Supplement to Eastside Subbasin Committee SMC Meeting

INTRODUCTION

SVBGSA is providing this data supplement to help Subbasin Committee members develop views and ideas about appropriate Sustainable Management Criteria (SMC). These data supplement information provided at the previous Subbasin Committee meeting and the July 28 SMC Workshop. These data should be reviewed in the context of the SMC definitions presented at the July 28 SMC Workshop, and the approach options for setting SMCs suggested at the previous Subbasin Committee meeting.

Stakeholders are being asked to consider SMC approach options as initial strategic direction, knowing this GSP will be adapted and improved over time. Some sustainability indicators may be adjusted to reflect a valley-wide approach if the Board of Directors decides on a more unified policy direction. Individual subbasins may still tailor potential valley-wide approaches to their own unique situations while still adhering to overarching guidelines. Subsequently, the feedback from subbasin committee members is still an invaluable component to developing these GSPs. GSP development is an iterative process designed to incorporate feedback from stakeholders, managers, board members, and the public in order to create a living plan to get the subbasin to sustainability in the long-term.

Some important points from the July 28 SMC Workshop presentation include:

- Each Sustainability Indicator must have a statement of what is ***significant and unreasonable*** for the GSP.
- ***Minimum thresholds*** are the quantitative value that define what is significant and unreasonable at every measuring point
- ***Undesirable results*** are defined as a combination of minimum thresholds exceedances for the whole subbasin. Therefore, the GSP must define when an undesirable result is triggered by first defining the minimum thresholds.
- ***Measurable objectives*** are quantitative goals. Think of measurable objectives as the safety factors on top of the minimum thresholds to accommodate for droughts.
- GSPs must clearly define a planned pathway to reach sustainability in the form of interim milestones towards measurable objectives, and show actual progress in annual reporting.

Figure 1 is taken from DWR's SMC Best Management Practice document. The green line is an example of historical groundwater elevations. The minimum threshold and measurable objectives are shown, as well as interim milestones (IM's) for every five years. The IM's show the path towards achieving the measurable objective.

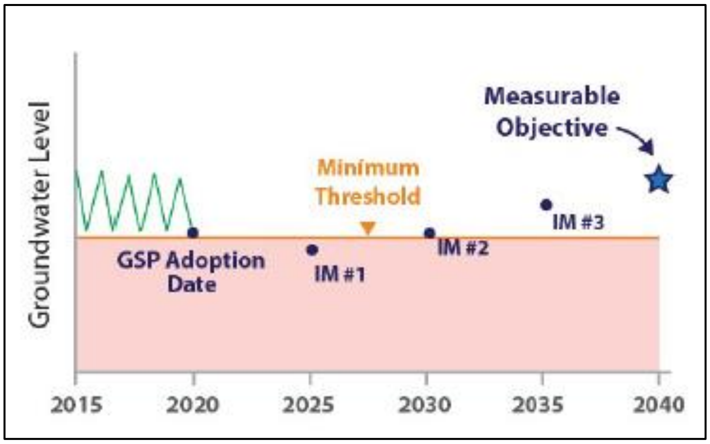


Figure 1: Example Minimum Threshold, Interim Milestones (IM), and Measurable Objective for One Well

In the previous Subbasin Committee meeting, SVBGSA staff and consultants provided a number of potential definitions of what might be significant and unreasonable for each sustainability indicator. These were only suggestions, and the Committee members are welcome to develop their own definitions.

An important factor in considering SMC approach options is that the GSP is a long-term plan, with adaptive management and regular updates as more and better information is collected. This GSP is being developed with the best currently available information.

SUPPLEMENTAL DATA

Supplemental data is intended to help Subbasin Committee members develop views and ideas about appropriate SMCs, and contribute to the strategic direction of the GSP as it is being developed. Each GSP shall define what is significant and unreasonable within the Subbasin (see August Subbasin Committee meeting presentation for example statements of significant and unreasonable). Based on that, each GSP shall select the metric used, minimum thresholds, measurable objectives, and undesirable results.

For each Sustainability Indicator, the following sections include an overview of the decisions that must be made, the metric used, and supplemental data to help bolster decisions by committee members.

Land Subsidence

Land subsidence is the change in land surface elevation at each measuring point.

Decisions

The statement of what is significant and unreasonable should address whether any amount of land subsidence is significant and unreasonable. Example statements of what might be considered significant and unreasonable land surface changes due to poor groundwater management were provided in the presentation at the previous Subbasin Committee meeting.

The approach options presented at the previous committee meeting are as follows:

1. Any subsidence anywhere in the Subbasin is significant and unreasonable
    - Minimum threshold = 0 subsidence (+/- 0.1ft to account for measurement error)
    - Measurable objective = 0 subsidence (+/- 0.1ft to account for measurement error)
2. Any subsidence may impact infrastructure in the Subbasin is significant and unreasonable Map infrastructure locations
    - Minimum threshold = 0 in mapped locations (+/- 0.1ft to account for measurement error)
    - Minimum threshold = ? outside of mapped locations
    - Measurable objective = 0 everywhere (+/- 0.1ft to account for measurement error)
3. Some level of subsidence is acceptable.
    - Minimum threshold = ? subsidence everywhere
    - Measurable Objective = 0 subsidence everywhere (+/- 0.1ft to account for measurement error)

The decision made in the 180/400-Foot Aquifer Subbasin was to define:

- ***Significant and unreasonable:*** Any subsidence anywhere in the Subbasin is significant and unreasonable (option 1).
- ***Metric:*** InSAR data
- ***Minimum threshold:*** No subsidence as defined by an InSAR measurement error of +/- 0.1 feet/year, with an option to address long term, slow subsidence
- ***Measurable objective:*** No subsidence as defined by an InSAR measurement error of +/- 0.1 feet/year, with an option to address long term, slow subsidence

SMC Metric

SGMA regulations state that the metric for land subsidence is the rate and extent of land subsidence. The minimum threshold for land subsidence is the rate and extent of subsidence that substantially interferes with surface land uses. Groundwater elevation may be used as a proxy for this sustainability indicator if the GSP demonstrates significant correlation between groundwater elevation and land subsidence rates.

Available Data

Historical subsidence data are limited, and therefore no additional data are provided for the Subsidence SMC. Figure 2 shows the average annual InSAR data from June 2015 to September 2019.

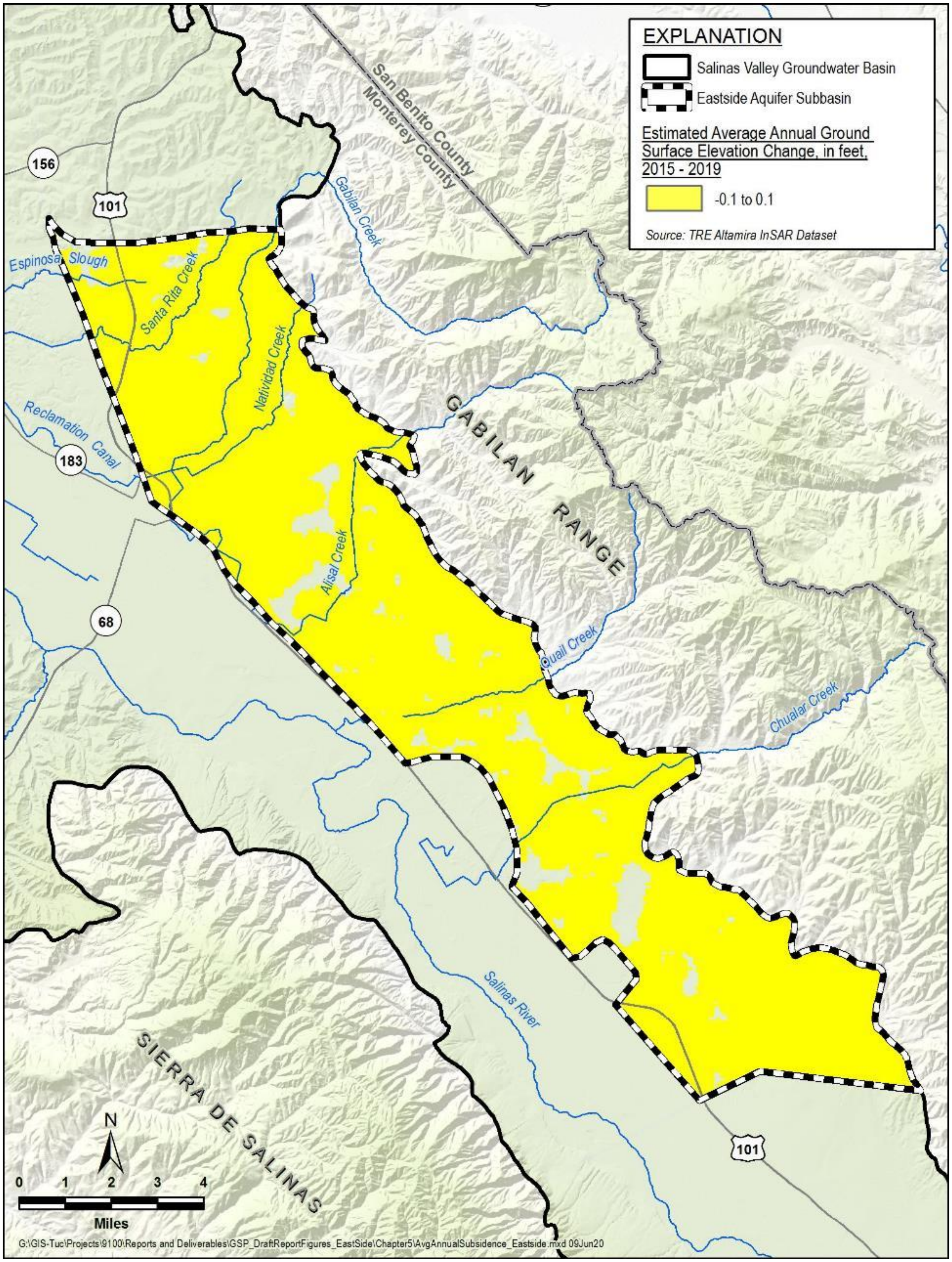


Figure 2: Average Annual Subsidence from 2015 to 2019

Interconnected Surface Water

Depletion of interconnected surface water is a rate or volume of surface water depletion.

Decisions

The statement of what is significant and unreasonable should address whether the current depletion rate is significant and unreasonable. Example statements of what might be considered significant and unreasonable surface water depletion were provided in the presentation at the previous Subbasin Committee meeting. As a reminder, the GSA is not required to mitigate any undesirable result that occurred prior to January 1, 2015.

The approach options presented at the previous committee meeting are as follows:

1. The current rate of surface water depletion is significant and unreasonable, and we choose to reduce the rate of depletion (leave more water in surface water bodies)
    - Minimum threshold
        - Less simulated depletion, or
        - Higher shallow groundwater levels
    - Measurable objectives
        - Less simulated depletion, or
        - Higher shallow groundwater levels
2. The current rate of surface water depletion is significant and unreasonable, but SVBGSA chooses not to reduce the rate of depletion
    - Minimum threshold
        - Less than today's simulated depletion, or
        - Higher shallow groundwater levels
    - Measurable objectives
        - Less simulated depletion, or
        - Higher shallow groundwater levels
    - We are not required to meet the minimum thresholds in this example
3. The current rate of surface water depletion is not unreasonable (although it may be significant)
    - Minimum threshold
        - Equal to today's simulated depletion, or
        - Equal to today's shallow groundwater levels
    - Measurable objectives
        - Equal to today's simulated depletion, or
        - Equal to today's shallow groundwater levels
4. Additional surface water depletion is neither significant nor unreasonable (take more water out of surface water bodies)

- Minimum threshold
    - More than today's simulated depletion, or
    - Lower shallow groundwater levels
- Measurable objectives
    - More than today's simulated depletion, or
    - Lower shallow groundwater levels

The decision made in the 180/400-Foot Aquifer Subbasin was to define:

- ***Significant and unreasonable:*** Current depletion rates are not unreasonable, even if they may possibly be significant. (option 3). This decision focuses on interconnection when the river flows without conservation releases from the reservoirs. One of the primary purposes of conservation releases is to recharge aquifers, so stream depletion is expected. The subbasin is currently using simulated (modeled) depletions, but is considering changing to shallow groundwater elevations.
- ***Metric:*** TBD by model or groundwater elevations as a proxy
- ***Minimum threshold:*** Equal to today's simulated depletion, or equal to current average rate of depletion ***Measurable objective:*** Equal to today's simulated depletion, or equal current average rate of depletion

In most other subbasins, there may not be enough shallow wells to determine shallow water levels near the streams. Subsequently, the model will provide the requisite initial data.

SMC Metric

SGMA regulations state that the metric for surface water depletion is a volume or a rate of surface water depletion from interconnected surface waters. Groundwater elevations may be used as a proxy for this sustainability indicator if the GSP demonstrates significant correlation between groundwater elevation and stream depletion rates. The GSP only manages interconnected surface waters, which are waters that are hydraulically connected by a continuous saturated zone to the underlying aquifer.

Available Data

Data on the location of interconnected surface waters are scarce. Better estimates will be available when the SVIHM becomes available to the SVBGSA. As a proxy for identifying interconnected surface waters, the following maps show areas where groundwater is mapped within close proximity of the ground surface. The general assumption is that water within 20 feet of ground surface is likely connected to the river, however, the Salinas River does not occur in this subbasin. Figure 4 shows 2017 groundwater levels between 40 and 50 feet of the ground surface because this was right after drought conditions and groundwater levels were deeper than 30 feet throughout the Subbasin. The SVHIM and SVOM will allow managers to look more closely at potentially interconnected reaches for targeted field verification. The statement of what is significant and unreasonable should address the current rate of surface water depletion which will be first explored using the SVIHM.

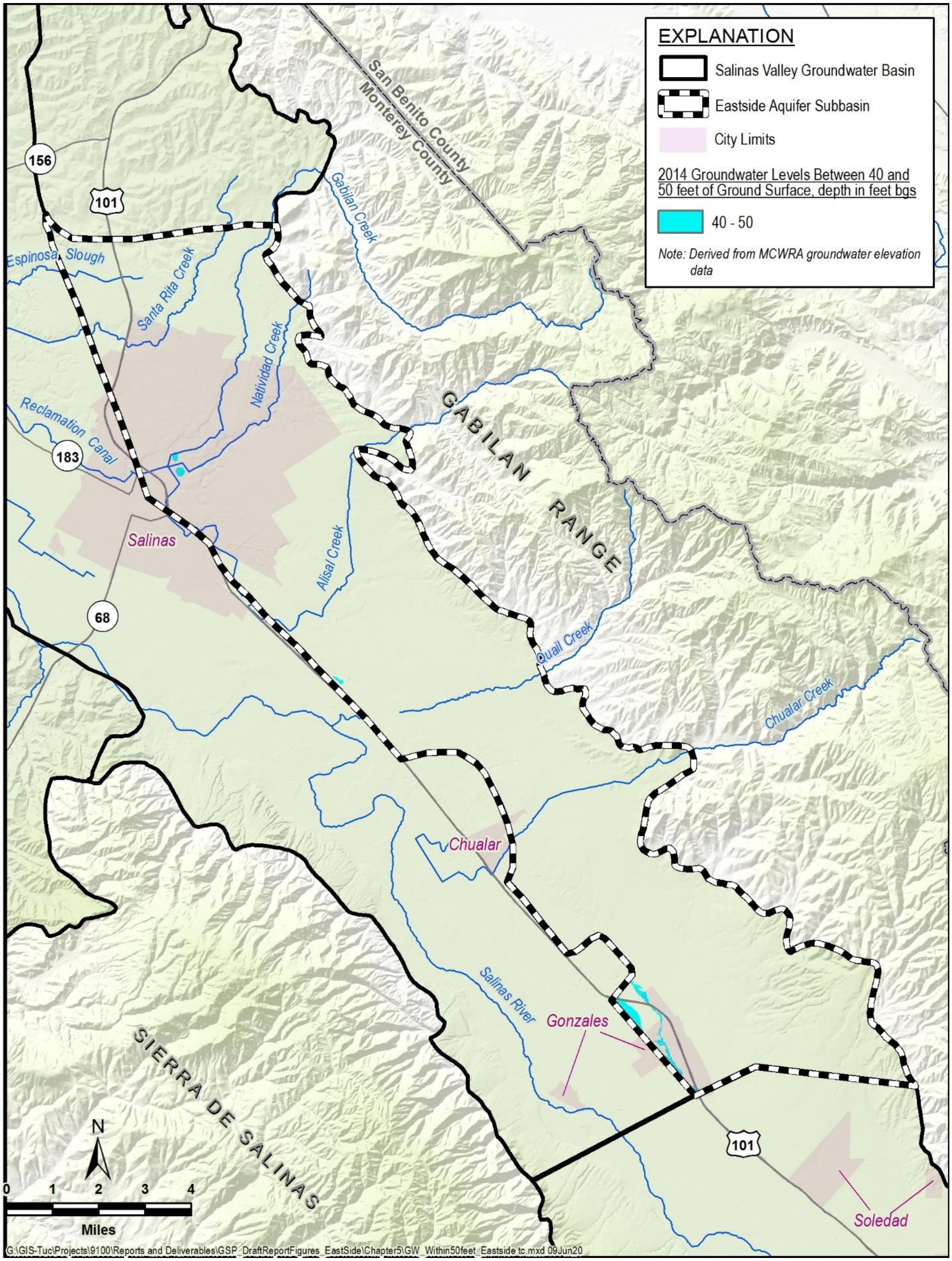


Figure 3: 2019 Groundwater Levels Within 20 feet of the Ground Surface

Groundwater Levels

Decisions

The statement of what is significant and unreasonable can be based on any number of options. Example statements of what might be considered significant and unreasonable groundwater elevations were provided in the presentation at the previous Subbasin Committee meeting. The statement of what is significant and unreasonable need not be confined to one criterion; many criteria can be used to define what is significant and unreasonable.

Groundwater levels are measured in representative monitoring wells, with one minimum threshold and one measurable objective per well. Other potential criteria for determining groundwater level thresholds and objectives are groundwater interaction with GDEs and/or impacts on shallow domestic wells.

If the Subbasin Committee decides to set SMC based on groundwater levels in a certain year, the Committee should identify which historical years had significant and unreasonable groundwater elevations. If the Subbasin Committee decides to set SMC based on GDEs, the Committee should state a preference for how close to ground surface groundwater elevations should be maintained.

The approach options presented at the previous committee meeting are as follows:

1. Groundwater elevations in a certain year were significant and unreasonable
   - Set minimum thresholds above whatever was recorded in the year in question
2. What is significant and unreasonable is determined at each representative monitoring site. Groundwater elevation minimum thresholds will be set a depth below the measurable objective at each well
   - Set the groundwater level goal you would like to achieve, then set a minimum threshold that allows groundwater levels to drop during a drought.
   - Need a way to set your groundwater level goal. Maybe current conditions?
3. Anything that goes beyond the predicted levels under current practices is significant and unreasonable. Groundwater elevations minimum thresholds are set at the lowest point predicted by models if current practices continue
   - Extend the current rate of groundwater decline out 20 years. Set the minimum thresholds there.
   - Option is to set minimum thresholds after 5,10, or 15 years of declines at current rates
4. Impacting shallow, domestic wells is significant and unreasonable
   - Minimum thresholds are set to ensure **most** shallow domestic wells have adequate water for operation
   - Option: set minimum thresholds excluding the very shallowest domestic wells

- Option: use this as a check on the reasonableness of minimum thresholds

5. Lowering groundwater elevations below the root zone of all (or selected) GDEs is significant and unreasonable
    - Minimum thresholds based on an assumed rooting depth of plants in a GDE
    - Measurable objectives are above this depth to account for droughts
6. Lowering groundwater levels to where wells pump poor quality groundwater is significant and unreasonable
    - Requires data on groundwater quality with depth.
    - Used for naturally occurring constituents such as arsenic etc.

The decision made in the 180/400-Foot Aquifer Subbasin was to define:

- ***Significant and unreasonable:*** Groundwater elevations in a certain year were significant and unreasonable (option 1). The GSP statistically assessed impacts on domestic wells as well (option 4).
- ***Metric:*** Groundwater elevations
- ***Minimum threshold:*** 1 foot above measured 2015 elevations
- ***Measurable objective:*** 2003 groundwater elevations

SMC Metric

SGMA regulations state that the metric for lowering groundwater levels are groundwater elevations. Groundwater levels are measured in representative monitoring wells, and converted to elevations for long-term monitoring.

Available Data

Hydrographs showing historical groundwater elevations for individual wells are included below. These hydrographs may provide direction for what groundwater levels may be achievable, and what groundwater levels may be unreasonably low. These hydrographs can guide assessments of whether groundwater levels in any years were significantly and unreasonably low. The hydrographs show the ground surface elevation to illustrate the historical depth to groundwater, which will influence GDEs. Figure 5 shows the spatial distribution of groundwater level changes is shown on a map with selected hydrographs inserted on the map.

