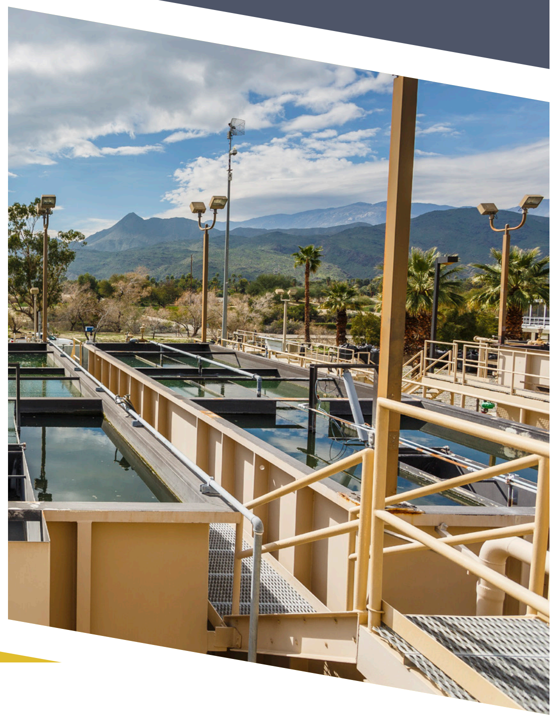
INDIO SUBBASIN

WATER MANAGEMENT PLAN UPDATE

Sustainable Groundwater Management Act Alternative Plan



Volume 2: Appendices

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Prepared for: Indio Subbasin Groundwater Sustainability Agencies

Coachella Valley Water District
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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

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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.

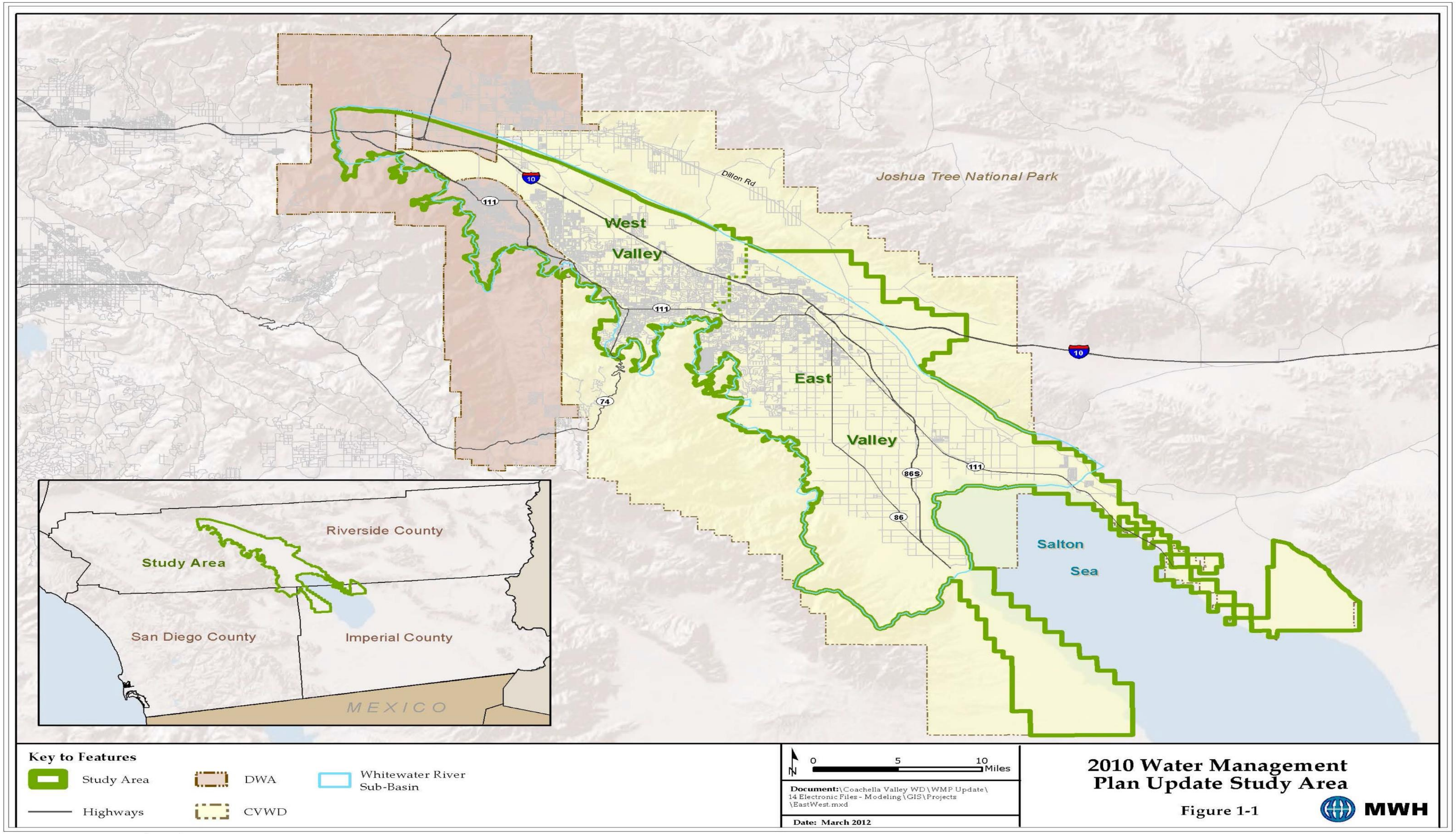
The programs and projects identified in the 2010 CVWMP are based on the following objectives:

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.



Source: 2010 CVWMP (CVWD)

Figure 1-1: 2010 CVWMP Planning Area

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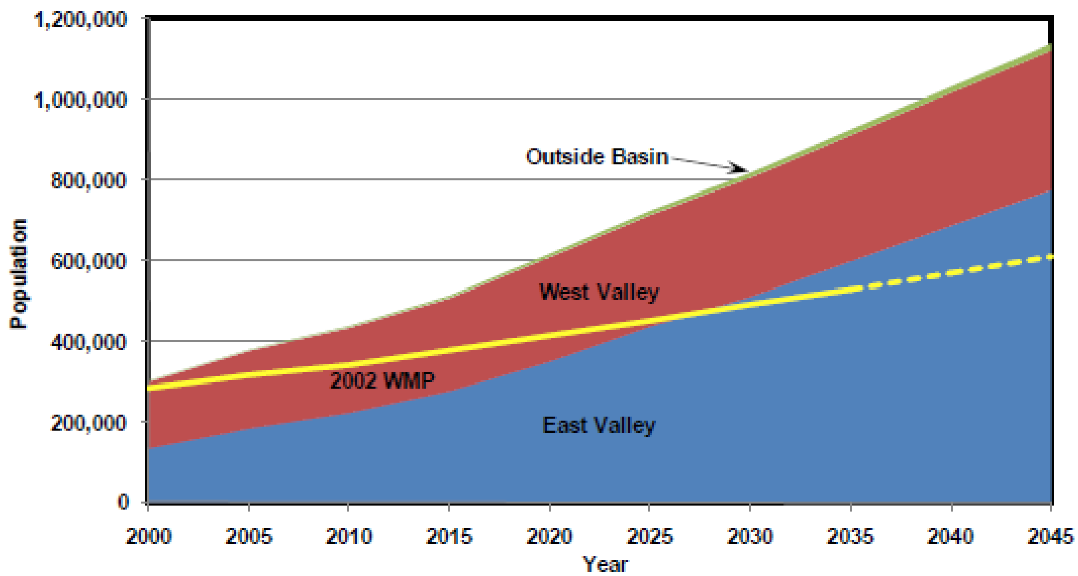
2. WATER DEMAND PROJECTIONS

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**).



2002 WMP – Coachella Valley Water Management Plan completed in 2002 – projections based on 1998 SCAG data. Data beyond 2020 are extrapolated.
2010 WMP Update – Riverside County Center for Demographic Research population projections adopted by CVAG in 2006. Data beyond 2035 are extrapolated.

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.

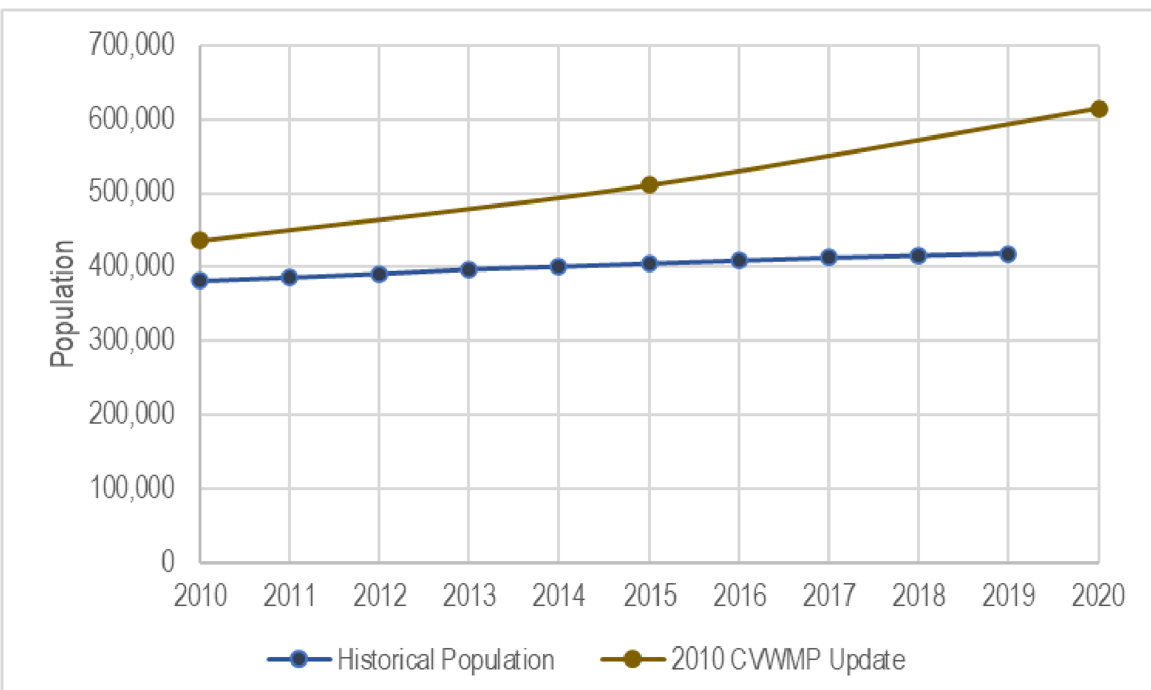


Figure 2-2: Comparison of Actual Population Growth with 2010 CVWMP Projections

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.

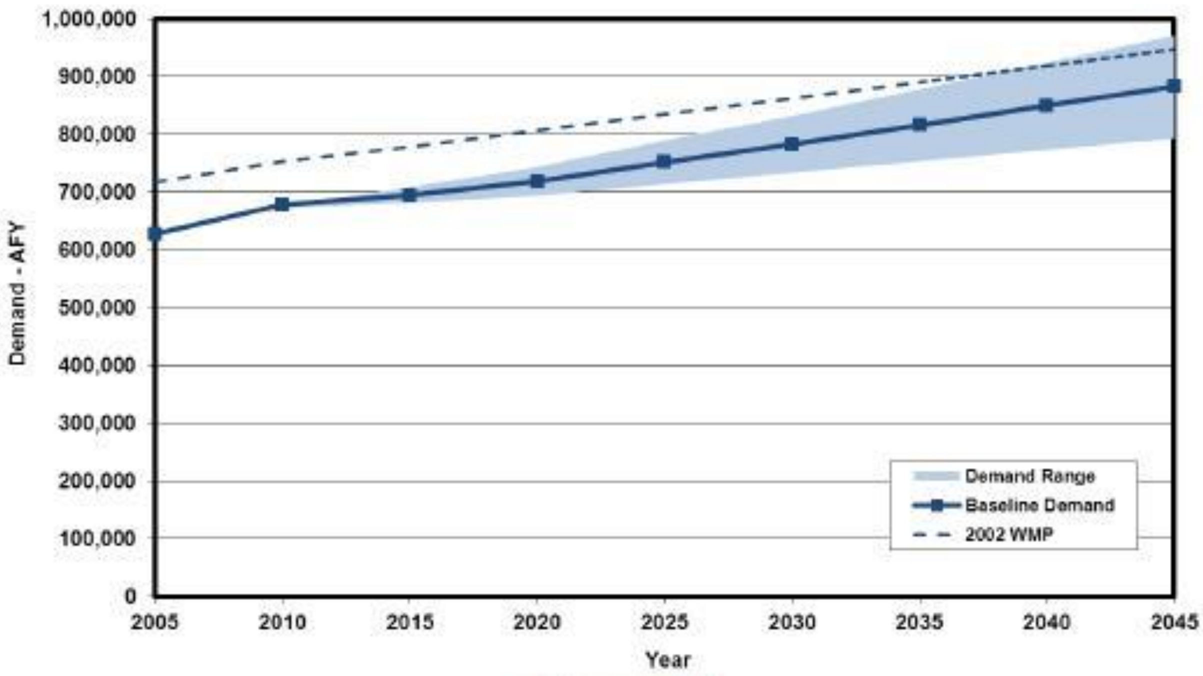
2.4 COMPARISON TO ACTUAL WATER DEMANDS

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.

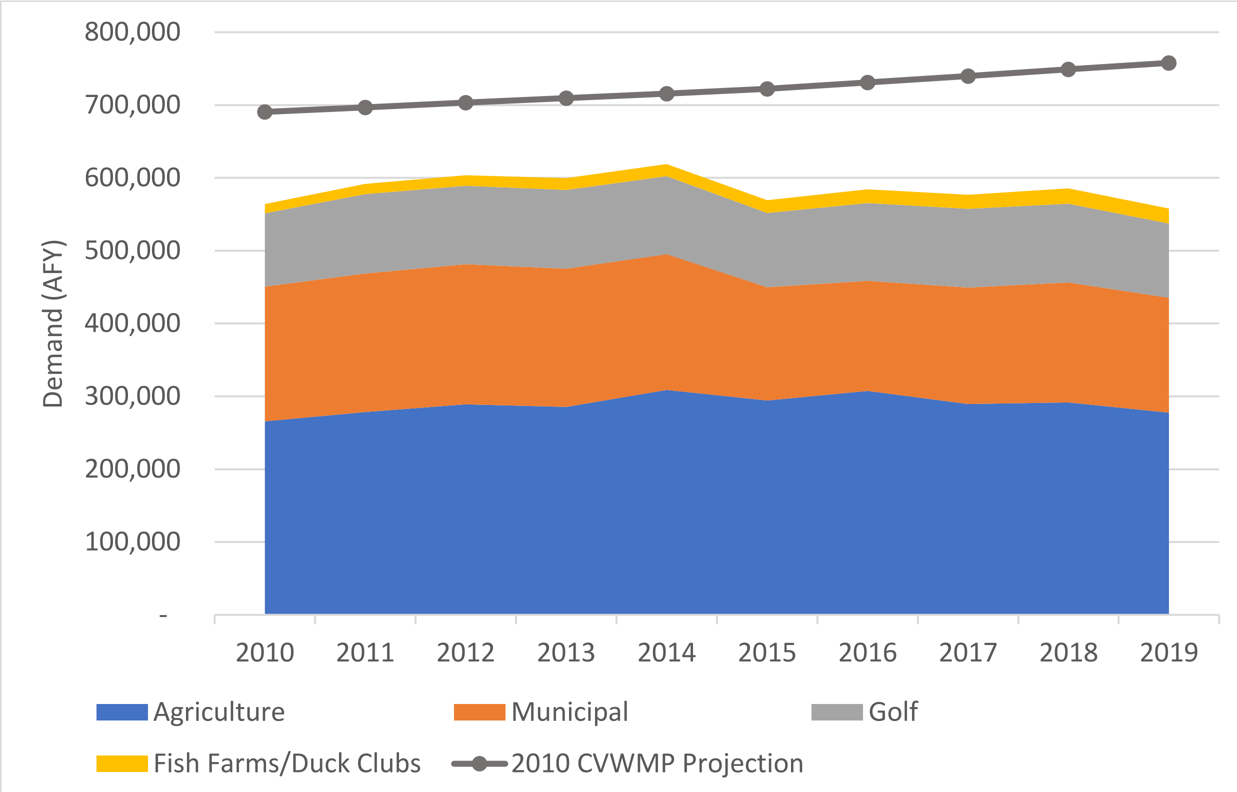


Figure 2-4: Total Historical Demand for the Indio Subbasin (2010-2019)

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

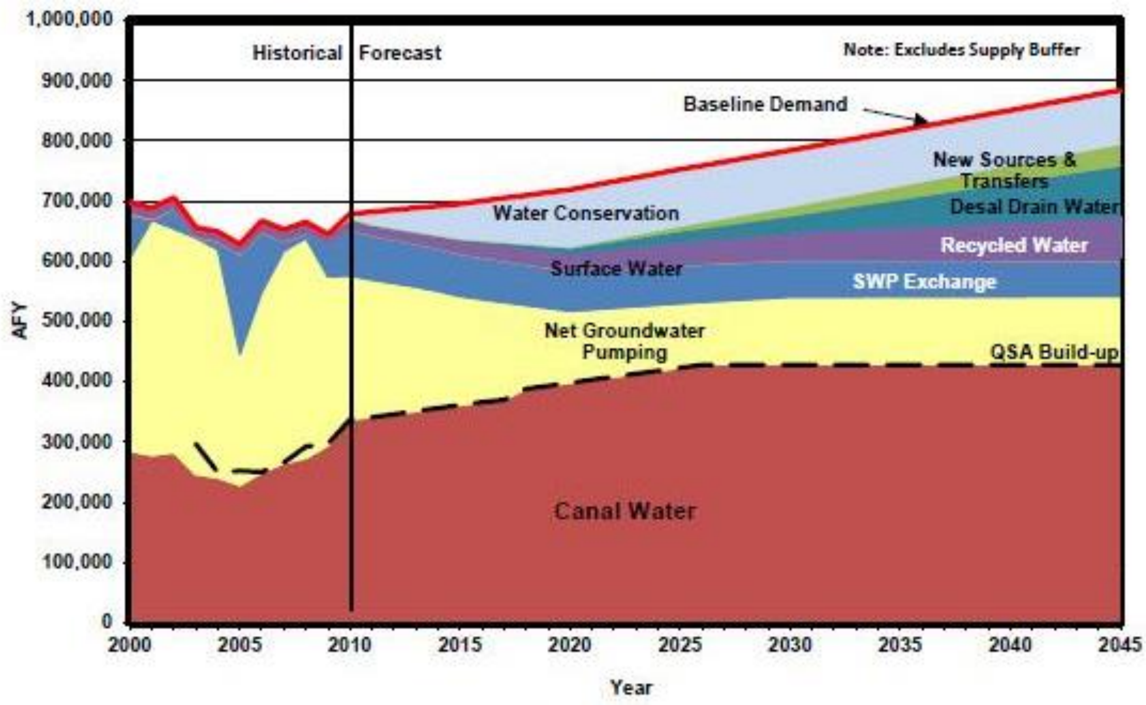
Historical supply data have been compiled from the following sources for 2010 through 2019:

- 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.

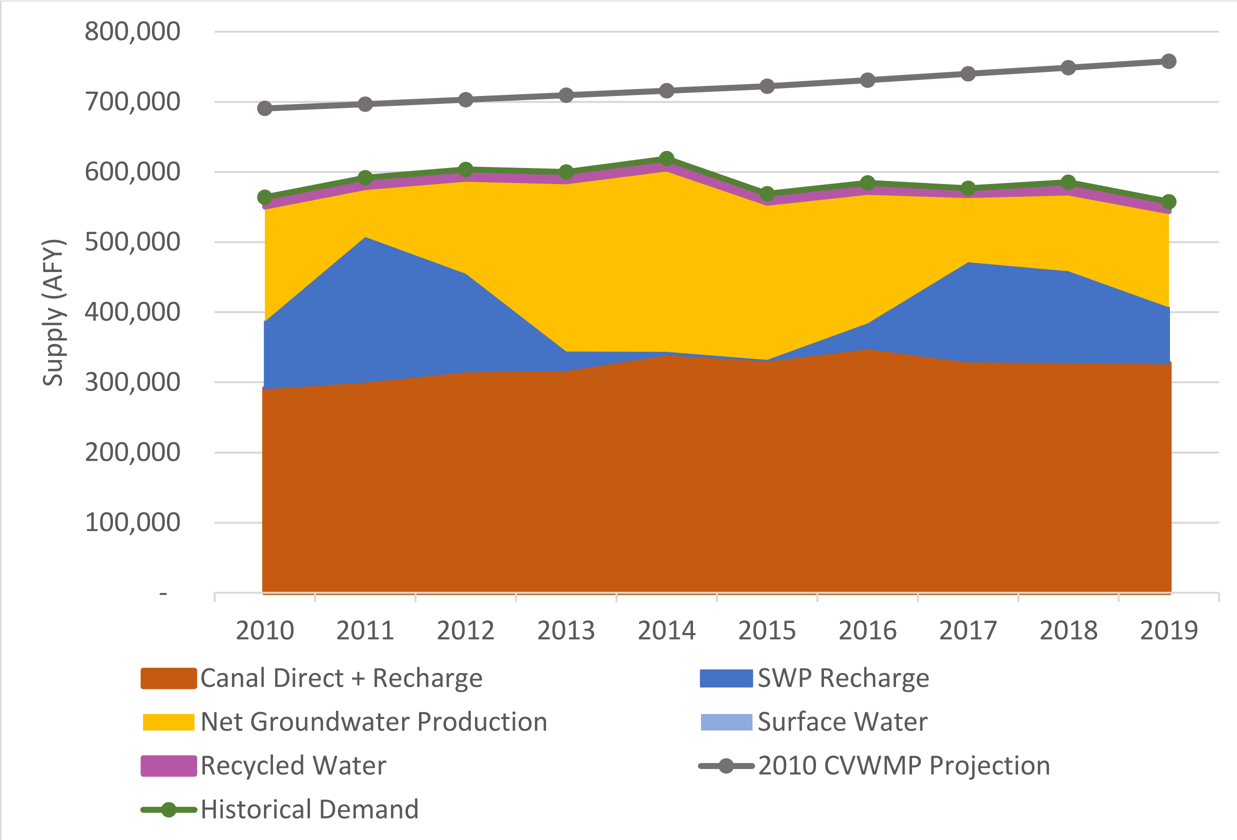


Figure 3-2: Comparison of Demand and Supply for the Indio Subbasin (2010-2019)[4]

[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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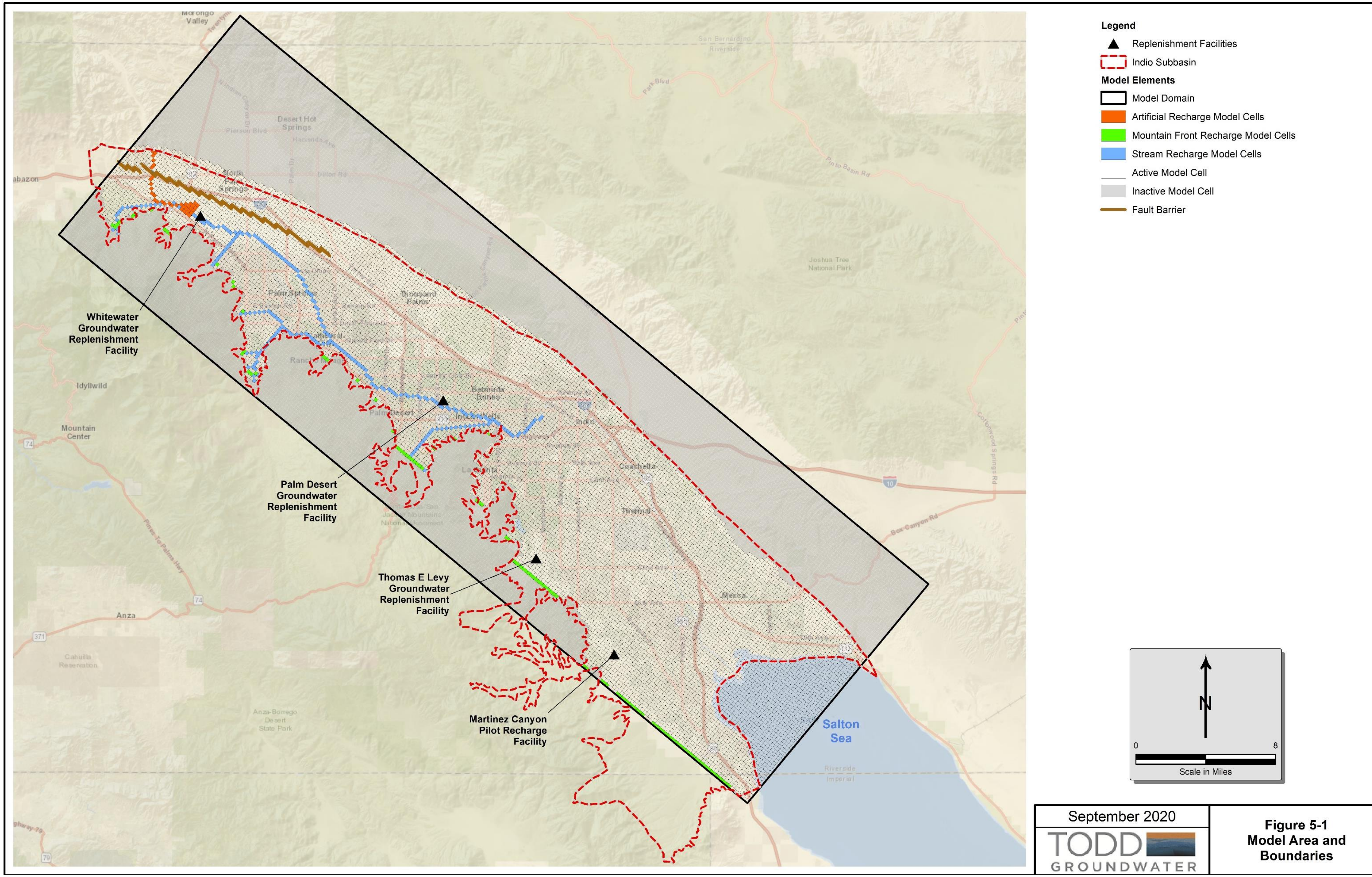
Legend
Replenishment Facilities
Indio Subbasin
Model Elements
Model Domain
Artificial Recharge Model Cells
Mountain Front Recharge Model Cells
Stream Recharge Model Cells
Active Model Cell
Inactive Model Cell
Fault Barrier
Whitewater Groundwater Replenishment Facility
Palm Desert Groundwater Replenishment Facility
Thomas E Levy Groundwater Replenishment Facility
Martinez Canyon Pilot Recharge Facility
Salton Sea
N
0
8
Scale in Miles
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.

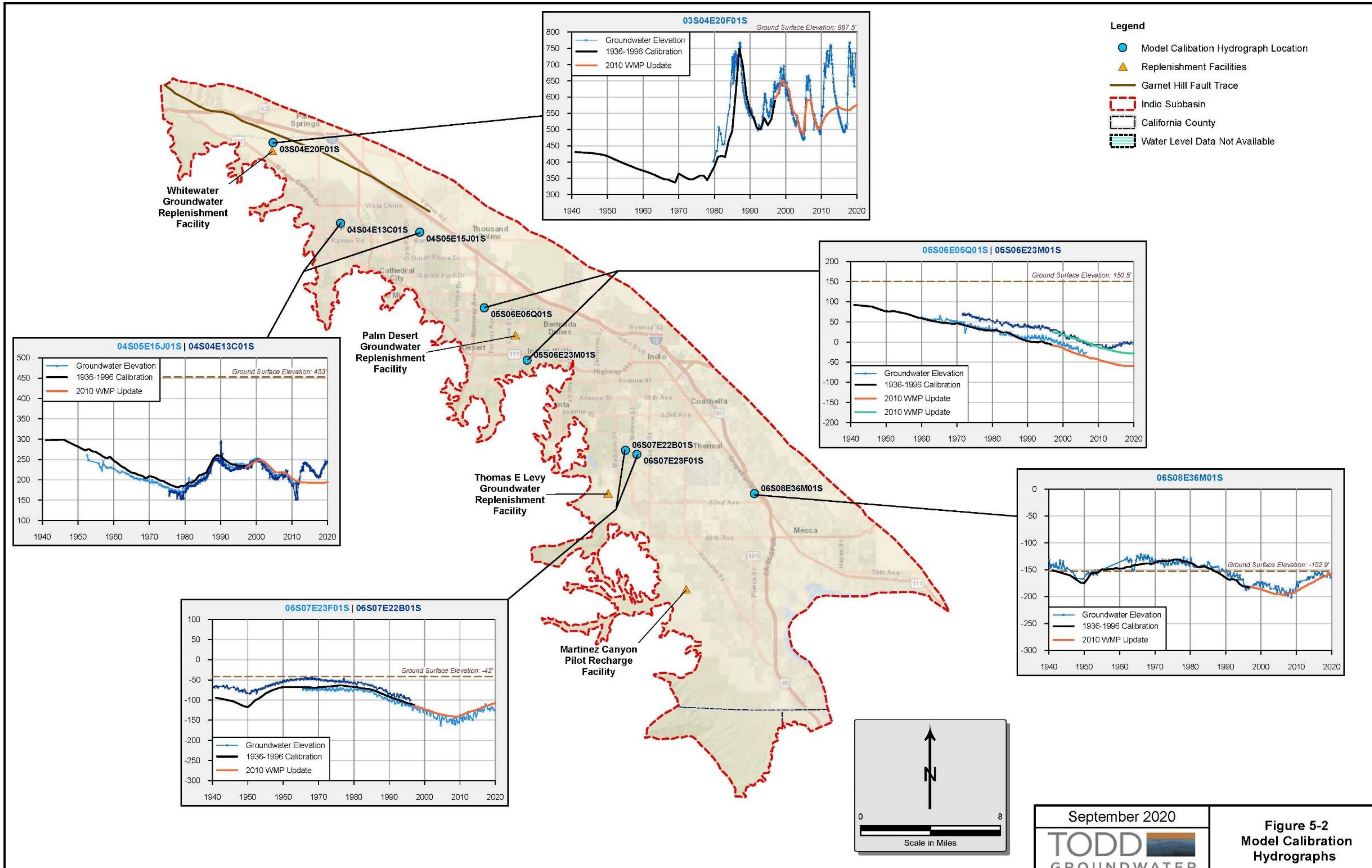
Well 03S04E20F01S is completed in the unconfined aquifer near the WW-GFR and exhibits large groundwater elevation fluctuations of around 250 feet between 1997 and 2008, in response to recharge operations at the GRF. The 2010 CVWMP Update simulation results show the model generally reproduces the observed 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.


Legend
Model Calibration Hydrograph Location
Replenishment Facilities
Garnet Hill Fault Trace
Indio Subbasin
California County
Water Level Data Not Available
03S04E20F01S
Ground Surface Elevation: 887.5'
Groundwater Elevation
1936-1996 Calibration
2010 WMP Update
04S05E15J01S | 04S04E13C01S
Ground Surface Elevation: 453'
05S06E05Q01S | 05S06E23M01S
Ground Surface Elevation: 150.5'
06S07E23F01S | 06S07E22B01S
Ground Surface Elevation: -42'
06S08E36M01S
Ground Surface Elevation: -152.9'
Whitewater Groundwater Replenishment Facility
Palm Desert Groundwater Replenishment Facility
Thomas E Levy Groundwater Replenishment Facility
Martinez Canyon Pilot Recharge Facility
04S04E13C01S
04S05E15J01S
05S06E05Q01S
05S06E23M01S
06S07E22B01S
06S07E23F01S
06S08E36M01S
Scale in Miles
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.

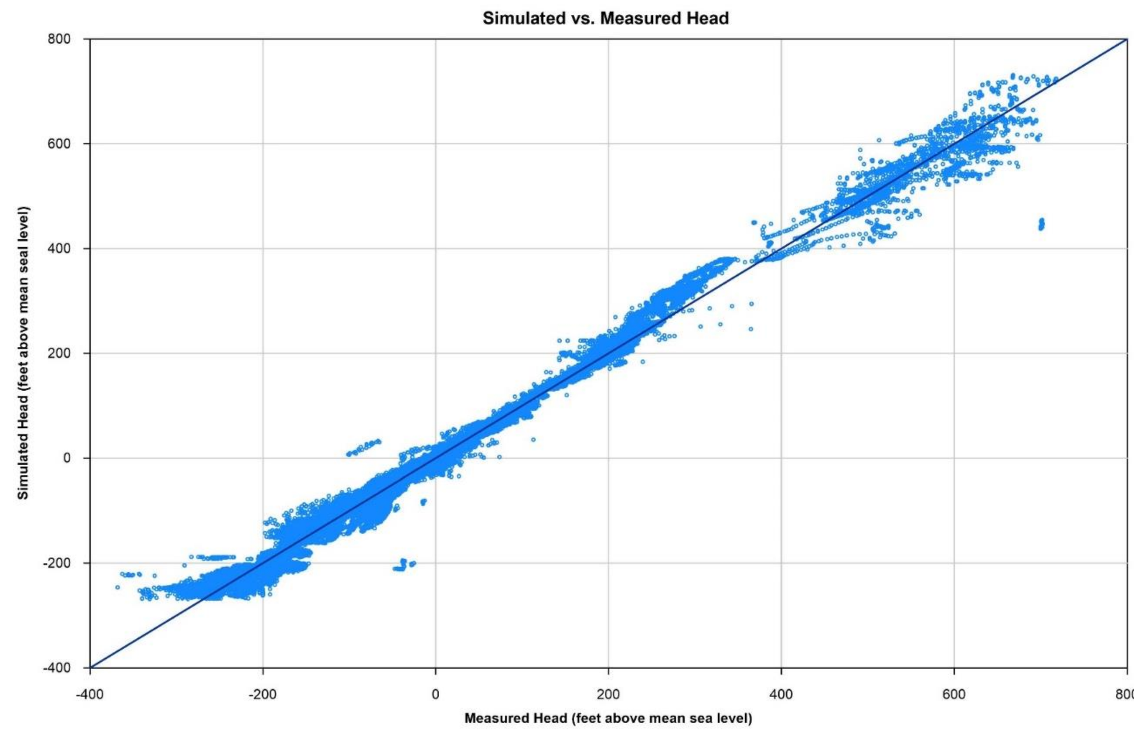
5.4.3 Water Budget Calibration

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.

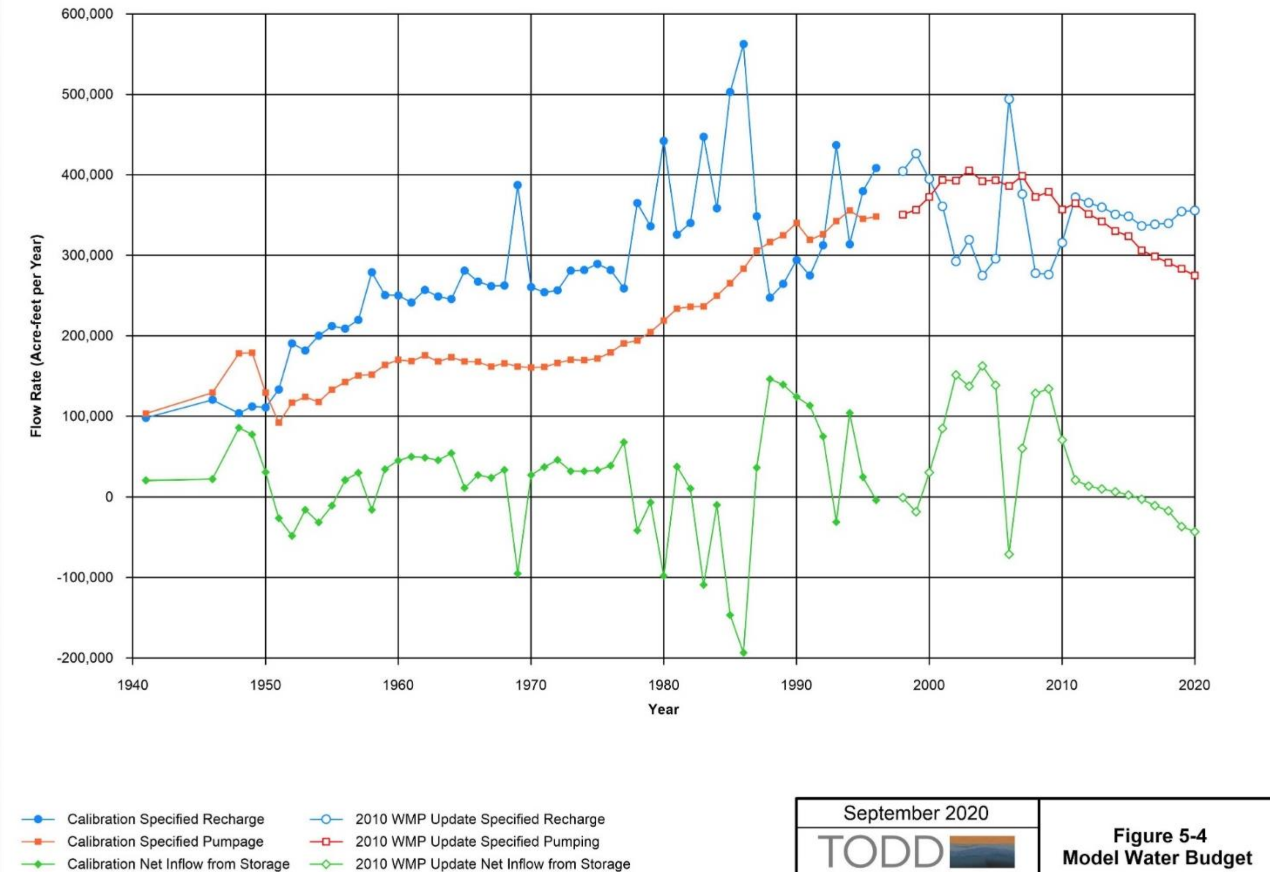
Model computed drain flows are compared with measured agricultural drain flows in **Figure 5-5**. The very good agreement from the 1950s through the early 2000s shows that the model is capable of simulating real trends in both water levels and flow rates. Apparent divergence of model-computed flows from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



September 2020

TODD GROUNDWATER

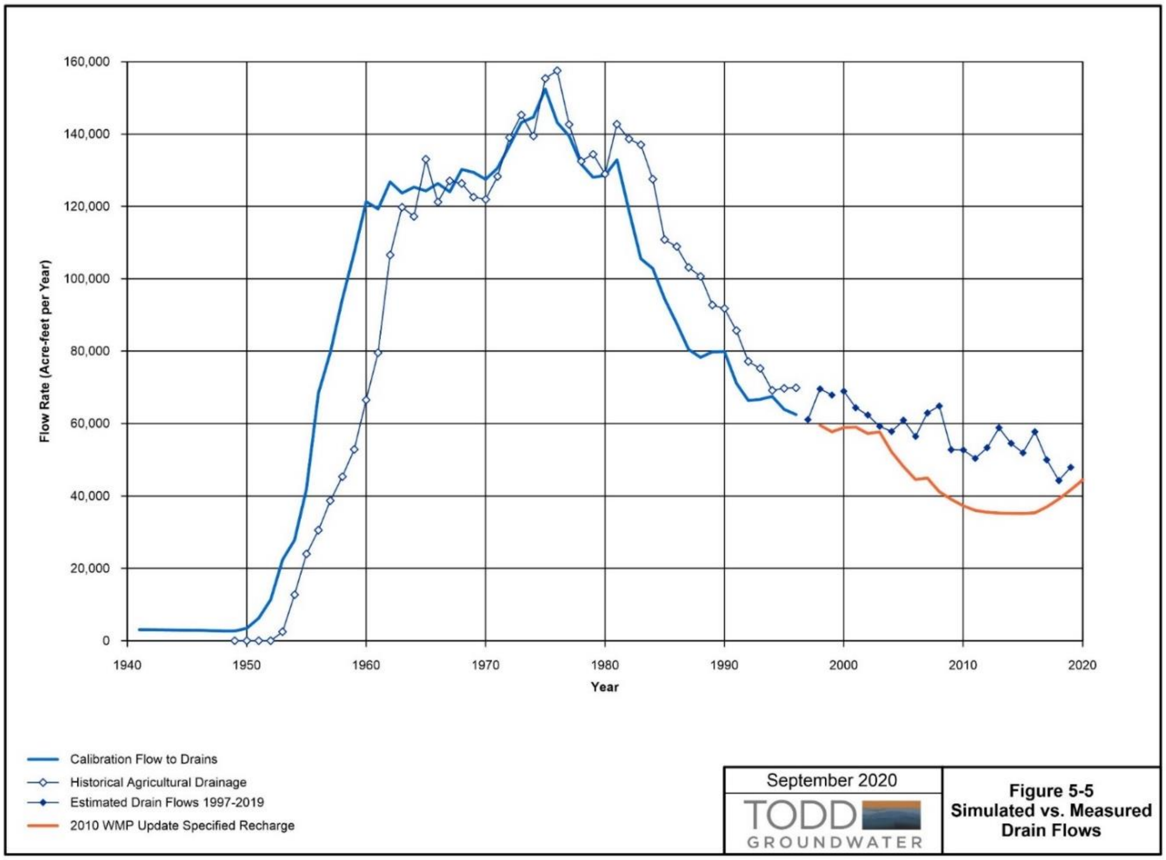
Figure 5-3
Simulated vs. Measured Groundwater Elevation Calibration, 1997-2009



September 2020

TODD GROUNDWATER

Figure 5-4
Model Water Budget



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.

Coachella Valley Water District (CVWD) (2012) Coachella Valley Water Management Plan 2010 Update, January 2012, prepared by MWH.

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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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.

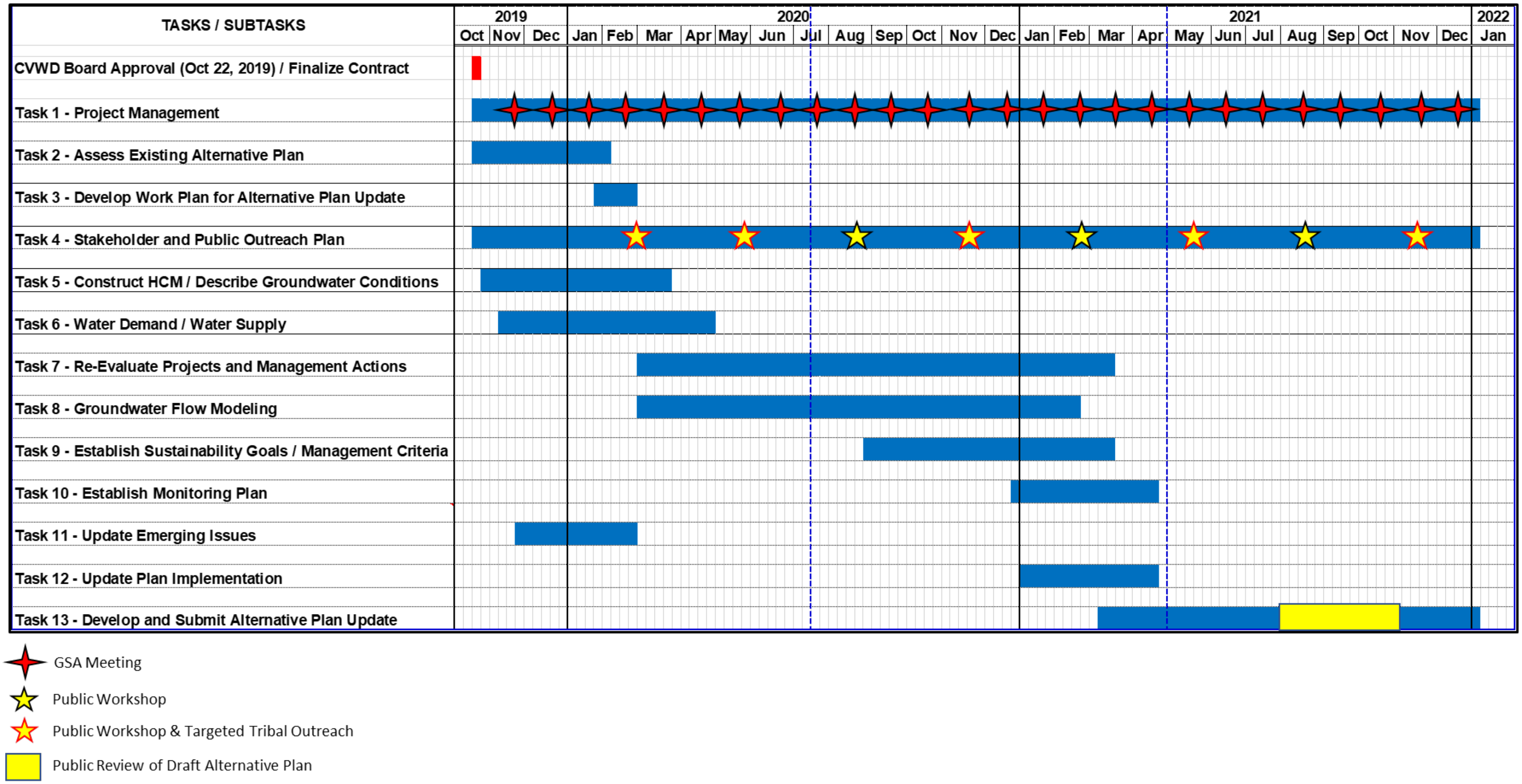
5. INPUT FROM DIVERSE SOCIAL, CULTURAL, AND ECONOMIC COMMUNITIES

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.

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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	✓

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.

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

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.

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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
Mark A Krause (signature)	______________________
Mark Krause	Brian Macy
Desert Water Agency	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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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
____________________	Brian E Macy (signature)
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.

6/27/18

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

William B. Pattison, Jr.

Coachella Water Authority

Mark S. Krause

Mark Krause

Desert Water Agency

Brian Macy

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

William B. Pattison, Jr.

Coachella Water Authority

Mark Krause

Desert Water Agency

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

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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

**times are subject to change*

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2022 Indio Subbasin Alternative Plan Update

Tribal Workgroup #5
SUMMARY

June 24, 2021 at 10:00 am – 12:00 pm
Virtual Meeting

Tribal Workgroup and Supporting Members	**Groundwater Sustainability Agencies (GSAs)**
• Chuck Jachens, Bureau of Indian Affairs • David Limon Saldivar, Augustine Band of Cahuilla Indians • Diana Ugarte Navarro, Torres Martinez • Jennifer Ruiz, Cabazon Band of Mission Indians • Jose Mora, Twenty-Nine Palms • Nina Waszak, Augustine Band • Otoniel Quiroz, Torres Martinez • Dr. Patrick Taber, Bureau of Indian Affairs • Shawn Muir, 29 Palms Band of Mission Indians	• Ashley Metzger, DWA • Castulo Estrada, CWA • Katie Evans, CVWD • Mark Krause, DWA • Ryan Molhoek, DWA • Trish Rhay, IWA • Zoe Rodriguez del Rey, CVWD **Consultant Team** • Iris Priestaf, Todd Groundwater • Nicole Poletto, Woodard & Curran • Rosalyn Prickett, Woodard & Curran • Vanessa De Anda, Woodard & Curran • William Medlin, 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. 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. Prickett 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. The public review period is anticipated in September or October 2021.

Groundwater Conditions: Water Quality

Ms. Priestaf, Todd Groundwater, presented the groundwater conditions for water quality in the Indio Subbasin. The water quality analysis involved compiling data from various databases and mapping the following eight constituents: salinity (TDS), nitrate, arsenic, hexavalent chromium (Cr-6), fluoride, perchlorate, uranium, and DBCP. The constituents were mapped from 1990 to 2019 to see geographic patterns, distribution, and trends. The cross-sections for TDS, nitrate, arsenic, Cr-6 show vertical variation, and the time concentration plots for TDS and nitrate show trends over time.

Ms. Priestaf presented a series of maps showing the range of contaminant concentrations overtime throughout the Subbasin.

The highest **TDS** concentrations are located near the Salton Sea and along the eastern edge potentially from seawater intrusion, and along the Subbasin margins potentially from return flows and subsurface inflow. The lower concentrations are found along the deeper center of the Subbasin. Shallow wells are more variable and have higher TDS concentrations because they are more influenced by recharge and other processes. Since 1990, TDS concentrations have increased in the deeper zones in the central and eastern Thermal subarea. Sources of TDS include natural sources, return flows from agricultural and landscape irrigation, imported water recharge, septic and wastewater disposal, subsurface inflow, and historical inflow from the Salton Sea.

Workgroup comments and questions included the following:

- On the TDS cross-sections, how can neighboring wells have good and bad water quality? What accounts for this anomaly?
    - Differences may be due to higher-salinity subsurface inflow. The project team will review the data and circumstances of each well.
- On TDS time-concentration plots, why are some wells with higher concentrations along the margins? Is that also from high TDS subsurface inflow?
    - In some cases, this might also be from higher salinity return flows.

The Maximum Contaminant Level (MCL) for **nitrate** is 45 mg/L, but the majority of the Subbasin is below 10 mg/L. Some particular areas with higher nitrate reflect multiple sources, including natural mesquite sources and loading from historical agriculture, landscaping, septic and wastewater disposal. In general, shallow wells have higher nitrate concentrations and are more variable.

Workgroup comments and questions included the following:

- Can you please provide a reference for the mesquite-nitrate relationship document discussed?
    - The reference will be shared following the Workgroup meeting.

The MCL for **arsenic** is 10 μg/L. Though the majority of the Subbasin is below 5 μg/L, there are areas with concentrations higher than 50 μg/L due to anoxic (low oxygen) conditions in the East Valley near the Salton Sea and geothermal factors. The higher concentrations tend to be found at greater depths.

The MCL for **total chromium** is currently 50 μg /L, and **Cr-6** is just one element of the total chromium standard for drinking water. The SWRCB had previously established an MCL for Cr-6 of 10 μg/L but has since rescinded this regulation. The drinking water standard for Cr-6 of 10 μg/L may be reinstated in the near term. The source of Cr-6 is likely natural, and higher concentrations are found at greater depths. Cr-6 levels are stable in most wells and decrease near groundwater replenishment facilities.

The MCL for **uranium** is 20 pCI/L, and the Subbasin primarily ranges from 5-10 pCI/L. Uranium in the Subbasin is likely from natural geologic sources such as granitic rocks in the northwestern portion of the Subbasin.

The MCL for **fluoride** in drinking water is 2 mg/L. Fluoride in the Subbasin is naturally occurring and is associated with faulting, such as the San Andreas Fault, and geothermal areas along the Salton Sea.

The MCL for **perchlorate** in drinking water is 6 µg/L. Perchlorate is largely undetected throughout the Subbasin, except for a few wells in the upper northwestern part of the Subbasin at levels below the MCL. Sources for perchlorate include industrial sources, fertilizer, and natural sources.

The MCL for DBCP is 0.2 µg/L. There have been DBCP detections in three private irrigation wells in the central **portion** of the Subbasin at levels below 0.1 µg/L. DBCP is associated with pesticides that were banned in 1979.

The GSAs are tracking water quality constituents of concern. The large water systems meet drinking water standards for the eight constituents presented. The domestic wells and small water systems may be affected by nitrate, Cr-6, and arsenic.

Workgroup comments and questions included the following:

- In the past, the use of Colorado River water for groundwater replenishment added perchlorate into the groundwater. Why does this phenomenon not appear on the maps?
  - Though perchlorate had been detected in Colorado River water in the past due to manufacturing facilities in the watershed, the Colorado River water is no longer a source of concern due to clean-up and mitigation efforts.

Groundwater Conditions: Groundwater Dependent Ecosystems (GDEs)

Mr. Will Medlin, Woodard & Curran, presented the groundwater dependent ecosystem (GDE) analysis required by the Sustainable Groundwater Management Act (SGMA). GDEs are ecological communities or species that depend on groundwater emerging from aquifers or groundwater occurring near the surface. The GDEs Assessment considered the U.S. Environmental Protection Agency (USEPA) Level III and IV ecoregions, the Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP) conservation areas, and special status (threatened and endangered) species. The MSHCP covers almost all of the Subbasin in Riverside County. The MSHCP was approved in 2008 and most recently amended in August 2016. The MSHCP is administered by the Coachella Valley Conservation Commission and is intended to conserve sensitive habitats and species through mitigation of impacts and issuance of take permits for species. CVWD, CWA, and IWA are permittees and signatories to the MSHCP.

The GDE assessment was limited to federal and state-listed "threatened and endangered species". There are 17 listed species in Subbasin, of which 6 have direct reliance on groundwater and 7 have indirect reliance.

The preliminary GDE Assessment started in 2020 with a desktop analysis based on the Natural Communities Commonly Associated with Groundwater (NCCAG) datasets. After completing the desktop GDE Assessment, the project team performed field surveys to verify the analysis in January 2021. The following was concluded from the field survey:

- Probable GDE: 1% (1 site)
  - I.e., water or other saturation or wetland vegetation or aquatic or semiaquatic
- Probable Non-GDE: 69% (9 sites)
  - I.e., uplands, developed areas, mis-mapped areas, human-made or otherwise modified features that would typically include water is present like golf courses, ponds, reservoirs, and fields
- Playa Wetlands: 23% (3 sites)
  - I.e., wetland vegetation where water has receded such as along the Salton Sea

Out of the 882 NCAG wetlands identified through the desktop analysis, 1,045 points were analyzed to assess whether GDEs were present. Out of those 1,045, 50 points were probable GDEs, 932 points were probable non-GDEs, and 63 points were playa wetlands. Probable GDEs exist in the mountain from canyons and may rely partially on surface water or snowmelt. Playa wetlands occur along the Salton Sea exposed seabed near the drain and surface water outlets.

Workgroup comments and questions included the following:

- Was the Whitewater Channel included in this assessment?
  - Yes, it was included, but generally considered a Probable non-GDE. Even though riparian habitat may exist within other areas of the Subbasin or along the channel, human-made structures (like ponds or drains) and other riparian areas that are not groundwater dependent are not considered GDEs under SGMA. They are still mapped and protected by other state and federal entities, but not designated under SGMA.

Sustainable Management

Ms. Priestaf presented an overview of DWR recommendations on Sustainable Management Criteria (SMC), which included setting thresholds for groundwater levels and using those as a proxy for storage and subsidence. Minimum threshold (MT) for groundwater levels is set at the historical low as measured at 57 Key Wells. The historical low was selected because undesirable results (such as production wells drying) were not reported, meaning that the historical low is protective against undesirable results. An undesirable result will occur when the MT is exceeded in 5 consecutive low-season monitoring events in 25 percent of wells across the Subbasin. The GSAs will monitor and report groundwater levels in Annual Reports.

Ms. Priestaf presented DWR recommendations to the GSAs for water quality, seawater intrusion, and GDEs. DWR also recommended GSAs: 1) continue to study the rate and level of increased salt contents in groundwater due to the importation of Colorado River Water, and 2) incorporate the Coachella Valley Salt and Nutrient Management Plan (CV-SNMP) into future iterations of the Alternative Plan. In response, the Alternative Plan includes maps, cross-sections, and time concentration plots, as well as a discussion of significance, sources, and distribution factors of salts and nitrates in the Subbasin. Development of Alternative Plan Update has also been coordinated with the CV-SNMP effort since 2020. The Subbasin has applied for funding from DWR to install additional monitoring wells.

DWR requested the GSAs to clarify if there is an MT associated with subsurface drain flow as referenced in the 2002 and 2010 Coachella Valley Water Management Plans (CVWMP). The 2010 CVWMP recognized the potential degradation of water quality as a result of downward migration of shallow return flows in the East Valley to deep zones. Projects have been able to raise groundwater levels in deep productive levels, which have resulted in upward gradients and flow. High groundwater levels are generally protecting deep zones. Although increasing drain flows are beneficial because they are correlated with groundwater levels, the Alternative Plan Update will not include an MT for drain flows.

Ms. Priestaf presented a map with simulated levels in the shallow aquifer as of 2020. The contour along the Salton Sea is at -220 feet below sea level (BSL), higher than the Salton Sea contour at -238 feet BSL. From 1997-2014, the modeling implies that there was inflow into the Subbasin from the Salton Sea. This has been reversed since 2015 through managed aquifer recharge, source substitution, and conservation. The modeling results match observed groundwater levels.

DWR also recommended that the GSAs identify the GDEs in the Subbasin. The Alternative Plan Update will include an appendix documenting the GDE study.

Workgroup comments and questions included the following:

- When will the draft Alternative Plan Update be made available for Tribes to comment on? Request to please make time for tribal members to review in advance of public review.
    - The draft Alternative Plan Update will be released for Tribes to comment during the public review period in Fall 2021 to allow time to address and incorporate comments, and to adopt the plan.

Groundwater Model Update

Ms. Priestaf presented the groundwater model update. The original historical simulation from 1936 to 1996 was first updated in 2010 and again recently to include the historical period from 2009 to 2017. The groundwater model is now being actively applied to model future scenarios.

Revised Plan Scenarios

Ms. Prickett presented an update on the revised plan scenarios. Three types of future scenarios will be analyzed, including:

- Baseline: additional demands but no new projects
- Near term projects: additional demands and capital improvement projects (CIP)/programs planned within 5 years
- Future projects: additional demands and all planned projects/programs in the CIP

These three scenarios will be modeled with and without climate change.

The baseline scenario assumes a 50-year hydrology mimicking hydrology between 1970 and 2019. Under climate change, the model assumes the recent 25-year hydrology with multiple dry cycles between 1994 and 2019. The recent 25 years have had 20 percent less mountain-front runoff compared to the 50-year year average.

The baseline scenario assumes SWP water reliability of 45 percent, the historical average since the Wanger decision in 2007. Some years, such as 2021, have experienced reliability as low as 5 percent. Future projects scenario includes participation in Delta Conveyance Facility (DCF) that may increase SWP reliability up to 58 percent. The climate change scenario will also assume a 1.5 percent factor as projected by DWR.

Workgroup comments and questions included the following:

- What is the probability of receiving SWP water?
    - The probability that water will be received is only 45 percent. However, 2014 experienced a 10 percent allocation, and 2021 is currently experiencing a 5 percent allocation. There have been two historical dry periods since the 2007 Wanger decision. The 45 percent reliability takes into consideration of recurrence of dry periods. This number is more conservative than the 58 percent reported in the DWR capability report.

The baseline scenario assumes the Quantification Settlement Agreement (QSA) entitlement minus conveyance losses. The future projects scenario includes additional nonpotable water such as Canal water and recycled water deliveries. Because of the current drought conditions in the Colorado River watershed, the climate change scenario assumes the QSA entitlement minutes conveyance losses, accounting for the Lower Basin Drought Contingency Plan (DCP) contribution in phases. CVWD's contribution is 7 percent (approximately 24,000 acre-feet [AF]) of the total for California; this volume will be contributed back to the lakes and storage.

Approximately 30 percent of water demand is assumed to return to sewer. The baseline scenario assumes only the current recycled water supplies will continue with no additional recycled water projects. The near term scenario assumes current supplies as well as projects planned for implementation within the next 5 years, and the long term scenario assumes all planned projects will be implemented. The amount of water available for recycled water is the same across all scenarios with or without climate change.

Next Steps

Ms. Prickett presented the next steps for July through September 2021. The consultant team will finalize Plan Scenarios in groundwater model and quantify water budgets, and results will be presented at the next Tribal workgroup scheduled for August 26, 2021. Ms. Prickett invited participants to offer any additional comments or questions. For any additional information, please contact Rosalyn Prickett at indiosubbasinSGMA@woodardcurran.com.

Workgroup comments and questions included the following:

- Is it possible to send the presentation before the meeting?
    - The slides are typically uploaded to the website (http://www.indiosubbasinsgma.org/) the Monday before the meeting.

Other Planning Efforts

Ms. Zoe Rodriguez del Rey, CVWD provided updates on the SNMP, a separate but concurrent update process with the *Indio Subbasin Alternative Plan Update*. The Monitoring Program Workplan was approved by the Regional Water Quality Control Board (Regional Board) in February 2021, and an SNMP Workplan was submitted to the Regional Board on May 3, 2021, and is tentatively scheduled to be presented to the Board in August 2021. A letter has been sent to the Tribal groups to determine interest in the monitoring program. For any additional information or to attend the meeting, please contact Zoe Rodriguez del Rey at zrodriguezdelrey@cvwd.org.

Ms. Ashley Metzger, DWA provided updates on the regional *2020 Urban Water Management Plan* (UWMP). All six agencies have adopted the UWMP, and the final UWMP will be submitted to DWR by July 1, 2021. Visit the CVRMWG (http://www.cvrwmg.org/uwmp/) if you are interested in receiving more information.

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

**times are subject to change*

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2022 Indio Subbasin Alternative Plan Update

Tribal Workgroup #6
SUMMARY

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

Tribal Workgroup and Supporting Members	**Groundwater Sustainability Agencies (GSAs)**
• Chuck Jachens, Bureau of Indian Affairs • Jennifer Ruiz, Cabazon • Guarav Rajen, Augustine Band • Nina Waszak, Agua Caliente Band • Marco Perez, Augustine Band • Dr. Patrick Taber, Bureau of Indian Affairs • Shawn Muir, Twenty-Nine Palms Band of Mission Indians	• Ashley Metzger, DWA • Castulo Estrada, CWA • Jim Barret, CVWD • Katie Evans, CVWD • Mark Krause, DWA • Melanie Garcia, CVWD • Reymundo Trejo, IWA • Steve Bigley, CVWD • Zoe Rodriguez del Rey, CVWD
	Consultant Team • Iris Priestaf, Todd Groundwater • Daniel Crag, Todd Groundwater • Arthella Vallarta, 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 then presented the meeting objectives and agenda. Ms. Prickett reviewed the meeting objectives and an overview of the Workgroup timeline over the two-year planning period.

Alternative Plan Status

Ms. Iris Priestaf, Todd Groundwater, presented an overview of the tasks and list of chapters for the Alternative Plan Update. Ms. Priestaff reviewed the *2010 CVWMP* goal that will be retained in the Alternative Plan Update, along with the new Sustainability goal: "to maintain a locally managed, economically viable, sustainable groundwater resource for existing and future beneficial uses in the Indio Subbasin by managing groundwater to avoid the occurrence of undesirable results." She then reviewed the refined Plan objectives being included in and guiding development of the Update, including a new 7th objective: "Reduce vulnerability to climate change and drought impacts".

Workgroup comments and questions included the following:

- You said we are "not" in overdraft and last year we were 10% over in demands. Why are you saying we are not in overdraft?
    - Overdraft is a long-term condition and sometimes the Subbasin balance will be slightly over or under. The goal is long-term positive storage. Although sometimes there is a negative water balance during drought, that storage will be replaced during wet conditions/years.
- Indio Subbasin had 30,000 AFY less coming in than going out last year. What if this happens year after year?
    - Negative balance uses storage and the Subbasin is being managed for this.

Groundwater Model

Mr. Daniel Craig, Todd Groundwater, presented an overview of the numerical model construction and model features. The model simulation period was extended through 2019 with updated recharge and pumping data, along with updated subsurface inflow boundary conditions. A calibration assessment was completed, which demonstrates that the model simulations are well matched with the measured levels. The model also compared simulated drain flows with measures flows, which were also well matched. Historical model accurately simulates shallow and deep groundwater levels and can be used to predict future water level and storage changes under different scenarios. The model also provides forecasts of future drain flows, Salton Sea interactions, and other water budget conditions.

Workgroup comments and questions included the following:

- What is definition of deep vs shallow (in terms of feet)?
    - I have my answer from the graphs. Thanks!
- Are the four layers of equal thickness?
    - No, they were based on geological analysis of well logs throughout the Subbasin. This will be described in the Alternative Plan Update, but the layers are all variable thickness based on geology.
- It is a 3-Dimensional grid of 1,000 ft by 1,000 of model cells. The model cannot really be used for locating one single cell well. Do we need more localized data?
    - For local projects and issues, you may want to have a smaller grid. If you are interested in looking at smaller models, some of the agencies do have smaller models for their local projects. The purpose of this model is to look at the overall regional groundwater trends. As a result, the model grid is adequate and sufficient for the Alternative Plan Update.
- Most hydrographs are showing drop over time, albeit they are leveling off lately.
    - Yes, that recovery is due to GSA management activities, including increased replenishment and source substitution.
- Is the rise in groundwater levels near the Salton Sea due to reduced pumping or recharge?
    - It was a combination of recharge at the Thomas E. Levy Groundwater Replenishment Facility, source substitution, and reduction in groundwater pumping.

Plan Scenarios & Projects and Management Actions

Ms. Prickett presented the five Plan scenarios and described how the model inputs were developed assuming implementation of differing suites of projects and management actions (PMAs). The GSAs established priorities in selection of PMAs, which are broken down into four categories:

1. Water Conservation
2. Water Supply Development
3. Source Substitution and Replenishment
4. Water Quality Protection

The complete list of PMAs will be available in the Alternative Plan Update.

Ms. Prickett also explained the groundwater model's climate change assumptions. The model assumes a 50-year period, and future scenarios incorporate recent (drier) patterns. For local inflow, the Baseline scenario uses a long-term hydrology and previously estimated annual recharge volumes. The climate change scenarios use repeated historical conditions only for the period 1995-2019 that include multiple droughts. Additionally, the availability of imported water for direct delivery and groundwater replenishment was reduced.

The five modeled scenarios include the following:

- *Baseline and Baseline with Climate Change* - The projects listed in these two scenarios are existing operational activities that are assumed to continue forward.
- *Five-Year Plan with Climate Change* - These are the projects the GSAs are planning to implement in their five-year Capital Improvement Plans (CIPs). Under this scenario, there are more Source Substitution and Replenishment projects compared to the Baseline and Baseline with Climate Change scenarios.
- *Future Projects with Climate Change* – This scenario includes a variety of additional supply acquisition, source substitution, and replenishment projects.
- *Expanded Agriculture with Climate Change* - This scenario assumes the same suite of future projects as Future Projects with Climate Change, along with a significant amount of new additional agriculture in the East Valley.

There were no Workgroup comments.

Simulation Results

Mr. Craig presented the simulation results from the five Plan scenarios that Ms. Prickett described. The results in these scenarios are not realistic because additional projects are already planned by the GSAs. However, the scenarios provide a comparison of future conditions with and without climate change/drought.

Baseline and Baseline with Climate Change

Total inflows for Baseline are higher than in Baseline with Climate Change, especially in peak recharge years. Note that the first 25 years assume addition of new supplies and demand, but the second 25 years do not assume new demands. Cumulative change in storage is much higher in Baseline. Baseline with Climate Change hovers right around zero and even ends negative. The groundwater model simulated forecasted supply and demand for 2020-2044 as required by SGMA, but kept assumptions at the year 2045 levels for 2045-2069. This operates as a stress test for ongoing management of the basin at 2045 levels but does not recognize that demands will continue increasing after 2045.

Future groundwater levels in Baseline with Climate Change in West Valley are about 30-40 feet lower than baseline conditions due to reduced replenishment supplies. In East Valley, the impacts of climate change are less (only 5 feet difference) because most of natural infiltration occurs in the West Valley. In Baseline, there are larger changes in groundwater levels in the East Valley, while in Baseline with Climate Change, declines are more substantial in the far West Valley near WWR-GRF.

There were no Workgroup comments.

Four Climate Change Scenarios

The groundwater model simulated additional scenarios with five-year CIP projects, future projects, and expanded agriculture. Water budgets show net positive inflows in all three of the project scenarios. Mr. Craig presented simulated pumping, inflows, groundwater levels, and cumulative storage for the four climate change scenarios. In Mid-Valley and East Valley areas, Baseline with Climate Change groundwater levels are declining, but they are increasing for the other three scenarios. All three scenarios show significant declines in far West Valley due to reductions in WWR-GRF replenishment under various future project implementation. Cumulative change in storage for Baseline with Climate Change is net negative after 50 years, while other three climate change scenarios show net positive.

Mr. Craig stated that the scenarios indicate that Five-Year PMAs are needed for supply-demand balance and that future PMAs are needed for reliability in face of climate change and uncertainties in demand past the 25-year planning horizon. He also concluded that for all scenarios (except Baseline with Climate Change) the Subbasin will be sustainable.

Workgroup comments and questions included the following:

- I am looking into the future, and Tribal groups have an interest in water quality. MODFLOW modeling is not right approach to address those issues.
    - The Alternative Plan Update includes discussion of historical and current groundwater conditions but defers to the Salt and Nutrient Management Plan process for establishment of water quality objectives. This groundwater model only deals with volume (levels and storage) and not quality.
- Streamflow and precipitation do not answer all our climate change questions. We need to look in detail at vegetation and ET changes due to climate changes.

Next Steps

Ms. Prickett presented the next steps for completion and submittal of the Alternative Plan Update to DWR. The Draft Plan will be circulated for review for 30 days in late September. Following receipt of comments, a Final Plan will be released for adoption by the GSA governing bodies in early December.

Workgroup comments and questions included the following:

- The Whitewater River Groundwater Replenishment Project Draft EIR is out for public comment. You can find the information and all the documents at http://www.cvwd.org/502/Whitewater-River-Groundwater-Replenishme

Other Planning Efforts

Ms. Zoe Rodriguez del Rey, CVWD, provided updates on the *Salt and Nutrient Management Plan* (SNMP). The Monitoring Program Workplan was approved by the Regional Board February 2021. The SNMP Development Workplan was submitted to the Regional Board in May 2021 and will be presented to the Regional Board on September 14, 2021. Implementation will likely begin in early 2022 and will include a stakeholder process.

2022 Indio Subbasin Alternative Plan Update

SGMA Tribal Workgroup

AGENDA

October 20, 2021 at 10:00 am – 12:00 pm

GoToMeeting: https://global.gotomeeting.com/join/334147341

or Dial In by Phone: +1 (872) 240-3212; Access Code: 334-147-341#

#	ITEM	TIME
1	**Welcome and Introductions** • GoToMeeting Instructions • Agenda and Meeting Objectives	10:00 am
2	**Alternative Plan Status** • Subbasin History and Plan Objectives	10:20 am
3	**Groundwater Conditions and Sustainable Management** • Groundwater Conditions and Sustainability Criteria	10:30 am
4	**Water Demands and Supplies** • Demand Forecasts and Supply Portfolio	10:50 am
5	**Numerical Model, Plan Scenarios, and Projects & Management Actions (PMAs)** • Model Features and PMAs in each Plan Scenario	11:10 am
6	**Plan Evaluation and Implementation** • Plan Implementation Activities	11:25 am
7	**Other Planning Efforts** • SNMP Update	11:40 am

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2022 Indio Subbasin Alternative Plan Update

Tribal Workgroup #7
SUMMARY

October 20, 2021 at 10:00 am – 12:00 pm
Virtual Meeting

Tribal Workgroup and Supporting Members	**Groundwater Sustainability Agencies (GSAs)**
• Jennifer Ruiz, Cabazon Band • Guarav Rajen, Augustine Band • Margaret Park, Agua Caliente Band • Dr. Patrick Taber, Bureau of Indian Affairs	• Ashley Metzger, DWA • Ryan Molhoek, DWA • Katie Evans, CVWD • Mark Krause, DWA • Melanie Garcia, CVWD • Reymundo Trejo, IWA • Michelle Tse, IWA • Steve Bigley, CVWD • Zoe Rodriguez del Rey, CVWD
	Consultant Team • Iris Priestaf, Todd Groundwater • Maureen Reilly, Todd Groundwater • Rosalyn Prickett, Woodard & Curran • Vanessa De Anda, Woodard & Curran

Welcome and Introductions

Ms. Rosalyn Prickett, Woodard & Curran, greeted participants as they joined the call. Ms. Prickett welcomed everyone to the workshop and reviewed how to use the virtual GoToMeeting platform. She then reviewed the meeting objectives and provided an overview of the Workgroup timeline over the two-year planning period. She noted that this is the final SGMA Tribal Workgroup meeting specific to the *2022 Indio Subbasin Alternative Plan Update* (*Alternative Plan Update*) before submittal to the State in December 2021.

Alternative Plan Status

Ms. Iris Priestaf, Todd Groundwater, presented an overview of the *Alternative Plan Update*. Ms. Priestaff reviewed the methods in which people have been engaged, which included seven public workshops, seven SGMA Tribal Workgroups, a website with monthly updates, and regular email announcements and updates. The four GSAsare developing the *Alternative Plan Update* for the Indio Subbasin (Subbasin) and areas that are, or are likely to be, supplied groundwater from the Subbasin.

The importance of supplemental supply to alleviate groundwater overdraft has been noted for decades. The water supply portfolio includes capture and recharge of stormflows, completion of the Coachella Canal, acquirement of State Water Project (SWP) contracts, and use of recycled water.

Ms. Priestaf reviewed the *Alternative Plan Update* goal: "To reliability meet current and future water demands in a cost-effective and sustainable manner". She also reviewed the refined objectives being included in and guiding the development of the *Alternative Plan Update*, including a new 7th objective: "Reduce vulnerability to climate change and drought impacts". Plan implementation has resulted in significant groundwater levels increases regionally and cumulative groundwater storage increases across the Subbasin.

Workgroup comments and questions included the following:

- The history of the Valley presented in Sections 1.1 and 1.2 starts late. USBR has historical surveys of Coachella Valley available online that describe the Valley as a mesquite forest. The surveys also show numerous wells and thousands of people living in the Valley. The mesquites, which hold water in the ground, were cut down for agriculture. We should question the existence of golf courses in the area given the limited precipitation.

Groundwater Conditions and Sustainable Management

Ms. Priestaf presented an overview of the Subbasin and groundwater flows, noting that it extends from the San Gorgonio Pass Subbasin to the Salton Sea. Groundwater flow moves downhill through the Subbasin supplying wells and discharging into the Salton Sea.

Ms. Priestaf presented an overview of undesirable results for six sustainability indicators, which are all addressed in the *Alternative Plan Update* and listed below. A minimum threshold (MT) is a numeric value used to define undesirable results.

Groundwater Levels

Undesirable results include significant and unreasonable reduction in the long-term viability of domestic, agricultural, municipal, or environmental uses, and impacts to relatively shallow wells, including small water systems and private drinking water supply wells. Hydrographs in the *Alternative Plan Update* show declining groundwater level trends in the Subbsain from the 1990s to around 2009. As such, the MTs have been defined as the historical lows measured at 57 Key Wells in around 2009 with no reported shortages. An undesirable result has been defined to occur when the MT is crossed in five consecutive low-season monitoring events in at least 25% of wells across the Subbasin.

Groundwater Storage and Land Subsidence

The MTs for groundwater levels have a strong correlation with, and are therefore a proxy for, the groundwater storage and land subsidence sustainability indicators. The change in groundwater storage indicated declines between 1987 to 2009, and reversal of overdraft and increase of storage in 2009. This correlates with the change of groundwater levels seen across the Subbasin around 2009. Since then, there has been an increase of about 840,000 AF in storage that can be used during periods of drought. Similarly, the Subbasin experienced up to 2 feet of land subsidence between 1995 to 2010 correlated with groundwater declines due to groundwater pumping. Stabilization and uplift have been documented in the Subbasin since 2010 with increasing groundwater levels.

Groundwater Quality

The GSAs are tracking numerous water quality constituents. Large water systems meet all drinking water standards, but small water systems and domestic wells may be affected by some constituents like nitrate from multiple sources and naturally occurring hexavalent chromium and arsenic. The GSAs are coordinating with community representatives and domestic systems to ensure access to high-quality water. The *Alternative Plan Update* provides a comprehensive assessment of groundwater quality that incorporates an extensive discussion of eight constituents of concern, including maps, cross-sections, and time concentration plots. As an example, Ms. Priestaf presented a map showing total dissolved solids (TDS) concentrations in the Subbasin to provide an overview of groundwater quality. The map shows TDS concentrations are below the recommended levels in the majority of the Subbasin, but higher concentrations are found along the Subbasin boundaries and near the Salton Sea. The *Alternative Plan Update* resulted in an improved basis to study the rate and level of increased salt in groundwater from all sources. Coordination with the Coachella Valley Salt and Nutrient Management Plan (CV-SNMP) will start in 2022.

<u>Seawater Intrusion</u>

The Subbasin is bounded by one end of the Salton Sea, which is distinguished by salinity that is twice that of the ocean and increasing, and decreasing surface water levels and shoreline. Seawater intrusion is a consequence of overdraft and is therefore closely tracked by the GSAs. Numerical modeling indicates there was net inflow from the Salton Sea into the Subbasin from 1997 to 2014 and a net outflow from the Subbasin to the Salton Sea since 2015. Seawater intrusion has been reversed.

<u>Interconnected Surface Water and Groundwater Dependent Ecosystems (GDEs)</u>

The *Alternative Plan Update* reviewed the Coachella Valley Multiple Species Habitat Conservation Plan and other documents for protected species, performed a desktop analysis of polygons provided by DWR's Natural Communities Commonly Associated with Groundwater (NCCAG), conducted a field survey of 13 sites, and mapped potential GDEs. The analysis found that 5% of the evaluated sites were probable GDEs that partially rely on surface water or snowmelt, 89% of the evaluated sites are probable non-GDEs that include agricultural fields and drainages, uplands, and dry washes, and 6% are playa wetlands that depend on agricultural drain flows and occur along the Salton Sea exposed seabed. This analysis is included in an appendix to the *Alternative Plan Update*.

Workgroup comments and questions included the following:

- Looking at slide 33, how is seawater intrusion reversed? You noted that aquifer levels were lowest in 2009, but this reversed in 2015.
    - Seawater intrusion was reversed through replenishment, source substitution, and water recycling, which caused groundwater levels to increase throughout the Subbasin. Increasing groundwater levels pushes seawater out.
- Why is there is a 6-year gap between increased groundwater levels and reversal of seawater intrusion? Does the groundwater replenished at the GRF ultimately end up at the Salton Sea?
    - The model looks at the hydraulic head at the Salton Sea. Because there are higher hydraulic levels, the seawater is pushed out.
- Should the Plan be looking at increasing nitrate and TDS trends instead of the fact that the constituents are below the thresholds? If you look at the system as a whole, TDS may increase over time upgradient of the Subbasin.
    - The *Alternative Plan Update* includes a lot of information on TDS and nitrate trends for wells in the Subbasin. Water quality will be further discussed in the CV-SNMP that is currently underway.
- The Plan needs to give additional thought to GDEs. Additional resource areas in the canyon and the playa supplies natural vegetation.
    - The GDEs assessment consisted of a robust desktop analysis and field verification. The desktop analysis looked at NCCAG and other data sources to identify GDEs, though, through areal mapping, many areas were screened out. A wetland biologist also analyzed the sites within the Valley to verify the desktop analysis.

Water Demands and Supplies

Ms. Prickett presented the demand forecast for 2020 to 2045. The demand forecast was based on 11 geographic units and considered projected land uses, conversion of agricultural lands, historical water use, and conservation trends. Demands were forecasted for municipal, golf, agricultural, and other uses. Municipal demands relied on regional growth projections provided by the Southern California Association of Governments (SCAG), land use inventories, unit demand factors, projected water loss, and adjustment factors (i.e., conservation savings estimates). Forecasted demands for agriculture considered existing agriculture and projected conversions of idle land to urban land uses, and forecasted demands for golf considered market trends and three proposed new golf courses. Other demands included fish farms, duck clubs, polo/turf, and potential surf parks. Total water demand is expected to increase approximately 8% between 2020 to 2045 with urban demands increasing with urban growth and agricultural demands decreasing as a result of land conversions.

Ms. Prickett presented the supply portfolio for the Subbasin, which includes groundwater, SWP exchange water, Colorado River water, recycled water, surface water, and other supplies. There is an estimated 10% increase in anticipated future supplies accounting for planned projects. Climate change is anticipated to reduce available water projections by up to 40,000 AFY. The total available and planned supplies are presented in the *Alternative Plan Update*.

There were no Workgroup comments.

Numerical Model, Plan Scenarios, and Projects and Management Actions (PMAs)

Ms. Priestaf presented the updates to the groundwater model. The calibration hydrographs show that the actual and simulated data points align, and therefore this model is deemed to accurately simulate shallow and deep groundwater levels in the Subbasin. The model can be used to predict future water level and storage changes under different inflow and outflow scenarios for 50 years into the future. The model presents a forecast of future drain flows, Salton Sea flow, and water budget conditions. Calibration hydrographs and simulation hydrographs are available in the *Alternative Plan Update*.

Ms. Prickett reviewed the simulation results from the five Plan scenarios. The results of the Baseline scenarios are not realistic because additional projects are already planned by the GSAs. However, the Baseline scenarios provide a comparison of future conditions with and without climate change/drought. The additional three scenarios simulate the implementation of 5-year (i.e., near-term) projects, future projects, and/or expanded agriculture.

The model incorporates climate change assumptions. For local inflow, the Baseline scenario uses long-term hydrology and previously estimated annual recharge volumes. The climate change scenarios use repeated historical conditions only for the period 1995-2019 that include multiple droughts. Additionally, the availability of imported water for direct delivery and groundwater replenishment was reduced consistent with reduced SWP deliveries in the past 14 years as a result of legal, environmental, and drought conditions, and with potential reductions in CVWD's Colorado River water supply if Lake Mead reservoir levels continue to decline, as stipulated in the Lower Basin Drought Contingency Plan.

Ms. Prickett presented the differing suites of projects and management actions (PMAs). The GSAs established priorities in the selection of PMAs, which are broken down into four categories: Water Conservation, Water Supply Development, Source Substitution and Replenishment, and Water Quality Protection. The Plan scenarios reflect varying water supplies and suite of PMAs. The PMAs have varying assumptions of total supply availability and the timeframe in which these supplies will be available. The *Alternative Plan Update* includes supply graphics showing how much water will be available and where the water will flow. The simulation results show that the Baseline scenarios will likely result in a negative cumulative change in storage and will not achieve Subbasin sustainability.

In comparison, the three project scenarios show an increasing cumulative change in groundwater storage and groundwater levels. Therefore, it is concluded that the 5-year PMAs are needed to achieve a supply-demand balance in the Subbasin. Additional future PMAs will be needed for reliability in the face of climate change and uncertainty with future water supplies and demands.

Workgroup comments and questions included the following:

- The model works great regionally. Can you pull out a prism for the Augustine Band showing what is going into and out of the Tribe's boundaries? Also, is everything grouped to one production well per square mile? How accurate are the estimates if they are lumped into one well?
    - The way the numerical model works is that all groundwater pumping in a cell is grouped as one point. This is a regional model that is meant to simulate groundwater in the Subbasin, not locally. Local models require a smaller grid size and data at a more refined spatial scale. This model can be used to look at inflows and outflows for the Tribe, but need to remember that this is a regional model with a wide grid cell.

Plan Evaluation and Implementation

Ms. Prickett presented the implementation activities that the GSAs will employ as part of the *Alternative Plan Update*. Implementation activities include, but are not limited to, GSA program management, monitoring programs, tribal coordination, stakeholder outreach, and annual reports. The GSAs have established a list of priorities, listed in the *Alternative Plan Update*, that will guide the implementation of PMAs.

Ms. Prickett presented the key takeaway from the *Alternative Plan Update,* which is that with the implementation of the PMAs, the three project scenarios have adequate supplies to meet the projected demand forecast. The water budgets for the three project scenarios show that each scenario has an average inflow higher than outflow, which will result in a cumulative increase in groundwater storage. The *Alternative Plan Update* demonstrates that the GSAs can meet the established goal and the Subbasin can be sustainable. The GSAs will continue to monitor trends in demand and supply availability and implement the PMAs as needed.

There were no Workgroup comments.

Next Steps

Ms. Priestaf presented the next steps for the *Alternative Plan Update*. The Draft *Alternative Plan Update* can be downloaded at http://www.indiosubbasinsgma.org/. Public comments are due on October 29, 2021. Comments should be submitted via email to IndioSubbasinSGMA@woodardcurran.com. The GSAs will review all comments submitted and incorporate revisions as appropriate. The Final *Alternative Plan Update* will be prepared and released for adoption by the GSA governing bodies in early December. The GSAs will submit the *Alternative Plan Update* to the State for review and approval before January 1, 2022.

Other Planning Efforts

Ms. Zoe Rodriguez del Rey, CVWD, provided updates on the *Salt and Nutrient Management Plan* (SNMP). The Monitoring Program Workplan was approved by the Regional Board in February 2021. The SNMP Development Workplan was submitted to the Regional Board in May 2021 and was presented to the Regional Board on September 14, 2021. The Regional Board approved the SNMP Development Workplan on October 4, 2021. The GSAs will coordinate over the next six months to select a consultant for technical support and outreach and to begin implementing the SNMP

Development Workplan. The GSAs are working collaboratively to implement the Monitoring Program Workplan and the Development Workplan.

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
- 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

Groundwater Sustainability Agencies (GSAs)
- 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*

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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

- 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

Groundwater Sustainability Agencies (GSAs)

- 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#

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#	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

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2022 Indio Subbasin Alternative Plan Update

Public Workshop #5
SUMMARY

June 24, 2021 at 2:00 pm – 4:00 pm
Virtual Meeting

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Members of the Public
- Alena Callimanis, City of Indian Wells
- Cathy Sanford, Regional Water Quality Control Board
- Craig Kessler, Southern California Golf Association and CVWD Golf and Water Task Force
- Dina Purvis, City of Indian Wells
- Douglas Garcia, US Bureau of Indian Affairs
- Gwen Atherton, Coachella Valley WaterKeeper
- Jennifer Harkness, USGS
- Kevin Fitzgerald, Southern California Golf Association
- Kimberly Romich, California Department of Fish & Wildlife
- Nina Waszak, Agua Caliente Band of Cahuilla Indians
- Nataly Escobedo Garcia, Leadership Council
- Ron Buchwald, Valley Sanitary District
- Tarren Torres, Egoscue Law Group representing Agua Caliente Band of Cahuilla Indians

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Groundwater Sustainability Agencies (GSAs)
- Ashley Metzger, DWA
- Elizabeth Campos, CVWD
- Jamie Pricer, CVWD
- Jim Barrett, CVWD
- Ivory Reyburn, CVWD
- Katie Evans, CVWD
- Mark Krause, DWA
- Robert Cheng, CVWD
- Ryan Molhoek, DWA
- Steve Bigley, CVWD
- Zoe Rodriguez del Rey, CVWD

Consultant Team
- Iris Priestaf, Todd Groundwater
- Maureen Reilly, Todd Groundwater
- Nicole Poletto, Woodard & Curran
- Rosalyn Prickett, Woodard & Curran
- Vanessa De Anda, Woodard & Curran
- William Medlin, Woodard & Curran

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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.

Alternative Plan Status

Ms. Prickett 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. The public review period is anticipated in September or October 2021.

Groundwater Conditions: Water Quality

Ms. Priestaf, Todd Groundwater, presented the groundwater conditions for water quality in the Indio Subbasin. The water quality analysis involved compiling data from various databases and mapping the following eight constituents: salinity (TDS), nitrate, arsenic, hexavalent chromium (Cr-6), fluoride, perchlorate, uranium, and DBCP. The constituents were mapped from 1990 to 2019 to see geographic patterns, distribution, and trends. The cross-sections for TDS, nitrate, arsenic, Cr-6 show vertical variation, and the time concentration plots for TDS and nitrate show trends over time.

Ms. Priestaf presented a series of maps showing the range of contaminant concentrations overtime throughout the Subbasin.

The highest **TDS** concentrations are located near the Salton Sea and along the eastern edge potentially from seawater intrusion, and along the Subbasin margins potentially from return flows and subsurface inflow. The lower concentrations are found along the deeper center of the Subbasin. Shallow wells are more variable and have higher TDS concentrations because they are more influenced by recharge and other processes. Since 1990, TDS concentrations have increased in the deeper zones in the central and eastern Thermal subarea. Sources of TDS include natural sources, return flows from agricultural and landscape irrigation, imported water recharge, septic and wastewater disposal, subsurface inflow, and historical inflow from the Salton Sea.

Public comments and questions included the following:

- Groundwater sampled from 300 feet, is that below ground surface or mean sea level?
    - Ms. Priestaf responded that this is from the ground surface

Public comments and questions included the following:

- How was the depth of specific concentrations determined? Well perforations?
    - Yes, depth is an approximation of well screening.
- The samples came from water drawn from the whole length of the colored zones?
    - Yes, when the well is pumped, water is sampled from the whole screened area. Water was not sampled at discrete layers for this analysis.

The Maximum Contaminant Level (MCL) for **nitrate** is 45 mg/L, but the majority of the Subbasin is below 10 mg/L. Some particular areas with higher nitrate reflect multiple sources, including natural mesquite sources and loading from historical agriculture, landscaping, septic and wastewater disposal. In general, shallow wells have higher nitrate concentrations and are more variable.

The MCL for **arsenic** is 10 µg/L. Though the majority of the Subbasin is below 5 µg/L, there are areas with concentrations higher than 50 µg/L due to anoxic (low oxygen) conditions in the East Valley near the Salton Sea and geothermal factors. The higher concentrations tend to be found at greater depths.

The MCL for **total chromium** is currently 50 µg /L, and **Cr-6** is just one element of the total chromium standard for drinking water. The SWRCB had previously established an MCL for Cr-6 of 10 µg/L but has since rescinded this regulation. The drinking water standard for Cr-6 of 10 µg/L may be reinstated in the near term. The source of Cr-6 is likely natural, and higher concentrations are found at greater depths. Cr-6 levels are stable in most wells and decrease near groundwater replenishment facilities.

The MCL for **uranium** is 20 pCI/L, and the Subbasin primarily ranges from 5-10 pCI/L. Uranium in the Subbasin is likely from natural geologic sources such as granitic rocks in the northwestern portion of the Subbasin.

The MCL for **fluoride** in drinking water is 2 mg/L. Fluoride in the Subbasin is naturally occurring and is associated with faulting, such as the San Andreas Fault, and geothermal areas along the Salton Sea.

The MCL for **perchlorate** in drinking water is 6 µg/L. Perchlorate is largely undetected throughout the Subbasin, except for a few wells in the upper northwestern part of the Subbasin at levels below the MCL. Sources for perchlorate include industrial sources, fertilizer, and natural sources.

The MCL for **DBCP** is 0.2 µg/L. There have been DBCP detections in three private irrigation wells in the central portion of the Subbasin at levels below 0.1 µg/L. DBCP is associated with pesticides that were banned in 1979.

The GSAs are tracking water quality constituents of concern. The large water systems meet drinking water standards for the eight constituents presented. The domestic wells and small water systems may be affected by nitrate, Cr-6, and arsenic.

Public comments and questions included the following:

- Did you do any volume corrections?
    - The analyses are not dependent on volume, and the data comes from other monitoring programs collected by multiple agencies.
- Was any data included from State Small Water Systems and domestic wells?
    - Yes, the analysis included all available water quality data from State databases.

Groundwater Conditions: Groundwater Dependent Ecosystems (GDEs)

Mr. Will Medlin, Woodard & Curran, presented the groundwater dependent ecosystem (GDE) analysis required by the Sustainable Groundwater Management Act (SGMA). GDEs are ecological communities or species that depend on groundwater emerging from aquifers or groundwater occurring near the surface. The GDEs Assessment considered the U.S. Environmental Protection Agency (USEPA) Level III and IV ecoregions, the Coachella Valley Multiple Species Habitat Conservation Plan (MSHCP) conservation areas, and special status (threatened and endangered) species. The MSHCP covers almost all of the Subbasin in Riverside County. The MSHCP was approved in 2008 and most recently amended in August 2016. The MSHCP is administered by the Coachella Valley Conservation Commission and is intended to conserve sensitive habitats and species through mitigation of impacts and issuance of take permits for species. CVWD, CWA, and IWA are permittees and signatories to the MSHCP.

The GDE assessment was limited to federal and state-listed “threatened and endangered species”. There are 17 listed species in Subbasin, of which 6 have direct reliance on groundwater and 7 have indirect reliance.

The preliminary GDE Assessment started in 2020 with a desktop analysis based on the Natural Communities Commonly Associated with Groundwater (NCCAG) datasets. After completing the desktop GDE Assessment, the project team performed field surveys to verify the analysis in January 2021. The following was concluded from the field survey:

- Probable GDE: 1% (1 site)
    - I.e., water or other saturation or wetland vegetation or aquatic or semiaquatic
- Probable Non-GDE: 69% (9 sites)
    - I.e., uplands, developed areas, mis-mapped areas, human-made or otherwise modified features that would typically include water is present like golf courses, ponds, reservoirs, and fields
- Playa Wetlands: 23% (3 sites)
    - I.e., wetland vegetation where water has receded such as along the Salton Sea

Public comments and questions included the following:

- What water year is shown in the aerial photo of the Salton Sea shoreline boundary? Has the Salton Sea shoreline decreased with the receding of the Salton Sea water level?
    - Aerial imagery was from 2019/2020. Aerial photography of the Salton Sea shows recession, and vegetation has grown at the Grant Street and Johnson Street drains, as they drain out onto the exposed seabed.

Out of the 882 NCAG wetlands identified through the desktop analysis, 1,045 points were analyzed to assess whether GDEs were present. Out of those 1,045, 50 points were probable GDEs, 932 points were probable non-GDEs, and 63 points were playa wetlands. Probable GDEs exist in the mountain from canyons and may rely partially on surface water or snowmelt. Playa wetlands occur along the Salton Sea exposed seabed near the drain and surface water outlets.

Public comments and questions included the following:

- Are there any GDEs along the base of Coral Mountain near the La Quinta area?
    - Based on the NCAG polygons, these are most likely probable non-GDEs.
- Has the Clapper Rail habitat been diminished, and if so, by how much?
    - The playa wetlands and areas around the Salton Sea could potentially be habitat for Clapper Rail, but the team is unable to answer if they have been diminished or impacted.
- Where is the one probable GDE located that was visited in the field?
    - The probable GDE is located in the northern-most cluster of Probable-GDEs on the map, near the Tram.

Sustainable Management

Ms. Priestaf presented an overview of DWR recommendations on Sustainable Management Criteria (SMC), which included setting thresholds for groundwater levels and using those as a proxy for storage and subsidence. Minimum threshold (MT) for groundwater levels is set at the historical low as measured at 57 Key Wells. The historical low was selected because undesirable results (such as production wells drying) were not reported, meaning that the historical low is protective against undesirable results. An undesirable result will occur when the MT is exceeded in 5 consecutive low-season monitoring events in 25 percent of wells across the Subbasin. The GSAs will monitor and report groundwater levels in Annual Reports.

Public comments and questions included the following:

- What can be attributed to the increase in water levels on the hydrograph?
    - Groundwater level increases can be attributed to the GSAs' groundwater management activities such as source substitution, managed aquifer recharge, and water conservation.

Ms. Priestaf presented DWR recommendations to the GSAs for water quality, seawater intrusion, and GDEs. DWR also recommended GSAs: 1) continue to study the rate and level of increased salt contents in groundwater due to the importation of Colorado River Water, and 2) incorporate the Coachella Valley Salt and Nutrient Management Plan (CV-SNMP) into future iterations of the Alternative Plan. In response, the Alternative Plan includes maps, cross-sections, and time concentration plots, as well as a discussion of significance, sources, and distribution factors of salts and nitrates in the Subbasin. Development of Alternative Plan Update has also been coordinated with the CV-SNMP effort since 2020. The Subbasin has applied for funding from DWR to install additional monitoring wells.

Public comments and questions included the following:

- Were there any wells excluded from the analysis and why?
  - All available data were included in the analysis, though each constituent map only includes wells with relevant data.

DWR requested the GSAs to clarify if there is an MT associated with subsurface drain flow as referenced in the 2002 and 2010 Coachella Valley Water Management Plans (CVWMP). The 2010 CVWMP recognized the potential degradation of water quality as a result of downward migration of shallow return flows in the East Valley to deep zones. Projects have been able to raise groundwater levels in deep productive levels, which have resulted in upward gradients and flow. High groundwater levels are generally protecting deep zones. Although increasing drain flows are beneficial because they are correlated with groundwater levels, the Alternative Plan Update will not include an MT for drain flows.

Ms. Priestaf presented a map with simulated levels in the shallow aquifer as of 2020. The contour along the Salton Sea is at -220 feet below sea level (BSL), higher than the Salton Sea contour at -238 feet BSL. From 1997-2014, the modeling implies that there was inflow into the Subbasin from the Salton Sea. This has been reversed since 2015 through managed aquifer recharge, source substitution, and conservation. The modeling results match observed groundwater levels.

DWR also recommended that the GSAs identify the GDEs in the Subbasin. The Alternative Plan Update will include an appendix documenting the GDE study.

Public comments and questions included the following:

- Were there any artesian water locations found for this GDE survey?
  - Site 15 in the field assessment is a spring and could be considered artesian.

Groundwater Model Update

Ms. Priestaf presented the groundwater model update. The original historical simulation from 1936 to 1996 was first updated in 2010 and again recently to include the historical period from 2009 to 2017. The groundwater model is now being actively applied to model future scenarios.

Revised Plan Scenarios

Ms. Prickett presented an update on the revised plan scenarios. Three types of future scenarios will be analyzed, including:

- Baseline: additional demands but no new projects
- Near term projects: additional demands and capital improvement projects (CIP)/programs planned within 5 years
- Future projects: additional demands and all planned projects/programs in the CIP

These three scenarios will be modeled with and without climate change.

The baseline scenario assumes a 50-year hydrology mimicking hydrology between 1970 and 2019. Under climate change, the model assumes the recent 25-year hydrology with multiple dry cycles between 1994 and 2019. The recent 25 years have had 20 percent less mountain-front runoff compared to the 50-year year average.

The baseline scenario assumes SWP water reliability of 45 percent, the historical average since the Wanger decision in 2007. Some years, such as 2021, have experienced reliability as low as 5 percent. Future projects scenario includes participation in Delta Conveyance Facility (DCF) that may increase SWP reliability up to 58 percent. The climate change scenario will also assume a 1.5 percent factor as projected by DWR.

Public comments and questions included the following:

- Is 45 percent SWP allocation a conservative baseline? Is this a "worst-case scenario" planning estimate under climate change assessments?
  - 45 percent reliability is a reasonable estimate unless the DCF is constructed. For climate change, DWR has already applied the climate change factor in the projections.

The baseline scenario assumes the Quantification Settlement Agreement (QSA) entitlement minus conveyance losses. The future projects scenario includes additional nonpotable water such as Canal water and recycled water deliveries. Because of the current drought conditions in the Colorado River watershed, the climate change scenario assumes the QSA entitlement minutes conveyance losses, accounting for the Lower Basin Drought Contingency Plan (DCP) contribution in phases. CVWD's contribution is 7 percent (approximately 24,000 acre-feet [AF]) of the total for California; this volume will be contributed back to the lakes and storage.

Approximately 30 percent of water demand is assumed to return to sewer. The baseline scenario assumes only the current recycled water supplies will continue with no additional recycled water projects. The near term scenario assumes current supplies as well as projects planned for implementation within the next 5 years, and the long term scenario assumes all planned projects will be implemented. The amount of water available for recycled water is the same across all scenarios with or without climate change.

Next Steps

Ms. Prickett presented the next steps for July through September 2021. The consultant team will finalize Plan Scenarios in groundwater model and quantify water budgets, and results will be presented at the next public workgroup scheduled for August 26, 2021. Ms. Prickett invited participants to offer any additional comments or questions. For any additional information, please contact Rosalyn Prickett at indiosubbasinSGMA@woodardcurran.com.

Public comments and questions included the following:

- The 34-acre Crystal Lagoon required 62 gallons of water. The Wilderness Study Area (WSA) concluded that 34 million gallons will be required to refill the Crystal Lagoon over a year. However, the area has experienced 143 days over 100 degrees, resulting in the evaporation of 1-3 inches, or 1 million gallons, per day. Request to reassess this water feature.
  - The demand assessment was done with existing data, and the demands associated with Crystal Lagoon have been incorporated into the demand forecast. Evaporative loss is included in the analysis.
- Does the analysis project fewer acres of agriculture? What are the forecasted increases in water demand – domestic, commercial, and industrial?
  - The demand forecast relied on changes in land use projected by the Southern California Association of Governments (SCAG) through 2045. This data is a compilation of all general plans, municipal plans, and community plans to identify where growth will occur and how it will be distributed. The project teams coordinated with SCAG to verify the analysis. The analysis projects the conversion of agricultural lands to urban uses.
- Regarding the Colorado River, California does not start making voluntary contributions until the water elevation falls to 1,045 feet, and contributions are a sliding scale to 1,025 feet. CVWD's reductions start at 14,500 AF and are maxed at 24,500 AF, which is accounted for in the modeling.

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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2022 Indio Subbasin Alternative Plan Update

Public Workshop #6
SUMMARY

August 26, 2021 at 2:00 pm – 4:00 pm
Virtual Meeting

Members of the Public	Groundwater Sustainability Agencies (GSAs)
• Alena Callimanis, City of Indian Wells • Amy McNeill, Riverside County Flood Control and Water Conservation District • Ben Olson, Olsen Engineering • Chuck Jachens, Bureau of Indian Affairs • David Newell. Citv of Palm Springs • Lorena Pena • Kevin Fitzgerald, Southern California Golf Association • Kimberly Romich, California Department of Fish & Wildlife • Margaret Park, Agua Caliente Band of Cahuilla Indians • Nina Waszak, Agua Caliente Band of Cahuilla Indians • Omar Gastelum, Leadership Council • Nataly Escobedo Garcia, Leadership Council • Ron Buchwald, Valley Sanitary District • Stephen Reich, Stetson Engineers • Steve Ledbetter, TKM Engineering on behalf of Mission Springs Water District • Tarren Torres, Egoscue Law Group representing Agua Caliente Band of Cahuilla Indians	• Ashley Metzger, DWA • Castulo Estrada, CWA • Jim Barret, CVWD • Katie Evans, CVWD • Mark Krause, DWA • Melanie Garcia, CVWD • Reymundo Trejo, IWA • Steve Bigley, CVWD • Zoe Rodriguez del Rey, CVWD **Consultant Team** • Iris Priestaf, Todd Groundwater • Daniel Crag, Todd Groundwater • Maureen Reilly, Todd Groundwater • Arthella Vallarta, 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 notified attendees that the conference would be recorded. She then presented the meeting objectives and agenda. Ms. Prickett reviewed the meeting objectives and an overview of the Workgroup timeline over the two-year planning period.

Alternative Plan Status

Ms. Iris Priestaf, Todd Groundwater, presented an overview of the tasks and list of chapters for the Alternative Plan Update. Ms. Priestaff reviewed the *2010 CVWMP* goal that will be retained in the Plan Update, along with the new Sustainability goal: "to maintain a locally managed, economically viable, sustainable groundwater resource for existing and future beneficial uses in the Indio Subbasin by managing groundwater to avoid the occurrence of undesirable results". She then reviewed the refined Plan objectives being included in and guiding development of the Update, including a new 7th objective: "Reduce vulnerability to climate change and drought impacts".

There were no public comments.

Groundwater Model

Mr. Daniel Craig, Todd Groundwater, presented an overview of the numerical model construction and model features. The model simulation period was extended through 2019 with updated recharge and pumping data, along with updated subsurface inflow boundary conditions. A calibration assessment was completed, which demonstrates that the model simulations are well matched with the measured levels. The model also compared simulated drain flows with measures flows, which were also well matched. Historical model accurately simulates shallow and deep groundwater levels and can be used to predict future water level and storage changes under different scenarios. The model also provides forecasts of future drain flows, Salton Sea interactions, and other water budget conditions.

Public comments and questions included the following:

- Pre-deliveries of State Water Project water supplies has influence on historic groundwater declines during the last 5 to 10 years. Have you accounted for these pre-deliveries in the model? Without those pre-deliveries, would the ground water continue to decline?
    - In developing the model, we recognized there is a positive delivery account balance right now. We accounted for that, and moving forward, that advanced delivery account balance would be credited down to 0. When we modeled the State Water Project deliveries, we made sure to account for variability in deliveries over time.
- It is very concerning the first chart shows the model very far off for January 2020. Why?
    - Overall, the measured and simulated groundwater elevations are well-matched, but there is some divergence at the end and that has to do with the high recharge at the GRF. There are a lot of reasons why models do not match perfectly, but overall, it does match adequately.
- Is Thomas E Levy mostly Colorado River recharge?
    - Yes, replenishment water comes from Coachella Canal.

Plan Scenarios & Projects and Management Actions

Ms. Prickett presented the Five Plan scenarios and described how the model inputs were developed assuming implementation of differing suites of projects and management actions (PMAs). The GSAs established priorities in selection of PMAs, which are broken down into four categories:

1. Water Conservation
2. Water Supply Development
3. Source Substitution and Replenishment
4. Water Quality Protection

The complete list of PMAs will be available in the Alternative Plan Update.

Ms. Prickett also explained the groundwater model's climate change assumptions. The model assumes a 50-year period, and future scenarios incorporate recent (drier) patterns. For local inflow, the Baseline scenario uses a long-term hydrology and previously estimated annual recharge volumes. The climate change scenarios use repeated historical conditions only for the period 1995-2019 that include multiple droughts. Additionally, the availability of imported water for direct delivery and groundwater replenishment was reduced.

The five modeled scenarios include the following:

- *Baseline and Baseline with Climate Change* - The projects listed in these two scenarios are existing operational activities that are assumed to continue forward.
- *Five-Year Plan with Climate Change* - These are the projects the GSAs are planning to implement in their five-year Capital Improvement Plans (CIPs). Under this scenario, there are more Source Substitution and Replenishment projects compared to the Baseline and Baseline with Climate Change scenarios.
- *Future Projects with Climate Change* – This scenario includes a variety of additional supply acquisition, source substitution, and replenishment projects.
- *Expanded Agriculture with Climate Change* - This scenario assumes the same suite of future projects as Future Projects with Climate Change, along with a significant amount of new additional agriculture in the East Valley.

Public comments and questions included the following:

- The Intergovernmental Panel on Climate Change (IPCC) released a new report with worsening effect of climate change, resulting in longer droughts, shorter cold seasons, and more intense heat waves. I am concerned that Colorado River supply assumptions are too high. California will be affected, and agreements will be affected. Simulations should model Colorado River with lower deliveries, showing less water than senior water rights.
    - Yes, model assumes that CVWD will contribute to the *Lower Basin Drought Contingency Plan* (DCP). The *Lower Basin DCP* is based on tiers, and as levels in Lake Mead drop, different tiers will be implemented. We have modeled the full CVWD contribution to the *Lower Basin DCP* annually.
- The sustainability goal stated a beneficial use of water. A 62-million-gallong beach resort in Rancho Mirage and two 20-million-gallon surf parks in Thermal and La Quinta do not seem to be beneficial uses of water.

Simulation Results

Mr. Craig presented the simulation results from the five Plan scenarios that Ms. Prickett described. The results in these scenarios are not realistic because additional projects are already planned by the GSAs. However, the scenarios provide a comparison of future conditions with and without climate change/drought.

Baseline and Baseline with Climate Change

Total inflows for Baseline are higher than in Baseline with Climate Change, especially in peak recharge years. Note that the first 25 years assume addition of new supplies and demand, but the second 25 years do not assume new demands. Cumulative change in storage is much higher in Baseline. Baseline with Climate Change hovers right around zero and even ends negative. The groundwater model simulated forecasted supply and demand for 2020-2044 as required by SGMA, but kept assumptions at the year 2045 levels for 2045-2069. This operates as a stress test for ongoing management of the basin at 2045 levels but does not recognize that demands will continue increasing after 2045.

Future groundwater levels in Baseline with Climate Change in West Valley are about 30-40 feet lower than baseline conditions due to reduced replenishment supplies. In East Valley, the impacts of climate change are less (only 5 feet difference) because most of natural infiltration occurs in the West Valley. In Baseline, there are larger changes in groundwater levels in the East Valley, while in Baseline with Climate Change, declines are more substantial in the far West Valley near WWR-GRF.

Four Climate Change Scenarios

The groundwater model simulated additional scenarios with five-year CIP projects, future projects, and expanded agriculture. Water budgets show net positive inflows in all three of the project scenarios. Mr. Craig presented simulated pumping, inflows, groundwater levels, and cumulative storage for the four climate change scenarios. In Mid-Valley and East Valley areas, Baseline with Climate Change groundwater levels are declining, but they are increasing for the other three scenarios. All three scenarios show significant declines in far West Valley due to reductions in WWR-GRF replenishment under various future project implementation. Cumulative change in storage for Baseline with Climate Change is net negative after 50 years, while other three climate change scenarios show net positive.

Mr. Craig stated that the scenarios indicate that Five-Year PMAs are needed for supply-demand balance and that future PMAs are needed for reliability in face of climate change and uncertainties in demand past the 25-year planning horizon. He also concluded that for all scenarios (except Baseline with Climate Change) the Subbasin will be sustainable.

Public comments and questions included the following:

- The assumptions for supply and demand in the West and Central Valley need to be explained well in the report. For Baseline and Baseline with Climate change, what are the past and future replenishment and demand assumptions and why are West Valley groundwater levels projected to increase?
  - There is a Numeric Model and Plan Scenarios chapter in the Alternative Plan Update, which will explain these scenarios with more detail.
- What does ET cover?
  - ET is calculated in areas in the model where groundwater is shallow and rises to rooting depth of plants. Most of ET occurs in East Valley where groundwater is shallow.
  - We also calculate ET losses at recharge sites and ET is considered in the return flow methodology.
- The Whitewater River replenishment looks too high.
  - The Alternative Plan Update includes a section that explains our assumptions regarding the Whitewater River replenishment. We feel confident that those numbers are appropriate, and we look forward to your review.

Public Comment

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

- Are the presentation slides going to be available?
  - The slides are already available on our website (www.IndioSubbasinSGMA.org). All of the meeting materials from workshops are uploaded onto the website.
- How will the Five-Year projects be funded?
  - These projects are within the GSAs Five-Year CIPs. In some cases, agencies have sought grant funding for implementation of those projects. In some cases, they are

funded using the fund from water rates. It depends on the agencies and the specific projects. It is a combination of different funding mechanisms.

Next Steps

Ms. Prickett directed participants to our homepage (www.IndioSubbasinSGMA.org) and encourage people to sign up for email updates. She announced to workshop participants that the next Public Workgroup will be held on October 13 from 2:00 PM to 4:00 PM.

Ms. Pricket presented the next steps for completion and submittal of the Alternative Plan Update to DWR. The Draft Plan will be circulated for review for 30 days in late September. Following receipt of comments, a Final Plan will be released for adoption by the GSA governing bodies in early December.

Public comments and questions include the following:

- If we received the email announcement about today's workshop, will we receive an email about the Draft Alternative Plan Update?
    - Yes, we will send an email to notify our stakeholders that the Draft Alternative Plan Update is available.
- How many weeks after the October 13 workshop will public comment continue?
    - The Public Review Period will be open for 30 days. The October 13 workshop is right in the middle of review period. You will have two weeks before the public workshop to review the draft, and you will have two weeks after the workshop to review the draft.

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2022 Indio Subbasin Alternative Plan Update

Workshop #7

AGENDA

October 20, 2021 at 2:00 pm – 4:00 pm

Hybrid Format

In Person: Coachella Valley Water District – Steve Robins Administration Building
75515 Hovley Ln E, Palm Desert, CA 92211

Online: GoToMeeting: https://global.gotomeeting.com/join/647606925
or Dial In by Phone: +1 (646) 749-3122; Access Code: 647-606-925#

Español: *Llamar al (207) 558-4270, código de acceso: 316 818 074#*

#	ITEM	TIME
1	**Welcome and Introductions** • GoToMeeting Instructions • Agenda and Meeting Objectives	2:00 pm
2	**Alternative Plan Status** • Subbasin History and Plan Objectives	2:20 pm
3	**Groundwater Conditions and Sustainable Management** • Groundwater Conditions and Sustainability Criteria	2:30 pm
4	**Water Demands and Supplies** • Demand Forecasts and Supply Portfolio	2:50 pm
5	**Numerical Model, Plan Scenarios, and Projects & Management Actions (PMAs)** • Model Features and PMAs in each Plan Scenario	3:10 pm
6	**Plan Evaluation and Implementation** • Plan Implementation Activities	3:25 pm
7	**Public Comment** • Your Participation and Input are Important	3:40 pm
8	**Get Involved**	3:55 pm

**times are subject to change*

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2022 Indio Subbasin Alternative Plan Update

Public Workshop #7
SUMMARY

October 20, 2021 at 2:00 pm – 4:00 pm
Virtual Meeting

Members of the Public	Groundwater Sustainability Agencies (GSAs)
• Alena Callimanis, resident • Amy McNeill, Riverside County Flood Control and Water Conservation District • Ben Olson, Olson Engineering • Benjamin Whittle, student, UC Irvine • Cathy Sanford, RWQCB • Craig Kessler, Southern California Golf Association • Dale Tyerman, resident • Kevin Fitzgerald, Southern California Golf Association • Kimberly Romich, California Department of Fish & Wildlife • Marion Champion, Mission Springs Water District • Pakiza Chatha, CA Department of Water Resources • PJ Iyer • Sachi Itagaki, Kennedy/Jenks Consultants • Sarah Spinuzzi, Coachella Valley Gatekeeper • Sheila Warren, resident • Steve Ledbetter, TKM Engineering on behalf of Mission Springs Water District • Tarren Torres, Egoscue Law Group representing Agua Caliente Band of Cahuilla Indians	• Alejandro Lara, CVWD • Ashley Metzger, DWA • Berlinda Blackburn, CWA • Ivory Reyburn, CVWD • Joseph Mellinger, CVWD • Katie Evans, CVWD • Luis Sanchez, CVWD • Mark Krause, DWA • Michelle Tse, IWA • Nancy Munoz, CVWD • Reymundo Trejo, IWA • Ryan Molhoek, DWA • Steve Bigley, CVWD • Zoe Rodriguez del Rey, CVWD **Consultant Team** • Iris Priestaf, Todd Groundwater • Maureen Reilly, Todd Groundwater • Rosalyn Prickett, Woodard & Curran • Vanessa De Anda, Woodard & Curran

Welcome and Introductions

Ms. Rosalyn Prickett, Woodard & Curran, greeted participants as they joined the call. Ms. Prickett welcomed everyone to the workshop and reviewed how to use the virtual GoToMeeting platform. She then reviewed the meeting objectives and provided an overview of the project team. She noted that this is the final public workshop specific to the *2022 Indio Subbasin Alternative Plan Update* (*Alternative Plan Update*) before submittal to the State in December 2021.

Alternative Plan Status

Ms. Iris Priestaf, Todd Groundwater, presented an overview of the *Alternative Plan Update*. Ms. Priestaff reviewed the methods in which people have been engaged, which included seven public workshops, seven SGMA Tribal Workgroups, a website with monthly updates, and regular email announcements and updates. The four GSAs are developing the *Alternative Plan Update* for the Indio Subbasin (Subbasin) and areas that are, or are likely to be, supplied groundwater from the Subbasin.

The importance of supplemental supply to alleviate groundwater overdraft has been noted for decades. The water supply portfolio includes capture and recharge of stormflows, completion of the Coachella Canal, acquirement of State Water Project (SWP) contracts, and use of recycled water.

Ms. Priestaf reviewed the *Alternative Plan Update* goal: "To reliability meet current and future water demands in a cost-effective and sustainable manner". She also reviewed the refined objectives being included in and guiding the development of the *Alternative Plan Update*, including a new 7th objective: "Reduce vulnerability to climate change and drought impacts". Plan implementation has resulted in significant groundwater levels increases regionally and cumulative groundwater storage increases across the Subbasin.

Public comments and questions included the following:

- What kind of water can be substituted in exchange for the Colorado River water?
    - There is a contractual element to the exchange. Both DWA and CVWD receive SWP water, but they exchange it for Colorado River water through Metropolitan Water District. At this point, there is no physical way to get SWP water to the Valley.

Groundwater Conditions and Sustainable Management

Ms. Priestaf presented an overview of the Subbasin and groundwater flows, noting that it extends from the San Gorgonio Pass Subbasin to the Salton Sea. Groundwater flow moves downhill through the Subbasin supplying wells and discharging into the Salton Sea.

Ms. Priestaf presented an overview of undesirable results for six sustainability indicators, which are all addressed in the *Alternative Plan Update* and listed below. A minimum threshold (MT) is a numeric value used to define undesirable results.

Groundwater Levels

Undesirable results include significant and unreasonable reduction in the long-term viability of domestic, agricultural, municipal, or environmental uses, and impacts to relatively shallow wells, including small water systems and private drinking water supply wells. Hydrographs in the *Alternative Plan Update* show declining groundwater level trends in the Subbsain from the 1990s to around 2009. As such, the MTs have been defined as the historical lows measured at 57 Key Wells in around 2009 with no reported shortages. An undesirable result has been defined to occur when the MT is crossed in five consecutive low-season monitoring events in at least 25% of wells across the Subbasin.

Groundwater Storage and Land Subsidence

The MTs for groundwater levels have a strong correlation with, and are therefore a proxy for, the groundwater storage and land subsidence sustainability indicators. The change in groundwater storage indicated declines between 1987 to 2009, and reversal of overdraft and increase of storage in 2009. This correlates with the change of groundwater levels seen across the Subbasin around 2009. Since then, there has been an increase of about 840,000 AF in storage that can be used during periods of drought. Similarly, the Subbasin experienced up to 2 feet of land subsidence between 1995 to 2010 correlated with groundwater declines due to groundwater pumping. Stabilization and uplift have been documented in the Subbasin since 2010 with increasing groundwater levels.

Groundwater Quality

The GSAs are tracking numerous water quality constituents. Large water systems meet all drinking water standards, but small water systems and domestic wells may be affected by some constituents like nitrate from multiple sources and naturally occurring hexavalent chromium and arsenic. The GSAs are coordinating with community representatives and domestic systems to ensure access to high-quality water. The *Alternative Plan Update* provides a comprehensive assessment of groundwater quality that incorporates an extensive discussion of eight constituents of concern, including maps, cross-sections, and time concentration plots. As an example, Ms. Priestaf presented a map showing total dissolved solids (TDS) concentrations in the Subbasin to provide an overview of groundwater quality. The map shows TDS concentrations are below the recommended levels in the majority of the Subbasin, but higher concentrations are found along the Subbasin boundaries and near the Salton Sea. The *Alternative Plan Update* resulted in an improved basis to study the rate and level of increased salt in groundwater from all sources. Coordination with the Coachella Valley Salt and Nutrient Management Plan (CV-SNMP) will start in 2022.

Seawater Intrusion

The Subbasin is bounded by one end of the Salton Sea, which is distinguished by salinity that is twice that of the ocean and increasing, and decreasing surface water levels and shoreline. Seawater intrusion is a consequence of overdraft and is therefore closely tracked by the GSAs. Numerical modeling indicates there was net inflow from the Salton Sea into the Subbasin from 1997 to 2014 and a net outflow from the Subbasin to the Salton Sea since 2015. Seawater intrusion has been reversed.

Interconnected Surface Water and Groundwater Dependent Ecosystems (GDEs)

The *Alternative Plan Update* reviewed the Coachella Valley Multiple Species Habitat Conservation Plan and other documents for protected species, performed a desktop analysis of polygons provided by DWR's Natural Communities Commonly Associated with Groundwater (NCAG), conducted a field survey of 13 sites, and mapped potential GDEs. The analysis found that 5% of the evaluated sites were probable GDEs that partially rely on surface water or snowmelt, 89% of the evaluated sites are probable non-GDEs that include agricultural fields and drainages, uplands, and dry washes, and 6% are playa wetlands that depend on agricultural drain flows and occur along the Salton Sea exposed seabed. This analysis is included in an appendix to the *Alternative Plan Update*.

