Salinas Valley Groundwater Basin
180/400-Foot Aquifer Subbasin
Water Year 2019 Annual Report
Submitted in Support of Groundwater Sustainability Plan Implementation

Salinas Valley Basin
Groundwater Sustainability Agency

Prepared by:

MONTGOMERY & ASSOCIATES
Water Resource Consultants

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ABBREVIATIONS AND ACRONYMS

AF/yr.	acre-feet per year
COC	constituent of concern
CSIP	Castroville Seawater Intrusion Project
DWR	California Department of Water Resources
eWRIMS	Electronic Water Rights Information Management System
GEMS	Groundwater Extraction Monitoring System
GSA	Groundwater Sustainability Agency
GSP or Plan	Groundwater Sustainability Plan
InSAR	Synthetic-Aperture Radar
JPA	Joint Powers Authority
MCGSA	Monterey County Groundwater Sustainability Agency
MCL	Maximum Contaminant Level
MCWD GSA	Marina Coast Water District Groundwater Sustainability Agency
mg/L	milligram/Liter
SGMA	Sustainable Groundwater Management Act
SMC	Sustainable Management Criteria/Criterion
SMCL	Secondary Maximum Contaminant Level
Subbasin	180/400-Foot Aquifer Subbasin
SVBGSA	Salinas Valley Basin Groundwater Sustainability Agency
SVIHM	Salinas Valley Integrated Hydrologic Model
SWIG	Seawater Intrusion Working Group
SWRCB	State Water Resources Control Board
TAC	Technical Advisory Committee
WY	Water Year

EXECUTIVE SUMMARY

The Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) is required to submit an annual report for the 180/400-Foot Aquifer Subbasin (Subbasin) to the California Department of Water Resources (DWR) by April 1 of each year following the SVBGSA's 2020 adoption and submittal of its Groundwater Sustainability Plan (GSP or Plan). This first annual report covers data collected through Water Year (WY) 2019 and reports any changes to the GSP.

As described in the GSP, DWR lists the Subbasin as a high priority basin in critical overdraft, which indicates that continuation of present water management practices would probably result in significant adverse impacts.

In WY 2019, groundwater conditions remained similar to conditions in recent years, with slight changes in conditions related to specific sustainability indicators. WY 2019 is classified as a wet year.

The groundwater data for WY 2019 are summarized below:

- Groundwater extractions for reporting year 2019 (November 1, 2018 through October 31, 2019) were approximately 117,800 acre-feet (AF). Pumping in WY 2019 was 5,600 AF more than the minimum threshold established for the change in groundwater storage Sustainable Management Criterion (SMC). This does not include the estimate for rural domestic pumping because the long-term sustainable yield in the GSP only includes urban and agricultural pumping. The minimum threshold is set to the long-term sustainable yield after sustainability has been achieved, and therefore it does not account for additional pumping reductions that may be necessary to reach sustainability.
- Groundwater elevations increased slightly after this wet water year, with most wells showing elevations above their minimum thresholds but still below their measurable objectives. Some wells have measured groundwater elevations approaching their measurable objectives.
- Seawater intrusion continued in the Subbasin, but intrusion rates slowed in WY 2019 compared to recent years.
- No groundwater quality minimum thresholds were exceeded in 2019.
- No subsidence was reported within the Subbasin.
- Currently, insufficient data exist to measure interconnected surface water. However, SVBGSA plans to collect more data to address this data gap during GSP implementation.

Since GSP submittal in January 2020, the SVBGSA has taken numerous actions to implement the GSP. These include:

- Actively engaging stakeholders through its Advisory Committee and Board of Directors.
- Developing a Cooperation Agreement with the Monterey County Groundwater Sustainability Agency (MCGSA).
- Developing a two-year schedule for refining and initiating projects and management actions. The schedule includes efforts to fill data gaps, establish a water charges framework, and select initial projects for implementation.
- Initiating a working group on seawater intrusion.
- Proposing a strategic dialogue with disadvantaged communities.

To achieve these efforts, the SVBGSA has applied for and anticipates receiving a grant for initial implementation in the 180/400-Foot Aquifer Subbasin.

1 INTRODUCTION

1.1 Purpose

The 2014 California Sustainable Groundwater Management Act (SGMA) requires that, following adoption of a Groundwater Sustainability Plan (GSP), Groundwater Sustainability Agencies (GSAs) annually report on the condition of the basin and show that the GSP is being implemented in a manner that will likely achieve the sustainability goal for the basin. This report fulfills that requirement for the Salinas Valley – 180/400-Foot Aquifer Subbasin (Subbasin). Because this is the first annual report, it includes monitoring data from the end date of the data used in the GSP through Water Year (WY) 2019. WY 2019 is from October 1, 2018 to September 30, 2019. This first annual report includes a description of basin conditions through text, hydrographs, groundwater elevation contour maps, calculated estimates of change in groundwater in storage, and maps of the distribution of groundwater extraction across the Subbasin. It compares WY 2019 data to Sustainability Management Criteria (SMC) as a measure of where the Subbasin is with respect to the sustainability goal that must be reached by the end of 2040.

1.2 180/400-Foot Aquifer Subbasin Groundwater Sustainability Plan

In 2017, local GSA-eligible entities formed the Salinas Valley Basin Groundwater Sustainability Agency (SVBGSA) to develop and implement the GSPs for the Salinas Valley. The SVBGSA is a Joint Powers Authority (JPA) with membership comprising the County of Monterey, Water Resources Agency of the County of Monterey (Monterey County Water Resources Agency, or MCWRA), City of Salinas, City of Soledad, City of Gonzales, City of King, Castroville Community Services District, and Monterey One Water.

The SVBGSA developed the GSP for the 180/400-Foot Aquifer Subbasin, identified as California Department of Water Resources (DWR) subbasin 3-004.01, in coordination with the Marina Coast Water District Groundwater Sustainability Agency (MCWD GSA) and the County of Monterey Ground Water Sustainability Agency (MCGSA), each of which has exclusive jurisdiction over part of the 180/400-Foot Aquifer Subbasin. DWR has designated the 180/400-Foot Aquifer Subbasin as a critically overdrafted basin, which indicates that continuation of present water management practices would probably result in significant adverse impacts.

The SVBGSA developed the GSP for the 180/400-Foot Aquifer Subbasin in concert with the five other Salinas Valley Subbasin GSPs that fall partially or entirely under its jurisdiction: the Eastside Aquifer Subbasin (DWR subbasin 3-004.02), the Forebay Aquifer Subbasin (DWR subbasin 3-004.04), the Upper Valley Aquifer Subbasin (DWR subbasin 3-004.05), the Langley Area Subbasin (DWR subbasin 3-004.09) and the Monterey Subbasin (DWR subbasin 3-004.10).

This Annual Report covers all the 89,700 acres of the 180/400-Foot Aquifer Subbasin, as shown on Figure 1.

1.3 Organization of This Report

This Annual Report corresponds to the requirements of GSP Regulations §356.2. The Report first outlines the subbasin conditions, including several components of the Regulations: groundwater elevations, groundwater extractions, surface water use, total water use, and change in groundwater storage. The Report then addresses GSP implementation by reporting on actions taken to implement the Plan, and progress toward interim milestones.

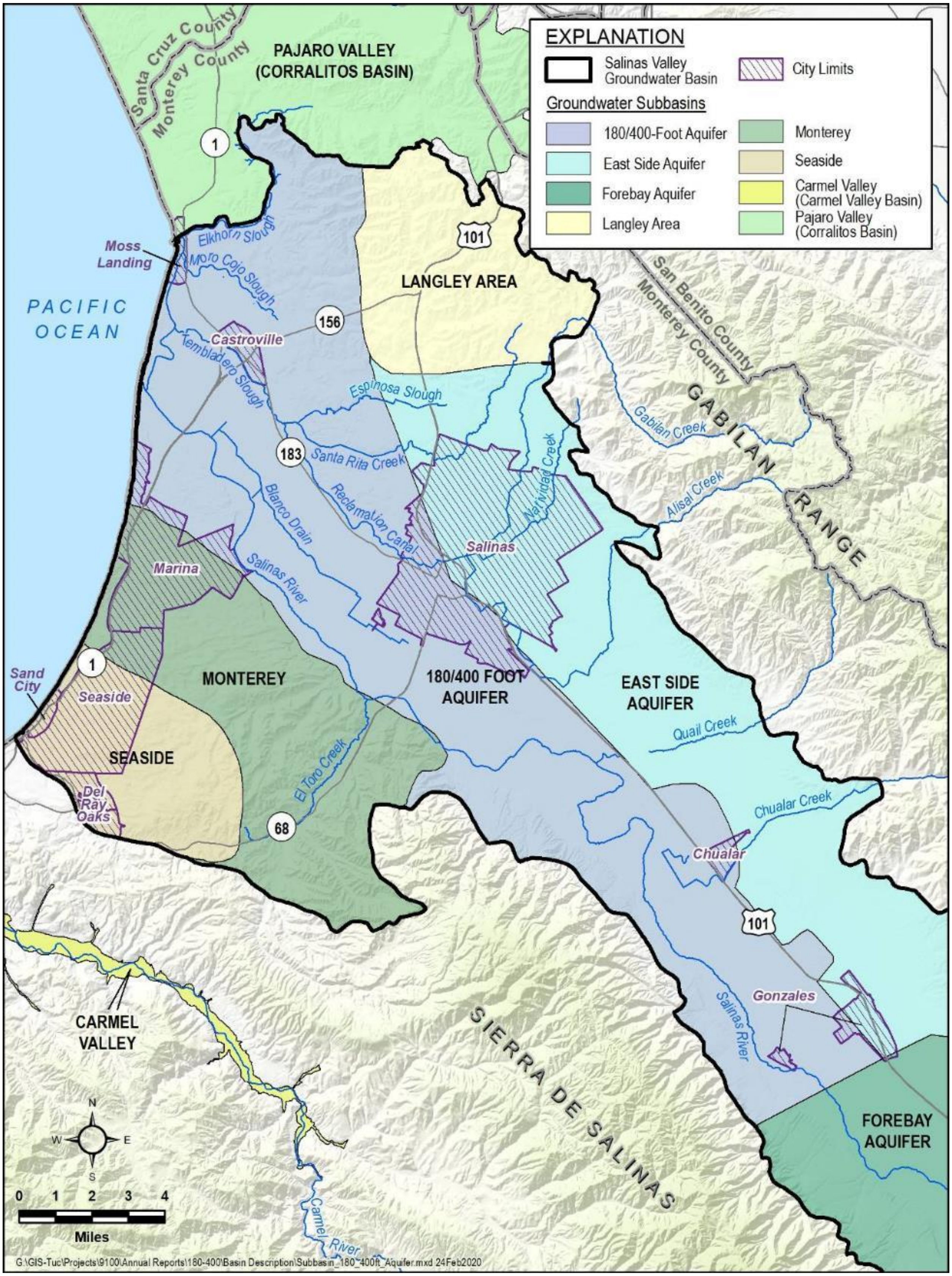


Figure 1. 180/400-Foot Aquifer Subbasin

2 SUBBASIN SETTING

The 180/400-Foot Aquifer Subbasin is a high-priority groundwater subbasin in northwestern Monterey County that includes the northern end of the Salinas River Valley. The Salinas River flows into the Subbasin from the south and discharges into Monterey Bay in the north. Subbasin boundaries are determined in part by geologic structures and depositional changes that influence groundwater flow. The northern boundary of the 180/400-Foot Aquifer Subbasin follows the current course of Elkhorn Slough and corresponds to a paleo-drainage of the Salinas River that limits groundwater flow between basins (Durbin, et al., 1978). The boundary with the Langley Subbasin to the northeast is based on a topographic change from the valley floor to an elevated foothill area, but there is no hydraulic barrier to groundwater flow. To the east, hydraulic connectivity is restricted by depositional changes along the border with the Eastside Aquifer. To the southeast, there is hydraulic connectivity with the Forebay Subbasin. To the southwest, the boundary with the Monterey Subbasin is based on topographic rise that coincides with a buried trace of the Reliz fault, which may act as a groundwater flow barrier (Durbin, et al. 1978); however, more data is needed to determine the extent of hydraulic connectivity. Finally, there is no hydraulic barrier between the 180/400-Foot Aquifer Subbasin and the Monterey Bay.

2.1 Principal Aquifers and Aquitards

Vertically, the shallowest water-bearing sediments are not considered a principal aquifer because they are thin, laterally discontinuous, and a minor source of water. Groundwater in these shallow sediments is hydraulically connected to the Salinas River but poorly connected to the underlying productive principal aquifers: the 180-Foot, 400-Foot, and Deep Aquifers. The base of the shallow sediments is the Salinas Valley Aquitard, which overlies and confines the 180-Foot Aquifer. The 180-Foot Aquifer consists of interconnected sand and gravel beds that are 50 to 150 feet thick. Below the 180-Foot Aquifer, the 180/400-Foot Aquitard confines the 400-Foot Aquifer. The 400-Foot Aquifer is a relatively permeable horizon that is approximately 200 feet thick near Salinas; but in other areas the aquifer is split into multiple permeable zones by clay layers (DWR, 1973). Below the 400-Foot Aquifer, the 400-Foot/Deep Aquitard confines the Deep Aquifers, also referred to as the 900-Foot and 1500-Foot Aquifers. There are limited data available from the Deep Aquifers.

2.2 Natural Groundwater Recharge and Discharge

Natural groundwater recharge occurs through infiltration of surface water, deep percolation of excess applied irrigation water, and deep percolation of infiltrating precipitation. Recharge to the 180-Foot Aquifer is likely limited due to the low permeability of the Salinas Valley Aquitard. No mapped springs, seeps, or discharge to streams have been identified in the Subbasin. Some phreatophytes discharge groundwater through evapotranspiration in areas where the water table is sufficiently high.

2.3 Water Use and Supply

Within the Subbasin, water is used for agricultural, urban, industrial use, and wetlands and native vegetation. Most of the water in the Subbasin is used for agriculture. Only a relatively small amount of water is used by wetlands and native vegetation.

The water supply in the 180/400-Foot Aquifer Subbasin is a combination of groundwater, surface water, and recycled water. Groundwater is the main water source in the Subbasin. The Salinas River and its tributaries provide limited surface water. The Castroville Seawater Intrusion Project (CSIP) delivers a combination of groundwater, surface water, and recycled water from Monterey One Water to the coastal farmland surrounding Castroville.

2.4 Precipitation and Water Year Type

Precipitation that falls within the Subbasin contributes to runoff and percolation components of the water budget. The precipitation gage at the Salinas Airport (National Oceanographic and Atmospheric Administration Station USW00023233) recorded 7.16 inches of rainfall in 2018 and 13.95 inches in 2019. For comparison, the average rainfall at this gage is 13.26 inches of precipitation, and the gage recorded 16.49 inches of precipitation in 2017.

The SVBGSA adopted the methodology used by MCWRA for determining the Subbasin's water year type. The MCWRA assigns a water year type of either dry, dry-normal, normal, wet-normal, or wet based on an indexing of annual mean flows at the USGS stream gage Arroyo Seco near Soledad (USGS Gage 11152000) (MCWRA, 2005). Using the MCWRA method, the WY 2018 was a dry year and WY 2019 was a wet year.

3 2019 DATA AND SUBBASIN CONDITIONS

This section details the subbasin conditions and 2019 data. Where 2019 data is not available, it includes the most recent data available. The SVBGSA developed a data management system to store monitoring data. Monitoring data is included in this Annual Report and is being submitted electronically on forms provided by DWR.

3.1 Groundwater Elevations

The current groundwater elevation monitoring network in the 180/400-Foot Aquifer Subbasin contains 21 wells. All 21 wells are representative monitoring sites and monitored by MCWRA. Locations of groundwater elevation monitoring network wells within the Subbasin are shown on Figure 2.

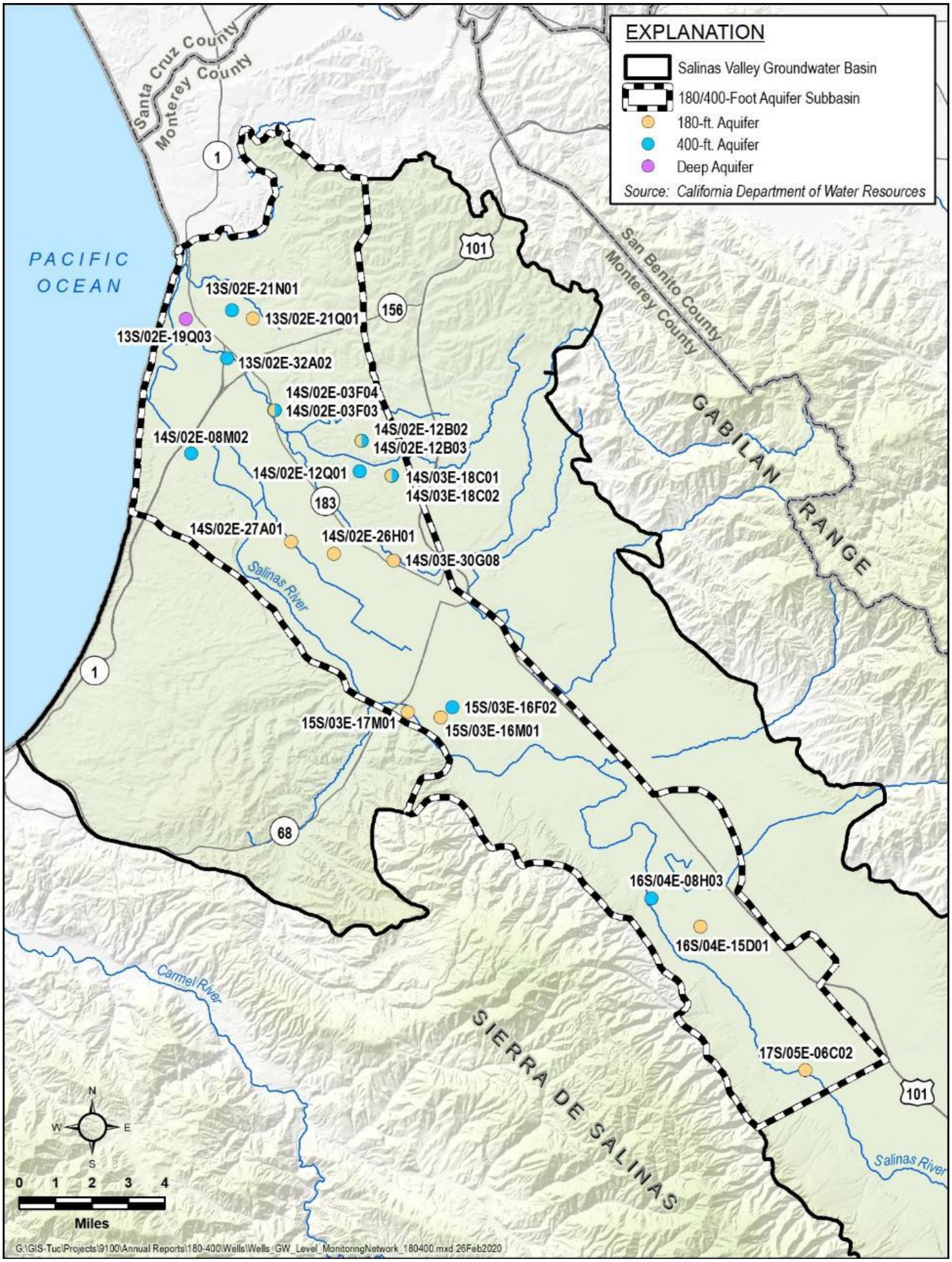


Figure 2. Locations of Representative Groundwater Elevation Monitoring Sites

Fall 2018 and Fall 2019 groundwater elevation data are presented in Table 1. In accordance with the GSP, this report uses groundwater elevations measured in October of 2018 and 2019 in order to approximate neutral groundwater conditions that are not heavily influenced by either summer irrigation pumping or winter rainfall recharge.

Table 1. Groundwater Elevation Data

Monitoring Site	Aquifer	WY 2018 elevation data	WY 2019 elevation data
13S/02E-21Q01	180-ft Aquifer	6.4	7
14S/02E-03F04	180-ft Aquifer	-11.4	-10.3
14S/02E-12B02	180-ft Aquifer	-14.8	-13.7
14S/02E-26H01	180-ft Aquifer	-20.1	-19.6
14S/02E-27A01	180-ft Aquifer	-16.5	-15.4
14S/03E-18C01	180-ft Aquifer	7.8	9.4
14S/03E-30G08	180-ft Aquifer	-25.4	-24.7
15S/03E-16M01	180-ft Aquifer	-20.5	-6.7
15S/03E-17M01	180-ft Aquifer	-8.8	-7.8
16S/04E-15D01	180-ft Aquifer	42.2	47
17S/05E-06C02	180-ft Aquifer	80.6	83.8
13S/02E-21N01	400-ft Aquifer	-12	-12.9
13S/02E-32A02	400-ft Aquifer	-5.7	-5.2
14S/02E-03F03	400-ft Aquifer	-24.8	-36.7
14S/02E-08M02	400-ft Aquifer	-9.2	-10.9
14S/02E-12B03	400-ft Aquifer	-46.4	-57.4
14S/02E-12Q01	400-ft Aquifer	-21.1	-18.3
14S/03E-18C02	400-ft Aquifer	-35.1	-33.7
15S/03E-16F02	400-ft Aquifer	-10.9	-8.6
16S/04E-08H03	400-ft Aquifer	35.9	42.2
13S/02E-19Q03	Deep Aquifers	-11.5	-9.3

During GSP implementation, the SVBGSA will fill data gaps with additional wells to include in the monitoring network, which will be reported in future annual reports.

3.1.1 Groundwater Elevation Contours

The SVBGSA received groundwater elevation contour maps from MCWRA for the Salinas Valley Groundwater Basin for August 2019 and Fall 2019; and developed new contour maps for February 2019. The August contours represent seasonal low conditions. The MCWRA *Quarterly Salinas Valley Water Conditions* report (MCWRA, 2019) supports high groundwater elevations in the Subbasin in either February for the 400-Foot Aquifer or March for the 180-Foot Aquifer. For consistency, this Report uses February for the seasonal high groundwater elevations.

Groundwater elevation contours for high and low groundwater conditions in the 180-Foot Aquifer are shown on Figure 3 and Figure 4, respectively. Groundwater elevation contours for high and low groundwater conditions in the 400-Foot Aquifer are shown on Figure 5 and Figure 6, respectively. The contours indicate that groundwater flow directions are similar in the 180- and 400-Foot Aquifers during both seasonal low and seasonal high conditions. However, groundwater elevations in the 400-Foot Aquifer are lower than groundwater elevations in the 180-Foot Aquifer. Figures 3 through 6 show a groundwater depression in the northern portion of the Subbasin. These depressions are related to a pumping trough centered north of Salinas in the Eastside Subbasin. In this area, groundwater flow gradients are not parallel to the Valley's long axis, but rather are cross-valley towards the pumping trough. The pumping trough is more pronounced in August than in February due to the seasonal groundwater pumping trends in the basin. Contours are not extended to the northern-most portions of the Subbasin due to data limitations in that area; this is a data gap that will be addressed during GSP implementation. The MCWRA does not produce groundwater elevation maps of the Deep Aquifers. Insufficient data currently exist to map flow directions and groundwater elevations in the Deep Aquifers. This is a data gap that will be addressed in GSP implementation.

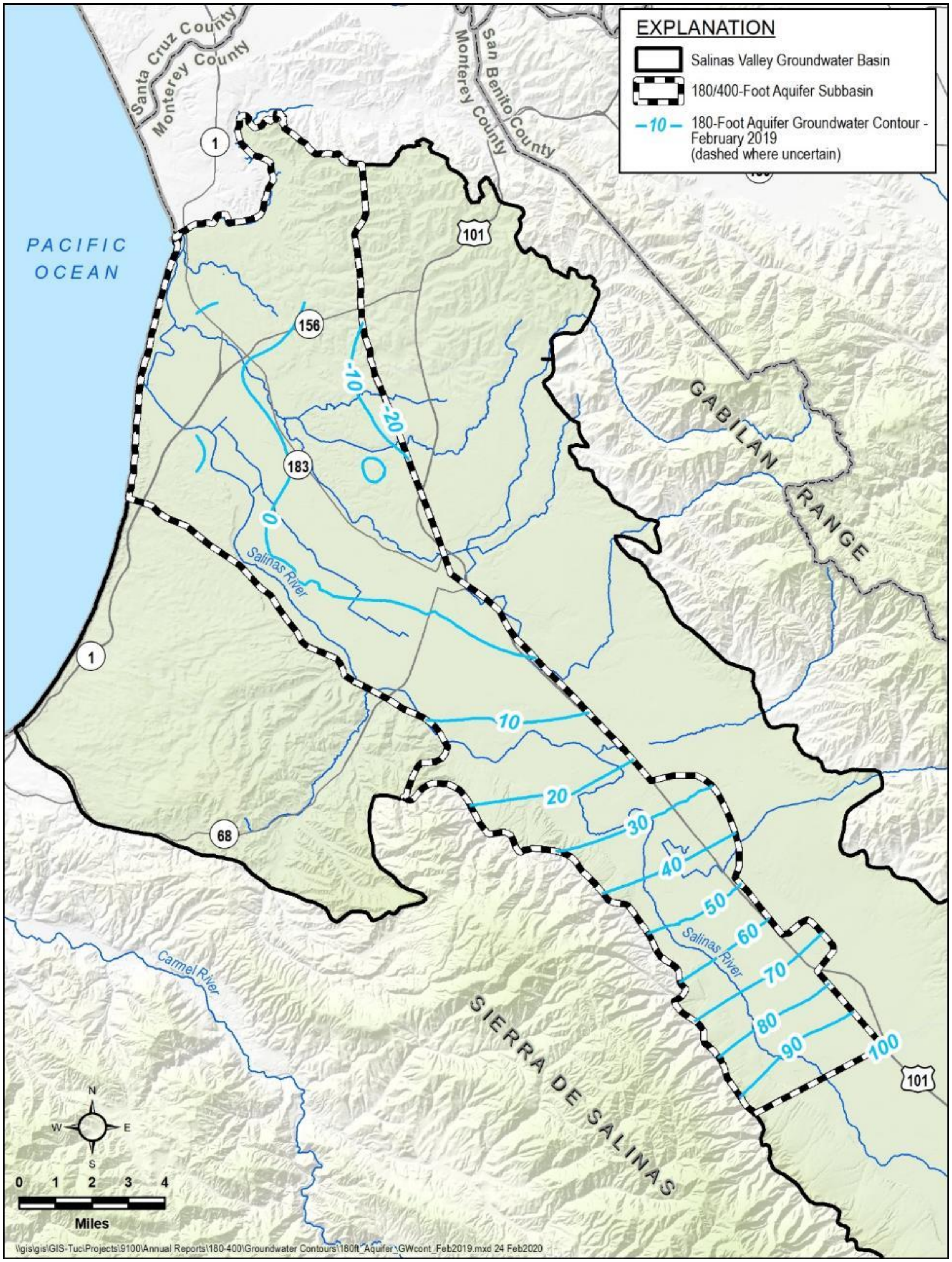


Figure 3. Seasonal High Groundwater Elevation Contour Map for 180-Foot Aquifer

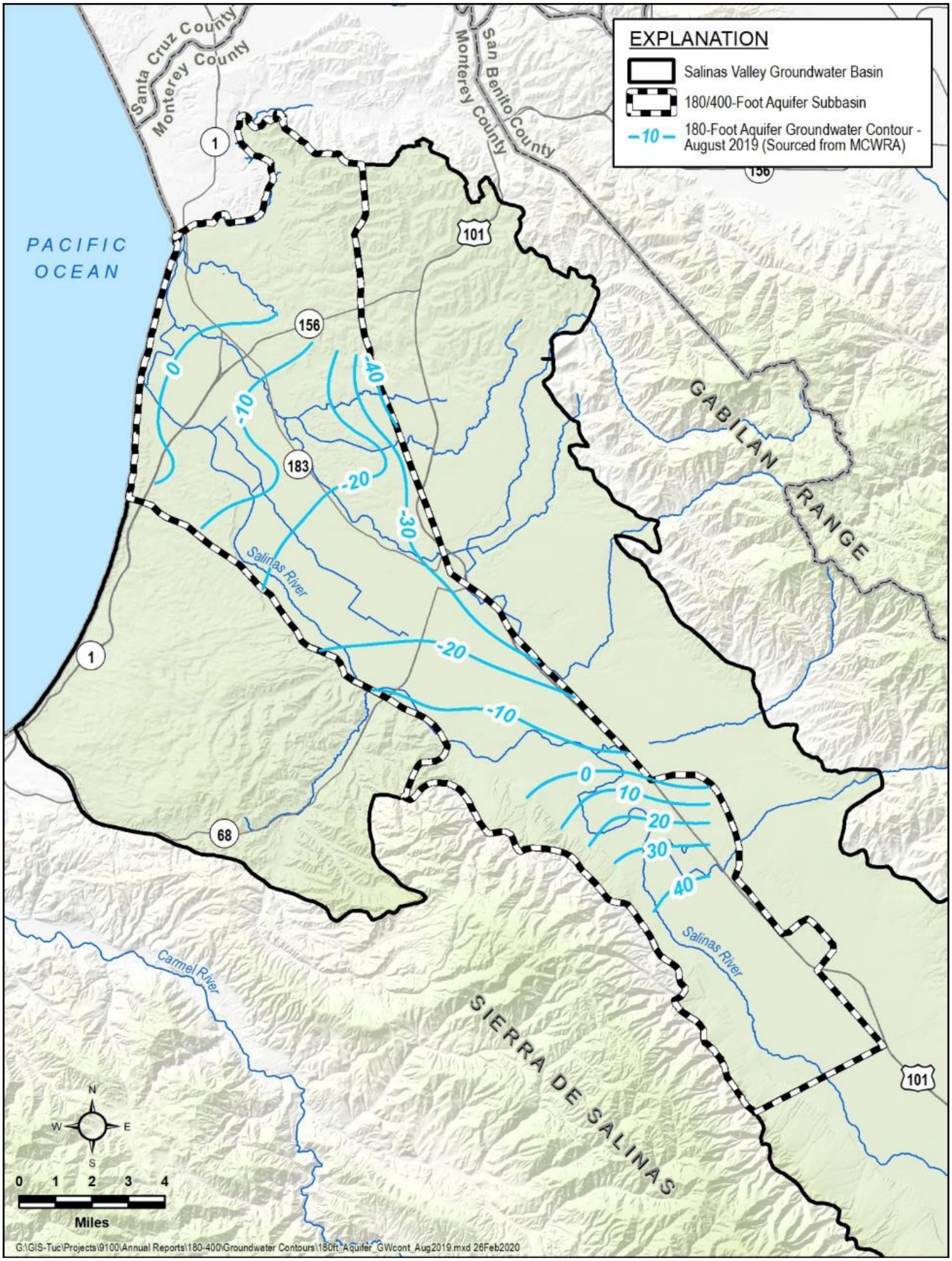


Figure 4. Seasonal Low Groundwater Elevation Contour Map for 180-Foot Aquifer

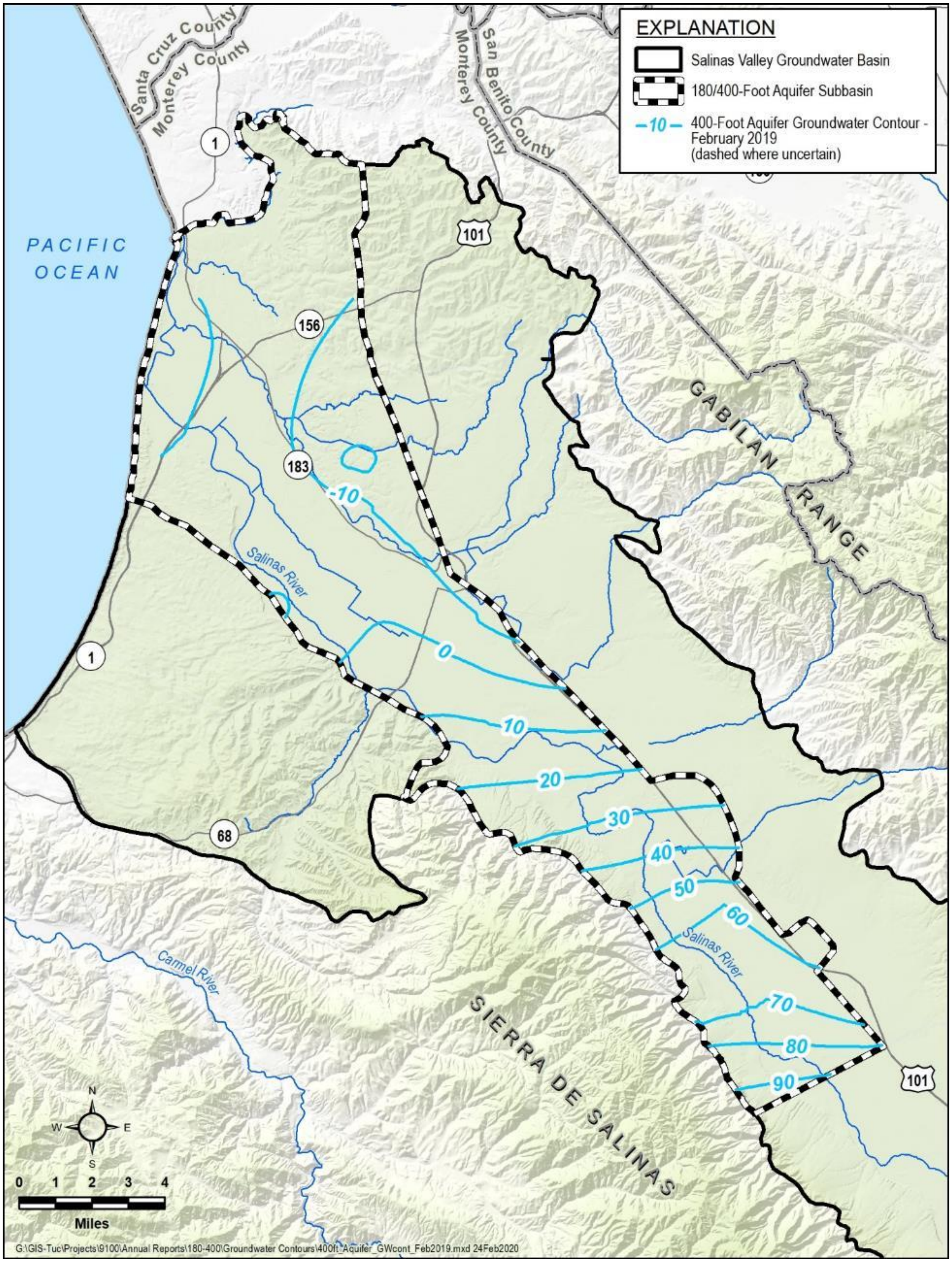


Figure 5. Seasonal High Groundwater Elevation Contour Map for 400-Foot Aquifer

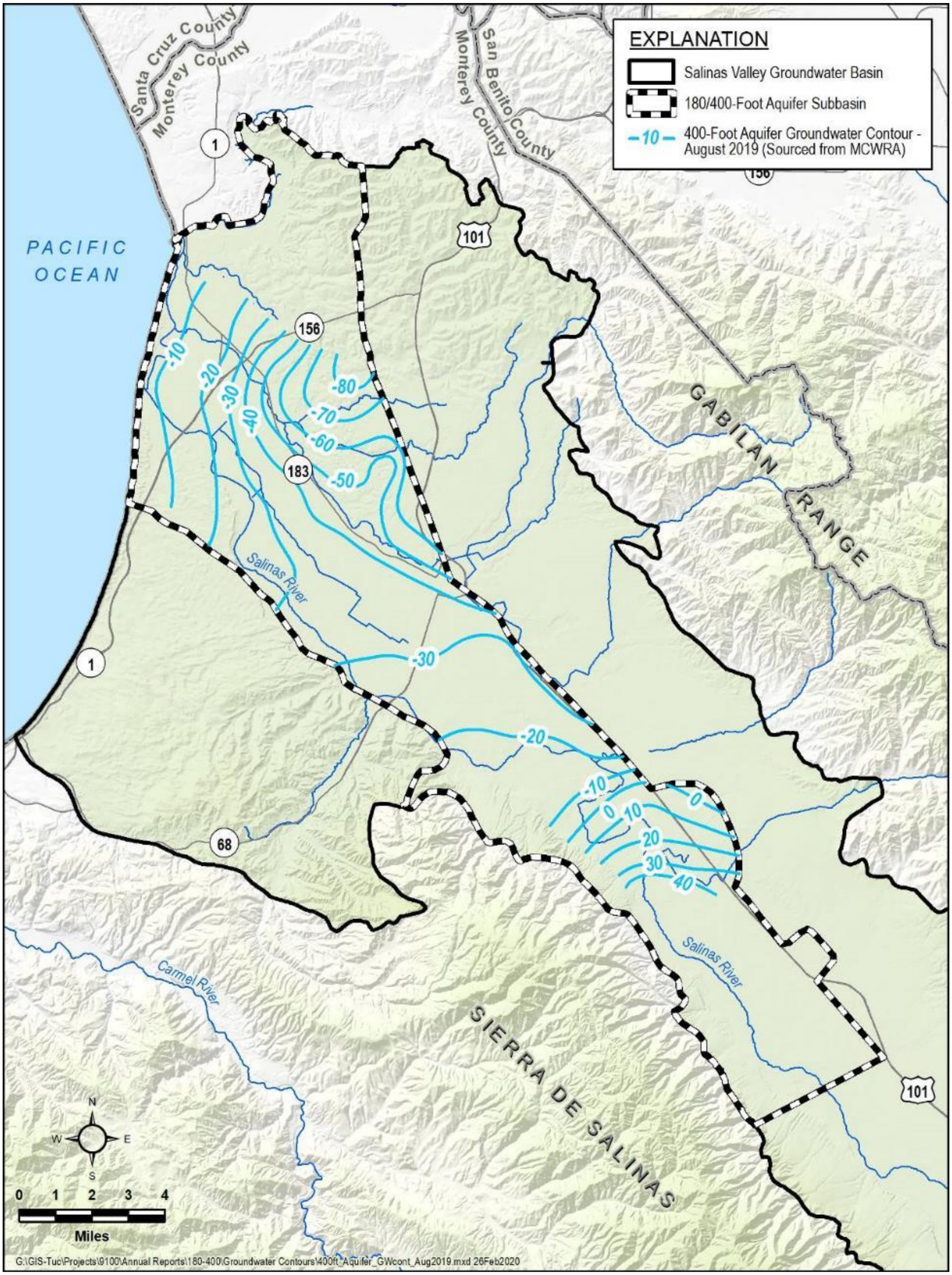


Figure 6. Seasonal Low Groundwater Elevation Contour Map for 400-Foot Aquifer

3.1.2 Groundwater Elevation Hydrographs

Temporal trends in groundwater elevations can be assessed with hydrographs that plot changes in groundwater elevations over time. Hydrographs for selected monitoring wells within the 180-Foot Aquifer, 400-Foot Aquifer, and the Deep Aquifers are shown on Figure 7 through Figure 9, respectively. These hydrographs were selected to show characteristic trends in groundwater elevation in each aquifer. The hydrographs indicate that groundwater elevations in the 180-Foot and 400-Foot Aquifers have generally remained stable (with seasonal fluctuations) or have slightly risen throughout the basin since 2017. Groundwater elevations in the Deep Aquifers have generally declined since 2017. Hydrographs for all representative monitoring sites are included in Appendix A.

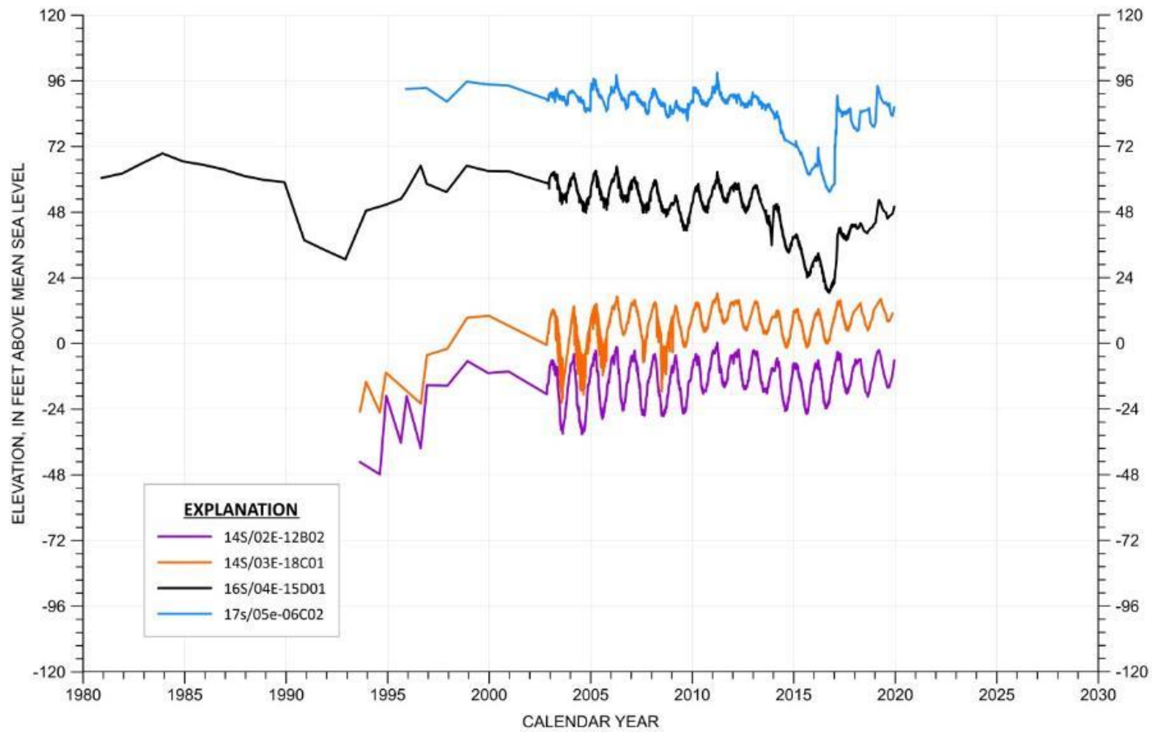


Figure 7. Groundwater Elevation Hydrographs for Selected Monitoring Wells in 180-Foot Aquifer

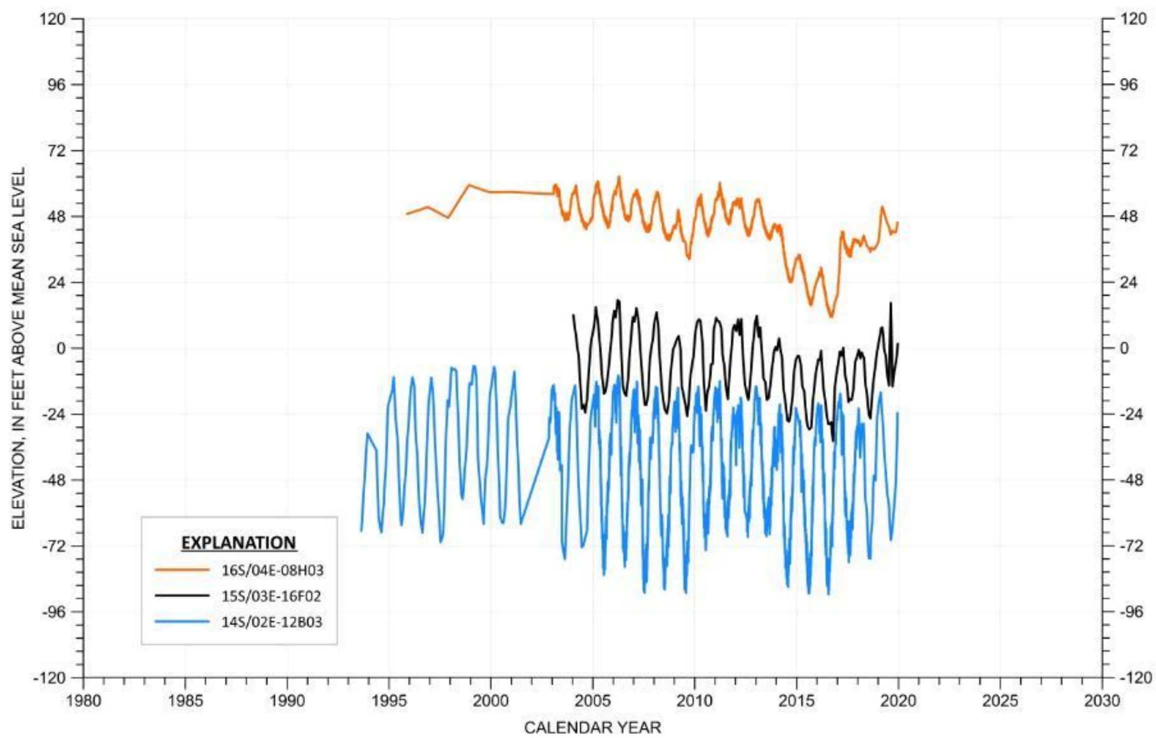


Figure 8. Groundwater Elevation Hydrographs for Selected Monitoring Wells in 400-Foot Aquifer

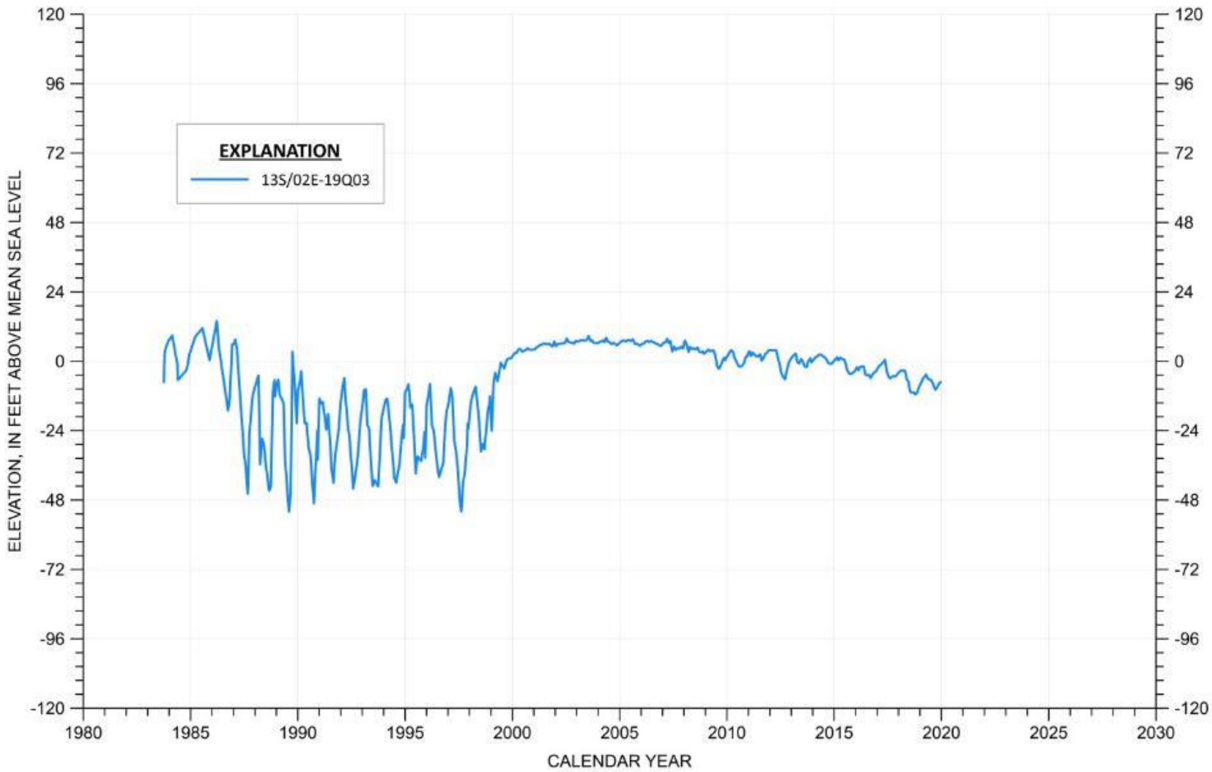


Figure 9. Groundwater Elevation Hydrograph for Selected Monitoring Well in Deep Aquifers

3.2 Water Supply and Use

Within the Subbasin, water is used for agricultural, urban, industrial use, and wetlands and native vegetation. Most of the water in the Subbasin is used for agriculture. Only a relatively small amount of water is used by wetlands and native vegetation.

The water supply in the 180/400-Foot Aquifer Subbasin is a combination of groundwater, surface water, and recycled water. Groundwater is the main water source in the Subbasin. The Salinas River and its tributaries provide limited surface water. The Castroville Seawater Intrusion Project (CSIP) delivers a combination of groundwater, surface water, and recycled water from Monterey One Water to the coastal farmland surrounding Castroville. A small amount of recycled water is also used to irrigate horse pastures in California American Water Company's Salinas Hills Water System.

3.2.1 Groundwater Extraction

Urban and agricultural groundwater extractions are compiled using MCWRA's Groundwater Extraction Management System (GEMS), which collects data from groundwater wells with an internal discharge pipe diameter greater than 3 inches within Zones 2, 2A, and 2B.

Table 2 presents groundwater extractions by water use sector in the 180/400-Foot Aquifer Subbasin, including the method of measurement and accuracy of measurement. Urban use data from MCWRA aggregates municipal wells, small public water systems, and industrial wells. Agricultural use accounted for 89% of groundwater extraction in 2019; urban and industrial use accounted for 11%. It is important to note that the reporting year varies according to user: agricultural pumping is reported to MCWRA for the period November 1 through October 31, whereas urban pumping is reported to MCWRA on a calendar year basis. Domestic pumping, including water systems small enough to not require reporting to the State Water Resources Control Board (SWRCB), is estimated by multiplying the estimated number of domestic users by a water use factor. The initial water use factor will be 0.39 AF/yr. per dwelling unit. Rural domestic pumping is estimated on a calendar year basis. No groundwater was extracted for managed wetlands or managed recharge. Groundwater use by natural vegetation is assumed to be small and was not estimated for this report. The total reported groundwater extraction in reporting year 2019 was 117,800 acre-feet per year (AF/yr.) in the Subbasin. This total is for the 180/400-Foot Aquifer Subbasin not the MCWRA Pressure Subarea; therefore, the pumping total is not identical to what MCWRA publishes in their annual Groundwater Extraction Summary Reports. Figure 10 illustrates the general location and volume of groundwater extractions in the Subbasin.

