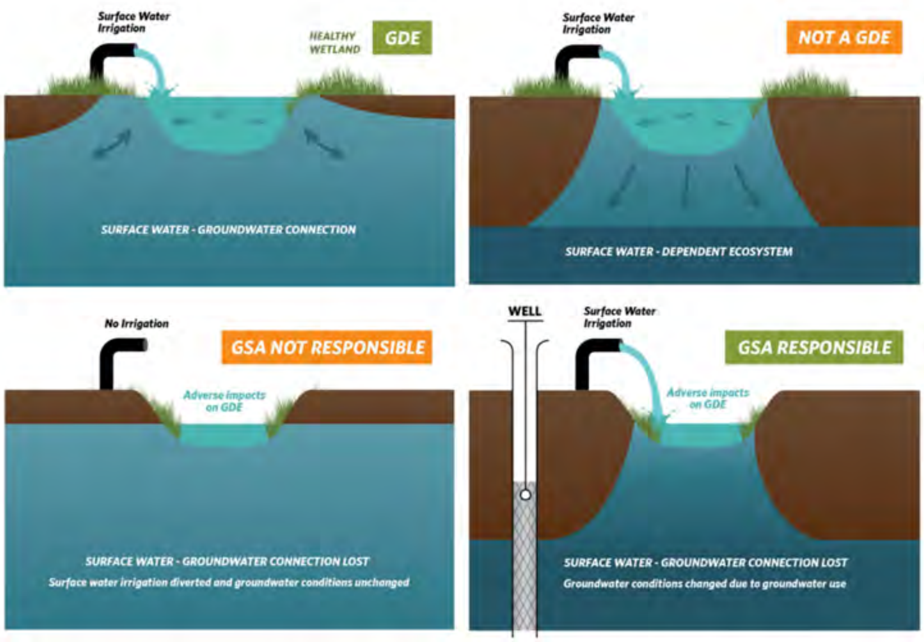

Figure 4. Ecosystems often depend on multiple sources of water. Top: (Left) Surface water and groundwater are interconnected, meaning that the GDE is supported by both groundwater and surface water. **(Right)** Ecosystems that are only reliant on non-groundwater sources are not groundwater-dependent. **Bottom: (Left)** An ecosystem that was once dependent on an interconnected surface water, but loses access to groundwater solely due to surface water diversions may not be the GSA's responsibility. **(Right)** Groundwater dependent ecosystems once dependent on an interconnected surface water system, but loses that access due to groundwater pumping is the GSA's responsibility.

[10] For a list of environmental beneficial users of surface water by basin, visit: https://groundwaterresourcehub.org/gde-tools/environmental-surface-water-beneficiaries/

BEST PRACTICE #4. Select Representative Groundwater Wells

Identifying GDEs in a basin requires that groundwater conditions are characterized to confirm whether polygons in the NC dataset are supported by the underlying aquifer. To do this, proximate groundwater wells should be identified to characterize groundwater conditions (Figure 5). When selecting representative wells, it is particularly important to consider the subsurface heterogeneity around NC polygons, especially near surface water features where groundwater and surface water interactions occur around heterogeneous stratigraphic units or aquitards formed by fluvial deposits. The following selection criteria can help ensure groundwater levels are representative of conditions within the GDE area:

- Choose wells that are within 5 kilometers (3.1 miles) of each NC Dataset polygons because they are more likely to reflect the local conditions relevant to the ecosystem. If there are no wells within 5km of the center of a NC dataset polygon, then there is insufficient information to remove the polygon based on groundwater depth. Instead, it should be retained as a potential GDE until there are sufficient data to determine whether or not the NC Dataset polygon is supported by groundwater.

- Choose wells that are screened within the surficial unconfined aquifer and capable of measuring the true water table.

- Avoid relying on wells that have insufficient information on the screened well depth interval for excluding GDEs because they could be providing data on the wrong aquifer. This type of well data should not be used to remove any NC polygons.

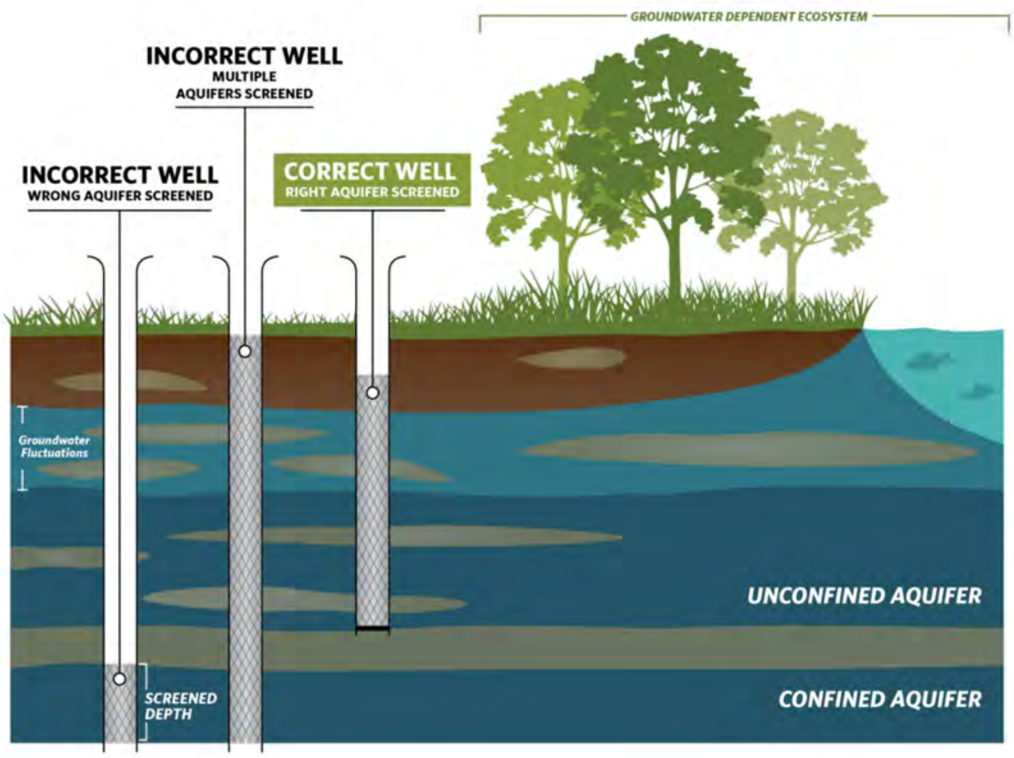

Figure 5. Selecting representative wells to characterize groundwater conditions near GDEs.

BEST PRACTICE #5. Contouring Groundwater Elevations

The common practice to contour depth-to-groundwater over a large area by interpolating measurements at monitoring wells is unsuitable for assessing whether an ecosystem is supported by groundwater. This practice causes errors when the land surface contains features like stream and wetland depressions because it assumes the land surface is constant across the landscape and depth-to-groundwater is constant below these low-lying areas (Figure 6a). A more accurate approach is to interpolate **groundwater elevations** at monitoring wells to get groundwater elevation contours across the landscape. This layer can then be subtracted from land surface elevations from a Digital Elevation Model (DEM)[11] to estimate depth-to-groundwater contours across the landscape (Figure b; Figure 7). This will provide a much more accurate contours of depth-to-groundwater along streams and other land surface depressions where GDEs are commonly found.

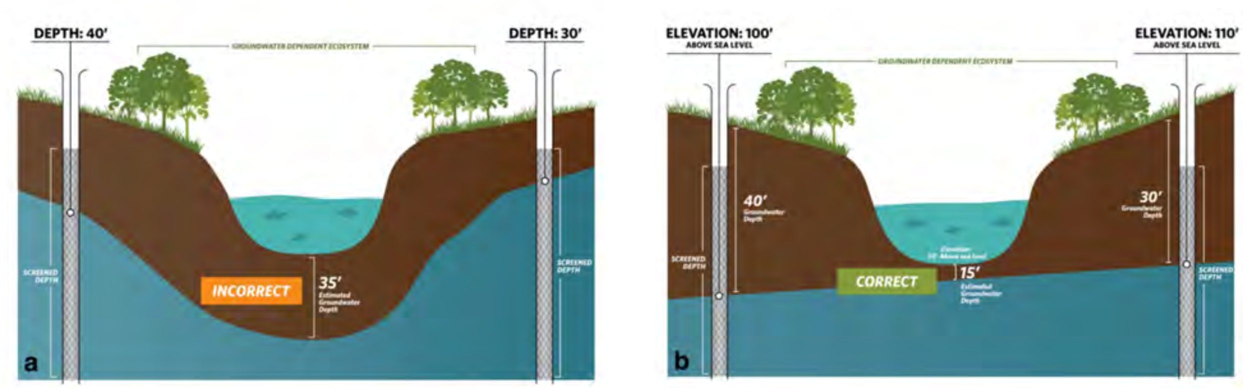

Figure 6. Contouring depth-to-groundwater around surface water features and GDEs. (a) Groundwater level interpolation using depth-to-groundwater data from monitoring wells. **(b)** Groundwater level interpolation using groundwater elevation data from monitoring wells and DEM data.

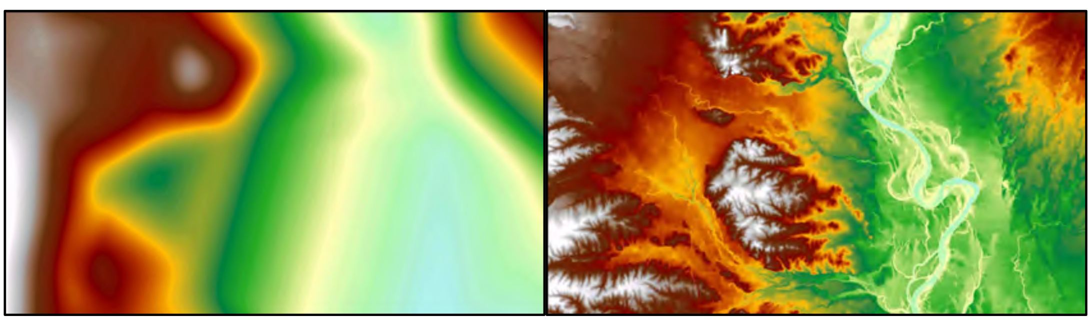

Figure 7. Depth-to-groundwater contours in Northern California. (Left) Contours were interpolated using depth-to-groundwater measurements determined at each well. **(Right)** Contours were determined by interpolating groundwater elevation measurements at each well and superimposing ground surface elevation from DEM spatial data to generate depth-to-groundwater contours. The image on the right shows a more accurate depth-to-groundwater estimate because it takes the local topography and elevation changes into account.

[11] USGS Digital Elevation Model data products are described at: https://www.usgs.gov/core-science-systems/ngp/3dep/about-3dep-products-services and can be downloaded at: https://iewer.nationalmap.gov/basic/

BEST PRACTICE #6. Best Available Science

Adaptive management is embedded within SGMA and provides a process to work toward sustainability over time by beginning with the best available information to make initial decisions, monitoring the results of those decisions, and using the data collected through monitoring programs to revise decisions in the future. In many situations, the hydrologic connection of NC dataset polygons will not initially be clearly understood if site-specific groundwater monitoring data are not available. If sufficient data are not available in time for the 2020/2022 plan, **The Nature Conservancy strongly advises that questionable polygons from the NC dataset be included in the GSP until data gaps are reconciled in the monitoring network.** Erring on the side of caution will help minimize inadvertent impacts to GDEs as a result of groundwater use and management actions during SGMA implementation.

KEY DEFINITIONS

Groundwater basin is an aquifer or stacked series of aquifers with reasonably well-defined boundaries in a lateral direction, based on features that significantly impede groundwater flow, and a definable bottom. *23 CCR §341(g)(1)*

Groundwater dependent ecosystem (GDE) are ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface. *23 CCR §351(m)*

Interconnected surface water (ISW) surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted. *23 CCR §351(o)*

Principal aquifers are aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems. *23 CCR §351(aa)*

ABOUT US

The Nature Conservancy is a science-based nonprofit organization whose mission is *to conserve the lands and waters on which all life depends*. To support successful SGMA implementation that meets the future needs of people, the economy, and the environment, TNC has developed tools and resources (www.groundwaterresourcehub.org) intended to reduce costs, shorten timelines, and increase benefits for both people and nature.

Attachment E

Maps of representative monitoring sites in relation to key beneficial users

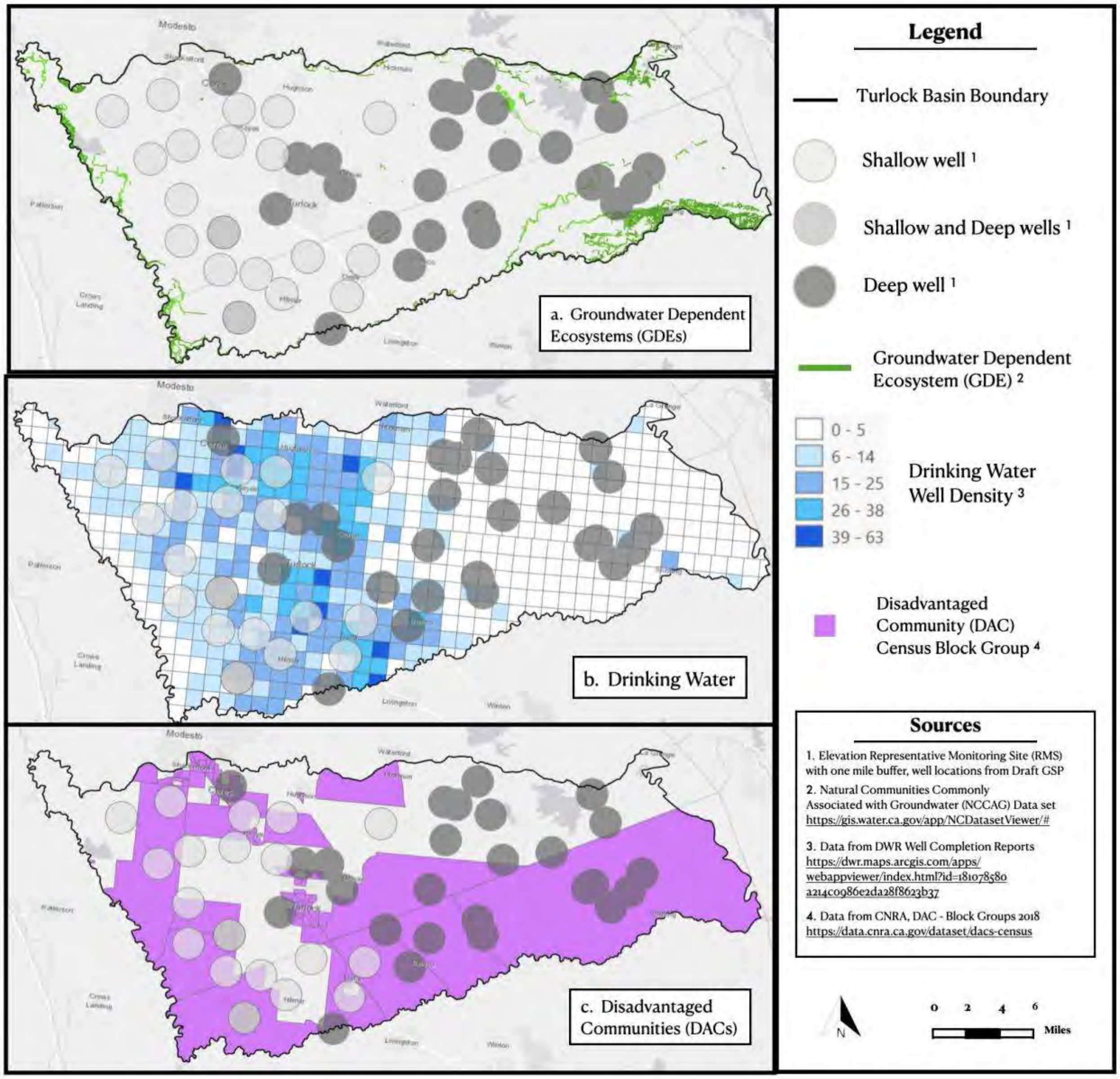

Figure 1. Groundwater elevation representative monitoring sites in relation to key beneficial users: a) Groundwater Dependent Ecosystems (GDEs), b) Drinking Water users, c) Disadvantaged Communities (DACs), and d) Tribes.

Rhett Calkins
[redacted]
Hughson, CA

Re: Comments to the draft Turlock Subbasin GSP

My dry domestic pump and falling water levels:

I own and live on 20 acres of land within the TID. I grow Almonds. I have a micro-sprinkler system that runs off a boost pump from a TID canal. Since the last drought, I also own and operate my ag well for dry year irrigations.

In 2003 I had a domestic well drilled. Depth to water was reported in the drilling log as 60 feet. A pump was set on 90 feet of pipe.

In 2006 I began construction on my house.

In 2007 TID did extensive work to bring the large Tomlinson ag pump on line that sits approximately 300 feet from my domestic well. Prior to that time the well was reportedly abandoned for over 15 years and it was inoperable.

In June of 2007, just prior to my move-in to my newly constructed house, my water stopped flowing from my domestic well. I asked for the Tomlinson pump to be turned off. TID said that they will not turn off the pump.

TID had begun pumping into the canal with the Tomlinson pump and called it "**conjunctive use".**

My pump service measured my static level with the Tomlinson pump running 24 hours at 94.5 feet below surface. Static level 6-16-2007, 71 feet deep with Tomlinson pump off. From this I learned of the subject known as a "pumping cone of depression". In this case stabilized continuous TID pumping from the Tomlinson pump drops water level an additional 23.5 feet at my well. My pump service added 40 feet of pipe and wire to increase my pumping depth. My new house had water.

Fast forward to this year 6-2-2021, my static depth to water is 99 feet with Tomlinson pump off. Tomlinson pump has been off this year. I asked that it be off. Most years, with the exception of one or two, the Tomlinson pump has been run for "conjunctive use".

My observed change in water level since 2007 (14 years) is 28 feet lower. Conjunctive use is not replacing the groundwater under my property. Pumping is lowering groundwater. In wet water years I see some recovery, yet the net direction, since my domestic well was drilled, is 39 feet lower.

I am part of a very large and growing cone of depression in the east Turlock Subbasin.

Specific comments to the GSP:

Minimum thresholds set at 2015 levels are too low in the north east quadrant of TID's service territory. In the West GSA, it is this area that has seen by far the greatest groundwater decline. If minimum thresholds stay set at 2015 levels then Ag pumping will interfere with domestic wells in dry years. Minimum thresholds don't mean levels cannot go lower. Intermediate thresholds and multiple exceedances in more than one measuring location allow water levels below minimum thresholds before action is taken. As we have seen in the last drought, domestic wells go dry before Agriculture makes any kind of adjustment. Owners of domestic wells have little representation in the GSAs. The GSAs need more representation from the domestic well owners, particularly in the north east of the West GSA where water levels continue to drop.

The GSP should not set a permanent gradient of levels so that water will always flow to the east toward the cone of depression created by unsustainable pumping. Setting minimum thresholds at 2015 levels establishes a gradient and a strong underground flow of water to the east. All projects, past, present, and future in the West GSA to support the basin are, and will be sending water east. This flow supported by the gradient could establish a right to water by the East GSA.

Projects such as the regional surface water supply project for the cities of Ceres and Turlock were long fought battles to be implemented, planned, and paid for. As one who once paid those bills, I don't think that the East GSA has any claim to that water that will contribute to the support of the Subbasin.

It has been suggested that an additional 2 years is to be planned in the GSP for settling the dispute of water accounting between the West GSA and East GSA within the Turlock Subbasin. Details why it did not happen yet, or how it will occur now, are not known. This has not been discussed in public. It needs to be openly discussed so that the public can participate in the debate and can know what is happening. Management actions and projects have to be different for land without access to imported surface water. Until the accounting is settled the entire basin is without clear direction or incentive to change course from what is already occurring. We continue to diverge from sustainability. I can not see how we (two GSA's with divergent views) move forward without an agreement on accounting within the subbasin. The GSP is missing an important component for the Turlock Subbasin without the internal subbasin accounting.

On this water accounting:

Who represents me? I would like to know what accounts for 39 feet of water decline and who ended up with the water. I would like to be a participant in the debate on water accounting within the subbasin.

Sincerely,
Rhett Calkins P.E.
Almond Farmer
Domestic well owner
Ag well owner
Within the Turlock Subbasin West GSA

December 15, 2021

Turlock Subbasin GSP Comments
c/o Turlock Irrigation District
PO Box 949
Turlock, CA 95381-0949
Via Email

Re: Comments on the Turlock Subbasin Groundwater Sustainability Plan (GSP).

To Whom It May Concern:

The Tuolumne River Trust (TRT) and the California Sportfishing Protection Alliance (CSPA) write to comment on the Turlock Subbasin Groundwater Sustainability Plan (GSP). Overall, TRT and CSPA appreciate the attention and detail that has gone into the development of the GSP. We also commend the Turlock Subbasin GSAs for conducting an open and transparent process with many opportunities for public engagement. We support Scenario 5 (the Sustainable Scenario) which incorporates both groundwater projects and management actions, including demand reduction.

TRT and CSPA believe there is room for improvement in setting more ambitious goals to achieve groundwater sustainability. We encourage the Turlock Subbasin GSAs to aim to exceed baseline conditions established on January 1, 2015, which was several years into an extended drought that led to overreliance on groundwater and depleted groundwater reserves. Accordingly, we believe the GSP would benefit from including more details on the Group 3 Projects.

To help fund a more ambitious plan, we propose that the Turlock Subbasin GSAs engage with the San Francisco Public Utilities Commission (SFPUC) to explore opportunities for collaboration on infrastructure improvements, water use efficiency, and groundwater banking. We believe the SFPUC would be very interested in helping to fund projects in the Turlock Subbasin in exchange for water credits or a water insurance policy to be used in the case of drought.

The SFPUC uses an extremely conservative drought planning scenario that couples the drought of record (1987-92) with the driest two-year period on record (1976/77) to create a manufactured 8.5-year design drought. This is in spite of the fact that the SFPUC's recent Long-Term Vulnerability Assessment suggests that the likelihood of occurrence of the design drought is extremely low.

In recent years, the SFPUC and its wholesale customers have reduced overall demand dramatically. Rationing and alternatives supplies allow them to stretch their water supply even further. The SFPUC's 10-Year Financial Plan projects that water sales will remain flat for at least the next decade, largely due to hefty rate increases on the horizon that will encourage greater efficiency. Nonetheless, despite its enviable position, the SFPUC is seeking greater assurance that it won't run out of water.

Establishing a Groundwater Water Bank

The SFPUC could help fund the in-lieu and direct groundwater recharge projects identified in the GSP. To incentivize the SFPUC's participation in groundwater recharge projects, a groundwater water bank could be established to operate in a similar fashion to the Don Pedro Water Bank. The SFPUC would essentially pre-pay water for use by parties in the Turlock Subbasin (especially in dry years), and be allowed to redeem banked credits at Hetch Hetchy by diverting additional water there during droughts. Similar to the Don Pedro Water Bank, no water from the Turlock Subbasin would be directly transported to the San Francisco Bay Area. Water users in the Turlock Subbasin would instead rely on groundwater already banked by the SFPUC, while the SFPUC could divert a defined amount of water at Hetch Hetchy above its normal allocation as a junior diverter.

Water Use Efficiency

The potential for water use efficiency in the Turlock Subbasin is tremendous. For example, after the South San Joaquin Irrigation District (SSJID) initiated a pilot project to automate and pressurize an irrigation system, water and energy use decreased by 30% and crop yield increased by 30%.[1] However, funding is needed to improve on-farm infrastructure to achieve greater water use efficiency, and could be secured through an agreement with the SFPUC.

Furthermore, the Turlock Subbasin GSP identifies the City of Modesto's Advanced Metering Infrastructure (AMI) Project. We would like to see similar projects adopted by the Cities of Turlock and Ceres. Turlock is projected to receive 20 thousand acre feet from the Regional Surface Water Supply Project. With a population of 73,000, this suggests gross per capita demand of 245 gallons per day, well above the state average. Similarly, Ceres, with a population of 48,000 and a demand of 10 thousand acre feet, appears to have a gross per capita demand of 185 gallons per day, again quite high. AMI programs would go a long way to promoting water use efficiency.

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[1] Stantec (2015). "South San Joaquin Irrigation District Water Delivery System Recognized with Grand Award for Engineering Excellence" – https://www.stantec.com/en/projects/united-states-projects/s/south-san-joaquin-irrigation-district-division-9-irrigation-enhancement

Floodplain Inundation / Groundwater Recharge

We support the following recommendation from the National Marine Fisheries Service (NMFS) that the Turlock Subbasin GSP explore the possibility of recharging groundwater through floodplain inundation:

> NMFS recommendation for future Projects and Management Actions: We suspect that groundwater recharge projects are likely to be an important action implemented as part of the effort to achieve groundwater sustainability in the Turlock subbasin. NMFS encourages the GSA to consider implementing recharge projects that facilitate floodplain inundation, offering multiple benefits including downstream flood attenuation, groundwater recharge, and ecosystem restoration. Managed floodplain inundation can recharge floodplain aquifers, which in turn slowly release stored water back to the stream during summer months. These projects also reconnect the stream channel with floodplain habitat, which can benefit juvenile salmon and steelhead by creating off-channel habitat characterized by slow water velocities, ample cover in the form of submerged vegetation, and high food availability. As an added bonus, these types of multi-benefit projects likely have more diverse grant funding streams that can lower their cost as compared to traditional off-channel recharge projects. NMFS stands ready to work with any GSA interested in designing and implementing floodplain recharge projects.[2]

Thank you for the opportunity to comment on the GSP for the Turlock Subbasin.

Sincerely,

Peter Drekmeier
Policy Director
Tuolumne River Trust
peter@tuolumne.org

Chris Shutes
FERC Projects Director
California Sportfishing Protection Alliance
blancapaloma@msn.com

[2] NOAA's National Marine Fisheries Service Comments on the Developing Groundwater Sustainability Plan for the Turlock Subbasin, September 29, 2021.

West Turlock and East Turlock Groundwater Sustainability Agencies

Sent via email to turlockgroundwater@gmail.com

December 15, 2021

Re: Recommendations to Ensure that the Turlock Subbasin Draft GSP Protects Vulnerable Drinking Water Users

Dear West Turlock and East Turlock GSA Board Members,

Our organization works alongside low income communities of color in the San Joaquin Valley and the Eastern Coachella Valley to advocate for local, regional and state government entities to address their communities' needs for the basic elements that make up a safe and healthy community, including clean, safe, reliable and affordable drinking water, affordable housing, effective and safe transportation, efficient and affordable energy, green spaces, clean air, and more. We have been engaged in the Sustainable Groundwater Management Act (SGMA) implementation process because many of the communities with whom we work are dependent on groundwater for their drinking water supplies, and often have already experienced groundwater quality and supply issues. In the Turlock Subbasin, we work closely with residents in the community of Delhi, who are vulnerable to impacts to their domestic wells and community water supply wells. We have worked with residents from the community of Delhi for seven years on issues ranging from land use, parks and recreation development, and access to safe and reliable water sources. We are supporting Delhi residents' engagement in the Sustainable Groundwater Management Act (SGMA) implementation process because they are dependent on groundwater for their drinking water supplies. Residents in Delhi have experienced groundwater contamination from surrounding dairies and have had issues with residential wells drying up.

Historically, communities we work with have been excluded from decision-making about their water resources, and their needs have not been at the forefront of such decisions. In 2012, California recognized the Human Right to Drinking Water as a statewide goal. Now, because of SGMA's requirements for a transparent and inclusive process, groundwater management under the new law has the opportunity to include disadvantaged communities in decision-making and create groundwater management plans that understand their unique vulnerabilities and are sensitive to their drinking water needs.

We appreciate the opportunities we have had to participate in conversations about GSP development at GSA board and Technical Advisory Committee meetings, and we appreciate West Turlock and East Turlock GSAs' staff and consultants' openness to discussing issues we raise during these meetings. We also appreciate the GSAs' openness to collaboration and feedback on outreach to Delhi residents, and are looking forward to the upcoming community discussion about the Draft GSP in Delhi.

We have evaluated the Draft GSP according to our Human Right to Water Scorecard,[1] which is founded on existing law, as well as our understanding of water conditions in the subbasin and in Delhi, and we have included our comments on these Draft Chapters below. We would welcome the opportunity to speak further with GSA staff, TAC members and board members about our concerns and recommendations.

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[1] Leadership Counsel and others, Human Right to Water Scorecard, February 10th, 2020, found at https://leadershipcounsel.org/wp-content/uploads/2020/05/HR2W-Letter-Scorecard.pdf .
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I. The Draft GSP does not adequately discuss current and historical groundwater quality impacts on drinking water users within the subbasin.

We are encouraged to see that Draft Chapter 2 of the GSP identifies, describes, and provides maps of Disadvantaged Communities (DACs), community water systems and private well communities. However, in discussing groundwater quality issues within the subbasin, the Draft GSP does not include information on past and current drinking water issues within these communities. Additionally, the Draft GSP does not analyze all drinking water contaminants in the subbasin, and does not provide an explanation why certain contaminants are omitted from the analysis.

Chapter 4 discusses the locations of high concentrations of contaminants, but does not describe which homes or communities have experienced drinking water contamination. (4-37) Information about affected homes and communities is key to ensuring that the GSP is accurately evaluating groundwater impacts on all beneficial users of groundwater, and effectively addressing those impacts. Without this information, the West Turlock and East Turlock GSAs (GSAs) have not adequately considered impacts to all beneficial users in the subbasin. We recommend that the GSAs fill this data gap with specific information regarding all past and current drinking water quality exceedances experienced by domestic well users, small community water systems, state small water systems and disadvantaged communities within the subbasin, according to the best available information. The GSAs should also include descriptions of where there have been high levels of contaminants that threaten to exceed MCLs, or trend lines approaching MCLs.

Chapter 4 discusses the presence and concentrations of nitrates, TDS, arsenic, manganese, uranium, sulfate, boron, 123-TCP, PCE and DBCP. Chapter 4 does not explain why the GSAs chose to evaluate those contaminants and exclude others from its analysis. In order to ensure that the GSAs are adequately considering impacts to drinking water users, the GSAs must also evaluate the presence of other harmful contaminants proven to damage human health, such as hexavalent chromium and PFOs/PFAs. We recommend that Chapter 4 include an analysis of all contaminants proven to be harmful to human health. This list would include all primary and secondary drinking water contaminants, as well as hexavalent chromium and PFOs/PFAs.

Recommendations regarding current and historical drinking water quality information:

1. In Chapter 2, include specific information regarding all past and current drinking water quality exceedances experienced by domestic well users, small community water systems, state small water systems and disadvantaged communities within the subbasin, according to the best available information.
2. In Chapter 4, include an analysis of all contaminants proven to be harmful to human health. This list would include all primary and secondary drinking water contaminants, as well as hexavalent chromium and PFOs/PFAs.

II. The GSP must include complete information about how GSAs will ensure sustainable groundwater use despite local land use agencies' policies regarding "right to farm" and continued development.

The Draft GSP identifies many relevant local policies that could impact groundwater and addresses the impact of each policy on sustainable groundwater management. Many of these policies align with the goals of sustainable groundwater use, but the GSAs fail to adequately address how they will prevent several of the identified policies from contributing to continued overdraft in the subbasin.

Several policies referenced in Chapter 2 are particularly likely to cause a substantial increase in groundwater pumping or, at best, continued overdraft. These include Stanislaus County's "Right-to-Farm Ordinance" and "Farmland Mitigation Ordinance." (2-29) A guarantee for continued farming on all land that is currently zoned as farmland will hinder the GSAs' ability to reach sustainability. More explanation is needed regarding how the GSAs will ensure sustainability despite the County's policies guaranteeing supply for this large water demand.

Furthermore, the GSAs must explain how the GSAs will coordinate with Stanislaus and Merced County's planning divisions to ensure that new developments comply with the subbasin's sustainable yield. Chapter 2 states that "[a]ll of the agencies with land use planning responsibilities and authorities are also member agencies of one or both GSAs in the Turlock Subbasin" and "[t]his overlap, combined with a past history of numerous agencies working together, ensures a high level of coordination between land use planning and the GSP process." (2-43) To ensure that this coordination occurs, however, GSAs and land use planning agencies will need clear processes by which permitting decisions are evaluated for compliance with groundwater sustainability goals set in the GSP.[2] For example, well permitting could be done by

[2] Our comments encourage scrutiny on permitting for new market-rate developments, not water for existing communities or affordable housing. *Existing* communities that lack adequate drinking water resources should be connected immediately to safe, affordable and reliable drinking water, and affordable housing development should be prioritized.

the GSAs instead of the County governments, and permits for new developments could come before the GSAs as part of the land use authority's approval processes. Chapter 2 should give this level of detail to adequately explain how these processes will be coordinated.

Recommendations regarding how the GSA will ensure sustainable groundwater management in light of existing land use policies:

1. Explain how the GSAs will ensure sustainable groundwater use despite local "right-to-farm" and "farmland mitigation" ordinances.
2. Describe specific processes by which land use permitting and well permitting decisions will be evaluated for compliance with groundwater sustainability goals in the Subbasin.

III. The Description of the Water Budget in Draft Chapter 5 Is Incomplete And Does Not Include Rural Water Use.

After evaluating the data and analysis presented regarding the water budget, we find that the description in Draft Chapter 5 of the water budget, along with the supporting data and assumptions, is incomplete. Additionally, it is unclear if or how water demands from rural domestic water users and small community water systems are included in the water budgets presented for the Subbasin. Therefore, the draft chapter does not allow for adequate public review and comment of key components related to drinking water beneficial users, and the Department of Water Resources will not be able to evaluate "[w]hether the Agency has adequately responded to comments that raise credible technical or policy issues with the Plan," as required under 23-CCR §355.5(b)(10).

First, the draft chapter lacks information on the assumptions and data sources used to develop water budget estimates for the Subbasin, thus making a detailed review of individual water budget components impossible. Per 23-CCR §354.2(f)(2), "groundwater and surface water models used for a Plan shall include publicly available supporting documentation." Section 5.1.2 notes that "water budgets were developed utilizing the C2VSimTM, a fully integrated surface and groundwater flow model covering the entire Central Valley." The chapter states that "[d]evelopment of the [C2VSimTM] model was informed by the study and analysis of hydrogeologic conditions, agricultural and urban water supplies, and an evaluation of regional water quality conditions. Additional detail on the data used to develop the C2VSimTM, which represents the best available data known at this time, is included in Appendix X." However, Appendix X had not been made available on the GSAs' website[3] as of 12 November 2021. The GSAs should therefore upload the C2VSimTM Model Development Technical Memo appendix

[3] https://turlockgroundwater.org/gsp#GSPsections

to their website to allow for adequate public review and comment of the model and associated datasets and assumptions used to develop the water budgets for the Subbasin.

Second, the draft chapter includes no information regarding the quantification of urban water demands within the water budget. It is unclear if domestic and small community water system demands are included in the estimate of urban pumping. 23 CCR §354.18(a) requires water demands of each public water system and domestic users to be presented in a transparent, tabular format, and requires the public to be able to review the included assumptions and estimates. Section 5.1.4 notes how groundwater production by "municipal and private domestic wells for urban/residential water supply" is a "primary component of the groundwater system." However, the water budget tables and figures only include estimates of "urban pumping" and do not quantify groundwater demands from rural communities or domestic well users. Table 5-1 notes that historical urban demands were estimated from "historical records," yet no supporting references or citations are provided. Section 5.1.4.3 further notes that "development of the projected water demands is based on the population growth trends reported in the 2015 urban water management plans (UWMPs)," yet these assumptions are not detailed in the draft chapter. UWMPs are limited to retail suppliers serving 3,000 or more service connections or 3,000 acre-feet per year, and demand assessments and projections are, as a rule, limited to that which is met through sales from the urban water supplier. Thus, these demand projections do not include estimates of groundwater demands from rural domestic well users or the many smaller community water systems within the Subbasin. The draft chapter should further detail the data and assumptions used to develop estimates of urban and rural groundwater pumping in the Subbasin and should, to the extent possible, quantify groundwater demands from individual cities, small community water systems, and domestic well users and clearly report this information in the water budget tables and figures.

Recommendations Regarding the Water Budget:

1. Upload the C2VSimTM Model Development Technical Memo appendix to their website to allow for adequate public review and comment of the model and associated datasets and assumptions used to develop the water budgets for the Subbasin.
2. Further detail the data and assumptions used to develop estimates of urban and rural groundwater pumping in the Subbasin and, to the extent possible, quantify groundwater demands from individual cities, small community water systems, and domestic well users and clearly report this information in the water budget tables and figures.

IV. Sustainability Goal Does Not Include Drinking Water Protection

The Sustainability Goal does not demonstrate a commitment to protecting drinking water users, and must be changed to show that it has considered the needs of all beneficial users including vulnerable drinking water users.

The Sustainability Goal includes several admirable goals to manage groundwater sustainably in the Turlock subbasin yet displays a major gap with respect to safe drinking water for existing residents. To demonstrate a commitment to protecting drinking water, we recommend including an explicit mention of drinking water protection in the GSP's Sustainability Goal. As currently written, the Sustainability Goal references other specific uses and users of groundwater such as "the agricultural economy" and "population growth," yet leaves out current drinking water users. Safe, affordable and reliable drinking water is a basic human right. Furthermore, it should be a goal of the Turlock Subbasin GSAs to protect this most basic human right. We therefore strongly recommend including drinking water protection in the subbasin's Sustainability Goal.

V. Sustainable Management Criteria for Chronic Lowering of Water Levels Must Be Revised To Protect The Human Right to Drinking Water

The sustainable management criteria for groundwater levels must be made after considering the interests of all beneficial user groups, including residents of disadvantaged communities reliant on domestic wells and community water systems,[4] and must be based on an analysis of what are "significant" and "unreasonable" impacts.[5] These policy decisions must also avoid disparate impacts on protected groups pursuant to state and federal law.[6] As discussed below, the sustainable management criteria for chronic lowering of water levels in Draft Chapter 6 do not meet these requirements. Below, we include recommendations to ensure that significant and unreasonable impacts to vulnerable drinking water users (domestic well users and disadvantaged communities) do not occur.

a. Undesirable Results Must Be Revised To Protect Drinking Water Wells

Draft Chapter 6 defines the undesirable results for chronic lowering of water levels as "significant and unreasonable groundwater level declines such that water supply wells are

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[4] Water Code § 10723.2.

[5] Water Code § 10721(x); 23 CCR 354.28(b); *see also* Cal. Dep't Water Res., *Draft Best Management Practices for the Sustainable Management of Groundwater* 6 (Nov. 2017) ["GSAs must consider and document the conditions at which each of the six sustainability indicators become significant and unreasonable in their basin, including the reasons for justifying each particular threshold selected."]; *id.* 8 ["The GSP must include an analysis and written interpretation of the information, data, and rationale used to set the minimum threshold."].

[6] Gov. Code § 11135; Gov. Code § 65008; Government Code §§ 12955, subd. (l).

adversely impacted during multi-year droughts in a manner that cannot be readily managed or mitigated. An undesirable result for each principal aquifer will occur when at least 33% of representative monitoring wells exceeds the MT for that Principal Aquifer in three (3) consecutive Fall semiannual monitoring events." The GSAs state that "setting the MTs at the low water levels of 2015 will prevent significant future groundwater level declines that could lead to undesirable results."[7] However, this statement is incorrect. This definition of an undesirable result is not adequately protective of drinking water users, as it will allow for water level declines below historic drought levels across significant areas of the Subbasin (in up to 33% of the representative monitoring wells) for an extended period of time (more than 3 years) before the GSAs are required to take action. The deleterious effects of this approach will be felt by drinking water users before the GSA would need to take action and could be even more severe and widespread than was experienced during the 2013-2016 drought period. Undesirable results must be defined as the points at which "significant and unreasonable" impacts occur. Widespread decline of water levels below historic drought levels for an extended period of time is significant and unreasonable. Thus, this undesirable results definition does not comply with the requirements of SGMA, and is not adequately protective of drinking water users. The GSAs should instead set a definition for undesirable results for water levels that is protective of drinking water users, and requires the GSA to take action well before widespread adverse effects take place.

While the GSAs provide a high level assessment that additional domestic well failures could happen in the future,[8] this analysis does not fully or accurately show the "[p]otential effects on the beneficial uses and users of groundwater"[9] using the best available data. The GSP should provide a more rigorous assessment of the potential domestic well failures, and present the results of this impact analysis in a clear and transparent manner, illustrating for example, 1) where the likely impacted wells are located, 2) what communities are most affected (including DACs), 3) an estimate of the size of the population that relies on these domestic wells, and 4) if the creation a new or expanded community water system could address some or all of the population affected by the loss of domestic wells. The GSAs should then use this analysis to adjust the undesirable results definition to protect drinking water users, and to inform the design and implementation of the domestic well mitigation program.

Additionally, because the undesirable results would allow for conditions to become worse than during the 2013-2016 drought, the GSP should include a detailed and proactive plan to mitigate these effects on drinking water users before drinking water users lose access to their water supply or the supply or quality is affected by reduced water quality. This plan should include an

[7] Draft Turlock GSP Chapter 6, sec. 6.3.2.1.

[8] Draft Turlock GSP Chapter 6, sec. 2.3.2.4.

[9] 23 CCR § 354.26.

identified funding source, and not assume that state or federal grant funds will be available to address such issues in the future.

Furthermore, this undesirable results definition is similar to the undesirable results in the Westside Subbasin GSP, which the Department of Water Resources has highlighted as a deficiency and is requiring the Westlands Groundwater Sustainability Agency to revise. The Westside Subbasin GSP set groundwater levels minimum thresholds at 2015 levels also, and defined undesirable results as 25% of monitoring sites exceeding the minimum thresholds for two consecutive years - a lower percentage of wells and fewer years than described in the Turlock undesirable results for groundwater levels. In its letter to the Westlands GSA, the Department of Water Resources stated that the Westside Subbasin GSP's undesirable results definition was likely to cause significant and unreasonable impacts on drinking water users. DWR is requiring the GSA to remedy this deficiency by evaluating the potential impact of reaching undesirable results on drinking water users. DWR is requiring the GSA to demonstrate that it will change its plan to protect against those impacts. Therefore we strongly recommend that the Turlock Subbasin GSP change its undesirable results definition to protect drinking water users.

b. The Minimum Thresholds for Water Levels

Draft Chapter 6 defines minimum thresholds for chronic decline of water levels as "the low groundwater elevation observed in Fall 2015 at each representative monitoring site in each Principal Aquifer."[10]

SGMA requires GSAs to analyze both the significance and reasonableness of proposed minimum thresholds,[11] and minimum thresholds must have the purpose of avoiding "significant and unreasonable" impacts on beneficial users.[12] The GSA's determination of what is "significant and unreasonable" must consider the impacts on all types of beneficial users, including disadvantaged communities.[13]

Based on the analysis on page 4 of the attached Focused Technical Review, dewatering of domestic wells may occur if water levels reach the minimum thresholds. If water levels reach the proposed minimum thresholds, approximately 3% of domestic wells within a 1.5-mile radius of RMWs (approximately 61) would be expected to be fully dewatered and an additional 2% of domestic wells within a 1.5-mile radius of RMWs (approximately 38) would be expected to be partially dewatered. Given that the undesirable results for chronic lowering of water levels

[10] Draft Turlock Subbasin GSP Chapter 6, p. 6-14.

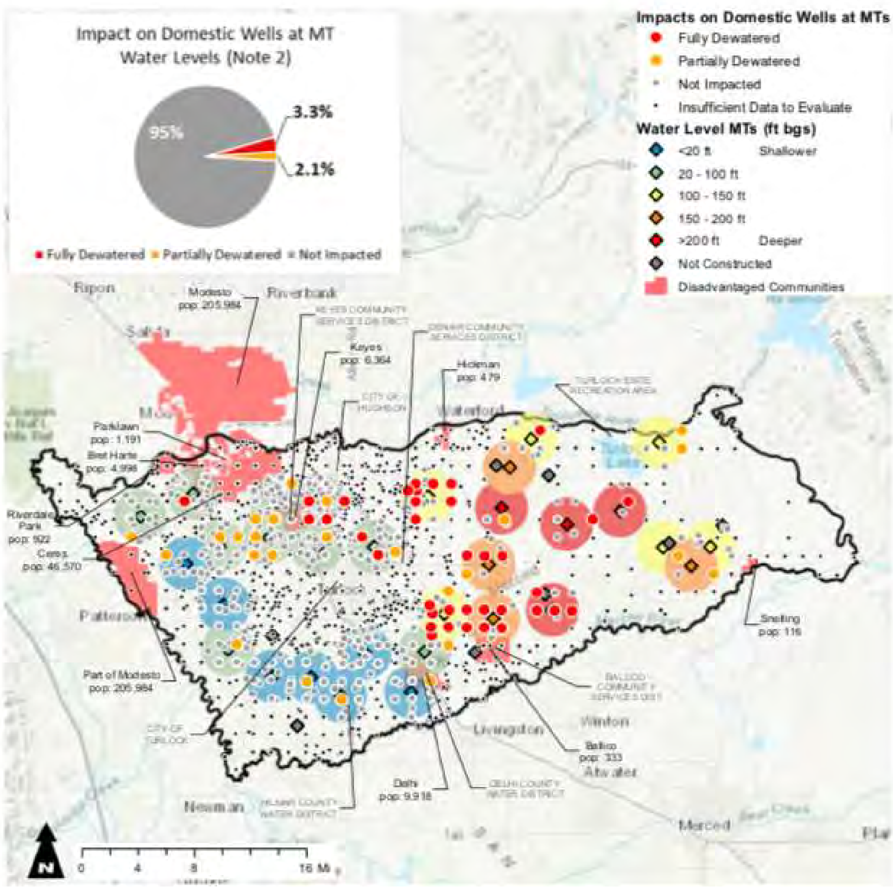
[11] Water Code § 10721(x); 23 CCR 354.26(a). (b), 354.28(b); see also Cal. Dep't Water Res., Draft Best Management Practices for the Sustainable Management of Groundwater 6, 8 (Nov. 2017).

[12] 23 CCR § 354.26.

[13] Water Code § 10723.2.

allows for water levels in significant portions of the Subbasin to continue to drop below minimum thresholds, additional domestic well users would be vulnerable to impacts. Further, more than half of domestic wells are located outside of the area analyzed by the Focused Technical Review, and may also be impacted by declining water levels.

Figure 3 - Impact on Domestic Wells at MT Water Levels
West and East Turlock Subbasin GSA



Therefore the GSP should present a thorough, robust, and transparent analysis, supported by maps and accurate and comprehensive data, that identifies: 1) which domestic wells are likely to be impacted at the minimum thresholds, 2) which domestic wells are likely to be impacted as water levels are allowed to drop below minimum thresholds before the undesirable results definition is met, 3) the location of the likely impacted wells with respect to DACs and other communities and systems dependent on groundwater, and 4) an estimate of the total population likely to be affected, and 5) whether domestic well impacts have a disparate impact on protected classes under civil rights law. This assessment should include multiple scenarios in which 33% or more RWMs exceed their minimum thresholds for three years, to appropriately represent conditions that may occur under the GSAs' definition of undesirable results. This analysis would allow the GSAs not only to evaluate the potential impacts, but to proactively prevent, or, if necessary, mitigate domestic well impacts, rather than responding only under emergency conditions, as was done during the 2013-2016 drought.

The Focused Technical Review attached to this letter (See Focused Technical Review, page 3) also highlights potential changes to groundwater flow gradients which are likely to result from groundwater elevations reaching minimum thresholds, and could cause undesirable results in adjacent basins. Therefore, the GSP should include a transparent analysis of the groundwater flow gradients expected to be present when the Subbasin reaches sustainability at measurable objectives and if groundwater levels are allowed to reach minimum thresholds.

Finally, the GSAs must ensure that the sustainable management criteria do not cause a disparate impact on protected classes under civil rights law or make housing unavailable in contravention of state and federal fair housing laws. We provide more detail on this point in the recommendations below.

Recommendations Regarding Groundwater Levels Sustainable Management Criteria:

At a minimum, groundwater levels sustainable management criteria must add the following elements:

1. Set a definition for undesirable results for water levels that is protective of drinking water users, and requires the GSA to take action well before widespread adverse effects take place.
2. Present a thorough, robust, and transparent analysis, supported by maps, that identifies: 1) which domestic wells are likely to be impacted at the minimum thresholds, 2) which domestic wells are likely to be impacted as water levels are allowed to drop below minimum thresholds before the undesirable results definition is met, 3) the location of the likely impacted wells with respect to DACs and other communities and systems dependent on groundwater, and 4) an estimate of the total population likely to be affected. This assessment should include multiple scenarios in which 33% or more RWMs exceed their minimum thresholds for three years, to appropriately represent conditions that may occur under the GSAs' definition of undesirable results. This analysis would allow the GSAs not only to evaluate the potential impacts, but to modify its sustainable management criteria to protect the Human Right to Water.
3. Include a transparent analysis of the groundwater flow gradients expected to be present when the Subbasin reaches sustainability at measurable objectives and if groundwater levels are allowed to reach minimum thresholds.
4. Avoid disparate impact:[14] Ensure that the measurable objectives and minimum thresholds for groundwater levels are established in such a way that prevents a disproportionately negative ("disparate") impact from occurring on communities of color in the GSP area. For example, the GSP should ensure that the same

[14] Gov. Code § 11135; Gov. Code § 65008; Government Code §§ 12955, subd. (l).

minimum threshold methodology across the GSP area will not lead to disproportionately more wells going dry for residents of color than for white residents.

VI. Sustainable Management Criteria for Degraded Water Quality Must Be Revised To Avoid Significant and Unreasonable Impacts to Drinking Water Users

a. The GSAs Must Add Manganese and DBCP to Their Contaminants of Concern

Draft Chapter 6 identifies nitrate, arsenic, uranium, total dissolved solids, 123-TCP and PCE as the GSAs' contaminants of concern. We commend the GSAs' analysis of existing contaminants and their inclusion of this list of contaminants. However, the GSP must also include manganese and DCBP.

Draft Chapter 6 identifies that manganese and DBCP have historically impacted groundwater quality conditions near population centers within the Subbasin, but it does not define sustainable management criteria for these contaminants. Specifically, Section 4.3.5.3.4 notes that "elevated [manganese] concentrations near or exceeding the secondary MCL were detected in in some wells near Hughson and the Tuolumne River," and that a public supply well in the "City of Ceres exceeded the MCL for manganese" that prevented it from being put into service. Additionally, Section 4.3.5.10. notes that "elevated concentrations of DBCP (more than 50 percent of, or exceeding the MCL) are prevalent in the vicinity of Denair and Hughson," and that "several wells near and west of Ceres have had recent concentrations of DBCP that are greater than 50-percent or exceed the MCL."

While manganese is not typically considered a health risk, it does impact drinkability of water from a color and taste standpoint, and thus can result in significant cost to treat water for drinking water purposes (similar to TDS). DBCP is a soil fumigant and nematicide, and can have significant health effects. Because manganese and DBCP are present near or above MCLs and because they present a clear risk to use of groundwater for drinking water purposes, the GSAs should include these constituents in its monitoring program and establish measurable objectives and minimum thresholds for these constituents.

b. The Undesirable Results Definition Must Be Improved to Ensure Drinking Water Protection For All Drinking Water Users

Draft Chapter 6 defines undesirable results for degradation of water quality as "significant and unreasonable adverse impacts to groundwater quality caused by GSA projects, management actions, or management of water levels or extractions such that beneficial uses are affected and well owners experience an increase in operational costs. The undesirable result will occur if a new (first-time) exceedance of an MT is observed in a potable water supply well in the representative monitoring network that results in a well owner's increase on operational costs and is caused by GSA management activities as listed above."[15] Several elements of this undesirable results definition will lead to unreasonable and significant impacts to drinking water users, and show a lack of consideration of all beneficial users, particularly domestic well users and residents of disadvantaged communities and households reliant on small water systems.

First, the undesirable results definition only considers a "first-time" exceedance to be unreasonable or significant. However, increased drinking water contamination is harmful to human health and economically burdensome. GSAs must evaluate the reasonableness or significance of impacts based on their real-world impact, irrespective of whether or not an exceedance is "first time exceedance", a repeat exceedance, or a worsening exceedance. For example, homes that have 123-TCP contamination and are not connected to a water system may still use their tap water to bathe. As 123-TCP levels increase, the household will experience an increased risk of cancer and dangerous health impacts. Additionally, as levels of harmful contaminants increase, homes and water system operators must increase treatment of contaminants, leading to increased cost burdens. Furthermore, extremely high levels of contamination for some contaminants make effective treatment impossible. The GSA must consider these impacts and factor in increased levels of existing contamination into the definition of undesirable results.

Second, the undesirable results definition only considers contamination "caused by GSA projects, management actions, or management of water levels or extractions." This definition does not account for contamination caused by a *lack* of action taken, or a failure of the GSAs to act in a way that would avoid increased groundwater contamination. We recommend that the definition be modified to include "increased contamination caused by GSA projects, management actions, or management of water levels or extractions such that beneficial uses are affected and well owners experience an increase in operational costs, or a failure to address groundwater use or issues leading to increased contamination."

Third, the undesirable results definition only counts exceedances in wells "in the representative monitoring network." This definition allows widespread increases in contamination to occur throughout the subbasin, as long as they do not occur in the wells in the representative monitoring wells. While the representative monitoring network wells provide a sampling of water quality throughout the subbasin, they do not reflect a comprehensive and accurate assessment of the impacts of changing pumping patterns, management actions and projects on groundwater users in the subbasin, including impacts to groundwater quality. Of particular concern is the exclusion of areas of concentrated domestic wells and small community water systems from the monitoring network. If the SGMA monitoring network designed to detect degraded water quality does not include domestic wells or wells from small community water systems, this should be clearly stated, and an action plan should be developed to add these sites

[15] Draft Turlock Subbasin GSP Chapter 6, p. 6-35.

to the monitoring network such that there is sufficient coverage to evaluate potential water quality impacts to all drinking water beneficial users within the Subbasin.

Fourth, as written, the undesirable results definition for water quality only accounts for impacts that result in an increase to a domestic well owner's operational costs. This definition also does not account for increased costs to small community water systems, which would be significant if water systems are impacted by contamination due to groundwater pumping or management activities. This definition notably excludes the impairment or total loss of access to safe drinking water supplies as a "significant and unreasonable impact" of degraded water quality, which is especially relevant to domestic well users who do not have access to alternative potable water supplies within the subbasin. This definition also does not take into account severe health impacts to those who lose access to safe drinking water. The undesirable results definition for degraded water quality thus does not adequately address significant and unreasonable impacts to drinking water for all beneficial users in the subbasin. The undesirable impacts definition for degraded water quality therefore must be changed to include impairment or total loss of access to safe drinking water supplies for *all* water users, including residents reliant on domestic wells and residents reliant on small community water systems.

Lastly, the GSP should include a more detailed explanation of the protocols and methodologies the GSAs will use to determine whether or not a "GSA management activity" is causing any future observed MT exceedances in water quality and to evaluate how implementation of projects and management actions will not result in further water quality impairments, particularly those that affect drinking water users, to the Subbasin.

c. The Minimum Thresholds for Degraded Water Quality Are Not Sufficiently Protective and Will Lead to Significant and Unreasonable Impacts When Viewed in Light of the Undesirable Results Definition.

Draft Chapter 6 defines the minimum thresholds for degraded water quality as "a new (first-time) exceedance of a drinking water quality standard (primary or secondary MCL) in a potable supply well in the representative monitoring network for any of the Subbasin constituents of concern."[16]

The same concerns as cited above regarding only considering "first-time" exceedances, and only considering impacts to wells in the representative monitoring network, apply here. These restrictions on the definition of minimum thresholds does not allow the GSAs to consider actual impacts to all drinking water users - and particularly those living in disadvantaged communities - in the subbasin.

Section 6.3.2.2 notes that "MTs for chronic lowering of water levels are supportive of the MTs developed for degraded water quality. By arresting water level declines…potential increases in

[16] Draft Turlock GSP Chapter 6, p. 6-36.

[contaminants of concern] associated with depth (such as TDS) can be avoided. By managing to a previous groundwater level surface (Fall 2015), the MTs will not significantly alter historical hydraulic gradients and will not accelerate the rate of migration of any groundwater contaminants." However, as mentioned above, the draft GSP notes that during the 2014-2017 drought water quality impacts were already being observed in public supply wells throughout the Subbasin. Furthermore, as described above, the draft GSP allows for a sustained exceedance in water level MTs for up to three (3) consecutive years before an undesirable result is triggered, which could further exacerbate groundwater quality issues known to occur when water levels decline below Fall 2015 elevations. Therefore, the draft GSP fails to note that undesirable results for chronic lowering of water levels could allow for further water quality impairments within public water supply wells (including those used by small community water systems) and thus are not sufficiently protective of "significant and unreasonable impacts" to drinking water beneficial users of the Subbasin.

Recommendations Regarding Groundwater Quality Sustainable Management Criteria:

At a minimum, groundwater quality sustainable management criteria must be changed to include the following elements:

1. Because manganese and DBCP are present near or above MCLs and because they present a clear risk to use of groundwater for drinking water purposes, the GSAs should include these constituents in its monitoring program and establish measurable objectives and minimum thresholds for these constituents.
2. Include ***increased*** concentrations of existing contaminants and impairment or total loss of access to safe drinking water supplies, for both water systems and domestic well users, in the definition of undesirable results.
3. Modify the undesirable results definition to include "increased contamination caused by GSA projects, management actions, or management of water levels or extractions such that beneficial uses are affected and well owners experience an increase in operational costs, or a failure to address groundwater use or issues leading to increased contamination."
4. If the SGMA monitoring network for degraded water quality does not include domestic wells or wells from small community water systems, this should be clearly stated, and an action plan should be included in the GSP to add these sites to the monitoring network such that there is sufficient coverage to evaluate potential water quality impacts to all drinking water beneficial users within the Subbasin.
5. Include a more detailed explanation of the protocols and methodologies the GSAs will use to determine whether or not a "GSA management activity" is causing any future observed minimum threshold exceedances in water quality and to evaluate how implementation of projects and management actions will not

result in further water quality impairments, particularly those that affect drinking beneficial water users, to the Subbasin.

6. Ensure that the GSP triggers a violation of a minimum threshold after one test shows that there has been an increase in contamination since January 1st, 2015. Once the minimum threshold is reached, the GSAs must start the evaluation of whether groundwater management activities or groundwater pumping have caused the increase, or whether the increase was caused by other factors such as natural fluctuation, testing inaccuracy, or activities outside the purview of the GSAs. If the increase was caused by groundwater management activities or groundwater pumping, the GSAs must immediately stop the activity causing increased contamination and remediate the contamination.
7. Strive to remediate existing drinking water contamination: Ensure that the GSAs will strive to remediate drinking water contaminants that exceeded the MCL before 2015 wherever feasible, through projects, management actions and policies.
8. Revise the *groundwater levels* undesirable results definition to ensure contamination does not increase from falling groundwater levels.
9. Include an analysis of how drinking water wells (municipal wells, community water system wells, and domestic wells) are likely to be be affected by the undesirable results,[17] measurable objectives and minimum thresholds.[18]
10. Incorporate new drinking water data into sustainable management criteria:[19] Ensure that the GSP includes a description of how data gaps and uncertainties of its drinking water well impact assessment will be addressed and serve to reassess the sustainable management criteria, projects and management actions in accordance with new data.
11. Avoid disparate impact:[20] Ensure that the minimum thresholds for groundwater quality are established in such a way that prevents a disproportionately negative impact on communities of color in the GSP area. For example, the GSP should ensure that the same minimum threshold methodology across the GSP area will not lead to disproportionately more wells going dry for residents of color than for white residents.

VII. The Monitoring Network Will Not Catch and Prevent Significant and Unreasonable Impacts To Drinking Water Supply or Quality

[17] 23 CCR § 354.26(c)

[18] 23 CCR § 354.28(b)(4)

[19] 23 CCR § 354.38(e)(3)

[20] Gov. Code § 11135; Gov. Code § 65008; Government Code §§ 12955, subd. (l).

GSAs must monitor impacts to groundwater for drinking water beneficial users,[21] including disadvantaged communities on domestic wells,[22] and must avoid disparate impacts on protected groups pursuant to state law.[23]

a. Groundwater Levels Representative Monitoring Wells Must Be Included Near Communities and Domestic Wells

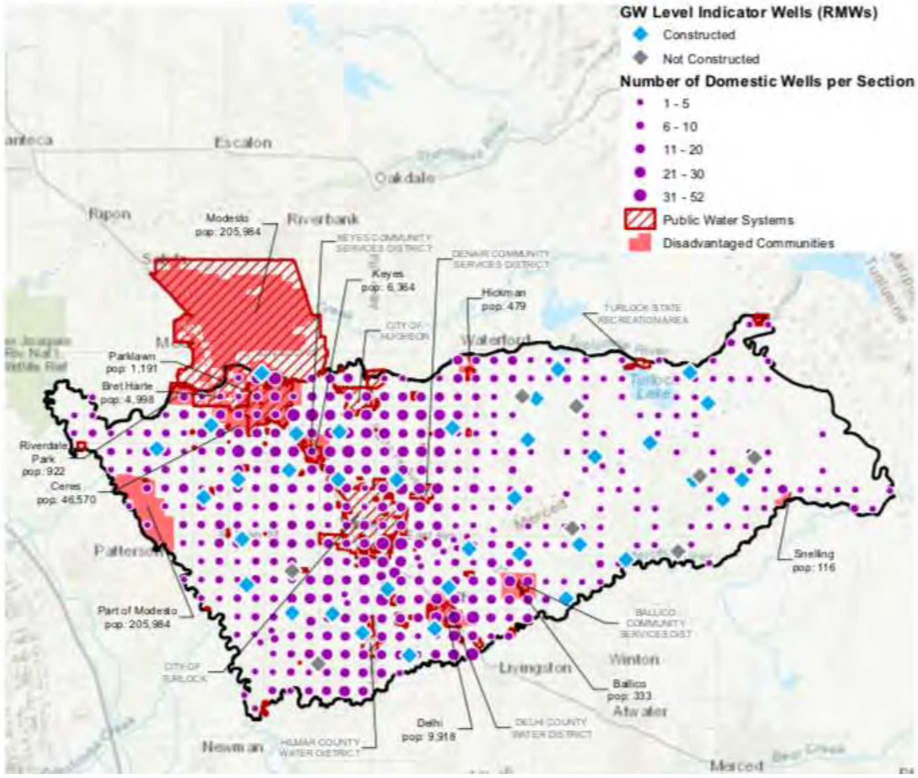
As shown in Figure 1 of the attached Focused Technical Analysis, there are notable gaps in coverage of the water level network in several areas that contain a substantial number of domestic well users and small public water systems. Of the approximately 4,300 identified domestic wells in the Subbasin, approximately 2,500, or 57%, are located more than 1.5 miles from a water level RMW. In particular, domestic well users and small public water systems located 1) along the northern portion of the Subbasin, including the communities of Hughson, Ceres, Hickman, Bret Harte, Parklawn, and southern Modesto (most of which are DACs), 2) along the southern Subbasin boundary, including those surrounding Ballico, Delhi, and Snelling, and 3) a significant portion of domestic well users surrounding the City of Turlock are beyond the 1.5 mile radius of a water level representative monitoring well.

[21] 23 CCR § 354.34

[22] Water Code § 10723.2.

[23] Gov. Code § 11135; Gov. Code § 65008; Government Code §§ 12955, subd. (l).

Figure 1 - Representative Monitoring Network for Groundwater Levels Relative to Domestic Wells, DACs, and Public Water Systems
West and East Turlock Subbasin GSA



The GSAs must develop the monitoring network in a way that protects the interests of all beneficial users.[24] These significant gaps in monitoring near vulnerable communities do not show a consideration of the interests of all beneficial users. Therefore, we strongly recommend that additional water level RMWs be established proximate to these communities and domestic wells, in order to protect of drinking water beneficial users across the Subbasin.

Recommendations Regarding the Groundwater Levels Monitoring Network:

At a minimum, an adequate groundwater levels monitoring network must include the following elements:

1. Ensure accurate detection of impacts on drinking water users and DACs:[25] Ensure that the groundwater level monitoring network includes representative monitoring wells in or near DACs, and placed in a way that detects impacts to the vast majority of drinking water users in the GSP area. If new monitoring wells are required, ensure that the GSP contains a concrete plan to fund and construct new representative monitoring wells within the first year of GSP implementation to ensure that vulnerable communities' drinking water resources

[24] 23 CCR § 354.34(b)(2)

[25] 23 CCR § 354.34(b)(2) and (f)(3)

are monitored. The plan to improve the monitoring network should include testing of domestic wells in the interim as wells are constructed.

2. Clearly show representative monitoring well locations in relation to DACs:[26] Ensure that the representative monitoring wells (RMWs) for groundwater levels are presented on maps and in tables that identify which set of minimum thresholds and measurable objectives will be applied to which RMWs, and that these maps clearly identify the locations of DACs, small water systems and other sensitive users.
3. Identify and address other drinking water data gaps:[27] Ensure that the GSP clearly identifies any other gaps in data regarding impacts to drinking water users, and that the GSP contains a clear plan to fill data gaps regarding impacts to drinking water users. The GSP explains how it will fill some monitoring data gaps, but does not ensure that these gaps will capture impacts on all drinking water users, particularly disadvantaged communities.

b. Groundwater Quality Monitoring System Must Be Improved

SGMA regulations require that GSAs create a groundwater quality monitoring network that will "collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues."[28] Upon review of the groundwater quality monitoring network, we found that the monitoring network must address the following issues.

