# Salinas Valley Groundwater Basin
# 180/400-Foot Aquifer Subbasin
# Water Year 2020 Annual Report
## Submitted in Support of Groundwater Sustainability Plan Implementation

Salinas Valley Basin
Groundwater Sustainability Agency

Prepared by:

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## ABBREVIATIONS AND ACRONYMS

AF .....................acre-feet
AF/yr. ................acre-feet per year
CASGEM..........California Statewide Groundwater Elevation Monitoring
CBI....................Consensus Building Institute
COC ..................Constituent of concern
CSIP ..................Castroville Seawater Intrusion Project
DAC ..................Disadvantaged Communities
DAWWG ..........Deep Aquifers Well Working Group
DDW .................Division of Drinking Water
D-TAC ..............Drought Operations Technical Advisory Committee
DWR .................California Department of Water Resources
CAO ..................County Administrative Office
CCRWQCB.......Central Coast Regional Water Quality Control Board
eWRIMS ...........Electronic Water Rights Information Management System
GEMS ...............Groundwater Extraction Monitoring System
GSA...................Groundwater Sustainability Agency
GSP or Plan.......Groundwater Sustainability Plan
InSAR ...............Interferometric Synthetic-Aperture Radar
ILRP ..................Irrigated Lands Regulatory Program
IRWMP .............Integrated Regional Water Management Plan
ISP.....................Integrated Sustainability Plan
JPA....................Joint Powers Authority
OSWCR ............Online System for Well Completion Reports
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
SRDF.................Salinas River Diversion Facility
Subbasin............180/400-Foot Aquifer Subbasin
SVA...................Salinas Valley Aquitard
SVBGSA...........Salinas Valley Basin Groundwater Sustainability Agency
SVIHM..............Salinas Valley Integrated Hydrologic Model
SVRP.................Salinas Valley Reclamation Project
SWIG ................Seawater Intrusion Working Group
SWRCB.............State Water Resources Control Board
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 Annual Report covers data collected for Water Year (WY) 2020, from October 1, 2019 to September 30, 2020.

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 2020, groundwater conditions remained similar to conditions in recent years, with slight changes in conditions related to specific sustainability indicators. WY 2020 is classified as a dry-normal year.

The groundwater data for WY 2020 are summarized below:

- Groundwater extractions for reporting year 2020 (November 1, 2019 through October 31, 2020) were approximately 119,300 acre-feet (AF). Pumping in WY 2020 was 7,100 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 decreased slightly after this dry-normal water year, with most wells showing elevations above their minimum thresholds but still below their measurable objectives.
- Seawater intrusion continued in the Subbasin, but intrusion rates continued to show minimal advancement in WY 2020, similar to the previous year.
- No groundwater quality minimum thresholds were exceeded in WY 2020.
- No new subsidence data were available for the Subbasin beyond data submitted in the WY 2019 Annual Report.
- 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:

- Refining the two-year schedule for GSP implementation and initiating long-term strategic planning.
- Actively engaging stakeholders through its Advisory Committee and Board of Directors.
- Establishing the Seawater Intrusion Working Group (SWIG).
- Initiating a strategic dialogue with disadvantaged communities.
- Beginning development of a Sustainable Groundwater Management Act (SGMA) Implementation Grant application for the 180/400-Foot Aquifer Subbasin.
- Starting to fill data gaps in the monitoring networks.

## Annual Report Elements Guide Checklist

| Groundwater Sustainability Plan Annual Report Elements Guide | | | |
|---|---|---|---|
| **Basin Name** | | | |
| **GSP Local ID** | | | |
| ***California Code of Regulations - GSP Regulation Sections*** | ***Groundwater Sustainability Plan Elements*** | **Document** ***page number(s) that address the applicable GSP element.*** | ***Notes: Briefly describe the GSP element does not apply.*** |
| **Article 5** | **Plan Contents** | | |
| ***Subarticle 4*** | ***Monitoring Networks*** | | |
| **§354.40** | **Reporting Monitoring Data to the Department** | | |
| | Monitoring data shall be stored in the data management system developed pursuant to Section 352.6. A copy of the monitoring data shall be included in the Annual Report and submitted electronically on forms provided by the Department. | 10 | |
| | Note: Authority cited: Section 10733.2, Water Code. Reference: Sections 10728, 10728.2, 10733.2 and 10733.8, Water Code. | | |
| **Article 7** | **Annual Reports and Periodic Evaluations by the Agency** | | |
| **§356.2** | **Annual Reports** | | |
| | Each Agency shall submit an annual report to the Department by April 1 of each year following the adoption of the Plan. The annual report shall include the following components for the preceding water year: | | |
| | (a) General information, including an executive summary and a location map depicting the basin covered by the report. | 1:2, 7 | Executive Summary and Figure 1 |
| | (b) A detailed description and graphical representation of the following conditions of the basin managed in the Plan: | | |
| | (1) Groundwater elevation data from monitoring wells identified in the monitoring network shall be analyzed and displayed as follows: | | |
| | (A) Groundwater elevation contour maps for each principal aquifer in the basin illustrating, at a minimum, the seasonal high and seasonal low groundwater conditions. | 14:17 | Figures 3 to 6. 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. |

| Groundwater Sustainability Plan Annual Report Elements Guide | | | |
|---|---|---|---|
| **Basin Name** | | | |
| **GSP Local ID** | | | |
| ***California Code of Regulations - GSP Regulation Sections*** | ***Groundwater Sustainability Plan Elements*** | **Document *page number(s) that address the applicable GSP element.*** | ***Notes: Briefly describe the GSP element does not apply.*** |
| | (B) Hydrographs of groundwater elevations and water year type using historical data to the greatest extent available, including from January 1, 2015, to current reporting year. | 19:21, 71:91 | Figures 7:9 and Appendix A |
| | (2) Groundwater extraction for the preceding water year. Data shall be collected using the best available measurement methods and shall be presented in a table that summarizes groundwater extractions by water use sector, and identifies the method of measurement (direct or estimate) and accuracy of measurements, and a map that illustrates the general location and volume of groundwater extractions. | 22:24 | Tables 2 and 3, Figure 10 |
| | (3) Surface water supply used or available for use, for groundwater recharge or in-lieu use shall be reported based on quantitative data that describe the annual volume and sources for the preceding water year. | 25:26 | Section 3.2.2 and Table 5 |
| | (4) Total water use shall be collected using the best available measurement methods and shall be reported in a table that summarizes total water use by water use sector, water source type, and identifies the method of measurement (direct or estimate) and accuracy of measurements. Existing water use data from the most recent Urban Water Management Plans or Agricultural Water Management Plans within the basin may be used, as long as the data are reported by water year. | 26 | Table 5 |
| | (5) Change in groundwater in storage shall include the following: | | |
| | (A) Change in groundwater in storage maps for each principal aquifer in the basin. | 32, 34 | Figures 14 and 16 |
| | (B) A graph depicting water year type, groundwater use, the annual change in groundwater in storage, and the cumulative change in groundwater in storage for the basin based on historical data to the greatest extent available, including from January 1, 2015, to the current reporting year. | 36 | Figure 17 |
| | (c) A description of progress towards implementing the Plan, including achieving interim milestones, and implementation of projects or management actions since the previous annual report. | 42:68 | Section 4 |

# 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). This is the second annual report and includes monitoring data for Water Year (WY) 2020, which are from October 1, 2019 to September 30, 2020. This 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 2020 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, Monterey County Water Resources Agency (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.

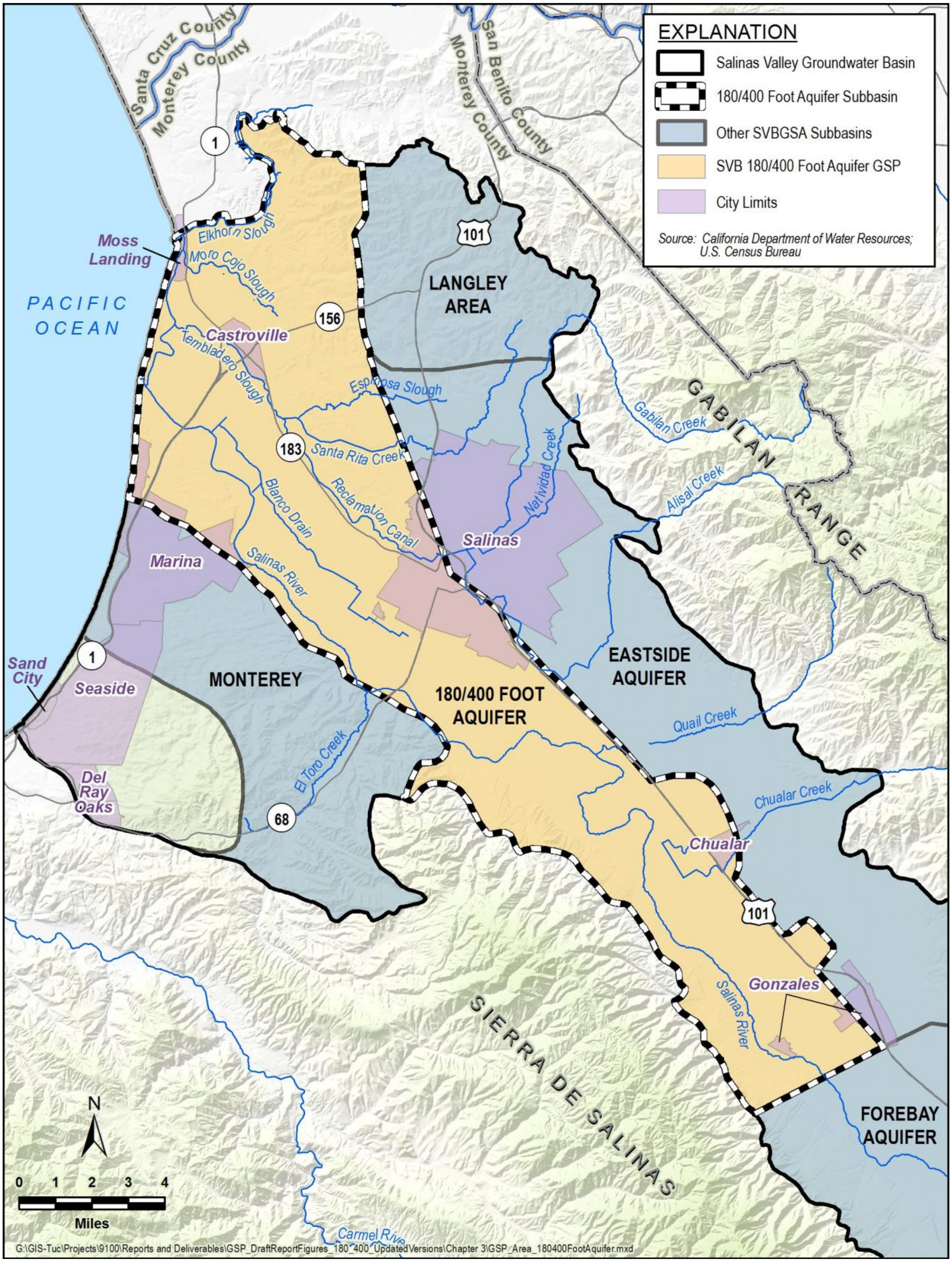


Figure 1. 180/400-Foot Aquifer Subbasin

# 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). There is no sign of the fault affecting groundwater flow in the sediments that contain the 180-Foot Aquifer or the 400-Foot Aquifer based on observed groundwater elevation and seawater intrusion conditions across the Subbasin boundary (HLA, 1994; Feeney and Rosenberg, 2003). However, more data are needed to determine the extent of hydraulic connectivity in all principal aquifers. 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 for the Deep Aquifers.

## 2.2 Natural Groundwater Recharge and Discharge

Natural groundwater recharge occurs through deep percolation of surface water, including from Salinas River, deep percolation of excess applied irrigation water, and deep percolation of precipitation. However, 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 along the Salinas River 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 13.98 inches of rainfall in WY 2019 and 9.18 inches in WY 2020. For comparison, the average rainfall from WY 1980 to WY 2020 at this gage is 12.13 inches of precipitation.

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, WY 2019 was a wet year and WY 2020 was a dry-normal year.

# 3 2020 DATA AND SUBBASIN CONDITIONS

This section details the Subbasin conditions and WY 2020 data. Where WY 2020 data are not available, it includes the most recent data available. The SVBGSA developed a data management system to store monitoring data. Monitoring data are included in this Annual Report and are 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 and are part of the California Statewide Groundwater Elevation Monitoring (CASGEM) program. Locations of groundwater elevation representative monitoring network wells within the Subbasin are shown on Figure 2.

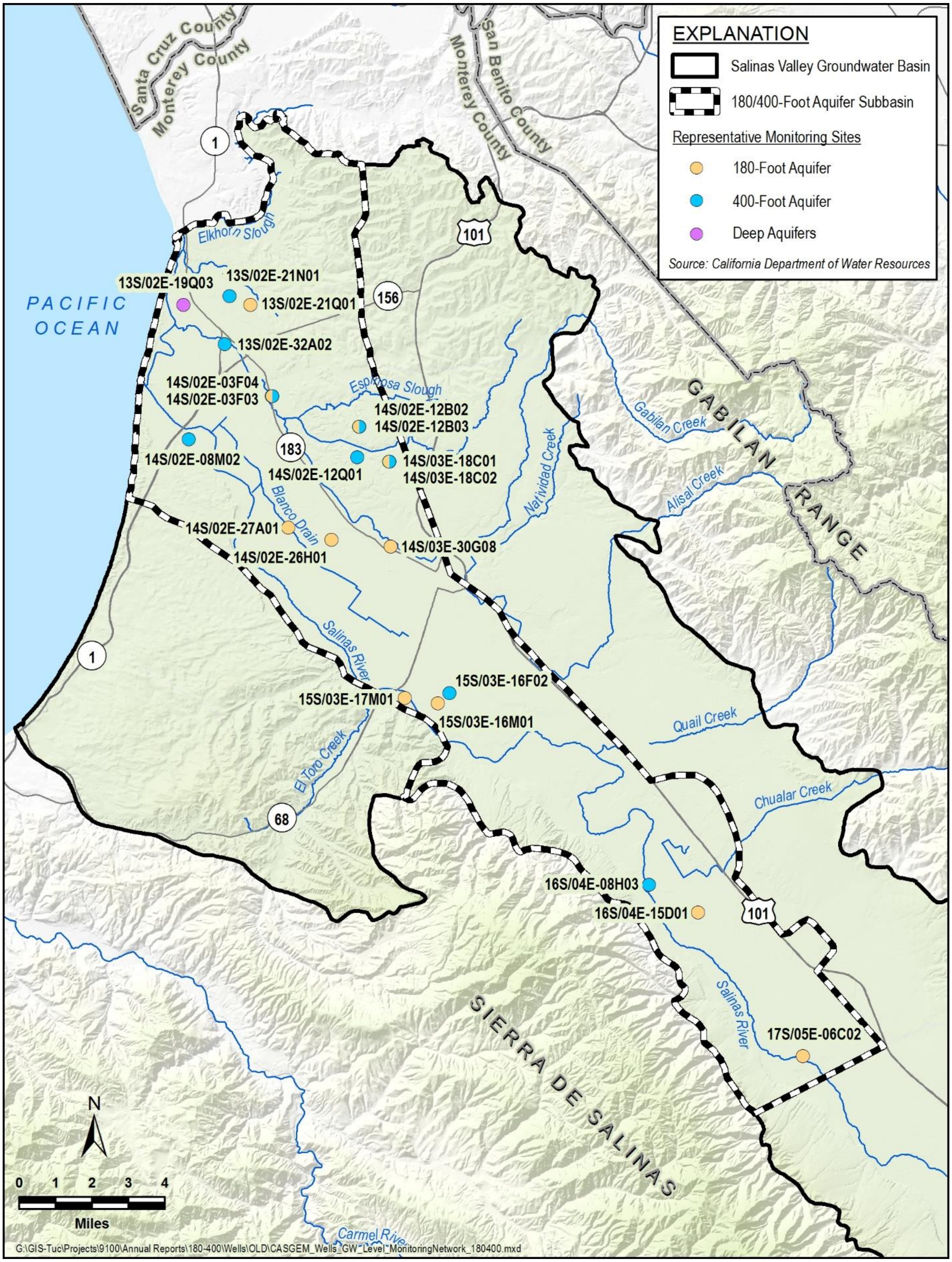


Figure 2. Locations of Representative Groundwater Elevation Monitoring Sites

Fall 2019 and fall 2020 groundwater elevation data are presented in Table 1. In accordance with the GSP, this report uses groundwater elevations measured in October 2019 and 2020 in order to approximate neutral groundwater conditions that are not heavily influenced by either summer irrigation pumping or winter rainfall recharge. October groundwater elevations are used to compare to SMC, as described in Section 4.3.1, because minimum thresholds and measurable objective are based on October groundwater elevations. Table 1 also includes data from November to December which were used to produce groundwater elevation contours for fall 2020 to be consistent with MCWRA's 2019 fall contours. These fall contours are further discussed in Section 3.4.1.

Table 1. Groundwater Elevation Data

| Monitoring Site | October | | November/December | |
|---|---|---|---|---|
| | WY 2019 elevation data (ft) | WY 2020 elevation data (ft) | WY 2019 elevation data (ft) | WY 2020 elevation data (ft) |
| 180-Foot Aquifer | | | | |
| 13S/02E-21Q01 | 7.0 | 7.2 | 9.0 | 8.6 |
| 14S/02E-03F04 | -10.3 | -9.7 | -8.3 | -5.2 |
| 14S/02E-12B02 | -13.7 | -10.1 | -6.1 | -7.6 |
| 14S/02E-26H01 | -19.6 | -19.1 | -7.0 | -9.5 |
| 14S/02E-27A01 | -15.4 | -15.3 | -6.0 | -7.3 |
| 14S/03E-18C01 | 9.4 | 8.5 | 11.1 | 11.8 |
| 14S/03E-30G08 | -24.7 | -23.0 | -11.7 | -13.1 |
| 15S/03E-16M01 | -6.7 | -7.5 | 3.6 | -0.2 |
| 15S/03E-17M01 | -7.8 | -6.0 | 4.7 | 0.3 |
| 16S/04E-15D01 | 47.0 | 47.4 | 50.1 | 48.3 |
| 17S/05E-06C02 | 83.8 | 72.2 | 86.4 | 71.9 |
| 400-Foot Aquifer | | | | |
| 13S/02E-21N01 | -12.9 | -10.9 | -4.9 | -6.1 |
| 13S/02E-32A02 | -5.2 | -4.7 | -1.9 | -2.5 |
| 14S/02E-03F03 | -36.7 | -34.5 | -11.5 | -11.8 |
| 14S/02E-08M02 | -10.9 | -8.8 | -2.1 | -3.2 |
| 14S/02E-12B03 | -57.4 | -36.6 | -23.6 | -28.2 |
| 14S/02E-12Q01 | -18.3 | -17.8 | -9.5 | -10.9 |
| 14S/03E-18C02 | -33.7 | -30.8 | -26.9 | -18.3 |
| 15S/03E-16F02 | -8.6 | -7.6 | 1.6 | 0.4 |
| 16S/04E-08H03 | 42.2 | 41.7 | 45.8 | 42.8 |
| Deep Aquifers | | | | |
| 13S/02E-19Q03 | -9.3 | -10.9 | -7.2 | -8.9 |

During GSP implementation, the SVBGSA is working to fill data gaps with additional wells to include in the monitoring network.

### 3.1.1 Groundwater Elevation Contours

The SVBGSA received groundwater elevation contour maps from MCWRA for the 180/400-Foot Aquifer Subbasin for August 2020 and developed new contour maps for January 2020. The August contours represent seasonal low conditions, and the January contours represent seasonal high conditions. The MCWRA *Quarterly Salinas Valley Water Conditions* report (MCWRA, 2021) supports high groundwater elevations in the Subbasin in January for both the 180 and 400-Foot Aquifers.

Groundwater elevation contours for seasonal high and low groundwater conditions in the 180-Foot Aquifer are shown on Figure 3 and Figure 4, respectively. Groundwater elevation contours for seasonal 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 trending towards the city of Salinas. These depressions are related to a pumping trough 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 January 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 SVBGSA is working to address during GSP implementation.