Table 2. 2019 Groundwater Extraction by Water Use Sector

<table>
<tr><th>Water Use Sector</th><th>Groundwater Extraction (AF/yr.)</th><th>Method of Measurement</th><th>Accuracy of Measurement</th></tr>
<tr><td>Rural Domestic Wells</td><td>200</td><td>Multiply estimated number of domestic users by 0.39 AF/yr.</td><td>Other estimates have ranged as high as 0.75 AF/yr.</td></tr>
<tr><td>Urban</td><td>12,500</td><td rowspan="2">MCWRA's Groundwater Reporting Program allows three different reporting methods: water flowmeter, electrical meter, or hour meter. For 2019, 82% of extractions were calculated using a flowmeter, 17% electrical meter and 1%hour meter.</td><td rowspan="2">MCWRA ordinances 3717 and 3718 require annual flowmeter calibration, and that flowmeters be accurate to within +/- 5%. The same ordinance requires annual pump efficiency tests. SVBGSA assumes an electrical meter accuracy of +/- 5%.</td></tr>
<tr><td>Agricultural</td><td>105,200</td></tr>
<tr><td>Managed Wetlands</td><td>0</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Managed Recharge</td><td>0</td><td>N/A</td><td>N/A</td></tr>
<tr><td>Natural Vegetation</td><td>0</td><td>De-minimis and not estimated. Will be refined when SVIHM becomes available</td><td>Unknown</td></tr>
<tr><td>TOTAL</td><td>117,800</td><td></td><td></td></tr>
</table>

Note: Agricultural pumping is reported on a water-year basis whereas urban is reported in calendar-year basis. Rural domestic pumping is estimated on a calendar year basis. N/A = Not Applicable.

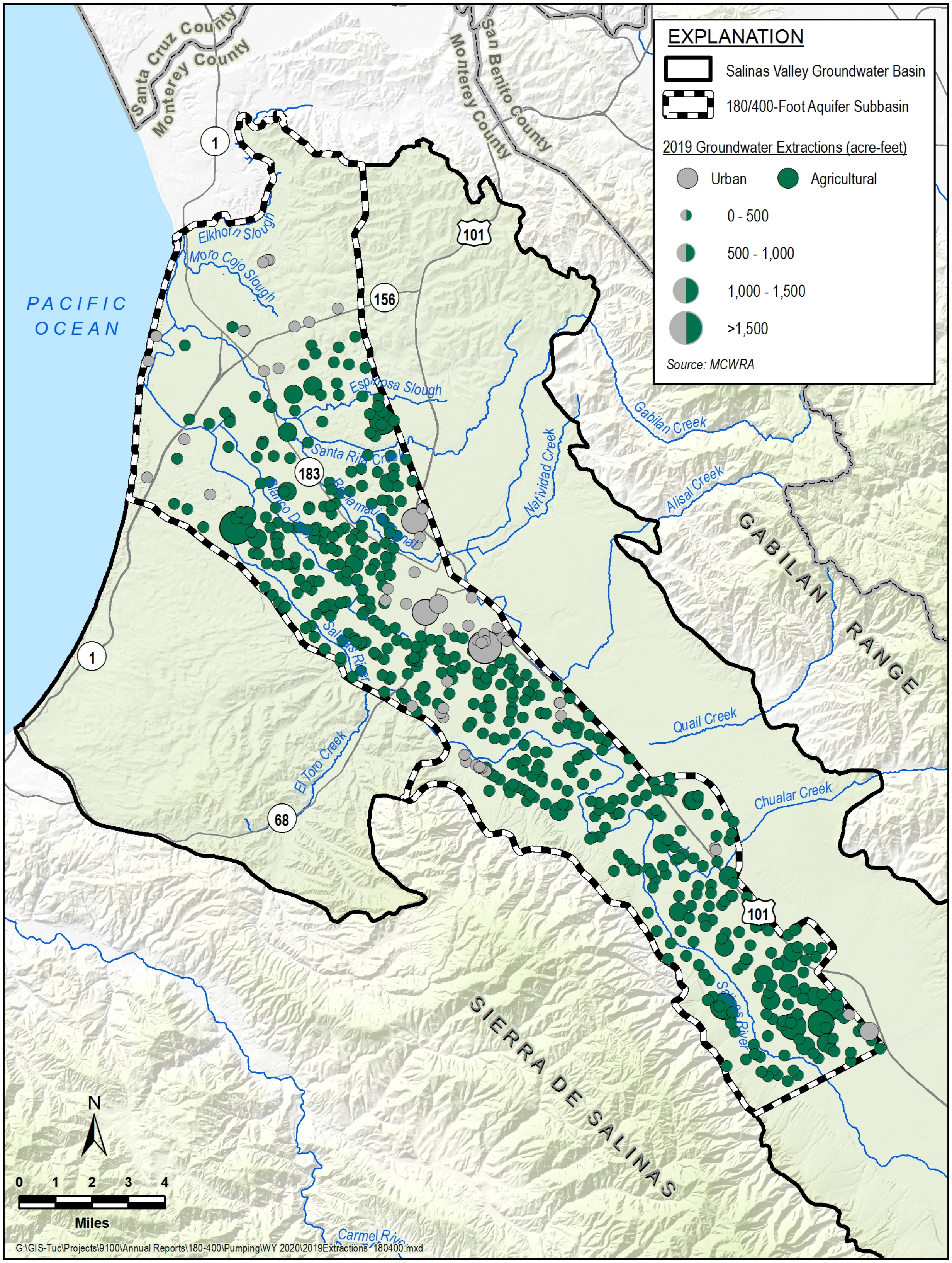


Figure 10. General Location and Volume of Groundwater Extractions

3.2.2 Surface Water Supply

Salinas River diversion data were obtained from the State of California's Electronic Water Rights Information Management System (eWRIMS) website. The data are reported annually and include diversions from the Salinas River and its tributaries. Surface water diversions reported to eWRIMS were approximately 7,400 AF/yr in WY 2019. All of these diversions were reported as a Statement of Diversion and Use. These diversions do not include the diversions at the Salinas River Diversion Facility (SRDF). All diverted surface water is used for irrigation.

3.2.3 Recycled Water Supply

In addition to groundwater and surface water, a third water source type in the 180/400-Foot Aquifer Subbasin is recycled water. Monterey One Water treats and delivers recycled water to the coastal farmland surrounding Castroville through the CSIP system. CSIP deliveries are summarized in Table 3.

Table 3. CSIP Water Deliveries

	2019 (AF/yr.)
CSIP Wells	3,200
SRDF-River	7,600
SVRP-Recycled	8,500
Total	**19,300**

Note: CSIP water deliveries are reported on a Water Year basis.

3.2.4 Total Water Use

Total water use is the sum of groundwater extractions, surface water use, and recycled water use. Total water use is summarized in Table 4.

Many growers and residents have noted that some irrigation is reported both to the SWRCB as Salinas River diversions and to the MCWRA as groundwater pumping. To avoid double counting, all surface water reported as a Statement of Diversion and Use is excluded from the total water use count for the Subbasin. Therefore, in WY 2019, the total surface water use for the Subbasin, which is inclusive of the diversions made at SRDF and diversions reported to eWRIMS, is adjusted from 15,000 to 7,600 AF/yr. In other words, the total surface water use includes only the SRDF river diversions in WY 2019. It is possible that not all of the surface water diversions excluded are being reported to both SWRCB and MCWRA, in which case total water use may be up to that amount greater than calculated here. This accounting is done to calculate the total water use and is not meant to imply that SVBGSA classifies any or all the reported diversions as groundwater. SVBGSA will continue to work with stakeholders to refine the method used to resolve double counting.

Total water use was 133,900 AF/yr in WY 2019, as shown in Table 4.

Table 4. Total Water Use by Water Use Sector in 2019 (AF/yr.)

Water Use Sector	Groundwater Extraction	Surface Water Use	Recycled Water	Method of Measurement	Accuracy of Measurement
Rural Domestic	200	0	0	Estimated	N/A
Urban	12,500	0	0	Direct, Estimated	Estimated to be +/- 5%.
Agricultural	105,100	7,600	8,500	Direct	Estimated to be +/- 5%.
Managed Wetlands	0	0	0	N/A	N/A
Managed Recharge	0	0	0	N/A	N/A
Natural Vegetation	Unknown	Unknown	Unknown	N/A	N/A
SUBTOTALS	117,800	7,600	8,500		
TOTAL	**133,900**				

Note: Agricultural pumping is reported on a Water Year basis whereas urban is reported in calendar-year basis. To avoid double counting with groundwater pumping reported to MCWRA, Statement of Diversion and Use surface water diversions reported in Section 3.2.2 are subtracted from the total water use. N/A = Not Applicable.

3.3 Seawater Intrusion

MCWRA prepares contours of seawater intrusion every two years. The extent of seawater intrusion is based on the 500 milligram per liter (mg/L) chloride isocontour. Figure 11 and Figure 12 show the seawater intrusion contours for the 180-Foot and 400-Foot Aquifers, respectively. The 2019 contours on these figures show incremental change from the previous 2017 contours. This indicates that seawater intrusion is still occurring, but the front is moving at a much slower rate than in previous years. An important exception is the isolated patches of seawater intrusion in the 400-Foot Aquifer. The middle patch, which expanded the most from 2017 to 2019, is associated with a leaky well that connects the 180-Foot and 400-Foot Aquifers. This well was destroyed in November 2019. The northern most patch also developed as a result of a collapsed well. MCWRA plans to destroy this well soon.

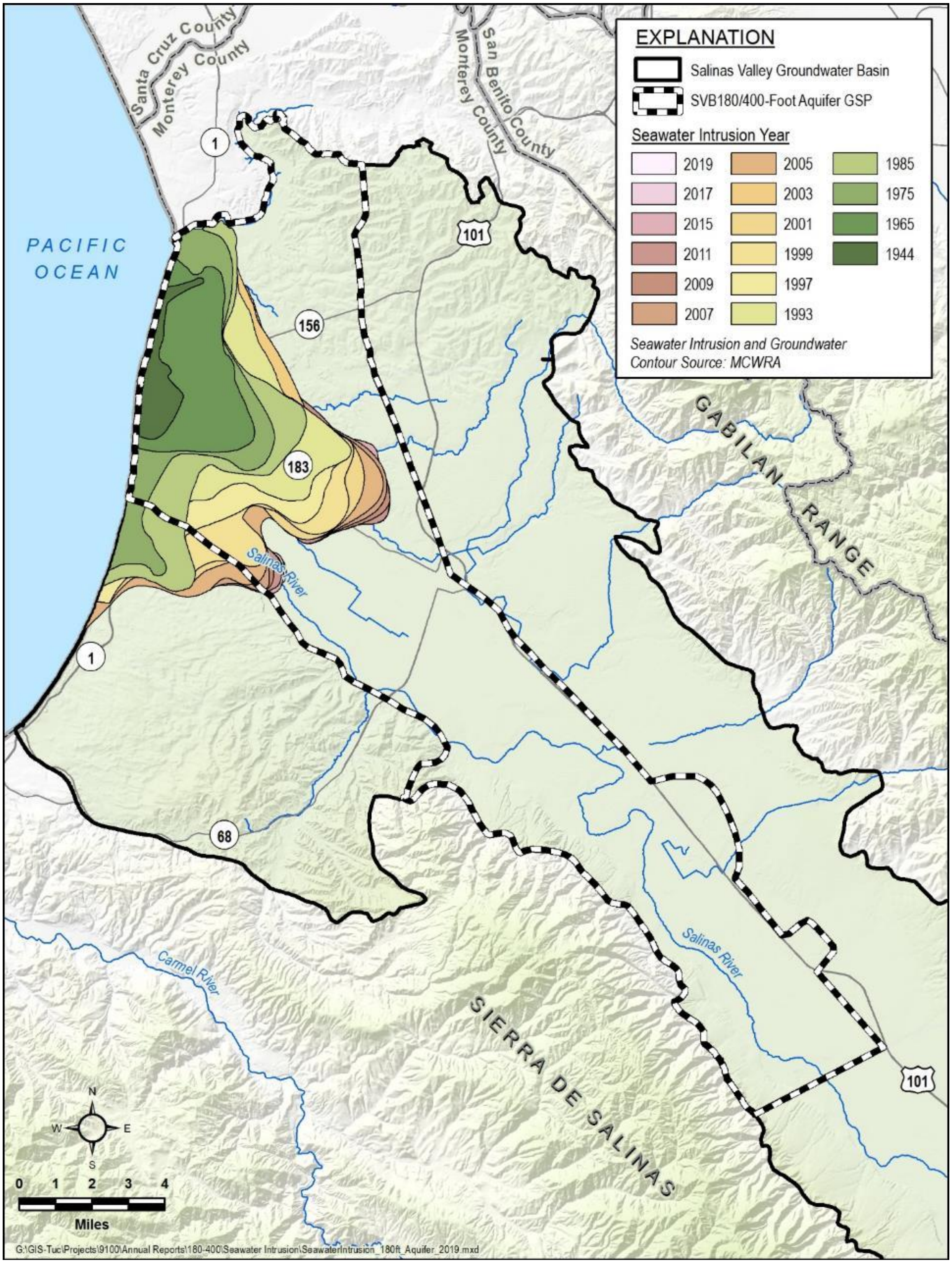


Figure 11. 2019 Seawater Intrusion Contours for the 180-Foot Aquifer

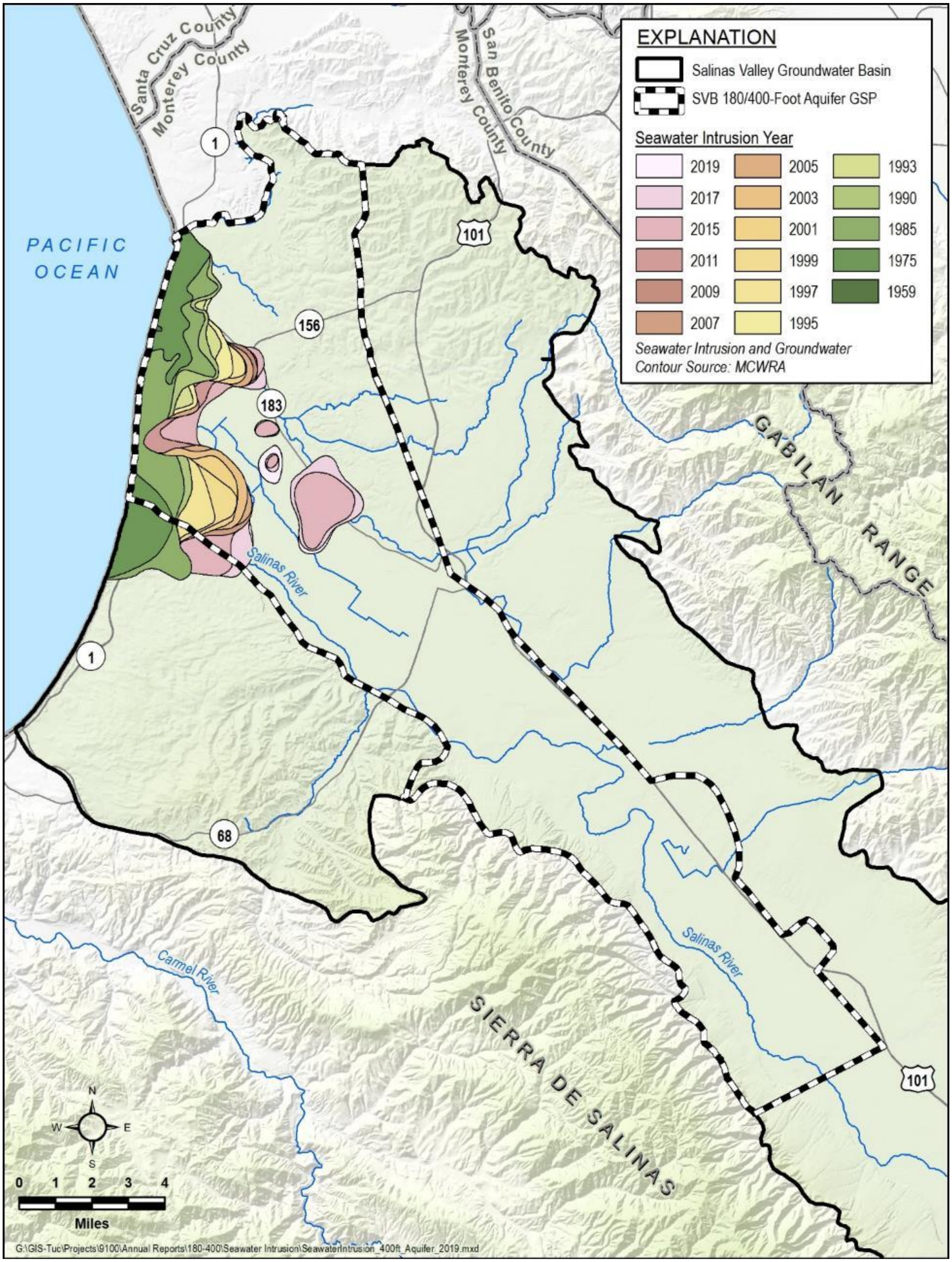


Figure 12. 2019 Seawater Intrusion Contours for the 400-Foot Aquifer

3.4 Change in Groundwater Storage

The Subbasin GSP adopted the concept of change in usable groundwater storage, defined as the annual average increase or decrease in groundwater that can be safely used for municipal, industrial, or agricultural purposes. Change in usable groundwater storage is the sum of change in storage due to groundwater elevation changes and the change in storage due to seawater intrusion.

3.4.1 Change in Groundwater Storage Due to Groundwater Elevation Changes

One component of the change in groundwater storage is calculated from groundwater elevations in the Subbasin. The observed groundwater elevation changes provide a measure of the amount of groundwater that has moved into and out of storage during each year, not accounting for seawater intrusion. The change in storage was calculated by multiplying a change in groundwater elevation by a storage coefficient and the land area of the contoured portion of the subbasin. Average annual changes in groundwater storage due to changes in groundwater elevations in the 180-Foot and 400-Foot Aquifers between 2017 and 2019 are shown on Figures 13 and 14, respectively.

The SVBGSA received groundwater elevation contours from MCWRA for fall 2017 and fall 2019. Contours were only received for the 180-Foot and 400-Foot Aquifers. Insufficient data are available to develop contours for the Deep Aquifers. Therefore, no change in storage is estimated for the Deep Aquifers. This is a data gap and will be addressed during GSP implementation. For evaluating changes in usable groundwater storage, the seawater intrusion area was removed from the total subbasin area for this analysis. Groundwater storage changes due to seawater intrusion are evaluated separately in Section 3.4.2.

Average annual change in groundwater elevation over the two-year period was estimated by subtracting the 2019 groundwater elevations from the 2017 groundwater elevations, and then dividing by two years. MCWRA contours do not extend across the entire subbasin, as shown by the areas without color on Figures 13 and 14. Thus, only the contoured area of the basin is included in this analysis. Furthermore, the extent of seawater intrusion in 2019, as mapped by MCWRA (Figures 11 and 12), was subtracted from the contoured area to estimate the change in storage solely due to groundwater elevation changes. The storage coefficient for the 180/400 Foot Aquifer Subbasin was estimated to be 0.04 based on MCWRA's *State of the Basin Report* (Brown and Caldwell, 2015). A summary of parameters used for estimating change in groundwater storage due to groundwater elevation changes is shown in Table 5.

Table 5. Parameters Used for Estimating Change in Groundwater Storage Due to Groundwater Elevation Changes

Parameter	180-Foot Aquifer	400-Foot Aquifer
Area of Contoured Portion of Subbasin minus Seawater Intrusion Area (acres)	53,570	59,430
Storage Coefficient	0.04	0.04
Average Change in Groundwater Elevation Since 2017 (feet)	0.15	-0.72
Change in Groundwater Storage Since 2017 (AF)	320	-1710
Average Annual Change in Groundwater Storage Since 2017 (AF)	160	-855
Total Average Annual Change in Groundwater Storage	-695	

Note: Negative values indicate loss, positive values indicate gain.

Average annual groundwater storage change due to changes in groundwater elevation since 2017 was +160 AF/yr. in the 180-Foot Aquifer and -855 AF/yr. in the 400-Foot Aquifer. Positive change value indicates gain in storage, while negative change value indicates loss in storage. The average annual change in storage due to groundwater elevation fluctuations during the current period is a change (loss) of approximately -695 AF/yr.

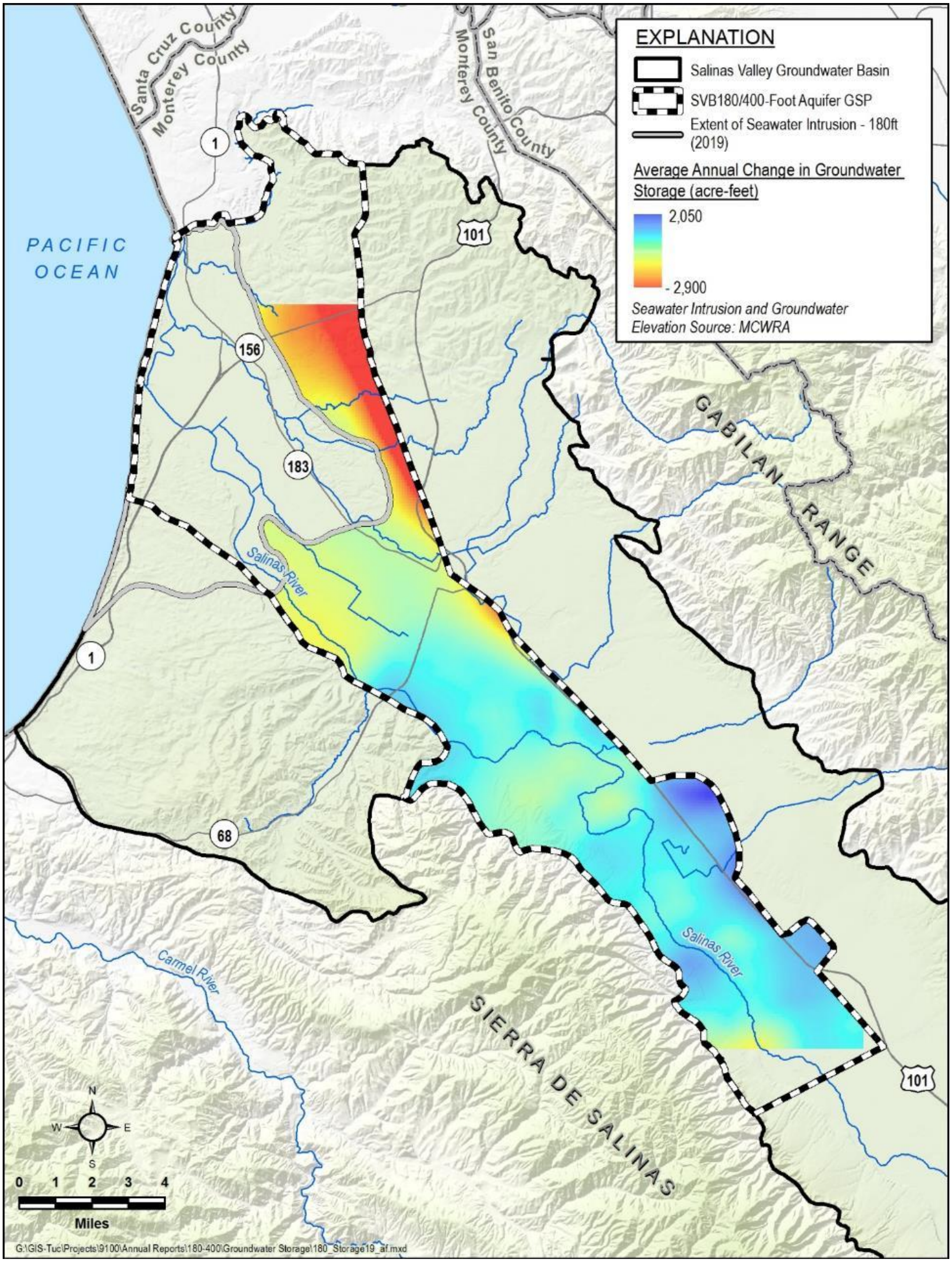


Figure 13. Average Annual Change in Groundwater Storage Between 2017 and 2019 in the 180-Foot Aquifer

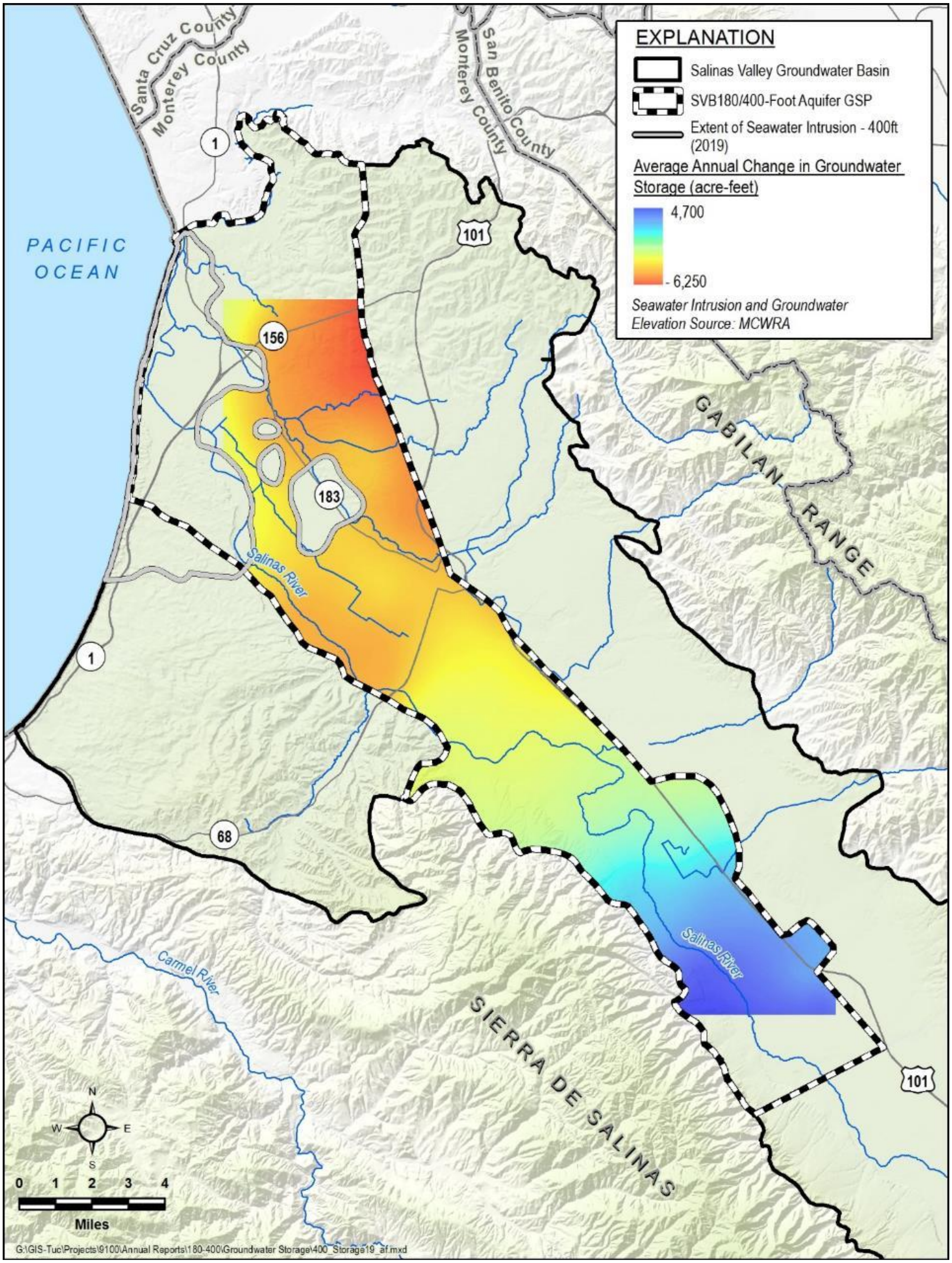


Figure 14. Average Annual Change in Groundwater Storage Between 2017 and 2019 in the 400-Foot Aquifer

3.4.2 Change in Groundwater Storage due to Seawater Intrusion

Groundwater storage losses due to seawater intrusion were estimated based on the change in seawater intrusion area since 2017, as mapped by MCWRA. Seawater intrusion is summarized in Section 3.3 of this report. The area of change since 2017 was multiplied by an assumed aquifer thickness and storage coefficient of 0.04 to estimate the average annual loss of groundwater storage due to seawater intrusion. Average aquifer thickness is approximately 150 feet in the 180-Foot Aquifer and 200 feet in the 400-Foot Aquifer, based on descriptions in the GSP. Average annual groundwater storage losses due to seawater intrusion in the 180/400-Foot Aquifer since 2017 are approximately 105 AF/yr. in the 180-Foot Aquifer and 1,300 AF/yr. in the 400-Foot Aquifer. This storage loss is in addition to the change in groundwater storage due to changes in groundwater elevations. A summary of parameters used for estimating change in groundwater storage due to seawater intrusion is shown in Table 6.

Table 6. Parameters Used for Estimating Loss in Groundwater Storage Due to Seawater Intrusion

Component	180-Foot Aquifer	400-Foot Aquifer
Change in seawater intrusion area since 2017 (acres)	35	325
Storage coefficient	0.04	0.04
Approximate aquifer thickness (feet)	150	200
Loss in groundwater storage since 2017 (AF)	210	2,600
Average annual loss of storage (AF/yr.)	105	1,300
Total Average Annual Change in Groundwater Storage	1,405	

Note: Positive change values indicate loss in storage in this table.

3.4.3 Total Change in Groundwater Storage

The total change in groundwater storage is the sum of the changes in groundwater storage due to groundwater elevation changes and seawater intrusion since 2017. The estimated total average annual loss in groundwater storage is summarized in Table 7.

Table 7. Total Average Annual Change in Groundwater Storage

Component	180-Foot Aquifer	400-Foot Aquifer	Subbasin Total
Annual storage loss due to groundwater elevation decrease(AF/yr.)	160	-855	-695
Annual loss due to seawater intrusion (AF/yr.)	-105	-1,300	-1,405
Total annual loss of storage (AF/yr.)	55	-2,155	-2,100

Note: Negative values indicate loss, positive values indicate gain.

Total change in groundwater storage for this reporting year is substantially smaller than the annual changes reported in the GSP.

GSP Regulations also require that annual and cumulative changes in groundwater storage and groundwater use along with water year type data are plotted together, as shown on Figure 15. The annual and cumulative groundwater storage changes included on Figure 15 are based on Subbasin-wide average groundwater elevation changes. This figure includes groundwater extraction from 1995 to 2021, the 1995 to 2016 average historical extraction, and the 2070 projected extraction from Chapter 6 of the GSP[1]. Pumping in 2019 increased very slightly since the previous reporting year, but is slightly lower than the historical average pumping and the projected pumping. The orange line represents cumulative storage change since 1944 (i.e., zero is the amount of groundwater in storage in 1944, and each year the annual change in storage is added to produce the cumulative change in storage). The green line represents the annual change in storage from the previous year. The 1995 annual change in storage value is based on change in storage from 1994. After the wetter conditions in WY 2019, cumulative and annual change in storage increased, as shown by the orange and green lines, respectively.

[1]The average historical and 2070 projected pumping included in Figure 15 are from the updated water budgets included in Chapter 6 of the 2022 GSP Amendment. The extraction data presented on this figure was updated at DWR's request after the 2022 GSP Amendment replaced the original 2020 GSP.

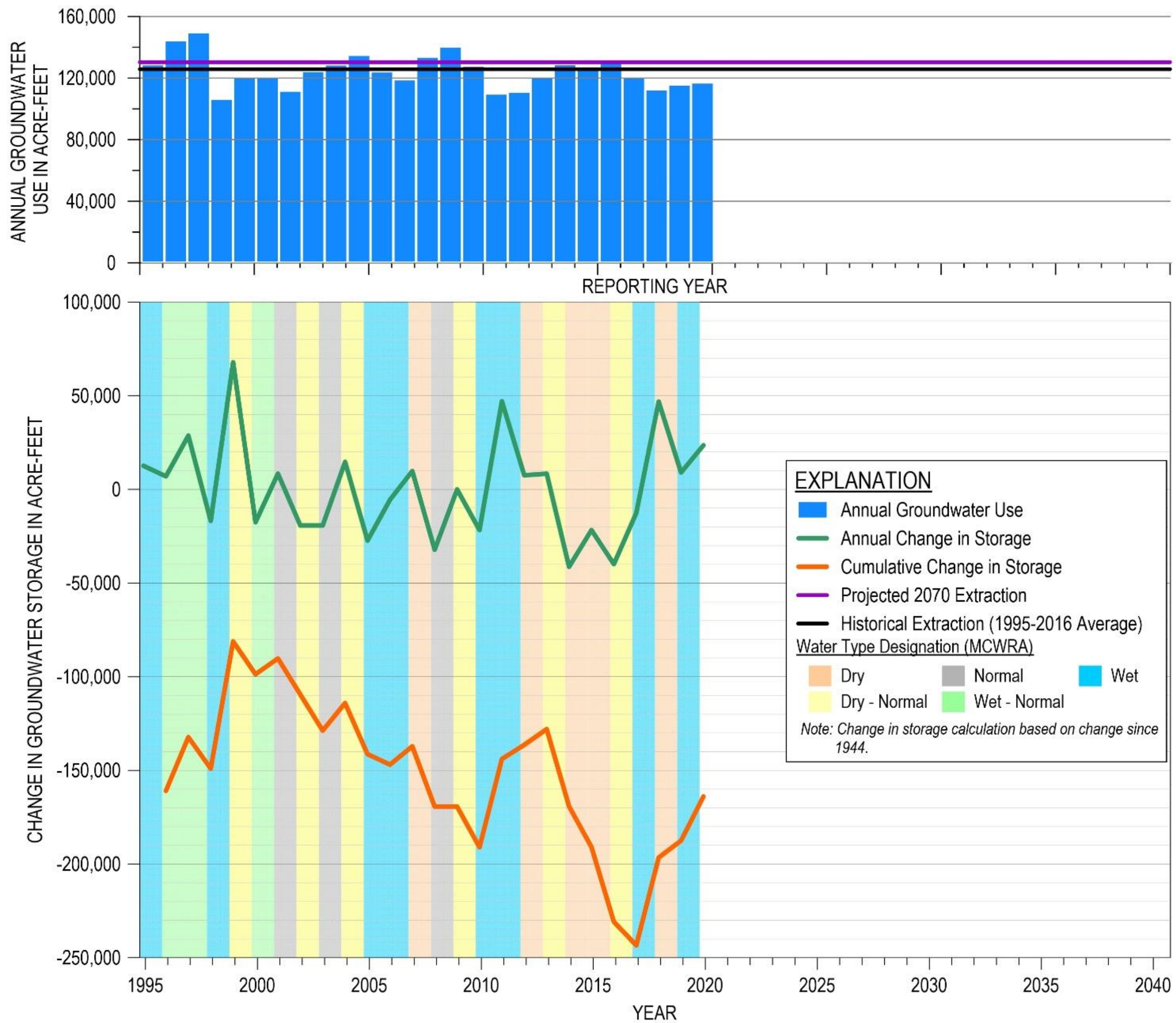


Figure 15. Groundwater Use and Annual and Cumulative Change in Groundwater Storage (historical average pumpnig and projected 2070 pumping are from the 2022 GSP Amendment)

3.5 Groundwater Quality

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. As discussed in the GSP, each set of wells has its own constituents of concern. Table 8 reports the groundwater quality data for wells that reported 2019 groundwater quality. The small systems supply wells will be added when the data gap of well construction information is filled. The table shows the number of wells with MCL exceedances for WY 2019. There are a few constituents that have no exceedances, including cadmium, fluoride, perchlorate, thallium, and boron.

Table 8. WY 2019 Groundwater Quality Data

Constituent of Concern (COC)	Regulatory Exceedance Standard	Standard Units	Number of Wells Sampled for COC in WY 2019	Number of Wells Exceeding Regulatory Standard
MUNICIPAL SUPPLY WELLS UNDER THE CURRENT MONITORING NETWORK				
123-Trichloropropane	0.005	ug/L	39	2
Arsenic	10	ug/L	23	1
Cadmium	5	ug/L	17	0
Chloride	250	mg/L	19	1
Fluoride	2	mg/L	18	0
Iron	300	ug/L	19	2
Manganese	50	ug/L	18	1
MTBE (Methyl tert-butyl ether)	13	ug/L	4	0
Nitrate	10	mg/l	69	5
Perchlorate	6	ug/L	17	0
Thallium	2	ug/L	17	0
Total Dissolved Solids	500	mg/l	18	7
SMALL SYSTEMS SUPPLY WELLS UNDER THE CURRENT MONITORING NETWORK				
Arsenic	0.01	mg/L	*[Unavailable until March 2019]*	
Nitrate	10	mg/l	*[Unavailable until March 2019]*	
ILRP DOMESTIC WELLS UNDER THE CURRENT MONITORING NETWORK				
Chloride	250	mg/L	8	0
Iron	0.3	mg/L	1	0
Manganese	0.05	mg/L	1	0
Nitrate	10	mg/l	21	5
Sulfate	500	mg/l	8	1
TDS	500	mg/l	7	7
ILRP WELLS FOR AGRICULTURAL USE UNDER THE CURRENT MONITORING NETWORK				
Boron	0.75	mg/L	10	0
Chloride	350	mg/L	50	3
Iron	5	mg/L	10	0
Manganese	0.2	mg/L	10	1

3.6 Subsidence

Subsidence is measured using Interferometric Synthetic-Aperture Radar (InSAR) data. These data are provided by DWR on the Sustainable Groundwater Management Act (SGMA) data viewer portal (DWR, 2020). For this Report, Figure 16 shows the subsidence for the 180/400-Foot Aquifer Subbasin in 2018. Data continues to show negligible subsidence. All land movement was within the estimated error of measurement of +/- 0.1 foot.

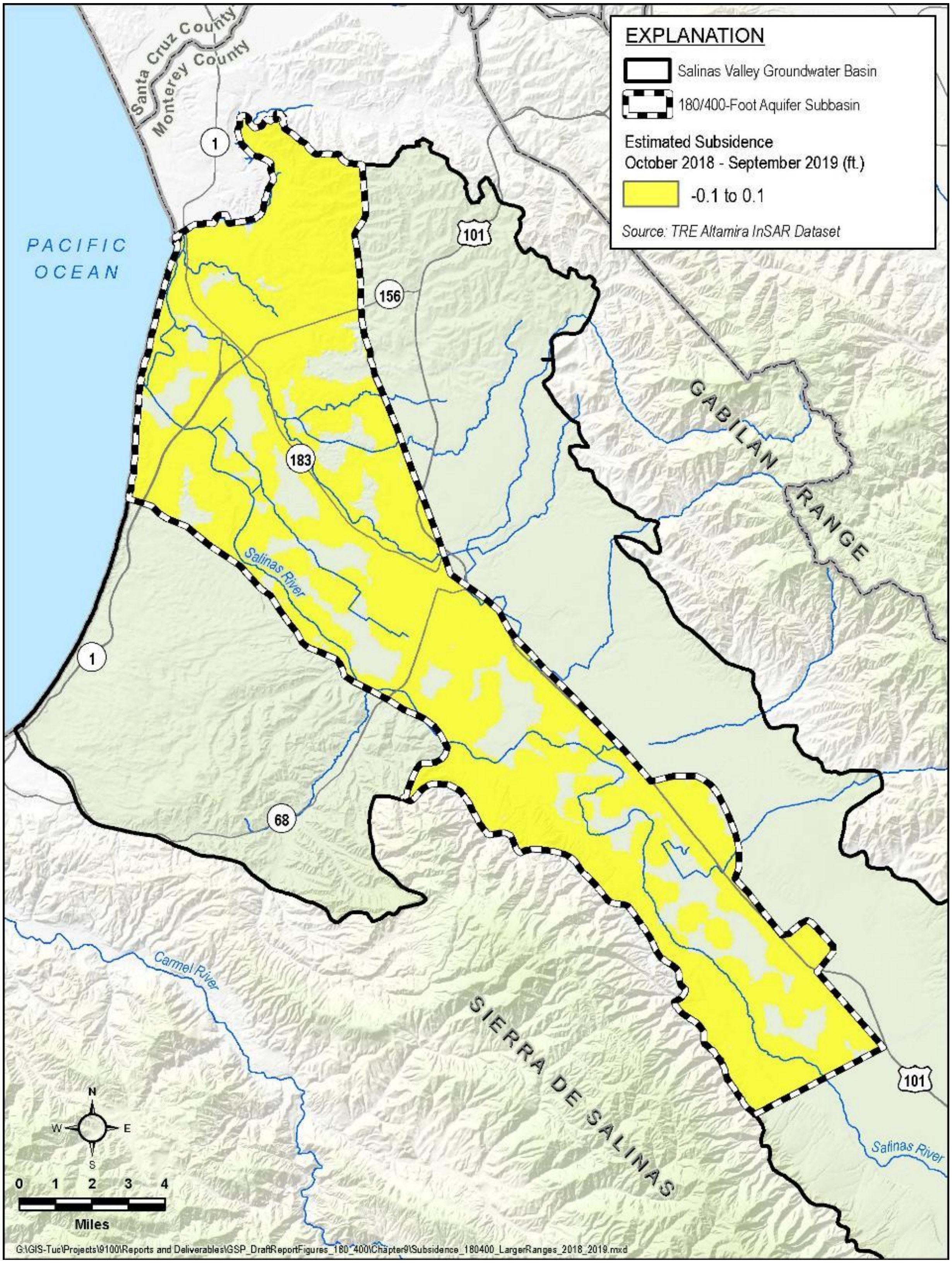


Figure 16. Subsidence from October 2018 to September 2019

3.7 Depletion of Interconnected Surface Water

Depletion of interconnected surface waters was estimated in the GSP; however, there is very little monitoring data in the shallow sediments, and the level of interconnection to the 180/400-Foot Aquifer is unclear. When the SVIHM becomes available, it will be updated regularly to estimate the depletion of interconnected surface water. Additionally, the SVBGSA plans to install two shallow wells along the Salinas River in the 180/400-Foot Aquifer Subbasin to provide a proxy for measuring the depletion of interconnected surface water. Until these tools become available, annual estimates of surface water depletion are considered unreliable.

4 ANNUAL PROGRESS TOWARDS IMPLEMENTATION OF THE GSP

4.1 WY 2019 Groundwater Management Activities

This section details groundwater management activities that have occurred in 2019, independent of GSP implementation. Although not directly related to GSP implementation, these activities promote groundwater sustainability and are important for reaching the GSP sustainability goal.

4.1.1 Monterey County Ordinance 5303

As noted in the GSP, MCWRA staff published a *Recommendations Report to Address the Expansion of Seawater Intrusion in the Salinas Valley Groundwater Basin* (MCWRA, 2017). The report outlined six recommendations aimed at halting seawater intrusion. This report resulted in Monterey County Ordinance 5302. This ordinance was set to expire on July 5, 2018; however, Monterey County Ordinance 5303 extended interim Ordinance 5302 until May 21, 2020.

MCWRA Staff is currently working on updating the 2017 Recommendations Report based on the MCWRA's most recent information and data analysis. The updated report will also evaluate the effectiveness of Ordinance 5303 towards the original recommendations proposed by MCWRA to halt seawater intrusion. Once completed, the updated report will be brought to the MCWRA Basin Management Advisory Committee, MCWRA Board of Directors, and Monterey County Board of Supervisors.

4.1.2 Drought TAC Formation

The MCWRA is forming a new technical advisory committee (TAC) to develop standards and guiding principles for managing the operations of Nacimiento and San Antonio reservoirs during multi-year drought periods. The TAC is open to all interested stakeholders but is limited in attendance to third-party experts with expertise in hydrology, hydrogeology, hydrological modeling, civil engineering or fisheries biology. Interested parties must retain and pay for an expert to serve on the TAC on his/her behalf.

On May 8, 2020, the TAC will meet for the first time to develop standards and guiding principles for drought operations. Thereafter, the TAC will meet any time a drought trigger occurs to develop a recommended release schedule for Nacimiento and San Antonino Reservoirs.

4.1.3 Well Destruction in the Coastal Region

On October 18, 2019, MCWRA received notice from the SWRCB of preliminary approval to fund a project through the Proposition 1 Groundwater Grant Program for the destruction of abandoned wells in the coastal region of the Salinas Valley. The project was conditionally approved for funding with a preliminary grant award of up to $7,348,000 and a project total cost of $9,197,332. The need for this project was identified in the 2017 *Recommendations Report to Address the Expansion of Seawater Intrusion in the Salinas Valley Groundwater Basin*.

4.2 WY 2019 GSP Implementation Activities

The SVBGSA submitted the 180/400-Foot Aquifer Subbasin GSP on January 23, 2020. It has continued to work on implementing the GSP through further stakeholder engagement, developing a Cooperation Agreement with MCGSA, applying for and receiving a DWR Proposition 68 Grant, assessing data gaps, and planning the implementation approach.

4.2.1 Stakeholder Engagement Meetings

The 180/400-Foot Aquifer Subbasin GSP included a list of stakeholder meetings and outreach events through the submittal of the GSP. After that date, and including meetings planned prior to the March 30, 2020 completion of the Annual Report, the SVBGSA held another Advisory Committee meeting and three Board of Directors meetings. During these meetings, the SVBGSA gathered feedback on the process used to develop the 180/400-Foot Aquifer Subbasin GSP to inform its approach moving forward. It also shared a two-year schedule for developing the remaining five Salinas Valley subbasin GSPs, updating the 180/400-Foot Aquifer Subbasin GSP, developing an Integrated Sustainability Plan, and beginning implementation on the 180/400-Foot Aquifer Subbasin GSP, among other efforts. Table 9 lists the meetings held within this timeframe, the member participation, and an estimate of public participation.

Table 9. SVBGSA Stakeholder Engagement Meetings Between January 23 and March 31, 2020

Date	Format	Location	Participation	Purpose
January 30, 2020	Board Meeting	Salinas City Hall	11 Members – 25 Public	Approval of County request to Cover GSA with SVBGSA GSP for 180-400
February 13, 2020	Board Meeting	Salinas City Hall	10 Members – 25 Public	Review of two-year GSP implementation plan 180-400 aquifer
February 20, 2020	Advisory Committee Meeting	Schilling Place	16 Members - 10 Public	Review of two-year GSP implementation plan 180-400 aquifer
March 12, 2020	Board Meeting	Salinas City Hall	11 Members - 30 Public	Budget Approval funding positions and reorganization for implementation of the GSP for 180-400

4.2.2 Seawater Intrusion Working Group.

The SVBGSA is in the process of establishing a Seawater Intrusion Working Group (SWIG). It held numerous meetings with individual stakeholders interested in participating in the development of the SWIG.

4.2.3 Cooperation Agreement with Monterey County Groundwater Sustainability Agency

In January 2020, the SVBGSA worked with the MCGSA to develop a Cooperation Agreement. The Agreement lays out how the two agencies will collaborate on the 180/400-Foot Aquifer Subbasin, including the adoption of the single GSP for the Subbasin. The County Board of Supervisors approved the Agreement on January 28, 2020, and the SVBGSA Board of Directors approved it on January 30, 2020.

4.2.4 SGMA Planning Grant Application

In Fall 2019, the SVBGSA applied for and received the DWR Round 3 SGMA Planning Grant, which includes funding for implementation of the 180/400-Foot Aquifer Subbasin GSP and development of four additional subbasin GSPs. In addition, the SVBGSA was part of the MCWD grant application for the Monterey Subbasin. In January 2020, DWR requested that the SVBGSA revise its grant to include grant activities for the Arroyo Seco Groundwater Sustainability Agency (originally submitted as a separate grant). On February 21, 2020, the SVBGSA submitted the revised grant, which was approved and will fund expansion of monitoring networks and the beginning phase of implementation activities in the 180/400-Foot Aquifer Subbasin.

4.2.5 Filling Data Gaps

The SVBGSA has started to fill data gaps in the 180/400-Foot Aquifer Subbasin. It is in the process of evaluating whether wells exist that could help fill those gaps. To the extent possible, the SVBGSA will use existing wells to expand the network by identifying appropriate wells and developing agreements with well owners.

4.2.6 Two-Year Schedule

The SVBGSA has developed a schedule for its activities over the next two years, including implementation of the 180/400-Foot Aquifer Subbasin GSP. The USGS anticipates releasing the SVIHM in 2020, which will enable the SVBGSA to use it to update the 180/400-Foot Aquifer Subbasin GSP and develop the remaining subbasin GSPs in the Salinas Valley Groundwater Basin. In addition to updating the GSP, the schedule includes SVBGSA stakeholder meetings to develop the water charges framework as a financing mechanism for implementation projects, planning for implementation projects, filling data gaps, and expanding monitoring networks. Additionally, the schedule proposes a strategic dialogue with disadvantaged communities and a working group on seawater intrusion. These two specific efforts will help refine the SVBGSA's implementation approach. With the numerous tasks ahead of the SVBGSA, this schedule will enable it to make progress over the next two years.

4.3 Sustainable Management Criteria

The 180/400-Foot Aquifer Subbasin GSP includes descriptions of significant and unreasonable conditions, minimum thresholds, undesirable results, measurable objectives, and interim milestones for each of DWR's six sustainability indicators. The SVBGSA determined locally defined significant and unreasonable conditions based on public meetings and staff discussions. The SMC are individual criterion that will each be met simultaneously, rather than in an integrated manner. A brief comparison of the data presented in Section 3 and the SMC criteria included for each sustainability indicator in the following sections.

4.3.1 Chronic Lowering of Groundwater Levels SMC

4.3.1.1 Minimum Thresholds

Section 8.6.2.1 of the 180/400-Foot Aquifer Subbasin GSP describes the information and methodology used to establish minimum thresholds for chronic lowering of groundwater levels. In the 180/400-Foot Aquifer Subbasin, the minimum threshold was set to 1-foot above 2015 groundwater elevations. The minimum threshold values for each well within the groundwater elevation monitoring network are provided in Table 10. Groundwater elevation data are color-coded on this table: red cells mean the groundwater elevation is below the minimum threshold, yellow cells mean the groundwater elevation is above the minimum threshold but below the measurable objective, green cells mean the groundwater elevation is above the measurable objective.