Figure 6 shows the MCWRA-produced change in groundwater elevation plot for the Eastside subarea, which covers most of the Eastside Subbasin. This chart also shows the initial proposal for minimum thresholds and measurable objectives. In the Pressure subarea, the initial proposed minimum threshold was set to one foot above the Fall 2015 groundwater elevations. These are initial selections based on available data, and are subject to revision by the subbasin committee.

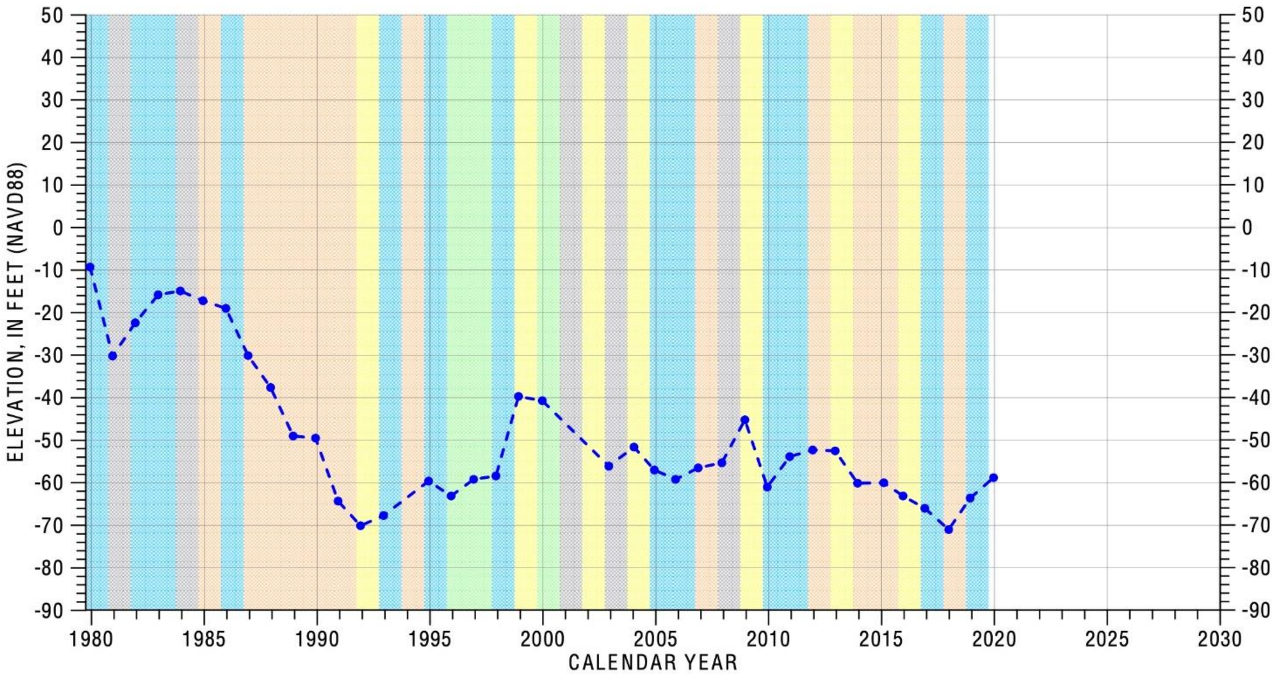
To assist with the option of using GDE's for defining significant and unreasonable conditions, a map is provided that shows the potential GDEs for the subbasin (Figure 7). These are only potential GDEs. Field verification is necessary to establish if these are true GDEs, and what ecosystems exist in each GDE.

To assist with the option of using domestic wells for defining significant and unreasonable conditions, Table 1 shows the average depth of domestic wells in the Subbasin. This table was extracted from the draft ISP. The row showing the average domestic well depth in the Eastside Subbasin is highlighted in orange. Additionally, Figure 8 shows two shallow wells in the Eastside Subbasin with their most recent groundwater level record. The average depth of the wells in Figure 8 is approximately 187.5 ft and the average depth to water is approximately 61 ft. None of these wells are domestic wells but they are the only shallow wells with recent groundwater level records (post 2018) in the Monterey Subbasin.

Hydrographs

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-03K01

Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface (169 FT MSL)

WATER YEAR TYPE DESIGNATION

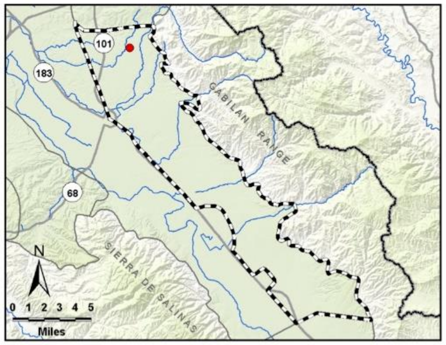
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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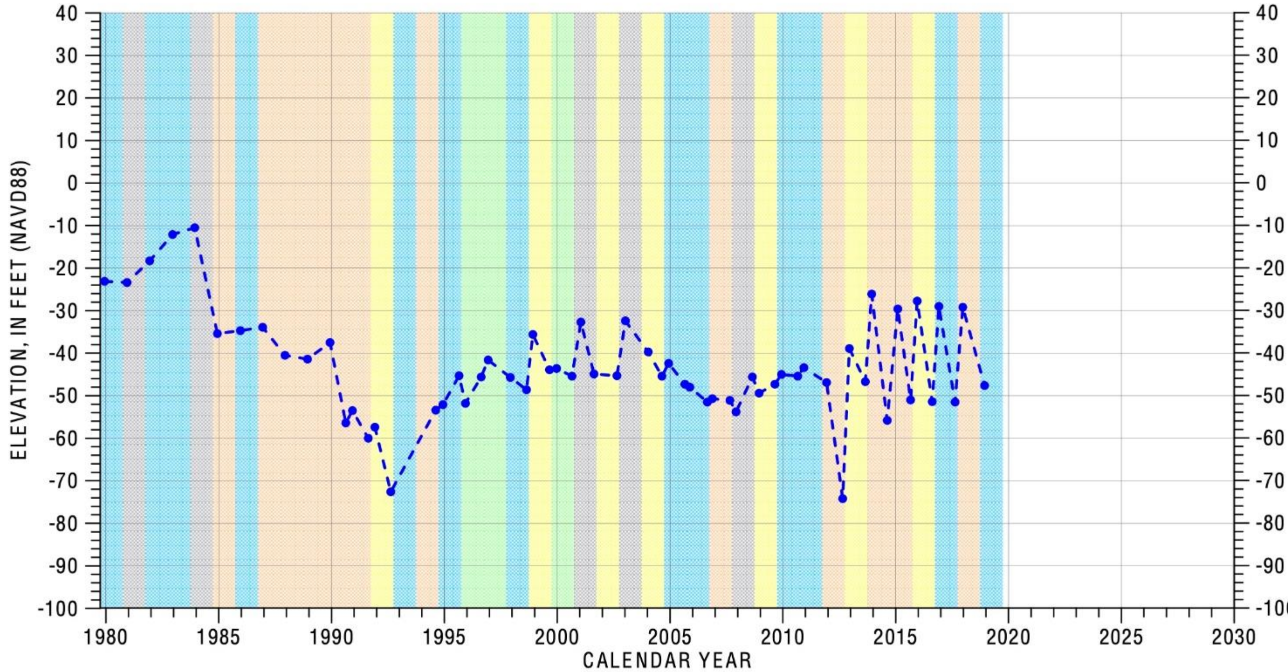
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-04E01

Eastside Aquifer Subbasin

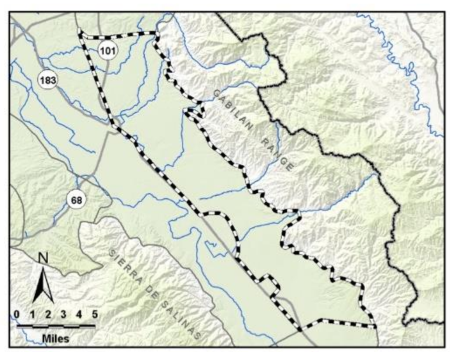


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (136 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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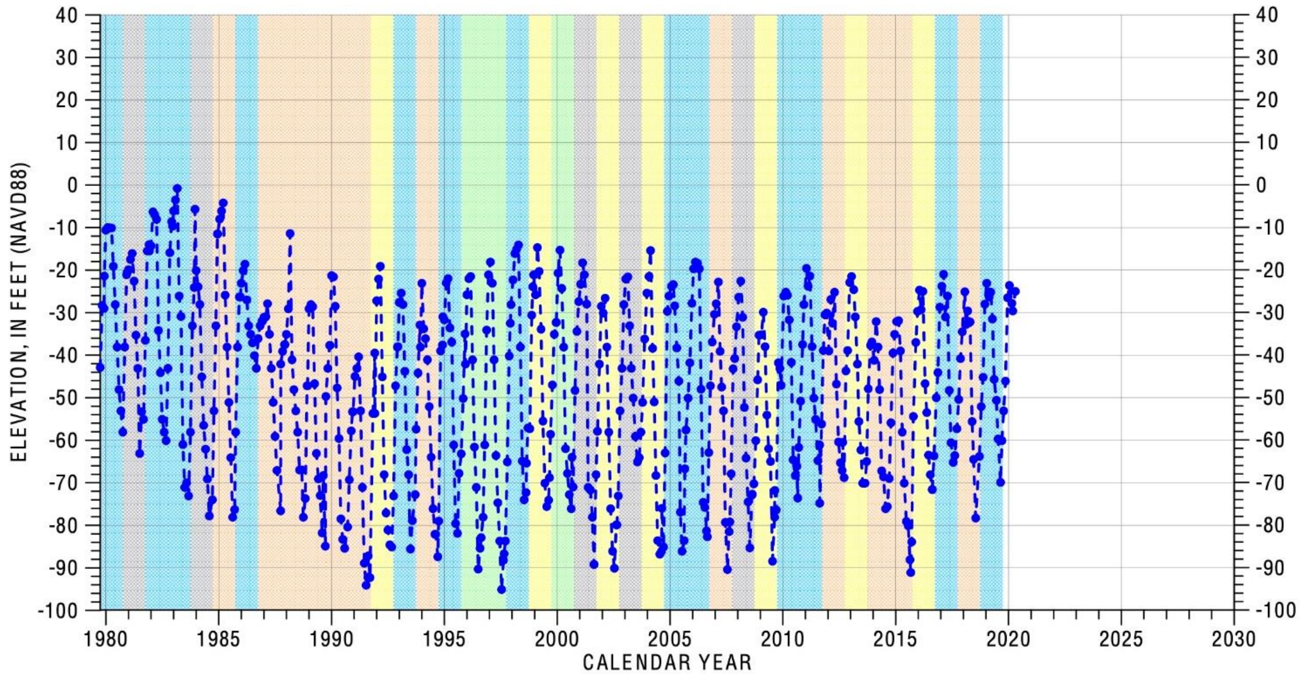
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-06R01

Eastside Aquifer Subbasin

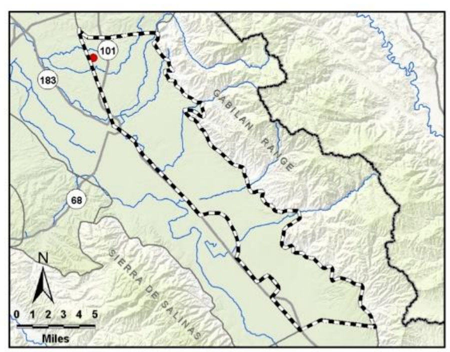


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (92 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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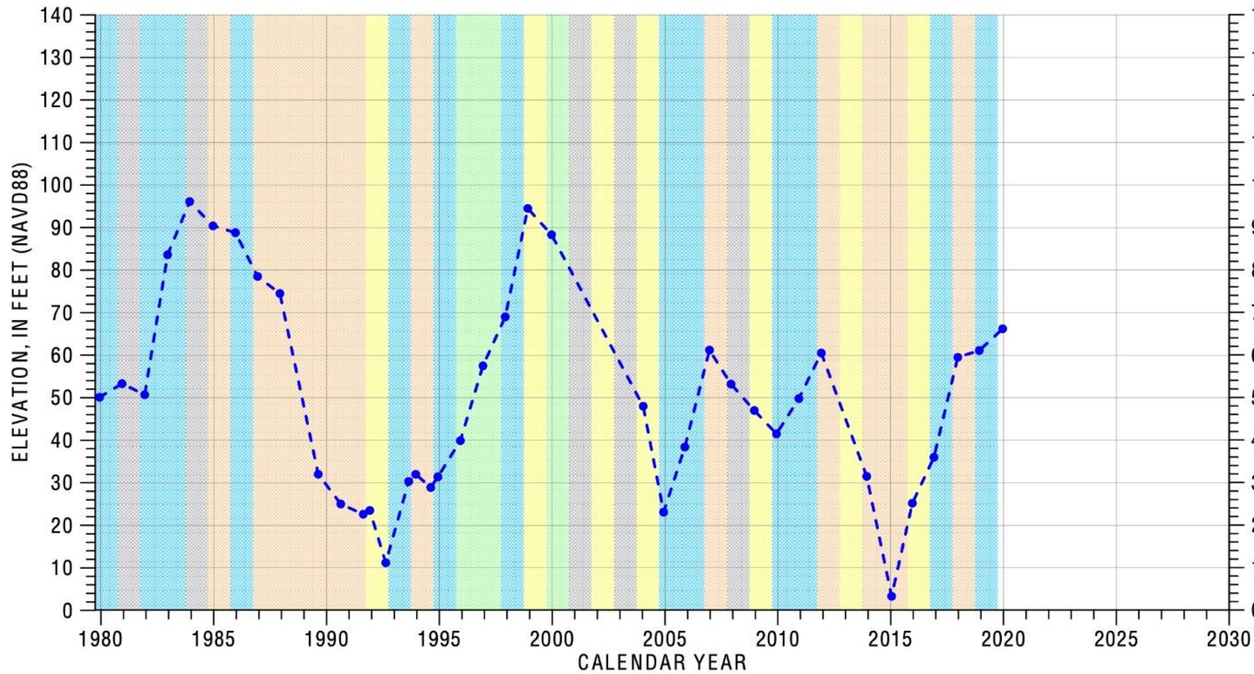
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-11H01 Eastside Aquifer Subbasin

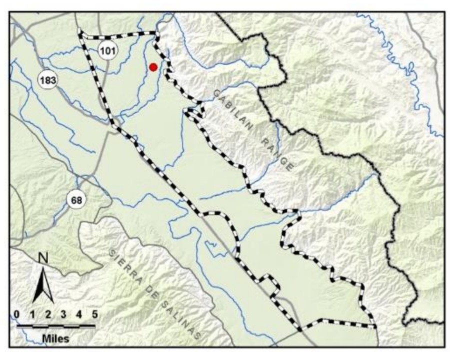


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (142 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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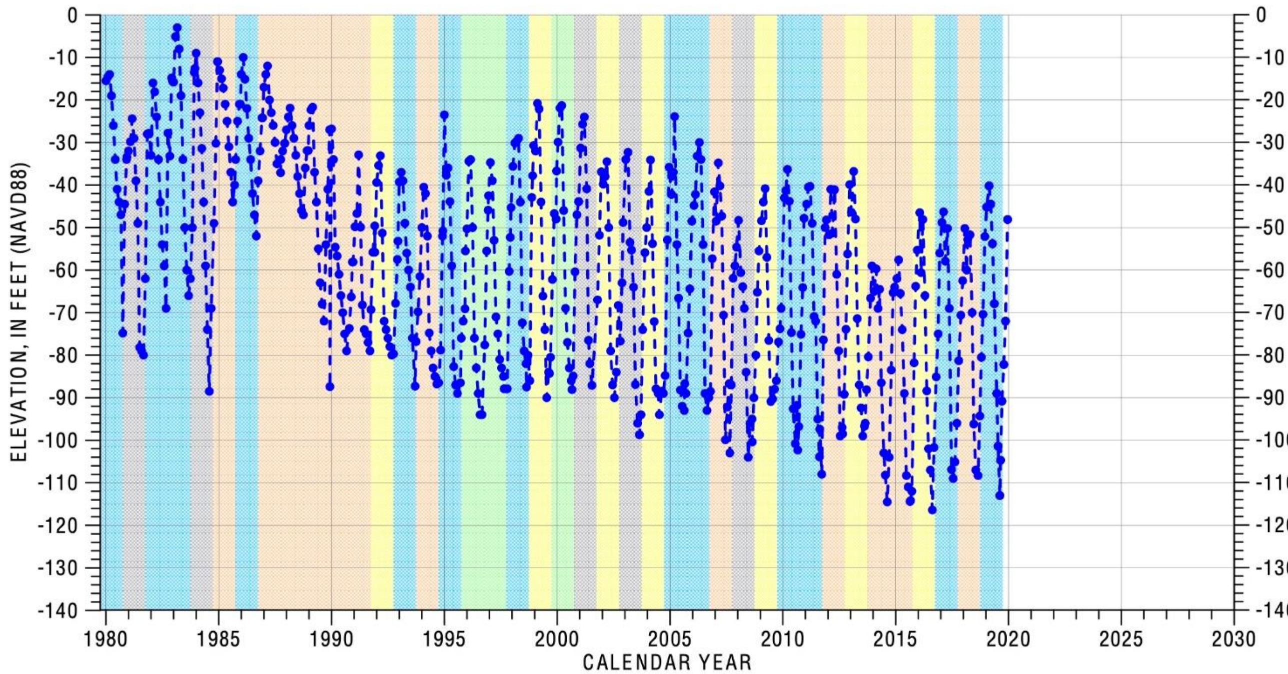
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-15H03

Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface (126 FT MSL)

WATER YEAR TYPE DESIGNATION

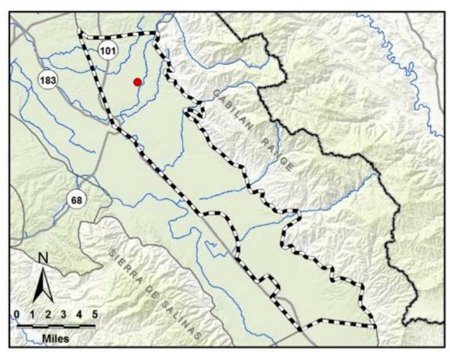
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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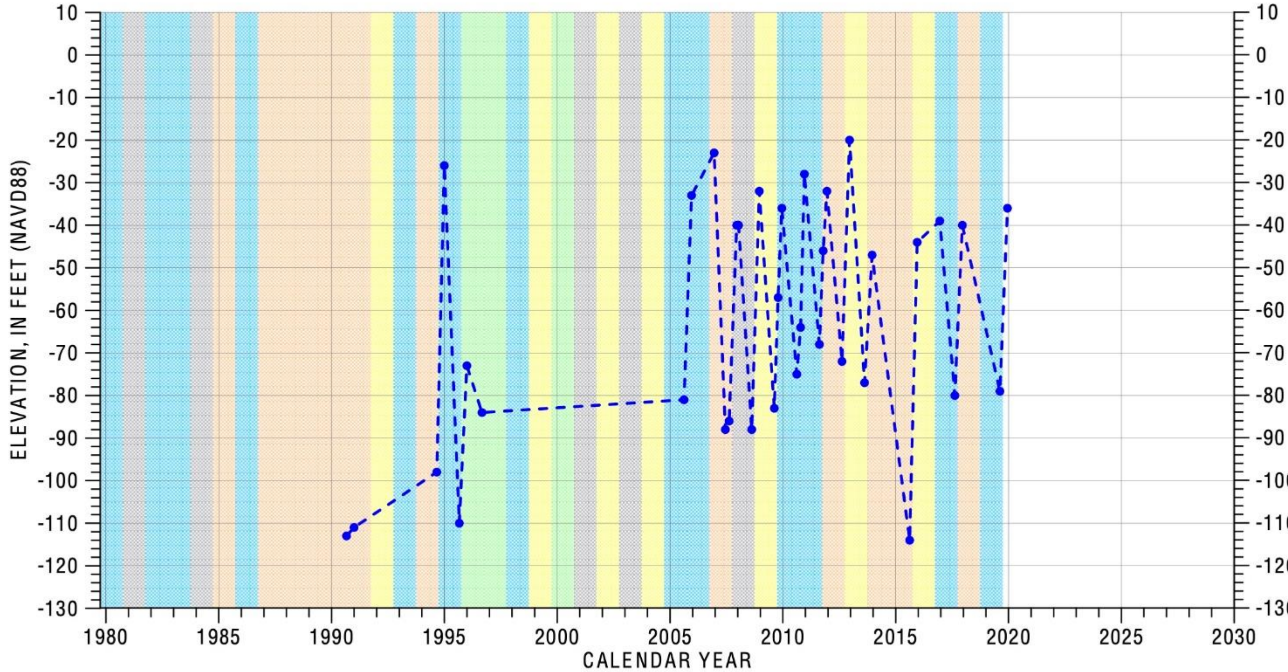
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-17F01 Eastside Aquifer Subbasin