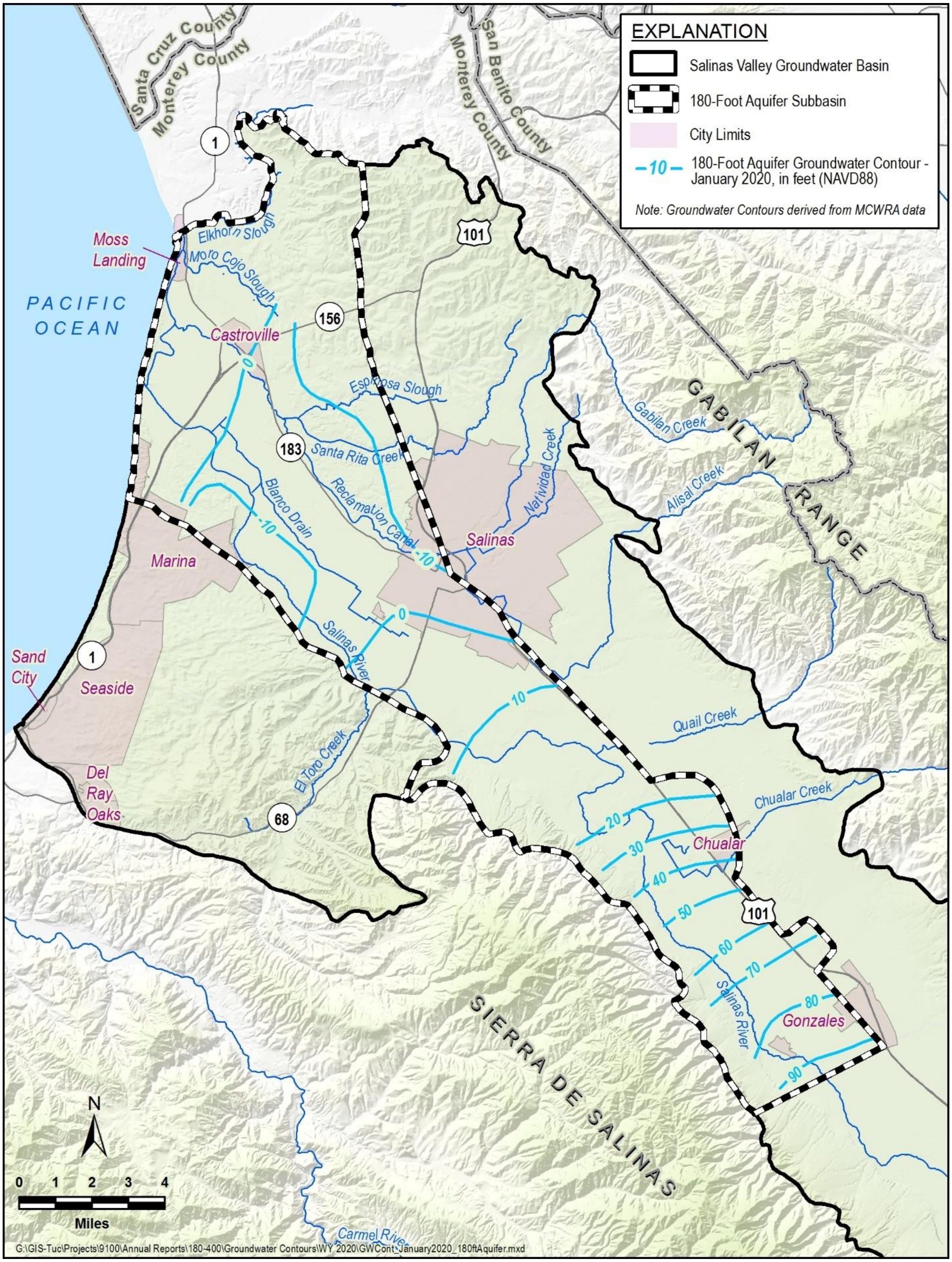

Figure 3. Seasonal High Groundwater Elevation Contour Map for 180-Foot Aquifer

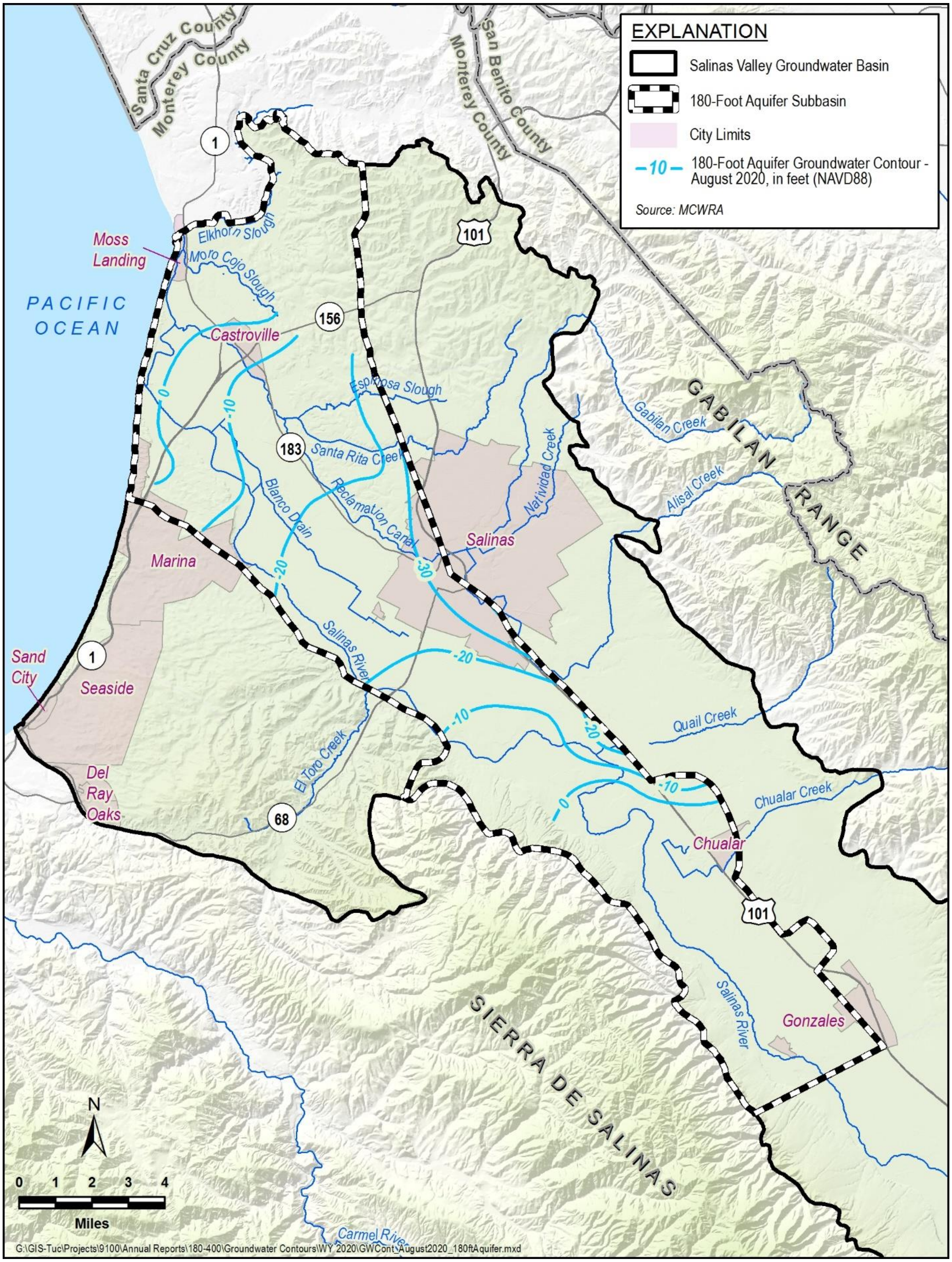


Figure 4. Seasonal Low Groundwater Elevation Contour Map for 180-Foot Aquifer

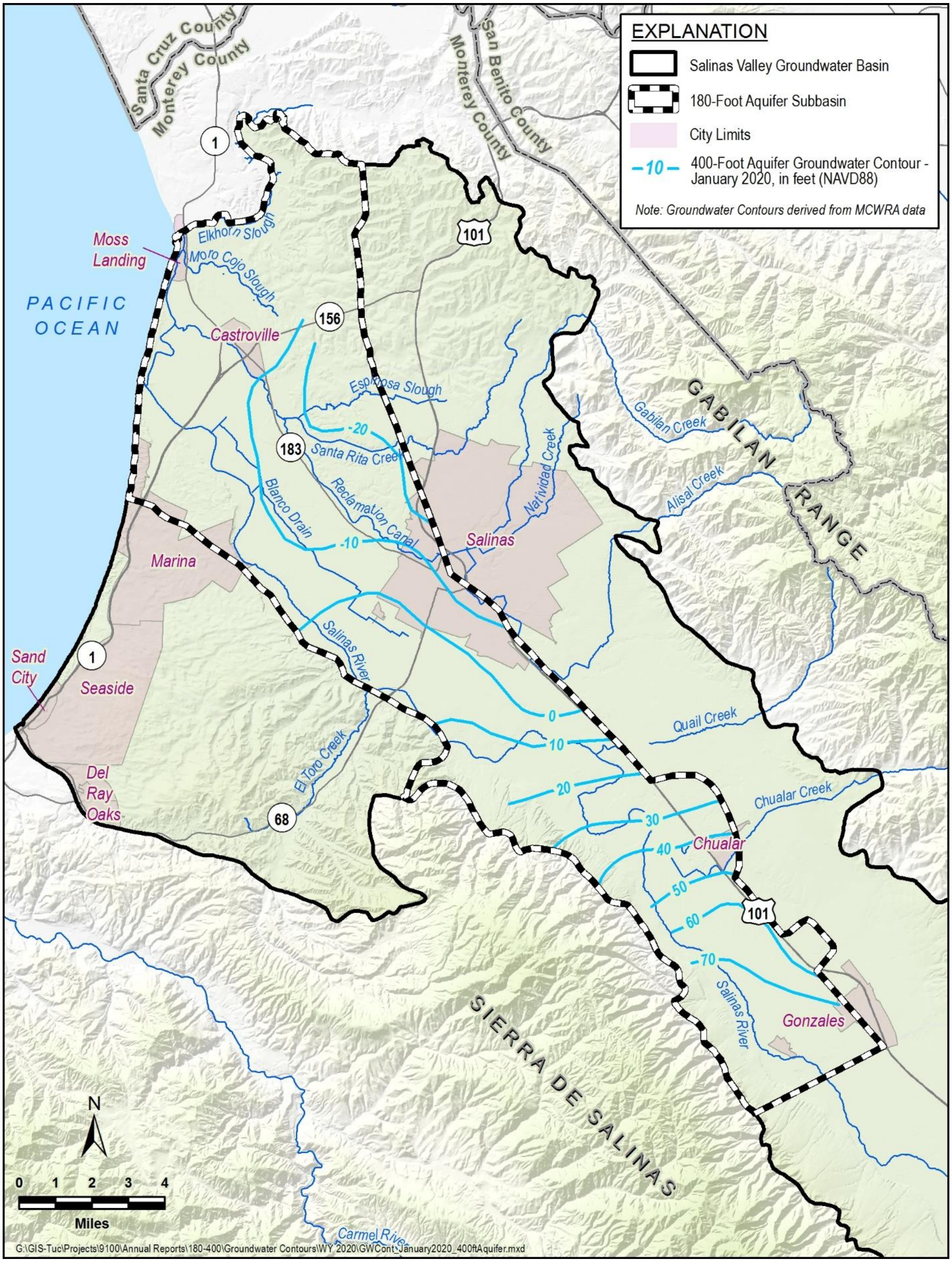


Figure 5. Seasonal High Groundwater Elevation Contour Map for 400-Foot Aquifer

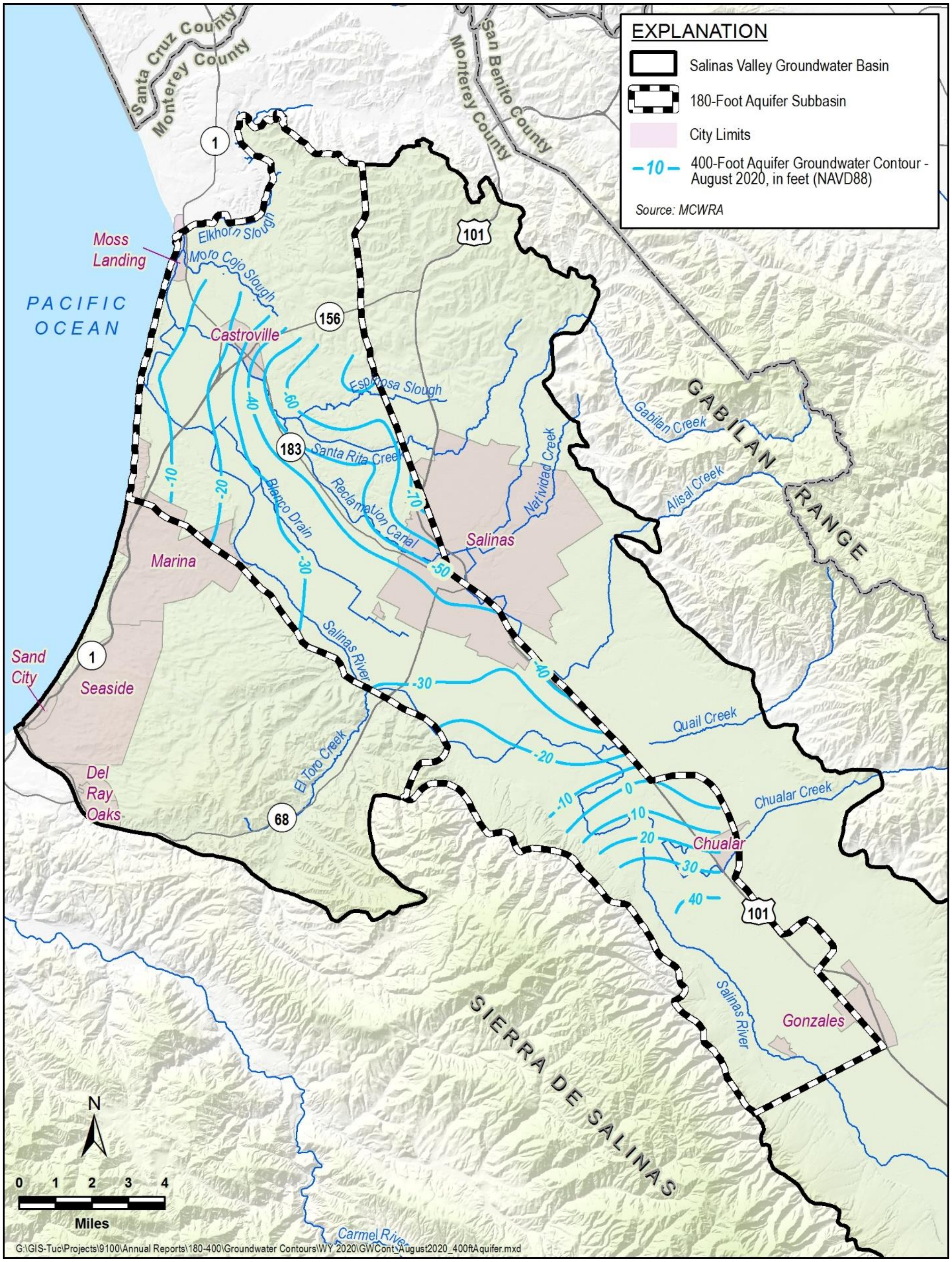


Figure 6. Seasonal Low Groundwater Elevation Contour Map for 400-Foot Aquifer

### 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 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 declined throughout the Subbasin since 2019. Meanwhile, groundwater elevations for the one monitoring well in the Deep Aquifers have continued to decrease with too little data to establish any spatial pattern. Hydrographs for all representative monitoring sites are included in Appendix A.

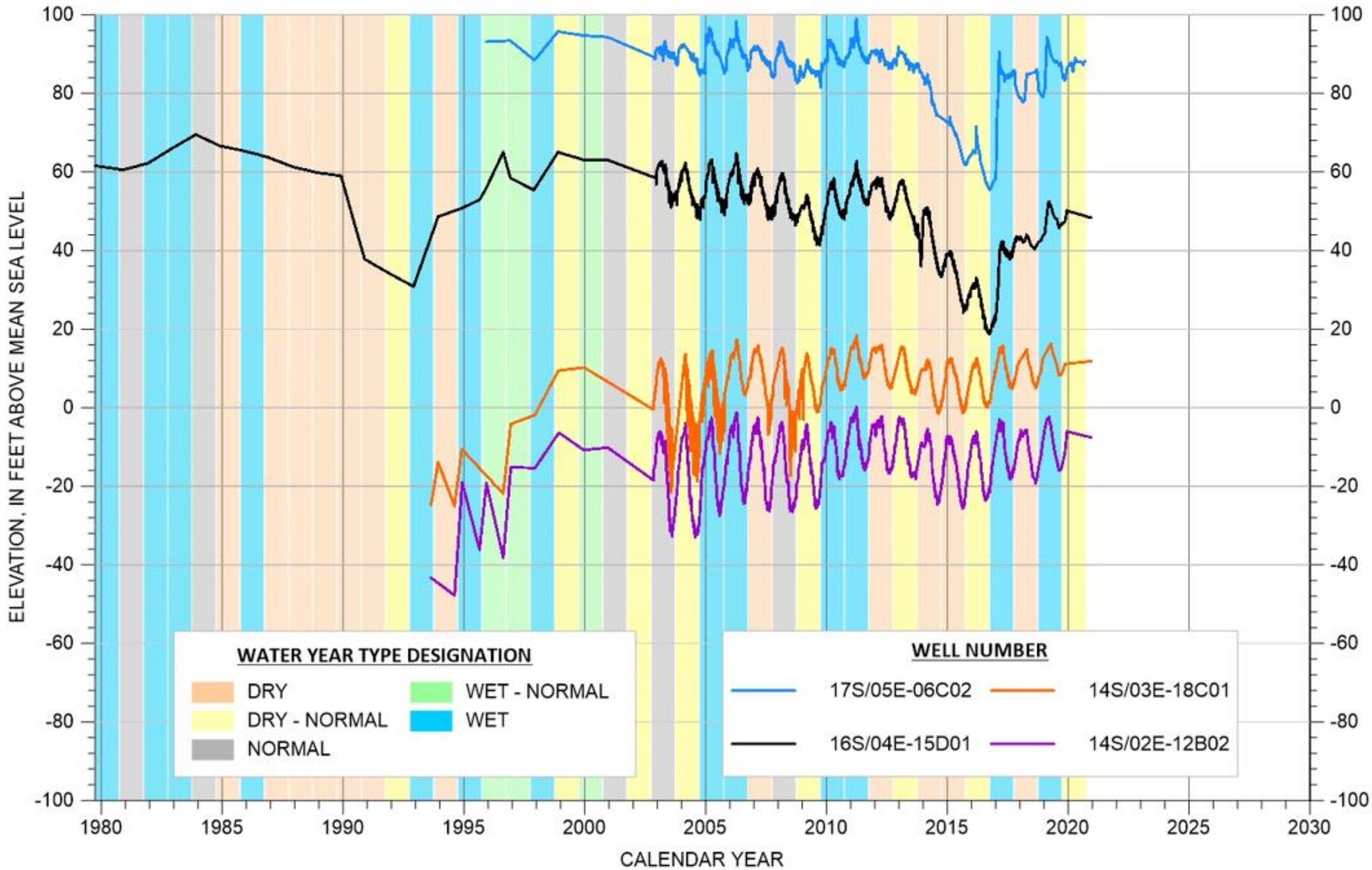

Figure 7. Groundwater Elevation Hydrographs for Selected Monitoring Wells in 180-Foot Aquifer

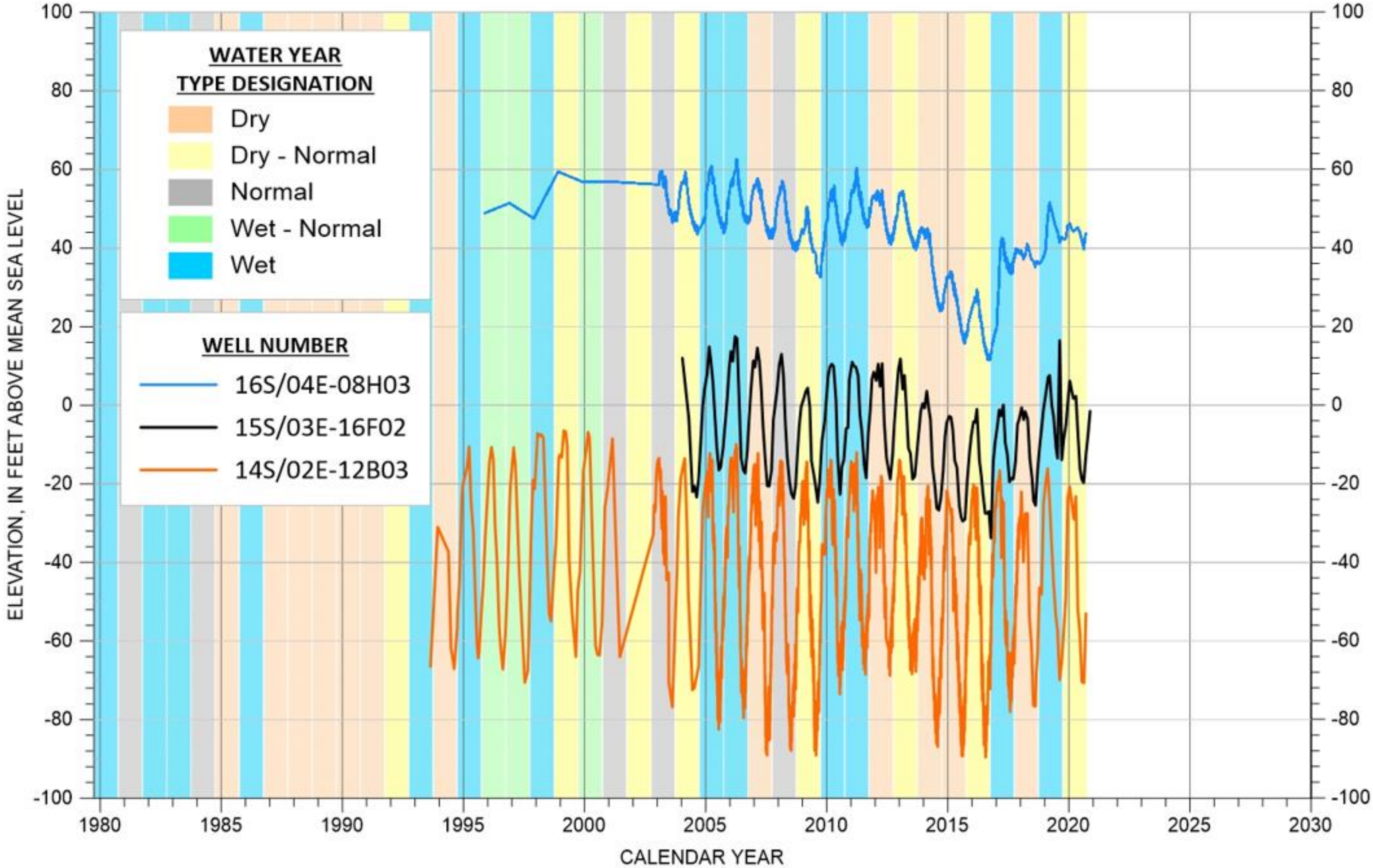


Figure 8. Groundwater Elevation Hydrographs for Selected Monitoring Wells in 400-Foot Aquifer

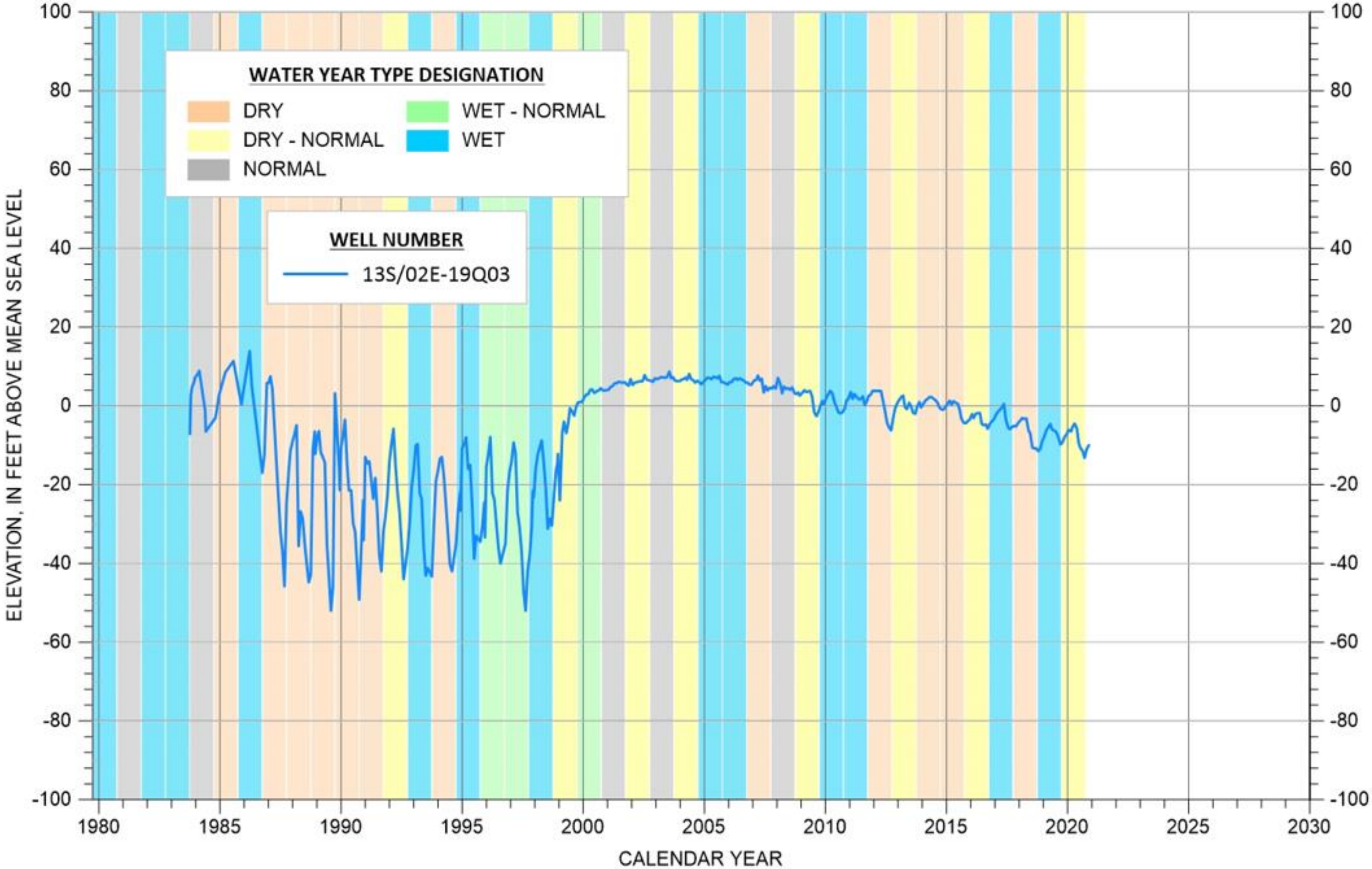


Figure 9. Groundwater Elevation Hydrograph for Selected Monitoring Well in Deep Aquifers

## 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 2020; 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 2020 was 119,300 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. 2020 Groundwater Extraction by Water Use Sector (AF/yr.)

| Water Use Sector | Groundwater Extraction (AF/yr.) | Method of Measurement | Accuracy of Measurement |
|---|---|---|---|
| **Rural Domestic Wells** | 200 | Multiply estimated number of domestic users by 0.39 AF/yr. | Other estimates have ranged as high as 0.75 AF/yr. |
| **Urban** | 12,600 | MCWRA's Groundwater Reporting Program allows three different reporting methods: water flowmeter, electrical meter, or hour meter. For 2020, 83% of extractions were calculated using a flowmeter, 16% electrical meter and 1% hour meter. | 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%. |
| **Agricultural** | 106,500 | | |
| **Managed Wetlands** | 0 | N/A | N/A |
| **Managed Recharge** | 0 | N/A | N/A |
| **Natural Vegetation** | 0 | De-minimis and not estimated. | Unknown |
| **TOTAL** | **119,300** | | |

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

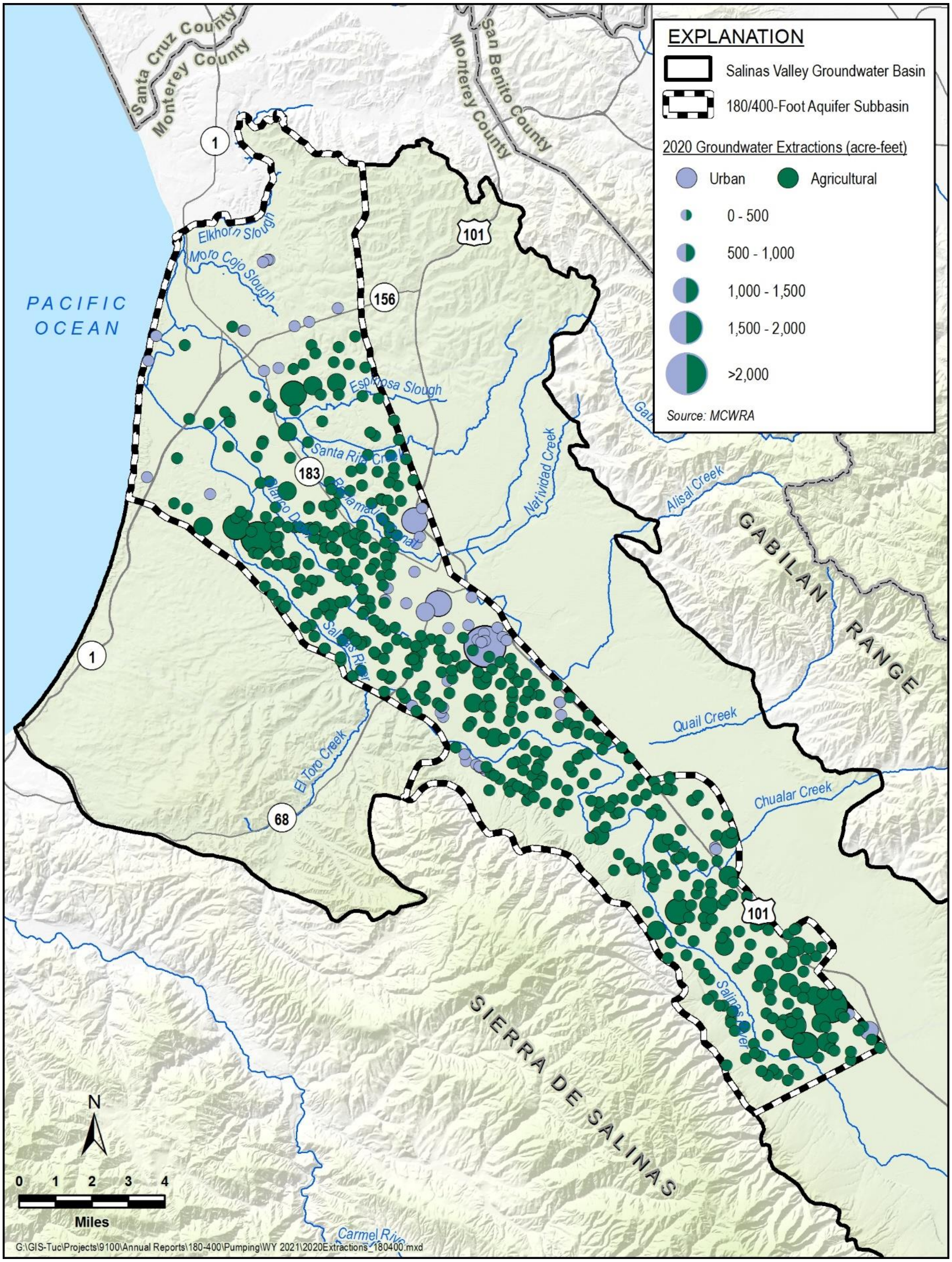


Figure 10. General Location and Volume of Groundwater Extractions in the 180/400-Foot Aquifer Subbasin

### 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 7,900 AF/yr in WY 2020. Of these, 7,300 AF/yr were reported as a Statement of Diversion and Use and 600 AF/yr were reported as Appropriative for the Blanco Drain and Reclamation Ditch. 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 this Salinas Valley Reclamation Plant (SVRP) recycled water to the coastal farmland surrounding Castroville through the CSIP system. CSIP deliveries are summarized in Table 3.

Table 3. CSIP Water Deliveries

| | WY 2020 (AF/yr.) |
|---|---|
| CSIP Wells | 3,500 |
| SRDF-River | 6,200 |
| SVRP-Recycled | 11,200 |
| Total | **20,900** |

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 and 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 2020, 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 14,100 AF/yr to 7,300 AF/yr. In other words, the total surface water use includes the SRDF river diversions and appropriative surface water diversions reported to eWRIMS. 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 139,100 AF/yr in WY 2020, as shown in Table 4.

Table 4. Total Water Use by Water Use Sector in WY 2020 (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 | 12,600 | 0 | 0 | Direct, Estimated | Estimated to be +/- 5%. |
| Agricultural | 106,500 | 7,300 | 12,500 | 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 | 119,300 | 7,300 | 12,500 | | |
| TOTAL | **139,100** | | | | |

Note: Agricultural pumping is reported on the MCWRA reporting 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 prepared contours of seawater intrusion for 2020. 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 2020 contours on these figures show a slight incremental change from the previous 2019 contours. This indicates that seawater intrusion is still occurring, with minimal advancement compared with previous years. An important exception is the isolated islands of seawater intrusion in the 400-Foot Aquifer. Specifically, the increase in seawater intrusion that has connected the largest island and the middle island. This increase is due to vertical migration of impaired groundwater between the 180-Foot and 400-Foot Aquifers.