Table 10. Groundwater Elevation Data, Minimum Thresholds, and Measurable Objectives

Below minimum threshold		Above minimum threshold			Above measurable objective	
Monitoring Site	**Aquifer**	**Minimum Threshold (elevation in feet)**	**WY 2018 elevation data**	**WY 2019 elevation data**	**Interim Milestone at Year 2025 (elevation in feet)**	**Measurable Objective (elevation in feet) (goal to reach at 2040)**
13S/02E-21Q01	180-ft Aquifer	3	6.4	7	6.7	8
14S/02E-03F04	180-ft Aquifer	-12	-11.4	-10.3	-6.4	-7.1
14S/02E-12B02	180-ft Aquifer	-19	-14.8	-13.7	-9.2	-11.9
14S/02E-26H01	180-ft Aquifer	-25	-20.1	-19.6	-13.4	-18
14S/02E-27A01	180-ft Aquifer	-18.7	-16.5	-15.4	-9.9	-10.7
14S/03E-18C01	180-ft Aquifer	5	7.8	9.4	11.4	10
14S/03E-30G08	180-ft Aquifer	-29	-25.4	-24.7	-13.1	-3.5
15S/03E-16M01	180-ft Aquifer	-16	-20.5	-6.7	-10.3	-4.1
15S/03E-17M01	180-ft Aquifer	-17.2	-8.8	-7.8	-9.2	2.9
16S/04E-15D01	180-ft Aquifer	26	42.2	47	46	55
17S/05E-06C02	180-ft Aquifer	73.5	80.6	83.8	82.6	94.1
13S/02E-21N01	400-ft Aquifer	-15	-12	-12.9	-12.7	-7.6
13S/02E-32A02	400-ft Aquifer	-9.9	-5.7	-5.2	-6.2	-5
14S/02E-03F03	400-ft Aquifer	-40	-24.8	-36.7	-15.1	-19.4
14S/02E-08M02	400-ft Aquifer	-12	-9.2	-10.9	-10.5	-5.9
14S/02E-12B03	400-ft Aquifer	-54	-46.4	-57.4	-33	-43
14S/02E-12Q01	400-ft Aquifer	-26.3	-21.1	-18.3	-21.9	-13.5
14S/03E-18C02	400-ft Aquifer	-38	-35.1	-33.7	-18.5	-17.4
15S/03E-16F02	400-ft Aquifer	-20	-10.9	-8.6	-12.1	1.2
16S/04E-08H03	400-ft Aquifer	19	35.9	42.2	40.9	48
13S/02E-19Q03	Deep Aquifers	-10	-11.5	-9.3	-6.9	5

4.3.1.2 Undesirable Result

The chronic lowering of groundwater levels undesirable result is a quantitative combination of groundwater elevation minimum threshold exceedances. For the Subbasin, the groundwater elevation undesirable result is:

> *Over the course of any one year, no more than 15% of the groundwater elevation minimum thresholds shall be exceeded in any single aquifer. Additionally, the minimum threshold in any one well shall not be exceeded for more than two sequential years.*

Based on the data in Table 10, the percentage of groundwater elevation minimum threshold exceedances for each aquifer in WY 2019 are tabulated in Table 11. This table shows that currently, the groundwater elevations do not exceed the 20-year planning horizon undesirable result. Groundwater elevation minimum threshold exceedances, compared with the 2040 undesirable result, is shown on Figure 17. Values in the shaded red area are above the 2040 undesirable result. This graph will be updated annually with new data to demonstrate the sustainability indicator's direction towards sustainability.

Table 11. Groundwater Elevation Measurements Compared to Undesirable Result

Principal Aquifer	Number of GW Elevation Wells	Number of GW Elevation Exceedances	Percentage of GW Elevation Exceedances
180-Foot Aquifer	11	0	0%
400-Foot Aquifer	9	1	11%
Deep Aquifers	1	0	0%

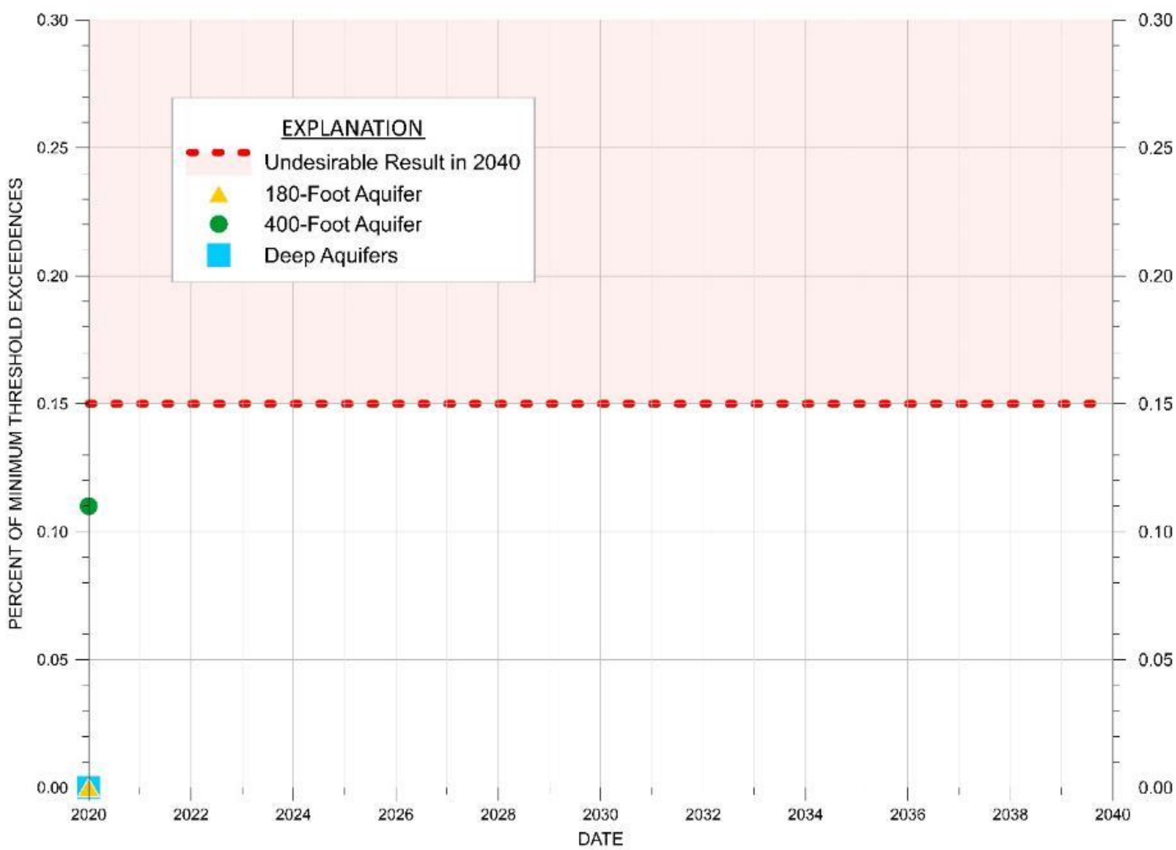


Figure 17. Groundwater Elevation Exceedances Compared to 2040 Undesiralbe Result

4.3.1.3 Measurable Objectives and Interim Milestones

The measurable objectives for chronic lowering of groundwater levels represent target groundwater elevations that are higher than the minimum thresholds. These measurable objectives provide operational flexibility to ensure that the Subbasin can be managed sustainably over a reasonable range of hydrologic variability. Measurable objectives for the chronic lowering of groundwater levels are summarized in Table 10.

To reach measurable objectives, the SVBGSA set interim milestones at five-year intervals. The 2025 interim milestones for groundwater elevations are shown in Table 10. The WY 2019 groundwater elevations in nine wells are already higher than the 2025 interim milestones.

4.3.2 Reduction in Groundwater Storage SMC

4.3.2.1 Minimum Thresholds

In accordance with SGMA regulations, the minimum threshold for reduction of groundwater storage is a total volume of groundwater that can be withdrawn from the subbasin without causing conditions that may lead to undesirable results. Section 8.7.2.1 of the 180/400-Foot Aquifer Subbasin GSP describes the information and methodology used to establish minimum thresholds for reduction in groundwater storage. The future long-term sustainable yield of the Subbasin under reasonable climate change assumptions is 112,000 AF/yr. Therefore, the minimum threshold is set at the long-term future sustainable yield of 112,000 AF/yr. This sustainable yield does not include reductions that may be necessary to reach sustainability. The total groundwater extraction for Reporting Year 2019, without rural domestic pumping, was 117,600 AF and exceeds the minimum threshold by 5,600 AF.

The minimum threshold applies to pumping of natural recharge only. Natural recharge includes items such as recharge from precipitation and percolation of excess irrigation water. Pumping of intentionally recharged water that is not part of the natural recharge is not considered when compared against the minimum threshold.

4.3.2.2 Undesirable Result

The reduction in groundwater storage undesirable result is a quantitative combination of reduction in groundwater storage minimum threshold exceedances. The reduction in groundwater storage undesirable result is:

> *During average hydrogeologic conditions, and as a long-term average over all hydrogeologic conditions, the total groundwater pumping shall not exceed the minimum threshold, which is equivalent to the long-term sustainable yield of the aquifers in the Subbasin.*

Based on the data in Section 3.2, the amount of groundwater pumping in 2019 was 117,600 AF/yr. not including the rural domestic pumping estimate. The 2019 groundwater extractions exceeded the 20-year planning horizon undesirable result. Figure 18 shows groundwater extractions compared to the 2040 change in storage undesirable results goal. Values in the shaded red area are above the 2040 undesirable result. This graph will be updated annually with new data to demonstrate the sustainability indicator's direction towards sustainability.

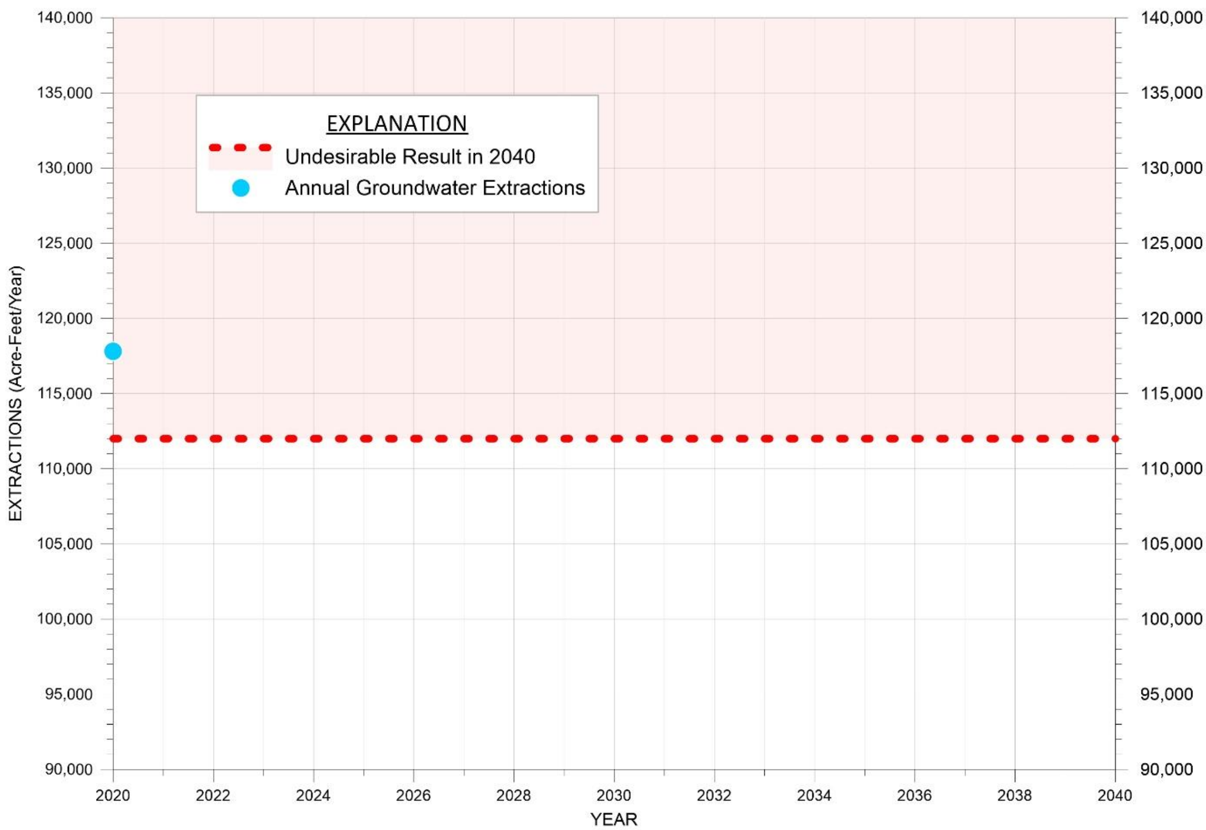


Figure 18. Groundwater Extraction Compared to the Groundwater Storage 2040 Undesirable Result

4.3.2.3 Measurable Objective and Interim Milestones

The measurable objective for reduction in groundwater storage is the same as the minimum threshold, set at the long-term future sustainable yield of 112,000 AF/yr. for the entire 180/400-Foot Aquifer Subbasin. The reduction in storage 2025 interim milestone is set to 112,000 AF/yr. During WY 2019, 117,600 AF were withdrawn from the Subbasin, exceeding the 2025 interim milestone by 5,600 acre-feet.

4.3.3 Seawater Intrusion SMC

4.3.3.1 Minimum Thresholds

The minimum threshold for seawater intrusion is defined by a chloride concentration isocontour of 500 mg/L for each principal aquifer where seawater intrusion may lead to undesirable results. Section 8.8.2.1 of the 180/400-Foot Aquifer Subbasin GSP describes the information and methodology used to establish minimum thresholds for chronic seawater intrusion. In the 180/400-Foot Aquifer Subbasin, the 2017 extent of the 500 mg/L chloride concentration isocontour as mapped by MCWRA is adopted as the seawater intrusion minimum threshold for both the 180- and 400-Foot Aquifers. The line defined by Highway 1 is adopted as the seawater intrusion minimum threshold for the Deep Aquifers, as shown on Figure 19 and Figure 20.

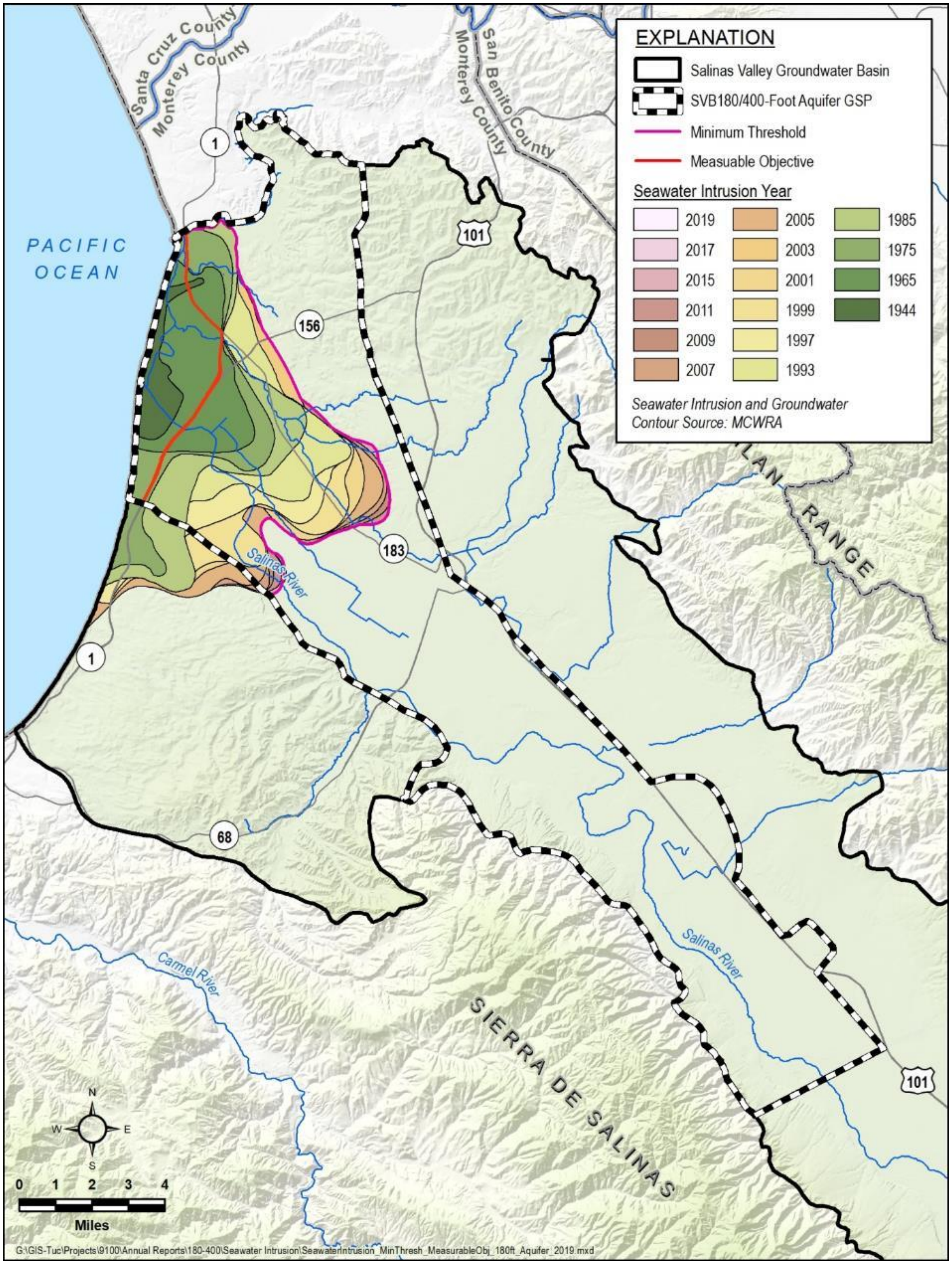


Figure 19. Seawater Intrusion Compared to the Seawater Intrusion Minimum Threshold, 2040 Undesirable Result, and Measurable Objective for the 180-Foot Aquifer

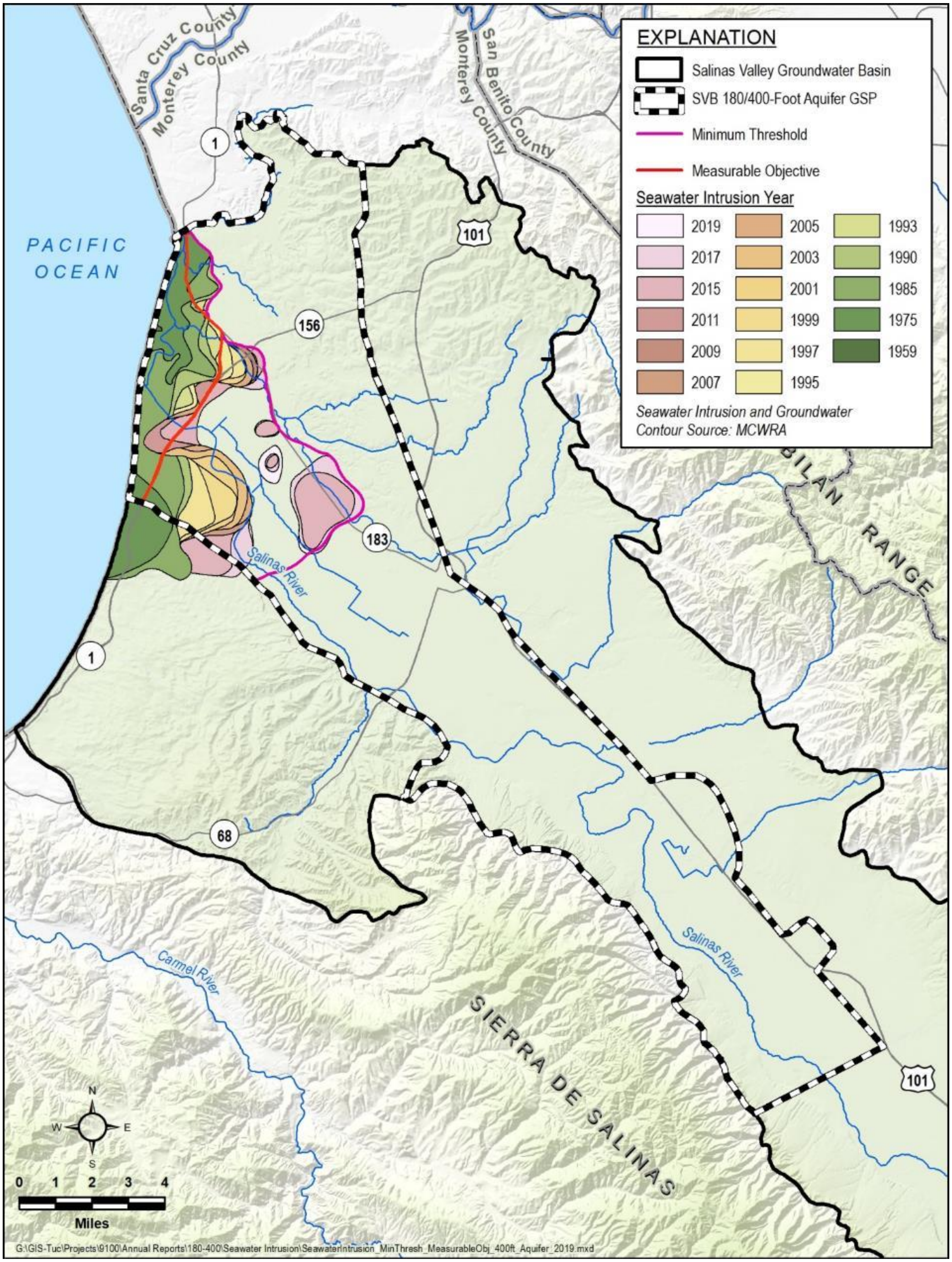


Figure 20. Seawater Intrusion Compared to the Minimum Threshold, 2040 Undesirable Result, and Measurable Objective for the 400-Foot Aquifer

4.3.3.2 Undesirable Result

The seawater intrusion undesirable result is a quantitative combination of chloride concentrations minimum threshold exceedances. There is only one minimum threshold for each of the three aquifers. Because even localized seawater intrusion is not acceptable, the basin-wide undesirable result is zero exceedances of minimum thresholds. For the Subbasin, the seawater intrusion undesirable result is:

> *On average in any one year there shall be no exceedances of any minimum threshold.*

Figure 19 and Figure 20 show that the 2019 extent of seawater intrusion in the 180-Foot Aquifer and 400-Foot Aquifer exceeded the 2017 extents, and therefore exceeded the undesirable results. However, the extent of seawater intrusion increased only slightly, and the rate was lower than in previous years. Insufficient data are available to map the extent of seawater intrusion in the Deep Aquifers. This is a data gap that the SVBGSA will address during GSP implementation.

4.3.3.3 Measurable Objectives and Interim Milestones

The measurable objective for the seawater intrusion SMC is to move the 500 mg/L chloride isocontour to the line defined by Highway 1. To reach measurable objectives, the SVBGSA set interim milestones at five-year intervals. The interim milestones for seawater intrusion are:

- 5-Year: identical to current conditions
- 10-year: one-third of the way to the measurable objective
- 15-year: two-thirds of the way to the measurable objective

Because seawater intrusion in the 180-Foot Aquifer and 400-Foot Aquifer have both moved farther inland in WY 2019, seawater intrusion is not yet progressing towards the interim milestones. However, the slowing rate of intrusion indicates makes it easier to move toward measurable objectives in future years.

4.3.4 Degraded Groundwater Quality SMC

4.3.4.1 Minimum Thresholds

The degraded groundwater quality minimum threshold is based on a number of supply wells monitored in any given year that have higher concentrations of constituents than the levels the SVBGSA has determined to be of concern. Section 8.9.2.1 of the 180/400-Foot Aquifer Subbasin GSP describes the information and methodology used to establish minimum thresholds for degraded groundwater quality. The minimum threshold values for each well within the groundwater quality monitoring network are provided in Table 8.

4.3.4.2 Undesirable Result

The degradation of groundwater quality undesirable result is a quantitative combination of groundwater quality minimum threshold exceedances. Any groundwater quality degradation as a direct result of GSP implementation is unacceptable. Some groundwater quality changes are expected to occur independent of SGMA activities; because these changes are not related to SGMA activities they do not constitute an undesirable result. The degradation of groundwater quality undesirable result is:

> *During any one year, no groundwater quality minimum threshold shall be exceeded when computing annual averages at each well, as a direct result of projects or management actions taken as part of GSP implementation.*

Table 8 shows that the number of groundwater quality exceedances in WY 2019 was not greater than the minimum threshold for any constituent of concern. Therefore, the groundwater quality data do not exceed the 20-year planning horizon undesirable result. The groundwater quality minimum threshold exceedances, compared with the 2040 undesirable results, is shown on Figure 21. Values in the shaded red area are above the 2040 undesirable result. This graph will be updated annually with new data to demonstrate the sustainability indicator's direction towards sustainability.

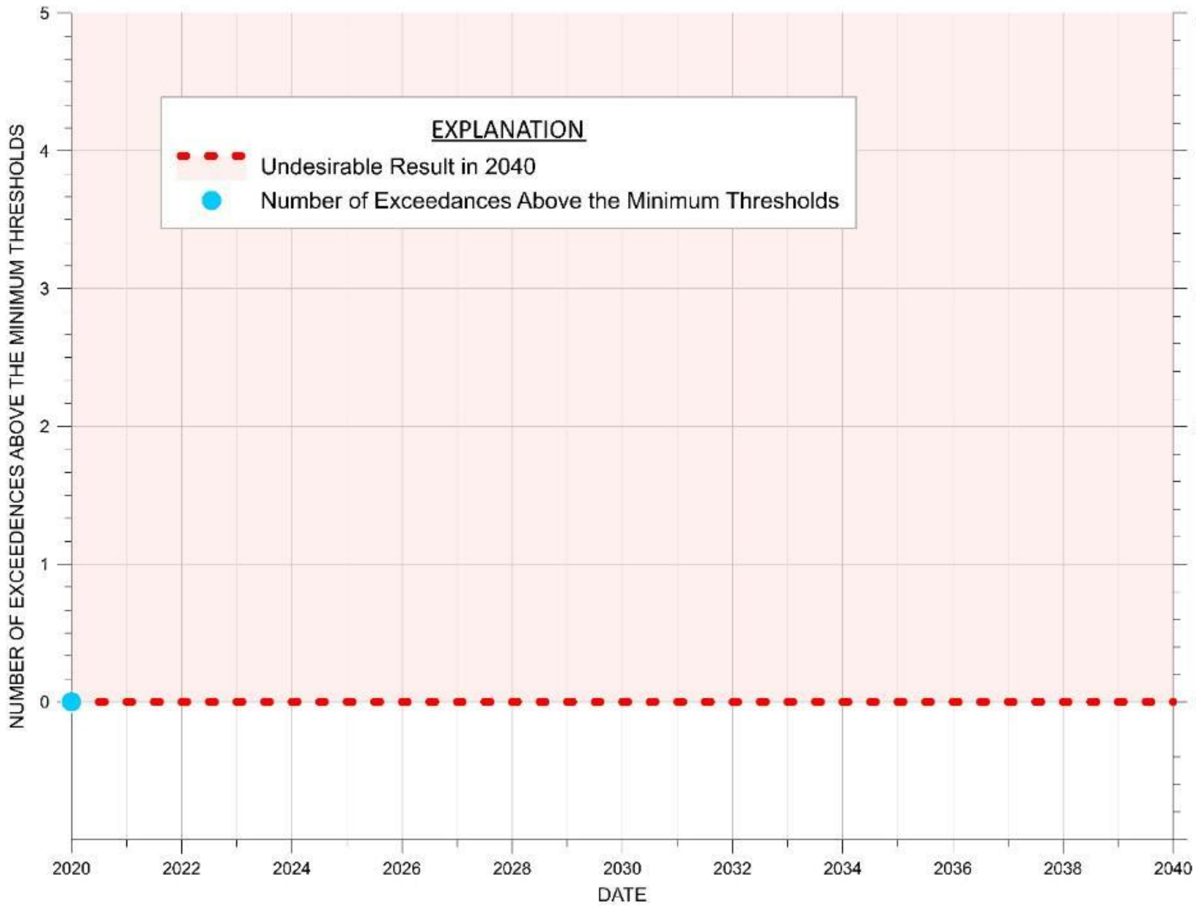


Figure 21. Groundwater Quality Minimum Threshold Exceedences Compared to the 2040 Groundwater Quality Undesirable Result

4.3.4.3 Measurable Objectives and Interim Milestones

The measurable objectives for degradation of groundwater quality represent a target number of groundwater quality exceedances in the Subbasin. SGMA does not mandate the improvement of groundwater quality. Therefore, the SVBGSA has set the measurable objectives identical to the minimum thresholds, as defined in Table 8. Interim milestones are set at the minimum threshold levels. Because there are no groundwater quality minimum threshold exceedances in WY 2019, the groundwater quality data already meet the 2025 interim milestones.

For this 2019 Annual Report, Table 12 reports the groundwater quality data from the groundwater quality monitoring network. The table shows the minimum thresholds, measurable objectives, and number of wells with higher concentrations than MCLs in WY 2019. There are a few constituents that have no exceedances, including cadmium, fluoride, perchlorate, thallium, and boron.

Table 12. Minimum Thresholds and Measureable Objectives for Degradation of Groundwater Quality for Wells Under the Current Monitoring Network

Constituent of Concern (COC)	Regulatory Exceedance Standard	Standard Units	Minimum Threshold/ Measurable Objective - Number of Wells Exceeding Regulatory Standard	Number of Wells Sampled for COC in WY2019	Number of Wells Exceeding Regulatory Standard
MUNICIPAL SUPPLY WELLS UNDER THE CURRENT MONITORING NETWORK					
123-Trichloropropane	0.005	ug/L	2	39	2
Arsenic	10	ug/L	1	23	1
Cadmium	5	ug/L	0	17	0
Chloride	250	mg/L	2	19	1
Fluoride	2	mg/L	0	18	0
Iron	300	ug/L	8	19	2
Manganese	50	ug/L	3	18	1
MTBE (Methyl tert-butyl ether	13	ug/L	1	4	0
Nitrate	10	mg/l	9	69	5
Perchlorate	6	ug/L	0	17	0
Thallium	2	ug/L	0	17	0
Total Dissolved Solids	500	mg/l	18	18	7
SMALL SYSTEMS SUPPLY WELLS UNDER THE CURRENT MONITORING NETWORK					
Arsenic	0.01	mg/L	1		*[Unavailable until March 2019]*
Nitrate	10	mg/l	22		*[Unavailable until March 2019]*
ILRP DOMESTIC WELLS UNDER THE CURRENT MONITORING NETWORK					
Chloride	250	mg/L	29	8	0
Iron	0.3	mg/L	12	1	0
Manganese	0.05	mg/L	4	1	0
Nitrate	10	mg/l	51	21	5
Sulfate	500	mg/l	43	8	1
TDS	500	mg/l	111	7	7
ILRP WELLS FOR AGRICULTURAL USE UNDER THE CURRENT MONITORING NETWORK					
Boron	0.75	mg/L	0	10	0
Chloride	350	mg/L	28	50	3
Iron	5	mg/L	3	10	0
Manganese	0.2	mg/L	2	10	1

4.3.5 Subsidence SMC

4.3.5.1 Minimum Thresholds

Accounting for measurement errors in the InSAR data, the minimum threshold for land subsidence in the GSP was set to 0.1 feet per year in the GSP. Section 8.10.2.1 of the 180/400-Foot Aquifer Subbasin GSP describes the information and methodology used to establish minimum thresholds for subsidence. A single minimum threshold is set for the entire Subbasin.

4.3.5.2 Undesirable Result

The ground surface subsidence undesirable result is a quantitative combination of subsidence minimum threshold exceedances. For the 180/400-Foot Subbasin, no long-term subsidence that impacts infrastructure is acceptable. Therefore, the ground surface subsided undesirable result is:

> *In any one year, there will be zero exceedances of the minimum thresholds for subsidence.*

Based on the data in Section 3.6, the amount of subsidence in 2019 was less than the minimum threshold of 0.1 feet/year. The 2019 land subsidence, therefore, does not exceed the 20-year planning horizon undesirable result. Maximum measured subsidence in the Subbasin, compared with the 2040 change in subsidence undesirable results goal, is shown on Figure 22. Values in the shaded red area are above the 2040 undesirable result.

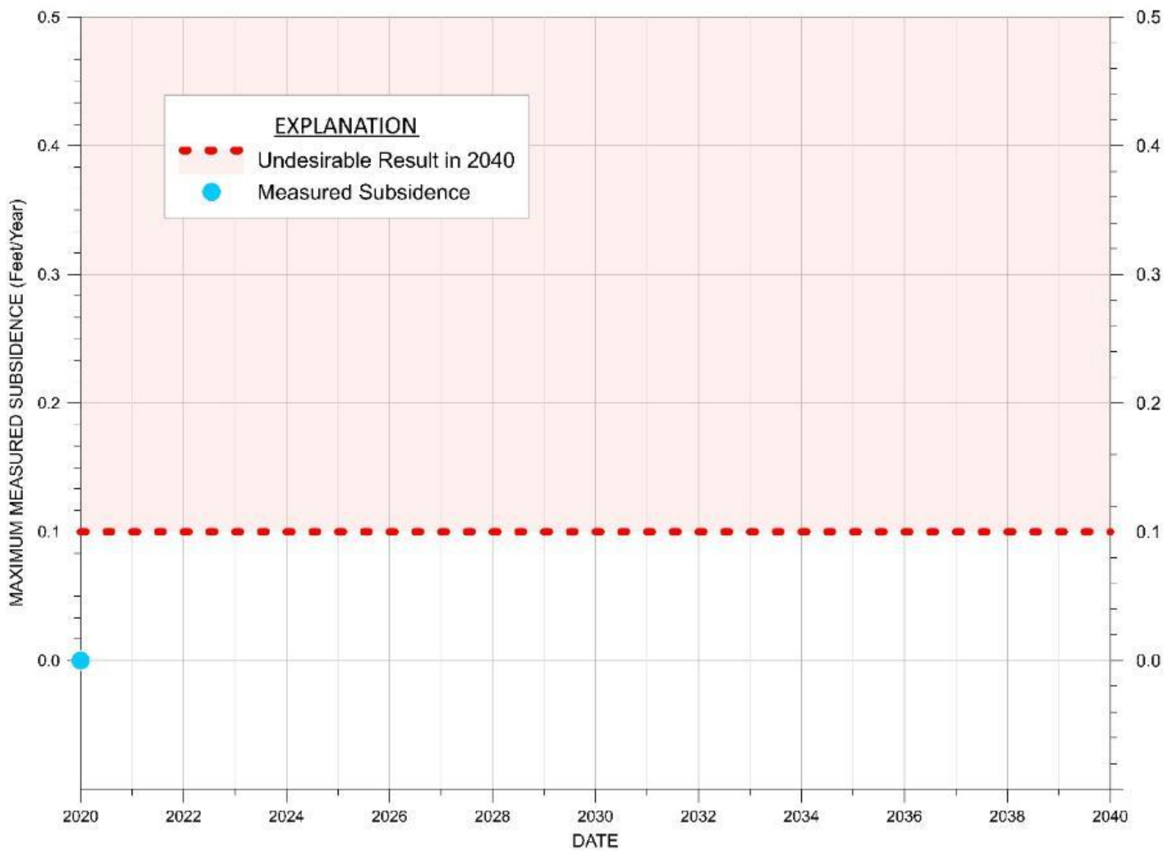


Figure 22. Maximum Measured Subsidence Compared to the Undesirable Result

4.3.5.3 Measurable Objectives and Interim Milestones

The measurable objectives for ground surface subsidence represent target subsidence rates in the Subbasin. Because the minimum thresholds of zero net long-term subsidence are the best achievable outcome, the measurable objectives are identical to the minimum thresholds. The interim milestones are identical to minimum threshold of 0.1 feet/year. The 2019 subsidence data shows that the 2025 subsidence interim milestone is already being met. This graph will be updated annually with new data to demonstrate the sustainability indicator's direction towards sustainability.

4.3.6 Depletion of Interconnected Surface Water SMC

4.3.6.1 Minimum Thresholds

The minimum threshold for depletions of interconnected surface water is 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. Section 8.11.2.1 of the 180/400-Foot Aquifer Subbasin GSP describes the information and methodology used to establish minimum thresholds for chronic lowering of groundwater levels. Minimum thresholds only apply to the interconnected stream reaches.

The estimated average future surface water depletion rate in the 180/400-Foot Aquifer Subbasin is approximately 69,700 AF/yr. This rate is also considered a reasonable estimate of the current surface water depletion. The current rate of stream depletion from pumping is not considered significant and unreasonable. Therefore, the minimum threshold for depletion of interconnected surface water is currently set to the current average rate of 69,700 AF/yr. This estimate will be modified if needed when the GSP is updated, anticipated to be in 2020.

4.3.6.2 Undesirable Result

The depletion of interconnected surface water undesirable result is a quantitative combination of minimum threshold exceedances. There is only one reduction in depletion of interconnected surface water minimum threshold. Therefore, no minimum threshold exceedances are allowed to occur and the reduction in groundwater storage undesirable result is:

> *During average hydrogeologic conditions, and as a long-term average over all hydrogeologic conditions, the depletion of interconnected surface waters shall not exceed the single minimum threshold.*

As stated in Section 3.7, without the SVIHM and shallow groundwater wells, annual estimates of surface water depletion are unreliable. Therefore, there are no reliable data from WY 2019 to compare to the 2040 planning horizon undesirable result.

4.3.6.3 Measurable Objectives and Interim Milestones

The measurable objective for depletion of surface water is the same as the minimum threshold: 69,700 AF/yr. The interim milestones are identical to the minimum threshold of 69,700 AF/yr. As stated in Section 3.7, without the SVIHM and shallow groundwater wells, annual estimates of surface water depletion are unreliable. Therefore, there are no reliable data from WY 2019 to compare to the 2025 interim milestone.

5 CONCLUSION

This 2019 Annual Report updates data and information for the 180/400-Foot Aquifer Subbasin GSP through Water Year 2019 with the best available data. It covers GSP implementation activities from the submittal of the GSP on January 23, 2020, to March 31, 2020. All GSP implementation and annual reporting meets the regulations set forth in the SGMA GSP Regulations.

Results show little change in groundwater sustainability indicators when compared to the current conditions described in the GSP. Water Year 2019 was classified as wet, which likely helped groundwater conditions. Groundwater elevations increased slightly in WY 2019, with most wells showing elevations above their minimum thresholds but still below their measurable objectives. Change in groundwater storage, as measured by pumping, was slightly greater than the minimum threshold. Seawater continued to intrude into the Subbasin, but these intrusion rates slowed in WY 2019 compared to recent years. Groundwater quality data showed no exceedances of minimum thresholds, and no groundwater quality degradation was related to GSP implementation activities. Negligible subsidence was observed in 2019, the most recent date of measurement. Finally, insufficient data exists to estimate depletion of interconnected surface water; however, the SVBGSA plans to fill data gaps during GSP implementation to allow estimates of surface water depletion.

Since GSP submittal, the SVBGSA has continued to actively engage stakeholders and has started planning activities to implement the GSP. The SVBGSA continues to engage stakeholders through its participatory Advisory Committee and Board of Directors. It has also begun efforts to establish the SWIG, and plan for refining and starting projects and management actions to implement the 180/400-Foot Aquifer Subbasin GSP over the next two years.

REFERENCES

Brown and Caldwell. 2015. *State of the Salinas River Groundwater Basin - Hydrology Report*. Monterey County Water Resources Agency Water Reports. http://digitalcommons.csumb.edu/hornbeck_cgb_6_a/21.

Durbin, Timothy J., G.W. Kapple and J.R. Freckleton. 1978. *Two-Dimensional and Three-Dimensional Digital Flow Models of the Salinas Valley Ground-Water Basin, California*. U.S. Geological Survey. Water Resources Investigations Report 78-113. Prepared in cooperation with the U.S. Army Corps of Engineers. 134 p.

DWR (Department of Water Resources). 1973. *Seawater Intrusion Lower Salinas Valley*. Bulletin 118 Interim Update 1973.

———. 2020. SGMA Data Viewer: Land Subsidence. https://sgma.water.ca.gov/webgis/?appid=SGMADataViewer#landsub.

MCWRA (Monterey County Water Resources Agency). 2005. *Salinas Valley Water Project Flow Prescription for Steelhead Trout in the Salinas River.*

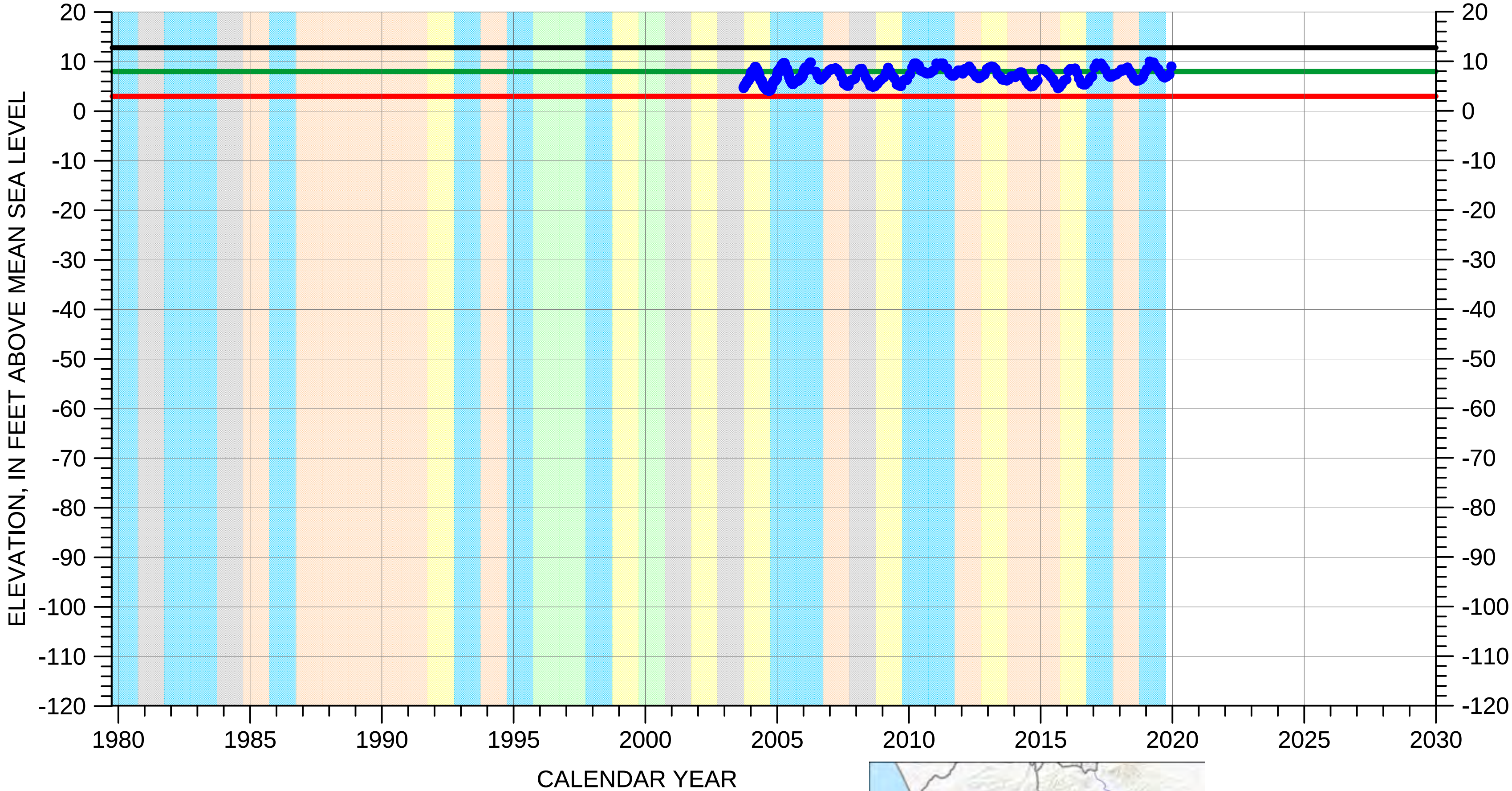
———. 2017. “Recommendations to Address the Expansion of Seawater Intrusion in the Salinas Valley Groundwater Basin.” Special Reports Series 17-01. https://www.co.monterey.ca.us/home/showdocument?id=57396.

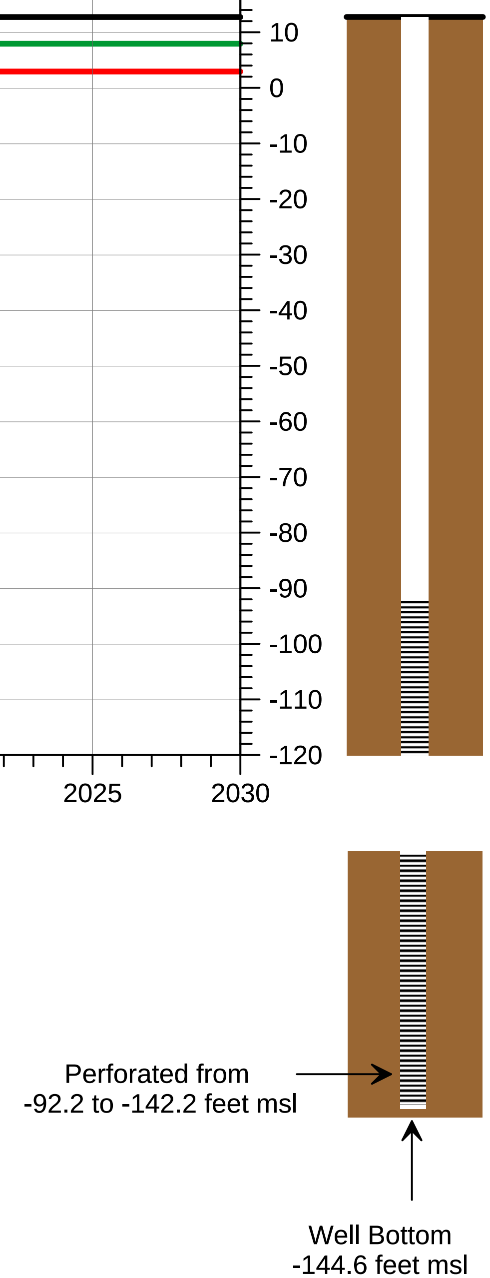
———. 2019. “Quarterly Salinas Valley Water Conditions: 2019 Water Year.” https://www.co.monterey.ca.us/Home/ShowDocument?id=83768.