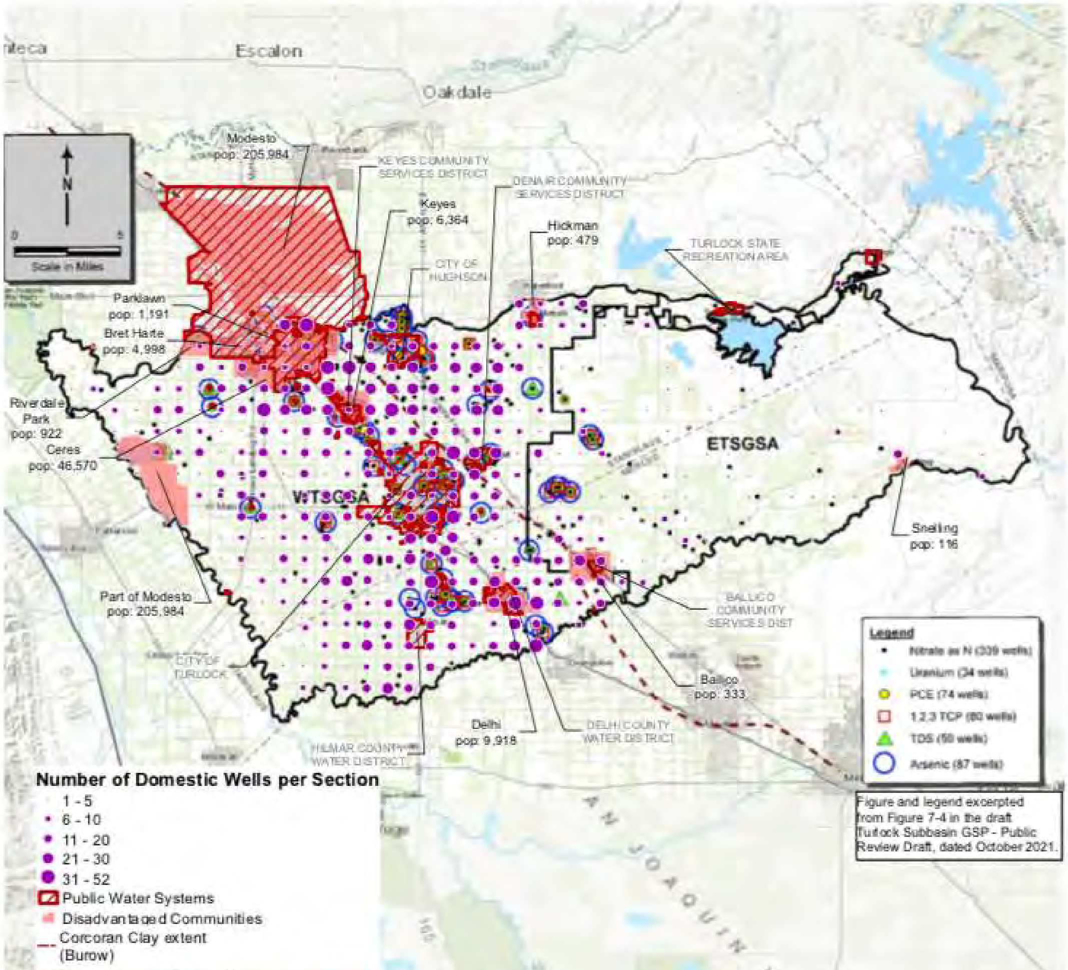
First, as shown in Figure 4 in the attached Focused Technical Analysis, monitoring wells are lacking in many areas with high concentrations of domestic wells and disadvantaged communities in the subbasin. The GSAs must address these data gaps and establish a clear plan for adding monitoring sites to detect impacts to these most vulnerable drinking water users.

[26] 23 CCR § 354.34(b)(2) and (f)(3)

[27] 23 CCR § 354.38(e)(3)

[28] 23 CCR § 354.34(c)(4)

Figure 4 - Monitoring Network for Groundwater Quality Relative to Domestic Wells, DACs, and Public Water Systems
West and Turlock Subbasin GSA



Second, the GSAs' planned approach for monitoring water quality will render inconsistent results and prevent the GSAs from progressively or effectively monitoring impacts and progress towards plan goals. The GSAs have not specifically defined a SGMA monitoring network for degraded water quality and will rely entirely on existing water quality monitoring programs in place throughout the Subbasin (including GAMA, Geotracker, CV-SALTS, and the Nitrate Control Program). The draft GSP also notes that "the monitoring network will vary from year-to-year based on regulatory requirements from each water quality program." Therefore, the GSAs will not be able to independently control the availability, frequency, and quality of water quality monitoring data used to evaluate SGMA compliance within the Subbasin. This monitoring system is not likely to meet the requirements to "develop a monitoring network capable of collecting sufficient data to demonstrate short-term, seasonal, and long-term trends in groundwater conditions… to demonstrate progress toward achieving measurable objectives described in the Plan, [or] to monitor impacts to the beneficial uses or users of groundwater."[29] We recommend that the GSP explicitly define and establish a set of SGMA monitoring wells that will be included in the SGMA monitoring network for degraded water quality to ensure these wells will be consistently monitored and will fully comply with requirements for SGMA monitoring networks as outlined in the GSP regulations.

Third, Draft Chapter 7 does not include a list of monitoring sites or pertinent information about these sites (e.g., well type/owner, well construction details, Principal Aquifer designations, etc.). 23 CCR § 352.4(c) requires these details to be disclosed for each monitoring site. However, the draft chapter only includes the general location of wells in Figure 7-4. Neither the public nor DWR are able to accurately evaluate the effectiveness of the monitoring network without more detail about monitoring sites. The GSA must include these details for each monitoring site. In addition, the draft GSP does not identify what principal aquifer each water quality RMW is located in. The water quality monitoring network should provide adequate coverage of all principal aquifers, and this information should be readily available in the GSP.

Fourth, it is unclear which of the representative monitoring wells will be evaluated for exceedances of minimum thresholds or undesirable results. As mentioned above, the undesirable results and minimum thresholds definitions for degraded water quality in the GSP are specifically tied to "potable water supply wells" in the representative GSP monitoring network. It is unclear from the information presented in the draft GSP which public supply wells will be monitored or if the water quality monitoring network includes domestic wells or wells within small public water systems. The GSP should clearly provide a list of monitoring sites included in the SGMA monitoring network for degraded water quality and include relevant information about each well (locations, well types/owners, well construction details, screening intervals, etc.) to meet GSP requirements for data and reporting standards as outlined in 23 CCR §352.4(c). The GSP must specify which monitoring sites are being used to monitor for compliance with groundwater quality minimum thresholds and undesirable results.

Fifth, the monitoring network must show that the GSA has considered all beneficial users including domestic well users and small water systems. Domestic wells are typically not covered by the state's existing water quality regulatory programs and thus may not be adequately covered by the water quality monitoring program presented in Draft Chapter 7. If the monitoring network for degraded water quality does not include domestic wells or wells from small community water systems, this should be clearly stated, and an action plan should be included in the GSP to add these sites to the monitoring network such that there is sufficient coverage to evaluate potential water quality impacts to all drinking water beneficial users within the Subbasin.

Lastly, to adequately protect drinking water, the groundwater quality monitoring network should test for all primary drinking water contaminants, PFOs and PFOAs and chrome-6, other known secondary drinking water contaminants, and specifically contaminants like uranium which are

[29] 23-CCR §354.34

known to increase due to groundwater management practices. If the network detects increases in any of these contaminants, they should be elevated to the level of Contaminants of Concern and evaluated for compliance with minimum threshold and undesirable results.

Recommendations Regarding Groundwater Quality Monitoring:

At a minimum, the groundwater quality monitoring network must be changed to include the following elements:

1. Ensure that the GSP plans to measure the following contaminants at all representative monitoring wells:[30]
    a. All contaminants with primary drinking water standards
    b. Secondary drinking water contaminants like manganese which are known to be widespread
    c. PFOs/PFOAs and chrome-6, which are contaminants known to be very harmful to human health despite not having established drinking water standards
    d. Contaminants like uranium which are known to increase due to groundwater management practices
2. Explicitly define a set of SGMA monitoring wells that will be included in the SGMA monitoring network for degraded water quality to ensure consistent and comprehensive water quality monitoring and full compliance with requirements for SGMA monitoring networks as outlined in the GSP regulations.
3. Include details for each monitoring site. Provide a list of monitoring sites included in the SGMA monitoring network for degraded water quality and include relevant information about each well (locations, well types/owners, well construction details, screening intervals, etc.) to meet GSP requirements for data and reporting standards as outlined in 23 CCR §352.4(c).
4. Ensure that the monitoring network provides adequate coverage of all principal aquifers. Include this information clearly in the GSP.
5. Specify which monitoring sites are being used to monitor for compliance with groundwater quality minimum thresholds and undesirable results.
6. If the monitoring network for degraded water quality does not include domestic wells or wells from small community water systems, this should be clearly stated, and an action plan should be developed immediately to add these sites to the monitoring network such that there is sufficient coverage to evaluate potential water quality impacts to all drinking water beneficial users within the Subbasin.
7. Ensure accurate detection of impacts on drinking water users and DACs:[31] Ensure that the groundwater level monitoring network includes representative monitoring wells in or near DACs, and placed in a way that detects impacts to the vast majority of drinking water users in the GSP area. If new monitoring

[30] 23 CCR § 354.34(b)(2) and (f)(3)

[31] 23 CCR § 354.34(b)(2) and (f)(3)

wells are required, ensure that the GSP contains a concrete plan to fund and construct new representative monitoring wells within the first year of GSP implementation to ensure that vulnerable communities' drinking water resources are monitored. The plan to improve the monitoring network should include testing of domestic wells in the interim as wells are constructed.

8. Identify baseline contaminant levels: Ensure that the GSP identifies the current contaminant levels, minimum thresholds and measurable objectives at each RMW, so that it is clear to the public how the contamination could change at each RMW site.
9. Frequent testing: Ensure that the groundwater quality monitoring network tests for contaminants of concern frequently, in a way that prevents drinking water contamination. Testing should be done monthly.

VIII. Projects and Management Actions Do Not Ensure Drinking Water Protection, So Not Show How Sustainability Goal Will Be Achieved, and May Not Avoid Undesirable Results.

The GSAs must consider the interests of all beneficial users including domestic well owners and disadvantaged communities[32] and avoid disparate impacts on protected groups.[33] The GSP must also concretely outline how each objective and the overall sustainability goal will be achieved.[34] Unfortunately, the projects and management actions set forth in the Draft GSP do not adequately account for drinking water users or the needs of disadvantaged communities pertaining to protected groups under state law, and do not show how the sustainability goal will be achieved.

a. The proposed projects and management actions do not show how the GSP will achieve the Sustainability Goal.

In order to stop overdraft and undesirable results, ambitious measures must be taken quickly. Draft Chapter 8 contains many potential Projects and Management Actions, many of which would contribute to avoiding undesirable results in the subbasin if implemented effectively and expeditiously. However, the GSAs plan to wait five years to implement pumping reductions, which are critical to reversing groundwater depletion and preventing undesirable results such as dry drinking water wells. (8-86) It is unlikely that the GSAs will be able to stop overuse of groundwater within five years through recharge and in-lieu recharge alone, especially considering the construction time for recharge projects, funding limits and limitations in surface water supplies during drought years. To prevent further drinking water wells from going dry, the GSAs must design and implement pumping management and pumping reductions immediately.

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[32] Water Code § 10723.2.
[33] Gov. Code § 11135; Gov. Code § 65008; Government Code §§ 12955, subd. (l).
[34] Water Code § 10727.2(b)(2).

b. Descriptions of projects and management actions do not evaluate or address negative water quality and water supply impacts on disadvantaged communities.

First, the recharge projects in Draft Chapter 8 do not evaluate or address drinking water quality impacts from recharge projects. While recharge projects can have positive impacts on groundwater levels, if done over contaminated land, recharge projects can push contaminants into drinking water supplies for nearby communities. Recharge projects have also been shown to cause uranium leaching, among other water quality impacts. In order to adequately consider drinking water users, the GSAs must evaluate the potential impacts of groundwater recharge on drinking water supplies, and plan to prevent or otherwise address those issues.

Therefore the GSAs must include an evaluation of these potential impacts, and include commitments to prevent and, if necessary, address drinking water quality impacts. Recharge projects must be located on land that is not contaminated, and recharge projects must be monitored closely to avoid drinking water quality impacts. Furthermore, plans must be in place to respond to any detected impacts immediately. We recommend referencing the white paper on Protecting Groundwater Quality While Replenishing Aquifers written by Sustainable Conservation.[35] This white paper reviews best practices for siting recharge projects and monitoring recharge projects in ways that ensure better protection of surrounding drinking water users.

Second, groundwater trading, included in the Draft GSP as the potential Management Action 6, is likely to cause severe harm to small communities' drinking water supplies in the Subbasin. The GSAs have not evaluated these impacts, and instead state that "Benefits to disadvantaged communities overlap with the benefits described above for sustainability indicators." (8-92) However, allowing financially powerful groundwater users to purchase and pump more than their share of allocations is likely to cause localized impacts, and is likely to deplete drinking water supplies for nearby communities. In order to protect drinking water supplies of vulnerable communities in the Subbasin, the GSAs must remove groundwater trading as a potential Management Action.

Furthermore, negative impacts from the projects discussed above (groundwater quality degradation from recharge, and drinking water depletion from groundwater markets) are likely to disportionately impactcommunities of color in the Subbasin. In order to avoid disparate impacts on classes protected by civil rights and fair housing laws, the GSAs must re-evaluate these projects according to the recommendations above.

[35] Sustainable Conservation, Protecting Groundwater Quality While Replenishing Aquifers, June 2021, found at https://suscon.org/wp-content/uploads/2021/06/Protecting-Groundwater-Quality-While-Replenishing-Aquifers.pdf .

c. **Critical actions for drinking water protection do not have clear timelines or implementation plans.**

We are encouraged to see the inclusion of a Domestic Well Mitigation Program, and we are encouraged to see that the description of the management action outlines several elements of the management action. We perceive that the GSAs' development of this outline has been supported by the Framework for a Drinking Water Well Mitigation Program published by Leadership Counsel and our partner organizations,[36] and we will continue to support the development of this important management action.

However, the GSAs do not make a clear commitment to implement this project. It is included as one of the actions that "may be undertaken" by the GSAs. (8-69) and it does not contain a clear implementation timeline. It also lacks potential funding sources.

Such a program is a central piece of drinking water protection, and is an essential component of considering disadvantaged communities and domestic well users. Additionally, a drinking water mitigation program is critical should program actions fail to prevent well failure entirely as we have recommended throughout. Without a clear commitment containing an implementation timeline and identification of potential funding sources, residents and the public cannot be assured that the GSAs will act upon this management action. Furthermore, such a program must be implemented immediately to address any future dry wells caused by declining water levels. Therefore, the GSA must amend the description of Management Action and commit to designing and implementing the action immediately upon GSP adoption, and identify potential funding sources to be pursued immediately.

Recommendations for ensuring that Projects and Management Actions protect drinking water:

At a minimum, the following changes must be made:

1. Establish a clear and proactive plan for demand reduction. Demand reduction should be implemented immediately. The GSP must include a clear timeline for implementation of demand reduction measures, and concrete metrics for measuring success of demand reduction measures.
2. Evaluate all projects and management actions for potential negative water quality and water supply impacts on disadvantaged communities and domestic well users.
3. For all recharge projects, include an evaluation of potential negative groundwater quality impacts, a plan for monitoring for such impacts, and a plan to respond to impacts immediately upon detection.

[36] Framework for a Drinking Water Well Mitigation Program, found at https://static1.squarespace.com/static/5e83c5f78f0db40cb837cfb5/t/5f3ca9389712b732279e5296/1597811008129/Well_Mitigation_English.pdf.

4. Eliminate groundwater trading as a potential management action.
5. Amend the Domestic Well Mitigation Program (Management Action 7) to include a commitment to begin program design and implementation immediately.
6. Identify potential funding sources for the Domestic Well Mitigation Program.
7. Ensure that the GSP's projects and management actions will not cause a disparate impact: Ensure that the GSP's projects and management actions, taken as a whole, prevent a disproportionately negative impact on communities of color in the GSP area. Projects and management actions may not cause, or fail to prevent, disproportionately more dry wells and contaminated water for residents of color than for white residents in the GSP area.

IX. The GSP Does Not Comply With California Water Law.

a. **The GSP Conflicts With Water Code § 106.3.**

As noted above, California codified access to an adequate supply of safe and affordable drinking water as a human right in 2012. Water Code § 106.3(a) provides as follows:

> It is hereby declared to be the established policy of the state that every human being has the right to safe, clean, affordable, and accessible water adequate for human consumption, cooking, and sanitary purposes.

It is often incorrectly stated that this section is not binding. This is a misnomer for several reasons. First, § 106.3(b) expressly states in that "[a]ll relevant state agencies, including the department, the state board, and the State Department of Public Health, ***shall*** consider this state policy when revising, adopting, or establishing policies, regulations, and grant criteria when those policies, regulations, and criteria are pertinent to the uses of water described in this section." (emphasis added.) The use of the mandatory "shall" rather than a permissive "may" indicates that the requirement of subsection (b) to consider the Human Right to Water is a mandatory duty of DWR and the SWRCB.

Moreover, there is nothing in § 106.3 that indicates that either a GSA or a state agency may take an action that conflicts with the human right of all Californians to access safe and affordable drinking water. Rather, the section and its requirements are subject to only three narrow exceptions. First, subsection (c) states that "[t]his section does not expand any obligation of the state to provide water or to require the expenditure of additional resources to develop water infrastructure beyond the obligations that may exist pursuant to subdivision (b)." This exception applies only to the "state," and does not apply to GSAs. Further, it speaks only to the obligation to provide water or to require development of water infrastructure, not to any obligation to manage groundwater resources in a way that protects access to drinking water and sources of drinking water.

Second, subsection (d) states that "[t]his section shall not apply to water supplies for new development." This exception does not limit the applicability of § 106.3 in the context of water supplies for existing households.

Third, subsection (e) states that "[T]he implementation of this section shall not infringe on the rights or responsibilities of any public water system." As a GSA is not a public water system, this exception is not relevant here.

Given that none of the three exceptions contained in § 106.3 apply to the development and implementation of the GSP, it must be consistent with the Human Right to Water. The GSP must be revised to ensure access to safe and affordable drinking water.

b. The GSP Threatens to Infringe Upon Water Rights

In enacting SGMA, the legislature found and declared that "[f]ailure to manage groundwater to prevent long-term overdraft infringes on groundwater rights."[37] The text of SGMA further notes that "[n]othing in this part, or in any groundwater management plan adopted pursuant to this part, determines or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights."[38] As discussed in detail above, the GSP allows continued overdraft above the safe yield of the basin, such that drinking water wells (especially domestic wells) will continue to go dry, infringing upon the rights of overlying users of groundwater. The GSP must be revised to protect the rights of residents of disadvantaged communities and/or low-income households who hold overlying rights.[39]

c. The GSP Conflicts with the Reasonable And Beneficial Use Doctrine

The "reasonable and beneficial use" doctrine is codified in the California Constitution. It requires that "the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare."[40] The doctrine applies to all water users, regardless of basis of water right, and all water rights and methods of diversion.[41] A determination of reasonableness of a use "cannot be resolved in vacuo isolated from statewide considerations of transcendent importance."[42]

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[37] AB 1739 (2014).
[38] Water Code § 10720.5(b).
[39] *See also* Water Code § 10723.2 [The groundwater sustainability agency shall consider the interests of all beneficial uses and users of groundwater... [including] Domestic well owners."].
[40] Cal Const, Art. X § 2; see also Water Code § 100; United States v. State Water Resources Control Bd. (1986) 182 Cal.App.3d 82, 105 ["...superimposed on those basic principles defining water rights is the overriding constitutional limitation that the water be used as reasonably required for the beneficial use to be served."].
[41] Peabody v. Vallejo (1935) 2 Cal.2d 351, 367, 372; Light v. State Water Resources Control Board, (2014) 226 Cal. App. 4th 1463, 1479.
[42] Joslin v. Marin Municipal Water Dist. (1967) 67 Cal.2d 132, 140.

The Turlock GSAs must ensure that GSP's water allocations are consistent with the reasonable and beneficial use doctrine.[43] The GSAs must follow the Legislature's directive to prioritize domestic use of water resources over irrigated agriculture[44] and ensure that SGMA implementation furthers the human right to safe and affordable drinking water[45] — both statewide considerations of transcendent importance. In other words, a GSP that allows use of water for irrigation at the expense of use of water for domestic purposes is not consistent with the reasonable and beneficial use doctrine or Water Code § 106.

The reasonable and beneficial use doctrine applies here given the negative impacts of the GSP on groundwater supply and quality, which will unreasonably interfere with the use of groundwater for drinking water and other domestic uses. As the GSP authorizes waste and unreasonable use, and indeed does not even analyze the reasonable and beneficial use doctrine at all, it conflicts with the reasonable and beneficial use doctrine and the California Constitution. The GSP must be revised to comply with the reasonable and beneficial use doctrine.

d. **The GSP Conflicts with the Public Trust Doctrine**

The public trust doctrine applies to the waters of the State, and establishes that "the state, as trustee, has a duty to preserve this trust property from harmful diversions by water rights holders" and that thus "no one has a vested right to use water in a manner harmful to the state's waters."[46]

The public trust doctrine has recently been applied to groundwater where there is a hydrological connection between the groundwater and a navigable surface water body.[47] In *Environmental Law Foundation v. State Water Resources Control Board* ("*ELF*"), the court held that the public trust doctrine applies to "the extraction of groundwater that adversely impacts a navigable waterway" and that the government has an affirmative duty to take the public trust into account in the planning and allocation of water resources.[48] Under *ELF*, the Public Trust doctrine imposes an affirmative and independent obligation to consider the public trust that applies to GSAs' decisions regarding groundwater management, imposing a legal duty on the Turlock Subbasin GSAs to not only consider the potential adverse impacts of groundwater extractions on

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[43] Water Code § 275 ["The department and board shall take all appropriate proceedings or actions before executive, legislative, or judicial agencies to prevent waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water in this state"]; *Light*, 226 Cal.App.4th at 1482-83 [same].

[44] Water Code § 106 ["It is hereby declared to be the established policy of this State that the use of water for domestic purposes is the highest use of water and that the next highest use is for irrigation"]; *United States v. State Water Resources Control Board* (1986) 182 Cal.App.3d 82, 103.

[45] Water Code § 106.3.

[46] *United States v. State Water Resources Control Bd.* (1986) 182 Cal.App.3d 82, 106; *see also Nat'l Audubon Soc'y v. Superior Court* (1983) 33 Cal.3d 419, 426 ["before state courts and agencies approve water diversions they should consider the effect of such diversions upon interests protected by the public trust, and attempt, so far as feasible, to avoid or minimize any harm to those interests."].

[47] *Environmental Law Foundation v. State Water Resources Control Bd.* (2018) 26 Cal.App.5th 844, 844.

[48] *Id.* at 856-62.

navigable waterways but also "to protect public trust uses whenever feasible."[49] The court also specifically held that SGMA does not supplant the requirements of the common law public trust doctrine.[50]

Notably, the public trust doctrine applies to both currently navigable surface water bodies and surface water bodies that were historically navigable at the time of statehood.[51]

In contrast to these requirements, the Draft GSP does not consider impacts on public trust resources, or attempt to avoid insofar as feasible harm to the public's interest in those resources. The GSAs therefore must (1) identify any public trust resources within the basin; (2) identify any public trust uses within the basin; (3) identify and analyzing potential adverse impacts of groundwater extractions on public trust resources and uses; and (4) determine the feasibility of protecting public trust uses and protect such uses whenever feasible.

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Our aim with these comments is to provide effective feedback on ways to ensure that drinking water is protected for vulnerable communities in the Subbasin, and to ensure that the GSP complies with the requirements in SGMA and applicable law. We appreciate the opportunity to provide comments on the Draft Turlock Subbasin GSP, and would welcome further conversation with GSA staff and consultants to ensure that significant and unreasonable impacts to vulnerable drinking water users (domestic well users and disadvantaged communities) do not occur in the Turlock Subbasin.

Sincerely,

Amanda Monaco, Water Policy Coordinator

Aracely G. Gonzalez, Policy Advocate

Nataly Escobedo Garcia, Water Policy Coordinator

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[49] Id. at 865.

[50] *Id.* at 862-870.

[51] *See San Francisco Baykeeper, Inc. v. State Lands Com.* (2015) 242 Cal.App.4th 202, 232 citing *Western Oil & Gas Asso. v. State Lands Com.* (1980) 105 Cal.App.3d 554, 562 ["When California became a state in 1850 it succeeded to sovereign ownership of various tidelands and submerged lands under the terms of common law trust doctrine... ."]; PPL Montana, LLC v. Montana (2012) 565 U.S. 576, 592 ["For state title under the equal-footing doctrine, navigability is determined at the time of statehood...and based on the 'natural and ordinary condition' of the water."] [internal citation omitted].

Focused Technical Review:
Turlock Subbasin Groundwater Sustainability Agencies
Public Review Draft Groundwater Sustainability Plan

Water Level Monitoring Network and Sustainable Management Criteria (SMCs)

The draft Groundwater Sustainability Plan (GSP) for the Turlock Subbasin (Subbasin) was developed jointly by two Groundwater Sustainability Agencies (GSAs) - the West Turlock Subbasin GSA (WTSGSA) and East Turlock Subbasin GSA (ETSGSA). Collectively, these two GSAs cover the entire Subbasin.

The draft GSP sets the minimum thresholds (MTs) for groundwater levels at "the low groundwater elevation observed in Fall 2015 at each representative monitoring site [RMS] in each Principal Aquifer" (Section 6.3.2). Measurable Objectives (MOs) are established as "the midpoint between the MT and the high groundwater elevation observed over the historical Study Period WY 1991 – WY 2015 at each RMS for each Principal Aquifer" (Section 6.3.3.) The draft GSP defines the undesirable result (UR) for chronic lowering of water levels for each Principal Aquifer unit "when at least 33% of representative monitoring wells exceeds the MT for that Principal Aquifer in three (3) consecutive Fall semi-annual monitoring events" (Section 6.3.1.4).

<u>As described in the comments below, the draft GSP does not include a thorough analysis of impacts to key beneficial users in the Subbasin, particularly domestic well users, and does not provide a clear plan to mitigate against adverse effects to these users that may occur before an undesirable result is triggered in the Subbasin.</u>

- As shown on **Figure 1**, the Subbasin includes over 4,300 domestic wells, eleven DWR-designated DACs[1] (i.e., Ballico, Bret Harte, Bystrom, Ceres, Delhi, Hickman, Keyes, Modesto, Parklawn, Riverdale Park, and Snelling) with a collective population of over 280,000 people. It should be noted that the majority of the City of Modesto overlies the Modesto Subbasin, and the population of the DACs excluding Modesto is approximately 75,000. The Turlock Subbasin also includes over 100 public water systems, including 76 systems with less than 15 service connections, and 94 systems with less than 100 service connections. **While the draft GSP notes that input from the TAC was used to develop definitions of undesirable results, the GSP should provide more detail as to what input was provided and how it was applied to the process.**
- As discussed in Section 6.3.1 of the draft GSP, domestic wells and some municipal supply wells are particularly at risk from lowering of water levels and experienced adverse effects during the 2013-2016 drought. According to the draft GSP, 165 domestic wells were documented as having been impacted during the drought, and well owners required substantial aid including trucked water, storage tanks, and new well installations. Municipal suppliers also experienced significant impacts, including collapsed wells, loss of pumping capacity, and water quality issues. However, the draft GSP defines the undesirable results for chronic lowering of groundwater levels as "significant and unreasonable groundwater level declines such that water supply wells are adversely impacted during multi-year droughts in a manner that cannot be readily managed or mitigated. An undesirable result for each principal aquifer will occur when at least 33% of representative

[1] Designated at the Census Place level.

monitoring wells exceeds the MT for that Principal Aquifer in three (3) consecutive Fall semiannual monitoring events." This definition of an undesirable result is not protective of drinking water users, as it will allow for water level declines below historic drought levels across significant areas of the Subbasin for an extended period of time (more than 3 years) before the GSAs are required to take action. Thus, the effects that would be felt by drinking water users before the GSA would need to take action could be even more severe and widespread than was experienced during the 2013-2016 drought period. **The GSP should set a definition for undesirable results for water levels that is protective of drinking water users, and requires the GSA to take action well before widespread adverse effects take place.**

- Section 2.3.2.4 of the draft GSP explains that significant measures were taken by Stanislaus and Merced Counties to mitigate the effects of the 2013-2016 drought on domestic well users in the Subbasin. The draft GSP explains "The 386 new and deeper wells in areas of about 165 failed wells suggest that many failed wells have been replaced by deeper wells. No new domestic well failures have been documented by the counties or reported to the DWR on the new web-based records of domestic water supply shortage. However, the status of older wells remains unknown. The relatively high density of domestic wells suggests that some shallow wells may remain at risk of failure if future water levels continue to decline. Even if wells have now been replaced and are capable of supplying water at 2015 levels, significant future declines could trigger additional well failures in the future." Given that the water level MTs are set relative to the 2013-2016 drought conditions, widespread adverse effects were experienced by drinking water users during this drought (both domestic well users and municipal suppliers), and that the undesirable results definition in the draft GSP would allow localized water level conditions to become worse than experienced during the 2013-2016 drought, **the GSP should include a detailed and proactive plan, to mitigate these effects on drinking water users, before drinking water users lose access to their water supply or the supply is affected by reduced water quality. This plan should include an identified funding source, and not assume that state or federal grant funds will be available to address such issues in the future.**
- Section 2.3.2.4 of the draft GSP (quoted in the above bullet) provides a high level assessment that additional domestic well failures could happen in the future. The GSP should provide a more **rigorous assessment of the potential domestic well failures, and present the results of this impact analysis in a clear and transparent manner, illustrating for example, 1) where the likely impacted wells are located, 2) what communities are most affected (including DACs), 3) an estimate of the size of the population that relies on these domestic wells, or 4) if the creation a new or expanded community water system could address some or all of the population affected by the loss of domestic wells.**
- Section 6.3.2.1 of the draft GSP states that "However, setting the MTs at the low water levels of 2015 will prevent significant future groundwater level declines that could lead to undesirable results." However, **because the definition of undesirable results allows for water levels in up to 33% of the RMWs to drop below 2015 water levels for a 3 year period, significant future groundwater level declines will still be likely, and would be expected to further impact vulnerable drinking water users, as occurred during the 2013-2016 drought. Thus, the draft GSP is not adequately projective of drinking water users.**

- **Figure 1** shows the location of key drinking water users as indicated above, along with the proposed water level representative monitoring wells (RMWs) that are identified as being in the Western Upper or Eastern principal aquifers (i.e., excluding those identified as being in the Western Lower aquifer beneath the Corcoran clay), including both existing wells and those that have been proposed for construction, per the draft GSP. As illustrated in Figure 1m there are notable gaps in coverage of the water level network in several areas with a substantial number of domestic well users and small public water systems. Of the approximately 4,300 identified domestic wells in the Subbasin, approximately 2,500, or 57%, are located more than 1.5 miles from a water level RMW. In particular, domestic well users and small public water systems located 1) along the northern portion of the Subbasin, including the communities of Hughson, Ceres, Hickman, Bret Harte, Parklawn, and southern Modesto (most of which are DACs), 2) along the southern Subbasin boundary, including those surrounding Ballico, Delhi, and Snelling, and 3) a significant portion of domestic well users surrounding the City of Turlock. **Therefore, it is recommended that additional water level RMWs be established proximate to these communities and domestic wells, in order to be protective of drinking water beneficial users across the Subbasin.**
- **Figures 2A** and **2B** show the approximate locations of domestic wells and water level RMWs within the Subbasin. For each RMW, the change in water level from current conditions (i.e., the most recent water level measurement reported in the hydrographs presented in the draft GSP Appendix X), that will occur if water levels reach the MOs and MTs were calculated. Based on this, if water levels reach the MOs, this will result in an increase in water levels in the eastern portion of the Subbasin (up to 62 feet higher), and a decline in water levels in the western portion of the Subbasin (up to 21 feet lower). If water levels reach the MTs, water levels across the majority of the basin will decline, by up to 38 feet. The draft GSP makes several unsupported assertions that domestic wells will not be further impacted if water levels reach MTs, but does not include an actual analysis of this, by comparing available domestic well depth data to the anticipated water level declines. The draft GSP also does not address how many domestic wells will be affected if water levels in areas of 33% of the RMWs are allowed to decline below MTs for a three year period before triggering an undesirable result. **The GSP should present a thorough, robust, and transparent analysis, supported by maps, that identifies: 1) which domestic wells are likely to be impacted at the MTs and at the MOs, and 2) the location of the likely impacted wells with respect to DACs and other communities and systems dependent on groundwater.**
- **Figures 2A** and **2B** show current (Spring 2017) groundwater elevation contours for the Subbasin, alongside the change in water level depths to reach the MOs and MTs, respectively. As illustrated in **Figure 2A** and **2B**, given that the change in groundwater elevation to reach MOs and MTs varies significantly between RMWs, groundwater flow gradients would be expected to change as MOs and MTs are reached. However, the draft GSP does not include an analysis of these gradients (i.e., presenting contour maps of groundwater elevations at MOs and MTs). Section 6.3.2 says "These MTs allow GSAs to manage to an existing groundwater surface throughout the Subbasin, demonstrating that hydraulic gradients associated with the MTs can be supported by the Principal Aquifer systems;" however, the draft GSP does not provide any further analysis or explanation to support this statement. Further, this analysis is key to demonstrating "How minimum thresholds have been selected to avoid causing undesirable results in adjacent basins or affecting the ability of

adjacent basins to achieve sustainability goals," as required by 23-CCR §354.28(b)(3) and would support DWR's ability to evaluate whether the GSP will "adversely affect the ability of an adjacent basin to implement its Plan or impede achievement of its sustainability goal" per 23-CCR §355.4(b)(7). **Therefore, the GSP should include a transparent analysis of the groundwater flow gradients expected to be present when the Subbasin reaches sustainability at MOs and if groundwater levels are allowed to reach MTs.**

- **Figure 3** shows the approximate locations of domestic wells and water level RMWs (excluding those identified as being in the Western Lower principal aquifer) within the Subbasin. For purposes of this evaluation, a 1.5-mile radius is shown around each RMW. Based on available well construction information, the well screens of the domestic wells located within this 1.5-mile radius are compared to the proposed MTs for the RMWs. For purposes of this assessment, a well is identified as fully dewatered if the MT is below the midpoint of the screen well screen interval, and partially dewatered if the MT is below the top of the screen interval. For domestic wells with incomplete well screen information, it is assumed that the well screen extends 40 feet above the bottom of the well. Approximately 43% of domestic wells in the Subbasin are located within the 1.5-mile radius of RMWs; given the location of the RMWs this analysis excludes the approximately 2,500 domestic wells, including those located in and around the communities of Hughson, Ceres, Hickman, Bret Harte, Parklawn, southern Modesto, Ballico, Delhi, Snelling, and Turlock (most of which are DACs). Based on this assessment, if water levels reach the proposed MTs, approximately 3% of domestic wells within a 1.5-mile radius of RMWs (approximately 61) would be expected to be fully dewatered and an additional 2% of domestic wells within a 1.5-mile radius of RMWs (approximately 38) would be expected to be partially dewatered.

  We acknowledge that this is a "quick and dirty" assessment of domestic well impacts; however, the results of this assessment suggest that dewatering of domestic wells may occur if water levels reach the MTs. Given that the UR for chronic lowering of water levels allows for water levels in significant portions of the Subbasin to continue to drop below MTs, additional domestic well users would be vulnerable to impacts. Further, more than half of domestic wells are located outside of a 1.5 mile radius of the RMWs and may also be impacted by declining water levels. The GSAs could evaluate the likely effects on domestic wells by developing a water level contour map that extends across areas not proximate to RMW and evaluates dewatering effects. **The GSP should present a thorough, robust, and transparent analysis, supported by maps, that identifies: 1) which domestic wells are likely to be impacted at the MTs, 2) which domestic wells are likely to be impacted as water levels are allowed to drop below MTs before the UR definition is met, 3) the location of the likely impacted wells with respect to DACs and other communities and systems dependent on groundwater, and 4) an estimate of the total population likely to be affected. This assessment should include multiple scenarios in which 33% or more RWMs exceed their MTs at for three years, to appropriate represent conditions that may occur under the GSAs' definition of URs. This analysis would allow the GSAs not only to evaluate the potential impacts, but to proactively plan for mitigation of domestic well impacts, rather than responding only under emergency conditions, as was done during the 2013-2016 drought.**

Water Quality Monitoring Network and SMCs

The draft GSP identifies chemicals of concern (COCs) for the Subbasin, which include arsenic, uranium, manganese, sulfur, total dissolved solids (TDS), nitrate, 1,2,3-trichloropropane (1,2,3-TCP), tetrachloroethylene (PCE), and dibromochloropropane (DBCP). MTs for groundwater quality are set as "a new (first-time) exceedance of a drinking water quality standard (primary or secondary maximum contaminant level [MCL]) in a potable supply well in the representative monitoring network for any of the Subbasin constituents of concern, [including]: nitrate (as N) (10 milligrams per Liter [mg/L]), arsenic (10 micrograms per Liter [µg/L]), uranium (20 picocuries per Liter [pCi/L]), TDS (500 mg/L), 1,2,3-TCP (0.005 µg/L), and PCE (5 µg/L)" (Section 6.6.2). MOs for groundwater quality are defined as "no increase above the maximum historical concentration for any constituent of concern in a potable water supply well in the draft GSP monitoring program caused by GSA management activities" (Section 6.6.3). The draft GSP defines the UR for water quality as occurring if "a new (first-time) exceedance of an MT is observed in a potable water supply well in the representative monitoring network that results in a well owners increase on operational costs and is caused by GSA management activities" (Section 6.6.1.3). As identified below, several clarifications or improvements are recommended for the water quality SMCs and monitoring network presented in the draft GSP.

- The draft GSP identifies additional COCs that have historically impacted groundwater quality conditions near population centers within the Subbasin but does not define SMCs for these COCs. Specifically, Section 4.3.5.3.4 notes that "elevated [manganese] concentrations near or exceeding the secondary MCL were detected in in some wells near Hughson and the Tuolumne River", and that a public supply well in the "City of Ceres exceeded the MCL for manganese" that ultimately prevented it from being put into service. Additionally, Section 4.3.5.10. notes that "elevated concentrations of DBCP (more than 50 percent of or exceeding the MCL) are prevalent in the vicinity of Denair and Hughson" and that "several wells near and west of Ceres have had recent concentrations of DBCP that are greater than 50-percent or exceed the MCL." While manganese is not typically considered a health risk, it does impact drinkability of water from a color and taste standpoint, and thus can result in significant cost to treat water for drinking water purposes (similar to TDS). DBCP, is a soil fumigant and nematicide, and can have significant health effects. **Because manganese and DBCP are present near or above MCLs and because they present a clear risk to use of groundwater for drinking water purposes, the GSAs should include these constituents in its monitoring program and establish MOs and MTs for these constituents.**

- As mentioned above, the UR for degraded water quality is limited to addressing first-time MT exceedances in the representative monitoring well network "that results in a well owners increase on operational costs." This UR notably excludes the impairment or total loss of access to safe drinking water supplies as a "significant and unreasonable impact" of degraded water quality, which is especially relevant to domestic well users who do not have access to alternative potable water supplies within the Subbasin. **The UR definition for degraded water quality thus does not adequately address significant and unreasonable impacts to drinking water beneficial users of the Subbasin.**

- Similarly, the UR for degraded water quality is limited to water quality impairments "caused by GSA management activities." The draft GSP loosely defines "GSA regulated groundwater levels, extractions, or projects/management actions" as GSA management activities that could contribute to a water quality UR and notes that "GSAs are responsible for ensuring that their groundwater management activities do not cause or contribute to exceedances of drinking water standards" (Section 6.6.1). Several sections of the draft GSP note there is a correlation between groundwater level declines and/or changes in hydraulic gradients and degraded groundwater quality. For example, Table 6-1 (Section 6.3.1) notes that historic low water levels observed during the 2014-2017 drought resulted in water quality impacts to potable water supply wells in the cities of Modesto, Ceres, and Waterford as well as the Hilmar Community Water District (CWD). Section 6.6.2.1.7 notes that "in other parts of the Central Valley, naturally occurring arsenic, uranium, and TDS have been correlated with depth and observed to increase in concentration when water levels decline." However, the draft GSP does not attempt to quantify what declines in groundwater elevations and/or increases in groundwater pumping would result in additional water quality impairments to the Subbasin and does not adequately explain how potential water quality impacts were evaluated in the design of projects and management actions. **The GSP should include a more detailed explanation of the protocols and methodologies the GSAs will use to determine whether or not a "GSA management activity" is causing any future observed MT exceedances in water quality and to evaluate how implementation of projects and management actions will not result in further water quality impairments, particularly those that effect drinking beneficial water users, to the Subbasin.**

- Section 6.3.2.2 notes that "MTs for chronic lowering of water levels are supportive of the MTs developed for degraded water quality. By arresting water level declines…potential increases in [COCs] associated with depth (such as TDS) can be avoided. By managing to a previous groundwater level surface (Fall 2015), the MTs will not significantly alter historical hydraulic gradients and will not accelerate the rate of migration of any groundwater contaminants." However, as mentioned above, the draft GSP notes that during the 2014-2017 drought water quality impacts were already being observed in public supply wells throughout the Subbasin. Furthermore, as described above, the draft GSP allows for a sustained exceedance in water level MTs for up to three (3) consecutive years before a UR is triggered, which could further exacerbate groundwater quality issues known to occur when water levels decline below Fall 2015 elevations. **Therefore, the draft GSP fails to note that URs for chronic lowering of water levels could allow for further water quality impairments within public water supply wells (including those used by small community water systems) and thus are not sufficiently protective of "significant and unreasonable impacts" to drinking water beneficial users of the Subbasin.**

- **Figure 4** shows the locations of water quality RMWs relative to domestic wells, public water systems, and DACs within the Subbasin. As described in Section 7.1.4, the GSAs have not specifically defined a SGMA monitoring network for degraded water quality and will rely entirely on existing water quality monitoring programs in place throughout the Subbasin (including GAMA, Geotracker, CV-SALTS, and the Nitrate Control Program). The draft GSP notes that "the monitoring network will vary from year-to-year based on regulatory requirements from each water quality program." By outsourcing water quality monitoring to existing programs outside the purview of SGMA regulation, the GSAs will not be able to independently control the availability, frequency, and quality of water quality monitoring data used to evaluate SGMA compliance within the Subbasin and may not meet GSP regulations to "develop a monitoring network capable of collecting sufficient data to demonstrate short-term, seasonal, and long-term trends in groundwater conditions… to demonstrate progress toward achieving measurable objectives described in the Plan, [or] to monitor impacts to the beneficial uses or users of groundwater" (23-CCR §354.34). **Therefore, it is recommended that the GSP explicitly define a set of monitoring**

wells that will be included in the SGMA monitoring network for degraded water quality to ensure these wells will be consistently monitored and will fully comply with requirements for SGMA monitoring networks as outlined in the GSP regulations.

- The draft GSP does not provide a list of monitoring sites included in the water quality monitoring network or include any other pertinent information about these sites (e.g., well type/owner, well construction details, Principal Aquifer designations, etc.). All the draft GSP provides is a figure (Figure 7-4) that shows the general location of the wells, without any identifying information or a designation of what principal aquifer they are located in. As mentioned above, the UR, MT, and MO definitions for degraded water quality are specifically tied to "potable water supply wells" in the representative GSP monitoring network. It is it is unclear from the information presented in the draft GSP which public supply wells will be monitored or if the water quality monitoring network includes domestic wells or wells within small public water systems. **The GSP should clearly provide a list of monitoring sites included in the SGMA monitoring network for degraded water quality and include relevant information about each well (locations, well types/owners, well construction details, screening intervals, etc.) to meet GSP requirements for data and reporting standards as outlined in 23-CCR §354.2(c).**

- Domestic wells are typically not covered by the state's existing water quality regulatory programs and thus may not be adequately covered by the water quality monitoring program presented in this draft GSP. **If the SGMA monitoring network for degraded water quality does not include domestic wells or wells from small community water systems, this should be clearly stated, and an action plan should be developed to add these sites to the monitoring network such that there is sufficient coverage to evaluate potential water quality impacts to all drinking water beneficial users within the Subbasin.**

- As noted above, the draft GSP does not identify what principal aquifer each water quality RMW is located in. **The water quality monitoring network should provide adequate coverage of all principal aquifers, and this information should be readily available in the GSP.**

Water Budget

The water budget section of the draft GSP was reviewed to identify approaches and assumptions used in water budget development that may not be protective of DACs, rural domestic water users, and small community water systems. Water budgets were developed by the GSAs for historical conditions (WY 1991 - 2015), current conditions (for an "average year of the historical simulation that incorporates current irrigation and operational practices," selected to be WY 2010), and projected future conditions (based on the 50-year hydrologic period WY 1969-2018). As further described below, the description of the water budget and supporting data and assumptions is incomplete in the draft GSP, and it is unclear if/how water demands from rural domestic water users and small community water systems are included in the water budgets presented for the Subbasin. <u>Therefore, the draft GSP does not allow for adequate public review and comment of key components related to drinking water beneficial users, and DWR cannot evaluate "Whether the Agency has adequately responded to comments that raise credible technical or policy issues with the Plan," as required under 23-CCR §355.5(b)(10).</u>

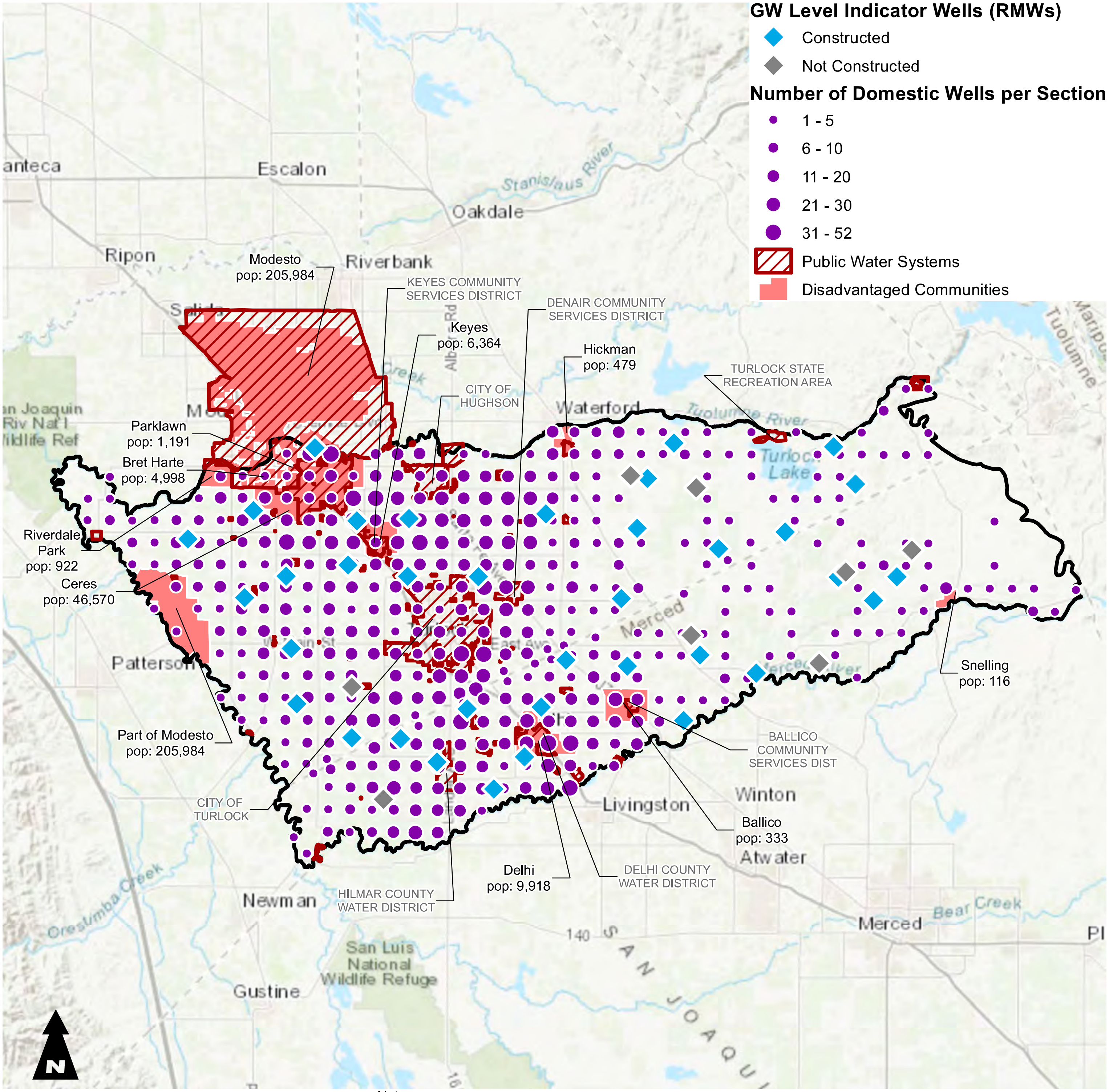
- The draft GSP is lacking information on the assumptions and data sources used to develop water budget estimates for the Subbasin, thus making a a detailed review of individual water budget components impossible at this time. Section 5.1.2 notes how "water budgets were developed utilizing the C2VSimTM, a fully integrated surface and groundwater flow model covering the entire Central Valley." Further description of the C2VSimTM is limited to the following statement: "Development of the model was informed by the study and analysis of hydrogeologic conditions, agricultural and urban water supplies, and an evaluation of regional water quality conditions. Additional detail on the data used to develop the C2VSimTM, which represents the best available data known at this time, is included in Appendix X." However, Appendix X has not been made available on the GSAs' website[2] as of 12 November 2021. **Per 23-CCR §354.2(f)(2), "groundwater and surface water models used for a Plan shall include publicly available supporting documentation." GSAs should therefore upload the *C2VSimTM Model Development Technical Memo* appendix to their website to allow for adequate public review and comment of the model and associated datasets and assumptions used to develop the water budgets for the Subbasin.**

- Per the above comment, the draft GSP includes no pertinent information on how urban water demands are quantified within the water budget and it is unclear if domestic and small community water system demands are even included in the estimate of urban pumping. Section 5.1.4 notes how groundwater production by "municipal and private domestic wells for urban/residential water supply" is a "primary component of the groundwater system;" however, the water budget tables and figures only include estimates of "urban pumping" and do not explicitly quantify groundwater demands from rural communities or domestic well users. Table 5-1 notes that historical urban demands were estimated from "historical records," yet no supporting references or citations are provided. Section 5.1.4.3 further notes that "development of the projected water demands is based on the population growth trends reported in the 2015 urban water management plans (UWMPs)," yet these assumptions are not detailed in the draft GSP. UWMPs are limited to retail supplier serving 3,000 or more service connections or 3,000 acre-feet per year, and demand assessments and projections are, as a rule, limited to that which is met through sales from the urban water supplier. Thus, these demand projections would not be expected to include estimates of groundwater demands from rural domestic well users or the many smaller community water systems within the Subbasin. **The draft GSP should further detail the data and assumptions used to develop estimates of urban and rural groundwater pumping in the Subbasin and should, to the extent possible, quantify groundwater demands from individual cities, small community water systems, and domestic well users and clearly report this information in the water budget tables and figures. Water demands by each public water system and domestic users should be presented in a transparent, tabular format as required by 23 CCR §354.18(a), and to allow for the public to review the included assumptions and estimates.**

[2] https://turlockgroundwater.org/gsp#GSPsections

Figure 1 - Representative Monitoring Network for Groundwater Levels Relative to Domestic Wells, DACs, and Public Water Systems

West and East Turlock Subbasin GSA



Notes
1. All locations are approximate.
2. Wells beneath the Corcoran clay (i.e., Principal Aquifer identified as Western Lower) are excluded.

Abbreviations
CWC = Community Water Center
DAC = disadvantaged community
GSA = Groundwater Sustainability Agency
GSP = Groundwater Sustainability Plan
MO = measurable objective
MT = minimum threshold
RMW = representative monitoring well

References
1. Domestic Well Densities: Research to develop the CWC Vulnerability Tool draft as of 16 May 2019 and 6 August 2019.
2. Disadvantaged community data (place): downloaded on 6 August 2019 from the DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/.
3. Public Water System data: downloaded on 6 August 2019 from Tracking California: https://trackingcalifornia.org/water/map-viewer.
4. Groundwater level indicator monitoring wells are the wells assigned with MTs and MOs according to the draft Turlock Subbasin GSP. The well information is from Table 7-1 in the draft GSP - Public Review Draft dated October 2021.

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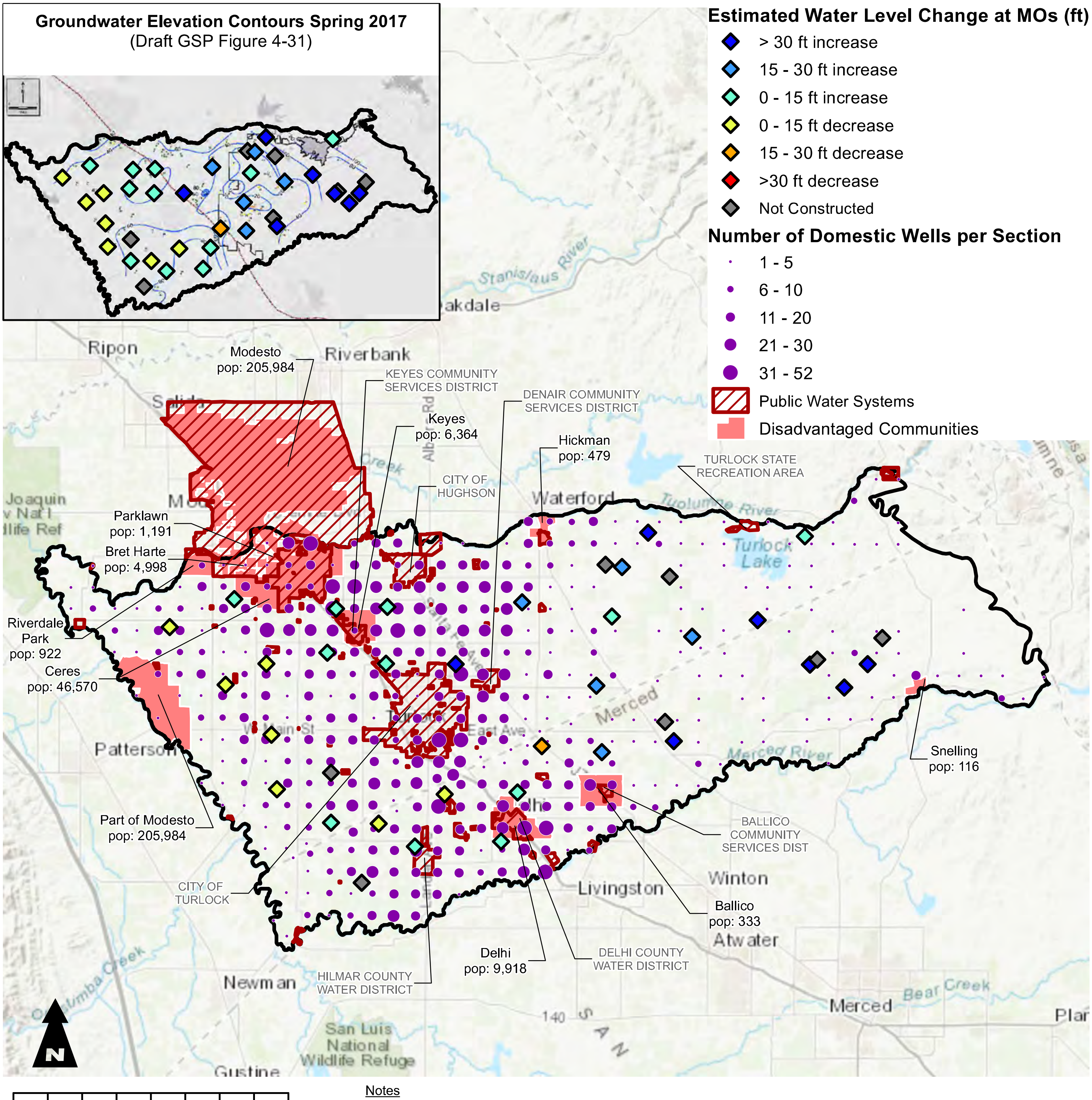
Figure 2A - Estimated Water Level Change at Measurable Objectives and Domestic Wells

West and East Turlock Subbasin GSA



Notes
1. All locations are approximate.
2. Wells beneath the Corcoran clay (i.e., Principal Aquifer identified as Western Lower) are excluded.

Abbreviations
CWC = Community Water Center
DAC = disadvantaged community
GSA = Groundwater Sustainability Agency
GSP = Groundwater Sustainability Plan
MO = measurable objective

References
1. Domestic well data: Research to develop the CWC Vulnerability Tool draft as of 16 May 2019 and 6 August 2019.
2. Disadvantaged community data (place): downloaded on 6 August 2019 from the DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/.
3. Public Water System data: downloaded on 6 August 2019 from Tracking California: https://trackingcalifornia.org/water/map-viewer.
4. MO values are from Table 7-1 in the Turlock Subbasin GSP - Public Review Draft, dated October 2021. Current water level values are from Appendix X of the draft GSP. Inset contour map is from Figure 4-31 of the draft GSP.

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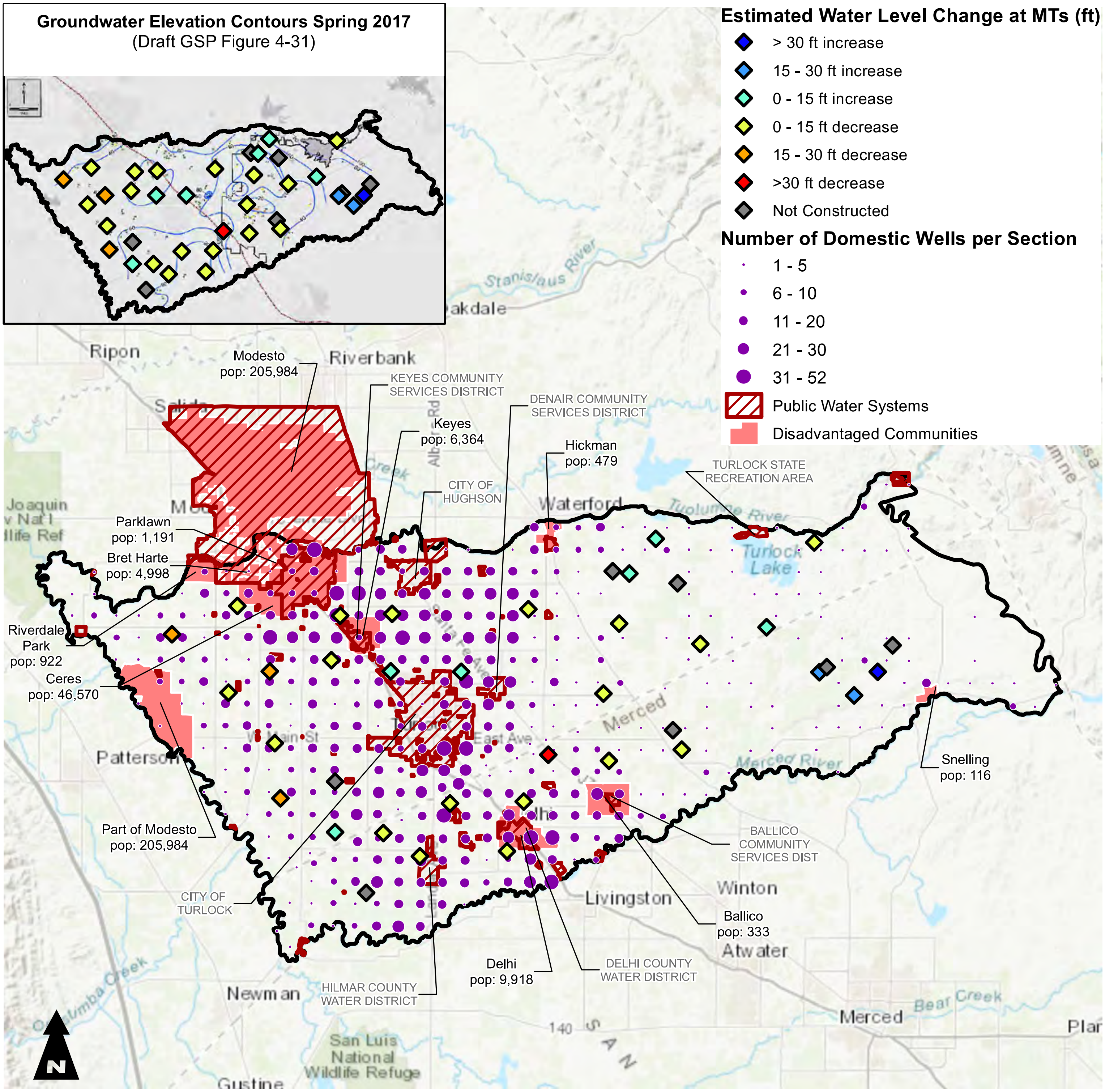
Figure 2B - Estimated Water Level Change at Minimum Thresholds and Domestic Wells

West and East Turlock Subbasin GSA



0 4 8 16 Miles

Abbreviations

CWC = Community Water Center
DAC = disadvantaged community
GSA = Groundwater Sustainability Agency
GSP = Groundwater Sustainability Plan
MT = minimum threshold

Notes

1. All locations are approximate.
2. Wells beneath the Corcoran clay (i.e., Principal Aquifer identified as Western Lower) are excluded.

References

1. Domestic well data: Research to develop the CWC Vulnerability Tool draft as of 16 May 2019 and 6 August 2019.
2. Disadvantaged community data (place): downloaded on 6 August 2019 from the DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/.
3. Public Water System data: downloaded on 6 August 2019 from Tracking California: https://trackingcalifornia.org/water/map-viewer.
4. MT values are from Table 7-1 in the Turlock Subbasin GSP - Public Review Draft, dated October 2021. Current water level values are from Appendix X of the draft GSP. Inset contour map is from Figure 4-31 of the draft GSP.

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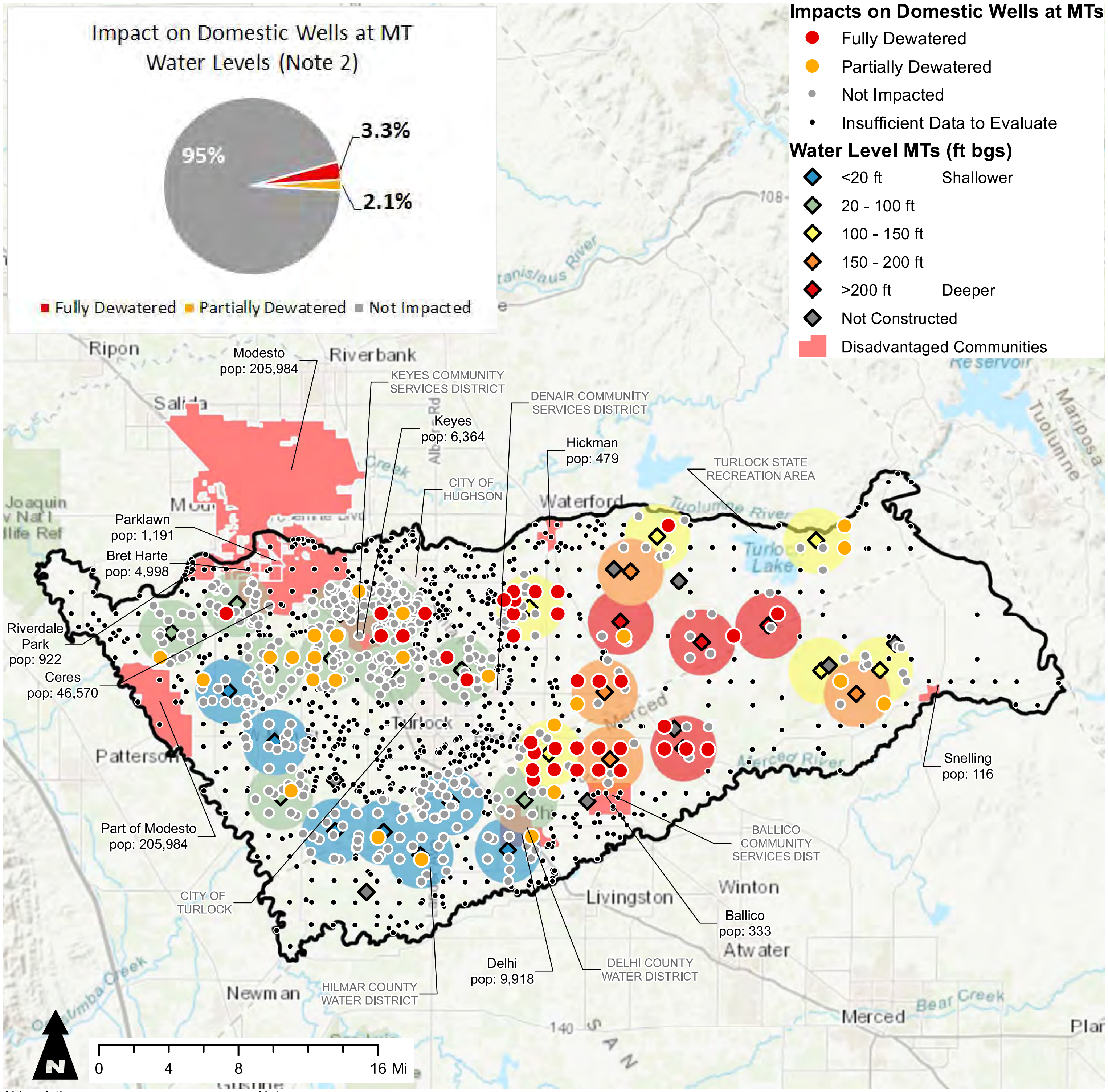
Figure 3 - Impact on Domestic Wells at MT Water Levels

West and East Turlock Subbasin GSA



<u>Abbreviations</u>

CWC = Community Water Center
DAC = disadvantaged community
GSA = Groundwater Sustainability Agency
GSP = Groundwater Sustainability Plan
MT = minimum threshold

<u>Notes</u>

1. All locations are approximate.
2. A well is identified as fully dewatered if the MT is below the midpoint of the screen well screen interval, and partially dewatered if the MT is below the top of the screen interval. For domestic wells with incomplete well screen information, it is assumed that the well screen extends 40 feet above the bottom of the well. Where available, the bottom of the screen interval of a domestic well was used for this assessment, and the bottom of the well depth was used for the remaining domestic wells. Wells with insufficient data and/or wells outside of the 1.5-mile buffer were not evaluated.

<u>References</u>

1. Domestic well data: Research to develop the CWC Vulnerability Tool draft as of 16 May 2019 and 6 August 2019.
2. Disadvantaged community data (place): downloaded on 6 August 2019 from the DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/.
3. Public Water System data: downloaded on 6 August 2019 from Tracking California: https://trackingcalifornia.org/water/map-viewer.
4. MT values are from Table 7-1 in the Turlock Subbasin GSP - Public Review Draft, dated October 2021.