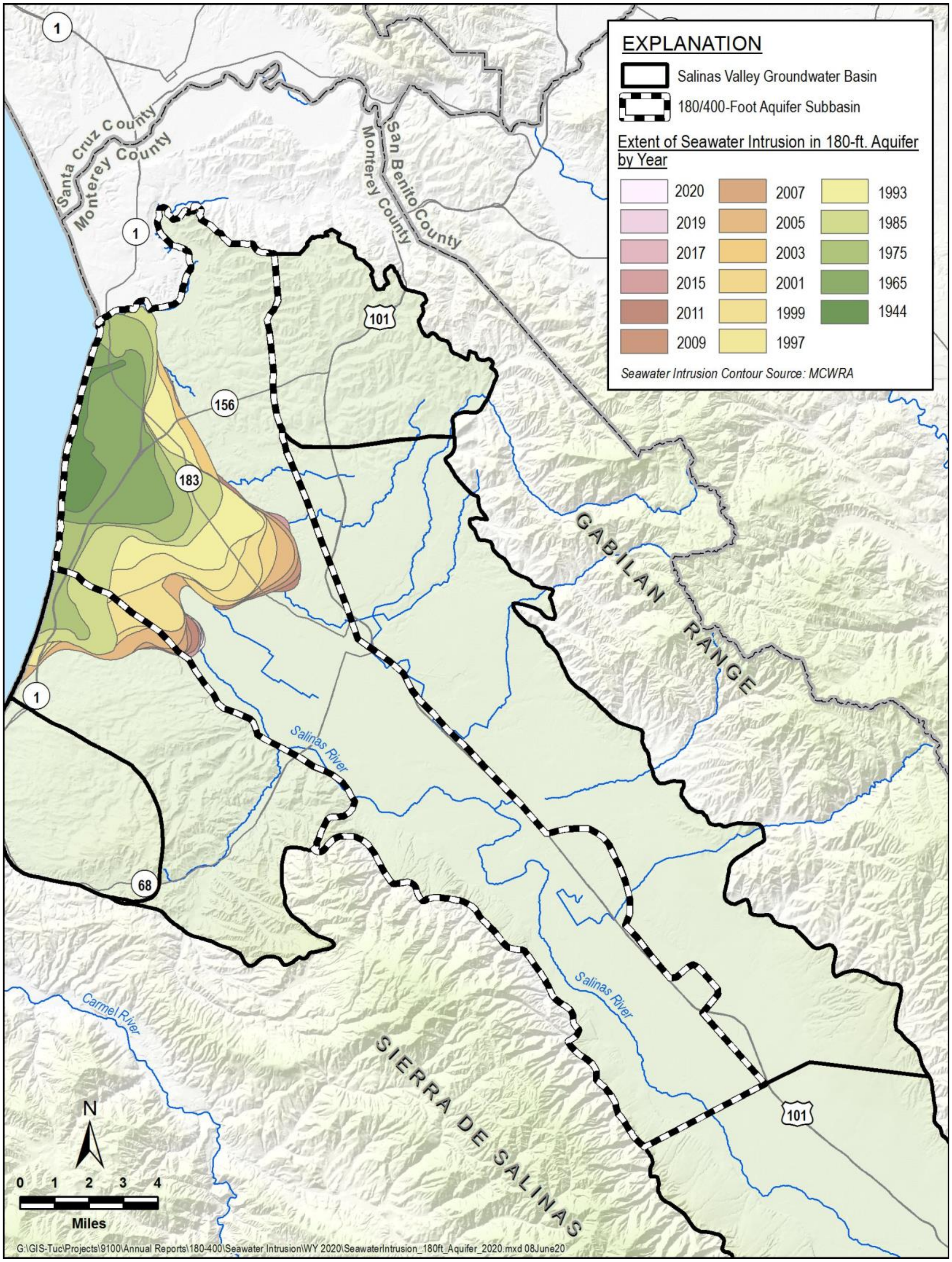


Figure 11. 2020 Seawater Intrusion Contours for the 180-Foot Aquifer

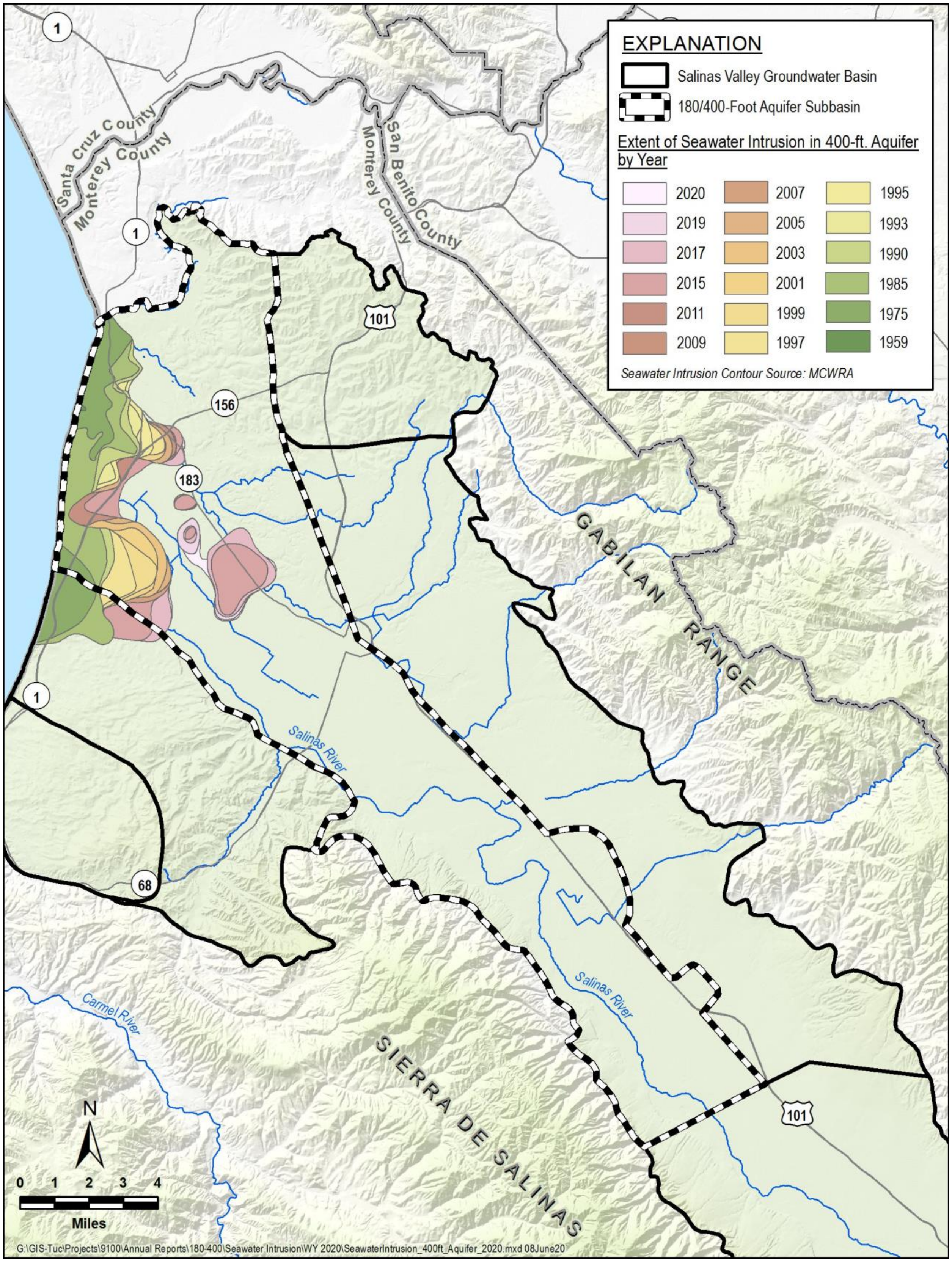


Figure 12. 2020 Seawater Intrusion Contours for the 400-Foot Aquifer

## 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.

The SVBGSA received groundwater elevation contours from MCWRA for fall 2019 and created contours for fall 2020. MCWRA uses groundwater elevations from November to December to produce their contours, for consistency SVBGSA used the same time period. Currently, MCWRA only generates contours 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 continue to 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 elevations in the 180-Foot Aquifer from WY 2019 to WY 2020 was estimated by subtracting the fall 2019 groundwater elevations from the fall 2020 groundwater elevations shown on Figure 13. This change was then multiplied by the storage coefficient for the 180/400 Foot Aquifer Subbasin. MCWRA's *State of the Basin Report* approximates the storage coefficient to 0.036 for the Pressure Subarea, which covers most of the 180/400-Foot Aquifer Subbasin (Brown and Caldwell, 2015). This report uses the rounded value of 0.04 as the storage coefficient for the Subbasin as was done for the GSP. The estimated change in storage due to groundwater elevation changes, in AF per acre, in the 180-Foot Aquifer is depicted on Figure 14. Similarly, for the 400-Foot Aquifer, Figure 15 shows the fall 2019 and 2020 groundwater elevation contours used to calculate the average annual groundwater elevation change. This change in groundwater elevations was multiplied by the storage coefficient of 0.04 to calculate the change in storage in the 400-Foot Aquifer, in AF per acre, shown on Figure 16.

Since the groundwater elevation contours do not extend across the entire Subbasin, the storage change was not calculated in the areas that were not contoured, as indicated by the areas without color on Figure 14 and Figure 16. Furthermore, the extent of seawater intrusion in 2020, as mapped by MCWRA, was subtracted from the contoured area to estimate the change in storage solely due to groundwater elevation changes. A summary of components 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

| Component | 180-Foot Aquifer | 400-Foot Aquifer |
|---|---|---|
| Area of contoured portion of Subbasin minus seawater intrusion area (acres) | 51,300 | 54,700 |
| Storage coefficient | 0.04 | 0.04 |
| Average change in groundwater elevation from fall 2019 to fall 2020 (feet) | -1.13 | -1.75 |
| Change in groundwater storage from fall 2018 to fall 2019 (AF) | -2,300 | -3,800 |
| Total annual change in groundwater storage | -6,100 | |

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

Annual groundwater storage changes due to changes in groundwater elevation from fall 2019 to fall 2020 was -2,300 AF/yr. in the 180-Foot Aquifer and -3,800 AF/yr. in the 400-Foot Aquifer. These negative changes indicate loss in storage. The average annual change in storage due to groundwater elevation fluctuations during the current period is a change (loss) of approximately 6,100 AF/yr. for the Subbasin.

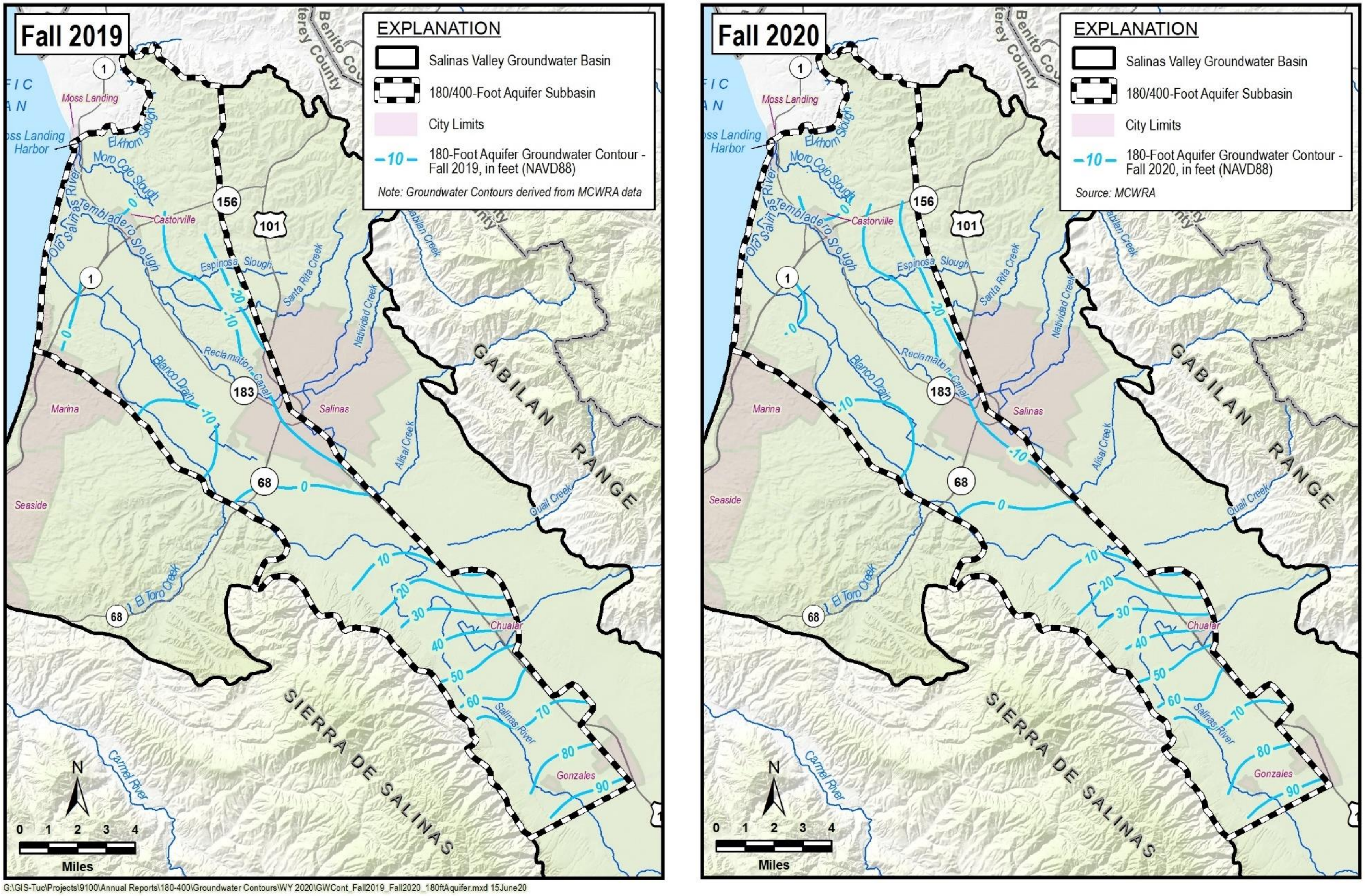


Figure 13. Fall 2019 (left) Fall 2020 (right) Groundwater Elevation Contour Map for 180-Foot Aquifer

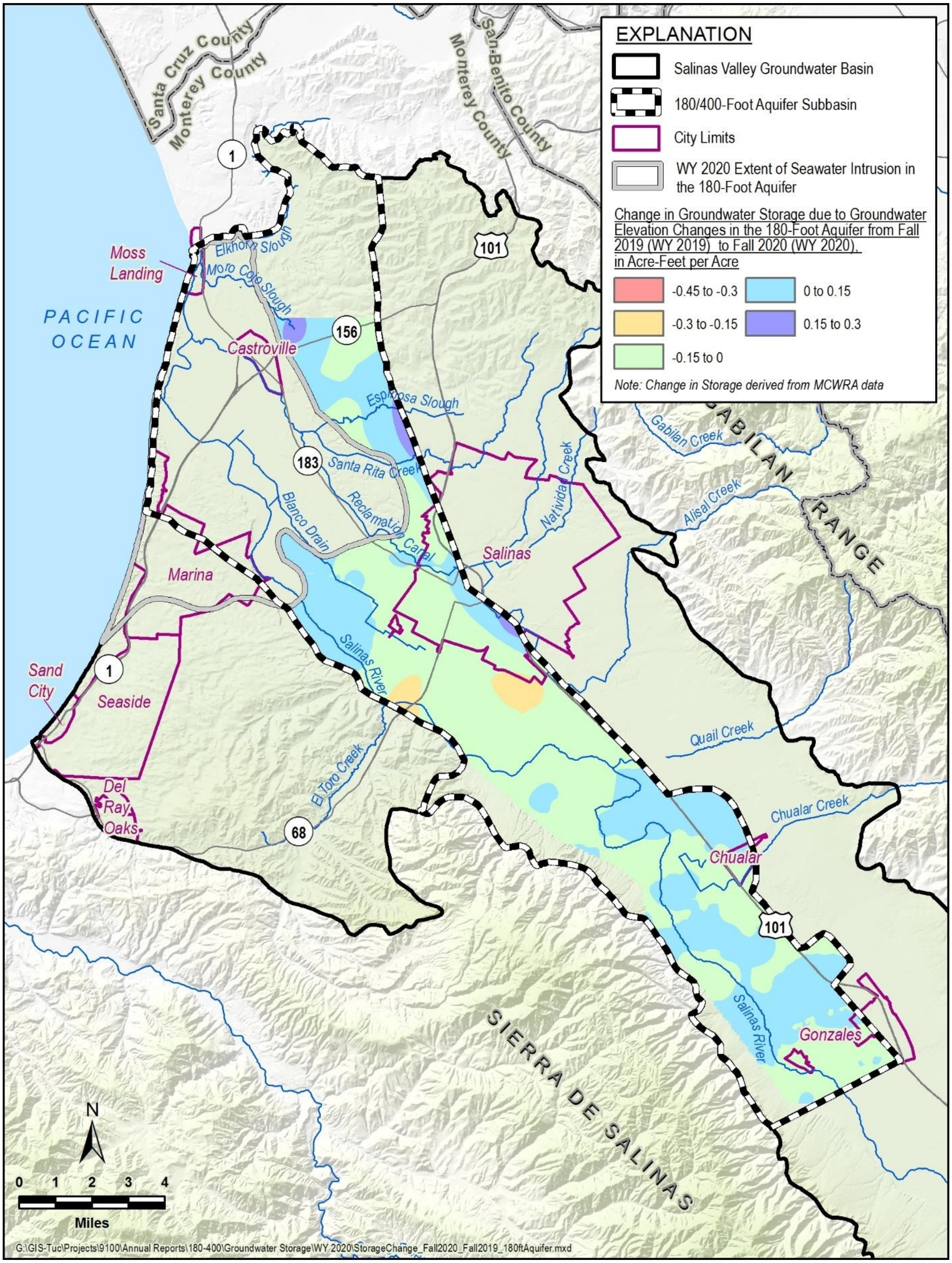


Figure 14. Average Annual Change in Groundwater Storage Between WY 2019 and WY 2020 in the 180-Foot Aquifer

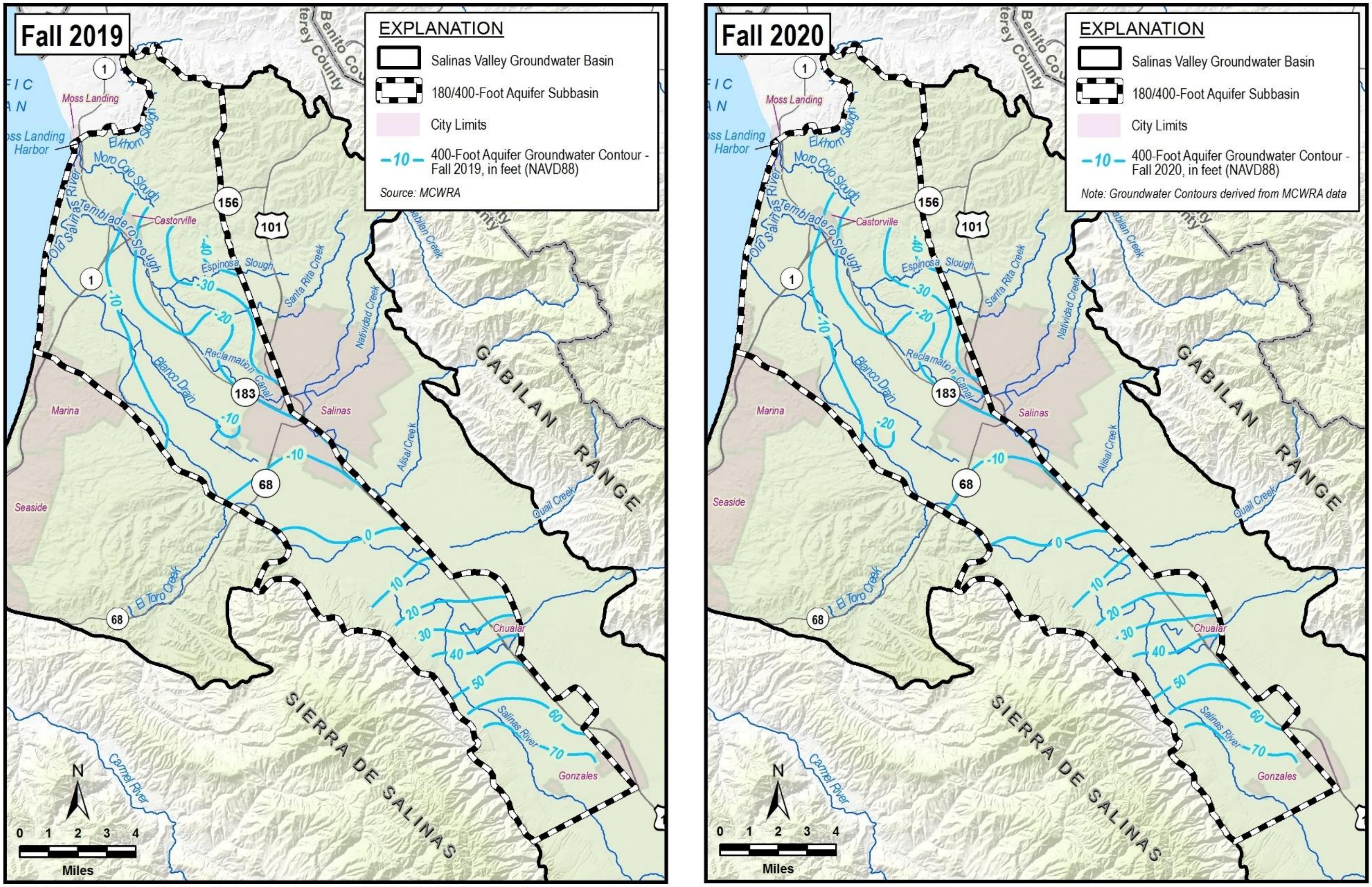


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Figure 15. Fall 2019 (left) Fall 2020 (right) Groundwater Elevation Contour Map for 400-Foot Aquifer

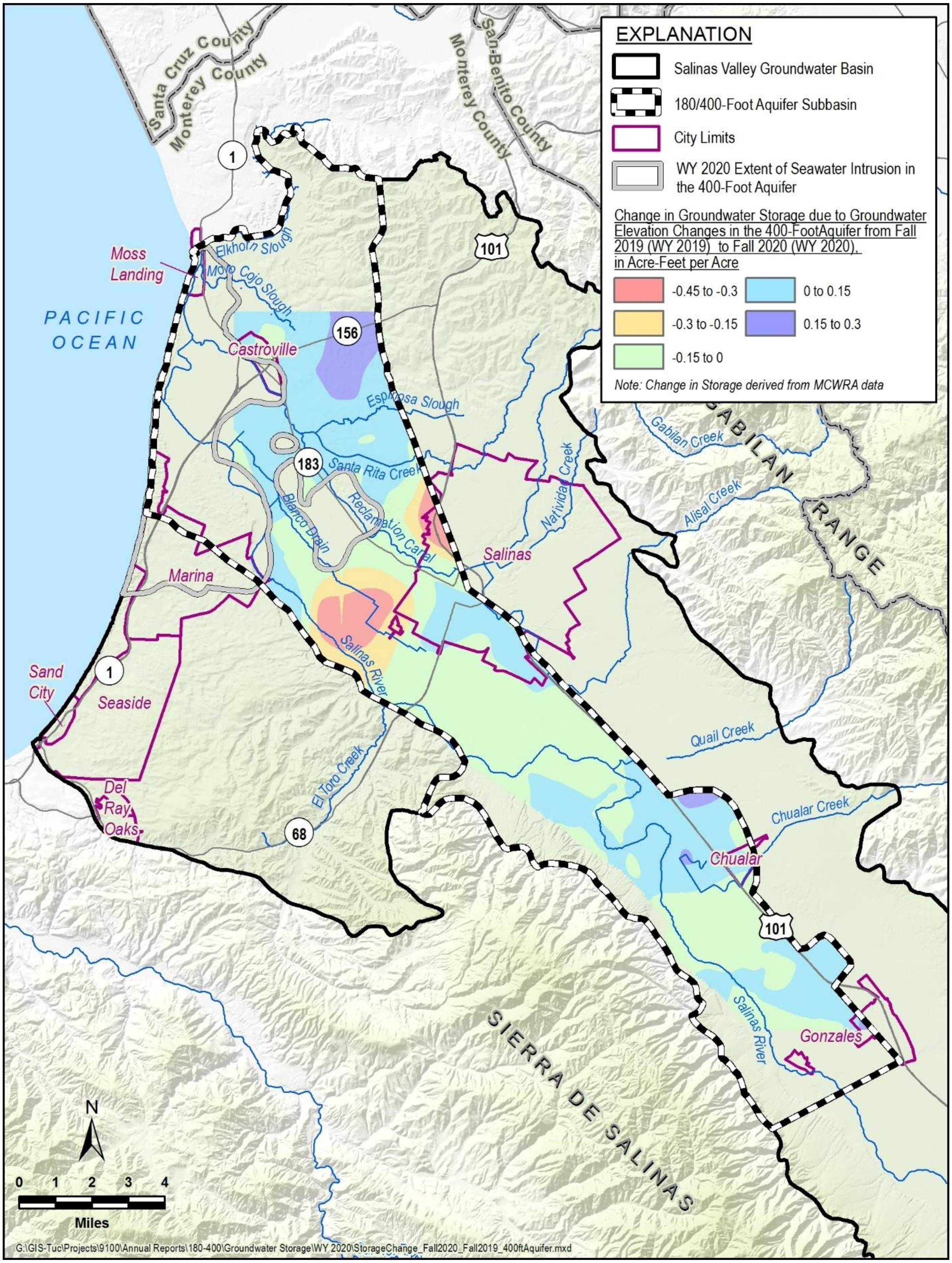



Figure 16. Average Annual Change in Groundwater Storage Between WY 2019 and WY 2020 in the 400-Foot Aquifer

### 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 from WY 2019 to WY 2020, as mapped by MCWRA. Seawater intrusion is summarized in Section 3.3 of this report. The area of change from 2019 to 2020 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 from 2019 to 2020 are approximately 200 AF/yr. in the 180-Foot Aquifer and 1,800 AF/yr. in the 400-Foot Aquifer. 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 from WY 2019 to WY 2020 (acres) | -33 | -219 |
| Storage coefficient | 0.04 | 0.04 |
| Approximate aquifer thickness (feet) | 150 | 200 |
| Change in groundwater storage from WY 2019 to WY 2020 (AF) | -200 | -1,800 |
| Total Average Annual Change in Groundwater Storage | -2,000 | |

Note: Increases in acreage intruded by seawater are indicated by negative values. Negative values indicate loss, positive values indicate gain.

### 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 from WY 2019 to WY 2020. 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 change due to groundwater elevation changes (AF/yr.) | -2,300 | -3,800 | -6,100 |
| Annual storage change due to seawater intrusion (AF/yr.) | -200 | -1,800 | -2,000 |
| Total annual storage change (AF/yr.) | -2,500 | -5,600 | -8,100 |

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

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 17. The annual and cumulative groundwater storage changes included on Figure 17 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. Pumping in 2020 increased 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. In WY 2020, cumulative and annual change in storage decreased, as shown by the orange and green lines, respectively.

[1]The average historical and 2070 projected pumping included in Figure 17 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.

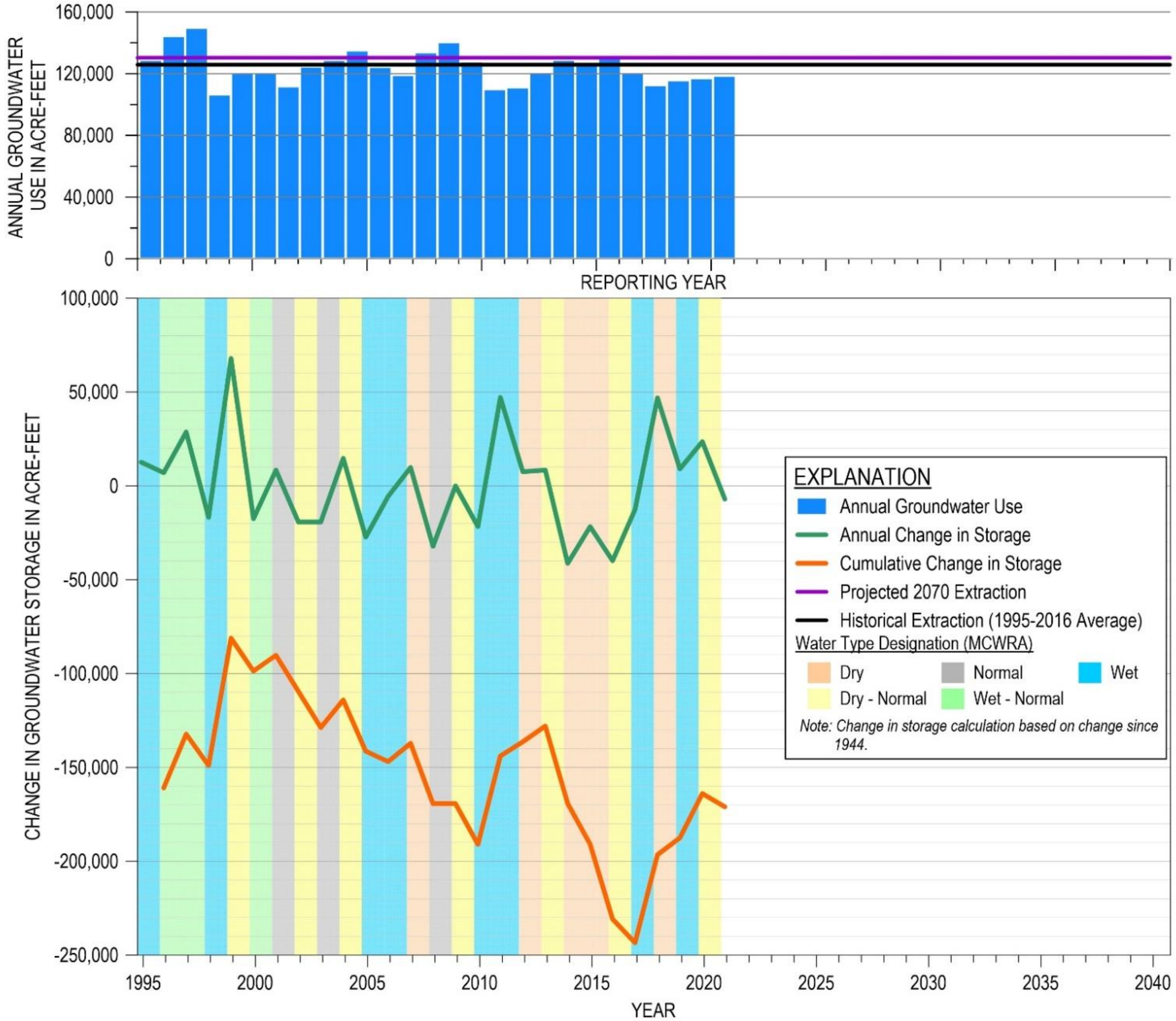



Figure 17. Groundwater Use and Annual and Cumulative Change in Groundwater Storage (historical average pumpnig and projected 2070 pumping are from the 2022 GSP Amendment)

## 3.5 Groundwater Quality

Degradation of groundwater quality is measured in public water system supply wells using data from the SWRCB Division of Drinking Water (DDW). Under the Irrigated Lands Regulatory Program, water quality degradation is monitored for on-farm domestic wells and agricultural supply (irrigation) wells. Water quality data for both programs can be found on SWRCB's GeoTracker GAMA database. The constituents of concern (COC) for municipal public water system supply wells and domestic wells have a Maximum Contaminant Level (MCL) or Secondary Maximum Contaminant Level (SMCL) established by the State's Title 22 Regulations. The COCs for agricultural supply wells include those that may lead to reduced crop production and are outlined in the Central Coast Regional Water Quality Control Board (CCRWQCB)'s Basin Plan. 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 2020 groundwater quality for the constituents of concern in the 180/400-Foot Aquifer Subbasin listed in the GSP. The table shows the number of wells that have exceeded the regulatory standard in WY 2020. There are a few COCs that have no exceedances, including cadmium, fluoride, MTBE, perchlorate, thallium, sulfate, and boron.