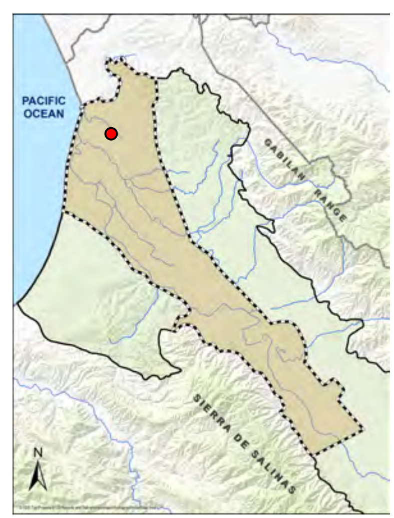
APPENDIX A. ADDITIONAL HYDROGRAPHS

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 13S/02E-21Q01

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)







EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

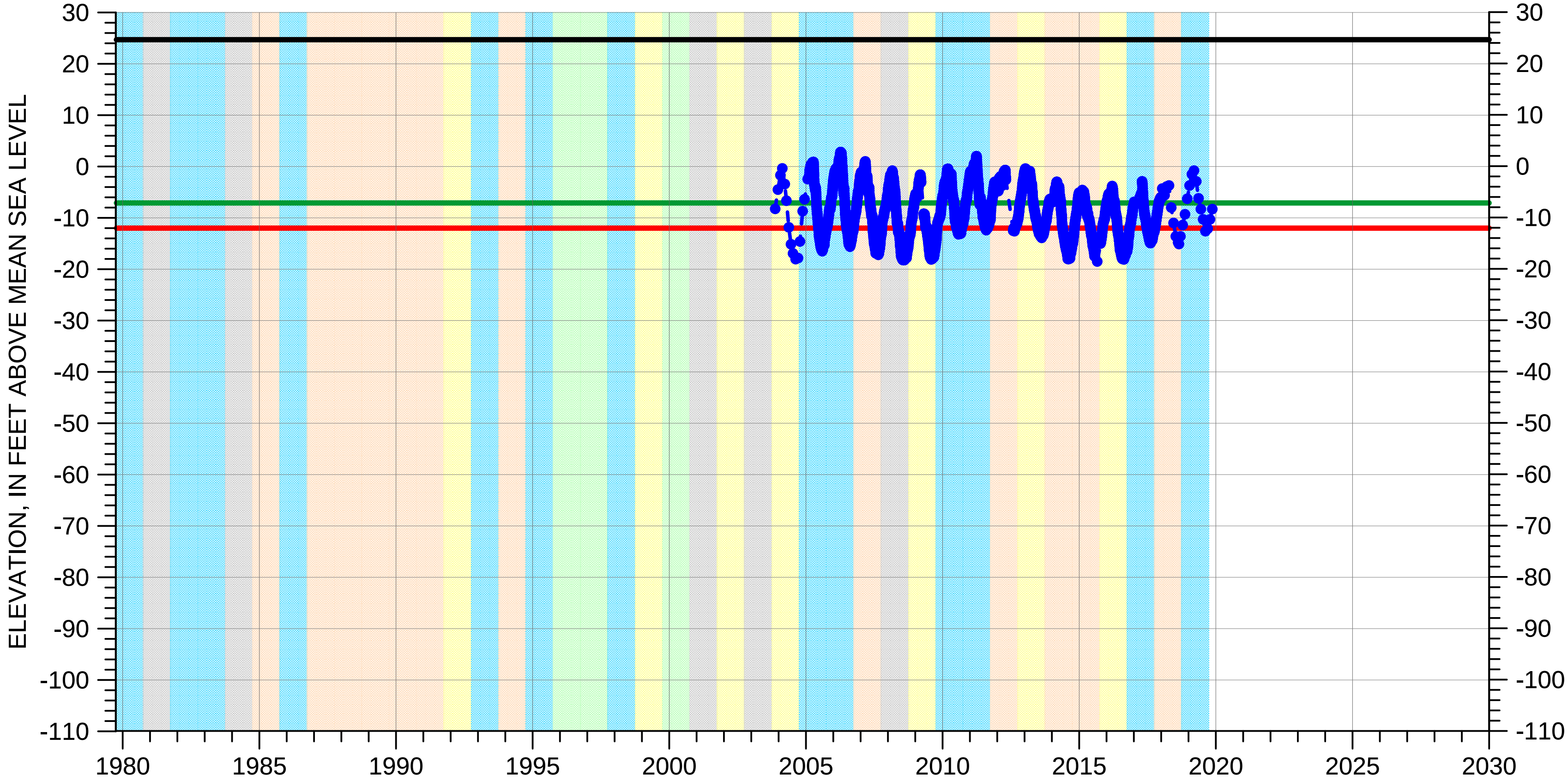
WATER YEAR TYPE DESIGNATION

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

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\13S_02E-21Q01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-03F04

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)

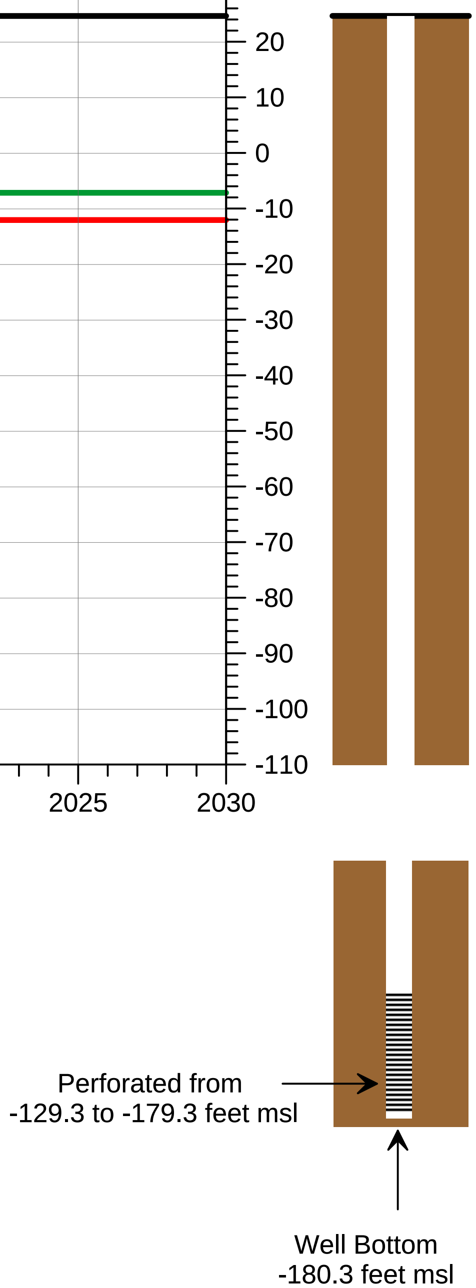


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

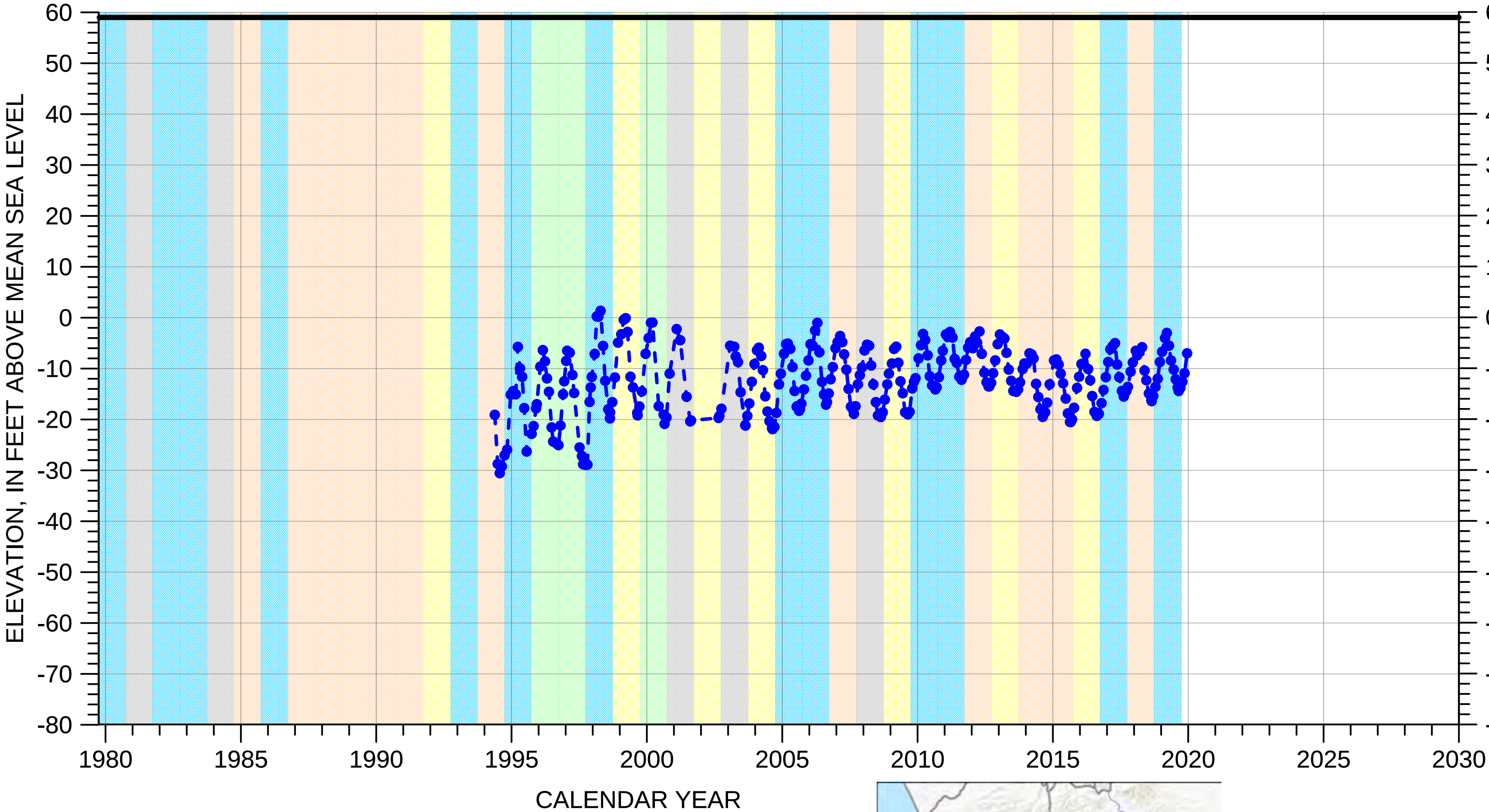
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

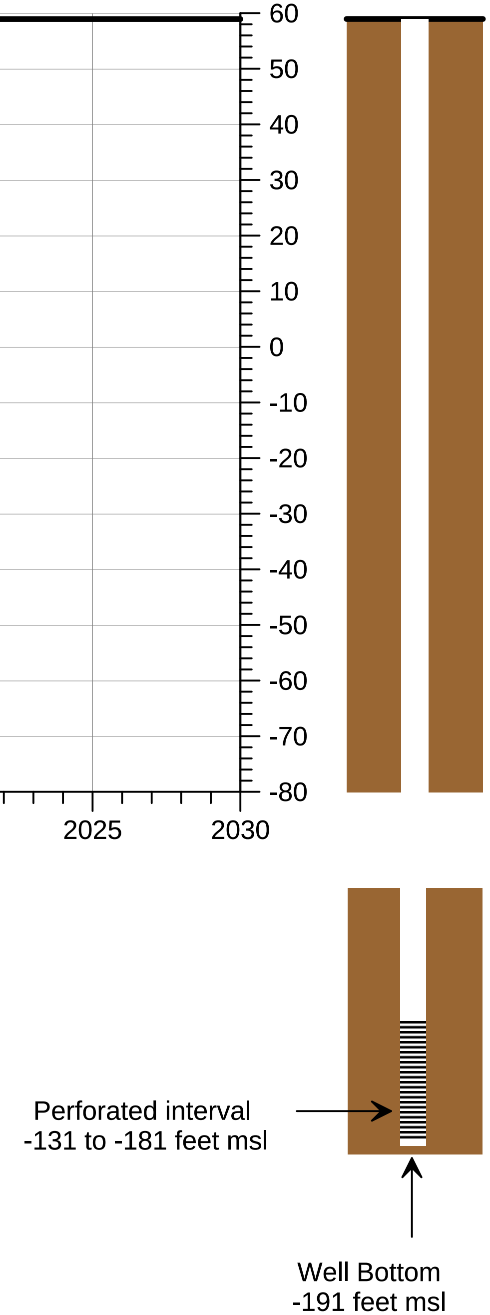


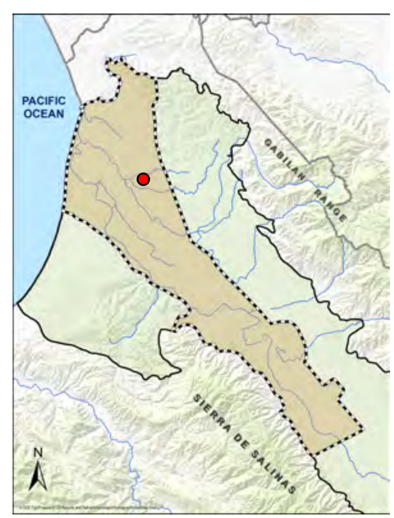
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-03F04.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-11A02

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)







EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

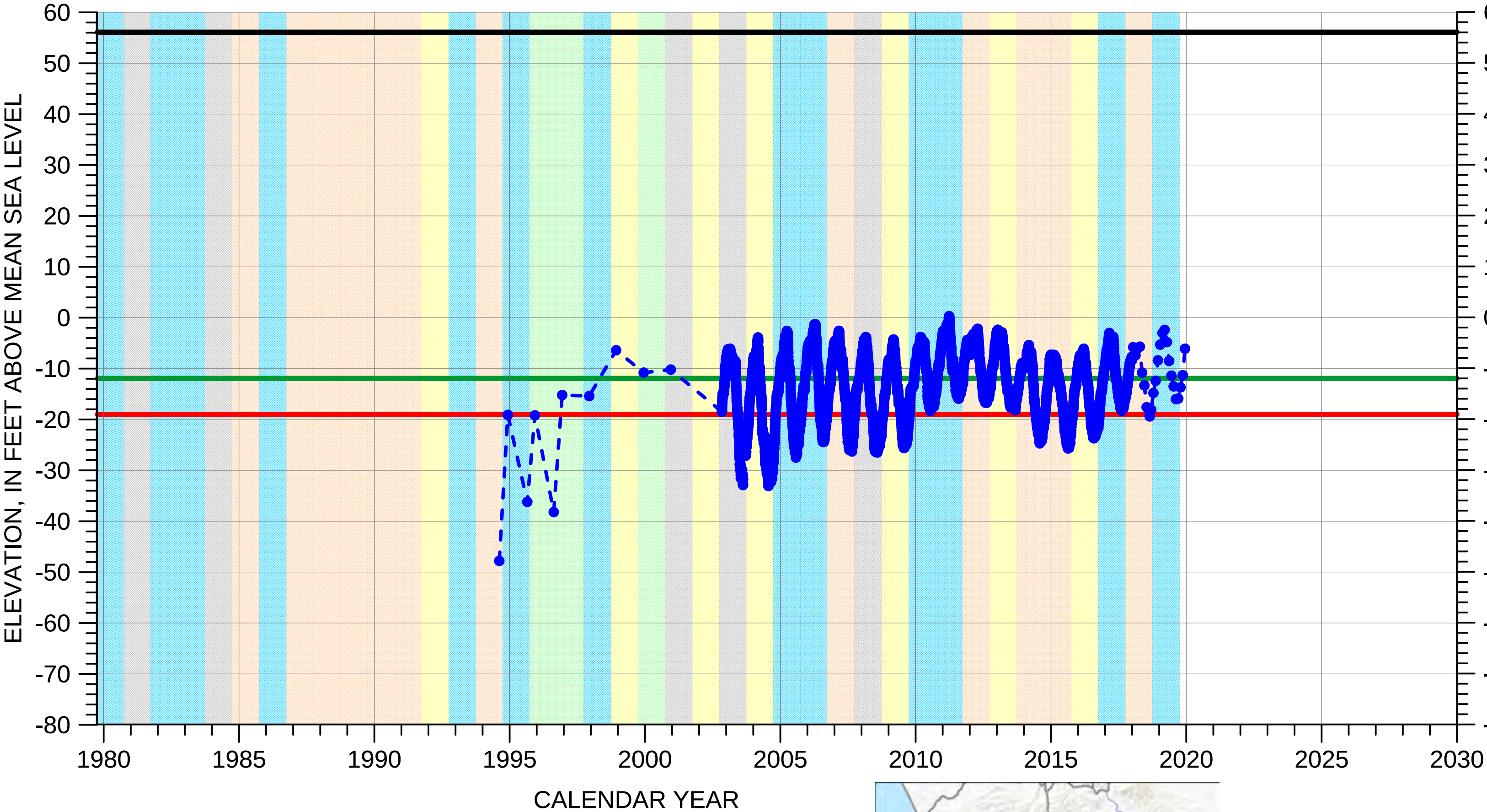
WATER YEAR TYPE DESIGNATION

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

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-11A02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-12B02

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)

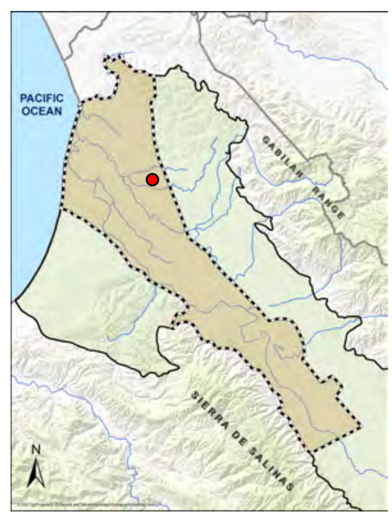


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

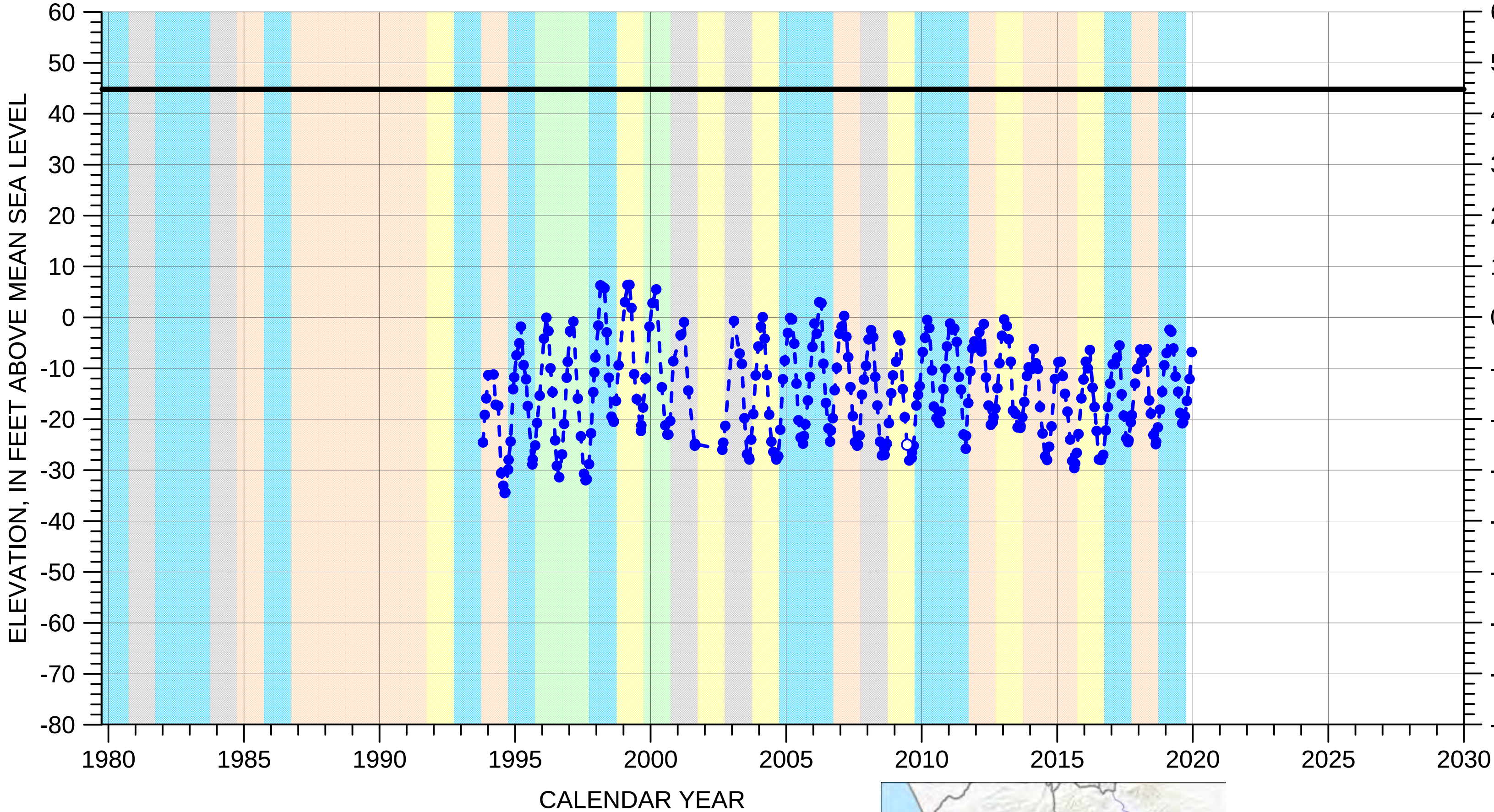
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

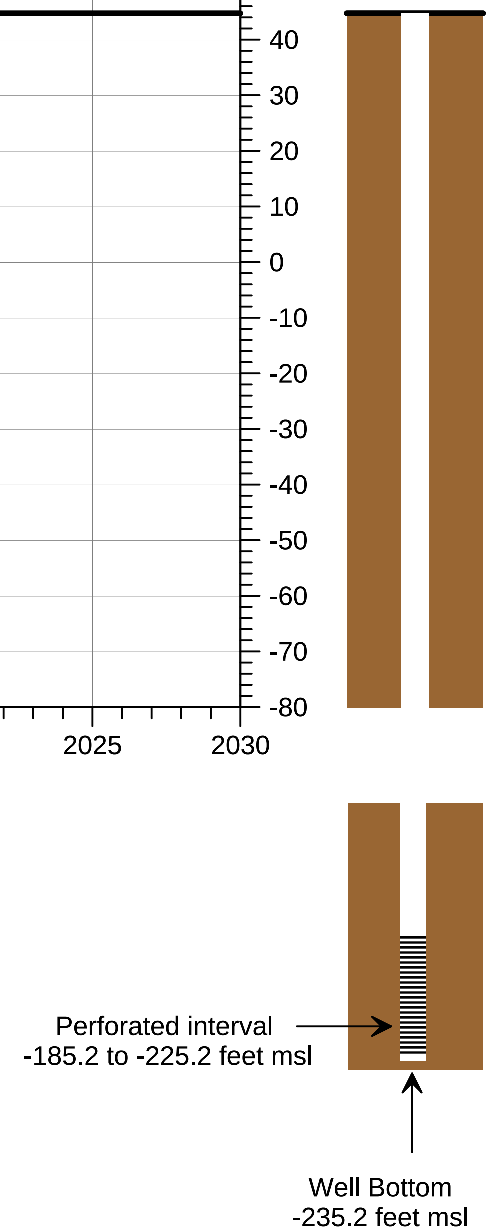


C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-12B02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-13F03

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)





EXPLANATION

GROUNDWATER ELEVATION

ESTIMATED ELEVATION

LAND SURFACE

MEASURABLE OBJECTIVE

MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

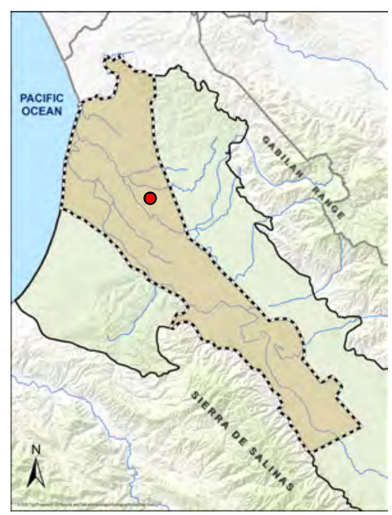
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

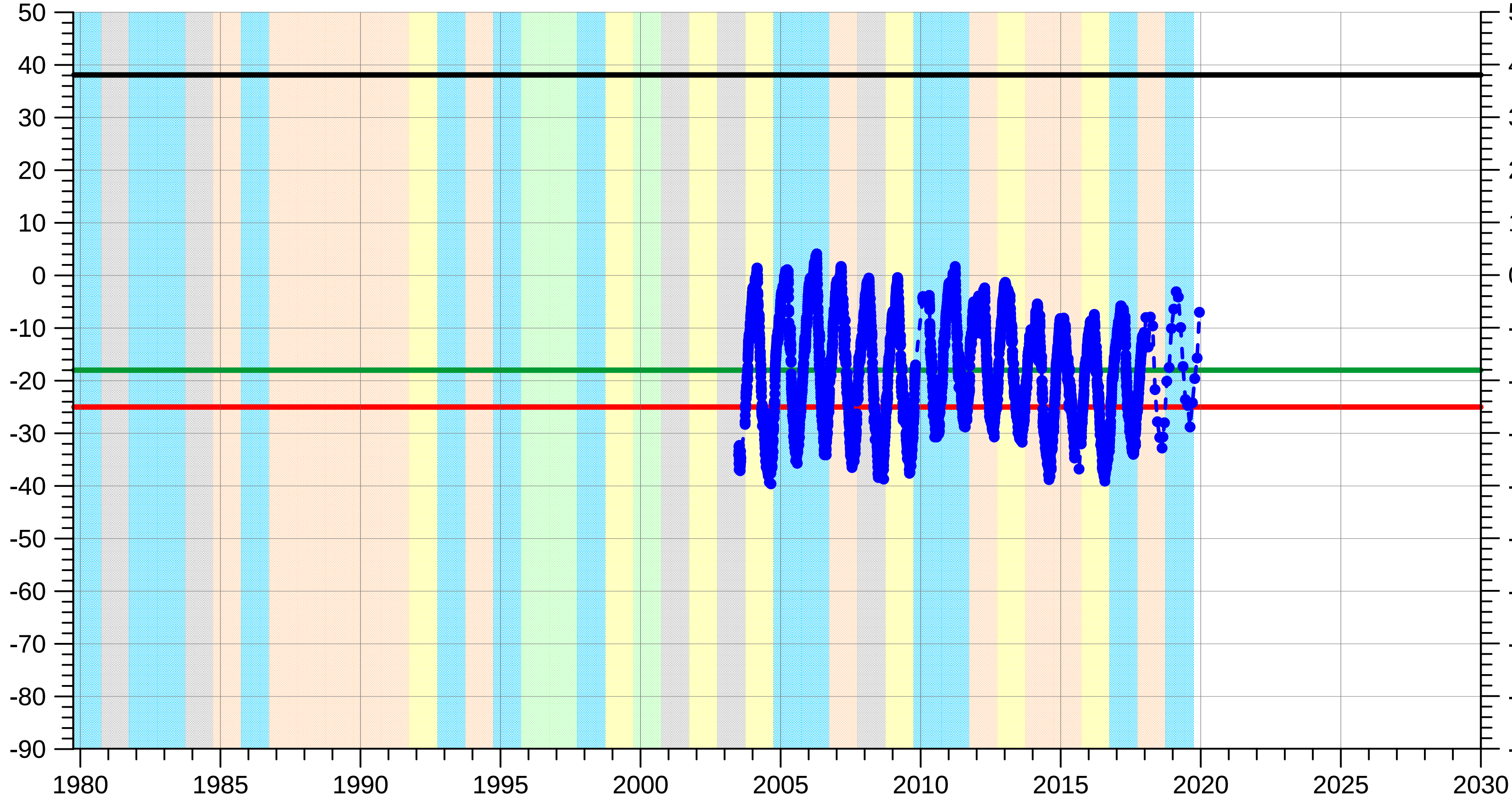
WET

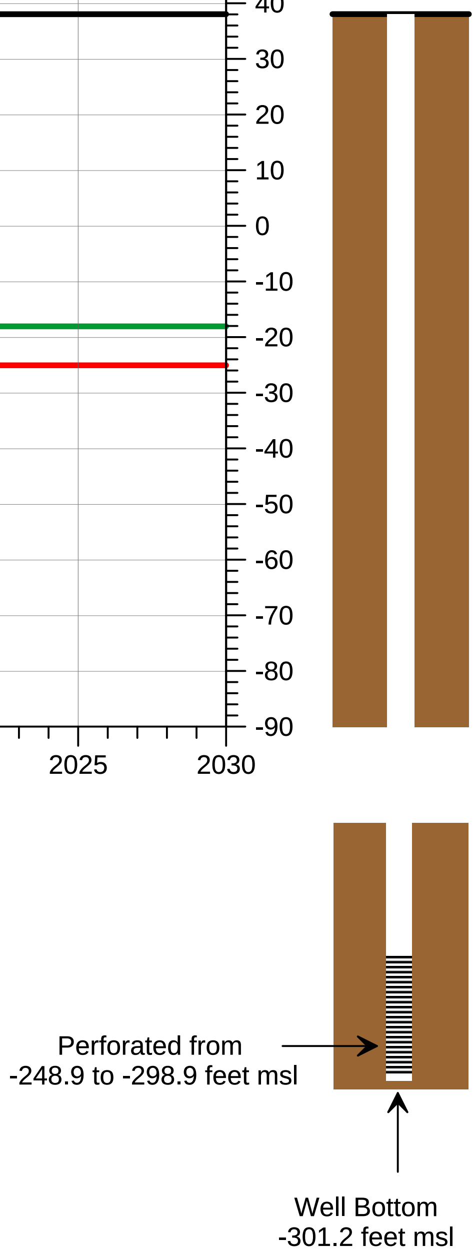


C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-13F03.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-26H01

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)





EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

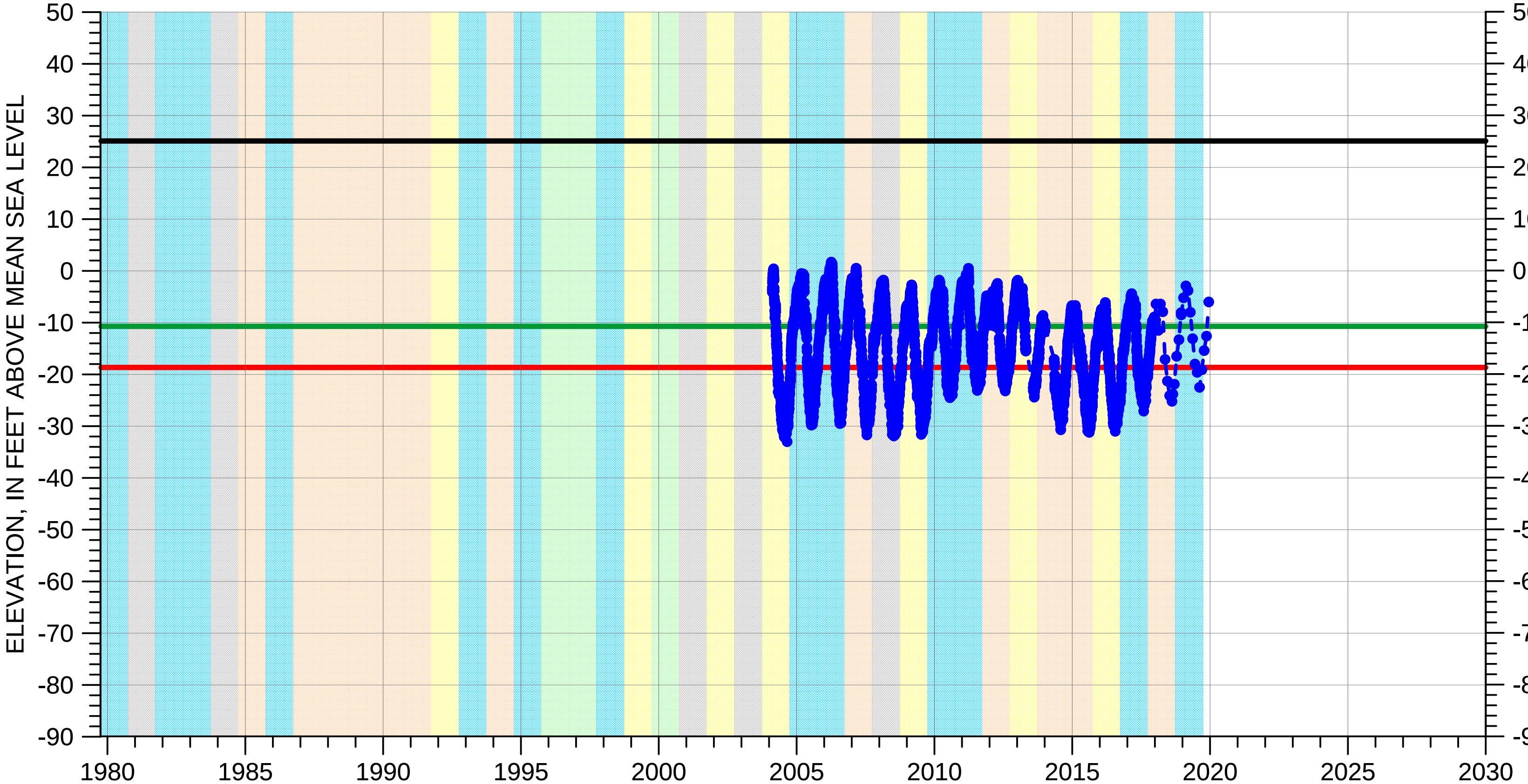
WATER YEAR TYPE DESIGNATION

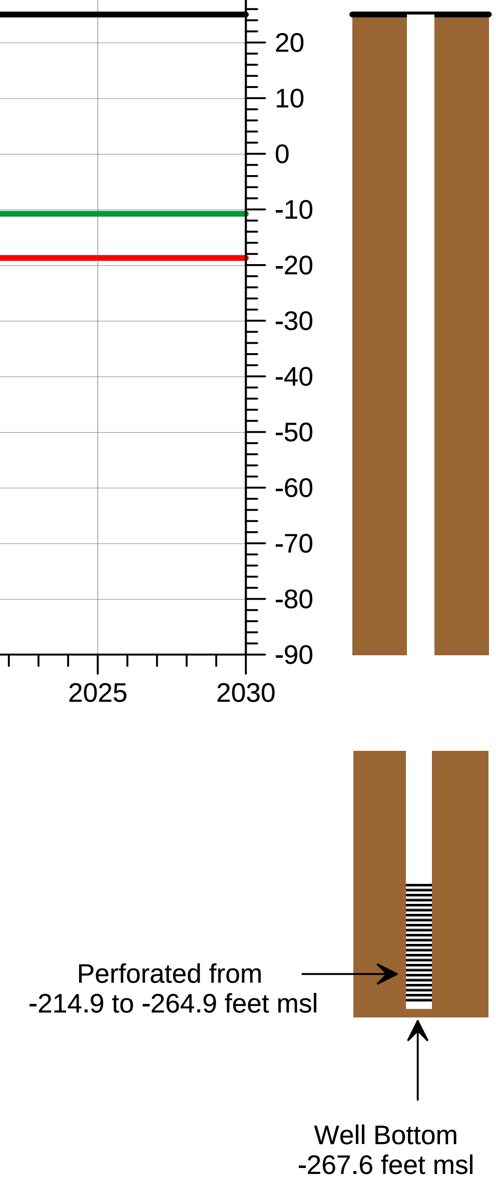
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-26H01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-27A01

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)



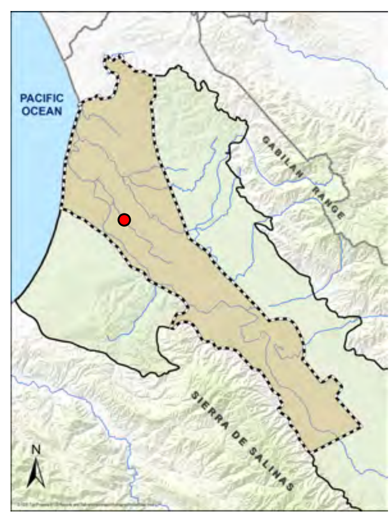


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

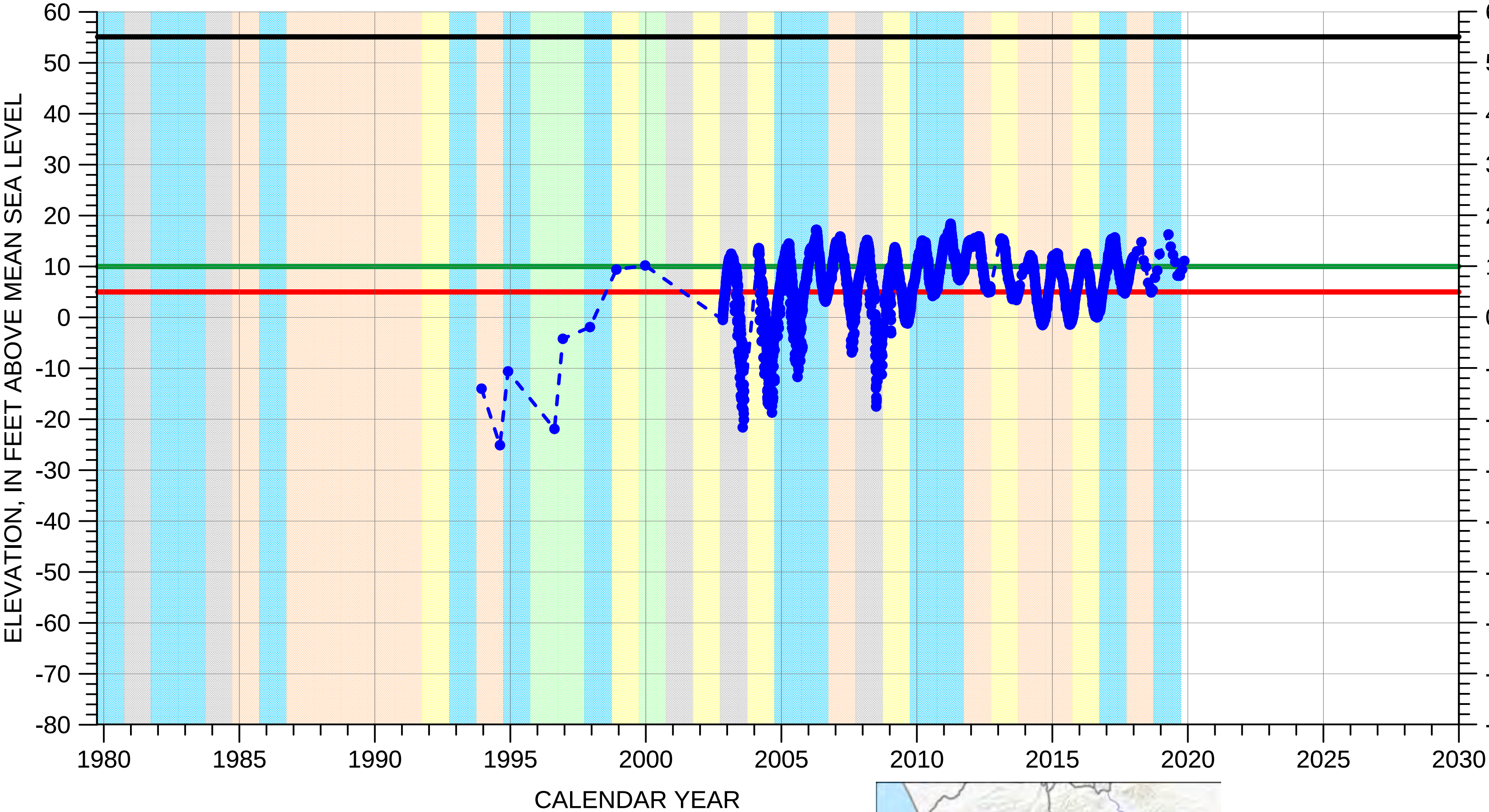
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

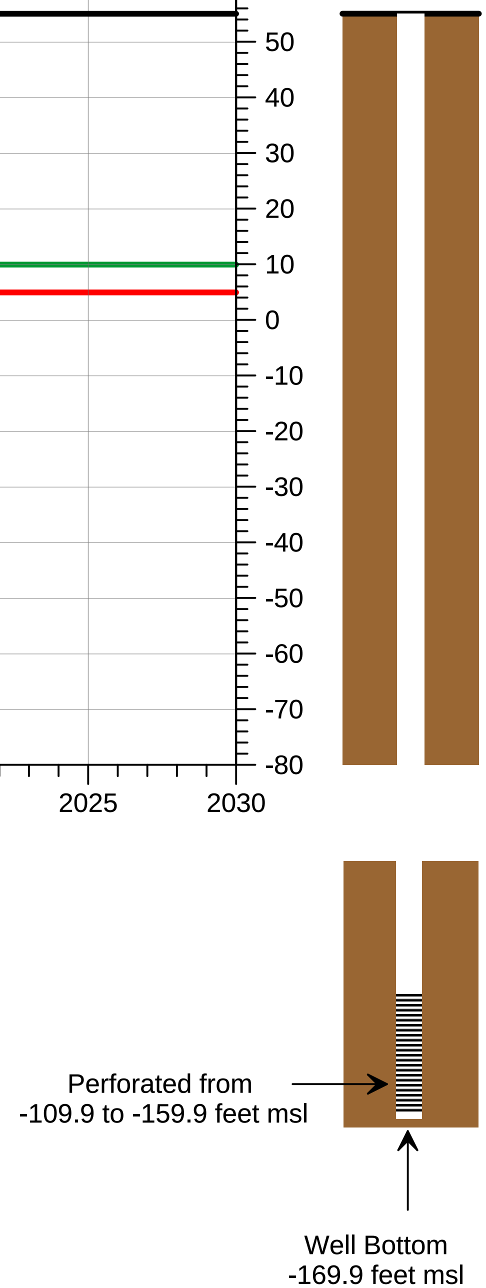


C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-27A01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-18C01

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)





EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

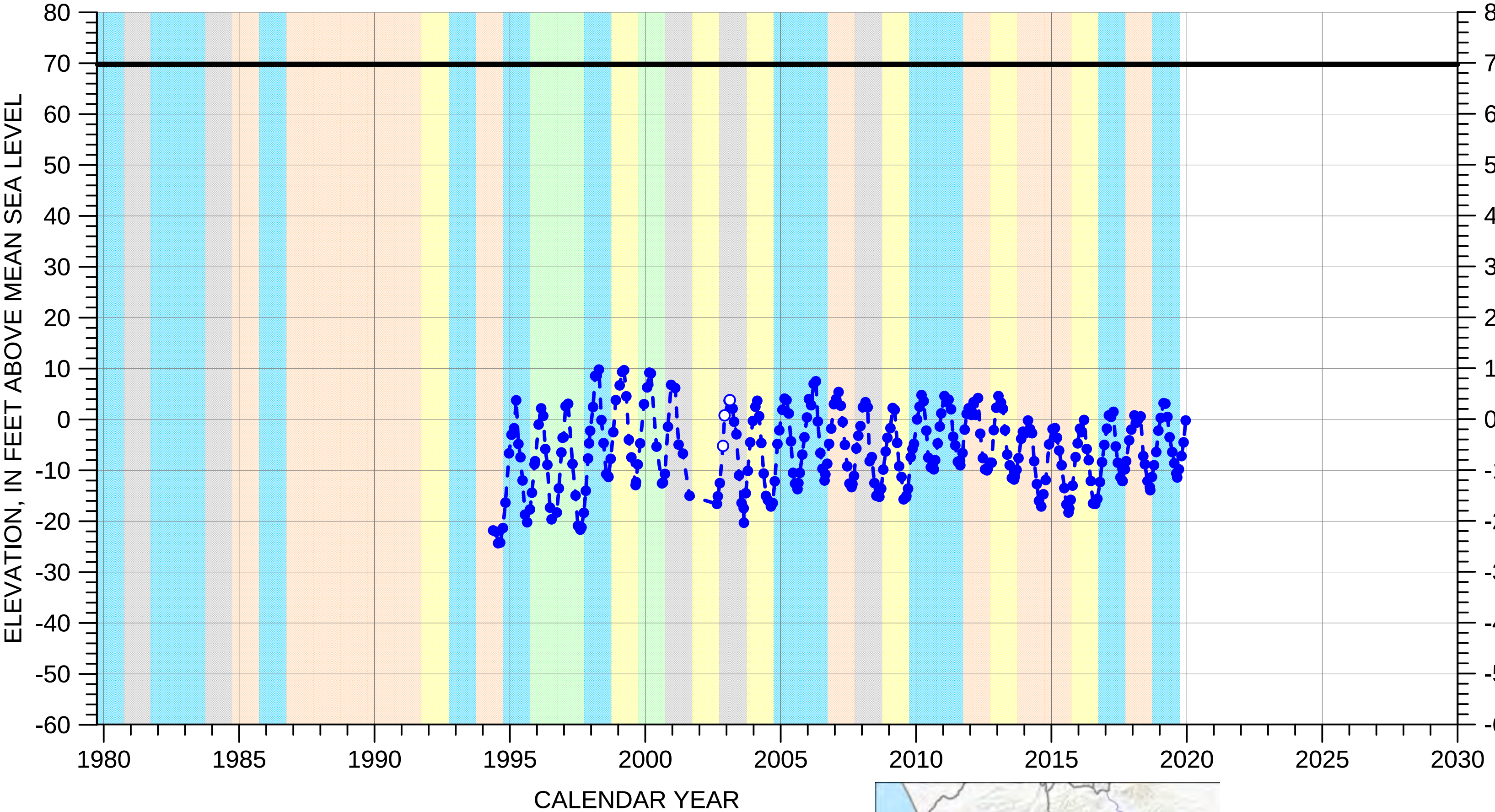
WATER YEAR TYPE DESIGNATION

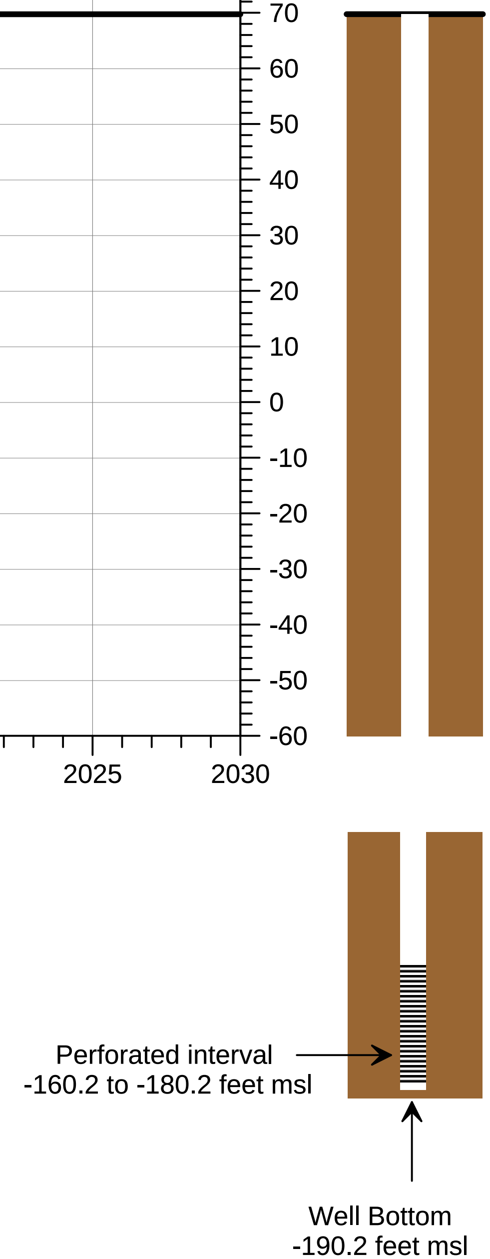
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

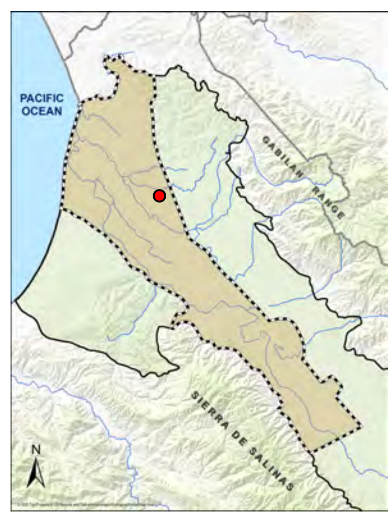
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_03E-18C01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-18E03

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)







EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

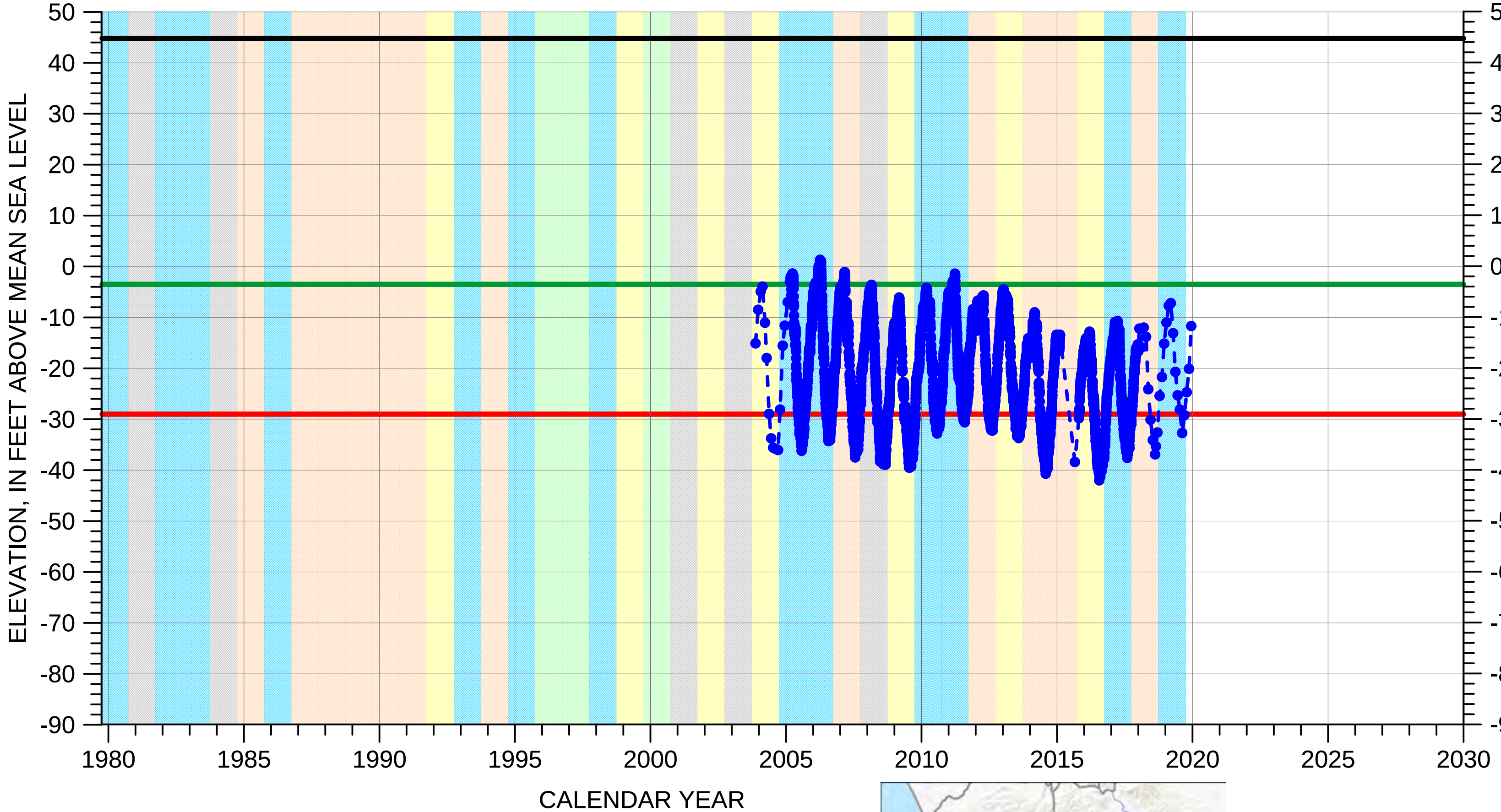
WATER YEAR TYPE DESIGNATION

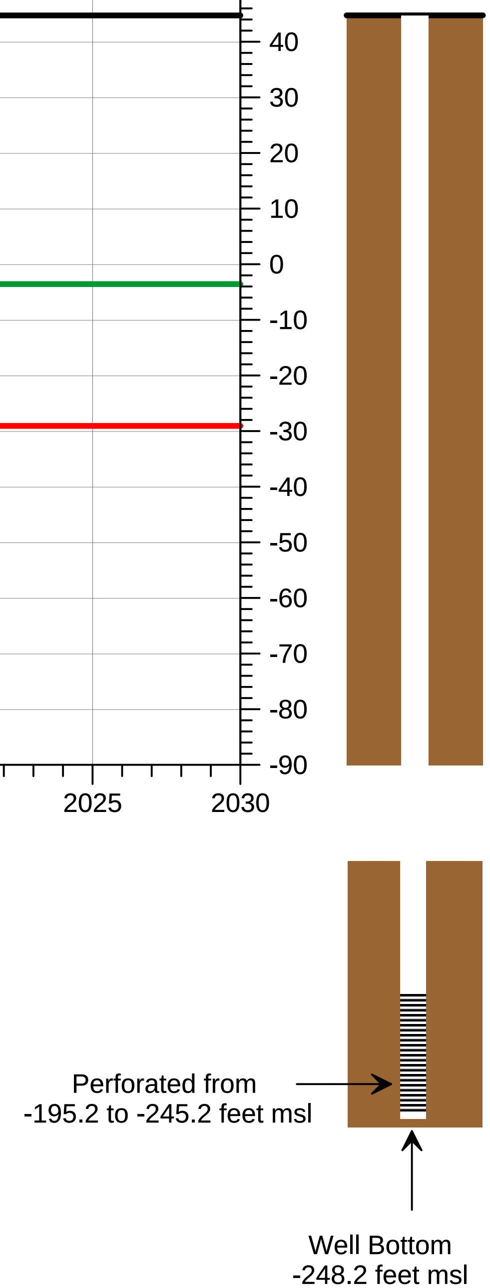
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_03E-18E03.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-30G08

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)