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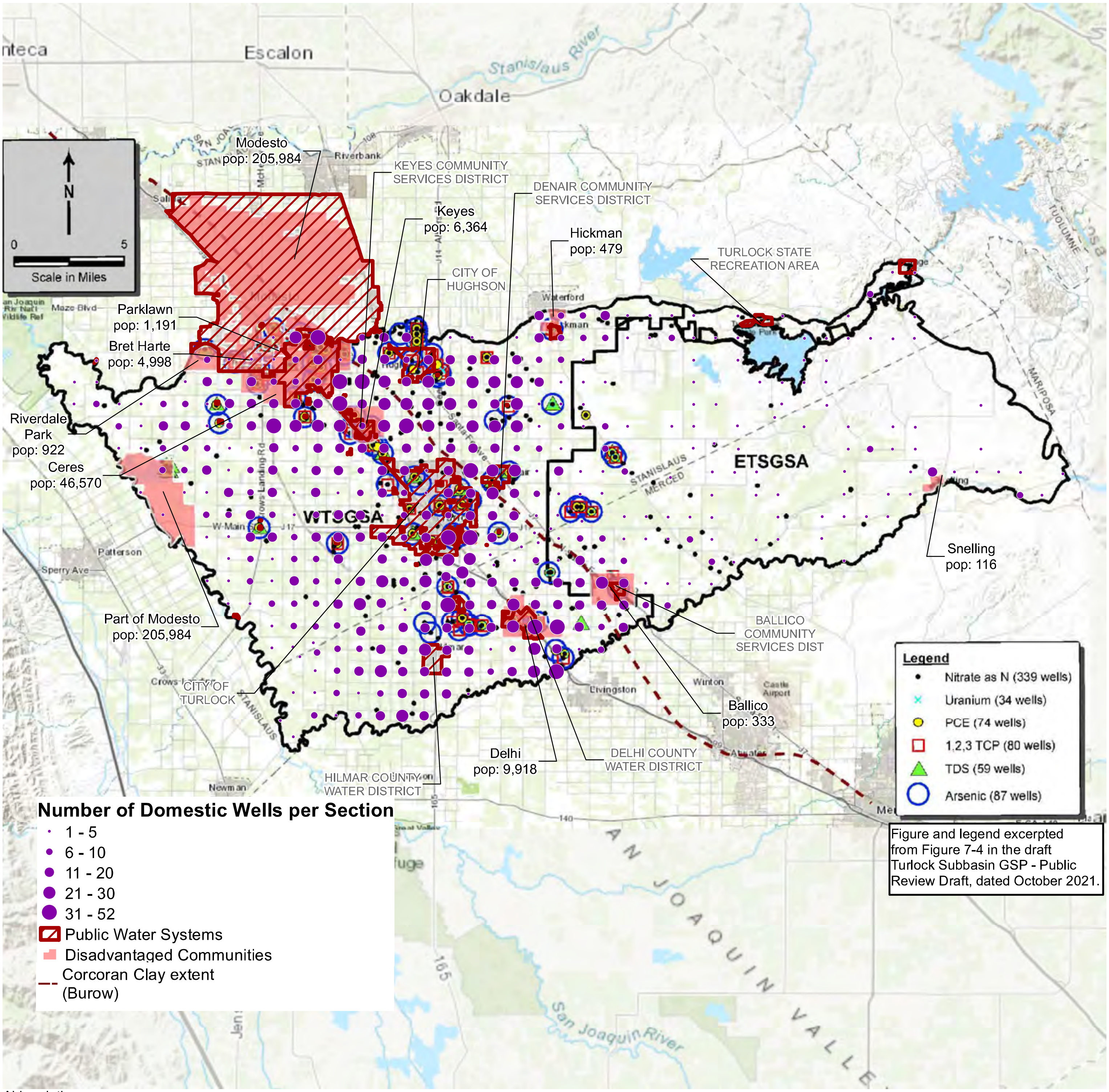
Figure 4 - Monitoring Network for Groundwater Quality Relative to Domestic Wells, DACs, and Public Water Systems

West and Turlock Subbasin GSA



Abbreviations

CWC = Community Water Center
DAC = disadvantaged community
GSA = Groundwater Sustainability Agency
GSP = Groundwater Sustainability Plan

Notes

1. All locations are approximate.

References

1. Domestic Well data: Research to develop the CWC Vulnerability Tool draft as of 16 May 2019 and 6 August 2019.
2. Disadvantaged community data (place): downloaded on 6 August 2019 from the DAC Mapping Tool: https://gis.water.ca.gov/app/dacs/.
3. Community Water System data: downloaded on 6 August 2019 from Tracking California: https://trackingcalifornia.org/water/map-viewer.
4. Figure 7-4 (Water Quality Monitoring Sites, January 2020 to May 2021) reproduced from the draft Turlock Subbasin GSP - Public Review Draft, dated October 2021 and presented as a basemap here.

SOUTH VALLEY FARMS
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DECEMBER 15, 2021

VIA U.S. MAIL and EMAIL

West Turlock Subbasin GSA
East Turlock Subbasin GSA
Turlock Subbasin GSP Comments
c/o Turlock Irrigation District
P.O. Box 949
Turlock, CA 95381
Email: turlockgroundwater@gmail.com

RE: Turlock Subbasin GSP Comment

Dear Board Members:

The purpose of this letter is to provide the West Turlock Subbasin Groundwater Sustainability Agency and the East Turlock Subbasin Groundwater Sustainability Agency (GSAs) with the comments of South Valley Farms to the GSAs' draft groundwater sustainability plan (GSP).

First and foremost, we appreciate the time and effort the GSAs' boards, committees, management staff, and consultants have committed to preparing this draft GSP. Further, we appreciate the opportunity to provide comments to the GSAs regarding this draft GSP. We hope the GSAs will consider the following comments in finalizing this draft GSP for submission to the Department of Water Resources (DWR). In considering the following comments, we recognize that this draft GSP is a "living document," and will undergo updates and modifications as more information is gathered to help the Turlock Subbasin reach sustainability by 2042 and beyond.

Our comments are as follows:

1. The GSAs should revise Minimum Thresholds for the Sustainable Management Criteria regarding the Chronic Lowering of Groundwater Levels and the Reduction of Groundwater in Storage.

Section 6.3.2 of the Sustainable Management Criteria (SMC) regarding the Chronic Lowering of Groundwater provides that "[Minimum Thresholds] are quantified as the low groundwater elevations observed in the Fall 2015 at representative monitoring sites for all three Principal Aquifers." Similarly, section 6.4.3 of the SMC regarding the Reduction of Groundwater in Storage provides that "the [Minimum Thresholds] for chronic lowering of groundwater levels are selected as a proxy for the reduction of groundwater in storage indicator. . . ."

Groundwater elevations observed in the Fall of 2015 reflect severe drought conditions. Reliance on these elevations imposes overly stringent standards on water users in the Subbasin. And while the GSP should establish a path toward sustainability, the GSAs must acknowledge that it will take time to reach sustainability through the implementation of projects and management actions. Accordingly, it is important that the GSAs provide sufficient time for projects and management actions to take effect and for water use practices to be modified without unnecessarily creating negative economic impacts.

To address this concern, we recommend that the GSAs revise the Minimum Thresholds for the SMC regarding the Chronic Lower of Groundwater Levels and the Reduction of Groundwater in Storage to include a buffer below the Fall 2015 groundwater elevations to provide operating flexibility for water users in the Subbasin.

2. The GSAs should apply the 2027 Interim Milestones to all representative monitoring wells.

Section 6.9 of the draft GSP establishes 2027 Interim Milestones for monitoring networks in the Eastern Principal Aquifer and the Wester Principal Aquifer. These Interim Milestones are:

> 2027 target values that provide a buffer to allow water levels to drop below the [Minimum Thresholds] between 2022 and 2027, *recognizing that water levels in these wells may continue to decline after the GSP is adopted as projects are being brought online.*
> (Draft GSP, § 7.1; emphasis added.)

Here, and elsewhere, the draft GSP expressly acknowledges that "the aquifer response to projects and management actions will take time." In addition to supporting the request to modify Minimum Thresholds per Comment No. 1, above, this language supports the need to apply the 2027 Interim Milestones to the Subbasin as a whole.

3. The GSAs should revise the definition of Undesirable Results as it pertains to the SMC regarding the Chronic Lowering of Groundwater Levels and the Reduction of Groundwater in Storage.

Table 6-2 provides that:

> An undesirable result for each principal aquifer will occur when at least 33% of representative monitoring wells exceed the [Minimum Threshold] for that Principal Aquifer in three (3) consecutive Fall semi-annual monitoring events."

Similarly, Table 6-2 provides that:

> An undesirable result will occur for each principal aquifer when at least 33% of representative monitoring wells exceed the [Minimum Threshold] for that principal aquifer in three (3) consecutive Fall monitoring events."

It is unclear if this language considers whether dry periods or drought are present during the three consecutive Fall measurements. We recommend that the three consecutive Fall measurements expressly consider whether a dry period or drought has existed during those three consecutive years; and, if a dry period or drought is found to have existed during those three consecutive years, then an undesirable result should not be triggered.

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4. If the GSAs implement groundwater allocations, the GSAs should impose allocations based on historical use.

The GSAs' proposed "Groundwater Allocation and Pumping Management Program" would "assign groundwater extractions into categories, assign pumping allocations to groundwater users, and manage pumping as needed to stay within the Subbasin's sustainable yield." (Draft GSP, § 8.4.2.2.1.) Notably, in describing this management action, the GSAs fail to indicate what methodology they would follow in establishing groundwater allocations.

In making this determination, we recommend that the GSAs rely on historical groundwater use. We believe this approach is the most equitable way of establishing groundwater allocations as it respects each user's individual history and allows the GSAs to obtain a representative average of how much water a user actually needs. In contrast, if the GSAs were to rely on other methodologies, such as gross acreage, the GSAs would risk allocating water to users who have done little or nothing to exercise their groundwater rights.

5. The GSAs should revisit the annual water budget and revise sustainability targets for agricultural groundwater producers.

Table 5-17 details the "Sustainable Yield Average Annual Water Budget" for the Subbasin. Provided is an excerpt of that table, relevant to this discussion:

	Historical Conditions	**Projected Conditions**	**Sustainable Conditions**
Groundwater Production	404,400	414,100	310,700
Agency Ag. Groundwater Production	79,200	51,300	51,300
Private Ag. Groundwater Production	269,700	287,000	191,200
Urban Groundwater Production	55,500	75,800	68,200

This table indicates that the GSAs do not anticipate that Agency Agriculture Groundwater Production will experience any reduction in use to achieve sustainable conditions. In contrast, the GSP anticipates a reduction of 95,800 acre-feet of water per year for Private Agriculture Groundwater Production. We do not believe it is appropriate for private agricultural water users to bear a disproportionate amount of the burden when it comes to helping the GSAs achieve their sustainability goal for the Subbasin. Therefore, we recommend that the GSAs revisit the water budget to consider an appropriate and equitable reduction for Agency Agriculture Groundwater Production.

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Thank you for the opportunity to provide these comments. We appreciate the significance of the considerations and decisions the GSA must undertake, and we look forward to working with you further regarding these matters.

Very truly yours,

Spencer Birch
General Manager
South Valley Farms

Attachment C – Turlock Subbasin Groundwater Sustainability Plan Comments and Comment Response Matrix

Responses to Public Comments, Turlock Subbasin GSP

Ref #	Ltr #	Author	Location in GSP	Comment	Response
1	1	Leadership Counsel for Justice and Accountability (1)	Chapters 1, 2, 4	*[Leadership Counsel for Justice and Accountability submitted a comment letter pertaining to draft chapters 1, 2, and 4 on 8/26/2021. The contents of this letter are included in their third and final comment letter submitted 12/15/2021. The GSAs considered the contents of this first letter and prepared responses, which are provided below, alongside the individual comments from the third letter.]*	Please see responses to Leadership Counsel for Justice and Accountability's comments below.
2	2	Eastside Water District	Tables 5-4 and 5-5	Tables 5-4 and 5-5 attempt to develop Average Annual Water Budgets – Land Surface System for the East Turlock GSA and the West Turlock GSA. In doing so, it includes, without support, agricultural percolation of surface water entirely within the West Turlock GSA budget.	Several clarifying comments and notes were added to the operational water budget discussions in Chapter 5 and to one place in the discussion regarding undesirable results in Chapter 6. In addition, ETSGSA and WTSGSA have agreed to collaboratively develop an Accounting Mechanism for Water Supplies within the Subbasin, as documented in Amendment 1 to the Memorandum of Agreement between the GSAs, which is included as an appendix to the GSP. The approach and schedule for development of this Accounting Mechanism have been added to Chapter 9 as Implementation Support Activity 3. It is anticipated that EWD's concerns will be addressed through this process during the first two years of GSP implementation. Since EWD is a member of the ETSGSA JPA, it will have the opportunity to provide input to this process.
3	2	Eastside Water District	Tables 5-4 and 5-5	Tables 5-4 and 5-5 make assumptions about "Native Percolation" to each GSA without defining the term.	See response to first comment by EWD.
4	2	Eastside Water District	Tables 5-8 and 5-9	Similarly, Tables 5-8 and 5-9 allocate "Canal & Reservoir Recharge" and "Deep Percolation" to the GSAs without discussion.	See response to first comment by EWD.
5	2	Eastside Water District	Section 5.4.4.1	Section 5.1.4.1 states: "The goal of the water budget analysis is to characterize the water supply and demand, while summarizing the accounting of water demand and supply components and their changes within each GSA, and the Subbasin as a whole". If these conclusion are intended simply to define the geographical occurrence of these items, and not allocate ownership or entitlement, then that should be clarified.	See response to first comment by EWD.
6	2	Eastside Water District	Section 5.4.4.1	The Draft Chapter actually does develop stream budgets by GSA.	See response to first comment by EWD.
7	2	Eastside Water District		The conclusion of "net recharge" on the west side depends entirely upon the classification and allocation of "Native Percolation", "Canal & Reservoir Recharge" and "Deep Percolation. Until these terms are defined, and a legal determination of entitlement is made, the Draft Chapter cannot and should not arbitrarily allocate them based solely upon physical inclusion within the politically drawn boundaries of a GSA.	See response to first comment by EWD.
8	2	Eastside Water District	Section 5.3	First, there is no support for imposing a 40% decrease on agricultural users while at the same time capping groundwater reductions imposed upon municipal users of 12% when their priority to use of the groundwater under the law has not yet been determined.	See response to first comment by EWD.
9	2	Eastside Water District	Section 5.3	the chapter does not discuss the requirement that California achieve a twenty-percent reduction in per person urban water use by the end of 2020 (also known as "20 x 2020"), which became law in 2009.	See response to first comment by EWD.
10	2	Eastside Water District	Section 5.3	this particular methodology for reducing subbasin wide groundwater pumping should simply not be used as it is prejudicial at this time.	See response to first comment by EWD.
11	2	Eastside Water District	Chapter 5	[The draft chapter] attempts to allocate water sources to the separate GSAs participating in plan development. It does so without legal analysis of who is entitled to water sources or components	See response to first comment by EWD.
12	2	Eastside Water District	Chapter 5	The Chapter should either be changed to exclude discussion of the division between the East Turlock Subbasin GSA and the West Turlock Subbasin GSA, or a disclaimer should be included that the numbers included in the Water Budget chapter are preliminary, based solely upon physical political boundaries, and are not intended to constitute an allocation between the GSAs.	See response to first comment by EWD.
13	3	National Marine Fisheries Service	Section 4.3.6 and 4.3.7 and Chapters 5 & 6	Using Valley Oak rooting depth to inform impacts resulting from streamflow depletion, as many GSAs are attempting to do, is inappropriate and not supported by science.	The Valley Oak rooting depth (30 feet) was used for a preliminary screening of potential GDEs, but was not used in the evaluation of streamflow depletion impacts as suggested by the comment. When used as a screening depth to identify where GDEs may potentially exist -- as was done for this GSP -- use of phreatophyte rooting depths such as Valley Oak serves as a conservative construct. However, the evaluation of streamflow depletion was conducted with the calibrated surface water-groundwater model as summarized in Section 4.3.7. The analysis of surface water and streamflow depletion estimates for historical, current, and projected future conditions is contained in Section 5.1.4 (see specifically Tables 5-2 and 5-7). Impacts were discussed in the analysis of sustainable yield (Section 5.3) and in the discussion of sustainable management criteria in Section 6.8.

Ref #	Ltr #	Author	Location in GSP	Comment	Response
14	3	National Marine Fisheries Service	Section 4.3.7and Chapters 5 & 8	If information to inform potential impacts to surface water beneficial uses is currently unavailable, we recommend the GSA develop a future study that investigates the relationship between groundwater levels, streamflow depletion rates, and significant and unreasonable impacts to beneficial uses of surface water, especially as those beneficial uses pertain to ESA-listed salmonids and their critical habitat, including EFH.	Significant analyses described in the GSP were used to protect against future adverse impacts to surface water beneficial uses from lowering of groundwater levels. Section 4.3.7 describes the analysis of interconnected surface water, which determined that all of the Turlock Subbasin river boundaries were interconnected surface water in 2015 as defined by SGMA. The analysis notes the correlation between streamflow depletions and groundwater levels. This correlation was also demonstrated by The Nature Conservancy in their 2016 assessment of Central Valley river systems including those surrounding the Turlock Subbasin (described in Section 4.3.7). Section 5.1.4.3 discusses the increase in streamflow depletions that are predicted by the model to potentially occur in the future if groundwater levels continue to decline. Estimated future depletions, along with potential disconnection on portions of the Merced River, were correlated to the lowering of water levels along the interconnected surface water; these depletions were determined to be undesirable results in Chapter 6 (see Section 6.8). By arresting water level declines in the Subbasin, future undesirable results can be avoided. A sustainable yield analysis (Section 5.3) was developed to test various sustainable management criteria and to select criteria that could prevent the future depletions predicted by the model (see Table 6-17). Further modeling of projects and management actions (Section 8.5.1, Table 8-25) indicates that sustainable management criteria would likely result in even lower deletions than indicated by the sustainable yield analysis (Section 5.3). Also, Section 8.5.1 documents the relationship between groundwater levels and streamflow depletion in the modeling of sustainable conditions with projects and management actions. Additional information on fish and streamflow habitat will be incorporated into the ongoing Programmatic Environmental Impact Report (PEIR), which includes analyses of use of Tuolumne River water for GSP projects and management actions. Lastly, the ongoing evaluation of streamflow depletion during GSP implementation will be coordinated with the agencies responsible for assuring that minimum flow temperature requirements in the adadramous streams that border the Subbasin are met.
15	3	National Marine Fisheries Service		The GSA should qualitatively describe what conditions within the subbasin would constitute an undesirable result with regard to streamflow depletion, ensuring that the description accounts for impacts to instream habitat that support ESA-listed salmon and steelhead.	As noted in responses above, Sections 4.3.7, 5.1.4, 5.3, and Chapter 6 all provide information used to define undesirable results for streamflow depletion. Section 6.8.1 describes conditions that would lead to undesirable results for interconnected surface water including causes and potential effects on beneficial uses including surface water rights holders and the environment (riparian habitat, and potential GDEs). Also noted in Section 6.8.1.1 are "concerns over decreases in baseflow during low flow conditions in the river and potential impacts to habitat and other environmental uses," which would include instream habitat that supports ESA-listed salmon and steelhead, and other aquatic habitat. The GSAs are not responsible for undesirable results that have not been corrected by January 1, 2015; however, the GSAs wish to avoid the predicted future streamflow depletions associated with continual declines in water levels. By setting MTs at the 2014-2015 water levels, groundwater level declines are arrested and future streamflow depletions as predicted by the modeling can be avoided.
16	3	National Marine Fisheries Service	Chapter 6, SMC	If the GSA intends to propose groundwater elevations as a minimum threshold for streamflow depletion, the GSA should provide an explanation, with supporting evidence, for why groundwater levels are a reasonable proxy for interconnected surface water depletion	As noted in responses above, the integrated surface water-groundwater model provided a strong correlation between lowering of water levels and predicted future streamflow depletions, thereby demonstrating that groundwater levels are a reasonable proxy for interconnected surface water depletion. This correlation was consistent with previous analyses conducted along the Turlock Subbasin river systems by The Nature Conservancy (2016). As noted in Section 4.3.7, increases in streamflow depletion over both the historical and future predicted conditions along segments of the Subbasin's rivers were correlated to declines in water levels. Additional modeling for sustainable conditions (Section 5.3) demonstrated that by maintaining 2014-2015 water levels, streamflow depletions would be significantly lower than the predicted future streamflow depletions estimated by the model (see also Section 6.8.2 and Table 6-17). The correlation between groundwater elevations and streamflow depletions is also demonstrated in Section 8.5.1 by the modeling of sustainable conditions with projects and management actions.
17	3	National Marine Fisheries Service	Chapters 5, 6, & 8	[The GSA should provide an explanation for] why those levels are sufficient to avoid streamflow depletion that significantly impacts surface water beneficial uses.	The correlation between the MTs and the avoidance of future predicted streamflow depletions has been demonstrated in both the sustainable yield analysis (Section 5.3) and the modeling of projects and management actions (Section 8.5.1). See also information in previous responses above.
18	3	National Marine Fisheries Service	Chapter 6	If a lack of data prevents the development of appropriate sustainable management criteria, the GSA should design and implement studies that better inform appropriate minimum thresholds and measurable objectives for streamflow depletion.	As described in Chapter 9, the GSAs plan to update the integrated surface water-groundwater model annually for ongoing analyses of interconnected surface water conditions for the Turlock Subbasin (Section 9.6). These analyses will be presented in Annual Reports. Further, future refinements to the model are envisioned for improved analyses over time. Sustainable management criteria, including MTs and MOs, will be re-evaluated in the five-year GSP assessment as required by the GSP regulations.
19	3	National Marine Fisheries Service	Chapter 6	We suggest the GSA follow guidance by the California Department of Fish and Wildlife (2019) that recommends conservative sustainability management criteria be established to ensure groundwater dependent ecosystem protection.	GDEs were considered in the selection of sustainable management criteria (Section 6.8.1). Setting MTs at the 2015 or higher water levels along the river boundaries were determined to be protective of currently-mapped potential GDEs and aquatic habitat.

Ref #	Ltr #	Author	Location in GSP	Comment	Response
20	3	National Marine Fisheries Service	Chapter 8 - Projects/MAs	NMFS encourages the GSA to consider implementing recharge projects that facilitate floodplain inundation, offering multiple benefits including downstream flood attenuation, groundwater recharge, and ecosystem restoration.	GSP projects were developed, where possible, to be aligned with the Governor's Water Action Plan by providing multiple benefits, including benefits to disadvantaged communities and environmental water users. The Turlock Subbasin GSP prioritizes projects that meet multiple needs and focus on natural infrastructure, including the basin itself for storage and the natural waterways and floodplains as recharge areas (see Section 8.1). As one example, the recharge project in the Dry Creek watershed would use natural channels for recharge, improving in-stream riparian habitat and providing benefits to interconnected surface water, among other benefits (Section 8.3).
21	4	Restore Hetch Hetchy	Chapter 8 - Projects/MAs	The GSP may, however, be missing a significant opportunity by, in draft chapters made available to date, failing to even mention the possibility of cooperative conjunctive use agreements with the San Francisco Public Utilities Commission. Note the SFPUC has not only the water but also the financial resources to invest in wet-year groundwater recharge in the Turlock Subbasin. Importantly, such investment could provide substantial benefits within the Turlock Subbasin, not only refilling depleted aquifers but also providing additional supplies to local communities, cities and farms – within both Turlock Irrigation District and the Eastside Water District. A well designed conjunctive use program would provide significant benefits to the Turlock region and its farmers for generations to come. It is less clear, however, that the programs and projects in the GSP will identify the degree of possible water supply benefits to local communities and farms that are readily available (chapter 8 may provide more clarity when it is available).	The GSAs appreciate the information and comments, and will continue to explore opportunities for recharge to augment the current GSP water supply projects in development. The GSAs have identified and prioritized recharge projects for GSP implementation, all involving conjunctive use of surface water and groundwater (Section 8.2). As noted in Table 8-1, ten of the eleven GSP projects selected for early implementation involve either in-lieu or direct recharge as the primary mechanism to supplement current groundwater supplies. Additional recharge projects have been identified for further planning and evaluation (see Table 8-2).
22	5	Tuolumne River Conservancy	Chapter 7	We are concerned that the monitoring wells for the Tuolumne River seepage are not adequately placed to measure the impacts of pumping ground water upstream between Waterford and Peaslee Creek. In the last several years hundreds of acres of orchards have replaced pasture. If these orchards are using agricultural wells, they are likely negatively impacting the Tuolumne River. Monitoring wells should be placed between Waterford and Peaslee creek along the Tuolumne River to monitor the draw from the Tuolumne River.	The need for additional monitoring wells along the rivers has been recognized by the GSAs and is being prioritized for GSP implementation. As documented in GSP Chapter 9 , GSA budgets include funding for additional wells over the next two fiscal cycles (2021-2022 and 2022-2023) for well design (see Section 9.2.2). The GSAs may seek funding for well installation, or if unavailable, may use GSA funds. At this time, a total of 8 shallow monitoring wells are planned for installation along the river boundaries. Although sites have not yet been finalized, the locations between Waterford and Peaslee Creek along the Tuolumne River (as described in the comment) will be considered for the new monitoring wells.
23	6	Leadership Counsel for Justice and Accountability (2)	Chapters 5, 6, 7	*[Leadership Counsel for Justice and Accountability submitted a comment letter pertaining to draft chapters 5, 6, and 7 on 11/19/2021. The contents of this letter are included in their third and final comment letter submitted 12/15/2021. The GSAs considered the contents of this second letter and prepared responses, which are provided below, alongside the individual comments from the third letter.]*	Please see responses to Leadership Counsel for Justice and Accountability's comments below.
24	7	Milt Trieweiler	Chapters 5, 8 & 9	The amount of water extracted by all the stakeholders must be based on the natural input of water from the natural rainfall in any given year.	As described in Section 8.4, a series of management actions have been identified to achieve the sustainability goal for the Subbasin. These actions include a pumping management framework (Section 8.4.2) that will be adaptively developed and implemented over time, as needed. The development of this framework will be conducted in a transparent manner involving outreach and input by Subbasin stakeholders. In addition, GSAs are coordinating on an accounting mechanism to be developed over the initial two years of GSP implementation (see Section 9.3). All of these steps will consider the physical water budget and water availability from a variety of sources. Both annual and long-term water budget data will be considered.
25	7	Milt Trieweiler	Chapter 8 - Projects/MAs	Th focus on storage should be on the recharging of the aquifer in the Subbasins. In the few years we have above average rainfall we should add that water to the aquifer in the winter months by flood irrigating farmlands in the irrigation districts.	The GSAs support these comments. Aquifer recharge and conjunctive use are the foundation of the Turlock Subbasin GSP projects. As noted in previous responses, ten of the eleven GSP projects selected for early implementation involve either in-lieu or direct recharge, including on-farm recharge as indicated by this comment. The GSAs are developing a Turlock Subbasin Groundwater Recharge Assessment Tool (GRAT) to assist with and prioritize these planning efforts. All of these efforts assist with addressing potential future effects of climate change as highlighted as a concern in the comment letter.
26	7	Milt Trieweiler	Chapter 8 - Projects/MAs	should also be investing in pipe lines to distribute this water for recharging to the areas in the Subbasins with the best recharging capacities.	The GSAs agree and are planning for infrastructure to support the numerous recharge projects identified in the GSP. Infrastructure planned for each project is included in project descriptions in Sections 8.2 and 8.3 of the GSP.
27	8	California Poultry Federation	Chapter 8 - Projects/MAs	CPF commends the Draft GSP for emphasizing the development of projects to augment available water supplies. We encourage the Turlock Subbasin Groundwater Sustainability Agencies to continue identifying and implementing measures to increase groundwater recharge and obtain additional surface water.	The GSAs will continue to explore opportunities for recharge to augment the current GSP water supply projects in development. In addition to those projects already identified for early implementation, the GSP includes additional recharge projects (Group 3) that are in preliminary planning stages and hold promise for further augmentation of water supply for the Subbasin.
28	8	California Poultry Federation	Chapter 8 - Projects/MAs	To the extent demand reductions may be necessary, CPF trusts the public will have a meaningful opportunity to participate fully in their development, including by submitting written comments on the proposals and supporting data.	The GSAs are committed to a public process for the implementation for all management actions identified in the GSP, including the potential for demand reduction. Details of management actions will be developed in a transparent manner with opportunities for Stakeholder input and public comment.
29	8	California Poultry Federation	Chapter 9	[It is] particularly important to consider all of the associated costs, which, as the Draft GSP recognizes (e.g., at Table 9-1), are still being developed.	The GSAs are mindful of the implementation budgets and GSP costs. As public agencies, the GSAs intend to conduct groundwater management in a cost-effective manner that minimizes costs to member agencies and Subbasin stakeholders.

Ref #	Ltr #	Author	Location in GSP	Comment	Response
30	9	Tuolumne River Conservancy (2)	Section 8.5	The Stream-Aquifer Interaction Historical Simulation 2006-2015 map marks 11 spots with a losing scenario for the Tuolumne River. But that increases to 32 losing spots into the future. The increase in the number of losing spots is unacceptable and a violation of the public trust.	This comment correctly notes that model simulations of interconnected surface water predict a future increase in the extent of losing reaches along the Tuolumne River compared to historical conditions. However, the modeling is predicting what might occur without additional projects or management actions. Modeling suggests these predicted increases are correlated to potential future declines in groundwater levels. Accordingly, the GSP selects sustainable management criteria to arrest water level declines along the river and protect against future predictions of streamflow depletions (Section 6.8). The ability of the criteria to avoid future increases is demonstrated by the modeling analyses for both sustainable yield conditions (Section 5.3) and conditions with GSP projects and management actions (Section 8.5). As such, the GSP proactively manages the potential expansion of losing river reaches as an undesirable result; however, it has not been determined that such an increase would actually result in adverse impacts to public trust or other resources.
31	10	NGO Coalition	Figures 2-11 and 2-13	GSP provides the necessary information on domestic wells to understand the distribution of shallow and vulnerable drinking water wells within the subbasin. The GSP provides a density map of domestic wells (Figure 2-11), as well as a separate map of domestic wells color coded by depth (Figure 2-13).	Comment noted; no response needed.
32	10	NGO Coalition	Chapters 4 & 5	The identification of Interconnected Surface Waters (ISWs) is insufficient, due to lack of supporting information provided for the ISW analysis. The GSP describes the use of a groundwater model, the C2VSim-TM model, to analyze the interaction between groundwater and surface water within the subbasin. The model is briefly described in the Water Budget section of the GSP which refers to model documentation included in Appendix X, but this appendix was not provided as part of the draft GSP. The GSP could be improved by including a summary of the model in the main GSP text, including groundwater level monitoring well data and stream gauge data that were incorporated into the model, the screening depths of wells used in the groundwater model, and description of the temporal (seasonal and interannual) variability of the data used to calibrate the model. The GSP does not provide a map of these reaches to illustrate the conclusions of the modeling analysis regarding which reaches are connected to groundwater.	The C2VSim-TM model documentation in Appendix D is included with the Final Draft GSP and demonstrates good calibration to river gauge data (Section 5.3.2 of Appendix D). Associated data used for the water budget development is discussed in Section 5.1.2. Water budget components including streamflow-aquifer interaction are summarized in Section 5.1.4. See also Tables 5-2 and 5-7 for the water budget summaries of the stream systems. Section 8.5.1 documents the modeling associated with sustainable conditions including projects and managment actions. In that section, the coorrelation between groundwater elevations and streamflow depletions are well-documented. As indicated in Section 4.3.7, all three river boundaries are interconnected surface water as defined by SGMA. All reaches were interconnected as of January 1, 2015.
33	10	NGO Coalition	Chapters 4 & 8	Provide a map showing all the stream reaches in the subbasin, with reaches clearly labeled as interconnected (gaining/losing) or disconnected. Consider any segments with data gaps as potential ISWs and clearly mark them as such on maps provided in the GSP. In the main text of the GSP, summarize the groundwater elevation data and stream flow data used in the modeling analysis. Discuss temporal (seasonal and interannual) variability of the data used to calibrate the model. To confirm and illustrate the results of the groundwater modeling, overlay the subbasin's stream reaches with depth-to-groundwater contour maps to illustrate groundwater depths and the groundwater gradient near the stream reaches. Show the location of groundwater wells used in the analysis. For the depth-to-groundwater contour maps, use the best practices presented in Attachment D. Specifically, ensure that the first step is contouring groundwater elevations, and then subtracting this layer from land surface elevations from a Digital Elevation Model (DEM) to estimate depth-to-groundwater contours across the landscape. This will provide accurate contours of depth to groundwater along stream and other land surface depressions where GDEs are commonly found.	Maps illustrating the locations of gaining/losing reaches along each river boundary and changes to those conditions over time are illustrated on Figures 4-62 and 4-63. Text in Section 4.3.7 describes these conditions and notes the correlation between streamflow depletions and groundwater levels. Groundwater elevation and streamflow data are documented in Appendix D. In particular, Section 5.3.2 of Appendix D documents the good calibration between the model and measured streamflow on all of the river boundaries. Correlations between interconnected surface water and water levels are noted in Section 4.3.7 and discussed in the streamflow and sustainable yield analyses in Sections 5.1.4 and 5.3, respectively. Modeling analyses of interconnected surface water under scenarios of projects and management actions are included in Section 8.5.1.2. The depth to groundwater raster presented on Figure 4-65 was developed in a similar sequence to the best practices described in Attachment D.
34	10	NGO Coalition	Chapter 4	The identification of Groundwater Dependent Ecosystems (GDEs) is insufficient. The GSP took initial steps to identify and map GDEs using the Natural Communities Commonly Associated with Groundwater dataset (NC dataset). However, we found that some mapped features in the NC dataset were improperly disregarded. NC dataset polygons were incorrectly removed if Normalized Difference Vegetation Index (NDVI) and Normalized Difference Moisture Index (NDMI) data did not correlate with groundwater level trends. This is an incorrect method, since a lack of a relationship does not preclude that groundwater is providing some of the ecosystem's water needs. If the ecosystem is accessing groundwater, then the ecosystem should be categorized as a GDE. If there are no data to characterize groundwater conditions underlying the GDE, then the GDE should be retained as a potential GDE and data gaps reconciled in the Monitoring Network section of the GSP. The GSP uses depth-to-groundwater data from a wet year (1998) and a critically dry year (2015) to characterize areas where the depth to groundwater was less than 30 feet. While we recognize that use of data from wet and dry periods is appropriate, we recommend using more recent groundwater data, where available, over multiple seasons and water year types to determine the range of depth-to-groundwater underlying NC dataset polygons. We also recommend showing the location of wells used in the analysis on both the GDE map (Figure 4-64. Potential Vegetation and Wetland GDEs) and depth-to-groundwater map (Figure 4-63. Areas with Depth to Water within 30 feet in 1998) so that proximity of groundwater data to GDEs can be readily determined. The GSP does not provide an inventory of flora and fauna in the subbasin, nor is any discussion of threatened or endangered species provided.	As described in Section 4.3.8, the analysis of NDVI and NDMI was used to correlate vegetation to its predominant water source, which in many cases appeared to be surface water sources. Regardless of whether there are mutlitple water sources, the removal of these polygons did not materially affect the analysis because almost all of the remaining polygons after the initial depth to water analysis were located along the river boundaries (some additional internal polygons were removed due to land use). As such, the entire interconnected surface water systems were considered in the sustainable management criteria regardless of the number or location of polygons along the river boundaries.The extent of GDEs will be further evaluation during GSP investigations as mentioned in Chapter 9 (supported by data gap investigations in Section 9.2 and in coordination iwth other planning projects, see Section 9.8). The recommendation to use more recent groundwater data would have resulted in lower groundwater levels; the 1998 data used in the analysis would have remained the controlling water levels given that they represented the historical high groundwater levels along the river boundaries (and elsewhere in the Subbasin) during the 25-year historical study period.

Ref #	Ltr #	Author	Location in GSP	Comment	Response
35	10	NGO Coalition	Chapter 4	Re-evaluate the NC dataset polygons that were incorrectly removed based on NDVI and NDMI trends. Refer to Attachment D of this letter for best practices for using local groundwater data to verify whether polygons in the NC Dataset are supported by groundwater in an aquifer. Use depth-to-groundwater data from multiple seasons and water year types (e.g., wet, dry, average, drought) to determine the range of depth to groundwater around NC dataset polygons. We recommend that a baseline period (10 years from 2005 to 2015) be established to characterize groundwater conditions over multiple water year types. Show the location of wells used in the analysis on the GDE map and depth-to-groundwater contour map. Refer to Attachment B for more information on TNC's plant rooting depth database. Deeper thresholds are necessary for plants that have reported maximum root depths that exceed the averaged 30-ft threshold, such as Valley Oak (Quercus lobata). We recommend that the reported max rooting depth for these deeper-rooted plants be used. For example, a depth-to-groundwater threshold of 80 feet should be used instead of the 30-ft threshold, when verifying whether Valley Oak polygons from the NC Dataset are connected to groundwater. It is important to emphasize that actual rooting depth data are limited and will depend on the plant species and site-specific conditions such as soil and aquifer types, and proximity to other water sources. Discuss data gaps for GDEs. If insufficient data are available to describe groundwater conditions within or near polygons from the NC dataset, include those polygons as "Potential GDEs" in the GSP until data gaps are reconciled in the monitoring network. Provide a complete inventory, map, or description of fauna (e.g., birds, fish, amphibian) and flora (e.g., plants) species in the subbasin and note any threatened or endangered species (see Attachment C in this letter for a list of freshwater species located in the Turlock Subbasin).	See response above; the removal of those polygons did not materially affect the remaining analyses in the GSP. The range of groundwater levels was already evaluated for the analysis; the wettest year (correlating to the highest water levels) and driest years (correlating to the lowest water levels) were selected over a 25-year study period representing average hydrologic conditions. Hydrographs and water level contour maps were used in the selections. Collectively, the two maps provide end-member groundwater levels for the depth to water analysis. The wells for these two time periods are shown on water level contours maps (see Figures 4-29 and 4-30a), but simulated groundwater elevations were used to supplement the analysis in areas of limited wells. As explain in the text, the model contours extended across the river boundaries and provided a better understanding of groundwater levels beneath the potential GDEs. All of the polygons remaining after the two screening analyses were retained as potential GDEs. GDEs will be further evaluated in the data gap investigation and in coordination with other planning projects (see Chapter 9). The map on Figure 4-66 is embedded with a complete listing of species in GIS format. An ongoing Programmatic Environmental Impact Report (PEIR) is being prepared to supplement the GSP and will provide information on threatened or endangered species (including freshwater species). Additional information on GDEs can be incorporated into the GSP in the future as appropriate.
36	10	NGO Coalition	Chapter 5	Native vegetation and managed wetlands are water use sectors that are required to be included in the water budget. The integration of native vegetation into the water budget. The integration of native vegetation into the water budget is sufficient. We commend the GSA for including the groundwater demands of this ecosystem in the historical, current and projected water budgets. Managed wetlands are not mentioned in the GSP, so it is not known whether or not they are present in the subbasin.	Comment noted. There are no managed wetlands in the Turlock Subbasin. As noted in the comment, native and riparian vegetation ET was included in the water budget analysis (Section 5.1).
37	10	NGO Coalition	Chapter 5	State whether or not there are managed wetlands in the subbasin. If there are, ensure that their groundwater demands are included as separate line items in the historical, current, and projected water budgets.	There are no managed wetlands in the Turlock Subbasin.
38	10	NGO Coalition	Chapter 3	Stakeholder engagement during GSP development is insufficient. SGMA's requirement for public notice and engagement of stakeholders is not fully met by the description in the Notice and Communication section (Chapter 3) of the GSP. Chapter 3 of the Draft GSP appears to be under development at the time of publication, due to highlighted sections and missing appendices (including Appendix 3-1: Turlock Subbasin Communications Plan). Ensure that as this section is finalized, it addresses the following deficiencies with the overall stakeholder engagement process as currently presented in the GSP: The GSP documents opportunities for public involvement and engagement in very general terms for listed stakeholders. Public notice and engagement activities include public meetings, GSA meetings made available on YouTube, Technical Advisory Committee meetings, GSP technical and community workshops, adjacent subbasin coordination meetings, email notifications to an interested parties list, updates to the GSA website, sharing information over social media and flyers, and outreach to local media. The GSP does not state whether there was direct engagement with DACs and environmental stakeholders or representatives, or whether these stakeholders are represented on the Technical Advisory Committee. The plan does not include documentation on how stakeholder input from the above-mentioned outreach and engagement was solicited, considered, and incorporated into the GSP development process. The GSP states (p. 3-22): "GSAs will inform the public on Plan implementation utilizing the same successful engagement strategies described in the sections above, including email notifications to Interested Parties List, posting information on the Turlock Groundwater website, sharing information via social media channels, distributing flyers where appropriate, outreach to local media, and hosting public meetings (e.g. GSA meetings, TAC meetings, meetings of GSA member agencies and workshops)." However, the GSP does not include a detailed plan for continual opportunities for engagement through the implementation phase of the GSP that is specifically directed to DACs, domestic well owners, and environmental stakeholders within the subbasin. "A communication section of the Plan shall include a requirement that the GSP identify how it encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin." [23 CCR §354.10(d)(3)]	The Notice and Communication described in Chapter 3 of the GSP complies with state law (specifically the requirements for such in SGMA) and meets the requirements outlaid in DWR's GSP regulations. Draft Chapter 3 was released for comment on Nov. 15, 2021, when the GSP was still under development and GSP public engagement was not yet complete. Hence, Chapter 3 was released Nov. 15 for comment with the knowledge and understanding that additional outreach activities, including but not limited to meetings scheduled through the Jan. 6, 2022 public hearing and adoption of the GSP, would need to be added to Chapter 3 of the GSP. Further, several digital metrics depicting the depth of GSP outreach efforts (e.g. website visitors or YouTube video views) change daily, and it is prudent to update these metrics in Chapter 3 as close in time to finalizing the GSP as possible to provide the most up-to-date data describing public engagement efforts. Up-to-date metrics through Nov. 12, 2021 were presented in Draft Chapter 3 prior to release for comment on Nov. 15, 2021. Stakeholder engagement was openly solicited regularly at the multiple engagement opportunities listed in Section 3.2. Stakeholder comments and questions were considered through the decision-making process outlined in Section 3.3. Numerous informal comments and feedback were incorporated into the GSP throughout early GSP development (2018-2020) and are too numerous to list, and formal comments on the GSP are addressed in the Response to Comments Matrix, which includes discussion about how comments have been incorporated into the GSP or how they will be incorporated during implementation of the GSP after adoption.

Ref #	Ltr #	Author	Location in GSP	Comment	Response
39	10	NGO Coalition	Chapter 3	Include the missing Chapter 3 appendices in the Final GSP. Describe active and targeted outreach to engage DACs, drinking water users, and environmental stakeholders throughout the GSP development and implementation phases. Refer to Attachment B for specific recommendations on how to actively engage stakeholders during all phases of the GSP process. Clearly identify which stakeholders the members of the Technical Advisory Committee represent (e.g., DACs, environmental) and how their input was incorporated into the GSP. Utilize DWR's tribal engagement guidance to comprehensively identify, involve, and address all tribes and tribal interests that may be present in the subbasin.	The Chapter 3 appendices initially listed in draft Chapter 3 are provided in full in the Final GSP. All stakeholders who use Turlock Subbasin groundwater are considered environmental stakeholders. Direct engagement with DACs was so important to Turlock Subbasin GSAs that the only in-person meeting conducted during the COVID pandemic was a community meeting held Dec. 1, 2021 in Delhi to inform Delhi community members of the GSP development process, provide resources, and solicit their thoughts and concerns related to the sustainable management of groundwater. The two Turlock Subbasin Technical Advisory Committees consisted of representatives from GSA membership rather than members of the public. To that effect, the TACs included public servants employed by Stanislaus County and Merced County, as well public servants employed by individual water agencies that provide domestic water to many DACs. Attachment B of Comment Letter 10 is noted and also is referenced as a resource in Draft Chapter 3. Tribal engagement is clearly outlined in Section 3.1.2 and in several appendices, including a Tribal Contact Report and Tribal Call Log.
40	10	NGO Coalition	Chapter 6 (also Section 2.3.2.4)	Consideration of beneficial uses and users when establishing sustainable management criteria (SMC) is insufficient. The consideration of potential impacts on all beneficial users of groundwater in the basin are required when defining undesirable results and establishing minimum thresholds.	The comment refers to the lack of quantitative data on the impact to current domestic wells. The text in Section 2.3.2.4 quantifies the number of failed domestic wells during the 2015 drought of record (165 wells) and the number of replacement wells drilled to deeper depths in those same areas (483 wells). It is not known how many, if any, of the 165 failed wells remain in service, but water levels are lower in many areas suggesting that the wells would have remained unusable over a long period of time. Given that the water level MTs are set at 2015 levels, those same 165 wells would indicate failure again with the analysis. Without a better understanding as to the status and location of active domestic wells, any quantitative analysis would be inaccurate and incomplete. The GSAs have committed to a Domestic Well Mitigation Program (Section 8.4.3) to fill this data gap.
41	10	NGO Coalition	Chapters 2, 6, & 8	For chronic lowering of groundwater levels, the GSP provides discussion of the impact on water supply wells, including domestic wells, from the recent drought. Minimum thresholds are set to the low groundwater elevation observed in Fall 2015 at each representative monitoring site in each principal aquifer. The GSP justifies this in part with the following statement (p. 6-15): "The large number of deeper domestic wells drilled since 2015 can be reasonably assumed to accommodate 2015 water levels, with some tolerance for future droughts." However, despite the discussion of impacts to domestic wells during the previous drought, no quantitative data is provided on the impact to current domestic wells, including those that may not have been recently replaced. The GSP does not sufficiently describe whether minimum thresholds will avoid significant and unreasonable loss of drinking water to domestic well users. In addition, the GSP does not sufficiently describe or analyze direct or indirect impacts on DACs or drinking water users when defining undesirable results, nor does it describe how the groundwater level minimum thresholds are consistent with the Human Right to Water policy and will avoid significant and unreasonable impacts on these beneficial users. The GSP is failing to manage the subbasin in such a way that strives to minimize significant adverse impacts to beneficial users, which are often felt greatest in below-average, dry, and drought years. Furthermore, the requirement that one-third of monitoring wells exceed the minimum threshold before triggering an undesirable result means that areas with high concentrations of domestic wells may experience impacts significantly greater than the established minimum threshold because the one-third threshold isn't triggered. The minimum thresholds for degraded water quality for each of the identified key water quality constituents are based on their MCLs. According to the state's anti-degradation policy high water quality should be protected and is only allowed to worsen to the MCL if a finding is made that it is in the best interest of the people of the State of California. No analysis has been done and no such finding has been made. The GSP only includes a very general discussion of impacts on drinking water users when defining undesirable results and evaluating the impacts of proposed minimum thresholds for degraded water quality. The GSP does not, however, mention or discuss direct and indirect impacts on DACs when defining undesirable results for degraded water quality, nor does it evaluate the cumulative or indirect impacts of proposed minimum thresholds on these stakeholders.	The discussion of the domestic well analysis is based on logic and reasonableness while recognizing data gaps that prevent an accurate quantitative analysis (Section 2.3.2.4). (The data gap is filled by the Domestic Well Mitigation Program Management Action in Section 8.4.3). Domestic wells that did not fail during the 2015 drought conditions or in the following dry years (3 out of 4 years) are not expected to fail due to declining water levels with MTs set at 2015 levels. If new wells were installed during low water level conditions that have persisted since 2015, then those wells would be constructed for those conditions and also not be expected to fail under 2015 MTs. If all failed wells were not replaced, then those wells would likely fail again under 2015 MTs. Although the former assumption that failed wells were replaced is reasonable, the number of remaining failed wells cannot be quantified. At a minimum, the setting of chronic lowering of water level MTs at 2015 levels likely protects new wells and older wells that did not fail previously. The MTs protect these domestic wells by arresting chronic declines in other portions of the Subbasin that have lowered water levels in concentrated areas of domestic wells. See Section 6.3.1 for a more complete explanation. In addition, the Domestic Well Mitigation Program Management Action (Section 8.4.3) is planned to take effect in an escalating manner, beginning before MTs are violated. Program details will be developed in the inital two years of GSP implementation. The basis for undesirable results being triggered by one-third of the representative monitoring wells is based on areas in the Subbasin that are continuing to decline at relatively high rates now. Given the length of the Subbasin (more than 35 miles), water level declines take time to propagate to western areas with large numbers of relatively shallow domestic wells. During the drought of record, water levels in areas of shallow domestic wells only declined about 20 feet overall over a period of three dry years while water level declines exceeded 40 feet in the eastern Subbasin. The MOs are set to prevent increases over maximum historical concentrations and any increase in the concentrations of constituents of concern will be analyzed for impacts from GSA management activities. It is also noted that the constituents of concern have already exceeded the respective MCLs over widespread portions of the Subbasin. These constituents were determined to have the largest impact on water quality. Given the widespread nature of the DAC areas (see Figure 3-1), the analysis of drinking water users and DACs have significant overlap. MTs were developed to avoid impacts on these stakeholders.

Ref #	Ltr #	Author	Location in GSP	Comment	Response
42	10	NGO Coalition	Section 6.1	Chronic Lowering of Groundwater Levels Describe direct and indirect impacts on drinking water users and DACs when describing undesirable results and defining minimum thresholds for chronic lowering of groundwater levels. Include information on the impacts during prolonged periods of below average water years. Consider and evaluate the impacts of selected minimum thresholds and measurable objectives on drinking water users and DACs within the subbasin. Further describe the impact of passing the minimum threshold for these users. For example, provide the number of domestic wells that would be fully or partially de-watered at the minimum threshold. Consider minimum threshold exceedances during single dry years when defining the groundwater level undesirable result across the subbasin.	Causes of undesirable results and potential effects on beneficial uses are included in Sections 6.3.1.1 and 6.3.1.2. In the latter section, the text recognizes that continued lowering of water levels "can jeopardize the ability to secure a reliable drinking water supply... and affects beneficial uses of groundwater from wells including municipal, domestic, industrial, and agricultural water supply." Given that most drinking water users in the Turlock Subbasin are located within DAC areas (DACs, SDACs, EDAs) (see Figure 3-1), impacts to drinking water users and DACs are considered the same. As indicated in the response above, data gaps prevent an accurate assessment of domestic wells that could fail with water levels hitting the 2015 levels again (recognizing that many areas of the Subbasin are lower than that now). It is noted that the undesirable result definition doesn't limit the exceedance to dry years. MT exceedances in any 3 consecutive Fall measurements would be indicative of a long-term decline rather than a short term lowering of water levels. Using historical data as an indicator, Fall declines over three years led to undesirable results previously and are used to trigger undesirable results in the future.
43	10	NGO Coalition	Section 6.6	Degraded Water Quality Describe direct and indirect impacts on drinking water users and DACs when defining undesirable results for degraded water quality. For specific guidance on how to consider these users, refer to "Guide to Protecting Water Quality Under the Sustainable Groundwater Management Act." Evaluate the cumulative or indirect impacts of proposed minimum thresholds for degraded water quality on drinking water users and DACs.	Causes of undesirable results and potential effects of degraded water quality on beneficial uses are included in Sections 6.6.1.1 and 6.6.1.2. In the latter section, the text recognizes that five constituents in drinking water have primary MCLs that are associated with heath concerns such as toxicity or carcinogens. Accordingly, elevated concentrations of these constituents above the MCL (set as the MTs) can cause deleterious health effects and impact access to a safe drinking water supply. Given that most drinking water users in the Turlock Subbasin are located within DAC areas (DACs, SDACs, EDAs) (see Figure 3-1), impacts to drinking water users and DACs are considered the same.
44	10	NGO Coalition	Chapter 6	Sustainable management criteria for chronic lowering of groundwater levels provided in the GSP do not consider potential impacts to environmental beneficial users. Since GDEs are present in the subbasin, they must be considered when developing SMC for chronic lowering of groundwater levels. The GSP neither describes nor analyzes direct or indirect impacts on environmental users of groundwater when defining undesirable results. This is problematic because without identifying potential impacts on GDEs, minimum thresholds may compromise, or even destroy, these environmental beneficial users. The GSP justifies the consideration of impacts to GDEs for only the depletion of interconnected surface water sustainability indicator by stating that GDEs are primarily located near surface water features. However, Figure 4-62 (Vegetation Commonly Associated with Groundwater and Wetlands) shows GDEs in areas of the subbasin that are non-adjacent to surface water. Sustainable management criteria for depletion of interconnected surface water are established by proxy using groundwater levels. For the Tuolumne and San Joaquin Rivers, the minimum threshold is the low groundwater elevation observed in Fall 2015 at each representative monitoring site. For the Merced River, the minimum threshold is the groundwater elevation observed in Spring 2014 at each representative monitoring site. The GSP notes that the minimum thresholds along the Merced River are set at the slightly higher Spring 2014 groundwater elevations to maintain interconnectedness along the river and reduce the potential for future streamflow depletion. Undesirable results are established as follows (p. 6-62): "An undesirable result will occur on one of the three monitored rivers when 50% of the representative monitoring sites for that river exceed the MT in two consecutive Fall monitoring events." However, if minimum thresholds are set to drought-level low groundwater levels (for the Tuolumne and San Joaquin Rivers) and the subbasin is allowed to operate at or close to those levels over many years, there is a risk of causing catastrophic damage to ecosystems that are more adverse than what was occurring at the height of the 2012-2016 drought. This is because California ecosystems, which are adapted to our Mediterranean climate, have some drought strategies that they can utilize to deal with short-term water stress. However, if the drought conditions are prolonged, the ecosystem can collapse. No analysis or discussion is presented to describe how the SMC will affect beneficial users, and more specifically GDEs, or the impact of these minimum thresholds on GDEs in the subbasin. Furthermore, the GSP makes no attempt to evaluate how the proposed minimum thresholds and measurable objectives avoid significant and unreasonable effects on surface water beneficial users in the subbasin (see Attachment C for a list of environmental users in the subbasin), such as increased mortality and inability to perform key life processes (e.g., reproduction, migration).	Chronic lowering of water levels focuses on impacts to wells but recognizes potential adverse impacts to GDEs (see the last paragraph of Section 6.3.1). In the section on potential effects on beneficial uses, the text states that "chronic lowering of groundwater levels can also adversely impact environmental uses of groundwater including GDEs. Given that GDEs in the Turlock Subbasin are primarily located along the rivers, GDE impacts are also affected by the interconnected surface water indicator. Accordingly MTs for the river boundaries are set equal to or more protective than chronic lowering of water levels to protect against undesirable results and adverse impacts to GDEs. Although the comment refers to potential GDEs that are inland to the Subbasin, that figure refers to potential GDEs before initial screening of depth to water. Almost all of the inland potential GDE polygons were found to be in areas with depth to water greater than 30 feet. By setting the MTs at 2014-2015 levels, a floor is established that prevents water levels from significant declines. The setting of these MTs do not mean that water levels will be kept at drought conditions as indicated by the comment; it means that the drought levels will not be significantly lowered in the future. The comment indicates that the MTs are responsible for prolonging drought conditions. This is not the case. Water levels will rise and fall with changes in hydrology but will be prevented from falling significantly below the MTs. If a second Fall measurement falls below the MT - regardless of whether the intervening spring measurement recovers), undesirable results can be triggered. Potential effects on beneficial uses are noted in Section 6.8.1.2. As stated, future projected increases in streamflow depletion would have negative impacts on environmental beneficial uses. Riparian habitat and GDEs would be negatively affected. If the rivers became disconnected, GDEs would lose their water supply and other downstream beneficial uses reliant on flow requirements could also be adversely impacted. As provided by SGMA, GSAs are not required to correct undesirable results that occurred before January 1, 2015; rather the GSAs intend to protect against future droughts becoming worse than the one recently experienced.

Ref #	Ltr #	Author	Location in GSP	Comment	Response
45	10	NGO Coalition	Sections 6.1 and 6.8	When establishing SMC for the subbasin, consider that the SGMA statute [Water Code 10727.4(l)] specifically calls out that GSPs shall include "impacts on groundwater § dependent ecosystems." When defining undesirable results for chronic lowering of groundwater levels, provide specifics on what biological responses (e.g., extent of habitat, growth, recruitment rates) would best characterize a significant and unreasonable impact to GDEs. Undesirable results to environmental users occur when 'significant and unreasonable effects on beneficial users are caused by one of the sustainability indicators (i.e., chronic lowering of groundwater levels, degraded water quality, or depletion of interconnected surface water). Thus, potential impacts on environmental beneficial uses and users need to be considered when defining undesirable results in the subbasin. Defining undesirable results is the crucial first step Defining undesirable results is the crucial first step before the minimum thresholds can be determined. When defining undesirable results for depletion of interconnected surface water, include a description of potential impacts on instream habitats within ISWs when minimum thresholds in the subbasin are reached . The GSP should confirm that minimum thresholds for ISWs avoid adverse impacts on environmental beneficial users of interconnected surface waters as these environmental users could be left unprotected by the GSP. These recommendations apply especially to environmental beneficial users that are already protected under pre-existing state or federal law.	Impacts on surface water habitat are considered when downstream flow requirements are set on the river boundaries including the Tuolumne and Merced rivers. Turlock ID and Merced ID are meeting these flow requirements and will continue to do so in the future. By preventing significant increase in streamflow depletions, continued compliance will be protective of environmental uses that were considered in setting downstream flow requirements.
46	10	NGO Coalition	Chapter 5 Climate change; water budgets	The integration of climate change into the projected water budget is insufficient. The GSP incorporates climate change into the projected water budget using DWR change factors for 2070. However, the GSP does not indicate whether multiple climate scenarios (e.g., the 2070 extremely wet and extremely dry climate scenarios) were considered in the projected water budget. The GSP would benefit from clearly and transparently incorporating the extremely wet and dry scenarios provided by DWR into projected water budgets or select more appropriate extreme scenarios for the subbasin. While these extreme scenarios may have a lower likelihood of occurring and their consideration is not required (only suggested) by DWR, their consequences could be significant and their inclusion can help identify important vulnerabilities in the subbasin's approach to groundwater management. The GSP integrates climate change into key inputs (e.g., changes in precipitation, evapotranspiration, and surface water flow) of the projected water budget. However, the sustainable yield is based on the projected baseline water budget, instead of the projected water budget with climate change incorporated. If the water budgets are incomplete, including the omission of extremely wet and dry scenarios and the omission of climate change projections in the sustainable yield calculations, then there is increased uncertainty in virtually every subsequent calculation used to plan for projects, derive measurable objectives, and set minimum thresholds. Plans that do not adequately include climate change projections may underestimate future impacts on vulnerable beneficial users of groundwater such as ecosystems, DACs, and domestic well owners.	The GSP intends to provide the most realistic projected conditions scenario that supports sustainable groundwater management including effects of implementation of projects and management actions. To that end, all efforts are made to minimize the uncertainties in the projected conditions with respect to data including the hydrologic, hydrogeologic, land and water use operations, as well as climate change. Therefore, the climate change scenario analysis used in the GSP reflects the most likely scenario, based on the DWR analysis, i.e., the 2070 central tendency. Although extreme dry and wet climate scenarios are also presented by DWR, the GSP adopted the most likely scenario to evaluate the range of impacts on the water budget components. The sustainable yield analysis involves evaluation of the state of the Subbasin under current and projected conditions within the GSP implementation planning horizon. The analysis is intended to develop a yield that is solid and robust enough (with minimum uncertainties) that the GSAs can plan for projects and management actions that can be implemented. This includes definition, design, estimation of capacity and yield, sources of water, and economics and financing of projects. The evolving approaches involved in the climate change analysis introduce significant uncertainties, which does not lend itself to appropriate engineering design of projects at the final round of GSP development stage. However, the GSAs will perform additional analysis of impacts of climate change on projects over time, and as the projects are defined and designed in more detail during the implementation phase of the GSP.
47	10	NGO Coalition	Chapter 5 Climate change; water budgets	Integrate climate change, including extreme climate scenarios, into all elements of the projected water budget to form the basis for development of sustainable management criteria and projects and management actions. Calculate sustainable yield based on the projected water budget with climate change incorporated. Incorporate climate change scenarios into projects and management actions.	The GSP has included the most likely climate change scenario, per DWR (2070 central tendency), in the analysis of all components of the water budget. The GSP, however, intends to minimize the uncertainties on estimation of the sustainable yield and definition and sizing of the projects and management actions to have a better control on the size, water source, and economics and financing of the projects considered. Due to evolving approaches on climate change analysis, and significant uncertainties involved with various climate change scenarios, the GSP has elected to consider climate change impacts during the implementation stage of the projects.
48	10	NGO Coalition	Chapters 7 & 9	The consideration of beneficial users when establishing monitoring networks is insufficient, due to lack of specific plans to increase the Representative Monitoring Sites (RMSs) in the monitoring network that represent shallow groundwater elevations around DACs and domestic wells in the subbasin. These beneficial users may remain unprotected by the GSP without adequate monitoring and identification of data gaps in the shallow aquifer. While we note that the plan states (p. 7-11): "Data gaps in the monitoring network will be addressed with a Management Action to improve future GSP monitoring," this Management Action was not included in the Draft GSP. The Plan therefore fails to meet SGMA's requirements for the monitoring network. Figure 7-4 (Water Quality Monitoring Sites) shows sufficient representation of DACs and drinking water users for the water quality monitoring network. Maps of shallow and deep wells within the subbasin (Figures 7-1 to 7-3) show insufficient spatial representation of DACs and drinking water users for the groundwater elevations monitoring network, particularly in areas with the highest density of drinking water wells. Refer to Attachment E for maps of these monitoring sites in relation to key beneficial users of groundwater. Note that we were only able to map groundwater elevation RMSs with information provided in the Draft GSP.	The text in Chapter 7 inadvertently mischaracterized the GSAs' commitment to monitoring network improvements as a Management Action. Rather, this commitment is listed in the GSP as an Implementation Support Activity (ISA2) and described in Chapter 9 (see Section 9.2). The GSAs have already made substantial commitments to improving the current monitoring network. The network wells funded by the Round 3 SGMP grant (Proposition 68) are currently being permitted for installation in 2022. Additional wells funded by the DWR TSS grant program are also scheduled for installation beginning in 2022. Finally, as described in Section 9.2, funding has been included in the WTSGSA budget over two fiscal cycles (2021-2022 and 2022-2023) for additional new monitoring wells are planned to fill additional data gaps.

Ref #	Ltr #	Author	Location in GSP	Comment	Response
49	10	NGO Coalition	Chapters 2, 3, and 4: Chapter 9	Provide maps that overlay current and proposed monitoring well locations with the locations of DACs, domestic wells, and GDEs to clearly identify monitored areas. Increase the number of RMSs in the shallow aquifer across the subbasin as needed to map ISWs and adequately monitor all groundwater condition indicators across the subbasin and at appropriate depths for all beneficial users. Prioritize proximity to DACs, domestic wells, GDEs, and ISWs when identifying new RMSs. Ensure groundwater elevation and water quality RMSs are monitoring groundwater conditions spatially and at the correct depth for all beneficial users - especially DACs, domestic wells, and GDEs. Describe biological monitoring that can be used to assess the potential for significant and unreasonable impacts to GDEs or ISWs due to groundwater conditions in the subbasin.	Given the widespread coverage of DAC areas (DACs, SDACs, EDAs), it is relatively straightforward to compare the areas highlighted in Figure 3-1 with maps of monitoring network wells in Chapter 7, maps of domestic wells on Figures 2-13 and 2-15, and a map of potential GDEs on Figure 4-66. Additional monitoring wells are already planned for interconnected surface water, which will also monitor potential GDEs in the Subbasin. Wells are also planned for other identified data gaps as indicated in Section 9.2. Additional wells have also been prioritized for areas of DACs and domestic wells as indicated in Section 9.2. Significant monitoring and other efforts for habitat protection are already being conducted by surface water rights holders along the river boundaries as part of the FERC relicensing process. Turlock Irrigation District (TID) has set aside $132 million for habitat restoration, monitoring and research on the Tuolumne River. Significant habitat restoration efforts are also being pursued by Merced ID, including a recently completed *Merced River Instream and Off Channel Habitat Restoration Project,* with funding from Merced ID, U.S. Bureau of Reclamation, U.S. Fish and Wildlife Service, and California Department of Fish and Wildlife. This project consists of enhancements of salmonid spawning habitat, seasonably inundated juvenile rearing habitat and13 acres of the Merced River channel. Numerous other efforts, working with a variety of partners including agricultural diverters, have been undertaken or are in progress (http://mercedid.org/index.cfm/about/environment/merced-river-instream-and-off-channel-habitat-restoration-project/). Although these efforts are not part of the GSP, both TID and Merced ID are member agencies of the GSAs and provide collaboration and coordination with GSAs on these important environmental issues. Collectively, these efforts, along with the GSA current monitoring program (including improvements over time as described in Section 9.2) provide additional protection for both GDEs and ISW. Any needed additional monitoring specific to GDEs can be considered in the future. Improvements to the GSP monitoring networks will be ongoing over time.
50	10	NGO Coalition	Chapters 8 & 9	The consideration of beneficial users when developing projects and management actions is incomplete. The GSP identifies benefits and impacts of identified projects and management actions to beneficial users of groundwater. However, while the GSP describes multiple recharge projects (e.g., Dianne Storm Basin, Stanislaus State Stormwater Recharge, and the Mustang Creek Flood Control Project), it fails to describe the explicit environmental benefits for these or other projects and management actions within the subbasin. Therefore, potential project and management actions may not protect environmental beneficial users. Groundwater sustainability under SGMA is defined not just by sustainable yield, but by the avoidance of undesirable results for all beneficial users. We note that the GSP includes a domestic well mitigation program (Section 8.4.3) to monitor and protect drinking water wells. We recommend that the GSP provide an explicit timeline for planned implementation of the domestic well mitigation program.	GSP projects were developed, where possible, to be aligned with the Governor's Water Action Plan by providing multiple benefits, including benefits to disadvantaged communities and environmental water users. The Turlock Subbasin GSP prioritizes projects that meet multiple needs and focus on natural infrastructure, including the basin itself for storage and the natural waterways and floodplains as recharge areas (see Section 8.1). Group 3 projects under consideration by ETSGSA (Section 8.3) include opportunities for recharge along natural watercourses such as Dry Creek and Mustang Creek. Potential opportunities to provide habitat and other environmental benefits will be considered during the design and environmental review of these projects. In addition, potential environmental sensitivities and impacts associated with these projects will be addressed during the CEQA review process, which includes the ongoing PEIR that is being prepared for implementation of projects and management actions under the GSP. In addition, the Regional Surface Water Supply Project (in-lieu groundwater recharge project - see section 8.2.1.1), led by the Stanislaus Regional Water Authority (SRWA), has significant environmental benefits. For that project, treated surface water would be provided to cities to reduce groundwater pumping, including in DAC areas and areas of domestic wells. An additional project objective is to benefit Tuolumne River fish and other aquatic resources by increasing seasonal releases from La Grange Dam. This would allow water that would otherwise be diverted at the dam to remain in the river an additional 26 miles, thereby increasing flows through salmon spawning areas, and providing benefits to water temperature. This is a Group 1 GSP project with implementation in progress. The GSP has been updated to include these environmental benefits. The explicit timeline for planned implementation of the Domestic Well Mitigation Program is provided on the schedule for GSP implementation support activities in Table 9-2.
51	10	NGO Coalition	Chapter 8 - Projects/MAs	Describe the projected timeline for implementation of the domestic well mitigation program in Chapter 8 of the GSP. Recharge ponds, reservoirs, and facilities for managed aquifer recharge can be designed as multiple-benefit projects to include elements that act functionally as wetlands and provide a benefit for wildlife and aquatic species. For guidance on how to integrate multi-benefit recharge projects into your GSP, refer to the "Multi-Benefit Recharge Project Methodology Guidance Document. Develop management actions that incorporate climate and water delivery uncertainties to address future water demand and prevent future undesirable results.	As indicated in the response above and shown in Table 9-2, the Domestic Well Mitigation Program will be developed over the first two years of GSP implementation, which will involve identification of program details and funding, as needed. In addition, the program description provides a general assessment of impacts to domestic wells. GSP projects were developed, where possible, to be aligned with the Governor's Water Action Plan by providing multiple benefits, including benefits to disadvantaged communities and environmental water users. The Turlock Subbasin GSP prioritizes projects that meet multiple needs and focus on natural infrastructure, including the basin itself for storage and the natural waterways and floodplains as recharge areas (see Section 8.1). As one example, the recharge project in the Dry Creek watershed would use natural channels for recharge, improving in-stream riparian habitat and providing benefits to interconnected surface water, among other benefits (Section 8.3). Group 3 projects provide backup to the project identified for initial implementation and will be implemented over time as needed to provide a backstop for climate and water delivery uncertainties.

