INDIO SUBBASIN

WATER MANAGEMENT PLAN UPDATE

Sustainable Groundwater Management Act Alternative Plan

Volume 2: Appendices

DRAFT | SEPTEMBER 2021

http://www.indiosubbasinsgma.org/

Prepared for: Indio Subbasin Groundwater Sustainability Agencies

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APPENDIX 1-A
ALTERNATIVE PLAN ASSESSMENT, EVALUATION OF EXISTING MODEL AND RECOMMENDATIONS

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DRAFT

ALTERNATIVE PLAN ASSESSMENT, EVALUATION OF EXISTING MODEL AND RECOMMENDATIONS

COACHELLA VALLEY WATER DISTRICT
COACHELLA WATER AUTHORITY
DESERT WATER AGENCY
INDIO WATER AUTHORITY

October 2020

TODD GROUNDWATER

2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
www.toddgroundwater.com

In cooperation with:

WOODARD & CURRAN

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TABLE OF CONTENTS

LIST OF TABLES PAGE

LIST OF FIGURES PAGE

LIST OF ACRONYMS AND ABBREVIATIONS

AF	acre-feet
AFY	acre-feet per year
CRA	Colorado River Aqueduct
CVSC	Coachella Valley Stormwater Channel
CVWD	Coachella Valley Water District
CVWMP	Coachella Valley Water Management Plan
CWA	Coachella Water Authority
DWA	Desert Water Agency
DWR	California Department of Water Resources
ET	evapotranspiration
feet bgs	feet below ground surface
feet msl	feet above mean sea level
GSA	Groundwater Sustainability Agency
HCM	hydrogeologic conceptual model
IWA	Indio Water Authority
MWD	Metropolitan Water District of Southern California
MWH	MWH Americas, Inc.
PD-GRF	Palm Desert Groundwater Replenishment Facility
SGMA	Sustainable Groundwater Management Act
SMCL	Secondary Maximum Contaminant Level
SWP	State Water Project
SWRCB	State Water Resources Control Board
TEL-GRF	Thomas E. Levy Groundwater Replenishment Facility
USBR	United States Bureau of Reclamation
USGS	United States Geological Survey
WWR-GRF	Whitewater River Groundwater Replenishment Facility
WY	Water Year

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1. INTRODUCTION

The Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), and Indio Water Authority (IWA) represent the Groundwater Sustainability Agencies (GSAs) responsible for managing the Indio Subbasin in compliance with the Sustainable Groundwater Management Act (SGMA). In December 2016, these agencies, collectively the Indio Subbasin GSAs, submitted to the California Department of Water Resources (DWR) the *2010 Coachella Valley Water Management Plan Update* (2010 CVWMP) (CVWD, 2012a) and a Bridge Document (Indio Subbasin GSAs, 2016), as an Alternative to a Groundwater Sustainability Plan (Alternative Plan) to comply with SGMA requirements. The Alternative Plan has guided local water management since 2010 and, along with annual reports and this Alternative Plan Update, will continue to guide water management.

As part of the Alternative Plan Update, Todd Groundwater and Woodard & Curran have prepared this Technical Memorandum (TM) to summarize a review of the 2010 CVWMP and to document the performance of the existing groundwater model through Water Year (WY) 2018-2019.

1.1 TM ORGANIZATION

This Technical Memorandum is divided into the following sections:

- **Section 1 – Introduction** summarizes the report organization, 2010 CVWMP background, and planning area.
- **Section 2 – Water Demand Projections** describes the 2010 CVWMP population, growth, and demand projections as compared to historical data.
- **Section 3 – Water Supply Projections** describes the planning assumptions used to develop water supply projections for the 2010 CVWMP and compares these projections to actual supply used to meet demand.
- **Section 4 – Status of 2010 CVWMP Implementation** describes the 2010 CVWMP projects and highlights of implementation.
- **Section 5 - 2010 CVWD Model Assessment** documents the numerical groundwater flow model that will be used to assess sustainability and future management alternatives for the Indio subbasin.
- **Section 6 – References** provides references for this TM.

1.2 2010 CVWMP UPDATE BACKGROUND

The 2010 CVWMP, an update of the original *2002 Coachella Valley Water Management Plan* (2002 CVWMP), was prepared to reflect the changes in expected development within the Coachella Valley based on conversion of agricultural land to urban land uses and the reductions in water supply reliability estimates resulting from environmental and legal restrictions in the San Francisco Bay/Sacramento-San Joaquin Delta (Bay-Delta). Additional factors were also considered such as climate change, changing water quality requirements, and the potential for other emerging issues.

The programs and projects identified in the 2010 CVWMP are based on the following objectives:

1. Meet current and future water demands with a 10 percent supply buffer,
2. Eliminate long-term groundwater overdraft,
3. Manage and protect water quality,
4. Comply with state and federal laws and regulations,
5. Manage future costs, and
6. Minimize adverse environmental impacts.

Each objective contributes to improved water supply reliability for the Coachella Valley by ensuring adequate supplies to meet current and future demands, eliminating the long-term depletion of groundwater storage, and ensuring that basin water quality is protected from degradation.

1.3 PLANNING AREA

The Planning Area for the original 2002 CVWMP was the Indio Subbasin and the portion of Imperial County served by CVWD. The Imperial County portion of the Planning Area depends on water supplies delivered from the Indio Subbasin. The Planning Area for the 2010 CVWMP covered this same area, plus those portions of the Desert Hot Springs Subbasin that were within the incorporated boundaries or the spheres of influence of the cities of Coachella and Indio. shows the Planning Area boundary used in the 2010 CVWMP.

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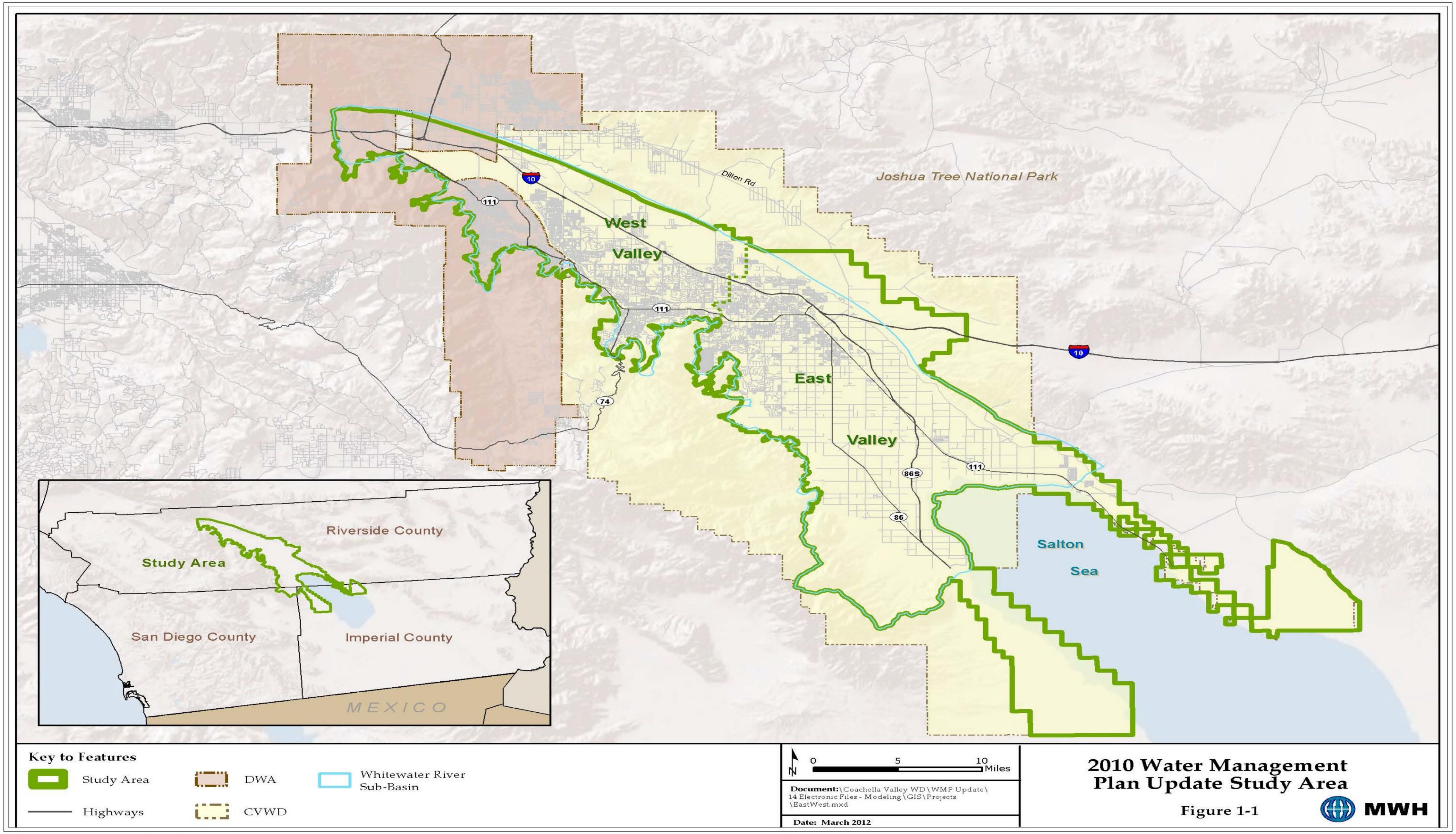

Figure 1-1: 2010 CVWMP Planning Area

Source: 2010 CVWMP (CVWD)

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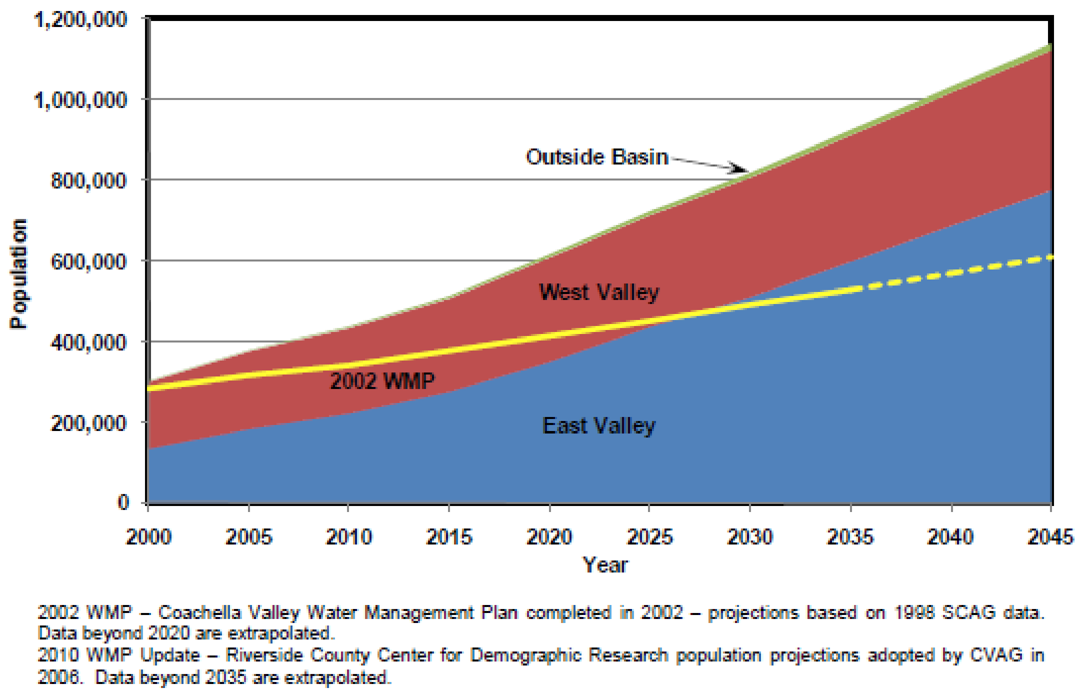
2. WATER DEMAND PROJECTIONS

The purpose of this section is to summarize the planning assumptions used to develop the water demand projections for the 2010 CVWMP and compare these projections to actual demands between 2010 and 2019. The planning horizon for the 2010 CVWMP was 2045.

2.1 POPULATION AND GROWTH PROJECTIONS

The growth forecast from the 2010 CVWMP was based on the Riverside County Projections 2006 (RCP-06) developed by the Riverside County Center for Demographic Research. This forecast was prepared in late 2006 and early 2007 during the rapid period of growth in the Coachella Valley, before the collapse of the housing market and economic recession. Between 2000 and 2008, Riverside County's population increased by over a half million people, making it one of the fastest growing metropolitan areas in the United States over that period. Population in the Planning Area in 2020 was projected to be 600,000, growing to almost 1,200,000 by 2045 (**Figure 2-1**).



Source: 2010 CVWMP (CVWD)

Figure 2-1: 2010 CVWMP Population Projections

While adopted land use plans were not specifically used to develop the 2010 CVWMP demand projections, it was recognized that significant land use changes would be required to accommodate the projected population growth. The 2010 CVWMP incorporated the following assumptions to apply growth forecasts to projected land use changes:

1. Urban growth in the East Valley would occur equally (50 percent each) on agricultural and vacant parcels. Urban growth in the West Valley was assumed to occur on vacant parcels, as there was little to no agricultural land.
2. A total of 75 new golf courses were projected to be constructed by 2045. If fewer courses were constructed, it was expected that the land area would be developed for urban uses.
3. RCP-06 included growth on Tribal lands. Land development on Tribal lands would occur at the same rate and in the same patterns as growth on non-Tribal lands.
4. The RCP-06 population growth forecast was used (with the water demand factors) to project future municipal water demands.

2.2 Comparison to Actual Population and Growth

Historical population was calculated using California State Department of Finance (DOF) and U.S. Census Bureau data for 2010 to 2019. DOF data were used to estimate population within the cities. Population estimates within the unincorporated areas of the region were based on 2010 Census Place data. These estimates were then adjusted to include additional population associated with the average number of new units from annual American Community Survey (ACS) estimates. The 2010 CVWMP projected a 40 percent growth in population from 2010 to 2020. Actual population within a similar timeframe (2010-2019) grew just 10 percent, as shown in **Figure 2-2**. The historical 2019 population estimate was 418,000, while the 2010 CVWMP projected about 600,000.

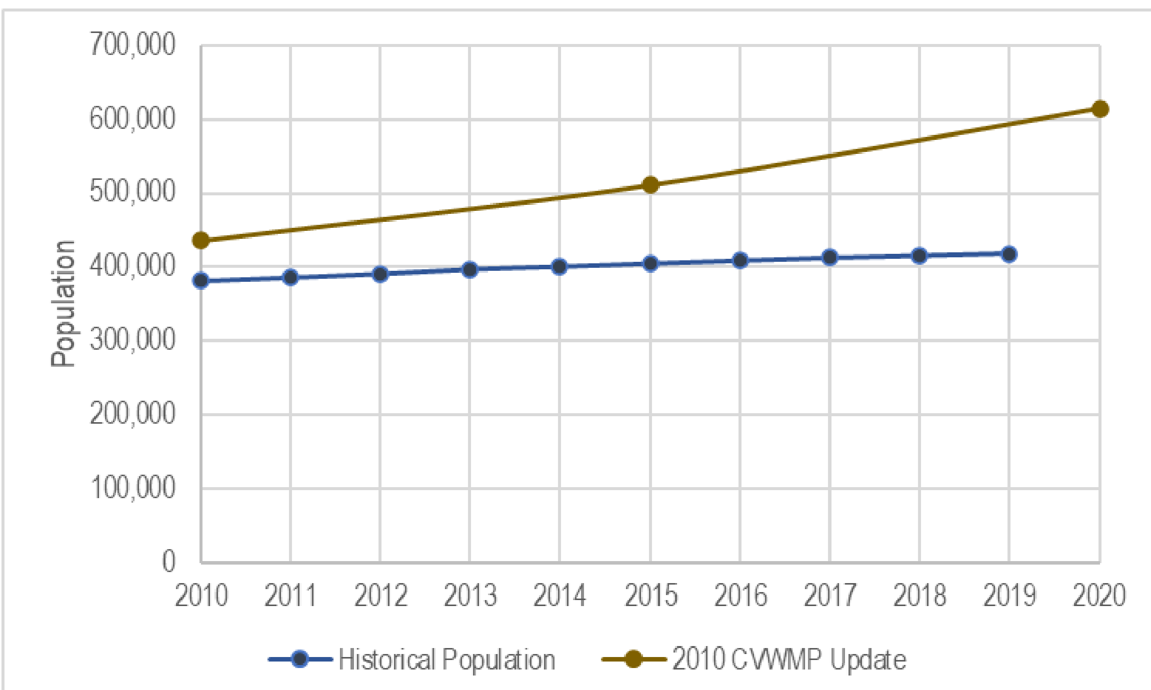


Figure 2-2: Comparison of Actual Population Growth with 2010 CVWMP Projections

2.3 WATER DEMAND PROJECTIONS

Water demand projections in the 2010 CVWMP were divided into four categories using a 2005 baseline: urban, agricultural, golf, and fish farms and duck clubs. The 2005 baseline total demand was adjusted up by 8.7 percent for the projections to account for above average rainfall in that year.

2.3.1 Urban Water Demands Assumptions

Existing urban water demands in the 2010 CVWMP were based on data obtained from CVWD and DWA on urban groundwater, recycled water, and Coachella Canal (Canal) water use for 2000-2009. Per capita water use ranged from 579 gallons per capita per day (gpcd) in 2000 to 428 gpcd in 2009, with an average of 463 gpcd. The 2010 CVWMP assumed existing indoor and outdoor urban per capita demands would decrease 20 percent by 2020 to about 371 gpcd due to implementation of new California plumbing fixture requirements. The 2005 adjusted baseline urban demand was 207,100 AF. Projected population growth rates in RCP-06 were applied to the 2005 baseline population. A 320 gpcd demand factor[1] was applied to projected population growth, with the resulting new demand added to the baseline demand. This lower demand factor reflected an expected 25 percent demand reduction with on-going implementation of landscape irrigation requirements in the 2007 and 2009 CVWD landscape ordinances and then existing plumbing codes for new development. The following conservation percentages were applied to the baseline water demand projections each year (see also Section 3.1.5 below):

- Existing and future indoor use: build up to 20 percent reduction by 2020 and apply moving forward
- Existing outdoor use: build up to 20 percent reduction by 2020 and apply moving forward
- Agriculture: build up to 14 percent reduction by 2020 and apply moving forward
- Existing golf: build up to 10 percent reduction by 2015 and apply moving forward.

The Coachella Valley has relatively little dedicated industrial use. Most industrial water demands are supplied by the municipal water agencies and are included in the urban water demands. Colmac Energy Division operates a 47 megawatt (MW) agricultural waste-to-energy plant on Cabazon tribal land near Mecca. The water demand for this facility was estimated to be 1,100 AFY in the 2002 CVWMP. The Cabazon Band of Mission Indians proposed construction of a major resource recovery park at the site. This facility was expected to increase demand to about 2,300 AFY by 2010. As of January 2020, this enlarged facility has not been constructed.

2.3.2 Golf Course Demand Assumptions

Existing golf course demands were established based on historical groundwater pumping, Canal water deliveries, and recycled water deliveries. When the 2010 CVWMP was prepared, there were 83 golf courses (79.7 18-hole equivalents) in the western Indio Subbasin and 37 golf courses (37.5 18-hole equivalent courses) in the East Valley[2]. Existing golf courses were assumed to remain in operation for the planning period. Golf course demand ranged from 102,500 AFY to 116,100 AFY between 2000 and 2009

[1] 800 gpd/connection divided by 2.5 persons/connection. The 800 gpd/connection factor is an average associated with the implementation of the 2007 and 2009 Landscape Ordinances. The 2.5 persons/connection is an average provided by CVWD.

[2] Most courses are regulation 18-hole courses. However, some courses have 9 holes, other courses have 27 holes, and a few are 9-hole short courses (pitch and putt).

based on historical data. For the few courses where water demand data were not available, a demand of 1,200 acre-feet per year (AFY) per 18-hole course was assumed. Water conservation of 5 percent in 2010 ramping up to 10 percent by 2015 was applied to existing golf course demands.

Future golf course demands were based on the turf acreage limitation of the 2007 CVWD landscape ordinance (four acres per hole plus 10 acres for practice areas) and the Maximum Applied Water Allowance (MAWA) calculations from the ordinance, averaging 700 AFY per 18-hole course. The future number of golf courses was calculated using the ratio of the total number of existing golf course to the total existing population. Therefore, golf demand increased in proportion to population growth in the West and East Valley areas, respectively.

2.3.3 Agricultural Demand Assumptions

Historical agricultural demand was based on Canal water use and estimated groundwater pumping. Canal water use was based on CVWD billing records. Due to a lack of reliable agricultural groundwater pumping records prior to 2005, agricultural production was estimated for the years 2000-2006 using power records and crop reports. Estimates of agricultural pumping for 2007-2009 were based on a combination of reported pumping and estimates. The 2010 CVWMP estimated average irrigation efficiency to be about 70 percent. In addition, CVWD furnished information on extraordinary water conservation savings for the period 2004-2009.

Future agricultural water demands were adjusted to account for assumed tribal water use. Tribal demand was estimated to be 24,200 AFY in 2005 based on estimated water use on tribal parcels in the East Valley. The 2010 CVWMP assumed tribal water use would increase at the same rate as municipal water use.

2.3.4 Fish Farms and Duck Clubs Demand Assumptions

Other water demands included fish farms and duck clubs, . Fish farm demands were based on available groundwater pumping and Canal water delivery records. During the 2010 CVWMP, a major fish farm operation ceased operation. Consequently, fish farm water demands were assumed to be 8,500 AFY which represented the expected demands of the remaining fish farming operations.

Duck clubs in the Coachella Valley use water seasonally to fill and maintain ponds during the fall and winter months. Historical demands averaged about 4,000 AFY for the 2000-2009 period with a declining trend after 2005. Future duck club water demands were assumed to be 2,000 AFY for the planning period.

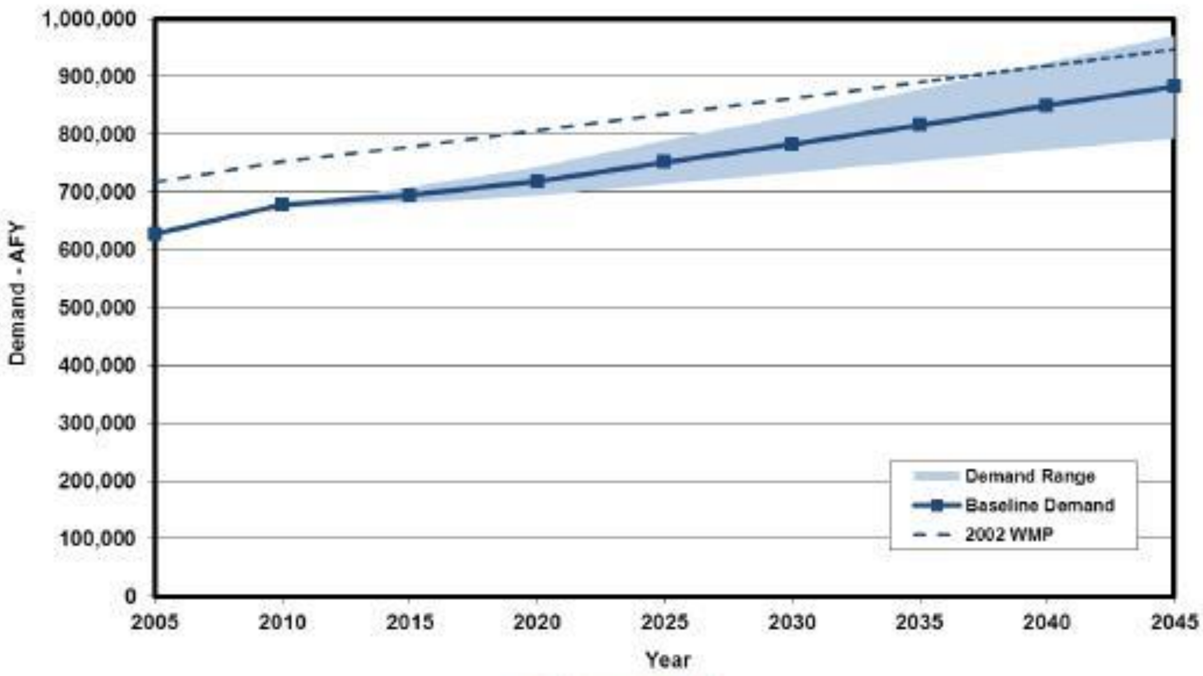
2.4 Comparison to Actual Water Demands

Historical demand data have been compiled from the following sources for 2010 through 2019:

- CVWD and DWA monthly groundwater production data
- CVWD monthly Canal delivery data
- CVWD and DWA monthly recycled water delivery data

As part of the ongoing Alternative Plan Update process, these data are being evaluated for the the Alternative Plan Update chapter, Water Demand Projections. Since the 2010 CVWMP, actual demands have been on average 150,000 AFY lower than projected.

Figure 2-3, reproduced from the 2010 CVWMP, shows the projected demand from the 2002 WMP and the 2010 CVWMP, extending from 2005 to 2045.



Source: 2010 CVWMP (CVWD)

Figure 2-3: Projected Demand from 2010 CVWMP

Figure 2-4 presents a comparison of water demand as projected in the 2010 CVWMP for the years 2010 to 2019, along with the actual water demand by sector for those years. As illustrated, the 2010 CVWMP projected a baseline demand (gray line) that reached approximately 722,000 AFY in 2015 and continued to increase to 758,000 AFY in 2019. Actual demands increased generally in the first few years and were approximately 618,000 AFY in 2014. Actual demands then decreased to 558,000 AFY by 2019.

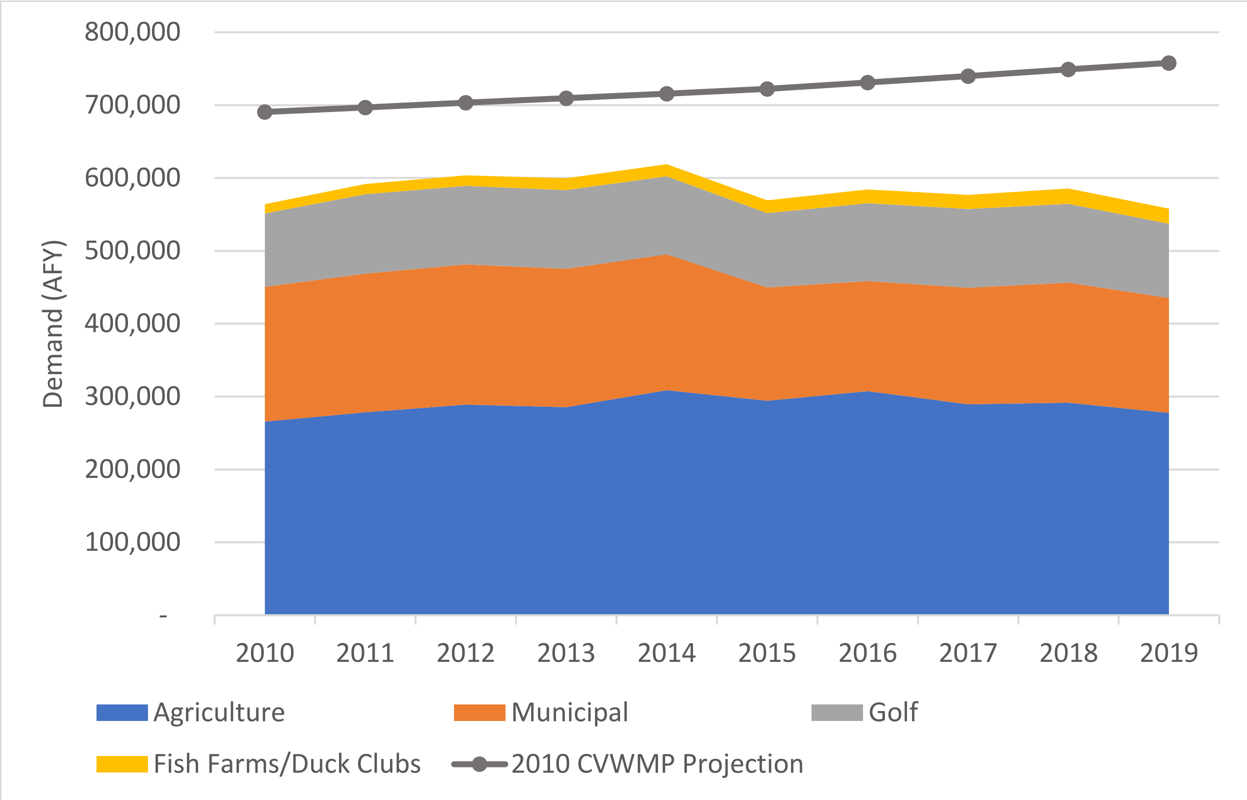


Figure 2-4: Total Historical Demand for the Indio Subbasin (2010-2019)

3. WATER SUPPLY PROJECTIONS

The purpose of this section is to summarize the planning assumptions used to develop the water supply projections for the 2010 CVWMP and to compare these projections to actual supply. The 2010 CVWMP describes and evaluates four water supply planning scenarios based on existing local water supplies and differing levels of imported water supply availability. The 2010 CVWMP water supply mix is based on Scenario 2. Scenario 2 assumes the Quantification Settlement Agreement (QSA) is valid, but that no improvements in the Bay-Delta conveyance occurs, resulting in a decrease of the State Water Project (SWP) reliability to 50 percent.

3.1 WATER SUPPLY PROJECTIONS

Water supply planning for both the 2002 CVWMP and the 2010 CVWMP included evaluation of direct water delivery separately from groundwater replenishment uses. Direct demands were those uses served with surface water, Colorado River water, recycled water, or groundwater. Replenishment water deliveries were considered separately as they supplement the groundwater supplies. Groundwater replenishment was evaluated as part of the groundwater balance with the amount based on proposed projects and available supplies.

3.1.1 Surface Water Assumptions

The 2010 CVWMP assumed that local surface water was diverted for direct use only from Whitewater River, Snow Creek, Falls Creek, and Chino Creek. The long-term average for natural precipitation was estimated at 60,200 AFY. The 2010 CVWMP assumed that 95 percent of flows become groundwater supply (57,190 AFY), with 5 percent outflow to the Salton Sea. No annual variations in natural recharge were included in the 2010 CVWMP projections.

Stream diversions were based on long-term average of 3,217 AFY. While the 2010 CVWMP assumed a constant 3,217 AFY of local surface water supply for the entire projection period, those deliveries were not realized. Ongoing evaluation as part of the Alternative Plan Update indicate that actual surface water supply averaged approximately 1,800 AFY from 2010 to 2019.

3.1.2 Colorado River Assumptions

In the 2010 CVWMP, Colorado River supplies were as shown in **Table 3-1**. No annual variations in Canal water available for delivery was included in the 2010 CVWMP projections. Conveyance losses in the Coachella Canal were estimated to be 31,000 AFY.

Direct use of Colorado River water includes agriculture, duck clubs, fish farms, golf courses, and untreated municipal (includes construction water). Colorado River direct delivery assumptions for the 2010 CVWMP included 1,000 AFY to duck clubs, 1,500 AFY to fish farms, and increasing deliveries to agriculture and golf courses based on expansion of the Canal delivery system.

Table 3-1: Quantification Settlement Agreement (QSA) Canal Water Diversions

Diversion	2020 Quantity (AFY)	2026-2045 Quantity (AFY)
Base Entitlement	330,000	330,000
1988 MWD/IID Approval Agreement	20,000	20,000
IID/CVWD First Transfer	50,000	50,000
IID/CVWD Second Transfer	23,000	53,000
Coachella Canal Lining	-26,000	-26,000
Indian Present Perfected Rights Transfer	-3,000	-3,000
QSA Diversions at Imperial Dam	**394,000**	**424,000**
MWD/SWP Transfer	35,000	35,000
Total Diversions at Imperial Dam	**429,000**	**459,000**
Assumed Conveyance Losses (2010 CVWMP Update)	**-31,000**	**-31,000**
Total Deliveries	**398,000**	**428,000**

Anticipated conversion of groundwater to Colorado River (Canal) supply for urban demands in the East Valley involved the following assumptions:

- Future non-potable use was assumed to be served with untreated Canal water meeting 50 percent of the urban demand growth.
- Future potable use was assumed to be treated Canal water. The treated volumes were adjusted annually with initial operation by 2015.
- Oasis Distribution System Project delivered up to 32,000 AFY of additional Canal water for agriculture in the Oasis Area.

Following are the Colorado River recharge assumptions for the 2010 CVWMP:

- *Thomas E. Levy GRF (TEL-GRF)*: Assumed TEL-GRF to operate at 32,500 AFY increasing to 40,000 AFY by 2015.
- *Martinez Canyon GRF*: Projected that Martinez Canyon GRF would be operated as a pilot facility at 4,000 AFY through 2020, increasing to 20,000 AFY full-scale facility by 2025.
- *Indio GRF*: Projected that Indio GRF would be operated at 5,000 AFY starting in 2014, increasing to 10,000 AFY in 2021.
- *Whitewater River GRF (WWR-GRF)*: Assumed operation based on available excess Canal water available from the East Valley. This amount in worksheet calculations is unclear.

The 2010 CVWMP assumed no changes to the prescribed allocations under the QSA, and those allocations were realized. In 2019, U.S. Bureau of Reclamation diverted 344,000 AFY of Colorado River water for CVWD. After conveyance losses, approximately 327,000 AFY of Canal water was received. Treatment and delivery of 25,000 AFY of Canal water was never realized; all Canal deliveries were untreated.

3.1.3 State Water Project (SWP) Exchange Assumptions

In the 2010 CVWMP, DWA and CVWD were shown to have a combined maximum annual SWP Table A amount of 194,100 AFY, as shown in **Table 3-2.** All Table A SWP Exchange water delivered to DWA and CVWD was assumed to recharge either at Whitewater River Groundwater Replenishment Facility (WWR-GRF) in the Indio Subbasin or at Mission Creek GRF (MC-GRF) in Mission Creek Subbasin.

Table 3-2: SWP Table A Amounts

Agency	Original SWP Table A (AFY)	MWD Transfer (AFY)	Tulare Lake Basin Transfer #1 (AFY)	Tulare Lake Basin Transfer #2 (AFY)	Berrenda Transfer (AFY)	Total (AFY)
CVWD	23,100	88,100	9,900	5,250	12,000	138,350
DWA	38,100	11,900	-	1,750	4,000	55,750
Total	**61,200**	**100,000**	**9,900**	**7,000**	**16,000**	**194,100**

Because imported water recharge deliveries vary widely from year to year, recharge was based on estimated long-term average SWP Exchange reliability rather than year-to-year values. SWP supply assumptions were as follows:

- Assumed 60 percent supply reliability based on 2009 SWP Reliability Report, with future reduction of SWP reliability at 0.1 percent per year
- Did not include any projected deliveries of SWP Article 21, Turnback Pool, Governor's Drought Water Bank, Yuba Accord, or Rosedale Rio Bravo water because they were seen as highly uncertain.
- Assumed allocation of Table A amounts at 93 percent to WWR-GRF and 7 percent to MC-GRF.
- MWD SWP Transfer (35,000 AFY) historically delivered to WWR-GRF, though included in the Colorado River supply in 2010 CVWMP Update.
- Did not include MWD Advanced Deliveries because those are banked supplies and they ultimately contribute to long-term averages.

The 2010 CVWMP assumed average SWP Table A deliveries of 73,500 AFY from 2010 to 2019, which were realized. By 2019, the Table A Allocation 10-year average delivery was approximately 75,000 AFY. The 10-year average total WWR-GRF deliveries, which include advanced deliveries and non-Table A supplies, was approximately 153,300 AFY.

3.1.4 Non-Potable Water Assumptions

The 2010 CVWMP developed projections of future wastewater generation and subsequent recycled water deliveries for each of the wastewater treatment plants in the Valley. Existing (2009) wastewater treated at CVWD's Water Reclamation Plant-4 (WRP-4), the Valley Sanitary District (VSD) plant, and the Coachella Sanitary District (CSD) plant was assumed to be discharged to the CVSC for the planning period.

The 2010 CVWMP assumed future wastewater flows to be equivalent to domestic indoor water use, less consumptive use of about 3 gpcd. Indoor demands were estimated to be about 20 percent of total demands based on the ratio of wastewater flow per service account to urban water demand per service account using CVWD data. Wastewater was routed to respective wastewater treatment plants based on the projected population served by each plant. Baseline wastewater flow projections were adjusted to account for indoor water conservation. Projected recycled water use was then subtracted to determine the wastewater volumes percolated to the groundwater basin or discharged to the Coachella Valley Stormwater Channel (CVSC).

The 2010 CVWMP assumptions for recycled water delivery included (see **Table 3-3**):

- All of the recycled water generated by growth after 2009 from CVWD's four WRPs, VSD, and CSD was assumed to be reused for non-potable irrigation.
- About 5,000 AFY of WRP-4 effluent was assumed to be used for agriculture; all other recycled was assumed to be used for golf irrigation.
- Approximately 85 percent of the available wastewater from the City of Palm Springs WWTP was assumed to be treated and delivered by DWA WRP for urban and golf course irrigation.

Table 3-3: Projected Recycled Water Supplies, 2010 CVWMP (AFY)

Recycled Water Facility	2010	2020	2045
DWA WRF	4,800	6,268	9,119
CSD WRF	0	1,790	6,602
VSD WRF	389	500	2,798
CVWD WRP-4	0	3,929	22,116
CVWD WRP-7	2,448	3,674	6,248
CVWD WRP-9	322	302	302
CVWD WRP-10	5,610	10,001	11,800
Projected Totals	13,569	26,464	58,985

While the 2010 CVWMP assumed all wastewater flows generated by new growth would become recycled water supply, those deliveries were not realized. By 2019, half of projected recycled water supplies had been realized (approximately 13,500 AFY deliveries from DWA WRF, CVWD WRP-7, and CVWD WRP-10) due to slower than projected growth.

3.1.5 Conservation Assumptions

The 2010 CVWMP included an aggressive program of water conservation for urban, golf course and agricultural water users to meet projected demands. Water conservation was based on annual conservation percentages that were applied to the baseline demand forecast. Model documentation for the 2010 CVWMP states that return factors and wastewater flows were also adjusted annually to account for the effects of planned water conservation.

Urban Conservation

The 2010 CVWMP developed baseline urban water demands and then adjusted them to incorporate water conservation measures to be implemented as part of the Plan. Existing urban water demands were based on data obtained from CVWD and DWA for 2000-2009. Per capita water use ranged from 579 gpcd in 2000 to 428 gpcd in 2009, with an average of 463 gpcd. The 2010 CVWMP assumed:

- existing indoor and outdoor urban per capita demands would decrease 20 percent by 2020 to about 371 gpcd as a result of water conservation (20 percent by 2020), and
- per capita water use for future growth was estimated to be 320 gpcd; this lower demand factor reflected an expected 25 percent demand reduction with on-going implementation of landscape irrigation requirements and plumbing codes for new development.

Conservation percentages were applied to the baseline water demand projections each year. If the conservation targets could be achieved, they would result in urban water savings of 82,400 to 106,200 AFY by 2045 depending on the water supply scenario.

Golf Conservation

The 2010 CVWMP assumed that existing golf courses would remain in operation for the planning period. Golf course demand ranged from 102,500 AFY to 116,100 AFY between 2000 and 2009 based on historical data. For the few courses where water demand data was not available, a demand of 1,200 AFY per 18-hole course was assumed. The 2010 CVWMP Update assumed:

- Water conservation of 5 percent in 2010 ramping up to 10 percent by 2015 was applied to existing golf course demands.
- Future golf course demands for an estimated 75 new golf courses were based on the turf acreage limitation of the 2007 CVWD landscape irrigation ordinance (4 acres per hole plus 10 acres for practice areas) and the MAWA calculations from the ordinance, averaging 700 AFY per 18-hole course. The future golf demand increased in proportion to population growth in the West and East Valley areas.

The golf course conservation target is a savings of 11,600 to 17,400 AFY by 2045.

Agricultural Conservation

The 2010 CVWMP says average agricultural usage per acre was estimated to be 6.28 AFY/acre accounting for double cropping and excluding any additional water conservation. This figure was multiplied by the estimated future agricultural acreage to estimate future agricultural demand.

The 2010 CVWMP established an agricultural water conservation target of 14 percent by 2020 compared to the average use per acre in 2000-2002 (pre-CVWMP adoption). The 14 percent goal was based on the U.S. Bureau of Reclamation (USBR) *Water 2025 Report* and CVWD's Extraordinary Conservation Program, which identified potential agricultural conservation savings.

If the 14 percent target could be achieved, the CVWMP's agricultural conservation program was to save about 39,500 AFY of water in 2020, decreasing to 23,300 AFY by 2045 as agricultural land uses transition to urban uses.

Water Conservation – Range

The 2010 CVWMP included a range of water conservation savings from 117,300 AFY to 147,000 AFY by 2045, depending on what QSA and SWP scenarios are used (see **Table 3-4**). The "low range" estimates are based on the assumptions outlined above for the three use types; the "high range" estimates include increasingly more expensive and mandatory programs as necessary to fill the supply gap.

Table 3-4: Ranges of Potential Water Conservation Savings - 2045

Type of Conservation	Low Range (AFY)[1]	High Range (AFY)[2]
Urban	82,400	106,200
Agriculture[3]	23,300	23,300
Golf Courses	11,600	17,400
Total	**117,300**	**146,900**

1. The low range represent the minimum amount of demand reduction required assuming successful completion of the BDCP and provides a portion of the supply buffer.
2. The high range represents the among of demand reduction required if the BDCP is not successful and provides a portion of the 10 percent supply buffer.
3. Agricultural savings decline over time as agricultural land is converted to urban uses.

3.2 COMPARISON TO ACTUAL SUPPLIES

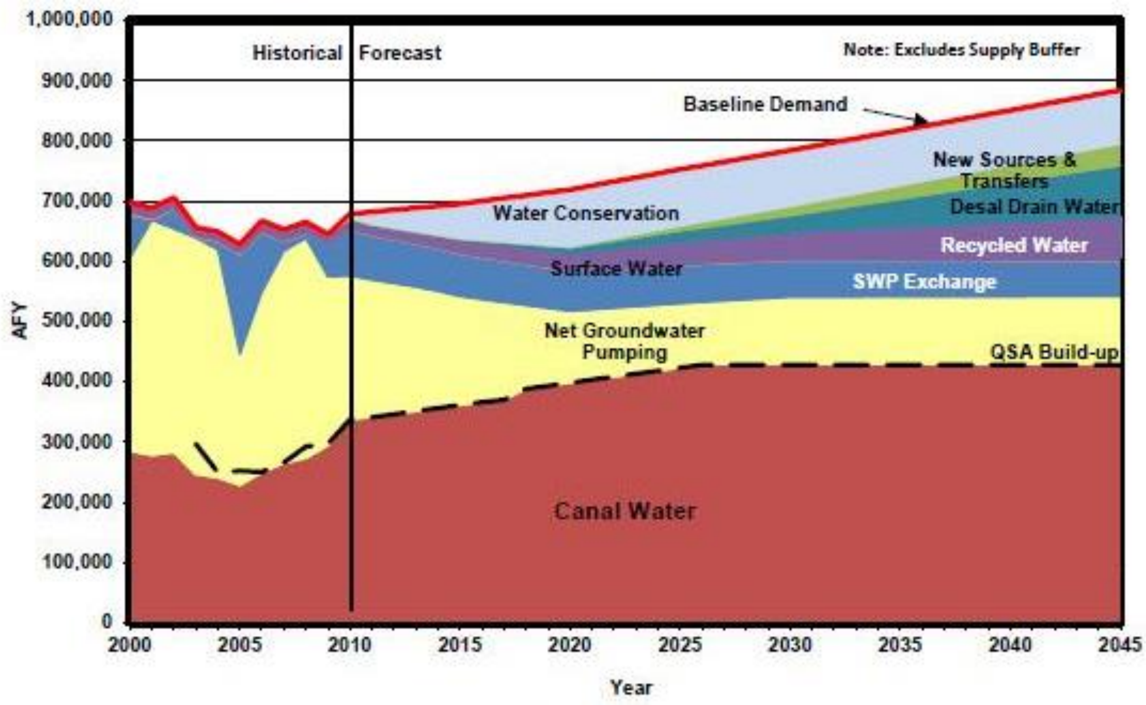
Historical supply data have been compiled from the following sources for 2010 through 2019:

- CVWD monthly Canal delivery data
- CVWD SWP annual delivery data
- CVWD and DWA groundwater recharge data
- CVWD and DWA monthly recycled water delivery data
- DWA monthly surface water diversion data

Since the 2010 CVWMP, actual supplies served to users have been lower than projected due to lower water demands throughout the region.

Figure 3-1 is reproduced from the 2010 CVWMP and shows the projected supply from 2000 to 2045. As illustrated, the 2010 CVWMP projected a baseline demand (red line) and how these would be met through various sources of supply and water conservation to achieve sustainability.

Figure 3-2 presents a comparison between the 2010 CVWMP demand projection and actual supplies used to fulfill demands for the years 2010 to 2019. As illustrated**,** the 2010 CVWMP projected a baseline demand (gray line) that reached approximately 758,000 AFY in 2019. Actual supplies used to meet regional water demand (see Figure 2-4 above) amounted to approximately 618,000 AFY in 2014 and then decreased to 558,000 AFY in 2019**.** Colorado River water and SWP exchange water delivered to the Indio Subbasin for both direct use and recharge are accounted for, with the exception of SWP advanced deliveries. Desalinated drain water was not developed as a supply source over the last decade.



Source: 2010 CVWMP (CVWD)[3]

Figure 3-1: Projected Supply from 2010 CVWMP

[3] Note that the 2010 CVWMP assumed a greater portion of the projected supply would be made up by water conservation than estimated in its baseline demand forecast (refer back to Figure 2-3). The conservation band in the demand forecast (light blue in Figure 2-3) is based on varying conditions of growth and passive conservation. The conservation band in the supply chart (light blue in Figure 3-1) was calculated as the necessary difference between total supplies and the baseline demand.

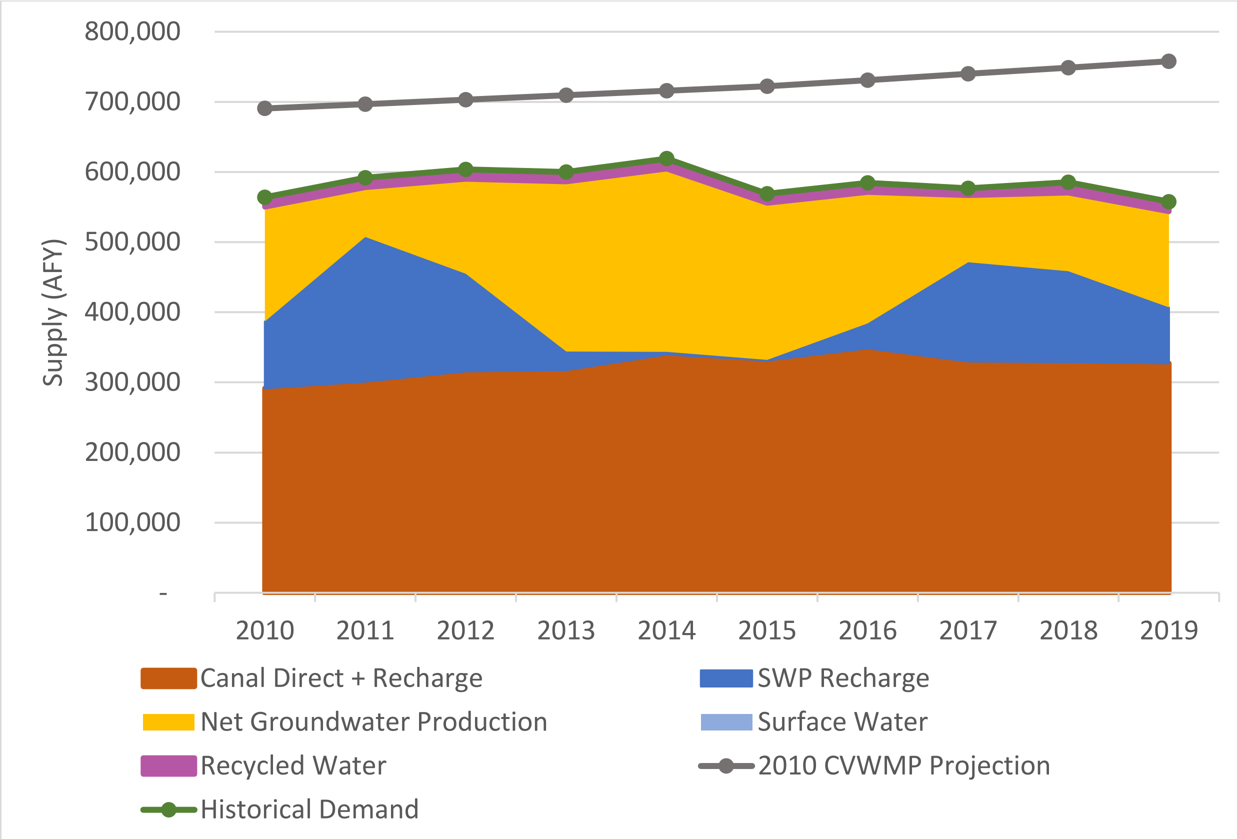


Figure 3-2: Comparison of Demand and Supply for the Indio Subbasin (2010-2019)[4]

[4] Note: SWP recharge totals in Figure 3-2 do not include Advanced Deliveries.

4. STATUS OF 2010 CVWMP IMPLEMENTATION

It is critical to perform periodic evaluations of Plan implementation. Current progress and preliminary results provide guidance as to whether Plan goals or projects require revisions or adjustments. This section summarizes 2010 CVWMP Implementation.

The Indio Subbasin GSAs continue to implement the goals and programs of the 2010 CVWMP. As noted in the *Indio Subbasin WY 2018-2019 Annual Report,* groundwater production remains more than 25 percent less than the historical highs in the early 2000s. The results of the on-going basin monitoring program demonstrate the significant progress being made toward the goal of eliminating long-term groundwater overdraft. In the last 10 years, the Indio Subbasin has gained over 840,000 AF of groundwater in storage.

Over the past ten years, much of the Indio Subbasin experienced water level gains as a result of continued recharge at the WWR-GRF and TEL-GRF, conversion of golf courses from groundwater to Coachella Canal and recycled water, and water conservation. Replenishment operations at the PD-GRF began in February 2019 and are expected to contribute significantly to improved groundwater level conditions in the mid-valley region.

CVWD continues to work with the golf courses in its service area to extend the Mid-Valley Pipeline and recycled water distribution system to serve additional courses with Coachella Canal and recycled water, and to reduce their groundwater pumping. CVWD's increased allocation of Colorado River water through the Quantification Settlement Agreement (QSA) added 5,000 AF of available supply in 2019.

Projects described in the 2010 CVWMP include:

- *Water conservation*: The Indio Subbasin GSAs have implemented water conservation programs for both large irrigation customers and residential customers. Most water purveyors and several cities have implemented landscape audit programs and rebates for replacement lawn conversion and high-efficiency water devices. CVWD adopted a Landscape Ordinance (Ordinance No. 1302.4) that establishes maximum allowable turf area and associated water demands for new golf courses.
- *New supply development*: As part of the QSA, CVWD's Colorado River allocation through the Coachella Canal will increase to 424,000 AFY by 2026 and remain at that level until 2047, decreasing to 421,000 AFY until 2077, when the agreement terminates. CVWD and DWA are actively participating in other statewide programs to improve the long-term reliability of the SWP supply. As opportunities arise, CVWD and DWA make water purchases from other water transfer programs.
- *Source substitution*: Golf courses connected to the Coachella Canal distribution system in the East Valley meet a majority of their total water use with Coachella Canal water. CVWD is working on design drawings for new connections to its Mid Valley Pipeline, which delivers non-potable water to West Valley golf courses.
- *Groundwater recharge*: WWR-GRF and TEL-GRF continue to replenish the Indio Subbasin with SWP exchange water and Colorado River water. In 2019, PD-GRF began replenishing the mid-valley area of the basin with Colorado River supplies.

- *Water quality protection*: The Indio Subbasin GSAs are operating wellhead treatment facilities to address elevated arsenic in local wells. Additional water quality programs are being implemented for well and septic system abandonment.

Overall, groundwater conditions documented in the *Indio Subbasin WY 2018-2019 Annual Report* demonstrate the effectiveness of the 2010 CVWMP in guiding sustainable management of the Indio Subbasin.

5. 2010 CVWD MODEL EVALUATION

This Section documents the numerical groundwater flow model that was updated and used for the 2010 CVWMP and evaluates the model's suitability for additional update and improvement, followed by assessment of sustainability and future management alternatives for the Alternative Plan Update. The original model was developed for CVWD during the mid- to late-1990s as a tool for managing groundwater in Coachella Valley. The model was constructed with the widely used USGS MODFLOW code and simulates three-dimensional groundwater flow within and between the shallow and deep aquifer zones, includes various sources of Subbasin recharge, discharge to production wells, evapotranspiration, flow to drains, and flow to and from the Salton Sea. The model was originally calibrated over a 61-year historical period from 1936-96. It was subsequently extended as a part of the 2002 and 2010 CVWMP and used to simulate future subbasin management scenarios beginning in 1997 through a defined future planning period. The most-recent version of the model, prepared for the 2010 CVWMP (and containing measured and estimated of inflows and outflows through 2008), will be used as the basis for the calibration update and future management simulations as a part of the Indio Subbasin Alternative Plan five-year update (Plan Update) for submission to DWR. Most of the inflow and outflow data for the period 1997-2008 will be retained in the updated model, recent data will be used for the period 2009-2019, and new estimates will be synthesized for predictive simulations of future conditions.

The original model was documented in a report prepared by Graham Fogg, the author of the model (Fogg, et.al, 2000). Graham Fogg and his consulting team, along with David Ringel, Consulting Engineer, consulted with Todd Groundwater staff, providing insights into construction and input data for the original model and 2010 CVWMP version of the model, and providing selected data files and computer programs used to develop and pre-process the model inputs (Fogg, 2020a,b; Ringel, 2020).

The following section describes the features and key input parameters of the model. Some of these input parameters will be updated and refined for use in the Plan Update.

5.1 MODEL INPUT AND CONSTRUCTION

The area covered by the groundwater model is shown on **Figure 5-1**. The upstream and downstream ends of the model correspond to the San Gorgonio Pass area and Salton Sea, respectively. The southwest flank of the model represents the interface between the unconsolidated sedimentary fill and consolidated to semi-consolidated rocks of the San Jacinto and Santa Rosa Mountains. The northeast flank of the model represents the interface between the unconsolidated sedimentary fill and consolidated to semi-consolidated rocks of the Little San Bernardino Mountains, Indio Hills, and Mecca Hills. Most of the ephemeral stream flow into the basin originates along the southwest flank. Note that the San Gorgonio Pass, Mission Creek and Desert Hot Springs subbasins are not explicitly modeled; subsurface outflow from these subbasins into the main basin is included in the boundary conditions at the Pass, and along the Banning and San Andreas faults.

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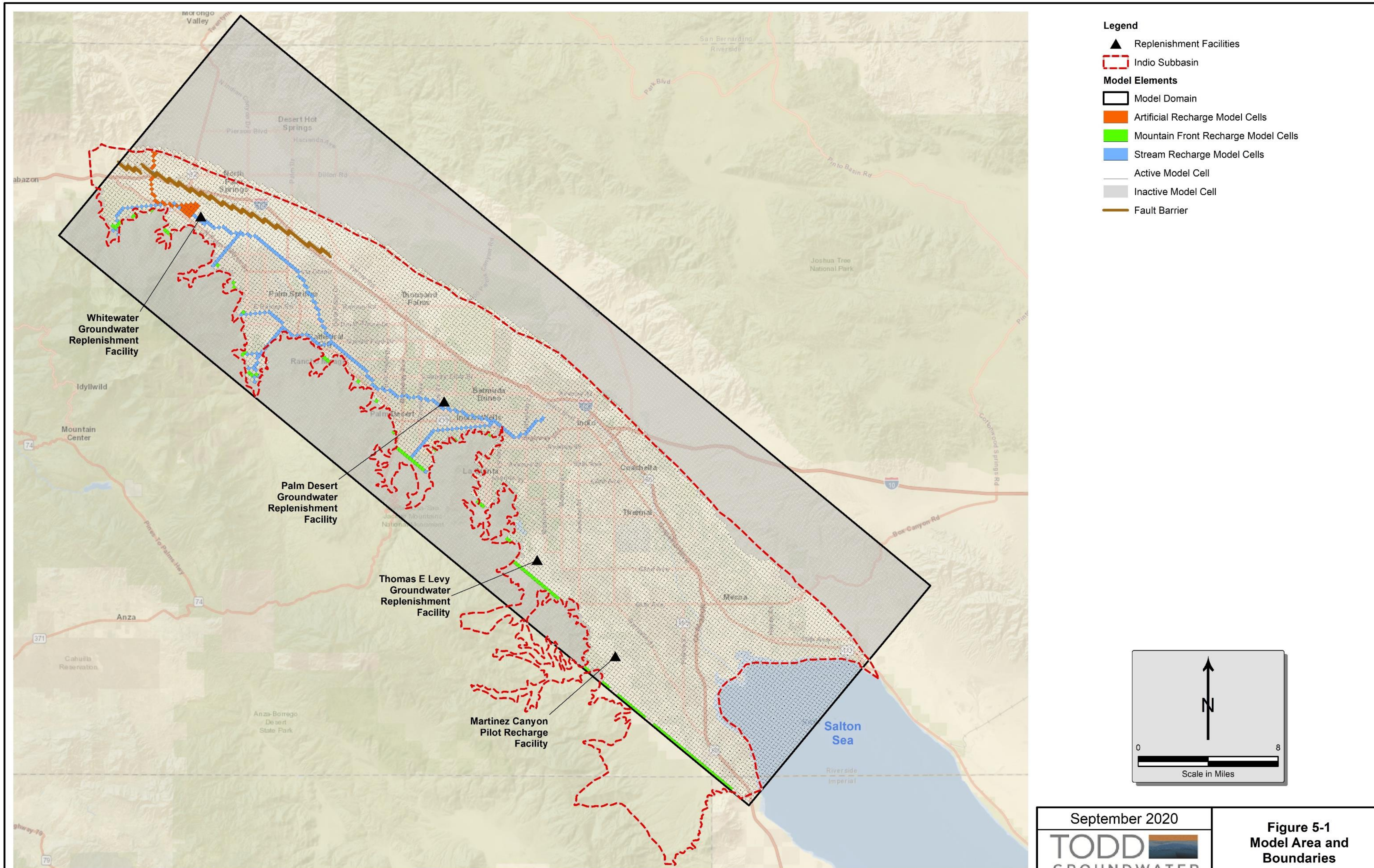

September 2020

TODD GROUNDWATER

Figure 5-1
Model Area and Boundaries

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5.1.1 MODFLOW Code and Input Packages

The original model was constructed using 'MODFLOW 88'. For the 2010WMP, the code was updated to 'MODFLOW 2005'. GFA used various data files and pre-processing programs to format the data and create the MODFLOW input files.

The model utilizes the following standard MODFLOW Packages:

- BASIC (BAS)
- BLOCK CENTERED FLOW (BCF)
- HORIZONTAL FLOW BARRIER (HFB)
- WELL (WEL)
- RECHARGE (RCH)
- DRAIN (DRN)
- EVAPOTRANSPIRATION (EVT)
- GENERAL HEAD BOUNDARY (GHB)

The original 1936-1996 model also used the TIME-VARIANT SPECIFIED HEAD (CHD) Package for the northwestern boundary with the San Gorgonio Basin, but this was changed to a specified flux boundary for the 2010 CVWMP version of the model, and the CHD Package is no longer used.

Input data for the original and 2010WMP models were generally pre-processed using various datafiles and programs to accumulate and format the input types, that were then loaded into the text (ASCii) MODFLOW input files. For example, the various sources of recharge such as mountain front and stream channel recharge, return flows, artificial recharge, and wastewater percolation were pre-processed and accumulated on a model grid cell basis to create the MODFLOW RCH Package for input.

For the model update, upgraded input data pre-processing methodologies including new databases and GIS data sets will be used to streamline model input development.

5.1.2 Model Grid and Layers

The model consists of a three-dimensional, finite-difference grid of blocks called cells, the locations of which are described in terms of the 270 rows, 86 columns and 4 layers. At the center of each cell there is a point called a node at which head is calculated. The model has a node spacing of 1,000 ft in the x-y plane, and variable vertical node spacing representing variable thicknesses of the corresponding aquifer or aquitard intervals. The grid is oriented along the length of the valley, coinciding with the principal direction of regional groundwater flow.

The MODFLOW model comprises four layers, representing the following hydrostratigraphic units:

- Layer 1 – semi-perched aquifer in East Valley and upper portion of shallow aquifer in West Valley
- Layer 2 – shallow aquifer zone
- Layer 3 – regional aquitard in East Valley and shallow-deep aquifer transition zone in West Valley
- Layer 4 – deep aquifer

The elevation of the tops and bottoms of the model layers are referenced to land surface elevations and reflect aquifer and hydrostratigraphic unit thickness as inferred from borehole data across the basin. In the lower valley, layer thickness follows geologic characterizations by DWR (1979) that were corroborated by analysis of subsurface data. For example, Model Layer 1 approximately corresponds with the semi-perched zone (100 ft thick), Layer 2 with the upper aquifer unit (80 to more than 240 ft thick), Layer 3 with the regional aquitard (80 to more than 240 ft thick), and Layer 4 with a lower aquifer unit (1,000 ft thick). In the upper valley, aquifer thickness estimated by USGS (Reichard and Meadows, 1992), was initially used and later revised during model calibration.

5.1.3 Aquifer Properties

Distributions of aquifer hydraulic properties were developed to simulate the aquifer and aquitard units in the shallow and deep aquifer zones. Aquifer hydraulic properties control the rates of groundwater flow, amounts of water in storage, and aquifer responses to recharge and pumping, and include aquifer transmissivity, horizontal and vertical hydraulic conductivity, and unconfined and confined storage coefficients. Initial estimates of transmissivity (T) were obtained in part from previously calibrated values used in Reichard and Meadows (1992) for the upper valley, some pumping test results for the lower valley, and fairly abundant specific capacity data for the entire valley. Hydraulic conductivity (K) of the confining bed in multiple aquifer zones was estimated based on the sediment texture and heterogeneity and was treated as a calibration parameter in the original 1936-1996 model. Similarly, vertical K (Kv) of the aquifer zones was based on the degree of fine-grained bedding present in electric and drillers logs as well as past experience with three-dimensional heterogeneity in sedimentary basins; this parameter was also adjusted in calibration.

Most model cells were assigned moderate to high hydraulic conductivities, based on the pumping test and specific capacity data, and reflect the properties of the coarse sand and gravel deposits that predominate in the subsurface. Transmissivities are higher on the southwest margins of the basin grading to lower values in the center. Also, permeabilities tend to decrease southeastward toward the Salton Sea. Southeast of Indio, tight silts and clays up to 100 ft thick are present in the upper aquifer and create a semi-perched zone. The lower permeabilities were assigned to these model cells within Model Layer 3.

The specified ratio of horizontal to vertical hydraulic conductivity varies between 10 and 100 throughout the model, based on the degree of fine-grained bedding present in electric and drillers logs.

Distribution of specific yield (Sy) from Reichard and Meadows (1992) was initially used in the upper valley for Model Layer 1; these values were subsequently modified slightly during calibration. Similar specific yield values were initially estimated for the unconfined areas and semi-perched zone in the lower valley; these values were later adjusted during calibration. Specific storage (Ss) values were estimated for each of the Model Layers 2, 3 and 4, and were multiplied by layer thickness to obtain storage coefficient (S) for each model layer. Ss varied in confined vs. unconfined areas. Storage coefficients of the aquifer system are much greater in the upper unconfined alluvium than in the deeper confined units

The Garnet Hill Fault forms a partial barrier to flow between the Garnet Hill and Palm Springs subareas. The MODFLOW HFB Package was used to simulate the barrier effects of this fault.

5.1.4 Initial Conditions

Initial head conditions in the 2010 CVWMP model are set from the final computed heads for each cell in the 1936-1996 calibration simulation, corresponding to the end of calendar year 1996. Thus, these are the starting heads for the predictive model simulations, which begin in 1997. This approach maintains consistency between the model computed heads and flows from the original calibrated model, as well as continuity between the calibration and predictive models.

5.2 GROUNDWATER INFLOWS

The model addresses inflows to the subbasin, which involve recharge through a combination of natural inflows of surface water and groundwater, imported water, and wastewater percolation. Sources of recharge to the basin include

- Subsurface inflow from the San Gorgonio Pass and Mission Creek subbasins
- Mountain front and stream channel recharge
- Artificial recharge of imported water
- Wastewater discharges
- Return flows from municipal/domestic, agricultural, golf courses, and other sources

Combined return flows represent the largest source of recharge, followed by imported water recharge and natural Mountain front and stream channel recharge.

Except for subsurface inflow boundaries, each of these sources of recharge was estimated individually, then accumulated into a combined MODFLOW RCH Package. Recharge rates over time were accumulated on a model grid cell basis, accounting for cell areas to preserve total recharge amounts, and applied as recharge to Model Layer 1. The MODFLOW RCH Package was used to simulate mountain front and stream channel recharge rather than the MODFLOW Streamflow Routing Packages, which is sometimes used to simulate groundwater-stream interactions.

For the Alternative Plan model update, the individual components of recharge will be re-calculated for the period 2009-2019 using measured data and better estimates, and the MODFLOW RCH Package re-constructed. New simulations of the period 1997-2019 will be run to confirm model performance, prior to conducting the future predictive simulations.

5.2.1 Subsurface Inflow

Figure 5-1 shows the locations of subsurface inflows specified in the northwestern and eastern boundaries of the model. These boundaries simulate inflow from San Gorgonio and Mission Creek Groundwater Basins. Flux rates were estimated for each boundary and applied to Model Layers 1 through 4.

Inflow from San Gorgonio Basin

A specified-flux boundary is used to simulate subsurface inflow from the San Gorgonio Pass subbasin to the Indio subbasin. In the original historical model, the amounts of flow over time were computed by the model with a time-dependent specified head boundary using the MODFLOW CHD Package. In the 2010 CVWMP model, the boundary condition was changed from a time-dependent specified head to a specified flux boundary, which is used to represent the long-term average inflow for each cell. The amount of inflow was set to a constant value of approximately 9,000 AFY in the 2010 CVWMP model.

Inflow from Mission Creek Basin

Subsurface inflow also occurs from the Mission Creek subbasin to the northeast into the Garnet Hill subbasin, across the Banning and San Andreas faults. These faults consist of several parallel faults and form the northeasterly boundary of the Indio groundwater basin. Groundwater level differences across the Banning Fault in this area are on the order of 200-250 ft. The estimated flow across the Banning Fault into the Garnet Hill Subbasin in the CVWMP Model was set to a constant value of 2,000 AFY. The Garnet Hill Fault also forms a partial barrier to flow and demarcates the Garnet Hill and Palm Springs subareas internal to the model. This barrier was simulated using the MODFLOW HFB Package and allows variable flow between the subareas.

5.2.2 Mountain front and Stream Channel Recharge

Rainfall runoff that recharges along the mountain front and infiltration of streamflow beyond the mountain fronts are simulated in the groundwater model. Precipitation in the San Bernardino, San Jacinto, and Santa Rosa Mountains is the primary natural source of water to the subbasin, with only minor recharge from precipitation in the Little San Bernardino Mountains. The total volume of tributary inflow varies from season to season and year to year, due to wide variations in precipitation. Perennial streamflow from the mountain watersheds is does not occur.

Rainfall-runoff relationships were developed for the twenty-four watersheds in the San Bernardino, San Jacinto and Santa Rosa Mountains that contribute to groundwater recharge in the study area. Where stream gage station data are available, annual streamflow amounts were recharged along the mountain fronts and stream reaches. For un-gaged watersheds, synthetic runoff relations were developed based on the rainfall-runoff curves developed for nearby gaged streams.

Mountain-front recharge includes subsurface inflow from the canyons and surface runoff from minor tributaries along the mountain fronts. Mountain-front recharge from the watersheds was assumed to be ten percent of the average annual streamflow, and evenly distributed to perimeter cells of the model located in canyons and along mountain fronts. Recharge from infiltration of streamflow was distributed to model cells differently depending on whether the year was relatively wet or dry. During dry years, recharge from infiltration of streamflow was distributed to the perimeter model cells. During wet years, recharge from streamflow on major tributaries was distributed to the streamflow recharge cells according to a basic river routing model.

Recharge by infiltration of streamflow occurs primarily along the major stream channels within the model boundary. For the 2010 CVWMP model, actual and synthesized stream flows were used for the period 1997-2008, and estimated average flows were used for the period after 2008. Total streamflow recharge between 1997 and 2008 in the 2010 CVWMP model ranged from approximately 7,000 to 90,000 AFY. Corresponding mountain front recharge ranged from 700 to 9,000 AFY. Recharge from the lower portion of the Whitewater River Channel contributed another 800 to 4,600 AFY of recharge.

5.2.3 Artificial Recharge

Managed artificial recharge occurs in the subbasin at several sites including the Whitewater Groundwater Replenishment Facility (WWR-GRF), Thomas E. Levy Groundwater Replenishment Facility (TEL-GRF), and recently constructed Palm Desert Groundwater Replenishment Facility (PD-GRF). Minor amounts of imported water were also recharged at the Martinez GRF. Since 1973, CVWD and DWA have received State Water Project (SWP) water through an exchange agreement with Metropolitan Water District of Southern California (Metropolitan). Water released from Metropolitan's Colorado River Aqueduct flows down the Whitewater River channel to the recharge ponds near Windy Point. A portion of the water infiltrates along the channel, and some evaporates from the ponds before percolating down to the water table. Estimates of the amount lost to infiltration in the channel and that to evaporation from the ponds were made for the model. Note that during extremely wet years, over 100,000 AF of water are replenished at the WWR-GRF, and groundwater levels in the artificial recharge area increased hundreds of feet. Total annual artificial recharge amounts between 1997 and 2008 ranged from approximately 1,000 to 162,000 AFY.

5.2.4 Wastewater Discharges

Treated wastewater that is not recycled is discharged to percolation ponds for disposal. The Palm Springs Water Reclamation Plant (WRP), Valley Sanitation District WRP, and CVWD's WRP7, WRP9 and WRP10 each discharge effluent to percolation ponds. Total annual wastewater percolation amounts between 1997 and 2008 ranged from approximately 5,800 to 14,000 AFY.

5.2.5 Return Flows

Return flows represent the largest sources of recharge to the basin and groundwater model. Sources of return flows include Agricultural, Municipal and Domestic, Golf Courses, and other sources.

Agricultural

Colorado River water from the Coachella Canal is used along with groundwater pumped from wells to supply the needs of agriculture. Annual estimates of agricultural returns for each section were made for the historical period using a water budget methodology, as documented in Fogg et al. (2000). Agriculture areas, crop types, crop demands, consumptive use, and corresponding demands for surface water and pumped groundwater were estimated, to develop the return flow amounts. These returns were distributed uniformly to model cells within each section in the uppermost model layer using various database and pre-processing programs. A FORTRAN program was also written to include these agricultural returns, along with other sources of recharge, in the complete RCH package dataset for MODFLOW. Total annual agricultural return flow amounts between 1997 and 2008 ranged from approximately 106,000 to 146,000 AFY.

Municipal and Domestic

Municipal and domestic return flows to the groundwater basin result from septic tank effluent in unsewered areas and from outdoor landscape irrigation returns, which are affected by the amounts of water used indoors versus outdoors.

The West Valley is generally sewered, and landscape irrigation is the main source of municipal and domestic return flows. Based on water use analyses, West Valley returns were estimated to be 32 percent of the total groundwater pumped for municipal and domestic uses. In the East Valley, landscape irrigation represents a smaller fraction of municipal water use, and return flows are estimated to be 20 percent of municipal and domestic groundwater pumping in sewered areas, and 54 percent of the pumping in unsewered areas. Urbanized areas were assumed sewered while most on-farm domestic use is unsewered. Returns from municipal and domestic use were distributed evenly to the cell at the well location and the surrounding eight model cells in the uppermost model layer. Total annual municipal and domestic return flow amounts between 1997 and 2008 ranged from approximately 53,000 to 67,000 AFY.

Golf Courses

Annual returns from golf course irrigation were estimated to be 34.7 percent of applied water, based on the difference between the applied water and turf evapotranspiration. These returns were evenly distributed to Layer 1 model cells within the sections where the golf courses are located. Golf course pumping is metered in the west valley management area; returns from metered golf course pumping were estimated to be 34.7 percent of the pumped water and were distributed evenly to the cell at the well location and the surrounding eight model cells in the uppermost model layer. Total annual golf course return flow amounts between 1997 and 2008 ranged from approximately 35,000 to 44,000 AFY.

Other Return Flows

In the original historical model, no groundwater returns are assumed to occur from fish farm and duck club operations. Water losses at these facilities include evaporation and direct discharges to the drain system for disposal. For the historical model, return flows from groundwater pumping for reclamation leaching was returned to the groundwater system as recharge within the semi-perched zone in sections where drains were installed. However, no reclamation leaching was assumed to occur during the 2010WMP period; thus, no such returns were specified for 1997-2008.

5.3 GROUNDWATER OUTFLOWS

The model quantifies outflows; groundwater is discharged from the Indio Subbasin through groundwater pumping for multiple beneficial uses, evapotranspiration, drain outflows, and subsurface outflow to the Salton Sea.

5.3.1 Groundwater Pumping

Annual estimates of agricultural, municipal, golf course, and other pumping for each section were made for the historical model using the consumptive use method. Wells were simulated using the MODFLOW WEL Package, with wells assigned to model cells based on known or inferred well locations and depths. The agricultural pumping was distributed to known and inferred irrigation wells within each section in the upper and lower aquifers. Unmetered golf course pumping was estimated in a similar manner. Pumping for municipal and domestic use was compiled from SWRCB, USGS, CVWD and DWA records and estimated where necessary. CVWD and DWA metered pumping for municipal and domestic use, and all available metered golf course and fish farm pumping, was included where available in years 1997-2009 in the 2010 CVWMP Update. Pumping estimates also included any unmetered municipal and domestic use, golf course, agricultural, greenhouse, on-farm domestic pumping from private wells, and any fish farms and duck club pumping. Although metering of agricultural pumping in the east valley began in 2004, the data were not complete until 2011-2012; thus, agricultural pumping was estimated for the 2010 CVWMP Update. Metered pumping will be used after 2012 in the updated model simulations.

Pumping is simulated in the model using the standard MODFLOW WEL Package. Pumping amounts over time were calculated and distributed to model grid cells corresponding to the known or estimated production well locations and depths. Most pumping occurs from the deep aquifer (Model Layer 4).

For the Alternative Plan model update, the individual categories of pumping will be re-calculated for the period 2009-2019 using measured and better estimates, and the MODFLOW WEL Package will be re-constructed. New simulations of the period 1997-2019 will be run to confirm model performance, prior to conducting the future predictive simulations.

Agricultural

Agricultural pumping, primarily in the east valley, represents a component of groundwater discharge from the basin. For the 2010 CVWMP model, agricultural pumping was estimated based on water deliveries and consumptive use. Details of the methodologies used to estimate agricultural pumping are provided in Fogg (2000). Total annual agricultural water usage amounts between 1997 and 2008 ranged from approximately 283,000 to 372,000 AFY, with pumping amounts during this period estimated to range from 53,400 to 105,900 AFY. Metering of agricultural pumping in the east valley began with the inception of the East Whitewater River Subbasin Area of Benefit Groundwater Replenishment Program in 2005 and was completed in 2011-2012. Metered well pumping data will be used in the model update.

Municipal and Domestic

CVWD and DWA have metered municipal groundwater pumping in the upper valley since the mid-1970s. Most of the historical groundwater production in the East valley was unmetered and was estimated in the 2010 CVWMP model. On-farm domestic water use was included in the pumping distribution. Metered municipal well pumping data will be used in the model update for both the upper and lower valley, with minor unmetered domestic and other pumping estimated. Total annual municipal and domestic pumping amounts between 1997 and 2008 ranged from approximately 179,000 to 230,000 AFY.

Golf Courses

Golf course pumping in the upper and lower valley was estimated in the historical model based on known pumping amounts or estimated based on the acreage irrigated and year when each course was constructed. For estimated amounts, water use was computed using turf demands, annual evapotranspiration (ET) rates, leaching rates, and irrigation efficiencies. For the 2010 CVWMP model, metered pumping data was used for golf pumping. Total annual golf course pumping amounts between 1997 and 2008 ranged from approximately 82,900 to 93,400 AFY.

Fish Farms, Duck Clubs and Other

Fish farming is a water-using agricultural enterprise that benefits from the warm groundwater in the lower valley near the Salton Sea. Fish farming grew rapidly in the 1980s and 1990s, to approximately 1,000 acres of fish farm ponds in the East valley. The total water demand by fish farms in 1997 was estimated to be approximately 27,000 acre-ft.

Duck clubs provide water for ponds to attract ducks and other waterfowl during hunting season. The duck clubs are located entirely within the East valley. The total water demand for duck clubs in 1996 was estimated to be approximately 4,000 acre-ft.

5.3.2 Evapotranspiration

Native vegetation ET is simulated in the eastern portion of the historical model as described in Fogg et al. (2000). An ET boundary condition was initially assigned to cells within the semi-perched zone in the historical simulation; as land within the semi-perched zone was developed for agriculture, the ET boundary was replaced with a drain boundary. Since no additional drains were installed after 1996, the ET boundaries were maintained at 1996 conditions in the predictive model. ET amounts are calculated based on specified plant rooting depths, reference ET values, and simulated shallow groundwater elevations. Total annual evapotranspiration amounts simulated between 1997 and 2008 ranged from approximately 4,400 to 5,100 AFY.

5.3.3 Drains

Shallow groundwater drainage systems are installed in the eastern portion of the Subbasin and serve to maintain the water table below crop rooting depths. The model simulates drains in Layer 1 with installation dates, locations, and drain elevations based on their construction records. On-farm drains are constructed at approximately 6-ft depths and are connected to the CVWD drains. CVWD drains are typically installed at depths of 8 to 10 ft. The model calculates the amounts of drain flow based on the drain elevations, adjacent groundwater elevations, and aquifer/drain conductance, a permeability parameter. Flow from the drains goes either into the CVSC or directly into the Salton Sea. No additional drains have been installed since 1996 and 2002; consequently, the drain boundary conditions in the model are maintained at the 1996 configuration. Total annual drain flow amounts simulated between 1997 and 2008 ranged from approximately 41,200 to 51,500 AFY.

5.3.4 Salton Sea

The Salton Sea is simulated as a GHB with time-varying elevations. Actual Salton Sea elevations were used in the historical model then held constant at 1999 levels 2010 CVWMP Update simulations. Note that Salton Sea levels have declined approximately 10 feet since circa 2000, and simulated elevations of this boundary condition will be adjusted in the updated model. Simulated net flow between the Sea and groundwater system is relatively small, less than 1,000 AFY in the 1997-2008 simulation.

5.4 MODEL PERFORMANCE

The original 1936-1996 regional model was well-calibrated to measured groundwater elevation and water budget trends across the basin (Fogg, 2000). Errors between observed and simulated groundwater elevations were generally low, and simulated drain flow amounts over time corresponded to measured and estimated drain flows after the drains were installed.

Performance of the updated 2010 CVWMP model was re-assessed to confirm the model continues to accurately simulate of measured data for the period from 1997-2019. Model simulation results for the latest 2010 CVWMP Update dataset were compared with measured groundwater elevations throughout the valley, and with agricultural drain flows in the East Valley. Because the original model was constructed and calibrated to 1936-1996 data, and since aquifer properties were not changed in the model for the 2010 CVWMP Update, calibration results for the updated period provide an additional validation step for the original model.

It is noteworthy that the 2010 CVWMP Update dataset was developed during 2008-10 and includes measured pumping and recharge data that were readily available at the time, generally through 2008. However, for the simulation period from 2009 to 2019, for which data were not yet available, various modeling assumptions (pertaining to natural and artificial recharge, municipal, resort and irrigation pumping demands, as well as included CVWMP programs) were used to estimate future pumping and recharge amounts and their distributions in the model. Thus, it is reasonable to expect the current model to perform better from 1997-2009 than from 2010-19. Model inflows and outflows for the period 2009-2019 will be updated and the model re-run to confirm calibration quality for this period.

5.4.1 Head Calibration Hydrographs

Figure 5-2 shows the locations of five wells considered to be representative of local groundwater level conditions throughout the subbasin, and which have also been monitored for many years. These wells were selected for plotting hydrographs for visual comparison with model-simulated results as well as for calculation of error residuals. The original calibration results for the 1936-1996 model, along with the 1997 through 2019 results from the 2010 CVWMP model update are included on the hydrographs. Model year 1997 through 2008 simulation results are considered representative of actual historical conditions, while 2009 through 2019 results are based on 2010 CVWMP projections of inflows and outflows and are not representative of actual conditions during this period. The calibration results for the five wells are described below from northwest to southeast, down the Valley.

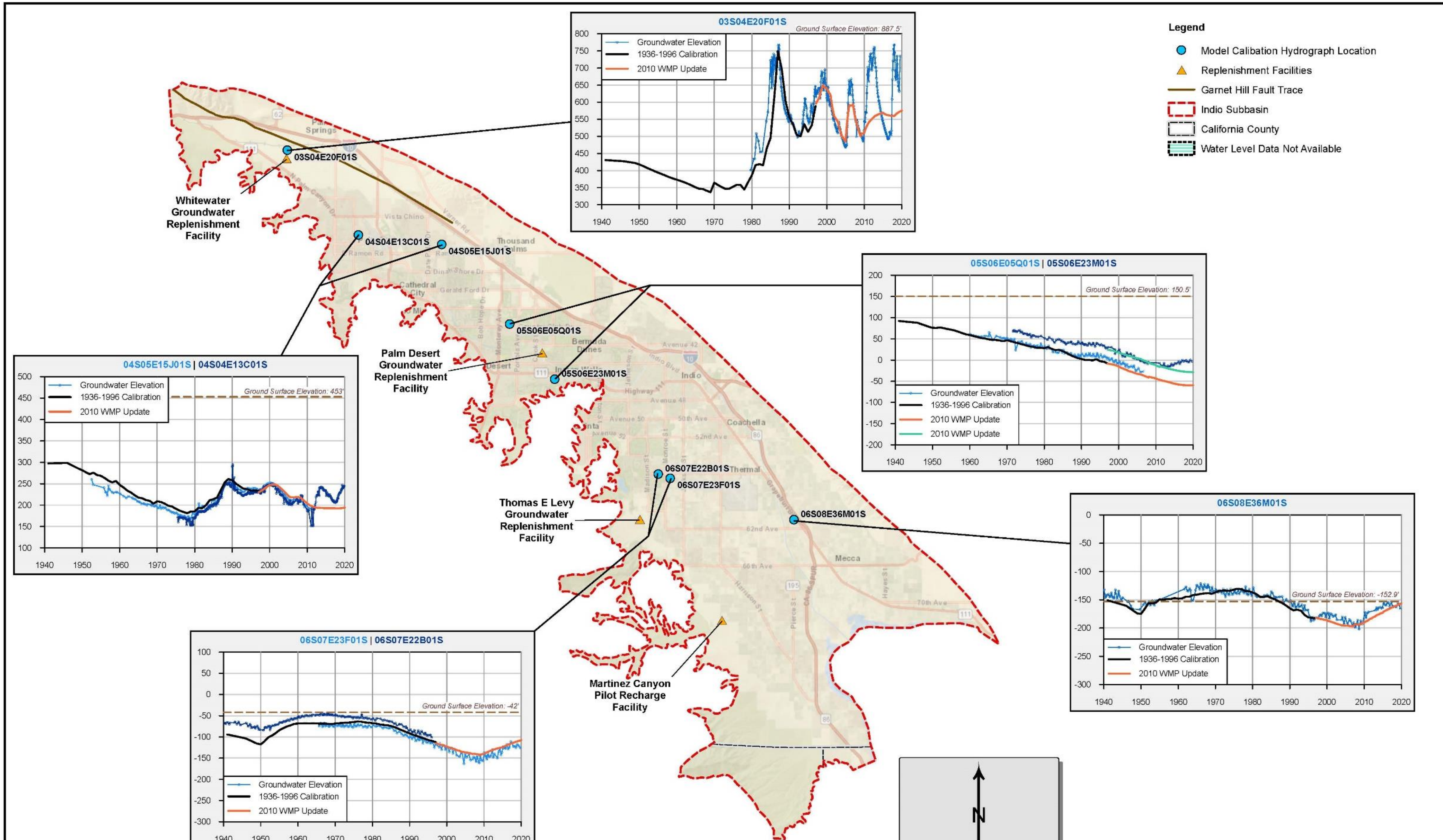
Well 03S04E20F01S is completed in the unconfined aquifer near the WW-GFR and exhibits large groundwater elevation fluctuations of around 250 feet between 1997 and 2008, in response to recharge operations at the GRF. The 2010 CVWMP Update simulation results show the model generally reproduces the observed trends in groundwater levels during the period 1997-2008. The modeled peak groundwater elevations are lower that the observed peaks in 1998-99 and 2005-06, but this is due in part to the annual stress periods of the model, that use average annual recharge volumes at the GRF, rather that the dynamic amounts recharged across the year. Observed-simulated hydrographs after 2008 deviate, due to the assumed relatively constant recharge and discharge amounts used for this simulation period.

Nearby wells 04S04E15J01S and 04S04E13C01S are in Palm Springs near the San Jacinto Mountain front and completed in the lower aquifer. Both wells are shown on the hydrograph because they have different periods of record but are closely located, with similar depths and water level responses, and are located in the same model cell. As shown, the model simulation results compare well with observed groundwater levels from 1997-2008. The model-simulated peaks from the hydraulic effects of the artificial recharge at

WWR-GRF and recovery are well-matched with the measured data, both of which exhibit muted and delayed responses to the wet year WWR-GRF recharge events.

Well 05S06E05Q01S and nearby Well 05S06E23M01S are located near Indian Wells and completed in the lower aquifer. Both exhibited similar water level trends for their periods of record. The model results compare well with the observed trends in groundwater levels through 2008, including the diminished peaks due to large amounts of artificial recharge at WWR-GRF in 1998-99 and 2005-06 that, due to its location downgradient from WWR-GRF, have been attenuated and delayed by approximately 4 years at this location.

Well 06S07E23F01S and nearby Well 06S07E22B01S are located near Lake Cahuilla and completed in the lower aquifer. The model closely reproduces the trends and approximates the values in measured groundwater levels very well in this area over the 1997-2008 simulation period.



September 2020

TODD GROUNDWATER

Figure 5-2
Model Calibration Hydrographs

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Well 06S08E36M01S is located between Thermal and Mecca and completed in the lower aquifer. The simulated groundwater elevation trends match groundwater levels very well in this area over the 1997-2008 simulation period.

The example hydrographs shown on Figure 5-2 indicate good overall calibration in most portions of the Indio subbasin. However, certain subareas and depth intervals exhibit lower quality calibration results for the 2010 CVWMP model update. For example, simulated water levels in the Garnet Hill subarea are not well-calibrated with observed levels in some wells. This may be due to offsets in simulated initial conditions, as compared with observed levels in 1997, and to inaccuracies in the simulated amounts of inflow from the Mission Creek subbasin. This will be further evaluated after completion of the 2009-2019 model update and changes made to certain input parameters to improve calibration in this subarea.

5.4.2 Head Calibration Statistics

Figure 5-3 shows a scatter plot of model-computed heads vs. measured water level data for measurements in the simulation from 1997-2009. The comparison of the match between measured data and simulated values for this subperiod is representative of model performance, since actual data on pumping and recharge are included in the model versus estimated rates used in the 2009-2019 portion of the simulation. In this period there are 27,890 groundwater elevation observations covering an elevation range of 1,086.05 ft. As shown on the chart, there is a very good correlation between observed and simulated data throughout the subbasin. The average residual (difference between observed and simulated elevations) of this data set 2.18 ft, and residual standard deviation of 22.93 ft. These calibration results indicate the model accurately reproduces groundwater elevations and trends in the subbasin.

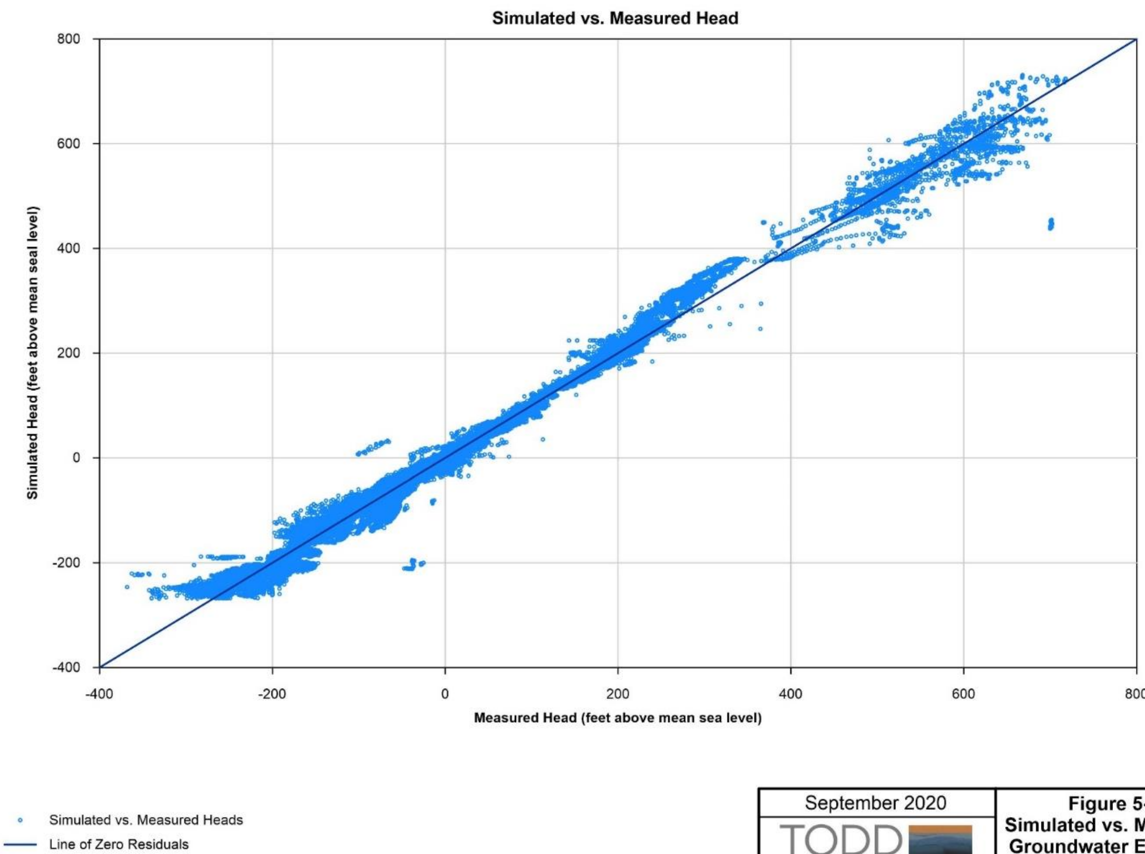
5.4.3 Water Budget Calibration

Figure 5-4 shows a summary of the transient simulated flow water budget components in the model from 1997-2009. Similar results were provided for the historical model period from 1936-96 in documentation provided by GFA (Fogg, 2000).

The water budget components include specified recharge, pumping, and subsurface inflows from the San Gorgonio Pass and the Mission Creek Subbasins, along with model computed flows to native vegetation ET, net flow to the Salton Sea, and net flow to drains. A QC check of model simulated recharge and discharge amounts with the original data used to develop the model inputs confirms the input data were processed and loaded correctly.

Model computed drain flow provides a calibration check for the model, since CVWD has measured or estimated flows to the agricultural drains for many years. Todd and Ringel Engineering provided GFA with measured data on these flows.

Model computed drain flows are compared with measured agricultural drain flows in **Figure 5-5**. The very good agreement from the 1950s through the early 2000s shows that the model is capable of simulating real trends in both water levels and flow rates. Apparent divergence of model-computed flows from measured after 2005 will be re-checked after completion of the model update.



September 2020

TODD GROUNDWATER

Figure 5-3
Simulated vs. Measured Groundwater Elevation Calibration, 1997-2009

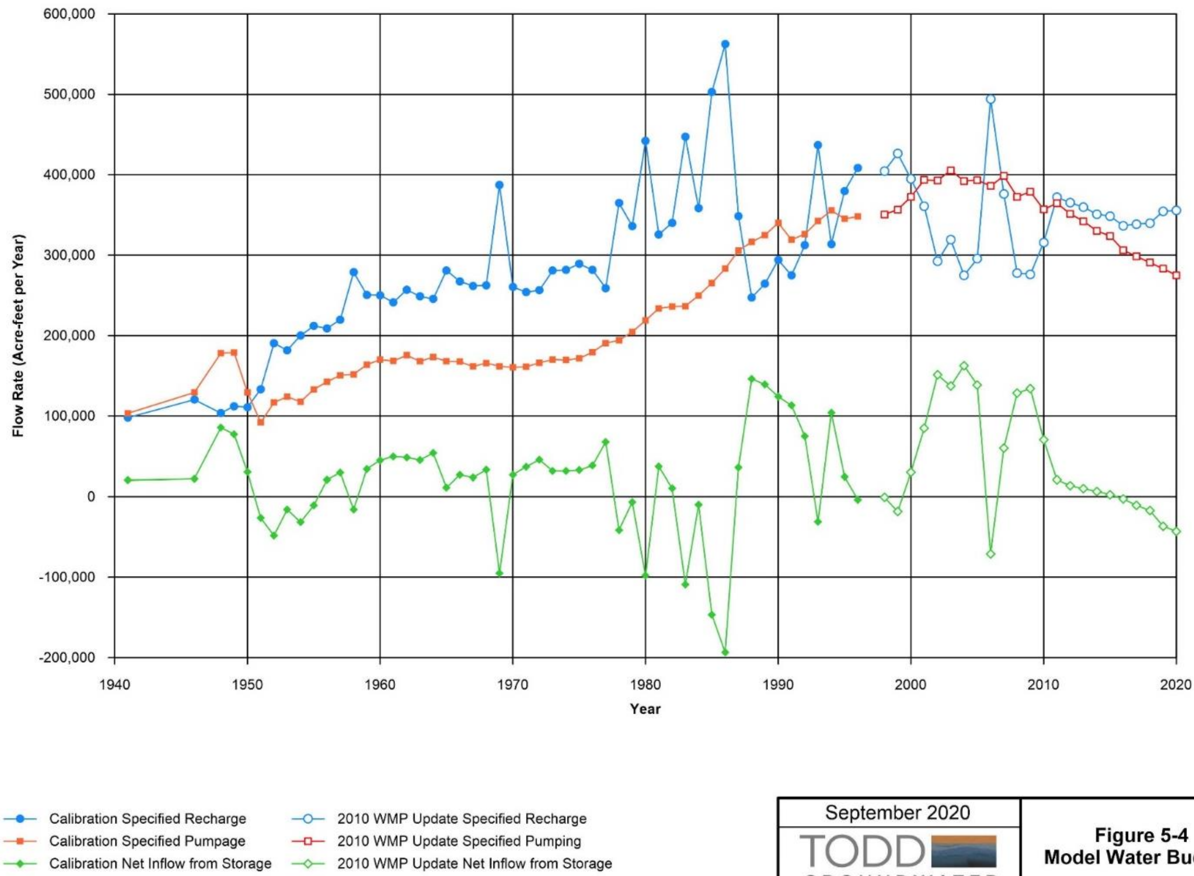


Figure 5-4
Model Water Budget

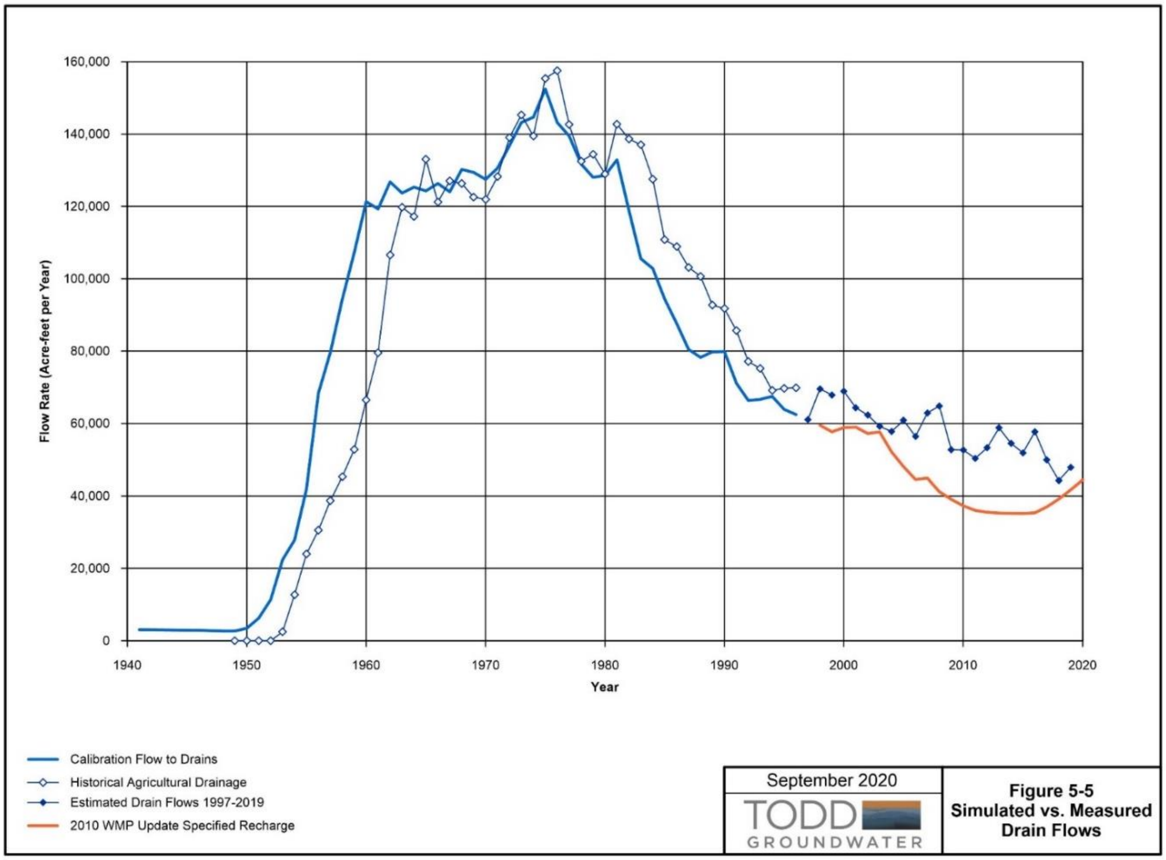


Figure 5-5
Simulated vs. Measured Drain Flows

5.5 MODEL UPDATE RECOMMENDATIONS

The most recent version of the model, prepared for the 2010 CVWMP (and containing measured and best-estimates of recharge and discharge through 2008), will be used as the basis for the calibration update and future management simulations as a part of the Indio Subbasin Alternative Plan five-year update (Plan Update) for submission to DWR. We recommend that most of the recharge and discharge input data for the period 1997-2008 be retained in the updated model, but better estimates developed for the period 2009-2019 and synthesized for predictive simulations of future conditions.

Updated measurements and improved estimates for the period 2009-2019 will be developed using new data sources and a database/GIS pre-processing data management system, for model update efficiency and use in future updates. The key recharge and discharge components that will be updated include:

- Initial Conditions in Garnet Hill subarea
- Subsurface Inflow Boundary Conditions
- Mountain front and Stream Channel Recharge
- Artificial Recharge
- Wastewater Discharges
- Return Flows
- Groundwater Pumping
- Salton Sea Elevations

After completion of the update through 2019, it is recommended that model performance and calibration results be re-assessed, prior to conducting the predictive model future management scenario simulations.

6. REFERENCES

California Department of Water Resources (DWR) (1979) Coachella Valley area well standards investigation: Los Angeles, California Department of Water Resources, Southern District.

Coachella Valley Water District (CVWD) (2002a) Coachella Valley Final Water Management Plan, September 2002, prepared by MWH and WaterConsult.

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Fogg, G.E., G.T. O'Neill, E.M. LaBolle, and D.J. Ringel (2000). Groundwater flow model of Coachella Valley, California: an overview.

Indio Subbasin GSAs (2016). SGMA Alternative Groundwater Sustainability Plan – Bridge Document for the Indio Subbasin, prepared by MWH.

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APPENDIX 1-B
2022 INDIO SUBBASIN ALTERNATIVE PLAN COMMUNICATIONS PLAN

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9655 Chesapeake Drive | Suite 320
San Diego, California 92123
www.woodardcurran.com

T 858.875.7400

2022 Indio Subbasin Alternative Plan Communication Plan

TO: Indio Subbasin Groundwater Sustainability Agencies (GSAs)

FROM: Rosalyn Prickett, Woodard & Curran
Jen Sajor, Woodard & Curran
Nicole Poletto, Woodard & Curran

DATE: April 14, 2020

TABLE OF CONTENTS

Please note, this Communication Plan is a living document that may change as additional stakeholders are identified or feedback is received. Additional schedule changes may occur due to COVID-19, along with changes in our approach to communicating with and engaging stakeholders remotely. An updated Communication Plan will be uploaded to the website as needed.

1. INTRODUCTION

In 2014, California enacted the Sustainable Groundwater Management Act (SGMA) to provide a framework for long-term sustainable groundwater management across California. SGMA requires that all California basins designated high or medium priority shall be managed under a GSP or Alternative Plan to a GSP (Alternative Plan). The Indio Subbasin (Subbasin) was designated by DWR as a medium priority basin. As such, SGMA requires formation of locally-controlled groundwater sustainability agency(ies) (GSAs) as the entity(ies) responsible for developing and implementing a GSP or Alternative Plan. The primary goal of the GSP or Alternative Plan is to develop sustainable groundwater management practices for managing the groundwater basin or subbasin without causing undesirable results.

Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), and Indio Water Authority (IWA) collectively represent the Indio Subbasin GSAs. In January 2017, the GSAs submitted to DWR the *2010 Coachella Valley Water Management Plan* (2010 CVWMP), accompanied by an Indio Subbasin Bridge Document, as a SGMA-compliant Alternative Plan. On July 17, 2019, DWR approved the Alternative Plan with a requirement to submit an Alternative Plan Update by January 1, 2022.

This Communication Plan contains outreach strategies and methods to address effective communication with stakeholders during development of the Alternative Plan Update, including: building trust between and among the GSAs and property owners/residents, disadvantaged communities, tribes, agricultural interests, and environmental interests; language barriers and the need for translation;; and the need for strong and transparent facilitation.

2. GSA DECISION-MAKING PROCESS

The GSAs are the designated decision-making entities for the Alternative Plan Update process. On October 5, 2016, the GSAs (CVWD, CWA, DWA, and IWA) entered into a Memorandum of Understanding (MOU) to establish an agreement for collaboration and cost-share for management of the Indio Subbasin under SGMA. Each GSA is responsible for the portion of the Indio Subbasin within their respective service area. The MOU establishes that its intent is to foster cooperation, coordination, and communication among the GSAs regarding management of the Indio Subbasin.

The 2016 MOU established the GSAs' intent to develop and submit the Alternative Plan to DWR. On April 3, 2018, the GSAs approved a Supplement to the MOU that outlined the GSAs intent to prepare an Annual Report for Water Year 2017. On October 29, 2018, the GSAs approved a Second Supplement to the MOU that allowed for ongoing preparation of Annual Reports by April 1 of each water year, along with preparation of a 2022 Indio Subbasin Alternative Plan Update (which is the subject of this Communication Plan). The Second Supplement directs CVWD to serve as the managing entity for selected consultants, but allows for input and review of all SGMA-related deliverables and transmittal of all data and files to each of the four GSAs.

The GSAs will participate in all community workshops and directed outreach meetings. Public input, no matter the method received (e.g., phone, email, public meeting), will be shared with all of the GSAs for consideration throughout the planning process.

3. OPPORTUNITIES FOR PUBLIC ENGAGEMENT

3.1 Purpose

Public engagement includes both stakeholder coordination and general public involvement. The goal of this public engagement effort is to understand the needs of stakeholders, increase awareness and understanding of the Alternative Plan Update, and promote active involvement in the process. Stakeholders with interest in water management – including agency representatives, municipalities, tribes, agricultural representatives, large irrigators, and non-profit organizations – are the target audience for this Alternative Plan Update Communication Plan. The general public will be engaged throughout the planning process to share information about the Indio Subbasin and water management decisions, and solicit input to the Alternative Plan Update.

Coordination with various entities with interests and/or authority over water management will ensure their active involvement in the Alternative Plan Update. These entities have a vested interest in local water resources and can provide invaluable input to the Alternative Plan Update process, as well as implementing projects/management actions during Plan implementation phases. Through public involvement, the Alternative Plan Update process aims to increase awareness and understanding from the general public including residents, community members, tribes and disadvantaged communities that are ultimately served by the GSAs. The Plan Update will take into account community needs, while demonstrating the importance and interrelation of water management strategies, increasing regional and local support for implementation projects/management actions (and associated investments), and generating broad-based support for continued regional coordination.

3.2 Participants

All interested stakeholders and members of the general public are invited to participate in this process and collaborate with the GSAs. Individuals representing the following groups have been identified as potential stakeholders:

- State, county and municipal governments
- Wastewater and water agencies
- Land use planning and economic development agencies
- Community councils
- School districts
- Environmental conservation and natural resources organizations
- Private pumpers and large irrigators
- Resource agencies and special interest groups
- Flood control districts
- Disadvantaged and environmental justice communities
- Elected officials
- Farm Bureau and agricultural interest
- Tribal governments
- Academic institutions
- Recreational interests
- Regional planning organization
- Regulatory agencies
- Stormwater management agencies
- Development community
- Chambers of Commerce

Interested members of the general public may include:

- Private homeowners or landowners
- Homeowners associations
- Landscape architects and contractors
- Garden clubs and organizations
- Rotary clubs and other service clubs
- Commercial, industrial, and residential developers
- Community-based organizations
- Schools and parent groups
- Churches

The Alternative Plan Update process will leverage stakeholder connections made through the Coachella IRWM Program. **Appendix A** (located at the end of this Plan) lists all regional stakeholders identified in collaboration with the Coachella Valley IRWM Program, as well as additional participants identified by the GSAs. These stakeholders will be contacted and invited to participate in the Alternative Plan Update process. This Communication Plan is a living document and the stakeholder list may continue to expand if additional stakeholders are identified.

4. SCHEDULE FOR PUBLIC INPUT

The Alternative Plan Update planning process will include outreach and education activities that involve stakeholders affected by water management in the Indio Subbasin. The outreach and education process will inform and educate them about SGMA, groundwater management, the Alternative Plan Update planning process, and solicit and address issues and opportunities to improve groundwater management for the Subbasin. The following activities will be undertaken by the GSAs:

- Develop and provide information regarding SGMA, Alternative Plan Update planning, and groundwater management for public dissemination.

- Present groundwater analysis and modeling, and solicit stakeholder and public input on sustainability goals, management actions, and implementation plans.
- Provide and summarize stakeholder and public input for the GSAs to consider throughout the GSP process.
- Identify and provide opportunities for public input at key project milestones as shown in the Project Schedule (see Figure 1).

4.1 Project Schedule

The final Alternative Plan Update must be submitted to the DWR by January 1, 2022. The 2022 Alternative Plan Update is scheduled for completion by November 2021, providing time for adoption and approval by the GSAs. The project schedule is designed to solicit, consider, and address public and stakeholder input regarding the important planning elements, including Subbasin conditions, groundwater modeling, sustainability goals, management actions, implementation plan, and the draft and final Alternative Plan Update. Figure 1 shows a depiction of the generalized schedule for these planning elements and public and stakeholder engagement. This Communication Plan is a living document and the schedule may change as the need arises. All schedule updates will be posted to the website (www.IndioSubbasinSGMA.org).

Alternative Plan review and evaluation will begin in Summer 2021. During this phase, the draft Alternative Plan will be published for public review at the website (www.IndioSubbasinSGMA.org). The GSAs will open a 45-day public comment period. The GSAs will hold a community workshop to provide an overview of the Alternative Plan content, while giving stakeholders an opportunity to provide feedback and comments about the Alternative Plan. Once the public review period is completed, public comments will be taken into consideration and incorporated into a final version of the Alternative Plan before submitting to DWR by January 1, 2022. Following submittal, DWR will post the Alternative Plan Update for a 60-day comment period through the DWR's SGMA portal at http://sgma.water.ca.gov/portal/. Public comments will be posted to the DWR's website prior to the State agency's evaluation, assessment, and approval.

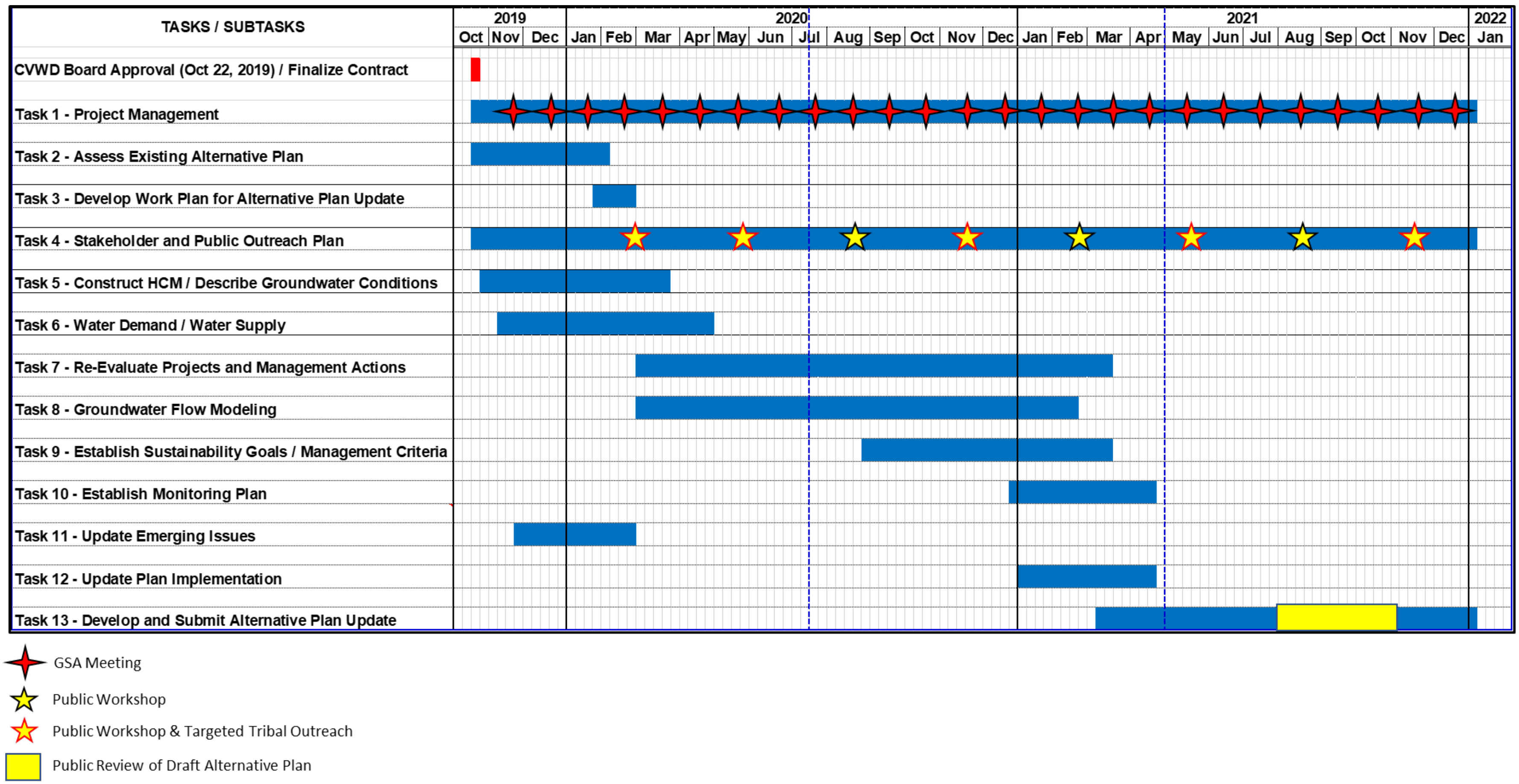
5. INPUT FROM DIVERSE SOCIAL, CULTURAL, AND ECONOMIC COMMUNITIES

5.1 Purpose

The goal of diverse outreach is to identify and obtain input from groups that may be otherwise limited from participating in the Alternative Plan Update process and implementation. Various reasons exist which limit participation in regional water planning efforts, such as financial or language constraints. Previous outreach efforts through the Coachella IRWM Program have identified water-related concerns facing groups with limited voice in water management efforts. Diverse outreach for input to the Indio Subbasin Alternative Plan Update will build on previous efforts from the Coachella Valley IRWM program and CVWD's Disadvantaged Community Infrastructure Task Force.

Targeted outreach to diverse populations within the Indio Subbasin will be conducted to ensure that the technical assumptions and approach used in the planning effort are understood. This outreach includes directed email communications inviting these groups to attend up to eight quarterly public workshops (described in Section 7 Outreach Methods below).

Figure 1: 2022 Indio Subbasin Alternative Plan Update Schedule



5.2 Participants

Communities targeted for diverse outreach include disadvantaged communities (DACs) and environmental justice (EJ) organizations. DACs are defined by DWR as census geographies with an annual Median Household Income (MHI) of less than 80% of the statewide MHI. EJ is defined by the U.S. Environmental Protection Agency as "the fair treatment and meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and environmental of environmental laws." Outreach to organizations also involved with EJ issues ensures that water management activities implemented under the Alternative Plan implementation do not unduly burden DACs.

Numerous local and State-wide DACs and EJ organizations will be targeted during outreach for the Alternative Plan, including but not limited to:

- Clean Water Action
- Desert Alliance for Community Empowerment
- Desert Edge Community Council
- El Sol Neighborhood Educational Center
- Environmental Justice Coalition for Water (EJCW)
- Inland Congregation United for Change (ICUC)
- Leadership Counsel for Justice and Accountability
- Representative from Assemblyman Garcia
- Pueblo Unido Community Development Corporation
- Rural Community Assistance Corporation

5.3 Coachella Valley EJ Enforcement Task Force (regional Water Quality Control Board)Public Comments

Public comments will be accepted both verbally and in writing, and will be considered in development of the Alternative Plan Update. A comment matrix will be maintained by the GSAs throughout the planning process to track and incorporate, as appropriate, comments received on the Alternative Plan Update.

5.4 Community Meetings

GSA members are available to speak at existing community meetings regarding SGMA and the Alternative Plan Update, as requested by and based on the interest of stakeholders. If a GSA member is present at a community meeting, they can provide a SGMA Update as available.

6. TRIBAL OUTREACH AND COORDINATION

6.1 Purpose

The goal of engaging the Coachella Valley's tribal governments is to better understand their critical water resources issues and needs. An Indio Subbasin Tribe and Groundwater Sustainability Agency Workgroup (Tribal Workgroup) was established in 2017 and has existed for several years through submittal and DWR approval of the Alternative Plan. During the Alternative Plan Update, the GSAs seek to continue to discuss major water-related concerns facing the tribes and ensure regional water management efforts, such as the long-term implementation of the Alternative Plan Update, are responsive to those needs.

Targeted outreach to the tribes within the Indio Subbasin will be conducted to ensure that the technical assumptions and approach used in the planning effort are understood. This outreach includes up to five semi-annual meetings with tribal representatives through the existing Tribal Workgroup and will occur on the same day as the public workshops (described in Section 7 Outreach Methods below).

6.2 Participants

Tribal participants will be contacted based on input from Tribal Workgroup members and the GSA partners. The following six Native American tribes in the region will be targeted during outreach for the Alternative Plan Update process:

- Agua Caliente Band of Cahuilla Indians
- Augustine Band of Mission Indians
- Cabazon Band of Mission Indians
- Morongo Band of Mission Indians
- Torres-Martinez Desert Cahuilla Indians
- Twenty-Nine Palms Band of Mission Indians

Additionally, meetings will include the U.S. Bureau of Indian Affairs, a current member of the Tribal Workgroup, and may include representatives from other tribal coordinating agencies or groups.

7. OUTREACH METHODS

The GSAs believe that public access is critical to the success of the Alternative Plan Update process. The GSAs have taken a strategic approach to public outreach. The following tactics have been implemented to achieve successful outreach:

- Developed an initial Communication Plan that can be executed by any combination of agency staff or consultants.
- Refined the timeline for the Alternative Plan Update process in such a way that appropriate dates for notification of public meetings, workshops, etc. can be documented and addressed in a logical and orderly manner.
- Determined methods for the dissemination of information for public review and for public input (e.g. email and website).

The following tactics will be used moving forward, during the planning process, to achieve greater community participation where possible:

- Provide outreach documents in both English and Spanish to accommodate the primary languages of community members.
- During planning/preparation for public workshops, make suggestions for schedule or format that allow for greater public participation.
- Apprise the members at each meeting, and sooner if necessary, as to the issues and needs for supporting public outreach.

The public will be notified of public workshops via email and website, given specific contact information for questions or comments, and given sufficient time to review materials prior to or after workshops.

7.1 Public Workshops

Eight public workshops will be held on a quarterly basis. The public workshops are intended to inform stakeholders and the general public of the Alternative Plan Update progress, solicit data and information to support planning and analysis for the Subbasin, and seek input on key decisions made throughout the planning process. Public workshops to address the Plan Update will include outreach to the participants listed above. The GSAs recognize the need and importance of public participation and will work diligently to make sure that not only are stakeholders and participants listened to, but that their valuable advice helps create an effective groundwater management plan update for the region.

Public workshops will generally be held within the Indio Subbasin during regular business hours; however, select workshops and meetings may be held outside of normal business hours to accommodate the participation of stakeholders and the general public. Select after-hours workshops may focus on educating community members about the Indio Subbasin, its groundwater conditions, and the effectiveness of historical management strategies. As appropriate, meeting locations will rotate throughout the valley to ensure broad and fair participation by members of the local public, including areas of the valley that are predominantly DACs and EJs. Any changes to the location and time of public workshops will be considered to allow for meeting flexibility, as needed. Translation headsets for all public workshops will be provided by CVWD. In addition, GSAs can be available to present about SGMA at community meetings, at the request of community organizations.

7.2 Website

Establishing a bilingual (English and Spanish) Alternative Plan website will be a key component of the regional outreach. The website will house information about SGMA, the Alternative Plan Update process, GSA partners (CVWD, CWA, DWA, and IWA), public meetings, project reports and studies, and groundwater data and information. It will also provide options for contacting the GSAs – via email, writing, or in person.

The website (www.IndioSubbasinSGMA.org) will be developed with landing pages including a general overview of SGMA, ways to get involved, information about the Alternative Plan Update (including links to completed deliverables and workshop materials), and the GSAs' contact information. Each page of the website will include an opportunity to sign-up for project emails. Landing pages will be also be available in Spanish at http://www.indiosubbasinsgma.org/espanol/.

7.3 Fact Sheets & Flyers

A bilingual (English and Spanish) Fact Sheet will be developed to explain the purpose and regulatory requirements for Alternative Plans, as well as how the 2010 CVWMP serves as the basis for the Alternative Plan Update. Additional handouts or flyers for the Alternative Plan Update will be created and distributed to stakeholders as the need presents itself. These flyers may summarize work underway for the Plan Update or to document key decisions made during the planning process. All outreach documents will be produced in English and Spanish. The Alternative Plan Update will be made available in both print and electronic format in English.

7.4 Correspondence

An electronic mailing list of stakeholders and interested parties, and any special subgroups, will be maintained and updated throughout the Alternative Plan Update. E-mail notices, the primary method of communication, will be sent to announce the availability of new materials on Alternative Plan Update on the website, project milestones, and workshop dates. Press releases will also be used as a method of correspondence. Announcements will be distributed in English with Spanish translation in the same message.

7.5 Social Media

GSA partners will utilize existing social media channels (CVWD, DWA, and IWA Facebook and Twitter accounts) to spread updates on the Alternative Plan Update to the general public. CWA may post through the City of Coachella Facebook, Twitter, or Instagram. This may include announcements prior to public workshops or the availability of new materials on the Alternative Plan Update on the website.

8. PUBLIC ACCESS TO DATA

Existing and future data associated with the planning process, as included in the Alternative Plan Update, will be made available to the public through the public workshop series. Project maps and data tables will be presented and reviewed with stakeholders in order to garner input and feedback. Groundwater modeling assumptions and results will be presented to stakeholders during the workshop series.