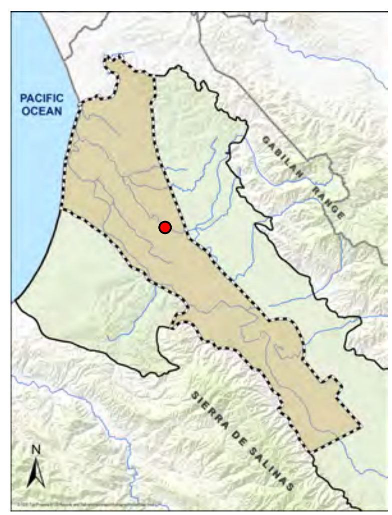


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

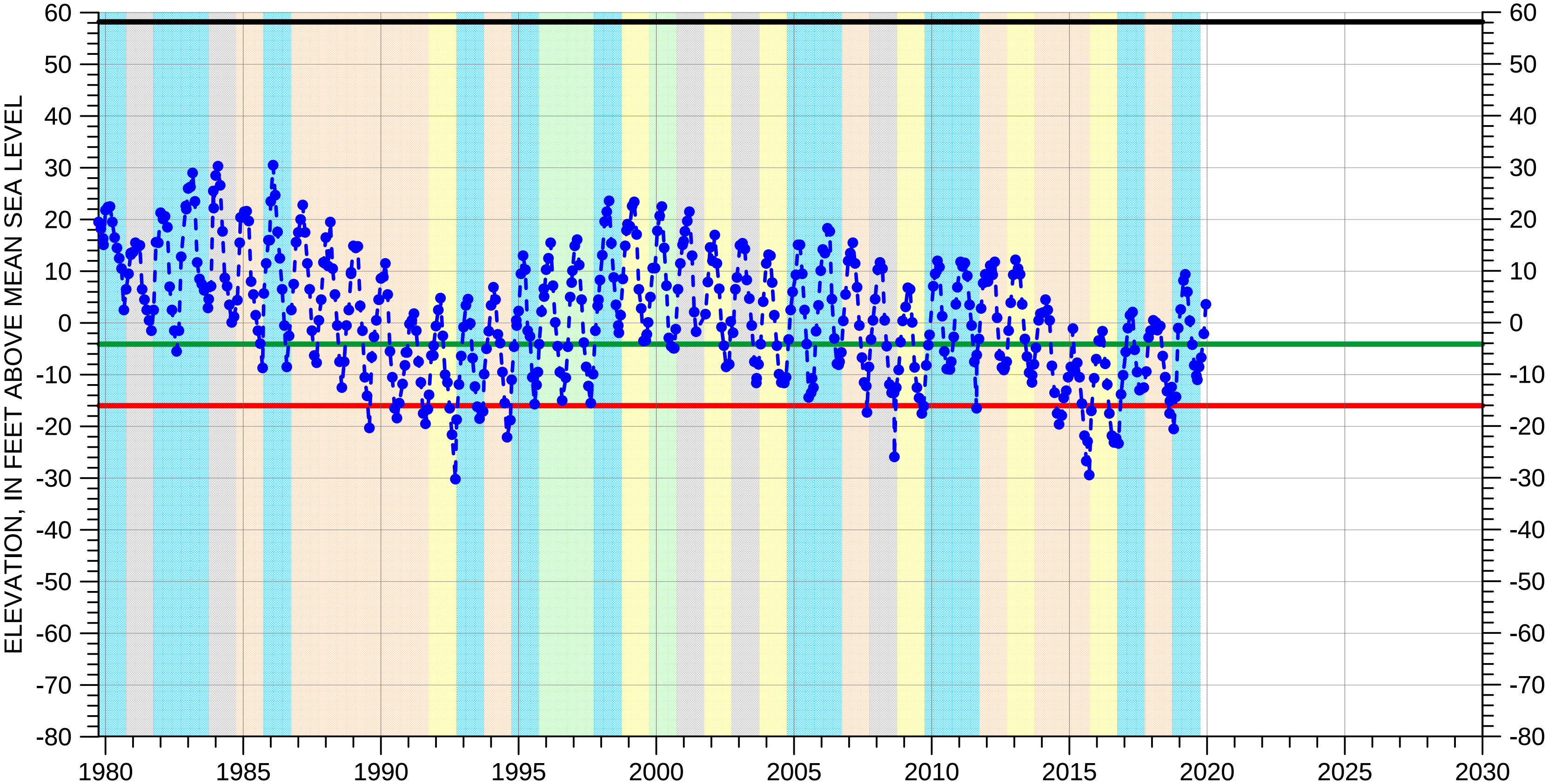
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_03E-30G08.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/03E-16M01

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)

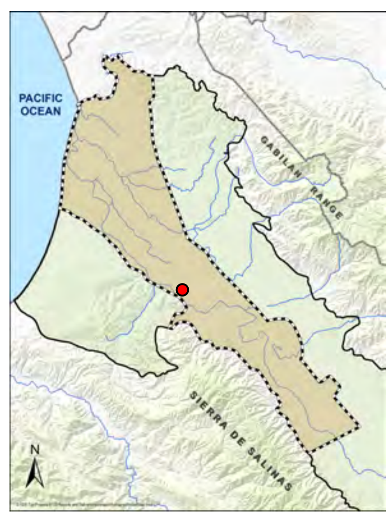


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

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

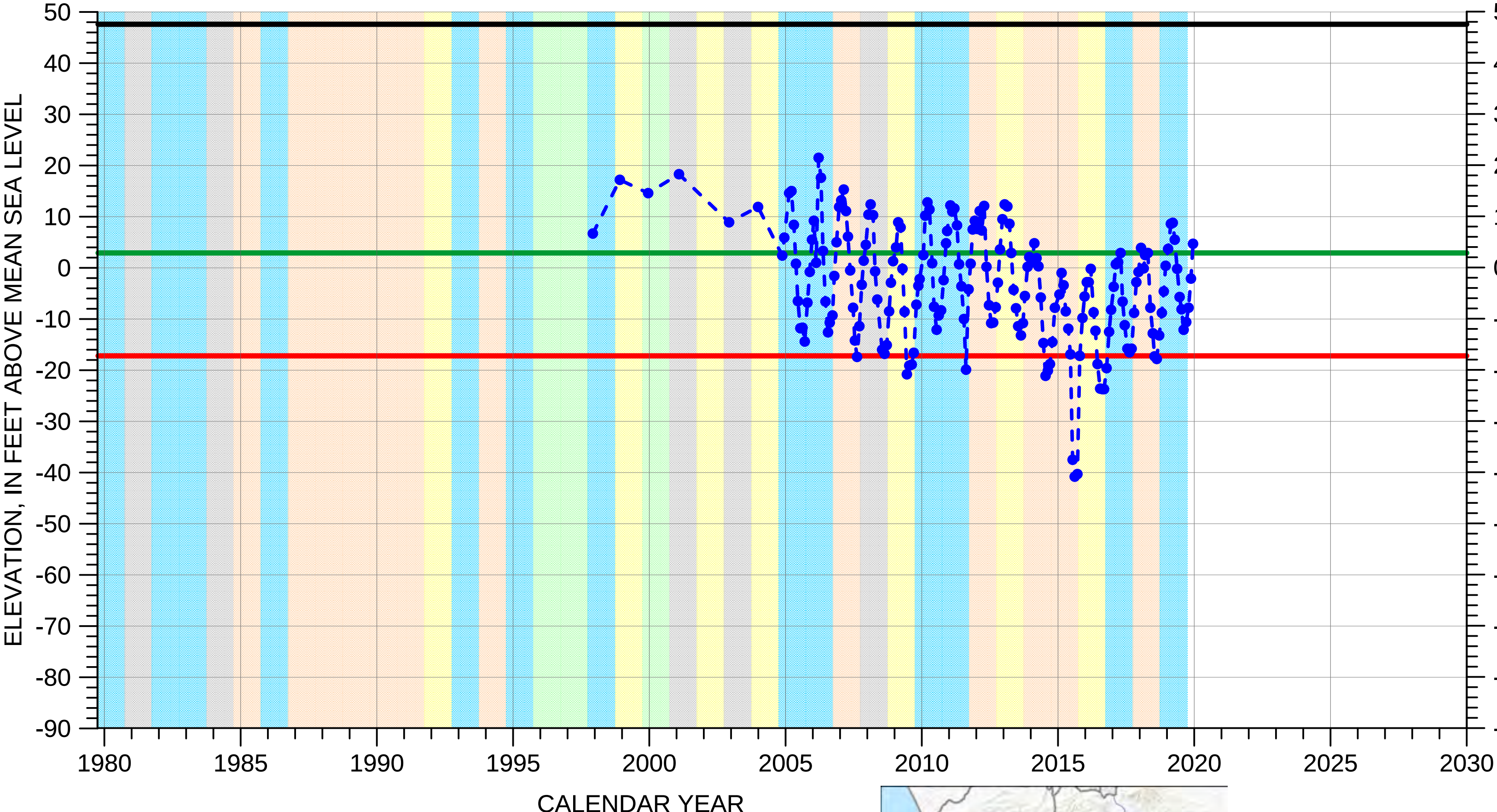


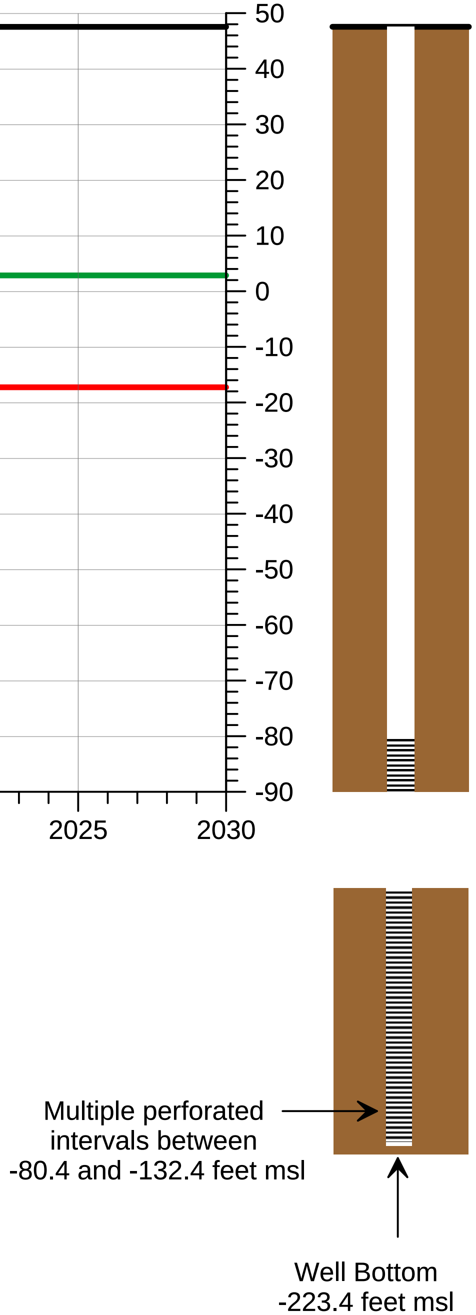
Perforated interval unknown

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\15S_03E-16M01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/03E-17M01

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)





EXPLANATION

GROUNDWATER ELEVATION
ESTIMATED ELEVATION
LAND SURFACE
MEASURABLE OBJECTIVE
MINIMUM THRESHOLD

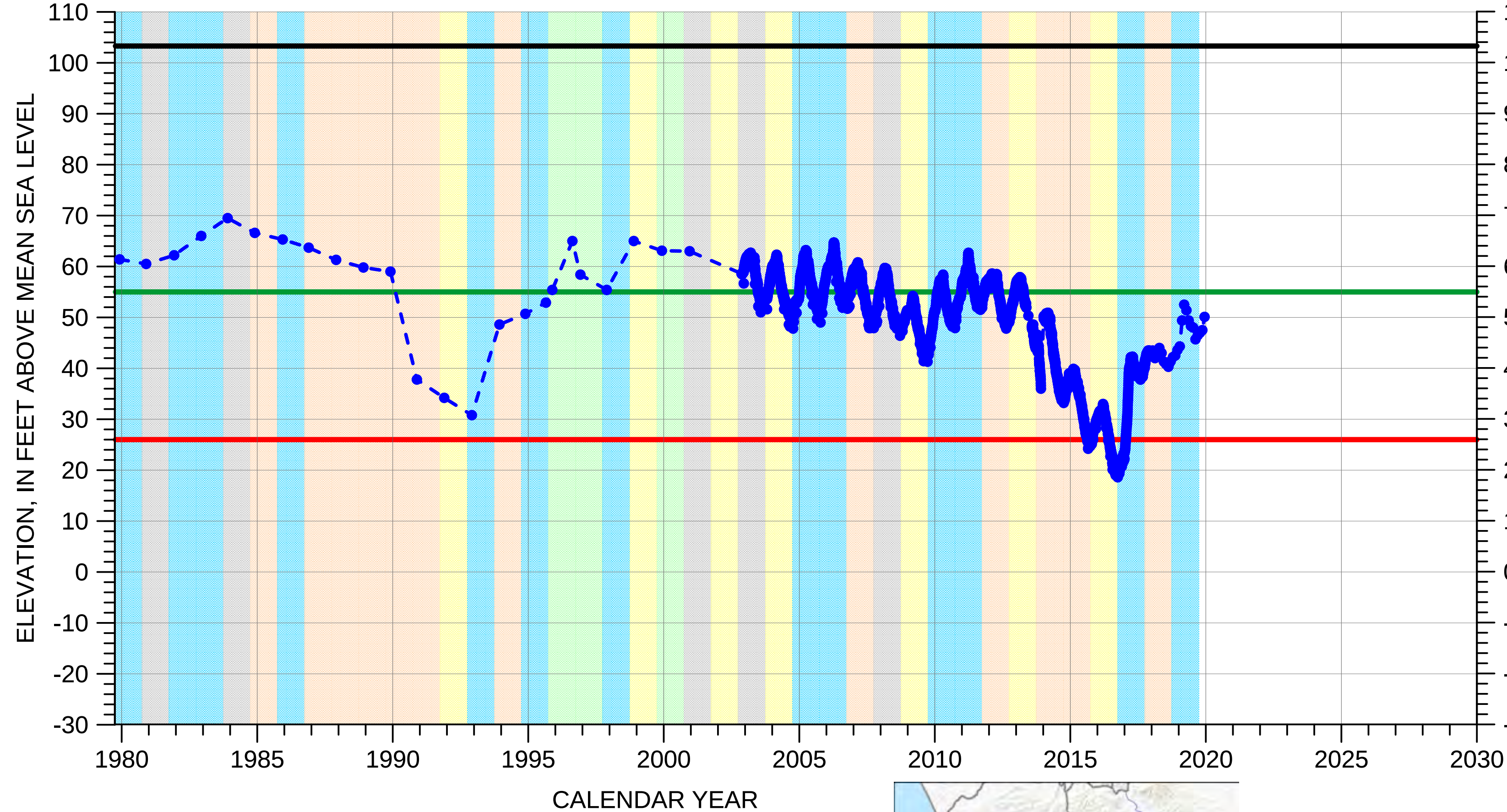
WATER YEAR TYPE DESIGNATION

DRY
DRY - NORMAL
NORMAL
WET - NORMAL
WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\15S_03E-17M01.grf

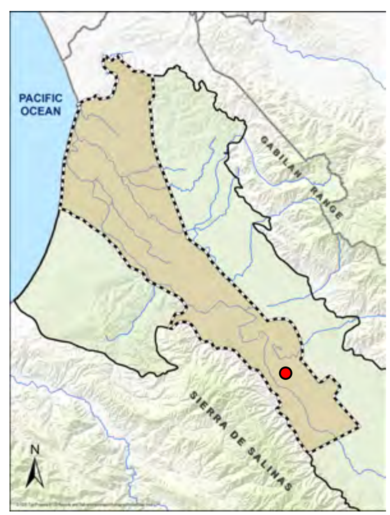
HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 16S/04E-15D01

180/400-Foot Aquifer Subbasin
(180-Foot Aquifer)



Multiple perforated intervals between -66.7 and -254.7 feet msl

Well Bottom
-280.7 feet msl



EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

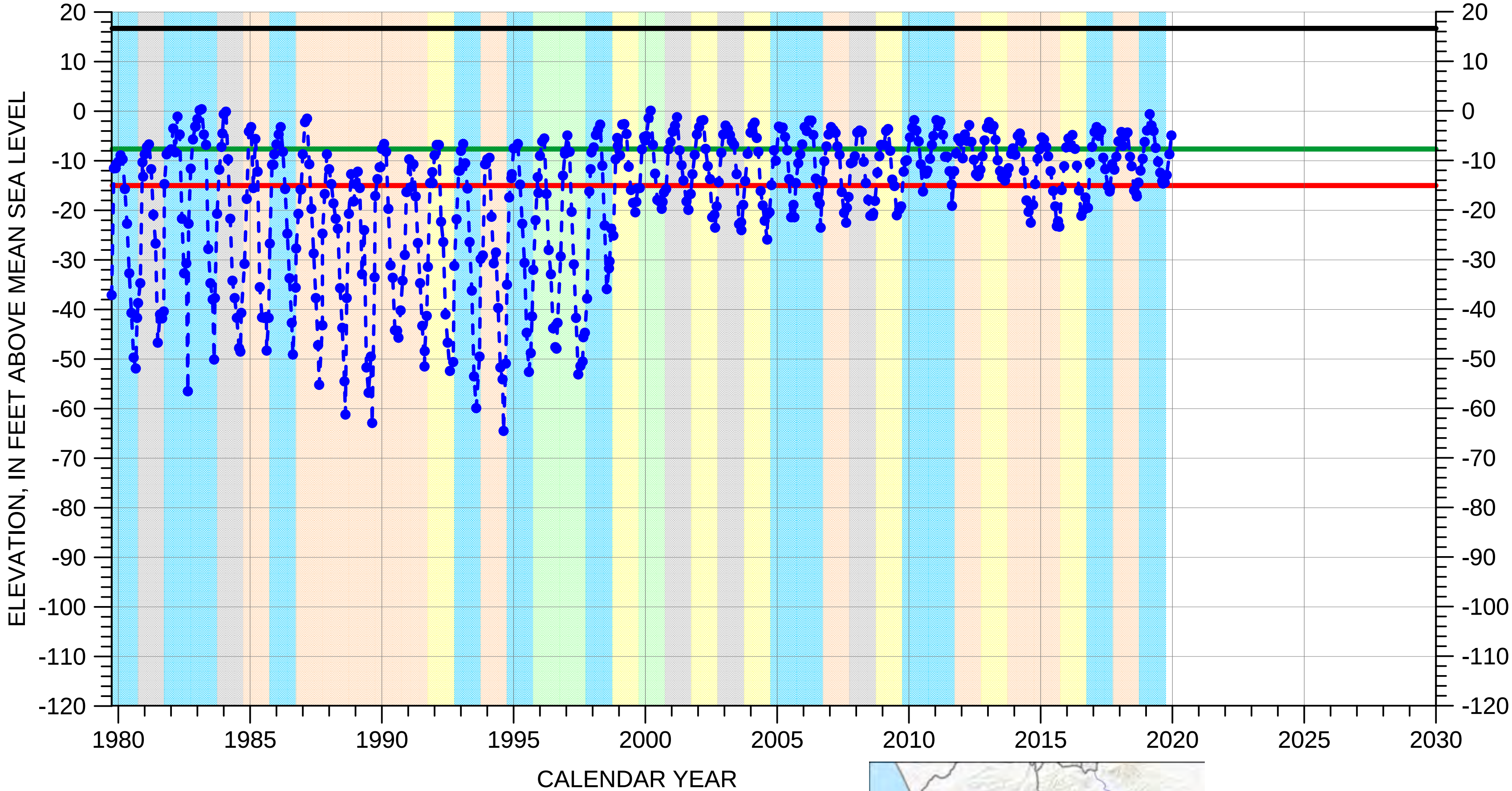
WATER YEAR TYPE DESIGNATION

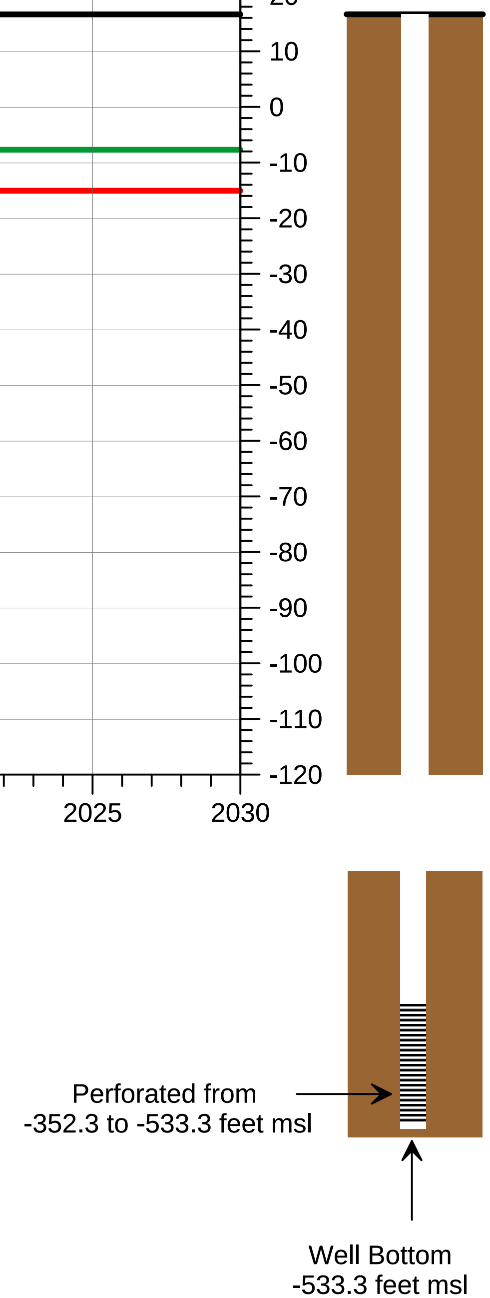
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

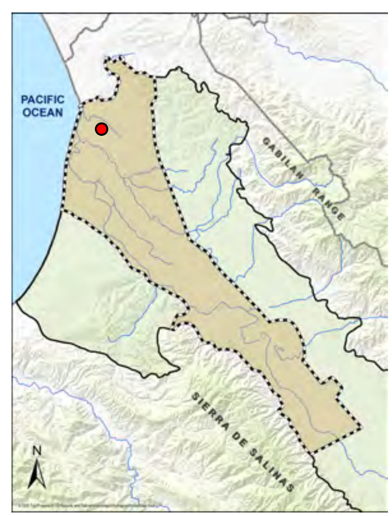
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\16S_04E-15D01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 13S/02E-21N01

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)







EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

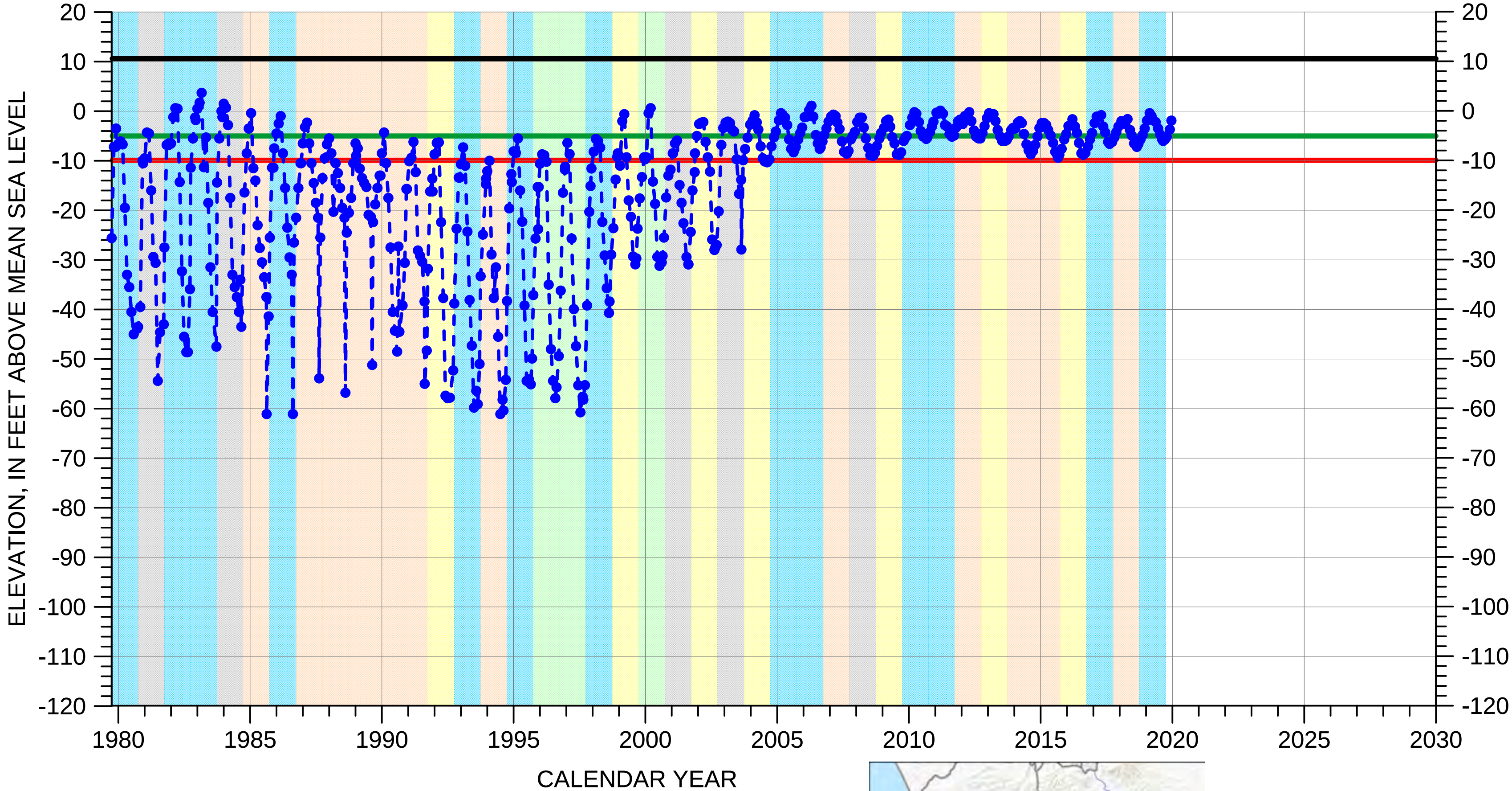
WATER YEAR TYPE DESIGNATION

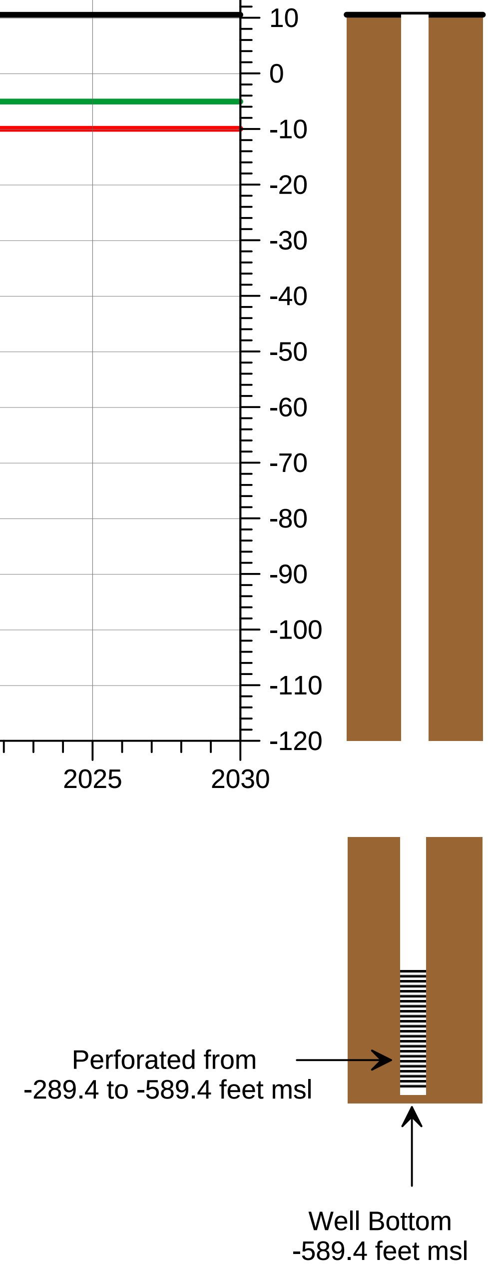
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\13S_02E-21N01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 13S/02E-32A02

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



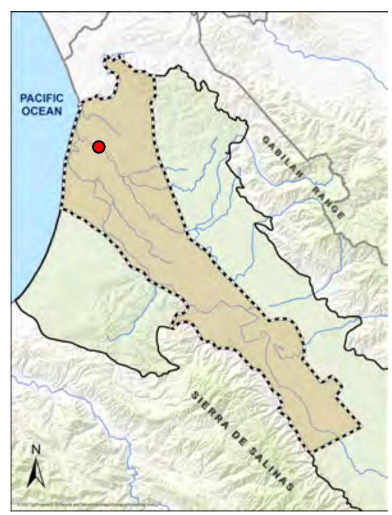


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

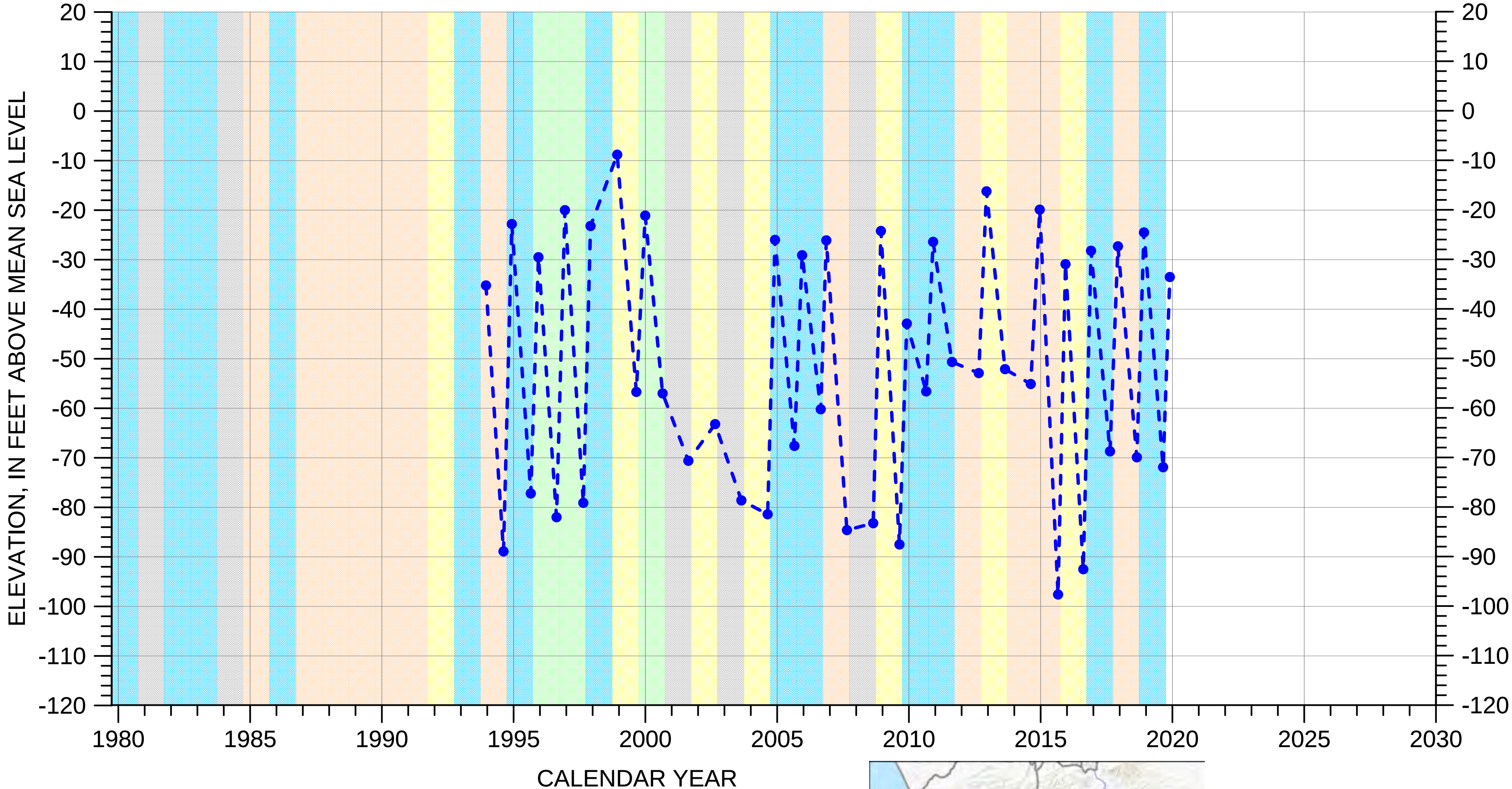
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\13S_02E-32A02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-02C03

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)

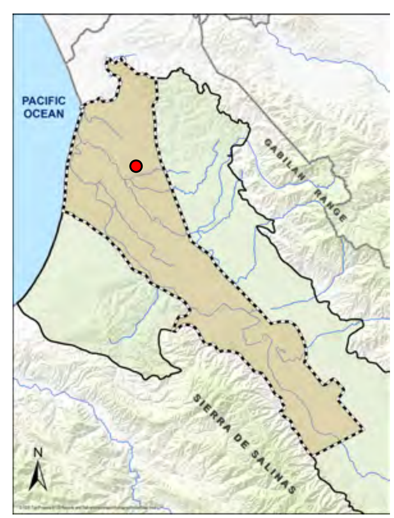


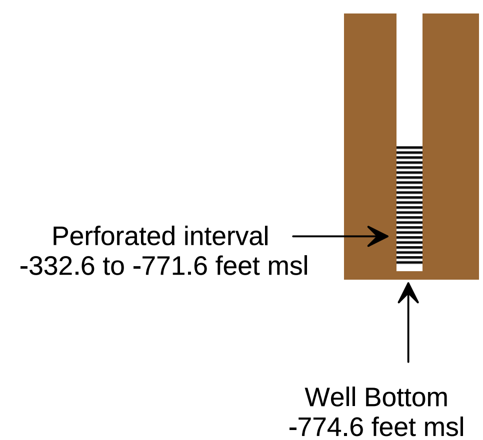
EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE (60.4 FT MSL)
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

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

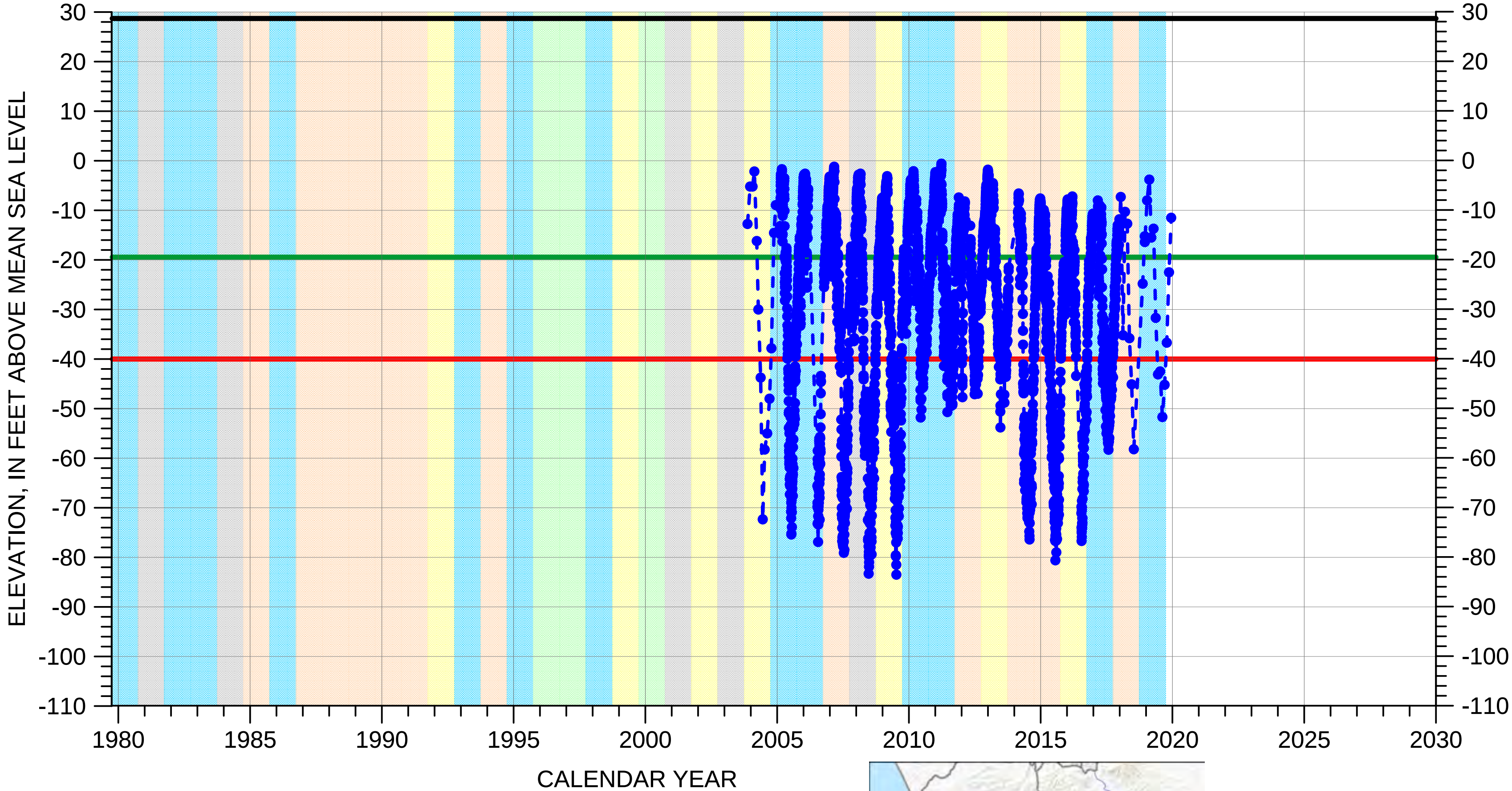


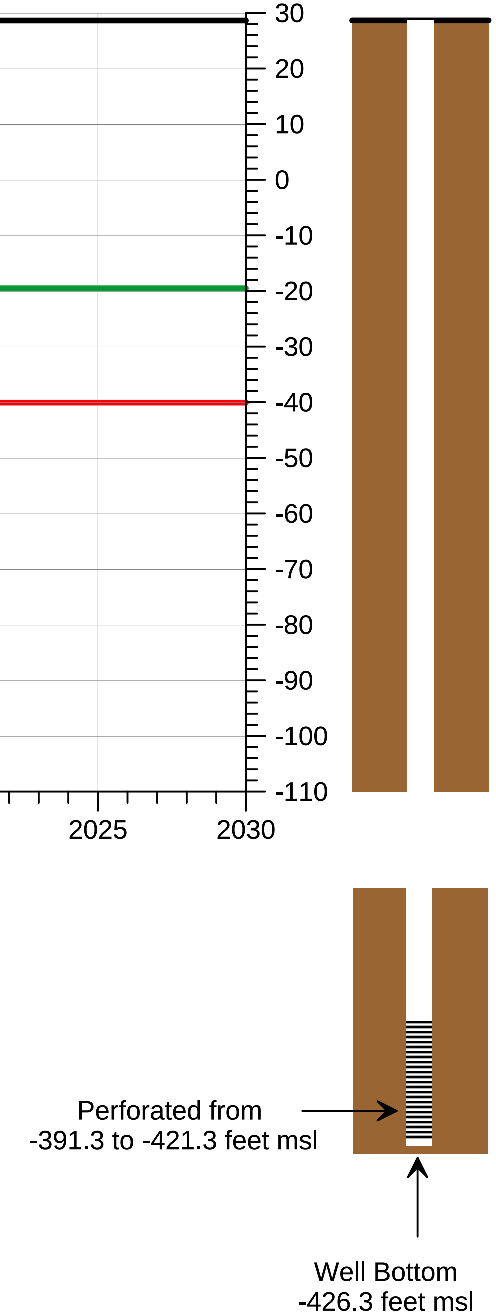


C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-02C03.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-03F03

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



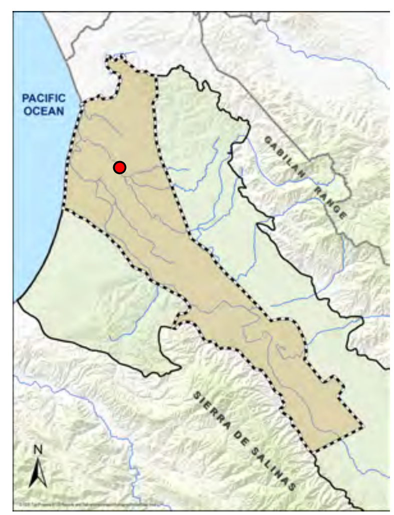


EXPLANATION

GROUNDWATER ELEVATION
ESTIMATED ELEVATION
LAND SURFACE
MEASURABLE OBJECTIVE
MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

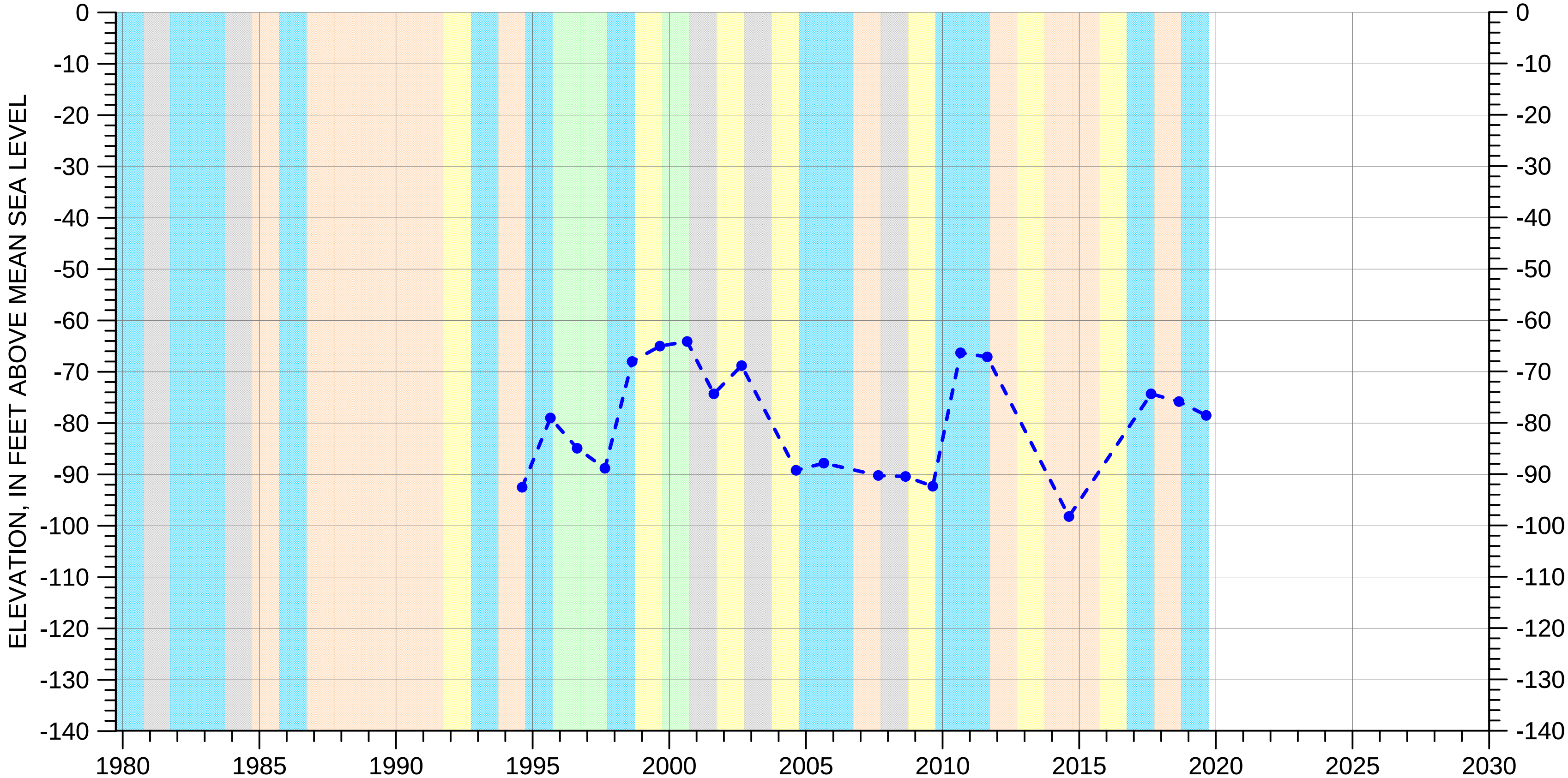
DRY
DRY - NORMAL
NORMAL
WET - NORMAL
WET

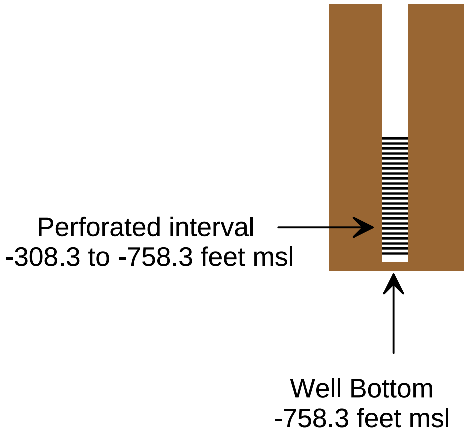


C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-03F03.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-03H01

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)





EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE (41.7 FT MSL)
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

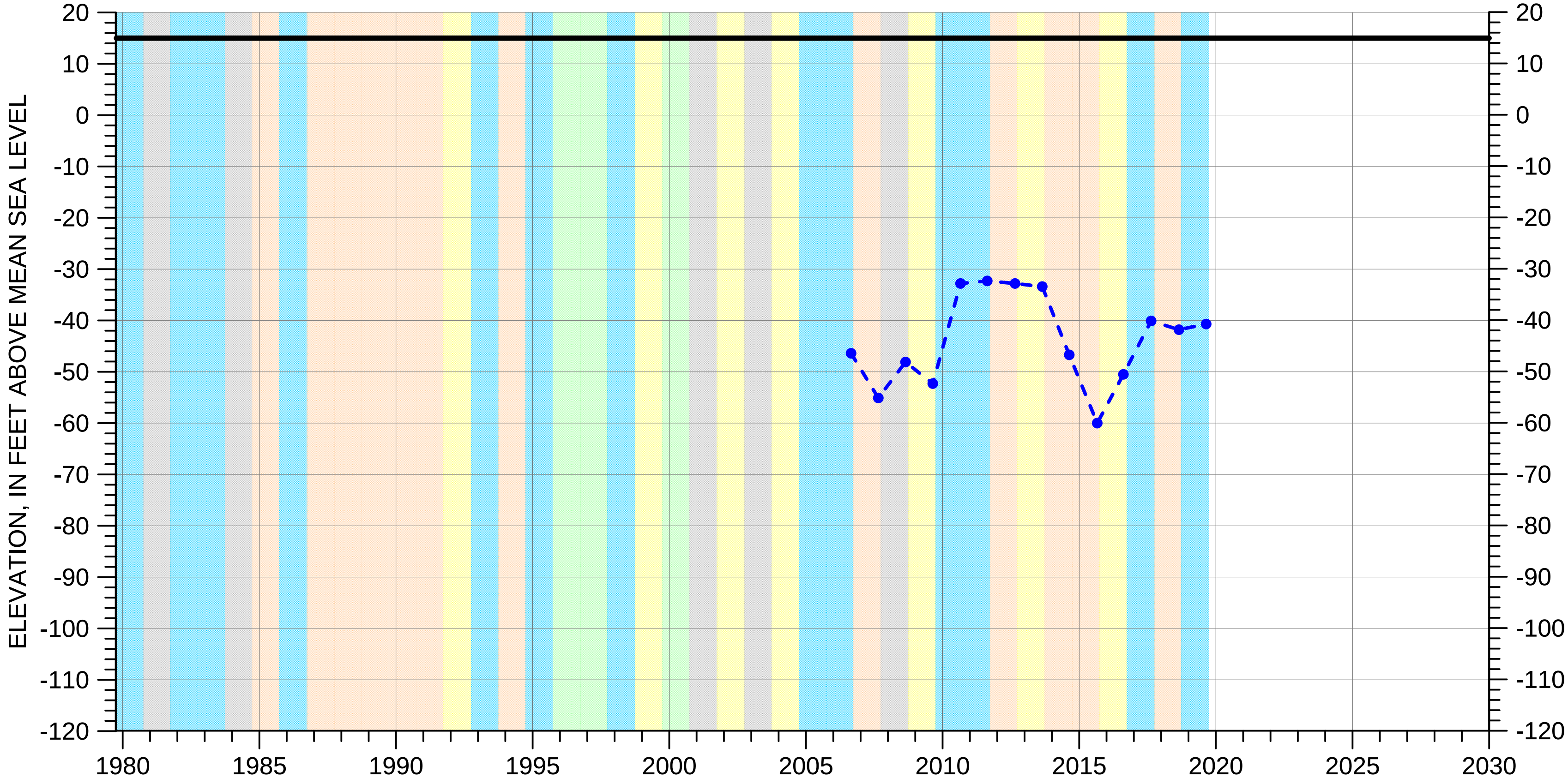
WATER YEAR TYPE DESIGNATION

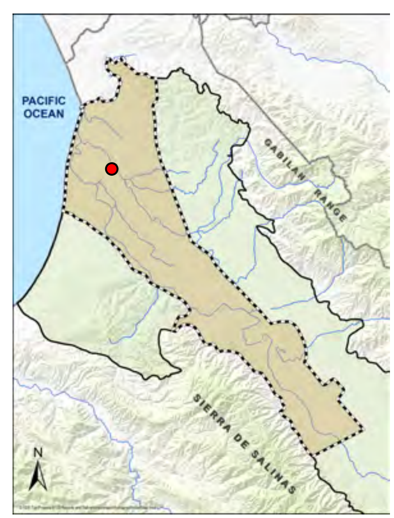
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-03H01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-04G02

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)





Perforated interval
-355 to -595 feet msl

Well Bottom
-605 feet msl

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-04G02.grf

EXPLANATION

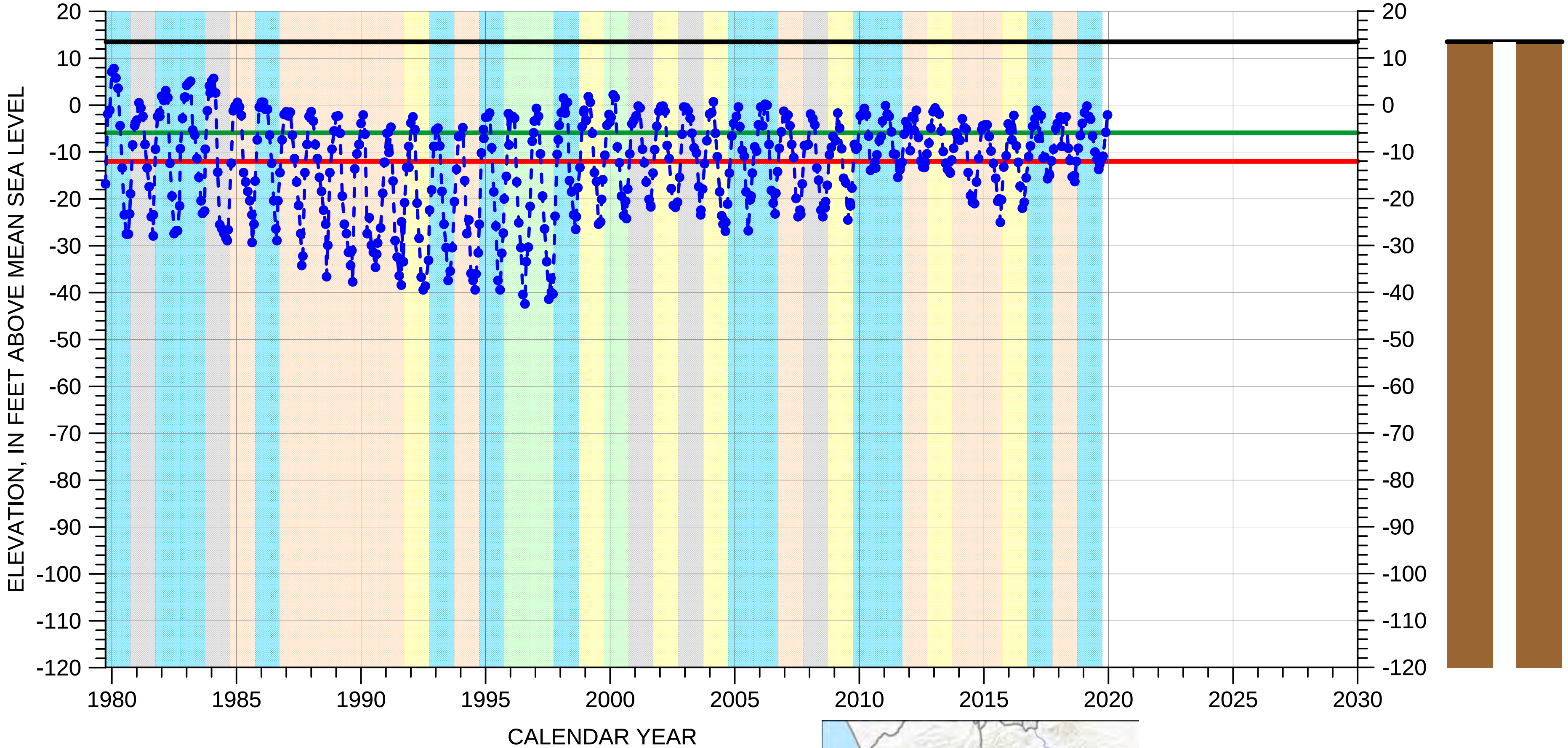
- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