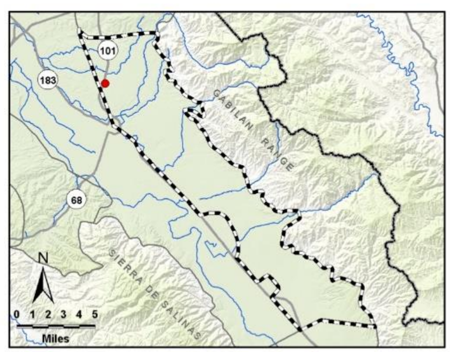


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (92 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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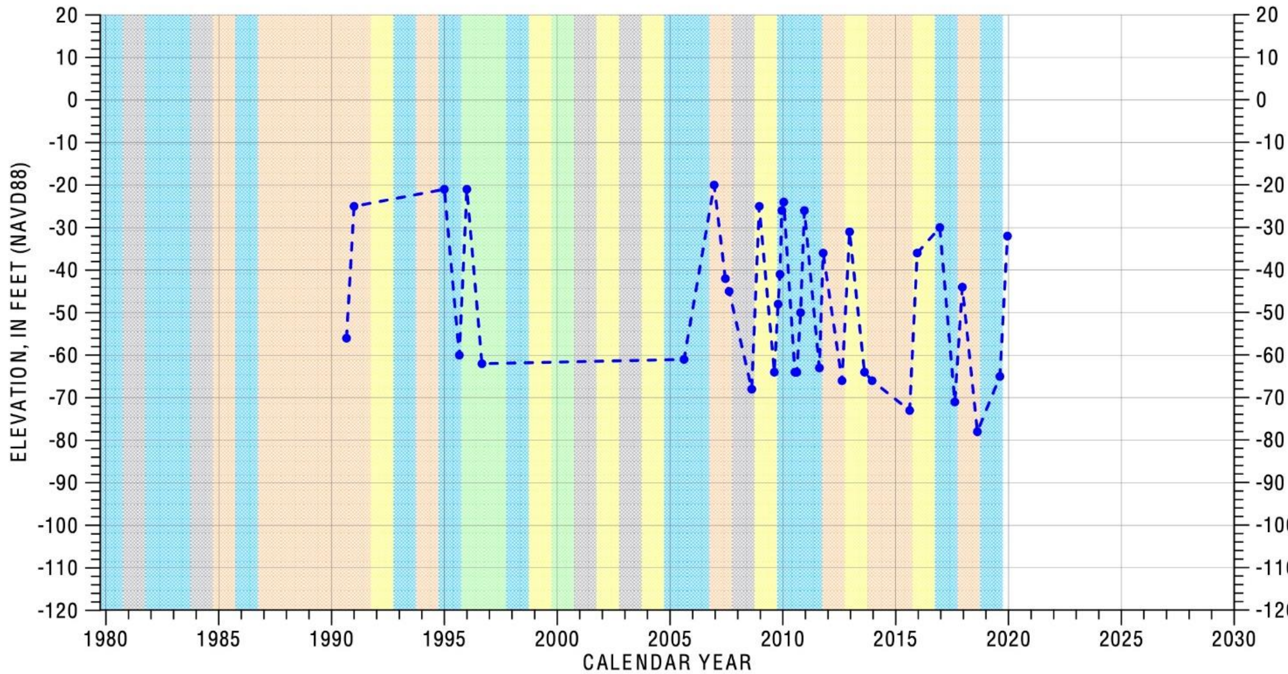
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-21L01

Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface (80 FT MSL)

WATER YEAR TYPE DESIGNATION

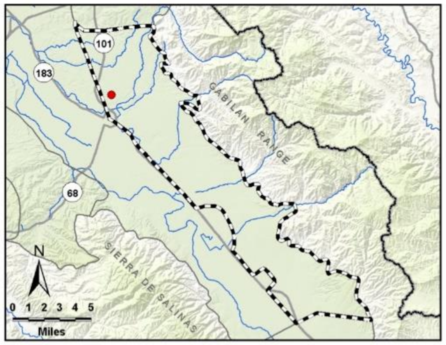
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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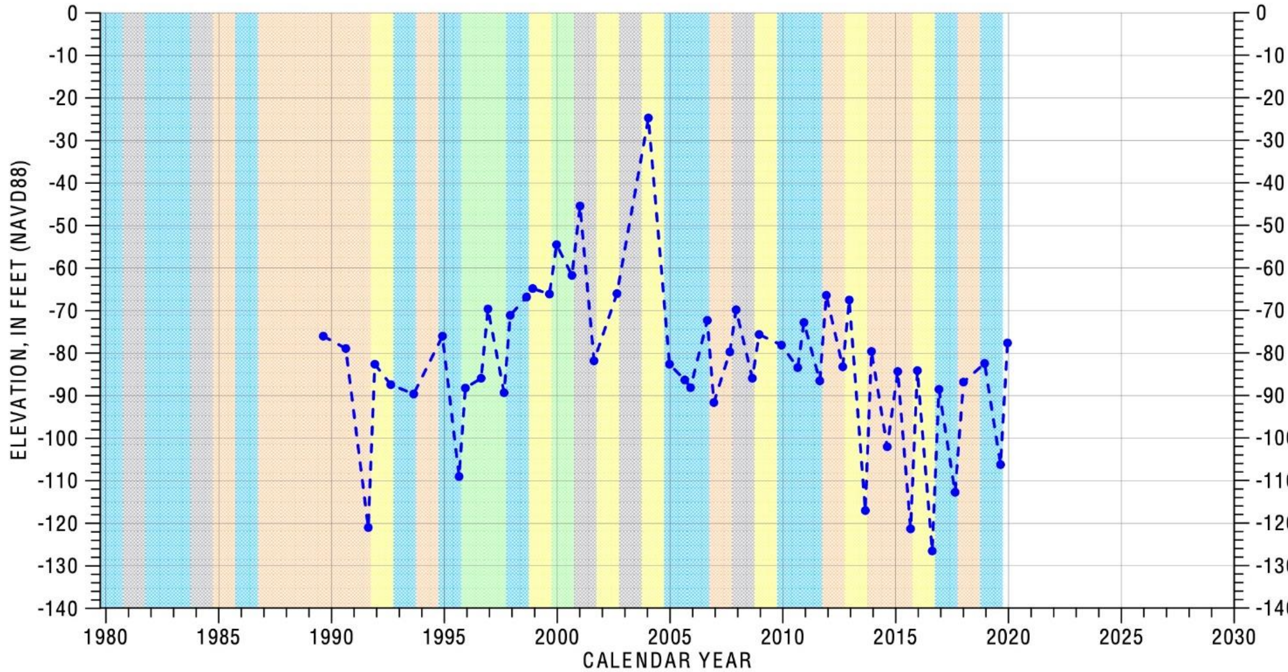
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-24H01

Eastside Aquifer Subbasin

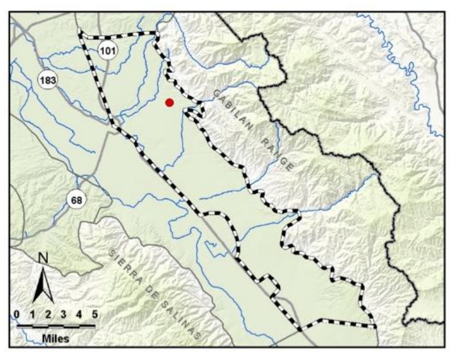


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (156 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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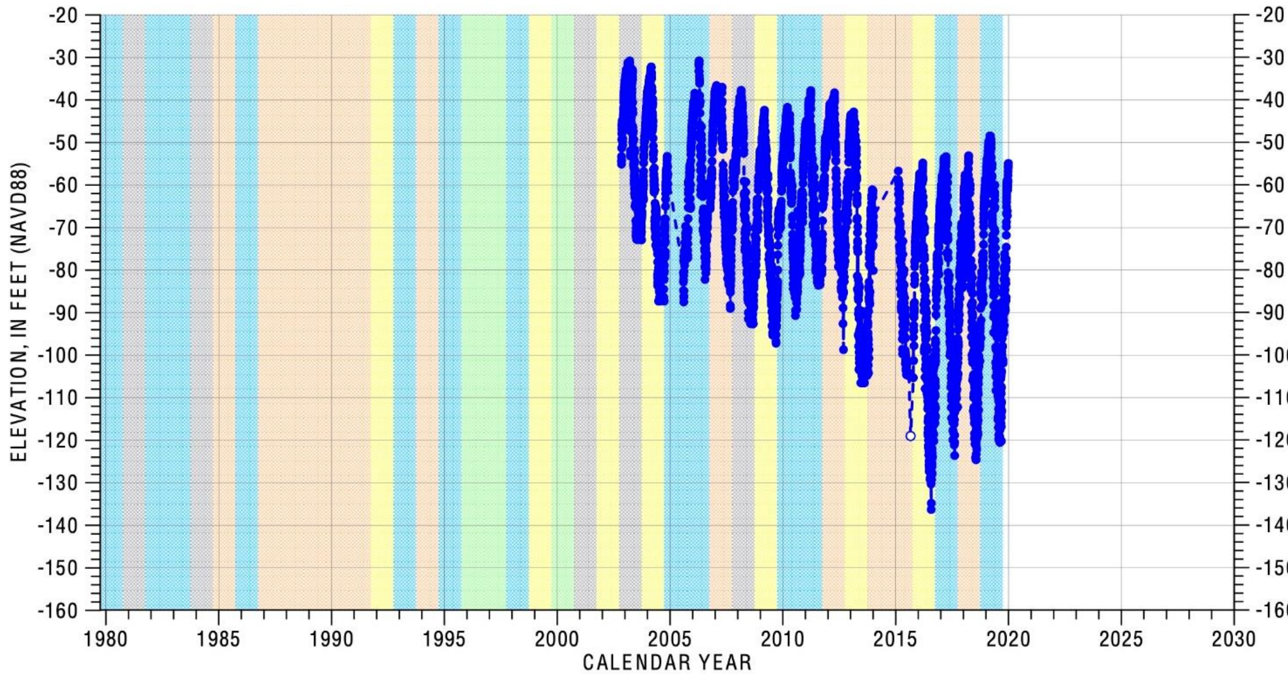
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-25C01 Eastside Aquifer Subbasin

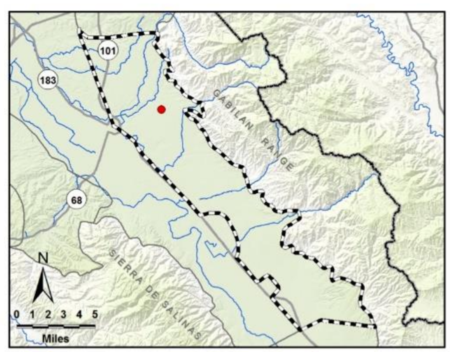


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (141 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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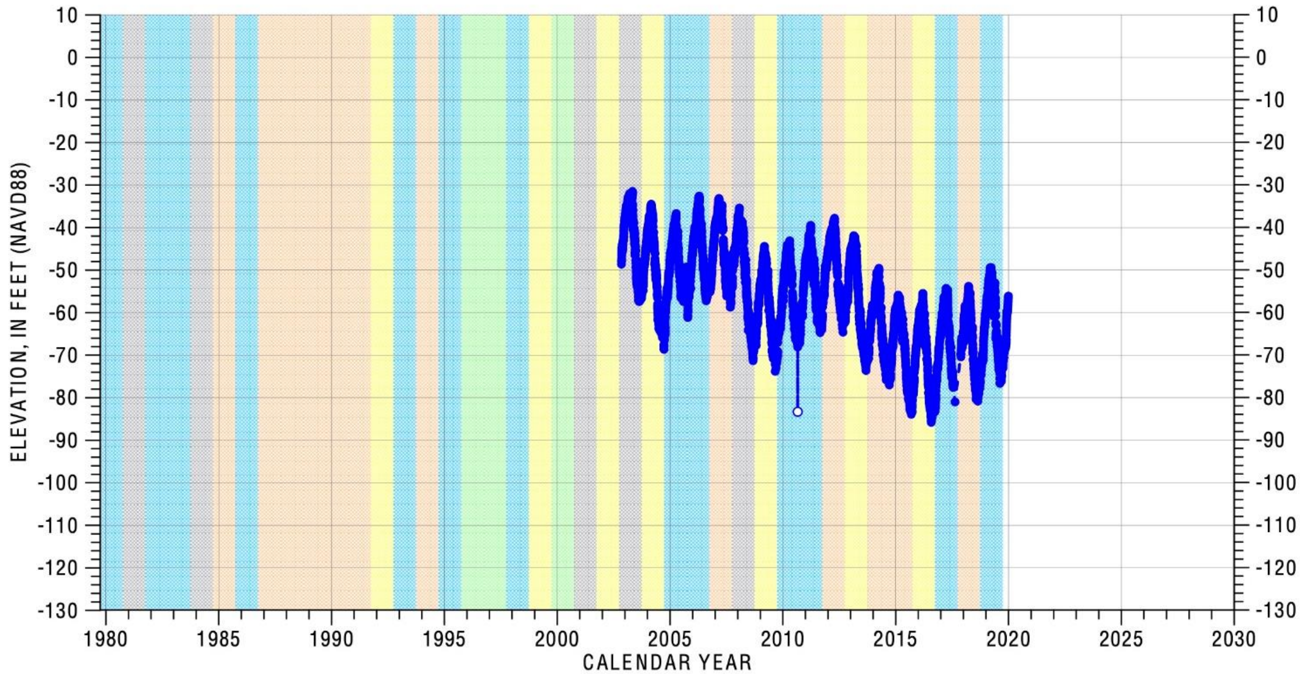
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-25C02

Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface (141 FT MSL)

WATER YEAR TYPE DESIGNATION

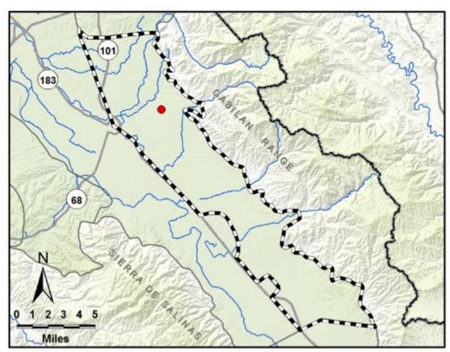
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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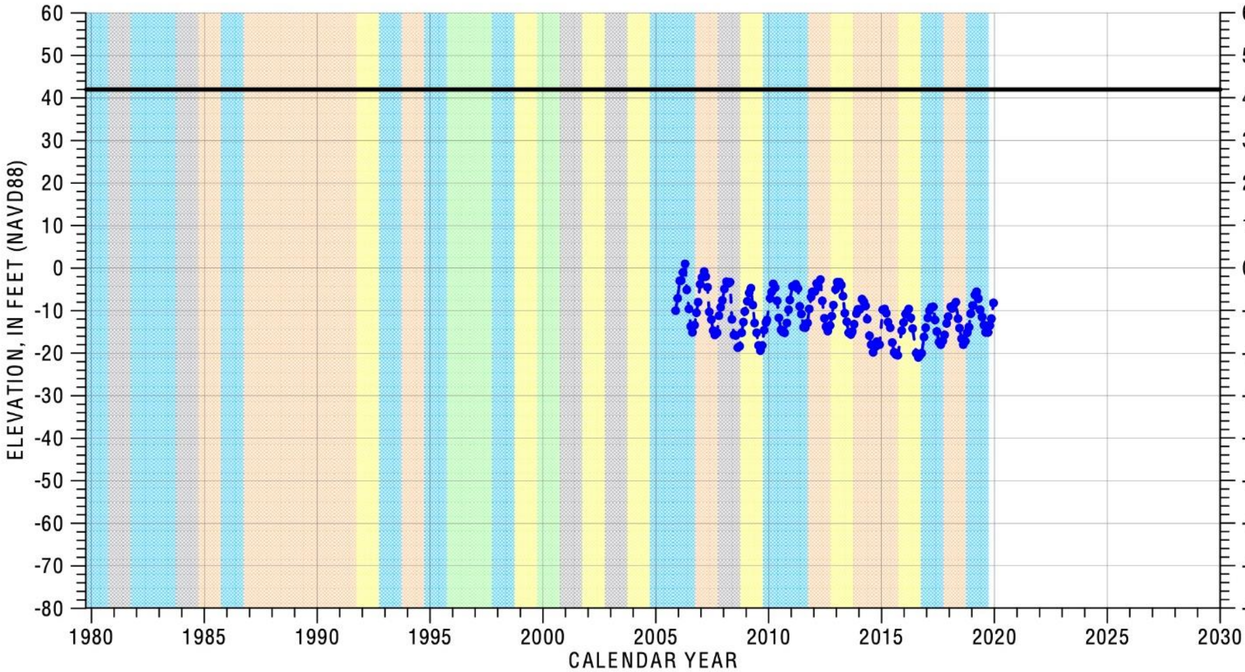
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-27B01

Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface

WATER YEAR TYPE DESIGNATION

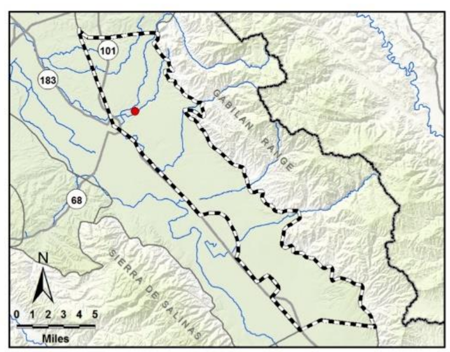
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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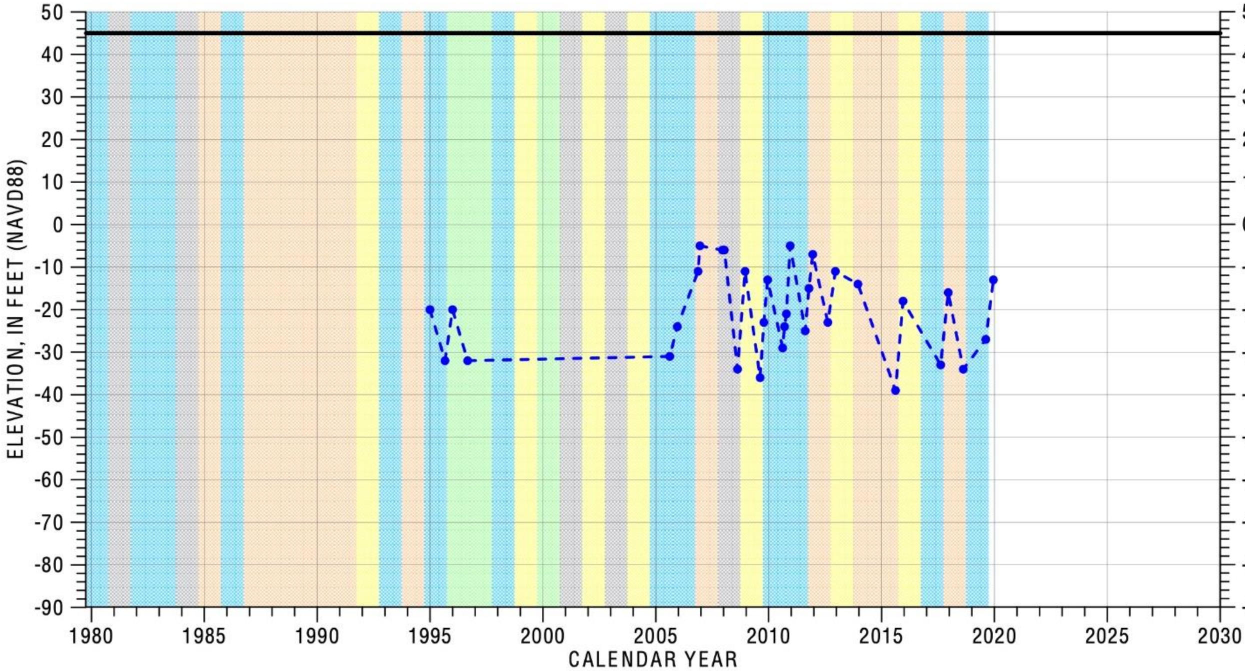
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-33G01