Table 8. WY 2020 Groundwater Quality Data

| Constituent of Concern (COC) | Regulatory Exceedance Standard | Standard Units | Number of Wells Sampled for COC in WY 2020 | Number of Wells Exceeding Regulatory Standard | Percentage of Wells with Exceedances |
|---|---|---|---|---|---|
| **DDW Wells** | | | | | |
| 123-Trichloropropane | 0.005 | UG/L | 23 | 2 | 9% |
| Arsenic | 10 | UG/L | 27 | 1 | 4% |
| Cadmium | 5 | UG/L | 22 | 0 | 0% |
| Chloride | 250 | UG/L | 18 | 1 | 6% |
| Fluoride | 2 | UG/L | 21 | 0 | 0% |
| Iron | 300 | UG/L | 21 | 2 | 10% |
| Manganese | 50 | UG/L | 19 | 2 | 11% |
| MTBE (Methyl tert-butyl ether) | 13 | UG/L | 20 | 0 | 0% |
| Nitrate | 10 | MG/L | 74 | 6 | 8% |
| Perchlorate | 6 | UG/L | 30 | 0 | 0% |
| Thallium | 2 | UG/L | 22 | 0 | 0% |
| Total Dissolved Solids | 500 | MG/L | 17 | 2 | 12% |
| **On-Farm Domestic Irrigated Lands Regulatory Program (ILRP) Wells** | | | | | |
| Chloride | 250 | MG/L | 3 | 0 | 0% |
| Iron | 0.3 | MG/L | 0 | 0 | 0% |
| Manganese | 0.05 | MG/L | 0 | 0 | 0% |
| Nitrate | 10 | MG/L | 9 | 1 | 11% |
| Sulfate | 500 | MG/L | 3 | 0 | 0% |
| Total Dissolved Solids | 500 | MG/L | 3 | 0 | 0% |
| **Irrigation ILRP Wells** | | | | | |
| Boron | 0.75 | MG/L | 5 | 0 | 0% |
| Chloride | 350 | MG/L | 10 | 0 | 0% |
| Iron | 5 | MG/L | 5 | 0 | 0% |
| Manganese | 0.2 | MG/L | 5 | 0 | 0% |

## 3.6 Subsidence

Subsidence is measured using Interferometric Synthetic-Aperture Radar (InSAR) data. These data are provided by DWR on the SGMA data viewer portal (DWR, 2020). Figure 18 shows the annual subsidence for the 180/400-Foot Aquifer Subbasin from June 2019 to June 2020. Data continue to show negligible subsidence. All land movement was within the estimated error of measurement of +/- 0.1 foot.

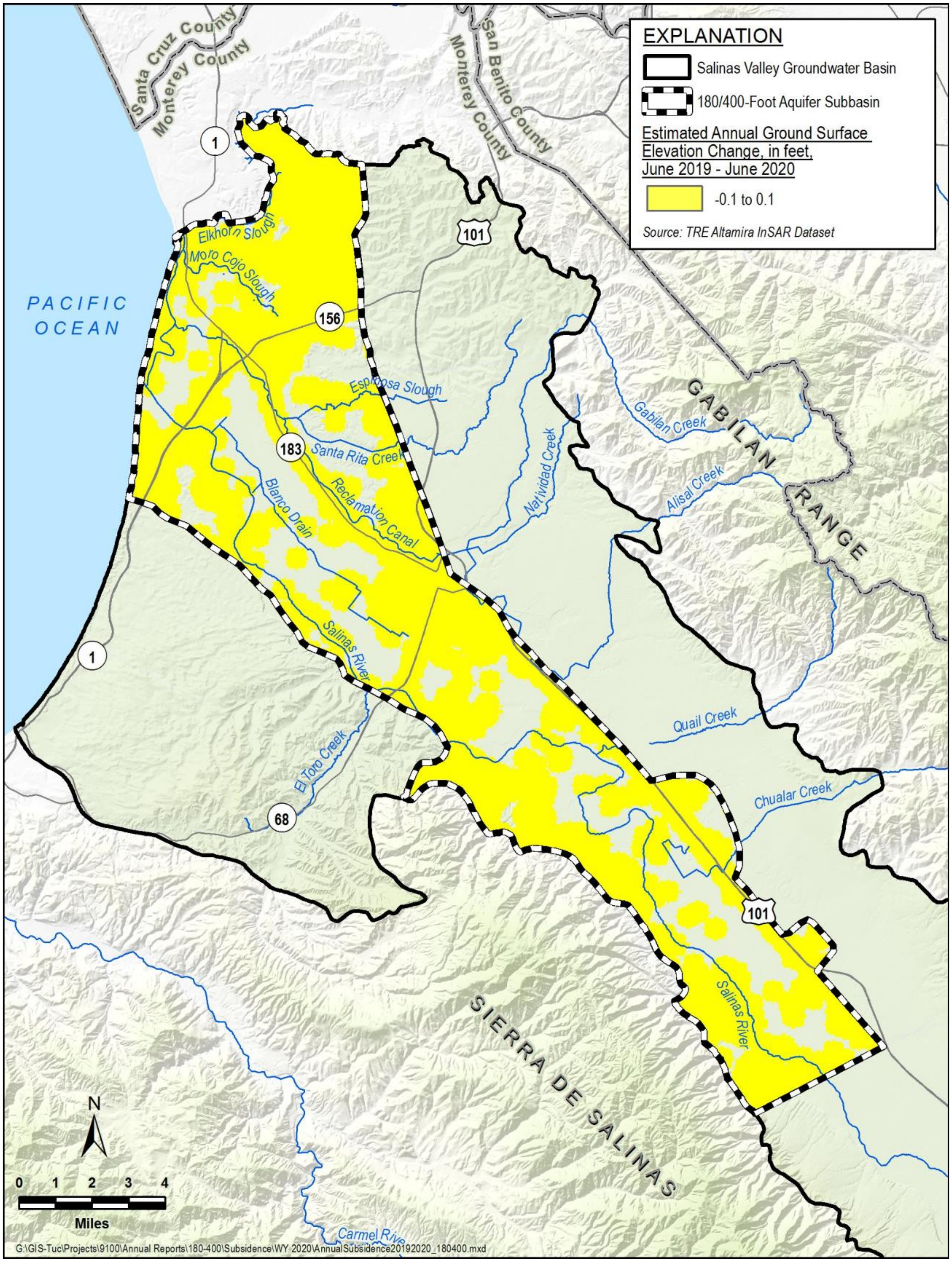


Figure 18. Annual Subsidence from June 2019 to June 2020

## 3.7 Depletion of Interconnected Surface Water

Depletion of interconnected surface waters was estimated in the GSP; however, there are very little monitoring data in the shallow sediments, and the level of interconnection to the 180/400-Foot Aquifer is unclear. The primary tool for assessing depletions of interconnected surface waters due to pumping will be shallow monitoring wells adjacent to the Subbasin's rivers. A network of shallow monitoring wells is yet to be established; this is a data gap that will continue to be addressed with GSP implementation. Existing shallow wells will be added to the monitoring network where possible and the SVBGSA plans to install two shallow wells along the Salinas River in the 180/400-Foot Aquifer Subbasin to supplement the existing shallow wells. A relationship between stream depletion and groundwater elevation will be established using the Salinas Valley Integrated Hydrologic Model (SVIHM) developed by the United States Geological Survey, which allows for the use of shallow groundwater elevations as proxies for stream depletion. The SVIHM is also used to determine the locations of interconnected surface waters. Additionally, it provides temporal changes in conditions due to variations in stream discharge and regional groundwater extraction, as well as other factors that may be necessary to identify adverse impacts on beneficial uses of surface water. Since the development of the GSP, SVBGSA has continued to engage stakeholders in discussions on monitoring interconnected surface waters. To base interconnected surface water monitoring on data rather than model estimations, SVBGSA will monitor shallow groundwater elevations in relation to streamflow. To base interconnected surface water monitoring on data rather than model estimations, other SVBGSA subbasins will monitor shallow groundwater elevations in relation to streamflow, and whether to shift to a similar approach in the 180/400-Foot Aquifer Subbasin will be considered as part of the GSP update process. Until modeling and monitoring tools become available, annual estimates of surface water depletion are considered unreliable.

# 4 ANNUAL PROGRESS TOWARDS IMPLEMENTATION OF THE GSP

## 4.1 WY 2020 Groundwater Management Activities

This section details groundwater management activities that have occurred in WY 2020, 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

Monterey County Ordinance 5303 expired in May 2020. Before its expiration MCWRA staff published a *Recommendations Report to Address the Expansion of Seawater Intrusion in the Salinas Valley Groundwater Basin: 2020 Update* (MCWRA, 2020a). The report updated the 2017 Recommendations Report based on the MCWRA's most recent information and data analysis and outlined nine recommendations aimed at halting seawater intrusion. The updated report evaluated the effectiveness of Ordinance 5303 towards the original recommendations proposed by MCWRA to halt seawater intrusion. The updated report was brought to the MCWRA Basin Management Advisory Committee, MCWRA Board of Directors, and Monterey County Board of Supervisors; subsequently, the Board of Supervisors initiated the Deep Aquifers Well Working Group (DAWWG) via the County Administrative Office (CAO).

### 4.1.2 Drought Operations Technical Advisory Committee Formation

The MCWRA has form a new drought operations technical advisory committee (D-TAC) to develop standards and guiding principles for managing the operations of Nacimiento and San Antonio reservoirs during multi-year drought periods. The D-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 D-TAC on his/her behalf.

The D-TAC, which began meeting in August 2020, completed the development of standards and guiding principles for drought operations, which were adopted by the Agency Board of Directors on February 16, 2021. Moving forward, the D-TAC will meet any time a drought trigger occurs to develop a recommended release schedule for Nacimiento and San Antonio Reservoirs.

### 4.1.3 Well Destruction in the Coastal Region

In July 2020, MCWRA and the SWRCB entered into an agreement for the *Protection of Domestic Drinking Water Supplies for the Lower Salinas Valley* project (Project). The Project is funded in part by a Proposition 1 Implementation Grant from the SWRCB with the goal of destroying a minimum of one hundred abandoned or inactive wells in the coastal Salinas Valley to prevent vertical migration of seawater- and nitrate-contaminated groundwater between aquifers. Project implementation is ongoing and will be completed by February 2023.

## 4.2 WY 2020 GSP Implementation Activities

The SVBGSA submitted the 180/400-Foot Aquifer Subbasin GSP on January 23, 2020. On April 1, 2020, SVBGSA submitted the WY 2019 Annual Report, which included the following activities completed between GSP submittal and Annual Report submittal: two-year schedule, 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. This section covers additional activities completed within WY 2020, including continuing to work on implementing the GSP through developing a two-year work plan and initiating long-term strategic planning, holding additional stakeholder engagement meetings, establishment of the Seawater Intrusion Working Group, initiation of a Strategic Dialogue with Disadvantaged Communities, beginning development of a SGMA Implementation Grant application, and filling data gaps.

### 4.2.1 Two-Year Work Plan and Long-term Strategic Planning

As outlined in the 2019 Annual Report, in early 2020, the SVBGSA developed a two-year work plan for its activities over 2020 and 2021, including implementation of the 180/400-Foot Aquifer Subbasin GSP. The USGS has recently released a provisional version of the SVIHM, which will enable the SVBGSA to use it to update the 180/400-Foot Aquifer Subbasin GSP and continue to 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 work plan proposed a strategic dialogue with disadvantaged communities and a working group on seawater intrusion. These two specific efforts help refine the SVBGSA’s implementation approach. With the numerous tasks ahead of the SVBGSA, this work plan enables the Agency to organize and plan for tasks over the next two years.

In addition to the two-year schedule, the SVBGSA initiated a longer-term strategic planning effort. Staff identified the potential need for the Agency to engage in strategic planning in 2021 to further define Agency roles and responsibilities, a clear and concise mission statement, organizational goals and objectives, staffing and support structure, financial and governance policies, and strong communications and outreach. At the September 24, 2020 Executive Committee meeting, a subcommittee consisting of two members was appointed to work with staff on a scope of work and cost estimate for the proposed strategic planning effort for Executive Committee and Board approval in 2021.

### 4.2.2 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 WY 2019 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 work plan 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.

From submittal of the 2019 Annual Report to the end of WY 2019, September 30, 2020, SVBGSA continued to engage stakeholders in the 180/400-Foot Aquifer Subbasin, in addition to establishing subbasin planning committees for the other Salinas Valley subbasins. During this period, it held six valley-wide Advisory Committee meetings and six Board of Directors meetings, as listed in Table 9.

To implement one of the management actions from the 180/400-Foot Aquifer Subbasin GSP, SVBGSA established the Seawater Intrusion Working Group (SWIG) and the SWIG Technical Advisory Committee (SWIG TAC), as described in Section 4.2.3 below. Table 9 lists the meetings held between April 1, 2020, and September 30, 2020, the total participation, including panelists and staff, and the agenda topics related to the 180/400-Foot Aquifer Subbasin.

Table 9. SVBGSA Stakeholder Engagement Meetings Between April and September 2020

| Date | Format | Location | Participation | Agenda Topics |
|---|---|---|---|---|
| **April 9, 2020** | Board Meeting | Via Teleconference | 52 | Consider adopting budget for FY 2020-21 |
| **April 16, 2020** | Advisory Committee Meeting | Via Teleconference | 88 | Accept 180/400-Foot Aquifer Subbasin Water Year 2019 Annual Report; Discuss Subbasin Planning Update and Discuss Advisory Committee and Integrated Sustainability Plan Committee roles |
| **May 14, 2020** | Board Meeting | Via Teleconference | 64 | Receive report and take appropriate action on Monterey County's Deep Aquifer Well Moratorium Ordinance No. 5303; Receive report on Implementation of Seawater Intrusion Working Group |
| **June 11, 2020** | Board Meeting | Via Teleconference | 70 | Appropriation of DWR Grant Funds; Receive a report on the status of the SVIHM and SVOM model and have discussion and provide guidance on the use of the models for 2022 GSPs development and 180/400-Foot Aquifer GSP update |

| Date | Format | Location | Participation | Agenda Topics |
|---|---|---|---|---|
| **June 18, 2020** | Advisory Committee Meeting | Via Teleconference | 63 | Review 180/400-Aquifer GSP Public Comment Summary; Discuss Disadvantaged Communities Strategic Engagement |
| **July 9, 2020** | Board Meeting | Via Teleconference | 93 | Presentation and direction on Groundwater Dependent Ecosystems and Interconnected Surface Waters |
| **July 16, 2020** | Advisory Committee Meeting | Via Teleconference | 71 | Discussion of Shallow Sediments Aquifer and discussion of approach to Interconnected Surface Waters and Groundwater Dependent Ecosystems in response to Board request |
| **June 19, 2020** | SWIG Meeting | Via Teleconference | 21 | Discuss purpose, perceptions, and ground rules of SWIG |
| **July 27, 2020** | SWIG Meeting | Via Teleconference | 21 | Review agreements on meetings, decision making, formation of Technical Advisory Committee, Monterey County Well Ordinance Update |
| **August 13, 2020** | Board Meeting | Via Teleconference | 64 | Appointment of Members to the Integrated Sustainability Plan (ISP) Committee; Presentation on the Interlake Tunnel Project by Monterey County Water Resources Agency; Receive update on Seawater Intrusion Working Group and Well Moratorium Working Group |
| **August 20, 2020** | Advisory Committee Meeting | Via Teleconference | 58 | Receive requested update on Interconnected Surface Waters and Groundwater Dependent Ecosystem approach and make recommendation to Board; Appoint Three Advisory Committee Members to the ISP Committee; Receive Update on Subbasin Planning Calendar and Comment Process |
| **August 24, 2020** | SWIG Meeting | Via Teleconference | 34 | Review SWIG TAC scope: Review Monterey Country Well Ordinance and working group formed to advise County |
| **August 31, 2020** | SWIG TAC Meeting | Via Teleconference | 13 | Introductions, overview of scope of work, reviewing existing data |
| **September 10, 2020** | Board Meeting | Via Teleconference | 86 | Consider Salinas Valley Basin GSA membership to the Greater Monterey County Integrated Regional Water Management Group and Resolution to Adopt the Integrated Regional Water Management Plan for Greater Monterey County; Receive report and provide initial recommendation for Proposition 68 Round 1 Implementation Grant for January 2021 submittal to Department of Water Resources |
| **September 28, 2020** | SWIG Meeting | Via Teleconference | 26 | CSIP Presentation; Monterey County Well Ordinance Update |

### 4.2.3 Seawater Intrusion Working Group

The SVBGSA established a Seawater Intrusion Working Group (SWIG). The preliminary goal of the SWIG is to develop consensus on the science of seawater intrusion in the Salinas Valley Groundwater Basin. The ultimate goal of the SWIG is to develop a comprehensive set of projects and management actions that control seawater intrusion while providing cost effective water supplies for the region. The SWIG TAC provides technical information in support of the SWIG's policy direction and decision-making functions. The SWIG TAC provides the SWIG information on the nature and extent of seawater intrusion, the processes underlying seawater intrusion, technical advice on the effectiveness of potential projects or actions that may halt or reverse seawater intrusion, uncertainties surrounding seawater intrusion, and data needed to better assess the current status of seawater intrusion. The primary benefit of the SWIG is to compile the best available science, data, and understanding of local seawater intrusion causes and potential resolutions. The outcome is an agreed-to approach for managing seawater intrusion.

In WY 2020, the SWIG and SWIG TAC meetings focused on administrative groundwork such as: building the SWIG foundation for the long-term, setting ground rules for the group and meetings, creating the SWIG TAC, agreeing to decision-making models, and defining how public participation will be included in the meetings. It further agreed to work with GSA staff to support development of a scope of work and RFP for a Deep Aquifers Investigation. The SWIG and SWIG TAC meetings also focused on improving the working knowledge of CSIP, the Monterey County Well Ordinance, and the well permitting processes to gain a better understanding of the current concerns regarding the Deep Aquifers.

### 4.2.4 Strategic Dialogue with Disadvantaged Communities

At the approval of the 180/400-Foot Aquifer Subbasin GSP in January 2020, the SVBGSA Board expressed an interest in understanding more about Disadvantaged Communities (DAC) experiences as stakeholders in the Salinas Valley and how the GSP development process could help better understand groundwater conditions affecting these communities. Following extensive written comments filed by stakeholders on the 180/400 GSP regarding documentation of water quality conditions in DACs, staff and consultants documented locations of DACs and reviewed a domestic well water quality analysis. This work built off the Integrated Regional Water Management Plan (IRWMP) for the Greater Monterey County Region completed in 2018. The IRWMP Appendix entitled *Integrated Plan to Address Drinking Water and Wastewater Needs of Disadvantaged Communities in the Salinas Valley and Greater Monterey County IRWM Region* identified 25 small disadvantaged, severely disadvantaged, and suspected disadvantaged communities in unincorporated areas in the IRWM region, which includes the entire SVBGSA area. After updating DAC mapping in the 180/400 Subbasin GSP, SVBGSA conducted further analysis of DACs within the Salinas Valley Groundwater Basin. As a result of this work, staff made the decision to include a request in the Proposition 68 Planning Grant for a dedicated task to develop a Strategic Engagement effort with DACs regarding SGMA and GSP development throughout the Basin. That was approved by DWR in the grant and staff has contracted with Gina Bartlett with Consensus Building Institute (CBI) to assist SVBGSA with this work over six months.

At the June 18, 2020 Advisory Committee, staff presented background and information on ways that GSAs could more intentionally engage with disadvantaged communities on GSA goals for groundwater sustainability. Several Advisory Committee members volunteered to engage as advisors in this process and assisted CBI in a series of interviews as well as connecting CBI staff to additional leaders to interview regarding disadvantaged community engagement in groundwater sustainability planning and implementation. This fed into a CBI presentation of the results of this phase of their work to date. This work has included 14 interviews with 17 people over three months. This work completes the stakeholder assessment and interview tasks and provides a draft engagement strategy for further discussion and consideration by the Advisory Committee following the presentation.

### 4.2.5 SGMA Implementation Grant Application

In fall 2020, the SVBGSA began development of an application for a SGMA Implementation Grant. Staff reviewed the opportunity and strategy for the Round 1 Prop 68 Implementation Grant. This initial implementation grant is an important decision for SVBGSA as we begin to put in place critical projects to initiate mitigating overdraft in the 180/400-Foot Aquifer GSP. Staff reviewed the status of projects within the 180/400-Foot Aquifer Subbasin GSP to develop a list of potential projects eligible for the grant. Staff presented five potential projects to the Board of Directors at the September meeting. Based on Board feedback and recommendation, staff and consultants began working with partner agencies, scoping the projects, and confirming eligibility with DWR per the PSP requirements. This provided the initial steps of developing the grant for submittal in January 2021.

### 4.2.6 Filling Data Gaps

The SVBGSA has started to fill data gaps and expand the monitoring networks in the 180/400-Foot Aquifer Subbasin. WY 2020 efforts focused on the groundwater levels monitoring network. To the extent possible existing wells are used to address the data gaps in the groundwater level monitoring network. SVBGSA identified additional wells that report groundwater level data to MCWRA and wrote letters to well owners notifying them of inclusion of their wells and groundwater elevation data in the monitoring network. This effort has identified 135 wells for potential inclusion in the groundwater elevation monitoring network, which would expand the total number of wells to 156, some of which will be selected as Representative Monitoring Sites. It will fill most data gaps in the 180-Foot and 400-Foot

Aquifers, the remaining data gaps are mainly in the Deep Aquifers. SVBGSA plans to complete this work in 2021 and include it in a 2-year Update to the 180/400-Foot Aquifer Subbasin GSP.

In addition, the vertical and lateral extent of the Salinas Valley Aquitard (SVA) was mapped based on previous interpretations and well completion reports from DWR's Online System for Well Completion Reports (OSWCR) database. The SVA exists in the northern part of the Monterey Subbasin, the western part of the Eastside Aquifer Subbasin, and throughout the majority of the 180/400-Foot Aquifer Subbasin. On the northern side of the aquitard, the blue clay that makes up the aquitard pinches out and becomes intermittent, as evidenced by analyzing well completion report drill logs/records. Because the shallow sediments only exist above the SVA, this analysis effectively infers the extent of the shallow sediments. Vertically, the shallow sediments extend from ground surface to the top of the SVA. Close to the City of Marina, the shallow sediments are up to 50 feet thick, but thin farther inland. Most of the shallow sediments are within 30 feet of the ground surface. It is unlikely that these shallow sediments are thick enough to have any substantial saturation capable of sustaining constant groundwater pumping for water supply.

## 4.3 Sustainable Management Criteria

The 180/400-Foot Aquifer Subbasin GSP includes descriptions of significant and unreasonable conditions, minimum thresholds, interim milestones, measurable objectives, and undesirable results 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 are included for each sustainability indicator in the following sections.

Since the GSP addresses long-term groundwater sustainability, some of the metrics for the sustainability indicators may not be applicable in each individual future year. The GSP is developed to avoid undesirable results—under average hydrogeologic conditions—with long-term, deliberate management of groundwater. Sustainable management criteria that will be met under average hydrogeologic conditions are those for chronic lowering of groundwater levels, reduction of groundwater storage, and depletion of interconnected surface water.

Average hydrogeologic conditions are the anticipated future groundwater conditions in the Subbasin, averaged over the planning horizon and accounting for anticipated climate change. Future groundwater conditions are based on historical precipitation, evapotranspiration, and streamflow, as well as reasonably anticipated climate change and sea level rise. The average hydrogeologic conditions include reasonably anticipated wet and dry periods.

The undesirable results described in the sections below reflect groundwater conditions under the reasonably anticipated climatic fluctuations that underpin the future water budget. Groundwater conditions due to extreme, unanticipated climatic conditions do not constitute an undesirable result. As stated in the SMC BMP (DWR, 2017), "Overdraft during a period of drought is not sufficient to establish a chronic lowering of groundwater levels if extractions and groundwater recharge are managed as necessary to ensure that reductions in groundwater levels or storage during a period of drought are offset by increases in groundwater levels or storage during other periods."

The two solid green lines on Figure 19 show the anticipated average precipitation for 2030 and 2070, accounting for reasonable future climatic change. Measured annual precipitation for WY 2019 and 2020 are shown as the two blue dots, and the dashed blue line shows the average measured precipitation since GSP implementation. This figure shows that WY 2020 was below the average hydrologic conditions expected for the Subbasin. Furthermore, average rainfall since GSP implementation has not risen to the anticipated future average conditions. As a result, it is not anticipated that all measurable objectives have been achieved this year because these measurable objectives were based on managing to average future climatic conditions. This does not mean that minimum thresholds should be exceeded. However, WY 2020 was relatively dry, and therefore it is more likely that minimum thresholds are exceeded in 2020. Because the Subbasin is not expected to achieve sustainability until 2040, the current minimum threshold exceedances do not imply unsustainable groundwater management. However, areas with current minimum threshold exceedances should be monitored, and should demonstrate progress towards measurable objectives as conditions approach expected average conditions.

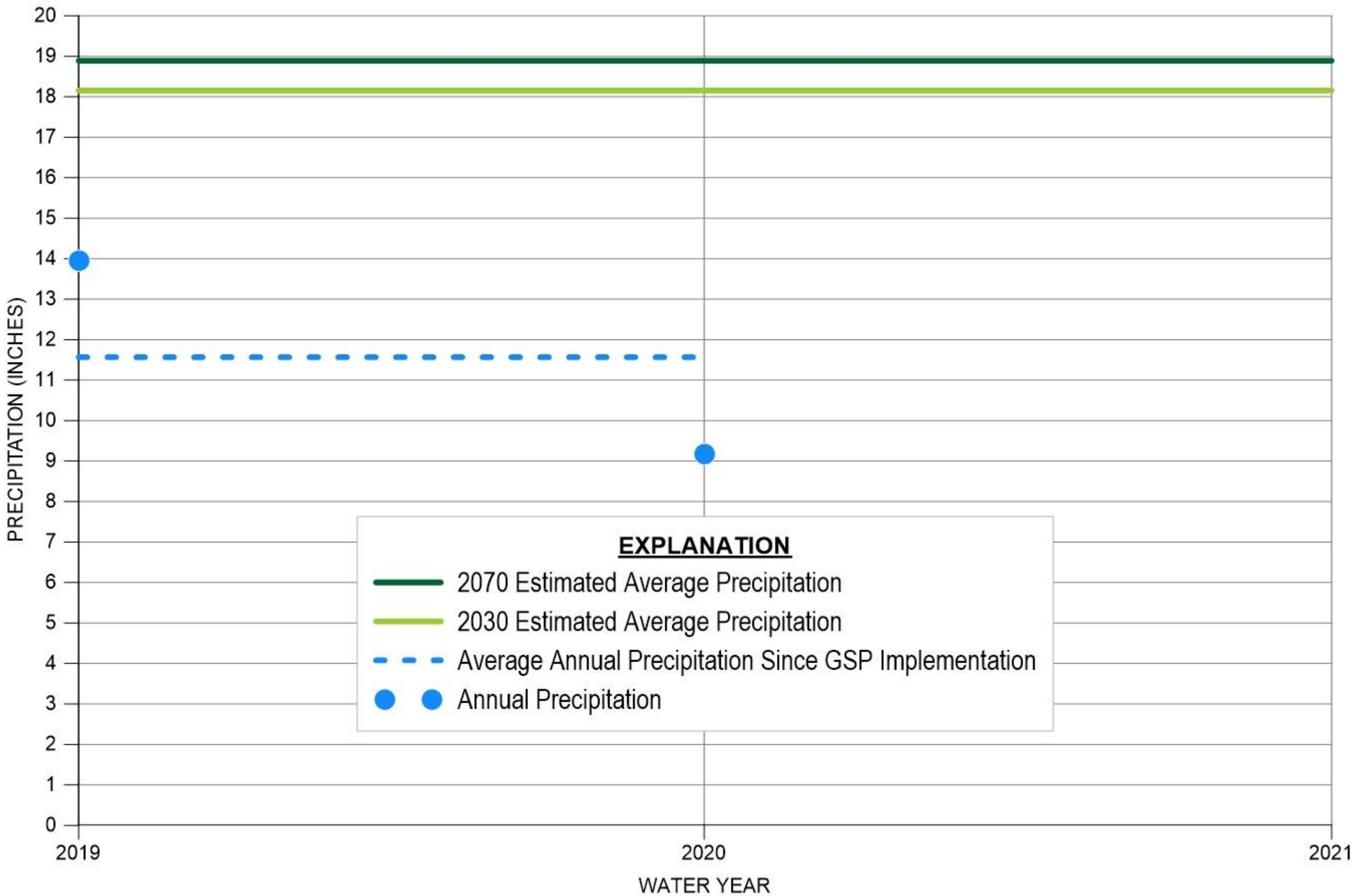



Figure 19. Comparison of Average Precipitation Since GSP Implementation and Estimated Future Average Precipitation

### 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. October 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, and green cells mean the groundwater elevation is above the measurable objective. In WY 2020, one well in both the 180-Foot and Deep Aquifers, exceeded its minimum threshold as indicated by the red cells below. No wells in the 400-Foot Aquifer exceeded their minimum thresholds.