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52	11	Rhett Calkins, PE	Chapters 2 & 8	Minimum thresholds set at 2015 levels are too low in the north east quadrant of TID's service territory. In the West GSA, it is this area that has seen by far the greatest groundwater decline. If minimum thresholds stay set at 2015 levels then Ag pumping will interfere with domestic wells in dry years. Minimum thresholds don't mean levels cannot go lower. Intermediate thresholds and multiple exceedances in more than one measuring location allow water levels below minimum thresholds before action is taken. As we have seen in the last drought, domestic wells go dry before Agriculture makes any kind of adjustment. Owners of domestic wells have little representation in the GSAs. The GSAs need more representation from the domestic well owners, particularly in the north east of the West GSA where water levels continue to drop. The GSP should not set a permanent gradient of levels so that water will always flow to the east toward the cone of depression created by unsustainable pumping. Setting minimum thresholds at 2015 levels establishes a gradient and a strong underground flow of water to the east. All projects, past, present, and future in the West GSA to support the basin are, and will be sending water east. This flow supported by the gradient could establish a right to water by the East GSA.	As documented in the GSP (Sections 2.3.2.4 and 8.4.3), about four percent of the domestic wells in the Subbasin failed during the 2015 drought. Since that time, 483 new and deeper domestic wells have been drilled in the areas of previously failed well areas. In the area of the commentor's well, water levels have not recovered and new wells were installed with water levels near MTs. According to the Stanislaus County and the DWR website for reporting domestic well problems, no new well failures related to water levels have been reported. These data indicate that the domestic well failures from 2015 have at least been partially mitigated. As indicated by the comment letter, the domestic well water levels are lowered significantly when a high capacity pump is operating in a well within a few hundred feet of the commentor's well. This indicates that the impacts to this domestic well result from nearby well interference rather than overall declines in the aquifer. The GSP contains a management action for the ongoing protection of domestic wells. Development of the Domestic Well Mitigation program (Section 8.4.3) details will occur over the first two years of GSP implementation as indicated in Section 9 and will identify issues and options for addressing future domestic well impacts. With regards to the comment on permanent hydraulic gradients, MTs are based on a previously existing water level surface, which appears to be able to support sustainable management. Water budgets, including subsurface flows, and compliance with MTs will be evaluated in Annual Reports. Sustainable management criteria will be re-evaluated in the five-year GSP assessment, and can be adjusted, if needed. In addition, the GSAs have committed to an accounting of water (Section 9.3). Finally, it hasn't been demonstrated that all projects in the WTSGSA will be "sending water east." Projects will be implemented by each GSA to support sustainable groundwater management in ehtier respective durisdictions and to meet the sustainability goals of the Subbasin.
53	11	Rhett Calkins, PE	Chapters 8 & 9	Projects such as the regional surface water supply project for the cities of Ceres and Turlock were long fought battles to be implemented, planned, and paid for. As one who once paid those bills, I don't think that the East GSA has any claim to that water that will contribute to the support of the Subbasin.	Most of the benefits for the Stanislaus Regional Surface Water Project will occur in the western Subbasin where municipal pumping will be reduced. This reduction will allow local water levels to rise, benefiting many areas of previously-failed domestic wells.As described in Chapters 8 and 9, a water allocation management action may be developed in the future.
54	11	Rhett Calkins, PE	Section 9.3	It has been suggested that an additional 2 years is to be planned in the GSP for settling the dispute of water accounting between the West GSA and East GSA within the Turlock Subbasin. Details why it did not happen yet, or how it will occur now, are not known. This has not been discussed in public. It needs to be openly discussed so that the public can participate in the debate and can know what is happening. Management actions and projects have to be different for land without access to imported surface water. Until the accounting is settled the entire basin is without clear direction or incentive to change course from what is already occurring. We continue to diverge from sustainability. I can not see how we (two GSA's with divergent views) move forward without an agreement on accounting within the subbasin. The GSP is missing an important component for the Turlock Subbasin without the internal subbasin accounting.	As documented in GSP Section 9.3, the GSAs will coordinate on an accounting mechanism of water supply in the Subbasin during the first two years of GSP implementation. This implementation support activity includes a timeline for a Groundwater Accounting Structure including GSA review and approval as the process develops. The process will be discussed with the GSAs in future public meetings, allowing for stakeholder input.
55	11	Rhett Calkins, PE	Chapter 9	Who represents me? I would like to know what accounts for 39 feet of water decline and who ended up with the water. I would like to be a participant in the debate on water accounting within the subbasin.	As mentioned above, the Domestic Well Mitigation Program and the process for water accounting will be developed and discussed with the Joint TAC and GSAs in public meetings. The commentor will be welcome to participate as a valued stakeholder in the Subbasin.
56	12	TRT/CSPA	Cpt 8	We support Scenario 5 (the Sustainable Scenario) which incorporates both groundwater projects and management actions, including demand reduction.	Comment noted.
57	12	TRT/CSPA	Chaptesr 6 & 8	We encourage the Turlock Subbasin GSAs to aim to exceed baseline conditions established on January 1, 2015, which was several years into an extended drought that led to overreliance on groundwater and depleted groundwater reserves. Accordingly, we believe the GSP would benefit from including more details on the Group 3 Projects.	Using 2015 conditions as the MTs for many of the sustainability indicators sets a "floor" and provides a reasonable approach to immediately arresting ongoing water level declines and avoiding undesirable results associated with those declines. Setting MTs at the 2015 drought levels does not mean that the groundwater basin will be maintained at these drought levels. Measurable objectives are set higher than these levels in all representative monitoring wells and water levels will continue to fluctuate above the MTs across the Subbasin. As discussed in Section 8.3 of the GSP, the Group 3 projects are in preliminary planning stages and details will be made available as project development continues. GSAs will prioritize the further definition and development of Group 3 projects in areas where the potential for undesirable results is the greatest.
58	12	TRT/CSPA	Chapter 8 - Projects/MAs	To help fund a more ambitious plan, we propose that the Turlock Subbasin GSAs engage with the San Francisco Public Utilities Commission (SFPUC) to explore opportunities for collaboration on infrastructure improvements, water use efficiency, and groundwater banking. We believe the SFPUC would be very interested in helping to fund projects in the Turlock Subbasin in exchange for water credits or a water insurance policy to be used in the case of drought. The SFPUC uses an extremely conservative drought planning scenario that couples the drought of record (1987-92) with the driest two-year period on record (1976/77) to create a manufactured 8.5-year design drought. This is in spite of the fact that the SFPUC's recent Long-Term Vulnerability Assessment suggests that the likelihood of occurrence of the design drought is extremely low.	The GSAs appreciate the information and comments, and will continue to explore opportunities for recharge to augment the current GSP water supply projects in development. The GSAs have identified and prioritized recharge projects for GSP implementation, all involving conjunctive use of surface water and groundwater (Section 8.2). As noted in Table 8-1, ten of the eleven GSP projects selected for early implementation involve either in-lieu or direct recharge as the primary mechanism to supplement current groundwater supplies. Additional recharge projects have been identified for further planning and evaluation (see Table 8-2).

Ref #	Ltr #	Author	Location in GSP	Comment	Response
59	12	TRT/CSPA	Chapter 8	The SFPUC could help fund the in-lieu and direct groundwater recharge projects identified in the GSP. To incentivize the SFPUC's participation in groundwater recharge projects, a groundwater water bank could be established to operate in a similar fashion to the Don Pedro Water Bank. The SFPUC would essentially pre-pay water for use by parties in the Turlock Subbasin (especially in dry years), and be allowed to redeem banked credits at Hetch Hetchy by diverting additional water there during droughts. Similar to the Don Pedro Water Bank, no water from the Turlock Subbasin would be directly transported to the San Francisco Bay Area. Water users in the Turlock Subbasin would instead rely on groundwater already banked by the SFPUC, while the SFPUC could divert a defined amount of water at Hetch Hetchy above its normal allocation as a junior diverter.	The GSAs could explore a more formal groundwater banking program with outside project partners in the future if technical issues and operational details are shown to support the sustainable management criteria in the Subbasin.
60	12	TRT/CSPA	Chapter 5	The potential for water use efficiency in the Turlock Subbasin is tremendous. For example, after the South San Joaquin Irrigation District (SSJID) initiated a pilot project to automate and pressurize an irrigation system, water and energy use decreased by 30% and crop yield increased by 30%. However, funding is needed to improve on-farm infrastructure to achieve greater water use efficiency, and could be secured through an agreement with the SFPUC. Furthermore, the Turlock Subbasin GSP identifies the City of Modesto's Advanced Metering Infrastructure (AMI) Project. We would like to see similar projects adopted by the Cities of Turlock and Ceres. Turlock is projected to receive 20 thousand acre feet from the Regional Surface Water Supply Project. With a population of 73,000, this suggests gross per capita demand of 245 gallons per day, well above the state average. Similarly, Ceres, with a population of 48,000 and a demand of 10 thousand acre feet, appears to have a gross per capita demand of 185 gallons per day, again quite high. AMI programs would go a long way to promoting water use efficiency.	The Sustainability Goal for the Turlock Subbasin contains a specific commitment to supporting efficient water use and water conservation. Member agencies and stakeholders have already made great strides toward water use efficiency and will continue to explore opportunities for increased efficiency in the future. For example, growers across the Turlock Subbasin have made significant improvements in irrigation efficiency over time; the projected water budgets incorporated these improvements in irrigation efficiency into future projected Subbasin conditions on which the GSP was based (as noted in Section 5.1.3.3). Recent achievements in urban water efficiency have also been realized by GSA member agencies in the Subbasin. With regards to the estimates for per capita demand included in the comment at left, the simple calculation using average estimates of future project water is not sufficient to evaluate current water use efficiency. As required by SB X7-7, each urban water retailer has implemented conservation measures to reduce its daily per capita water use by 2020. As documented in their respective Urban Water Management Plans (UWMPs), both Turlock and Ceres met their target 2020 GPCD reductions (City of Turlock 2020 UWMP, May 2021; City of Ceres UWMP, August 2021). It is also noted that the higher per capita demand for the City of Turlock is due, in part, to a relatively large industrial water use sector, which uses more water on a per capita basis than residential customers.
61	12	TRT/CSPA	Chapter 8 - Projects/MAs	We support the following recommendation from the National Marine Fisheries Service (NMFS) that the Turlock Subbasin GSP explore the possibility of recharging groundwater through floodplain inundation: NMFS recommendation for future Projects and Management Actions: We suspect that groundwater recharge projects are likely to be an important action implemented as part of the effort to achieve groundwater sustainability in the Turlock subbasin. NMFS encourages the GSA to consider implementing recharge projects that facilitate floodplain inundation, offering multiple benefits including downstream flood attenuation, groundwater recharge, and ecosystem restoration. Managed floodplain inundation can recharge floodplain aquifers, which in turn slowly release stored water back to the stream during summer months. These projects also reconnect the stream channel with floodplain habitat, which can benefit juvenile salmon and steelhead by creating off-channel habitat characterized by slow water velocities, ample cover in the form of submerged vegetation, and high food availability. As an added bonus, these types of multi-benefit projects likely have more diverse grant funding streams that can lower their cost as compared to traditional off channel recharge projects. NMFS stands ready to work with any GSA interested in designing and implementing floodplain recharge projects.	As indicated in the response to NMFS comments above, GSP projects were developed, where possible, to be aligned with the Governor's Water Action Plan by providing multiple benefits, including benefits to disadvantaged communities and environmental water users. This Plan prioritizes projects that meet multiple needs and focus on natural infrastructure, including the basin itself for storage and the natural waterways and floodplains as recharge areas. (see Section 8.1 in the GSP). As an example, one project in the Dry Creek watershed would use natural channels for recharge, improving in-stream riparian habitat and providing benefits to interconnected surface water, among other benefits (Section 8.3).
62	13	Leadership Counsel for Justice & Accountability (3)	Chapter 2	In Chapter 2, include specific information regarding all past and current drinking water quality exceedances experienced by domestic well users, small community water systems, state small water systems and disadvantaged communities within the subbasin, according to the best available information.	The groundwater quality analysis is described in Chapter 4 and focused on potential constituents of concern that have exceeded drinking water standards and also incorporated local knowledge for constituents of concern identified by public water suppliers. Most of the water quality datasets used in the analysis were from wells in disadvantaged or severely disadvantaged communities (DACs and SDACs) in the Subbasin (compare water quality data shown on Figure 4-36 with the map of DACs/SDACs on Figure 3-1).

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63	13	Leadership Counsel for Justice & Accountability (3)	Chapter 4	In Chapter 4, include an analysis of all contaminants proven to be harmful to human health. This list would include all primary and secondary drinking water contaminants, as well as hexavalent chromium and PFOs/PFAs.	There are more than 100 regulated constituents in California. Separate analyses do not have to be conducted for all such constituents to characterize Subbasin groundwater quality and support analysis of impacts from future GSA management activities. Based on upon the evaluation of water quality data in the subbasin, the GSAs selected six water quality constituents for which water quality data are widely available as indicators of potential water quality effects related to sustainable groundwater management. The constituents of concern have been most frequently detected above drinking water standards in widespread areas of the Subbasin. This provides a baseline of water quality conditions associated with the historic low water levels in the Subbasin. Those constituents have had the largest impact on recent Subbasin water supply. Monitoring and managing water quality using these sustainability indicators is an appropriate approach to the prevention of undesirable results related to water quality. With regards to hexavalent chromium: According to the SWRCB GAMA database, no water supply well in the Turlock Subbasin has exceeded the previous MCL of 10 ug/L. Currently, this constituent is being regulated under the total chromium MCL of 50 ug/L. With regards to the PFAS substances (including PFOA, PFOS, and others): Historical data for these substances are limited; only one well in the Turlock Subbasin has been sampled for PFOS or PFOA - the only two PFAS substances with notification levels. The SWRCB has recently initiated testing across the state with a focus on potential source areas. As indicated on the SWRCB website, "the assessment of this data ... is a prolonged undertaking and additional analyses will be conducted in the coming years." At this time, no drinking water standards have been developed. Public water suppliers analyze for regulated constituents as required by the SWRCB, the primary agency responsible for water quality. Those water suppliers are also GSA member agencies that provided information on local potential constituents of concern; those agencies will continue to provide information on any potential additional constituents of concern that may need to be added in the future.
64	13	Leadership Counsel for Justice & Accountability (3)	Chapter 2	Explain how the GSAs will ensure sustainable groundwater use despite local "right-to-farm" and "farmland mitigation" ordinances.	California's "right-to-farm" law generally protects typical farming practices from nuisance claims and local "farmland mitigation" ordinances allow for conservation of prime farmland through conservation commitments or other incentives. Compliance with either law would not conflict with sustainable groundwater use (Section 2.6.1). Further, County ordinances for well permitting and other land use activities support sustainable groundwater management (Section 2.6.2). SGMA requires land use agencies to coordinate with GSAs as part of future planning processes. As noted in the comment letter (and in Section 6.2.3 of the GSP), agencies responsible for land use in the Subbasin are also member agencies of the GSAs (i.e., cities and both counties in the Subbasin), providing ongoing coordination between SGMA and land use. Future policies for the coordination of land use and SGMA will evolve in the Subbasin over time.
65	13	Leadership Counsel for Justice & Accountability (3)	Chapter 2	Describe specific processes by which land use permitting and well permitting decisions will be evaluated for compliance with groundwater sustainability goals in the Subbasin.	The discussion on well permitting in Section 2.6.2 provides detailed information on groundwater ordinances for both Stanislaus and Merced counties and the nexus of those ordinance on the well permitting process. In brief those ordinances and well permitting requirements have similar objectives to the GSP and provide a cross-walk between wells and groundwater management by the GSAs. As indicated above, future policies for the coordination of land use, well permitting, and GSA management will evolve in the Subbasin over time.
66	13	Leadership Counsel for Justice & Accountability (3)	Chapter 5	Upload the C2VSimTM Model Development Technical Memo appendix to their website to allow for adequate public review and comment of the model and associated datasets and assumptions used to develop the water budgets for the Subbasin.	Datasets and assumptions used to develop the water budgets are summarized in Section 5.1.2. Documentation of the C2VSim-FG model, on which the Turlock Subbasin model is based, is available online (https://www.water.ca.gov/Library/Modeling-and-Analysis/Central-Valley-models-and-tools/C2VSim). The methodology for developing urban water demand, including in the unincorporated areas, is consistent with the regional model and is also described in Section 3.6 of Appendix D. Appendix D is included in the Final Draft GSP and available to the public prior to GSP adoption. After adoption, stakeholders will have an additional public review period during which to comment on the GSP.
67	13	Leadership Counsel for Justice & Accountability (3)	Chapter 5	Further detail the data and assumptions used to develop estimates of urban and rural groundwater pumping in the Subbasin and, to the extent possible, quantify groundwater demands from individual cities, small community water systems, and domestic well users and clearly report this information in the water budget tables and figures.	As documented in Section 5.1.4.1, urban water demand was incorporated from planning documents such as UWMPs. For areas without UWMPs, population of unincorporated areas and per capita water use were derived from values developed by DWR in the C2VSim model and held constant for projected baseline conditions. As noted in Section 2, water use values for domestic wells and small water systems comprise about 5 percent or less of the total groundwater use in the Subbasin.
68	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 - Sustainability Goal	We strongly recommend including an explicit mention of drinking water protection in the Subbasin Sustainability Goal.	The GSAs note that this is already incorporated into the current Turlock Subbasin Sustainability Goal, which is to ensure a reliable and sustainable groundwater supply that provides for beneficial uses. Clearly groundwater supply and beneficial uses include drinking water.

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69	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 - WLs SMC	Set a definition for undesirable results for water levels that is protective of drinking water users, and requires the GSA to take action well before widespread adverse effects take place.	As described in Section 6.3.1, the undesirable results definition is specifically developed for the protection of drinking water wells. Only one-third of the representative monitoring wells for each principal aquifer are allowed to fall below the MT in consecutive Fall events before the undesirable result is triggered. This means that only 7 wells in the Eastern Principal Aquifer - where the primary water level declines are occurring (Section 4.3.2 and 6.3.2.1) - are allowed to exceed the MT before triggering undesirable results. The three-year time period is consistent with the time period when consecutive Fall declines (WY 2013 - 2015) led to previous undesirable results. As explained in the text, three recent dry years since 2015 could have triggered undesirable result conditions in the Subbasin now, even though no additional domestic wells have reported failure.
70	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 - WLs SMC	Present a thorough, robust, and transparent analysis, supported by maps, that identifies: 1) which domestic wells are likely to be impacted at the minimum thresholds, 2) which domestic wells are likely to be impacted as water levels are allowed to drop below minimum thresholds before the undesirable results definition is met, 3) the location of the likely impacted wells with respect to DACs and other communities and systems dependent on groundwater, and 4) an estimate of the total population likely to be affected. This assessment should include multiple scenarios in which 33% or more RWMs exceed their minimum thresholds for three years, to appropriately represent conditions that may occur under the GSAs' definition of undesirable results. This analysis would allow the GSAs not only to evaluate the potential impacts, but to modify its sustainable management criteria to protect the Human Right to Water.	As explained in the domestic well analysis in Section 2.3.2.4, it is difficult to precisely determine how many wells are likely to be impacted at MTs levels because it is unknown how many previously failed wells during the 2015 drought are still active, if any. Given that the County reported that most failed wells were older and relatively shallow wells, it is assumed that most of those wells are out of service. With about 483 new and deeper domestic wells installed since 2015 (almost 3 times the number of previously failed wells), it is reasonable to conclude that almost all of the failed wells have been replaced. Given these conditions, it is reasonable to conclude that there will be fewer, if any, additional failed wells at MTs set at 2015 water levels, which are higher in some areas than current water levels. With water levels generally declining in the eastern Subbasin, exceedances of MTs are likely to occur there first. Water level declines in the concentrated areas of domestic wells were much smaller than in the eastern Subbasin. During the 2015 drought, water levels in western Subbasin near failed domestic wells declined only about 20 feet. Replacement wells were drilled during dry conditions with water levels at or near MTs in most areas. Therefore, properly installed replacement wells should be capable of managing these similar drought conditions in the future. The conservative "quick and dirty" analysis conducted by the commentor's own technical consultants included wells that have likely been replaced and already out of service. In addition, the analysis defined dewatering as water levels below the midpoint of the well screen interval; depending on the construction, these well conditions do not preclude production. Nonetheless, the GSAs are aware of the uncertainty in these analyses due to data gaps relating to domestic wells. Accordingly, the GSAs have committed to a Domestic Well Mitigation Program (Section 8.4.3) that will address the locations and construction of active domestic wells and track water level changes in concentrated areas of domestic wells to better understand potential future impacts.
71	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 - WLs SMC	Include a transparent analysis of the groundwater flow gradients expected to be present when the Subbasin reaches sustainability at measurable objectives and if groundwater levels are allowed to reach minimum thresholds.	The technical analysis suggests that the hydraulic gradients in the groundwater system have not been evaluated for MTs. This is not the case. Because MTs are set at 2015 water levels, the water level contour maps for 2015 conditions (Figures 4-30a, 4-30b, Appendix F) demonstrate that these gradients are not only reasonable but have already occurred throughout the Subbasin. In adidtion, groundwater gradients will change as projects and management actions are implemenated and Interim Milestones and Measurable Objectives are achieved.
72	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 - WLs SMC	Avoid disparate impact: Ensure that the measurable objectives and minimum thresholds for groundwater levels are established in such a way that prevents a disproportionately negative ("disparate") impact from occurring on communities of color in the GSP area. For example, the GSP should ensure that the minimum threshold methodology across the GSP area will not lead to disproportionately more wells going dry for residents of color than for white residents.	MTs and MOs are established with the same methodology throughout the entire Subbasin and are no higher or lower in the various communities across the Subbasin. Given that disadvantaged communities cover most of the Subbasin (including areas containing about 82 percent of the Subbasin population), consistently-determined sustainable management criteria are applied in an equitable manner.

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73	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 -WQ SMC	Because manganese and DBCP are present near or above MCLs and because they present a clear risk to use of groundwater for drinking water purposes, the GSAs should include these constituents in its monitoring program and establish measurable objectives and minimum thresholds for these constituents.	The constituents of concern have been most frequently detected above drinking water standards in widespread areas of the Subbasin, providing a baseline of water quality conditions associated with the historic low water levels in the Subbasin. Those constituents include both naturally-occurring and anthropogenic constituents and are sourced both point and non-point sources. They involve the most ubiquitous industrial-related and agricultural-related contaminants associated with the largest land uses in the Subbasin. The focus for degraded water quality has been on constituents with primary MCLs, but TDS is also included because of its known occurrence with depth in the Subbasin. These constituents cover a variety of groundwater conditions that could indicate potential impacts from GSA management activities including water levels and extractions. Monitoring and managing water quality using these sustainability indicators is an appropriate approach to the prevention of undesirable results related to water quality. Manganese does not have a primary MCL, which is the focus for the selection of MTs. In addition, as noted in Section 4.3.5.3.4, manganese analyses are sensitive to turbidity in groundwater samples, leading to inherent uncertainties as to the data. Turbidity values are generally unavailable to determine the vaility of concentrations in domestic wells. Accordingly, data would not be as effective in determining whether GSA management activities were causing increases in manganese concentrations. As noted in Section 4.3.5.3, the vertical and geogrphic distribution of DBCP data in the Subbasin does not appear to indicate a widespread problem. Although localized areas of DBCP MCL exceedances have been detected in urban areas near Hughson and Ceres, concentrations appear to have declining trends over time with recent concentrations being lower than historical concentrations. The six indicator constituents of concern include both nitrate and 1,2,3-TCP, which are also sourced in agricultural areas similar to DBCP, and are used to analyze the potential for GSA activities to impact groundwater quality. these indicator consituents would include a variety of additional constituents that may be present at lower concentratons and can be managed through actions to mitigate the indicators. In addition, the SWRCB has identified additional constituents of concern for testing in domestic wells, including DBCP (scheduled for monitoring in 2022). That program will be approved and regulated by the SWRCB, the agency with primary responsibility for groundwater quality. In accordance with the objectives of this program, an alternative source of drinking water will be provided to impacted domestic wells owners that quality financially for the Nitrate Control Program. In addition, results of this supplemental monitoring program will be reviewed in the GSP Annual Reports for potential future recommendations to incorporate one or more of these constituents into the GSP monitoring network.
74	14	Leadership Counsel for Justice & Accountability (3)	Chapter 6 -WQ SMC	Because manganese and DBCP are present near or above MCLs and because they present a clear risk to use of groundwater for drinking water purposes, the GSAs should include these constituents in its monitoring program and establish measurable objectives and minimum thresholds for these constituents.	Based on upon the evaluation of water quality data in the Subbasin, the GSAs selected six water quality constituents for which water quality data are widely available as indicators of potential water quality effects related to sustainable groundwater management. The constituents of concern have been most frequently detected above drinking water standards in widespread areas of the Subbasin. This provides a baseline of water quality conditions associated with the historic low water levels in the Subbasin. Those constituents have had the largest impact on recent Subbasin water supply and serve as indicator constituents for potential future impacts from GSA management activities. The six constituents of concern include both naturally-occurring and anthropogenic constituents and are sourced both point and non-point sources. They involve the most ubiquitous industrial-related and agricultural-related contaminants associated with the largest land uses in the Subbasin. Monitoring and managing water quality using these sustainability indicators is an appropriate approach to the prevention of undesirable results related to water quality. Manganese does not have a primary MCL, which is the focus for the selection of MTs. In addition, as noted in Section 4.3.5.3.4, manganese analyses are sensitive to turbidity in groundwater samples, leading to inherent uncertainties as to the data. Turbidity values are generally unavailable to determine the vaility of concentrations in domestic wells. Accordingly, data would not be as effective in determining whether GSA management activities were causing increases in manganese concentrations. As noted in Section 4.3.5.3, the vertical and geogrphic distribution of DBCP data in the Subbasin does not appear to indicate a widespread problem. Although localized areas of DBCP MCL exceedances have been detected in urban areas near Hughson and Ceres, concentrations appear to have declining trends over time with recent concentrations being lower than historical concentrations. The six indicator constituents of concern include both nitrate and 1,2,3-TCP, which are also sourced in agricultural areas similar to DBCP, and are used to analyze the potential for GSA activities to impact groundwater quality. these indicator consituents would include a variety of additional constituents that may be present at lower concentratons and can be managed through actions to mitigate the indicators. In addition, the SWRCB has identified additional constituents of concern for testing in domestic wells, including DBCP (scheduled for monitoring in 2022). That program will be approved and regulated by the SWRCB, the agency with primary responsibility for groundwater quality. In accordance with the objectives of this program, an alternative source of drinking water will be provided to impacted domestic wells owners that quality financially for the Nitrate Control Program. In addition, results of this supplemental monitoring program will be reviewed in the GSP Annual Reports for potential future recommendations to incorporate one or more of these constituents into the GSP monitoring network.

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75	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 -WQ SMC	Modify the undesirable results definition to include "increased contamination caused by GSA projects, management actions, or management of water levels or extractions such that beneficial uses are affected and well owners experience an increase in operational costs, or a failure to address groundwater use or issues leading to increased contamination."	The current definition already includes significant and unreasonable adverse impacts. The revisions to the definition would not be consistent with the MTs set at drinking water standards. See response above regarding measurable objectives.
76	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 -WQ SMC	If the SGMA monitoring network for degraded water quality does not include domestic wells or wells from small community water systems, this should be clearly stated, and an action plan should be included in the GSP to add these sites to the monitoring network such that there is sufficient coverage to evaluate potential water quality impacts to all drinking water beneficial users within the Subbasin.	Monitoring sites do not have to include domestic wells to be capable of analyzing the potential degradation of water quality from GSA management. Wells screened in the Western Upper Principal Aquifer in the area of domestic wells are capable of representing changes in groundwater quality as required by SGMA. As indicated on Figure 7-4, numerous water quality monitoring sites are located within areas of domestic wells. In addition, the current groundwater quality monitoring sites shown on Figure 7-4 includes recent analyses in about 160 domestic wells; most of these wells are in the Nitrate Control Program and include nitrate analyses only, with relatively good coverage over areas of domestic wells in the Subbasin. Although recent analyses are limited to nitrate, water quality coalitions - in cooperation with the SWRCB, have applied for funding under SAFER to expand the groundwater quality analysis to include data for additional constituents (arsenic, total chromium, uranium, copper, lead, nitrate, perchlorate, DBCP, EDB, and 1,2,3-TCP). This sampling is expected to commence in 2022 and will provide additional water quality data in domestic wells for incorporation into the GSP monitoring network and analysis in Annual Reports.
77	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 -WQ SMC	Include a more detailed explanation of the protocols and methodologies the GSAs will use to determine whether or not a "GSA management activity" is causing any future observed minimum threshold exceedances in water quality and to evaluate how implementation of projects and management actions will not result in further water quality impairments, particularly those that affect drinking beneficial water users, to the Subbasin.	The methodology for analyzing groundwater quality data for potential impacts from GSA management activities is discussed throughout Section 6.6.2 and described in more detail in Section 6.6.2.6. Additional analyses methodologies will be described in annual reports and based on available data.. Implementation of projects and management actions are subject to analysis under CEQA. A Programmatic Environmental Impact Report is currently underway and will analyze potential impacts to groundwater quality from proposed GSP projects and management actions, as appropriate.
78	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 -WQ SMC	Ensure that the GSP triggers a violation of a minimum threshold after one test shows that there has been an increase in contamination since January 1st, 2015. Once the minimum threshold is reached, the GSAs must start the evaluation of whether groundwater management activities or groundwater pumping have caused the increase, or whether the increase was caused by other factors such as natural fluctuation, testing inaccuracy, or activities outside the purview of the GSAs. If the increase was caused by groundwater management activities or groundwater pumping, the GSAs must immediately stop the activity causing increased contamination and remediate the contamination.	As previously noted, the MTs are triggered when a new exceedance of a drinking water standard occurs if related to GSA management. However the MO will require an analysis of increases in constituents of concern, so the MT does not have to be revised. GSAs have developed an implementation support activity (ISA 5) for the development of an Action Plan for any exceedances of MTs, even if undesirable results are not yet triggered (see Section 9.5). That plan is scheduled to be developed in the initial year of GSP implementation as indicated on Table 9-2.
79	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 -WQ SMC	Strive to remediate existing drinking water contamination: Ensure that the GSAs will strive to remediate drinking water contaminants that exceeded the MCL before 2015 wherever feasible, through projects, management actions and policies.	Remediation of existing drinking water contamination is not required by SGMA and would be difficult for implementation by the GSAs. SGMA does not provide GSA authority to duplicate activities of those agencies with primary responsibility for drinking water quality (i.e., SWRCB). GSAs are not "Responsible Parties" for contamination under State or Federal water quality regulations. Nonetheless, several of the proposed projects and management actions will have potential benefits to drinking water supplies including projects involving in lieu or direct groundwater recharge with surface water supplies. In addition, GSP projects were developed, where possible, to be aligned with the Governor's Water Action Plan by providing multiple benefits, including benefits to disadvantaged communities. Further, the GSAs, through their member agencies that are public water suppliers, will continue to coordinate with drinking water regulatory agencies for improvements to drinking water in the Subbasin.
80	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 -WQ SMC	Revise the groundwater levels undesirable results definition to ensure contamination does not increase from falling groundwater levels.	The current definition of undesirable results for chronic lowering of water levels specifically refers to adverse impacts to water supply wells. As indicated on Table 6-1 (and discussed in Section 6.3.1), impacts to water quality are listed as adverse impacts associated with declining water levels. Nonetheless, as recognized in Section 6.6.1, the relationships between depth and concentrations of constituents of concern are complex in the Turlock Subbasin. This lack of correlation between depth and contamination was the primary reason that water levels were not used as a proxy for the water quality sustainability indicator.
81	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 -WQ SMC	Include an analysis of how drinking water wells (municipal wells, community water system wells, and domestic wells) are likely to be affected by the undesirable results, measurable objectives and minimum thresholds.	As required by the GSP regulations, the potential effects of undesirable results and MTs on beneficial uses are discussed in Sections 6.6.1.2 and 6.6.2.4. MOs, discussed in Section 6.6.3 provide further protection against degraded water quality by providing a target condition to avoid increases in contamination to benefit drinking water supplies for all drinking water supply wells.
82	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 -WQ SMC	Incorporate new drinking water data into sustainable management criteria: Ensure that the GSP includes a description of how data gaps and uncertainties of its drinking water well impact assessment will be addressed and serve to reassess the sustainable management criteria, projects and management actions in accordance with new data.	Consistent with adaptive management, the GSP will continue to evolve as monitoring data are tracked and analyzed over time. Public water suppliers, as member agencies of the GSAs, will provide input on Annual Reports and recommendations for improvements to monitoring water quality over time.

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83	13	Leadership Counsel for Justice & Accountability (3)	Chapter 6 -WQ SMC	Avoid disparate impact: Ensure that the minimum thresholds for groundwater quality are established in such a way that prevents a disproportionately negative impact on communities of color in the GSP area. For example, the GSP should ensure that the same minimum threshold methodology across the GSP area will not lead to disproportionately more wells going dry for residents of color than for white residents.	The MTs were established identically for the entire Subbasin and do not have disproportionally negative impacts on any individual community. Most of the historical water quality data have been collected in disadvantaged communities in the Subbasin and most of the water quality monitoring sites are located in disadvantaged communities and areas of most of the domestic wells.
84	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - DACs and drinking water	Ensure accurate detection of impacts on drinking water users and DACs: Ensure that the groundwater level monitoring network includes representative monitoring wells in or near DACs, and placed in a way that detects impacts to the vast majority of drinking water users in the GSP area. If new monitoring wells are required, ensure that the GSP contains a concrete plan to fund and construct new representative monitoring wells within the first year of GSP implementation to ensure that vulnerable communities' drinking water resources are monitored. The plan to improve the monitoring network should include testing of domestic wells in the interim as wells are constructed.	As shown on Figure 3-1, disadvantaged communities (including DACs, SDACs, and EDAs) cover most of the Turlock Subbasin with approximately 82 percent of the total Subbasin population and most of the domestic wells. Accordingly, almost all of the representative monitoring wells in the groundwater level monitoring network can be characterized as located either in or near DACs and clearly represent the vast majority of drinking water users in the GSP area. As indicated in Chapter 7 and by implementation support activity ISA 2 (Section 9.2), improvements to monitoring networks are being prioritized. New wells are currently being planned for installation in 2022 through two current grant programs (Proposition 68, Round 3 and TSS) and additional new wells are budgeted over the next two fiscal years, including new representative monitoring wells for areas of domestic wells. Because new wells are being installed now and additional new wells are planned early in the GSP implementation period, new wells would likely be available before additional interim domestic wells could be identified and accessed.
85	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - DACs and drinking water	Clearly show representative monitoring well locations in relation to DACs: Ensure that the representative monitoring wells (RMWs) for groundwater levels are presented on maps and in tables that identify which set of minimum thresholds and measurable objectives will be applied to which RMWs, and that these maps clearly identify the locations of DACs, small water systems and other sensitive users.	Because of the widespread coverage of DAC areas (DACs, SDACs, EDAs) in the Turlock Subbasin, it is easy to recognize that almost all of the representative monitoring wells in the Subbasin are in DAC areas. Figure 3-1 clearly demonstrates the coverage on the same map as Figure 7-6, which shows a summary of the GSP monitoring network wells (Figure 7-6). As mentioned above, most of the water quality monitoring sites are also located in DAC areas (Figure 7-4).
86	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - DACs and drinking water	Identify and address other drinking water data gaps: Ensure that the GSP clearly identifies any other gaps in data regarding impacts to drinking water users, and that the GSP contains a clear plan to fill data gaps regarding impacts to drinking water users. The GSP explains how it will fill some monitoring data gaps, but does not ensure that these gaps will capture impacts on all drinking water users, particularly disadvantaged communities.	As mentioned in previous responses above, most of the representative monitoring sites are located in DAC areas. The current recent monitoring network provides reasonable coverage for analyses of drinking water wells. Additional data gaps may be identified as data are compiled and analyzed. Any such gaps will be identified in future Annual Reports and filled adaptively, as needed. As required by GSP regulations, the monitoring network will be evaluated during each five-year assessment.
87	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - WQ Monitoring	Ensure that the GSP plans to measure the following contaminants at all representative monitoring wells: a. All contaminants with primary drinking water standards b. Secondary drinking water contaminants like manganese which are known to be widespread c. PFOs/PFOAs and chrome-6, which are contaminants known to be very harmful to human health despite not having established drinking water standards d. Contaminants like uranium which are known to increase due to groundwater management practices	The GSP identified six constituents of concern as having the largest impact on drinking water users with the largest concentrations in excess of drinking water standards and widespread exceedances in the Subbasin. Those constituents include both naturally-occurring and anthropogenic constituents and are sourced both point and non-point sources. They involve the most ubiquitous industrial related contaminants and agricultural related contaminants as the largest land use in the Subbasin. The focus for degraded water quality has been on constituents with primary MCLs, but TDS is also included because of its known occurrence with depth. These constituents serve as indicator constituents for a variety of groundwater conditions to cover potential impacts from GSA management activities including water levels and extractions. In addition, the SWRCB has identified additional constituents of concern for testing in these domestic wells, including arsenic, total chromium, uranium, copper, lead, nitrate, perchlorate, DBCP, EDB, and 1,2,3-TCP (scheduled for monitoring to begin in 2022). Sampling will be conducted by the water quality coalition for the NItrate Control Program. The monitoring program will be approved and regulated by the SWRCB, the agency with primary responsibility for groundwater quality. Results of this supplemental monitoring will be reviewed in the Annual Reports to consider future incorporation of one or more of these constituents into the GSP monitoring network. As mentioned above and in Section 4.3.5.3.4, manganese is subject to signficant data uncertainties and is highly affected by turbidity in groundwater such as in poorly-developed domestic wells. Uranium is a current constituent of concern and will be analyzed for the Turlock Subbasin beginning with the first Annual Report. With regards to hexavalent chromium and PFOs/PFOAs, please refer to the response to the second comment by Leadership Counsel for Justice & Accountability (3) above.
88	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - WQ Monitoring	Explicitly define a set of SGMA monitoring wells that will be included in the SGMA monitoring network for degraded water quality to ensure consistent and comprehensive water quality monitoring and full compliance with requirements for SGMA monitoring networks as outlined in the GSP regulations.	The SGMA monitoring wells for degraded water quality are shown on Figure 7-4. As described in Section 6.6.2.6, the water quality monitoring network makes best use of existing monitoring networks approved by the SWRCB. As provided in the GSP regulations, GSAs may coordinate with existing monitoring program to incorporate other programs into the GSP.
89	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - WQ Monitoring	Include details for each monitoring site. Provide a list of monitoring sites included in the SGMA monitoring network for degraded water quality and include relevant information about each well (locations, well types/owners, well construction details, screening intervals, etc.) to meet GSP requirements for data and reporting standards as outlined in 23 CCR §352.4(c).	Monitoring sites are tabulated in Appendix H.
90	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - WQ Monitoring	Ensure that the monitoring network provides adequate coverage of all principal aquifers. Include this information clearly in the GSP.	As shown on Figure 7-4 and discussed in Section 7.1.4. the GSP water quality monitoring network contains sufficient coverage for both the western principal aquifers and the Eastern Principal Aquifer. In the west, numerous municipal wells from public water suppliers cover both the Upper Western Principal Aquifer and Western Lower Principal Aquifer. Data gaps will be further analyzed and addressed in Annual Reports and in the five-year assessment for each constituent of concern.

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91	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - WQ Monitoring	Specify which monitoring sites are being used to monitor for compliance with groundwater quality minimum thresholds and undesirable results.	All monitoring sites in the initial water quality monitoring network on Figure 7-4 will be analyzed for MTs and undesirable results.
92	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - WQ Monitoring	If the monitoring network for degraded water quality does not include domestic wells or wells from small community water systems, this should be clearly stated, and an action plan should be developed immediately to add these sites to the monitoring network such that there is sufficient coverage to evaluate potential water quality impacts to all drinking water beneficial users within the Subbasin.	The initial water quality monitoring network on Figure 7-4 includes 160 domestic wells, most of which are sampled for nitrate only. However, regulated water quality coalitions are planning to expand monitoring in these wells with oversight from the SWRCB. The coalition intends to use a grant from the Safe and Affordable Funding for Equity and Resilience (SAFER) Program to analyze domestic wells for arsenic, total chromium, uranium, copper, lead, nitrate, perchlorate, DBCP, EDB, and 1,2,3-TCP. Those data will be available and incorporated into the Annual Report analysis for the Turlock Subbasin, when available. If constituents do not meet drinking water standards, and the domestic well owner qualifies financially for the program, the SWRCB or water quality coalition will provide replacement water. It is noted that monitoring sites do not have to include either domestic wells or wells from small community water systems to be capable of representing local groundwater quality. Other wells in areas of domestic wells or community water systems with appropriate construction are valid monitoring network sites for analysis of sustainable management criteria and identifying issues of concern with respect to drinking water quality in domestic wells.
93	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - WQ Monitoring	Ensure accurate detection of impacts on drinking water users and DACs: Ensure that the groundwater level monitoring network includes representative monitoring wells in or near DACs, and placed in a way that detects impacts to the vast majority of drinking water users in the GSP area. If new monitoring wells are required, ensure that the GSP contains a concrete plan to fund and construct new representative monitoring wells within the first year of GSP implementation to ensure that vulnerable communities' drinking water resources are monitored. The plan to improve the monitoring network should include testing of domestic wells in the interim as wells are constructed.	As indicated on Figures 7-1 through 7-4, but the groundwater level and water quality monitoring networks are mostly located in DAC areas (DACs, SDACs, EDAs) and represent the vast majority of drinking water users in the Turlock Subbasin. Monitoring networks will be improved over time and include wells planned and budgeted in the next two budget cycles in addition to those in the planning stages now funded by Proposition 68 and the DWR TSS program. Monitoring networks will be reviewed in the five-year assessment as required by the GSP regulations.
94	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - WQ Monitoring	Identify baseline contaminant levels: Ensure that the GSP identifies the current contaminant levels, minimum thresholds and measurable objectives at each RMW, so that it is clear to the public how the contamination could change at each RMW site.	The GSP water quality analysis in Chapter 4 provides a baseline characterization used for identification of constituents of concern (Section 4.3.5).
95	13	Leadership Counsel for Justice & Accountability (3)	Chapter 7 - WQ Monitoring	Frequent testing: Ensure that the groundwater quality monitoring network tests for contaminants of concern frequently, in a way that prevents drinking water contamination. Testing should be done monthly.	Monthly testing for water quality is not needed for all wells and constituents to analyze MTs and identify the potential for degraded groundwater quality. All water quality existing monitoring networks are approved by the SWRCB or other regulatory agency with the primary responsibility for water quality and have designated monitoring protocols for the ongoing tracking and analysis for groundwater quality. As allowed by the regulations, the Turlock Subbasin GSAs are incorporating these existing groundwater quality monitoring programs into this GSP and will coordinate with the SWRCB, RWQCB, or other entity with responsibility for each monitoring program.
96	13	Leadership Counsel for Justice & Accountability (3)	Chapter 8 - Projects/MAs	Establish a clear and proactive plan for demand reduction. Demand reduction should be implemented immediately. The GSP must include a clear timeline for implementation of demand reduction measures, and concrete metrics for measuring success of demand reduction measures.	A variety of demand reduction strategies will be implemented using an adaptive management approach as discussed in Section 8.4.1. This approach recognizes the uncertainty of aquifer response to GSP projects being implemented immediately. As summarized in the schedule presented in Chapter 9, development of the management action frameworks that support demand management will begin early during this five-year period. Formal programs will be developed and implemented over the first five years of GSP implementation, as needed.
97	13	Leadership Counsel for Justice & Accountability (3)	Chapter 8 - Projects/MAs	Evaluate all projects and management actions for potential negative water quality and water supply impacts on disadvantaged communities and domestic well users.	GSP projects and management actions will be considered for potential water quality impacts in the GSP Draft Programmatic Environmental Impact Report (PEIR), which is currently being prepared by the GSAs.
98	13	Leadership Counsel for Justice & Accountability (3)	Chapter 8 - Projects/MAs	For all recharge projects, include an evaluation of potential negative groundwater quality impacts, a plan for monitoring for such impacts, and a plan to respond to impacts immediately upon detection.	See response above regarding the ongoing GSP Draft PEIR. It is also noted that projects identified for implementation involve recharge of water from the Tuolumne and Merced rivers, both representing a high quality water source that has been recharged -- mostly naturally and as managed conjunctive use -- in the Turlock Subbasin for many decades, providing benefits to water quantity and quality.
99	13	Leadership Counsel for Justice & Accountability (3)	Chapter 8 - Projects/MAs	Eliminate groundwater trading as a potential management action.	As described in Section 8.4.2.4, the GSAs may decide to implement a program that allows trading or sale of unused sustainable pumping or carry-over pumping credits in order to allow for operational flexibility, especially in the future if sustainable pumping allocations are scaled back. These strategies can be implemented in a manner that addresses concerns stated in the comment letter including the protection of drinking water supplies in vulnerable communities. Such strategies have been implemented successfully in various groundwater basin adjudications in California.
100	13	Leadership Counsel for Justice & Accountability (3)	Chapter 8 - Projects/MAs	Amend the Domestic Well Mitigation Program (Management Action 7) to include a commitment to begin program design and implementation immediately.	The Domestic Well Mitigation Program Management Action is scheduled for immediate development during the first two years of GSP implementation (See Table 9-2 and Section 8.4.3). No amendment is needed.
101	13	Leadership Counsel for Justice & Accountability (3)	Chapter 8 - Projects/MAs	Identify potential funding sources for the Domestic Well Mitigation Program.	As indicated in the response above, the Well Mitigation program will be developed over the first two years of GSP implementation, which will involve identification of program details and funding, as needed. In addition, the program description provides a series of funding programs that may provide resources for consideration.
102	13	Leadership Counsel for Justice & Accountability (3)	Chapter 8 - Projects/MAs	Ensure that the GSP's projects and management actions will not cause a disparate impact: Ensure that the GSP's projects and management actions, taken as a whole, prevent a disproportionately negative impact on communities of color in the GSP area. Projects and management actions may not cause, or fail to prevent, disproportionately more dry wells and contaminated water for residents of color than for white residents in the GSP area.	GSP projects have been selected for multiple benefits in the Subbasin including drinking water supplies in the widespread DAC areas across the Subbasin. GSP projects are targeted for meeting the sustainability goal and avoiding undesirable results.

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103	13	Leadership Counsel for Justice & Accountability (3)	Legal	The GSP Conflicts with Human Right to Water CWC 106.3(a)	The GSP is consistent with the Human Right to Water, including how it is further described in the Water Education Foundation 2021 report titled "Achieving Water Equity in California: Restructuring Water Management, Governance & Engagement". Pursuant to Water Code section 10723.2, the GSP considers all beneficial uses of groundwater (Section 2.3). Specifically, the GSP considers how to manage groundwater in a sustainable manner, which would support the supply of safe and affordable drinking water for domestic users (Chapter 6, Figure 6-1; also see Sections 2.3.2.4 and Section 8.4.3).
104	13	Leadership Counsel for Justice & Accountability (3)	Legal	The GSP allows continued overdraft above the safe yield of the basin, such that drinking water wells (especially domestic wells) will continue to go dry, infringing upon the rights of overlying users of groundwater. The GSP must be revised to protect the rights of residents of disadvantaged communities and/or low-income households who hold overlying rights.	SGMA requires that the Turlock Subbasin reach sustainability by 2042. The GSP is proposing how to appropriately manage groundwater to prevent long-term overdraft and undesirable results. The GSP takes into consideration disadvantaged communities and the GSAs have representatives from those communities on their boards. As described in Section 6.3.1, the undesirable results definition is specifically developed for the protection of drinking water wells. SGMA allows continued extractions over safe yield, while reaching sustainability in 20 years. This does not mean that the GSP is not considering or appropriately managing to prevent long-term overdraft and undesirable results. The GSP respects the rights of all groundwater users, including overlying groundwater rights holders. However, the GSP cannot guarantee a water supply for any category of user and is not a water supplier. The GSAs will continue to work with all interest groups to try to propose solutions for sustainability of the groundwater supply in the Subbasin.
105	13	Leadership Counsel for Justice & Accountability (3)	Legal	The GSP conflict with the Reasonable and Beneficial Use Doctrine. The GSAs much follow the Legislature's directive to prioritize domestic use of water resources over irrigated agriculture and ensure that SGMA implementation further the human right to safe and affordable drinking water.	The GSP considered all beneficial uses and users in developing the sustainable management criteria, projects and management actions, including, but not limited to, potable use, irrigation needs and environmental uses. To clarify, the Reasonable and Beneficial Use Doctrine recognizes both domestic and agriculture as beneficial uses of water (Section 106). SGMA specifically prohibits the GSAs from determining groundwater rights or making determinations with regard to water uses as reasonable and/or beneficial. Therefore, the GSP does not allocate groundwater and is not the arbiter of which uses are reasonable or not, as that job is left for the courts. The GSP does not categorically favor one beneficial use of water over another.
106	13	Leadership Counsel for Justice & Accountability	Legal	The GSP conflicts with the Public Trust Doctrine, which applies to groundwater where there is a hydrological connection between groundwater and a navigable surface water body. The Draft GSP does not consider impacts on public trust resources, or attempt to avoid insofar as feasible harm to the public's interest in those resources.	In Chapter 6, the GSP addresses the means to avoid potential undesirable results to Interconnected Surface Waters that are Public Trust resources. Pursuant to Water Code section 10723.2, the GSP considers all beneficial uses of groundwater, including Public Trust resources (Section 6.8).
107	14	South Valley Farms	Chapter 6	The GSAs should apply the 2027 Interim Milestones to all representative monitoring wells. Section 6.9 of the draft GSP establishes 2027 Interim Milestones for monitoring networks in the Eastern Principal Aquifer and the Wester Principal Aquifer. These Interim Milestones are: 2027 target values that provide a buffer to allow water levels to drop below the [Minimum Thresholds] between 2022 and 2027, recognizing that water levels in these wells may continue to decline after the GSP is adopted as projects are being brought online. (Draft GSP, § 7 .1; emphasis added.) Here, and elsewhere, the draft GSP expressly acknowledges that "the aquifer response to projects and management actions will take time." In addition to supporting the request to modify Minimum Thresholds per Comment No. 1, above, this language supports the need to apply the 2027 Interim Milestones to the Subbasin as a whole.	Interim milestones are assigned to areas of the Subbasin where water levels are continuing to decline and projects are not yet being implemented. Because the eastern Subbasin is almost solely reliant on groundwater, those areas are more sensitive to recent years of dry hydrologic conditions. In the western Subbasin where surface water is available for water supply, water levels have recovered in part from dry conditions and declines are less severe. Importantly, concentrations of domestic wells in the western Subbasin may be adversely impacted if interim milestones are set too low in western areas. Also, a significant GSP project is already nearing completion in the western Subbasin where treated surface water will be provided to the cities of Turlock and Ceres to offset pumping for drinking water supply. The decrease in pumping is expected to raise water levels locally by 2023 helping to alleviate local declines.
108	14	South Valley Farms	Chapter 6	The GSAs should revise the definition of Undesirable Results as it pertains to the SMC regarding the Chronic Lowering of groundwater Levels and the Reduction of Groundwater in Storage. Table 6-2 provides that: An undesirable result for each principal aquifer will occur when at least 33% of representative monitoring wells exceed the [Minimum Threshold] for that Principal Aquifer in three (3) consecutive Fall semi-annual monitoring events. Similarly, Table 6-2 provides that: An undesirable result will occur for each principal aquifer when at least 33% of representative monitoring wells exceed the [Minimum Threshold] for that principal aquifer in three (3) consecutive Fall monitoring events. It is unclear if this language considers whether dry periods or drought are present during the three consecutive Fall measurements. We recommend that the three consecutive Fall measurements expressly consider whether a dry period or drought has existed during those three consecutive years; and, if a dry period or drought is found to have existed during those three consecutive years, then an undesirable result should not be triggered.	The fall events incorporated into the undesirable result criteria for chronic lowering of water levels and reduction of groundwater in storage are not constrained by water year type. The recommendation to allow for longer declines during drought could have detrimental effects on drinking water supply wells (including domestic wells) and impacts on surface water beneficial uses including environmental uses (streamflow habitat and GDEs) and surface water rights holders. The three years is based on the time that water level declines led to undesirable results and are used to indicate the beginning of a long-term decline rather than short term fluctuations. With the implementation of GSP projects, water levels should be supported such that drought conditions, while lowering water levels temporarily, can be moderated such that groundwater levels do not continue to reach new historic lows in each drought. This "stair-stepping" downward would make it harder and harder for the groundwater system to recover to levels above the MTs.

Ref #	Ltr #	Author	Location in GSP	Comment	Response
109	14	South Valley Farms	Chapters 8 & 9	If the GSAs implement groundwater allocations, the GSAs should impose allocations based on historical use. Notably, in describing this management action, the GSAs fail to indicate what methodology they would follow in establishing groundwater allocations. In making this determination, we recommend that the GSAs rely on historical groundwater use. We believe this approach is the most equitable way of establishing groundwater allocations as it respects each user's individual history and allows the GSAs to obtain a representative average of how much water a user actually needs. In contrast, if the GSAs were to rely on other methodologies, such as gross acreage, the GSAs would risk allocating water to users who have done little or nothing to exercise their groundwater rights.	The comment regarding methods for developing allocations is noted and will be considered for future program developments as needed. Although a Groundwater Allocation and Pumping Management Program is included in the GSP as a Management Action (Table 8-18), this GSP does not allocate groundwater and no details for allocations are being developed at this time. As discussed in Section 9.4, the program will be developed and implemented, as needed, consistent with an adaptive management approach.
110	14	South Valley Farms	Chapter 5	The GSAs should revisit the annual water budget and revise sustainability targets for agricultural groundwater producers. The GSAs do not anticipate that Agency Agriculture Groundwater Production will experience any reduction in use to achieve sustainable conditions. In contrast, the GSP anticipates a reduction of 95,800 acre-feet of water per year for Private Agriculture Groundwater Production. We do not believe it is appropriate for private agricultural water users to bear a disproportionate amount of the burden when it comes to helping the GSAs achieve their sustainability goal for the Subbasin. Therefore, we recommend that the GSAs revisit the water budget to consider an appropriate and equitable reduction for Agency Agriculture Groundwater Production.	The reduction of groundwater pumping in the sustainable yield analysis (Table 5-17) will be met by projects and management actions primarily in the eastern Subbasin where groundwater is the sole water supply. As indicated by the operational budgets in Chapter 5, the western Subbasin is operating conjunctively with a surface water supply. The agency production in the water budget is by Turlock ID, who uses groundwater to balance surface water deliveries throughout their service area. Through their conjunctive use program, Turlock ID recharges more groundwater than is pumped; accordingly, agency does not contribute to the Subbasin overdraft.

Appendix E-16
Memorandum of Intent to Coordinate Between the Merced Subbasin and Turlock Subbasin

MEMORANDUM OF INTENT TO COORDINATE BETWEEN THE MERCED SUBBASIN AND TURLOCK SUBBASIN

WHEREAS, the Turlock Groundwater Subbasin (Subbasin No. 5-22.03) and the Merced Groundwater Subbasin (Subbasin No. 5-22.04) are adjacent subbasins that share a common boundary along the Merced River; and

WHEREAS, the Turlock Subbasin is a high-priority subbasin that is required to submit a Groundwater Sustainability Plan (GSP) to the Department of Water Resources (DWR) by January 31, 2022 and the Merced Subbasin is a high-priority, critically overdraft subbasin that must submit a GSP to DWR by January 31, 2020; and

WHEREAS, the West Turlock Subbasin Groundwater Sustainability Agency (WTSGSA) and the East Turlock Subbasin Groundwater Sustainability Agency (ETSGSA) are working to develop a single GSP in the Turlock Subbasin; and

WHEREAS, the Merced Subbasin Groundwater Sustainability Agency, the Merced Irrigation Urban Groundwater Sustainability Agency, and the Turner Island Water District Groundwater Sustainability Agency-1 are working to develop a single GSP in the Merced Subbasin; and

WHEREAS, the Sustainable Groundwater Management Act (SGMA) prohibits a GSP from adversely affecting an adjacent basin's ability to implement its GSP or impede the ability to achieve its sustainability goal (Water Code, § 10733(c)); and

WHEREAS, the parties to this Memorandum of Intent (MOI) (collectively "Party" or "Parties") desire to establish compatible sustainability goals and understanding regarding fundamental elements of the GSPs of each GSA as they relate to sustainable groundwater management.

NOW, THEREFORE BE IT RESOLVED that the Parties agree to coordinate in the following matter:

1. Each Party desires to comply with SGMA by assuring that its GSP actions do not negatively impact the adjacent GSA in complying with SGMA.

2. To assure this compliance, each Party commits to meeting as necessary to compare GSP development concepts and approaches to identify potential areas of concern that may negatively impact the other.

3. Each Party will commit to sharing data, analysis, methods, results, and any other information that is pertinent to the Parties' compliance with SGMA.

4. The Parties recognize that the development of the respective GSPs have different deadlines and may be developed using different timelines. Coordination is expected to continue, as needed, throughout GSP development and implementation.

5. The Parties recognize there may be data gaps that will need to be filled. Datasets will improve as the Parties develop and implement GSPs over time. The Parties agree to continue to work together to develop and refine understanding of the conditions over time. This common knowledge and understanding will be incorporated into future GSPs as data and information becomes available.

6. The Parties intend to coordinate messaging and outreach along the subbasin borders to maximize stakeholder outreach and understanding between the subbasins.

IN WITNESS WHEREOF, the parties have caused this Memorandum to be executed by and through their respective officers thereunto duly authorized.