Public comments and questions included the following:

- On slide 14, you mention working with Tribes on a shared set of objectives. What are those shared objectives and what are the names of the Tribes you worked with?
    - The GSAs have been consistently working and meeting with five Tribes in the Plan Area through the SGMA Tribal Workgroup. The GSAs are committed to continue coordinating with the Tribes. The Tribes include: Agua Caliente Band of Cahuilla Indians, Augustine Band of Cahuilla Indians, Cabazon Band of Mission Indians, Torres-Martinez Desert Cahuilla Indians, and Twenty-Nine Palms Band of Mission Indians.
- On groundwater quality - PFAS was in the headline in the NYT today. How are you addressing current or potential PFAS or PFOA in groundwater? It wasn't part of the list of constituents.

    - This is included in the *Alternative Plan Update.* Though it is not on the list of eight constituents of concern, these are emerging constituents of concern. The GSAs will continue to monitor evolving regulations.
- Have you considered what impact a potential lithium brine mining at the Salton Sea might have on water levels and quality?
    - The planning team is unaware of potential lithium brine mine that is within the Plan Area of the *Alternative Plan Update*.
- Impressed with the turnaround in groundwater levels in the 2000s. What caused this, and is it sustainable given concerns with drought and less water from alternative sources?
    - The turnaround in groundwater levels is due to supplemental supply and source substitution. The agencies brought additional supplies to decrease reliance on groundwater pumping, acquired new water supplies for increased replenishment, leveraged additional non-potable water supplies, and connected agricultural users to Colorado River water.
- Is aquifer the same as groundwater storage?
    - The Indio Subbasin is a groundwater basin, meaning that it is an area that produces groundwater (as opposed to the mountainous areas that do not support groundwater production). There are aquifers (i.e., permeable areas) within the basin. An aquifer is a geologic term for distinct water bearing areas with permeability like sands and gravels. Groundwater storage refers to groundwater in storage in the basin.
- East Coachella Valley groundwater levels are still very close to their all-time lows. This likely means that subsidence is more likely to impact small wells in these areas. What accounts for the continued depletion of groundwater in East Coachella Valley, and what efforts are being made to increase the availability of municipal water supply for East Coachella Valley residents?
    - There are multiple replenishment facilities in the mid-Valley area. The GSAs are continuing to work on groundwater replenishment and consolidation of SWS with water quality issues. USGS has not studied subsidence on the individual systems, just at a regional scale and found that in most areas subsidence had stopped, been reversed, or significantly slowed down.
- We have only regained up to 25% of the groundwater that was lost as of 2019. Is the next presentation going to talk about how we build all the way up?
    - The Subbasin does not necessarily have to regain all of the groundwater since there are multiple water sources. Though more groundwater in storage is always good, this plan is looking at the overall dynamic operation of the Subbasin.

Water Demands and Supplies

Ms. Prickett presented the demand forecast for 2020 to 2045. The demand forecast was based on 11 geographic units and considered projected land uses, conversion of agricultural lands, historical water use, and conservation trends. Demands were forecasted for municipal, golf, agricultural, and other uses. Municipal demands relied on regional growth projections provided by the Southern California Association of Governments (SCAG), land use inventories, unit demand factors, projected water loss, and adjustment factors (i.e., conservation savings estimates). Forecasted demands for agriculture considered existing agriculture and projected conversions of idle land to urban land uses, and forecasted demands for golf considered market trends and three proposed new golf courses. Other demands included fish farms, duck clubs, polo/turf, and potential surf parks. Total water demand is expected to increase approximately 8% between 2020 to 2045 with urban demands increasing with urban growth and agricultural demands decreasing as a result of land conversions.

Ms. Prickett presented the supply portfolio for the Subbasin, which includes groundwater, SWP exchange water, Colorado River water, recycled water, surface water, and other supplies. There is an estimated 10% increase in anticipated future supplies accounting for planned projects. Climate change is anticipated to reduce available water projections by up to 40,000 AFY. The total available and planned supplies are presented in the *Alternative Plan Update*.

Public comments and questions included the following:

- Why is recycled water still so low in 2045? It doesn't seem recycled water use is growing.
    - The GSAs are committed to investing in and expanding recycled water.
- Do you assess a scenario in which Colorado River water decreases, and does not get bumped back up to full allocation?
    - Yes, the simulated scenarios assume less than the full entitlement will be delivered.
- Do you have a similar chart for reduction in the Colorado River supply if that happens? This still shows Colorado River water increasing.
    - Colorado River supplies are still ramping up due to negotiated transfers that peak in 2027. The plan scenarios assume less than the full entitlement will be delivered.
- How many surf parks and beaches did you include? And is there any way to find out the breakdown of "other" amounts today versus 2045?
    - There is a table of other projected demands in Chapter 6, but this is not broken down by specific categories.
    - There are 4 proposed surf parks in permitting phases, plus one 34 acre and one 20-acre swimming beaches that are included under the Other category.

Numerical Model, Plan Scenarios, and Projects and Management Actions (PMAs)

Ms. Priestaf presented the updates to the groundwater model. The calibration hydrographs show that the actual and simulated data points align, and therefore this model is deemed to accurately simulate shallow and deep groundwater levels in the Subbasin. The model can be used to predict future water level and storage changes under different inflow and outflow scenarios for 50 years into the future. The model presents a forecast of future drain flows, Salton Sea flow, and water budget conditions. Calibration hydrographs and simulation hydrographs are available in the *Alternative Plan Update*.

Ms. Prickett reviewed the simulation results from the five Plan scenarios. The results of the Baseline scenarios are not realistic because additional projects are already planned by the GSAs. However, the Baseline scenarios provide a comparison of future conditions with and without climate change/drought. The additional three scenarios simulate the implementation of 5-year (i.e., near-term) projects, future projects, and/or expanded agriculture.

The model incorporates climate change assumptions. For local inflow, the Baseline scenario uses long-term hydrology and previously estimated annual recharge volumes. The climate change scenarios use repeated historical conditions only for the period 1995-2019 that include multiple droughts. Additionally, the availability of imported water for direct delivery and groundwater replenishment was reduced consistent with reduced SWP deliveries in the past 14 years as a result of legal, environmental, and drought conditions, and with potential reductions in CVWD's Colorado River water supply if Lake Mead reservoir levels continue to decline, as stipulated in the Lower Basin Drought Contingency Plan.

Ms. Prickett presented the differing suites of projects and management actions (PMAs). The GSAs established priorities in the selection of PMAs, which are broken down into four categories: Water Conservation, Water Supply Development, Source Substitution and Replenishment, and Water Quality Protection. The Plan scenarios reflect varying water supplies and suite of PMAs. The PMAs have varying assumptions of total supply availability and the timeframe in which these supplies will be available. The *Alternative Plan Update* includes supply graphics showing how much water will be available and where the water will flow. The simulation results show that the Baseline scenarios will likely result in a negative cumulative change in storage and will not achieve Subbasin sustainability. In comparison, the three project scenarios show an increasing cumulative change in groundwater storage and groundwater levels. Therefore, it is concluded that the 5-year PMAs are needed to achieve a supply-demand balance in the Subbasin. Additional future PMAs will be needed for reliability in the face of climate change and uncertainty with future water supplies and demands.

Public comments and questions included the following:

- If SWP declines are 45% over the last 14 years, what has the allocation over the last one to two years? The point was made it was from a high of 80% of contract amount received to a low of 5%.
    - SWP allocations for the past two years have been 20% and 5%. The 45% assumption looks at a combination of wet and dry years. DWR is modeling long-term reliability at 58%, but the Plan is choosing to go with the lower, more conservative 45%.
- Iris mentioned that we expect the operation of groundwater to be dynamic and will likely get down to the Minimum Threshold (MT). At that point, does that mean groundwater pumping would need to be curtailed?
    - There are no plans to curtail groundwater pumping. After looking at all the scenarios and available supplies, the Subbasin is no longer in overdraft and remains above the MTs.
- Governor Newsom declared a drought emergency and is calling for everyone to voluntarily reduce water use by 15%, including Riverside County. How does this affect the Plan?
    - The *Alternative Plan Update* includes conservation as part of the PMAs. Conservation includes everything from turf rebates to toilet replacements, which are being done by the GSAs. All water conservation will be tracked by the GSAs and reported in the Annual Reports.
- What do you see as the biggest risks and challenges in executing the Plan? You mentioned that cost management is one of the goals. How will this impact water rates in the foreseeable future?
    - From a cost-effectiveness perspective, the GSAs are aware of the costs associated with the PMAs in their Capital Improvement Plans and how this may impact their rate structure. The GSAs' governing bodies decide which projects will be implemented. For reference, the *2010 Plan Update* was created at a time when the Valley was anticipated to grow explosively, so there were a lot of projects planned. However, a lot of the projects were not implemented because regional growth did not materialize. The *Alternative Plan Update* will take an adaptive management approach and implement projects as needed while tracking population growth and development. Challenges include the uncertainties associated with demands and supplies.

Plan Evaluation and Implementation

Ms. Prickett presented the implementation activities that the GSAs will employ as part of the *Alternative Plan Update*. Implementation activities include, but are not limited to, GSA program management, monitoring programs, tribal coordination, stakeholder outreach, and annual reports. The GSAs have established a list of priorities, listed in the *Alternative Plan Update*, that will guide the implementation of PMAs.

Ms. Prickett presented the key takeaway from the *Alternative Plan Update,* which is that with the implementation of the PMAs, the three project scenarios have adequate supplies to meet the projected demand forecast. The water budgets for the three project scenarios show that each scenario has an average inflow higher than outflow, which will result in a cumulative increase in groundwater storage. The *Alternative Plan Update* demonstrates that the GSAs can meet the established goal and the Subbasin can be sustainable. The GSAs will continue to monitor trends in demand and supply availability and implement the PMAs as needed.

There were no public comments.

Next Steps

Ms. Priestaf presented the next steps for the *Alternative Plan Update*. The Draft *Alternative Plan Update* can be downloaded at http://www.indiosubbasinsgma.org/. Public comments are due on October 29, 2021. Comments should be submitted via email to IndioSubbasinSGMA@woodardcurran.com. The GSAs will review all comments submitted and incorporate revisions as appropriate. The Final *Alternative Plan Update* will be prepared and released for adoption by the GSA governing bodies in early December. The GSAs will submit the *Alternative Plan Update* to the State for review and approval before January 1, 2022.

Public comments and questions included the following:

- Given the large amount of information provided in the Plan, 30 days is too short for a comment period; 45 days seems more appropriate.
    - The *Alternative Plan Update* is due to the State by the end of December 2021. The planning team understands that 30 days is a short period, but the comment period needs to close to finalize the Plan and submit it to the GSAs for their Boards to approve in early December 2021.

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

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#	Commenter Name	Commenter Organization	Comment	Response
1	Leslie MacNair, Regional Manager	California Department of Fish and Wildlife (CDFW)	**Sampling: Groundwater Dependent Ecosystems** Within the Indio Subbasin Alternative Plan, the Indio Subbasin, along with lands beyond the Subbasin that are, or in the future may be, reliant on groundwater pumped from the Subbasin are included (Plan Area). The Plan Area is geographically divided into West Valley and East Valley (refer to Attachment A). It is indicated that DWR recommended that an update be provided that identifies GDEs in the Indio Subbasin, with this being accomplished "using best available information (including data available from DWR) and by applying the expertise of a professional wetland scientist (emphasis added)". DWR provides the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset through the online SGMA data portal. This NCCAG dataset was used for initial identification of potential GDEs in the Subbasin". The NCCAG dataset locations were assessed by a licensed wetlands biologist that included a review of the U.S. Environmental Protection Agency ecoregions and a preliminary review of special- status (threatened and endangered) species. The desktop assessment used publicly available statewide and regional data layers and involved visual review of 1,045 individual locations to determine potential GDE status. The biologist then selected 15 locations for GDE field assessment with 13 sites being accessible. Upon completion of the in-person field verification, the preliminary desktop GDE assessment was refined into three categories: Probable GDEs, Probable non-GDEs, and Playa Wetland Communities (Indio Subbasin Alternative Plan Section 4.6 Groundwater Dependent Ecosystems). Probable GDEs were defined as 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. Fifty (50) of the 1,045 sites (5%) were determined to be Probable GDEs. Probable Non-GDEs were classified as "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 humanmade ponds, lakes, and other features, channelized drains, and areas with 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 classified as Probable Non-GDEs". Of the 1,045 sites, 932 sites (89%) were determined to be Probable non- GDEs. A 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 is exposing thousands of acres of playa each year and water from irrigation ditches and other drainages that previously flowed directly into waters of the Sea now spreads out on the exposed playa of the Sea where new vegetation and wetlands currently exist as a result". Of the 1045 sites, 63 (6%) were determined to be Playa Wetland Communities. A Technical Memorandum, Indio Subbasin Groundwater Dependent Ecosystems Study (Woodard & Curran, 2021) was provided in Appendix 4-B and reviewed by CDFW. While DWR may encourage "best available information", CDFW tries to rely on credible science in all resource management decisions. [FGC § 703.3.] Accordingly, CDFW expects groundwater/alternative plans and supporting documentation to follow 'best available science' practices. For more information on the application of scientific concepts that can improve the likelihood that a groundwater plan will avoid impacts to fish and wildlife beneficial uses and users of groundwater, GDEs, and ISW, please visit: https://wildlife.ca.gov/Conservation/Watersheds/Groundwater. While the use of a large sample size that is well distributed may be adequate, CDFW is not clear on what publicly available statewide and regional layers were visual reviewed to determine the 1,045 reference GDE sites used for the baseline data. CDFW downloaded the NCCAG dataset (Klausmeyer et al., 2018) from ESRI ArcGIS online (See Attachments B and C). Eleven (11) types of wetland habitat were identified within the Indio Subbasin Area, including: • Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded • Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Hyperhaline • Lacustrine, Littoral, Unconsolidated Shore, Sand, Seasonally Flooded • Palustrine, Scrub-Shrub, Broad-Leaved- Evergreen, Semipermanently Flooded • Palustrine, Scrub-Shrub, Broad-Leaved- Evergreen, Seasonally Flooded • Palustrine, Scrub-Shrub, Seasonally Saturated • Palustrine, Scrub-Shrub, Seasonally Flooded • Palustrine, Forested, Emergent, Persistent, Seasonally Saturated • Palustrine, Emergent, Persistent, Seasonally Flooded • Palustrine, Unconsolidated Bottom, Permanently Flooded • Warm Semi-Desert/Mediterranean Alkali–Saline Wetland There were also several vegetation communities identified as NCCAG within the Indio Subbasin (Alkaline Mixed Scrub, Alkaline Mixed Grasses, Alkali Desert Scrub, Blue Palo Verde, Desert Riparian, Desert Willow, Desert Mixed Wash Shrub, California Sycamore, Catclaw Acacia, Common Elderberry, Fremont Cottonwood, Honey Mesquite, Riparian Mixed Hardwood, Riversidean Alluvial Scrub, Scalebroom, and Tamarisk). After comparing and	The Alternative Plan, composed of the 2010 Coachella Valley Water Management Plan Update and companion Bridge Document, was approved by the Department of Water Resources (DWR) in June 2019. The Groundwater Dependent Ecosystems (GDEs) assessment in this Alternative Plan Update, Appendix 4-B, improves on the content of the Alternative Plan. During their review of the Alternative Plan, DWR's recommendation was to provide "an identification of GDEs in the Subbasin" (Recommended Action 7). The Natural Communities Commonly Associated with Groundwater (NCCAG) dataset provided by DWR was used to complete the GDE assessment. All NCCAG polygons were included in the assessment. The intent of the preliminary assessment was to evaluate and screen the polygons in the NCCAG dataset, using other State and federal datasets related to sensitive species, habitats, vegetation, and protected areas, to determine which were probable vs non-probable GDEs. This evaluation resulted in a map of identified probable GDEs. Given limited time during the planning process presented by the deadline to submit an Alternative Plan Update by January 1, 2022, we then selected a handful of representative sites to evaluate in the field and confirm the findings of our desktop study. The field assessment considered multiple sites within all three categories (probable GDEs, probable non-GDEs, and playa wetlands) to confirm the methodology for categorizing NCCAG polygons. Note that access to several representative sites was denied. Appendix 4-B, page 6, includes a list of publicly available statewide and regional layers that were visually reviewed to determine the 1,045 reference GDE sites used for the baseline data. The wetland biologist leading the GDEs assessment attempted to contact CDFW Inland Deserts Region 6 (via telephone calls) in November 2020 and January 2021 to request input on GDEs Assessment, with no response. The probable GDEs identified in the northwestern portion of the Indio Subbasin were defined as such due to the presence of seeps and springs at those locations. There is very little, if any, groundwater pumping near the probable GDEs within the canyon areas. Although there is no available groundwater data in those canyon areas, water is, in fact, surfacing at those locations and supporting small wetlands habitats before that surfacing water then infiltrates into the stream channel. The playa wetlands identified in the southeastern portion of the Indio Subbasin were defined as such because they are not natural wetland communities dependent on surfacing groundwater. Those playa wetlands only exist due to the agricultural tile drains discharging to the Salton Sea playa; without the drains, the vegetation would not persist. Under SGMA, the GSAs lack authority over surface water. Instead, the GSA's focus on groundwater management, including whether

#	Commenter Name	Commenter Organization	Comment	Response
			reviewing the information provided on the NCCAG, CDFW is concerned that the analysis within the Indio Subbasin Alternative Plan is not scientifically robust and would like clarification regarding why areas mapped as NCCAG are not part of the 1,045 GDE reference sites in the Plan Area, as well as why only field visits were performed for 13, or 1%, of the possible GDE locations. It should be noted that DWR cautions that because the NCCAG dataset was not verified, a more thorough evaluation of NCCAG-identified locations should occur. The NCCAG dataset is also limited due to “a comprehensive understanding of geology, hydrology, and biology not being available at the statewide scale; thus…. further investigation and verification of the connection and dependence between groundwater and mapped vegetation and wetlands at a local scale may be needed for water managers in sustainable groundwater management planning.” (Klausmeyer et al., 2018). Finally, Figure 4-36 GDE Assessment (refer to Attachment D) illustrates that a disproportionate number of GDEs occur in the southern half of the Indio Subbasin, yet most of the probable GDEs were determined to be within the canyons in the northern portion of the subbasin. For even the few that were classified as ‘Probable GDEs’, it is suggested that these may not be groundwater dependent, but rather, “may be associated with surface runoff, snowmelt, or springs and seeps from up-gradient sources”. Conversely, it does disclaim that “due to their location in upper canyons where groundwater extraction is generally not occurring, the specific areas in the Indio Subbasin where Probable GDEs were identified do not have existing groundwater data available for review”. Again, CDFW would like a more scientific, detailed analysis and discussion on GDEs given the importance of these state resources.	groundwater conditions occurring throughout the Subbasin causes undesirable results such as “depletions of interconnected surface water [caused by groundwater conditions] that have significant and unreasonable adverse conditions on beneficial uses of the surface water.” (Water Code, §10721(x).)
2	Leslie MacNair, Regional Manager	CDFW	**Sampling: Representative Wells** Fifty-three (53) key wells were chosen (Attachment E) to monitor groundwater levels with respect to a Minimum Threshold (MT), or an established threshold that when crossed, an undesirable result occurs. For the Indio Subbasin Alternative Plan, the MT was defined by the GSA as “five consecutive low season monitoring events in 25% of wells across the subbasin (Section 10.1.1.1 Spatial and Vertical Coverage). The inclusion of key wells in the groundwater level monitoring program included the following factors: • Spatial distribution and density of wells, accounting for variable geographic conditions including topography, hydrology, geologic structures, aquifer characteristics, confined and unconfined conditions, pumping patterns, management activities (including replenishment), and potential impacts to beneficial uses/users. • Length, completeness, and reliability of historical groundwater level record. • Well depth and information on well construction. • Regular access to the well for measurements. CDFW would like to understand how the GSA determined 25% of wells over five consecutive low seasons as a MT, whether this will this be further analyzed, and if there is adaptive management that is proposed. CDFW also encourages that when choosing reference wells, GDEs, ISWs, and/or areas of biological concern/interest be considered, including whether the MT is sufficient to detect deleterious impacts to these areas.	As discussed in Chapter 9, *Sustainable Management* (Section 9.3.3.3), undesirable results are based on exceedances of MT levels including how they occur, where and when. The GSAs selected 25% of wells to allow distinction of local groundwater level declines and to alert the GSAs to undesirable declines of Subbasin-wide significance. The 25% value (equivalent to 14 wells of 57) is based on consideration of the potential extent of declines due to severe and prolonged drought, climate change, reduction of imported water supply, or increased groundwater pumping, and is protective of the Subbasin as a whole. The five consecutive low seasons are based on consideration of time needed to identify, confirm, and respond to groundwater level declines in Key Wells given variable hydrology and periodic droughts. Note that groundwater levels are currently above the MTs, that GSAs will provide annual reporting and public presentation of groundwater levels at key wells, and that GSAs are planning projects to maintain levels above MTs. Adaptive management has been integral to local water management and is being continued whereby the GSAs regularly assess groundwater conditions, evaluate and apply appropriate projects and management actions, and report regularly to the public. The MTs and key wells will be evaluated further as part of ongoing adaptive management.
3	Leslie MacNair, Regional Manager	CDFW	**State Sensitive Species** The Coachella Valley Association of Governments (CVAG), a joint powers authority of elected representatives, completed a Multispecies Habitat Conservation Plan (HCP; United States Fish and Wildlife 10(a)(l)(B) incidental take permit # R8-AES) and Natural Community Conservation Plan (NCCP; Permit No. 2835-2008-001-06) in 2008 (termed herein as ‘CVMSHCP/NCCP’). The CVWD, as a Permittee of the CVMSHCP/NCCP, has incidental take for its operations and maintenance covered activities for twenty-seven (27) species within the CVMSHCP/NCCP Plan Area. Any other activities/actions that are not a covered activity of the CVMSHCP/NCCP, or is performed by a non-participant, that may take a California Endangered Species Act (CESA) listed species is prohibited, except as authorized by state law (Fish and Game Code, §§ 2080 & 2085). CDFW recommends that the GSA, or an individual water agency, seek appropriate authorization prior to implementation. This may include an incidental take permit (ITP) or a consistency determination (Fish & Game Code, §§ 2080.1 & 2081). Also, Fish and Game Code section 3503 makes it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by Fish and Game Code or any regulation made pursuant thereto. Fish and Game Code section 3503.5	The projects and management actions (PMAs) considered as “projects” under the California Environmental Quality Act (CEQA) will go through CEQA and CDFW permitting processes and receive necessary approvals. CEQA compliance will be addressed for individual projects at the time of implementation by the individual GSAs. Compliance with the Coachella Valley Multiple Species Habitat Conservation Plan (CV-MSHCP), as needed, will be addressed at that time. Additionally, the GSAs have obtained or will obtain necessary CDFW permits for any other regulated activity that are part of the Plan’s projects and management actions.

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			makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by Fish and Game Code or any regulation adopted pursuant thereto. Fish and Game Code section 3513 makes it unlawful to take or possess any migratory nongame bird except as provided by the rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703 et seq.).	
4	Leslie MacNair, Regional Manager	CDFW	**Groundwater Dependent Ecosystems Impact Analysis** Within the Indio Subbasin Alternative Plan, wells that had long-term water level data were selected to analyze groundwater conditions (elevations, flows, trends over time, vertical groundwater gradients and depth to groundwater, and regional groundwater level changes). Since groundwater elevations of the principal aquifer are averaged over the water year; the most current representative, or the 2018-2019 water year, was selected "as local groundwater levels do not exhibit strong seasonal trends" (Indio Subbasin Alternative Plan Section 4.1.1 Groundwater Elevations, Flow, and Trends). Thirty (30) of these monitoring and production wells were used to calibrate the Indio Subbasin model by looking at the water level residual (differences between observed and simulated levels) trends (Section 7.3.3.2 Observed vs. Simulated Hydrographs). CDFW examined potential suitable habitat for state sensitive riparian birds (least Bell's vireo (Vireo bellii pusillus), summer tanager (Piranga rubra), southern willow flycatcher (Empidonax traillii extimus), and yellow-breasted chat (Icteria virens)) and wetland (California black rail (Laterallus jamaicensis coturniculus), Yuma clapper rail (Rallus longirostris yumanensil)), amphibians (arroyo toad (Anaxyrus californicus)), and fish (desert pupfish (Cyprinodon macularius)) using GIS shapefiles available from the CVMSHCP/NCCP. Given that the simulated water levels are "generally very well matched with the observed groundwater trends for all shallow and deep wells across the Indio Subbasin" (Section 7.3.3.1 Simulated Groundwater Elevation Contour Maps), as well as there are not strong seasonality water fluctuations, CDFW also chose a representative calibration well from each subarea that was closest to each of the biological resource of interest. The calibrated well groundwater elevation hydrographs and the CVMSHCP/NCCP biological resources are shown in Attachment F. A brief description of each subarea is summarized below. A. West Valley/Palm Springs Subarea - This subarea showed dynamic fluctuations (i.e., over 300 feet in response to very large recharge years associated with recharge events), with large water level mounding and recovery cycles. Model-simulated levels were very closely matched with observed levels, both with respect to peak and valley magnitudes and timing. B. and C. Mid-Valley/Thousand Palms to Indian Wells Area - Observed levels at this location exhibited declines from 1997 through 2010, then were characterized by relatively stabilized levels through 2019. The model simulates these trends generally well, although the simulated levels were lower than observed in two of the wells near the City of Indio. This was speculated to be due to sources of error in the numerical simulation, underestimation of return flow recharge in local areas, or inaccuracies in other model parameters. Regardless, the model "generally captures the measured levels in this area showing declines through 2010 followed by stable trends". D. East Valley/ Thomas E. Levy Groundwater Replenishment Facility Area - Observed levels exhibited declines from 1997 through 2009, then rapidly increased through 2019 in response to initiation of the Thomas E. Levy Groundwater Replenishment Facility (TEL-GRF) operations. The model simulated trends well, with it responding to recharge operations and simulated levels and observed being well-matched. E. East Valley/Mecca, Oasis, and Salton Sea Areas - The observed levels were relatively stable between 1997 through around 2010, then increased through 2019, likely in response to source substitution and in response to initiation of TEL-GRF operations. The model simulates these trends well. For areas that have been mapped as a GDE, spectral characteristics of satellite imagery, including the Normalized Difference Vegetation Index (NDVI), can be used to illustrate how plant canopy absorbs and reflects light using the accompanying online mapping tool, GDE Pulse (The Nature Conservancy, Version 2.0: https://gde.codefornature.org/#/home). CDFW reviewed the NDVI for the Indio Subbasin from 1985 through 2018 along with the reference well hydrograph findings (Attachments G and H). Most notably, the TEL-GRF (D) and Mecca, Oasis, and Salton Sea Areas (E) in the East Valley showed a water decline (D) or stable (E) period from 1997 through 2009, with both regions having a rapid increase in water from 2009 to 2019. Conversely, the NDVI from these areas illustrated small areas where the NDVI decreased (Attachment I and J), with the primary decline being between the latter five (5) years, or from 2014-2018 (Attachments K and L). CDFW believes that analyzing the NDVI in relation to water gain/loss could be useful within the Indio Subbasin Alternative Plan and advocates for further investigation to the causes of this decrease in vegetation canopy (e.g., water stress).	Thank you for your careful review of the Alternative Plan Update and for your comments about the new GDE Pulse tool. The GDEs assessment in Appendix 4-B (page 5) considered the evaluation criteria (shallow aquifer, depth to groundwater, and known seeps/springs) recommended in The Nature Conservancy's Guidance. Any future analysis of GDEs will consider use of GDE Pulse and NVDI review. See also Response to Comment No. 1.

#	Commenter Name	Commenter Organization	Comment	Response
5	Leslie MacNair, Regional Manager	CDFW	**Groundwater Dependent Ecosystems/Interconnected Surface Waters Biological Importance Considerations** ***Springs and Associated Habitat*** Numerous sensitive plant communities are known to occur in southern California. While all these unique plant communities are important, other habitats that are often not traditionally considered "riparian" or "wetlands" need to be considered. Because Southern California GDE habitats vary widely regarding species composition, geomorphology, and hydrologic regimes, three habitat types/water features have been focused on in the Indo Subbasin: springs (with or without associated vegetation), artificial drainages, and ephemeral desert washes/aeolian desert dunes. *Springs and Associated Habitat* There are different types of springs – artesian, gravity, perennial, intermittent and seepage. Artesian springs usually occur along faults, or in areas of great topographic relief (i.e., cliffs or valleys). Groundwater pumping that causes aquifer levels to drop may result in different types of springs drying out, even if the amount of groundwater stored in the aquifer is still very large (Danielopol et al. 2003; Strayer 2006). There are also various natural and anthropogenic mechanisms that can cause groundwater declines that stress GDEs, but little quantitative information exists on the nature of plant responses to different magnitudes, rates, and durations of groundwater decline. In places where unsustainable groundwater extraction has depleted aquifers and caused springs to dry up, spring dwelling and groundwater-dependent species have gone extinct (Danielopol et al. 2003; Strayer 2006). Many water dependent state listed species rely on mountain spring fed water for their existence including, but not limited to desert pupfish, mountain yellow-legged frog (Rana muscosa), and arroyo toad. Further, many terrestrial species also depend on spring water for their survival. For example, Peninsular bighorn sheep (Ovis canadensis nelson), a state endangered species, are thought to migrate seasonally during the hot season, where they center their activity near standing water (5-year Review for Peninsular bighorn sheep, 2011). Refer to Attachment M for more details. Because these GDEs can include both precipitation and groundwater-dominated systems and may include the presence of state sensitive resources, CDFW would like to understand more regarding what was selected as a threshold for identifying springs as a 'probable GDE'. Springs may be without vegetation but still provide a valuable water source, while others may have vegetation that is atypical (i.e., Honey Mesquite) of those that are traditionally classified as 'riparian' (i.e., Cottonwood Forest). Further, although using a depth to water of less than 30 feet near stream channels is a standard threshold used as a screening tool for identifying possible phreatophyte areas, plant reactions can be highly variable, with other factors, such as soil texture and stratigraphy, availability of precipitation-derived soil moisture, physiological and morphological adaptations to water stress, and tree age; all, or in part, contributing to a plants' response to its hydrologic environment. Because springs and their associated GDEs sustain a number of important landscape functions (Cohen et al. 2016), and are globally-recognized biodiversity hotspots (Murphy et al. 2015) that support locally endemic species, focus on sustaining these areas is vital. Data regarding springs/seeps is often lacking, with smaller ones frequently being undetected or overlooked because their discharges are inconsequential to the overall water budget of the area. Hydrologic connectivity between surface water and groundwater, as well as groundwater accessibility to terrestrial vegetation, is complex and any conclusions reached should be well-supported. This complexity is especially evident if the surface water is in between, or transitional, the surface waters are hydraulically connected to the underlying aquifer by a capillary fringe. Due to the capillary fringe connection, water table elevation changes can still affect the exchange rate of surface waters. Because lowering the groundwater elevation under a streambed without a continuous saturated connection to the underlying aquifer may in some cases increase the rate of loss from the surface water body into the underlying aquifer, the potential for increased loss rates during transitional states can ultimately increase the area or flow-duration of stream reaches that may be perceived as 'disconnected.' Certain species may be more adept at taking advantage of groundwater and soil water at different times of the year (Busch and Smith 1995). Therefore, CDFW believes that more focus in identifying the water sources used by phreatophytic plants is also critical to understanding their link to, and degree of dependency upon, groundwater. For example, a study that observed groundwater dynamics and the response of Fremont cottonwoods (Populus fremontii), Gooding's willows (Salix gooddingii), and salt cedar (Tamarix ramosissima) saplings, all of which can occur within the Basin, showed that where the lowest groundwater level was observed (-1.97 meters in 1996 vs. - 0.86 meters in 1995), 92 to 100% of the native tree saplings died, whereas only 0 to 13% of the nonnative salt cedar stems were compromised. Alternatively, where the absolute water table depths were greater, but experienced less change from the previous year conditions (-2.55 meters in 1996 compared to 0.55 meters in 1995), cottonwoods and willows experienced less mortality and increased basal area. Excavations of the sapling roots suggested that root distribution was related to the groundwater history, with a decline in the water table relative to the condition under which roots developed causing plant roots to be stranded where they could not obtain sufficient moisture (Shafroth et al. 2000). CDFW stresses that focused, scientifically driven studies, should be part of the groundwater monitoring to establish sustainable management criteria that avoid undesirable results to GDEs and ISWs. Some recommendations include, but are not limited to:	We agree with California Department Fish & Wildlife (CDFW)'s description of the value of spring habitats. In the GDEs assessment included in the Alternative Plan Update, Appendix 4-B, three specific areas with springs (identified by the U.S. Geological Survey (USGS) were listed as Probable GDEs unless they were outside the basin. Another one is located within the Palm Springs area and is inside a tribal reservation now. In the assessment, we acknowledge the uncertainty associated with the water source for those springs – snowmelt, shallow underflow, fractured bedrock, etc., – given the lack of data available for those areas and the challenges associated with site access. We requested access to one of the Probable GDEs representative sites and were not granted access by the tribe. In the arid Coachella Valley environment, we note that a majority of the NCCAG polygons are groundwater recharge supportive (i.e., they facilitate infiltration), rather than groundwater dependent. The comment describes a theory related to perennial or near-perennial streams, rather than the ephemeral streams we have in Indio Subbasin. In their study on *Disconnected Surface Water and Groundwater*, Brunner, Cook, and Simmons (2011) note that "Ephemeral streams are found mostly in semi-arid and arid areas where occasional flood events are an important source of groundwater recharge. The depth to groundwater under ephemeral streams is often sufficiently deep (e.g., tens of meters) that the available surface water during a flood event usually runs out before full saturation between the river and the groundwater occurs (and therefore becomes connected). Ephemeral streams therefore are frequently disconnected even in the absence of a clogging layer." Thank you for the recommendations. SGMA regulations require the use of the "best available" information and science (California Code of Regulations §355.4(b)(1)). We look forward to seeing what new tools DWR releases to support GDEs analysis and we will explore other ways to utilize available information in future analysis. See also Response to Comment No. 1.

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			• Studying the fitness and various water sources to plants (relationships between incremental growth, branch growth, productivity, and canopy condition and hydrologic variables) to determine water sources and needs for phreatophytic vegetation. • Understanding the relationship between plant age or developmental stage, root morphology, and water acquisition since vulnerability to water stress may decline as a function of age or developmental stage for many species. • Using stable isotopes that can trace the water source to understand how many years it takes for woody plant seedlings or saplings to develop roots deep enough to acquire groundwater, or to determine the proportion of rain-recharged soil water that typical phreatophytes utilize (Stromberg and Patten 1991). CDFW also contends that the Indio Subbasin Alternative Plan should include field measurements to determine water sources and needs for phreatophytic vegetation (Stromberg and Patten 1991, 1996; Lite and Stromberg 2005). Good plant morphological measurements can be useful in assessing riparian and wetland health and tracking changes in condition through time. For example, it is also expected that variation in the sources of water used by different tree species has important ramifications for riparian forest water balances. A study of tree transpiration water derived from the unsaturated soil zone and groundwater in a riparian forest was quantified for Fremont cottonwoods, Gooding's willows, and velvet mesquite (Prosopis velutina) across a gradient of groundwater depth and streamflow regime (San Pedro River, AZ). The proportion of tree transpiration derived from different potential sources was determined using oxygen and hydrogen stable isotope analysis in conjunction with two- and three-compartment linear mixing models. Comparisons of tree xylem water with that of potential water sources indicated that Gooding's willows did not take up water in the upper soil layers during the summer rainy period, but instead used only groundwater, even at an ephemeral stream site where depth to groundwater exceeded 4 meters. Conversely, Fremont cottonwoods, a dominant 'phreatophyte' in semi-arid riparian ecosystems, also used mainly groundwater, but at the ephemeral stream site during the summer rainy season, measurements of transpiration flux combined with stable isotope data revealed that a greater quantity of water was taken from upper soil layers compared to the perennial stream site. Many vegetation attributes are supported by, and respond directly to, water availability. Both plant characteristics, as well as population and community attributes can assist in assessing the health and sensitivity to altered water availability so that informed decisions on proposed water extraction, groundwater pumping, and prescriptive and managed hydrologic regimes can be made. Some recommendations include, but are not limited to, the following: • Study specific parameters at certain locations, including vegetation volume, canopy height, woody plant stem and root density and woody plant basal area/ analysis of stomatal conductance and/or xylem pressure. • Monitor wetted depth (e.g., piezometers with data loggers) within riparian corridors at various points from the main channel (e.g., furthest edge from main flowline). • Perform aerial photographic analysis (e.g., small-unmanned aircraft systems) of canopy, vegetation diversity, distribution, and general riparian conditions including overall health at set locations of interest and control locations in spring and fall. • Document lateral/spatial extent of GDEs over time. • Perform field monitoring at established permanent grids and control sites that includes plant characteristics (water status, transpiration, rooting depth, and incremental growth) and population and community attributes (fitness, vulnerability to pathogens and herbivores, fecundity, competitive ability and productivity, population structure, and community composition and richness).	
6	Leslie MacNair, Regional Manager	CDFW	***Artificial Drainages – Irrigation Canals*** CDFW recognizes that groundwater levels in the Indio Subbasin East Valley have recovered as irrigation from the Colorado River water has been relied upon for farming rather than groundwater. Conversely, it stands to reason that as future urbanization and drought conditions increase, groundwater may be needed. The Indio Subbasin Alternative Plan (Section 4.1.2 Vertical Groundwater Gradients (Artesian Conditions)) identifies artesian conditions in the Eastern Valley as: "Historically, eastern portions of the Indio Subbasin experienced artesian conditions with sufficient pressure to cause groundwater levels in wells to rise above the ground surface; such artesian-flowing wells attracted early settlers to farm in this area. Artesian conditions declined in the late 1930s as a result of increased local groundwater pumping. The completion of the Coachella Canal by the United States Bureau of Reclamation (USBR) in 1949 brought Colorado River water to the eastern Coachella Valley for agricultural irrigation purposes. Artesian conditions returned in the early 1960s	The demand forecast in the Alternative Plan Update (Chapter 5, *Demand Forecast*) considers projected future urbanization, including conversion of agricultural lands to urban land uses, and associated water demands. The supply analysis (Chapter 6, *Water Supply* and Chapter 7, *Numerical Model and Plan Scenarios*) considers future climate conditions under historical and climate change conditions. Groundwater is one component of the GSA's supply portfolio. Due to recovering groundwater levels over the last decade, artesian conditions have returned to the East Valley. These conditions do

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			through the 1980s, as imported Colorado River water was substituted for groundwater production. Beginning in the late 1980s, groundwater use increased again, resulting in declining water levels and loss of artesian conditions. Groundwater water management programs (including groundwater replenishment, source substitution, and water conservation) are restoring local groundwater levels, and artesian conditions have recurred in the eastern Indio Subbasin. Benefits associated with artesian conditions include reduced groundwater pumping costs and water quality protection of the deeper, confined production zone aquifers". Because the depth to groundwater provides a general indication of locations where gaining streams and/or GDEs may be present, if the wells are near larger tributaries/ water bodies (i.e., Whitewater River, Salton Sea), water supply wells, which typically screen deep in the aquifer, should be noted and the groundwater elevation (potentiometric head) difference at the depth of the well screen and the water table (upper surface of the saturated zone) be recorded and tracked. Also, because recharge occurs at the land surface and pumping occurs at depth, the water level information can potentially underestimate the locations where the water table is shallow enough to support phreatophytic vegetation. Further, water extraction from wells could extend into a nearby water source (stream, canal, pond, or lake), causing it to become dry. Desert pupfish are the only native fish species in the Salton Sea, and they can be found not only in natural creeks, but in shoreline pools, a few artificial refuge ponds, and agricultural drains in the Eastern Valley. CDFW would like clarification on what measures are proposed within the Indio Subbasin to identify, address, and manage (avoid and/or monitor any wells within 0.25 miles of known desert pupfish occupied or suitable areas) any well extraction effects (induced recharge, cone of depression/influence) on irrigation or sensitive areas that have, or could contain, the desert pupfish.	benefit the deeper, confined production zone aquifer by exporting salts from the shallower aquifer through the agricultural drains. We agree with CDFW that there are multiple sources of inflow to shallow groundwater and surface channels in the East Valley. Note that surface water flows in Coachella Valley Stormwater Channel (CVSC) only below the first discharging wastewater treatment plant (WWTP). The CVSC flows are from WWTPs and agricultural drains. The agricultural drains are supported by agricultural return flows and intercept shallow groundwater collected into the tile drain system. A Drain Flow Study, described in Chapter 12, *Plan Evaluation and Implementation*, is planned to better understand the relationships between groundwater levels in the various aquifers, current and historical crop water application, and flows and salt export through the drain system. CVWD is working with CDFW and Coachella Valley Conservation Committee (CVCC) on an evaluation of desert pupfish associated with the Coachella Valley Multiple Species Habitat Conservation Plan (CV-MSHCP).
7	Leslie MacNair, Regional Manager	CDFW	***Ephemeral Desert Washes/Aeolian Desert Dunes*** CDFW is uncertain that the Indio Subbasin Alternative Plan is relying on the common assumption that in ephemeral streams where an unsaturated zone exists beneath a stream, that the interaction between surface water and groundwater is unidirectional and therefore, does not contribute significantly to transmission losses. However, a recent study (Quichimbo 2020) has illustrated that bi-directional stream–aquifer hydraulic interactions in arid ephemeral streams may be greater than previously assumed and "groundwater and surface water should be considered as connected systems for water resource management unless there is clear evidence to the contrary". Aeolian processes support a variety of flora and fauna (i.e., Coachella fringe-toed lizard (Uma inornate) and Coachella Valley milk vetch (Astragalus lentiginosus var. coachellae)) that are specially adapted to blow sand deposits within harsh desert environments. The sediment-delivery system that creates these active sand dunes consists of fluvial depositional areas, with sediment being delivered during infrequent large winter storm events within larger drainages (e.g., Whitewater – San Gorgonio Rivers and Mission Creek – Morongo Wash) originating in the local surrounding mountains, or in smaller ephemeral drainages during intense summer thunderstorms. The particle-size distribution of sediments transported by these ephemeral streams varies depending on the transport process, with most sediment transported by streamflow ranging in size from sand to small gravel. Previous studies of sediment supply have evaluated the long-term sand budget in the northern Coachella Valley and how it might change given modifications to the major watercourses that provide sand to the aeolian system (USGS, 2002). While quantifying sand transport rates has been attempted with various results, CDFW is concerned that water management practices that impact not only large washes/rivers (e.g., retention basins, levees), but also smaller tributaries, could reduce the sand supply, potentially stabilizing the dunes and degrading habitat. Therefore, CDFW strongly recommends that the Indio Subbasin Alternative Plan include an analysis of the sediment aeolian processes (e.g., entrainment, sediment yield, sediment-transport modeling, etc.) where sand dunes could be impacted (Attachment N).	We appreciate the complexity of groundwater-surface water interactions, which vary dynamically in vertical direction and magnitude both spatially and through time. The cited study, which involved a series of numerical model experiments using idealized two-dimensional channel-transects, contributes to the extensive science on arid area hydrology. However, this experimental study is not sufficient to effectively consider ephemeral streams as connected systems for water resources management in the Coachella Valley. The Indio Subbasin Alternative Plan Update presents the projects and management actions (PMAs) that are directed toward groundwater sustainability. PMAs considered "projects" under the California Environmental Quality Act (CEQA) will go through CEQA and CDFW permitting processes and receive necessary approvals. CEQA compliance, including potential impacts to sediment aeolian processes, will be addressed for individual projects at the time of implementation by the individual GSAs.
8	Leslie MacNair, Regional Manager	CDFW	**Conserved Lands** According to the CVMSHCP/NCCP (Section 1.4.4 Coachella Valley Multiple Species Habitat Conservation Plan): "The Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) (CVAG, 2016) is a multiagency conservation plan for the entire Coachella Valley and surrounding mountains to address State and Federal Endangered Species Act (ESA) compliance in the region. The CVMSHCP, last amended in 2016, defines a shared regional vision for balanced growth to enhance and maintain biological diversity and ecosystem processes while also fostering economic growth. The CVMSHCP protects 240,000 acres of open space and 27 species; enhances infrastructure without environmental conflicts; offers opportunities for recreation, tourism, and job creation; and ensures the survival of endangered species (CVAG, 2016). The CVMSHCP was considered in the development of this Alternative Plan Update, with emphasis in the groundwater dependent ecosystem analysis (emphasis added)".	The GDEs assessment included in the Alternative Plan Update, Appendix 4-B, considered the Coachella Valley Multiple Species Habitat Conservation Plan (CV-MSHCP) conservation areas, including those owned by CDFW, in its analysis. These areas were evaluated and there are no anticipated impacts to these reserves from implementation of the Alternative Plan Update.

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			CDFW has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants and habitat necessary for biologically sustainable populations of those species under the CESA (California Fish and Game Code §§ 2050 et seq.), the California Native Plant Protection Act (California Fish and Game Code §§ 1900 et seq.), the California Natural Community Conservation Planning Act ("NCCP Act") (California Fish and Game Code §§ 2800 et seq.) and other relevant state laws. CDFW has worked with the Permittees of the CVMSHCP/NCCP to apply principles of conservation biology that capture the reserve design tenets described in the NCCP General Process Guidelines and NCCP Act (CDFG 1998). These reserve design tenets provided a framework for the conservation planning process and include: • conserve focus species and their Habitats throughout the Plan Area; • conserve large habitat blocks; • conserve habitat diversity; • keep reserves contiguous and connected; and • protect reserves from encroachment and invasion by non-native species. Although the Indio Subbasin Alternative Plan does consider the CVMSHCP/NCCP, CDFW advises that the various land use management plans governing state and federal lands, species management plans approved by state and/or federal agencies, and habitat conservation plans in adjoining or overlapping areas also be considered. More specifically, CDFW manages approximately 27,700 acres of land within the Indio Subbasin and CVMSHCP/NCCP Reserve System for the conservation of state sensitive resources. Using the CVMSHCP/NCCP GIS mapping tool, the conserved lands in relation to the Indio Subbasin are included in Attachment O. The Santa Rosa Wildlife Area is approximately 101,500 acres with very steep terrain habitat for the largest herd of peninsular bighorn sheep. The Magnesia Spring Ecological Reserve, an approximately 3,800-acre property, and the Carrizo Canyon Ecological Reserve, approximately 1,000-acre, also have similar terrain that includes several narrow canyons. Both properties were acquired and designated an ecological reserve by the Fish and Game Commission to preserve a historic water supply and to maintain and improve habitat for this species. Similarly, the 485-acre Oasis Spring Ecological Reserve, which is located along the Salton Sea below the historical high- water mark, was designated as an ecological reserve by the Fish and Game Commission to provide habitat for the desert pupfish. CDFW also manages lands in the Coachella Valley Fringe Toed Lizard Preserve to protect aeolian processes that support a variety of flora and fauna (i.e., Coachella fringe-toed lizard (Uma inornate) and Coachella Valley milk vetch (Astragalus lentiginosus var. coachellae)) that are specially adapted to blow sand deposits within harsh desert environments. CDFW recommends that the Indio Subbasin Alternative Plan focus on impacts to conserved lands to ensure that they function and provide benefits as intended in perpetuity.	
9	Leslie MacNair, Regional Manager	CDFW	**Data Gaps: Geological** The Indio Subbasin Alternative Plan includes a numerical groundwater flow model and associated water budget with updated inflow and outflow data through 2019 that were used to assess groundwater conditions and future sustainability within the Plan Area. Other improvements include: (1) updated Salton Sea elevations; (2) more accurate land surface elevations and Salton Sea bathymetry; (3) more details regarding the Garnet Hill subarea; and (4) updated subsurface inflow boundary conditions from adjacent subbasins. The improved model was applied to simulate transient three-dimensional groundwater flow within and between the shallow and deep aquifer zones, with a contiguous 50-mile cross section oriented along the central longitudinal axis of the Indio Subbasin (labeled A-A', A'-A'', and A''- A''') starting in the San Gorgonio Pass Subbasin in the northwest and ending at the northern shore of the Salton Sea in the southeast. Cross sections B-B', C-C', D-D', and E-E' (Indio Subbasin Alternative Plan Figures 3-10 through 3-13) were constructed perpendicular to the main axis of the Indio Subbasin. Collectively, these cross sections incorporate hydrogeologic information from the five main subareas of the Indio Subbasin, with cross section B-B' crossing the Palm Springs Subarea in the south and the Garnet Hill Subarea and the Mission Creek Subbasin in the north, and cross section E-E' intersecting the Oasis and Thousand Palms Subareas of the Indio Subbasin in the southwest and the Desert Hot Springs Subbasins in the northeast (Indio Subbasin Alternative Plan Section 3.5 Hydrogeologic Cross Sections). Refer to Attachment P for more details. CDFW found this technique useful in providing information for the entire Subbasin (e.g., greatest depths to water were observed in the northwestern portion of the subbasin that was generally greater than 200 feet, depths to groundwater generally decreased to about 100 to 250 feet in the mid-subbasin area and then to zero or above the ground surface in artesian wells near the Salton Sea), but is unclear whether more specific details can be gained regarding the Salton Sea. Cross sections A'' – A''' and E-E' just north of the Salton Sea show the boundary between the upper and lower aquifers with shallow depths to water (Section 3.5.2 Perpendicular Cross Sections). In addition to relatively shallow or artesian conditions, this subarea	Update of the numerical groundwater flow model was completed according to the recommendations in DWR's Modeling Best Management Practices (BMPs) guidebook (available at: https://water.ca.gov/Programs/Groundwater-Management/SGMA-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents). Model documentation is provided in Appendix 1-A, within the context that the model has been used since the 1990s and updated multiple times as part of ongoing Subbasin management. The model code is public domain open source MODFLOW, one of the most widely used codes in the United States. The model is based on field data, consistent with the hydrogeological conceptual model (HCM) and the water budget. The modeling tool is demonstrably well calibrated and applicable to the scenarios as documented in Chapter 7, *Numerical Model and Plan Scenarios*. The Alternative Plan Update has not identified any data gaps relative to geology, monitoring, or modeling that significantly affect the understanding of the basin setting or limit the ability to assess whether a basin is being sustainably managed. Nonetheless, the

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			(Thermal) is characterized by a shallow semi-perched aquifer (Indio Subbasin Alternative Plan Section 4.1.3 Groundwater Occurrence (Depth to Water)), as shown in Attachment Q. The Indio Subbasin Alternate Plan (Figure 3-2 Groundwater Subareas of the Indio Subbasin and Section 3.5.2 Perpendicular Cross Sections) concludes that the Barton Canyon subareas, which is located west of the northern shore of the Salton Sea, are "semi-water bearing and generally lack subsurface information". CDFW concurs with this observation given the lack of well information in this region. For example, with over 345 monitoring wells (52 CASGEM and 293 other) in the Plan Area, roughly only 12 appear to be within close proximity to this area (Please see Attachment R: Figure 2-11 Groundwater Elevation Monitoring Well Locations). CVWD is a founding member of the Salton Sea Authority, with two members currently serving on its board. CDFW strongly recommends the GSA continue to address the concerns of the Salton Sea and its ecological value by closely monitoring and evaluating the elevational sea level changes, as well as the receding/increasing shoreline vegetation/water and the effects to the adjacent habitat along the northwestern shore of the Salton Sea. Finally, major changes to the modeling included correcting the initial 1997 conditions in the Garnet Hill Subarea. In doing this, the effect of the Garnet Hill Fault was seen in the abrupt change in groundwater levels across the fault. Subsurface inflow across the Banning and San Andreas faults were also discussed from the Mission Creek and Desert Hot Springs Subbasins into the Indio Subbasin (Section 7.2.5.1 Subsurface Inflows). The Indio Subbasin Alternative Plan did express the need to conduct future analyses of the San Gorgonio and Mission Creek Subbasin boundaries to better estimate subsurface inflows from adjacent Subbasins. To update and improve the numerical model, the study will consider subsurface flow at faults and to the Garnet Hill Subarea, as well as adjacent groundwater Subbasins and their numerical models through coordination with other GSAs (Section 12.2.8.3 Subsurface Flow Study). CDFW suggests that if the available groundwater monitoring wells are not already appropriately located or constructed for the purpose of performing detailed high-quality evaluations of the effects of faults throughout the Subbasin faults (e.g., San Gorgonio Pass, San Jacinto Fault) under a variety of groundwater conditions, that this occurs and is incorporated into the updated analysis.	GSAs continue to improve monitoring and analyze information. Chapter 12, *Plan Evaluation and Implementation* (Section 12.2.8) includes multiple studies that have been prioritized by the GSAs to refine Subbasin understanding: • Drain Flow Study • Subsidence Study • Subsurface Flow Study Data from these studies, as well as groundwater level and quality measurements collected as part of this Plan implementation, may be useful for agencies that are leading the effort to implement the Salton Sea Management Plan. Additionally, through both this Alternative Plan Update and the Coachella Valley Salt and Nutrient Management Plan (CV-SNMP), the GSAs will fill 23 monitoring gaps that were identified (including six wells in the perched aquifer system, with four located along the Salton Sea) in the CV-SNMP Groundwater Monitoring Program Workplan. The GSAs goal is to continue improving Subbasin information as needed to ensure sustainable groundwater management. The Garnet Hill fault (among others) has long been recognized as a flow barrier. The model uses the MODFLOW HFB Package to simulate the effects of the fault on flow between the subareas. As described in Chapter 7, *Numerical Model and Plan Scenarios*, changes were made to initial 1997 conditions in Garnet Hill and historical pumping inputs were revised with improved pumping records. While this represents a local improvement in a boundary area, it is not a major change to the model which was, and is, well calibrated. See also Response to Comment No. 1.
10	Leslie MacNair, Regional Manager	CDFW	**Data Gaps: Sub/Surface Water** The Indio Subbasin Alternative Plan acknowledges that uncertainty exists in the actual amounts of inflow at the Indio Subbasin eastern boundary, with the subsurface outflow at the San Gorgonio Pass (SGP) Subbasin representing one of the largest unknowns in the water budget and groundwater modeling. CDFW appreciates that the Indio Subbasin GSA plans to reconcile the differences and refine outflow/inflow as a part of the next 5-Year Alternative Plan update to include: (1) a Sensitivity and Uncertainty Analysis using the SGP Subbasin MODFLOW model; (2) review upcoming data from three nested monitoring well clusters near the Subbasin boundary, followed by evaluation and model calibration to recent (and future) water level trends; and (3) include sensitivity simulations in the model using a range of subsurface inflows. CDFW also recommends that the monitoring network for groundwater-surface water interaction be enhanced to not only incorporate the use of existing stream gaging and groundwater level monitoring networks, but also include monitoring along ephemeral and intermittent water bodies (e.g., streams/washes, springs, seeps). Particularly, monitoring should entail a rigorous assessment that encompasses baseline data, control area(s), and/or similar reference watersheds (e.g., elevation, faulting, geomorphology, size, etc.) of water bodies and/or GDEs/ISWs that have high biological value. Some suggestions include, but are not limited to, the following: • Determining the safe yield (water balance) in the sub-watershed containing the extraction points with inputs (precipitation gaging, groundwater inflow, and infiltration) and outputs (evapotranspiration gaging, overland flow, surface water outflow, and groundwater outflow including extraction), as well as a gridded surface water-groundwater model. Note: Building and calibrating a fractured mountain-front hydrogeologic model is a longer-term goal given the lack of baseline data and the multiple parameters needed.	The Alternative Plan Update has not identified any data gaps relative to subsurface or surface water that significantly affect the understanding of the basin setting or limit the ability to assess whether a basin is being sustainably managed. Data will continue to be collected and input into the numerical model over time. Chapter 12, *Plan Evaluation and Implementation* (Section 12.2.2) includes six components of the GSAs monitoring program: • groundwater levels • climate, streamflow, and drain flow • groundwater production • subsidence • water quality • seawater intrusion The numerical model used to simulate groundwater conditions in the Alternative Plan Update uses best available data to develop inflows and parameters. The inflow from neighboring basins was

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			• Performing stable isotope analysis through water sampling to measure travel time through the system to assess potential differences in recharge elevation and groundwater flow paths. Also, the Indio Subbasin GSA should be aware that Fish and Game Code section 1602 requires an entity to notify CDFW prior to commencing any activity that may do one or more of the following: (1) Substantially divert or obstruct the natural flow of any river, stream or lake; (2) Substantially change or use any material from the bed, channel or bank of any river, stream, or lake; or (3) Deposit debris, waste or other materials that could pass into any river, stream or lake. This includes "any river, stream or lake" that are intermittent (i.e., those that are dry for periods of time) or perennial (i.e., those that flow year-round) with surface, or subsurface, flow.	estimated using previous numerical models, neighboring models, water level data, and aquifer parameters. The subsurface flow across the San Gorgonio Pass (SGP) boundary may represent one of the largest unknowns in the SGP Basin water budget and groundwater modeling (because the SGP basin is relatively small) but it does not represent a large unknown for the Indio Subbasin. For Indio, the subsurface inflow is relatively small compared to other inputs and it remains at similar volumes in all future scenarios. New monitoring wells in the area will provide additional data to further calibrate the model and inflow from neighboring basins. Groundwater-surface water interaction was also developed using available watershed data including local watershed precipitation, recharge/runoff relationships, evapotranspiration (both measured and estimated), and measured streamflow. Mountain front recharge was estimated annually by watershed and runoff routed through the model domain depending on surface water flow conditions. The methodology is consistent with previous water management plans and utilizes the available data to greatest extent possible. SGMA requires an examination of the "sustainable yield" of the Subbasin and water balance, but not the "safe yield" of the whole surface watershed (California Code of Regulations §354.18(b)(7)). The Indio Subbasin water budget, as modeled under several different scenarios in Chapter 7, *Numerical Model and Plan Scenarios*, is primarily dominated by imported water recharge and return flows. As such, the water budget is a more appropriate tool for determining sustainability in this Subbasin.
11	Leslie MacNair, Regional Manager	CDFW	In conclusion, though the Indio Subbasin Alternative Plan does address certain species and their habitat as identified in the CVMSHCP/NCCP, it does not comply with all aspects of SGMA statutes and regulations, and CDFW deems it insufficient in its consideration of fish and wildlife beneficial uses and users of groundwater and interconnected surface waters. CDFW recommends that the GSA address the above comments for the following reasons derived from regulatory criteria for GSP/Alternative Plan evaluation: 1. The assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones are not reasonable and/or not supported by the best available information and best available science (23 CCR § 355.4(b)(1)). (See Comments in Sections #1 – 6) 2. It does not identify reasonable measures and schedules to eliminate data gaps. (23 CCR § 355.4(b)(2)) (See Comments in Section #6) 3. The sustainable management criteria and projects and management actions are not commensurate with the level of understanding of the basin setting, based on the level of uncertainty. (23 CCR § 355.4(b)(3)) (See Comments in Sections #1-6) 4. The interests of the beneficial uses and users of groundwater in the basin, and the land uses and property interests potentially affected by the use of groundwater in the basin, have not been considered. (23 CCR § 355.4(b)(4)) (See Comments in Section # 5)	The Alternative Plan was approved by DWR in 2019 and this Alternative Plan Update addresses DWR's specific recommendations. Please see Response to Comments No. 1-10 above.
12	Nataly Escobedo Garcia, Policy Coordinator	Leadership Counsel for Justice and Accountability	**Transparency and Brown Act in the Indio Subbasin and Coachella Valley Water District GSA** Transparency is a critical function of public agencies, particularly those engaged in managing such a critical resource as water. Unfortunately, the Indio subbasin agencies have consistently failed to hold meetings or make decisions in a transparent and accessible way. Furthermore, we are alarmed to note ongoing violations of the Brown Act. We have expressed these concerns to agency staff and have noted no change. Some of the agencies' barriers	All GSA decisions related to SGMA have been and will continue to be conducted at public meetings subject to the Brown Act. For example, following is a list of publicly noticed meetings where SGMA has been addressed in the last two years:

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	Sarah Spinuzzi, Senior Staff Attorney	Coachella Valley Waterkeeper	to accessibility and transparency occurred before the COVID-19 epidemic, and some have arisen during the epidemic. We urge you to make the suggested changes below so that ongoing decisions about critical water resources are made in a transparent and accessible way. *All SGMA-related decisions must be made at public meetings of the GSA* The Brown Act requires that legislative agencies such as the Indio Subbasin Groundwater Sustainability Agencies (GSAs) discuss and decide upon subject matter within their jurisdiction at public meetings only.1 The Indio Subbasin GSAs have begun to conduct workshops around the Alternative Plan Update to be submitted next year. However, during this process, to the best of our knowledge, CVWD GSA has not held any board meetings in which it has publicly discussed or taken action related to the Draft Plan Update. We know that the individual GSAs within the Indio subbasin are each making decisions about the Alternative Plan Update, yet no GSA board meetings have been held where such decisions are discussed and available for public comment.	• December 17, 2019 – DWA Board approval for Sustainable Groundwater Management Grant Program application • March 3, 2020 – CVWD Board Update on Alternative Plan Update and Annual Report • March 9, 2021 – CVWD Board Update on Alternative Plan Update and Annual Report • August 3, 2021 – DWA Board Update on Alternative Plan Update • August 3, 2021 – CVWD Board Study Session on Alternative Plan Update • October 26, 2021 – CVWD Board approval to submit Technical Support Services application for monitoring wells • December 7, 2021 – DWA Board to consider Plan adoption • December 7, 2021 – CVWD Board to consider Plan adoption • December 8, 2021 – CWA Board to consider Plan adoption • December 15, 2021 – IWA Board to consider Plan adoption
13	Nataly Escobedo Garcia, Policy Coordinator Sarah Spinuzzi, Senior Staff Attorney	Leadership Counsel for Justice and Accountability Coachella Valley Waterkeeper	**Transparency and Brown Act in the Indio Subbasin and Coachella Valley Water District GSA** *Public meetings of the GSA must be noticed effectively* As we have previously expressed, the CVWD GSA does not publicly notice and agendize its GSA meetings. The Brown Act states that "[a]t least 72 hours before a regular meeting, the legislative body of the local agency...shall post an agenda containing a brief general description of each item of business to be transacted or discussed at the meeting, including items to be discussed in closed session." For this reason, we do not believe that current meeting structures are in compliance with the Brown Act. Coachella Valley Water District, Desert Water Agency, Coachella Water Authority, and Indio Water Authority may be making SGMA-related decisions at their separately noticed board meetings. However, it is important that decisions regarding SGMA implementation be separately noticed as GSA board meetings. We saw this issue arise for several GSAs in the San Joaquin Valley where existing agencies assumed the responsibilities of GSAs and began to make SGMA-related decisions at their regular board meetings. GSAs in the San Joaquin Valley resolved this issue in several different ways. For example, the Westlands GSA continues to include SGMA as an item on its regular Westlands Water District board meeting agenda, but maintains a list of interested parties for SGMA purposes and sends a separate notice to that email list, informing them about the SGMA agenda item at the upcoming Westlands board meeting. The Madera County GSA follows a similar method, separately noticing their list of SGMA interested parties before any Madera County Board of Supervisors meetings at which decisions related to SGMA are to be made. The Central Kings GSA, also the board of Consolidated Irrigation District, separated its GSA meetings from its Consolidated Irrigation District meetings, separately noticing and agendizing both and holding them back to back. We encourage the CVWD GSA to hold separate GSA and CVWD meetings, or state a specific time for the SGMA items at their regular board meetings, and separately agendize and notice the SGMA items, so that stakeholders are able to plan their time and participate in the relevant moment. Many residents are only able to take specific hours off of work, and need to be able to plan their days accordingly. Additionally, GSAs must provide a complete description of the items to be discussed, for example “Discussion/Decision Regarding Minimum Thresholds for Groundwater Levels,” rather than a general “SGMA update,” so that stakeholders may come prepared knowing what topic will be discussed. Furthermore, on the Indio Subbasin website it is stated that there is a Management Committee composed of its four member GSAs that is leading the Indio Subbasin Alternative Plan update. Because this is a meeting of agency members deciding on matters within their SGMA jurisdiction, any meetings this committee holds must be made public according to the Brown Act. It is important for the public to be able to give feedback and engage at every point of the plan update process. To the point in the above section, public meetings are critical to agency transparency and therefore agency decisions must be made in a public meeting only.. Based on this information, our recommendations on ways to ensure accessible and transparent public GSA meetings are as follows:	All GSA Board of Directors meetings are open to the public and follow Brown Act requirements by their respective agencies (CVWD, CWA, DWA, and IWA). All public workshops held to engage stakeholders in the Alternative Plan Update planning effort were noticed approximately 30 days in advance with an email announcement in English and Spanish, followed by a reminder and circulation of the agenda 72-hours in advance in English and Spanish. All 72-hour announcements contain the website link and remind stakeholders that agendas and presentations are posted to the website and available for review. Workshop agendas include specific topical areas that will be discussed, including an agenda item titled “public comments”. While the public workshops are not subject to the Brown Act, the GSAs followed noticing practices that enhance transparency and encourage stakeholder engagement. Thank you for your suggestion to notify stakeholders when SGMA topics are addressed in GSA Board meetings. As described in Response to Comment No. 12, all GSA decisions related to SGMA have been and will continue to be conducted at public meetings subject to the Brown Act. However, as water agencies guided by the Alternative Plan Update, nearly all of the GSA Board meetings will address items related to or included in the Plan Update. For example, award of design or construction contracts for the proposed non-potable connections listed in *Chapter 11: Projects and Management Actions* are, by default, part of the agencies Plan Update implementation efforts. To manage communications and workload, the GSAs will send stakeholders an announcement through the tribal and stakeholder email lists when the GSA Boards

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			• Notify the public of all hearing/meeting times, topics, and detailed information regarding participation. All translated preparatory materials and documents should be made available at the time meeting notices are posted as well. Notices should be easy to find on state or local jurisdiction websites, and disseminated at least 72 hours in advance. Notices must clearly show how public comments will be received.
			• Give ample time for the public to submit comments prior to the meeting's start time, such as via a dedicated phone number. Comments should be accepted starting from the time the notices are disseminated. Written or voice message comments should be allowed up until the start of the meeting, as well as live comments throughout the meeting.
			  ○ Do not limit opportunities to comment only to email and avoid implementing arbitrary word limits on email comments. Limiting comments only to email leaves room for them to remain unheard and ignored. Allow email comments to be read aloud on the record by staff during the live meeting, for transparency and consideration by the full board/commission.
			  ○ Allow the public to leave voice message comments, which can be limited to 3 minutes, and played during the comment period of the meeting. Ensure that these messages, as well as the emails, can be received in multiple languages and interpreted as needed.
			• During the meeting, provide multiple options for teleconferencing, with two-way communication options that allows either computer-users or phone-users to engage and provide public comment. Webcasting does not constitute a public meeting, as it does not provide the opportunity for public comment and dialogue between the agency and constituents.
			  ○ Each teleconferencing medium will offer benefits and limitations, ranging from professional options such as Zoom, GoToMeeting, and WebEx, as well as wide-reaching mediums for video streaming like YouTube and Facebook Live. For live-streamed meetings, the public should be allowed to comment in real time, through a combination of phone and video, chat boxes, and/or email.
			  ○ Ensure that there is time for public comment after each agenda item during the meeting, and allow sufficient time for live comments to be submitted either electronically or via telephone.
			• For members of the public that may not have access to the internet or a computer, or who are unable to use video applications, consistently provide an adequate telephone option–available in multiple languages–and ensure that comments can be made via phone.
				addresses SGMA-specific items, such as Plan adoption, future Plan updates, and presentation of the Annual Reports.
				There is no Management Committee in the Indio Subbasin. While the staffs of the four GSA agencies coordinate on data sharing, analysis, and reporting, there is no Management Committee. The website text was in error and has been corrected.
				We are happy to report that the Indio Subbasin GSAs implemented a majority of your recommendations during the planning process. Our public workshop presentations, available starting 72-hours prior to each workshop, contain an email address for submittal of comments. No word limit or deadline was issued, and comments were accepted at any time. For each public workshop, a Spanish interpreter and separate phone were made available for any interested stakeholders. This Spanish translation line was advertised in email announcements and announced at the beginning of each workshop verbally and in the "Chat". Our public workshops were held via the GoToMeeting platform, which allowed stakeholders to access online and via phone line. In both cases, communication was two-way and stakeholders could either type questions and comments into the Chat or unmute and ask questions and comments verbally. Stakeholders did comment at each public workshop – their input is summarized in the meeting notes posted on the website. Stakeholder input was used to refine the climate change assumptions used for local Whitewater River watershed hydrology and all sources of imported water (see Section 7.5.1 in Chapter 7, *Numerical Model and Plan Scenarios*).

14	Nataly Escobedo Garcia, Policy Coordinator Sarah Spinuzzi, Senior Staff Attorney	Leadership Counsel for Justice and Accountability Coachella Valley Waterkeeper	**Insufficient Community Engagement and Outreach** SGMA requires that a GSA "shall consider the interests of all beneficial uses and users of groundwater," which expressly includes "[h]olders of overlying rights" and "[d]isadvantaged communities, including, but not limited to, those served by private domestic wells or small community water systems." The emergency regulations similarly require that a Draft GSP summarize and identify "opportunities for public engagement and a discussion of how public input and response will be used." The GSA thus must engage "diverse social, cultural, and economic elements of the population within the basin." We acknowledge that the COVID-19 pandemic impacted everyone's ability to engage in person with communities and we appreciate the virtual workshops that were held by the CVWD GSA in-lue of in-person meetings. However, these workshops were all held during business hours, which are not accessible to many of the communities we work with. Additionally, CVWD GSA actively points to their Disadvantaged Communities Infrastructure Committee Meetings as a space for community engagement. These meetings are not open to the public and are held at hours inaccessible to many of the residents we work with, and were not held for an entire year, between February 2020 until January 2021. To address concerns over public engagement, transparency, and inclusivity, the GSAs must meaningfully consult with all beneficial user groups to shape policies that reflect the priorities of all beneficial user groups in the GSA area. Then recirculate a new Draft GSP for the public to review.	The GSAs led all stakeholder outreach and communications in accordance with a Communications Plan that was developed at program onset and considered and incorporated all comments received to the extent possible given COVID-19 restrictions (see Appendix 1-B). The GSAs conducted an extensive outreach effort to ensure that all beneficial user groups were engaged in the development of the *Alternative Plan Update.* The five local tribal governments in Indio Subbasin were engaged through a SGMA Tribal Workgroup coordinated by the GSAs. Stakeholders with interest in water management—including agency representatives, municipalities, agricultural representatives, golf course industry representatives, Homeowners Associations, other large irrigators, environmental justice groups, and other non-governmental organizations—are a primary audience for the *Alternative Plan Update*. The general public was engaged throughout the planning process to share information about the Indio Subbasin and water management decisions and solicit input. Stakeholders were encouraged to subscribe to the stakeholder email list to receive email updates and announcements. Public workshop announcements, agendas, and

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				materials were posted on the website in advance of each meeting. To encourage stakeholder involvement in the planning process, the GSAs also provided outreach documents, including the program website and all workshop announcements, in both English and Spanish to accommodate the primary languages of many community members. The adopted Alternative Plan Update must be submitted to DWR by January 1, 2022.
15	Nataly Escobedo Garcia, Policy Coordinator Sarah Spinuzzi, Senior Staff Attorney	Leadership Counsel for Justice and Accountability Coachella Valley Waterkeeper	**The Water Budget is Inadequate** Under SGMA, the "[c]urrent water budget information shall quantify current inflows and outflows for the basin using the most recent hydrology, water supply, water demand, and land use information." Based on our review, the Draft Plan Update's Water Budget is incomplete, as it has failed to include the consolidation of unpermitted parks to their water budget. We are pleased to see that the ECV Water Supply Master Plan was incorporated into the water budget. However, this plan only included permitted mobile home parks. The ECV has very few permitted parks in comparison to the nearly 500 unpermitted parks. Excluding these parks from consolidation planning, massively under-estimates the amount of water needed to address drinking water needs in the ECV. The water budget is central to establishing effective policies for sustainable groundwater management in the GSA area, as such the drinking water needs of these groups must be incorporated into the water budget. Before it can submit an adequate Alternative Plan, the CVWD GSA must integrate data on groundwater use in unincorporated parks into water budget calculations in order to include drinking water needs of unpermitted parks in the ECV.	The water budget that is incorporated in the numerical model includes all metered pumping and additional estimated pumping (1,500 AFY) to account for domestic wells and small unmetered community water systems. In the water budget, the pumping component included demand projections for all housing units within Plan Area, including MHPs regardless of permitting status. The municipal demand projections were described in detail in *Chapter 5: Demand Projections*. We accounted for all potential water use, plus a 10% municipal demand buffer in evaluation of projected available supplies against the demand forecast (see Chapter 12*, Plan Evaluation and Implementation*).
16	Nataly Escobedo Garcia, Policy Coordinator Sarah Spinuzzi, Senior Staff Attorney	Leadership Counsel for Justice and Accountability Coachella Valley Waterkeeper	**The Monitoring Network Is Inadequate With Respect to Groundwater Quality** GSAs must monitor impacts to groundwater for drinking water beneficial users,9 including disadvantaged communities on domestic wells,10 and must avoid disparate impacts on protected groups pursuant to state law.11 The GSA's monitoring network does not comply with SGMA regulations, and fails to capture drinking water impacts to disadvantaged communities and domestic wells. The GSA has therefore not considered the interests of this beneficial user group and is likely to cause a disparate impact on protected groups who are dependent on domestic wells in the GSA area. SGMA regulations require that Alternative Plans create a groundwater quality monitoring network that will "collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues." Despite having identified many known water quality issues in the Groundwater Conditions chapter,13 the Draft Plan Update fails to comprehensively analyze whether the sites being monitored by existing programs will adequately "address known water quality issues" and their impacts on all beneficial users in the GSA area. As proposed, the monitoring does not sufficiently monitor groundwater quality in the Eastern Coachella Valley, where as noted in the Draft Plan Update, there are high levels of groundwater contaminants. Therefore the monitoring network as written violates the GSA's responsibility to collect sufficient data to determine trends and address known water quality issues affecting beneficial users in the GSA area. As written, the monitoring network would allow severe drinking water impacts to occur on domestic well users and in unincorporated communities. To ensure that the representative wells within the monitoring network accurately monitor impacts to groundwater management for drinking water beneficial users, the following revisions are required: • The GSA must analyze whether the groundwater quality monitoring network adequately captures increases in the extent and concentration of all known contaminants in the GSA area that are harmful to human health, and ensure that it does so. • The GSA must ensure that the groundwater quality monitoring network will detect impacts from groundwater quality on all types of beneficial users, most importantly drinking water users who have limited financial ability to treat their drinking water sources. To this end, the GSA must ensure that existing representative wells are in or near such communities or domestic wells, or that it has a concrete plan for installing new monitoring wells that will detect these impacts or working with domestic well users to regularly test their wells and incorporate that data into	SGMA regulations require monitoring of static groundwater elevation at "sufficient density" to characterize the groundwater table (California Code of Regulations §354.34). The representative monitoring well network established in the Alternative Plan Update are sufficient for tracking and determining sustainability under SGMA.DWR's Monitoring Networks and Identification of Data Gaps BMP manual (available at: https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-2-Monitoring-Networks-and-Identification-of-Data-Gaps_ay_19.pdf) provides guidance for monitoring well density. The BMP manual confirms that the necessary monitoring point density for groundwater management depends on local geology, extent of groundwater use, and how the GSAs define undesirable results. DWR provides relevant references, one of which (Heath, 1976) suggests 0.2 to 10 wells per 100 square miles. As documented in the Alternative Plan Update, groundwater levels are monitored in 345 wells across the Indio Subbasin area of 525 square miles, within the guidelines. Of these, the GSAs also have defined 57 key wells, approximately 10.8 wells per 100 square miles. Additionally, as documented in Section 10.1.4, the GSAs are developing a CV-SNMP to further monitor and assess groundwater quality. The CV-SNMP Groundwater Monitoring Workplan (which has been added as Appendix 2-A of the Alternative Plan Update) includes a network of 187 existing wells and 23 new wells to

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			its monitoring network. Monitoring wells must detect groundwater quality issues in shallow groundwater near disadvantaged communities. A particular focus must be small mobile home parks in the Eastern Coachella Valley that rely on small water systems. • The GSA must prioritize constructing new monitoring wells in the Eastern Coachella Valley in order to ensure the region is being properly monitored for all primary drinking water contaminants, and in particular arsenic, chrom-6, and uranium.	monitor water quality. The resulting data will be incorporated into future Alternative Plan Updates. The CV-SNMP Agencies, which include the Indio Subbasin GSAs, recently conducted an evaluation of the monitoring network for the CV-SNMP Groundwater Monitoring Workplan (which has been added as Appendix 2-A of the Alternative Plan Update). The network of deep aquifer wells in the Workplan approved by RWQCB was found to be adequate, and the GSAs will continue to monitor these wells. The network of available shallow aquifer wells was found to be limited due to a lack of wells screened in the shallow aquifer and the GSAs are working on funding and installing additional monitoring wells. The CV-SNMP Groundwater Monitoring Workplan further describes these data gaps. The GSAs are considering monitoring other constituents (Arsenic, Cr-6, and Fluoride) in these monitoring network wells once constructed, in addition to the monitoring that is already conducted for water quality, as described in Chapter 10, *Monitoring Program* (Section 10.1.4).
17	Nataly Escobedo Garcia, Policy Coordinator Sarah Spinuzzi, Senior Staff Attorney	Leadership Counsel for Justice and Accountability Coachella Valley Waterkeeper	**The Alternative Plan Update Must Address Groundwater Quality Impacts Caused By Recharge Or Overpumping** SGMA charged GSAs with the responsibility to protect water quality from further degradation due to groundwater management practices, and requires GSAs to establish sustainable management criteria to prevent degraded groundwater quality.15 The proposed SMCs are inadequate in protecting communities in the ECV from further groundwater quality degradation. This is particularly concerning for contaminants such as arsenic and chrom-6, which are a widespread issue in the ECV, as noted in the Draft Plan Update.16 Further, it is not adequate to simply defer to infrastructure programs that include consolidating water systems or treating drinking water — the Alternative must protect sources of drinking water from contamination caused by groundwater management activities. In order to comply with SGMA and its regulations, which require the GSA to set sustainable management criteria that will avoid undesirable results resulting from degraded water quality for all beneficial users in the basin, and avoid disparate impacts on protected groups, the Draft Plan Update must include the following: • Set a protective minimum threshold, measurable objective, and interim milestones for all constituents with primary drinking water standards that may be impacted by groundwater management activities, or failure to manage groundwater in a way that does not negatively impact groundwater quality. • A detailed explanation as to how the groundwater quality minimum threshold, measurable objectives, and interim milestones will result in the protection of groundwater for disadvantaged communities and other drinking water users in the subbasin.	The Indio Subbasin Alternative Plan was approved by DWR with recommendations for the Five-Year Update. With regard to groundwater quality, these included recommendations to provide maps showing the areas affected by the primary water quality constituents including fluoride, arsenic, chromium-6, and DBCP. These maps were provided along with maps for additional constituents. The Alternative Plan Update also included substantial collection of water quality data into a database and mapping of the four recommended constituents plus TDS, nitrate, uranium, and perchlorate. Water quality monitoring is addressed in Chapter 10, *Monitoring Program* (Section 10.1.4) and water quality protection is in addressed in Chapter 11, *Projects and Management Actions* (Section 11.6). Water management projects like Oasis and non-potable water connections will work to reduce pumping and therefore, potential mobilization. Simultaneously recharging with Colorado River water helps reduce these naturally occurring contaminants. The Alternative Plan Update presents sustainable management criteria (SMCs) for groundwater levels, storage, and subsidence. Groundwater quality SMCs will be included in the next Five-Year Plan Update that integrates the findings of the CV-SNMP groundwater monitoring program and development activities currently underway. The CV-SNMP is being developed in collaboration with the RWQCB, who has primary authority over water quality issues in the Subbasin. See also Response to Comment No. 29.
18	Nataly Escobedo	Leadership Counsel for	**The Alternative Plan Update Should Ensure No Further Land Subsidence**	USGS and CVWD have a long history of investigating and tracking subsidence in the Coachella Valley, and the collaborative studies are continuing.

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	Garcia, Policy Coordinator Sarah Spinuzzi, Senior Staff Attorney	Justice and Accountability Coachella Valley Waterkeeper	As currently written, the sustainable management criteria for land subsidence are vague and do not protect for impacts on disadvantaged communities or domestic well users. The GSA must set sustainable management criteria that reflect the needs of all the stakeholders in the subbasin and protect all types of beneficial users from impacts from further land subsidence in the area. The GSA must define the undesirable results for subsidence in a way that avoids subsidence that substantially interferes with surface land uses.17 The GSA must consider the interests of all beneficial user groups, including domestic well users and disadvantaged communities, in determining its undesirable result for land subsidence. The CVWD GSA has decided to use groundwater levels as a proxy for land subsidence and accordingly apply the same sustainable management criteria. While we are not disputing using groundwater levels as proxy, we want to ensure the SMCs for land subsidence also includes impacts to critical infrastructure. The SMC for land subsidence does not show whether they will protect critical infrastructure such as roads, drinking water wells, distribution lines, housing, septic systems,. These surface land uses must also be taken into account in establishing the SMC for land subsidence. To comply with its obligations under state law, CVWD GSA must: • Analyze the impact of land subsidence on all beneficial user groups, including potential impacts on drinking water wells, homes, distribution lines, roads, etc. • Define a local undesirable result for subsidence that takes into account the critical infrastructure needs of all beneficial user groups, including domestic well owners, and specifically impacts to homes, piping, and wells.	The magnitude of subsidence has been relatively small compared to areas in the Central Valley that experienced tens of feet of subsidence. To be specific, Coachella Valley experienced less than two inches of subsidence between 1995 and 2010, with the most subsidence occurring along the southwestern margin of the valley near Palm Desert and mostly between Indian Wells and La Quinta. As indicated in Sections 4.3 and 9.2, the most recent USGS study (Sneed and Brandt, 2020) documented that, although a few areas subsided (albeit at a slower rate), most areas stopped subsiding from 2010 to 2017 and some even uplifted. In Coachella Valley, subsidence has been stopped as groundwater levels have increased in response to water resource management action including replenishment, source substitution, and conservation. The MTs were set at levels where no significant undesirable results related to subsidence have occurred, and the MTs are protective of all uses and users. Chapter 9, *Sustainable Management* (Section 9.5.1) lists undesirable results of land subsidence to include "disruption of surface drainage, water supply conveyance, and flood control facilities; damage to infrastructure such as pipelines, airport runways, railroads, roads, and highways; and potential subsidence around a production well, disrupting wellhead facilities." Thanks for your additions – the following has been added to Section 9.5.1 to include "housing, septic systems, distribution lines, and piping."
19	Nataly Escobedo Garcia, Policy Coordinator Sarah Spinuzzi, Senior Staff Attorney	Leadership Counsel for Justice and Accountability Coachella Valley Waterkeeper	**Projects and Management Actions Must Benefit All Beneficial Users and Avoid Disparate Impacts** The GSA must consider the interests of all beneficial users including domestic well owners and disadvantaged communities and avoid disparate impacts on protected groups. We commend CVWD GSA for including small water system consolidation as planned management actions. However, we are concerned these management actions exclude important groups, specifically unpermitted mobile home parks, from planned actions. Additionally, no timeline was put forward for implementing this management action and as currently written, it appears implementation is dependent on state funding, which can be an extremely drawn out process. Given the groundwater quality issues in the ECV and aging infrastructure, CVWD GSA needs to set a proactive timeline for consolidating small water systems in the ECV and must modify their water budget to reflect consolidation of unpermitted parks. Furthermore, we would like to reiterate that waiting for state funding to move forward on consolidation in the ECV will lead to an extremely drawn out process. CVWD GSA must strengthen proposed management actions to include direct investment from its annual budget to support water system consolidation.	Please see the response to the comment on the water budget; small water systems are addressed using best available data. Due to state laws governing use of funds, such as Proposition 218, and other laws and issues, domestic water and sewer consolidations *are* dependent on state and federal funding – we also recognize that it is a drawn-out process, but the GSAs are working toward these consolidations in partnership with the funding entities. The GSAs will continue to pursue the consolidations as aggressively as possible in collaboration with DAC Infrastructure Task Force. The GSAs need Leadership Counsel's support and advocacy for State funding programs that would support these consolidations, specifically around drought funding which is less competitive given that Coachella Valley has managed water effectively over the last few decades. Please help support funding for Coachella Valley.
20	Nataly Escobedo Garcia, Policy Coordinator	Leadership Counsel for Justice and Accountability	**The Draft Plan Update Conflicts with the Reasonable And Beneficial Use Doctrine** The "reasonable and beneficial use" doctrine is codified in the California Constitution. It requires that "the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare." The doctrine applies to all water users, regardless of the basis of the water right, and all water rights and methods	As described in *Chapter 6: Water Supply*, the Colorado River supply projection does not use an assumption 100% of CVWD's Quantification Settlement Agreement (QSA) entitlement will be available under future conditions. CVWDs allocations are still increasing due to transfers (by 5,000 AFY every year through 2027), and the Plan Update does not account for all of it in projections. Given anticipated climate changes and the 20-year drought in the

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	Sarah Spinuzzi, Senior Staff Attorney	Coachella Valley Waterkeeper	of diversion. A determination of reasonableness of a use "cannot be resolved in vacuo isolated from statewide considerations of transcendent importance." The reliance on imported water to support sustainable groundwater aquifers cannot be avoided when addressing issues around beneficial use. As is made clear by the Draft Plan Update, the primary source of water for the GSA area is the Colorado River, accounting for approximately 62% of the total water supply.24 We are deeply concerned that each Plan Scenario assumes that the GSA will receive its full allocation of Colorado River water, and that the total delivery will actually increase from 402,800 AFY to 436,050 AFY through 2045. This assumption appears to be based on CVWD's high-priority position regarding Colorado River Allocations and CVWD's success in legal challenges to the QSA. Reliance on priority positioning and past legal successes ignores the reality of the Colorado River. Supply reliability of the Colorado River is addressed in two sentences, where it is acknowledged that "Colorado River supplies face a number of challenges to long-term reliability including the extended Colorado River Basin drought and shortage sharing agreements, endangered species and habitat protection, and climate change." Yet, there is no acknowledgement that even under long term historical natural flow (which does not account for climate change), the Basin is over-apportioned. The Colorado River becomes increasingly imperiled every single year due to drought and overdraft as over 40 million people rely upon it for drinking water, agriculture, and power.29 There is no acknowledgement that the Colorado River is already at or near critically low elevations in Lakes Powell and Mead. The current level of Lake Mead is 1,067.15 feet MSL. The U.S. Bureau of Reclamation (USBR) has declared a water shortage for the first time in the Basin's history. Lake Powell could fall below the minimum power pool elevation of 3,490 feet as early as July 2022, while Lake Mead is projected to be less than one foot above 1,050 feet by the end of 2022.31 USBR further projects that there is a 62% probability that Lake Mead's elevation falls below 1,025 feet by 2026 – approximately the same time the Draft Plan Update assumes that water transfers from the Colorado River will increase from 424,000 AFY to 459,000 AFY. Water levels dropping below these critical thresholds means that millions of people will be without the electricity generated by hydropower on the Colorado River. Under these extreme emergency situations, which are becoming more of a statistical certainty, the GSAs cannot continue to rely on its status as a senior water rights holder without a contingency plan for a decrease in delivery from the Colorado River. The over allocation of water from the Colorado is a mathematical certainty that needs to be accounted for in at least some of the plan scenarios. Moreover, the Draft Plan Updates' forecasts of water supply for its 5-year plans with climate change scenarios all rely on the timely completion of numerous water supply projects in order to meet forecasted demand. These projects are in various stages of permitting, design, and construction, with many currently existing only on paper. The Draft Plan Update acknowledges that failure to implement these projects is unsustainable with climate change. To account for loss of Colorado River deliveries, we encourage the GSAs to look for conservation opportunities in the categories of water use with the least overall importance – namely new development of water-intense recreational developments such as surf parks, beach clubs, and new golf courses. There is a new wave of recreation coming to a crest in the Indio Subbasin that requires significant amounts of clean water: surf lagoons. There are currently three proposed projects to build man-made pools that generate surfable waves hundreds of miles from any coastline: DSRT Surf Resort, Thermal Beach Club, and Coral Mountain in La Quinta, CA. Surf lagoons rely on water from Colorado River allocations. Unlike golf courses, which are also not a priority over the generation of electricity and food, surf lagoons require the use of potable water and cannot rely on recycled water supplies. Each new non-essential water use in the desert has the potential to negatively impact groundwater recharge. While courts wield an extraordinary amount of power, they have yet to cause precipitation events to reverse the course of climate change, and there is no reliable indication that CVWD's use of imported water for surf parks, fake beaches, and new golf courses will continue to take priority over the generation of power and food for millions of people. The GSAs must ensure that Alternative Plan Update's water allocations are consistent with the reasonable and beneficial use doctrine. In doing so, the GSAs must prioritize domestic use of water resources over irrigated agriculture36 and ensure that SGMA implementation furthers the human right to safe and affordable drinking water — both statewide considerations of transcendent importance. In other words, a plan that allows use of water for non-essential water use at the expense of use of water for domestic purposes is not consistent with the reasonable and beneficial use doctrine. It is also inconsistent with the reasonable and beneficial use doctrine to allow agricultural uses at the expense of the domestic uses of water for drinking, cooking, and basic sanitation. The reasonable and beneficial use doctrine applies here given the potential negative impacts of the Plan on groundwater sustainability which are likely to unreasonably interfere with the use of groundwater for drinking water and other domestic uses. As the Draft Plan Update authorizes waste and	Colorado River basin, the Alternative Plan Update assumes that CVWD will contribute water to Lake Mead under the Lower Basin Drought Contingency Plan. The Lower Basin Drought Contingency Plan is described in detail in *Chapter 6: Water Supply*. Those assumptions are then reflected in the Plan scenarios described in *Chapter 7: Numerical Model and Plan Scenarios*. The 5-Year Plan with Climate Change scenario is based on the GSAs adopted 5-Year CIPs to identify specific projects. We agree those projects are in various phases of permitting, design, and construction. If only the current suite of projects in the agencies' respective 5-year CIP is implemented, the Indio Subbasin would remain in a sustainable condition. As water supplies are needed to meet water demands, identified future supply, source substitution, or conservation projects will be moved forward under the adaptive management framework described in *Chapter 12: Plan Evaluation and Implementation*. That includes the active conservation programs being implemented by the agencies, as described in *Chapter 11: Projects and Management Actions*. The GSAs are proactively pursuing additional supplies to ensure sustainability beyond the planning horizon, to ensure reliability of supplies under drought and climate change conditions, and pursuing voluntary conservation programs to encourage conservation to the same ends. The GSAs do not approve of projects that involve waste and unreasonable use of water. All of the Plan Scenarios modeled in Chapter 7, *Numerical Model and Plan Scenarios* assume reduced Colorado River water deliveries; this was part of our planning assumptions described in Chapter 6, *Water Supply*. The Baseline and Five-Year Plan scenarios both assume that not all of the GSAs planned projects meet their supply goals on time. The GSAs commit to protecting drinking water as the highest and best use of water.

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			unreasonable use, and indeed does not even analyze the reasonable and beneficial use doctrine at all, it conflicts with the reasonable and beneficial use doctrine and the California Constitution. In order to ensure the Draft Update is not in conflict with the Reasonable and Beneficial Use Doctrine, we make the following suggestions: • The GSAs must commit to disapproval of projects that involve waste and unreasonable use. • The GSAs must revise the Draft Plan Update to include scenarios where the full allotment of Colorado River water cannot be delivered. • The GSAs must account for scenarios where some or all of the planned projects fail to meet their supply goals on time. • The GSAs must commit to ensuring that access to drinking water is protected as the highest and best use of water.	
21	Nataly Escobedo Garcia, Policy Coordinator Sarah Spinuzzi, Senior Staff Attorney	Leadership Counsel for Justice and Accountability Coachella Valley Waterkeeper	**The Draft Plan Update Conflicts with the Public Trust Doctrine** The Public Trust doctrine applies to the waters of the State, and establishes that "the state, as trustee, has a duty to preserve this trust property from harmful diversions by water rights holders" and that thus "no one has a vested right to use water in a manner harmful to the state's waters." The Public Trust doctrine has recently been applied to groundwater where there is a hydrological connection between the groundwater and a navigable surface water body. In Environmental Law Foundation v. State Water Resources Control Board ("ELF"), the court held that the public trust doctrine applies to "the extraction of groundwater that adversely impacts a navigable waterway" and that the government has an affirmative duty to take the public trust into account in the planning and allocation of water resources. Under ELF, the Public Trust doctrine imposes an affirmative and independent obligation to consider the public trust that applies to DWR's decisions regarding submitted GSPs, imposing a legal duty on DWR to not only consider the potential adverse impacts of groundwater extractions on navigable waterways but also "to protect public trust uses whenever feasible." The court also specifically held that SGMA does not supplant the requirements of the common law public trust doctrine. Notably, the public trust doctrine applies to both currently navigable surface water bodies and surface water bodies that were historically navigable at the time of statehood. Further, certain rivers like the San Joaquin River have been declared navigable in statute. In contrast to these requirements, the GSP does not consider impacts on public trust resources, or attempt to avoid, insofar as feasible, harm to the public's interest in those resources. The GSAs must (1) identify any public trust resources within the basin; (2) identify any public trust uses within the basin; (3) identify and analyzing potential adverse impacts of groundwater extractions on public trust resources and uses; and (4) determine the feasibility of protecting public trust uses and protect such uses whenever feasible.	Comment noted. The GSAs are complying with the Public Trust Doctrine. See also Response to Comments No. 1-10.
22	Nataly Escobedo Garcia, Policy Coordinator Sarah Spinuzzi, Senior Staff Attorney	Leadership Counsel for Justice and Accountability Coachella Valley Waterkeeper	**The Draft Alternative Plan Update Lacks A Coordination Agreement.** Pursuant to Water Code, § 10733.6, "[i]f groundwater sustainability agencies develop multiple groundwater sustainability plans for a basin," there must be a joint submittal to DWR of several items, including "[a] copy of the coordination agreement between the groundwater sustainability agencies to ensure the coordinated implementation of the groundwater sustainability plans for the entire basin." This requirement applies to Alternative Plans as well, which must satisfy "the objectives" of SGMA, including coordinated groundwater management for entire groundwater basins. Here, though the draft Alternative Plan does not itself cover the entire basin, no coordination agreement is provided. To comply with SGMA, a coordination agreement must be submitted to DWR with the Alternative Plan Update.	The *Alternative Plan Update* covers the entire Indio Subbasin. Coordination with Mission Creek Subbasin and San Gorgonio Pass Subbasin is occurring through staff of the GSAs. Based on the quoted text, we believe that the reference to Water Code §10733.6 is not correct and can actually be found in Water Code §10733.4(b)(3). Water Code §10733.4(b)(3) applies when two or more groundwater sustainability agencies develop multiple groundwater sustainability plans for a basin. The *Alternative Plan* for the Indio Subbasin approved by DWR is a single plan covering the entire Indio Subbasin and did not require a coordination agreement for submittal or approval.
23	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	**Tribal Workgroup and Stakeholder Outreach** The GSAs hosted numerous public meetings during the development of the Alt Plan Update. They also hosted tribal meetings during the Work Group. The GSAs provided information that they deemed appropriate and relevant for the public. Unfortunately, they did not provide any meaningful backup data or other technical information prior to or during any meeting that would enable the Authority to evaluate the methodology or assumptions of the Alt Plan. This is the first time the Authority has seen this new Plan and yet we are only allowed 30 days to provide substantive comments on this highly technical document consisting of a 476-page Plan and a 422-page Appendix.	Presentations at each SGMA Tribal Workgroup and public workshop showed graphics and data on all technical aspects of the Plan Update. Those presentations were available on the website before, during, and after the workshops. The SGMA Tribal meetings were intended to be a working group and included additional requests for data and input from both the Tribes and GSAs. Because of the January 1, 2022 deadline to submit the Alternative Plan Update to DWR, the GSAs were unable to provide a longer review period. The GSAs are committed to continuing the SGMA Tribal Workgroup

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				meetings as stated in Chapter 1, *Introduction* (Section 1.5.5) of the Alternative Plan Update.
24	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	**Treating the Indio Subbasin as a Uniform Source** The Alt Plan Update presents most water information at a basin-wide level. Generalizing this information as if the Basin operates uniformly can be misleading. The Plan acknowledges that the Numerical Model uses many data inputs, assumptions and identification of hydrologic subsets to inform the numerical model but it doesn't present the information most relevant to the public in a way that informs public decision-making. In the spirit of transparency and clarity, please amend the Alt Plan to include a detailed map that overlays and shows the boundaries of these areas: 1. West Whitewater River Subbasin Management Area 2. West Whitewater River Area of Benefit 3. DWA West Area of Benefit 4. CVWD West Area of Benefit 5. West Valley Management Area 6. Palm Springs Subbasin 7. Thermal Subbasin These terms are used throughout the document but for different purposes and within varying contexts. It would be helpful to the Authority to understand where the Reservation is located relative to these areas. It is impossible to understand the impacts of water management actions such as raw water replenishment and salt loading on the Reservation without more granular information. The Authority also requests that the Alt Plan be amended to include the following information broken down in four ways: a) by West Whitewater River Subbasin Management Area, b) by West Whitewater River Area of Benefit, c) by DWA West Area of Benefit, d) by CVWD West Area of Benefit: 1. A table showing return flows 2. The quantity of groundwater that constitutes the historical depletion of the aquifer 3. Model Inflows and Outflows 4. Water Balance 5. Combined Return Flows 6. Salt Loading by source: natural sources, return flows from agricultural and landscape irrigation, recharge of imported Colorado River water, wastewater discharge and subsurface inflows from other basins. 7. Table 5-27 (Municipal Demand Forecast for the Plan Area) 8. Table 5-28 (Municipal Demand Forecast for GSA Areas) 9. Table 5-35 (Total Projected Water Demands in Plan Area) 10. Table 6-1 (Indio Subbasin Groundwater Balance)	Under SGMA, Indio Subbasin is a single subbasin and must be managed as such. The *2010 CVWMP Update*, which is the approved Alternative Plan, did not designate management areas and this Plan Update continues addressing the needs of the entire Subbasin without designating management zones. Management areas can be established, for example, as a basis for differing MTs and MOs; this Alternative Plan Update establishes one cohesive set of MTs for groundwater levels, groundwater storage, and subsidence for the entire Subbasin. The hydrogeologic information presented in Chapter 3, *Hydrogeological Conceptual Model* and Chapter 4, *Current and Historical Groundwater Conditions* (including geologic cross-sections and groundwater contours) indicates that the Subbasin as a whole is hydraulically connected from one end to the other. This is reflected in the numerical model. Institutional boundaries are presented in Chapter 2, *Plan Area* and subarea boundaries (e.g., Palm Springs and Thermal) are described in Chapter 3, *Hydrogeological Conceptual Model*.
25	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	**Projects and Management Actions** The Alt Plan includes a final list of 29 possible PMAs by 4 GSAs. It is disappointing to see that very few projects are led by DWA in support of its customers. Please explain why DWA has not implemented tiered rates as most other water district do despite this being an effective way to reduce water usage. On page 8-5, Section 8.1.3 the Plan notes: "In the Plan Area, recycled water is a significant and reliable local resource used to help offset groundwater pumping." Yet recycled water accounts for only 2% of the Subbasin's water supply (Section 6.9.4). The Plan discusses the water recycling gains that are planned for the basin but the focus of recycling efforts seems to be the East Valley. By 2045, the GSAs plan to generate 20,213 AFY of recycled water to offset other water sources which will be only 3% of the Subbasin's water supply. Table 6-13 shows the recycled water supply (2018-19) based on wastewater flows. DWA shows that of the 6,613 AFY it receives from the City of Palm Springs WWTP, recycled water use is at 3,413 AFY. In Section 6.6.2, the Plan notes that DWA could produce 2,014 AFY of additional supply. With the 3,200 AFY of unused capacity + 2,014 of additional supply, DWA has unused capacity of 5,214 AFY. Further, in Section 11.5.2.6 the Plan notes: "The DWA WRP project will increase deliveries of recycled water in DWA's service area as new customers are identified and consistent with wastewater flow growth up to the 11,200 AFY of existing tertiary capacity." How will DWA identify new customers and reach its goal of maximum use of recycled water? Has DWA prepared a Plan of Service or similar document that can be included as an appendix to this Alt Plan?	DWA has developed a recycled water program and included a project in Chapter 11, *Projects and Management Actions* to expand it with outside funding. Two years ago, Agua Caliente Band of Cahuilla Indians (ACBCI) cancelled an agreement previously executed with DWA for the delivery of recycled water to two golf courses operated by ACBCI, and began pumping groundwater from the Subbasin for turf irrigation. DWA has advised ACBCI of the adverse impacts to water conservation efforts and adverse impacts to groundwater quality. ACBCI has continued to use groundwater to irrigate the courses, leaving DWA with unused capacity in its recycled water facilities. With a shared commitment to groundwater sustainability and as an existing recycled water customer interested in protection of water quality, DWA respectfully requests ACBCI to cooperate to restore and increase its recycled water use.

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				DWA is also actively pursuing and implementing other conservation programs. There are many ways to reduce water use; DWA has successfully implemented extensive conservation programs instead of tiered rates. As documented in the 2020 Regional UWMP, the local GSAs have achieved water use reductions consistent with the State's SBx7-7 reductions. Notably, during the last drought, DWA was able to achieve substantial levels of water conservation without the use of tiered rates. Whether DWA uses a tiered rate structure is beyond the scope of SGMA regulations. The Alternative Plan Update specifically includes the GSAs' commitment to recycled water and source substitution, but only includes recycled water delivery assumptions for projects that are sufficiently developed. For example, the recycled water projections in the Plan Update do not include recycling of WRP-4 wastewater in modeling projections because, although a change petition for that WRP has been filed, it has not yet been approved (see Chapter 6, *Water Supply* (Section 6.6.5)). CVWD has plans to construct tertiary treatment at this facility to offset water use in the East Valley by delivering recycled water to irrigation customers, but did not include those recycled water flows in the supply projections due to uncertainty with the final outcome of the change petition that is underway. This is a conservative approach when evaluating ability to meet projected water demands and groundwater sustainability. CVWD is committed to recycling 100% of wastewater available where and when it is needed, feasible and cost-effective to the community.
26	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	**Projects and Management Actions** The Alt Plan notes that an Adaptive Management process will be used for project implementation. Will there be a public process associated with this Process? [ES-18]	Yes, there will be a public process associated with the adaptive management process described in Chapter 11, *Projects and Management Actions* (Section 11.1.1). The GSAs will continue to host stakeholder workshops to ensure open participation in Plan implementation by members of the public and interested parties and to receive stakeholder input. Stakeholder workshops are anticipated to be held at least annually to present the findings of the Annual Reports, including reporting on monitoring data and sustainability criteria established in this Alternative Plan Update. The Indio Subbasin website will be updated as needed to feature meeting agendas and materials, so that tribes and stakeholders have access to past and current materials related to Plan implementation. As new materials are added to the website or workshops are held, the tribal and stakeholder email lists will be notified. Additionally, the GSAs will continue to provide updates at their Boards of Directors/Council meetings annually, at a minimum, for review and discussion of results from the Annual Reports. Board/Council meetings are publicly noticed and open to all stakeholders to participate. As the GSA Boards consider SGMA decisions, the tribal and stakeholder email lists will be notified.

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				The GSAs will continue to coordinate SGMA Tribal Workgroup meetings during Plan implementation. New text has been added to Section 1.5.5 to clarify this. Tribal governments and stakeholders will also be notified when the next Five Year Plan Update is initiated.
27	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	**Projects and Management Actions** CVWD also currently replenishes a portion of its Colorado River supply at WWR-GRF (ranging from 35,000 to 50,000 AFY), based on its 2019 Exchange Agreement with MWD, until that water is needed in the East Valley." Is this water used in the DWA service area? How is this water transferred from the WWR-GRF to the CVWD Service Area? Does it flow under the Agua Caliente Indian Reservation? [11-19 11.5.3.3]	This comment inquires about replenished water in both hydrologic and institutional terms. In strictly hydrologic terms, water replenished at WWR-GRF is added to Subbasin groundwater flow that may flow under CVWD's service area, DWA's service area, and/or the Agua Caliente Indian Reservation. All imported water under the 2003 QSA belongs to CVWD.
28	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	**SGMA Tools** The Authority strongly encourages the GSAs to use all tools available to them under SGMA to comprehensively and completely manage and track all groundwater pumping in the basin. The Authority acknowledges the work of the GSAs but as a native sovereign nation with rights to groundwater, the Tribe needs to have more transparency and information to ensure its federally reserved water right is not being infringed upon. Comprehensive use of all SGMA powers gives the Authority confidence that its water rights will be respected and its water secured. [1.1.5 (1-6)] Please provide groundwater production numbers and detailed maps of locations of all wells by AOB so that the Authority can determine the impact of pumping on the Reservation. The Authority strongly encourages the Districts to meter all wells producing 2 AF-Yr as is allowed by SGMA. It is difficult to have confidence that water is properly managed in the basin when the Districts have incomplete data on minimal pumpers. [(12.2.7.2) (10-7 10.1.2)]	The GSAs understand the benefits of gathering pumping data throughout the Indio Subbasin beyond the authority provided to CVWD and DWA, in their respective water code authorities to replenish groundwater. As described in *Chapter 12: Plan Evaluation and Implementation*, the GSA agencies will each be considering expanding well registration and metering for all wells not defined as *de minimis* extractors by SGMA.
29	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	**Water Quality and Salt & Nutrient Management Planning** 3-12 3.5.1 & Fig 4-3, 4-7 4.1.4: Please add a discussion of the impacts of groundwater level fluctuations on Agua Caliente Indian Reservation water resources. 8-5 8.1.2 Antidegradation Policy – Please see the letter to the Districts from the Regional Board dated February 19, 2020. The Authority is concerned that recharge with untreated Colorado River water is not for maximum benefit of the people and results in water quality lower than standards. 9-22 9.8.1 "…salt migration through the groundwater system (both vertical and horizontal) is driven by dynamics of groundwater recharge and discharge and thus influenced not only by recharge/percolation, but also by groundwater pumping…" And this is why the Authority needs to see analysis for the West Valley Management Area to determine the impacts to the Agua Caliente Indian Reservation.	Chapter 4, *Current and Historical Groundwater Conditions* (Section 4.1) presents graphics and text on groundwater elevations, flow, and trends for the Indio Subbasin. The groundwater level fluctuation discussion is presented (for space convenience) in terms of West Valley and East Valley (Figures 4-3 and 4-4) and artesian wells (Figure 4-5) and shows well locations, but is not presented in terms of specific jurisdictions. We are not aware of any impacts to Agua Caliente Indian Reservation from groundwater level fluctuations. As documented in Chapter 10, *Monitoring Program* (Section 10.1.4), the GSAs and other collaborating agencies will be developing an update to the CV-SNMP based on the CV-SNMP Development Workplan approved by the RWQCB on October 4, 2021 (which has been added as Appendix 2-A of the Plan Update). As defined in the CV-SNMP Development Workplan, groundwater modeling will consider sources of recharge and discharge (e.g., pumping), as well as completing an antidegradation analysis in accordance with the Antidegradation Policy.
30	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	9-23 9.8.3 "The analysis also will include characterization of current groundwater quality in all Subbasin areas/Subareas (with delineation of Management Zones…" The Authority asks that this work be prioritized based on its impacts to the Agua Caliente Indian Reservation as the closest community downstream of the WWR-GRF.	The CV-SNMP Development Workplan (which has been added as Appendix 2-A of the Plan Update) has been approved by the RWQCB and has a schedule for completion. A Request for Proposals from qualified firms is currently being developed.
31	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	**Chapter 3 – Hydrogeologic Conceptual Model (HCM)** This section of the Alt Plan does not provide the foundation required to support the use and application of the numerical model described in Section 7. For example, the Alt Plan's description of surface water bodies and the interaction of surface water and groundwater lacks the required detail to	The request for additional documentation of watershed, surface water is noted. The HCM summarizes available understanding of surface water bodies and flow, but the Alternative Plan Update does not attempt to reproduce previously presented or compiled

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			support the model's numerical analysis. The HCM states "The Whitewater River is the major stream channel contributing recharge with additional infiltration along other channels such as Snow and Falls Creek in the upper valley and several smaller streams in the lower portion of the valley that only flow during wet years". However, the numerical model states that there are 24 watersheds and stream channels that contribute recharge to the groundwater basin. Detailed calculations by subwatershed and by year, of how the authors link the surface water in the HCM (Chapter 3) to water supply (Chapter 6) and the model input (Chapter 7) is required to validate the available 52,500 AFY (Figure 7-22) of surface water. Additionally, the Alt Plan should contain a map(s) that identify the locations of all named perennial, intermittent, and ephemeral surface water bodies (i.e., Andreas, Chino, Deep, Murray, Palm, Tahquitz, and Unnamed Watershed #2) described in the text.	information (see Bridge Document for Alternative Plan documentation). Rather, the Plan Update applies the information to groundwater sustainability analyses and documentation. Accordingly, information on streams is introduced in the HCM and then subsequent chapters provide additional information on surface water supplies (Chapter 6, *Water Supply*), modeling (Chapter 7, *Numerical Model and Plan Scenarios*) and monitoring (Chapter 10, *Monitoring Program*). The numerical model is an update of the numerical model originally developed in the 1990s and updated as part of the *2010 CVWMP Update*. The previous modeling developed analytical methodology to estimate surface water inflow; this Plan Update uses the same methodology with recent data to estimate flow into the model. Stream recharge is described in Section 7.2.5.2 and stream recharge cells are shown on Figure 7-8.
32	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	The HCM also lacks a qualitative discussion regarding the interaction between surface water and groundwater throughout the different subareas of the Indio Subbasin. Does mountain front recharge impact the shallow and deep portions of the aquifer? At what depth does groundwater occur and is it found in confined or unconfined conditions? Section 3.2.2 of the HCM's recital from the 1964 DWR Bulletin 108 leaves the reader confused regarding recent fanglomerate and the Ocotillo Conglomerate formations since these geologic units have not yet been introduced. These fundamental descriptions of groundwater occurrence and movement are required to support the use of four layers simulated in the model (Chapter 7). The HCM should address the relationship between groundwater pumping and the various aquifers that are identified in the hydrogeologic cross sections (Section 3.4.2.3). Although there are water supply and quality data provided in Chapters 4 and 6, the HCM does not provide the reader with a conceptual description of how natural and imported water sources move from areas of recharge to various portions (i.e., vertical distribution) of the aquifer. For example, do return flows from septic systems, wastewater percolation, and outdoor domestic applications impact (quality and quantity) the portions of the aquifer that are used for drinking water sources? Which portions of the aquifer are relied on for drinking water, agricultural, and other sources? While the HCM introduces vertical barriers to groundwater flow in the Thermal subarea, how do these geologic impediments impact the available resources from both a water quantity and water quality perspective?	The HCM introduces the geologic setting, subareas, recharge and discharge areas, and hydrogeologic cross sections with text describing groundwater occurrence and flow. Figure 3-4 is generalized and illustrative of local geology and is not intended to represent model layers, which vary in thickness and extent across the Subbasin. Additional information on groundwater levels, flow, and quality is provided in Chapter 4, *Current and Historical Groundwater Conditions*, while Chapter 7, *Numerical Model and Plan Scenarios* provides information on recharge, including mountain front recharge, return flows, and effects of fault barriers to groundwater flow. The Subbasin areas relied on for groundwater supply are shown on Figure 2-13 in terms of groundwater production per square mile.
33	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	**Chapter 4** Chapter 4 of the Alt Plan addresses salt loading and TDS in the Indio Subbasin. It acknowledges that, "Elevated TDS and nitrate concentrations are linked to current and historic water and wastewater management, agricultural activity, urban land use, septic systems, and natural conditions" (p. 4-16). The Alt Plan describes the general sources of salts in the Subbasin but does not quantify the amount of salt loading by source or even as a total. Because the CV-SNMP is still in development, an estimate of the salt loading may not be available at this time, but sources of salt may still be explored in more detail. While it is stated that, "Irrigation results in evaporative concentration of TDS in shallow groundwater," and "Water use for domestic purposes results in salt loading to wastewater," (p. 4-44), notably absent from the Plan is acknowledgement or quantification of how the increased salt may affect water demands in the Subbasin. Increasing salt in the Subbasin would impact future water demands, especially in the agricultural sector. Increased salts may increase demands due to higher leaching requirements but may also affect crop selection and distribution. As stated in the Alt Plan, "Agricultural demand varies by farmed parcel, depending on crop type and sequencing" (p. 5-36). The agricultural demand forecast does not include a consideration of the potential impacts of increased salt in the Basin.	In Chapter 9, *Sustainable Management* (Section 9.8), the Alternative Plan Update summarizes work toward estimation of salt loading, which includes collection and organization of water quality data into a database; evaluation of the sources, areal extent, vertical distribution, and time trends for TDS. As described in Chapter 2, *Plan Area* (Section 2.8.5), the CV-SNMP Development Workplan (included as Appendix 2-A of the Plan Update), has been approved by RWQCB and will be used as the basis to update the CV-SNMP and address salt and nutrient management in the Coachella Valley. As appropriate, future updates of the Alternative Plan can evaluate changes in demand (increases/decreases) from any changes to conservation legislation or other changing conditions. Currently, as shown in Chapter 5, *Demand Projections* (Figure 5-11), agricultural water demands, although annually variable, have been stable over the last decade.
34	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	**Chapter 6** Chapter 6 of the Alt Plan details water supply but does not specify quantities of supply broken down by source or location. For example, the Alt Plan lists sources of groundwater inflow as watershed runoff, subsurface inflows, return flow of applied water, treated wastewater, and septic, and	Chapter 7, *Numerical Model and Plan Scenarios* documents the numerical model components. Section 7.2.5 and Figure 7-6 illustrates where recharge occurs in the model from both artificial

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			imported water recharge. However, it does not go on to detail the quantities of these inflows by source. The average amount of natural infiltration for 2010-2019 is 28,800 AFY, "as measured or simulated in the numerical model" but it is unclear how much of that infiltration comes from each watershed, or how it is distributed throughout the basin. Similarly, the average return flow is estimated to be 162,000 AFY but the Alt Plan does not specify how much of that may be due to wastewater percolation, irrigation return flows, etc. even though "irrigation return flows and imported water recharge are now the major source of inflows to the Indio Subbasin." Documentation of these major sources of inflow and outflow is essential to transparent and effective planning for the Subbasin.	and natural sources (e.g., mountain front and stream channel). Section 7.2.5.5 goes on to describe the components of return flows and how they are distributed throughout the Subbasin. Section 7.5 includes more detailed quantification related to the inflows and outflows associated with each of the Plan Scenarios and PMA implementation. See the supply balance graphics in Figures 7-22 to 7-26. The primary tributary watersheds are gaged by U.S. Geological Survey (USGS), as shown in Chapter 2, *Plan Area* (see Figure 2-9). This data is available on the USGS website (National Water Information System [NWIS]) and reported daily.
35	Margaret Park, Chief Planning Officer	Agua Caliente Water Authority	**Chapter 7** The use of the 2000 and 2010 models to establish the Alt Plan's management actions and goals is questionable since the Alt Plan Model has not been peer reviewed. Updates to boundary conditions and the availability of new hydrogeologic data suggest the need for the development of a steady-state model, possible application of parameter estimation techniques, and the need for an updated calibrated model. The authors should not only address the need for a new calibrated model, but also add a section to the Alt Plan regarding the use and limitation of the existing model. While the Alt Plan clearly identifies the uncertainty of the inflow from San Gorgonio Pass, there are hydrogeologic uncertainties associated with the model's previous parameter estimation. Although the Alt Plan model is described as an update to the previous models, it does not excuse it from the need to undergo rigorous scientific peer review since it is the basis for a State approved Alt Plan. The authors should describe which parameters have the biggest effect on the model accuracy and discuss the certainty of the values used for these parameters. For example, which parameters were determined from calibration and which were determined from physical measurements. A section of the report describing model uncertainty and application of sensitivity analysis to determine how the uncertainty could impact the model results would be informative. Until scientific peer review can be performed, we recommend that the model and Alt Plan be characterized as interim or provisional. The Alt Plan does not clearly show the impact of each future model scenario on a spatial or temporal basis. For example, Figures 7-32 shows the change in groundwater levels for the 2009 to 2045 Baseline Scenario that includes 12 years of historical data and 25 years of model simulated data. As shown in the water level hydrographs (Figure 7-30), model simulated groundwater levels in the Palm Springs Subarea are declining during the 2020-2069 period. The 2009 through 2020 actual data reflect MWD advanced deliveries to the WWR-WRF and account for much of the groundwater storage increase in the Palm Springs Subarea. Without the inclusion of these 12 years of actual data, the color flood maps would only reflect the impact of the management scenarios and show different results. Similarly, Figures 7-33 and Figure 7-39 show a pattern of declining groundwater levels in the Palm Springs Subarea during the simulation period for the Baseline with Climate Change option. The Alt Plan states that the 2009 period was "selected as the period for comparison because it generally reflects historically low groundwater elevations in most of the Subbasin, and these values are used as sustainability criteria for groundwater levels." Although Chapter 9 discusses the use of 2005 vs 2009 as a minimum threshold, it is not clear why historical and accumulated advanced MWD deliveries are used to show recovery from minimum water levels when comparing results from simulated future management scenarios. Although the model recognizes that MWD advanced deliveries are depleted by 2035, it is difficult to assess the impact of each scenario over the initial 25-year period. It would be more appropriate to spatially view the impact of each model scenario consistent with the water budget shown in the table on Page 7-12. Disappointingly, the updated SGMA Alternative Plan continues a long history by the water agencies of obfuscation and a stubborn unwillingness to provide the public a clear and comprehensive record that verifies their hollow claims of responsible management of the aquifer in the Coachella Valley.	The development of the numerical model is described in Appendix 1-A, Alternative Plan Assessment, Evaluation of Existing Model and Recommendations. As described, the numerical model was developed in the 1990s by Graham Fogg and Associates and subsequently extended (peer reviewed at the time) for the *2002* and *2010 CVWMPs*. As described in Appendix 1-A, the model was reviewed and evaluated by Daniel Craig, PG, CHG, a senior hydrogeologist/modeler with Todd Groundwater with over 30 years of experience, as an initial task of the Alternative Plan Update. The model assessment results were presented at a tribal work group meeting and a public workshop on May 21, 2020. As documented in Appendix 1-A, the model was deemed suitable for update and application to scenarios. Section 7 provides documentation of the water level calibration results for the updated model, which satisfy American Society for Testing and Materials (ASTM) recommendations. SGMA requirements for GSPs, while not directly applicable to Alternative Plans, are instructive about State expectations. These include use of public domain software, use of field measurements and calibration against specified field data, and provision of supporting documentation. This model is based on the publicly available and widely accepted USGS MODFLOW software, is calibrated with field-measured groundwater level data (and other data), and is documented in Chapter 7, *Numerical Model and Plan Scenarios*. Peer review is not a requirement for a GSP or for an Alternative Plan. No additional Advance Deliveries from Metropolitan Water District of Southern California (MWD) were assumed in the Plan scenarios as described in Section 7.5. In addition, assumptions were made in the model to zero out the existing Advance Delivery account credits by reducing future SWP deliveries, also explained in Section 7.5. That Advance Delivery water is, in fact, in the Indio Subbasin and contributing to the current water levels. As such, past deliveries must be accounted for to ensure a well calibrated model.
36	Alena Callimanis	La Quinta Residents for	The first thing I would like to address is the reasonable and beneficial use doctrine and that three surfing parks, 6.7 acres, 16.7 acres and 20 acres, plus a 34 acre swimming lagoon are not reasonable and beneficial use. I know it is not up to CVWD to approve a project, but rather say if there is enough	As noted in the comment, GSAs do not approve development projects because we are not land use agencies. The GSAs cooperate

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		Responsible Development	water. Given the reality of the drought and climate change, I think it is important to give guidance to the cities that are bringing this forward. The two largest surf parks are private. That only gives "benefit" to wealthy people and not to the Coachella Community at large. You talk about your leadership in conserving water. Your estimates for these four water features for water use for the year is 431.5 acre feet. We have done calculations using the EPA evaporation estimates which take into consideration wind, humidity, surface temperature, and heat and we have determined that the yearly water use would be 6 times as much or 2,589 acre-feet per year. I request that CVWD recalculate yearly water usage for Thermal Surf Park, Grand Oasis Crystal Lagoon, Coral Mountain Surf Resort and DSRT SRF and use these recalculated figures into the "Other" water use component.	with land use planners and complete water supply assessments (WSAs) for proposed development projects. The GSAs considered WSA projected demands as part of "Other" demands in the Alternative Plan Update is demand forecast. CVWD has included estimated water use for these projects based on approved WSAs. These estimates are based on reasonable and best available information at the time the WSA preparation. As stated in the WSAs, the assessment does not relieve the Project from complying with all applicable state, county, city, and local ordinances or regulations, including the CVWD Landscape Ordinance and indoor water use performance standards provided in the California Water Code. This includes complying with Maximum Applied Water Allowance (MAWA) budget, which was the basis for the water use estimates for these water features. See also Response to Comment No. 20.
37	Alena Callimanis	La Quinta Residents for Responsible Development	Second, I would like to address your percentage of 45% used to calculate water supply from SWP Exchange. The last two years you have only received 5% of your allocation. It is invalid to use the 14 year average, 45% figure, given the current state of the Colorado River. The charts should be recalculated using the 5% number.	The use of a 45% reliability assumption for State Water Project (SWP) deliveries, based on the 14-year average from 2007 – 2020, is conservative. The longer-term average reliability that is projected by DWR in their *2019 Delivery Capability Report* is 58%. Prudent water resources planning does not base supply forecasting on 1 to 2 years of data, as there are cycles of wet and dry hydrology. As such, the GSAs have considered the average reliability since recent environmental and legal constraints were instituted. Additionally, we have further reduced this SWP reliability assumption based on DWR climate change factors. See Chapter 6, *Water Supply* for a detailed description of these assumptions.
38	Alena Callimanis	La Quinta Residents for Responsible Development	Third, I would like to address the Colorado River entitlement. It should be lowered starting in 2022 at least at the level of the first allocation decrease when we hit the California trigger number. All indications are that will happen next year. So these charts which show continuing increase or leveling of Colorado River allocations must be adjusted to show a decrease in the Colorado River allocations.	As described in Chapter 6, *Water Supply* (Section 6.4.4), the Colorado River supply projection does not use an assumption of 100% of CVWD's Quantification Settlement Agreement (QSA) entitlement will be available under future climate change conditions. CVWDs allocations are still increasing due to transfers (by 5,000 AFY every year through 2027),and the Plan Update does not account for all of it in future project scenarios. Sections 6.4.2 and 6.4.4 have been revised to better explain the Colorado River entitlements and how those were adjusted for scenario modeling in the Plan Update. Given anticipated climate changes and the 20-year drought in the Colorado River basin, the Alternative Plan Update assumes that CVWD will contribute water to Lake Mead under the Lower Basin Drought Contingency Plan. The Lower Basin Drought Contingency Plan is described in detail in Section 6.4.3. Those assumptions are then reflected in the Plan scenarios described in Chapter 7*, Numerical Model and Plan Scenarios*.
39	Alena Callimanis	La Quinta Residents for Responsible Development	Fourth, many of the assumptions in this document are based on future water projects coming on line. For example, the amount of recycled water available is less than the first cut to our Colorado River allocations. You must accelerate grant requests and get appropriate timings of these new supplies so you can accurately project how future projects will help supply. With the Governor's 15% cuts, that will further impact revenue generation which may cause more of these projects to not come on-line.	The GSAs used their 5-year CIPs to estimate timing of future non-potable and source substitution projects. Those connections within the 5-year CIPs are included in current funding plans. The Alternative Plan Update specifically includes the GSAs' commitment

#	Commenter Name	Commenter Organization	Comment	Response
				to recycled water and source substitution, but only includes recycled water delivery assumptions for projects that are sufficiently developed. For example, the recycled water projections in the Plan Update do not include recycling of WRP-4 effluent. See also Response to Comment No. 25. In the meantime, the GSAs are committed to aggressively pursuing state and federal grant funding for future non-potable connections.
40	Alena Callimanis	La Quinta Residents for Responsible Development	Fifth, the future modeling scenarios should not be based on past drought and resupply conditions over the past 25 years. What has been happening these past two years must be the basis for the future modeling of our conditions, not relying on past numbers.	Hydrology in the Indio Subbasin is dynamic with periods of wet and dry years. Prudent water resources planning does not base supply forecasting on 1 to 2 years of data. Using only the last two dry years would not accurately capture the observed hydrology in the Subbasin. Chapter 6, *Water Supply* (Section 6.3.1) describes the two hydrology scenarios used in the planning process. While a baseline scenario was run to understand conditions under historical hydrology, the future scenarios were run assuming climate change conditions. Chapter 7, *Numerical Model and Plan Scenarios* (Section 7.5.1) describes the climate change assumptions used in the modeling for both local and imported water sources.
41	Alena Callimanis	La Quinta Residents for Responsible Development	Sixth, climate change impacts are minimized. When you discuss up to 40,000 AFY impact, that is an underestimation based on the hotter summers and hotter years we are experiencing. This amount cannot even be covered by recycled water. With this increasing heat, higher evapotranspiration rates, etc., projections must show this higher impact starting in 2022; golf course usage can be curtailed. Surf park and swimming lagoon usage cannot be curtailed or these features must close. We and the country rely on agriculture. With growing heat, agriculture must be protected as our nation's food supplier. Seven, subbasin storage has only recovered up to 45% of its decline. This was due mostly to Colorado River allocations. You cannot rely on future Colorado River allocations even though CVWD has senior rights to the water. We will start seeing very quickly outflow greater than inflow as this drought persists. The modeling in this document must be revised to reflect the true water situation in our valley.	The climate change assumptions applied in the Alternative Plan Update go beyond those recommended by DWR and simulate more recent, drier conditions. The GSAs are committed to implementation of their water conservation programs for all water users in the Subbasin. See Response to Comment No. 38 regarding Colorado River entitlements.
42	Javin Moore, Superintendent	United States Department of the Interior – Bureau of Indian Affairs	**A. Comments on Alternative Plan** 1. Tribal entities are referred to as stakeholders, rather than sovereign nations with Federally Reserved Water Rights. These rights should be explicitly identified.	Tribes were identified in the Alternative Plan Update as a group separate from stakeholders. Chapter 1, *Introduction* (Section 1.5.5) describes the SGMA Tribal Workgroup and participation by the five tribes within the Subbasin and Bureau of Indian Affairs (BIA) staff. In Water Code § 10720.5, SGMA dictates that the groundwater planning process shall not determine or modify water rights. The extent of tribal water rights are currently in litigation and have not been quantified.
43	Javin Moore, Superintendent	United States Department of the Interior – Bureau of Indian Affairs	2. The Bureau of Indian Affairs is concerned that the Basin Salt Nutrient Management Plan has not been released for public comments, and an Agency and Regional request to receive copy has not been acknowledged. As the first year of the SNMP is currently being monitored, will the plan be provided for input prior to it's initial first year report?	The CV-SNMP was prepared and submitted to the RWQCB in 2015. Work to update the CV-SNMP has not yet begun. The CV-SNMP Development Workplan (included as Appendix 2-A to the Alternative Plan Update), which will guide the update to the CV-SNMP, was recently completed and approved by RWQCB in October 2021. The Colorado River RWQCB considered the Workplan during a public meeting on September 14, 2021. The work to update the CV-SNMP in accordance with the CV-SNMP Development Workplan will be completed as indicated in the schedule that is part of this Workplan.