APPENDIX A: INDIO SUBBASIN STAKEHOLDER LIST

Agency	Stakeholder List
CVRWMG	
Coachella Valley Water District	✓
Coachella Water Authority	✓
Desert Water Agency	✓
Indio Water Authority	✓
Mission Springs Water District	✓
Valley Sanitary District	✓
Cities	
City of Cathedral City	✓
City of Coachella	✓
City of Desert Hot Springs	✓
City of Indian Wells	✓
City of Rancho Mirage	✓
City of Palm Desert	✓
City of Palm Springs	✓
County of Riverside	
Coachella Valley Economic Partnership	✓
Riverside County Transportation and Land Management Agency	✓
Riverside County Department of Environmental Health	✓
Riverside County Economic Development Agency	✓
Riverside County Flood Control and Water Conservation District	✓
Supervisor V. Manuel Perez's office	✓
Supervisor Chuck Washington's office	✓
Community Councils	
Desert Edge Community Council	✓
Elected Officials	
Congressman Raul Ruiz (36th Dist.)	✓
State Senator Mike Morrell (23rd Dist.)	✓
State Senator Ben Hueso (40th Dist.)	✓
Assemblyman Chad Mayes (42nd Dist.)	✓
Assemblyman Eduardo Garcia (56th Dist.)	✓
Resource Agencies	
California Department of Fish and Wildlife	✓
California Department of Water Resources	✓
Colorado River Regional Water Quality Control Board	✓
U.S. Bureau of Indian Affairs	✓
Special Interests	
Clean Water Action	✓
Coachella Valley Association of Governments	✓
Coachella Valley Mosquito and Vector Control	✓
Desert Recreation District	✓
Friends of the Desert Mountains	✓
Leadership Counsel for Justice & Accountability	✓
Tribes	
Agua Caliente Band of Cahuilla Indians	✓
Augustine Band of Mission Indians	✓
Cabazon Band of Mission Indians	✓
Morongo Band of Mission Indians	✓
Torres-Martinez Desert Cahuilla Indians	✓

Agency	Stakeholder List
Twenty-Nine Palms Band of Mission Indians	✓
Academia	
California State University San Bernardino	✓
Loma Linda University	✓
Other Water/Wastewater Entities	
Myoma Dunes Mutual Water Company	✓
Salton Community Services District	✓
Private Pumpers and Large Irrigators	
Agricultural pumpers	✓
Home Owners' Associations	✓
Golf courses	✓
Nurseries	✓
Disadvantaged Community Organizations	
Clean Water Action	✓
Desert Alliance for Community Empowerment	✓
Desert Edge Community Council	✓
El Sol Neighborhood Educational Center	✓
Environmental Justice Coalition for Water	✓
Inland Congregation United for Change	✓
Leadership Counsel for Justice & Accountability	✓
Pueblo Unido CDC	✓
Rural Community Assistance Corporation	✓

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APPENDIX 1-C
MEMORANDUM OF UNDERSTANDING REGARDING GOVERNANCE OF THE INDIO SUB-BASIN UNDER THE SUSTAINABLE GROUNDWATER MANAGEMENT ACT

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MEMORANDUM OF UNDERSTANDING
REGARDING GOVERNANCE OF THE INDIO SUB-BASIN
UNDER THE SUSTAINABLE GROUNDWATER MANAGEMENT ACT

This memorandum of understanding (MOU) is entered into among the City of Coachella, a municipal corporation acting through, and on behalf of, the Coachella Water Authority (CWA), the Coachella Valley Water District (CVWD), the Desert Water Agency (DWA), and the City of Indio, a municipal corporation acting through, and on behalf of, the Indio Water Authority (IWA) for the purpose of developing a common understanding among the Partners regarding the governance structures applicable to implementation of the Sustainable Groundwater Management Act (Water Code, Part 2.74, Section 10720 et seq.) (SGMA) in the Indio Sub-Basin of the Coachella Valley Groundwater Basin. The Partners to this MOU shall be collectively referred to herein as "Partners" and individually as "Partner".

WHEREAS, SGMA requires all groundwater basins designated as high or medium priority to be managed under a groundwater sustainability plan (GSP), under coordinated GSP's, or under an approved "alternative";

WHEREAS, the California Department of Water Resources (DWR) has designated the Coachella Valley Groundwater Basin, Indio Sub-Basin (Bulletin 118, No. 7-21.01) ("Indio Sub-Basin" or the "Sub-Basin") as a medium priority basin; and,

WHEREAS, the service area of each of the Partners overlies over a portion of the Indio-Sub-Basin;

WHEREAS, SGMA provides that "any local agency or combination of local agencies overlying a groundwater basin may elect to be a groundwater sustainability agency [GSA] for that basin" and that GSA's are to be formed no later than June 30, 2017;

WHEREAS, under SGMA, DWA has been deemed the exclusive local agency with the power to implement SGMA within DWA's statutory boundaries, unless DWA elects to "opt out of being the exclusive groundwater management agency within its statutory boundaries" (Water Code, § 10723(c)(2));

WHEREAS, each of the Partners plans to become a separate GSA or groundwater management agency for portions of the Indio Sub-Basin: and

WHEREAS the Partners desire to reach a common understanding with respect to the future SGMA governance structure of the Indio Sub-Basin to maximize coordination and minimize potential areas of disagreement.

NOW, THEREFORE, it is mutually understood and agreed as follows:

SECTION 1:

AUTHORITY OF THE PARTNERS

1.1 Coachella Water Authority is a joint powers authority formed as a component of the City of Coachella and the Housing Authority of the City of Coachella and has statutory authority over water supply.

1.2 Coachella Valley Water District is a public agency of the State of California organized and operating under the County Water District Law, California Water Code section 30000, et seq, and the Coachella Valley Water District Merger Law, Water Code section 33100, et seq. Coachella Valley Water District has groundwater management powers under its enabling legislation and other applicable law.

1.3 Desert Water Agency is an independent special district created by a special act of the State Legislature contained in chapter 100 of the appendix of the California Water Code. Desert Water Agency is empowered to replenish local groundwater supplies and collect assessments necessary to support a groundwater replenishment program as provided for in the Desert Water Agency Law, and has statutory authority over water supply.

1.4 Indio Water Authority is a joint powers authority formed as a component of the City of Indio and Housing Authority of the City of Indio and has statutory authority over water supply.

SECTION 2:

PURPOSES AND GOALS OF THIS MOU

2.1. This MOU is to memorialize the intent of the Partners to coordinate and cooperate regarding implementation of SGMA within their respective jurisdictions to ensure that the sustainability goals of SGMA are met within the Indio Sub-Basin. This MOU is intended to encourage cooperation and coordination regarding management of the Indio Sub-Basin, and to improve and maintain overall communication between the Partners involved. It is anticipated that coordination and information sharing among the Partners will assist in achieving their respective missions to the overall well-being of the Sub-Basin.

2. 2 Each Partner shall have the sole and exclusive right to determine whether, and if so when, it will elect to be a GSA or, in the case of DWA, the exclusive local agency with powers to implement SGMA for the portion of the Indio Sub-Basin underlying its statutory boundaries.

2. 3 Subject to SGMA and any other applicable laws, the Partners agree that if a Partner elects not to become a GSA for the portion of the Sub-Basin underlying its service area by June 30, 2017, the other Partners will not object should such Partner later seek to become a GSA on or after July 1, 2017.

2.4 The Partners agree to coordinate to ensure, to the greatest extent feasible, that there are no overlapping boundaries among the recognized GSA's governing the Sub-Basin. The Partners further agree to cooperate regarding any contemplated Sub-Basin boundary modification requests that may be pursued that affect their respective GSA boundaries or groundwater management service areas.

2.5 Should any Partner withdraw or cease being a GSA, the other Partners shall have the first opportunity to become the GSA for the abandoned area of the Sub-Basin before such area would potentially fall under the groundwater management jurisdiction of the County of Riverside, the State of California, or other entity pursuant to SGMA; provided that the service area of the abandoned area is within the service area of the Partner seeking to become the new GSA for the abandoned area.

2.6 Nothing in this MOU is intended to affect the statutory powers granted under SGMA or any other law to any of the Partners, or to a GSA or local agency duly formed by any Partner. Nothing in this MOU shall affect any existing authorities or powers of the Partners existing under each Partner's enabling legislation or otherwise.

2.7 Each Partner shall be responsible for the adoption and enforcement of any ordinances, bylaws or other legally enforceable action taken by any GSA it forms or local agency with authority to implement SGMA. None of the actions or decisions of one Partner shall be attributable to the other Partners.

2.8 The Partners acknowledge and agree that a pre-existing, approved water management plan or plans (WMP) has been prepared and adopted that covers the Indio Sub-Basin. The Partners acknowledge and agree that CVWD individually or with Partners has the right to submit the WMP(s) as a potential "alternative" to a GSP for the portion of the Sub-Basin within their respective GSA boundaries or local agency boundaries. (See Water Code, section 10733.6.) The Partners agree to support, and not object, to the submission of the currently approved WMP(s) as an alternative to a GSP. Should modifications or amendments to the WMP(s) become necessary to meet the alternative compliance procedures outlined in SGMA or for other reasons, the Partners agree to the following:

2.8.1 MWH America's Inc. (MWH), the consultant who completed the pre-existing, approved water management plan is the most qualified consultant to complete an alternative GSP.

2.8.2 MWH has provided a scope of work, fees that have been agreed to by the Partners.

2.8.3 CVWD shall retain MWH to prepare an alternative Plan for an amount not to exceed $112,723, without prior authorization.

2.8.4 CVWD shall invoice each Partner for reimbursement of one-fourth (1/4) of the cost of GSP alternative Preparation which is an amount equal to $28,180.75.

2.8.5 The Partners agree to coordinate their implementation of SGMA in the Sub-Basin whether or not DWR approves the alternative, in whole or in part.

2.8.6 The Partners acknowledge that by virtue of commitments and intentions stated within this MOU, the need to share additional costs shall be addressed in future amendments to this MOU.

2. 9 Unless otherwise agreed to by the Partners in the future, each Partner shall absorb its own costs related to implementation of this MOU.

2. 10 By signing this MOU each of the Partners commits to sharing the responsibility and the resources necessary to comply with SGMA in the Sub-Basin under the statutory, regulatory and other applicable timelines, including but not limited to attending scheduled meetings, providing comments and other deliverables on time, and otherwise fully participating in the process.

2. 11 The Partners acknowledge that SGMA may require the Partners to enter into future agreements, including a coordination agreement, to fully implement SGMA in the Indio Sub-Basin.

SECTION 3:

JOINT PLANNING FOR SGMA IMPLEMENTATION

3.1 It is the intent of the Partners that they coordinate and collaborate to address the common issues identified in this MOU. The Partners may develop and implement governance objectives, projects and programs under SGMA individually or jointly, or enter into additional agreements in furthering those goals.

3.2 It is the intent of the Partners to meet on at least a quarterly basis in order to carry out the purposes and goals of this MOU. The frequency and location of meetings are subject to the discretion of the Partners and may be changed whenever appropriate.

SECTION 4:

GENERAL PROVISIONS GOVERNING MOU

4.1 Term: The term of this MOU shall be from the date the second Partner signs this MOU ("Effective Date"). This MOU shall be effective as to any Partners that execute it, whether or not all named Partners execute it.

4.2 Termination. Any Partner may terminate its participation in this MOU upon thirty (30) days prior written notice to the other Partners for any reason or no reason. Any Partner terminating or otherwise ceasing its participation in this MOU shall be responsible for its share of the costs, as set forth herein, which are incurred on or before the effective date of said termination.

4.3 Construction of Terms: This MOU is for the sole benefit of the Partners and shall not be construed as granting rights to any person other than the Partners or imposing obligations on a Partner to any person other than another Partner.

4.4 Good Faith: Each Partner shall use its best efforts and work wholeheartedly and in good faith for the expeditious completion of the objectives of this MOU and the satisfactory performance of its terms.

4.5 Rights of the Partners and Constituencies: This MOU does not contemplate the Partners taking any action that would adversely affect the rights of any Partners, or adversely affect the customers or constituencies of any Partners.

4.6 Partner Discretion. Participation in this MOU shall not restrict any Partner's authority and discretion to continue its own planning and undertake its own efforts to secure SGMA, Proposition 1 or other funding from any other source.

4.7 Necessary Actions. Each Partner agrees to execute and deliver additional documents and instruments and to take any additional actions as may be required to carry out the purposes of this MOU.

4.8 Third Party Beneficiaries. This MOU shall not create any right or interest in any non-Partner or in any member of the public as a third-party beneficiary.

4.9 Counterparts. This MOU may be executed in one or more counterparts, each of which shall be deemed to be an original

IN WITNESS WHEREOF, the Partners have executed this MOU as of the day and year indicated on the first page of this MOU.

Jim Barrett	David Garcia
Coachella Valley Water District	Coachella Water Authority
Mark Krause	Brian Macy
Desert Water Agency	Indio Water Authority

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____

Jim Barrett

Coachella Valley Water District

____

David Garcia

Coachella Water Authority

Mark A Krause

Mark Krause

Desert Water Agency

____

Brian Macy

Indio Water Authority

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____________________	[signature] ____________________
Jim Barrett	David Garcia
Coachella Valley Water District	Coachella Water Authority
____________________	____________________
Mark Krause	Brian Macy
Desert Water Agency	Indio Water Authority

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IN WITNESS WHEREOF, the Partners have executed this MOU as of the day and year indicated on the first page of this MOU.

____________________	____________________
Jim Barrett	David Garcia
Coachella Valley Water District	Coachella Water Authority
____________________	Brian E Macy
Mark Krause	Brian Macy
Desert Water Agency	Indio Water Authority

SUPPLEMENT TO
MEMORANDUM OF UNDERSTANDING
REGARDING GOVERNANCE OF THE INDIO SUB-BASIN
UNDER THE SUSTAINABLE GROUNDWATER MANAGEMENT ACT

This SUPPLEMENT dated April 3, 2018 is entered into among the City of Coachella, a municipal corporation acting through, and on behalf of, the Coachella Water Authority (CWA), the Coachella Valley Water District (CVWD), the Desert Water Agency (DWA), and the City of Indio, a municipal corporation acting through, and on behalf of, the Indio Water Authority (IWA) for the purpose of developing a common understanding among the Partners regarding the governance structures applicable to implementation of the Sustainable Groundwater Management Act (Water Code, Part 2.74, Section 10720 et seq.) (SGMA) in the Indio Sub-Basin of the Coachella Valley Groundwater Basin. The Partners to this MOU shall be collectively referred to herein as "Partners" and individually as "Partner".

WHEREAS, each Partner is a party to a Memorandum of Understanding (MOU) regarding governance of the Indio Sub-basin under SGMA; and

WHEREAS, the Partners wish to supplement the MOU for the purpose of retaining consultants to assist in the preparation of Groundwater Sustainability Agency (GSA) annual reports by water year for the Indio Sub-basin for submission to the California Department of Water Resources (DWR) by April 1 of each year to satisfy SGMA requirements;

NOW, THEREFORE, it is mutually understood and agreed as follows:

SECTION 1:

RETENTION OF CONSULTANTS AND AGREEMENTS

1.1 The Partners acknowledge and agree that DWR has required that all GSAs who have submitted an Alternative Groundwater Sustainability Plan (Alternative GSP) prepare and submit an Annual Report for Water Year 2017 (October 1, 2016 – September 30, 2017) to DWR by April 1, 2018 in accordance with SGMA. The Partners agree to the following:

1.1.1 Stantec Consulting Services Inc. (Stantec, formerly MWH America's Inc.), the consultant who completed work needed to submit the Indio Sub-basin Alternative GSP, has provided the scope of work and fee schedule included in Exhibit 1 for the preparation of the GSAs Annual Report for the Indio Sub-basin for Water Year 2017.

1.1.2 The Partners have agreed to have CVWD retain Stantec to prepare the GSAs Annual Report for the Indio Sub-basin for Water Year 2017 for an amount not to exceed $63,260, without prior authorization of the Partners.

1.1.3 CVWD shall invoice each Partner for reimbursement of one-fourth (1/4) of the cost of the preparation of the Annual Report for the Indio Sub-basin for Water Year 2017 which is an amount equal to $15,815.

SECTION 2:

INVOICING AND PAYMENT

2.1. CVWD shall administer Agreements and pay consultants per the terms of the Agreements as approved by the Partners, and then invoice each Partner for reimbursement of one-fourth (1/4) of the payment that has been made to the consultants.

2. 2 Each Partner shall pay the invoice within 30 days of receipt of the invoice.

SECTION 3:

MISCELLANEOUS

3.1 Abbreviations, capitalized words, and phrases used in this supplement shall have the same meaning as in the MOU.

3.2 All terms of the MOU remain unchanged, except, as supplemented herein.

3.3 This Supplement may be executed in any number of counterparts, each of which shall be deemed original, but all of which, when taken together, shall constitute one and the same instrument.

IN WITNESS WHEREOF, the Partners have executed this Supplement as of the day and year indicated on the first page of this MOU.

J. M. Barrett 6/27/18

Coachella Valley Water District

William B. Pattison, Jr.

Coachella Water Authority

Mark Krause

Desert Water Agency

Brian Macy

Indio Water Authority

_____________________________	_____________________________
J.M. Barrett	William B. Pattison, Jr.
Coachella Valley Water District	Coachella Water Authority
Mark S. Krause __________	_____________________________
Mark Krause	Brian Macy
Desert Water Agency	Indio Water Authority

J.M. Barrett

Coachella Valley Water District

William B. Pattison, Jr.

Coachella Water Authority

Mark Krause

Desert Water Agency

Brian Macy

Indio Water Authority

J.M. Barrett

Coachella Valley Water District

Mark Krause

Desert Water Agency

William B. Pattison, Jr.

Coachella Water Authority

Brian Macy

Indio Water Authority

SECOND SUPPLEMENT TO
MEMORANDUM OF UNDERSTANDING
REGARDING GOVERNANCE OF THE INDIO SUB-BASIN
UNDER THE SUSTAINABLE GROUNDWATER MANAGEMENT ACT

This SECOND SUPPLEMENT dated October 29, 2018 is entered into among the City of Coachella, a municipal corporation acting through, and on behalf of, the Coachella Water Authority (CWA), the Coachella Valley Water District (CVWD), the Desert Water Agency (DWA), and the City of Indio, a municipal corporation acting through, and on behalf of, the Indio Water Authority (IWA) for the purpose of developing a common understanding among the Partners regarding the governance structures applicable to implementation of the Sustainable Groundwater Management Act (Water Code, Part 2.74, Section 10720 et seq.) (SGMA) in the Indio Sub-Basin of the Coachella Valley Groundwater Basin. The Partners to this MOU shall be collectively referred to herein as "Partners" and individually as "Partner".

WHEREAS, each Partner is a party to a Memorandum of Understanding (MOU) dated October 5, 2016 regarding governance of the Indio Sub-basin under SGMA; and

WHEREAS, each Partner is a party to a Supplement to MOU dated April 3, 2018 for the purpose of retaining a consultant to assist in preparing the Groundwater Sustainability Agency's (GSA's) Indio Sub-basin Annual Report for Water Year 2016-2017 in accordance with SGMA; and

WHEREAS, the Partners wish to supplement the MOU a second time for the purpose of retaining consultants to assist in the preparation of the GSA's Indio Sub-basin Annual Reports by Water Year for submission to the California Department of Water Resources (DWR) by April 1 of each year to satisfy SGMA requirements; and

WHEREAS, the Partners wish to supplement the MOU a second time for the purpose of retaining consultants to assist in updates and revisions identified and required by the DWR of the Alternative Groundwater Sustainability Plan (Alternative GSP) for the Indio Sub-basin to satisfy SGMA requirements;

NOW, THEREFORE, it is mutually understood and agreed as follows:

SECTION 1:

RETENTION OF CONSULTANTS AND EXECUTION OF AGREEMENTS

1.1 The Partners acknowledge and agree that DWR has required that the GSAs prepare and submit an annual report by April 1 of each year for the previous Water Year (October 1 through September 30) to DWR in accordance with SGMA. The Partners therefore agree to the following:

1.1.1 The Partners agree to have CVWD develop a scope of work by the end of each Water Year for the preparation of the GSA's Indio Sub-basin Annual Report for the previous Water Year.

1.1.1.1 Each Partner shall have the opportunity to review the scope of work and provide comments for inclusion prior to release in a Request for Proposals (RFP) or Bid Package.

1.1.2 The Partners agree to have CVWD release an RFP or Bid Package in accordance with all Procurement Policies of the CVWD to solicit proposals from qualified consultants for the preparation of the GSA's Indio Sub-basin Annual Report for the previous Water Year. For the purposes of this Second Supplement to the MOU, qualified consultants consist of firms competitively selected and contracted by CVWD for on-call hydrogeological services.

1.1.2.1 Each Partner shall have the opportunity to review and score the proposals received from each respondent to the RFP or Bid Package for the selection of the consultant.

1.1.3 The Partners agree to have CVWD enter into Agreements with selected consultants in accordance with all Procurement Policies of the CVWD to prepare the GSA's Indio Sub-basin Annual Report for each Water Year.

1.1.3.1 Each Partner shall have the opportunity to review and comment on the Draft Annual Report and the Draft Final Annual Report.

1.1.3.2 Each Partner shall be provided one electronic and one hard copy of the Final Annual Report.

1.1.3.3 Each Partner shall be provided electronic copies of all data and files used to create report graphics and tables.

1.2 The Partners acknowledge and agree that DWR may periodically notify the GSAs to perform updates, revisions, or modifications to the Alternative GSP in accordance with SGMA. The Partners therefore agree to the following:

1.2.1 The Partners agree to have the CVWD develop a scope of work to perform required updates, revisions, or modifications to the Alternative GSP.

1.2.1.1 Each Partner shall have the opportunity to review the scope of work and provide comments for inclusion prior to release in a Request for Proposals (RFP) or Bid Package.

1.2.2 The Partners agree to have CVWD release an RFP or Bid Package in accordance with all Procurement Policies of the CVWD to solicit proposals from qualified consultants to perform updates, revisions, or modifications to the Alternative GSP. For the purposes of this Second Supplement to the MOU, qualified consultants consist of firms competitively selected and contracted by CVWD for on-call hydrogeological services.

1.2.2.1 Each Partner shall have the opportunity to review and score the proposals received from each respondent to the RFP or Bid Package for the selection of the consultant.

1.2.3 The Partners agree to have CVWD enter into Agreements with selected consultants in accordance with all Procurement Policies of the CVWD to perform updates and revisions to the Alternative GSP.

1.2.3.1 Each Partner shall have the opportunity to review and comment on the Draft Alternative GSP and Draft Final Alternative GSP.

1.2.3.2 Each Partner shall be provided one electronic and one hard copy of the Final Alternative GSP.

1.2.3.3 Each Partner shall be provided electronic copies of all data and files used to create report graphics and tables.

SECTION 2:

INVOICING AND PAYMENT

2.1 CVWD shall administer the Agreements with the consultants and pay the consultants per the terms of the Agreement.

2.2 CVWD shall invoice each Partner for reimbursement of one-fourth (1/4) of the payment that has been made to the consultants.

2.3 Each Partner shall pay invoices within 30 days of receipt of the invoice.

SECTION 3:

MISCELLANEOUS

3.1 Abbreviations, capitalized words, and phrases used in this Second Supplement shall have the same meaning as in the MOU.

3.2 All terms of the MOU remain unchanged, except, as supplemented herein.

3.3 This Second Supplement may be executed in any number of counterparts, each of which shall be deemed original, but all of which, when taken together, shall constitute one and the same instrument.

IN WITNESS WHEREOF, the Partners have executed this Second Supplement to the MOU as of the day and year indicated on the first page of this Second Supplement to the MOU.

J. M. Barrett 10·31·2018

Coachella Valley Water District

William B. Pattison, Jr.

Coachella Water Authority

Mark Krause

Desert Water Agency

Mark Scott

Indio Water Authority

IN WITNESS WHEREOF, the Partners have executed this Second Supplement to the MOU as of the day and year indicated on the first page of this Second Supplement to the MOU.

____________________________	____________________________
J. M. Barrett	William B. Pattison, Jr.
Coachella Valley Water District	Coachella Water Authority
Mark S. Krause	____________________________
Mark Krause	Brian Macy
Desert Water Agency	Indio Water Authority

IN WITNESS WHEREOF, the Partners have executed this Second Supplement to the MOU as of the day and year indicated on the first page of this Second Supplement to the MOU.

J. M. Barrett	William B. Pattison, Jr.
Coachella Valley Water District	Coachella Water Authority
Mark Krause	Brian Macy
Desert Water Agency	Indio Water Authority

IN WITNESS WHEREOF, the Partners have executed this Second Supplement to the MOU as of the day and year indicated on the first page of this Second Supplement to the MOU.

J. M. Barrett

Coachella Valley Water District

William B. Pattison, Jr.

Coachella Water Authority

Mark Krause

Desert Water Agency

Brian Macy

Indio Water Authority

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APPENDIX 1-D
SGMA TRIBAL WORKGROUP AND PUBLIC WORKSHOP MEETING AGENDAS AND SUMMARIES

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2022 Indio Subbasin Alternative Plan Update

Tribal Workgroups

Example Email Notification

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Vanessa De Anda

From:	IndioSubbasinSGMA
Sent:	Monday, August 23, 2021 5:17 PM
To:	IndioSubbasinSGMA
Subject:	REMINDER: You're Invited! Indio Subbasin Alternative Plan Update Tribal Workgroup: August 26
Attachments:	Indio Go To Meeting Instructions_26Aug21.pdf; Indio_Tribal Workgroup 6_Agenda.pdf

Coachella Valley Tribal Workgroup –

Reminder, our next Tribal Workgroup for the 2022 *Indio Subbasin Alternative Plan Update* is **this Thursday, August 26**. This meeting is only open to Tribal Workgroup members and will be held virtually due to COVID-19 concerns. The agenda is attached. Our meeting materials, including the PowerPoint presentation, will be available on our website (www.IndioSubbasinSGMA.org).

Indio Subbasin Alternative Plan Update – Tribal Workgroup
Thursday August 26, 2021, 10:00 am – 12:00 pm
GoToMeeting
Please join my meeting from your computer, tablet or smartphone:
https://global.gotomeeting.com/join/991180029
You can also dial in using your phone: (571) 317-3122, *Access Code*: 991-180-029
Please let us know if you did not receive the calendar appointment by responding to this email

Discussion topics will include:

- Alternative Plan Status
- Groundwater Model
- Plan Scenarios & Projects and Management Actions
- Simulation Results

It is important that we hear your voice, as this Alternative Plan Update will be used to reliably meet current and future water demands in a cost-effective and sustainable manner in the Indio Subbasin. Your participation is greatly appreciated.

Please note, the public workshop scheduled to follow the Tribal Workgroup meeting will begin at 2:00 PM.

If you have any questions, feel free to contact us by phone at 213-223-9463 or email indiosubbasinsgma@woodardcurran.com.

Thank You,

Indio Subbasin GSAs

Learn more at www.IndioSubbasinSGMA.org

2022 Indio Subbasin Alternative Plan Update

Tribal Workgroups

Agendas and Meeting Minutes

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2022 Indio Subbasin Alternative Plan Update

Tribal Workgroup

AGENDA

February 20, 2020 at 10:00 am – 12:00 pm

Spotlight 29 Casino, Medjool Room

46-200 Harrison Place, Coachella, CA 92236

#	ITEM	TIME*
1	**Welcome and Introductions** • Introductions • Agenda • Meeting Objectives	10:00 am
2	**Overview of Sustainable Groundwater Management Act (SGMA)** • What is SGMA? • How does SGMA apply to the Indio Subbasin? • What are the roles/responsibilities of GSAs? • What is the SGMA Timeline for the Indio Subbasin	10:20 am
3	**Water Management Planning in the Indio Subbasin** • When did water management planning begin and how has it evolved? • What is the current status of groundwater planning?	10:40 am
4	**Indio Subbasin Alternative Plan Update** • What is the Alternative Plan? • Is the Alternative Plan working? • What is the strategy and process to update the Alternative Plan?	11:00 am
5	**Public Comment** • Your participation and input are important	11:30 am
6	**Next Steps and Closing Remarks**	11:40 am

**times are subject to change*

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2022 Indio Subbasin Alternative Plan Update

Tribal Workgroup #1

SUMMARY

February 20, 2020 at 2:00 pm – 4:00 pm

Spotlight 29 Casino, Medjool Room

46-200 Harrison Place, Coachella, CA 92236

Welcome and Introductions

Mr. Levi Anderson, Twenty-Nine Palms Band of Mission Indians, welcomed everyone to the meeting and introductions were made around the room. Mr. Edwin Lin, Todd Groundwater Inc., presented the meeting objectives and agenda, and introduced the project team working on the Indio Subbasin Alternative Plan Update. The Indio Subbasin Groundwater Sustainability Agencies (GSAs) are Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), and Indio Water Authority (IWA). The Consultant team includes Todd Groundwater Inc. and Woodard & Curran Inc.

Overview of Sustainable Groundwater Management Act (SGMA)

Mr. Lin presented an overview of the Sustainable Groundwater Management Act (SGMA). SGMA provides a framework for sustainable management of groundwater basins, promotes local management, and sets regulatory deadlines for submitting plans and reporting progress towards sustainable management. SGMA also offers State assistance in the form of funding, data, and technical support. Local GSAs are required to prepare a Groundwater Sustainability Plan (GSP) or submit an Alternative Plan. "Sustainable" management is defined as the management and use of groundwater in a manner that can be maintained without causing undesirable results.

Mr. Lin explained that the Indio Subbasin is designated as a medium-priority basin and is subject to SGMA legislation. The State has recognized the existing water management plan, the *2010 Coachella Valley Water Management Plan* (CVWMP), as a functionally equivalent Alternative Plan. The State recommended that the Indio Subbasin GSAs quantify sustainability criteria and incorporate additional elements into the *2022 Alternative Plan Update*. SGMA also requires that the Indio Subbasin be sustainably managed within 20 years.

Each Indio Subbasin GSA is responsible and has the authority for water management within its respective boundaries. The Indio GSAs have a history of cooperation, which is ongoing. A Memorandum of Understanding (MOU) has been executed and establishes an intent to foster cooperation, coordination, and communication regarding management of the Indio Subbasin. The GSAs have also agreed on collaboration and joint submission of the Alternative Plan, Annual Reports, and 5-Year Plan Updates.

Mr. Lin presented the current SGMA timeline for the Indio Subbasin. The Indio GSAs formed in June 2017 and the Alternative Plan, submitted in December 2016, was approved by DWR in July 2019. The

2022 Alternative Plan Update must be submitted by January 1, 2022. From then, the GSAs are required to prepare four 5-Year Plan Updates, with the expectation that the Indio Subbasin will achieve groundwater sustainability by 2042.

Discussion by the tribal members on the overview of SGMA included:

- Tribes have land use authority and we hope to participate in the planning process.
- SGMA requires 5-year updates, so water management issues will be revisited regularly. Plus, Annual Reports will be submitted annually to DWR to track progress.
- The Indio Subbasin website (www.IndioSubbasinSGMA.org) includes a link to DWR's SGMA portal, which has the 2010 CVWMP, Indio Subbasin Bridge Document, and submitted Annual Reports.

Water Management Planning in the Indio Subbasin

Mr. Lin presented the history of water management in the Indio Subbasin. Multiple sources of water have been developed to ensure a reliable supply for the region. Stormflows from the Whitewater River were captured and used for groundwater recharge beginning in 1918. The Coachella Canal, which imports Colorado River water, was completed in 1949. CVWD and DWA contracts for State Water Project (SWP) water began in 1963. SWP water is exchanged for Colorado River water via the Colorado River Aqueduct as there are no physical SWP facilities to deliver the SWP allocations. Since 1973, this SWP exchange water has been used to recharge the Indio Subbasin at the Whitewater River Groundwater Replenishment Facility. Finally, water recycling within the Indio Subbasin began in 1965.

Mr. Lin then presented the history of the CVWMP and other water management plans. The 2010 CVWMP serves as the Indio Subbasin Alternative Plan. The Plan assessed future growth and land use changes, estimated future water demands and supplies, and established data collection and monitoring programs to track groundwater conditions and Plan performance. The 2010 CVWMP also identified management actions needed to meet current and future water demands in a cost effective and reliable manner. Mr. Lin then explained that the Alternative Plan shared the same goals and met the requirements of a GSP. Agencies in the Indio Subbasin use a combination of management actions to meet local water demands, including local stormwater water and imported water for direct replenishment of groundwater, non-potable water and recycled water for source substitution, and agricultural, golf, and urban conservation. The Alternative Plan has resulted in a significant increase in groundwater storage across the Indio Subbasin and groundwater levels have increased regionally. More work is needed to ensure continued success of the Alternative Plan.

Discussion by the tribal members on water management planning in the Indio Subbasin included:

- Will the Alternative Plan Update build from the 2010 CVWMP?
    - Yes, plus it will incorporate SGMA requirements and DWR recommendations.
- The 2010 CVWMP is larger than SGMA – will there be a separate process to update that?
    - No, the 2010 CVWMP focused on water management planning, groundwater and economic growth, and this Plan Update will encompass all. The Plan update will have all elements of the CVWMP and SGMA, including supply and demand assumptions, projects and management actions, and environmental factors (beyond interconnected surface waters).

Indio Subbasin Alternative Plan Update

Mr. Lin described the purpose of the Alternative Plan and outlined the tasks involved in preparing the plan. Tasks include assessing the existing plan, estimating future water demands and supplies, establishing quantifiable sustainability goals, and implementing a stakeholder and public outreach plan. The Alternative Plan Update will include an update of the Coachella Valley groundwater flow model to support the development of current and future water budgets. The process will have four biennial Tribal Workgroup meetings, in which the project team will report on progress, share results and findings, and solicit input and feedback. The 2022 Alternative Plan Update Report Draft is expected to be ready for public review and comment in early Fall 2021. The Final Report will be prepared in Winter 2021. Mr. Lin encouraged meeting participants to visit the Indio Subbasin website (www.IndioSubbasinSGMA.org) for more information on the planning process and to learn how to get involved. He emphasized that tribal participation and input are important components to this planning process. The goals of the tribal outreach task are to keep the tribal members informed about and engaged in the planning process, so the project team can incorporate their concerns and feedback.

Discussion by the tribal members on the Alternative Plan Update included:

- Bureau of Indian Affairs (BIA) is concerned that the workshop announcements aren't clear – wasn't clear to him that CVWMP and Alternative Plan are the same and will be updated in this planning process. The CVWMP needs to be thoroughly vetted.
  - The intent of the workshop announcements was to articulate that the CVWMP and Alternative Plan are the same and are being updated. The project team will review the announcements moving forward to make sure this is clear.
- The Coachella Valley Salt & Nutrient Management Plan (SNMP) also needs to be accepted and adopted. GSA representatives shared next steps in this process.
- Does the Alternative Plan include agricultural use of groundwater?
  - Yes, the Plan includes Coachella Canal and groundwater pumping data gathered by DWA (>10 AF) and CVWD (>25 AF) Replenishment Assessment Charges (RACs). However, it does not include tribal groundwater pumping unless the tribes provide this data.
- Will the 2022 Alternative Plan Update have groundwater level data from 2010-2020?
  - Yes, this is part of DWR requirements.
- How is water delivered to the Thomas E. Levy recharge area and Palm Desert recharge area?
  - The Thomas E. Levy Groundwater Replenishment Facility is replenished with Canal water sent to Lake Cahuilla and then to the recharge area. The Palm Desert Groundwater Replenishment Facility is replenished with Canal water from the Mid Valley Pipeline.
- Why is the natural recharge value different from the surface water direct use value?
  - The natural recharge value is metered by USGS in stream, while the surface water direct use is metered by DWA for potable use.
- Water balance could be accomplished by converting more agriculture use to Canal water
- SGMA requirement for 5-year update means that the Alternative Plan will be a living document with regular updates. The region can change direction if needed and make the 'right' investments.

- Any conclusions so far regarding how climate change will affect groundwater basin?
    - None yet; likely effects will be availability/reliability of imported supply.
- What is the groundwater modeling software being used?
    - MODFLOW, standard USGS code

Next Steps

Mr. Lin announced to workshop participants that the next Tribal Workgroup meeting will be held on August 27, 2020 from 10:00 AM – 12:00 PM at a location to be determined. He reminded participants to make sure they're on the tribal workgroup email list to receive updates. For additional information, please contact Rosalyn Prickett at: IndioSubbsinSGMA@woodardcurran.com or (858) 875-7420.

Discussion by the tribal members on the Next Steps included:

- How will the public workshops and Tribal Workgroup meetings differ?
    - We will be giving the same presentation today, may be different in the future based on timing of meetings. Tribal Workgroup members are on the outreach list and will also be invited to the Public Workshops.
- California Rural Water Association (CRWA) contacted 29 Palms Band of Mission Indians to offer facilitation services for SGMA, if needed. This would be funded by the State. But we believe the Workgroup process is going well so far.
- What will the public review process be for the Alternative Plan?
    - Public Review will be 45 days, one time. But we will discuss elements of the Alternative Plan Update here (at the Tribal Workgroup) prior to Plan release; there will be no surprises.
- The project team is asking for tribal land use and demand data, for use in the planning process. The project team has also sent letters to the cities and County because land and water planning is interconnected.
- Suggestion to add to website a place to update progress monthly (graphic or news box? Send information to tribes in advance?).
- The State Water Project (SWP)/Colorado River Aqueduct (CRA) exchange is unique. Suggestion to publish an annual accountability of that water banking, so we know how much MWD water has been stored in the Indio Subbasin. The region could have deficit if that water is called in.
    - CVWD already does this in their SGMA Annual Reports. MWD is advanced delivery, not banking. Allocation belongs to CVWD or DWA and is simply delivered early. No water is later removed by MWD.
- BIA's hydrogeologist is responsible for 107 Federal tribes in State, and this basin has 5-7 tribes. BIA is concerned that the water data for this basin is in difficult places to track down (e.g., CVWMP, Bridge Document, Engineer's Reports, etc.).
- Suggestion that a cross-walk is developed for the Alternative Plan vs GSP.
- Suggestion that hyperlinks be included with sources (+ page numbers) that will take reader directly to background document. Context of the presented numbers is important (e.g. natural recharge number versus direct use number).

2022 Indio Subbasin Alternative Plan Update

Tribal Workgroup #2

AGENDA

August 27, 2020 at 10:00 am – 12:00 pm

GoToMeeting: https://global.gotomeeting.com/join/919772373

or Dial In by Phone: +1 (872) 240-3212; Access Code: **919-772-373** #

#	ITEM	TIME
1	**Welcome and Introductions** • Meeting Objectives • Workgroup Timelines	10:00 am
2	**Alternative Plan Status** • Review Tasks • Tribal Outreach • Summary of Requested Data	10:15 am
3	**Demand Forecast** • Confirm SCAG Growth Projections on Tribal Lands	10:40 am
4	**Questions and SGMA Next Steps** • Get Involved	11:00 am
5	**Other Planning Efforts** • SNMP Update • UWMP Update	11:15 am

**times are subject to change*

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2022 Indio Subbasin Alternative Plan Update

Tribal Workgroup #2

SUMMARY

August 27, 2020 at 10:00 am – 12:00 pm

Virtual Meeting

Tribal Workgroup and Supporting Members	Groundwater Sustainability Agencies (GSAs)
• Chuck Jachens, Bureau of Indian Affairs • Brian Moniez, Department of Water Resources (DWR) • David Limón Saldivar, Augustine Band of Cahuilla Indians • Gabi Lewis, Torres Martinez Desert Cahuilla Indians (TMDCI) • Jennifer Wong, DWR • John Covington, Morongo Band of Mission Indians • Jose Mora, Twenty-Nine Palms Band of Mission Indians • Joseph Mirelez, TMDCI • Levi Anderson, Twenty-Nine Palms Band of Mission Indians • Pakiza Chatha, DWR • Thomas Tortez Jr., TMDCI	• Adekunle Ojo, Indio Water Authority (IWA) • Ashley Metzger, Desert Water Agency (DWA) • Mark Krause, DWA • Melanie Garcia, Coachella Valley Water District (CVWD) • Mike Nusser, CVWD • Reymundo Trejo, IWA • Ryan Molhoek, DWA • Steve Bigley, CVWD • Trish Rhay, IWA • Zoe Rodriguez del Rey, CVWD **Consultant Team** • Edwin Lin, Todd Groundwater • Iris Priestaf, Todd Groundwater • Nicole Poletto, Woodard & Curran • Rosalyn Prickett, Woodard & Curran

Welcome and Introductions

Ms. Rosalyn Prickett, Woodard & Curran, welcomed everyone to the meeting and introductions were made as participants joined the call. Ms. Prickett briefed everyone on how to use the virtual GoToMeeting platform and then presented the meeting objectives and agenda. She reintroduced the project team working on the Indio Subbasin Alternative Plan Update, including the Indio Subbasin Groundwater Sustainability Agencies (GSAs) and Consultant team. Ms. Prickett provided an overview of the Workgroup timeline over the two-year planning period. This included the quarterly meeting schedule for both Public Workshops and Tribal Workgroup meetings.

One question by the tribal members on the schedule included:

- Is there a progress calendar that identifies the proposed completion dates?
    - We have a general schedule on when we intend to proceed with different components of the Alternative Plan Update. **We can circulate this to the SGMA Tribal Workgroup.**

Alternative Plan Status

Ms. Prickett presented an overview of the Alternative Plan Update tasks. The first two tasks, assess the existing plan and process available datasets, have been completed. Data analysis for 2010 to 2019 is underway. Task 3, which documents groundwater conditions and basin characterization, is also underway. The demand forecast that is currently under development will be discussed later in this meeting (Tasks 4 and 5). Projections for municipal, golf, and agriculture future demands are underway and projected future supplies and potential supply projects and management actions are being defined. This includes the amount of recycled water delivered to irrigation customers in the Valley and future recycled water plans.

Groundwater model inputs from 2010 to 2019 are being updated and calibrated under Task 6. The next steps are to incorporate the projected demand forecast and supply mix into the groundwater model. Tasks 7 and 8 haven't been started yet. Establishing the sustainability goal and criteria are all coordinated with the Plan implementation tasks.

The final task is stakeholder engagement and tribal outreach that will run throughout the Alternative Plan Update process. Tribal outreach is consistent with DWR's 2017 *SGMA Guidance for Engagement with Tribal Governments* and communications are sent out via the tribal email list. There are 5 semi-annual Tribal Workgroup presentations and a data request was circulated in early May 2020 with a follow-up letter sent mid-May. The GSA is looking to collect any data related to land use, population and housing projections, water demands, or water conservation data or programs on tribal lands.

Discussion by the tribal members on Plan status included:

- Is there a Technical Advisory Committee or Stakeholder Advisory Committee that has been formed by the Indio GSA?
  - There is no advisory or stakeholder committee other than our Public Workshops announced to all stakeholders in the Indio Subbasin. The GSA members do have coordination meetings to manage the consultant team, but there is no advisory or stakeholder committee. All of the Alternative Plan Update analysis and deliverables are presented at the scheduled Public Workshops.
- How can beneficial users and public users engage with the Alternative Plan and the Bridge Document, other than outreach conference calls?
  - The intent of the Public Workshops is to engage anyone that may be interested in participating in the planning process. Anyone who may want to provide technical input or input on the materials being developed may participate in these workshops. Rather than selecting a few individuals to an advisory committee, we opted to cast a wide net and invite everyone to participate.
- Has the Communication Plan been developed? What does it look like?
  - The Communication Plan has been developed and is available on the website on the "Get Involved" page. The document outlines how we intend to engage stakeholders during the planning process. It includes topics such as establishing a preliminary list of stakeholders, outlining Public Workshops, and discussing SGMA Tribal Workgroup meetings.
- Several comments submitted with the Bridge Document in 2017 talked about the presence of five federally recognized tribes within the Subbasin. Is it the intent of the GSA to prepare a tribal consultation policy drafted by the GSA to engage the tribes?
  - When the GSAs began working on SGMA compliance, each GSA met individually with the tribes in their service areas. At these consultations, we discussed the best way to engage

the tribes and whether we should focus on formal government-to-government consultation or to work with staff during the planning process. The tribes concluded at that time that staff-to-staff coordination was appropriate, and we established the SGMA Tribal Workgroup. This may need to change in the future, but that was the approach we agreed upon at that time. We are also following the *SGMA Guidance for Engagement with Tribal Governments*.

Demand Forecast

Ms. Prickett discussed the municipal demand forecast process which takes Southern California Association of Governments (SCAG) 2020 growth projections for households, population, and employment and allocates growth to land use categories. 5-year (2015-2019) averages from customer billing data were then used to develop unit demand factors for residential and non-residential land uses, which are also adjusted by conservation factors.

Maps of the Subbasin have been prepared to demonstrate anticipated population growth per SCAG projections, along with anticipated land uses. The SCAG projections may need to be refined based on planned tribal development. The GSAs are requesting information on any future plans or projects that are forecasted on tribal lands through 2045. There was general acceptance to use the presented population projections as the basis of our demand forecast.

Discussion by the tribal members on the demand forecast included:

- What type of tribal data was used?
    - The SCAG projections are based on tribal data shared with local municipalities and reflected in their General Plans.
    - The Agua Caliente Band of Cahuilla Indians confirmed that their tribal land use projections are included in local municipal General Plans.
    - The Morongo Band of Mission Indians confirmed that their tribal lands are included in the San Gorgonio GSP. They offered to share information if deemed helpful to the *Indio Subbasin Alternative Plan Update*.
- Torres Martinez Desert Cahuilla Indians has larger conceptual projects such as casinos and hotels that may be implemented in the future. Where can we submit that information?
    - If you have any data or information on large-scale projects, please contact indiosubbasinsgma@woodardcurran.com or rprickett@woodardcurran.com. We would like to include this information in the demand forecast.
    - The Consultant team will follow up directly with the Torres Martinez Desert Cahuilla Indians tribal chair to gather this information.

Next Steps

Ms. Prickett announced to workshop participants that the next SGMA Tribal Workgroup meeting will be held on November 19, 2020 from 10:00 AM – 12:00 PM and will be held virtually via GoToMeeting. There will be a Public Workshop following the Tribal Workgroup meeting from 2:00 PM – 4:00 PM on the same day.

She reminded participants to make sure to visit our website for more information. For additional information, please contact Rosalyn Prickett at: IndioSubbsinSGMA@woodardcurran.com or (858) 875-7420.

Other Planning Efforts

Ms. Zoe Rodriguez del Rey, CVWD provided updates on the Salt and Nutrient Management Plan (SNMP), a separate but concurrent update process with the *Indio Subbasin Alternative Plan Update*. The Regional Board sent a letter on February 19, 2020 and an SNMP Workplan and Monitoring Plan will be completed by December 31, 2020 to address their concerns.

Ms. Ashley Metzger, DWA announced the 2020 Urban Water Management Plan (UWMP) update is underway. UWMPs must be submitted every five years. The 2020 plans are due July 1, 2021. For this update, all of the water purveyors in the Valley are collaborating to ensure consistency among local agencies, especially when related to water shortage contingency planning. The team is waiting for DWR to release the 2020 Guidebook that incorporates new legislative changes to complete the update.

2022 Indio Subbasin Alternative Plan Update

SGMA Tribal Workgroup #3
AGENDA

November 19, 2020 at 10:00 am – 12:00 pm

GoToMeeting: https://global.gotomeeting.com/join/431521669

or Dial In by Phone: +1 (224) 501-3412; Access Code: 431-521-669#

#	ITEM	TIME
1	**Welcome and Introductions** • GoToMeeting Instructions • Agenda and Meeting Objectives • Introductions	10:00 am
2	**Alternative Plan Status** • Process and Plan Update Outline	10:20 am
3	**Plan Area** • Topics to Provide Geographic Context	10:25 am
4	**Hydrogeologic Conceptual Model (HCM)** • Topics to Describe Hydrogeologic Setting	10:35 am
5	**Groundwater Model Update** • Status of Model Update	10:50 am
6	**Demand Forecast** • Municipal, Agricultural, Golf and Other Demands	11:05 am
7	**Supply Analysis** • Available Future Supplies	11:20 am
8	**Next Steps** • Emerging Issues	11:35am
9	**Other Planning Efforts** • SNMP Update • UWMP Update	11:45 am

**times are subject to change*

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2022 Indio Subbasin Alternative Plan Update

SGMA Tribal Workgroup

SUMMARY

November 19, 2020 at 10:00 am – 12:00 pm

GoToMeeting for Presentation

Tribal Workgroup and Supporting Members	Groundwater Sustainability Agencies (GSAs)
• Chuck Jachens, Bureau of Indian Affairs • John Covington, Morongo Band of Mission Indians • Justin Conley, Agua Caliente Band • Levi Anderson, Twenty-Nine Palms Band of Mission Indians	• Ashley Metzger, DWA • Castulo Estrada, CWA • Katie Evans, CVWD • Mark Krause, DWA • Melanie Garcia, CVWD • Reymundo Trejo, IWA • Ryan Molhoek, DWA • Steve Bigley, CVWD • Trish Rhay, IWA • Zoe Rodriguez del Rey, CVWD
	Consultant Team • Iris Priestaf, Todd Groundwater • John Ayres, Woodard & Curran • Maureen Reilly, Todd Groundwater • Nicole Poletto, Woodard & Curran • Rosalyn Prickett, Woodard & Curran

Welcome and Introductions

Ms. Rosalyn Prickett, Woodard & Curran, welcomed everyone to the meeting and introductions were made as participants joined the call. Ms. Prickett briefed everyone on how to use the virtual GoToMeeting platform and then presented the meeting objectives and agenda. She reintroduced the project team working on the Indio Subbasin Alternative Plan Update, including the Indio Subbasin Groundwater Sustainability Agencies (GSAs) and Consultant team.

Ms. Iris Priestaf, Todd Groundwater reviewed the meeting objectives and an overview of the Workgroup timeline over the two-year planning period. This included the quarterly meeting schedule for both Public Workshops and Tribal Workgroup meetings.

Alternative Plan Status

Ms. Priestaf presented an overview of the Alternative Plan Update tasks. Outreach is a key task throughout the Alternative Plan Update process. There are 12 chapters in the Plan and Ms. Priestaf walked attendees through the outline of the document, beginning with information included in the Plan Area chapter.

The Plan Area chapter will include maps that note the location of cities and counties, tribal lands, federal and state lands, and disadvantaged communities, etc. The purpose of these maps is to depict the location of agencies that have water management and/or land use planning roles and to understand the region. One map depicts water management facilities including water sources and infrastructure in the region as well as accompanying descriptions. A water resource monitoring networks and programs map introduces climate, streamflow, subsidence, groundwater elevations, surface water and groundwater quality, groundwater pumping, and drain flows.

If anyone has any updated information or input for the maps, please let the team know.

Discussion: Are there any other items to describe or introduce in the Plan Area chapter?

- Will the plan include maps indicating areas affected by the primary water quality constituents?
    - That information will be located in the Groundwater Conditions chapter. The Plan Area chapter will depict the basic monitoring network.

Hydrogeologic Conceptual Model (HCM)

Ms. Priestaf introduced the HCM which establishes the physical framework for the Plan Area. The HCM cross sections allow for a depth view of the basin and depict geology, wells, faults, and groundwater levels to improve understanding of what is below the surface. Ms. Priestaf walked the attendees through a cross-section graphic to explain the constituents that make up the basin. The lighter colored sand and gravel is permeable, and as the constituents get darker, they become less permeable. For example, clay is less permeable compared to sand. Slide 19 indicates how fault zones impact water levels in the basin, decreasing depth to surface and then causing a sudden drop in flow due to faults.

Ms. Priestaf also explained groundwater inflow and outflow in the Indio Subbasin. Slide 21 depicts a panoramic view of the topography of the Basin. There are markers along the cross section to let you know where you are located on land. In the upper valley, the basin is permeable, and as you move towards the Salton Sea, there is more clay soil. Groundwater levels near the Salton Sea are much closer to the surface compared to the upper valley. With this information, the groundwater model will simulate the Subbasin.

Groundwater Model Update

Ms. Maureen Reilly, Todd Groundwater provided an update on the groundwater model. The HCM shows that the basin has not changed considerably from the previous plan. This model builds upon the consistency of previous estimates, adds new pumping data for all wells, updates subsurface inflow and Salton Sea elevations, and develops recharge estimates for 2010-2019. These updates improve the data and methods used in the 2010 model.

First, the team characterized the inflow in the basin from various sources. Inflow included:

- Mountain and Stream - USGS gages help depict mountain front recharge and stream percolation throughout the basin. Mountain flow routes water through the watershed. Mountain flow is typically in the southern end of the basin and subsurface flow exists in the eastern end of the basin.
- Golf - The team inventoried golf courses in the basin and identified their water supply sources. Comparing the supply with the expected demand gives return flow. The supply and

return flow were similar to the previous analysis in 2010, but improved the spatial variability of irrigation efficiency.

- Agricultural - The agricultural return flow was calculated using the Trimester Crop Census. The Census shows what crops are being grown when and where and can help provide an understanding of the amount of water that is being used. It depicts multicropping and permanent crops to allow for detailed temporal change of water use in the Basin.
- Municipal – Municipal return flow was calculated looking at outdoor water use. The model was able to vary the local outdoor use spatially.

The major outflow in the basin is groundwater pumping, The depth of pumping impacts water conditions. As water use changes, the well depth data can give a better picture of how the basin conditions may change.

In order to confirm if the groundwater model simulates reality, observation wells were used to compare simulated and observed values. The team coordinated with neighboring basins in order to ensure consistency. This tool will allow for scenario planning in the future.

- In the Alternative Plan, 2005 groundwater levels were used as a threshold for land subsidence as an example. Since the model will be redefined, what data will be incorporated [what year] to define groundwater levels, land subsidence, groundwater in storage and of course determining a threshold for sustainability indicators?
  - The model is only a tool and doesn't develop sustainability indicators. It also doesn't calculate subsidence. It calculates water levels and storage based on the inflows and outflows that are entered. The groundwater levels used as the threshold for subsidence will be discussed when the sustainability indicators are discussed at a future meeting.

Demand Forecast

Ms. Prickett noted that the demand forecast results presented are preliminary. Feedback was encouraged to determine if any changes needed to be made. The demand forecast is based on 11 geographic units used to identify the underlying demographic information that included land use and water use patterns in each area. This includes an east and a west unincorporated area in order to analyze the data at a finer scale.

Municipal Demands

There are five major steps to determine the municipal demands forecast: the regional growth forecast, land use inventories, unit demand factors, projected water loss, and adjustment factors. These steps are discussed in more detail below.

1) Regional Growth Forecast – The Southern California Association of Governments (SCAG) 2020 data was used to provide projections for households, employment, and population. SCAG data was used in the previous plans. These growth forecasts are based on the City and County General Plans and other planning documents for the agencies. The SCAG growth forecast projects that for the Plan Area, population will increase by approximately 53%, households will increase 66% and employees will increase 39%. These projections are more in line with the 2002 Plan. Because the Alternative Plan Update is due before the US Census data is released, the SCAG 2020 numbers were used.
2) Land Use Inventories – This is important to project housing units in alignment with demand. SCAG and US Census data helped determine the number of occupied households vs planned. About 30% of the housing units in the Plan Area are vacant or are only occupied seasonally

but may continue to have water use and therefore it is important to incorporate. The SCAG land use inventory map shows land use based on the City and County general plans. Over time, a slight shift to multi-family units are expected, but the split between single family and multi-family units will remain relatively equal at the end of the planning horizon.

3) Unit Demand Factors – Unit demand factors use 5-year averages from customer billing data (2015-2019). It is important to note that the demand factors show gallons per housing unit or gallons for employee per day for industrial use, which is not equivalent to gallons per capita per day (GPCD). A demand factor for all GSAs was calculated. CVWD's single family demand factors were calculated for each of the geographic units within their service area. Water demands for small water systems throughout the eastern unincorporated area were applied to the demand factor for CVWD to accommodate other housing units that are not currently served by CVWD's domestic system. All of DWAs designated land use meters show up in the Commercial, Industrial, and Institutional (CII) category rather than the designated Landscape category.
4) Projected Water Loss – Water loss is based on audited water loss reports for the water that is lost between delivery and the meters. Water loss is estimated at about 10%.
5) Adjustment Factors –Demands are adjusted by conservation savings estimates for indoor and outdoor water use. Passive conservation includes indoor conservation (e.g. changes in indoor plumbing) and outdoor conservation for only future development (new development efficiencies) and not existing development. Conservation for existing development will be applied separately.

In summary, there is a 43% increase in projected municipal demands over time. Each GSA is depicting a projected increase in demand ranging from 28% (DWA) to 190% (CWA).

Agricultural Demands

The forecast process was similar to the municipal demands forecast. Ms. Prickett explained that the team analyzed the regional growth forecast, land use inventories, and unit demand factors. The forecast considered the SCAG 2020 growth projections for households, population, and employment. The land use inventory identified idle and agricultural lands for conversion based on SCAG land use mapping to see which agricultural areas may be going out of service. 5-year averages (2015-2019) from agricultural pumping and Canal delivery data were used to develop unit demand factors.

The baseline demand for the 5-year average of 2015-2019 is 205,150 AFY. These projections were applied to the crop census to estimate the total cropped acres and develop demand factors. The average unit demand factors ranged from approximately 4.3 acre-feet/acre to 7.3 acre-feet/acre. This affects the agricultural demand factors because changing agriculture in the future years impact the demand forecast in the geographic units. Within CWA and IWA especially, a total of approximately 14,300 acres are expected to be converted from agricultural or idle land to urban land. The forecast predicts an overall decrease in water demand, even with the addition of approximately another 1,000 acres of agricultural land converted from idle land.

Golf Demands

The golf water demands followed a similar format to calculate the baseline demand. It also planned for conservation from future golf courses to comply with CVWD Ordinance No. 1302.4. In the last 10 years, two golf courses were opened, and two very small courses were closed, depicting a potential flat line in the golf industry. Ms. Prickett explained that the team also talked to the Southern California Golf Association to understand projected growth, and they did not project significant growth. The current demand forecast assumes three new golf courses will be constructed before 2045.

Other Demands

The other demands include fish farms, duck clubs, surf parks, polo/turf, and environmental water. Through the review of supply assessments and the Salton Sea pilot project, three new users were identified. The baseline average was approximately 19,000 AF. The demand forecast predicts four new users will be added between 2025 and 2035, adding 2,700 AFY of water demands.

Summary

When all demands are rolled together, there is a 7% increase in demand from 2020 to 2045. This is relatively low in comparison to the projected population increase and depicts the impact of changing uses in the Valley. Any input on new or planned demands was requested.

Supply Analysis

Ms. Prickett noted that there is uncertainty with the supply sources discussed today. In certain scenarios, these supplies may change. The six buckets of the supply portfolio include groundwater, State Water Project exchange water, Colorado River water, recycled water, surface water, and other supplies. These supplies are discussed in more detail below.

The Indio Subbasin provides **groundwater** storage capacity. Total groundwater storage has increased since 2009. The recovery of the groundwater storage demonstrates the success of the 2002 and 2010 Water Management Plans. The water budget is a work in progress (inflows and outflows) and will be evaluated with the model when the water budget calculations are complete. The difference between the inflow and the outflow is the net return flow that is entering the basin. The groundwater model will give a better estimate of the net return flow number. For the watershed model, the long-term average for net watershed runoff is 42,300 AFY (1931-2019). The high was in 1980 and the low was in 2002. The surface water diversions were removed from the average as well as the amount of flow that goes through the Indio gage to the Salton Sea.

DWA and CVWD have contracts for **State Water Project Water** (SWP). SWP water is exchanged with Metropolitan Water District (MWD) for Colorado River Water and it is annually variable due to Northern California hydrology. The SWP Table A amount assumes a reliability of 58% annually that will decrease to 52% over time. If the Delta Conveyance Facility is constructed, reliability will improve assumedly back to 58% or more.

CVWD has a QSA entitlement and MWD SWP transfer. **Colorado River water** is generally delivered by the Coachella Canal to farmers in the eastern portion of the Valley. The MWD transfer can be delivered to the Canal or Whitewater and can be recharged at Whitewater River GRF. The plan includes a ramp up of QSA entitlement minus conveyance and transfer losses (436,000 AFY at its peak). The supply forecast reflects the ramp up (5,000 AFY per year) in accordance with 2003 QSA, minus conveyance and transfer losses.

Surface water diversions occur at Snow, Falls, Chino Creeks in the San Jacinto Mountains and Whitewater River Canyon. Water is delivered directly to agriculture and municipal users in the West Valley. Forecast is continued delivery of that supply from 2,360 AFY to 6,000 AFY over time.

Recycled water is produced at three Water Reclamation Plants (WRPs) including CVWD's WRP-7 and WRP-10 and DWA's WRP. Existing wastewater flow at these plants is 19,400 AFY but current capacity is over 30,000 AFY. About 35% of the available supply is recycled at these plants. The forecast is based on difference of these projected flows. The amount of indoor water use is the projection for available wastewater going forward. If this additional water up to design capacity is recycled, this could be about 32,500 AFY. This is the potential supply but there might not be any infrastructure to distribute. This will be discussed further in the Projects and Management Actions chapter of the GSP.

Other supplies include several other transfers and supplies not covered by the other buckets. This includes the Yuba Accord, Rosedale Rio-Bravo, and the construction of Sites Reservoir.

Ms. Prickett echoed that the Supply forecast results are preliminary, and feedback is encouraged. The existing supplies forecast totals to about 640,000 AF by 2045. If future additional supplies are added, supplies are over 700,000 AFY. The water supplies for the future are dependent on the implementation of projects based on the projects and management sections of the GSP.

- Will there be a discussion of uncertainty? Such as annual variations, drought, data error, etc.
    - Yes, in the Alternative Plan Update we will discuss uncertainty. In the scenarios there is the option to change some of the supply projections. For example, in a drought scenario there would be less surface water available from runoff and therefore the supply numbers will be updated accordingly for that projection.
- Uncertainty would potentially include Sites and DCP?
    - The uncertainty will include potential future supplies that haven't been discussed yet and are not controllable by the suppliers in the basin. We will take into account how that will impact the supply and demand moving forward.
- Can you explain the increase in surface diversion from the Snow, Falls, Chino creek, San Jacinto Mountains, and Whitewater River Canyon from 2,630 to 6,000 AFY?
    - The projected increase in diversions is projected based on the available supply that DWA has projected from watershed runoffs.
    - Is that mountain runoff?
        - Yes, it is watershed runoff.
    - What is that dependent on?
        - It is dependent on development of customers in that geography, just like a recycled water project. There is potential for supply, but it is dependent on projects for delivery.
- Where would additional data greatly improve the certainty of the conclusions?
    - We are working through processing that kind of data while working through our supply forecast to understand long term supply certainty and are talking with State water supply contractors to improve our understanding. The goal is to make it as accurate as possible.
- Will that information be included in the plan?
    - Yes, the assumptions that we did for the supply forecast will be included in the Plan. There will also be a scenario on climate change that will be included in the plan.

Next Steps

Ms. Priestaf reviewed next steps for the team for the next few months. This includes the documentation of groundwater dependent ecosystems, completing the update of the groundwater model, quantifying the Indio Subbasin water budget, identifying projects and management actions, developing proposed sustainability criteria, and identifying emerging issues.

For the context of emerging issues, SGMA identifies six undesirable results, and serve as the indicators for what sustainable management within the basin means. The team needs to determine what the criteria are to maintain sustainable management goals. The emerging issues identified in

2010 need to be updated. These issues included specific water quality constituents, water conservation, seismic risk, subsidence, invasive species, climate change. What are some emerging issues that concern you now?

Emerging issues identified by attendees include:

- Salt and Nutrient Management Plan - Will a discussion of the SNMP and its influence on this plan be included? The regulatory aspects of salt and nutrient management can greatly influence water supply.
- Chromium-6 MCL to be developed/updated in the future is a concern

Other Planning Efforts

Ms. Zoe Rodriguez del Rey, CVWD provided updates on the *Salt and Nutrient Management Plan* (SNMP), a separate but concurrent update process with the *Indio Subbasin Alternative Plan Update*. The Regional Board sent a letter on February 19, 2020 and an SNMP Workplan and Monitoring Plan will be completed by December 31, 2020 to address their concerns. A workplan is being developed and the due date has been extended to April 30, 2021. The draft monitoring plan was submitted November 16 and there is a meeting in December to review. The SNMP development workplan is being collaboratively prepared by water and wastewater agencies with input from the Regional Water Quality Control Board.

Ms. Ashley Metzger, DWA announced the *2020 Urban Water Management Plan* (UWMP) update is underway. UWMPs must be submitted every five years. The 2020 plans are due July 1, 2021. DWR has released the draft Guidebook. There are new requirements this round including reporting on energy use and Delta reliance. DWA is also working on water shortage contingency planning. The first stakeholder meeting on the UWMP is December 14, 2020 from 2:00-4:00. Email Ashley (ashley@dwa.org) if you are interested in receiving more info. A final draft is due to DWR July 2021.

- DWR's review of the Alternative Plan included seven recommended action items to be addressed in future updates of the Alternative Plan. Additionally, the Tribes provided comments related to the review of the Alternative Plan. How can the tribes be assured that these action items and comments will be addressed or considered? Note: I am not representing any other tribe other than Morongo based on the contents of my question.
    - We plan to integrate our work in response to DWR’s recommendations into the Plan itself. We will specifically address DWR’s recommendations by integrating those recommendations and all comments we receive into our document. I think these issues will be coming up in future workshops, and the interaction in workshops have been key to understanding what the concerns are.

Groundwater Dependent Ecosystems (GDEs)

Ms. Prickett reviewed a “bonus slide” focused on the GDE Field Assessment Sites. The *Natural Communities Commonly Associated with Groundwater* (NCAG) geospatial dataset were included on a map with the California Natural Diversity Database (CNDDB) vegetation sites. Of the NCAG data set parcels identified, the team is looking to understand which sites are groundwater dependent ecosystems. The data set captures everything that could be related to waterways including streams, riparian corridors, and dry washes and the team is fact checking the NCAG data sets to see where there are habitats that could be accessing groundwater for survival.

15 sites have been identified for field assessments in December. Four sites have been identified as tribal owned sites: Sites 3, 7, 13, and 14. Sites 3 and 7 may be Torrez Martinez and are identified as

Department of Interior parcels (assumedly BIA). 13 and 14 may be on Agua Caliente lands. Can you help our team get access to those sites for the field assessment so we can verify if they are GDEs?

- Site 9 looks like it is near Twenty-Nine Palms Reservation land. Where is this?
    - It says it is federal government owned – you are correct, it is probably Twenty-Nine Palms.
    - Would need to see a closer look. Cabazon Reservation and Twenty-Nine Palms are adjacent.
- Even if GDEs are not on Tribal lands, they may have significant values to the Tribes.
    - We look forward to that input next time when we discuss the results of the field study
- Who do we follow up with if we find a site that is not publicly accessible but is on tribal land?
    - Some of these lands may be publicly accessible. I am seeing one that is Torres Martinez but it may be close to something that CVWD operates. We will narrow down to the site list to sites that may not be publicly accessible.
- Who will go out from your team?
    - A wetland biologist will conduct the field assessment. They have looked at the Multiple Species Conservation plan and completed their desktop analysis. The results of this analysis and the field survey will be presented at the next meeting.
- Site 15 looks like it is open to the public.

2022 Indio Subbasin Alternative Plan Update

SGMA Tribal Workgroup

AGENDA

March 3, 2021 at 10:00 am – 12:00 pm

GoToMeeting: https://global.gotomeeting.com/join/801714669

or Dial In by Phone: +1 (872) 240-3311; Access Code: 801-714-669 #

#	ITEM	TIME
1	**Welcome and Introductions** • GoToMeeting Instructions • Agenda and Meeting Objectives • Introductions	10:00 am
2	**Alternative Plan Status** • Process and Plan Update Outline	10:20 am
3	**Groundwater Conditions** • Topics to Characterize Groundwater Conditions	10:25 pm
4	**Sustainable Management Criteria** • Orientation • Groundwater Levels, Storage, and Subsidence	10:40 pm
5	**Groundwater Model Update** • Status of Model Update	11:00 pm
6	**Projects and Management Actions** • Proposed List of PMAs • Scenario Planning	11:10 pm
7	**Other Planning Efforts** • SNMP Update • UWMP Update	11:45 pm

**times are subject to change*

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2022 Indio Subbasin Alternative Plan Update

Tribal Workgroup #4
SUMMARY

March 3, 2021 at 10:00 am – 12:00 pm
Virtual Meeting

Tribal Workgroup and Supporting Members	Groundwater Sustainability Agencies (GSAs)
• Altrena Santillanes, Torres Martinez Desert Cahuilla Indians • David Limon Saldivar, Augustine Band of Cahuilla Indians • Jennifer Wong, DWR • John Covington, Morongo Band of Mission Indians • Jonathan Rose, Torres Martinez • Jose Mora, Twenty-Nine Palms • Nina Waszak, Augustine Band • Dr. Patrick Taber, Bureau of Indian Affairs • Richie Lopez, Torres Martinez • Thomas Tortez, Torres Martinez	• Castulo Estrada, CWA • Ivory Reyburn, CVWD • Katie Evans, CVWD • Mark Krause, DWA • Melanie Garcia, CVWD • Reymundo Trejo, IWA • Ryan Molhoek, DWA • Steve Bigley, CVWD • Trish Rhay, IWA • Zoe Rodriguez del Rey, CVWD **Consultant Team** • Iris Priestaf, Todd Groundwater • John Ayres, Woodard & Curran • Nicole Poletto, Woodard & Curran • Rosalyn Prickett, Woodard & Curran • Vanessa De Anda, Woodard & Curran

Welcome and Introductions

Ms. Rosalyn Prickett, Woodard & Curran, welcomed everyone to the meeting, and introductions were made as participants joined the call. Ms. Prickett briefed everyone on how to use the virtual GoToMeeting platform and notified attendees that the conference would be recorded. She then presented the meeting objectives and agenda and reintroduced the project team working on the Indio Subbasin Alternative Plan Update, including the Indio Subbasin Groundwater Sustainability Agencies (GSAs) and Consultant team. Ms. Prickett reviewed the meeting objectives and an overview of the Workgroup timeline over the two-year planning period. This included the quarterly meeting schedule for both Public Workshops and Tribal Workgroup meetings.

Alternative Plan Status

Ms. Iris Priestaf, Todd Groundwater, presented an overview of the Alternative Plan Update tasks. Outreach is a key task throughout the Alternative Plan Update process. There are 12 chapters in the Plan and Ms. Priestaf walked attendees through the outline of the document, beginning with the information included in the Plan Area chapter.

Groundwater Conditions

Groundwater Levels

Ms. Priestaf presented a map of the groundwater level contours in the Indio Subbasin (Subbasin). The Subbasin has a robust monitoring program that consists of 345 wells. Monitoring data from these wells was used to develop the groundwater level contour map. The groundwater levels range from 1,100 feet in the northeastern part of the Subbasin and decrease to 200 feet below mean sea level (msl) toward the Salton Sea. Groundwater flow is perpendicular to the contours, so groundwater flows from northwest to southeast in the Subbasin.

Ms. Priestaf presented a map showing the change in groundwater levels from 2009 through 2019. The map indicates that groundwater levels have primarily increased during the past decade, and the largest increases have occurred near the groundwater replenishment facilities (GRF). These increases in groundwater levels are the result of recharge in the GRFs, implementation of source substitution programs (e.g., recycled water to offset groundwater use), and conservation programs.

Ms. Priestaf presented four hydrographs showing groundwater levels from 2009 through 2020, though she noted that numerous hydrographs in the Subbasin are available. The hydrographs show a consistent pattern of overall groundwater level increases from 2009. The hydrographs also show large increases near recharge at the GRFs and smaller increases at locations distant from the GRFs. Overall, the hydrographs show recovery from overdraft since 2009.

Change in Groundwater Storage

Ms. Priestaf presented a graph showing the cumulative change in storage from 1970 through 2019. The hydrograph starts a "running total" of groundwater storage in 1970 as this was right before the Whitewater River GRF began operation in 1973. The hydrograph starts with a net change in storage of 0 acre-feet (AF) in 1970 and shows a significant decline in groundwater storage happening in the mid-1980s through 2009. The year 2009 marked a historical low for groundwater storage, and overdraft has started to reverse since then with a net storage increase of 840,000 AF. Increased groundwater storage is important as it can be used during a water shortage such as drought.

Workgroup comments and questions included the following:

- There is an overall increase in groundwater storage between 2016 and 2019. Is this due increased availability of groundwater after the recent drought?
    - Yes, the graph shows the net effect of pumping plus replenishment and recharge, which includes both natural and managed recharge.
- What is the size and storage capacity of the Subbasin?
    - The Subbasin is very large. In some places, the aquifers might be thousands of feet deep, but this may not necessarily translate to usable groundwater in an economic manner.
    - In 1964, the Department of Water Resources (DWR) determined that the Subbasin was 1,000 feet deep with a storage capacity of approximately 39 million AF. However, studies since then have proven that the Subbasin is more than 1,000 feet deep.

Land Subsidence

Ms. Priestaf presented land subsidence, or the sinking of the ground surface, in the Subbasin. In this case, land subsidence is not caused by tectonics and action in the San Andreas fault, but rather as a result of the compaction of sediments that occur with groundwater level declines. Clay layers in the Subbasin float in groundwater, so if groundwater levels decline, the clay layers settle and compact, causing the ground surface to also decline. The Subbasin is susceptible to land subsidence which may disrupt conveyance facilities and facilities on the ground surface. Land subsidence in the Subbasin has been studied since 1995 by the United States Geological Survey (USGS) and CVWD. USGS research shows a correlation between land subsidence and groundwater declines, reaching up to 2 feet of subsidence in parts of the Subbasin between 1995 and 2010. USGS has documented stabilization of land surface and even uplift in some areas of the Subbasin since 2010 as a result of increasing groundwater levels. For comparison, land subsidence in the Central Valley is as much as 30 feet and is still ongoing.

Sustainable Management Criteria

Mr. John Ayres, Woodard & Curran, presented the Sustainable Management Criteria (SMC) for the Alternative Plan Update. To define the SMC, DWR recommends setting thresholds for groundwater levels and using these thresholds as a proxy for the storage and subsidence indicators. The GSAs have an overarching objective to avoid undesirable results of a significant and unreasonable loss of yield from existing production wells. SGMA does not define "significant" and "unreasonable" as these are determined at the local level. Representative monitoring will occur throughout the Subbasin, but not every well will be monitored. Subbasin management will only include management activities that the GSAs can influence.

Sustainability Management Criteria

Mr. Ayres explained that SMCs can be qualitative. For the Subbasin, the *Sustainability Goals* are defined as the conditions in the absence of undesirable results within the next 20 years. *Undesirable Results* are qualitative and descriptive; these are conditions that should be avoided in the Subbasin. In comparison, *Measurable Objectives* (MO) are specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions to achieve the sustainability goal. *Minimum Thresholds* (MT) are numeric values for each sustainability indicator used to define undesirable results. *Interim Milestones* (IM) are quantitative target values representing measurable groundwater conditions in increments of five years; these will be updated during every Plan update. A graphic illustrating the quantitative criteria was presented to the group.

The Alternative Plan goal is "to reliably meet current and future water demands cost-effectively and sustainably." The draft SGMA Sustainability Goal is to "maintain a locally managed, economically viable, sustainable groundwater resource for existing and future beneficial use in the Indio Subbasin by managing groundwater to avoid undesirable results." The SGMA Sustainability Goal only focuses on groundwater and is nested within the Alternative Plan goal, which is broader and encompasses all water supplies.

This meeting focuses on three of the six SMC, which include: 1) chronic lowering of groundwater levels, 2) reduction of groundwater storage, and 3) land subsidence. The draft undesirable result statements were phrased broadly for these three SMC to give the GSAs local control over what is significant and unreasonable, as well as drive the monitoring networks and thresholds.

Groundwater Levels

Mr. Ayres explained that the undesirable results for the chronic lowering of groundwater levels indicator include impacts to shallow wells, and maintenance of municipal and industrial water supply.

Ms. Priestaf provided the consultant team's recommendations on setting MTs for groundwater levels, storage, and subsidence. SGMA defines a groundwater level MT as a groundwater elevation measured at a representative monitoring site. There will not be MTs or monitoring conducted for every single pumping well in the Subbasin, just for the representative sites. There are two options for setting groundwater elevation MTs, as described below:

1. Use historical low groundwater levels. The groundwater levels reached a historical low in 2009. The historical low occurred recently without any reported significant problems that impacted the beneficial uses of water wells. In comparison, historical groundwater level lows in the Central Valley led to community water systems and wells drying up. This option is recommended because the historical low groundwater levels are conservative and protective of the Subbasin based on the best available information.
2. Document construction of all production wells, select criteria per diverse well characteristics, relate private wells to representative "Key Wells." This option would protect production wells; however, it requires documentation of the construction of all production wells (including but not limited to the well location, bottom depth of the well, etc.). To implement this option, extensive data collection and decision-making would be required to define the selection criteria. It is recommended that the Subbasin develops a well inventory in the future as a way to refine the MTs.

Ms. Priestaf presented hydrographs showing the suggested MTs corresponding with the lowest groundwater elevations measured at Key Wells. These MTs will guide management in the Subbasin. Ms. Priestaf stated that there are 757 wells in the Subbasin. Of these wells, 57 wells were selected as representative wells in the Key Well network because they have well construction data, are easily accessible (though this may change in the future if they are abandoned or replaced), have an extensive monitoring record and current data, are distributed throughout the Subbasin near other production wells and small water systems that are vulnerable to groundwater level declines, and are representative of all GSAs.

Workgroup comments and questions included the following:

- Are all 747 wells part of the CVWD system, or are some private?
  - No, they belong to various GSAs and organizations. Some wells are private.
- How many wells are in Tribal lands?
  - The consultant team is unsure how many wells are in Tribal lands.
- Does the Alternative Plan Update address the Data Management System (DMS) that is required in the SGMA regulations?
  - The Alternative Plan Update will include a chapter for the monitoring program and the DMS.
- Will there be a physical DMS already in place or created for the Alternative Plan?
  - There is ongoing data management in the Subbasin. The team is currently reviewing how data is managed and will be making recommendations for improvements and quality control/quality assurance (QA/QC) to ensure data are accurate and complete. This will be used to develop a living DMS with geographic information.
- Will the data from the 57 representative wells be available?
  - Yes, Annual Reports will include well data and hydrographs comparing data to MTs.
  - Currently, DWR is planning to roll up all data from GSPs and Alternative Plans in a statewide DMS, similar to CASGEM.

Ms. Priestaf stated that the SMC will assume that undesirable results will occur if groundwater levels remain consistently below the MTs. It is recommended that an undesirable result be defined when the MT is crossed in five low season monitoring events (i.e., October) in 25% of the monitoring wells across the subbasin. Annual reporting will include MT hydrographs to identify potential problems, analyze what will happen as groundwater management actions change in that area, and determine if the Subbasin will recover.

Groundwater Storage

Ms. Priestaf explained that using levels as a proxy for groundwater storage is recommended for the Subbasin as groundwater level monitoring generally matches the long-term change in storage. Based on previous monitoring, it is expected that the groundwater level MTs are protective of groundwater storage and will not lead to significant and unreasonable conditions in storage.

Land Subsidence

Ms. Priestaf explained that using levels as a proxy for subsidence is also recommended for the Subbasin. Based on previous monitoring, it is expected that the groundwater level MTs are protective of land subsidence and will not lead to significant and unreasonable conditions.

Groundwater Model Status

Ms. Priestaf presented the groundwater model status. The model provides a numerical simulation of the Subbasin. The model was updated with recent inflow and outflow data and coordinated with models for adjacent basins for consistency. The model is in the process of final calibration, and a chapter for the model is underway. The model will continue to provide a reliable tool to simulate future conditions and scenarios.

Projects and Management Actions

Ms. Prickett presented the projects and management actions (PMAs) which are required under SGMA to achieve sustainability. The project team previously presented the water supply portfolio, which will be packaged into different scenarios and modeled when the model calibration is finalized. The PMAs have been grouped into two major categories: 1) SGMA implementation to comply with the SGMA requirements, and 2) PMAs.

1. SGMA implementation activities to support SGMA compliance.
2. The PMAs are actions that support sustainable water management. These PMAs are different from, but support, the water supplies that were discussed in the last workshop. Many PMAs help to convey, deliver, and recharge regional supplies. PMAs[1] that will be included in the Alternative Plan Update are grouped into the following five categories:
    - Water Conservation
    - Water Supply Development
    - Source Substitution and Replenishment
    - Water Quality Improvements
    - Other Studies and Programs

Ms. Prickett presented the objectives of scenario modeling. Scenario modeling will consider how uncertainties may affect the ability to sustainability manage water resources, as well as help the Subbasin meet SGMA regulations for balancing the water budget and avoiding groundwater overdraft.

Ms. Prickett explained there are several uncertainties for the water demand projections. Land use agencies may experience development at rates greater than anticipated, resulting in higher water demands than projected. There may also be increased agricultural water demands resulting from an influx of new farmers from neighboring subbasins that have experienced significant decreases in pumping due to SGMA. To account for these uncertainties, there was a 10% buffer added to the total

[1] Please refer to the meeting presentation for a list of PMAs considered for the Subbasin.

municipal demand (i.e., 110% of total municipal demand), and the potential new acreage for agriculture was doubled (i.e., 1,000 acres of *new* agriculture).

Ms. Prickett explained there are also many uncertainties for the supply projections. Climate change may change the local hydrology, which would reduce watershed runoff, as well as lead to additional reductions in water supplies from the Colorado River and State Water Project (SWP). SWP supplies may also decline if the Delta Conveyance project is delayed or not constructed. Other sources of uncertainty include imported water disruptions as a result of natural disasters or regulatory constraints, groundwater changes in storage and outflows, and recycled water constraints from evolving regulations and project delays. The Sites Reservoir and Lake Perris Seepage projects may also not be constructed or delayed.

Ms. Prickett presented five scenarios that are underway. These include:

1) No Project – assumes growth but no additional water supplies,
2) Baseline – assumes supplies and facilities in the Capital Improvement Program,
3) Future Projects – assumes all planned supplies and facilities including new SWP supplies, the buildout of nonpotable system, and source substitutions,
4) Future Projects with Climate Change – assumes planned supplies & facilities, limited by climate change, and
5) Future Projects with Drought – assumed planned supplies and facilities limited by reoccurring drought.

Workgroup comments and questions included the following:

- Are forecasts only quantitative versus qualitative (i.e., arsenic levels in the lower groundwater basin)?
    - The water budget (groundwater levels and volume) will be assessed quantitatively, but not the groundwater quality.

Next Steps

Ms. Prickett presented the next steps for February through April 2021. The consultant team will develop scenarios and determine how they will be input into the groundwater model. Results will be presented at the next meeting. The consultant team will also complete fieldwork and surveys for Groundwater Dependent Ecosystems (GDEs), finalize proposed PMAs and sustainability criteria based on input from Tribal and public workshops, and quantify Indio Subbasin water budget. Finally, the consultant team will finalize the 2020 Annual Report and submit to DWR by April 1. The 2020 Annual Report will be presented to the CVWD Board on March 9 and uploaded to the CVRMWG website (http://www.cvrwmg.org/).

Workgroup comments and questions included the following:

- Will the Tribal Workgroup continue even after the Alternative Plan Update is submitted? Will the Tribal Workgroup be involved in the periodic 5-year updates? If yes, what will be the frequency of meetings?
    - Yes, the Tribal Workgroup will continue but will return to the previous format. The meeting frequency will be determined by CVWD and the tribes – how often does the group want to meet? Tribal Workgroup meetings will be added to the SGMA implementation list.
        - There were no comments from the attendees on meeting frequency.

- Ms. Altrena Santillanes requested to be added to all future stakeholder meetings. Ms. Santillanes will email Ms. Prickett so that she can add her to the future Tribal Workgroup invitations and email list.

Other Planning Efforts

Ms. Zoe Rodriguez del Rey, CVWD provided updates on the *Salt and Nutrient Management Plan* (SNMP), a separate but concurrent update process with the *Indio Subbasin Alternative Plan Update*. The Regional Water Quality Control Board (Regional Board) sent a letter on February 19, 2020, and an SNMP Workplan and Monitoring Plan will be completed by December 31, 2020, to address their concerns. The workplan consists of a groundwater monitoring plan for the entire basin, as well as a scope of work for updating the SNMP. A workplan is being developed and the due date has been extended to April 30, 2021. The draft monitoring plan was submitted in December 2020 and was approved by the Regional Board in February 2021. The SNMP development workplan is being collaboratively prepared by eight water and wastewater agencies with input from the Regional Board.

Mr. Ryan Molhoek, DWA announced the *2020 Urban Water Management Plan* (UWMP) update is underway. UWMPs must be submitted every five years. DWR has released the final Guidebook. There are new requirements this round including reporting on energy use and Delta reliance. DWA is also working on updating the water shortage contingency planning so that it aligns with the 2020 UWMP. The next stakeholder meeting on the UWMP will be held on March 31, 2021, from 2:00-4:00. Visit the CVRMWG (http://www.cvrwmg.org/uwmp/) if you are interested in receiving more information. A final draft is due to DWR on July 1, 2021.

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2022 Indio Subbasin Alternative Plan Update

SGMA Tribal Workgroup

AGENDA

June 24, 2021 at 10:00 am – 12:00 pm

GoToMeeting: https://global.gotomeeting.com/join/959153965

or Dial In by Phone: +1 (312) 757-3121; Access Code: 959-153-965#

#	ITEM	TIME
1	**Welcome and Introductions** • GoToMeeting Instructions • Agenda and Meeting Objectives • Introductions	10:00 am
2	**Alternative Plan Status** • Process and Plan Update Outline	10:20 am
3	**Groundwater Conditions** • Groundwater Quality, Groundwater Dependent Ecosystems	10:25 pm
4	**Sustainable Management** • Groundwater Quality, Seawater Intrusion, Interconnected Surface Waters	10:55 pm
5	**Groundwater Model and Plan Scenarios** • Status of Model Update • Scenario Planning	11:25 pm
6	**Other Planning Efforts** • SNMP Update • UWMP Update	11:45 pm

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2022 Indio Subbasin Alternative Plan Update

SGMA Tribal Workgroup

AGENDA

August 26, 2021 at 10:00 am – 12:00 pm

GoToMeeting: https://global.gotomeeting.com/join/991180029

or Dial In by Phone: +1 (571) 317-3122; Access Code: 991-180-029#

#	ITEM	TIME
1	**Welcome and Introductions** • GoToMeeting Instructions • Agenda and Meeting Objectives • Introductions	10:00 am
2	**Alternative Plan Status** • Process and Plan Update Outline	10:20 am
3	**Groundwater Model** • Overview of Model Features and Updates	10:25 am
4	**Plan Scenarios & Projects and Management Actions (PMAs)** • Climate Change Assumptions • PMAs in each Plan Scenario	10:40 am
5	**Simulation Results** • Comparison of Baseline vs. Baseline with Climate Change • Results of 4 Climate Change Scenarios	10:55 am
6	**Other Planning Efforts** • SNMP Update	11:25 am

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2022 Indio Subbasin Alternative Plan Update

Public Workshops

Example Email Notification

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Vanessa De Anda

From:	IndioSubbasinSGMA
Sent:	Monday, August 23, 2021 5:14 PM
To:	IndioSubbasinSGMA
Subject:	REMINDER: You're Invited/Estas Invitado! Indio Subbasin Alternative Plan Update Public Workshop #6: August 26
Attachments:	Indio_Public Workshop 6_Agenda.pdf; Indio Go To Meeting Instructions_26Aug21.pdf

Indio Subbasin Stakeholders –

Reminder, our sixth public workshop for the 2022 *Indio Subbasin Alternative Plan Update* is **this Thursday, August 26**.

The 2022 *Indio Subbasin Alternative Plan Update* serves as a comprehensive update of the 2010 *Coachella Valley Water Management Plan Update*. We are inviting local community members, municipal agency staffers, non-profit organizations, farmers, landowners, business owners, tribes, and any other interested local stakeholders to attend. This is a great opportunity to get involved, learn about the planning process, and provide input on the future of groundwater management in the Indio Subbasin. This meeting will be held virtually due to COVID-19 concerns. Our meeting materials, including the PowerPoint presentation, will be available on our website (www.IndioSubbasinSGMA.org). The agenda is attached.

> **Indio Subbasin Alternative Plan Update – Public Workshop #6**
> **Thursday, August 26, 2021 at 2:00 pm – 4:00 pm**
> **GoToMeeting**
> Please join my meeting from your computer, tablet or smartphone
> https://global.gotomeeting.com/join/262772877
> You can also dial in using your phone: +1 (646) 749-3122, *Access Code*: 262-772-3122

Discussion topics will include:

- Alternative Plan Status
- Groundwater Model
- Plan Scenarios & Projects and Management Actions
- Simulation Results

To accommodate stakeholders who wish to participate in the meeting and need interpreter services, please email Arthella at indiosubbasinsgma@woodardcurran.com at least 24 hours before the start of the meeting.

It is important that we hear your voice, as this Alternative Plan Update will be used to reliably meet current and future water demands in a cost-effective and sustainable manner within your area. Your participation is greatly appreciated.

If you have any questions, feel free to contact us by phone at 213-223-9463 or email indiosubbasinsgma@woodardcurran.com.

Thank You,

Indio Subbasin GSAs

Learn more at www.IndioSubbasinSGMA.org

Partes Interesadas de la Subcuenca de Indio –

Invitamos a miembros de la comunidad, personal de agencias municipales, organizaciones no lucrativas, agricultores, terratenientes (persona que posee tierras), propietarios de negocios, tribus, y cualquier otro grupo local interesado para que asistan al tercer taller público para la actualización del plan de alternativa de la Subcuenca de Indio del 2022 (*por 2022 Indio Subbasin Alternative Plan Update*), una actualización completa del Plan de Gestión del Agua del Valle de Coachella de 2010 (por *2010 Coachella Valley Water Management Plan Update*), el cual fue aprobado como plan de alternativa para cumplir con la Ley de Gestión Sostenible del Agua Subterránea (*por Sustainable Groundwater Management Act, SGMA*). Esta es una gran oportunidad para involucrarse, conocer del proceso de planificación, y contribuir en el futuro de la gestión del agua subterránea de la Subcuenca de Indio. La reunión se celebrará virtualmente debido a las preocupaciones causadas por COVID-19. Visite nuestra página web (www.IndioSubbasinSGMA.org) para tener acceso a los materiales de la reunión.

Actualización del plan alternativa de la Subcuenca de Indio – Taller Público #6
Jueves, 26 de agosto de 2021 de 2:00 p.m. – 4:00 p.m.
(207) 558-4270, 119-495-611#

Partes interesadas que deseen participar en la reunión y necesiten servicios de interpretación, por favor de enviar un correo electrónico a Arthella a indiosubbasinsgma@woodardcurran.com con **el mínimo de 24 horas** antes del inicio de la junta.

Los temas de discusión incluirán:

- Estatus del plan de alternativa
- Modelo de agua subterránea
- Escenarios del plan y accciones de proyectos y gestión
- Resultados de la simulación

Es importante que se oiga su voz, ya que esta actualización del plan de alternativa se usará para cumplir fidedignamente con las necesidades actuales y futuras de manera asequible y sostenible dentro de su área. Le agradecemos enormemente su participación.

Por favor de contactarnos por teléfono con cualquier pregunta que tenga, llame al 213-223-9463 o por correo electrónico indiosubbasinsgma@woodardcurran.com

Gracias,

GSA(s) de la Subcuenca de Indio

www.IndioSubbasinSGMA.org

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2022 Indio Subbasin Alternative Plan Update

Public Workshops

Agendas and Meeting Minutes

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2022 Indio Subbasin Alternative Plan Update

Public Workshop

AGENDA

February 20, 2020 at 2:00 pm – 4:00 pm

Coachella Valley Water District, Board Room

75-515 Hovley Lane East, Palm Desert, CA 92211

#	ITEM	TIME
1	**Welcome and Introductions** • Introductions • Agenda • Meeting Objectives	2:00 pm
2	**Overview of Sustainable Groundwater Management Act (SGMA)** • What is SGMA? • How does SGMA apply to the Indio Subbasin? • What are the roles/responsibilities of GSAs? • What is the SGMA Timeline for the Indio Subbasin	2:20 pm
3	**Water Management Planning in the Indio Subbasin** • When did water management planning begin and how has it evolved? • What is the current status of groundwater planning?	2:40 pm
4	**Indio Subbasin Alternative Plan Update** • What is the Alternative Plan? • Is the Alternative Plan working? • What is the strategy and process to update the Alternative Plan?	3:00 pm
5	**Public Comment** • Your participation and input are important	3:30 pm
6	**Next Steps**	3:50 pm

**times are subject to change*

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2022 Indio Subbasin Alternative Plan Update

Public Workshop #1

SUMMARY

February 20, 2020 at 2:00 pm – 4:00 pm

Coachella Valley Water District, Board Room

75-515 Hovley Lane East, Palm Desert, CA 92211

Welcome and Introductions

Mr. Steve Bigley, Coachella Valley Water District, welcomed everyone to the public workshop. Mr. Edwin Lin, Todd Groundwater Inc., presented the meeting objectives and agenda, and introduced the project team working on the Indio Subbasin Alternative Plan Update. The Indio Subbasin Groundwater Sustainability Agencies (GSAs) are Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), and Indio Water Authority (IWA). The Consultant team includes Todd Groundwater Inc. and Woodard & Curran Inc.

Overview of Sustainable Groundwater Management Act (SGMA)

Mr. Lin presented an overview of the Sustainable Groundwater Management Act (SGMA). SGMA provides a framework for sustainable management of groundwater basins, promotes local management, and sets regulatory deadlines for submitting plans and reporting progress towards sustainable management. SGMA also offers State assistance in the form of funding, data, and technical support. Local GSAs are required to prepare a Groundwater Sustainability Plan (GSP) or submit an Alternative Plan. "Sustainable" management is defined as the management and use of groundwater in a manner that can be maintained without causing undesirable results.

Mr. Lin explained that the Indio Subbasin is designated as a medium-priority basin and is subject to SGMA legislation. The State has recognized the existing water management plan, the *2010 Coachella Valley Water Management Plan* (CVWMP), as a functionally equivalent Alternative Plan. The State recommends that the Indio Subbasin GSAs quantify sustainability criteria and incorporate additional elements into the *2022 Alternative Plan Update*. SGMA also requires that the Indio Subbasin be sustainably managed within 20 years.

Each Indio Subbasin GSA is responsible and has the authority for water management within its respective boundaries. The Indio GSAs have a history of cooperation, which is ongoing. A Memorandum of Understanding (MOU) has been executed and establishes an intent to foster cooperation, coordination, and communication regarding management of the Indio Subbasin. The GSAs have also agreed on collaboration and joint submission of the Alternative Plan, Annual Reports, and 5-Year Plan Updates.

Mr. Lin presented the current SGMA timeline for the Indio Subbasin. The Indio GSAs formed in June 2017 and the Alternative Plan, submitted in December 2016, was approved by DWR in July 2019. The 2022 Alternative Plan Update must be submitted by January 1, 2022. From then, the GSAs are required to prepare four 5-Year Plan Updates, with the expectation that the Indio Subbasin will achieve groundwater sustainability by 2042.

Water Management Planning in the Indio Subbasin

Mr. Lin presented the history of water management in the Indio Subbasin. Multiple sources of water have been developed to ensure a reliable supply for the region. Stormflows from the Whitewater River were captured and used for groundwater recharge beginning in 1918. The Coachella Canal, which imports Colorado River water, was completed in 1949. CVWD and DWA contracts for State Water Project (SWP) water began in 1963. SWP water is exchanged for Colorado River water via the Colorado River Aqueduct as there are no physical SWP facilities to deliver the SWP allocations. Since 1973, this SWP exchange water has been used to recharge the Indio Subbasin at the Whitewater River Groundwater Replenishment Facility. Finally, water recycling within the Indio Subbasin began in 1965.

Mr. Lin then presented the history of the CVWMP and other water management plans. The 2010 CVWMP serves as the Indio Subbasin Alternative Plan. The Plan assessed future growth and land use changes, estimated future water demands and supplies, and established data collection and monitoring programs to track groundwater conditions and Plan performance. The 2010 CVWMP also identified management actions needed to meet current and future water demands in a cost effective and reliable manner. Mr. Lin then explained that the Alternative Plan shared the same goals and met the requirements of a GSP. Agencies in the Indio Subbasin use a combination of management actions to meet local water demands, including local stormwater water and imported water for direct replenishment of groundwater, non-potable water and recycled water for source substitution, and agricultural, golf, and urban conservation. The Alternative Plan has resulted in a significant increase in groundwater storage across the Indio Subbasin and groundwater levels have increased regionally. More work is needed to ensure continued success of the Alternative Plan.

Indio Subbasin Alternative Plan Update

Mr. Lin described the purpose of the Alternative Plan and outlined the tasks involved in preparing the plan. Tasks include assessing the existing plan, estimating future water demands and supplies, establishing quantifiable sustainability goals, and implementing a stakeholder and public outreach plan. The Alternative Plan Update will include an update of the Coachella Valley groundwater flow model to support the development of current and future water budgets. The process will include eight quarterly public workshops, in which the project team will report on progress, share results and findings, and solicit input and feedback. The 2022 Alternative Plan Update Report Draft is expected to be ready for public review and comment in early Fall 2021. The Final Report will be prepared in Winter 2021.

Mr. Lin encouraged workshop participants to visit the Indio Subbasin website (www.IndioSubbasinSGMA.org) for more information on the planning process and to learn how to get involved. He emphasized that public participation and input are important components to this planning process. The goals of the public outreach task are to keep the public informed about the planning process, engage diverse interested parties, and respond to and incorporate public concerns and feedback.

Public Comment

Mr. Lin invited workshop participants to ask questions and provide comments:

- The East Area of Benefit (east of Washington) has been depleted since 2010 and is down 4.5 million acre-feet. SGMA doesn't necessarily address putting water back into the [Indio Subbasin] and some wells are 200 feet down.

- The SWP is dependent on the Delta Conveyance Project (Delta Fix) and may add 22,000 acre-feet per year (AFY) of water (8%) in deliveries. However, the cost is $380 million in present value, which is $1 billion over a 30-year timeline. The 2010 CVWMP shows a 14% conservation goal for agriculture and a 20% reduction for Municipal & Institutional demands. Agricultural users have never met their 14% conservation goal. Why would we pay $1 billion for the Delta Fix, when we would save equally as much through agricultural conservation?
- CVWD has more water than it knows what to do with. The Palm Desert Groundwater Replenishment Facility was built so that it could store the water. The CVWD Board of Directors has taken the approach to sell water as cheaply as possible to get rid of that water. We need to look more at conservation. Why can't we bank that water in the groundwater basin or Lake Mead or somewhere else?
- Golf irrigation is an "unreasonable use" of water. CVWD's goal is to get golf courses off groundwater supply and sell Coachella Canal water.
- Consumptive returns of agriculture water amount to 90 AFY. However, this water hits the aquitard and doesn't get back into the aquifer. This should not be counted as "sustainable groundwater."
- The 2010 CVWMP is based on assumptions of 138 golf courses. I would love to see rapid growth of golf, but there is not enough playership to support this kind of growth.
    - Do we have access to growth projections from the golf industry? We would like this data.
- Is the GSP goal for 2042 to get back to 1970s levels? Or is this undetermined at this point?
    - The goal is to prevent undesirable results. We have not determined "undesirable results" for Indio Subbasin yet. Example goals include maintaining the good trend we are on or not allowing groundwater elevations to reduce further.
- Will all six sustainable management criteria identified by DWR be addressed?
    - Five sustainable management criteria will be addressed. Seawater intrusion is not applicable to Indio Subbasin and will not be addressed.
- Why are we not addressing seawater intrusion? We don't have ocean water, but we do have high salinity water intrusion from the Salton Sea.
    - We are looking at this issue under the "water quality" criteria. We will evaluate salinity along the margin between the Salton Sea and the Indio Subbasin.
- Fifty-two percent of golf courses are connected to the Non-Potable Water (NPW) system. Do we have a list of those golf courses and what is the process for connecting new systems?
    - CVWD will follow up with the commenter on the process for connecting golf courses to the NPW system.
- How will the Coachella Valley Salt and Nutrient Management Plan (SNMP) be incorporated into the Alternative Plan?
    - The SNMP is currently under review by the Regional Water Quality Control Board (RWQCB). The RWQCB said it is planning additional outreach and studies. We need to move forward with the Alternative Plan Update while waiting on the RWQCB's decision on the SNMP. The Alternative Plan will report out on the progress of the SNMP for the 2022 Alternative Plan Update.

    - The SNMP is a Coachella Valley-wide effort and is not specific to the Indio Subbasin. We will need to incorporate all stakeholders. The first SNMP took three years. This Alternative Plan update is due in less than two years.
- The RWQCB released findings on Coachella Valley SNMP yesterday.
    - CVWD has not received notice that the findings were released, but will look for them.
    - The GSAs are working to address salt and nutrient management issues through the SNMP development process, and DWR is aware of this approach.
- The CVWD rate system disincentivizes source substitution – there is a disparity between the Replenishment Assessment Charges (RACs) and Coachella Canal rates. The golf course rates should be modeled after incentives that coastal California water agencies are using. For example, Los Angeles Department of Water and Power (LADWP) based its water budgets on 80% Model Water Efficient Landscape ordinance (MWELO) if signed up for the program. In the program, operations decisions are open/free.

Next Steps

Mr. Lin announced to workshop participants that the next Public Workshop will be held on May 21, 2020 from 2:00 – 4:00 PM at a location to be determined. He reminded participants to make sure they're on the stakeholder email list to receive workshop updates. For additional information, please contact Rosalyn Prickett at: IndioSubbsinSGMA@woodardcurran.com or (858) 875-7420.

2022 Indio Subbasin Alternative Plan Update

Workshop #2

AGENDA

May 21, 2020 at 2:00 pm – 4:00 pm

GoToMeeting: https://global.gotomeeting.com/join/642252461

or Dial In by Phone: +1 (646) 501-3412; Access Code: **642-252-461** #

#	ITEM	TIME
1	**Welcome and Introductions** • GoToMeeting Instructions • Agenda and Meeting Objectives • Introductions	2:00 pm
2	**Alternative Plan Status** • Overview of SGMA and How it Applies in Indio Subbasin • Indio Subbasin Alternative Plan	2:20 pm
3	**Plan Area** • Planning Boundary and Land Use	2:30pm
4	**Hydrogeologic Conceptual Model (HCM)** • HCM Components • Hydrogeologic Cross Sections • Groundwater Production, Levels, and Quality • Land Subsidence and GDEs	2:35 pm
5	**2010 Plan Assessment** • Population Growth • Water Demands • Water Supply	2:50 pm
6	**Groundwater Model Assessment & Approach** • 2010 CVWMP Model Assessment • Groundwater Model Update Approach	3:05 pm
5	**Public Comment** • Your participation and input are important	3:15 pm
6	**Schedule and Next Steps**	3:45 pm

**times are subject to change*

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2022 Indio Subbasin Alternative Plan Update

Public Workshop #2

SUMMARY

May 21, 2020 at 2:00 pm – 4:00 pm

GoToMeeting for Presentation and Microsoft Teams for Spanish Translation Services

Members of the Public	Groundwater Sustainability Agencies (GSAs)
• Aaron Rojas, Twenty-Nine Palms Band of Mission Indians • Brian Macy, Mission Springs Water District • Cathy Sanford, Regional Water Quality Control Board • Craig Kessler, Southern California Golf Association and CVWD Golf and Water Task Force • Crystal Sandoval, Cathedral City • George Cappello, Grimmway • Jim Schmid, HiLo Desert Golf Course • Justin Conley, Agua Caliente Band of Cahuilla Indians • Kevin Fitzgerald – Southern California Golf Association • Kimberly Romich, California Department of Fish & Wildlife • Margaret Park, Agua Caliente Band of Cahuilla Indians • Melanie Rivera, Kennedy Jenks • Michael Magnani, HiLo Golf Course Superintendents Association • Nataly Escobedo Garcia, Leadership Counsel for Justice & Accountability • Nina Waszak, Coachella Valley Water Keeper • Parker Cohn, Greener Golf • Patrick Taber, Bureau of Indian Affairs • Rolland M. Vaugn, Troon Golf / Shadow Hills Golf Club • Ron Buchwald, Valley Sanitary District • Ryan Zeferino Llamas, Audubon California • Steven Ledbetter, Mission Springs Water District • Tom Calabrese, Envirologic Resources	• Adekunle Ojo, Indio Water Authority (IWA) • Angela Johnson, Coachella Valley Water District (CVWD) • Ashley Metzger, Desert Water Agency (DWA) • Castulo Estrada, Coachella Water Authority (CWA) • David Wilson, CVWD • Elizabeth Campos, CVWD • Ivory Reyburn, CVWD • Jamie Pricer, CVWD • Jennifer Shimmin, CVWD • Katie Evans, CVWD • Melanie Garcia, CVWD • Mike Nusser, CVWD • Nancy Munoz, CVWD • Olivia Bennett, CVWD • Reymundo Trejo, IWA • Ruben Rivera, CVWD • Ryan Molhoek, DWA • Steve Bigley, CVWD • Trish Rhay, IWA • Zoe Rodriguez del Rey, CVWD **Consultant Team** • Arden Wells, Todd Groundwater • Edwin Lin, Todd Groundwater • Erica Wolski, Woodard & Curran • Iris Priestaf, Todd Groundwater • John Ayres, Woodard & Curran • Nicole Poletto, Woodard & Curran • Rosalyn Prickett, Woodard & Curran

Welcome and Introductions

Ms. Rosalyn Prickett, Woodard & Curran, welcomed everyone to the public workshop and briefed everyone on how to use the virtual GoToMeeting platform. Ms. Prickett then presented the meeting objectives and agenda, and introduced the project team working on the 2022 Indio Subbasin Alternative Plan Update. The Indio Subbasin Groundwater Sustainability Agencies (GSAs) are Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), and Indio Water Authority (IWA). The Consultant team includes Todd Groundwater Inc. and Woodard & Curran, Inc. Ms. Prickett held a roll call for all attendees of the virtual meeting. There were approximately 46 attendees; some callers were unidentified.

Alternative Plan Status

Mr. Edwin Lin, Todd Groundwater, presented an overview of the Sustainable Groundwater Management Act (SGMA). SGMA provides a framework for sustainable management of groundwater basins, promotes local management, and sets regulatory deadlines for submitting plans and reporting progress towards sustainable management. SGMA also offers State assistance in the form of funding, data, and technical support. Local GSAs are required to prepare a Groundwater Sustainability Plan (GSP) or submit an Alternative to a GSP (Alternative Plan). The GSAs are currently in the process of updating the approved Alternative Plan. "Sustainable" management is defined as the management and use of groundwater in a manner that can be maintained without causing undesirable results. Five undesirable results have been identified; chronic lowering of groundwater levels, reduction of groundwater storage, land subsidence, groundwater quality degradation, and depletion of interconnected surface water.

Mr. Lin explained that the Indio Subbasin is designated as a medium-priority basin by the State and is subject to SGMA legislation. The State has recognized the existing water management plan, the *2010 Coachella Valley Water Management Plan (CVWMP) Update*, as a functionally equivalent Alternative to a GSP (Alternative Plan). The State recommends that the Indio Subbasin GSAs quantify sustainability criteria and incorporate additional elements into the *2022 Indio Subbasin Alternative Plan Update*. SGMA also requires that the Indio Subbasin be sustainably managed within 20 years.

Each Indio Subbasin GSA is responsible and has the authority for water management within its respective boundaries. The Indio GSAs have a history of cooperation, which is ongoing. A Memorandum of Understanding (MOU) has been executed and establishes an intent to foster cooperation, coordination, and communication regarding management of the Indio Subbasin. The GSAs have also agreed on collaboration and joint submission of the Alternative Plan, Annual Reports, and 5-Year Alternative Plan Updates. The 2022 Indio Subbasin Alternative Plan Update must be submitted by January 1, 2022. From then, the GSAs are required to prepare 5-Year Alternative Plan Updates, with the expectation that the Indio Subbasin will achieve groundwater sustainability by 2042.

The 2022 Indio Subbasin Alternative Plan Update is currently underway. The team has assessed the existing plan and is currently updating and processing datasets and documenting current groundwater conditions. Future tasks will project future supplies and demands, establish quantifiable sustainability goals and criteria, and assess data collection and monitoring programs. These tasks will be presented at a future meeting, and therefore public participation is important to ensure the best available information is incorporated into the Alternative Plan Update and it responds to the publics concerns.

Plan Area

Ms. Prickett presented an overview of the plan area that will be considered in the Alternative Plan Update. The Indio Subbasin planning boundary is slightly larger than the subbasin and extends to the east to include the potential sphere of influence for IWA and CWA in Desert Hot Springs Subbasin, and extends to the South to include portions of CVWD's service area. This ensures the Alternative Plan Update will more accurately reflect supply and demand. Ms. Prickett then displayed the General Plan Buildout map from the Southern California Association of Governments (SCAG) from the *2020 Regional Transportation Plan and Sustainable Communities Strategy*. The land uses in map are being used to forecast future water demands.

Hydrogeologic Conceptual Model

Mr. Lin explained that a Hydrogeologic Conceptual Model (HCM) is a collection of maps, cross-sections, figures, and tables that provide a framework for understanding the movement of surface water and groundwater in the Indio Subbasin. The HCM provides context to identify major water budget components and the basis for the development of a numerical groundwater model. The numerical groundwater model has been developed but needs to be updated to include recent data. This process will help identify data gaps.

There are seven major features of the HCM. All components are currently being processed by the team, and Mr. Lin presented preliminary results for each component. Mr. Lin provided more detail on each component of an HCM:

1. *Hydrogeologic Cross Sections*: Five cross sections will be used to illustrate basin geometry and subsurface conditions, including major aquifers and aquitard units, the effect of faults, groundwater levels, and production well screen intervals. Three groundwater replenishment facilities in the plan area are active and the cross sections will show them.
2. *Surface Water and Natural Recharge*: There are 24 recharge points for the plan area where tributary watersheds generate runoff that recharges the Indio Subbasin through stream flow recharge or mountain-front recharge. The team is currently updating runoff/recharge estimates from 18 weather stations and streamflow data from 20 USGS gauge stations.
3. *Groundwater Production*: Annual groundwater production maps demonstrate production by well and general production volume per square foot.
4. *Groundwater Levels*: Groundwater level maps compare observed and projected groundwater levels.
5. *Groundwater Quality*: The Alternative Plan Update will review the same constituents of concern that were evaluated as part of the *2010 Coachella Valley Water Management Plan Update*.
6. *Land Subsidence*: The cooperative agreement between USGS and CVWD has provided good data to evaluate subsidence from 1995 to 2017. In some portions, ground surface elevation levels dropped, but have stabilized since 2010, and even recovered in some places.
7. *Groundwater Dependent Ecosystems (GDEs)*: GDEs are wetland and riparian habitats that are dependent on the regional aquifer. This component involves a desktop evaluation and biological field assessment.

Plan Assessment

Ms. Prickett explained that the plan assessment will compare projections from the *2010 CVWMP Update* to historical demand and supply data through 2019. Part of the work moving forward will be to understand the previous assumptions used, and then to revise them to match current conditions and agreements. Ms. Prickett used the difference in population projections as an example of the updated projections. The population projection for the Alternative Plan Update uses 2020 SCAG data, which is very close to the 1998 SCAG data projections used in the *2002 CVWMP,* estimating population in the Coachella Valley to be approximately 615,000 people, instead of over 1.1 million, by 2045. In addition to a lower population projection from the *2010 CVWMP Update,* the Alternative Plan Update will also show a lower water demand than projected previously. The *2010 CVWMP Update* projected a great deal of urbanization, and that growth was not realized, therefore demand is below the projection. Additionally, several statewide droughts have decreased water use.

Ms. Prickett reviewed the six water supply sources for the plan area, including groundwater, State Water Project (SWP) water, Colorado River water, surface water, and recycled water. Water conservation is considered the sixth water supply source because conservation offsets the need to develop additional supplies. Groundwater replenishment consists of SWP water, Colorado River water, and surface water in the Indio Subbasin. Ms. Prickett discussed each source and its associated *2010 CVWMP Update* assumptions.

Groundwater Model Assessment & Approach

Mr. Lin explained the original groundwater model was developed in the late 1990s for the 2002 CVWP, and included a historical calibration period from 1936-1996. Actual data from 1997-2008 was incorporated into the model for the *2010 CVWMP Update,* as well as a future predictive period from 2009-2075 to project groundwater pumping, demand, and supplies. Mr. Lin then explained that the team is currently reviewing the model and plans to input additional actual data from 2009 – 2019 to better estimate current and future water budgets, evaluate benefits of proposed management actions, and support identification of appropriate sustainability criteria. The model calibrates well in the eastern Coachella Valley. There is a slight departure in the western Coachella Valley between predictive and observed groundwater levels due to advanced deliveries at the Whitewater River Groundwater Replenishment Facility (GRF).

Public Comment

Ms. Prickett invited workshop participants to ask questions and provide comments:

- *Craig Kessler*: At the February meeting, the Coachella Valley golf community accepted your offer to provide the market data necessary to address Task 4 (estimated future water demand and supplies). Of course, COVID-19 intervened, putting us behind in getting that information to you. What is the new deadline for submittal of that information?
    - Mid-July 2020. This information is needed to develop an assumption for the demand forecast. The team is calculating water use factors for residential and commercial users and applying them to land use maps over time from SCAG. At the next workshop, we will talk about the methodology and change in demand use factors and present a draft demand forecast.
- *Crystal Sandoval*: What does AFY mean?
    - AFY = Acre-feet per year
- *Parker Cohn*: Referring to Slide 38, is golf categorized as agricultural or urban water use?
    - Urban water use. This is from the 2019 Annual Report.
- *Parker Cohn*: What percentage of urban water users (homeowners) receive their irrigation water from golf irrigation systems? For instance, the pumps that provide pressure to the golf course also provides the pressure to irrigate lawns of HOAs.

- We will return to the August meeting with data on this topic when we discuss the demand projections.
- *Parker Cohn*: Thank you. It would be helpful to distinguish water conservation efforts between urban and golf. There is grey area.
- *Craig Kessler*: Parker's question goes to the circumstance in which the same water that is used to irrigate the golf course is used to irrigate the common areas and surrounds of an adjoining HOA.
- *Parker Cohn*: Thanks for clarifying Craig. I have witnessed excessive homeowner/HOA water use in this scenario and that information would help us understand the relationship between golf courses and homeowners/HOAs categorized as "urban water use".
- *Zoe Rodriguez Del Rey*: Most golf courses are on their own private wells and for the most part, irrigation supply and domestic supply is separate. Irrigation is from a mixture of private wells and golf courses that are receiving Canal water directly or recycled water from WRP-4 and WRP-10.
- *Parker Cohn*: What percentage of homeowners receive their irrigation water by means of a golf course? Adjoining HOAs, homeowners, etc. How many acres, or square feet? This information could help develop a hypothesis that homeowners and HOAs in these areas are much less water conscious than both golf courses and the urban population.

- *Margaret Park*: How will salt and nutrient planning be addressed in the Alternative Plan Update? The existing Alternative Plan assumed the districts would already have a Salt and Nutrient Management Plan (SNMP) in place, but that has not been finalized. How will this Alternative Plan Update incorporate the SNMP?
  - *Zoe Rodriguez del Rey*: The SNMP is separate from the Alternative Plan Update. Due to the tight schedule for the Alternative Plan Update, the Alternative Plan Update and SNMP will be implemented in parallel. The Alternative Plan Update will include information on SNMP progress.
  - *Zoe Rodriguez del Rey*: At our first Public Workshop in February, we discussed that the Regional Water Quality Control Board (RWQCB) had sent a letter to the three agencies that had submitted the 2015 SNMP (CVWD, DWA, and IWA). In the letter, the RWQCB provided an evaluation of the SNMP and provided recommendations to update the plan prior to approval. The three agencies have met with the RWQCB to determine next steps. The agencies recommended that the next step would be to move to develop a workplan to develop the SNMP, which the RWQCB found reasonable and asked the agencies to submit a formal request in writing. All agencies within the Coachella Valley that are water or wastewater providers that have a stake in the approved SNMP (about 8 agencies) have agreed to participate in the process. A scope of work was released on Tuesday May 19th to develop the SNMP work plan and schedule. Proposals are due June 9th.
- *Nataly Escobedo Garcia*: How will you look at degradation of groundwater quality in regard to the Salton Sea?
  - Groundwater quality and quantity will be characterized as part of the Alternative Plan Update. We would have to look at what the *2010 CVWMP Update* impact assumptions were and update them as needed.
- *Nataly Escobedo Garcia*: How is the Alternative Plan Update incorporating the needs of communities near the Salton Sea (specifically eastern Coachella Valley)? Community impacts

include groundwater quality, quantity, and land subsidence. How are these communities taken under consideration to ensure the impacts do not happen in the future?

  - The purpose of SGMA is to avoid undesirable results, and negative community impacts are undesirable. These communities will be considered when establishing sustainability criteria in the Alternative Plan Update.

- *Nataly Escobedo Garcia*: Many communities in the eastern Coachella Valley do not have access to broadband/WiFi. How are we planning to host the other public workshops?
  - Our goal is to host all workshops in person. With the pandemic, we are using technology available to share updates on the work we have been doing. The virtual GoToMeeting platform allows us to use desktop or web video, or phone audio, so all stakeholders can participate. We have also provided Spanish translation on announcements, the website, and for meetings to increase meeting accessibility.
- *Nataly Escobedo Garcia*: How will the GSAs handle adopting the Alternative Plan Update? Once decisions are made and taken to individual Boards, will the adoption be included in regular board meetings or will separate special GSA meetings be planned?
  - *Zoe Rodriguez del Rey*: For CVWD, our decision-making body is our Board. We will provide quarterly updates on the process and agendize when decisions will be made. At the end of the process, the Alternative Plan Update will be considered in its entirety and adopted at a regular or special Board meeting.
  - *Ashley Metzger*: Same process. DWA will approve the plan at a regular or special Board meeting depending on the circumstances on what is on the agenda at that time.
  - *Adekunle Ojo:* The process is the same for IWA.
- *Nataly Escobedo Garcia*: I cannot find any information online on how stakeholders can engage in the GSA Management Meetings.
  - The GSAs present all their work through the Public Workshops.
- *Aaron Rojas*: On Slide 45, can you clarify the departure between the groundwater model projection for 2009-2019 and what was actually recharged?
  - The difference was the Advanced Delivery water that was received and recharged at the Whitewater River GRF, which was much higher than projected in the *2010 CVWMP Update*.

Next Steps

Ms. Prickett directed participants to our homepage (www.IndioSubbasinSGMA.org) and encouraged people to sign up for email updates. She announced to workshop participants that the next Public Workshop will be held on August 27, 2020 from 2:00 – 4:00 PM at a location to be determined, if safe to meet in person. If not, the GSAs will host another meeting virtually. She reminded participants to make sure they are on the stakeholder email list to receive workshop updates. For additional information, please contact Rosalyn Prickett at: IndioSubbsinSGMA@woodardcurran.com or (858) 875-7420.

2022 Indio Subbasin Alternative Plan Update

Workshop #3

AGENDA

November 19, 2020 at 2:00 pm – 4:00 pm

GoToMeeting: https://global.gotomeeting.com/join/208631461

or Dial In by Phone: +1 (872) 240-3212; Access Code: 208-631-461#

#	ITEM	TIME
1	**Welcome and Introductions** • GoToMeeting Instructions • Agenda and Meeting Objectives • Introductions	2:00 pm
2	**Alternative Plan Status** • Process and Plan Update Outline	2:20 pm
3	**Plan Area** • Topics to Provide Geographic Context	2:25 pm
4	**Hydrogeologic Conceptual Model (HCM)** • Topics to Describe Hydrogeologic Setting	2:35 pm
5	**Groundwater Model Update** • Status of Model Update	2:50 pm
6	**Demand Forecast** • Municipal, Agricultural, Golf and Other Demands	3:05 pm
7	**Supply Analysis** • Available Future Supplies	3:20 pm
8	**Next Steps** • Emerging Issues	3:35pm
9	**Public Comment** • Your Participation and Input are Important	3:45 pm
10	**Get Involved**	3:55 pm

**times are subject to change*

2022 Indio Subbasin Alternative Plan Update

Public Workshop #3

SUMMARY

November 19, 2020 at 2:00 pm – 4:00 pm

GoToMeeting for Presentation and Microsoft Teams for Spanish Translation Services

Members of the Public	Groundwater Sustainability Agencies (GSAs)
• Amy McNeill, Riverside County Flood Control and Water Conservation District • Brian Macy, Mission Springs Water District • Cathy Sanford, Regional Water Quality Control Board • Chuck Jachens, Bureau of Indian Affairs • Craig Kessler, Southern California Golf Association and CVWD Golf and Water Task Force • Daniel Carney, Eastern Municipal Water District • Diana Ugarte Navarro, Torres Martinez Desert Cahuilla Indians • Golf Course Superintendents Association of America • Hector, La Quinta Grower • Jennifer Harkness, United States Geologic Survey (USGS) • John Covington, Morongo Band of Mission Indians • Justin Conley, Agua Caliente Band of Cahuilla Indians • Kevin Fitzgerald – Southern California Golf Association • Kimberly Romich, California Department of Fish & Wildlife • Kim Taylor, USGS • Manny Rosas, Agua Caliente Water Authority • Margaret Park, Agua Caliente Band of Cahuilla Indians • Nataly Escobedo Garcia, Leadership Counsel for Justice & Accountability • Nina Waszak, Coachella Valley Water Keeper • Randy Roberts, Palm Desert Resident • Ron Buchwald, Valley Sanitary District • Steven Ledbetter, Mission Springs Water District • Tarren Torres, Egoscue Law Group representing Agua Caliente Band of Cahuilla Indians • Tim Bradshaw, La Quinta Grower • Tom Calabrese, Envirologic Resources	• Angela Johnson, Coachella Valley Water District (CVWD) • Ashley Metzger, Desert Water Agency (DWA) • Castulo Estrada, Coachella Water Authority (CWA) • Ivory Reyburn, CVWD • Jamie Pricer, CVWD • Jason Lucas, CVWD • Jim Barrett, CVWD • Katie Evans, CVWD • Melanie Garcia, CVWD • Nancy Munoz, CVWD • Reymundo Trejo, IWA • Ryan Molhoek, DWA • Steve Bigley, CVWD • Trish Rhay, IWA • Zoe Rodriguez del Rey, CVWD **Consultant Team** • Iris Priestaf, Todd Groundwater • Maureen Reilly, Todd Groundwater • Nicole Poletto, Woodard & Curran • Rosalyn Prickett, Woodard & Curran

Welcome and Introductions

Ms. Rosalyn Prickett, Woodard & Curran, welcomed everyone to the meeting and introductions were made as participants joined the call. Ms. Prickett briefed everyone on how to use the virtual GoToMeeting platform. She reintroduced the project team working on the Indio Subbasin Alternative Plan Update. The Indio Subbasin Groundwater Sustainability Agencies (GSAs) are Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), and Indio Water Authority (IWA). The Consultant team includes Todd Groundwater Inc. and Woodard & Curran, Inc. Ms. Prickett held a roll call for all attendees of the virtual meeting. There were approximately 40 attendees; some callers were unidentified.