WEST TURLOCK SUBBASIN GSA,
a Joint Powers Authority

By: ______________________
Joe Alamo, Chair

Date: 12/18/18

EAST TURLOCK SUBBASIN GSA,
a Joint Powers Authority

By: [signature]
Albert Rossini, Chair

Date: 01-28-19

MERCED IRRIGATION-URBAN GSA

By: ______________________
Chair

Date: 1/19/19

MERCED SUBBASIN GSA,
a Joint Powers Authority

By: ______________________
Chair

Date: 1/16/19

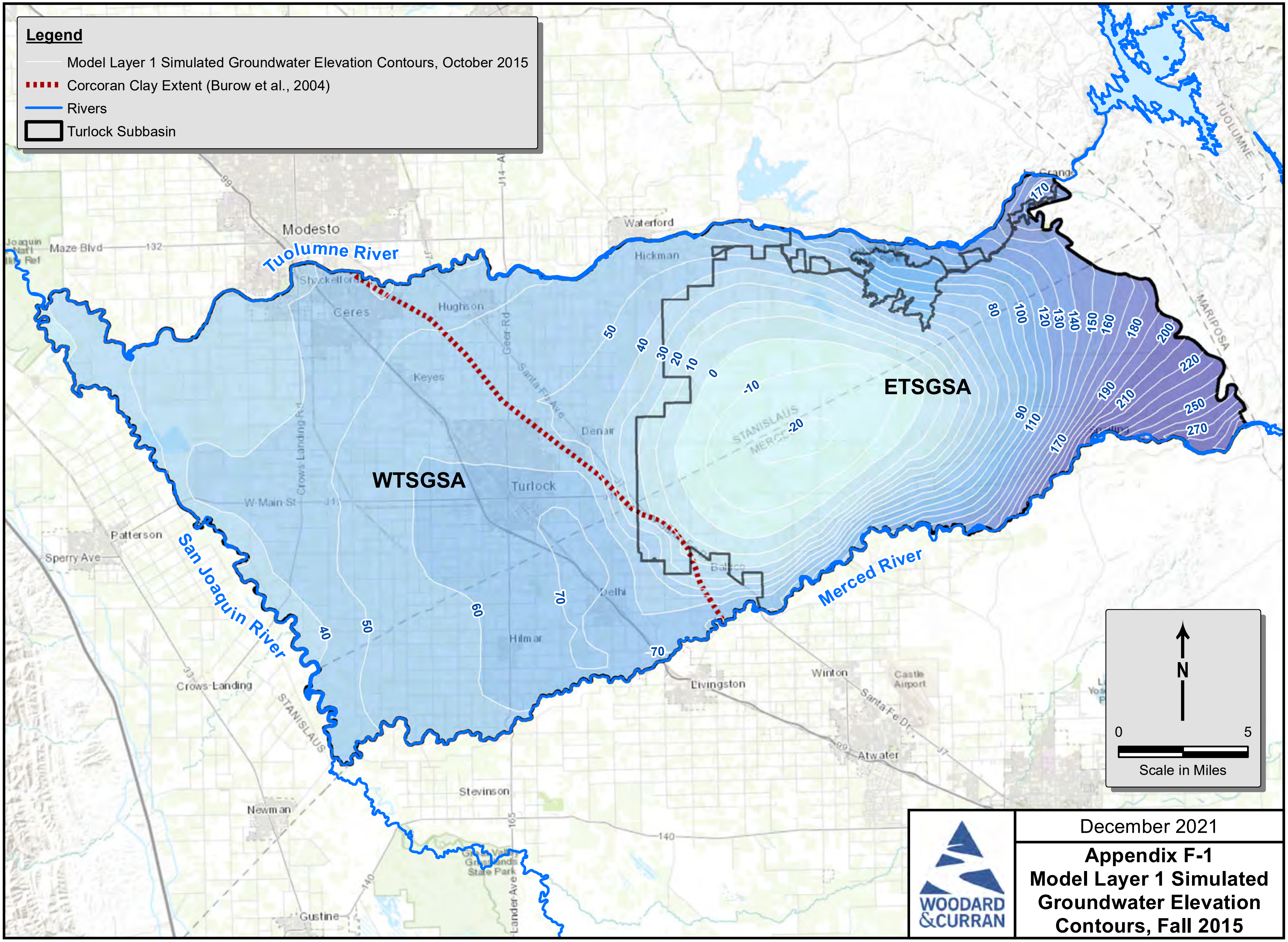
TURNER ISLAND WATER DISTRICT

By: ______________________
Chair

Date: 2-19-19

Appendix F

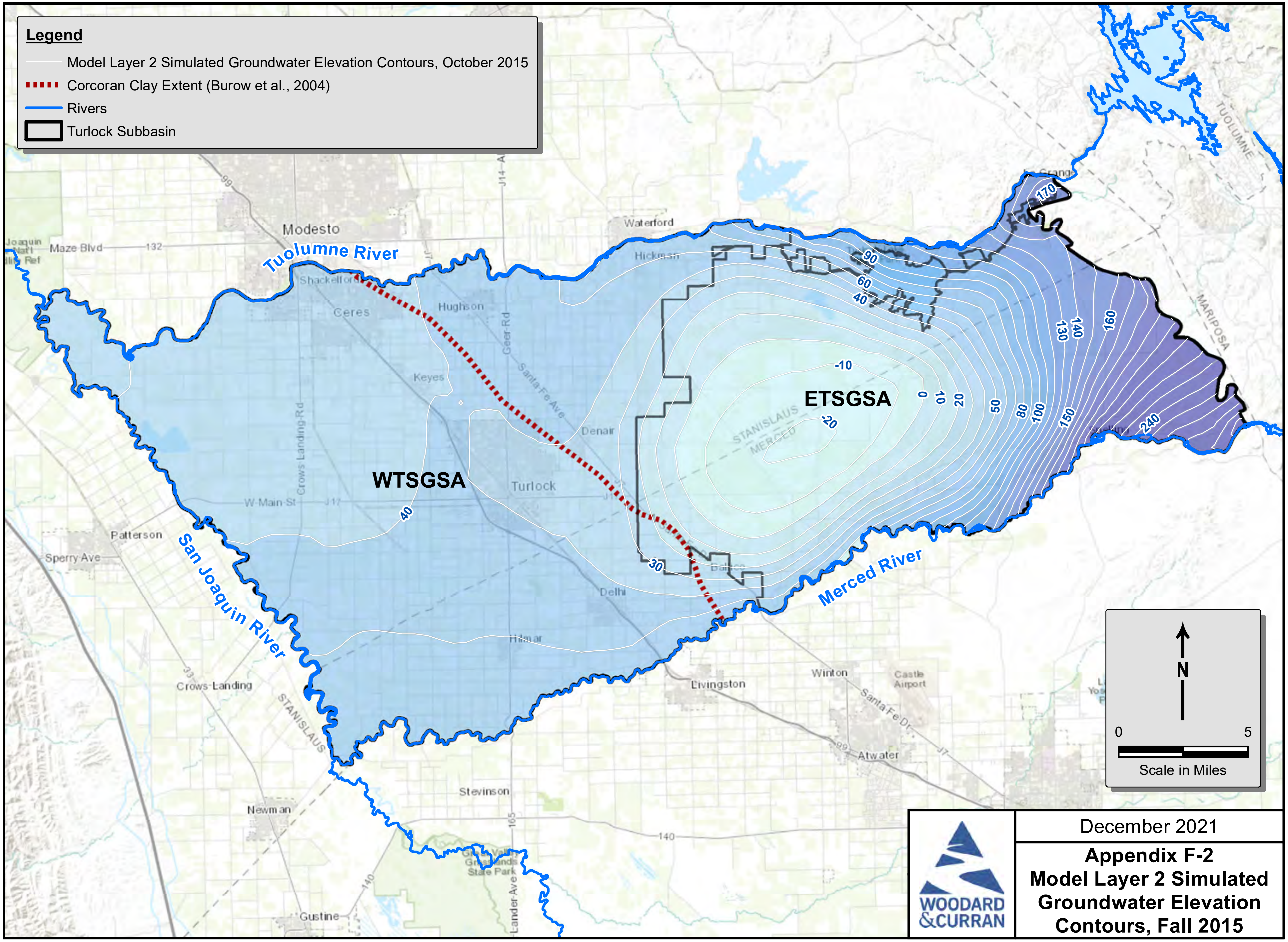
Model Simulated Groundwater Elevation Contour Maps, Fall 2015



December 2021

Appendix F-1
Model Layer 1 Simulated Groundwater Elevation Contours, Fall 2015

WOODARD & CURRAN



December 2021

Appendix F-2
Model Layer 2 Simulated Groundwater Elevation Contours, Fall 2015

Appendix G

Hydrographs for Representative Monitoring Network Wells

Hydrographs for Wells in the Monitoring Network for:

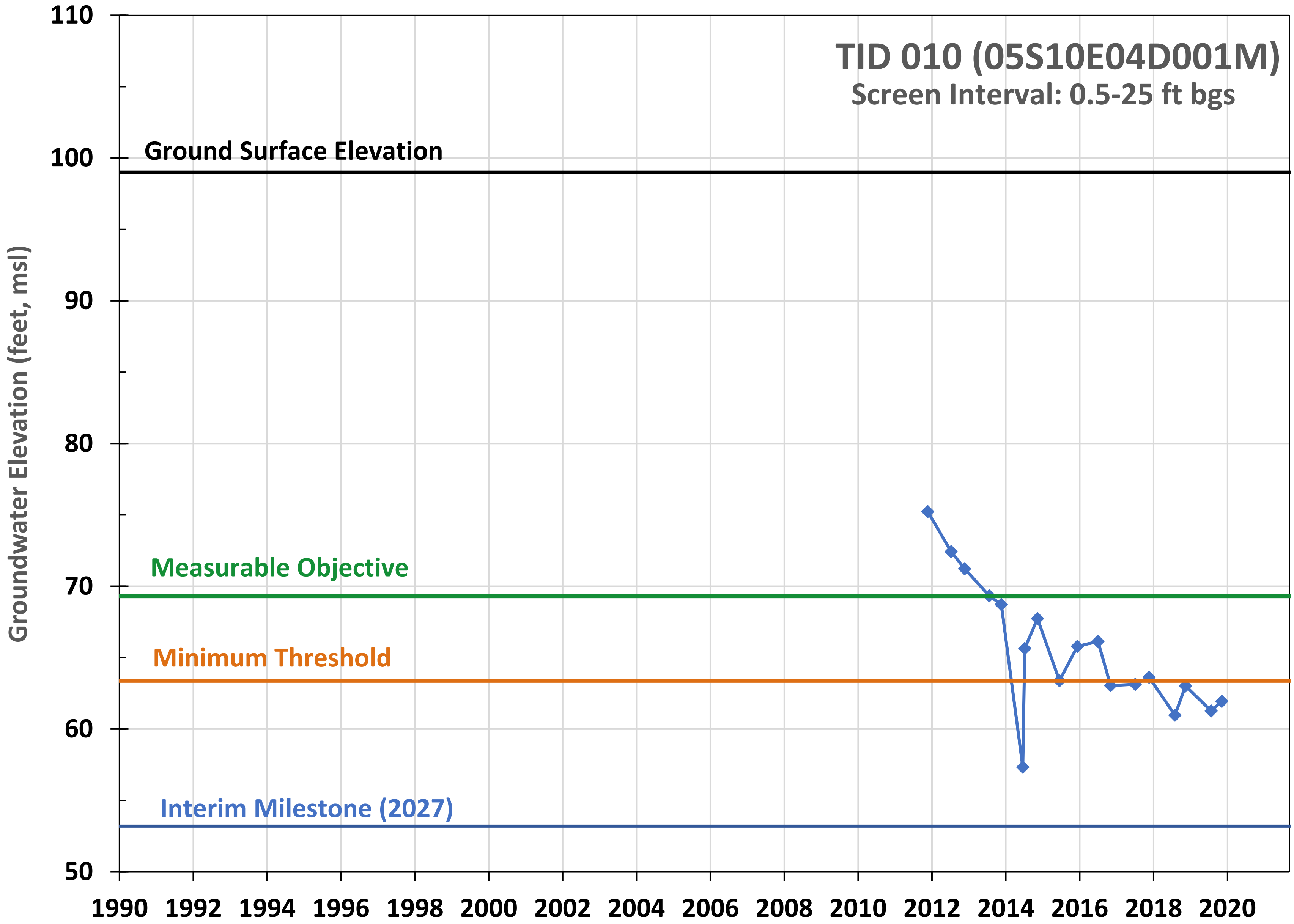
Chronic Lowering of Groundwater Levels

Reduction of Groundwater in Storage

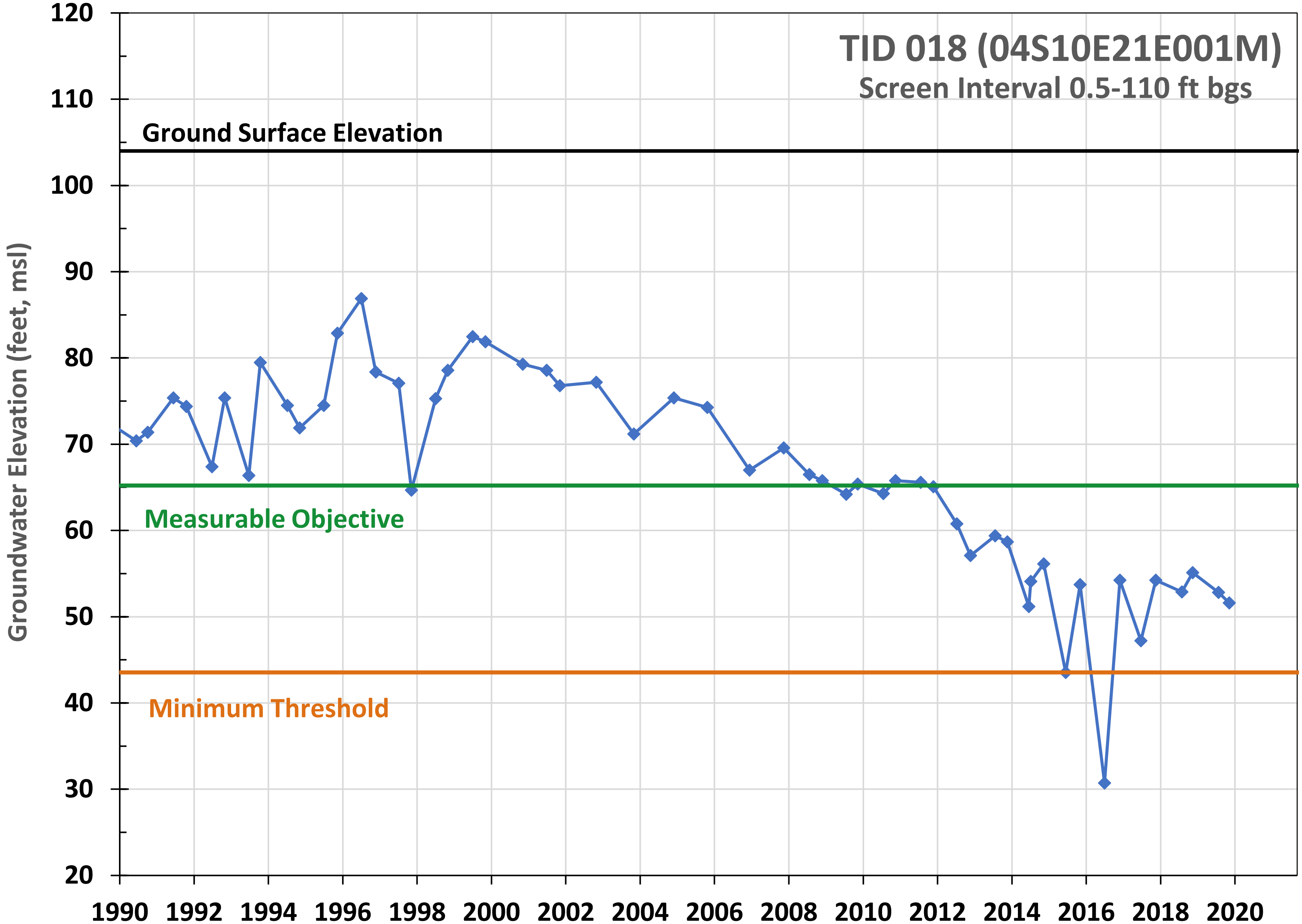
Land Subsidence

(in the order as they appear on Table 7-1)

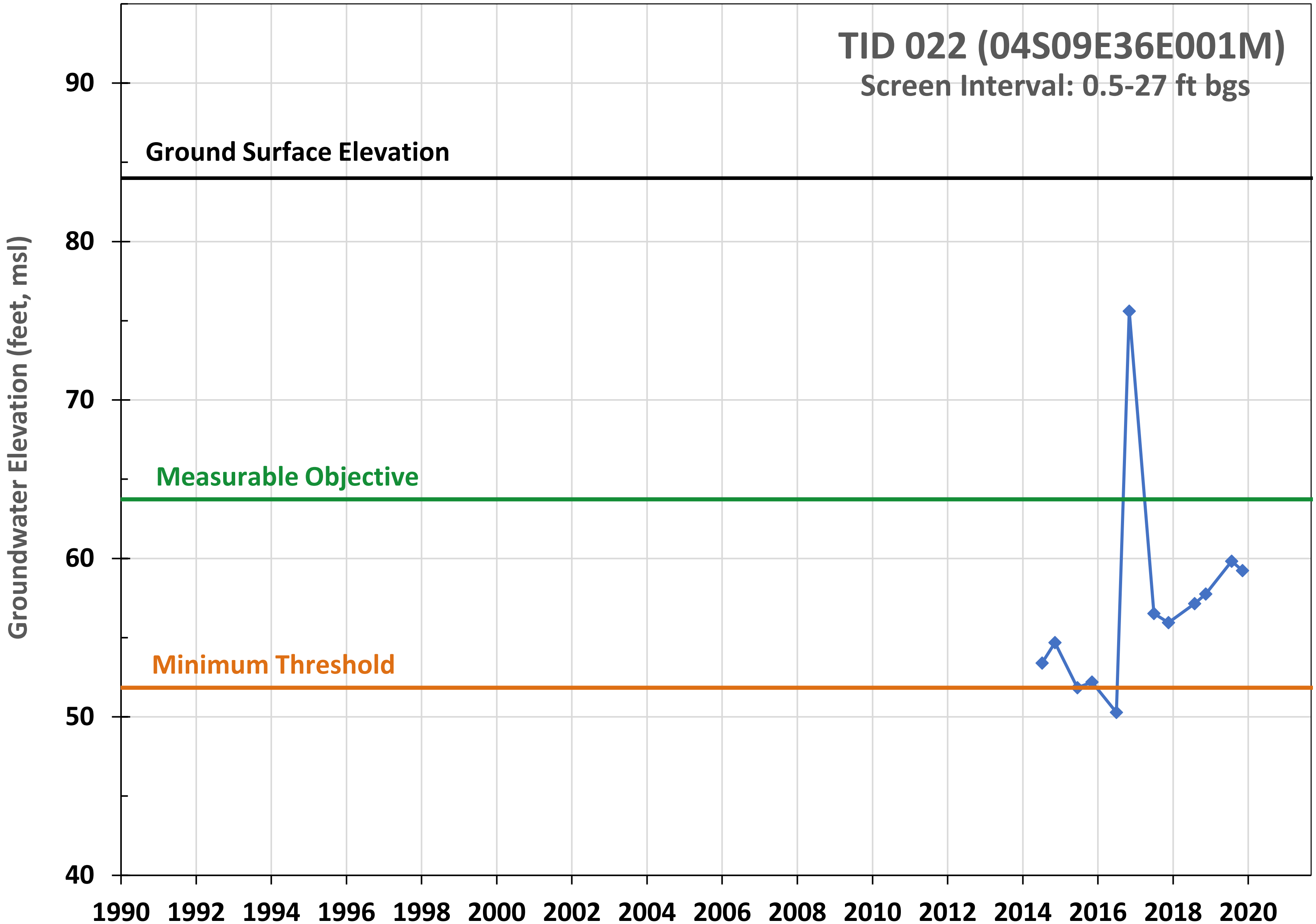
Note: water level data not available for Olam R2-4



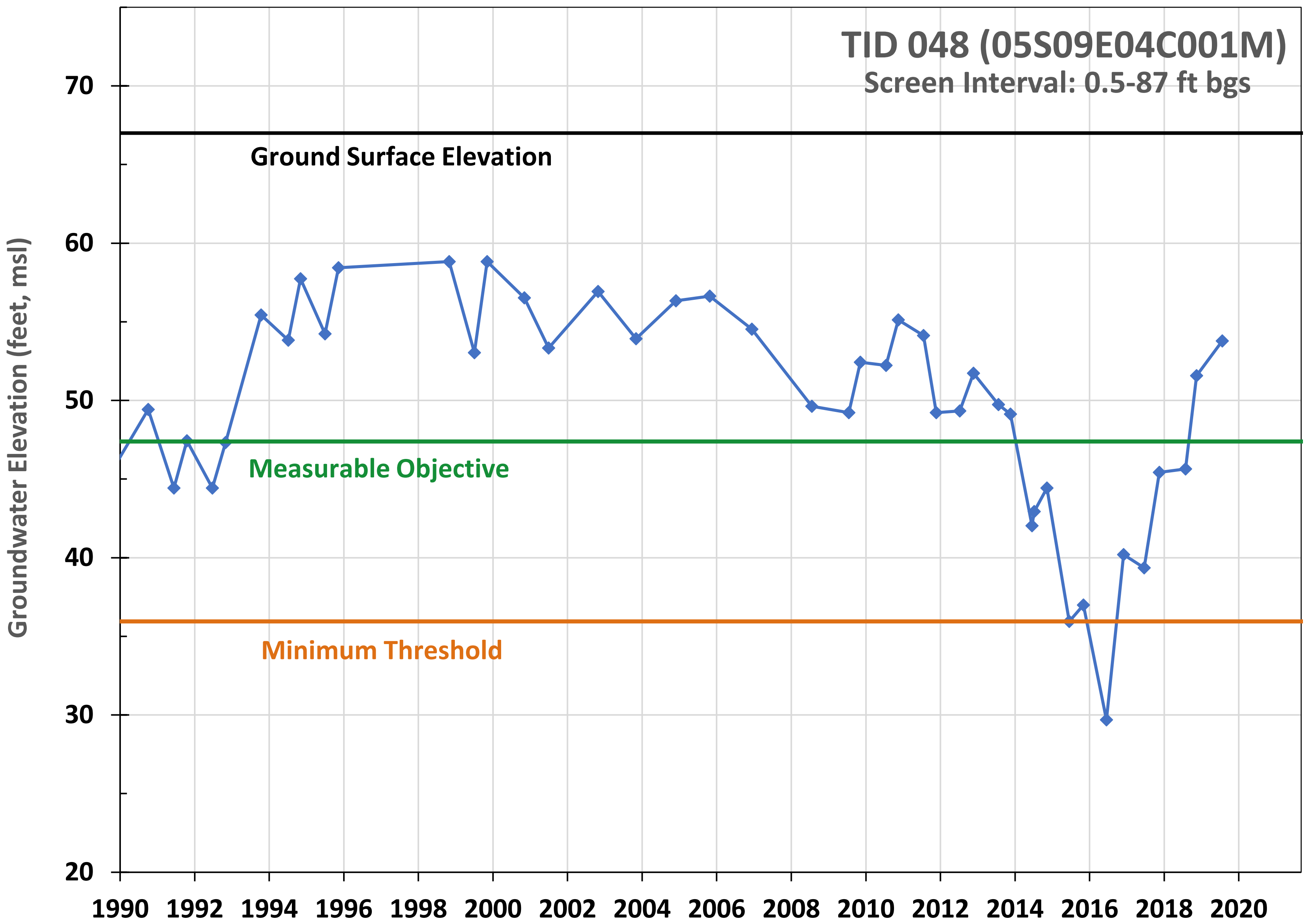
TID 010 (05S10E04D001M)
Screen Interval: 0.5-25 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
110
100
90
80
70
60
50
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

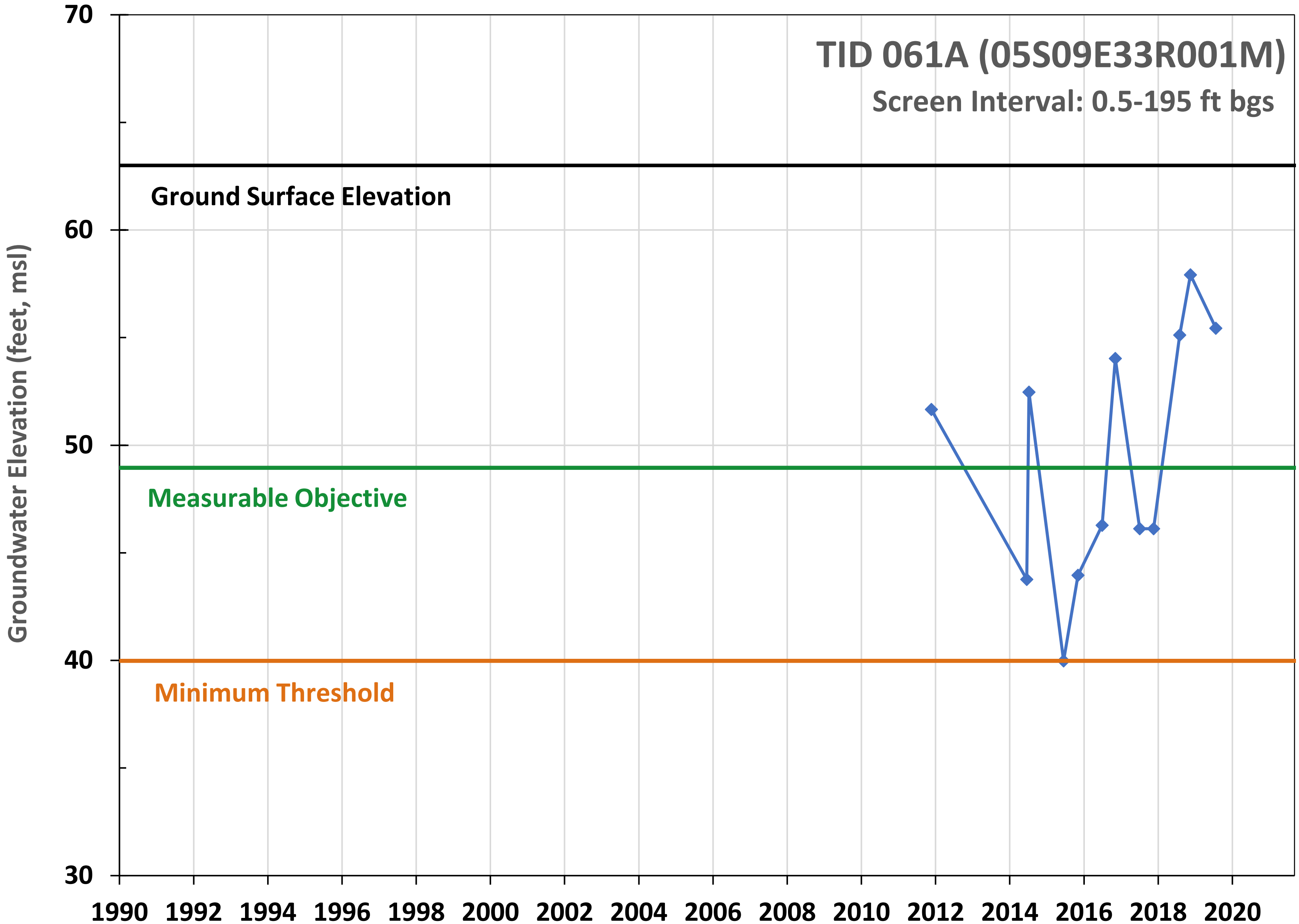


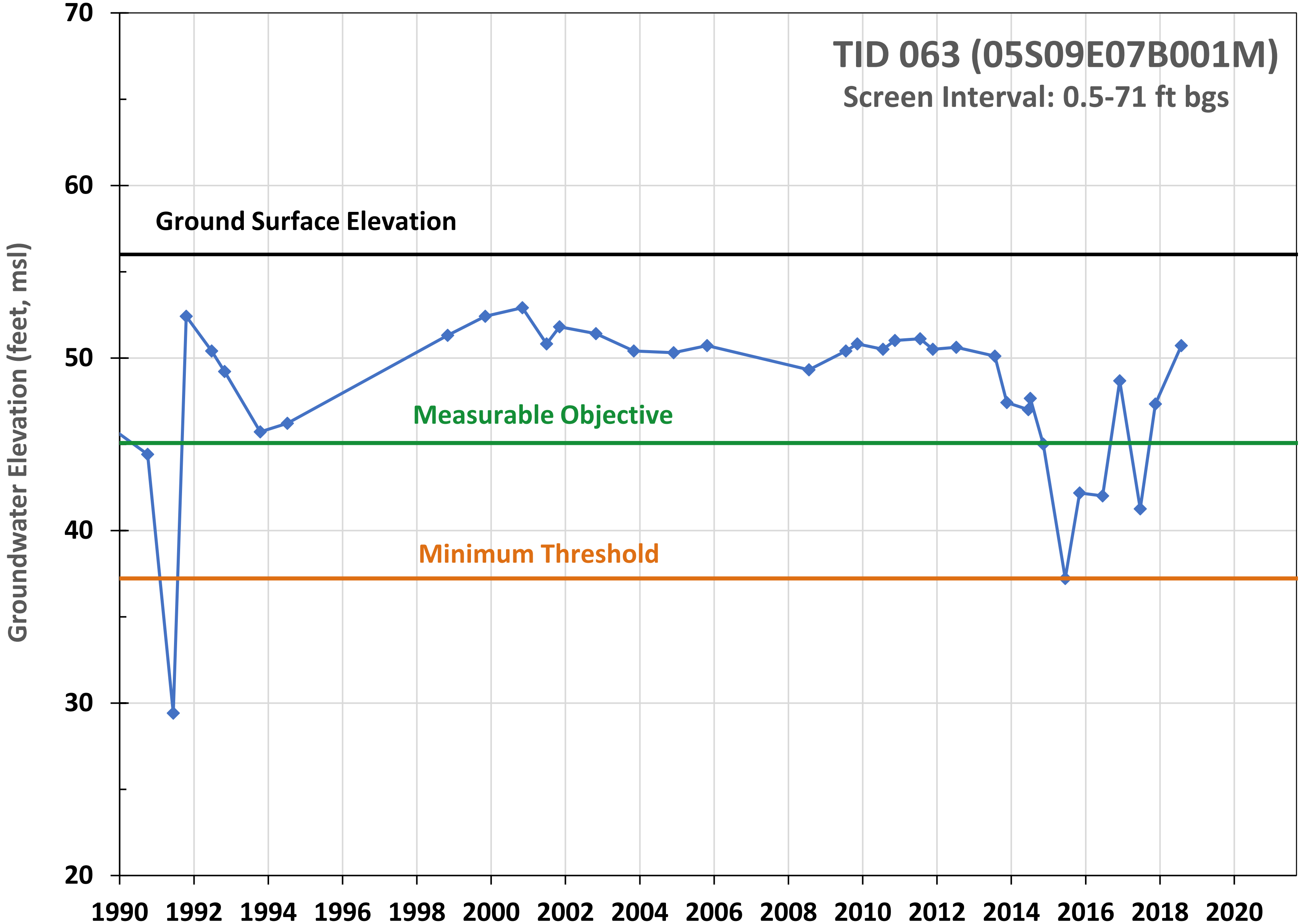
TID 018 (04S10E21E001M)
Screen Interval 0.5-110 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
120
110
100
90
80
70
60
50
40
30
20
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



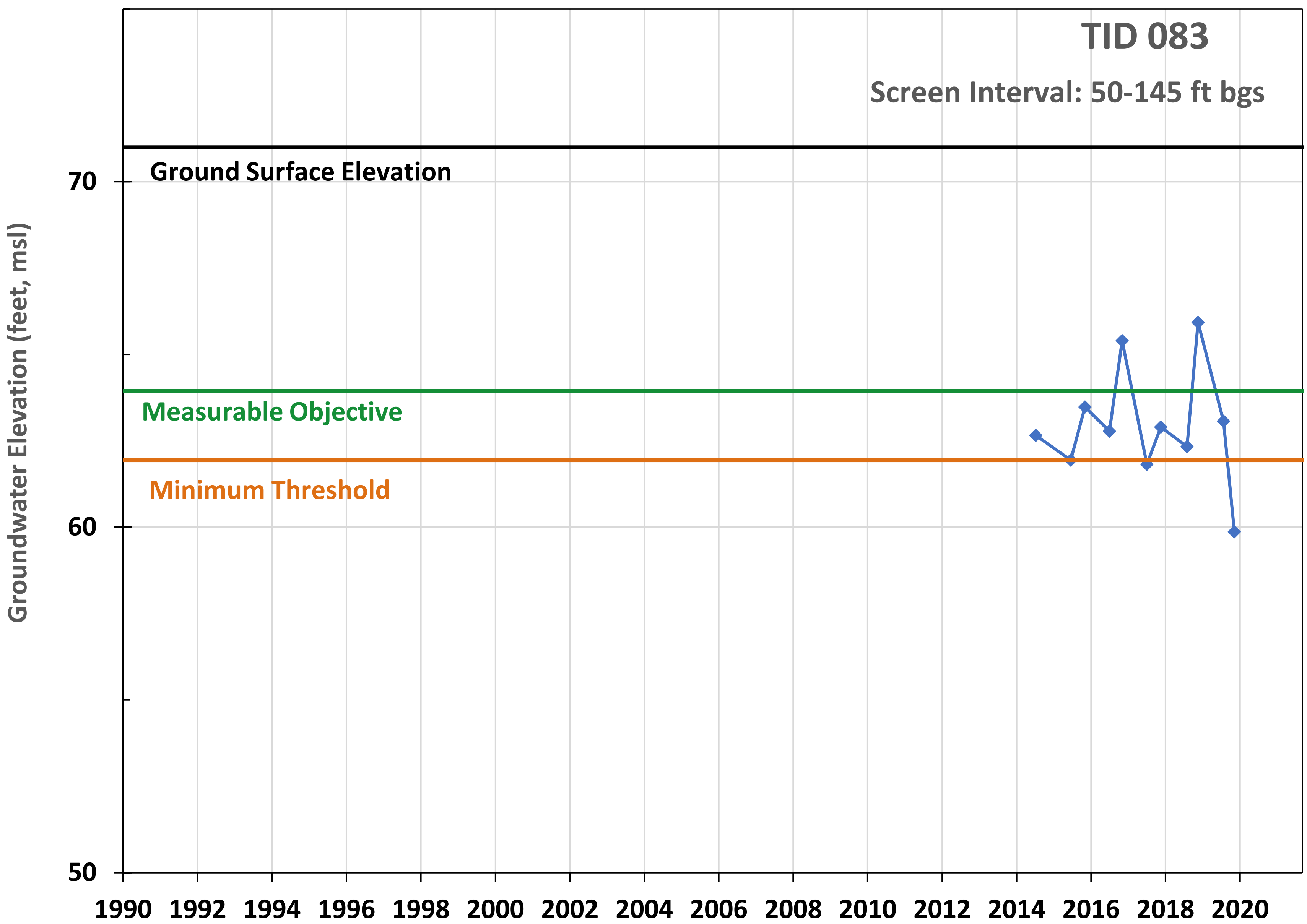
TID 022 (04S09E36E001M)
Screen Interval: 0.5-27 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
90
80
70
60
50
40
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020


TID 048 (05S09E04C001M)
Screen Interval: 0.5-87 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
70
60
50
40
30
20
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

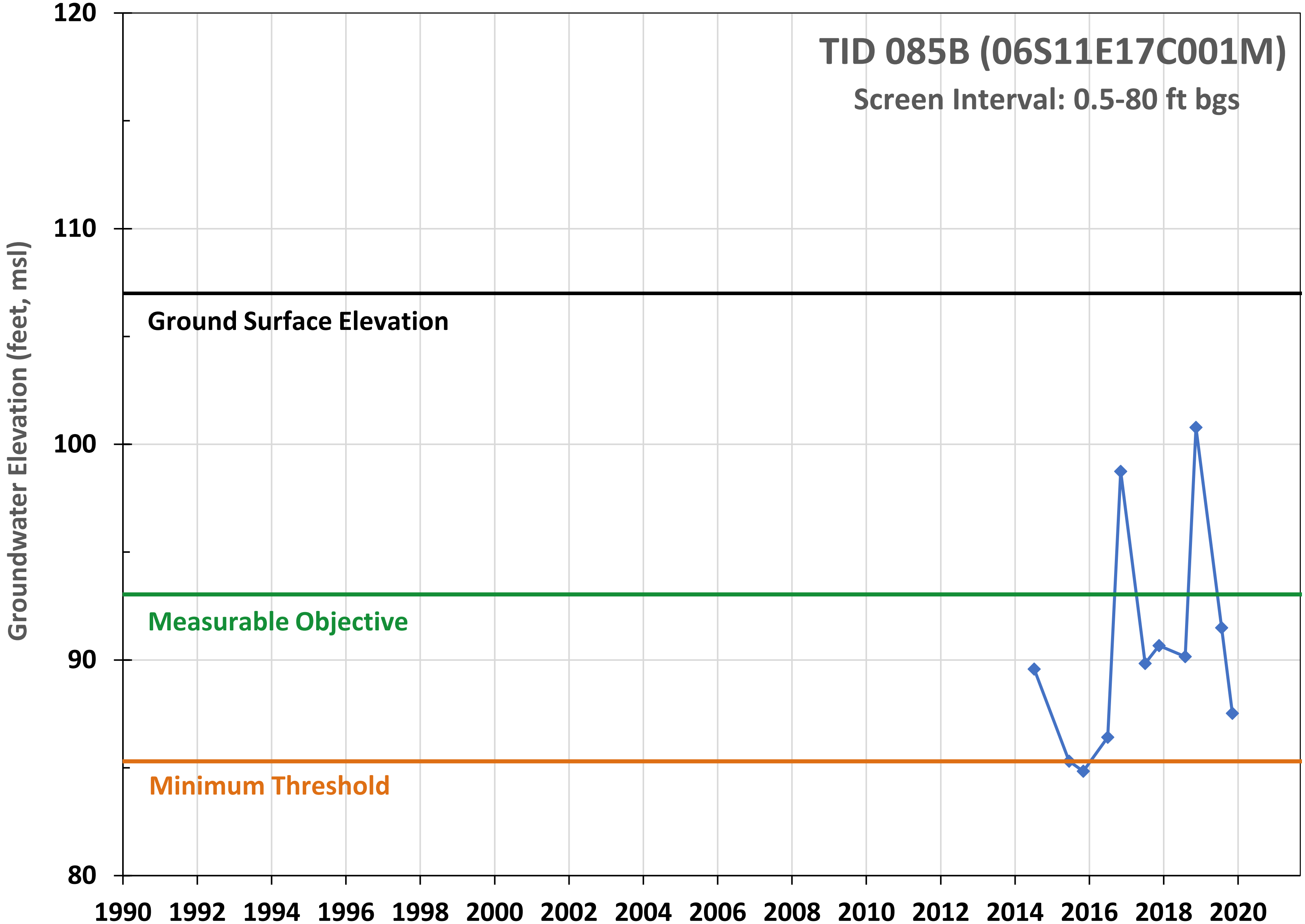

TID 061A (05S09E33R001M)
Screen Interval: 0.5-195 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
70
60
50
40
30
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



TID 063 (05S09E07B001M)
Screen Interval: 0.5-71 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
70
60
50
40
30
20
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



TID 083
Screen Interval: 50-145 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
70
60
50
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



TID 085B (06S11E17C001M)
Screen Interval: 0.5-80 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
120
110
100
90
80
1990
1992
1994
1996
1998
2000
2002
2004
2006
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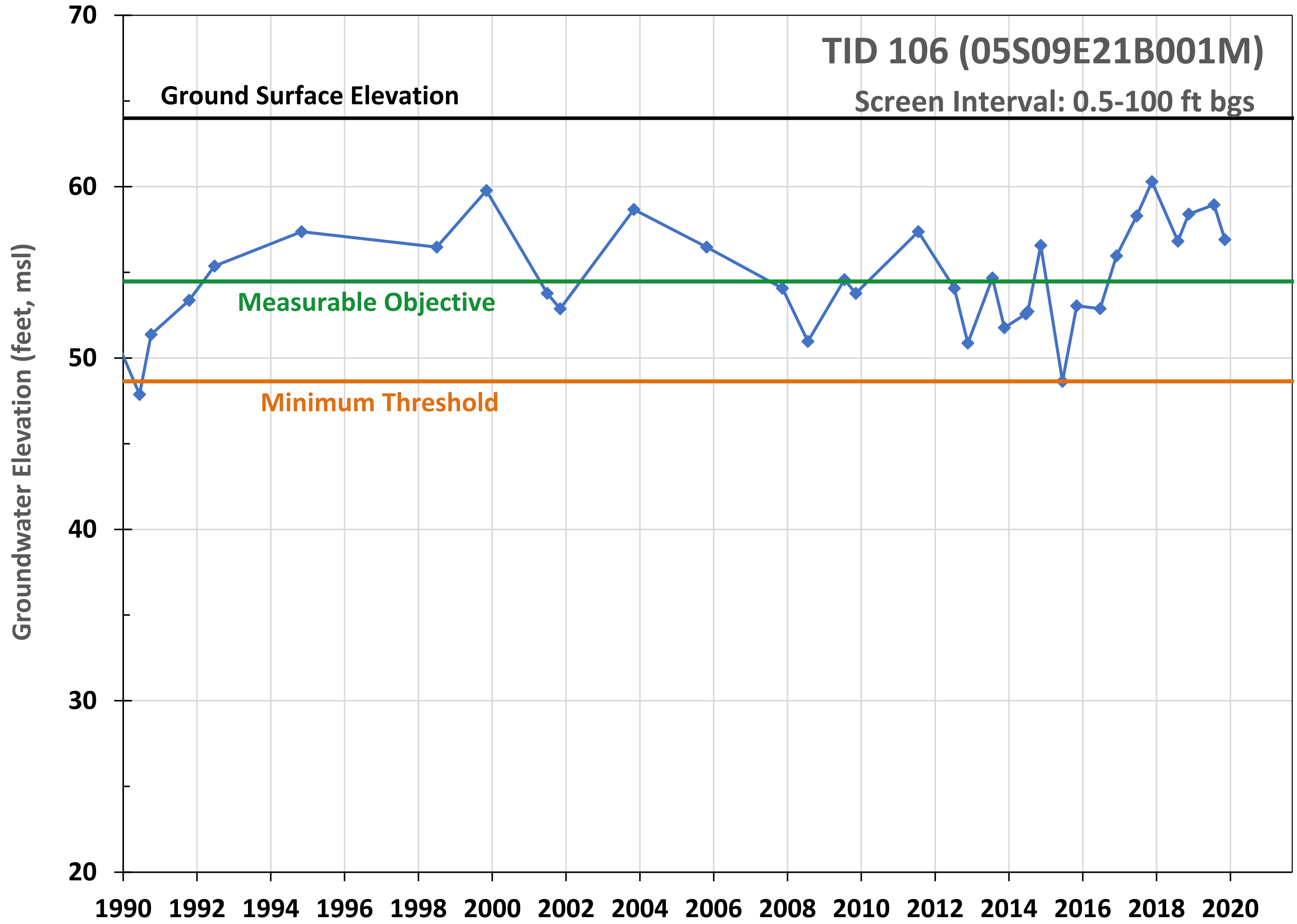
2010
2012
2014
2016
2018
2020


TID 106 (05S09E21B001M)
Screen Interval: 0.5-100 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
70
60
50
40
30
20
1990
1992
1994
1996
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2000
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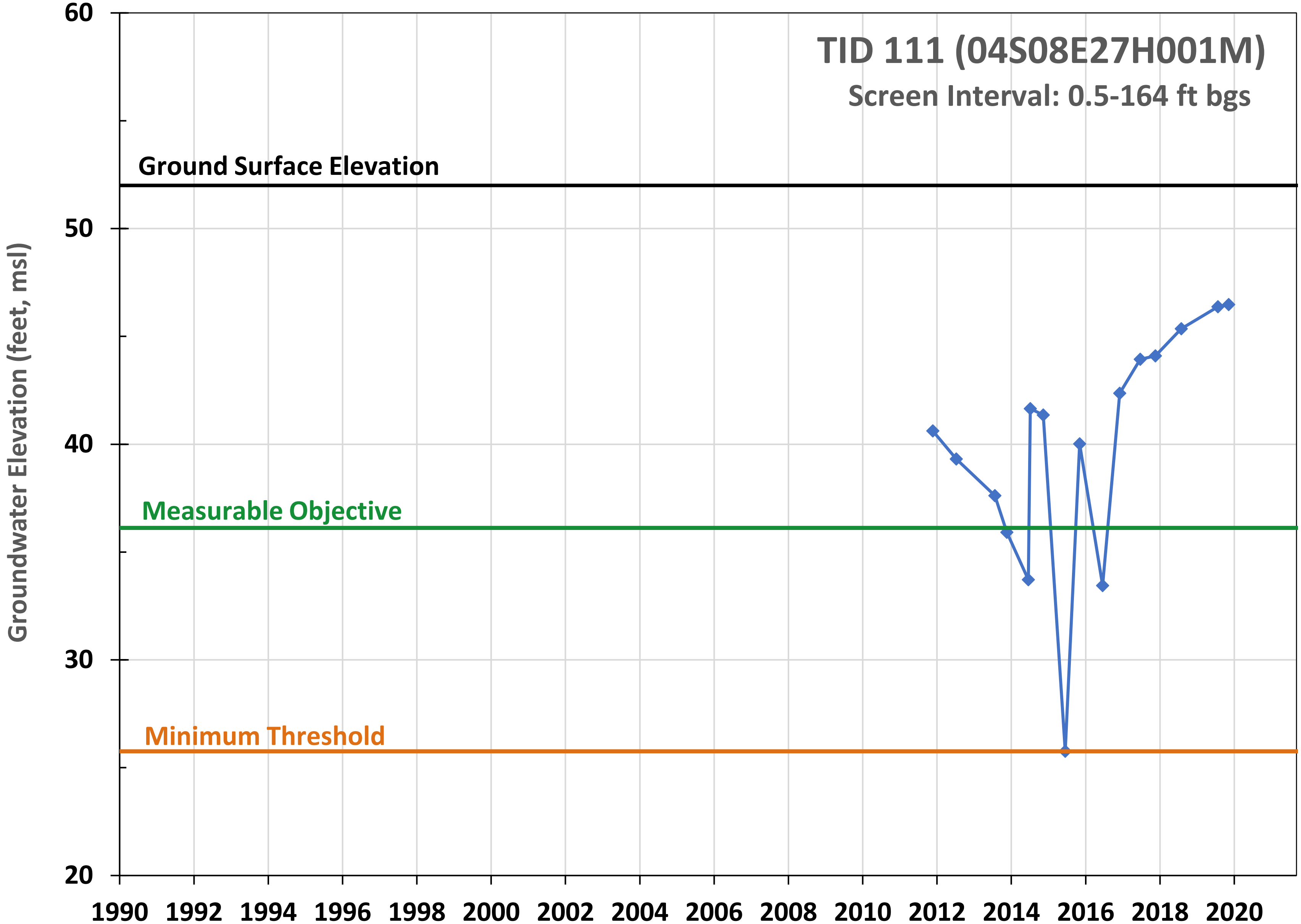
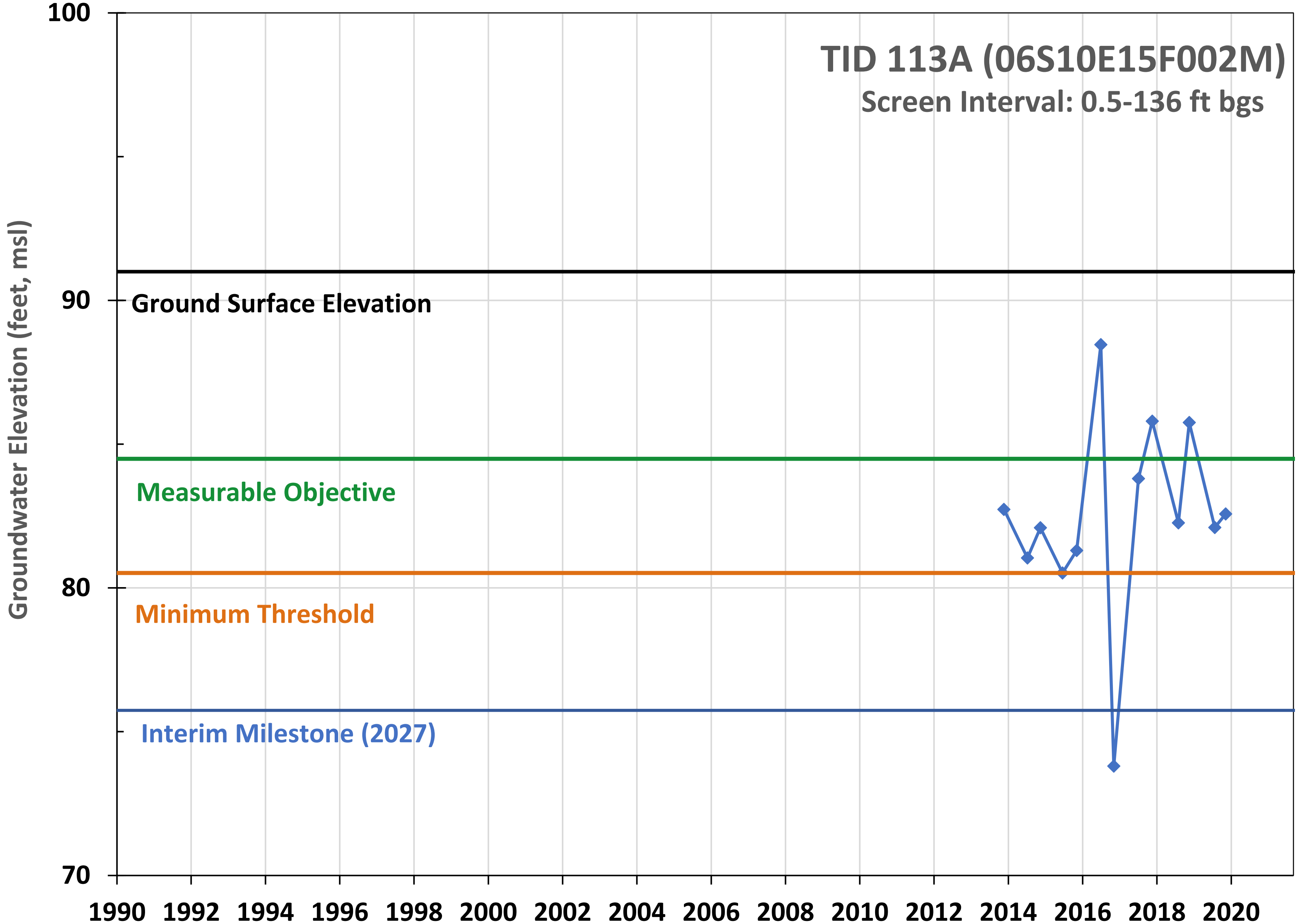
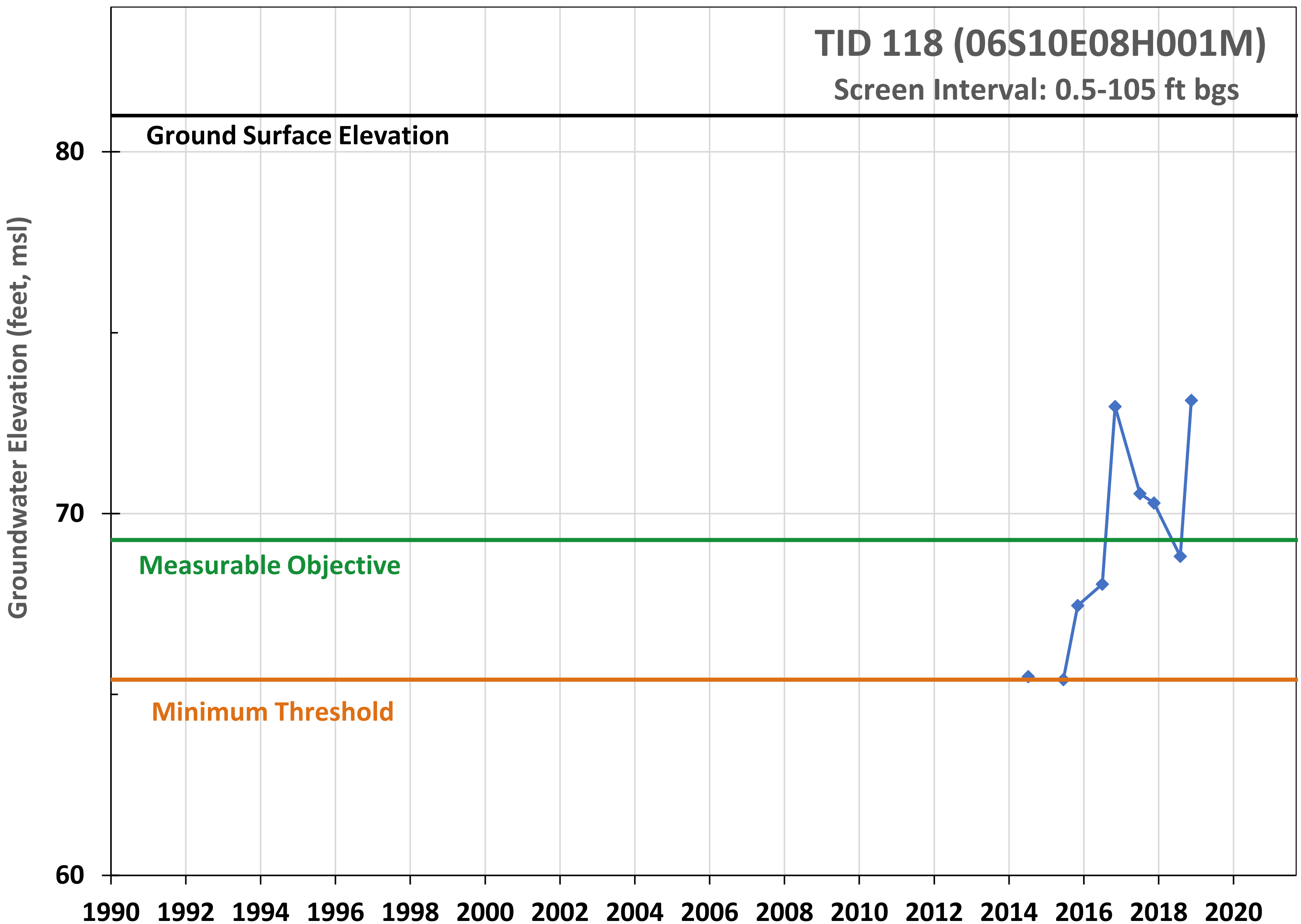
2012
2014
2016
2018
2020

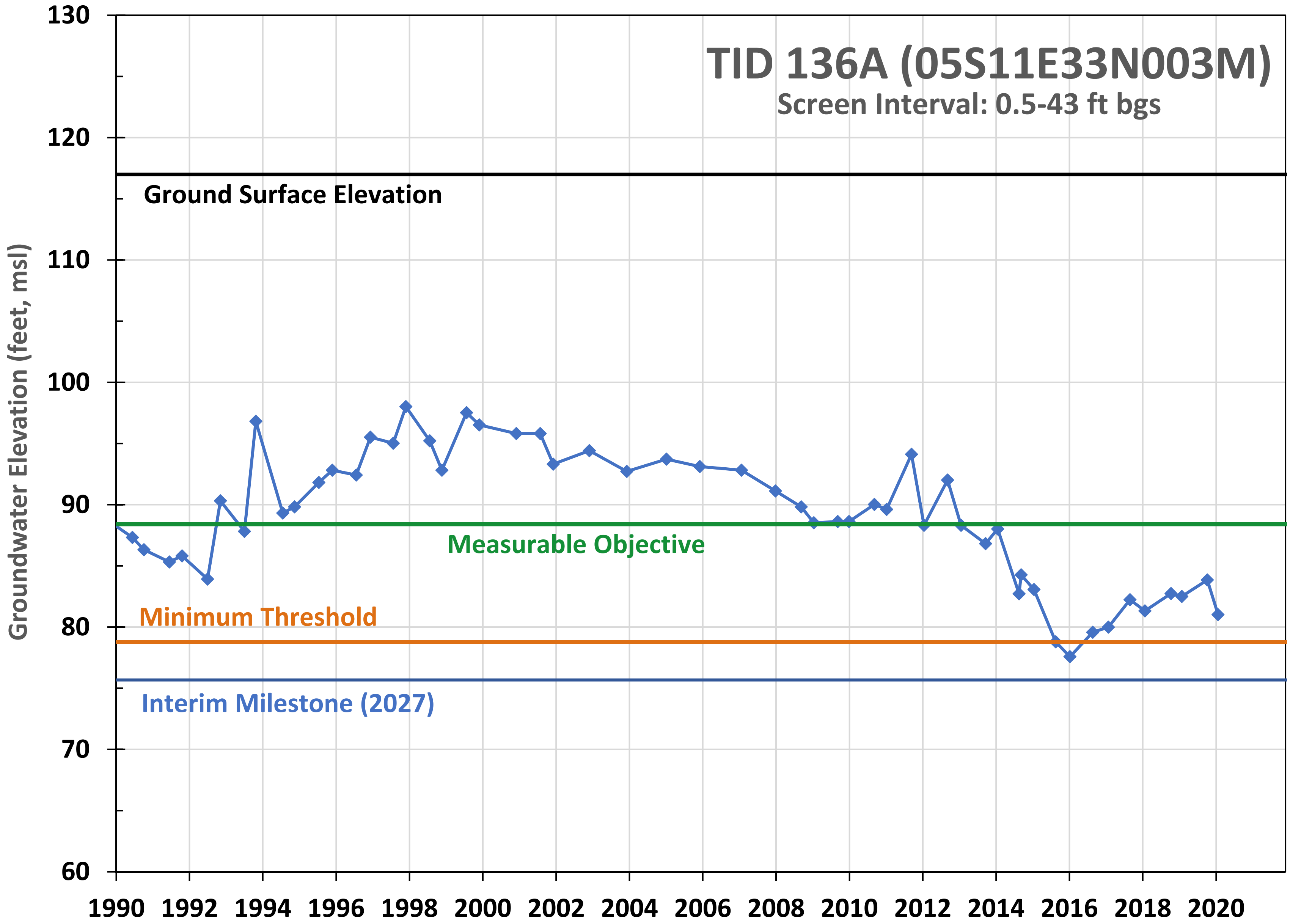


TID 111 (04S08E27H001M)
Screen Interval: 0.5-164 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
60
50
40
30
20
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

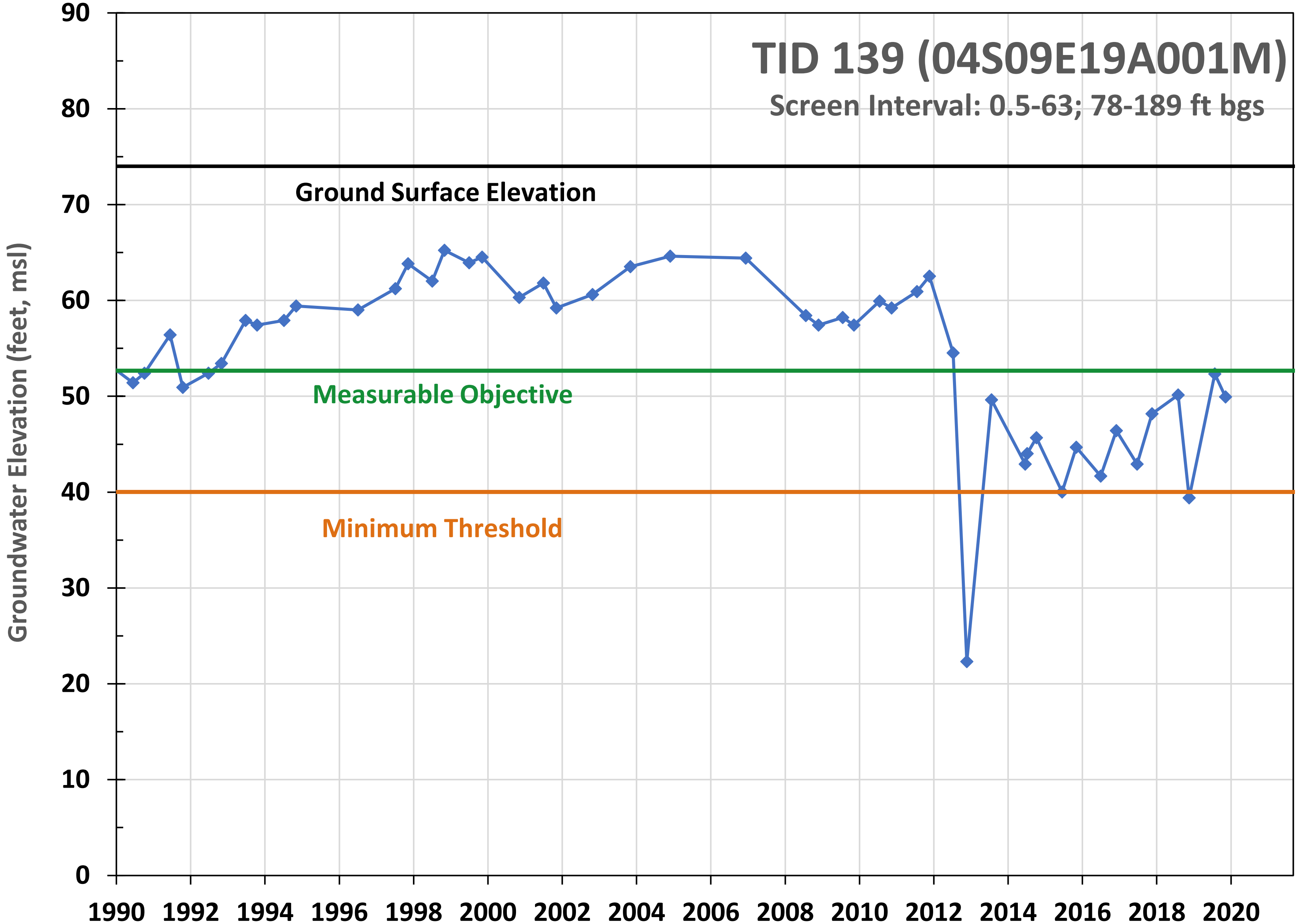

TID 113A (06S10E15F002M)
Screen Interval: 0.5-136 ft bgs
Groundwater Elevation (feet, msl)
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
100
90
80
70
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



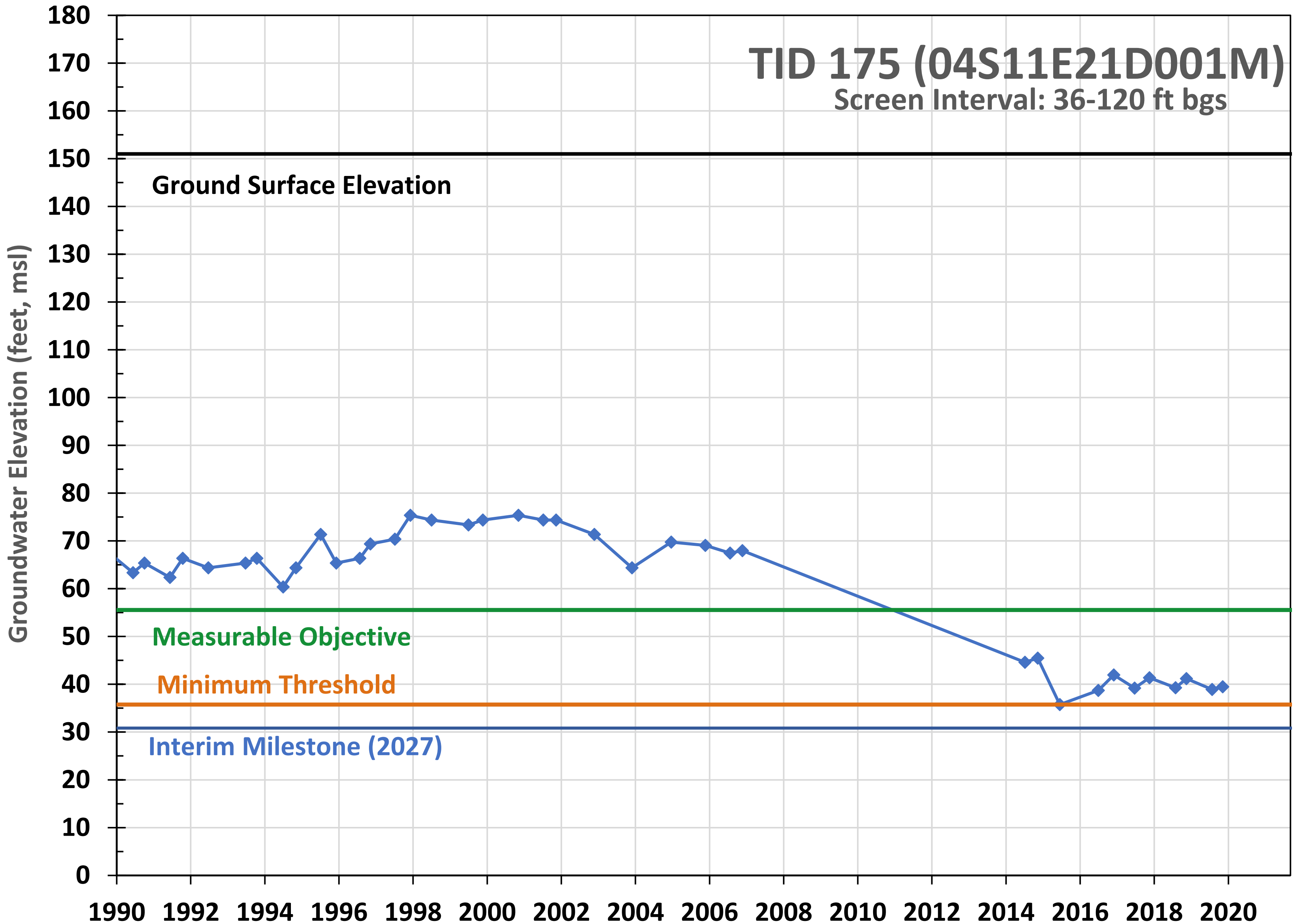
TID 118 (06S10E08H001M)
Screen Interval: 0.5-105 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
80
70
60
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



TID 136A (05S11E33N003M)
Screen Interval: 0.5-43 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
130
120
110
100
90
80
70
60
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



TID 139 (04S09E19A001M)
Screen Interval: 0.5-63; 78-189 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
0
10
20
30
40
50
60
70
80
90
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020


TID 175 (04S11E21D001M)
Screen Interval: 36-120 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
0
10
20
30
40
50
60
70
80
90
100
110
120
130
140
150
160
170
180
1990
1992
1994
1996
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2000
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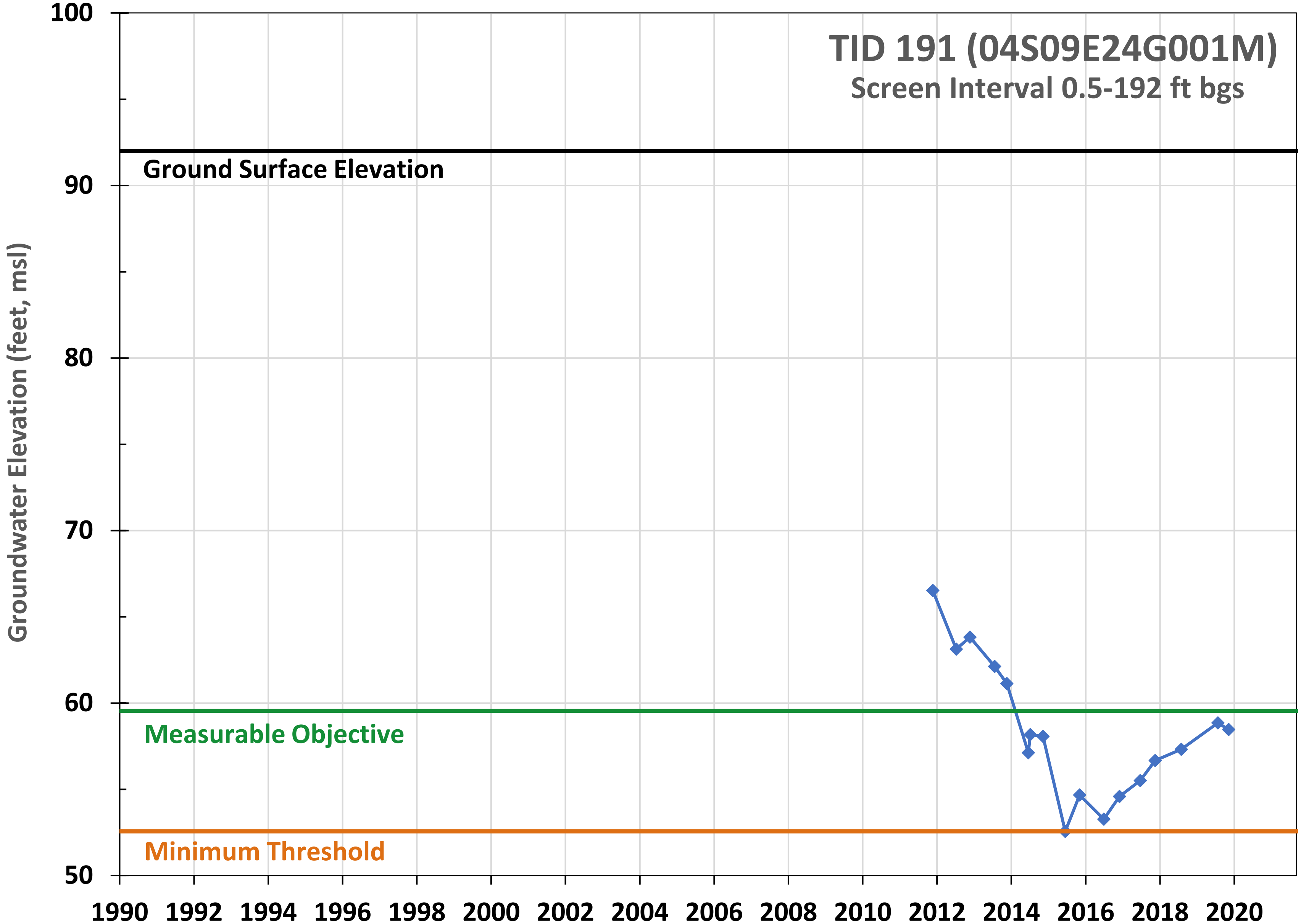
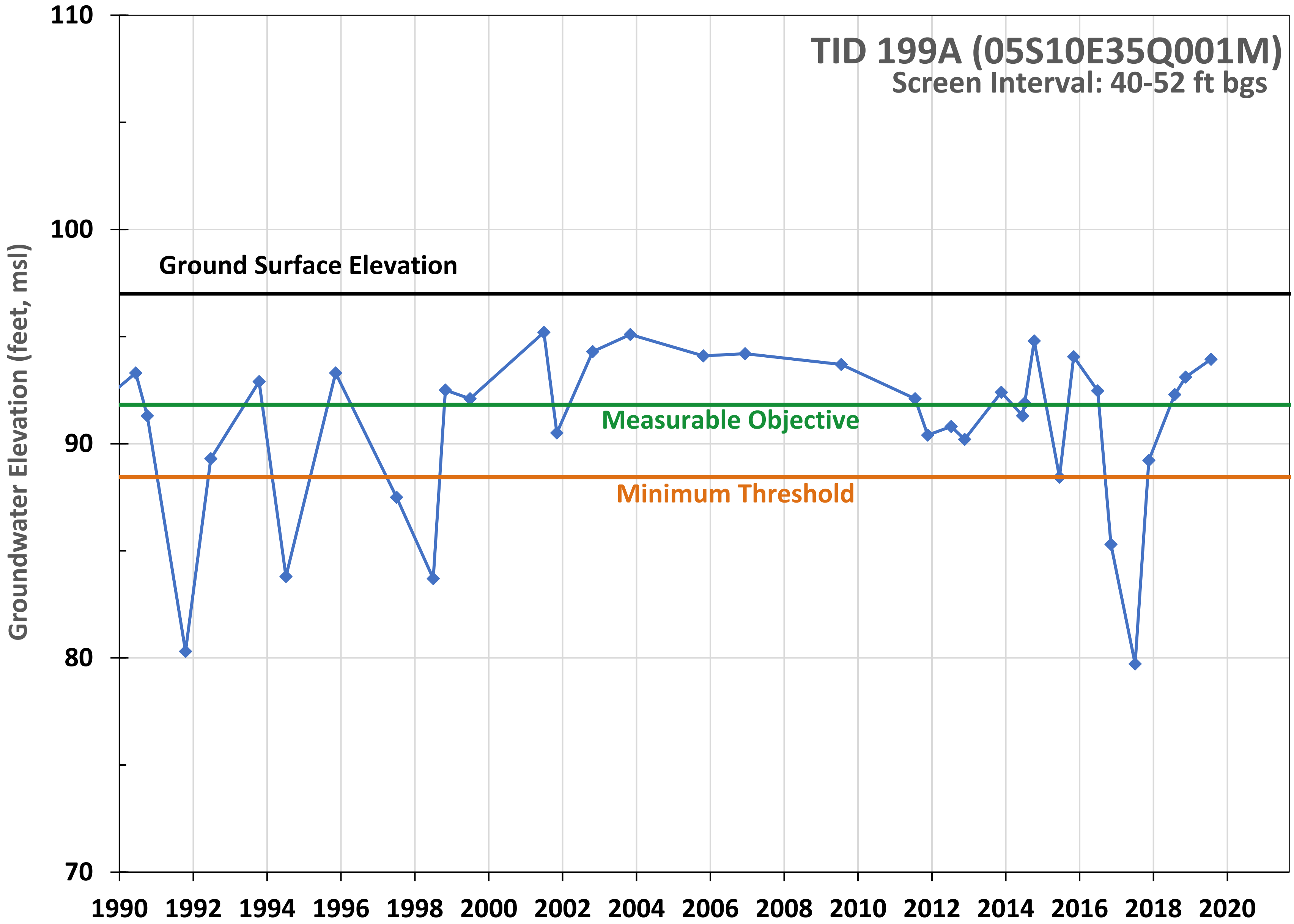
2012
2014
2016
2018
2020



TID 191 (04S09E24G001M)
Screen Interval 0.5-192 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
100
90
80
70
60
50
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020