#	Commenter Name	Commenter Organization	Comment	Response
44	Javin Moore, Superintendent	United States Department of the Interior – Bureau of Indian Affairs	3. On figures, differentiate between model projections and calculated, current, and measured values. Lack of data segregation results in inaccuracies and is subject to interpretative bias.	Thank you for your comment. Our modeling team will review and consider the figure labeling. We recognize the importance of distinguishing between observed and simulated data. Please consider Figures 7-30 and 7-31 in Chapter 7, *Numerical Model and Plan Scenarios* with both measured and simulated hydrograph data.
45	Javin Moore, Superintendent	United States Department of the Interior – Bureau of Indian Affairs	**B.** Goals of 2002 water management plan were not included within the current Alternative Plan, however are still relevant. The 2002 Water Management Plan explicitly identified 2015 as a marker for salt loading in terms of aquifer degradation. In order to evaluate the potential for water quality degradation, the projected salt balance in 2015 and 2035 is compared to current conditions. The current net salt addition in the Coachella Valley is 265,000 tons per year. By 2035, Alternative 1 would result in the highest rate of salt addition to the Coachella Valley of 504,000 tons per year—a dramatic increase compared to 1999 conditions. The net salt addition in 2035 would decrease compared to current conditions under Alternative 2 (68,000 tons per year) and Alternative 4 (155,000 tons per year) with Alternative 2 best minimizing the water quality degradation. Table 6-6 showed a net decrease by 2035. What is current salt loading and how does the salt loading from 2015 compare to model projections?	In Section 9.8, the Alternative Plan Update summarized work toward estimation of salt loading, which included collection and organization of water quality data into a database; evaluation of the sources, areal extent, vertical distribution, and time trends for TDS; and improvement of the monitoring program relative to TDS. As described in Chapter 2, *Plan Area* (Section 2.8.5), the CV-SNMP Development Workplan (included as Appendix X of the Plan Update), which has been approved by RWQCB, will be used as the basis to update the CV-SNMP and address salt and nutrient management in the Coachella Valley.
46	Javin Moore, Superintendent	United States Department of the Interior – Bureau of Indian Affairs	**Comments on Errata** Cumulative Baseline measurements should be determined from date of minimum storage, 2009 according to the report, to indicate potential crossing of minimal levels.	The future scenarios and simulated water budgets in the *Executive Summary* and Chapter 7, *Numerical Model and Plan Scenarios* are shown relative to the simulated period of 2020 - 2069. Chapter 4, *Current and Historical Groundwater Conditions* (Section 4.2) describes changes in groundwater storage over time. As shown in Figure 4-9, the Indio Subbasin has gained approximately 840,000 acre-feet in storage between 2010 and 2019.

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October 29, 2021

Via Electronic Mail

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Subject: California Department of Fish and Wildlife Comments to the draft Water Management Plan Update to the Alternative Plan

Dear Zoe Rodriguez del Rey:

The California Department of Fish and Wildlife (CDFW) appreciates the opportunity to provide comments on the draft Water Management Plan Update to the Alternative Plan (Indio Subbasin Alternative Plan) prepared pursuant to the Sustainable Groundwater Management Act (SGMA). On December 29, 2016, the Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), and Indio Water Authority (IWA), collectively referred to as the Groundwater Sustainability Agency (GSA), submitted to the California Department of Water Resources (DWR) the 2010 Coachella Valley Water Management Plan, or CVWMP Update (CVWD, 2012a), accompanied by a Bridge Document (Indio Subbasin GSAs, 2016), as an Alternative Plan to a Groundwater Sustainability Plan (GSP) for the Indio Subbasin (as per Water Code Section 10733.6 (b)). On July 17, 2019, DWR approved the *2010 CVWMP Update* as an Alternative Plan (referred herein as 'Indio Subbasin Alternative Plan). In compliance with SGMA, the Plan must be updated every 5 years.

As trustee agency for the State's fish and wildlife resources, CDFW has jurisdiction over the conservation, protection, and management of fish, wildlife, native plants, and the habitat necessary for biologically sustainable populations of such species (Fish & Game Code §§ 711.7 and 1802). Development and implementation of GSPs under SGMA represents a new era of California groundwater management. CDFW has an interest in the sustainable management of groundwater, as many sensitive ecosystems, species, and public trust resources depend on groundwater and interconnected surface waters (ISWs), including ecosystems on CDFW-owned and managed lands within SGMA-regulated basins.

SGMA and its implementing regulations afford ecosystems and species specific statutory and regulatory consideration, including the following:

- GSPs must **consider impacts to groundwater dependent ecosystems** (GDEs) (Water Code § 10727.4(l); see also 23 CCR § 354.16(g));

- GSPs must consider the interests of all beneficial uses and users of groundwater, including environmental users of groundwater (Water Code § 10723.2) and GSPs must **identify and consider potential effects on all beneficial uses and users of groundwater** (23 CCR §§ 354.10(a), 354.26(b)(3), 354.28(b)(4), 354.34(b)(2), and 354.34(f)(3));
- GSPs must **establish sustainable management criteria that avoid undesirable results** within 20 years of the applicable statutory deadline, including **depletions of interconnected surface water that have significant and unreasonable adverse impacts on beneficial uses of the surface water** (23 CCR § 354.22 *et seq*. and Water Code §§ 10721(x)(6) and 10727.2(b)) and describe monitoring networks that can identify adverse impacts to beneficial uses of interconnected surface waters (23 CCR § 354.34(c)(6)(D)); and
- GSPs must **account for groundwater extraction for all water use sectors,** including managed wetlands, managed recharge, and native vegetation (23 CCR §§ 351(al) and 354.18(b)(3)).

Furthermore, the Public Trust Doctrine imposes a related but distinct obligation to consider how groundwater management affects public trust resources, including navigable surface waters and fisheries. Groundwater hydrologically connected to surface waters is also subject to the Public Trust Doctrine to the extent that groundwater extractions or diversions affect or may affect public trust uses. (*Environmental Law Foundation v. State Water Resources Control Board* (2018), 26 Cal. App. 5th 844; *National Audubon Society v. Superior Court* (1983), 33 Cal. 3d 419.) The GSA has "an affirmative duty to take the public trust into account in the planning and allocation of water resources, and to protect public trust uses whenever feasible." (*National Audubon Society*, *supra*, 33 Cal. 3d at 446.) Accordingly, groundwater plans should consider potential impacts to and appropriate protections for ISWs and their tributaries, and ISWs that support fisheries, including the level of groundwater contribution to those waters.

In the context of SGMA statutes and regulations, and Public Trust Doctrine considerations, groundwater planning should carefully consider and protect environmental beneficial uses and users of groundwater, including fish and wildlife and their habitats, GDEs, and ISWs.

COMMENTS AND RECOMMENDATIONS

CDFW is writing to support ecosystem preservation and enhancement in compliance with SGMA and its implementing regulations based on CDFW expertise and best available information and science. CDFW is providing the comments and recommendations below.

1. Sampling

Groundwater Dependent Ecosystems

Within the Indio Subbasin Alternative Plan, the Indio Subbasin, along with lands beyond the Subbasin that are, or in the future may be, reliant on groundwater pumped from the Subbasin are included (Plan Area). The Plan Area is geographically divided into West Valley and East Valley (refer to Attachment A). It is indicated that DWR recommended that an update be provided that identifies GDEs in the Indio Subbasin, with this being accomplished "**using best available**

information (including data available from DWR) and by applying the expertise of a professional wetland scientist (emphasis added)". DWR provides the Natural Communities Commonly Associated with Groundwater (NCCAG) dataset through the online SGMA data portal. This NCCAG dataset was used for initial identification of potential GDEs in the Subbasin". The NCCAG dataset locations were assessed by a licensed wetlands biologist that included a review of the U.S. Environmental Protection Agency ecoregions and a preliminary review of special-status (threatened and endangered) species. The desktop assessment used publicly available statewide and regional data layers and involved visual review of 1,045 individual locations to determine potential GDE status. The biologist then selected 15 locations for GDE field assessment with 13 sites being accessible. Upon completion of the in-person field verification, the preliminary desktop GDE assessment was refined into three categories: Probable GDEs, Probable non-GDEs, and Playa Wetland Communities (Indio Subbasin Alternative Plan Section 4.6 Groundwater Dependent Ecosystems).

Probable GDEs were defined as 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. Fifty (50) of the 1,045 sites (5%) were determined to be Probable GDEs. Probable Non-GDEs were classified as "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 humanmade ponds, lakes, and other features, channelized drains, and areas with 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 classified as Probable Non-GDEs". Of the 1,045 sites, 932 sites (89%) were determined to be Probable non-GDEs. A 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 is exposing thousands of acres of playa each year and water from irrigation ditches and other drainages that previously flowed directly into waters of the Sea now spreads out on the exposed playa of the Sea where new vegetation and wetlands currently exist as a result". Of the 1045 sites, 63 (6%) were determined to be Playa Wetland Communities.

A Technical Memorandum, *Indio Subbasin Groundwater Dependent Ecosystems Study* (Woodard & Curran, 2021) was provided in Appendix 4-B and reviewed by CDFW. While DWR may encourage "best available information", CDFW tries to rely on credible science in all resource management decisions. [FGC § 703.3.] Accordingly, CDFW expects groundwater/alternative plans and supporting documentation to follow 'best available science' practices. For more information on the application of scientific concepts that can improve the likelihood that a groundwater plan will avoid impacts to fish and wildlife beneficial uses and users of groundwater, GDEs, and ISW, please visit: https://wildlife.ca.gov/Conservation/Watersheds/Groundwater.

While the use of a large sample size that is well distributed may be adequate, CDFW is not clear on what publicly available statewide and regional layers were visual reviewed to determine the 1,045 reference GDE sites used for the baseline data. CDFW downloaded the NCCAG dataset (Klausmeyer et al., 2018) from ESRI ArcGIS online (See Attachments B and C). Eleven (11) types of wetland habitat were identified within the Indio Subbasin Area, including:

- Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded
- Lacustrine, Limnetic, Unconsolidated Bottom, Permanently Flooded, Hyperhaline
- Lacustrine, Littoral, Unconsolidated Shore, Sand, Seasonally Flooded
- Palustrine, Scrub-Shrub, Broad-Leaved- Evergreen, Semipermanently Flooded
- Palustrine, Scrub-Shrub, Broad-Leaved- Evergreen, Seasonally Flooded
- Palustrine, Scrub-Shrub, Seasonally Saturated
- Palustrine, Scrub-Shrub, Seasonally Flooded
- Palustrine, Forested, Emergent, Persistent, Seasonally Saturated
- Palustrine, Emergent, Persistent, Seasonally Flooded
- Palustrine, Unconsolidated Bottom, Permanently Flooded
- Warm Semi-Desert/Mediterranean Alkali–Saline Wetland

There were also several vegetation communities identified as NCCAG within the Indio Subbasin (Alkaline Mixed Scrub, Alkaline Mixed Grasses, Alkali Desert Scrub, Blue Palo Verde, Desert Riparian, Desert Willow, Desert Mixed Wash Shrub, California Sycamore, Catclaw Acacia, Common Elderberry, Fremont Cottonwood, Honey Mesquite, Riparian Mixed Hardwood, Riversidean Alluvial Scrub, Scalebroom, and Tamarisk). After comparing and reviewing the information provided on the NCCAG, CDFW is concerned that the analysis within the Indio Subbasin Alternative Plan is not scientifically robust and would like clarification regarding why areas mapped as NCCAG are not part of the 1,045 GDE reference sites in the Plan Area, as well as why only field visits were performed for 13, or 1%, of the possible GDE locations.

It should be noted that DWR cautions that because the NCCAG dataset was not verified, a more thorough evaluation of NCCAG-identified locations should occur. The NCCAG dataset is also limited due to “a comprehensive understanding of geology, hydrology, and biology not being available at the statewide scale; thus…. further investigation and verification of the connection and dependence between groundwater and mapped vegetation and wetlands at a local scale may be needed for water managers in sustainable groundwater management planning.” (Klausmeyer et al., 2018). Finally, Figure 4-36 GDE Assessment (refer to Attachment D) illustrates that a disproportionate number of GDEs occur in the southern half of the Indio Subbasin, yet most of the probable GDEs were determined to be within the canyons in the northern portion of the subbasin. For even the few that were classified as ‘Probable GDEs’, it is suggested that these may not be groundwater dependent, but rather, “may be associated with surface runoff, snowmelt, or springs and seeps from up-gradient sources”. Conversely, it does disclaim that “due to their location in upper canyons where groundwater extraction is generally not occurring, the specific areas in the Indio Subbasin where Probable GDEs were identified do not have existing groundwater data available for review”. Again, CDFW would like a more scientific, detailed analysis and discussion on GDEs given the importance of these state resources.

Representative Wells

Fifty-three (53) key wells were chosen (Attachment E) to monitor groundwater levels with respect to a Minimum Threshold (MT), or an established threshold that when crossed, an undesirable result occurs. For the Indio Subbasin Alternative Plan, the MT was defined by the GSA as “five consecutive low season monitoring events in 25% of wells across the subbasin (Section 10.1.1.1 Spatial and Vertical Coverage).

The inclusion of key wells in the groundwater level monitoring program included the following factors:

- Spatial distribution and density of wells, accounting for variable geographic conditions including topography, hydrology, geologic structures, aquifer characteristics, confined and unconfined conditions, pumping patterns, management activities (including replenishment), and potential impacts to beneficial uses/users.
- Length, completeness, and reliability of historical groundwater level record.
- Well depth and information on well construction.
- Regular access to the well for measurements.

CDFW would like to understand how the GSA determined 25% of wells over five consecutive low seasons as a MT, whether this will this be further analyzed, and if there is adaptive management that is proposed. CDFW also encourages that when choosing reference wells, GSEs, ISWs, and/or areas of biological concern/interest be considered, including whether the MT is sufficient to detect deleterious impacts to these areas.

2. State Sensitive Species

The Coachella Valley Association of Governments (CVAG), a joint powers authority of elected representatives, completed a Multispecies Habitat Conservation Plan (HCP; United States Fish and Wildlife 10(a)(l)(B) incidental take permit # R8-AES) and Natural Community Conservation Plan (NCCP; Permit No. 2835-2008-001-06) in 2008 (termed herein as 'CVMSHCP/NCCP'). The CVWD, as a Permittee of the CVMSHCP/NCCP, has incidental take for its operations and maintenance covered activities for twenty-seven (27) species within the CVMSHCP/NCCP Plan Area. Any other activities/actions that are not a covered activity of the CVMSHCP/NCCP, or is performed by a non-participant, that may take a California Endangered Species Act (CESA) listed species is prohibited, except as authorized by state law (Fish and Game Code, §§ 2080 & 2085). CDFW recommends that the GSA, or an individual water agency, seek appropriate authorization prior to implementation. This may include an incidental take permit (ITP) or a consistency determination (Fish & Game Code, §§ 2080.1 & 2081). Also, Fish and Game Code section 3503 makes it unlawful to take, possess, or needlessly destroy the nest or eggs of any bird, except as otherwise provided by Fish and Game Code or any regulation made pursuant thereto. Fish and Game Code section 3503.5 makes it unlawful to take, possess, or destroy any birds in the orders Falconiformes or Strigiformes (birds-of-prey) to take, possess, or destroy the nest or eggs of any such bird except as otherwise provided by Fish and Game Code or any regulation adopted pursuant thereto. Fish and Game Code section 3513 makes it unlawful to take or possess any migratory nongame bird except as provided by the rules and regulations adopted by the Secretary of the Interior under provisions of the Migratory Bird Treaty Act of 1918, as amended (16 U.S.C. § 703 et seq.).

3. Groundwater Dependent Ecosystems Impact Analysis

Within the Indio Subbasin Alternative Plan, wells that had long-term water level data were selected to analyze groundwater conditions (elevations, flows, trends over time, vertical groundwater gradients and depth to groundwater, and regional groundwater level changes). Since groundwater elevations of the principal aquifer are averaged over the water year; the most current representative, or the 2018-2019 water year, was selected "as local groundwater levels do not exhibit strong seasonal trends" (Indio Subbasin Alternative Plan Section 4.1.1 Groundwater Elevations, Flow, and Trends). Thirty (30) of these monitoring and production wells were used to calibrate the Indio Subbasin model by looking at the water level residual (differences between observed and simulated levels) trends (Section 7.3.3.2 Observed vs. Simulated Hydrographs).

CDFW examined potential suitable habitat for state sensitive riparian birds (least Bell's vireo (*Vireo bellii pusillus*), summer tanager (*Piranga rubra*) , southern willow flycatcher (*Empidonax traillii extimus*), and yellow-breasted chat (*Icteria virens*)) and wetland (California black rail (*Laterallus jamaicensis coturniculus*), Yuma clapper rail (*Rallus longirostris yumanensil*)), amphibians (arroyo toad (*Anaxyrus californicus*)), and fish (desert pupfish (*Cyprinodon macularius*)) using GIS shapefiles available from the CVMSHCP/NCCP. Given that the simulated water levels are "generally very well matched with the observed groundwater trends for all shallow and deep wells across the Indio Subbasin" (Section 7.3.3.1 Simulated Groundwater Elevation Contour Maps), as well as there are not strong seasonality water fluctuations, CDFW also chose a representative calibration well from each subarea that was closest to each of the biological resource of interest. The calibrated well groundwater elevation hydrographs and the CVMSHCP/NCCP biological resources are shown in Attachment F.

A brief description of each subarea is summarized below.

(A) *West Valley/Palm Springs Subarea* - This subarea showed dynamic fluctuations (i.e., over 300 feet in response to very large recharge years associated with recharge events), with large water level mounding and recovery cycles. Model-simulated levels were very closely matched with observed levels, both with respect to peak and valley magnitudes and timing.

(B) and (C) *Mid-Valley/Thousand Palms to Indian Wells Area* - Observed levels at this location exhibited declines from 1997 through 2010, then were characterized by relatively stabilized levels through 2019. The model simulates these trends generally well, although the simulated levels were lower than observed in two of the wells near the City of Indio. This was speculated to be due to sources of error in the numerical simulation, underestimation of return flow recharge in local areas, or inaccuracies in other model parameters. Regardless, the model "generally captures the measured levels in this area showing declines through 2010 followed by stable trends".

(D) *East Valley/ Thomas E. Levy Groundwater Replenishment Facility Area* - Observed levels exhibited declines from 1997 through 2009, then rapidly increased through 2019 in response to initiation of the Thomas E. Levy Groundwater Replenishment Facility (TEL-GRF) operations. The model simulated trends well, with it responding to recharge operations and simulated levels and observed being well-matched.

(E) *East Valley/Mecca, Oasis, and Salton Sea Areas* - The observed levels were relatively stable between 1997 through around 2010, then increased through 2019, likely in response to source substitution and in response to initiation of TEL-GRF operations. The model simulates these trends well.

For areas that have been mapped as a GDE, spectral characteristics of satellite imagery, including the Normalized Difference Vegetation Index (NDVI), can be used to illustrate how plant canopy absorbs and reflects light using the accompanying online mapping tool, GDE Pulse (The Nature Conservancy, Version 2.0: https://gde.codefornature.org/#/home). CDFW reviewed the NDVI for the Indio Subbasin from 1985 through 2018 along with the reference well hydrograph findings (Attachments G and H). Most notably, the TEL-GRF (D) and Mecca, Oasis, and Salton Sea Areas (E) in the East Valley showed a water decline (D) or stable (E) period from 1997 through 2009, with both regions having a rapid increase in water from 2009 to 2019. Conversely, the NDVI from these areas illustrated small areas where the NDVI decreased (Attachment I and J), with the primary decline being between the latter five (5) years, or from 2014-2018 (Attachments K and L). CDFW believes that analyzing the NDVI in relation to water gain/loss could be useful within the Indio Subbasin Alternative Plan and advocates for further investigation to the causes of this decrease in vegetation canopy (e.g., water stress).

4. Groundwater Dependent Ecosystems/Interconnected Surface Waters Biological Importance Considerations

Numerous sensitive plant communities are known to occur in southern California. While all these unique plant communities are important, other habitats that are often not traditionally considered “riparian” or “wetlands” need to be considered. Because Southern California GDE habitats vary widely regarding species composition, geomorphology, and hydrologic regimes, three habitat types/water features have been focused on in the Indo Subbasin: springs (with or without associated vegetation), artificial drainages, and ephemeral desert washes/aeolian desert dunes.

Springs and Associated Habitat

There are different types of springs – artesian, gravity, perennial, intermittent and seepage. Artesian springs usually occur along faults, or in areas of great topographic relief (i.e., cliffs or valleys). Groundwater pumping that causes aquifer levels to drop may result in different types of springs drying out, even if the amount of groundwater stored in the aquifer is still very large (Danielopol et al. 2003; Strayer 2006). There are also various natural and anthropogenic mechanisms that can cause groundwater declines that stress GDEs, but little quantitative information exists on the nature of plant responses to different magnitudes, rates, and durations of groundwater decline. In places where unsustainable groundwater extraction has depleted aquifers and caused springs to dry up, spring dwelling and groundwater-dependent species have gone extinct (Danielopol et al. 2003; Strayer 2006). Many water dependent state listed species rely on mountain spring fed water for their existence including, but not limited to desert pupfish, mountain yellow-legged frog (*Rana muscosa*), and arroyo toad. Further, many terrestrial species also depend on spring water for their survival. For example, Peninsular bighorn sheep (*Ovis canadensis nelson*), a state endangered species, are thought to migrate seasonally during the hot season, where they center their activity near standing water (5-year Review for Peninsular bighorn sheep, 2011). Refer to Attachment M for more details.

Because these GDEs can include both precipitation and groundwater-dominated systems and may include the presence of state sensitive resources, CDFW would like to understand more regarding what was selected as a threshold for identifying springs as a ‘probable GDE’. Springs may be without vegetation but still provide a valuable water source, while others may have vegetation that is atypical (i.e., Honey Mesquite) of those that are traditionally classified as 'riparian' (i.e., Cottonwood Forest). Further, although using a depth to water of less than 30 feet near stream channels is a standard threshold used as a screening tool for identifying possible phreatophyte areas, plant reactions can be highly variable, with other factors, such as soil texture and stratigraphy, availability of precipitation-derived soil moisture, physiological and morphological adaptations to water stress, and tree age; all, or in part, contributing to a plants' response to its hydrologic environment.

Because springs and their associated GDEs sustain a number of important landscape functions (Cohen et al. 2016), and are globally-recognized biodiversity hotspots (Murphy et al. 2015) that support locally endemic species, focus on sustaining these areas is vital. Data regarding springs/seeps is often lacking, with smaller ones frequently being undetected or overlooked because their discharges are inconsequential to the overall water budget of the area. Hydrologic connectivity between surface water and groundwater, as well as groundwater accessibility to terrestrial vegetation, is complex and any conclusions reached should be well-supported. This complexity is especially evident if the surface water is in between, or transitional, the surface waters are hydraulically connected to the underlying aquifer by a capillary fringe. Due to the capillary fringe connection, water table elevation changes can still affect the exchange rate of surface waters. Because lowering the groundwater elevation under a streambed without a continuous saturated connection to the underlying aquifer may in some cases increase the rate of loss from the surface water body into the underlying aquifer, the potential for increased loss rates during transitional states can ultimately increase the area or flow-duration of stream reaches that may be perceived as 'disconnected.'

Certain species may be more adept at taking advantage of groundwater and soil water at different times of the year (Busch and Smith 1995). Therefore, CDFW believes that more focus in identifying the water sources used by phreatophytic plants is also critical to understanding their link to, and degree of dependency upon, groundwater. For example, a study that observed groundwater dynamics and the response of Fremont cottonwoods (*Populus fremontii*), Gooding's willows (*Salix gooddingii*), and salt cedar (*Tamarix ramosissima*) saplings, all of which can occur within the Basin, showed that where the lowest groundwater level was observed (-1.97 meters in 1996 vs. -0.86 meters in 1995), 92 to 100% of the native tree saplings died, whereas only 0 to 13% of the nonnative salt cedar stems were compromised. Alternatively, where the absolute water table depths were greater, but experienced less change from the previous year conditions (-2.55 meters in 1996 compared to 0.55 meters in 1995), cottonwoods and willows experienced less mortality and increased basal area. Excavations of the sapling roots suggested that root distribution was related to the groundwater history, with a decline in the water table relative to the condition under which roots developed causing plant roots to be stranded where they could not obtain sufficient moisture (Shafroth et al. 2000). CDFW stresses that focused, scientifically driven studies, should be part of the groundwater monitoring to establish sustainable management criteria that avoid undesirable results to GDEs and ISWs. Some recommendations include, but are not limited to:

- Studying the fitness and various water sources to plants (relationships between incremental growth, branch growth, productivity, and canopy condition and hydrologic variables) to determine water sources and needs for phreatophytic vegetation.

- Understanding the relationship between plant age or developmental stage, root morphology, and water acquisition since vulnerability to water stress may decline as a function of age or developmental stage for many species.
- Using stable isotopes that can trace the water source to understand how many years it takes for woody plant seedlings or saplings to develop roots deep enough to acquire groundwater, or to determine the proportion of rain-recharged soil water that typical phreatophytes utilize (Stromberg and Patten 1991).

CDFW also contends that the Indio Subbasin Alternative Plan should include field measurements to determine water sources and needs for phreatophytic vegetation (Stromberg and Patten 1991, 1996; Lite and Stromberg 2005). Good plant morphological measurements can be useful in assessing riparian and wetland health and tracking changes in condition through time. For example, it is also expected that variation in the sources of water used by different tree species has important ramifications for riparian forest water balances. A study of tree transpiration water derived from the unsaturated soil zone and groundwater in a riparian forest was quantified for Fremont cottonwoods, Gooding's willows, and velvet mesquite (*Prosopis velutina*) across a gradient of groundwater depth and streamflow regime (San Pedro River, AZ). The proportion of tree transpiration derived from different potential sources was determined using oxygen and hydrogen stable isotope analysis in conjunction with two- and three-compartment linear mixing models. Comparisons of tree xylem water with that of potential water sources indicated that Gooding's willows did not take up water in the upper soil layers during the summer rainy period, but instead used only groundwater, even at an ephemeral stream site where depth to groundwater exceeded 4 meters. Conversely, Fremont cottonwoods, a dominant 'phreatophyte' in semi-arid riparian ecosystems, also used mainly groundwater, but at the ephemeral stream site during the summer rainy season, measurements of transpiration flux combined with stable isotope data revealed that a greater quantity of water was taken from upper soil layers compared to the perennial stream site.

Many vegetation attributes are supported by, and respond directly to, water availability. Both plant characteristics, as well as population and community attributes can assist in assessing the health and sensitivity to altered water availability so that informed decisions on proposed water extraction, groundwater pumping, and prescriptive and managed hydrologic regimes can be made.

Some recommendations include, but are not limited to, the following:

- Study specific parameters at certain locations, including vegetation volume, canopy height, woody plant stem and root density and woody plant basal area/ analysis of stomatal conductance and/or xylem pressure.
- Monitor wetted depth (e.g., piezometers with data loggers) within riparian corridors at various points from the main channel (e.g., furthest edge from main flowline).
- Perform aerial photographic analysis (e.g., small-unmanned aircraft systems) of canopy, vegetation diversity, distribution, and general riparian conditions including overall health at set locations of interest and control locations in spring and fall.
- Document lateral/spatial extent of GDEs over time.

- Perform field monitoring at established permanent grids and control sites that includes plant characteristics (water status, transpiration, rooting depth, and incremental growth) and population and community attributes (fitness, vulnerability to pathogens and herbivores, fecundity, competitive ability and productivity, population structure, and community composition and richness).

Artificial Drainages - Irrigation Canals

CDFW recognizes that groundwater levels in the Indio Subbasin East Valley have recovered as irrigation from the Colorado River water has been relied upon for farming rather than groundwater. Conversely, it stands to reason that as future urbanization and drought conditions increase, groundwater may be needed.

The Indio Subbasin Alternative Plan (Section 4.1.2 Vertical Groundwater Gradients (Artesian Conditions)) identifies artesian conditions in the Eastern Valley as:

> "Historically, eastern portions of the Indio Subbasin experienced artesian conditions with sufficient pressure to cause groundwater levels in wells to rise above the ground surface; such artesian-flowing wells attracted early settlers to farm in this area. Artesian conditions declined in the late 1930s as a result of increased local groundwater pumping. The completion of the Coachella Canal by the United States Bureau of Reclamation (USBR) in 1949 brought Colorado River water to the eastern Coachella Valley for agricultural irrigation purposes. Artesian conditions returned in the early 1960s through the 1980s, as imported Colorado River water was substituted for groundwater production. Beginning in the late 1980s, groundwater use increased again, resulting in declining water levels and loss of artesian conditions. Groundwater water management programs (including groundwater replenishment, source substitution, and water conservation) are restoring local groundwater levels, and artesian conditions have recurred in the eastern Indio Subbasin. Benefits associated with artesian conditions include reduced groundwater pumping costs and water quality protection of the deeper, confined production zone aquifers".

Because the depth to groundwater provides a general indication of locations where gaining streams and/or GDEs may be present, if the wells are near larger tributaries/ water bodies (i.e., Whitewater River, Salton Sea), water supply wells, which typically screen deep in the aquifer, should be noted and the groundwater elevation (potentiometric head) difference at the depth of the well screen and the water table (upper surface of the saturated zone) be recorded and tracked. Also, because recharge occurs at the land surface and pumping occurs at depth, the water level information can potentially underestimate the locations where the water table is shallow enough to support phreatophytic vegetation. Further, water extraction from wells could extend into a nearby water source (stream, canal, pond, or lake), causing it to become dry.

Desert pupfish are the only native fish species in the Salton Sea, and they can be found not only in natural creeks, but in shoreline pools, a few artificial refuge ponds, and agricultural drains in the Eastern Valley. CDFW would like clarification on what measures are proposed within the Indio Subbasin to identify, address, and manage (avoid and/or monitor any wells within 0.25 miles of known desert pupfish occupied or suitable areas) any well extraction effects (induced recharge, cone of depression/influence) on irrigation or sensitive areas that have, or could contain, the desert pupfish.

Ephemeral Desert Washes/Aeolian Desert Dunes

CDFW is uncertain that the Indio Subbasin Alternative Plan is relying on the common assumption that in ephemeral streams where an unsaturated zone exists beneath a stream, that the interaction between surface water and groundwater is unidirectional and therefore, does not contribute significantly to transmission losses. However, a recent study (Quichimbo 2020) has illustrated that bi-directional stream–aquifer hydraulic interactions in arid ephemeral streams may be greater than previously assumed and “groundwater and surface water should be considered as connected systems for water resource management unless there is clear evidence to the contrary”.

Aeolian processes support a variety of flora and fauna (i.e., Coachella fringe-toed lizard (*Uma inornate*) and Coachella Valley milk vetch (*Astragalus lentiginosus var. coachellae*)) that are specially adapted to blow sand deposits within harsh desert environments. The sediment-delivery system that creates these active sand dunes consists of fluvial depositional areas, with sediment being delivered during infrequent large winter storm events within larger drainages (e.g., Whitewater – San Gorgonio Rivers and Mission Creek – Morongo Wash) originating in the local surrounding mountains, or in smaller ephemeral drainages during intense summer thunderstorms. The particle-size distribution of sediments transported by these ephemeral streams varies depending on the transport process, with most sediment transported by streamflow ranging in size from sand to small gravel. Previous studies of sediment supply have evaluated the long-term sand budget in the northern Coachella Valley and how it might change given modifications to the major watercourses that provide sand to the aeolian system (USGS, 2002). While quantifying sand transport rates has been attempted with various results, CDFW is concerned that water management practices that impact not only large washes/rivers (e.g., retention basins, levees), but also smaller tributaries, could reduce the sand supply, potentially stabilizing the dunes and degrading habitat. Therefore, CDFW strongly recommends that the Indio Subbasin Alternative Plan include an analysis of the sediment aeolian processes (e.g., entrainment, sediment yield, sediment-transport modeling, etc.) where sand dunes could be impacted (Attachment N).

5. Conserved Lands

According to the CVMSHCP/NCCP (Section 1.4.4 Coachella Valley Multiple Species Habitat Conservation Plan):

> “The Coachella Valley Multiple Species Habitat Conservation Plan (CVMSHCP) (CVAG, 2016) is a multiagency conservation plan for the entire Coachella Valley and surrounding mountains to address State and Federal Endangered Species Act (ESA) compliance in the region. The CVMSHCP, last amended in 2016, defines a shared regional vision for balanced growth to enhance and maintain biological diversity and ecosystem processes while also fostering economic growth. The CVMSHCP protects 240,000 acres of open space and 27 species; enhances infrastructure without environmental conflicts; offers opportunities for recreation, tourism, and job creation; and ensures the survival of endangered species (CVAG, 2016). **The CVMSHCP was considered in the development of this Alternative Plan**

Update, with emphasis in the groundwater dependent ecosystem analysis (emphasis added)".

CDFW has jurisdiction over the conservation, protection, restoration, enhancement and management of fish, wildlife, native plants and habitat necessary for biologically sustainable populations of those species under the CESA (California Fish and Game Code §§ 2050 et seq.), the California Native Plant Protection Act (California Fish and Game Code §§ 1900 et seq.), the California Natural Community Conservation Planning Act ("NCCP Act") (California Fish and Game Code §§ 2800 et seq.) and other relevant state laws.

CDFW has worked with the Permittees of the CVMSHCP/NCCP to apply principles of conservation biology that capture the reserve design tenets described in the NCCP General Process Guidelines and NCCP Act (CDFG 1998). These reserve design tenets provided a framework for the conservation planning process and include:

- conserve focus species and their Habitats throughout the Plan Area;
- conserve large habitat blocks;
- conserve habitat diversity;
- keep reserves contiguous and connected; and
- protect reserves from encroachment and invasion by non-native species.

Although the Indio Subbasin Alternative Plan does consider the CVMSHCP/NCCP, CDFW advises that the various land use management plans governing state and federal lands, species management plans approved by state and/or federal agencies, and habitat conservation plans in adjoining or overlapping areas also be considered. More specifically, CDFW manages approximately 27,700 acres of land within the Indio Subbasin and CVMSHCP/NCCP Reserve System for the conservation of state sensitive resources. Using the CVMSHCP/NCCP GIS mapping tool, the conserved lands in relation to the Indio Subbasin are included in Attachment O.

The Santa Rosa Wildlife Area is approximately 101,500 acres with very steep terrain habitat for the largest herd of peninsular bighorn sheep. The Magnesia Spring Ecological Reserve, an approximately 3,800-acre property, and the Carrizo Canyon Ecological Reserve, approximately 1,000-acre, also have similar terrain that includes several narrow canyons. Both properties were acquired and designated an ecological reserve by the Fish and Game Commission to preserve a historic water supply and to maintain and improve habitat for this species. Similarly, the 485-acre Oasis Spring Ecological Reserve, which is located along the Salton Sea below the historical high-water mark, was designated as an ecological reserve by the Fish and Game Commission to provide habitat for the desert pupfish. CDFW also manages lands in the Coachella Valley Fringe Toed Lizard Preserve to protect aeolian processes that support a variety of flora and fauna (i.e., Coachella fringe-toed lizard (*Uma inornate*) and Coachella Valley milk vetch (*Astragalus lentiginosus var. coachellae*)) that are specially adapted to blow sand deposits within harsh desert environments.

CDFW recommends that the Indio Subbasin Alternative Plan focus on impacts to conserved lands to ensure that they function and provide benefits as intended in perpetuity.

6. Data Gaps

Geological

The Indio Subbasin Alternative Plan includes a numerical groundwater flow model and associated water budget with updated inflow and outflow data through 2019 that were used to assess groundwater conditions and future sustainability within the Plan Area. Other improvements include: (1) updated Salton Sea elevations; (2) more accurate land surface elevations and Salton Sea bathymetry; (3) more details regarding the Garnet Hill subarea; and (4) updated subsurface inflow boundary conditions from adjacent subbasins.

The improved model was applied to simulate transient three-dimensional groundwater flow within and between the shallow and deep aquifer zones, with a contiguous 50-mile cross section oriented along the central longitudinal axis of the Indio Subbasin (labeled A-A', A'-A'', and A''-A''') starting in the San Gorgonio Pass Subbasin in the northwest and ending at the northern shore of the Salton Sea in the southeast. Cross sections B-B', C-C', D-D', and E-E' (Indio Subbasin Alternative Plan Figures 3-10 through 3-13) were constructed perpendicular to the main axis of the Indio Subbasin. Collectively, these cross sections incorporate hydrogeologic information from the five main subareas of the Indio Subbasin, with cross section B-B' crossing the Palm Springs Subarea in the south and the Garnet Hill Subarea and the Mission Creek Subbasin in the north, and cross section E-E' intersecting the Oasis and Thousand Palms Subareas of the Indio Subbasin in the southwest and the Desert Hot Springs Subbasins in the northeast (Indio Subbasin Alternative Plan Section 3.5 Hydrogeologic Cross Sections). Refer to Attachment P for more details**.**

CDFW found this technique useful in providing information for the entire Subbasin (e.g., greatest depths to water were observed in the northwestern portion of the subbasin that was generally greater than 200 feet, depths to groundwater generally decreased to about 100 to 250 feet in the mid-subbasin area and then to zero or above the ground surface in artesian wells near the Salton Sea), but is unclear whether more specific details can be gained regarding the Salton Sea. Cross sections A'' – A''' and E-E' just north of the Salton Sea show the boundary between the upper and lower aquifers with shallow depths to water (Section 3.5.2 Perpendicular Cross Sections). In addition to relatively shallow or artesian conditions, this subarea (Thermal) is characterized by a shallow semi-perched aquifer (Indio Subbasin Alternative Plan Section 4.1.3 Groundwater Occurrence (Depth to Water)), as shown in Attachment Q. The Indio Subbasin Alternate Plan (Figure 3-2 Groundwater Subareas of the Indio Subbasin and Section 3.5.2 Perpendicular Cross Sections) concludes that the Barton Canyon subareas, which is located west of the northern shore of the Salton Sea, are "semi-water bearing and generally lack subsurface information". CDFW concurs with this observation given the lack of well information in this region. For example, with over 345 monitoring wells (52 CASGEM and 293 other) in the Plan Area, roughly only 12 appear to be within close proximity to this area (Please see Attachment R: Figure 2-11 Groundwater Elevation Monitoring Well Locations).

CVWD is a founding member of the Salton Sea Authority, with two members currently serving on its board. CDFW strongly recommends the GSA continue to address the concerns of the Salton Sea and its ecological value by closely monitoring and evaluating the elevational sea level changes, as well as the receding/increasing shoreline vegetation/water and the effects to the adjacent habitat along the northwestern shore of the Salton Sea.

Finally, major changes to the modeling included correcting the initial 1997 conditions in the Garnet Hill Subarea. In doing this, the effect of the Garnet Hill Fault was seen in the abrupt change in groundwater levels across the fault. Subsurface inflow across the Banning and San Andreas faults were also discussed from the Mission Creek and Desert Hot Springs Subbasins into the Indio Subbasin (Section 7.2.5.1 Subsurface Inflows). The Indio Subbasin Alternative Plan did express the need to conduct future analyses of the San Gorgonio and Mission Creek Subbasin boundaries to better estimate subsurface inflows from adjacent Subbasins. To update and improve the numerical model, the study will consider subsurface flow at faults and to the Garnet Hill Subarea, as well as adjacent groundwater Subbasins and their numerical models through coordination with other GSAs (Section 12.2.8.3 Subsurface Flow Study). CDFW suggests that if the available groundwater monitoring wells are not already appropriately located or constructed for the purpose of performing detailed high-quality evaluations of the effects of faults throughout the Subbasin faults (e.g., San Gorgonio Pass, San Jacinto Fault) under a variety of groundwater conditions, that this occurs and is incorporated into the updated analysis.

Sub/Surface Water

The Indio Subbasin Alternative Plan acknowledges that uncertainty exists in the actual amounts of inflow at the Indio Subbasin eastern boundary, with the subsurface outflow at the San Gorgonio Pass (SGP) Subbasin representing one of the largest unknowns in the water budget and groundwater modeling. CDFW appreciates that the Indio Subbasin GSA plans to reconcile the differences and refine outflow/inflow as a part of the next 5-Year Alternative Plan update to include: (1) a Sensitivity and Uncertainty Analysis using the SGP Subbasin MODFLOW model; (2) review upcoming data from three nested monitoring well clusters near the Subbasin boundary, followed by evaluation and model calibration to recent (and future) water level trends; and (3) include sensitivity simulations in the model using a range of subsurface inflows. CDFW also recommends that the monitoring network for groundwater-surface water interaction be enhanced to not only incorporate the use of existing stream gaging and groundwater level monitoring networks, but also include monitoring along ephemeral and intermittent water bodies (e.g., streams/washes, springs, seeps). Particularly, monitoring should entail a rigorous assessment that encompasses baseline data, control area(s), and/or similar reference watersheds (e.g., elevation, faulting, geomorphology, size, etc.) of water bodies and/or GDEs/ISWs that have high biological value. Some suggestions include, but are not limited to, the following:

- Determining the safe yield (water balance) in the sub-watershed containing the extraction points with inputs (precipitation gaging, groundwater inflow, and infiltration) and outputs (evapotranspiration gaging, overland flow, surface water outflow, and groundwater outflow including extraction), as well as a gridded surface water-groundwater model. *Note: Building and calibrating a fractured mountain-front hydrogeologic model is a longer-term goal given the lack of baseline data and the multiple parameters needed*.
- Performing stable isotope analysis through water sampling to measure travel time through the system to assess potential differences in recharge elevation and groundwater flow paths.

Also, the Indio Subbasin GSA should be aware that Fish and Game Code section 1602 requires an entity to notify CDFW prior to commencing any activity that may do one or more of the following: (1) Substantially divert or obstruct the natural flow of any river, stream or lake; (2) Substantially change or use any material from the bed, channel or bank of any river, stream, or lake; or (3) Deposit debris, waste or other materials that could pass into any river, stream or lake. This includes "any river, stream or lake" that are intermittent (i.e., those that are dry for periods of time) or perennial (i.e., those that flow year-round) with surface, or subsurface, flow.

CONCLUSION

In conclusion, though the Indio Subbasin Alternative Plan does address certain species and their habitat as identified in the CVMSHCP/NCCP, it does not comply with all aspects of SGMA statutes and regulations, and CDFW deems it insufficient in its consideration of fish and wildlife beneficial uses and users of groundwater and interconnected surface waters. CDFW recommends that the GSA address the above comments for the following reasons derived from regulatory criteria for GSP/Alternative Plan evaluation:

1. The assumptions, criteria, findings, and objectives, including the sustainability goal, undesirable results, minimum thresholds, measurable objectives, and interim milestones are not reasonable and/or not supported by the best available information and best available science (23 CCR § 355.4(b)(1)). (See Comments in Sections #1 – 6)
2. It does not identify reasonable measures and schedules to eliminate data gaps. (23 CCR § 355.4(b)(2)) (See Comments in Section #6)
3. The sustainable management criteria and projects and management actions are not commensurate with the level of understanding of the basin setting, based on the level of uncertainty. (23 CCR § 355.4(b)(3)) (See Comments in Sections #1-6)
4. The interests of the beneficial uses and users of groundwater in the basin, and the land uses and property interests potentially affected by the use of groundwater in the basin, have not been considered. (23 CCR § 355.4(b)(4)) (See Comments in Section # 5)

CDFW appreciates the opportunity to provide comments on the Indio Subbasin Alternative Plan. Please contact Kim Romich at (760) 937-1380 or at kimberly.romich@wildlife.ca.gov) with any questions.

Sincerely,

DocuSigned by:
Leslie MacNair
AFEAC2ED7258498...

Leslie MacNair
Regional Manager

Enclosures (Literature Cited; Attachments A-R) ec: California CDFW of Fish and Wildlife

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<u>Literature Cited</u>

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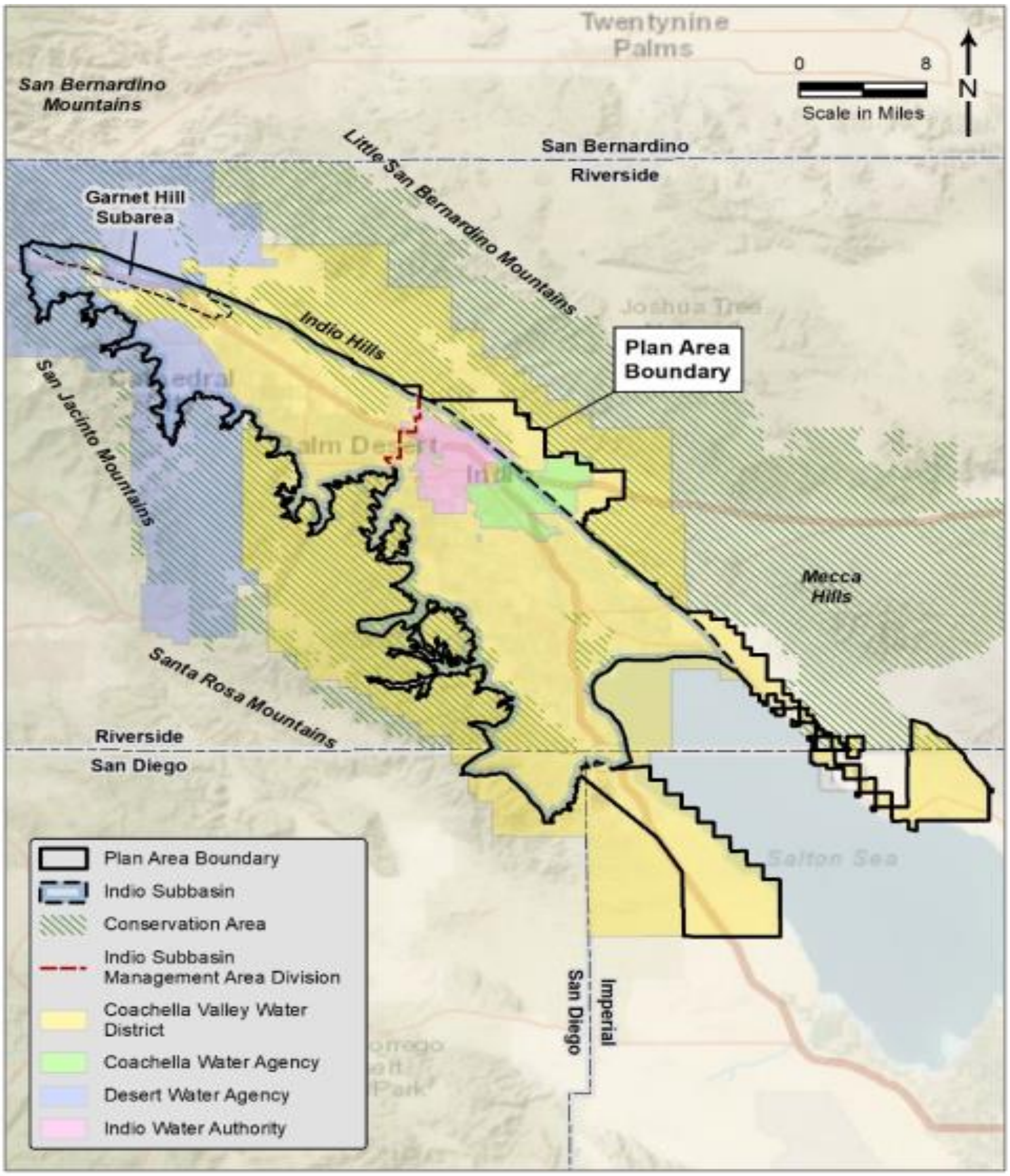
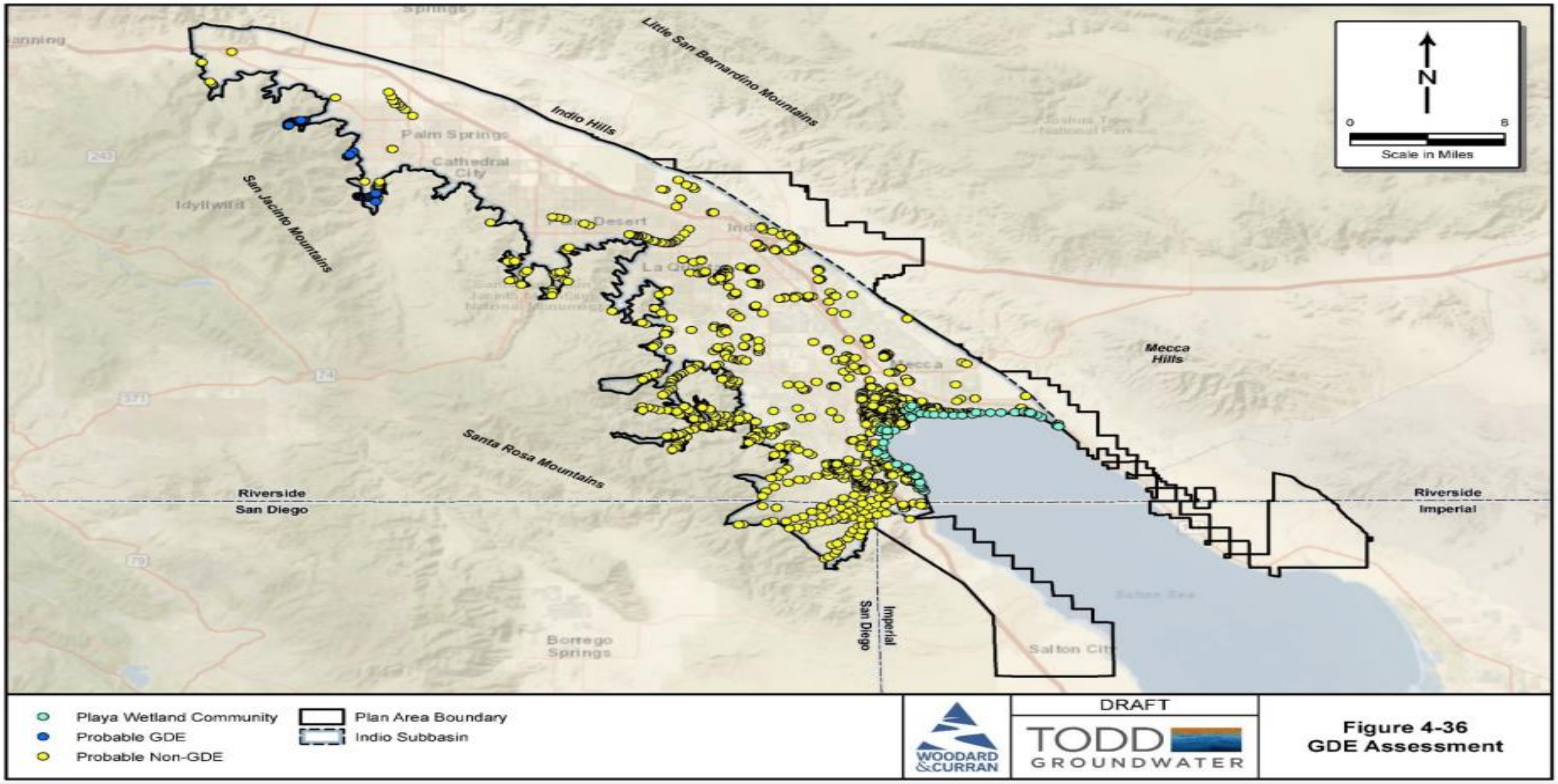
Attachment A:
Indio Subbasin Plan Area



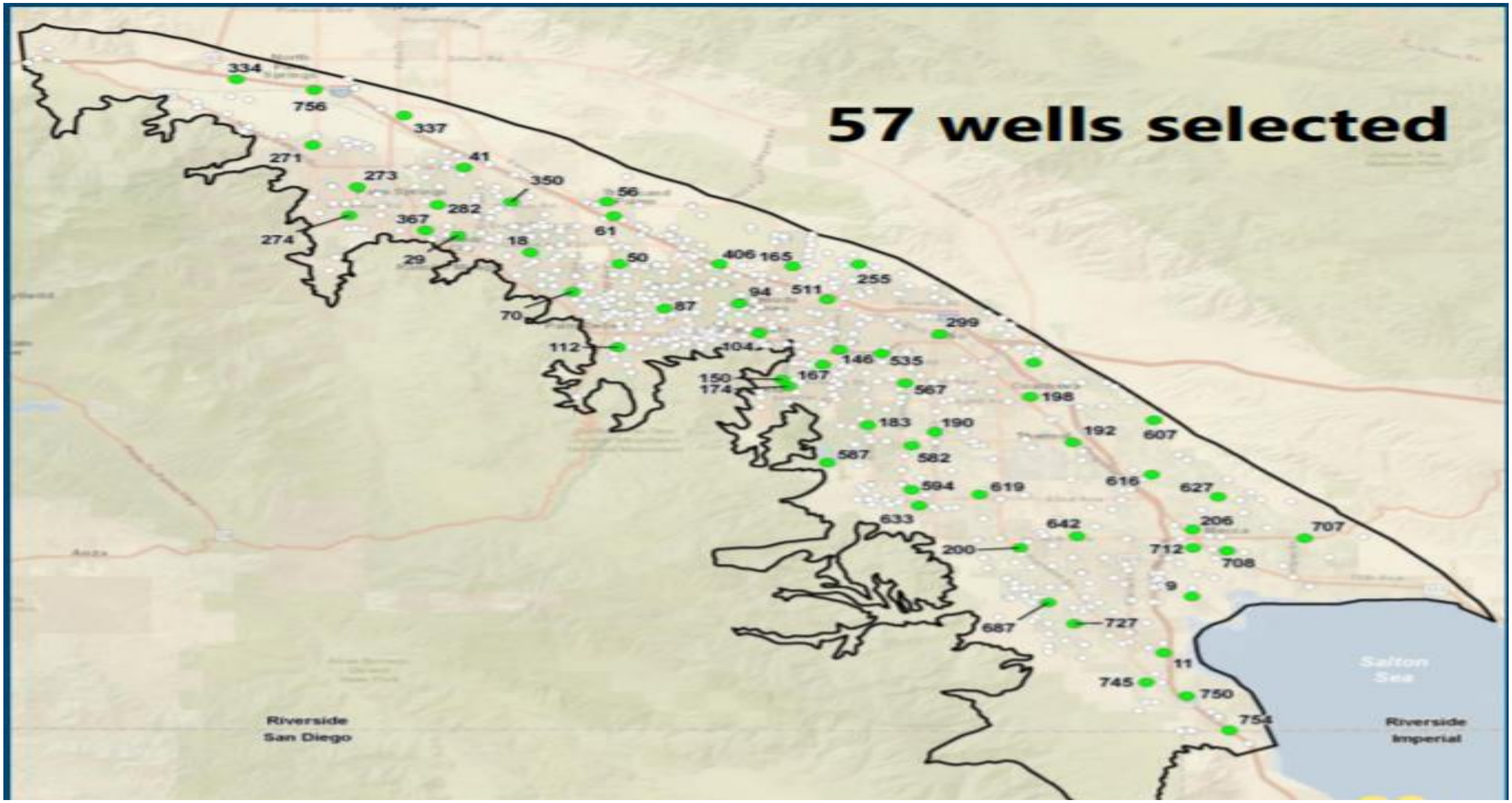
Attachment B:
Natural Communities Commonly Associated with Groundwater (NCCAG) within the East Valley.

Attachment C
Natural Communities Commonly Associated with Groundwater (NCCAG) within the West Valley.

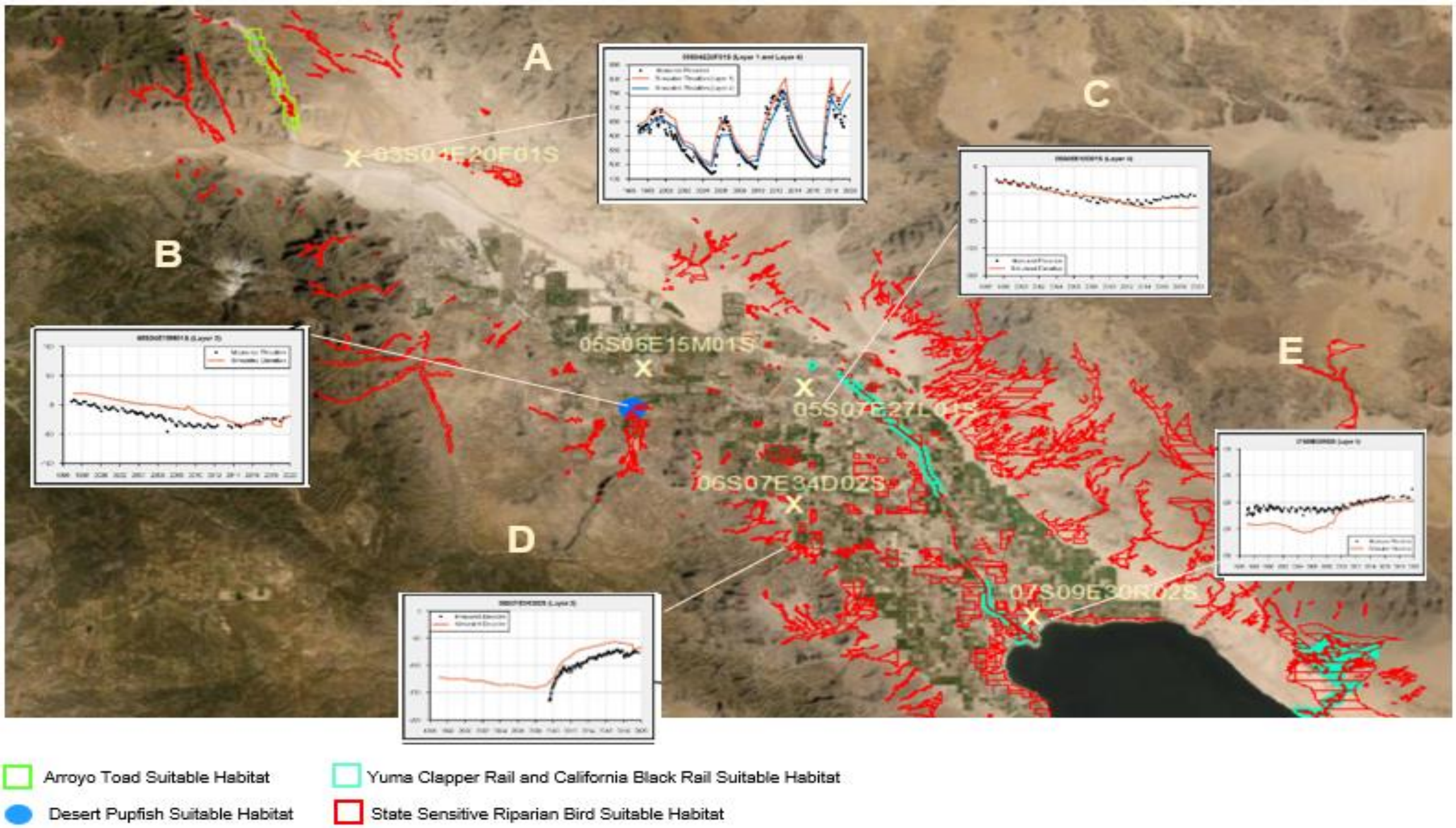
Attachment D:
Assessment for Groundwater Dependent Ecosystems (GDEs)



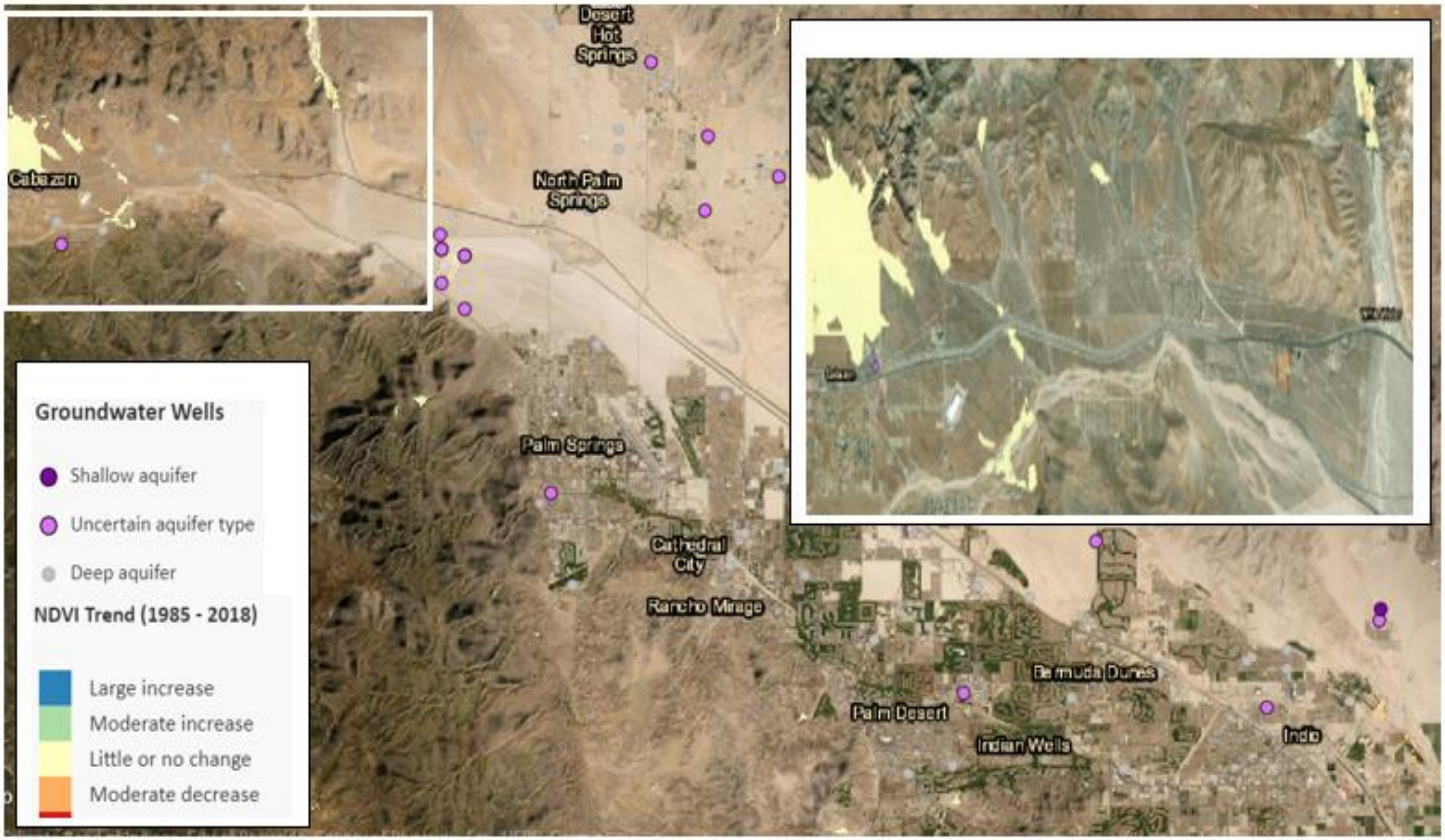
Attachment E:
Key Wells Chosen to Monitor Long-term Groundwater within the Indio Subbasin.



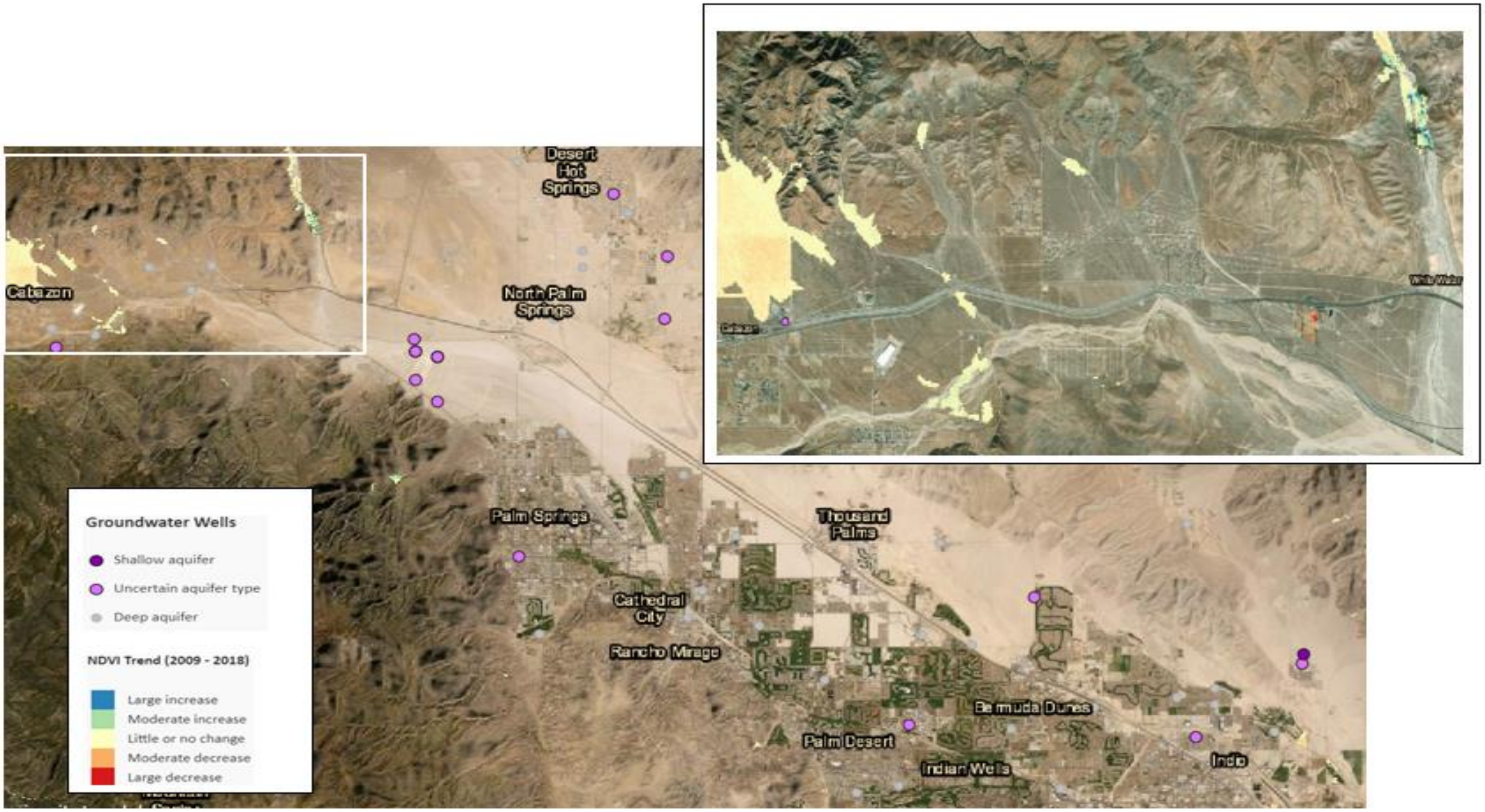
Attachment F:
Representative calibration well hydrographs from each subarea along with CVMSHCP/NCCP biological resources. Observed levels are shown as black points on the graphs, while simulated levels are shown as the orange lines.



Attachment G(1):
Overview of Normalized Difference Vegetation Index (NDVI) within the West Valley.

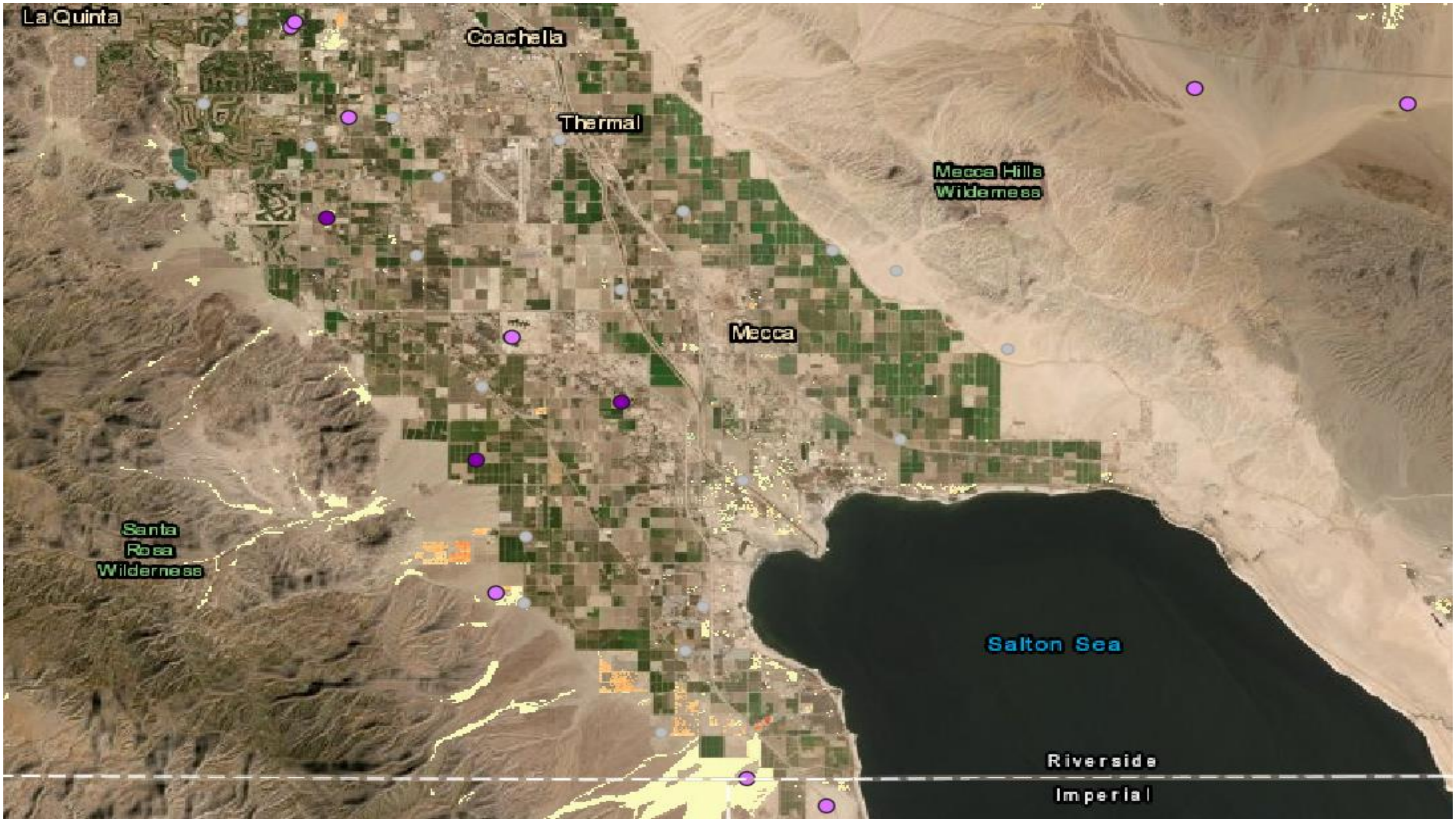


Attachment G(2):
Overview of Normalized Difference Vegetation Index (NDVI) within the West Valley.

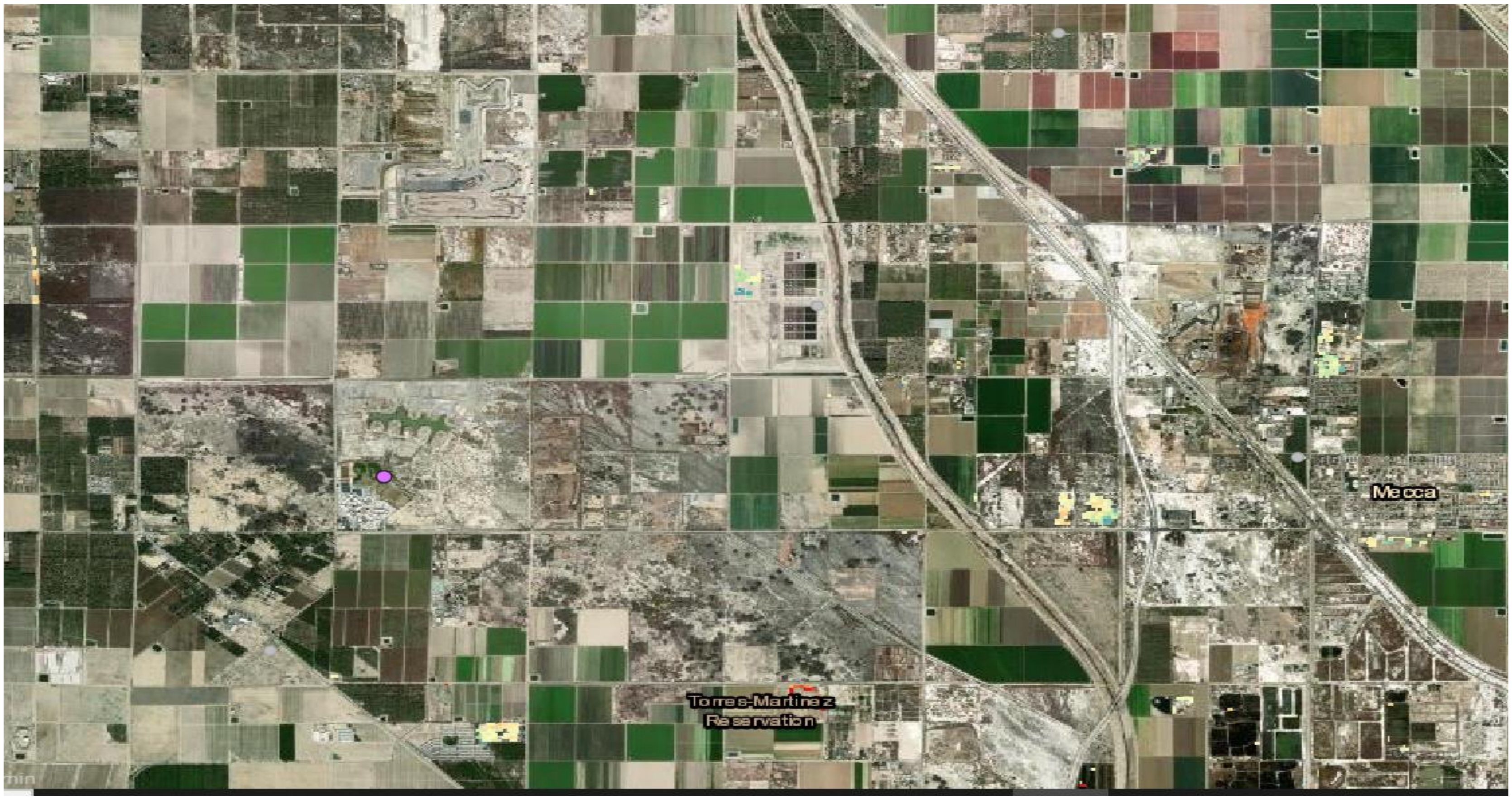


Attachment H:

Overview of Normalized Difference Vegetation Index (NDVI) within the East Valley.

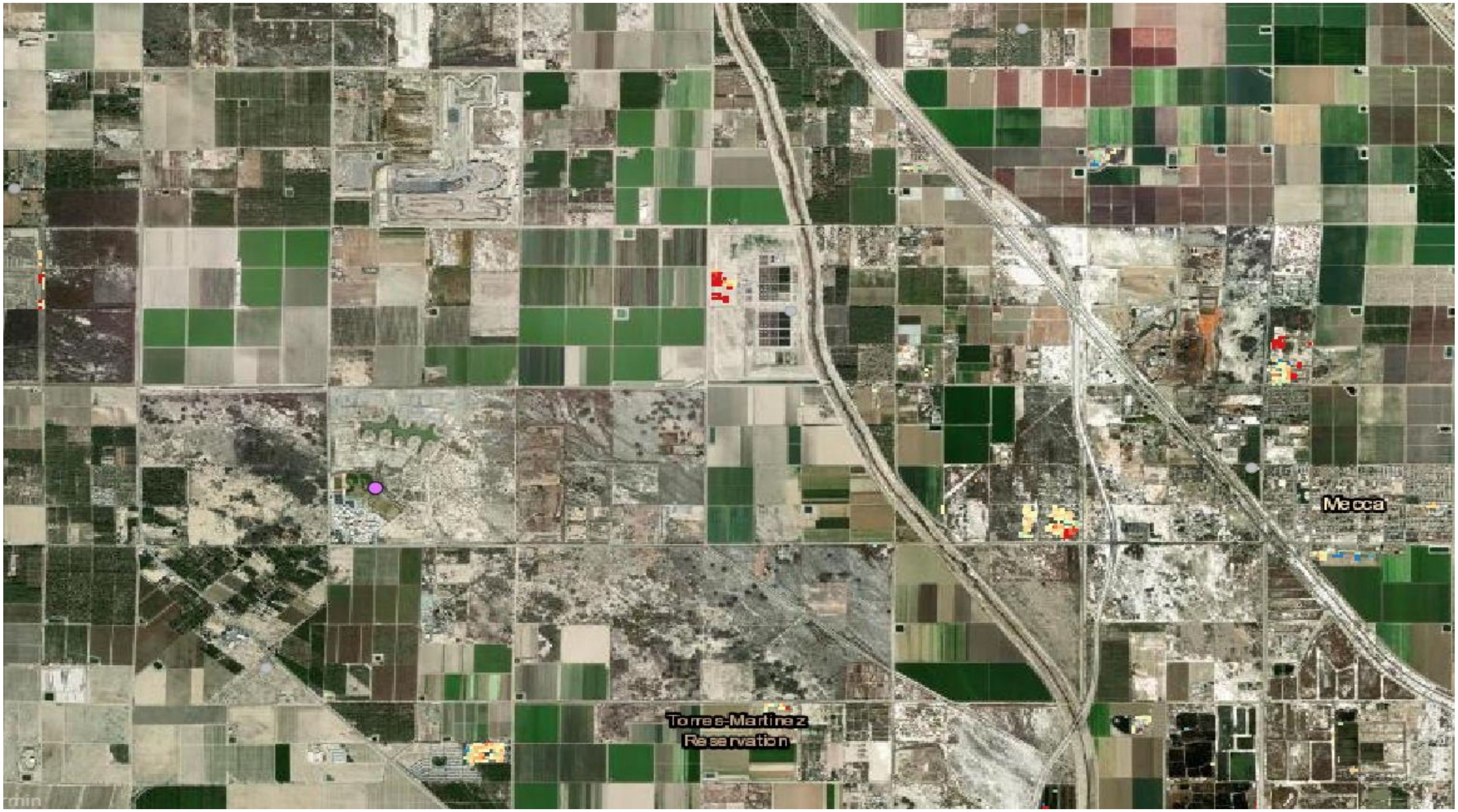


Attachment I:
Finer Scale View of the Normalized Difference Vegetation Index (NDVI)Trend within the East Valley at TEL-GRF Area (D) from 2009-2018.



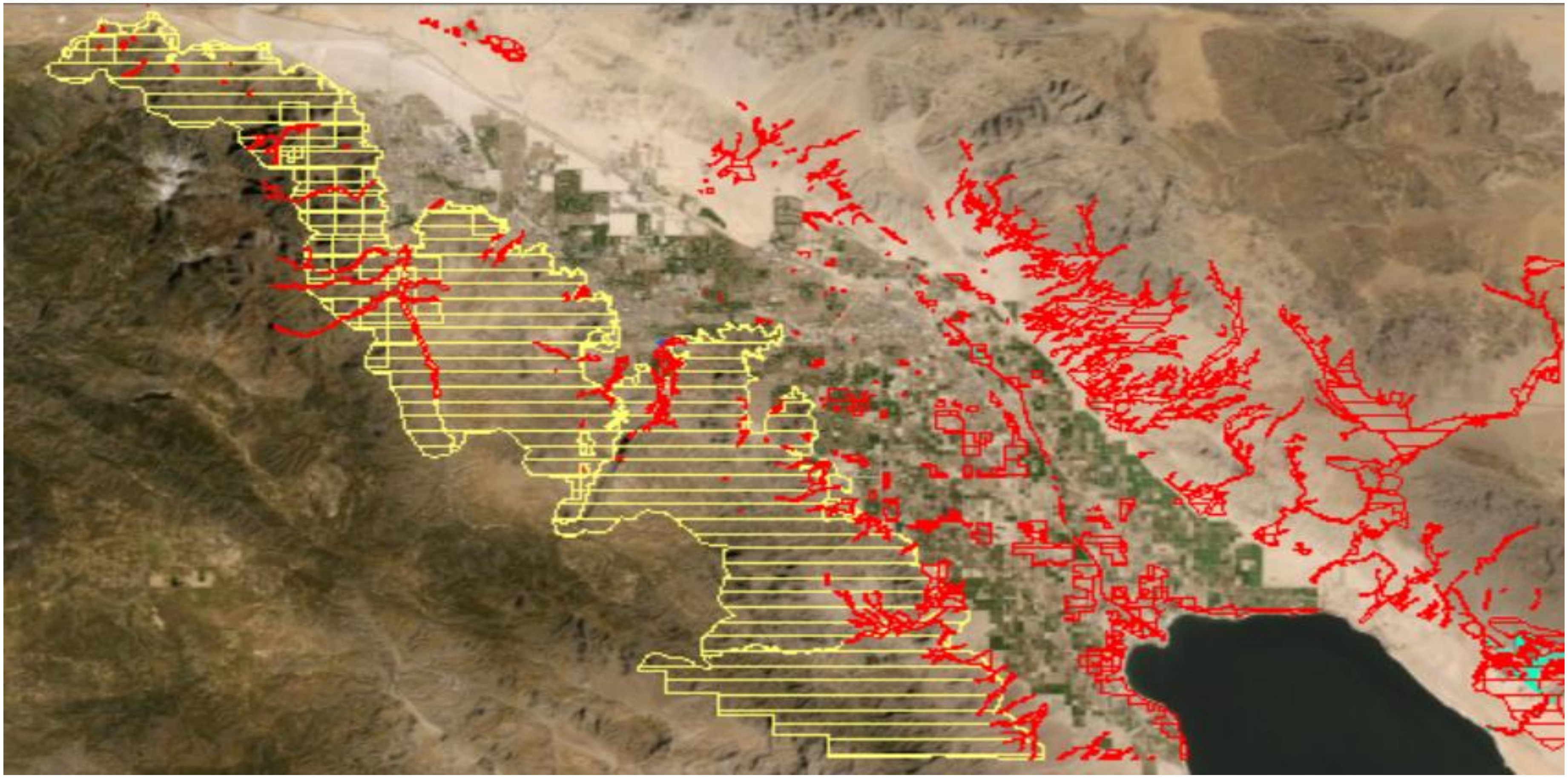
Attachment J:
Finer Scale View of the Normalized Difference Vegetation Index (NDVI)Trend within the East Valley at Mecca, Oasis, and Salton Sea Area (E) from 2009-2018.

Attachment K:
Finer Scale View of the Normalized Difference Vegetation Index (NDVI)Trend within the East Valley at TEL-GRF Area (D) from 2014 -2018.

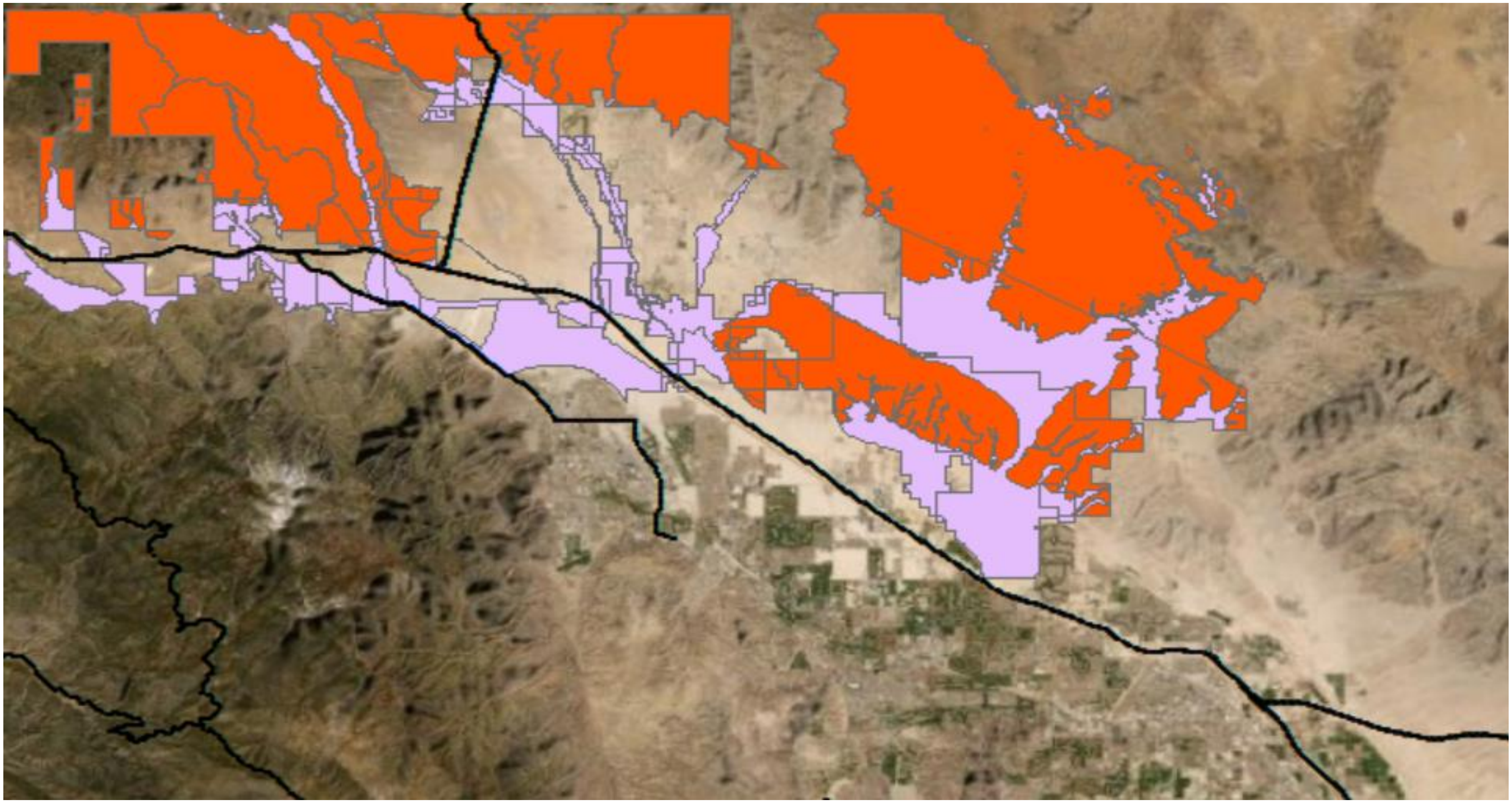


Attachment L:
Finer Scale View of the Normalized Difference Vegetation Index (NDVI)Trend within the East Valley at Mecca, Oasis, and Salton Sea Area (E) from 2014-2018.

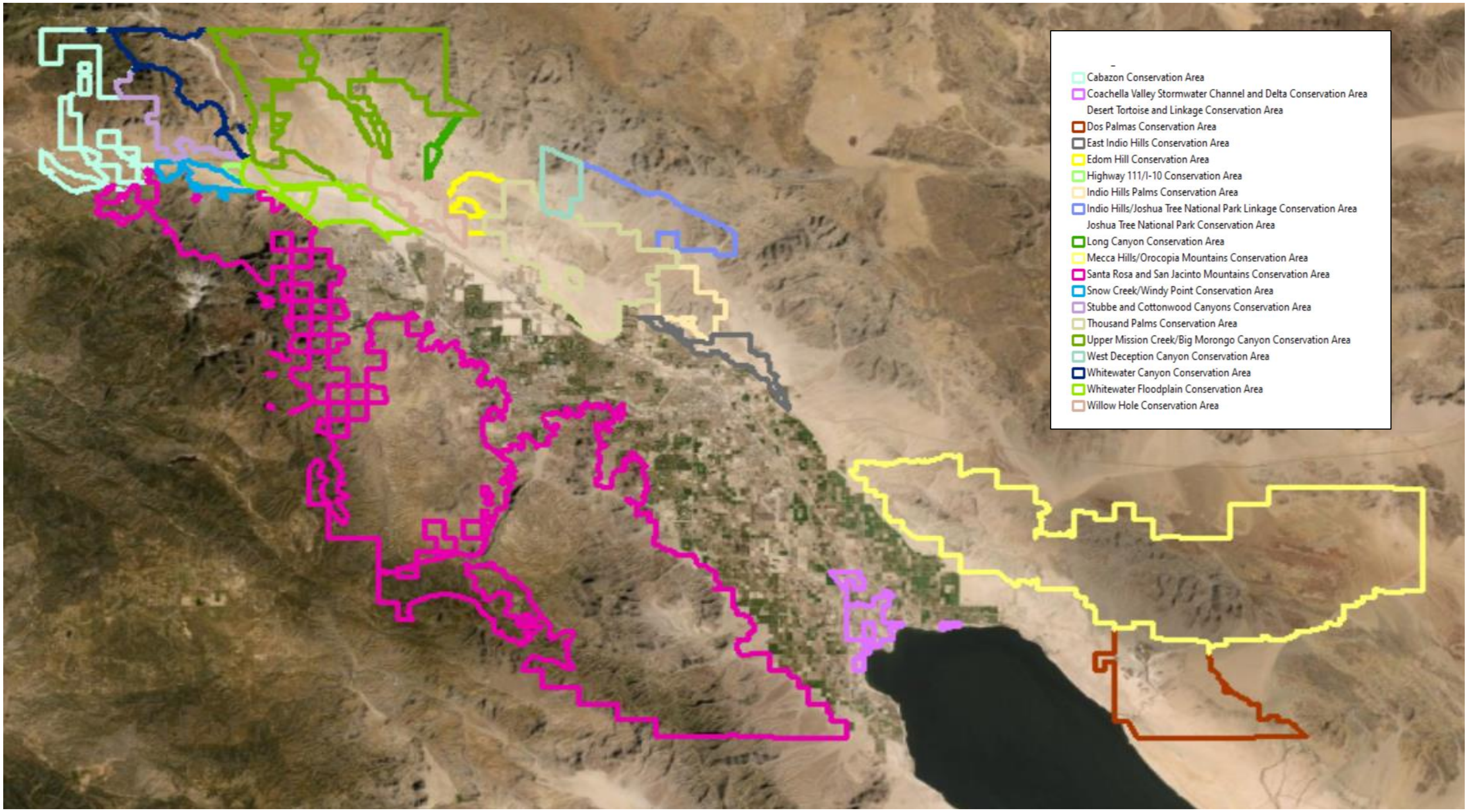
Attachment M:
Peninsular Bighorn Sheep Suitable Habitat Along with Riparian Areas as Identified in the Coachella Valley HCP/NCCP.



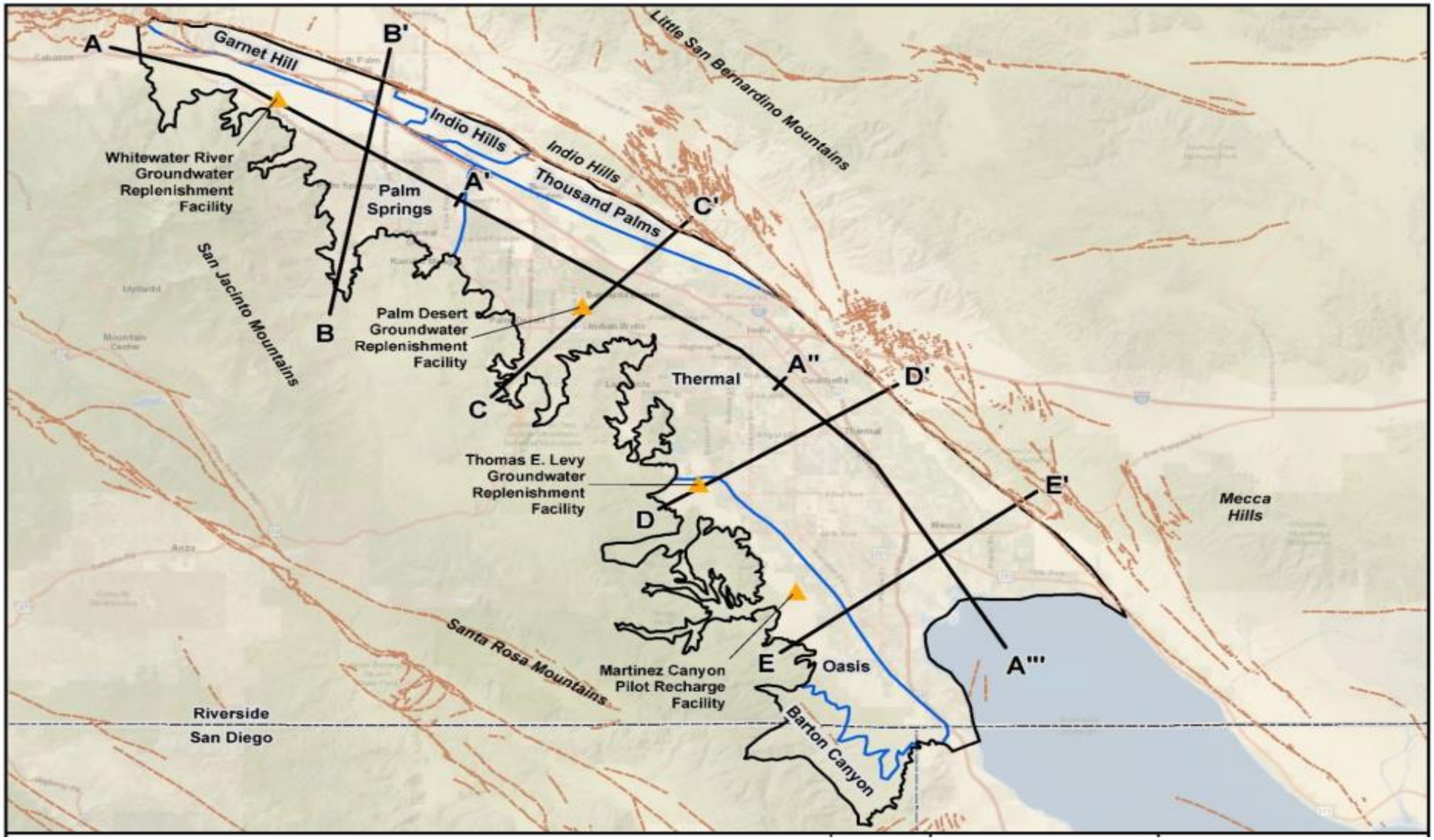
Attachment N:
Sand Source and Transport areas identified in the Coachella Valley HCP/NCCP.



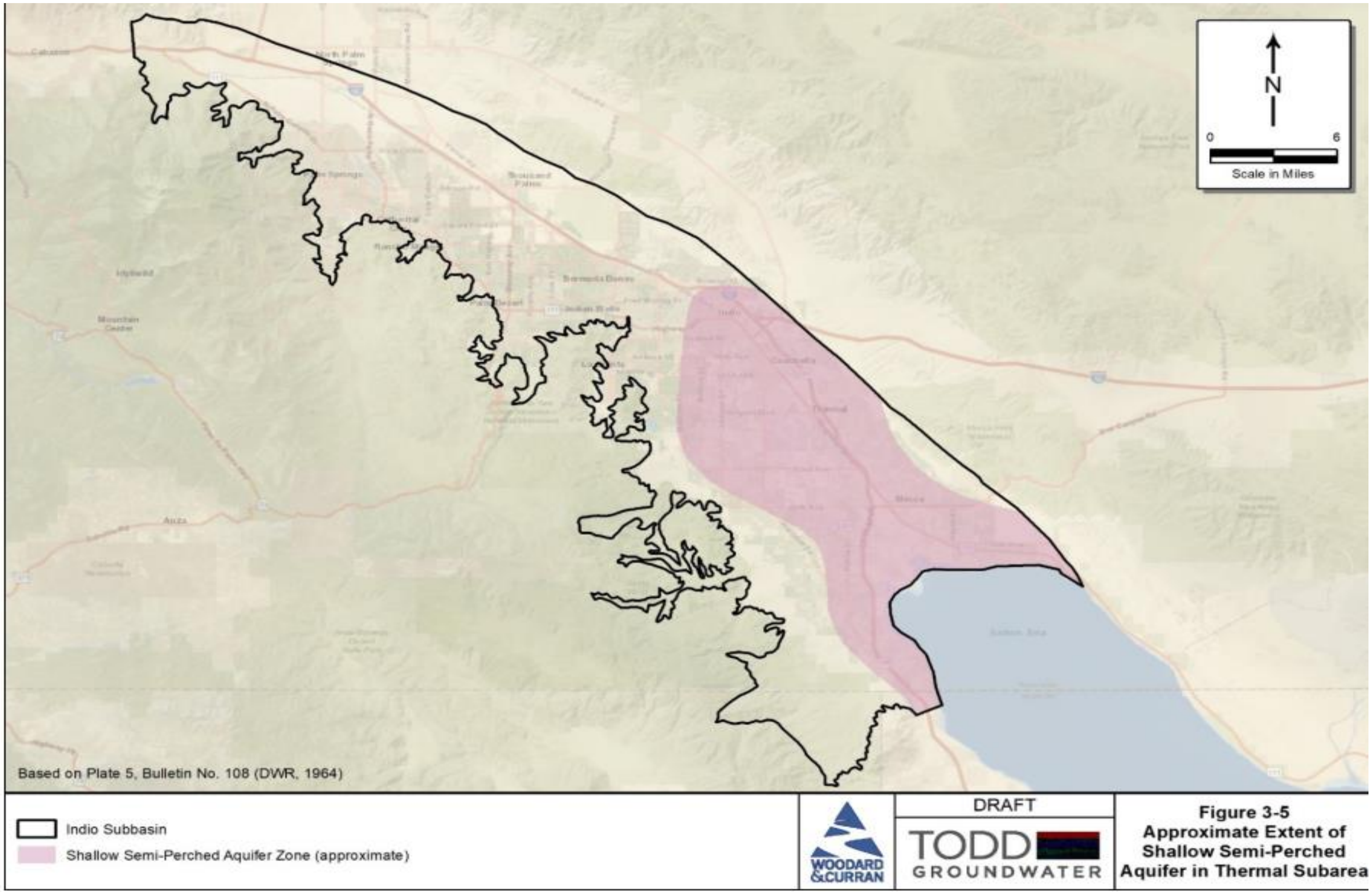
Attachment O:
Conservation Areas Identified in the Coachella Valley HCP/NCCP



Attachment P:
Transient Three-Dimensional Groundwater Flow Cross Sections

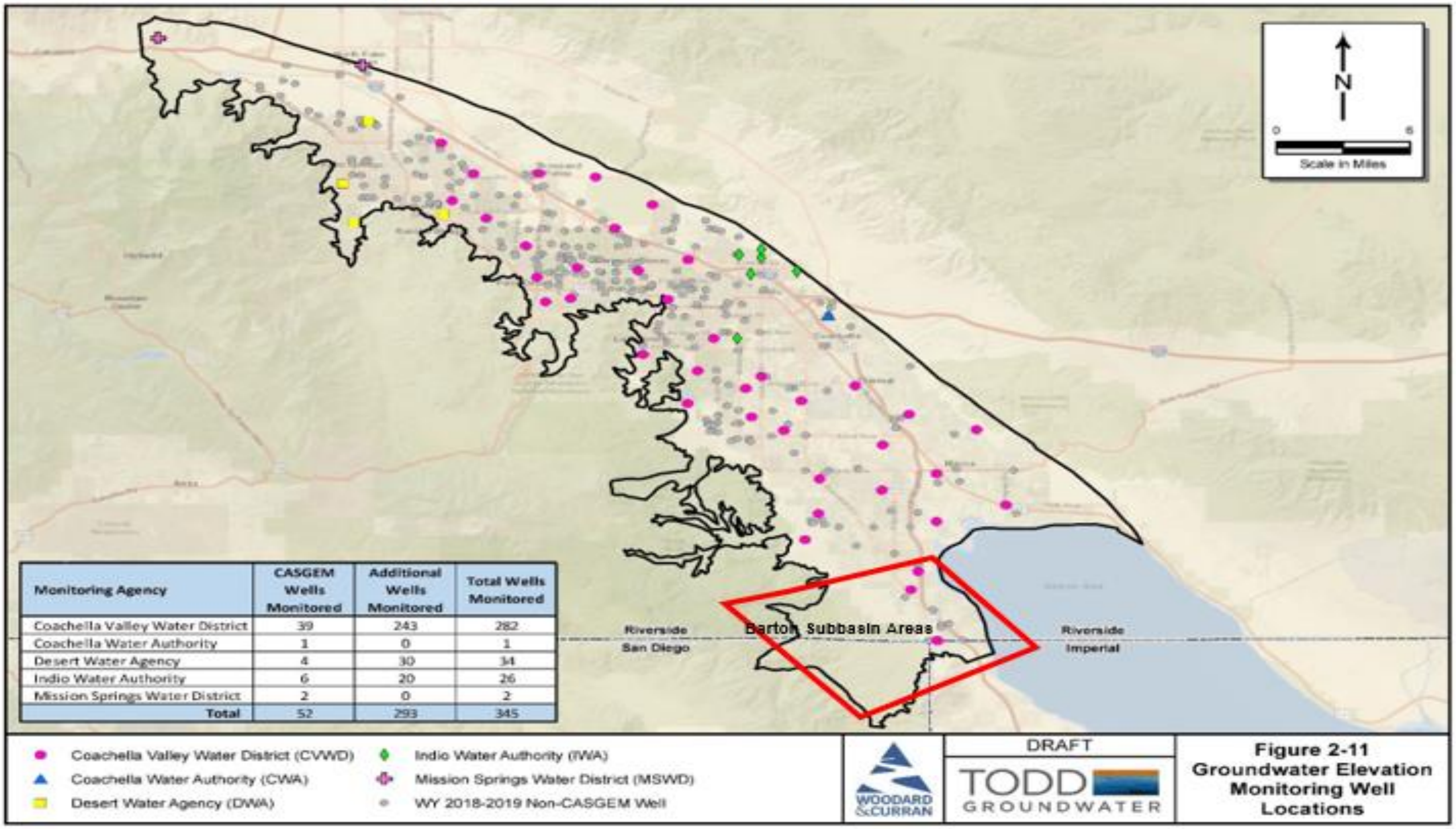


Attachment Q:
Location of Artesian Water within the East Valley.



Attachment R:
The Location of the Groundwater Monitoring Wells in the Indio Subbasin.

Figure 2-11. Groundwater Elevation Monitoring Well Locations



Monitoring Agency	CASGEM Wells Monitored	Additional Wells Monitored	Total Wells Monitored
Coachella Valley Water District	39	243	282
Coachella Water Authority	1	0	1
Desert Water Agency	4	30	34
Indio Water Authority	6	20	26
Mission Springs Water District	2	0	2
Total	52	293	345

October 29, 2021

Board Member John Aguilar - Division One
Board Member Anthony Bianco - Division Two
Board President John Powell Jr. - Division Three
Board Member Peter Nelson - Division Four
Board Vice President Cástulo R. Estrada - Division Five

Sent via email

Re: Comments on Coachella Valley Water District GSA Indio Subbasin Water Management Plan Update

Dear Coachella Valley Water District GSA Board of Directors,

Leadership Counsel for Justice and Accountability works alongside low income communities of color in the Eastern Coachella Valley and San Joaquin Valley. As is most relevant here, we work in partnership with community leaders in the communities of Oasis, Thermal, Mecca and North Shore to to address community priorities including safe and affordable drinking water and wastewater, affordable housing, land use, effective and safe transportation, clean renewable and affordable energy, green spaces, and clean air.

The mission of Coachella Valley Waterkeeper ("CVWK" or "Waterkeeper") is to protect and enhance the water quality of Coachella Valley watersheds, ensuring that our desert communities have access to clean and sustainable water resources. Waterkeeper, together with Orange County Coastkeeper and Inland Empire Waterkeeper (our associated programs), represents over 1,355 members who support this mission. CVWK is also an affiliate of the Waterkeeper Alliance, a worldwide association of Waterkeeper organizations that advocate for clean water throughout the world, and the California Coastkeeper Alliance, a statewide association of Waterkeepers that advances policies and programs for healthy and clean waters throughout the state.

We have been engaged in the Sustainable Groundwater Management Act (SGMA) implementation process because most of the communities we work with are wholly dependent on groundwater for their drinking water supplies, and many have already experienced groundwater quality issues. Communities we work have not been included in decision-making about their precious water resources, and their needs are not at the forefront of such decisions. In 2012, California recognized the Human Right to Water for domestic purposes, and required that state agencies consider this human right in their activities. State law also requires that GSAs avoid disparate impacts on protected classes. SGMA's requirements for a transparent and inclusive process presents an opportunity in the context of groundwater management to meaningfully include disadvantaged communities in decision-making, and to create groundwater management plans that understand their unique vulnerabilities, are sensitive to their drinking water needs, and avoid causing disparate negative impacts on low-income communities of color.

We submit these comments to elevate our concerns that the draft Indio Subbasin Water Management Plan Update (Draft Plan Update) is incomplete and does not adequately consider drinking water impacts in its policy decisions about groundwater management. Our review shows that the Draft Plan Update neither adequately analyzes nor incorporates input from disadvantaged communities and domestic well users, and will create a disparate impact on protected classes unless modified to protect drinking water resources for disadvantaged communities unless significant changes are made. We include herein our comments with respect to deficiencies in the Draft Plan Update as well as recommendations for improvements.

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A. Transparency and Brown Act in the Indio Subbasin and Coachella Valley Water District GSA

Transparency is a critical function of public agencies, particularly those engaged in managing such a critical resource as water. Unfortunately, the Indio subbasin agencies have consistently failed to hold meetings or make decisions in a transparent and accessible way. Furthermore, we are alarmed to note ongoing violations of the Brown Act. We have expressed these concerns to agency staff and have noted no change. Some of the agencies' barriers to accessibility and transparency occurred before the COVID-19 epidemic, and some have arisen during the epidemic. We urge you to make the suggested changes below so that ongoing decisions about critical water resources are made in a transparent and accessible way.

i. All SGMA-related decisions must be made at public meetings of the GSA

The Brown Act requires that legislative agencies such as the Indio Subbasin Groundwater Sustainability Agencies (GSAs) discuss and decide upon subject matter within their jurisdiction at public meetings only.[1] The Indio Subbasin GSAs have begun to conduct workshops around the Alternative Plan Update to be submitted next year. However, during this process, to the best of our knowledge, CVWD GSA has not held any board meetings in which it has publicly discussed or taken action related to the Draft Plan Update. We know that the individual GSAs within the Indio subbasin are each making decisions about the Alternative Plan Update, yet no GSA board meetings have been held where such decisions are discussed and available for public comment.

ii. Public meetings of the GSA must be noticed effectively

As we have previously expressed, the CVWD GSA does not publicly notice and agendize its GSA meetings. The Brown Act states that "[a]t least 72 hours before a regular meeting, the legislative body of the local agency...shall post an agenda containing a brief general description of each item of business to be transacted or discussed at the meeting, including items to be

[1] Gov Code Sec. 54952.2(b)(1).

discussed in closed session."[2] For this reason, we do not believe that current meeting structures are in compliance with the Brown Act.

Coachella Valley Water District, Desert Water Agency, Coachella Water Authority, and Indio Water Authority may be making SGMA-related decisions at their separately noticed board meetings. However, it is important that decisions regarding SGMA implementation be separately noticed as GSA board meetings. We saw this issue arise for several GSAs in the San Joaquin Valley where existing agencies assumed the responsibilities of GSAs and began to make SGMA-related decisions at their regular board meetings. GSAs in the San Joaquin Valley resolved this issue in several different ways. For example, the Westlands GSA continues to include SGMA as an item on its regular Westlands Water District board meeting agenda, but maintains a list of interested parties for SGMA purposes and sends a separate notice to that email list, informing them about the SGMA agenda item at the upcoming Westlands board meeting. The Madera County GSA follows a similar method, separately noticing their list of SGMA interested parties before any Madera County Board of Supervisors meetings at which decisions related to SGMA are to be made. The Central Kings GSA, also the board of Consolidated Irrigation District, separated its GSA meetings from its Consolidated Irrigation District meetings, separately noticing and agendizing both and holding them back to back. We encourage the CVWD GSA to hold separate GSA and CVWD meetings, or state a specific time for the SGMA items at their regular board meetings, and separately agendize and notice the SGMA items, so that stakeholders are able to plan their time and participate in the relevant moment. Many residents are only able to take specific hours off of work, and need to be able to plan their days accordingly. Additionally, GSAs must provide a complete description of the items to be discussed, for example "Discussion/Decision Regarding Minimum Thresholds for Groundwater Levels," rather than a general "SGMA update," so that stakeholders may come prepared knowing what topic will be discussed.

Furthermore, on the Indio Subbasin website it is stated that there is a Management Committee composed of its four member GSAs that is leading the Indio Subbasin Alternative Plan update. Because this is a meeting of agency members deciding on matters within their SGMA jurisdiction, any meetings this committee holds must be made public according to the Brown Act. It is important for the public to be able to give feedback and engage at every point of the plan update process. To the point in the above section, public meetings are critical to agency transparency and therefore agency decisions must be made in a public meeting only..

Based on this information, our recommendations on ways to ensure accessible and transparent public GSA meetings are as follows:

- Notify the public of all hearing/meeting times, topics, and detailed information regarding participation. All translated preparatory materials and documents should be made available at the time meeting notices are posted as well. Notices should be easy to find on state or local jurisdiction websites, and disseminated *at least* 72 hours in advance. Notices must clearly show how public comments will be received.

[2] Gov Code Sec. 54954.22(a)(1)

- Give ample time for the public to submit comments prior to the meeting's start time, such as via a dedicated phone number. Comments should be accepted starting from the time the notices are disseminated. Written or voice message comments should be allowed up until the start of the meeting, as well as live comments throughout the meeting.
    - Do not limit opportunities to comment only to email and avoid implementing arbitrary word limits on email comments. Limiting comments only to email leaves room for them to remain unheard and ignored. Allow email comments to be read aloud on the record by staff during the live meeting, for transparency and consideration by the full board/commission.
    - Allow the public to leave voice message comments, which can be limited to 3 minutes, and played during the comment period of the meeting. Ensure that these messages, as well as the emails, can be received in multiple languages and interpreted as needed.
- During the meeting, provide multiple options for teleconferencing, with *two-way* communication options that allows either computer-users or phone-users to engage and provide public comment. Webcasting does not constitute a public meeting, as it does not provide the opportunity for public comment and dialogue between the agency and constituents.
    - Each teleconferencing medium will offer benefits and limitations, ranging from professional options such as Zoom, GoToMeeting, and WebEx, as well as wide-reaching mediums for video streaming like YouTube and Facebook Live. For live-streamed meetings, the public should be allowed to comment in real time, through a combination of phone and video, chat boxes, and/or email.
    - Ensure that there is time for public comment after *each* agenda item during the meeting, and allow sufficient time for live comments to be submitted either electronically or via telephone.
- For members of the public that may not have access to the internet or a computer, or who are unable to use video applications, consistently provide an adequate telephone option–available in multiple languages–and ensure that comments can be made via phone.