Ms. Iris Priestaf, Todd Groundwater reviewed the meeting objectives and presented the agenda for today's workshop.

Alternative Plan Status

Ms. Priestaf presented an overview of the Alternative Plan Update tasks. Outreach is a key task throughout the Alternative Plan Update process. There are 12 chapters in the Plan and Ms. Priestaf walked attendees through the outline of the document, beginning with information included in the Plan Area chapter.

The Plan Area chapter will include maps that note the location of cities and counties, tribal lands, federal and state lands, and disadvantaged communities, etc. The purpose of these maps is to depict the location of agencies that have water management and/or land use planning roles and to understand the region. One map depicts water management facilities including water sources and infrastructure in the region as well as accompanying descriptions. A water resource monitoring networks and programs map introduces climate, streamflow, subsidence, groundwater elevations, surface water and groundwater quality, groundwater pumping, and drain flows.

If anyone has any updated information or input for the maps, please let the team know.

- Will maps include where DAC communities are located?
    - Yes, we have included mapping of DACs.
- Will DAC communities be included on the monitoring networks map?
    - If this question is asking if there is adequate monitoring for DACs, we can compare the maps. Part of the monitoring program is to assess where monitoring sites are and where additional monitoring sites may be needed.
    - This may be something that we bring back into our presentation on the monitoring network. While we may not include it in the Plan itself, we could include it in the February workshop.
    - We could also include small water systems on this map.
        - That would be great!

Hydrogeologic Conceptual Model (HCM)

Ms. Priestaf introduced the HCM which establishes the physical framework for the Plan Area. The HCM cross sections allow for a depth view of the basin and depict geology, wells, faults, and groundwater levels to improve understanding of what is below the surface. Ms. Priestaf walked the attendees through a cross-section graphic to explain the constituents that make up the basin. The lighter colored sand and gravel is permeable, and as the constituents get darker, they become less permeable. For example, clay is less permeable compared to sand. Slide 19 indicates how fault zones impact water levels in the basin, decreasing depth to surface and then causing a sudden drop in flow due to faults.

Ms. Priestaf also explained groundwater inflow and outflow in the Indio Subbasin. Slide 21 depicts a panoramic view of the topography of the Basin. There are markers along the cross section to let you know where you are located on land. In the upper valley, the basin is permeable, and as you move towards the Salton Sea, there is more clay soil. Groundwater levels near the Salton Sea are much closer to the surface compared to the upper valley. With this information, the groundwater model will simulate the Subbasin.

Groundwater Model Update

Ms. Maureen Reilly, Todd Groundwater provided an update on the groundwater model. The HCM shows that the basin has not changed considerably from the previous plan. This model builds upon the consistency of previous estimates, adds new pumping data for all wells, updates subsurface inflow and Salton Sea elevations, and develops recharge estimates for 2010-2019. These updates improve the data and methods used in the 2010 model.

First, the team characterized the inflow in the basin from various sources. Inflow included:

- Mountain and Stream - USGS gages help depict mountain front recharge and stream percolation throughout the basin. Mountain flow routes water through the watershed. Mountain flow is typically in the southern end of the basin and subsurface flow exists in the eastern end of the basin.
- Golf - The team inventoried golf courses in the basin and identified their water supply sources. Comparing the supply with the expected demand gives return flow. The supply and return flow were similar to the previous analysis in 2010, but improved the spatial variability of irrigation efficiency.
- Agricultural - The agricultural return flow was calculated using the Trimester Crop Census. The Census shows what crops are being grown when and where and can help provide an understanding of the amount of water that is being used. It depicts multicropping and permanent crops to allow for detailed temporal change of water use in the Basin.
- Municipal – Municipal return flow was calculated looking at outdoor water use. The model was able to vary the local outdoor use spatially.

The major outflow in the basin is groundwater pumping. The depth of pumping impacts water conditions. As water use changes, the well depth data can give a better picture of how the basin conditions may change.

In order to confirm if the groundwater model simulates reality, observation wells were used to compare simulated and observed values. The team coordinated with neighboring basins in order to ensure consistency. This tool will allow for scenario planning in the future.

Demand Forecast

Ms. Prickett noted that the demand forecast results presented are preliminary. Feedback was encouraged to determine if any changes needed to be made. The demand forecast is based on 11 geographic units used to identify the underlying demographic information that included land use and water use patterns in each area. This includes an east and a west unincorporated area in order to analyze the data at a finer scale.

Municipal Demands

There are five major steps to determine the municipal demands forecast: the regional growth forecast, land use inventories, unit demand factors, projected water loss, and adjustment factors. These steps are discussed in more detail below.

1) Regional Growth Forecast – The Southern California Association of Governments (SCAG) 2020 data was used to provide projections for households, employment, and population. SCAG data was used in the previous plans. These growth forecasts are based on the City and County General Plans and other planning documents for the agencies. The SCAG growth forecast projects that for the Plan Area, population will increase by approximately 53%, households will increase 66% and employees will increase 39%. These projections are more in line with the 2002 Plan. Because the Alternative Plan Update is due before the US Census data is released, the SCAG 2020 numbers were used.
2) Land Use Inventories – This is important to project housing units in alignment with demand. SCAG and US Census data helped determine the number of occupied households vs planned. About 30% of the housing units in the Plan Area are vacant or are only occupied seasonally but may continue to have water use and therefore it is important to incorporate. The SCAG land use inventory map shows land use based on the City and County general plans. Over time, a slight shift to multi-family units are expected, but the split between single family and multi-family units will remain relatively equal at the end of the planning horizon.
3) Unit Demand Factors – Unit demand factors use 5-year averages from customer billing data (2015-2019). It is important to note that the demand factors show gallons per housing unit or gallons for employee per day for industrial use, which is not equivalent to gallons per capita per day (GPCD). A demand factor for all GSAs was calculated. CVWD's single family demand factors were calculated for each of the geographic units within their service area. Water demands for small water systems throughout the eastern unincorporated area were applied to the demand factor for CVWD to accommodate other housing units that are not currently served by CVWD's domestic system. All of DWAs designated land use meters show up in the Commercial, Industrial, and Institutional (CII) category rather than the designated Landscape category.
4) Projected Water Loss – Water loss is based on audited water loss reports for the water that is lost between delivery and the meters. Water loss is estimated at about 10%.
5) Adjustment Factors –Demands are adjusted by conservation savings estimates for indoor and outdoor water use. Passive conservation includes indoor conservation (e.g. changes in indoor plumbing) and outdoor conservation for only future development (new development efficiencies) and not existing development. Conservation for existing development will be applied separately.

In summary, there is a 43% increase in projected municipal demands over time. Each GSA is depicting a projected increase in demand ranging from 28% (DWA) to 190% (CWA).

Discussion: What industries are changing? How is residential seasonality changing over time?

- Is there a demand forecast for tourism and the impact that will have on water demands?
    - Yes, tourism was considered in the Commercial, Industrial, Institutional category of the municipal demand forecast

Agricultural Demands

The forecast process was similar to the municipal demands forecast. Ms. Prickett explained that the team analyzed the regional growth forecast, land use inventories, and unit demand factors. The forecast considered the SCAG 2020 growth projections for households, population, and employment. The land use inventory identified idle and agricultural lands for conversion based on SCAG land use mapping to see which agricultural areas may be going out of service. 5-year averages (2015-2019) from agricultural pumping and Canal delivery data were used to develop unit demand factors.

The baseline demand for the 5-year average of 2015-2019 is 205,150 AFY. These projections were applied to the crop census to estimate the total cropped acres and develop demand factors. The average unit demand factors ranged from approximately 4.3 acre-feet/acre to 7.3 acre-feet/acre. This affects the agricultural demand factors because changing agriculture in the future years impact the demand forecast in the geographic units. Within CWA and IWA especially, a total of approximately 14,300 acres are expected to be converted from agricultural or idle land to urban land. The forecast predicts an overall decrease in water demand, even with the addition of approximately another 1,000 acres of agricultural land converted from idle land.

Discussion: Is agriculture stable, growing, or shrinking over the next 20 years? What are current trends in local agriculture? What crops are changing and where?

- Due to a scheduling conflict, many of the agricultural stakeholders could not attend today's meeting. CVWD will be following up with them.
- How are conservation savings factored into your plan of 42,000 AF?
    - We are separating passive and active conservation programs in the Alternative Plan Update. This forecast only includes passive conservation.
    - The goal of 42,000 AF has been deferred for 10 years and I'd like to see it referenced in this plan. I have been bringing this up for multiple years. Conservation goals need to be addressed.

Golf Demands

The golf water demands followed a similar format to calculate the baseline demand. It also planned for conservation from future golf courses to comply with CVWD Ordinance No. 1302.4. In the last 10 years, two golf courses were opened, and two very small courses were closed, depicting a potential flat line in the golf industry. Ms. Prickett explained that the team also talked to the Southern California Golf Association to understand projected growth, and they did not project significant growth. The current demand forecast assumes three new golf courses will be constructed before 2045.

Discussion: Are you aware of any new or planned golf courses? What are current trends in golf?

- We've predicted that by 2030 there will be three less golf courses than there are now and we are not projecting any additional future courses. COVID-19 has caused an incredible spike in golf play. The desert is a seasonal and out of town market, and we are waiting to see if the increase in golf play is reflected here. It may be negatively impacted by the restrictions on foreign travel. We are hopeful that a portion of the spike in golf play will remain in the future, but it is unknown. I think you guessed right for the demand forecast.
    - In the demand forecast, we are assuming conservation only for the new courses, and no passive conservation for existing programs. We are reserving those conservation programs for the Projects and Management Actions to calculate water savings for those programs. Any turf rebate that a golf course would take advantage of would be active savings.

- In 2014/2015, Governor Brown mandated a 10% cut back on water usage for golf courses. Golf courses in Coachella Valley are not very drought tolerant and contain "wall to wall" grass on private country clubs. On Google satellite view you can see that golf courses are only a fraction of the water being used to water the surrounding areas of the golf courses. Golf is considered an unreasonable use of water and is a matter of public policy. I'm not seeing anything about conservation for the water use for golf courses outside of the courses themselves that are using 1,000-1200 AFY.
    - Those surrounding areas are considered in the conservation ordinance calculations on maximum allowable water.
        - I think you are missing what I am saying. The surrounding areas aren't exactly the golf courses. All of the area surrounding the golf courses (HOAs and country clubs) are considered golf course use. The grass extends for acres that has nothing to do with playing golf. It is very important that it is quantified. It is considered by the golf course as part of their water use.
    - I will add clarification to Randy Robert's comment, that conservation for existing development by sector will be considered in the Project & Management Actions section of the Plan Update. Stay tuned for more on that topic in upcoming workshops!
- Regarding Mr. Roberts' comments about golf's conservation record, I'd like to point out that the 108 courses served by CVWD are currently irrigating at levels significantly below both 2010 and 2013. They can and will do better over time, but to suggest that they are profligate in that use is not sustained by the data.
    - Thank you both, I know it is a hot topic.

Other Demands

The other demands include fish farms, duck clubs, surf parks, polo/turf, and environmental water. Through the review of supply assessments and the Salton Sea pilot project, three new users were identified. The baseline average was approximately 19,000 AF. The demand forecast predicts four new users will be added between 2025 and 2035, adding 2,700 AFY of water demands.

Discussion: Are there any other water demands that we should consider? Have all potential users been included in the forecast?

- How often will these forecasts be updated? For example, Riverside County just approved the development of the Thermal Beach Club. Is something like that included in this forecast?
    - SGMA requires a 5-year update and there will most likely be a comprehensive update of the demand forecast in those 5-year updates. We reached out to all of the municipalities in the Plan area to see if there were any current developments that were not included in the SCAG 2020 data. We received information back from those agencies in the Spring of 2020.
- The Thermal Beach Club was just approved like 2 weeks ago; so, would that mean it is not included?
    - Even though the project wasn't approved yet we had the data to work into the calculations from the Water Supply Assessment/Water Supply Verification (WSA/WSV).
    - It is included as are all such water uses with approved WSA/WSVs

Summary

When all demands are rolled together, there is a 7% increase in demand from 2020 to 2045. This is relatively low in comparison to the projected population increase and depicts the impact of changing uses in the Valley. Any input on new or planned demands was requested.

Supply Analysis

Ms. Prickett noted that there is uncertainty with the supply sources discussed today. In certain scenarios, these supplies may change. The six buckets of the supply portfolio include groundwater, State Water Project exchange water, Colorado River water, recycled water, surface water, and other supplies. These supplies are discussed in more detail below.

The Indio Subbasin provides **groundwater** storage capacity. Total groundwater storage has increased since 2009. The recovery of the groundwater storage demonstrates the success of the 2002 and 2010 Water Management Plans. The water budget is a work in progress (inflows and outflows) and will be evaluated with the model when the water budget calculations are complete. The difference between the inflow and the outflow is the net return flow that is entering the basin. The groundwater model will give a better estimate of the net return flow number. For the watershed model, the long-term average for net watershed runoff is 42,300 AFY (1931-2019). The high was in 1980 and the low was in 2002. The surface water diversions were removed from the average as well as the amount of flow that goes through the Indio gage to the Salton Sea.

DWA and CVWD have contracts for **State Water Project Water** (SWP). SWP water is exchanged with Metropolitan Water District (MWD) for Colorado River Water and it is annually variable due to Northern California hydrology. The SWP Table A amount assumes a reliability of 58% annually that will decrease to 52% over time. If the Delta Conveyance Facility is constructed, reliability will improve assumedly back to 58% or more.

CVWD has a QSA entitlement and MWD SWP transfer. **Colorado River water** is generally delivered by the Coachella Canal to farmers in the eastern portion of the Valley. The MWD transfer can be delivered to the Canal or Whitewater and can be recharged at Whitewater River GRF. The plan includes a ramp up of QSA entitlement minus conveyance and transfer losses (436,000 AFY at its peak). The supply forecast reflects the ramp up (5,000 AFY per year) in accordance with 2003 QSA, minus conveyance and transfer losses.

Surface water diversions occur at Snow, Falls, Chino Creeks in the San Jacinto Mountains and Whitewater River Canyon. Water is delivered directly to agriculture and municipal users in the West Valley. Forecast is continued delivery of that supply from 2,360 AFY to 6,000 AFY over time.

Recycled water is produced at three Water Reclamation Plants (WRPs) including CVWD's WRP-7 and WRP-10 and DWA's WRP. Existing wastewater flow at these plants is 19,400 AFY but current capacity is over 30,000 AFY. About 35% of the available supply is recycled at these plants. The forecast is based on difference of these projected flows. The amount of indoor water use is the projection for available wastewater going forward. If this additional water up to design capacity is recycled, this could be about 32,500 AFY. This is the potential supply but there might not be any infrastructure to distribute. This will be discussed further in the Projects and Management Actions chapter of the GSP. **Other supplies** include several other transfers and supplies not covered by the other buckets. This includes the Yuba Accord, Rosedale Rio-Bravo, and the construction of Sites Reservoir.

Ms. Prickett echoed that the Supply forecast results are preliminary, and feedback is encouraged. The existing supplies forecast totals to about 640,000 AF by 2045. If future additional supplies are added, supplies are over 700,000 AFY. The water supplies for the future are dependent on the implementation of projects based on the projects and management sections of the GSP.

- It looks like watershed runoff was below normal since 1996; not just the last 10 years.
    - Yes, that is correct. When we added in the last 10 years, overall average decreased.
- Will this presentation be made available on the Indio Subbasin website?
    - Yes, the presentation is already available on the website and can be accessed here: http://www.indiosubbasinsgma.org/get-involved-faq/.
- How much of the one million acre feet gain in groundwater storage is advanced deliveries?
    - CVWD tracks the advanced delivery account; unsure of the volume at this time.
- Where is groundwater pumping accounted for in this water supply?
    - It is not accounted for in the supply; pumping is included in demands.
- Beside PFAS, are there other concerns for groundwater contaminants in groundwater (nitrate, arsenic)?
    - Yes, we have both ongoing issues and emerging issues.

Next Steps

Ms. Priestaf reviewed next steps for the team for the next few months. This includes the documentation of groundwater dependent ecosystems, completing the update of the groundwater model, quantifying the Indio Subbasin water budget, identifying projects and management actions, developing proposed sustainability criteria, and identifying emerging issues.

For the context of emerging issues, SGMA identifies six undesirable results, which serve as the indicators for what sustainable management within the basin means. The team needs to determine what the criteria are to maintain sustainable management goals. The emerging issues identified in 2010 need to be updated. These issues included specific water quality constituents, water conservation, seismic risk, subsidence, invasive species, climate change. What are some emerging issues that concern you now?

Emerging issues identified by attendees include:

- Salt and Nutrient Management Plan
- Chromium-6 has been recognized for a while but standards change, and that may have an impact on our systems.

Get Involved

Ms. Priestaf encouraged attendees to sign up for the stakeholder list on the Indio Subbasin website and mark the calendar for the next public workshop scheduled for February 2021. The workshop will be held from 2:00-4:00 p.m. and will most likely be virtual due to COVID-19. For any additional information, please contact Rosalyn Prickett at indiosubbasinSGMA@woodardcurran.com.

2022 Indio Subbasin Alternative Plan Update

Workshop #4

AGENDA

March 3, 2021 at 2:00 pm – 4:00 pm

English: GoToMeeting: https://global.gotomeeting.com/join/691894997

or Dial In by Phone: +1 (646) 749-3122; Access Code: 691-894-997#

Español: *Llamar al (207) 558-4270, código de acceso: 744-554-134#*

#	ITEM	TIME
1	**Welcome and Introductions** • GoToMeeting Instructions • Agenda and Meeting Objectives • Introductions	2:00 pm
2	**Alternative Plan Status** • Process and Plan Update Outline	2:20 pm
3	**Groundwater Conditions** • Topics to Characterize Groundwater Conditions	2:25 pm
4	**Sustainable Management Criteria** • Orientation • Groundwater Levels, Storage, and Subsidence	2:40 pm
5	**Groundwater Model Status** • Status of Model Update	3:00 pm
6	**Projects and Management Actions** • Proposed List of PMAs • Scenario Planning	3:10 pm
7	**Public Comment** • Your Participation and Input are Important	3:45 pm
8	**Get Involved**	3:55 pm

**times are subject to change*

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2022 Indio Subbasin Alternative Plan Update

Public Workshop #4
SUMMARY

March 3, 2021 at 2:00 pm – 4:00 pm
Virtual Meeting

Members of the Public	Groundwater Sustainability Agencies (GSAs)
• Alan Pace, Petra Geosciences • Amy McNeill, Riverside County Flood Control and Water Conservation District • Amanda Monaco, Leadership Counsel for Justice & Accountability • Ben Olson, Olsen Engineering • Cathy Sanford, Regional Water Quality Control Board • Craig Kessler, Southern California Golf Association and CVWD Golf and Water Task Force • George Cappello, Grimway Farms • Johnathan Abadesco, High Desert Water District • Karina Jaquez • Kevin Fitzgerald, Southern California Golf Association • Kim Taylor, USGS • Kimberly Romich, California Department of Fish & Wildlife • Margaret Park, Agua Caliente Band of Cahuilla Indians • Mark Meeler, Myoma Dunes Mutual Water Company • Nina Waszak, Agua Caliente Band of Cahuilla Indians • Ron Buchwald, Valley Sanitary District • Sergio Sandoval • Steven Ledbetter, Mission Springs Water District • Tarren Torres, Egoscue Law Group representing Agua Caliente Band of Cahuilla Indians • Tom Calabrese, Envirologic Resources	• Castulo Estrada, CWA • Jamie Pricer, CVWD • Jesse Ruiz, CVWD • Jim Barrett, CVWD • Katie Evans, CVWD • Lauren Chase, CVWD • Mark Krause, DWA • Melanie Garcia, CVWD • Nancy Munoz, CVWD • Reymundo Trejo, IWA • Ryan Molhoek, DWA • Steve Bigley, CVWD • Trish Rhay, IWA • Zoe Rodriguez del Rey, CVWD **Consultant Team** • Iris Priestaf, Todd Groundwater • John Ayres, Woodard & Curran • Maureen Reilly, Todd Groundwater • Nicole Poletto, Woodard & Curran • Rosalyn Prickett, Woodard & Curran • Vanessa De Anda, Woodard & Curran

Welcome and Introductions

Ms. Rosalyn Prickett, Woodard & Curran, welcomed everyone to the meeting, and introductions were made as participants joined the call. Ms. Prickett briefed everyone on how to use the virtual GoToMeeting platform and notified attendees that the conference would be recorded. She then presented the meeting objectives and agenda and reintroduced the project team working on the Indio Subbasin Alternative Plan Update, including the Indio Subbasin Groundwater Sustainability Agencies (GSAs) and Consultant team. Ms. Prickett reviewed the meeting objectives.

Alternative Plan Status

Ms. Iris Priestaf, Todd Groundwater, presented an overview of the Alternative Plan Update tasks. Outreach is a key task throughout the Alternative Plan Update process. There are 12 chapters in the Plan and Ms. Priestaf walked attendees through the outline of the document, beginning with the information included in the Plan Area chapter.

Groundwater Conditions

Groundwater Levels

Ms. Priestaf presented a map of the groundwater level contours in the Indio Subbasin (Subbasin). The Subbasin has a robust monitoring program that consists of 345 wells. Monitoring data from these wells was used to develop the groundwater level contour map. The groundwater levels range from 1,100 feet in the northeastern part of the Subbasin and decrease to 200 feet below mean sea level (msl) toward the Salton Sea. Groundwater flow is perpendicular to the contours, so groundwater flows from northwest to southeast in the Subbasin.

Ms. Priestaf presented a map showing the change in groundwater levels from 2009 through 2019. The map indicates that groundwater levels have primarily increased during the past decade, and the largest increases have occurred near the groundwater replenishment facilities (GRF). These increases in groundwater levels are the result of recharge in the GRFs, implementation of source substitution programs (e.g., recycled water to offset groundwater use), and conservation programs.

Ms. Priestaf presented four hydrographs showing groundwater levels from 2009 through 2020, though she noted that numerous hydrographs in the Subbasin are available. The hydrographs show a consistent pattern of overall groundwater level increases from 2009. The hydrographs also show large increases near recharge at the GRFs and smaller increases at locations distant from the GRFs. Overall, the hydrographs show recovery from overdraft since 2009.

Change in Groundwater Storage

Ms. Priestaf presented a graph showing the cumulative change in storage from 1970 through 2019. The hydrograph starts a "running total" of groundwater storage in 1970 as this was right before the Whitewater River GRF began operation in 1973. The hydrograph starts with a net change in storage of 0 acre-feet (AF) in 1970 and shows a significant decline in groundwater storage happening in the mid-1980s through 2009. The year 2009 marked a historical low for groundwater storage, and overdraft has started to reverse since then with a net storage increase of 840,000 AF. Increased groundwater storage is important as it can be used during a water shortage such as drought.

Land Subsidence

Ms. Priestaf presented land subsidence, or the sinking of the ground surface, in the Subbasin. In this case, land subsidence is not caused by tectonics and action in the San Andreas fault, but rather as a result of the compaction of sediments that occur with groundwater level declines. Clay layers in the Subbasin float in groundwater, so if groundwater levels decline, the clay layers settle and compact, causing the ground surface to also decline. The Subbasin is susceptible to land subsidence which may disrupt conveyance facilities and facilities on the ground surface. Land subsidence in the Subbasin has been studied since 1995 by the United States Geological Survey (USGS) and CVWD. USGS research shows a correlation between land subsidence and groundwater declines, reaching up to 2 feet of subsidence in parts of the Subbasin between 1995 and 2010. USGS has documented stabilization of land surface and even uplift in some areas of the Subbasin since 2010 as a result of increasing groundwater levels. For comparison, land subsidence in the Central Valley is as much as 30 feet and is still ongoing.

Sustainable Management Criteria

Mr. John Ayres, Woodard & Curran, presented the Sustainable Management Criteria (SMC) for the Alternative Plan Update. To define the SMC, DWR recommends setting thresholds for groundwater levels and using these thresholds as a proxy for the storage and subsidence indicators. The GSAs have an overarching objective to avoid undesirable results of a significant and unreasonable loss of yield from existing production wells. SGMA does not define “significant” and “unreasonable” as these are determined at the local level. Representative monitoring will occur throughout the Subbasin, but not every well will be monitored. Subbasin management will only include management activities that the GSAs can influence.

Sustainability Management Criteria

Mr. Ayres explained that SMCs can be qualitative. For the Subbasin, the *Sustainability Goals* are defined as the conditions in the absence of undesirable results within the next 20 years. *Undesirable Results* are qualitative and descriptive; these are conditions that should be avoided in the Subbasin. In comparison, *Measurable Objectives* (MO) are specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions to achieve the sustainability goal. *Minimum Thresholds* (MT) are numeric values for each sustainability indicator used to define undesirable results. *Interim Milestones* (IM) are quantitative target values representing measurable groundwater conditions in increments of five years; these will be updated during every Plan update. A graphic illustrating the quantitative criteria was presented to the group.

The Alternative Plan goal is “to reliably meet current and future water demands cost-effectively and sustainably.” The draft SGMA Sustainability Goal is to “maintain a locally managed, economically viable, sustainable groundwater resource for existing and future beneficial use in the Indio Subbasin by managing groundwater to avoid undesirable results.” The SGMA Sustainability Goal only focuses on groundwater and is nested within the Alternative Plan goal, which is broader and encompasses all water supplies.

This meeting focuses on three of the six SMC, which include: 1) chronic lowering of groundwater levels, 2) reduction of groundwater storage, and 3) land subsidence. The draft undesirable result statements were phrased broadly for these three SMC to give the GSAs local control over what is significant and unreasonable, as well as drive the monitoring networks and thresholds.

Groundwater Levels

Mr. Ayres explained that the undesirable results for the chronic lowering of groundwater levels indicator include impacts to shallow wells, and maintenance of municipal and industrial water supply.

Public comments and questions included the following:

- Drinking water is the primary beneficial use of water in California, but the Sustainability Goal references only the economic use of water. Ms. Amanda Monaco, a representative from Leadership Counsel who works with several vulnerable communities in the Subbasin, requested that a reference to protecting drinking water also be included.
    - This comment was noted and will be addressed.

- Regarding land subsidence, reviewing impacts to only water infrastructure may ignore impacts to other development like roads. Ms. Amanda Monaco suggested that language for land subsidence be less restrictive to only water conveyance infrastructure.
    - This comment was noted and will be addressed

Ms. Priestaf provided the consultant team's recommendations on setting MTs for groundwater levels, storage, and subsidence. SGMA defines a groundwater level MT as a groundwater elevation measured at a representative monitoring site. There will not be MTs or monitoring conducted for every single pumping well in the Subbasin, just for the representative sites. There are two options for setting groundwater elevation MTs, as described below:

1. <u>Use historical low groundwater levels.</u> The groundwater levels reached a historical low in 2009. The historical low occurred recently without any reported significant problems that impacted the beneficial uses of water wells. In comparison, historical groundwater level lows in the Central Valley led to community water systems and wells drying up. This option is recommended because the historical low groundwater levels are conservative and protective of the Subbasin based on the best available information.
2. <u>Document construction of all production wells, select criteria per diverse well characteristics, relate private wells to representative "Key Wells."</u> This option would protect production wells; however, it requires documentation of the construction of all production wells (including but not limited to the well location, bottom depth of the well, etc.). To implement this option, extensive data collection and decision-making would be required to define the selection criteria. It is recommended that the Subbasin develops a well inventory in the future as a way to refine the MTs.

Ms. Priestaf presented hydrographs showing the suggested MTs corresponding with the lowest groundwater elevations measured at Key Wells. These MTs will guide management in the Subbasin. Ms. Priestaf stated that there are 757 wells in the Subbasin. Of these wells, 57 wells were selected as representative wells in the Key Well network because they have well construction data, are easily accessible (though this may change in the future if they are abandoned or replaced), have an extensive monitoring record and current data, are distributed throughout the Subbasin near other production wells and small water systems that are vulnerable to groundwater level declines, and are representative of all GSAs.

Public comments and questions included the following:

- What is a production well, and does it include private wells?
    - It is a pumping well for beneficial use (e.g., industrial, drinking water, municipal, agricultural)

Ms. Priestaf stated that the SMC will assume that undesirable results will occur if groundwater levels remain consistently below the MTs. It is recommended that an undesirable result be defined when the MT is crossed in five low season monitoring events (i.e., October) in 25% of the monitoring wells across the subbasin. Annual reporting will include MT hydrographs to identify potential problems, analyze what will happen as groundwater management actions change in that area, and determine if the Subbasin will recover.

Public comments and questions included the following:

- What is an example of five consecutive low-season monitoring events?
    - These are five consecutive years, likely in October; not consecutive monitoring events, which might be quarterly.

Groundwater Storage

Ms. Priestaf explained that using levels as a proxy for groundwater storage is recommended for the Subbasin as groundwater level monitoring generally matches the long-term change in storage. Based on previous monitoring, it is expected that the groundwater level MTs are protective of groundwater storage and will not lead to significant and unreasonable conditions in storage.

Land Subsidence

Ms. Priestaf explained that using levels as a proxy for subsidence is also recommended for the Subbasin. Based on previous monitoring, it is expected that the groundwater level MTs are protective of land subsidence and will not lead to significant and unreasonable conditions. Undesirable results may include disruption of surface drainage, water supply conveyance and flood control facilities, damage to other critical infrastructure, and earth fissures.

Groundwater Model Status

Ms. Priestaf presented the groundwater model status. The model provides a numerical simulation of the Subbasin. The model was updated with recent inflow and outflow data and coordinated with models for adjacent basins for consistency. The model is in the process of final calibration, and a chapter for the model is underway. The model will continue to provide a reliable tool to simulate future conditions and scenarios.

Projects and Management Actions

Ms. Prickett presented the projects and management actions (PMAs) which are required under SGMA to achieve sustainability. The project team previously presented the water supply portfolio, which will be packaged into different scenarios and modeled when the model calibration is finalized. The PMAs have been grouped into two major categories: 1) SGMA implementation to comply with the SGMA requirements, and 2) PMAs.

1. SGMA implementation activities to support SGMA compliance.
2. The PMAs are actions that support sustainable water management. These PMAs are different from, but support, the water supplies that were discussed in the last workshop. Many PMAs help to convey, deliver, and recharge regional supplies. PMAs[1] that will be included in the Alternative Plan Update are grouped into the following five categories:
    - Water Conservation
    - Water Supply Development
    - Source Substitution and Replenishment
    - Water Quality Improvements
    - Other Studies and Programs

Ms. Prickett presented the objectives of scenario modeling. Scenario modeling will consider how uncertainties may affect the ability to sustainability manage water resources, as well as help the Subbasin meet SGMA regulations for balancing the water budget and avoiding groundwater overdraft.

Ms. Prickett explained there are several uncertainties for the water demand projections. Land use agencies may experience development at rates greater than anticipated, resulting in higher water demands than projected. There may also be increased agricultural water demands resulting from an

[1] Please refer to the meeting presentation for a list of PMAs considered for the Subbasin.

influx of new farmers from neighboring subbasins that have experienced significant decreases in pumping due to SGMA. To account for these uncertainties, there was a 10% buffer added to the total municipal demand (i.e., 110% of total municipal demand), and the potential new acreage for agriculture was doubled (i.e., 1,000 acres of *new* agriculture).

Ms. Prickett explained there are also many uncertainties for the supply projections. Climate change may change the local hydrology, which would reduce watershed runoff, as well as lead to additional reductions in water supplies from the Colorado River and State Water Project (SWP). SWP supplies may also decline if the Delta Conveyance project is delayed or not constructed. Other sources of uncertainty include imported water disruptions as a result of natural disasters or regulatory constraints, groundwater changes in storage and outflows, and recycled water constraints from evolving regulations and project delays. The Sites Reservoir and Lake Perris Seepage projects may also not be constructed or delayed.

Ms. Prickett presented five scenarios that are underway. These include:

1) No Project – assumes growth but no additional water supplies,
2) Baseline – assumes supplies and facilities in the Capital Improvement Program,
3) Future Projects – assumes all planned supplies and facilities including new SWP supplies, the buildout of nonpotable system, and source substitutions,
4) Future Projects with Climate Change – assumes planned supplies & facilities, limited by climate change, and
5) Future Projects with Drought – assumed planned supplies and facilities limited by reoccurring drought.

Public comments and questions included the following:

- These 5 scenarios are logical since they factor in climate change. It is encouraging that Indio is already working on drinking water and consolation projects, which gives GSAs the ability to collaborate.
- There is a need for enhanced land use planning that is coordinated with water planning. There are a lot of uncertainties with land use, so coordination will be vital.
    - The consultant team coordinated with land use planning agencies during development of the demand forecast. The consultant team used the SCAG 2020 forecast as the basis and then asked the city and county municipalities for confirmation that their planned future developments and General Plan developments were correctly included in that forecast.
- There needs to be coordination with local permitting agencies on future agricultural lands and their wells.

Next Steps

Ms. Prickett presented the next steps for February through April 2021. The consultant team will develop scenarios and determine how they will be input into the groundwater model. Results will be presented at the next meeting, which will be held on May 19 from 2 to 4 pm. The consultant team will also complete fieldwork and surveys for Groundwater Dependent Ecosystems (GDEs), finalize proposed PMAs and sustainability criteria based on input from Tribal and public workshops, and quantify Indio Subbasin water budget. Finally, the consultant team will finalize the 2020 Annual Report and submit to DWR by April 1. The 2020 Annual Report will be presented to the CVWD Board on March 9 and uploaded to the CVRMWG website (http://www.cvrwmg.org/).

Ms. Prickett invited participants to offer any additional comments or questions. For any additional information, please contact Rosalyn Prickett at indiosubbasinSGMA@woodardcurran.com.

2022 Indio Subbasin Alternative Plan Update

Workshop #5

AGENDA

June 24, 2021 at 2:00 pm – 4:00 pm

English: GoToMeeting: https://global.gotomeeting.com/join/346450773

or Dial In by Phone: +1 (571) 317-3122; Access Code: 346-450-773#

Español: *Llamar al (207) 558-4270, código de acceso: 256 242 646#*

#	ITEM	TIME
1	**Welcome and Introductions** • GoToMeeting Instructions • Agenda and Meeting Objectives • Introductions	2:00 pm
2	**Alternative Plan Status** • Process and Plan Update Outline	2:20 pm
3	**Groundwater Conditions** • Groundwater Quality, Groundwater Dependent Ecosystems	2:25 pm
4	**Sustainable Management** • Groundwater Quality, Seawater Intrusion, Interconnected Surface Waters	2:55 pm
5	**Groundwater Model and Plan Scenarios** • Status of Model Update • Scenario Planning	3:25 pm
6	**Public Comment** • Your Participation and Input are Important	3:45 pm
7	**Get Involved**	3:55 pm

**times are subject to change*

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2022 Indio Subbasin Alternative Plan Update

Workshop #6

AGENDA

August 26, 2021 at 2:00 pm – 4:00 pm

English: GoToMeeting: https://global.gotomeeting.com/join/262772877

or Dial In by Phone: +1 (646) 749-3122; Access Code: 262-772-877#

Español: *Llamar al (207) 558-4270, código de acceso: 119 495 611#*

#	ITEM	TIME
1	**Welcome and Introductions** • GoToMeeting Instructions • Agenda and Meeting Objectives • Introductions	2:00 pm
2	**Alternative Plan Status** • Process and Plan Update Outline	2:20 pm
3	**Groundwater Model** • Overview of Model Features and Updates	2:25 pm
4	**Plan Scenarios & Projects and Management Actions (PMAs)** • Climate Change Assumptions • PMAs in each Plan Scenario	2:40 pm
5	**Simulation Results** • Comparison of Baseline vs. Baseline with Climate Change • Results of 4 Climate Change Scenarios	2:55 pm
6	**Public Comment** • Your Participation and Input are Important	3:25 pm
7	**Get Involved**	3:45 pm

**times are subject to change*

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APPENDIX 1-E
PUBLIC COMMENTS RECEIVED AND RESPONSE TO PUBLIC COMMENTS

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Public Comments and responses will be added after the public review period ends.

APPENDIX 4-A
GROUNDWATER LEVEL MONITORING WELL HYDROGRAPHS

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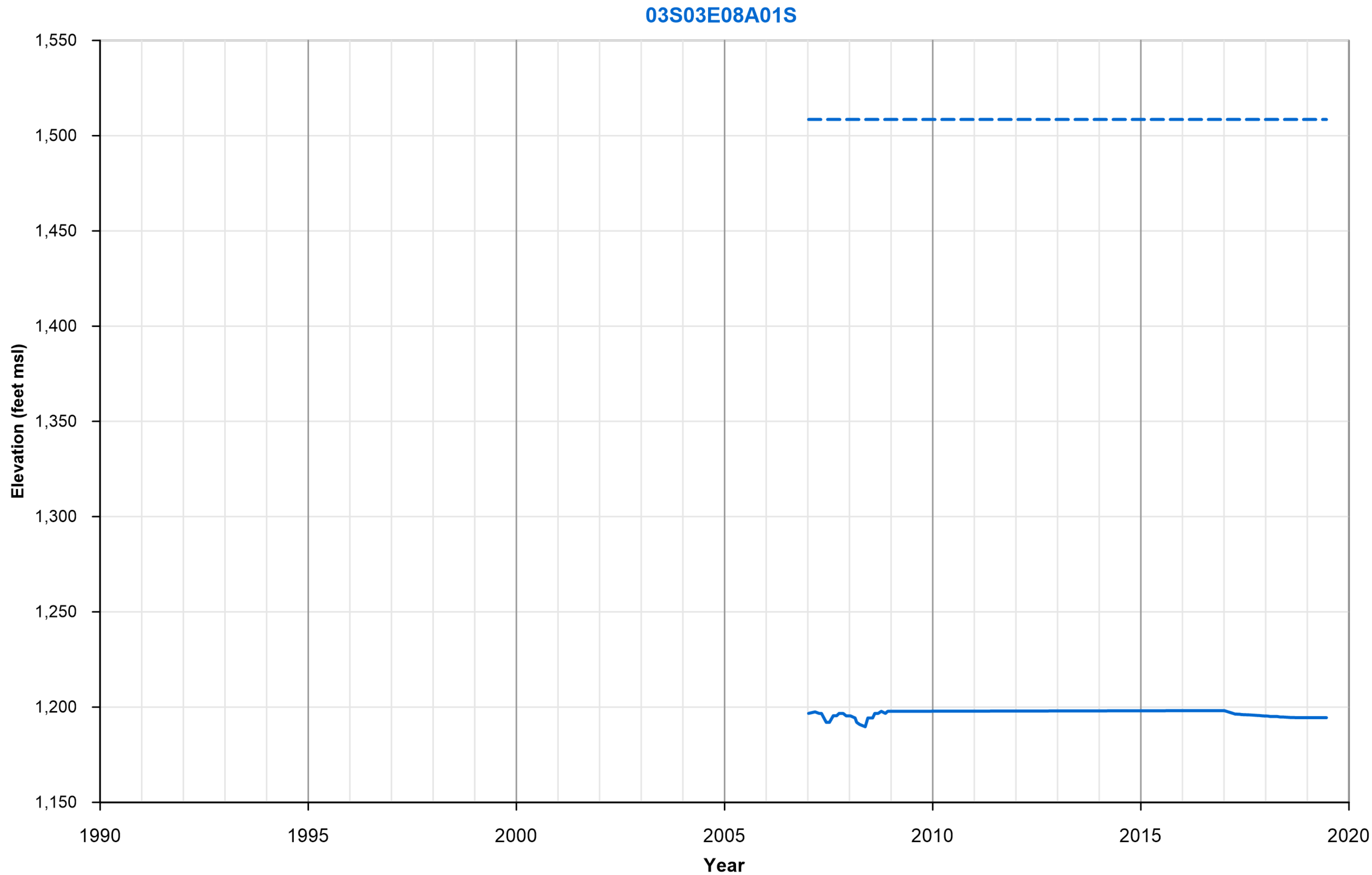
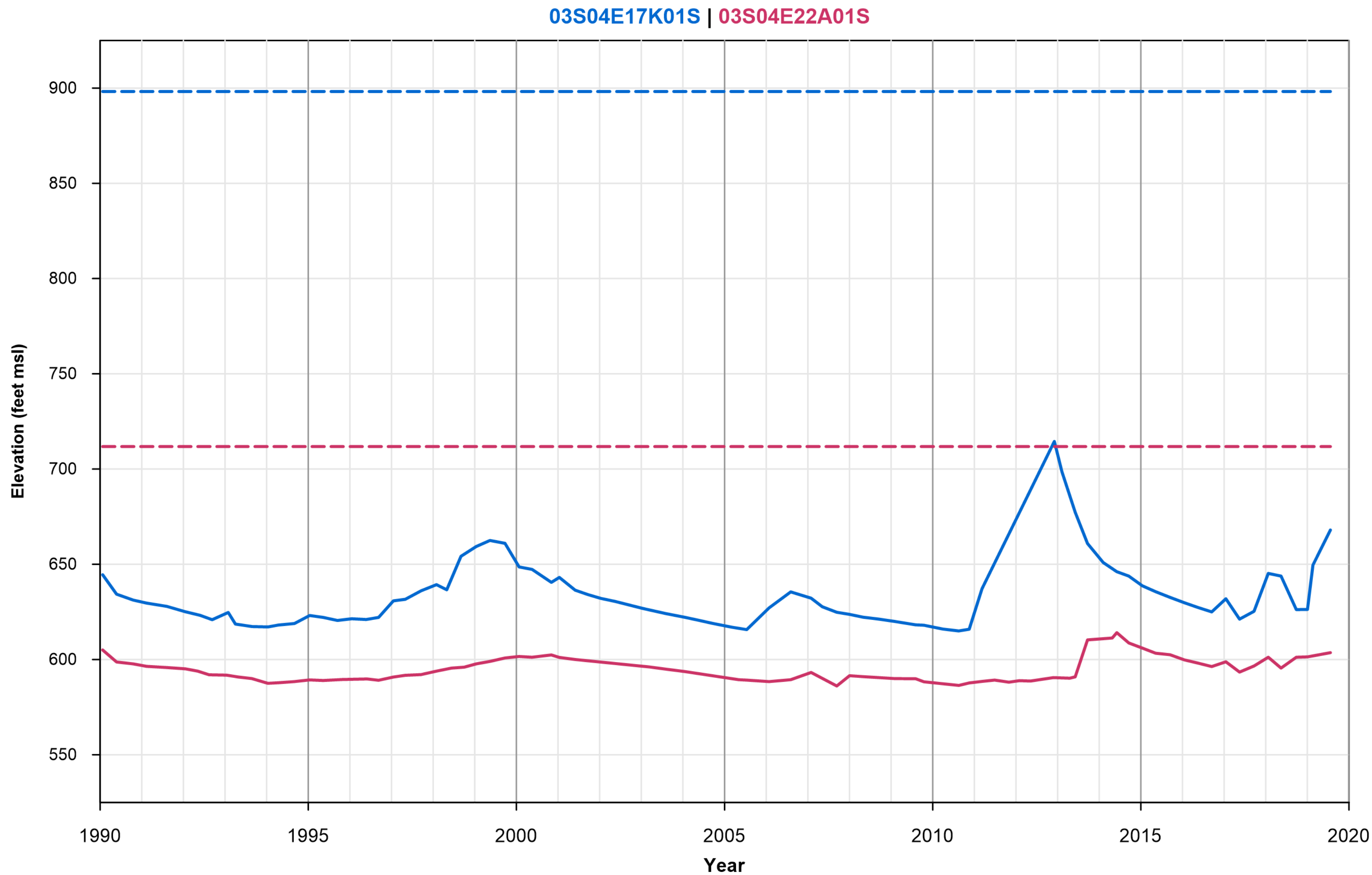


WOODARD & CURRAN

February 2021

TODD GROUNDWATER

Appendix A-1
Groundwater Elevation Hydrograph
03S03E08A01S

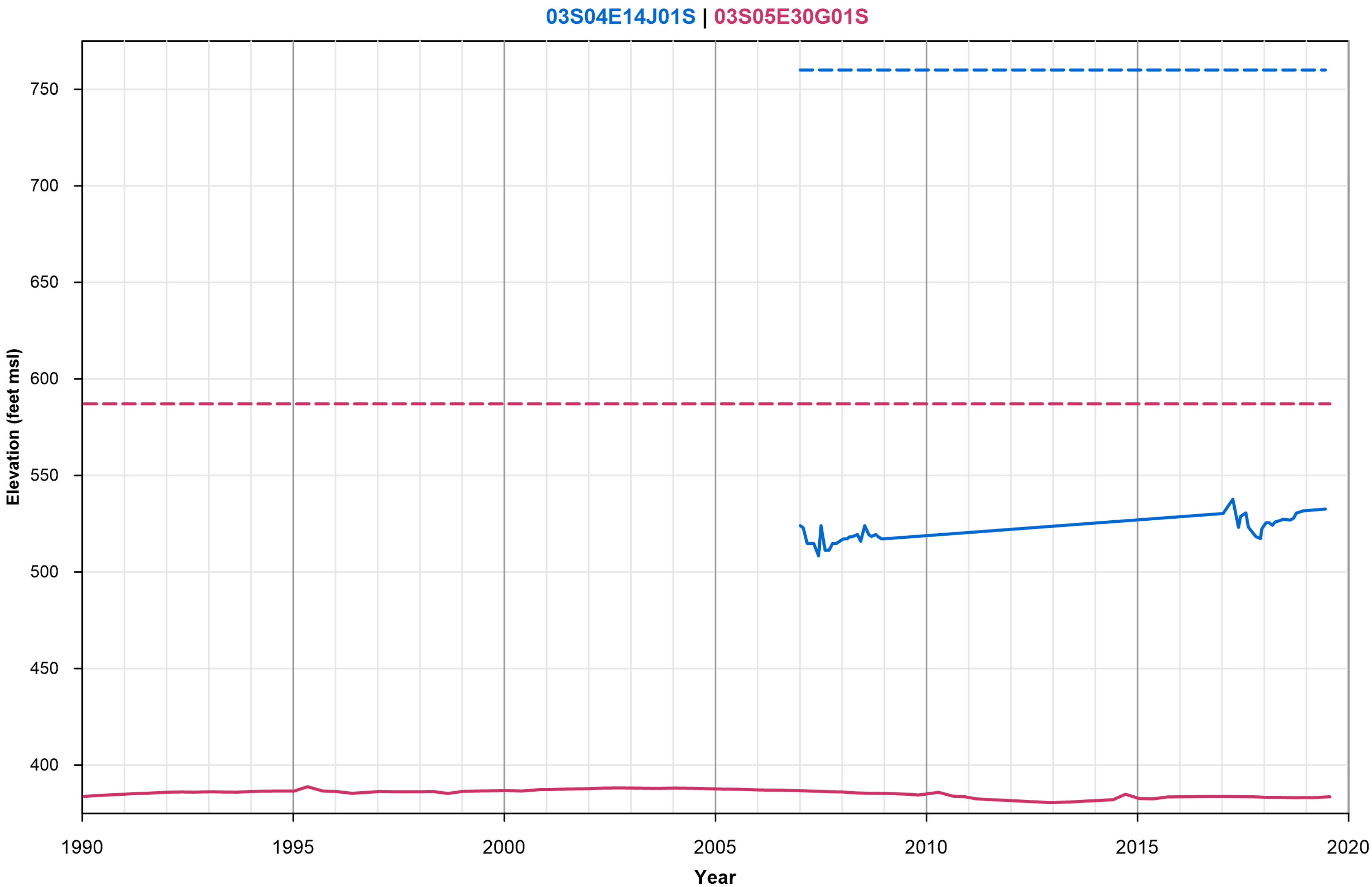


February 2021

WOODARD & CURRAN

TODD GROUNDWATER

Appendix A-2
Groundwater Elevation Hydrographs
03S04E17K01S and 03S04E22A01S



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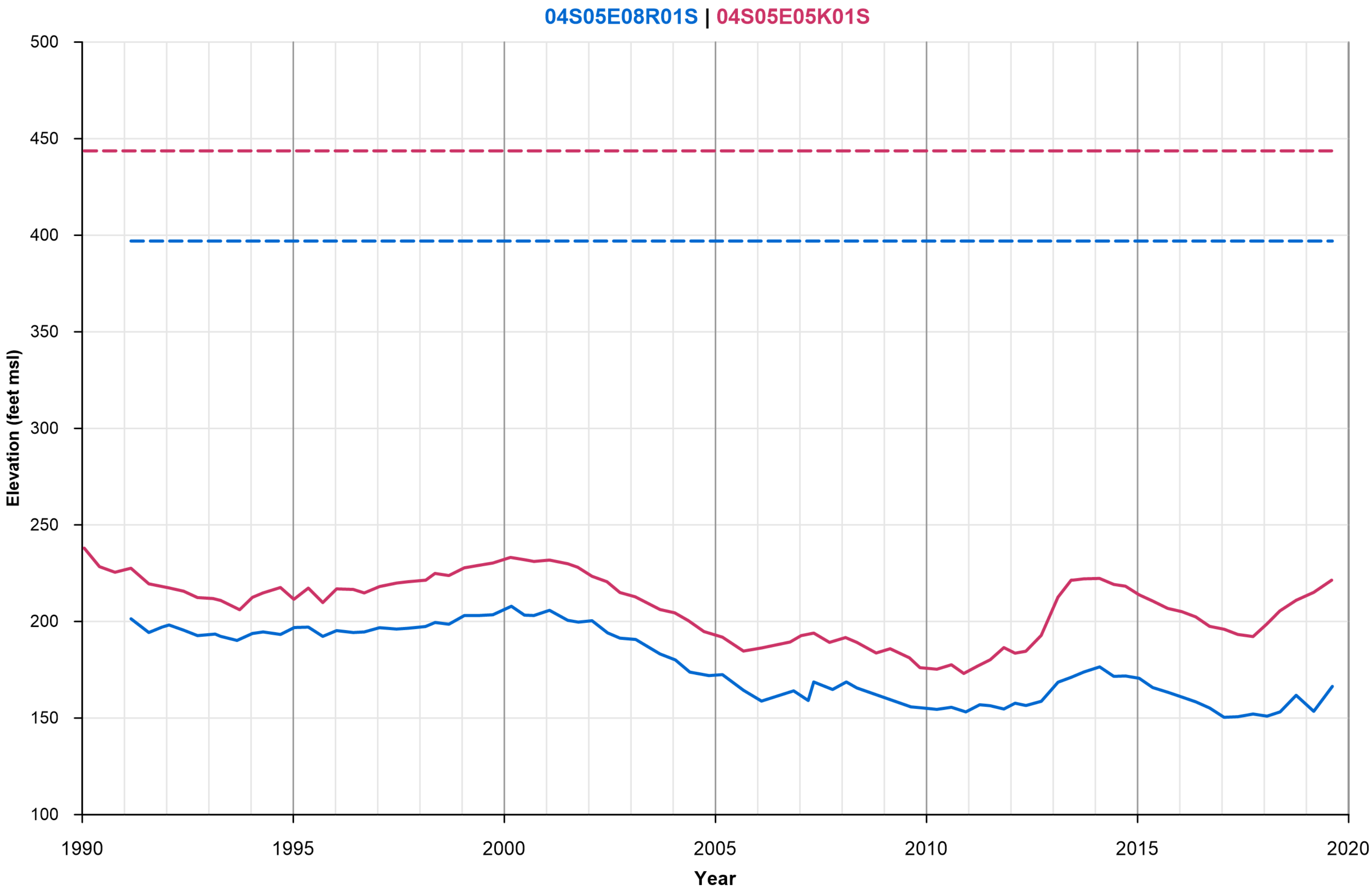
February 2021

TODD GROUNDWATER

Appendix A-3
Groundwater Elevation Hydrographs
03S04E14J01S and 03S05E30G01S



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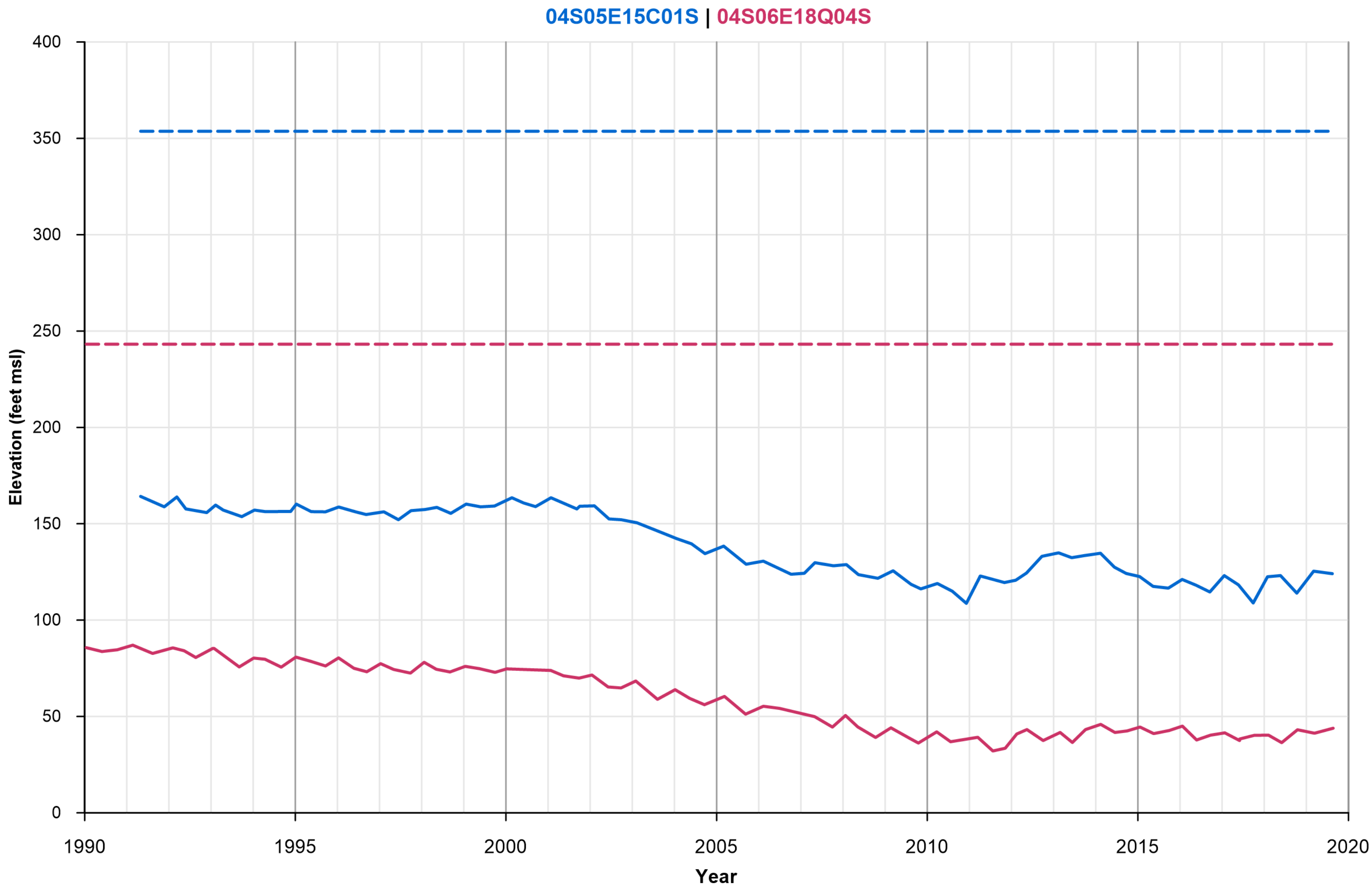
February 2021

TODD GROUNDWATER

Appendix A-4
Groundwater Elevation Hydrographs
04S05E08R01S and 04S05E05K01S



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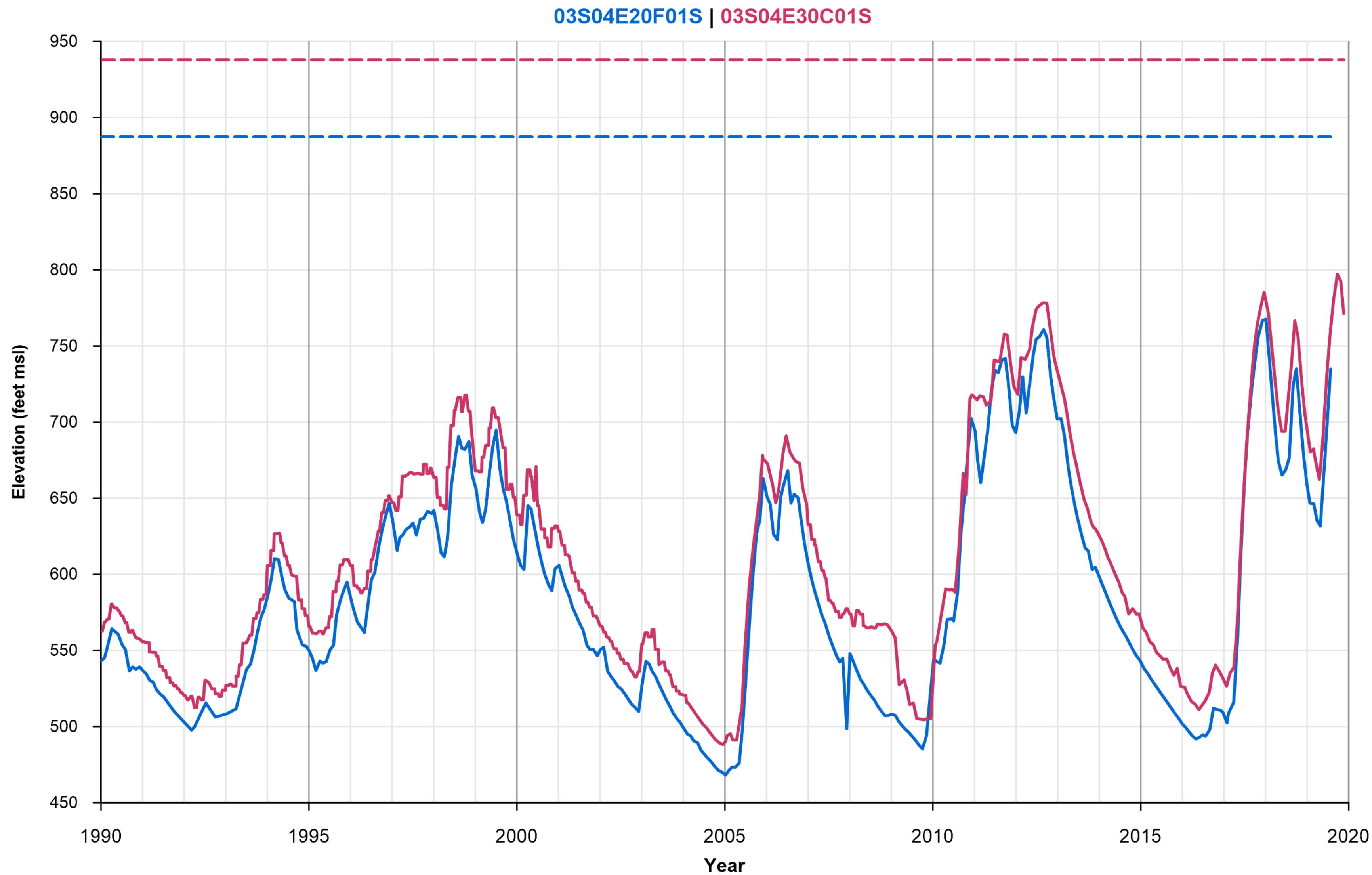
February 2021

TODD GROUNDWATER

Appendix A-5
Groundwater Elevation Hydrographs
04S05E15C01S and 04S06E18Q04S



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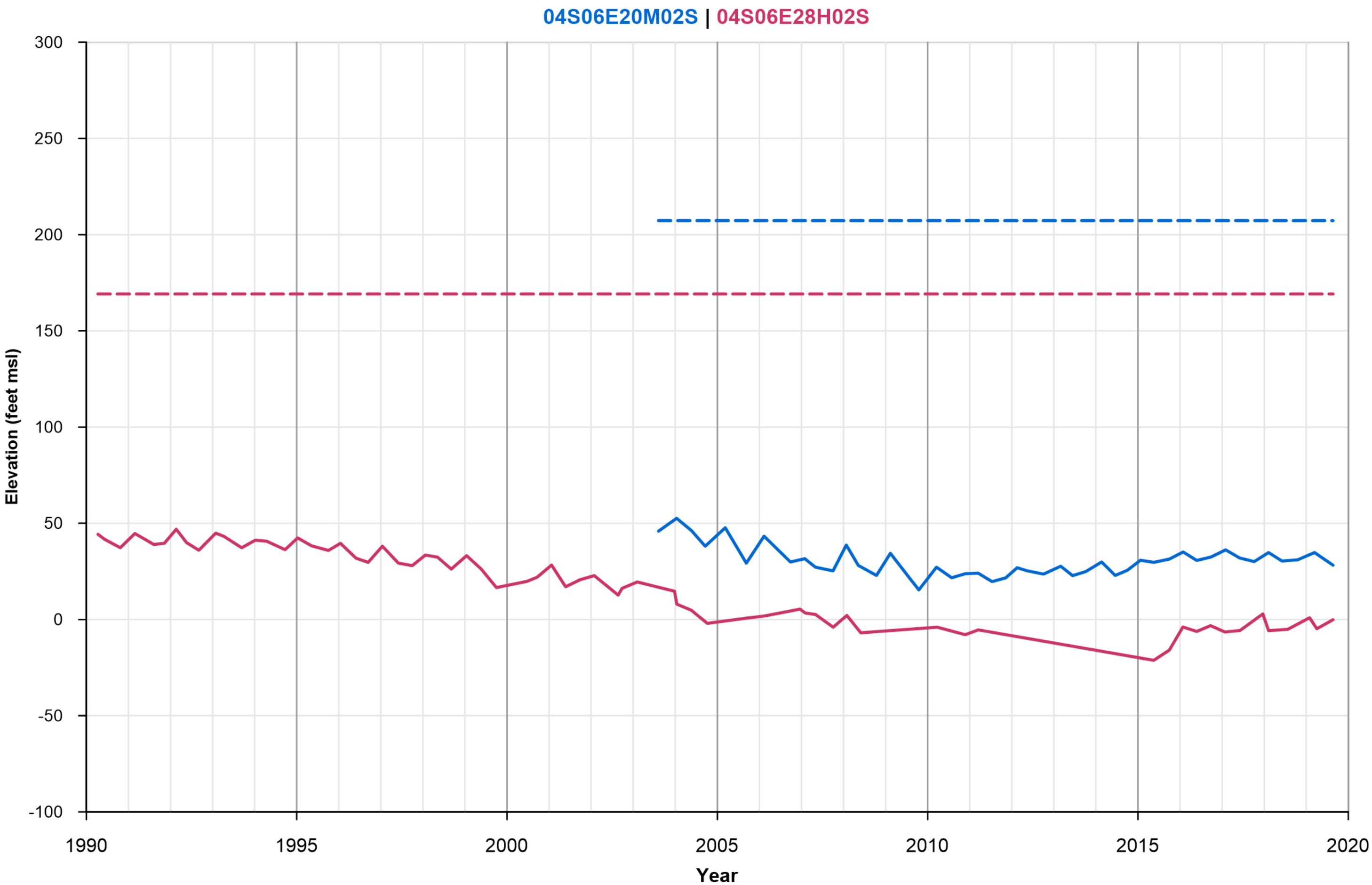
February 2021

TODD GROUNDWATER

Appendix A-6
Groundwater Elevation Hydrographs
03S04E20F01S and 03S04E30C01S



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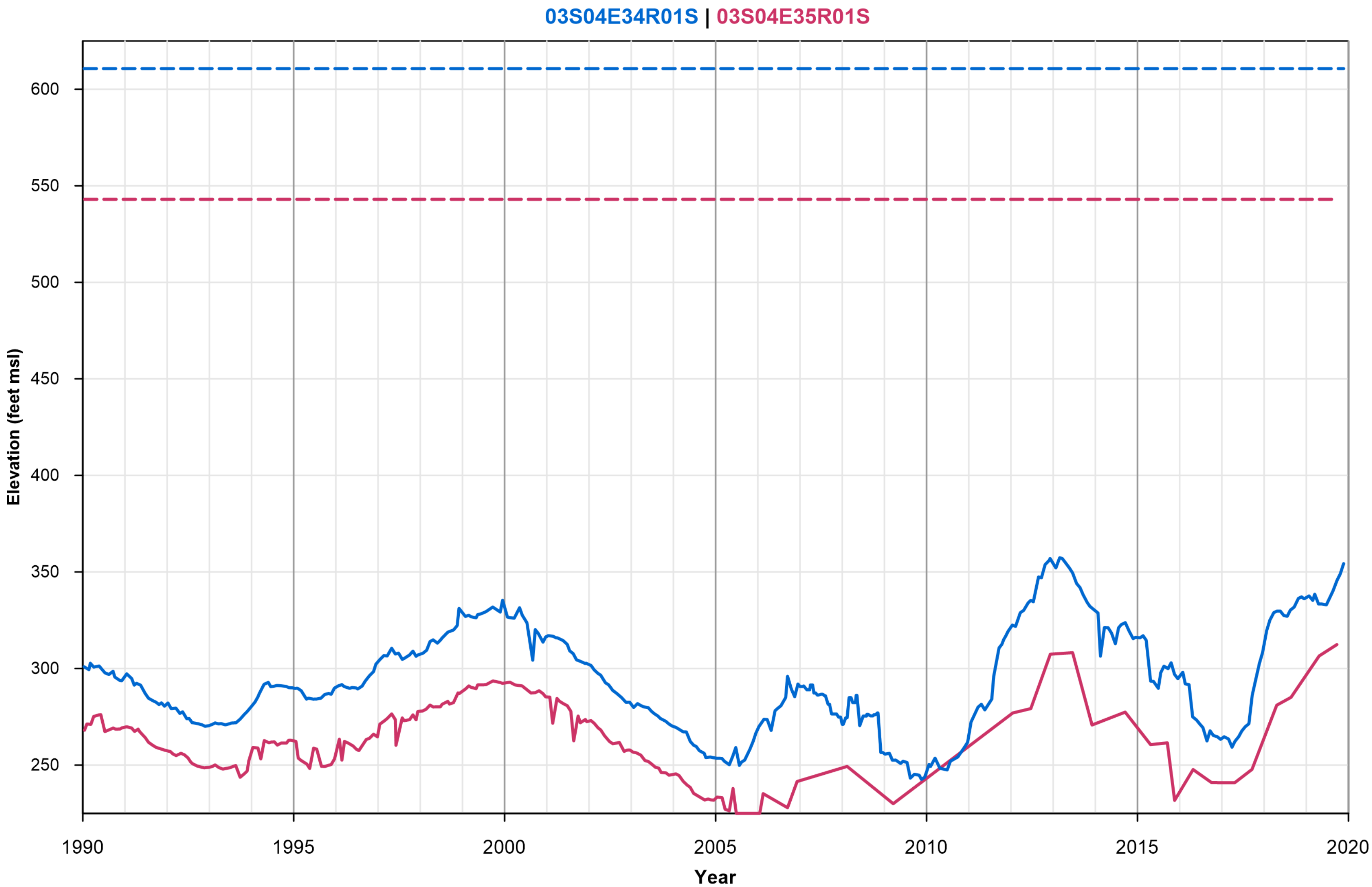
February 2021

TODD GROUNDWATER

Appendix A-7
Groundwater Elevation Hydrographs
04S06E20M02S and 04S06E28H02S



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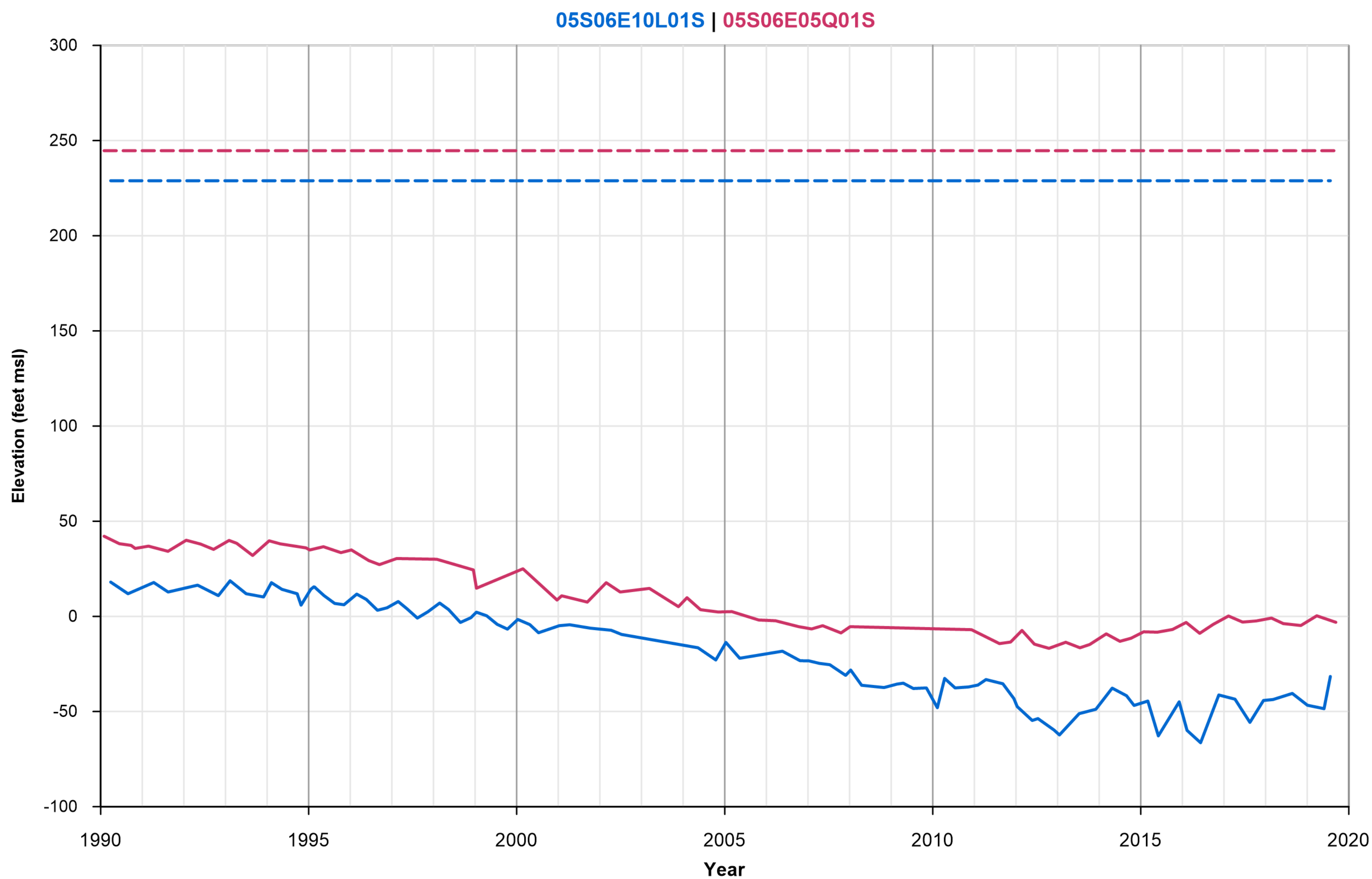
February 2021

TODD GROUNDWATER

Appendix A-8
Groundwater Elevation Hydrographs 03S04E35R01S and 03S04E34R01S



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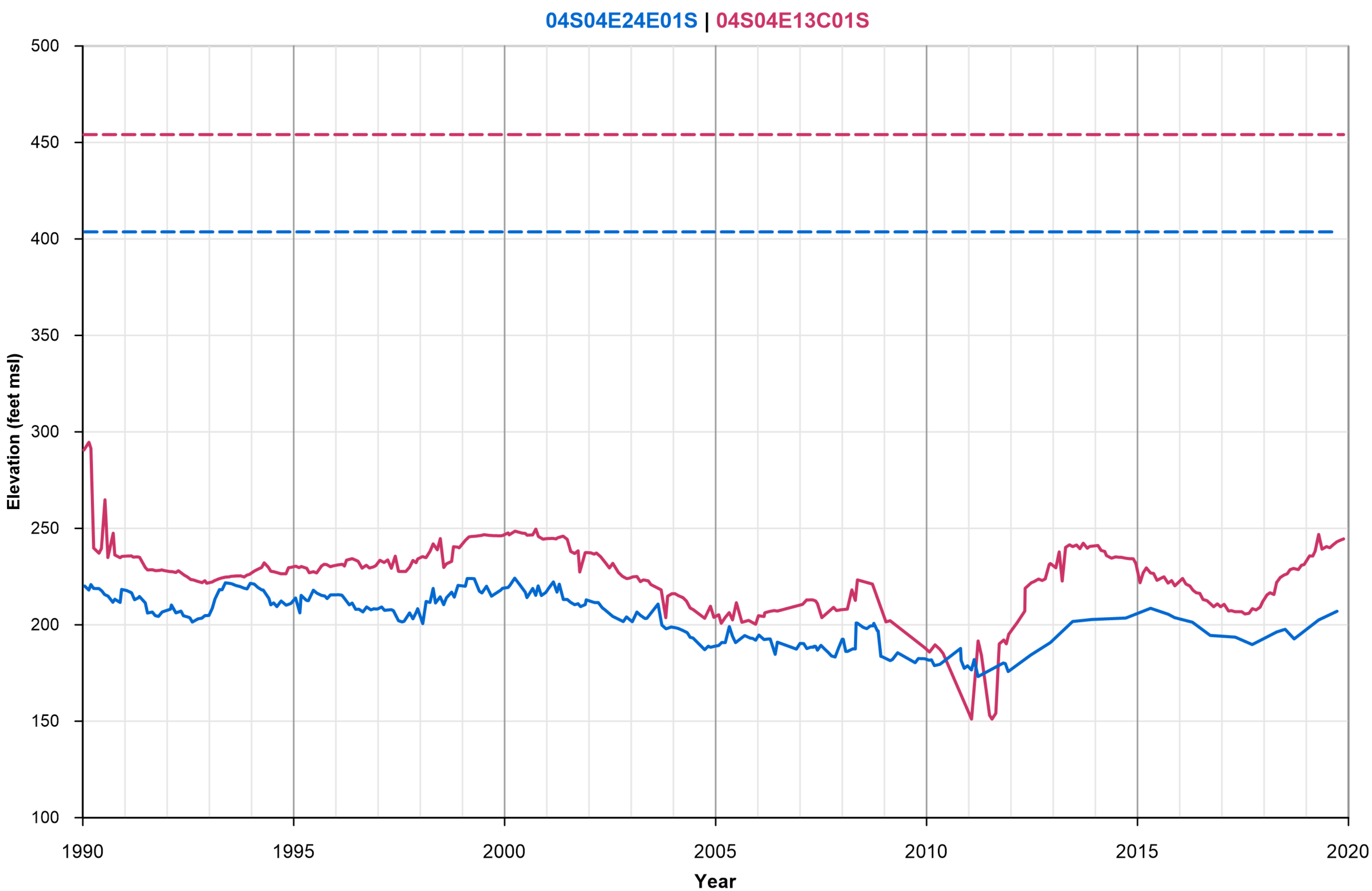
February 2021

TODD GROUNDWATER

Appendix A-9
Groundwater Elevation Hydrographs 05S06E10L01S and 05S06E05Q01S



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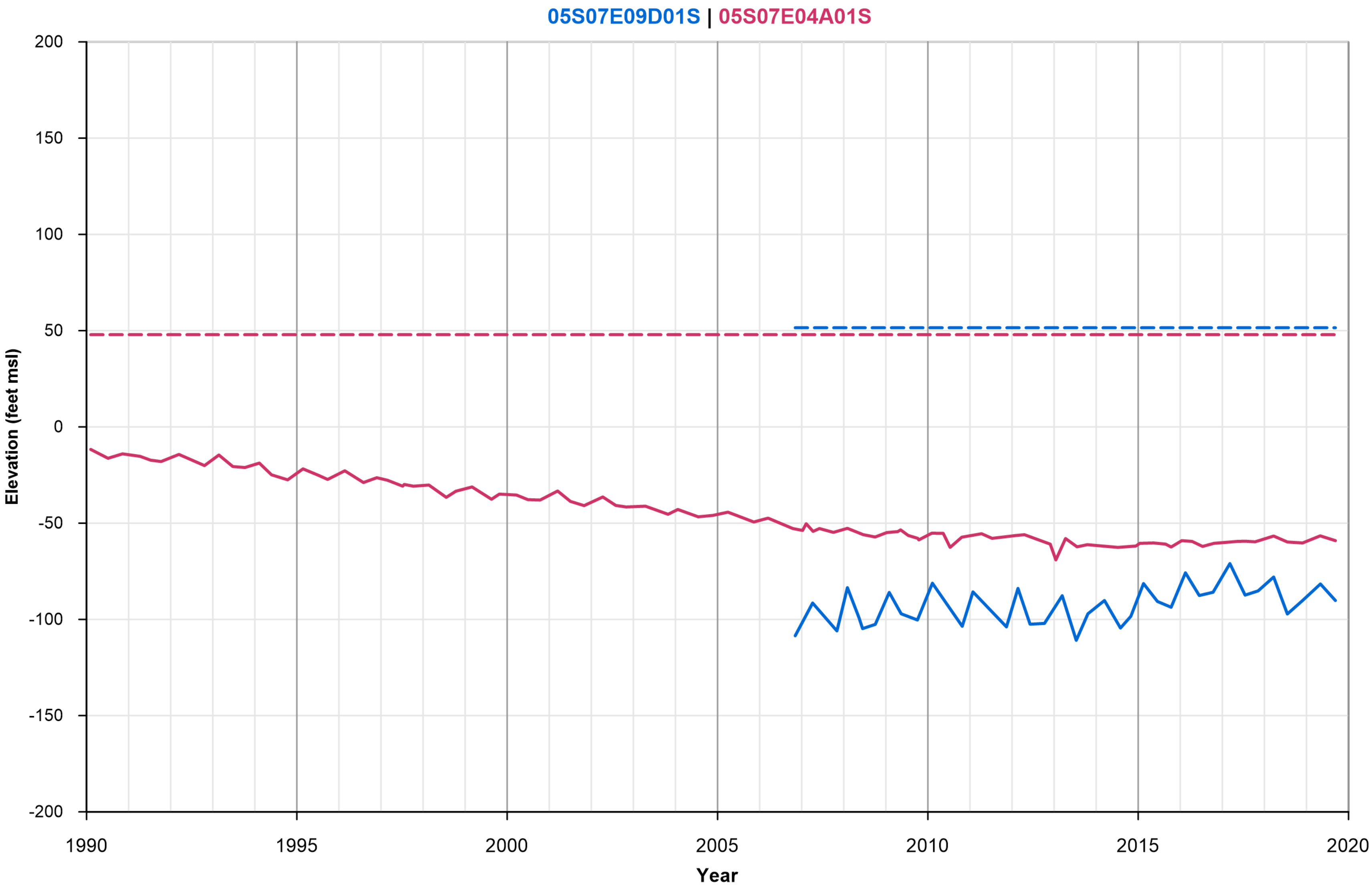
February 2021

TODD GROUNDWATER

Appendix A-10
Groundwater Elevation Hydrographs
04S04E24E01S and 04S04E13C01S



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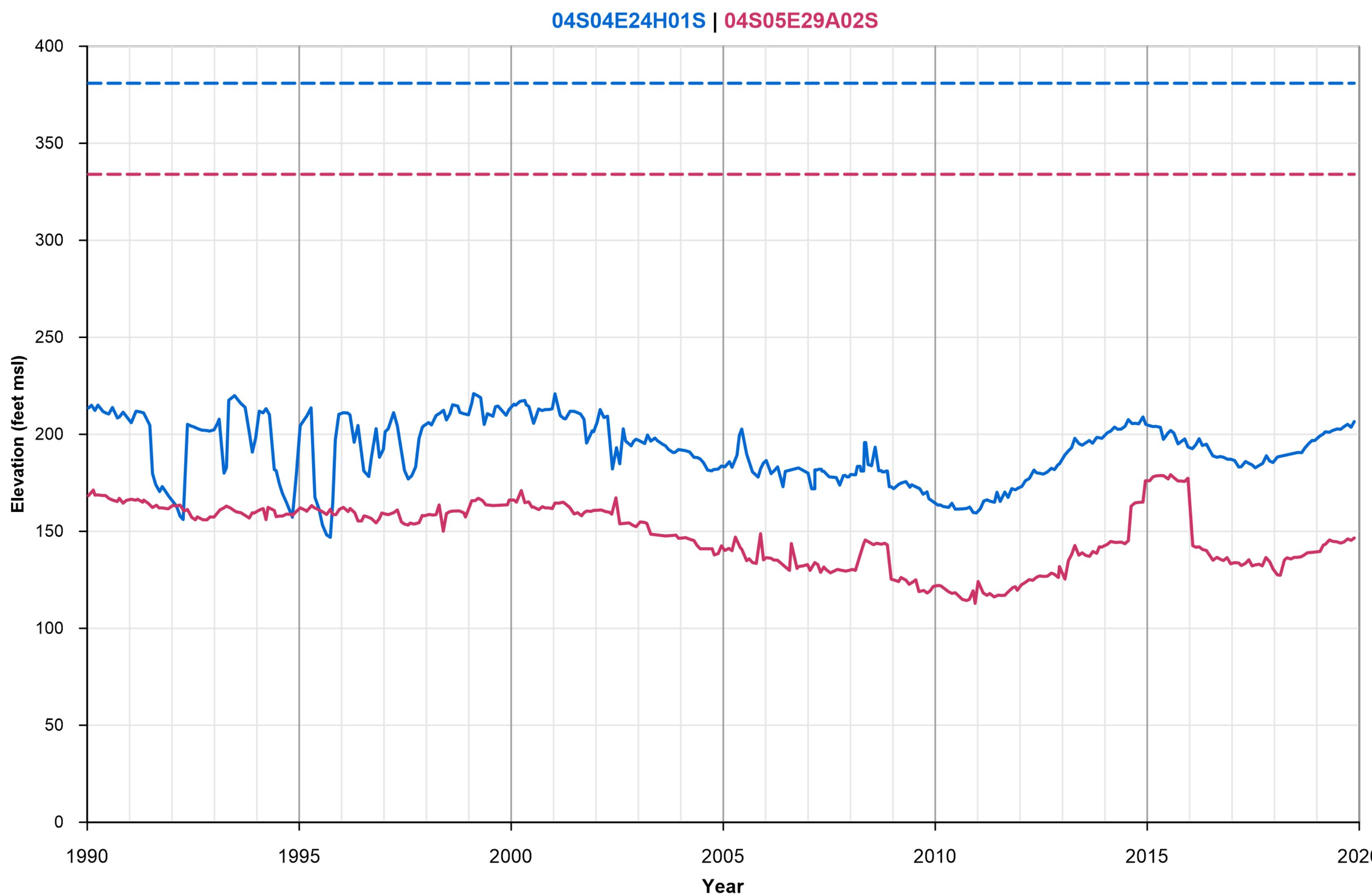
February 2021

TODD GROUNDWATER

Appendix A-11
Groundwater Elevation Hydrographs
05S07E09D01S and 05S07E04A01S



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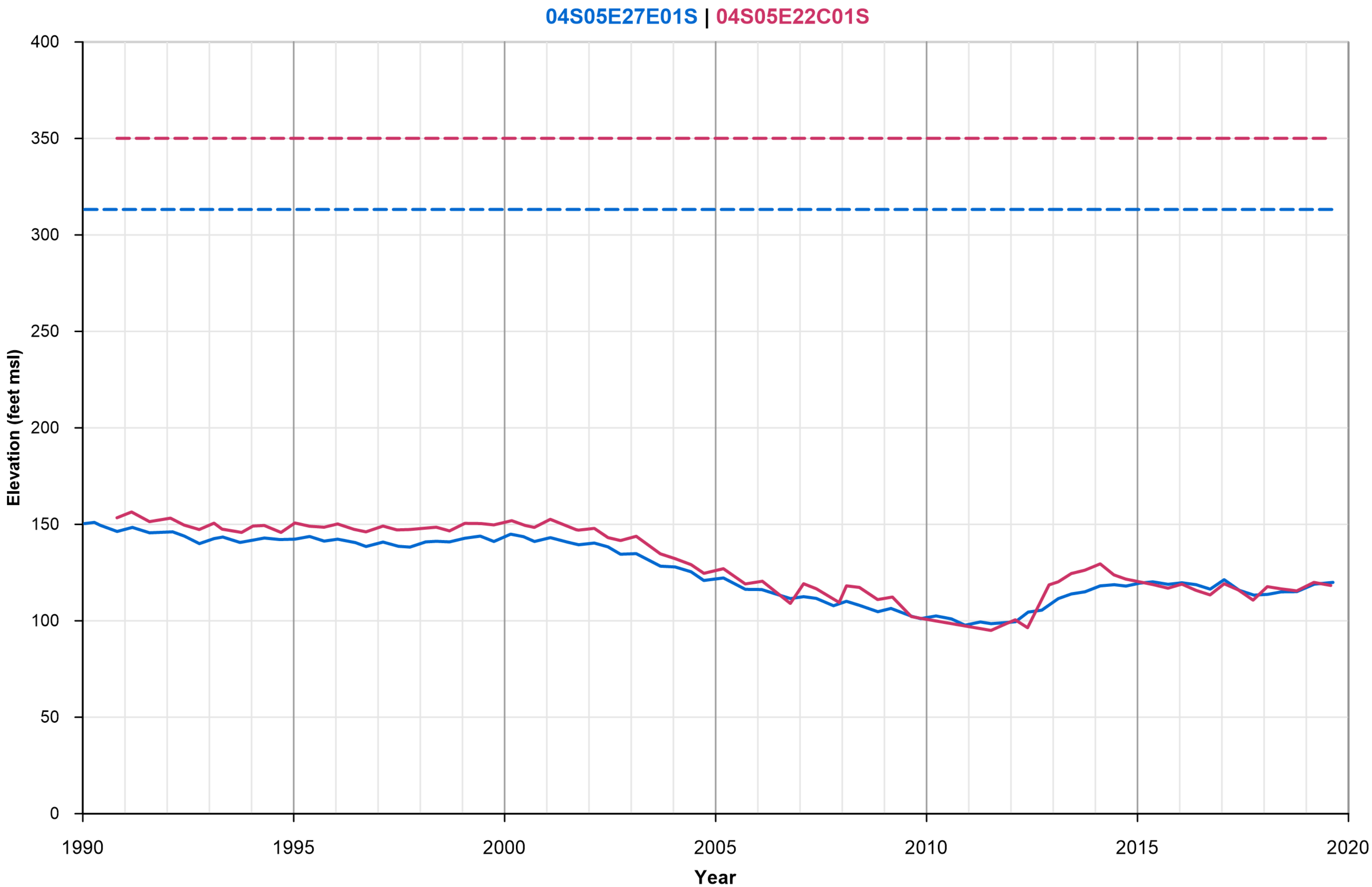
February 2021

TODD GROUNDWATER

Appendix A-12
Groundwater Elevation Hydrographs
04S04E24H01S and 04S05E29A02S



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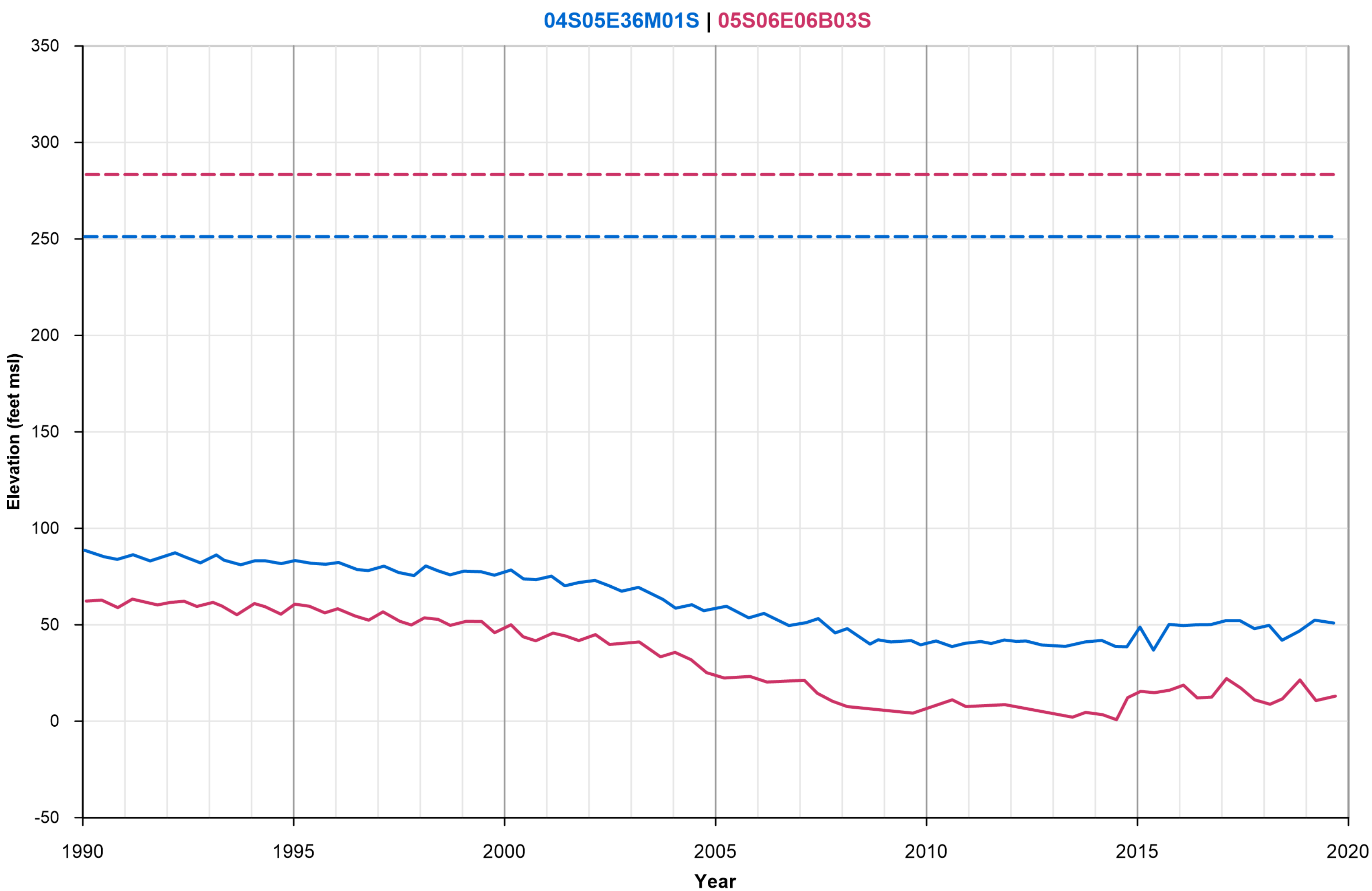
February 2021

TODD GROUNDWATER

Appendix A-13
Groundwater Elevation Hydrographs 04S05E27E01S and 04S05E22C01S



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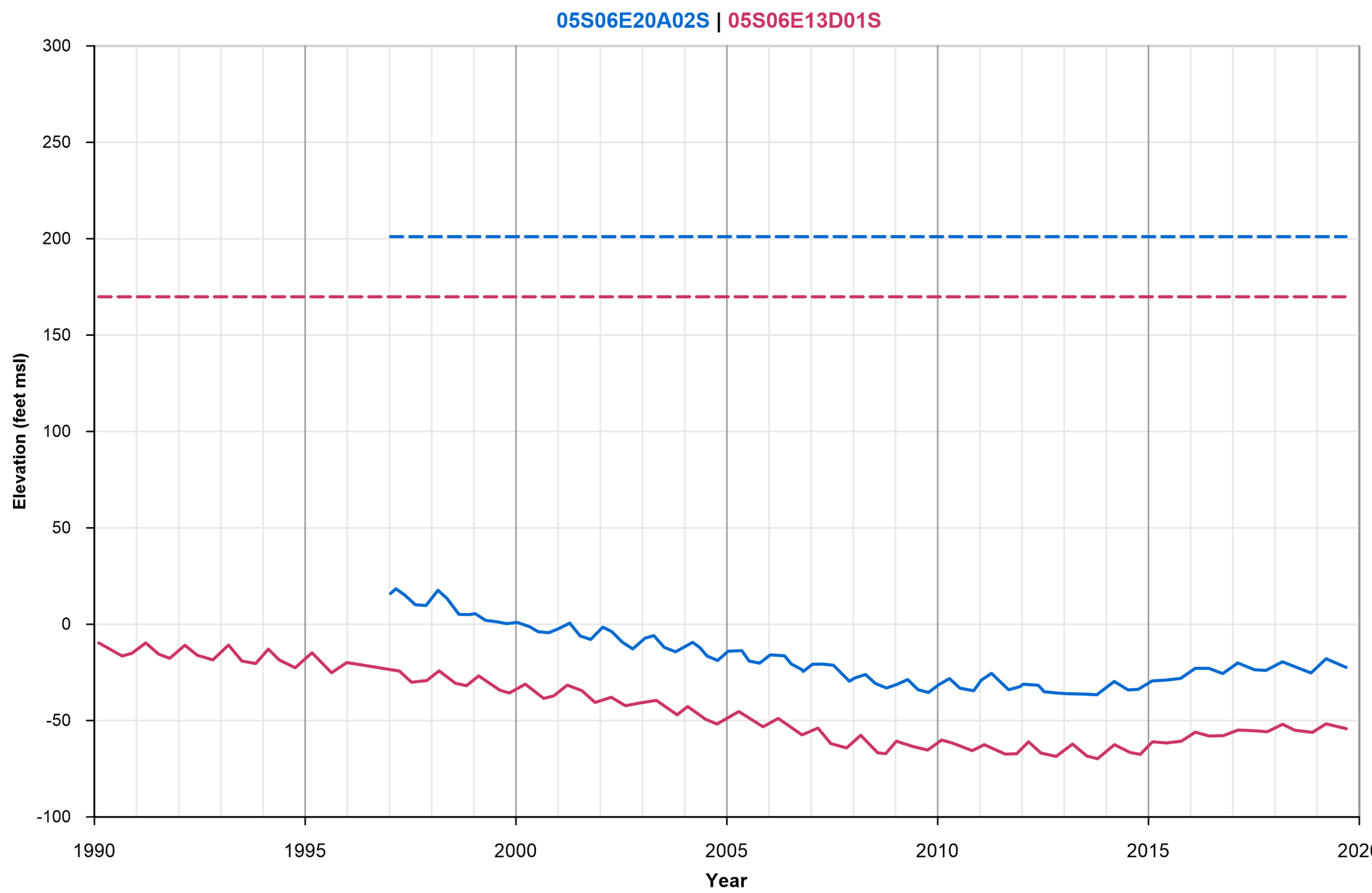
February 2021

TODD GROUNDWATER

Appendix A-14
Groundwater Elevation Hydrographs
04S05E36M01S and 05S06E06B03S



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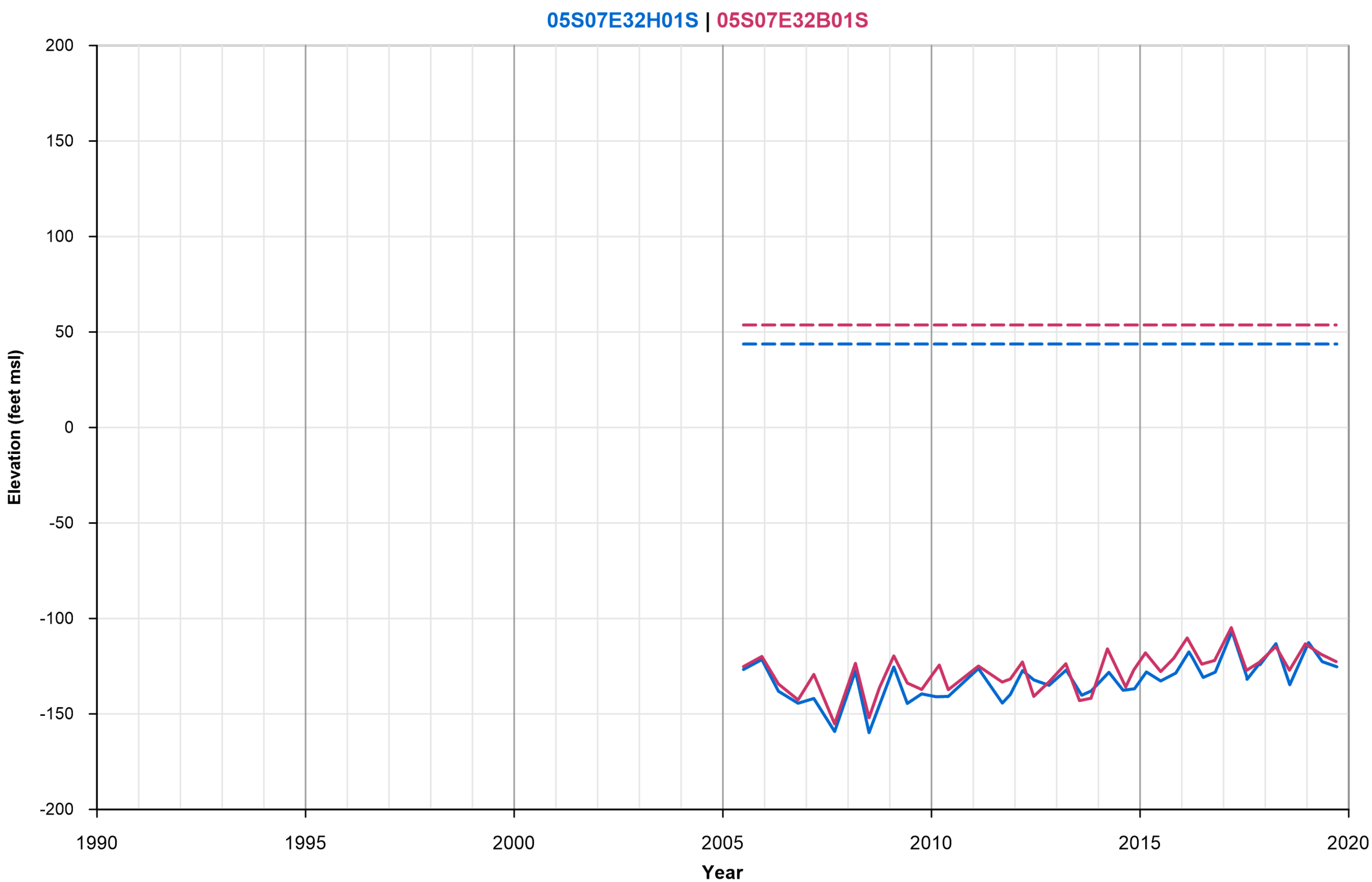
February 2021

TODD GROUNDWATER

Appendix A-15
Groundwater Elevation Hydrographs 05S06E20A02S and 05S06E13D01S



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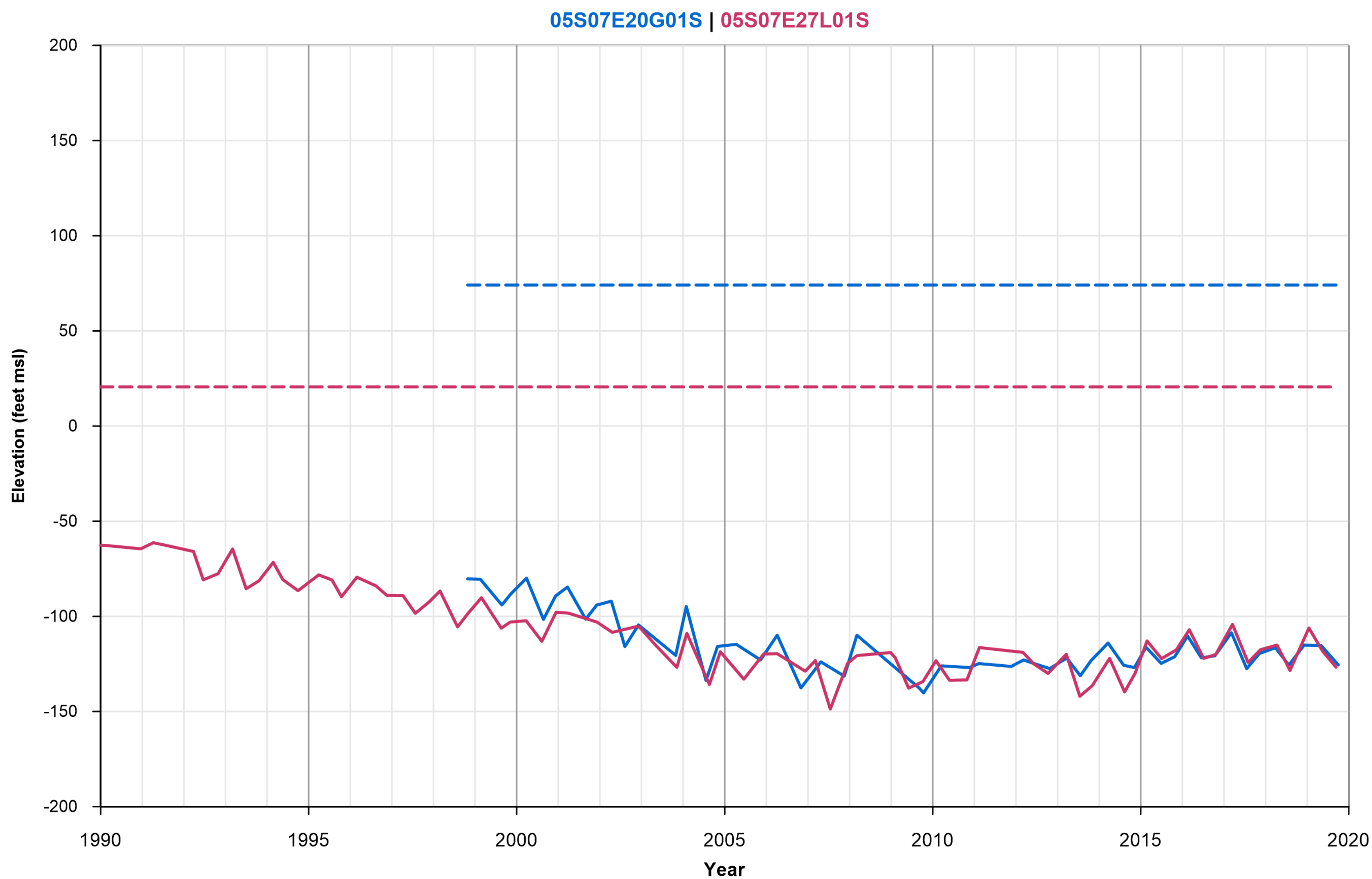
February 2021

TODD GROUNDWATER

Appendix A-16
Groundwater Elevation Hydrographs
05S07E32H01S and 05S07E32B01S



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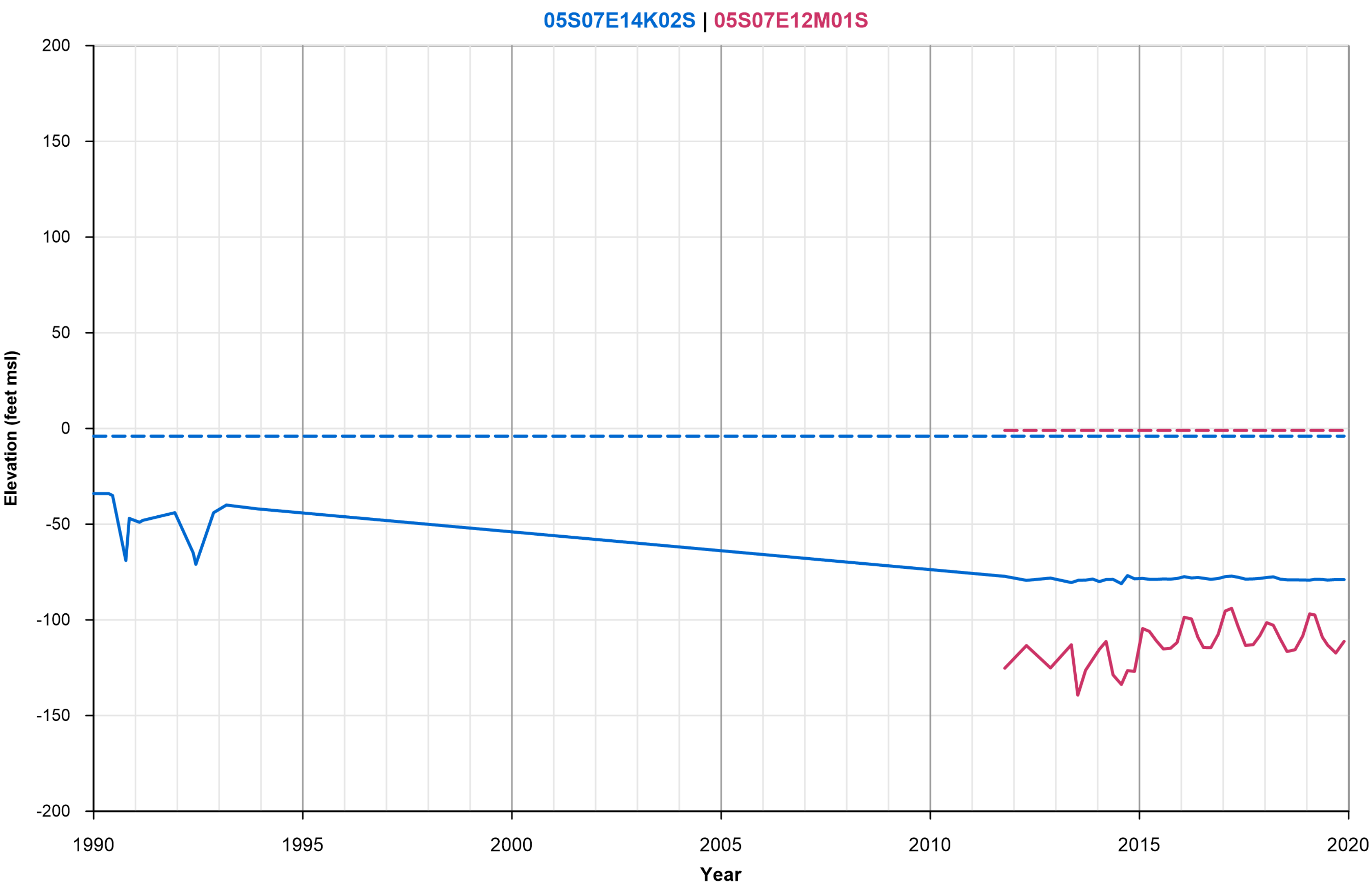
February 2021

TODD GROUNDWATER

Appendix A-17
Groundwater Elevation Hydrographs 05S07E20G01S and 05S07E27L01S



February 2021

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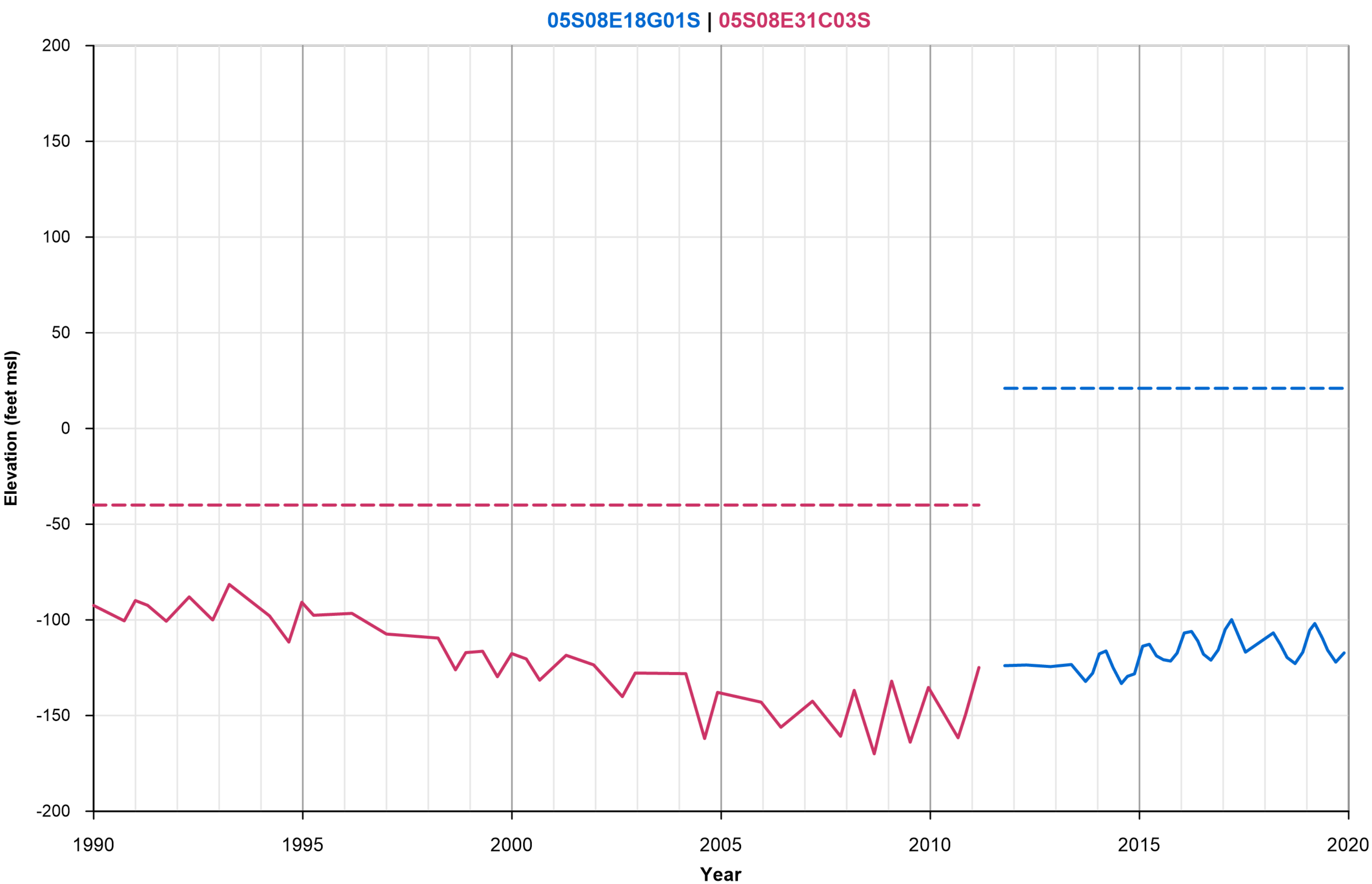
TODD GROUNDWATER

Appendix A-18
Groundwater Elevation Hydrographs
05S07E14K02S and 05S07E12M01S



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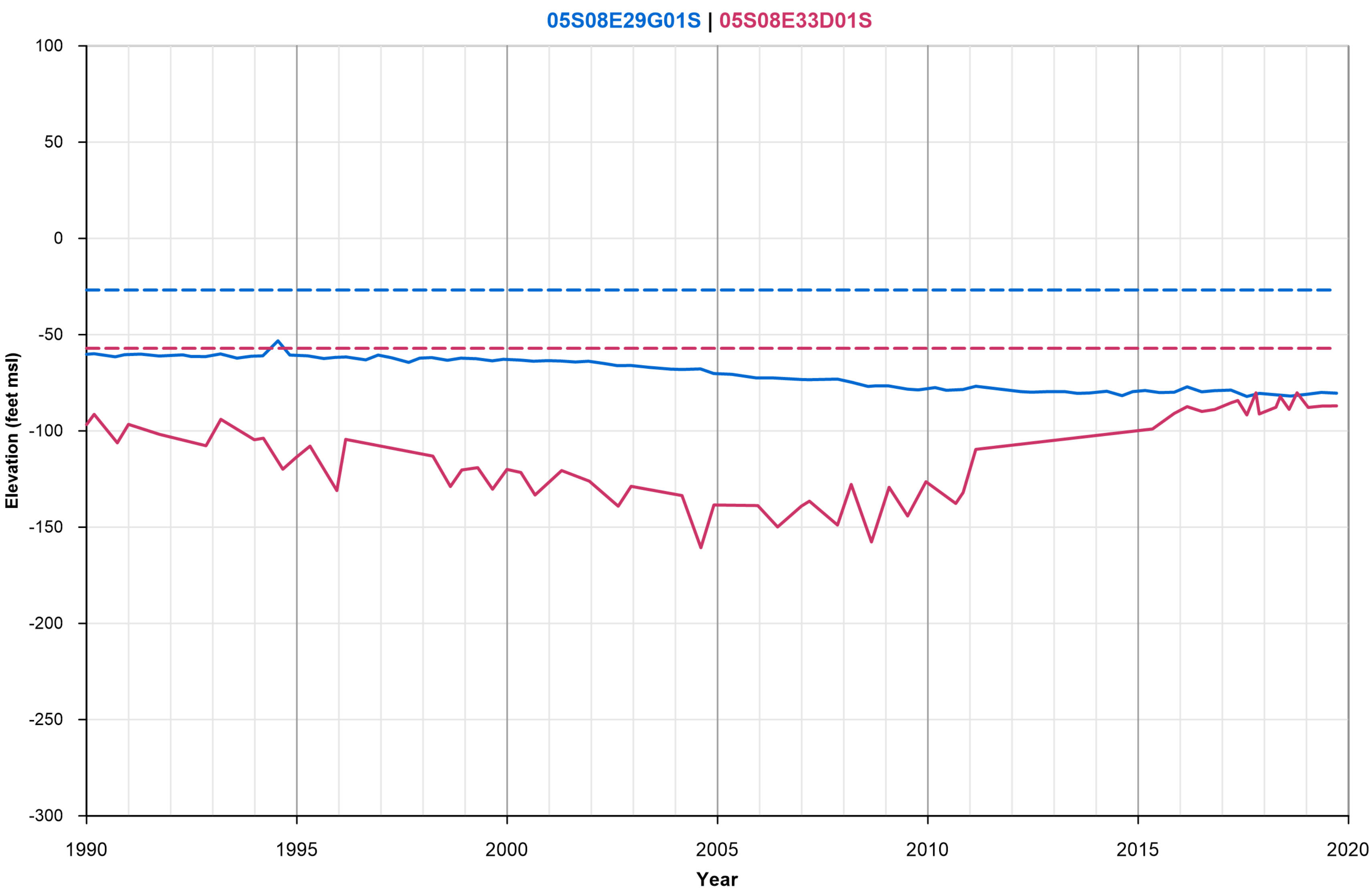
February 2021

TODD GROUNDWATER

Appendix A-19
Groundwater Elevation Hydrographs
05S08E18G01S and 05S08E31C03S



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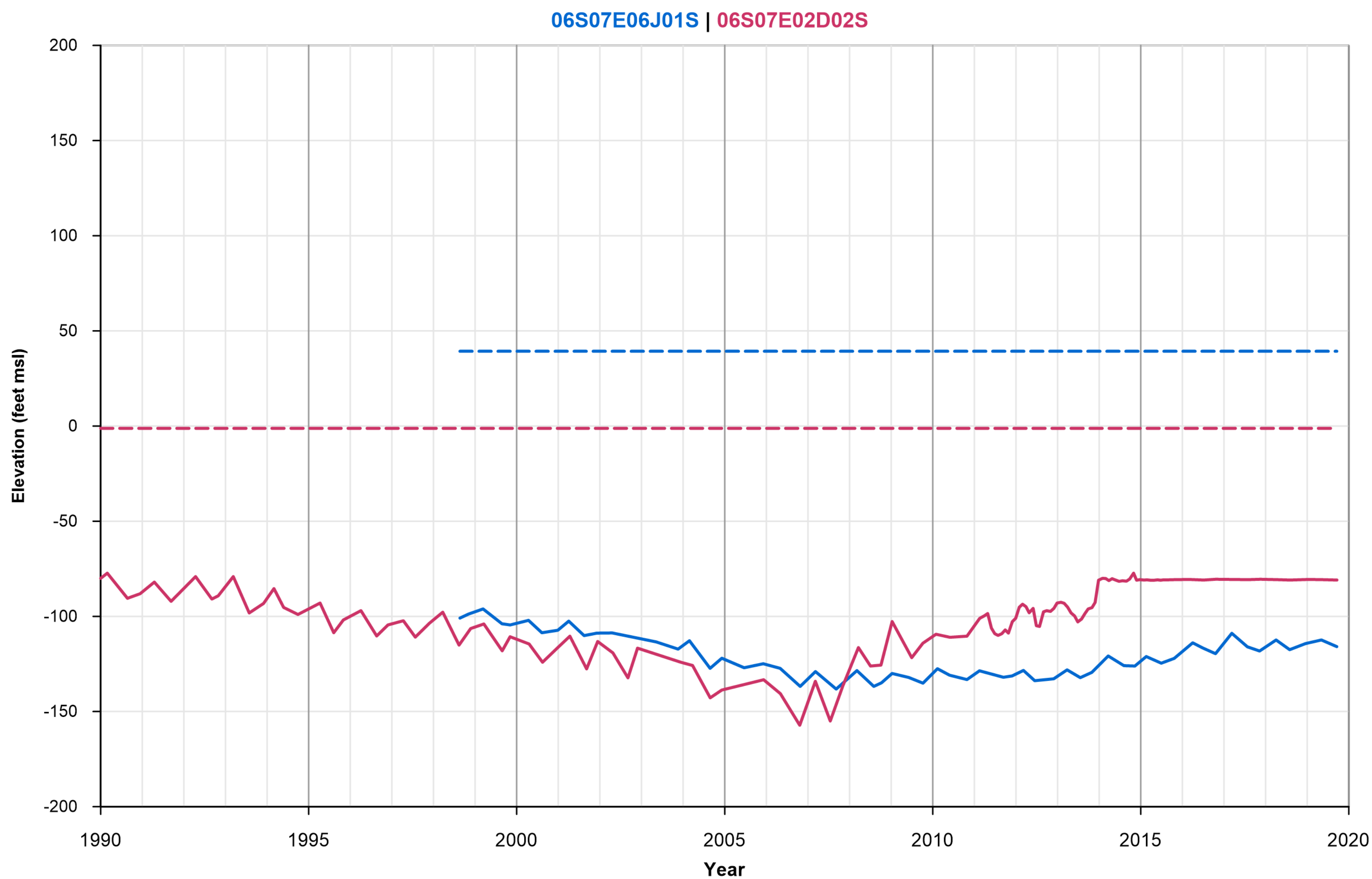
February 2021

TODD GROUNDWATER

Appendix A-15
Groundwater Elevation Hydrographs
05S06E20A02S and 05S06E13D01S



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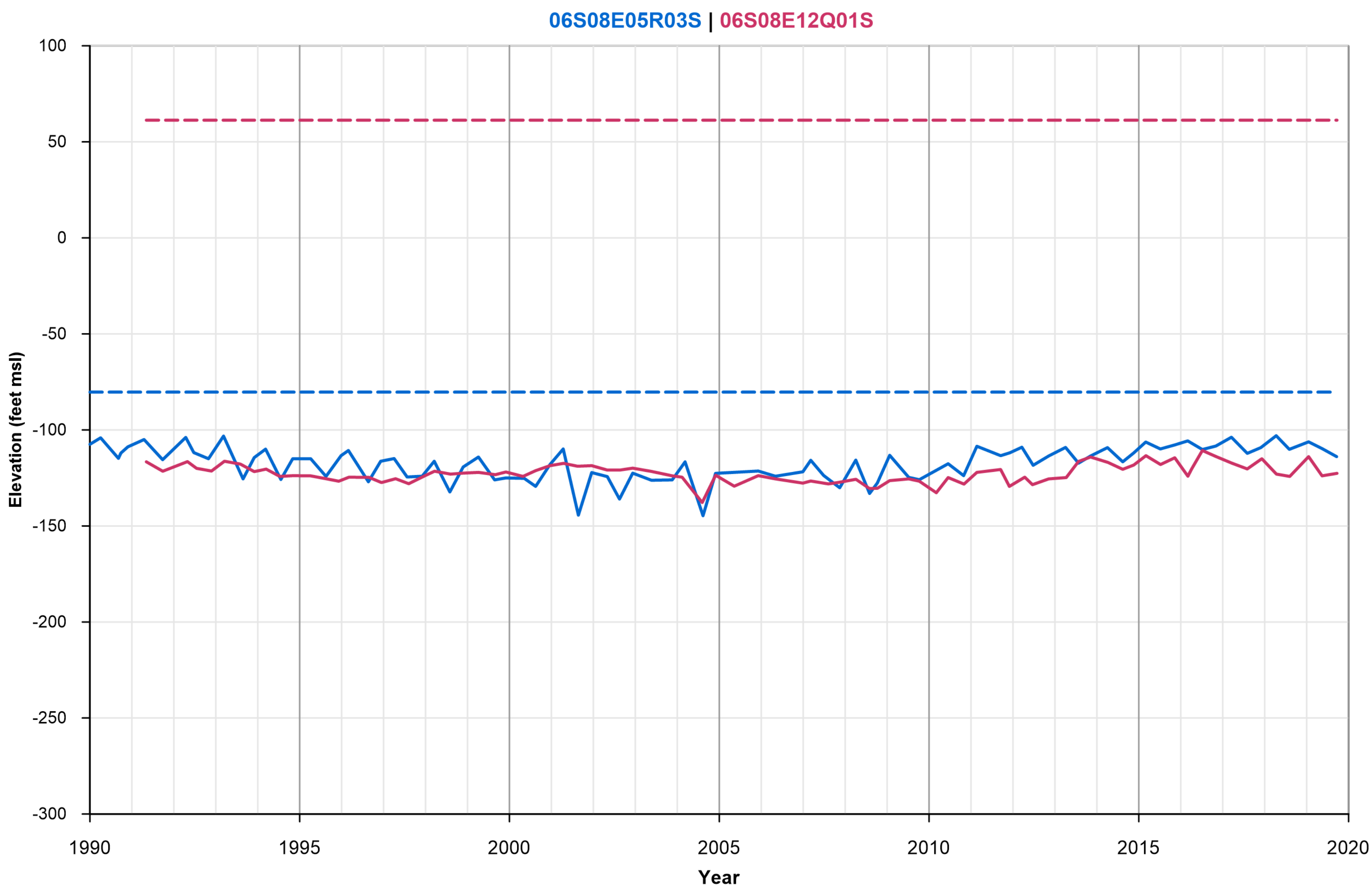
February 2021