Eastside Aquifer Subbasin

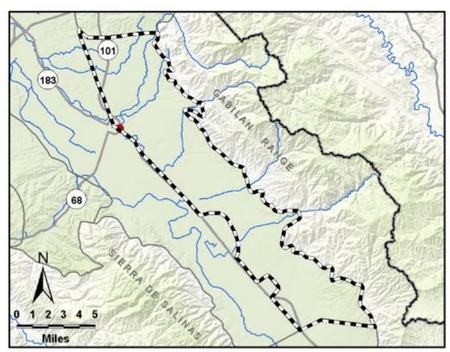


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface

WATER YEAR TYPE DESIGNATION

DRY	WET - NORMAL
DRY - NORMAL	WET
NORMAL	



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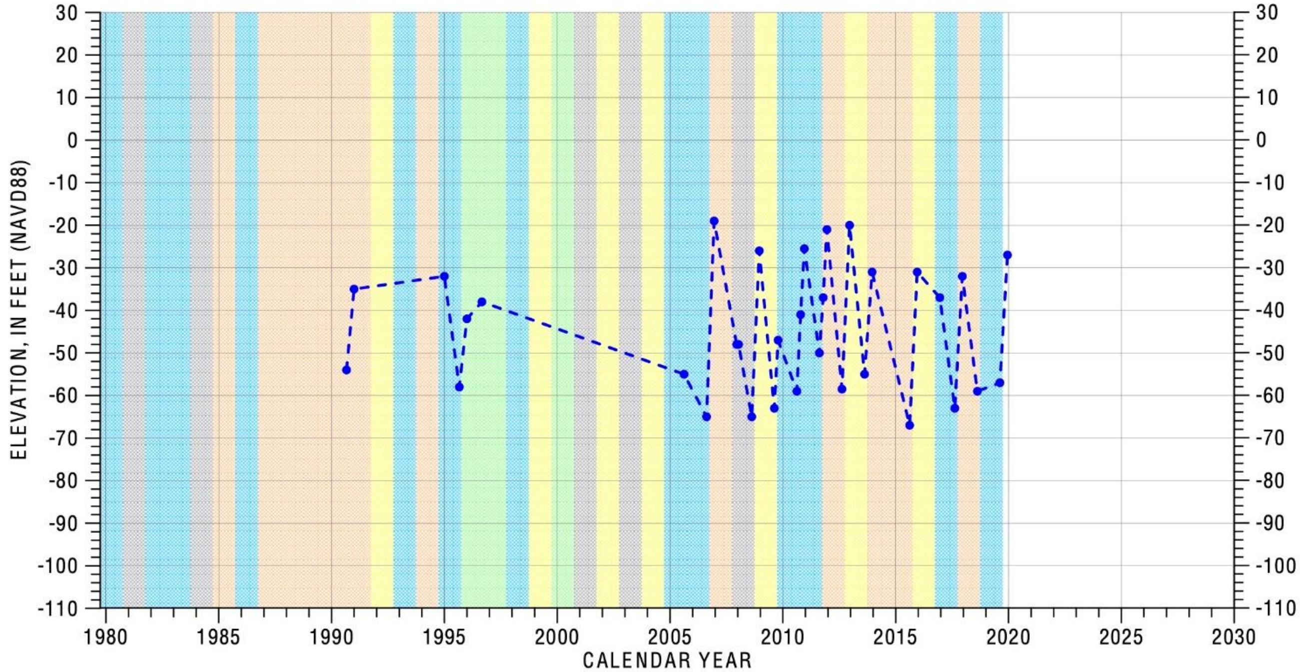
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-34C01 Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface

WATER YEAR TYPE DESIGNATION

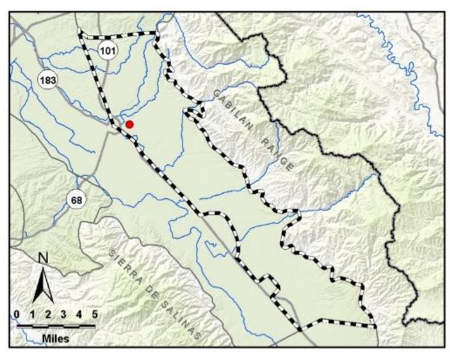
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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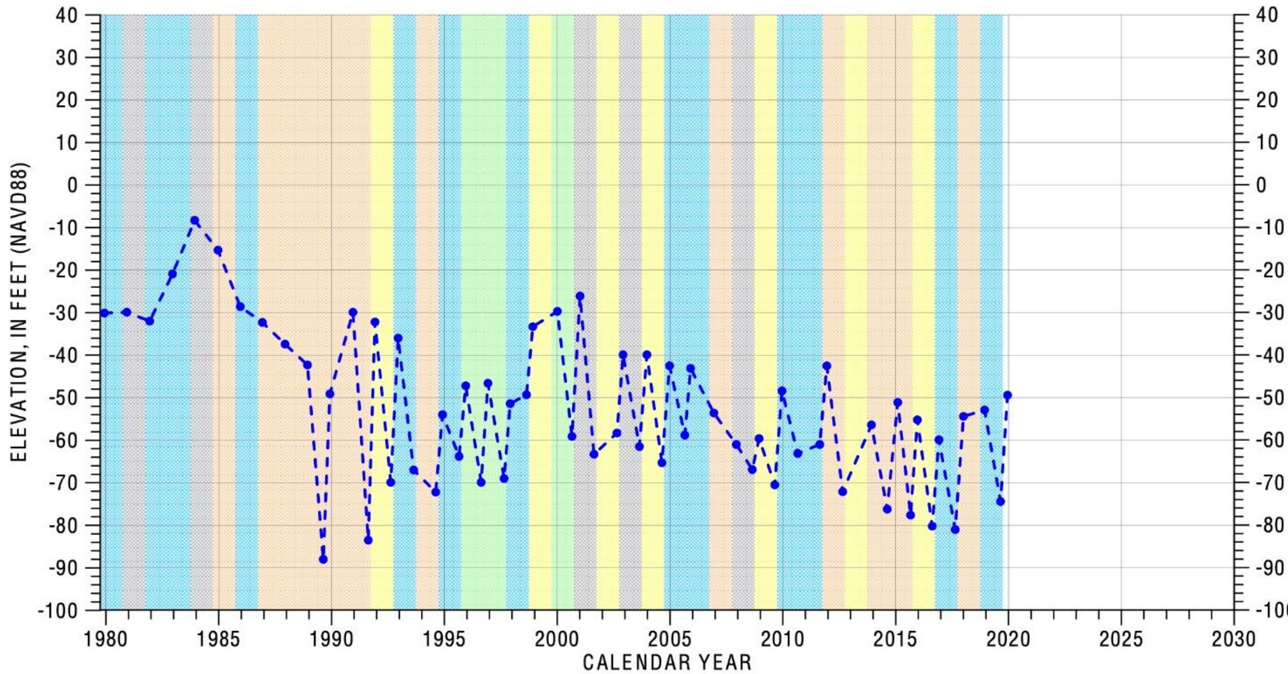
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-36A01 Eastside Aquifer Subbasin

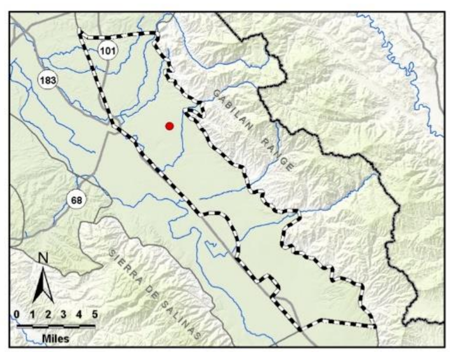


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (140 FT MSL)

WATER YEAR TYPE DESIGNATION

DRY	WET - NORMAL
DRY - NORMAL	WET
NORMAL	



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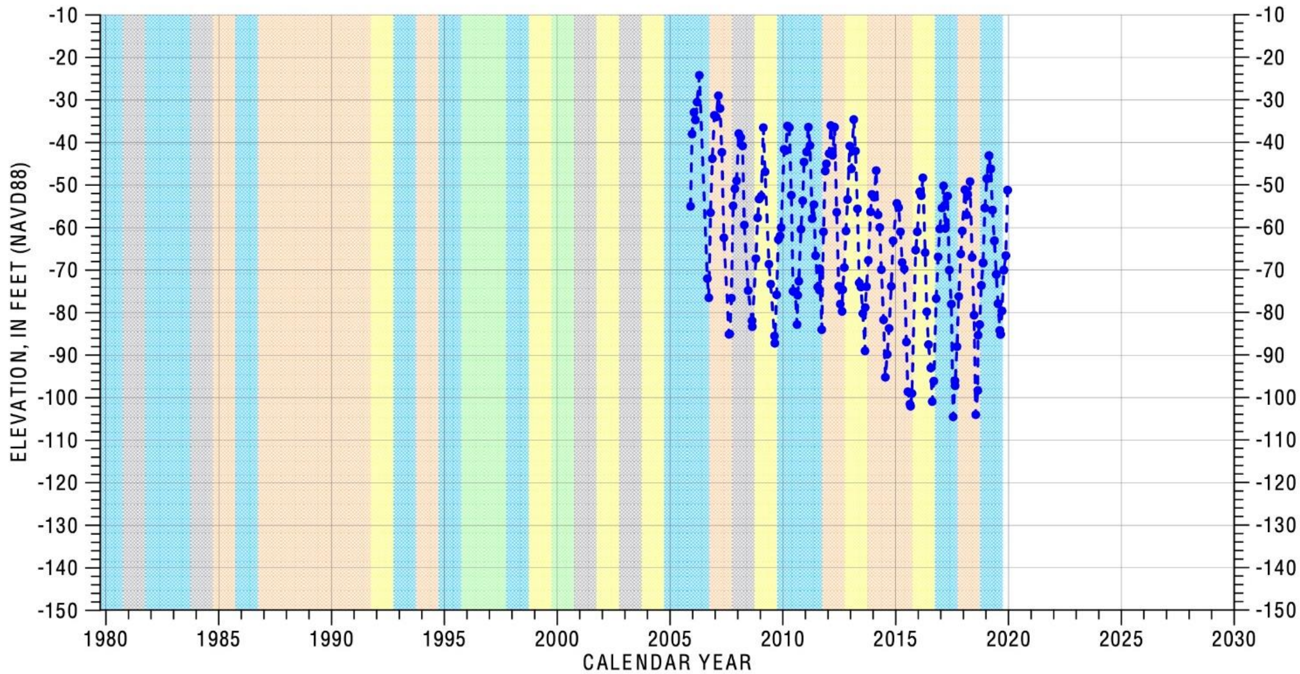
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/04E-31Q02

Eastside Aquifer Subbasin

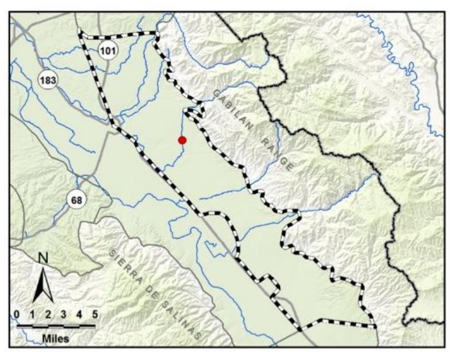


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (104 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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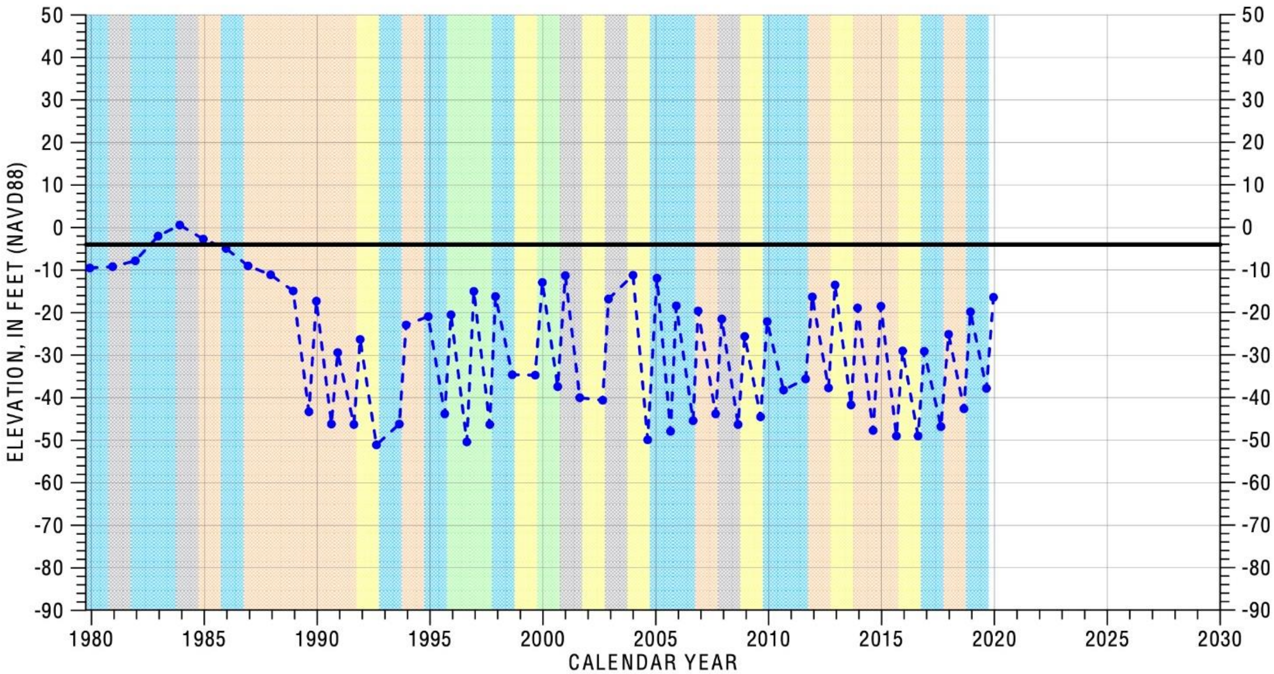
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/02E-02G01

180/400-Foot Aquifer Subbasin

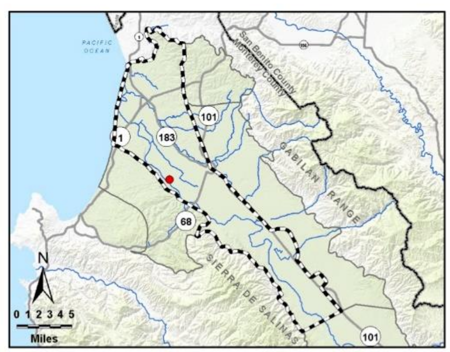


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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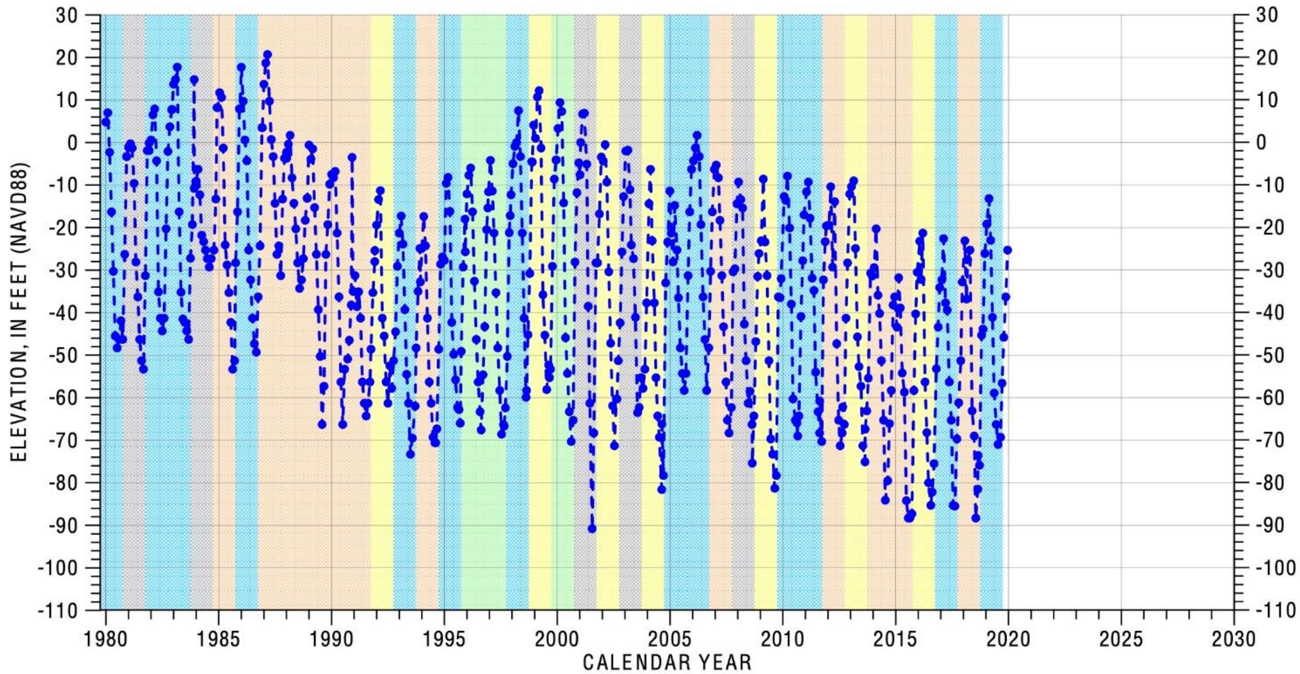
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/04E-06R01

Eastside Aquifer Subbasin

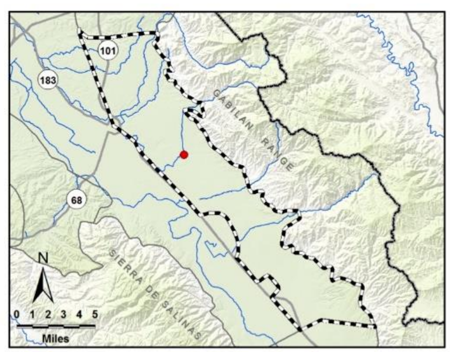


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (93.7 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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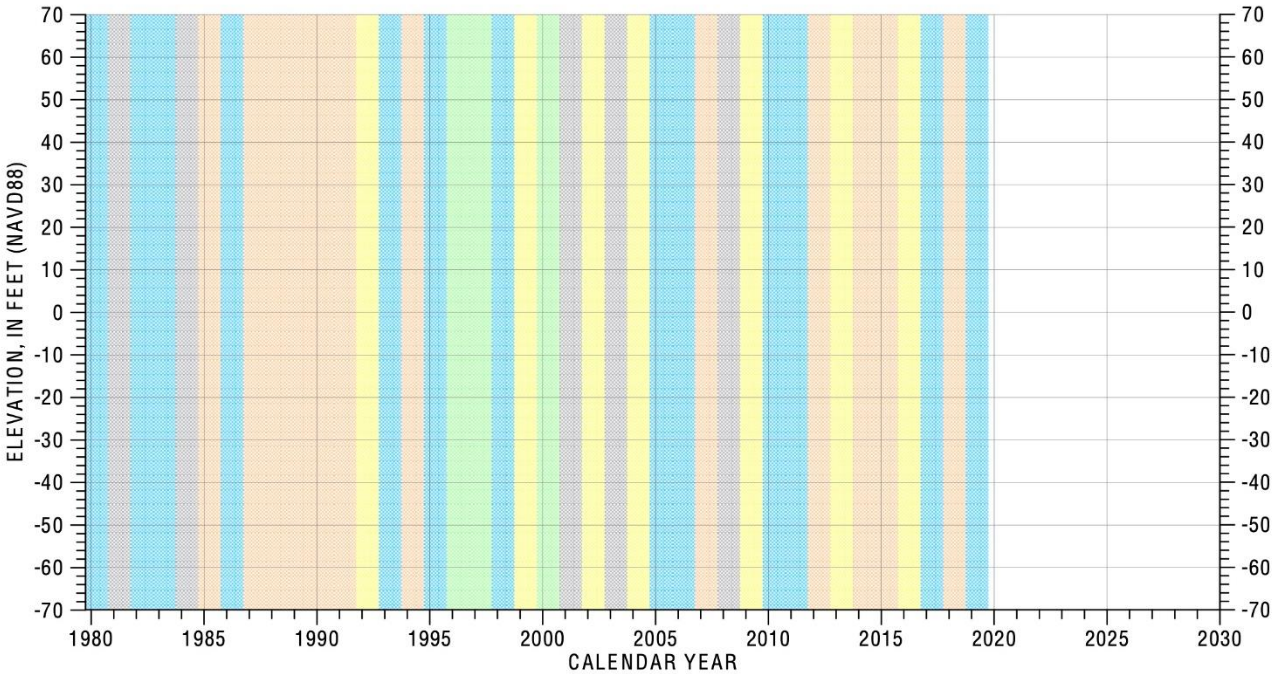
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/04E-07R02

Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface (80 FT MSL)