B. Insufficient Community Engagement and Outreach

SGMA requires that a GSA "shall consider the interests of all beneficial uses and users of groundwater," which expressly includes "[h]olders of overlying rights" and "[d]isadvantaged communities, including, but not limited to, those served by private domestic wells or small community water systems."[3] The emergency regulations similarly require that a Draft GSP summarize and identify "opportunities for public engagement and a discussion of how public

[3] Water Code § 10723.2.

input and response will be used."[4] The GSA thus must engage "diverse social, cultural, and economic elements of the population within the basin."[5]

We acknowledge that the COVID-19 pandemic impacted everyone's ability to engage in person with communities and we appreciate the virtual workshops that were held by the CVWD GSA in-lue of in-person meetings. However, these workshops were all held during business hours, which are not accessible to many of the communities we work with. Additionally, CVWD GSA actively points to their Disadvantaged Communities Infrastructure Committee Meetings as a space for community engagement. These meetings are not open to the public and are held at hours inaccessible to many of the residents we work with, and were not held for an entire year, between February 2020 until January 2021.

To address concerns over public engagement, transparency, and inclusivity, the GSAs must meaningfully consult with all beneficial user groups to shape policies that reflect the priorities of all beneficial user groups in the GSA area. Then recirculate a new Draft GSP for the public to review.

C. The Water Budget is Inadequate

Under SGMA, the "[c]urrent water budget information shall quantify current inflows and outflows for the basin using the most recent hydrology, water supply, water demand, and land use information."[6] Based on our review, the Draft Plan Update's Water Budget is incomplete, as it has failed to include the consolidation of unpermitted parks to their water budget.

We are pleased to see that the ECV Water Supply Master Plan was incorporated into the water budget. However, this plan only included permitted mobile home parks. The ECV has very few permitted parks in comparison to the nearly 500 unpermitted parks.[7] Excluding these parks from consolidation planning, massively under-estimates the amount of water needed to address drinking water needs in the ECV. The water budget is central to establishing effective policies for sustainable groundwater management in the GSA area, as such the drinking water needs of these groups must be incorporated into the water budget.[8] Before it can submit an adequateAlternative Plan, the CVWD GSA must integrate data on groundwater use in unincorporated parks into water budget calculations in order to include drinking water needs of unpermitted parks in the ECV.

D. The Monitoring Network Is Inadequate With Respect to Groundwater Quality

GSAs must monitor impacts to groundwater for drinking water beneficial users,[9] including disadvantaged communities on domestic wells,[10] and must avoid disparate impacts on protected groups pursuant to state law.[11] The GSA's monitoring network does not comply with SGMA regulations, and fails to capture drinking water impacts to disadvantaged communities and

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[4] 23 CCR 354.10(d).
[5] Guidance Document for Groundwater Sustainability Plan; Stakeholder Communication and Engagement, p. 1.
[6] 23 CCR § 354.18(c)(1).
[7] https://www.latimes.com/archives/la-xpm-2007-mar-26-me-trailerpark26-story.html
[8] 23 CCR § 354.18
[9] 23 CCR § 354.34
[10] Water Code § 10723.2.
[11] Gov. Code § 11135; Gov. Code § 65008; Government Code §§ 12955, subd. (l).

domestic wells. The GSA has therefore not considered the interests of this beneficial user group and is likely to cause a disparate impact on protected groups who are dependent on domestic wells in the GSA area.

SGMA regulations require that Alternative Plans create a groundwater quality monitoring network that will "collect sufficient spatial and temporal data from each applicable principal aquifer to determine groundwater quality trends for water quality indicators, as determined by the Agency, to address known water quality issues."[12]

Despite having identified many known water quality issues in the Groundwater Conditions chapter,[13] the Draft Plan Update fails to comprehensively analyze whether the sites being monitored by existing programs will adequately "address known water quality issues" and their impacts on all beneficial users in the GSA area.[14] As proposed, the monitoring does not sufficiently monitor groundwater quality in the Eastern Coachella Valley, where as noted in the Draft Plan Update, there are high levels of groundwater contaminants.

Therefore the monitoring network as written violates the GSA's responsibility to collect sufficient data to determine trends and address known water quality issues affecting beneficial users in the GSA area. As written, the monitoring network would allow severe drinking water impacts to occur on domestic well users and in unincorporated communities.

To ensure that the representative wells within the monitoring network accurately monitor impacts to groundwater management for drinking water beneficial users, the following revisions are required:

- The GSA must analyze whether the groundwater quality monitoring network adequately captures increases in the extent and concentration of all known contaminants in the GSA area that are harmful to human health, and ensure that it does so.

- The GSA must ensure that the groundwater quality monitoring network will detect impacts from groundwater quality on all types of beneficial users, most importantly drinking water users who have limited financial ability to treat their drinking water sources. To this end, the GSA must ensure that existing representative wells are in or near such communities or domestic wells, or that it has a concrete plan for installing new monitoring wells that will detect these impacts or working with domestic well users to regularly test their wells and incorporate that data into its monitoring network. Monitoring wells must detect groundwater quality issues in shallow groundwater near disadvantaged communities. A particular focus must be small mobile home parks in the Eastern Coachella Valley that rely on small water systems.

- The GSA must prioritize constructing new monitoring wells in the Eastern Coachella Valley in order to ensure the region is being properly monitored for all primary drinking water contaminants, and in particular arsenic, chrom-6, and uranium.

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[12] 23 CCR § 354.34(c)(4)
[13] Indio Subbasin Water Management Plan Update pgs. 4-1;4-51
[14] Water Code § 10723.2.(b)(2)

E. The Alternative Plan Update Must Address Groundwater Quality Impacts Caused By Recharge Or Overpumping

SGMA charged GSAs with the responsibility to protect water quality from further degradation due to groundwater management practices, and requires GSAs to establish sustainable management criteria to prevent degraded groundwater quality.[15] The proposed SMCs are inadequate in protecting communities in the ECV from further groundwater quality degradation. This is particularly concerning for contaminants such as arsenic and chrom-6, which are a widespread issue in the ECV, as noted in the Draft Plan Update.[16] Further, it is not adequate to simply defer to infrastructure programs that include consolidating water systems or treating drinking water — the Alternative must protect sources of drinking water from contamination caused by groundwater management activities. In order to comply with SGMA and its regulations, which require the GSA to set sustainable management criteria that will avoid undesirable results resulting from degraded water quality for all beneficial users in the basin, and avoid disparate impacts on protected groups, the Draft Plan Update must include the following:

- Set a protective minimum threshold, measurable objective, and interim milestones for all constituents with primary drinking water standards that may be impacted by groundwater management activities, or failure to manage groundwater in a way that does not negatively impact groundwater quality.
- A detailed explanation as to how the groundwater quality minimum threshold, measurable objectives, and interim milestones will result in the protection of groundwater for disadvantaged communities and other drinking water users in the subbasin.

F. The Alternative Plan Update Should Ensure No Further Land Subsidence

As currently written, the sustainable management criteria for land subsidence are vague and do not protect for impacts on disadvantaged communities or domestic well users. The GSA must set sustainable management criteria that reflect the needs of all the stakeholders in the subbasin and protect all types of beneficial users from impacts from further land subsidence in the area.

The GSA must define the undesirable results for subsidence in a way that avoids subsidence that substantially interferes with *surface land uses*.[17] The GSA must consider the interests of all beneficial user groups, including domestic well users and disadvantaged communities, in determining its undesirable result for land subsidence.

The CVWD GSA has decided to use groundwater levels as a proxy for land subsidence and accordingly apply the same sustainable management criteria.[18] While we are not disputing using groundwater levels as proxy, we want to ensure the SMCs for land subsidence also includes impacts to critical infrastructure. The SMC for land subsidence does not show whether they will protect critical infrastructure such as roads, drinking water wells, distribution lines, housing, septic systems,. These surface land uses must also be taken into account in establishing the SMC for land subsidence.

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[15] Water Code § 10721(w)(4); 23 CCR § 354.28(c)(4).
[16] Indio Subbasin Water Management Plan Update pg 4-47
[17] Water code § 10721.(x)(5)
[18] Indio Subbasin Alternative Management Plan, pg.9-14

To comply with its obligations under state law, CVWD GSA must:

- Analyze the impact of land subsidence on all beneficial user groups, including potential impacts on drinking water wells, homes, distribution lines, roads, etc.
- Define a local undesirable result for subsidence that takes into account the critical infrastructure needs of all beneficial user groups, including domestic well owners, and specifically impacts to homes, piping, and wells.

G. Projects and Management Actions Must Benefit All Beneficial Users and Avoid Disparate Impacts

The GSA must consider the interests of all beneficial users including domestic well owners and disadvantaged communities[19] and avoid disparate impacts on protected groups. We commend CVWD GSA for including small water system consolidation as planned management actions[20]. However, we are concerned these management actions exclude important groups, specifically unpermitted mobile home parks, from planned actions. Additionally, no timeline was put forward for implementing this management action and as currently written, it appears implementation is dependent on state funding, which can be an extremely drawn out process.

Given the groundwater quality issues in the ECV and aging infrastructure, CVWD GSA needs to set a proactive timeline for consolidating small water systems in the ECV and must modify their water budget to reflect consolidation of unpermitted parks. Furthermore, we would like to reiterate that waiting for state funding to move forward on consolidation in the ECV will lead to an extremely drawn out process. CVWD GSA must strengthen proposed management actions to include direct investment from its annual budget to support water system consolidation.

G. The Draft Plan Update Conflicts with the Reasonable And Beneficial Use Doctrine

The "reasonable and beneficial use" doctrine is codified in the California Constitution. It requires that "the water resources of the State be put to beneficial use to the fullest extent of which they are capable, and that the waste or unreasonable use or unreasonable method of use of water be prevented, and that the conservation of such waters is to be exercised with a view to the reasonable and beneficial use thereof in the interest of the people and for the public welfare."[21] The doctrine applies to all water users, regardless of the basis of the water right, and all water rights and methods of diversion.[22] A determination of reasonableness of a use "cannot be resolved in vacuo isolated from statewide considerations of transcendent importance."[23]

The reliance on imported water to support sustainable groundwater aquifers cannot be avoided when addressing issues around beneficial use. As is made clear by the Draft Plan Update, the primary source of water for the GSA area is the Colorado River, accounting for approximately

[19] Water Code § 10723.2.
[20] Indio Subbasin Water Management Plan Update pg. 11-21
[21] Cal Const, Art. X § 2; see also Water Code § 100; United States v. State Water Resources Control Bd. (1986) 182 Cal.App.3d 82, 105 ["…superimposed on those basic principles defining water rights is the overriding constitutional limitation that the water be used as reasonably required for the beneficial use to be served."].
[22] Peabody v. Vallejo (1935) 2 Cal.2d 351, 367, 372; Light v. State Water Resources Control Board, (2014) 226 Cal. App. 4th 1463, 1479.
[23] Joslin v. Marin Municipal Water Dist. (1967) 67 Cal.2d 132, 140.

62% of the total water supply.[24] We are deeply concerned that each Plan Scenario assumes that the GSA will receive its full allocation of Colorado River water, and that the total delivery will actually increase from 402,800 AFY to 436,050 AFY through 2045.[25] This assumption appears to be based on CVWD's high-priority position regarding Colorado River Allocations and CVWD's success in legal challenges to the QSA.[26] Reliance on priority positioning and past legal successes ignores the reality of the Colorado River.

Supply reliability of the Colorado River is addressed in two sentences, where it is acknowledged that "Colorado River supplies face a number of challenges to long-term reliability including the extended Colorado River Basin drought and shortage sharing agreements, endangered species and habitat protection, and climate change."[27] Yet, there is no acknowledgement that even under long term historical natural flow (which does not account for climate change), the Basin is over-apportioned.[28]

The Colorado River becomes increasingly imperiled every single year due to drought and overdraft as over 40 million people rely upon it for drinking water, agriculture, and power.[29] There is no acknowledgement that the Colorado River is already at or near critically low elevations in Lakes Powell and Mead. The current level of Lake Mead is 1,067.15 feet MSL.[30] The U.S. Bureau of Reclamation (USBR) has declared a water shortage for the first time in the Basin's history. Lake Powell could fall below the minimum power pool elevation of 3,490 feet as early as July 2022, while Lake Mead is projected to be less than one foot above 1,050 feet by the end of 2022.[31] USBR further projects that there is a 62% probability that Lake Mead's elevation falls below 1,025 feet by 2026 – approximately the same time the Draft Plan Update assumes that water transfers from the Colorado River will increase from 424,000 AFY to 459,000 AFY.[32]

Water levels dropping below these critical thresholds means that millions of people will be without the electricity generated by hydropower on the Colorado River. Under these extreme emergency situations, which are becoming more of a statistical certainty, the GSAs cannot continue to rely on its status as a senior water rights holder without a contingency plan for a decrease in delivery from the Colorado River. The over allocation of water from the Colorado is a mathematical certainty that needs to be accounted for in at least some of the plan scenarios.

Moreover, the Draft Plan Updates' forecasts of water supply for its 5-year plans with climate change scenarios all rely on the timely completion of numerous water supply projects in order to meet forecasted demand.[33] These projects are in various stages of permitting, design, and

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[24] Indio Subbasin Water Management Plan Update Table 12-2, 5-Year Plan with Climate Change.
[25] Indio Subbasin Water Management Plan Update Table 6-3
[26] Indio Subbasin Water Management Plan Update Sections 6.4.3, 6.4.3.1
[27] See, Draft Plan Update Section 6.4.3
[28] Colorado River Basin Water Supply and Demand Executive Summary, U.S. Bureau of Reclamation, December 2012.
https://www.usbr.gov/watersmart/bsp/docs/finalreport/ColoradoRiver/CRBS_Executive_Summary_FINAL.pdf
[29] See, Id. at Fn 1
[30] http://mead.uslakes.info/level.asp
[31] Reclamation Releases Updated Projections of Colorado River System Conditions, U.S. Bureau of Reclamation, October 2021. https://www.usbr.gov/newsroom/#/news-release/4013
[32] Five Year Probabilistic Projections, U.S. Bureau of Reclamation, October 2021. https://www.usbr.gov/lc/region/g4000/riverops/crss-5year-projections.html
[33] Indio Subbasin Water Management Plan Update, Sections 7.5.4-7.5.6

construction, with many currently existing only on paper. The Draft Plan Update acknowledges that failure to implement these projects is unsustainable with climate change.[34] To account for loss of Colorado River deliveries, we encourage the GSAs to look for conservation opportunities in the categories of water use with the least overall importance – namely new development of water-intense recreational developments such as surf parks, beach clubs, and new golf courses.

There is a new wave of recreation coming to a crest in the Indio Subbasin that requires significant amounts of clean water: surf lagoons. There are currently three proposed projects to build man-made pools that generate surfable waves hundreds of miles from any coastline: DSRT Surf Resort, Thermal Beach Club, and Coral Mountain in La Quinta, CA. Surf lagoons rely on water from Colorado River allocations. Unlike golf courses, which are also not a priority over the generation of electricity and food, surf lagoons require the use of potable water and cannot rely on recycled water supplies. Each new non-essential water use in the desert has the potential to negatively impact groundwater recharge. While courts wield an extraordinary amount of power, they have yet to cause precipitation events to reverse the course of climate change, and there is no reliable indication that CVWD's use of imported water for surf parks, fake beaches, and new golf courses will continue to take priority over the generation of power and food for millions of people.

The GSAs must ensure that Alternative Plan Update's water allocations are consistent with the reasonable and beneficial use doctrine.[35] In doing so, the GSAs must prioritize domestic use of water resources over irrigated agriculture[36] and ensure that SGMA implementation furthers the human right to safe and affordable drinking water[37] — both statewide considerations of transcendent importance. In other words, a plan that allows use of water for non-essential water use at the expense of use of water for domestic purposes is not consistent with the reasonable and beneficial use doctrine. It is also inconsistent with the reasonable and beneficial use doctrine to allow agricultural uses at the expense of the domestic uses of water for drinking, cooking, and basic sanitation.

The reasonable and beneficial use doctrine applies here given the potential negative impacts of the Plan on groundwater sustainability which are likely to unreasonably interfere with the use of groundwater for drinking water and other domestic uses. As the Draft Plan Update authorizes waste and unreasonable use, and indeed does not even analyze the reasonable and beneficial use doctrine at all, it conflicts with the reasonable and beneficial use doctrine and the California Constitution.

In order to ensure the Draft Update is not in conflict with the Reasonable and Beneficial Use Doctrine, we make the following suggestions:

[34] Indio Subbasin Water Management Plan Update, Section 7.8

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

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

[37] Water Code § 106.3.

- The GSAs must commit to disapproval of projects that involve waste and unreasonable use.
- The GSAs must revise the Draft Plan Update to include scenarios where the full allotment of Colorado River water cannot be delivered.
- The GSAs must account for scenarios where some or all of the planned projects fail to meet their supply goals on time.
- The GSAs must commit to ensuring that access to drinking water is protected as the highest and best use of water.

H. The Draft Plan Update Conflicts with the Public Trust Doctrine

The Public Trust doctrine applies to the waters of the State, and establishes that "the state, as trustee, has a duty to preserve this trust property from harmful diversions by water rights holders" and that thus "no one has a vested right to use water in a manner harmful to the state's waters."[38]

The Public Trust doctrine has recently been applied to groundwater where there is a hydrological connection between the groundwater and a navigable surface water body.[39] In *Environmental Law Foundation v. State Water Resources Control Board* ("*ELF*"), the court held that the public trust doctrine applies to "the extraction of groundwater that adversely impacts a navigable waterway" and that the government has an affirmative duty to take the public trust into account in the planning and allocation of water resources.[40] Under *ELF*, the Public Trust doctrine imposes an affirmative and independent obligation to consider the public trust that applies to DWR's decisions regarding submitted GSPs, imposing a legal duty on DWR to not only consider the potential adverse impacts of groundwater extractions on navigable waterways but also "to protect public trust uses whenever feasible."[41] The court also specifically held that SGMA does not supplant the requirements of the common law public trust doctrine.[42]

Notably, the public trust doctrine applies to both currently navigable surface water bodies and surface water bodies that were historically navigable at the time of statehood.[43] Further, certain rivers like the San Joaquin River have been declared navigable in statute.[44]

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[38] United States v. State Water Resources Control Bd. (1986) 182 Cal.App.3d 82, 106; see also Nat'l Audubon Soc'y v. Superior Court (1983) 33 Cal.3d 419, 426 ["before state courts and agencies approve water diversions they should consider the effect of such diversions upon interests protected by the public trust, and attempt, so far as feasible, to avoid or minimize any harm to those interests."].
[39] Environmental Law Foundation v. State Water Resources Control Bd. (2018) 26 Cal.App.5th 844, 844.
[40] Id. at 856-62.
[41] Id. at 865.
[42] Id. at 862-870.
[43] See San Francisco Baykeeper, Inc. v. State Lands Com. (2015) 242 Cal.App.4th 202, 232 citing Western Oil & Gas Asso. v. State Lands Com. (1980) 105 Cal.App.3d 554, 562 ["When California became a state in 1850 it succeeded to sovereign ownership of various tidelands and submerged lands under the terms of common law trust doctrine… ."]; PPL Montana, LLC v. Montana (2012) 565 U.S. 576, 592 ["For state title under the equal-footing doctrine, navigability is determined at the time of statehood...and based on the 'natural and ordinary condition' of the water."] [internal citation omitted].
[44] Harb. & Nav. Code s. 105 [affirmatively declaring the San Joaquin River to be navigable "between its mouth and Sycamore Point."]..

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

I. The Draft Alternative Plan Update Lacks A Coordination Agreement.

Pursuant to Water Code, § 10733.6, "[i]f groundwater sustainability agencies develop multiple groundwater sustainability plans for a basin," there must be a joint submittal to DWR of several items, including "[a] copy of the coordination agreement between the groundwater sustainability agencies to ensure the coordinated implementation of the groundwater sustainability plans for the entire basin." This requirement applies to Alternative Plans as well, which must satisfy "the objectives" of SGMA, including coordinated groundwater management for entire groundwater basins.

Here, though the draft Alternative Plan does not itself cover the entire basin, no coordination agreement is provided. To comply with SGMA, a coordination agreement must be submitted to DWR with the Alternative Plan Update.

~ ~ ~ ~ ~ ~ ~ ~ ~

The Indio Subbasin Alternative Plan Update must protect the most vulnerable drinking water users in the GSA area. We welcome the opportunity to discuss our recommendations with the CVWD GSA board, staff and consultants to ensure compliance with state law. We are also in communication with the Department of Water Resources about current Alternative Plan update activities in the Eastern Coachella Valley, and hope to successfully work with GSAs, communities and DWR to ensure that groundwater management is equitable and sufficiently protective of vital drinking water resources.

Sincerely,

/s/

Nataly Escobedo Garcia
Policy Coordinator
Leadership Counsel for Justice and
Accountability

Sarah Spinuzzi
Senior Staff Attorney
Coachella Valley Waterkeeper
Inland Empire Waterkeeper
Orange County Coastkeeper

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October 29, 2021

Emailed to: IndioSubbasinSGMA@woodardcurran.com

Coachella Valley Water District
Attention: General Manager/Chief Engineer
P.O. Box 1058
Coachella, CA 92236

Desert Water Agency
Attention: General Manager
1200 Gene Autry Trail
P.O. Box 1710
Palm Springs, CA 92263

To Whom it May Concern:

The Agua Caliente Water Authority has reviewed the SGMA Alternative Plan submitted by the groundwater sustainability agencies here in the Coachella Valley. The Authority continues to have fundamental concerns over the implementation of the Sustainable Groundwater Management Act (SGMA) and the Alternative Plan (Alt Plan) submitted in lieu of a Groundwater Sustainability Plan (GSP).

Groundwater sustainability and management in the Coachella Valley, and thus the SGMA Alternative Plan, are of paramount importance to Agua Caliente. The Groundwater Sustainability Agencies (GSAs) formed by Desert Water Agency (DWA) and Coachella Valley Water District (CVWD) include within their boundaries the overwhelming majority of the Agua Caliente Indian Reservation. The Agua Caliente Reservation, in turn, overlies a substantial amount of groundwater that the United States reserved and holds for the benefit of the Tribe pursuant to the doctrine set forth in *Winters v. United States*, 207 U.S. 564 (1908), and its progeny. Agua Caliente relies almost entirely on that groundwater to meet its water needs.

Agua Caliente has laid out, in prior comment letters and court filings, its position concerning its own water rights and the fundamental legal and practical inadequacy of any SGMA plan or Alternative Plan that fails to account for those rights and the Tribe's concomitant role in groundwater management. While the Tribe's position and related concerns remain valid and relevant, the Authority will not belabor them here. These comments focus instead on procedural and substantive scientific/technical issues with the SGMA Alternative Plan.

Tribal Workgroup and Stakeholder Outreach

The GSAs hosted numerous public meetings during the development of the Alt Plan Update. They also hosted tribal meetings during the Work Group. The GSAs provided information that they deemed appropriate and relevant for the public. Unfortunately, they did not provide any meaningful backup data or other technical information prior to or during any meeting that would enable the Authority to evaluate the methodology or assumptions of the Alt Plan. This is the first time the Authority has seen this new Plan and yet we are only allowed 30 days to provide substantive comments on this highly technical document consisting of a 476-page Plan and a 422-page Appendix.

Treating the Indio Subbasin as a Uniform Source

The Alt Plan Update presents most water information at a basin-wide level. Generalizing this information as if the Basin operates uniformly can be misleading. The Plan acknowledges that the Numerical Model uses many data inputs, assumptions and identification of hydrologic subsets to inform the numerical model but it doesn't present the information most relevant to the public in a way that informs public decision-making.

In the spirit of transparency and clarity, please amend the Alt Plan to include a detailed map that overlays and shows the boundaries of these areas:

1. West Whitewater River Subbasin Management Area
2. West Whitewater River Area of Benefit
3. DWA West Area of Benefit
4. CVWD West Area of Benefit
5. West Valley Management Area
6. Palm Springs Subbasin
7. Thermal Subbasin

These terms are used throughout the document but for different purposes and within varying contexts. It would be helpful to the Authority to understand where the Reservation is located relative to these areas. It is impossible to understand the impacts of water management actions such as raw water replenishment and salt loading on the Reservation without more granular information.

The Authority also requests that the Alt Plan be amended to include the following information broken down in four ways: a) by West Whitewater River Subbasin Management Area, b) by West Whitewater River Area of Benefit, c) by DWA West Area of Benefit, d) by CVWD West Area of Benefit:

1. A table showing return flows
2. The quantity of groundwater that constitutes the historical depletion of the aquifer
3. Model Inflows and Outflows
4. Water Balance
5. Combined Return Flows

6. Salt Loading by source: natural sources, return flows from agricultural and landscape irrigation, recharge of imported Colorado River water, wastewater discharge and subsurface inflows from other basins.
7. Table 5-27 (Municipal Demand Forecast for the Plan Area)
8. Table 5-28 (Municipal Demand Forecast for GSA Areas)
9. Table 5-35 (Total Projected Water Demands in Plan Area)
10. Table 6-1 (Indio Subbasin Groundwater Balance):

Projects and Management Actions

The Alt Plan includes a final list of 29 possible PMAs by 4 GSAs. It is disappointing to see that very few projects are led by DWA in support of its customers. Please explain why DWA has not implemented tiered rates as most other water district do despite this being an effective way to reduce water usage.

On page 8-5, Section 8.1.3 the Plan notes: "*In the Plan Area, recycled water is a significant and reliable local resource used to help offset groundwater pumping."* Yet recycled water accounts for only 2% of the Subbasin's water supply (Section 6.9.4). The Plan discusses the water recycling gains that are planned for the basin but the focus of recycling efforts seems to be the East Valley. By 2045, the GSAs plan to generate 20,213 AFY of recycled water to offset other water sources which will be only 3% of the Subbasin's water supply.

Table 6-13 shows the recycled water supply (2018-19) based on wastewater flows. DWA shows that of the 6,613 AFY it receives from the City of Palm Springs WWTP, recycled water use is at 3,413 AFY. In Section 6.6.2, the Plan notes that DWA could produce 2,014 AFY of additional supply. With the 3,200 AFY of unused capacity + 2,014 of additional supply, DWA has unused capacity of 5,214 AFY. Further, in Section 11.5.2.6 the Plan notes: *"The DWA WRP project will increase deliveries of recycled water in DWA's service area as new customers are identified and consistent with wastewater flow growth up to the 11,200 AFY of existing tertiary capacity."* How will DWA identify new customers and reach its goal of maximum use of recycled water? Has DWA prepared a Plan of Service or similar document that can be included as an appendix to this Alt Plan?

The Alt Plan notes that an Adaptive Management process will be used for project implementation. Will there be a public process associated with this Process? [ES-18]

"*CVWD also currently replenishes a portion of its Colorado River supply at WWR-GRF (ranging from 35,000 to 50,000 AFY), based on its 2019 Exchange Agreement with MWD, until that water is needed in the East Valley*." Is this water used in the DWA service area? How is this water transferred from the WWR-GRF to the CVWD Service Area? Does it flow under the Agua Caliente Indian Reservation? [11-19 11.5.3.3]

SGMA Tools

The Authority strongly encourages the GSAs to use all tools available to them under SGMA to comprehensively and completely manage and track all groundwater pumping in the basin. The Authority acknowledges the work of the GSAs but as a native sovereign nation with rights to groundwater, the Tribe needs to have more transparency and information to ensure its federally reserved water right is not being infringed upon. Comprehensive use of all SGMA powers gives the Authority confidence that its water rights will be respected and its water secured. [1.1.5 (1-6)]

Please provide groundwater production numbers and detailed maps of locations of all wells by AOB so that the Authority can determine the impact of pumping on the Reservation. The Authority strongly encourages the Districts to meter all wells producing 2 AF-Yr as is allowed by SGMA. It is difficult to have confidence that water is properly managed in the basin when the Districts have incomplete data on minimal pumpers. [(12.2.7.2) (10-7 10.1.2)]

Water Quality and Salt & Nutrient Management Planning

3-12 3.5.1 & Fig 4-3, 4-7 4.1.4: Please add a discussion of the impacts of groundwater level fluctuations on Agua Caliente Indian Reservation water resources.

8-5 8.1.2 Antidegradation Policy – Please see the letter to the Districts from the Regional Board dated February 19, 2020. The Authority is concerned that recharge with untreated Colorado River water is not for maximum benefit of the people and results in water quality lower than standards.

9-22 9.8.1 *"…salt migration through the groundwater system (both vertical and horizontal) is driven by dynamics of groundwater recharge and discharge and thus influenced not only by recharge/percolation, but also by groundwater pumping…"* And this is why the Authority needs to see analysis for the West Valley Management Area to determine the impacts to the Agua Caliente Indian Reservation.

9-23 9.8.3 "*The analysis also will include characterization of current groundwater quality in all Subbasin areas/Subareas (with delineation of Management Zones…"* The Authority asks that this work be prioritized based on its impacts to the Agua Caliente Indian Reservation as the closest community downstream of the WWR-GRF.

Chapter 3 – Hydrogeologic Conceptual Model (HCM)

This section of the Alt Plan does not provide the foundation required to support the use and application of the numerical model described in Section 7. For example, the Alt Plan's description of surface water bodies and the interaction of surface water and groundwater lacks the required detail to support the model's numerical analysis. The HCM states "*The Whitewater River is the major stream channel contributing recharge with additional infiltration along other channels such as Snow and Falls Creek in the upper valley and* *several smaller streams in the lower portion of the valley that only flow during wet years*". However, the numerical model states that there are 24 watersheds and stream channels that contribute recharge to the groundwater basin. Detailed calculations by sub-watershed and by year, of how the authors link the surface water in the HCM (Chapter 3) to water supply (Chapter 6) and the model input (Chapter 7) is required to validate the available 52,500 AFY (Figure 7-22) of surface water. Additionally, the Alt Plan should contain a map(s) that identify the locations of all named perennial, intermittent, and ephemeral surface water bodies (i.e., Andreas, Chino, Deep, Murray, Palm, Tahquitz, and Unnamed Watershed #2) described in the text.

The HCM also lacks a qualitative discussion regarding the interaction between surface water and groundwater throughout the different subareas of the Indio Subbasin. Does mountain front recharge impact the shallow and deep portions of the aquifer? At what depth does groundwater occur and is it found in confined or unconfined conditions? Section 3.2.2 of the HCM's recital from the 1964 DWR Bulletin 108 leaves the reader confused regarding recent fanglomerate and the Ocotillo Conglomerate formations since these geologic units have not yet been introduced. These fundamental descriptions of groundwater occurrence and movement are required to support the use of four layers simulated in the model (Chapter 7).

The HCM should address the relationship between groundwater pumping and the various aquifers that are identified in the hydrogeologic cross sections (Section 3.4.2.3). Although there are water supply and quality data provided in Chapters 4 and 6, the HCM does not provide the reader with a conceptual description of how natural and imported water sources move from areas of recharge to various portions (i.e., vertical distribution) of the aquifer. For example, do return flows from septic systems, wastewater percolation, and outdoor domestic applications impact (quality and quantity) the portions of the aquifer that are used for drinking water sources? Which portions of the aquifer are relied on for drinking water, agricultural, and other sources? While the HCM introduces vertical barriers to groundwater flow in the Thermal subarea, how do these geologic impediments impact the available resources from both a water quantity and water quality perspective?

Chapter 4

Chapter 4 of the Alt Plan addresses salt loading and TDS in the Indio Subbasin. It acknowledges that, "*Elevated TDS and nitrate concentrations are linked to current and historic water and wastewater management, agricultural activity, urban land use, septic systems, and natural conditions*" (p. 4-16). The Alt Plan describes the general sources of salts in the Subbasin but does not quantify the amount of salt loading by source or even as a total. Because the CV-SNMP is still in development, an estimate of the salt loading may not be available at this time, but sources of salt may still be explored in more detail. While it is stated that, "*Irrigation results in evaporative concentration of TDS in shallow groundwater*," and "*Water use for domestic purposes results in salt loading to wastewater*," (p. 4-44), notably absent from the Plan is acknowledgement or quantification of how the increased salt may affect water demands in the Subbasin. Increasing salt in the Subbasin would impact future water demands, especially in the agricultural sector.

Increased salts may increase demands due to higher leaching requirements but may also affect crop selection and distribution. As stated in the Alt Plan, "*Agricultural demand varies by farmed parcel, depending on crop type and sequencing*" (p. 5-36). The agricultural demand forecast does not include a consideration of the potential impacts of increased salt in the Basin.

Chapter 6

Chapter 6 of the Alt Plan details water supply but does not specify quantities of supply broken down by source or location. For example, the Alt Plan lists sources of groundwater inflow as watershed runoff, subsurface inflows, return flow of applied water, treated wastewater, and septic, and imported water recharge. However, it does not go on to detail the quantities of these inflows by source. The average amount of natural infiltration for 2010-2019 is 28,800 AFY, "*as measured or simulated in the numerical model*" but it is unclear how much of that infiltration comes from each watershed, or how it is distributed throughout the basin. Similarly, the average return flow is estimated to be 162,000 AFY but the Alt Plan does not specify how much of that may be due to wastewater percolation, irrigation return flows, etc. even though "irrigation return flows and imported water recharge are now the major source of inflows to the Indio Subbasin." Documentation of these major sources of inflow and outflow is essential to transparent and effective planning for the Subbasin.

Chapter 7

The use of the 2000 and 2010 models to establish the Alt Plan's management actions and goals is questionable since the Alt Plan Model has not been peer reviewed. Updates to boundary conditions and the availability of new hydrogeologic data suggest the need for the development of a steady-state model, possible application of parameter estimation techniques, and the need for an updated calibrated model. The authors should not only address the need for a new calibrated model, but also add a section to the Alt Plan regarding the use and limitation of the existing model. While the Alt Plan clearly identifies the uncertainty of the inflow from San Gorgonio Pass, there are hydrogeologic uncertainties associated with the model's previous parameter estimation. Although the Alt Plan model is described as an update to the previous models, it does not excuse it from the need to undergo rigorous scientific peer review since it is the basis for a State approved Alt Plan. The authors should describe which parameters have the biggest effect on the model accuracy and discuss the certainty of the values used for these parameters. For example, which parameters were determined from calibration and which were determined from physical measurements. A section of the report describing model uncertainty and application of sensitivity analysis to determine how the uncertainty could impact the model results would be informative. Until scientific peer review can be performed, we recommend that the model and Alt Plan be characterized as interim or provisional.

The Alt Plan does not clearly show the impact of each future model scenario on a spatial or temporal basis. For example, Figures 7-32 shows the change in groundwater levels for the 2009 to 2045 Baseline Scenario that includes 12 years of historical data and 25 years of model simulated data. As shown in the water level hydrographs (Figure 7-30), model simulated groundwater levels in the Palm Springs Subarea are declining during the 2020-2069 period. The 2009 through 2020 actual data reflect MWD advanced deliveries to the WWR-WRF and account for much of the groundwater storage increase in the Palm Springs Subarea. Without the inclusion of these 12 years of actual data, the color flood maps would only reflect the impact of the management scenarios and show different results. Similarly, Figures 7-33 and Figure 7-39 show a pattern of declining groundwater levels in the Palm Springs Subarea during the simulation period for the Baseline with Climate Change option.

The Alt Plan states that the 2009 period was "*selected as the period for comparison because it generally reflects historically low groundwater elevations in most of the Subbasin, and these values are used as sustainability criteria for groundwater levels.*" Although Chapter 9 discusses the use of 2005 vs 2009 as a minimum threshold, it is not clear why historical and accumulated advanced MWD deliveries are used to show recovery from minimum water levels when comparing results from simulated future management scenarios. Although the model recognizes that MWD advanced deliveries are depleted by 2035, it is difficult to assess the impact of each scenario over the initial 25-year period. It would be more appropriate to spatially view the impact of each model scenario consistent with the water budget shown in the table on Page 7-12.

Disappointingly, the updated SGMA Alternative Plan continues a long history by the water agencies of obfuscation and a stubborn unwillingness to provide the public a clear and comprehensive record that verifies their hollow claims of responsible management of the aquifer in the Coachella Valley. Thank you for the opportunity to comment on this Alternative Plan.

Regards,

Margaret Park

Margaret Park, AICP
Chief Planning Officer
AGUA CALIENTE
WATER AUTHORITY

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Vanessa De Anda

From: Alena Callimanis <acallimanis@gmail.com>
Sent: Friday, October 29, 2021 1:14 PM
To: IndioSubbasinSGMA
Subject: Comments on Indio Subbasin Water Management 2022 Alternative Plan Update

Thank you for the opportunity to respond to the Indio Subbasin Water Management 2022 Alternative Plan Update.

The first thing I would like to address is the reasonable and beneficial use doctrine and that three surfing parks, 6.7 acres, 16.7 acres and 20 acres, plus a 34 acre swimming lagoon are not reasonable and beneficial use. I know it is not up to CVWD to approve a project, but rather say if there is enough water. Given the reality of the drought and climate change, I think it is important to give guidance to the cities that are bringing this forward. The two largest surf parks are private. That only gives "benefit" to wealthy people and not to the Coachella Community at large. You talk about your leadership in conserving water. Your estimates for these four water features for water use for the year is 431.5 acre feet. We have done calculations using the EPA evaporation estimates which take into consideration wind, humidity, surface temperature, and heat and we have determined that the yearly water use would be 6 times as much or 2,589 acre-feet per year. I request that CVWD recalculate yearly water usage for Thermal Surf Park, Grand Oasis Crystal Lagoon, Coral Mountain Surf Resort and DSRT SRF and use these recalculated figures into the "Other" water use component.

Second, I would like to address your percentage of 45% used to calculate water supply from SWP Exchange. The last two years you have only received 5% of your allocation. It is invalid to use the 14 year average, 45% figure, given the current state of the Colorado River. The charts should be recalculated using the 5% number.

Third, I would like to address the Colorado River entitlement. It should be lowered starting in 2022 at least at the level of the first allocation decrease when we hit the California trigger number. All indications are that will happen next year. So these charts which show continuing increase or leveling of Colorado River allocations must be adjusted to show a decrease in the Colorado River allocations.

Fourth, many of the assumptions in this document are based on future water projects coming on line. For example, the amount of recycled water available is less than the first cut to our Colorado River allocations. You must accelerate grant requests and get appropriate timings of these new supplies so you can accurately project how future projects will help supply. With the Governor's 15% cuts, that will further impact revenue generation which may cause more of these projects to not come on-line.

Fifth, the future modeling scenarios should not be based on past drought and resupply conditions over the past 25 years. What has been happening these past two years must be the basis for the future modeling of our conditions, not relying on past numbers.

Sixth, climate change impacts are minimized. When you discuss up to 40,000 AFY impact, that is an underestimation based on the hotter summers and hotter years we are experiencing. This amount cannot even be covered by recycled water. With this increasing heat, higher evapotranspiration rates, etc., projections must show this higher impact starting in 2022; golf course usage can be curtailed. Surf park and swimming lagoon usage cannot be curtailed or these features must close. We and the country rely on agriculture. With growing heat, agriculture must be protected as our nation's food supplier.

Seven, subbasin storage has only recovered up to 45% of its decline. This was due mostly to Colorado River allocations. You cannot rely on future Colorado River allocations even though CVWD has senior rights to the water. We will start seeing very quickly outflow greater than inflow as this drought persists. The modeling in this document must be revised to reflect the true water situation in our valley.

Thank you very much for your consideration.

Respectfully,

Alena Callimanis
La Quinta Residents for Responsible Development
Bachelor in Physics, Rensselaer Polytechnic Institute
Masters Physics, State University of NY StonyBrook
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United States Department of the Interior

BUREAU OF INDIAN AFFAIRS
Southern California Agency
1451 Research Park Drive, Suite 100
Riverside, California 92507

IndioSubbasinSGMA@woodardcurran.com

Attn: Project Manager:

The Bureau of Indian Affairs, Southern California Agency (Agency) appreciates the opportunity to comment on the Indio Subbasin Alternative Plan for the tribes under the agencies jurisdiction, and additionally in the interest of self-governance tribes and tribes under the Palm Springs Agency. The Agency recognizes tribal sovereignty and holds all government entities to the same standard as identified within Section 8 of the United States Constitution. Comments made by the Bureau of Indian Affairs reflect the Bureau's fiduciary duty as a trustee for tribal lands held by the Federal Government, and attempt to ensure recognition of the tribal sovereign status and additionally ensure maximum protection of trust assets. The following comments should be evaluated from the above context:

A) Comments on Alternative Plan:

1) Tribal entities are referred to as stakeholders, rather than sovereign nations with Federally Reserved Water Rights. These rights should be explicitly identified.

2) The Bureau of Indian Affairs is concerned that the Basin Salt Nutrient Management Plan has not been released for public comments, and an Agency and Regional request to receive copy has not been acknowledged. As the first year of the SNMP is currently being monitored, will the plan be provided for input prior to it's initial first year report?

3) On figures, differentiate between model projections and calculated, current, and measured values. Lack of data segregation results in inaccuracies and is subject to interpretative bias.

B) Goals of 2002 water management plan were not included within the current Alternative Plan, however are still relevant. The 2002 Water Management Plan explicitly identified 2015 as a marker for salt loading in terms of aquifer degradation.

> In order to evaluate the potential for water quality degradation, the projected salt balance in 2015 and 2035 is compared to current conditions. The current net salt addition in the Coachella Valley is 265,000 tons per year. By 2035, Alternative 1 would result in the highest rate of salt addition to the Coachella Valley of 504,000 tons per year—a dramatic increase compared to 1999 conditions. The net salt addition in 2035 would decrease compared to current conditions under Alternative 2 (68,000 tons per year) and Alternative 4 (155,000 tons per year) with Alternative 2 best minimizing the water quality degradation. Table 6-6 showed a net decrease by 2035.

What is current salt loading and how does the salt loading from 2015 compare to model projections?

C) Comments on Errata:
Cumulative Baseline measurements should be determined from date of minimum storage, 2009 according to the report, to indicate potential crossing of minimal levels.

If there are any questions, please contact Patrick Taber, Agency Hydrologist, at (951) 276-6624 ext. 256.

Sincerely,

Javin Moore
Superintendent

APPENDIX 2-A
WORKPLAN TO DEVELOP THE COACHELLA VALLEY SALT AND NUTRIENT MANAGEMENT PLAN AND GROUNDWATER MONITORING WORKPLAN

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FINAL WORKPLAN | SEPTEMBER 2, 2021

Workplan to Develop the Coachella Valley Salt and Nutrient Management Plan

PREPARED FOR

The Coachella Valley SNMP Agencies

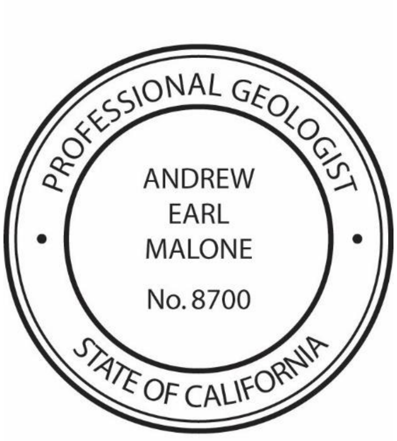
PREPARED BY

Workplan to Develop the Coachella Valley Salt and Nutrient Management Plan

Prepared for

The Coachella Valley SNMP Agencies

Project No. 943-80-20-01



Sept 2, 2021

Project Manager: Andy Malone, PG — Date

Sept 2, 2021

QA/QC Review: Samantha Adams — Date

WEST YOST
Water. Engineered.

FINAL WORKPLAN | SEPTEMBER 2, 2021

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LIST OF ACRONYMS AND ABBREVIATIONS

AWQ	Ambient Water Quality
CPS	City of Palm Springs
CV-SNMP	Salt and Nutrient Management Plan for the Coachella Valley Groundwater Basin
CVSC	Coachella Valley Stormwater Channel
CVWD	Coachella Valley Water District
CWA/CSD	Coachella Water Authority and Coachella Sanitary District
CWC	California Water Code
DWA	Desert Water Agency
DWR	California Department of Water Resources
ft-bgs	Feet below ground surface
IWA	Indio Water Authority
GAMA	Groundwater Ambient Monitoring & Assessment
GIS	Geographic Information System
MC-GRF	Mission Creek Groundwater Replenishment System
MDMWC	Myoma Dunes Mutual Water Company
MOU	Memorandum of Understanding
MSWD	Mission Springs Water District
NGO	Non-Governmental Organization
N/TDS	Nitrate and TDS
O&M	Operations and Maintenance
PD-GRF	Palm Desert Groundwater Replenishment Facility
POTW	Publicly Owned Treatment Works
RFP	Request for Proposals
RFQ	Request for Qualifications
SGMA	Sustainable Groundwater Management Act of 2014
TAC	Technical Advisory Committee
TDS	Total Dissolved Solids
TEL-GRF	Thomas E. Levy Groundwater Replenishment Facility
USGS	United States Geological Survey
VSD	Valley Sanitary District
WRP	Water Reclamation Plant
WW-GRF	White Water Groundwater Replenishment Facility

1.0 BACKGROUND AND OBJECTIVES OF THE CV-SNMP

The Regional Water Quality Control Board for the Colorado River Basin (Regional Board) is requiring the development of a Salt and Nutrient Management Plan for the Coachella Valley Groundwater Basin (CV-SNMP). The objective of the CV-SNMP is to sustainably manage salt and nutrient loading in the Coachella Valley Groundwater Basin (Basin) in a manner that protects its beneficial uses.

In 2015, a CV-SNMP was submitted to the Regional Board (2015 SNMP); however, the Regional Board found the 2015 SNMP insufficient (see Section 1.2 below). This document is a workplan to update the 2015 SNMP (CV-SNMP Development Workplan). It was prepared on behalf the City of Coachella Sanitary District (CSD), City of Palm Springs (Palm Springs), Coachella Valley Water District (CVWD), Coachella Water Authority (CWA), Desert Water Agency (DWA), Indio Water Authority (IWA), Mission Springs Water District (MSWD), Myoma Dunes Mutual Water Company (MDMWC), and Valley Sanitary District (VSD), collectively the CV-SNMP Agencies.

This CV-SNMP Development Workplan defines the scope of work that the CV-SNMP Agencies will follow to update the 2015 SNMP and implement a supporting monitoring and reporting program. The intent is to develop the CV-SNMP in a collaborative approach with the Regional Board, including stakeholder and public outreach and involvement.

Figure 1-1 is a map that defines spatial extent of the Basin that is subject to the CV-SNMP. The Basin is located within the northwest portion of the Salton Sea Watershed (USGS Hydrologic Unit 18100200) and is the Coachella Valley Groundwater Basin as delineated by the California Department of Water Resources (DWR Groundwater Basin No. 7-021), but excludes the San Gorgonio Pass Subbasin (DWR Subbasin 7-021.04). Hence, the Basin, as defined for the CV-SNMP, is comprised of three of the four DWR Subbasins: the Indio Subbasin (DWR Subbasin 7-021.01), the Mission Creek Subbasin (7-021.02), and the Desert Hot Springs Subbasin (7-021.03).

The remainder of this section includes a description of the regulatory framework behind the requirements for the CV-SNMP, the results of past efforts to develop the CV-SNMP, an overview of the process to prepare this CV-SNMP Development Workplan, and the organization of this report.

1.1 Regulatory Framework

1.1.1 2009 Recycled Water Policy

The statewide requirement to develop SNMPs for groundwater basins in California was first promulgated in 2009 when the State Water Resources Control Board (State Board) adopted the Recycled Water Policy[1] (2009 Policy). The purpose of the 2009 Policy was to encourage increased use of recycled water in a manner that implements state and federal water quality laws. To accomplish this, the 2009 Policy included, among other provisions, a requirement to prepare SNMPs such that "salts and nutrients from all sources be managed on a basin-wide or watershed-wide basis in a manner that ensures attainment of water quality objectives and protection of beneficial uses." The 2009 Policy recognized that all groundwater basins are different in size, hydrogeologic complexity, and loading factors, which

[1] State Water Resources Control Board Resolution No. 2009-0011. *Adoption of a Policy for Water Quality Control for Recycled Water*. February 3, 2009.

necessitates locally-driven stakeholder efforts to define an appropriate SNMP that addresses the region-specific conditions.

The 2009 Policy defined general guidelines for preparing SNMPs, including the following required components:

- A basin/sub-basin-wide monitoring plan that includes an appropriate network of wells for assessing water quality and determining whether the concentrations of salts and nutrients are consistent with applicable water quality objectives.
- Description of water recycling goals and objectives.
- Identification of salt and nutrient sources, and estimation of salt and nutrient loading, basin assimilative capacity, and the fate and transport of salt and nutrients.
- Description of implementation measures to manage salt and nutrient loading in the basin on a sustainable basis.
- An antidegradation analysis to demonstrate that the implementation measures included within the plan will collectively satisfy the requirements of State Board Resolution 68-16 (the Antidegradation Policy).

The 2009 Policy acknowledged that not all Regional Board Water Quality Control Plans (Basin Plans) included adequate implementation measures for achieving or ensuring compliance with the water quality objectives for salts or nutrients. In addition, the 2009 Policy did not specify the methods or approaches for performing the above listed SNMP analyses. In this way, it implicitly left it to the SNMP stakeholders to define, and the Regional Boards to approve, the SNMP methods and approaches that are appropriate for the local area and the Basin Plan.

The initial deadline for completing SNMPs pursuant to the 2009 Policy was April 2014, with the option to apply for an extension through April 2016.

1.1.2 2018 Recycled Water Policy

In December 2016, the State Board adopted Resolution No. 2016-0061[2], which directed staff to propose amendments to the 2009 Policy, in part, to improve the SNMP guidelines based on lessons learned over the first seven years of implementation. Among the requested amendments was the inclusion of revised goals and mandates for statewide use of recycled water, clarification of recycled water monitoring and reporting requirements, recommendations for the development of representative, basin-wide groundwater monitoring networks, and an evaluation of the frequency of priority pollutant monitoring in recycled water (2018 Policy).

The State Board Staff Report supporting the 2018 Policy amendments identified the administrative and technical challenges in the development of SNMPs since 2009.[3] Some of the administrative challenges identified included:

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[2] State Water Resources Control Board Resolution No. 2061-0061. *To Reaffirm Support for the Development of Salt and Nutrient Management Plans and Direct Staff to Initiate a Stakeholder Process to Update the Recycled Water Policy*. December 6, 2016.
[3] State Water Resources Control Board. 2018. *Final Staff Report with Substitute Environmental Documentation, Amendment to the Recycled Water Policy*. December 11, 2018.

- The incentives for participation in the SNMPs were tied to recycled water projects, which resulted in:
  - Lack of involvement from key stakeholders representing major contributions to salt and nutrient loading.
  - SNMPs not being developed in areas with limited or no recycled water reuse.
- Management plans with implementation measures for which the stakeholders lack the regulatory authority to enforce or implement the measures.

Technical challenges included:

- A lack of readily available, representative groundwater monitoring data to assess water quality conditions. For example, monitoring programs that relied solely on deep municipal production wells for data would exclude shallow portions of the aquifer system.
- Most SNMPs relied upon overly simplistic mass-balance approaches to assess current and future assimilative capacity in the basin. These simplistic approaches assumed complete mixing of salt and nutrient loads in the basin, which is not typically representative of what occurs. Such approaches can under-estimate the assimilative capacity within deep aquifers and over-estimate the assimilative capacity within shallow aquifers.

Despite the identification of these challenges, the 2018 amendments to the SNMP guidelines within the Policy primarily focused on clarifying the roles of the Regional Boards in accepting SNMPs, performing periodic SNMP reviews, and defining new compliance schedules for completing SNMPs in areas where they had either not been prepared or approved by the Regional Boards. The 2018 Policy identified the same basic components to be included in the SNMPs as were defined in the 2009 Policy and still does not prescribe methods or approaches for SNMP analyses. As before, the SNMP methods and approaches that are appropriate for the local area and Basin Plan must be defined by the stakeholders and approved by the Regional Boards.

The State Board adopted the 2018 Policy in December 2018[4] and it went into effect in April 2019 following adoption by the Office of Administrative Law. For groundwater basins without approved SNMPs, the 2018 Policy does not define a deadline for SNMPs to be completed and approved by the Regional Board; it only requires that the Regional Boards identify which groundwater basins require an SNMP by Executive Order or Resolution by April 2021.

In addition, with approval of the Indio Subbasin Alternative and the Mission Creek Subbasin Alternative for the Sustainable Groundwater Management Act (SGMA) Groundwater Sustainability Plan requirement, DWR staff recommended that an approved SNMP be incorporated into future iterations of the Alternatives.

[4] State Water Resources Control Board. 2018. *2018 Water Quality Control Policy for Recycled Water*. December 18, 2018.

1.2 2015 Coachella Valley Salt and Nutrient Management Plan

1.2.1 Overview of the 2015 SNMP

In a letter dated February 14, 2011, the Regional Board asked the Coachella Valley stakeholders "take the necessary steps to initiate a collaborative process to prepare a salt and nutrient management plan" pursuant to the 2009 Policy.[5] In June 2015, the CVWD, DWA, and IWA submitted the final *Coachella Valley Groundwater Basin Salt and Nutrient Management Plan*[6] (2015 SNMP) to the Regional Board.

The 2015 SNMP included the following:

- Definition of the planning area, regulatory setting, stakeholder participation process, and the salt and nutrient constituents of concern: nitrate and total dissolved solids (N/TDS).
- A hydrogeologic characterization of the Coachella Valley groundwater subbasins, including definition of seven groundwater management zones for the 2015 SNMP.
- Characterization of current N/TDS concentrations for each management zone, including calculation of the volume-weighted estimates of ambient N/TDS concentrations within each management zone that had sufficient data available over the 15-year period of 1999-2013.
- For the management zones with estimates of ambient water quality, the 2015 SNMP included:
    - Assessments of assimilative capacity for N/TDS. Given the absence of numeric groundwater-quality objectives for TDS in the Basin Plan, the "upper level" for the secondary maximum contaminant level (MCL), which is 1,000 milligrams per liter (mgl), was used to compute assimilative capacity and concluded that there is assimilative capacity for loading of TDS. The 2015 SNMP also concluded that there is assimilative capacity for loading of nitrate.
    - Projections of N/TDS loading by source and the change in the volume-weighted ambient N/TDS concentrations by management zone over a 30-year planning period through 2045. Based on the projections, the 2015 SNMP concluded that there will continue to be assimilative capacity for N/TDS loading over the planning period.
    - An antidegradation analysis to support recycled water use, which only occurs in two of the management zones. The 2015 SNMP concluded that the recycled water projects will use much less than 10 percent of the available assimilative capacity and therefore these projects can continue to be permitted in accordance with the Policy.
- A listing of salt and nutrient management strategies that could help to minimize impacts of salt and nutrient loading and protect beneficial uses. No management plan was defined to implement these projects based on the findings that that there will continue to be assimilative capacity for N/TDS loading over the planning period.
- A monitoring plan to guide the reasonable and adequate collection of data and information to estimate ambient water quality for the management zones. The monitoring plan

[5] Perdue, R. 2011. Letter to Coachella Valley stakeholders (February 14, 2011).
[6] MWH. 2015. *Coachella Valley Groundwater Basin Salt and Nutrient Management Plan*. June, 2015.

identified existing and new monitoring locations and included recommendations regarding the additional data to be collected and the frequency of monitoring.

1.2.2 Regional Board Response to the 2015 SNMP

Since the submittal of the final 2015 SNMP, Regional Board staff have issued three letters to the 2015 SNMP participants detailing their comments and finding that the 2015 SNMP does not satisfy the requirements of the Policy.[7] In the most recent letter issued in February 2020, the Regional Board staff reiterated the specific findings regarding which components of the 2015 SNMP were insufficient and provided specific recommendations to develop an acceptable SNMP that is consistent with the 2018 Policy.

The Regional Board concerns are related to the following five technical and/or policy issues:

- The insufficiency of the monitoring program to fill data gaps and adequately characterize the spatial and vertical distribution of water quality conditions.
- The use of simple mass-balance approaches to compute current and future ambient N/TDS concentrations for the management zones.
- The use of the secondary upper MCL of 1,000 mgl for TDS to assess assimilative capacity.
- The lack of an antidegradation analysis to support salt and nutrient loading from sources other than recycled water, including the use and recharge of Colorado River water.
- The absence of an implementation plan for measures to manage salt and nutrient loading from all sources on a sustainable basis.

The Regional Board comments and associated recommendations to resolve the technical and policy issues are describe in more detail below.

SNMP Monitoring Program. The Policy requires a groundwater monitoring program that can determine whether the concentrations of salts, nutrients, and other constituents of concern in groundwater are consistent with groundwater quality objectives and are thereby protective of beneficial uses. The Regional Board perceived insufficiencies in the proposed monitoring plan in the 2015 SNMP. In particular, that the monitoring plan did not address:

- The identified data gaps in the management zones with no ambient water quality findings.
- The need to improve the characterization of the vertical distribution of groundwater quality.
- The identification of critical areas for monitoring near water supply wells, large water recycling projects, Colorado River water recharge projects, or other significant sources of salt and nutrients identified in the 2015 SNMP.

The Regional Board required that the CV-SNMP Agencies prepare a new monitoring program workplan to address these concerns by December 2020.

[7] Stormo, J. 2015. Letter to Patti Reyes (August 7, 2015).
Sanford, C. 2016. Letter to Joan Stormo and Abdi Haile (March 22, 2016).
Rasmussen, P. 2020. Letter to Steve Bigley, Marc Krause, and Trish Rhay (February 19, 2020).

Ambient Water Quality and the Capacity to Assimilate Salt and Nutrient Loading. The Regional Board believes that the findings of assimilative capacity for salt and nutrient loading to the groundwater management zones are potentially inaccurate and thereby may not be protective of beneficial uses. The Regional Board concerns are related to:

- The lack of ambient groundwater quality estimates for four of the seven proposed management zones and the ability of the monitoring program to supply sufficient data to estimate ambient groundwater quality.
- The use of a 15-year period to define ambient groundwater quality conditions.
- The use of a simple mass-balance approach that:
  - assumes complete and instantaneous mixing of salt and nutrient loads through the full depth of the aquifer,
  - simplifies the current and projected ambient groundwater quality into a single volume-weighted concentration that represents an entire management zone, and
  - does not account for the spatial and vertical distribution of constituents in groundwater.
- The use of the secondary upper MCL of 1,000 mgl for TDS to assess assimilative capacity.

To address these concerns, the Regional Board recommended: preparing the above noted monitoring program workplan; identifying where shallow groundwater or isolated areas within the groundwater basin may be influenced by salt and nutrient loading activities and thereby warrant additional monitoring or management techniques; a more conservative use of the mass-balance models that is capable of estimating depth-specific and site-specific ambient groundwater quality; and comparing the existing groundwater quality to all the established TDS ranges referenced in Title 22, including the "recommended" level of 500 mgl, citing that this approach will ensure that the most protective water quality standards are implemented.

Antidegradation Analysis. The 2018 Policy recognizes that while some recycled water projects have measurable salt and nutrient loading contributions to groundwater, it is other entities or activities such as agriculture, industry, wastewater treatment plant operations, and the use of imported waters that can result in significant salt and nutrient loading to groundwater. Section 6.2.4 of the 2018 Policy requires that SNMPs contain an antidegradation analysis demonstrating that the existing projects, reasonably foreseeable future projects, and other sources of loading to the basin described within SNMP will cumulatively satisfy the antidegradation requirements of State Board Order 68-16 (the Antidegradation Policy).

In the Coachella Valley, the Regional Board is specifically concerned with the TDS loading associated with the recharge of Colorado River water, and that future updates to the CV-SNMP must include an antidegradation analysis for the recharge of Colorado River water.

Implementation Measures to Manage Salt and Nutrient Loading. The 2015 SNMP discussed potential implementation measures to manage or reduce the salt and nutrient loading to groundwater, but did not include a plan to implement the measures, citing that corrective measures are not needed based on the results of the assimilative capacity and antidegradation analyses. As noted above, the Regional Board is concerned with the loading from the use and recharge of Colorado River water, which was identified as the greatest single source of salt entering the groundwater basin. The Regional Board believes that there is insufficient analytical data presented to evaluate the suspected impacts to the aquifer in the vicinity of any of the four active groundwater recharge facilities to conclude that mitigation measures are not needed. The Regional Board stated that the potential impacts to groundwater from the use and recharge of Colorado River water must be evaluated, and mitigation measures be proposed as warranted by the evaluations.

1.3 Update of the CV-SNMP

Following the February 19, 2020 letter, the CV-SNMP Agencies entered discussions with the Regional Board to address their comments and concerns and develop a plan and schedule to update the 2015 CV-SNMP for approval by the Regional Board. Per these discussions, and as documented in its April 27, 2020 letter,[8] the Regional Board required the CV-SNMP Agencies to address its concerns by developing the CV-SNMP Development Workplan by December 2020 (subsequently postponed to April 2021) that defines the scope and schedule to prepare an updated CV-SNMP. The CV-SNMP Development Workplan is required to include a monitoring program workplan.

The CV-SNMP Development Workplan will be the guide for updating the CV-SNMP to comply with the 2018 Policy and resolve the challenges identified by the Regional Board as discussed in Section 1.2.2 above.

1.3.1 Process to Prepare the CV-SNMP Development Workplan

The CV-SNMP Agencies prepared a Request for Proposals to solicit a technical consultant to assist in preparing the CV-SNMP Development Workplan. The CV-SNMP Agencies selected and contracted with Wildermuth Environmental, Inc. (now West Yost Associates) as the technical consultant in July 2020.

In September 2020, the CV-SNMP Agencies provided a progress report to Regional Board staff on preparing the CV-SNMP Development Workplan and requested a revision to the scope and schedule defined in the April 27, 2020 letter. The requested revision was for a two-step process, whereby:

- The CV-SNMP Groundwater Monitoring Program Workplan was due by December 18, 2020.

  The CV-SNMP Agencies completed the CV-SNMP Groundwater Monitoring Program Workplan (final report dated December 23, 2020), and the Regional Board approved the CV-SNMP Groundwater Monitoring Program Workplan in a letter dated February 21, 2021.[9] The approved CV-SNMP Groundwater Monitoring Program Workplan is included as Appendix A and is summarized in Sections 2 and 3 of this workplan.

- The remainder of the CV-SNMP Development Workplan is due to the Regional Board by April 30, 2021.[10]

Through discussions and advice from West Yost Associates, the CV-SNMP Agencies concluded that *numeric* objectives for TDS and nitrate in groundwater are necessary to resolve the concerns of the Regional Board (Section 1.2.2 above). Numeric objectives in the CV-SNMP will be necessary to:

- Demonstrate that beneficial uses are protected.

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8 Rasmussen, P. 2020. Letter to Steve Bigley (April 27, 2020).

9 Rasmussen, P. 2021. Letter to Steve Bigley (February 21, 2021).

10 Rasmussen, P. 2021. Letter to Steve Bigley (March 23, 2021).

- Quantify the magnitude of available assimilative capacity for salt and nutrient loading.
- Provide a technical basis for the Regional Board to allocate the use of assimilative capacity.
- Set triggers for implementation measures at appropriate locations and times.

Currently, the Basin Plan includes a nitrate-nitrogen objective of 10 mgl for groundwater in the Coachella Valley based on the primary drinking water MCL but lacks scientifically-derived numeric TDS objectives that are consistent with the provisions of Title 22. The process to recommend numeric TDS objectives needs to include technically-defensible methods and tools to answer the following questions:

- What are logical management areas within the Basin (management zones) and the beneficial uses of groundwater within the management zones?
- What is current groundwater quality? And, is current groundwater quality protective of beneficial uses?
- How is groundwater quality expected to change across the basin and within the depth-specific aquifer systems?
- Will these changes in groundwater quality impact beneficial uses? If so, where and when?
- What are economically and technically feasible salt management strategies, that when implemented, will achieve the objectives of both the CV-SNMP stakeholders and the Regional Board? Economic feasibility will need to be defined and should consider the sources of revenue and the factors that could restrict the sources of revenue.

In addition, the California Water Code section 13241 describes the factors to consider when establishing the TDS objectives:

a) *Past, present, and probable future beneficial uses of water*.

b) *Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto*.

c) *Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area*.

d) *Economic considerations*.

e) *The need for developing housing within the region*.

f) *The need to develop and use recycled water*.

The CV-SNMP Development Workplan must include a process to address these factors when recommending numeric TDS objectives for groundwater management zones.

This final CV-SNMP Development Workplan was prepared in a collaborative process between the CV-SNMP Agencies and Regional Board staff. A draft CV-SNMP Development Workplan dated April 30, 2021 was submitted to the Regional Board staff for review. The CVWD (representing the CV-SNMP Agencies) received a letter from the Regional Board dated June 30, 2021 with comments and suggested revisions to the draft CV-SNMP Development Workplan. The CV-SNMP Agencies prepared responses to the Regional Board comments and revised the CV-SNMP Development Workplan to address the comments. The

Regional Board's comments and the CV-SNMP Agencies' responses-to-comments are included in Appendix C.

1.3.2 Workplan Organization

This CV-SNMP Development Workplan describes the detailed scope of work to update the CV-SNMP by using technically-defensible methods and tools to recommend numeric TDS objectives for groundwater, answer the questions listed above, comply with State law and Policy, and resolve the concerns of the Regional Board.

The remainder of the CV-SNMP Development Workplan is organized as follows:

Section 2 – Study Area Setting. This section describes the study area that will be covered by the CV-SNMP and is included herein to provide context to the components and methods of the CV-SNMP Development Workplan.

Section 3 – CV-SNMP Monitoring Program Workplan. This section describes the detailed scope of work, schedule and budget required to implement a revised monitoring and data collection program that will support the development and implementation of the CV-SNMP. The Regional Board informed the CV-SNMP Agencies of approval of the CV-SNMP Groundwater Monitoring Program (described herein) in a letter dated February 21, 2021.

Section 4 – CV-SNMP Development Workplan. This section describes the detailed scope of work to prepare an updated CV-SNMP that complies with the State law and Policy and resolves the concerns of the Regional Board with the 2015 CV-SNMP. The scope of work includes the technical methods and approaches for applying State and Regional Board policies that will be relied upon in the development of the CV-SNMP.

Section 5 – CV-SNMP Development Workplan Implementation. This section describes the schedule and budget-level cost estimates to implement the CV-SNMP Development Workplan.

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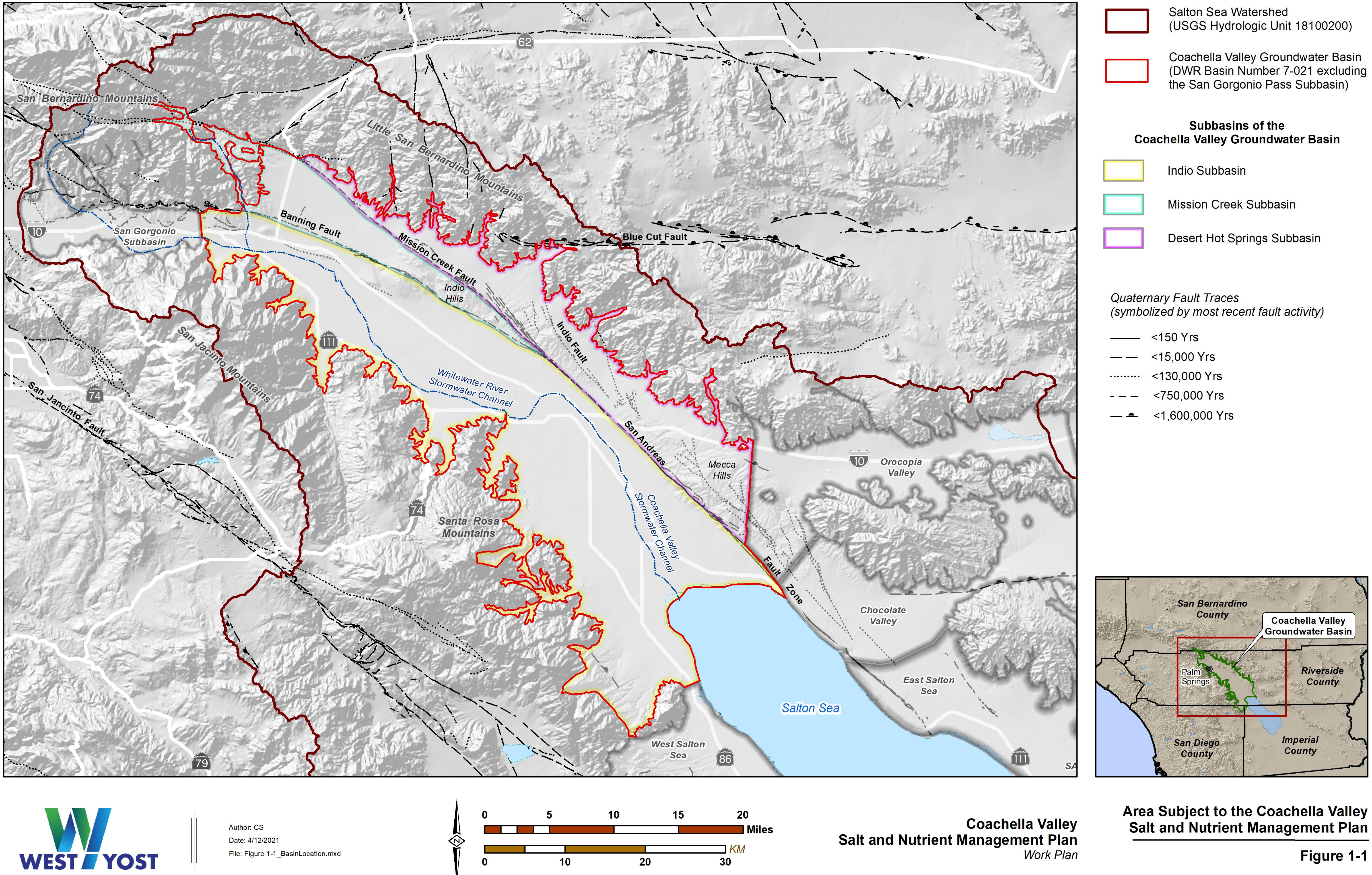

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Coachella Valley Salt and Nutrient Management Plan
Work Plan

Area Subject to the Coachella Valley Salt and Nutrient Management Plan

Figure 1-1

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2.0 STUDY AREA SETTING

This section summarizes the physical characteristics and dynamics of the Basin regarding surface water, groundwater, and the origin and fate and transport of salts and nutrients. Understanding the physical characteristics and dynamics of the Basin provides the foundation for defining SNMP methods and approaches that are appropriate for the local area and Basin Plan and selecting a monitoring network that will meet the objectives of the 2018 Policy.

This section was prepared from a review of past technical studies and reports; no original work or analyses were performed for this section of the workplan.

2.1 Basin Setting

Figure 2-1 is a geologic map that shows the Basin as delineated by the California Department of Water Resources (DWR Groundwater Basin No. 7-021, excluding the San Gorgonio Pass Subbasin), which represents the area subject to the CV-SNMP. The Basin is located within the northwest portion of the Salton Sea Watershed (USGS Hydrologic Unit 18100200).

Figure 2-1 shows the surface geology as generalized into natural divisions with regard to groundwater:

> **Unconsolidated water-bearing sediments**. These are the pervious formations that comprise the Basin.
>
> **Bedrock formations**. These are the semi-consolidated sediments and the consolidated bedrock formations that come to the surface in the hills and mountains that surround and bound the Basin. Groundwater can exist in pore spaces and fractures within the bedrock formations; however, the permeability of the bedrock formations typically is much less than the water-bearing sediments.

The upper 2,000 ft of the unconsolidated water-bearing sediments constitute the freshwater aquifer system that is the main source of groundwater supply in the region. The sediments tend to be finer-grained in the southeastern portions of the Basin due to the greater distance from the mountainous source areas and the lower-energy depositional environments, such as historical Lake Cahuilla.

The Whitewater River is the major drainage course in the Basin. The Whitewater River is an unlined channel, so surface water flows have the potential to infiltrate and recharge the Basin. In areas with shallow groundwater, the groundwater has the potential to discharge to interconnected surface water.

2.2 Hydrogeology

2.2.1 Subbasins and Subareas

Figure 2-2 is a map of the general hydrogeology of the area. The Basin is cross-cut by several geologic faults, which have created low-permeability zones within the water-bearing sediments that act as barriers to groundwater flow. These barriers impede, but do not eliminate, groundwater flow between subbasins. Groundwater flow can still occur across the barriers from areas of higher groundwater levels to areas of lower groundwater levels. The map identifies the locations of faults, subbasins, and subareas that comprise the Basin, and describes the general occurrence and movement of groundwater through the Basin.

The DWR has defined three main subbasins within the study area that are separated by geologic faults or changes in formation permeability that limit and control the movement of groundwater: the Indio Subbasin (DWR Subbasin 7-021.01), the Mission Creek Subbasin (7-021.02), and the Desert Hot Springs Subbasin (7-021.03).[11] These subbasins have been further subdivided into subareas based on one or more of the following geologic or hydrogeologic characteristics: type(s) of water-bearing formations, water quality, areas of confined groundwater, forebay areas, and groundwater or surface drainage divides.

Figure 2-2 shows groundwater-elevation contours for water-year 2019 (October 1, 2018 through September 30, 2019). Lateral groundwater flow is generally perpendicular to the contours from higher to lower elevation, as indicated by the arrows on the map. Generally, groundwater flows from areas of natural recharge along the surrounding mountain-fronts toward the valley floor and then southeast toward the distal portions of the Basin near the Salton Sea. Locally, the structural and compositional features within the Basin result in groundwater conditions and flow directions that vary significantly between subbasins. Anthropogenic activities such as artificial recharge and groundwater pumping also influence groundwater-flow directions.

2.2.2 Occurrence and Movement of Groundwater

Described below is the general occurrence of groundwater, and how groundwater flows through and discharges from each subbasin:

Desert Hot Springs Subbasin. In the Desert Hot Springs Subbasin, groundwater typically flows from the Little San Bernardino Mountains to the south but is locally variable due to faulting. The aquifer system is poorly understood due to relatively poor water quality, which has limited the development of groundwater resources in the area. Faulting in the northern portion of the subbasin has resulted in thermal mineral waters in the aquifer with temperatures up to 250 degrees Fahrenheit. These thermal waters are used by several spas in the area. Groundwater discharge primarily occurs by pumping at wells or subsurface outflow. Generally, groundwater elevations in the Desert Hot Springs Subbasin are higher than in the Mission Creek and Indio Subbasins, and hence, the subsurface outflow from the Desert Hot Springs Subbasin occurs across the Mission Creek Fault into these downgradient subbasins. These subsurface flows are thought to be relatively minor based on the differences in groundwater quality on either side of the fault barriers that separate the subbasins. However, any subsurface outflow from the Desert Hot Springs Subbasin could be a source of poor-quality inflow to the Mission Creek and Indio Subbasins.

Mission Creek Subbasin. In the Mission Creek Subbasin, groundwater typically flows from northwest to southeast. The aquifer system is up to 2,000 feet thick and is predominantly unconfined. Portions of the aquifer along the Banning Fault northwest of the Seven Palms Ridge area are semi-confined as evidenced by historically flowing-artesian wells in the area. Depth to groundwater in the Mission Creek Subbasin in 2019 ranged from an estimated 600 feet-bgs (ft-bgs) upgradient of the Mission Creek Groundwater Replenishment Facility (MC-GRF) to less than 5 feet-bgs in the southeast (west of the Indio Hills). Groundwater discharge primarily occurs by pumping at wells or subsurface flow across the Banning Fault into the Indio Subbasin.

Indio Subbasin. The Indio Subbasin is bordered on the west by the San Gorgonio Pass Subbasin and the crystalline bedrock of the Santa Rosa and San Jacinto Mountains. It is separated from the Mission Creek

[11] The DWR defines the San Gorgonio Pass Subbasin (7-021.04) as part the Basin, but it is not subject to the CV-SNMP.

Subbasin by the Banning Fault, and from the Desert Hot Springs Subbasin by the San Andreas Fault. Both faults are barriers to groundwater flow as evidenced by differences in groundwater levels across the faults. For example, groundwater-level differences across the Banning Fault, between the Mission Creek Subbasin and the Indio Subbasin, can be up to 250 feet. Subsurface flow between subbasins primarily occurs from the Desert Hot Springs and Mission Creek Subbasins into the Indio Subbasin.

In the Indio Subbasin, the aquifer system is generally unconfined in the forebay areas and across the northwestern portion of the subbasin. Generally, groundwater flows from the northwest toward the southeastern portions of the subbasin near the Salton Sea. In the southeast portion of the Indio Subbasin, the predominance of fine-grained sediments at depth has created three distinct aquifer systems, which are shown graphically in **Figure 2-3** and are described below:

> ***Perched***. A semi-perched aquifer up to 100 feet thick that is persistent across much of the area southeast of the City of Indio. The fine-grain units that cause the perched conditions are likely a barrier to deep percolation of surface water. The extent of the semi-perched aquifer is shown on **Figure 2-2**. Shallow groundwater within the semi-perched aquifer is conveyed away from the root zone by a network of privately-owned subsurface tile drainage systems that are distributed across the agricultural land uses in the southeastern portion of the Basin. CVWD maintains a regional network of surface and subsurface drains, shown on **Figure 2-4**, that accumulate and convey the drainage waters from the agricultural lands to the Salton Sea.
>
> ***Shallow***. An upper aquifer up to 300 feet thick that is present across most of the area. The upper aquifer is unconfined except in the areas of the semi-perched aquifer where it is semi-confined.
>
> ***Deep***. A lower aquifer that is 500-2,000 feet thick and is the most productive portion of the Basin. In the southeast portion of the Basin, the lower aquifer is confined and is separated from the upper aquifer by a fine-grained aquitard unit that is 100-200 feet thick. **Figure 2-2** displays the extent of the aquitard unit.

Groundwater discharge primarily occurs by pumping at wells, shallow groundwater discharge to subsurface tile drainage systems on agricultural lands that ultimately discharge to the Salton Sea, and subsurface outflow to groundwater underlying the Salton Sea.

2.3 Origin and Fate and Transport of N/TDS

Figure 2-4 is a map that depicts the general areas and processes of salt and nutrient loading, transport, and discharge throughout the Basin.

2.3.1 Loading of N/TDS

Salts, and in some cases nutrients, are loaded to the Basin via the following mechanisms:

- Subsurface inflow from: saturated sediments and bedrock fractures in the surrounding mountains and hills; the upgradient the San Gorgonio Pass Subbasin; and deep thermal water sources.
- Recharge of precipitation runoff in unlined stream channels that cross the Basin.

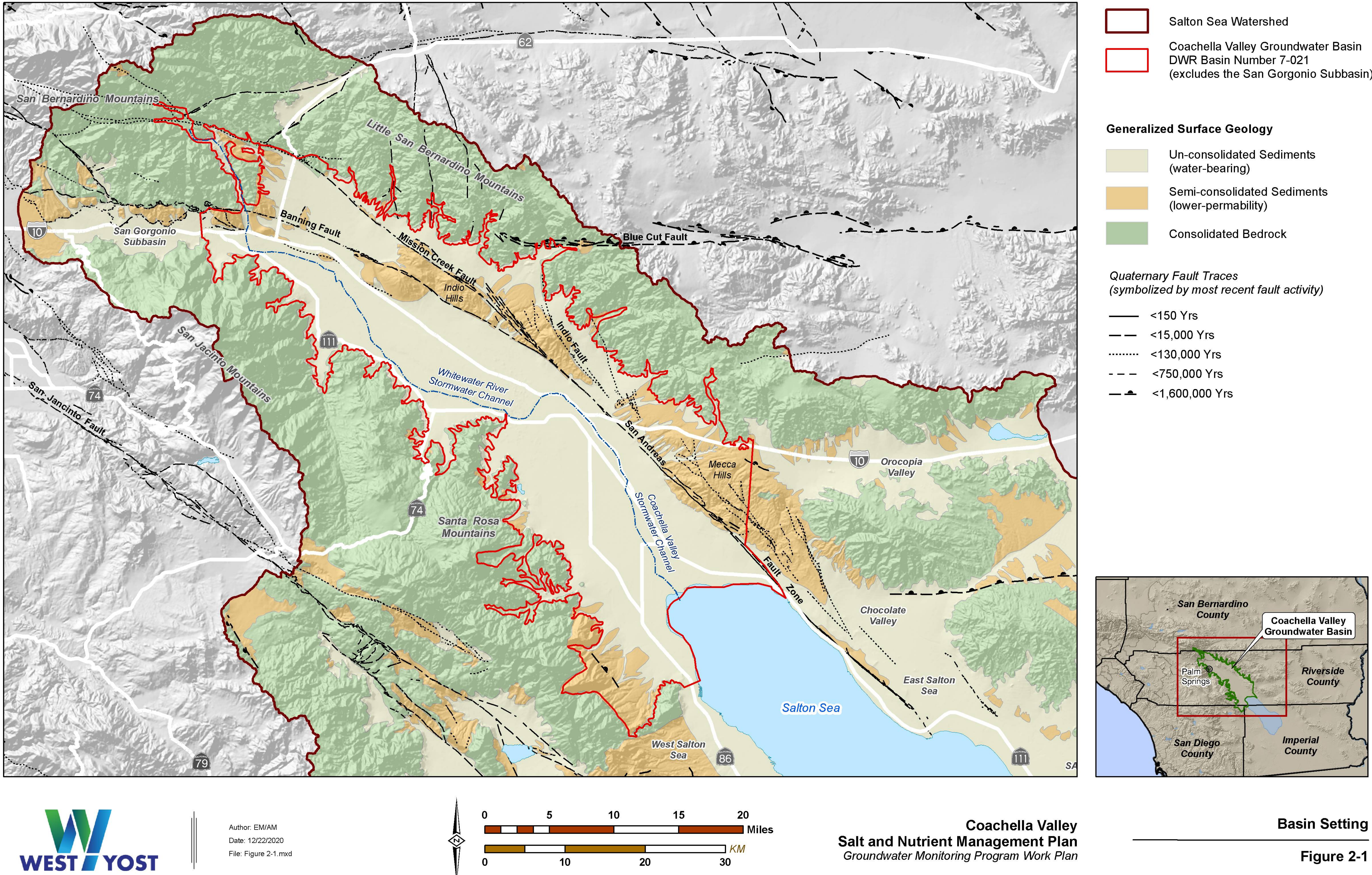
- Artificial recharge of imported Colorado River Water at the Groundwater Replenishment Facilities (GRF).
- Percolation of treated wastewater discharge to unlined ponds.
- Seepage from septic systems.
- Deep infiltration of precipitation on the land surface.
- Return flows from irrigation waters applied to the overlying land uses, such as agriculture, golf courses, and urban landscapes. Loading from return flows is a complex process that involves the following mechanisms that ultimately influence the volume and associated N/TDS concentrations of waters that migrate past the root zone to the saturated zone:
    - The interaction of precipitation and irrigation waters.
    - Evapotranspiration processes that concentrate salts in the root zone.
    - Geochemical and microbial processes that occur during the downward migration through the unsaturated (vadose) zone, such as absorption and chemical transformations.
    - Past N/TDS loading to the vadose zone by historical overlying land uses.

Figure 2-4 shows the spatial distribution and location of these sources of salt and nutrient loading across the Basin.

2.3.2 Transport and Discharge of N/TDS in the Saturated Zone

Once within the saturated zone, the dissolved salts and nutrients are transported through the aquifer system via the groundwater-flow systems shown on **Figure 2-2** and **Figure 2-4**. Ultimately, salts and nutrients are discharged from the Basin via the following mechanisms:

- Groundwater pumping.
- Discharge to agricultural drains. As described above, throughout the lower Basin, CVWD maintains a network of surface and subsurface drains to convey shallow groundwater away from the crop root zones. These drains convey water to the Coachella Valley Stormwater Channel (CVSC) and 27 smaller open channel drains that discharge directly to the Salton Sea.
- Subsurface outflow to downgradient subbasins. In the Indio Subbasin, subsurface outflow occurs to groundwater beneath the Salton Sea.
- Phreatophyte consumptive use.



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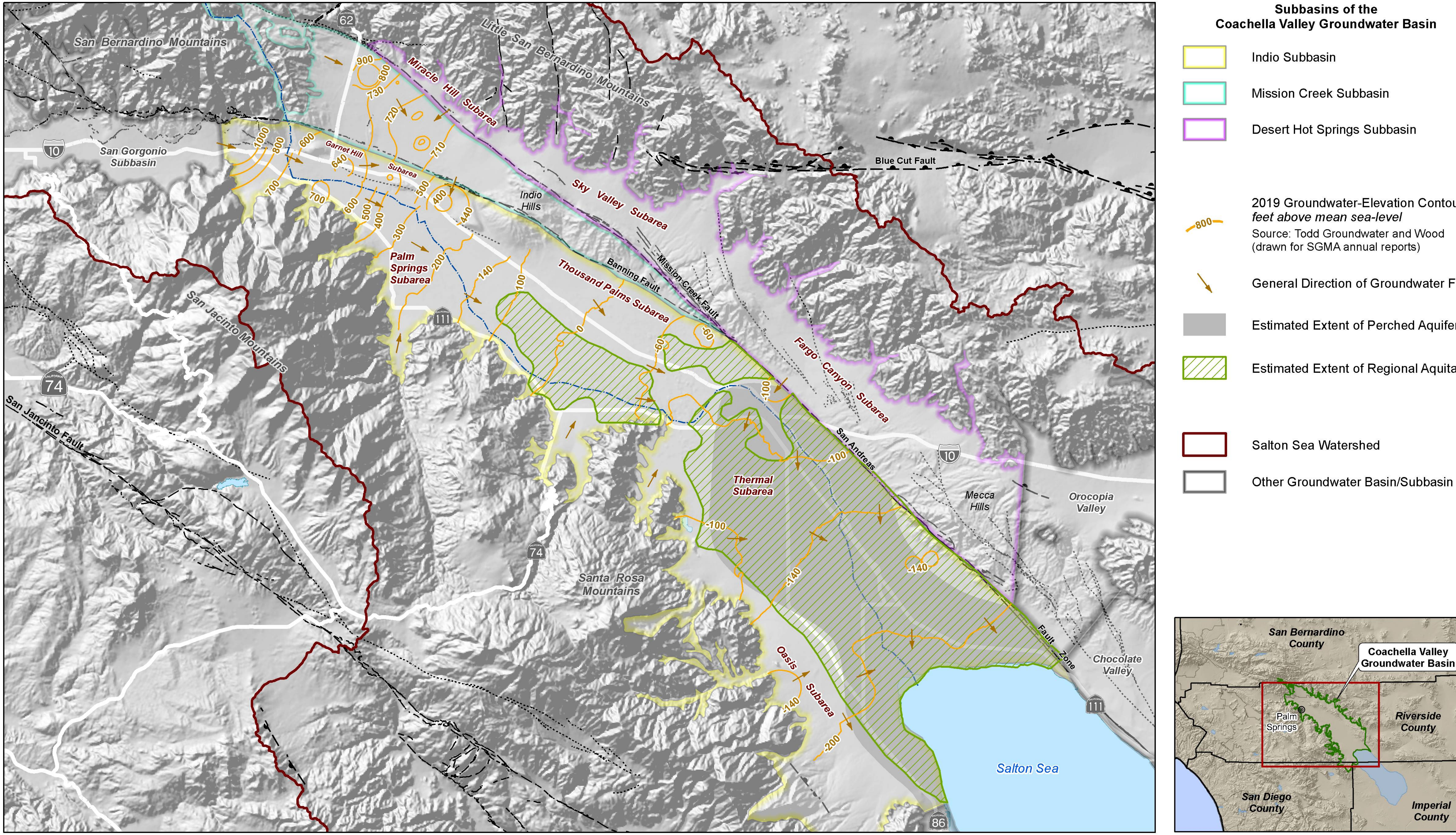
Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Basin Setting

Figure 2-1



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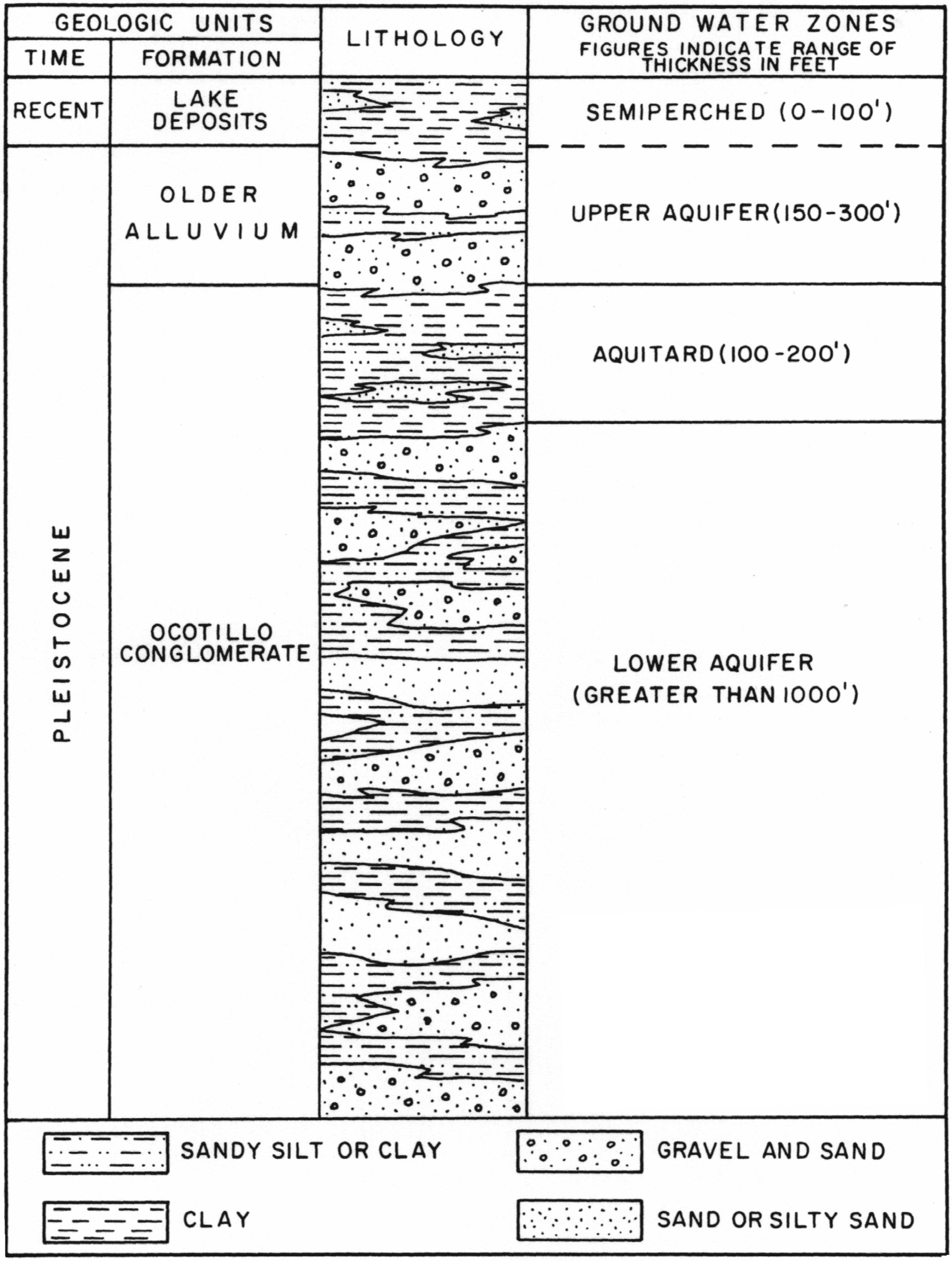
Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Hydrogeologic Map

Figure 2-2

Figure 2-3
Generalized Stratigraphic Column in Eastern Coachella Valley



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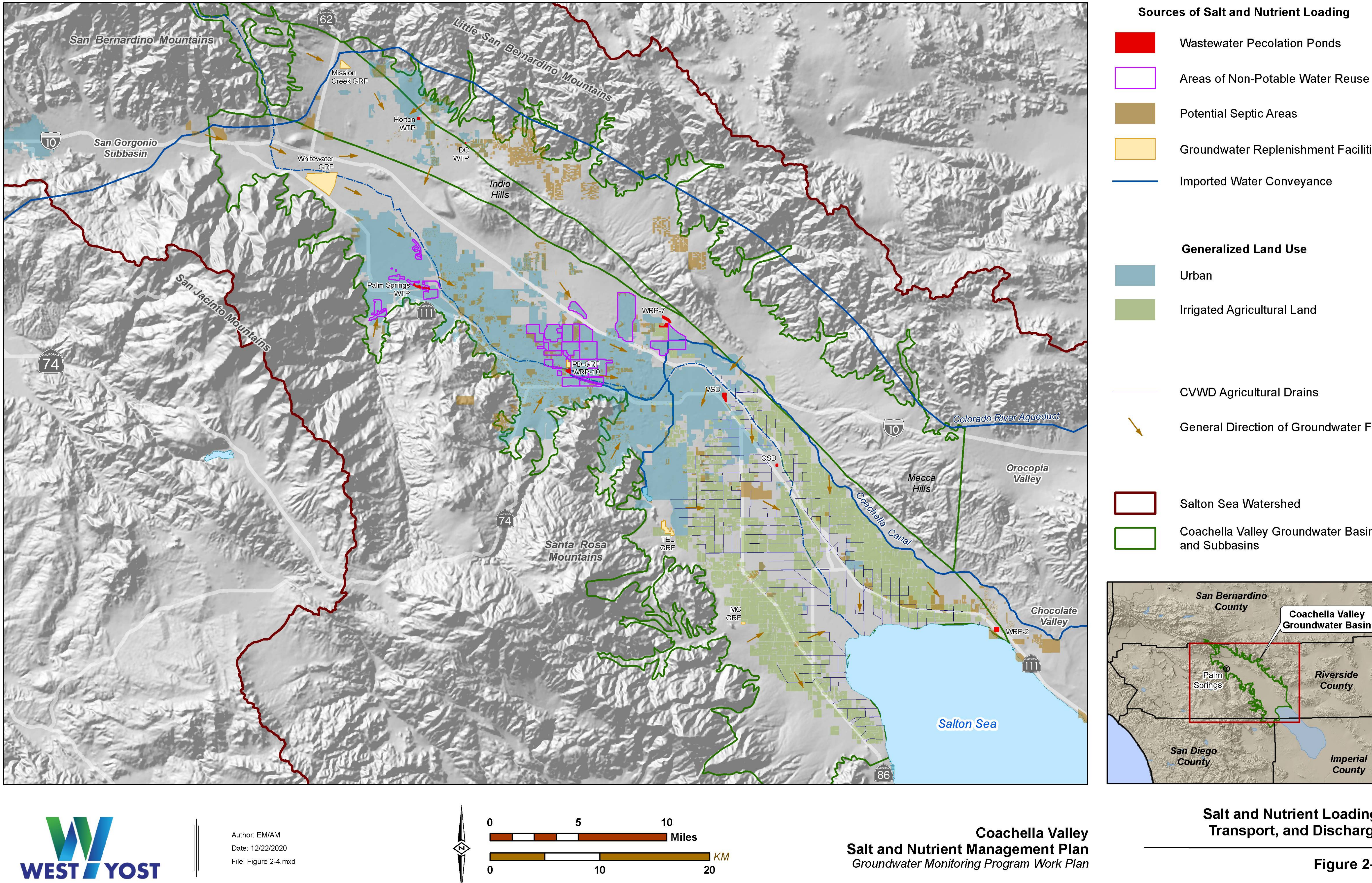

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Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Salt and Nutrient Loading, Transport, and Discharge

Figure 2-4

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3.0 CV-SNMP GROUNDWATER MONITORING PROGRAM WORKPLAN

The Groundwater Monitoring Program for the CV-SNMP consists of the following components, each further described below:

- Groundwater monitoring network
- Chemical analytes and sampling frequency
- Monitoring and reporting

3.1 Groundwater Monitoring Network

Section 6.2.4.1 of the Policy requires the implementation of a monitoring program that can determine whether the concentrations of salts and nutrients in groundwater are consistent with water quality objectives and are thereby protective of beneficial uses. The Policy also recognizes the monitoring program will be dependent upon basin-specific conditions and input from the Regional Board.

For the CV-SNMP Groundwater Monitoring Program, the Regional Board is requiring that the monitoring program:

- *Cover all subbasins and subareas within the Basin*. The updated CV-SNMP will require periodic mapping of groundwater quality to estimate ambient water quality and assimilative capacity. A monitoring network that is spatially distributed across all subbasins and subareas of the Basin will provide the necessary data for technically defensible mapping of groundwater quality.
- *Include sampling from all three major aquifer systems: Deep, Shallow, and Perched*. Section 2 of this Workplan described the hydrogeologic stratification of the aquifer system in the Basin. Groundwater quality, and the physical processes that can alter groundwater quality over time, can be significantly different between aquifer systems. This is because: (i) anthropogenic loading of salts and nutrients occur primarily at the ground surface, and hence, can influence the quality of shallower groundwaters first before influencing the quality of deeper groundwaters; (ii) thick aquitards in the southeastern portion of the Basin restrict the vertical movement of groundwater between aquifer systems; and (iii) upward hydraulic gradients, as evidenced by flowing artesian conditions in the southeastern portion of the Basin, limit the downward migration of salts and nutrients to the Deep aquifer system in this region. For these reasons, monitoring of perched, shallow and deep groundwaters is proposed herein across most of the Basin.
- *Focus on critical areas near: (i) large water recycling projects, (ii) near large recharge projects, particularly where Colorado River water is used to replenish the Basin for water-supply and groundwater management purposes, and (iii) near other potential sources of salt and nutrients*. It is important that monitoring occurs hydraulically upgradient and downgradient from these sources of salt and nutrient loading to characterize their influence on groundwater quality.
- *Focus on critical areas near water supply wells*. The water-supply wells are the main points of extraction for the ultimate beneficial uses of the Basin.

- *Identify critical gaps in the monitoring network and develop a plan and timeline to fill the gaps*. The current gaps in the monitoring network are described in this section. The plan and timeline to fill the gaps are included in Section 4.
- *Identify the stakeholders responsible for conducting, compiling, and reporting the monitoring data*.

3.1.1 Methods for Selection of the Groundwater Monitoring Network

The criteria used to select the groundwater monitoring network included the following:

1. **Spatial Distribution**. The monitoring network was designed to cover all subbasins and subareas within the Basin.
2. **Hydrogeology**. The monitoring network was designed to monitor all three major aquifer systems: Deep, Shallow, and Perched. Water-supply wells in the Basin typically pump groundwater from the Deep aquifer system and were therefore more available for inclusion in the monitoring network. Wells with screens across the Shallow and Perched aquifer systems were less abundant. Hence, most "gaps" in the proposed monitoring network are within the Shallow and Perched aquifer systems.
3. **Areas of Salt or Nutrient Loading**. The network was designed to monitor the influence of known sources of salt or nutrient loading on groundwater quality within the Basin. These sources included: the GRFs; wastewater percolation ponds; areas with septic systems; overlying land uses with irrigation returns (e.g., golf, landscapes, agriculture); and areas served non-potable waters for irrigation (e.g., recycled and/or imported waters). Monitoring of non-point-source loading, such as returns from non-potable irrigation waters and septic systems, is intended to be representative of the influence of non-point-sources of loading on groundwater quality. It is not intended to be site-specific monitoring of every area of non-point-source loading across the Basin, which would be infeasible.
4. **Groundwater Flow**. The network was designed to monitor all major groundwater-flow systems, from areas of recharge to areas of discharge, and within and between the groundwater subbasins. This is necessary in order to track the subsurface migration of salts and nutrients through the Basin.
5. **Use of Existing Wells**. Wherever possible, active municipal production or monitoring wells were preferentially selected if they currently participate in a similar monitoring program (e.g., California Division of Drinking Water [DDW] or Regional Board orders). In some areas, such wells were not available for selection. In those areas, inactive municipal production wells or private wells were selected for inclusion in the monitoring network. The use of inactive or private wells in this monitoring program will require significant coordination with the private well owners and/or physical wellhead improvements to collect groundwater samples. Lastly, if no wells were identified in an area/depth that should be monitored, a "gap" was designated in the monitoring network.

3.1.2 *Monitoring Network and Gaps* – Shallow Aquifer System

Figure 3-1 is a map of the groundwater monitoring network for the Shallow aquifer system. Each well is labeled by a Map_ID. Because most production wells in the Basin have well screens across the Deep aquifer system, there were several identified "gaps" in the monitoring network, particularly in the Thermal Subarea of the Indio Subbasin. **Table 3-1** is a list of wells shown on **Figure 3-1** sorted by Map_ID. The table includes a summary justification for why each well was included in the monitoring program. **Table 3-4** is a list of the "gaps" in the monitoring network with a summary explanation of why each gap should be filled.

3.1.3 *Monitoring Network and Gaps* – Deep Aquifer System

Figure 3-2 is a map of the groundwater monitoring network for the Deep aquifer system. Each well is labeled by a Map_ID. Most production wells in the Basin have well screens across the Deep aquifer system; hence, there were no identified "gaps" in the Deep monitoring network. **Table 3-2** is a list of wells shown on **Figure 3-2** sorted by Map_ID. The table includes a summary justification for why the well was included in the monitoring program.

3.1.4 *Monitoring Network and Gaps* – Perched Aquifer System

Figure 3-3 is a map of the groundwater monitoring network for the Perched aquifer system. Each well is labeled by a Map_ID. The map shows the extent of the Perched aquifer system which is confined to the Thermal Subarea of the Indio Subbasin. The network of CVWD's agricultural drains that convey perched groundwater to the CVSC and the Salton Sea is also shown. The only existing wells with well screens across the Perched aquifer system are five monitoring wells owned by the CVWD; hence, there were several identified "gaps" in the Perched monitoring network. **Table 3-3** is a list of wells shown on **Figure 3-3** sorted by Map_ID. The table includes a summary justification for why each well was included in the monitoring program. **Table 3-4** is a list of the "gaps" in the monitoring network with a summary explanation of why each gap should be filled.

3.2 Chemical Analytes and Sampling Frequency

Table 3-5 lists the chemicals that will be analyzed for dissolved concentration in each groundwater sample for the monitoring program. The table describes the justification for each chemical analyte. Testing will be performed at a laboratory accredited by the State of California for the testing of inorganic chemistry of drinking water.

The minimum sampling frequency is once every three years. Many wells chosen for this monitoring program are sampled more frequently under other required or voluntary monitoring programs.

During each groundwater sampling event, the agency responsible for sampling will attempt to obtain a static (non-pumping) depth-to-water measurement. In instances when a static depth-to-water measurement cannot be obtained, it will be noted with a description for the reason.

3.3 Monitoring and Reporting

The CV-SNMP Agencies have the following responsibilities for sampling of the wells in the monitoring network (described in Section 3.1), the laboratory analysis of chemical analytes (described in Section 3.2), and the reporting of the laboratory results pursuant to the Policy

3.3.1 Groundwater Sampling and Laboratory Analysis

For groundwater sampling and analysis:

- Municipal well owners are responsible for the groundwater sampling and laboratory analyses for their own wells.

- For private wells within their service area, the overlying CV-SNMP Agency is responsible for coordinating with the private well owners to conduct groundwater sampling and the laboratory analyses. In areas of overlapping jurisdictions of CV-SNMP Agencies, the agencies must jointly coordinate to assign responsibility for sampling and analysis of private wells that fall within the overlapping jurisdictions. Agency responsibilities may include developing administrative agreements with the well owners (e.g., right-of-entry agreement) and making physical modifications to the wellhead to enable collection of a sample (e.g., installation of a sampling port on the well discharge pipe).

Table 3-6 lists all wells proposed for the monitoring program. For each well, the table includes a designation for the overlying CV-SNMP Agency(ies).

3.3.2 Reporting of Laboratory Results

Section 6.2.4.1.3 of the Policy requires that all data collected for the monitoring program "shall be electronically reported annually in a format that is compatible with a Groundwater Ambient Monitoring & Assessment (GAMA) information system and must be integrated into the GAMA information system or its successor." This will centralize data generated from SNMPs at the State level and create consistency across regional water boards to allow for further analysis of monitoring data.

By March 31 of each year, the CV-SNMP Agencies will report the laboratory water-quality results from the prior calendar year to the GAMA information system.

3.4 Filling of Gaps in the Monitoring Network

Table 3-4 lists the gaps in the monitoring network that were identified during the selection of the monitoring network.

Gaps in the monitoring network will be filled in one of two ways:

1. Field identification of an existing well that: (i) is located near the identified gap; (ii) can be sampled, and (iii) has well screens across the appropriate depth interval (e.g., across the Shallow aquifer system). This may require the following activities: field canvassing to identify a candidate well; research and/or exploratory well surveys to confirm well screen depth intervals; and constructing any well/wellhead modifications that are necessary to collect groundwater samples.

2. Construction of a new monitoring well with well screens across the appropriate depth interval. This may require the following activities: a well-siting study; well-site acquisition or easement; development of technical specifications for a monitoring well; conducting a bid process to select a well drilling/construction subcontractor; obtaining the necessary permits and CEQA clearance; performing well construction with oversight; performing well development and testing; preparing a well completion report; equipping the well for sampling, and wellhead completion including any needed site improvements.

In the first year, the CV-SNMP Agencies will perform the necessary field work and research and develop a plan for how each gap in the monitoring program will be filled.

Filling the gaps in the monitoring network is likely the most expensive, complicated element of the monitoring program. Therefore, the filling of gaps will be executed over a six-year period, subject to funding availability. The CV-SNMP Agencies will pursue grant funding to support the filling of gaps under State-run programs such as Integrated Regional Water Management and the Sustainable Groundwater Management Act.

By March 31 of each year, the CV-SNMP Agencies will report to the Regional Board on progress made toward filling the gaps in the monitoring network over the preceding calendar year (see Section 5.2 below).

Table 3-1. SNMP Groundwater Monitoring Network -- *Shallow Aquifer System*

Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Justification for Inclusion in SNMP Monitoring Program
1	03S04E20F01S	USGS	335348116352701	Active	Monitoring	600-640	S	Northwest area at WW-GRF
2	03S04E20J01S	USGS	335339116345301	Active	Monitoring	550-590	S	Northeast area at WW-GRF
3	06S07E33G02S	Coachella Valley Water District	TEL-GRF MW-21S	Active	Monitoring	230-250	S	Adjacent to and downgradient of TEL-GRF
4	06S07E33J02S	Coachella Valley Water District	TEL-GRF MW-22S	Active	Monitoring	230-250	S	Adjacent to and downgradient of TEL-GRF
5	06S07E34N03S	Coachella Valley Water District	TEL-GRF MW-23S	Active	Monitoring	230-250	S	Adjacent to and downgradient of TEL-GRF
7	02S04E26C01S	Mission Springs Water District	Well 28	Inactive	MUN	590-898	S	Downgradient from Mission Creek GRF; near golf course and septic areas
8	02S04E28A01S	Mission Springs Water District	Well 34	Active	MUN	550-980	S	Downgradient from Mission Creek GRF
9	02S05E31L01S	Mission Springs Water District	Well 11	Inactive	Unknown	220-285	S	Downgradient of Desert Hot Springs (DHS) subbasin
10	03S04E04Q02S	CPV Sentinel	03S04E04Q02S	Active	Unknown		S	Upgradient portion of Mission Creek subbasin
11	03S04E11L01S	Mission Springs Water District	Well 27	Active	MUN	180-380	S	Upgradient of Garnet Hill subarea; near potential septic areas in N. Palm Springs
12	03S05E05Q01S	Hidden Springs Golf Course	P27	Active	Unknown	220-600	S	Downgradient of DHS subbasin; near golf course and septic areas
13		City of Palm Springs	Airport MW-2	Active	Monitoring	240-250	S	Center of Indio subbasin; near airport and areas served non-potable water (NPW)
14		City of Palm Springs	MW-1	Active	Monitoring	170-210	S	Downgradient of Palm Springs WTP percolation ponds
15		City of Palm Springs	MW-3	Active	Monitoring	140-215	S	Upgradient of Palm Springs WTP percolation ponds
16		City of Palm Springs	MW-4	Active	Monitoring	170-210	S	Downgradient of Palm Springs WTP percolation ponds
17		City of Palm Springs	MW-5	Active	Monitoring	170-210	S	Downgradient of Palm Springs WTP percolation ponds
18		City of Palm Springs	MW-6	Active	Monitoring	170-210	S	Downgradient of Palm Springs WTP percolation ponds
19	03S03E08M01S	Mission Springs Water District	Well 26	Active	MUN	225-553	S	Monitoring of subsurface inflow from San Gorgonio Pass subbasin
20	03S03E10P02S	Agua Caliente	DWA P05	Active	Unknown	306-906	S	Upgradient of Whitewater GRF
21	03S04E12B02S	Coachella Valley Water District	CVWD Well 3408-1	Active	MUN	270-500	S	Central portion of Mission Creek subbasin; near potential septic areas
22	03S04E29F01S	USGS	335304116353001	Active	Monitoring	550-570	S	Monitoring at southwestern area of Whitewater GRF
23	03S04E29R01S	USGS	335231116345401	Active	Monitoring	431-551	S	Monitoring at southeastern area of Whitewater GRF
24	04S04E11Q01S	Desert Water Agency	DWA Well 5	Standby	MUN	302-402	S	Western portion of Indio subbasin; downgradient of septic areas
25	04S04E35A01S	Agua Caliente	Indian Canyons Well	Active	Unknown	360-680	S	Near golf courses, septic, and areas served NPW
26	04S05E09F03S	Coachella Valley Water District	CVWD Well 4564-1	Active	MUN	410-670	S	Center of Indio subbasin; near golf courses and septic areas
27	04S05E29A02S	Desert Water Agency	DWA Well 25	Active	MUN	166-300	S	Downgradient of Palm Springs WTP percolation ponds; near golf courses and NPW areas
29	04S07E33L02S	Coachella Valley Water District	WRP7 MW-2S	Active	Monitoring	60-190	S	Near WRP-7 percolation ponds
30	05S06E09M03S	Coachella Valley Water District	WRP10 MW-7	Active	Monitoring	260-340	S	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
31	05S06E09P02S	Coachella Valley Water District	PD-GRF MW 2	Active	Monitoring	260-340	S	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
32	05S06E10J01S	Coachella Valley Water District	PD-GRF MW 1	Active	Monitoring	260-340	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
33	05S06E13G03S	Coachella Valley Water District	WRP10 MW-8	Active	Monitoring	260-340	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
34	05S06E14G03S	Coachella Valley Water District	WRP10 MW-5	Active	Monitoring	240-320	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
35	05S06E14P03S	Coachella Valley Water District	WRP10 MW-6	Active	Monitoring	190-270	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
36	05S06E15F01S	Coachella Valley Water District	WRP10 MW-2	Active	Monitoring	160-290	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
37	05S06E15M01S	Coachella Valley Water District	WRP10 MW-1	Active	Monitoring	145-295	S	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
38	05S06E15P01S	Coachella Valley Water District	WRP10 MW-3	Active	Monitoring	130-290	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
39	05S06E16A03S	Coachella Valley Water District	WRP10 MW-4	Active	Monitoring	190-270	S	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
40	05S06E21Q04S	Coachella Valley Water District	PD-GRF MW 3	Active	Monitoring	260-340	S	Cross-gradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
41	05S06E23M02S	Coachella Valley Water District	PD-GRF MW 4	Active	Monitoring	270-360	S	Cross-gradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
42	05S07E03D02S	Coachella Valley Water District	WRP7 MW-4S	Active	Monitoring	60-190	S	Near WRP-7 percolation ponds
43	05S07E04A04S	Coachella Valley Water District	WRP7 MW-3S	Active	Monitoring	50-180	S	Near WRP-7 percolation ponds
44	05S07E16K02S	Coachella Valley Water District	CVWD Well 5737-1	Inactive	Monitoring	200-415	S	Center of Indio subbasin; downgradient from areas served NPW
45	05S07E19D04S	Coachella Valley Water District	WRP10 MW-9	Active	Monitoring	260-340	S	West in Indio subbasin; near golf courses and areas served NPW
46	05S07E24M02S	Indio Water Authority	Well 1B	Active	MUN	190-410	S	Center of Indio subbasin; upgradient of VSD plant
47	06S06E12G01S	Coachella Valley Water District	CVWD Well 6650-1	Inactive	Monitoring	<370	S	Within center of The Cove
48	06S07E34A02S	Coachella Valley Water District	TEL-GRF MW-25	Active	Monitoring	115-135	S	Downgradient from TEL-GRF and golf courses
49	06S07E34D02S	Coachella Valley Water District	TEL-GRF MW-24	Active	Monitoring	180-200	S	Directly north and downgradient of TEL-GRF
50	07S08E29P03S	Coachella Valley Water District	MC-3	Active	Monitoring	380-440	S	At Martinez Canyon GRF
51	08S09E31R03S	Coachella Valley Water District	CVWD Well 8995-1	Active	MUN	260-390	S	Southern corner of the Indio basin; near agriculture; near Salton Sea
52	03S04E17K01S	Valley View MWC	03S04E17K01S	Undetermined	Unknown	340-375	S	Cross-gradient from Whitewater GRF in Garnet Hill subarea
53	03S04E22A01S	Erin Miner	03S04E22A01S	Active	Unknown	180-230	S	Downgradient of Whitewater GRF in Garnet Hill subarea; upgradient of West Valley WWTP
54	03S05E08P02S	Bluebeyond Fisheries	03S05E08P02S	Active	Fish Farm	200-400	S	Central Mission Creek subbasin; near golf course and septic areas

Table 3-1. SNMP Groundwater Monitoring Network -- *Shallow Aquifer System*

Map_ID	SWN	Well Owner	Well Name	Well Status[(a)]	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Justification for Inclusion in SNMP Monitoring Program
55	03S05E15N01S	Too Many Palms LLC	03S05E15N01S	Active	Irrigation	158-320	S	Distal area in Mission Creek subbasin; downgradient of DHS subbasin
56	03S05E18J01S	Desert Dunes Golf Club	03S05E18J01S	Active	Irrigation	76-340	S	Upgradient of Garnet Hill subarea; near golf course and septic areas
57	03S06E21G01S	Sky Valley Mobile Home Park	03S06E21G01S	Undetermined	Unknown	188-248	S	Western portion of Sky Valley subarea; near septic areas
58	04S05E04F01S	So Pacific Trans Co #32601	04S05E04F01S	Active	Irrigation	276-576	S	Eastern edge of Indio subbasin; downgradient from Garnet Hill subarea; near septic areas
59	04S05E23F01S	Westin Mission Hills Resort	04S05E23F01S	Active	Irrigation	275-1165	S	Center of Indio subbasin; near golf courses and septic areas
60	04S05E34C01S	Manufacture Home Community Inc	04S05E34C01S	Active	Irrigation	240-500	S	Western edge of Indio subbasin; near septic and areas served NPW
61	04S05E35Q01S	Tamarisk Country Club	04S05E35Q01S	Active	Irrigation	171-518	S	Western edge of Indio subbasin; near septic and areas served NPW
62	04S05E36L02S	Annenberg Estate	04S05E36L02S	Active	Irrigation	252-650	S	Center of Indio subbasin; near golf, septic, and areas served NPW
63	04S06E20C01S	Shenandoah Ventures LP	04S06E20C01S	Inactive	Irrigation	250-790	S	Upgradient in Thousand Palms area; upgradient of septic areas
66	05S05E12D01S	Thunderbird Country Club	05S05E12D01S	Active	Irrigation	125-360	S	Western edge of Indio subbasin; near septic and areas served NPW
67	05S06E12M01S	Palm Desert Resort Country Club	05S06E12M01S	Active	Irrigation	140-650	S	Center of Indio subbasin; near areas served NPW
68	05S07E08Q01S	Bermuda Dunes Airport	05S07E08Q01S	Active	Domestic	203-654	S	Center of Indio subbasin; near areas served NPW
69	05S07E28H02S	Tricon/COB Riverdale LP	05S07E28H02S	Active	Domestic	162-636	S	Center of Indio subbasin
70	05S08E28M02S	JS Cooper	05S08E28M02S	Undetermined	Unknown	208-268	S	Eastern edge of Indio subbasin; downgradient of VSD discharge point
71	05S08E30N03S	Carver Tract Mutual Water Co	05S08E30N03S	Active	Domestic	270-330	S	Eastern portion of Indio subbasin; downgradient from VSD plant
72	06S07E07B01S	Traditions Golf Club	06S07E07B01S	Active	Irrigation	200-480	S	Downgradient from The Cove; near golf courses and septic areas
73	06S08E02L01S	Prime Time International	06S08E02L01S	Undetermined	Irrigation	216-407	S	Eastern edge of Indio subbasin; near agriculture; upgradient from CWA/CSD WWTP
74	06S08E05K01S	Peter Rabbit Farms	06S08E05K01S	Active	Irrigation	126-375	S	Eastern portion of Indio subbasin in Coachella
75	06S08E32L01S	Guillermo Torres	06S08E32L01S	Undetermined	Unknown	127-227	S	Downgradient from TEL-GRF; agricultural area
76	07S08E27A01S	Gimmway Enterprises Inc	07S08E27A01S	Active	Domestic	147-215	S	Downgradient from Martinez Canyon GRF; near septic areas
77	07S09E14C01S	Tudor Ranch Inc.	07S09E14C01S	Active	Domestic	93-290	S	Southeastern corner of Indio subbasin; near agriculture and septic areas; near Salton Sea
78	08S08E15G02S	Thermiculture Management LLC	08S08E15G02S	Active	Irrigation	260-500	S	Southern corner of Indio subbasin; near agriculture; near Salton Sea
79		Mission Springs Water District	Well 25	Active	MUN	330-455	S	Monitoring of subsurface inflow from San Gorgonio Pass subbasin
80		Mission Springs Water District	Well 1	Inactive	Monitoring		S	Northern Miracle Hill subarea; upgradient of Mission Creek subbasin
81		Mission Springs Water District	Horton WWTP MW-1	Active	Monitoring	186-236	S	Monitoring wells upgradient and downgradient of the Horton WWTP
82		Mission Springs Water District	Horton WWTP MW-2	Active	Monitoring	220-270	S	Monitoring wells upgradient and downgradient of the Horton WWTP
83		Mission Springs Water District	Horton WWTP MW-3	Active	Monitoring	200-250	S	Monitoring wells upgradient and downgradient of the Horton WWTP

(a) Well Status: Well Status: "Active" means well is known to exist and currently used for original purpose; "Standby" means active backup well; "Inactive" means well exists but is no longer used as a water-supply.