TODD GROUNDWATER

Appendix A-21
Groundwater Elevation Hydrographs
06S07E06J01S and 06S07E02D02S



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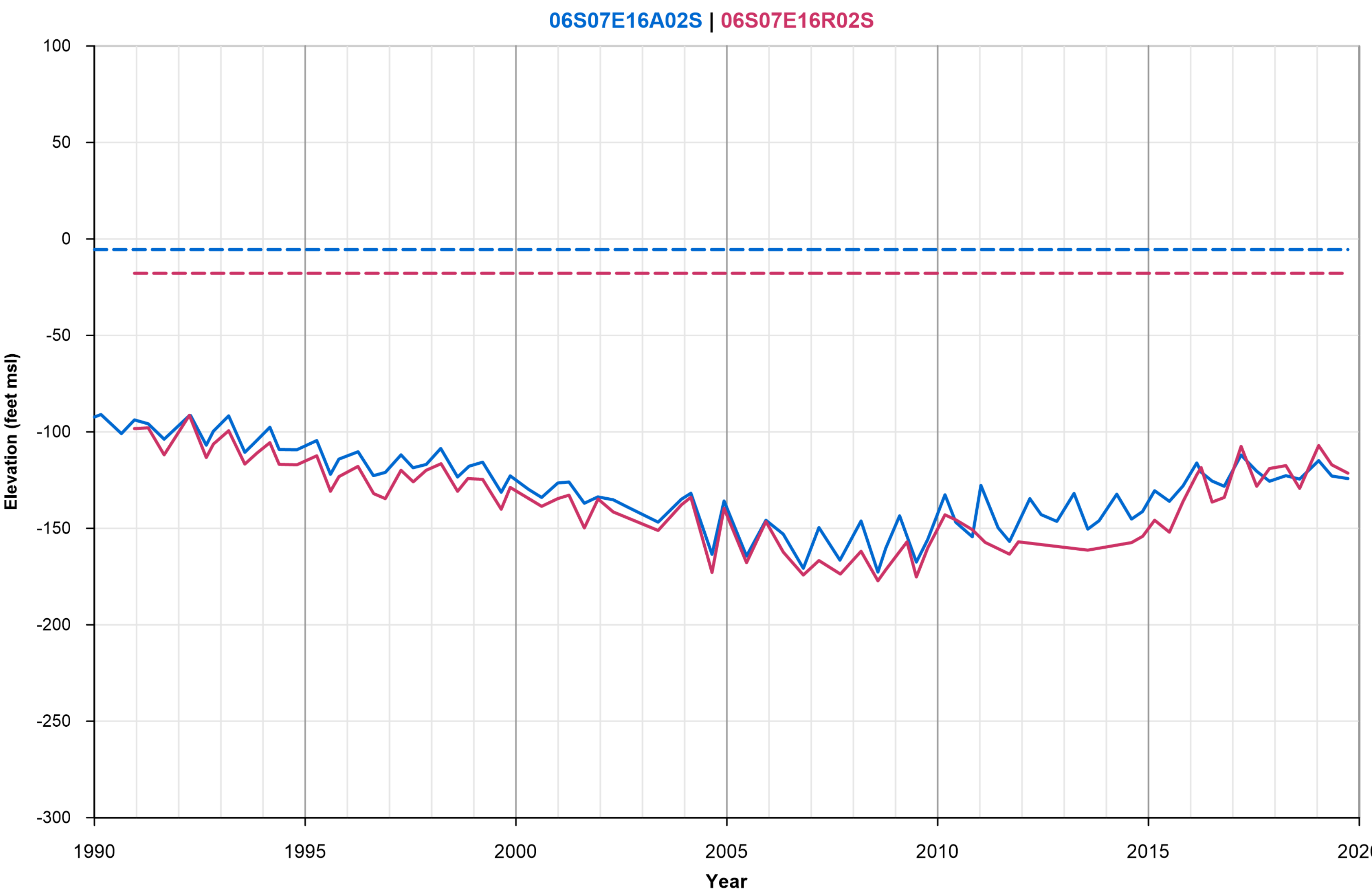
February 2021

TODD GROUNDWATER

Appendix A-22
Groundwater Elevation Hydrographs
06S08E05R03S and 06S08E12Q01S



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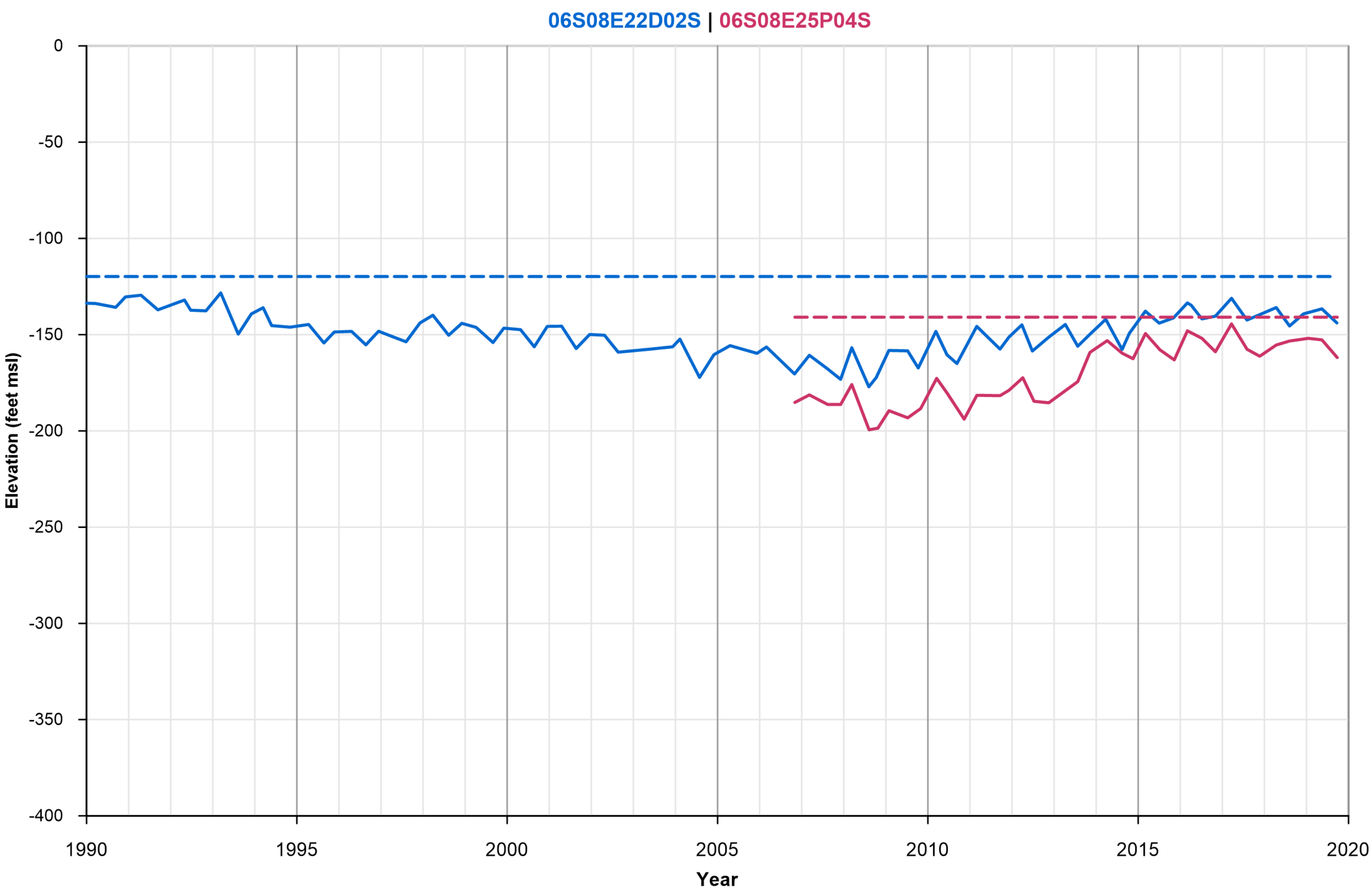
February 2021

TODD GROUNDWATER

Appendix A-23
Groundwater Elevation Hydrographs
06S07E16A02S and 06S07E16R02S



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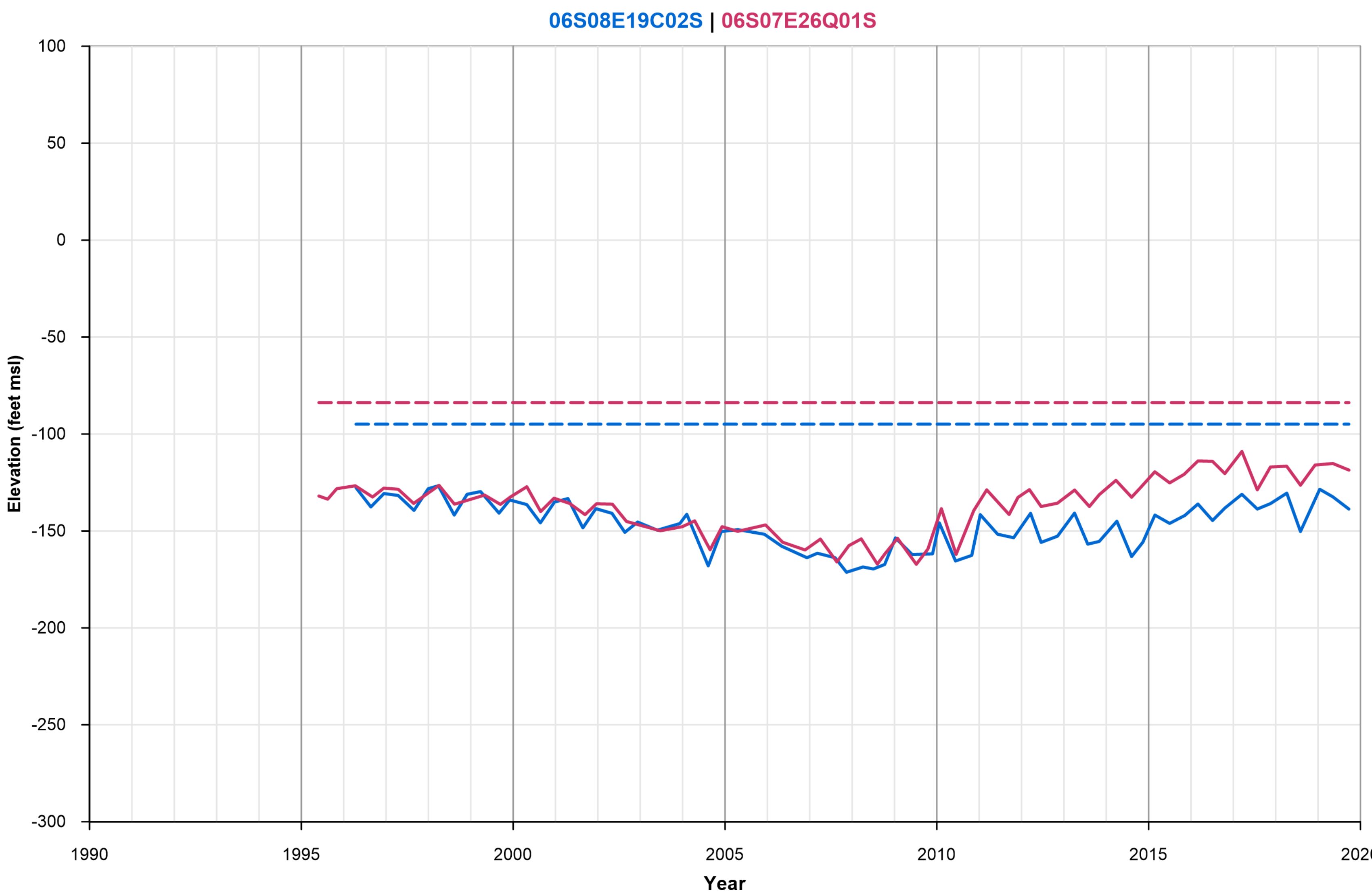
February 2021

TODD GROUNDWATER

Appendix A-24
Groundwater Elevation Hydrographs
06S08E22D02S and 06S08E25P04S



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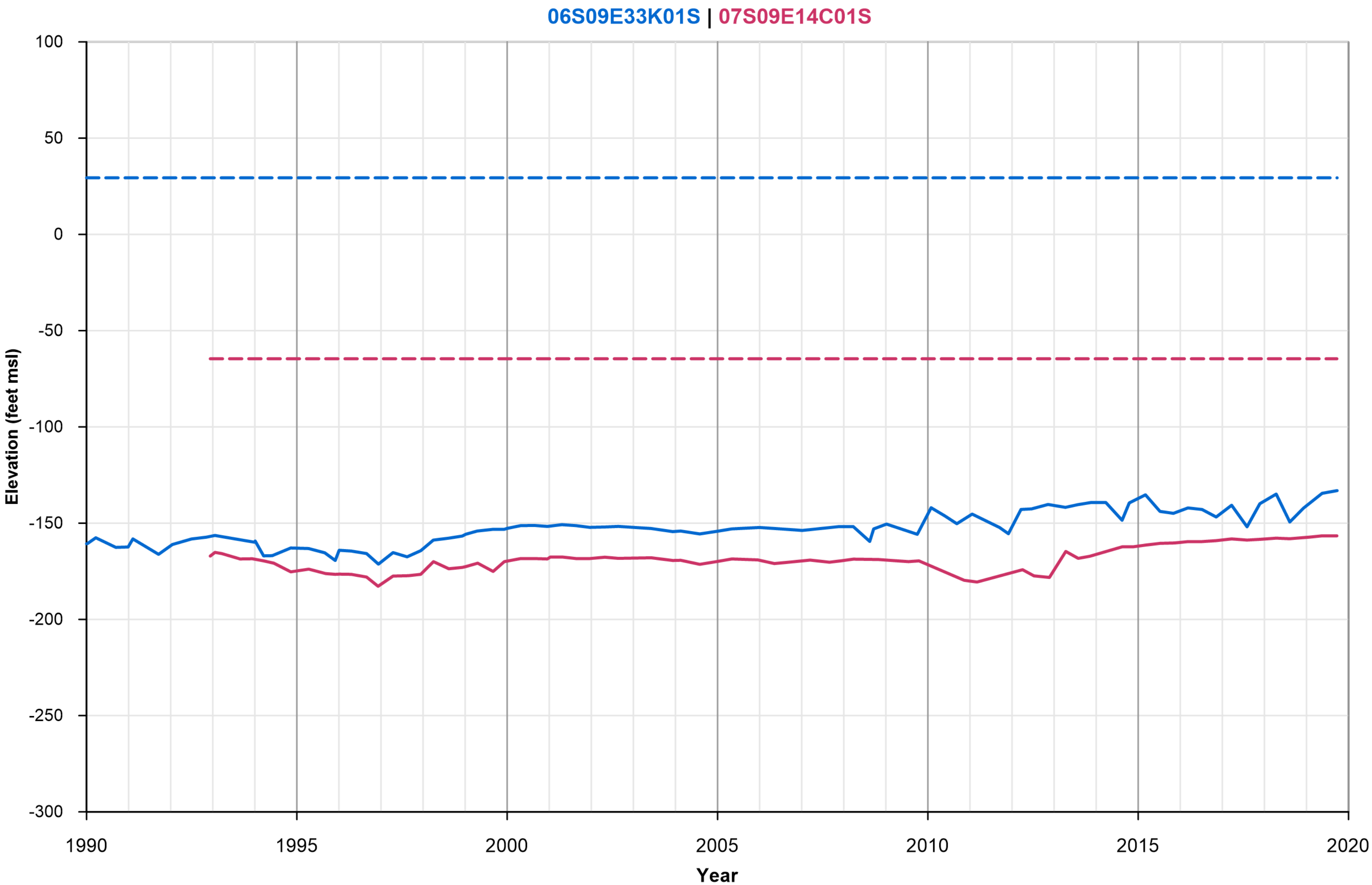
February 2021

TODD GROUNDWATER

Appendix A-25
Groundwater Elevation Hydrographs
06S08E19C02S and 06S07E26Q01S



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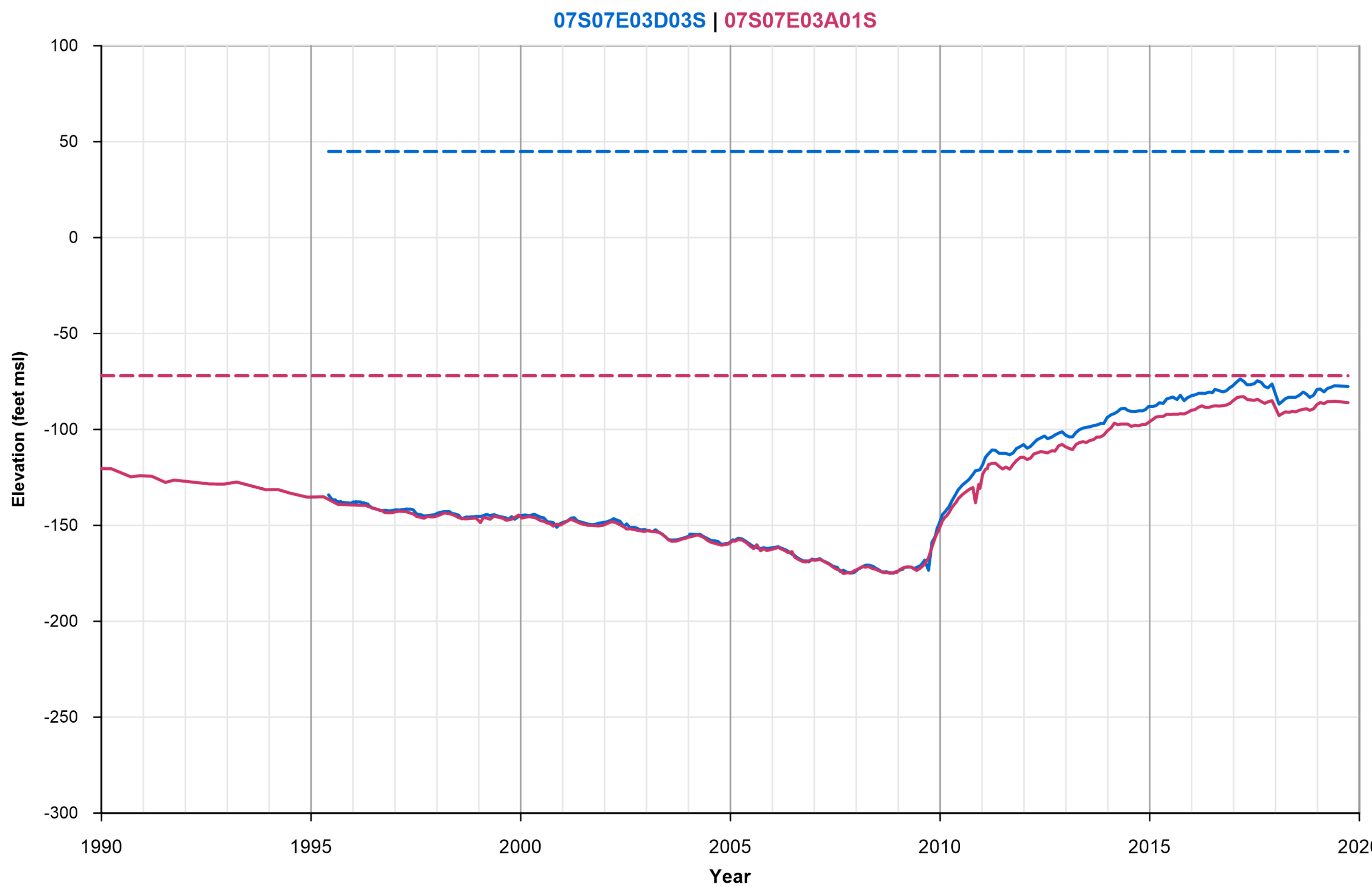
February 2021

TODD GROUNDWATER

Appendix A-26
Groundwater Elevation Hydrographs 06S09E33K01S and 07S09E14C01S



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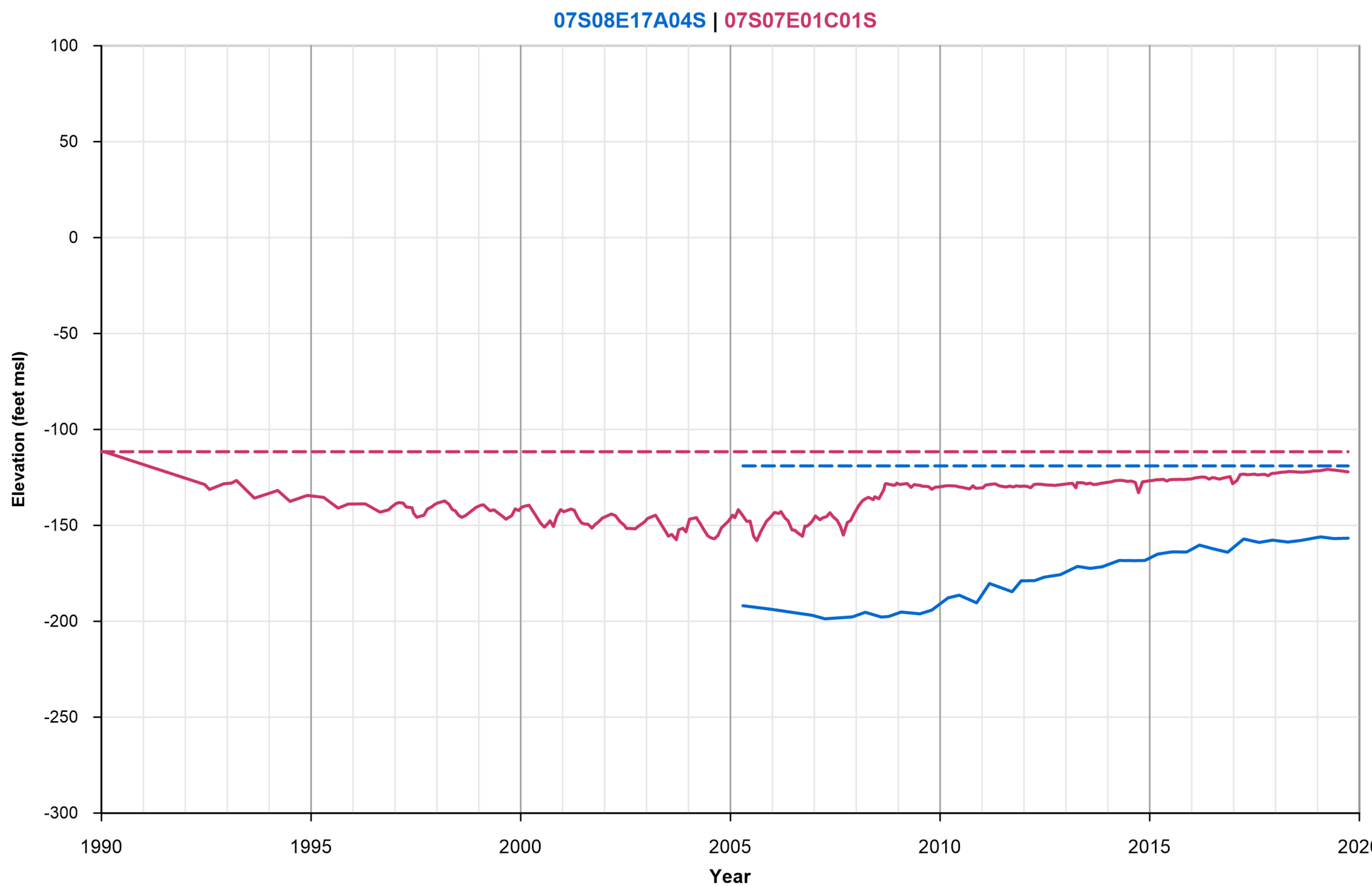
February 2021

TODD GROUNDWATER

Appendix A-27
Groundwater Elevation Hydrographs
07S07E03D03S and 07S07E03A01S



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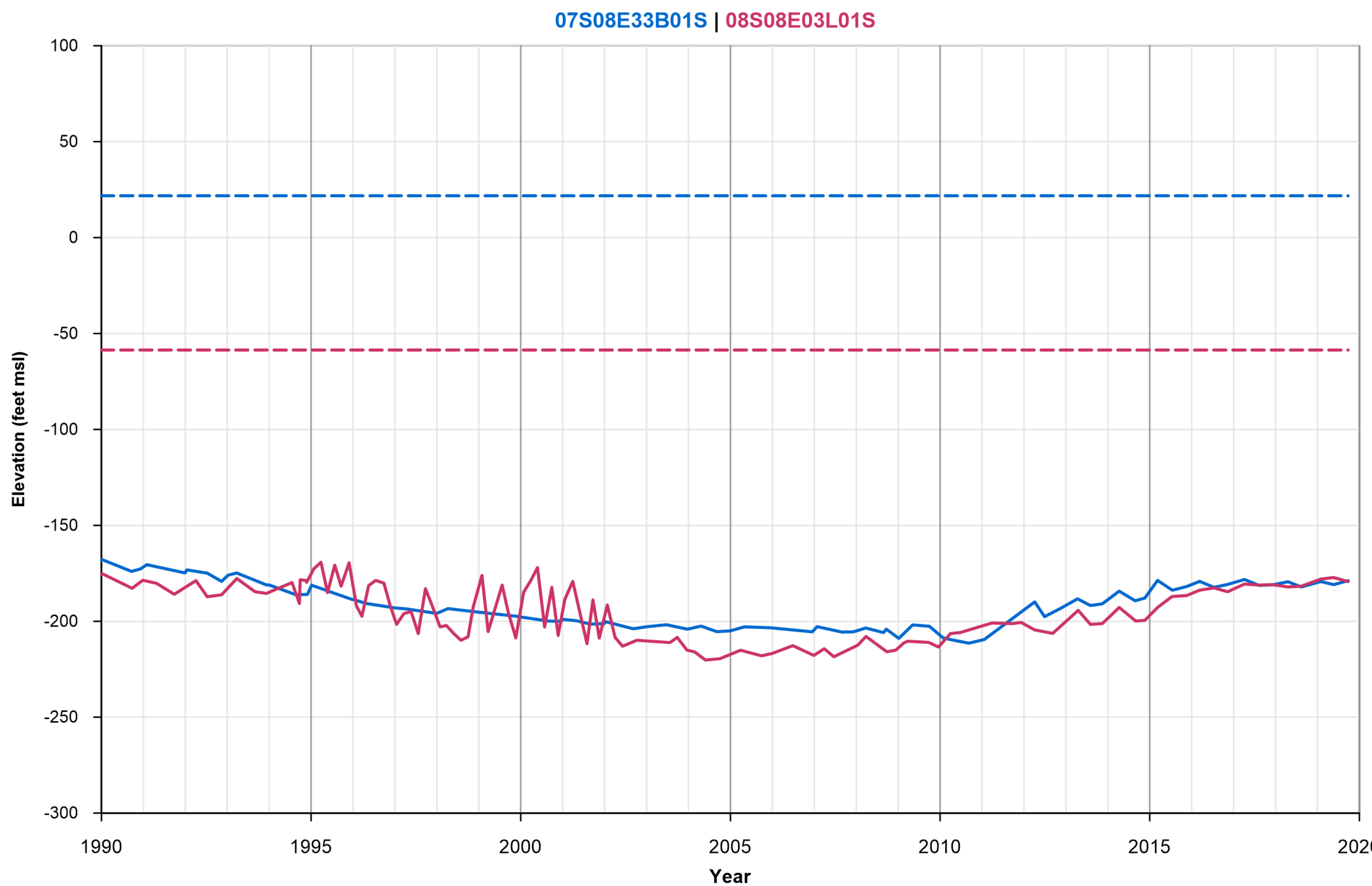
February 2021

TODD GROUNDWATER

Appendix A-28
Groundwater Elevation Hydrographs
07S08E17A04S and 07S07E01C01S



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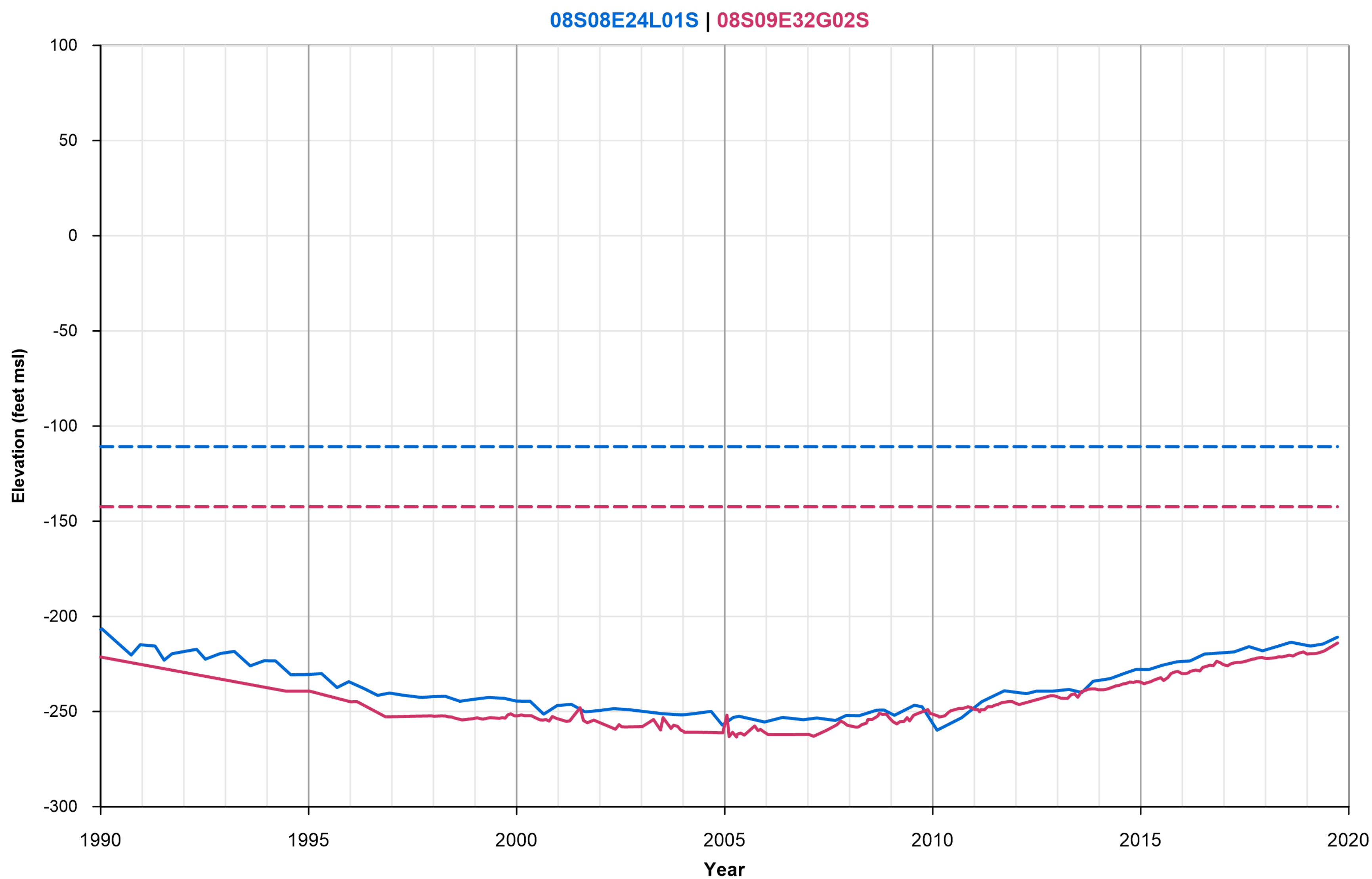
February 2021

TODD GROUNDWATER

Appendix A-29
Groundwater Elevation Hydrographs
07S08E33B01S and 08S08E03L01S



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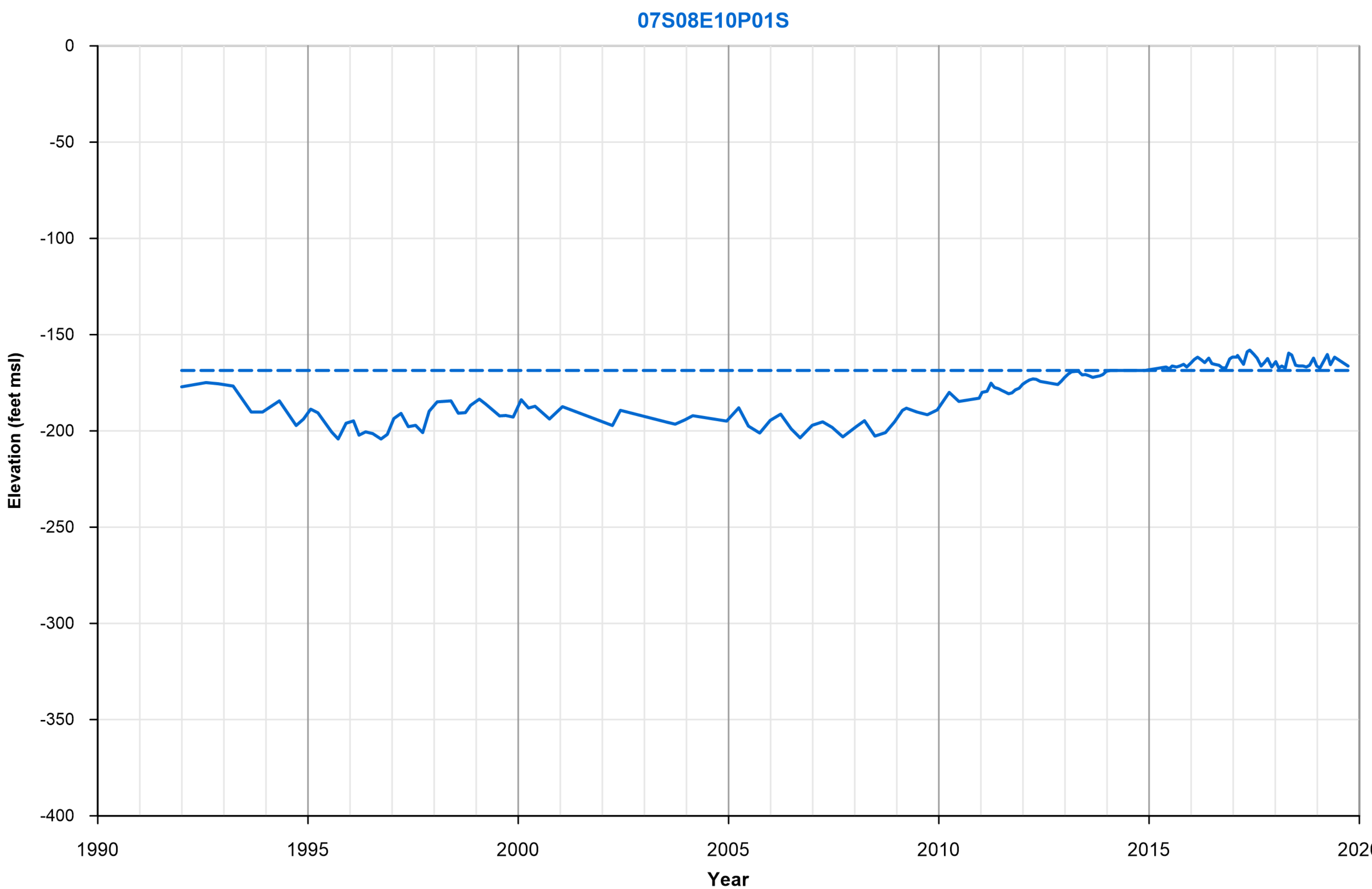
February 2021

TODD GROUNDWATER

Appendix A-30
Groundwater Elevation Hydrographs
08S08E24L01S and 08S09E32G02S



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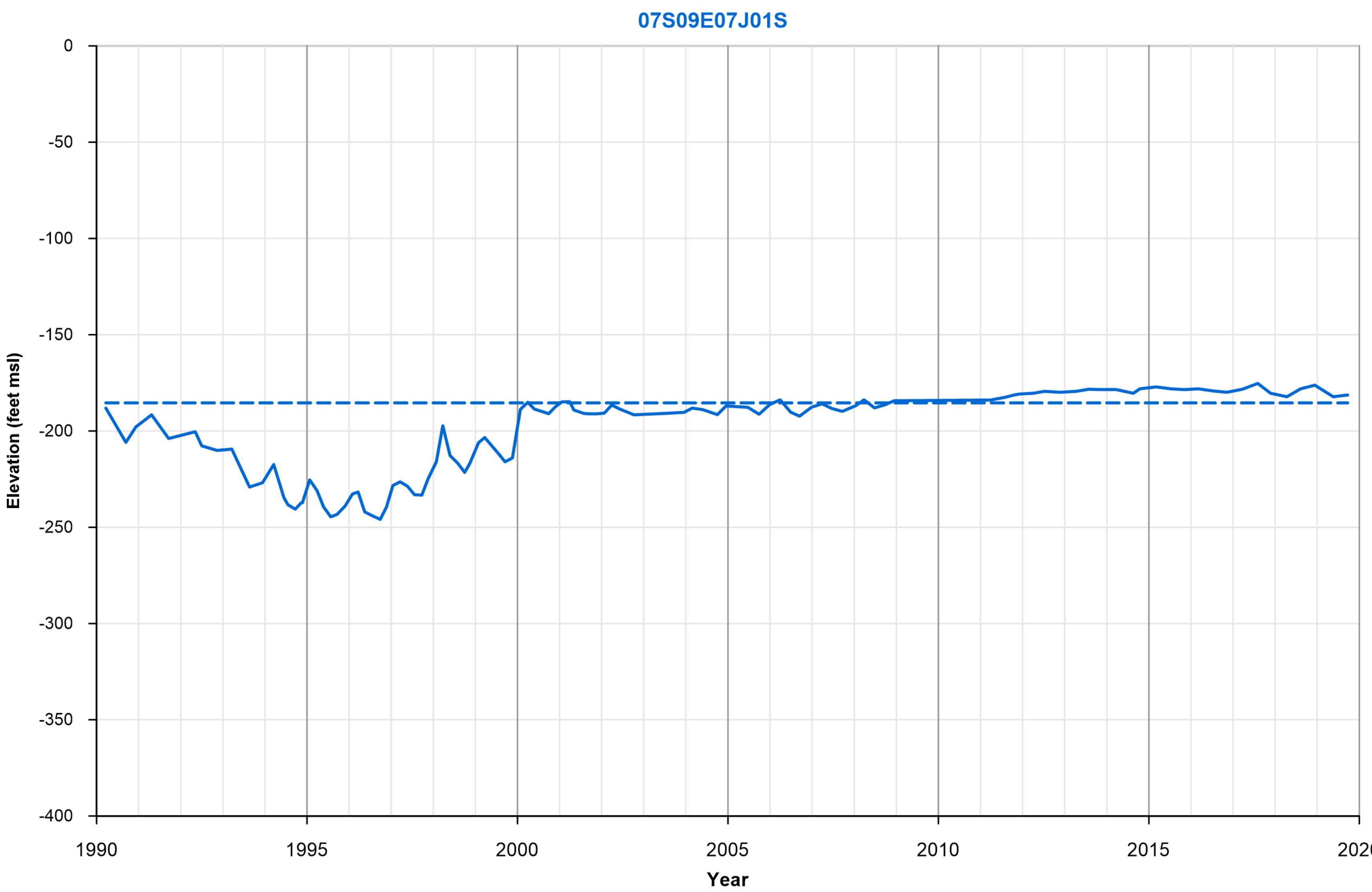
February 2021

TODD GROUNDWATER

Appendix A-31
Groundwater Elevation Hydrographs
07S08E10P01S

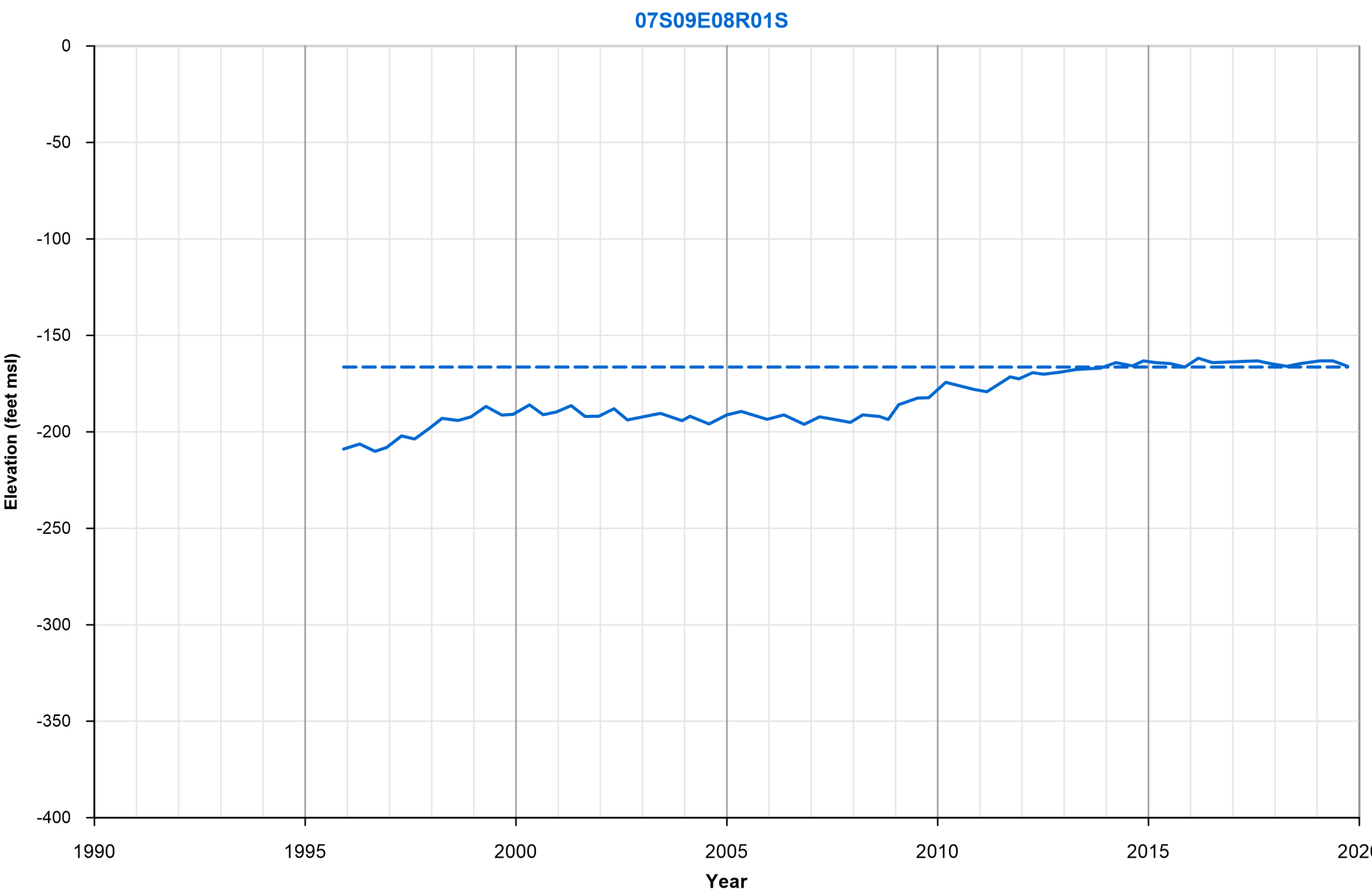


WOODARD & CURRAN

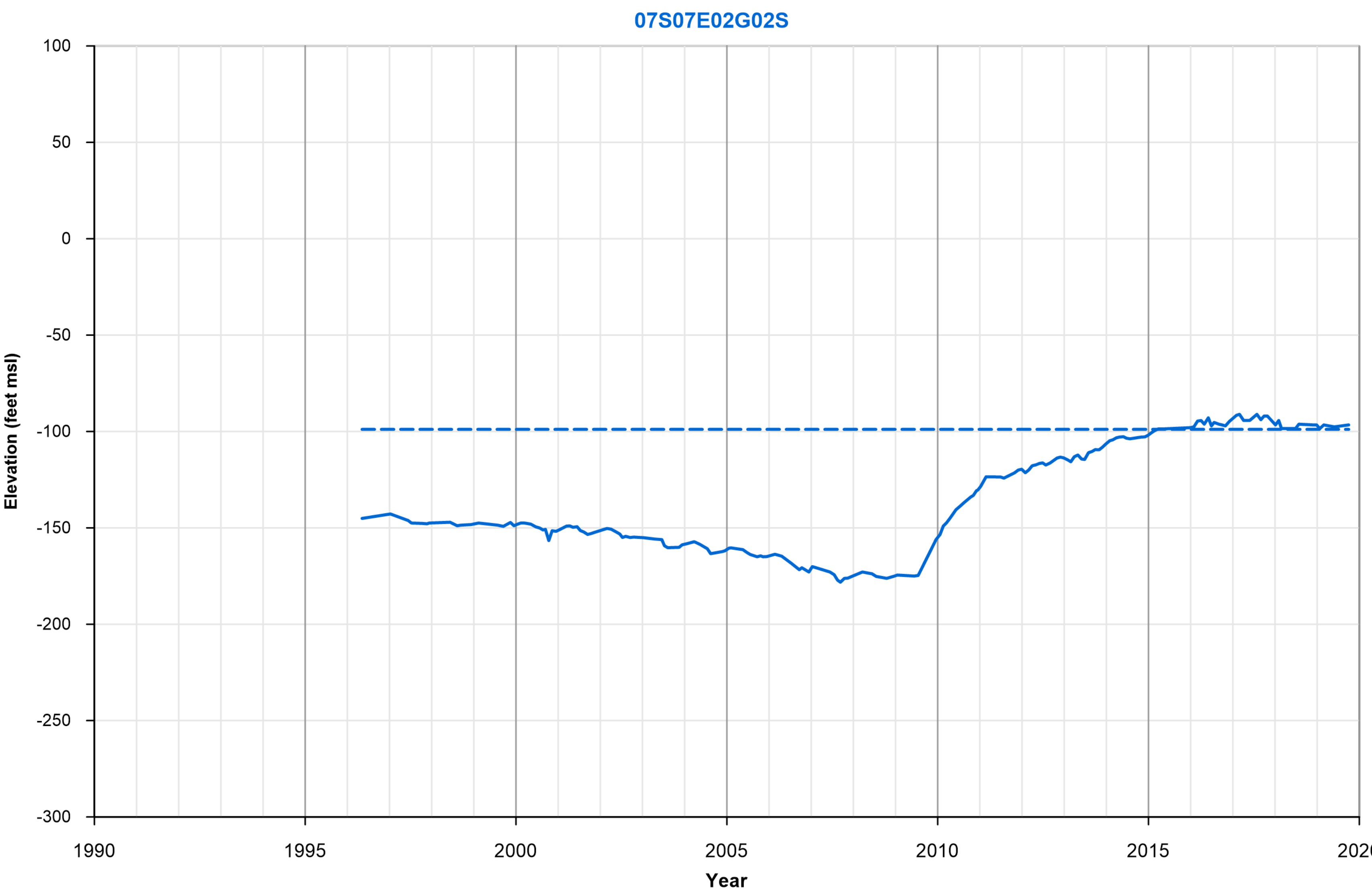
February 2021

TODD GROUNDWATER

Appendix A-32
Groundwater Elevation Hydrographs
07S09E07J01S



07S09E08R01S
0
-50
-100
-150
-200
-250
-300
-350
-400
Elevation (feet msl)
1990
1995
2000
2005
2010
2015
2020
Year



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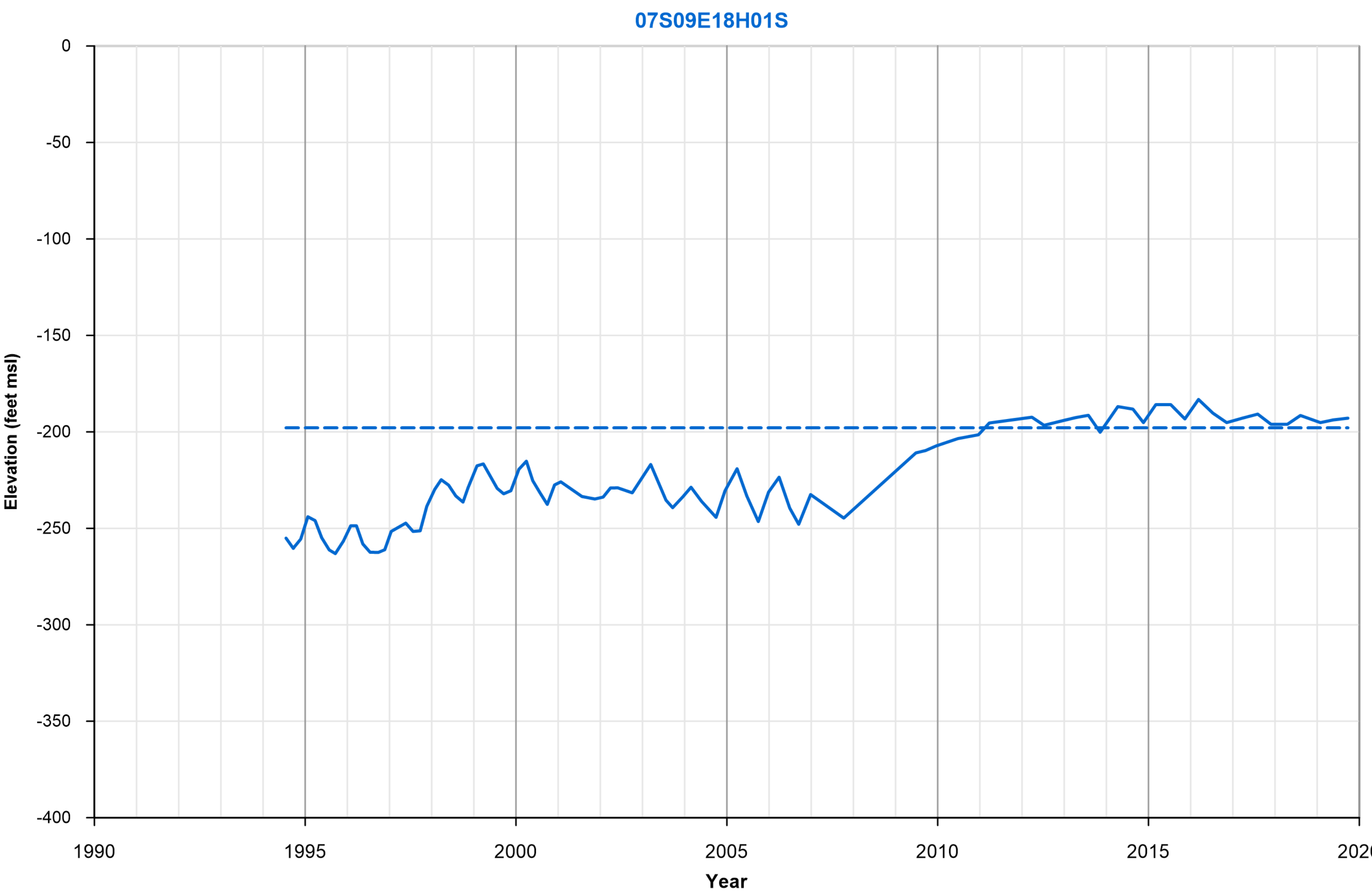
February 2021

TODD GROUNDWATER

Appendix A-34
Groundwater Elevation Hydrographs
07S07E02G02S



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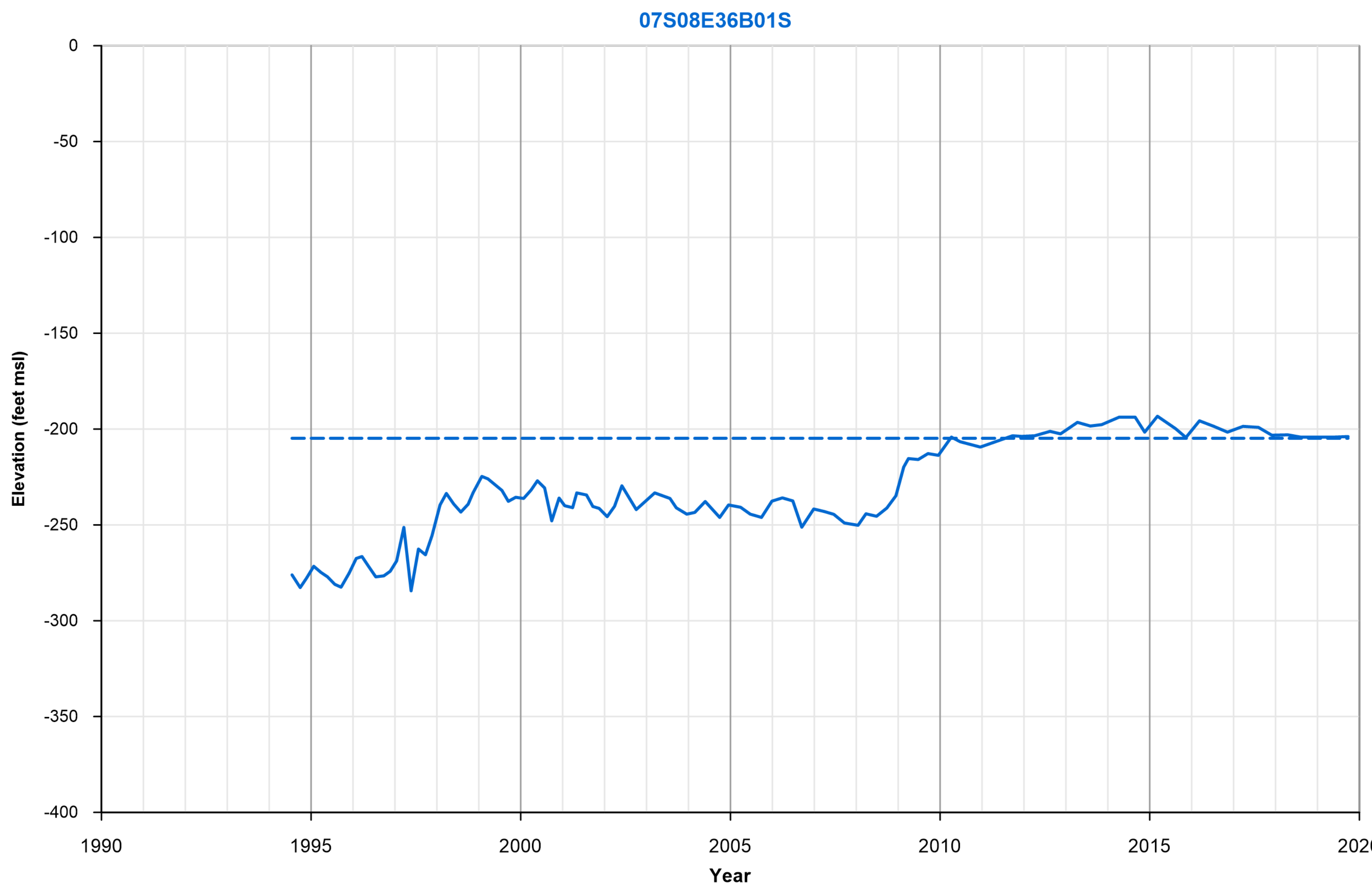
February 2021

TODD GROUNDWATER

Appendix A-35
Groundwater Elevation Hydrographs
07S09E18H01S



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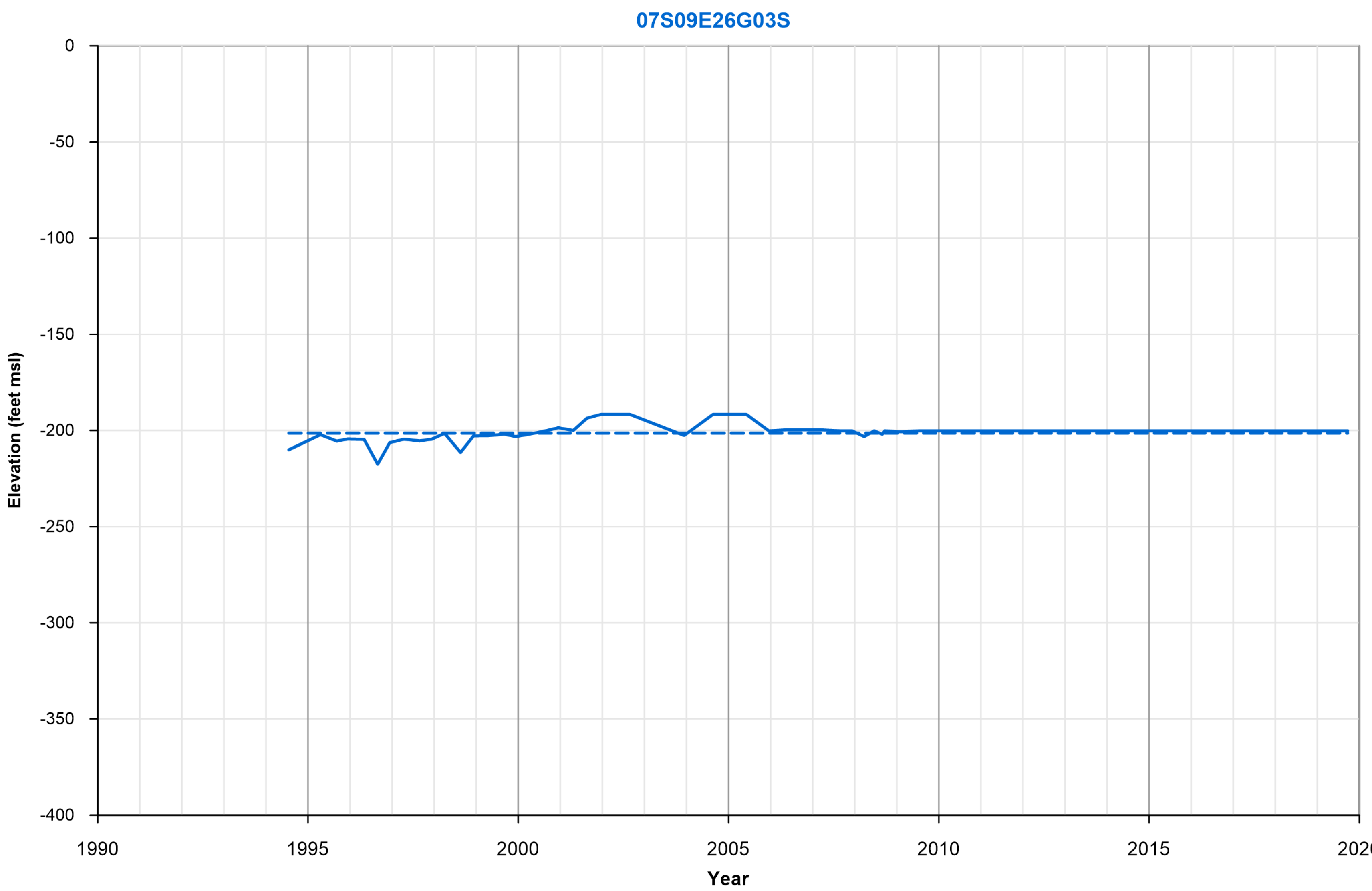
February 2021

TODD GROUNDWATER

Appendix A-36
Groundwater Elevation Hydrographs
07S08E36B01S

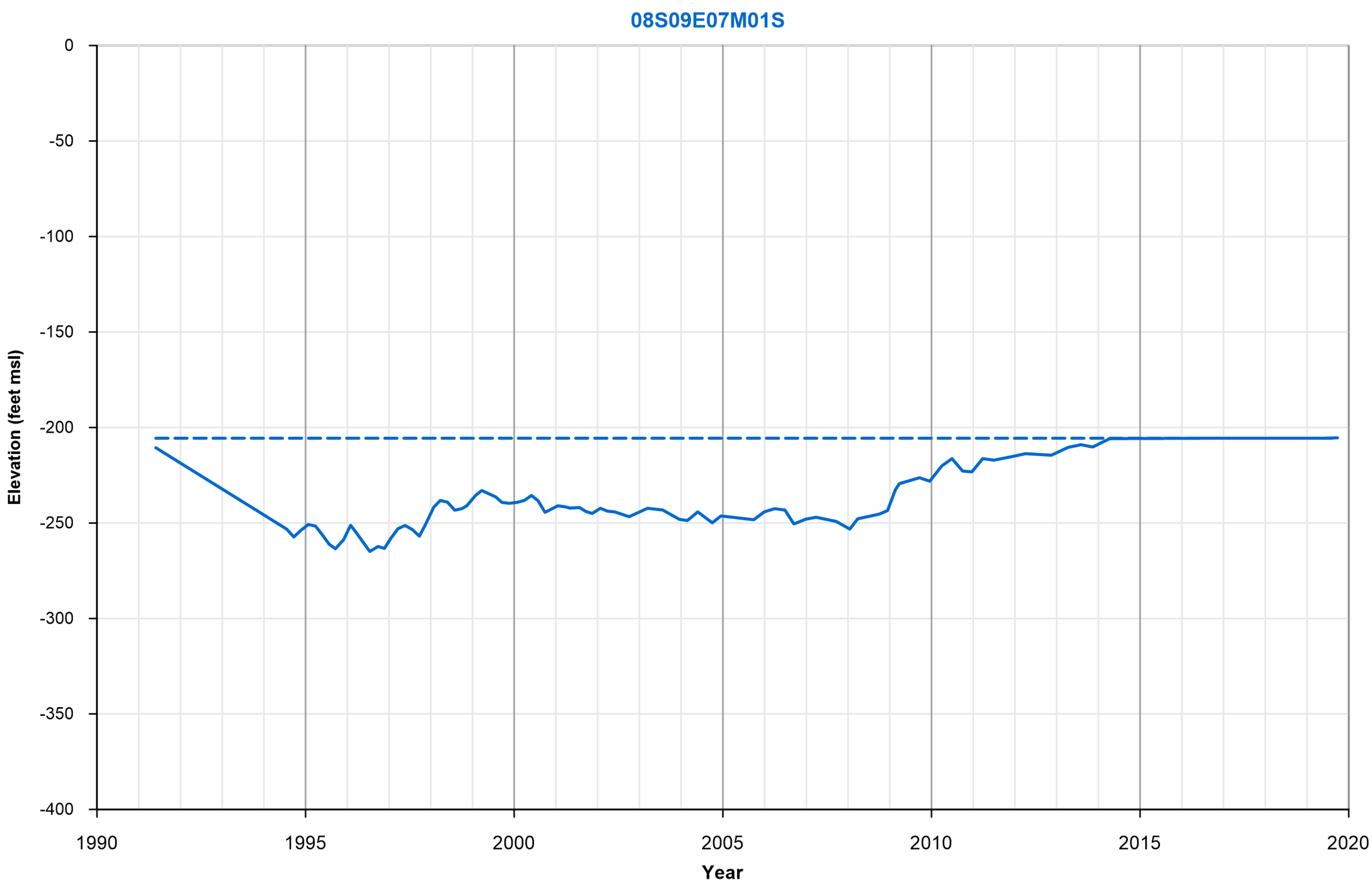


WOODARD & CURRAN

February 2021

TODD GROUNDWATER

Appendix A-37
Groundwater Elevation Hydrographs
07S09E26G03S

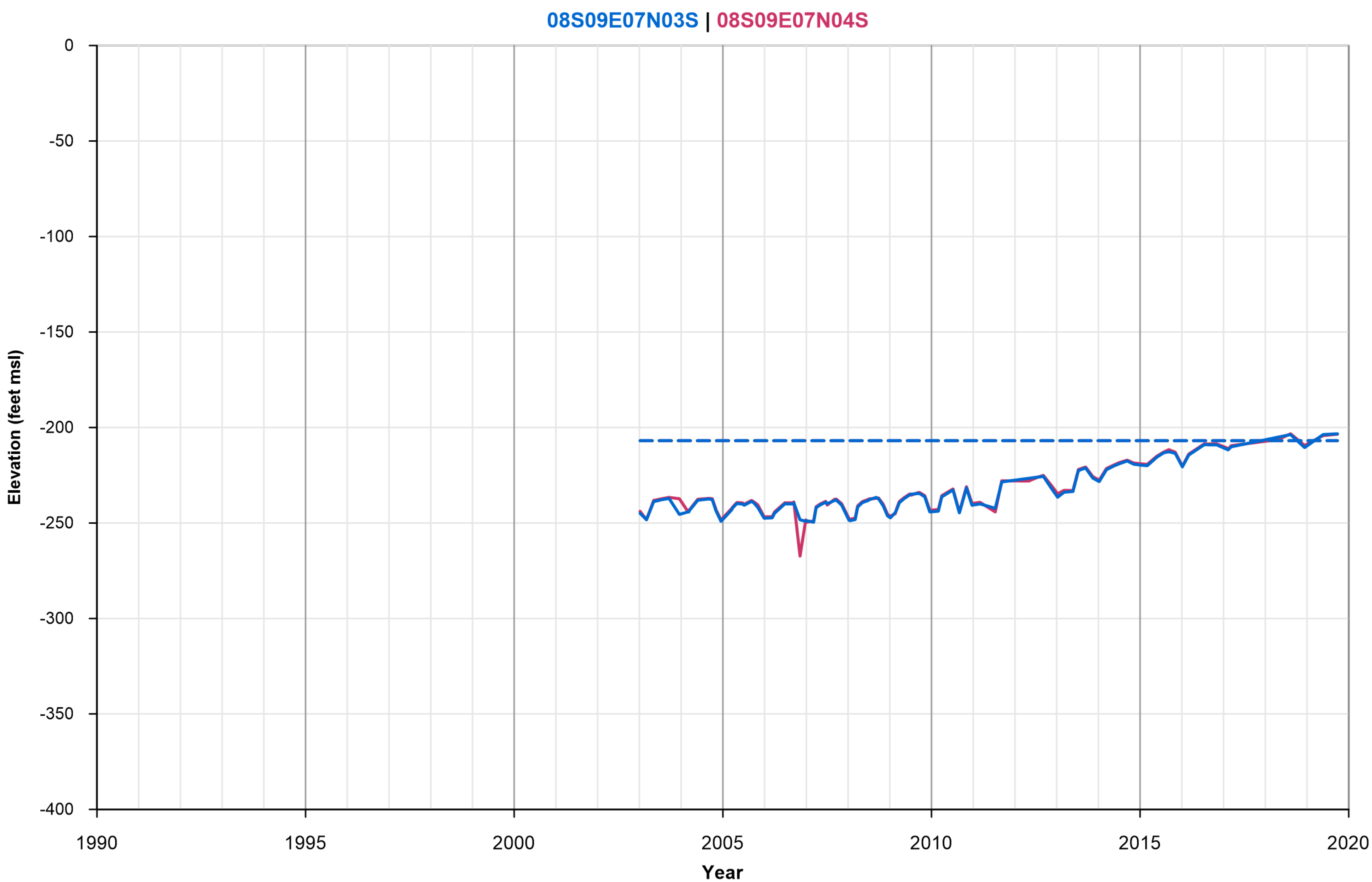


February 2021

WOODARD & CURRAN

TODD GROUNDWATER

Appendix A-38
Groundwater Elevation Hydrographs
08S09E07M01S

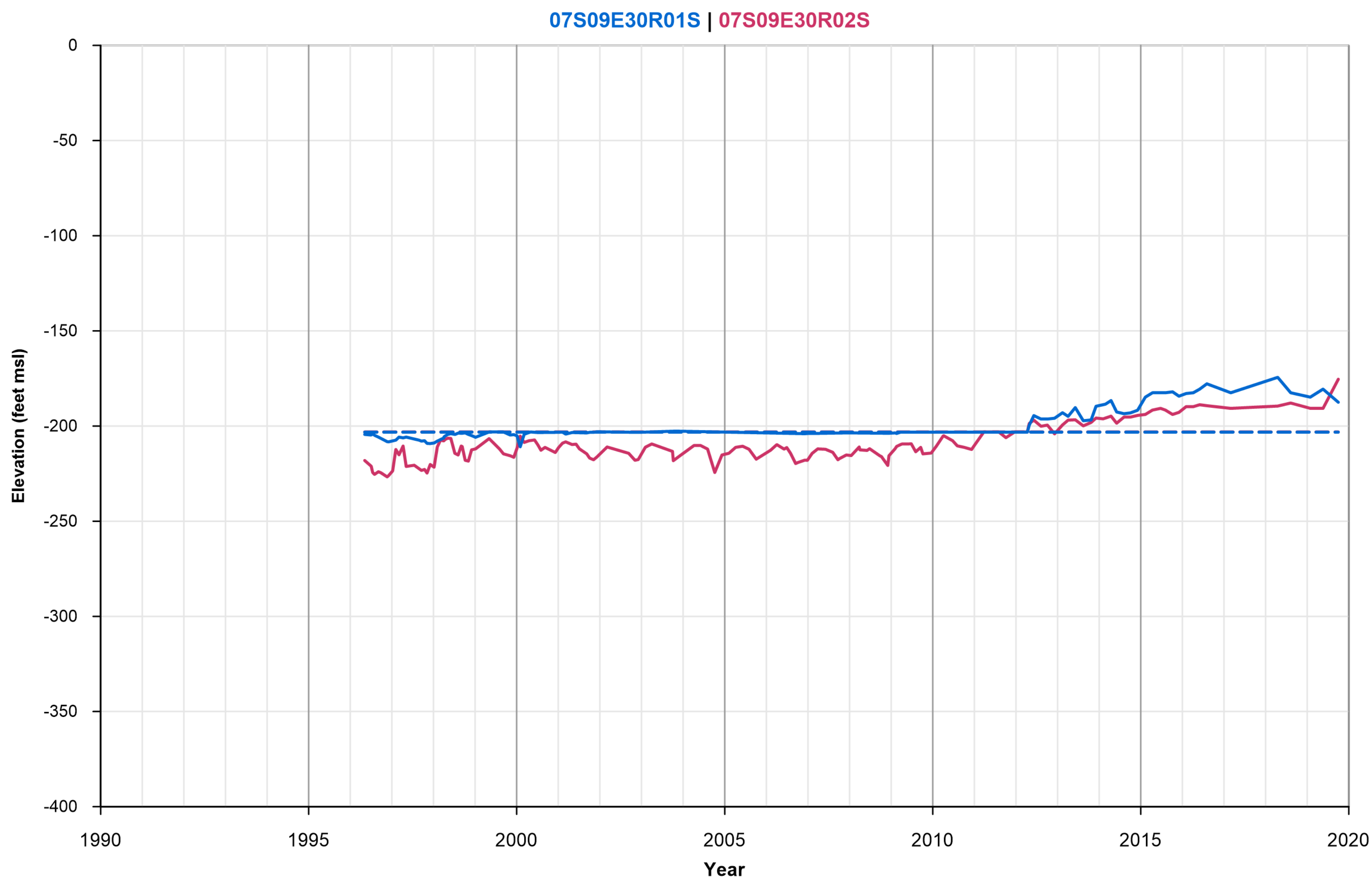


WOODARD & CURRAN

February 2021

TODD GROUNDWATER

Appendix A-39
Groundwater Elevation Hydrographs
08S09E07N03S and 08S09E07N04S



WOODARD & CURRAN

February 2021

TODD GROUNDWATER

Appendix A-40
Groundwater Elevation Hydrographs
07S09E30R01S and 07S09E30R02S

APPENDIX 4-B
INDIO SUBBASIN GROUNDWATER DEPENDENT ECOSYSTEMS STUDY

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TECHNICAL MEMORANDUM

TO: Coachella Valley Water District

CC: Iris Priestaf, Todd Groundwater

PREPARED BY: William L. Medlin, PWS, ENV SP

REVIEWED BY: Rosalyn Prickett, AICP

DATE: June 2021

RE: Indio Subbasin Groundwater Dependent Ecosystems Study

Identification of Groundwater Dependent Ecosystems (GDEs) are a required component of groundwater management planning under the Sustainable Groundwater Management Act (SGMA). SGMA defines GDEs as “ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface” (23 CCR § 351(m)). This Technical Memorandum (memo) specifically focuses on potential GDEs identified within the Indio Subbasin of the Coachella Valley Groundwater Basin (project area).

1. INDIO GROUNDWATER BASIN ECOLOGICAL SETTING

An ecoregion is an area with generally similar ecosystems with similar quantity, quality, and type of environmental resources. Ecoregions are an important geospatial mapping system that are used by many local, state, and federal regulatory agencies and non-governmental organizations as a frame of reference for assessment and management of ecosystems across the United States (US). In the context of GDEs, it is important to consider the ecoregion where the GDEs are being assessed because biotic and abiotic processes may vary widely between localities.

The Indio Subbasin is located in southern California and sits between the San Jacinto Mountains to the west and the Little San Bernardino Mountains to the east. The project area encompasses multiple cities and unincorporated communities within Riverside County, California. A very small section in the southwestern extent of the Subbasin extends into San Diego County and Imperial County. The Subbasin sits entirely within the Sonoran Basin and Range (85) Level III ecoregion (USGS, EPA 2016). The Sonoran Basin and Range ecoregion consists of low mountains with large swaths of federal government-owned property and is generally hotter than the Mojave. Vegetation is typically adapted to prolonged drought and hot weather, along with accompanying extreme soil moisture and temperature regimes. Predominant natural vegetative communities are desert scrub including multiple species of cacti and creosotebush (*Larrea tridentata*) and microphyll woodlands that generally occupy desert washes or bajadas that carry occasional stormwater flow.

The project area covers four different Level IV ecoregions. Figure 1 (Attachment A) illustrates the general location of the Indio Subbasin in the context of the Ecoregions of California. The extreme southwestern extents of the Indio Subbasin occupy the Western Sonoran Mountain Woodland and Shrubland (81b) ecoregion. This montane transition area occurs at the western edge of the Sonoran Desert and is generally above 3,000 feet in elevation. The landscape typically consists of desert chapparal mixed with pinyon pine (*Pinus monophylla*) and California juniper (*Juniperus californica*) along with a few canyon live oak (*Quercus chrysolepis*) among the scattered granitic boulders. Native fan palm oases are found in some of the steeper canyons. Rocky mountainous slopes, cliffs, canyons, dry washes, and alluvial fans in this region provide habitat for the protected Peninsular bighorn sheep (*Ovis canadensis nelsoni*).

The western edges and tips of the basin extend into the Western Sonoran Mountains (81a) ecoregion. This area is characterized by erosional highlands of exposed bedrock dissected by dry washes that are subject to flash flooding. Rainfall is infrequent in this ecoregion. Vegetative communities in this rocky terrain are typically creosotebush scrub with ocotillo (*Fouquieria splendens*) and cacti scattered throughout. Spring annual forbs are also abundant in this region.

The northern half of the basin consists of the Upper Coachella Valley and Hills (81e) ecoregion. This area is made up of alluvial and sand deposits surrounded by mountains to the east, west, and north. To the south, the valley slopes towards the Salton Sea and land use transitions to a vast agricultural landscape. However, the Mecca Hills and Indio Hills provide some rolling topography, and the Indio Hills have canyons where some native fan palm oases still persist. Soils are typically hot and very dry. Certain sandy areas may provide suitable habitat for the protected Coachella Valley fringe-toed lizard (*Uma inornata*) as well as other rare or unusual species. Habitat fragmentation and loss by urban and suburban land development presents constant pressure on these protected species.

The southern half of the basin consists of the Imperial/Lower Coachella Valleys (81f) ecoregion. This area is largely comprised of the former Lake Cahuilla lakebed within the greater Salton Sink geologic formation. The region is mostly below sea level and contains significant areas of historically deposited silts and other river sediments that have made the area rich in agricultural productivity. Planted and fallow fields dominate the landscape and there is a complex system of irrigation for crop production. The Salton Sea sits at the low point of the Salton Trough and serves as the terminal drainage point for the Whitewater River/Coachella Valley Stormwater Channel (CVSC), New River, and Alamo River along with numerous other small tributaries, agricultural drains, and dry washes. The Salton Sea is an important ecological “stopover” habitat for a multitude of migratory birds and waterfowl that travel the Pacific Flyway; however, there are some persistent water quality problems that pose a threat to species such as eutrophication, contamination, and ever-increasing salinity.

According to United States Geological Survey (USGS) 7.5-minute topography, the approximate elevation of the western extent of the Indio Subbasin within the Santa Rosa Mountains is 3,000 above mean sea level and the approximate elevation of the southern extent of the basin along the shoreline of the Salton Sea is -230 feet below mean sea level. The principal surface drainage features within the Indio Subbasin are mainly comprised of larger, named urban stormwater channels, canals, creeks, agricultural drains, and dry washes that drain to the Whitewater River Stormwater Channel (which becomes the Coachella Valley Stormwater Channel in the lower portion of the valley). Most of these major drainages generally flow east and south through the project area eventually emptying into the Salton Sea. It should also be noted that, according to the USGS topography mapping, there are many mapped springs in various locations throughout the basin. Refer to Figure 2 (Attachment A) for USGS 7.5-minute topography in the vicinity of the Indio groundwater basin.

2. THREATENED AND ENDANGERED SPECIES IN THE INDIO BASIN

As part of the GDEs assessment, Woodard & Curran conducted a preliminary review of special-status species within the Indio Subbasin. This study focuses on state and federal listed species designated as “threatened” and/or “endangered” by the California Department of Fish and Wildlife (CDFW) or the US Fish and Wildlife Service (USFWS). Other listed or otherwise unlisted special status species were excluded from our evaluation. The purpose of this exercise was to support the determination of ecological value for potential GDEs within the Subbasin.

Much of the Indio Subbasin is covered by the Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP). The plan was approved in September 2008 and most recently amended in August 2016. The CVMSHCP is administered by the Coachella Valley Conservation Commission (CVCC) and is designed to conserve regional sensitive ecological habitat and protected plant and animal species by coordinating project impacts and compensatory mitigation through the issuance of “take” permits for special-status species. The CVMSHCP plan area encompasses approximately 1.2 million acres within Riverside County, California. The small portions of the Indio Subbasin located within San Diego and Imperial Counties are not covered by the CVMSHCP. Refer to Figure 3 (Attachment A) for protected areas covering the Coachella Valley and the Indio Subbasin.

Woodard & Curran conducted a literature review of the California Natural Diversity Database (CNDDB; CDFW 2020) for the Indio Subbasin. Additionally, Woodard & Curran reviewed the USFWS Critical Habitat Mapper and the Information, Planning and Consultation (IPaC) database for the area covering the Indio Subbasin. Refer to Figure 4 (Attachment A) for federal and state listed threatened and endangered species occurring within the Indio Subbasin according to CNDDB.

As part of the GDEs field assessment, thirteen (13) representative locations were surveyed in the field by a Woodard & Curran senior biologist to document the vegetative community and general habitat conditions from January 11 – 14, 2021. The field survey locations were selected during the preliminary desktop assessment of GDEs for the project area. Plant and wildlife species observed were documented during the field visit(s), and representative photographs were taken. Protocol-level or presence-absence surveys were not conducted as part of this scope of work. Refer to Figure 4 for a map of state and federal protected species potentially occurring within the Indio Subbasin. Table 1 below describes state and federal listed threatened and endangered species within the Indio Subbasin and whether they were observed during the field assessment.

Table 1. State and Federal Threatened and Endangered Species in Indio Subbasin.

Scientific Name Common Name	**Status**	**Habitat**	**Potential to Occur Within the Project Area**	**Reliance on Groundwater**	**Individual(s) Observed**
		Fauna			
Ovis canadensis nelsoni Peninsular bighorn sheep	**USFWS:** E **CDFW:** T **CVMSHCP coverage:** yes	Open rocky slopes, cliffs, canyons, dry washes, and alluvial fans.	**Presumed extant** based on CNDDB (2020) data. Suitable habitat exists within the project area. USFWS-designated critical habitat in project area.	**Indirect.** Species relies on GDE vegetation and surface water that may be supported by groundwater.	No
Charadrius nivosus nivosus Western snowy plover	**USFWS:** T **CDFW:** none **CVMSHCP coverage:** no	Coastal beaches sand spits, and salt pans; freshwater and brackish wetlands.	**Presumed extant** based on USFWS IPaC (2021). Potential habitat may exist within the project area.	**Indirect.** Species may nest in or near wetlands supported by groundwater.	No
Empidonax traillii extimus southwestern willow flycatcher	**USFWS:** E **CDFW:** E **CVMSHCP coverage:** yes	Riparian and wetland thickets.	**Presumed extant** based on CNDDB (2020) data. Potential habitat may exist within the project area.	**Indirect.** Species relies on GDE riparian vegetation.	No
Polioptila californica californica coastal California gnatcatcher	**USFWS:** T **CDFW:** none **CVMSHCP coverage:** no	Coastal sage scrub; dry slopes, washes, mesas.	**Presumed extant** based on CNDDB (2020) data. However, habitat does not appear to exist within the project area.	No	No
Rallus obsoletus yumanensis Yuma Ridgway's rail	**USFWS:** E **CDFW:** T **CVMSHCP coverage:** yes	Freshwater and alkali marshes with shallow open water areas.	**Presumed extant** based on CNDDB (2020) data. Potential habitat may exist within the project area.	**Direct.** Species relies on shallow wetlands that may be supported by groundwater.	No
Vireo bellii pusillus least Bell's vireo	**USFWS:** E **CDFW:** E **CVMSHCP coverage:** yes	Willow-cottonwood forest, streamside thickets, and scrub oak.	**Presumed extant** based on CNDDB (2020) data. Potential habitat may exist within the project area.	**Indirect.** Species relies on GDE vegetation in riparian areas for breeding.	No
Gopherus agassizii desert tortoise	**USFWS:** T **CDFW:** T **CVMSHCP coverage:** yes	Sandy flats, dry washes, and canyons with enough soil for burrowing.	**Presumed extant** based on CNDDB (2020) data. Potential habitat may exist within the project area.	**Indirect.** Species may rely on GDE vegetation.	No

Scientific Name Common Name	**Status**	**Habitat**	**Potential to Occur Within the Project Area**	**Reliance on Groundwater**	**Individual(s) Observed**
Uma inornata Coachella Valley fringe-toed lizard	**USFWS:** T **CDFW:** E **CVMSHCP coverage:** yes	Sparsely vegetated areas and dry washes with fine, wind-blown sand.	**Presumed extant** based on CNDDB (2020) data. Suitable habitat exists within the project area. USFWS-designated critical habitat in project area.	**Indirect.** Species may rely on GDE vegetation such as mesquite.	No
Charina umbratica southern rubber boa	**USFWS:** none **CDFW:** T **CVMSHCP coverage:** no	Damp woodlands, grassy meadows, and sandy areas along streams.	**Presumed extant** based on CNDDB (2020) data. Potential habitat may exist within the project area.	**Indirect.** Species relies on GDE vegetation in woodlands and moist sandy areas near springs and streams.	No
Anaxyrus californicus arroyo toad	**USFWS:** E **CDFW:** none **CVMSHCP coverage:** yes	Washes, streams, arroyos, and adjacent riparian uplands; shallow gravelly pools.	**Presumed absent** based on CNDDB (2020) data. Potential habitat may exist within the project area.	**Direct and indirect.** Species relies on groundwater for breeding and on GDE vegetation for foraging.	No
Batrachoseps aridus desert slender salamander	**USFWS:** E **CDFW:** E **CVMSHCP coverage:** no	Small permanent desert springs and creeks with riparian vegetation.	**Presumed absent** based on CNDDB (2020) data. Potential habitat may exist within the project area.	N/A*	No
Rana muscosa southern mountain yellow-legged frog	**USFWS:** E **CDFW:** E **CVMSHCP coverage:** no	Sunny streambanks, pools, and lake borders; rocky streams fed by snow melt.	**Presumed extant** based on CNDDB (2020) data. Potential habitat may exist within the project area.	**Direct.** Species relies on surface water features that may be supported by groundwater.	No
Rana draytonii California red-legged frog	**USFWS:** T **CDFW:** none **CVMSHCP coverage:** no	Ponds, wetlands, and seeps and adjacent grassy uplands.	**Presumed extant** based on CNDDB (2020) data. Potential habitat may exist within the project area.	**Direct.** Species relies on surface water features that may be supported by groundwater.	No
Cyprinodon macularius desert pupfish	**USFWS:** E **CDFW:** E **CVMSHCP coverage:** yes	Freshwater springs, oases, and saline/brackish pools; also found in agricultural drains.	**Presumed extant** based on CNDDB (2020) data. Potential habitat may exist within the project area.	**Direct.** Species relies on springs and other surface water features that may be supported by groundwater.	No
Xyrauchen texanus razorback sucker	**USFWS:** E **CDFW:** E **CVMSHCP coverage:** no	Runs and pools of freshwater rivers; warm, shallow backwaters.	**Presumed extant** based on CNDDB (2020) data. However, habitat does not appear to exist within the project area. Additionally, the literature suggests that no naturally propagating populations are left in California.	**Direct.** Species relies on rivers and other surface water features that may be supported by groundwater.	No

Scientific Name Common Name	**Status**	**Habitat**	**Potential to Occur Within the Project Area**	**Reliance on Groundwater**	**Individual(s) Observed**
Dinacoma caseyi Casey's June beetle	**USFWS:** E **CDFW:** none **CVMSHCP coverage:** no	Found in the desert in coarse gravelly sands.	**Presumed extant** based on CNDDB (2020) data. Suitable habitat may exist within the project area. USFWS-designated critical habitat in project area.	N/A*	No
Euphydryas editha quino quino checkerspot	**USFWS:** E **CDFW:** none **CVMSHCP coverage:** no	Chaparral; coastal sage scrub with *Plantago* spp.	**Presumed absent** based on CNDDB (2020) data. Habitat does not appear to exist within the project area.	N/A*	No
Flora					
Astragalus lentiginosus var. coachellae Coachella Valley milk-vetch	**USFWS:** E **CDFW:** none **CVMSHCP coverage:** yes	Sandy washes and windblown dunes; creosotebush scrub.	**Presumed extant** based on CNDDB (2020) data. Suitable habitat may exist within the project area. USFWS-designated critical habitat in project area.	N/A*	No
Astragalus tricarinatus triple-ribbed milk-vetch	**USFWS:** E **CDFW:** none **CVMSHCP coverage:** yes	Sandy, gravelly soils in dry washes; gravelly soils and granite at the base of slopes.	**Presumed extant** based on CNDDB (2020) data. Suitable habitat may exist within the project area.	N/A*	No
Dodecahema leptoceras slender-hornded spineflower	**USFWS:** E **CDFW:** E **CVMSHCP coverage:** no	Old sandy benches or floodplain terraces with alluvial fan scrub just below 2200 feet.	**Presumed extant** based on CNDDB (2020) data. Potential habitat may exist within the project area.	N/A*	No

E – Endangered
T – Threatened
N/A* - Reliance on groundwater unknown or otherwise not fully understood based on species omission from the *Critical Species LookBook* (2019).
Source: California Natural Diversity Database (CDFW 2020); USFWS Critical Habitat Mapper (2021); IPaC Trust Resources List (USFWS 2021).

3. GROUNDWATER DEPENDENT ECOSYSTEM ASSESSMENT

To support identification and protection of GDEs under SGMA, The Nature Conservancy (TNC) developed a 2018 report entitled *Groundwater Dependent Ecosystems under the Sustainable Groundwater Management Act: Guidance for Preparing Groundwater Sustainability Plans.* The GDEs Guidance suggests three criteria for assessment of the presence of GDEs: 1) Is the GDE underlain by a shallow unconfined or perched aquifer? 2) Is the depth to groundwater under the GDEs less than 30 feet? 3) Is the GDE located in an area known to discharge groundwater (e.g., springs/seeps)? These questions were considered during this assessment.

Preliminary Desktop Assessment

Using Geographic Information Systems (GIS), Woodard & Curran completed a preliminary desktop analysis of the California *Natural Communities Commonly Associated with Groundwater* (NCCAG) database for the project area. The NCCAG database represents a compilation of 48 publicly available state and federal environmental datasets that map wetlands, springs, seeps, and vegetation in California. The datasets were reviewed by a working group made up of multiple agencies and stakeholders including the California Department of Water Resources (DWR), CDFW, and TNC. The current NCCAG database includes a set of GIS data for vegetative communities and a separate data set for wetlands which together are considered to be GDE indicators.

Additional relevant environmental and hydrogeological GIS data sets were also reviewed as part of the desktop GDE assessment. A Subbasin map was created using these publicly available statewide and regional data layers to understand the extent of the NCCAG dataset within the project area. Refer to Figure 5 (Attachment A) for a map of GDE indicators within the project area. Once the basin map of GDE indicators was developed, Woodard & Curran then reviewed the project area and attempted to identify NCCAG polygons that appeared to be “probable GDEs” based on the following observations:

- Presence of a USGS-mapped stream, spring, seep, or other waterbody
- Presence of USFWS National Wetlands Inventory (NWI) mapped wetlands
- Inundation visible on aerial imagery
- Saturation visible on aerial imagery
- Dense riparian and/or wetland vegetation visible on aerial imagery
- CNDDB and/or CNPS vegetative community data indicating a concentration of deep-rooted woody phreatophytes
- California Protected Areas and/or Areas of Conservation Emphasis

If an NCCAG polygon, or a portion thereof, included one or multiple of the above characteristics, then it was marked as a “Probable GDE” for further evaluation and field validation. NCCAG polygons that did not exhibit the above characteristics (or similar) were tentatively considered “Probable Non-GDEs” for purposes of the desktop study and would be subject to further review as part of the field study. Areas that appeared to consist primarily of wetland vegetation at drainages along the exposed seabed of the Salton Sea where the water level has receded from historic levels were classified as “Playa Wetland Communities” and were not included as GDEs at this point.

As part of our preliminary desktop GDE assessment, Woodard & Curran selected 15 separate locations for a GDE field assessment. These locations were selected from various representative NCCAG polygons across the project area based on apparent habitat type and accessibility for field survey. Refer to Figure 6 (Attachment A) for GDE field assessment locations.

GDE Field Assessment

Woodard & Curran completed a GDE field assessment study at representative locations throughout the Indio Subbasin. Fifteen representative locations were originally selected based on geographic position within the project area, vegetative community/habitat type, land use, topography, and other environmental factors determined via remote sensing. Prior to field work, Woodard & Curran coordinated with the Indio Subbasin GSAs and other agencies, tribes, and landowners to review the selected GDE field assessment sites and property owner information, as well as confirm physical access to the sites. Survey permissions were obtained from the appropriate property owners for 13 field assessment sites prior to mobilization for the field effort.

The field study was conducted January 11 – 14, 2021. Woodard & Curran Senior Biologist Will Medlin and CVWD environmental staff (Mr. Luis Sanchez and Mr. Sergio Martinez) worked together to complete the field study. Sites one (1) through eight (8), ten (10) through twelve (12), and fourteen (14) and fifteen (15) were assessed in the field. Sites nine (9) and thirteen (13) were not accessible at the time of field deployment and have therefore been eliminated from this assessment and report.

Field observations were made at NCCAG-mapped seeps, springs, wetlands, and other riparian habitats to document plant communities, aquatic or semi-aquatic wildlife, indicators of surface and subsurface hydrology, soil-based evidence of a high-water table, and other relevant ecological and hydrological data. Soils were sampled to an approximate depth of between 12 – 20 inches (depending on restrictive layer) to determine moisture content and texture. The soil profile was assessed and classified based on color using a Munsell soil color chart. Photographs were taken in the four cardinal directions (north, east, south, west) at each GDE field assessment site to document the general habitat conditions. Field notes and additional photographs were taken of plant species, wildlife, and other relevant ecological data to support the GDE assessment at each site. Global Positioning System (GPS) points were also collected using a sub-meter Trimble Geo 7x GPS unit at each GDE field assessment site.

Upon completion of the GDE field assessment, Woodard & Curran refined the preliminary desktop GDE assessment data and revised the mapping for Probable GDEs and Probable Non-GDEs based on field observations and further research.

4. RESULTS

Using a combination of GIS desktop study and field assessments, Woodard & Curran attempted to assess 882 NCCAG-mapped polygons (136 NCCAG wetland and 746 NCCAG vegetation) within the project area. During the desktop assessment, 1,045 individual locations were visually reviewed and a determination of potential GDE status was made for a point on the landscape within the NCCAG polygon(s). Out of 1,045 assessment locations, 50 points (5%) were determined to be Probable GDEs. 932 points (89%) were determined to be Probable non-GDEs. 63 points (6%) were determined to be Playa Wetland Communities. Refer to Figure 7 (Attachment A) for the Preliminary GDE Assessment map.

Probable GDEs consisted of areas with apparent dense riparian and wetland vegetative communities along mapped drainage systems with potential for deep-rooted phreatophytes and/or visible, natural surface water flow. These Probable GDE clusters comprise hot or cold springs, seeps, and stream channels that convey snowmelt from the surrounding San Jacinto mountain front. The USGS has studied the Agua Caliente Spring, located in downtown Palm Springs, and determined that faulting of the basement rock provides a pathway for deep thermal water to rise from an underlying geothermal reservoir (USGS 2011). The USGS study assessed multiple thermal and non-thermal springs in Palm and Chino Canyons, determining that the hot springs are sourced from deep thermal water and not the regional aquifer. Typically, probable GDEs might be identified where monitoring well data for the regional aquifer indicated the depth to groundwater at 30 feet or less relative to the ground surface. The 30-foot threshold is based on scientific literature that indicates that groundwater levels extracted to greater than 30 feet below ground surface (bgs) may result in adverse impacts to ecosystem structure and function (Eamus et al., 2015). It should be noted that the areas within the Indio Subbasin where Probable GDEs were identified for this study do not have existing groundwater data that was available for review. Probable GDEs identified herein along the mountain-front may be associated with surface runoff, snowmelt, or springs and seeps from up-gradient sources.

Probable Non-GDEs consisted of areas that appeared incorrectly mapped based on current land development and land-use or that otherwise appeared to be dry upland areas, cultivated and/or flooded agricultural land, obvious human-made ponds, lakes, and other features, channelized drains, and where there were no other indicators of groundwater presence near the surface. It should be noted that dry washes, arroyos, bajadas, and other ephemeral conveyances where water only flows in response to heavy precipitation events were not classified as GDEs for purposes of this study.

Playa Wetland Community included areas of wetland habitat along the Salton Sea exposed seabed (playa) generally downstream of stream, agricultural drain, or stormwater channel outlets. The receding of the Salton Sea, due to reduced inflows, is exposing thousands of acres of playa each year. A 2020 Audubon report on Salton Sea wetlands explains that the irrigation ditches and other drainages "that used to drain directly into the Sea now spread out and slowly flow and pool on the exposed playa where new vegetation and wetlands now form" (Audubon California 2020). Irrigation drainage to the Salton Sea was determined to be the major driver of these pockets of vegetation along the northern seashore. The irrigation drains are fed by collected groundwater from agricultural return flows; as they discharge to the playa, they can potentially create wetland habitats. The CVMSHCP identifies some of these playa wetlands as part of the CVSC/Delta Conservation Area, which includes the CVSC, agricultural drains emptying into the Salton Sea which may contain desert pupfish habitat, and areas along the seashore that contain sensitive natural communities (CVAG 2007). The CVMSHCP acknowledges that this habitat is sustained largely by agricultural runoff and outflow in the CVSC, but that maintenance of the drains and the flood control channel periodically modifies the habitat. .

For the field study, 13 representative locations were assessed for GDE indicators, functions, and values. Of the 13 sites reviewed in the field, one appeared to be a Probable GDE, nine appeared to be Probable Non-GDEs, and three appeared to be Playa Wetland Communities. The four GDE and Playa Wetland Community sites had deep-rooted woody riparian or wetland species growing there. Further, two sites (4 and 15) had either standing or flowing water observed at the surface. Table 2 below describes each of the field assessment sites in more detail.

Table 2. Woodard & Curran GDE Field Assessment Sites in the Indio Subbasin.

GDE Field Assessment Site[1]	Latitude / Longitude	NCCAG-Mapped Polygon?	NCCAG Vegetation / Wetland Type*	Dominant Plant Species Observed	Field Assessment Notes
1	33.422221 N, 116.095600 W	Yes	**Vegetation** – Parkinsonia florida – Olneya tesota	*Parkinsonia florida, Larrea tridentata, Encelia farinosa, Lotus rigidus, Ferocactus acanthodes, Ericameria linearifolia, Cylindropuntia ramosissima*	Site is a dry creek/wash or bajada. Appears to only receive flow in response to major rainfall events. Soils are fine to coarse sands and gravel overlying bedrock and boulders. Some surface soil cracking observed in lower pools indicating temporary water presence. **This location does not appear to be a GDE.**
2	33.492767 N 116.199718 W	Yes	**Vegetation** – Alkaline Mixed Scrub	*Acacia greggii, Larrea tridentata, Parkinsonia florida, Bromus tectorum*	Site is a dry wash bajada habitat with no evidence of recent flooding or high groundwater. Cobble-gravel and boulders are strewn throughout the valley. Soils are dry coarse sands and fine gravel over bedrock. Some birds and lizards observed at the data point location. **This location does not appear to be a GDE.**
3	33.502204 N 116.080565 W	Yes	**Wetland** – Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Hyperhaline	*Allenrolfea occidentalis*	Site is an alkaline salt flat; soils have redoximorphic features and deep surface cracking indicating periodic saturation or inundation. Multiple songbirds were observed/heard at this site. **This location appears to be a Playa Wetland Community.**
4	33.524165 N 116.042841 W	Yes	**Wetland** - Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Hyperhaline	*Bolboschoenus robustus, Typha domingensis, Phragmites australis, Rumex crispus, Tamarisk ramosissima, Pluchea odorata, Polypogon monspeliensis*	Site is located near an agricultural drain that flows to the Salton Sea and consists of a dense emergent marsh wetland with standing water; soils are saturated and low-chroma with some organic content. Multiple songbirds, raptors, and wading birds observed at this location. Tadpoles observed in pools. **This location appears to be a Playa Wetland Community.**
5	33.511431 N 115.922835 W	Yes	**Wetland** – Palustrine, Emergent, Persistent, Semi-permanently Flooded	*Tamarisk ramosissima, Allenrolfea occidentalis, Pluchea sericea, Prosopis glandulosa*	Site is located near the Salton Sea alongside a dense, low vegetated swale; the area appears to have burned in the recent past. No visible surface water; however, soils do have some redoximorphic concentrations indicating some periodic saturation or inundation. **This location appears to be a Playa Wetland Community.**
6	33.571216 N 116.096213 W	Yes	**Vegetation** - Alkali Desert Scrub	*Atriplex lentiformis*	Site is located just west of large agricultural drain and consists of alkaline salt scrub. Soils were dry and high chroma with no redoximorphic features. **This location does not appear to be a GDE.**
7	33.580616 N 116.007632 W	Yes	**Wetland** – Palustrine, Emergent, Persistent, Seasonally Flooded	*Tamarisk ramosissima*	Site is within a basin created by the sloping land and the levee embankment for the Coachella Canal. The area likely receives and temporarily holds surface runoff. Soils are high chroma and very friable. Multiple songbirds heard/observed. **This location does not appear to be a GDE.**
8	33.655652 N 116.125904 W	Yes	**Vegetation** – Alkali Desert Scrub	N/A	Site is an active agricultural field with planted row crops. Site has active irrigation system and soils are wet due to watering. **This location does not appear to be a GDE.**

GDE Field Assessment Site[1]	Latitude / Longitude	NCCAG-Mapped Polygon?	NCCAG Vegetation / Wetland Type*	Dominant Plant Species Observed	Field Assessment Notes
10	33.714428 N 116.262822 W	Yes	**Wetland** – Riverine, Unknown Perennial, Unconsolidated Bottom, Semi-permanently Flooded	*Xanthium strumarium, Atriplex canescens, Distichlis spicata, Tamarisk ramosissima, Ricinus communis*	Site is an alkaline salt scrub community located within the Coachella Valley Stormwater Channel. Soils are high chroma fine sands that are a little moist below six inches. **This location does not appear to be a GDE.**
11	33.591113 N 116.190892 W	Yes	**Vegetation** – Alkali Desert Scrub	N/A	Site is an active agricultural field with planted row crops. Site has active irrigation system and soils are wet due to watering. **This location does not appear to be a GDE.**
12	33.731912 N 116.430599 W	Yes	**Vegetation** – Desert Willow	*Acacia greggii, Larrea tridentata, Ericameria linearifolia, Dalea spinosa, Bromus tectorum*	Site is a creosote bush scrub habitat located in a valley above a small dam. No evidence of recent water flow or prolonged inundation. Soils are very dry, friable sands. **This location does not appear to be a GDE.**
14	33.853607 N 116.506499 W	Yes	**Wetland** – Riverine, Unknown Perennial, Unconsolidated Bottom, Semi-permanently Flooded	*Larrea tridentata, Atriplex canescens, Encelia farinosa, Artemisia* sp.,	Site is a dry riverbed wash within the floodplain of the upper Whitewater River. Some soil surface cracking observed, however no indicators of groundwater near surface. Soils are loose, dry sand. **This location does not appear to be a GDE.**
15	33.843826 N 116.604978 W	Yes	**Vegetation** – Riparian Mixed Hardwood; **Wetland** – Palustrine, Scrub-Shrub, Seasonally Flooded	*Platanus racemosa, Salix exigua, Salix laevigata, Typha domingensis, Schoenoplectus americanus, Erythranthe cardinalis*	Site is located in a palustrine scrub-shrub and forested freshwater wetland seepage. Groundwater was visibly seeping at this data point. Soils were saturated to the surface and had some organic content. Multiple songbirds heard/observed. **This location appears to be a GDE.**
1 Note that GDE Field Assessment Sites #9 and 13 were not granted access by property-owners and are therefore not included in this table.					

5. CONCLUSIONS

Based on our preliminary assessment, few true GDEs appear to be present within the Indio Subbasin. Groundwater monitoring well data and groundwater contours shows depth to water at greater than 50 feet bgs for much of the northern and western portions of the Subbasin. However, the southeastern portion of the Subbasin between Thermal and the Salton Sea appears to indicate depth to water of less than 30 feet bgs in a shallow semi-perched aquifer zone. These shallow groundwater levels in the southeastern Indio Subbasin may be affected by local groundwater replenishment facilities or through surface infiltration via agricultural irrigation or subsurface collection via agricultural tile drains.

Although the project area is heavily urbanized in the west and impacted by significant agricultural operations to the east, the major surface water drainageways still appear to have some pockets of riparian and wetland vegetative communities growing along them. The streams, hot and cold springs, palm oases, stormwater channels, canals, agricultural drains, and their associated riparian vegetative communities provide valuable ecological habitat for many animal species to shelter, feed, and breed. They also provide wildlife corridors for movement and migration through the urban and suburban and agricultural landscapes.

The *SGMA Alternative Groundwater Sustainability Plan Bridge Document for the Indio Subbasin* acknowledges that "there is no direct interconnection between surface water and groundwater" in the western Subbasin (Stantec 2016). This finding is generally supported by the desktop and field assessments completed for this study, with the exception of several obvious mountain-front springs that support palm oases and wetland habitats. The few **Probable GDEs** present within the project area are located in the northwestern extents of the Indio Subbasin within canyons along streams that convey mountain-front runoff. It is undetermined whether these Probable GDEs depend on the regional groundwater table. These GDEs may rely on surface runoff, snowmelt, and springs and seeps from up-gradient sources to influence soil moisture requirements for vegetative communities. However, the three probable GDE clusters identified in this assessment are not likely directly affected by management of the primary aquifer in the Indio Subbasin. The connection between these potential GDEs and the regional groundwater basin should be further investigated.

In the eastern Subbasin, this study identifies **Playa Wetland Communities** along the Salton Sea, but acknowledges that these habitats are likely dependent on collection and discharge of agricultural drain water. The collection of agricultural return flows into a surface water conveyance system results in the concentrated discharge of groundwater onto the Salton Sea playa, which spreads out and creates wetland habitats. It is important to note that DWR staff do not consider the subsurface tile drain system and the conveyance of agricultural runoff in the eastern Coachella Valley as a surface water system (DWR 2019). These wetland communities may not exist if it were not for the human-made tile drain system, coupled with the recession of the Salton Sea which creates large, exposed playa areas. There is a clear dynamic between the agricultural drains and the Playa Wetland Communities. Based on the 2020 Audubon study the drivers for wetlands creation are the surface drainage coupled with the recession of Salton Sea. The aerial extent of the playa wetlands appears to have grown over the last decade while drain flows were declining. The interconnection between these factors is uncertain and dependent on other state and federal entities' management of the Salton Sea and its surface elevation. The aerial extent of Playa Wetland Communities may continue to change over time regardless of Indio Subbasin management activities. Further study of these habitats may be conducted to better assess their dependance on drain flows and/or underlying perched groundwater. Changes in the footprint of the Playa Wetland Communities should be explored through additional study and field validation, including monitoring of drain and surface water discharges and groundwater levels in the shallow perched aquifer. Additionally, collaboration with Salton Sea Authority and other entities focused on Salton Sea wetlands protection is warranted.