WATER YEAR TYPE DESIGNATION

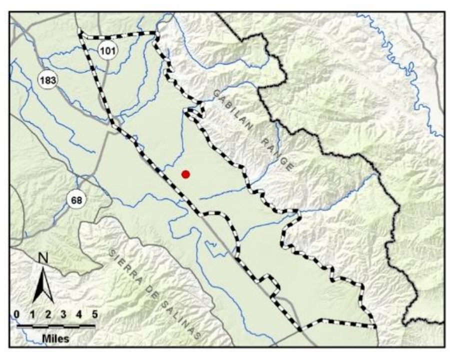
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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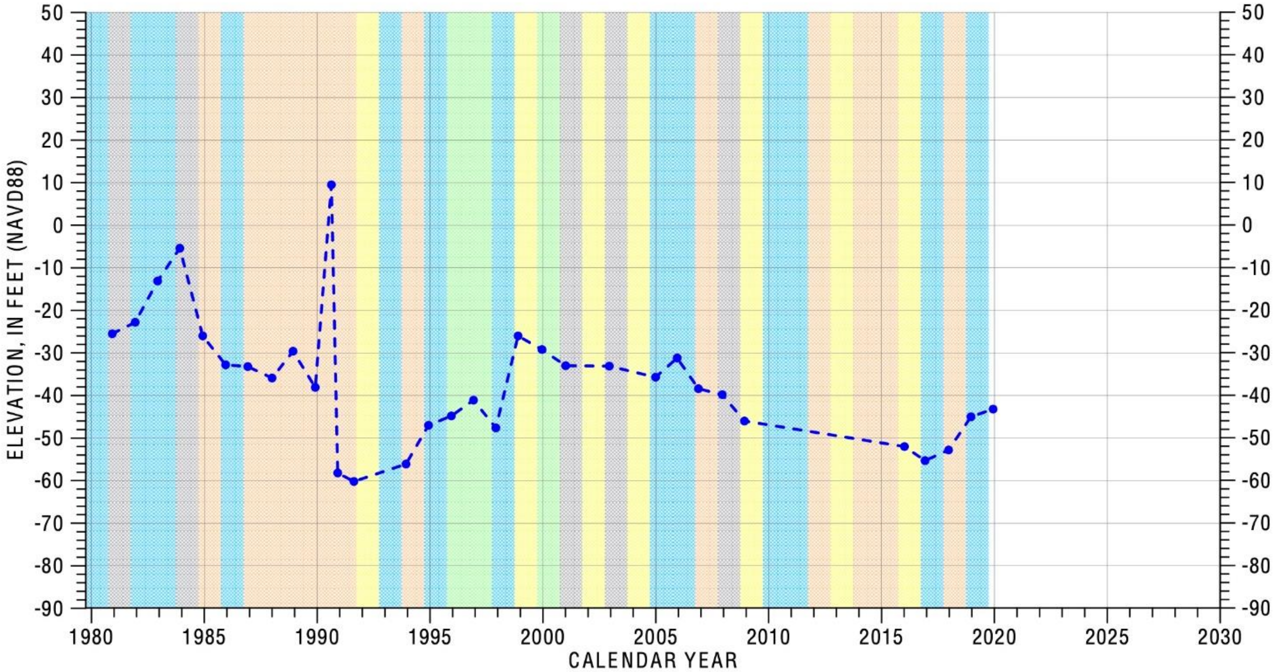
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/04E-09D01

Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface (127 FT MSL)

WATER YEAR TYPE DESIGNATION

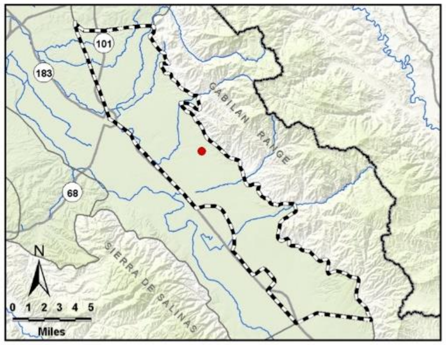
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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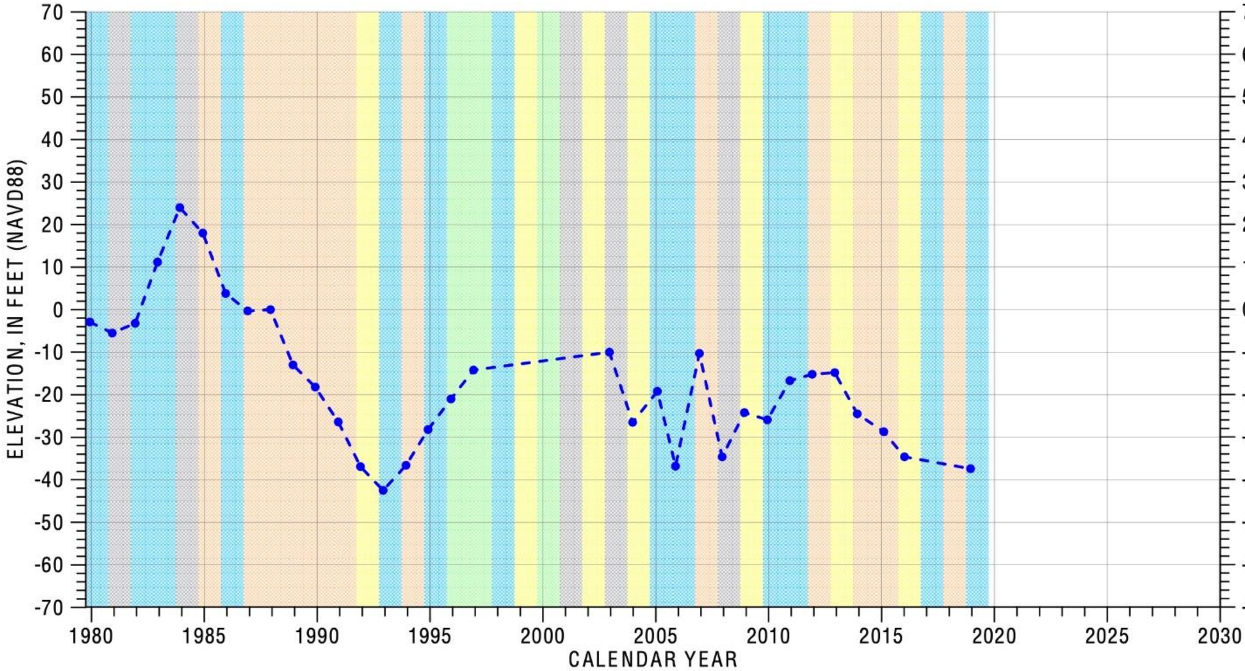
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/04E-14N01

Eastside Aquifer Subbasin



EXPLANATION

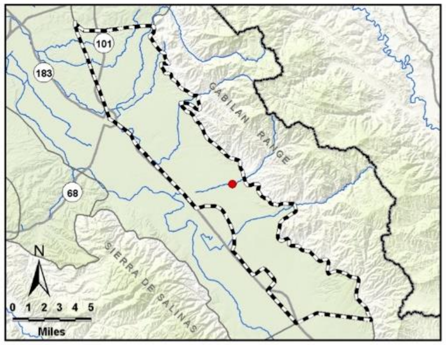
Groundwater Elevation

Estimated Elevation

Land Surface (240 FT MSL)

WATER YEAR TYPE DESIGNATION

DRY
DRY - NORMAL
NORMAL
WET - NORMAL
WET



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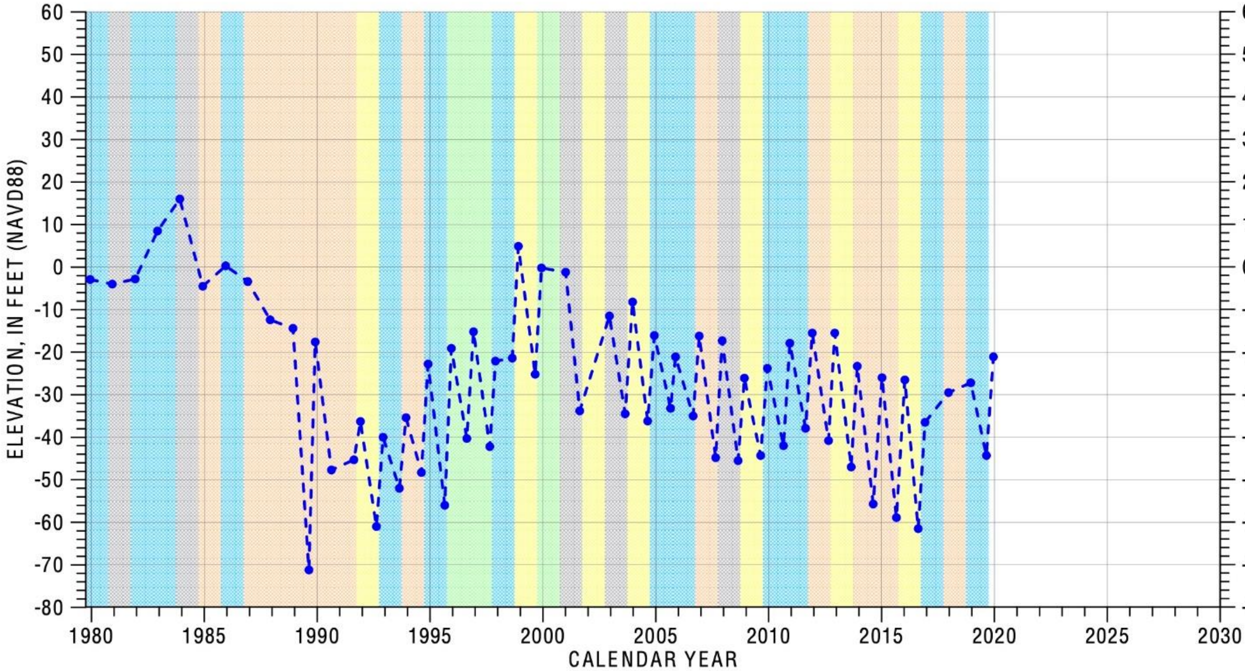
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/04E-15D02

Eastside Aquifer Subbasin

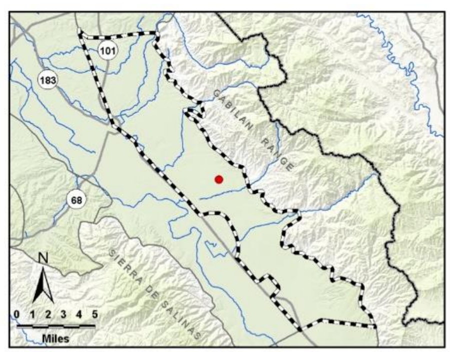


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (186 FT MSL)

WATER YEAR TYPE DESIGNATION

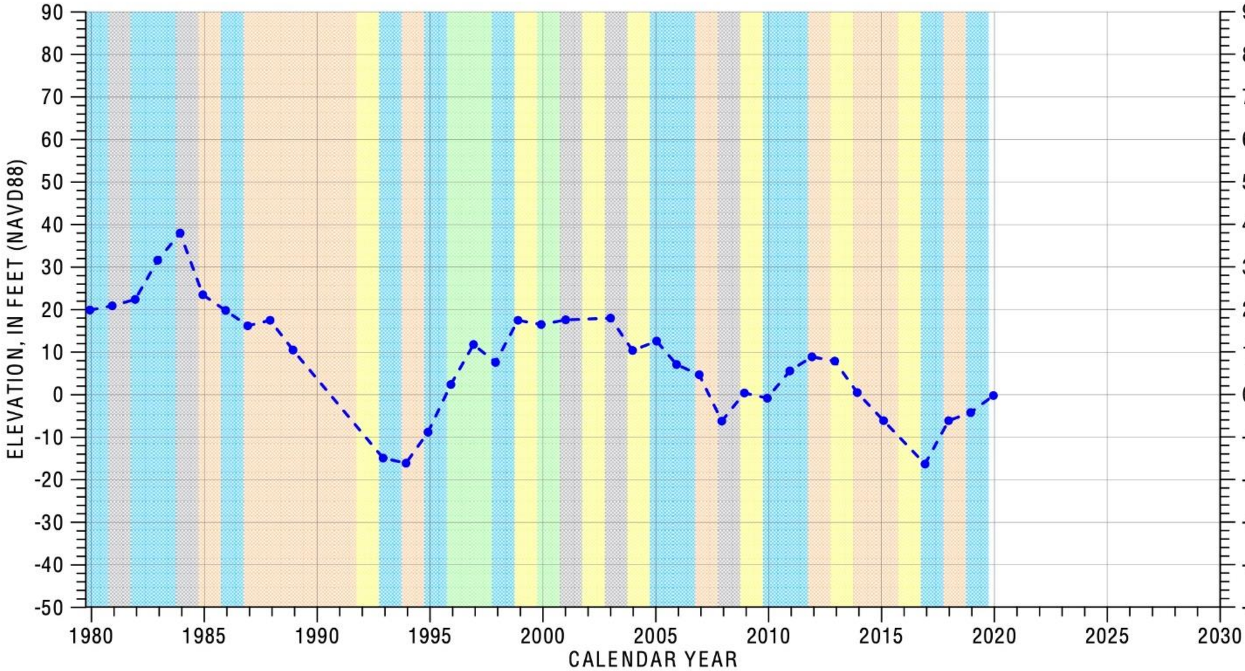
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



S:\projects\9100_Salinas_GSP\gsp\valley-wide\Chapter_5\Hydrographs\GRFs_UpdatedMaps\15S_04E-15D02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/04E-21F04

Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface (127 FT MSL)

WATER YEAR TYPE DESIGNATION

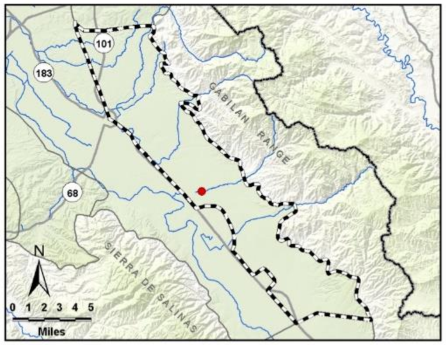
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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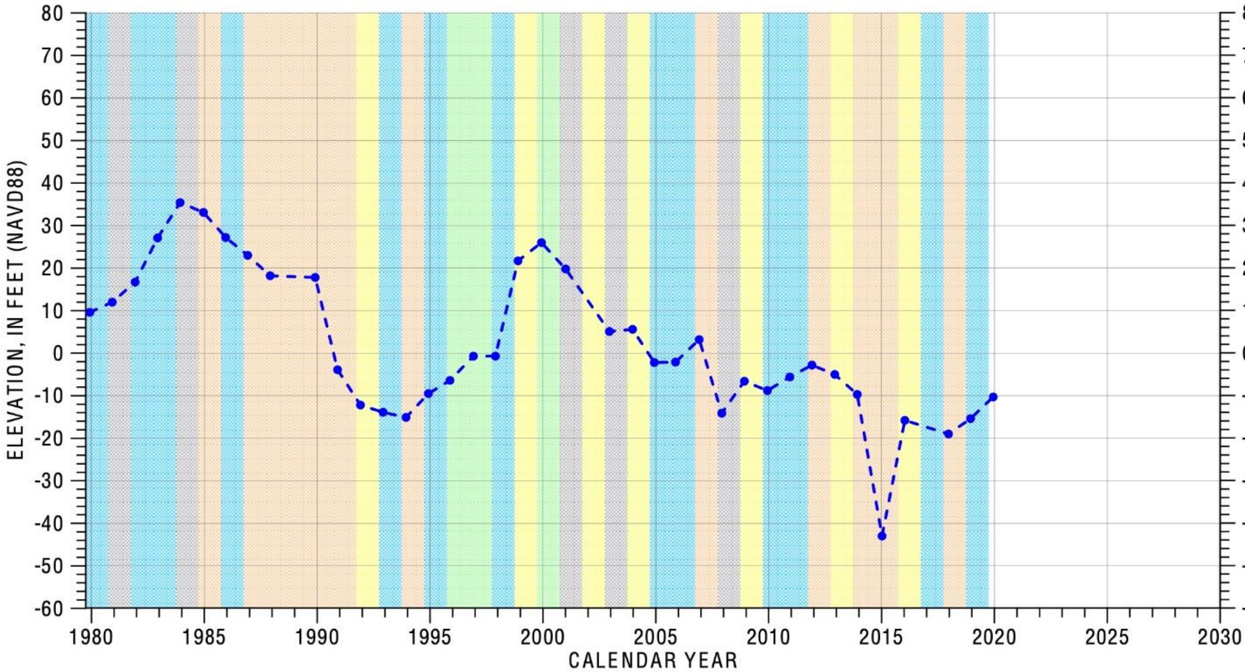
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/04E-24N03

Eastside Aquifer Subbasin

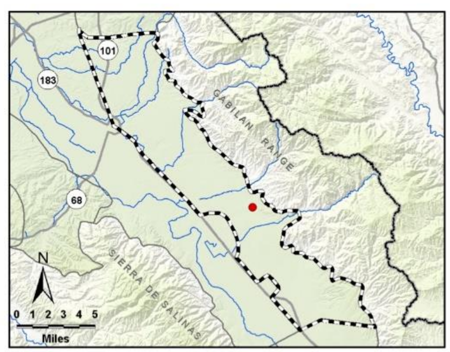


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (272 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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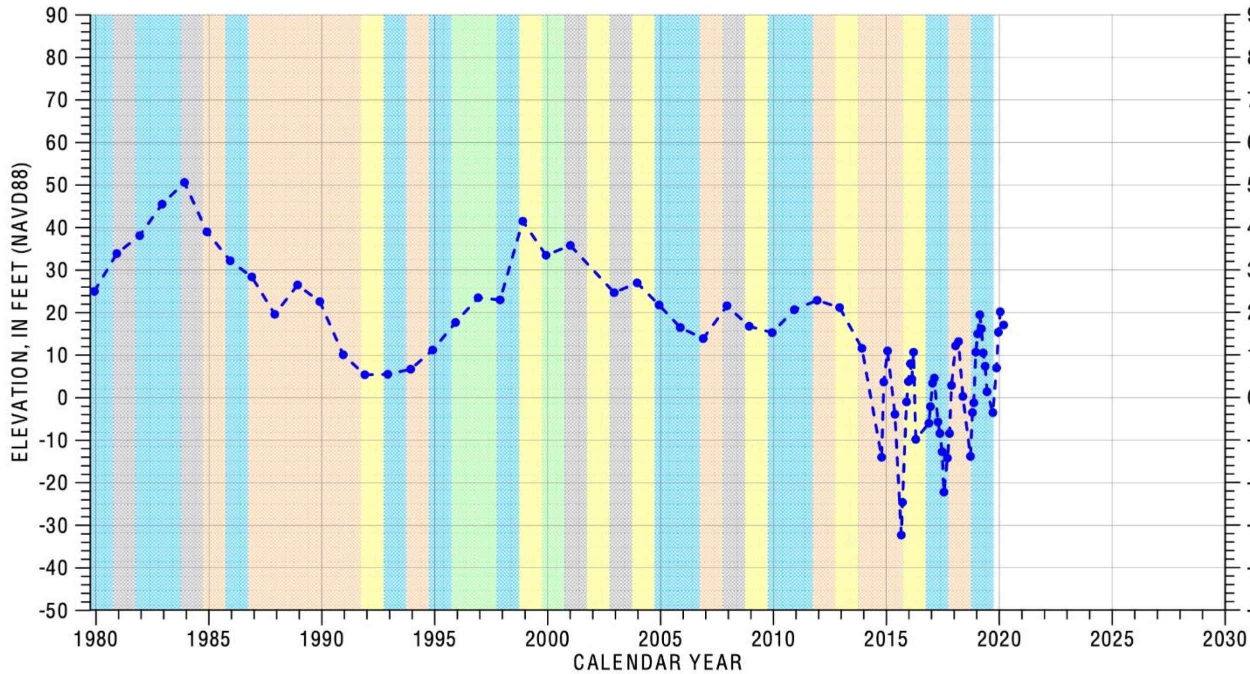
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/04E-27G01

Eastside Aquifer Subbasin

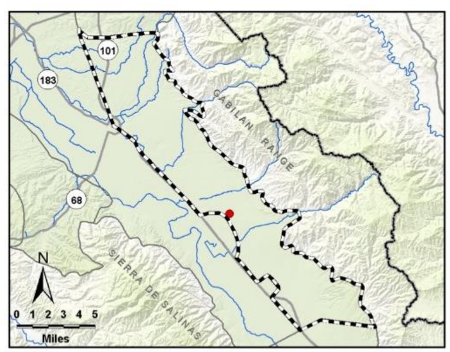


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (189 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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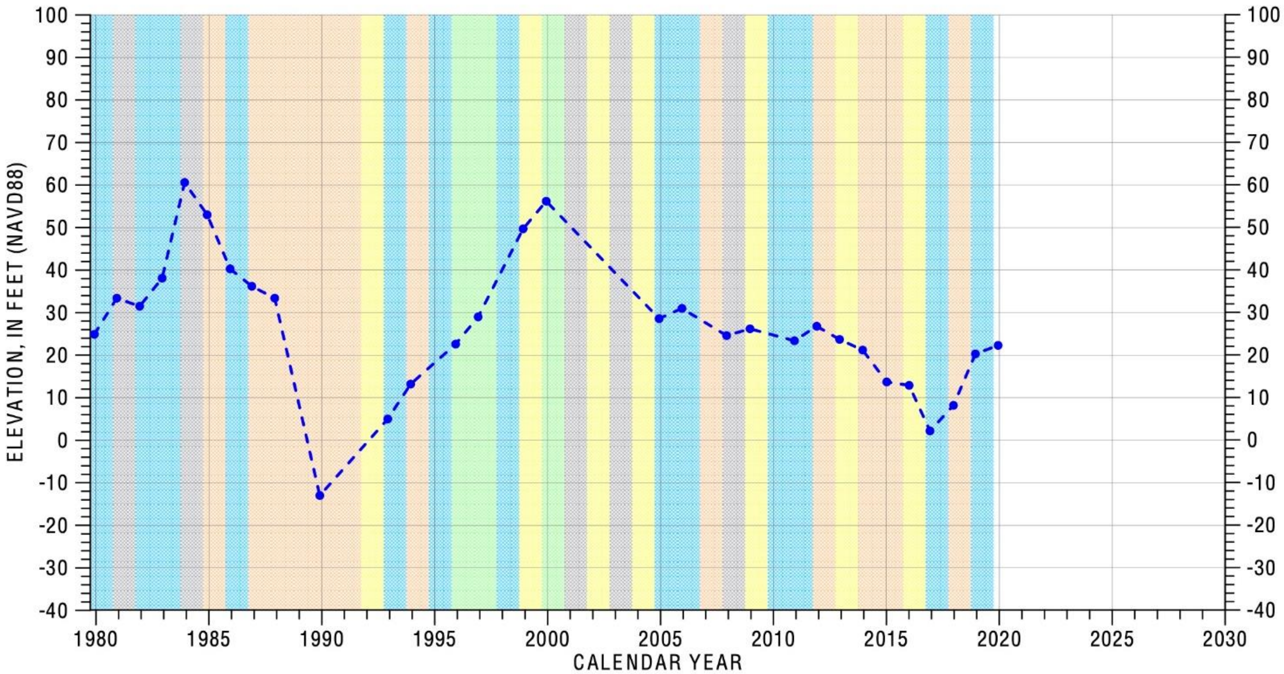
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/04E-36H01 Eastside Aquifer Subbasin