(b) Well Use: MUN = municipal and domestic supply

(c) Depth Code: This monitoring program assigns wells to aquifer layers by depth. P = Perched aquifer system, mainly in the Thermal subarea. S = Shallow aquifer system. D = Deep aquifer system

Table 3-2. SNMP Groundwater Monitoring Network -- *Deep Aquifer System*								
Map_ID	SWN	Well Owner	Well Name	Well Status[(a)]	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Justification for Inclusion in SNMP Monitoring Program
84	03S04E20F02S	USGS	335348116352702	Active	Monitoring	850-890	D	Northwest area at WW-GRF
85	03S04E20J03S	USGS	335339116345303	Active	Monitoring	850-890	D	Northeast area at WW-GRF
86	06S07E33G01S	Coachella Valley Water District	TEL-GRF MW-21D	Active	Monitoring	390-410	D	Adjacent to and downgradient of TEL-GRF
87	06S07E33J01S	Coachella Valley Water District	TEL-GRF MW-22D	Active	Monitoring	520-540	D	Adjacent to and downgradient of TEL-GRF
88	06S07E34N02S	Coachella Valley Water District	TEL-GRF MW-23D	Active	Monitoring	525-545	D	Adjacent to and downgradient of TEL-GRF
89	07S09E30R03S	Coachella Valley Water District	Peggy	Active	Monitoring	730-770	D	Downgradient of WRP-4; near agriculture; area of subsurface outflow toward Salton Sea
90	08S09E07N02S	Coachella Valley Water District	Rosie	Active	Monitoring	720-780	D	Near agriculture; area of subsurface outflow toward Salton Sea
91	05S07E24L03S	Indio Water Authority	Well 1E	Active	MUN	552-815	D	Center of Indio subbasin; upgradient of VSD plant
92	02S04E28J01S	Mission Springs Water District	Well 35	Active	MUN	725-1020	D	Downgradient from Mission Creek GRF
93	02S04E36P01S	Mission Springs Water District	Well 37	Active	MUN	450-1080	D	Downgradient of DHS subbasin; possibly downgradient of Horton WWTP
94	02S05E31H01S	Mission Springs Water District	Well 5	Inactive	Monitoring	274-784	D	Northern Miracle Hill subarea; upgradient of Mission Creek subbasin
95	03S03E07D01S	Mission Springs Water District	Well 25A	Active	MUN	500-740	D	Monitoring of subsurface inflow from San Gorgonio Pass subbasin
96	03S04E04P01S	CPV Sentinel	03S04E04P01S	Active	Unknown		D	Upgradient portion of Mission Creek subbasin
97	03S04E11A02S	Mission Springs Water District	Well 32	Active	MUN	320-980	D	Center of Mission Creek subbasin; near potential septic areas
98	03S03E08A01S	Mission Springs Water District	Well 26A	Active	MUN	320-600	D	Monitoring of subsurface inflow from San Gorgonio Pass subbasin
99	03S03E10P01S	Agua Caliente	DWA P04	Active	Unknown	476-776	D	Upgradient of Whitewater GRF
100	03S04E14J01S	Mission Springs Water District	Well 33	Active	MUN	360-650	D	Along boundary of Mission Creek subbasin/Garnet Hill subarea
101	03S04E19L01S	Desert Water Agency	DWA Well 43	Active	MUN	500-900	D	Upgradient of Whitewater GRF
102	03S04E34H02S	Desert Water Agency	DWA Well 35	Active	MUN	600-1000	D	Upgradient of urban land uses in Palm Springs; downgradient of WW-GRF
103	03S04E36Q01S	Desert Water Agency	DWA Well 38	Active	MUN	620-1000	D	Upgradient of urban land uses in Palm Springs; downgradient of WW-GRF
104	04S04E02B01S	Desert Water Agency	DWA Well 22	Active	MUN	570-1003	D	Upgradient of urban land uses in Palm Springs; downgradient of WW-GRF
105	04S04E11Q02S	Desert Water Agency	DWA Well 18	Standby	MUN	535-948	D	Western portion of Indio subbasin; downgradient of septic areas
106	04S04E13C01S	Desert Water Agency	DWA Well 23	Active	MUN	512-912	D	Center of Indio subbasin; near airport
107	04S04E24E01S	Desert Water Agency	DWA Well 32	Active	MUN	600-1000	D	Western portion of Palm Springs subarea; near areas served non-potable water (NPW)
108	04S04E24H01S	Desert Water Agency	DWA Well 29	Active	MUN	600-1000	D	Upgradient of Palm Springs WTP percolation ponds
109	04S04E25C01S	Desert Water Agency	DWA Well 39	Active	MUN	580-750	D	Downgradient of Indian Canyon; near golf, septic, and areas served NPW
110	04S05E05A01S	Coachella Valley Water District	CVWD Well 4568-1	Active	MUN	800-955	D	Eastern edge of Indio subbasin; downgradient from Garnet Hill; upgradient of septic areas
111	04S05E08N01S	Desert Water Agency	DWA Well 41	Active	MUN	610-1000	D	Center of Indio subbasin; near airport, near golf courses and areas served NPW
112	04S05E09R01S	Coachella Valley Water District	CVWD Well 4567-1	Active	MUN	855-1150	D	Center of Indio subbasin; near golf courses and septic areas
113	04S05E15G01S	Coachella Valley Water District	CVWD Well 4521-1	Active	MUN	500-800	D	Center of Indio subbasin; near golf courses and septic areas
114	04S05E17Q02S	Desert Water Agency	DWA Well 31	Active	MUN	600-1000	D	Center of Indio subbasin; near airport, golf courses, and areas served NPW
115	04S05E25D02S	Coachella Valley Water District	CVWD Well 4507-2	Active	MUN	860-1320	D	Center of Indio subbasin; near golf courses and septic areas
116	04S05E27K01S	Coachella Valley Water District	CVWD Well 4527-1	Active	MUN	850-1155	D	Western edge of Indio subbasin; near NPR and septic areas
117	04S05E29H01S	Desert Water Agency	DWA Well 26	Active	MUN	590-990	D	Downgradient of Palm Springs WTP percolation ponds; near golf and areas served NPW
118	04S05E35G04S	Coachella Valley Water District	CVWD Well 4504-1	Active	MUN	600-1000	D	Western edge of Indio subbasin; near septic and areas served NPW
119	04S06E18Q04S	Coachella Valley Water District	CVWD Well 4630-1	Active	MUN	480-990	D	Upgradient in Thousand Palms area; upgradient of septic areas
120	04S06E28K04S	Coachella Valley Water District	CVWD Well 4629-1	Active	Monitoring	496-796	D	Thousand Palms area; near septic and areas served NPW
121	04S07E31H01S	Coachella Valley Water District	CVWD Well 4722-1	Active	MUN	570-1160	D	Thousand Palms area; near septic and areas served NPW
122	04S07E33L01S	Coachella Valley Water District	WRP7 MW-2D	Active	MUN	245-395	D	Near WRP-7 percolation ponds
123	05S06E02C01S	Coachella Valley Water District	CVWD Well 5664-1	Active	MUN	500-930	D	Thousand Palms area; near septic and areas served NPW
124	05S06E06B03S	Coachella Valley Water District	CVWD Well 5630-1	Active	Monitoring	455-890	D	Center of Indio subbasin; near golf, septic, and areas served NPW
125	05S06E09A01S	Coachella Valley Water District	CVWD Well 5682-1	Active	Monitoring	850-1300	D	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
126	05S06E09F01S	Coachella Valley Water District	CVWD Well 5637-1	Inactive	MUN	450-830	D	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
127	05S06E14B02S	Coachella Valley Water District	CVWD Well 5665-1	Inactive	MUN	400-600	D	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
128	05S06E14P02S	Coachella Valley Water District	CVWD Well 5603-2	Active	MUN	720-975	D	Downgradient of WRP-10/PD-GRF; near golf courses and areas served NPW
129	05S06E16A04S	Coachella Valley Water District	CVWD Well 5620-2	Active	MUN	1040-1360	D	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
130	05S06E16K03S	Coachella Valley Water District	CVWD Well 5681-1	Active	Monitoring	900-1200	D	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
131	05S06E17L01S	Coachella Valley Water District	CVWD Well 5667-1	Active	Monitoring	470-800	D	Western edge of Indio subbasin; near golf, septic, and areas served NPW
132	05S06E20A02S	Coachella Valley Water District	CVWD Well 5674-1	Inactive	Monitoring	750-1050	D	South/cross-gradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
133	05S07E03D01S	Coachella Valley Water District	WRP7 MW-4D	Active	MUN	245-395	D	Near WRP-7 percolation ponds
134	05S07E04A01S	Coachella Valley Water District	WRP7 MW-1 Dave Price	Active	Monitoring	147-367	D	Near WRP-7 percolation ponds
135	05S07E15N01S	Indio Water Authority	Well AA	Active	MUN	550-1230	D	Center of Indio subbasin; downgradient from areas served NPW
136	05S07E19A01S	Coachella Valley Water District	CVWD Well 5708-1	Inactive	MUN	450-970	D	Western portion of Indio subbasin; near golf courses and areas served NPW
137	05S07E20J01S	Indio Water Authority	Well T	Active	MUN	580-1305	D	Western portion of Indio subbasin; near golf courses and areas served NPW
138	05S07E26E02S	Indio Water Authority	Well 3B	Active	MUN	500-1200	D	Center of Indio subbasin

Table 3-2. SNMP Groundwater Monitoring Network -- *Deep Aquifer System*

Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Justification for Inclusion in SNMP Monitoring Program
139	05S07E27P01S	Indio Water Authority	Well Z	Active	MUN	580-1290	D	Center of Indio subbasin
140	05S07E33E01S	Indio Water Authority	Well S	Active	MUN	460-1260	D	Western portion of Indio subbasin; near golf courses and septic areas
141	05S07E34P04S	Indio Water Authority	Well V	Active	MUN	460-1270	D	Western portion of subbasin; near golf courses and septic areas
142	05S07E35R02S	Indio Water Authority	Well U	Active	MUN	480-1190	D	Center of Indio subbasin
143	05S07E36D03S	Coachella Water Authority	Well 19	Active	MUN	650-1250	D	Center of Indio subbasin
144	05S08E31C03S	Coachella Water Authority	Well 11	Active	MUN	513-818	D	Eastern portion of Indio subbasin; downgradient from VSD plant
145	06S07E06B01S	Coachella Valley Water District	CVWD Well 6701-1	Active	MUN	580-800	D	Downgradient from The Cove; near golf courses and septic areas
146	06S07E22B02S	Coachella Valley Water District	CVWD Well 6726-1	Active	MUN	640-1160	D	North/downgradient of TEL-GRF; near golf courses, septic, and agricultural areas
147	06S07E34A01S	Coachella Valley Water District	CVWD Well 6728-1	Active	MUN	500-750	D	Downgradient from TEL-GRF; near golf courses
148	06S07E34D01S	Coachella Valley Water District	CVWD Well 6729-1	Active	MUN	500-780	D	Directly north/downgradient of TEL-GRF
149	06S08E06K02S	Coachella Water Authority	Well 12	Active	MUN	500-1010	D	Eastern portion of Indio subbasin
150	06S08E09N02S	Coachella Water Authority	Well 16	Active	Monitoring	480-730	D	Eastern portion of Indio subbasin; upgradient from CWA/CSD WWTP
151	06S08E19D05S	Coachella Valley Water District	CVWD Well 6808-1	Active	MUN	675-1200	D	Center of Indio subbasin; near septic and agricultural areas
152	06S08E22D02S	Coachella Valley Water District	CVWD Well 6803-1	Inactive	MUN	500-1100	D	Downgradient from CWA/CSD WWTP; near septic and agricultural areas
153	06S08E25P04S	Coachella Valley Water District	CVWD Well 6807-1	Active	MUN	665-1300	D	Upgradient of WRP-4; downgradient of CWA WWTP; near agriculture and septic areas
154	06S08E28N06S	Coachella Water Authority	Well 18	Active	Monitoring	900-1190	D	Eastern edge of Indio subbasin; downgradient of VSD discharge point
155	07S08E17A04S	Coachella Valley Water District	CVWD Well 7803-1	Active	MUN	250-710	D	Downgradient from TEL-GRF; in agricultural and septic areas
156	07S09E23N01S	Coachella Valley Water District	CVWD Well 7990-1	Inactive	Unknown	530-560	D	Southeastern corner of the basin; near agricultural and septic areas; near Salton Sea
157		Indio Water Authority	Well 13A	Active	Irrigation	550-1171	D	East in subbasin; downgradient from WRP-7 ponds and NPR areas
158	03S05E08B01S	R.C Roberts	03S05E08B01S	Undetermined	Irrigation	356-516	D	Downgradient of DHS subbasin; near golf course and septic areas
159	03S05E17M01S	Desert Dunes Golf Club	03S05E17M01S	Active	Unknown	305-412	D	Upgradient of Garnet Hill subarea; near golf course and septic areas
160	03S05E20H02S	Donald Franklin	03S05E20H02S	Active	Irrigation	240-360	D	Distal area in Mission Creek subbasin; upgradient of Garnet Hill subarea; near septic
161	03S06E21R01S	Joel Rosenfeld	03S06E21R01S	Undetermined	Irrigation	355-495	D	Western portion of Sky Valley subarea; near septic
162	05S05E12B03S	Tandika Corp	05S05E12B03S	Active	Irrigation	410-800	D	Western edge of Indio subbasin; near NPR and septic areas
163	05S06E13F01S	PD Golf Operations LLC	05S06E13F01S	Active	Irrigation	400-700	D	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
164	05S06E15H01S	Toscana Country Club	05S06E15H01S	Active	Irrigation	430-950	D	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
165	05S06E22C02S	Desert Horizons Country Club	05S06E22C02S	Active	Irrigation	550-990	D	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
166	05S06E27A01S	El Dorado Country Club	05S06E27A01S	Active	MUN	458-596	D	South/cross-gradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
167	05S06E29P04S	Bighorn Golf Club	05S06E29P04S	Active	MUN	530-720	D	Upgradient of Palm Desert; near golf courses and septic areas
168	05S07E07F04S	Myoma Dunes Mutual Water Company	Well 4	Active	MUN	430-730	D	Center of Indio subbasin; near areas served NPW
169	05S07E08L01S	Myoma Dunes Mutual Water Company	Well 11	Active	Unknown	500-1060	D	Center of Indio subbasin; near areas served NPW
170	05S07E17K01S	Myoma Dunes Mutual Water Company	Well 12	Active	Irrigation	450-950	D	Center of Indio subbasin; near areas served NPW
171	05S08E09N03S	Jamie Brack	05S08E09N03S	Undetermined	Unknown	480-580	D	Downgradient of septic areas in Fargo subarea; upgradient of Indio subbasin
172	06S07E27B01S	Andalusia Golf Club	06S07E27B01S	Active	Irrigation	300-780	D	Downgradient of TEL-GRF; near golf course and agricultural areas
173	06S07E35L02S	Castro Bros	Castro Bros	Active	Unknown	300-400	D	Downgradient from TEL-GRF; near golf courses and agricultural areas
174	06S08E11A01S	Cocopah Nurseries Inc	06S08E11A01S	Active	Unknown	400-842	D	Eastern edge of Indio subbasin; near agriculture; upgradient from CWA/CSD WWTP
175	06S08E31P01S	Deer Creek	Deer Creek	Active	Irrigation	400-550	D	Downgradient from TEL-GRF, in agricultural area
176	06S08E35E02S	Otto L. Zahler	06S08E35E02S	Undetermined	Unknown	521-596	D	Center of Indio subbasin; directly upgradient of WRP-4; in agricultural area
177	07S07E02G02S	Warren Webber	Warren Webber	Active	Irrigation	380-700	D	Downgradient from TEL-GRF; in agricultural area
178	07S08E01L02S	Bill Wordon	07S08E01L02S	Undetermined	Domestic	500-880	D	Center of Indio subbasin; downgradient of WRP-4, in agricultural area
179	07S08E27A02S	Gimmway Enterprises Inc	07S08E27A02S	Active	MUN	491-811	D	Downgradient from Martinez Canyon GRF; in agricultural area
180	07S09E10F01S	Prime Time International	07S09E10F01S	Active	Unknown	360-500	D	Southeast Indio subbasin; in agricultural area; near Salton Sea
181		Mission Springs Water District	Well 31	Active	MUN	270-670	D	Upgradient of Garnet Hill subarea; near potential septic areas in N. Palm Springs

(a) Well Status: Well Status: "Active" means well is known to exist and currently used for original purpose; "Standby" means active backup well; "Inactive" means well exists but is no longer used as a water-supply.

(b) Well Use: MUN = municipal and domestic supply

(c) Depth Code: This monitoring program assigns wells to aquifer layers by depth. P = Perched aquifer system, mainly in the Thermal subarea. S = Shallow aquifer system. D = Deep aquifer system

Table 3-3. SNMP Groundwater Monitoring Network -- *Perched Aquifer System*

Map_ID	SWN	Well Owner	Well Name	Well Status[(a)]	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Justification for Inclusion in SNMP Monitoring Program
182		Coachella Valley Water District	WRP2 MW3	Active	Monitoring	<90	P	At WRP-2; represents subsurface discharge to Salton Sea
183	06S07E27J03S	Coachella Valley Water District	TEL-GRF MW-8	Active	Monitoring	25-45	P	North/downgradient of TEL-GRF; near golf course and agriculture
184	06S07E34A03S	Coachella Valley Water District	TEL-GRF MW-9	Active	Monitoring	25-45	P	Downgradient from TEL-GRF and golf course
185	06S08E31R01S	Coachella Valley Water District	TEL-GRF MW-10	Active	Monitoring	25-45	P	Downgradient from TEL-GRF; agricultural area
186	07S08E06P01S	Coachella Valley Water District	TEL-GRF MW-11	Active	Monitoring	25-45	P	Downgradient from TEL-GRF; agricultural area
187		Coachella Valley Water District	PEW-1	Active	Monitoring	10-55	P	At WRP-4; agricultural area

(a) Well Status: "Active" means well is known to exist and currently used for original purpose; "Standby" means active backup well; "Inactive" means well exists but is no longer used as a water-supply.

(b) Well Use: MUN = municipal and domestic supply

(c) Depth Code: This monitoring program assigns wells to aquifer layers by depth. P = Perched aquifer system, mainly in the Thermal subarea. S = Shallow aquifer system. D = Deep aquifer system

Table 3-4. Gaps in SNMP Groundwater Monitoring Network

Map_ID	Depth Code[a]	Justification for Inclusion in SNMP Monitoring Program	Approx. Depth of Well Screens	Overlying SNMP Agency[b]
G1	S	Monitoring of subsurface inflows from areas upgradient of Mission Creek GRF	700-1000 ft-bgs	DWA, MSWD
G2	S	Monitoring directly downgradient of the planned MSWD West Valley WWTP	200-300 ft-bgs	MSWD, DWA
G3	S	Monitoring of southern Miracle Hill subarea; near septic; upgradient of Desert Crest WWTP	100-300 ft-bgs	CVWD
G4	S	Monitoring of the Fargo subarea of DHS subbasin; near septic	100-300 ft-bgs	CVWD
G5	S	Monitoring upgradient of urban land uses in Palm Springs; downgradient of WW-GRF	300-500 ft-bgs	DWA
G6	S	Monitoring center of Indio subbasin; near airport, golf courses, and areas served non-potable water (NPW)	250-350 ft-bgs	DWA
G7	S	Monitoring a spatial gap in western portion of Indio subbasin; near golf courses, septic and areas served NPW	200-300 ft-bgs	CVWD
G8	S	Monitoring of subsurface inflows from areas upgradient of urban land uses in Palm Desert Canyon	250-400 ft-bgs	CVWD
G9	S	Monitoring a spatial gap in western portion of Indio subbasin; near golf courses and septic	100-250 ft-bgs	CVWD, IWA
G10	S	Monitoring downgradient from CWA/CSD WWTP; near septic areas and agriculture	100-250 ft-bgs	CVWD
G11	S	Monitoring a spatial gap downgradient of TEL-GRF; near golf courses, septic, and agricultural areas	85-160 ft-bgs	CVWD
G12	S	Monitoring a spatial gap in center of Indio subbasin; near septic areas and agriculture	100-235 ft-bgs	CVWD
G13	S	Monitoring a spatial gap downgradient from TEL-GRF; in agricultural areas	50-150 ft-bgs	CVWD
G14	S	Monitoring a spatial gap downgradient of WRP-4; in agricultural area; near Salton Sea	100-250 ft-bgs	CVWD
G15	S	Monitoring a spatial gap directly upgradient of WRP-4; in agricultural area	100-275 ft-bgs	CVWD
G16	S	Monitoring a spatial gap upgradient of WRP-4; downgradient of CWA/CSD WWTP; near agriculture, septic	100-250 ft-bgs	CVWD
G17	P	Monitoring a spatial gap in northern portion of Perched area; downgradient from Fargo subarea	<100 ft-bgs	CVWD, IWA, VSD
G18	P	Monitoring a spatial gap on eastern side of Perched area; in agricultural area	<70 ft-bgs	CVWD, CWA/CSD
G19	P	Monitoring a spatial gap in center of Perched area; near agricultural and septic areas	<90 ft-bgs	CVWD, CWA/CSD
G20	P	Monitoring a spatial gap in southern basin; may represent subsurface discharge to Salton Sea	<70 ft-bgs	CVWD
G21	P	Monitoring a spatial gap in southern basin; may represent subsurface discharge to Salton Sea	<70 ft-bgs	CVWD
G22	P	Monitoring a spatial gap in southern basin; may represent subsurface discharge to Salton Sea	<90 ft-bgs	CVWD
G23	S	Monitoring a spatial gap in Thousand Palms area; near septic and areas served NPW	150-300 ft-bgs	CVWD

(a) Depth Code: This monitoring program assigns wells to aquifer layers by depth. P = Perched aquifer system, mainly in the Thermal subarea. S = Shallow aquifer system.

(b) CVWD = Coachella Valley Water District; CWA/CSD = Coachella Water Authority and Sanitary District; DWA = Desert Water Agency; IWA = Indio Water Authority; VSD = Valley Sanitary District; MSWD = Mission Springs Water District

Table 3-5. Analyte List for the SNMP Groundwater Monitoring Program			
Analytes	Justification	Method	Cost/Sample
Total Dissolved Solids	Measure of total dissolved salt content in water	E160.1/SM2540C	$14
Nitrate as Nitrogen	Primary nutrient in groundwater	EPA 300.0	$12
Major cations: K, Na, Ca, Mg	Useful in source water characterization	EPA 200.7	$20
Major anions: Cl, SO_4	Useful in source water characterization	EPA 300.0	$18
Total Alkalinity (HCO_3, CO_3, OH)	Useful in source water characterization	SM 2320B/2330B	$13

Table 3-6. Responsibilities for Groundwater Sampling and Laboratory Analyses

Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Overlying SNMP Agency[d]
1	03S04E20F01S	USGS	335348116352701	Active	Monitoring	600-640	S	CVWD
2	03S04E20J01S	USGS	335339116345301	Active	Monitoring	550-590	S	CVWD
3	06S07E33G02S	Coachella Valley Water District	TEL-GRF MW-21S	Active	Monitoring	230-250	S	CVWD
4	06S07E33J02S	Coachella Valley Water District	TEL-GRF MW-22S	Active	Monitoring	230-250	S	CVWD
5	06S07E34N03S	Coachella Valley Water District	TEL-GRF MW-23S	Active	Monitoring	230-250	S	CVWD
7	02S04E26C01S	Mission Springs Water District	Well 28	Inactive	MUN	590-898	S	MSWD
8	02S04E28A01S	Mission Springs Water District	Well 34	Active	MUN	550-980	S	MSWD
9	02S05E31L01S	Mission Springs Water District	Well 11	Inactive	Unknown	220-285	S	MSWD
10	03S04E04Q02S	CPV Sentinel	03S04E04Q02S	Active	Unknown		S	DWA, MSWD
11	03S04E11L01S	Mission Springs Water District	Well 27	Active	MUN	180-380	S	MSWD
12	03S05E05Q01S	Hidden Springs Golf Course	P27	Active	Unknown	220-600	S	DWA, MSWD
13		City of Palm Springs	Airport MW-2	Active	Monitoring	240-250	S	CPS
14		City of Palm Springs	MW-1	Active	Monitoring	170-210	S	CPS
15		City of Palm Springs	MW-3	Active	Monitoring	140-215	S	CPS
16		City of Palm Springs	MW-4	Active	Monitoring	170-210	S	CPS
17		City of Palm Springs	MW-5	Active	Monitoring	170-210	S	CPS
18		City of Palm Springs	MW-6	Active	Monitoring	170-210	S	CPS
19	03S03E08M01S	Mission Springs Water District	Well 26	Active	MUN	225-553	S	MSWD
20	03S03E10P02S	Agua Caliente	DWA P05	Active	Unknown	306-906	S	DWA
21	03S04E12B02S	Coachella Valley Water District	CVWD Well 3408-1	Active	MUN	270-500	S	CVWD
22	03S04E29F01S	USGS	335304116353001	Active	Monitoring	550-570	S	CVWD
23	03S04E29R01S	USGS	335231116345401	Active	Monitoring	431-551	S	CVWD
24	04S04E11Q01S	Desert Water Agency	DWA Well 5	Standby	MUN	302-402	S	DWA
25	04S04E35A01S	Agua Caliente	Indian Canyons Well	Active	Unknown	360-680	S	DWA
26	04S05E09F03S	Coachella Valley Water District	CVWD Well 4564-1	Active	MUN	410-670	S	CVWD
27	04S05E29A02S	Desert Water Agency	DWA Well 25	Active	MUN	166-300	S	DWA
29	04S07E33L02S	Coachella Valley Water District	WRP7 MW-2S	Active	Monitoring	60-190	S	CVWD
30	05S06E09M03S	Coachella Valley Water District	WRP10 MW-7	Active	Monitoring	260-340	S	CVWD
31	05S06E09P02S	Coachella Valley Water District	PD-GRF MW 2	Active	Monitoring	260-340	S	CVWD
32	05S06E10J01S	Coachella Valley Water District	PD-GRF MW 1	Active	Monitoring	260-340	S	CVWD
33	05S06E13G03S	Coachella Valley Water District	WRP10 MW-8	Active	Monitoring	260-340	S	CVWD
34	05S06E14G03S	Coachella Valley Water District	WRP10 MW-5	Active	Monitoring	240-320	S	CVWD
35	05S06E14P03S	Coachella Valley Water District	WRP10 MW-6	Active	Monitoring	190-270	S	CVWD
36	05S06E15F01S	Coachella Valley Water District	WRP10 MW-2	Active	Monitoring	160-290	S	CVWD
37	05S06E15M01S	Coachella Valley Water District	WRP10 MW-1	Active	Monitoring	145-295	S	CVWD
38	05S06E15P01S	Coachella Valley Water District	WRP10 MW-3	Active	Monitoring	130-290	S	CVWD
39	05S06E16A03S	Coachella Valley Water District	WRP10 MW-4	Active	Monitoring	190-270	S	CVWD
40	05S06E21Q04S	Coachella Valley Water District	PD-GRF MW 3	Active	Monitoring	260-340	S	CVWD
41	05S06E23M02S	Coachella Valley Water District	PD-GRF MW 4	Active	Monitoring	270-360	S	CVWD
42	05S07E03D02S	Coachella Valley Water District	WRP7 MW-4S	Active	Monitoring	60-190	S	CVWD
43	05S07E04A04S	Coachella Valley Water District	WRP7 MW-3S	Active	Monitoring	50-180	S	CVWD
44	05S07E16K02S	Coachella Valley Water District	CVWD Well 5737-1	Inactive	MUN	200-415	S	CVWD, IWA, VSD
45	05S07E19D04S	Coachella Valley Water District	WRP10 MW-9	Active	Monitoring	260-340	S	CVWD
46	05S07E24M02S	Indio Water Authority	Well 1B	Active	Monitoring	190-410	S	IWA
47	06S06E12G01S	Coachella Valley Water District	CVWD Well 6650-1	Inactive	Monitoring	<370	S	CVWD
48	06S07E34A02S	Coachella Valley Water District	TEL-GRF MW-25	Active	Monitoring	115-135	S	CVWD
49	06S07E34D02S	Coachella Valley Water District	TEL-GRF MW-24	Active	MUN	180-200	S	CVWD
50	07S08E29P03S	Coachella Valley Water District	MC-3	Active	Unknown	380-440	S	CVWD
51	08S09E31R03S	Coachella Valley Water District	CVWD Well 8995-1	Active	Unknown	260-390	S	CVWD
52	03S04E17K01S	Valley View MWC	03S04E17K01S	Undetermined	Fish Farm	340-375	S	DWA, MSWD
53	03S04E22A01S	Erin Miner	03S04E22A01S	Active	Irrigation	180-230	S	DWA
54	03S05E08P02S	Bluebeyond Fisheries	03S05E08P02S	Active	Irrigation	200-400	S	CVWD
55	03S05E15N01S	Too Many Palms LLC	03S05E15N01S	Active	Unknown	158-320	S	CVWD
56	03S05E18J01S	Desert Dunes Golf Club	03S05E18J01S	Active	Irrigation	76-340	S	CVWD
57	03S06E21G01S	Sky Valley Mobile Home Park	03S06E21G01S	Undetermined	Irrigation	188-248	S	CVWD
58	04S05E04F01S	So Pacific Trans Co #32601	04S05E04F01S	Active	Irrigation	276-576	S	CVWD
59	04S05E23F01S	Westin Mission Hills Resort	04S05E23F01S	Active	Irrigation	275-1165	S	CVWD
60	04S05E34C01S	Manufacture Home Community Inc	04S05E34C01S	Active	Irrigation	240-500	S	CVWD
61	04S05E35Q01S	Tamarisk Country Club	04S05E35Q01S	Active	Irrigation	171-518	S	CVWD
62	04S05E36L02S	Annenberg Estate	04S05E36L02S	Active	Unknown	252-650	S	CVWD
63	04S06E20C01S	Shenandoah Ventures LP	04S06E20C01S	Inactive	Irrigation	250-790	S	CVWD
66	05S05E12D01S	Thunderbird Country Club	05S05E12D01S	Active	Domestic	125-360	S	CVWD
67	05S06E12M01S	Palm Desert Resort Country Club	05S06E12M01S	Active	Domestic	140-650	S	CVWD
68	05S07E08Q01S	Bermuda Dunes Airport	05S07E08Q01S	Active	Unknown	203-654	S	CVWD, MDMWC

Table 3-6. Responsibilities for Groundwater Sampling and Laboratory Analyses

Map_ID	SWN	Well Owner	Well Name	Well Status[(a)]	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Overlying SNMP Agency[(d)]
69	05S07E28H02S	Tricon/COB Riverdale LP	05S07E28H02S	Active	Domestic	162-636	S	CVWD, IWA, VSD
70	05S08E28M02S	JS Cooper	05S08E28M02S	Undetermined	Irrigation	208-268	S	CVWD, CWA/CSD
71	05S08E30N03S	Carver Tract Mutual Water Co	05S08E30N03S	Active	Irrigation	270-330	S	CVWD, VSD
72	06S07E07B01S	Traditions Golf Club	06S07E07B01S	Active	Irrigation	200-480	S	CVWD
73	06S08E02L01S	Prime Time International	06S08E02L01S	Undetermined	Unknown	216-407	S	CVWD, CWA/CSD
74	06S08E05K01S	Peter Rabbit Farms	06S08E05K01S	Active	Domestic	126-375	S	CVWD, CWA/CSD
75	06S08E32L01S	Guillermo Torres	06S08E32L01S	Undetermined	Domestic	127-227	S	CVWD
76	07S08E27A01S	Gimmway Enterprises Inc	07S08E27A01S	Active	Irrigation	147-215	S	CVWD
77	07S09E14C01S	Tudor Ranch Inc.	07S09E14C01S	Active	MUN	93-290	S	CVWD
78	08S08E15G02S	Thermiculture Management LLC	08S08E15G02S	Active	Monitoring	260-500	S	CVWD
79		Mission Springs Water District	Well 25	Active	Monitoring	330-455	S	MSWD
80		Mission Springs Water District	Well 1	Inactive	Monitoring		S	MSWD
81		Mission Springs Water District	Horton WWTP MW-1	Active	Monitoring	186-236	S	MSWD
82		Mission Springs Water District	Horton WWTP MW-2	Active	Monitoring	220-270	S	MSWD
83		Mission Springs Water District	Horton WWTP MW-3	Active	Monitoring	200-250	S	MSWD
84	03S04E20F02S	USGS	335348116352702	Active	Monitoring	850-890	D	CVWD
85	03S04E20J03S	USGS	335339116345303	Active	Monitoring	850-890	D	CVWD
86	06S07E33G01S	Coachella Valley Water District	TEL-GRF MW-21D	Active	Monitoring	390-410	D	CVWD
87	06S07E33J01S	Coachella Valley Water District	TEL-GRF MW-22D	Active	Monitoring	520-540	D	CVWD
88	06S07E34N02S	Coachella Valley Water District	TEL-GRF MW-23D	Active	Monitoring	525-545	D	CVWD
89	07S09E30R03S	Coachella Valley Water District	Peggy	Active	MUN	730-770	D	CVWD
90	08S09E07N02S	Coachella Valley Water District	Rosie	Active	MUN	720-780	D	CVWD
91	05S07E24L03S	Indio Water Authority	Well 1E	Active	MUN	552-815	D	IWA
92	02S04E28J01S	Mission Springs Water District	Well 35	Active	Monitoring	725-1020	D	MSWD
93	02S04E36P01S	Mission Springs Water District	Well 37	Active	MUN	450-1080	D	MSWD
94	02S05E31H01S	Mission Springs Water District	Well 5	Inactive	Unknown	274-784	D	MSWD
95	03S03E07D01S	Mission Springs Water District	Well 25A	Active	MUN	500-740	D	MSWD
96	03S04E04P01S	CPV Sentinel	03S04E04P01S	Active	MUN		D	DWA, MSWD
97	03S04E11A02S	Mission Springs Water District	Well 32	Active	Unknown	320-980	D	MSWD
98	03S03E08A01S	Mission Springs Water District	Well 26A	Active	MUN	320-600	D	MSWD
99	03S03E10P01S	Agua Caliente	DWA P04	Active	MUN	476-776	D	DWA
100	03S04E14J01S	Mission Springs Water District	Well 33	Active	MUN	360-650	D	MSWD
101	03S04E19L01S	Desert Water Agency	DWA Well 43	Active	MUN	500-900	D	DWA
102	03S04E34H02S	Desert Water Agency	DWA Well 35	Active	MUN	600-1000	D	DWA
103	03S04E36Q01S	Desert Water Agency	DWA Well 38	Active	MUN	620-1000	D	DWA
104	04S04E02B01S	Desert Water Agency	DWA Well 22	Active	MUN	570-1003	D	DWA
105	04S04E11Q02S	Desert Water Agency	DWA Well 18	Standby	MUN	535-948	D	DWA
106	04S04E13C01S	Desert Water Agency	DWA Well 23	Active	MUN	512-912	D	DWA
107	04S04E24E01S	Desert Water Agency	DWA Well 32	Active	MUN	600-1000	D	DWA
108	04S04E24H01S	Desert Water Agency	DWA Well 29	Active	MUN	600-1000	D	DWA
109	04S04E25C01S	Desert Water Agency	DWA Well 39	Active	MUN	580-750	D	DWA
110	04S05E05A01S	Coachella Valley Water District	CVWD Well 4568-1	Active	MUN	800-955	D	CVWD
111	04S05E08N01S	Desert Water Agency	DWA Well 41	Active	MUN	610-1000	D	DWA
112	04S05E09R01S	Coachella Valley Water District	CVWD Well 4567-1	Active	MUN	855-1150	D	CVWD
113	04S05E15G01S	Coachella Valley Water District	CVWD Well 4521-1	Active	MUN	500-800	D	CVWD
114	04S05E17Q02S	Desert Water Agency	DWA Well 31	Active	MUN	600-1000	D	DWA
115	04S05E25D02S	Coachella Valley Water District	CVWD Well 4507-2	Active	MUN	860-1320	D	CVWD
116	04S05E27K01S	Coachella Valley Water District	CVWD Well 4527-1	Active	MUN	850-1155	D	CVWD
117	04S05E29H01S	Desert Water Agency	DWA Well 26	Active	MUN	590-990	D	DWA
118	04S05E35G04S	Coachella Valley Water District	CVWD Well 4504-1	Active	MUN	600-1000	D	CVWD
119	04S06E18Q04S	Coachella Valley Water District	CVWD Well 4630-1	Active	MUN	480-990	D	CVWD
120	04S06E28K04S	Coachella Valley Water District	CVWD Well 4629-1	Active	Monitoring	496-796	D	CVWD
121	04S07E31H01S	Coachella Valley Water District	CVWD Well 4722-1	Active	MUN	570-1160	D	CVWD
122	04S07E33L01S	Coachella Valley Water District	WRP7 MW-2D	Active	MUN	245-395	D	CVWD
123	05S06E02C01S	Coachella Valley Water District	CVWD Well 5664-1	Active	MUN	500-930	D	CVWD
124	05S06E06B03S	Coachella Valley Water District	CVWD Well 5630-1	Active	Monitoring	455-890	D	CVWD
125	05S06E09A01S	Coachella Valley Water District	CVWD Well 5682-1	Active	Monitoring	850-1300	D	CVWD
126	05S06E09F01S	Coachella Valley Water District	CVWD Well 5637-1	Inactive	MUN	450-830	D	CVWD
127	05S06E14B02S	Coachella Valley Water District	CVWD Well 5665-1	Inactive	MUN	400-600	D	CVWD
128	05S06E14P02S	Coachella Valley Water District	CVWD Well 5603-2	Active	MUN	720-975	D	CVWD
129	05S06E16A04S	Coachella Valley Water District	CVWD Well 5620-2	Active	MUN	1040-1360	D	CVWD
130	05S06E16K03S	Coachella Valley Water District	CVWD Well 5681-1	Active	Monitoring	900-1200	D	CVWD
131	05S06E17L01S	Coachella Valley Water District	CVWD Well 5667-1	Active	Monitoring	470-800	D	CVWD
132	05S06E20A02S	Coachella Valley Water District	CVWD Well 5674-1	Inactive	Monitoring	750-1050	D	CVWD

Table 3-6. Responsibilities for Groundwater Sampling and Laboratory Analyses

Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Overlying SNMP Agency[d]
133	05S07E03D01S	Coachella Valley Water District	WRP7 MW-4D	Active	MUN	245-395	D	CVWD
134	05S07E04A01S	Coachella Valley Water District	WRP7 MW-1	Active	Monitoring	147-367	D	CVWD
135	05S07E15N01S	Indio Water Authority	Well AA	Active	MUN	550-1230	D	IWA
136	05S07E19A01S	Coachella Valley Water District	CVWD Well 5708-1	Inactive	MUN	450-970	D	CVWD
137	05S07E20J01S	Indio Water Authority	Well T	Active	MUN	580-1305	D	IWA
138	05S07E26E02S	Indio Water Authority	Well 3B	Active	MUN	500-1200	D	IWA
139	05S07E27P01S	Indio Water Authority	Well Z	Active	MUN	580-1290	D	IWA
140	05S07E33E01S	Indio Water Authority	Well S	Active	MUN	460-1260	D	IWA
141	05S07E34P04S	Indio Water Authority	Well V	Active	MUN	460-1270	D	IWA
142	05S07E35R02S	Indio Water Authority	Well U	Active	MUN	480-1190	D	IWA
143	05S07E36D03S	Coachella Water Authority	Well 19	Active	MUN	650-1250	D	CWA/CSD
144	05S08E31C03S	Coachella Water Authority	Well 11	Active	MUN	513-818	D	CWA/CSD
145	06S07E06B01S	Coachella Valley Water District	CVWD Well 6701-1	Active	MUN	580-800	D	CVWD
146	06S07E22B02S	Coachella Valley Water District	CVWD Well 6726-1	Active	MUN	640-1160	D	CVWD
147	06S07E34A01S	Coachella Valley Water District	CVWD Well 6728-1	Active	MUN	500-750	D	CVWD
148	06S07E34D01S	Coachella Valley Water District	CVWD Well 6729-1	Active	MUN	500-780	D	CVWD
149	06S08E06K02S	Coachella Water Authority	Well 12	Active	MUN	500-1010	D	CWA/CSD
150	06S08E09N02S	Coachella Water Authority	Well 16	Active	Monitoring	480-730	D	CWA/CSD
151	06S08E19D05S	Coachella Valley Water District	CVWD Well 6808-1	Active	MUN	675-1200	D	CVWD
152	06S08E22D02S	Coachella Valley Water District	CVWD Well 6803-1	Inactive	MUN	500-1100	D	CVWD
153	06S08E25P04S	Coachella Valley Water District	CVWD Well 6807-1	Active	MUN	665-1300	D	CVWD
154	06S08E28N06S	Coachella Water Authority	Well 18	Active	Monitoring	900-1190	D	CWA/CSD
155	07S08E17A04S	Coachella Valley Water District	CVWD Well 7803-1	Active	MUN	250-710	D	CVWD
156	07S09E23N01S	Coachella Valley Water District	CVWD Well 7990-1	Inactive	Unknown	530-560	D	CVWD
157		Indio Water Authority	Well 13A	Active	Irrigation	550-1171	D	IWA
158	03S05E08B01S	R.C Roberts	03S05E08B01S	Undetermined	Irrigation	356-516	D	DWA
159	03S05E17M01S	Desert Dunes Golf Club	03S05E17M01S	Active	Unknown	305-412	D	CVWD
160	03S05E20H02S	Donald Franklin	03S05E20H02S	Active	Irrigation	240-360	D	CVWD
161	03S06E21R01S	Joel Rosenfeld	03S06E21R01S	Undetermined	Irrigation	355-495	D	CVWD
162	05S05E12B03S	Tandika Corp	05S05E12B03S	Active	Irrigation	410-800	D	CVWD
163	05S06E13F01S	PD Golf Operations LLC	05S06E13F01S	Active	Irrigation	400-700	D	CVWD
164	05S06E15H01S	Toscana Country Club	05S06E15H01S	Active	Irrigation	430-950	D	CVWD
165	05S06E22C02S	Desert Horizons Country Club	05S06E22C02S	Active	Irrigation	550-990	D	CVWD
166	05S06E27A01S	El Dorado Country Club	05S06E27A01S	Active	MUN	458-596	D	CVWD
167	05S06E29P04S	Bighorn Golf Club	05S06E29P04S	Active	MUN	530-720	D	CVWD
168	05S07E07F04S	Myoma Dunes Mutual Water Company	Well 4	Active	MUN	430-730	D	MDMWC
169	05S07E08L01S	Myoma Dunes Mutual Water Company	Well 11	Active	Unknown	500-1060	D	MDMWC
170	05S07E17K01S	Myoma Dunes Mutual Water Company	Well 12	Active	Irrigation	450-950	D	MDMWC
171	05S08E09N03S	Jamie Brack	05S08E09N03S	Undetermined	Unknown	480-580	D	CVWD, IWA
172	06S07E27B01S	Andalusia Golf Club	06S07E27B01S	Active	Irrigation	300-780	D	CVWD
173	06S07E35L02S	Castro Bros	Castro Bros	Active	Unknown	300-400	D	CVWD
174	06S08E11A01S	Cocopah Nurseries Inc	06S08E11A01S	Active	Unknown	400-842	D	CVWD, CWA/CSD
175	06S08E31P01S	Deer Creek	Deer Creek	Active	Irrigation	400-550	D	CVWD
176	06S08E35E02S	Otto L. Zahler	06S08E35E02S	Undetermined	Unknown	521-596	D	CVWD
177	07S07E02G02S	Warren Webber	Warren Webber	Active	Irrigation	380-700	D	CVWD
178	07S08E01L02S	Bill Wordon	07S08E01L02S	Undetermined	Domestic	500-880	D	CVWD
179	07S08E27A02S	Gimmway Enterprises Inc	07S08E27A02S	Active	MUN	491-811	D	CVWD
180	07S09E10F01S	Prime Time International	07S09E10F01S	Active	Monitoring	360-500	D	CVWD
181		Mission Springs Water District	Well 31	Active	Monitoring	270-670	D	MSWD
182		Coachella Valley Water District	WRP2 MW3	Active	Monitoring	<90	P	CVWD
183	06S07E27J03S	Coachella Valley Water District	TEL-GRF MW-8	Active	Monitoring	25-45	P	CVWD
184	06S07E34A03S	Coachella Valley Water District	TEL-GRF MW-9	Active	Monitoring	25-45	P	CVWD
185	06S08E31R01S	Coachella Valley Water District	TEL-GRF MW-10	Active	Monitoring	25-45	P	CVWD
186	07S08E06P01S	Coachella Valley Water District	TEL-GRF MW-11	Active	Monitoring	25-45	P	CVWD
187		Coachella Valley Water District	PEW-1	Active	Monitoring	10-55	P	CVWD

(a) Well Status: "Active" means well is known to exist and currently used for original purpose; "Standby" means active backup well; "Inactive" means well exists but is no longer used as a water-supply.

(b) Well Use: MUN = municipal and domestic supply

(c) Depth Code: This monitoring program assigns wells to aquifer layers by depth. P = Perched aquifer system. S = Shallow aquifer system. D = Deep aquifer system

(d) CVWD = Coachella Valley Water District; CWA/CSD = Coachella Water Authority and Sanitary District; DWA = Desert Water Agency; IWA = Indio Water Authority; MDMWC = Myoma Dunes Mutual Water Company; VSD = Valley Sanitary District; MSWD = Mission Springs Water District; CPS = City of Palm Springs

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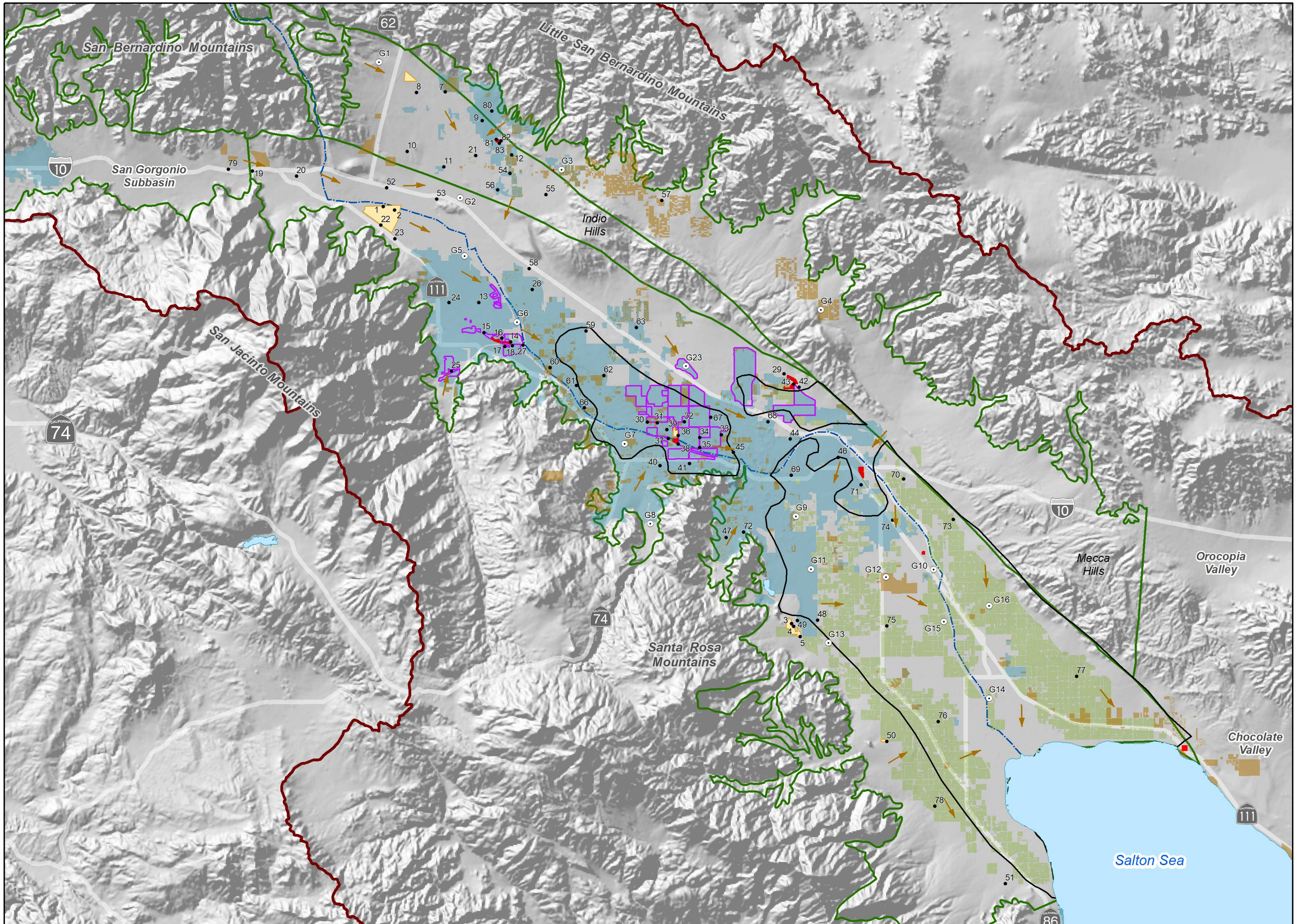
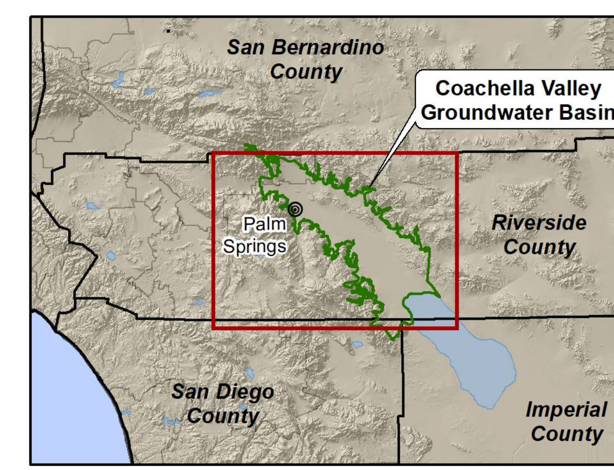




WEST YOST

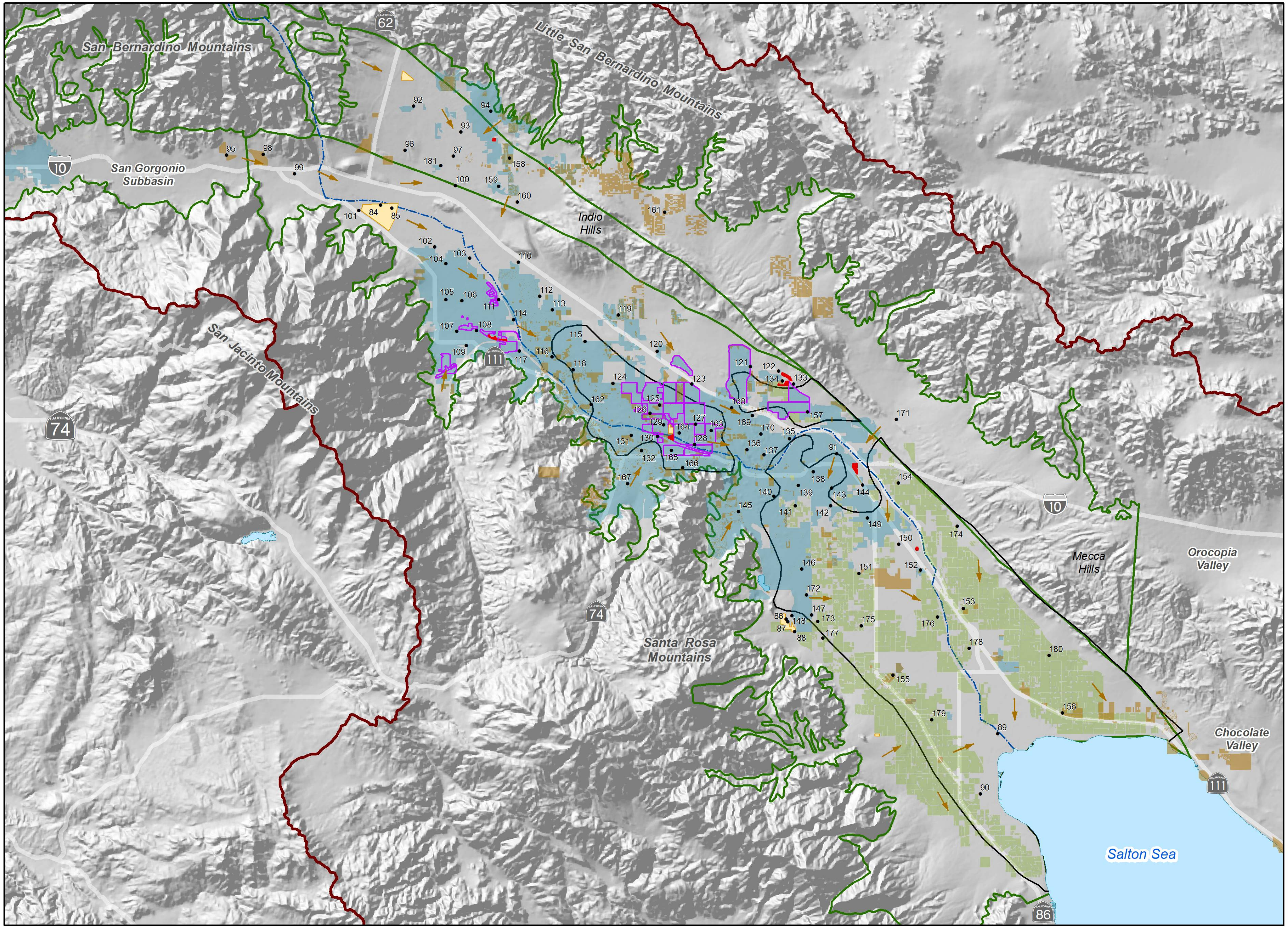
Author: EM
Date: 12/11/2020
File: Figure 3-1.mxd

0 5 10 Miles
0 10 20 KM

Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Groundwater Monitoring Network and Gaps
Shallow Aquifer System

Figure 3-1



Map_ID • Proposed Monitoring Well
See Tables 3-1a and 3-1b

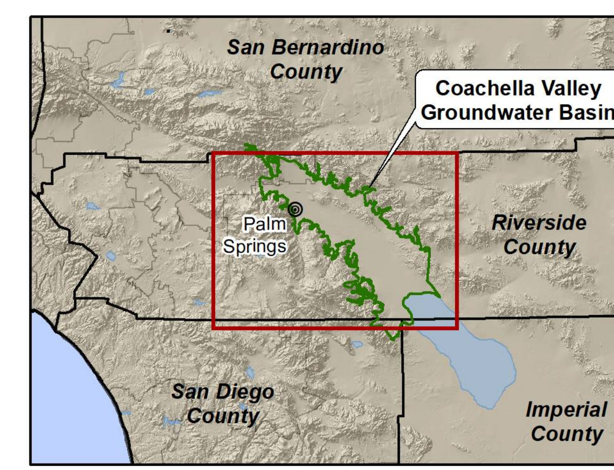
Sources of Salt and Nutrient Loading

- Wastewater Pecolation Ponds
- Areas of Non-Potable Water Reuse
- Potential Septic Areas
- Groundwater Replenishment Facilities

Generalized Land Use

- Urban
- Irrigated Agricultural Land

- General Direction of Groundwater Flow
- Extent of Regional Aquitard
- Salton Sea Watershed
- Coachella Valley Groundwater Basin and Subbasins



0 5 10 Miles
0 10 20 KM

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Author: EM/AM
Date: 12/11/2020
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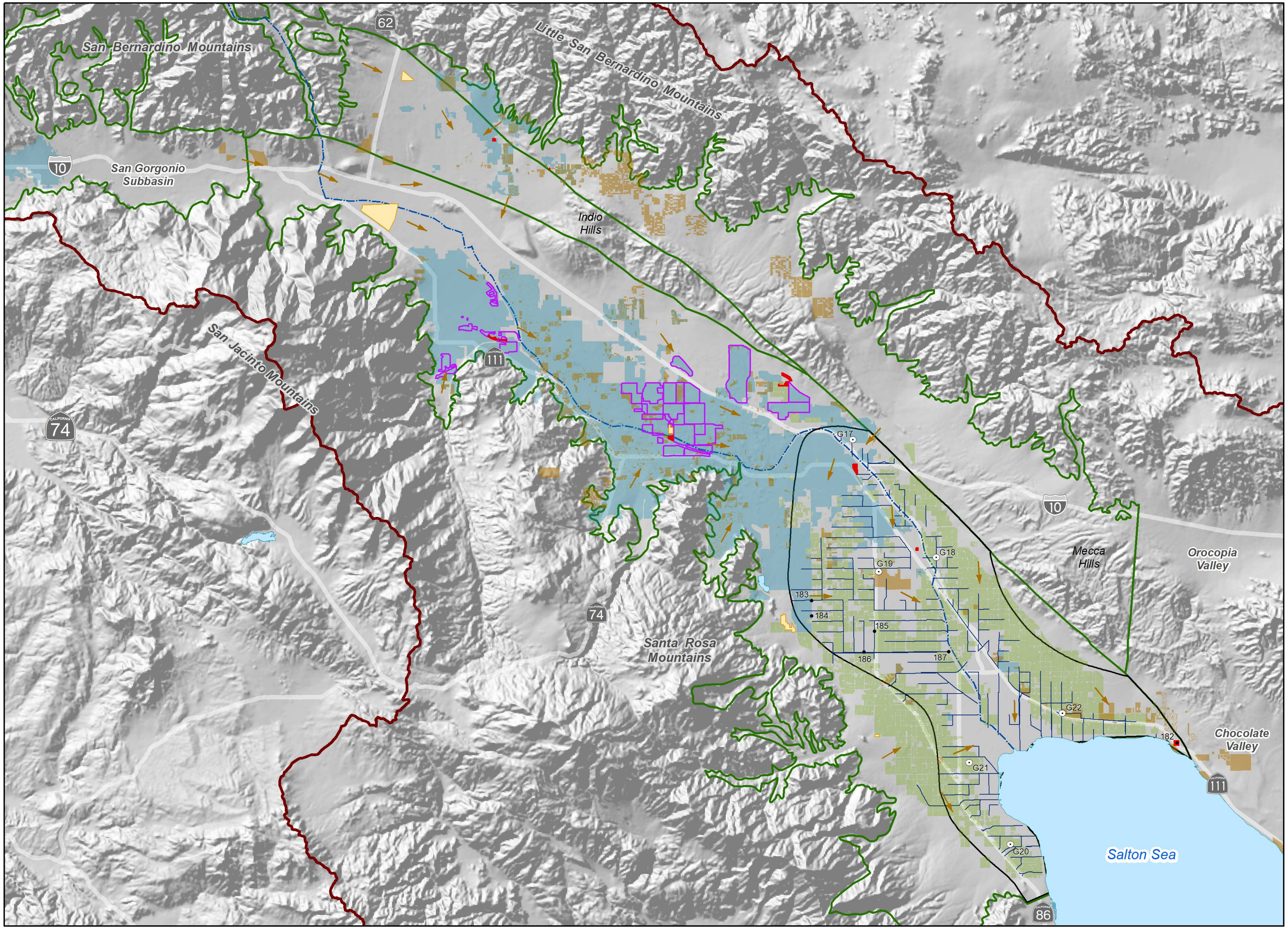
Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Groundwater Monitoring Network
Deep Aquifer System

Figure 3-2



Map_ID • Proposed Monitoring Well
See Tables 3-1a and 3-1b

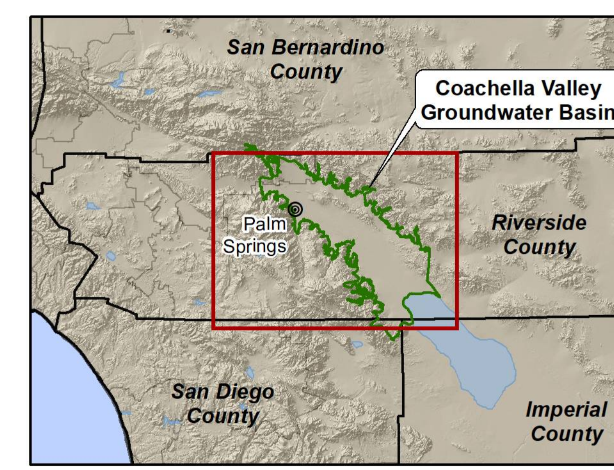
Map_ID ⊙ Gap in Monitoring Network
See Table 3-2

Sources of Salt and Nutrient Loading

- Wastewater Pecolation Ponds
- Areas of Non-Potable Water Reuse
- Potential Septic Areas
- Groundwater Replenishment Facilities

Generalized Land Use

- Urban
- Irrigated Agricultural Land
- CVWD Agricultural Drains
- General Direction of Groundwater Flow
- Extent of Perched Aquifer System
- Salton Sea Watershed
- Coachella Valley Groundwater Basin and Subbasins



WEST YOST

Author: EM/AM
Date: 12/11/2020
File: Figure 3-3.mxd

0 5 10 Miles
0 10 20 KM

Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Groundwater Monitoring Network and Gaps
Perched Aquifer System

Figure 3-3

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4.0 CV-SNMP DEVELOPMENT WORKPLAN

This section describes:

- The logic and reasoning behind this proposed CV-SNMP Development Workplan, and how it ensures the development of a CV-SNMP that will comply with State law and Policy.
- The detailed scope of work for the CV-SNMP Development Workplan.

Through discussions and advice from West Yost Associates, the CV-SNMP Agencies have concluded that numeric objectives for TDS and nitrate in groundwater are necessary for a CV-SNMP that complies with the 2018 Policy and resolves the concerns of the Regional Board with the 2015 CV-SNMP. Numeric objectives in the CV-SNMP will be necessary to:

- Demonstrate that beneficial uses are protected.
- Quantify the magnitude of available assimilative capacity for salt and nutrient loading.
- Provide a technical basis for the Regional Board to allocate the use of assimilative capacity.
- Set triggers for implementation measures at appropriate locations and times.

Currently, the Basin Plan includes a nitrate-nitrogen objective of 10 mgl for groundwater in the Coachella Valley based on the primary drinking water MCL but lacks scientifically-derived numeric TDS objectives that are consistent with the provisions of Title 22. The process to recommend numeric TDS objectives needs to include technically-defensible methods and tools to answer the following questions:

- What are logical management areas within the Basin (management zones) and the beneficial uses of groundwater within the management zones?
- What is current groundwater quality? And, is current groundwater quality protective of beneficial uses?
- How is groundwater quality expected to change in the future, both across the basin and within the depth-specific aquifer systems?
- Will these changes in groundwater quality impact beneficial uses? If so, where and when?
- What are economically and technically feasible salt management strategies, that when implemented, will achieve the objectives of both the CV-SNMP stakeholders and the Regional Board? Economic feasibility needs to be defined and should consider the sources of revenue and the factors that could restrict the sources of revenue.

California Water Code section 13241 (CWC 13241) describes the factors to consider when establishing the TDS objectives:

a) *Past, present, and probable future beneficial uses of water*.

b) *Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto*.

c) *Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area*.

d) *Economic considerations*.

e) *The need for developing housing within the region*.

f) *The need to develop and use recycled water*.

The CV-SNMP Development Workplan must address each of these factors in CWC 13241, and answer the questions above, when recommending the TDS objectives for groundwater to ensure that the Basin is put to maximum beneficial use while also protecting water quality pursuant to State law and Policy.

The proposed scope-of-work for the CV-SNMP Development Workplan is described in the subsections below, and is organized as follows:

Task 4.1 Select Consultants for CV-SNMP Facilitation and Technical Services

Task 4.2 Establish CV-SNMP Stakeholder Group and Technical Advisory Committee

Task 4.3 Characterize N/TDS Loading to the Groundwater Basin

Task 4.4 Characterize Current Groundwater Quality

Task 4.5 Delineate Draft Management Zones and Describe Metrics to Characterize Beneficial Use Protection

Task 4.6 Develop Technical Approach for Forecasting N/TDS Concentrations in Groundwater

Task 4.7 Construct N/TDS Forecasting Tools and Evaluate the Baseline Scenario

Task 4.8 Forecast N/TDS Concentrations for CV-SNMP Scenarios

Task 4.9 Characterize and Compare the Cost of Baseline and CV-SNMP Scenarios

Task 4.10 Select the Preferred CV-SNMP Scenario, Finalize Management Zones and Beneficial Uses, and Recommend TDS Objectives

Task 4.11 Prepare Final CV-SNMP

Table 4-1 describes how this CV-SNMP Development Workplan will result in a CV-SNMP that satisfies all recommended and required components for SNMPs pursuant to the 2018 Policy.

4.1 Select Consultants for CV-SNMP Facilitation and Technical Services

The objective of this task is to select a qualified consultant(s) to facilitate and execute the implementation of this workplan.

- A ***Facilitation Consultant*** will be responsible for leading and conducting stakeholder outreach and engagement efforts, leading and attending all stakeholder and technical meetings, and co-authoring all interim and final project deliverables with the Technical Consultant. Qualifications for the Facilitation Consultant include comprehensive knowledge of the legal, policy, and regulatory issues regarding SNMPs; successful experience in leading stakeholder groups; and local knowledge of the Coachella Valley and its CV-SNMP stakeholders, including the agricultural, golf, and tribal entities.
- A ***Technical Consultant*** will be responsible for executing the technical scope-of-work described in this workplan. Minimum qualifications for the Technical Consultant include: successful experience in characterizing water quality and the fate and transport of salt and nutrients; successful

experience in water and groundwater management planning; successful experience in modeling of water quality; and local knowledge of the hydrology, hydrogeology, and water resources of the Coachella Valley. Preferred qualifications include a working knowledge and of the legal, policy, and regulatory issues regarding SNMPs and successful experience in leading technical committees.

In this task, the CV-SNMP Agencies will prepare a request for qualification (RFQ) or request for proposals (RFP) and select a qualified consultant(s) for stakeholder facilitation and technical services. Once the consultant(s) is selected, the CV-SNMP Agencies will negotiate and issue a contract(s).

4.2 Establish CV-SNMP Stakeholder Group and Technical Advisory Committee

The objective of this task is to convene a CV-SNMP Stakeholder Group and the CV-SNMP Technical Advisory Committee (TAC). The CV-SNMP Agencies and the selected consultants will organize and facilitate both groups during the implementation of the CV-SNMP Development Workplan.

4.2.1 Convene the CV-SNMP Stakeholder Group

The CV-SNMP Stakeholder Group will be comprised of the CV-SNMP Agencies, other salt and nutrient contributors to groundwater, and other interested groups. The objectives of convening the CV-SNMP Stakeholder Group are:

- Provide the CV-SNMP Agencies with a venue to engage interested parties in the CV-SNMP development process.
- Inform the CV-SNMP development process of the needs and wants of all interested parties.
- Provide a venue to keep the interested parties informed through key steps of the CV-SNMP development process.
- Understand the ability/authority of the stakeholders to implement best management practices and salt and nutrient management measures.
- Provide a mechanism to receive input on draft CV-SNMP deliverables.
- Garner participation from other salt and nutrient contributors to groundwater.
- Identify potential cost-sharing partners and in-kind services for CV-SNMP implementation.

The CV-SNMP Agencies and the Facilitation Consultant will conduct outreach to identify stakeholders and inform them of the intent to form the CV-SNMP Stakeholder Group. Outreach activities will include but are not limited to:

- Prepare and maintain a website that is available to the public with information on the CV-SNMP development and the public's role in the process.
- Distribute public notices on the development of the CV-SNMP and the establishment of the CV-SNMP Stakeholder Group. The public notices will include the website details and information on introductory public meetings.

- Lead two (2) public meetings to request stakeholder engagement and explain the purpose of the CV-SNMP and the process to develop it.
- Prepare and maintain a directory of contact information of stakeholders and establish an email listserve.

Potential stakeholders include but are not limited to: the agricultural community and groups; golf course industry groups; tribes; the Coachella Valley Regional Water Management Group; the Groundwater Sustainability Agencies in the Coachella Valley; all major water and wastewater agencies; industrial dischargers; county and city land use planning agencies; Federal and State agencies; the Colorado River Basin Salinity Control Forum; Metropolitan Water District of Southern California; and non-governmental organizations (NGOs).

A critical first step will be to solicit input from the CV-SNMP Stakeholder Group as to their issues, needs and wants. This information will be collected up front so the CV-SNMP Agencies and consultants can proactively address stakeholder concerns, and potentially incorporate them in the CV-SNMP development process.

The CV-SNMP Stakeholder Group will be kept informed of CV-SNMP development progress through the website and email listserves. The group will be informed of draft deliverables and provided an opportunity to submit comments. All stakeholder comments will be noted in appendices of the final deliverables. Group meetings will typically occur to support the review of draft deliverables, and these meetings are included in the individual tasks of this workplan.

4.2.2 Convene the CV-SNMP Technical Advisory Committee

The TAC can be composed of representatives of the CV-SNMP Agencies, technical consultants that each CV-SNMP Agency chooses to represent them, and at least one neutral technical expert (e.g., U.S. Geological Survey [USGS] hydrologist). Regional Board staff will be encouraged to participate on the TAC in an advisory role.

The objectives of the TAC are:

- Advise the Technical Consultant on the execution of workplan tasks.
- Provide review and comment on administrative draft and draft CV-SNMP deliverables.

The Technical Consultant will coordinate with the CV-SNMP Agencies to prepare a directory of contact information of TAC members and will establish an email listserve. The TAC will be kept informed of CV-SNMP development progress through the website and the email listserve. The group will be informed of all draft deliverables and will be provided an opportunity to submit comments. All TAC comments will be addressed in the final deliverables, and the comments and responses will be included as appendices of the final deliverables.

An inaugural meeting of the TAC will be held to describe the roles and responsibilities of the TAC, describe the CV-SNMP Development Workplan and its milestones and schedule, and inform the TAC of next steps. Subsequent meetings of the TAC will typically occur for review of draft deliverables, and these meetings are included in the individual tasks of this workplan.

4.3 Characterize N/TDS Loading to the Groundwater Basin

The objective of this task is to quantify the individual components of N/TDS loading to groundwater.

The results of this task will:

- Satisfy the requirements of Section 6.2.4 of the Policy regarding the required components of SNMPs:

  Section 6.2.4.3. Salt and nutrient source identification, basin or subbasin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.

- Provide the information to prepare input files for the modeling of future N/TDS concentrations in groundwater.
- Support subsequent tasks in this workplan to recommend TDS objectives pursuant to CWC 13241(b): *Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto*.

The general sources of N/TDS loading in the basin are described in Section 2.3.1. The characterization of N/TDS loading will be performed for a recent historical period to the present to characterize seasonal variations and long-term trends in loading and generate estimates of N/TDS loads in the vadose zone. The length of the historical period will be defined as part of this task but should be long enough to characterize the N/TDS loads in the vadose zone.

4.3.1 Collect Data and Information

The following types of data and information will be collected for the historical period:

- Existing groundwater-flow model data/estimates of historical recharge volumes over the model calibration periods.
- Groundwater-quality data from wells in adjacent, upgradient basins to characterize the quality of subsurface inflow.
- Water quality of subsurface inflow from the surrounding mountains and hills and streambed recharge:
  - Water-quality data from bedrock springs, wells, and streamflow within the watersheds tributary to the Coachella Valley.
  - Literature on salt-intensification and nitrogen-loss rates during streambed recharge.
- Groundwater replenishment:
  - Historical volumes of Colorado River water artificially recharged at GRFs.
  - Water-quality data for each source of Colorado River water supply.
  - Historical volumes and water-quality data of local runoff diverted for recharge at GRFs.
- Wastewater and recycled water:
  - Historical volumes of treated wastewater discharged to percolation ponds and the associated water-quality data.

- Historical volumes of recycled water used for irrigation and the associated water-quality data.

- Septic systems data:
  - Characterizations of current and future parcels using septic systems.
  - Literature on N/TDS concentrations of septic tank discharges.
  - Information on septic tank moratoriums and abatement efforts.
- Applied water:
  - Historical and current land use maps.
  - Historical and current agriculture crop types.
  - Current and future agricultural land fertilizer application practices.
  - Literature on crop nitrogen requirements and loading associated with the application of fertilizer.
  - Literature on crop evapotranspiration and water requirements.
  - Local reference evapotranspiration data.
  - Literature/data for historical and current agriculture and urban irrigation efficiency.
  - Historical and current agriculture water supply plans, including sources and associated water quality.
  - Boundaries of agriculture and urban water service areas.
  - Historical and future water supply plans of urban water purveyors, including detail on volume and associated water quality of each supply source.
  - Historical and future water supply plans of other overlying water users.

4.3.2 Characterize Historical and Current N/TDS Loading

The data collected will be reviewed and the Technical Consultant will prepare a draft recommendation to describe the types of tables, maps, and data graphics that can be prepared with the available data to characterize historical and current N/TDS loading to groundwater. A meeting will be held with the TAC to review the draft recommendation and receive TAC feedback.

Once the types of tables, maps, and data graphics are finalized, the time-history of the volumes and associated N/TDS concentrations will be estimated and described for each N/TDS loading term. The N/TDS concentrations will be based on historical data to the extent possible, and where needed, assumptions based on literature review.

4.3.3 Prepare Task Memorandum

A draft and final task memorandum will be prepared to document the data collected and the characterization of historical and current N/TDS loading, as described below:

- An administrative draft task memorandum will be prepared and distributed to the TAC for review and comment.

- A meeting will be held to review the administrative draft memorandum and receive feedback from the TAC.
- A draft memorandum will be prepared based on the feedback from the TAC and distributed to the TAC for review and comment.
- The CV-SNMP Stakeholder Group will be notified of the availability of the draft memorandum for review and comment.
- A TAC meeting will be held to review the draft memorandum and receive feedback.
- A final memorandum will be prepared addressing the feedback.

4.4 Characterize Current Groundwater Quality

The objective of this task is to characterize N/TDS concentrations in groundwater as of 2020 (i.e. current conditions). The characterization will include an analysis of the time history of N/TDS concentrations in groundwater that led to current conditions. The results of this task will provide the necessary information to:

- Satisfy Section 6.2.4 of the Policy regarding the required components of SNMPs. In this case, estimating current groundwater quality is necessary to compute the existence and magnitude of assimilative capacity for a basin, subbasin, or management zone:

  Section 6.2.4.3. Salt and nutrient source identification, basin or subbasin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.
- Understand the current trends in N/TDS concentrations in groundwater.
- Support subsequent tasks in this workplan to:
  - Delineate draft groundwater management zones.
  - Define the methods to compute the current "ambient" N/TDS concentrations in groundwater management zones (i.e. the AWQ metric).
  - Assess the current protection of beneficial uses within groundwater management zones.
  - Prepare input files of initial conditions of N/TDS concentrations in groundwater for the forecast modeling of N/TDS concentrations.
  - Recommend TDS objectives pursuant to CWC 13241(b): *Past, present, and probable future beneficial uses of water*.
  - Support assessment of assimilative capacity for additional loading of N/TDS.

The characterizations of current groundwater quality will primarily rely on data collected from wells in the CV-SNMP Groundwater Monitoring Network (see Section 3), since these wells are intended to be representative of groundwater quality in all subbasins, subareas, and depth-specific aquifer systems within the Basin. However, the Groundwater Monitoring Network is not yet complete, and historical data may be lacking for some wells. For this reason, other available groundwater-quality data will likely be necessary for this characterization.

4.4.1 Collect Data and Information

The following data and information will be collected, compiled, checked, and uploaded to project databases and Geographic Information System (GIS):

- Well information
    - Well ID (State Well Number)
    - Well owner
    - Well name
    - Well use
    - Well status
    - XYZ coordinates
    - Well screen depth intervals
- Historical groundwater-elevation data at wells
- Historical water-quality data at wells for the following constituents:
    - TDS
    - Nitrate
    - Major cations: K, Na, Ca, Mg
    - Major anions: Cl, SO4
    - Total alkalinity: HCO3, CO3, OH

Some of these data have already been collected and compiled for the CV-SNMP Groundwater Monitoring Program Workplan (see Section 3).

4.4.2 Prepare Tables, Maps, and Data Graphics

The data collected will be reviewed and the Technical Consultant will prepare a draft recommendation to describe the periods of record and the types of tables, maps, and data graphics that can be prepared with the available data to characterize current N/TDS concentrations in groundwater. A meeting will be held with the TAC to review the draft recommendation and receive TAC feedback.

Described below are recommended examples of the tables, maps, and data graphics that could be prepared to characterize historical and current groundwater quality across the Basin. Examples of these types of tables, maps, and data graphics are included in Appendix B.[12]

Summary statistics of N/TDS concentrations at wells. These statistics characterize the data set at each well in terms of duration, depth, sample size, mean concentrations, variability, precision, and trends. The statistics can be summarized in tables that include the following fields:

- State Well Number, well owner, well name, and well status.
- DWR subbasin.
- Aquifer layers penetrated by the well screens.
- Period of record of available data.

[12] These examples are illustrative, and do not represent the exact tables and figures that will be prepared for this task.

- Number of years with sample results.
- Total number of sample results.
- Minimum, maximum, median, and average N/TDS concentration statistics.
- Average N/TDS concentrations for the defined historical and current periods (e.g. 2016-2020).
- Standard deviation and coefficient of variance for the sample set.
- Comparison to drinking water-quality standards or other beneficial use thresholds.
- Mann-Kendall trend test results for N/TDS concentrations.

Table B-1 is an example of a table prepared for similar purposes.

Point and raster maps of N/TDS concentrations in groundwater. The objectives of these maps are to:

- Characterize the spatial distribution of N/TDS concentrations in groundwater relative to the sources of recharge and discharge.
- Provide the initial conditions for N/TDS concentrations in groundwater for the forecast modeling of N/TDS concentrations.
- Support the mapping of change in N/TDS concentrations over time.

On these types of maps, wells are typically labeled with the average N/TDS concentrations for a defined period (e.g. five-year period). Maps can be prepared for a historical period (e.g. 1996-2000) and a current period (e.g. 2016-2020) to facilitate characterization of historical changes in water quality. An interpolation tool in ArcGIS can be used to generate raster surfaces of average N/TDS concentrations across the Basin. The raster can be symbolized by color-ramp to illustrate the spatial distribution of N/TDS concentrations. For areas with multiple aquifer layers and sufficient data, maps can be prepared to characterize each layer. **Figure B-1** is an example of such a map that was prepared for similar purposes.

If this mapping approach is adopted, the following areas and aquifer layers should be mapped:

- Northern portion of the Indio subbasin (including the Garnet Hill and Palm Springs subareas)
    - Shallow aquifer system (Layers 1-3)
    - Deep aquifer system (Layer 4)
- Central portion of the Indio subbasin (including the Thousand Palms subarea)
    - Shallow aquifer system (Layers 1-3)
    - Deep aquifer system (Layer 4)
- Southern portion of the Indio subbasin (including the Thermal and Oasis subareas)
    - Perched aquifer system (Layer 1)
    - Shallow aquifer system (Layers 2/3)
    - Deep aquifer system (Layer 4)
- Mission Creek subbasin
    - Shallow aquifer system (Layers 1-3)
    - Deep aquifer system (Layer 4)

- Desert Hot Springs subbasin

Maps of changes and trends in N/TDS concentration in groundwater. The objectives of these maps are to:

- Identify areas (and depths) within the Basin where N/TDS concentrations are increasing, decreasing, or not changing, and potentially reveal why the changes are occurring.
- Support the understanding of the fate and transport of N/TDS.

On these types of maps, wells are typically labeled by changes in average N/TDS concentrations between two defined periods (a historical period [e.g. 1996-2000] minus a current period [e.g. 2016-2020]). Wells with enough data can be symbolized by the Mann-Kendall trend test results for N/TDS concentrations. An interpolation tool in ArcGIS can be used to generate raster surfaces of changes in N/TDS concentrations across the Basin. The raster can be symbolized by color-ramp to illustrate the spatial changes in N/TDS concentrations. For areas with multiple aquifer layers and sufficient data, maps can be prepared to characterize each layer. The maps can be prepared for the same areas and aquifer layers as listed above for the point and raster maps of N/TDS concentrations. **Figure B-2** is an example of such a map that was prepared for similar purposes.

Multi-variate exhibits of groundwater and surface water. The objectives of these types of exhibits is to improve understanding of the fate and transport of N/TDS in the Basin, and support interpretations of the potential causes of increasing or decreasing N/TDS concentrations in groundwater.

These exhibits can be prepared for each well in the CV-SNMP Groundwater Monitoring Network (or logical groupings of wells) over a historical to current period, and typically include:

- Time-series chart of groundwater levels at the well(s).
- Time-series chart of N/TDS concentrations at the well(s), including a statistical quantification of trends using the Mann-Kendall test results.
- Time-series chart of N/TDS concentrations for nearby sources of N/TDS loading.
- Piper Diagrams for the well(s) and the nearby sources of N/TDS loading. Piper Diagrams are a graphical representation of the chemistry of water samples that aid in understanding the sources of the dissolved constituents in the groundwater.

Figure B-3 is an example of such an exhibit that was prepared for similar purposes.

4.4.3 Prepare Task Memorandum

A task memorandum will be prepared to document the data collected and the characterization of current N/TDS concentrations in groundwater, as described below:

- An administrative draft task memorandum will be prepared and distributed to the TAC for review and comment.
- A TAC meeting will be held to review the administrative draft memorandum and receive feedback.
- A draft memorandum will be prepared based on the feedback from the TAC and distributed to the TAC for review and comment.

- The CV-SNMP Stakeholder Group will be notified of the availability of the draft memorandum for review and comment.
- A TAC meeting will be held to review the draft memorandum and receive feedback.
- A final memorandum will be prepared addressing TAC feedback.

4.5 Delineate Draft Management Zones and Describe Metrics to Characterize Beneficial Use Protection

The objectives of this task are to:

- Delineate draft groundwater management zones.
- Describe the existing and potential future beneficial uses of groundwater within each management zone.
- Define the *ambient water quality (AWQ) metric* in each management zone that will be used to estimate ambient water quality conditions and assess beneficial use protection. An *AWQ metric* is a method to estimate "ambient" N/TDS concentrations for groundwater in each management zone. The purpose of AWQ metrics is to enable the comparison of ambient N/TDS concentrations in groundwater versus the beneficial-use thresholds and water quality objectives, and thereby indicate the state of beneficial use protection. Examples of AWQ metrics include, but are not limited to:
    - Volume-weighted constituent concentration within the management zone.
    - 5-year moving average of constituent concentration at a key well or wells within a management zone.
    - Volume-weighted constituent concentration of groundwater discharge from a management zone.

The results of this task will provide the necessary information to:

- Assess the current and future protection of the beneficial uses of groundwater.
- Support subsequent tasks in this workplan to:
    - Post-process, display, and interpret the forecast modeling results.
    - Recommend TDS objectives pursuant to CWC 13241(a): *Past, present, and probable future beneficial uses of water*.
    - Support assessments of assimilative capacity for additional loading of N/TDS.

The management zone delineations and the AWQ metrics will be considered draft at this stage. It is possible that subsequently derived information, such as understanding potential future water-quality conditions and the ability for the stakeholders to control future water-quality conditions, will indicate that modifications to management zone delineations and AWQ metrics will better support salt and nutrient management.

4.5.1 Delineate Draft Groundwater Management Zones

The delineation of draft management zones will be based on:

- Hydrogeology of the basin.
- Locations and magnitudes of N/TDS loading.
- Location of hydrologically vulnerable areas as identified in the GAMA Groundwater Information System database.
- Current understanding of groundwater-flow directions and the fate and transport of N/TDS within the groundwater basin.
- Current N/TDS concentrations in groundwater.
- Existing and potential future beneficial uses of groundwater.

Management zones will be delineated both spatially and vertically throughout the basin.

4.5.2 Describe Beneficial Uses for Management Zones and Beneficial-Use Thresholds

For each management zone, the existing and potential beneficial uses and users of groundwater will be described along with the associated beneficial-use thresholds for N/TDS concentrations.

The beneficial uses will reference those uses listed in the Water Quality Control Plan and the known existing users and uses of groundwater in each proposed management zone.

The beneficial-use thresholds will be based on regulatory standards and guidance published by the State of California on the numeric water-quality thresholds that protect the beneficial uses.

4.5.3 Define AWQ Metrics and Determine Current Protection of Beneficial Uses

Draft AWQ metrics will be proposed for each management zone and used to estimate the current ambient N/TDS concentrations for groundwater in each management zone. The current ambient N/TDS concentrations will be compared to the beneficial-use thresholds to assess the current state of beneficial use protection. If the concentration of the AWQ metric is less than the beneficial-use threshold, then that specific beneficial use is protected. If the concentration of the AWQ metric is greater than the beneficial-use threshold, then that specific beneficial use is not protected.

The appropriate AWQ metric may be different in different management zones based on the size of the management zone, the beneficial users and uses within the management zone, the location and magnitude of N/TDS loading, and the fate and transport of N/TDS.

Figure 4-1 is a chart that conceptually illustrates:

- The use of a hypothetical AWQ metric that utilizes existing TDS data to estimate the "historical ambient" and "current ambient" TDS concentrations for a management zone. These features can characterize the recent trends in TDS concentration within the management zone.
- A comparison of a current ambient TDS concentration in the management zone to the beneficial use thresholds for TDS. This comparison can characterize the current protection of beneficial uses.

These types of charts will be prepared for N/TDS in each management zone over a recent historical period.

4.5.4 Prepare Task Memorandum

A task memorandum will be prepared to document the draft management zones, the beneficial uses within each management zone, the beneficial-use thresholds for N/TDS concentrations in each management zone, the proposed AWQ metrics that represent ambient N/TDS concentrations in each management zone, and the assessment of beneficial use protection in each management zone over a recent historical period, as described below:

- An administrative draft task memorandum will be prepared and distributed to the TAC for review and comment.
- A TAC meeting will be held to review the administrative draft memorandum and receive feedback.
- A draft memorandum will be prepared based on the feedback from the TAC and distributed to the TAC and the CV-SNMP Stakeholder Group for review and comment.
- A public meeting will be held to review the draft memorandum and receive feedback.
- A final memorandum will be prepared addressing the feedback.

4.6 Develop Technical Approach for Forecasting N/TDS Concentrations in Groundwater

The objective of this task is to define the most appropriate and efficient technical approach to forecast N/TDS concentrations in groundwater.

Currently, two numerical groundwater-flow models are being updated and used to support SGMA compliance in the Mission Creek subbasin[13] and the Indio subbasin. Both models are based on the USGS modular groundwater-flow model MODFLOW. Review of preliminary model documentation and discussions with the technical consultants who are preparing these model updates indicate that the appropriate strategy for making forecasts of N/TDS concentrations is to build two separate water-quality models that cascade from the Mission Creek subbasin to the Indio subbasin. In this strategy, the water-quality models will be capable of making forecasts of N/TDS concentrations in groundwater utilizing the results of MODFLOW simulations. The water-quality model results for N/TDS concentrations in groundwater will be at the same spatial and temporal resolution as the MODFLOW model results for groundwater flow. For the CV-SNMP Development Workplan, it is assumed that a water-quality model of the Mission Creek subbasin will be executed first, and its results will be used as boundary conditions that will be carried over (cascaded) to a water-quality model of the Indio subbasin.

This modeling approach for forecasting N/TDS concentrations must include the following capabilities:

- Ability to assign a volume and N/TDS concentrations to each individual source of recharge.
- Ability to simulate the vadose zone processes (e.g. transport and chemical transformations).

[13] The Mission Creek Subbasin Model includes the Miracle Hill subarea of the Desert Hot Springs subbasin where there may be significant subsurface flows from the Desert Hot Springs subbasin into the Mission Creek subbasin.

- Ability to simulate the feedback cycles associated with groundwater pumping, the N/TDS concentrations of potable water supply, the N/TDS concentrations of recycled water, and the N/TDS concentrations of return flows.
- Ability to simulate the fate and transport of N/TDS with a cascading approach from the existing Mission Creek subbasin MODFLOW model domain to the Indio subbasin MODFLOW model domain. Because the domains of the two MODFLOW models overlap the Garnet Hill Subarea, consideration must be given to this boundary in the water-quality modeling approach.
- Ability to calculate the volume-weighted N/TDS concentrations for each management zone by layer.
- Ability to calculate N/TDS concentration at wells.
- The ability to reasonably simulate verifiable historical groundwater-quality conditions.
- Ability to efficiently simulate several CV-SNMP scenarios with modified input files that represent potential CV-SNMP management projects and programs.
- Ability to forecast N/TDS concentrations in subareas that are not covered by the model domains of the MODFLOW models, which includes the Fargo Canyon Subarea and a portion of the Sky Valley Subarea in the Desert Hot Springs Subbasin.

Formulating this modeling strategy will require a thorough understanding of the existing MODFLOW models, the model input files (particularly the recharge files that represent N/TDS loading terms), and the output files. It is likely that separate data-processing routines will need to be automated (i.e. coded) so the water-quality modeling of multiple scenarios can be performed efficiently and accurately. Such data-processing routines may include reconstructing the MODFLOW recharge input files to include the assignment of N/TDS concentrations to the individual recharge sources, automating the update of model input files to address feedback cycles to achieve appropriate convergence of model results, and the post-processing of the water-quality model results to support the cascading model approach.

The vadose zone processes (solute travel time and chemical transformations) and their effect on the N/TDS loading to groundwater will need to be analyzed and considered for inclusion in the modeling approach.

4.6.1 Evaluate Existing MODFLOW Models

Model reports and documentation are forthcoming for the updates to the Mission Creek Subbasin Model and the Indio Subbasin Model. These reports and documentation will be reviewed to gain insight into the hydrogeologic conceptual model, model assumptions, model settings, and model limitations.

The MODFLOW input files need to be understood, particularly to develop automated routines for assigning N/TDS concentrations to recharge terms. For example, the MODFLOW models include recharge input files for return flows that originate from several water sources. The SGMA modeling teams have indicated that significant pre-processing efforts are conducted to prepare the input files for recharge from the various recharge sources. To perform the water-quality modeling, the N/TDS concentrations for each water source must be estimated, and the volume-weighted concentration needs to be calculated and assigned to the water-quality models. These pre-processing efforts will likely need to be automated for the water-quality modeling, so a thorough understanding of the MODFLOW model input files, and their preparation, is necessary.

The MODFLOW output files need to be assessed to determine whether they meet the requirements of the water-quality modeling and its cascading modeling approach.

In this subtask, it is likely that meetings and conference calls will be necessary with the SGMA modeling teams to ask questions and resolve challenges that are identified during the evaluation of the MODFLOW models.

4.6.2 Develop Procedures for Simulating Vadose Zone Processes

Vadose zone processes may be important to timing and magnitude of N/TDS loading to the saturated zone, particularly for return flows from the land surface through partially saturated sediments. Criteria to consider in developing procedures for simulating the vadose zone are: microbial processes in the hyporheic zone; vadose zone thickness, hydraulic and solute lag times, the initial N/TDS conditions within the vadose zone, and the appropriate methods and tools to simulate N/TDS loading through the vadose zone to the saturated zone.

In this subtask, the Technical Consultant will evaluate the existing information developed in prior tasks and the existing models to develop a recommendation for procedures to simulate vadose zone processes in N/TDS loading.

4.6.3 Define the Appropriate Planning Period

The appropriate length of the planning period for water-quality model forecasting is partly dependent on the solute travel times through the vadose zone. In this subtask, the Technical Consultant will evaluate the solute travel times through the vadose zone and develop a recommendation for the planning period. If the planning period is recommended for a period longer than 50 years, the modeling approach must describe how the planning period will be extended beyond the 2020-2070 period that the MODFLOW models are using in the development of the Alternatives to Groundwater Sustainability Plans to comply with the SGMA (SGMA Alternative Plans).

4.6.4 Develop Procedures for Simulating Feedback Processes

The future changes in N/TDS concentrations in groundwater will influence the N/TDS concentrations in water supplies that include groundwater, such as potable water and recycled water, which in turn, can migrate back to the groundwater system as irrigation return flows. Such feedback processes can have a significant effect on the future N/TDS concentrations in groundwater and must be simulated.

In this subtask, the Technical Consultant will evaluate the existing information developed in prior tasks and the existing models to develop a recommendation for procedures to simulate feedback processes in N/TDS loading.

4.6.5 Define Assumptions for Future N/TDS Concentration of Colorado River Water

Colorado River water is a major source of supplemental water that supports groundwater basin sustainability and the economy of the Coachella Valley. The future N/TDS concentrations of Colorado River water will affect the quality of groundwater.

In this subtask, the Technical Consultant will: analyze the historical N/TDS concentrations of Colorado River water; research the existing and any proposed changes to the water quality objectives for Colorado River water; review available information on the existing structures and efforts in place to help reduce salinity in Colorado River water; review available information on salinity projections for Colorado River water including any predicted impacts from climate change; and recommend assumptions for N/TDS concentrations of Colorado River water for water-quality modeling over the planning period.

4.6.6 Develop Procedures for Verifying the N/TDS Forecasting Tools

The water-quality models cannot be calibrated using traditional methods of model calibration primarily because of a lack of historical, depth-specific groundwater-quality data. However, the water-quality models should have the ability to reasonably simulate the available data and information on historical groundwater-quality conditions.

In this subtask, the Technical Consultant will describe the process to verify the ability of the water-quality models to reasonably simulate historical groundwater-quality conditions. Likely, the water-quality models will need to be run and evaluated, and adjustments to the input files or other model assumptions will need to be tested to produce “reasonable” results.

4.6.7 Develop Procedures for Post-Processing Model Results

The water-quality modeling will need efficient tools for post-processing and displaying the model results. This is because:

- In Task 4.7, the water-quality models will need to be run and evaluated repeatedly to demonstrate their ability to produce “reasonable” results.
- In Task 4.8, the water-quality models will be used to test the effectiveness of various implementation measures to control N/TDS loading and protect beneficial uses. Hence, the water-quality model results will need to be evaluated efficiently to save cost and time in the identification of a preferred CV-SNMP Scenario.

In this subtask, the Technical Consultant will describe the post-processing tools that will be prepared to efficiently display and characterize the water-quality model results.

4.6.8 Prepare Task Memorandum

A task memorandum will be prepared to describe and document the methods, assumptions, and tools that will be used to construct and run the water-quality models and interpret the results, as described below:

- An administrative draft task memorandum will be prepared and distributed to the TAC for review and comment.
- A TAC meeting will be held to review the administrative draft memorandum and receive feedback.
- A draft memorandum will be prepared based on the feedback from the TAC and distributed to the TAC for review and comment.
- The CV-SNMP Stakeholder Group will be notified of the availability of the draft memorandum for review and comment.
- A TAC meeting will be held to review the draft memorandum and receive additional feedback.
- A final memorandum will be prepared addressing the feedback.

4.7 Construct N/TDS Forecasting Tools and Evaluate the Baseline Scenario

The objectives of this task will be to:

- Construct the N/TDS forecasting tools defined in Task 4.6 and verify their ability to reasonably simulate historical groundwater-quality conditions.
- Define a "baseline" planning scenario that represents the current water-supply plans and water-management plans for the Coachella Valley (Baseline Scenario).
- Forecast N/TDS concentrations to determine whether beneficial uses of groundwater are protected under the Baseline Scenario.

These objectives will be accomplished by constructing the water-quality models (and associated pre-processing and post-processing tools) and using the models to forecast N/TDS concentrations in groundwater for a Baseline Scenario over the planning period.

The evaluation of the Baseline Scenario will be used in subsequent tasks of this workplan to:

- If necessary, support the development of CV-SNMP implementation measures (*i.e.* projects and/or programs) to manage N/TDS loading to protect beneficial uses of groundwater on a sustainable basis.
- Finalize the management zone delineations and the AWQ metrics that are used to estimate the ambient N/TDS concentrations for each management zone.
- Recommend TDS objectives pursuant to CWC 13241(b): *Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto*.

4.7.1 Develop a Baseline Scenario based on the SGMA Alternative Plans

The Baseline Scenario will be based on:

- The SGMA Alternative Plans that are being developed for the Mission Creek and Indio Subbasins to comply with the SGMA.
- The N/TDS loading that is estimated to occur under the SGMA Alternative Plans (described in Task 4.3).

The Baseline Scenario will be described in enough detail to prepare model input files for the water-quality modeling efforts in Task 4.7.2 and to prepare cost estimates for the aggregate water supply in Task 4.9.

4.7.2 Construct N/TDS Forecasting Tools and Run the Baseline Scenario

In this task, the water-quality models and associated pre- and post- processing tools are constructed, verified, and used to run the Baseline Scenario pursuant to the methods described in the task memorandum for Task 4.6 – *Develop Technical Approach for Forecasting N/TDS Concentrations in Groundwater*.

Verification of the water-quality models will be performed by running the models over a defined historical period to verify their ability to reasonably simulate historical water groundwater-quality conditions. The model verification results will be reviewed with the TAC before running of the Baseline Scenario.

The initial conditions for N/TDS concentrations in groundwater (by model layer) will be based on the results of Task 4.4 – *Characterize Current Groundwater Quality*. The initial condition for N/TDS loads within the vadose will be based on the strategies outlined in Task 4.6.

Several iterative model runs and sensitivity analyses will be needed to check for the reasonableness of the water-quality model results, and if necessary, adjust various assumptions in the initial conditions and the input datasets of the Baseline Scenario. The interim results will need to be reviewed with the TAC to define changes to any assumptions.

The interim simulation results will be summarized for each model run with: N/TDS concentration maps for selected points in the planning period, maps of change in N/TDS concentration, N/TDS concentration time-series charts for wells and return flows over the planning period, and time-series charts of the draft compliance metrics for each management zone as proposed in Task 4.5.3 – *Define AWQ metrics and determine current protection of beneficial uses*.

Any TAC-recommended adjustments will be implemented to the Baseline Scenario, the water-quality models and associated tools will be modified accordingly, and the next simulation run for Baseline Scenario will be conducted. It is anticipated that three iterative model runs will be necessary to finalize the Baseline Scenario.

The final simulation results of the Baseline Scenario will be evaluated to determine if CV-SNMP implementation measures are potentially necessary in the future to control N/TDS loading to protect the beneficial uses of groundwater in specific management zones.

Figure 4-2 is a chart that conceptually illustrates the evaluation of a hypothetical Baseline Scenario in a hypothetical management zone. These types of charts will be prepared for N/TDS in each management zone over the planning period. Each management zone will be evaluated for:

- The long-term protection of beneficial uses in the management zone.
- The potential need for, and timing of, CV-SNMP implementation measure(s) that may be necessary in the future to protect beneficial uses.

At this stage, the water-quality modeling and evaluation of the Baseline Scenario are considered final, and "buy-in" from Regional Board staff is needed to confirm that:

- The data, assumptions, tools, and methods that were used to develop and evaluate the Baseline Scenario are acceptable.
- The need for implementation measures to control N/TDS loading in specific management zones (if any) have been appropriately identified.

4.7.3 Prepare Task Memorandum

A task memorandum will be prepared to describe the methods, assumptions, results and evaluations of the Baseline Scenario and document the "buy-in" from the Regional Board, as outlined below:

- An administrative draft task memorandum will be prepared and distributed to the TAC for review and comment. Review and comment by Regional Board staff is mandatory.
- A TAC meeting will be held to review the administrative draft memorandum and receive feedback. Attendance by Regional Board staff is mandatory.
- A draft memorandum will be prepared based on the feedback from the TAC. An appendix of comments and responses-to-comments will be included in the draft memorandum. Additional review and comment on the draft memorandum by Regional Board staff is mandatory.
- The CV-SNMP Stakeholder Group will be notified of the availability of the draft memorandum for review and comment.
- A public meeting will be held to review the draft memorandum and receive feedback. Attendance by Regional Board staff is mandatory.
- A final memorandum will be prepared addressing the feedback. An appendix of comments and responses-to-comments will be included in the final memorandum.
- Regional Board staff approval of the final memorandum by letter from the Executive Officer is required before proceeding with Task 4.8.

4.8 Forecast N/TDS Concentrations for CV-SNMP Scenarios

Task 4.8 is necessary if Task 4.7 concludes that CV-SNMP implementation measures are potentially necessary in the future to protect the beneficial uses of groundwater in management zones. If not, then Tasks 4.8 and 4.9 in this workplan are not necessary to execute.

The objective of Task 4.8 is to develop CV-SNMP implementation measures that have the potential to control N/TDS loading and protect beneficial uses of groundwater in the Coachella Valley on a sustainable basis. The CV-SNMP implementation measures will be grouped into logical CV-SNMP Scenarios, evaluated with the water-quality models, and compared to the Baseline Scenario results. The CV-SNMP Scenarios will be evaluated in steps, with the model results of a scenario (or a set of scenarios) informing the preparation of subsequent scenarios. For cost estimating purposes, this workplan assumes an iterative, step-wise process to evaluate up to eight CV-SNMP Scenarios.

The water-quality modeling results for the CV-SNMP Scenarios will:

- Quantify the relative effectiveness of each CV-SNMP Scenario in managing the N/TDS concentrations in each groundwater management zone.
- Support subsequent tasks in this workplan to:
    - Propose final management zone delineations and AWQ metrics. As stated earlier in this workplan, it is possible that understanding potential future water-quality conditions, and the ability for the stakeholders to control future water-quality conditions, will indicate that modifications to management zone delineations and AWQ metrics will better support salt and nutrient management.
    - Recommend TDS objectives pursuant to CWC 13241(c): *Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area*. In other words, the results of this task will describe the water-

quality conditions that could be achieved via the implementation of various CV-SNMP implementation measures.

4.8.1 Evaluate Baseline Scenario Results and Recommend Implementation Measures

In this task, the Baseline Scenario results will be used to develop recommendations for CV-SNMP implementation measures to manage N/TDS loading in the Basin on a sustainable basis. These implementation measures will be formulated into CV-SNMP Scenarios (i.e. one or more projects or programs) with the objective to protect the long-term beneficial uses of groundwater in the management zones.

The Technical Consultant will prepare a task memorandum to describe the recommended CV-SNMP Scenarios, as described below:

- An administrative draft task memorandum will be prepared and distributed to the TAC for review and comment.
- A TAC meeting will be held to review the administrative draft memorandum and receive feedback.
- A draft memorandum will be prepared based on the feedback from the TAC.
- The CV-SNMP Stakeholder Group will be notified of the availability of the draft memorandum for review and comment.
- A public meeting will be held to review the draft memorandum and receive feedback.
- A final memorandum will be prepared addressing the feedback.

4.8.2 Evaluate CV-SNMP Scenarios

In this task, the recommended CV-SNMP Scenarios will be implemented in the models, the model simulations will be conducted, and the model results will be evaluated and compared against the Baseline Scenario for their effectiveness in controlling N/TDS loading and protecting beneficial uses.

The CV-SNMP Scenarios will be evaluated in steps, with the model results of one scenario (or a set of scenarios) informing the preparation of the subsequent scenarios. After each step, the results will be shared with the TAC to receive feedback on the preparation of the subsequent scenarios. This will be an iterative process to evaluate up to eight CV-SNMP Scenarios.

Figure 4-3 and **Figure 4-4** are charts that conceptually illustrate the evaluation of two hypothetical CV-SNMP Scenarios in a hypothetical management zone:

- Hypothetical SNMP Scenario #1 is assumed to include a relatively aggressive and expensive implementation measure to reduce TDS loading. The TDS concentration in the management zone is projected to stabilize at concentrations significantly below the maximum beneficial use threshold over the planning period, and hence, appears to be protective of beneficial uses.
- Hypothetical SNMP Scenario #2 is assumed to include a less aggressive and less expensive implementation measures to reduce TDS loading compared to Hypothetical SNMP Scenario #1. The TDS concentration in the management zone is still projected to stabilize at concentrations below the maximum beneficial use threshold over the planning period, and hence, appears to be

protective of beneficial uses, but at a higher TDS concentration than projected for Hypothetical SNMP Scenario #1.

The types of charts in **Figure 4-3** and **Figure 4-4** will be prepared for N/TDS concentrations for each scenario in each management zone over the planning period. The CV-SNMP Scenarios will be evaluated for:

- The long-term protection of beneficial uses.
- The potential need for, and timing of, other CV-SNMP implementation measure(s) that may be necessary for the long-term protection of beneficial uses in the most cost-efficient manner.

The evaluation of economic considerations between scenarios is performed in Task 4.9.

4.8.3 Prepare Task Memorandum

A task memorandum will be prepared to describe and document the methods, assumptions, and results of the evaluations of the CV-SNMP Scenarios, as described below:

- An administrative draft memorandum will be prepared and distributed to the TAC for review and comment.
- A TAC meeting will be held to review the administrative draft memorandum and receive feedback.
- A draft memorandum will be prepared based on the feedback from the TAC and distributed for review and comment.
- The CV-SNMP Stakeholder Group will be notified of the availability of the draft memorandum for review and comment.
- A public meeting will be held to review the draft memorandum and receive feedback.
- A final memorandum will be prepared addressing the feedback.

4.9 Characterize and Compare the Cost of Baseline and CV-SNMP Scenarios

The objective of this task is to prepare an engineering cost analysis of the Coachella Valley water supply for the Baseline Scenario and the CV-SNMP Scenarios. The cost analysis will provide information required for recommending TDS objectives pursuant to CWC 13241(d): *Economic considerations*.

4.9.1 Develop Cost-Estimating Planning Criteria and a Cost Model

Standard planning criteria will be developed for assumptions related to capital improvement construction and operations and maintenance (O&M) of projects to ensure consistency in estimating costs.

An engineering cost model will be developed for the purposes of estimating the annual melded unit cost of the aggregate water supply[14] in the Coachella Valley over the planning period for the Baseline and the

[14] Aggregate water supply is the cumulative of all water supplies produced and used in the Basin.

CV-SNMP Scenarios. The cost model will breakdown each water purveyor's water-supply plan into individual water-supply sources, and then assign costs for acquiring the water supply, production (energy costs associated with producing the water supply), O&M, treatment, and conveyance over the planning period. Agricultural water users and golf course water users will be analyzed in an aggregate fashion.

If applicable, the cost model will include the costs associated with the effects of potential future increases in groundwater salinity.

A description of the planning criteria and the cost model will be shared with the TAC to receive feedback from the TAC. The planning criteria and cost model will be finalized based on TAC feedback.

4.9.2 Develop Cost Estimates for the Baseline and CV-SNMP Scenarios

The engineering cost model will be applied to the Baseline and CV-SNMP Scenarios to estimate and compare the annual melded unit cost of the aggregate water supply in the Coachella Valley over the planning period. These costs will be summarized into an annual melded unit cost of the aggregate water supply over the planning period and a net-present value cost for each Scenario.

This task will also include a description of the funding mechanisms available to the agencies responsible for CV-SNMP implementation and the cost impacts to those agencies and their rate payers.

4.9.3 Prepare Task Memorandum

A task memorandum will be prepared to describe and document the planning criteria and the methods, assumptions, and results of the cost analyses and cost comparisons, as described below:

- An administrative draft memorandum will be prepared and distributed to the TAC for review and comment.
- A TAC meeting will be held to review the administrative draft memorandum and receive feedback.
- A draft memorandum will be prepared based on the feedback from the TAC and distributed for review and comment.
- The CV-SNMP Stakeholder Group will be notified of the availability of the draft memorandum for review and comment.
- A public meeting will be held to review the draft memorandum and receive feedback.
- A final memorandum will be prepared addressing the feedback.

4.10 Select the Preferred CV-SNMP Scenario, Finalize Management Zones and Beneficial Uses, and Recommend TDS Objectives

The objective of this task is to select a preferred CV-SNMP Scenario, which will form the basis for a CV-SNMP implementation plan and any recommended updates to the Basin Plan, which could include:

- Establishment of management zone delineations and descriptions.
- Groundwater beneficial use descriptions for each management zone.
- Addition of numeric TDS objectives for each management zone.

- Addition of CV-SNMP implementation measures and associated time schedules.

4.10.1 Evaluate All Forecasted Information and Select a Preferred CV-SNMP Scenario

In this task, the results of the Baseline and CV-SNMP Scenarios will be compared and ranked based on the following criteria:

1. The ability of the scenario to protect the beneficial uses over the planning period.
2. The feasibility of implementation.
3. The melded unit cost of the total water supply.
4. The funding mechanisms available to the agencies responsible for CV-SNMP implementation and the cost impacts to those agencies and their rate payers.

At this stage, it is possible that results of the scenarios indicate the need for refinements to the management zone delineations and/or the AWQ metrics that are meant to represent ambient N/TDS concentrations in the management zones. If so, the model results will be re-processed to compute the revised AWQ metrics.

Based on the evaluation and ranking of the Baseline and CV-SNMP Scenarios, the consultant(s) will recommend a preferred CV-SNMP Scenario, including the final management zones, beneficial use designations, and TDS objectives.[15] The evaluation, ranking, and the recommended CV-SNMP Scenario will be shared with the TAC to receive feedback. The TAC will then select the preferred CV-SNMP Scenario.

4.10.2 Recommend TDS Objectives based on CWC 13241

California Water Code (CWC) section 13241 lists the factors to consider when establishing water quality objectives without unreasonably affecting beneficial uses. These factors include:

a) Past, present, and probable future beneficial uses of water.

b) Environmental characteristics of the hydrographic unit under consideration, including the quality of water available thereto.

c) Water quality conditions that could reasonably be achieved through the coordinated control of all factors which affect water quality in the area.

d) Economic considerations.

e) The need for developing housing within the region.

f) The need to develop and use recycled water.

A written demonstration will be prepared, referencing all work performed in prior tasks, to illustrate how the preferred CV-SNMP Scenario and the recommended TDS objectives collectively satisfy the requirements of CWC 13241.

[15] A numeric nitrate-nitrogen objective for groundwater in the Basin is already established in the Basin Plan at 10 mgl.

4.10.3 Document Antidegradation Demonstration Pursuant to State Board Policy 68-16

An antidegradation demonstration will be prepared as required by Section 6.2.4.5 of the 2018 Policy. The objective will be to illustrate how the preferred CV-SNMP Scenario and the recommended N/TDS objectives collectively satisfy the requirements of State Board Resolution 68-16 (the Antidegradation Policy). The key components of an antidegradation demonstration include:

- Identifying the water quality parameters and beneficial uses that will be impacted by the proposed action and the extent of the impact. In this case, the proposed action is the adoption of the CV-SNMP (including implementation of the preferred CV-SNMP Scenario) and the proposed changes to the Basin Plan (e.g. management zones, TDS objectives, and beneficial use designations).
- The scientific rationale for the determination that the proposed action will or will not lower water quality in the impacted receiving waters.
- A discussion of the alternative measures that were considered.
- A socio-economic evaluation.
- The rationale for determining that the proposed action is or is not justified by socio-economic considerations.
- Comparing the potential water-quality outcomes.
- Demonstrating that any water quality degradation allowed by the CV-SNMP provides maximum benefit to the people of California.

Figure 4-5 is a chart that conceptually illustrates the evaluation of a hypothetical preferred SNMP Scenario in a hypothetical management zone. In this example, the TDS concentration objective in the management zone is selected based upon an evaluation of all factors listed in CWC 13241 and a demonstration that the scenario and the recommended TDS objective collectively satisfy the requirements of Antidegradation Policy (see Section 4.10.3 below). These types of charts will be prepared for N/TDS concentrations for each scenario in each management zone over the planning period.

4.10.4 Prepare Task Memorandum

A task memorandum will be prepared to describe: the evaluation and ranking of the Baseline and CV-SNMP Scenarios; the preferred CV-SNMP Scenario; the final management zones, beneficial use designations, and recommended TDS objectives; and how the CV-SNMP and the recommended TDS objectives collectively satisfy the requirements of CWC 13241 and the Antidegradation Policy. "Buy-in" from the Regional Board is mandatory at this stage. The memorandum will be completed as described below:

- An administrative draft task memorandum will be prepared and distributed to the TAC for review and comment. Review and comment by Regional Board staff is mandatory.
- A TAC meeting will be held to review the administrative draft memorandum and receive feedback. Attendance by Regional Board staff is mandatory.
- A draft memorandum will be prepared based on the feedback from the TAC. An appendix of comments and responses-to-comments will be included in the draft memorandum. Additional review and comment on the draft memorandum by Regional Board staff is mandatory.

- The CV-SNMP Stakeholder Group will be notified of the availability of the draft memorandum for review and comment.
- A public meeting will be held to review the draft memorandum and receive feedback. Attendance by Regional Board staff is mandatory.
- A final memorandum will be prepared addressing the feedback. An appendix of comments and responses-to-comments will be included in the final memorandum.
- Regional Board staff approval of the final memorandum by letter from the Executive Officer is required before proceeding with Task 4.11.

4.11 Prepare Final CV-SNMP

The complete findings and recommendations from the work performed to implement this CV-SNMP Development Workplan will be documented in a final plan titled: *Final Coachella Valley Salt and Nutrient Management Plan* (CV-SNMP). The CV-SNMP will be a compilation of the final technical memorandums and interim work products prepared in Tasks 4.1 through 4.10. The CV-SNMP will define the management activities that the CV-SNMP Agencies will implement, including the ongoing monitoring programs, to comply with the N/TDS objectives of the defined groundwater management zones.

The CV-SNMP will include a plan and schedule to implement the preferred CV-SNMP Scenario and perform the monitoring, reporting, and update activities as required by Sections 6.2.4.1.3 and 6.2.6 of the 2018 Policy. The CV-SNMP will address:

- Milestones, triggers, and schedules for implementation of any programs or facilities included in the preferred CV-SNMP Scenario.
- Milestones and schedules for implementing and updating the CV-SNMP Groundwater Monitoring Program. The monitoring program may need to be updated to address new information and data gaps identified in the implementation of this CV-SNMP Development Workplan (or during ongoing monitoring efforts) and to ensure monitoring program is robust enough to assess the impacts of implementing the preferred CV-SNMP Scenario.
- A process for performing the five-year data assessment, which must include an evaluation of:
    - Observed trends in water quality data as compared with trends predicted in the CV-SNMP.
    - The ability of the monitoring network to adequately characterize groundwater quality in the Basin.
    - Potential new data gaps.
    - Groundwater quality impacts predicted in the CV-SNMP based on most recent trends and any relied-upon models, including an evaluation of the ability of the models to simulate groundwater quality.
    - Available assimilative capacity based on observed trends and most recent water quality data.
    - New projects that are reasonably foreseeable at the time of the data assessment but may not have been considered when the CV-SNMP was prepared or last updated.

CV-SNMP Development Workplan

The process to prepare the final CV-SNMP will include the following:

- An administrative draft CV-SNMP will be prepared and distributed to the TAC for review and comment. Review and comment by Regional Board staff is mandatory.
- A TAC meeting will be held to review the administrative draft CV-SNMP and receive feedback. Attendance by Regional Board staff is mandatory.
- A draft CV-SNMP will be prepared based on the feedback from the TAC for additional review and comment. An appendix of comments and responses-to-comments will be included in the draft memorandum. Review and comment on the draft memorandum by Regional Board staff is mandatory.
- The CV-SNMP Stakeholder Group will be notified of the availability of the draft memorandum for review and comment.
- A public meeting will be held to review the draft CV-SNMP and receive feedback. Attendance by Regional Board staff is mandatory.
- The CV-SNMP will be prepared addressing the feedback. An appendix of comments and responses-to-comments will be included in the final memorandum.
- The final CV-SNMP will be submitted to the Regional Board for approval.