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

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-08M02

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)

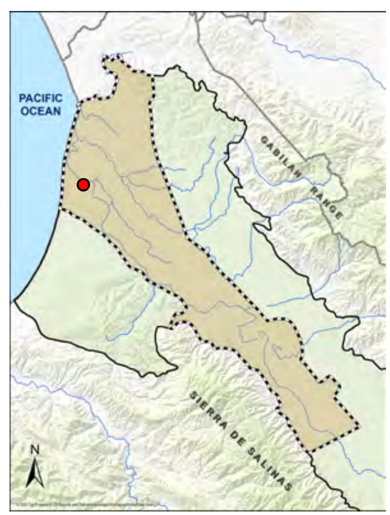


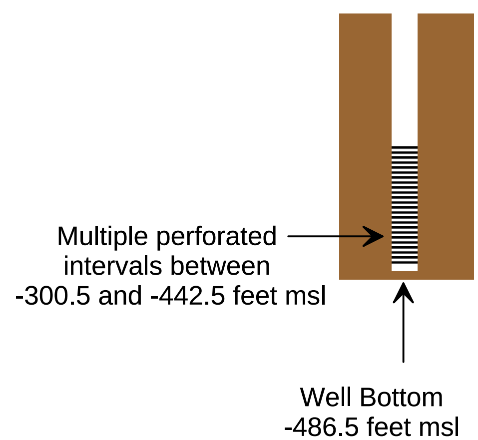
EXPLANATION

GROUNDWATER ELEVATION
ESTIMATED ELEVATION
LAND SURFACE
MEASURABLE OBJECTIVE
MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

DRY
DRY - NORMAL
NORMAL
WET - NORMAL
WET

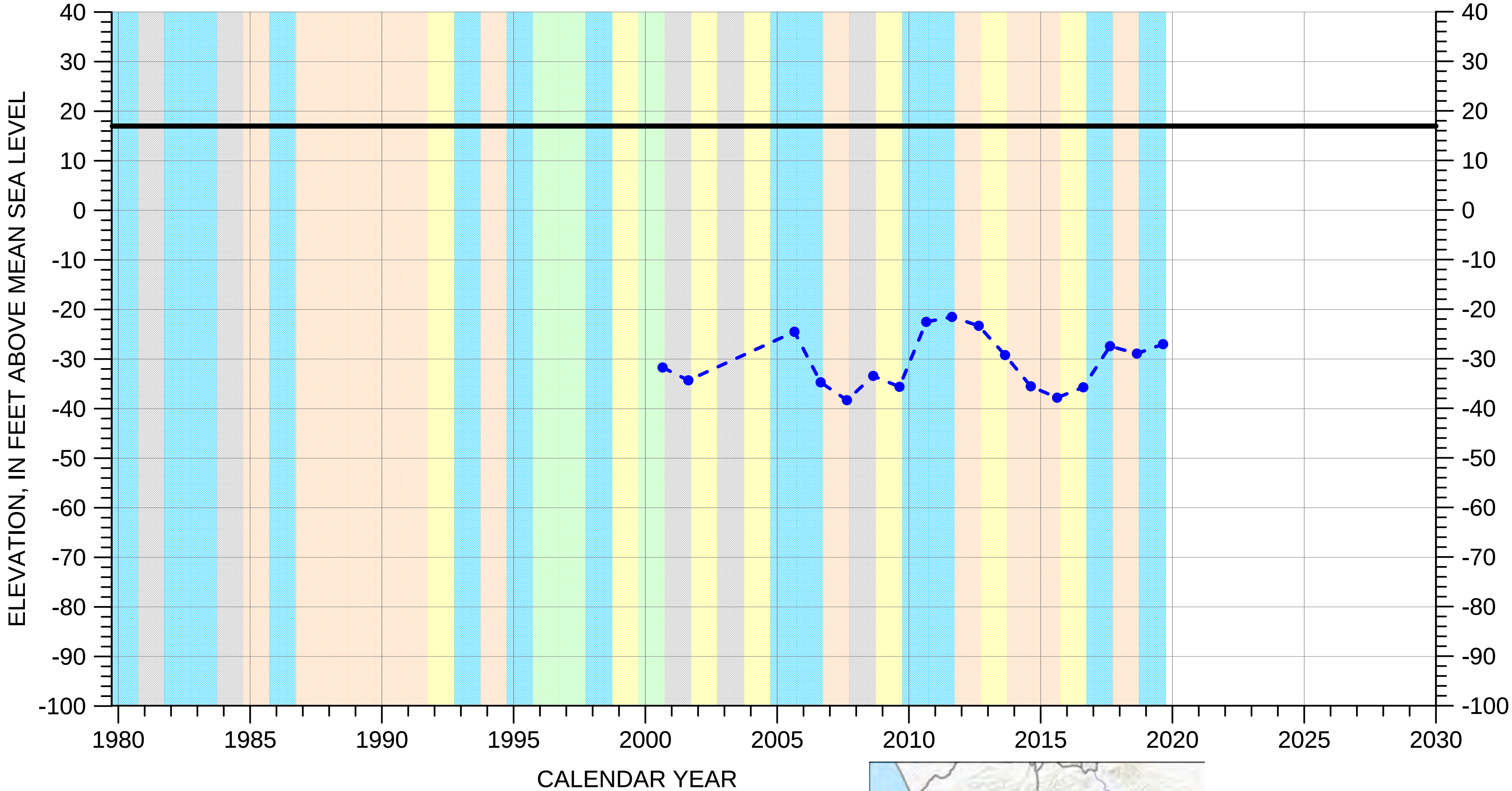




C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-08M02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-09D04

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)

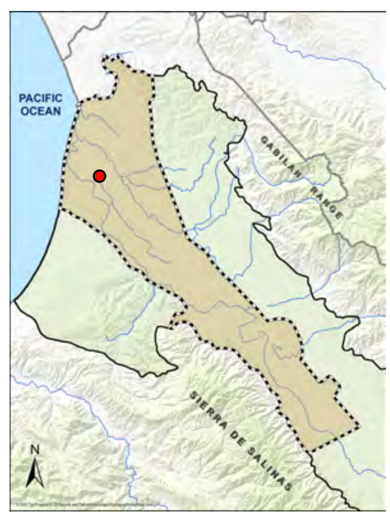


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

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



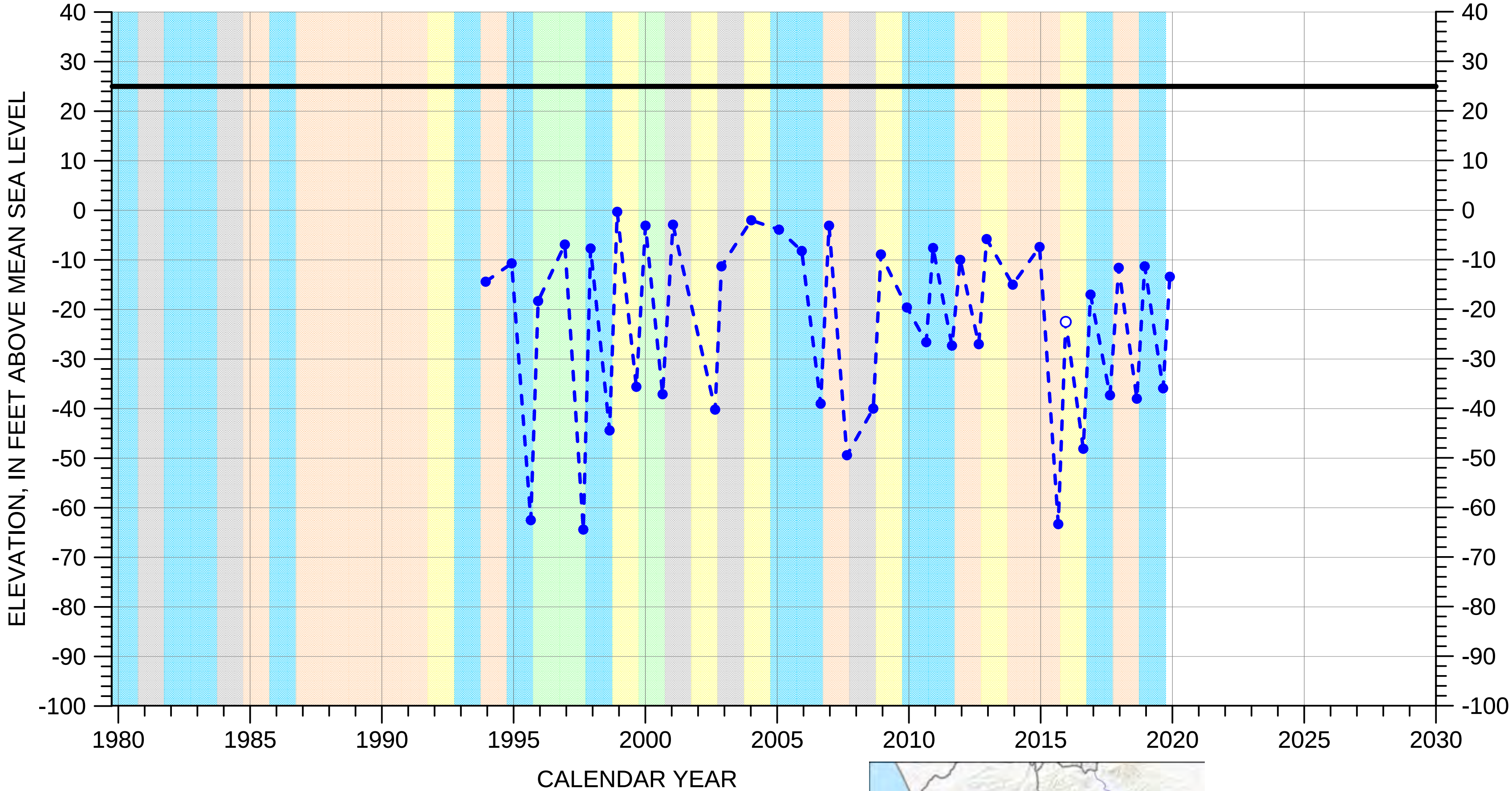
Perforated interval
-333 to -583 feet msl

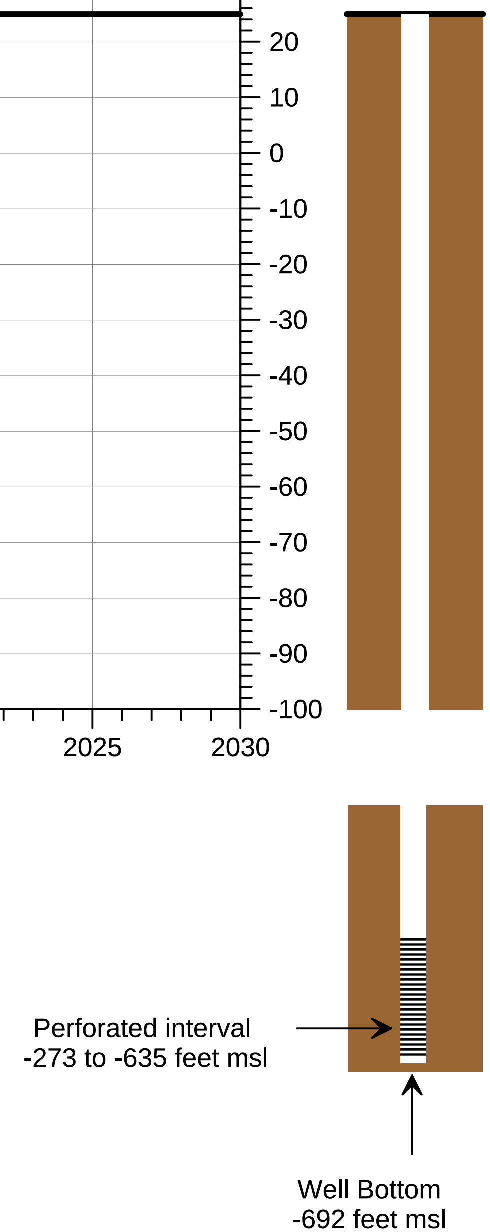
Well Bottom
-593 feet msl

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-09D04.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-10E02

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



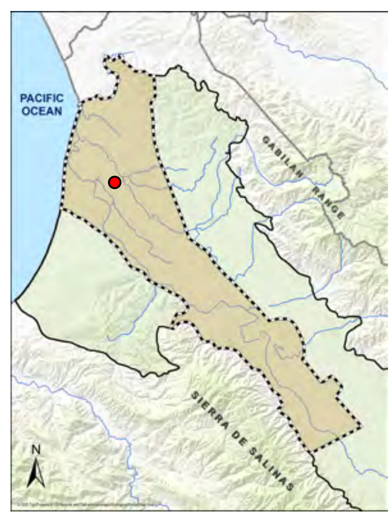


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

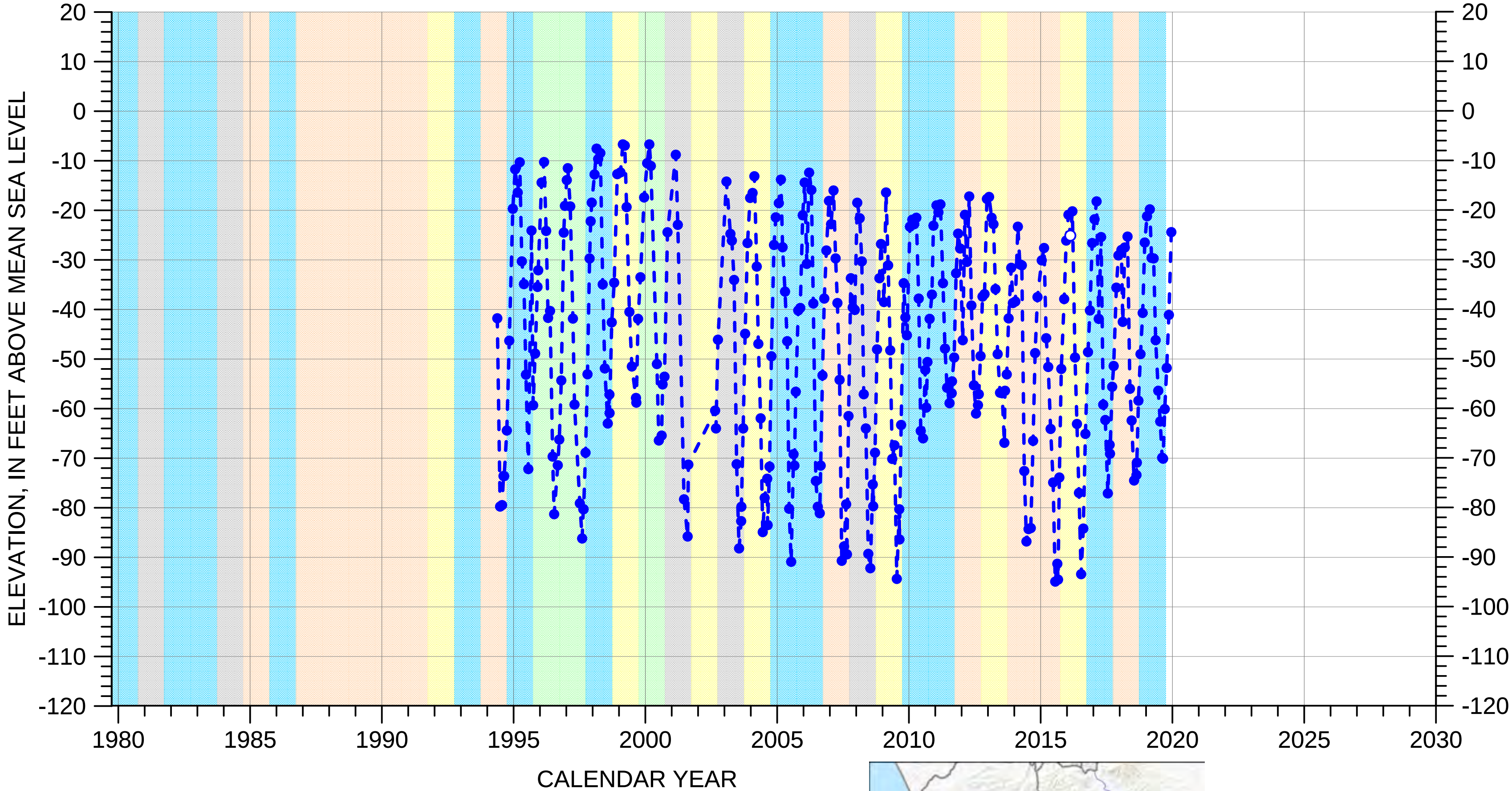
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

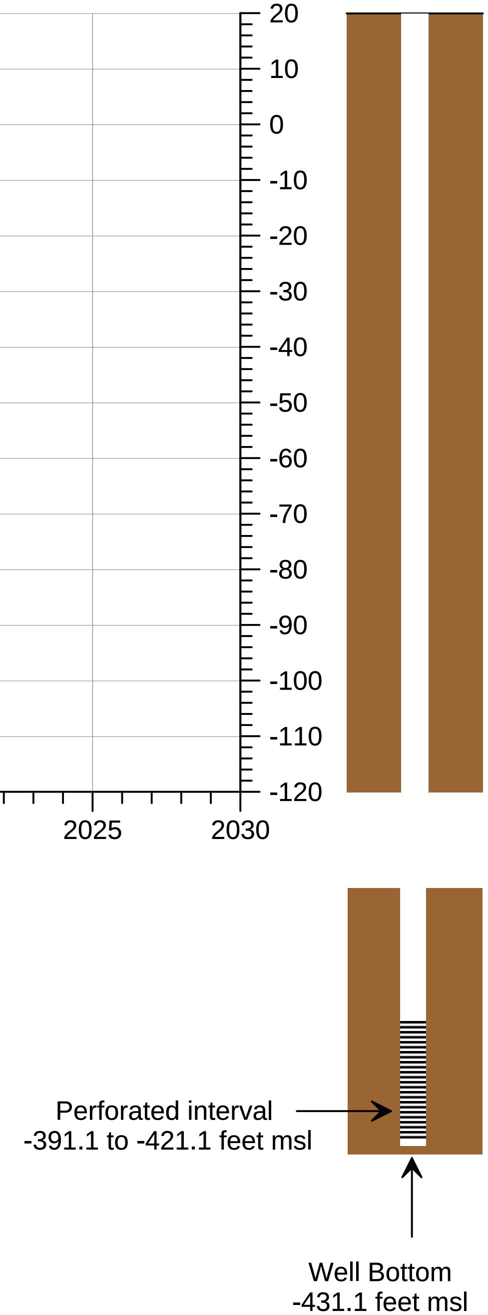


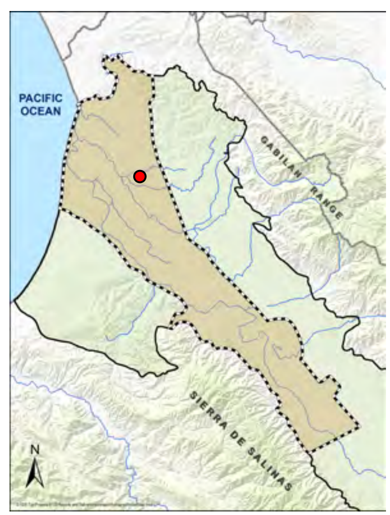
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-10E02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-11A04

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)







EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE (58.9 FT MSL)
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

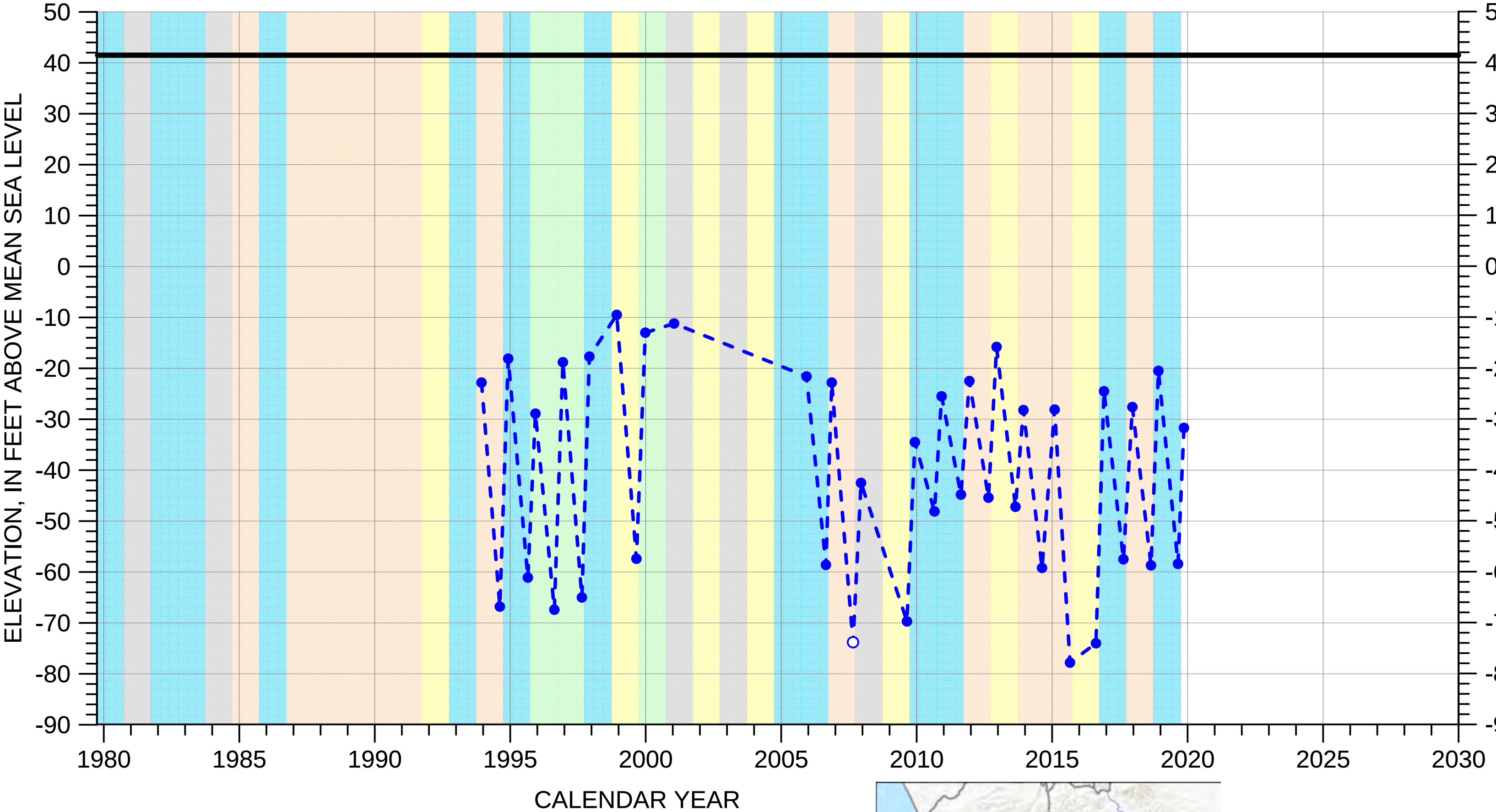
WATER YEAR TYPE DESIGNATION

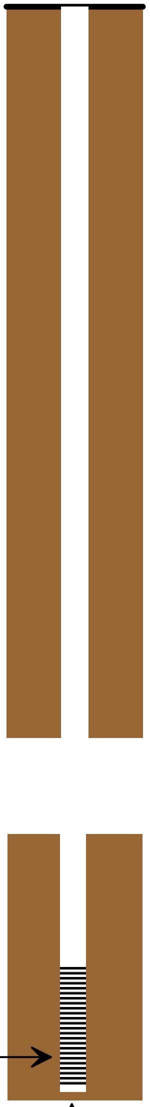
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-11A04.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-11M03

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)





EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

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

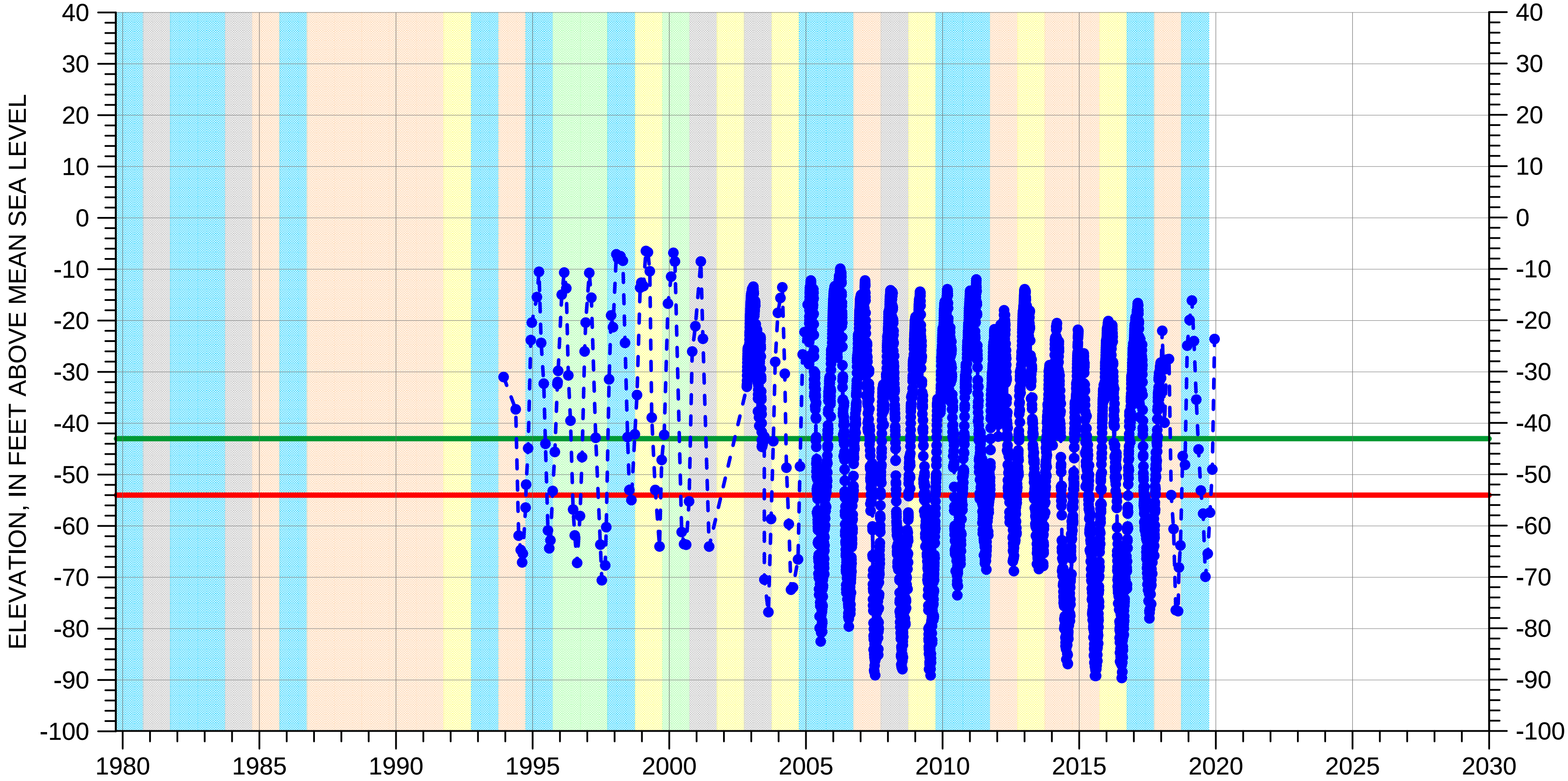
Perforated interval
-358.5 to -618.5 feet msl

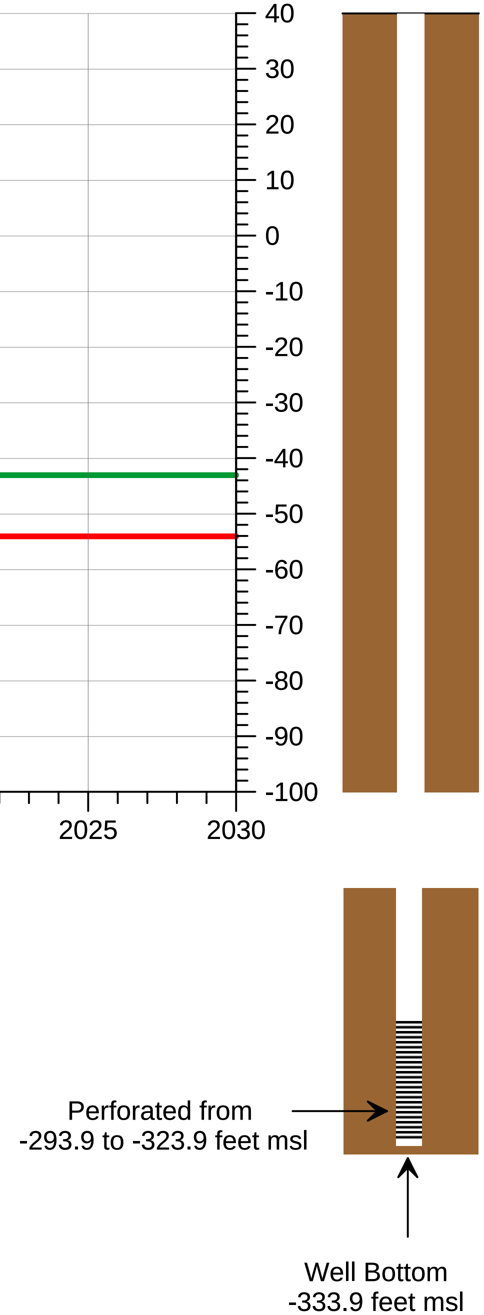
Well Bottom
-618.5 feet msl

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-11M03.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-12B03

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)





EXPLANATION

GROUNDWATER ELEVATION

ESTIMATED ELEVATION

LAND SURFACE (56.1 FT MSL)

MEASURABLE OBJECTIVE

MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

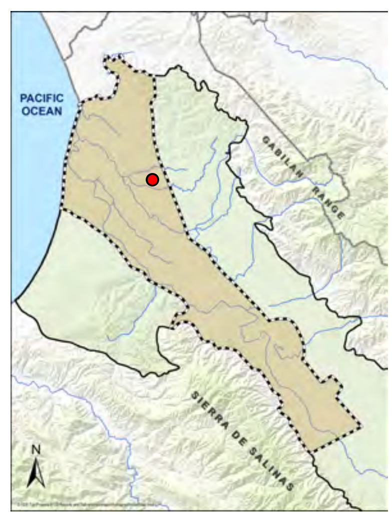
DRY

DRY - NORMAL

NORMAL

WET - NORMAL

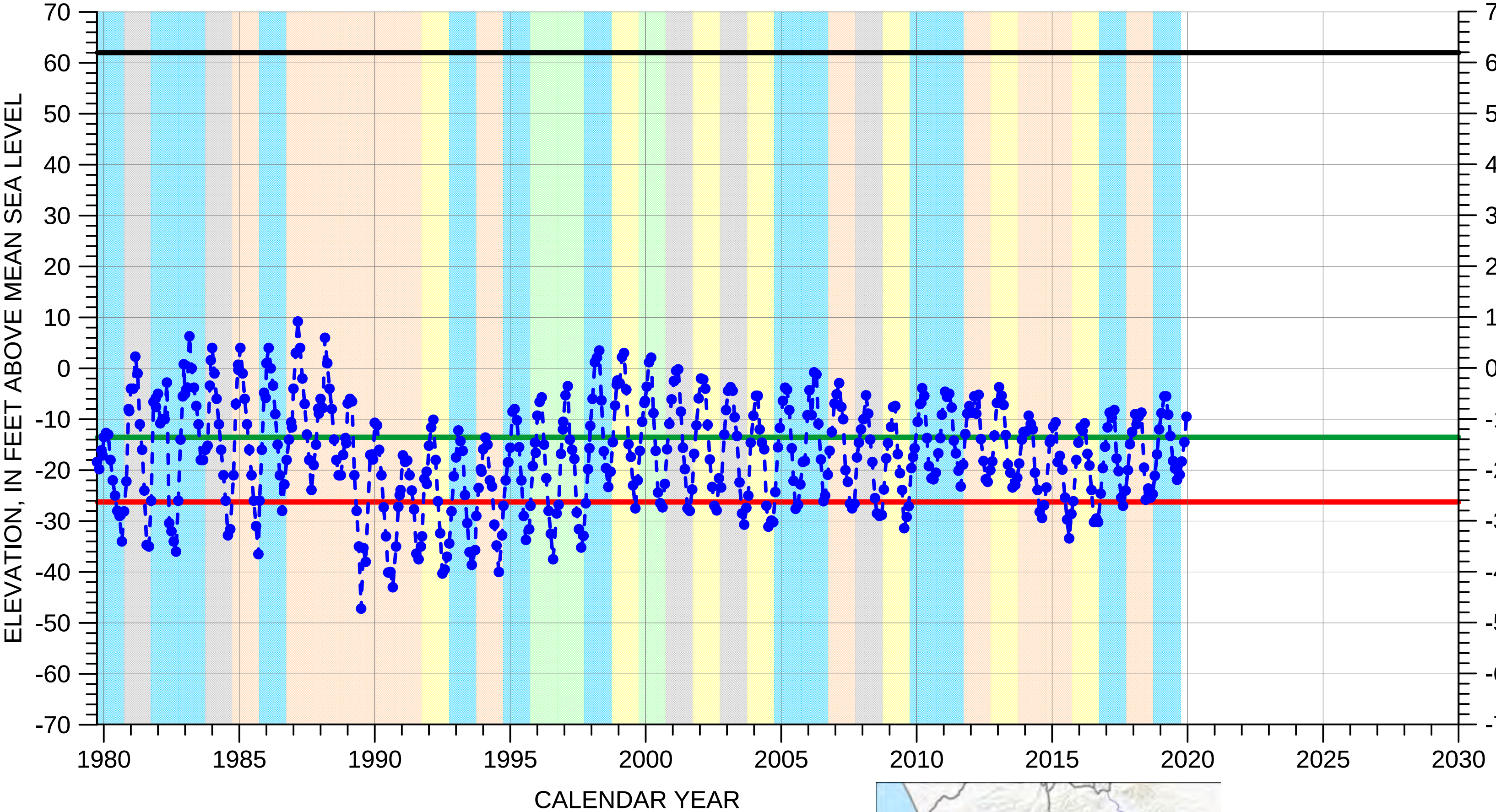
WET

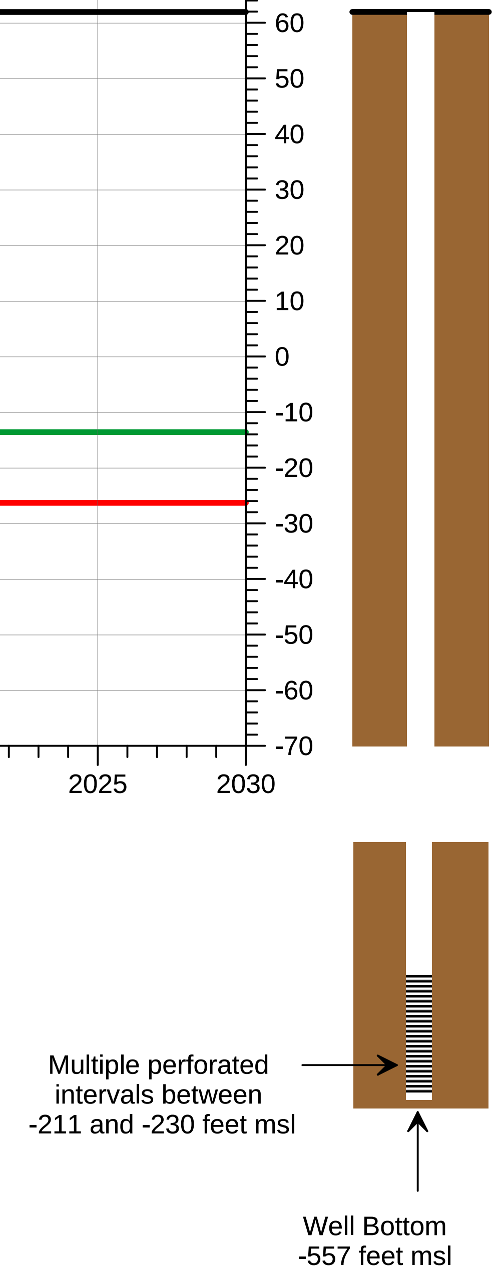


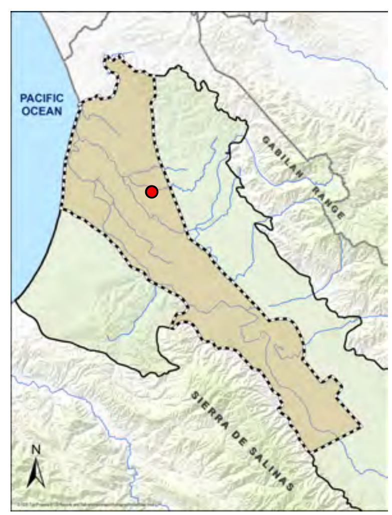
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-12B03.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-12Q01

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)







EXPLANATION

GROUNDWATER ELEVATION
ESTIMATED ELEVATION
LAND SURFACE
MEASURABLE OBJECTIVE
MINIMUM THRESHOLD

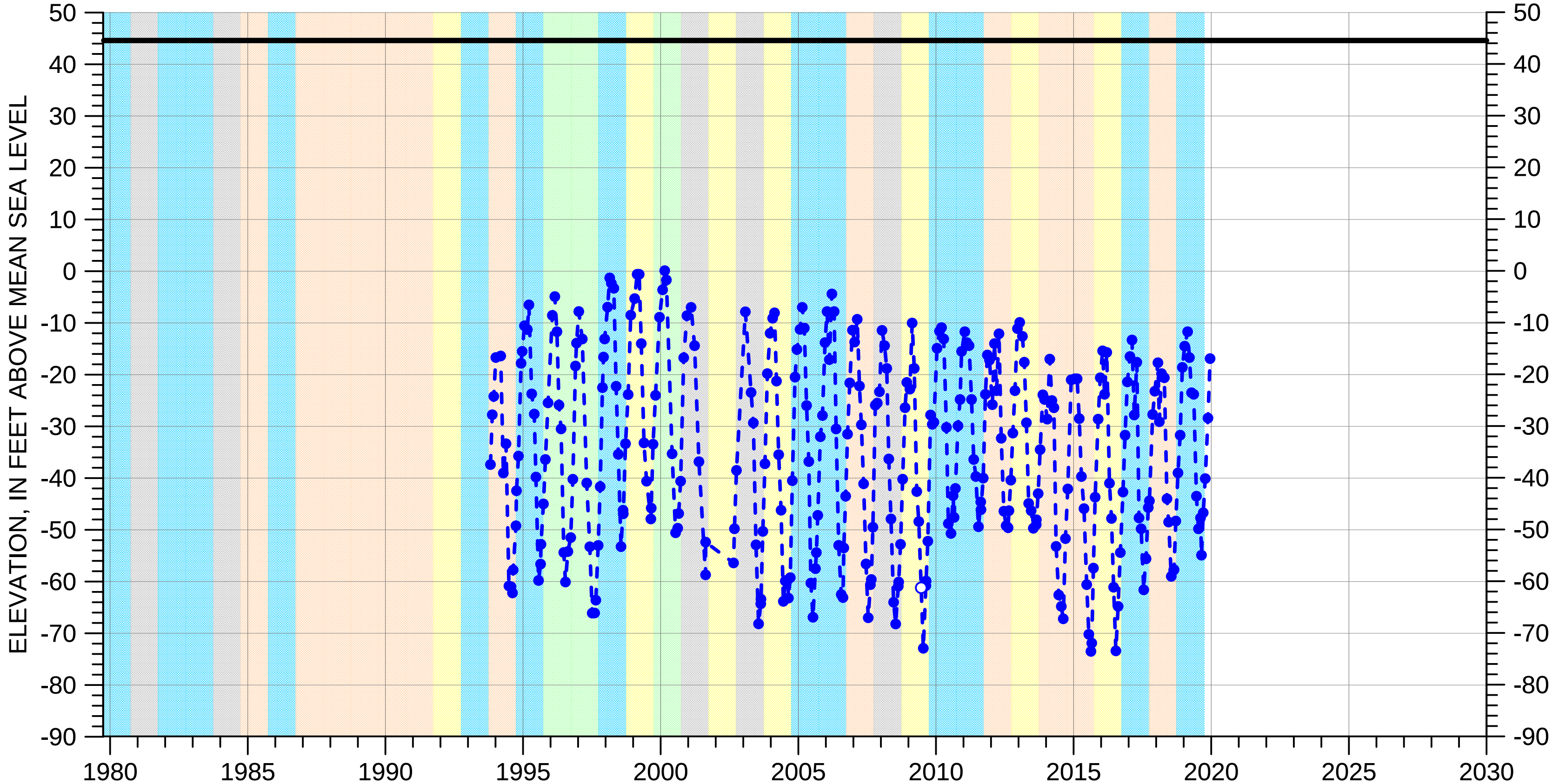
WATER YEAR TYPE DESIGNATION

DRY
DRY - NORMAL
NORMAL
WET - NORMAL
WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-12Q01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-13F02

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)

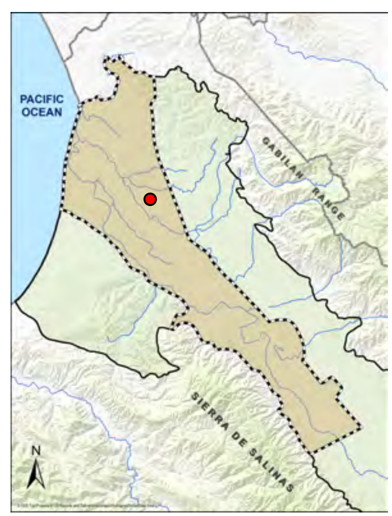


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

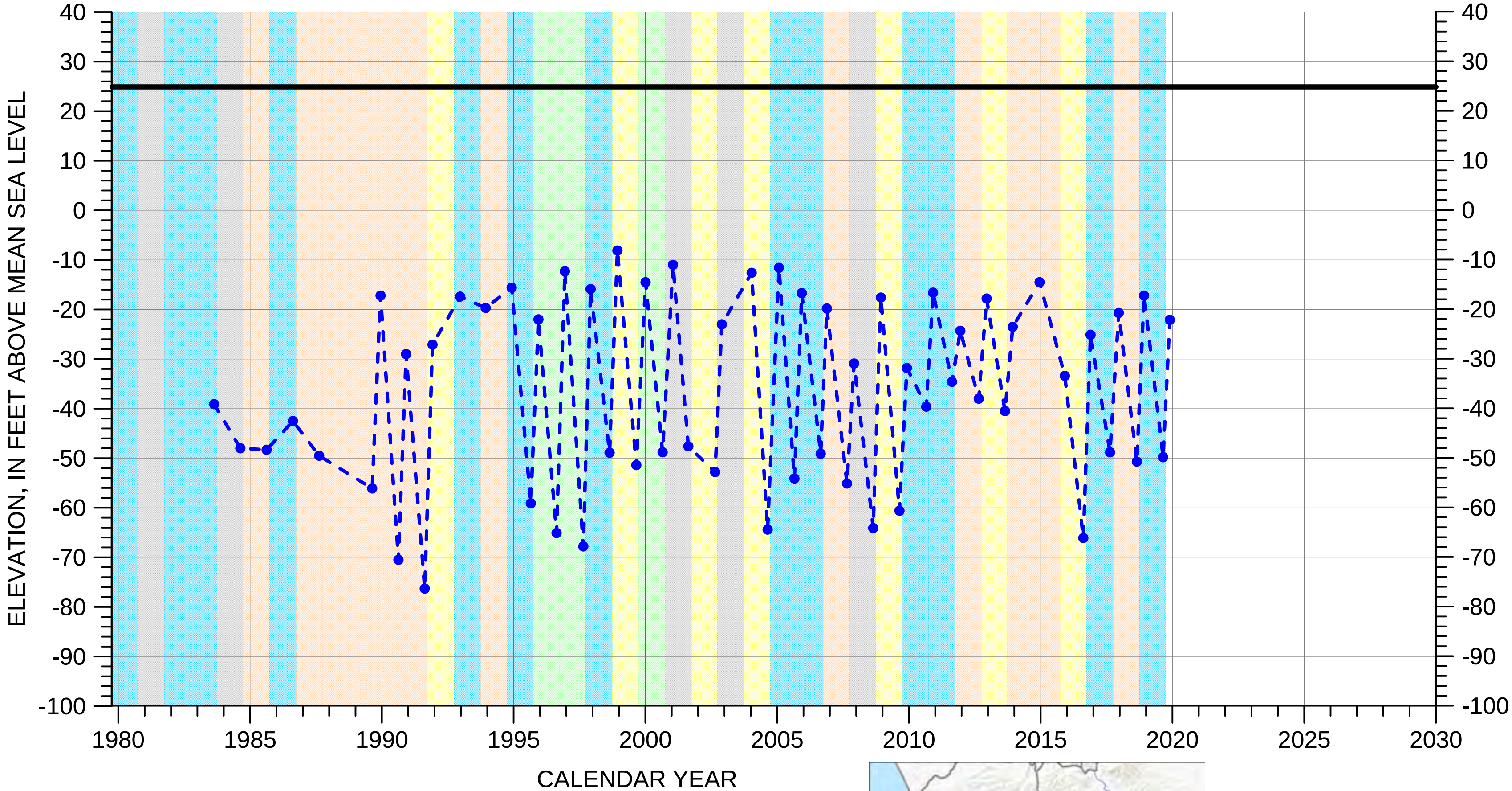
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

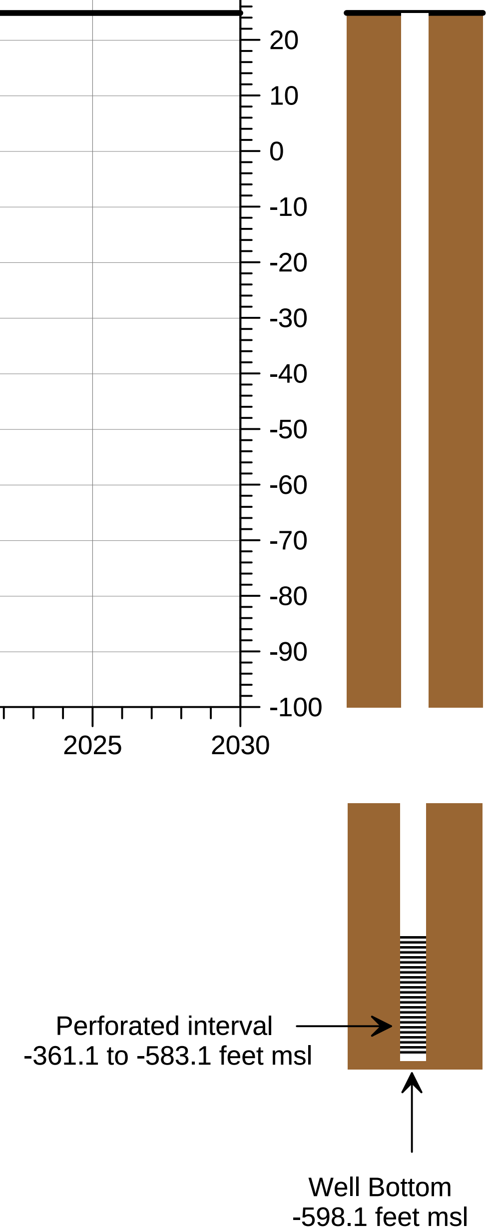


C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-13F02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-15A01