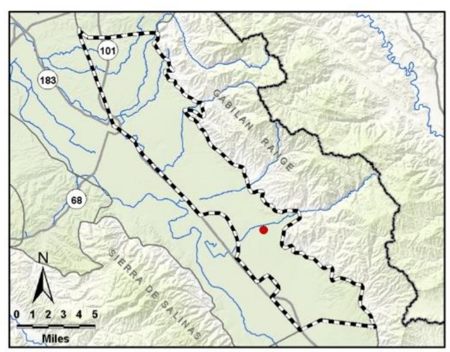


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (334 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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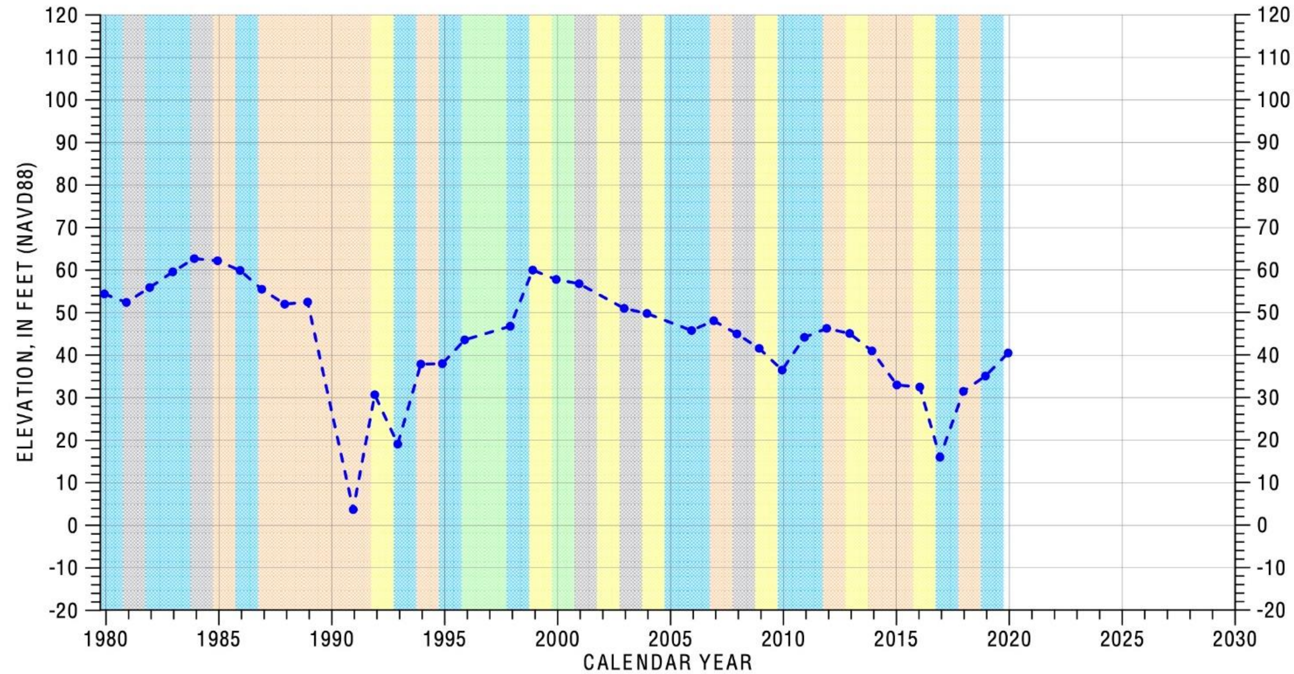
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 16S/04E-02Q03

Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface (136 FT MSL)

WATER YEAR TYPE DESIGNATION

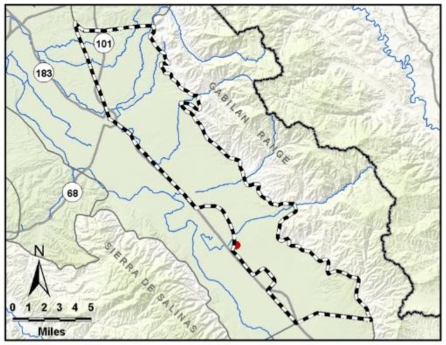
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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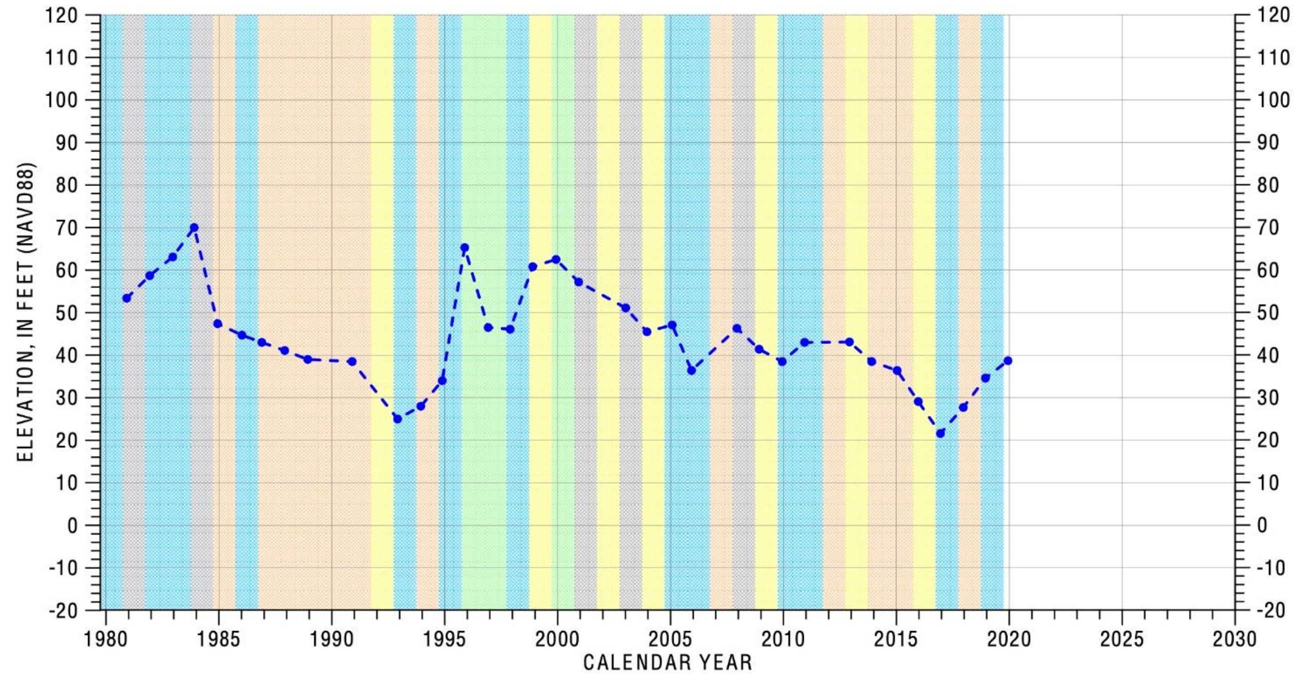
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 16S/05E-05N01

Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface (248 FT MSL)

WATER YEAR TYPE DESIGNATION

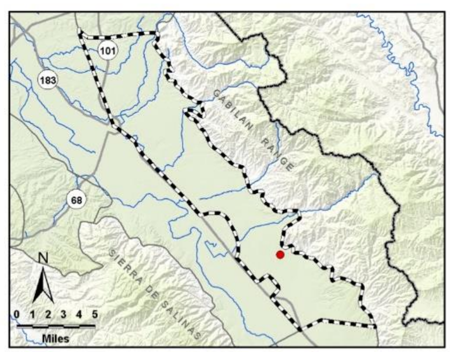
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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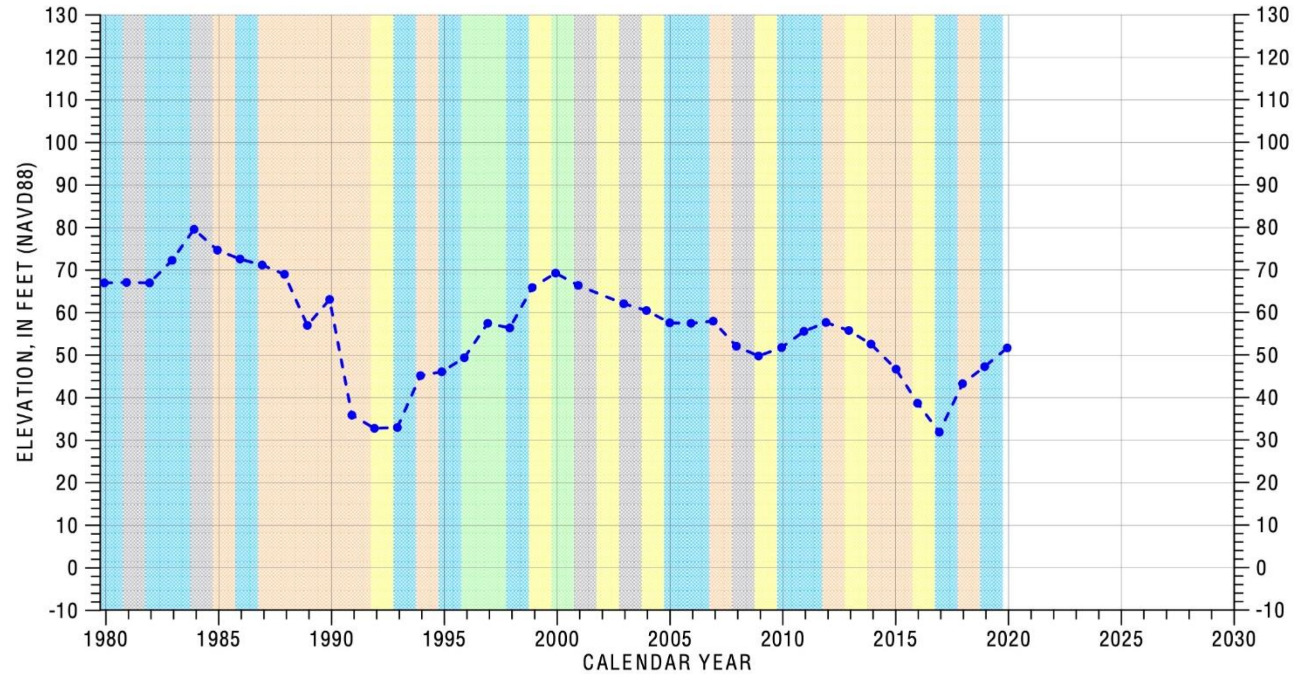
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 16S/05E-07G01

Eastside Aquifer Subbasin

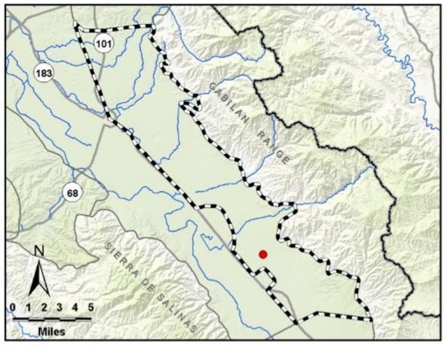


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (193 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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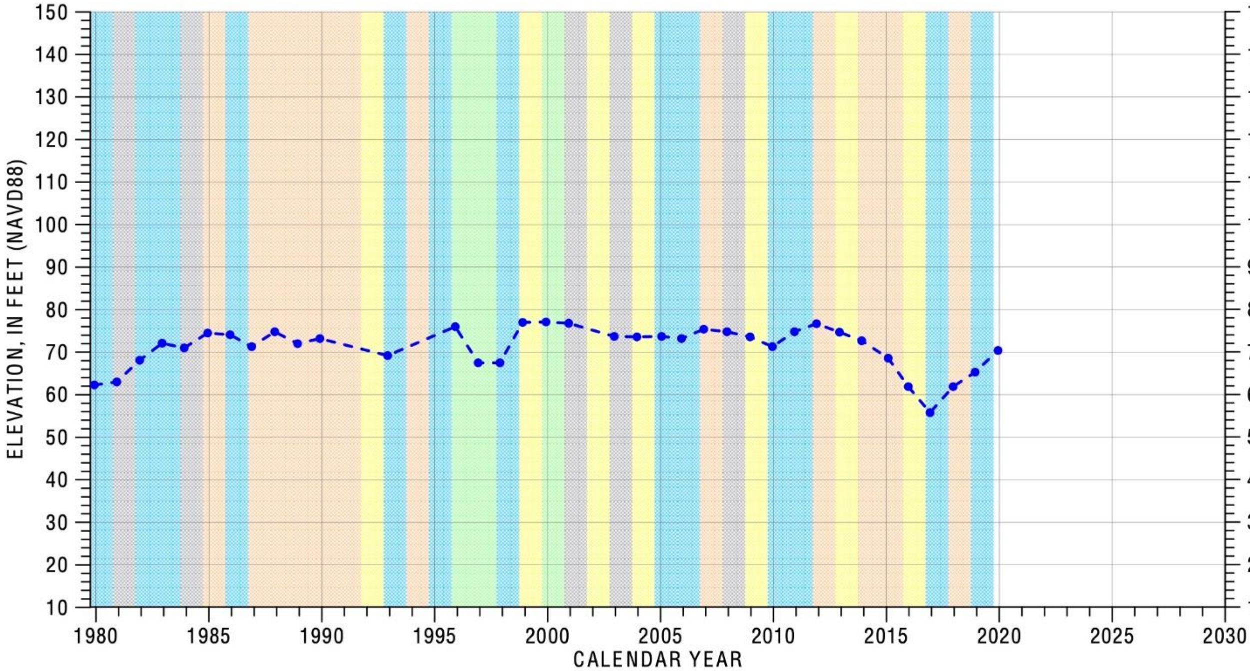
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 16S/05E-17R01

Eastside Aquifer Subbasin

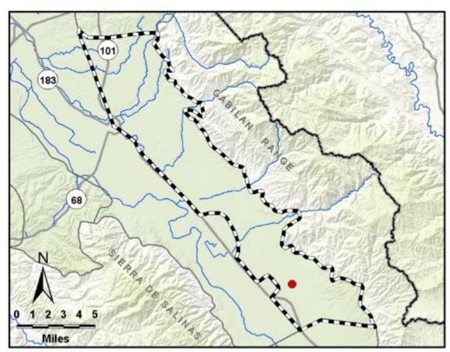


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (181 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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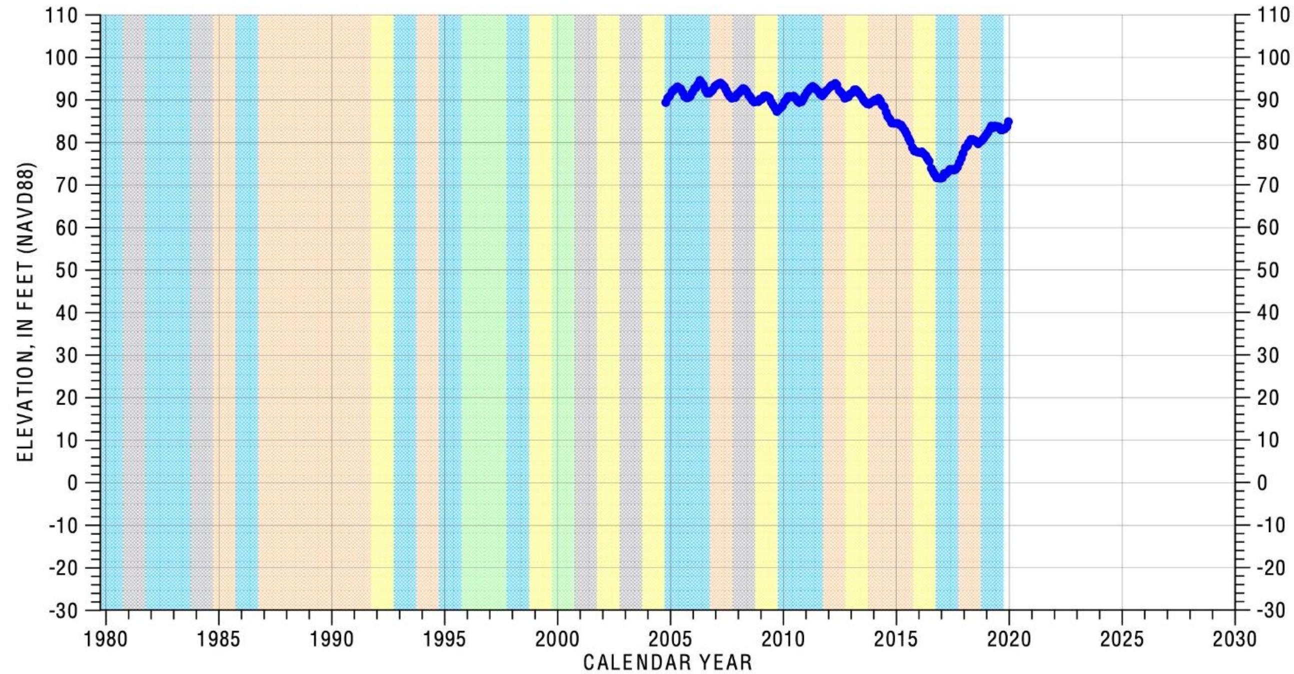
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 16S/05E-27G01

Eastside Aquifer Subbasin



EXPLANATION

Groundwater Elevation

Estimated Elevation

Land Surface (272 FT MSL)

WATER YEAR TYPE DESIGNATION

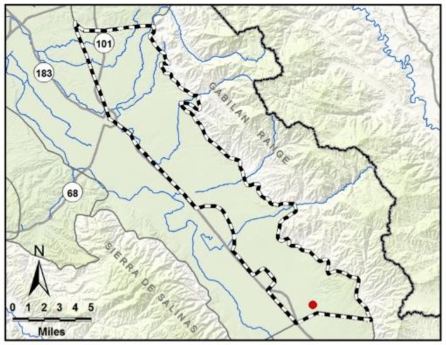
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET



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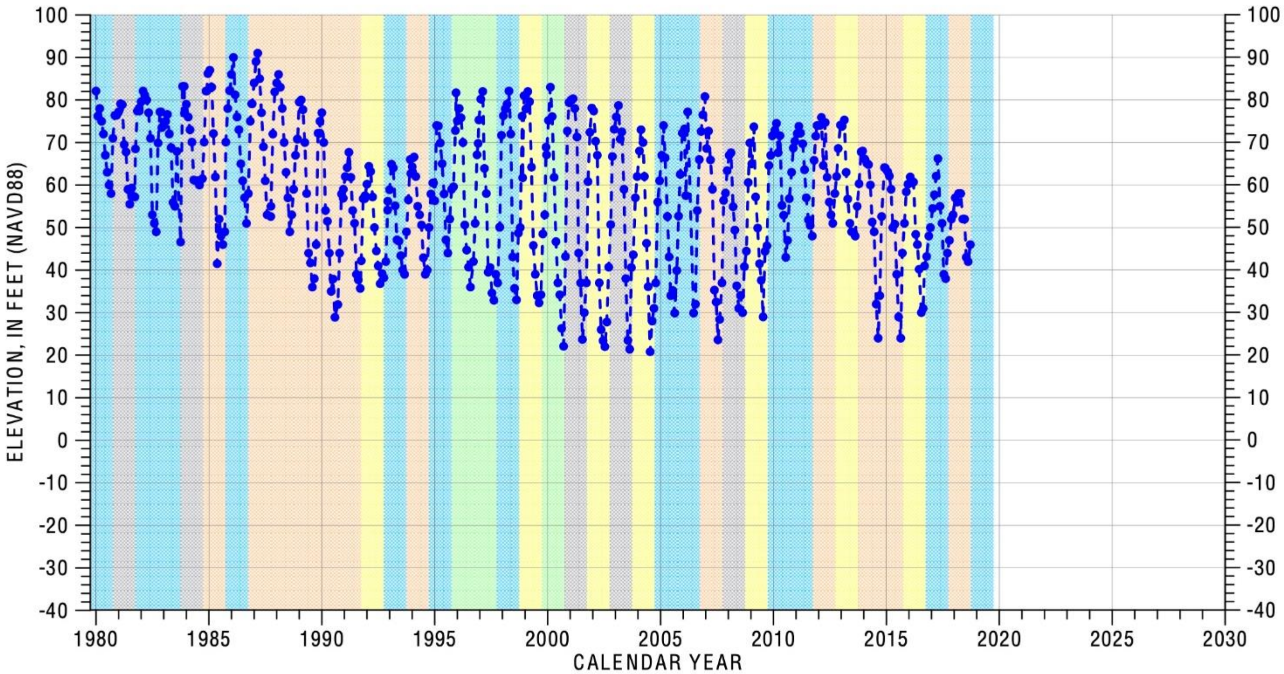
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 16S/05E-28D01