Table 4-1. CV-SNMP Development Workplan Compliance with the 2018 Recycled Water Policy	
Recommended and Required Components of SNMPs pursuant to 2018 Recycled Water Policy	**Workplan Section that Complies with the 2018 Policy**
Section 6.2 Development and adoption of salt and nutrient management plans	
6.2.1 The State Water Board encourages collaborative work among salt and nutrient management planning groups, the agricultural community, the regional water boards, Integrated Regional Water Management groups, and groundwater sustainability agencies formed under the Sustainable Groundwater Management Act to achieve the goals of groundwater sustainability, recycled water use, and water quality protection. For basins identified pursuant to 6.1.3, the State Water Board encourages local water suppliers, wastewater treatment agencies, and recycled water producers, together with local salt and nutrient contributing stakeholders, to continue locally driven and controlled, collaborative processes open to all stakeholders and the regional water board that will result in the development of salt and nutrient management plans for groundwater basins and the management of salts and nutrients on a basin-wide basis.	**Section 4.2 -** Establish CV-SNMP Stakeholder Group and Technical Advisory Committee
6.2.4.1. A basin- or subbasin-wide monitoring plan that includes an appropriate network of monitoring locations to provide a reasonable, cost effective means of determining whether the concentrations of salts, nutrients, and other constituents of concern as identified in the salt and nutrient management plans are consistent with applicable water quality objectives. The number, type, and density of monitoring locations to be sampled and other aspects of the monitoring program shall be dependent upon basin-specific conditions and input from the regional water board.	**Section 3 -** CV-SNMP Groundwater Monitoring Program Workplan
6.2.4.2. Water recycling use goals and objectives.	**Section 4.7 -** Construct N/TDS Forecasting Tools and Evaluate the Baseline Scenario
6.2.4.3. Salt and nutrient source identification, basin or subbasin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.	**Section 4.3** - Characterize N/TDS Loading to the Groundwater Basin **Section 4.4** - Characterize Current Groundwater Quality **Section 4.5** - Delineate Draft Management Zones and Describe Metrics to Characterize Beneficial Use Protection **Section 4.7** - Construct N/TDS Forecasting Tools and Evaluate Baseline Scenario
6.2.4.4. Implementation measures to manage or reduce the salt and nutrient loading in the basin on a sustainable basis and the intended outcome of each measure.	**Section 4.8** - Forecast N/TDS for up to Eight CV-SNMP Scenarios
6.2.4.5. An antidegradation analysis demonstrating that the existing projects, reasonably foreseeable future projects, and other sources of loading to the basin included within the plan will, cumulatively, satisfy the requirements of State Water Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality of Waters in California (Antidegradation Policy).	**Section 4.10** - Select the Preferred CV-SNMP Scenario, Finalize Management Zones and Beneficial Uses, and Set TDS Objectives

Figure 4-1. Conceptual Chart to Characterize Beneficial Use Protection in a Management Zone

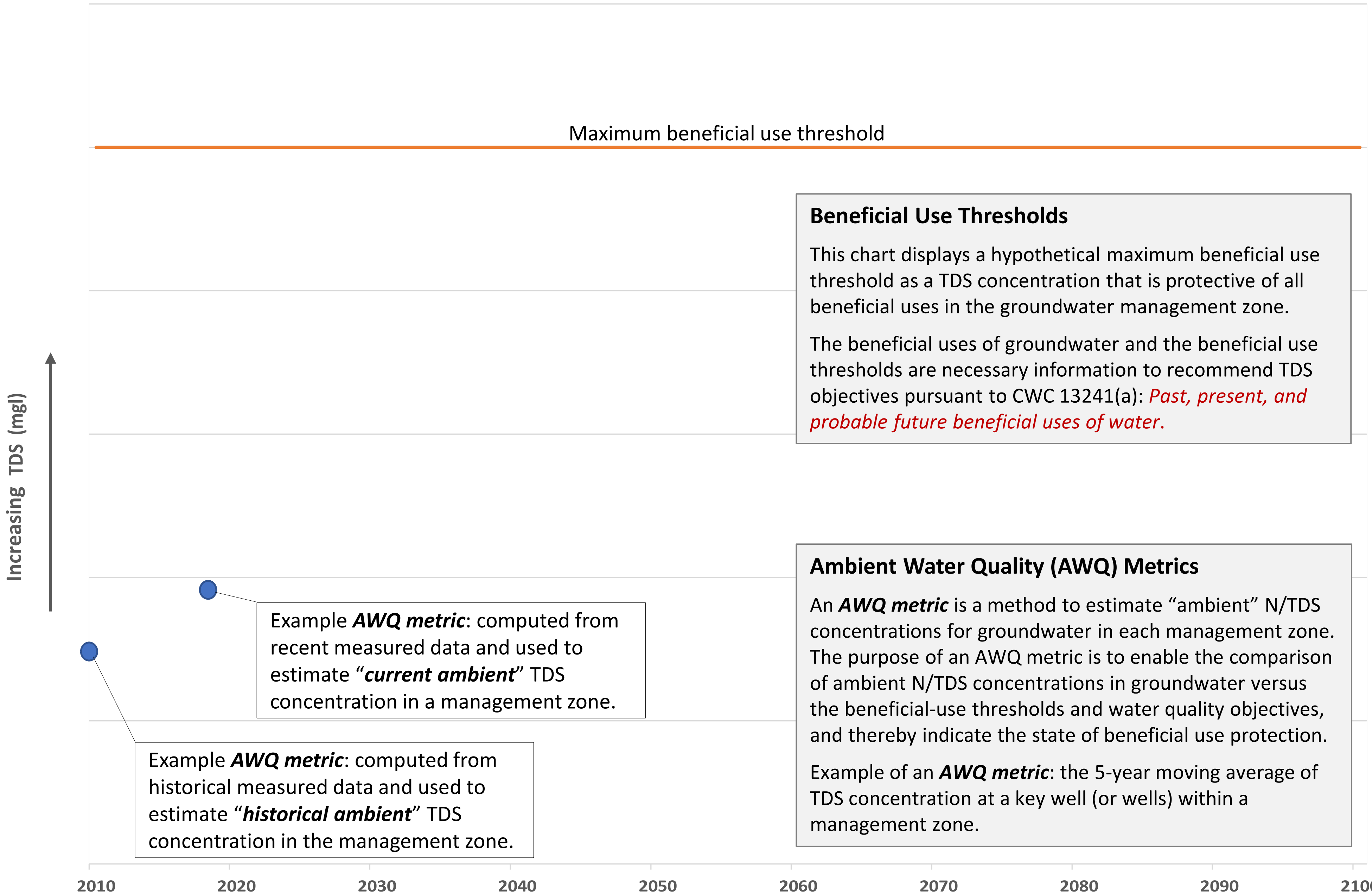


Figure 4-2. Conceptual Evaluation of a Hypothetical Baseline Scenario in a Management Zone

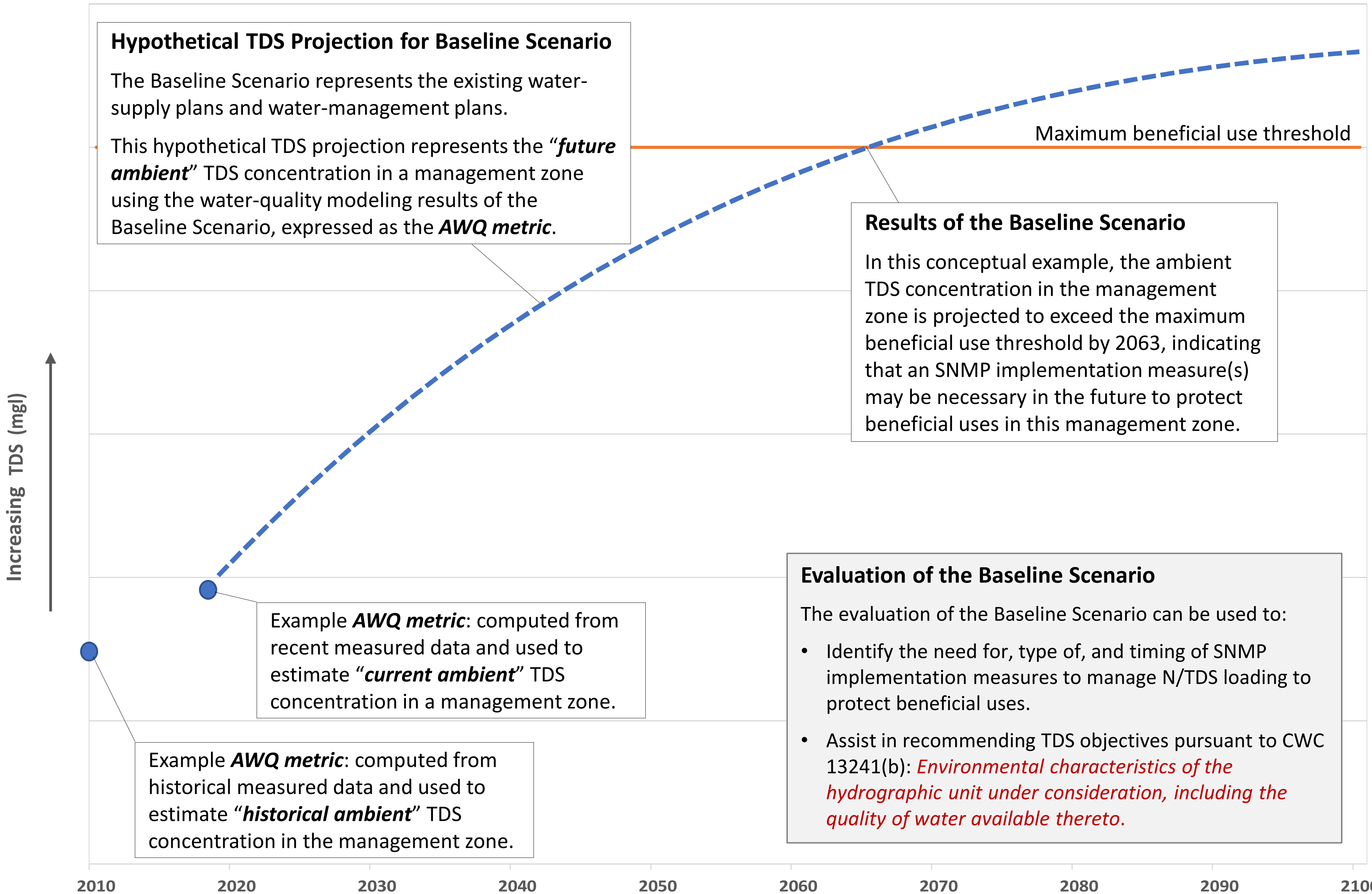


Figure 4-3. Conceptual Evaluation of Hypothetical SNMP Scenario #1 in a Management Zone

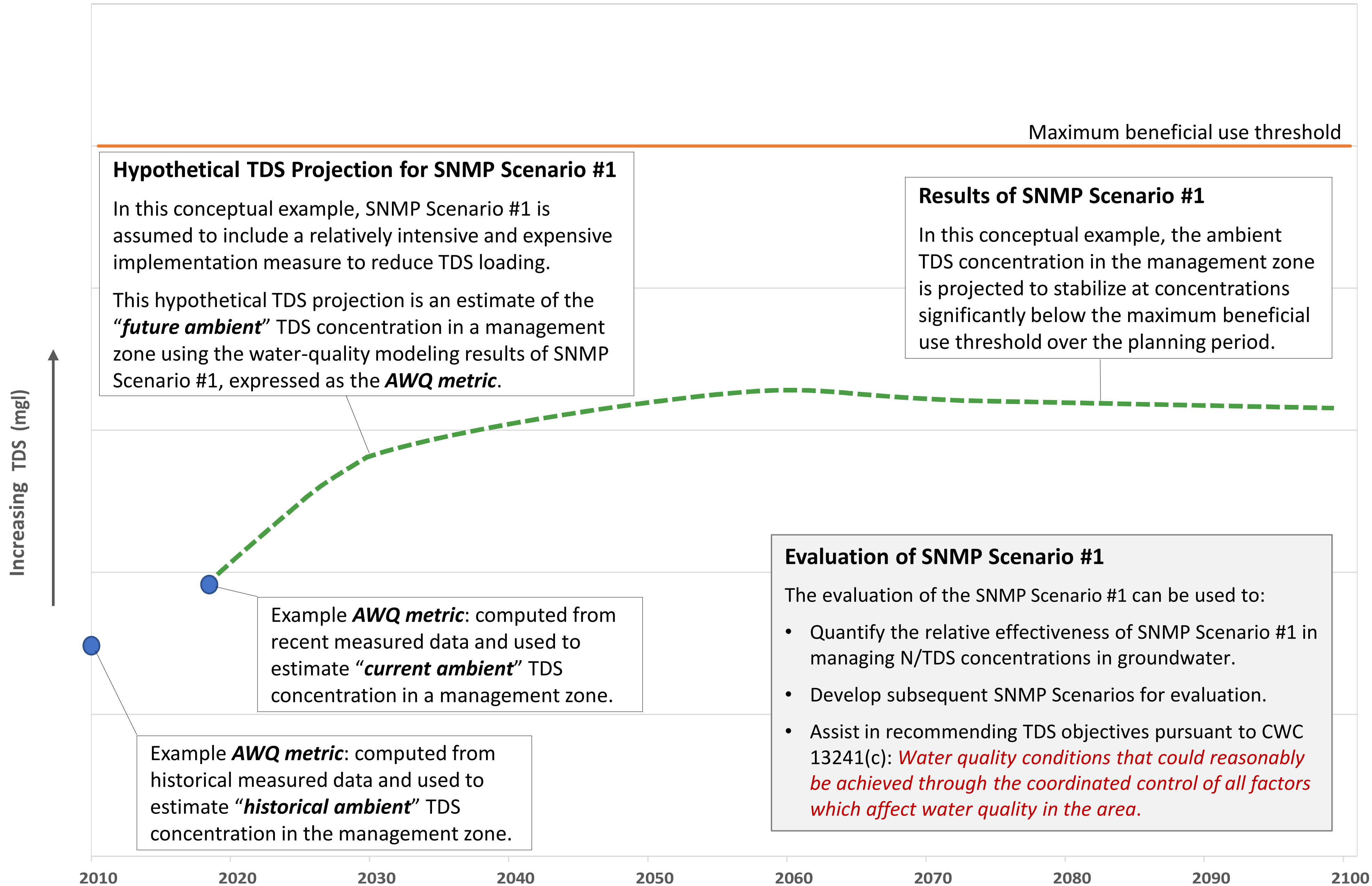


Figure 4-4. Conceptual Evaluation of Hypothetical SNMP Scenario #2 in a Management Zone

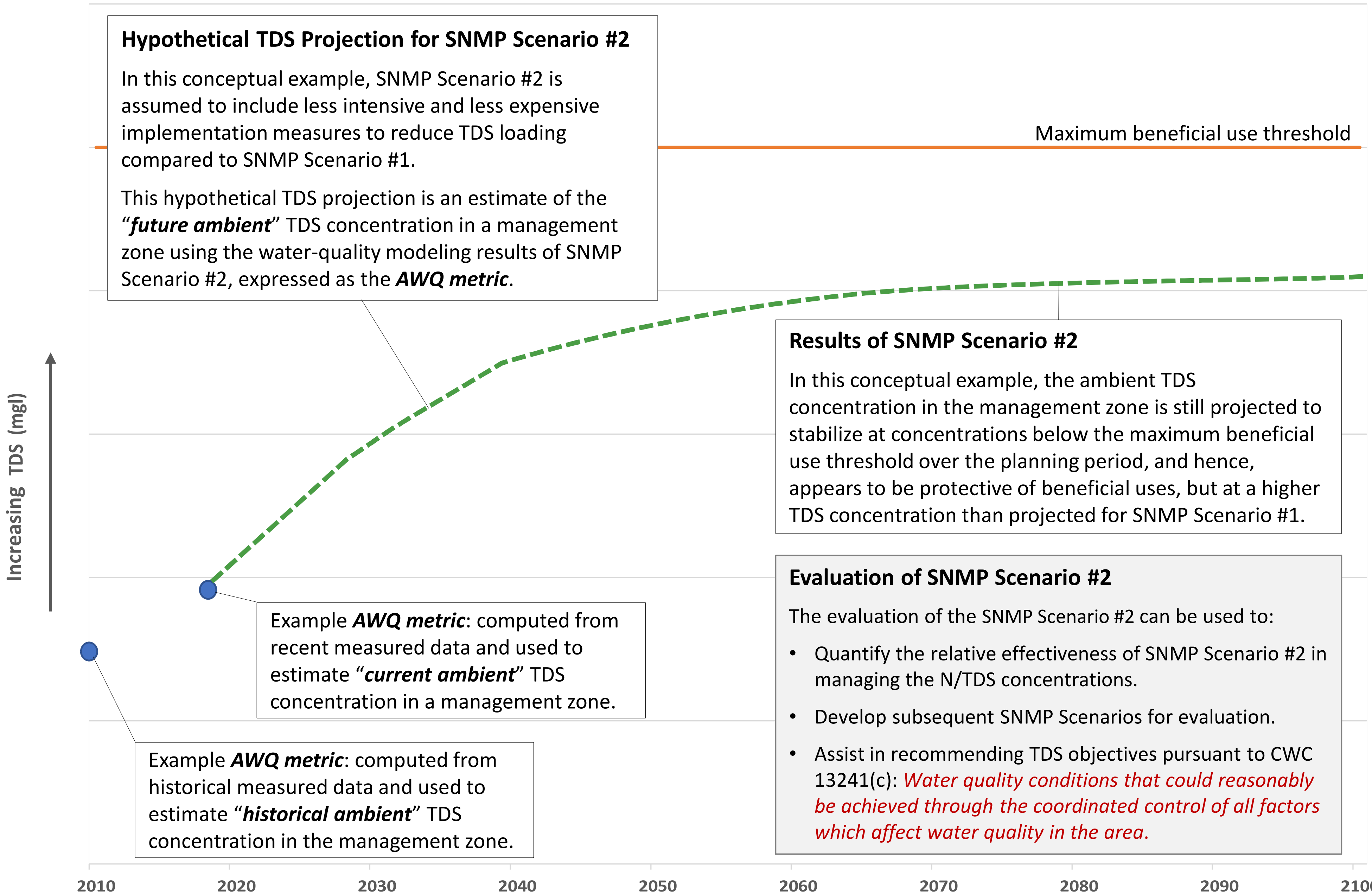
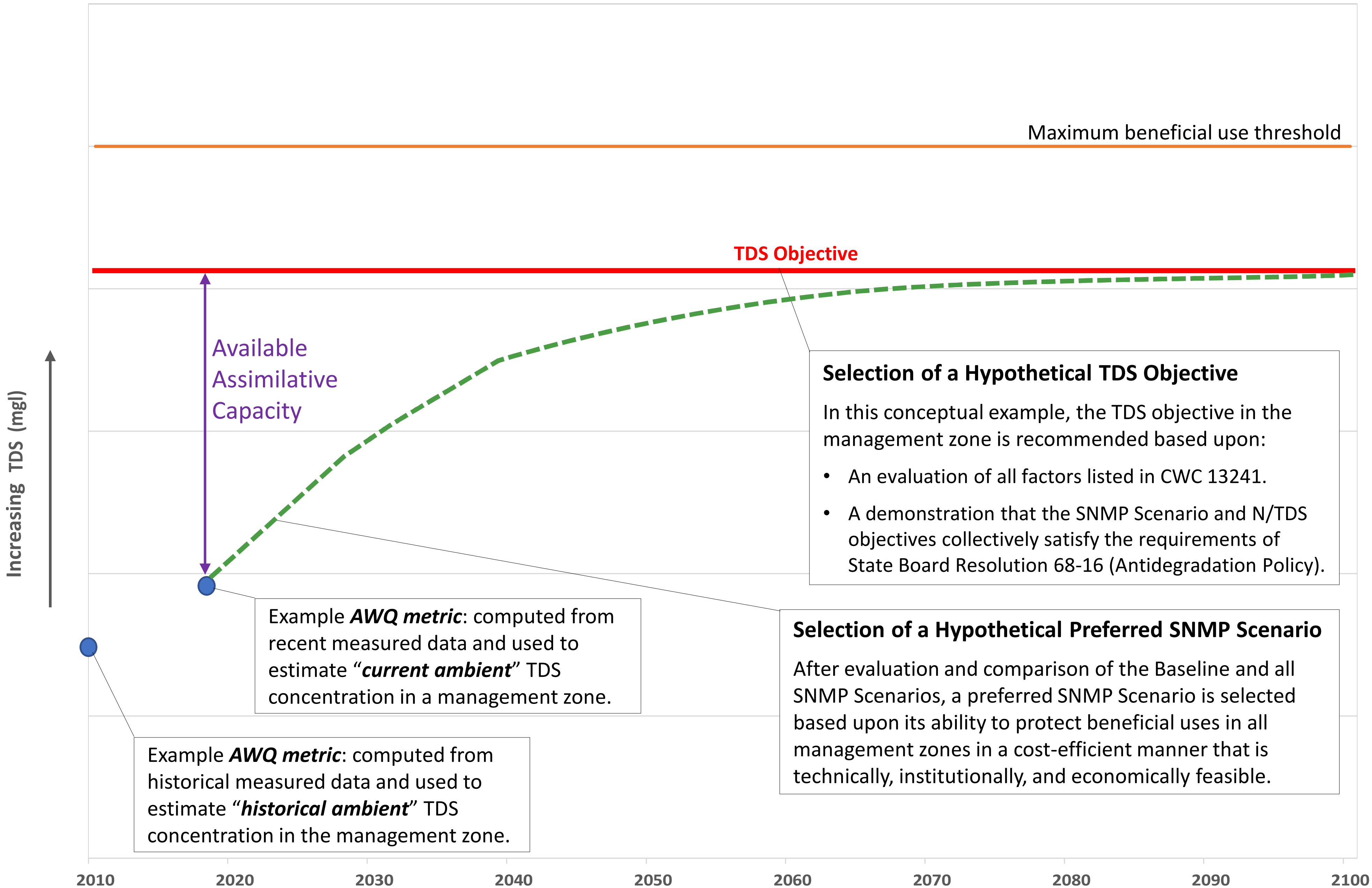


Figure 4-5. Selection of a Hypothetical SNMP Scenario and TDS Objective in a Management Zone



5.0 CV-SNMP DEVELOPMENT WORKPLAN IMPLEMENTATION

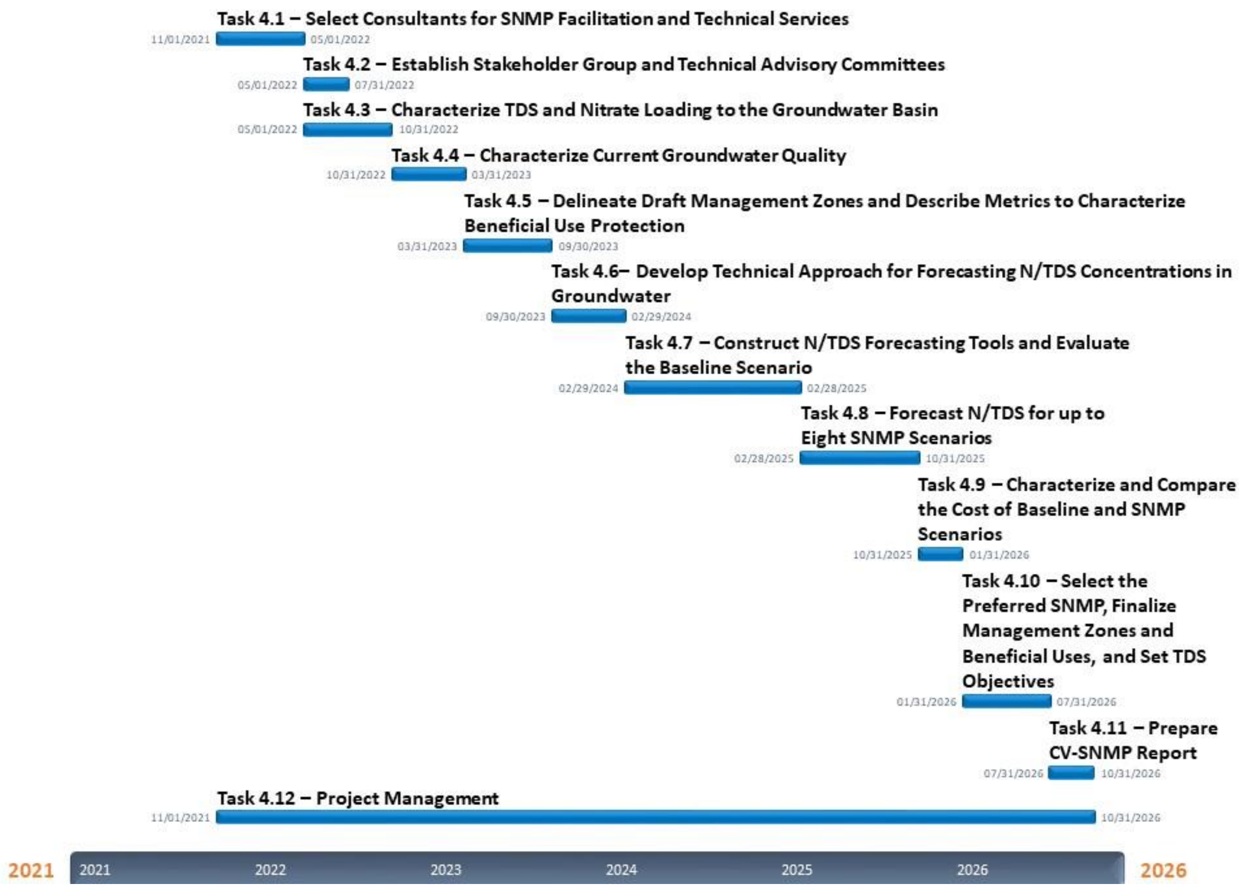
5.1 Schedule

The schedule of activities to implement the CV-SNMP Development Workplan is shown in **Table 5-1** and **Figure 5-1** below. The schedule assumes that Task 4.1 begins on November 1, 2021. The CV-SNMP Agencies are developing a Memorandum of Understanding (MOU) to implement this CV-SNMP Development Workplan.

Table 5-1. CV-SNMP Development Workplan Implementation Schedule

Task	Task Duration	Task Completion Date
Task 4.1 – Select Consultants for CV-SNMP Facilitation and Technical Services	6 months	May 1, 2022
Task 4.2 – Establish CV-SNMP Stakeholder Group and Technical Advisory Committees	3 months	July 31, 2022
Task 4.3 – Characterize N/TDS Loading to the Groundwater Basin	6 months	October 31, 2022
Task 4.4 – Characterize Current Groundwater Quality	5 months	March 31, 2023
Task 4.5 – Delineate Draft Management Zones and Describe Metrics to Characterize Beneficial Use Protection	6 months	September 30, 2023
Task 4.6– Develop Technical Approach for Forecasting N/TDS Concentrations in Groundwater	5 months	February 29, 2024
Task 4.7 –Construct N/TDS Forecasting Tools and Evaluate Baseline Scenario	12 months	February 28, 2025
Task 4.8 – Forecast N/TDS for CV-SNMP Scenarios	8 months	October 31, 2025
Task 4.9 – Characterize and Compare the Cost of Baseline and CV-SNMP Scenarios	3 months	January 31, 2026
Task 4.10 – Select the Preferred CV-SNMP Scenario, Finalize Management Zones and Beneficial Uses, and Recommend TDS Objectives	6 months	July 30, 2026
Task 4.11 – Prepare Final CV-SNMP	3 months	October 30, 2026
Task 4.12 – Project Management	Throughout	

Figure 5-1. Implementation of the CV-SNMP Development Workplan



5.2 Progress Reporting to the Regional Board

To keep the Regional Board informed of progress and future activities during implementation of the CV-SNMP Development Workplan, the CV-SNMP Agencies will add a section to the annual progress report that will be submitted to the Regional Board for the Groundwater Monitoring Program Workplan. The annual progress report will be retitled: *Annual Progress Report on Implementation of the CV-SNMP Groundwater Monitoring Program and CV-SNMP Development Workplan.* It will be submitted to the Regional Board by March 31 of each year of implementation. The first annual progress report will be due by March 31, 2022 to report progress achieved during calendar year 2021.

5.3 Cost Estimates

This section summarizes the total costs to implement the CV-SNMP Development Workplan as described in Section 4 and to implement the CV-SNMP Groundwater Monitoring Program Workplan as described in Section 3.

Total Costs to implement the CV-SNMP Development Workplan. **Table 5-2** below summarizes the cost estimates by major task for the implementation of the CV-SNMP Development Workplan (excluding the costs to implement the CV-SNMP Groundwater Monitoring Program). The costs in **Table 5-2** are first-order estimates for work performed by the consultant(s) and are based on the 2021 rates for West Yost

Associates. Total costs to prepare the final CV-SNMP are estimated to be about $2,870,000, which does not include the costs associated with CV-SNMP Agency staff efforts.

Table 5-2. Cost Estimates to Implement the CV-SNMP Development Workplan

Task	Cost
Task 4.1 – Select Consultants for CV-SNMP Facilitation and Technical Services	$0
Task 4.2 – Establish CV-SNMP Stakeholder Group and Technical Advisory Committees	$25,000
Task 4.3 – Characterize N/TDS Loading to the Groundwater Basin	$150,000
Task 4.4 – Characterize Current Groundwater Quality	$150,000
Task 4.5 – Delineate Draft Management Zones and Describe Metrics to Characterize Beneficial Use Protection	$200,000
Task 4.6 – Develop Technical Approach for Forecasting N/TDS Concentrations in Groundwater	$130,000
Task 4.7 – Construct N/TDS Forecasting Tools and Evaluate Baseline Scenario	$850,000
Task 4.8 – Forecast N/TDS for up to Eight CV-SNMP Scenarios	$500,000
Task 4.9 – Characterize and Compare the Cost of Baseline and CV-SNMP Scenarios	$200,000
Task 4.10 – Select the Preferred CV-SNMP Scenario, Finalize Management Zones and Beneficial Uses, and Recommend TDS Objectives	$200,000
Task 4.11 – Prepare Final CV-SNMP	$75,000
Task 4.12 – Project Management	$80,000
Task 5.2 – Progress Reporting to the Regional Board	$50,000
Contingency (10%)	$260,000
Total	**$2,870,000**

Total Costs to implement the CV-SNMP Groundwater Monitoring Program Workplan. **Table 5-3** summarizes the cost estimates by task and subtask for the first six-year period of monitoring program implementation. Total costs for the first six-year period of monitoring program implementation are estimated to be about $4,100,000 (including a contingency of 25%). Total costs are likely to be higher because these estimates do not include land acquisition, site improvement costs for new monitoring well sites, or CV-SNMP Agency staff efforts.

Table 5-3. Cost Estimates to Implement the CV-SNMP Groundwater Monitoring Program

Task	Cost by Sub-Task	Cost by Task
Task 1 – Sampling and Analysis of Private Wells		*$260,175*
Perform field canvass of private wells; develop access agreements	$21,001	
Development/execution of private well access agreements	$79,924	
Devise and construct and wellhead improvements to enable sample collection	$103,733	
Perform two sampling and laboratory analysis events over the five-year period	$55,518	
Task 2 – Filling of Gaps in the Monitoring Network		*$2,858,957*

Table 5-3. Cost Estimates to Implement the CV-SNMP Groundwater Monitoring Program

Task	Cost by Sub-Task	Cost by Task
Perform field work and research; prepare plan to fill gaps in monitoring network	$53,776	
Prepare well-siting study to identify 23 well sites	$50,828	
Prepare technical specifications for of two monitoring well types	$32,378	
Acquire well sites and/or execute lease agreements	$14,996	
Conducting a bid process to select a well drilling/construction subcontractor	$6,172	
Obtain permits and CEQA clearance	$27,899	
Drill, construct, and develop six wells in the Perched aquifer system	$231,144	
Drill, construct, and develop 16 wells in the Shallow aquifer system	$1,999,104	
Drill, construct, and develop one deep monitoring well	$216,294	
Prepare well completion reports for 23 new monitoring wells/file with DWR	$226,366	
Task 3 - Preparing Annual Progress Reports to the Regional Board		*$139,800*
Subtotal		*$3,258,932*
Contingency (25%)		*$814,733*
Total		**$4,073,665**

Appendix A

Groundwater Monitoring Program Workplan

Coachella Valley Salt and Nutrient Management Plan Update

(Approved by Regional Board on February 21, 2021)

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FINAL REPORT | DECEMBER 23, 2020

Groundwater Monitoring Program Workplan
Coachella Valley Salt and Nutrient Management Plan Update

PREPARED FOR

The Coachella Valley SNMP Agencies

PREPARED BY

West Yost
Water. Engineered.

Groundwater Monitoring Program Workplan
Coachella Valley Salt and Nutrient Management Plan Update

Prepared for

The Coachella Valley SNMP Agencies

Project No. 943-80-20-01

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12/23/2020

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WEST YOST
Water. Engineered.

FINAL REPORT | DECEMBER 23, 2020

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LIST OF ACRONYMS AND ABBREVIATIONS

CPS	City of Palm Springs
CV-SNMP	Salt and Nutrient Management Plan for the Coachella Valley Groundwater Basin
CVSC	Coachella Valley Stormwater Channel
CVWD	Coachella Valley Water District
CWA/CSD	Coachella Water Authority and Coachella Sanitary District
DWA	Desert Water Agency
DWR	California Department of Water Resources
ft-bgs	Feet below ground surface
IWA	Indio Water Authority
GAMA	Groundwater Ambient Monitoring & Assessment
MC-GRF	Mission Creek Groundwater Replenishment System
MDMWC	Myoma Dunes Mutual Water Company
MOU	Memorandum of Understanding
MSWD	Mission Springs Water District
PD-GRF	Palm Desert Groundwater Replenishment Facility
POTW	Publicly Owned Treatment Works
TDS	Total Dissolved Solids
TEL-GRF	Thomas E. Levy Groundwater Replenishment Facility
USGS	United States Geological Survey
VSD	Valley Sanitary District
WRP	Water Reclamation Plant
WW-GRF	White Water Groundwater Replenishment Facility

1.0 BACKGROUND AND OBJECTIVES

The Salt and Nutrient Management Plan for the Coachella Valley Groundwater Basin (CV-SNMP) must include a monitoring and reporting program pursuant to Section 6.2.4.1 of the 2018 Recycled Water Policy (Policy):

> 6.2.4.1. A basin- or subbasin-wide monitoring plan that includes an appropriate network of monitoring locations to provide a reasonable, cost effective means of determining whether the concentrations of salts, nutrients, and other constituents of concern as identified in the salt and nutrient management plans are consistent with applicable water quality objectives. The number, type, and density of monitoring locations to be sampled and other aspects of the monitoring program shall be dependent upon basin-specific conditions and input from the regional water board. Salts, nutrients, and the constituents identified in 6.2.1.1 shall be monitored. The frequency of monitoring shall be proposed in the salt and nutrient management plan for review by the regional water board pursuant to 6.2.3.
>
>> 6.2.4.1.1. The monitoring plan must be designed to effectively evaluate water quality in the basin. The monitoring plan must focus on water supply wells, areas proximate to large water recycling projects, particularly groundwater recharge projects, and other potential sources of salt and nutrients identified in the salt and nutrient management plan. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.
>>
>> 6.2.4.1.2. The monitoring plan may include water quality data from existing wells where the wells are located and screened appropriately to determine water quality throughout the most critical areas of the basin. The State Water Board supports monitoring approaches that leverage the use of groundwater monitoring wells from other regulatory programs, such as the Irrigated Lands Regulatory Program and the Sustainable Groundwater Management Act.
>>
>> 6.2.4.1.3. The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. Where applicable, the regional water board will assist by encouraging other dischargers in the basin or subbasin to participate in the monitoring program. The data shall be electronically reported annually in a format that is compatible with a Groundwater Ambient Monitoring & Assessment (GAMA) information system and must be integrated into the GAMA information system or its successor.

In its evaluation of the 2015 CV-SNMP, the Colorado River Basin Regional Water Quality Control Board (Regional Board) perceived insufficiencies in the proposed monitoring program, including: (i) a lack of data necessary to characterize groundwater quality in all areas and sub-areas of the basin; (ii) a lack of data in critical areas of salt loading (e.g., water recycling and recharge projects); and (iii) it did not propose a plan/timeline to fill the data gaps (Regional Board letter; February 19, 2020). Hence, the Regional Board is requiring the CV-SNMP stakeholders (CV-SNMP Agencies) to prepare a revised Groundwater Monitoring Program Workplan (Workplan) for the Coachella Valley Groundwater Basin (Basin) by December 2020 (Regional Board letter; April 27, 2020).

The CV-SNMP Agencies include: Coachella Valley Water District (CVWD); Coachella Water Authority and Coachella Sanitary District (CWA/CSD); Desert Water Agency (DWA); Indio Water Authority (IWA); Myoma Dunes Mutual Water Company (MDMWC); Valley Sanitary District (VSD); Mission Springs Water District (MSWD); and City of Palm Springs (CPS).

To achieve the requirements of the Policy and address the concerns of the Regional Board, this Workplan describes the following:

1. The physical setting of the Coachella Valley which includes the basic hydrology and hydrogeology of the Basin and its subbasins. The physical understanding of how the groundwater basin functions is necessary to select a monitoring network that is capable of characterizing groundwater quality in all areas and subareas of the Basin, both spatially and vertically.
2. An initial sampling network, including the locations planned for sampling, justifications for the sampling locations, well construction details, and the SNMP Agencies responsible for conducting monitoring at each site.
3. The existing spatial and vertical gaps in the monitoring network, why the gaps were identified, and how the gaps will be filled.
4. A proposed plan to implement the monitoring program.

2.0 HYDROGEOLOGIC CONCEPTUAL MODEL OF THE BASIN

This section summarizes the physical characteristics and dynamics of the Basin regarding surface water, groundwater, and the origin, fate and transport of salts and nutrients within the Basin. Understanding the physical characteristics and dynamics of the Basin provides the foundation for selecting a monitoring network that will meet the objectives of the Policy.

This section was prepared from a review of past technical studies and reports; no original work or analyses were performed for this section of the workplan.

2.1 Basin Setting

Figure 2-1 is a map that shows the Basin as delineated by the California Department of Water Resources (DWR Groundwater Basin No. 7-021, excluding the San Gorgonio Pass Subbasin), which represents the area subject to the CV-SNMP. The Basin is located within the northwest portion of the Salton Sea Watershed (USGS Hydrologic Unit 18100200).

Figure 2-1 shows the surface geology as generalized into natural divisions with regard to groundwater:

> **Unconsolidated water-bearing sediments**. These are the pervious formations that comprise the Basin.
>
> **Bedrock formations**. These are the semi-consolidated sediments and the consolidated bedrock formations that come to the surface in the hills and mountains that surround and bound the Basin. The permeability of the bedrock formations is much less than the water-bearing sediments.

The upper 2,000 ft of the unconsolidated water-bearing sediments constitute the freshwater aquifer system that is the main source of groundwater supply in the region. The sediments tend to be finer-grained in the southeastern portions of the Basin due to the greater distance from the mountainous source areas and the lower-energy depositional environments, such as historical Lake Cahuilla.

The Whitewater River is the major drainage course in the Basin. The Whitewater River is an unlined channel, so surface water flows have the potential to infiltrate and recharge the Basin. In areas with shallow groundwater, the groundwater has the potential to discharge to interconnected surface water.

2.2 Hydrogeology

2.2.1 Subbasins and Subareas

Figure 2-2 is a map of the general hydrogeology of the area. The Basin is cross-cut by several geologic faults, which have created low-permeability zones within the water-bearing sediments that act as barriers to groundwater flow. These barriers impede, but do not eliminate, groundwater flow between subbasins. Groundwater flow can still occur across the barriers from areas of higher groundwater levels to areas of lower groundwater levels. The map identifies the locations of faults, subbasins, and subareas that comprise the Basin, and describes the general occurrence and movement of groundwater through the Basin.

The DWR has defined three main subbasins within the study area that are separated by geologic faults or changes in formation permeability that limit and control the movement of groundwater: the Indio Subbasin (DWR Subbasin 7-021.01), the Mission Creek Subbasin (7-021.02), and the Desert Hot Springs Subbasin (7-021.03).[1] These subbasins have been further subdivided into subareas based on one or more of the following geologic or hydrogeologic characteristics: type(s) of water-bearing formations, water quality, areas of confined groundwater, forebay areas, and groundwater or surface drainage divides.

Figure 2-2 shows groundwater-elevation contours for water-year 2019 (October 1, 2018 through September 30, 2019). Lateral groundwater flow is generally perpendicular to the contours from higher to lower elevation, as indicated by the arrows on the map. Generally, groundwater flows from areas of natural recharge along the surrounding mountain-fronts toward the valley floor and then southeast toward the distal portions of the Basin near the Salton Sea. Locally, the structural and compositional features within the Basin result in groundwater conditions and flow directions that vary significantly between subbasins. Anthropogenic activities such as artificial recharge and groundwater pumping also influence groundwater-flow directions.

2.2.2 Occurrence and Movement of Groundwater

Described below is the general occurrence of groundwater, and how groundwater flows through and discharges from each subbasin:

Desert Hot Springs Subbasin. In the Desert Hot Springs Subbasin, groundwater typically flows from the Little San Bernardino Mountains to the southeast, but is locally variable due to faulting. The aquifer system is poorly understood due to relatively poor water quality, which has limited the development of groundwater resources in the area. Faulting in the northern portion of the subbasin has resulted in thermal mineral waters in the aquifer with temperatures up to 250 degrees Fahrenheit. These thermal waters are used by several spas in the area. Groundwater discharge primarily occurs by pumping at wells or subsurface outflow. Generally, groundwater elevations in the Desert Hot Springs Subbasin are higher than in the Mission Creek and Indio Subbasins, and hence, the subsurface outflow from the Desert Hot Springs Subbasin occurs across the Mission Creek Fault into these downgradient subbasins. These subsurface flows are thought to be relatively minor based on the differences in groundwater quality on either side of the fault barriers that separate the subbasins.

Mission Creek Subbasin. In the Mission Creek Subbasin, groundwater typically flows from northwest to southeast. The aquifer system is up to 2,000 feet thick and is predominantly unconfined. Portions of the aquifer along the Banning Fault northwest of the Seven Palms Ridge area are semi-confined as evidenced by historically flowing-artesian wells in the area. Depth to groundwater in the Mission Creek Subbasin in 2019 ranged from an estimated 600 feet-bgs (ft-bgs) upgradient of the Mission Creek Groundwater Replenishment Facility (MC-GRF) to less than 5 feet-bgs in the southeast (west of the Indio Hills). Groundwater discharge primarily occurs by pumping at wells or subsurface flow across the Banning Fault into the Indio Subbasin.

Indio Subbasin. The Indio Subbasin is bordered on the southwest by the crystalline bedrock of the Santa Rosa and San Jacinto Mountains. It is separated from the Mission Creek Subbasin by the Banning Fault, and from the Desert Hot Springs Subbasin by the San Andreas Fault. Both faults are barriers to

[1] The DWR defines the San Gorgonio Pass Subbasin (7-021.04) as part the Basin, but it is not included in the CV-SNMP.

groundwater flow as evidenced by differences in groundwater levels across the faults. For example, groundwater-level differences across the Banning Fault, between the Mission Creek Subbasin and the Indio Subbasin, can be up to 250 feet. Subsurface flow between subbasins primarily occurs from the Desert Hot Springs and Mission Creek subbasins into the Indio subbasin.

In the Indio Subbasin, the aquifer system is generally unconfined in the forebay areas and across the northwestern portion of the subbasin. Generally, groundwater flows from the northwest toward the southeastern distal portions of the subbasin near the Salton Sea. In the southeast portion of the Indio Subbasin, the predominance of fine-grained sediments at depth has created three distinct aquifer systems, which are shown graphically in **Figure 2-3** and are described below:

> ***Perched***. A semi-perched aquifer up to 100 feet thick that is persistent across much of the area southeast of the City of Indio. The fine-grain units that cause the perched conditions are likely a barrier to deep percolation of surface water. The extent of the semi-perched aquifer is shown on **Figure 2-2**. Shallow groundwater within the semi-perched aquifer is conveyed away from the root zone by a network of privately-owned subsurface tile drainage systems that are distributed across the agricultural land uses in the southeastern portion of the Basin. CVWD maintains a regional network of surface and subsurface drains, shown on **Figure 2-4**, that accumulate and convey the drainage waters from the agricultural lands to the Salton Sea.
>
> ***Shallow***. An upper aquifer up to 300 feet thick that is present across most of the area. The upper aquifer is unconfined except in the areas of the semi-perched aquifer where it is semi-confined.
>
> ***Deep***. A lower aquifer that is 500-2,000 feet thick and is the most productive portion of the Basin. In the southeast portion of the Basin, the lower aquifer is confined and is separated from the upper aquifer by a fine-grained aquitard unit that is 100-200 feet thick. Figure **2-2** displays the extent of the aquitard unit.

Groundwater discharge primarily occurs by pumping at wells, shallow groundwater discharge to subsurface tile drainage systems on agricultural lands that ultimately discharge to the Salton Sea, and subsurface outflow to groundwater underlying the Salton Sea.

2.3 Origin, Fate and Transport of Salts and Nutrients

Figure 2-4 is a map that depicts the general areas and processes of salt and nutrient loading, transport, and discharge throughout the Basin.

2.3.1 Salt and Nutrient Loading

Salts, and in some cases nutrients, are loaded to the Basin via the following mechanisms:

- Subsurface inflow from saturated sediments and bedrock fractures in the surrounding mountains and hills and from upgradient groundwater subbasins.
- Recharge of precipitation runoff in unlined stream channels that cross the Basin.
- Artificial recharge of imported Colorado River Water at the Groundwater Replenishment Facilities (GRF).
- Percolation of treated wastewater discharge to unlined ponds.

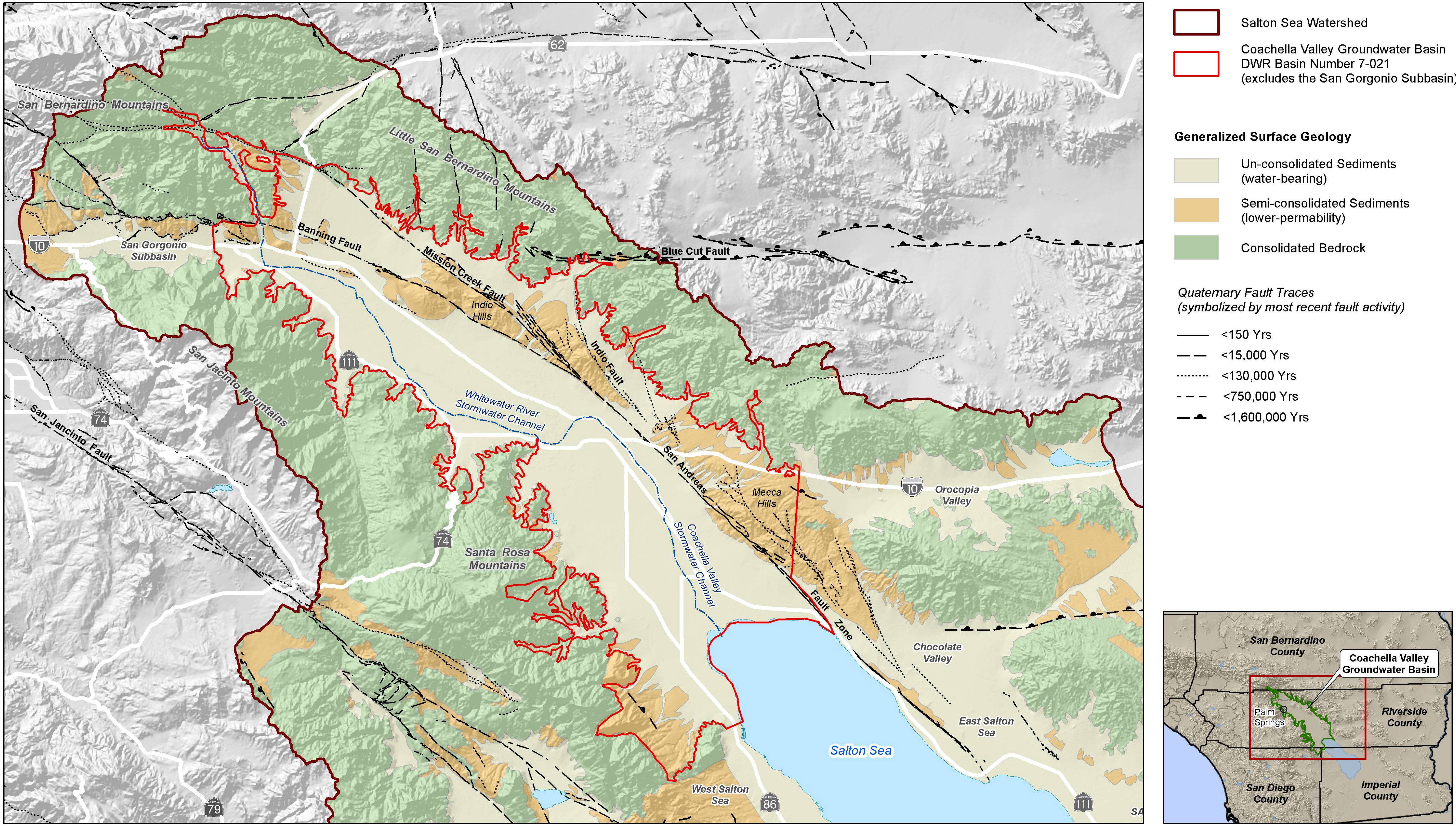
- Seepage from septic systems.
- Return flows from precipitation and irrigation waters applied to the overlying land uses (e.g., agriculture, golf courses, etc.). Loading from return flows is a complex process that is influenced by:
  - The combination of precipitation and irrigation waters that ultimately result in the return flows (and their associated TDS and nitrate concentrations) that migrate past the root zone.
  - During the downward migration of return flows through the unsaturated (vadose) zone, the TDS and nitrate concentrations of the return flows can be influenced by past TDS and nitrate loading to the vadose zone by historical overlying land uses.

Figure 2-4 shows the spatial distribution and location of these sources of salt and nutrient loading across the Basin.

2.3.2 Transport and Discharge of Salts and Nutrients

Once within the saturated zone, the dissolved salts and nutrients are transported through the aquifer system via the groundwater-flow systems shown on **Figure 2-2** and **Figure 2-4**. Ultimately, salts and nutrients are discharged from the Basin via the following mechanisms:

- Groundwater pumping.
- Discharge to agricultural drains. As described above, throughout the lower Basin, CVWD maintains a network of surface and subsurface drains to convey shallow groundwater away from the crop root zones. These drains convey water to the Coachella Valley Stormwater Channel (CVSC) and 26 smaller open channel drains that discharge directly to the Salton Sea.
- Subsurface outflow to downgradient subbasins. In the Indio Subbasin, subsurface outflow occurs to groundwater beneath the Salton Sea.
- Phreatophyte consumptive use.



Salton Sea Watershed

Coachella Valley Groundwater Basin
DWR Basin Number 7-021
(excludes the San Gorgonio Subbasin)

Generalized Surface Geology

Un-consolidated Sediments (water-bearing)

Semi-consolidated Sediments (lower-permability)

Consolidated Bedrock

Quaternary Fault Traces
(symbolized by most recent fault activity)

- <150 Yrs
- <15,000 Yrs
- <130,000 Yrs
- <750,000 Yrs
- <1,600,000 Yrs

0 5 10 15 20 Miles

0 10 20 30 KM

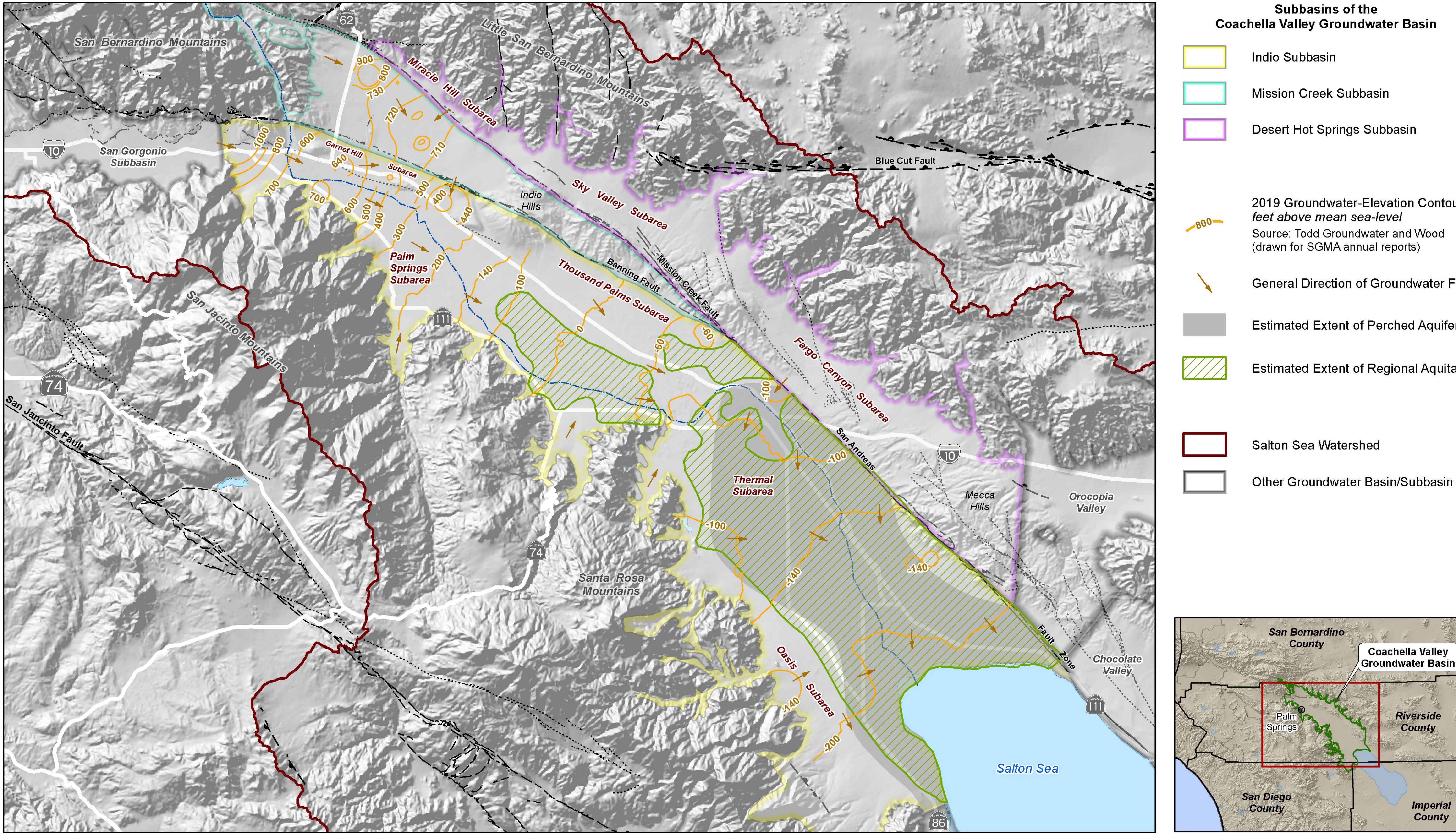
WEST YOST

Author: EM/AM
Date: 12/22/2020
File: Figure 2-1.mxd

Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Basin Setting

Figure 2-1



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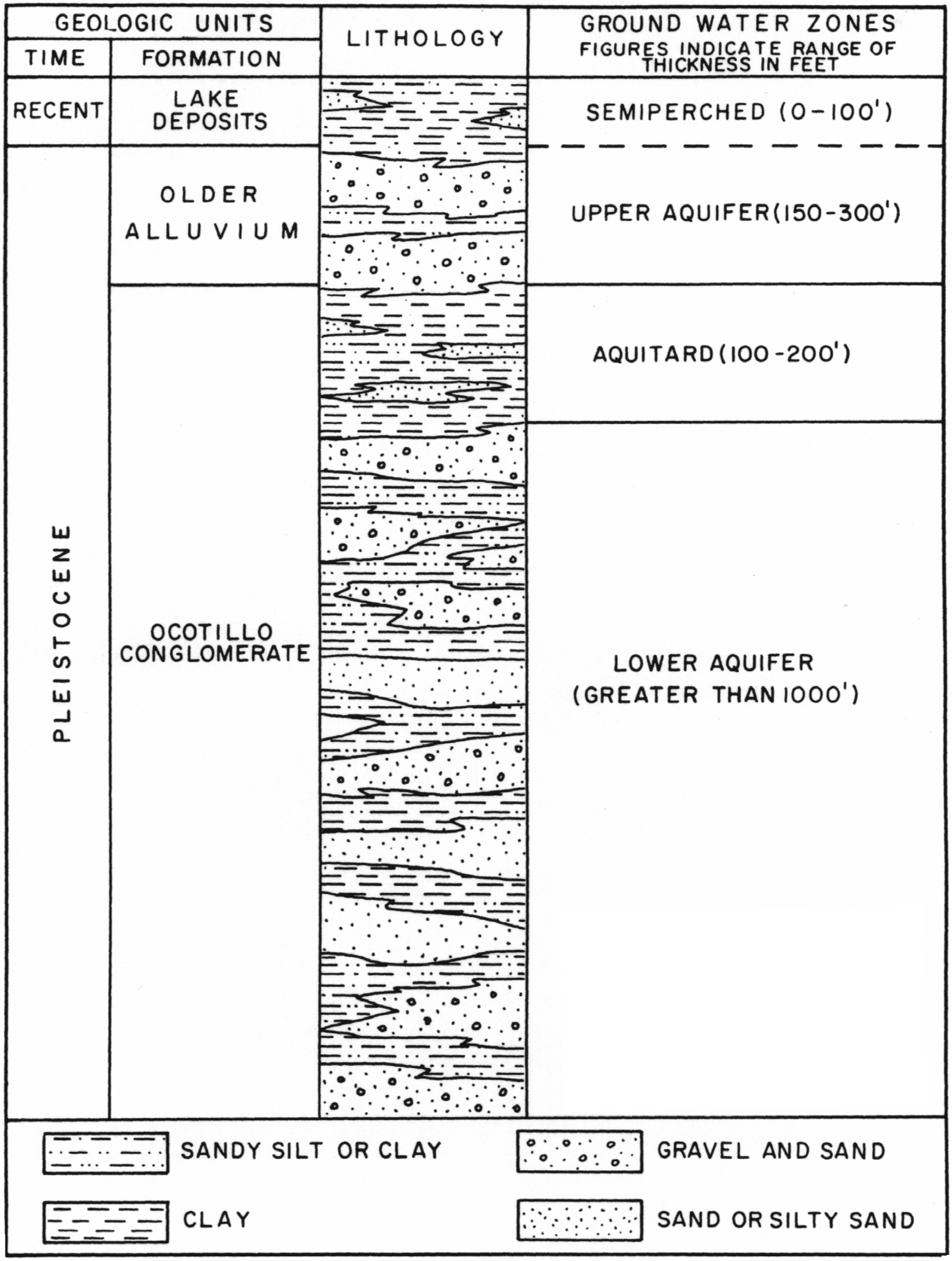
Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Hydrogeologic Map

Figure 2-2

Figure 2-3
Generalized Stratigraphic Column in Lower Coachella Valley



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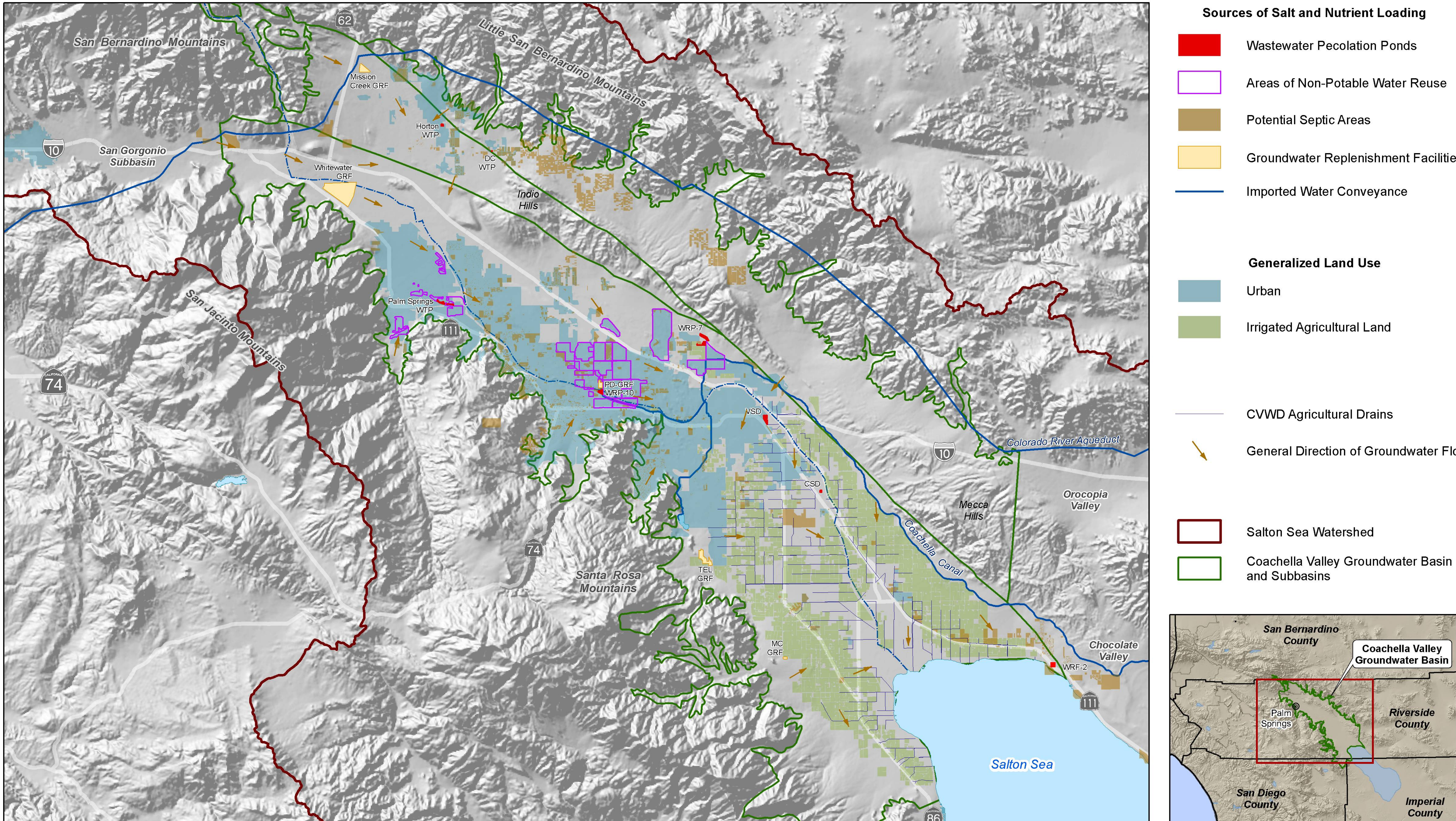

WEST YOST

Author: EM/AM
Date: 12/22/2020
File: Figure 2-4.mxd

0 5 10 Miles
0 10 20 KM

Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Salt and Nutrient Loading, Transport, and Discharge

Figure 2-4

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3.0 GROUNDWATER MONITORING PROGRAM

The Groundwater Monitoring Program for the CV-SNMP consists of the following components, each further described below:

- Groundwater Monitoring Network
- Chemical Analytes and Sampling Frequency
- Monitoring and Reporting

3.1 Groundwater Monitoring Network

Section 6.2.4.1 of the Policy requires the implementation of a monitoring program that can determine whether the concentrations of salts and nutrients in groundwater are consistent with water quality objectives and are thereby protective of beneficial uses. The Policy also recognizes the monitoring program will be dependent upon basin-specific conditions and input from the Regional Board.

For the CV-SNMP Groundwater Monitoring Program, the Regional Board is requiring that the monitoring program:

- *Cover all subbasins and subareas within the Basin*. The updated SNMP will require periodic mapping of groundwater quality to estimate ambient water quality and assimilative capacity. A monitoring network that is spatially distributed across all subbasins and subareas of the Basin will provide the necessary data for technically defensible mapping of groundwater quality.
- *Include sampling from all three major aquifer systems: Deep, Shallow, and Perched*. Section 2 of this Workplan described the hydrogeologic stratification of the aquifer system in the Basin. Groundwater quality, and the physical processes that can alter groundwater quality over time, can be significantly different between aquifer systems. This is because: (i) anthropogenic loading of salts and nutrients occur primarily at the ground surface, and hence, can influence the quality of shallower groundwaters first before influencing the quality of deeper groundwaters; (ii) thick aquitards in the southeastern portion of the Basin restrict the vertical movement of groundwater between aquifer systems; and (iii) upward hydraulic gradients, as evidenced by flowing artesian conditions in the southeastern portion of the Basin, limit the downward migration of salts and nutrients to the Deep aquifer system in this region. For these reasons, monitoring of perched, shallow and deep groundwaters is proposed herein across most of the Basin.
- *Focus on critical areas near: (i) large water recycling projects, (ii) near large recharge projects, particularly where Colorado River water is used to replenish the Basin for water-supply and groundwater management purposes, and (iii) near other potential sources of salt and nutrients*. It is important that monitoring occurs hydraulically upgradient and downgradient from these sources of salt and nutrient loading to characterize their influence on groundwater quality.
- *Focus on critical areas near water supply wells*. The water-supply wells are the main points of extraction for the ultimate beneficial uses of the Basin.

- *Identify critical gaps in the monitoring network and develop a plan and timeline to fill the gaps*. The current gaps in the monitoring network are described in this section. The plan and timeline to fill the gaps are included in Section 4.
- *Identify the stakeholders responsible for conducting, compiling, and reporting the monitoring data*.

3.1.1 Methods for Selection of the Groundwater Monitoring Network

The criteria used to select the groundwater monitoring network included the following:

1. **Spatial Distribution**. The monitoring network was designed to cover all subbasins and subareas within the Basin.
2. **Hydrogeology**. The monitoring network was designed to monitor all three major aquifer systems: Deep, Shallow, and Perched. Water-supply wells in the Basin typically pump groundwater from the Deep aquifer system and were therefore more available for inclusion in the monitoring network. Wells with screens across the Shallow and Perched aquifer systems were less abundant. Hence, most "gaps" in the proposed monitoring network are within the Shallow and Perched aquifer systems.
3. **Areas of Salt or Nutrient Loading**. The network was designed to monitor the influence of known sources of salt or nutrient loading on groundwater quality within the Basin. These sources included: the GRFs; wastewater percolation ponds; areas with septic systems; overlying land uses with irrigation returns (e.g., golf, landscapes, agriculture); and areas served non-potable waters for irrigation (e.g., recycled and/or imported waters). Monitoring of non-point-source loading, such as returns from non-potable irrigation waters and septic systems, is intended to be representative of the influence of non-point-sources of loading on groundwater quality. It is not intended to be site-specific monitoring of every area of non-point-source loading across the Basin, which would be infeasible.
4. **Groundwater Flow**. The network was designed to monitor all major groundwater-flow systems, from areas of recharge to areas of discharge, and within and between the groundwater subbasins. This is necessary in order to track the subsurface migration of salts and nutrients through the Basin.
5. **Use of Existing Wells**. Wherever possible, active municipal production or monitoring wells were preferentially selected if they currently participate in a similar monitoring program (e.g., California Division of Drinking Water [DDW] or Regional Board orders). In some areas, such wells were not available for selection. In those areas, inactive municipal production wells or private wells were selected for inclusion in the monitoring network. The use of inactive or private wells in this monitoring program will require significant coordination with the private well owners and/or physical wellhead improvements to collect groundwater samples. Lastly, if no wells were identified in an area/depth that should be monitored, a "gap" was designated in the monitoring network.

3.1.2 Monitoring Network and Gaps – Shallow Aquifer System

Figure 3-1 is a map of the groundwater monitoring network for the Shallow aquifer system. Each well is labeled by a Map_ID. Because most production wells in the Basin have well screens across the Deep aquifer system, there were several identified "gaps" in the monitoring network, particularly in the Thermal Subarea of the Indio Subbasin. **Table 3-1** is a list of wells shown on **Figure 3-1** sorted by Map_ID. The table includes a summary justification for why each well was included in the monitoring program. **Table 3-4** is a list of the "gaps" in the monitoring network with a summary explanation of why each gap should be filled.

3.1.3 Monitoring Network and Gaps – Deep Aquifer System

Figure 3-2 is a map of the groundwater monitoring network for the Deep aquifer system. Each well is labeled by a Map_ID. Most production wells in the Basin have well screens across the Deep aquifer system; hence, there were no identified "gaps" in the Deep monitoring network. **Table 3-2** is a list of wells shown on **Figure 3-2** sorted by Map_ID. The table includes a summary justification for why the well was included in the monitoring program.

3.1.4 Monitoring Network and Gaps – Perched Aquifer System

Figure 3-3 is a map of the groundwater monitoring network for the Perched aquifer system. Each well is labeled by a Map_ID. The map shows the extent of the Perched aquifer system which is confined to the Thermal Subarea of the Indio Subbasin. The network of CVWD's agricultural drains that convey perched groundwater to the CVSC and the Salton Sea is also shown. The only existing wells with well screens across the Perched aquifer system are five monitoring wells owned by the CVWD; hence, there were several identified "gaps" in the Perched monitoring network. **Table 3-3** is a list of wells shown on **Figure 3-3** sorted by Map_ID. The table includes a summary justification for why each well was included in the monitoring program. **Table 3-4** is a list of the "gaps" in the monitoring network with a summary explanation of why each gap should be filled.

3.2 Chemical Analytes and Sampling Frequency

Table 3-5 lists the chemicals that will be analyzed for dissolved concentration in each groundwater sample for the monitoring program. The table describes the justification for each chemical analyte. Testing will be performed at a laboratory accredited by the State of California for the testing of inorganic chemistry of drinking water.

The minimum sampling frequency is once every three years. Many wells chosen for this monitoring program are sampled more frequently under other required or voluntary monitoring programs.

During each groundwater sampling event, the agency responsible for sampling will attempt to obtain a static (non-pumping) depth-to-water measurement. In instances when a static depth-to-water measurement cannot be obtained, it will be noted with a description for the reason.

3.3 Monitoring and Reporting

3.3.1 Groundwater Sampling and Laboratory Analysis

The SNMP Agencies have the following responsibilities for sampling of the wells in the monitoring network (described in Section 3.1) and the laboratory analysis of chemical analytes (described in Section 3.2):

- Municipal well owners are responsible for the groundwater sampling and laboratory analyses for their own wells.
- For private wells within their service area, the overlying SNMP Agency is responsible for coordinating with the private well owners to conduct groundwater sampling and the laboratory analyses. In areas of overlapping jurisdictions of SNMP Agencies, the agencies

must jointly coordinate to assign responsibility for sampling and analysis of private wells that fall within the overlapping jurisdictions. Agency responsibilities may include developing administrative agreements with the well owners (e.g., right-of-entry agreement) and making physical modifications to the wellhead to enable collection of a sample (e.g., installation of a sampling port on the well discharge pipe).

Table 3-6 lists all wells proposed for the monitoring program. For each well, the table includes a designation for the overlying SNMP Agency(ies).

3.3.2 Reporting of Laboratory Results

Section 6.2.4.1.3 of the Policy requires that all data collected for the monitoring program "shall be electronically reported annually in a format that is compatible with a Groundwater Ambient Monitoring & Assessment (GAMA) information system and must be integrated into the GAMA information system or its successor." This will centralize data generated from SNMPs at the State level and create consistency across regional water boards to allow for further analysis of monitoring data.

By March 31 of each year, the SNMP Agencies will report the laboratory water-quality results from the prior calendar year to the GAMA information system.

3.4 Filling of Gaps in the Monitoring Network

Table 3-4 lists the gaps in the monitoring network that were identified during the selection of the monitoring network.

Gaps in the monitoring network will be filled in one of two ways:

1. Field identification of an existing well that: (i) is located near the identified gap; (ii) can be sampled, and (iii) has well screens across the appropriate depth interval (e.g., across the Shallow aquifer system). This may require the following activities: field canvassing to identify a candidate well; research and/or exploratory well surveys to confirm well screen depth intervals; and constructing any well/wellhead modifications that are necessary to collect groundwater samples.
2. Construction of a new monitoring well with well screens across the appropriate depth interval. This may require the following activities: a well-siting study; well-site acquisition or easement; development of technical specifications for a monitoring well; conducting a bid process to select a well drilling/construction subcontractor; obtaining the necessary permits and CEQA clearance; performing well construction with oversight; performing well development and testing; preparing a well completion report; equipping the well for sampling, and wellhead completion including any needed site improvements.

In the first year, the SNMP Agencies will perform the necessary field work and research and develop a plan for how each gap in the monitoring program will be filled.

Filling the gaps in the monitoring network is likely the most expensive, complicated element of the monitoring program. Therefore, the filling of gaps will be executed over a six-year period, subject to funding availability. The SNMP Agencies will pursue grant funding to support the filling of gaps under State-run programs such as Integrated Regional Water Management and the Sustainable Groundwater Management Act. The SNMP Agencies also are developing a Memorandum of Understanding (MOU) to implement the CV-SNMP Monitoring Program Workplan. The MOU will assign responsibilities and cost-sharing agreements between the SNMP Agencies for the filling of the gaps in the monitoring network.

By March 31 of each year, the SNMP Agencies will report to the Regional Board on progress made toward the filling the gaps in the monitoring network over the preceding calendar year (see Section 4.2 below).

Table 3-1. SNMP Groundwater Monitoring Network -- *Shallow Aquifer System*

Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Justification for Inclusion in SNMP Monitoring Program
1	03S04E20F01S	USGS	335348116352701	Active	Monitoring	600-640	S	Northwest area at WW-GRF
2	03S04E20J01S	USGS	335339116345301	Active	Monitoring	550-590	S	Northeast area at WW-GRF
3	06S07E33G02S	Coachella Valley Water District	TEL-GRF MW-21S	Active	Monitoring	230-250	S	Adjacent to and downgradient of TEL-GRF
4	06S07E33J02S	Coachella Valley Water District	TEL-GRF MW-22S	Active	Monitoring	230-250	S	Adjacent to and downgradient of TEL-GRF
5	06S07E34N03S	Coachella Valley Water District	TEL-GRF MW-23S	Active	Monitoring	230-250	S	Adjacent to and downgradient of TEL-GRF
7	02S04E26C01S	Mission Springs Water District	Well 28	Inactive	MUN	590-898	S	Downgradient from Mission Creek GRF; near golf course and septic areas
8	02S04E28A01S	Mission Springs Water District	Well 34	Active	MUN	550-980	S	Downgradient from Mission Creek GRF
9	02S05E31L01S	Mission Springs Water District	Well 11	Inactive	Unknown	220-285	S	Downgradient of Desert Hot Springs (DHS) subbasin
10	03S04E04Q02S	CPV Sentinel	03S04E04Q02S	Active	Unknown		S	Upgradient portion of Mission Creek subbasin
11	03S04E11L01S	Mission Springs Water District	Well 27	Active	MUN	180-380	S	Upgradient of Garnet Hill subarea; near potential septic areas in N. Palm Springs
12	03S05E05Q01S	Hidden Springs Golf Course	P27	Active	Unknown	220-600	S	Downgradient of DHS subbasin; near golf course and septic areas
13		City of Palm Springs	Airport MW-2	Active	Monitoring	240-250	S	Center of Indio subbasin; near airport and areas served non-potable water (NPW)
14		City of Palm Springs	MW-1	Active	Monitoring	170-210	S	Downgradient of Palm Springs WTP percolation ponds
15		City of Palm Springs	MW-3	Active	Monitoring	140-215	S	Upgradient of Palm Springs WTP percolation ponds
16		City of Palm Springs	MW-4	Active	Monitoring	170-210	S	Downgradient of Palm Springs WTP percolation ponds
17		City of Palm Springs	MW-5	Active	Monitoring	170-210	S	Downgradient of Palm Springs WTP percolation ponds
18		City of Palm Springs	MW-6	Active	Monitoring	170-210	S	Downgradient of Palm Springs WTP percolation ponds
19	03S03E08M01S	Mission Springs Water District	Well 26	Active	MUN	225-553	S	Monitoring of subsurface inflow from San Gorgonio Pass subbasin
20	03S03E10P02S	Unknown	DWA P05	Active	Unknown	306-906	S	Upgradient of Whitewater GRF
21	03S04E12B02S	Coachella Valley Water District	CVWD Well 3408-1	Active	MUN	270-500	S	Central portion of Mission Creek subbasin; near potential septic areas
22	03S04E29F01S	USGS	335304116353001	Active	Monitoring	550-570	S	Monitoring at southwestern area of Whitewater GRF
23	03S04E29R01S	USGS	335231116345401	Active	Monitoring	431-551	S	Monitoring at southeastern area of Whitewater GRF
24	04S04E11Q01S	Desert Water Agency	DWA Well 5	Standby	MUN	302-402	S	Western portion of Indio subbasin; downgradient of septic areas
25	04S04E35A01S	Indian Canyons Golf Resort	04S04E35A01S	Active	Unknown	360-680	S	Near golf courses, septic, and areas served NPW
26	04S05E09F03S	Coachella Valley Water District	CVWD Well 4564-1	Active	MUN	410-670	S	Center of Indio subbasin; near golf courses and septic areas
27	04S05E29A02S	Desert Water Agency	DWA Well 25	Active	MUN	166-300	S	Downgradient of Palm Springs WTP percolation ponds; near golf courses and NPW areas
29	04S07E33L02S	Coachella Valley Water District	WRP7 MW-2S	Active	Monitoring	60-190	S	Near WRP-7 percolation ponds
30	05S06E09M03S	Coachella Valley Water District	WRP10 MW-7	Active	Monitoring	260-340	S	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
31	05S06E09P02S	Coachella Valley Water District	PD-GRF MW 2	Active	Monitoring	260-340	S	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
32	05S06E10J01S	Coachella Valley Water District	PD-GRF MW 1	Active	Monitoring	260-340	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
33	05S06E13G03S	Coachella Valley Water District	WRP10 MW-8	Active	Monitoring	260-340	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
34	05S06E14G03S	Coachella Valley Water District	WRP10 MW-5	Active	Monitoring	240-320	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
35	05S06E14P03S	Coachella Valley Water District	WRP10 MW-6	Active	Monitoring	190-270	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
36	05S06E15F01S	Coachella Valley Water District	WRP10 MW-2	Active	Monitoring	160-290	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
37	05S06E15M01S	Coachella Valley Water District	WRP10 MW-1	Active	Monitoring	145-295	S	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
38	05S06E15P01S	Coachella Valley Water District	WRP10 MW-3	Active	Monitoring	130-290	S	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
39	05S06E16A03S	Coachella Valley Water District	WRP10 MW-4	Active	Monitoring	190-270	S	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
40	05S06E21Q04S	Coachella Valley Water District	PD-GRF MW 3	Active	Monitoring	260-340	S	Cross-gradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
41	05S06E23M02S	Coachella Valley Water District	PD-GRF MW 4	Active	Monitoring	270-360	S	Cross-gradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
42	05S07E03D02S	Coachella Valley Water District	WRP7 MW-4S	Active	Monitoring	60-190	S	Near WRP-7 percolation ponds
43	05S07E04A04S	Coachella Valley Water District	WRP7 MW-3S	Active	Monitoring	50-180	S	Near WRP-7 percolation ponds
44	05S07E16K02S	Coachella Valley Water District	CVWD Well 5737-1	Inactive	Monitoring	200-415	S	Center of Indio subbasin; downgradient from areas served NPW
45	05S07E19D04S	Coachella Valley Water District	WRP10 MW-9	Active	Monitoring	260-340	S	West in Indio subbasin; near golf courses and areas served NPW
46	05S07E24M02S	Indio Water Authority	Well 1B	Active	MUN	190-410	S	Center of Indio subbasin; upgradient of VSD plant
47	06S06E12G01S	Coachella Valley Water District	CVWD Well 6650-1	Inactive	Monitoring	<370	S	Within center of The Cove
48	06S07E34A02S	Coachella Valley Water District	TEL-GRF MW-25	Active	Monitoring	115-135	S	Downgradient from TEL-GRF and golf courses
49	06S07E34D02S	Coachella Valley Water District	TEL-GRF MW-24	Active	Monitoring	180-200	S	Directly north and downgradient of TEL-GRF
50	07S08E29P03S	Coachella Valley Water District	MC-3	Active	Monitoring	380-440	S	At Martinez Canyon GRF
51	08S09E31R03S	Coachella Valley Water District	CVWD Well 8995-1	Active	MUN	260-390	S	Southern corner of the Indio basin; near agriculture; near Salton Sea

Table 3-1. SNMP Groundwater Monitoring Network -- *Shallow Aquifer System*								
Map_ID	SWN	Well Owner	Well Name	Well Status[(a)]	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Justification for Inclusion in SNMP Monitoring Program
52	03S04E17K01S	Valley View MWC	03S04E17K01S	Undetermined	Unknown	340-375	S	Cross-gradient from Whitewater GRF in Garnet Hill subarea
53	03S04E22A01S	Erin Miner	03S04E22A01S	Active	Unknown	180-230	S	Downgradient of Whitewater GRF in Garnet Hill subarea; upgradient of West Valley WWTP
54	03S05E08P02S	Bluebeyond Fisheries	03S05E08P02S	Active	Fish Farm	200-400	S	Central Mission Creek subbasin; near golf course and septic areas
55	03S05E15N01S	Too Many Palms LLC	03S05E15N01S	Active	Irrigation	158-320	S	Distal area in Mission Creek subbasin; downgradient of DHS subbasin
56	03S05E18J01S	Desert Dunes Golf Club	03S05E18J01S	Active	Irrigation	76-340	S	Upgradient of Garnet Hill subarea; near golf course and septic areas
57	03S06E21G01S	Sky Valley Mobile Home Park	03S06E21G01S	Undetermined	Unknown	188-248	S	Western portion of Sky Valley subarea; near septic areas
58	04S05E04F01S	So Pacific Trans Co #32601	04S05E04F01S	Active	Irrigation	276-576	S	Eastern edge of Indio subbasin; downgradient from Garnet Hill subarea; near septic areas
59	04S05E23F01S	Westin Mission Hills Resort	04S05E23F01S	Active	Irrigation	275-1165	S	Center of Indio subbasin; near golf courses and septic areas
60	04S05E34C01S	Manufacture Home Community Inc	04S05E34C01S	Active	Irrigation	240-500	S	Western edge of Indio subbasin; near septic and areas served NPW
61	04S05E35Q01S	Tamarisk Country Club	04S05E35Q01S	Active	Irrigation	171-518	S	Western edge of Indio subbasin; near septic and areas served NPW
62	04S05E36L02S	Annenberg Estate	04S05E36L02S	Active	Irrigation	252-650	S	Center of Indio subbasin; near golf, septic, and areas served NPW
63	04S06E20C01S	Shenandoah Ventures LP	04S06E20C01S	Inactive	Irrigation	250-790	S	Upgradient in Thousand Palms area; upgradient of septic areas
66	05S05E12D01S	Thunderbird Country Club	05S05E12D01S	Active	Irrigation	125-360	S	Western edge of Indio subbasin; near septic and areas served NPW
67	05S06E12M01S	Palm Desert Resort Country Club	05S06E12M01S	Active	Irrigation	140-650	S	Center of Indio subbasin; near areas served NPW
68	05S07E08Q01S	Bermuda Dunes Airport	05S07E08Q01S	Active	Domestic	203-654	S	Center of Indio subbasin; near areas served NPW
69	05S07E28H02S	Tricon/COB Riverdale LP	05S07E28H02S	Active	Domestic	162-636	S	Center of Indio subbasin
70	05S08E28M02S	JS Cooper	05S08E28M02S	Undetermined	Unknown	208-268	S	Eastern edge of Indio subbasin; downgradient of VSD discharge point
71	05S08E30N03S	Carver Tract Mutual Water Co	05S08E30N03S	Active	Domestic	270-330	S	Eastern portion of Indio subbasin; downgradient from VSD plant
72	06S07E07B01S	Traditions Golf Club	06S07E07B01S	Active	Irrigation	200-480	S	Downgradient from The Cove; near golf courses and septic areas
73	06S08E02L01S	Prime Time International	06S08E02L01S	Undetermined	Irrigation	216-407	S	Eastern edge of Indio subbasin; near agriculture; upgradient from CWA/CSD WWTP
74	06S08E05K01S	Peter Rabbit Farms	06S08E05K01S	Active	Irrigation	126-375	S	Eastern portion of Indio subbasin in Coachella
75	06S08E32L01S	Guillermo Torres	06S08E32L01S	Undetermined	Unknown	127-227	S	Downgradient from TEL-GRF; agricultural area
76	07S08E27A01S	Gimmway Enterprises Inc	07S08E27A01S	Active	Domestic	147-215	S	Downgradient from Martinez Canyon GRF; near septic areas
77	07S09E14C01S	Tudor Ranch Inc.	07S09E14C01S	Active	Domestic	93-290	S	Southeastern corner of Indio subbasin; near agriculture and septic areas; near Salton Sea
78	08S08E15G02S	Thermiculture Management LLC	08S08E15G02S	Active	Irrigation	260-500	S	Southern corner of Indio subbasin; near agriculture; near Salton Sea
79		Mission Springs Water District	Well 25	Active	MUN	330-455	S	Monitoring of subsurface inflow from San Gorgonio Pass subbasin
80		Mission Springs Water District	Well 1	Inactive	Monitoring		S	Northern Miracle Hill subarea; upgradient of Mission Creek subbasin
81		Mission Springs Water District	Horton WWTP MW-1	Active	Monitoring	186-236	S	Monitoring wells upgradient and downgradient of the Horton WWTP
82		Mission Springs Water District	Horton WWTP MW-2	Active	Monitoring	220-270	S	Monitoring wells upgradient and downgradient of the Horton WWTP
83		Mission Springs Water District	Horton WWTP MW-3	Active	Monitoring	200-250	S	Monitoring wells upgradient and downgradient of the Horton WWTP

(a) Well Status: Well Status: "Active" means well is known to exist and currently used for original purpose; "Standby" means active backup well; "Inactive" means well exists but is no longer used as a water-supply.

(b) Well Use: MUN = municipal and domestic supply

(c) Depth Code: This monitoring program assigns wells to aquifer layers by depth. P = Perched aquifer system, mainly in the Thermal subarea. S = Shallow aquifer system. D = Deep aquifer system

Table 3-2. SNMP Groundwater Monitoring Network -- *Deep Aquifer System*

Map_ID	SWN	Well Owner	Well Name	Well Status[(a)]	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Justification for Inclusion in SNMP Monitoring Program
84	03S04E20F02S	USGS	335348116352702	Active	Monitoring	850-890	D	Northwest area at WW-GRF
85	03S04E20J03S	USGS	335339116345303	Active	Monitoring	850-890	D	Northeast area at WW-GRF
86	06S07E33G01S	Coachella Valley Water District	TEL-GRF MW-21D	Active	Monitoring	390-410	D	Adjacent to and downgradient of TEL-GRF
87	06S07E33J01S	Coachella Valley Water District	TEL-GRF MW-22D	Active	Monitoring	520-540	D	Adjacent to and downgradient of TEL-GRF
88	06S07E34N02S	Coachella Valley Water District	TEL-GRF MW-23D	Active	Monitoring	525-545	D	Adjacent to and downgradient of TEL-GRF
89	07S09E30R03S	Coachella Valley Water District	Peggy	Active	Monitoring	730-770	D	Downgradient of WRP-4; near agriculture; area of subsurface outflow toward Salton Sea
90	08S09E07N02S	Coachella Valley Water District	Rosie	Active	Monitoring	720-780	D	Near agriculture; area of subsurface outflow toward Salton Sea
91	05S07E24L03S	Indio Water Authority	Well 1E	Active	MUN	552-815	D	Center of Indio subbasin; upgradient of VSD plant
92	02S04E28J01S	Mission Springs Water District	Well 35	Active	MUN	725-1020	D	Downgradient from Mission Creek GRF
93	02S04E36P01S	Mission Springs Water District	Well 37	Active	MUN	450-1080	D	Downgradient of DHS subbasin; possibly downgradient of Horton WWTP
94	02S05E31H01S	Mission Springs Water District	Well 5	Inactive	Monitoring	274-784	D	Northern Miracle Hill subarea; upgradient of Mission Creek subbasin
95	03S03E07D01S	Mission Springs Water District	Well 25A	Active	MUN	500-740	D	Monitoring of subsurface inflow from San Gorgonio Pass subbasin
96	03S04E04P01S	CPV Sentinel	03S04E04P01S	Active	Unknown		D	Upgradient portion of Mission Creek subbasin
97	03S04E11A02S	Mission Springs Water District	Well 32	Active	MUN	320-980	D	Center of Mission Creek subbasin; near potential septic areas
98	03S03E08A01S	Mission Springs Water District	Well 26A	Active	MUN	320-600	D	Monitoring of subsurface inflow from San Gorgonio Pass subbasin
99	03S03E10P01S	Unknown	DWA P04	Active	Unknown	476-776	D	Upgradient of Whitewater GRF
100	03S04E14J01S	Mission Springs Water District	Well 33	Active	MUN	360-650	D	Along boundary of Mission Creek subbasin/Garnet Hill subarea
101	03S04E19L01S	Desert Water Agency	DWA Well 43	Active	MUN	500-900	D	Upgradient of Whitewater GRF
102	03S04E34H02S	Desert Water Agency	DWA Well 35	Active	MUN	600-1000	D	Upgradient of urban land uses in Palm Springs; downgradient of WW-GRF
103	03S04E36Q01S	Desert Water Agency	DWA Well 38	Active	MUN	620-1000	D	Upgradient of urban land uses in Palm Springs; downgradient of WW-GRF
104	04S04E02B01S	Desert Water Agency	DWA Well 22	Active	MUN	570-1003	D	Upgradient of urban land uses in Palm Springs; downgradient of WW-GRF
105	04S04E11Q02S	Desert Water Agency	DWA Well 18	Standby	MUN	535-948	D	Western portion of Indio subbasin; downgradient of septic areas
106	04S04E13C01S	Desert Water Agency	DWA Well 23	Active	MUN	512-912	D	Center of Indio subbasin; near airport
107	04S04E24E01S	Desert Water Agency	DWA Well 32	Active	MUN	600-1000	D	Western portion of Palm Springs subarea; near areas served non-potable water (NPW)
108	04S04E24H01S	Desert Water Agency	DWA Well 29	Active	MUN	600-1000	D	Upgradient of Palm Springs WTP percolation ponds
109	04S04E25C01S	Desert Water Agency	DWA Well 39	Active	MUN	580-750	D	Downgradient of Indian Canyon; near golf, septic, and areas served NPW
110	04S05E05A01S	Coachella Valley Water District	CVWD Well 4568-1	Active	MUN	800-955	D	Eastern edge of Indio subbasin; downgradient from Garnet Hill; upgradient of septic areas
111	04S05E08N01S	Desert Water Agency	DWA Well 41	Active	MUN	610-1000	D	Center of Indio subbasin; near airport, near golf courses and areas served NPW
112	04S05E09R01S	Coachella Valley Water District	CVWD Well 4567-1	Active	MUN	855-1150	D	Center of Indio subbasin; near golf courses and septic areas
113	04S05E15G01S	Coachella Valley Water District	CVWD Well 4521-1	Active	MUN	500-800	D	Center of Indio subbasin; near golf courses and septic areas
114	04S05E17Q02S	Desert Water Agency	DWA Well 31	Active	MUN	600-1000	D	Center of Indio subbasin; near airport, golf courses, and areas served NPW
115	04S05E25D02S	Coachella Valley Water District	CVWD Well 4507-2	Active	MUN	860-1320	D	Center of Indio subbasin; near golf courses and septic areas
116	04S05E27K01S	Coachella Valley Water District	CVWD Well 4527-1	Active	MUN	850-1155	D	Western edge of Indio subbasin; near NPR and septic areas
117	04S05E29H01S	Desert Water Agency	DWA Well 26	Active	MUN	590-990	D	Downgradient of Palm Springs WTP percolation ponds; near golf and areas served NPW
118	04S05E35G04S	Coachella Valley Water District	CVWD Well 4504-1	Active	MUN	600-1000	D	Western edge of Indio subbasin; near septic and areas served NPW
119	04S06E18Q04S	Coachella Valley Water District	CVWD Well 4630-1	Active	MUN	480-990	D	Upgradient in Thousand Palms area; upgradient of septic areas
120	04S06E28K04S	Coachella Valley Water District	CVWD Well 4629-1	Active	Monitoring	496-796	D	Thousand Palms area; near septic and areas served NPW
121	04S07E31H01S	Coachella Valley Water District	CVWD Well 4722-1	Active	MUN	570-1160	D	Thousand Palms area; near septic and areas served NPW
122	04S07E33L01S	Coachella Valley Water District	WRP7 MW-2D	Active	MUN	245-395	D	Near WRP-7 percolation ponds
123	05S06E02C01S	Coachella Valley Water District	CVWD Well 5664-1	Active	MUN	500-930	D	Thousand Palms area; near septic and areas served NPW
124	05S06E06B03S	Coachella Valley Water District	CVWD Well 5630-1	Active	Monitoring	455-890	D	Center of Indio subbasin; near golf, septic, and areas served NPW
125	05S06E09A01S	Coachella Valley Water District	CVWD Well 5682-1	Active	Monitoring	850-1300	D	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
126	05S06E09F01S	Coachella Valley Water District	CVWD Well 5637-1	Inactive	MUN	450-830	D	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
127	05S06E14B02S	Coachella Valley Water District	CVWD Well 5665-1	Inactive	MUN	400-600	D	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
128	05S06E14P02S	Coachella Valley Water District	CVWD Well 5603-2	Active	MUN	720-975	D	Downgradient of WRP-10/PD-GRF; near golf courses and areas served NPW
129	05S06E16A04S	Coachella Valley Water District	CVWD Well 5620-2	Active	MUN	1040-1360	D	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
130	05S06E16K03S	Coachella Valley Water District	CVWD Well 5681-1	Active	Monitoring	900-1200	D	Upgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
131	05S06E17L01S	Coachella Valley Water District	CVWD Well 5667-1	Active	Monitoring	470-800	D	Western edge of Indio subbasin; near golf, septic, and areas served NPW
132	05S06E20A02S	Coachella Valley Water District	CVWD Well 5674-1	Inactive	Monitoring	750-1050	D	South/cross-gradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
133	05S07E03D01S	Coachella Valley Water District	WRP7 MW-4D	Active	MUN	245-395	D	Near WRP-7 percolation ponds
134	05S07E04A01S	Coachella Valley Water District	WRP7 MW-1 Dave Price	Active	Monitoring	147-367	D	Near WRP-7 percolation ponds

Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Justification for Inclusion in SNMP Monitoring Program
135	05S07E15N01S	Indio Water Authority	Well AA	Active	MUN	550-1230	D	Center of Indio subbasin; downgradient from areas served NPW
136	05S07E19A01S	Coachella Valley Water District	CVWD Well 5708-1	Inactive	MUN	450-970	D	Western portion of Indio subbasin; near golf courses and areas served NPW
137	05S07E20J01S	Indio Water Authority	Well T	Active	MUN	580-1305	D	Western portion of Indio subbasin; near golf courses and areas served NPW
138	05S07E26E02S	Indio Water Authority	Well 3B	Active	MUN	500-1200	D	Center of Indio subbasin
139	05S07E27P01S	Indio Water Authority	Well Z	Active	MUN	580-1290	D	Center of Indio subbasin
140	05S07E33E01S	Indio Water Authority	Well S	Active	MUN	460-1260	D	Western portion of Indio subbasin; near golf courses and septic areas
141	05S07E34P04S	Indio Water Authority	Well V	Active	MUN	460-1270	D	Western portion of subbasin; near golf courses and septic areas
142	05S07E35R02S	Indio Water Authority	Well U	Active	MUN	480-1190	D	Center of Indio subbasin
143	05S07E36D03S	Coachella Water Authority	Well 19	Active	MUN	650-1250	D	Center of Indio subbasin
144	05S08E31C03S	Coachella Water Authority	Well 11	Active	MUN	513-818	D	Eastern portion of Indio subbasin; downgradient from VSD plant
145	06S07E06B01S	Coachella Valley Water District	CVWD Well 6701-1	Active	MUN	580-800	D	Downgradient from The Cove; near golf courses and septic areas
146	06S07E22B02S	Coachella Valley Water District	CVWD Well 6726-1	Active	MUN	640-1160	D	North/downgradient of TEL-GRF; near golf courses, septic, and agricultural areas
147	06S07E34A01S	Coachella Valley Water District	CVWD Well 6728-1	Active	MUN	500-750	D	Downgradient from TEL-GRF; near golf courses
148	06S07E34D01S	Coachella Valley Water District	CVWD Well 6729-1	Active	MUN	500-780	D	Directly north/downgradient of TEL-GRF
149	06S08E06K02S	Coachella Water Authority	Well 12	Active	MUN	500-1010	D	Eastern portion of Indio subbasin
150	06S08E09N02S	Coachella Water Authority	Well 16	Active	Monitoring	480-730	D	Eastern portion of Indio subbasin; upgradient from CWA/CSD WWTP
151	06S08E19D05S	Coachella Valley Water District	CVWD Well 6808-1	Active	MUN	675-1200	D	Center of Indio subbasin; near septic and agricultural areas
152	06S08E22D02S	Coachella Valley Water District	CVWD Well 6803-1	Inactive	MUN	500-1100	D	Downgradient from CWA/CSD WWTP; near septic and agricultural areas
153	06S08E25P04S	Coachella Valley Water District	CVWD Well 6807-1	Active	MUN	665-1300	D	Upgradient of WRP-4; downgradient of CWA WWTP; near agriculture and septic areas
154	06S08E28N06S	Coachella Water Authority	Well 18	Active	Monitoring	900-1190	D	Eastern edge of Indio subbasin; downgradient of VSD discharge point
155	07S08E17A04S	Coachella Valley Water District	CVWD Well 7803-1	Active	MUN	250-710	D	Downgradient from TEL-GRF; in agricultural and septic areas
156	07S09E23N01S	Coachella Valley Water District	CVWD Well 7990-1	Inactive	Unknown	530-560	D	Southeastern corner of the basin; near agricultural and septic areas; near Salton Sea
157		Indio Water Authority	Well 13A	Active	Irrigation	550-1171	D	East in subbasin; downgradient from WRP-7 ponds and NPR areas
158	03S05E08B01S	R.C Roberts	03S05E08B01S	Undetermined	Irrigation	356-516	D	Downgradient of DHS subbasin; near golf course and septic areas
159	03S05E17M01S	Desert Dunes Golf Club	03S05E17M01S	Active	Unknown	305-412	D	Upgradient of Garnet Hill subarea; near golf course and septic areas
160	03S05E20H02S	Donald Franklin	03S05E20H02S	Active	Irrigation	240-360	D	Distal area in Mission Creek subbasin; upgradient of Garnet Hill subarea; near septic
161	03S06E21R01S	Joel Rosenfeld	03S06E21R01S	Undetermined	Irrigation	355-495	D	Western portion of Sky Valley subarea; near septic
162	05S05E12B03S	Tandika Corp	05S05E12B03S	Active	Irrigation	410-800	D	Western edge of Indio subbasin; near NPR and septic areas
163	05S06E13F01S	PD Golf Operations LLC	05S06E13F01S	Active	Irrigation	400-700	D	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
164	05S06E15H01S	Toscana Country Club	05S06E15H01S	Active	Irrigation	430-950	D	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
165	05S06E22C02S	Desert Horizons Country Club	05S06E22C02S	Active	Irrigation	550-990	D	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
166	05S06E27A01S	El Dorado Country Club	05S06E27A01S	Active	MUN	458-596	D	South/cross-gradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
167	05S06E29P04S	Bighorn Golf Club	05S06E29P04S	Active	MUN	530-720	D	Upgradient of Palm Desert; near golf courses and septic areas
168	05S07E07F04S	Myoma Dunes Mutual Water Company	Well 4	Active	MUN	430-730	D	Center of Indio subbasin; near areas served NPW
169	05S07E08L01S	Myoma Dunes Mutual Water Company	Well 11	Active	Unknown	500-1060	D	Center of Indio subbasin; near areas served NPW
170	05S07E17K01S	Myoma Dunes Mutual Water Company	Well 12	Active	Irrigation	450-950	D	Center of Indio subbasin; near areas served NPW
171	05S08E09N03S	Jamie Brack	05S08E09N03S	Undetermined	Unknown	480-580	D	Downgradient of septic areas in Fargo subarea; upgradient of Indio subbasin
172	06S07E27B01S	Andalusia Golf Club	06S07E27B01S	Active	Irrigation	300-780	D	Downgradient of TEL-GRF; near golf course and agricultural areas
173	06S07E35L02S	Castro Bros	Castro Bros	Active	Unknown	300-400	D	Downgradient from TEL-GRF; near golf courses and agricultural areas
174	06S08E11A01S	Cocopah Nurseries Inc	06S08E11A01S	Active	Unknown	400-842	D	Eastern edge of Indio subbasin; near agriculture; upgradient from CWA/CSD WWTP
175	06S08E31P01S	Deer Creek	Deer Creek	Active	Irrigation	400-550	D	Downgradient from TEL-GRF, in agricultural area
176	06S08E35E02S	Otto L. Zahler	06S08E35E02S	Undetermined	Unknown	521-596	D	Center of Indio subbasin; directly upgradient of WRP-4; in agricultural area
177	07S07E02G02S	Warren Webber	Warren Webber	Active	Irrigation	380-700	D	Downgradient from TEL-GRF; in agricultural area
178	07S08E01L02S	Bill Wordon	07S08E01L02S	Undetermined	Domestic	500-880	D	Center of Indio subbasin; downgradient of WRP-4, in agricultural area
179	07S08E27A02S	Gimmway Enterprises Inc	07S08E27A02S	Active	MUN	491-811	D	Downgradient from Martinez Canyon GRF; in agricultural area
180	07S09E10F01S	Prime Time International	07S09E10F01S	Active	Unknown	360-500	D	Southeast Indio subbasin; in agricultural area; near Salton Sea
181		Mission Springs Water District	Well 31	Active	MUN	270-670	D	Upgradient of Garnet Hill subarea; near potential septic areas in N. Palm Springs

(a) Well Status: Well Status: "Active" means well is known to exist and currently used for original purpose; "Standby" means active backup well; "Inactive" means well exists but is no longer used as a water-supply.

(b) Well Use: MUN = municipal and domestic supply

(c) Depth Code: This monitoring program assigns wells to aquifer layers by depth. P = Perched aquifer system, mainly in the Thermal subarea. S = Shallow aquifer system. D = Deep aquifer system

Table 3-3. SNMP Groundwater Monitoring Network -- *Perched Aquifer System*								
Map_ID	SWN	Well Owner	Well Name	Well Status[(a)']	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Justification for Inclusion in SNMP Monitoring Program
182		Coachella Valley Water District	WRP2 MW3	Active	Monitoring	<90	P	At WRP-2; represents subsurface discharge to Salton Sea
183	06S07E27J03S	Coachella Valley Water District	TEL-GRF MW-8	Active	Monitoring	25-45	P	North/downgradient of TEL-GRF; near golf course and agriculture
184	06S07E34A03S	Coachella Valley Water District	TEL-GRF MW-9	Active	Monitoring	25-45	P	Downgradient from TEL-GRF and golf course
185	06S08E31R01S	Coachella Valley Water District	TEL-GRF MW-10	Active	Monitoring	25-45	P	Downgradient from TEL-GRF; agricultural area
186	07S08E06P01S	Coachella Valley Water District	TEL-GRF MW-11	Active	Monitoring	25-45	P	Downgradient from TEL-GRF; agricultural area
187		Coachella Valley Water District	PEW-1	Active	Monitoring	10-55	P	At WRP-4; agricultural area

(a) Well Status: "Active" means well is known to exist and currently used for original purpose; "Standby" means active backup well; "Inactive" means well exists but is no longer used as a water-supply.

(b) Well Use: MUN = municipal and domestic supply

(c) Depth Code: This monitoring program assigns wells to aquifer layers by depth. P = Perched aquifer system, mainly in the Thermal subarea. S = Shallow aquifer system. D = Deep aquifer system

Table 3-4. Gaps in SNMP Groundwater Monitoring Network

Map_ID	Depth Code[(a)]	Justification for Inclusion in SNMP Monitoring Program	Approx. Depth of Well Screens	Overlying SNMP Agency[(b)]
G1	S	Monitoring of subsurface inflows from areas upgradient of Mission Creek GRF	700-1000 ft-bgs	DWA, MSWD
G2	S	Monitoring directly downgradient of the planned MSWD West Valley WWTP	200-300 ft-bgs	MSWD, DWA
G3	S	Monitoring of southern Miracle Hill subarea; near septic; upgradient of Desert Crest WWTP	100-300 ft-bgs	CVWD
G4	S	Monitoring of the Fargo subarea of DHS subbasin; near septic	100-300 ft-bgs	CVWD
G5	S	Monitoring upgradient of urban land uses in Palm Springs; downgradient of WW-GRF	300-500 ft-bgs	DWA
G6	S	Monitoring center of Indio subbasin; near airport, golf courses, and areas served non-potable water (NPW)	250-350 ft-bgs	DWA
G7	S	Monitoring a spatial gap in western portion of Indio subbasin; near golf courses, septic and areas served NPW	200-300 ft-bgs	CVWD
G8	S	Monitoring of subsurface inflows from areas upgradient of urban land uses in Palm Desert Canyon	250-400 ft-bgs	CVWD
G9	S	Monitoring a spatial gap in western portion of Indio subbasin; near golf courses and septic	100-250 ft-bgs	CVWD, IWA
G10	S	Monitoring downgradient from CWA/CSD WWTP; near septic areas and agriculture	100-250 ft-bgs	CVWD
G11	S	Monitoring a spatial gap downgradient of TEL-GRF; near golf courses, septic, and agricultural areas	85-160 ft-bgs	CVWD
G12	S	Monitoring a spatial gap in center of Indio subbasin; near septic areas and agriculture	100-235 ft-bgs	CVWD
G13	S	Monitoring a spatial gap downgradient from TEL-GRF; in agricultural areas	50-150 ft-bgs	CVWD
G14	S	Monitoring a spatial gap downgradient of WRP-4; in agricultural area; near Salton Sea	100-250 ft-bgs	CVWD
G15	S	Monitoring a spatial gap directly upgradient of WRP-4; in agricultural area	100-275 ft-bgs	CVWD
G16	S	Monitoring a spatial gap upgradient of WRP-4; downgradient of CWA/CSD WWTP; near agriculture, septic	100-250 ft-bgs	CVWD
G17	P	Monitoring a spatial gap in northern portion of Perched area; downgradient from Fargo subarea	<100 ft-bgs	CVWD, IWA, VSD
G18	P	Monitoring a spatial gap on eastern side of Perched area; in agricultural area	<70 ft-bgs	CVWD, CWA/CSD
G19	P	Monitoring a spatial gap in center of Perched area; near agricultural and septic areas	<90 ft-bgs	CVWD, CWA/CSD
G20	P	Monitoring a spatial gap in southern basin; may represent subsurface discharge to Salton Sea	<70 ft-bgs	CVWD
G21	P	Monitoring a spatial gap in southern basin; may represent subsurface discharge to Salton Sea	<70 ft-bgs	CVWD
G22	P	Monitoring a spatial gap in southern basin; may represent subsurface discharge to Salton Sea	<90 ft-bgs	CVWD
G23	S	Monitoring a spatial gap in Thousand Palms area; near septic and areas served NPW	150-300 ft-bgs	CVWD

(a) Depth Code: This monitoring program assigns wells to aquifer layers by depth. P = Perched aquifer system, mainly in the Thermal subarea. S = Shallow aquifer system.

(b) CVWD = Coachella Valley Water District; CWA/CSD = Coachella Water Authority and Sanitary District; DWA = Desert Water Agency; IWA = Indio Water Authority; VSD = Valley Sanitary District; MSWD = Mission Springs Water District

Table 3-5. Analyte List for the SNMP Groundwater Monitoring Program

Analytes	Justification	Method	Cost/Sample
Total Dissolved Solids	Measure of total dissolved salt content in water	E160.1/SM2540C	$14
Nitrate as Nitrogen	Primary nutrient in groundwater	EPA 300.0	$12
Major cations: K, Na, Ca, Mg	Useful in source water characterization	EPA 200.7	$20
Major anions: Cl, SO_4	Useful in source water characterization	EPA 300.0	$18
Total Alkalinity (HCO_3, CO_3, OH)	Useful in source water characterization	SM 2320B/2330B	$13

Table 3-6. Responsibilities for Groundwater Sampling and Laboratory Analyses								
Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Overlying SNMP Agency[d]
1	03S04E20F01S	USGS	335348116352701	Active	Monitoring	600-640	S	CVWD
2	03S04E20J01S	USGS	335339116345301	Active	Monitoring	550-590	S	CVWD
3	06S07E33G02S	Coachella Valley Water District	TEL-GRF MW-21S	Active	Monitoring	230-250	S	CVWD
4	06S07E33J02S	Coachella Valley Water District	TEL-GRF MW-22S	Active	Monitoring	230-250	S	CVWD
5	06S07E34N03S	Coachella Valley Water District	TEL-GRF MW-23S	Active	Monitoring	230-250	S	CVWD
7	02S04E26C01S	Mission Springs Water District	Well 28	Inactive	MUN	590-898	S	MSWD
8	02S04E28A01S	Mission Springs Water District	Well 34	Active	MUN	550-980	S	MSWD
9	02S05E31L01S	Mission Springs Water District	Well 11	Inactive	Unknown	220-285	S	MSWD
10	03S04E04Q02S	CPV Sentinel	03S04E04Q02S	Active	Unknown		S	DWA, MSWD
11	03S04E11L01S	Mission Springs Water District	Well 27	Active	MUN	180-380	S	MSWD
12	03S05E05Q01S	Hidden Springs Golf Course	P27	Active	Unknown	220-600	S	DWA, MSWD
13		City of Palm Springs	Airport MW-2	Active	Monitoring	240-250	S	CPS
14		City of Palm Springs	MW-1	Active	Monitoring	170-210	S	CPS
15		City of Palm Springs	MW-3	Active	Monitoring	140-215	S	CPS
16		City of Palm Springs	MW-4	Active	Monitoring	170-210	S	CPS
17		City of Palm Springs	MW-5	Active	Monitoring	170-210	S	CPS
18		City of Palm Springs	MW-6	Active	Monitoring	170-210	S	CPS
19	03S03E08M01S	Mission Springs Water District	Well 26	Active	MUN	225-553	S	MSWD
20	03S03E10P02S	Unknown	DWA P05	Active	Unknown	306-906	S	DWA
21	03S04E12B02S	Coachella Valley Water District	CVWD Well 3408-1	Active	MUN	270-500	S	CVWD
22	03S04E29F01S	USGS	335304116353001	Active	Monitoring	550-570	S	CVWD
23	03S04E29R01S	USGS	335231116345401	Active	Monitoring	431-551	S	CVWD
24	04S04E11Q01S	Desert Water Agency	DWA Well 5	Standby	MUN	302-402	S	DWA
25	04S04E35A01S	Indian Canyons Golf Resort	04S04E35A01S	Active	Unknown	360-680	S	DWA
26	04S05E09F03S	Coachella Valley Water District	CVWD Well 4564-1	Active	MUN	410-670	S	CVWD
27	04S05E29A02S	Desert Water Agency	DWA Well 25	Active	MUN	166-300	S	DWA
29	04S07E33L02S	Coachella Valley Water District	WRP7 MW-2S	Active	Monitoring	60-190	S	CVWD
30	05S06E09M03S	Coachella Valley Water District	WRP10 MW-7	Active	Monitoring	260-340	S	CVWD
31	05S06E09P02S	Coachella Valley Water District	PD-GRF MW 2	Active	Monitoring	260-340	S	CVWD
32	05S06E10J01S	Coachella Valley Water District	PD-GRF MW 1	Active	Monitoring	260-340	S	CVWD
33	05S06E13G03S	Coachella Valley Water District	WRP10 MW-8	Active	Monitoring	260-340	S	CVWD
34	05S06E14G03S	Coachella Valley Water District	WRP10 MW-5	Active	Monitoring	240-320	S	CVWD
35	05S06E14P03S	Coachella Valley Water District	WRP10 MW-6	Active	Monitoring	190-270	S	CVWD
36	05S06E15F01S	Coachella Valley Water District	WRP10 MW-2	Active	Monitoring	160-290	S	CVWD
37	05S06E15M01S	Coachella Valley Water District	WRP10 MW-1	Active	Monitoring	145-295	S	CVWD
38	05S06E15P01S	Coachella Valley Water District	WRP10 MW-3	Active	Monitoring	130-290	S	CVWD
39	05S06E16A03S	Coachella Valley Water District	WRP10 MW-4	Active	Monitoring	190-270	S	CVWD
40	05S06E21Q04S	Coachella Valley Water District	PD-GRF MW 3	Active	Monitoring	260-340	S	CVWD
41	05S06E23M02S	Coachella Valley Water District	PD-GRF MW 4	Active	Monitoring	270-360	S	CVWD
42	05S07E03D02S	Coachella Valley Water District	WRP7 MW-4S	Active	Monitoring	60-190	S	CVWD
43	05S07E04A04S	Coachella Valley Water District	WRP7 MW-3S	Active	Monitoring	50-180	S	CVWD
44	05S07E16K02S	Coachella Valley Water District	CVWD Well 5737-1	Inactive	MUN	200-415	S	CVWD, IWA, VSD
45	05S07E19D04S	Coachella Valley Water District	WRP10 MW-9	Active	Monitoring	260-340	S	CVWD
46	05S07E24M02S	Indio Water Authority	Well 1B	Active	Monitoring	190-410	S	IWA
47	06S06E12G01S	Coachella Valley Water District	CVWD Well 6650-1	Inactive	Monitoring	<370	S	CVWD
48	06S07E34A02S	Coachella Valley Water District	TEL-GRF MW-25	Active	Monitoring	115-135	S	CVWD
49	06S07E34D02S	Coachella Valley Water District	TEL-GRF MW-24	Active	MUN	180-200	S	CVWD
50	07S08E29P03S	Coachella Valley Water District	MC-3	Active	Unknown	380-440	S	CVWD
51	08S09E31R03S	Coachella Valley Water District	CVWD Well 8995-1	Active	Unknown	260-390	S	CVWD
52	03S04E17K01S	Valley View MWC	03S04E17K01S	Undetermined	Fish Farm	340-375	S	DWA, MSWD
53	03S04E22A01S	Erin Miner	03S04E22A01S	Active	Irrigation	180-230	S	DWA
54	03S05E08P02S	Bluebeyond Fisheries	03S05E08P02S	Active	Irrigation	200-400	S	CVWD
55	03S05E15N01S	Too Many Palms LLC	03S05E15N01S	Active	Unknown	158-320	S	CVWD
56	03S05E18J01S	Desert Dunes Golf Club	03S05E18J01S	Active	Irrigation	76-340	S	CVWD
57	03S06E21G01S	Sky Valley Mobile Home Park	03S06E21G01S	Undetermined	Irrigation	188-248	S	CVWD
58	04S05E04F01S	So Pacific Trans Co #32601	04S05E04F01S	Active	Irrigation	276-576	S	CVWD
59	04S05E23F01S	Westin Mission Hills Resort	04S05E23F01S	Active	Irrigation	275-1165	S	CVWD
60	04S05E34C01S	Manufacture Home Community Inc	04S05E34C01S	Active	Irrigation	240-500	S	CVWD

Table 3-6. Responsibilities for Groundwater Sampling and Laboratory Analyses								
Map_ID	SWN	Well Owner	Well Name	Well Status[(a)]	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Overlying SNMP Agency[(d)]
61	04S05E35Q01S	Tamarisk Country Club	04S05E35Q01S	Active	Irrigation	171-518	S	CVWD
62	04S05E36L02S	Annenberg Estate	04S05E36L02S	Active	Unknown	252-650	S	CVWD
63	04S06E20C01S	Shenandoah Ventures LP	04S06E20C01S	Inactive	Irrigation	250-790	S	CVWD
66	05S05E12D01S	Thunderbird Country Club	05S05E12D01S	Active	Domestic	125-360	S	CVWD
67	05S06E12M01S	Palm Desert Resort Country Club	05S06E12M01S	Active	Domestic	140-650	S	CVWD
68	05S07E08Q01S	Bermuda Dunes Airport	05S07E08Q01S	Active	Unknown	203-654	S	CVWD, MDMWC
69	05S07E28H02S	Tricon/COB Riverdale LP	05S07E28H02S	Active	Domestic	162-636	S	CVWD, IWA, VSD
70	05S08E28M02S	JS Cooper	05S08E28M02S	Undetermined	Irrigation	208-268	S	CVWD, CWA/CSD
71	05S08E30N03S	Carver Tract Mutual Water Co	05S08E30N03S	Active	Irrigation	270-330	S	CVWD, VSD
72	06S07E07B01S	Traditions Golf Club	06S07E07B01S	Active	Irrigation	200-480	S	CVWD
73	06S08E02L01S	Prime Time International	06S08E02L01S	Undetermined	Unknown	216-407	S	CVWD, CWA/CSD
74	06S08E05K01S	Peter Rabbit Farms	06S08E05K01S	Active	Domestic	126-375	S	CVWD, CWA/CSD
75	06S08E32L01S	Guillermo Torres	06S08E32L01S	Undetermined	Domestic	127-227	S	CVWD
76	07S08E27A01S	Gimmway Enterprises Inc	07S08E27A01S	Active	Irrigation	147-215	S	CVWD
77	07S09E14C01S	Tudor Ranch Inc.	07S09E14C01S	Active	MUN	93-290	S	CVWD
78	08S08E15G02S	Thermiculture Management LLC	08S08E15G02S	Active	Monitoring	260-500	S	CVWD
79		Mission Springs Water District	Well 25	Active	Monitoring	330-455	S	MSWD
80		Mission Springs Water District	Well 1	Inactive	Monitoring		S	MSWD
81		Mission Springs Water District	Horton WWTP MW-1	Active	Monitoring	186-236	S	MSWD
82		Mission Springs Water District	Horton WWTP MW-2	Active	Monitoring	220-270	S	MSWD
83		Mission Springs Water District	Horton WWTP MW-3	Active	Monitoring	200-250	S	MSWD
84	03S04E20F02S	USGS	335348116352702	Active	Monitoring	850-890	D	CVWD
85	03S04E20J03S	USGS	335339116345303	Active	Monitoring	850-890	D	CVWD
86	06S07E33G01S	Coachella Valley Water District	TEL-GRF MW-21D	Active	Monitoring	390-410	D	CVWD
87	06S07E33J01S	Coachella Valley Water District	TEL-GRF MW-22D	Active	Monitoring	520-540	D	CVWD
88	06S07E34N02S	Coachella Valley Water District	TEL-GRF MW-23D	Active	Monitoring	525-545	D	CVWD
89	07S09E30R03S	Coachella Valley Water District	Peggy	Active	MUN	730-770	D	CVWD
90	08S09E07N02S	Coachella Valley Water District	Rosie	Active	MUN	720-780	D	CVWD
91	05S07E24L03S	Indio Water Authority	Well 1E	Active	MUN	552-815	D	IWA
92	02S04E28J01S	Mission Springs Water District	Well 35	Active	Monitoring	725-1020	D	MSWD
93	02S04E36P01S	Mission Springs Water District	Well 37	Active	MUN	450-1080	D	MSWD
94	02S05E31H01S	Mission Springs Water District	Well 5	Inactive	Unknown	274-784	D	MSWD
95	03S03E07D01S	Mission Springs Water District	Well 25A	Active	MUN	500-740	D	MSWD
96	03S04E04P01S	CPV Sentinel	03S04E04P01S	Active	MUN		D	DWA, MSWD
97	03S04E11A02S	Mission Springs Water District	Well 32	Active	Unknown	320-980	D	MSWD
98	03S03E08A01S	Mission Springs Water District	Well 26A	Active	MUN	320-600	D	MSWD
99	03S03E10P01S	Unknown	DWA P04	Active	MUN	476-776	D	DWA
100	03S04E14J01S	Mission Springs Water District	Well 33	Active	MUN	360-650	D	MSWD
101	03S04E19L01S	Desert Water Agency	DWA Well 43	Active	MUN	500-900	D	DWA
102	03S04E34H02S	Desert Water Agency	DWA Well 35	Active	MUN	600-1000	D	DWA
103	03S04E36Q01S	Desert Water Agency	DWA Well 38	Active	MUN	620-1000	D	DWA
104	04S04E02B01S	Desert Water Agency	DWA Well 22	Active	MUN	570-1003	D	DWA
105	04S04E11Q02S	Desert Water Agency	DWA Well 18	Standby	MUN	535-948	D	DWA
106	04S04E13C01S	Desert Water Agency	DWA Well 23	Active	MUN	512-912	D	DWA
107	04S04E24E01S	Desert Water Agency	DWA Well 32	Active	MUN	600-1000	D	DWA
108	04S04E24H01S	Desert Water Agency	DWA Well 29	Active	MUN	600-1000	D	DWA
109	04S04E25C01S	Desert Water Agency	DWA Well 39	Active	MUN	580-750	D	DWA
110	04S05E05A01S	Coachella Valley Water District	CVWD Well 4568-1	Active	MUN	800-955	D	CVWD
111	04S05E08N01S	Desert Water Agency	DWA Well 41	Active	MUN	610-1000	D	DWA
112	04S05E09R01S	Coachella Valley Water District	CVWD Well 4567-1	Active	MUN	855-1150	D	CVWD
113	04S05E15G01S	Coachella Valley Water District	CVWD Well 4521-1	Active	MUN	500-800	D	CVWD
114	04S05E17Q02S	Desert Water Agency	DWA Well 31	Active	MUN	600-1000	D	DWA
115	04S05E25D02S	Coachella Valley Water District	CVWD Well 4507-2	Active	MUN	860-1320	D	CVWD
116	04S05E27K01S	Coachella Valley Water District	CVWD Well 4527-1	Active	MUN	850-1155	D	CVWD
117	04S05E29H01S	Desert Water Agency	DWA Well 26	Active	MUN	590-990	D	DWA
118	04S05E35G04S	Coachella Valley Water District	CVWD Well 4504-1	Active	MUN	600-1000	D	CVWD
119	04S06E18Q04S	Coachella Valley Water District	CVWD Well 4630-1	Active	MUN	480-990	D	CVWD
120	04S06E28K04S	Coachella Valley Water District	CVWD Well 4629-1	Active	Monitoring	496-796	D	CVWD

Table 3-6. Responsibilities for Groundwater Sampling and Laboratory Analyses

Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Overlying SNMP Agency[d]
121	04S07E31H01S	Coachella Valley Water District	CVWD Well 4722-1	Active	MUN	570-1160	D	CVWD
122	04S07E33L01S	Coachella Valley Water District	WRP7 MW-2D	Active	MUN	245-395	D	CVWD
123	05S06E02C01S	Coachella Valley Water District	CVWD Well 5664-1	Active	MUN	500-930	D	CVWD
124	05S06E06B03S	Coachella Valley Water District	CVWD Well 5630-1	Active	Monitoring	455-890	D	CVWD
125	05S06E09A01S	Coachella Valley Water District	CVWD Well 5682-1	Active	Monitoring	850-1300	D	CVWD
126	05S06E09F01S	Coachella Valley Water District	CVWD Well 5637-1	Inactive	MUN	450-830	D	CVWD
127	05S06E14B02S	Coachella Valley Water District	CVWD Well 5665-1	Inactive	MUN	400-600	D	CVWD
128	05S06E14P02S	Coachella Valley Water District	CVWD Well 5603-2	Active	MUN	720-975	D	CVWD
129	05S06E16A04S	Coachella Valley Water District	CVWD Well 5620-2	Active	MUN	1040-1360	D	CVWD
130	05S06E16K03S	Coachella Valley Water District	CVWD Well 5681-1	Active	Monitoring	900-1200	D	CVWD
131	05S06E17L01S	Coachella Valley Water District	CVWD Well 5667-1	Active	Monitoring	470-800	D	CVWD
132	05S06E20A02S	Coachella Valley Water District	CVWD Well 5674-1	Inactive	Monitoring	750-1050	D	CVWD
133	05S07E03D01S	Coachella Valley Water District	WRP7 MW-4D	Active	MUN	245-395	D	CVWD
134	05S07E04A01S	Coachella Valley Water District	WRP7 MW-1	Active	Monitoring	147-367	D	CVWD
135	05S07E15N01S	Indio Water Authority	Well AA	Active	MUN	550-1230	D	IWA
136	05S07E19A01S	Coachella Valley Water District	CVWD Well 5708-1	Inactive	MUN	450-970	D	CVWD
137	05S07E20J01S	Indio Water Authority	Well T	Active	MUN	580-1305	D	IWA
138	05S07E26E02S	Indio Water Authority	Well 3B	Active	MUN	500-1200	D	IWA
139	05S07E27P01S	Indio Water Authority	Well Z	Active	MUN	580-1290	D	IWA
140	05S07E33E01S	Indio Water Authority	Well S	Active	MUN	460-1260	D	IWA
141	05S07E34P04S	Indio Water Authority	Well V	Active	MUN	460-1270	D	IWA
142	05S07E35R02S	Indio Water Authority	Well U	Active	MUN	480-1190	D	IWA
143	05S07E36D03S	Coachella Water Authority	Well 19	Active	MUN	650-1250	D	CWA/CSD
144	05S08E31C03S	Coachella Water Authority	Well 11	Active	MUN	513-818	D	CWA/CSD
145	06S07E06B01S	Coachella Valley Water District	CVWD Well 6701-1	Active	MUN	580-800	D	CVWD
146	06S07E22B02S	Coachella Valley Water District	CVWD Well 6726-1	Active	MUN	640-1160	D	CVWD
147	06S07E34A01S	Coachella Valley Water District	CVWD Well 6728-1	Active	MUN	500-750	D	CVWD
148	06S07E34D01S	Coachella Valley Water District	CVWD Well 6729-1	Active	MUN	500-780	D	CVWD
149	06S08E06K02S	Coachella Water Authority	Well 12	Active	MUN	500-1010	D	CWA/CSD
150	06S08E09N02S	Coachella Water Authority	Well 16	Active	Monitoring	480-730	D	CWA/CSD
151	06S08E19D05S	Coachella Valley Water District	CVWD Well 6808-1	Active	MUN	675-1200	D	CVWD
152	06S08E22D02S	Coachella Valley Water District	CVWD Well 6803-1	Inactive	MUN	500-1100	D	CVWD
153	06S08E25P04S	Coachella Valley Water District	CVWD Well 6807-1	Active	MUN	665-1300	D	CVWD
154	06S08E28N06S	Coachella Water Authority	Well 18	Active	Monitoring	900-1190	D	CWA/CSD
155	07S08E17A04S	Coachella Valley Water District	CVWD Well 7803-1	Active	MUN	250-710	D	CVWD
156	07S09E23N01S	Coachella Valley Water District	CVWD Well 7990-1	Inactive	Unknown	530-560	D	CVWD
157		Indio Water Authority	Well 13A	Active	Irrigation	550-1171	D	IWA
158	03S05E08B01S	R.C Roberts	03S05E08B01S	Undetermined	Irrigation	356-516	D	DWA
159	03S05E17M01S	Desert Dunes Golf Club	03S05E17M01S	Active	Unknown	305-412	D	CVWD
160	03S05E20H02S	Donald Franklin	03S05E20H02S	Active	Irrigation	240-360	D	CVWD
161	03S06E21R01S	Joel Rosenfeld	03S06E21R01S	Undetermined	Irrigation	355-495	D	CVWD
162	05S05E12B03S	Tandika Corp	05S05E12B03S	Active	Irrigation	410-800	D	CVWD
163	05S06E13F01S	PD Golf Operations LLC	05S06E13F01S	Active	Irrigation	400-700	D	CVWD
164	05S06E15H01S	Toscana Country Club	05S06E15H01S	Active	Irrigation	430-950	D	CVWD
165	05S06E22C02S	Desert Horizons Country Club	05S06E22C02S	Active	Irrigation	550-990	D	CVWD
166	05S06E27A01S	El Dorado Country Club	05S06E27A01S	Active	MUN	458-596	D	CVWD
167	05S06E29P04S	Bighorn Golf Club	05S06E29P04S	Active	MUN	530-720	D	CVWD
168	05S07E07F04S	Myoma Dunes Mutual Water Company	Well 4	Active	MUN	430-730	D	MDMWC
169	05S07E08L01S	Myoma Dunes Mutual Water Company	Well 11	Active	Unknown	500-1060	D	MDMWC
170	05S07E17K01S	Myoma Dunes Mutual Water Company	Well 12	Active	Irrigation	450-950	D	MDMWC
171	05S08E09N03S	Jamie Brack	05S08E09N03S	Undetermined	Unknown	480-580	D	CVWD, IWA
172	06S07E27B01S	Andalusia Golf Club	06S07E27B01S	Active	Irrigation	300-780	D	CVWD
173	06S07E35L02S	Castro Bros	Castro Bros	Active	Unknown	300-400	D	CVWD
174	06S08E11A01S	Cocopah Nurseries Inc	06S08E11A01S	Active	Unknown	400-842	D	CVWD, CWA/CSD
175	06S08E31P01S	Deer Creek	Deer Creek	Active	Irrigation	400-550	D	CVWD
176	06S08E35E02S	Otto L. Zahler	06S08E35E02S	Undetermined	Unknown	521-596	D	CVWD
177	07S07E02G02S	Warren Webber	Warren Webber	Active	Irrigation	380-700	D	CVWD
178	07S08E01L02S	Bill Wordon	07S08E01L02S	Undetermined	Domestic	500-880	D	CVWD

Table 3-6. Responsibilities for Groundwater Sampling and Laboratory Analyses

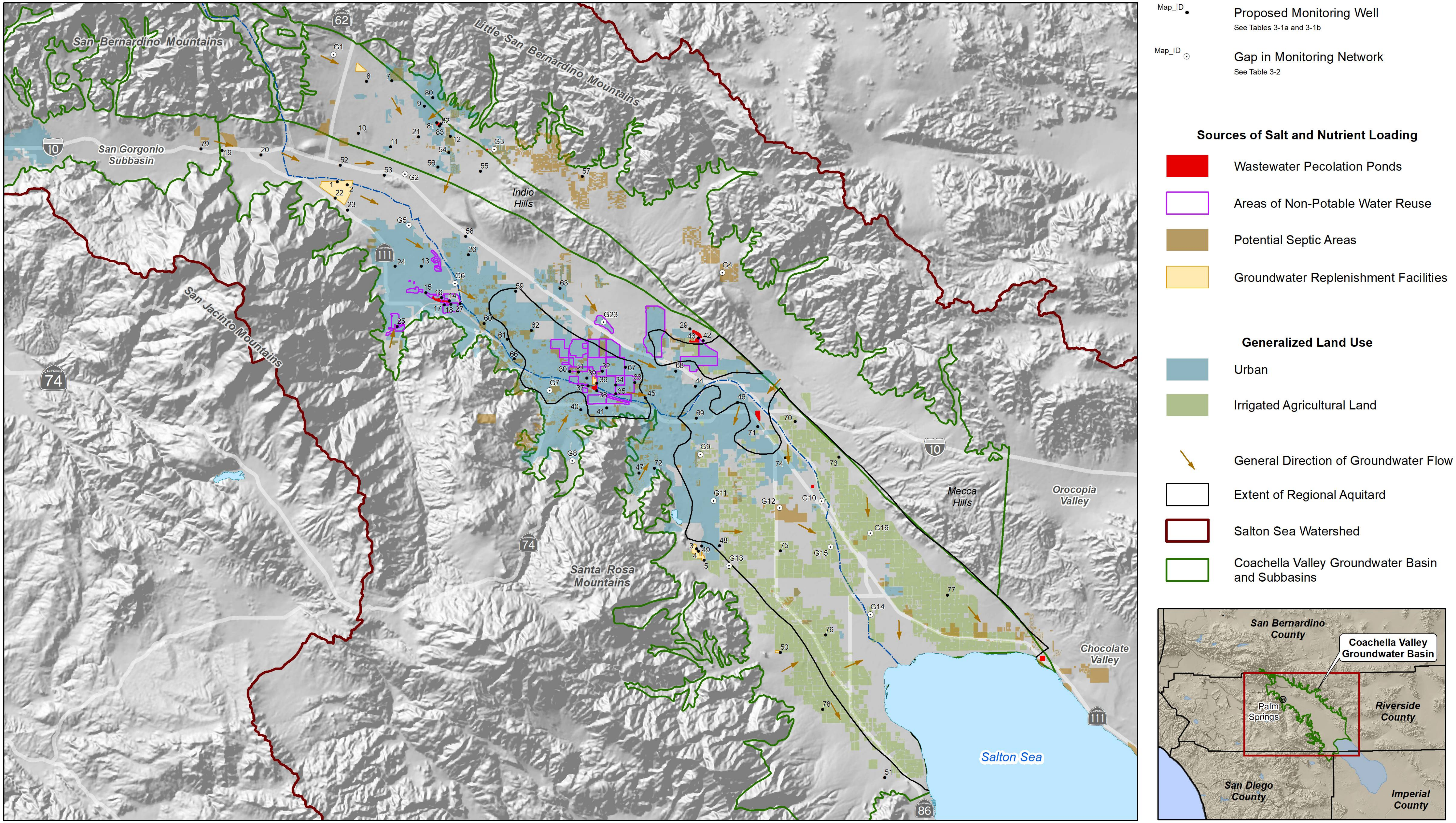
Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Overlying SNMP Agency[d]
179	07S08E27A02S	Gimmway Enterprises Inc	07S08E27A02S	Active	MUN	491-811	D	CVWD
180	07S09E10F01S	Prime Time International	07S09E10F01S	Active	Monitoring	360-500	D	CVWD
181		Mission Springs Water District	Well 31	Active	Monitoring	270-670	D	MSWD
182		Coachella Valley Water District	WRP2 MW3	Active	Monitoring	<90	P	CVWD
183	06S07E27J03S	Coachella Valley Water District	TEL-GRF MW-8	Active	Monitoring	25-45	P	CVWD
184	06S07E34A03S	Coachella Valley Water District	TEL-GRF MW-9	Active	Monitoring	25-45	P	CVWD
185	06S08E31R01S	Coachella Valley Water District	TEL-GRF MW-10	Active	Monitoring	25-45	P	CVWD
186	07S08E06P01S	Coachella Valley Water District	TEL-GRF MW-11	Active	Monitoring	25-45	P	CVWD
187		Coachella Valley Water District	PEW-1	Active	Monitoring	10-55	P	CVWD

(a) Well Status: "Active" means well is known to exist and currently used for original purpose; "Standby" means active backup well; "Inactive" means well exists but is no longer used as a water-supply.