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ATTACHMENT A: FIGURES

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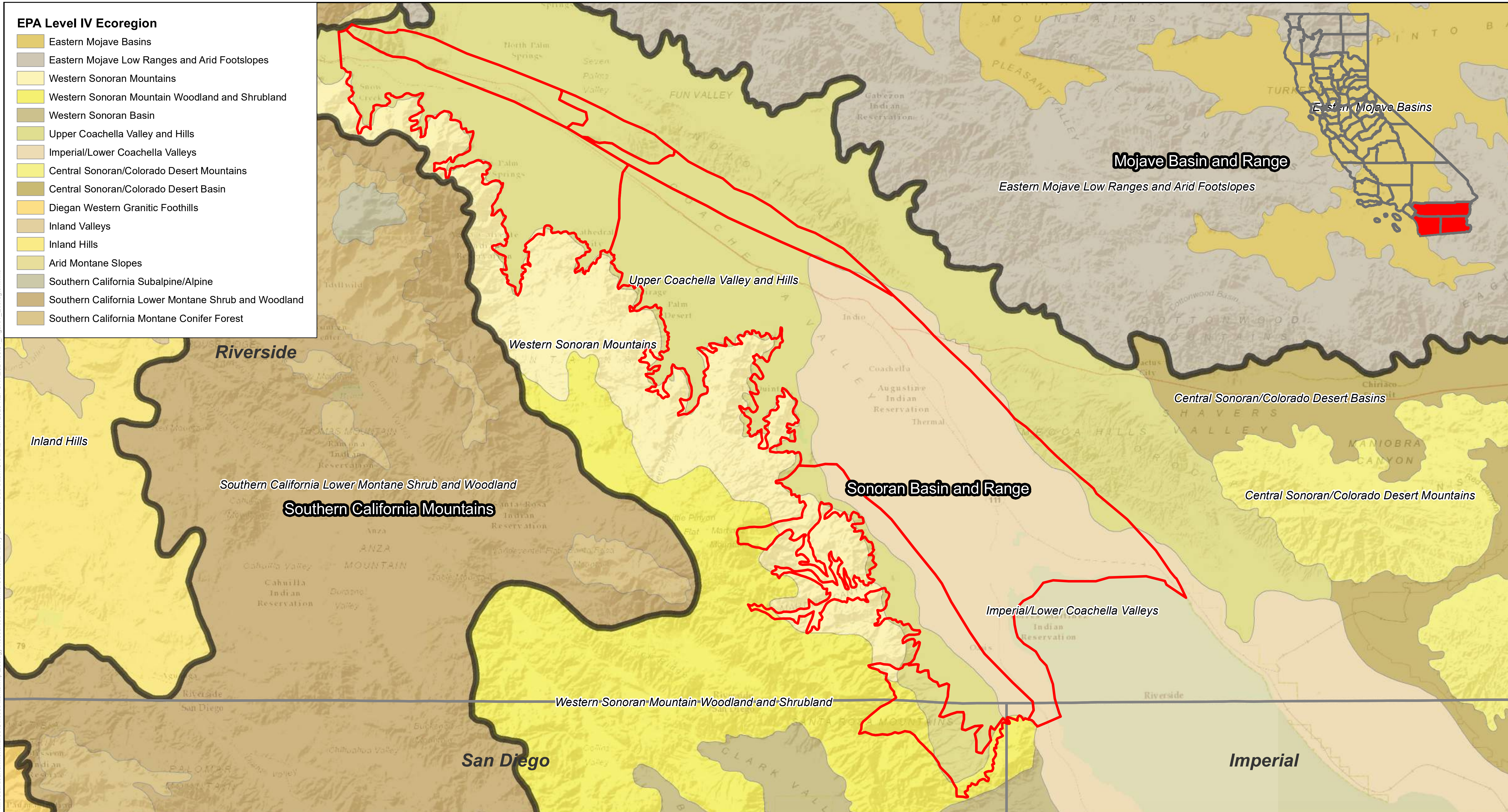

Figure 1
Project Location and Ecoregions
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

Legend
Indio Groundwater Basin
EPA Level III Ecoregion
California Counties

1 inch = 5 miles
0 2.5 5 10 Miles

N

WOODARD & CURRAN
Project #: 0011492.02
Map Created: March 2021

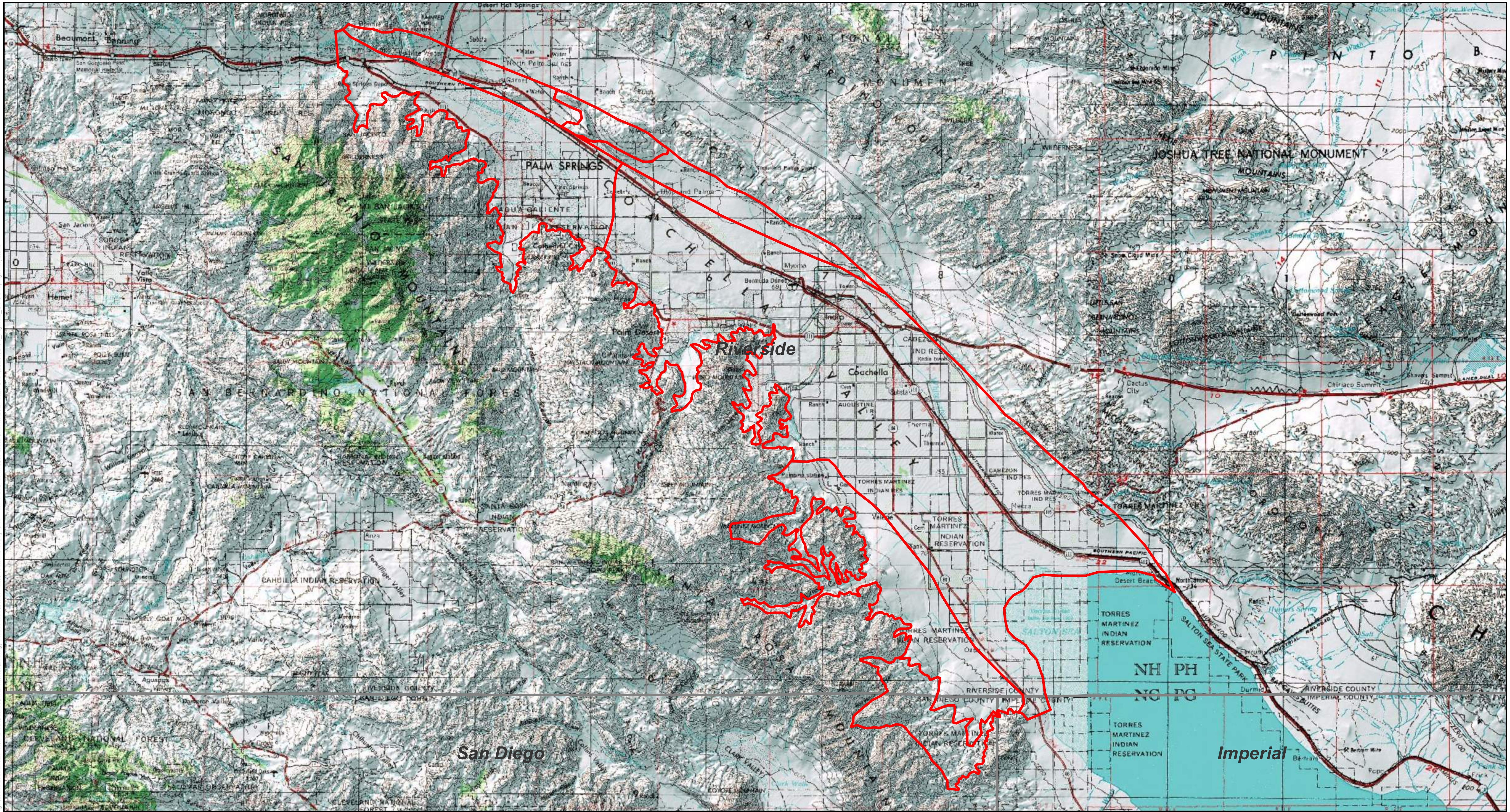

Figure 2
USGS Topography

Indio Groundwater Basin
Coachella Valley Water District

Imperial, Riverside, and San Diego Counties, CA

Legend

Indio Groundwater Basin

WATER DISTRICT

1 inch = 5 miles

0 2.5 5 10 Miles

N

WOODARD & CURRAN

Project #: 0011492.02
Map Created: March 2021

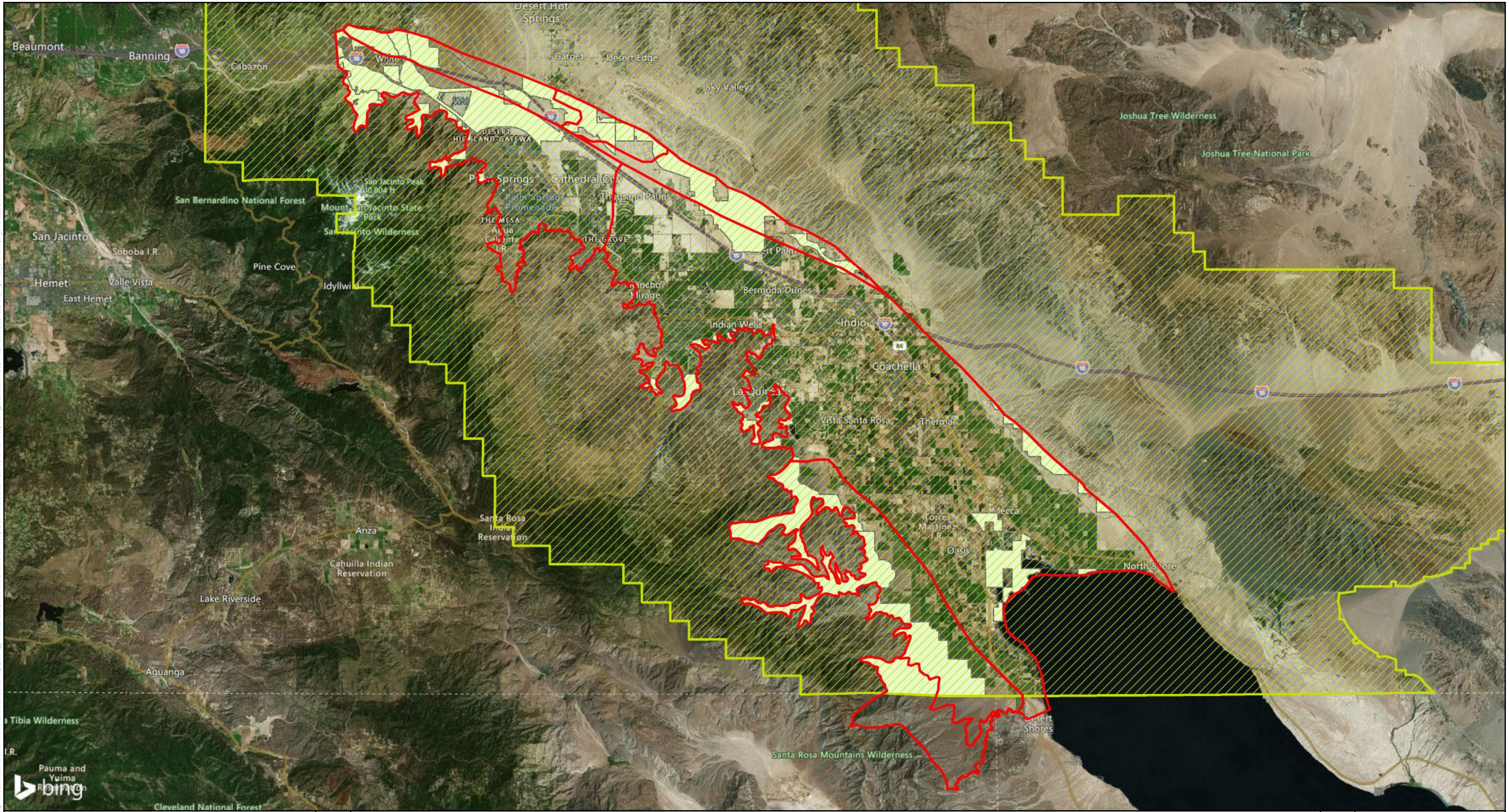

Figure 3
Coachella Valley Protected Areas

Indio Groundwater Basin
Coachella Valley Water District

Imperial, Riverside, and San Diego Counties, CA

Legend

- Indio Groundwater Basin
- Coachella Valley Multiple Species Habitat Conservation Plan Boundary
- CVMSHCP Conservation Areas in Indio Groundwater Basin

WATER DISTRICT

1 inch = 5 miles

0 2.5 5 10 Miles

N

WOODARD & CURRAN

Project #: 0011492.02
Map Created: March 2021

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions. Any reliance upon the map or data contained herein shall be at the users' sole risk. **Data Sources: Microsoft Bing Aerial Imagery; CVMSHCP Dataset 2021.**

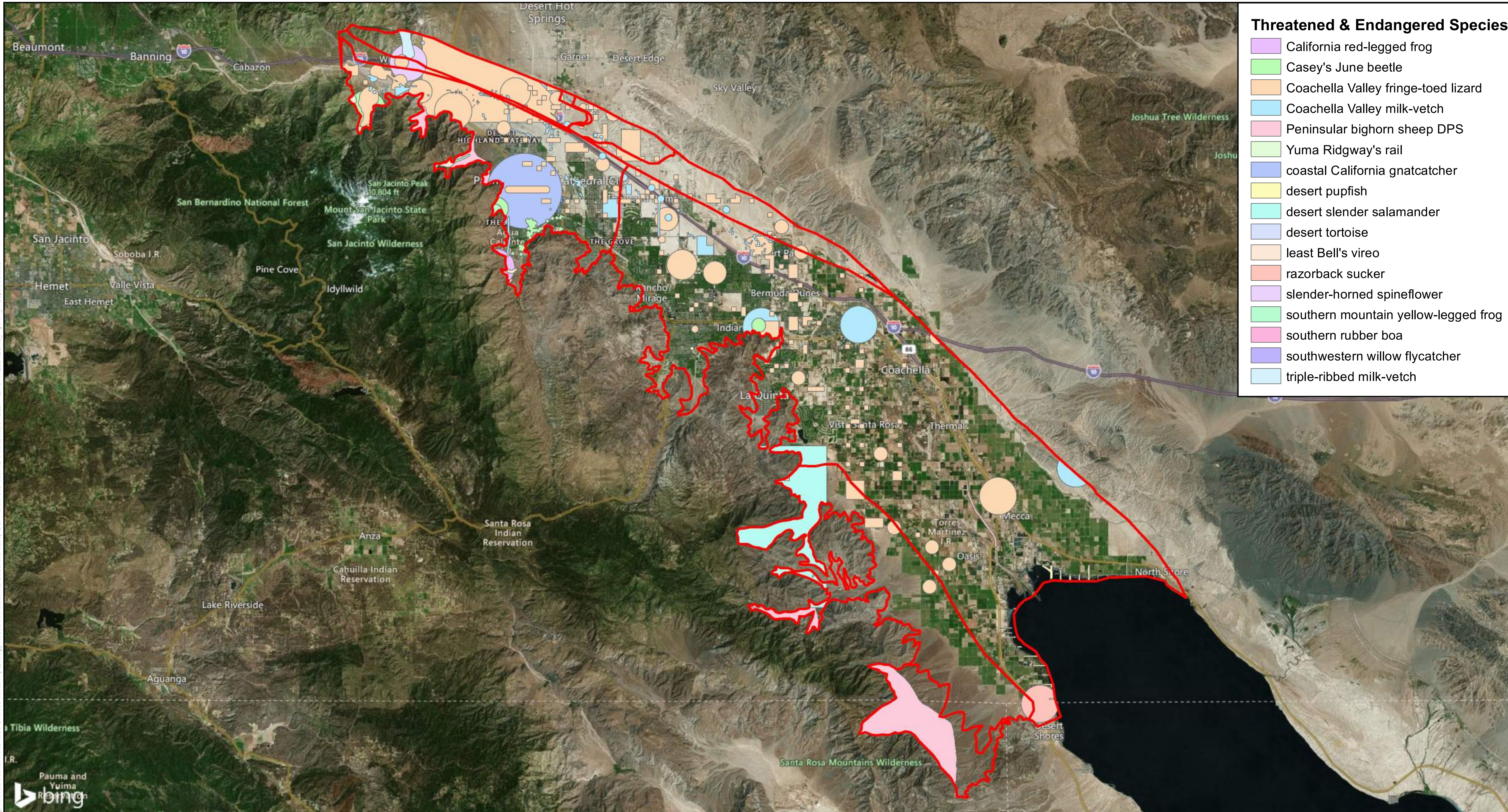

Figure 4
Threatened and Endangered Species
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

Legend

Indio Groundwater Basin

WATER DISTRICT

1 inch = 5 miles

0 2.5 5 10 Miles

N

WOODARD & CURRAN

Project #: 0011492.02
Map Created: March 2021

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions.
Any reliance upon the map or data contained herein shall be at the users' sole risk. **Data Sources:BING Aerial Imagery; California Natural Diversity Database 2020.**

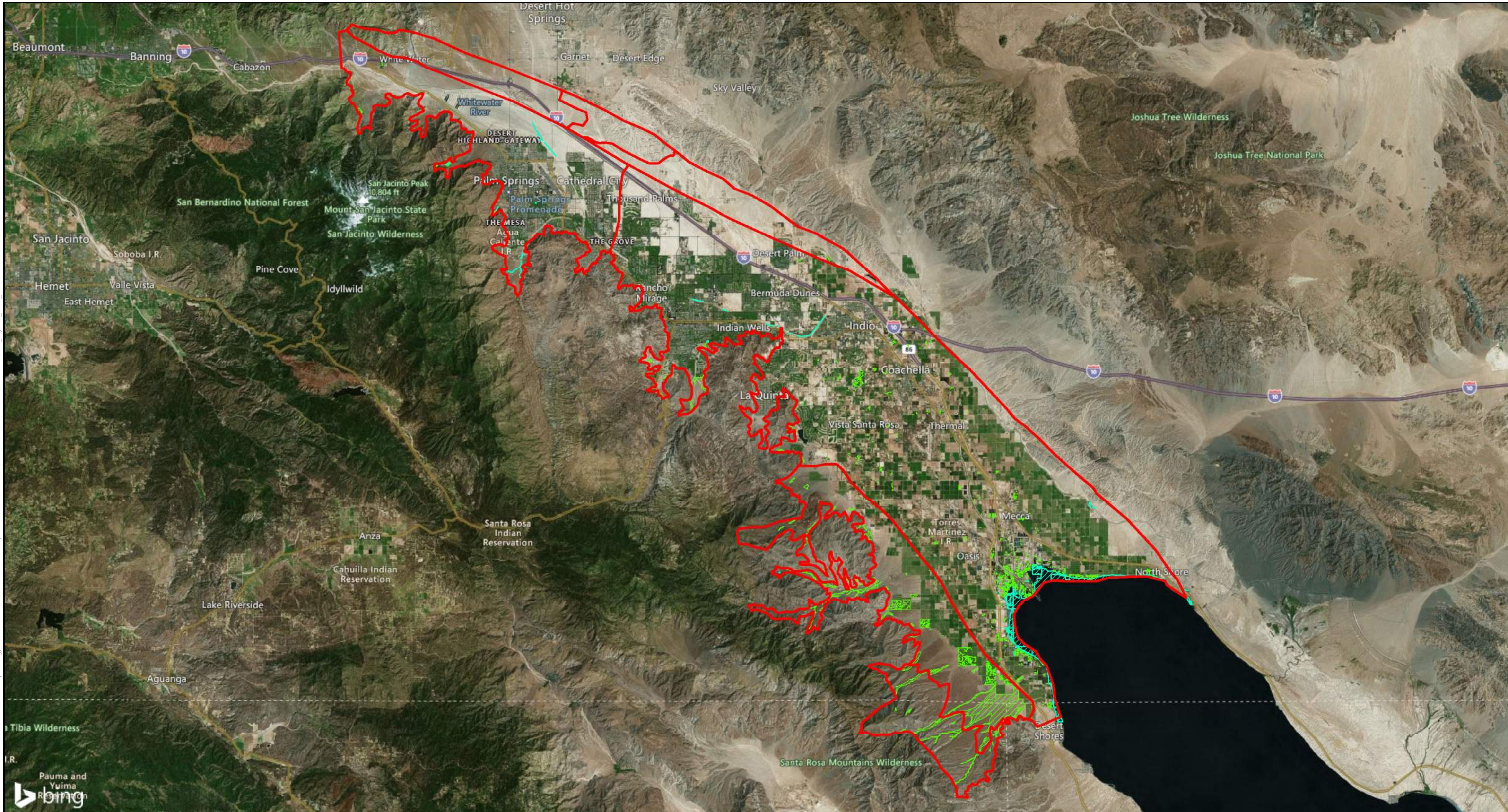

Figure 5
GDE Indicators

Indio Groundwater Basin
Coachella Valley Water District

Imperial, Riverside, and San Diego Counties, CA

Legend

- Indio Groundwater Basin
- NCCAG (Vegetation)
- NCCAG (Wetlands)

1 inch = 5 miles

0 2.5 5 10 Miles

N

Project #: 0011492.02
Map Created: March 2021

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions.
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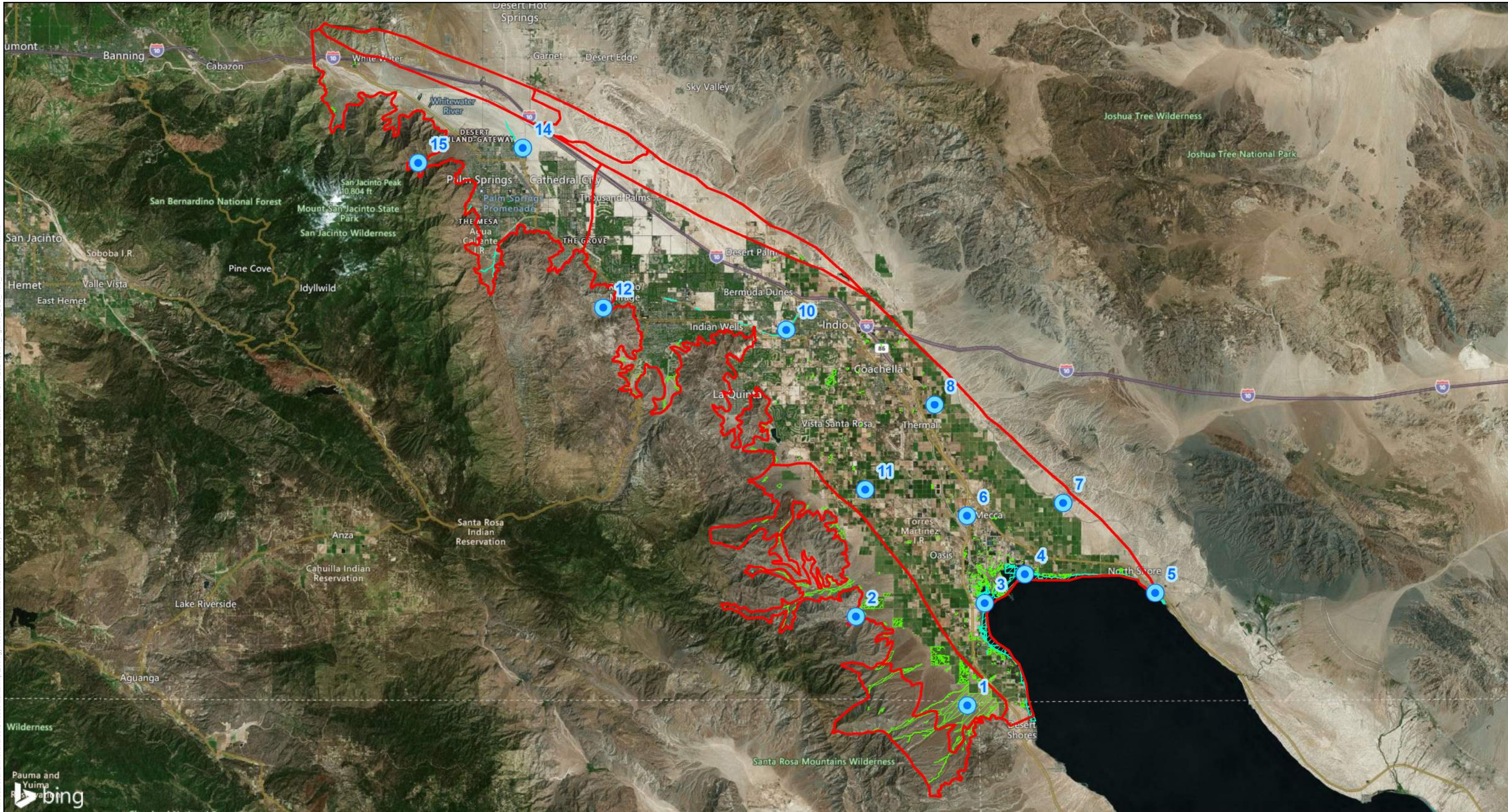

Figure 6
GDE Field Assessments
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

Legend

- Indio Groundwater Basin
- NCCAG (Vegetation)
- NCCAG (Wetlands)
- GDE Field Assessment Location

WATER DISTRICT

1 inch = 5 miles

0 2.5 5 10 Miles

N

WOODARD & CURRAN

Project #: 0011492.02
Map Created: March 2021

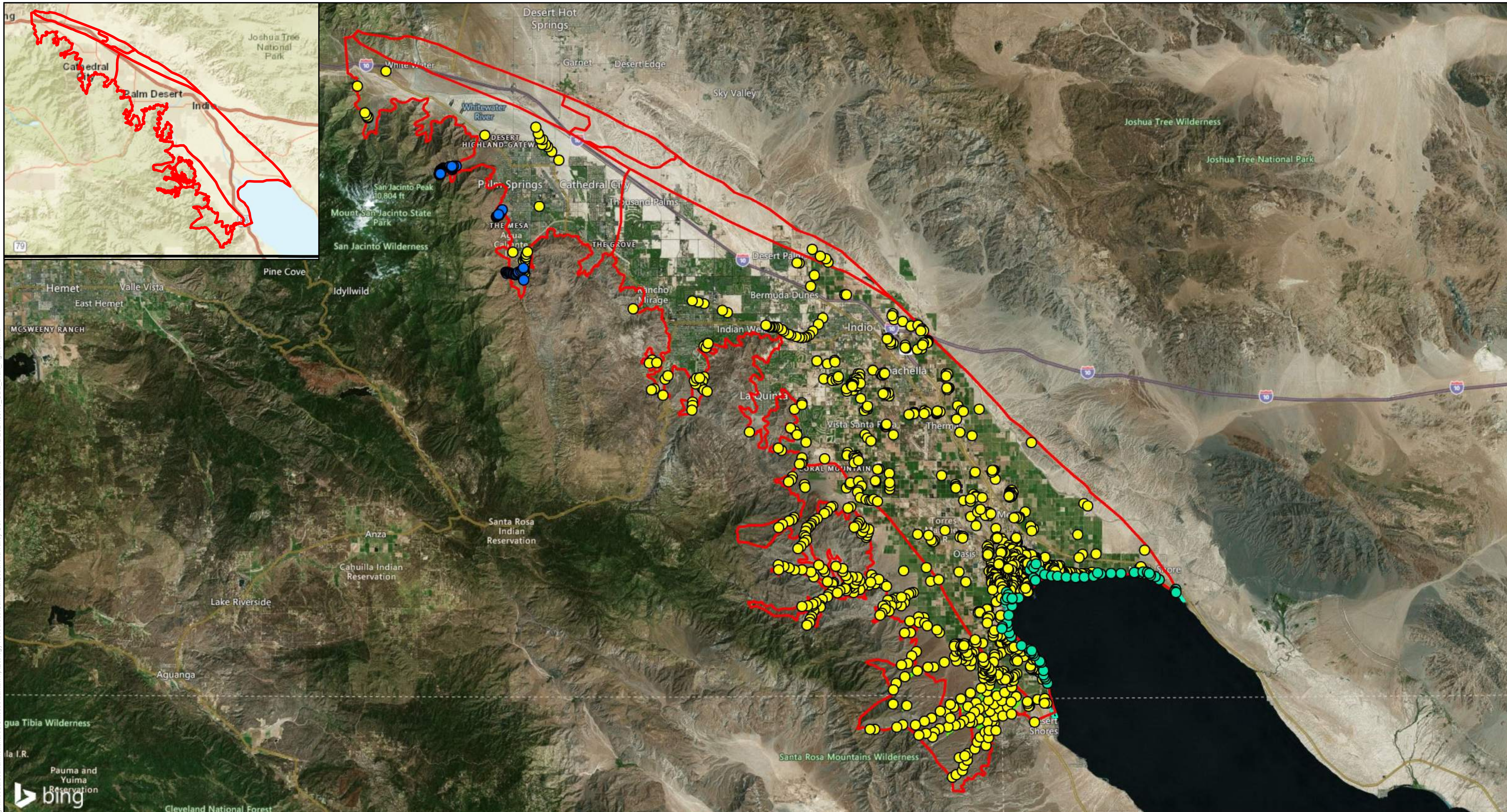

Figure 7
Preliminary GDE Assessment

Indio Groundwater Basin
Coachella Valley Water District

Imperial, Riverside, and San Diego Counties, CA

Legend

- Indio Subbasin Boundaries
- NCCAG (Vegetation)
- NCCAG (Wetlands)
- Probable GDE
- Probable Non-GDE
- Playa Wetland Community

WATER DISTRICT

1 inch = 5 miles

0 2.5 5 10 Miles

N

WOODARD & CURRAN

Project #: 0011492.02
Map Created: June 2021

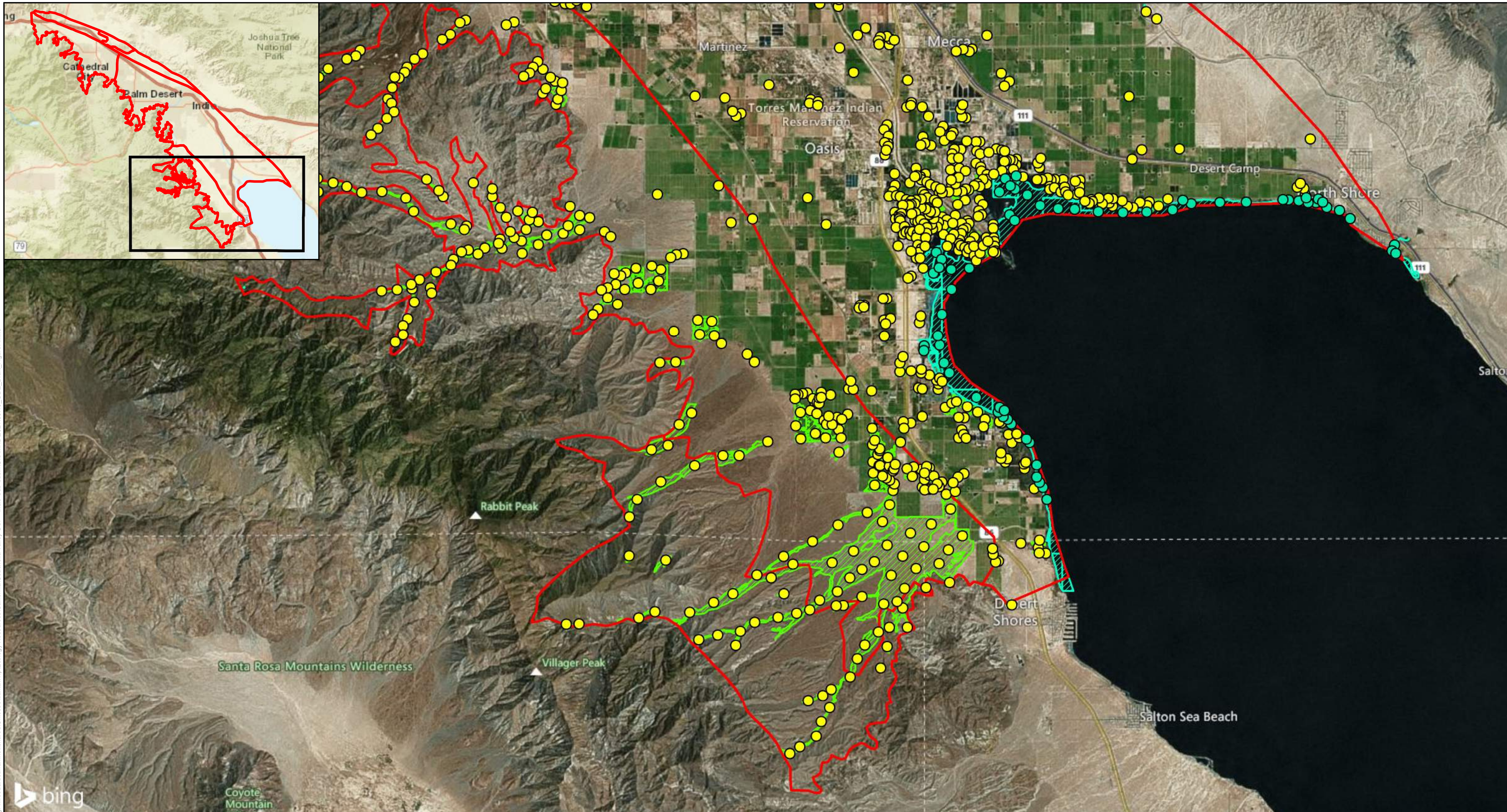

Figure 7a
Preliminary GDE Assessment
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

Legend

- Indio Subbasin Boundaries
- NCCAG (Vegetation)
- NCCAG (Wetlands)
- Probable GDE
- Probable Non-GDE
- Playa Wetland Community

1 inch = 2 miles

0 1 2 4 Miles

N

WOODARD & CURRAN

Project #: 0011492.02
Map Created: June 2021

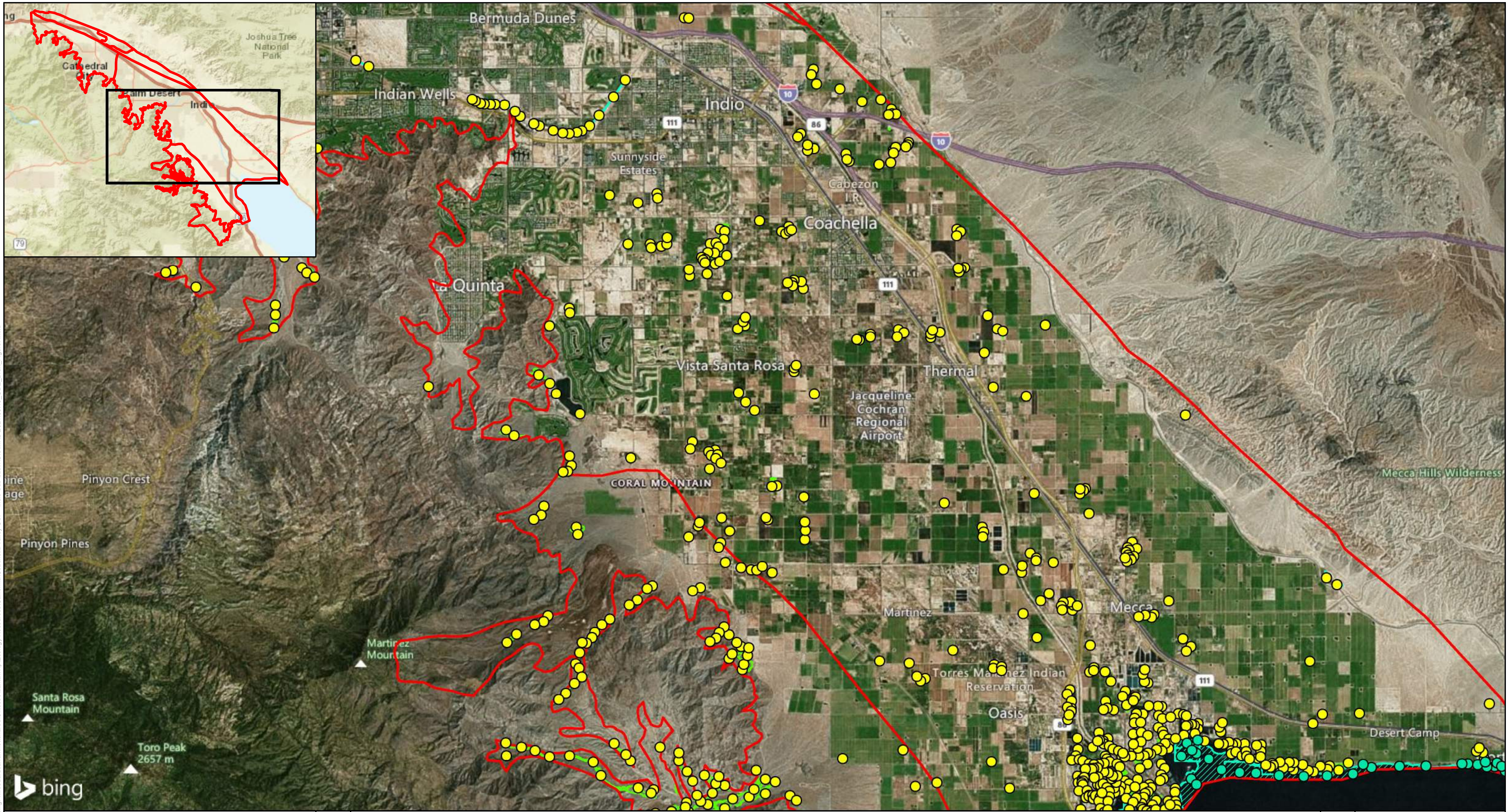

Figure 7b
Preliminary GDE Assessment
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

Legend

- Indio Subbasin Boundaries
- NCCAG (Vegetation)
- NCCAG (Wetlands)
- Probable GDE
- Probable Non-GDE
- Playa Wetland Community

WATER DISTRICT

1 inch = 2 miles
0 1 2 4 Miles

N

WOODARD & CURRAN
Project #: 0011492.02
Map Created: June 2021

Third Party GIS Disclaimer: This map is for reference and graphical purposes only and should not be relied upon by third parties for any legal decisions. Any reliance upon the map or data contained herein shall be at the users' sole risk. **Data Sources:Microsoft BING Aerial Imagery; CA DWR Natural Communities Commonly Associated with Groundwater.**

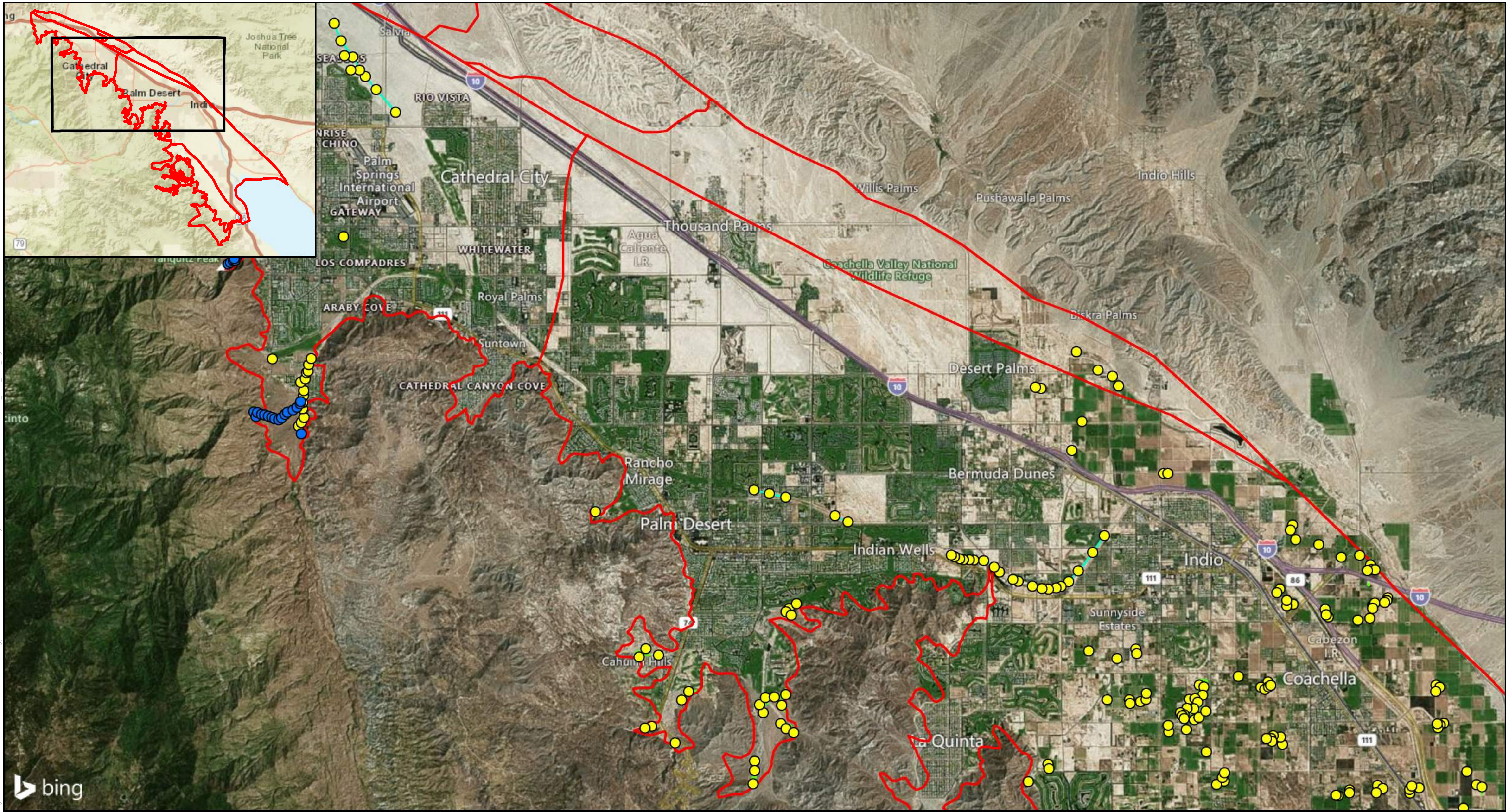

Figure 7c
Preliminary GDE Assessment
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

Legend
- Indio Subbasin Boundaries
- NCCAG (Vegetation)
- NCCAG (Wetlands)
- Probable GDE
- Probable Non-GDE
- Playa Wetland Community

WATER DISTRICT

1 inch = 2 miles
0 1 2 4 Miles

N

WOODARD & CURRAN
Project #: 0011492.02
Map Created: June 2021

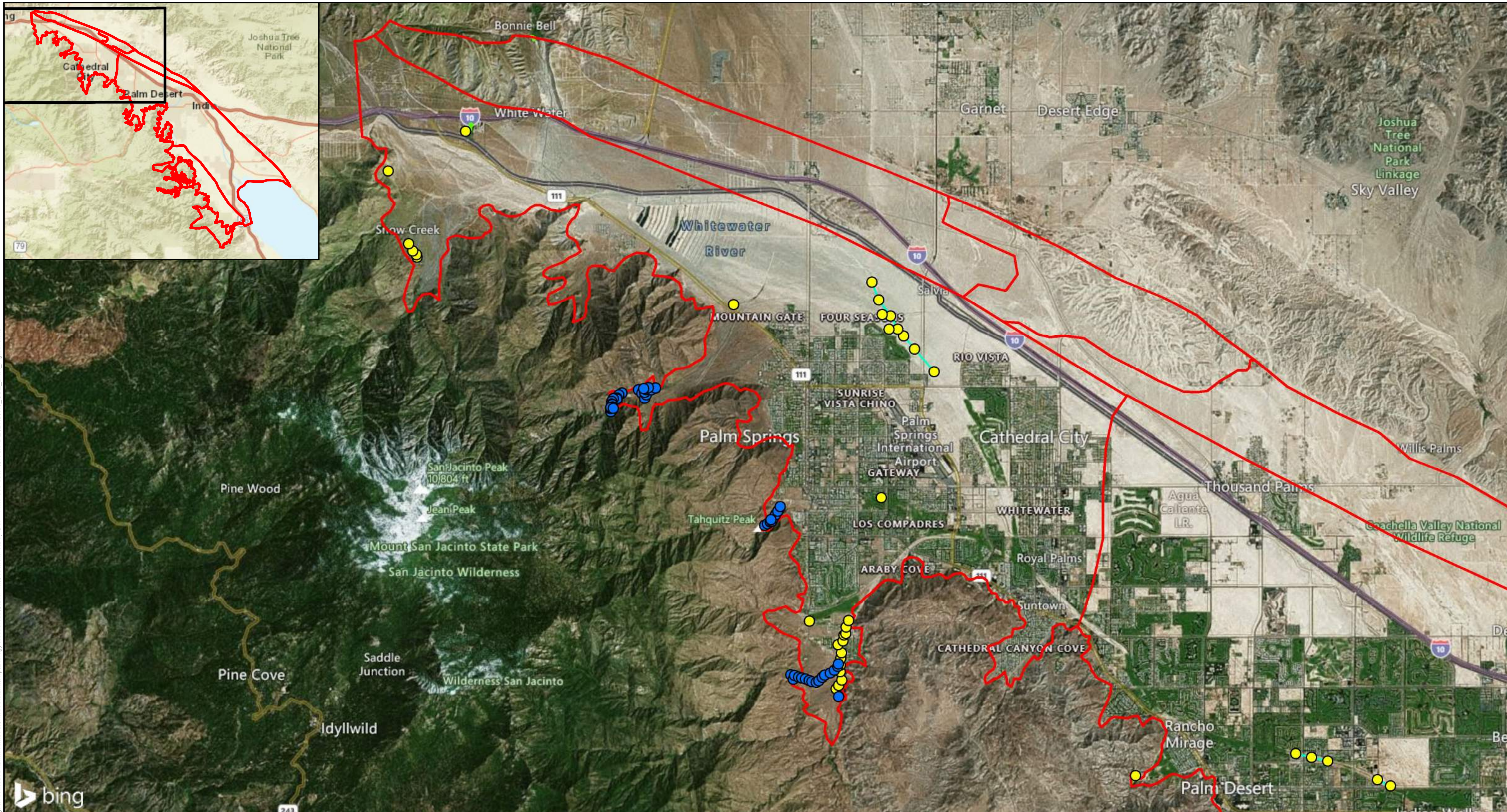

Figure 7d
Preliminary GDE Assessment

Indio Groundwater Basin
Coachella Valley Water District

Imperial, Riverside, and San Diego Counties, CA

Legend

- Indio Subbasin Boundaries
- NCCAG (Vegetation)
- NCCAG (Wetlands)
- Probable GDE
- Probable Non-GDE
- Playa Wetland Community

1 inch = 2 miles

0 1 2 4 Miles

N

WOODARD & CURRAN

Project #: 0011492.02
Map Created: June 2021

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ATTACHMENT B: PHOTOGRAPHIC LOG OF GDE FIELD ASSESSMENT SITES

Photo Number: 1 | **View Direction:** West | **Date:** January 11, 2021

Description: Representative photograph taken of confirmed probable groundwater dependent ecosystem (NCCAG 2020). Photo taken at GDE field assessment site 15.

Photo Number: 2 | **View Direction:** Northwest | **Date:** January 11, 2021

Description: Representative photograph taken of potential incorrectly mapped groundwater dependent ecosystem (NCCAG 2020). Photo taken at GDE field assessment site 14.

Photo Number: 3 | **View Direction:** North | **Date:** January 11, 2021
Description: Representative photograph taken of potential incorrectly mapped groundwater dependent ecosystem (NCCAG 2020). Photo taken at GDE field assessment site 12.

Photo Number: 4 | **View Direction:** Southwest | **Date:** January 12, 2021
Description: Representative photograph taken of potential incorrectly mapped groundwater dependent ecosystem (NCCAG 2020). Photo taken GDE field assessment site 10.

Photo Number: 5 | **View Direction:** North | **Date:** January 12, 2021
Description: Representative photograph taken of potential incorrectly mapped groundwater dependent ecosystem (NCCAG 2020). Photo taken GDE field assessment site 11.

Photo Number: 6 | **View Direction:** Southwest | **Date:** January 12, 2021
Description: Representative photograph taken of potential incorrectly mapped groundwater dependent ecosystem (NCCAG 2020). Photo taken at GDE field assessment site 2.

Photo Number: 7 | **View Direction:** North | **Date:** January 12, 2021
Description: Representative photograph taken of potential incorrectly mapped groundwater dependent ecosystem (NCCAG 2020). Photo taken at GDE field assessment site 6.

Photo Number: 8 | **View Direction:** West | **Date:** January 12, 2021
Description: Representative photograph taken of potential incorrectly mapped groundwater dependent ecosystem (NCCAG 2020). Photo taken at GDE field assessment site 8.

Photo Number: 9 | **View Direction:** South | **Date:** January 13, 2021

Description: Representative photograph taken of potential incorrectly mapped groundwater dependent ecosystem (NCCAG 2020). Photo taken at GDE field assessment site 1.

Photo Number: 10 | **View Direction:** South | **Date:** January 13, 2021

Description: Representative photograph taken of playa wetland community. Photo taken at GDE field assessment site 5.

Photo Number: 11 | **View Direction:** East | **Date:** January 13, 2021

Description: Representative photograph taken of potential incorrectly mapped groundwater dependent ecosystem (NCCAG 2020). Photo taken at GDE field assessment site 7.

Photo Number: 12 | **View Direction:** West | **Date:** January 14, 2021

Description: Representative photograph taken of playa wetland community. Photo taken at GDE field assessment site 4.

Photo Number: 13 | **View Direction:** East | **Date:** January 14, 2021
Description: Representative photograph taken of playa wetland community. Photo taken at GDE field assessment site 3.

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APPENDIX 5-A
MUNICIPAL WATER DEMAND PROJECTION FOR 2022 INDIO SUBBASIN ALTERNATIVE PLAN

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DRAFT

MUNICIPAL WATER DEMAND PROJECTION FOR 2022 INDIO SUBBASIN ALTERNATIVE PLAN

COACHELLA VALLEY WATER DISTRICT
COACHELLA WATER AUTHORITY
DESERT WATER AGENCY
INDIO WATER AUTHORITY

August 2021

TODD GROUNDWATER

2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
www.toddgroundwater.com

In cooperation with:

WOODARD & CURRAN

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APPENDIX TABLE OF CONTENTS

APPENDIX TABLES

GROWTH FORECAST BY JURISDICTION

Coachella Valley Water District

Table 1. Coachella Valley Water District—Population

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	46,808	48,749	51,217	53,685	56,153	58,956	61,759
Coachella	28	29	31	32	34	39	44
Desert Hot Springs	2	2	2	2	2	3	4
Indian Wells	5,272	5,569	5,993	6,418	6,843	7,296	7,748
Indio	6,335	6,812	7,695	8,578	9,462	10,170	10,879
La Quinta	38,449	39,408	40,902	42,397	43,891	45,385	46,878
Palm Desert	49,350	51,716	54,747	57,778	60,810	64,124	67,439
Palm Springs	27	51	82	112	143	179	216
Rancho Mirage	18,145	20,073	21,941	23,809	25,677	27,486	29,295
Unincorporated Imperial	5,391	11,037	11,606	12,175	12,744	12,826	12,908
Unincorporated West	16,494	16,832	17,645	18,457	19,269	19,483	19,698
Unincorporated East	12,174	12,939	17,198	21,458	25,718	27,872	30,026
Total	198,475	213,217	229,059	244,901	260,746	273,819	286,894

Note: Does not include customers in CVWD service area served by other water systems

Table 2. Coachella Valley Water District—Households

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	14,592	15,953	17,089	18,226	19,362	20,582	21,803
Coachella	7	7	8	8	9	10	12
Desert Hot Springs	1	1	1	1	1	1	1
Indian Wells	2,690	2,772	2,848	2,923	2,998	3,074	3,150
Indio	2,449	2,764	3,144	3,524	3,904	4,193	4,482
La Quinta	14,532	15,210	15,888	16,565	17,242	17,896	18,550
Palm Desert	22,742	24,693	26,359	28,025	29,691	31,412	33,133
Palm Springs	16	34	48	63	77	93	109
Rancho Mirage	8,853	10,436	11,449	12,462	13,474	14,399	15,324
Unincorporated Imperial	1,785	4,529	4,868	5,208	5,548	5,587	5,625
Unincorporated West	6,667	6,856	7,184	7,512	7,840	7,908	7,977
Unincorporated East	2,492	2,964	4,751	6,539	8,326	9,407	10,488
Total	76,826	86,219	93,637	101,056	108,472	114,562	120,654

Note: Does not include customers in CVWD service area served by other water systems

Table 3. Coachella Valley Water District—Employees

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	7,383	8,293	8,965	9,637	10,309	10,675	11,042
Coachella	2	2	2	2	2	2	2
Desert Hot Springs	2	19	27	34	41	43	44
Indian Wells	7,854	8,317	8,632	8,948	9,263	9,497	9,732
Indio	1,848	2,197	2,490	2,784	3,077	3,333	3,589
La Quinta	15,621	16,632	17,363	18,095	18,827	19,217	19,607
Palm Desert	39,780	41,533	43,021	44,508	45,996	48,185	50,375
Palm Springs	15	58	79	100	121	126	131
Rancho Mirage	16,550	17,642	18,435	19,228	20,021	20,508	20,995
Unincorporated Imperial	341	447	447	447	447	618	789
Unincorporated West	6,130	6,175	6,276	6,377	6,478	6,705	6,933
Unincorporated East	4,419	4,961	4,872	4,784	4,695	6,187	7,679
Total	99,945	106,276	110,609	114,944	119,277	125,096	130,918

Note: Does not include customers in CVWD service area served by other water systems

Coachella Water Authority

Table 4. Coachella Water Authority—Population

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	44,417	52,722	63,947	75,172	86,397	100,951	115,504
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	0	0	0	0	0	0	0
Unincorporated East	0	0	0	0	0	0	0
Total	44,417	52,722	63,947	75,172	86,397	100,951	115,504

Table 5. Coachella Water Authority—Households

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	9,460	13,506	17,041	20,575	24,110	28,325	32,539
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	0	0	0	0	0	0	0
Unincorporated East	0	0	0	0	0	0	0
Total	9,460	13,506	17,041	20,575	24,110	28,325	32,539

Table 6. Coachella Water Authority—Employees

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	8,599	12,209	14,884	17,560	20,235	21,909	23,582
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	0	0	0	0	0	0	0
Unincorporated East	0	0	0	0	0	0	0
Total	8,599	12,209	14,884	17,560	20,235	21,909	23,582

Desert Water Agency

Table 7. Desert Water Agency—Population

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	6,238	6,697	7,226	7,755	8,284	8,830	9,377
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	46,325	48,447	50,724	53,002	55,279	57,875	60,472
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	419	452	524	595	667	670	673
Unincorporated East	0	0	0	0	0	0	0
Total	52,982	55,596	58,474	61,352	64,230	67,375	70,522

Note: Does not include customers in DWA service area served by other water systems

Table 8. Desert Water Agency—Households

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	2,382	2,720	2,967	3,214	3,462	3,704	3,946
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	22,657	24,306	25,528	26,749	27,971	29,293	30,615
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	220	241	272	303	334	335	337
Unincorporated East	0	0	0	0	0	0	0
Total	25,259	27,267	28,767	30,266	31,767	33,332	34,898

Note: Does not include customers in DWA service area served by other water systems

Table 9. Desert Water Agency—Employees

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	4,560	4,921	5,195	5,470	5,744	5,891	6,039
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	30,748	33,086	34,606	36,127	37,647	38,220	38,794
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	20	100	184	269	354	369	385
Unincorporated East	0	0	0	0	0	0	0
Total	35,328	38,107	39,985	41,866	43,745	44,480	45,218

Note: Does not include customers in DWA service area served by other water systems

Indio Water Agency

Table 10. Indio Water Agency—Population

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	83,147	87,097	93,474	99,852	106,229	111,790	117,351
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	0	0	0	0	0	0	0
Unincorporated East	0	0	0	0	0	0	0
Total	83,147	87,097	93,474	99,852	106,229	111,790	117,351

Table 11. Indio Water Agency—Households

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	23,662	25,940	28,659	31,377	34,095	36,324	38,553
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	0	0	0	0	0	0	0
Unincorporated East	0	0	0	0	0	0	0
Total	23,662	25,940	28,659	31,377	34,095	36,324	38,553

Table 12. Indio Water Agency—Employees

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	27,530	30,177	32,108	34,039	35,970	36,970	37,971
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	0	0	0	0	0	0	0
Unincorporated East	0	0	0	0	0	0	0
Total	27,530	30,177	32,108	34,039	35,970	36,970	37,971

GROWTH FORECAST FOR CUSTOMERS OUTSIDE GSA DOMESTIC WATER SERVICE AREAS

Coachella Valley Water District

Table 13. CVWD Other Water Systems—Population

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	1,748	1,748	1,748	1,748	1,748	1,748	1,748
Unincorporated West	7,180	7,440	7,956	8,472	8,988	9,092	9,196
Unincorporated East	13,662	13,662	13,662	13,662	13,662	13,662	13,662
Total	22,590	22,850	23,366	23,882	24,398	24,502	24,606

Table 14. CVWD Other Water Systems—Households

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	627	627	627	627	627	627	627
Unincorporated West	3,209	3,372	3,592	3,813	4,033	4,078	4,123
Unincorporated East	3,727	3,727	3,727	3,727	3,727	3,727	3,727
Total	7,563	7,726	7,946	8,167	8,387	8,432	8,477

Table 15. CVWD Other Water Systems—Employees

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	221	221	221	221	221	221	221
Unincorporated West	2,832	3,002	3,191	3,380	3,570	3,847	4,124
Unincorporated East	2,740	2,740	2,740	2,740	2,740	2,740	2,740
Total	5,793	5,963	6,152	6,341	6,531	6,808	7,085

Desert Water Agency

Table 16. DWA Other Water Systems—Population

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	247	249	250	251	252	253	254
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	134	145	148	152	155	161	168
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	398	453	525	598	671	710	750
Unincorporated East	0	0	0	0	0	0	0
Total	779	847	923	1,001	1,078	1,124	1,172

Note: Does not include customers outside of the Planning Area

Table 17. DWA Other Water Systems—Households

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	64	65	66	66	67	67	67
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	31	31	31	31	31	33	35
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	163	200	232	265	297	314	331
Unincorporated East	0	0	0	0	0	0	0
Total	258	296	329	362	395	414	433

Note: Does not include customers outside of the Planning Area

Table 18. DWA Other Water Systems—Employees

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	44	65	80	95	110	119	129
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	148	238	306	374	441	455	469
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	9	25	46	68	90	132	174
Unincorporated East	0	0	0	0	0	0	0
Total	201	328	432	537	641	706	772

Note: Does not include customers outside of the Planning Area

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RESIDENTIAL GENERAL PLAN LAND USES

Table 19. General Plan Land Uses and Maximum Dwelling Units

Jurisdiction (Data Adopted)	City Land Use	SCAG Land Use Description (*Adjusted)	Maximum Dwelling Units/Acre
Cathedral City (2009)	RE	Low Density Single Family Residential	2
	RL	Medium Density Single Family Residential	4
	RR	Mixed Residential	6
	RM	Mixed Residential	10
	RMH	Mixed Residential	20
	DTC	Mixed Residential and Commercial	20
	RH	Mixed Multi-Family Residential	24
	MU-N	Mixed Residential and Commercial	25
	MU-U	Mixed Residential and Commercial	45
Coachella (2015)	Rural Rancho	Rural Residential	1
	Suburban Neighborhood	Medium Density Single Family Residential	8
	Resort District	Other Commercial	8
	General Neighborhood	Mixed Residential	25
	Urban Neighborhood	Multi-Family Residential	38
	Neighborhood Center	Mixed Residential and Commercial	40
	Urban Employment Center	General Office Use	65
	Downtown Center	Commercial-Oriented Residential/Commercial Mixed Use	65
Indian Wells (2007)	Very Low Density Residential	Low Density Single Family Residential	3
	Low Density Residential	Medium Density Single Family Residential	4
	Medium Density Residential	Medium Density Single Family Residential	7
	Medium High Density Residential	Multi-Family Residential	12
Indio (2007)	Country Estates	Low Density Single Family Residential	1
	Country Estates Transition	Low Density Single Family Residential	1
	Equestrian Estates	Low Density Single Family Residential	2
	Residential—Low	Medium Density Single Family Residential	4
	Residential—Medium	Multi-Family Residential	8
	Residential—High	Multi-Family Residential	20
La Quinta (2016)	LDR	Low Density Single Family Residential	4
	MHDR	Multi-Family Residential	16
	VC	Mixed Residential and Commercial	16
Palm Desert (2016)	R	Rural Residential	1
	CS	*Medium Density Single Family Residential	8
	GC&R	Mixed Residential and Commercial	8
	ST	Mixed Residential	10
	RE	Other Commercial	10

Table 19. General Plan Land Uses and Maximum Dwelling Units

Jurisdiction (Data Adopted)	City Land Use	SCAG Land Use Description (*Adjusted)	Maximum Dwelling Units/Acre
	SR	Commercial-Oriented Residential/Commercial Mixed Use	15
	N	Commercial-Oriented Residential/Commercial Mixed Use	15
	RR	Commercial-Oriented Residential/Commercial Mixed Use	15
	TC	Mixed Residential	40
	DT	Commercial-Oriented Residential/Commercial Mixed Use	40
Palm Springs (2007)	ER	Low Density Single Family Residential	2
	VLDR	*Medium Density Single Family Residential	4
	LDR	*Medium Density Single Family Residential	6
	SH	Hotels and Motels	10
	MDR	Mixed Residential	15
	MU	Mixed Residential and Commercial	15
	HDR	Multi-Family Residential	30
	TRC	*Mixed Residential and Commercial	30
	HDR	Mixed Residential and Commercial	30
	CBD	Mixed Residential and Commercial	30
Rancho Mirage (2017)	R-E	Low Density Single Family Residential	1
	R-L-2	*Low Density Single Family Residential	2
	R-L-3	*Low Density Single Family Residential	3
	R-M	*Low Density Single Family Residential	4
	R-H	Multi-Family Residential	9
	MHP	Mobile Homes and Trailer Parks	9
	M-U	Mixed Residential and Commercial	28
Riverside County (2015)	VLDR	Low Density Single Family Residential	1
	RC-VLDR	Low Density Single Family Residential	1
	LDR	Low Density Single Family Residential	2
	RC-LDR	Low Density Single Family Residential	2
	MDR	Medium Density Single Family Residential	5
	MHDR	Mixed Residential	8
	HDR	Mixed Residential	14
	VHDR	Multi-Family Residential	20
	HHDR	Multi-Family Residential	40
Imperial County	RR	*Low Density Single Family Residential	1
	MHP	Mobile Homes and Trailer Parks	8
	RA	Multi-Family Residential	30
	RC	Mixed Residential	30

RESIDENTIAL SPECIFIC PLAN LAND USES

Table 20. Specific Plan Land Uses and Maximum Dwelling Units

Jurisdiction (Date Adopted)	Specific Plan Name	City Land Use Code	SCAG Land Use Code (*Adjusted)	Maximum Dwelling Units/Acre
Cathedral City	North City Extended Specific Plan	MU-N	Mixed Residential and Commercial	25
		MU-U	Mixed Residential and Commercial	45
	North City Specific Plan	RE	Low Density Single Family Residential	2
		MU-N	Mixed Residential and Commercial	25
		MU-U	Mixed Residential and Commercial	45
Coachella	Eagle Falls Specific Plan	SFR	Low Density Residential	10
Indio	Central Highway 111 Corridor Specific Plan	RHD	*Multi-Family Residential	20
	Fred Young Specific Plan	Multi-Family Residential	Multi-Family Residential	20
		Mixed Residential	*Mixed Residential	20
	Gateway Conceptual SP	RVL	*Medium Density Single Family Residential	5
		RVM	*Medium Density Single Family Residential	10
		MU	Mixed Residential	20
	Indian Palm Country Club Conceptual Specific Plan	Residential—Low	Medium Density Single Family Residential	4
	Outdoor Resort Country Club Specific Plan	Lot Area	Mobile Homes and Trailer Parks	12
La Quinta	SP 01-053 Puerta Azul	MHDR	Multi-Family Residential	16
	SP 03-069 Watermark Villas	RMH	*Multi-Family Residential	12
	SP 05-076 Casa La Quinta	RMH	*Multi-Family Residential	16
	SP 121E La Quinta Resort & Club	RL	Low Density Residential	4
		RM	Low Density Residential	8
Palm Springs	College Park	Very Low Density Residential	*Low Density Single Family Residential	4
		Low Density Residential	*Medium Density Single Family Residential	6

Table 20. Specific Plan Land Uses and Maximum Dwelling Units

Jurisdiction (Date Adopted)	Specific Plan Name	City Land Use Code	SCAG Land Use Code (*Adjusted)	Maximum Dwelling Units/Acre
		Medium Density Residential	Mixed Residential	15
	Section 14	MBR	Multi-Family Residential	8
	Section 15	MR	Multi-Family Residential	15
	Section 16	HR	Multi-Family Residential	30
Rancho Mirage	Monterey Specific Plan	LDR	*Low Density Single Family Residential	2
		MDR	*Medium Density Single Family Residential	4
		HDR	*Multi-Family Residential	12

HOUSING UNIT FORECAST BY JURISDICTION

Coachella Valley Water District

Table 21. Coachella Valley Water District—Single Family Housing Units

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	12,491	13,917	15,064	16,160	17,178	18,130	18,844
Coachella	5	6	6	7	7	8	9
Desert Hot Springs	0	0	0	0	0	1	1
Indian Wells	4,405	4,534	4,650	4,758	4,860	4,949	5,016
Indio	2,121	2,444	2,820	3,178	3,512	3,732	3,898
La Quinta	20,357	21,273	22,157	22,999	23,781	24,439	24,933
Palm Desert	24,666	27,284	29,438	31,495	33,406	35,124	36,414
Palm Springs	15	38	56	73	89	105	117
Rancho Mirage	11,538	13,647	14,946	16,188	17,340	18,256	18,944
Unincorporated Imperial	2,142	5,849	6,292	6,714	7,106	7,145	7,175
Unincorporated West	6,562	6,774	7,130	7,470	7,786	7,843	7,886
Unincorporated East	1,322	1,778	3,443	5,033	6,510	7,288	7,871
Total	85,624	97,544	106,002	114,075	121,575	127,020	131,108

Note: Does not include customers in CVWD service area served by other water systems

Table 22. Coachella Valley Water District—Multiple Family Housing Units

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	5,553	5,809	6,067	6,376	6,763	7,320	8,115
Coachella	2	2	2	2	2	3	4
Desert Hot Springs	0	0	0	0	0	0	1
Indian Wells	602	626	652	682	721	773	847
Indio	845	903	987	1,088	1,215	1,344	1,528
La Quinta	2,821	2,986	3,184	3,422	3,720	4,105	4,654
Palm Desert	11,341	11,811	12,295	12,875	13,602	14,608	16,043
Palm Springs	9	14	18	23	29	38	51
Rancho Mirage	2,371	2,750	3,042	3,392	3,830	4,367	5,132
Unincorporated Imperial	703	1,370	1,469	1,588	1,738	1,761	1,793
Unincorporated West	2,300	2,339	2,418	2,514	2,635	2,668	2,716
Unincorporated East	1,520	1,602	1,976	2,425	2,987	3,442	4,091
Total	28,067	30,212	32,110	34,387	37,242	40,429	44,975

Note: Does not include customers in CVWD service area served by other water systems

Coachella Water Authority

Table 23. Coachella Water Authority—Single Family

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	7,413	11,062	14,135	17,070	19,795	22,623	24,746
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	0	0	0	0	0	0	0
Unincorporated East	0	0	0	0	0	0	0
Total	7,413	11,062	14,135	17,070	19,795	22,623	24,746

Table 24. Coachella Water Authority—Multiple Family

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	2,655	3,312	4,001	4,829	5,866	7,522	9,884
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	0	0	0	0	0	0	0
Unincorporated East	0	0	0	0	0	0	0
Total	2,655	3,312	4,001	4,829	5,866	7,522	9,884

Desert Water Agency

Table 25. Desert Water Agency—Single Family Housing Units

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	2,039	2,393	2,643	2,881	3,103	3,291	3,433
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	21,214	23,353	24,880	26,338	27,692	28,968	29,926
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	216	241	274	306	336	337	338
Unincorporated East	0	0	0	0	0	0	0
Total	23,469	25,987	27,797	29,525	31,131	32,596	33,697

Note: Does not include customers in DWA service area served by other water systems

Table 26. Desert Water Agency—Multiple Family Housing Units

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	906	970	1,026	1,093	1,178	1,288	1,446
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	13,459	13,843	14,186	14,597	15,113	15,860	16,925
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	76	80	88	97	108	109	110
Unincorporated East	0	0	0	0	0	0	0
Total	14,441	14,893	15,300	15,787	16,399	17,257	18,481

Note: Does not include customers in DWA service area served by other water systems

Indio Water Authority

Table 27. Indio Water Authority—Single Family Housing Units

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	20,486	22,824	25,511	28,078	30,461	32,163	33,441
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	0	0	0	0	0	0	0
Unincorporated East	0	0	0	0	0	0	0
Total	20,486	22,824	25,511	28,078	30,461	32,163	33,441

Table 28. Indio Water Authority—Multiple Family Housing Units

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	8,159	8,580	9,183	9,907	10,814	11,810	13,232
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	0	0	0	0	0	0	0
Unincorporated East	0	0	0	0	0	0	0
Total	8,159	8,580	9,183	9,907	10,814	11,810	13,232

HOUSING UNIT FORECAST FOR CUSTOMERS OUTSIDE GSA DOMESTIC WATER SERVICE AREAS

Coachella Valley Water District

Table 29. CVWD Other Water Systems—Single Family

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	753	753	753	753	753	753	753
Unincorporated West	3,158	3,342	3,581	3,809	4,022	4,059	4,087
Unincorporated East	1,977	1,977	1,977	1,977	1,977	1,977	1,977
Total	5,888	6,072	6,311	6,539	6,752	6,789	6,817

Table 30. CVWD Other Water Systems—Multiple Family

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	0	0	0	0	0	0	0
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	0	0	0	0	0	0	0
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	247	247	247	247	247	247	247
Unincorporated West	1,107	1,140	1,194	1,258	1,339	1,361	1,392
Unincorporated East	2,274	2,274	2,274	2,274	2,274	2,274	2,274
Total	3,628	3,661	3,715	3,779	3,860	3,882	3,913

Desert Water Agency

Table 31. DWA Other Water Systems—Single Family Housing Units

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	51	52	53	53	54	54	54
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	29	29	29	29	29	31	33
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	160	202	237	271	302	316	327
Unincorporated East	0	0	0	0	0	0	0
Total	240	283	319	353	385	401	414

Table 32. DWA Other Water Systems—Multiple Family Housing Units

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Cathedral City	0	0	0	0	0	0	0
Coachella	0	0	0	0	0	0	0
Desert Hot Springs	28	28	28	28	29	29	29
Indian Wells	0	0	0	0	0	0	0
Indio	0	0	0	0	0	0	0
La Quinta	0	0	0	0	0	0	0
Palm Desert	0	0	0	0	0	0	0
Palm Springs	18	18	18	18	18	20	21
Rancho Mirage	0	0	0	0	0	0	0
Unincorporated Imperial	0	0	0	0	0	0	0
Unincorporated West	56	64	72	81	93	101	113
Unincorporated East	0	0	0	0	0	0	0
Total	102	110	118	127	140	150	163

BASELINE WATER DEMAND PROJECTION BEFORE CONSERVATION

Table 33. Baseline Water Demand Projection Before Conservation

GSA	Sector	2016	2020	2025	2030	2035	2040	2045
CVWD	Single Family	47,369	53,964	58,643	63,111	67,259	70,271	72,532
CVWD	Multiple Family	5,623	6,043	6,439	6,913	7,508	8,140	9,040
CVWD	CII	6,087	6,473	6,737	7,001	7,264	7,619	7,973
CVWD	Landscape	28,328	31,803	34,396	36,996	39,609	41,763	43,931
CVWD	Other	1,067	1,197	1,295	1,393	1,491	1,572	1,654
CWA	Single Family	4,060	6,060	7,743	9,350	10,843	12,392	13,555
CWA	Multiple Family	710	886	1,071	1,292	1,570	2,013	2,645
CWA	CII	730	1,036	1,264	1,491	1,718	1,860	2,002
CWA	Landscape	589	841	1,061	1,281	1,501	1,764	2,026
CWA	Other	12	17	22	26	31	36	41
DWA	Single Family	15,060	16,675	17,837	18,946	19,977	20,917	21,623
DWA	Multiple Family	1,669	1,721	1,768	1,825	1,895	1,995	2,136
DWA	CII	9,220	9,945	10,435	10,926	11,416	11,608	11,801
DWA	Landscape	3,388	3,654	3,852	4,050	4,248	4,455	4,663
DWA	Other	0	0	0	0	0	0	0
IWA	Single Family	10,854	12,092	13,516	14,876	16,139	17,041	17,717
IWA	Multiple Family	1,753	1,843	1,973	2,128	2,323	2,537	2,843
IWA	CII	2,774	3,041	3,235	3,430	3,624	3,725	3,826
IWA	Landscape	4,982	5,462	6,034	6,606	7,178	7,648	8,117
IWA	Other	4	5	5	6	6	6	7

Table 34. Baseline Water Demand Projection Before Conservation (Other Water Systems)

GSA	Sector	2016	2020	2025	2030	2035	2040	2045
CVWD	Single Family	2,442	2,518	2,618	2,712	2,800	2,816	2,828
CVWD	Multiple Family	525	529	537	547	558	561	566
CVWD	CII	351	361	372	384	395	412	429
CVWD	Landscape	501	513	528	544	559	562	565
CVWD	Other	117	120	124	127	131	132	132
DWA	Single Family	76	90	101	112	122	127	131
DWA	Multiple Family	32	35	37	41	44	47	52
DWA	CII	100	163	215	268	320	352	385
DWA	Landscape	11	12	14	15	16	17	18
DWA	Other	2	2	2	2	3	3	3

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WATER LOSS PROJECTION

Table 35. Water Loss Projection by GSA

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Coachella Valley Water District	10,420	11,714	12,474	13,194	13,873	14,318	14,730
Coachella Water Authority	371	529	654	774	888	1,021	1,147
Desert Water Agency	2,820	3,041	3,142	3,236	3,323	3,412	3,493
Indio Water Authority	1,059	1,161	1,257	1,348	1,434	1,495	1,553

Note: Includes only customers within Planning Area. Does not include customers served by other water systems

Table 36. Water Loss Projection by GSA (Other Water Systems)

Jurisdiction	2016	2020	2025	2030	2035	2040	2045
Coachella Valley Water District	872	892	901	908	914	900	885
Desert Water Agency	25	29	32	34	37	38	39

Note: Includes only customers within the Planning Area

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ADJUSTMENT FACTORS

Table 37. Passive Conservation Projection (Planning Area)

GSA	Sector	2016	2020	2025	2030	2035	2040	2045
CVWD	Single Family	0	382	993	1,371	1,649	1,842	1,981
CVWD	Multiple Family	0	79	186	266	342	415	494
CVWD	CII	0	38	117	169	213	255	292
CVWD	Landscape	0	0	0	0	0	0	0
CVWD	Other	0	0	0	0	0	0	0
CWA	Single Family	0	94	277	421	543	662	756
CWA	Multiple Family	0	20	52	82	116	166	232
CWA	CII	0	4	16	26	36	44	52
CWA	Landscape	0	0	0	0	0	0	0
CWA	Other	0	0	0	0	0	0	0
DWA	Single Family	0	84	214	293	349	392	424
DWA	Multiple Family	0	32	74	102	126	149	171
DWA	CII	0	14	42	61	78	90	100
DWA	Landscape	0	0	0	0	0	0	0
DWA	Other	0	0	0	0	0	0	0
IWA	Single Family	0	152	396	548	660	740	797
IWA	Multiple Family	0	35	83	116	148	179	212
IWA	CII	0	11	34	50	64	75	84
IWA	Landscape	0	0	0	0	0	0	0
IWA	Other	0	0	0	0	0	0	0

Note: Does not include customers served by other water systems

Table 38. Passive Conservation Projection (Other Water Systems within Planning Area)

GSA	Sector	2016	2020	2025	2030	2035	2040	2045
CVWD	Single Family	0	30	75	100	116	125	131
CVWD	Multiple Family	0	16	37	50	60	68	73
CVWD	CII	0	2	6	9	12	14	16
CVWD	Landscape	0	0	0	0	0	0	0
CVWD	Other	0	0	0	0	0	0	0
DWA	Single Family	0	1	4	5	6	7	7
DWA	Multiple Family	0	0	1	1	2	2	3
DWA	CII	0	0	0	1	1	1	2
DWA	Landscape	0	0	0	0	0	0	0
DWA	Other	0	0	0	0	0	0	0

Note: Includes only customers within the Planning Area

Table 39. Outdoor Water Use Adjustment by GSA (Within Planning Area)

GSA	Sector	2016	2020	2025	2030	2035	2040	2045
CVWD	Single Family	0	944	1,615	2,254	2,849	3,280	3,604
CVWD	Multiple Family	0	31	60	95	138	185	251
CVWD	CII	0	52	88	124	160	208	256
CVWD	Landscape	0	931	1,625	2,322	3,021	3,599	4,179
CVWD	Other	0	0	0	0	0	0	0
CWA	Single Family	0	214	393	565	725	890	1,015
CWA	Multiple Family	0	6	13	21	32	48	71
CWA	CII	0	38	67	95	124	142	159
CWA	Landscape	0	67	126	185	244	315	385
CWA	Other	0	0	0	0	0	0	0
DWA	Single Family	0	239	412	576	729	868	973
DWA	Multiple Family	0	8	15	23	34	48	69
DWA	CII	0	179	300	422	543	590	638
DWA	Landscape	0	71	124	177	230	286	342
DWA	Other	0	0	0	0	0	0	0
IWA	Single Family	0	154	331	500	657	769	853
IWA	Multiple Family	0	6	16	27	41	56	78
IWA	CII	0	51	88	126	163	182	202
IWA	Landscape	0	129	282	435	588	714	840
IWA	Other	0	0	0	0	0	0	0

Note: Includes only customers within Planning Area. Does not include customers served by other water systems

Table 40. Outdoor Water Use Adjustment (Other Water Systems within Planning Area)

GSA	Sector	2016	2020	2025	2030	2035	2040	2045
CVWD	Single Family	0	8	19	30	39	41	42
CVWD	Multiple Family	0	1	2	4	5	6	7
CVWD	CII	0	12	24	37	50	69	87
CVWD	Landscape	0	2	6	9	12	13	13
CVWD	Other	0	0	0	0	0	0	0
DWA	Single Family	0	2	4	5	7	7	8
DWA	Multiple Family	0	0	0	1	1	1	1
DWA	CII	0	9	16	23	30	34	39
DWA	Landscape	0	1	1	2	2	2	3
DWA	Other	0	0	0	0	0	0	0

Note: Includes only customers within the Planning Area

FINAL DEMAND PROJECTIONS BY JURISDICTION

Table 41. Water Supplied (Within Planning Area)

GSA	Sector	2016	2020	2025	2030	2035	2040	2045
CVWD	Single Family	47,369	52,638	56,036	59,485	62,762	65,150	66,947
CVWD	Multiple Family	5,623	5,933	6,193	6,553	7,028	7,540	8,295
CVWD	CII	6,087	6,382	6,532	6,708	6,891	7,156	7,426
CVWD	Landscape	28,328	30,873	32,770	34,674	36,587	38,165	39,751
CVWD	Other	1,067	1,197	1,295	1,393	1,491	1,572	1,654
CVWD	Losses	10,420	11,714	12,474	13,194	13,873	14,318	14,730
CWA	Single Family	4,060	5,752	7,072	8,364	9,575	10,840	11,785
CWA	Multiple Family	710	860	1,005	1,189	1,422	1,799	2,342
CWA	CII	730	994	1,181	1,370	1,558	1,674	1,790
CWA	Landscape	589	774	935	1,096	1,257	1,449	1,641
CWA	Other	12	17	22	26	31	36	41
CWA	Losses	371	529	654	774	888	1,021	1,147
DWA	Single Family	15,060	16,352	17,211	18,078	18,899	19,657	20,226
DWA	Multiple Family	1,669	1,682	1,680	1,699	1,735	1,797	1,896
DWA	CII	9,220	9,752	10,093	10,443	10,795	10,928	11,063
DWA	Landscape	3,388	3,582	3,727	3,872	4,018	4,170	4,322
DWA	Other	0	0	0	0	0	0	0
DWA	Losses	2,820	3,041	3,142	3,236	3,323	3,412	3,493
IWA	Single Family	10,854	11,787	12,790	13,828	14,822	15,532	16,067
IWA	Multiple Family	1,753	1,802	1,875	1,985	2,135	2,303	2,553
IWA	CII	2,774	2,979	3,113	3,254	3,397	3,468	3,540
IWA	Landscape	4,982	5,333	5,752	6,171	6,590	6,934	7,277
IWA	Other	4	5	5	6	6	6	7
IWA	Losses	1,059	1,161	1,257	1,348	1,434	1,495	1,553

Note: Includes only customers within Planning Area. Does not include customers served by other water systems

Table 42. Water Supplied (Other Water Systems within Planning Area)

GSA	Sector	2016	2020	2025	2030	2035	2040	2045
CVWD	Single Family	2,442	2,480	2,523	2,583	2,645	2,650	2,654
CVWD	Multiple Family	525	513	499	493	493	488	486
CVWD	CII	351	347	342	337	334	330	326
CVWD	Landscape	501	510	523	535	547	549	552
CVWD	Other	117	120	124	127	131	132	132
CVWD	Losses	872	892	901	908	914	900	885
DWA	Single Family	76	86	94	102	109	113	116
DWA	Multiple Family	32	34	36	39	42	44	48
DWA	CII	100	155	199	244	289	317	344
DWA	Landscape	11	12	12	13	14	15	15
DWA	Other	2	2	2	2	3	3	3
DWA	Losses	25	29	32	34	37	38	39

Note: Includes only customers within the Planning Area

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APPENDIX 7-A
1997-2019 OBSERVED VS. SIMULATED GROUNDWATER ELEVATION HYDROGRAPHS

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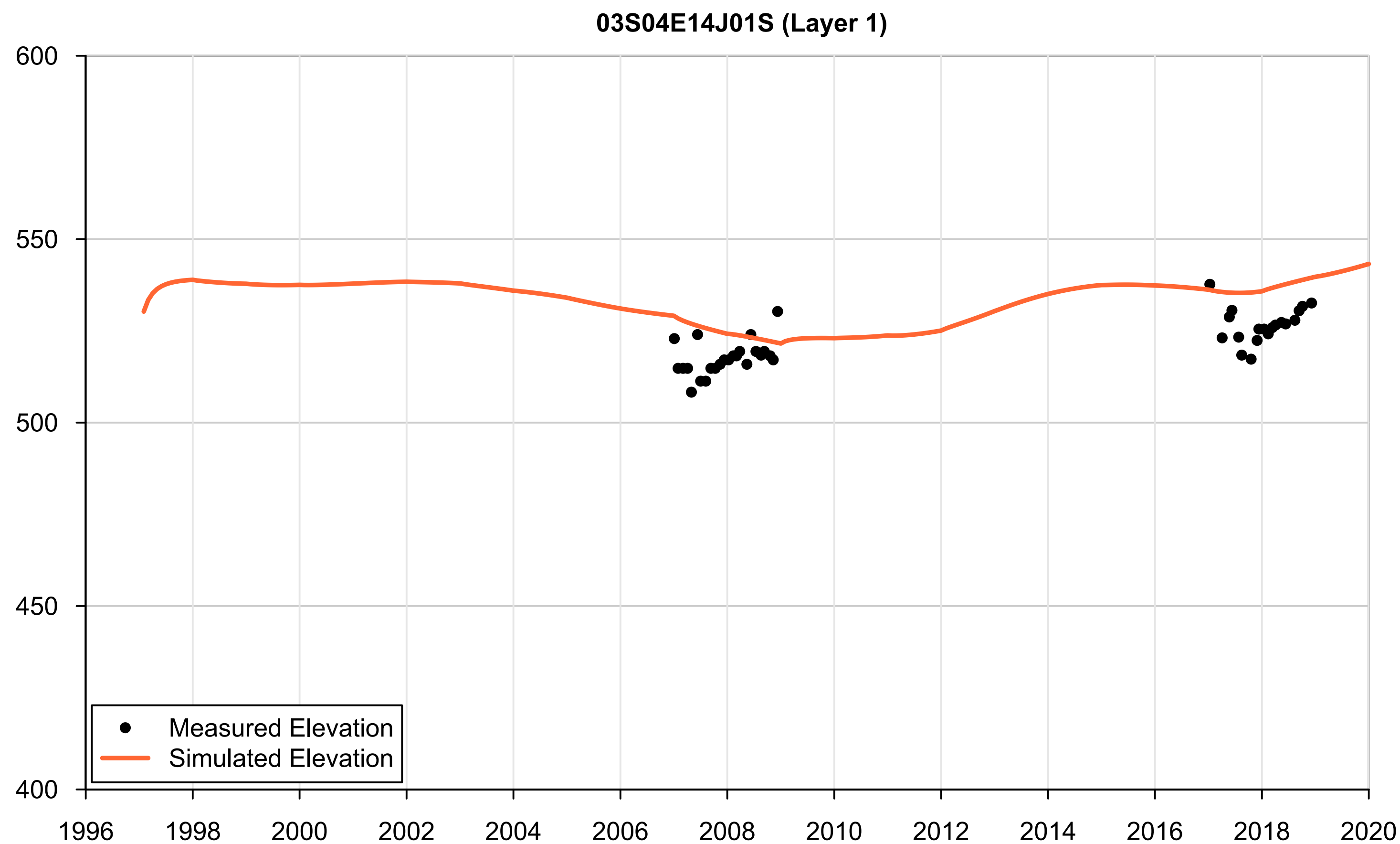

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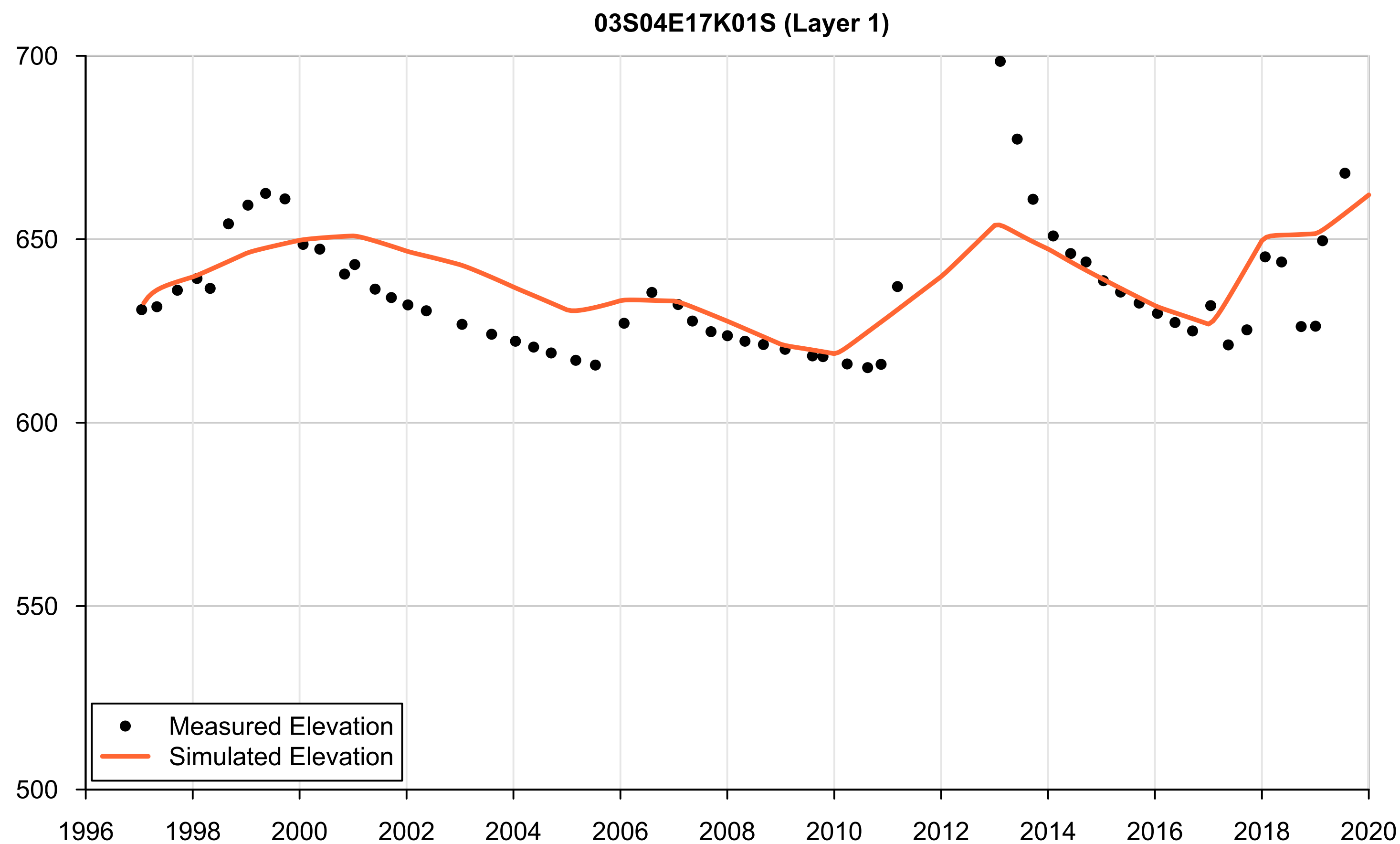
WOODARD & CURRAN

TODD GROUNDWATER

Appendix 7-A1
Groundwater Elevation Hydrograph
03S04E14J01S



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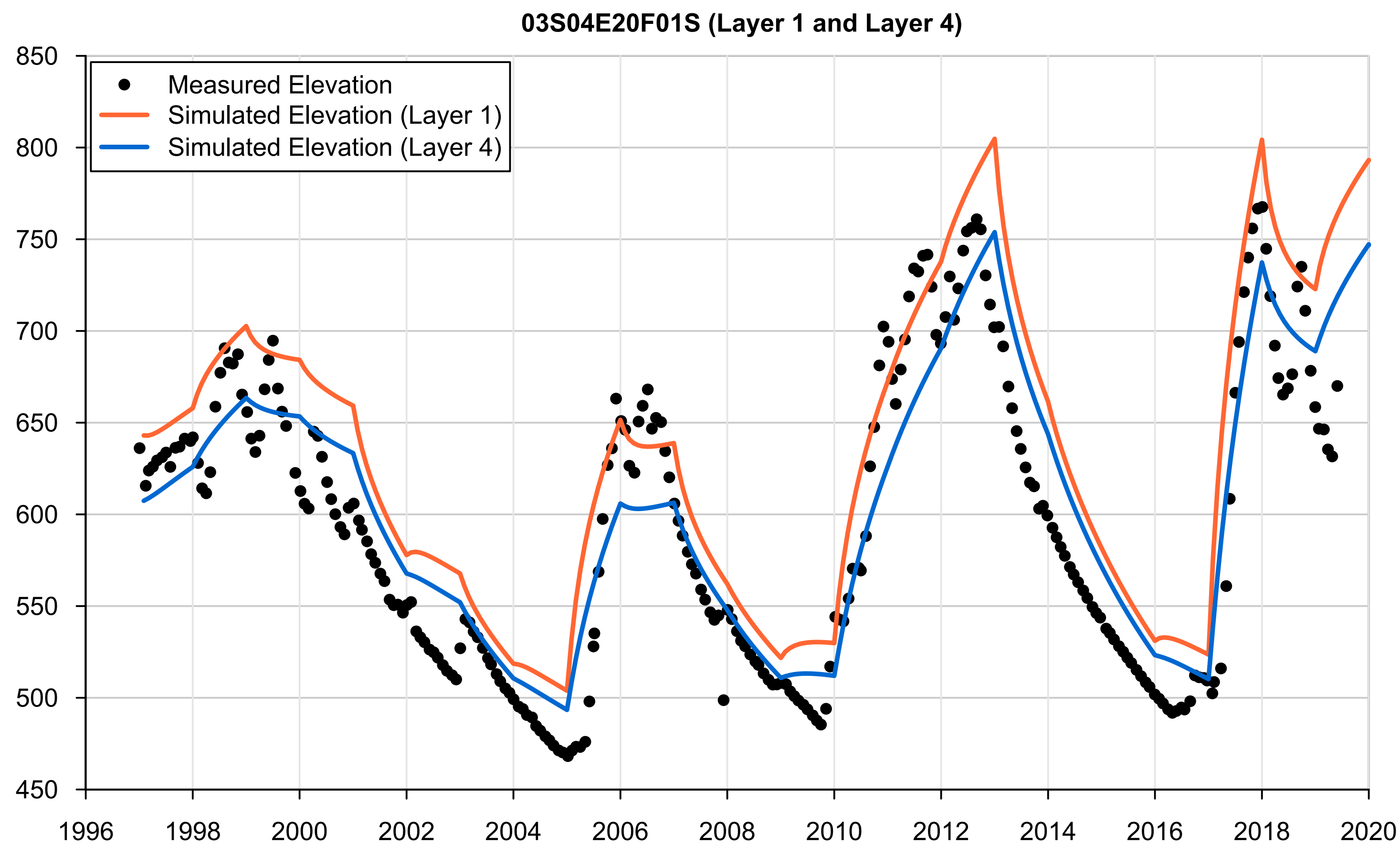
WOODARD & CURRAN

TODD GROUNDWATER

Appendix 7-A2
Groundwater Elevation Hydrograph
03S04E17K01S



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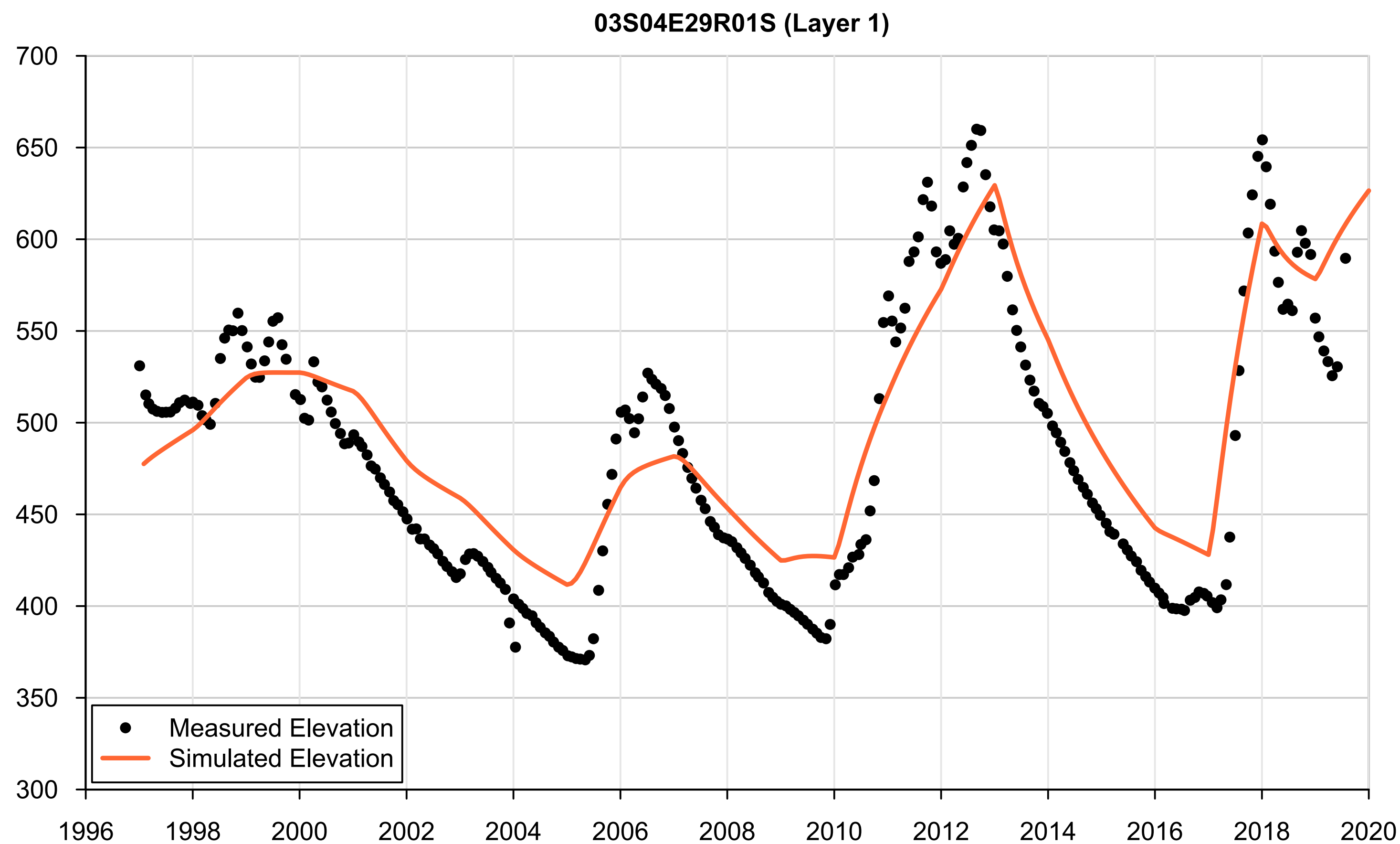
TODD GROUNDWATER

Appendix 7-A3
Groundwater Elevation Hydrograph
03S04E20F01S



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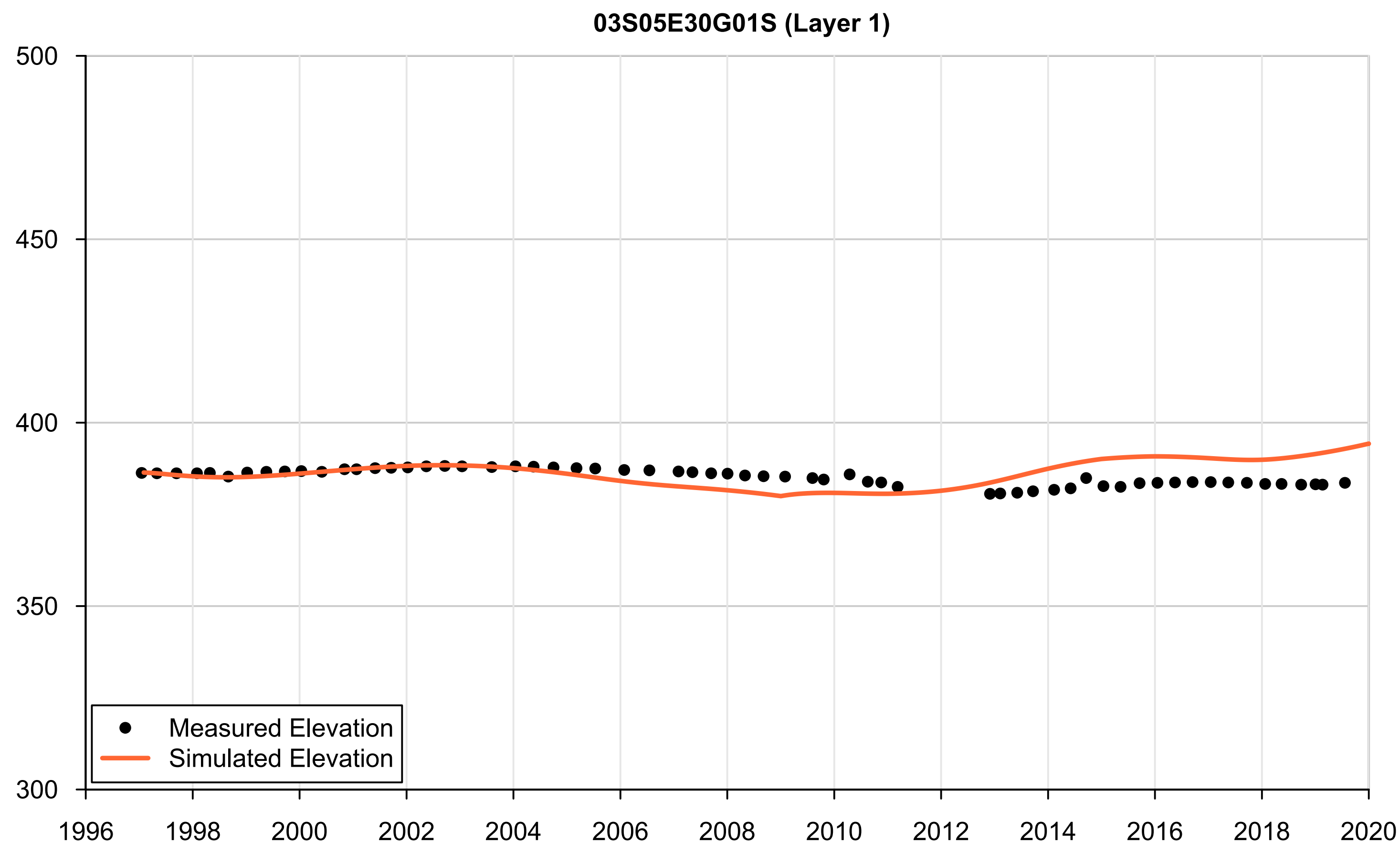
TODD GROUNDWATER

Appendix 7-A4
Groundwater Elevation Hydrograph
03S04E29R01S



WOODARD & CURRAN

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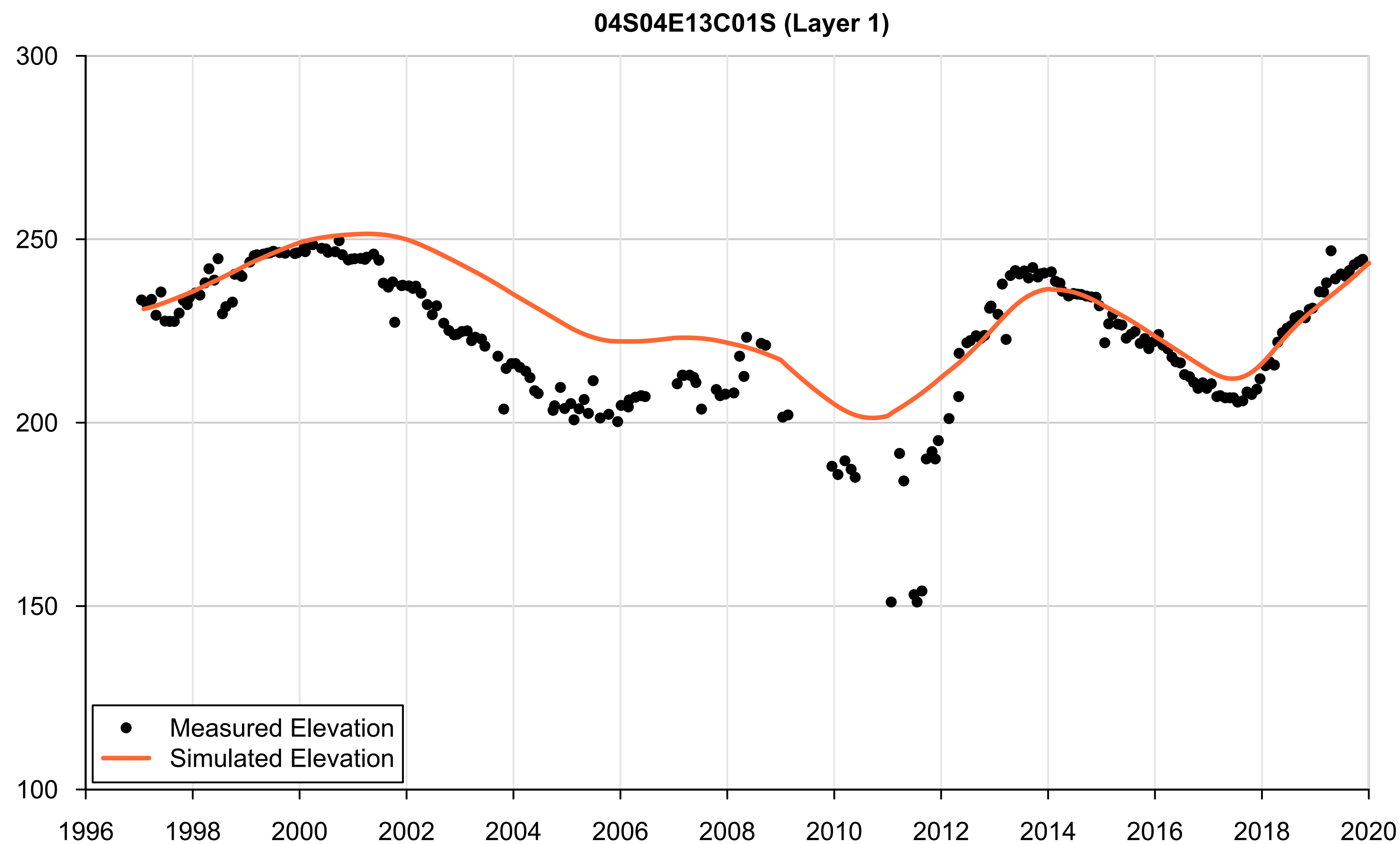
TODD GROUNDWATER

Appendix 7-A5
Groundwater Elevation Hydrograph
03S05E30G01S



WOODARD & CURRAN

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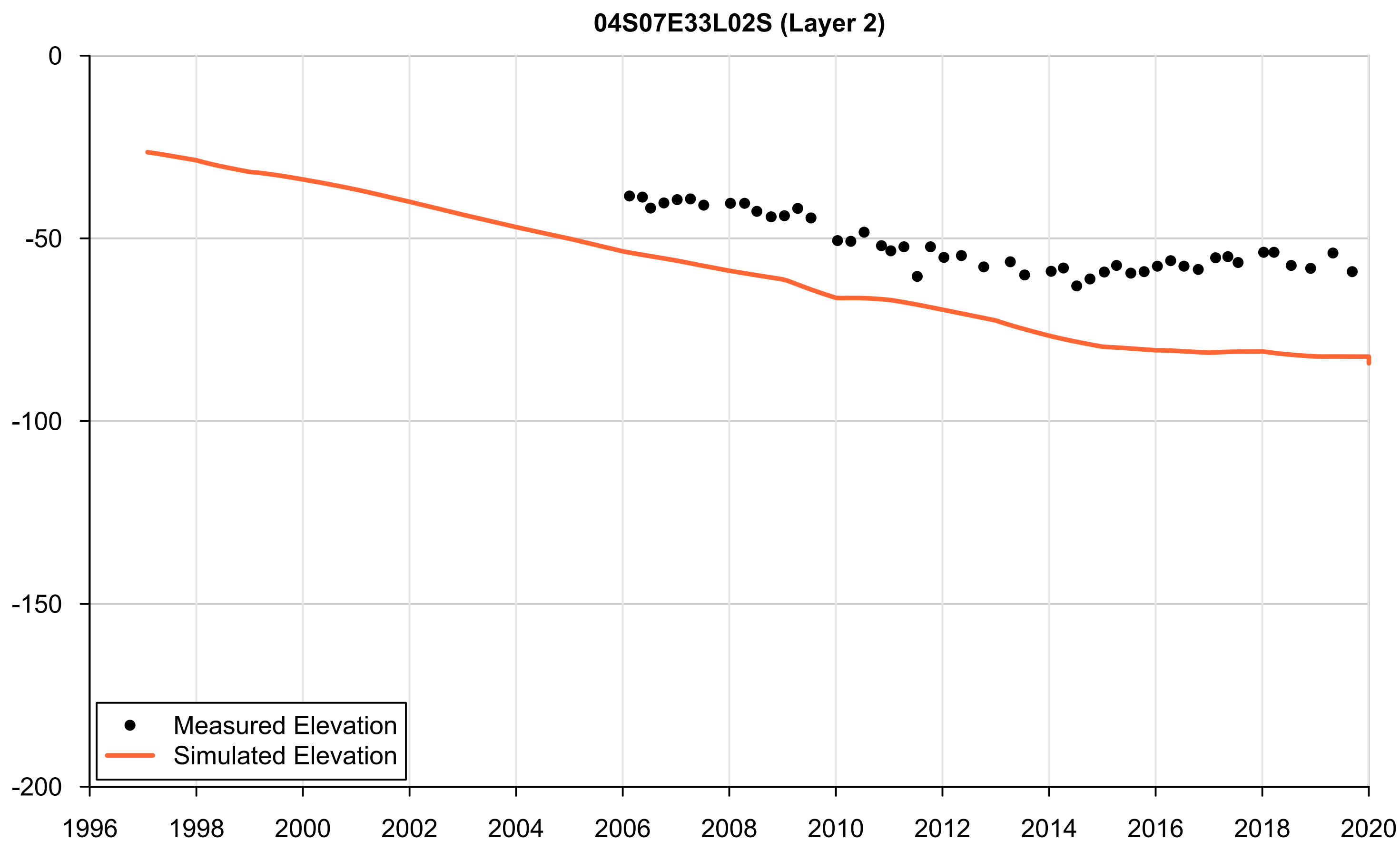
TODD GROUNDWATER

Appendix 7-A6
Groundwater Elevation Hydrograph
04S04E13C01S



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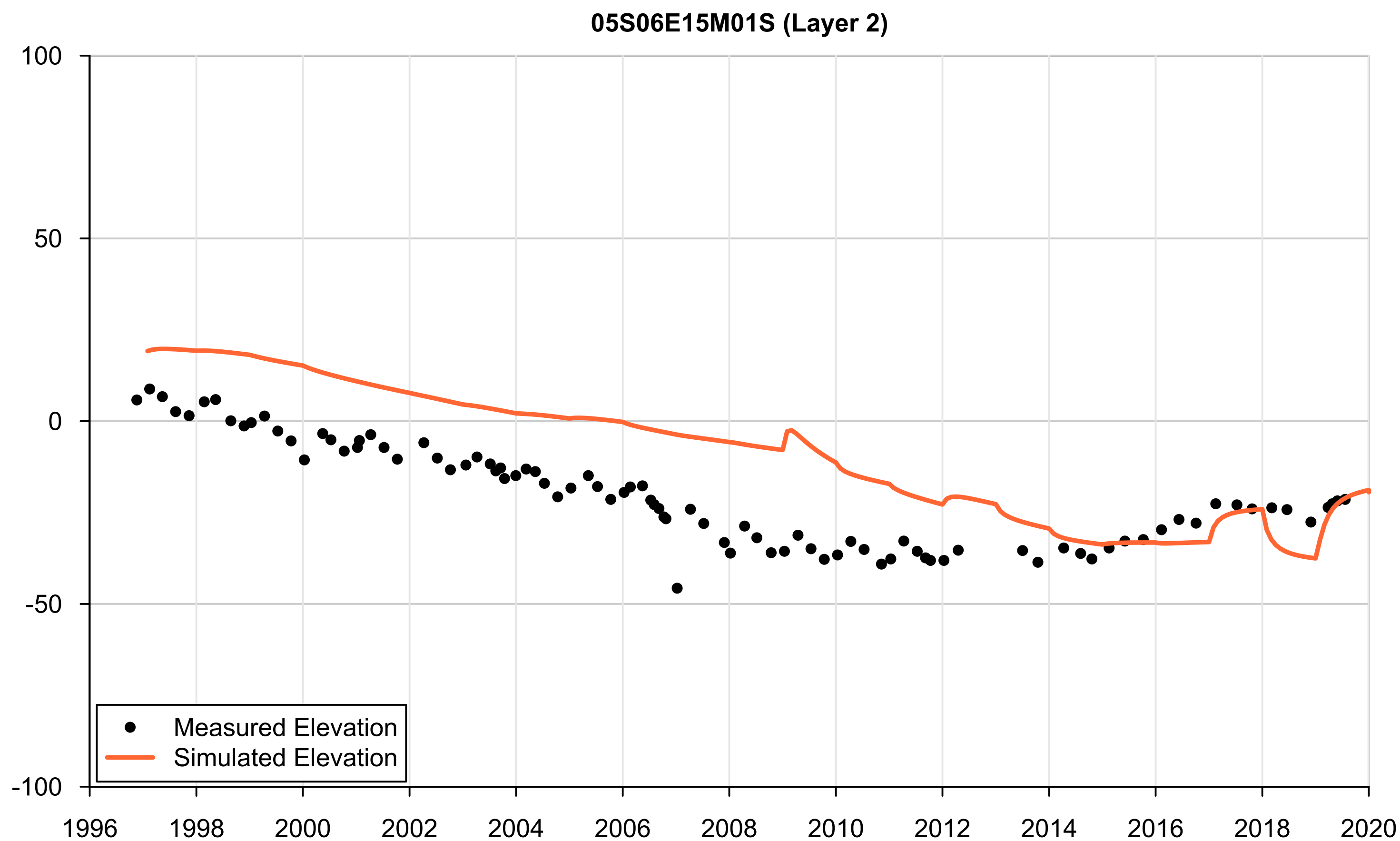
WOODARD & CURRAN

TODD GROUNDWATER

Appendix 7-A7
Groundwater Elevation Hydrograph
04S07E33L02S



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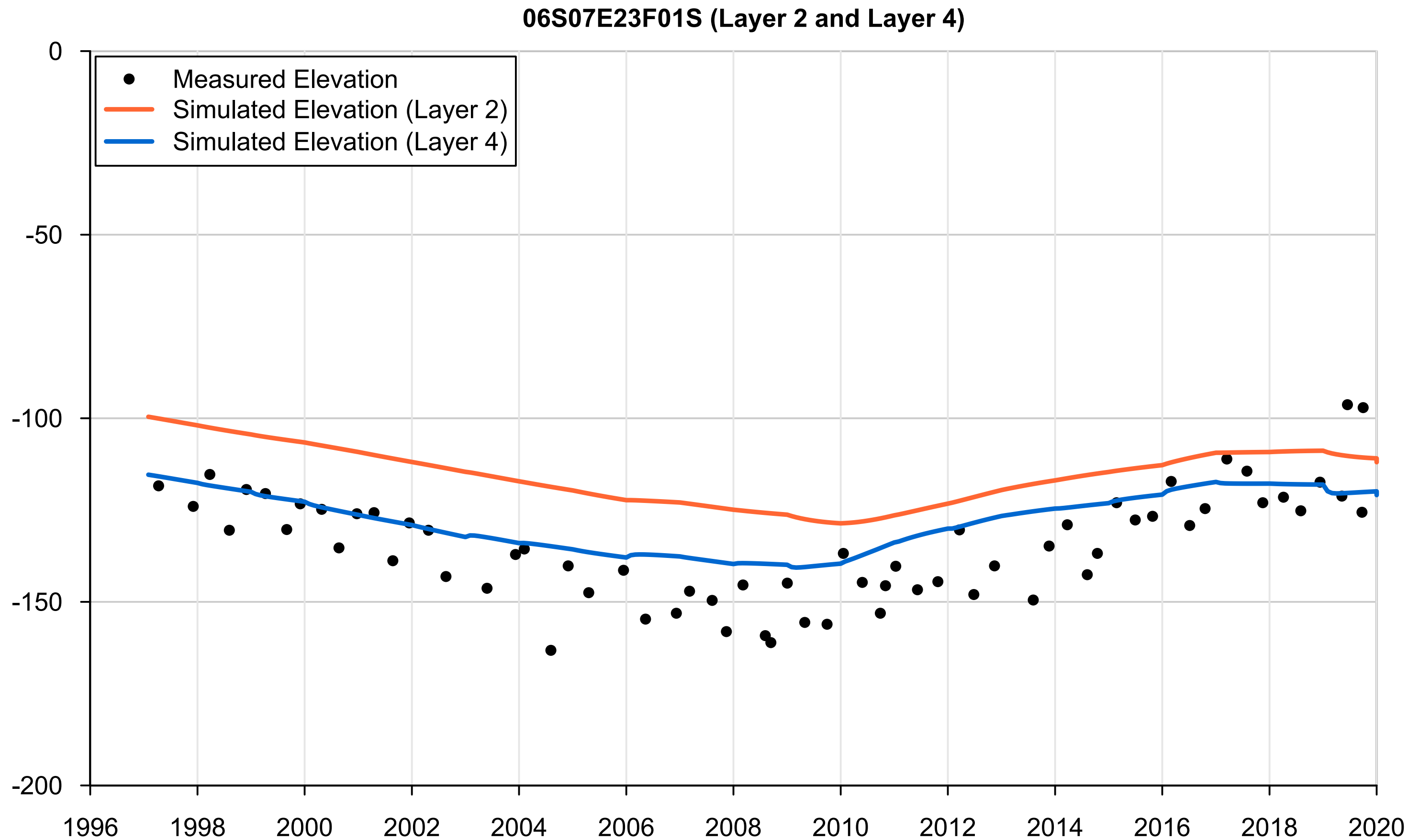
WOODARD &CURRAN

TODD GROUNDWATER

Appendix 7-A8
Groundwater Elevation Hydrograph
05S06E15M01S



WOODARD &CURRAN

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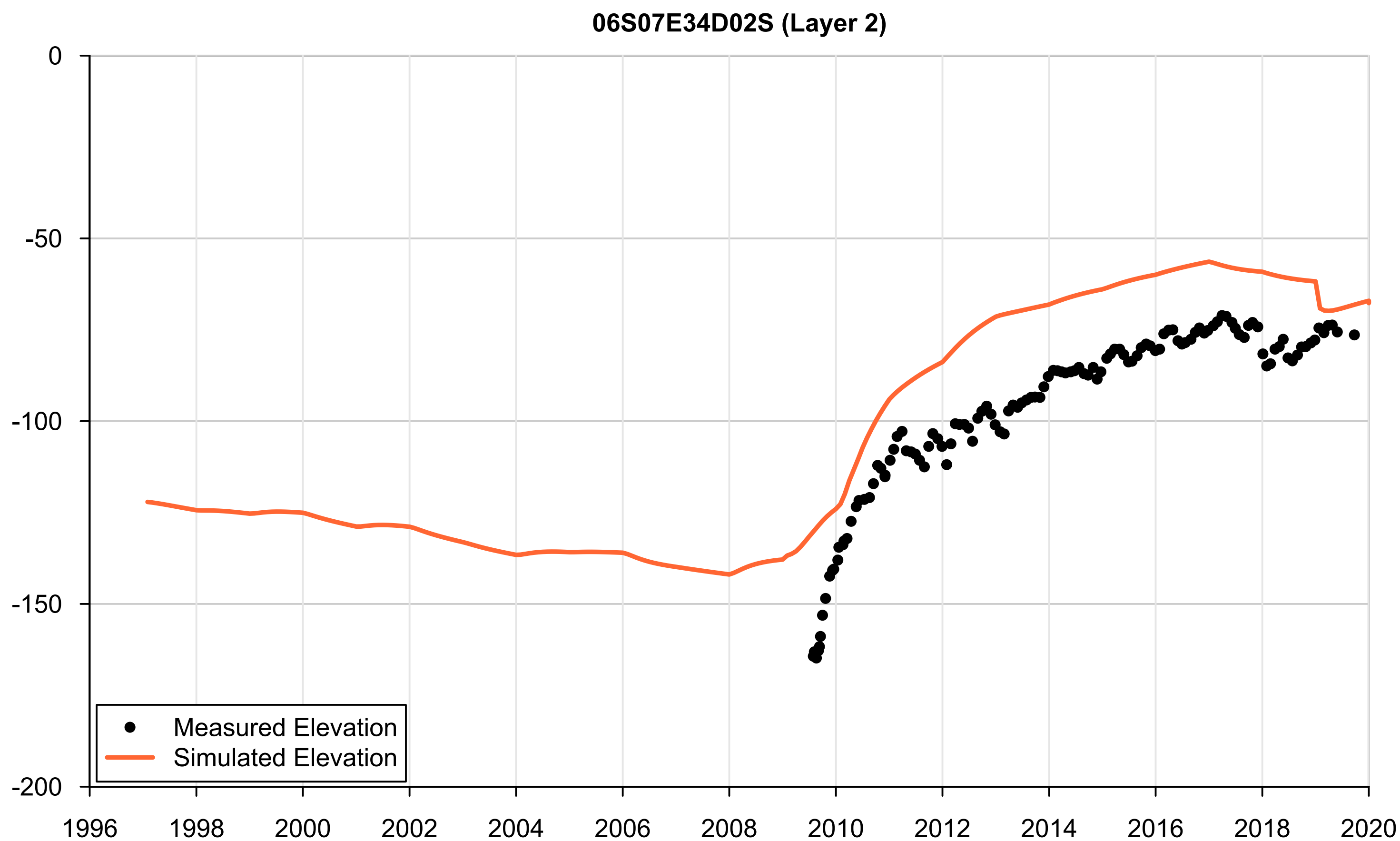
TODD GROUNDWATER

Appendix 7-A9
Groundwater Elevation Hydrograph
06S07E23F01S



WOODARD & CURRAN

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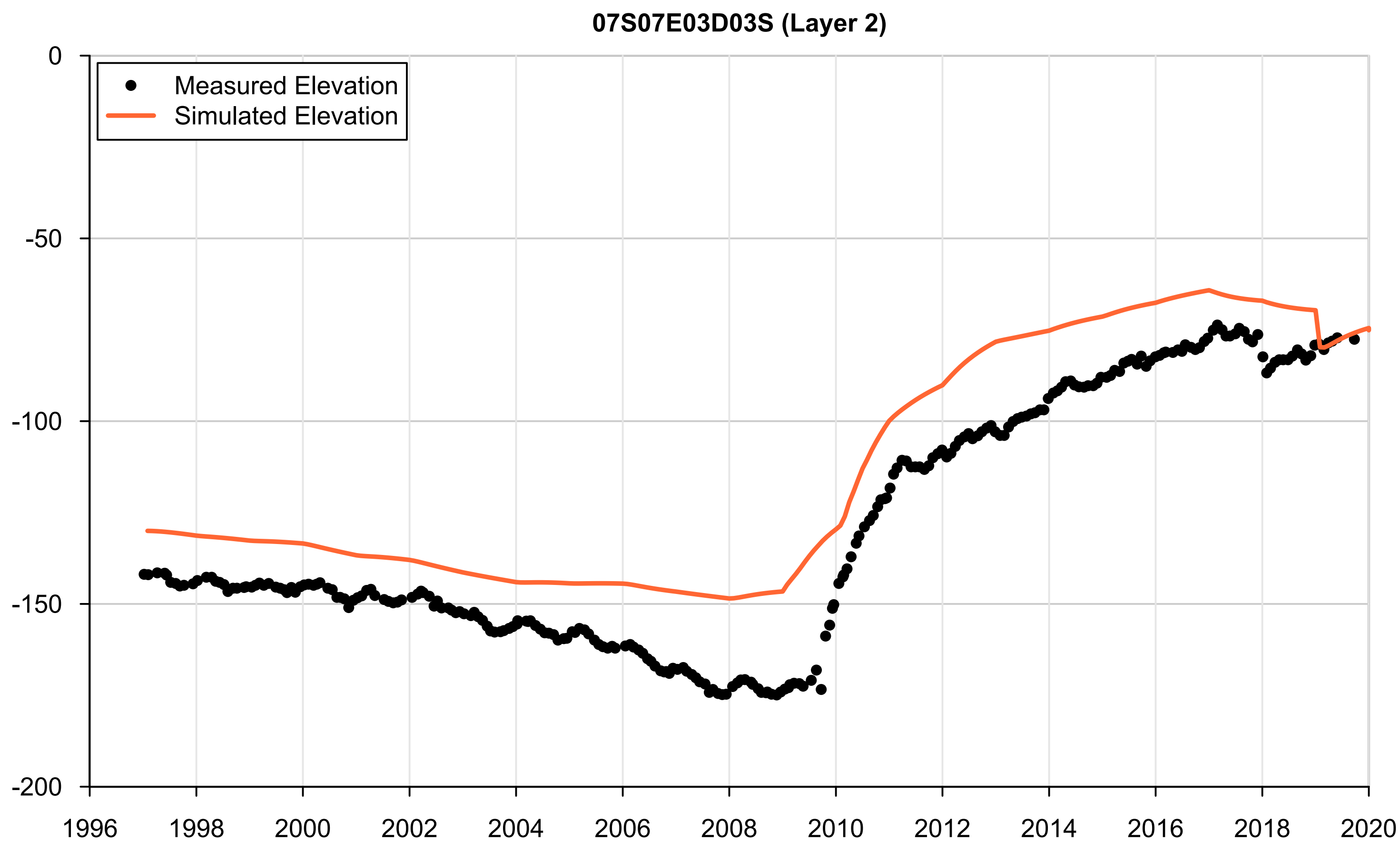
TODD GROUNDWATER

Appendix 7-A10
Groundwater Elevation Hydrograph
06S07E34D02S



WOODARD & CURRAN

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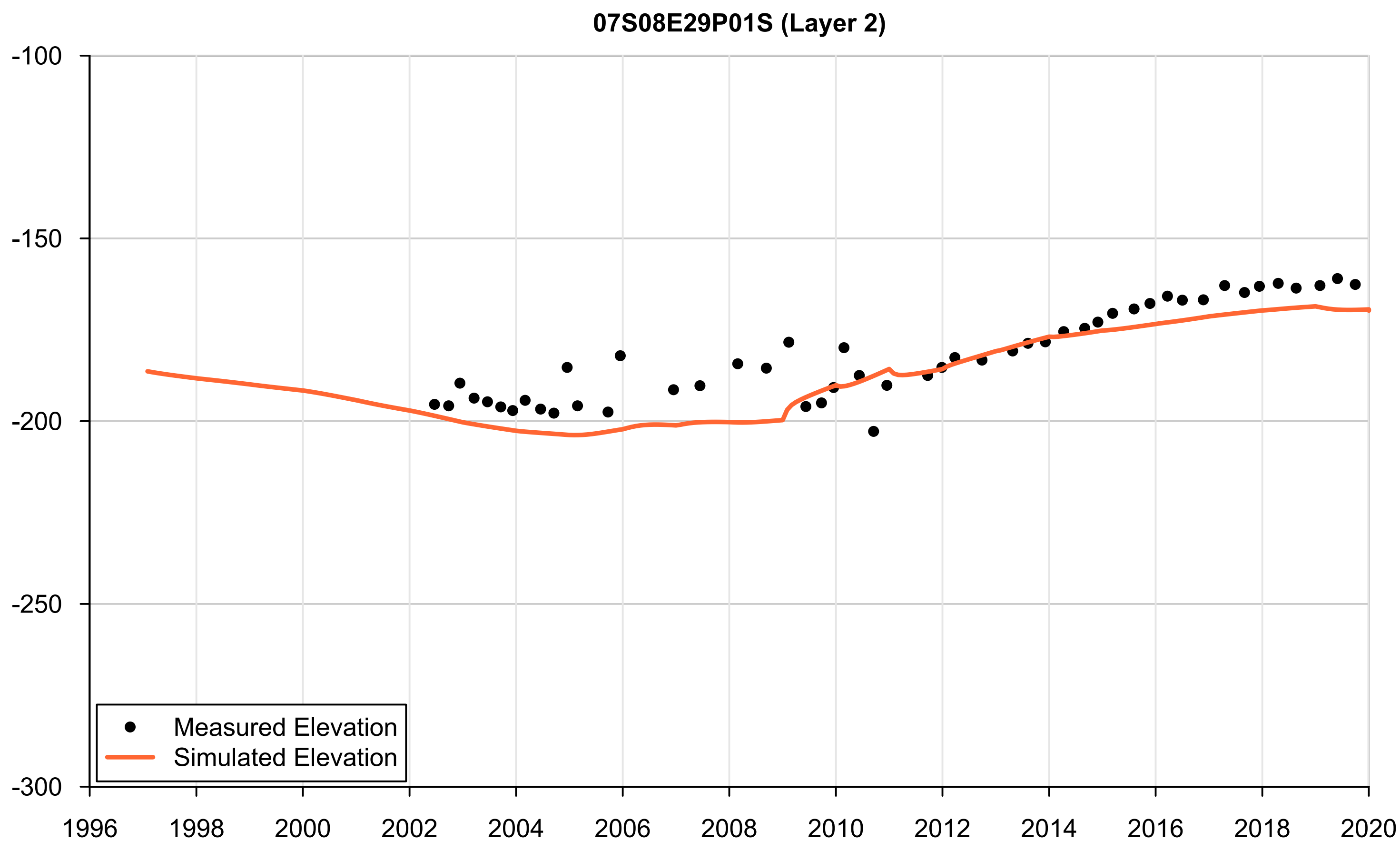
TODD GROUNDWATER

Appendix 7-A11
Groundwater Elevation Hydrograph
07S07E03D03S



WOODARD & CURRAN

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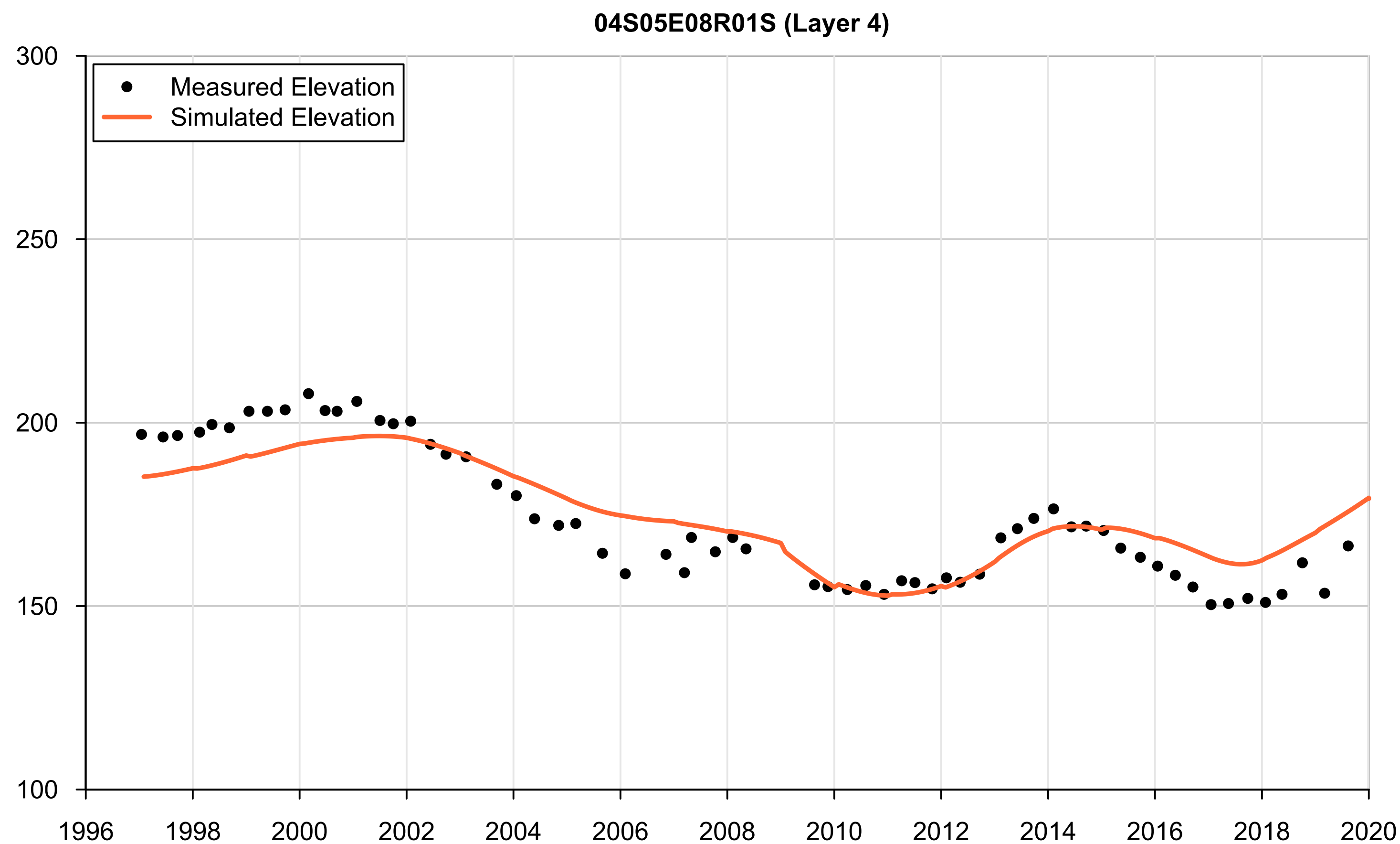
TODD GROUNDWATER

Appendix 7-A12
Groundwater Elevation Hydrograph
07S08E29P01S



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WOODARD & CURRAN

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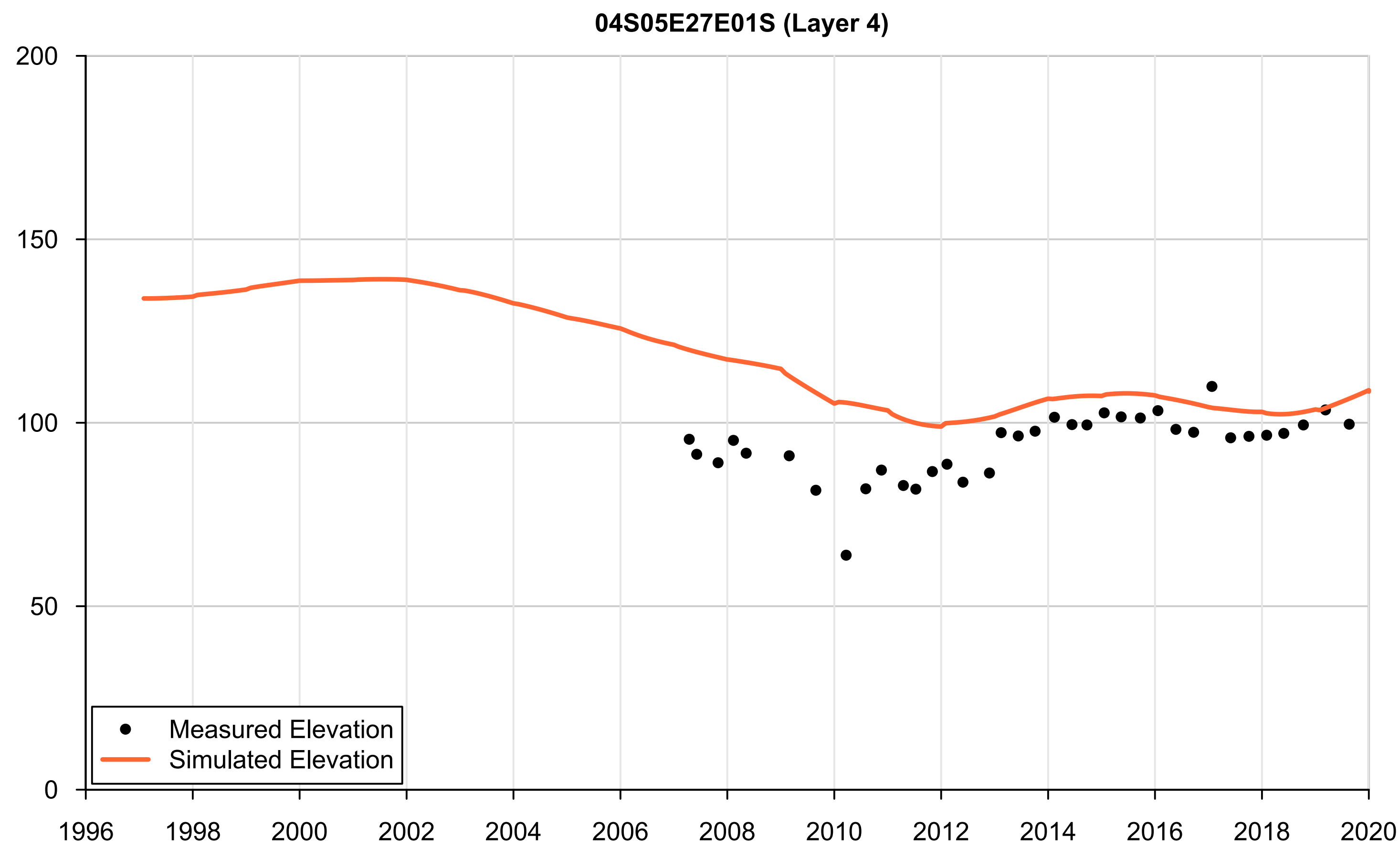
TODD GROUNDWATER