Eastside Aquifer Subbasin

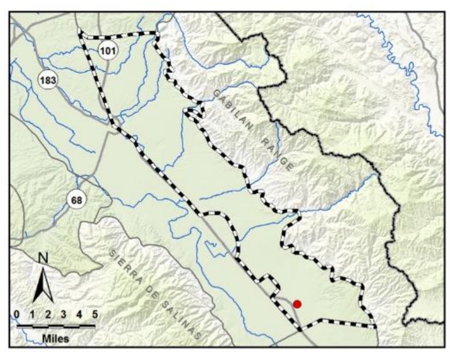


EXPLANATION

- Groundwater Elevation
- Estimated Elevation
- Land Surface (169 FT MSL)

WATER YEAR TYPE DESIGNATION

- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



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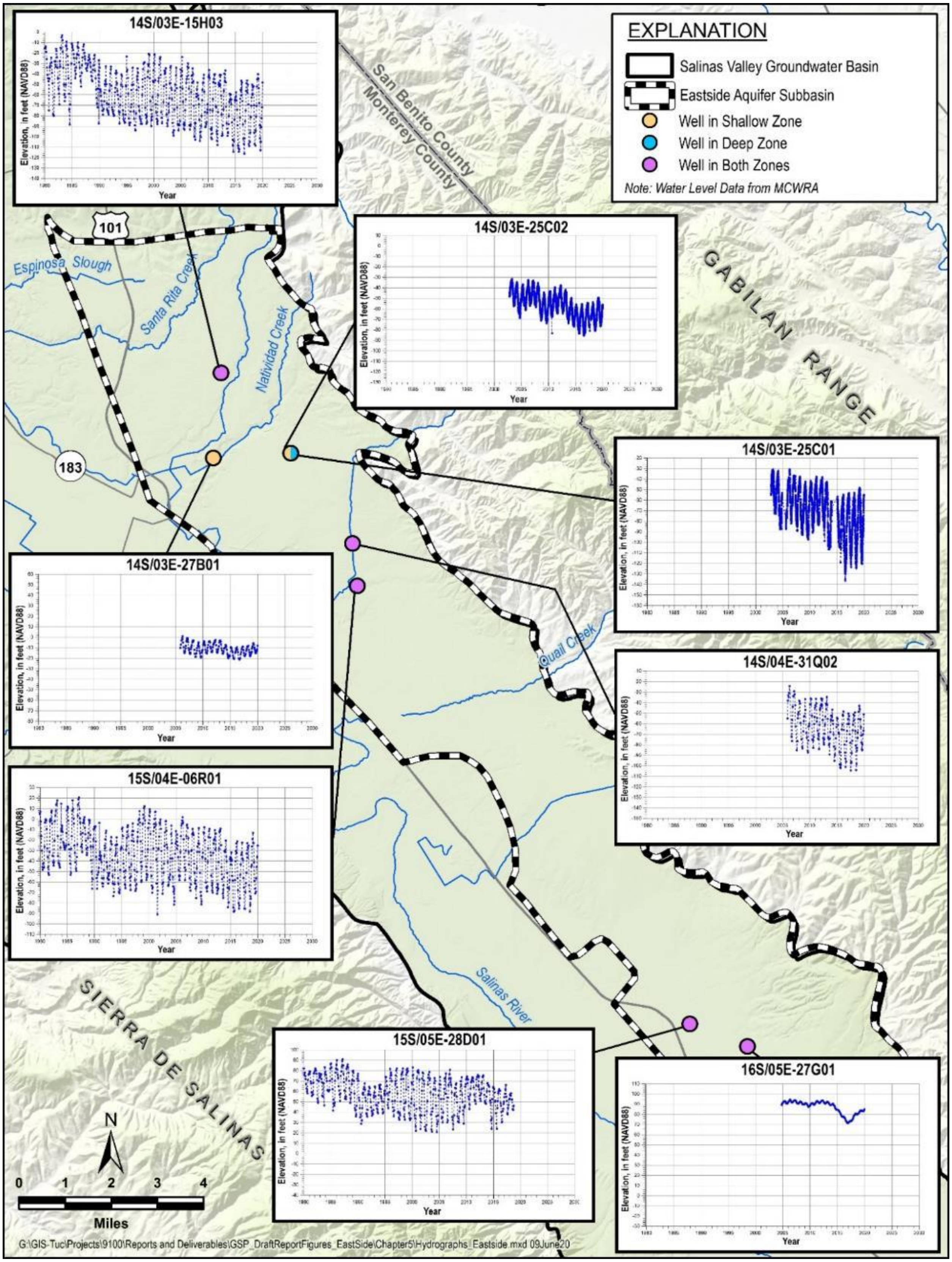

Figure 4: Example Hydrographs

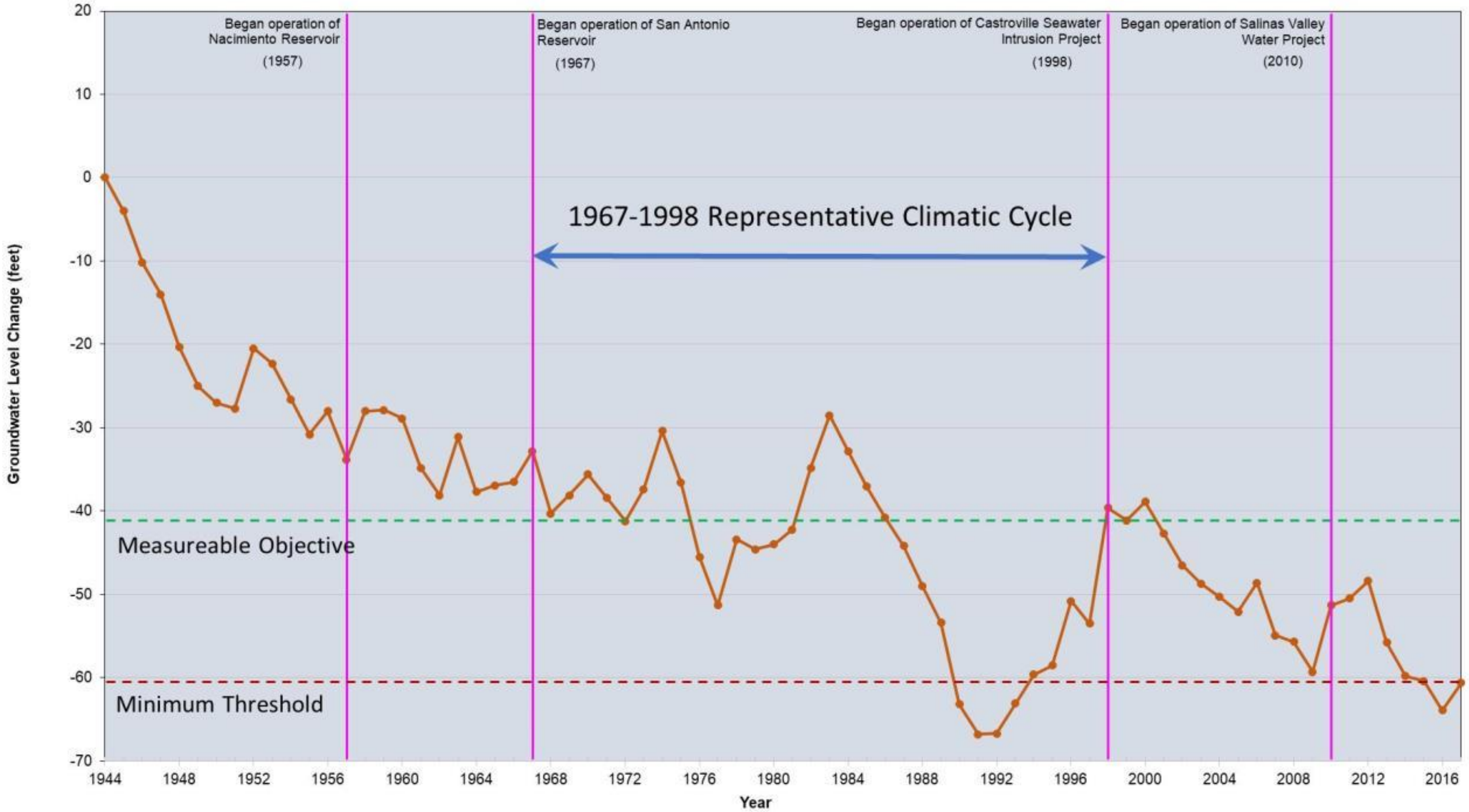

Figure 5: Cumulative Groundwater Level Change Hydrograph with Selected Measurable Objective and Minimum for the Eastside Subarea

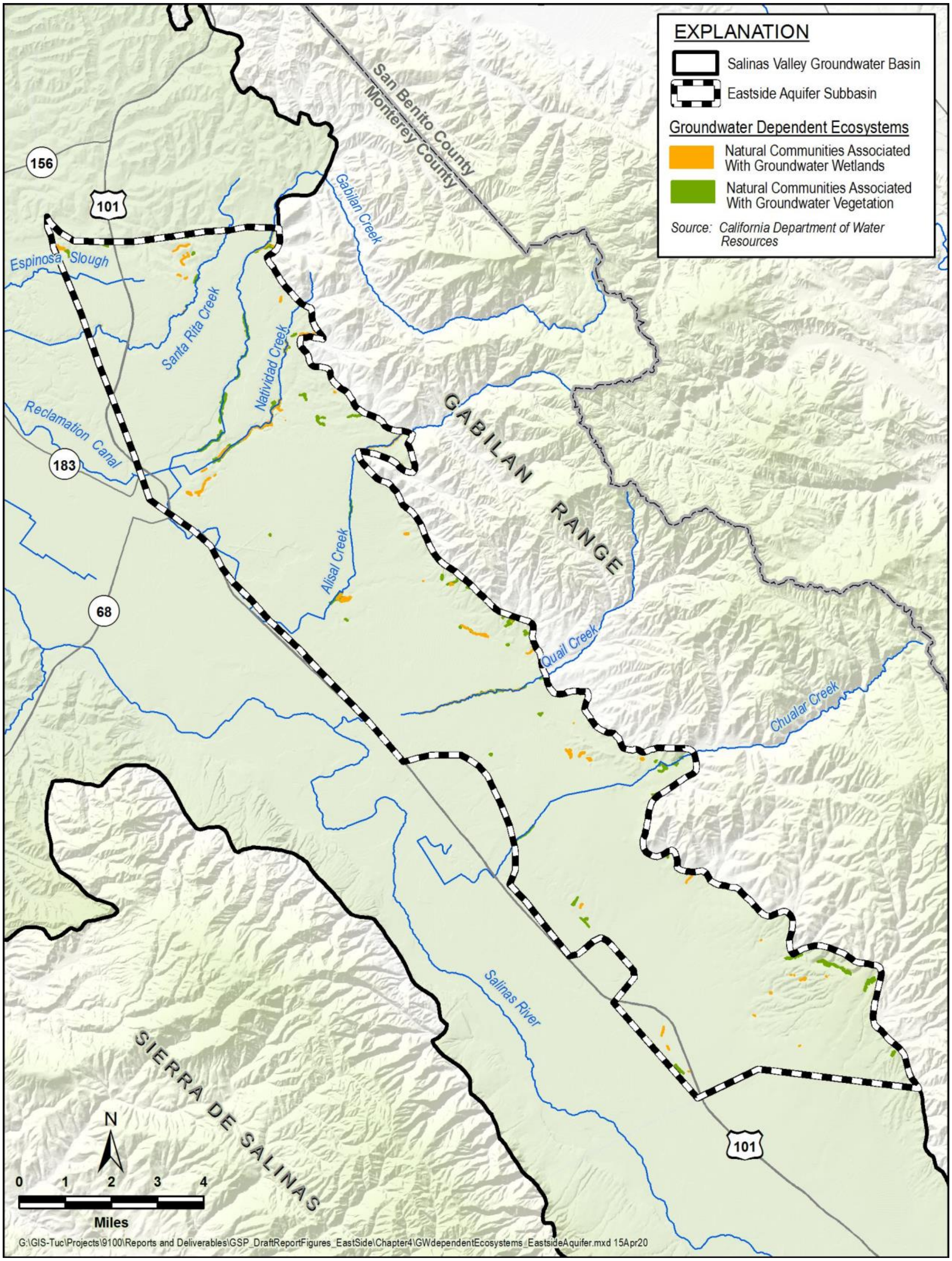

Figure 7: Potential Groundwater Dependent Ecosystems

Table 1: Computed Average Domestic Well Depth by Subbasin

Subbasin	Average Depth of Domestic Wells
180/400-Foot Aquifer	316.6 ft.
Eastside Aquifer	365.5 ft.
Forebay	292.45 ft.
Langley Area	308.1 ft.
Monterey	377.2 ft.
Upper Valley	369.0 ft.
Basin wide	328.4 ft.

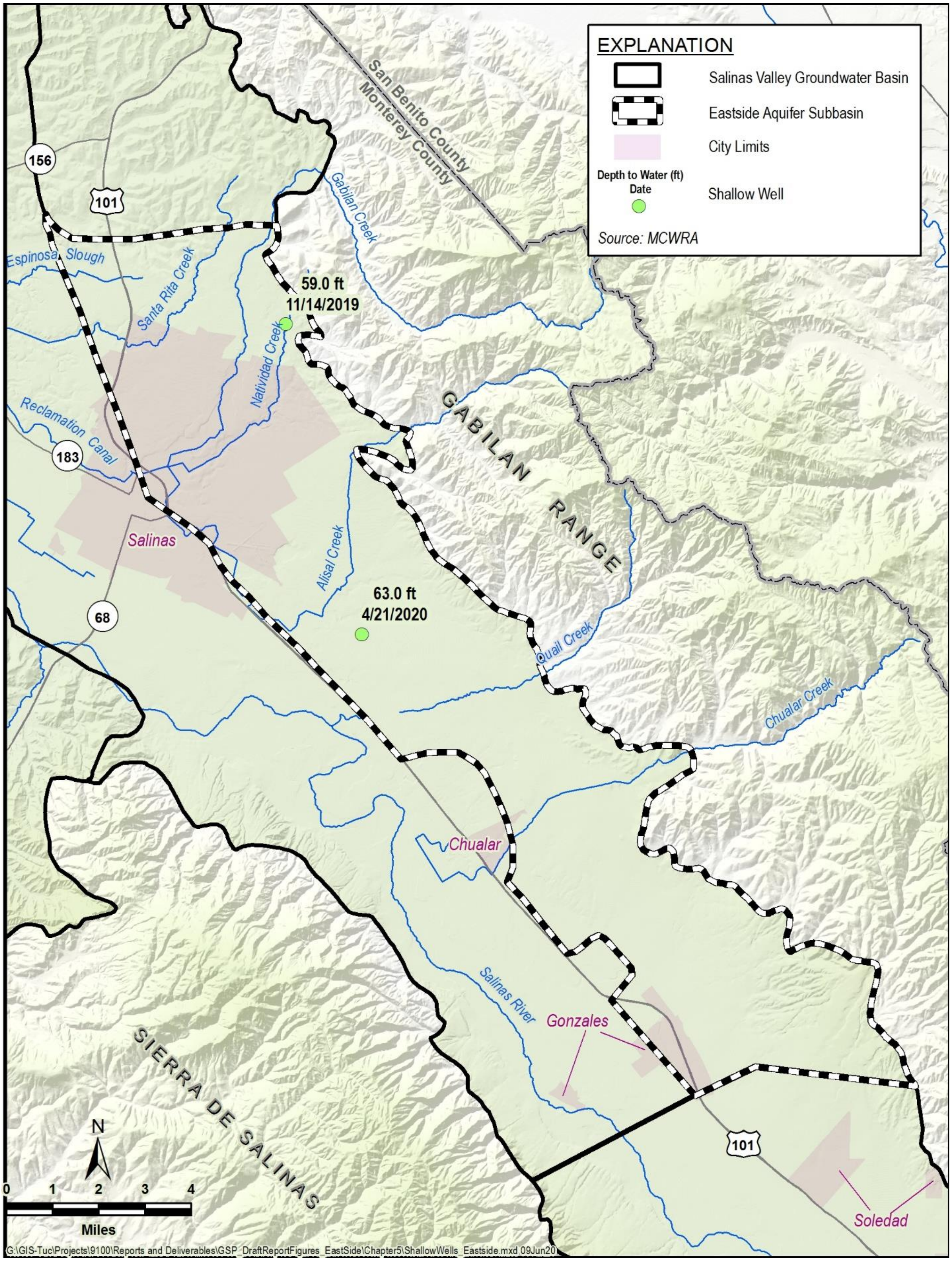

Figure 8: Shallow Wells with their Last Depth to Water Measurement

Groundwater Storage

Decisions

The statement of what is significant and unreasonable should address an extraction volume that is significant and unreasonable for the whole subbasin. Example statements of what might be considered significant and unreasonable changes in groundwater storage (pumping) were provided in the presentation at the previous Subbasin Committee meeting. It may be difficult to justify a minimum threshold of pumping more than the sustainable yield, or allowing a loss of groundwater storage.

The approach options presented at the previous committee meeting were options based on the metric (either pumping or groundwater levels), not on whether a long-term loss of storage is acceptable or not. The options presented at the previous committee meeting are as follows:

1. Pumping in excess of the sustainable yield leads to significant and unreasonable impacts
    - Minimum threshold = pump within the sustainable yield. Provide an estimate of the sustainable yield, acknowledging it will be refined with better data
    - Measurable objective = pump at, or less than the sustainable yield.
2. Pumping more than a zero net change in groundwater storage, based on groundwater elevations, leads to significant and unreasonable impacts
    - Minimum threshold = no long-term change in storage based on calculations using groundwater elevation data
    - Measurable objective = long-term stability, or increase in storage based on calculations using groundwater elevation data

The decision made in the 180/400-Foot Aquifer Subbasin was to define:

- ***Significant and unreasonable:*** Pumping in excess of the sustainable yield leads to significant and unreasonable impacts. (option 1).
- ***Metric:*** Groundwater extractions
- ***Minimum threshold:*** The estimated long-term future sustainable yield of 180/400-Foot Aquifer Subbasin, initially 112,000 AFY/yr. This will be refined with better data.
- ***Measurable objective:*** Pumping less than the sustainable extraction rate.

SMC Metric

SGMA regulations state that the metric for groundwater in storage should be a total volume of water that can be extracted, and the statement of what is significant and unreasonable should be related to sustainable yield. One minimum threshold and one measurable objective must be defined for the entire subbasin. Many GSPs have opted to calculate storage from groundwater levels as a proxy.

Available Data

The initial water budget data presented during the first Subbasin Committee meeting are repeated in this data supplement below (Table 2). This initial estimate will be updated as the GSP water budget chapter is developed. Table 2 shows that, without any other projects, the Eastside Subbasin would need to reduce pumping by approximately 8.2% to meet pump within the sustainable yield. Change in storage based on change in groundwater elevations between 1995 and 2019 are shown in Figures 7-8 below. This shows an uneven distribution of calculated change in storage based on change in groundwater elevations.

No additional data about the Subbasin's sustainable yield are currently available.