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 2019 elevation data** | **WY 2020 elevation data** | **Interim Milestone at Year 2025 (elevation in feet)** | **Measurable Objective (elevation in feet) (goal to reach at 2040)** |
| 13S/02E-21Q01 | 180-Foot Aquifer | 3.0 | 7.0 | 7.2 | 6.7 | 8.0 |
| 14S/02E-03F04 | 180-Foot Aquifer | -12.0 | -10.3 | -9.7 | -6.4 | -7.1 |
| 14S/02E-12B02 | 180-Foot Aquifer | -19.0 | -13.7 | -10.1 | -9.2 | -11.9 |
| 14S/02E-26H01 | 180-Foot Aquifer | -25.0 | -19.6 | -19.1 | -13.4 | -18.0 |
| 14S/02E-27A01 | 180-Foot Aquifer | -18.7 | -15.4 | -15.3 | -9.9 | -10.7 |
| 14S/03E-18C01 | 180-Foot Aquifer | 5.0 | 9.4 | 8.5 | 11.4 | 10.0 |
| 14S/03E-30G08 | 180-Foot Aquifer | -29.0 | -24.7 | -23.0 | -13.1 | -3.5 |
| 15S/03E-16M01 | 180-Foot Aquifer | -16.0 | -6.7 | -7.5 | -10.3 | -4.1 |
| 15S/03E-17M01 | 180-Foot Aquifer | -17.2 | -7.8 | -6.0 | -9.2 | 2.9 |
| 16S/04E-15D01 | 180-Foot Aquifer | 26.0 | 47.0 | 47.4 | 46.0 | 55.0 |
| 17S/05E-06C02 | 180-Foot Aquifer | 73.5 | 83.8 | 72.2 | 82.6 | 94.1 |
| 13S/02E-21N01 | 400-Foot Aquifer | -15.0 | -12.9 | -10.9 | -12.7 | -7.6 |
| 13S/02E-32A02 | 400-Foot Aquifer | -9.9 | -5.2 | -4.7 | -6.2 | -5.0 |
| 14S/02E-03F03 | 400-Foot Aquifer | -40.0 | -36.7 | -34.5 | -15.1 | -19.4 |
| 14S/02E-08M02 | 400-Foot Aquifer | -12.0 | -10.9 | -8.8 | -10.5 | -5.9 |
| 14S/02E-12B03 | 400-Foot Aquifer | -54.0 | -57.4 | -36.6 | -33.0 | -43.0 |
| 14S/02E-12Q01 | 400-Foot Aquifer | -26.3 | -18.3 | -17.8 | -21.9 | -13.5 |
| 14S/03E-18C02 | 400-Foot Aquifer | -38.0 | -33.7 | -30.8 | -18.5 | -17.4 |

| | | | | | | |
|---|---|---|---|---|---|---|
| 15S/03E-16F02 | 400-Foot Aquifer | -20.0 | -8.6 | -7.6 | -12.1 | 1.2 |
| 16S/04E-08H03 | 400-Foot Aquifer | 19.0 | 42.2 | 41.7 | 40.9 | 48.0 |
| 13S/02E-19Q03 | Deep Aquifer | -10.0 | -9.3 | -10.9 | -6.9 | 5.0 |

#### 4.3.1.2 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. Three wells had groundwater elevations higher than their measurable objective in WY 2020 and are represented by the green cells in Table 10.

To help reach measurable objectives, the SVBGSA set interim milestones at five-year intervals. The 2025 interim milestones for groundwater elevations are also shown in Table 10. The WY 2020 groundwater elevations in 10 wells are already higher than the 2025 interim milestones.

#### 4.3.1.3 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 2020 are tabulated in Table 11. This table shows that there was one exceedance of minimum thresholds in both the 180-Foot and Deep Aquifers. Additionally, the groundwater elevation for the one monitoring well in the Deep Aquifers exceeds the 20-year planning horizon undesirable result. Yet, no wells in any aquifer had two consecutive exceedances of their minimum thresholds. Groundwater elevation minimum threshold exceedances, compared with the 2040 undesirable result, is shown on Figure 20. 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 Groundwater Elevation Wells | Number of Groundwater Elevation Exceedances | Percentage of Groundwater Elevation Exceedances |
|---|---|---|---|
| **180-Foot Aquifer** | 11 | 1 | 9% |
| **400-Foot Aquifer** | 9 | 0 | 0% |
| **Deep Aquifers** | 1 | 1 | 100% |

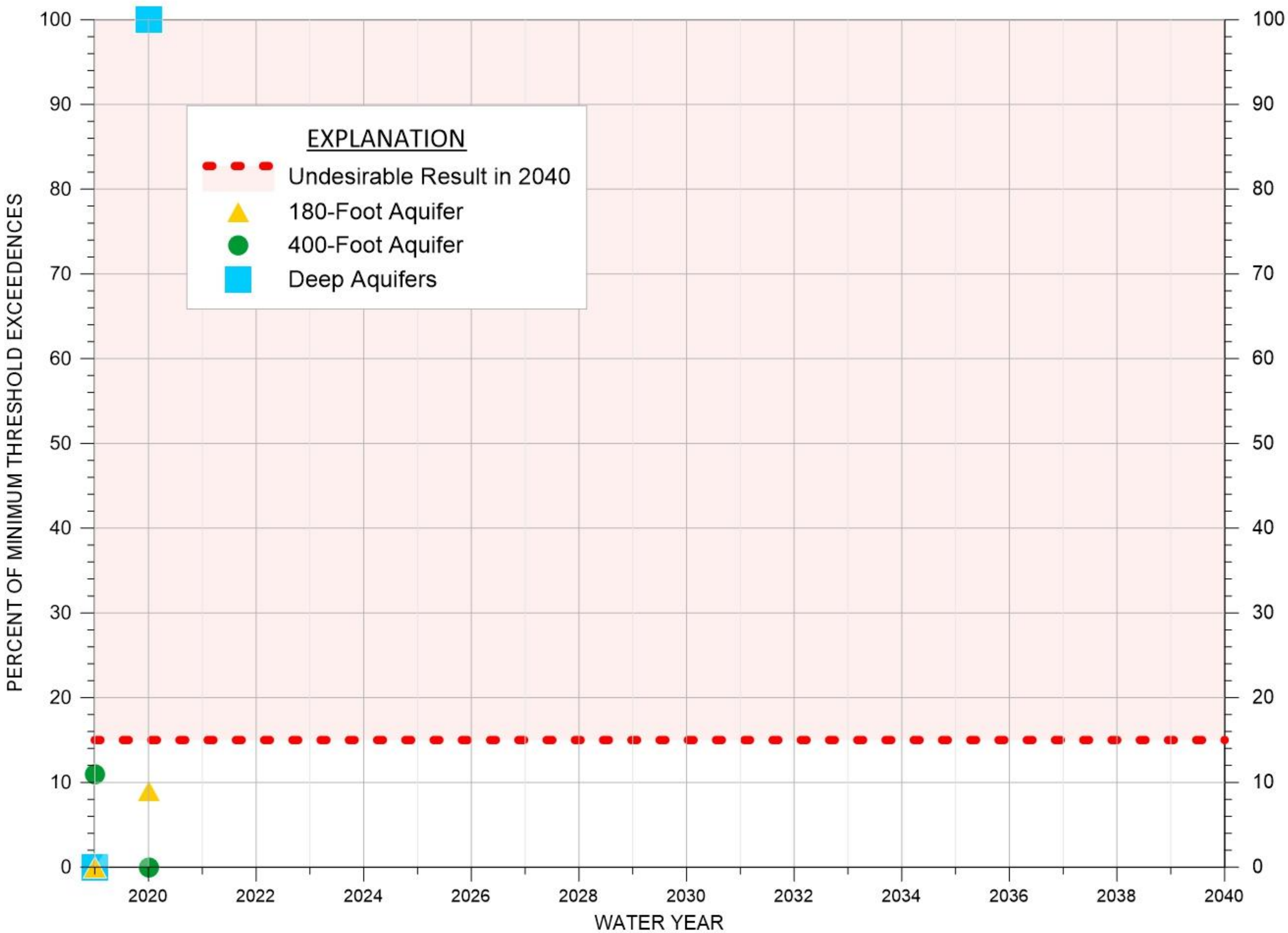



Figure 20. Groundwater Elevation Exceedances Compared to 2040 Undesirable Result

### 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. as described in Chapter 6 of the GSP. 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. It also does not include rural domestic pumping and thus the 200 AF/yr. estimation is not counted to determine if the minimum threshold was exceeded. The total groundwater extraction for Reporting Year 2020, without rural domestic pumping, was 119,100 AF and exceeds the minimum threshold by 7,100 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 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 also set to 112,000 AF/yr. and therefore is also exceeded by 7,100 AF.

#### 4.3.2.3 Undesirable Result

For the reduction in groundwater storage SMC, the undesirable result is a quantitative combination of 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 2020 was 119,100 AF/yr not including the rural domestic pumping estimate. The 2020 groundwater extractions exceeded the 20-year planning horizon undesirable result. Figure 21 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.

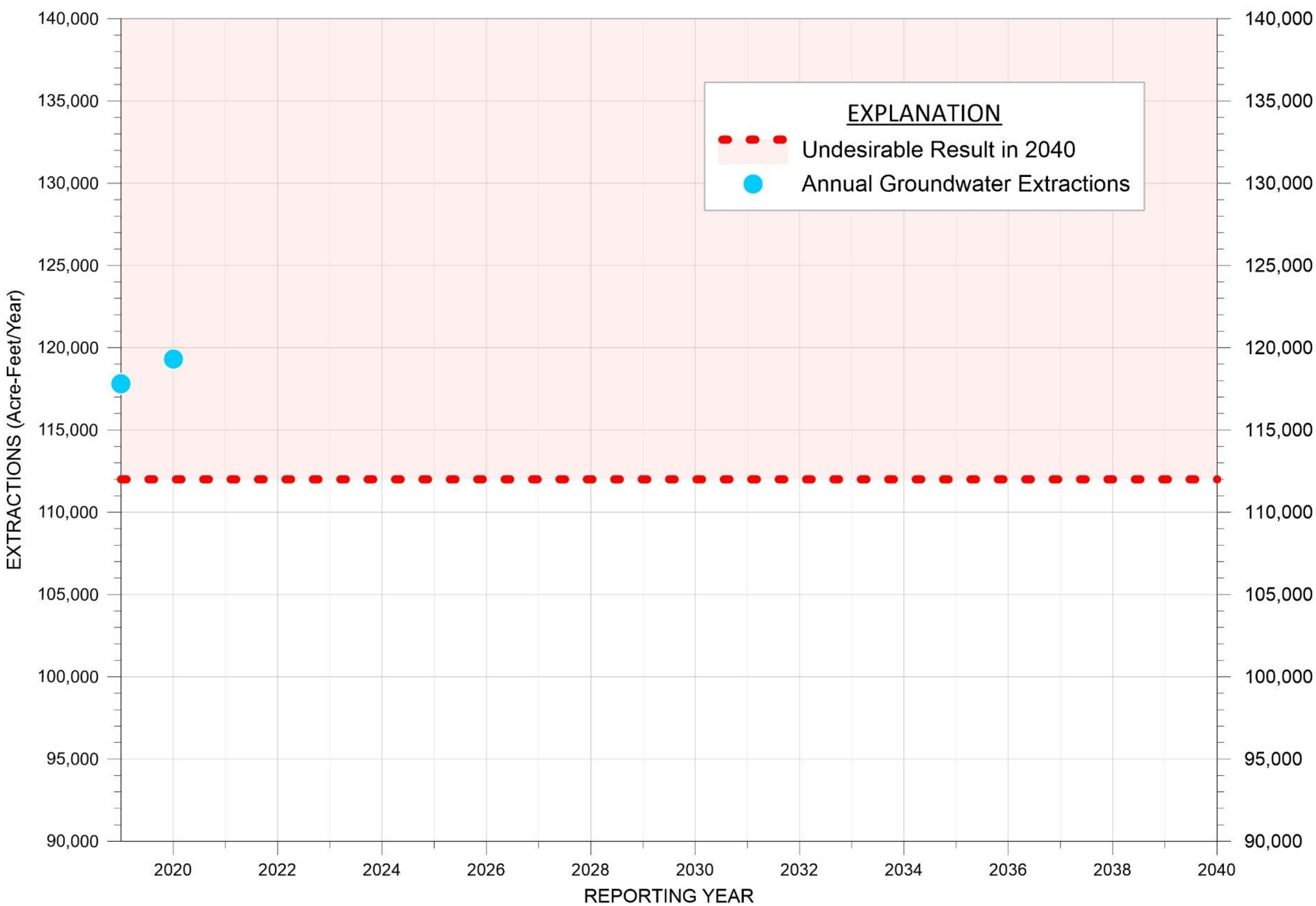



Figure 21. Groundwater Extraction Compared to the Groundwater Storage 2040 Undesirable Result

### 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-Foot 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 22 and Figure 23.

Seawater intrusion in the 180-Foot Aquifer and 400-Foot Aquifer have both increased in WY 2020 Figure 22 and Figure 23 show that the 2020 extent of seawater intrusion in the 180-Foot Aquifer and 400-Foot Aquifer exceeded the 2017 extents, and therefore exceeded the minimum thresholds.

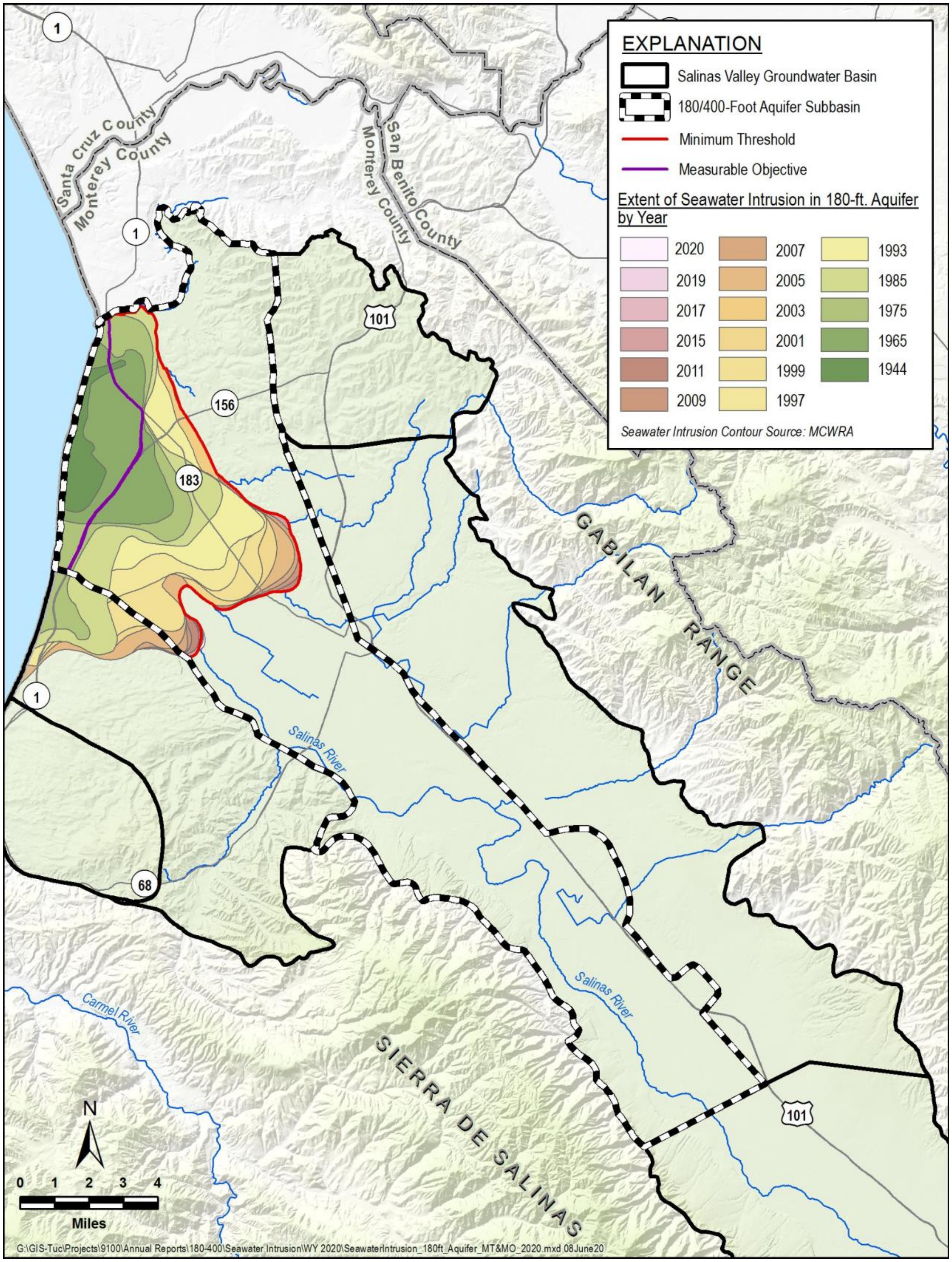



Figure 22. Seawater Intrusion Compared to the Seawater Intrusion Minimum Threshold, 2040 Undesirable Result, and Measurable Objective for the 180-Foot Aquifer

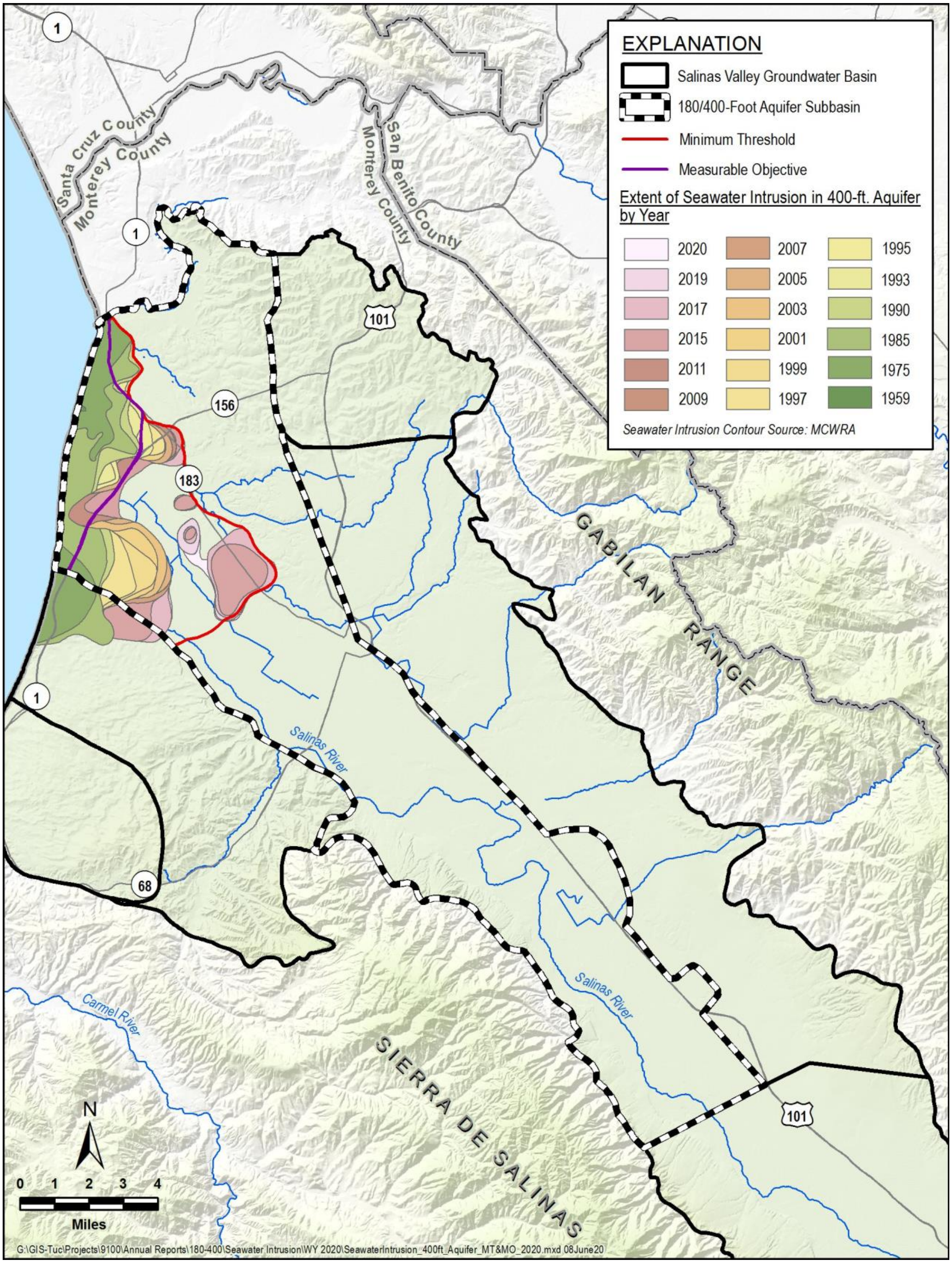



Figure 23. Seawater Intrusion Compared to the Minimum Threshold, 2040 Undesirable Result, and Measurable Objective for the 400-Foot Aquifer

#### 4.3.3.2 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 both the 180-Foot Aquifer and 400-Foot Aquifer have increased in WY 2020, 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.

#### 4.3.3.3 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 22 and Figure 23 show that the 2020 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. 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.

### 4.3.4 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 regulatory standards for drinking water and irrigation water. 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 12. There were no exceedances of the minimum thresholds established for DDW public water system supply wells nor for the ILRP on-farm domestic and irrigation wells.

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

| Constituent of Concern (COC) | Minimum Threshold/ Measurable Objective | WY 2020 Exceedances of Regulatory Standard |
|---|---|---|
| DDW Wells | | |
| 123-Trichloropropane | 2 | 2 |
| Arsenic | 1 | 1 |
| Cadmium | 0 | 0 |
| Chloride | 2 | 1 |
| Fluoride | 0 | 0 |
| Iron | 8 | 2 |
| Manganese | 3 | 2 |
| MTBE (Methyl tert-butyl ether) | 1 | 0 |
| Nitrate | 9 | 6 |
| Perchlorate | 0 | 0 |
| Thallium | 0 | 0 |
| Total Dissolved Solids | 18 | 2 |
| On-Farm Domestic ILRP Wells | | |
| Chloride | 29 | 0 |
| Iron | 12 | 0 |
| Manganese | 4 | 0 |
| Nitrate | 51 | 1 |
| Sulfate | 43 | 0 |
| TDS | 111 | 0 |
| Irrigation ILRP Wells | | |
| Boron | 0 | 0 |
| Chloride | 28 | 0 |
| Iron | 3 | 0 |
| Manganese | 2 | 0 |

#### 4.3.4.2 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 12. Interim milestones are also set at the minimum threshold levels. There were no groundwater quality minimum threshold exceedances in WY 2020, so the groundwater quality data already meet the 2025 interim milestones.

#### 4.3.4.3 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 12 shows no constituents exceeded their minimum thresholds in WY 2020. 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 24. Values in the shaded red area are above the 2040 undesirable result. This graph is updated annually with new data to demonstrate the sustainability indicator's direction towards sustainability.

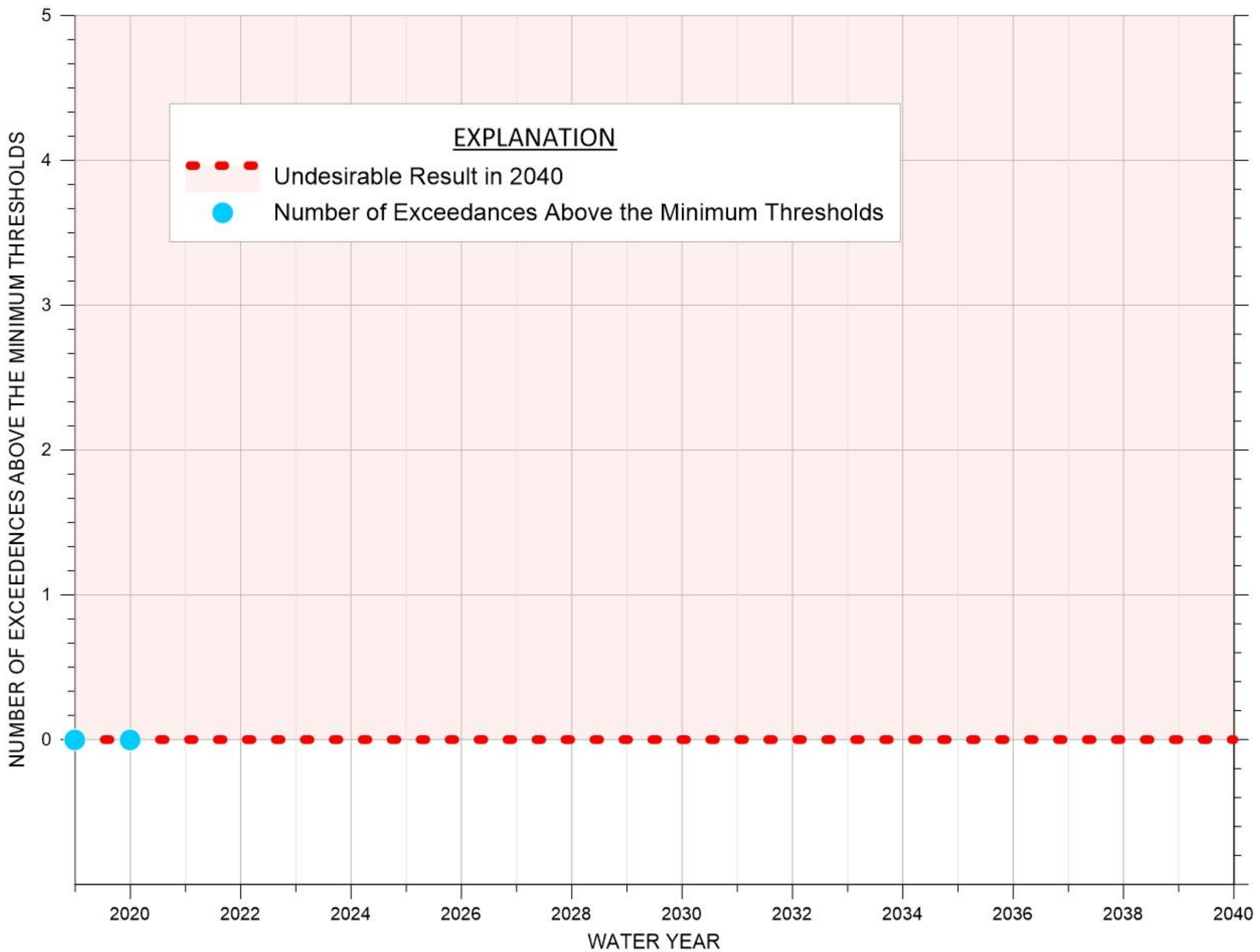



Figure 24. Groundwater Quality Minimum Threshold Exceedences Compared to the 2040 Groundwater Quality Undesirable Result

### 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. Data from June 2019 to June 2020 demonstrated less than the minimum threshold of 0.1 foot/year, as shown on Figure 18.

#### 4.3.5.2 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. Figure 18 demonstrates that data from June 2019 to June 2020 showed less than the measurable objective of no more than 0.1 foot/year of measured subsidence is being met.

The interim milestones are identical to minimum threshold of 0.1 foot/year. The WY 2020 subsidence data shows that the 2025 subsidence interim milestone is already being met.

#### 4.3.5.3 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 described in Section 3.6, the WY 2020 data for subsidence were unavailable at the time of this report. Data from June 2019 to June 2020 showed subsidence was below the minimum threshold of 0.1 foot/year. The WY 2020 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 25. Values in the shaded red area are above the 2040 undesirable result.