Appendix 7-A13
Groundwater Elevation Hydrograph
04S05E08R01S



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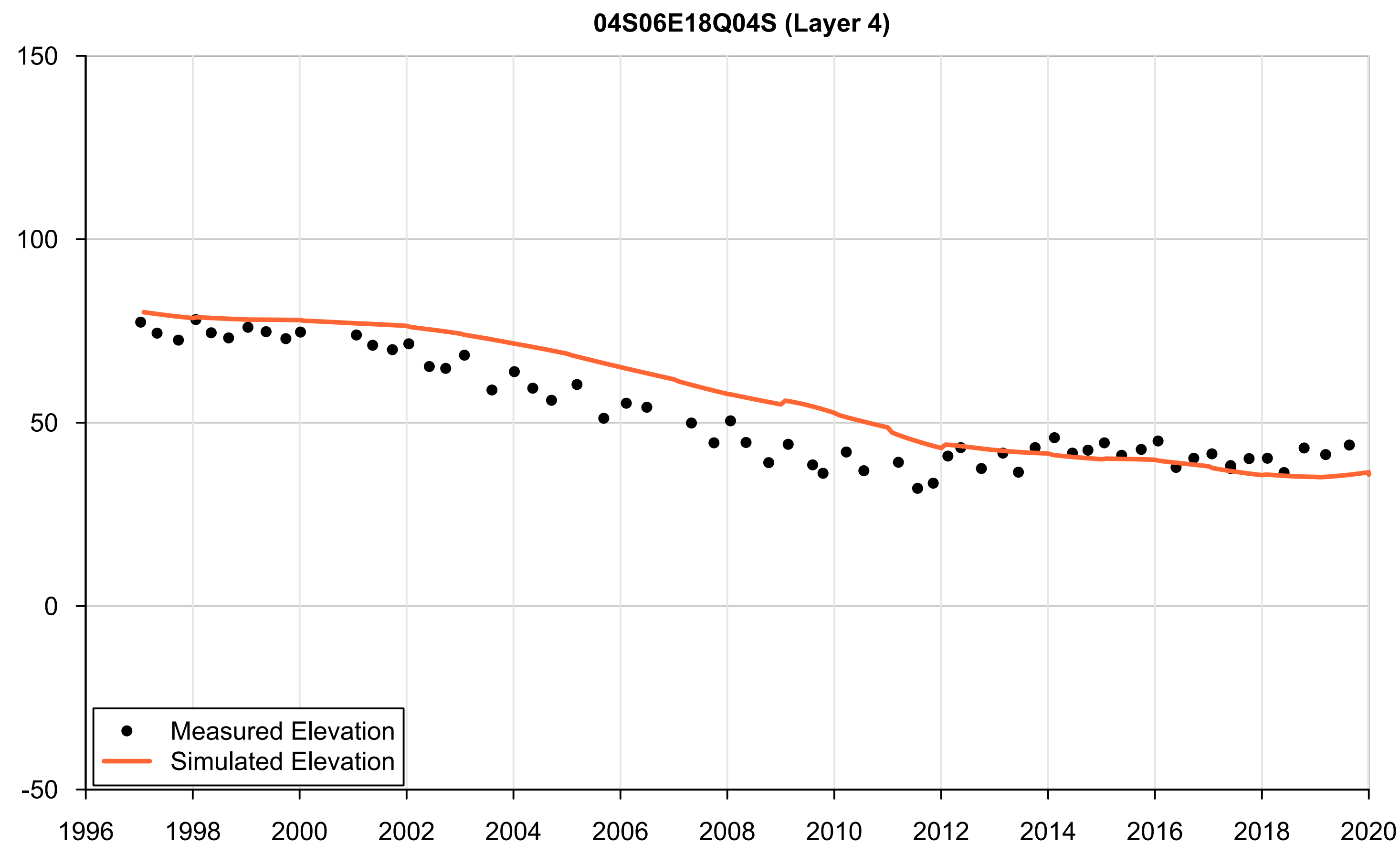
WOODARD &CURRAN

TODD GROUNDWATER

Appendix 7-A14
Groundwater Elevation Hydrograph
04S05E27E01S



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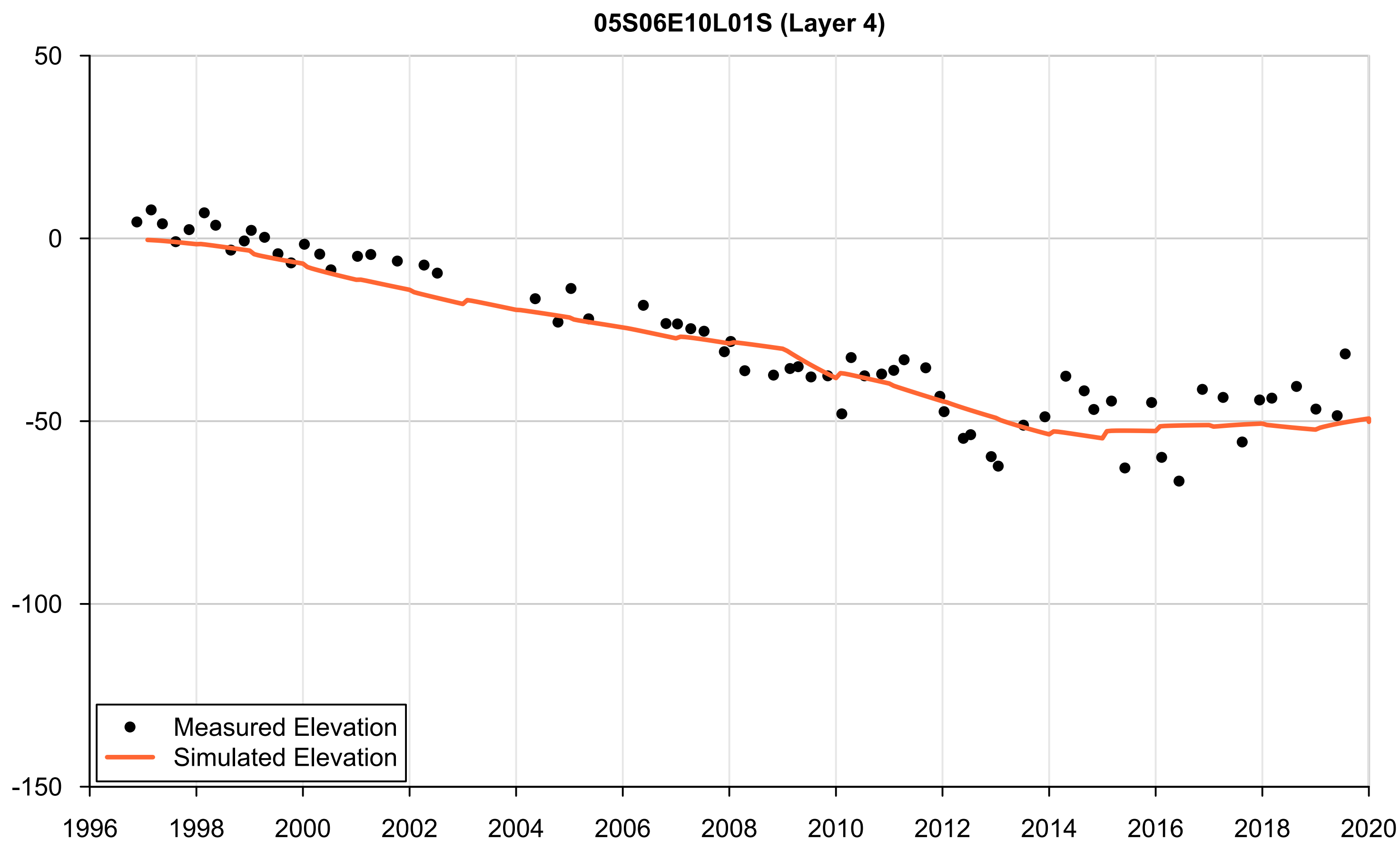
TODD GROUNDWATER

Appendix 7-A15
Groundwater Elevation Hydrograph
04S06E18Q04S



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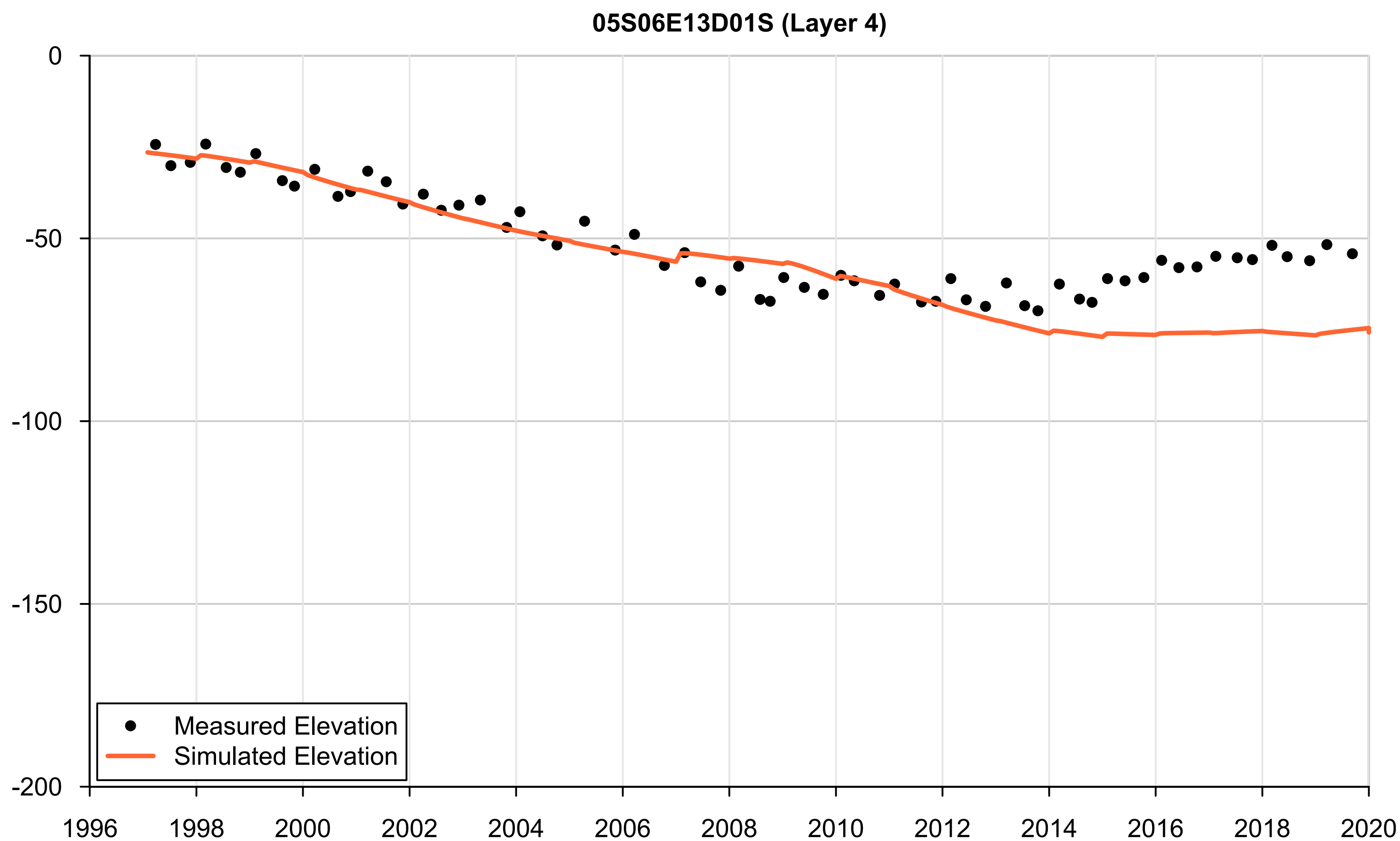
TODD GROUNDWATER

Appendix 7-A16
Groundwater Elevation Hydrograph
05S06E10L01S



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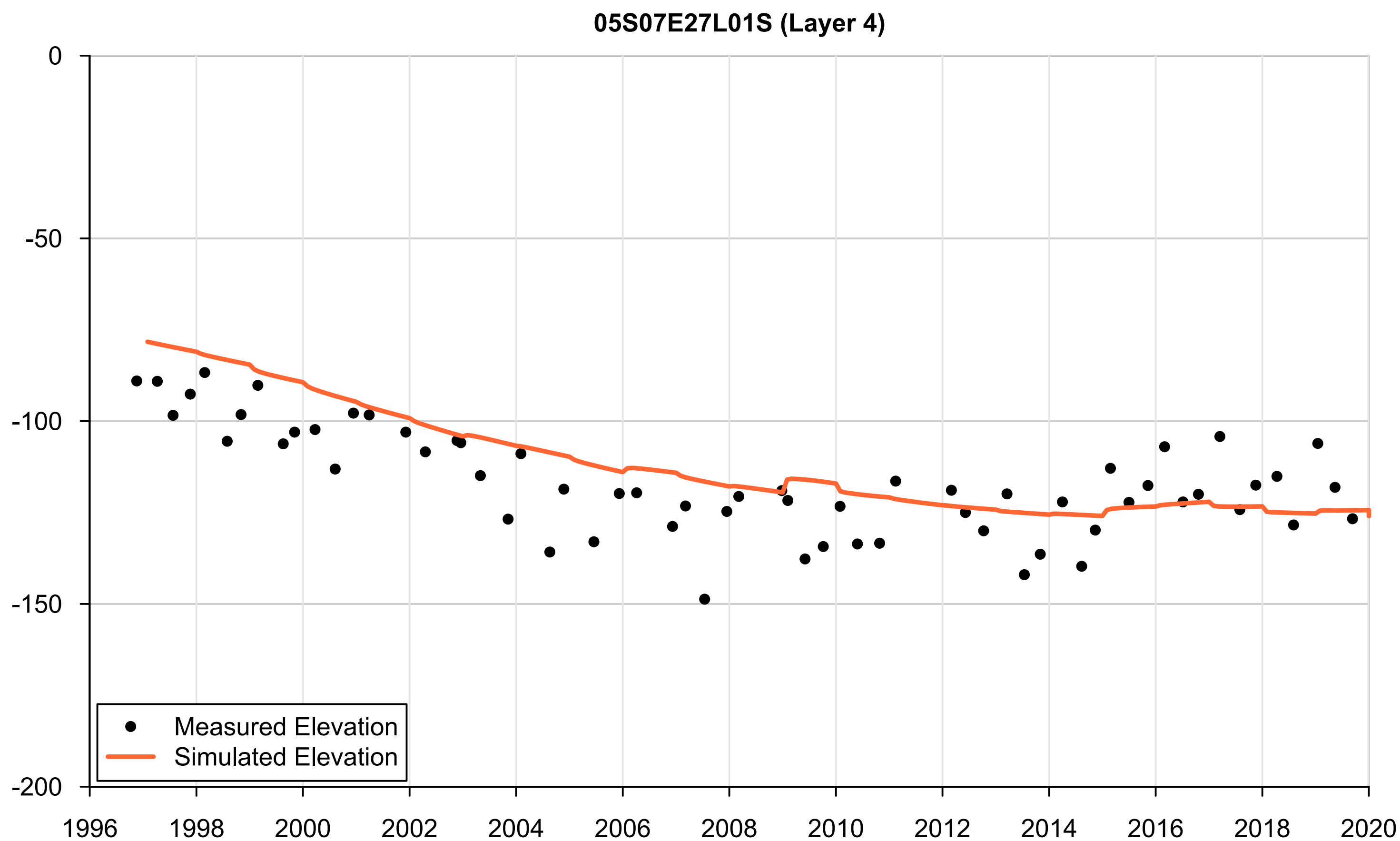
TODD GROUNDWATER

Appendix 7-A17
Groundwater Elevation Hydrograph
05S06E13D01S



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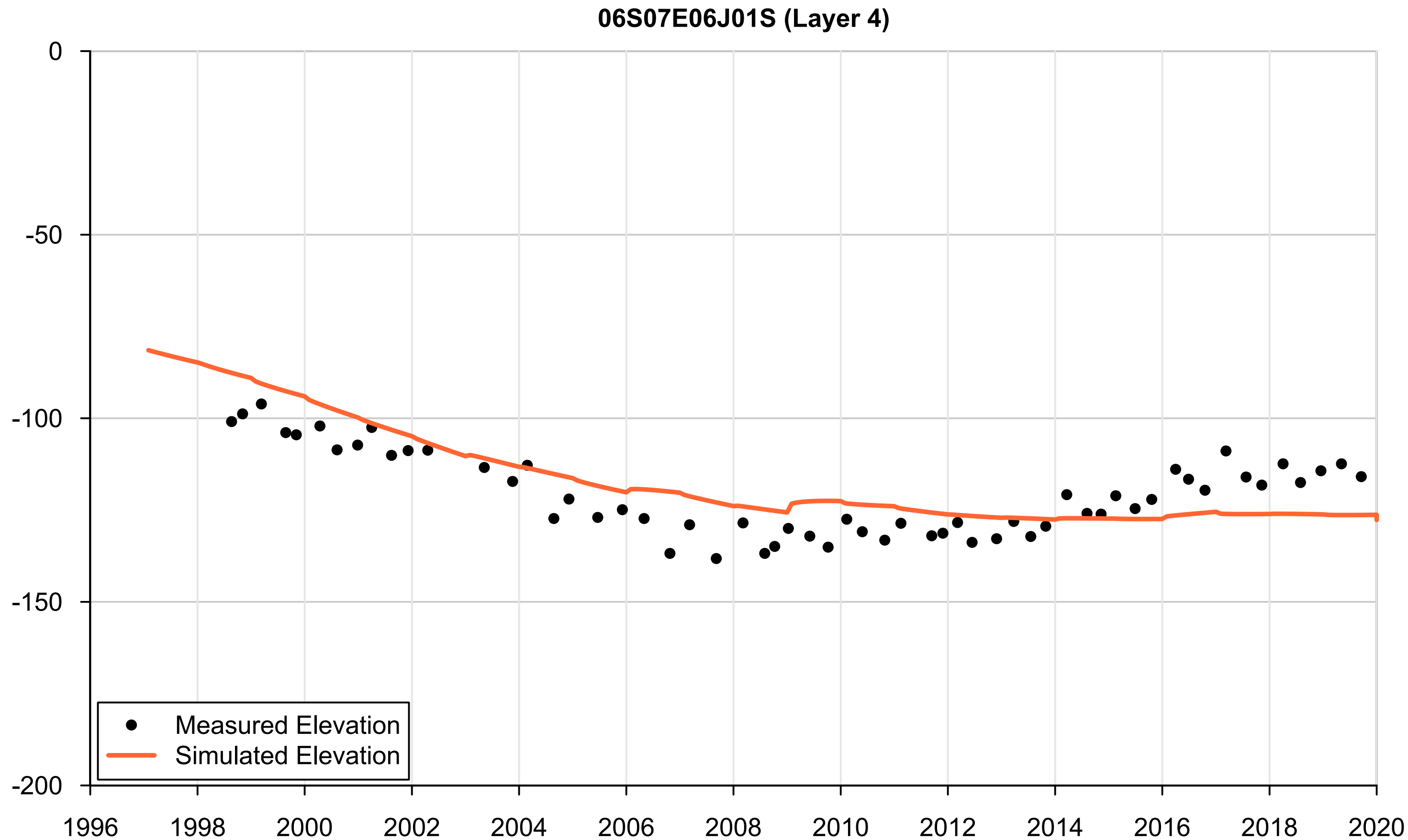
TODD GROUNDWATER

Appendix 7-A18
Groundwater Elevation Hydrograph
05S07E27L01S



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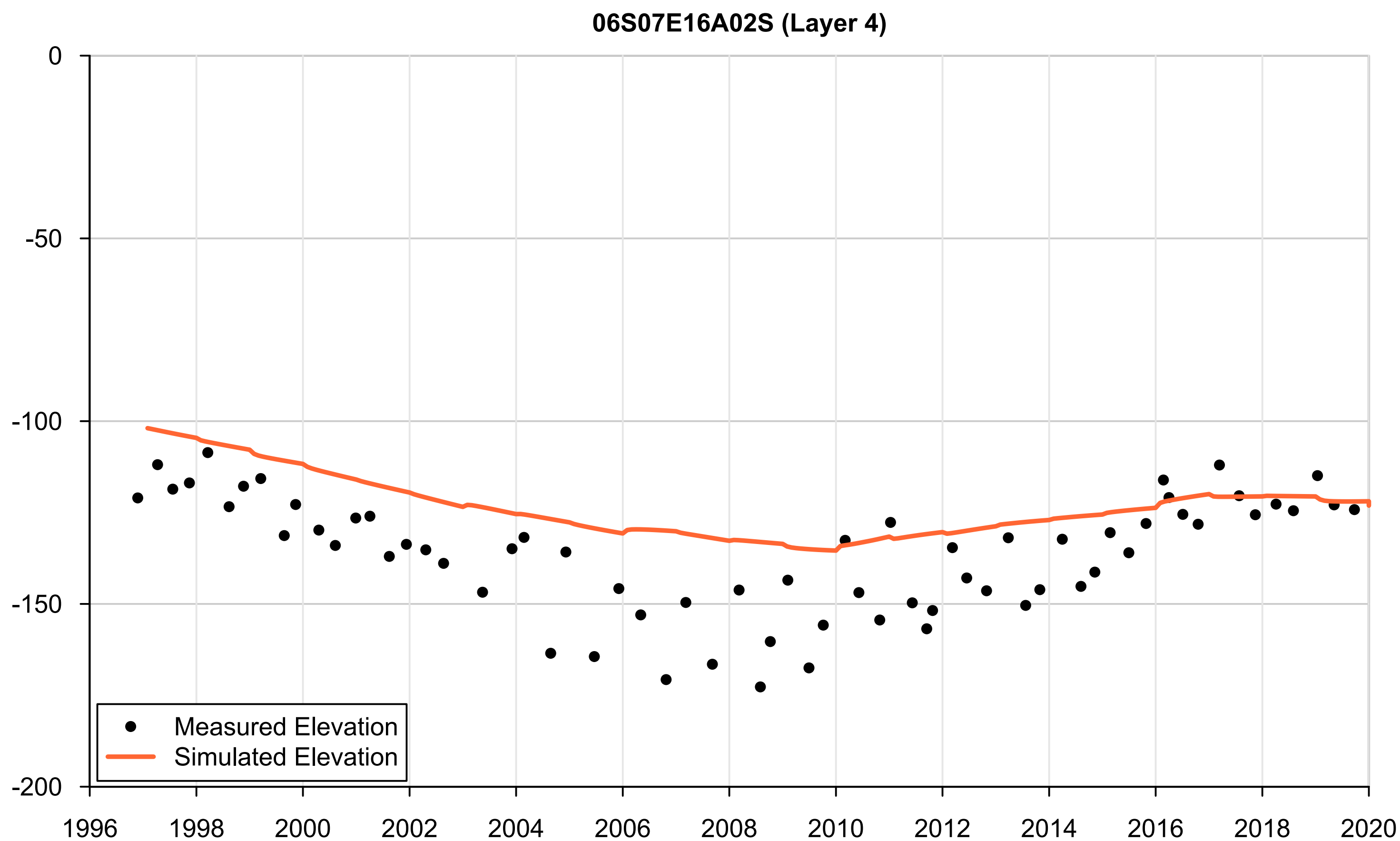
TODD GROUNDWATER

Appendix 7-A19
Groundwater Elevation Hydrograph
06S07E06J01S



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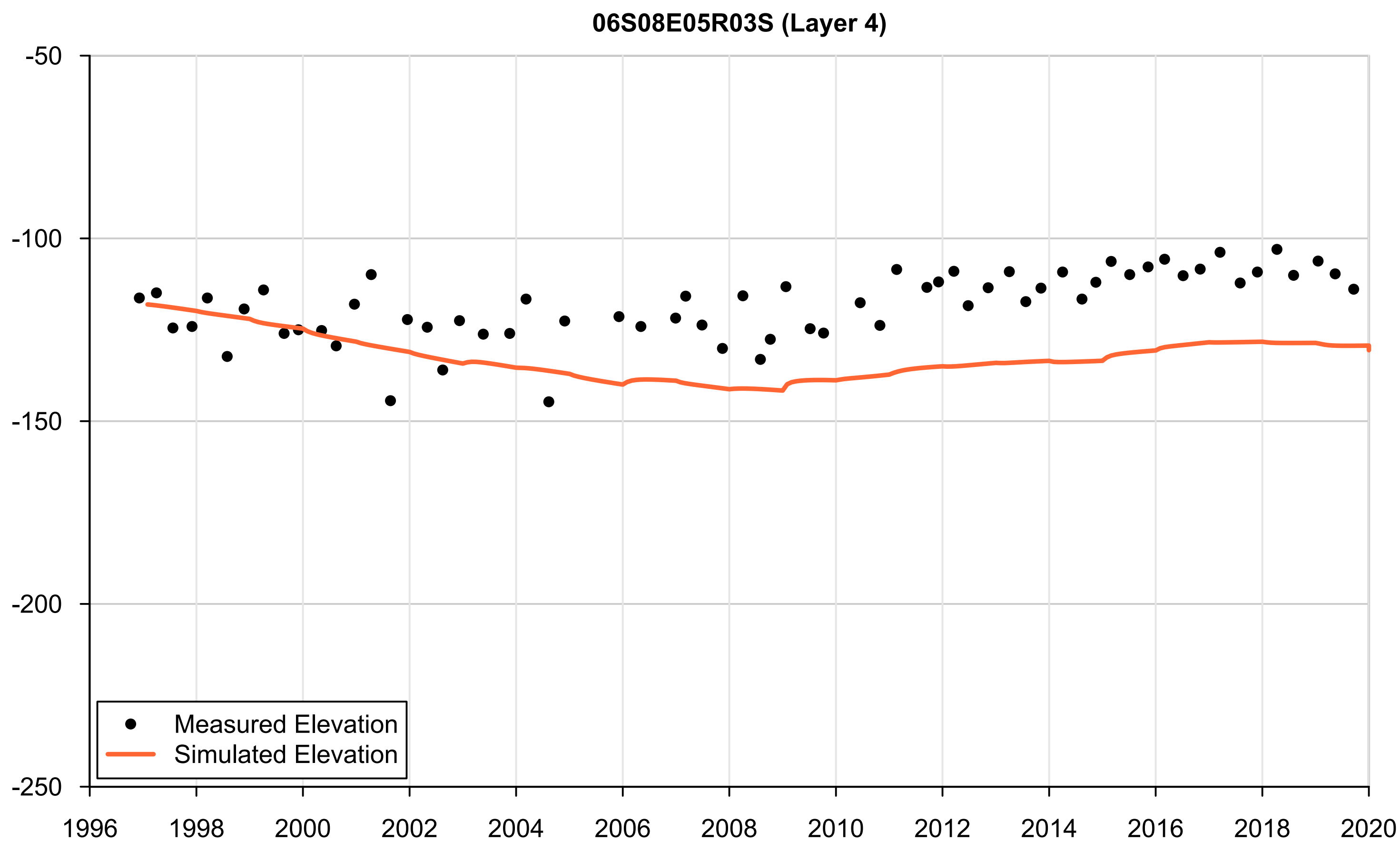
WOODARD & CURRAN

TODD GROUNDWATER

Appendix 7-A20
Groundwater Elevation Hydrograph
06S07E16A02S



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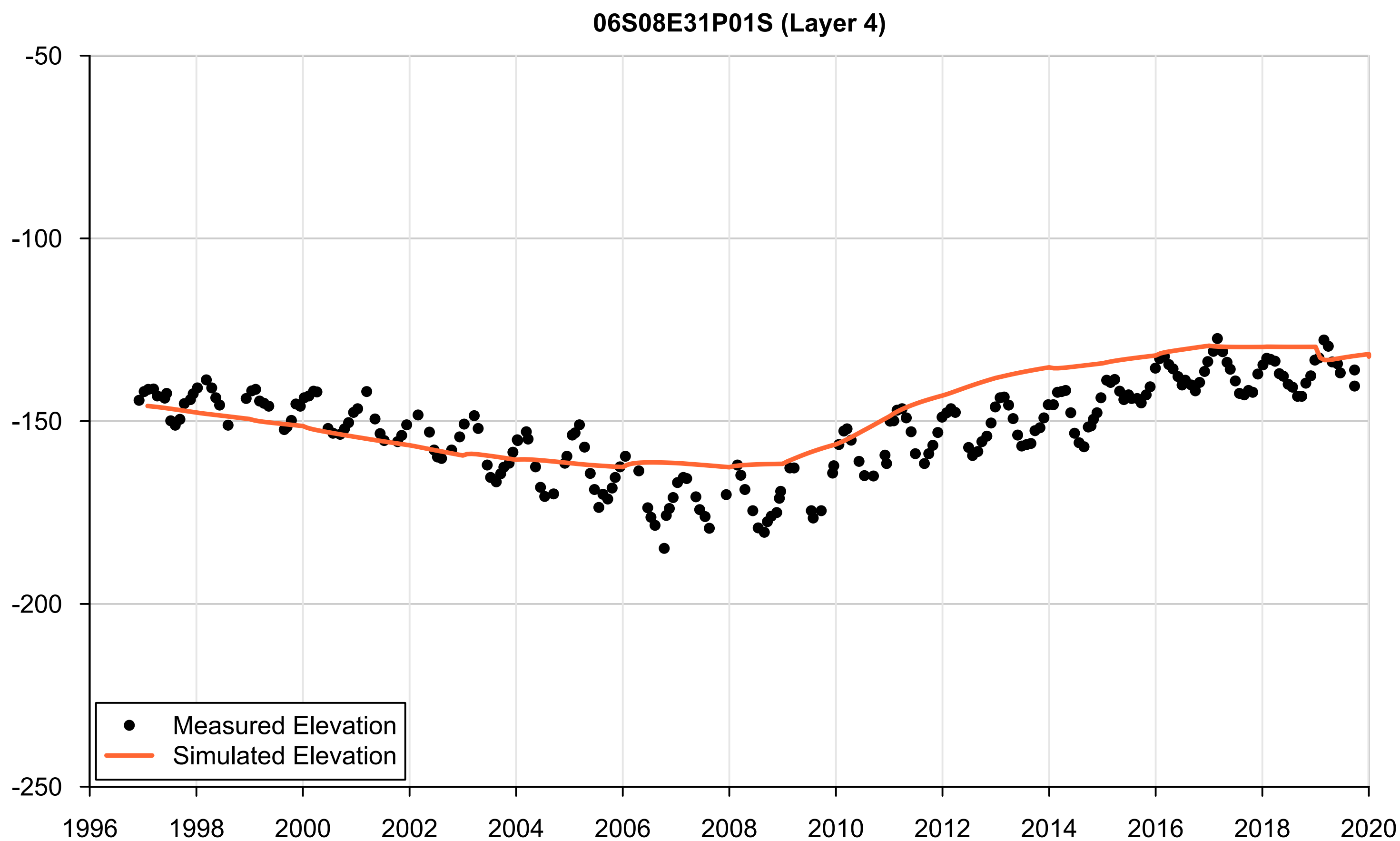
TODD GROUNDWATER

Appendix 7-A21
Groundwater Elevation Hydrograph
06S08E05R03S



WOODARD & CURRAN

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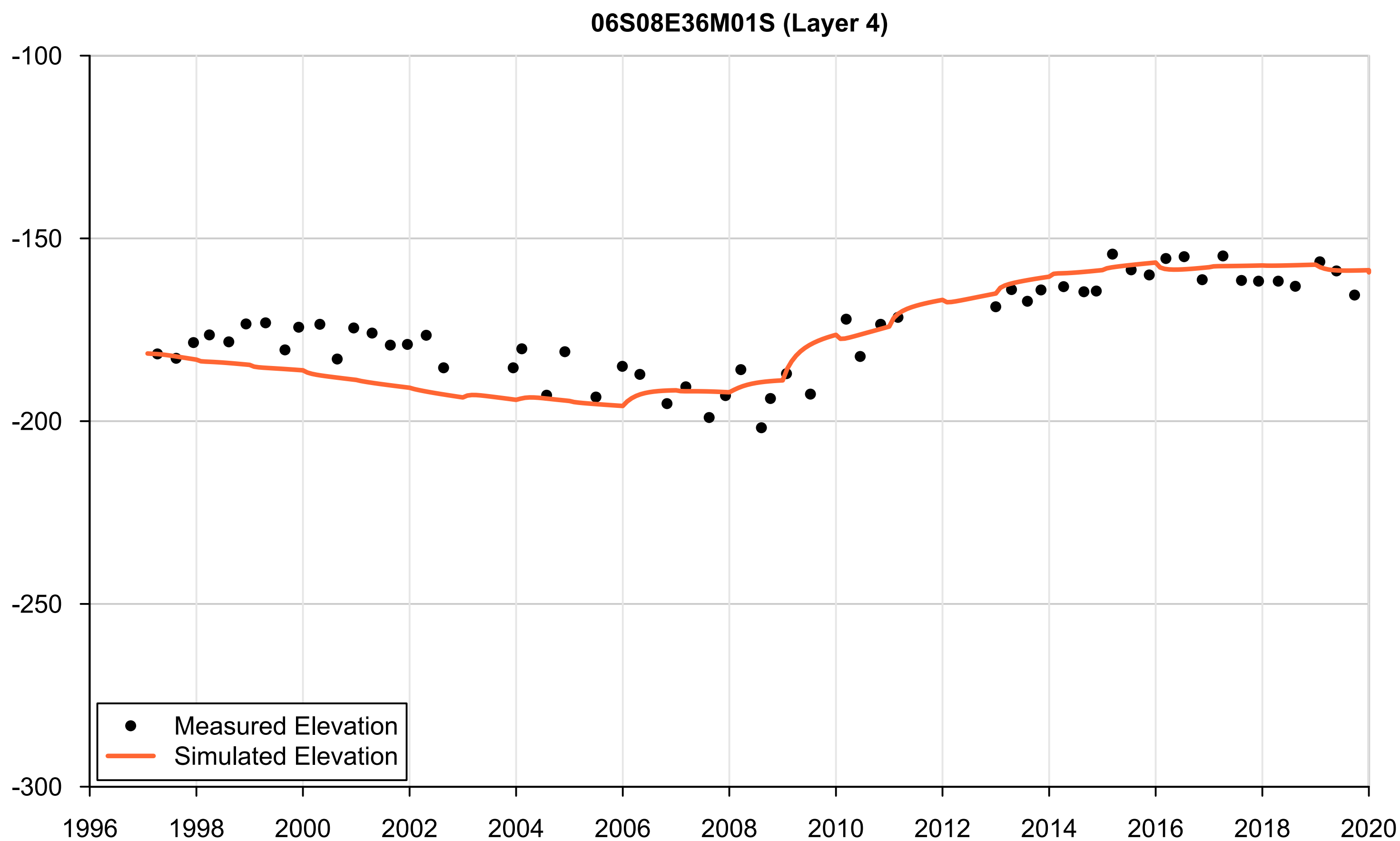
TODD GROUNDWATER

Appendix 7-A22
Groundwater Elevation Hydrograph
06S08E31P01S



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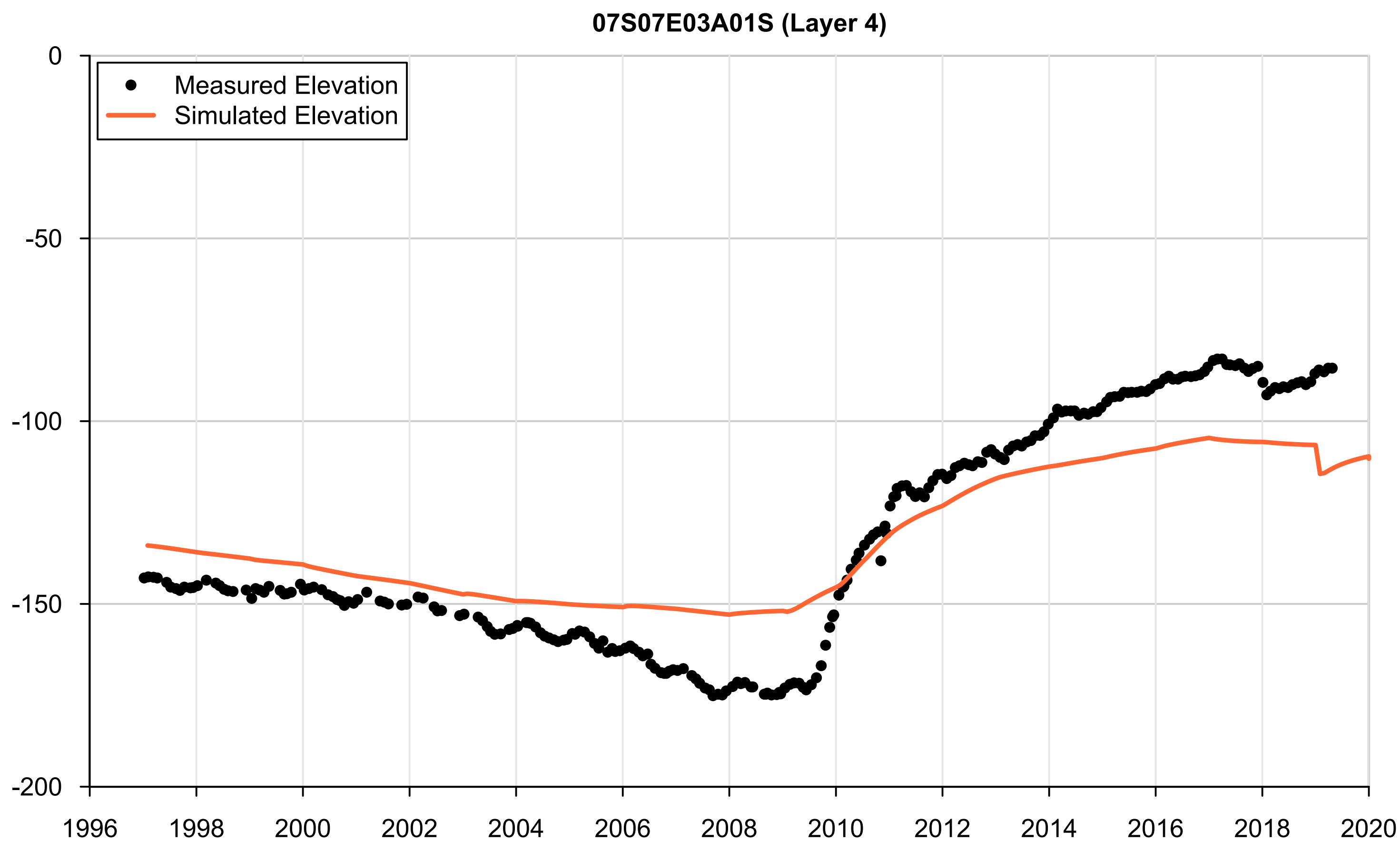
TODD GROUNDWATER

Appendix 7-A23
Groundwater Elevation Hydrograph
06S08E36M01S



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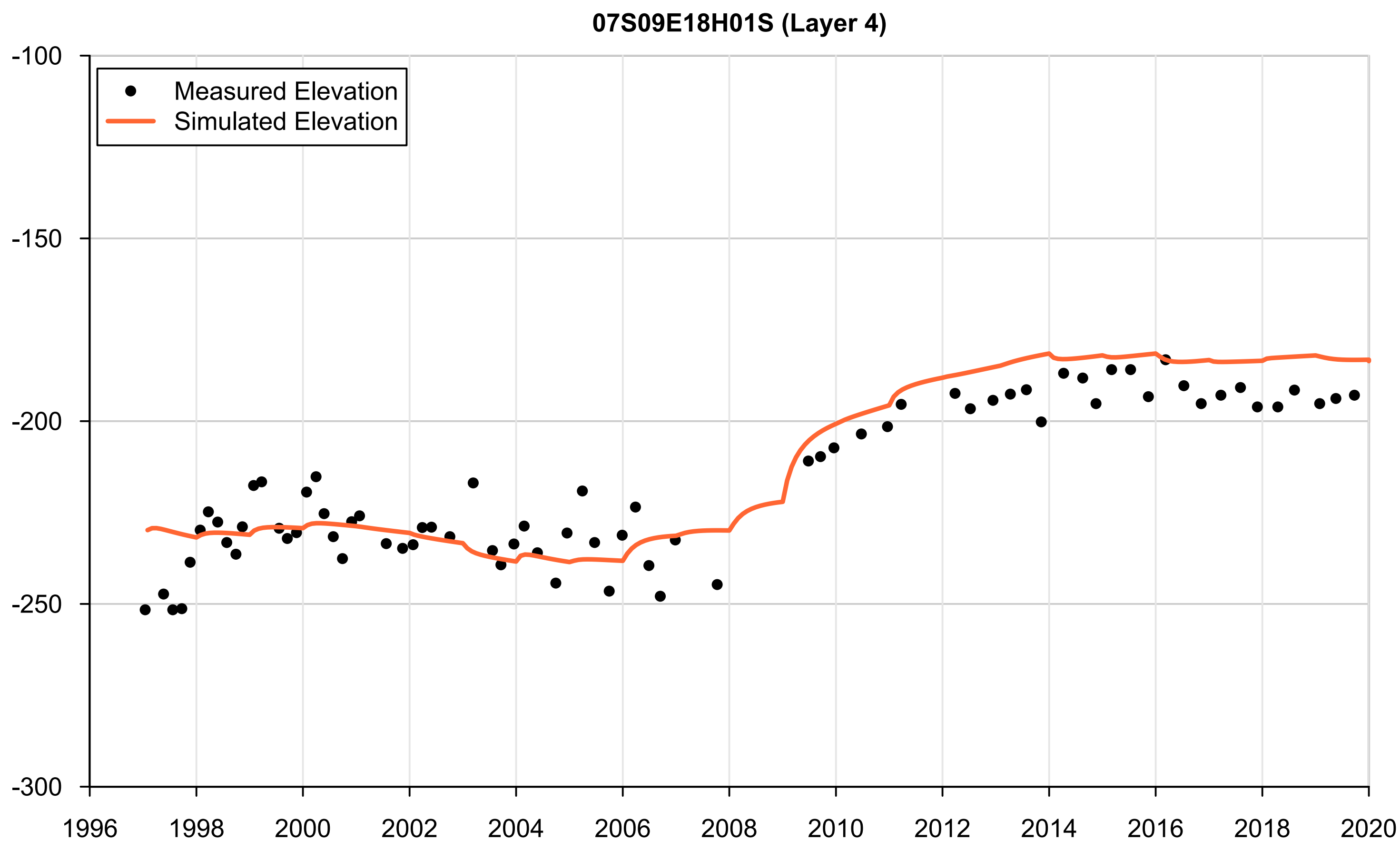
TODD GROUNDWATER

Appendix 7-A24
Groundwater Elevation Hydrograph
07S07E03A01S



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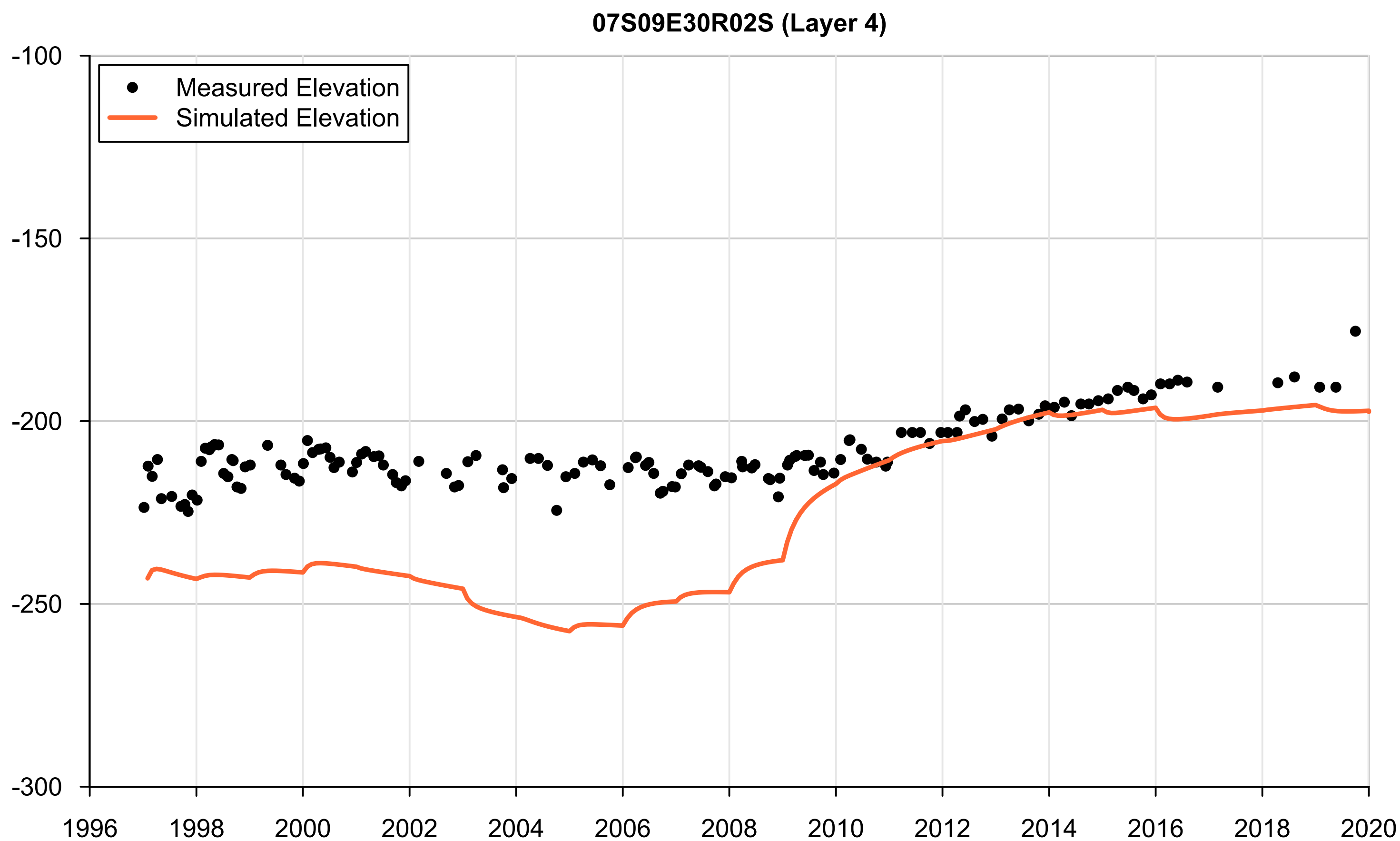
TODD GROUNDWATER

Appendix 7-A25
Groundwater Elevation Hydrograph
07S09E18H01S



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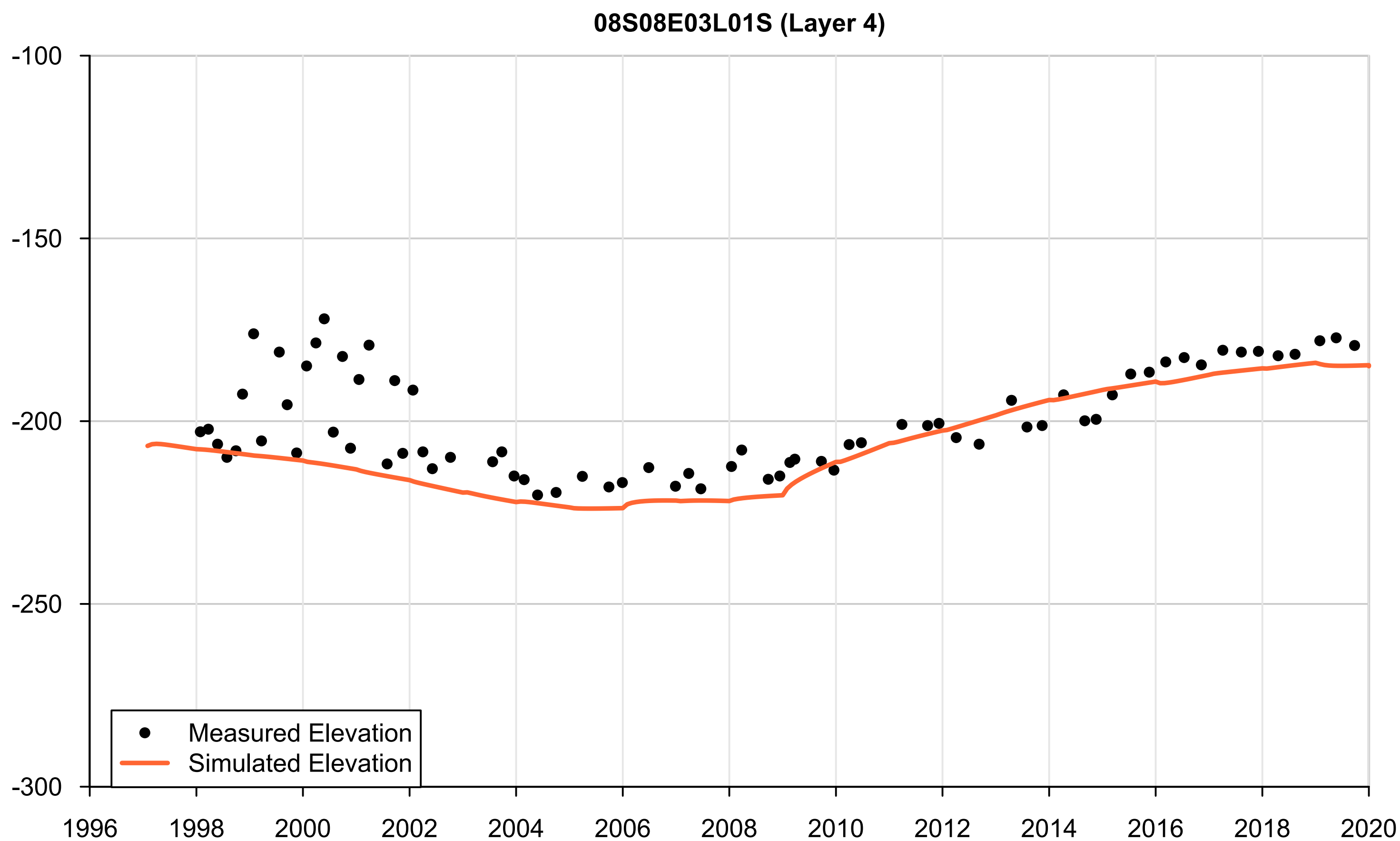
TODD GROUNDWATER

Appendix 7-A26
Groundwater Elevation Hydrograph
07S09E30R02S



WOODARD & CURRAN

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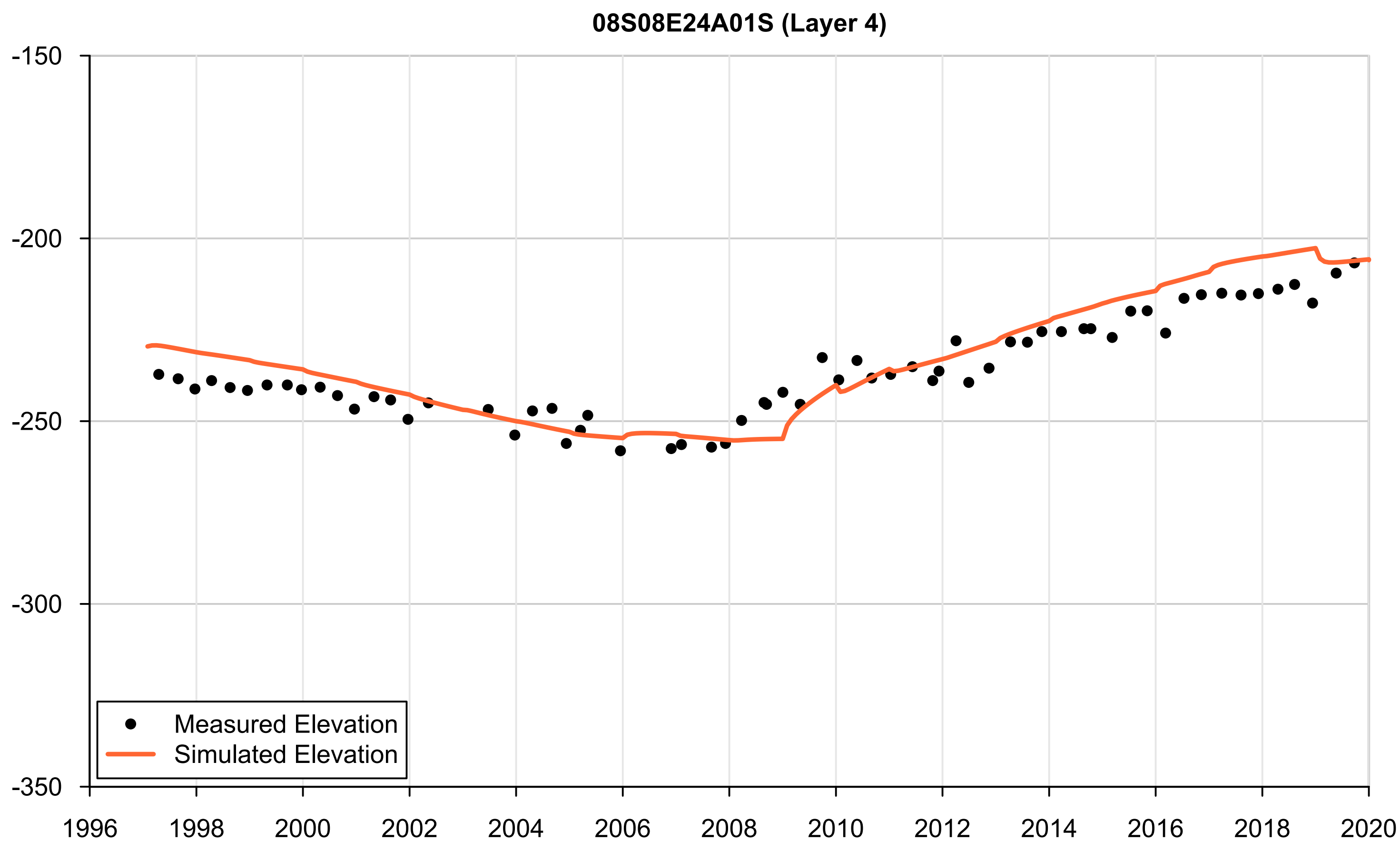
TODD GROUNDWATER

Appendix 7-A27
Groundwater Elevation Hydrograph
08S08E03L01S



WOODARD & CURRAN

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TODD GROUNDWATER

Appendix 7-A28
Groundwater Elevation Hydrograph
08S08E24A01S

APPENDIX 7-B
ADDITIONAL FUTURE PLAN SCENARIOS

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APPENDIX 7-B – ADDITIONAL FUTURE PLAN SCENARIOS

Scenarios for the *Alternative Plan Update* were developed based on potential future water supply conditions. These may change as the result of land development, source substitution projects, or new water supply projects. Four categories of planning conditions were established – Baseline (No New Projects), Five-Year Plan, Future Projects, and Expanded Agriculture. For each of the four categories, one Plan scenario assumed historical hydrology and a second assumed climate change conditions. Each scenario was simulated over a 50-year period consistent with SGMA requirements. However, the planning assumptions were only projected for the first 25 years to the 2045 planning horizon. Thereafter, growth and project assumptions were assumed to continue at the same rate for the second 25 years of the simulation.

While extending beyond foreseeable land use and water resource planning projections, the second 25-year projections allow long-term evaluation of water supply and demand conditions, effectively testing Indio Subbasin sustainability under long-term hydrologic variability over 50 years.

A total of eight scenarios were analyzed during the planning process. The Baseline and four climate change scenarios are included in Chapter 7, *Numerical Model and Plan Scenarios*. The following description includes only the four scenarios without climate change.

1. **Baseline (No New Projects):** No new supply or management projects or changes to historical hydrology. This scenario is described for comparison purposes only and will never happen, because new projects are in the process of being implemented. However, a baseline is useful to assess the other scenarios.
2. **Five-Year Plan:** Baseline conditions plus supply and management projects included in the GSA agencies' five-year capital improvement plans (CIPs).
3. **Future Projects:** Five-Year Plan conditions plus implementation of additional supply and management projects that are projected to be completed in the 25-year planning horizon.
4. **Expanded Agriculture:** Future Projects conditions plus expansion of agriculture resulting in increased water demands.

1. BASELINE (NO NEW PROJECTS)

The Baseline scenario includes only those supplies and facilities currently in place to support Indio Subbasin management and assumes that no new projects or water supplies will be implemented. The Baseline propagates current conditions into the future to use as a basis for comparing 'with and without' future project conditions. Figure 1 provides a flow chart that shows the water balance (inflows and outflows) of the Subbasin under Baseline assumptions, as well as the supplies used to meet demands. Table 1 provides a summary of Baseline supplies used to directly meet demand and Table 2 provides a summary of supplies used for replenishment. Supply inputs used for the model (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, and watershed runoff) and groundwater pumping are derived from the MODFLOW model. A summary of the assumptions for each supply source is provided below.

The Baseline scenario assumes passive conservation savings, surface water diversions, and GRF operations will continue to be implemented, along with potable water and sewer consolidations.

Table 1. Baseline (No New Projects) Scenario – Modeled Deliveries for Direct Use (AFY)

Supply (Acre-Feet)	2020	2025	2030	2035	2040	2045
Groundwater[a]	296,089	308,643	321,483	334,169	344,092	353,244
Colorado River[b]	285,337	284,818	282,419	280,771	279,370	277,969
Recycled Water	13,397	13,397	13,397	13,397	13,397	13,397
Total Direct Use Supplies	**594,823**	**606,858**	**617,299**	**628,337**	**636,859**	**644,610**

[a] Simulated groundwater pumping in the model scenarios is within 0.03 percent; the slight difference is due to the differences in model area vs. Subbasin extent and numerical precision.

[b] Colorado River deliveries decrease over time due to conversion of agriculture that receives Canal deliveries to urban uses.

Table 2. Baseline (No New Projects) Scenario – Modeled Deliveries for Replenishment (AFY)

Supply (Acre-Feet)	2020	2025	2030	2035	2040	2045
Colorado River[a]	97,000	97,000	82,000	82,000	82,000	82,000
SWP Exchange[b]	60,527	60,297	60,092	59,903	79,724	79,431
Other: Rosedale Rio-Bravo	10,563	10,563	10,563	10,563	0	0
Surface Water Diversions[c]	2,630	6,000	6,000	6,000	6,000	6,000
Total Replenishment	**170,720**	**173,860**	**158,655**	**158,466**	**167,724**	**167,431**

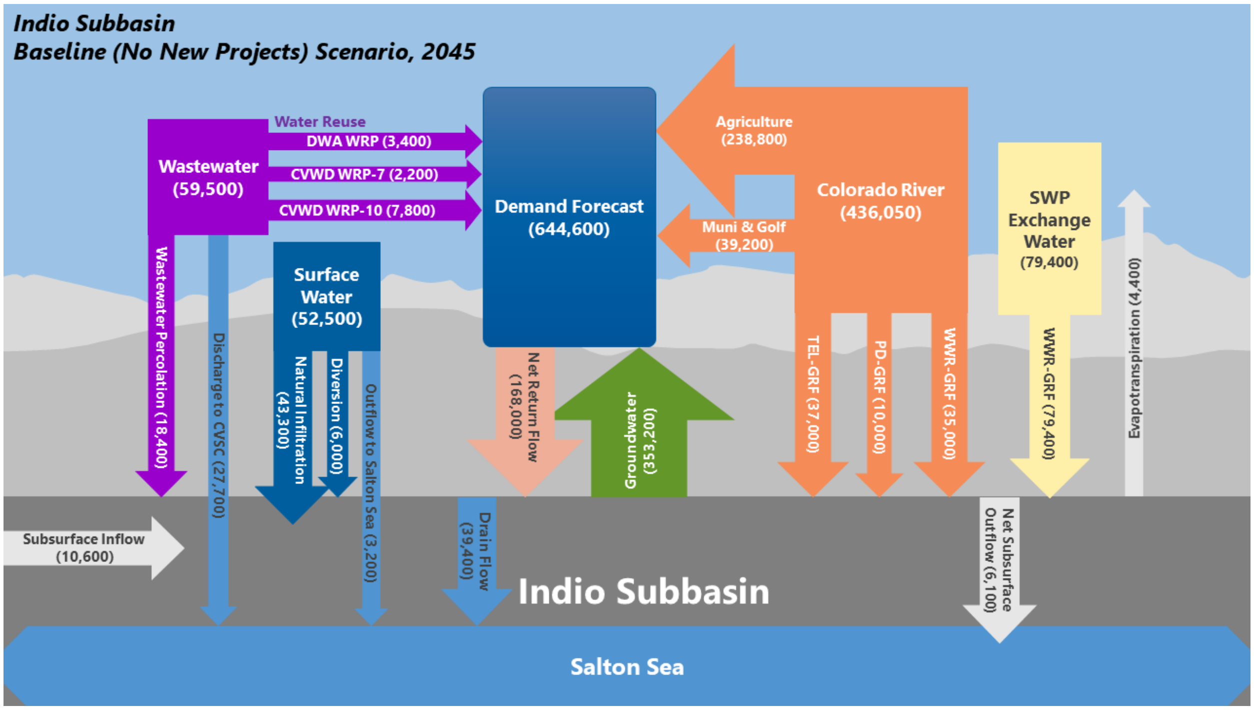
Note: Groundwater inflows and outflows (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, watershed runoff) are described in Section 7.6.

[a] Colorado River volumes assume that 15,000 AFY MWD-SWP transfer ends in 2027.

[b] SWP Exchange volumes assume Advanced Delivery credit from 2002 to 2035. This assumption is used so as not to double count advanced deliveries in future SWP deliveries.

[c] Surface water diversion include a small fraction of direct deliveries; for simplicity, all diversion volumes are assumed herein to be directed to WWR-GRF for recovery.

Figure 1: Baseline (No New Projects) Supply and Demand Flow Chart, 2045



Note: Values in this graphic are rounded to the nearest hundred and may not sum to totals. Colorado River volumes do not sum to total due to underrun under Baseline scenario with no new projects assumption.

Local Inflows, Outflows, and Supplies: As illustrated in Figure 1, inflows to groundwater include subsurface inflow, mountain front recharge, surface water runoff that is diverted for replenishment or percolates along the mountain front or in local channels (minus losses to the Salton Sea), wastewater percolation, and return flows from use (which include septic system percolation). Total surface water runoff from local watersheds is estimated based on the 50-year hydrologic period from 1970 to 2019 and simulated into the future using the MODFLOW model. Runoff inflows are assumed to vary annually, with estimated natural infiltration of watershed runoff (minus diversions and outflows to the Salton Sea) am ounting to an annual average of 43,319 AF for the 50-year hydrologic period. Septic system inflow starts at 8,800 AFY in 2020 and decreases to 4,600 AFY by 2045 due to the connection of septic systems to sewers. Wastewater percolation serves as an inflow to the Subbasin and occurs at five wastewater treatment facility sites (Palm Springs WWTP, CVWD WRP-2, CVWD WRP-7, CVWD WRP-10, and MSWD Regional WRF). Wastewater percolation is assumed to provide an average Subbasin inflow of 6,316 AFY in 2020 and ramping up to 18,377 AFY by 2045. Return flows from municipal, agricultural, and golf course demands are based on estimates of outdoor water use.

Outflows from the Indio Subbasin include drain flow, evapotranspiration, and subsurface outflow. Subsurface inflow, drain flow, evapotranspiration, and subsurface outflow are derived from the MODFLOW model.

As shown in Table 2, local supplies used for replenishment include surface water diversions. Under Baseline, local surface water diversions increase to 6,000 AFY by 2023, all of which is diverted to WWR-GRF subsurface storage and then recovered for delivery.

Colorado River: Colorado River water supplies available under Baseline include CVWD's base entitlement under the 2003 Quantification Settlement Agreement, along with transfers where there are agreements in place. Baseline assumes that diversions under the QSA ramp up from 394,000 AFY in 2020 to 424,000 AFY between 2027 and 2045 in 5,000 AFY increments. This ramp-up will allow the CVWD to fully utilize available Colorado River water at its maximum entitlement. The Colorado River supplies used in Baseline include a 15,000 AFY transfer from Metropolitan Water District of Southern California (MWD) delivered to WWR-GRF (MWD retains the remaining 5,000 AFY) and 35,000 AFY of SWP transfer with MWD per the 2003 QSA. Baseline also assumes annual Canal conveyance losses of 5 percent. Under the Baseline scenario, a portion of available Colorado River supply is not able to be beneficially used without the construction of new projects.

Colorado River supplies are assumed to be used for replenishment and direct use, as follows:

- *Colorado River replenishment*:
  - TEL-GRF: Recharge limited to current recharge of 37,000 AFY
  - PD-GRF: Recharge limited to Phase I capacity of 10,000 AFY
  - WWR-GRF: Recharge of 15,000 AFY of MWD transfer from 2020 to 2026 (totaling 105,000 AF) and recharge of 35,000 AFY of QSA MWD transfer through the planning horizon.
- *Colorado River direct deliveries*: Delivery to current agricultural, East Valley golf courses, other recreation, WRP-7, WRP-10, and MVP direct users at current levels equaling 278,000 AFY, less reduced agricultural demands due to urban conversion.

SWP Exchange: Average annual SWP Exchange supplies under Baseline are based on the reliability of SWP deliveries received by CVWD and DWA since 2007 when Federal Judge Wanger overturned the Biological Opinion authored by USFWS and USBR concerning Delta export pumping operations. This decision significantly impacted DWR's ability to convey SWP supplies across the Delta for export. Baseline applies an average 45 percent reliability to SWP deliveries.

Additionally, MWD's Advance Delivery account had 353,946 AF in storage as of January 2020. Baseline assumes that MWD will credit SWP deliveries against the Advance Delivery account at 22,122 AF annually from 2020-2035 so as not to double count these deliveries. Additional SWP Exchange water is available through Yuba Accord deliveries and is assumed to have a 10-year average of 651 AFY.

SWP Exchange supplies modeled under Baseline are varied annually based on the historical variability of SWP Table A deliveries received by the CVWD and DWA. Final SWP allocations between 2007 and 2021 have ranged from a high of 85 percent in 2017 to a low of 5 percent in 2014 and again in 2021. Baseline applies an annual variability factor that mimics the variability of deliveries associated with different climate years. The variability factors were developed based on the same water years (1970 to 2019) as local hydrology.

SWP Exchange water is assumed to be used for replenishment at WWR-GRF and MC-GRF, and the split of water between these replenishment facilities is to be consistent with the *2004 Settlement Agreement* between DWA, CVWD, and MSWD.

Other Supplies: One additional supply is included under Baseline: Rosedale-Rio Bravo deliveries of 10,563 AFY from 2020 to 2035.

Recycled Water: Recycled water supplies are currently produced at three locations: Palm Springs WWTP/DWA WRP, CVWD WRP-7, and CVWD WRP-10. Recycled water supply availability is expected to increase due to an increase in indoor water use and associated wastewater flows within the Plan area. Total recycled water use is expected to remain at 13,397 AFY as no new projects or non-potable connections are assumed to be implemented under Baseline.

2. FIVE-YEAR PLAN

The Five-Year Plan scenario includes supplies and facilities currently in place to support Subbasin management, along with new projects or supplies under the control of GSAs that are planned to be completed as part of the GSAs' five-year capital improvement programs (5-year CIPs). Table 5 provides a summary of Five-Year Plan with Climate Change supplies used to directly meet demand and Table 6 provides a summary of supplies used for replenishment and percolation to the Subbasin. Supply inputs used for the model (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, and watershed runoff) and groundwater pumping are derived from the MODFLOW model. Figure 3 provides a flow chart that shows the water balance of the basin under Five-Year Plan with Climate Change, as well as the supplies used to meet demands. A summary of the assumptions applied to each supply source is provided below.

The Five-Year Plan scenario assumes passive conservation, surface water diversions, and GRF operations will continue to be implemented, along with potable water and sewer consolidations. Planned non-potable expansions from WRP-7 and WRP-10 will deliver Canal and recycled water, along with Canal deliveries to East Valley golf courses and the Oasis Distribution System. Additionally, PD-GRF expansion will allow for greater Subbasin replenishment.

Table 3. Five Year Plan Scenario – Modeled Deliveries for Direct Use (AFY)

Supply (Acre-Feet)	2020	2025	2030	2035	2040	2045
Groundwater Pumping[a]	296,089	271,914	284,754	297,440	307,362	316,514
Colorado River[b]	285,337	317,932	314,733	312,385	310,184	307,883
Recycled Water	13,397	17,013	17,813	18,513	19,313	20,213
Total Direct Use Supplies	**594,823**	**606,858**	**617,299**	**628,337**	**636,859**	**644,610**

[a] Simulated groundwater pumping in the model scenarios is within 0.03 percent; the slight difference is due to the differences in model area vs. Subbasin extent and numerical precision.

[b] Colorado River deliveries increase over time due to new non-potable connections.

Table 4. Five Year Plan – Modeled Deliveries Used for Replenishment (AFY)

Supply (Acre-Feet)	2020	2025	2030	2035	2040	2045
Colorado River[a]	97,000	108,368	97,000	97,000	97,000	97,000
SWP Exchange[b]	60,527	62,816	62,603	62,405	82,217	81,915
Other: Rosedale Rio-Bravo	10,563	10,563	10,563	10,563	0	0
Surface Water Diversions[c]	2,630	6,000	6,000	6,000	6,000	6,000
Total Replenishment	**170,720**	**187,747**	**176,166**	**175,968**	**185,217**	**184,915**

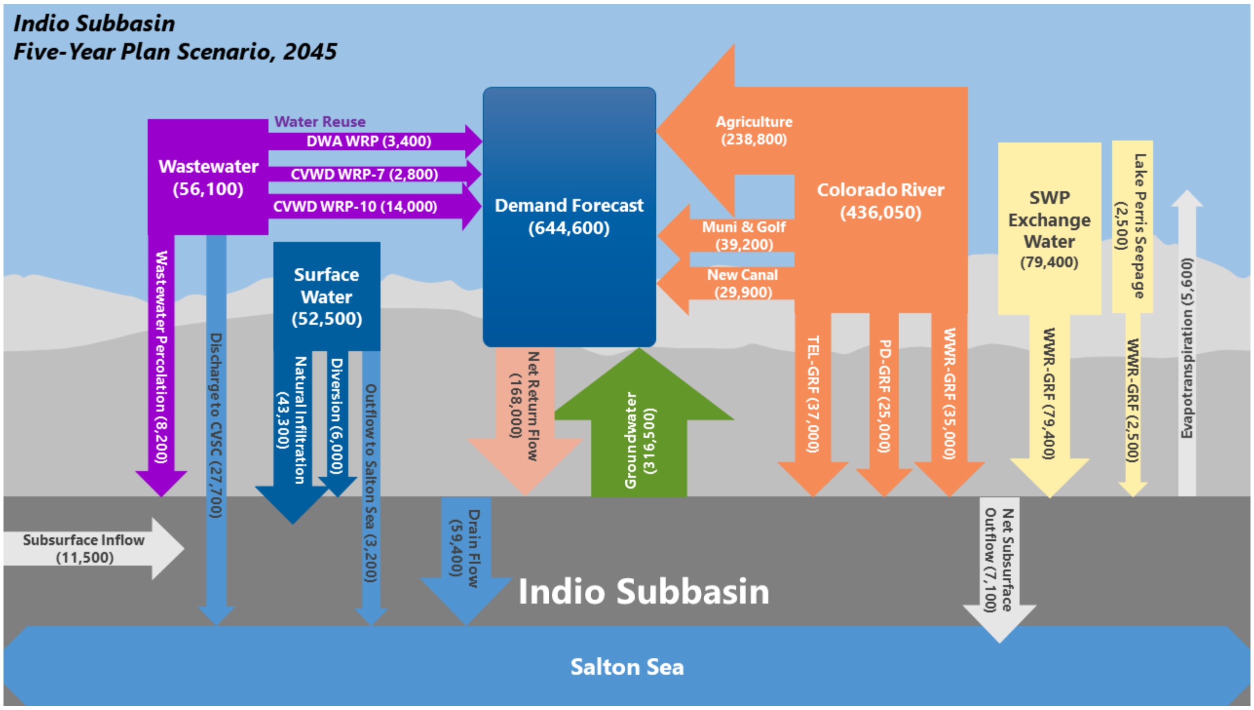
Note: Groundwater inflows and outflows (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, watershed runoff) are described in Section 7.6.

[a] Colorado River volumes assume that 15,000 AFY MWD-SWP transfer ends in 2027.

[b] SWP Exchange volumes assume Advanced Delivery credit from 2002 to 2035. This assumption is used so as not to double count advanced deliveries in future SWP deliveries.

[c] Surface water diversion include a small fraction of direct deliveries; for simplicity, all diversion volumes are assumed herein to be directed to WWR-GRF for recovery.

Figure 2: Five Year Plan Supply and Demand Flow Chart, 2045



Note: Values in this graphic are rounded to the nearest hundred and may not sum to totals.

Local Inflows, Outflows, and Supplies: Surface water hydrology under Five-Year Plan are the same as Baseline as are return flows and septic system inflow. Wastewater percolation is expected to be reduced due to an increase in recycled water use. Subsurface inflow, drain flow, evapotranspiration, and subsurface outflow are derived from the MODFLOW model.

Colorado River: Colorado River water supplies available under the Five-Year Plan are assumed to remain the same as under Baseline; however, available supplies will be routed differently due to planned expansions to replenishment facilities and direct deliveries. Under Five-Year Plan, the PD-GRF is planned to expand to allow for recharge to increase from 10,000 AFY in 2020 to 25,000 AFY in 2023. Combined replenishment at WWR-GRF, TEL-GRF, and PD-GRF is stable at 97,000 AFY through 2045. Increases in Colorado River direct deliveries begin in 2022 and total 29,914 AFY by 2045.

SWP Exchange: SWP Exchange supplies available under the Five-Year Plan are the same as under Baseline. SWP Exchange water is assumed to be used for replenishment at the WWR-GRF and MC-GRF, consistent with the *2004 Settlement Agreement*.

Recycled Water: Recycled water availability is expected to increase recycled water production and deliveries to new non-potable connections. WRP-7 deliveries increase from 2,201 AFY in 2020 to 2,800 AFY in 2025. WRP-10 deliveries increase from 7,783 AFY in 2020 to 14,000 AFY in 2045.

Other Supplies: Rosedale-Rio Bravo deliveries remain the same as in Baseline.

3. FUTURE PROJECTS

The Future Projects Scenario (Future Projects) includes supplies and facilities currently in place to support Subbasin management, along with projects for new supplies and facilities that are planned by the GSA agencies within the 25-year planning horizon. Table 9 provides a summary of Future Projects supplies used to directly meet demand and supplies used for replenishment and Table 10 provides a summary of supplies used for replenishment and percolation to the Subbasin. Supply inputs used for the model (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, and watershed runoff) and groundwater pumping are derived from the MODFLOW model. Figure 5 provides a flow chart that shows the water balance of the Subbasin under Future Projects, as well as the supplies used to meet demands. A summary of the assumptions applied to each supply source is provided below.

The Future Projects scenario assumes passive conservation, surface water diversions, and GRF operations will continue to be implemented, along with potable water and sewer consolidations. Planned non-potable expansions from WRP-7 and WRP-10 will deliver increased Canal and recycled water, along with increased Canal deliveries to Mid-Valley Pipeline connections, East Valley golf courses, and the Oasis Distribution System (as compared to the Five-Year Plan scenario). The EVRA potable reuse project will be implemented.

Table 5. Future Projects Scenario – Modeled Deliveries for Direct Use (AFY)

Supply (Acre-Feet)	2020	2025	2030	2035	2040	2045
Groundwater Pumping[a]	296,088	271,914	266,364	261,423	267,252	276,404
Colorado River[b]	285,337	317,932	333,122	348,401	350,294	347,993
Recycled Water	13,397	17,013	17,813	18,513	19,313	20,213
Total Direct Use Supplies	**594,823**	**606,858**	**617,299**	**628,337**	**636,859**	**644,610**

a Simulated groundwater pumping in the model scenarios is within 0.03 percent; the slight difference is due to the differences in model area vs. Subbasin extent and numerical precision.

b Colorado River deliveries increase over time due to new non-potable connections.

Table 6. Future Projects Scenario – Modeled Deliveries Used for Replenishment (AFY)

Supply (Acre-Feet)	2020	2025	2030	2035	2040	2045
Colorado River[a]	97,000	108,368	100,000	87,649	85,756	88,057
SWP Exchange[b]	60,527	62,816	62,603	72,908	92,682	116,262
Other: Rosedale Rio-Bravo	10,563	10,563	10,563	10,563	0	0
Indirect Potable Reuse	0	0	5,000	5,000	5,000	5,000
Surface Water Diversions[c]	2,630	6,000	6,000	6,000	6,000	6,000
Total Replenishment	**170,720**	**187,747**	**184,166**	**182,120**	**189,438**	**215,319**

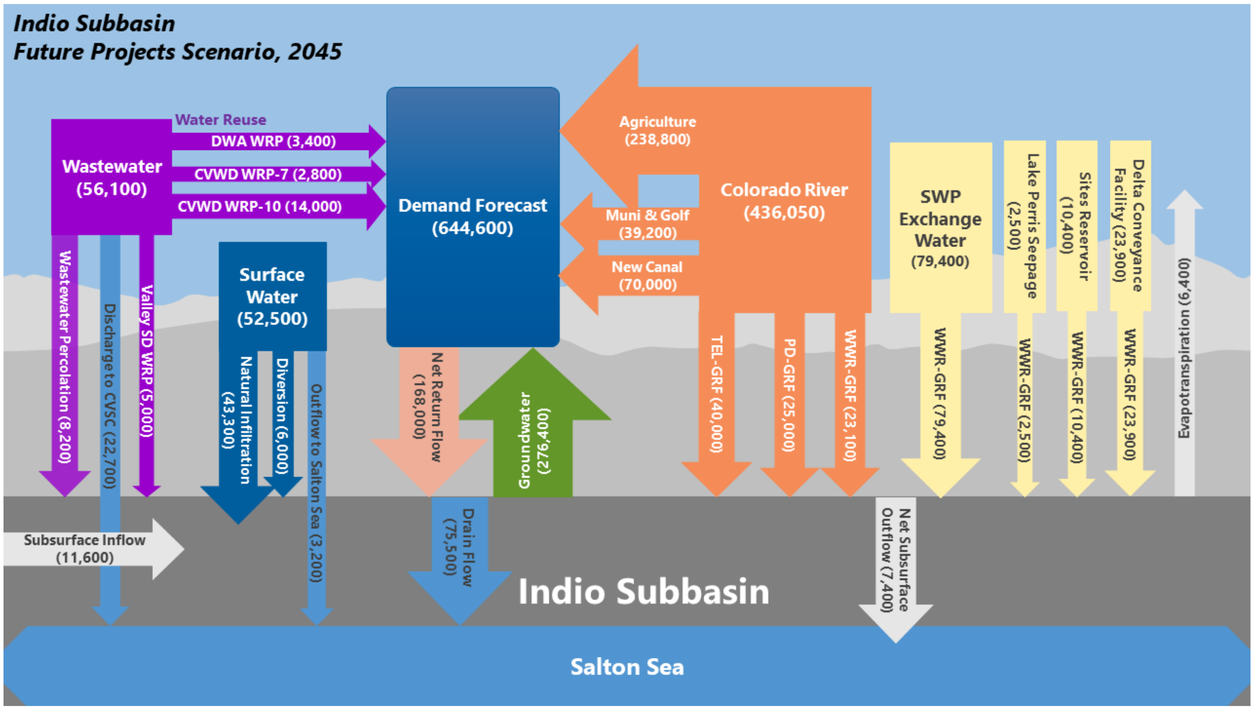
Note: Groundwater inflows and outflows (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, watershed runoff) are described in Section 7.6.

a Colorado River volumes assume that 15,000 AFY MWD-SWP transfer ends in 2027.

b SWP Exchange volumes assume Advanced Delivery credit from 2002 to 2035. This assumption is used so as not to double count advanced deliveries in future SWP deliveries. SWP Exchange includes future supplies from DCF, Sites Reservoir, and Lake Perris Seepage.

c Surface water diversion include a small fraction of direct deliveries; for simplicity, all diversion volumes are assumed herein to be directed to WWR-GRF for recovery.

Figure 3: Future Projects Supply and Demand Flow Chart, 2045



Note: Values in this graphic are rounded to the nearest hundred and may not sum to totals.

Local Inflows, Outflows, and Supplies: Surface water hydrology under Future Projects is the same as Baseline, as are return flows and septic system inflows. Wastewater percolation is expected to be reduced due to an increase in recycled water use, along with the transfer of MSWD Regional WRF flows to the Mission Creek Subbasin. Subsurface inflow, drain flow, evapotranspiration, and subsurface outflow are derived from the MODFLOW model.

Colorado River: Colorado River water supplies available under Future Projects are assumed to remain the same as under the Five-Year Plan scenario, but with additional expansions to replenishment facilities and direct deliveries. Under Future Projects, the TEL-GRF will expand from a capacity of 37,000 AFY in 2020 to 40,000 AFY in 2025. Increases in Colorado River direct deliveries begin in 2022 and total 70,024 AFY by 2045. As available Colorado River supply is fully utilized in the Mid- and East Valley, CVWD will reduce replenishment at the WWR-GRF. The increase in direct deliveries results in a reduction in replenishment of CVWD's 2003 QSA entitlement at WWR-GRF beginning in 2025 to a low of 20,756 AFY in 2040.

SWP Exchange: SWP Exchange supplies available under Future Projects include the Table A deliveries (45 percent average reliability and varied annually based on water year) assumed under Baseline, with the addition of the following projects:

- Delta Conveyance Facility (DCF) to increase the reliability of SWP deliveries by 26,500 AFY (59% of Table A) due to improvements in Delta conveyance; deliveries will vary according to the same variability factors used for SWP Table A water under Baseline and used for replenishment at WWR-GRF and MC-GRF.

- Lake Perris Dam Seepage Recovery Project to provide 2,754 AFY from 2025 to 2045 and used for replenishment at WWR-GRF and MC-GRF.
- Sites Reservoir Project to provide 11,550 AFY from 2035 to 2045 and used for replenishment at the WWR-GRF; 30 percent conveyance loss will be applied to this supply.

Recycled Water: Recycled water supplies under Future Projects are further expanded from those shown under the Five-Year Plan, including an increase in recycled water deliveries by 6,815 AFY in 2045 and with 5,000 AFY of potable reuse from Valley Sanitary District's WRP (referred to as the EVRA Potable Reuse Project).

Other Supplies: Rosedale-Rio Bravo deliveries remain the same as in Baseline.

4. EXPANDED AGRICULTURE

The Expanded Agriculture Scenario (Expanded Agriculture) includes increased agricultural demands, along with the same suite of planned future projects described under the Future Projects Scenario. This scenario assumes 8,000 acres of additional farmland (inclusive of 1,500 AFY in baseline demand forecast). Most Oasis farmlands are currently served by groundwater. This scenario assumes that new agricultural growth occurs due to expanded availability of Canal water to come currently idle lands. The scenario allocates 85 percent of new demands to Canal water and 15 percent to groundwater.

Table 13 provides a summary of Expanded Agriculture supplies used to directly meet demand and Table 14 provides a summary of supplies used for replenishment and percolation to the Subbasin. Supply inputs used for the model (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, and watershed runoff) and groundwater pumping are derived from the MODFLOW model. Figure 7 provides a flow chart that shows the water balance of the Indio Subbasin under Expanded Agriculture, as well as the supplies used to meet demands.

The Expanded Agriculture scenario assumes the same supplies as the Future Projects scenario – continued passive conservation, surface water diversions, and GRF operations, along with potable water and sewer consolidations. Planned non-potable expansions from WRP-7 and WRP-10 will deliver increased Canal and recycled water, along with increased Canal deliveries to Mid-Valley Pipeline connections, East Valley golf courses, and the Oasis Distribution System. The EVRA potable reuse project will be implemented.

Table 7. Expanded Agriculture Scenario – Modeled Deliveries for Direct Use (AFY)

Supply (Acre-Feet)	2020	2025	2030	2035	2040	2045
Groundwater Pumping [a]	296,088	272,967	268,470	264,581	271,463	281,667
Colorado River[b]	285,337	323,896	345,051	366,295	374,152	377,816
Recycled Water	13,397	17,013	17,813	18,513	19,313	20,213
Total Direct Use Supplies	**594,823**	**613,876**	**631,334**	**649,389**	**664,928**	**679,696**

[a] Simulated groundwater pumping in the model scenarios is within 0.03 percent; the slight difference is due to the differences in model area vs. Subbasin extent and numerical precision.

[b] Colorado River deliveries increase over time due to new non-potable connections.

Table 8. Expanded Agriculture Scenario – Modeled Deliveries for Replenishment (AFY)

Supply (Acre-Feet)	2020	2025	2030	2035	2040	2045
Colorado River[a]	97,000	102,404	90,999	69,755	61,898	58,234
SWP Exchange[b]	60,527	62,816	62,603	72,908	92,682	116,262
Other: Rosedale Rio-Bravo	10,563	10,563	10,563	10,563	0	0
Potable Reuse	0	0	5,000	5,000	5,000	5,000
Surface Water Diversions[c]	2,630	6,000	6,000	6,000	6,000	6,000
Total Replenishment	**170,720**	**181,783**	**175,165**	**164,226**	**165,580**	**185,496**

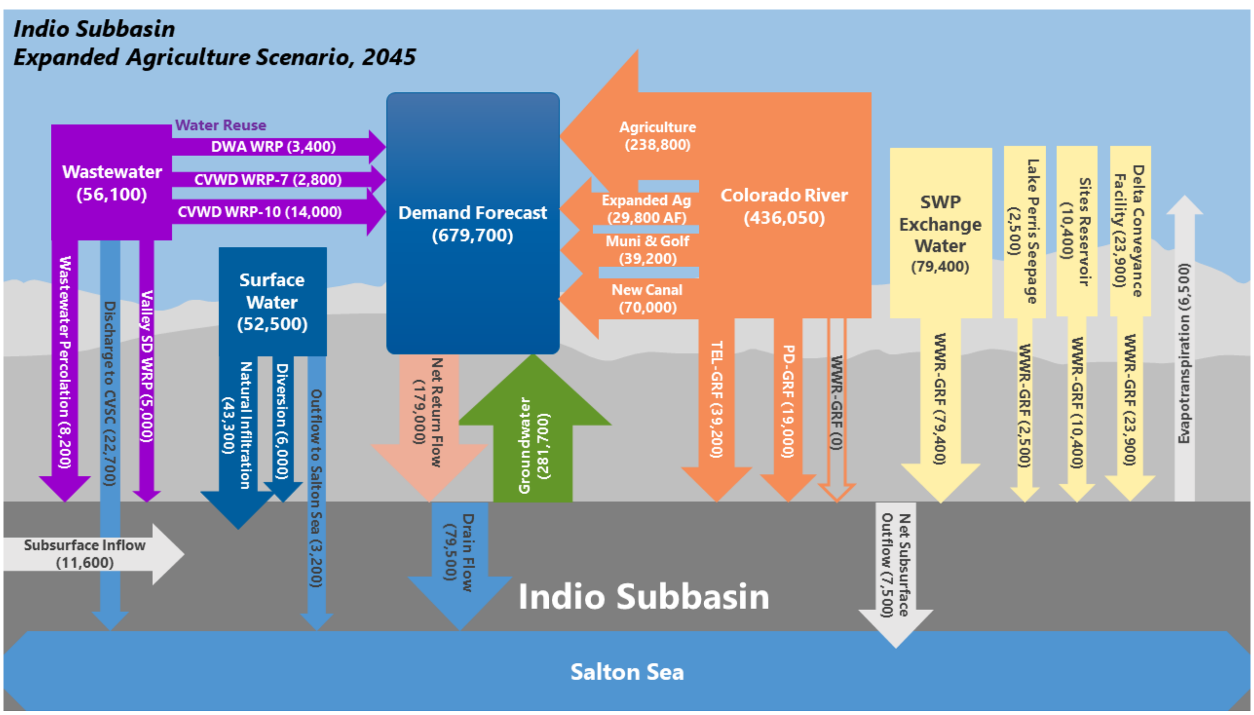
Note: Groundwater inflows and outflows (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, watershed runoff) are described in Section 7.6.

[a] Colorado River volumes assume that 15,000 AFY MWD-SWP transfer ends in 2027.

[b] SWP Exchange volumes assume Advanced Delivery credit from 2002 to 2035. This assumption is used so as not to double count advanced deliveries in future SWP deliveries. SWP Exchange includes future supplies from DCF, Sites Reservoir, and Lake Perris Seepage.

[c] Surface water diversion include a small fraction of direct deliveries; for simplicity, all diversion volumes are assumed herein to be directed to WWR-GRF for recovery.

Figure 4: Expanded Agriculture with Future Projects Supply and Demand Flow Chart, 2045



Note: Values in this graphic are rounded to the nearest hundred and may not sum to totals.

Local Inflows, Outflows, and Supplies: Surface water hydrology under Expanded Agriculture is the same as Baseline, as are return flows and septic system inflows. Wastewater percolation is expected to be reduced due to an increase in recycled water use. Subsurface inflow, drain flow, evapotranspiration, and subsurface outflow are derived from the MODFLOW model.

Colorado River: Colorado River water supplies available under Expanded Agriculture are assumed to remain the same as under the Future Projects, but with additional direct deliveries to the expanded agricultural areas. Replenishment facility expansions will be the same as in Future Projects. Increases in Colorado River direct deliveries begin in 2021 and total 99,800 AFY by 2045. As available Colorado River supply is fully utilized in the Mid- and East Valley, CVWD will reduce replenishment at the GRFs. This results in a reduction in replenishment of Colorado River water at PD-GRF beginning in 2038 to a low of 18,967 AFY, along with ending QSA deliveries at WWR-GRF in 2037.

SWP Exchange: SWP Exchange supplies are the same as under Future Projects and include Table A deliveries (45 percent average reliability and varied annually based on water year) along with DCF, Lake Perris Dam Seepage Recovery Project, and Sites Reservoir Project.

Recycled Water: Recycled water supplies are the same as under Future Projects.

Other Supplies: Rosedale-Rio Bravo deliveries remain the same as in Baseline.

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Table 9. Assumptions in Plan Scenarios

1- Baseline (No Project)	2- Baseline (No Project) w/ Climate Change	3- 5-Year Plan	4- Five-Year Plan w/Climate Change	5- Future Projects	6- Future Projects w/Climate Change	7- Expanded Agriculture	8- Expanded Agriculture w/Climate Change
Surface Water	**Surface Water**	**Surface Water**	**Surface Water**	**Surface Water**	**Surface Water**	**Surface Water**	**Surface Water**
• Watershed runoff (streamflow, subsurface inflow, ET) based on 50-yr average minus average losses to Salton Sea and diversions	• Watershed runoff (streamflow, subsurface inflow, ET) based on 25-yr dry cycle minus average losses to Salton Sea and diversions	• Watershed runoff (streamflow, subsurface inflow, ET) based on 50-yr average minus average losses to Salton Sea and diversions	• Watershed runoff (streamflow, subsurface inflow, ET) based on 25-yr dry cycle minus average losses to Salton Sea and diversions	• Watershed runoff (streamflow, subsurface inflow, ET) based on 50-yr average minus average losses to Salton Sea and diversions	• Watershed runoff (streamflow, subsurface inflow, ET) based on 25-yr dry cycle minus average losses to Salton Sea and diversions	• Watershed runoff (streamflow, subsurface inflow, ET) based on 50-yr average minus average losses to Salton Sea and diversions	• Watershed runoff (streamflow, subsurface inflow, ET) based on 25-yr dry cycle minus average losses to Salton Sea and diversions
• Surface water diversions increase in 2023-2045	• Surface water diversions increase in 2023-2045	• Surface water diversions increase in 2023-2045	• Surface water diversions increase in 2023-2045	• Surface water diversions increase in 2023-2045	• Surface water diversions increase in 2023-2045	• Surface water diversions increase in 2023-2045	• Surface water diversions increase in 2023-2045
Replenishment	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*	Replenishment	Replenishment
• Recharge of assumed natural infiltration in West AOB	• Recharge of assumed natural infiltration in West AOB	• Recharge of assumed natural infiltration in West AOB	• Recharge of assumed natural infiltration in West AOB	• Recharge of assumed natural infiltration in West AOB	• Recharge of assumed natural infiltration in West AOB	• Recharge of assumed natural infiltration in West AOB	• Recharge of assumed natural infiltration in West AOB
Colorado River	**Colorado River**	**Colorado River**	**Colorado River**	**Colorado River**	**Colorado River**	**Colorado River**	**Colorado River**
• QSA ramps up to 424,000 AFY in 2027-2045. Ramp up in 5,000 AFY increments	• QSA ramps up to 424,000 AFY in 2027-2045. Ramp up in 5,000 AFY increments	• QSA ramps up to 424,000 AFY in 2027-2045. Ramp up in 5,000 AFY increments	• QSA ramps up to 424,000 AFY in 2027-2045. Ramp up in 5,000 AFY increments	• QSA ramps up to 424,000 AFY in 2027-2045. Ramp up in 5,000 AFY increments	• QSA ramps up to 424,000 AFY in 2027-2045. Ramp up in 5,000 AFY increments	• QSA ramps up to 424,000 AFY in 2027-2045. Ramp up in 5,000 AFY increments	• QSA ramps up to 424,000 AFY in 2027-2045. Ramp up in 5,000 AFY increments
• Addition of QSA MWD SWP Transfer, with loss of 5,000 AFY to MWD per 2019 Amendment	• Addition of QSA MWD SWP Transfer, with loss of 5,000 AFY to MWD per 2019 Amendment	• Addition of QSA MWD SWP Transfer, with loss of 5,000 AFY to MWD per 2019 Amendment	• Addition of QSA MWD SWP Transfer, with loss of 5,000 AFY to MWD per 2019 Amendment	• Addition of QSA MWD SWP Transfer, with loss of 5,000 AFY to MWD per 2019 Amendment	• Addition of QSA MWD SWP Transfer, with loss of 5,000 AFY to MWD per 2019 Amendment	• Addition of QSA MWD SWP Transfer, with loss of 5,000 AFY to MWD per 2019 Amendment	• Addition of QSA MWD SWP Transfer, with loss of 5,000 AFY to MWD per 2019 Amendment
• Canal conveyance losses of 5% annually	• Canal conveyance losses of 5% annually	• Canal conveyance losses of 5% annually	• Canal conveyance losses of 5% annually	• Canal conveyance losses of 5% annually	• Canal conveyance losses of 5% annually	• Canal conveyance losses of 5% annually	• Canal conveyance losses of 5% annually
	• Under Lower Basin DCP, assume delivery reduction of CVWD's 7% of CA contribution		• Under Lower Basin DCP, assume delivery reduction of CVWD's 7% of CA contribution		• Under Lower Basin DCP, assume delivery reduction of CVWD's 7% of CA contribution		• Under Lower Basin DCP, assume delivery reduction of CVWD's 7% of CA contribution
Replenishment	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*	Replenishment	Replenishment
• Recharge to TEL-GRF based on current capacity	• Recharge to TEL-GRF based on current capacity	• Recharge to TEL-GRF based on current capacity	• Recharge to TEL-GRF based on current capacity	• Recharge to TEL-GRF expands to 40,000 AF in 2025-2045	• Recharge to TEL-GRF expands to 40,000 AF in 2025-2045	• Recharge to TEL-GRF expands to 40,000 AF in 2025-2045	• Recharge to TEL-GRF expands to 40,000 AF in 2025-2045
• Recharge to PD-GRF based on Phase I capacity	• Recharge to PD-GRF based on Phase I capacity	• Recharge to PD-GRF expands to 25,000 AFY in 2023	• Recharge to PD-GRF expands to 25,000 AFY in 2023	• Recharge to PD-GRF expands to 25,000 AFY in 2023	• Recharge to PD-GRF expands to 25,000 AFY in 2023	• Recharge to PD-GRF expands to 25,000 AFY in 2023	• Recharge to PD-GRF expands to 25,000 AFY in 2023
• Delivery of MWD/IID Transfer at WWR-GRF from 2020-2026	• Delivery of MWD/IID Transfer at WWR-GRF from 2020-2026	• Delivery of MWD/IID Transfer at WWR-GRF from 2020-2026	• Delivery of MWD/IID Transfer at WWR-GRF from 2020-2026	• Delivery of MWD/IID Transfer at WWR-GRF from 2020-2026	Delivery of MWD/IID Transfer at WWR-GRF from 2020-2026	Delivery of MWD/IID Transfer at WWR-GRF from 2020-2026	Delivery of MWD/IID Transfer at WWR-GRF from 2020-2026
• Delivery of QSA MWD SWP Transfer to WWR-GRF through 2045	• Delivery of QSA MWD SWP Transfer to WWR-GRF through 2045	• Delivery of QSA MWD SWP Transfer to WWR-GRF through 2045	• Delivery of QSA MWD SWP Transfer to WWR-GRF through 2045	• Delivery of QSA MWD SWP Transfer to WWR-GRF through 2045	• Delivery of QSA MWD SWP Transfer to WWR-GRF through 2045	• Delivery of QSA MWD SWP Transfer to WWR-GRF through 2045	• Delivery of QSA MWD SWP Transfer to WWR-GRF through 2045

1- Baseline (No Project)	2- Baseline (No Project) w/ Climate Change	3- 5-Year Plan	4- Five-Year Plan w/Climate Change	5- Future Projects	6- Future Projects w/Climate Change	7- Expanded Agriculture	8- Expanded Agriculture w/Climate Change
Direct Deliveries	*Direct Deliveries*	*Direct Deliveries*	*Direct Deliveries*	*Direct Deliveries*	*Direct Deliveries*	Direct Deliveries	Direct Deliveries
• Current Ag, East Valley Golf, West Valley/MVP Golf, Other Rec, WRP-10, and MVP Direct at current levels, minus conversion of some farmland to urban uses	• Current Ag, East Valley Golf, West Valley/MVP Golf, Other Rec, WRP-10, and MVP Direct at current levels, minus conversion of some farmland to urban uses	• Current Ag, East Valley Golf, West Valley/MVP Golf, Other Rec, WRP-10, and MVP Direct at current levels, minus conversion of some farmland to urban uses	• Current Ag, East Valley Golf, West Valley/MVP Golf, Other Rec, WRP-10, and MVP Direct at current levels, minus conversion of some farmland to urban uses	• Current Ag, East Valley Golf, West Valley/MVP Golf, Other Rec, WRP-10, and MVP Direct at current levels, minus conversion of some farmland to urban uses	• Current Ag, East Valley Golf, West Valley/MVP Golf, Other Rec, WRP-10, and MVP Direct at current levels, minus conversion of some farmland to urban uses	• Current Ag, East Valley Golf, West Valley/MVP Golf, Other Rec, WRP-10, and MVP Direct at current levels, minus conversion of some farmland to urban uses	• Current Ag, East Valley Golf, West Valley/MVP Golf, Other Rec, WRP-10, and MVP Direct at current levels, minus conversion of some farmland to urban uses
		• New Canal deliveries per NPW forecast	• New Canal deliveries per NPW forecast	• New Canal deliveries per NPW forecast	• New Canal deliveries per NPW forecast	• New Canal deliveries per NPW forecast	• New Canal deliveries per NPW forecast
						• Additional Canal direct deliveries per expanded Ag forecast	• Additional Canal direct deliveries per expanded Ag forecast
SWP Exchange Water	**SWP Exchange Water**	**SWP Exchange Water**	**SWP Exchange Water**	**SWP Exchange Water**	**SWP Exchange Water**	**SWP Exchange Water**	**SWP Exchange Water**
• Table A delivery at avg 45% reliability, delivered per MC/WWR split). Variable annually per historical SWP final allocation.	• Table A delivery at avg 45% reliability minus -1.5% climate change factor by 2045, delivered per MC/WWR split). Variable annually per historical SWP final allocation.	• Table A delivery at avg 45% reliability, delivered per MC/WWR split). Variable annually per historical SWP final allocation.	• Table A delivery at avg 45% reliability minus -1.5% climate change factor by 2045, delivered per MC/WWR split). Variable annually per historical SWP final allocation.	• Table A delivery at avg 45% reliability, delivered per MC/WWR split). Variable annually per historical SWP final allocation.	• Table A delivery at avg 45% reliability minus -1.5% climate change factor by 2045, delivered per MC/WWR split). Variable annually per historical SWP final allocation.	• Table A delivery at avg 45% reliability, delivered per MC/WWR split). Variable annually per historical SWP final allocation.	• Table A delivery at avg 45% reliability minus -1.5% climate change factor by 2045, delivered per MC/WWR split). Variable annually per historical SWP final allocation.
• Allocation of Table A between WWR-GRF and MC-GRF consistent w/2004 Settlement Agreement	• Allocation of Table A between WWR-GRF and MC-GRF consistent w/2004 Settlement Agreement	• Allocation of Table A between WWR-GRF and MC-GRF consistent w/2004 Settlement Agreement	• Allocation of Table A between WWR-GRF and MC-GRF consistent w/2004 Settlement Agreement	• Allocation of Table A between WWR-GRF and MC-GRF consistent w/2004 Settlement Agreement	• Allocation of Table A between WWR-GRF and MC-GRF consistent w/2004 Settlement Agreement	• Allocation of Table A between WWR-GRF and MC-GRF consistent w/2004 Settlement Agreement	• Allocation of Table A between WWR-GRF and MC-GRF consistent w/2004 Settlement Agreement
• Yuba Accord deliveries at 10-year average	• Yuba Accord deliveries at 10-year average	• Yuba Accord deliveries at 10-year average	• Yuba Accord deliveries at 10-year average	• Yuba Accord deliveries at 10-year average	• Yuba Accord deliveries at 10-year average	• Yuba Accord deliveries at 10-year average	• Yuba Accord deliveries at 10-year average
		• Lake Perris Seepage per 2019 Term Sheet (per MC/WWR Split)	• Lake Perris Seepage per 2019 Term Sheet (per MC/WWR Split)	• Lake Perris Seepage per 2019 Term Sheet (per MC/WWR Split)	• Lake Perris Seepage per 2019 Term Sheet (per MC/WWR Split)	• Lake Perris Seepage per 2019 Term Sheet (per MC/WWR Split)	• Lake Perris Seepage per 2019 Term Sheet (per MC/WWR Split)
				• Sites Reservoir deliveries at participation amount (with 30% conveyance loss) beginning in 2035	• Sites Reservoir deliveries at participation amount (with 30% conveyance loss) beginning in 2035	• Sites Reservoir deliveries at participation amount (with 30% conveyance loss) beginning in 2035	• Sites Reservoir deliveries at participation amount (with 30% conveyance loss) beginning in 2035
				• Once DCF is constructed, increase in SWP reliability up to 59% annually	• Once DCF is constructed, increase in SWP reliability up to 59% annually minus -1.5% climate change factor by 2045	• Once DCF is constructed, increase in SWP reliability up to 59% annually	• Once DCF is constructed, increase in SWP reliability up to 59% annually minus -1.5% climate change factor by 2045
Replenishment	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*
• Recharge to WWR-GRF based on SWP allocation and 2004 Agreement	• Recharge to WWR-GRF based on SWP allocation and 2004 Agreement	• Recharge to WWR-GRF based on SWP allocation and 2004 Agreement	• Recharge to WWR-GRF based on SWP allocation and 2004 Agreement	• Recharge to WWR-GRF based on SWP allocation and 2004 Agreement	• Recharge to WWR-GRF based on SWP allocation and 2004 Agreement	• Recharge to WWR-GRF based on SWP allocation and 2004 Agreement	• Recharge to WWR-GRF based on SWP allocation and 2004 Agreement
Recycled Water	**Recycled Water**	**Recycled Water**	**Recycled Water**	**Recycled Water**	**Recycled Water**	**Recycled Water**	**Recycled Water**
• DWA WRF to deliver recycled water based on average 2015-2019	• DWA WRF to deliver recycled water based on average 2015-2019	• DWA WRF to deliver recycled water based on average 2015-2019	• DWA WRF to deliver recycled water based on average 2015-2019	• DWA WRF to deliver recycled water based on average 2015-2019	• DWA WRF to deliver recycled water based on average 2015-2019	• DWA WRF to deliver recycled water based on average 2015-2019	• DWA WRF to deliver recycled water based on average 2015-2019
• CVWD WRP-7 to deliver recycled water to golf and municipal based on average 2015-2019	• CVWD WRP-7 to deliver recycled water to golf and municipal based on average 2015-2019	• CVWD WRP-7 to increase deliveries consistent w/NPW forecast per West/MVP connections	• CVWD WRP-7 to increase deliveries consistent w/NPW forecast per West/MVP connections	• CVWD WRP-7 to increase deliveries consistent w/NPW forecast per West/MVP connections	• CVWD WRP-7 to increase deliveries consistent w/NPW forecast per West/MVP connections	• CVWD WRP-7 to increase deliveries consistent w/NPW forecast per West/MVP connections	• CVWD WRP-7 to increase deliveries consistent w/NPW forecast per West/MVP connections

1- Baseline (No Project)	2- Baseline (No Project) w/ Climate Change	3- 5-Year Plan	4- Five-Year Plan w/Climate Change	5- Future Projects	6- Future Projects w/Climate Change	7- Expanded Agriculture	8- Expanded Agriculture w/Climate Change
• CVWD WRP-10 to deliver recycled water to golf and municipal based on average 2018-2019	• CVWD WRP-10 to deliver recycled water to golf and municipal based on average 2018-2019	• CVWD WRP-10 to increase deliveries consistent w/NPW forecast	• CVWD WRP-10 to increase deliveries consistent w/NPW forecast	• CVWD WRP-10 to increase deliveries consistent w/NPW forecast	• CVWD WRP-10 to increase deliveries consistent w/NPW forecast	• CVWD WRP-10 to increase deliveries consistent w/NPW forecast	• CVWD WRP-10 to increase deliveries consistent w/NPW forecast
Replenishment	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*	*Replenishment*
• Wastewater percolation per WW flows minus projected recycled water deliveries	• Wastewater percolation per WW flows minus projected recycled water deliveries	• Wastewater percolation per WW flows minus projected recycled water deliveries	• Wastewater percolation per WW flows minus projected recycled water deliveries	• Wastewater percolation per WW flows minus projected recycled water deliveries	• Wastewater percolation per WW flows minus projected recycled water deliveries	• Wastewater percolation per WW flows minus projected recycled water deliveries	• Wastewater percolation per WW flows minus projected recycled water deliveries
				• EVRA IPR Project (using VSD WWTP) begins potable replenishment in 2030-2045	• EVRA IPR Project (using VSD WWTP) begins potable replenishment in 2030-2045	• EVRA IPR Project (using VSD WWTP) begins potable replenishment in 2030-2045	• EVRA IPR Project (using VSD WWTP) begins potable replenishment in 2030-2045
Other Supplies	**Other Supplies**	**Other Supplies**	**Other Supplies**	**Other Supplies**	**Other Supplies**	**Other Supplies**	**Other Supplies**
• Rosedale Rio-Bravo deliveries 2020-2035	• Rosedale Rio-Bravo deliveries 2020-2035	• Rosedale Rio-Bravo deliveries 2020-2035	• Rosedale Rio-Bravo deliveries 2020-2035	• Rosedale Rio-Bravo deliveries 2020-2035	• Rosedale Rio-Bravo deliveries 2020-2035	• Rosedale Rio-Bravo deliveries 2020-2035	• Rosedale Rio-Bravo deliveries 2020-2035
Groundwater	**Groundwater**	**Groundwater**	**Groundwater**	**Groundwater**	**Groundwater**	**Groundwater**	**Groundwater**
• Net return flow = municipal + agricultural + golf return flow, minus estimated subsurface outflows, ET, and drain flows	• Net return flow = municipal + agricultural + golf return flow, minus estimated subsurface outflows, ET, and drain flows	• Net return flow = municipal + agricultural + golf return flow, minus estimated subsurface outflows, ET, and drain flows	• Net return flow = municipal + agricultural + golf return flow, minus estimated subsurface outflows, ET, and drain flows	• Net return flow = municipal + agricultural + golf return flow, minus estimated subsurface outflows, ET, and drain flows	• Net return flow = municipal + agricultural + golf return flow, minus estimated subsurface outflows, ET, and drain flows	• Net return flow = municipal + agricultural + golf return flow, minus estimated subsurface outflows, ET, and drain flows	• Net return flow = municipal + agricultural + golf return flow, minus estimated subsurface outflows, ET, and drain flows
Conservation	**Conservation**	**Conservation**	**Conservation**	**Conservation**	**Conservation**	**Conservation**	**Conservation**
• Passive municipal conservation	• Passive municipal conservation	• Passive municipal conservation	• Passive municipal conservation	• Passive municipal conservation	• Passive municipal conservation	• Passive municipal conservation	• Passive municipal conservation

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APPENDIX 7-C
ADDITIONAL FUTURE SCENARIO WATER BUDGETS AND MODEL SIMULATIONS

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Appendix 7-C Additional Future Scenario Water Budgets and Model Simulations

As documented in Chapter 7, scenarios for the Alternative Plan were developed based on potential future water supply conditions. These may change as the result of land development, source substitution projects, or new water supply projects. Four categories of planning conditions were established – Baseline (No New Projects), Five-Year Plan, Future Projects, and Expanded Agriculture. For each of the four categories, one Plan scenario assumed historical hydrology and a second assumed climate change conditions. Each scenario was simulated over a 50-year period consistent with SGMA requirements. However, the planning assumptions were only projected for the first 25 years to the 2045 planning horizon. Thereafter, growth and project assumptions were assumed to continue at the same rate for the second 25 years of the simulation.

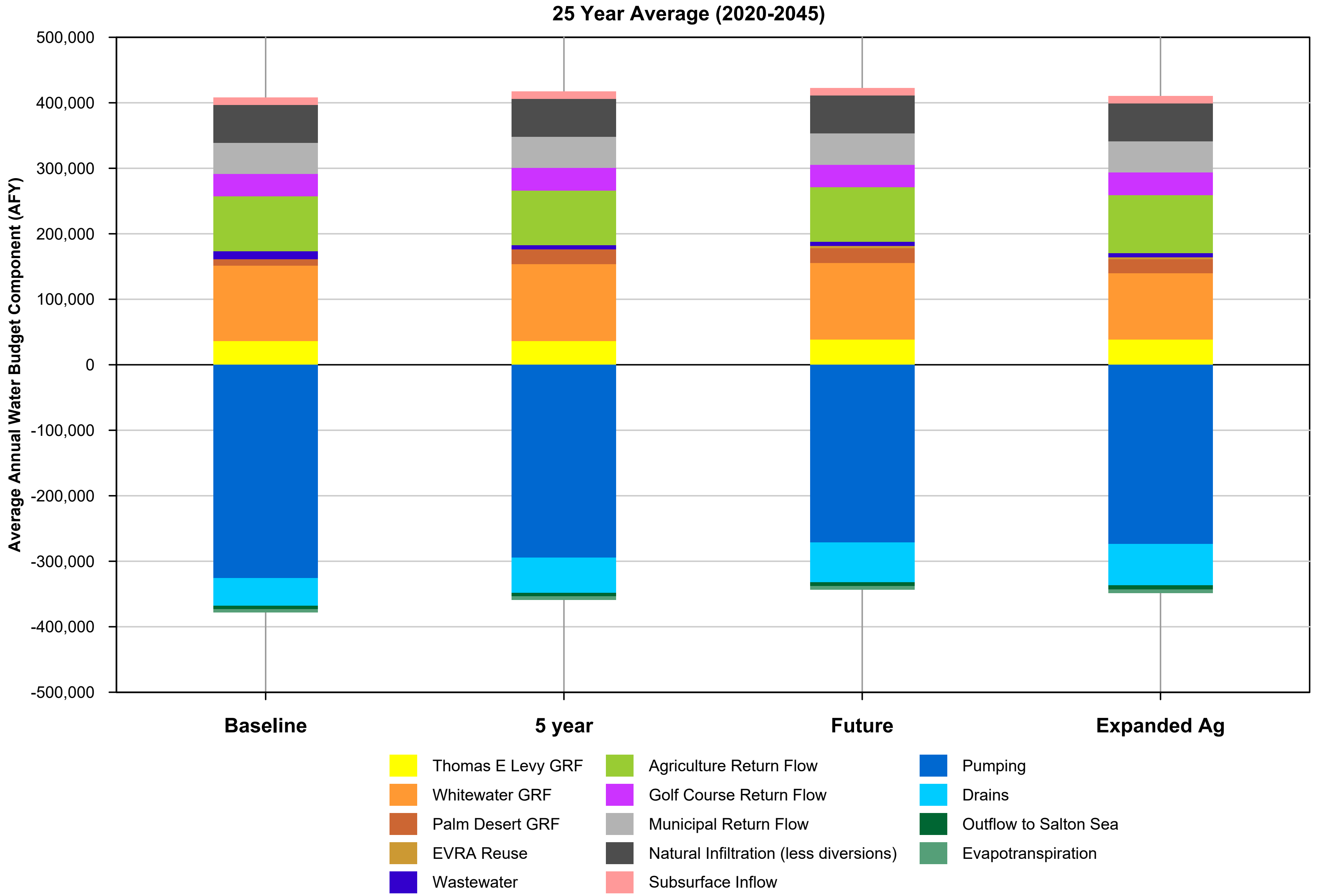
While extending beyond foreseeable land use and water resource planning projections, the second 25-year projections allow long-term evaluation of water supply and demand conditions, effectively testing Indio Subbasin sustainability under long-term hydrologic variability over 50 years.

The same suite of projects simulated in the scenarios described in Chapter 7 were also simulated without Climate Change. These scenarios were simulated using future hydrological conditions based on the past 50 years of observed hydrological data, in contrast to the climate change simulations of the past 25 years of observed hydrological data. The results of those simulations, without climate change, are included here.

The following scenario simulations are shown here:

1. **Baseline (No Project):** No new supply projects or changes to historical hydrology.
2. **Five-Year Plan**: Baseline conditions plus supply projects included in the GSA agencies' five-year capital improvement plans (CIPs), without anticipated climate change hydrology.
3. **Future Projects:** Five-Year Plan conditions plus implementation of additional supplies and facilities that are in the planning phases by GSA agencies, subsequent phases of projects, and/or GSAs are participating agencies, along without anticipated climate change hydrology.
4. **Expanded Agriculture plus Future Projects:** Future Projects conditions plus significant increases in agriculture resulting in increased agricultural demand, along without anticipated climate change hydrology.