TID 199A (05S10E35Q001M)
Screen Interval: 40-52 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
110
100
90
80
70
1990
1992
1994
1996
1998
2000
2002
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2006
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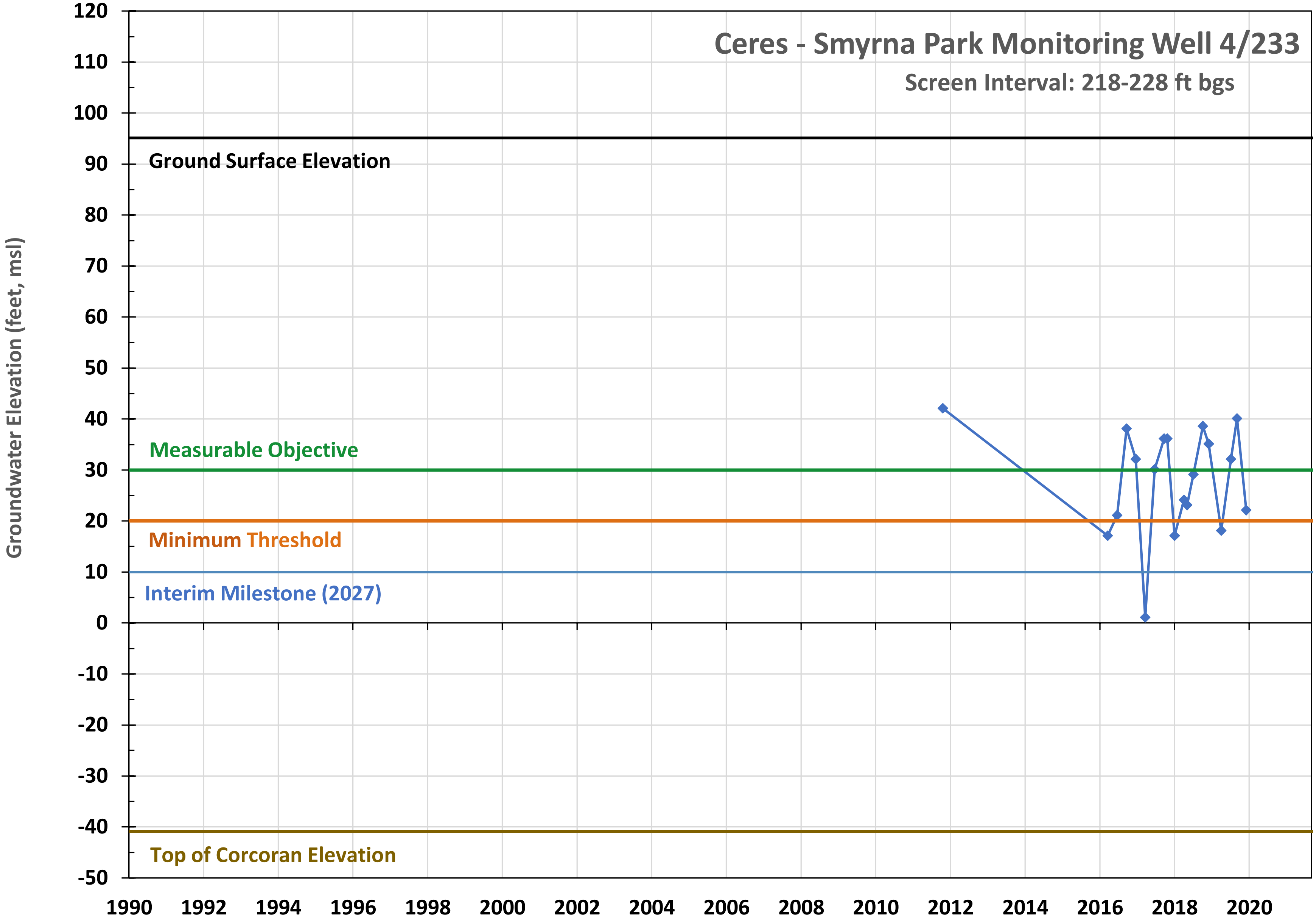
2012
2014
2016
2018
2020



Ceres - Smyrna Park Monitoring Well 4/233
Screen Interval: 218-228 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Top of Corcoran Elevation
Groundwater Elevation (feet, msl)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
1990
1992
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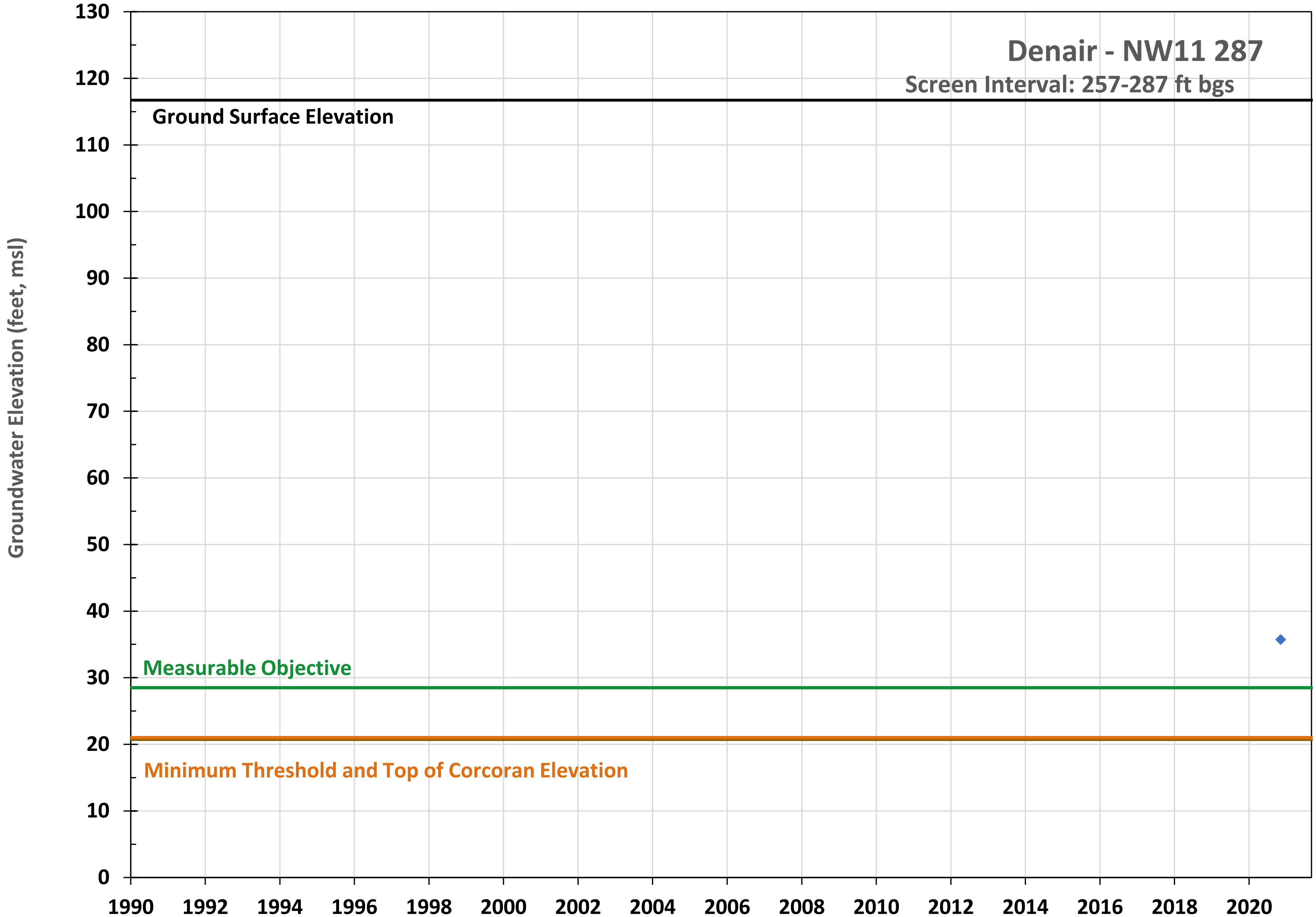
2012
2014
2016
2018
2020



Denair - NW11 287
Screen Interval: 257-287 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold and Top of Corcoran Elevation
Groundwater Elevation (feet, msl)
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1990
1992
1994
1996
1998
2000
2002
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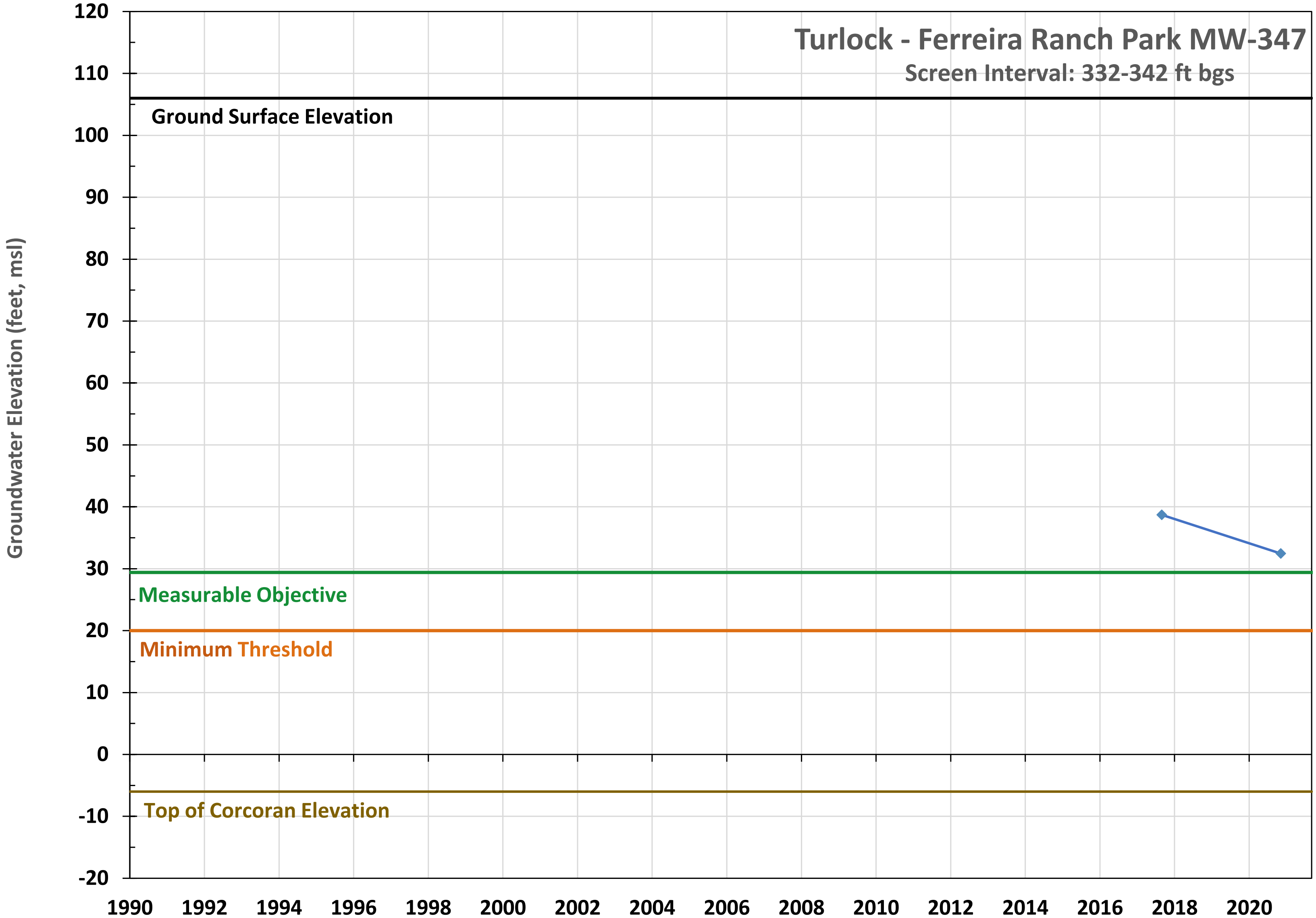
2012
2014
2016
2018
2020



Turlock - Ferreira Ranch Park MW-347
Screen Interval: 332-342 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Top of Corcoran Elevation
Groundwater Elevation (feet, msl)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
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1990
1992
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1996
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2012
2014
2016
2018
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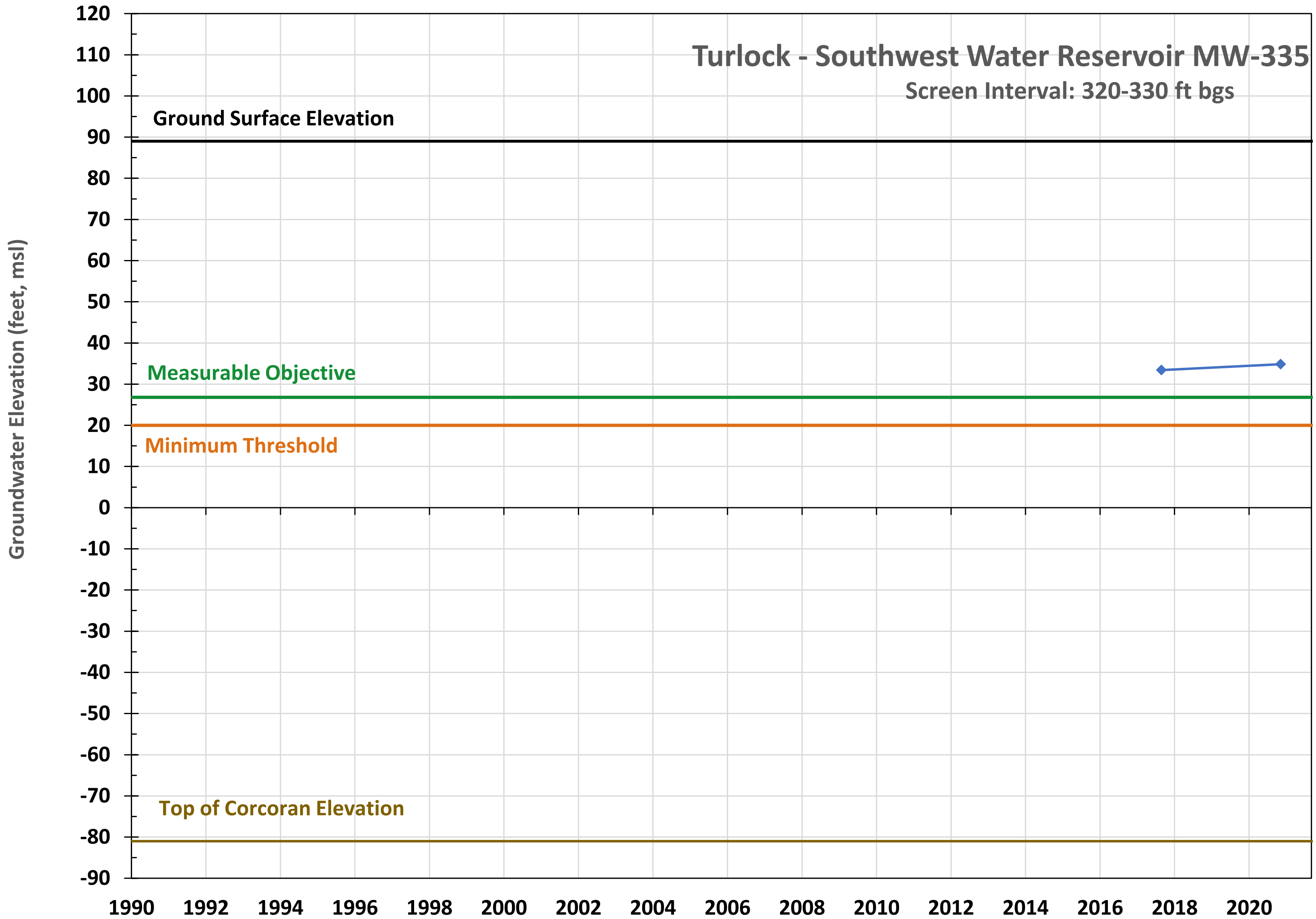

Turlock - Southwest Water Reservoir MW-335
Screen Interval: 320-330 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Top of Corcoran Elevation
Groundwater Elevation (feet, msl)
120
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
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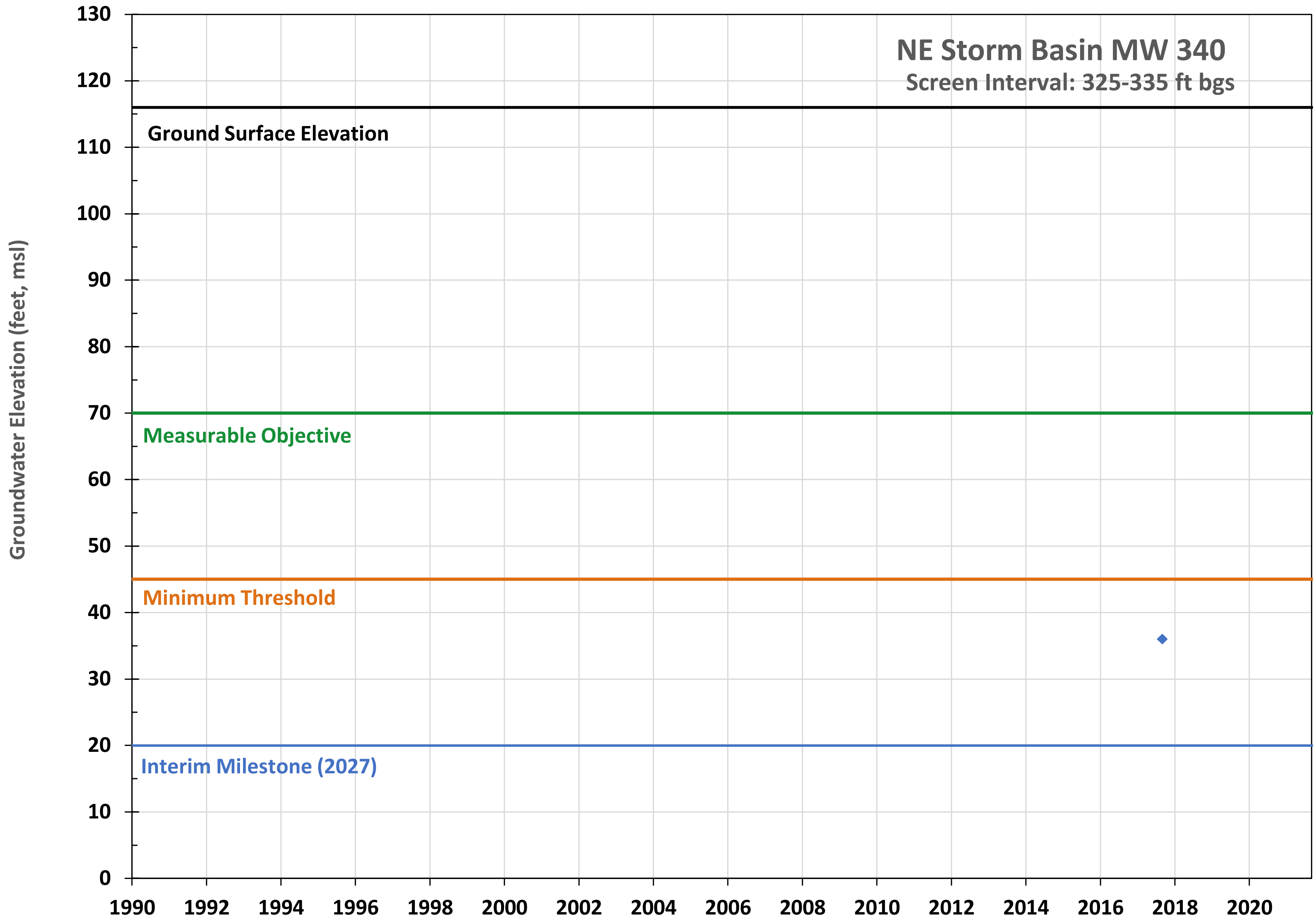
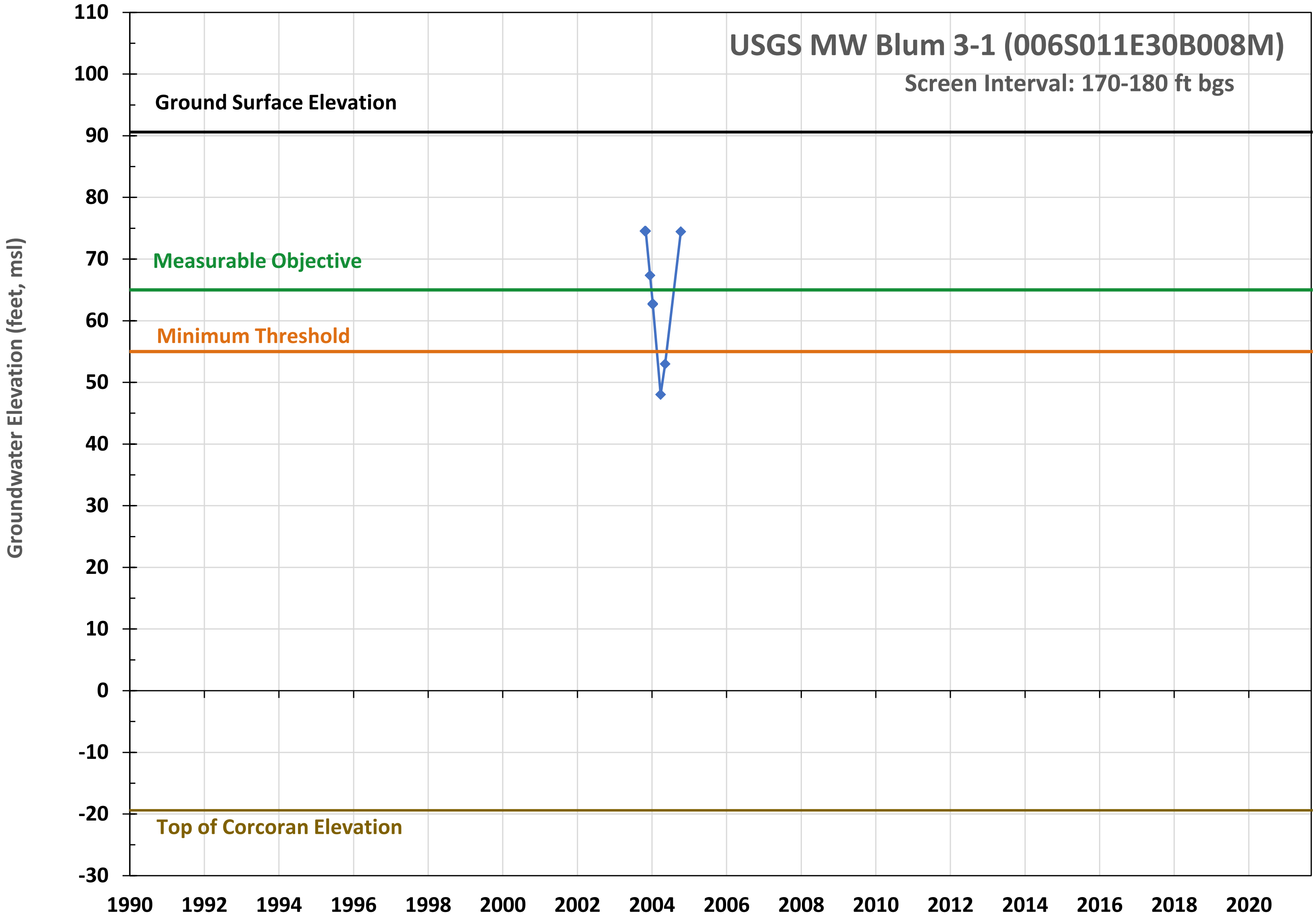
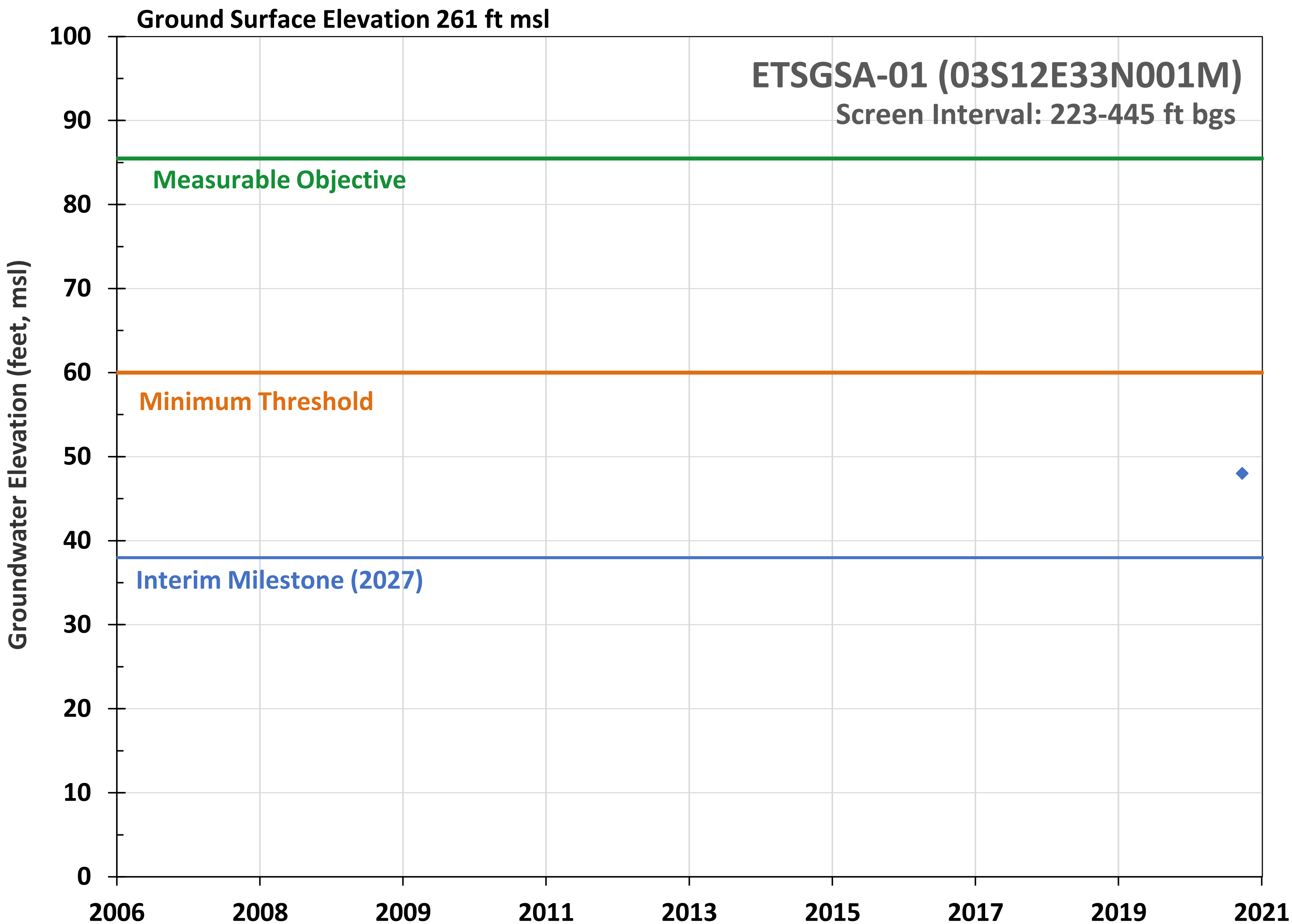
2012
2014
2016
2018
2020

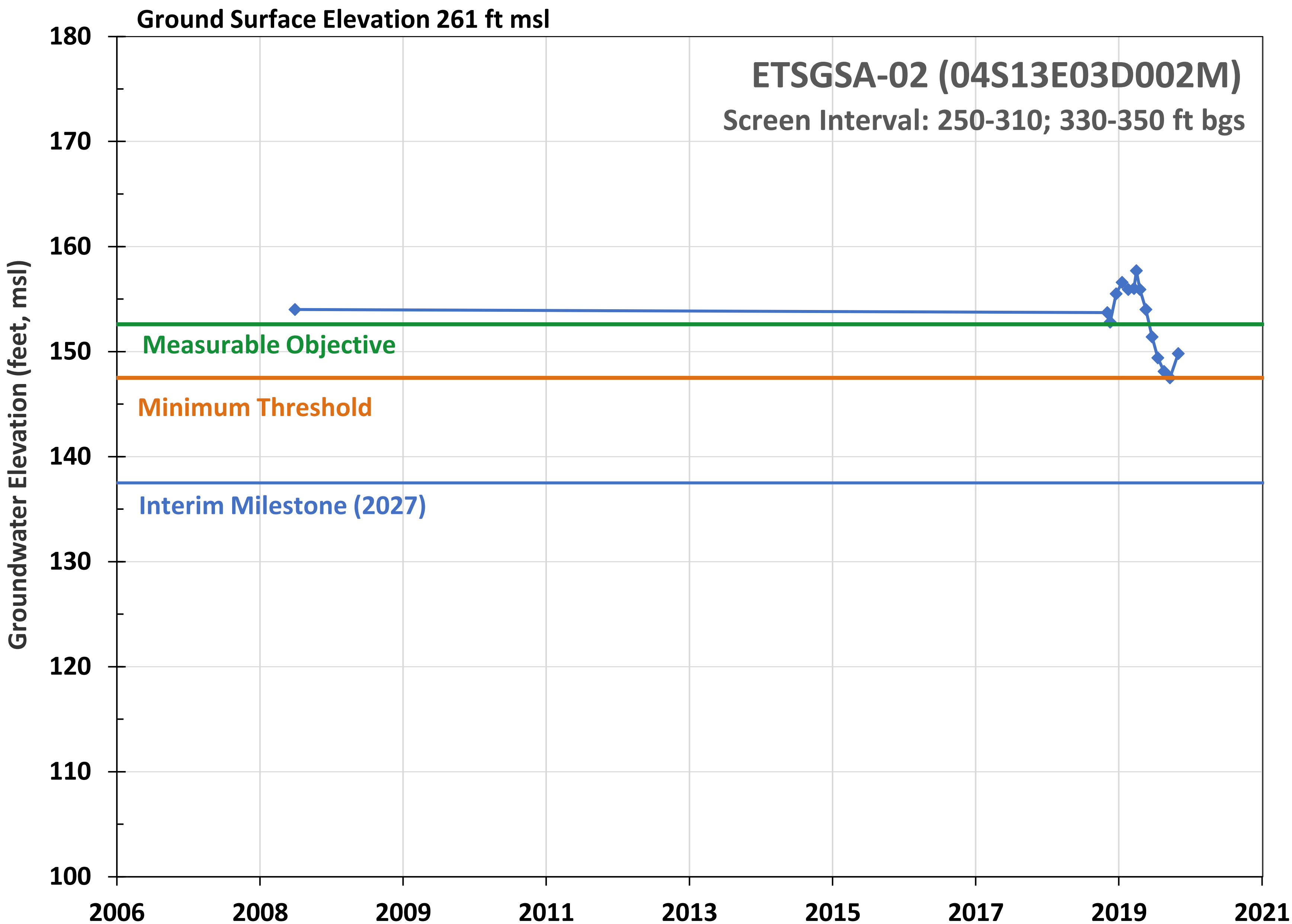

NE Storm Basin MW 340
Screen Interval: 325-335 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
130
120
110
100
90
80
70
60
50
40
30
20
10
0
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



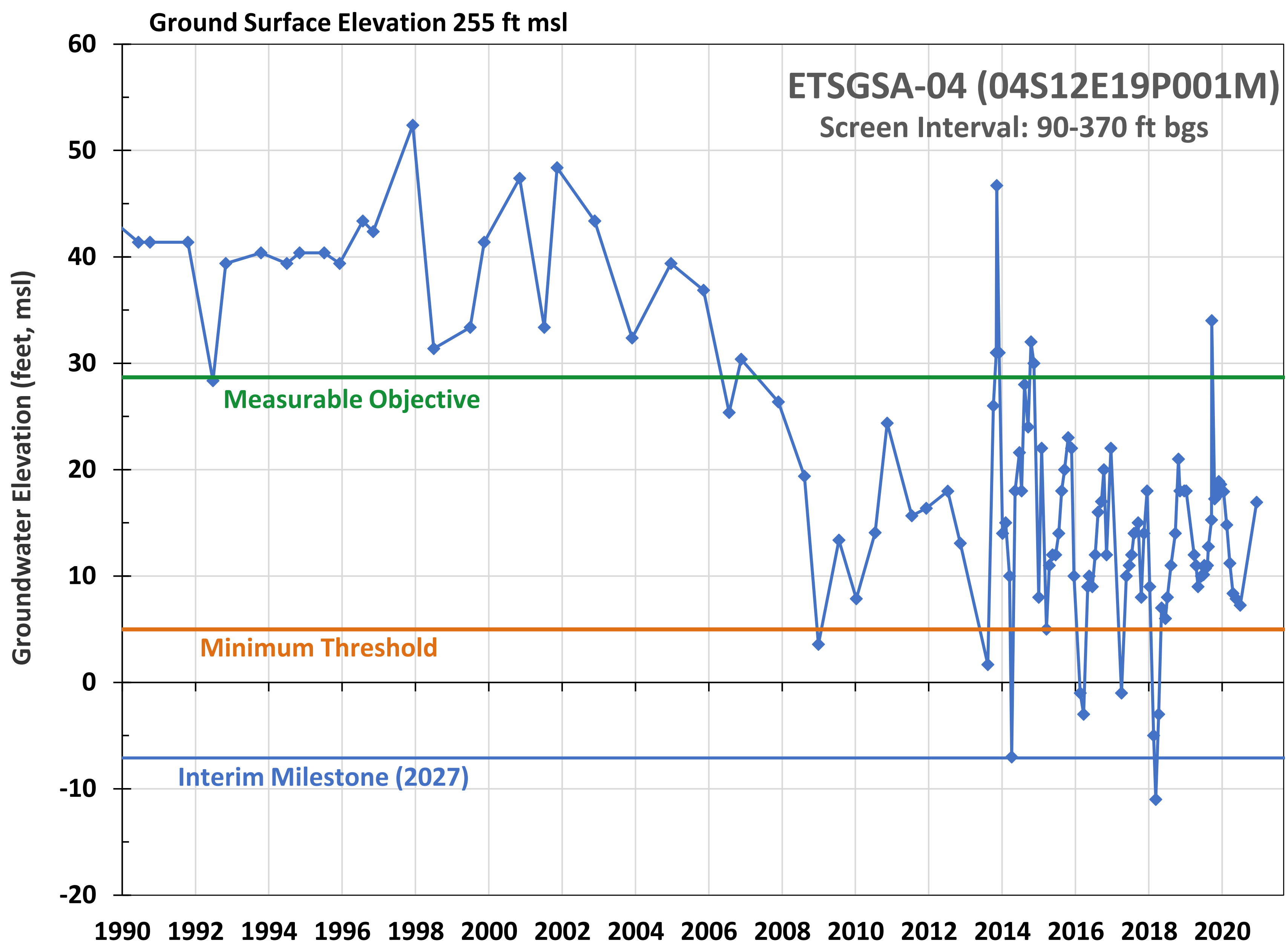
USGS MW Blum 3-1 (006S011E30B008M)
Screen Interval: 170-180 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Top of Corcoran Elevation
Groundwater Elevation (feet, msl)
110
100
90
80
70
60
50
40
30
20
10
0
-10
-20
-30
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

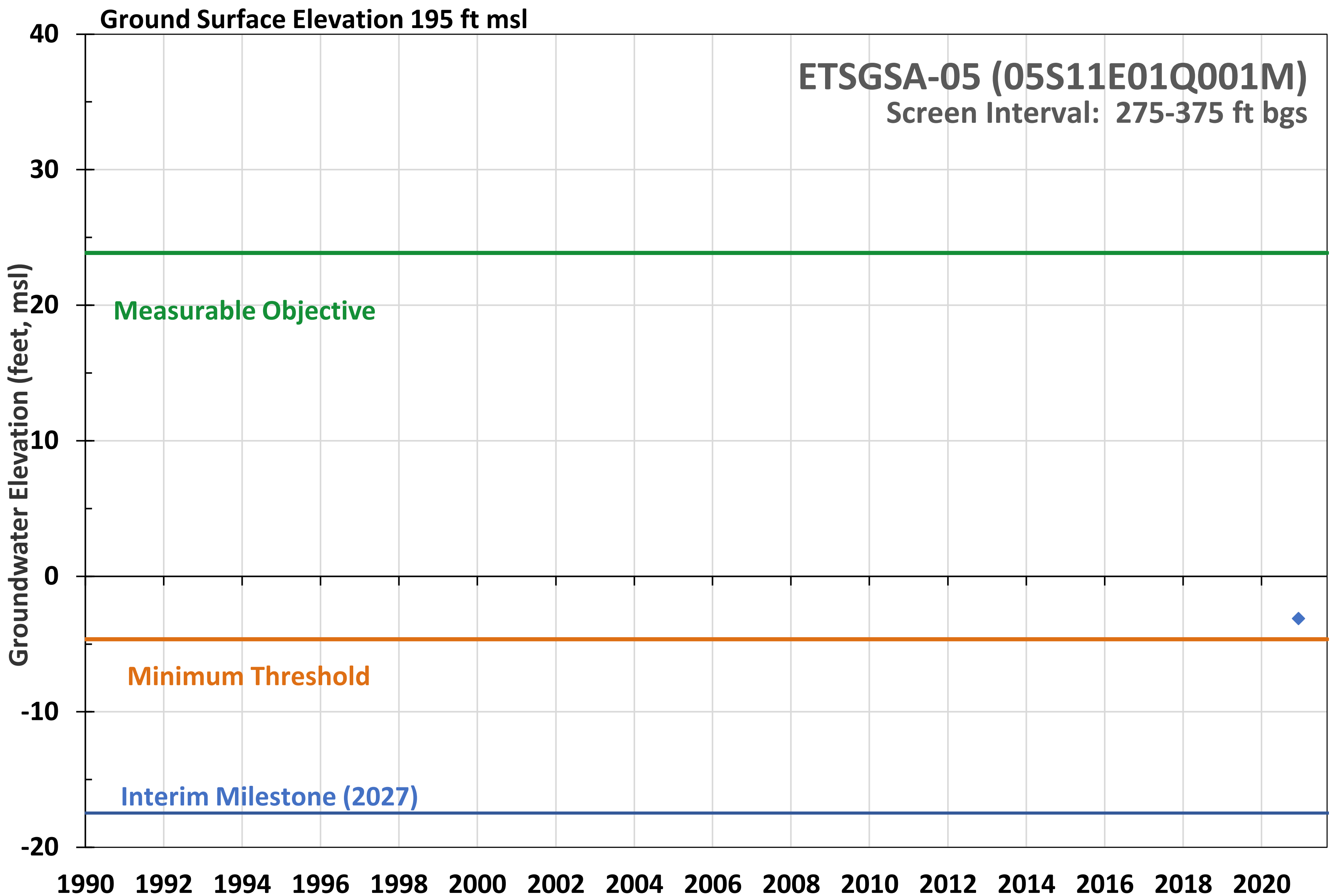


Ground Surface Elevation 261 ft msl
ETSGSA-01 (03S12E33N001M)
Screen Interval: 223-445 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
100
90
80
70
60
50
40
30
20
10
0
2006
2008
2009
2011
2013
2015
2017
2019
2021

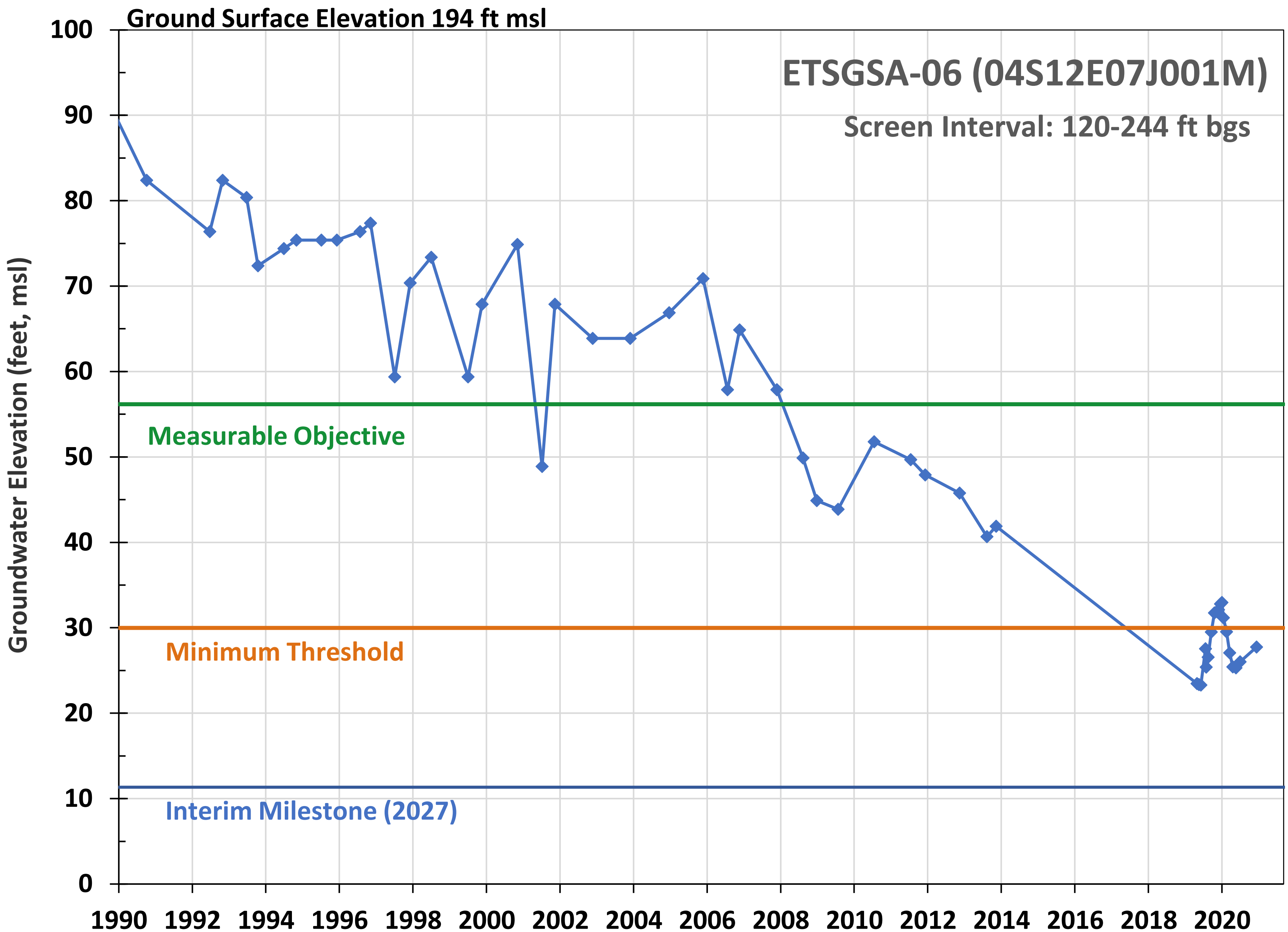


Ground Surface Elevation 261 ft msl
ETSGSA-02 (04S13E03D002M)
Screen Interval: 250-310; 330-350 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
180
170
160
150
140
130
120
110
100
2006
2008
2009
2011
2013
2015
2017
2019
2021

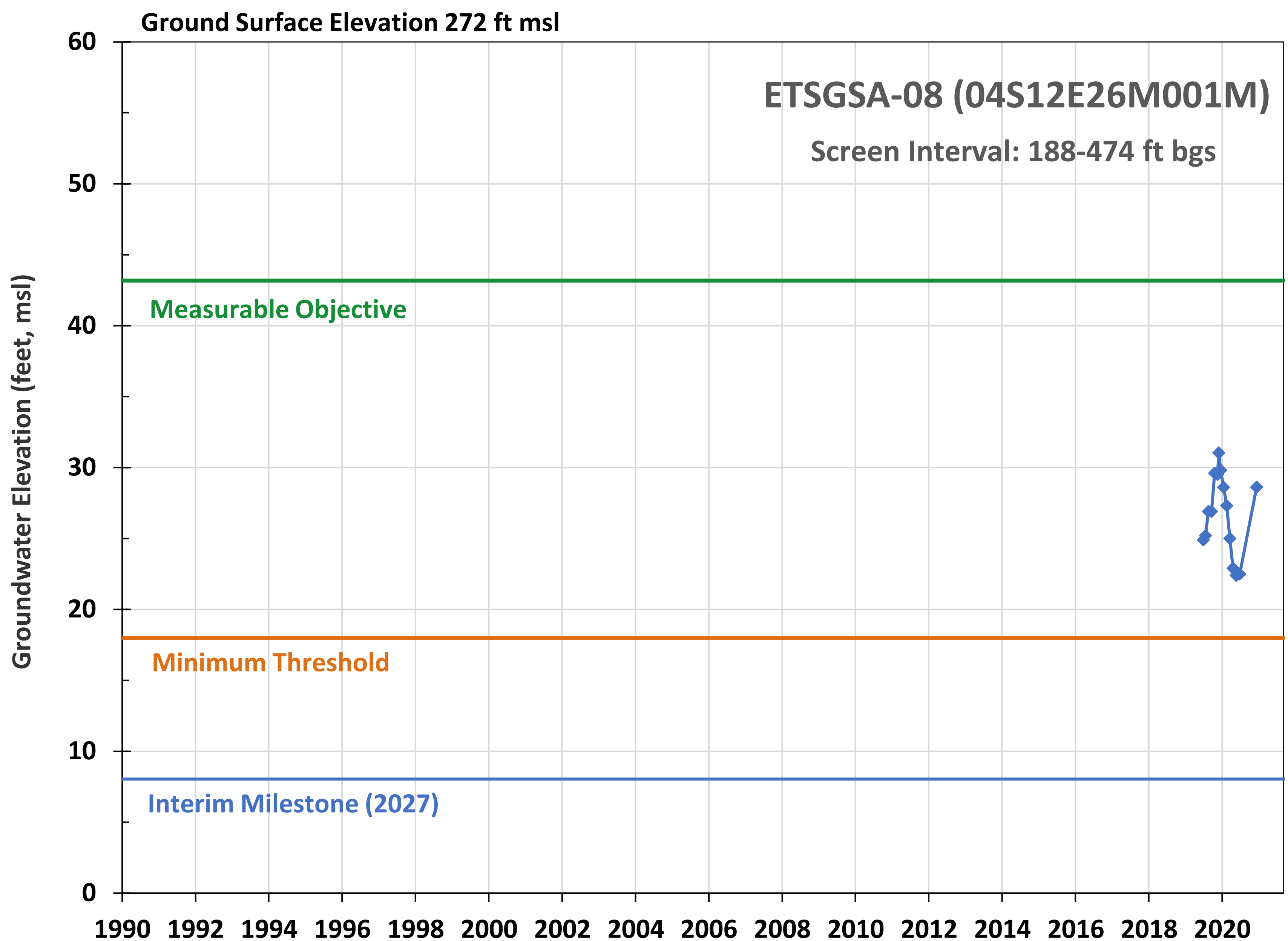

Ground Surface Elevation 255 ft msl
ETSGSA-04 (04S12E19P001M)
Screen Interval: 90-370 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
60
50
40
30
20
10
0
-10
-20
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

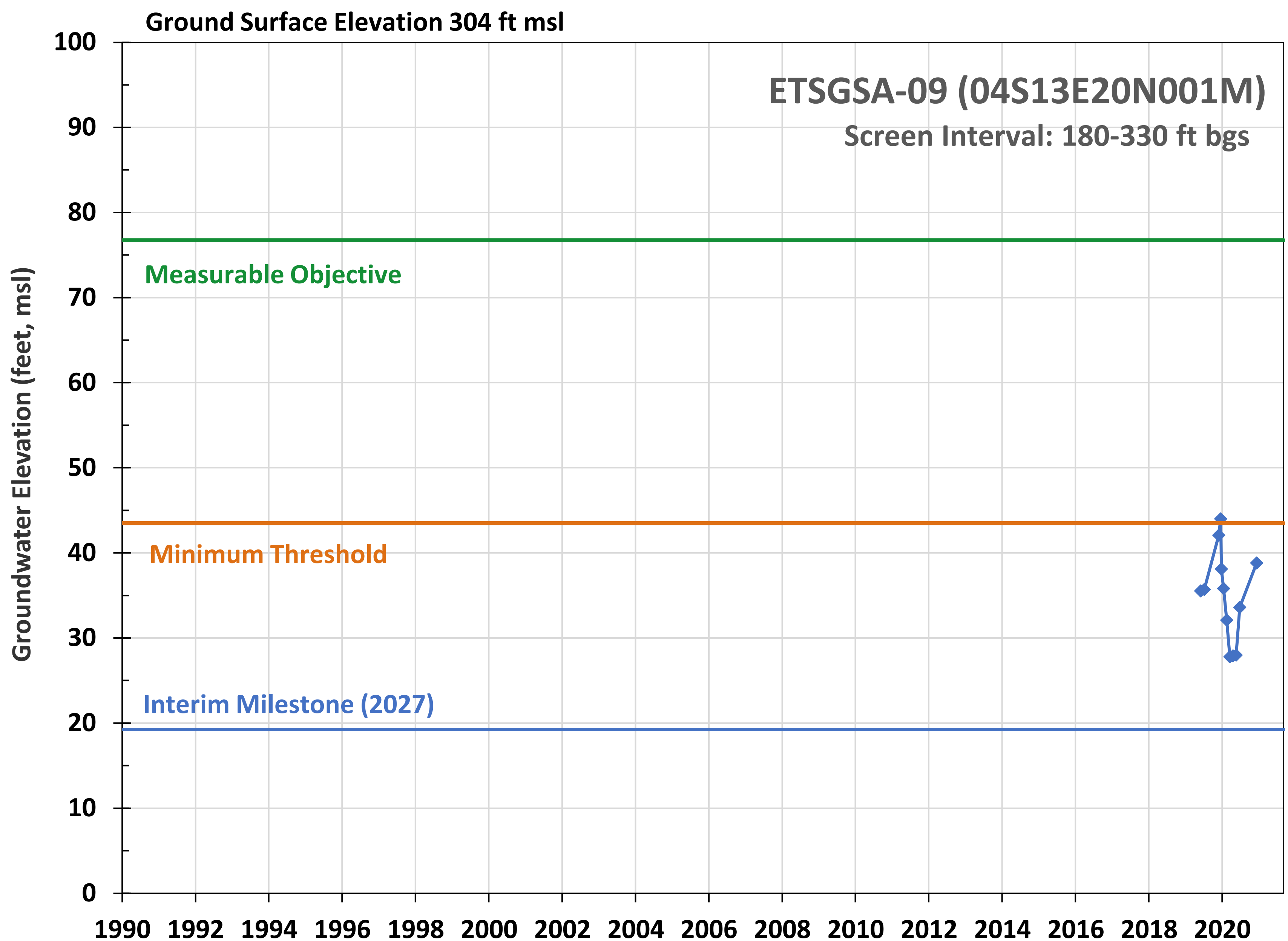


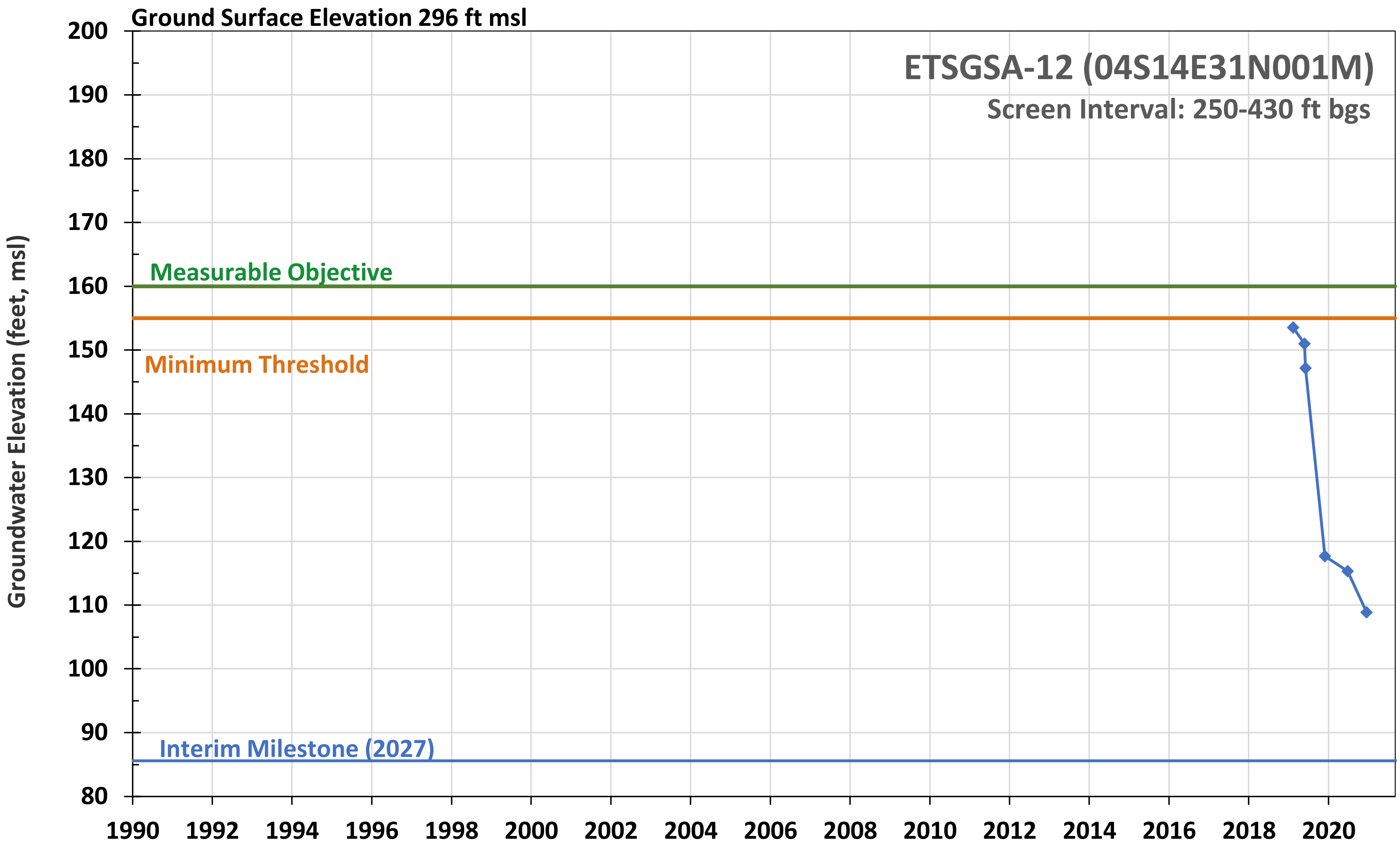
Ground Surface Elevation 195 ft msl
ETSGSA-05 (05S11E01Q001M)
Screen Interval: 275-375 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
40
30
20
10
0
-10
-20
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



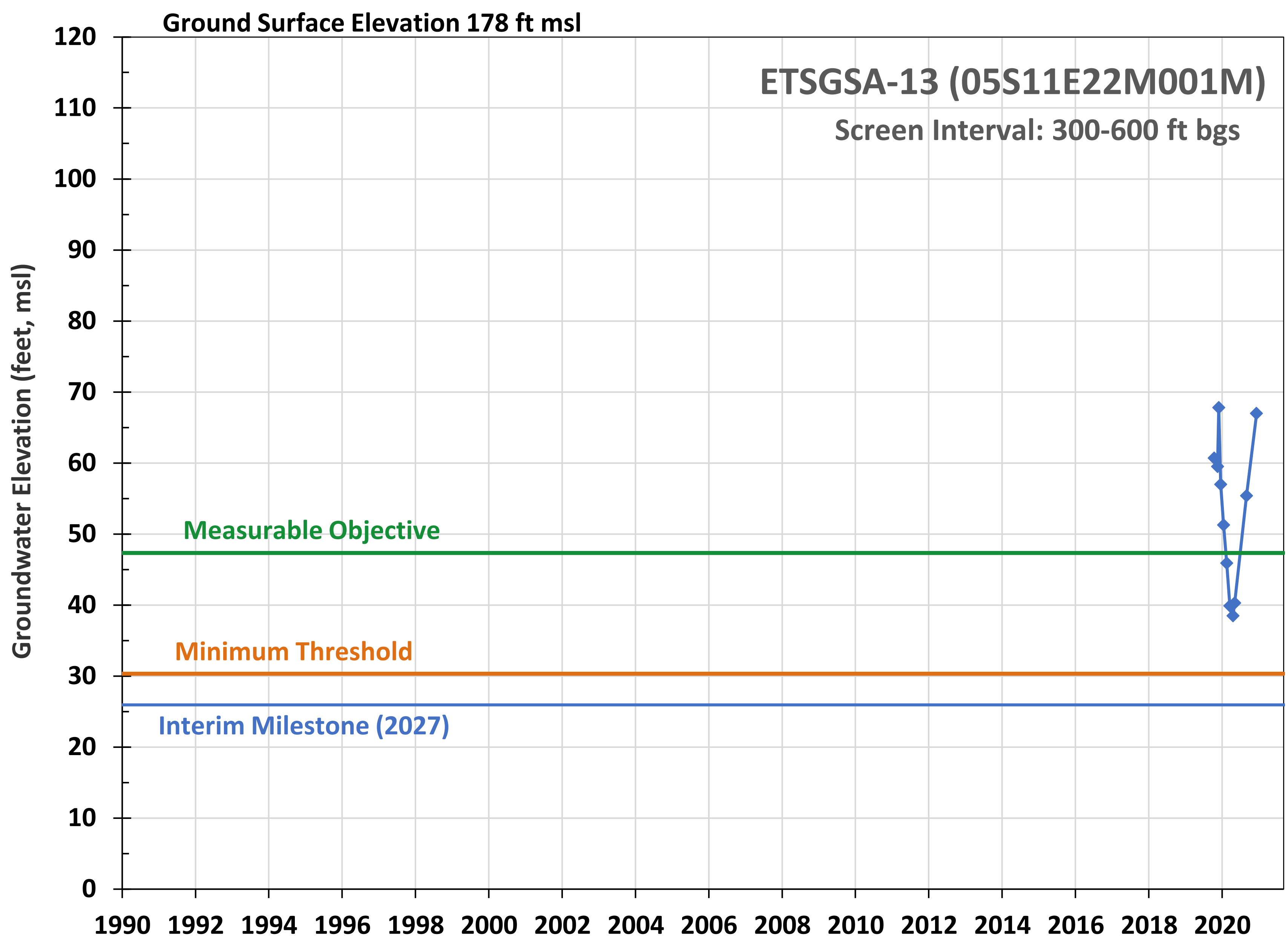
Ground Surface Elevation 194 ft msl
ETSGSA-06 (04S12E07J001M)
Screen Interval: 120-244 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
0
10
20
30
40
50
60
70
80
90
100
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020


Ground Surface Elevation 272 ft msl
ETSGSA-08 (04S12E26M001M)
Screen Interval: 188-474 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
0
10
20
30
40
50
60
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

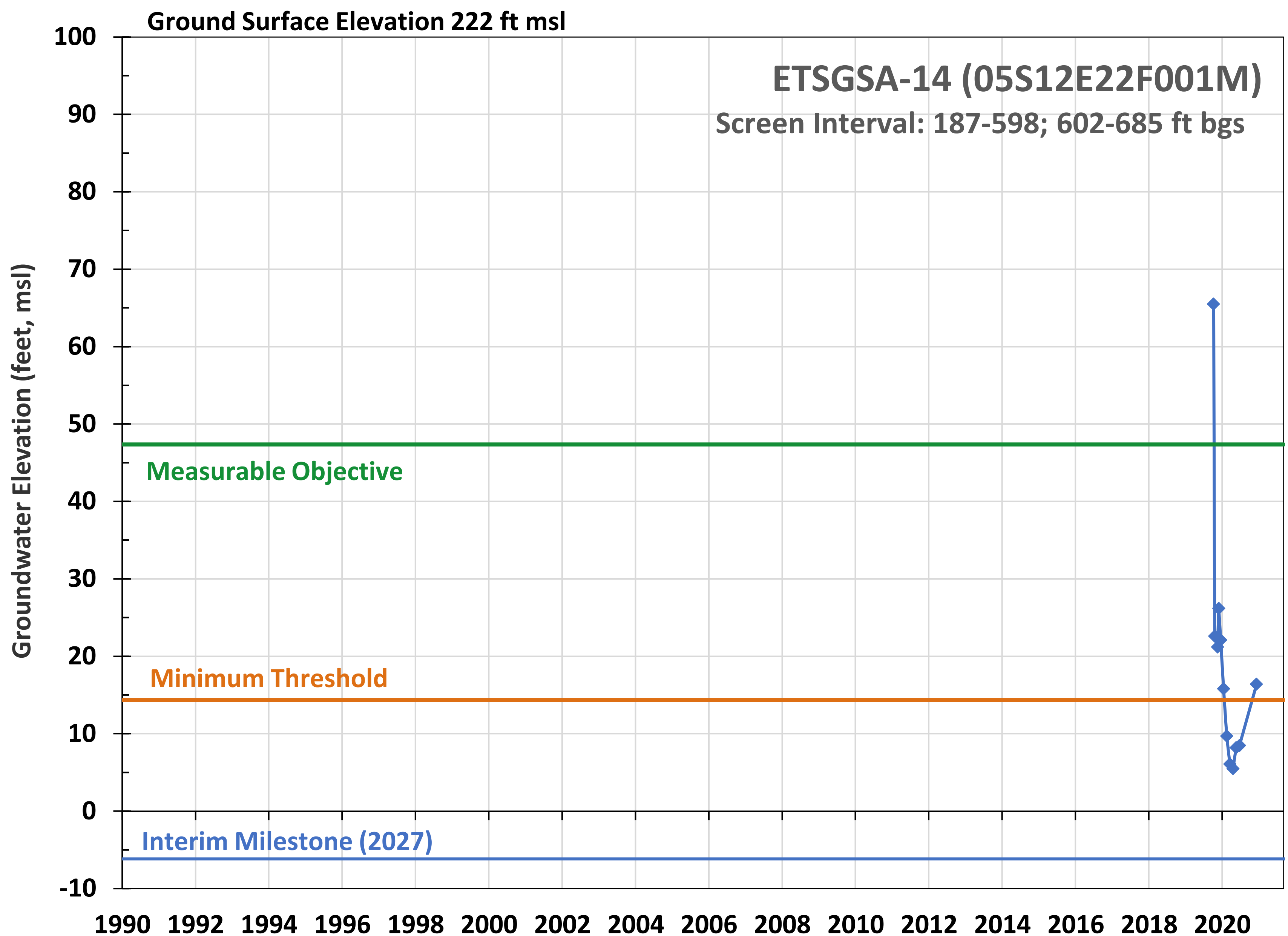

Ground Surface Elevation 304 ft msl
ETSGSA-09 (04S13E20N001M)
Screen Interval: 180-330 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
100
90
80
70
60
50
40
30
20
10
0
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

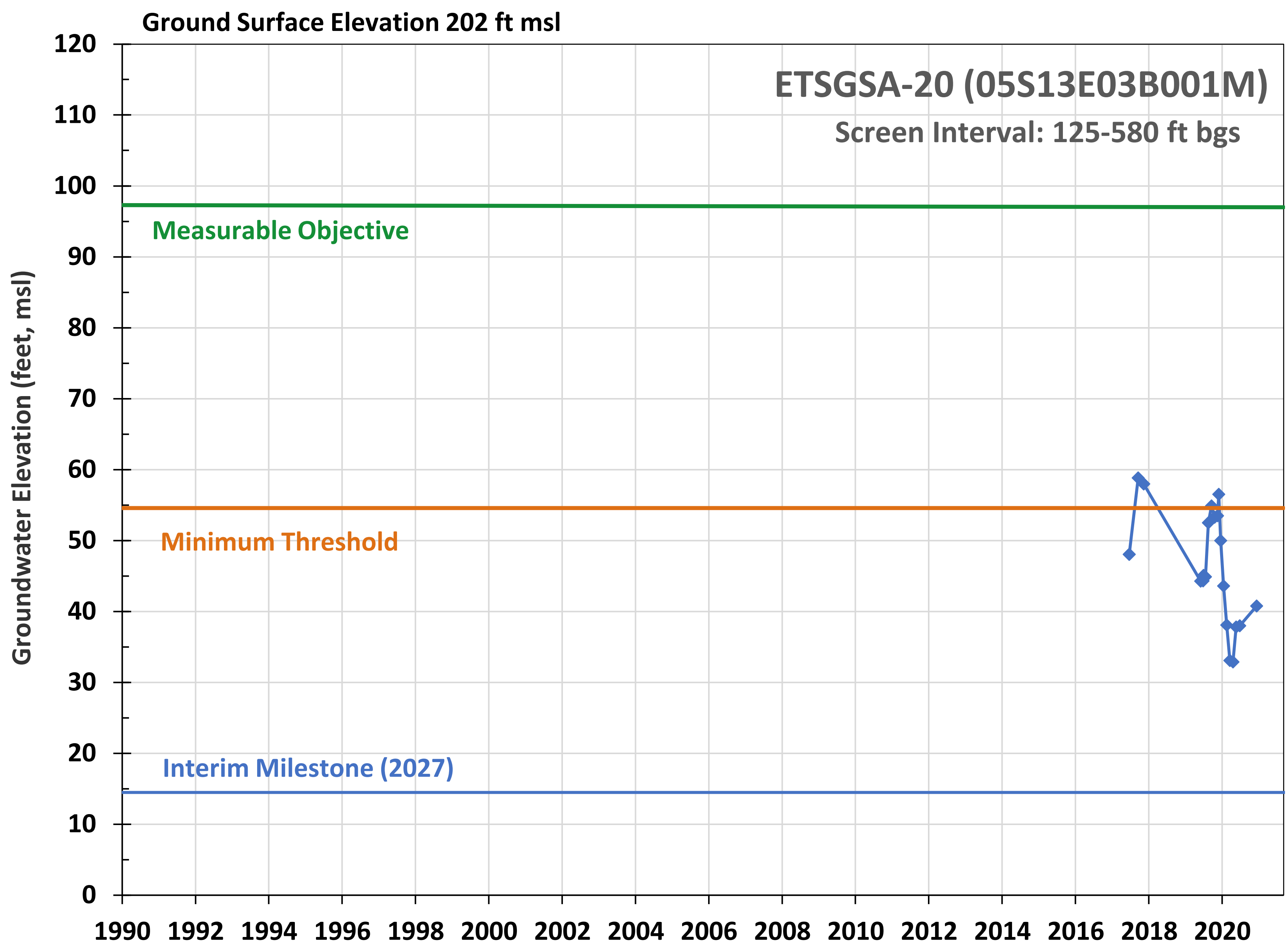


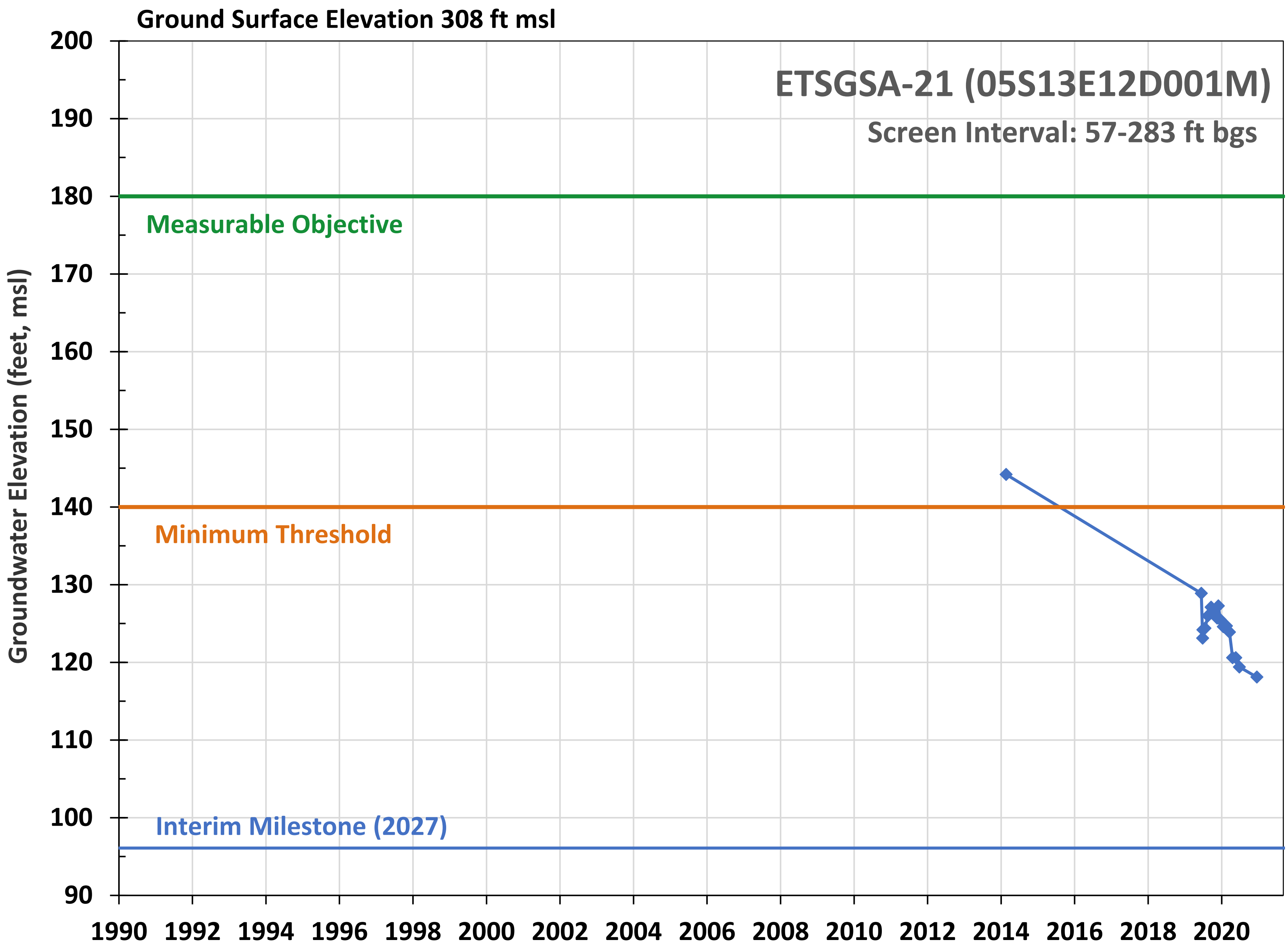
Ground Surface Elevation 296 ft msl
ETSGSA-12 (04S14E31N001M)
Screen Interval: 250-430 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
200
190
180
170
160
150
140
130
120
110
100
90
80
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