Table 2: Initial Water Budget

	2030	2070
Estimated Extractions (Acre-Feet/Year)	83,000	85,500
Estimated Overdraft (Acre-Feet/Year)	7,060	7,040
Percent Pumping Reduction	8.5%	8.2%

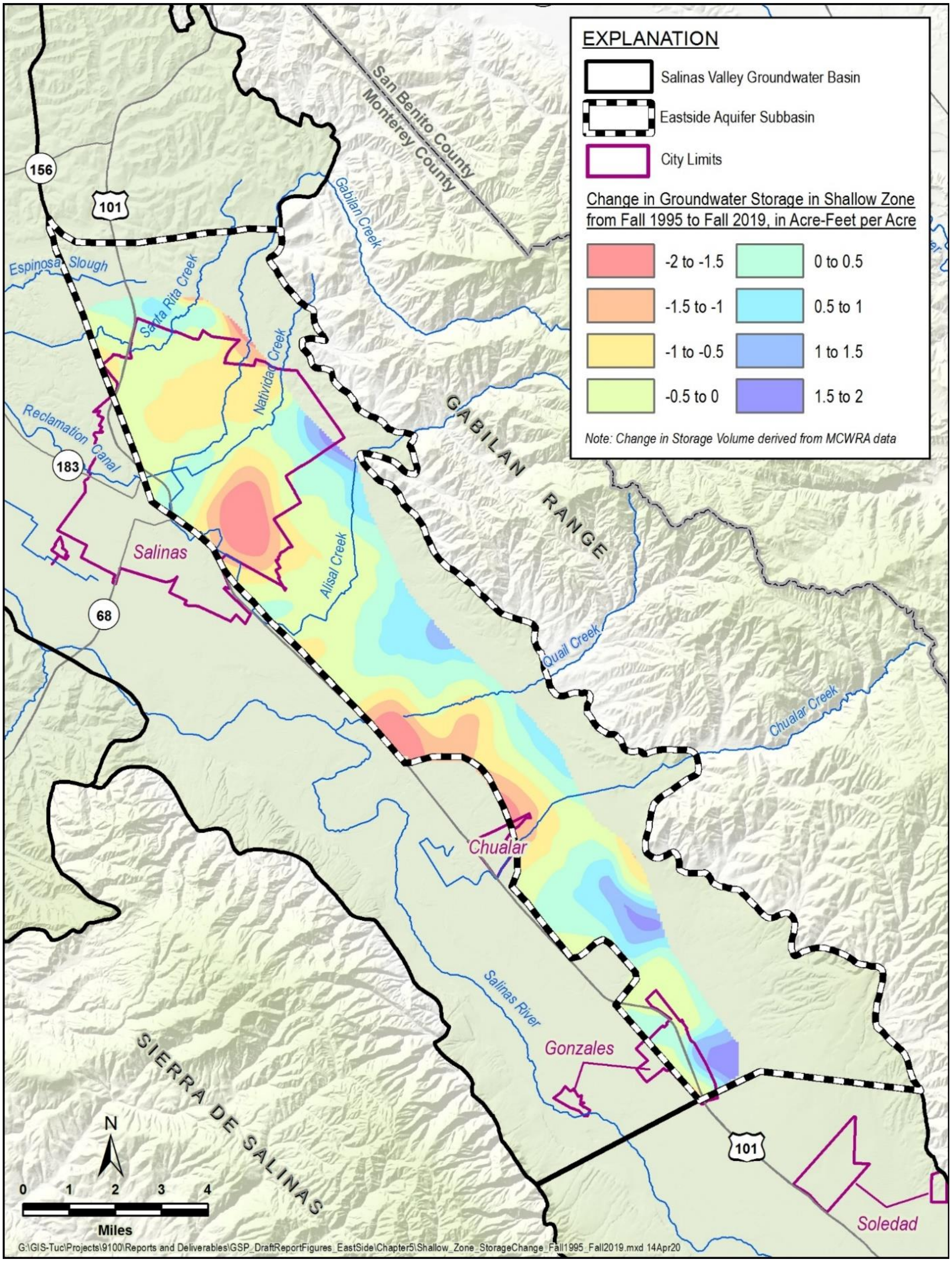

Figure 6. Change in storage by calculating change in groundwater elevations in Shallow Zone

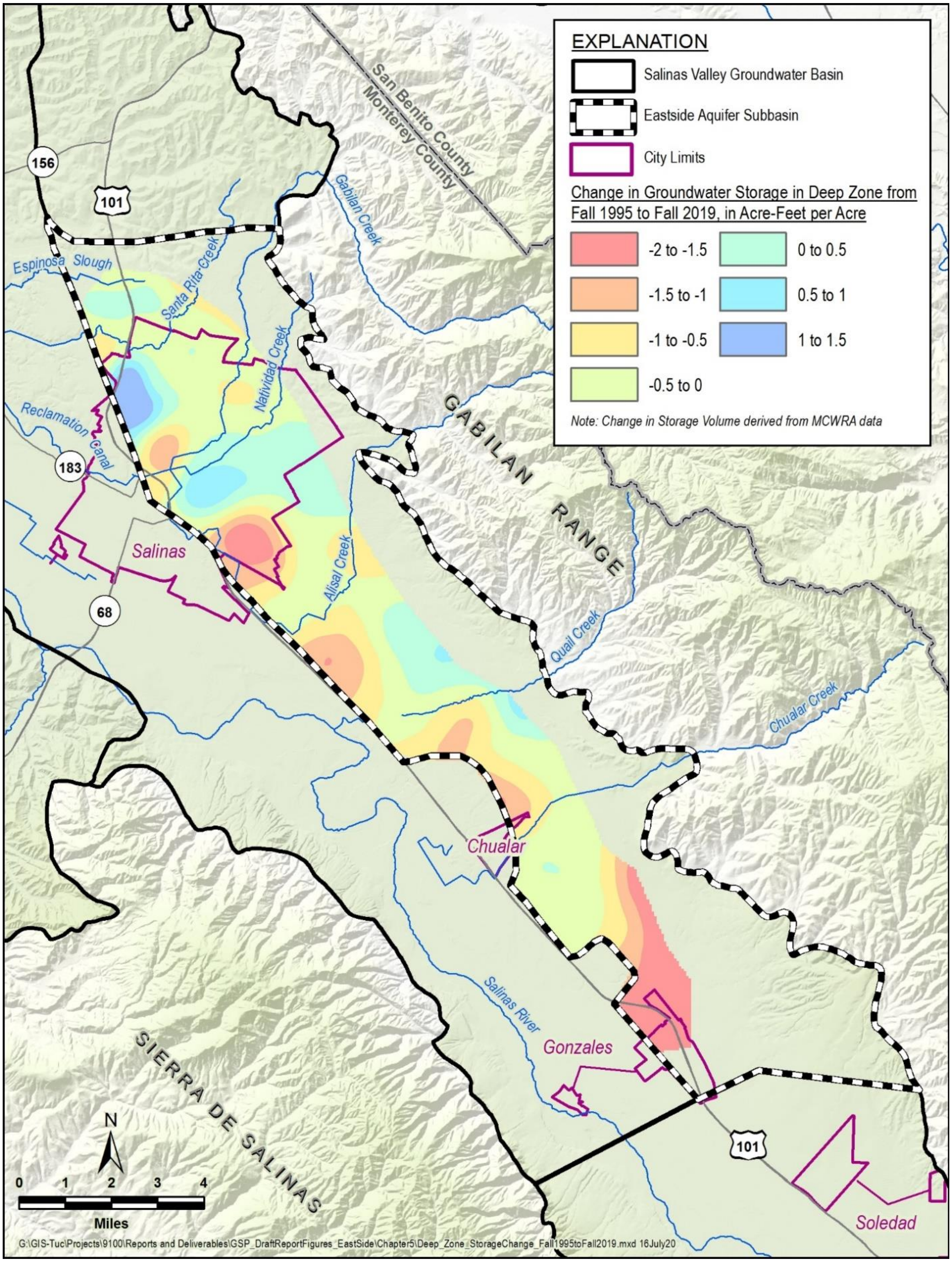

Figure 7. Change in storage by calculating change in groundwater elevations in Deep Zone

Degraded Groundwater Quality

Decisions

The statement of what is significant and unreasonable should address what level of degraded water quality is significant and unreasonable. All undesirable results will be based on minimum thresholds exceedances. The GSA is not required to improve water quality. Be cautious adopting responsibilities and authorities already held by other agencies such as CCRWQB, or County of Monterey.

The approach options presented at the previous committee meeting are as follows:

1. Degraded groundwater quality resulting from direct GSA actions is significant and unreasonable
   - Minimum threshold = maintain current groundwater quality impacts
   - Measurable objective = same as minimum threshold
2. Existing groundwater quality conditions are significant and unreasonable, but SVBGSA chooses not to improve existing groundwater quality
   - Minimum threshold = improve groundwater quality impacts
   - Measurable objective = same as minimum threshold
     - We are not required to meet the minimum thresholds in this example
3. Existing groundwater quality conditions are significant and unreasonable, and SVBGSA chooses to improve existing groundwater quality
   - Minimum threshold = improve groundwater quality impacts
   - Measurable objective = same as minimum threshold

The decision made in the 180/400-Foot Aquifer Subbasin was to define:

- ***Significant and unreasonable:*** Degraded groundwater quality resulting from direct GSA actions is significant and unreasonable (option 1). This is based on the idea that it is significant and unreasonable for the GSA to take an action that financially impacts a well owner such as treating the water, abandoning the well, or experiencing reduced crop production due to water quality.
- ***Metric:*** Existing MCLs for constituents of concern
- ***Minimum threshold:*** Zero additional exceedances of groundwater quality constituents of concern known to exist in the Subbasin.
- ***Measurable objective:*** Zero additional exceedances of groundwater quality constituents of concern known to exist in the Subbasin.

SMC Metric

SGMA regulations state that the metric for degraded water quality should be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin.

The minimum threshold shall be based on the number of supply wells, a volume of water, or a location of an isocontour that exceeds concentrations of constituents determined by the Agency to be of concern for the basin. In setting minimum thresholds for degraded water quality, the Agency shall consider local, state, and federal water quality standards applicable to the subbasin.

Available Data

Degradation of groundwater quality is measured in several supply wells in the Subbasin. Supply wells for constituents of concern that have an established Maximum Contaminant Level (MCL) or Secondary Maximum Contaminant Level (SMCL) include public water system wells, small water system wells, and domestic wells. Supply wells for constituents of concern that may lead to reduced crop production include agricultural irrigation supply wells. Each set of wells has its own constituents of concern. Table 3 reports the groundwater quality data for wells that reported 2019 groundwater quality. The table shows the number of wells with MCL exceedances for WY 2019.

Table 3: Water Year 2019 Water Quality Data Summary from GAMA website

Constituent of Concern	Regulatory Exceedance Standard	Standard Units	Number of Existing Wells in Monitoring Network Sampled in Water Year 2019	Number of Wells Exceeding Regulatory Standard in Water Year 2019	Percentage of Wells with Exceedances
DDW Wells					
123-Trichloropropane	0.005	ug/L	41	3	7%
Nitrate	10	mg/l	46	8	17%
Total Dissolved Solids	500	mg/l	9	3	33%
Domestic IRLP Wells					
Nitrate	10	mg/L	15	10	67%
TDS	1000	mg/L	9	2	22%
Nitrate + Nitrite	10	mg/L	11	8	73%
Specific Conductance	1600	UMHOS/CM	7	2	29%
Irrigation IRLP Wells					
Specific Conductance	1600	UMHOS/CM	29	1	3%
Nitrate + Nitrite	10	mg/L	28	15	54%
TDS	1000	mg/L	24	1	4%
Nitrate	10	mg/L	45	22	49%

Based on publicly available water quality information, the following constituents have been identified above levels of concern in the Subbasin:

- 1,2,3-trichloropropane
- copper and compounds
- lead
- manganese
- nitrate
- nitrate + nitrite
- organochlorine pesticides
- polychlorinated biphenyls
- specific conductance
- TDS
- zinc

Seawater Intrusion

Seawater intrusion is not present in the Eastside Subbasin at this time. However, seawater intrusion is present in the 180/400-Foot Aquifer Subbasin, and the location of the recent chloride isocontour is approximately one mile from the boundary with the Eastside Subbasin. This committee needs to determine if seawater intrusion should be an SMC included in the GSP, especially when viewed from a 50-year planning horizon

Decisions

The statement of what is significant and unreasonable should address chloride concentration isocontour location that is significant and unreasonable for the whole subbasin. The subbasin cannot set an SMC outside its own boundary. Example statements of what might be considered significant and unreasonable chloride concentration isocontours were provided in the presentation at the previous Subbasin Committee meeting.

The approach options presented at the previous committee meeting are as follows:

1. Any seawater intrusion in the Subbasin is significant and unreasonable
    - Minimum threshold = a chloride isocontour at the basin boundary
    - Measurable objective = same as minimum threshold
2. Additional seawater intrusion is neither significant nor unreasonable. Seawater intrusion can advance farther inland.
    - Minimum threshold = a chloride isocontour inland of the current location
    - Measurable objective = same as minimum threshold

The decision made in the 180/400-Foot Aquifer Subbasin was to define:

- ***Significant and unreasonable:*** Existing sea water intrusion significant and unreasonable and SVBGSA chooses to improve seawater intrusion. (option 2).
- ***Metric:*** Chloride concentration isocontour location
- ***Minimum threshold:*** The 2017 chloride isocontour.
- ***Measurable objective:*** Set to a line closer to the coast.

SMC Metric

SGMA regulations state that the metric for seawater intrusion is the locations of a chloride concentration isocontour location, and the statement of what is significant and unreasonable should be related to a location of the contour. One minimum threshold and one measurable objective must be defined for the entire subbasin.

Available Data

Figure 9 and Figure 10 show the seawater intrusion data for the 180-Foot Aquifer and 400-Foot Aquifer, respectively, presented in the Subbasin Committee meeting and are repeated in this data supplement. This data is developed by MCWRA.

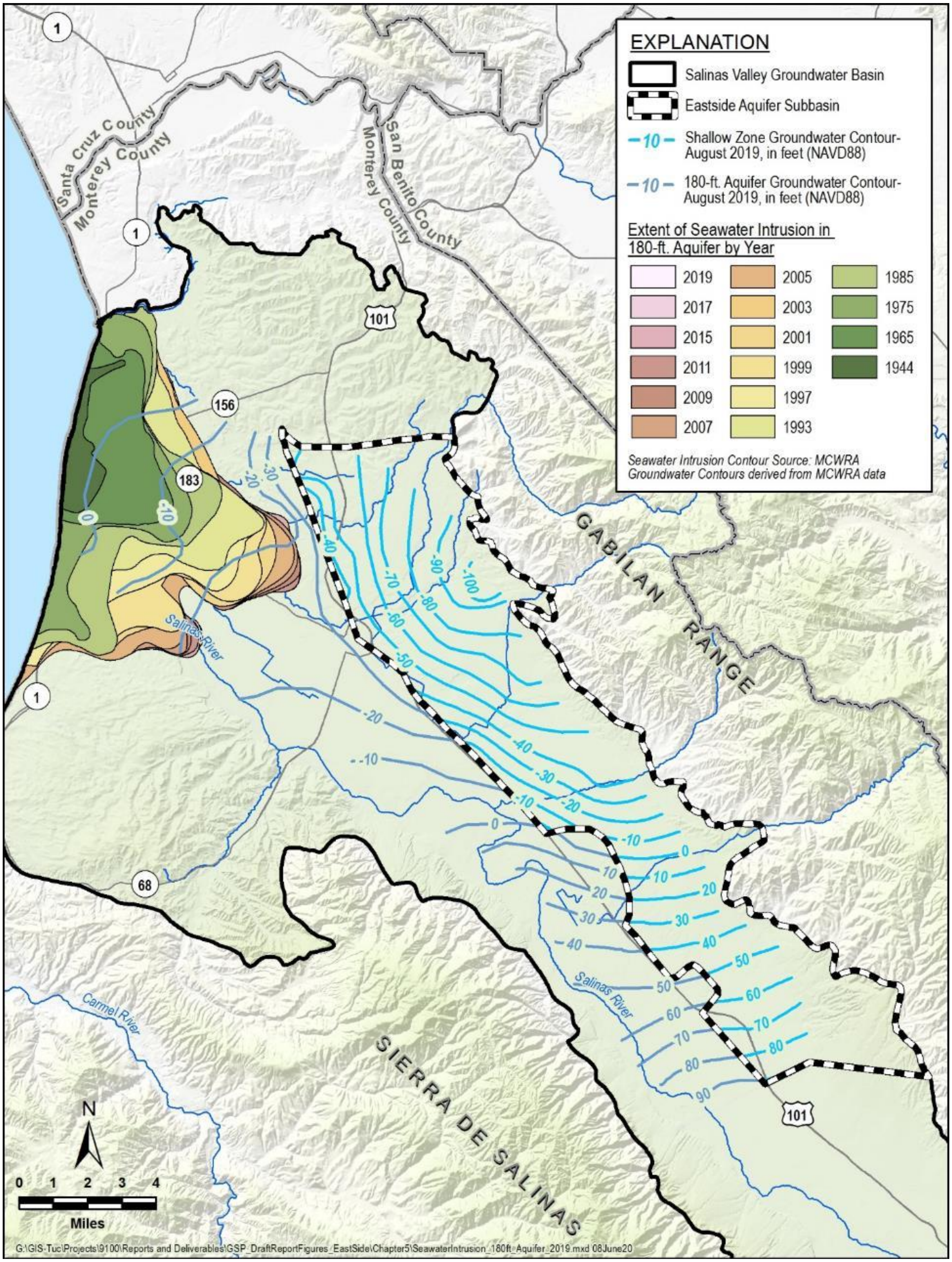

Figure 8: Seawater Intrusion in the 180-Foot Aquifer

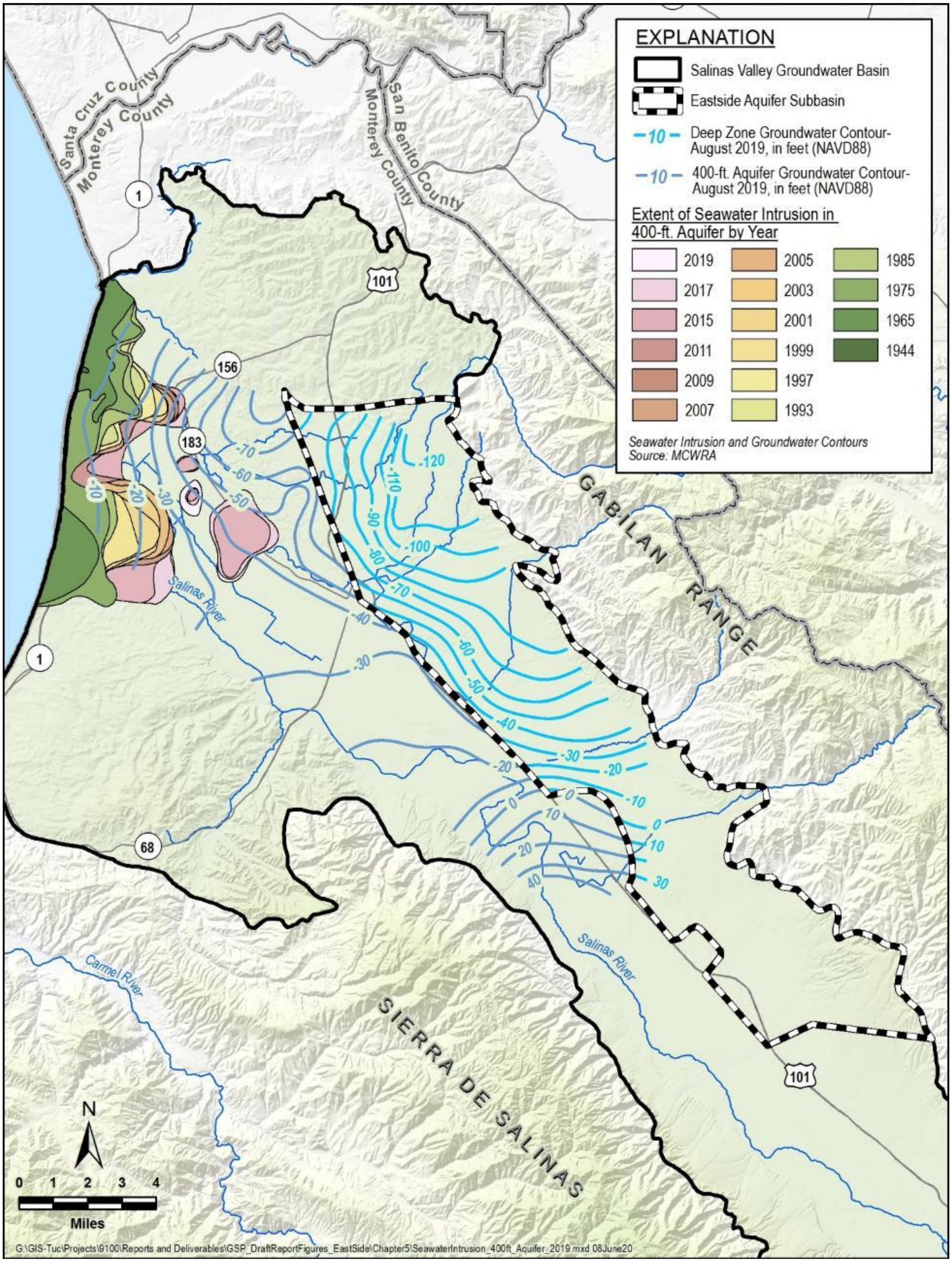

Figure 9: Seawater Intrusion in the 400-Foot Aquifer