(b) Well Use: MUN = municipal and domestic supply

(c) Depth Code: This monitoring program assigns wells to aquifer layers by depth. P = Perched aquifer system. S = Shallow aquifer system. D = Deep aquifer system

(d) CVWD = Coachella Valley Water District; CWA/CSD = Coachella Water Authority and Sanitary District; DWA = Desert Water Agency; IWA = Indio Water Authority; MDMWC = Myoma Dunes Mutual Water Company; VSD = Valley Sanitary District; MSWD = Mission Springs Water District; CPS = City of Palm Springs



Author: EM
Date: 12/11/2020
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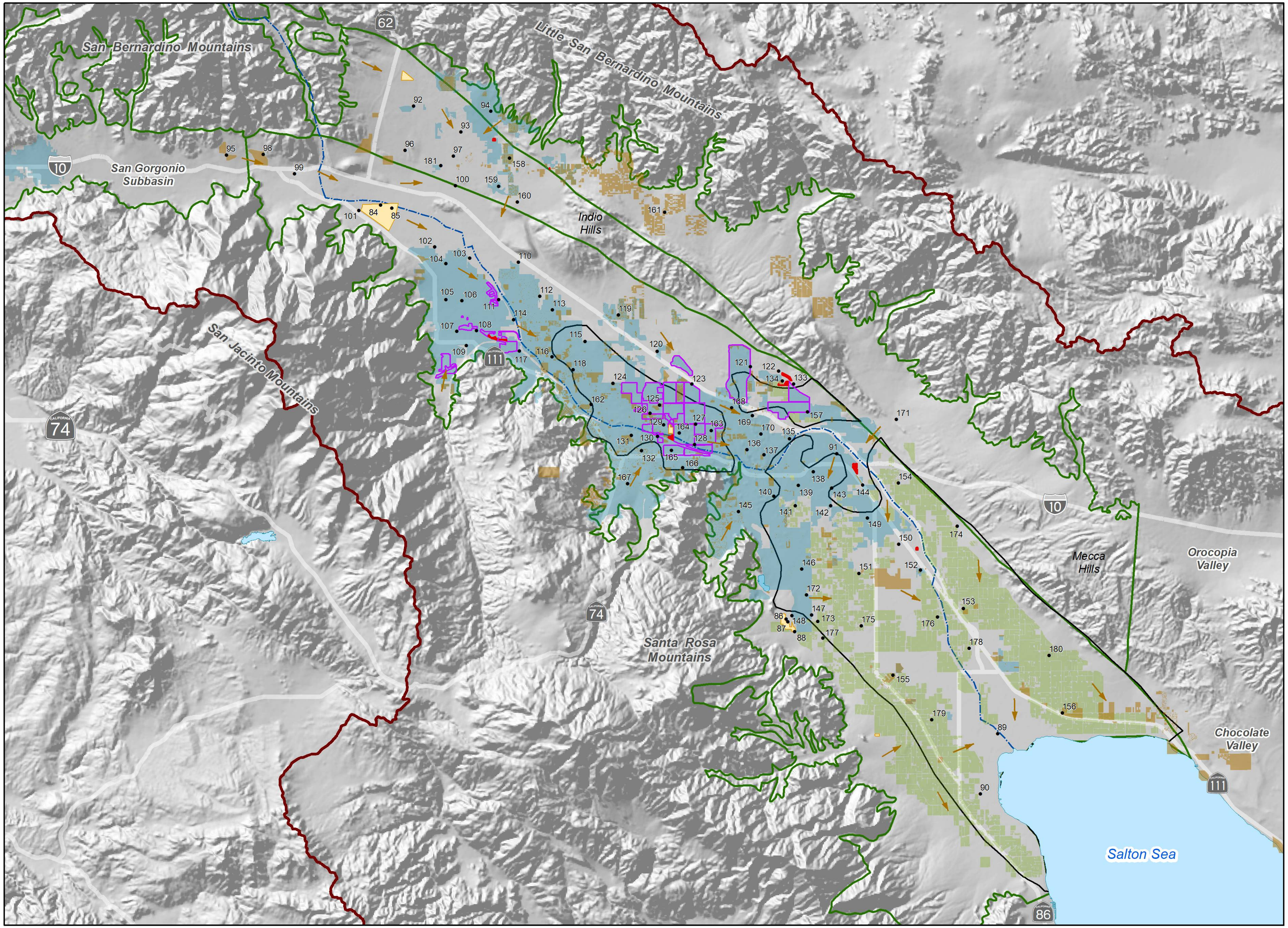
0 5 10 Miles
0 10 20 KM

Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Groundwater Monitoring Network and Gaps
Shallow Aquifer System

Figure 3-1



Map_ID ● Proposed Monitoring Well
See Tables 3-1a and 3-1b

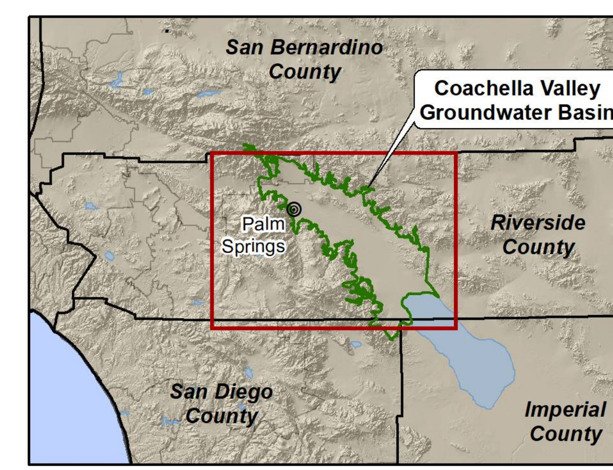
Sources of Salt and Nutrient Loading

- Wastewater Pecolation Ponds
- Areas of Non-Potable Water Reuse
- Potential Septic Areas
- Groundwater Replenishment Facilities

Generalized Land Use

- Urban
- Irrigated Agricultural Land

- General Direction of Groundwater Flow
- Extent of Regional Aquitard
- Salton Sea Watershed
- Coachella Valley Groundwater Basin and Subbasins



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0 10 20 KM

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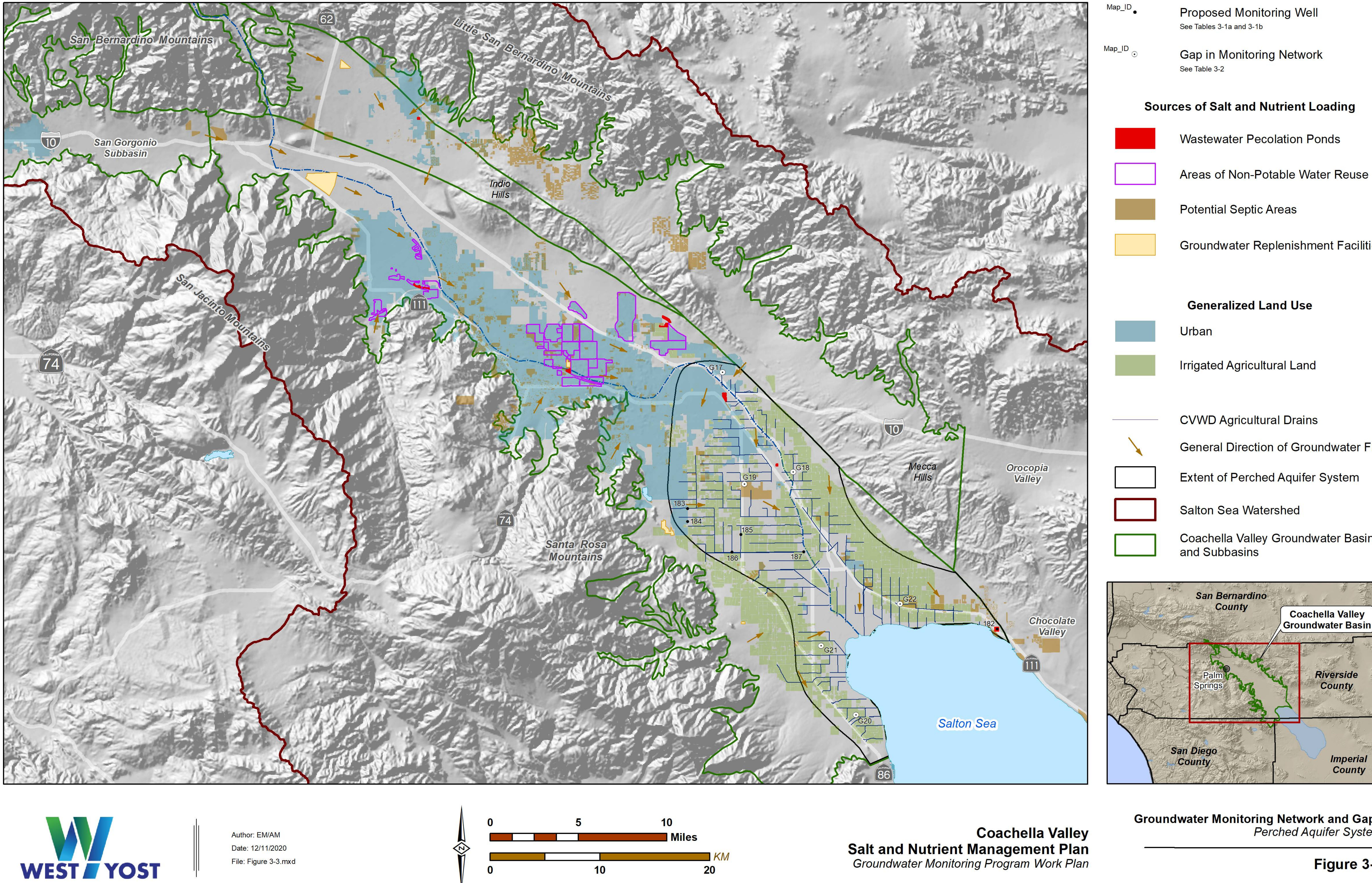
Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Groundwater Monitoring Network
Deep Aquifer System

Figure 3-2



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Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Groundwater Monitoring Network and Gaps
Perched Aquifer System

Figure 3-3

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4.0 IMPLEMENTATION PLAN

4.1 Schedule of Activities

The objective of the SNMP Agencies is to have a fully functioning groundwater monitoring program by March 31, 2027, including: (i) implementing the monitoring program at existing wells in the monitoring network; (ii) filling all gaps in the monitoring network identified in this Workplan; (iii) analysis of at least one groundwater sample for the constituents listed in **Table 3-5** from all monitoring wells in the network; and (iv) reporting of all laboratory results to the GAMA information system or its successor.

The schedule of activities to implement the groundwater monitoring program is described below:

- **Active and standby municipal production wells.**
  - All active and standby municipal production wells, identified in this SNMP groundwater monitoring program under a DDW monitoring order, will be sampled pursuant to their existing DDW Groundwater Monitoring Schedules. Most municipal production wells are sampled at least once every three years, or more frequently for some analytes like nitrate.
  - By March 31 of each year beginning in 2022, the SNMP Agencies will report to the GAMA information system the laboratory results from all groundwater samples collected during the prior calendar year for the analytes listed in **Table 3-5**.
- **Active monitoring wells.**
  - All monitoring wells identified in this SNMP groundwater monitoring program that are participating in regulatory or voluntary monitoring programs will be sampled pursuant to their existing monitoring schedules. Typically, such monitoring wells are sampled at least once every three years, and most are sampled more frequently. At least one sample must be analyzed for the constituents listed in **Table 3-5** every three years.
  - By March 31 of each year beginning in 2022, the SNMP Agencies will report to the GAMA information system the laboratory results from all groundwater samples collected during the prior calendar year for the analytes listed in **Table 3-5**.
- **Private wells and inactive wells.**
  - Starting 2021, SNMP Agencies responsible for sampling at private wells or inactive wells will initiate steps to collect the first groundwater sample from these wells. This may include executing access agreements and devising and/or implementing a method to collect a groundwater sample.
  - By the end of 2023, the responsible SNMP Agencies will collect and analyze one groundwater sample for every private and inactive well in the monitoring network, where feasible. By March 31 of each year beginning in 2022, the SNMP Agencies will report to the GAMA information system the laboratory results from all groundwater samples collected during the prior calendar year for the analytes listed in **Table 3-5**.
  - Thereafter, each private and inactive well will be sampled at least once every three years. It is the objective of this program to collect and analyze at least two groundwater samples for all private and inactive wells during the initial six-year implementation period.

- **Filling of Gaps in the Monitoring Network.**
  - In 2021, the SNMP Agencies that are responsible for filling gaps in the monitoring network will perform the necessary research and field work and develop plans to fill each gap. These plans will be summarized in the first annual progress report to the Regional Board by March 31, 2022.
  - Starting in 2022, the SNMP Agencies will initiate steps to fill the gaps. The objective is to fill all gaps in the monitoring network and collect and analyze at least one groundwater sample by December 31, 2026.
  - By March 31 of each year beginning in 2023, the SNMP Agencies will report to the GAMA information system the laboratory results from all groundwater samples collected during the prior calendar year for the analytes listed in **Table 3-5**.
  - It should be expected that new gaps in the monitoring network may be identified during implementation of the monitoring program. This may occur if a well in the monitoring network can no longer be sampled because it was destroyed, becomes inoperable, or otherwise is no longer available for monitoring. In such cases, the SNMP Agencies will attempt to identify a suitable replacement well (similar location and well construction) or develop a plan to fill this new gap in the monitoring network. These challenges and plans to address new data gaps will be summarized in the annual progress reports to the Regional Board (see Section 4.2 below).

4.2 Progress Reporting to the Regional Board

To keep the Regional Board informed of progress and future activities during implementation of the monitoring program, the SNMP Agencies will submit an *Annual Progress Report on Implementation of the CV-SNMP Groundwater Monitoring Program* to the Regional Board. The first progress report will be due by March 31, 2022 to report progress achieved during calendar year 2021. The contents of the progress report will include:

Section 1. Summary of Groundwater Monitoring Program and Implementation Schedule

Section 2. Activities Accomplished or In-Progress during the Prior Calendar Year

- Sampling and analysis of existing municipal production wells and monitoring wells.
- Progress made towards sampling and analysis of inactive and private wells.
- Progress made towards filling gaps in the monitoring network.
- Wells that can no longer be sampled and other challenges in sampling.

Section 3. Activities Planned for the Next Calendar Year

- Plans for sampling at wells, including addressing sampling challenges.
- Activities to replace wells that can no longer be sampled and fill gaps in the monitoring network.

Figures.

- Updated map of Groundwater Monitoring Network – *Shallow Aquifer System*.
- Updated map of Groundwater Monitoring Network – *Deep Aquifer System*.
- Updated map of Groundwater Monitoring Network – *Perched Aquifer System.*

Tables.

- Updated list of wells in Groundwater Monitoring Network.
- Updated list of gaps in Groundwater Monitoring Network.

Appendix A. 2020 CV-SNMP Groundwater Monitoring Program Workplan

4.3 Cost Estimates

Cost estimates were derived for the first six-year period of monitoring program implementation. Costs were estimated for only those additional activities that the monitoring program would cause the SNMP Agencies to perform (that they otherwise would not perform). These activities include: (i) sampling and analysis of private wells; (ii) filling of gaps in the monitoring program; and (iii) preparing the annual progress reports to the Regional Board.

Table 4-1 summarizes the cost estimates by task and subtask. The costs described herein are first-order estimates. Actual costs may vary because monitoring program implementation may unfold differently than assumed herein. For example, a gap in the monitoring network may be filled by identifying an existing suitable well, as opposed to constructing a new well. In addition, these costs do not include land acquisition costs for new monitoring well sites or any needed site improvements, including grading, block walls, or fencing.

Sampling of private wells. **Table 3-6** indicates there are 58 private wells that are proposed to participate in the monitoring program. Each well is assumed to be sampled twice over the first six years (116 samples).

The main activities associated with the sampling of private wells include:

1. Performing a field canvass of each well to: initiate coordination with the well owners; document the condition of the well; and determine the current ability to collect a water-quality sample.
2. Developing and executing an access agreement with the private well owner.
3. If necessary, hiring a subcontractor to construct wellhead improvements to enable sample collection. It is assumed that about half of the private wells will require such improvements at $3,000 per well.
4. Perform two sampling events and laboratory analyses over the six-year period. Laboratory costs are about $77 per sample.

Total costs for sampling of private wells over the first six-year implementation period are estimated at about $260,000.

Filling gaps in the monitoring network. **Table 3-4** indicates that there are 23 gaps in the monitoring network that need to be filled over the first six-year period. For cost estimating purposes, it is assumed that each gap will be filled with the construction of a new monitoring well.

Six of the proposed monitoring wells are targeted for the Perched aquifer system with well depths of less than about 100 ft-bgs—these well boreholes are assumed to be drilled via a sonic method. Sixteen of the proposed wells are targeted for the Shallow aquifer system with well depths of less than about 500 ft-bgs—these well boreholes are assumed to be drilled via a mud-rotary method. One of the proposed wells is estimated to have a total depth of about 1,000 ft-bgs—this well borehole is assumed to be drilled via a mud-rotary method.

The main activities associated with the drilling and construction of new monitoring wells are listed below.

1. Perform a well-siting study to select 23 available and appropriate well sites.
2. Prepare two sets of standard technical specifications for the drilling, construction, and development of two types of monitoring wells: (i) a monitoring well in the Perched aquifer system and (ii) a monitoring well in the Shallow or Deep aquifer systems.
3. Acquire well-site property and/or execute easements. The cost associated with land purchase or long-term land leases are unknown at this time and were therefore not estimated; however, such costs are likely to be significant.
4. Prepare bid package and conduct the bid process to select a well drilling/construction subcontractor. It is assumed that one contractor will construct all 23 wells.
5. Obtain all permits and CEQA clearance.
6. Drill, construct, and develop 23 monitoring wells. The wells are assumed to be comprised of 4” PVC Schedule 80 pipe with 40 feet of well screens. Well head completions are assumed to be an above ground 10-inch diameter stovepipe casing with a locking cap. Any needed well-site improvements are unknown at this time and were therefore not estimated; however, such costs are likely to be significant.
7. Prepare well completion reports for 23 new monitoring wells and file Well Completion Reports with the California Department of Water Resources. New monitoring wells will be added to the SNMP database.

Total costs to fill all gaps in the monitoring network over the first six-year implementation period are estimated to be about $2,900,000. These estimates do not include land acquisition costs for new monitoring well sites or any needed site improvements.

Task 3 – Preparing the Annual Progress Report to the Regional Board. As described above in Section 4.2, the SNMP Agencies will prepare an *Annual Progress Report on Implementation of the CV-SNMP* Groundwater *Monitoring Program* to the Regional Board each year to keep it abreast of progress and future activities.

Total costs to prepare five annual progress reports over the first six-year implementation period are estimated to be about $140,000.

Total Costs. Total costs for the first six-year period of monitoring program implementation are estimated to be about $4,100,000 (including a contingency of 25%). Total costs are likely to be higher because these estimates do not include land acquisition or site improvement costs for new monitoring well sites.

Table 4-1. Cost Estimates -- *Initial Six-Year Implementation Period of CV-SNMP Groundwater Monitoring Program*

	Task and Subtask Descriptions	Notes	Labor Cost		Other Direct Costs						Total Reimbursable Expenses		Total Project Costs	
			Sub-Task	Task	Travel	Well Construction Services (Sub)	E-Logging Services (Sub)	Permits and CEQA	Field Equip	Lab	Sub-Task	Task	Sub-Task	Task
Task 1 - Sampling and Analysis of Private Wells				**$152,146**								**$108,030**		**$260,175**
1.1	Perform field canvass of private wells; develop access agreements		$19,529		$1,472						$1,472		$21,001	
1.2	Development/execution of private well access agreements		$79,924								$0		$79,924	
1.3	Devise and construct and wellhead improvements to enable sample collection		$16,733			$87,000					$87,000		$103,733	
1.4	Perform two sampling and laboratory analysis events over the five-year period		$35,960						$10,626	$8,932	$19,558		$55,518	
Task 2 - Filling of Gaps in the Monitoring Network				**$1,089,443**								**$1,769,514**		**$2,858,957**
2.1	Perform field work and research; prepare plan to fill gaps in monitoring network		$53,776								$0		$53,776	
2.2	Prepare well-siting study to identify 23 well sites		$50,828								$0		$50,828	
2.3	Prepare technical specifications for of two monitoring well types		$32,378								$0		$32,378	
2.4	Acquire well sites and/or execute lease agreements		$14,996								$0		$14,996	
2.5	Conducting a bid process to select a well drilling/construction subcontractor		$5,988		$184						$184		$6,172	
2.6	Obtain permits and CEQA clearance		$3,299					$24,600			$24,600		$27,899	
2.7	Drill, construct, and develop six wells in the Perched aquifer system	a	$94,608		$1,536	$89,820	$42,000			$3,180	$136,536		$231,144	
2.8	Drill, construct, and develop 16 wells in the Shallow aquifer system	a	$555,712		$8,192	$1,314,720	$112,000			$8,480	$1,443,392		$1,999,104	
2.9	Drill, construct, and develop one deep monitoring well	a	$51,492		$512	$158,260	$5,500			$530	$164,802		$216,294	
2.10	Prepare well completion reports for 23 new monitoring wells/file with DWR		$226,366										$226,366	
Task 3 - Preparing Annual Progress Reports to the Regional Board				**$139,800**								**$0**		**$139,800**
	Project Subtotals			**$1,381,389**	**$11,896**	**$1,649,800**	**$159,500**	**$24,600**	**$10,626**	**$21,122**		**$1,877,544**		**$3,258,932**
	Contingency (25%)													**$814,733**
	Project Total													**$4,073,665**

Notes:

a = These estimates do not include land acquisition costs for new monitoring well sites or any needed site improvements, including grading, block walls, or fencing.

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Appendix B

Example Maps and Data Graphics to Characterize Groundwater Quality

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Table B-1: Example of Summary Statistics for N/TDS Concentrations at Wells

Well_ID	Well Name	Well Owner	Well Status	Management Zone	Aquifer Layer(s)	Number of TDS Sample Results	Mean of Annual Average Concentration Values	Standard Error	Standard Deviation
1025698	MW1	Alcoa	Monitoring	Chino-3/Chino-North	1	49	789.49	60.13	255.12
1025699	MW2	Alcoa	Monitoring	Chino-3/Chino-North	1	46	1519.88	76.30	275.12
1025700	Offsite MW1	Alcoa	Monitoring	Chino-3/Chino-North	2	32	444.13	12.06	41.77
1025701	Offsite MW2	Alcoa	Monitoring	Chino-3/Chino-North	1	23	500.72	10.40	32.88
1025702	Offsite MW3	Alcoa	Monitoring	Chino-3/Chino-North	1	33	518.14	31.35	113.03
1025703	Offsite MW4	Alcoa	Monitoring	Chino-3/Chino-North	1	30	678.56	57.31	198.53
1025704	MW2A	Alcoa	Monitoring	Chino-3/Chino-North	1	6	2700.00	237.54	411.43
1025705	NA_1006182	Almo, M.C.	Monitoring	Beaumont	unknown	5	339.04	10.57	23.63
1025706	Arco Well 14	Arco Facility 5172	Monitoring	Yucaipa	12	2	275.00		
1025707	Arco Well 18	Arco Facility 5172	Monitoring	Yucaipa	12	2	310.00		
1025708	Arco Well 19	Arco Facility 5172	Monitoring	Yucaipa	12	1	320.00		
1025709	Arco Well 20	Arco Facility 5172	Monitoring	Yucaipa	12	2	295.00		
1025710	Arco Well 21	Arco Facility 5172	Monitoring	Yucaipa	1	2	290.00		
1025711	Arco Well 22	Arco Facility 5172	Monitoring	Yucaipa	12	2	320.00		
1025712	Arco Well 23	Arco Facility 5172	Monitoring	Yucaipa	12	2	280.00		
1025713	Arco Well 24	Arco Facility 5172	Monitoring	Yucaipa	12	2	300.00		
1025714	Arco Well 25	Arco Facility 5172	Monitoring	Yucaipa	12	2	300.00		
1025715	3	Baseline Gardens Mutual Water Company	Active	Bunker Hill A	23	1	331.40		
1025716	PS & B 2	Baseline Gardens Mutual Water Company	Active	Bunker Hill B	1	1	579.00		
1025717	BV 5th Ave. 1	Bear Valley Mutual Water Company	Active	Yucaipa	3	2	340.00		
1025718	Cemetery Well 1	Beaumont Cemetery	Active	Beaumont	1	3	346.67	21.70	37.58
1025719	Cemetery Well 2	Beaumont Cemetery	Active	Beaumont	12	3	388.80	35.82	62.04
1025720	BCVWD 13	Beaumont Cherry Valley Water District	Active	Beaumont	123	2	230.00		
1025721	BCVWD 12	Beaumont Cherry Valley Water District	Active	Beaumont	123	8	240.86	9.75	25.80

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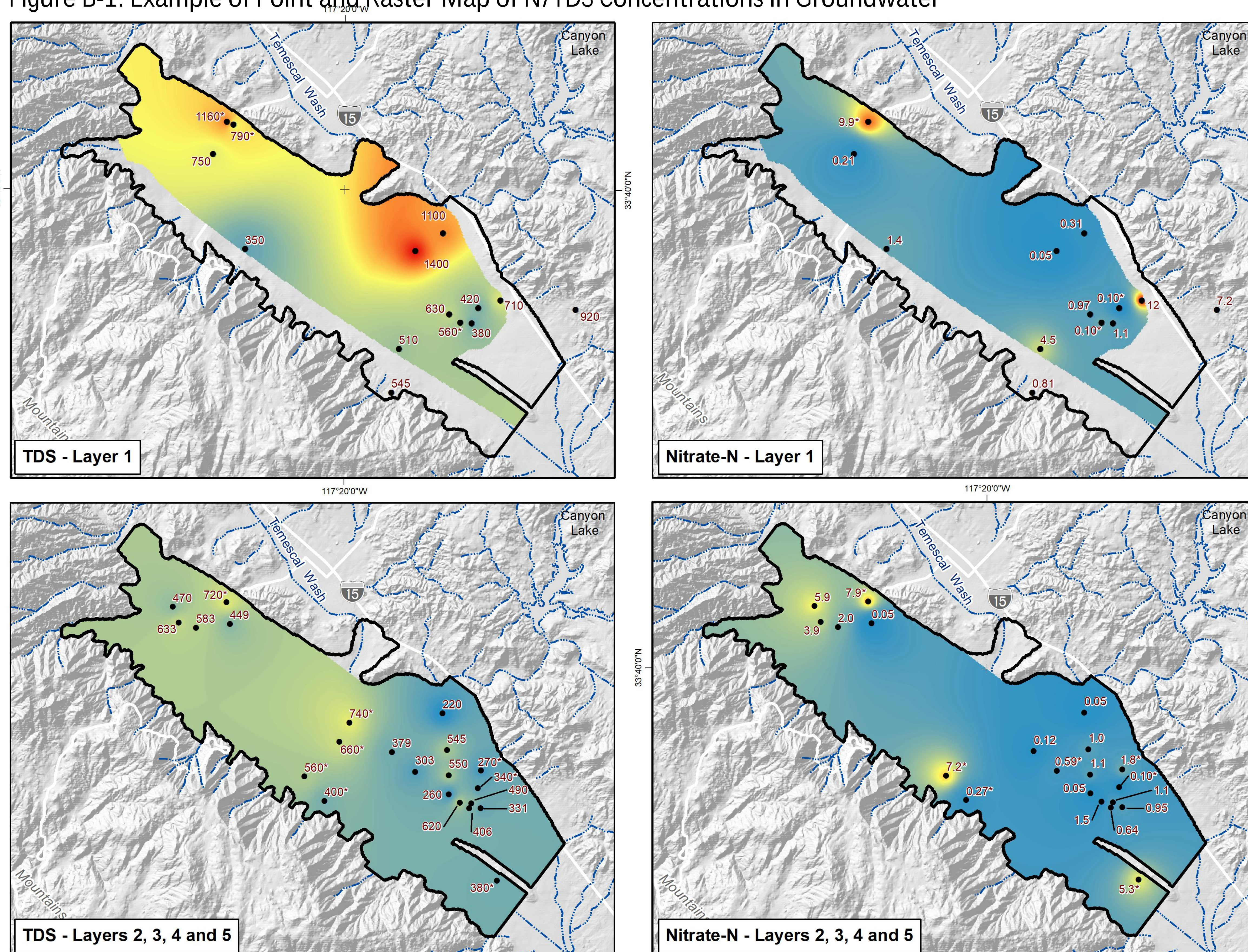
Figure B-1: Example of Point and Raster Map of N/TDS Concentrations in Groundwater



TDS Concentration (mgl)

High : 1400

810

Low : 220

Nitrate-N Concentration (mgl)

High : 12

6

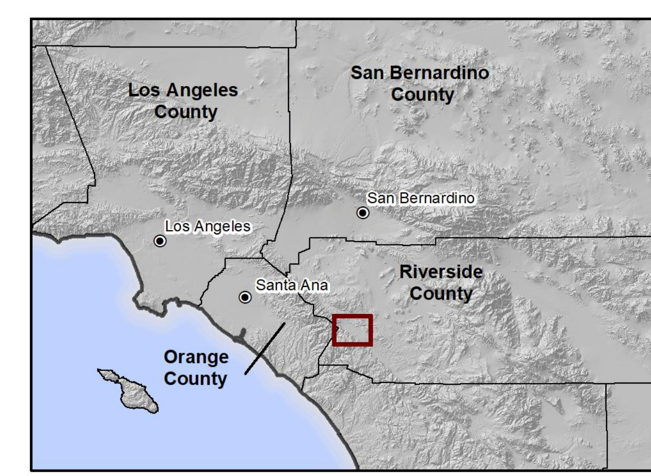
Low : 0.05

TDS/Nitrate-N Concentration (mgl)

Wells with current TDS and nitrate data used to estimate the initial conditions. A "*" in the label means that data prior to 2015 was used because no current data was available.

Elsinore Groundwater Model Boundary

Streams and Flood Control Channels



Prepared by:

WILDERMUTH ENVIRONMENTAL, INC.

Author: CS

Date: 8/30/2018

Document Name: Figure_B-10_Initial_Conditions_pts

0 1 2 3 Miles

0 1 2 3 4 KM

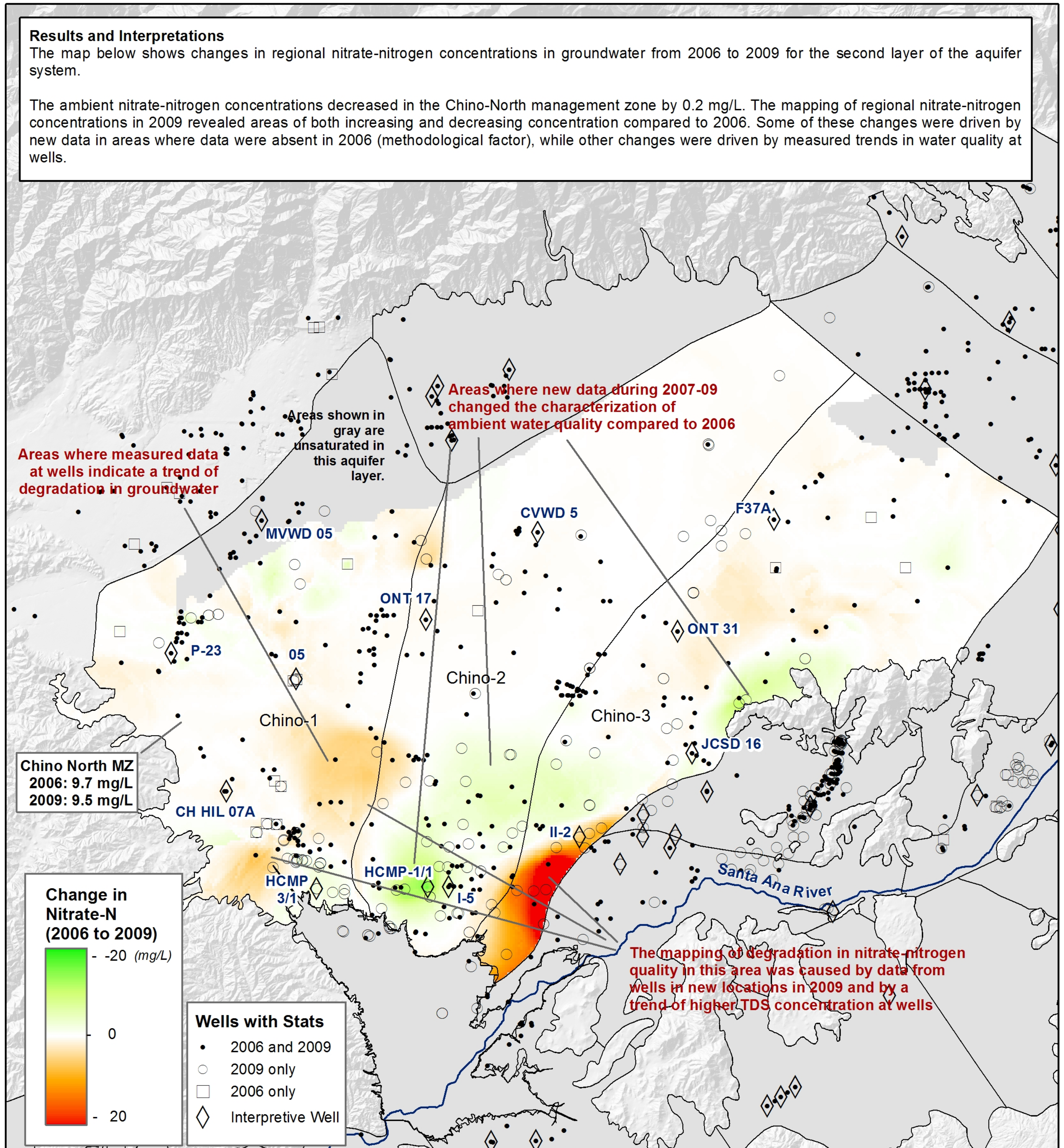
TDS and Nitrate Concentration Projections for the Elsinore GMZ

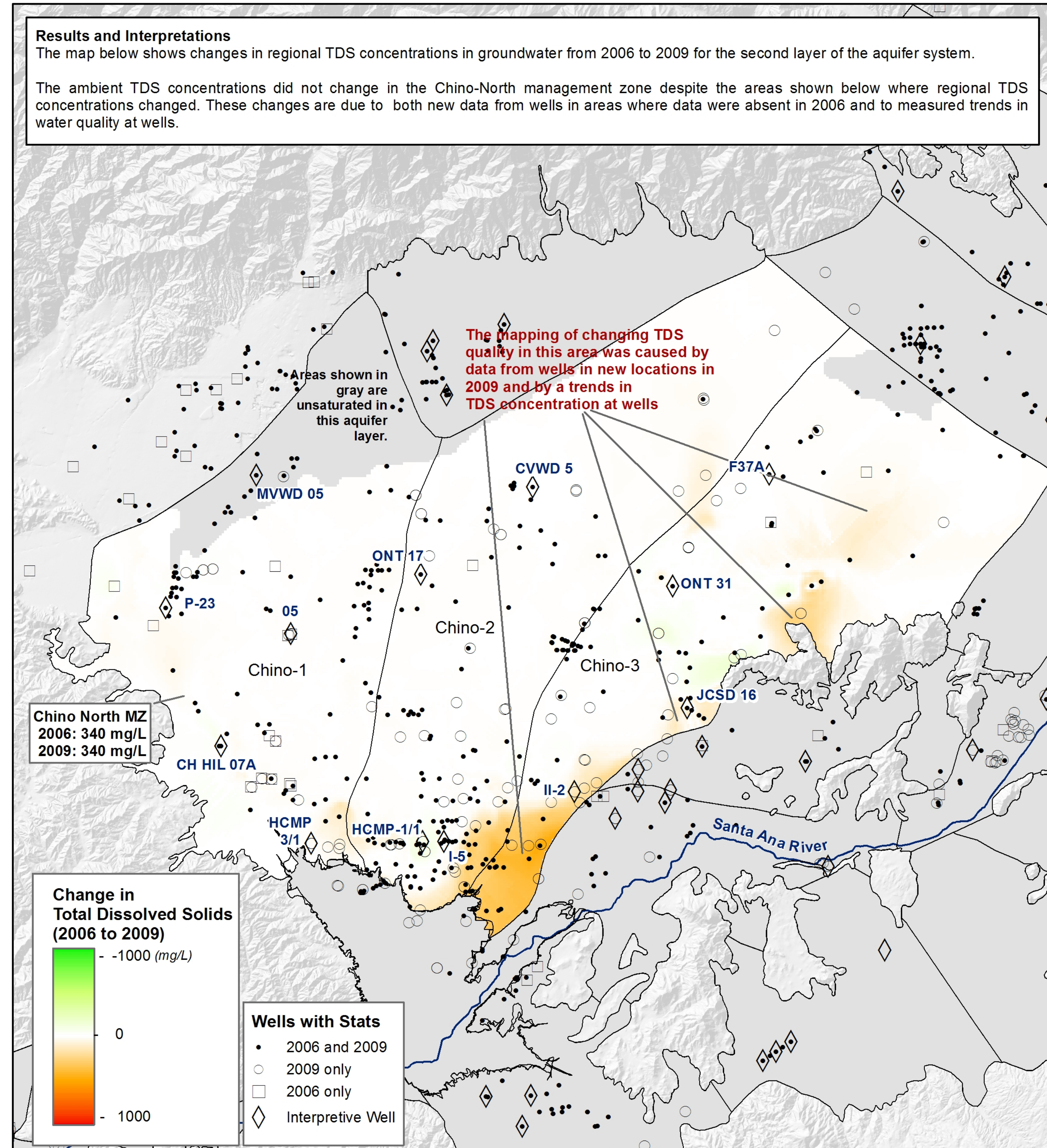
Elsinore Management Zone

TDS and Nitrate-N Concentrations Initial Conditions

Figure B-10

Figure B-2: Example of Water Quality Change Exhibit





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File: Figure 4-10

0 2.5 5 7.5 Miles
0 2.5 5 7.5 10 12.5 KM

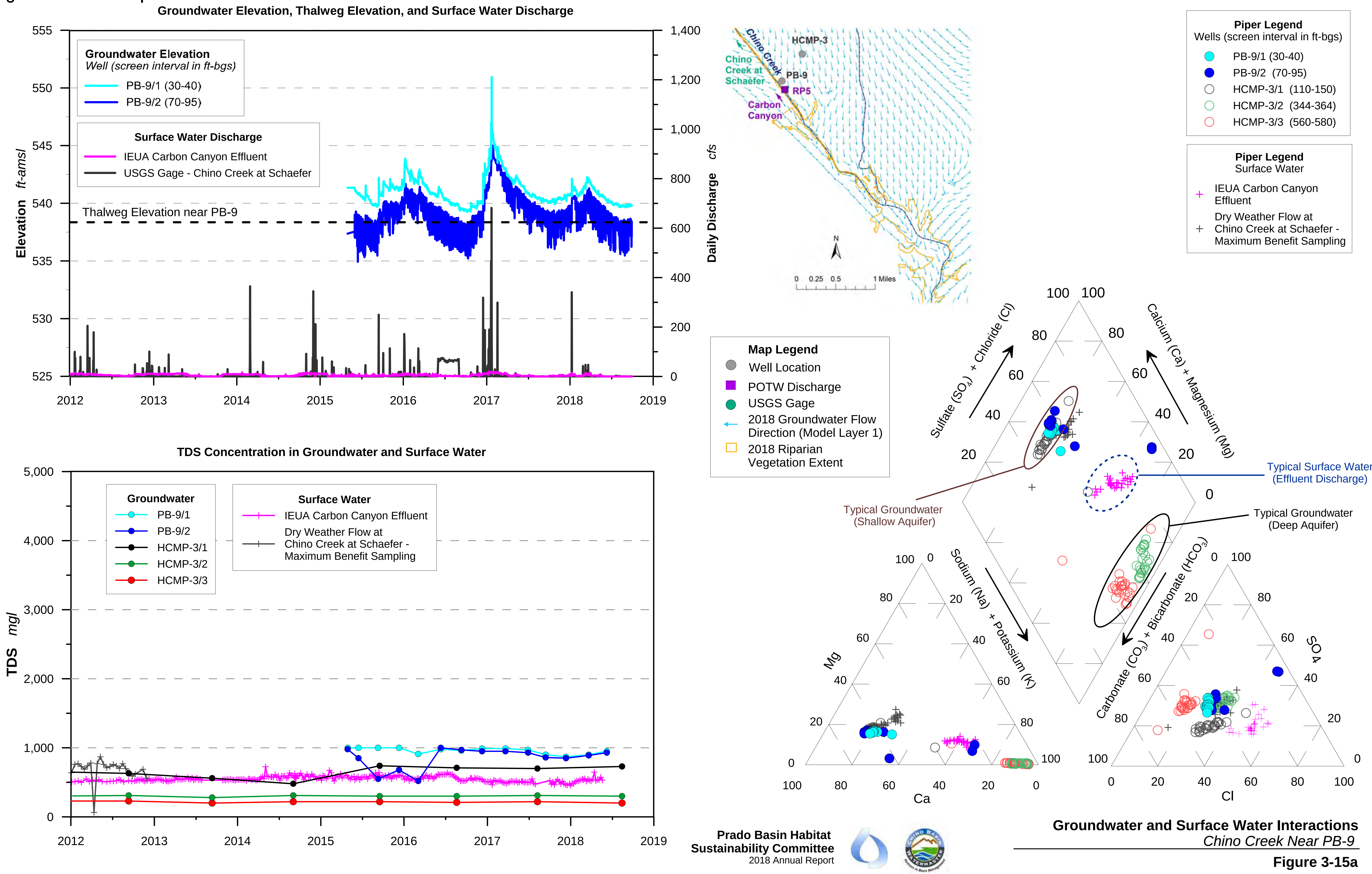
Basin Monitoring Program Task Force
Recomputation of Ambient Water Quality for the Period 1990 to 2009

SAWPA

Change Maps of Nitrate-N and TDS
Chino North Management Zone - 2006 to 2009
Layer 2

Figure 4-10

Figure B-3: Example of a Multi-variate Exhibit of Groundwater and Surface Water



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Appendix C

Responses to Comments on the Draft CV-SNMP Development Workplan

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Appendix C: Responses to Comments on the Draft CV-SNMP Development Workplan

Staff at the Regional Water Quality Control Board, Colorado River Basin (Regional Board) received and reviewed the draft CV-SNMP Development Workplan dated April 30, 2021. The Coachella Valley Water District (representing the CV-SNMP Agencies) received a letter from the Regional Board dated June 30, 2021 with comments and suggested revisions to the draft CV-SNMP Development Workplan. The Regional Board comment letter is attached to this Appendix C.

The CV-SNMP Agencies prepared responses to the Regional Board comments and revised the CV-SNMP Development Workplan to address the comments. The Regional Board's comments and the CV-SNMP Agencies' responses are described below.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
1	Section 1.0	Page 1 of the Workplan states: *The objective of the CV-SNMP is to sustainably manage salt and nutrient loading in the Coachella Valley Groundwater Basin in a manner that protects its beneficial uses*. Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs. The Sustainable Groundwater Management Act (SGMA) considers sustainable groundwater management to be occurring within a basin that is operated in such a way so as not to cause "undesirable results," such as chronic depletion of groundwater, groundwater degradation, or land subsidence. The Regional Water Board recommends the TAC develop a plan to manage identified salt and nutrient loading sources and provide a definition of what beneficial use protection will consist of, integrating the antidegradation analysis into the stakeholder's definition of protected.	The CV-SNMP Agencies, which include Groundwater Sustainability Agencies in the Indio and Mission Creek Subbasins, understand the SGMA definitions and requirements for sustainable groundwater management. SGMA compliance work for the two medium-priority basins in the Coachella Valley is being conducted under separate efforts and will leverage the development and implementation of the CV-SNMP for the sustainable management of salts and nutrients. The CV-SNMP Agencies believe the CV-SNMP Development Workplan addresses the Regional Board's recommendation to develop an SNMP that will manage identified salt and nutrient loading (see Section 4.3 of the Workplan) to protect defined beneficial uses (Section 4.5), and will include an anti-degradation analysis that satisfies the requirements of State Board Resolution 68-16 (Section 4.10).

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
2	Section 1.3	Page 7 of the Workplan states: *CV-SNMP Agencies have concluded that numeric objectives for [total dissolved solids] TDS and nitrate in groundwater are necessary to resolve the concerns of the Regional Board*. Identifying a water quality objective is necessary to determine the assimilative capacity of the aquifer. To assess the assimilative capacity of salts, the 2015 CV SNMP cited the "upper limit" Secondary Maximum Contaminant Level (SMCL) of 1,000 milligrams per liter (mg/l) as the water quality objective for total dissolved solids (TDS) excluding the more protective and "recommended limit" SMCL of 500 mg/l. The water quality data indicated that many areas within the basin had TDS concentrations that were less than 500 mg/l (the lower "recommended limit" of the SMCL range). Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California (Antidegradation Policy) states "Whereas the quality of some waters of the State is higher than that established by the adopted policies and it is the intent and purpose of this Board that such higher quality shall be maintained to the maximum extent possible consistent with the declaration of the Legislature; ..." The Regional Water Board recommends that the SNMP provide the scientific basis including an antidegradation analysis for any proposed water quality objectives.	The CV-SNMP Agencies believe that the approach presented in the CV-SNMP Development Workplan addresses the Regional Board's recommendation to provide the scientific basis for setting water quality objectives pursuant to CWC Section 13241 and will include an anti-degradation analysis that satisfies the requirements of State Board Resolution 68-16 (see Section 4.10 of the Workplan).

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
3	Section 1.3.1	Page 8 of the Workplan states: *The CV-SNMP Development Workplan must address each of these factors in setting the TDS objectives for groundwater management zones*. California Water Code § 13241 [Water quality objectives] states that "Each regional board shall establish water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance;..." The CV SNMP stakeholders may present recommendations regarding TDS water quality objectives, which the Regional Water Board will review and make a final determination regarding adoption into the Water Quality Control Plan for the Colorado River Basin Region (Basin Plan). The Regional Water Board recommends deleting the word 'setting' and using the word 'recommending' TDS objectives for groundwater.	The CV SNMP Development Workplan has been revised to replace the word "setting" with the word "recommending."
4	Section 2.2.2	Page 12 of the Workplan describes the general occurrence of groundwater, and how groundwater flows through and discharges from each subbasin. Publicly available data on the San Jacinto Tunnel installed through fractured bedrock in the 1930's and operated by Metropolitan Water District (MWD) reports that the fractured crystalline bedrock units contain and convey a substantial amount of water in the subsurface. The concept of a "mega-watershed groundwater system" from mountain block recharge is provided in the works of Robert Bisson and Jay Lehr.[1] In that mountain front recharge is identified later in the CV SNMP, Regional Water Board suggests the inclusion of a discussion on the water bearing nature of the surrounding fractured bedrock units.	Section 2.1 has been updated to recognize that the bedrock formations in the hills and mountains that surround the groundwater basin can contain groundwater within pore spaces and fractures. Subsurface inflow from the bedrock formations will be included in the technical analysis of salt and nutrient loading (Sections 4.3, 4.7, and 4.8 of the Workplan).

[1] https://www.oregondigital.org/downloads/oregondigital:df710j60x

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
5	Section 2.3.2	Page 14 identifies the mechanisms by which salts and nutrients are discharged from each subbasin. Dr. John Wilson's (New Mexico Tech) work provides strong research in regard to the removal of salts and nutrients through microbial activity. Specifically, see Dr. Wilson's study of salt and nutrient uptake and removal where there is mixing of shallow groundwater and surface water (hyporheic zone).[2] The Regional Water Board recommends evaluating microbial uptake as a salt and nutrient management mechanism.	Section 2.3.1 has been revised to include "microbial processes" in the description of the complexities of the N/TDS loading process.
6	Section 4.2	Page 39 of the Workplan states: *The objective of this task is to convene a CV-SNMP Stakeholder Group and the CV-SNMP Technical Advisory Committee (TAC). The CV-SNMP Agencies and the selected consultants will organize and run both groups during the implementation of the CV-SNMP Development Workplan*. A locally driven and controlled, collaborative process open to all stakeholders and the regional water board will contribute to the development of a CV SNMP that will manage salts and nutrients on a basin-wide basis and achieve the goals of groundwater sustainability, recycled water use, and water quality protection. The Regional Water Board recommends deleting the word "run" and adding a different word or words such as "will facilitate."	Section 4.2 has been revised to replace the word "run" with "facilitate."

[2] https://www.sciencedirect.com/topics/earth-and-planetary-sciences/hyporheic-zone

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
7	Section 4.2.1	Page 40 of the Workplan states: *Potential stakeholders include but are not limited to: the agricultural community and groups; golf course industry groups; tribes; the Coachella Valley Regional Water Management Group; the Groundwater Sustainability Agencies in the Coachella Valley; all major water and wastewater agencies; industrial dischargers; county and city land use planning agencies; Federal and State agencies; and nongovernmental organizations (NGOs).* *A critical first step will be to solicit input from the CV-SNMP Stakeholder Group as to their issues, needs and wants. This information will be collected up front so the CV-SNMP Agencies and consultants can proactively address stakeholder concerns, and potentially incorporate them in the CV-SNMP development process.* Achieving the goals of groundwater sustainability, recycled water use, and water quality protection is best achieved through the management of salts and nutrients on a basinwide basis through collaborative processes open to all stakeholders. Documenting and addressing the input from an all-inclusive stakeholder group will help identify the water use needs of a diverse population and address historical and state-wide SNMP development challenges identified during the 2018 Policy revision such as managing salt and nutrient loading to the basin from sources other than recycled water and the ability/authority of the stakeholders to implement best management practices and salt and nutrient management measures. The Regional Water Board encourages the CV SNMP Agencies to keep all-inclusiveness as a priority and involve all major stakeholders within the basin. The CV SNMP Agencies should also consider the inclusion of significant stakeholders from outside the basin such as The Colorado River Basin Salinity Control Program and the MWD.	Section 4.2.1 has been revised to: - Add the Colorado River Basin Salinity Control Forum and the Metropolitan Water District of Southern California to the list of potential CV-SNMP stakeholders. - Include the following bullet to describe the objectives of convening the CV-SNMP Stakeholder Group: • Understand the ability/authority of the stakeholders to implement best management practices and salt and nutrient management measures.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
8	Section 4.2.2	Page 40 of the Workplan states: *Regional Board staff will be encouraged to participate on the TAC in an advisory role*. Regional Water Board understands that critical details and decisions to develop an adequate CV SNMP will be established through the TAC and are committed to working with this committee.	Comment noted and appreciated.
9	Section 4.3	Page 40 of the Workplan states: *The objective of this task is to quantify the individual components of N/TDS (nitrate and TDS) loading to groundwater*. Mountain front recharge has been identified as a potential source of aquifer recharge originating from within the basin's watershed. The Regional Water Board recommends quantifying the salt and nutrient loading from the mountain front recharge component through evaluation of representative bedrock springs as indicators of the hydrologic conditions of the fractured bedrock units.	Section 4.3.1 has been revised to include the collection of historical "Water-quality data from bedrock springs, wells, and streamflow within the watersheds tributary to the Coachella Valley" to characterize the water quality of subsurface inflow from the surrounding mountains and hills.
10	Section 4.3	Page 41 of the Workplan states: *The characterization of N/TDS loading will be performed for a recent historical period to the present to characterize seasonal variations and long-term trends in loading and generate estimates of N/TDS loads in the vadose zone. The length of the historical period will be defined as part of this task but should be long enough to characterize the N/TDS loads in the vadose zone*. The required antidegradation analysis component of the CV SNMP, discussed in Section 4.10.3 of the Workplan, will need to incorporate a discussion on the impacts of elevated salinity to the public and the public infrastructure since 1968. The Regional Water Board recommends evaluation of past nitrate and salt (TDS) loading estimates for each management zone extending at least to 1968.	Comment noted. The SNMP Agencies will conduct the required antidegradation analysis in accordance with the requirements of the Antidegradation Policy. The exact length of the "historical period" will be defined as part of this task. Considerations will include the requirements of the Antidegradation Policy, as well as the availability of data and information and solute travel times through the vadose zone.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
11	Section 4.3.2	Page 42 of the Workplan states: *Once the methods are finalized, the time-history of the volumes and associated N/TDS concentrations will be estimated and described for each N/TDS loading term*. The CV SNMP must identify what 'methods' the Workplan is referring to.	Refer to the preceding paragraph. The "methods" are the "the types of tables, maps, and data graphics that can be prepared with the available data to characterize historical and current N/TDS loading to groundwater." The text in 4.3.2 has been revised to replace the word "methods" with "types of tables, maps, and data graphics."
12	Section 4.4	The introduction to Section 4.4 states: *The objective of this task is to characterize nitrate and TDS concentrations in groundwater as of 2020 (i.e. current conditions). The characterization will include an analysis of the time history of nitrate and TDS concentrations in groundwater that led to current conditions*. The Regional Water Board concurs that establishing existing water quality is necessary to compute the potential existence and magnitude of assimilative capacity for a basin, subbasin, or management zone and supports other proposed Workplan tasks; and also agree that the proposed evaluation of past water quality will assist with an understanding of nitrate and TDS historical trends in groundwater. The Regional Water Board expects the fully developed groundwater monitoring plan to provide groundwater quality data that is representative of the management zones and encourages the TAC to develop a technically defensible method to evaluate the ambient water quality of each area.	The CV-SNMP Agencies completed the CV-SNMP Groundwater Monitoring Program Workplan (final report dated December 23, 2020), and the Regional Board approved the CV-SNMP Groundwater Monitoring Program Workplan in a letter dated February 21, 2021. The intent of the monitoring program is to provide groundwater data that is representative of all subbasins, subareas, and depth-specific aquifer systems within the Basin. The approved CV-SNMP Groundwater Monitoring Program Workplan is included as Appendix A and is summarized in Sections 2 and 3 of this workplan. Section 4.5 describes the process to define the *ambient water quality (AWQ) metric* in each management zone that will be used to estimate ambient water quality conditions and assess beneficial use protection. An AWQ metric is a technical method to estimate "ambient" N/TDS concentrations in each groundwater management zone. The purpose of AWQ metrics is to enable the comparison of ambient N/TDS concentrations in groundwater versus the beneficial-use thresholds and water quality objectives, and thereby indicate the state of beneficial use protection.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
13	Section 4.5	Page 47 of the Workplan states: The results of this task will provide the necessary information to: - Support subsequent tasks in this workplan to: • Set TDS objectives pursuant to CWC 13241(a): Past, present, and probable future beneficial uses of water As previously stated, per California Water Code § 13241 water quality objectives are established by the regional boards. It is appropriate for the CV SNMP stakeholders to recommend TDS water quality objectives, which the Regional Water Board will review and make a final determination regarding adoption into the Basin Plan. The Regional Water Board recommends deleting the word 'Set' TDS objectives and using the word 'Recommend' TDS objectives.	The CV SNMP Development Workplan has been revised to replace the word "Set" with the word "Recommend."
14	Section 4.5.1	Hydrologically vulnerable areas, as identified in the Groundwater Ambient Monitoring Assessment (GAMA) Groundwater Information System database, exist where soil or rock conditions are more vulnerable (or susceptible) to groundwater contamination, and where aggressive salt and nutrient management practices may be warranted. The Regional Water Board recommends including hydrologically vulnerable areas as one of the criteria to assist with delineation of management zones.	The CV SNMP Development Workplan has been revised to add "Location of hydrologically vulnerable areas as identified in the GAMA Groundwater Information System database" as one of the criteria to assist with delineation of management zones.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
15	Section 4.5.3	Page 48 of the Workplan states: *The current ambient nitrate and TDS concentrations will be compared to the beneficial-use thresholds to assess the current state of beneficial use protection*. Assimilative capacity is not synonymous with the amount of allowable degradation. The Regional Water Board recommends that the CV SNMP not only provide the technical basis for determining the degree of water quality degradation allowable, but to also identify the potential impacts/injury to the members of the public. The SNMP should identify costs associated with using water with elevated nitrates and TDS levels and if there are potential impacts to human health, safety, or the environment with the proposed changes to water quality [and assimilative capacity] over time.	Section 4.10 of the CV SNMP Development Workplan addresses the Regional Board recommendation in this comment. The numeric TDS objectives proposed in the CV-SNMP will be derived through a documented technical analysis described in the Workplan. The TDS objectives can be used by the Regional Board to determine the degree of water quality degradation allowable (if any). Section 4.10.2 describes that a written demonstration will be prepared, referencing all technical work performed in prior tasks, to illustrate how the CV-SNMP and its recommended TDS objectives collectively satisfy the requirements of CWC 13241, including the protection of beneficial uses. Section 4.10.3 describes that an antidegradation demonstration will be prepared to illustrate how the CV-SNMP and its recommended TDS objectives collectively satisfy the requirements of State Board Resolution 68-16 (the Antidegradation Policy), again including the protection of beneficial uses. The antidegradation demonstration also will include a socio-economic evaluation of, but not limited to: - The melded unit cost of the total water supply under the CV-SNMP. - The funding mechanisms available to the agencies responsible for CV-SNMP implementation and the cost impacts to those agencies and their rate payers. - The potential costs associated with using groundwater if the CV-SNMP projects higher N/TDS concentrations in the future. The antidegradation demonstration also will include the rationale for determining that the CV-SNMP is or is not justified by the socio-economic considerations.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
16	Section 4.5.3	Page 50 of the Workplan states: *The MODFLOW output files need to be assessed to determine whether they meet the requirements of the water-quality modeling and its cascading modeling approach*. The Regional Water Board recommends calibrating the model to demonstrate the model's ability to return reasonable results for historical measured conditions.	The two MODFLOW models are calibrated and are currently being updated and used to support SGMA compliance in the Mission Creek subbasin and the Indio subbasin.
17	Section 4.6.2	Page 50 of the Workplan states: *Vadose zone processes may be important to timing and magnitude of N/TDS loading to the saturated zone, particularly for return flows from the land surface through partially saturated sediments*. The Regional Water Board recommends the consideration of previously mentioned hyporheic zone research, which has demonstrated that the potential for salt and nutrient removal via vadose zone processes is measurable.	Section 4.6.2 has been revised to include "microbial processes in the hyporheic zone" as criteria to consider in developing modeling procedures for simulating the vadose zone.
18	Section 4.6.5	Page 51 of the Workplan states: *Colorado River water is a major source of supplemental water that supports groundwater basin sustainability and the economy of the Coachella Valley. The future N/TDS concentrations of Colorado River water will affect the quality of groundwater*. The Regional Water Board recommends that the CV SNMP include an evaluation of climate change on the availability and quality of the Colorado River water source. If the evaluation indicates that the Colorado River water quality will be negatively impacted, potentially degrading the quality of the Coachella Valley groundwater, mitigation measures must be identified and evaluated for potential implementation.	Climate change could potentially impact the quality of Colorado River Water. The following phrase has been added to Section 4.6.5 to describe what the Technical Consultant should review before recommending assumptions for N/TDS concentrations of Colorado River water for water-quality modeling over the planning period: "review available information on salinity projections for Colorado River water including any predicted impacts from climate change."

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
19	Section 4.6.6	Page 51 of the Workplan states: *The water-quality models will not be calibrated using traditional methods of model calibration to historical data targets*. The Regional Water Board recommends the SNMP include proxy tests for the calibration of the model to historically verifiable datasets.	The CV-SNMP Agencies agree that the water-quality models should be capable of simulating historically verifiable datasets. The introduction of Section 4.6 has been modified to state that the water-quality models should have "the ability to reasonably simulate groundwater-quality conditions over a historical period" and a new subsection has been added to the Workplan: *Section 4.6.6 Develop Procedures for Verifying the N/TDS Forecasting Tools*.
20	Section 4.7.1	The objective of this section is to develop a 'baseline' planning scenario that represents the current water supply plans and water management plans for the Coachella Valley. The baseline scenario must provide a discussion of the water quality of both imported (allochthonous) water and sources of groundwater replenishment originating in the basin (autochthonous). Also include a reasonable economic forecast of the direct effects associated with the projected nutrient and salt loading in the baseline scenario. A similar economic evaluation was conducted in the Central Valley Region.[3]	The CV-SNMP Development Workplan lays out a strategy to perform a holistic evaluation of *all* sources of salt and nutrient loading for the Baseline Scenario (as well as all CV-SNMP Scenarios). The economic analysis for the Baseline Scenario (and the CV-SNMP Scenarios) is described in Section 4.9. The text in Section 4.9.1 has been revised to include the potential need to analyze the costs associated with the effects of potential future increases in groundwater salinity.

[3] https://www.waterboards.ca.gov/rwqcb5/water_issues/salinity/library_reports_programs/econ_rpt_final.pdf

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
21	Section 4.7.2	Page 53 of the Workplan states: *The final simulation results of the Baseline Scenario will be evaluated to determine if CV-SNMP implementation measures are potentially necessary in the future to control N/TDS loading to protect the beneficial uses of groundwater in specific management zones*. Section 6.2.4.4 of the Policy states that a required component of the SNMP is "Implementation measures to manage or reduce the salt and nutrient loading in the basin on a sustainable basis and the intended outcome of each measure." Additionally, the Department of Water Resources (DWR) notified many of the CV SNMP Agencies through their affiliation as a Coachella Valley Groundwater Sustainability Agency (GSA) that their Groundwater Sustainability Plan (GSP) developed pursuant to the SGMA should continue investigations into ways to reduce water quality impacts associated with importing Colorado River water. The DWR recommended that the GSAs take aggressive steps to further quantify the nature and scope of water quality issues associated with importing water (allochthonous supply) into the Subbasin, establish reasonable and achievable standards, and begin to adopt and implement projects and management actions that will achieve sustainability with regard to groundwater quality, and to do so on an accelerated basis. The CV SNMP must identify and evaluate implementation measures that have the potential to control salt and nutrient loading and protect groundwater in the Coachella Valley on a sustainable basis.	The CV-SNMP Agencies believe that the CV-SNMP Development Workplan fully addresses the Regional Board's comment. The workplan lays out a strategy to perform a holistic evaluation of *all* sources of salt and nutrient loading, the expected future changes in groundwater quality, and any predicted impairment of beneficial uses of groundwater. Equipped with this information, the CV-SNMP Agencies will then explore and evaluate the effectiveness and costs of CV-SNMP implementation measures (i.e. projects and/or programs) to manage N/TDS loading, and then recommend a preferred CV-SNMP approach to the Regional Board that will protect beneficial uses of groundwater on a sustainable basis. This work will be performed in an open, transparent process through the TAC and CV-SNMP Stakeholder groups with Regional Board participation and input throughout.
22	Section 4.8	Pages 54 and 55 of the Workplan states: *Task 4.8 is necessary if Task 4.7 concludes that CV-SNMP implementation measures are potentially necessary in the future to protect the beneficial uses of groundwater in management zones. If not, then Tasks 4.8 and 4.9 in this workplan are not necessary to execute.* *The objective of Task 4.8 is to develop CV-SNMP implementation measures that have*	

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
		the potential to control N/TDS loading and protect beneficial uses of groundwater in the Coachella Valley on a sustainable basis. Section 4.8 of the Workplan is an essential component of the CV SNMP, and without it the impact of the SNMP is reduced to a groundwater monitoring plan. Including implementation measures in the CV SNMP is important as the SNMP has been identified as part of the groundwater management strategy for the Coachella Valley and is referenced in water management plans generated by the Coachella Valley Integrated Regional Water Management Planning (IRWMP) Group, the Urban Water Management Planning (UWMP) Group, and the GSAs. As previously stated, DWR's approval of the Coachella Valley GSP recommended implementing salt and nutrient management projects and actions that will achieve sustainability with regard to groundwater quality, and to do so on an accelerated basis. A major source of salt (TDS) entering the Coachella Valley groundwater resources is from groundwater augmentation using water imported into the basin from another location (allochthonous), i.e. the Colorado River. The CV SNMP must identify and evaluate management strategies that improve and enhance the allochthonous sources of groundwater augmentation and include how impacts to groundwater quality from imported supplies can be offset (mitigated) by replenishing the groundwater resource with higher quality water from sources originating in the basin (autochthonous), as demonstrated in other regions of the state,[4] as well as other strategies. The Regional Water Board recommends the CV SNMP propose management scenarios for consideration including descriptions of how implementation/mitigation measures will be specifically developed to manage or reduce	See response for Item 20 above. The CV-SNMP Agencies contend that it is premature to develop specific implementation measures at the "workplan stage" in the development of the CV-SNMP update. The CV-SNMP Development Workplan proposes to develop and evaluate implementation measures at the appropriate time: after the evaluation of historical and current groundwater quality; after the evaluation of all sources of N/TDS loading; after the delineation of management zones and the description of their beneficial uses; and after the evaluation of future N/TDS concentrations in management zones under the Baseline Scenario. Only then are the CV-SNMP Agencies, the Regional Board, and other CV-SNMP stakeholders in a knowledgeable position to recommend the appropriate location, type, and timing of implementation measures that will effectively and efficiently manage N/TDS concentration in groundwater to protect beneficial uses on a sustainable basis.

[4] https://www.usbr.gov/lc/socal/reports/LASGwtraugmentation/AppC.pdf

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
		the salt and nutrient loading in the basin on a sustainable basis and the intended outcome of each measure.	
23	Section 4.8.2	Page 56 of the Workplan states: *In this task, the recommended CV-SNMP Scenarios will be implemented in the models, the model simulations will be conducted, and the model results will be evaluated and compared against the Baseline Scenario for their effectiveness in controlling N/TDS loading and protecting beneficial uses*. If the groundwater model is not calibrated to historically verifiable accuracy, the use as a comparative tool may be subjective. The Regional Water Board recommends the SNMP include proxy tests for the calibration of the model to historically verifiable datasets.	A new subtask has been added to Task 4.6: *4.6.6 Develop Procedures for Verifying the N/TDS Forecasting Tools*. Task 4.7 has been revised to state that these procedures will be implemented during the construction of the water-quality models to demonstrate their ability to reasonably simulate historical groundwater-quality conditions.
24	Section 4.10	Page 58 of the Workplan states: *The objective of this task is to select a preferred CV-SNMP Scenario, which will form the basis for a CV-SNMP implementation plan and any required updates to the Basin Plan*. The Regional Water Board recommends deleting the word "required"' and using the word "recommended" in reference to updates to the Basin Plan.	The CV SNMP Development Workplan has been revised to replace the word "required" with the word "recommended."

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
25	Section 4.10.2	Page 59 of the Workplan states: *California Water Code (CWC) section 13241 lists the factors to consider when establishing water quality objectives without unreasonably affecting beneficial uses*. The Regional Water Board recommends that the economic evaluation include impacts related to elevated salinity in groundwater and consider the correlated impacts to the assigned beneficial use. The SNMP should also identify human health, safety, and environmental impacts associated with the potential adoption of TDS water quality objectives. It is the responsibility of the involved stakeholders developing the CV SNMP to solicit public input and approval.	The SNMP-Agencies agree that the CV-SNMP must include evidence and analysis to support findings required by California Water Code section 13241 and State Water Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality of Waters in California (Antidegradation Policy). In accordance with California Water Code section 13241, to establish water quality objectives in a water quality control plan, the Regional Board must consider certain factors related to the proposed water quality objectives, including “economic conditions” and the “need for developing housing within the region.” Because the CV-SNMP may be used by the Regional Board to establish water quality objectives, the CV-SNMP will include sufficient evidence and analysis of all aspects of the “economic conditions,” the “need for developing housing within the region” and the other factors in Section 13241 as they relate to the issues addressed in the CV-SNMP. In addition, in accordance with the Antidegradation Policy and Section 6.2.4.5 of the 2018 Water Quality Control Policy for Recycled Water, the CV-SNMP will include evidence and analysis demonstrating consistency with the Antidegradation Policy, including, but not limited to, evidence and analysis related to the “maximum benefit” to the people of the state related to the issues addressed in the CV-SNMP. The economic analysis for the Baseline Scenario (and the CV-SNMP Scenarios) is described in Section 4.9. The text in Section 4.9.1 has been revised to include the potential need to analyze the costs associated with the effects of potential future increases in groundwater salinity.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
26	Section 4.10.3	Page 59 of the Workplan states: *An antidegradation demonstration will be prepared as required by Section 6.2.4.5 of the 2018 Policy. The objective will be to illustrate how the preferred CV-SNMP Scenario and N/TDS objectives collectively satisfy the requirements of State Board Resolution 68-16 (the Antidegradation Policy).* Section 6.2.4.5 of the Policy states that one of the required components of the SNMP includes an antidegradation analysis. The antidegradation analysis must consider all past (since 1968), current, and future salt and nutrient loading that is anticipated to occur under the preferred CV SNMP Scenario, and how this has and will continue to affect groundwater quality. The analysis should consider the changes in population and land use practices and their impacts to groundwater quality. The results of the antidegradation analysis will potentially identify hydrologically sensitive areas and direct the CV SNMP Agencies to evaluate the need for and the degree of management or mitigation and regulatory oversight that will be required to protect water quality.	The CV-SNMP Development Workplan includes an anti-degradation analysis that will satisfy the requirements of State Board Resolution 68-16 (Section 4.10) and will address the Regional Board recommendations in this comment.

Colorado River Basin Regional Water Quality Control Board

June 30, 2021

Jim Barrett
General Manager
Coachella Valley Water District
75515 Hovley Lane East
Palm Desert, California 92211
jbarrett@cvwd.org

SUBJECT: COMMENTS TO DRAFT WORKPLAN TO DEVELOP THE COACHELLA VALLEY SALT AND NUTRIENT MANAGEMENT PLAN

Dear Mr. Barrett,

On May 3, 2021, the California Regional Water Quality Control Board, Colorado River Basin Region (Regional Water Board) received the *Draft Workplan to Develop the Coachella Valley Salt and Nutrient Management Plan* (Workplan), submitted by West Yost Associates on behalf of the Coachella Valley Salt and Nutrient Management Plan (CV SNMP) Agencies. The Workplan discusses the CV SNMP background and objectives, the basin setting, the groundwater monitoring program, the development and implementation of the CV SNMP Workplan. The Regional Water Board has reviewed the Workplan and provides the comments contained within this letter.

The Workplan addresses the required SNMP components listed in Section 6.2.4 of the State of California Water Quality Control Board's (State Water Board) Resolution No. 2018-0057 *Amendment to the Policy for Water Quality Control for Recycled Water* (Policy). The Regional Water Board understands the details of the SNMP components will be developed over time through the efforts of the Technical Advisory Committee (TAC) and is providing preliminary comments to promote development of a CV SNMP that will sustainably manage impacts from salts and nutrients now and in the long term, thereby protecting the groundwater resource for future generations.

The following are the Regional Water Board's comments on specific sections of the Workplan.

Section 1.0 Background and Objectives of the CV SNMP

Page 1 of the Workplan states:

The objective of the CV-SNMP is to sustainably manage salt and nutrient loading in the Coachella Valley Groundwater Basin in a manner that protects its beneficial uses.

Regional Water Board Comment

Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs. The Sustainable Groundwater Management Act (SGMA) considers sustainable groundwater management to be occurring within a basin that is operated in such a way so as not to cause "undesirable results," such as chronic depletion of groundwater, groundwater degradation, or land subsidence.

The Regional Water Board recommends the TAC develop a plan to manage identified salt and nutrient loading sources and provide a definition of what beneficial use protection will consist of, integrating the antidegradation analysis into the stakeholder's definition of protected.

Section 1.3 Update of the CV SNMP

Page 7 of the Workplan states:

CV-SNMP Agencies have concluded that numeric objectives for [total dissolved solids] TDS and nitrate in groundwater are necessary to resolve the concerns of the Regional Board.

Regional Water Board Comment

Identifying a water quality objective is necessary to determine the assimilative capacity of the aquifer. To assess the assimilative capacity of salts, the 2015 CV SNMP cited the "upper limit" Secondary Maximum Contaminant Level (SMCL) of 1,000 milligrams per liter (mg/l) as the water quality objective for total dissolved solids (TDS) excluding the more protective and "recommended limit" SMCL of 500 mg/l. The water quality data indicated that many areas within the basin had TDS concentrations that were less than 500 mg/l (the lower "recommended limit" of the SMCL range). Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California (Antidegradation Policy) states "Whereas the quality of some waters of the State is higher than that established by the adopted policies and it is the intent and purpose of this Board that such higher quality shall be maintained to the maximum extent possible consistent with the declaration of the Legislature; ..."

The Regional Water Board recommends that the SNMP provide the scientific basis including an antidegradation analysis for any proposed water quality objectives.

Section 1.3.1 Process to Prepare the CV SNMP Development Workplan

Page 8 of the Workplan states:

*The CV-SNMP Development Workplan must address each of these factors in **setting** the TDS objectives for groundwater management zones.*

Regional Water Board Comment

California Water Code § 13241 [Water quality objectives] states that "Each regional board shall establish water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance; ..." The CV SNMP stakeholders may present recommendations regarding TDS water quality objectives, which the Regional Water Board will review and make a final determination regarding adoption into the Water Quality Control Plan for the Colorado River Basin Region (Basin Plan).

The Regional Water Board recommends deleting the word 'setting' and using the word 'recommending' TDS objectives for groundwater.

Section 2.0 Study Area Setting

Section 2.2.2 Occurrence and Movement of Groundwater

Page 12 of the Workplan describes the general occurrence of groundwater, and how groundwater flows through and discharges from each subbasin.

Regional Water Board Comment

Publicly available data on the San Jacinto Tunnel installed through fractured bedrock in the 1930's and operated by Metropolitan Water District (MWD) reports that the fractured crystalline bedrock units contain and convey a substantial amount of water in the subsurface. The concept of a "mega-watershed groundwater system" from mountain block recharge is provided in the works of Robert Bisson and Jay Lehr[1].

In that mountain front recharge is identified later in the CV SNMP, Regional Water Board suggests the inclusion of a discussion on the water bearing nature of the surrounding fractured bedrock units.

Section 2.3.2 Transport and Discharge of N/TDS in the Saturated Zone

Page 14 identifies the mechanisms by which salts and nutrients are discharged from each subbasin.

Regional Water Board Comment

Dr. John Wilson's (New Mexico Tech) work provides strong research in regard to the removal of salts and nutrients through microbial activity[2]. Specifically, see Dr. Wilson's

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[1] https://www.oregondigital.org/downloads/oregondigital:df710j60x

[2] John Wilson: New Mexico Tech (nmt.edu)

study of salt and nutrient uptake and removal where there is mixing of shallow groundwater and surface water (hyporheic zone)[3].

The Regional Water Board recommends evaluating microbial uptake as a salt and nutrient management mechanism.

Section 4.0 Coachella Valley SNMP Development Workplan
Section 4.2 Establish CV-SNMP Stakeholder Group and Technical Advisory Committee

Page 39 of the Workplan states:
The objective of this task is to convene a CV-SNMP Stakeholder Group and the CV-SNMP Technical Advisory Committee (TAC). The CV-SNMP Agencies and the selected consultants will organize and ***run*** *both groups during the implementation of the CV-SNMP Development Workplan.*

Regional Water Board Comment
A locally driven and controlled, collaborative process open to all stakeholders and the regional water board will contribute to the development of a CV SNMP that will manage salts and nutrients on a basin-wide basis and achieve the goals of groundwater sustainability, recycled water use, and water quality protection.

The Regional Water Board recommends deleting the word "run" and adding a different word or words such as "will facilitate".

Section 4.2.1 Convene the CV-SNMP Stakeholder Group

Page 40 of the Workplan states:
Potential stakeholders include but are not limited to: the agricultural community and groups; golf course industry groups; tribes; the Coachella Valley Regional Water Management Group; the Groundwater Sustainability Agencies in the Coachella Valley; all major water and wastewater agencies; industrial dischargers; county and city land use planning agencies; Federal and State agencies; and non-governmental organizations (NGOs).

A critical first step will be to solicit input from the CV-SNMP Stakeholder Group as to their issues, needs and wants. This information will be collected up front so the CV-SNMP Agencies and consultants can proactively address stakeholder concerns, and potentially incorporate them in the CV-SNMP development process.

Regional Water Board Comment
Achieving the goals of groundwater sustainability, recycled water use, and water quality protection is best achieved through the management of salts and nutrients on a basin-wide basis through collaborative processes open to all stakeholders. Documenting and addressing the input from an all-inclusive stakeholder group will help identify the water

[3] https://www.sciencedirect.com/topics/earth-and-planetary-sciences/hyporheic-zone

use needs of a diverse population and address historical and state-wide SNMP development challenges identified during the 2018 Policy revision such as managing salt and nutrient loading to the basin from sources other than recycled water and the ability/authority of the stakeholders to implement best management practices and salt and nutrient management measures.

The Regional Water Board encourages the CV SNMP Agencies to keep all-inclusiveness as a priority and involve all major stakeholders[4] within the basin. The CV SNMP Agencies should also consider the inclusion of significant stakeholders from outside the basin such as The Colorado River Basin Salinity Control Program[5] and the MWD.

Section 4.2.2 Convene the Technical Advisory Committee

Page 40 of the Workplan states:
Regional Board staff will be encouraged to participate on the TAC in an advisory role.

Regional Water Board Comment
Regional Water Board understands that critical details and decisions to develop an adequate CV SNMP will be established through the TAC and are committed to working with this committee.

Section 4.3 Characterize N/TDS Loading to the Groundwater Basin

Page 40 of the Workplan states:
The objective of this task is to quantify the individual components of N/TDS (nitrate and TDS) loading to groundwater.

Page 41 of the Workplan states:
The characterization of N/TDS loading will be performed for a recent historical period to the present to characterize seasonal variations and long-term trends in loading and generate estimates of N/TDS loads in the vadose zone. The length of the historical period will be defined as part of this task but should be long enough to characterize the N/TDS loads in the vadose zone.

Regional Water Board Comments
The following comment pertains to statements made on Page 40 of the Workplan:
Mountain front recharge has been identified as a potential source of aquifer recharge originating from within the basin's watershed.

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[4] untitled (nationalaglawcenter.org)

[5] Colorado River Basin Salinity Control Program | Upper Colorado Basin | Bureau of Reclamation (usbr.gov)

The Regional Water Board recommends quantifying the salt and nutrient loading from the mountain front recharge component through evaluation of representative bedrock springs as indicators of the hydrologic conditions of the fractured bedrock units.

The following comment pertains to statements made on Page 41 of the Workplan: The required antidegradation analysis component of the CV SNMP, discussed in Section 4.10.3 of the Workplan, will need to incorporate a discussion on the impacts of elevated salinity to the public and the public infrastructure since 1968.

The Regional Water Board recommends evaluation of past nitrate and salt (TDS) loading estimates for each management zone extending at least to 1968.

Section 4.3.2 Characterize Historical and Current N/TDS Loading

> Page 42 of the Workplan states:
> *Once the methods are finalized, the time-history of the volumes and associated N/TDS concentrations will be estimated and described for each N/TDS loading term.*

Regional Water Board Comment
The CV SNMP must identify what 'methods' the Workplan is referring to.

Section 4.4 Characterize Current Groundwater Quality

> The objective of this task is to characterize nitrate and TDS concentrations in groundwater as of 2020 (i.e. current conditions). The characterization will include an analysis of the time history of nitrate and TDS concentrations in groundwater that led to current conditions.

Regional Water Board Comment
The Regional Water Board concurs that establishing existing water quality is necessary to compute the potential existence and magnitude of assimilative capacity for a basin, subbasin, or management zone and supports other proposed Workplan tasks; and also agree that the proposed evaluation of past water quality will assist with an understanding of nitrate and TDS historical trends in groundwater.

The Regional Water Board expects the fully developed groundwater monitoring plan to provide groundwater quality data that is representative of the management zones and encourages the TAC to develop a technically defensible method to evaluate the ambient water quality of each area.

Section 4.5 Delineate Draft Management Zones and Describe Metrics to Characterize Beneficial Use Protection

> Page 47 of the Workplan states:
> *The results of this task will provide the necessary information to:*

- *Support subsequent tasks in this workplan to:*
    - ***Set TDS objectives** pursuant to CWC 13241(a): Past, present, and probable future beneficial uses of water.*

Regional Water Board Comment
As previously stated, per California Water Code § 13241 water quality objectives are established by the regional boards. It is appropriate for the CV SNMP stakeholders to recommend TDS water quality objectives, which the Regional Water Board will review and make a final determination regarding adoption into the Basin Plan.

The Regional Water Board recommends deleting the word 'Set' TDS objectives and using the word 'Recommend' TDS objectives.

Section 4.5.1 Delineate Draft Groundwater Management Zones
The objective of this task is to identify criteria and delineate management zones.

Regional Water Board Comment
Hydrologically vulnerable areas, as identified in the Groundwater Ambient Monitoring Assessment (GAMA) Groundwater Information System database, exist where soil or rock conditions are more vulnerable (or susceptible) to groundwater contamination, and where aggressive salt and nutrient management practices may be warranted.

The Regional Water Board recommends including hydrologically vulnerable areas as one of the criteria to assist with delineation of management zones.

Section 4.5.3 Define Ambient Water Quality Metrics and Determine Current Protection of Beneficial Uses
Page 48 of the Workplan states:
The current ambient nitrate and TDS concentrations will be compared to the beneficial-use thresholds to assess the current state of beneficial use protection.

Regional Water Board Comment

Assimilative capacity is not synonymous with the amount of allowable degradation.

The Regional Water Board recommends that the CV SNMP not only provide the technical basis for determining the degree of water quality degradation allowable, but to also identify the potential impacts/injury to the members of the public. The SNMP should identify costs associated with using water with elevated nitrates and TDS levels and if there are potential impacts to human health, safety, or the environment with the proposed changes to water quality [and assimilative capacity] over time.

Section 4.6.1 Evaluate Existing MODFLOW Models

Page 50 of the Workplan states:

The MODFLOW output files need to be assessed to determine whether they meet the requirements of the water-quality modeling and its cascading modeling approach.

Regional Water Board Comment

The Regional Water Board recommends calibrating the model to demonstrate the model's ability to return reasonable results for historical measured conditions.

Section 4.6.2 Develop Procedures for Simulating Vadose Zone Processes

Page 50 of the Workplan states:

Vadose zone processes may be important to timing and magnitude of N/TDS loading to the saturated zone, particularly for return flows from the land surface through partially saturated sediments.

Regional Water Board Comment

The Regional Water Board recommends the consideration of previously mentioned hyporheic zone research, which has demonstrated that the potential for salt and nutrient removal via vadose zone processes is measurable.

Section 4.6.5 Define Assumptions for Future N/TDS Concentration of Colorado River Water

Page 51 of the Workplan states:

Colorado River water is a major source of supplemental water that supports groundwater basin sustainability and the economy of the Coachella Valley. The future N/TDS concentrations of Colorado River water will affect the quality of groundwater.

Regional Water Board Comment

The Regional Water Board recommends that the CV SNMP include an evaluation of climate change on the availability and quality of the Colorado River water source. If the evaluation indicates that the Colorado River water quality will be negatively impacted, potentially degrading the quality of the Coachella Valley groundwater, mitigation measures must be identified and evaluated for potential implementation.

Section 4.6.6 Develop Procedures for Post-Processing Model Results

Page 51 of the Workplan states:

The water-quality models will not be calibrated using traditional methods of model calibration to historical data targets.

Regional Water Board Comment
The Regional Water Board recommends the SNMP include proxy tests for the calibration of the model to historically verifiable datasets.

Section 4.7.1 Develop a Baseline Scenario based on the SGMA Alternative Plans

The objective of this section is to develop a 'baseline' planning scenario that represents the current water supply plans and water management plans for the Coachella Valley.

Regional Water Board Comment
The baseline scenario must provide a discussion of the water quality of both imported (allochthonous) water and sources of groundwater replenishment originating in the basin (autochthonous). Also include a reasonable economic forecast of the direct effects associated with the projected nutrient and salt loading in the baseline scenario. A similar economic evaluation was conducted in the Central Valley Region[6].

Section 4.7.2 Construct N/TDS Forecasting Tools and Run the Baseline Scenario

Page 53 of the Workplan states:
The final simulation results of the Baseline Scenario will be evaluated to determine if CV-SNMP implementation measures are potentially necessary in the future to control N/TDS loading to protect the beneficial uses of groundwater in specific management zones.

Regional Water Board Comment
Section 6.2.4.4 of the Policy states that a required component of the SNMP is "Implementation measures to manage or reduce the salt and nutrient loading in the basin on a sustainable basis and the intended outcome of each measure." Additionally, the Department of Water Resources (DWR) notified many of the CV SNMP Agencies through their affiliation as a Coachella Valley Groundwater Sustainability Agency (GSA) that their Groundwater Sustainability Plan (GSP) developed pursuant to the SGMA should continue investigations into ways to reduce water quality impacts associated with importing Colorado River water. The DWR recommended that the GSAs take aggressive steps to further quantify the nature and scope of water quality issues associated with importing water (allochthonous supply) into the Subbasin, establish reasonable and achievable standards, and begin to adopt and implement projects and management actions that will achieve sustainability with regard to groundwater quality, and to do so on an accelerated basis.

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6 https://www.waterboards.ca.gov/rwqcb5/water_issues/salinity/library_reports_programs/econ_rpt_final.pdf

The CV SNMP must identify and evaluate implementation measures that have the potential to control salt and nutrient loading and protect groundwater in the Coachella Valley on a sustainable basis.

Section 4.8 Forecast N/TDS Concentrations for CV-SNMP Scenarios

Pages 54 and 55 of the Workplan states:

Task 4.8 is necessary if Task 4.7 concludes that CV-SNMP implementation measures are potentially necessary in the future to protect the beneficial uses of groundwater in management zones. If not, then Tasks 4.8 and 4.9 in this workplan are not necessary to execute.

The objective of Task 4.8 is to develop CV-SNMP implementation measures that have the potential to control N/TDS loading and protect beneficial uses of groundwater in the Coachella Valley on a sustainable basis.

Regional Water Board Comment

Section 4.8 of the Workplan is an essential component of the CV SNMP, and without it the impact of the SNMP is reduced to a groundwater monitoring plan. Including implementation measures in the CV SNMP is important as the SNMP has been identified as part of the groundwater management strategy for the Coachella Valley and is referenced in water management plans generated by the Coachella Valley Integrated Regional Water Management Planning (IRWMP) Group, the Urban Water Management Planning (UWMP) Group, and the GSAs. As previously stated, DWR's approval of the Coachella Valley GSP recommended implementing salt and nutrient management projects and actions that will achieve sustainability with regard to groundwater quality, and to do so on an accelerated basis.

A major source of salt (TDS) entering the Coachella Valley groundwater resources is from groundwater augmentation using water imported into the basin from another location (allochthonous), i.e. the Colorado River. The CV SNMP must identify and evaluate management strategies that improve and enhance the allochthonous sources of groundwater augmentation and include how impacts to groundwater quality from imported supplies can be offset (mitigated) by replenishing the groundwater resource with higher quality water from sources originating in the basin (autochthonous), as demonstrated in other regions of the state[7], as well as other strategies.

The Regional Water Board recommends the CV SNMP propose management scenarios for consideration including descriptions of how implementation/mitigation measures will be specifically developed to manage or reduce the salt and nutrient loading in the basin on a sustainable basis and the intended outcome of each measure.

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[7] https://www.usbr.gov/lc/socal/reports/LASGwtraugmentation/AppC.pdf

<u>Section 4.8.2 Evaluate CV-SNMP Scenarios</u>

Page 56 of the Workplan states:

In this task, the recommended CV-SNMP Scenarios will be implemented in the models, the model simulations will be conducted, and the model results will be evaluated and compared against the Baseline Scenario for their effectiveness in controlling N/TDS loading and protecting beneficial uses.

Regional Water Board Comment

If the groundwater model is not calibrated to historically verifiable accuracy, the use as a comparative tool may be subjective. The Regional Water Board recommends the SNMP include proxy tests for the calibration of the model to historically verifiable datasets.

<u>Section 4.10 Select the Preferred CV-SNMP Scenario, Finalize Management Zones and Beneficial Uses, and Set TDS Objectives</u>

Page 58 of the Workplan states:

The objective of this task is to select a preferred CV-SNMP Scenario, which will form the basis for a CV-SNMP implementation plan and any ***required*** *updates to the Basin Plan.*

Regional Water Board Comment

The Regional Water Board recommends deleting the word "required'" and using the word "recommended" in reference to updates to the Basin Plan.

<u>Section 4.10.2 Set TDS Objectives based on CWC 13241</u>

Page 59 of the Workplan states:

California Water Code (CWC) section 13241 lists the factors to consider when establishing water quality objectives without unreasonably affecting beneficial uses.

Regional Water Board Comment

The Regional Water Board recommends that the economic evaluation include impacts related to elevated salinity in groundwater and consider the correlated impacts to the assigned beneficial use. The SNMP should also identify human health, safety, and environmental impacts associated with the potential adoption of TDS water quality objectives. It is the responsibility of the involved stakeholders developing the CV SNMP to solicit public input and approval.

<u>Section 4.10.3 Document Antidegradation Demonstration Pursuant to State Board Policy 68-16</u>

Page 59 of the Workplan states:

An antidegradation demonstration will be prepared as required by Section 6.2.4.5 of the 2018 Policy. The objective will be to illustrate how the preferred CV-SNMP Scenario and N/TDS objectives collectively satisfy the requirements of State Board Resolution 68-16 (the Antidegradation Policy).

Regional Water Board Comment
Section 6.2.4.5 of the Policy states that one of the required components of the SNMP includes an antidegradation analysis. The antidegradation analysis must consider all past (since 1968), current, and future salt and nutrient loading that is anticipated to occur under the preferred CV SNMP Scenario, and how this has and will continue to affect groundwater quality. The analysis should consider the changes in population and land use practices and their impacts to groundwater quality. The results of the antidegradation analysis will potentially identify hydrologically sensitive areas and direct the CV SNMP Agencies to evaluate the need for and the degree of management or mitigation and regulatory oversight that will be required to protect water quality.

The Regional Water Board welcomes this opportunity to provide comments, appreciates your organization's efforts in assisting in the development of this Workplan and encourages continued outreach efforts to other stakeholders in the Coachella Valley. Please contact Greg Middleton, PG, CHG at (760) 776-8982 or greg.middleton@waterboards.ca.gov or Cathy Sanford at (760) 776-8934 or cathy.sanford@waterboards.ca.gov with any questions.

Sincerely,

Cassandra D. Owens

Cassandra Owens
Assistant Executive Officer
Colorado River Basin
Regional Water Quality Control Board

PR/CS/gm

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APPENDIX 4-A
GROUNDWATER LEVEL MONITORING WELL HYDROGRAPHS

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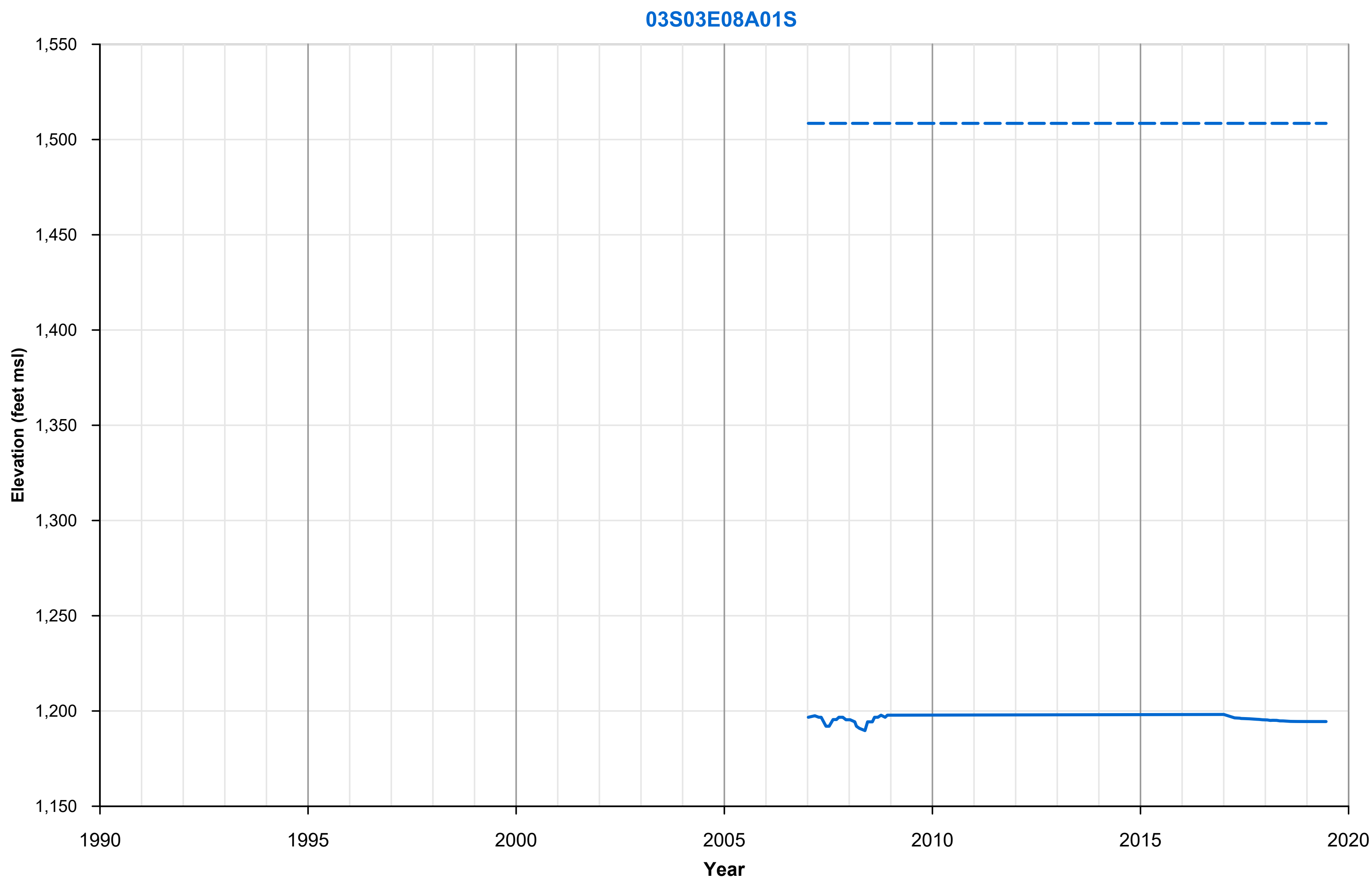

WOODARD & CURRAN

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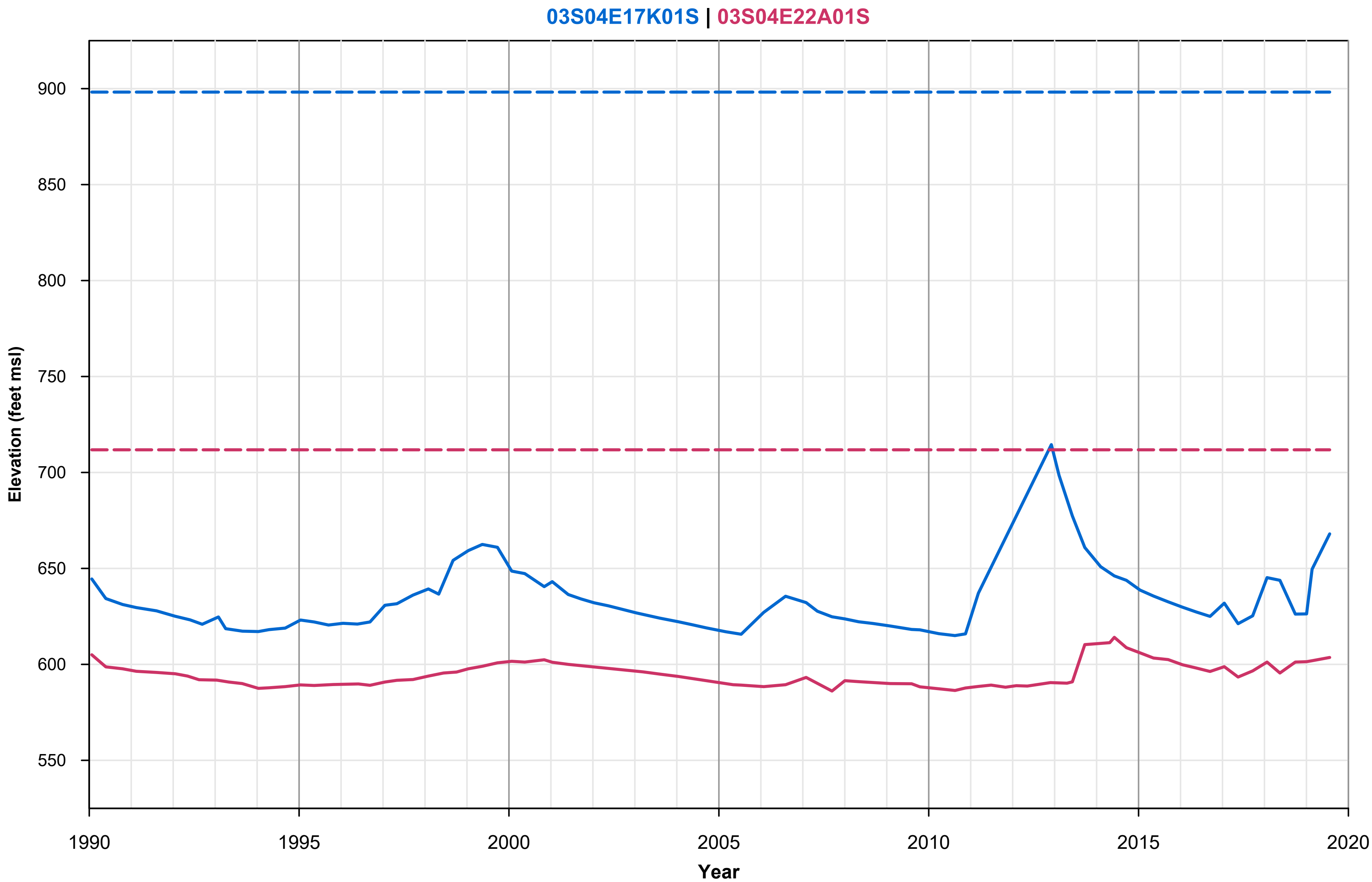
TODD GROUNDWATER

Appendix A-1
Groundwater Elevation Hydrograph
03S03E08A01S



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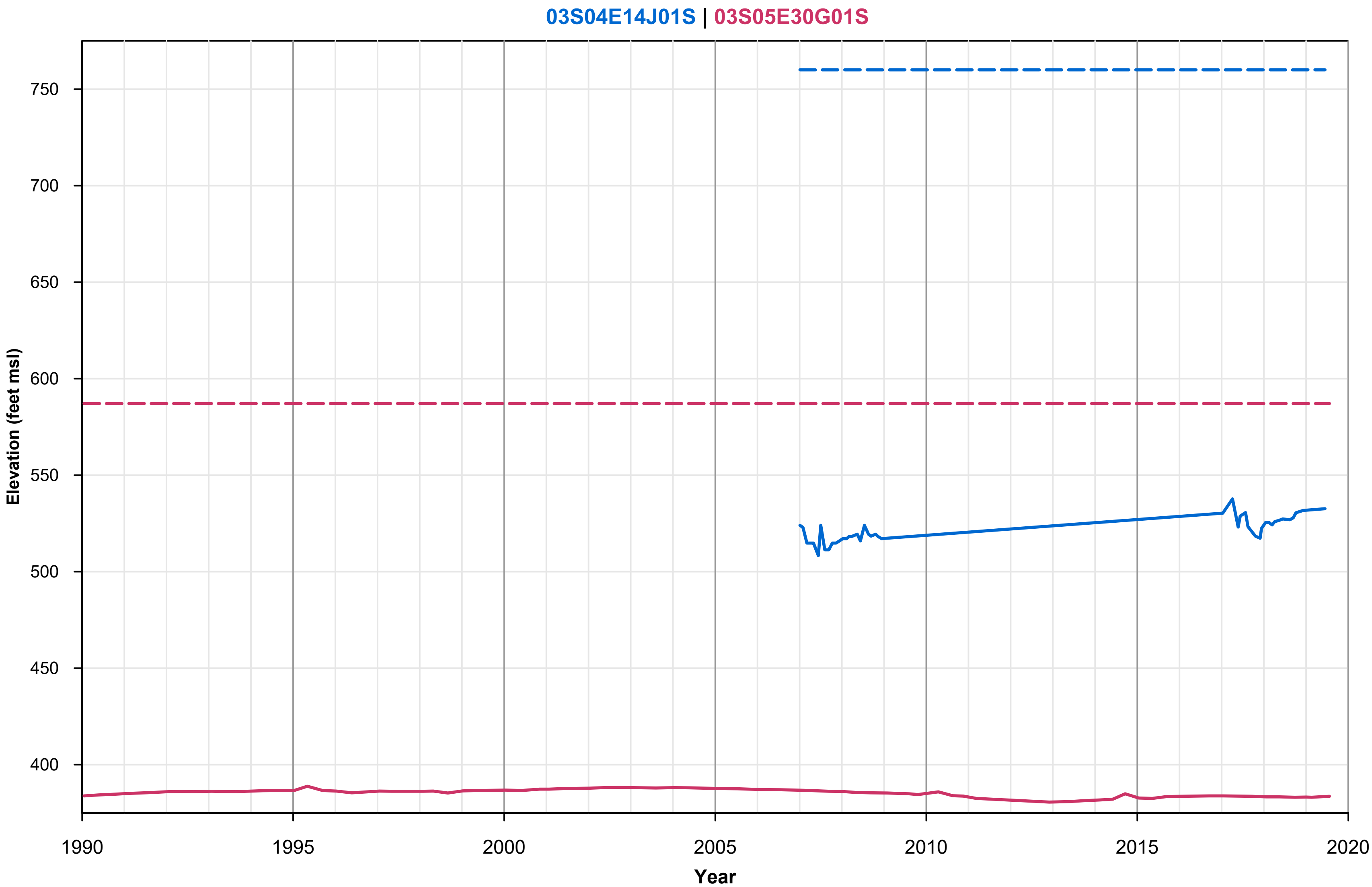
TODD GROUNDWATER

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



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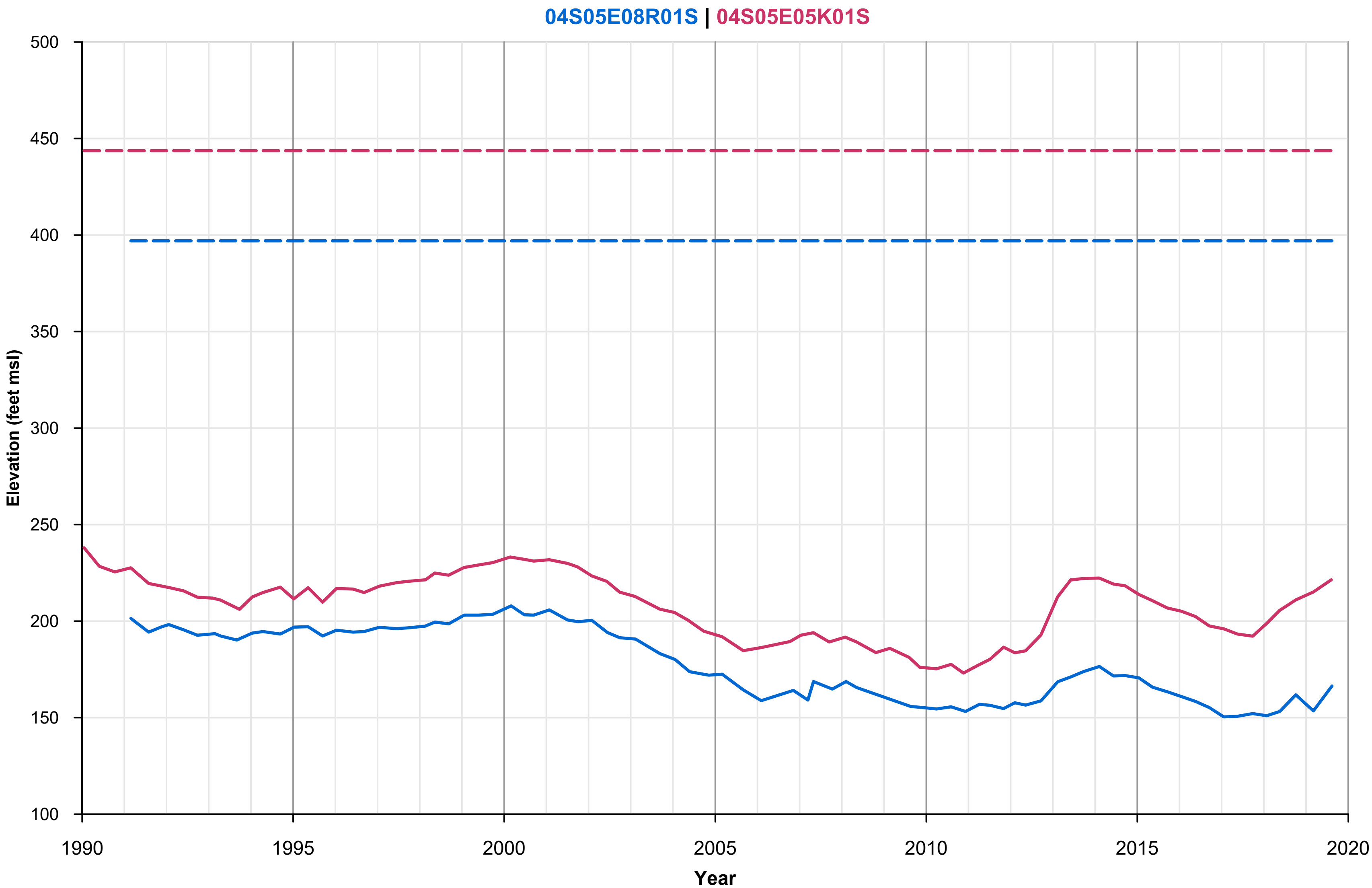
TODD GROUNDWATER

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



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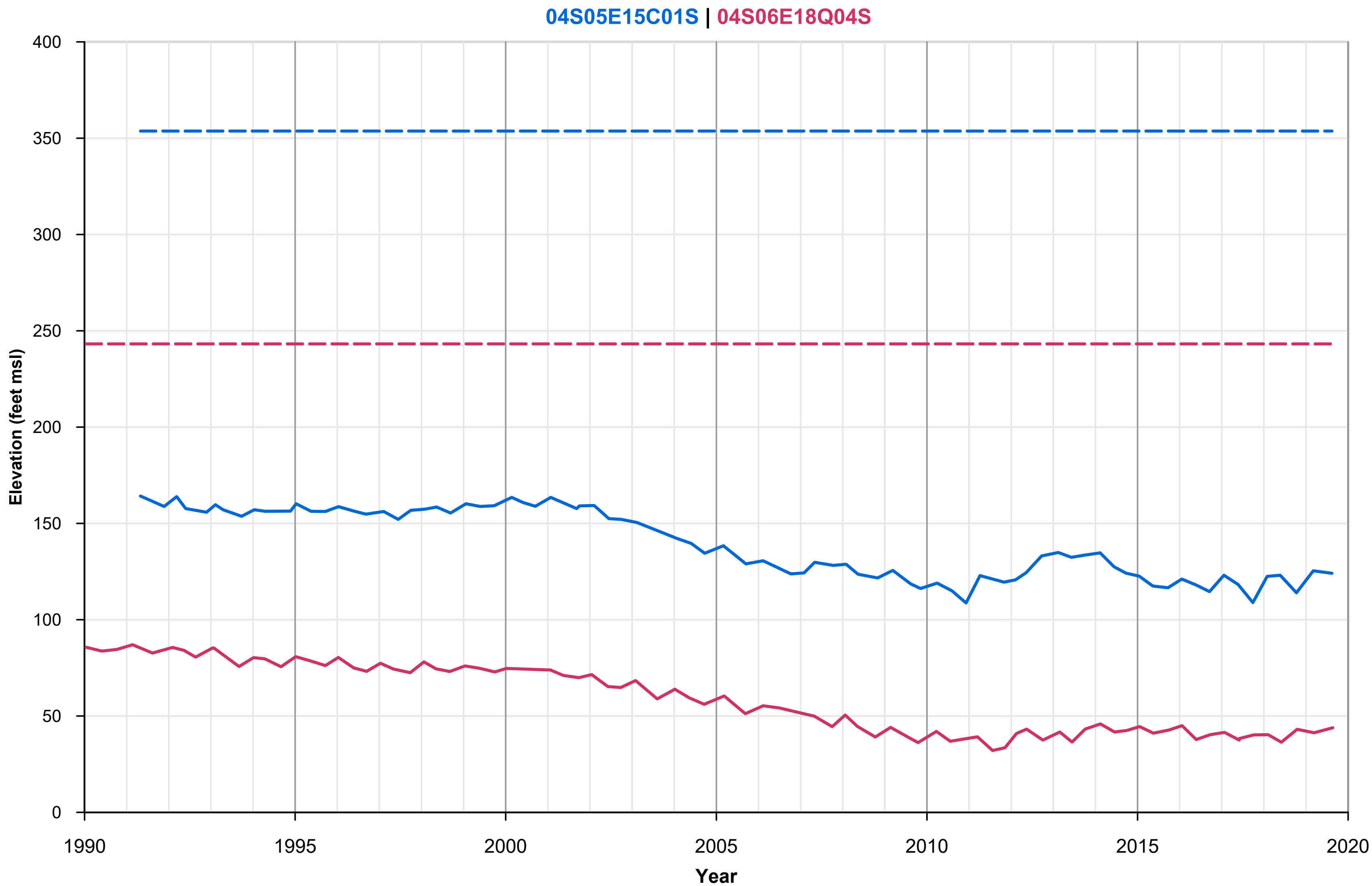
Appendix A-4
Groundwater Elevation Hydrographs
04S05E08R01S and 04S05E05K01S