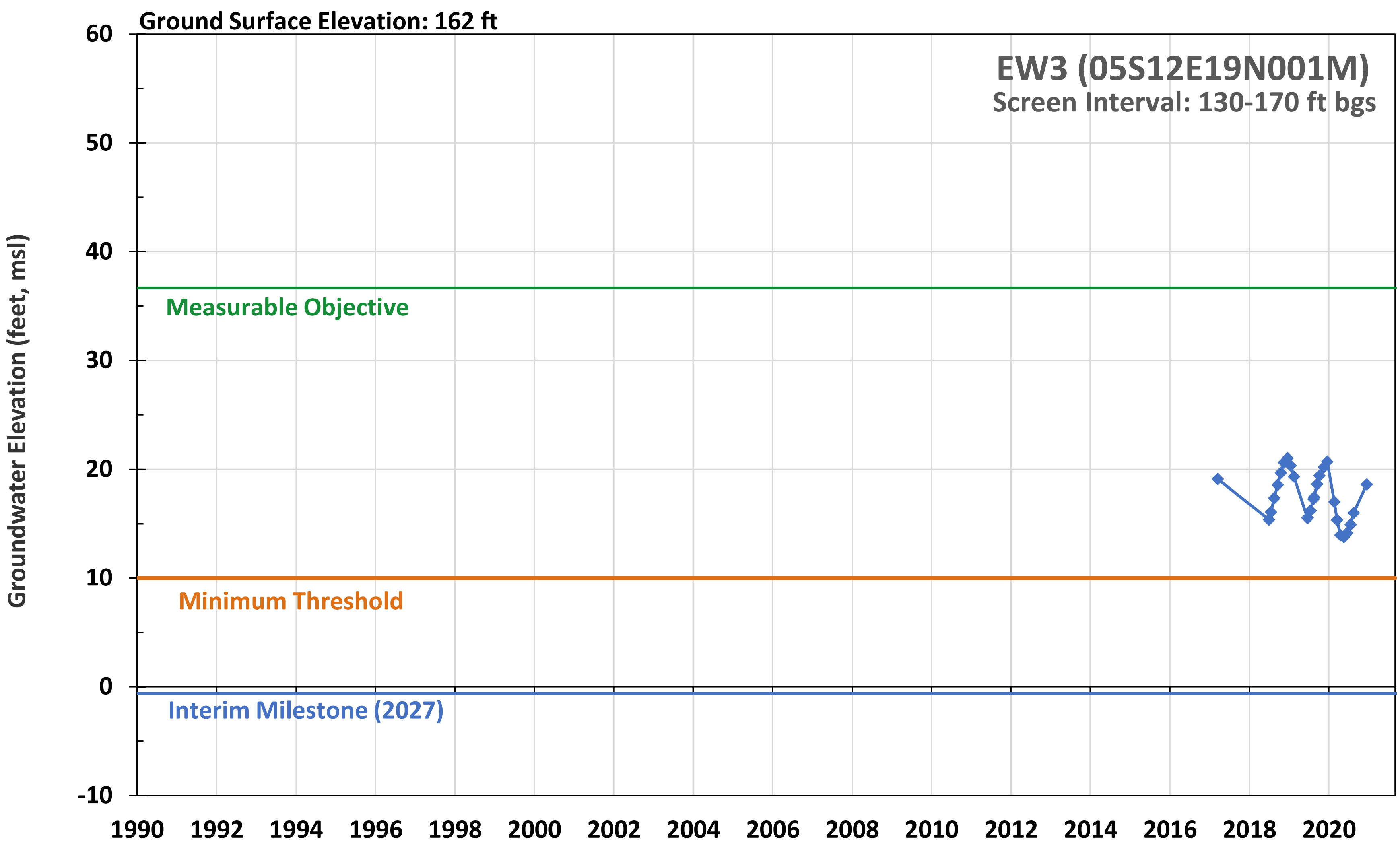
Ground Surface Elevation 178 ft msl
ETSGSA-13 (05S11E22M001M)
Screen Interval: 300-600 ft bgs
Groundwater Elevation (feet, msl)
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
0
10
20
30
40
50
60
70
80
90
100
110
120
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020


Ground Surface Elevation 222 ft msl
ETSGSA-14 (05S12E22F001M)
Screen Interval: 187-598; 602-685 ft bgs
Groundwater Elevation (feet, msl)
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
100
90
80
70
60
50
40
30
20
10
0
-10
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020


Ground Surface Elevation 202 ft msl
ETSGSA-20 (05S13E03B001M)
Screen Interval: 125-580 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
120
110
100
90
80
70
60
50
40
30
20
10
0
1990 1992 1994 1996 1998 2000 2002 2004 2006 2008 2010 2012 2014 2016 2018 2020



Ground Surface Elevation 308 ft msl
ETSGSA-21 (05S13E12D001M)
Screen Interval: 57-283 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
200
190
180
170
160
150
140
130
120
110
100
90
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

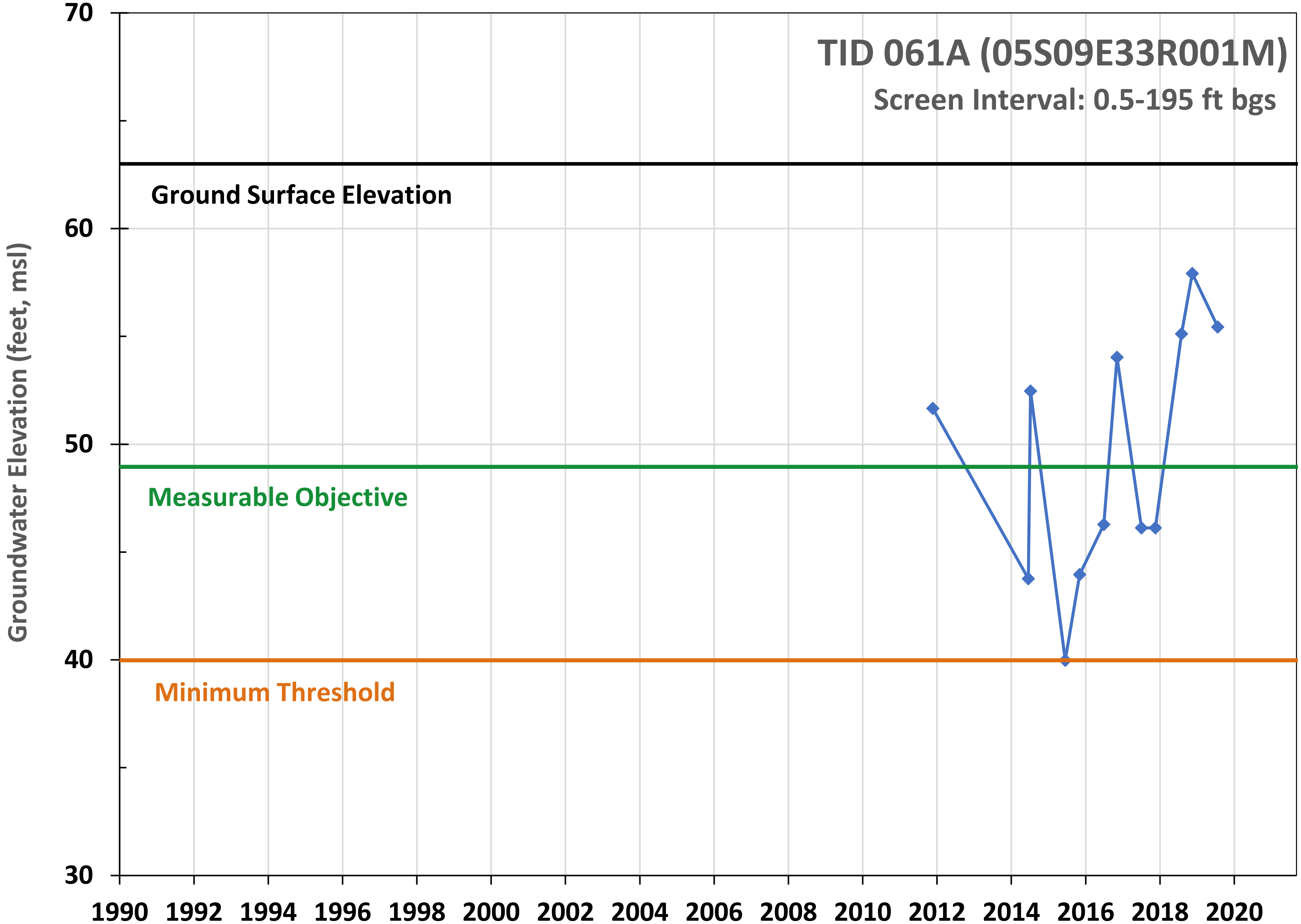


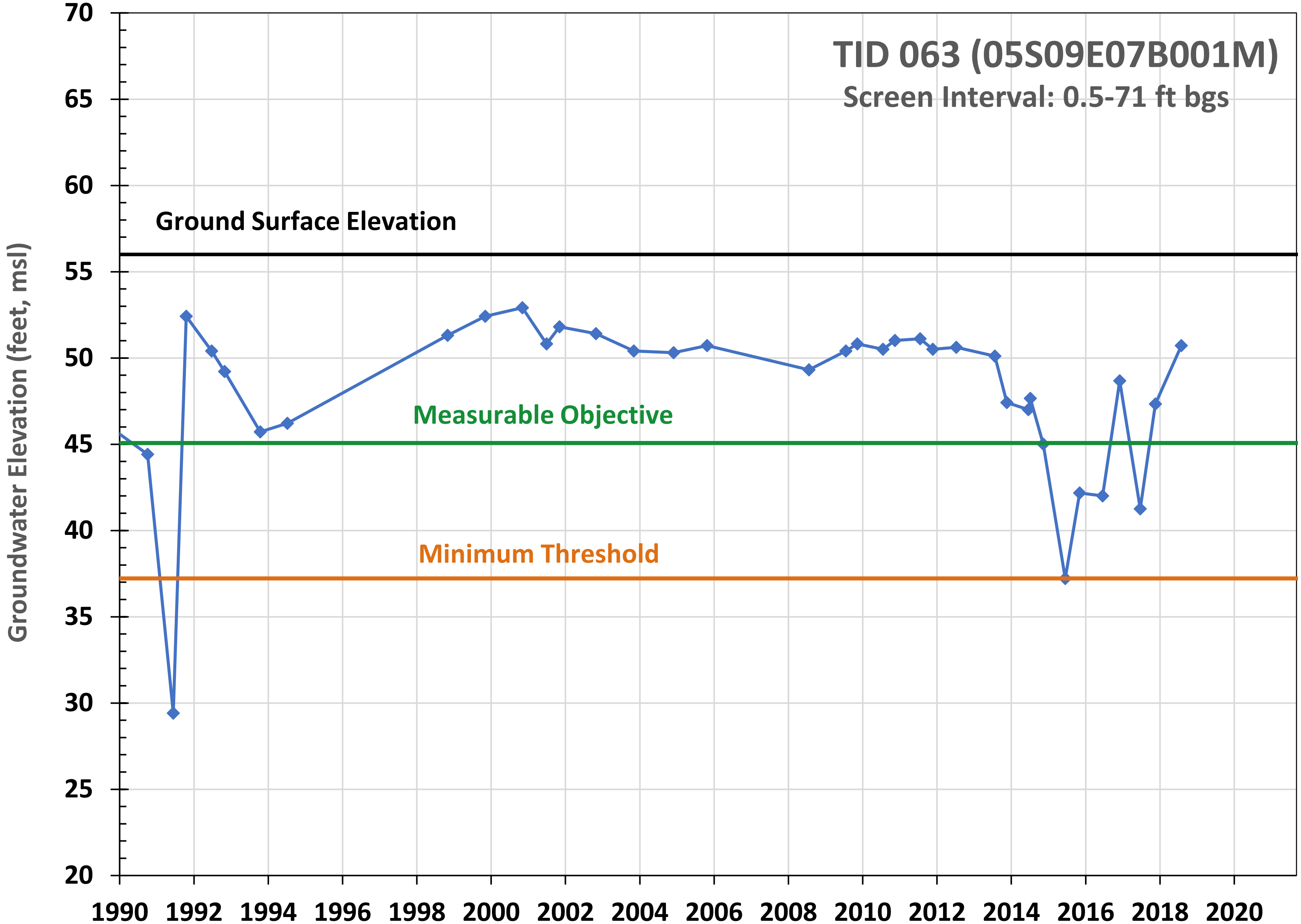
Ground Surface Elevation: 162 ft
EW3 (05S12E19N001M)
Screen Interval: 130-170 ft bgs
Groundwater Elevation (feet, msl)
60
50
40
30
20
10
0
-10
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

Hydrographs for Wells in the Monitoring Network for

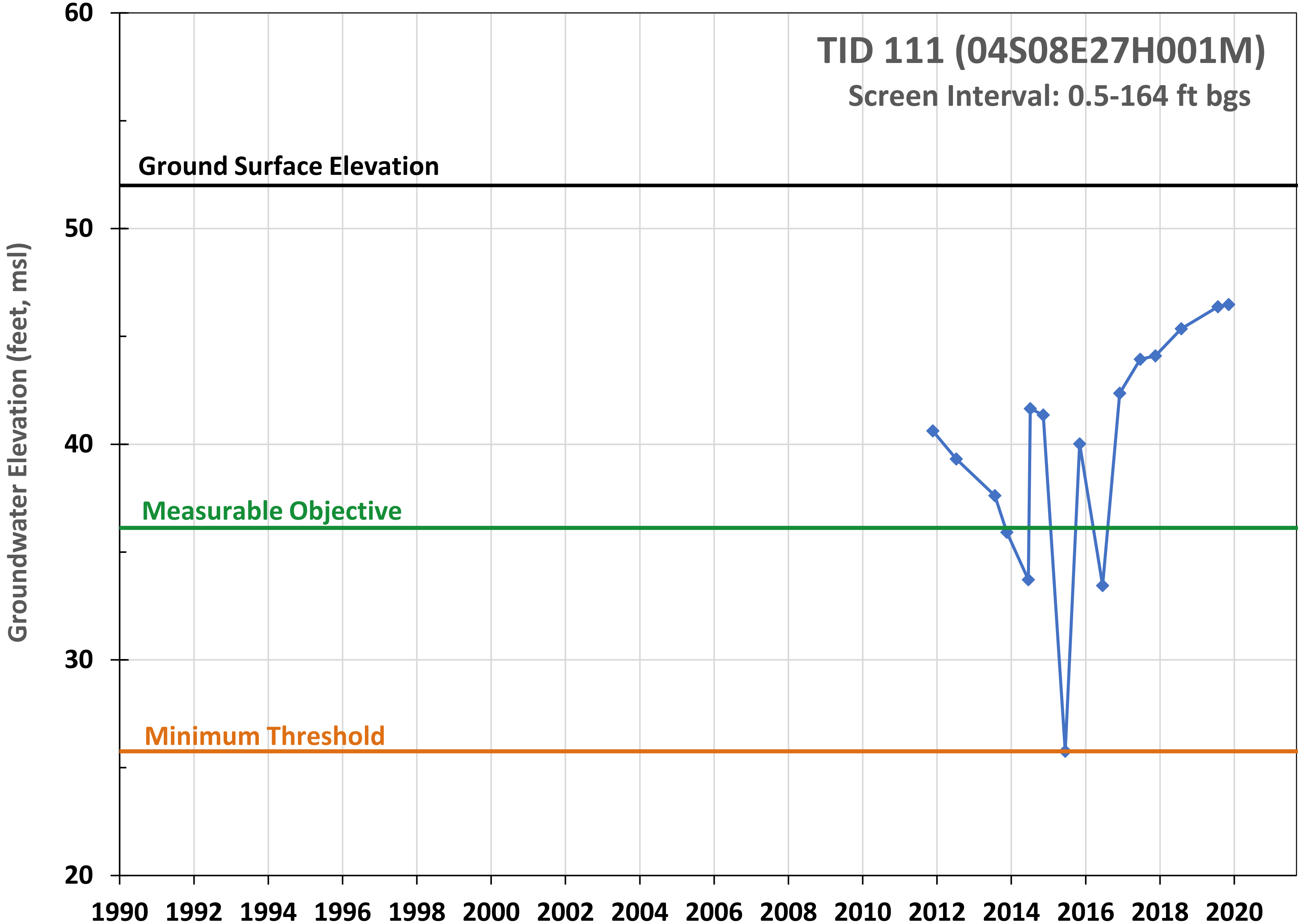
Depletions of Interconnected Surface Water

(in the order as they appear on Table 7-2)

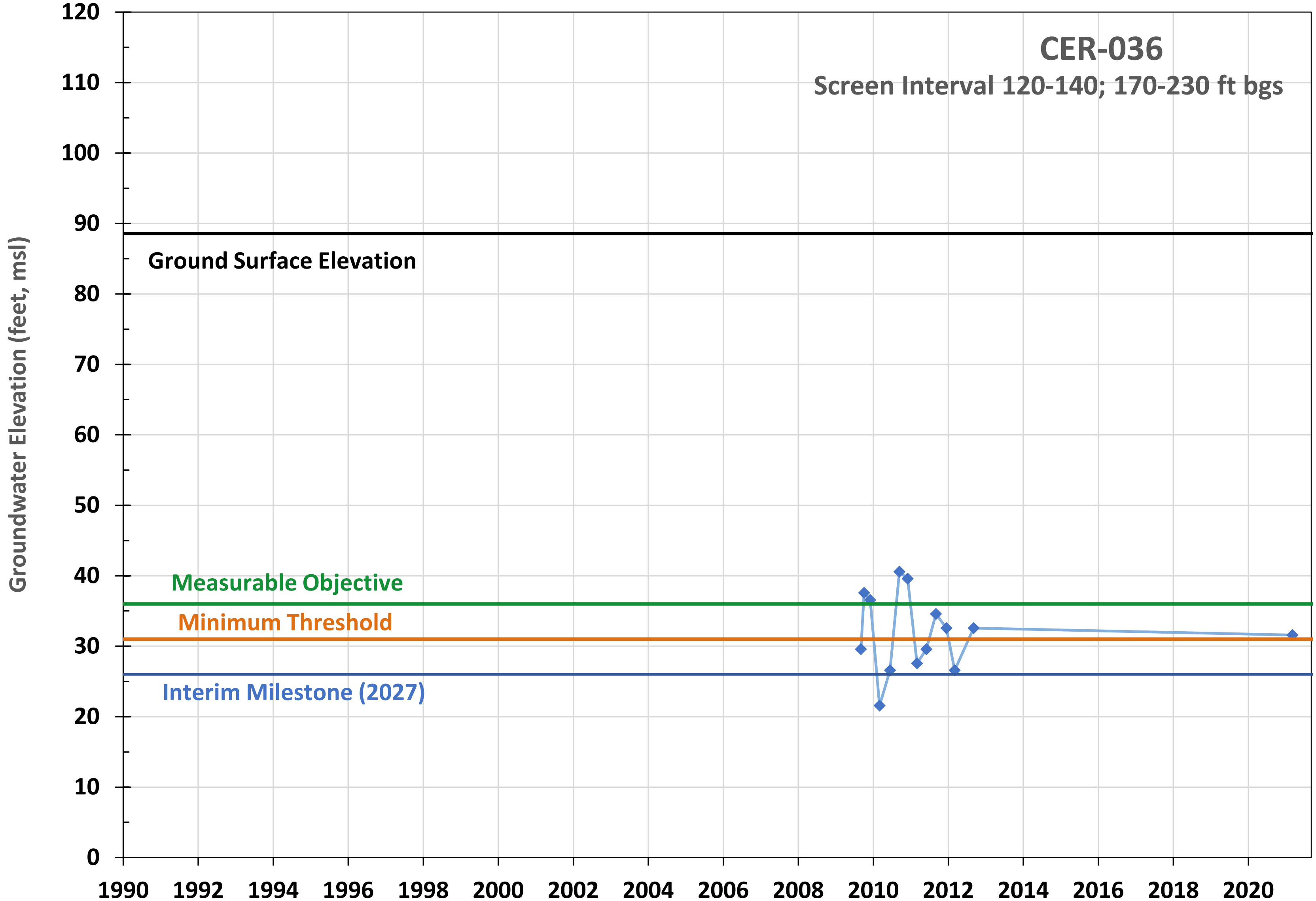

TID 061A (05S09E33R001M)
Screen Interval: 0.5-195 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
70
60
50
40
30
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



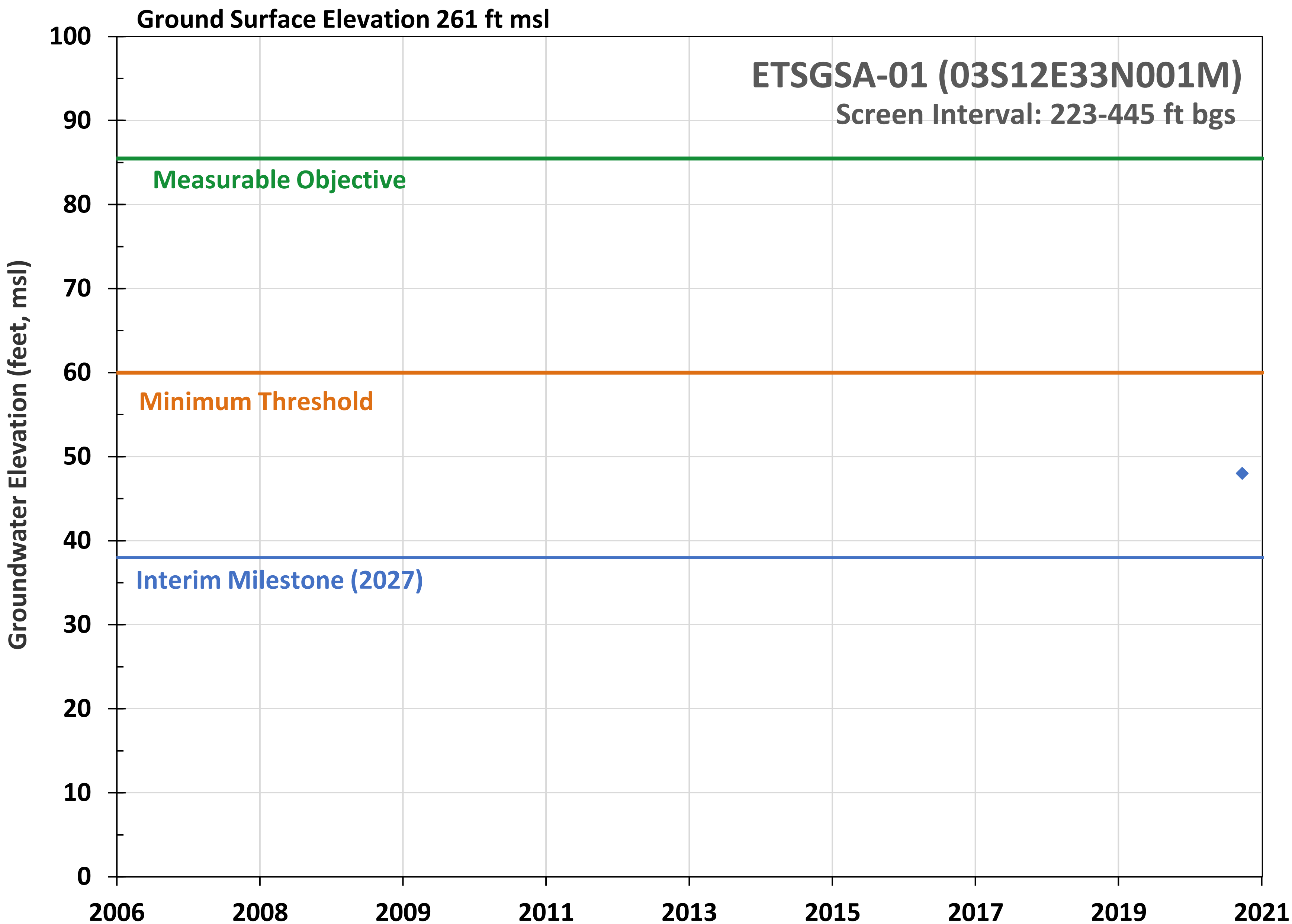
TID 063 (05S09E07B001M)
Screen Interval: 0.5-71 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
70
65
60
55
50
45
40
35
30
25
20
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



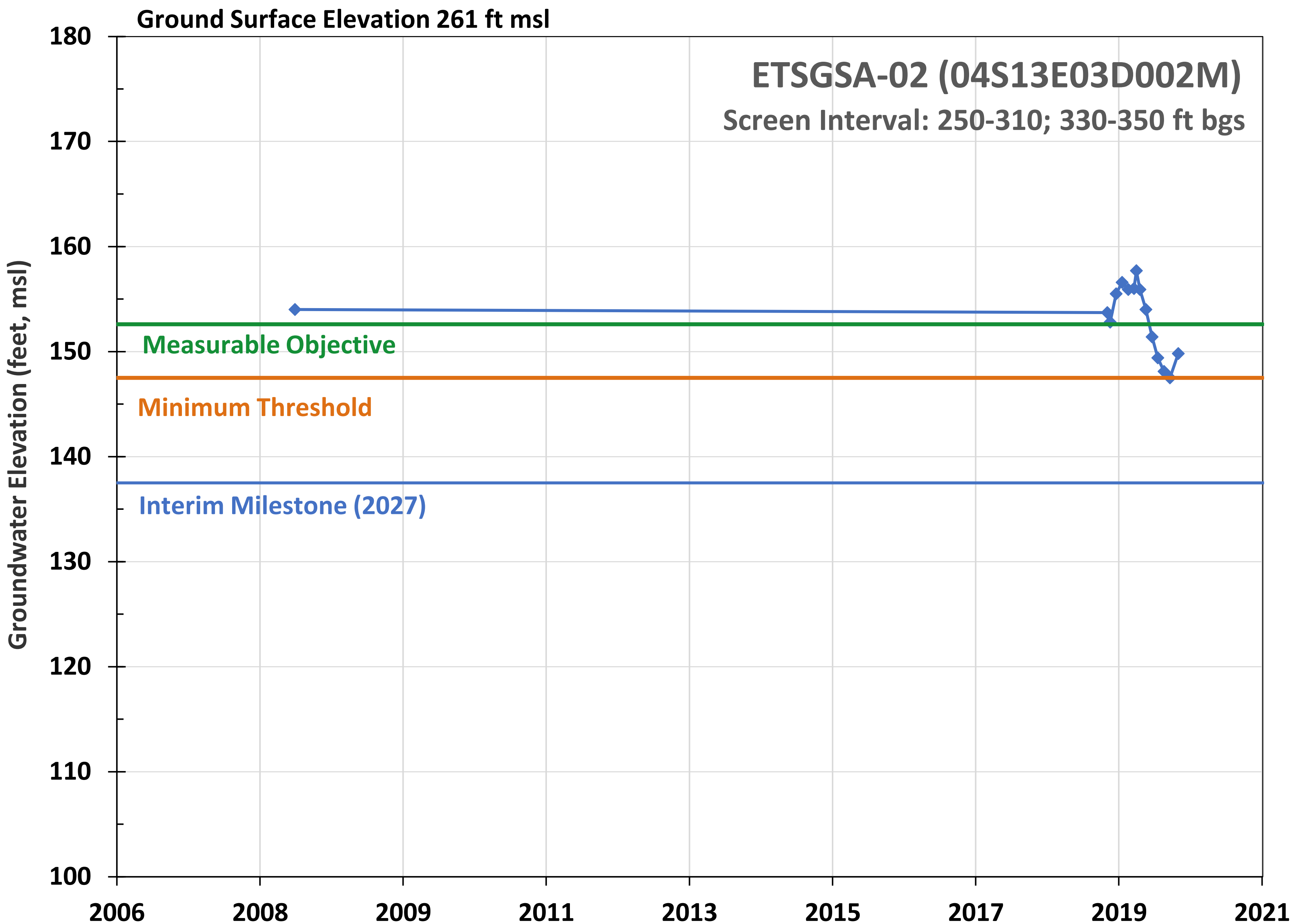
TID 111 (04S08E27H001M)
Screen Interval: 0.5-164 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
60
50
40
30
20
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



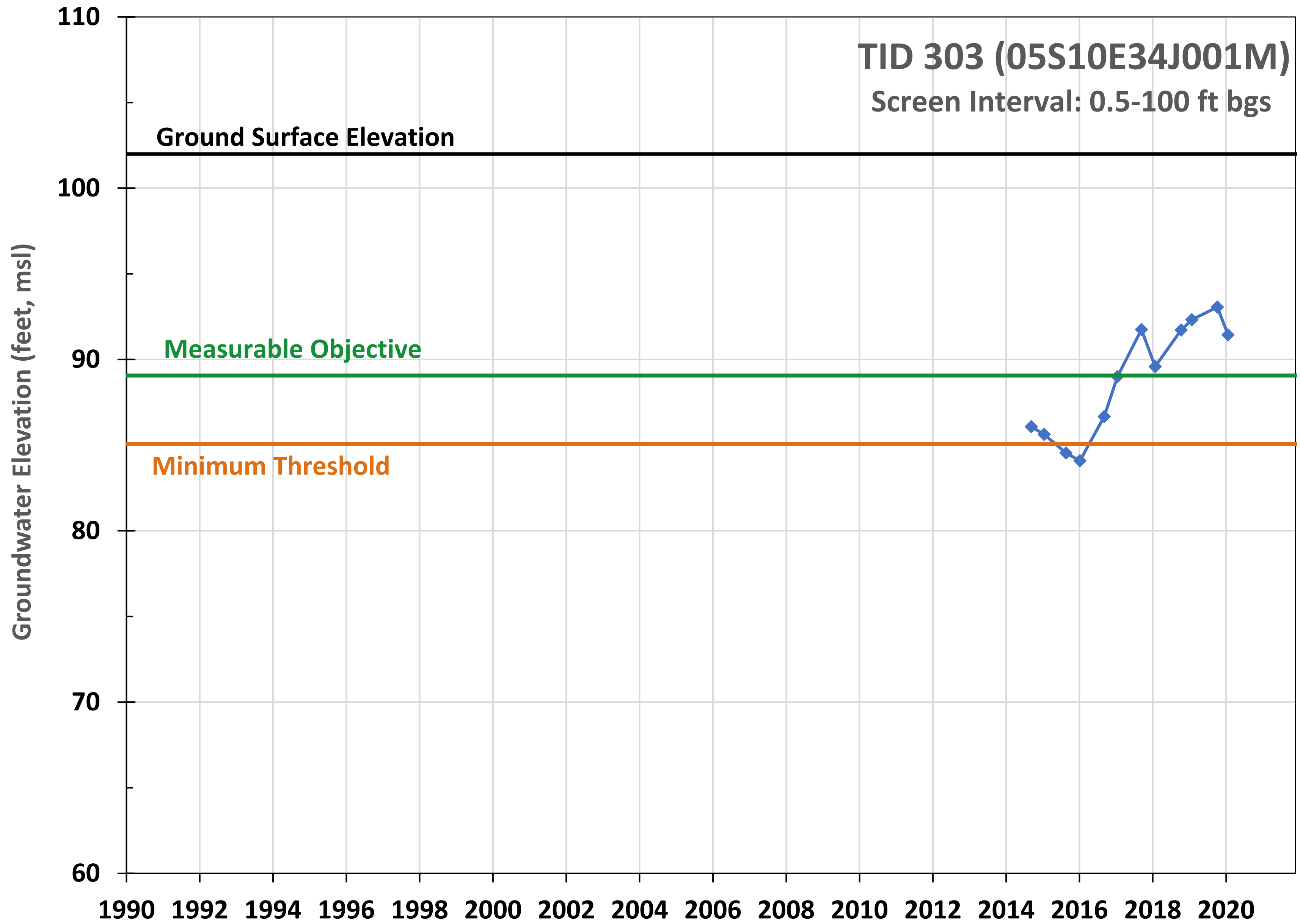
CER-036
Screen Interval 120-140; 170-230 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
120
110
100
90
80
70
60
50
40
30
20
10
0
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

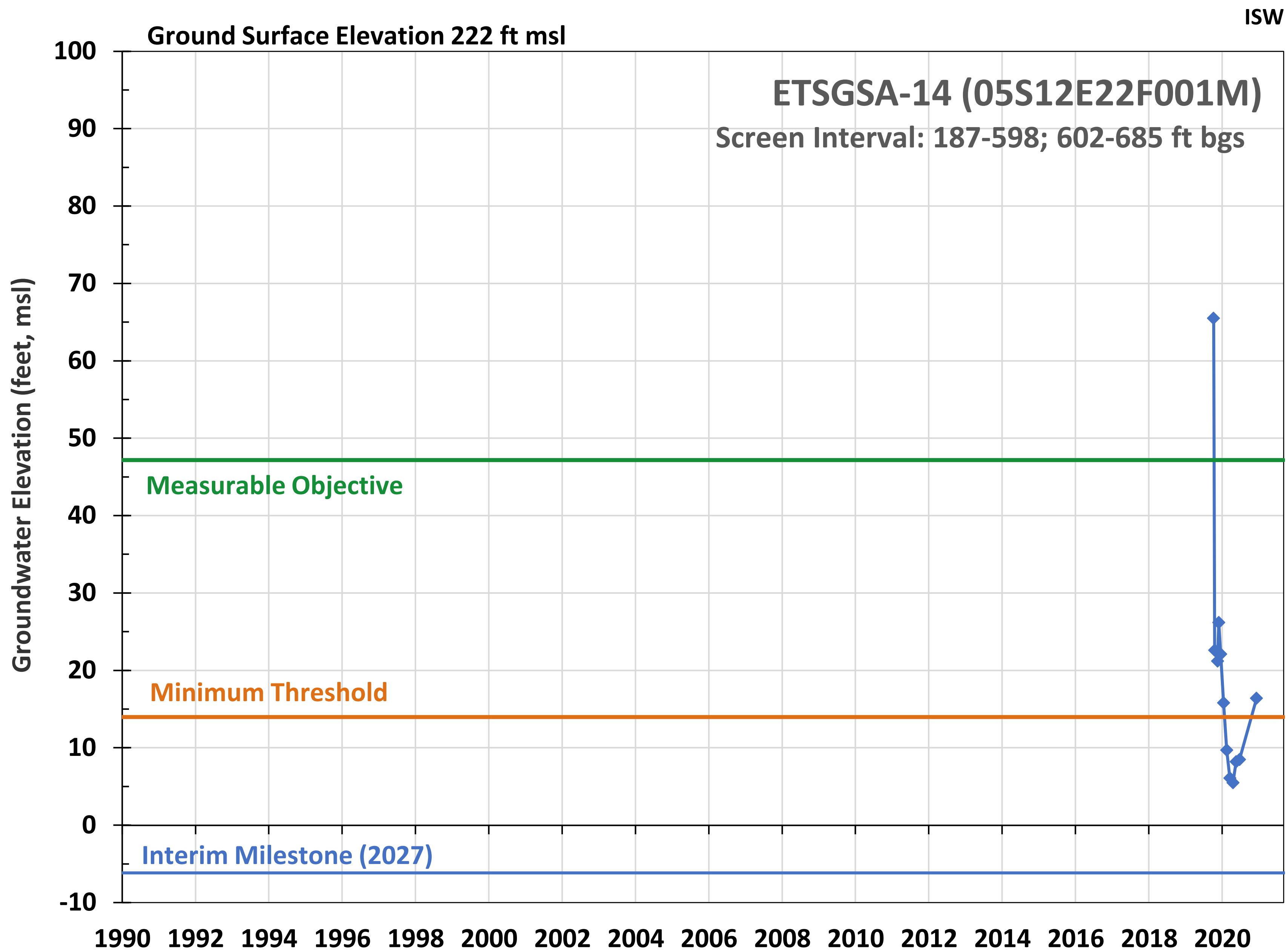


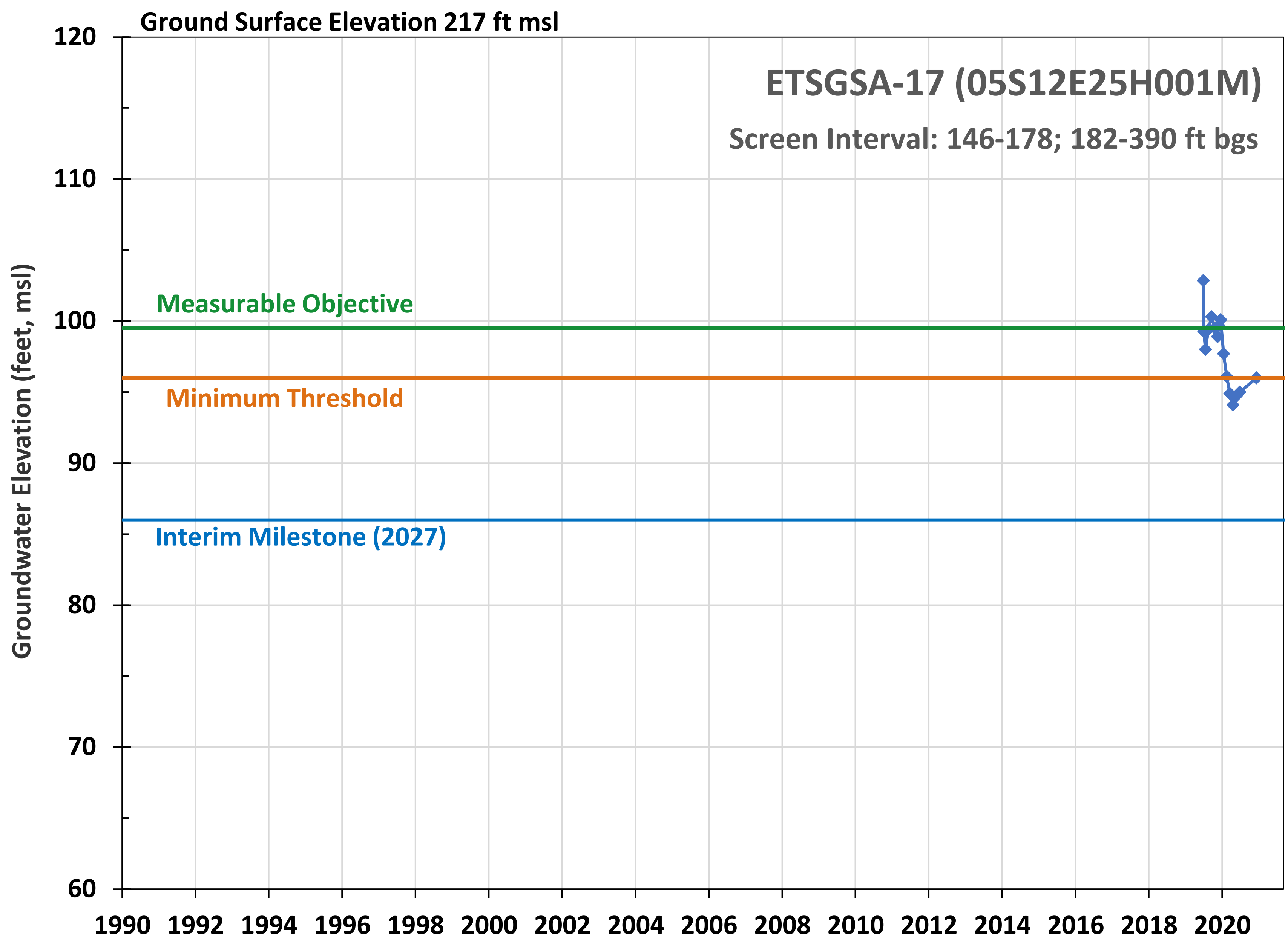
Ground Surface Elevation 261 ft msl
ETSGSA-01 (03S12E33N001M)
Screen Interval: 223-445 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
100
90
80
70
60
50
40
30
20
10
0
2006
2008
2009
2011
2013
2015
2017
2019
2021

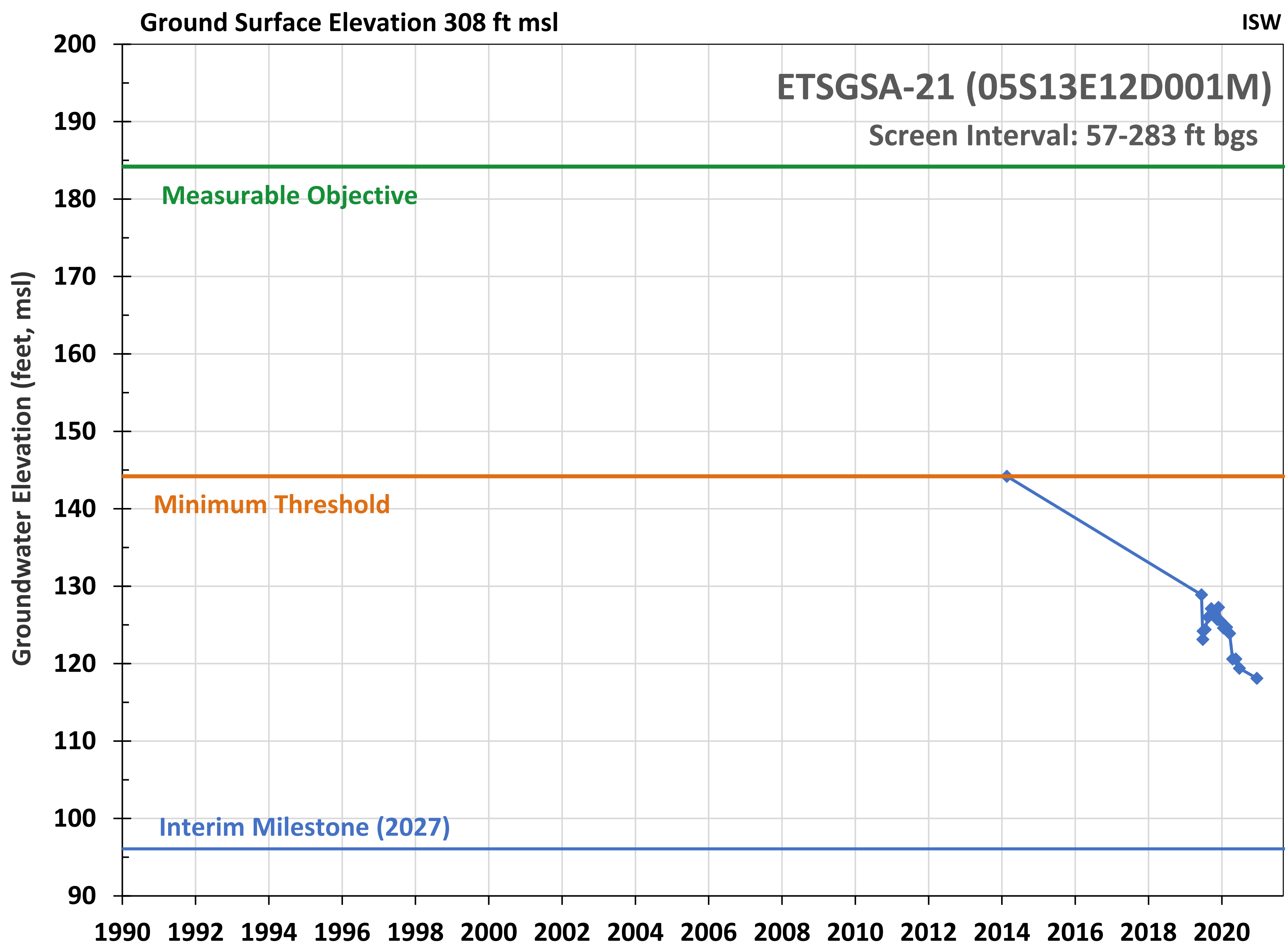


Ground Surface Elevation 261 ft msl
ETSGSA-02 (04S13E03D002M)
Screen Interval: 250-310; 330-350 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
180
170
160
150
140
130
120
110
100
2006
2008
2009
2011
2013
2015
2017
2019
2021

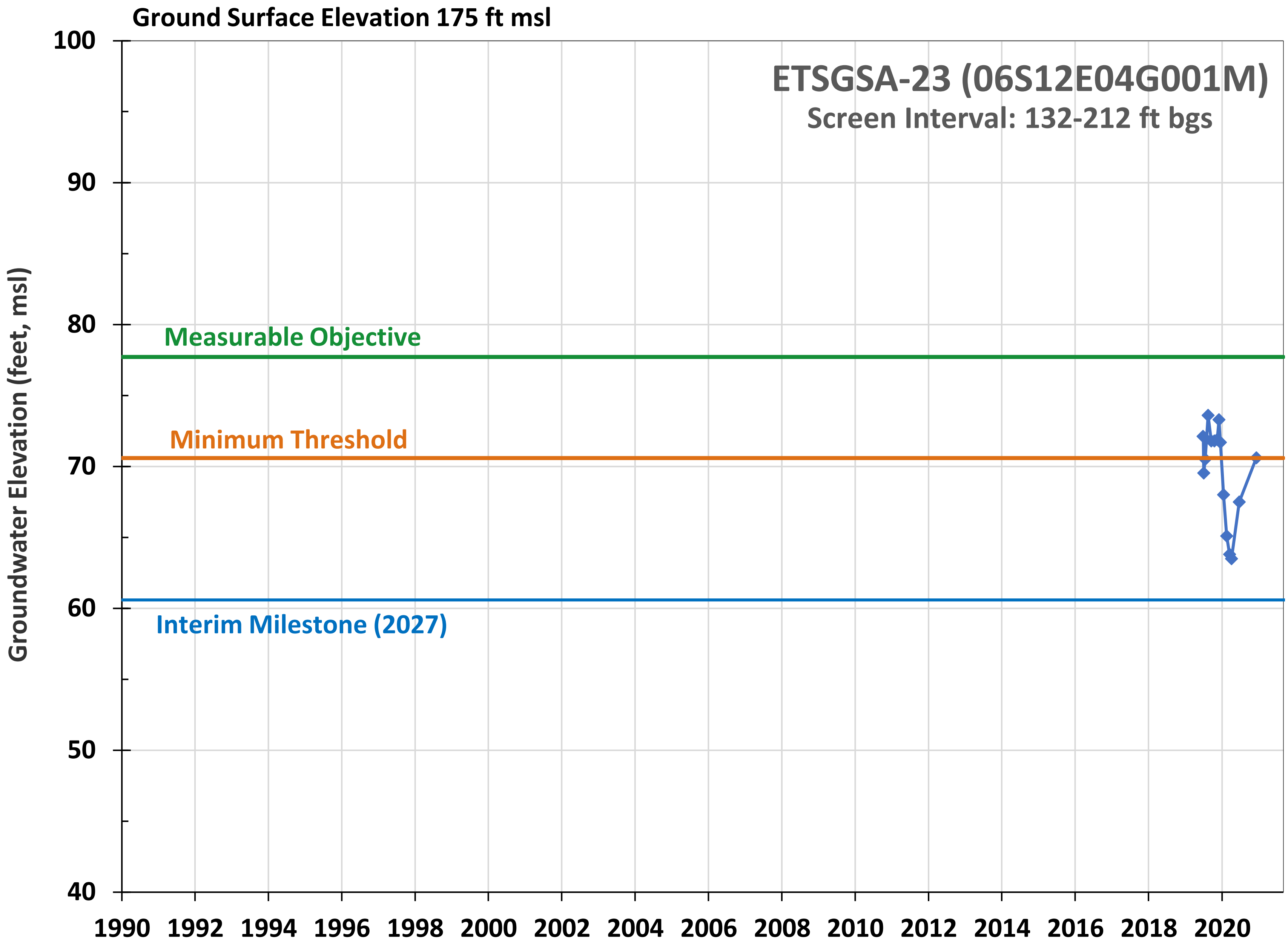

TID 303 (05S10E34J001M)
Screen Interval: 0.5-100 ft bgs
Ground Surface Elevation
Measurable Objective
Minimum Threshold
Groundwater Elevation (feet, msl)
110
100
90
80
70
60
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020


ISW
Ground Surface Elevation 222 ft msl
ETSGSA-14 (05S12E22F001M)
Screen Interval: 187-598; 602-685 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
100
90
80
70
60
50
40
30
20
10
0
-10
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020


Ground Surface Elevation 217 ft msl
ETSGSA-17 (05S12E25H001M)
Screen Interval: 146-178; 182-390 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
120
110
100
90
80
70
60
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020



Ground Surface Elevation 308 ft msl
ISW
ETSGSA-21 (05S13E12D001M)
Screen Interval: 57-283 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
200
190
180
170
160
150
140
130
120
110
100
90
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020


Ground Surface Elevation 175 ft msl
ETSGSA-23 (06S12E04G001M)
Screen Interval: 132-212 ft bgs
Measurable Objective
Minimum Threshold
Interim Milestone (2027)
Groundwater Elevation (feet, msl)
100
90
80
70
60
50
40
1990
1992
1994
1996
1998
2000
2002
2004
2006
2008
2010
2012
2014
2016
2018
2020

Appendix H

Water Quality Monitoring Network

Appendix H - Water Quality Monitoring Network

											Water Quality Parameters					
Well ID	Latitude	Longitude	Well Type	Well Depth (ft bgs)	Top of Screen (ft bgs)	Screen Length (ft)	Dataset Name	Alternative Well ID	Alternative Well ID 2	TDS	Nitrate	Arsenic	Uranium	1,2,3-TCP	PCE
5010028-038	37.607516	-120.925565	Municipal	--	--	--	DHS	5010028-038	WELL 38 - RAW TO GAC	x	x	x	x	x	x
5010028-032	37.579007	-120.966352	Municipal	--	--	--	DHS	5010028-032	WELL 32 - RAW - MN & AS	x	x	x		x	x
5010028-034	37.620719	-120.961892	Municipal	--	--	--	DHS	5010028-034	WELL 34 - RAW	x	x	x		x	x
5010028-014	37.601483	-120.951761	Municipal	--	160	40	DHS	5010028-014	WELL 14 - RAW	x	x	x		x	x
5010028-028	37.610556	-120.925556	Municipal	--	--	--	DHS	5010028-028	WELL 28 - RAW TO GAC	x	x			x	
5010028-035	37.587925	-120.997504	Municipal	--	--	--	DHS	5010028-035	WELL 35- RAW	x	x	x		x	x
5010028-040	37.598732	-120.945336	Municipal	--	--	--	DHS	5010028-040	WELL 40 - RAW	x	x	x		x	x
5010028-016	37.610147	-120.940866	Municipal	--	120	80	DHS	5010028-016	WELL 16 - RAW	x	x	x		x	x
5010028-027	37.590515	-120.951229	Municipal	--	195	120	DHS	5010028-027	WELL 27 - RAW	x	x	x		x	x
5010028-039	37.598607	-120.945336	Municipal	--	--	--	DHS	5010028-039	WELL 39 - RAW	x	x	x		x	x
5010028-022	37.600482	-120.970632	Municipal	--	124	23	DHS	5010028-022	WELL 22 - RAW - IX - U	x	x		x	x	
5010028-041	37.612238	-120.945483	Municipal	--	--	--	DHS	5010028-041	WELL 41 - RAW	x	x	x	x	x	x
5010010-132	37.61211	-120.98713	Municipal	--	--	105	DHS	5010010-132	WELL 305	x	x		x	x	
5010010-135	37.61224	-120.98698	Municipal	--	--	40	DHS	5010010-135	WELL 223 - ALAMO	x	x		x	x	x
T10000010311-MW-20	37.5320357	-121.0734323	Monitoring	--	--	--	EDF	MW-20	MW-20	x	x				
T10000010311-MW-16	37.5327916	-121.0685992	Monitoring	--	--	--	EDF	MW-16	MW-16	x	x				
T10000010311-MW-19	37.5317055	-121.0714334	Monitoring	--	--	--	EDF	MW-19	MW-19	x	x				
T10000010311-MW-17	37.5296125	-121.0698758	Monitoring	--	--	--	EDF	MW-17	MW-17	x	x				
T10000010311-MW-18	37.5300489	-121.0721484	Monitoring	--	--	--	EDF	MW-18	MW-18	x	x				
T10000010311-MW-9	37.5335868	-121.0726393	Monitoring	--	--	--	EDF	MW-9	MW-9	x	x				
100831	37.6238	-120.7541	Monitoring	--	60	20	LLNL	100831	03S/11E-34N01 M	x	x	x	x	x	x
5000498-001	37.541861	-120.893888	Municipal	--	360	20	DHS	5000498-001	LPA REPORTED PRIMARY SOURCE	x	x	x			x
5010021-008	37.529245	-120.789577	Municipal	--	185	100	DHS	5010021-008	WELL 08	x	x	x			x
5000579-002	37.574407	-120.753409	Municipal	--	--	--	DHS	5000579-002	D5A-EAST (15HP)	x	x	x			
5000579-001	37.574403	-120.753576	Municipal	--	--	--	DHS	5000579-001	D5B-WEST (25HP)	x	x	x	x		
5010009-012	37.5594	-120.9039	Municipal	--	246	87	DHS	5010009-012	WELL NO. 10 - RAW	x	x	x		x	
5000077-001	37.565631	-120.958556	Municipal	--	242	70	DHS	5000077-001	SOUTH WELL	x		x		x	x
5010019-040	37.4885	-120.869	Municipal	--	--	--	DHS	5010019-040	WELL NO. 40	x	x	x			x
5010028-023	37.609525	-120.949239	Municipal	--	190	80	DHS	5010028-023	WELL 23 - RAW	x	x	x		x	
2410012-006	37.432434	-120.828215	Municipal	--	--	60	DHS	2410012-006	WELL 06 (JAKE) - RAW	x	x	x		x	x
5010023-001	37.48831	-120.83569	Municipal	--	308	60	DHS	5010023-001	WELL 255 - COTTONWOOD	x	x	x		x	
5010010-136	37.62426	-120.98425	Municipal	--	--	55	DHS	5010010-136	WELL 217 - BYSTROM	x	x	x		x	
5010021-007	37.523135	-120.80348	Municipal	--	153	108	DHS	5010021-007	WELL 07	x	x	x			x
5010010-040	37.59386	-120.99096	Municipal	--	102	112	DHS	5010010-040	WELL 038	x	x	x	x	x	
2410006-016	37.429951	-120.765863	Municipal	--	--	--	DHS	2410006-016	WELL 10 -RAW	x	x	x		x	
2400347-001	37.453616	-120.84016	Municipal	--	--	--	DHS	2400347-001	WELL NO. 1	x	x	x	x	x	x
L10005824413-MW-28S	37.62406239	-120.8658056	Monitoring	83.61	84	20	EDF	MW-28S	MW-28S	x	x	x		x	x
L10005824413-MW-29D	37.62044922	-120.8657614	Monitoring	125.98	130.6	20	EDF	MW-29D	MW-29D	x	x	x		x	x
L10005824413-MW-30S	37.61580905	-120.8656919	Monitoring	98.94	99.2	20	EDF	MW-30S	MW-30S	x	x	x		x	x
L10005824413-MW-29S	37.62046271	-120.8657616	Monitoring	86.78	87.5	17	EDF	MW-29S	MW-29S	x	x	x		x	x
L10005824413-MW-28D	37.6240463	-120.8658057	Monitoring	137.04	137.3	20	EDF	MW-28D	MW-28D	x	x	x		x	x
L10005824413-MW-30D	37.61579301	-120.8656916	Monitoring	138.26	138.74	20	EDF	MW-30D	MW-30D	x	x	x		x	x
2410006-007	37.425244	-120.773096	Municipal	--	300	70	DHS	2410006-007	WELL 07 - RAW	x	x			x	x
5000054-003	37.566526	-120.917292	Municipal	--	260	40	DHS	5000054-003	WEST NEW	x	x	x			x
5010019-029	37.50752	-120.846683	Municipal	--	204	200	DHS	5010019-029	WELL NO. 29	x	x	x		x	x
5010019-032	37.51812	-120.830282	Municipal	--	200	236	DHS	5010019-032	WELL NO. 32	x	x	x			x
2410006-006	37.431239	-120.785757	Municipal	--	303	70	DHS	2410006-006	WELL 06 - RAW	x	x	x	x	x	x
AGC100012331-ESJQC00024	37.42899	-120.73028	Domestic	188	--	--	AGLAND	ESJQC00024	ESJQC00024	x					
5000603-001	37.54204	-120.704135	Municipal	--	--	--	DHS	5000603-001	NORTH WELL	x	x	x	x	x	x
5000603-002	37.538999	-120.701935	Municipal	--	--	--	DHS	5000603-002	SOUTH WELL	x	x	x	x	x	x
2410006-005	37.436975	-120.773042	Municipal	--	303	65	DHS	2410006-005	WELL 05 - RAW	x	x			x	x
5000072-001	37.565631	-120.958556	Municipal	--	310	40	DHS	5000072-001	NORTH PRIM	x	x	x			

Appendix H - Water Quality Monitoring Network

Well ID	Latitude	Longitude	Well Type	Well Depth (ft bgs)	Top of Screen (ft bgs)	Screen Length (ft)	Dataset Name	Alternative Well ID	Alternative Well ID 2	Water Quality Parameters					
										TDS	Nitrate	Arsenic	Uranium	1,2,3-TCP	PCE
5000080-003	37.573928	-121.031348	Municipal	--	--	--	DHS	5000080-003	LIL SIMON WELL - UNTREATED	x	x	x			x
5010010-133	37.61195	-120.98977	Municipal	--	--	58	DHS	5010010-133	WELL 287 - SCHOOL	x	x	x	x	x	x
5010010-051	37.59752	-120.99599	Municipal	--	--	80	DHS	5010010-051	WELL 049	x	x	x	x	x	x
5000019-003	37.610488	-121.040912	Municipal	--	60	60	DHS	5000019-003	WELL 03 WEST	x	x	x	x		
5000255-002	37.492351	-120.995838	Municipal	--	--	--	DHS	5000255-002	WELL 02	x	x	x	x		x
5010019-008	37.508155	-120.828732	Municipal	--	350	70	DHS	5010019-008	WELL NO. 08 - INACTIVE	x	x	x		x	x
5010019-031	37.526208	-120.867383	Municipal	--	200	190	DHS	5010019-031	WELL NO. 31	x	x	x			x
5010026-003	37.61782	-120.75082	Municipal	--	336	40	DHS	5010026-003	WELL 309 - RAW		x				
2400166-001	37.407248	-120.759878	Municipal	--	--	17	DHS	2400166-001	WELL 1- S. OF PRESSURE TANK		x				
2400339-001	37.462815	-120.754986	Municipal	--	--	--	DHS	2400339-001	WELL NO. 1		x		x		x
2400335-001	37.426927	-120.812649	Municipal	--	--	--	DHS	2400335-001	WELL NO. 1 - INAC		x				
5000595-002	37.451671	-120.868173	Municipal	--	--	--	DHS	5000595-002	2015 WELL		x				
5000547-001	37.547646	-120.901954	Municipal	--	--	--	DHS	5000547-001	WELL		x				
5010300-005	37.628554	-120.580298	Municipal	--	--	--	DHS	5010300-005	WELL NO. 03		x				
5010300-002	37.625379	-120.597928	Municipal	--	--	--	DHS	5010300-002	WELL NO. 02		x				
5010028-025	37.608862	-120.931656	Municipal	--	84	130	DHS	5010028-025	WELL 25 (BOOTHE ROAD WELL)		x			x	
5010019-039	37.528722	-120.826028	Municipal	--	--	--	DHS	5010019-039	WELL NO. 39		x				
5010019-004	37.505265	-120.871507	Municipal	--	158	182	DHS	5010019-004	WELL NO. 04		x			x	x
5010019-034	37.499165	-120.880688	Municipal	--	305	105	DHS	5010019-034	WELL NO. 34		x				
5010019-030	37.483806	-120.852888	Municipal	--	215	200	DHS	5010019-030	WELL NO. 30		x			x	x
AGW080012793-HOME	37.43037291	-120.6567122	Domestic	--	--	--	AGLAND	HOME	HOME		x				
5000116-001	37.488961	-120.7978	Municipal	--	73	60	DHS	5000116-001	WELL 01		x	x	x		x
AGW080012799-HOME	37.572557	-120.870461	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080012049-1754	37.50405991	-121.0206832	Domestic	--	--	--	AGLAND	1754	1754		x				
AGW080013201-3312	37.587465	-120.782387	Domestic	--	--	--	AGLAND	3312	3312		x				
AGW080012048-4512	37.54956762	-121.0781332	Domestic	--	--	--	AGLAND	4512	4512		x				
5010019-035	37.520949	-120.889889	Municipal	--	205	280	DHS	5010019-035	WELL NO. 35		x	x		x	
5010034-002	37.52018	-120.84554	Municipal	--	188	25	DHS	5010034-002	WELL 256 - HAYES		x			x	
5010010-032	37.61349	-120.99663	Municipal	--	--	--	DHS	5010010-032	WELL 030		x		x	x	
5000400-001	37.53	-120.89	Municipal	--	--	--	DHS	5000400-001	WELL 01		x				
5000532-001	37.579313	-120.925924	Municipal	--	--	--	DHS	5000532-001	WELL		x				
5000239-001	37.492067	-120.995916	Municipal	--	50	10	DHS	5000239-001	WELL #2 LOWER WELL		x				
5000395-001	37.646172	-120.491686	Municipal	--	165	50	DHS	5000395-001	WELL		x				
5000439-001	37.536472	-120.889085	Municipal	--	200	20	DHS	5000439-001	WELL #1		x				
5000525-002	37.49282	-120.994008	Municipal	--	--	--	DHS	5000525-002	PARKING LOT WELL		x				
AGW080013302-7590	37.47994187	-120.9343591	Domestic	--	--	--	AGLAND	7590	7590		x				
AGW080013303-1731	37.47654563	-120.9344247	Domestic	--	--	--	AGLAND	1731	1731		x				
5000225-001	37.479232	-120.831378	Municipal	--	--	--	DHS	5000225-001	WELL 01 - INACTIVE		x				
5010009-005	37.559221	-120.919119	Municipal	--	120	95	DHS	5010009-005	WELL NO. 07 - RAW		x	x		x	
5010019-033	37.487303	-120.830422	Municipal	--	150	158	DHS	5010019-033	WELL NO. 33		x	x			
5000268-001	37.582777	-120.945277	Municipal	--	--	--	DHS	5000268-001	WELL 01 - INACTIVE		x				
2400341-002	37.409982	-120.748617	Municipal	--	--	--	DHS	2400341-002	WELL NO. 2		x				
AGW080013127-11JF	37.61661739	-120.5333489	Domestic	--	--	--	AGLAND	11JF	11JF		x				
AGW080013134-HOME	37.51298718	-121.0025458	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080013126-22GF	37.61889537	-120.5287035	Domestic	--	--	--	AGLAND	22GF	22GF		x				
5000527-002	37.563202	-120.800802	Municipal	--	305	20	DHS	5000527-002	WELL #2		x	x			
5000101-001	37.482259	-120.931274	Municipal	--	--	25	DHS	5000101-001	WELL 01		x	x		x	x
5000440-002	37.506155	-120.730324	Municipal	--	50	18	DHS	5000440-002	YOSEMITE WELL		x	x		x	x
5000440-001	37.506361	-120.733361	Municipal	--	180	20	DHS	5000440-001	CORTEZ WELL		x	x		x	x
5000570-001	37.547095	-120.901738	Municipal	--	--	--	DHS	5000570-001	WELL		x	x		x	x
2400343-002	37.427824	-120.822437	Municipal	--	--	--	DHS	2400343-002	WELL NO. 2		x	x	x	x	x
2400167-001	37.452086	-120.699515	Municipal	--	408	42	DHS	2400167-001	WELL 1-PARK ST. NEAR BROADWAY		x	x		x	