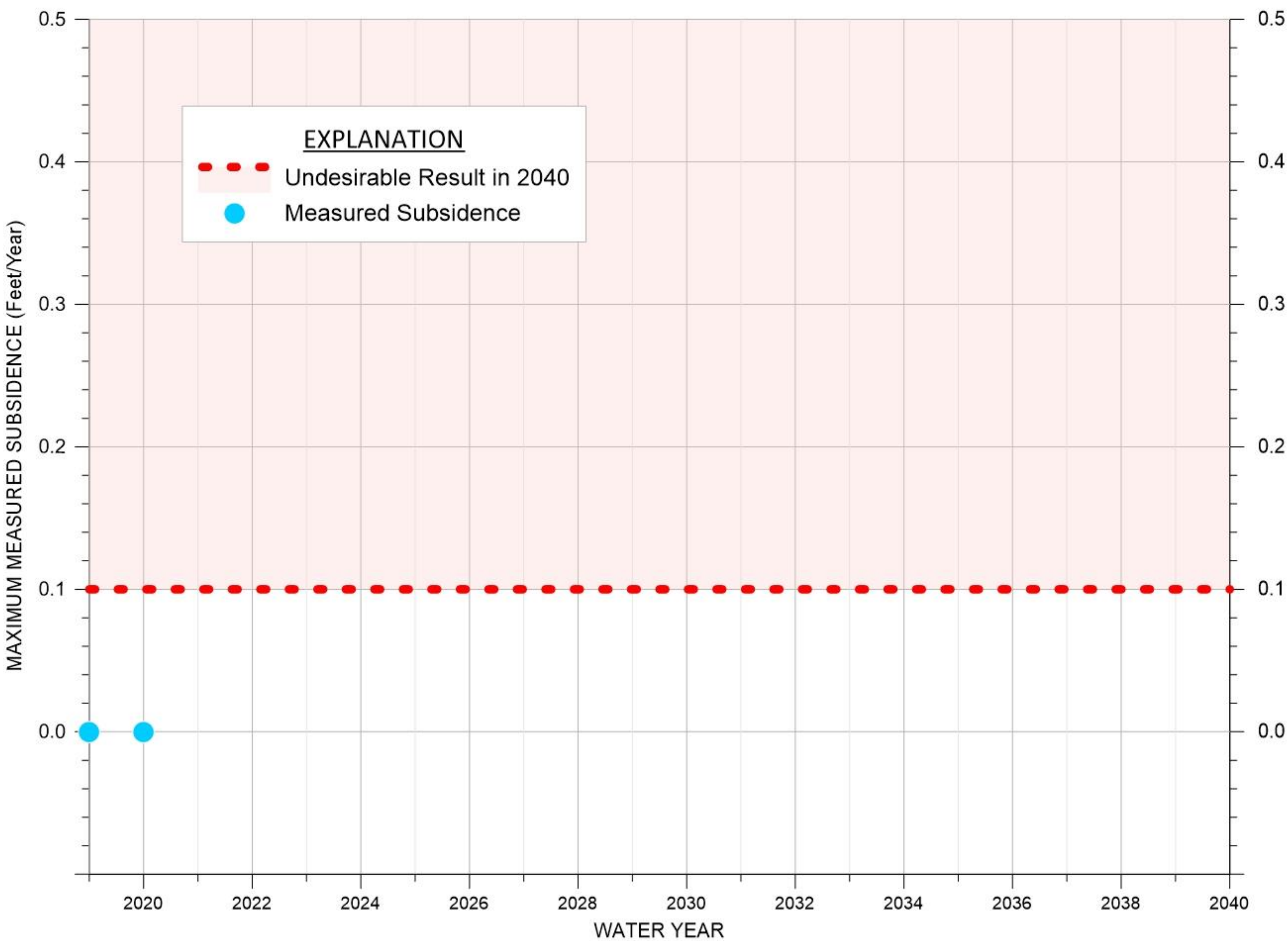



Figure 25. Maximum Measured Subsidence Compared to the Undesirable Result

### 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., as stated in Chapter 8 of the GSP. 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.

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 2020 to compare to the minimum thresholds.

#### 4.3.6.2 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 2020 to compare to the measurable objective or the 2025 interim milestone.

#### 4.3.6.3 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 2020 to compare to the 2040 planning horizon undesirable result.

# 5 CONCLUSION

This 2020 Annual Report updates data and information for the 180/400-Foot Aquifer Subbasin GSP from WY 2019 to WY 2020 with the best available data. It covers GSP implementation activities up to September 30, 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. WY 2020 was classified as dry-normal. Groundwater elevations decreased slightly in WY 2020, with most wells showing elevations above their minimum thresholds but still below their measurable objectives. Change in groundwater storage, as measured by pumping, exceeded the minimum threshold since pumping increased from WY 2019 to WY 2020. Seawater continued to intrude into the Subbasin in WY 2020. Groundwater quality data showed no exceedances of minimum thresholds. No new subsidence data were available for WY 2020; however, 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 and last year's Annual Report, 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, Board of Directors, and Seawater Intrusion Working Group. It has also begun to fill data gaps and start implementing projects and management actions in the 180/400-Foot Aquifer Subbasin GSP.

# 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.

California Department of Water Resources (DWR). 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.

CCRWQCB (Central Coast Regional Water Quality Control Board). 2019. *Water Quality Control Plan for the Central Coast Basin, June 2019 Edition*. California Environmental Protection Agency. https://www.waterboards.ca.gov/centralcoast/publications_forms/publications/basin_plan/docs/2019_basin_plan_r3_complete_webaccess.pdf

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.

Feeney, Martin B., and L.I. Rosenberg. 2003. *Deep Aquifer Investigation—Hydrogeologic Data Inventory, Review, Interpretation and Implications*.

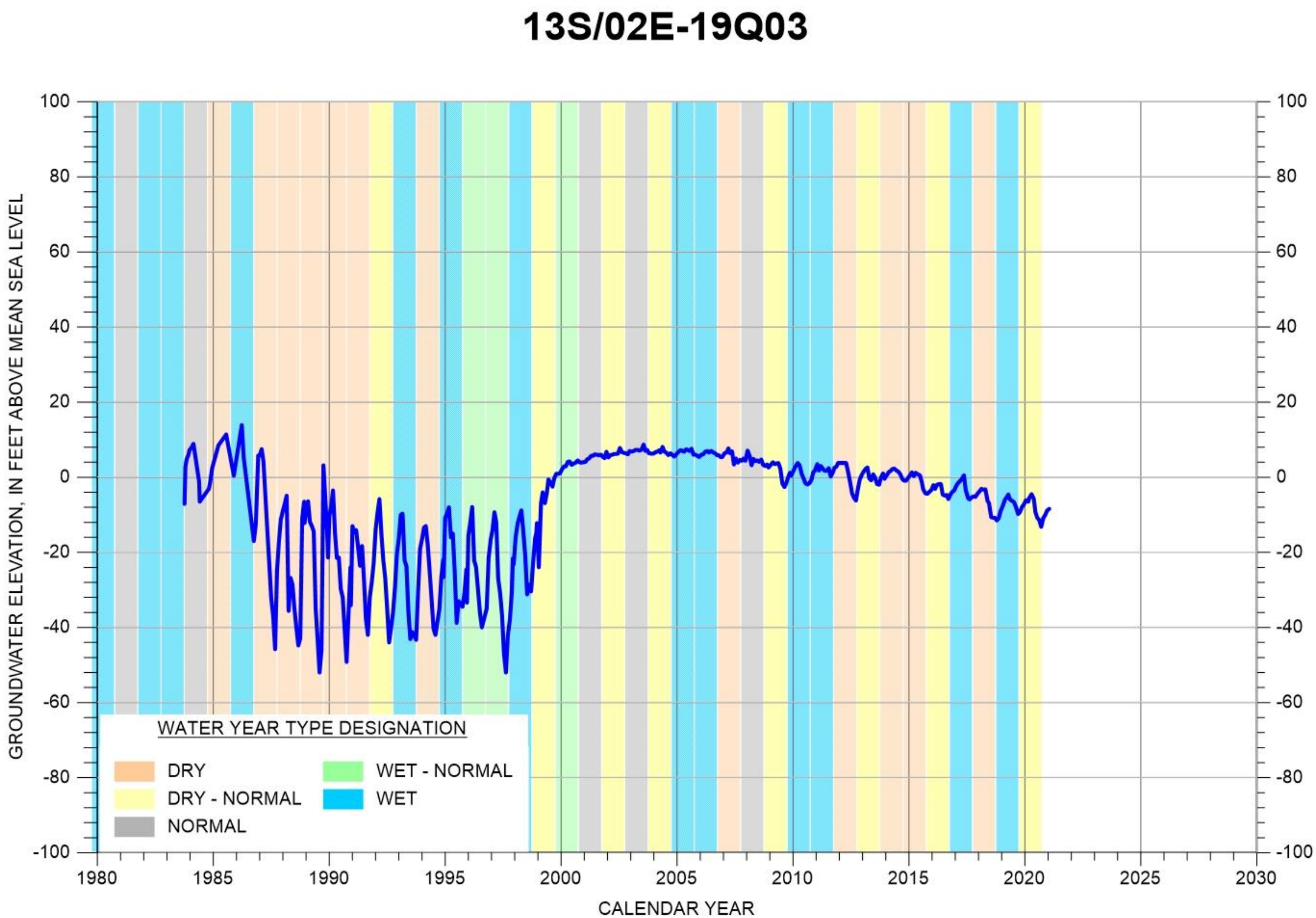
HLA. 1994. *Basewide Hydrogeologic Characterization, Fort Ord, California*. U.S. Department of the Army.

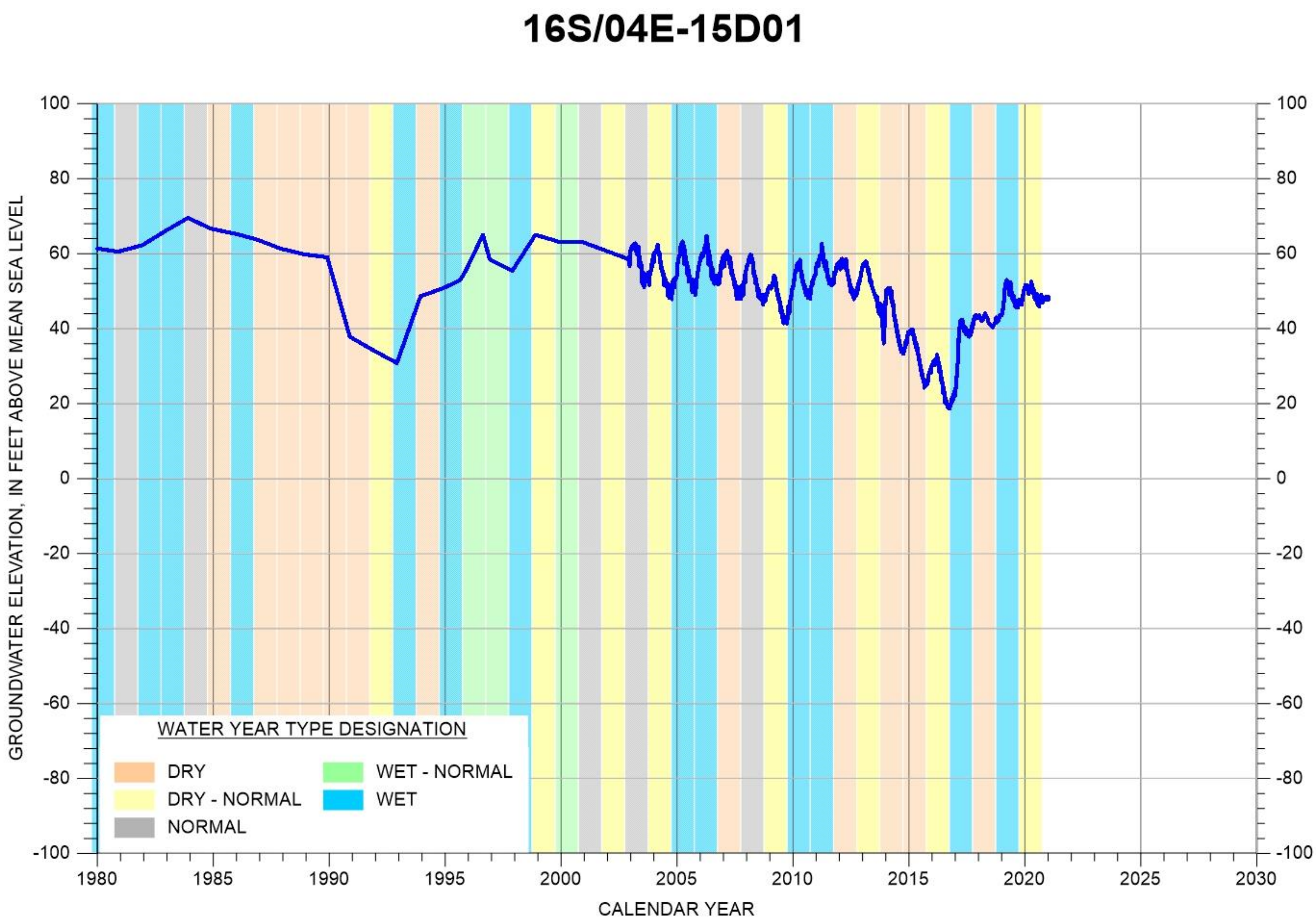
MCWRA (Monterey County Water Resources Agency). 2005. *Salinas Valley Water Project Flow Prescription for Steelhead Trout in the Salinas River*.

________. 2020a. "Recommendations to Address the Expansion of Seawater Intrusion in the Salinas Valley Groundwater Basin: 2020 Update." Special Reports Series 20-01. https://www.co.monterey.ca.us/home/showpublisheddocument?id=90578.

________. 2020b. "Quarterly Salinas Valley Water Conditions: 2020 Water Year." https://www.co.monterey.ca.us/home/showpublisheddocument?id=97605.

# APPENDIX A. ADDITIONAL HYDROGRAPHS

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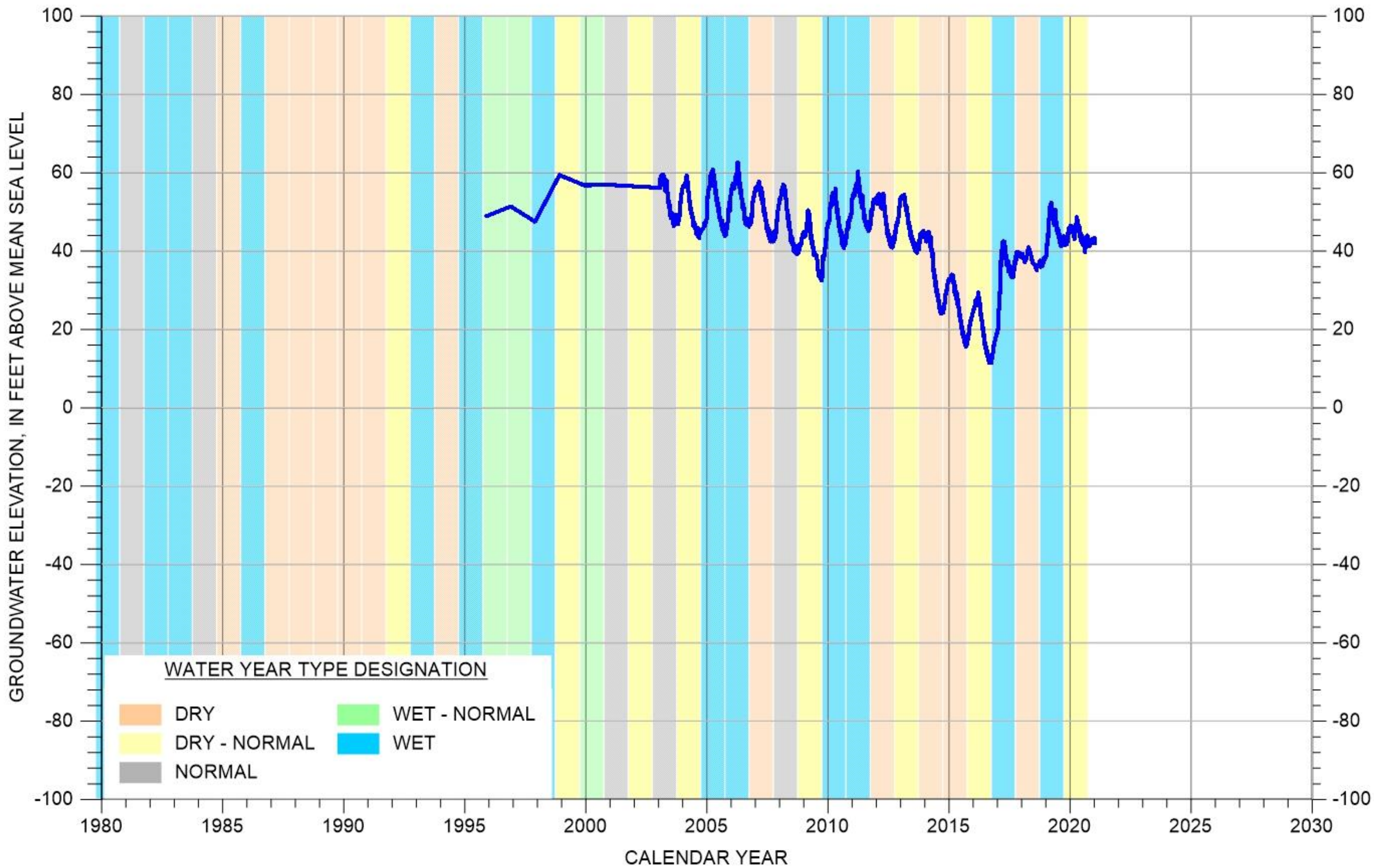
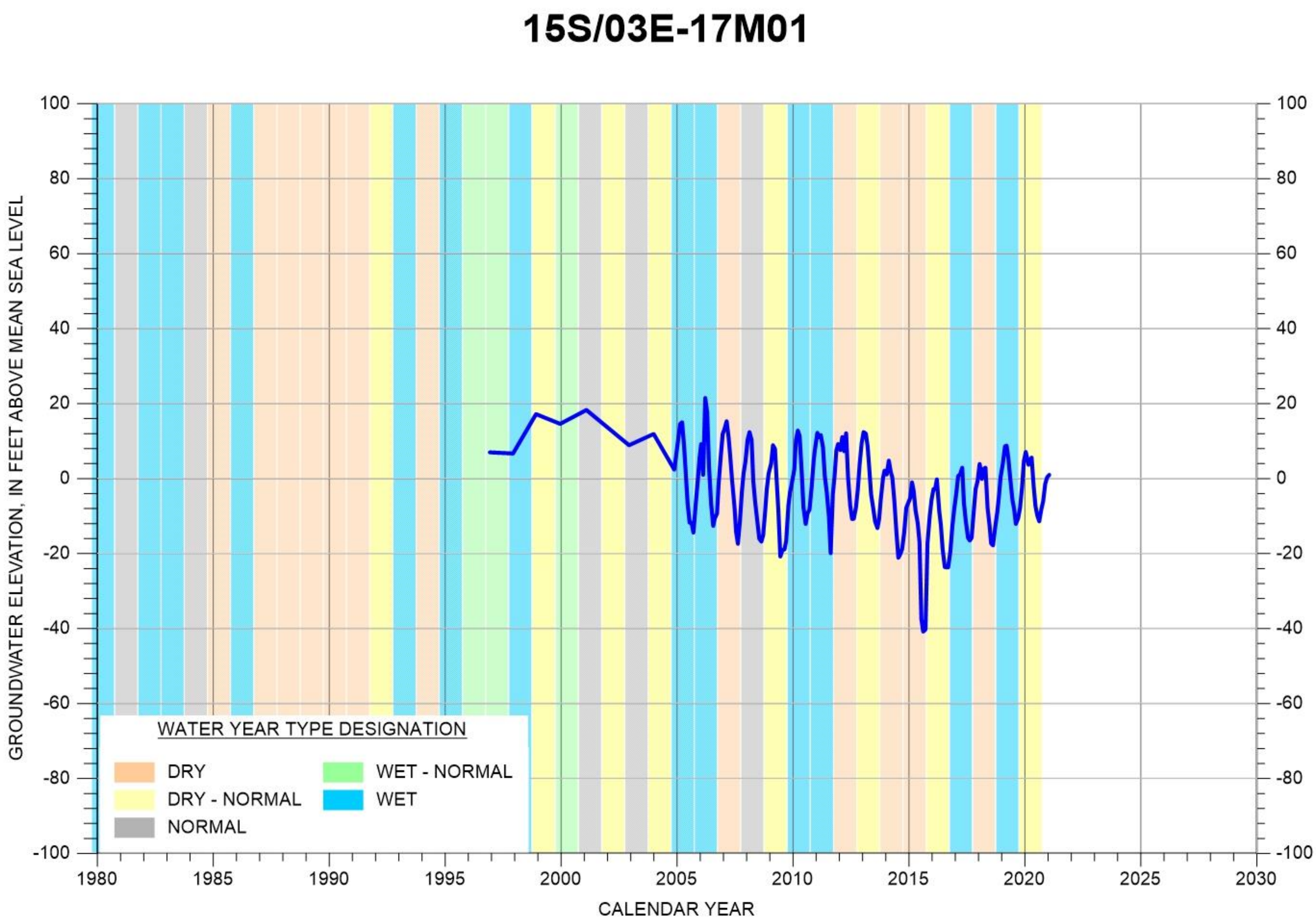
20
0
-20
-40
-60
-80
-100
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
2030
WATER YEAR TYPE DESIGNATION
DRY
DRY - NORMAL
NORMAL
WET - NORMAL
WET

# 16S/04E-08H03

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CALENDAR YEAR
WATER YEAR TYPE DESIGNATION
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DRY - NORMAL
NORMAL
WET - NORMAL
WET
100
80
60
40
20
0
-20
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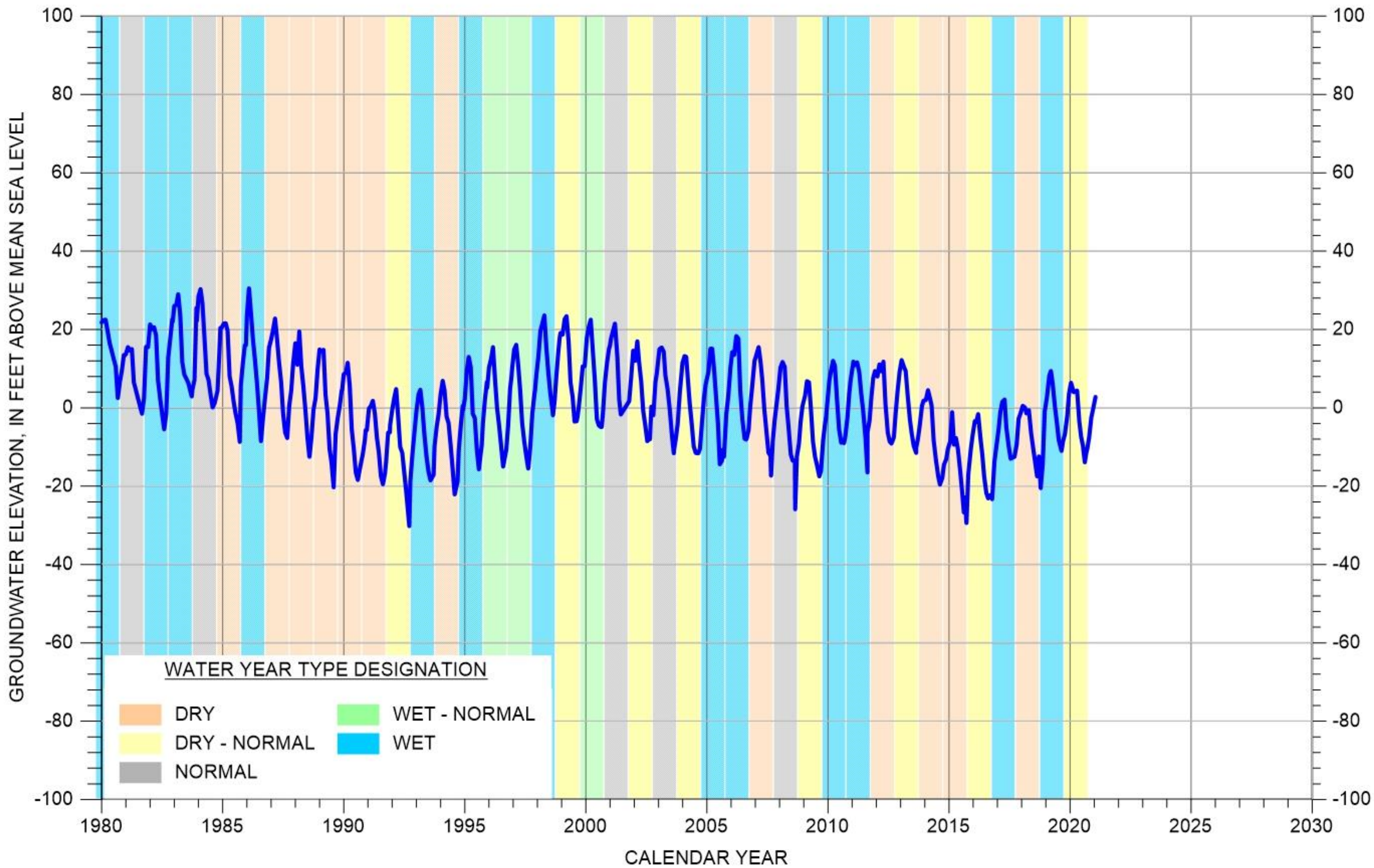

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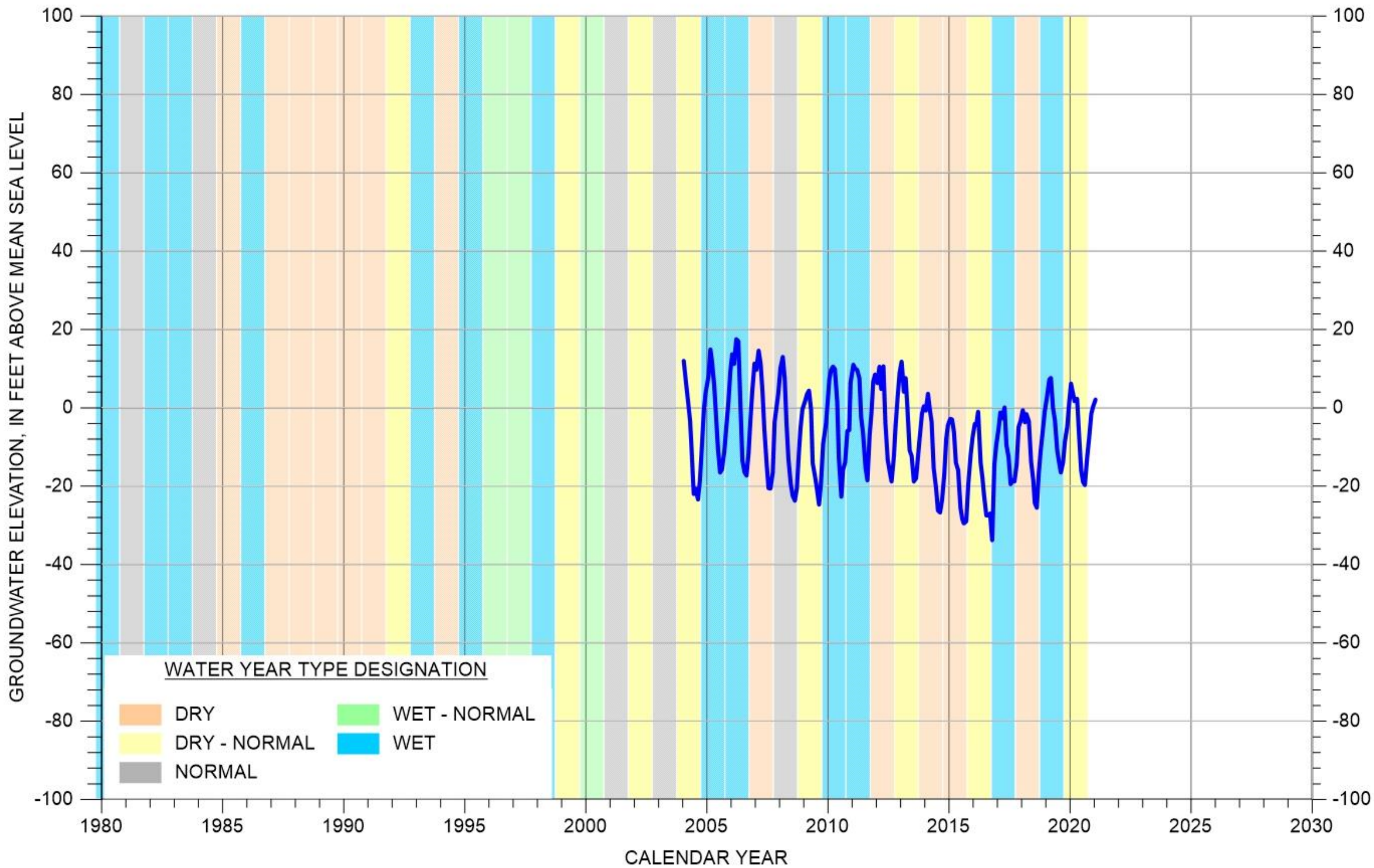