The results are shown in the following figures:



Path: T:\Projects\Coachella On-Call SGMA Services 2019 - 75004\Task Order 2 - Alternative Plan Update\GRAPHICS\Figure 7-C1 Annual Model Water Budget for Additional Scenarios.gpj

WOODARD & CURRAN

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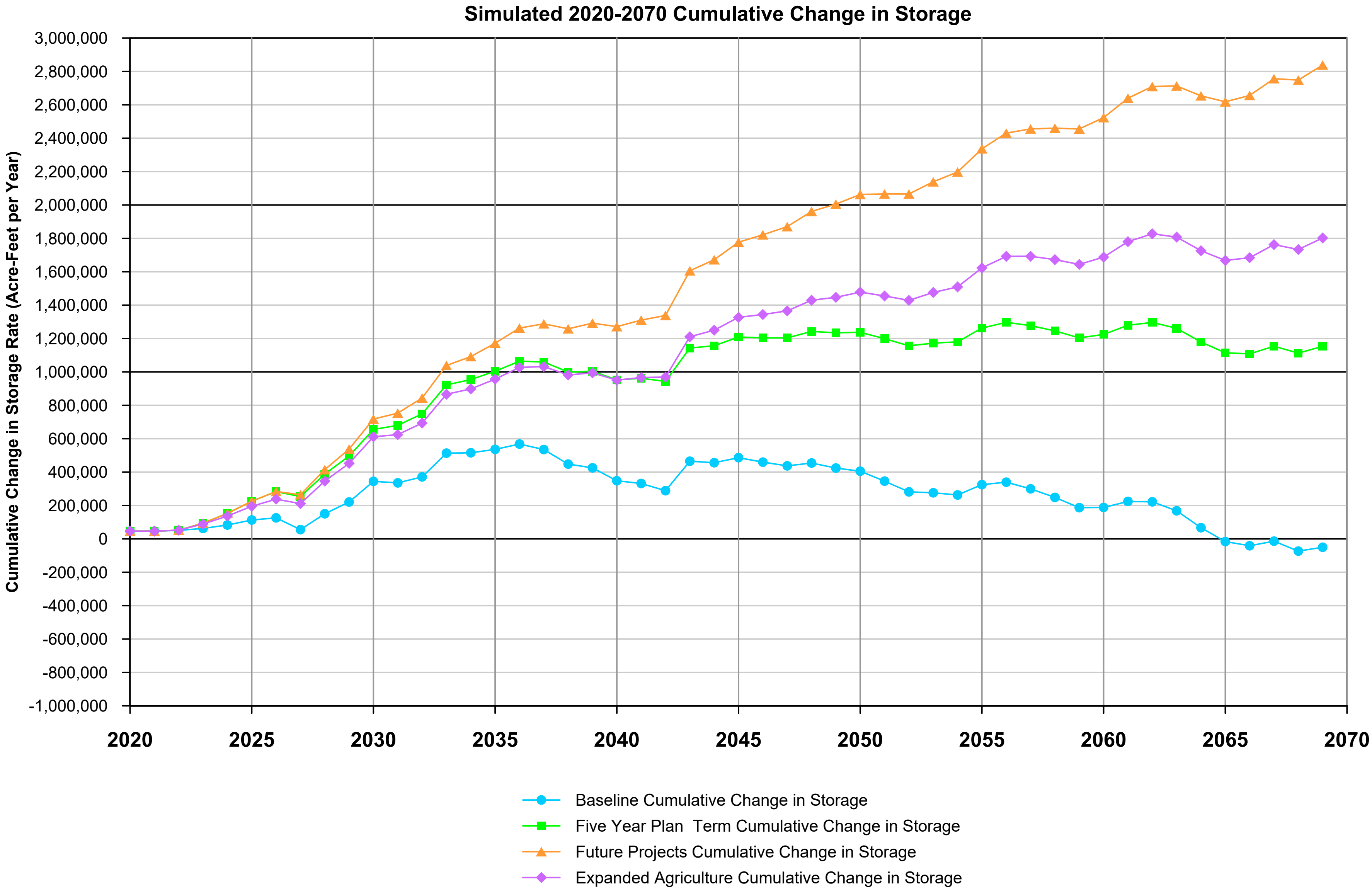
TODD GROUNDWATER

Figure 7-C1
Model Inflows and Outflows By Scenario



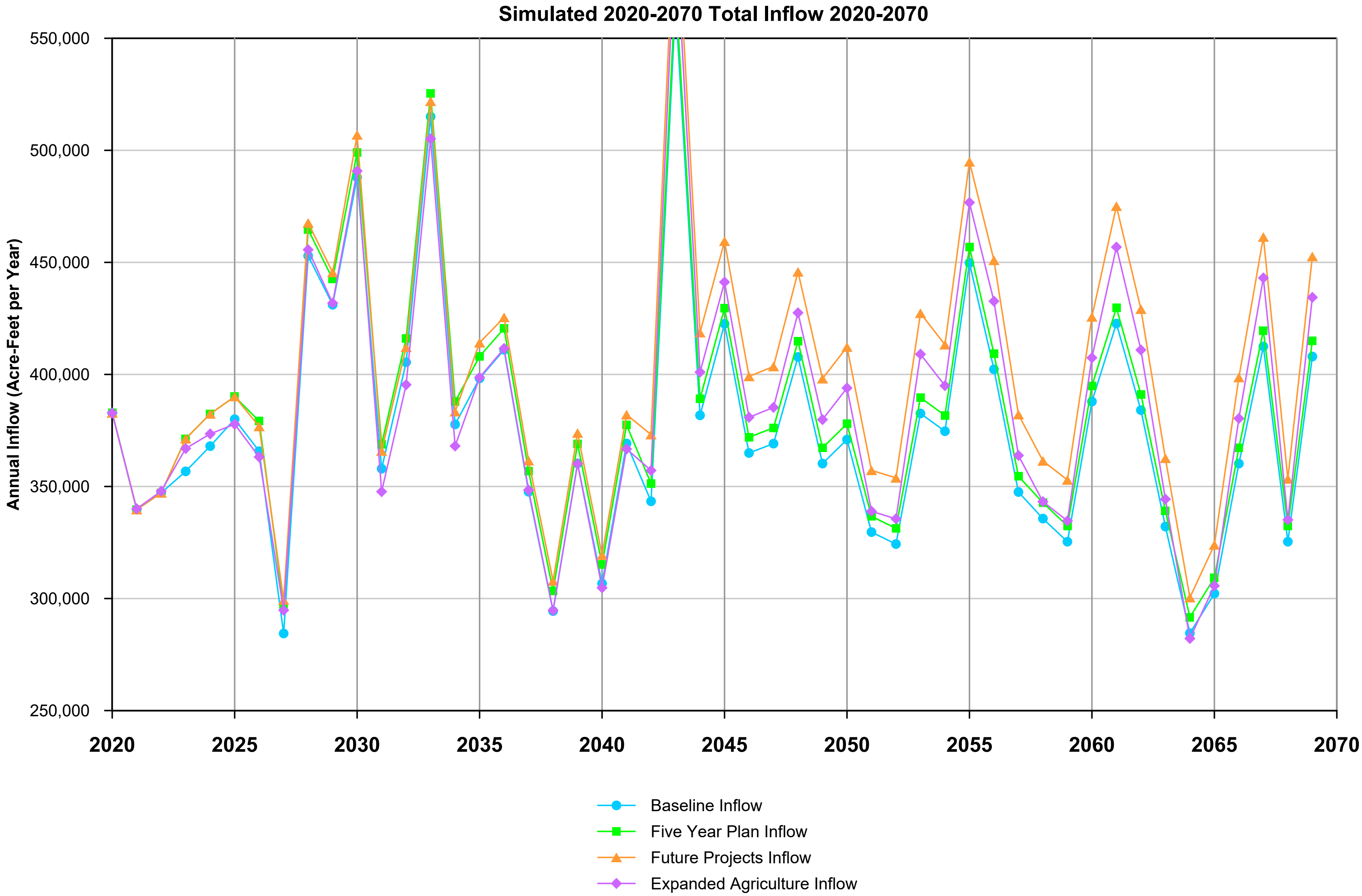
Path: T:\Projects\Coachella On-Call SGMA Services 2019 - 75004\Task Order 2 - Alternative Plan Update\GRAPHICS\Figure 7-C2 Cumulative Change in Storage for Additional Scenarios.gpj

WOODARD &CURRAN

DRAFT

TODD GROUNDWATER

Figure 7-C2
Cumulative Change in Storage for Additional Scenarios



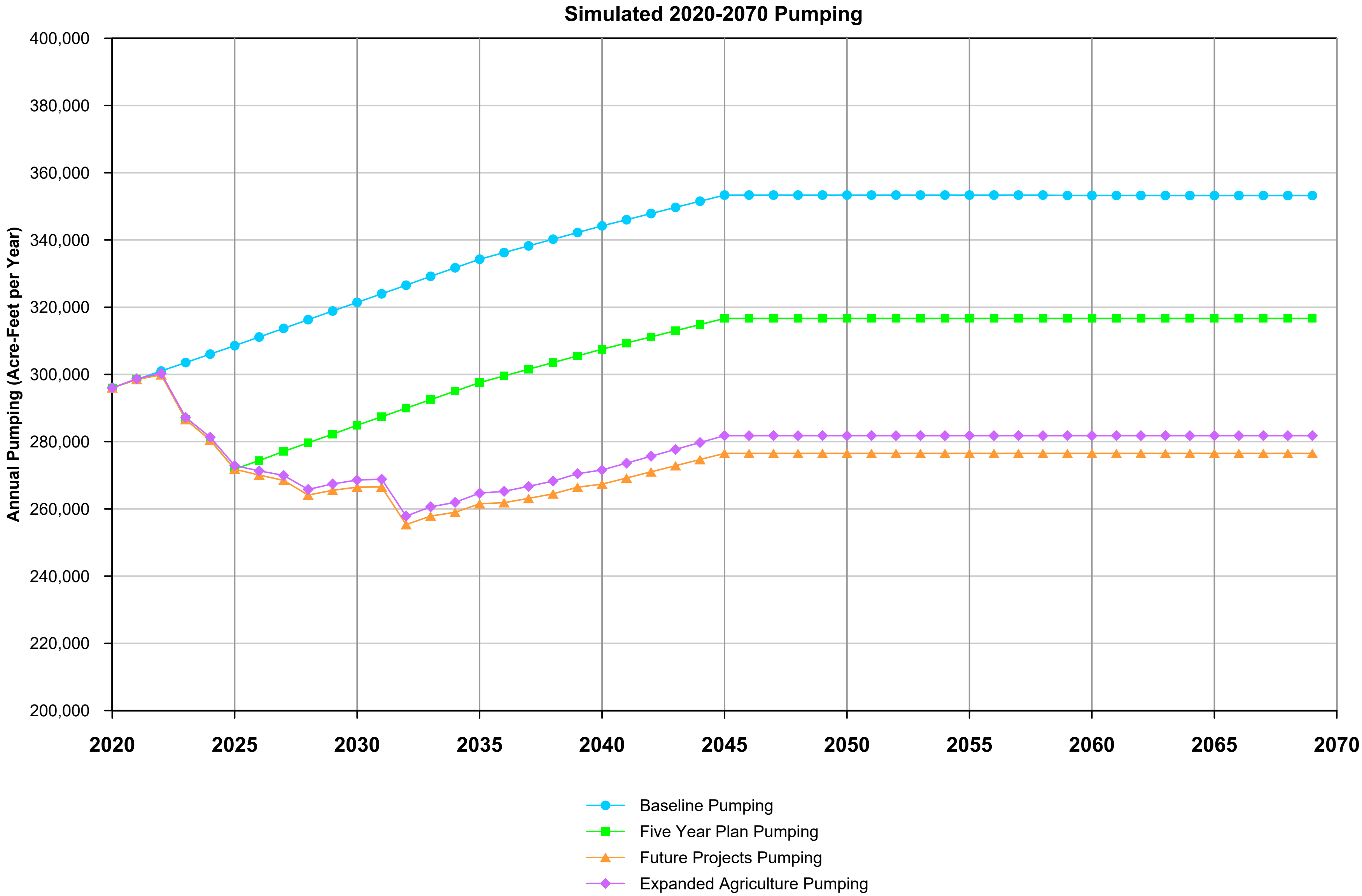
Path: T:\Projects\Coachella On-Call SGMA Services 2019 - 75004\Task Order 2 - Alternative Plan Update\GRAPHICS\Figure 7-C3 Total Model Inflow for Additional Scenarios.grf

WOODARD &CURRAN

DRAFT

TODD GROUNDWATER

Figure 7-C3
Total Model Inflow for Additional Scenarios



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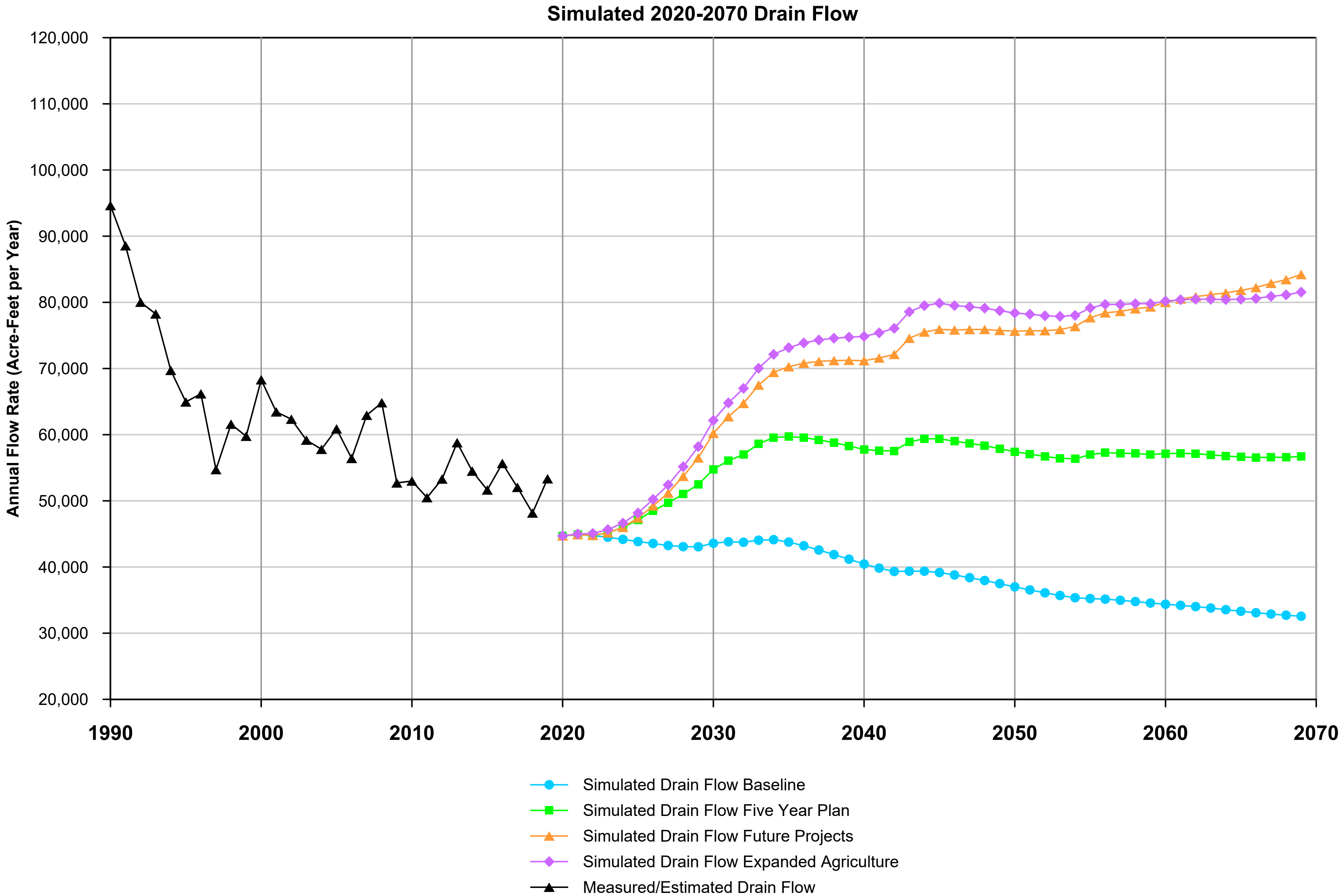
WOODARD & CURRAN

TODD GROUNDWATER

Figure 7-C4
Simulated Pumping for Additional Scenarios



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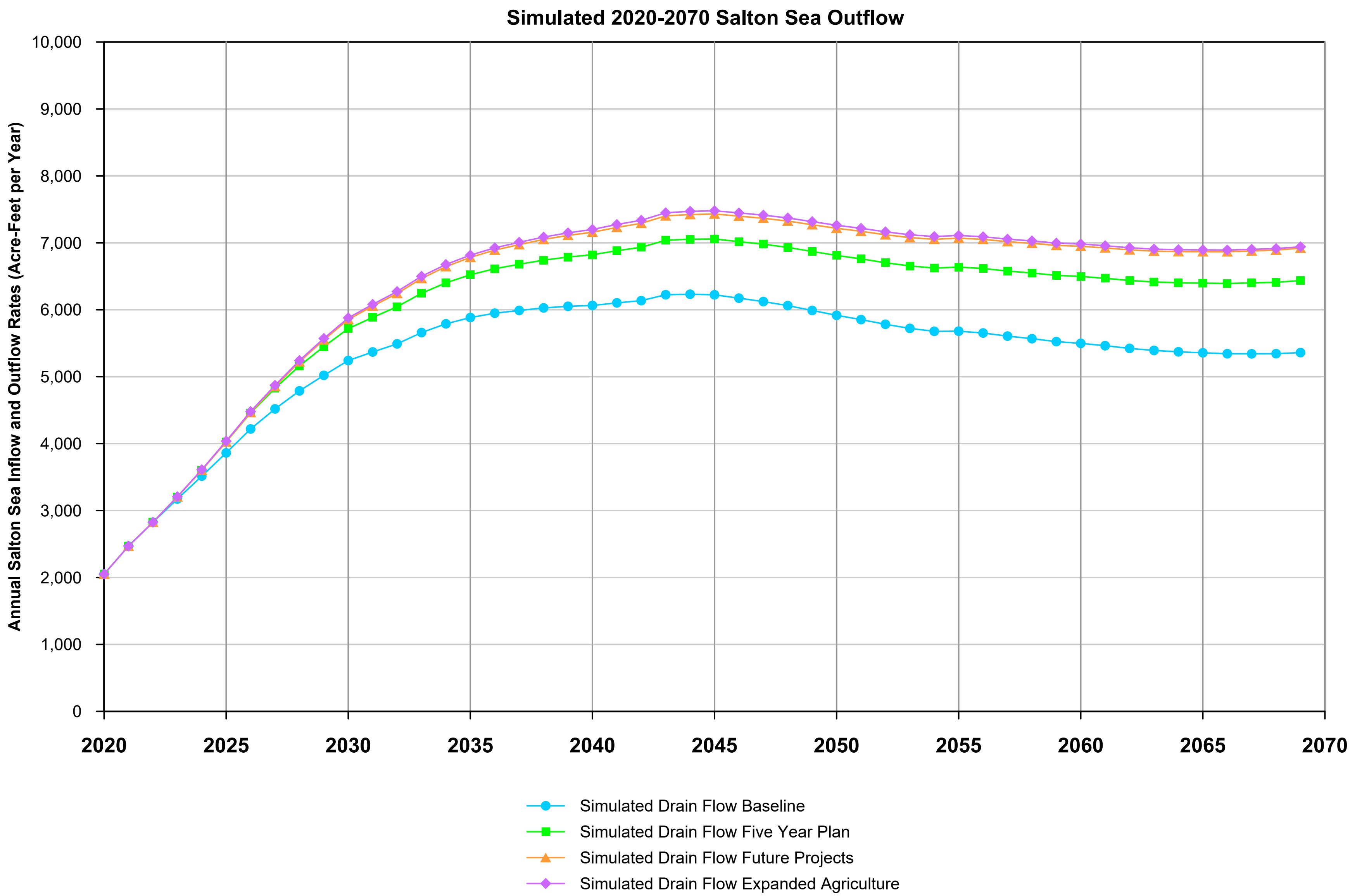
WOODARD & CURRAN

TODD GROUNDWATER

Figure 7-C5
Simulated Drain Flow for Additional Scenarios



Path: T:\Projects\Coachella On-Call SGMA Services 2019 - 75004\Task Order 2 - Alternative Plan Update\GRAPHICS\Figure 7-C6 Simulated Salton Sea Net Outflow for Additional Scenarios.grf

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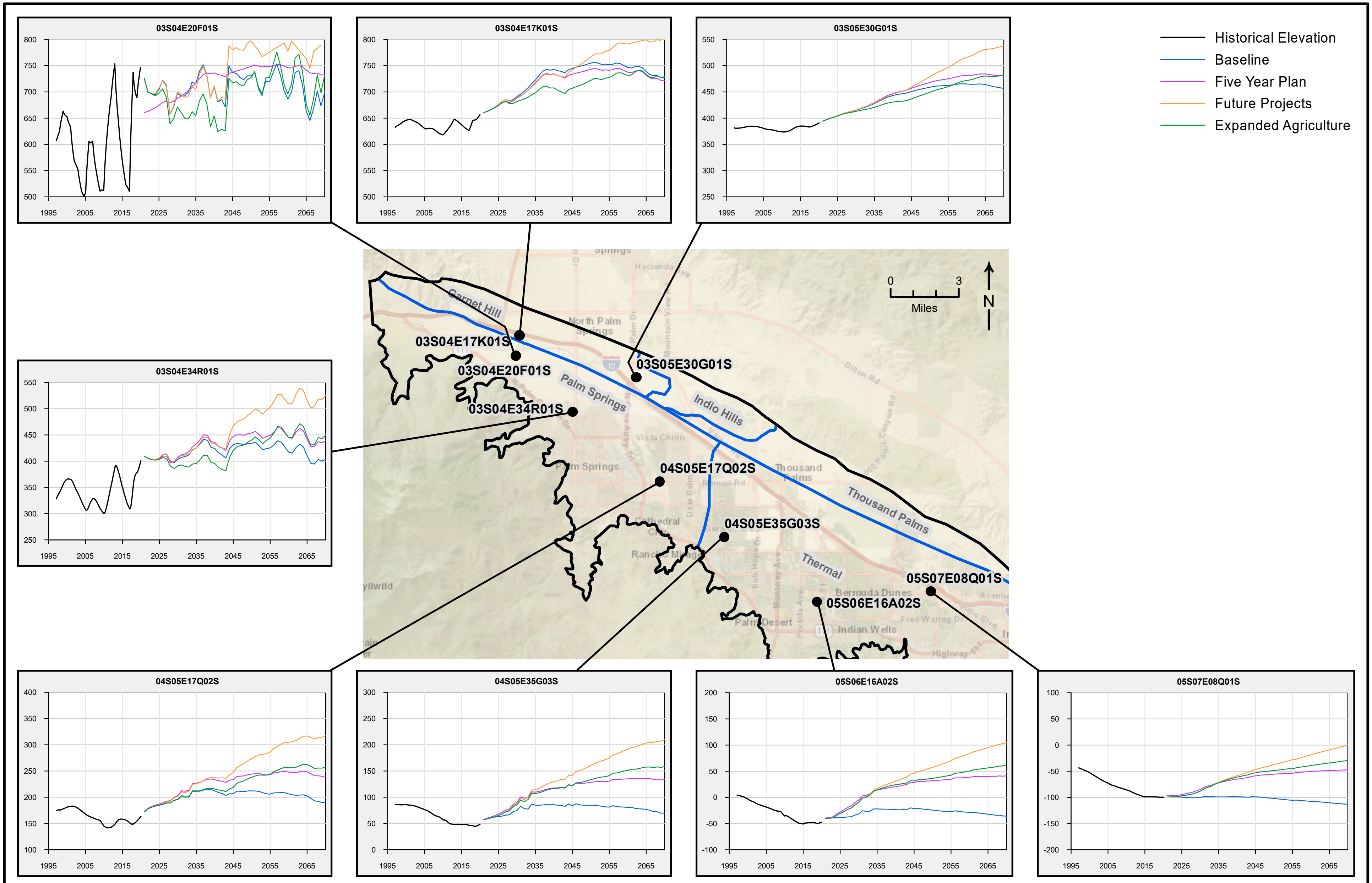
Figure 7-C6
Simulated Salton Sea Net Outflow for Additional Scenarios



- Model Results Hydrographs
- Indio Subbasin
- Indio Subbasin Subareas

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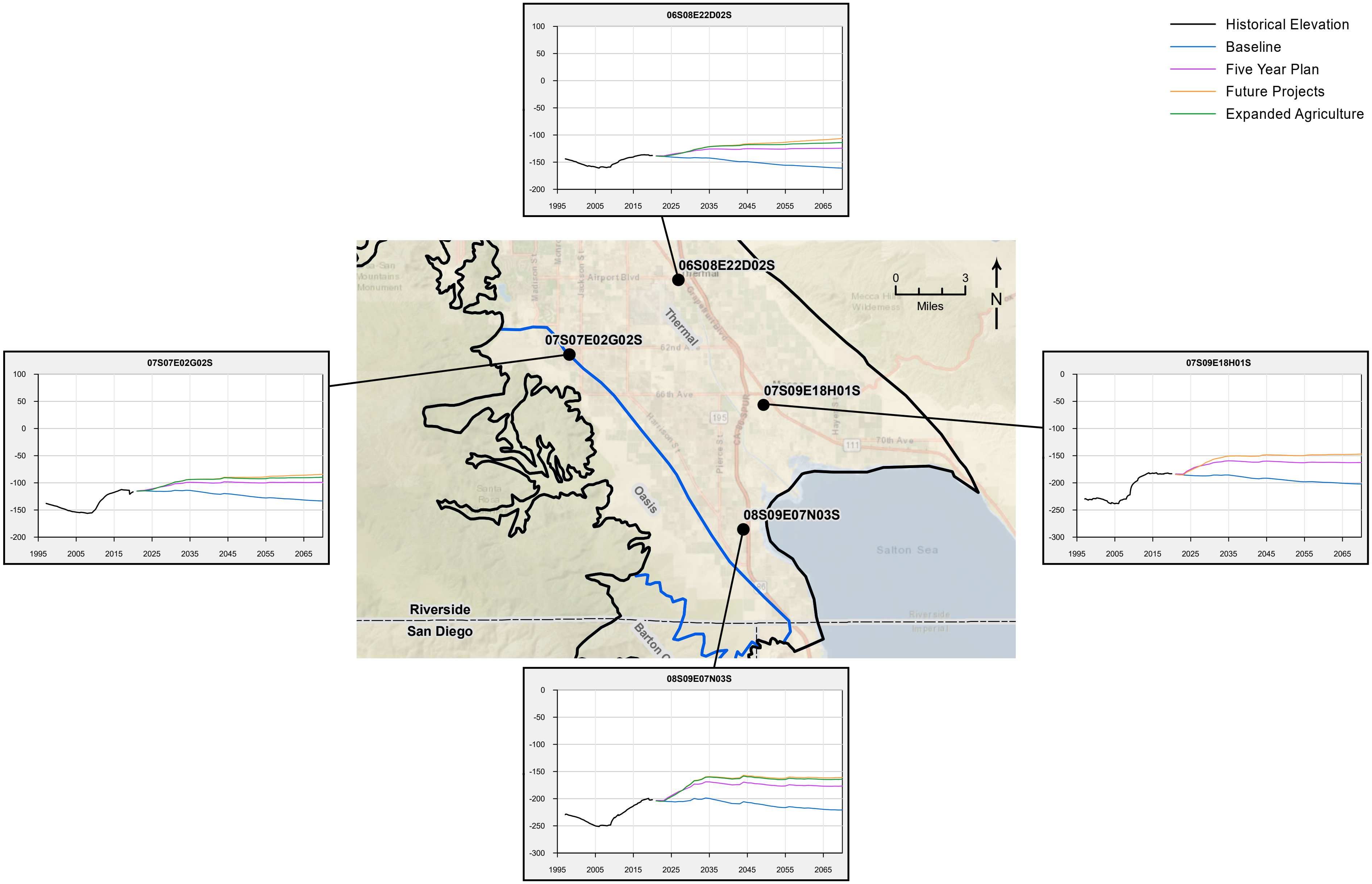
Figure 7-C7
Additional Scenarios Hydrographs, West Valley
2020-2069



Model Results Hydrographs
Indio Subbasin
Indio Subbasin Subareas
California County

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Figure 7-C8
Additional Scenarios
Hydrographs, East Valley
2020-2069

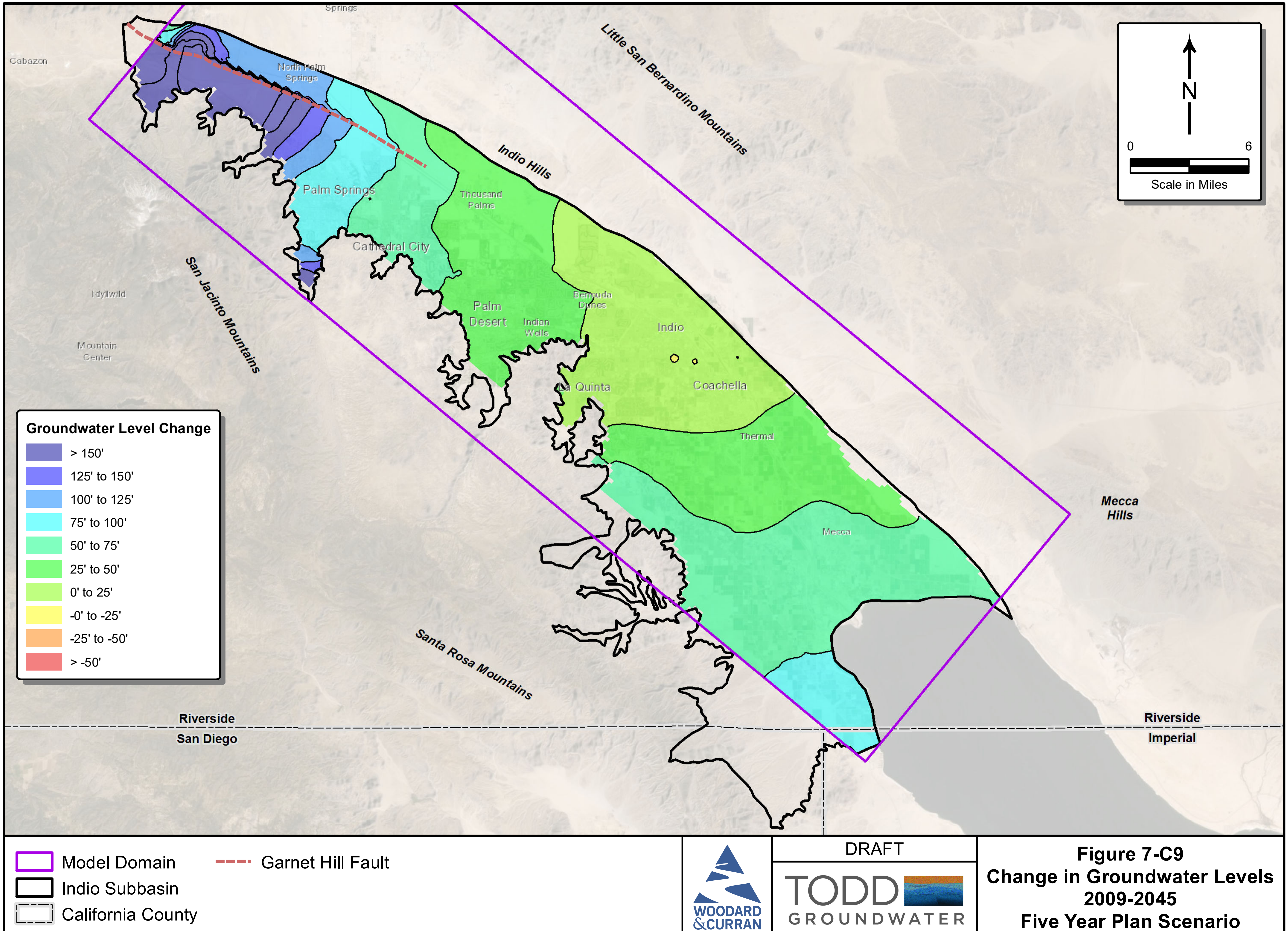
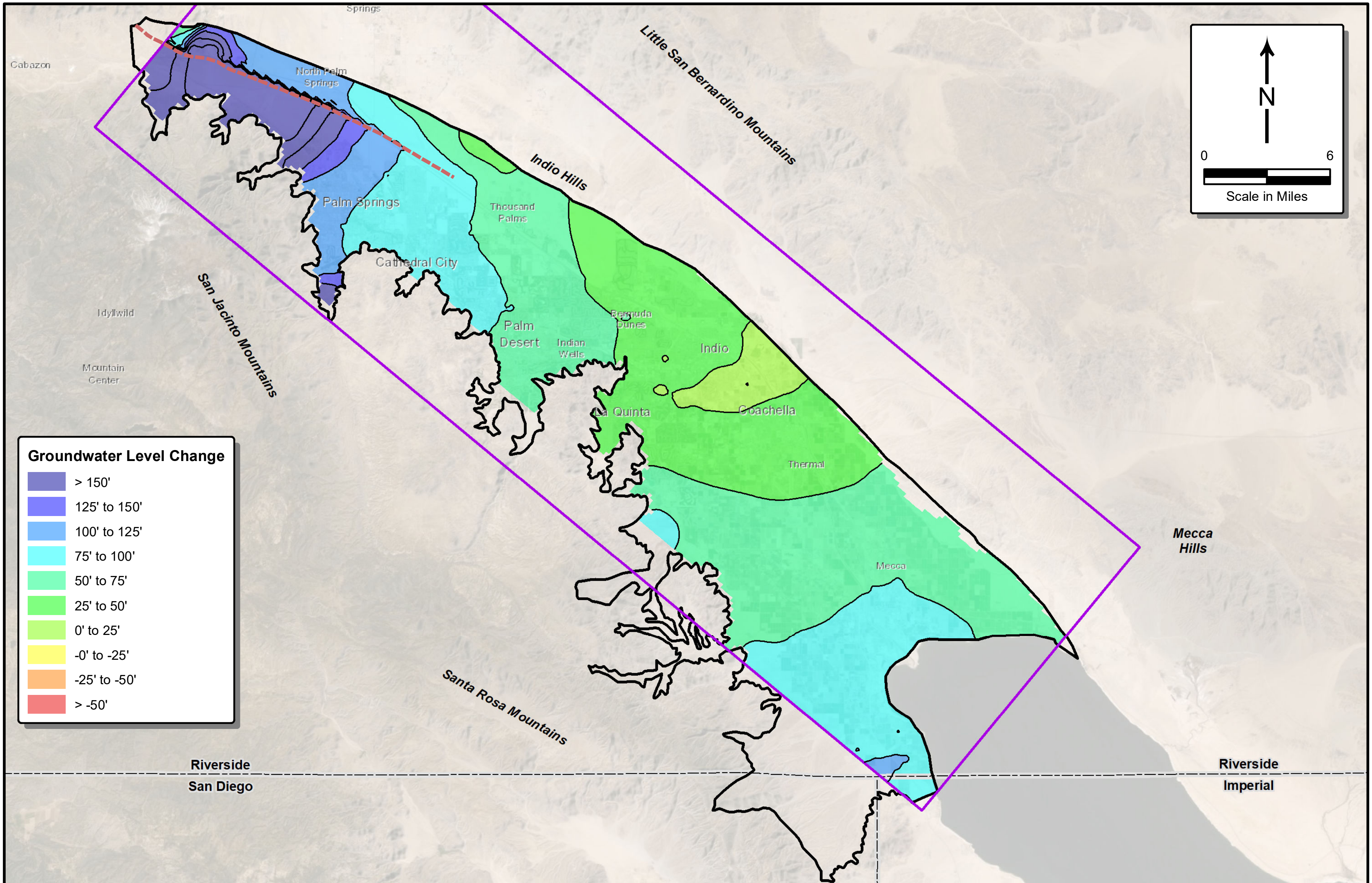


Figure 7-C9
Change in Groundwater Levels
2009-2045
Five Year Plan Scenario



Model Domain
Indio Subbasin
California County
Garnet Hill Fault

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Figure 7-C10
Change in Groundwater Levels
2009-2045
Future Projects Scenario

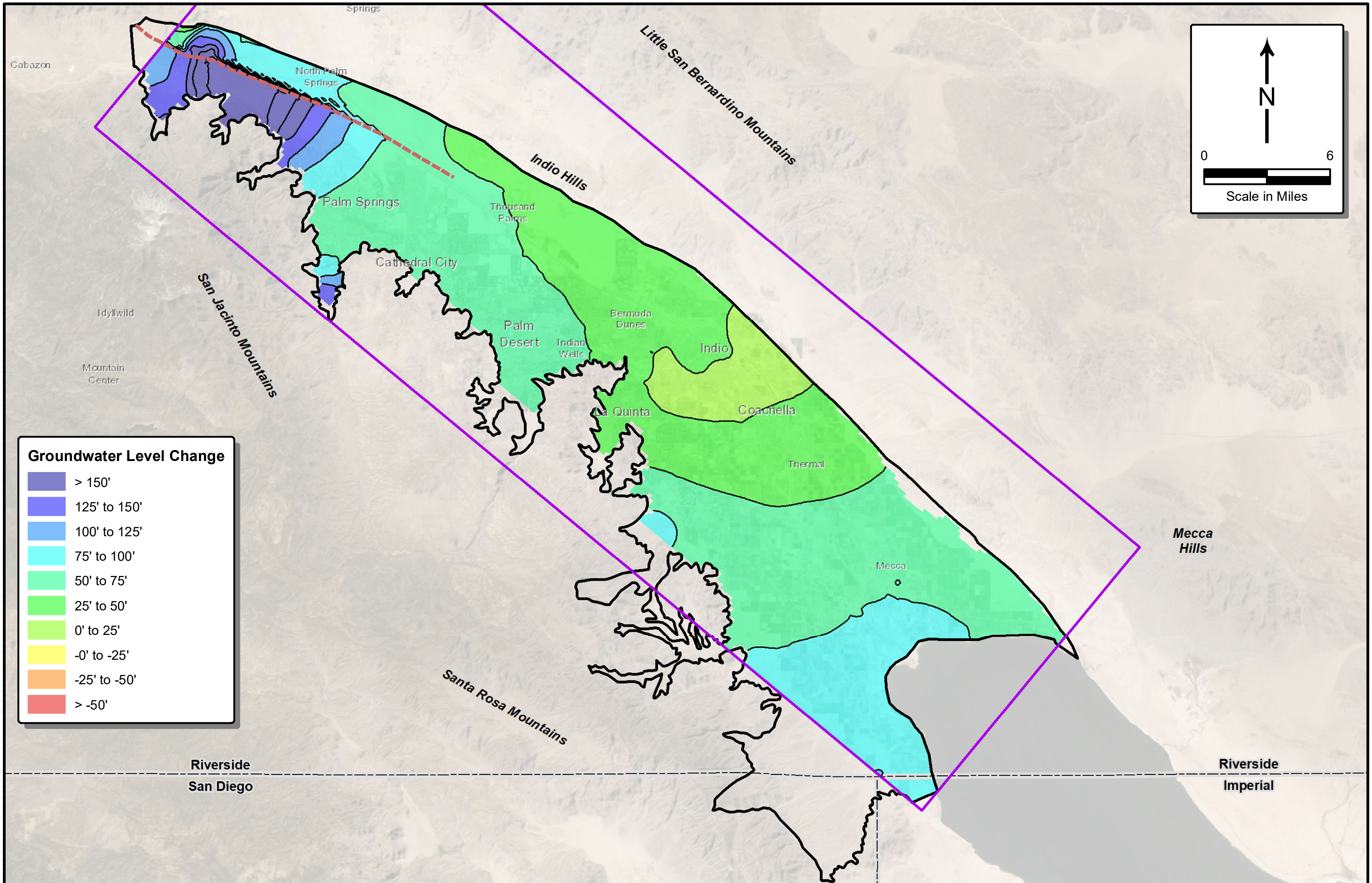

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Figure 7-C11
Change in Groundwater Levels
2009-2045
Expanded Agriculture Scenario

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APPENDIX 9-A
KEY WELL GROUNDWATER LEVEL HYDROGRAPHS WITH MINIMUM THRESHOLDS

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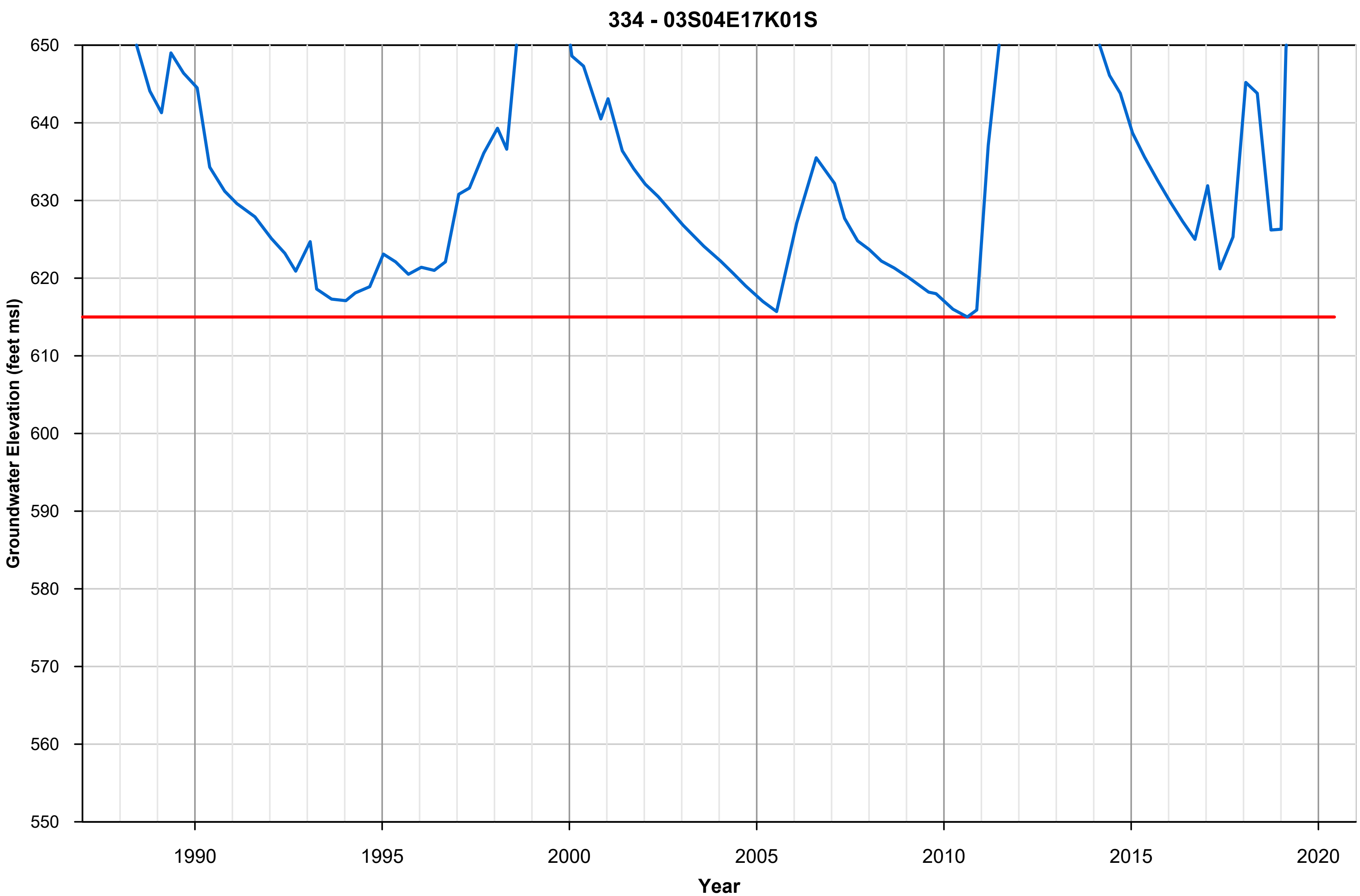

Note:
Minimum groundwater elevation occured in 1968.

Groundwater Elevation (feet msl)
Minimum Threshold (feet msl)

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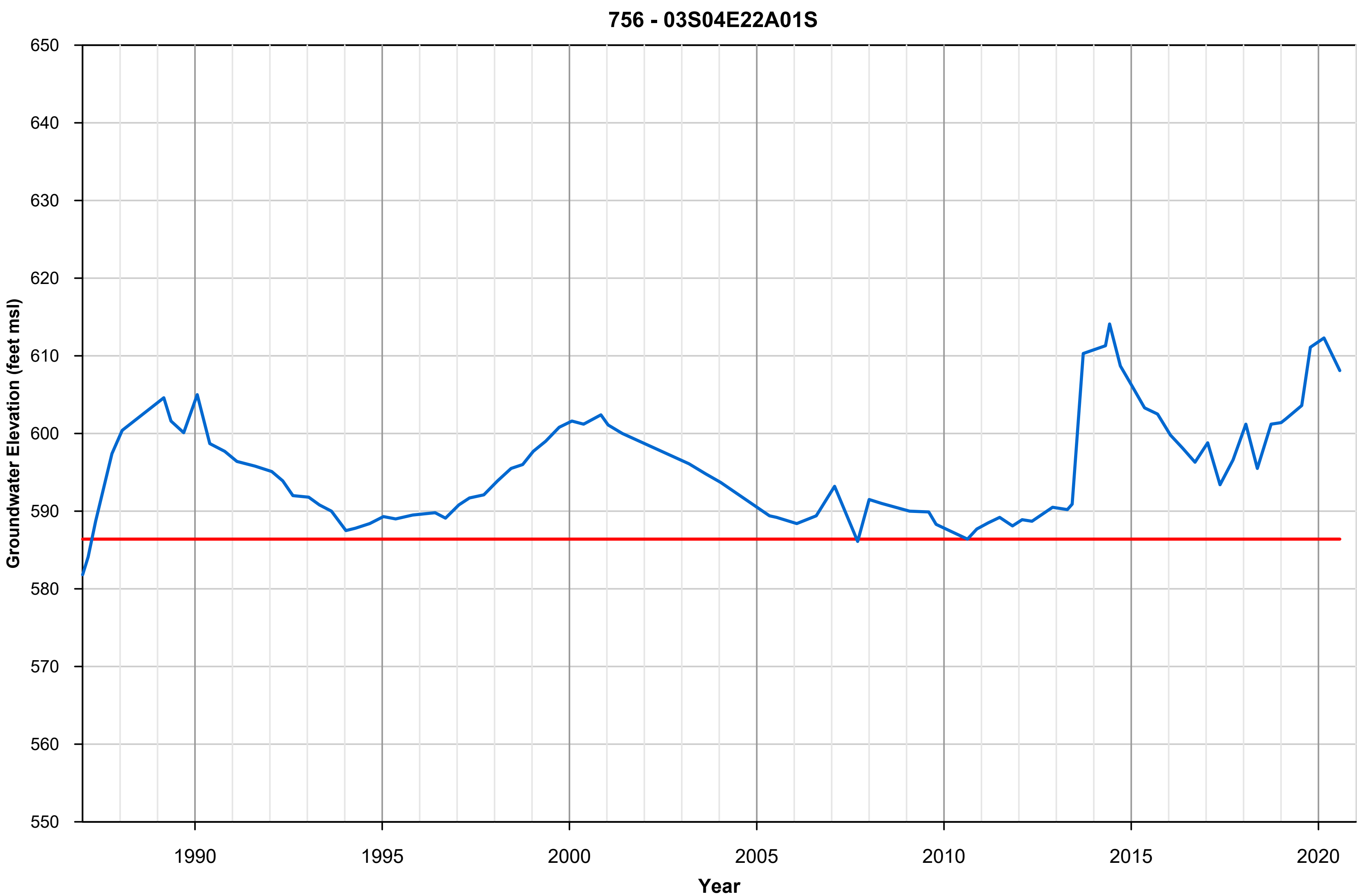
Appendix 9A-1
Groundwater Elevation Hydrograph
334 - 03S04E17K01S



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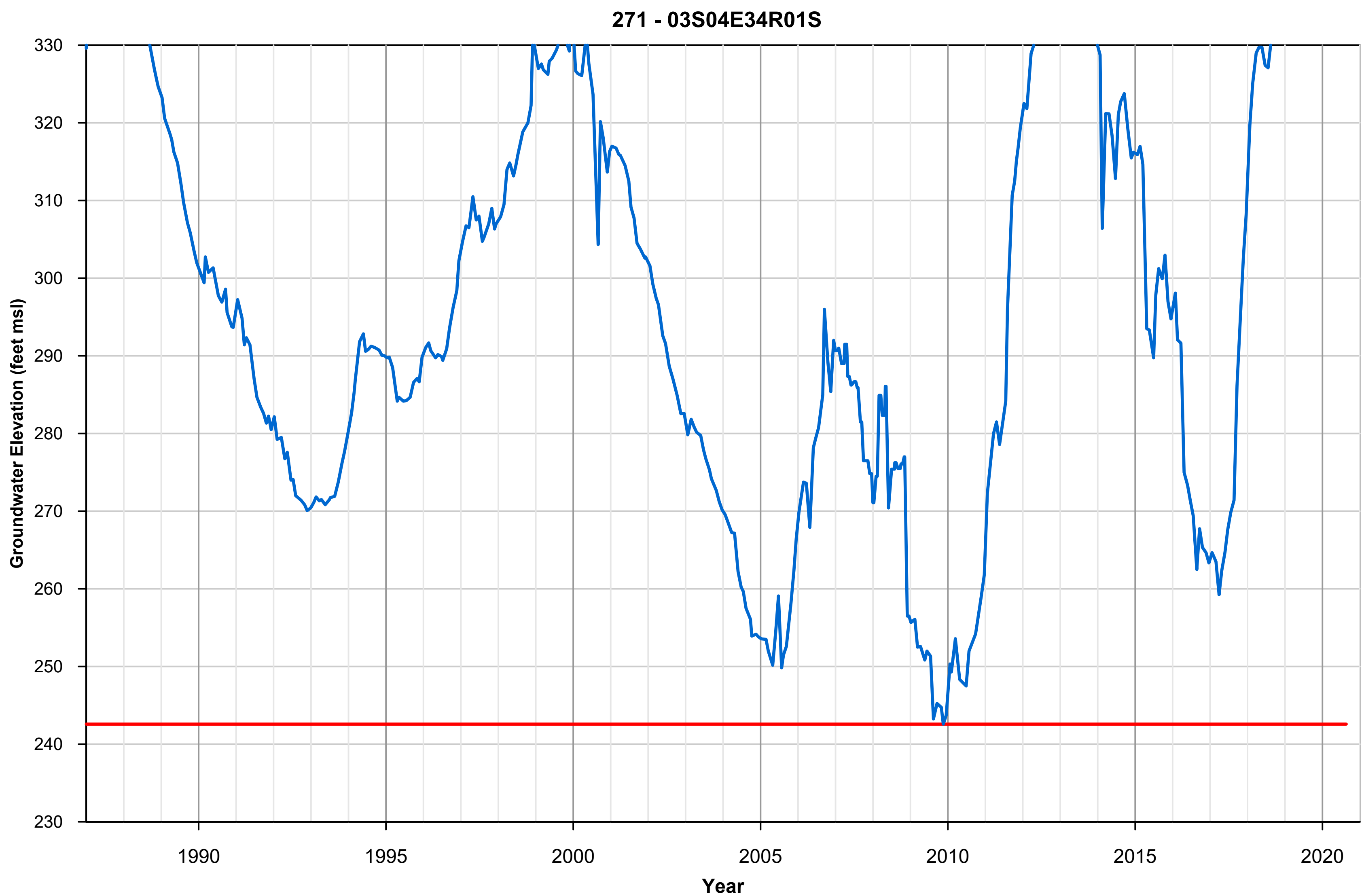
TODD GROUNDWATER

Appendix 9A-2
Groundwater Elevation Hydrograph
756 - 03S04E22A01S



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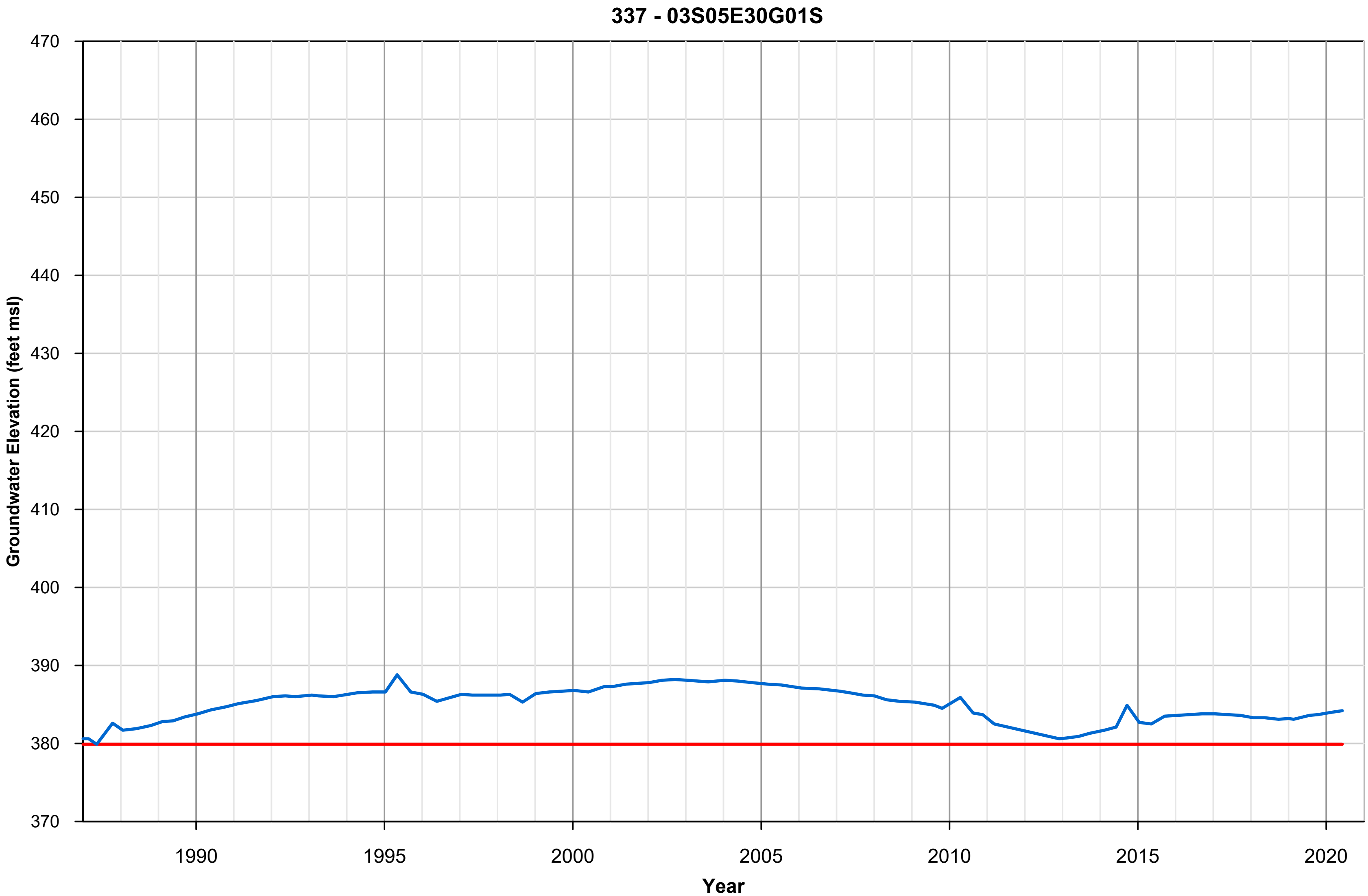
TODD GROUNDWATER

Appendix 9A-3
Groundwater Elevation Hydrograph
271 - 03S04E34R01S



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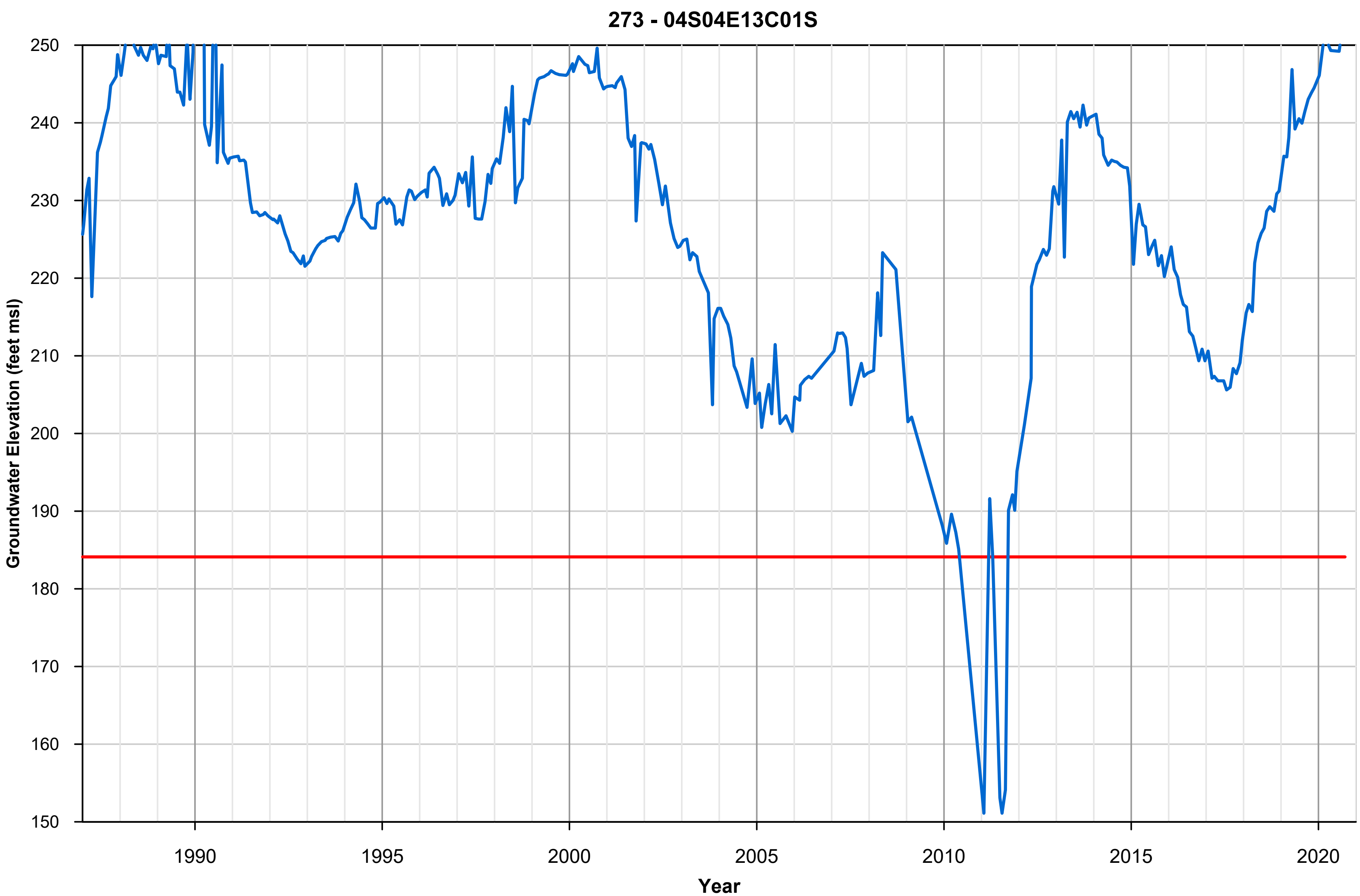
TODD GROUNDWATER

Appendix 9A-4
Groundwater Elevation Hydrograph
337 - 03S05E30G01S



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TODD GROUNDWATER

Appendix 9A-5
Groundwater Elevation Hydrograph
273 - 04S04E13C01S

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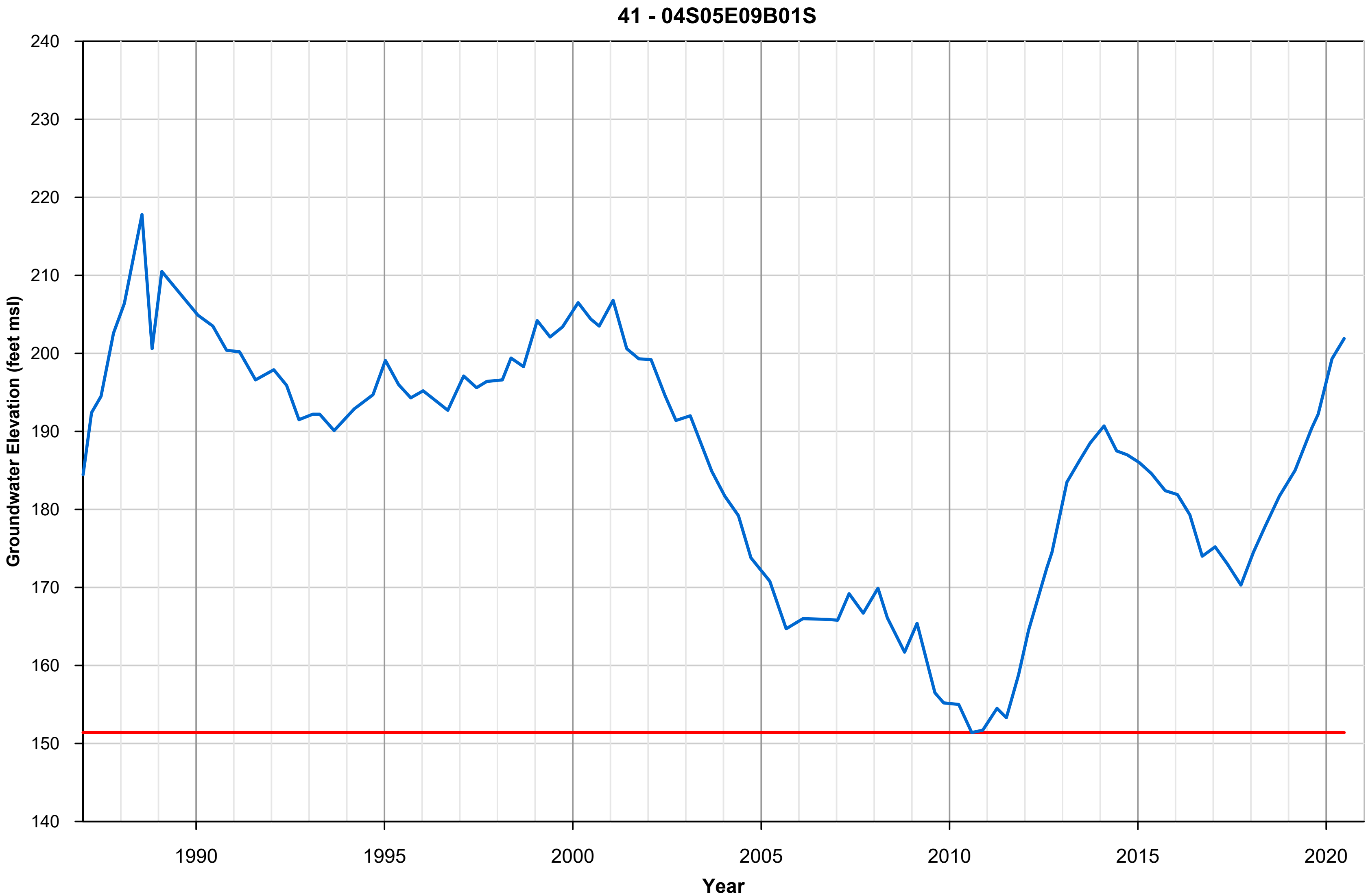
TODD GROUNDWATER

Appendix 9A-6
Groundwater Elevation Hydrograph
274 - 04S04E24D01S



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TODD GROUNDWATER

Appendix 9A-7
Groundwater Elevation Hydrograph
41 - 04S05E09B01S

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TODD GROUNDWATER

Appendix 9A-8
Groundwater Elevation Hydrograph
350 - 04S05E15R02S

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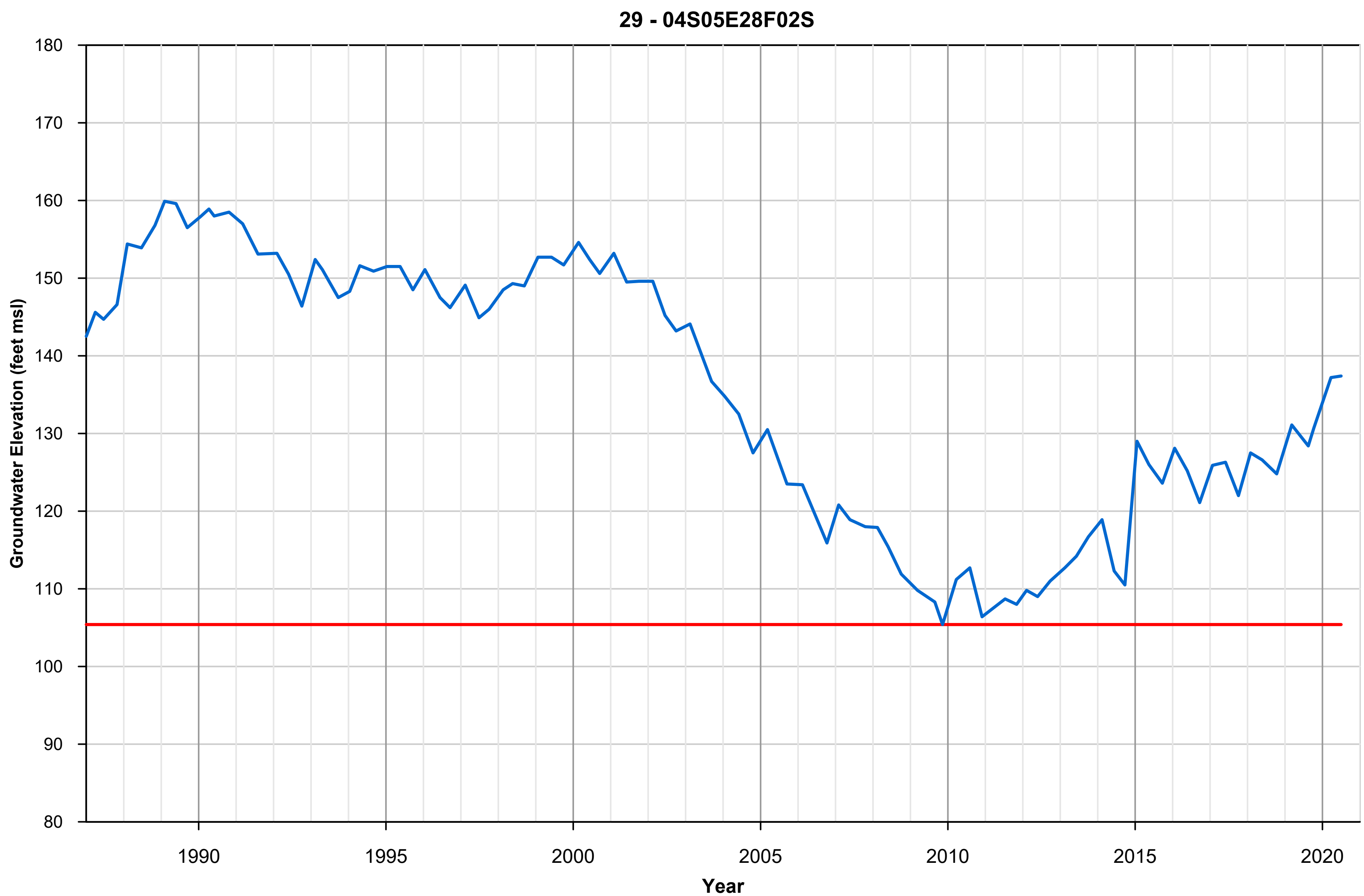
July 2021

TODD GROUNDWATER

Appendix 9A-9
Groundwater Elevation Hydrograph
282 - 04S05E17Q02S



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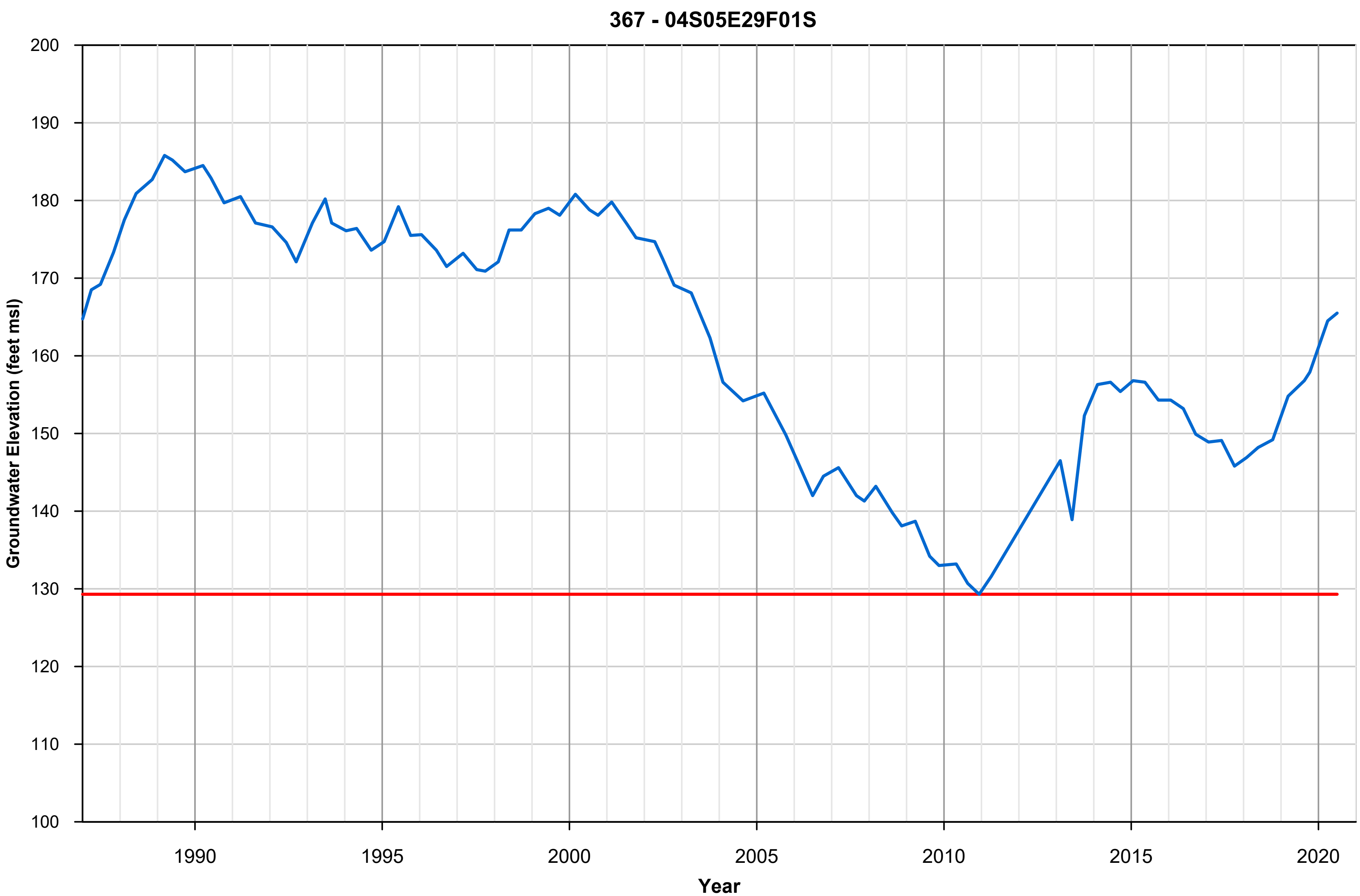
TODD GROUNDWATER

Appendix 9A-10
Groundwater Elevation Hydrograph
29 - 04S05E28F02S



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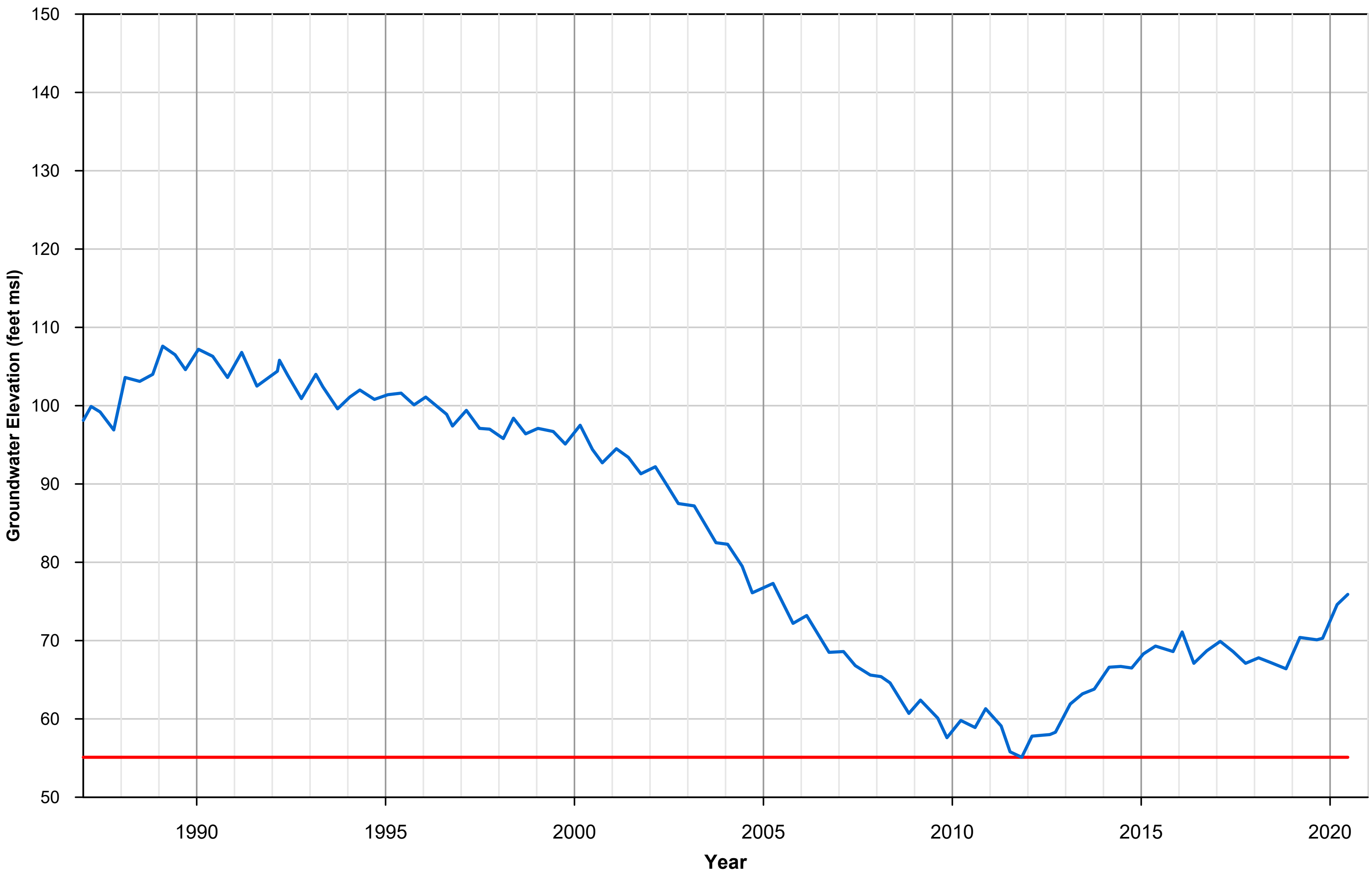
TODD GROUNDWATER

Appendix 9A-11
Groundwater Elevation Hydrograph
367 - 04S05E29F01S

18 - 04S05E35G03S



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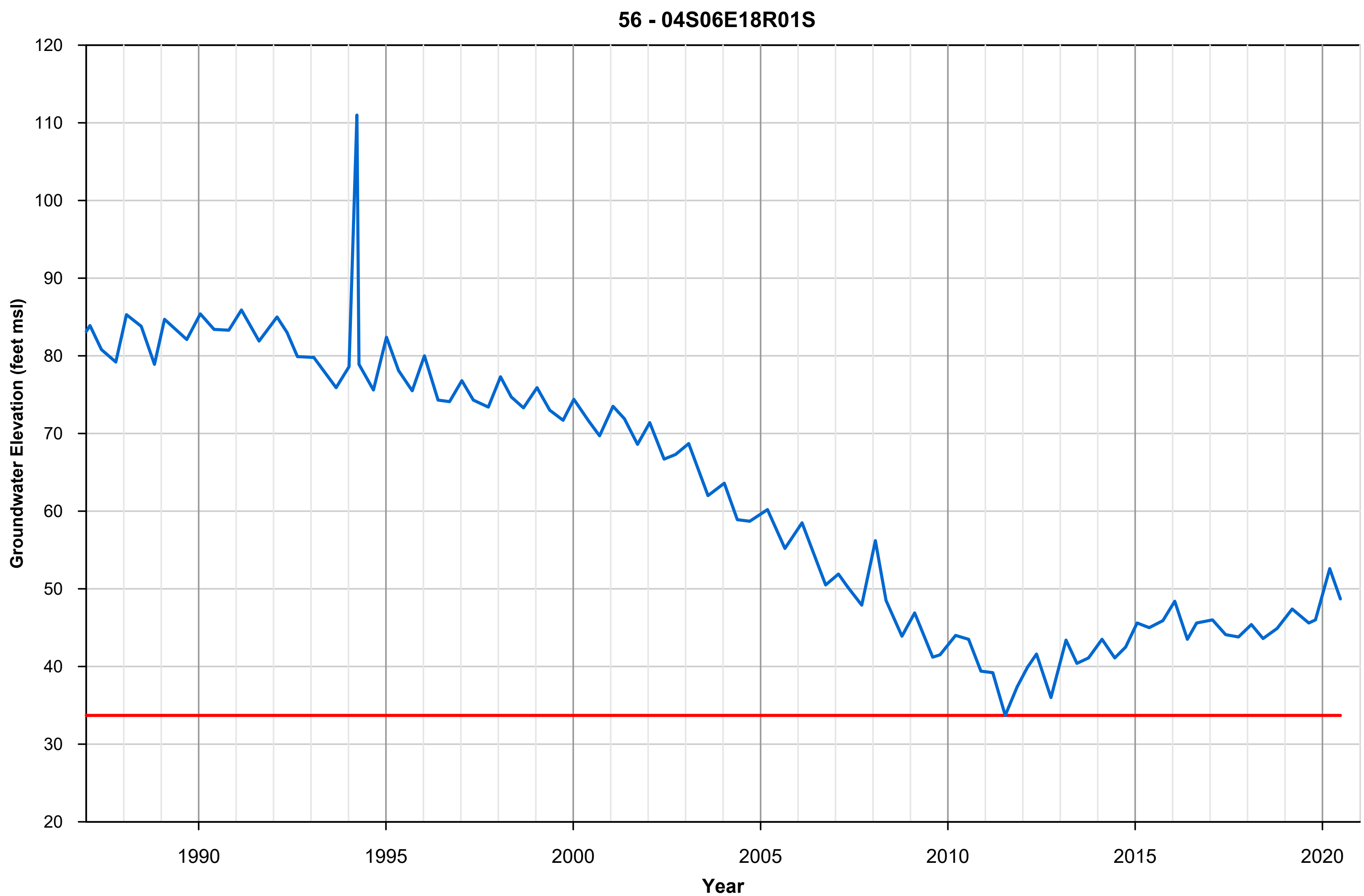
TODD GROUNDWATER

Appendix 9A-12
Groundwater Elevation Hydrograph
18 - 04S05E35G03S



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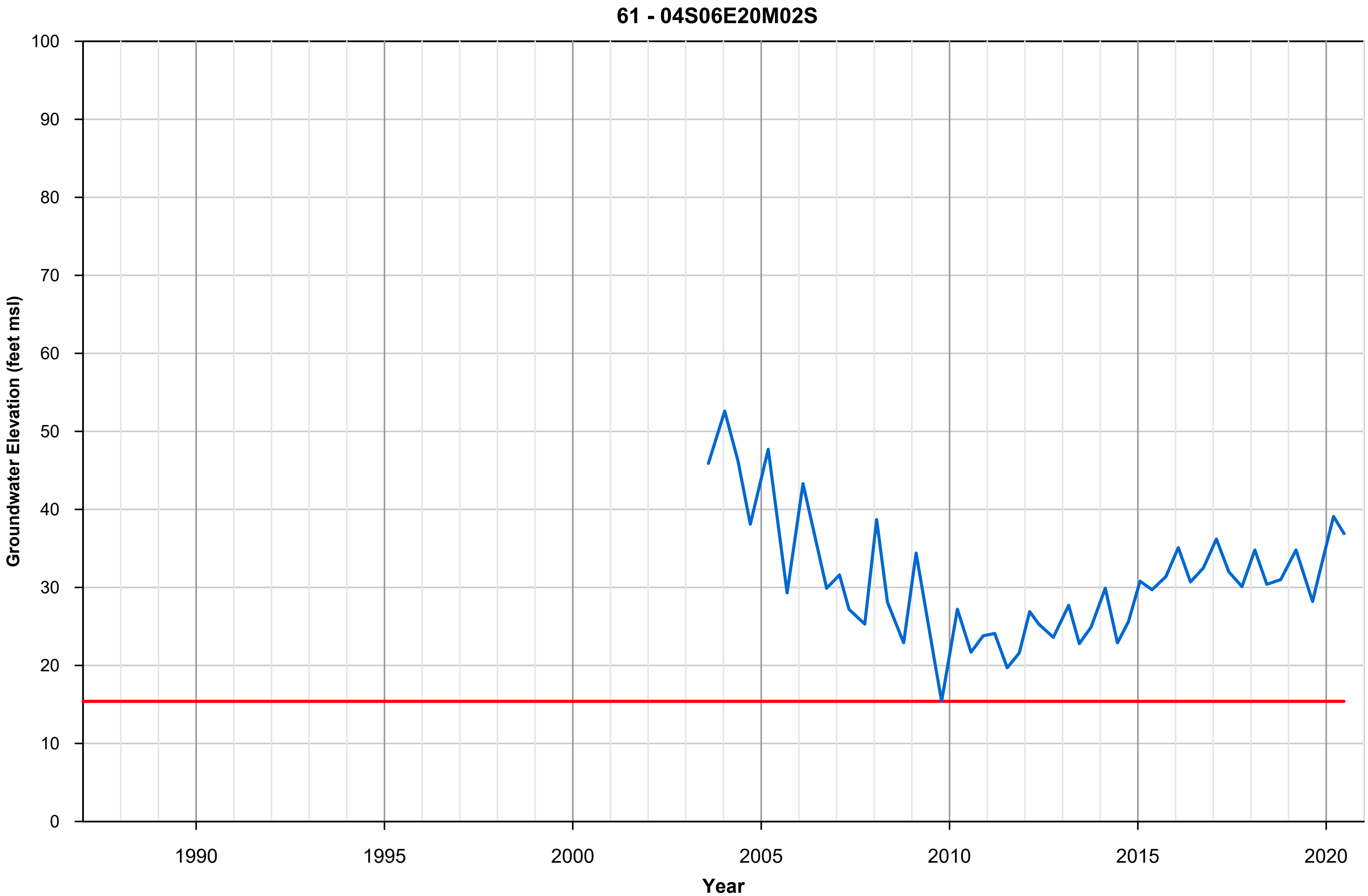
TODD GROUNDWATER

Appendix 9A-13
Groundwater Elevation Hydrograph
56 - 04S06E18R01S



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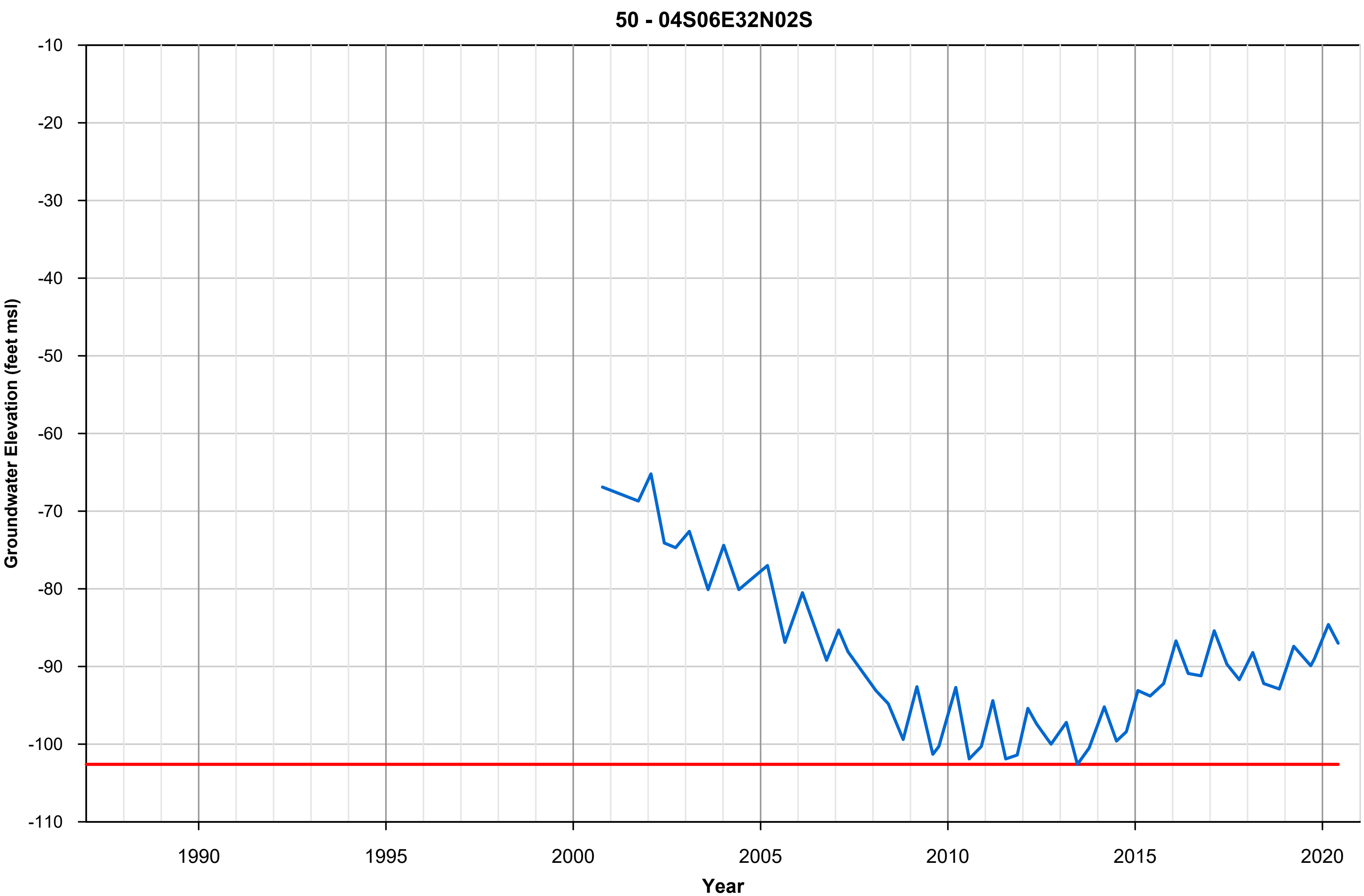
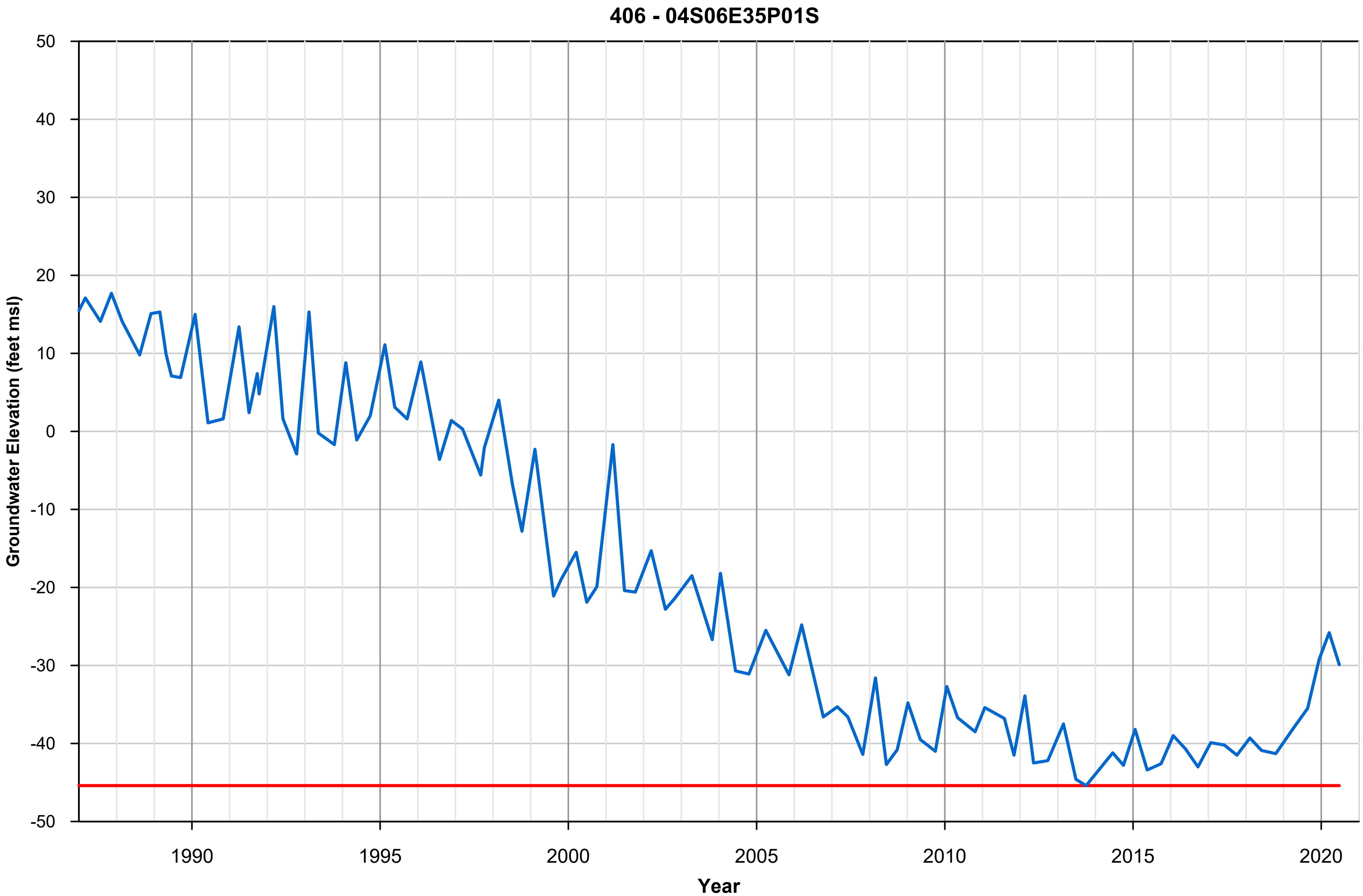
TODD GROUNDWATER

Appendix 9A-14
Groundwater Elevation Hydrograph
61 - 04S06E20M02S



50 - 04S06E32N02S
Groundwater Elevation (feet msl)
-10
-20
-30
-40
-50
-60
-70
-80
-90
-100
-110
1990
1995
2000
2005
2010
2015
2020
Year



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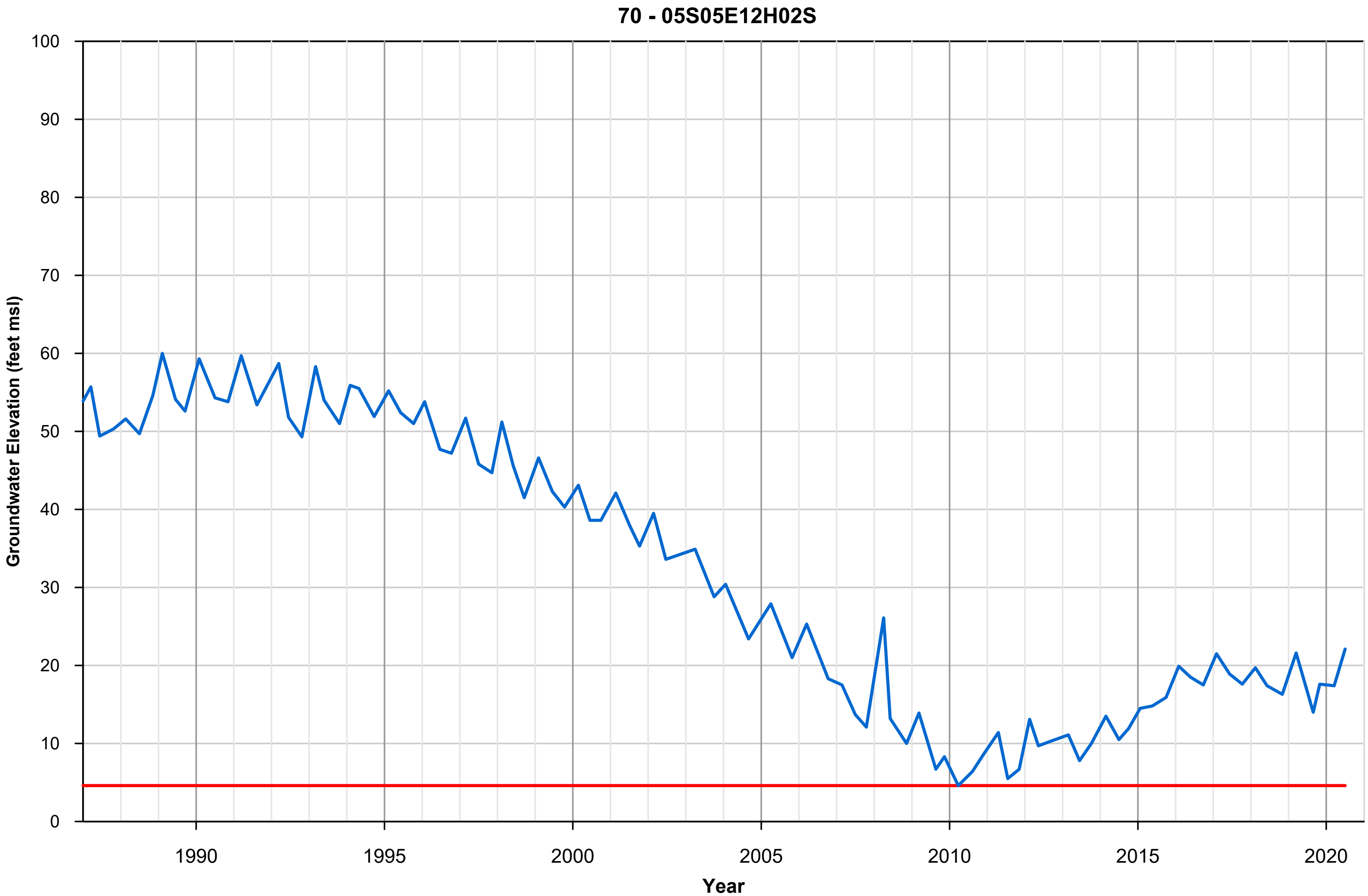
TODD GROUNDWATER

Appendix 9A-16
Groundwater Elevation Hydrograph
406 - 04S06E35P01S



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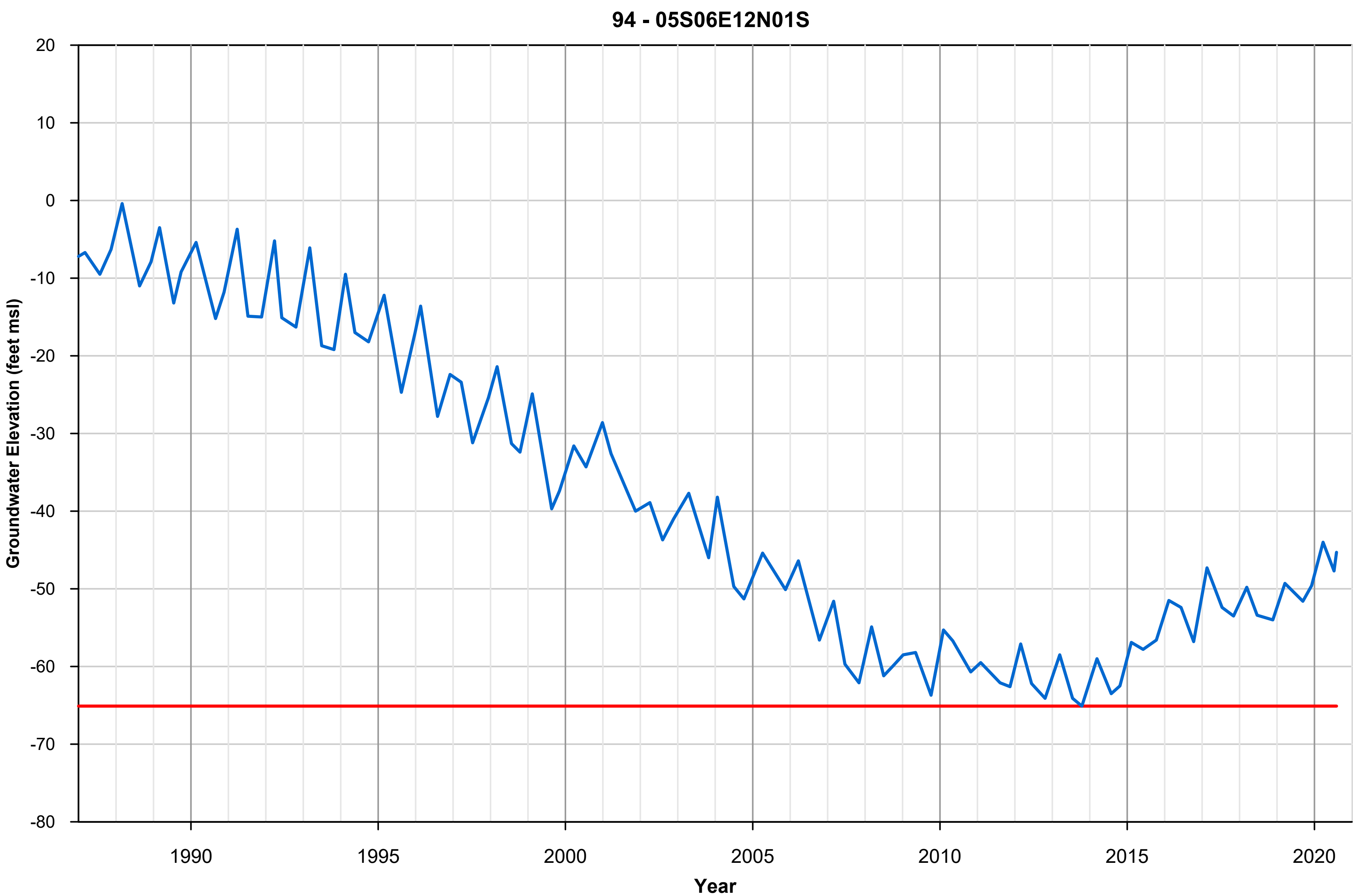
TODD GROUNDWATER

Appendix 9A-17
Groundwater Elevation Hydrograph
70 - 05S05E12H02S



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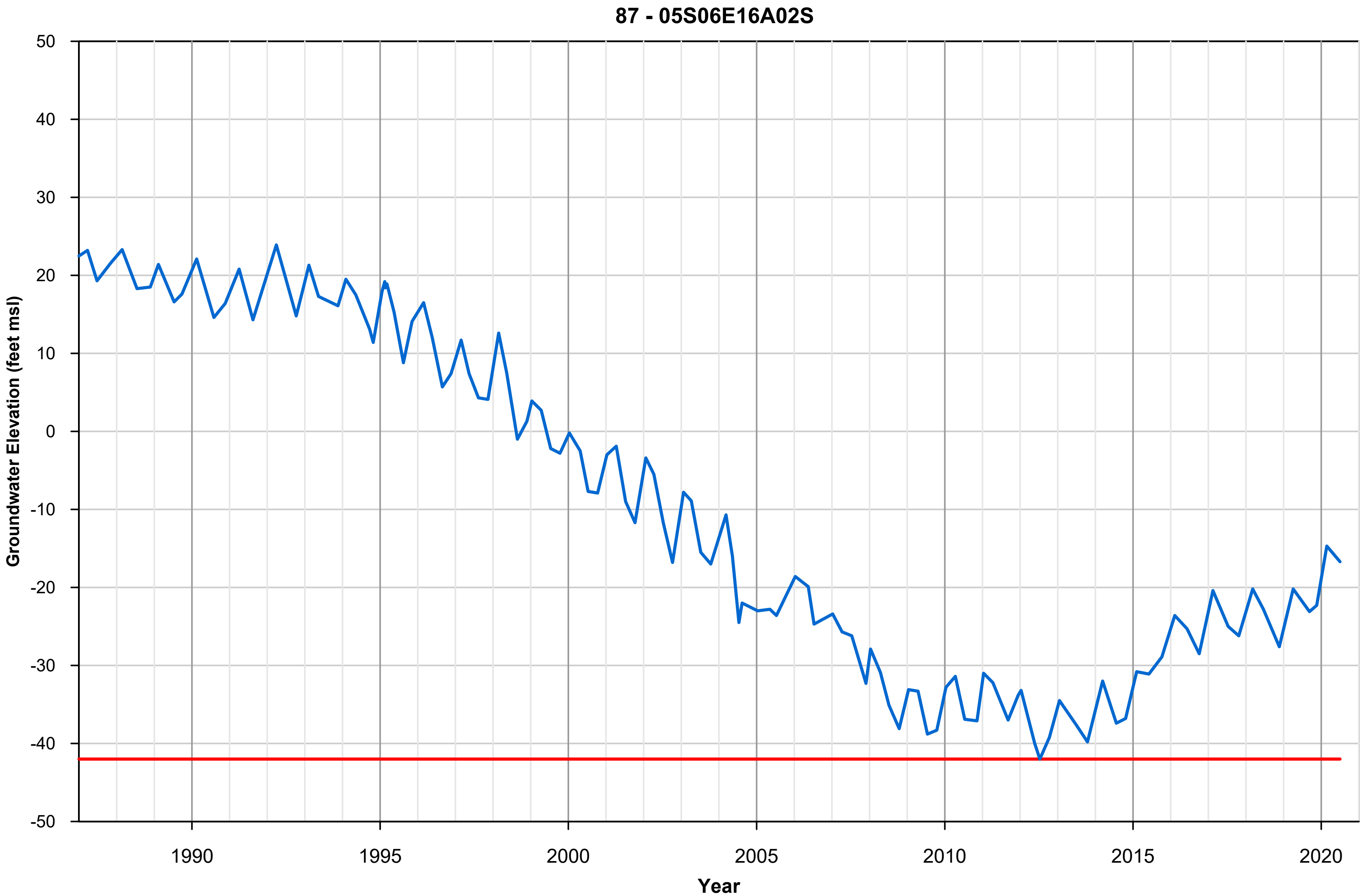
TODD GROUNDWATER

Appendix 9A-18
Groundwater Elevation Hydrograph
94 - 05S06E12N01S



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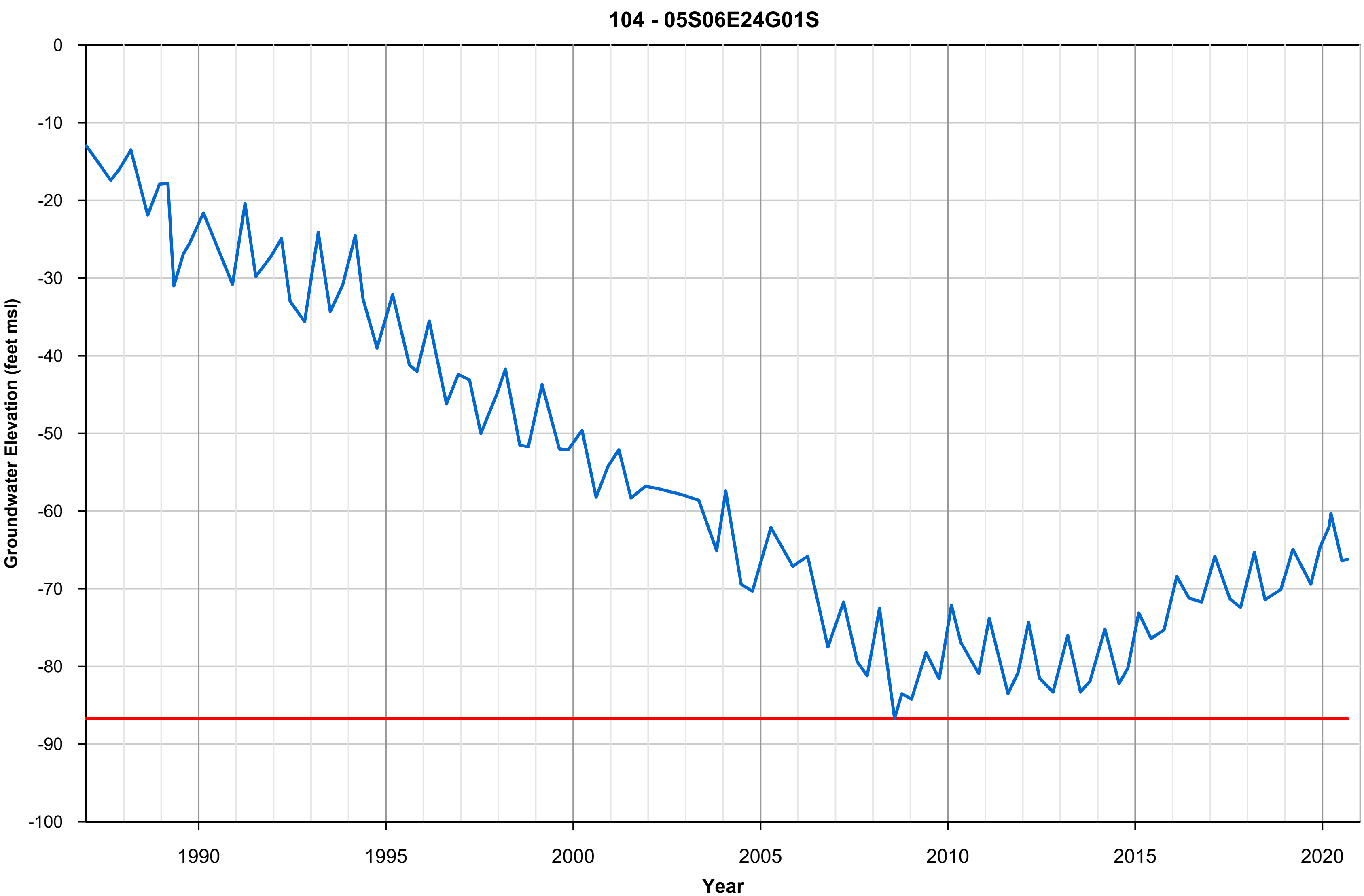
TODD GROUNDWATER

Appendix 9A-19
Groundwater Elevation Hydrograph
87 - 05S06E16A02S



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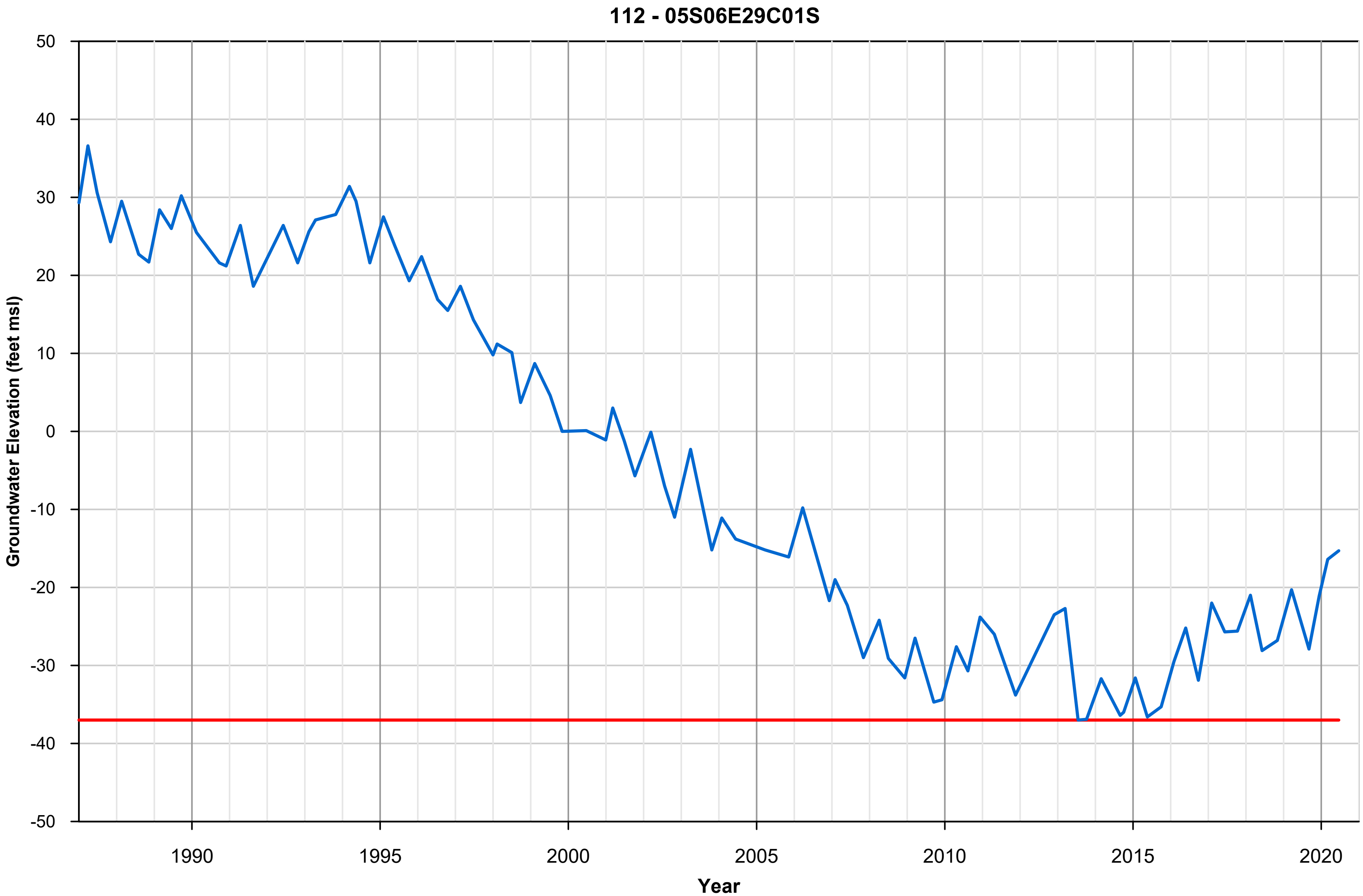
TODD GROUNDWATER

Appendix 9A-20
Groundwater Elevation Hydrograph
104 - 05S06E24G01S



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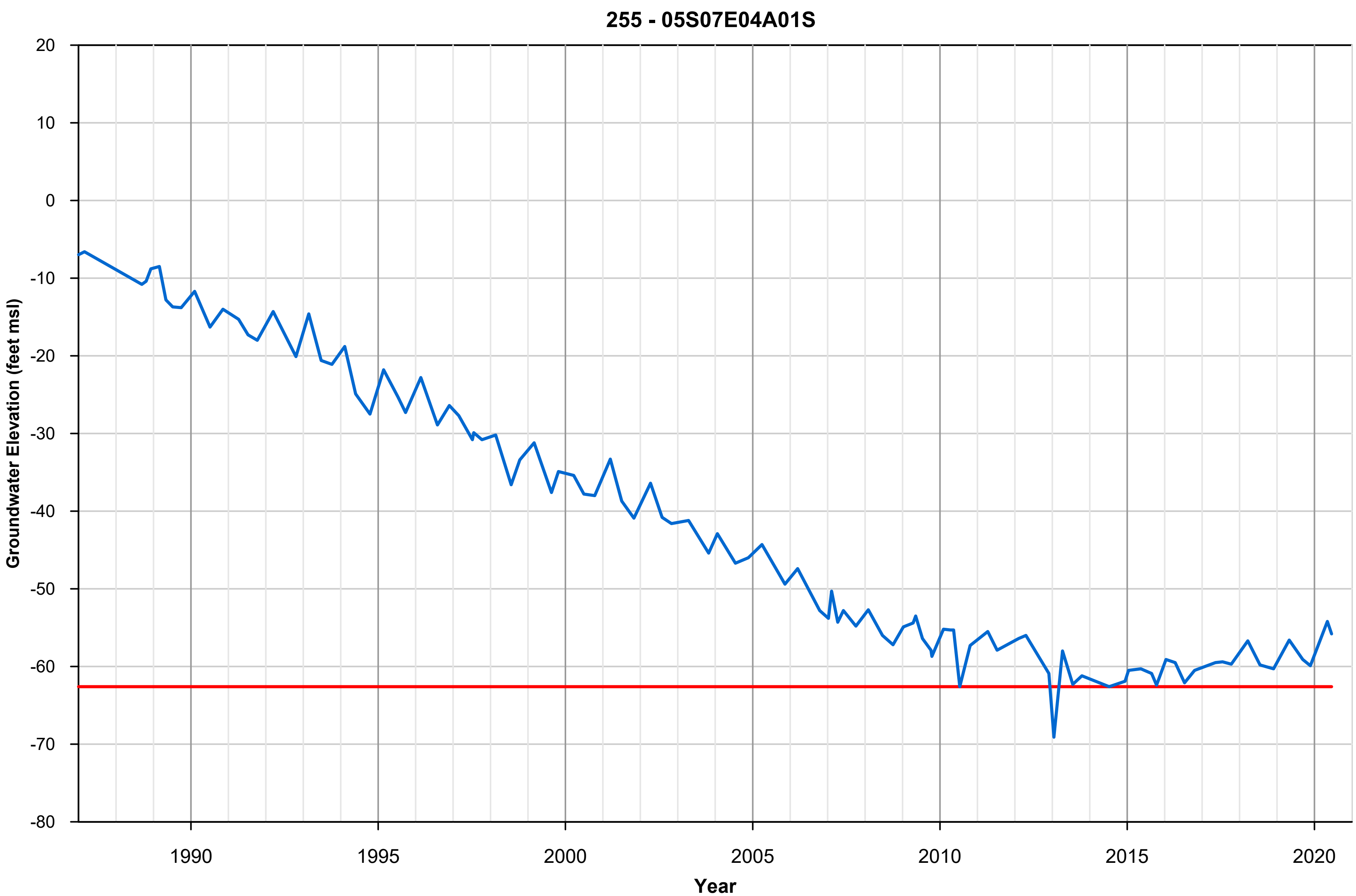
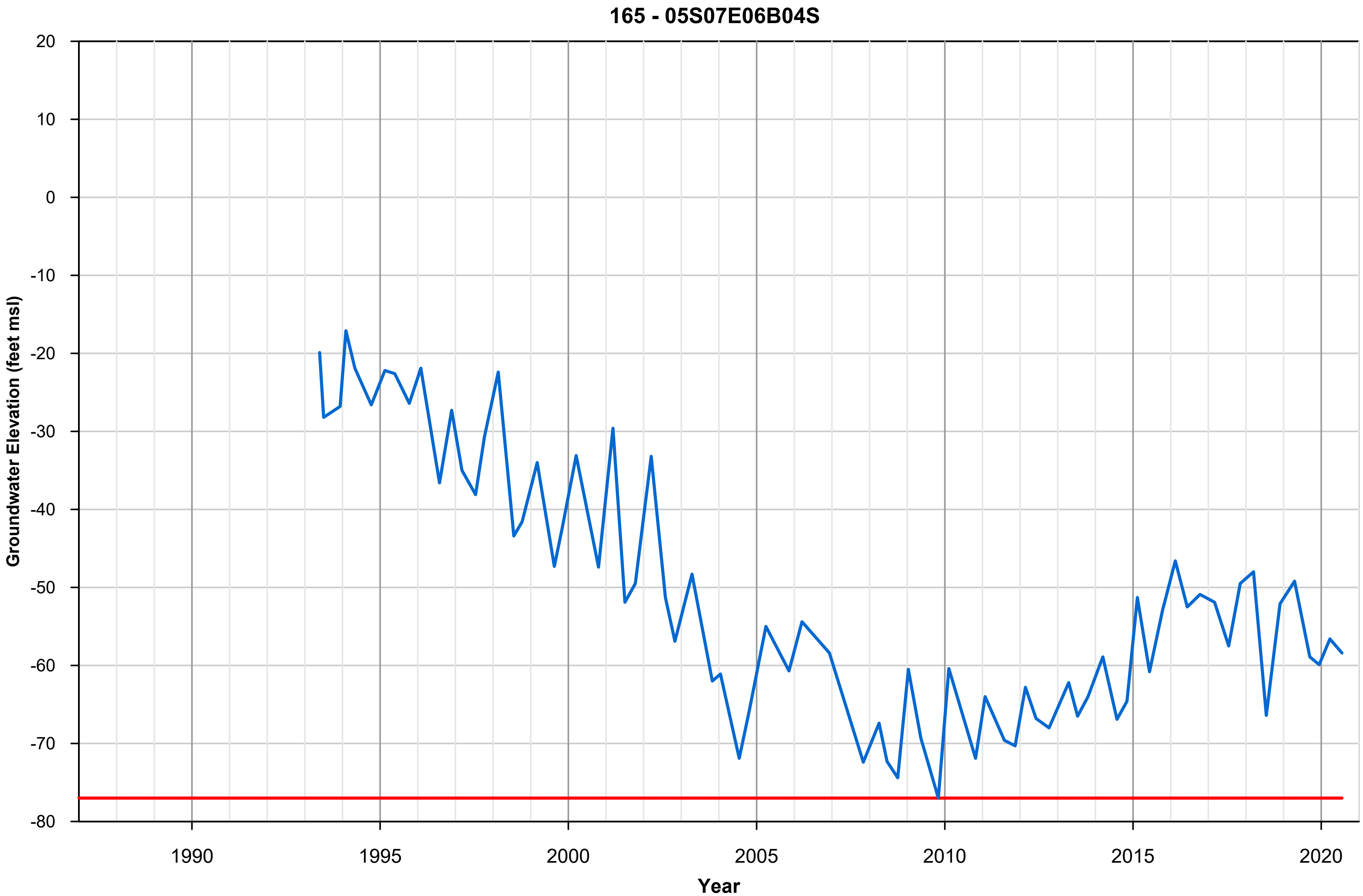
TODD GROUNDWATER

Appendix B-21
Groundwater Elevation Hydrograph
112 - 05S06E29C01S



July 2021

Appendix B-22
Groundwater Elevation Hydrograph
255 - 05S07E04A01S



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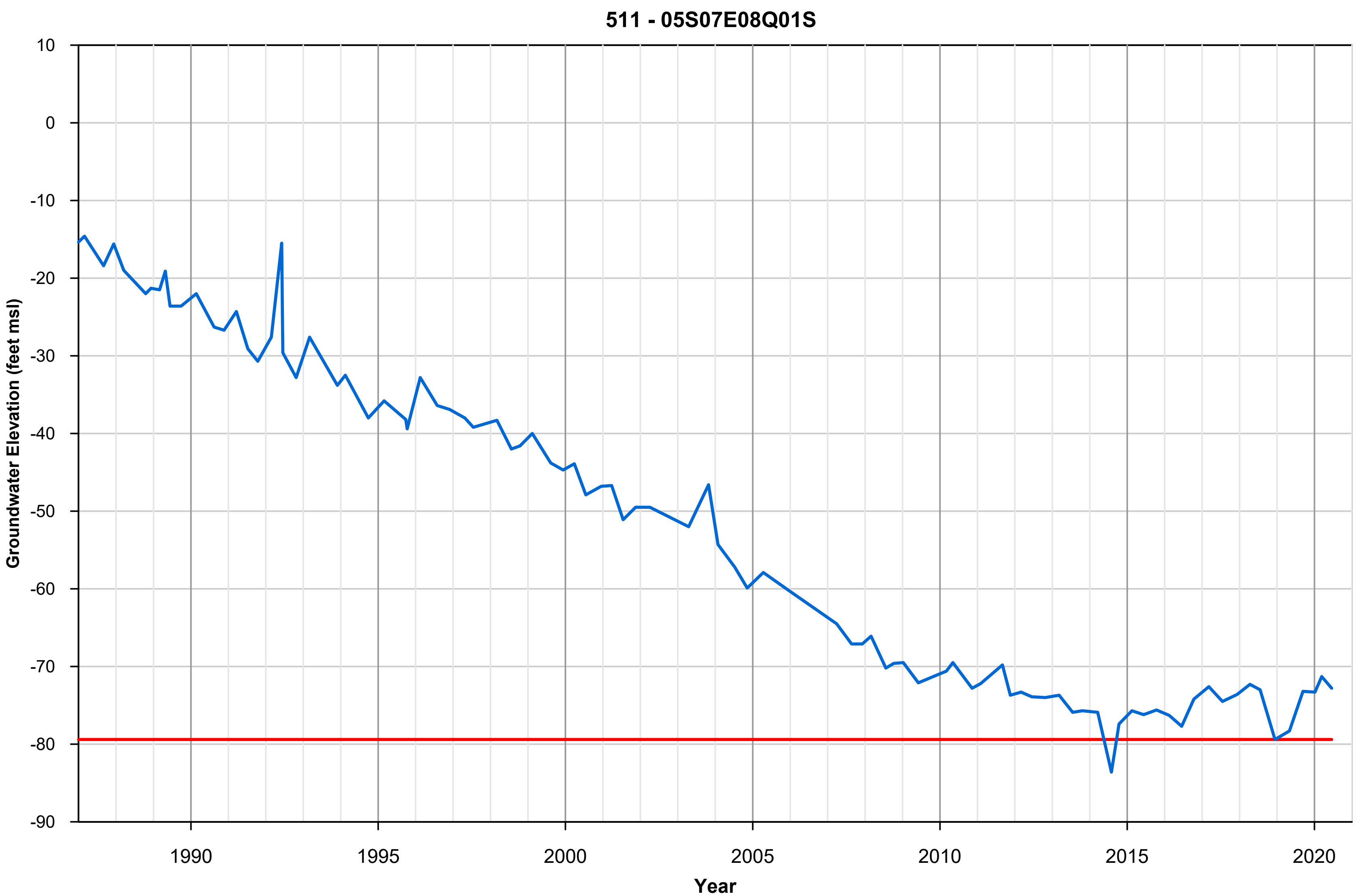
TODD GROUNDWATER

Appendix 9A-23
Groundwater Elevation Hydrograph
165 - 05S07E06B04S



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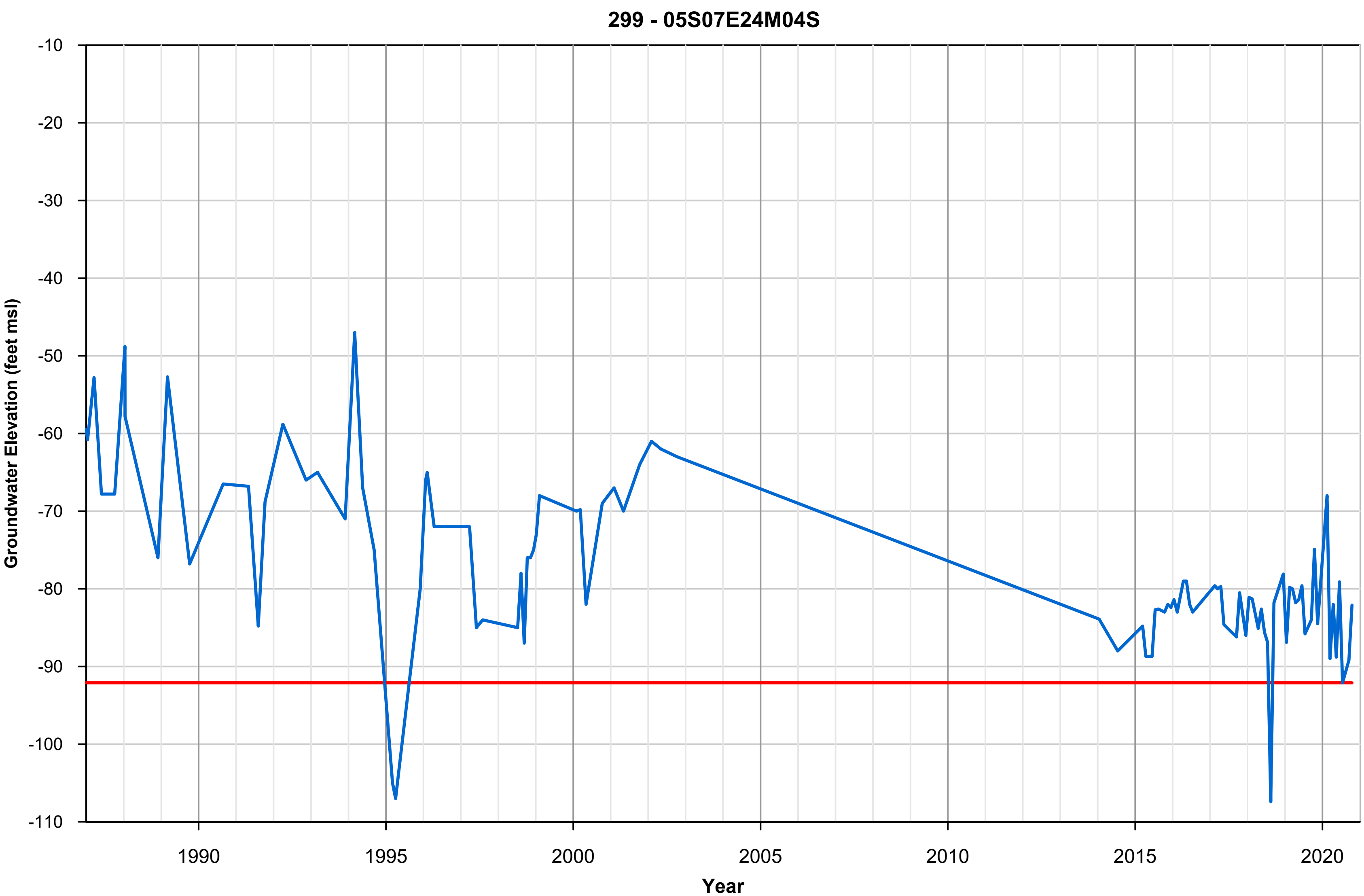
TODD GROUNDWATER

Appendix 9A-24
Groundwater Elevation Hydrograph
511 - 05S07E08Q01S



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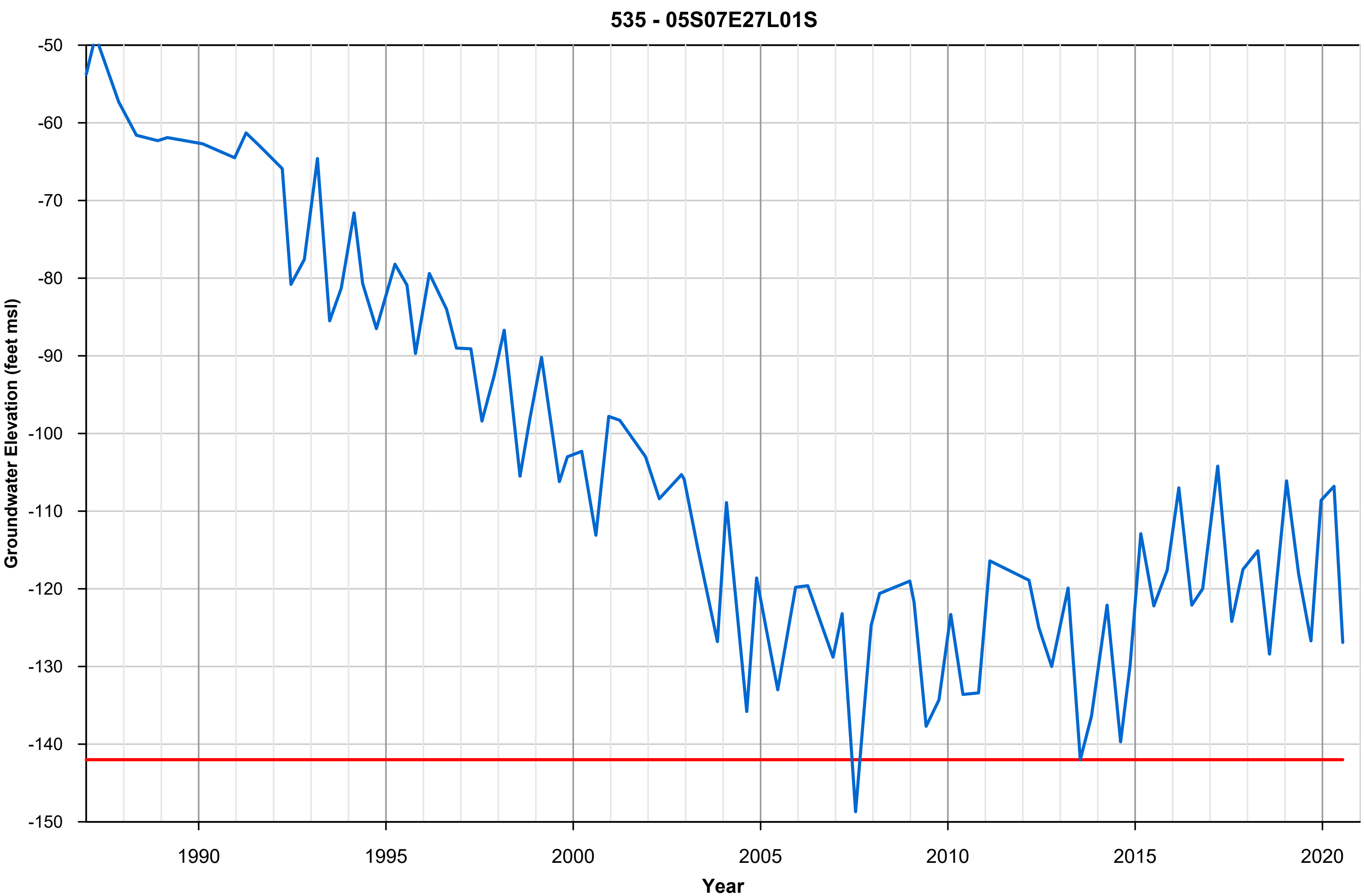
TODD GROUNDWATER