Well ID	Latitude	Longitude	Well Type	Well Depth (ft bgs)	Top of Screen (ft bgs)	Screen Length (ft)	Dataset Name	Alternative Well ID	Alternative Well ID 2	Water Quality Parameters					
										TDS	Nitrate	Arsenic	Uranium	1,2,3-TCP	PCE
5000454-001	37.485093	-120.834783	Municipal	--	50	10	DHS	5000454-001	LPA REPORTED PRIMARY SOURCE		x	x	x	x	
5000440-004	37.503036	-120.721516	Municipal	--	--	--	DHS	5000440-004	EAST BACK-UP WELL #4		x	x	x	x	x
2400343-001	37.428355	-120.822499	Municipal	--	--	--	DHS	2400343-001	WELL NO. 1		x	x	x	x	x
5000578-001	37.433326	-121.013823	Municipal	--	--	--	DHS	5000578-001	PICNIC WELL		x				
2400254-001	37.473621	-120.739185	Municipal	--	--	--	DHS	2400254-001	WELL 01		x				
5000440-005	37.503153	-120.738711	Municipal	--	--	--	DHS	5000440-005	2015 WELL		x	x		x	
2400165-001	37.406277	-120.745055	Municipal	--	200	30	DHS	2400165-001	WELL 1-S.E. OF OFFICE/SHOP BUILDING		x	x		x	
5000487-002	37.594223	-120.848676	Municipal	--	--	--	DHS	5000487-002	2009 WELL		x				
AGW080012661-HUMB	37.4604813	-120.8059319	Domestic	--	--	--	AGLAND	HUMB	HUMB		x				
5000332-001	37.478861	-120.833416	Municipal	--	50	10	DHS	5000332-001	WELL #1		x				
AGW080016605-DW1	37.56739919	-120.8311383	Domestic	--	--	--	AGLAND	DW1	DW1		x				
2410012-011	37.430274	-120.836016	Municipal	--	--	--	DHS	2410012-011	WELL 07 (WOODY) RAW		x	x		x	
5010010-138	37.61589	-120.96597	Municipal	--	--	15	DHS	5010010-138	WELL 214		x		x	x	
5000003-002	37.583503	-120.953268	Municipal	--	100	16	DHS	5000003-002	SOUTH		x				
5000319-001	37.575833	-120.953888	Municipal	--	--	--	DHS	5000319-001	WELL 01		x				
5000443-001	37.472557	-120.849573	Municipal	--	300	80	DHS	5000443-001	WELL 1 TRUCK STOP		x				
AGW080013927-3037	37.59014846	-120.8495178	Domestic	--	--	--	AGLAND	3037	3037		x				
AGW080013487-HOME	37.5663	-120.8648	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080013488-RENT	37.5675646	-120.8640907	Domestic	--	--	--	AGLAND	RENT	RENT		x				
AGW080013297-JAM1	37.62559619	-120.6548192	Domestic	--	--	--	AGLAND	JAM1	JAM1		x				
AGW080013388-PEPK	37.4799	-120.719	Domestic	--	--	--	AGLAND	PEPK	PEPK		x				
AGW080013468-HAM	37.559538	-120.834909	Domestic	--	--	--	AGLAND	HAM	HAM		x				
AGW080013466-GEER	37.56115	-120.846219	Domestic	--	--	--	AGLAND	GEER	GEER		x				
5010021-010	37.52707	-120.80325	Municipal	--	--	--	DHS	5010021-010	WELL PW-10		x				
5010010-134	37.61456	-120.97124	Municipal	--	--	93	DHS	5010010-134	WELL 284 - MUSICK		x		x	x	
2400066-001	37.522528	-120.434389	Municipal	--	100	12	DHS	2400066-001	WELL 1-S.E.CORNER OF SCHL GRNDS		x				
5000033-002	37.594581	-120.846329	Municipal	--	272	20	DHS	5000033-002	NEW NORTH		x	x		x	
AGW080013494-SAKU	37.47214279	-120.7476744	Domestic	--	--	--	AGLAND	SAKU	SAKU		x				
2400339-002	37.462755	-120.756489	Municipal	--	--	--	DHS	2400339-002	WELL NO. 2		x	x	x		x
2400028-002	37.400972	-120.746388	Municipal	--	--	--	DHS	2400028-002	WELL NO. 2: CLUBHOUSE WELL		x				
2400028-001	37.399815	-120.746611	Municipal	--	63	40	DHS	2400028-001	WELL NO. 1: LAUNDRY ROOM WELL		x				
AGW080013325-DOM	37.550438	-120.83764	Domestic	--	--	--	AGLAND	DOM	DOM		x				
AGW080013660-LAND	37.4193	-120.8478	Domestic	--	--	--	AGLAND	LAND	LAND		x				
5000109-002	37.561478	-121.028938	Municipal	--	90	30	DHS	5000109-002	WELL 02		x	x	x		x
AGW080013647-5642	37.555174	-120.878784	Domestic	--	--	--	AGLAND	5642	5642		x				
AGW080013646-5630	37.555344	-120.877986	Domestic	--	--	--	AGLAND	5630	5630		x				
AGW080013493-3000	37.59008849	-120.7703278	Domestic	--	--	--	AGLAND	3000	3000		x				
AGW080013492-2930	37.59008849	-120.7703278	Domestic	--	--	--	AGLAND	2930	2930		x				
5000465-003	37.608234	-120.888782	Municipal	--	--	--	DHS	5000465-003	LAB WELL		x	x		x	x
5000402-001	37.538444	-120.89525	Municipal	--	260	28	DHS	5000402-001	LPA REPORTED PRIMARY SOURCE		x				
5000501-002	37.608868	-120.883001	Municipal	--	--	--	DHS	5000501-002	2012 WELL		x				
2400226-002	37.460013	-120.704073	Municipal	--	--	--	DHS	2400226-002	WELL 2		x			x	
5000020-001	37.616666	-120.939444	Municipal	--	--	--	DHS	5000020-001	WELL 01		x				
5010019-024	37.510613	-120.821181	Municipal	--	140	220	DHS	5010019-024	WELL NO. 24		x	x			
2400014-001	37.43	-120.84	Municipal	--	155	40	DHS	2400014-001	WELL-S.W. OF OFFICE/CAFE		x				
AGW080013787-5925	37.58208146	-120.8852657	Domestic	--	--	--	AGLAND	5925	5925		x				
AGW080013788-5142	37.5929029	-120.8983734	Domestic	--	--	--	AGLAND	5142	5142		x				
5010023-002	37.48624	-120.82172	Municipal	--	180	72	DHS	5010023-002	WELL 275 - BRIER		x			x	
2400342-002	37.411175	-120.750914	Municipal	--	--	--	DHS	2400342-002	WELL NO. 2		x	x			x
5000502-001	37.575416	-120.846388	Municipal	--	--	10	DHS	5000502-001	LPA REPORTED PRIMARY SOURCE		x				
5000505-002	37.492805	-120.901666	Municipal	--	220	20	DHS	5000505-002	NEW EAST WELL		x				
AGW080011019-DW1	37.58836611	-120.8025691	Domestic	--	--	--	AGLAND	DW1	DW1		x				

Well ID	Latitude	Longitude	Well Type	Well Depth (ft bgs)	Top of Screen (ft bgs)	Screen Length (ft)	Dataset Name	Alternative Well ID	Alternative Well ID 2	Water Quality Parameters					
										TDS	Nitrate	Arsenic	Uranium	1,2,3-TCP	PCE
AGW080013784-2619	37.59336823	-120.90222	Domestic	--	--	--	AGLAND	2619	2619		x				
AGW080013785-0875	37.61911892	-120.899066	Domestic	--	--	--	AGLAND	875	875		x				
AGW080013786-1236	37.61470989	-120.9002108	Domestic	--	--	--	AGLAND	1236	1236		x				
AGW080013783-5119	37.59552435	-120.9003965	Domestic	--	--	--	AGLAND	5119	5119		x				
5000548-001	37.566749	-120.725903	Municipal	--	177	20	DHS	5000548-001	WELL		x				x
AGW080013790-WEST	37.53014348	-120.8064444	Domestic	--	--	--	AGLAND	WEST	WEST		x				
AGW080013789-EAST	37.53188543	-120.80363	Domestic	--	--	--	AGLAND	EAST	EAST		x				
AGW080013848-HOME	37.52240831	-120.7863289	Domestic	--	--	--	AGLAND	HOME	HOME		x				
5000554-001	37.605393	-120.807667	Municipal	--	--	--	DHS	5000554-001	WELL		x			x	x
5010031-001	37.61259	-120.9538	Municipal	--	176	29	DHS	5010031-001	WELL 213 - WALNUT MANOR		x		x	x	x
AGW080011078-CORT	37.43923128	-120.7375842	Domestic	--	--	--	AGLAND	CORT	CORT		x				
2400335-002	37.427633	-120.811971	Municipal	--	--	--	DHS	2400335-002	WELL NO. 2		x	x	x	x	x
5000490-003	37.497123	-120.995331	Municipal	--	--	--	DHS	5000490-003	WELL #3		x				
5010019-037	37.53625	-120.862028	Municipal	--	285	285	DHS	5010019-037	WELL NO. 37		x				
5010019-027	37.528929	-120.844186	Municipal	--	130	200	DHS	5010019-027	WELL NO. 27		x				
5000136-003	37.49333	-120.848411	Municipal	--	--	--	DHS	5000136-003	WELL #3		x				
AGW080011477-DW6	37.4533	-120.7672	Domestic	--	--	--	AGLAND	DW6	DW6		x				
2400165-003	37.40909	-120.743523	Municipal	--	--	--	DHS	2400165-003	WELL NO. 3		x		x		x
5010019-013	37.500295	-120.8374	Municipal	--	132	100	DHS	5010019-013	WELL NO. 13		x				
2400245-001	37.4013	-120.751121	Municipal	--	--	--	DHS	2400245-001	WELL 1		x				
5000307-003	37.565108	-120.957222	Municipal	--	--	--	DHS	5000307-003	WELL 02		x				
5000402-002	37.468792	-120.863839	Municipal	--	--	--	DHS	5000402-002	2019 WELL		x				
5010019-015	37.492282	-120.865397	Municipal	--	180	244	DHS	5010019-015	WELL NO. 15		x				
5010019-022	37.478061	-120.848278	Municipal	--	150	150	DHS	5010019-022	WELL NO. 22		x				
AGW080012012-SHOP	37.57344577	-121.123923	Domestic	--	--	--	AGLAND	SHOP	SHOP		x				
AGW080012013-6967	37.57344577	-121.123923	Domestic	--	--	--	AGLAND	6967	6967		x				
5010010-137	37.61633	-120.98207	Municipal	--	--	43	DHS	5010010-137	WELL 216 - PECOS		x		x	x	x
AGW080012407-5518	37.54700356	-120.6196128	Domestic	--	--	--	AGLAND	5518	5518		x				
5800920-001	37.57906	-120.995471	Municipal	--	--	--	DHS	5800920-001	WELL		x				
AGW080011062-DW1	37.63263071	-120.7535947	Domestic	--	--	--	AGLAND	DW1	DW1		x				
AGW080011036-1106	37.60757706	-120.7864713	Domestic	--	--	--	AGLAND	1106	1106		x				
AGW080011074-5231	37.56113732	-120.8035029	Domestic	--	--	--	AGLAND	5231	5231		x				
AGW080011038-RAM	37.57845516	-120.8994298	Domestic	--	--	--	AGLAND	RAM	RAM		x				
AGW080011076-5024	37.56295525	-120.7943921	Domestic	--	--	--	AGLAND	5024	5024		x				
5010019-036	37.502352	-120.862582	Municipal	--	290	150	DHS	5010019-036	WELL NO. 36		x				
5010026-001	37.62383	-120.75406	Municipal	--	104	36	DHS	5010026-001	WELL NO. 272		x				
5010019-020	37.52157	-120.862909	Municipal	--	160	60	DHS	5010019-020	WELL NO. 20		x	x			
5000582-001	37.566572	-120.994693	Municipal	--	--	--	DHS	5000582-001	WELL 01		x				
5010008-014	37.607495	-120.853311	Municipal	--	--	--	DHS	5010008-014	WELL 08		x	x		x	
5010008-005	37.595622	-120.865047	Municipal	--	278	51	DHS	5010008-005	WELL 04		x	x		x	
5010008-003	37.60328	-120.869809	Municipal	--	189	148	DHS	5010008-003	WELL 03		x	x		x	
5000470-004	37.620564	-120.87955	Municipal	--	--	--	DHS	5000470-004	LEEDOM WELL		x	x			
2400322-001	37.518462	-120.44037	Municipal	--	--	--	DHS	2400322-001	WELL 01		x				
5010009-007	37.555011	-120.920734	Municipal	--	256	65	DHS	5010009-007	WELL NO. 09 - RAW		x	x		x	
5010009-006	37.55607	-120.910728	Municipal	--	190	108	DHS	5010009-006	WELL NO. 08 - RAW		x	x		x	
AGW080012187-4854	37.56841771	-120.8549608	Domestic	--	--	--	AGLAND	4854	4854		x				
2400170-013	37.42964	-120.85916	Municipal	--	--	--	DHS	2400170-013	WELL 4 - RAW OSLO		x	x			
5000062-001	37.601523	-121.131852	Municipal	--	--	--	DHS	5000062-001	WELL 01		x				
5010021-009	37.517786	-120.798117	Municipal	--	--	--	DHS	5010021-009	WELL PW-9		x				
AGW080011026-R1N	37.62953472	-120.6801591	Domestic	--	--	--	AGLAND	R1N	R1N		x				
AGW080011028-L & J	37.61965892	-120.6684813	Domestic	--	--	--	AGLAND	L & J	L & J		x				
AGW080011027-R2	37.6194129	-120.6720176	Domestic	--	--	--	AGLAND	R2	R2		x				

Appendix H - Water Quality Monitoring Network

Well ID	Latitude	Longitude	Well Type	Well Depth (ft bgs)	Top of Screen (ft bgs)	Screen Length (ft)	Dataset Name	Alternative Well ID	Alternative Well ID 2	Water Quality Parameters					
										TDS	Nitrate	Arsenic	Uranium	1,2,3-TCP	PCE
2400170-016	37.422825	-120.854312	Municipal	--	--	--	DHS	2400170-016	WELL 5 - RAW		x	x			
5000273-002	37.572831	-120.790191	Municipal	--	--	--	DHS	5000273-002	2013 WELL		x	x		x	
AGW080011030-ETV	37.53202298	-120.454282	Domestic	--	--	--	AGLAND	ETV	ETV		x				
5000072-002	37.480401	-120.832671	Municipal	--	200	20	DHS	5000072-002	SOUTH WELL		x				
2400062-001	37.522527	-120.434388	Municipal	--	390	10	DHS	2400062-001	WELL NO. 1- N.OF CAFETERIA/GYMNASIUM		x				
5010044-001	37.536379	-121.076339	Municipal	--	--	--	DHS	5010044-001	WELL NO. 01		x		x		
5000494-001	37.481722	-120.835555	Municipal	--	245	20	DHS	5000494-001	LPA REPORTED PRIMARY SOURCE		x				
2400088-004	37.522521	-120.423883	Municipal	--	--	--	DHS	2400088-004	WELL 3		x				
2400088-002	37.400972	-120.746389	Municipal	--	--	--	DHS	2400088-002	WELL 2 EAST WELL		x				
AGW080012050-5000	37.54395175	-121.0892854	Domestic	--	--	--	AGLAND	5000	5000		x				
5010010-236	37.602571	-121.016501	Municipal	--	--	--	DHS	5010010-236	WELL 66		x	x	x	x	
5000557-001	37.480304	-120.832111	Municipal	--	--	--	DHS	5000557-001	WELL		x				
2400162-012	37.605198	-120.807895	Municipal	--	--	--	DHS	2400162-012	WELL 04		x			x	
AGW080013072-1200	37.56332075	-120.7720888	Domestic	--	--	--	AGLAND	1200	1200		x				
AGW080013074-1110	37.57914297	-120.789761	Domestic	--	--	--	AGLAND	1110	1110		x				
AGW080013069-2171	37.63093867	-120.5964481	Domestic	--	--	--	AGLAND	2171	2171		x				
AGW080013070-1183	37.56622416	-120.7754104	Domestic	--	--	--	AGLAND	1183	1183		x				
AGW080011044-TREVORS H	37.52196514	-120.6700882	Domestic	--	--	--	AGLAND	TREVORS H	TREVORS H		x				
AGW080013071-1112	37.59295494	-120.788738	Domestic	--	--	--	AGLAND	1112	1112		x				
AGW080011043-DARELLS H	37.52841501	-120.68796	Domestic	--	--	--	AGLAND	DARELLS H	DARELLS H		x				
AGW080013068-2150	37.62460424	-120.5680328	Domestic	--	--	--	AGLAND	2150	2150		x				
5000035-001	37.574606	-120.930172	Municipal	--	--	--	DHS	5000035-001	WELL 01 - INACTIVE		x				
5000382-004	37.493127	-120.993891	Municipal	--	--	--	DHS	5000382-004	NEW WELL 2012		x				
5010028-021	37.590832	-120.941204	Municipal	--	100	71	DHS	5010028-021	WELL 21 - ROEDING HGTS - INACTIVE		x			x	
5000095-001	37.625111	-120.993972	Municipal	--	140	20	DHS	5000095-001	EAST WELL		x				x
AGW080012998-HOUSE 1	37.49381706	-120.496787	Domestic	--	--	--	AGLAND	HOUSE 1	HOUSE 1		x				
2400329-001	37.489012	-120.63003	Municipal	--	--	--	DHS	2400329-001	WELL NO. 1		x				
2400330-001	37.474787	-120.635759	Municipal	--	--	--	DHS	2400330-001	WELL NO. 1		x				
2400304-001	37.519402	-120.438543	Municipal	--	--	--	DHS	2400304-001	WELL 01		x				
AGW080016297-DADS	37.59887314	-121.0106046	Domestic	--	--	--	AGLAND	DADS	DADS		x				
AGW080016294-JOES	37.59887464	-121.0107772	Domestic	--	--	--	AGLAND	JOES	JOES		x				
AGW080010538-HOME	37.439076	-120.692895	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080010995-HOME	37.581965	-120.868989	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080010542-BARN	37.441631	-120.694072	Domestic	--	--	--	AGLAND	BARN	BARN		x				
AGW080015008-KENS	37.451643	-120.78468	Domestic	--	--	--	AGLAND	KENS	KENS		x				
AGW080015009-JASN	37.449078	-120.778076	Domestic	--	--	--	AGLAND	JASN	JASN		x				
AGW080015024-HOME	37.55146414	-120.8874107	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080011371-GRAY	37.565097	-120.789199	Domestic	--	--	--	AGLAND	GRAY	GRAY		x				
AGW080015010-CLAU	37.456483	-120.825073	Domestic	--	--	--	AGLAND	CLAU	CLAU		x				
AGW080015011-YNST	37.455781	-120.822151	Domestic	--	--	--	AGLAND	YNST	YNST		x				
AGW080011003-2	37.4031	-120.881	Domestic	--	--	--	AGLAND	2	2		x				
AGW080011059-9844	37.58159223	-120.8434872	Domestic	--	--	--	AGLAND	9844	9844		x				
AGW080011060-9840	37.58159223	-120.8434872	Domestic	--	--	--	AGLAND	9840	9840		x				
AGW080010533-3607	37.4805	-120.8908	Domestic	--	--	--	AGLAND	3607	3607		x				
AGW080011438-HOME	37.494053	-120.881201	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080010537-SHOP	37.36548	-120.87572	Domestic	--	--	--	AGLAND	SHOP	SHOP		x				
AGW080010543-HOME	37.59754712	-120.8217642	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080010958-NEWN	37.5238936	-120.7855933	Domestic	--	--	--	AGLAND	NEWN	NEWN		x				
AGW080012150-HOME	37.589069	-120.785863	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080012062-3939	37.58848201	-120.9216369	Domestic	--	--	--	AGLAND	3939	3939		x				
AGW080011149-OLD	37.44674933	-120.9060056	Domestic	--	--	--	AGLAND	OLD	OLD		x				
AGW080015335-HOUSE	37.4684187	-120.6060067	Domestic	--	--	--	AGLAND	HOUSE	HOUSE		x				

Appendix H - Water Quality Monitoring Network

										Water Quality Parameters					
Well ID	Latitude	Longitude	Well Type	Well Depth (ft bgs)	Top of Screen (ft bgs)	Screen Length (ft)	Dataset Name	Alternative Well ID	Alternative Well ID 2	TDS	Nitrate	Arsenic	Uranium	1,2,3-TCP	PCE
AGW080011150-NEW	37.44674933	-120.9060056	Domestic	--	--	--	AGLAND	NEW	NEW		x				
AGW080010890-HOUSE	37.522	-120.8958	Domestic	--	--	--	AGLAND	HOUSE	HOUSE		x				
AGW080012190-2426	37.57294553	-120.5728696	Domestic	--	--	--	AGLAND	2426	2426		x				
AGW080012188-9951	37.49081234	-120.6662553	Domestic	--	--	--	AGLAND	9951	9951		x				
AGW080015023-HOME	37.583325	-120.806816	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080012189-9995	37.4834399	-120.6591682	Domestic	--	--	--	AGLAND	9995	9995		x				
AGW080015021-HOME	37.62997408	-120.715143	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080010525-HOME	37.62930472	-120.7123425	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080012046-GARY	37.44709144	-120.9570217	Domestic	--	--	--	AGLAND	GARY	GARY		x				
AGW080010561-MAIN WELL	37.604244	-120.779648	Domestic	--	--	--	AGLAND	MAIN WELL	MAIN WELL		x				
AGW080013079-2537	37.57395463	-120.948982	Domestic	--	--	--	AGLAND	2537	2537		x				
AGW080013077-2454	37.57230696	-120.9504667	Domestic	--	--	--	AGLAND	2454	2454		x				
AGW080013075-2406	37.57189542	-120.9517921	Domestic	--	--	--	AGLAND	2406	2406		x				
AGW080013076-2800	37.56031377	-120.942291	Domestic	--	--	--	AGLAND	2800	2800		x				
AGW080012065-1008	37.434698	-120.6989604	Domestic	--	--	--	AGLAND	1008	1008		x				
AGW080010984-6975	37.471932	-120.610719	Domestic	--	--	--	AGLAND	6975	6975		x				
AGW080010985-7310	37.462952	-120.615741	Domestic	--	--	--	AGLAND	7310	7310		x				
AGW080010560-LEE	37.4797	-120.6485	Domestic	--	--	--	AGLAND	LEE	LEE		x				
AGW080010987-1999	37.462587	-120.705583	Domestic	--	--	--	AGLAND	1999	1999		x				
AGW080010559-HOME	37.5198	-120.5843	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080010986-4166	37.499424	-120.560559	Domestic	--	--	--	AGLAND	4166	4166		x				
2400128-011	37.43928	-120.835458	Municipal	--	--	--	DHS	2400128-011	WELL 2-MAIN WELL-20 FROM RD.		x				
AGW080011050-DW1	37.46214174	-120.8469566	Domestic	--	--	--	AGLAND	DW1	DW1		x				
AGW080011037-1113	37.60757706	-120.7864713	Domestic	--	--	--	AGLAND	1113	1113		x				
AGW080016380-806	37.46176726	-120.8587392	Domestic	--	--	--	AGLAND	806	806		x				
AGW080016899-4104	37.627663	-120.707883	Domestic	--	--	--	AGLAND	4104	4104		x				
AGW080011435-DOMESTIC	37.5075505	-120.7959327	Domestic	--	--	--	AGLAND	DOMESTIC	DOMESTIC		x				
AGW080012002-HOME	37.372386	-120.898798	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080012280-HOME	37.38491557	-120.8230332	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080012063-3119	37.59025246	-120.9216384	Domestic	--	--	--	AGLAND	3119	3119		x				
AGW080010575-4212	37.454358	-120.88453	Domestic	--	--	--	AGLAND	4212	4212		x				
AGW080010660-HOME	37.544179	-120.839542	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080010547-MINT	37.41277	-120.90219	Domestic	--	--	--	AGLAND	MINT	MINT		x				
AGW080011075-5131	37.5638259	-120.8035058	Domestic	--	--	--	AGLAND	5131	5131		x				
AGW080016044-CARP	37.540109	-121.031234	Domestic	--	--	--	AGLAND	CARP	CARP		x				
AGW080016043-MONT	37.521939	-121.05214	Domestic	--	--	--	AGLAND	MONT	MONT		x				
5000218-004	37.592824	-120.848645	Municipal	--	--	--	DHS	5000218-004	NORTH WELL		x	x			x
AGW080011765-TODD	37.572712	-120.801952	Domestic	--	--	--	AGLAND	TODD	TODD		x				
AGW080017795-HOME	37.4343	-120.9079	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080011853-DW1	37.59742958	-120.7751942	Domestic	--	--	--	AGLAND	DW1	DW1		x				
AGW080011488-2520	37.58744575	-120.7035299	Domestic	--	--	--	AGLAND	2520	2520		x				
AGW080011491-2650	37.58744575	-120.7035299	Domestic	--	--	--	AGLAND	2650	2650		x				
AGW080011476-SFRDW	37.4845	-120.7573	Domestic	--	--	--	AGLAND	SFRDW	SFRDW		x				
AGW080013016-SH	37.571687	-120.7306	Domestic	--	--	--	AGLAND	SH	SH		x				
AGW080013012-SG	37.47948077	-120.7271923	Domestic	--	--	--	AGLAND	SG	SG		x				
AGW080013014-ME	37.487661	-120.816474	Domestic	--	--	--	AGLAND	ME	ME		x				
AGW080013204-PD WELL	37.45721414	-120.8615495	Domestic	--	--	--	AGLAND	PD WELL	PD WELL		x				
AGW080013078-2513	37.57126229	-120.9504953	Domestic	--	--	--	AGLAND	2513	2513		x				
AGW080013203-PD WELL	37.45585421	-120.861547	Domestic	--	--	--	AGLAND	PD WELL	PD WELL		x				
AGW080013010-DA1	37.499239	-120.672505	Domestic	--	--	--	AGLAND	DA1	DA1		x				
AGW080013009-CJ	37.534777	-120.695175	Domestic	--	--	--	AGLAND	CJ	CJ		x				
AGW080016089-WELL	37.48387558	-120.9899299	Domestic	--	--	--	AGLAND	WELL	WELL		x				

Appendix H - Water Quality Monitoring Network

Well ID	Latitude	Longitude	Well Type	Well Depth (ft bgs)	Top of Screen (ft bgs)	Screen Length (ft)	Dataset Name	Alternative Well ID	Alternative Well ID 2	Water Quality Parameters					
										TDS	Nitrate	Arsenic	Uranium	1,2,3-TCP	PCE
AGW080013011-TSJ	37.465473	-120.623176	Domestic	--	--	--	AGLAND	TSJ	TSJ		x				
AGW080017184-STG	37.51784542	-120.7566153	Domestic	--	--	--	AGLAND	STG	STG		x				
AGW080013008-TJ	37.513991	-120.639849	Domestic	--	--	--	AGLAND	TJ	TJ		x				
2400078-002	37.443086	-120.830741	Municipal	--	--	--	DHS	2400078-002	WELL NO. 2		x	x			
AGW080017272-WOOD	37.57388021	-120.9595298	Domestic	--	--	--	AGLAND	WOOD	WOOD		x				
AGW080016622-HOME	37.44015	-120.73355	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080012257-SN	37.4811	-120.5737	Domestic	--	--	--	AGLAND	SN	SN		x				
AGW080012264-SCH	37.4261	-120.7999	Domestic	--	--	--	AGLAND	SCH	SCH		x				
AGW080017733-WHITE	37.51716654	-120.5073404	Domestic	--	--	--	AGLAND	WHITE	WHITE		x				
AGW080011153-BDOM	37.43574319	-120.7597304	Domestic	--	--	--	AGLAND	BDOM	BDOM		x				
AGW080017055-HOME	37.42500953	-120.6947399	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080017270-HOME	37.44988261	-120.8331543	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080011002-HOME	37.468	-120.7997	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080011001-HOME	37.4695	-120.7996	Domestic	--	--	--	AGLAND	HOME	HOME		x				
5000414-001	37.484805	-120.838611	Municipal	--	190	120	DHS	5000414-001	WELL		x				
AGW080010536-HOME	37.4694836	-120.7667812	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080017265-HOME	37.43949098	-120.7111758	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080011753-HOME	37.6225985	-120.8619764	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080018045-JONS	37.49317	-120.913824	Domestic	--	--	--	AGLAND	JONS	JONS		x				
AGW080011279-6118	37.3769	-120.868	Domestic	--	--	--	AGLAND	6118	6118		x				
AGW080018047-FRAN	37.49318	-120.916412	Domestic	--	--	--	AGLAND	FRAN	FRAN		x				
AGW080018046-MIKE	37.507762	-120.897625	Domestic	--	--	--	AGLAND	MIKE	MIKE		x				
AGW080010870-4018	37.45602508	-120.8847682	Domestic	--	--	--	AGLAND	4018	4018		x				
AGW080010869-3812	37.45781261	-120.8847577	Domestic	--	--	--	AGLAND	3812	3812		x				
2410302-001	37.351634	-120.961555	Municipal	--	--	--	DHS	2410302-001	HATFIELD STATE PARK WELL		x				
2410301-002	37.416332	-120.712354	Municipal	--	--	--	DHS	2410301-002	MCCONNEL STATE PARK WELL		x				
AGW080010881-2124	37.557366	-120.78	Domestic	--	--	--	AGLAND	2124	2124		x				
AGW080010531-HOME	37.36991474	-120.8694604	Domestic	--	--	--	AGLAND	HOME	HOME		x				
AGW080018519-NAVE	37.44274183	-120.7300625	Domestic	--	--	--	AGLAND	NAVE	NAVE		x				
5000555-002	37.546209	-120.89834	Municipal	--	--	--	DHS	5000555-002	2012 WELL			x			x
2410012-004	37.424672	-120.830838	Municipal	--	--	50	DHS	2410012-004	WELL 04 (COX) - RAW - STANDBY			x		x	
2410006-018	37.431059	-120.78577	Municipal	--	--	--	DHS	2410006-018	WELL 6A - RAW			x			
5000440-003	37.503063	-120.738879	Municipal	--	180	60	DHS	5000440-003	BACK UP (SW)			x			
5000596-002	37.596873	-120.84449	Municipal	--	--	--	DHS	5000596-002	2018 WELL				x	x	
5000600-001	37.600435	-120.849084	Municipal	--	--	--	DHS	5000600-001	WELL					x	x
T0609907848-MW-9	37.5973202	-120.8684608	Monitoring	--	60	23	EDF	MW-9	MW-9						x
T0609907848-MW-10	37.5970574	-120.8684071	Monitoring	--	60	85	EDF	MW-10	MW-10						x
T0609907848-MW-4	37.597054	-120.8687083	Monitoring	--	65	15	EDF	MW-4	MW-4						x
T0609907848-MW-5	37.5971432	-120.8688056	Monitoring	--	65	15	EDF	MW-5	MW-5						x
T0609907848-MW-6	37.5971529	-120.8686947	Monitoring	--	65	15	EDF	MW-6	MW-6						x
T0609907848-MW-1	37.5969572	-120.8686096	Monitoring	--	65	15	EDF	MW-1	MW-1						x
T0609907848-MW-3	37.5970182	-120.8686171	Monitoring	--	65	15	EDF	MW-3	MW-3						x
T0609907848-MW-8	37.5971571	-120.8691473	Monitoring	--	65	15	EDF	MW-8	MW-8						x
T0609907848-MW-2	37.5969398	-120.8689229	Monitoring	--	65	15	EDF	MW-2	MW-2						x
T0609907848-MW-7	37.5972897	-120.868704	Monitoring	--	65	15	EDF	MW-7	MW-7						x

Appendix I

First Amendment to Memorandum of Agreement between the West Turlock Subbasin Groundwater Sustainability Agency and the East Turlock Subbasin Groundwater Sustainability Agency

(The original MOA is in Appendix C)

FIRST AMENDMENT TO MEMORANDUM OF AGREEMENT BETWEEN THE WEST TURLOCK SUBBASIN GROUNDWATER SUSTAINABILITY AGENCY AND THE EAST TURLOCK SUBBASIN GROUNDWATER SUSTAINABILITY AGENCY

THIS FIRST AMENDMENT TO AGREEMENT ("First **Amendment**") is entered into and effective this 15th day of November, 2021 (**"Effective Date"**), by and among the West Turlock Subbasin Groundwater Sustainability Agency ("**WTS GSA**") and the East Turlock Subbasin Groundwater Sustainability Agency ("**ETS GSA**") as an amendment to that Memorandum of Agreement between the Parties dated December 14, 2017 ("**MOA**"). Capitalized terms in this First Amendment shall have the meaning assigned in the MOA.

RECITALS

A. As contemplated by the MOA, the Parties are collaborating to develop a joint GSP for the Basin.

B. The Parties acknowledge that implementation of the GSP will require that an accounting of groundwater, surface water stored in basin aquifers and/or the sustainable yield of the Subbasin ("Groundwater Accounting Structure") be allocated to each GSA.

C. The Parties have not been able to agree on an Groundwater Accounting Structure between the two GSAs, but have agreed to resolve that issue immediately after the GSP is submitted to the Department of Water Resources ("DWR") for review.

THEREFORE, in consideration of the mutual promises, covenants and conditions herein set forth, the Parties agree as follows:

1. **METHOD TO RESOLVE THE GROUNDWATER ACCOUNTING STRUCTURE**. The Parties agree that they will undertake the following steps to resolve the accounting framework:

A. Continue to collaborate on the development of a single GSP for the Turlock Subbasin;

B. Suspend current negotiations over the Groundwater Accounting Structure until after the GSP is adopted by both GSAs;

C. Include an appendix in the GSP that includes the documents produced so far by both GSAs on the concept of the Groundwater Accounting Structure, which are attached hereto as **EXHIBIT A-1** and **EXHIBIT A-2** for the WTS GSA and **EXHIBIT B-1** and **EXHIBIT B-2** for the ETS GSA;

D. Include text in the appropriate sections of the GSP stating that the Groundwater Accounting Structure is an outstanding issue to be resolved, and that the current positions of each GSA is provided in the appendix; and

E. Add an Implementation Support Activity (or mutually acceptable equivalent) to the GSP requiring the development of an agreed upon Groundwater Accounting Structure by the GSAs, along with a timeline for doing so.

2. **CONTINUED VALIDITY**. Except as expressly provided in this First Amendment, the MOA shall continue unmodified and in full force and effect.

3. **RESERVATION OF SECTION 2.3**. To the extent the development of an agreed-upon Groundwater Accounting Structure is not achievable within a reasonable timeframe or otherwise impedes either Party's ability to implement the GSP or achieve sustainability within its respective GSA boundary, the Parties agree that any one Party may develop a separate GSP pursuant to section 2.3 of the MOA. Further, the Parties agree that the development of separate GSPs is allowable at any time under this First Amendment and that no action, including the submittal of a joint GSP to DWR, the development of annual reports, the acceptance of basin-level grant funding, shall preclude any Party from developing and submitting to DWR a separate GSP pursuant to this section and section 2.3 of the MOA.

4. **COUNTERPARTS AND ELECTRONIC SIGNATURES**. This First Amendment may be executed simultaneously in one or more counterparts, each of which shall be an original, but all of which together shall constitute one and the same document. A facsimile of .pdf signature of the Agreement shall be considered an original signature of this Agreement for all purposes.

IN WITNESS WHEREOF, the Parties have executed this Agreement on the day and year first above-written.

"ETS GSA"

EAST TURLOCK SUBBASIN
GROUNDWATER SUSTAINABILITY AGENCY

DocuSigned by:

By: ______________________ B3B7943604764B6... Date: 11/28/2021

Al Rossini, Chairman
East Turlock Subbasin GSA

"WTS GSA"

WEST TURLOCK SUBBASIN
GROUNDWATER SUSTAINABILITY AGENCY

DocuSigned by:

By: ______________________ 83FCD632ECA846A... Date: 11/29/2021

Joe Alamo, Chairman
West Turlock Subbasin GSA

EXHIBIT A-1

WTS GSA

Turlock Subbasin Proposed Water Accounting Framework

Purpose/Objective

This framework is intended to generally define groundwater supply sources throughout the Turlock Subbasin, but do not represent an allocation between the ETS and the WTS GSAs or to individual landowners. The accounting framework will facilitate development of solutions to ensure the Turlock subbasin is able to achieve sustainability.

Native Groundwater Supply

Native groundwater supply (native supply) is water that occurs naturally in the subbasin and is subject to extraction by overlying water right holders or appropriators. However, the Turlock Subbasin is currently in a state of overdraft, as determined by DWR, and as such, the native supply is not subject to new appropriation. Proposed accounting of the native supply yield is generally the total native supply divided by acres in the Turlock Subbasin. Native supply includes the following sources:

- Percolation from rain and precipitation
- Streambed percolation, from natural flow in channels
- Return flows from applied native groundwater
- Subsurface flows or underflows from deep aquifers, the Sierra-Nevada foothills and adjacent subbasins

Imported Water

Imported water is surface water that is brought from outside the subbasin, that is stored, conveyed, and applied to land within the subbasin with the intent of reclaiming it. Unless otherwise agreed to, imported water and the seepage therefrom is owned by the importer. Proposed accounting: seepage and storage of imported water remains owned by the importing party. Subject to current law[1] and any contractual agreements stating otherwise, supply of imported water includes:

- Seepage and percolation from imported stored water in natural watercourses
- Seepage and percolation from imported water in conveyance facilities (canals, reservoirs, etc.)
- Percolation from application of imported water on irrigated lands

Salvaged Water

Salvaged water is water that is saved from waste and reclaimed by conservation or investment. Proposed accounting: Unless otherwise agreed to, salvaged water and seepage/percolation from salvaged water is owned by salvaging party. Supply of salvaged water includes:

- Water recaptured from stormwater return flows
- Water that is recharged from treated wastewater discharge
- Conserved water from infrastructure improvements

Measurement

Any imported or salvaged water reclaimed must be reported, in accordance with GSP requirements.[2]

Living Document

This Water Accounting Framework is a living document that shall be revisited by the GSAs at least every five years as part of the GSP update.

[1] See City of Santa Maria v. Adam, 149 Cal. Rptr. 3d. 491, 520–25 (Cal. Ct. App. 2012); City of Los Angeles v. City of Glendale, 142 P.2d 289, 294–95 (Cal. 1943); City of Los Angeles v. City of San Fernando, 537 P.2d 1250, 1294 – 95 (Cal. 1975).

[2] Water Code § 10726.

EXHIBIT A-2

TECHNICAL MEMORANDUM

DATE:	September 13, 2021	**PROJECT #:** 9602.0101
TO:	Debbie Montalbano, Turlock Irrigation District Michael Cooke, Turlock Irrigation District Valerie Kincaid, O'Laughlin & Paris LLP	
FROM:	Derrik Williams, P.G., C.Hg., Louis Wersan, P.G.	
PROJECT:	GSP Technical Support	
SUBJECT:	Updated Water Accounting Framework White Paper	

INTRODUCTION

Montgomery & Associates (M&A) is developing a Water Accounting Framework (Framework) for the Turlock Subbasin on behalf of the Turlock Irrigation District (TID). The Framework classifies various components of the Subbasin's groundwater budget, consistent with commonly accepted rules regarding surface water and groundwater rights. The Framework provides a defensible and logical approach to allocating water and recognizes the investments made by various entities in the Subbasin to secure dependable and reliable water supplies.

The Framework is not an assessment or quantification of water rights. All groundwater extraction and use must comply with Article X, Section 2 of the California constitution, and conform to all other state and local laws.

WATER ACCOUNTING FRAMEWORK CONCEPTS

The Framework classifies groundwater supplies based on generalized concepts of groundwater rights. The three generalized water rights concepts included in this memorandum include:

1. Common pool groundwater. Groundwater recharge that results from natural processes and conditions is common pool water. Examples include rainfall percolation, percolation of natural river flows, mountain front recharge, and inflow from neighboring subbasins. All overlying landowners in the Subbasin have a correlative right to extract and use common pool groundwater, and put it to beneficial use.

2. Imported Water. Water percolating to the groundwater as a result of importing water into the subbasin is imported water. Examples of percolation from imported water include

water that percolates to the groundwater through canal leakage, is intentionally recharged by ponds or wells, or percolates past the root zone after being applied for irrigation. The water that percolates from imported water is not divided among all groundwater users, but rather, belongs to the importer. Only the entity that imported the water has the right to extract imported water and put it to beneficial use.

3. Salvaged groundwater. Water that would otherwise leave the Subbasin or not otherwise be available for use but for the efforts of an entity is salvaged water. Examples include captured stormwater, treated wastewater, efficiency improvements, or percolation from the release of previously stored water. Any salvaged water that percolates to the groundwater through canal leakage, is intentionally recharged by ponds or wells, or percolates past the root zone after being applied for irrigation is salvaged groundwater. Only the entity that salvaged the water has the right to extract salvaged groundwater and put it to beneficial use.

The Framework is not a water budget. It does not address change in groundwater storage and does not concern groundwater flow directions within the Subbasin. The Framework only classifies groundwater inflows into the three water rights classifications listed above. Once groundwater is assigned one of the three classifications, it retains that classification regardless of where it flows in the Subbasin.

The Framework presented in this memorandum divides the groundwater inflows between two entities: the West Turlock Subbasin GSA (WTSGSA) and the East Turlock Subbasin GSA (ETSGSA). Further refinement of the Framework within each GSA could be possible with additional data and analysis.

WATER ACCOUNTING FRAMEWORK DATA

The initial Framework is derived from detailed groundwater and land-surface budget data provided by Woodard Curran on December 8, 2020, and updated on February 24, 2021 and July 8, 2021 (D. Liebersbach, emails to D. Williams, December 8, 2020, and February 25, 2021). The groundwater and land-surface budget terms were extracted from the C2VSim-based model used by the Modesto and Turlock Subbasins for developing Groundwater Sustainability Plans (GSPs). Data from both the land surface budget and groundwater budget were used to develop the Framework.

The initial Framework was updated with data from the Draft Turlock Subbasin GSP released on July 8, 2021. Framework calculations and water supply data presented in this memorandum reflect the updated data. Water budget data from the draft GSP was only available for the historical and baseline averages as well as the year 2010. No other year-specific data were available for this update.

GROUNDWATER ACCOUNTING FRAMEWORK ASSUMPTIONS AND CALCULATIONS

Montgomery & Associates estimated the Framework components shown in the list below. These are the terms that could be extracted or calculated from the C2VSim output. The groundwater budget terms extracted from the C2VSim model do not strictly correlate with the Framework components. Some assumptions and calculations were necessary to estimate the Framework components.

Common Pool Components

Mountain front recharge

Subsurface flow from neighboring subbasins

River gains and losses

Deep percolation of precipitation on agricultural land

Recharge from land covered with native vegetation

Recharge in urban areas

Deep percolation of agricultural irrigation water from private wells

Deep percolation of applied agricultural irrigation water from TID wells

Canal infiltration from groundwater pumped by TID

Imported Water Components

Canal and reservoir infiltration of diverted water

Deep percolation of agricultural irrigation water from river diversions

Salvaged Water Components

Treated wastewater and recharged stormwater in urban settings

- This is not currently differentiated from other urban recharge. This may be included in future versions of the Framework when more detailed model data are available

Common Pool Components

This Framework calculates common pool components for the entire Subbasin rather than for the West Turlock and East Turlock GSAs. This is in accordance with groundwater case law, which apportions common pool groundwater among all users in the subbasin.

Mountain Front Recharge and Subsurface Flow from Adjacent Subbasins

Mountain front recharge and subsurface flow from adjacent subbasins are both natural processes and are included in the common pool. Net subsurface flows (inflows minus outflows) for both mountain front recharge and adjacent subbasins were extracted directly from C2VSim output spreadsheets.

Net Recharge or Discharge form River Gains and Losses

River losses and gains, although influenced by reservoir releases and groundwater elevations, are considered natural processes that are included in the common pool. The annual net recharge or discharge from river gains and losses was extracted directly from C2VSim output. This single value represents the net recharge and discharge from the Tuolumne, Merced, and San Joaquin rivers.

Deep Percolation of Precipitation on Agricultural, and Native Vegetation Land

Recharge of precipitation is a natural process and is included in the common pool. This Framework assumes that all recharge beneath lands covered with native vegetation is from precipitation, because there is no irrigation on these lands. Annual total recharge on lands with native vegetation and deep percolation of precipitation on agricultural lands were extracted directly from C2VSim output spreadsheets.

Deep Percolation Beneath Urban Land

This Framework assumes that all deep percolation beneath urban lands has historically been derived from either precipitation or groundwater pumped by urban water agencies. Both sources are common pool sources and therefore all deep percolation beneath urban land remains common pool water. Annual deep percolation of water beneath urban land was extracted directly from C2VSim output spreadsheets.

In the future, some deep percolation beneath urban lands may be derived from imported surface waters, and this calculation will need to be adjusted to reflect the source of the urban water percolation. Currently, there is no estimate of how much future urban percolation may be from imported surface water supplies.

Deep Percolation of Irrigation Water Applied to Agricultural Land from Private Agricultural Wells and Agricultural Agency Wells

This Framework assumes all wells extract common pool water, and therefore deep percolation of irrigation return flow from this pumping remains common pool water. This assumption likely results in an overestimate of common pool water and underestimate of imported water. Annual deep percolation of return flow from pumped groundwater was extracted directly from C2VSim output spreadsheets.

Canal Infiltration of Groundwater Pumped by Agricultural Agencies

TID pumps groundwater into its canal system for delivery to growers. This Framework assumes the TID wells extract common pool water, and therefore any of this water that infiltrates through the bottom or sides of canals remains common pool water. This assumption likely results in an overestimate of common pool water and underestimate of imported water. The C2VSim model output does not differentiate between canal infiltration of pumped groundwater and canal infiltration of diverted water. This Framework estimates the amount of canal infiltration from pumped water by multiplying the total canal infiltration below the broad-crested weir at Turlock Lake by the percentage of water in canals derived from groundwater.

$$Canal\ Infiltration\ of\ Ag.Agency\ Pumping\ =$$

$$Canal\ Infiltration\ Below\ Turlock\ Lake \times \frac{Ag.Agency\ Pumping}{(Ag.Agency\ Pumping) + (Ag.Agency\ Diversions)}$$

This may overestimate the canal infiltration of TID's pumped water, and therefore overestimate the amount of water in the common pool. A significant amount of infiltration from TID's canals below Turlock Lake likely occurs before groundwater is added to the canal system. Therefore, the canal and reservoir losses are mainly diverted river water, not pumped groundwater. This approach, however, provides a reasonable first estimate that could be refined with additional data and model outputs.

Total Common Pool Supply

The average available common pool supplies for both the historical simulated period and the future baseline simulated period are shown in Table 1. Negative values represent a loss of groundwater from the Subbasin; positive values represent a gain of groundwater in the Subbasin.

- Table 1. Average Amounts of Common Pool Supplies

Component	Historical Average (acre-feet/year)	Baseline Average (acre-feet/year)
Mountain front recharge	2,200	2,100
Subsurface inflow/outflow	35,900	27,900
River gains/losses	-56,600	38,400
Percolation beneath native vegetation	11,800	6,500
Percolation of precipitation on ag. land	62,400	56,900
Percolation beneath urban lands	5,100	11,700
Percolation from private well pumping irrigating ag. land	47,500	47,200
Percolation from ag. agency well pumping irrigating ag. land	22,900	12,200
Infiltration of ag. agency pumping through canals	5,659	3,850
Totals	136,859	206,750

Imported Water Components

Once surface water is lawfully diverted from a stream or river, the water becomes the possessory right of the diverter. Any infiltration of this diverted water through canals remains the possession of the diverter. This Framework calculates imported water components separately for the West Turlock and East Turlock GSAs. This is in accordance with groundwater case law, which allocates imported water to the importer.

Canal and Reservoir Infiltration of Diverted Surface Water

This Framework assumes that all canal infiltration of diversions in the West Turlock subarea are from TID's canal system, and all canal infiltration of diversions in the East Turlock subarea are from Merced Irrigation District's (MID's) canal system.

This Framework assumes that all water in the MID canal is diverted river water, and therefore all infiltration of MID's canal water is imported water. Annual infiltration from East Turlock subarea canals was extracted directly from C2VSim output spreadsheets.

TID conveys both diverted river water and pumped groundwater through its canal system. The C2VSim model output does not differentiate between canal/reservoir infiltration of pumped groundwater and canal/reservoir infiltration of diverted water. This Framework estimates the amount of canal and reservoir infiltration from diverted water by multiplying the total canal infiltration below the broad-crested weir at Turlock Lake by the percentage of water in canals and reservoirs derived from diversions.

$$Canal\ Infiltration\ of\ Diversions\ =$$

$$Canal\ Infiltration\ Below\ Turlock\ Lake \times \frac{West\ Turlock\ Diversions}{(TID\ Pumping) + (West\ Turlock\ Diversions)}$$

This likely underestimates the canal infiltration of TID's diversions, and therefore underestimates the amount of imported water that belongs to the WTSGSA. A significant amount of infiltration from TID's canals below Turlock Lake likely occurs before groundwater is added to the canal system. Therefore, the canal and reservoir losses are mainly diverted river water, not pumped groundwater. This approach, however, provides a reasonable first estimate that could be refined with additional data and model outputs.

Deep Percolation of Irrigation Water Applied to Agricultural Land from Diversions

Any deep percolation of irrigation return flow from this diverted water remains the possession of the diverter. Annual deep percolation of return flow from diverted water was extracted directly from C2VSim output spreadsheets for both the West Turlock and East Turlock subareas.

Total Imported Water Supplies

The average available imported water supplies for both the historical simulated period, and the future baseline simulated period are shown in Table 2 for the West Turlock Subarea, and Table 3 for the East Turlock Subarea.

- Table 2. Average Amounts of Imported Water Supplies: West Turlock Subarea

Component	Historical Average (acre-feet/year)	Baseline Average (acre-feet/year)
Canal and reservoir infiltration of diverted water	67,966	76,305
Percolation of diverted water applied for irrigation	129,000	116,500
Total	196,966	192,805

- Table 3. Average Amounts of Imported Water Supplies: East Turlock Subarea

Component	Historical Average (acre-feet/year)	Baseline Average (acre-feet/year)
Canal and reservoir infiltration of diverted water	4,888	5,223
Percolation of diverted water applied for irrigation	1,900	1,600
Total	6,788	6,823

Salvaged Water

The C2VSim model output did not include any data for potential salvaged water, such as irrigation with recycled water from the Modesto wastewater treatment plant, recharge of stormwater capture, or seepage from stored water flowing in a natural water course.

Unclear Model Output

The C2VSim model output provides values for water budget components that are unclear, such as agricultural runoff and return flow. The updated water budget data do not separate the terms labeled agricultural return and agricultural surface runoff; the fate of the return flow component is also unknown, and therefore, this Framework has not yet assigned this runoff and return flow to any one of the three Framework classifications. This runoff and return flow Subbasin-wide is small compared to some of the other water budget components: approximately 16,700 acre-feet per year. Therefore, although this component will have some influence on the Framework, the general results of this analysis will not be substantially changed by adding the return flow component later.

Deep percolation data presented in the updated Framework is based on data from the C2VSim model Land System Budget output. The updated Water budget data presented in the July 8, 2021 update to the Turlock Sub-Basin GSP resolved a discrepancy between the Groundwater Budget and Land System Budget used to build previous versions of the Framework. However, since the updated data only includes historical and baseline averages and the year 2010, other annual data presented in this version of the Framework are still based on the original C2VSim model outputs used in previous versions, described below.

Deep percolation data for the previous Framework versions were derived from both groundwater and land surface budgets of the C2VSim model Groundwater Budget. The percolation in the Land System Budget, however, included percolating water that remains in storage within the vadose zone and does not recharge the local aquifer. The Framework used percolation data from the Land System Budget to differentiate water ownership, however this leads to an overestimation of basin-wide recharge. From 1991-2015 the average difference between the Land System Budget Percolation Term and the Groundwater Budget Deep Percolation term was 13,287 AF.

To account for this discrepancy in the Framework, the difference between the percolation data from the Land System and Groundwater Budgets was calculated for each year. This difference is assumed to be water that remains as soil moisture, so it is subtracted from the Land System Budget data categories to calculate percolation that reaches the groundwater table. The soil moisture is subtracted from the various percolation components in proportion to each component's percentage of total percolation. An example of this calculation is shown below to calculate the Native Net Deep Percolation for the Water Accounting Framework.

LSB: $Land\ System\ Budget$
GWB: $Groundwater\ Budget$

$$Water\ Accounting\ Framework\ Native\ Net\ Deep\ Percolation =$$

$$LSB\ Native\ Percolation - \left[\left(\frac{LSB\ Native\ Percolation}{LSB\ Total\ Percolation}\right) * (LSB\ Percolation - GWB\ Deep\ Percolation)\right]$$

COMPLETE WATER ACCOUNTING FRAMEWORK

The complete Framework combines the common pool, imported water, and salvaged water classifications. For these allocations, common pool water is apportioned between the WTSGSA and ETSGSA based on total net acreage. A per-acre allocation is first calculated for the entire Subbasin. The per-acre allocation is then multiplied by the number of acres in each GSA to arrive at a GSA specific allocation of the common pool water. The calculations showing the division of common pool supply between WTSGSA and ETSGSA is shown in Table 4.

- Table 4. Common Pool Supply Divided Between WTSGSA and ETSGSA

	Historical Average (acre-feet/year)	Baseline Average (acre-feet/year)
Subbasin-Wide		
Average amount of available common pool water	136,859	206,750
Acres	348,511	348,511
Common pool allocation (acre-feet/acre)	0.393	0.593
Subareas		
West Turlock GSA (212,476 acres)	83,439	126,049
East Turlock GSA (136,035 acres)	53,420	80,701

The complete Water Accounting Framework accounting is shown in Table 5. This allocation combines the common pool and imported water allocations to estimate the total amount of water each GSA is allocated under the historical and baseline conditions. Table 5 also includes estimates of historical and future pumping in the ETSGSA and WTSGSA. The difference between the actual pumping and the allocation is an estimate of the overdraft or surplus that the ETSGSA and WTSGSA contribute to the Subbasin.

- Table 5. Water Accounting Framework Allocations

	Historical Average (acre-feet/year)		**Baseline Average (acre-feet/year)**	
	WTSGSA	**ETSGSA**	**WTSGSA**	**ETSGSA**
Common Pool	83,439	53,420	126,049	80,701
Imported Water	196,966	6,788	192,805	6,823
Total Allocation	280,405	60,209	318,853	87,524
Estimated Pumping	190,867	213,580	165,426	248,611
Surplus (positive) or overdraft (negative)	89,538	-153,371	153,427	-161,087

EXHIBIT B-1

ETS GSA

Turlock Subbasin Proposed Water Accounting Framework

Purpose/Objective

This framework is intended to generally define groundwater supply sources throughout the Turlock Subbasin, but does not represent an allocation between the ETS and the WTS GSAs, or to individual landowners. The accounting framework will facilitate development of solutions to ensure the Turlock subbasin is able to achieve sustainability.

Native Groundwater Supply

Native groundwater supply (native supply) is water that occurs naturally in the subbasin and is subject to extraction by overlying water right holders or appropriators. However, the Turlock Subbasin is currently in a state of overdraft, as determined by DWR, and as such, the native supply is not subject to new appropriation. Proposed accounting of the native supply yield is generally the total native supply divided by acres in the Turlock Subbasin. Native supply includes the following sources:

- Percolation from rain and precipitation
- Streambed percolation, from natural flow in channels
- Return flows from applied native groundwater
- Subsurface flows or underflows from deep aquifers, the Sierra-Nevada foothills and adjacent subbasins

Imported Water

Imported water is surface water that is brought from outside the subbasin, that is stored, conveyed, and applied to land within the subbasin. Imported surface water is owned by the importer. In most instances, the seepage percolation from imported water is also owned by the importer, but there are exceptions to this rule. The GSAs agree to complete in 2022 a proposed accounting for the following:

- Seepage and percolation from imported stored water in natural watercourses
- Seepage and percolation from imported water in conveyance facilities (canals, reservoirs, etc.)
- Percolation from application of imported water on irrigated lands.

Salvaged Water

Salvaged water is water that is saved from waste and reclaimed by conservation or investment. Proposed accounting: Unless otherwise agreed to, salvaged water and seepage/percolation from salvaged water is owned by salvaging party. Supply of salvaged water includes:

- Water recaptured from stormwater return flows
- Water that is recharged from treated wastewater discharge
- Conserved water from infrastructure improvements

Measurement

Any imported or salvaged water reclaimed will be measured using acceptable industry standards/methods of the then-current time and in a manner consistent with GSP requirements.[3]

Living Document

This Water Accounting Framework is a living document that shall be revisited by the GSAs at least every five years as part of the GSP update.

[3] Water Code § 10726.

EXHIBIT B-2

EAST TURLOCK SUBBASIN GSA
TURLOCK SUBBASIN WATER ALLOCATION FRAMEWORK
Legal Issues November 10, 2021

BACKGROUND

Part of the problem is that the September 13, 2021 Technical Memorandum prepared by Derrick Williams and Louis Wersan inaccurately characterizes water that leaks from project facilities or deep percolation of project irrigation water as Imported Water. Once recharged, such water meets the definition of Salvaged Water, as described below.

IMPORTED WATER

Imported or foreign water are used interchangeably in California law:

> If foreign waters are brought by artificial means into a watershed from another watershed, the person or organization constructing the diversion works and importing the water owns the right to use the water. This is true even when a natural watercourse is used as a conduit for foreign waters.[4] The importer of foreign waters has full rights to their use.[5]
>
> Furthermore, as pointed out in *Haun v. DeVaurs*,[6] an importer of water can sell or transfer foreign waters before their abandonment. In fact, the importer can dispose of such return foreign waters by contract prior to abandonment.[7]
>
> Native water is water which, without human intervention, historically provided replenishment to any given source. Accordingly, rainfall, stream channel infiltration, and tributary runoff all comprise the natural or native water supply.
>
> Rights to imported or foreign water are those rights which attach to water that does not originate within a given watershed or groundwater basin.[8]
>
> There is a tendency to refer to native water held in storage as "developed water" even though it may originate from within the watershed and is not technically imported. This is because the stored flow may augment the quantity of water that would otherwise be available from natural conditions in a different season or from year to year.

For the developed water supply to be classified as "foreign," it must originate from outside the boundaries of the watershed into which the water supply is imported for its ultimate use. The water supply is considered to be foreign, because it does not naturally originate within the watershed of its use.[9]

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[4] *See* Wat. Code §7075
[5] *City of Los Angeles v. City of Glendale* (1943) 23 Cal. 2d 68, 76-78; *Stevens v. Oakdale Irrig. District* (1939) 13 Cal. 2d 343, 348-353.
[6] *Haun v. DeVaurs* (1950) 97 Cal. App 2d 841, 844.
[7] *Stevinson Water Dist. v. Roduner* (1950) 36 Cal. 2d 264, 267-671; Rogers & Nichols *Water for California* Volume I, Chapter XI §263.
[8] *City of Los Angeles v. City of San Fernando* (1975) 14 Cal.3d 199, 255-256; Slater, California Water Law and Policy, 7-3.
[9] Slater, California Water Law and Policy, 7-7 – 7-8.

SALVAGED WATER

Salvaged water may be native to the extent it would naturally flow within the stream to which it is released, but it is "foreign in time."[10] As such, it may include water that would have occurred in the aquifer under natural, pre-development conditions. This has important implications that limit a developer's ability to lay claim to salvaged water recharged from its water importation facilities.

> Salvaged waters are waters that are saved from loss in a stream or water source.[11] In general, the person who undertakes artificial works obtains the benefit of the waters thus developed or salvaged, as long as he does not infringe prior rights of others.
>
> Thus, developers are entitled to waters that were not part of the natural flow. As to such waters, the court in *Vineland Irrigation Dist. v. Azusa Irrigating Co.*[12] pointed out that one is not entitled to developed waters that would naturally have gone into the watercourse or where their development injures the rights of others.[13]
>
> The determination of whether one may enjoy the use of salvaged or conserved water originating from native supplies still depends on whether injury will result to existing lawful users.[14]
>
> Water comprising a portion of the natural flow of a stream or comprising a portion of the natural, pre-development safe yield of a local groundwater basin, but which is salvaged through conservation efforts, is available to use by the salvager provided that no injury will result to other lawful users.[15]

SPECIFIC LEGAL ISSUES

1. **SALVAGED WATER CAN ONLY BE RECOVERED IF IT DOES NOT INJURE ANOTHER USER OF WATER.**

As is the case with return flows of imported water, a priority right to salvaged water *may* belong to the party salvaging the water and making it available to use, subject to certain limitations.
The general rule governing rights to the use of salvaged water is that the person who by his own efforts makes waters available that would have been part of the pre-development native yield, is entitled to use them, provided that in doing so he is not infringing the prior rights of other legal users.[16] The essential feature of the right to the use of salvaged waters is that its

[10] See Attwater and Markle, Overview of California Water Rights and Water Quality Law (1988) 19 Pacific L.J. 957, 966.
[11] *Vernon Irrig. Co. v. Los Angeles* (1895) 106 Cal. 237, 253.
[12] (1899) 126 Cal 486.
[13] Rogers & Nichols *Water for California* Volume I, Chapter XII §265.
[14] Slater, California Water Law and Policy, 7-10.
[15] *Scott v. Fruit Growers Supply Co.* (1927) 202 Cal. 47, 51-55; Slater, California Water Law and Policy, 7-1.
[16] Hutchins, *The California Law of Water Rights,* at p. 383.

exercise does not cause injury to any pre-existing right.[17] If return flows available to lawful users are diminished by salvage operations, the actions of the salvager may be enjoined.[18]

Historically, before the dam(s) were constructed, and the Tuolumne River flowed freely, the flow was absorbed in the valley stretch of the stream as groundwater recharge. That pre-development groundwater recharge from uncontrolled winter and spring flows was decreased when the dam(s) were constructed, but overlying pumpers are entitled to pump the originally available recharge prior to development, and a salvager may not lay claim to such water. To the extent that such water originates in the Tuolumne River under natural conditions, the groundwater users are entitled to protection from depletion of the supply as the result of project operation. No challenge was brought to construction of the dam(s) on these grounds. However, canals that convey the surface water and the applied water from the Tuolumne River also recharge the groundwater basin, and overlying users within the basin have been using that water for decades. **If TID now makes a claim to that recharged water, these overlying users of pre-existing native groundwater would be injured.**

- Therefore, TID can make a claim to its salvaged water only to the extent that its operations create recharge over and above natural recharge that would have occurred without its storage project. Further hydrologic studies, including an analysis of pre-development conditions and simulation of pre-development versus post development recharge would have to take place to document this number. Alternative approaches may be agreed to in recognition of the fact that all such modeling studies are limited by the availability of data and other factors, and are inherently uncertain.

- Further, TID cannot make a claim at this late date on recapturing salvaged water from the groundwater basin without injury to existing groundwater users. Historically, TID has relinquished dominion and control of its surface water after it is used by landowners within its jurisdiction or lost to leakage from its facilities. Consequently, those supplies have become available for appropriation by overlying pumpers. TID cannot now attempt to recapture those waters without injury to the historic overlying users, who have a right to their equivalent share of the pre-development native yield.

2. TID HAS NOT OBTAINED A PERMIT TO RECOVER THE SALVAGED WATER IT CLAIMS.

The State Water Resources Control Board takes the position that under existing California law a salvager must obtain a permit before appropriation of salvaged water; in others words, TID cannot store and recapture water in the underground (i.e., lay an ownership claim to it) without supplementing its existing water rights with an Underground Storage Supplement. In addition, it is unclear under California law what priority a salvager receives after salvage and

[17] *Id*. at p. 385.

[18] Slater, *California Water Law and Policy*, at p. 7-15, citing *Scott v. Fruit Growers Supply Co.* (1927) 202 Cal. 47, 51-55.

diversion. Under existing administrative practice, the State Water Resources Control Board grants salvagers permit rights subject to claims by senior users.[19]

3. IN THE ALTERNATIVE, GROUNDWATER PUMPERS MAY HAVE ACQUIRED A PRESCRIPTIVE RIGHT TO THE WATER.

If no prescriptive rights have attached to imported water used to recharge a basin, the imported water generally belongs solely to the importer, who may extract it (even if the basin is in overdraft) and use or export it without liability to other basin users. However, there is an open question as to whether prescription of imported water from the subbasin has occurred.[20]

4. **THERE SHOULD BE A LEAVE BEHIND OF SALVAGED WATER FOR PROTECTION OF THE GROUNDWATER BASIN.**

In order to insure that a groundwater banking project protects the health of the basin, a leave-behind requirement from 10 to 30 percent is ordinarily imposed. "There are well defined rules regarding leave behinds to address migration of water necessary to keep the subbasin whole."[21] In the case of Salvaged Water, a leave behind is necessary so as not to injure the rights of overlying pumpers to extract their correlative share of the pre-project native yield. This would further reduce the amount of groundwater recharge from project facilities that is available for salvage.

CONCERNS WITH TURLOCK SUBBASIN PROPOSED WATER ACCOUNTING FRAMEWORK AND TECHNICAL MEMORANDUM ("Framework")

The Framework defines Native groundwater supply as "water that occurs naturally in the subbasin and is subject to extraction by overlying water right holders of appropriators." Native supply is stated to include (among other things):

- Streambed percolation, from natural flow in channels
- Return flows from applied native groundwater

It is important to remember that, historically, "natural flow in channels" included all flows now impounded by the New Don Pedro Project. Historically, high winter and spring flows regularly topped the Tuolumne River's banks and supplied extensive recharge water to the Subbasin. This historical recharge volume should be considered part of the native groundwater supply. As noted in the water accounting framework concepts: "All overlying landowners in the Subbasin have a correlative right to extract and use common pool groundwater, and put it to beneficial use."

Imported Water is defined as "surface water that is brought from outside the subbasin." This is stated to include:

[19] *Governor's Commission to Review California Water Rights Law*, at p. 61 (December, 1978).
[20] Environmental Defense Fund and New Current Water and Land, LLC, *Groundwater Pumping Allocations under California's Sustainable Groundwater Management Act* (July 2018) at p. 3.
[21] *Id.*

- Seepage and percolation from imported stored water in natural watercourses;
- Seepage and percolation from imported water in conveyance facilities (canals, reservoirs, etc.); and
- Percolation from application of imported water on irrigated lands.

These definitions are legally correct; however, in the technical memorandum, canal and reservoir infiltration of diverted Tuolumne River water and deep percolation of agricultural irrigation water from Tuolumne River diversions are incorrectly classified only as imported water components and allocated solely and exclusively to TID. Clearly, use of Tuolumne River water does not meet the stated definition of Imported Water that is “brought from outside the subbasin.” The Framework states that all water in canals is diverted river water, and therefore all infiltration of canal water is imported water – a questionable conclusion. In fact, since project water originates from within the Tuolumne River basin and is diverted within the subbasin, seepage and percolation of this water is not imported water, but abandoned salvage water, and subject to appropriation only to the extent it does not harm an overlying pumpers right to extract their correlative share of the pre-development native yield.

CONCLUSIONS AND NEXT STEPS

1. WTSGSA continues to characterize water from their projects as “imported water.” There is no imported water in the basin; all of the water WTSGSA is referring to as imported water is legally categorized as salvaged water.

2. The WTSGSA Framework reaches the following conclusions regarding baseline averages:

Water Accounting Framework Allocations
Baseline Average
(acre feet/year)

	WTSGSA	ETSGSA
Common Pool	126,486	80,981
Imported Water	192,029	6,879
Total Allocation	318,515	87,859
Estimated Pumping	165,389	248,611
Surplus (positive) or overdraft (negative)	153,137	-160,751

Of the 192,029 acre feet of incorrectly labelled “imported water,” 76,305 acre feet is from canal and reservoir infiltration of Tuolumne River water diverted into canals and reservoirs, and 116,500 acre feet is from percolation of Tuolumne River water applied for irrigation.

3. Under the law, the ETSGSA has a strong legal claim to a significant portion of the native Tuolumne River water.
4. In order to make an informed argument as to which portion of the salvaged water ETSGSA is entitled to, additional information is needed to determine:

- What portion of the claimed water is attributable to historical natural flow in or flood events from, the river;
- What portion of the claimed seepage and percolation should be left behind for the basin; and
- What portion of the claimed seepage and percolation has been historically abandoned and/or used within the groundwater basin?

TURLOCK
GROUNDWATER