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



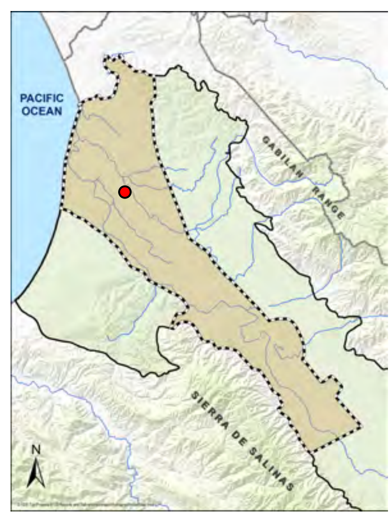


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

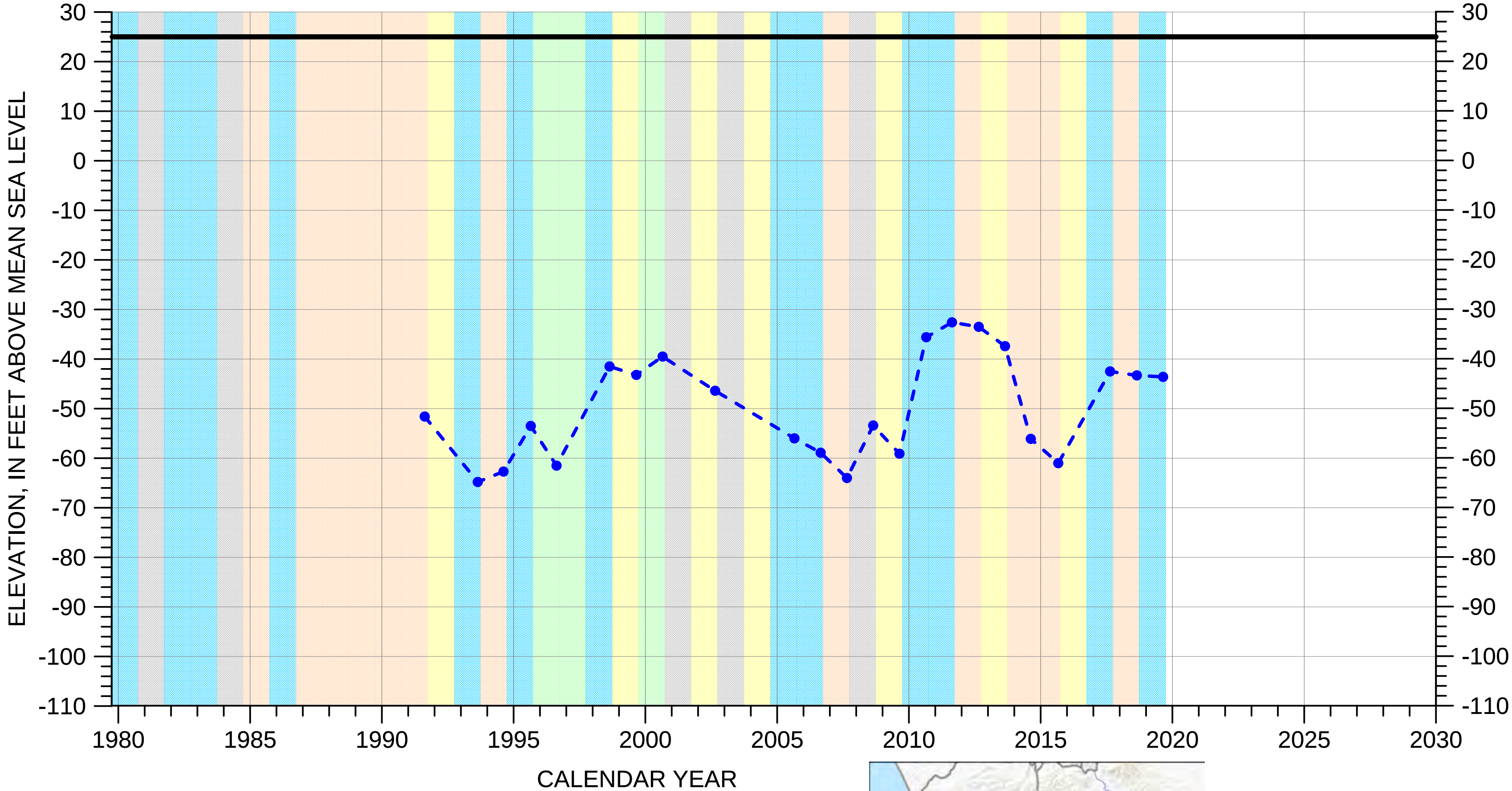
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

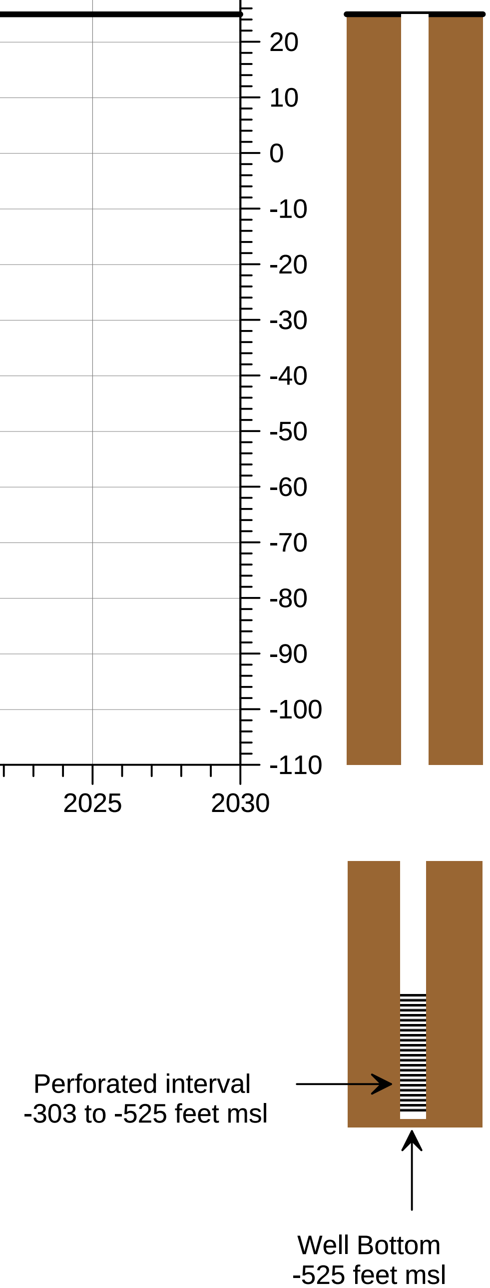


C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-15A01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-15C02

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



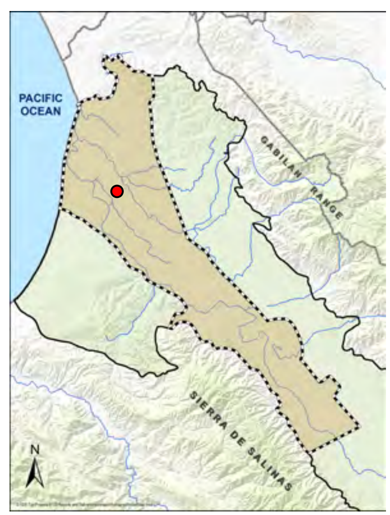


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

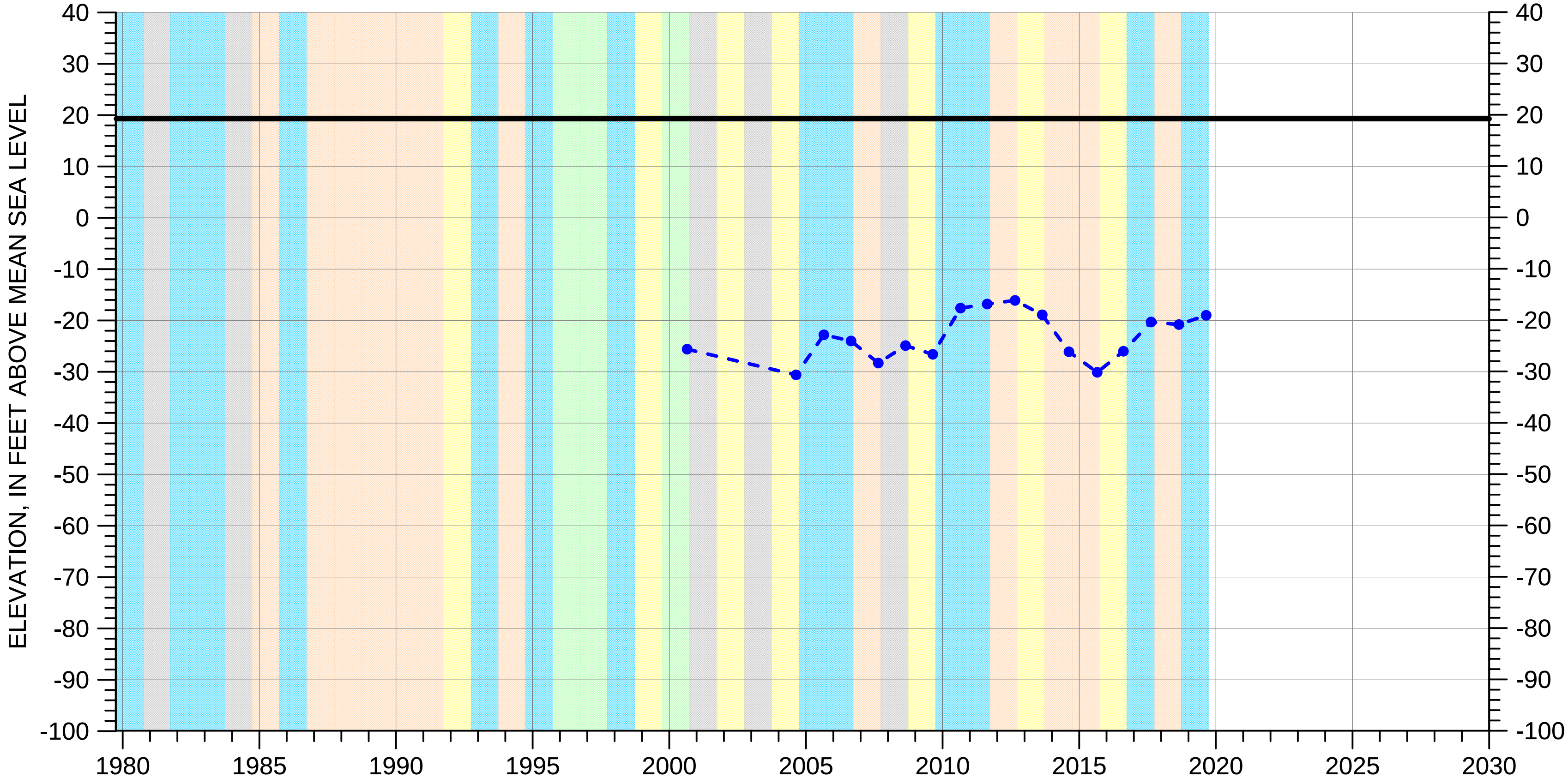
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

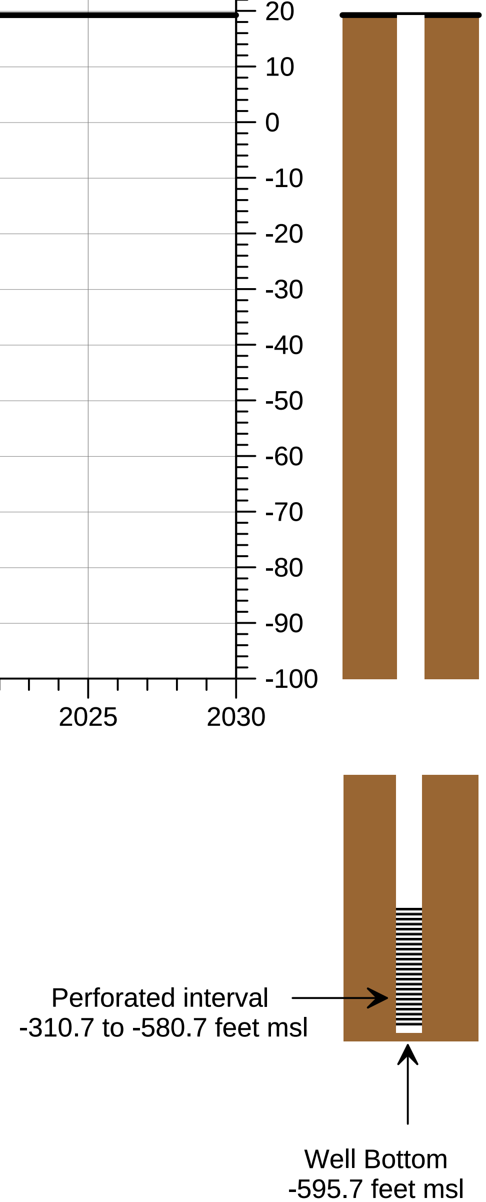


C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-15C02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-17B03

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)





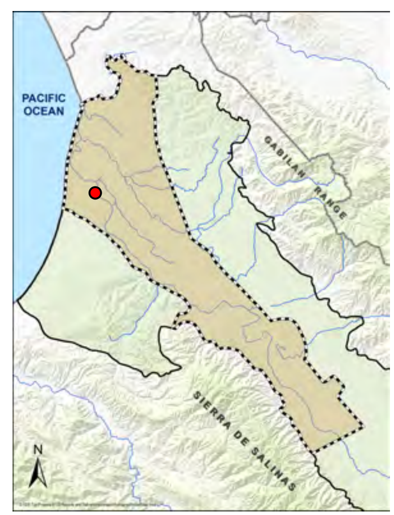
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-17B03.grf

EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

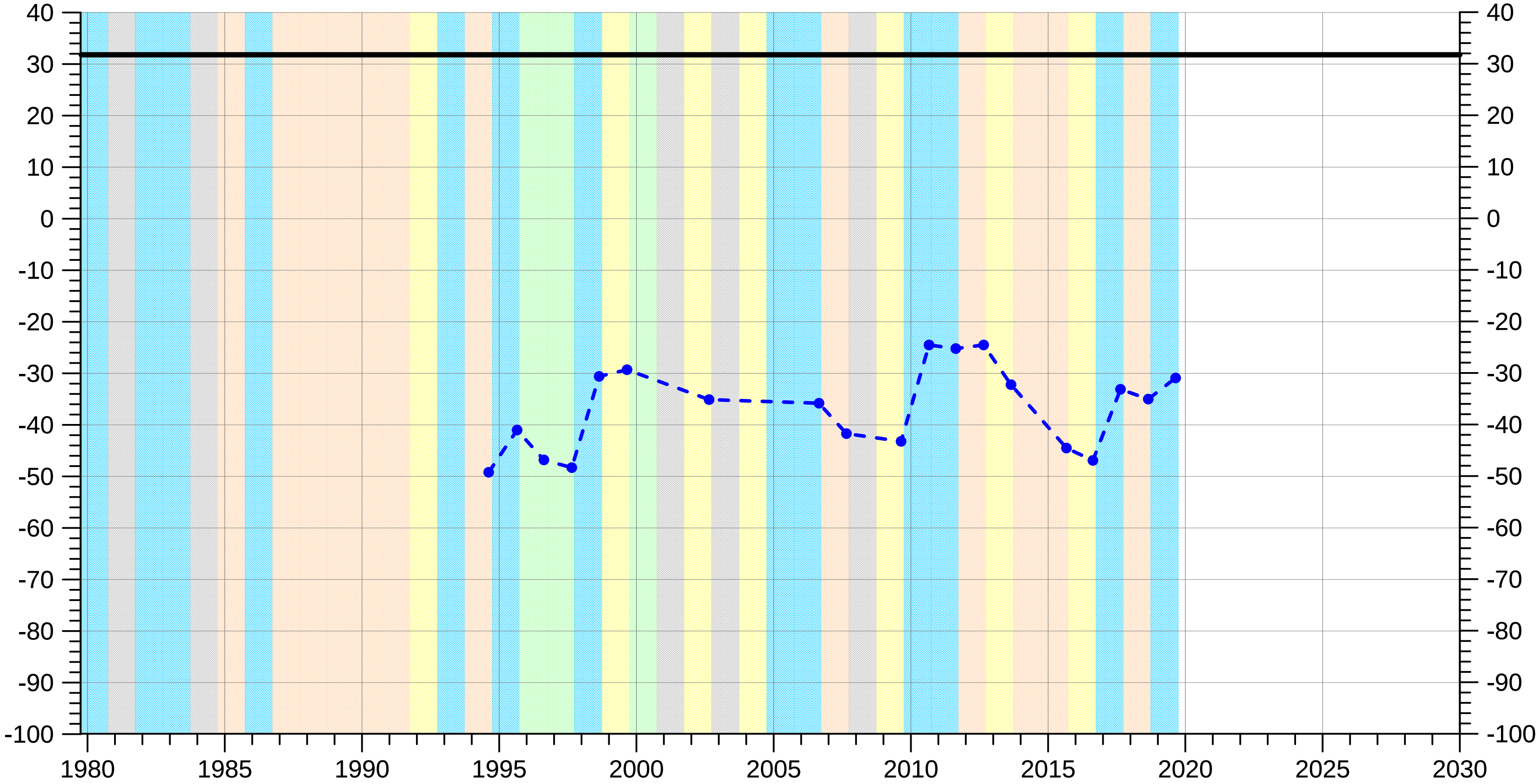
WATER YEAR TYPE DESIGNATION

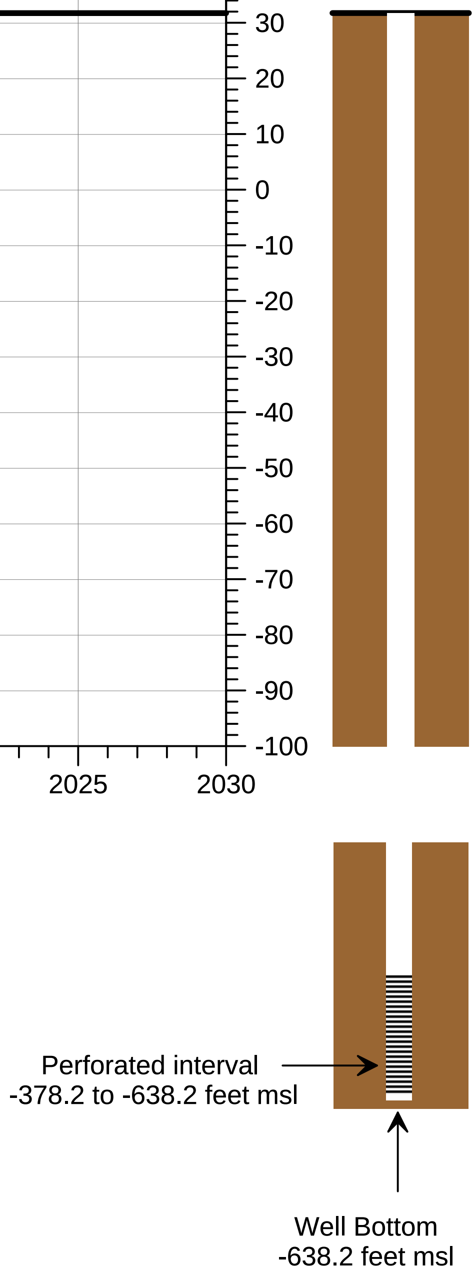
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-22B01

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)





EXPLANATION

GROUNDWATER ELEVATION
ESTIMATED ELEVATION
LAND SURFACE
MEASURABLE OBJECTIVE
MINIMUM THRESHOLD

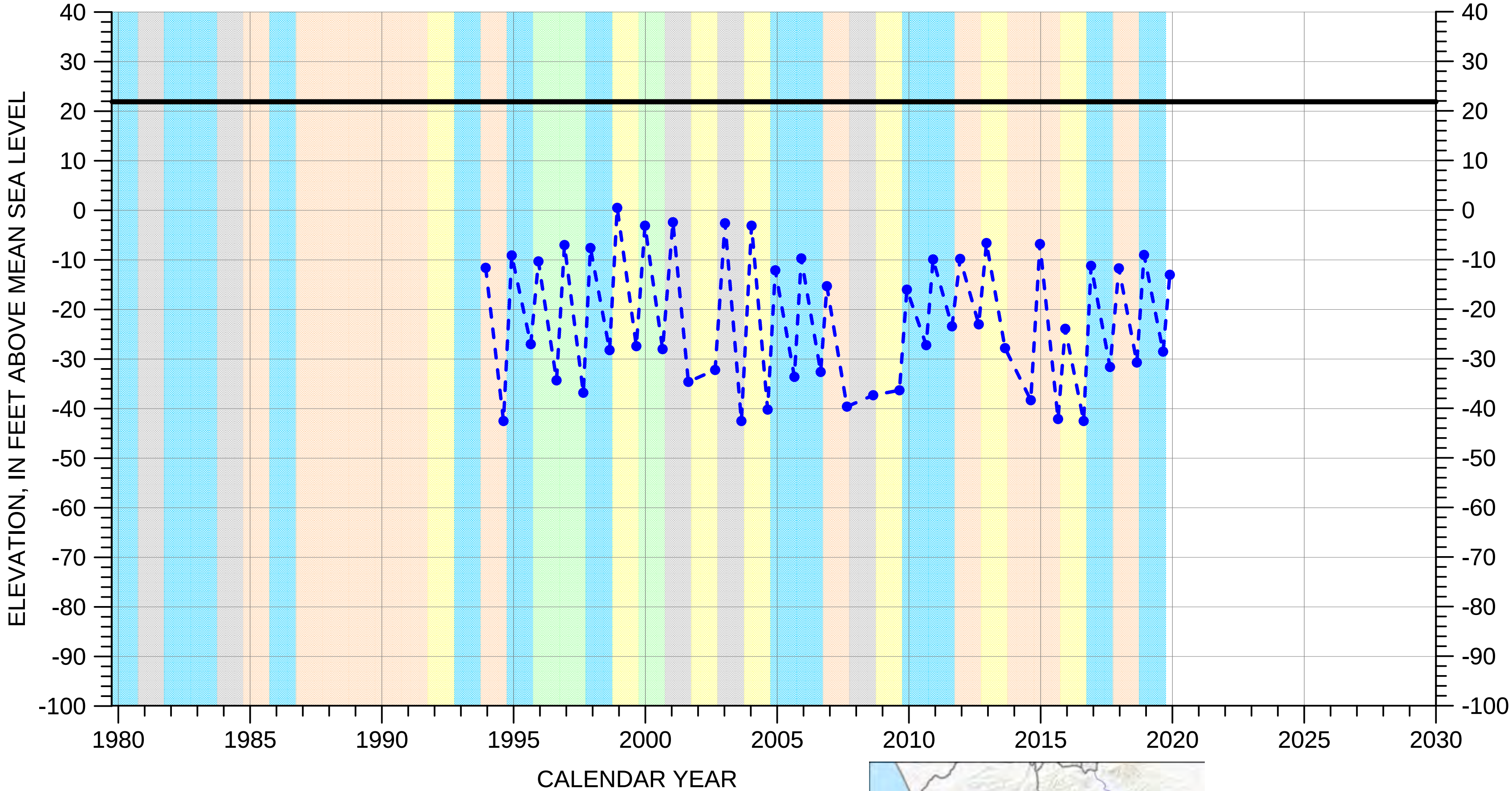
WATER YEAR TYPE DESIGNATION

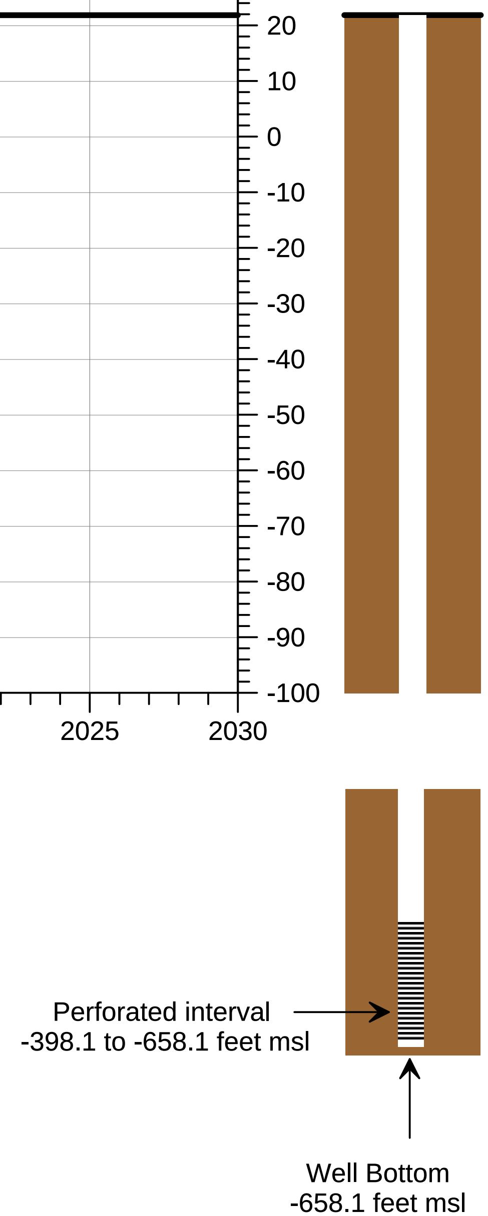
DRY
DRY - NORMAL
NORMAL
WET - NORMAL
WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-22B01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-22L01

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



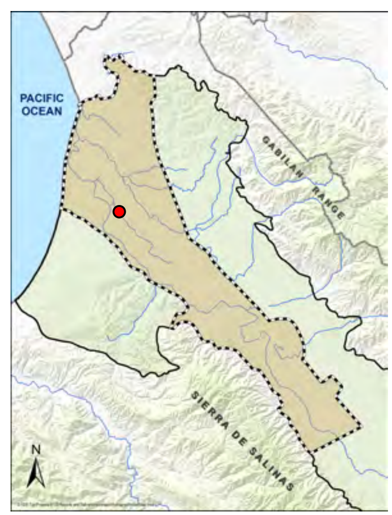


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

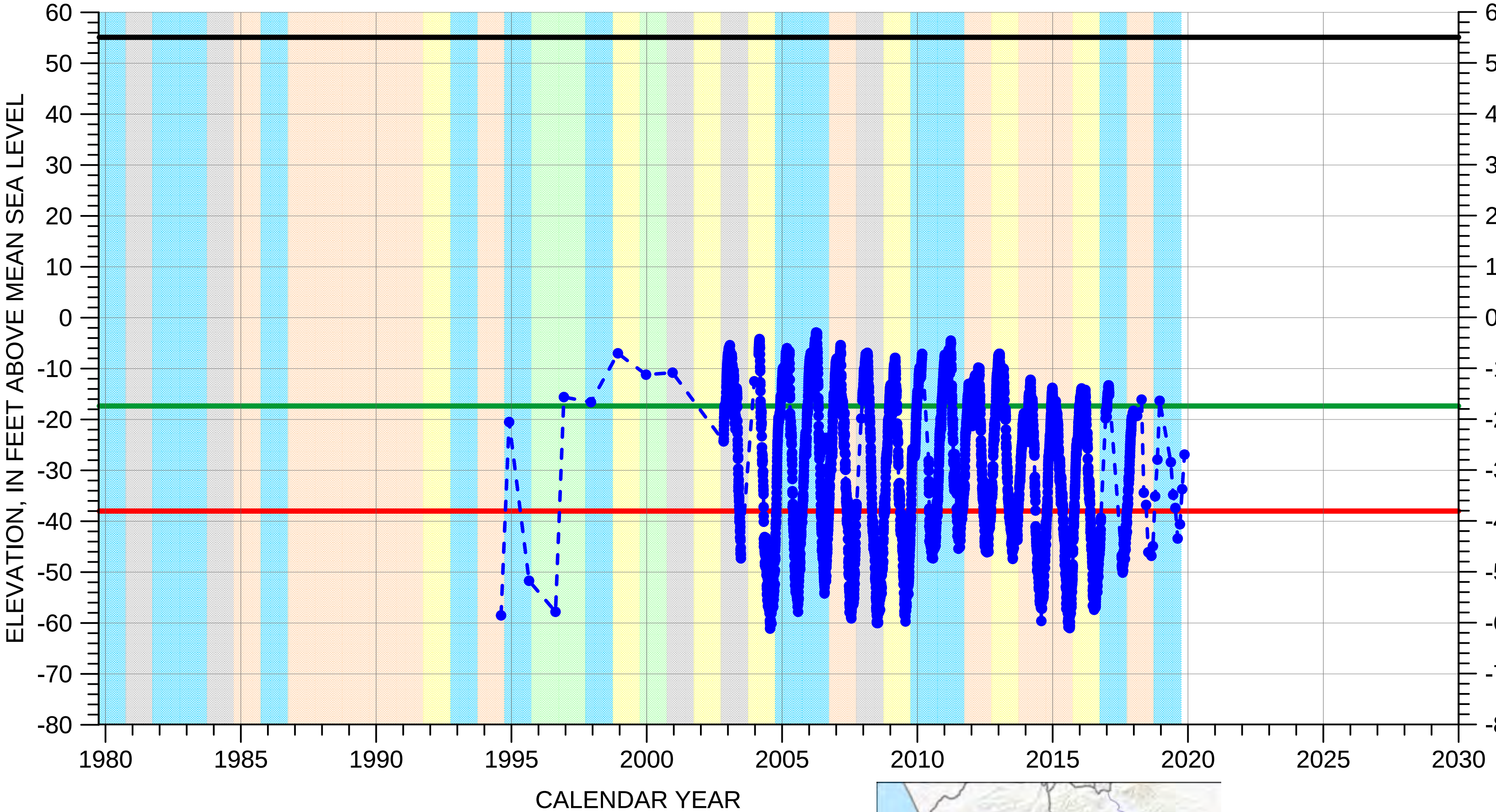
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

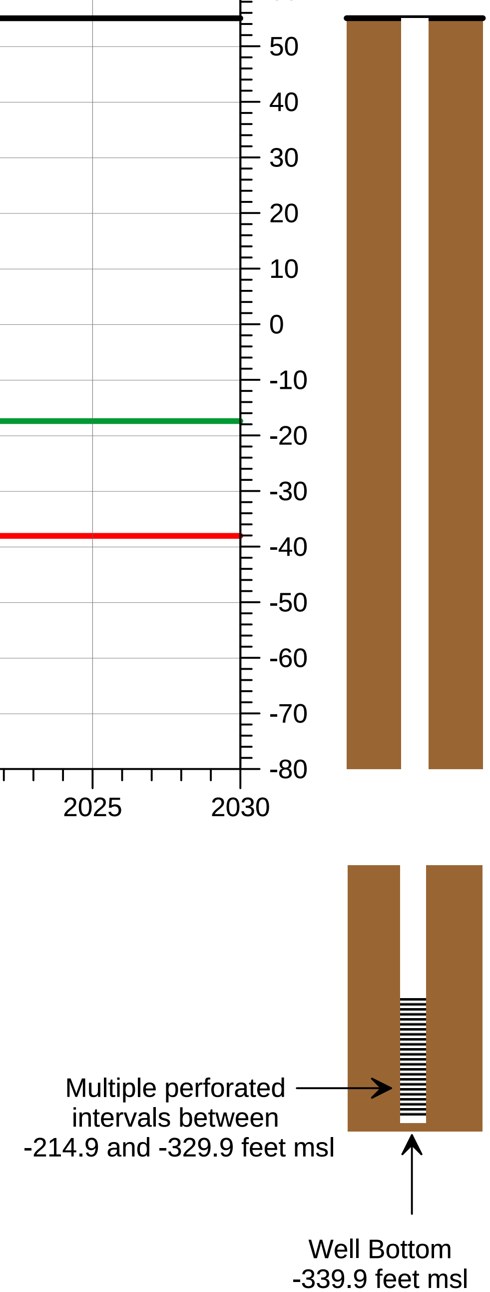


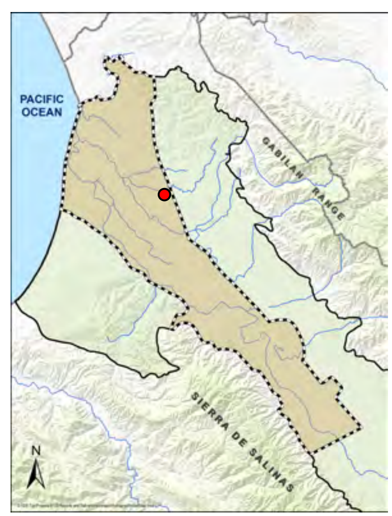
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-22L01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-18C02

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)







EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

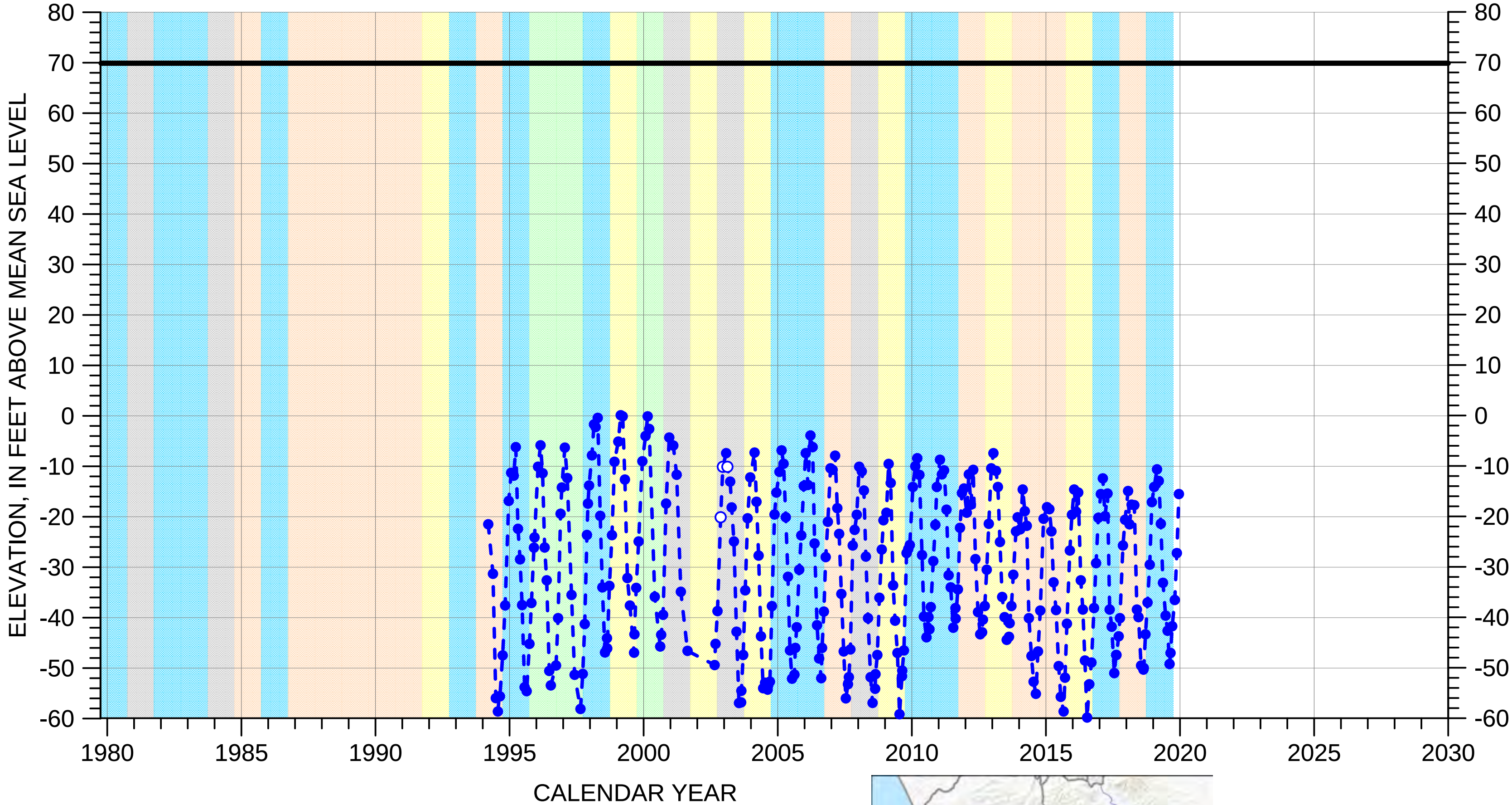
WATER YEAR TYPE DESIGNATION

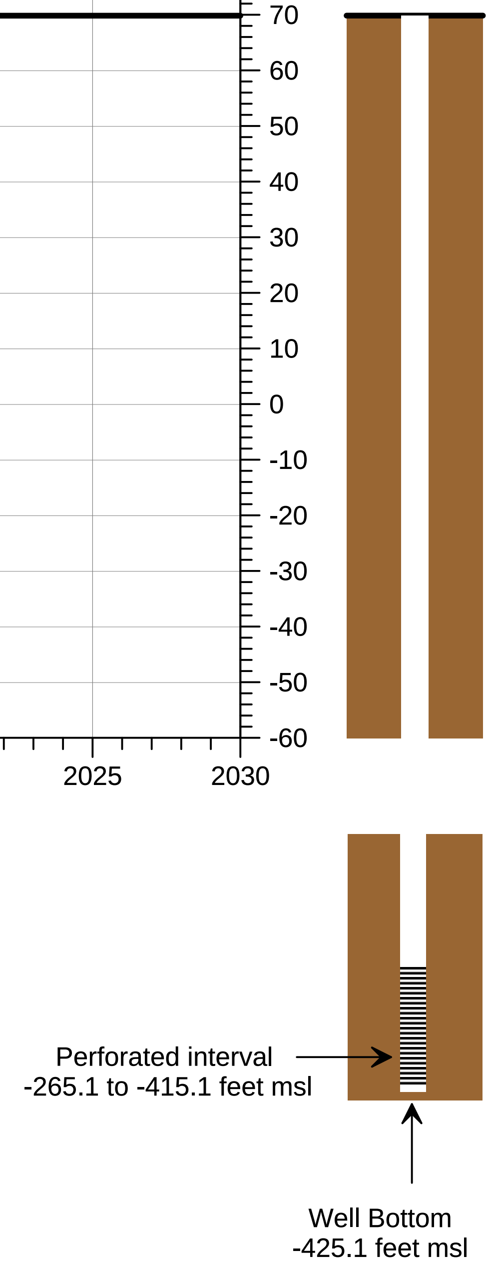
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_03E-18C02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/03E-18E04

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)





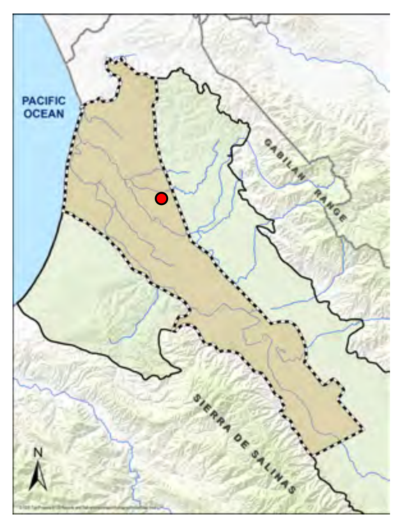
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_03E-18E04.grf

EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

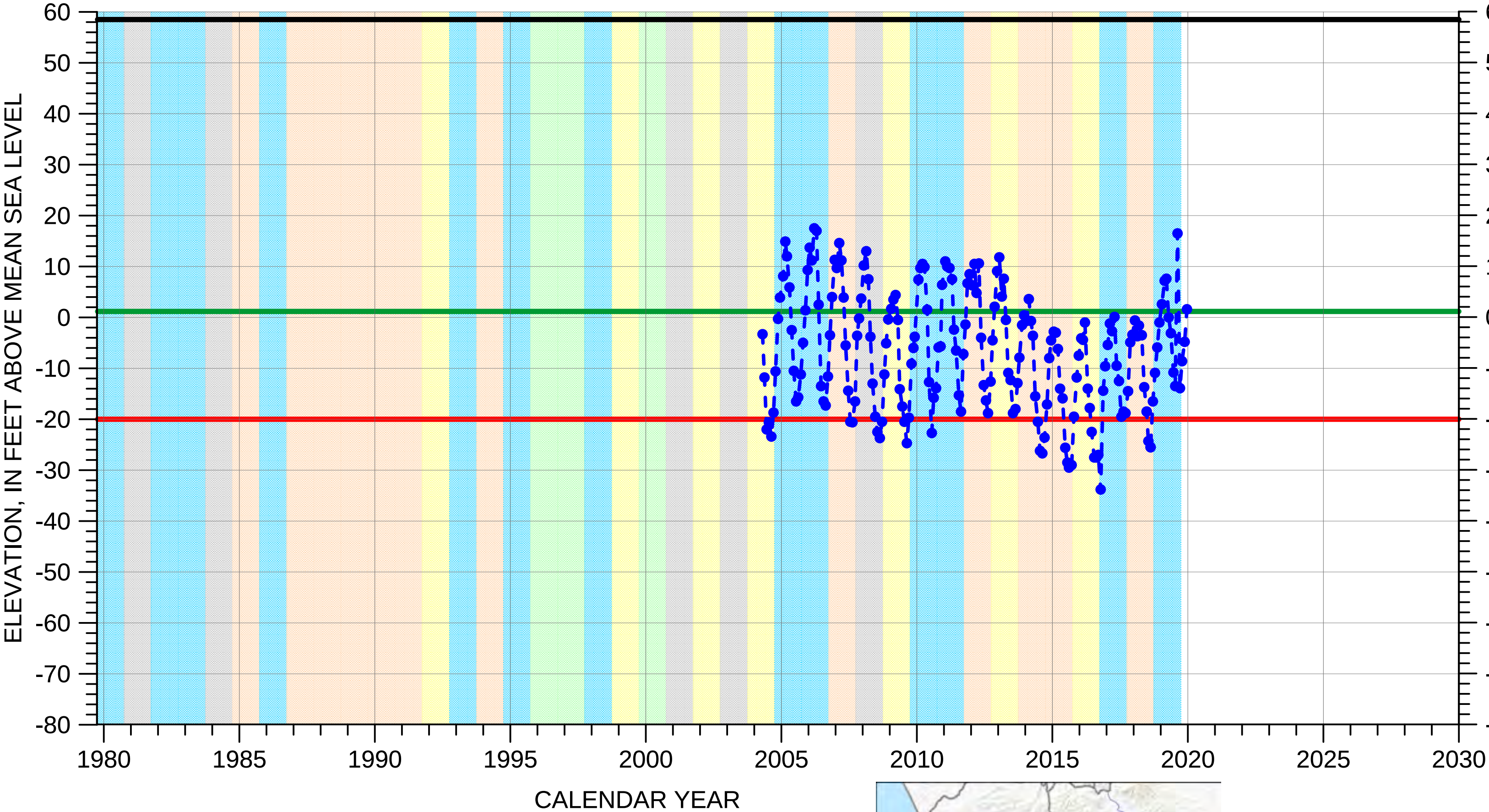
WATER YEAR TYPE DESIGNATION

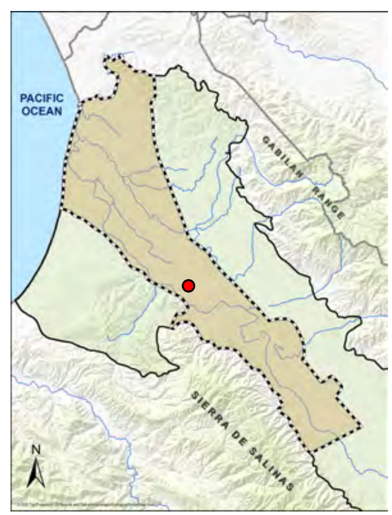
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

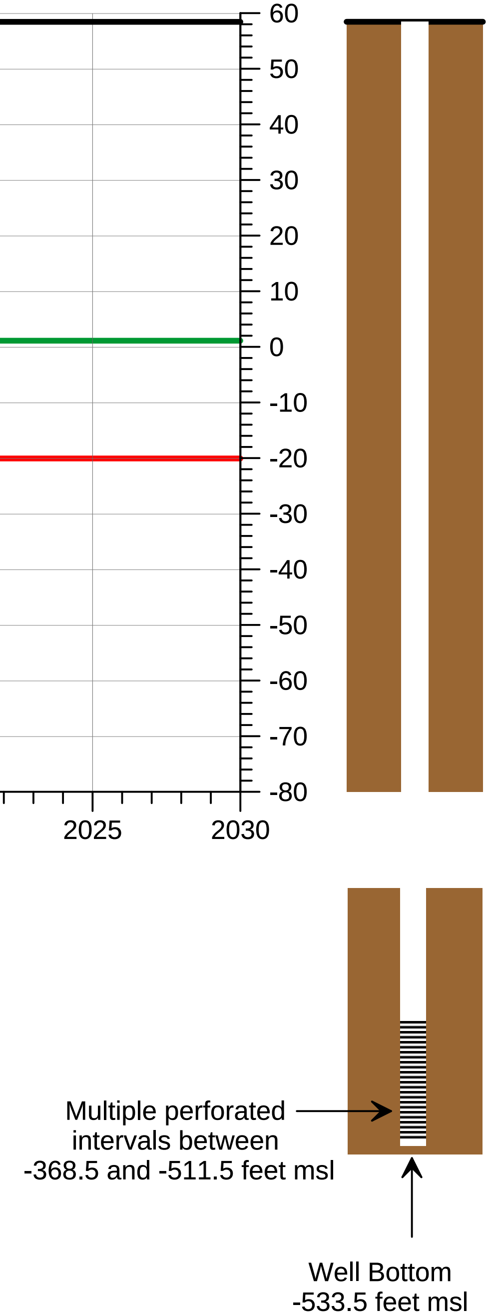


HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 15S/03E-16F02

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)







EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

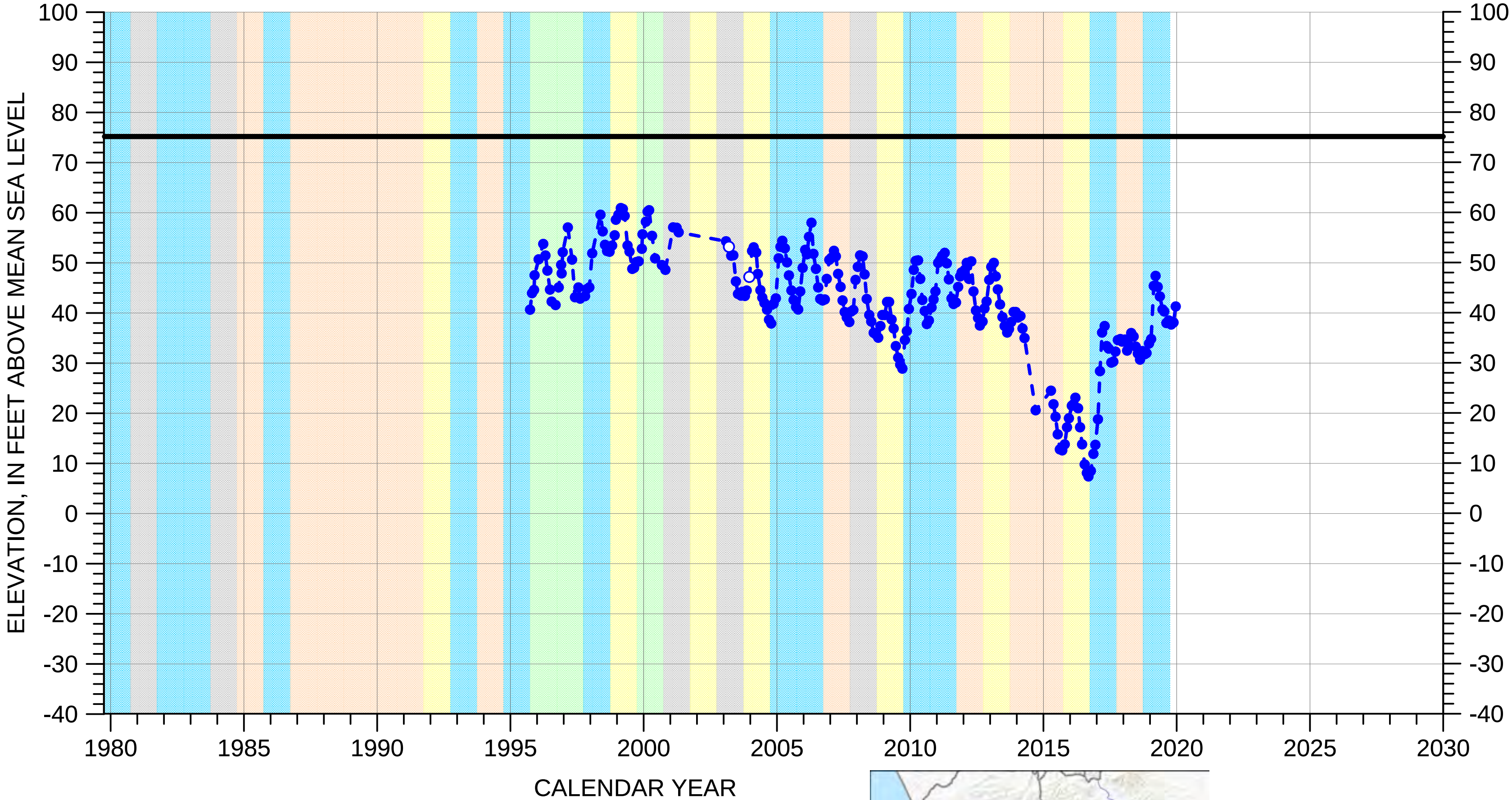
WATER YEAR TYPE DESIGNATION

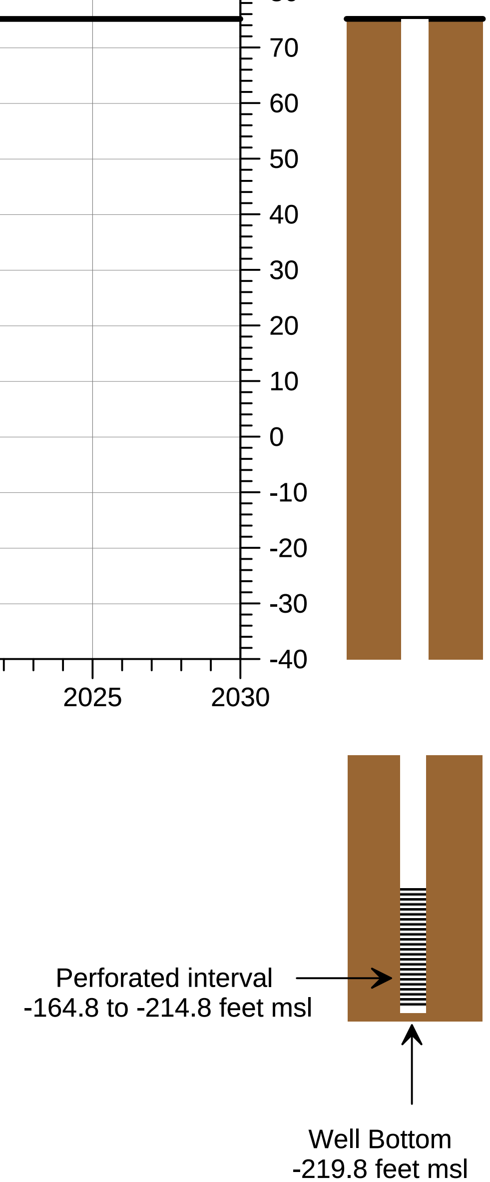
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\15S_03E-16F02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 16S/04E-08H02

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)