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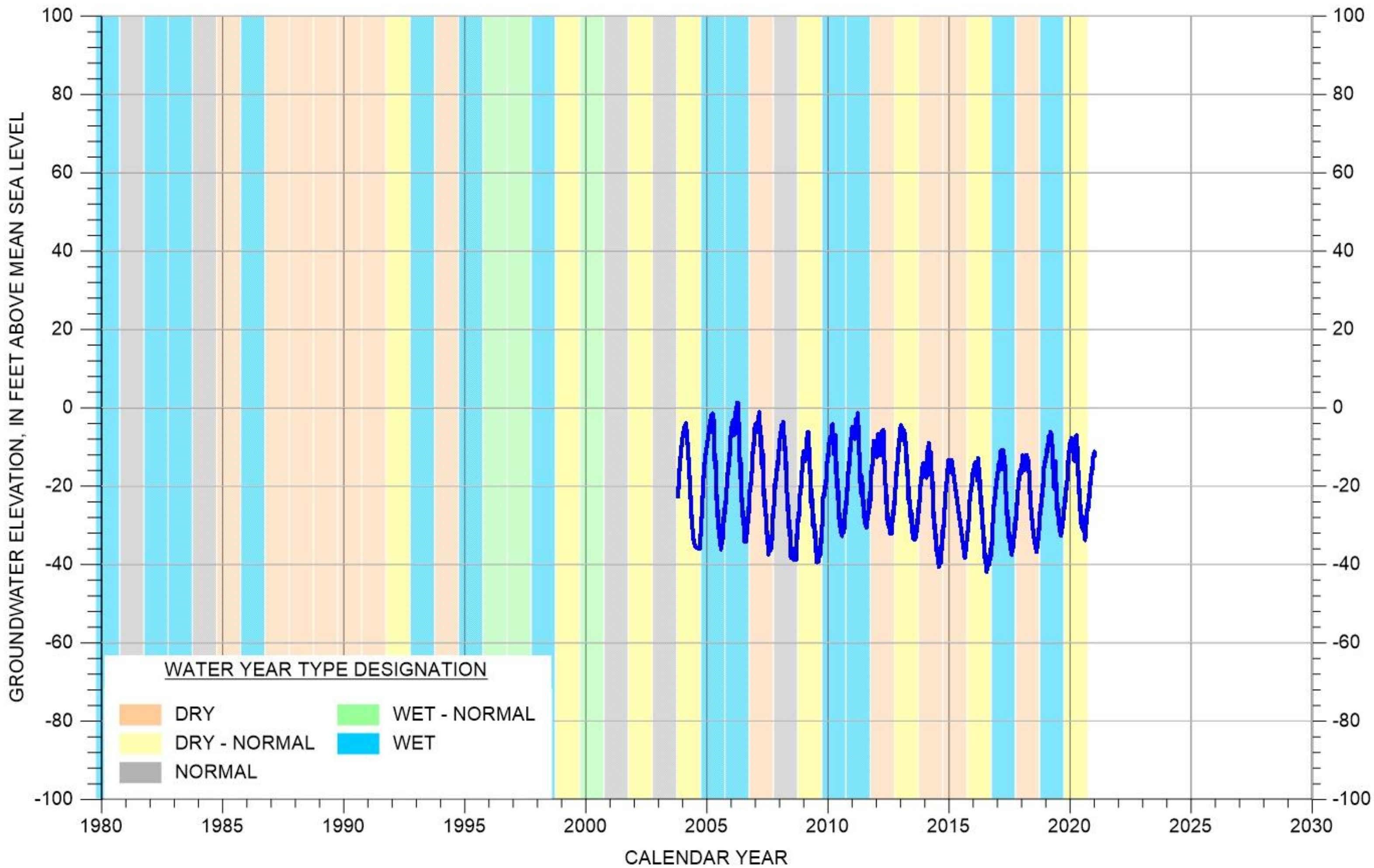

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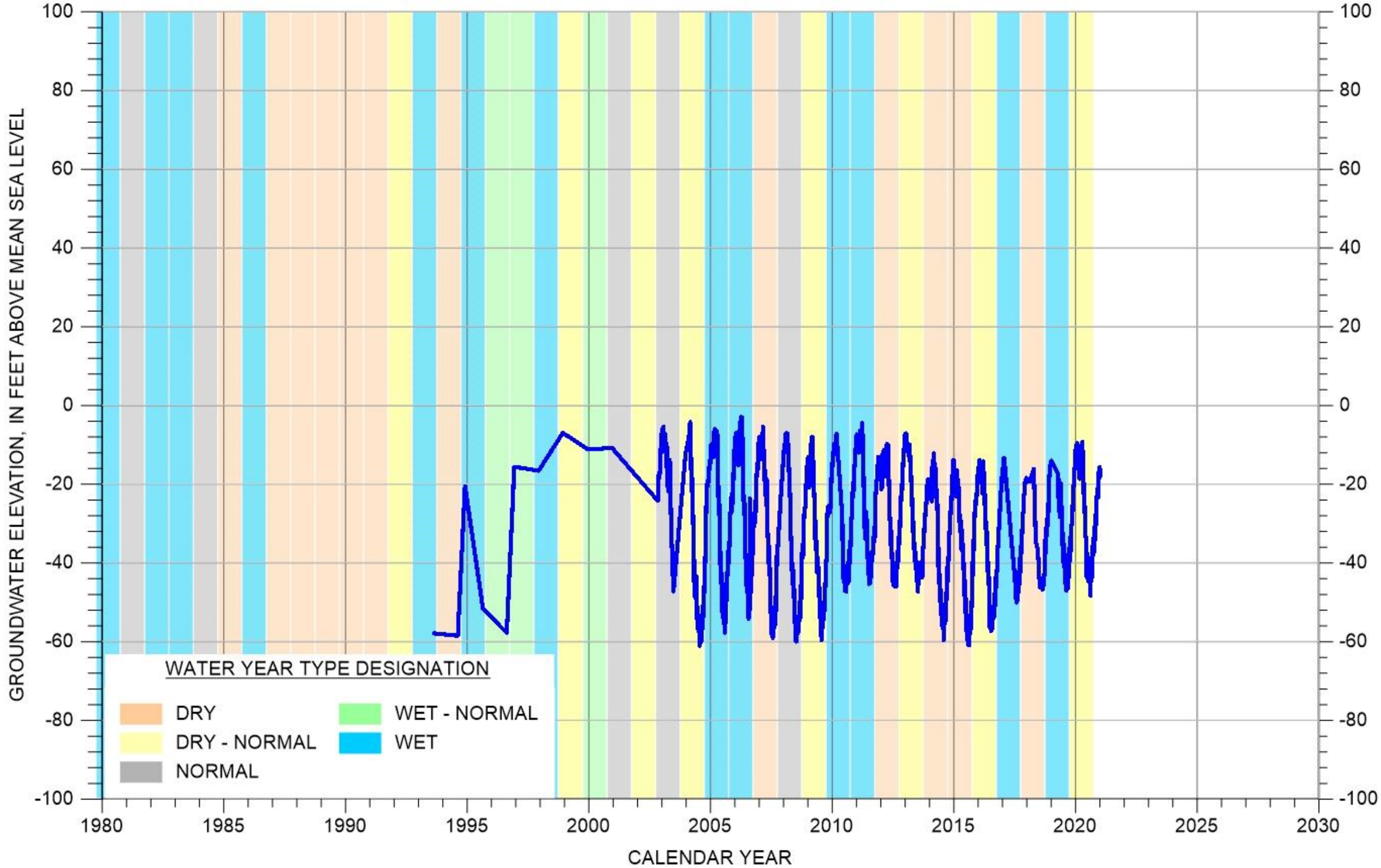

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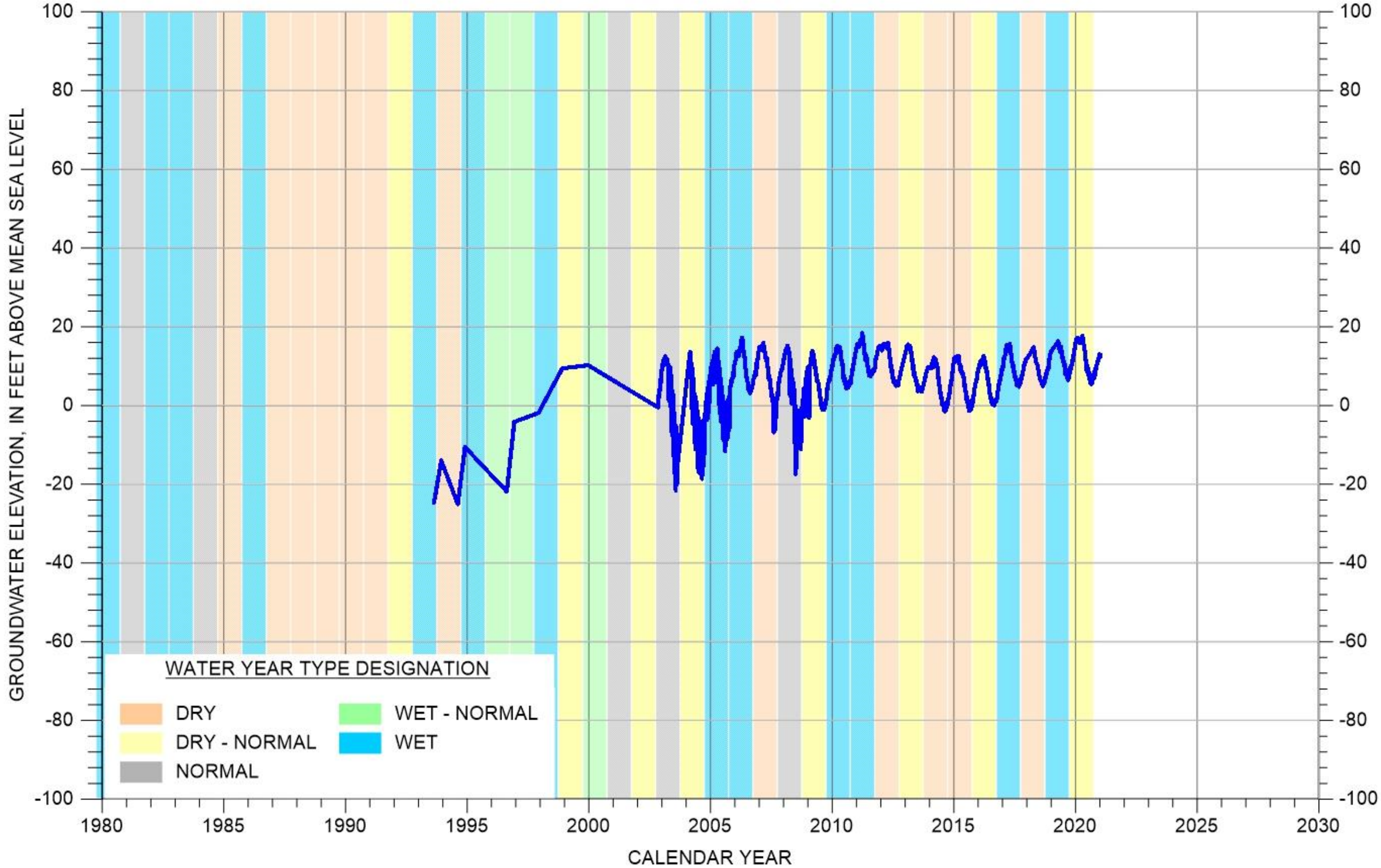

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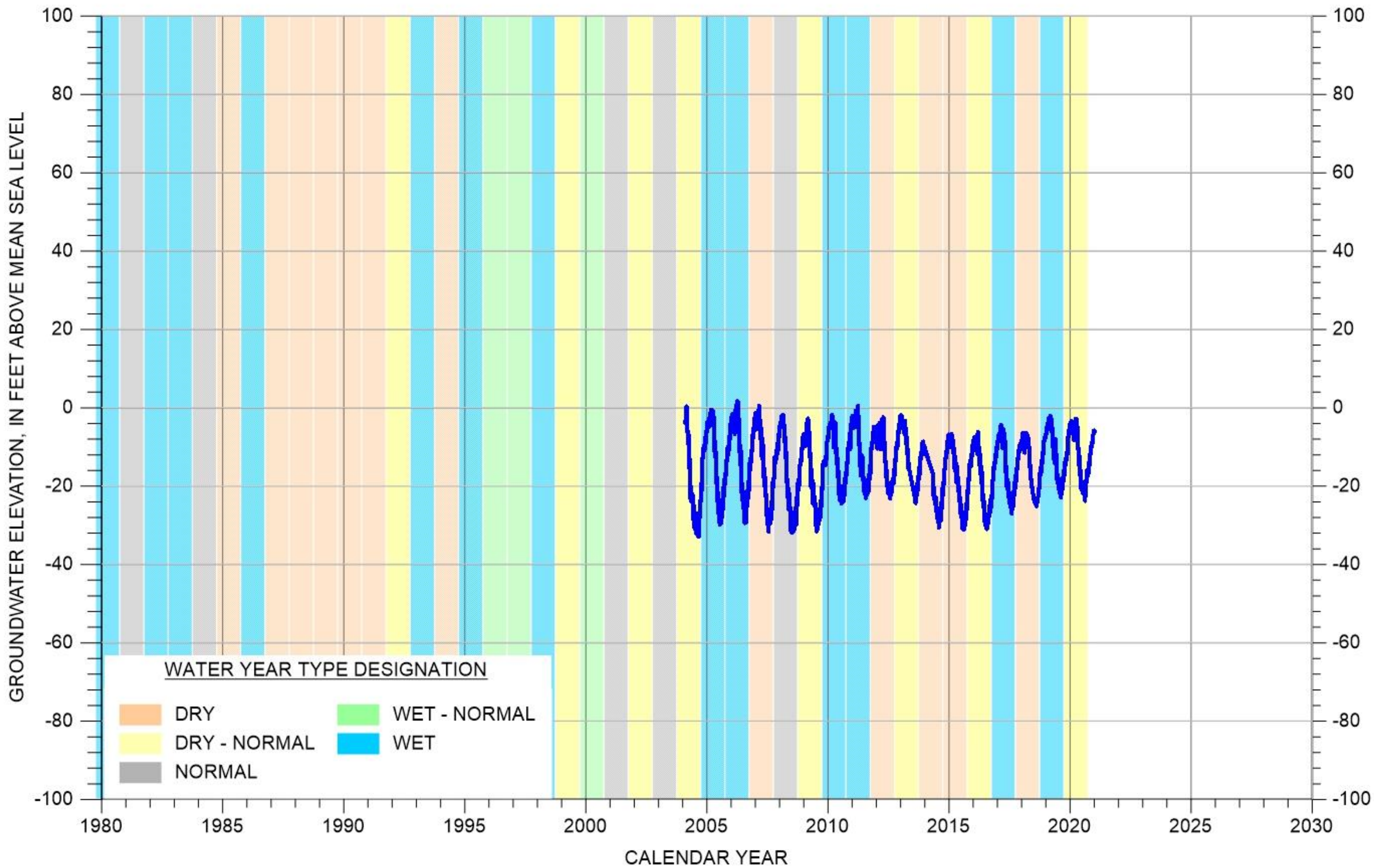

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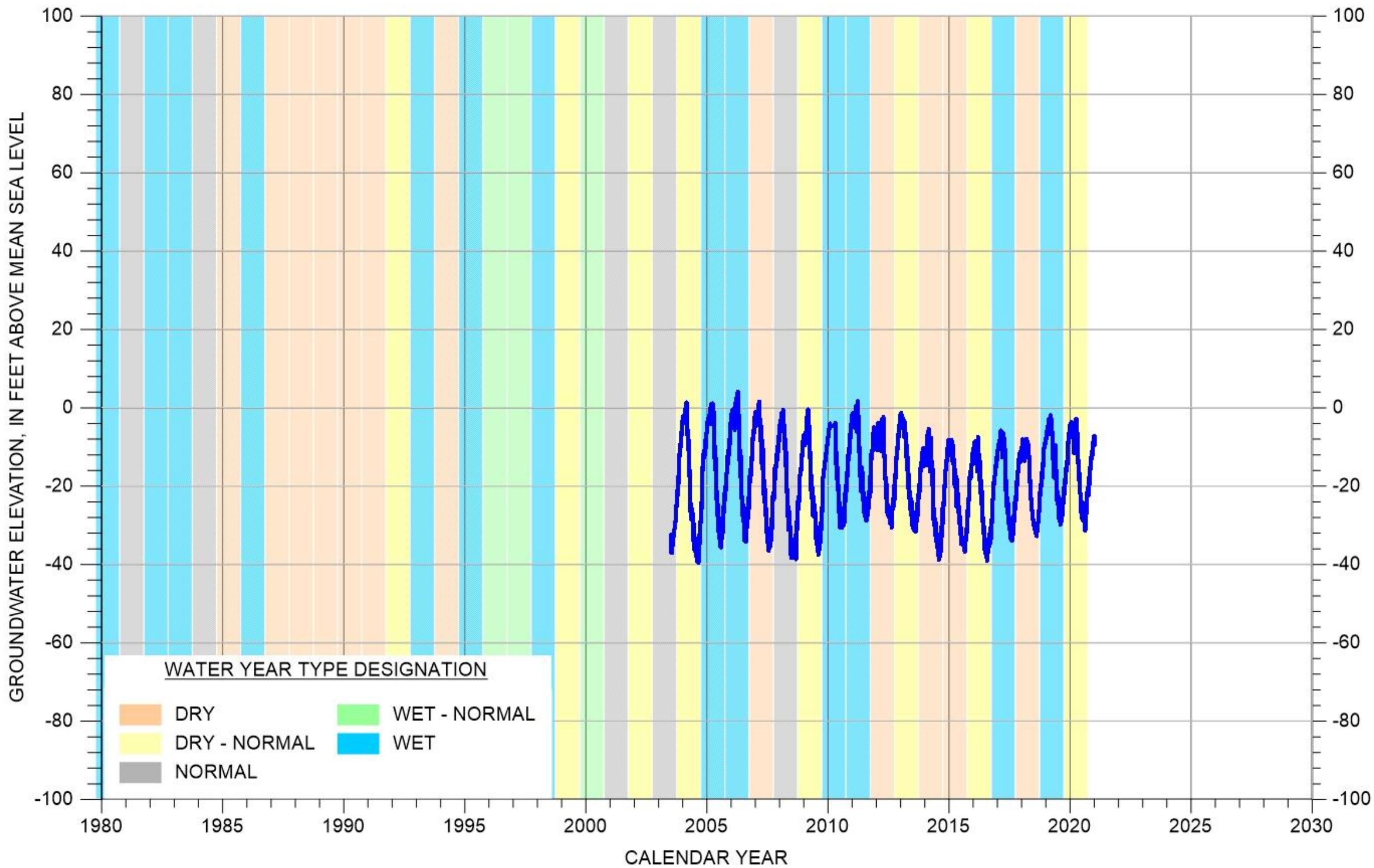

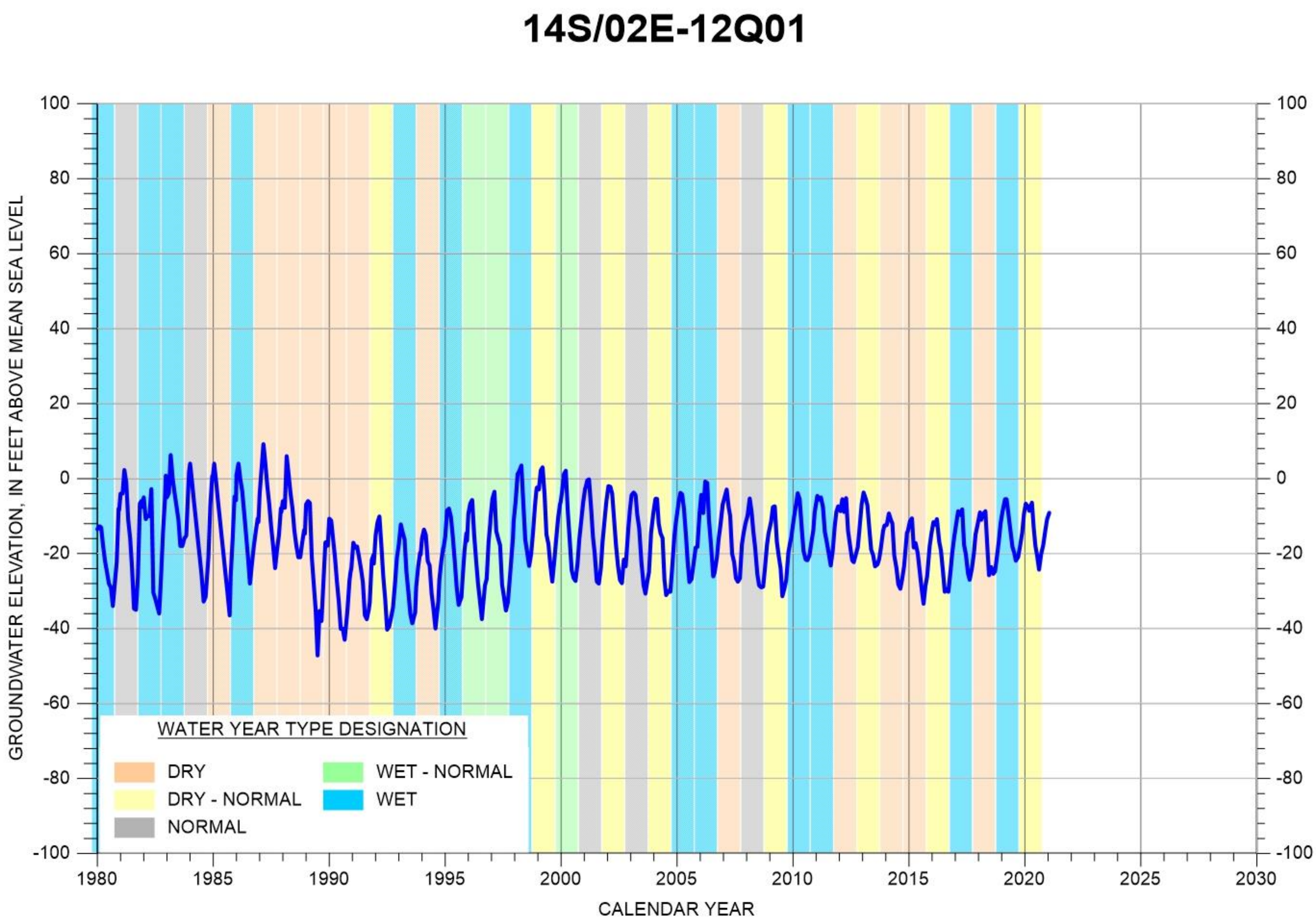
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CALENDAR YEAR
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DRY
DRY - NORMAL
NORMAL
WET - NORMAL
WET
100
80
60
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-20
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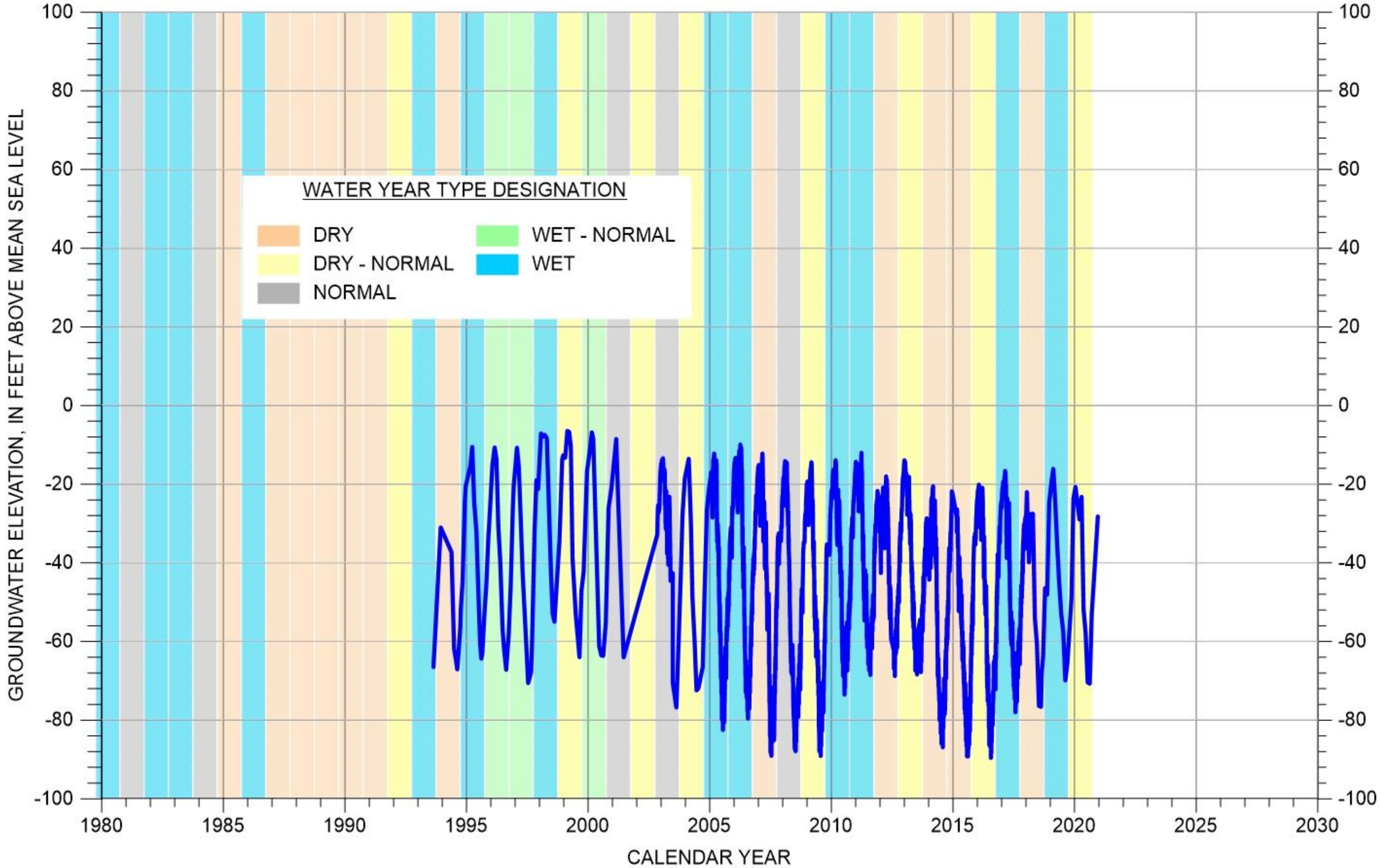