Appendix 9A-25
Groundwater Elevation Hydrograph
299 - 05S07E24M04S



July 2021

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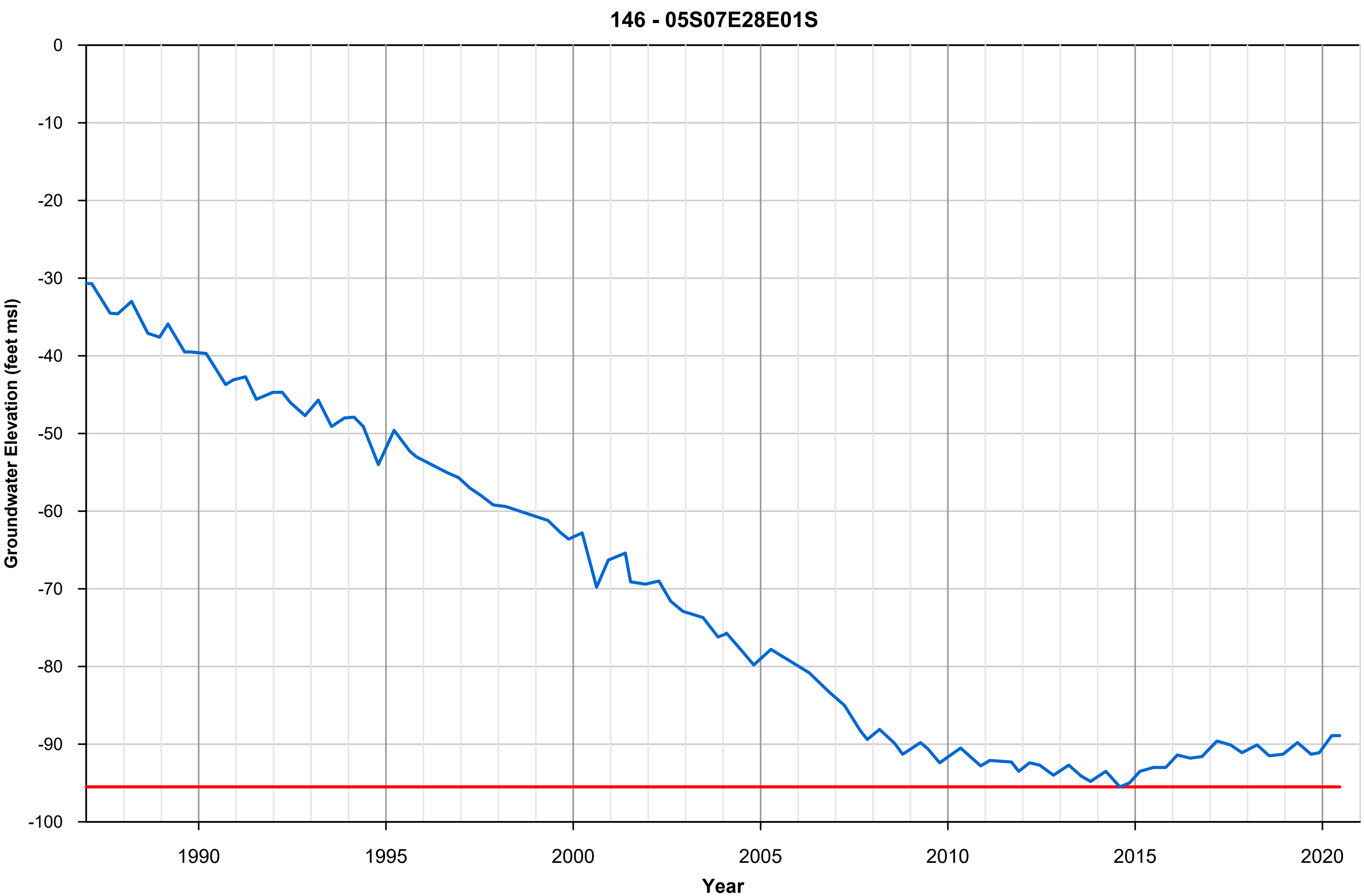
TODD GROUNDWATER

Appendix 9A-26
Groundwater Elevation Hydrograph
535 - 05S07E27L01S



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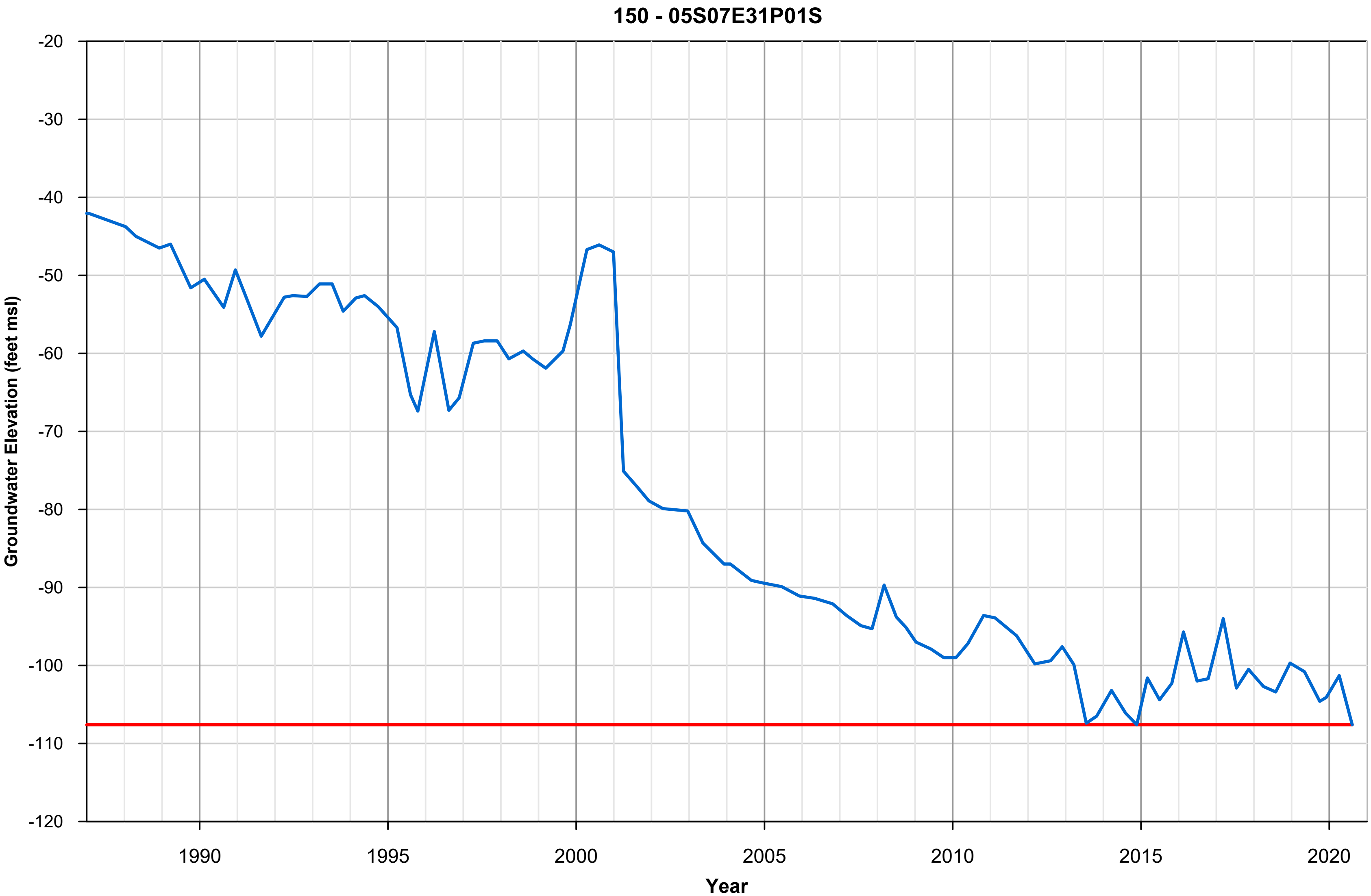
Appendix 9A-27
Groundwater Elevation Hydrograph
146 - 05S07E28E01S



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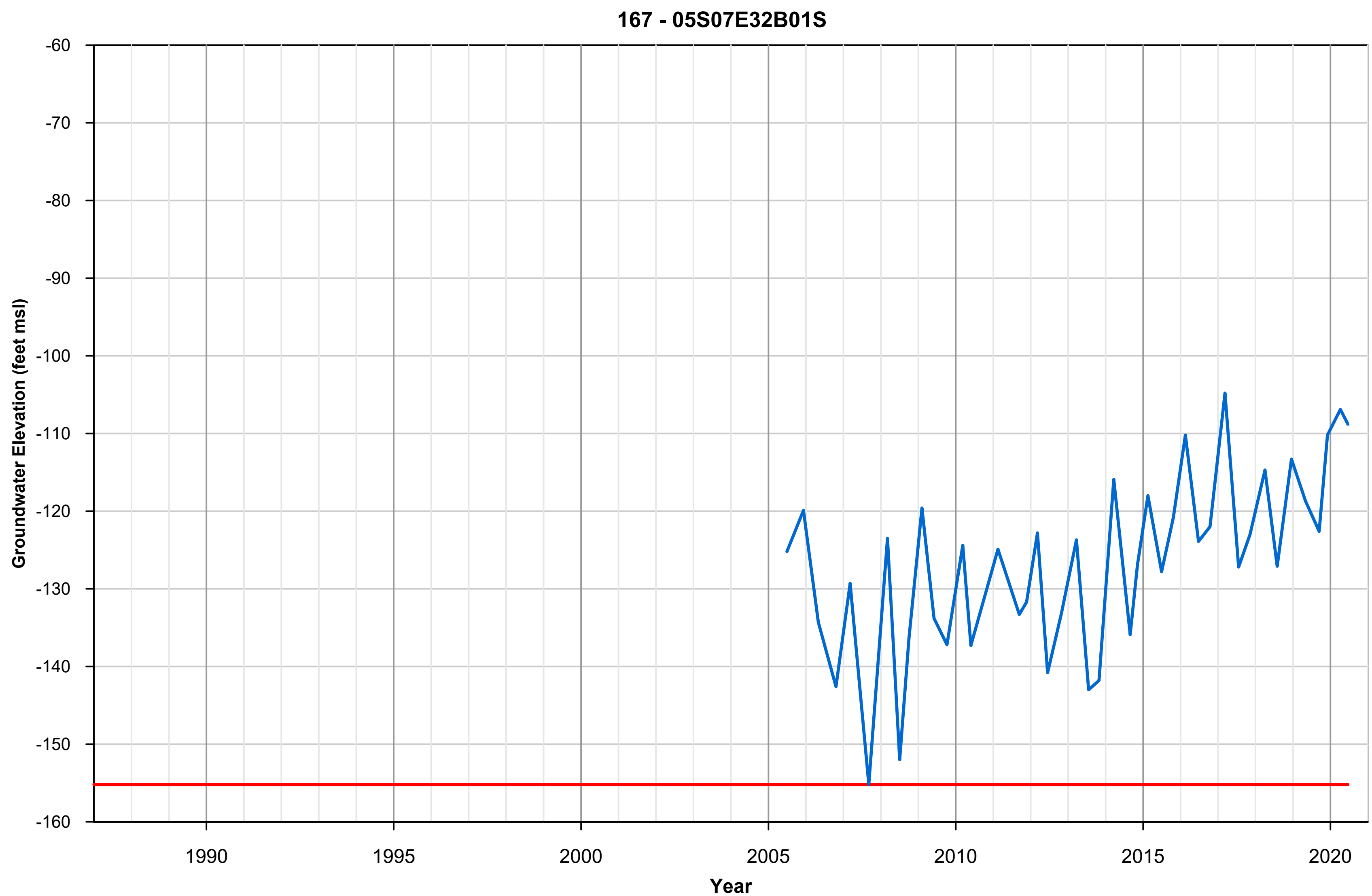
TODD GROUNDWATER

Appendix 9A-28
Groundwater Elevation Hydrograph
150 - 05S07E31P01S



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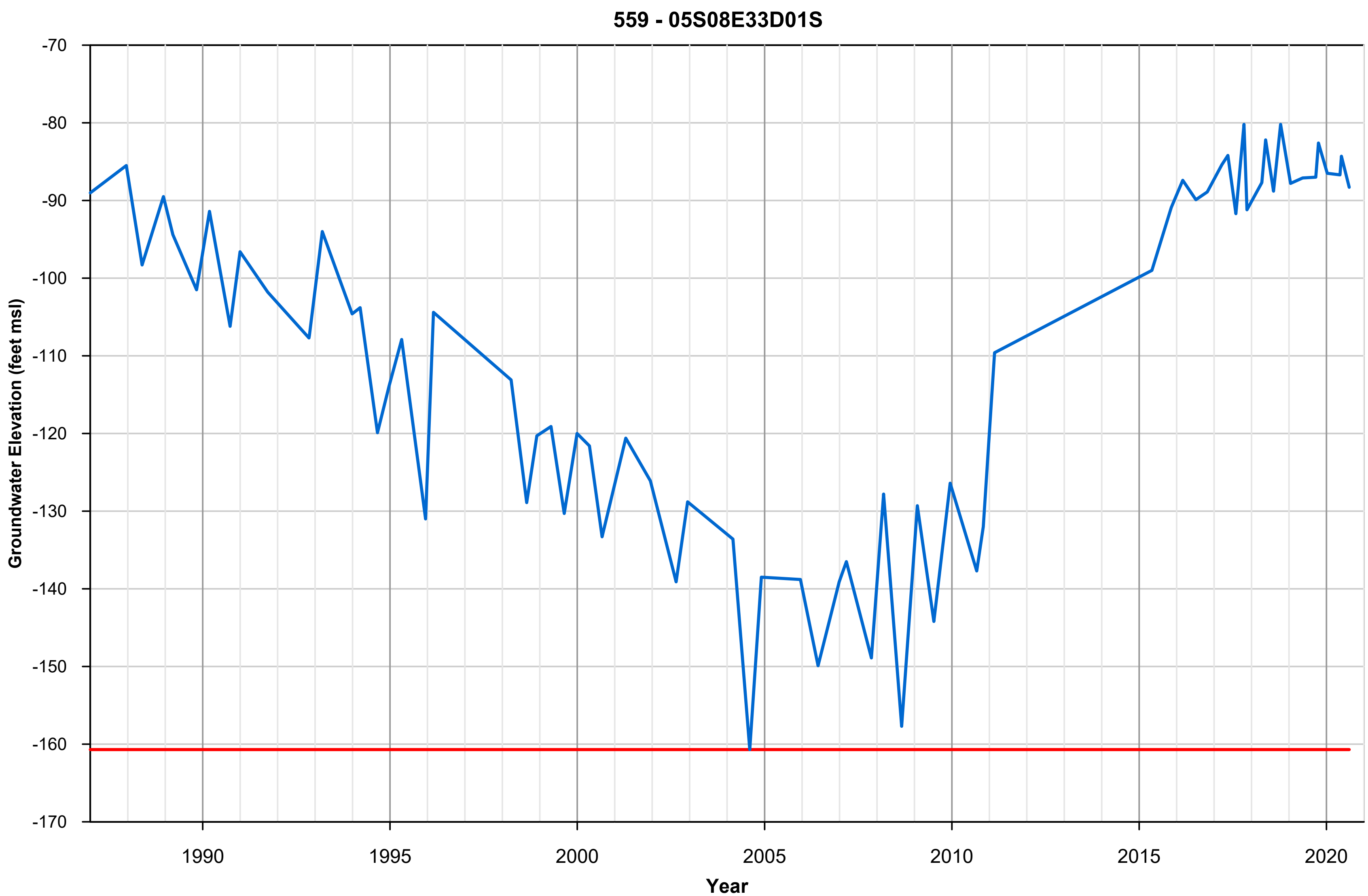
Appendix 9A-29
Groundwater Elevation Hydrograph
167 - 05S07E32B01S



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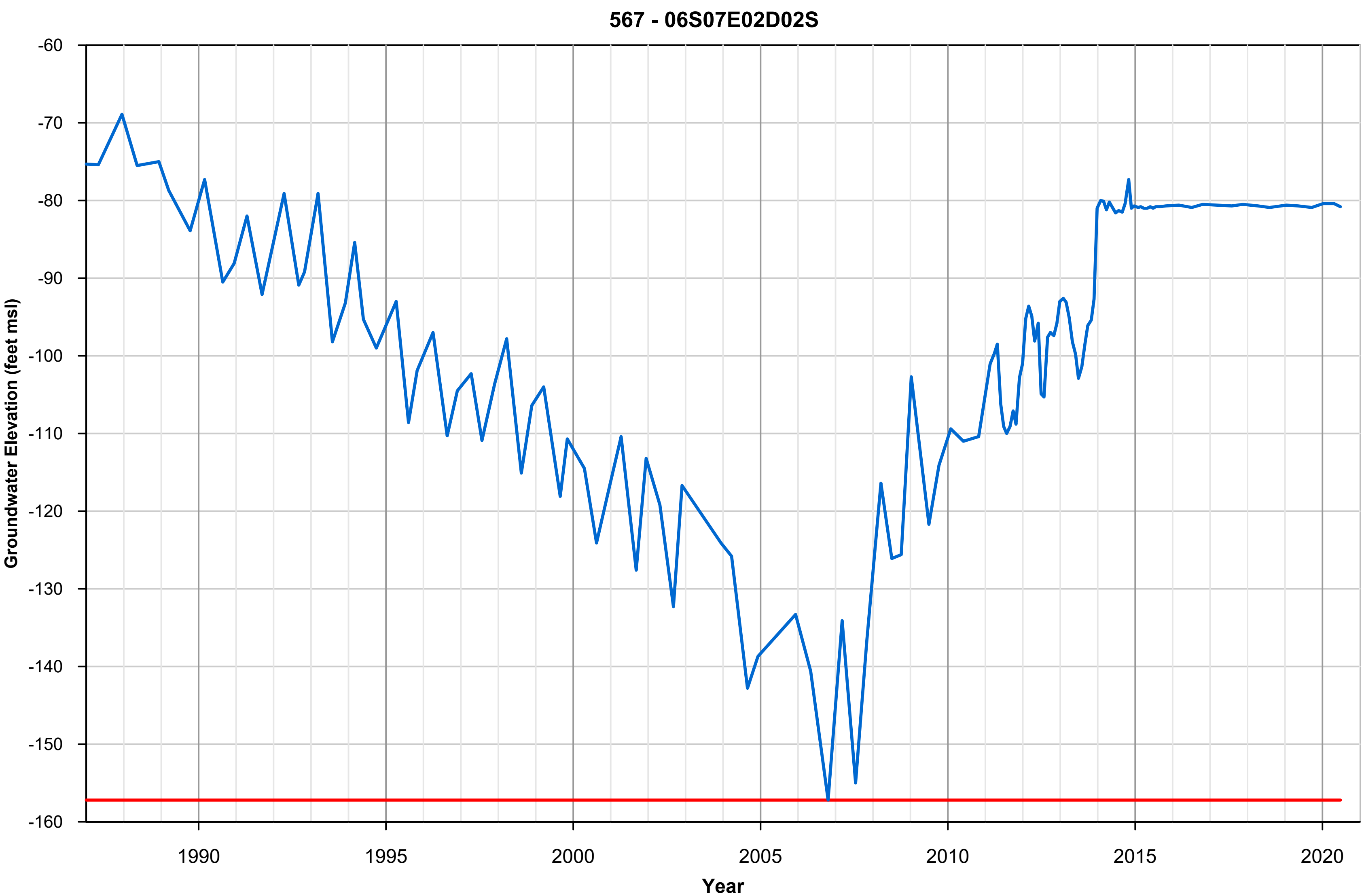
TODD GROUNDWATER

Appendix 9A-30
Groundwater Elevation Hydrograph
559 - 05S08E33D01S



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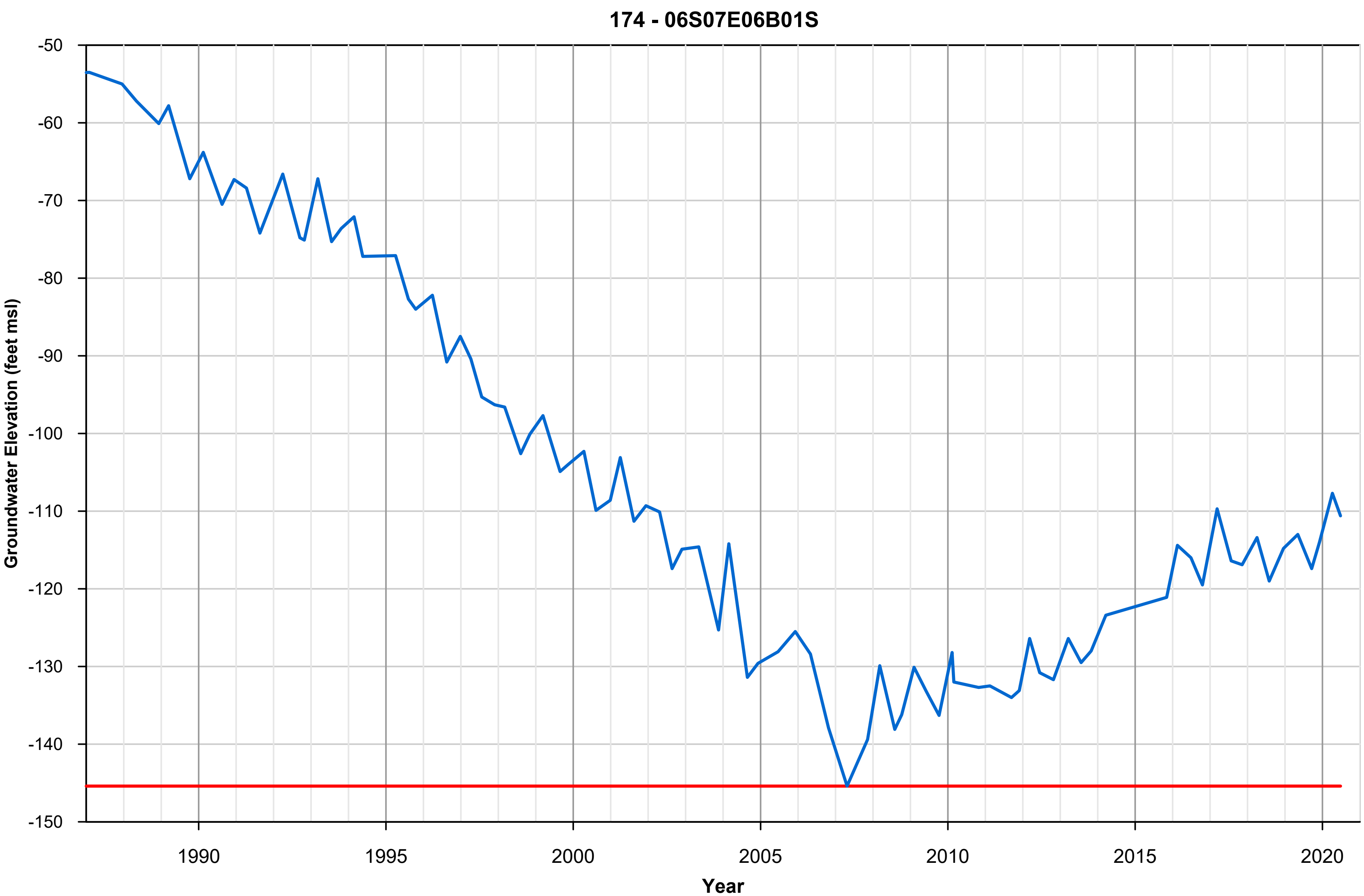
TODD GROUNDWATER

Appendix 9A-31
Groundwater Elevation Hydrograph
567 - 06S07E02D02S



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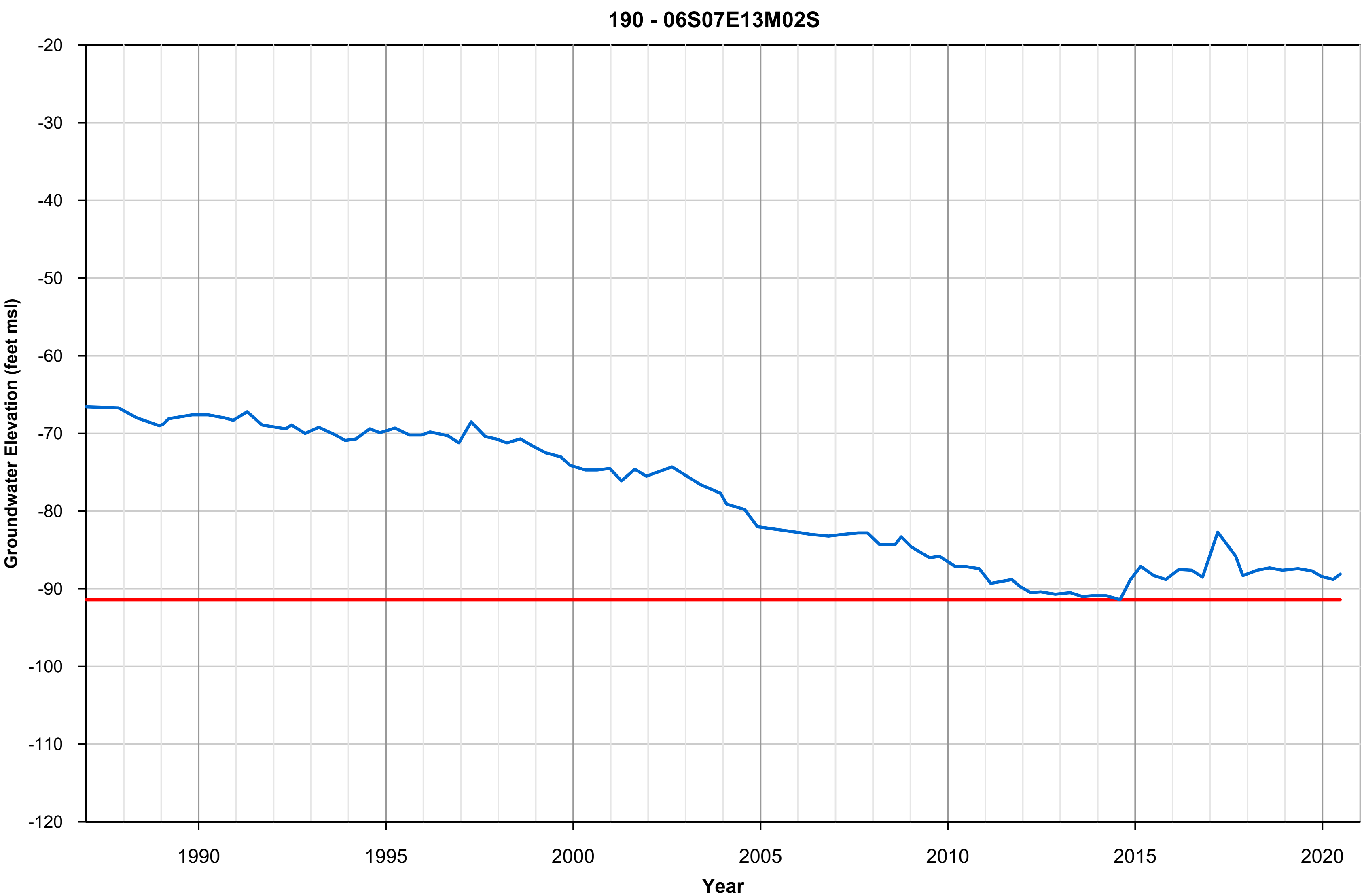
TODD GROUNDWATER

Appendix 9A-32
Groundwater Elevation Hydrograph
174 - 06S07E06B01S



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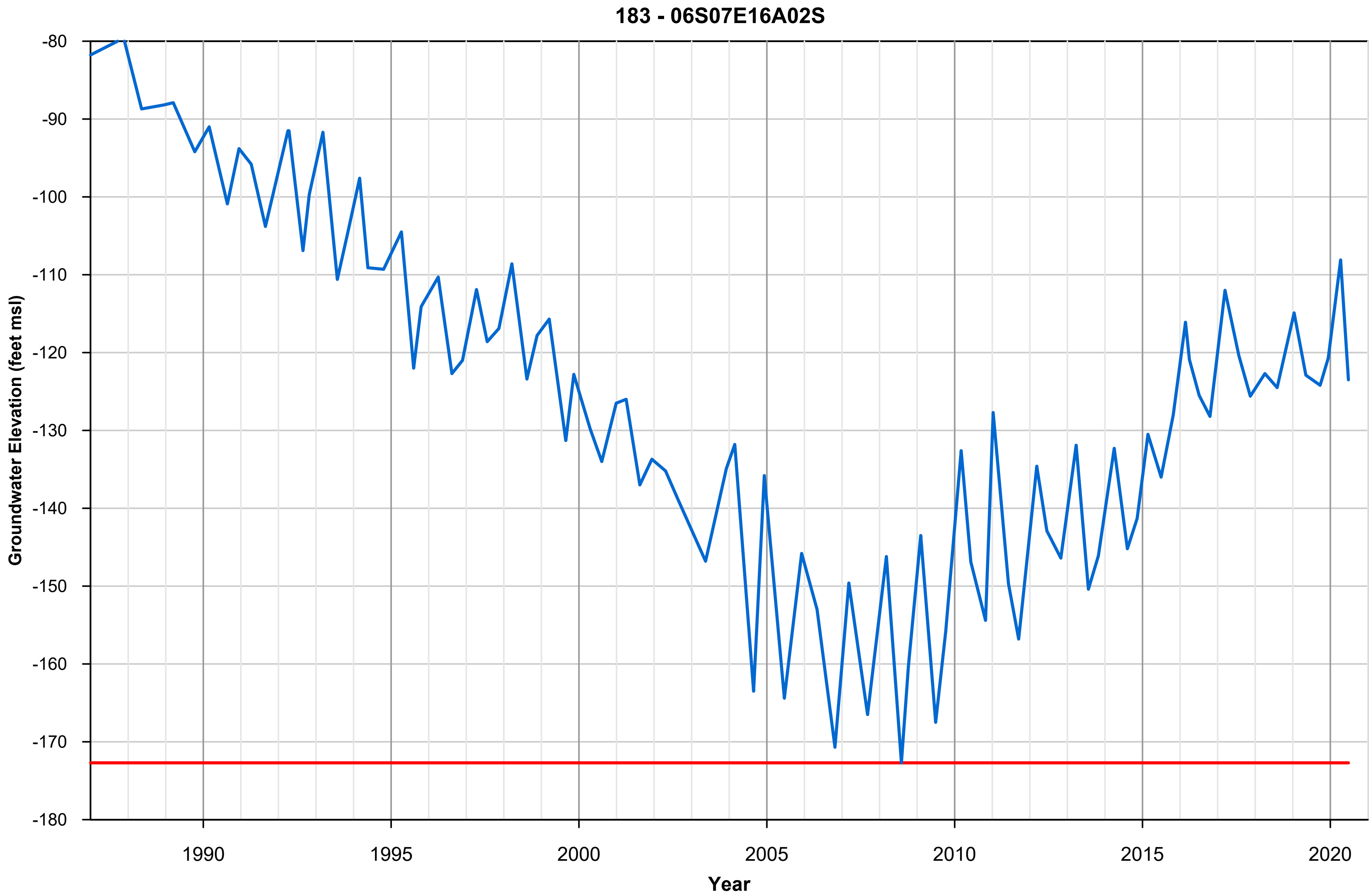
July 2021

TODD GROUNDWATER

Appendix 9A-33
Groundwater Elevation Hydrograph
190 - 06S07E13M02S



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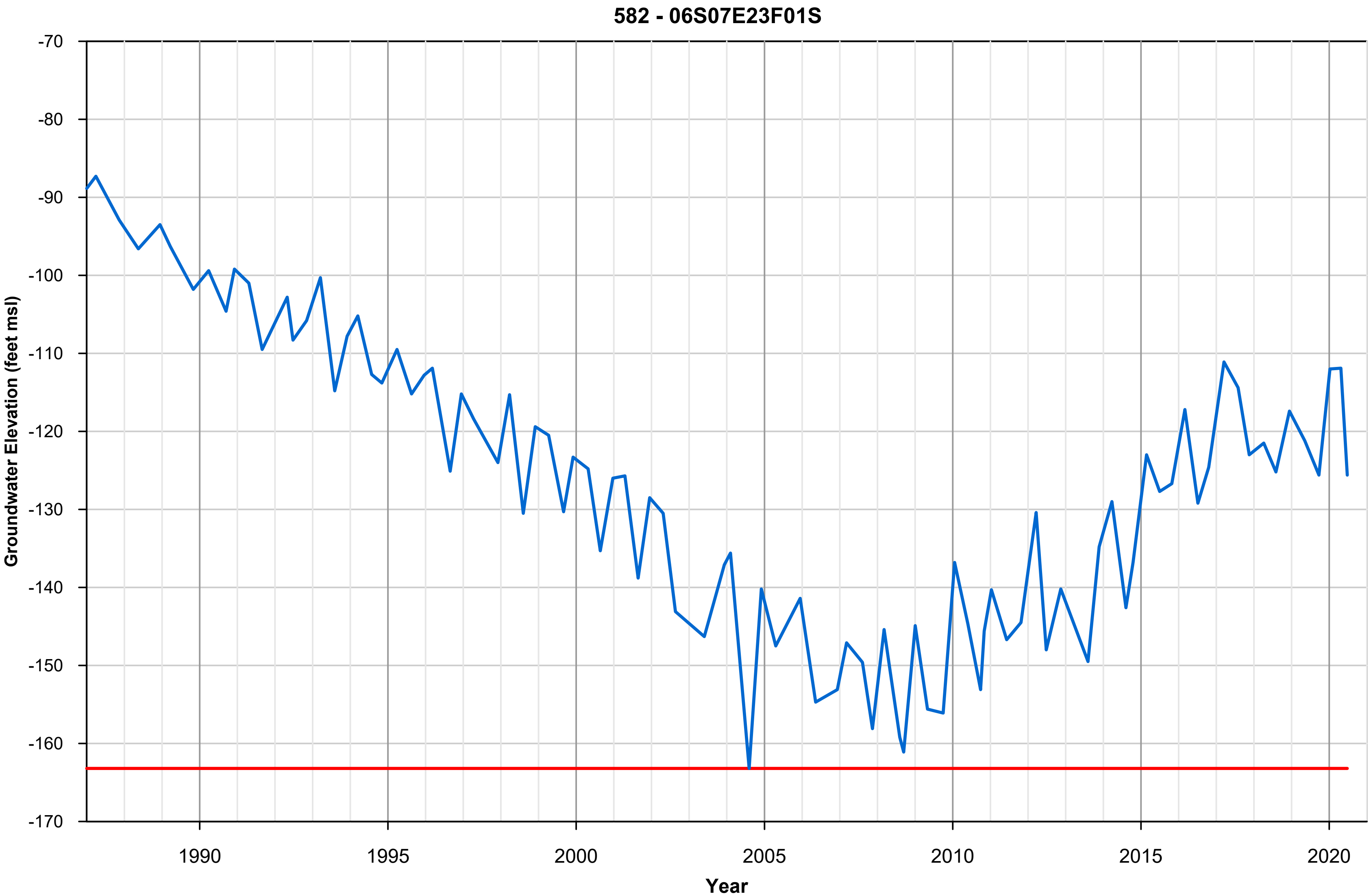
TODD GROUNDWATER

Appendix 9A-34
Groundwater Elevation Hydrograph
183 - 06S07E16A02S



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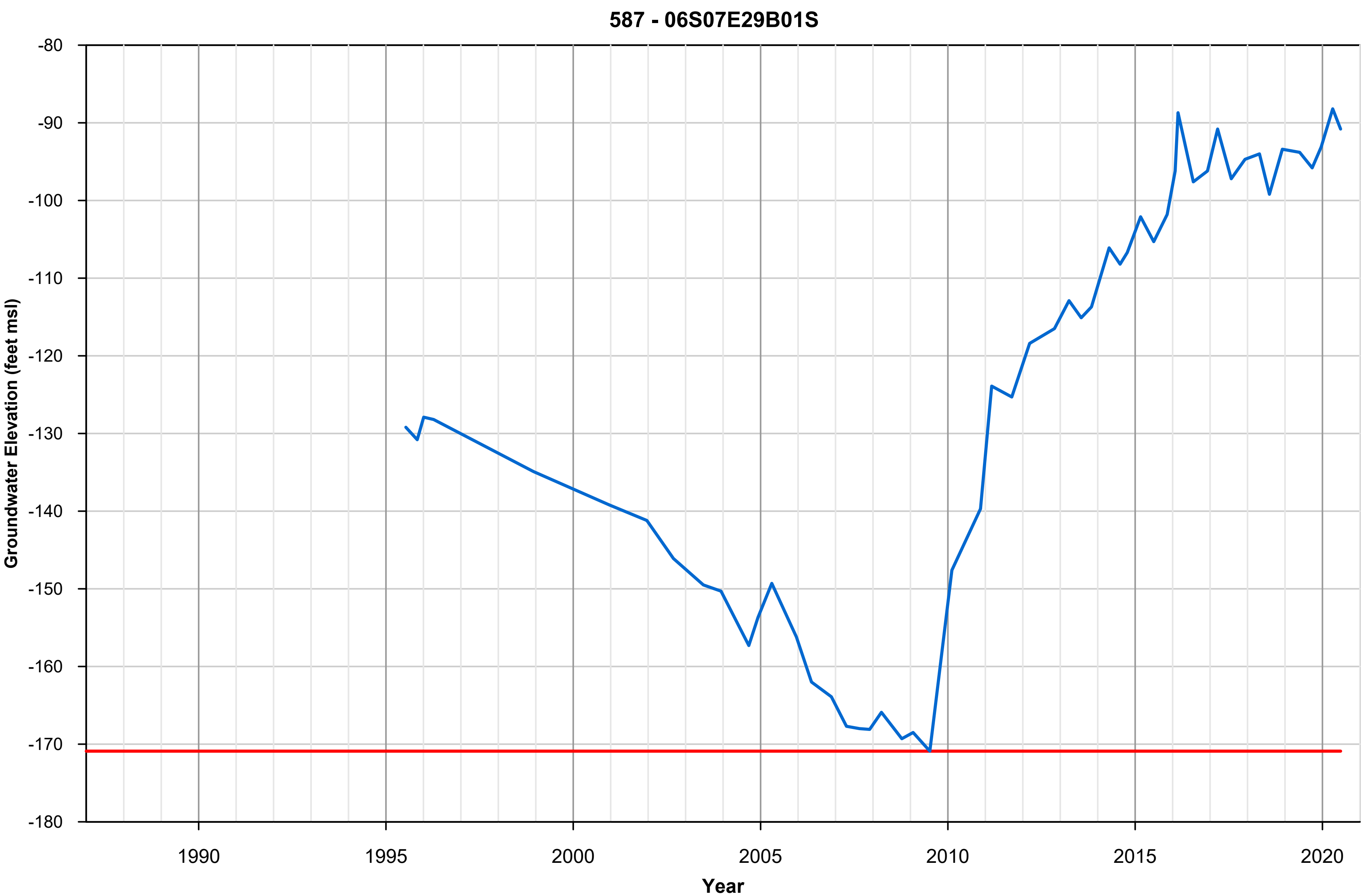
TODD GROUNDWATER

Appendix 9A-35
Groundwater Elevation Hydrograph
582 - 06S07E23F01S



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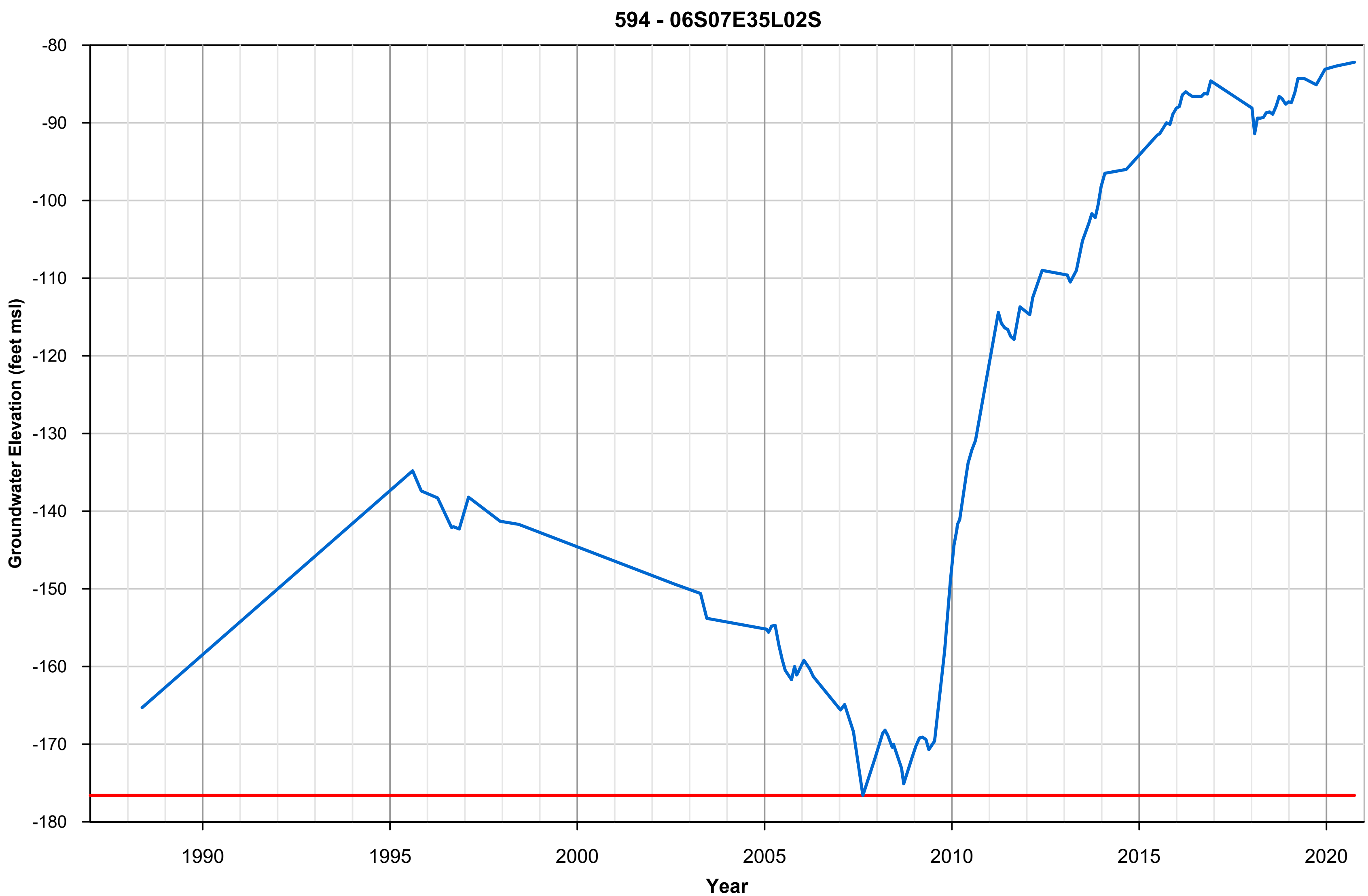
TODD GROUNDWATER

Appendix 9A-36
Groundwater Elevation Hydrograph
587 - 06S07E29B01S



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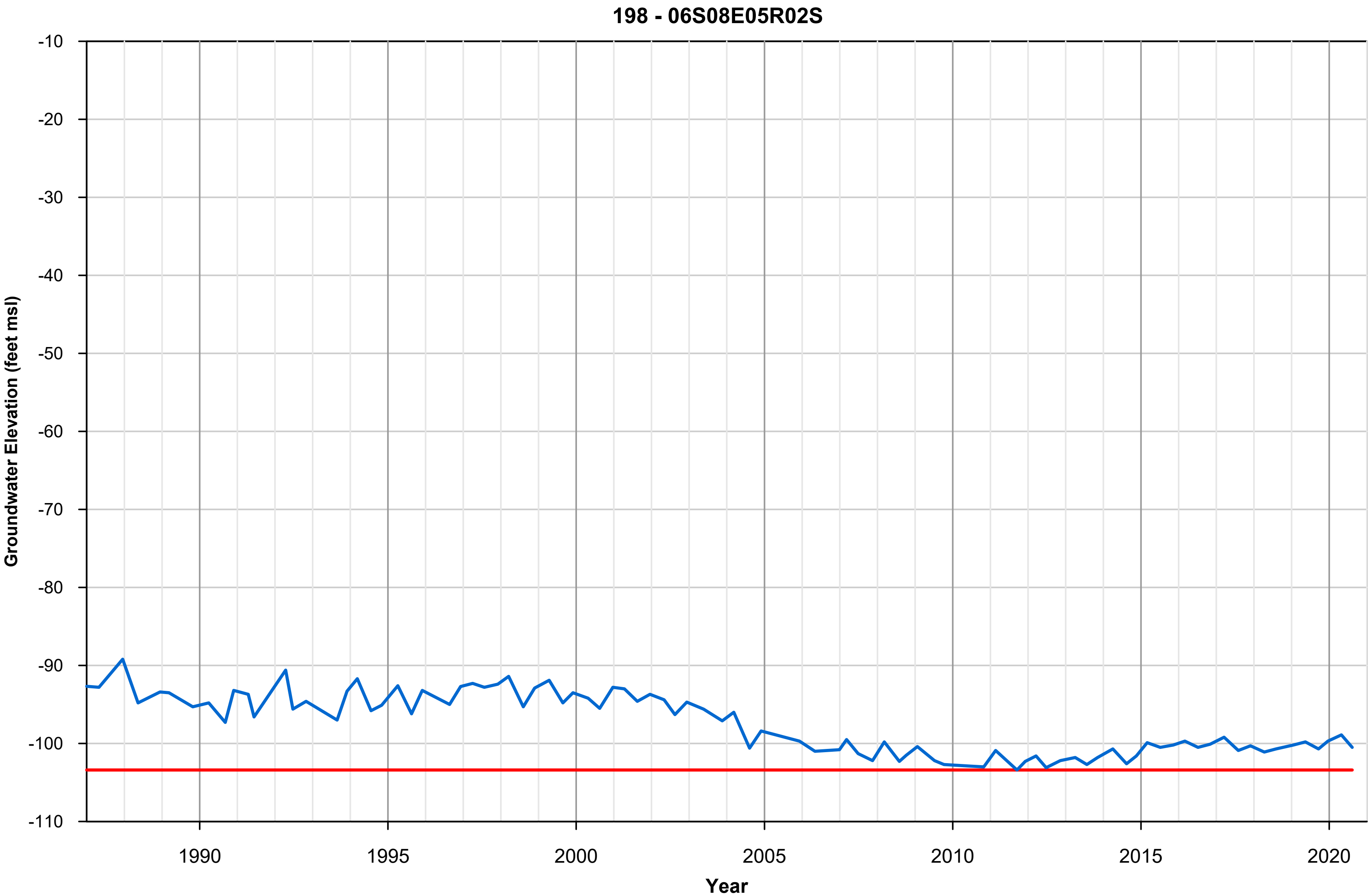
July 2021

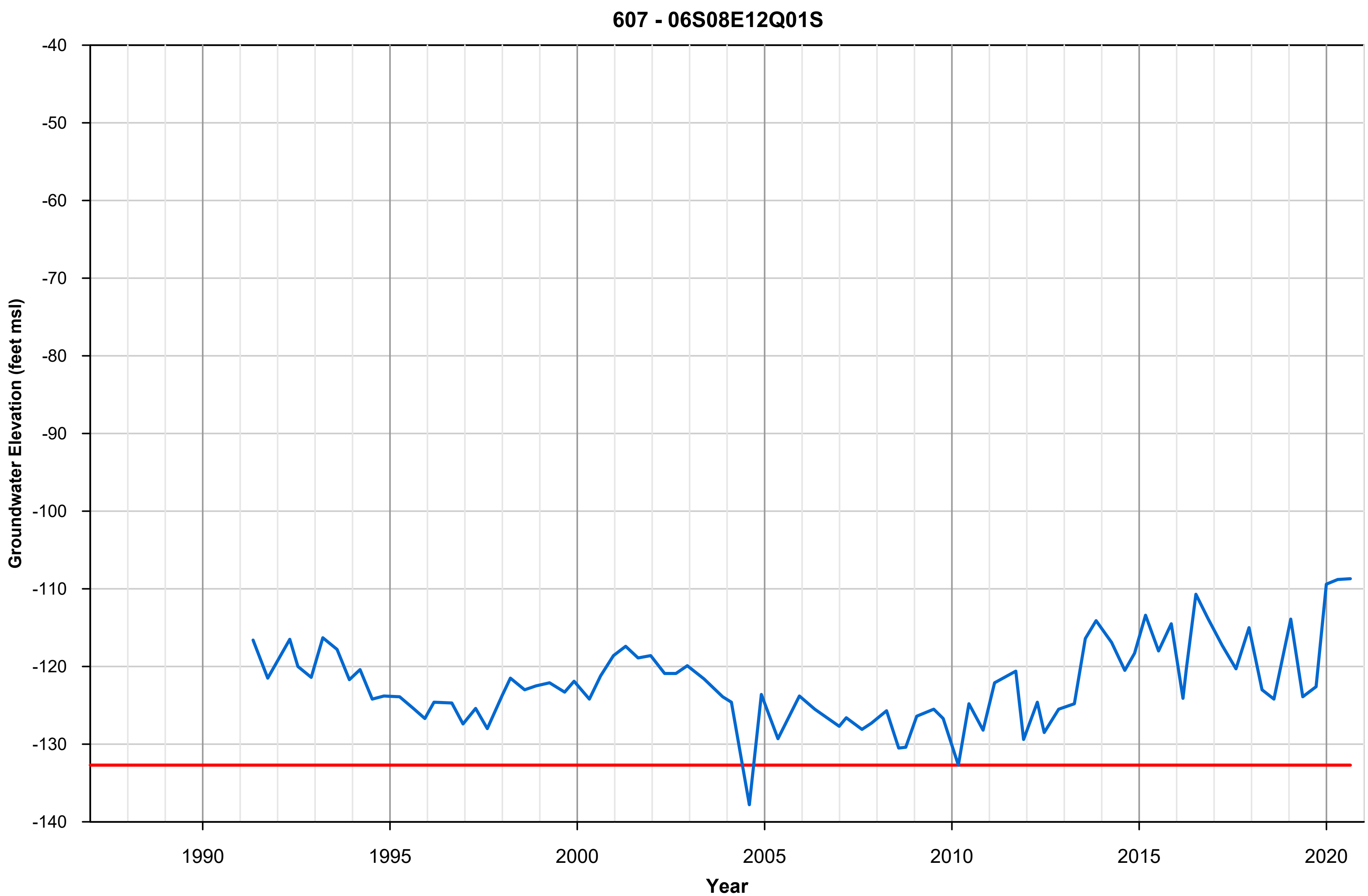
TODD GROUNDWATER

Appendix 9A-37
Groundwater Elevation Hydrograph
594 - 06S07E35L02S



July 2021

Appendix 9A-38
Groundwater Elevation Hydrograph
198 - 06S08E05R02S



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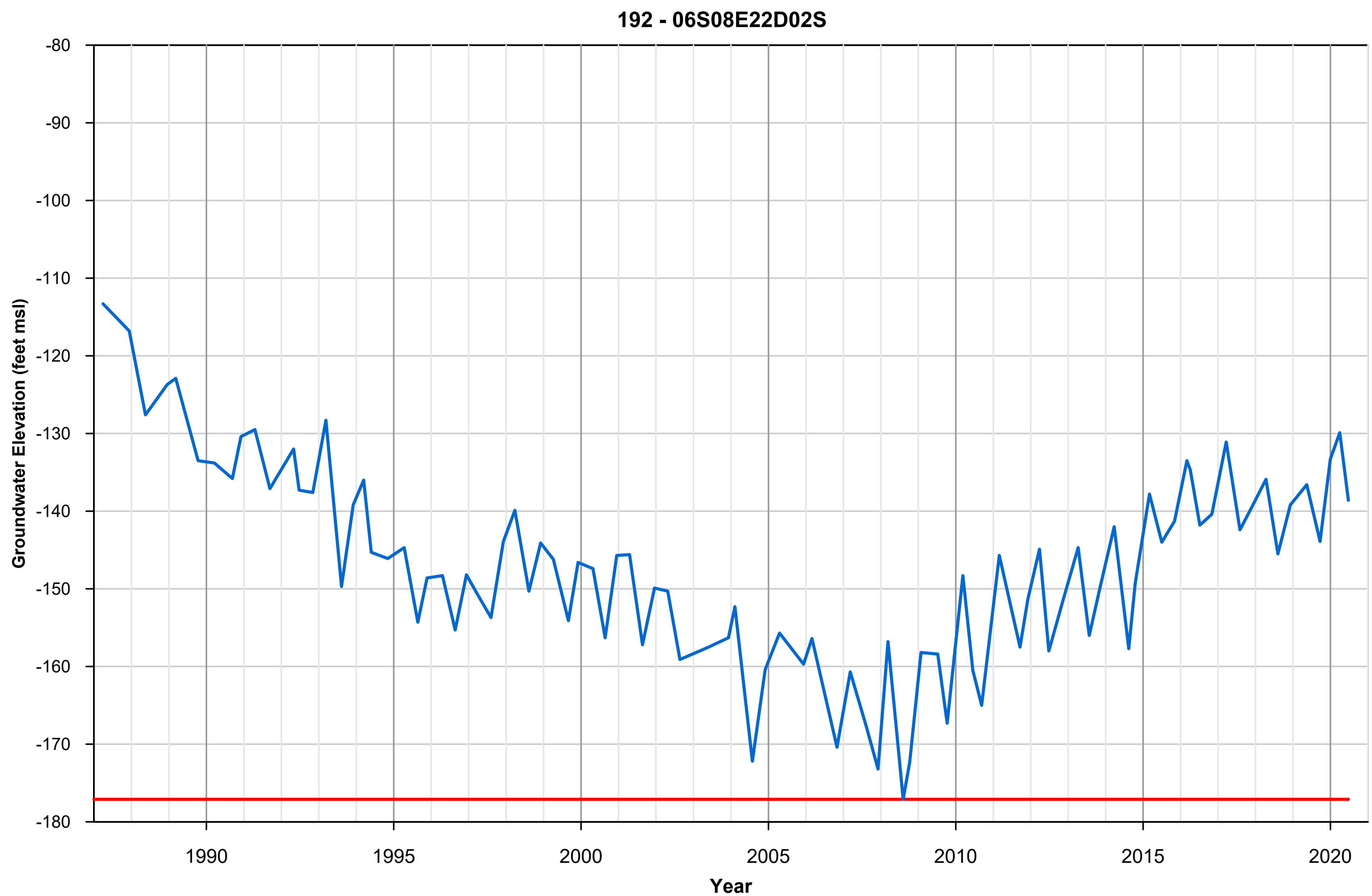
July 2021

TODD GROUNDWATER

Appendix 9A-39
Groundwater Elevation Hydrograph
607 - 06S08E12Q01S



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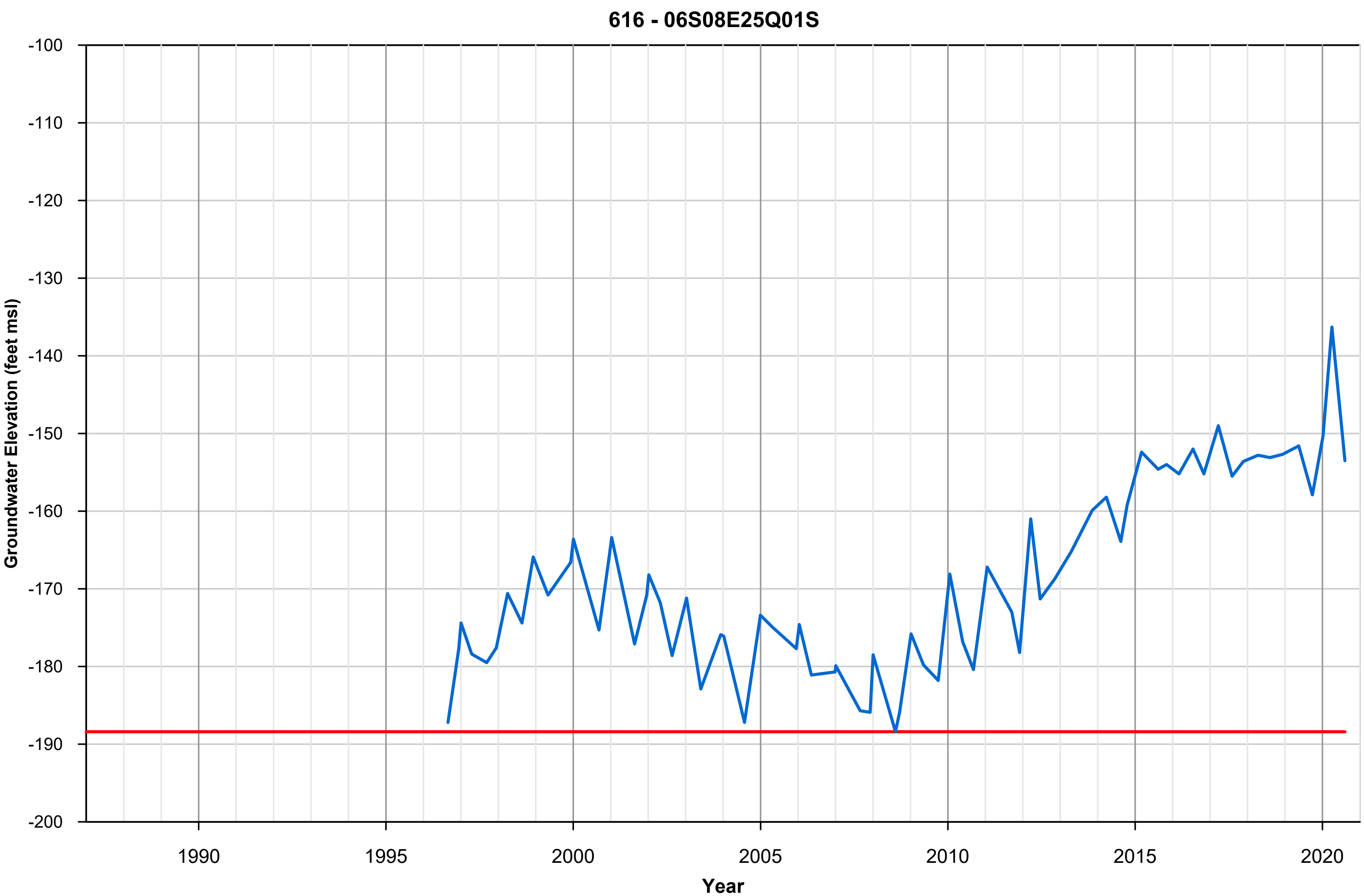
July 2021

TODD GROUNDWATER

Appendix 9A-40
Groundwater Elevation Hydrograph
192 - 06S08E22D02S



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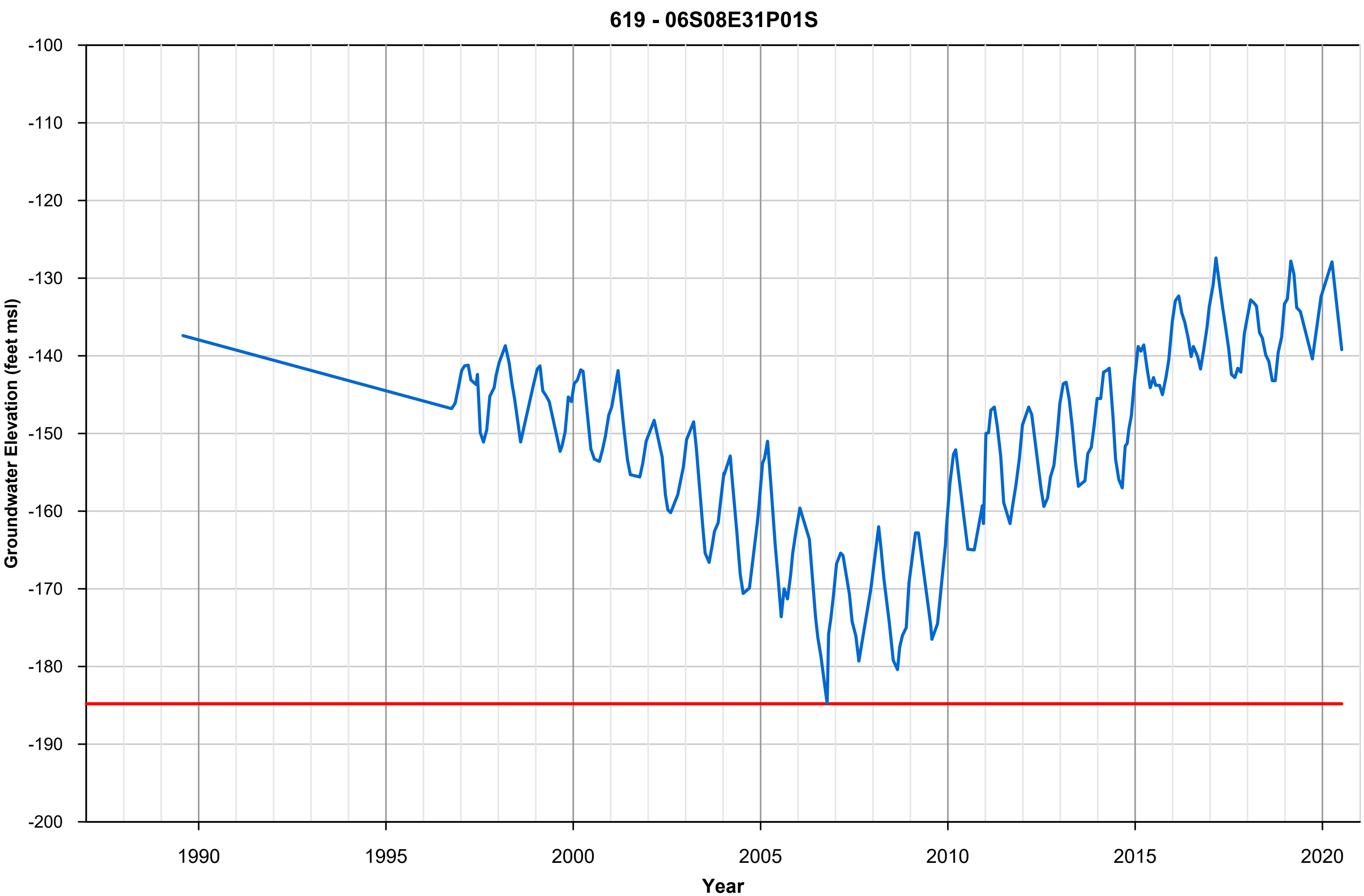
July 2021

TODD GROUNDWATER

Appendix 9A-41
Groundwater Elevation Hydrograph
616 - 06S08E25Q01S



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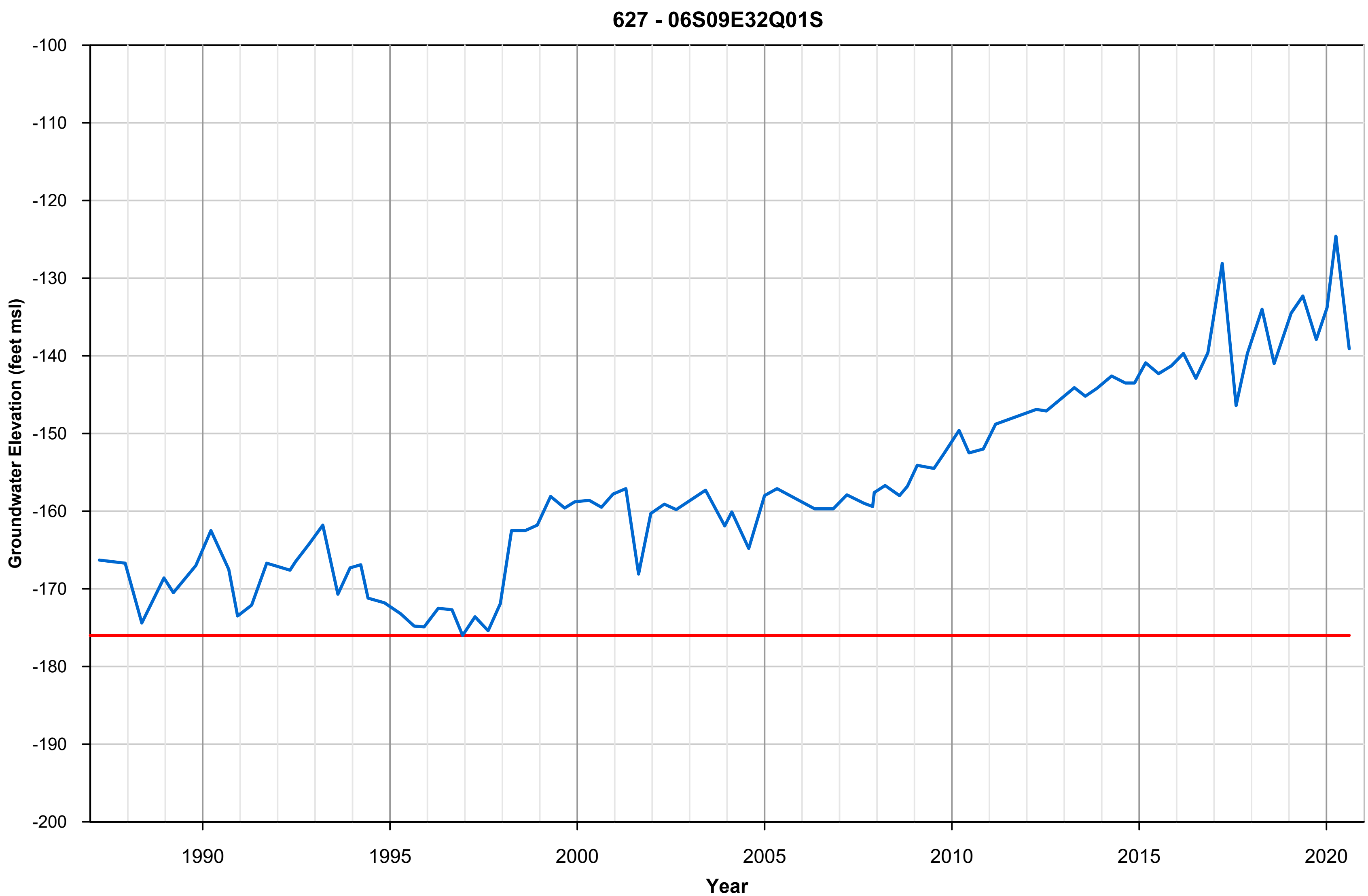
July 2021

TODD GROUNDWATER

Appendix 9A-42
Groundwater Elevation Hydrograph
619 - 06S08E31P01S



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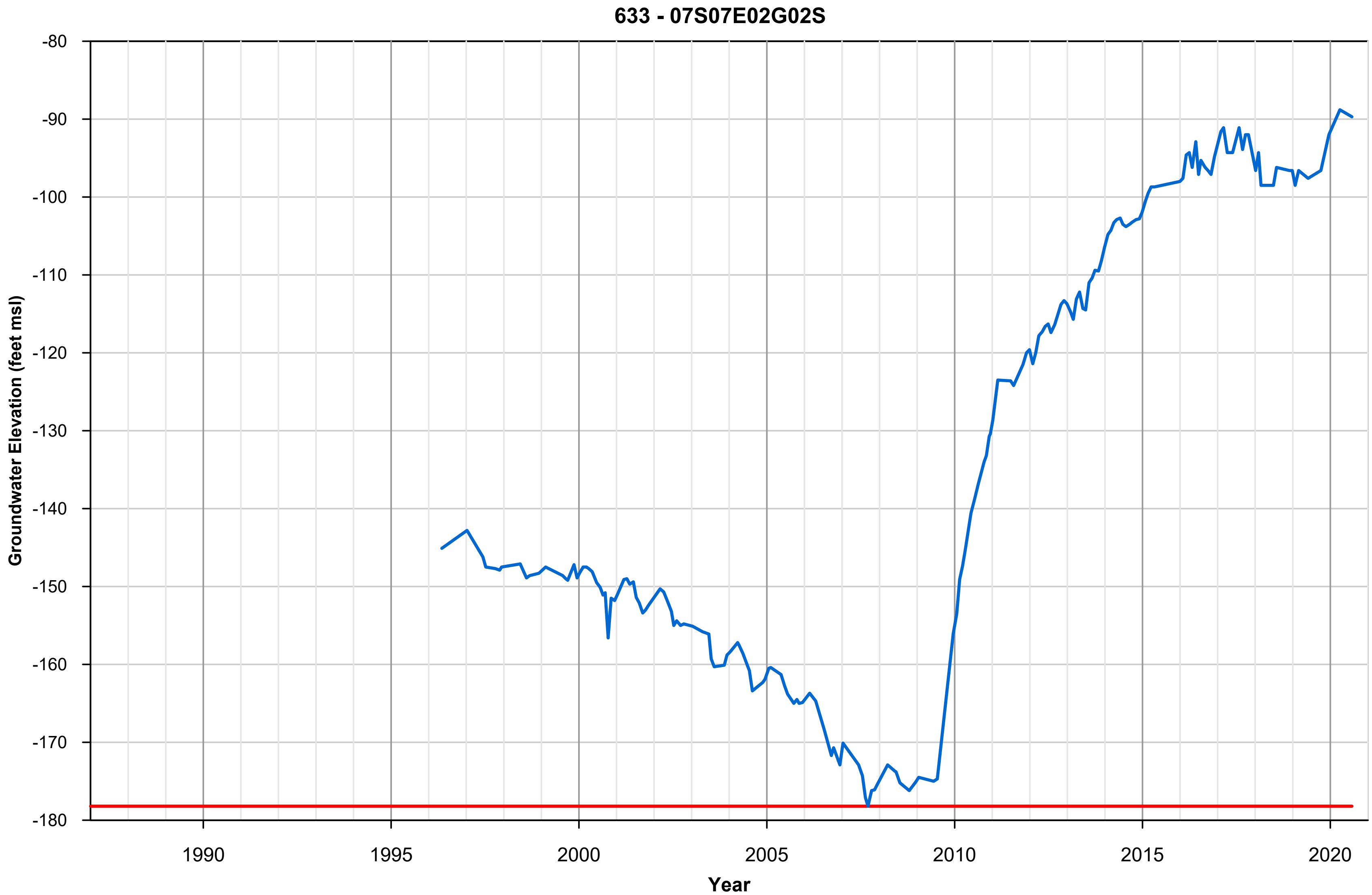
July 2021

TODD GROUNDWATER

Appendix 9A-43
Groundwater Elevation Hydrograph
627 - 06S09E32Q01S



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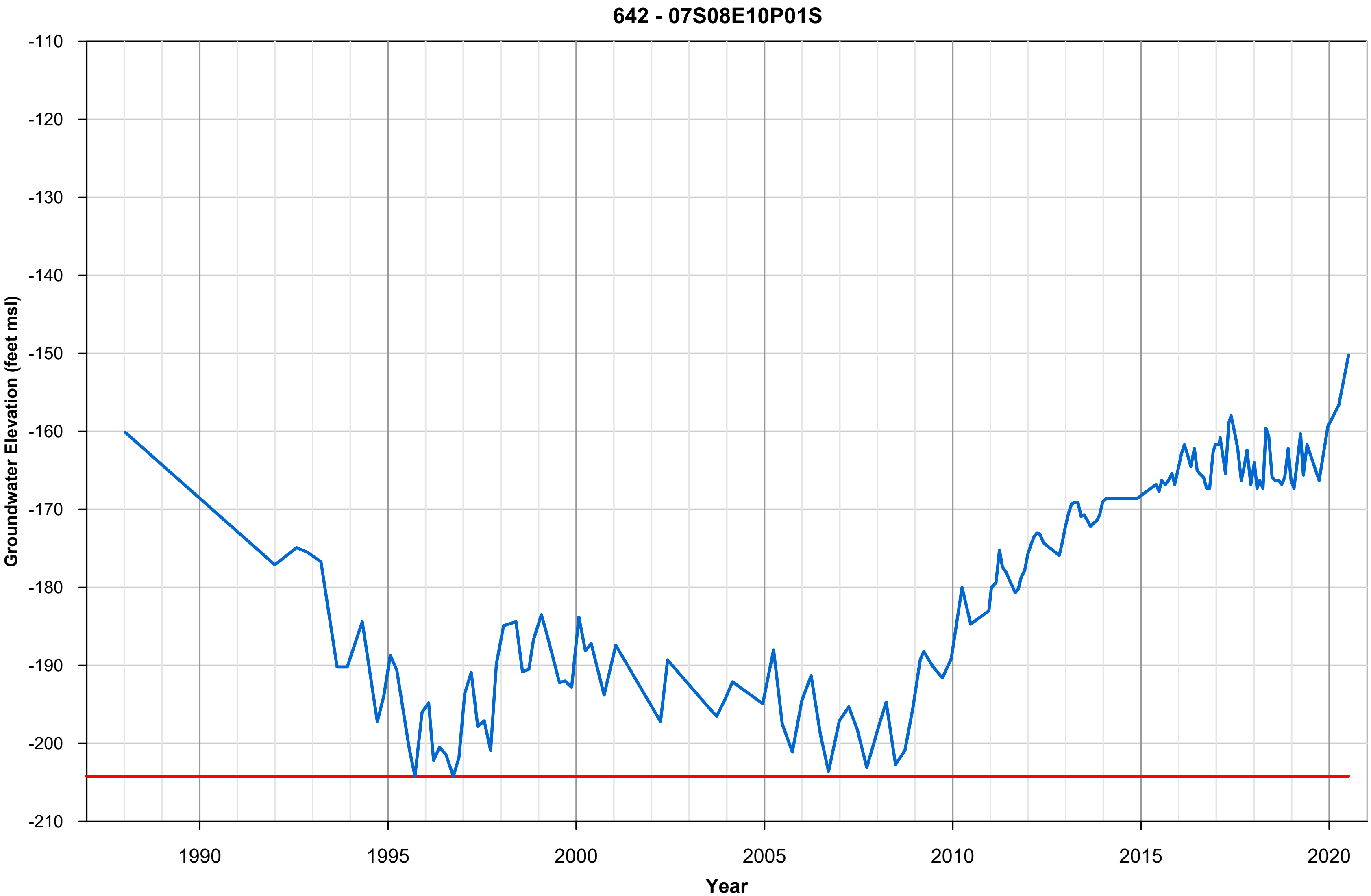
July 2021

TODD GROUNDWATER

Appendix 9A-44
Groundwater Elevation Hydrograph
633 - 07S07E02G02S



July 2021

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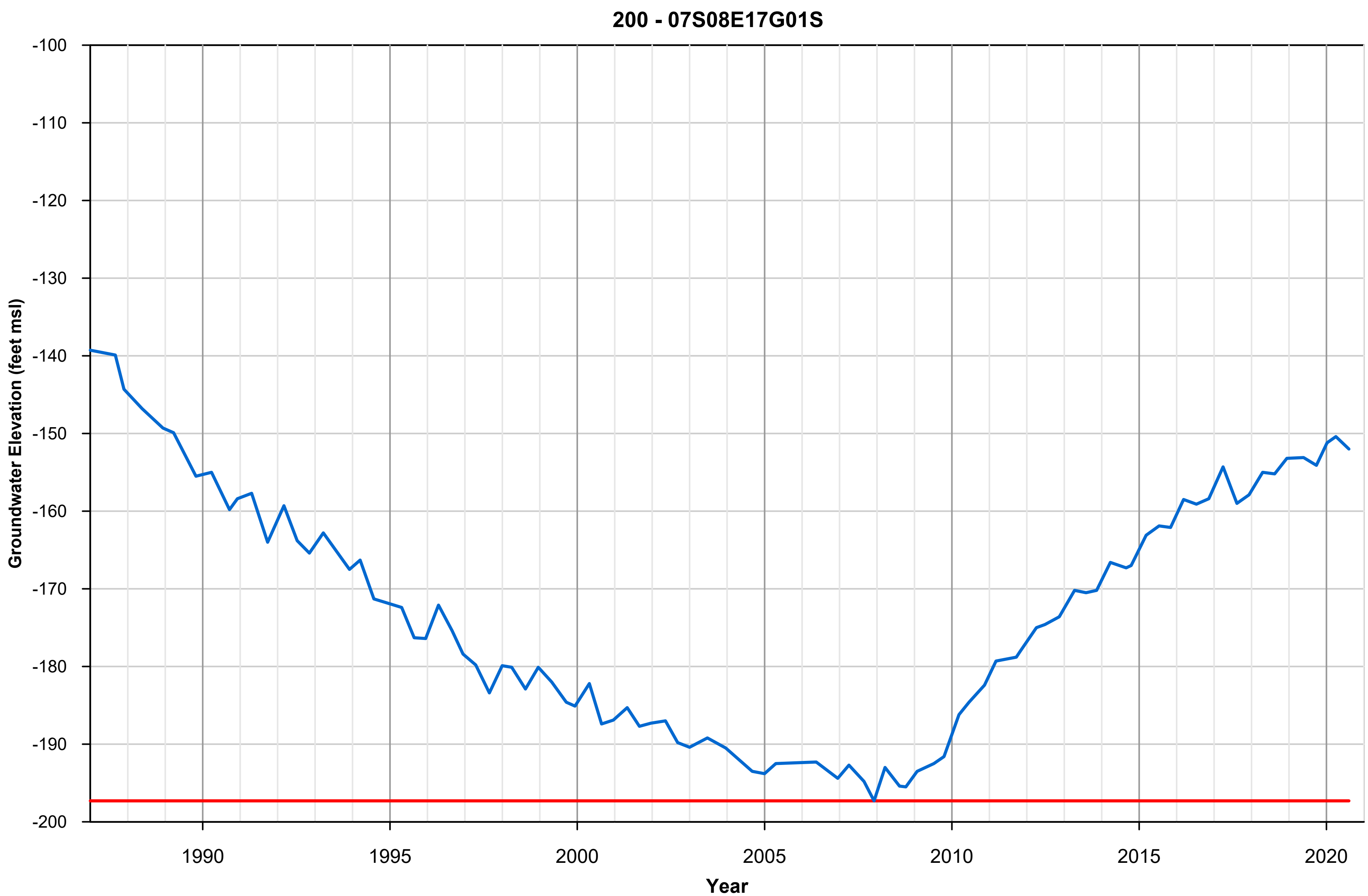
TODD GROUNDWATER

Appendix 9A-45
Groundwater Elevation Hydrograph
642 - 07S08E10P01S



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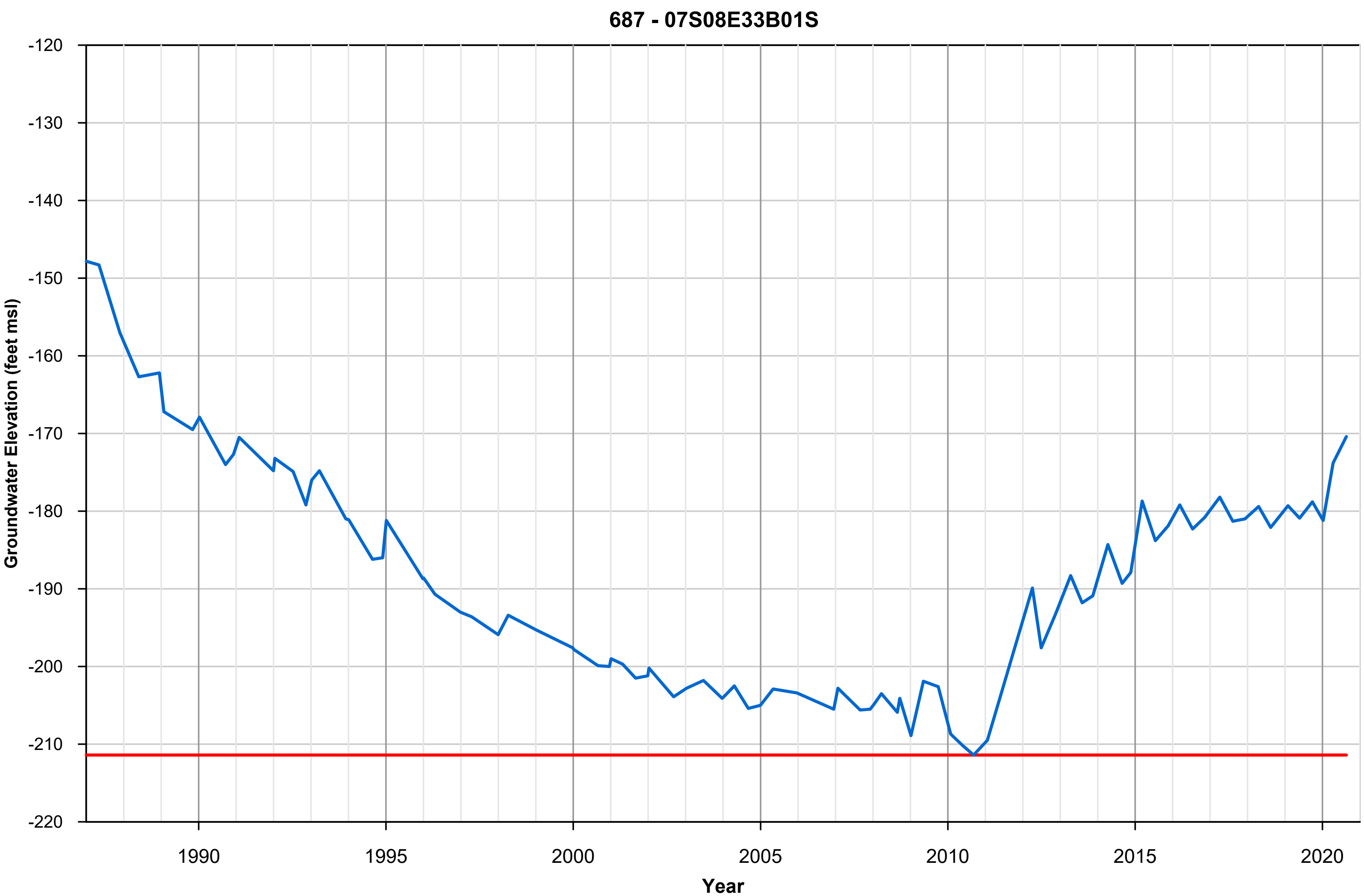
July 2021

TODD GROUNDWATER

Appendix 9A-46
Groundwater Elevation Hydrograph
200 - 07S08E17G01S



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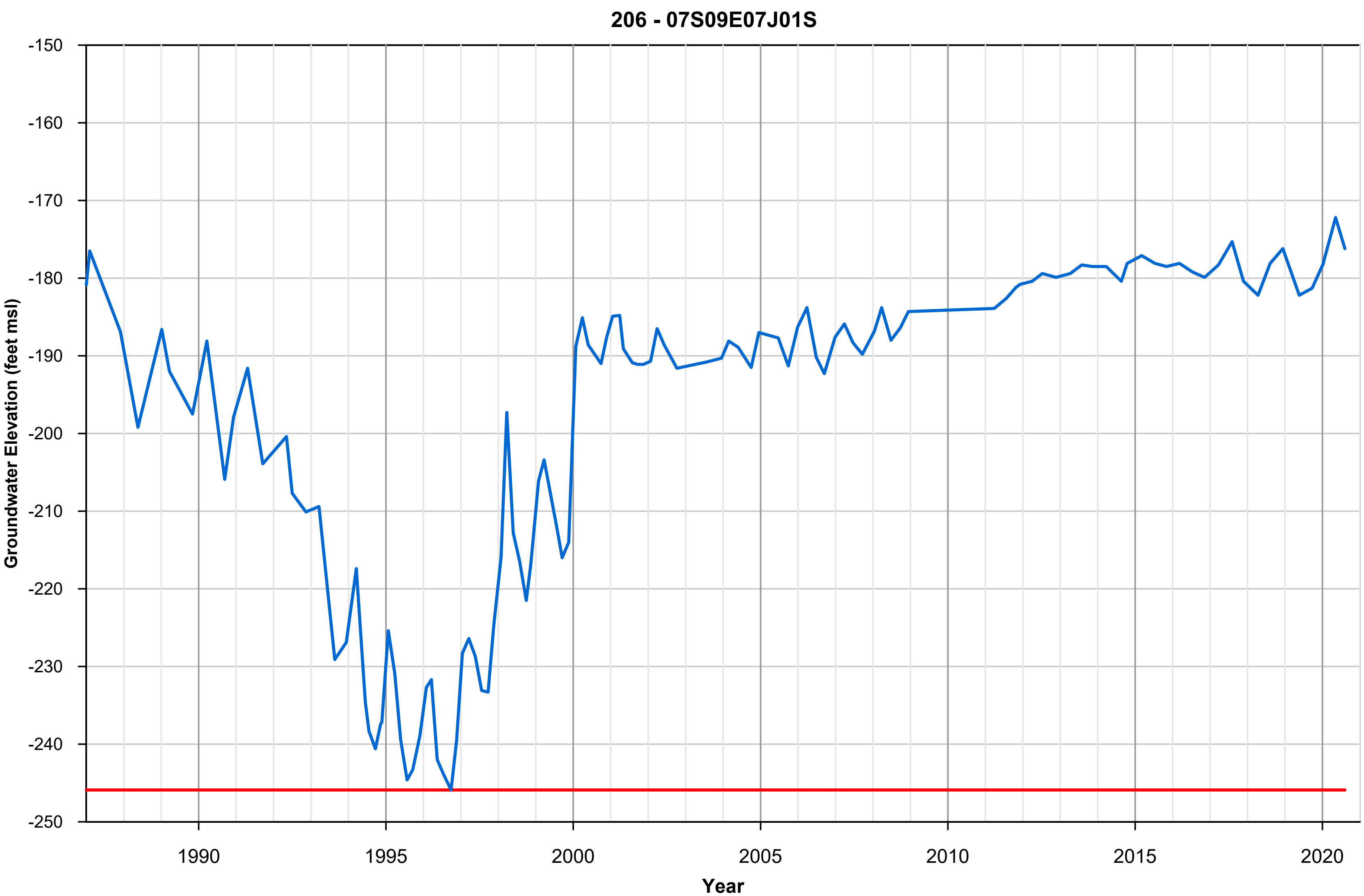
July 2021

TODD GROUNDWATER

Appendix 9A-47
Groundwater Elevation Hydrograph
687 - 07S08E33B01S



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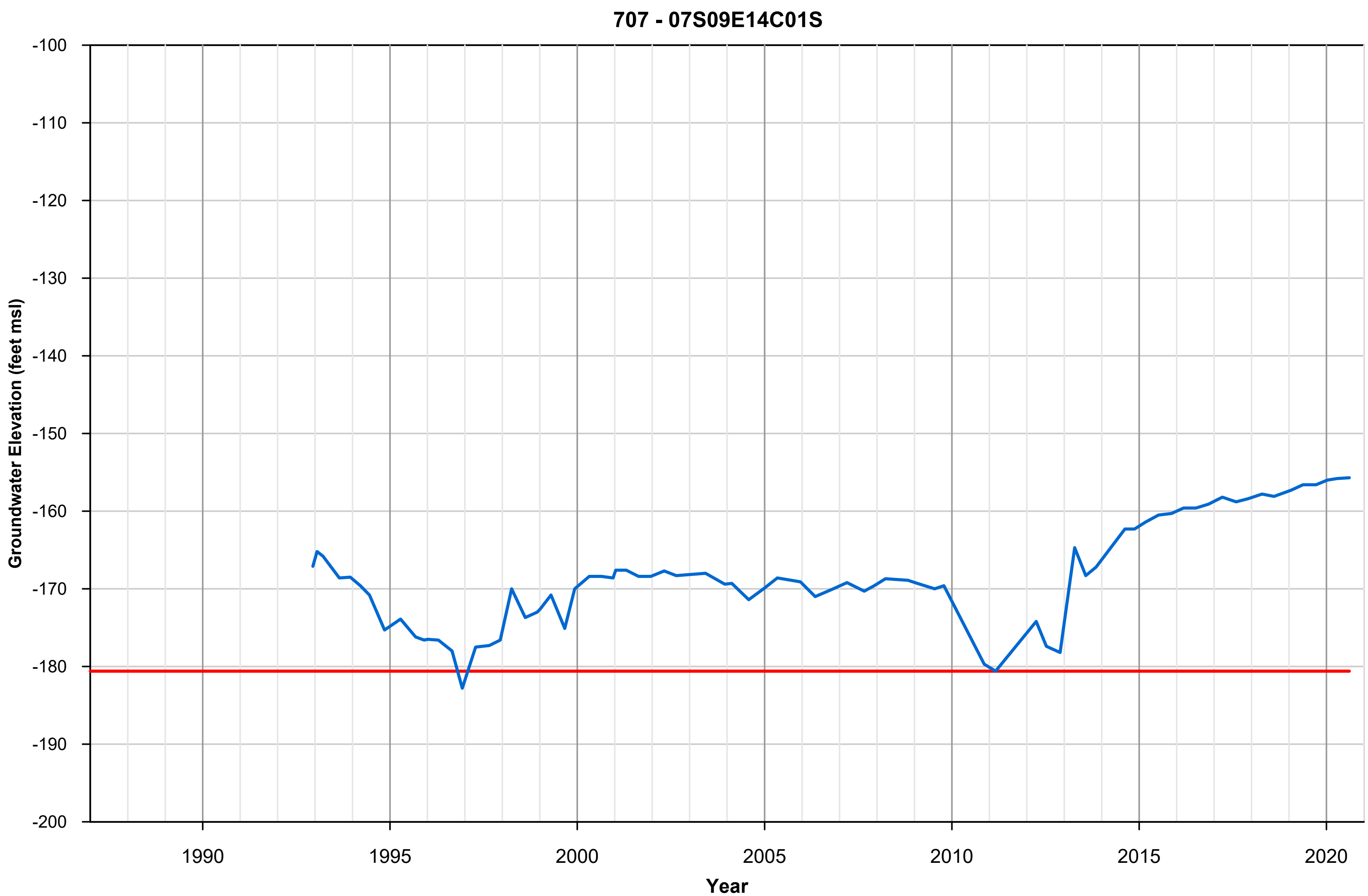
July 2021

TODD GROUNDWATER

Appendix 9A-48
Groundwater Elevation Hydrograph
206 - 07S09E07J01S



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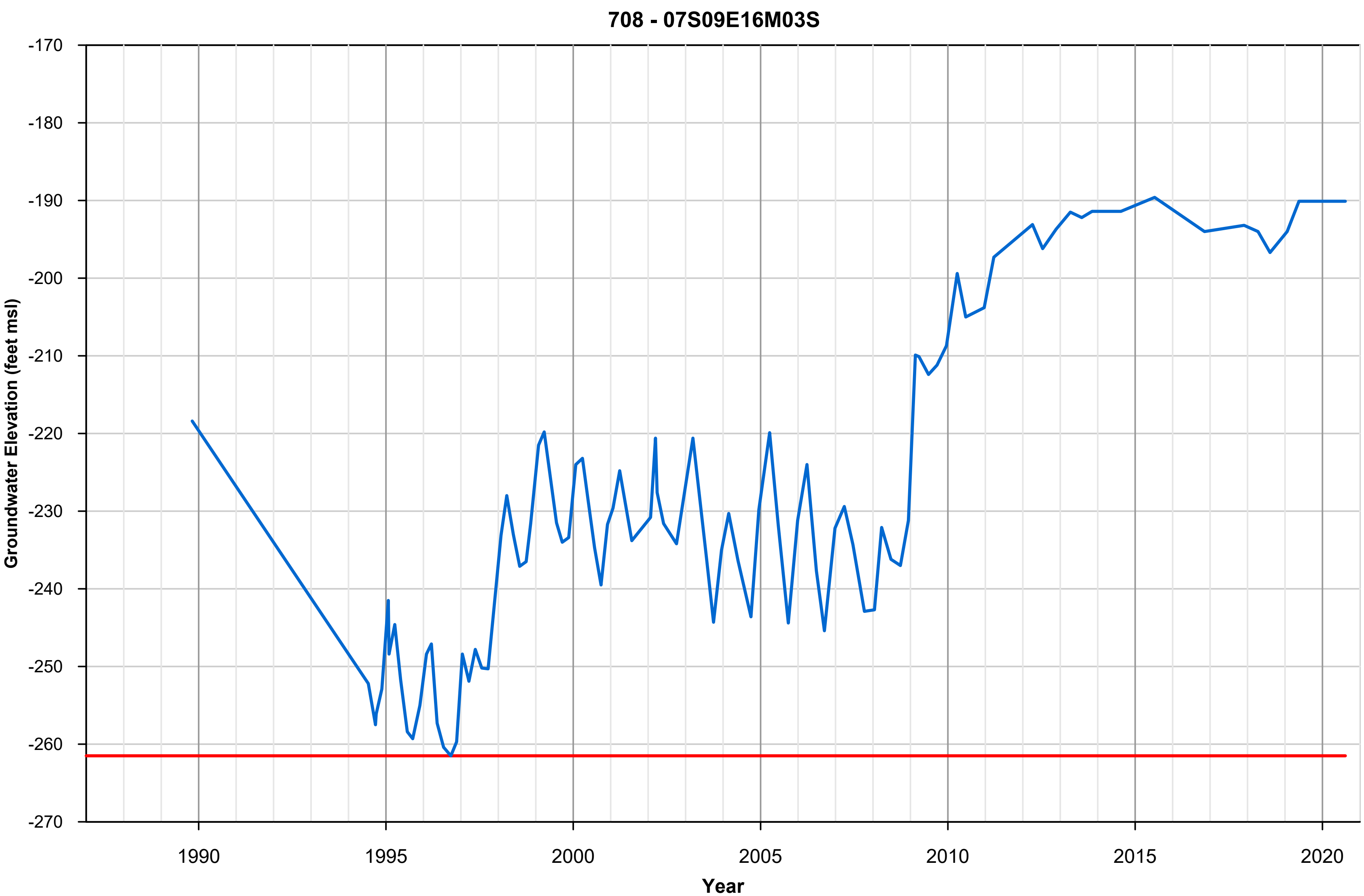
July 2021

TODD GROUNDWATER

Appendix 9A-49
Groundwater Elevation Hydrograph
707 - 07S09E14C01S



July 2021

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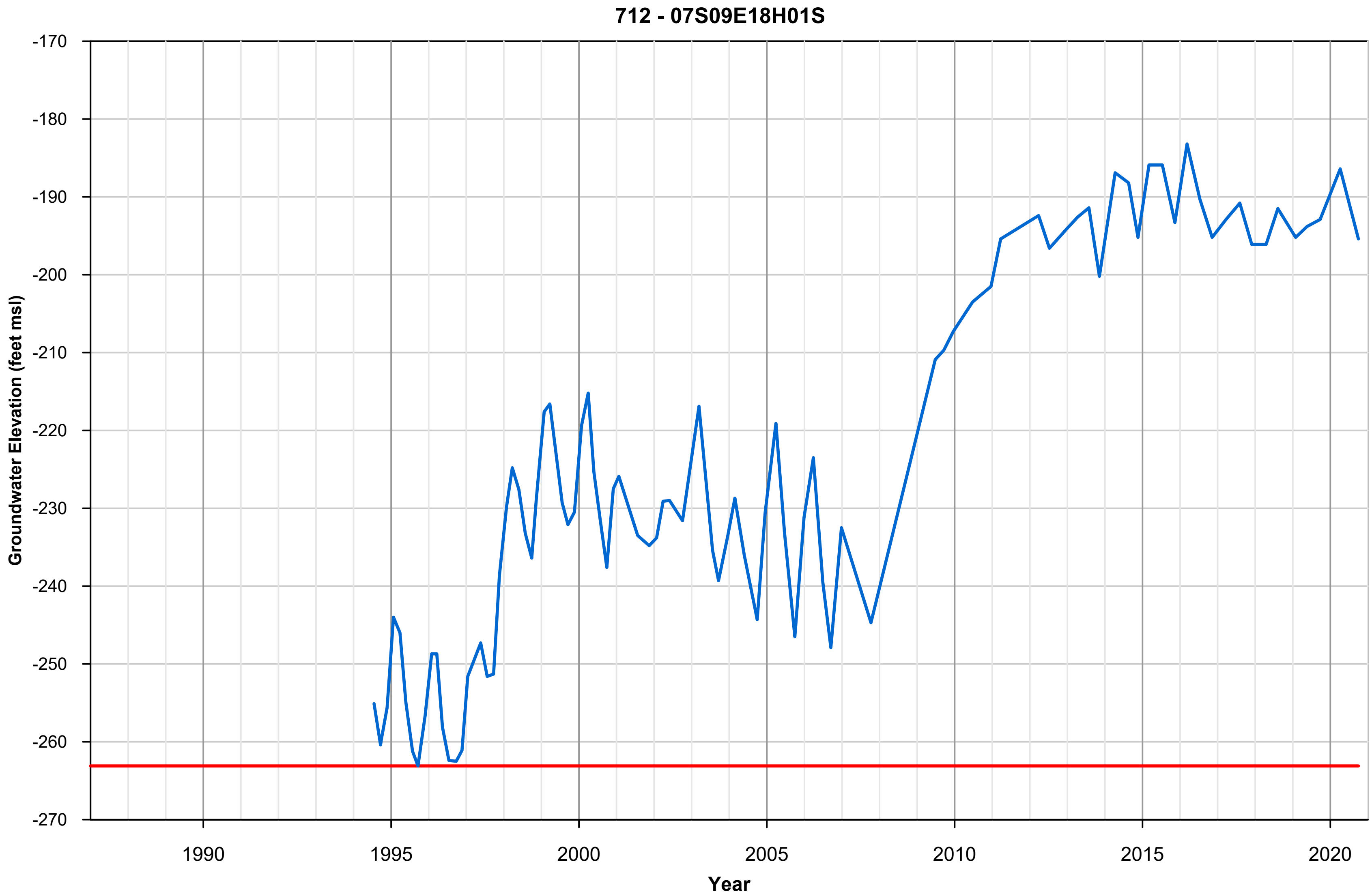
TODD GROUNDWATER

Appendix 9A-50
Groundwater Elevation Hydrograph
708 - 07S09E16M03S



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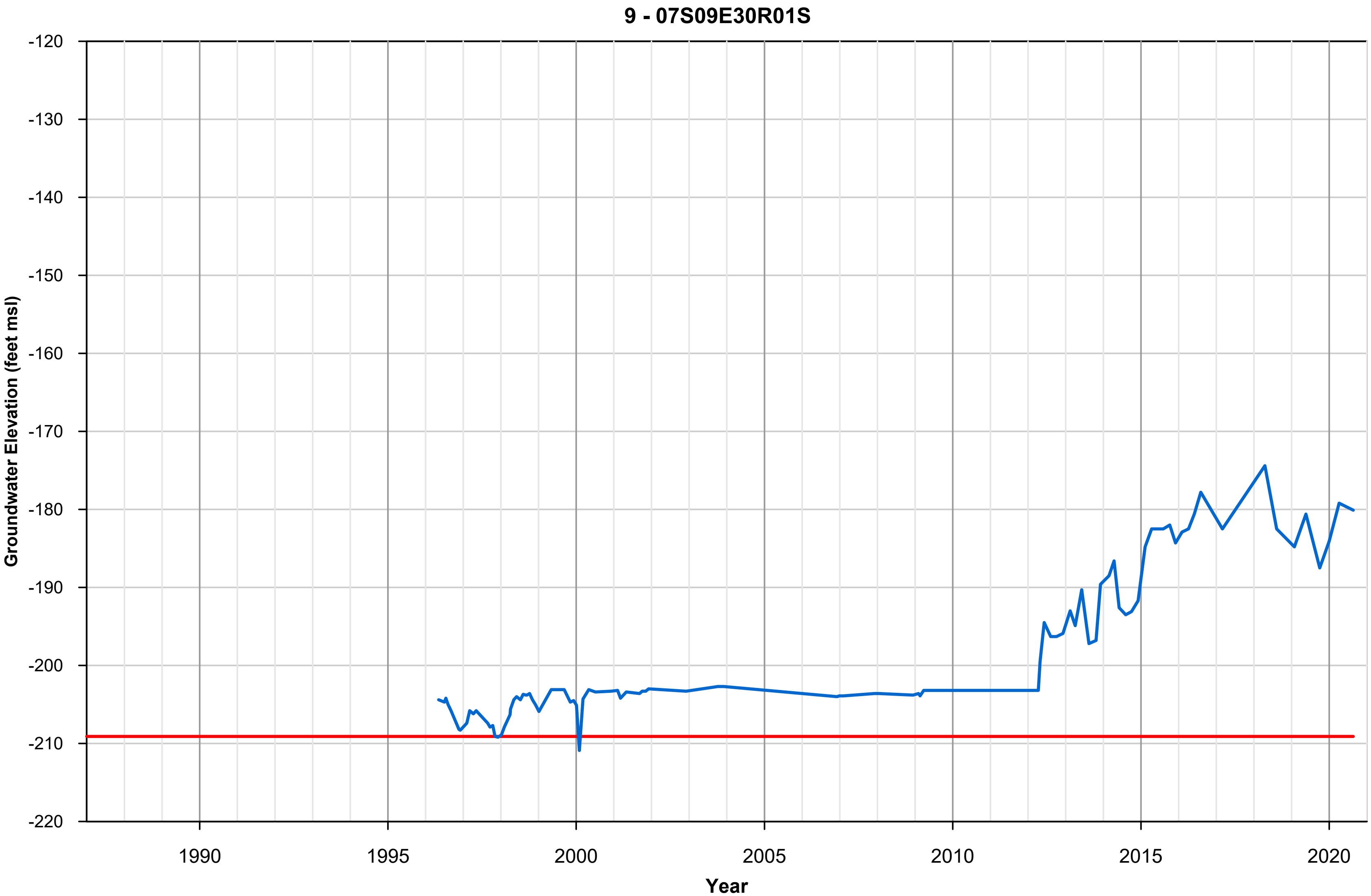
July 2021

TODD GROUNDWATER

Appendix 9A-51
Groundwater Elevation Hydrograph
712 - 07S09E18H01S



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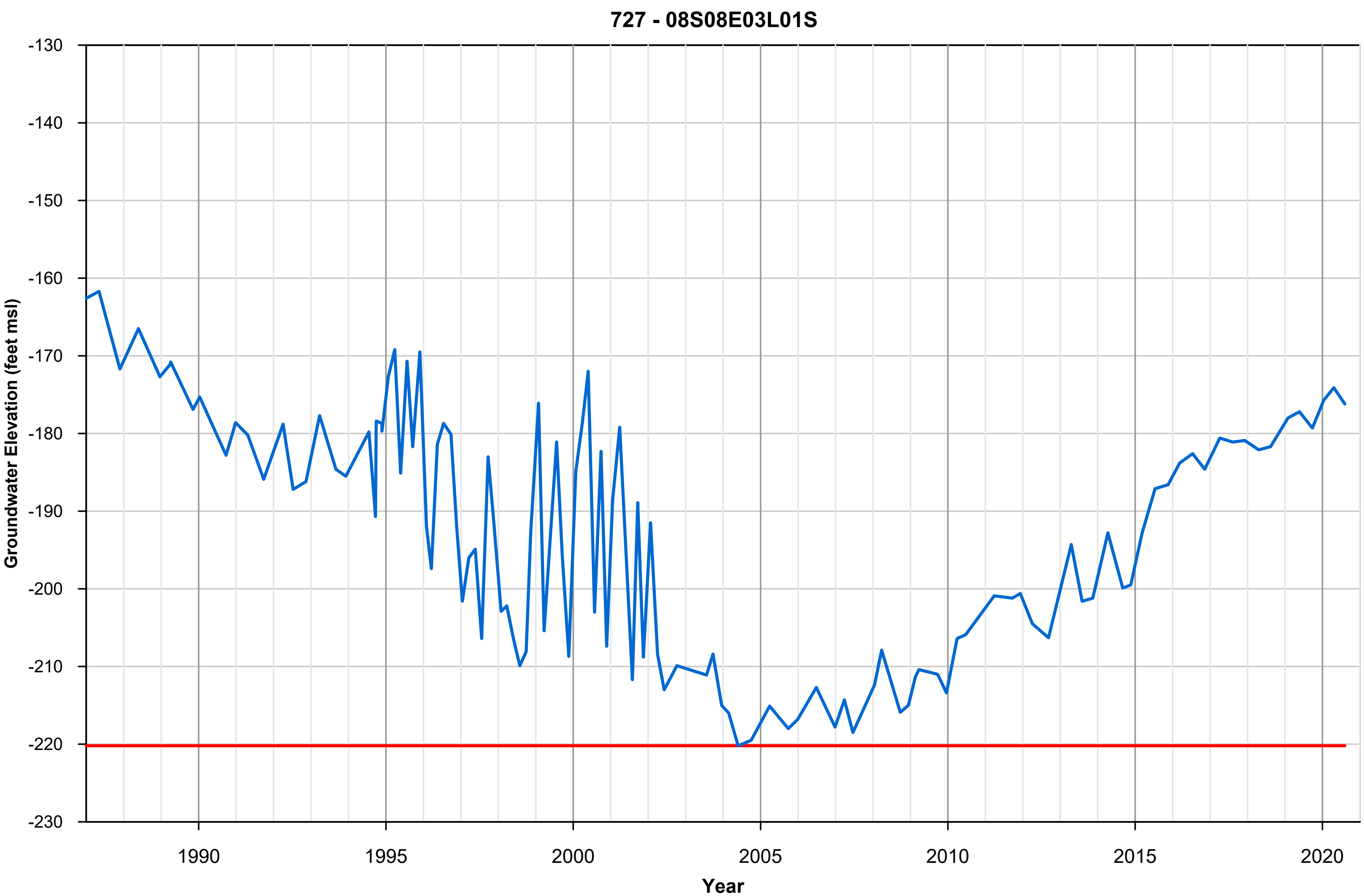
July 2021

TODD GROUNDWATER

Appendix 9A-52
Groundwater Elevation Hydrograph
9 - 07S09E30R01S



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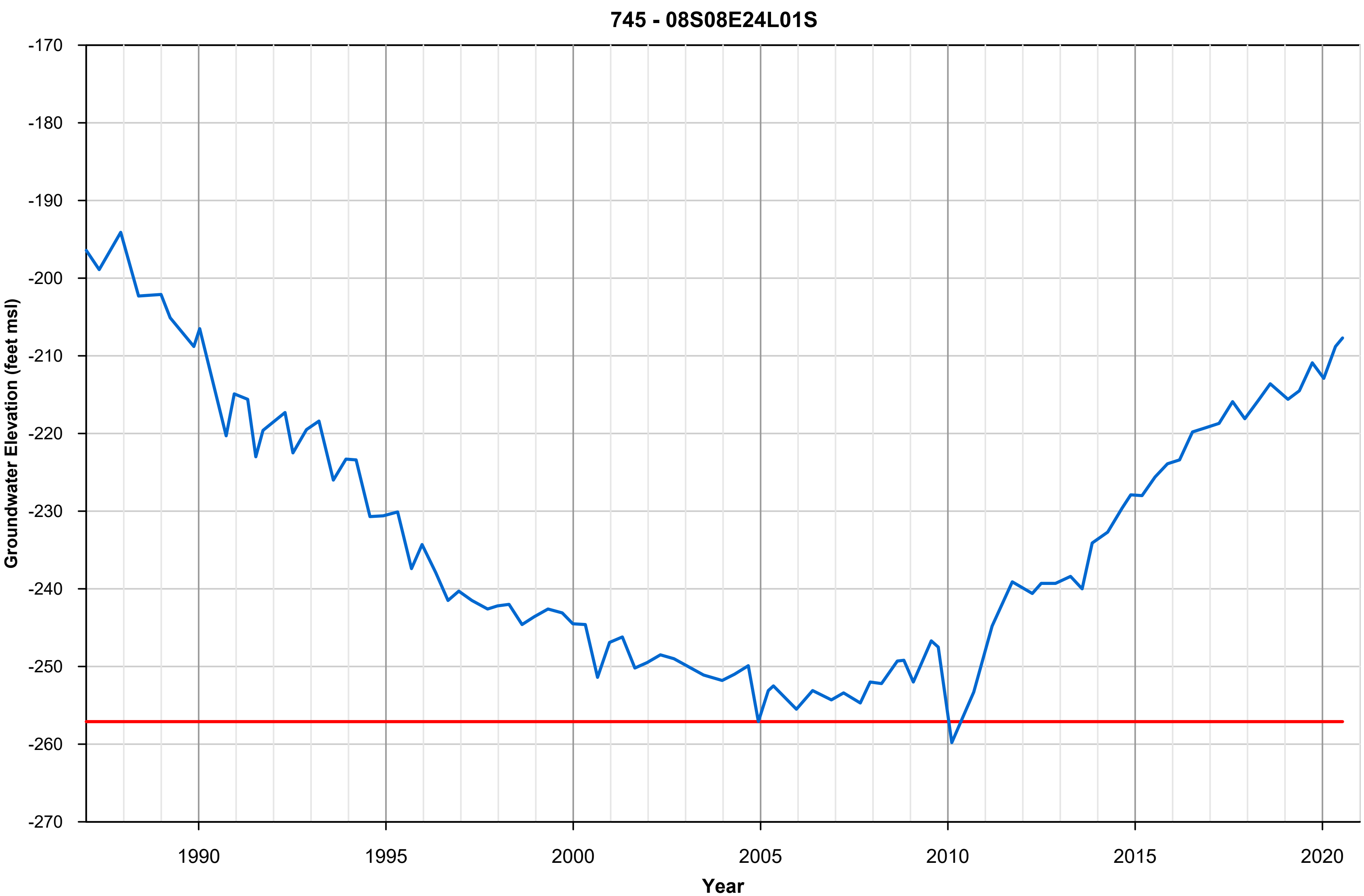
TODD GROUNDWATER

Appendix 9A-53
Groundwater Elevation Hydrograph
727 - 08S08E03L01S



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July 2021

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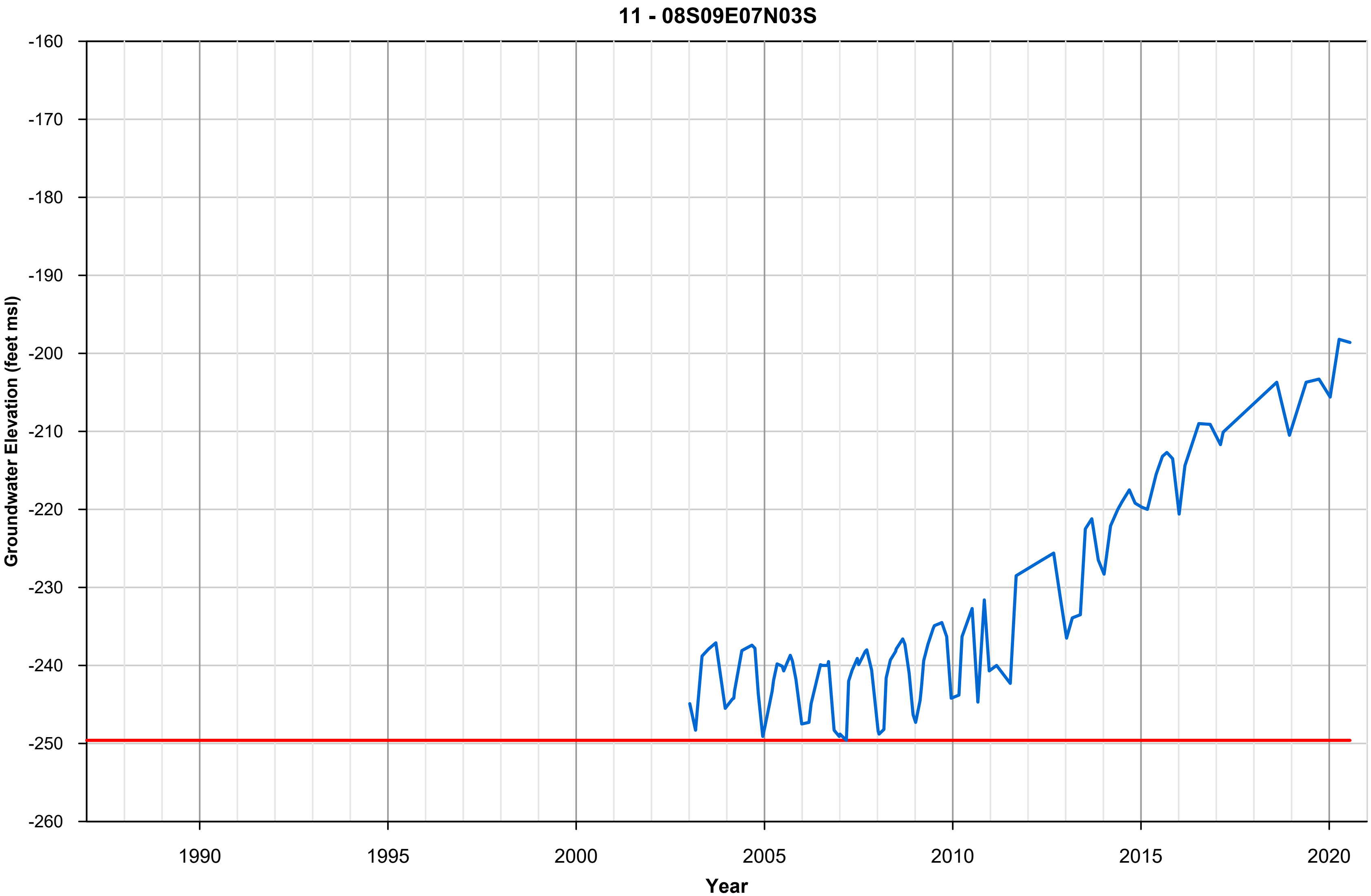
TODD GROUNDWATER

Appendix 9A-54
Groundwater Elevation Hydrograph
745 - 08S08E24L01S



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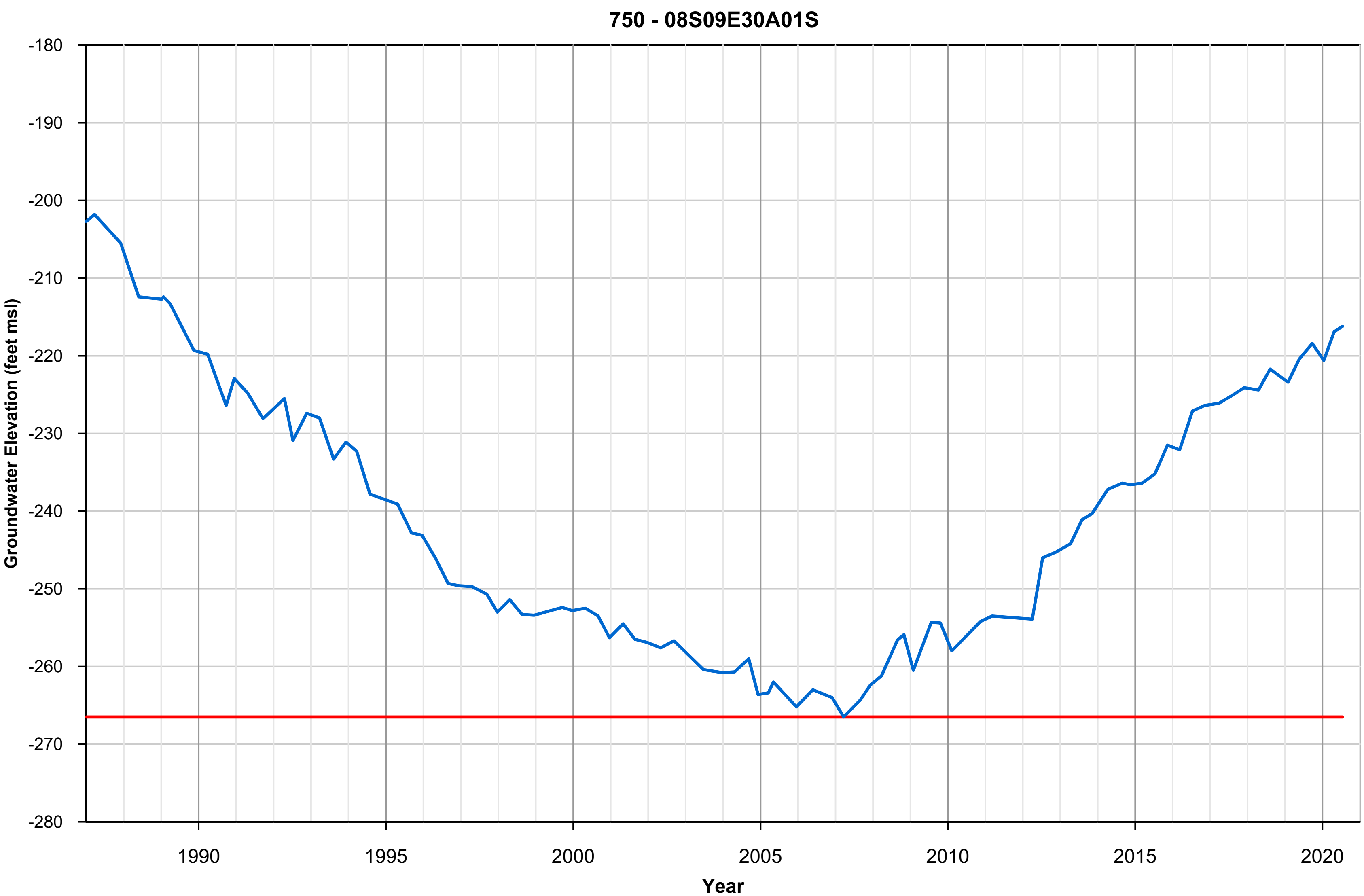
Appendix 9A-55
Groundwater Elevation Hydrograph
11 - 08S09E07N03S



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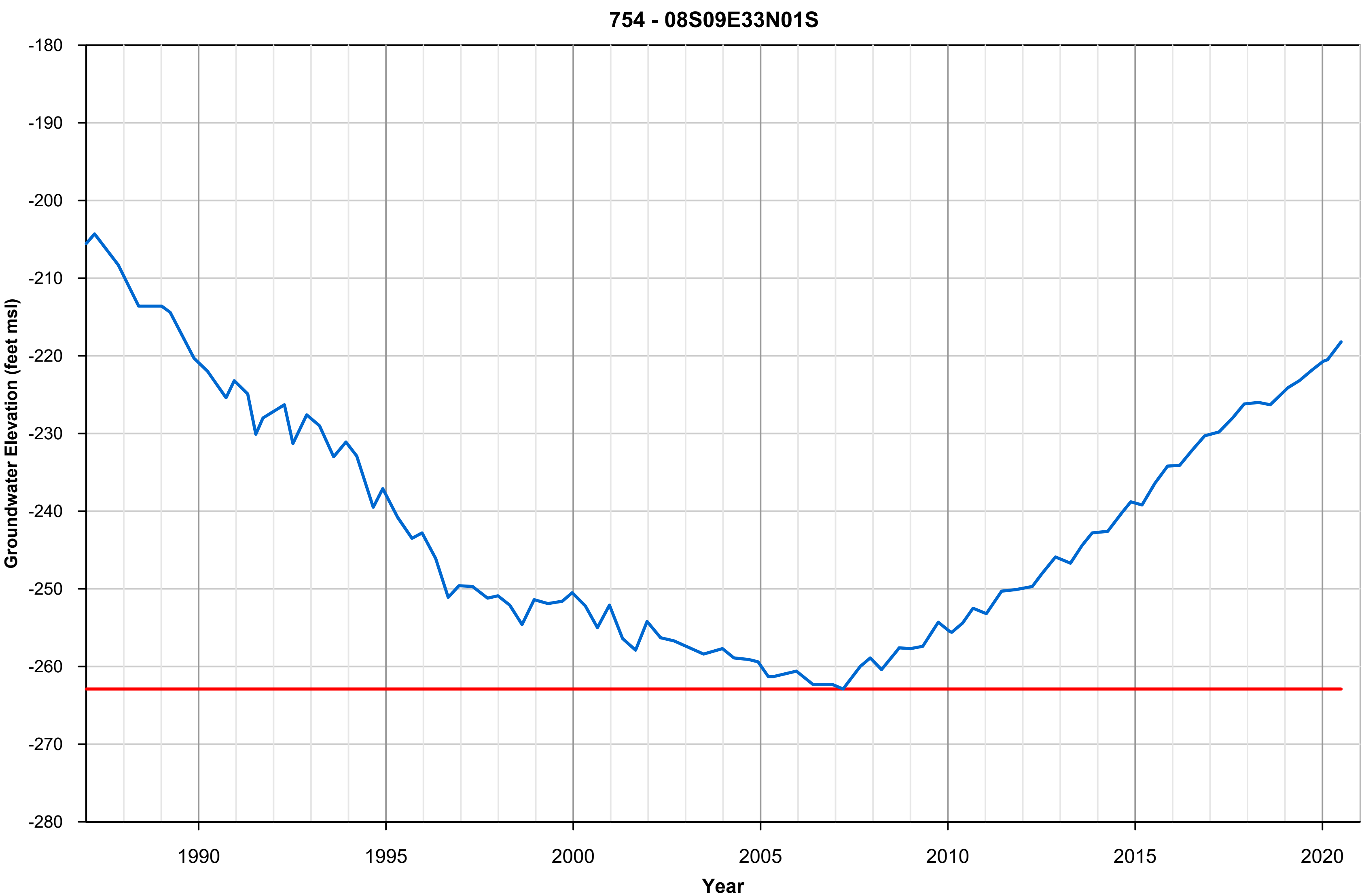
Appendix 9A-56
Groundwater Elevation Hydrograph
750 - 08S09E30A01S



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Appendix 9A-57
Groundwater Elevation Hydrograph
754 - 08S09E33N01S

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Prepared by

TODD GROUNDWATER

2490 Mariner Square Loop, Suite 215
Alameda, CA 94501
toddgroundwater.com

WOODARD & CURRAN

9655 Chesapeake Drive, Suite 320
San Diego, CA 92123
woodardcurran.com