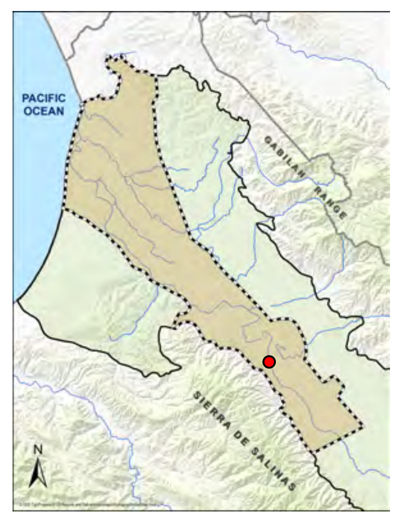


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

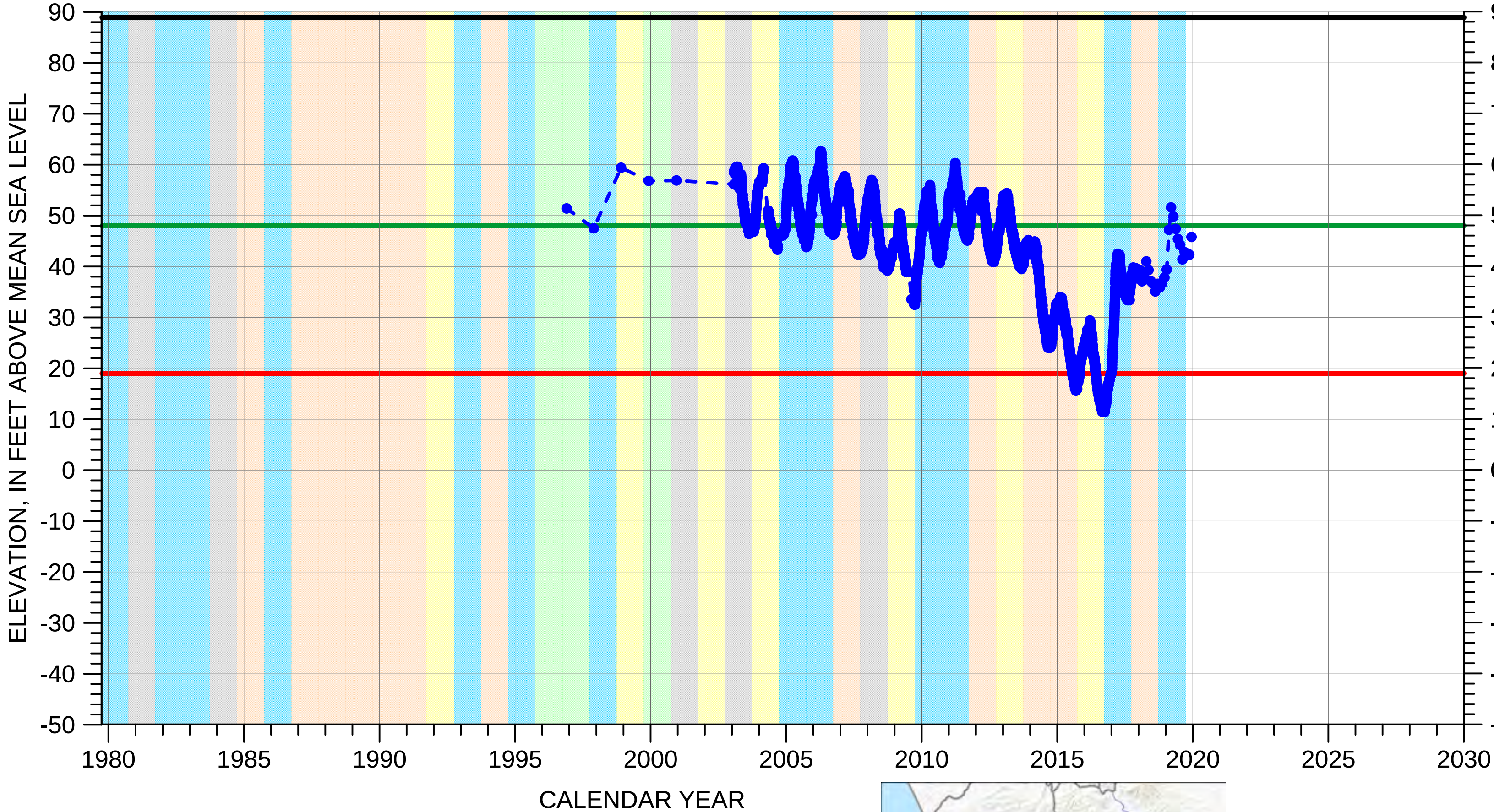
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

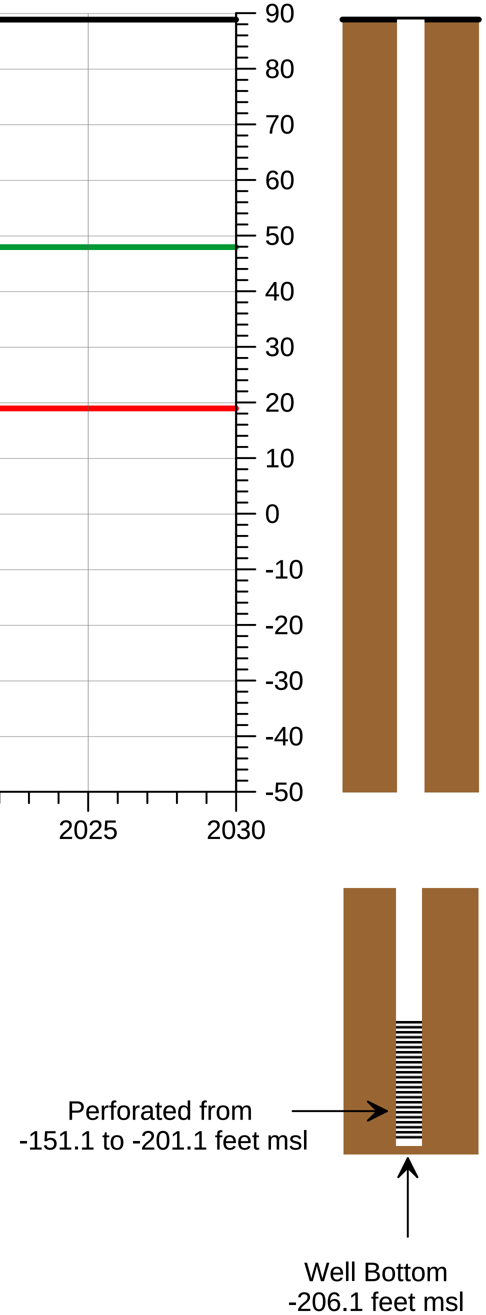


C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\16S_04E-08H02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 16S/04E-08H03

180/400-Foot Aquifer Subbasin
(400-Foot Aquifer)





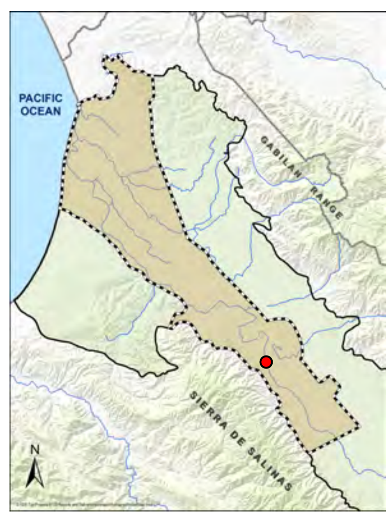
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\16S_04E-08H03.grf

EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

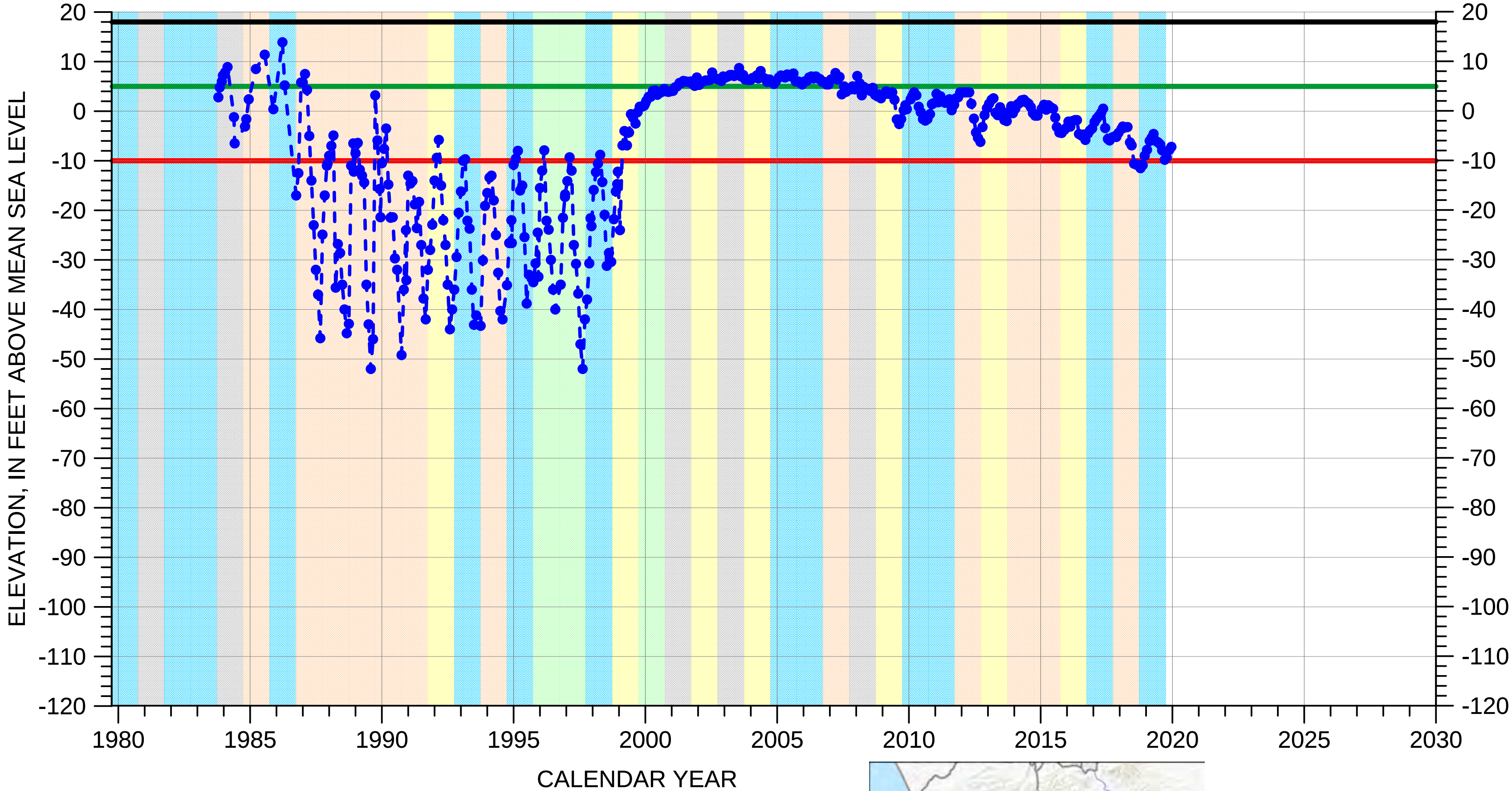
WATER YEAR TYPE DESIGNATION

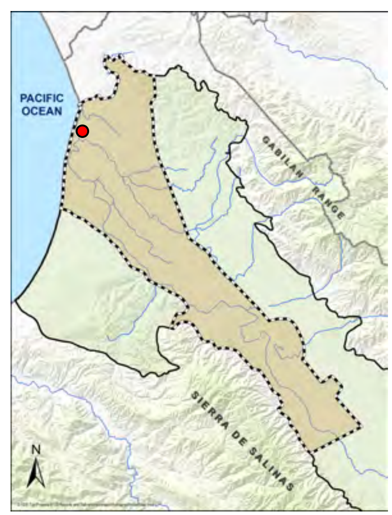
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 13S/02E-19Q03

180/400-Foot Aquifer Subbasin
(Deep Aquifer)





EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

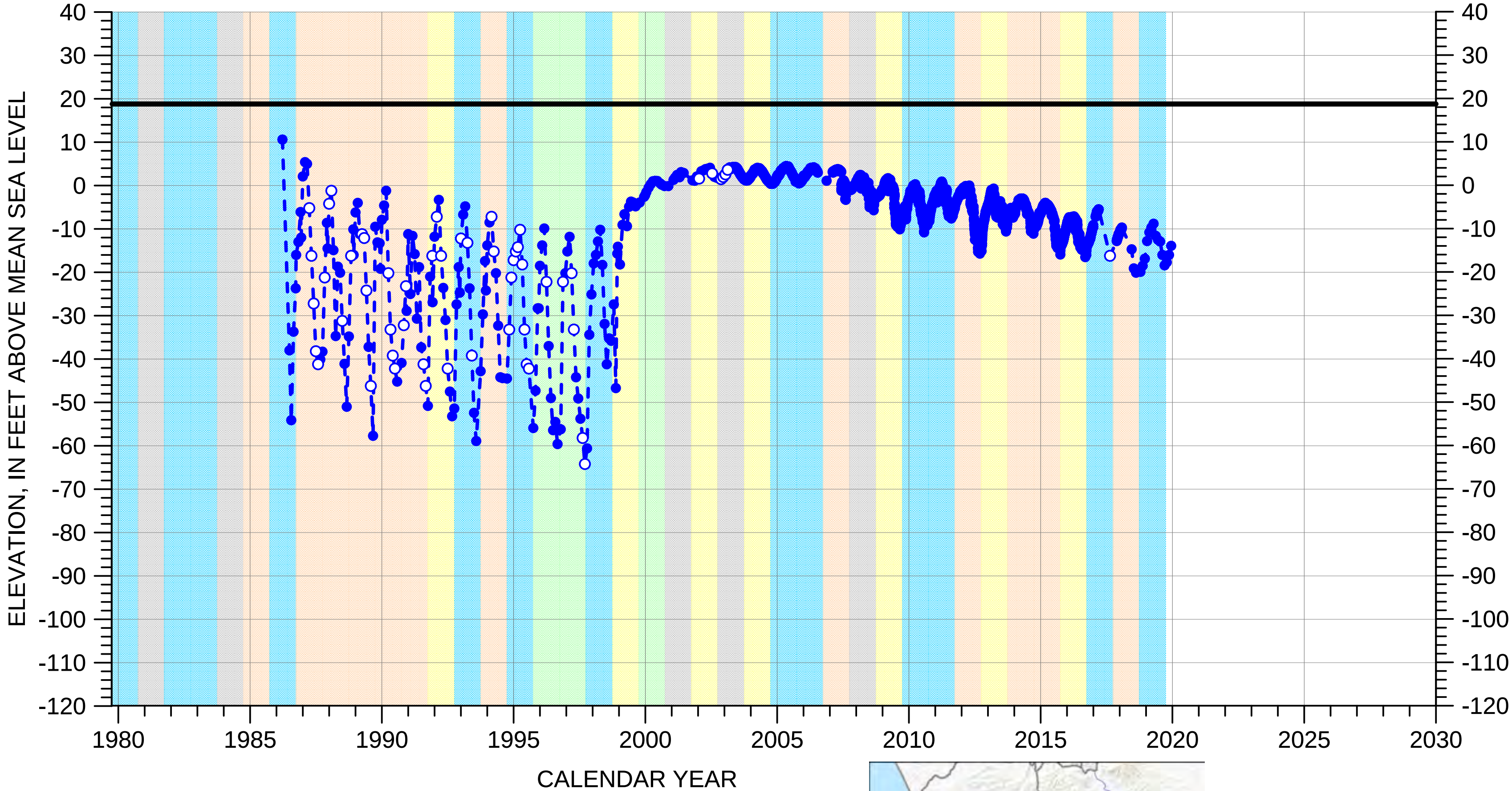
WATER YEAR TYPE DESIGNATION

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

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\13S_02E-19Q03.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 13S/02E-32E05

180/400-Foot Aquifer Subbasin
(Deep Aquifer)



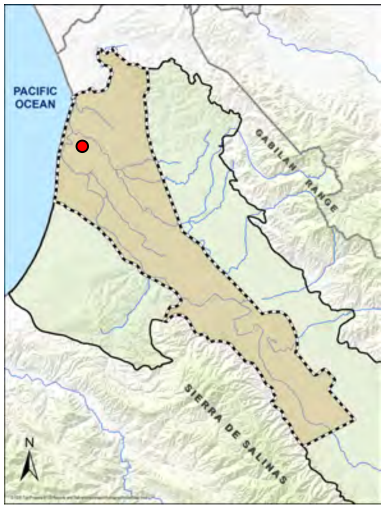
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\13S_02E-32E05.grf

EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

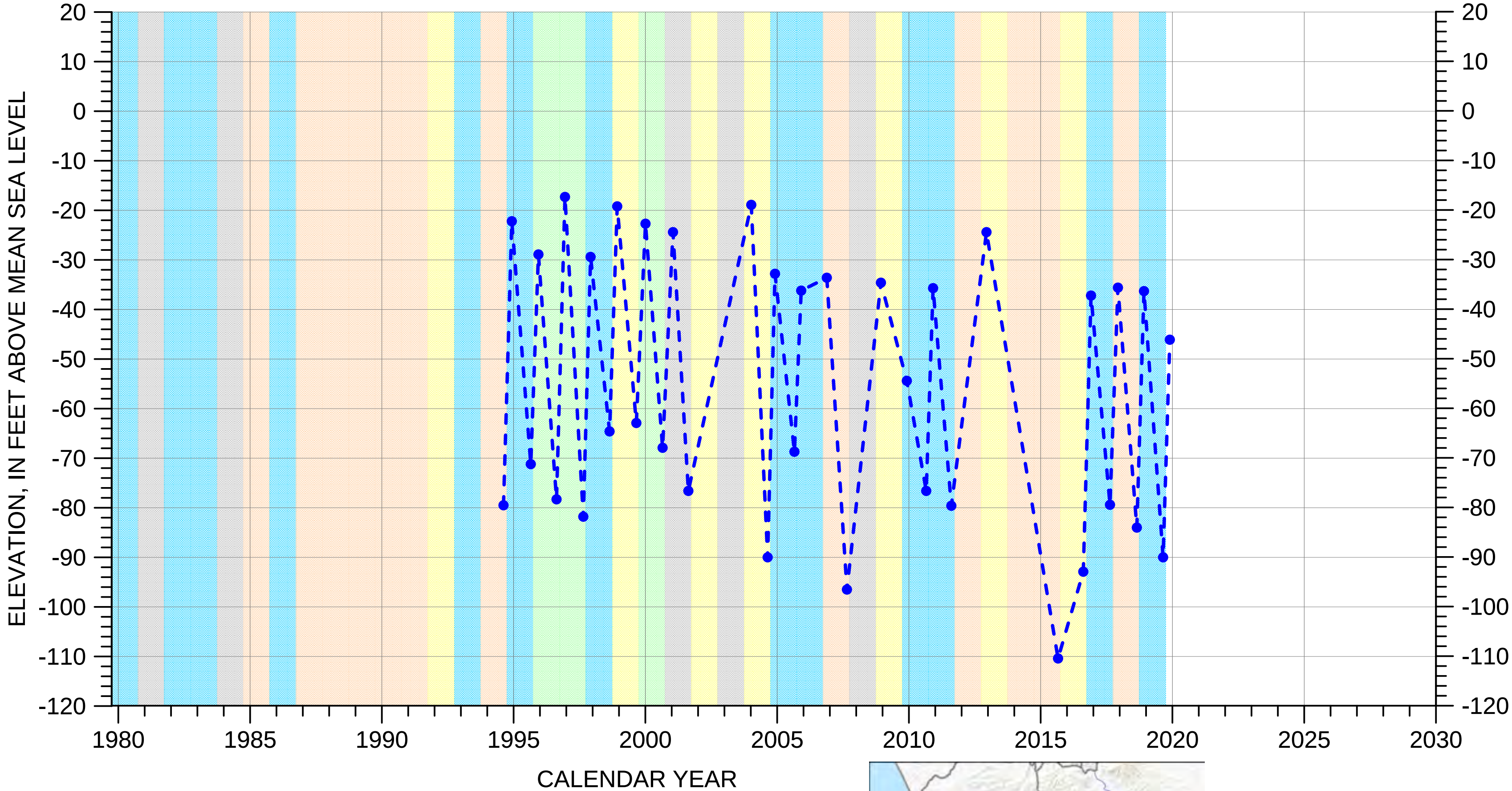
WATER YEAR TYPE DESIGNATION

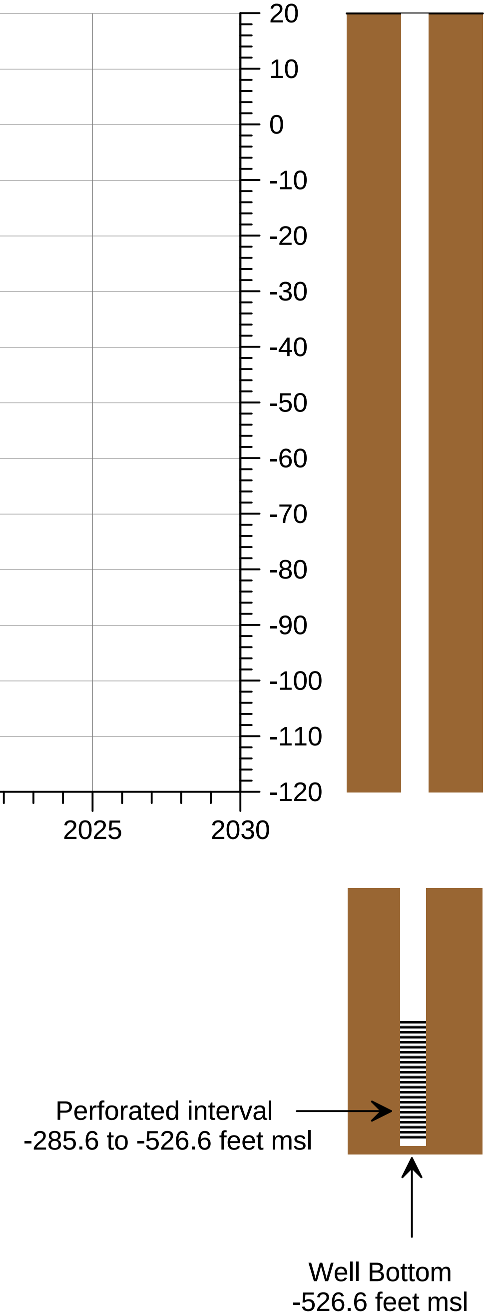
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-01C01

East Side Aquifer Subbasin
(Deep Aquifer)





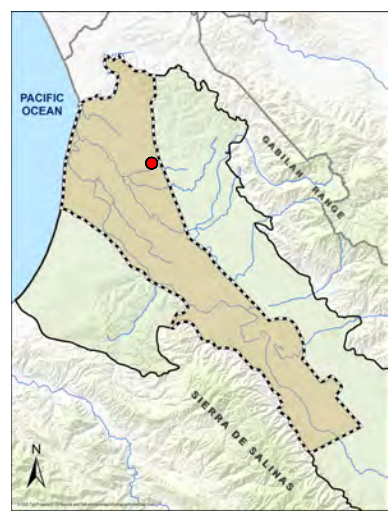
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-01C01.grf

EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE (64.4 FT MSL)
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

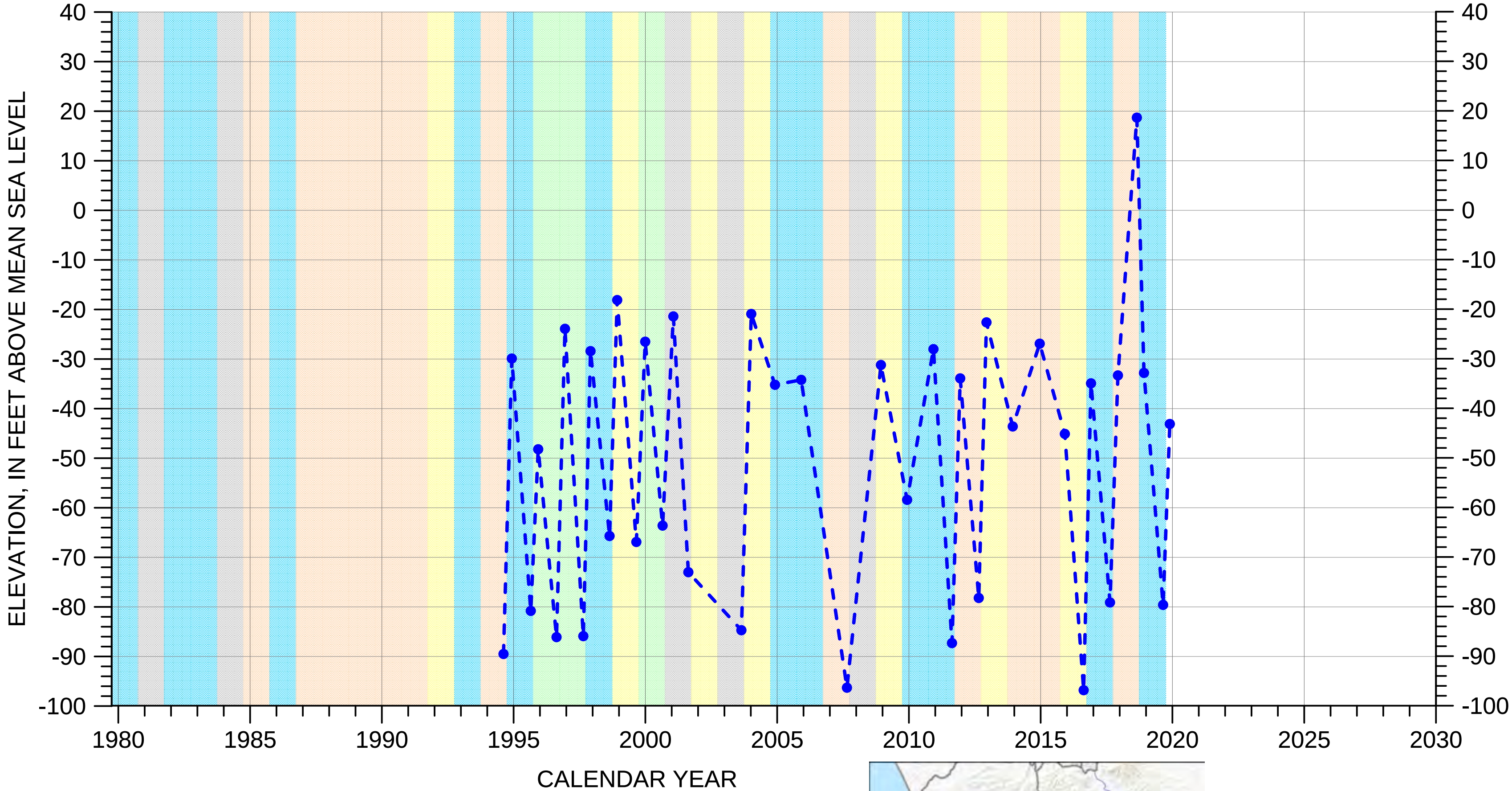
WATER YEAR TYPE DESIGNATION

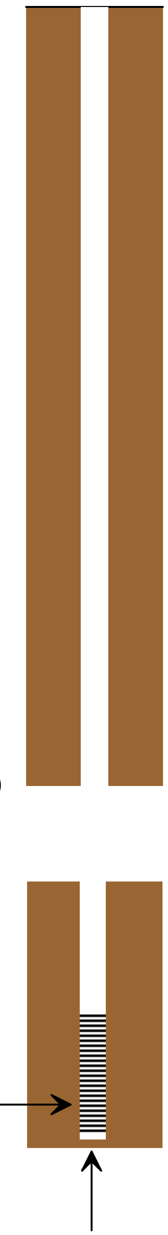
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET



HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-02A02

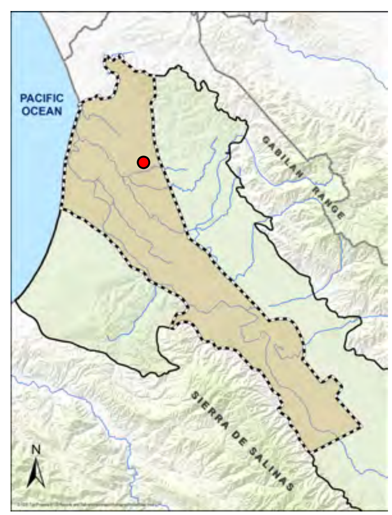
East Side Aquifer Subbasin
(Deep Aquifer)





Perforated interval
-305.2 to -755.2 feet msl

Well Bottom
-755.2 feet msl



EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE (54.8 FT MSL)
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

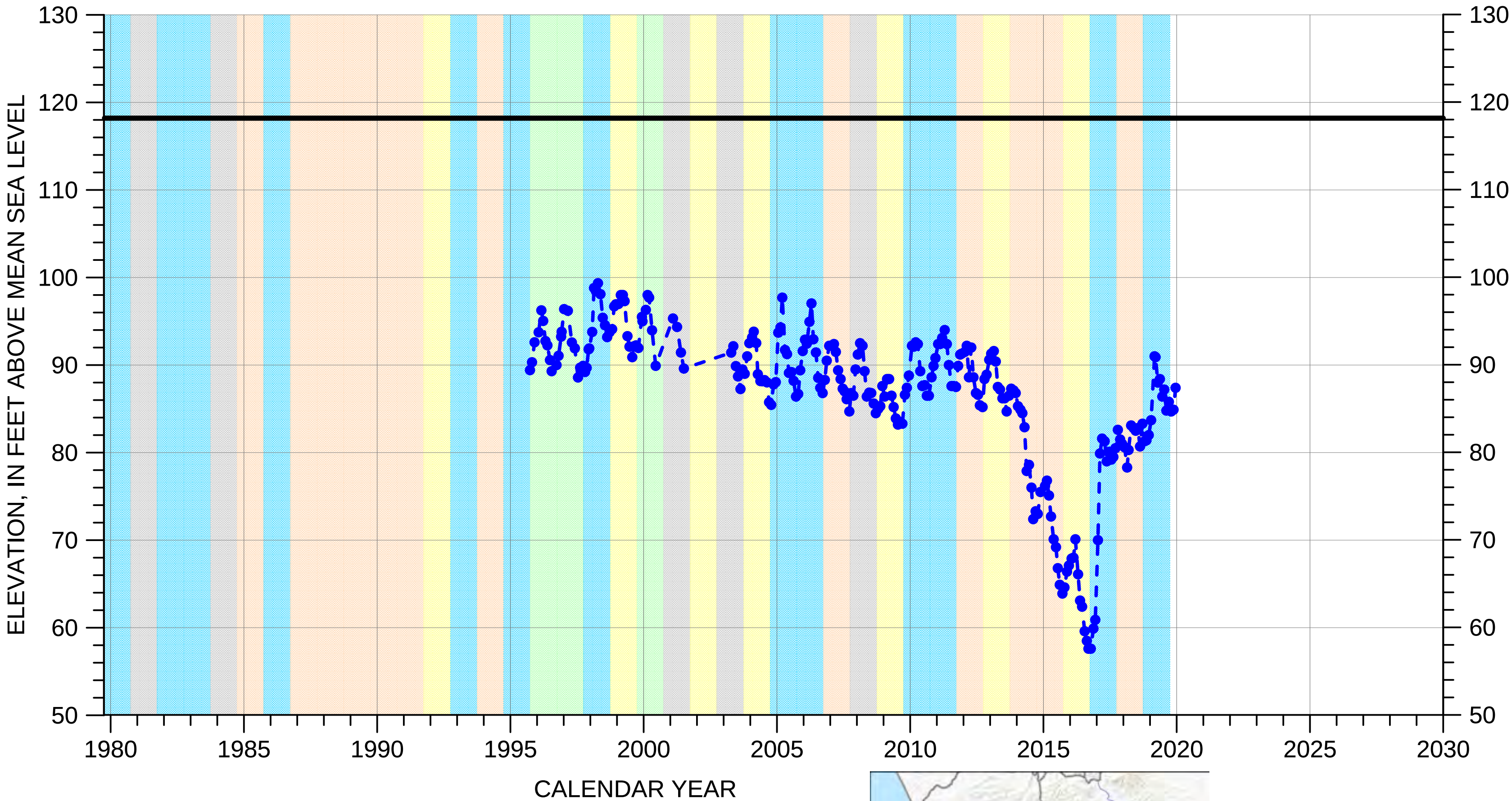
WATER YEAR TYPE DESIGNATION

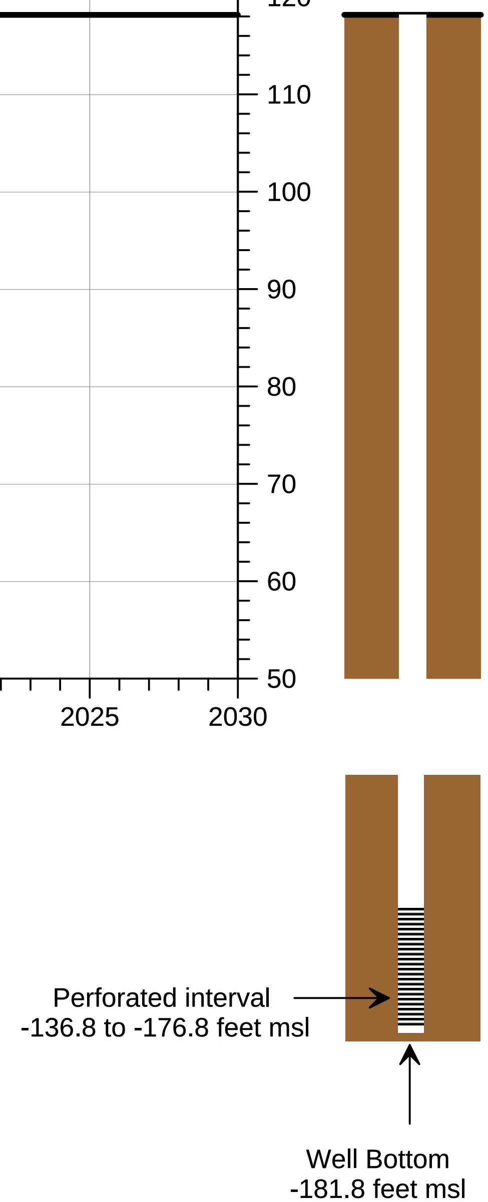
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

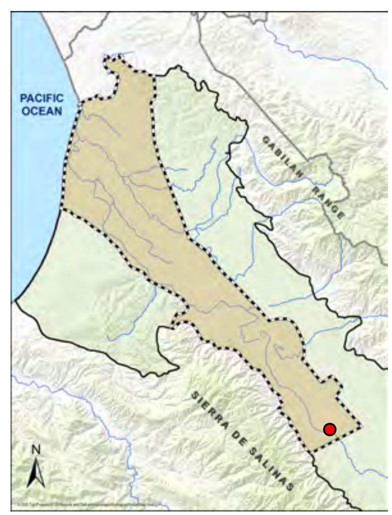
C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-02A02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 16S/05E-31P01

Forebay Aquifer Subbasin







EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

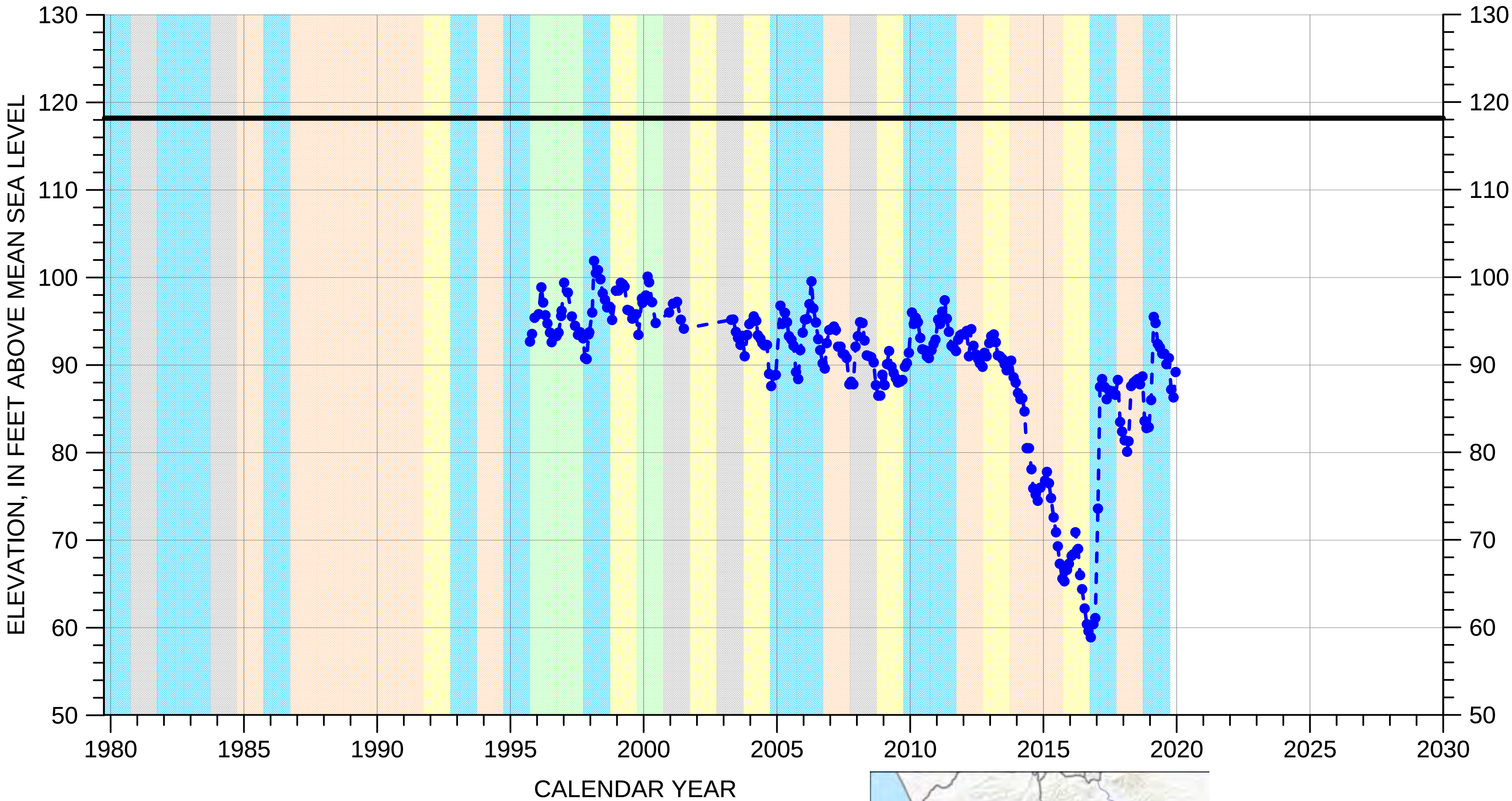
WATER YEAR TYPE DESIGNATION

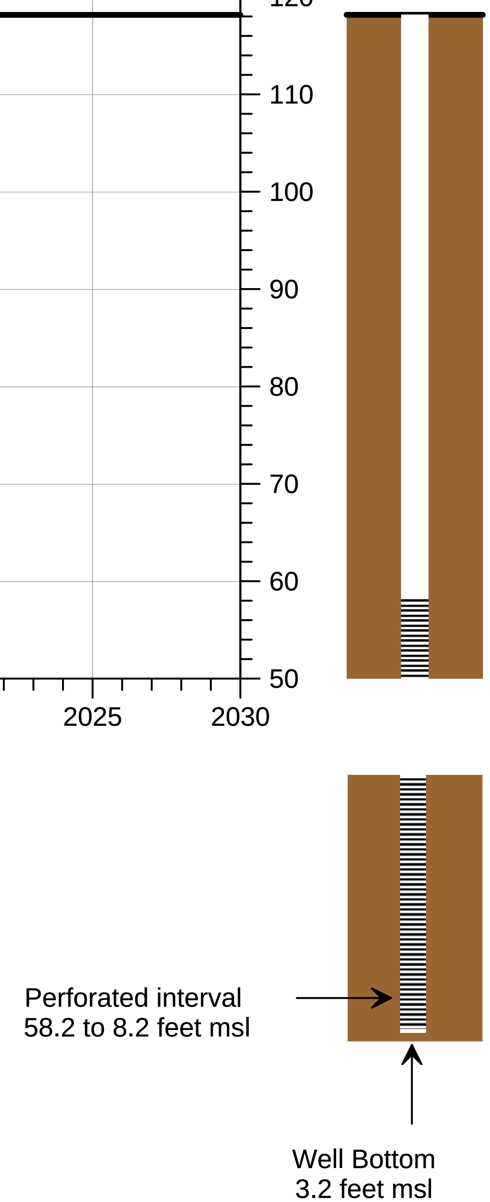
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\16S_05E-31P01.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 16S/05E-31P02

Forebay Aquifer Subbasin



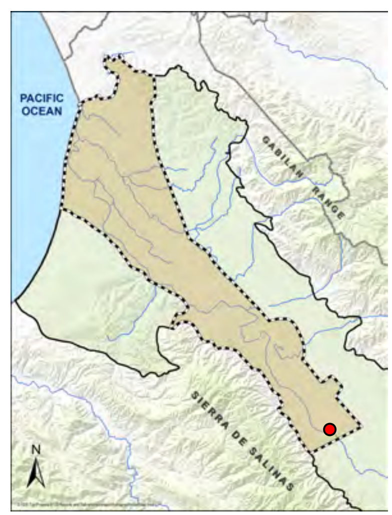


EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

WATER YEAR TYPE DESIGNATION

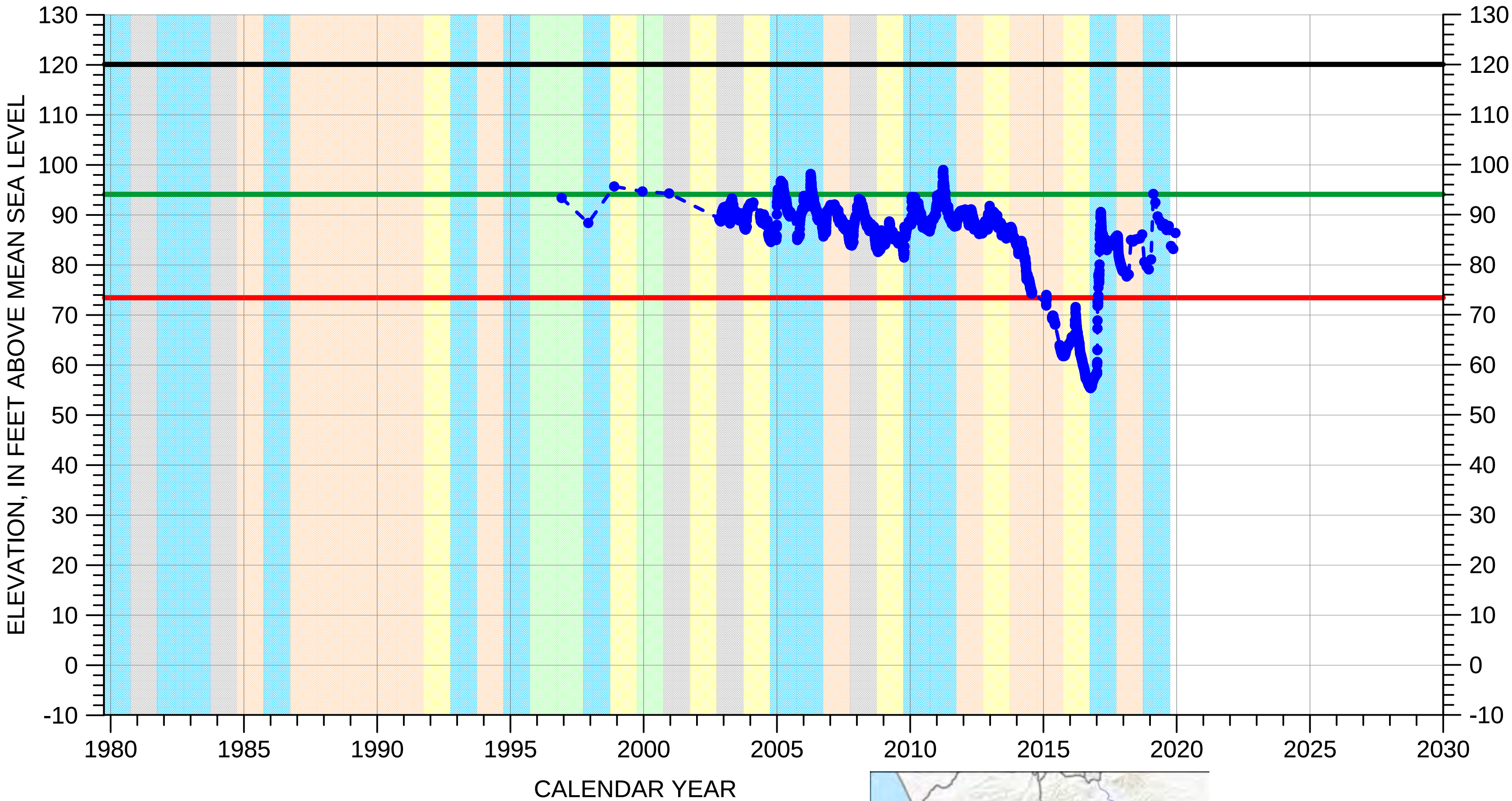
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

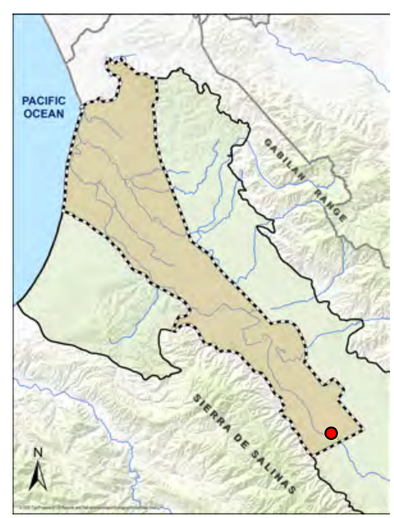


C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\16S_05E-31P02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 17S/05E-06C02

Forebay Aquifer Subbasin





EXPLANATION

- GROUNDWATER ELEVATION
- ESTIMATED ELEVATION
- LAND SURFACE
- MEASURABLE OBJECTIVE
- MINIMUM THRESHOLD

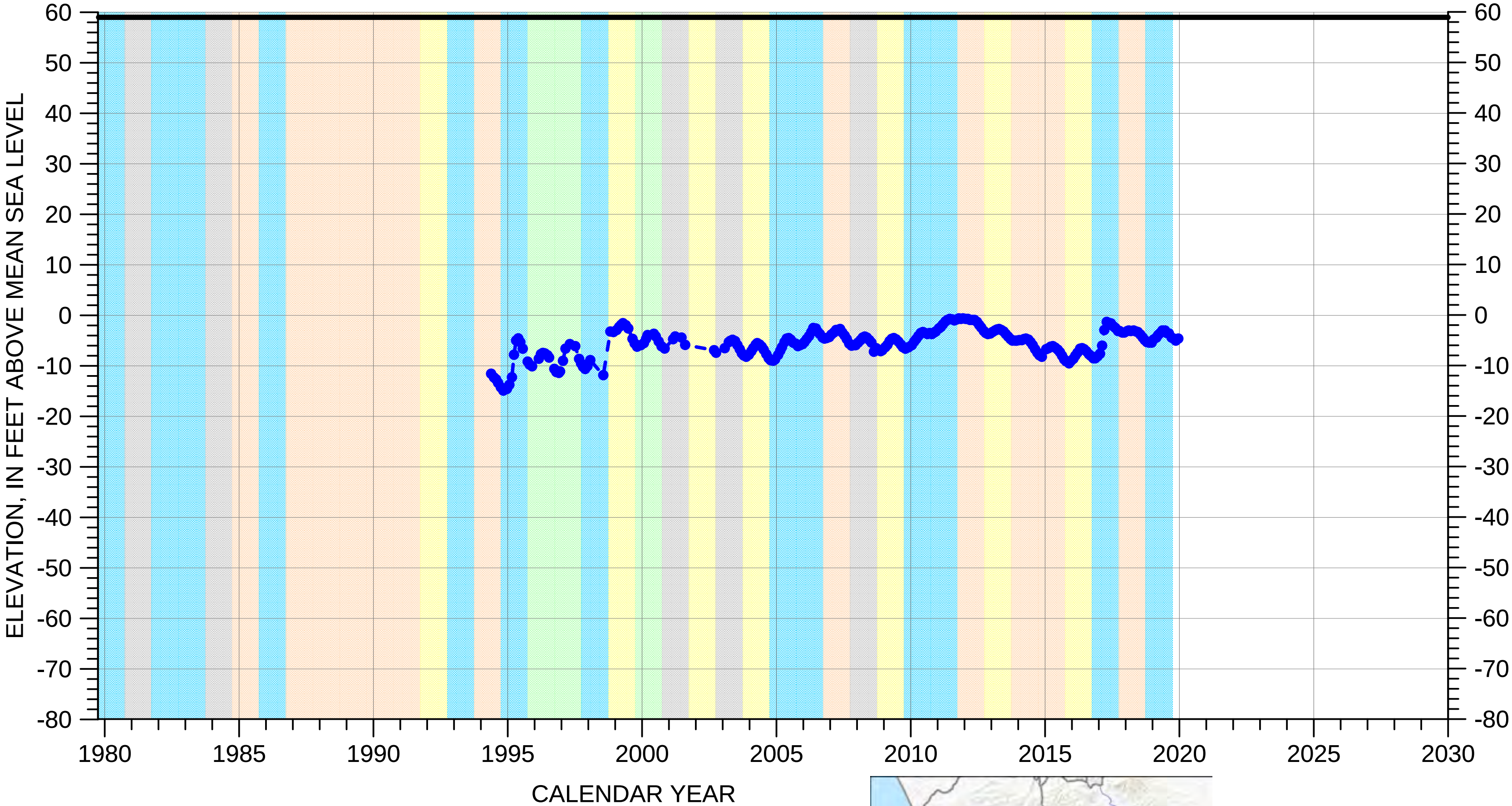
WATER YEAR TYPE DESIGNATION

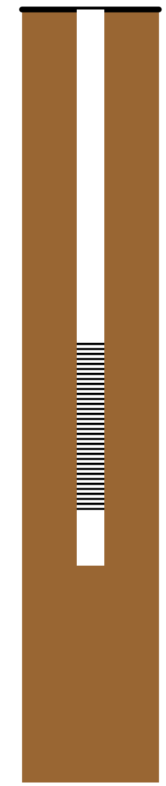
- DRY
- DRY - NORMAL
- NORMAL
- WET - NORMAL
- WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\17S_05E-06C02.grf

HYDROGRAPH OF MEASURED GROUNDWATER ELEVATION FOR 14S/02E-11A03

Perched Aquifer





EXPLANATION

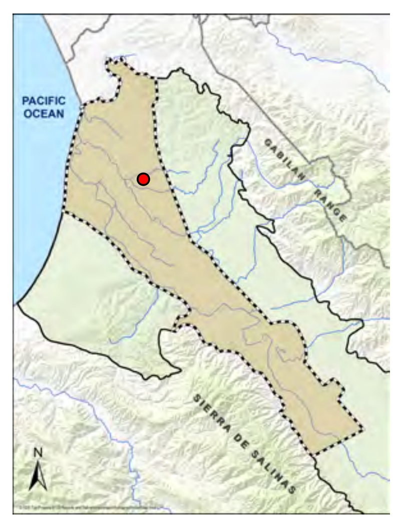
GROUNDWATER ELEVATION

ESTIMATED ELEVATION

LAND SURFACE

MEASURABLE OBJECTIVE

MINIMUM THRESHOLD



WATER YEAR TYPE DESIGNATION

DRY

DRY - NORMAL

NORMAL

WET - NORMAL

WET

C:\Users\jreeves\Documents\Projects\9100\Hydrographs\grf\14S_02E-11A03.grf