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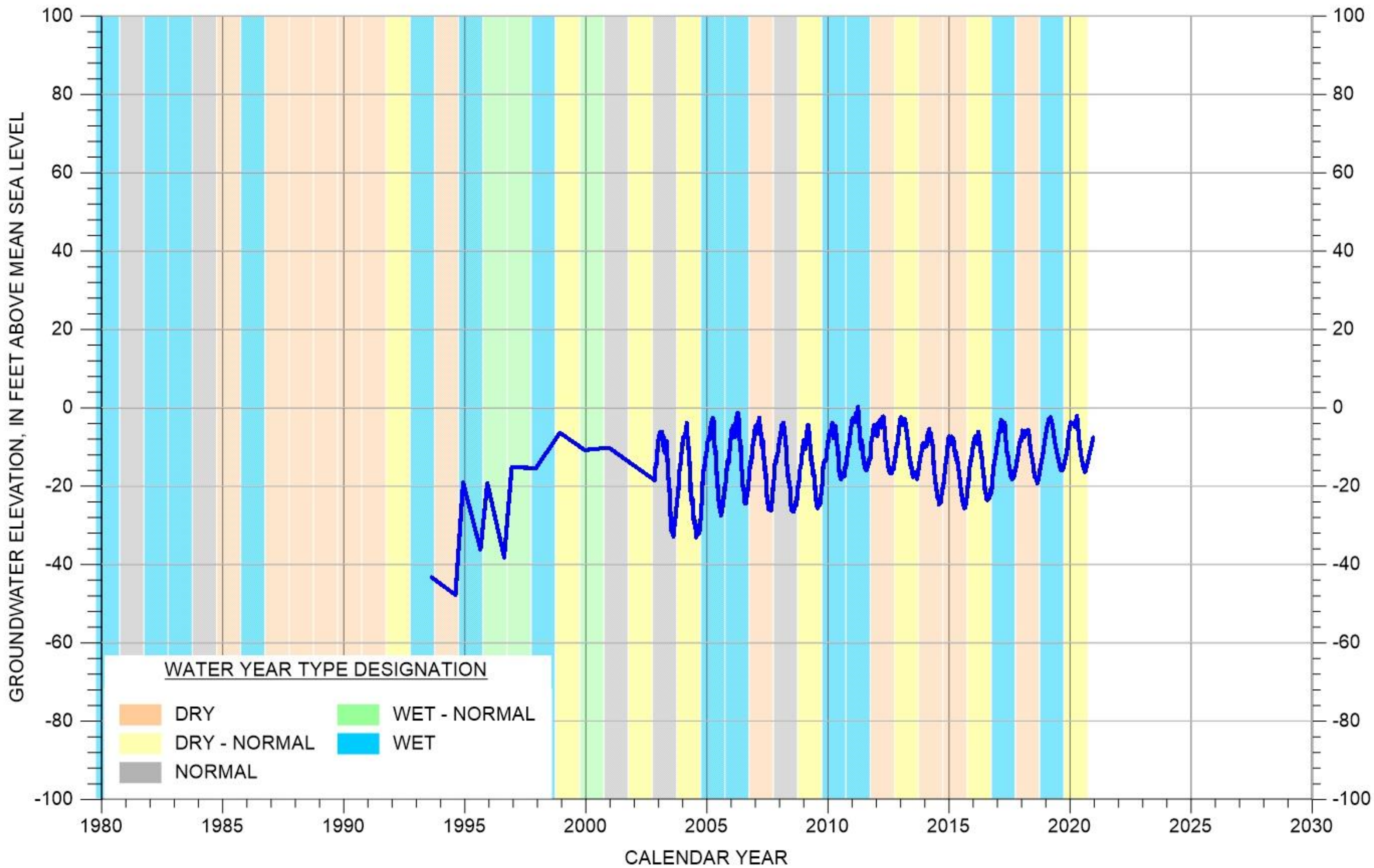

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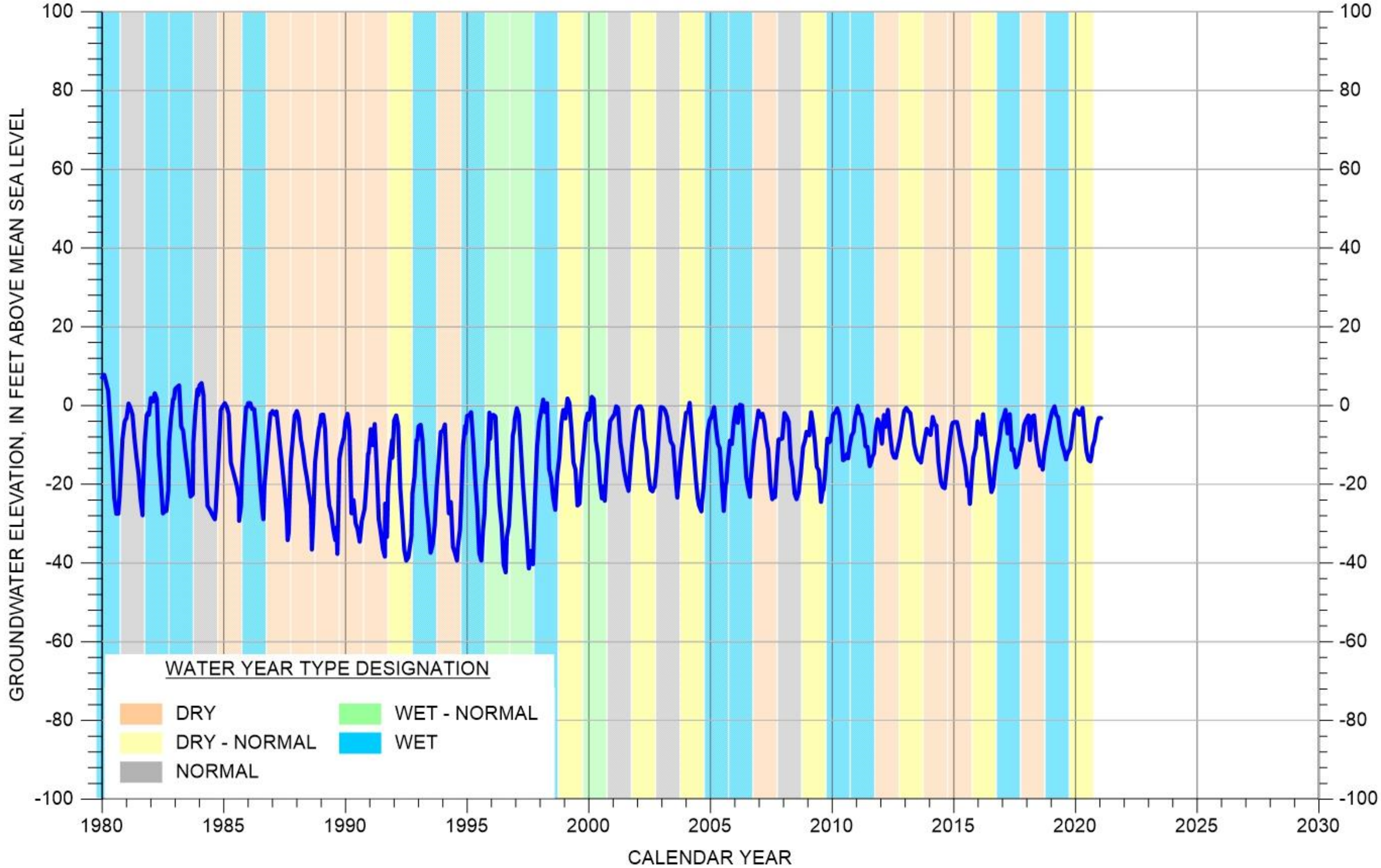

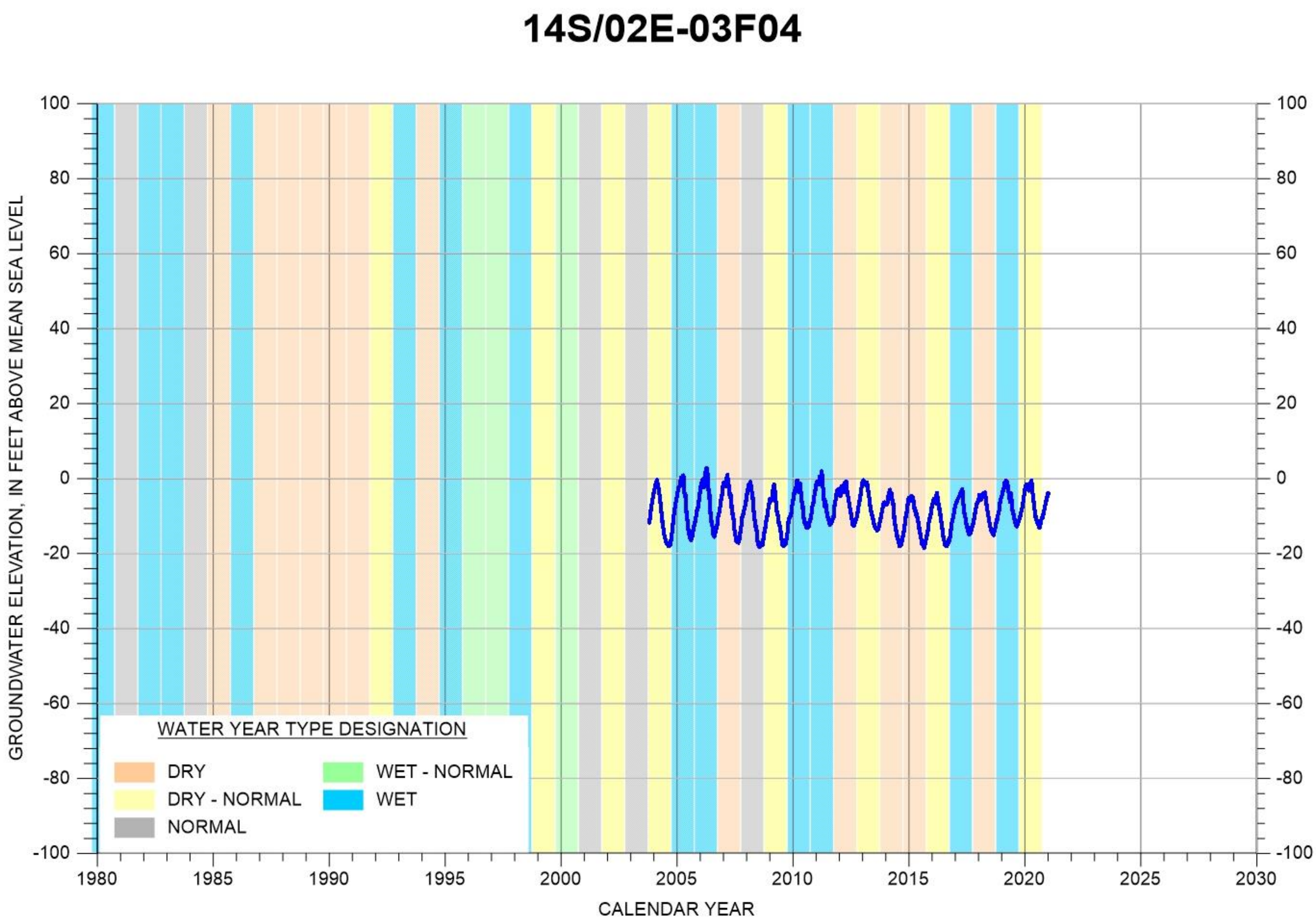

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WATER YEAR TYPE DESIGNATION
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DRY - NORMAL
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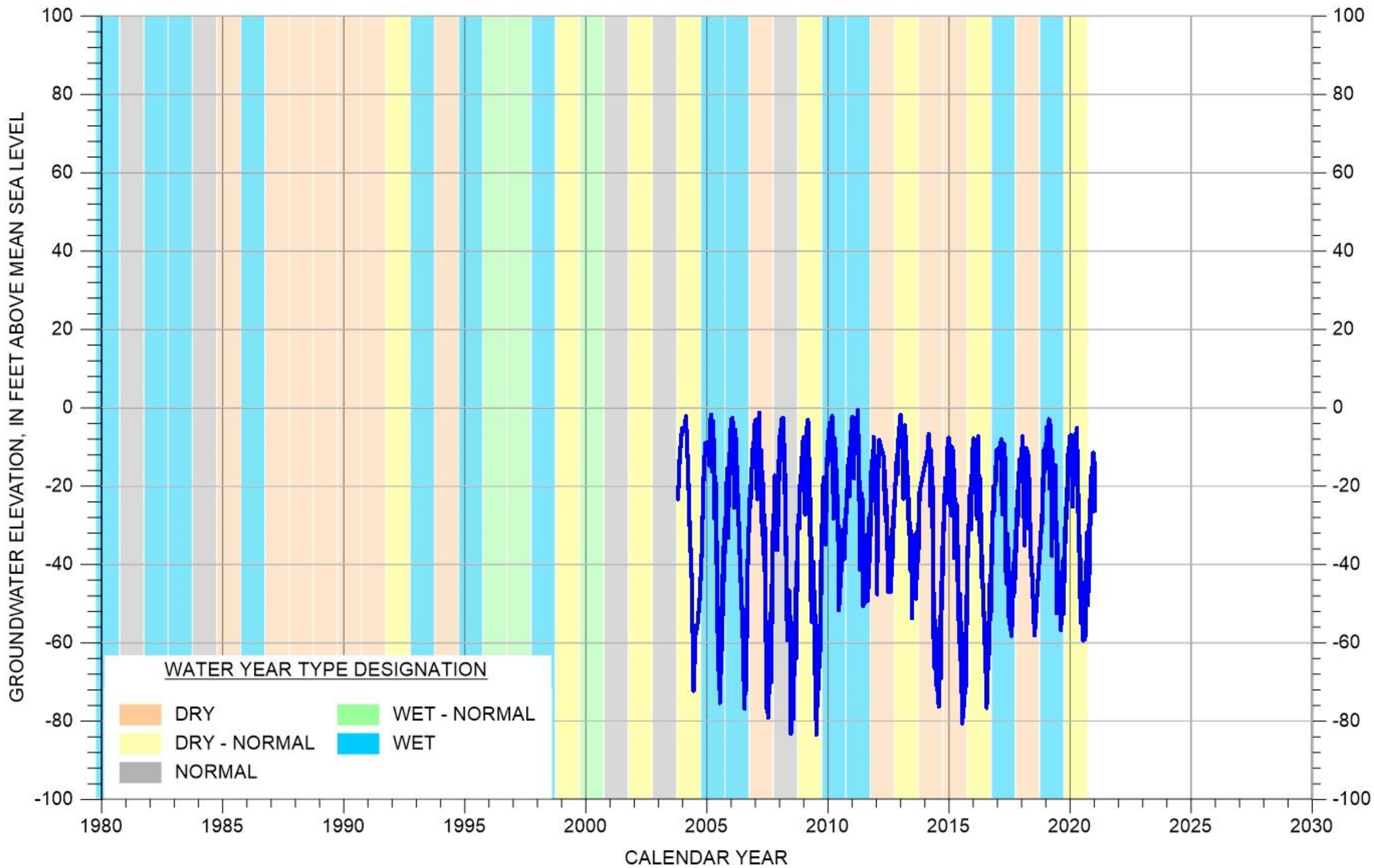

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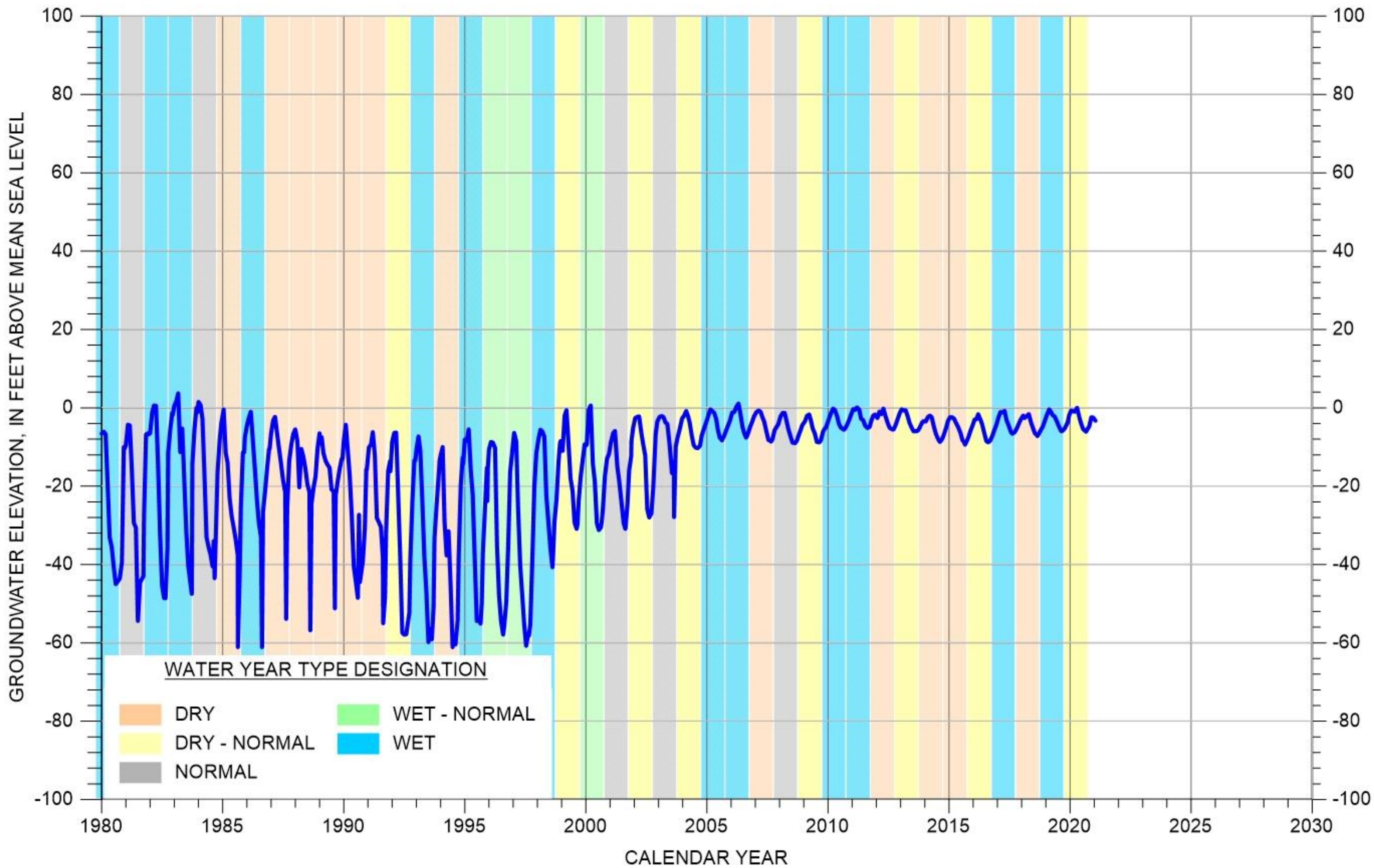

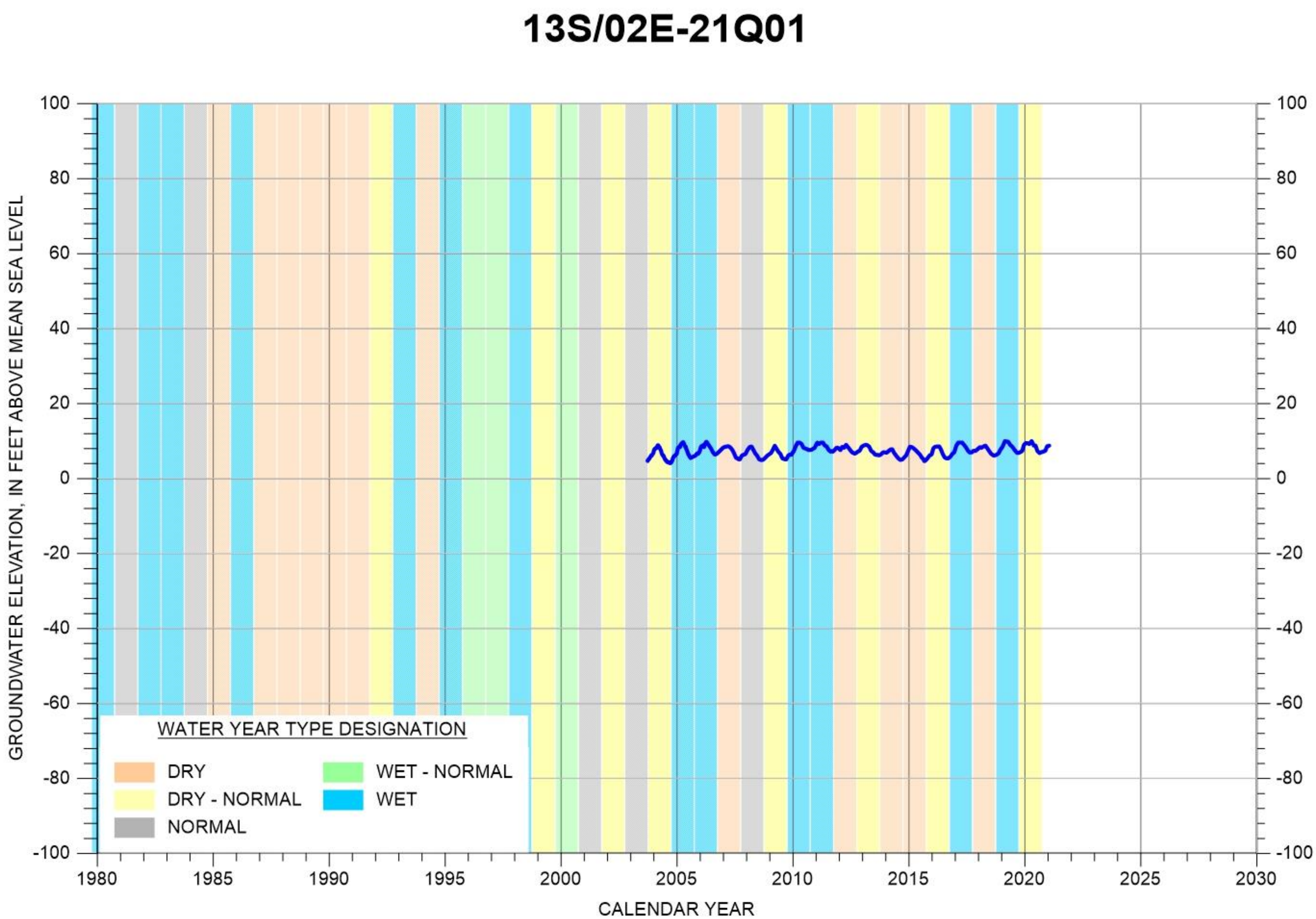
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CALENDAR YEAR
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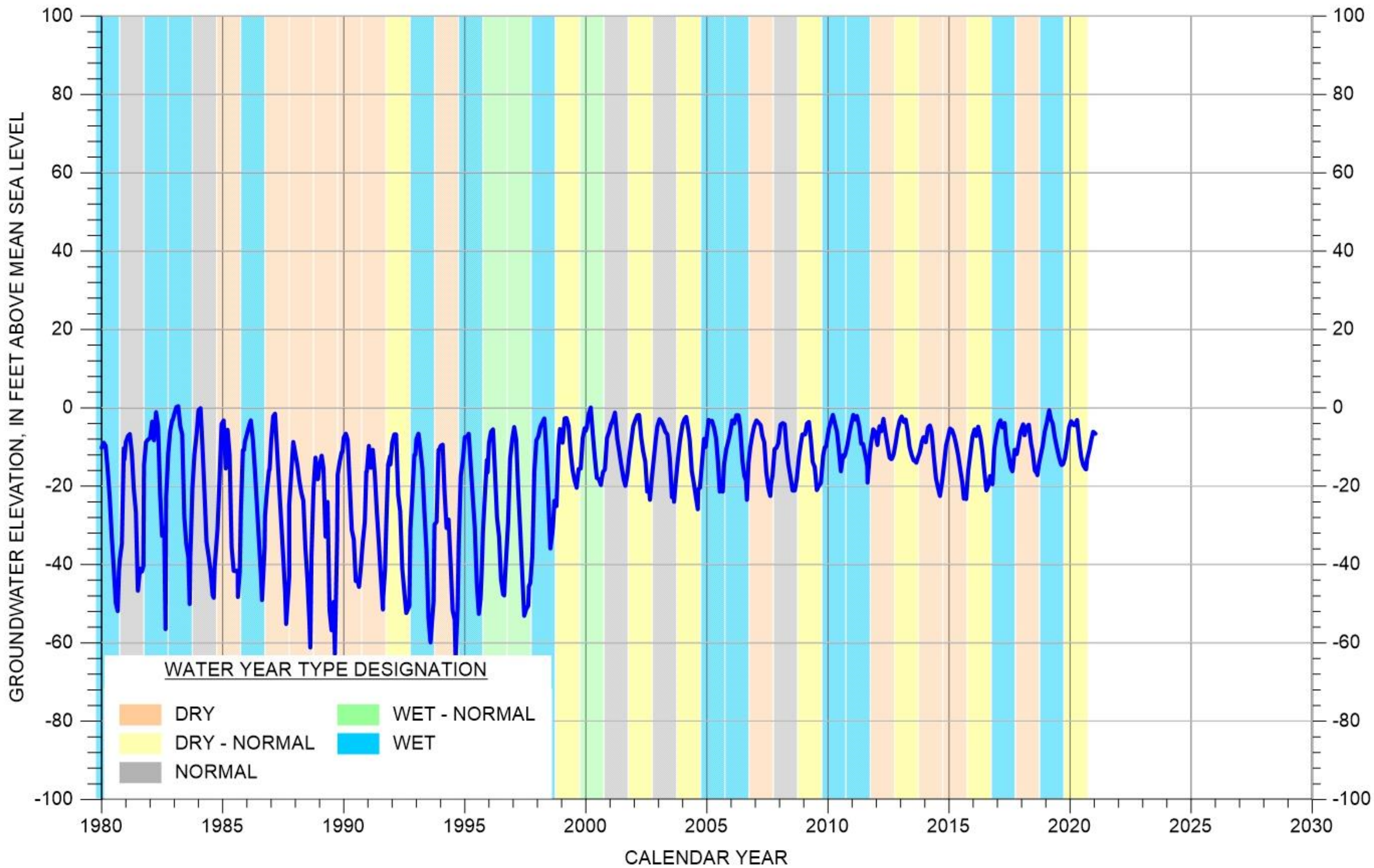

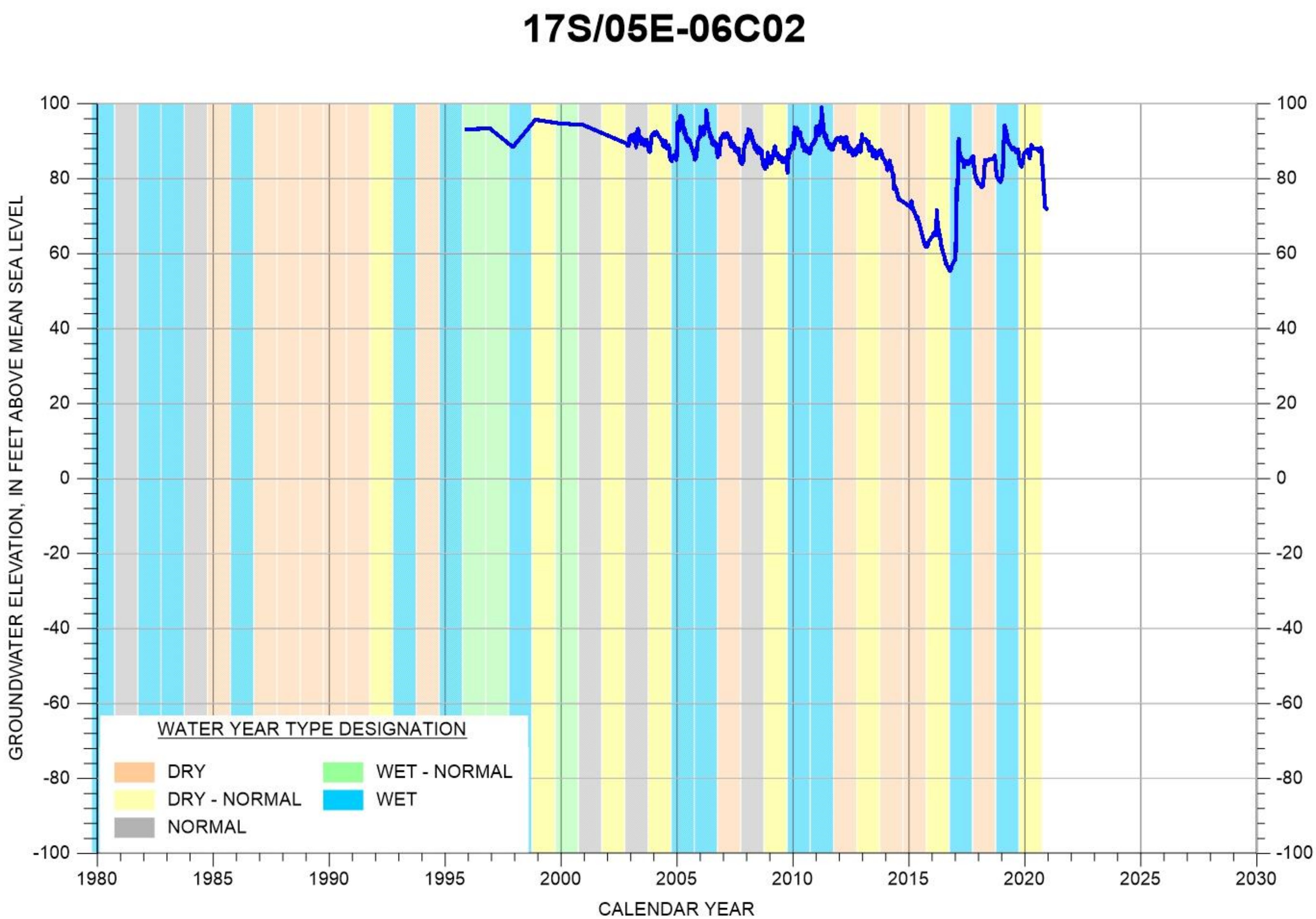
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NORMAL
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