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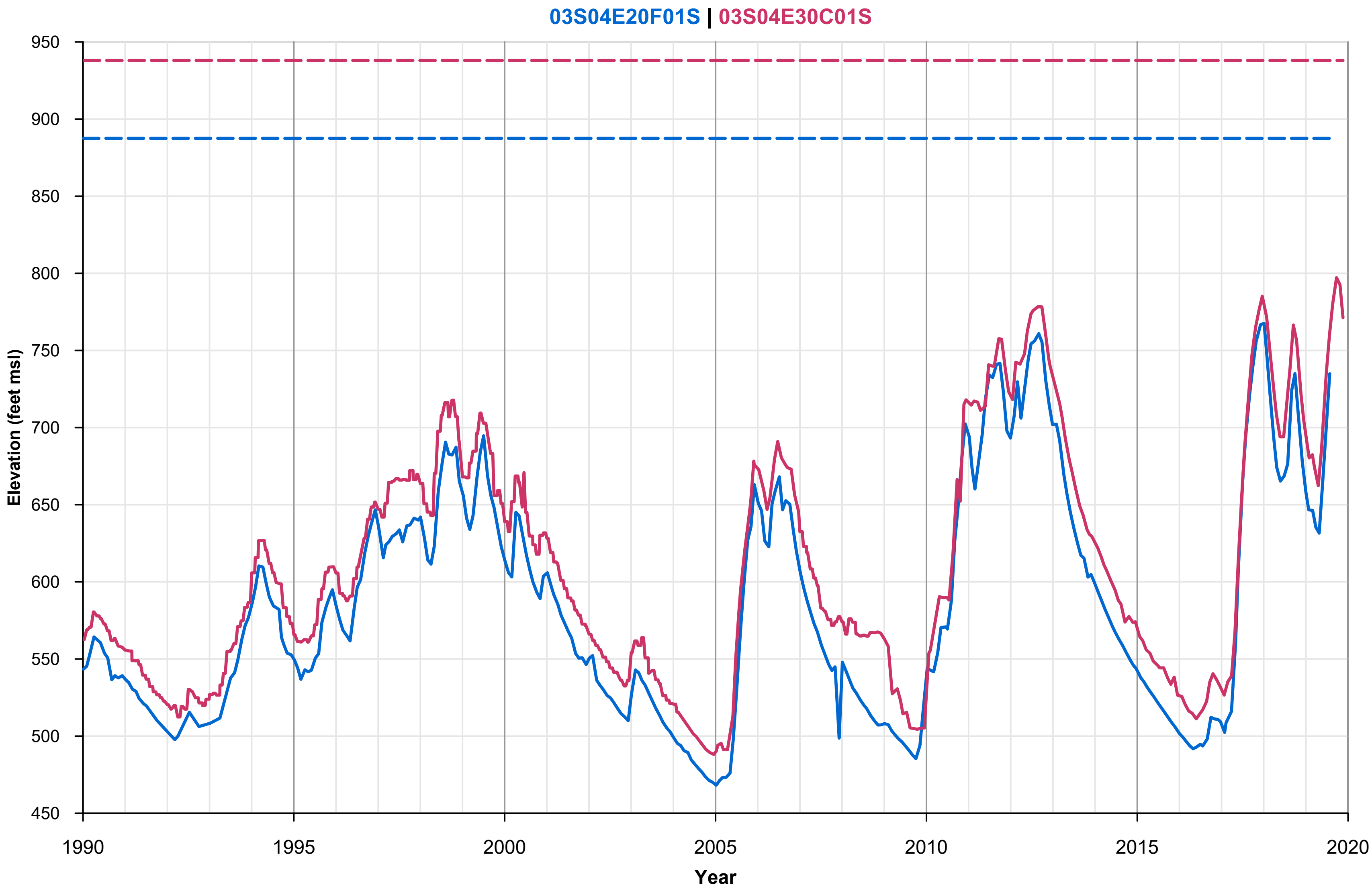
TODD GROUNDWATER

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



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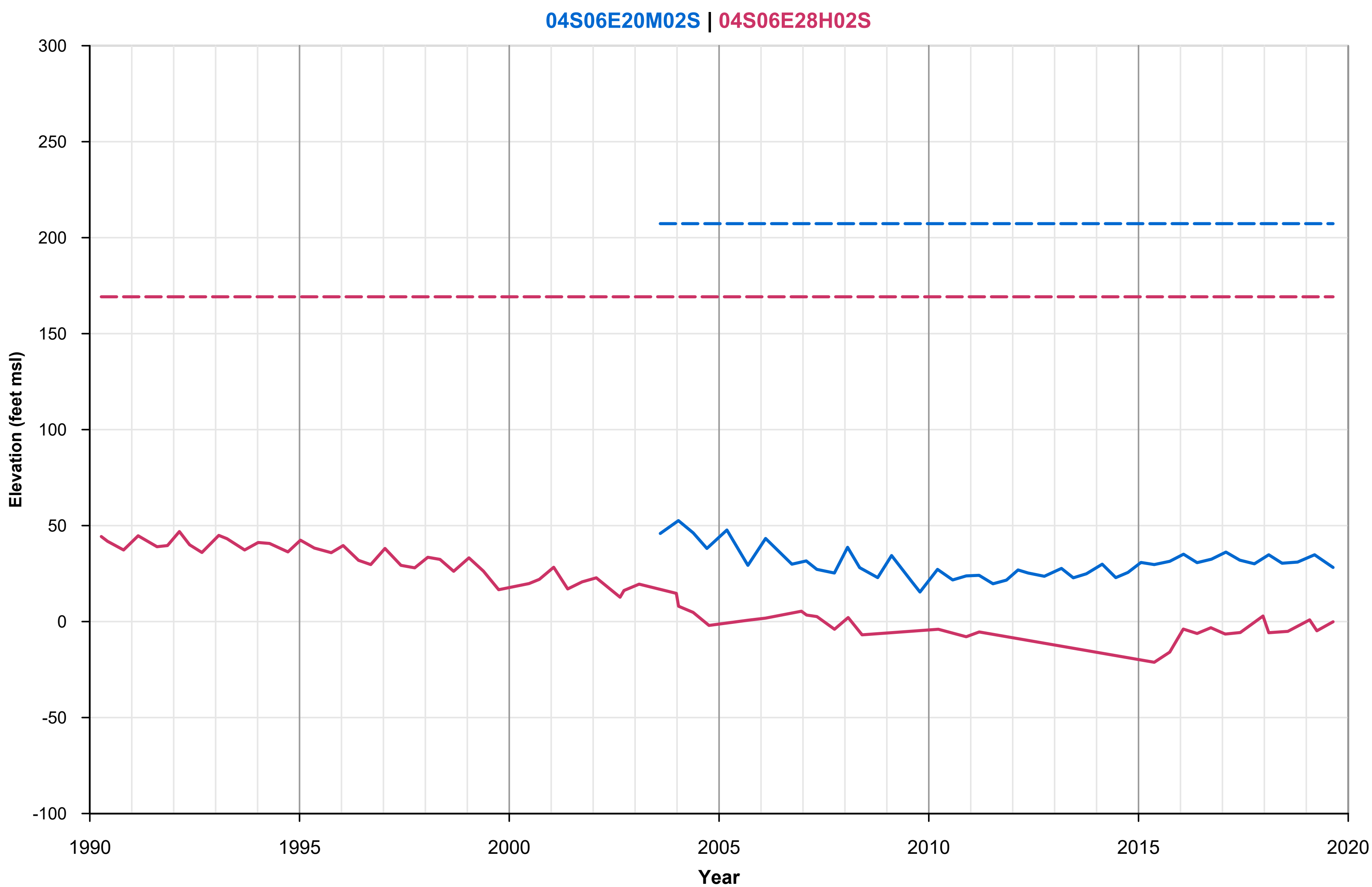
TODD GROUNDWATER

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



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TODD GROUNDWATER

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

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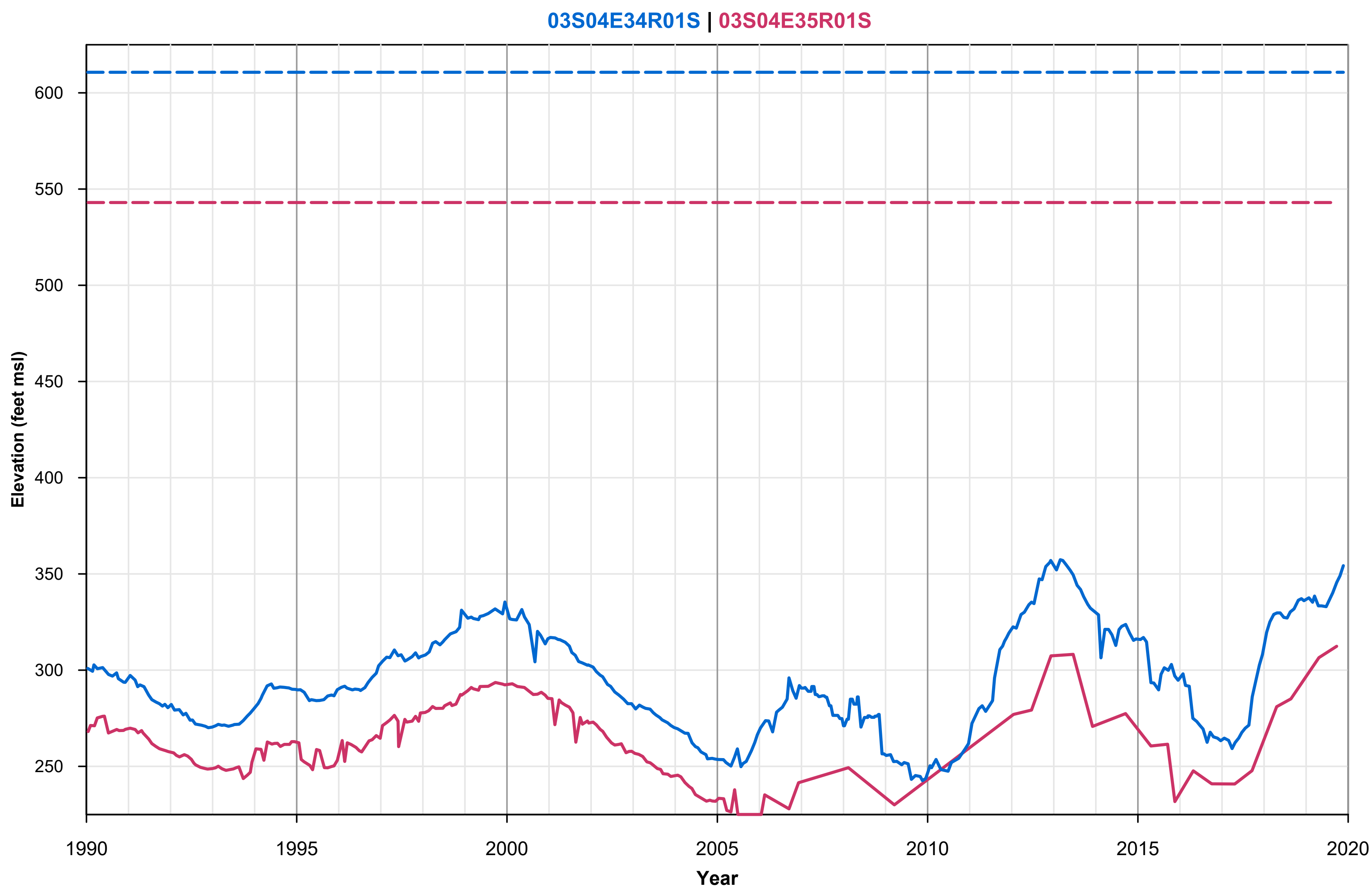

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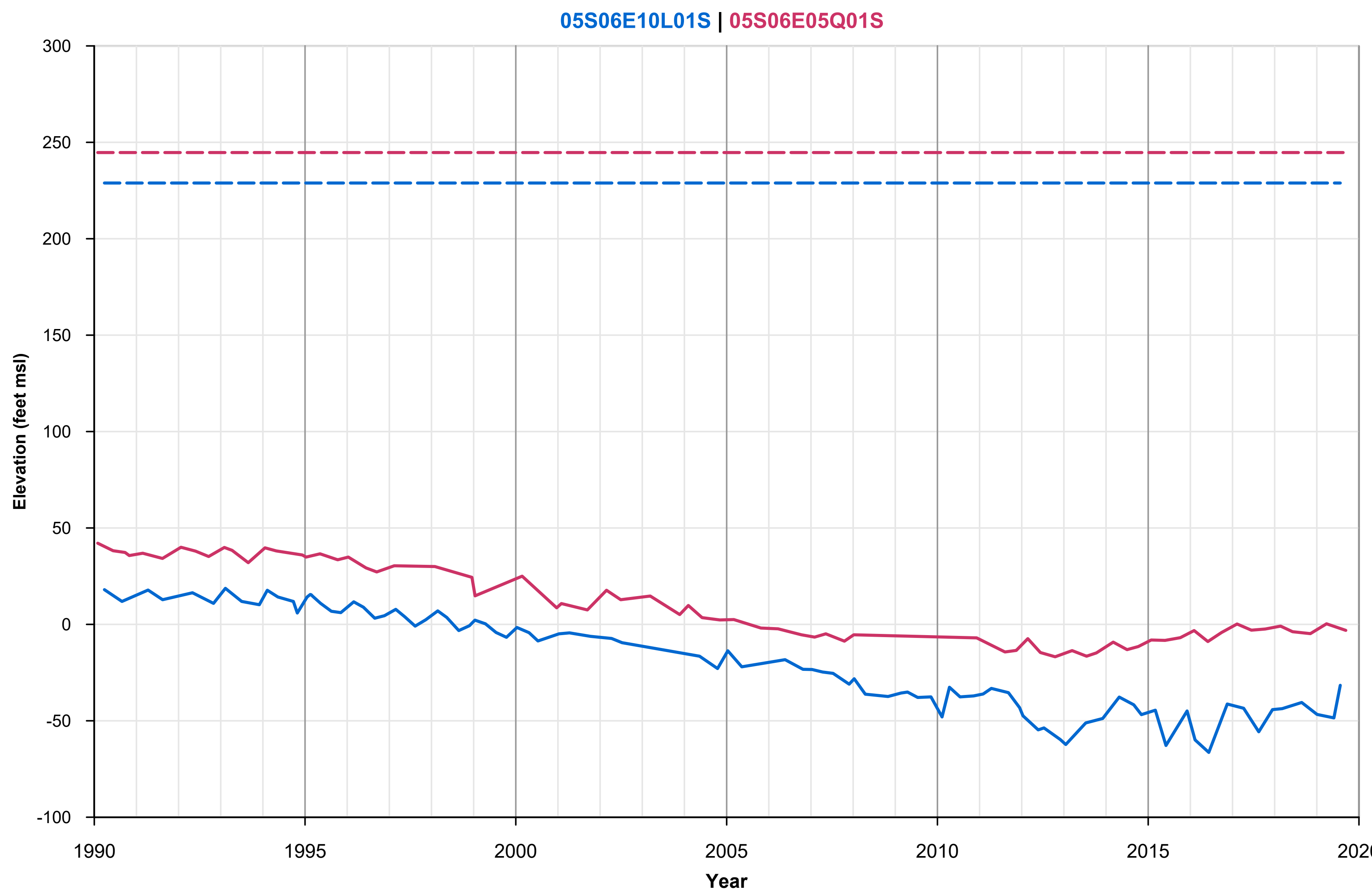
TODD GROUNDWATER

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



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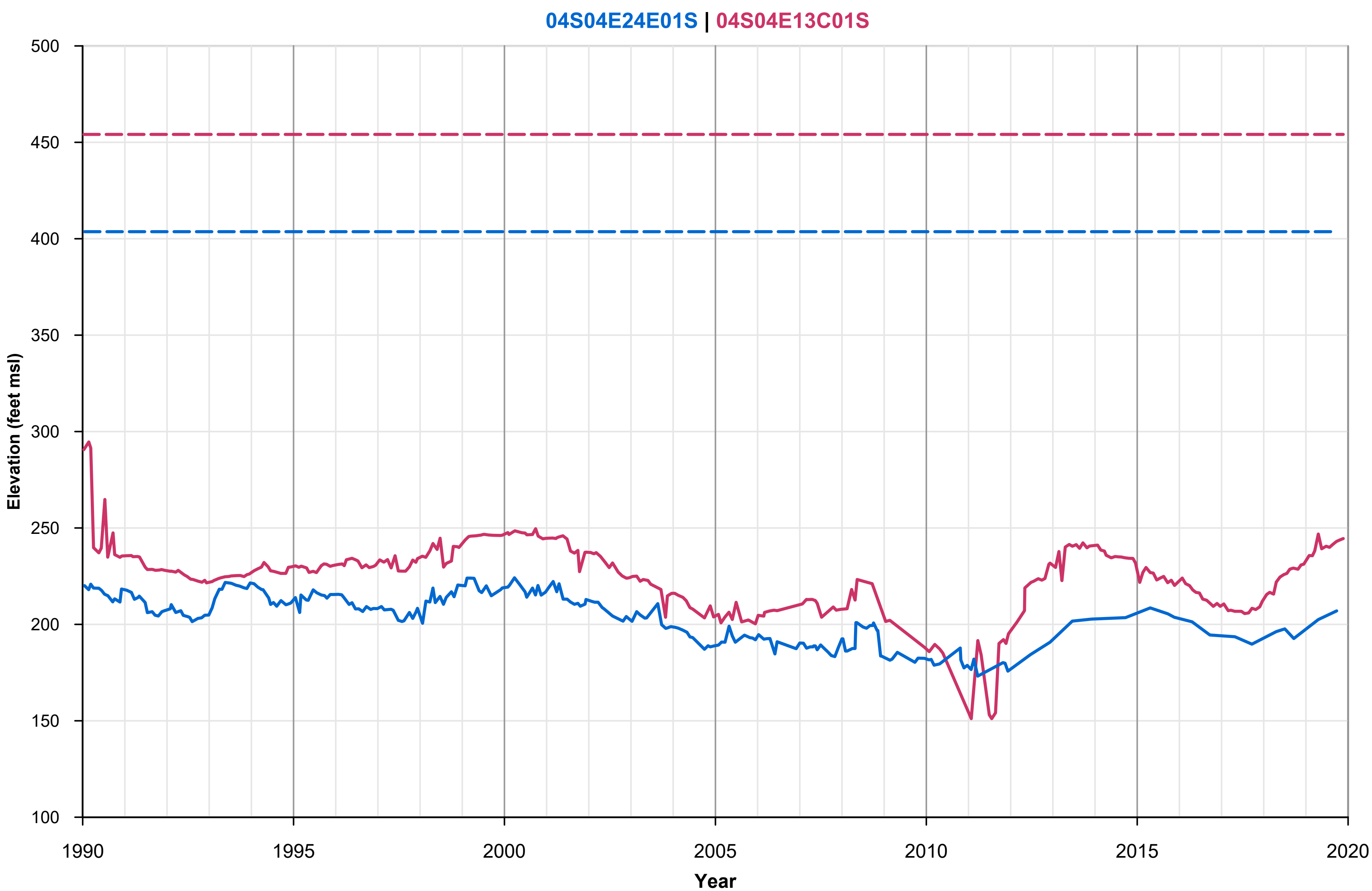
TODD GROUNDWATER

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



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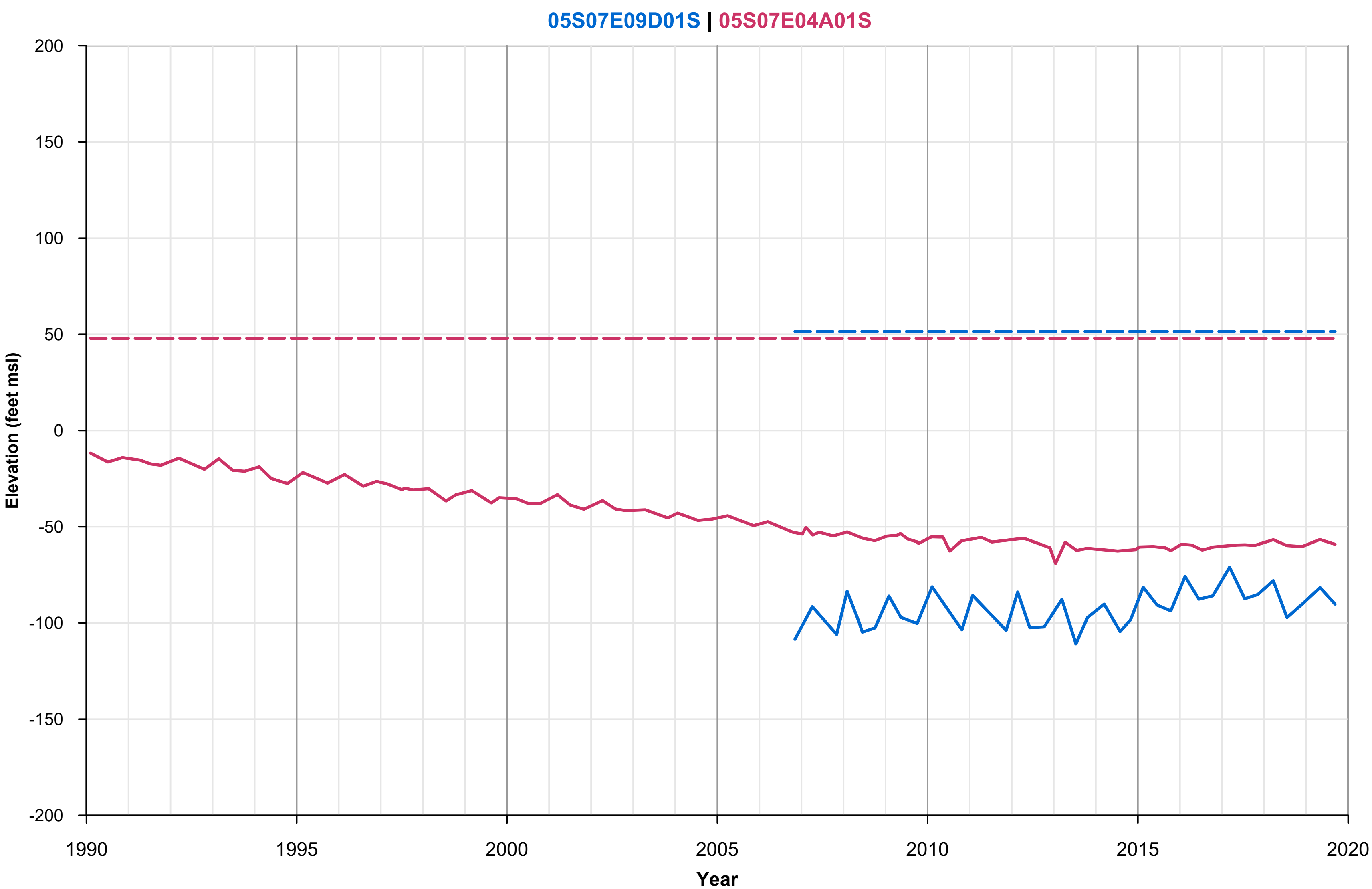
Appendix A-10
Groundwater Elevation Hydrographs
04S04E24E01S and 04S04E13C01S



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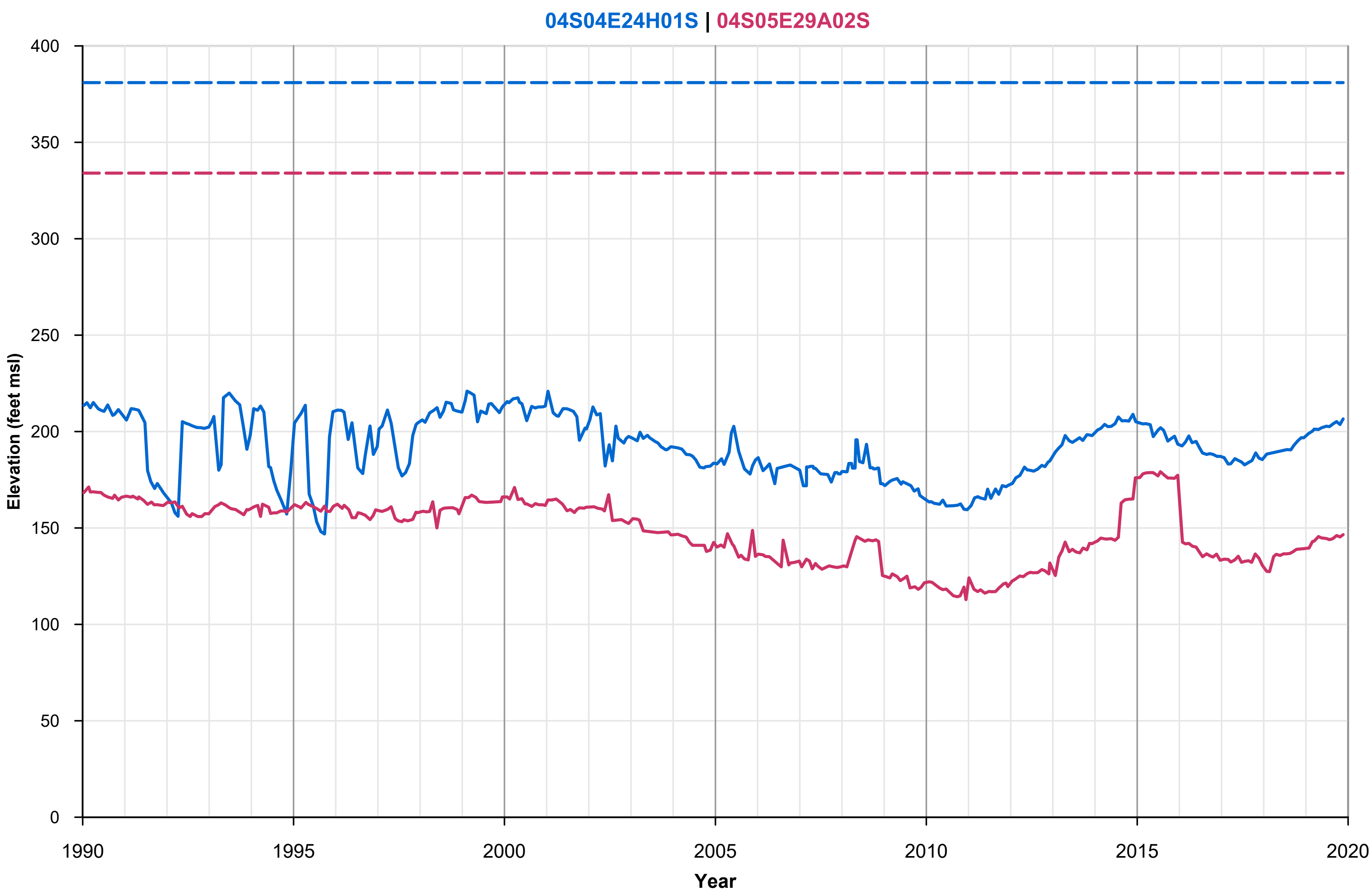
TODD GROUNDWATER

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



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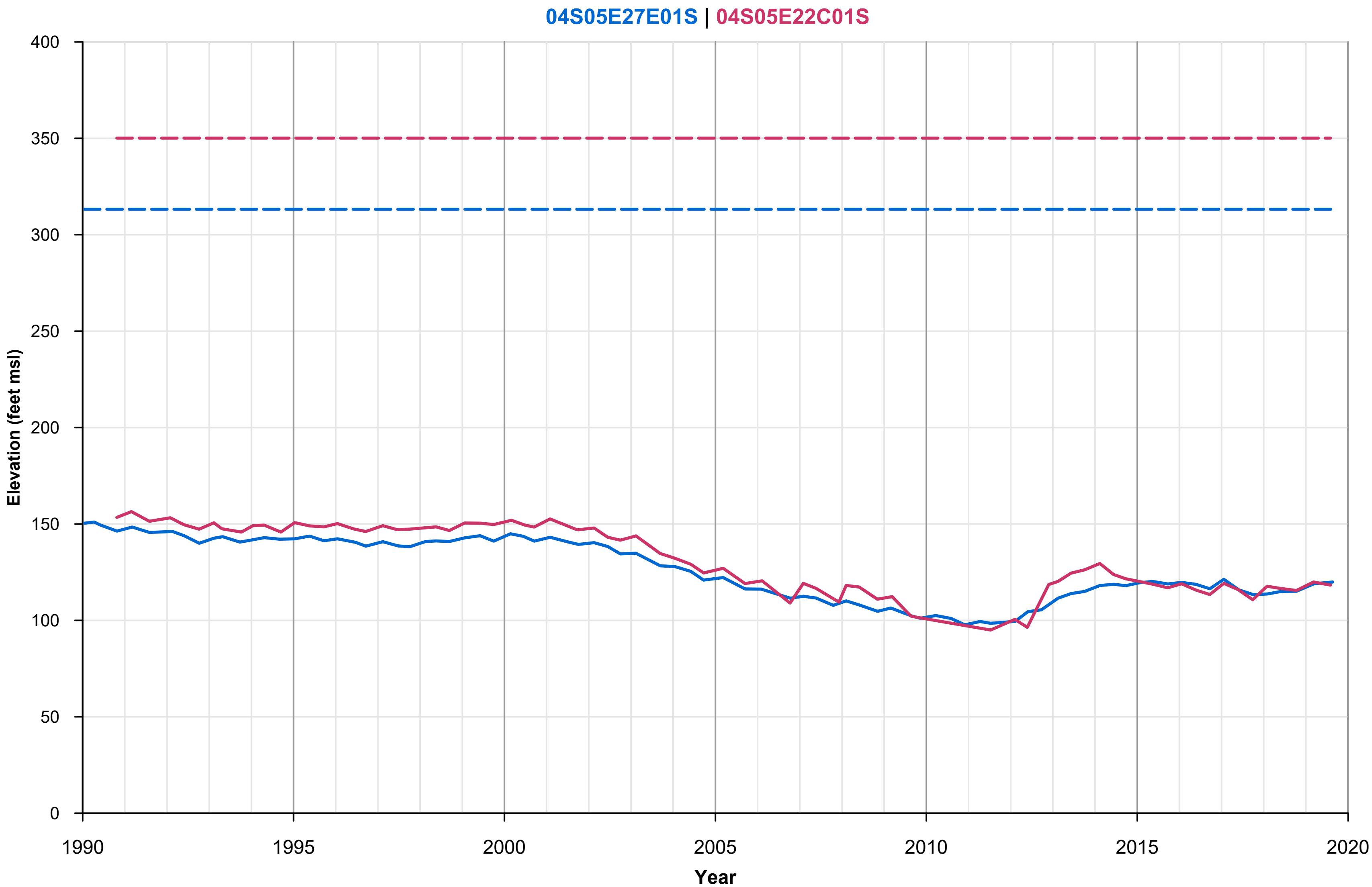
TODD GROUNDWATER

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



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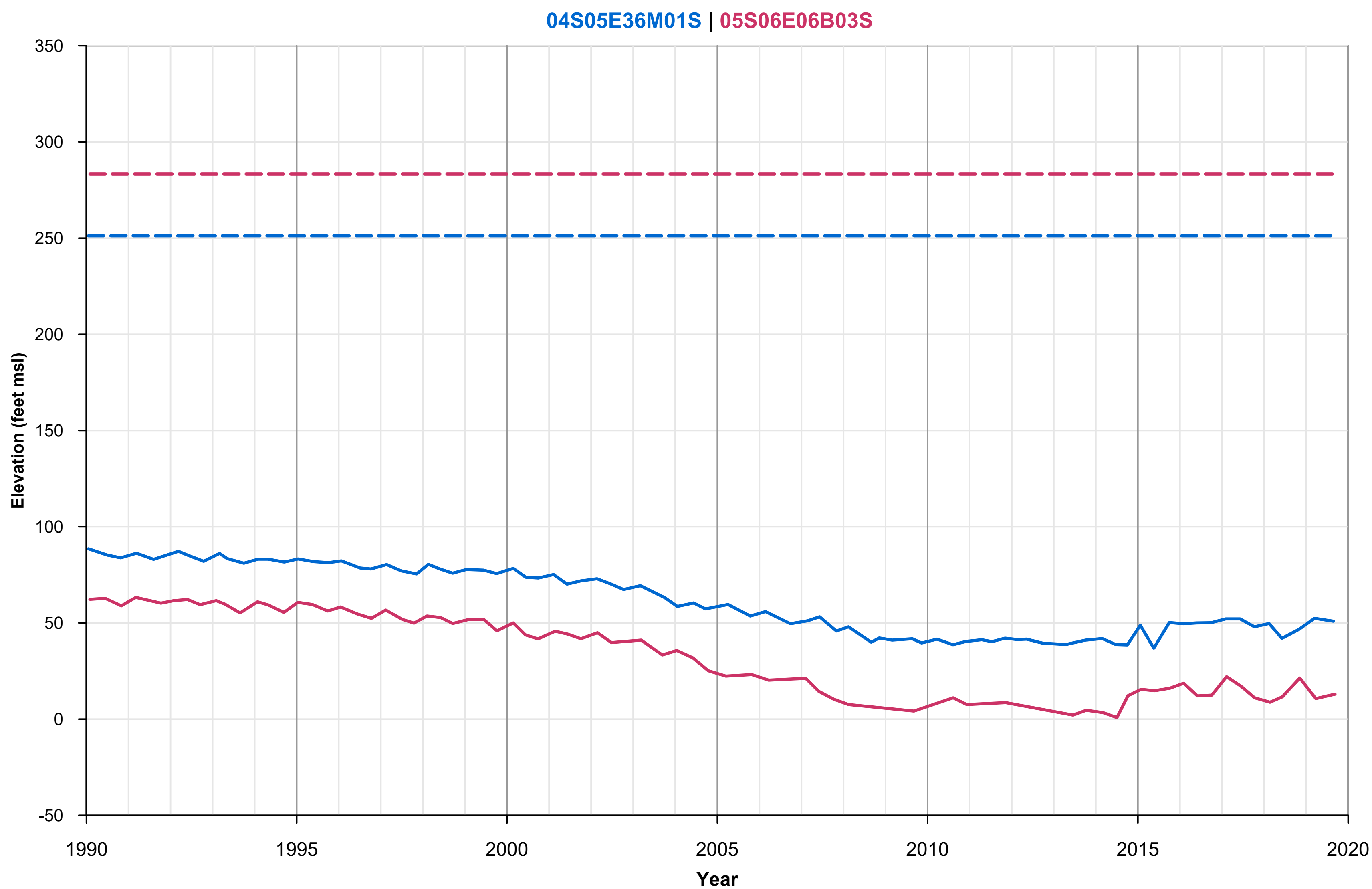
Appendix A-13
Groundwater Elevation Hydrographs
04S05E27E01S and 04S05E22C01S



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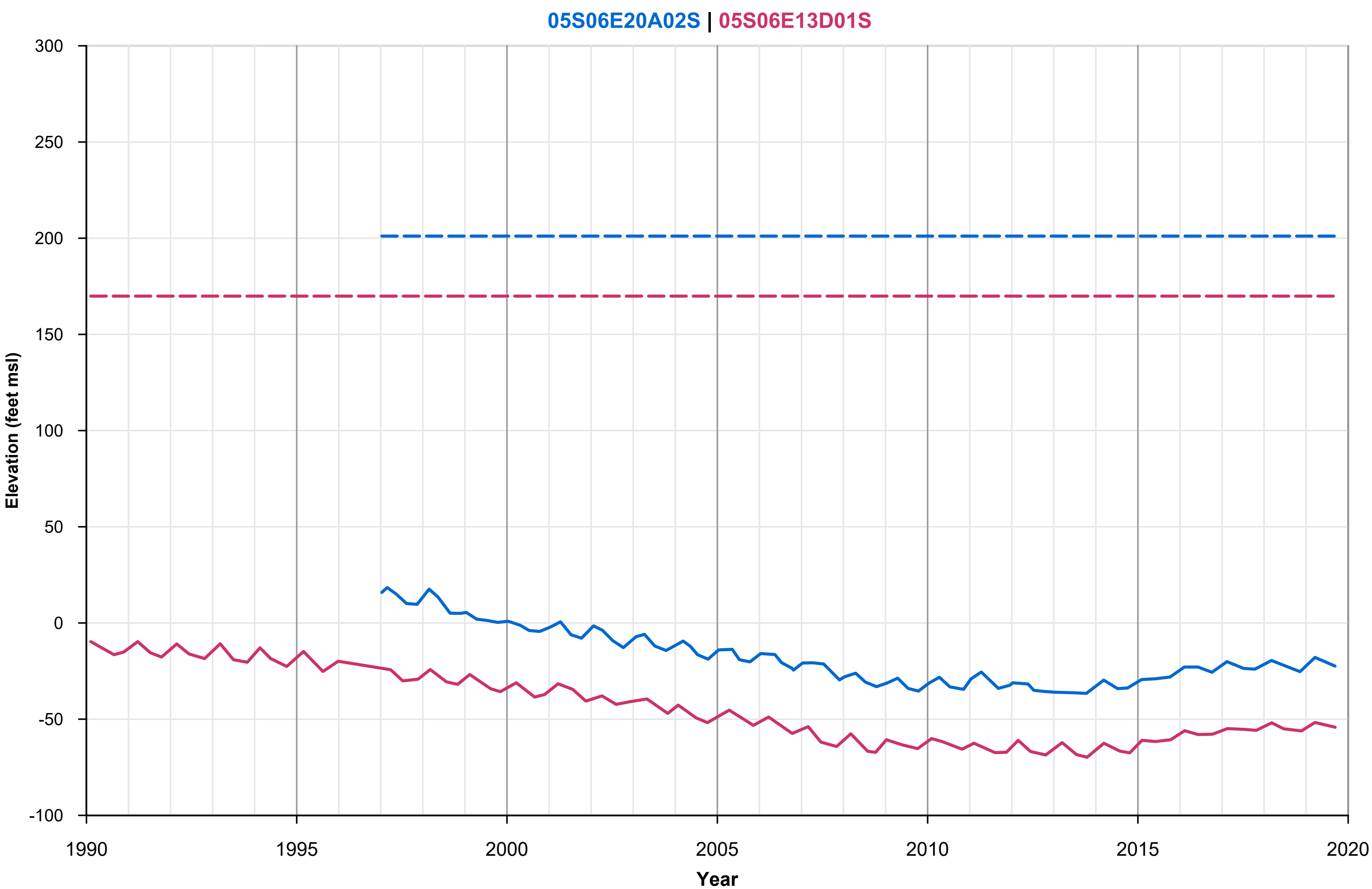
TODD GROUNDWATER

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



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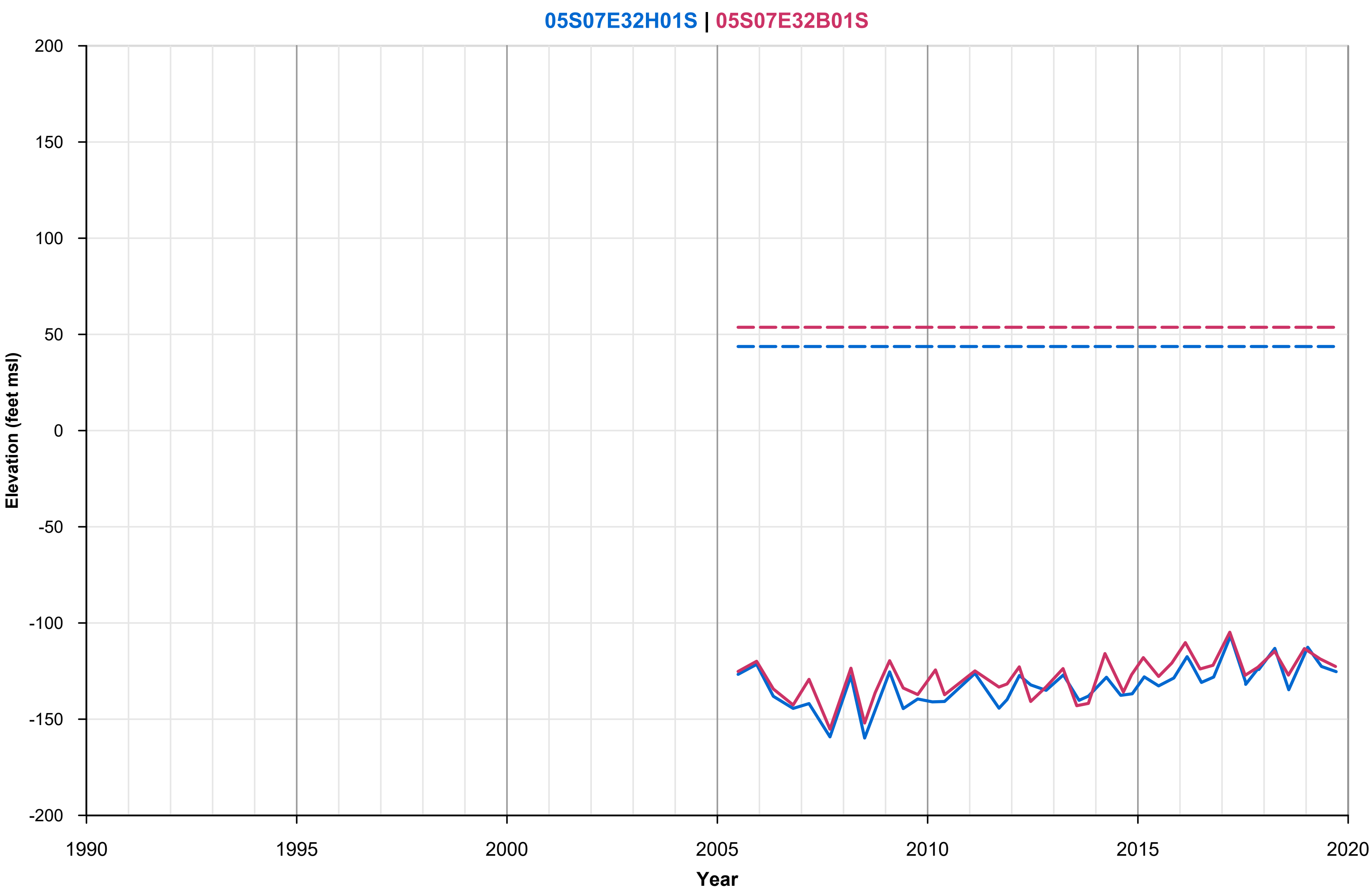
TODD GROUNDWATER

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



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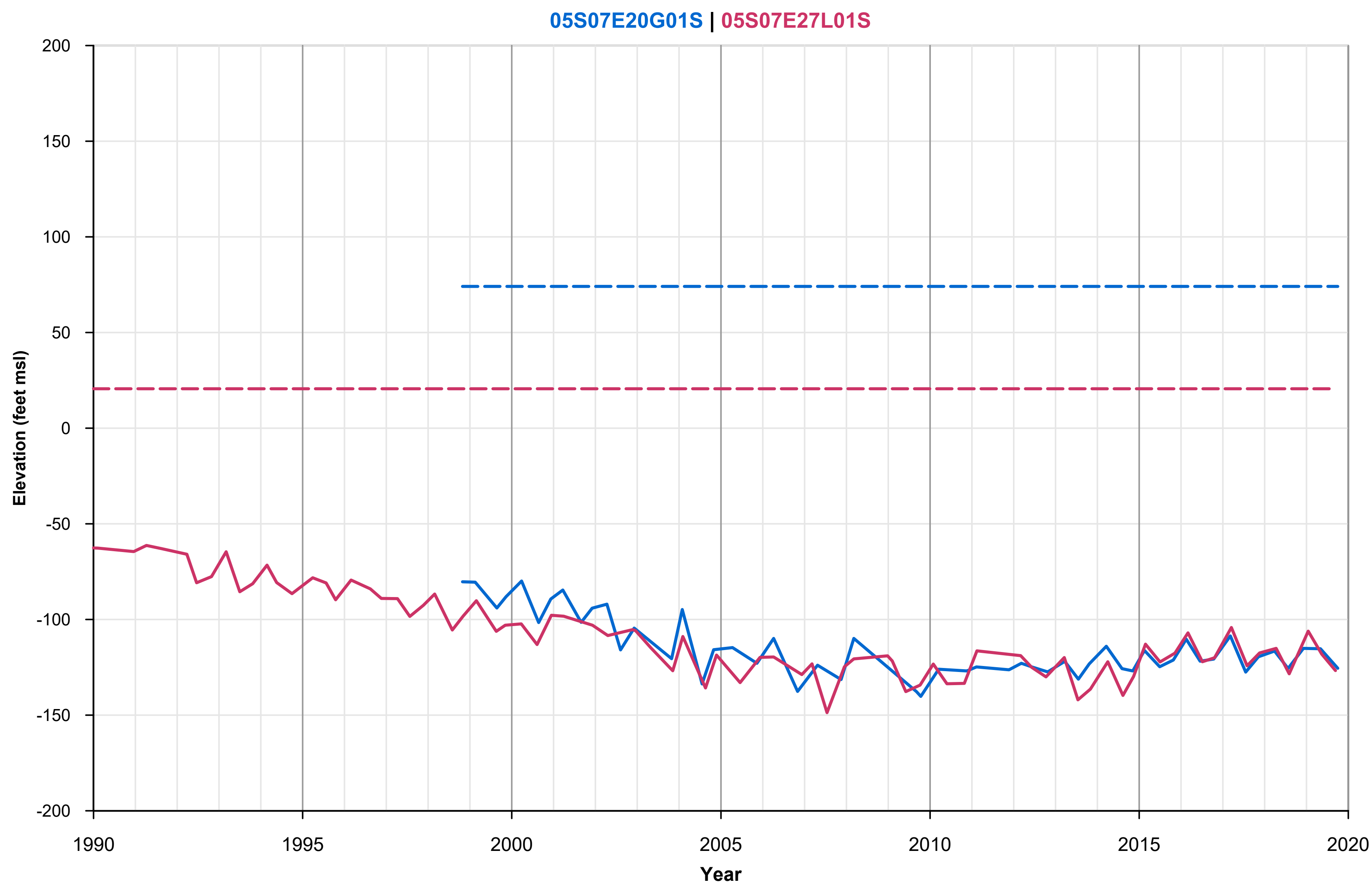
TODD GROUNDWATER

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



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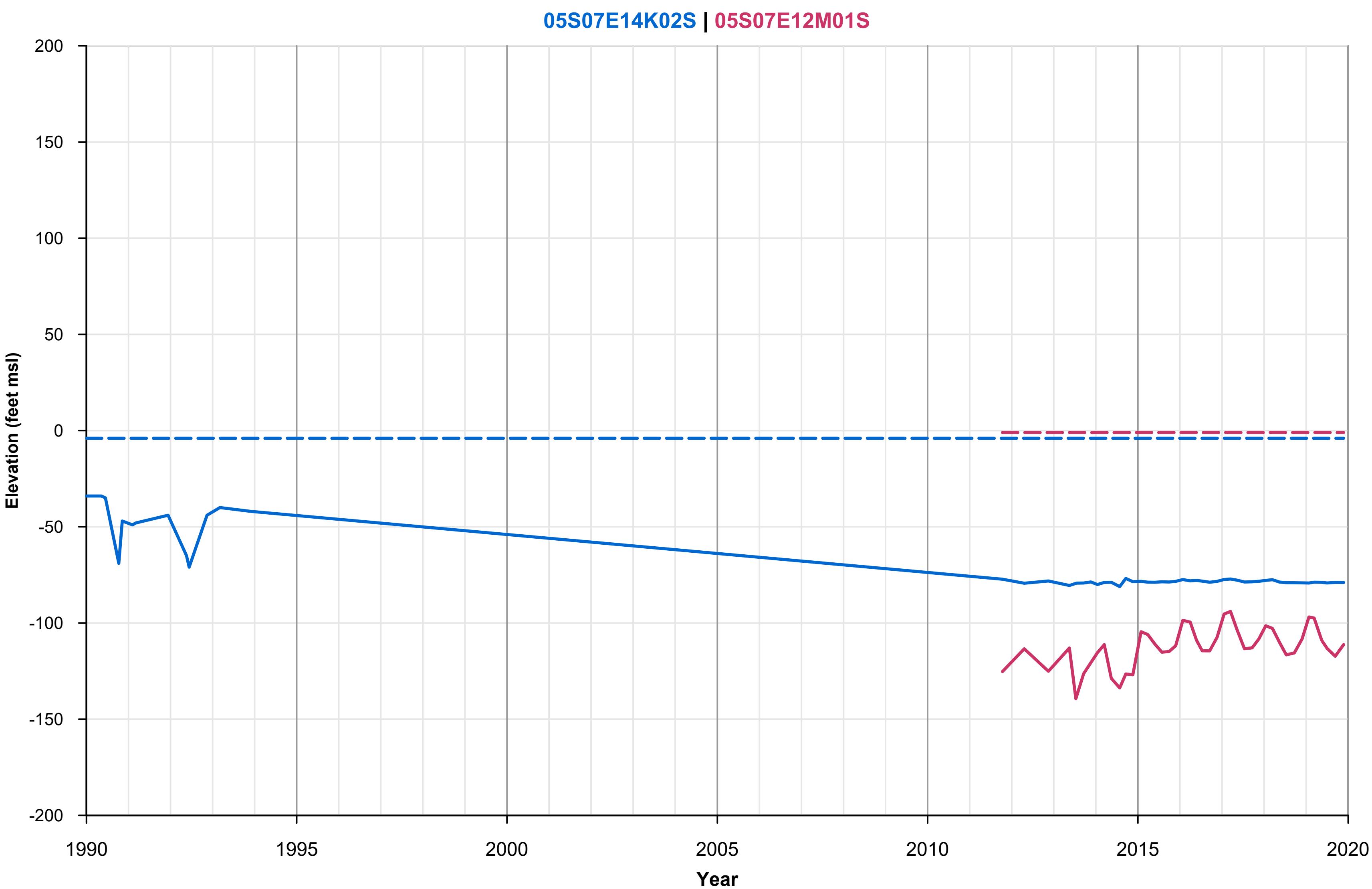
TODD GROUNDWATER

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



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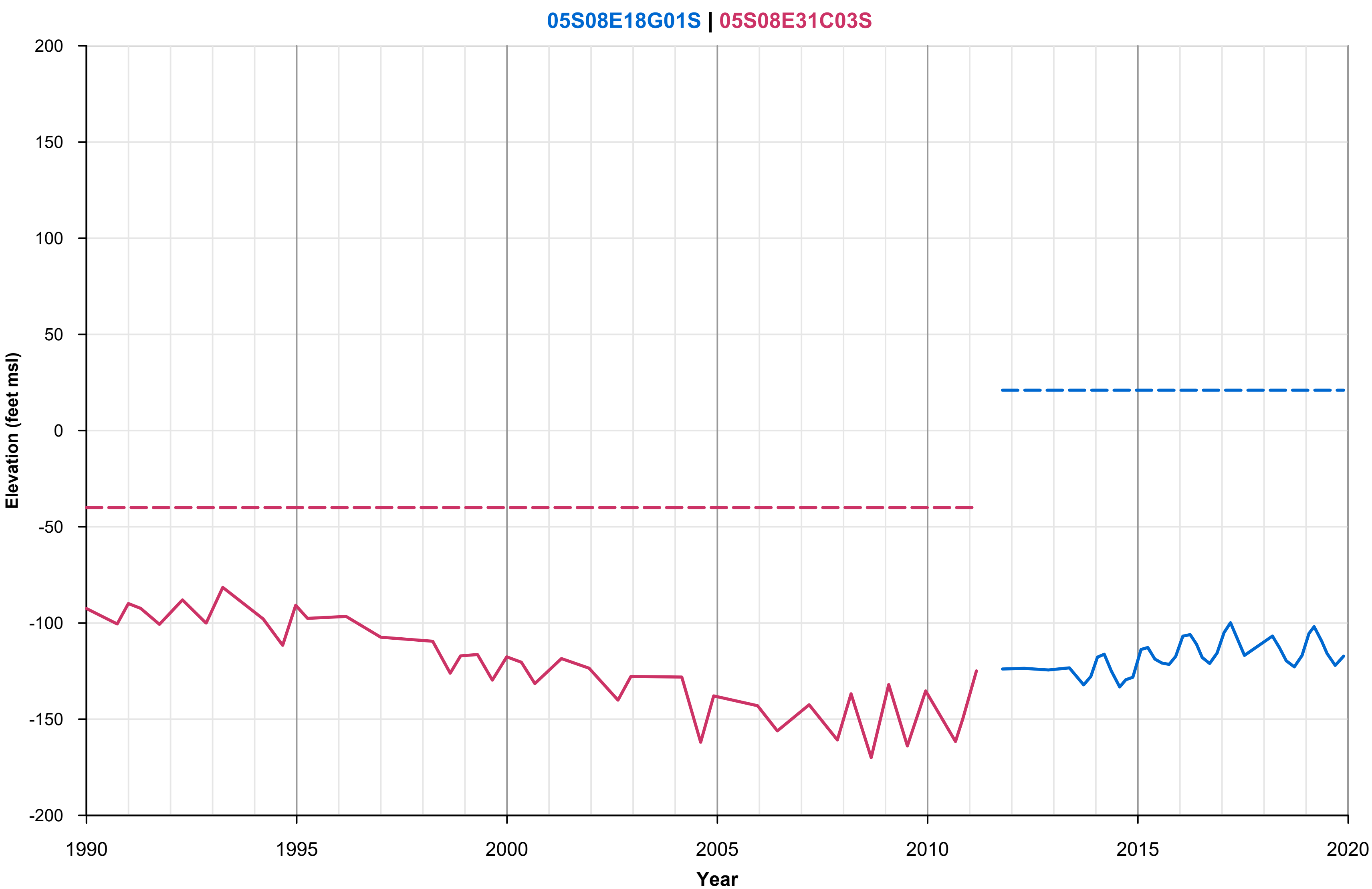
TODD GROUNDWATER

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



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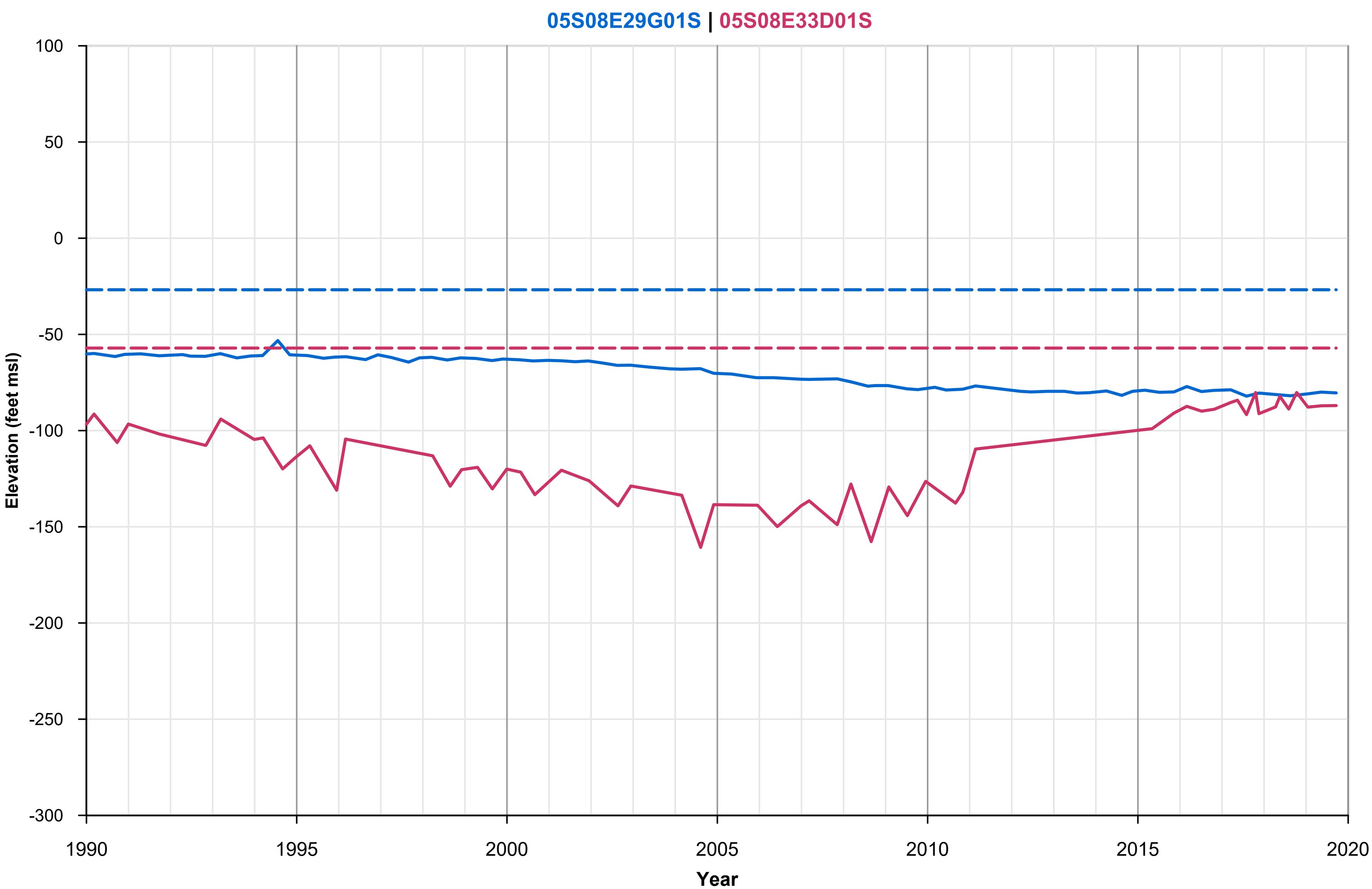
TODD GROUNDWATER

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



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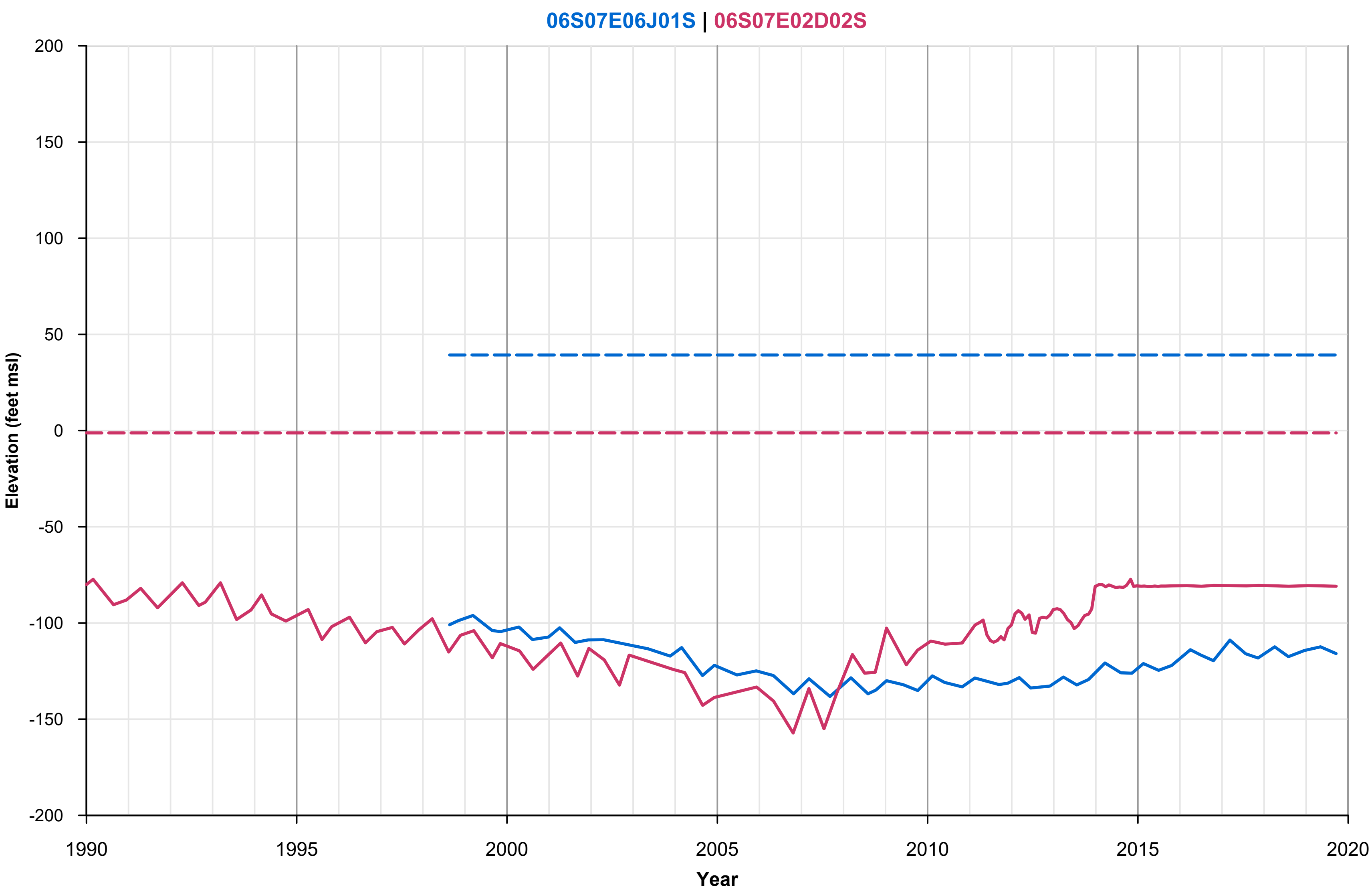
TODD GROUNDWATER

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



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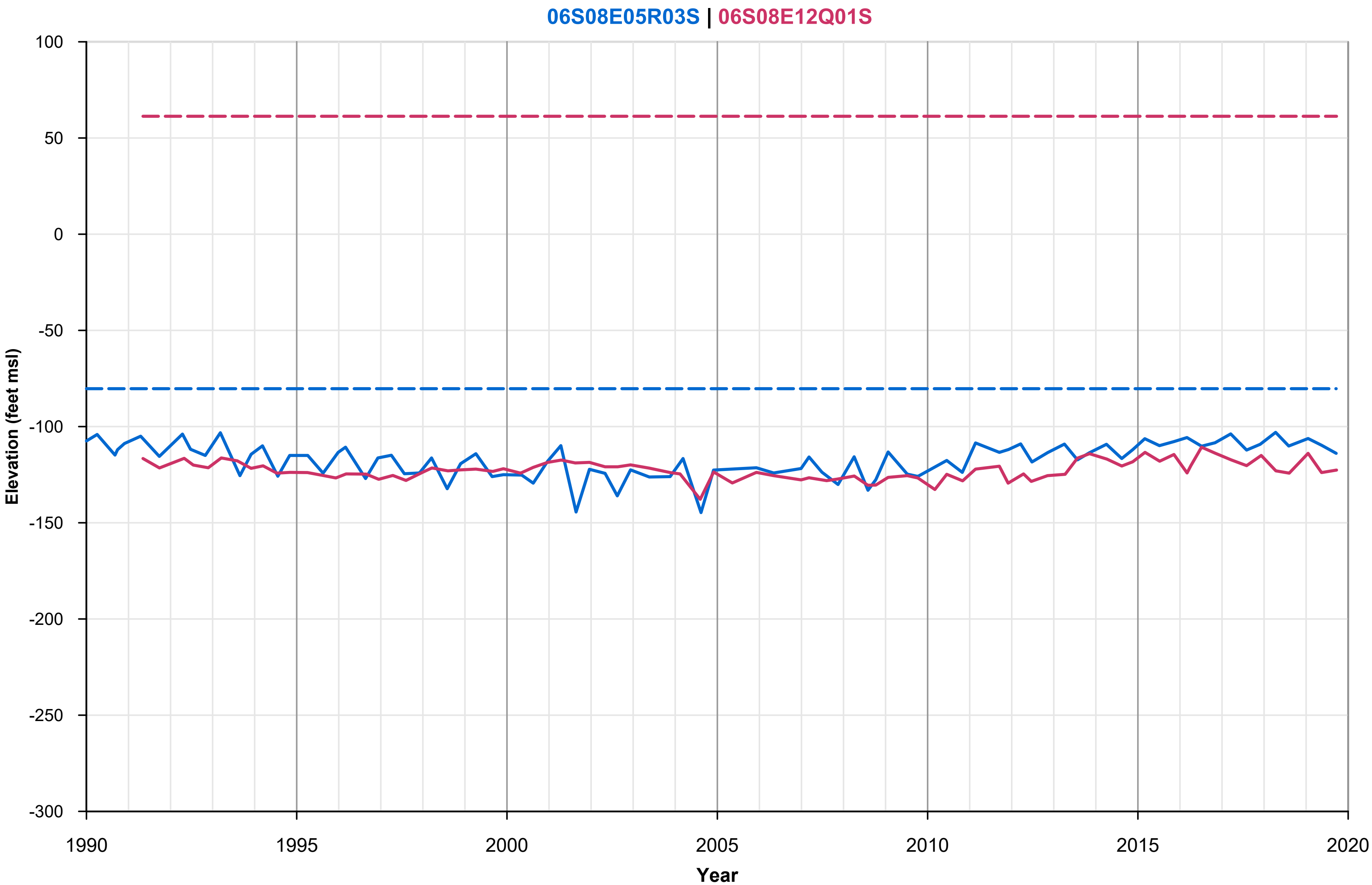
TODD GROUNDWATER

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



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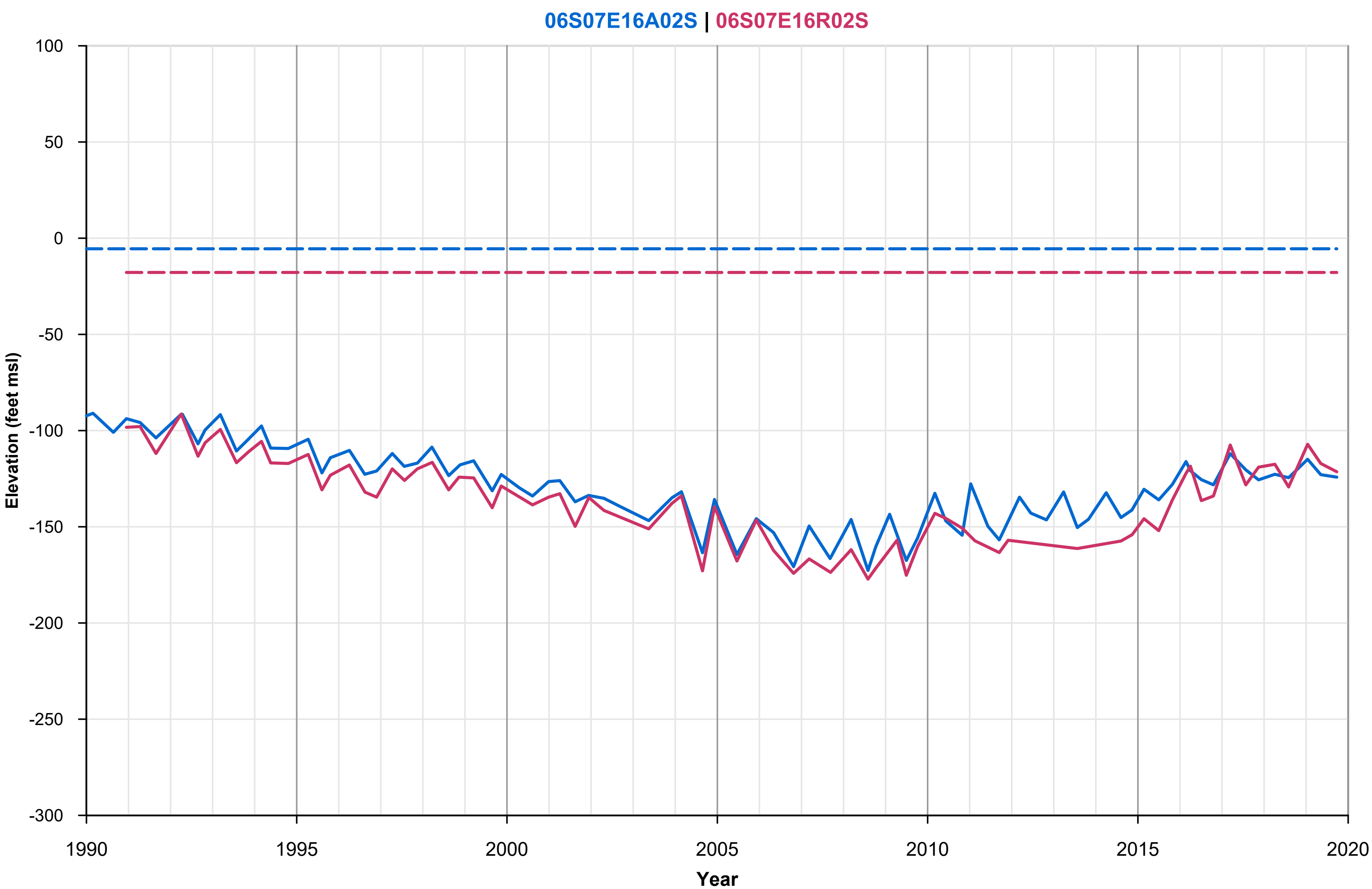
TODD GROUNDWATER

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



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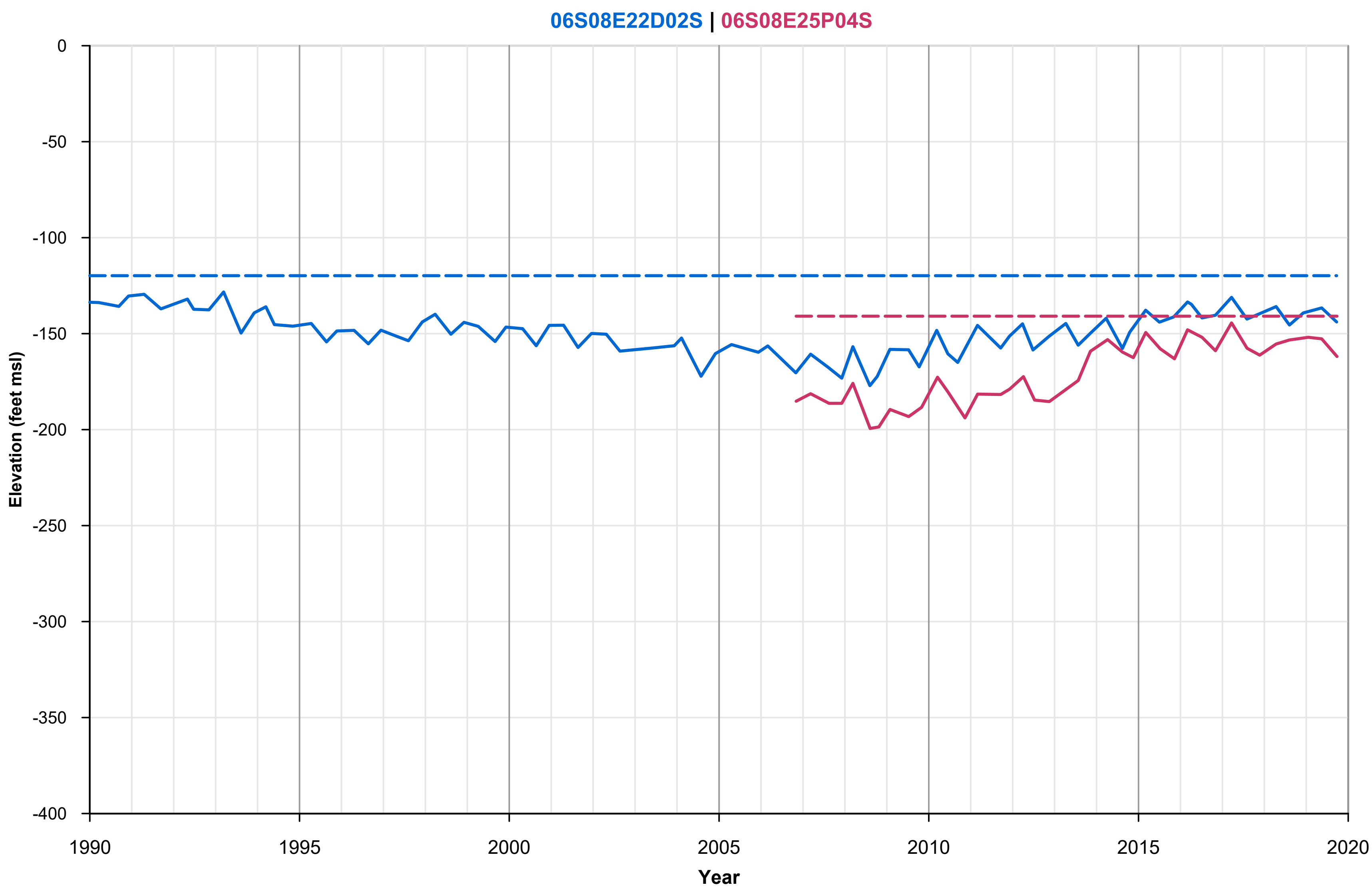
Appendix A-23
Groundwater Elevation Hydrographs
06S07E16A02S and 06S07E16R02S



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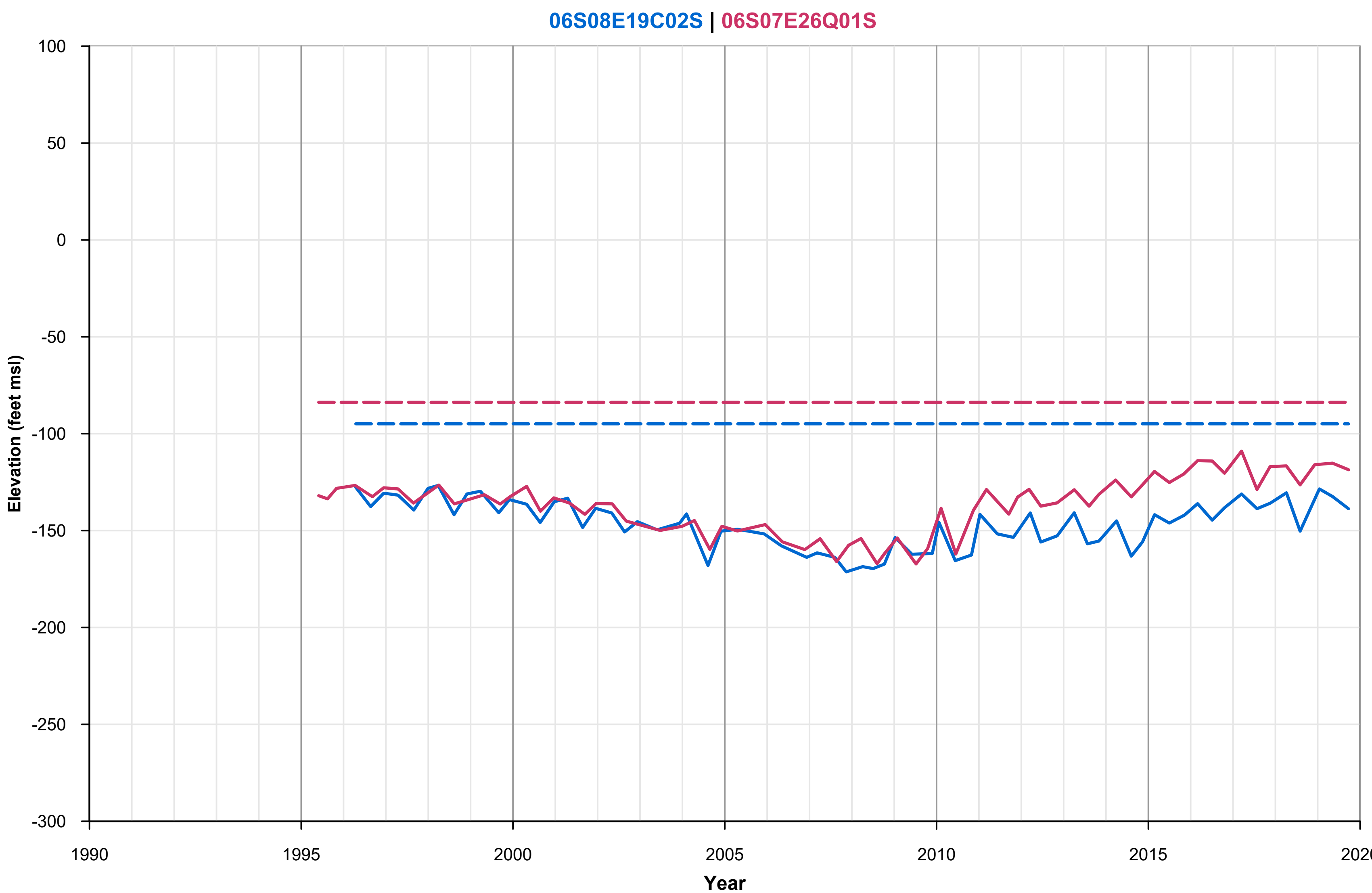
TODD GROUNDWATER

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



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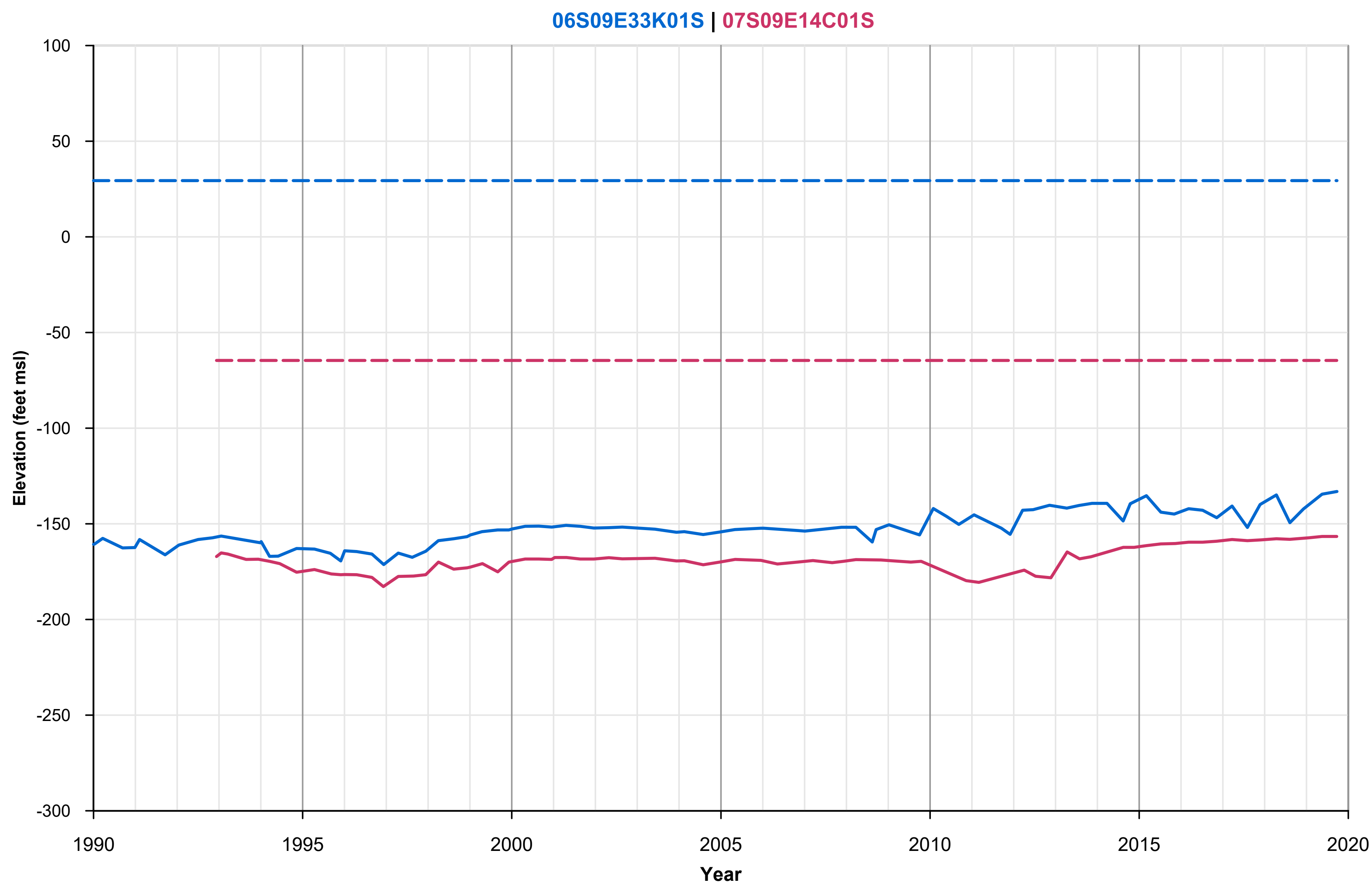
TODD GROUNDWATER

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



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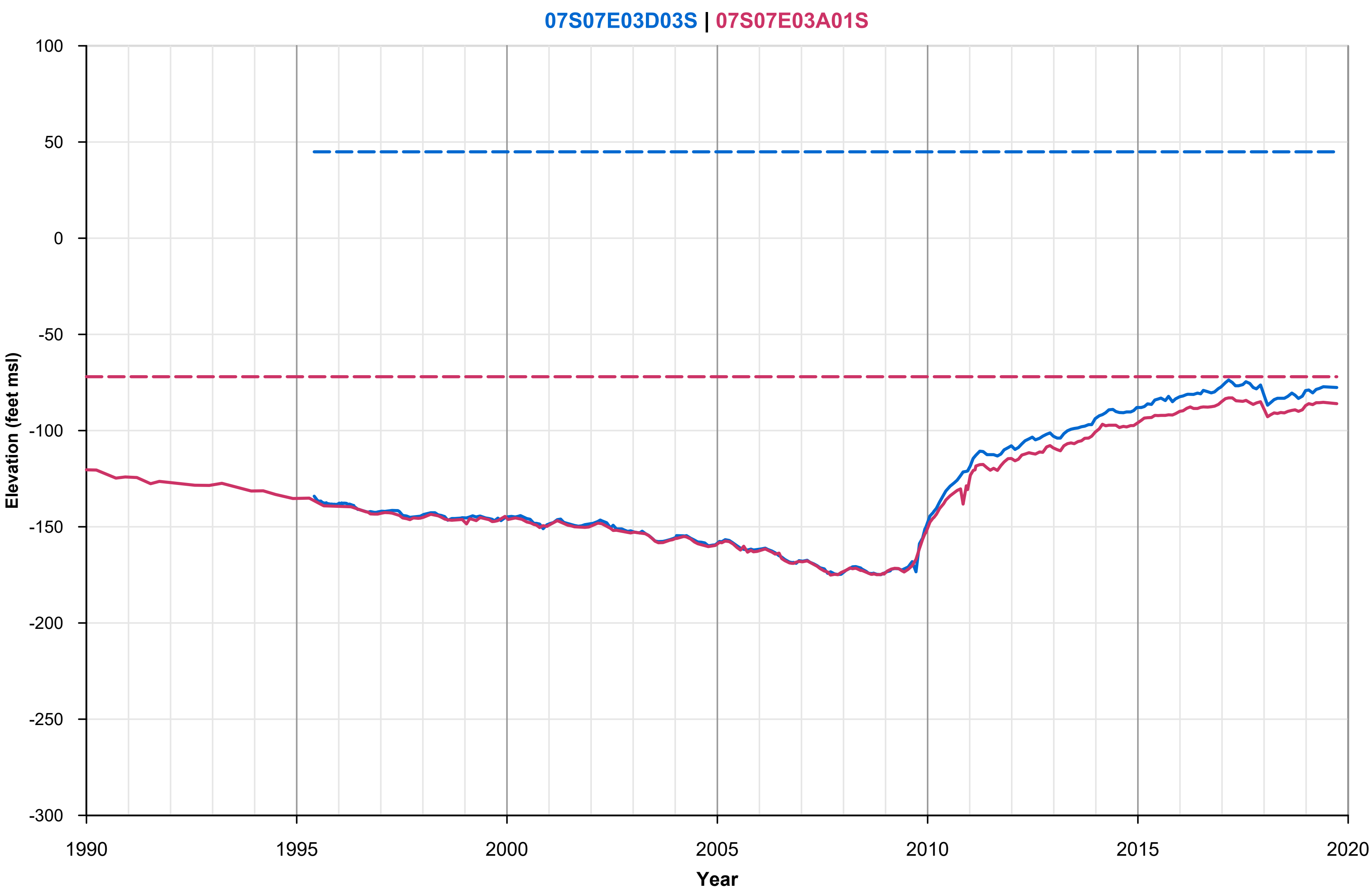
TODD GROUNDWATER

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



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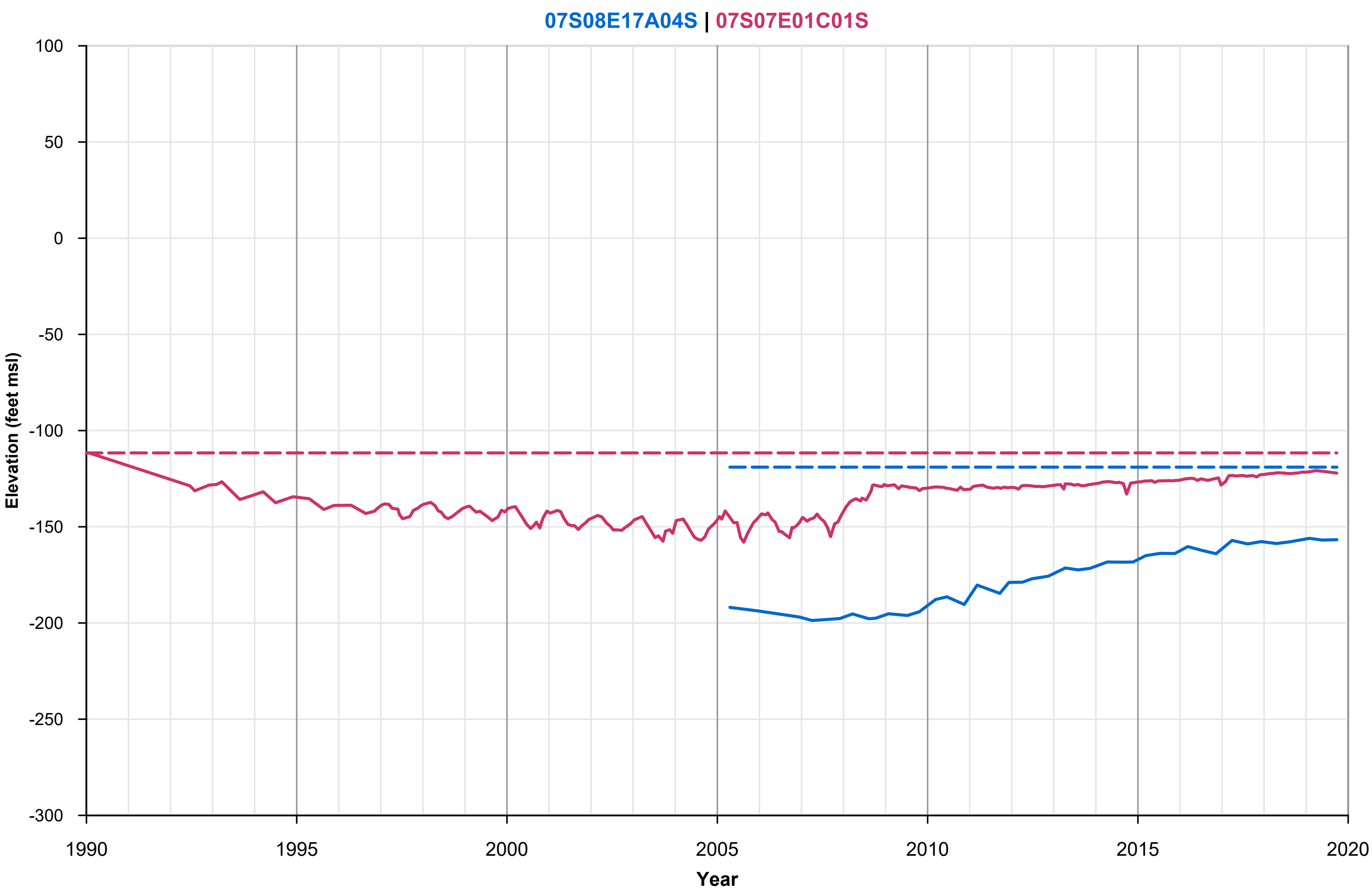
TODD GROUNDWATER

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



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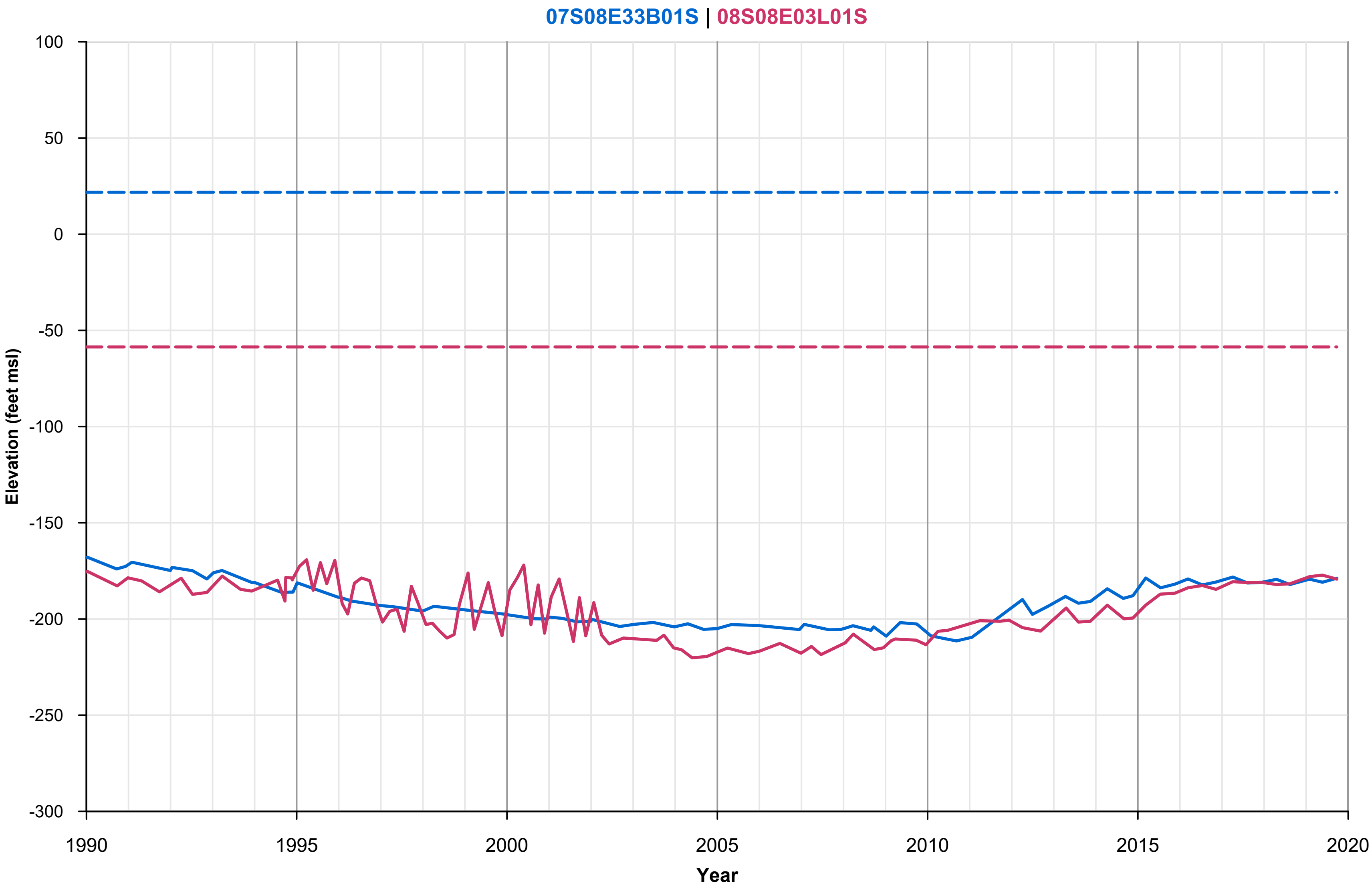
TODD GROUNDWATER

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



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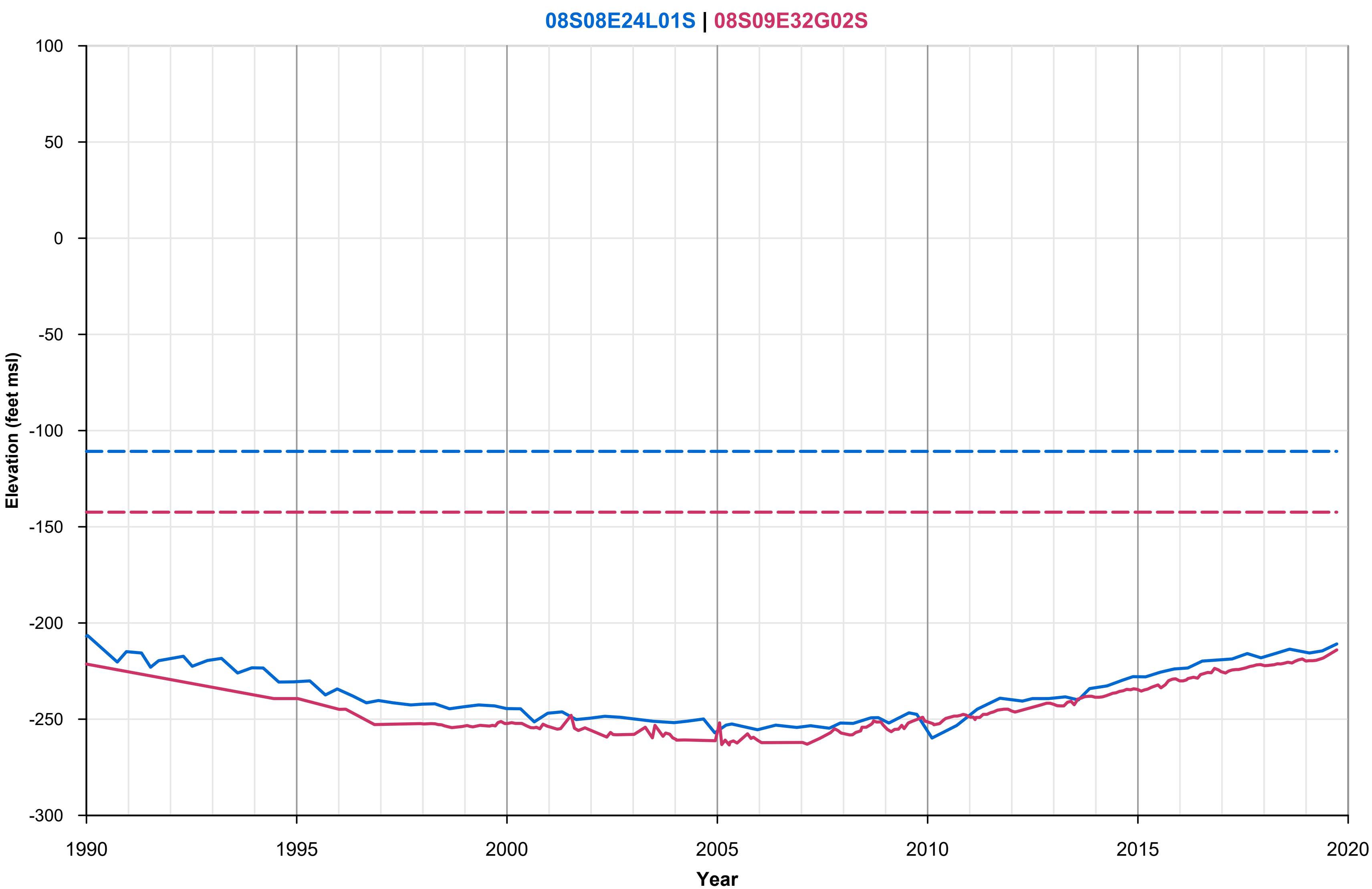
TODD GROUNDWATER

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



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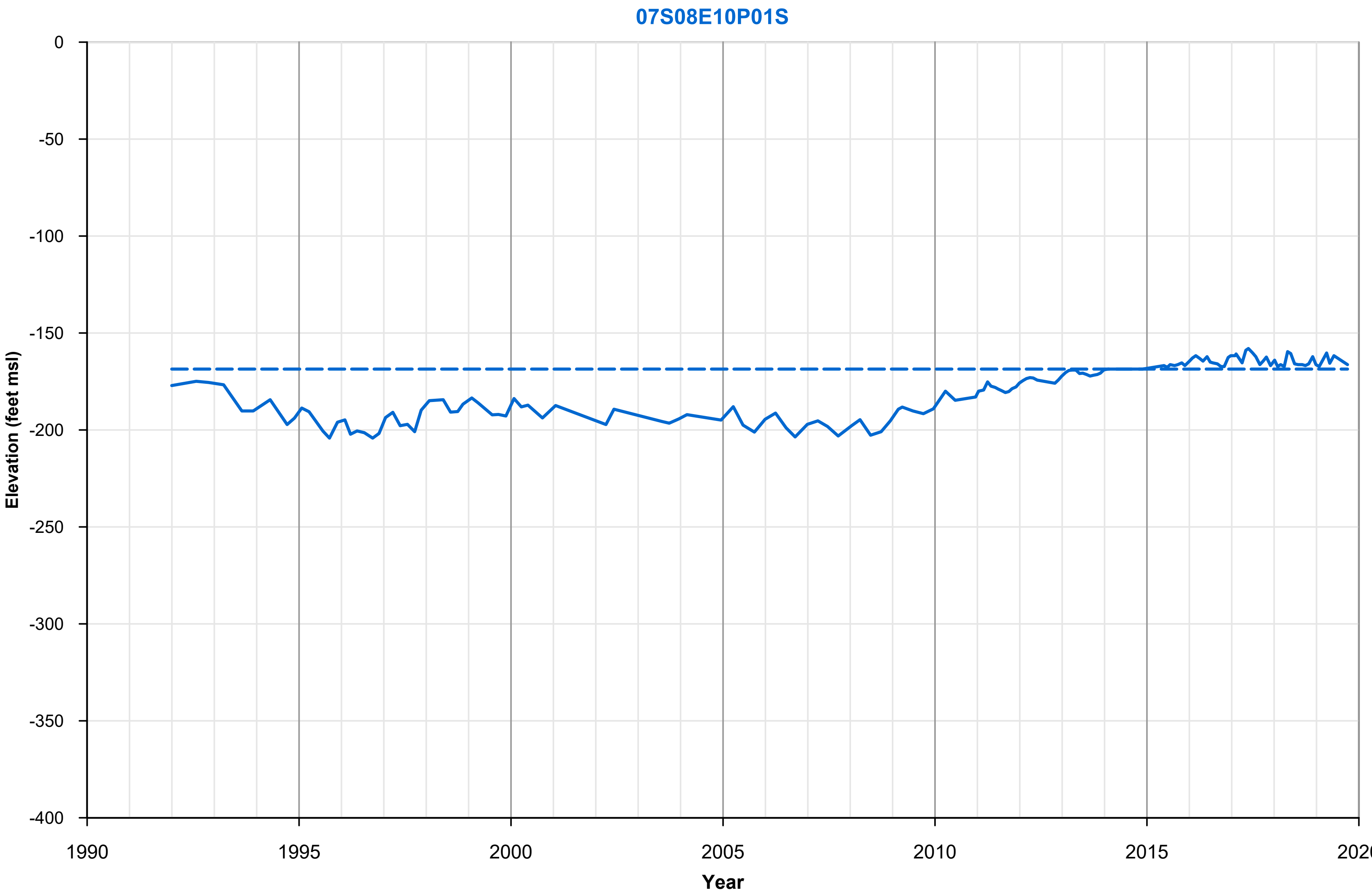
TODD GROUNDWATER

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



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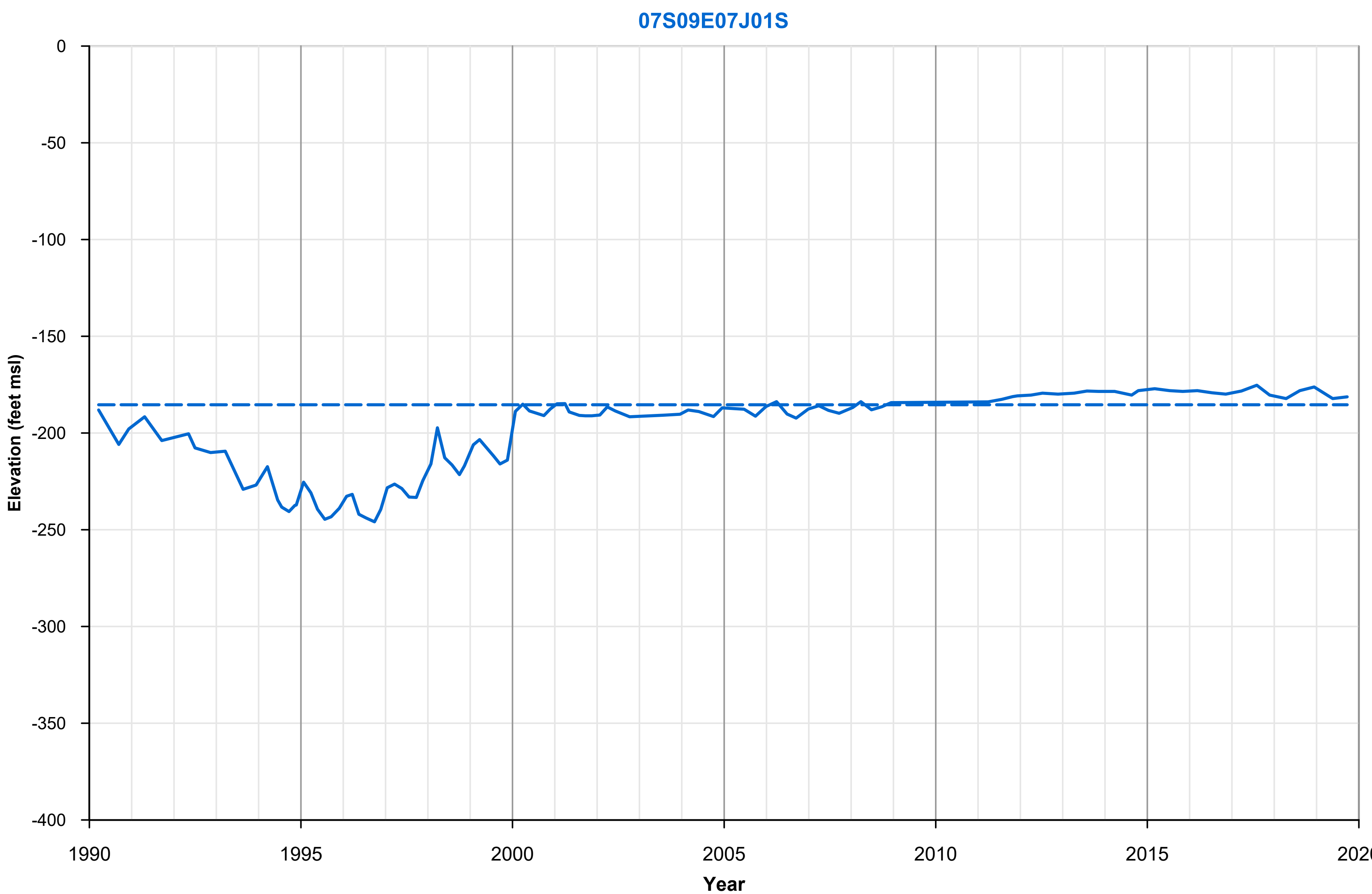
TODD GROUNDWATER

Appendix A-31
Groundwater Elevation Hydrographs
07S08E10P01S



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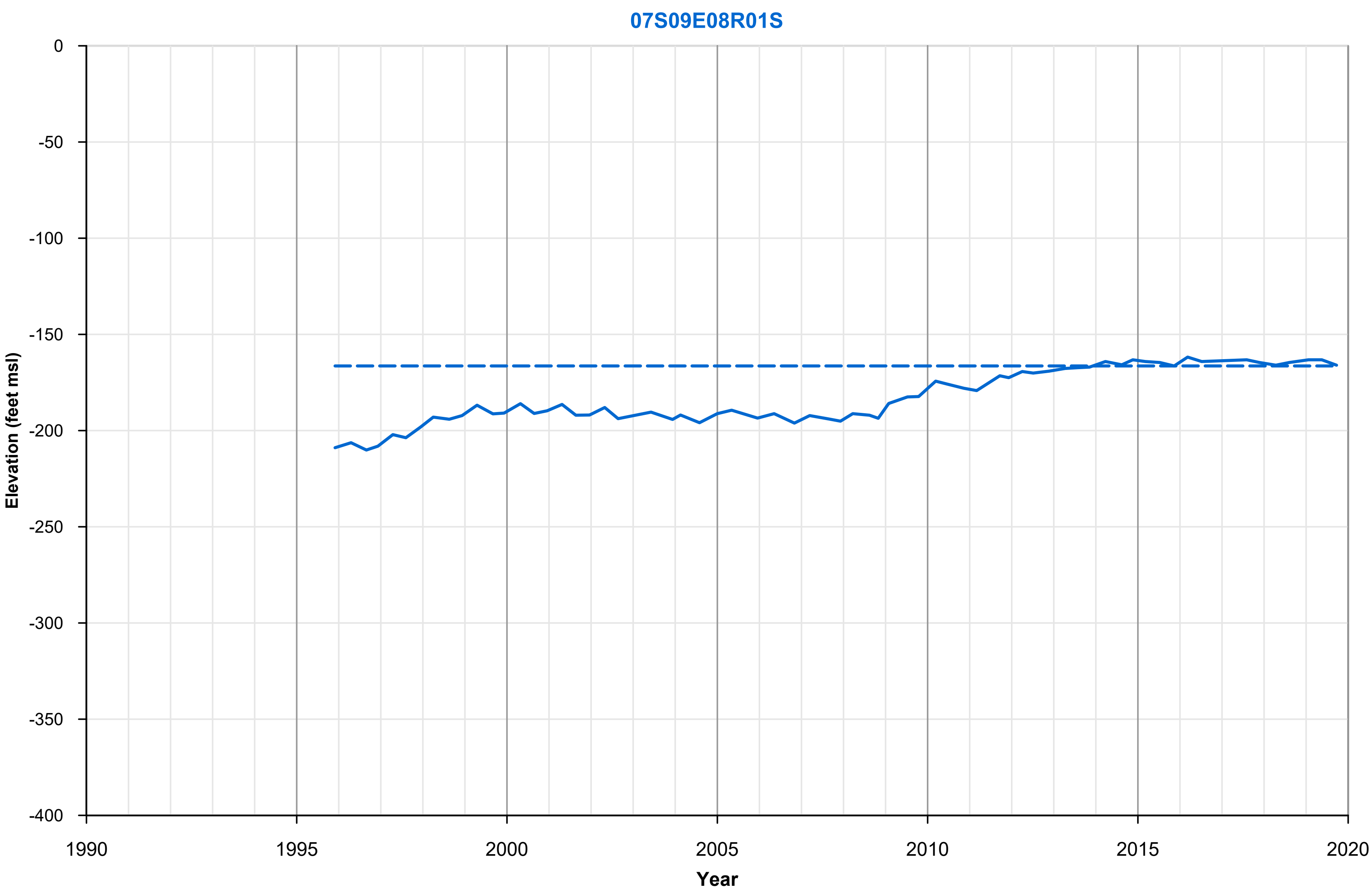
TODD GROUNDWATER

Appendix A-32
Groundwater Elevation Hydrographs
07S09E07J01S



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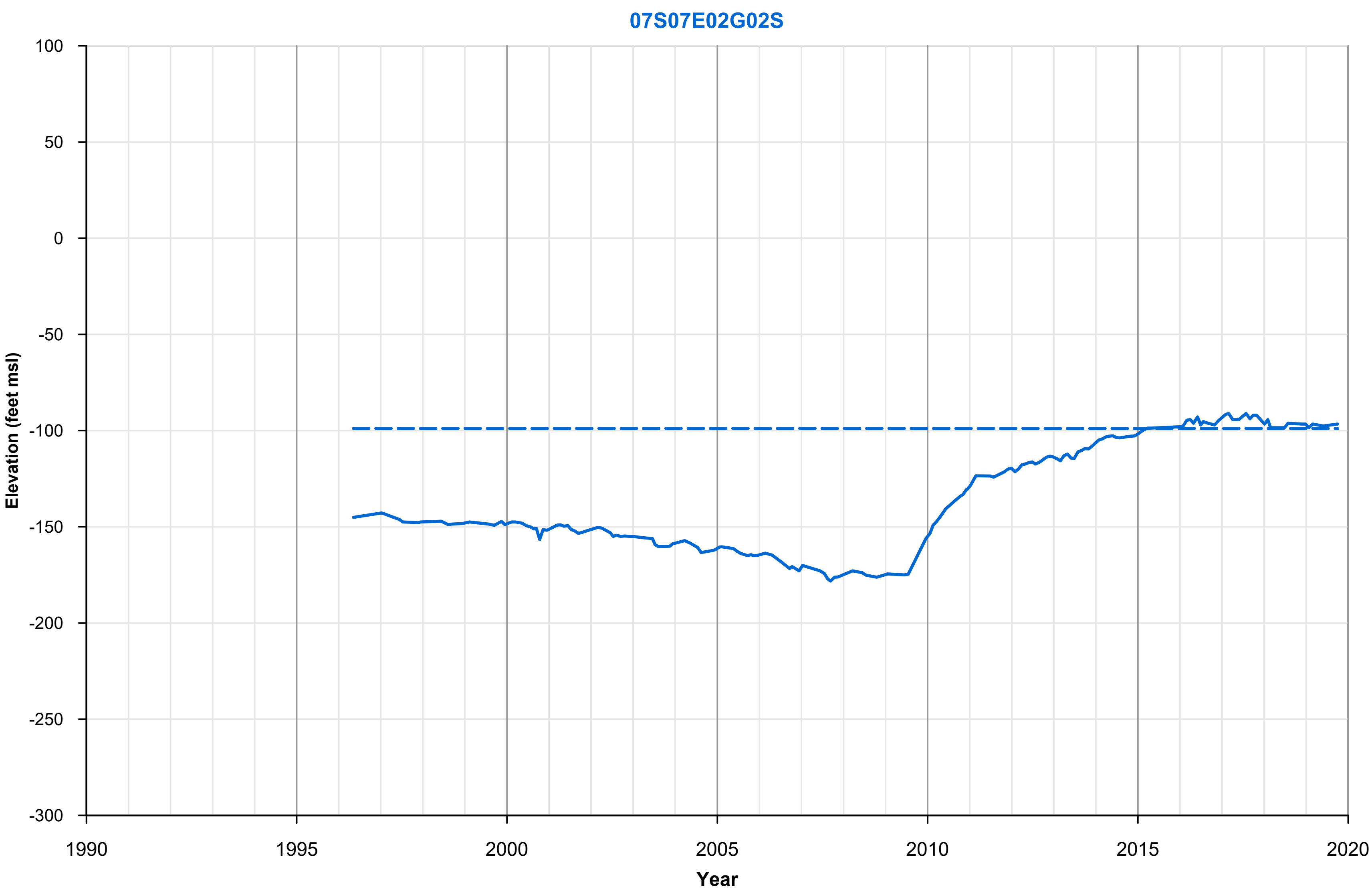
TODD GROUNDWATER

Appendix A-33
Groundwater Elevation Hydrographs
07S09E08R01S



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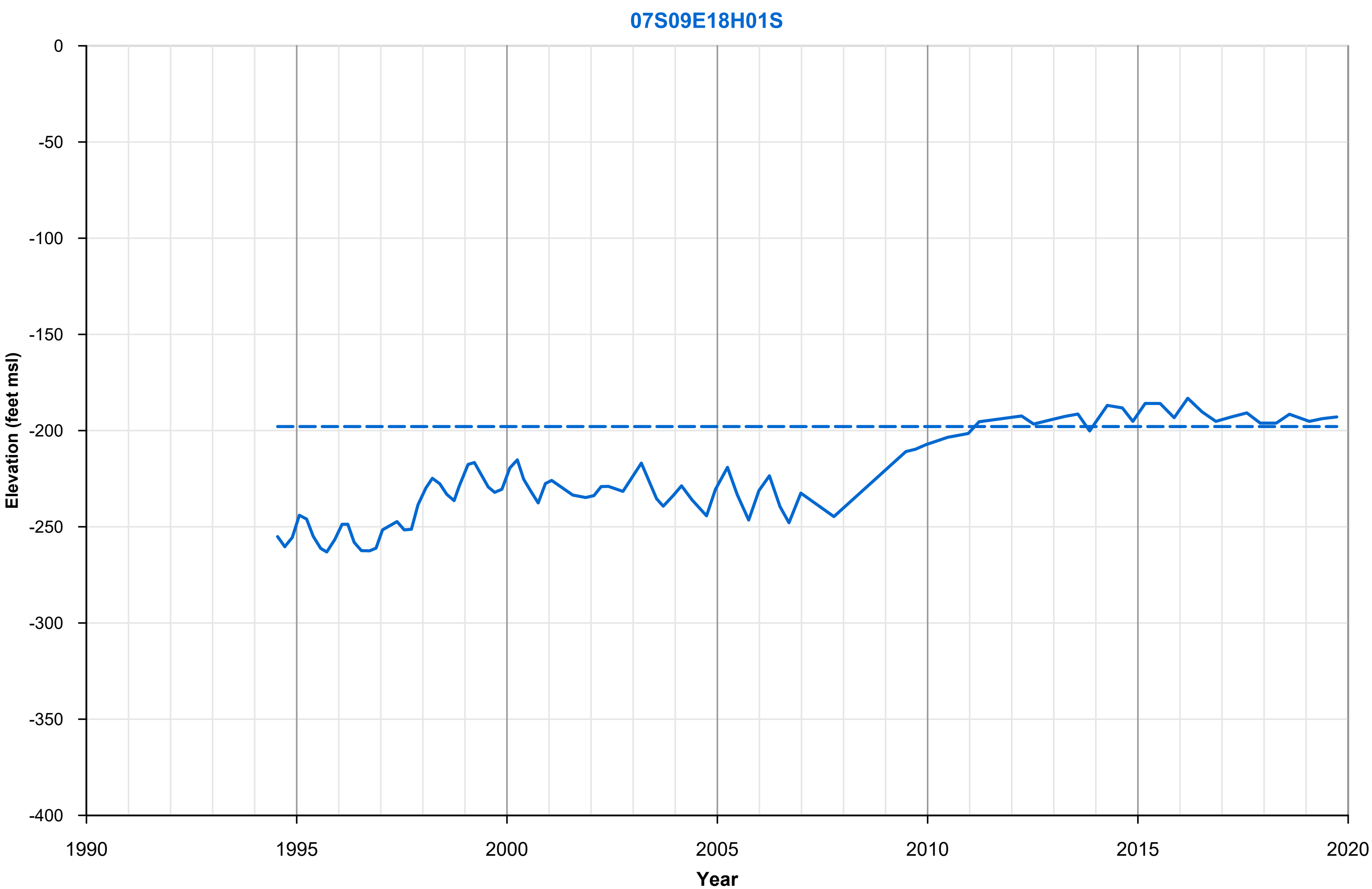
TODD GROUNDWATER

Appendix A-34
Groundwater Elevation Hydrographs
07S07E02G02S



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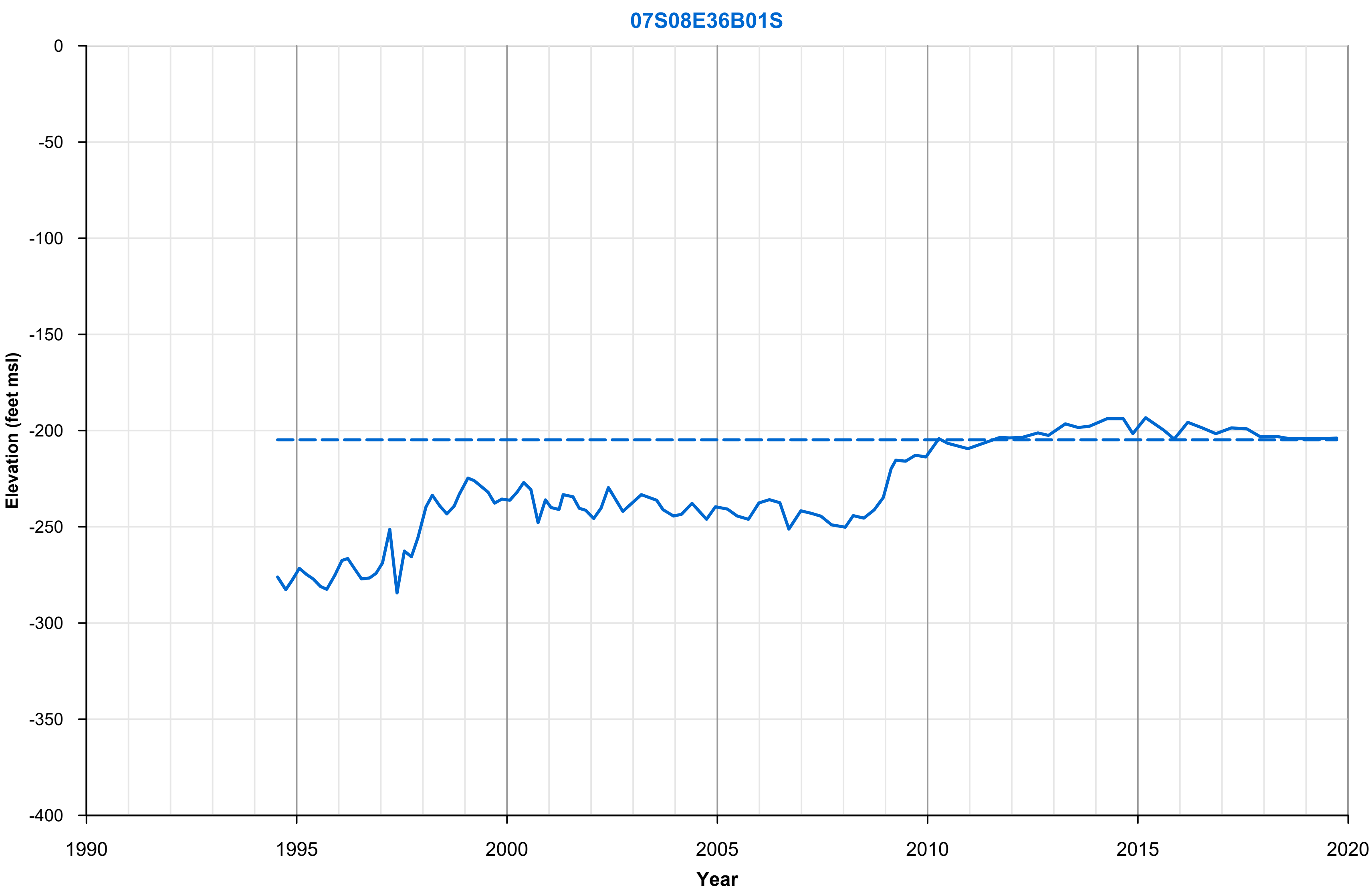
TODD GROUNDWATER

Appendix A-35
Groundwater Elevation Hydrographs
07S09E18H01S



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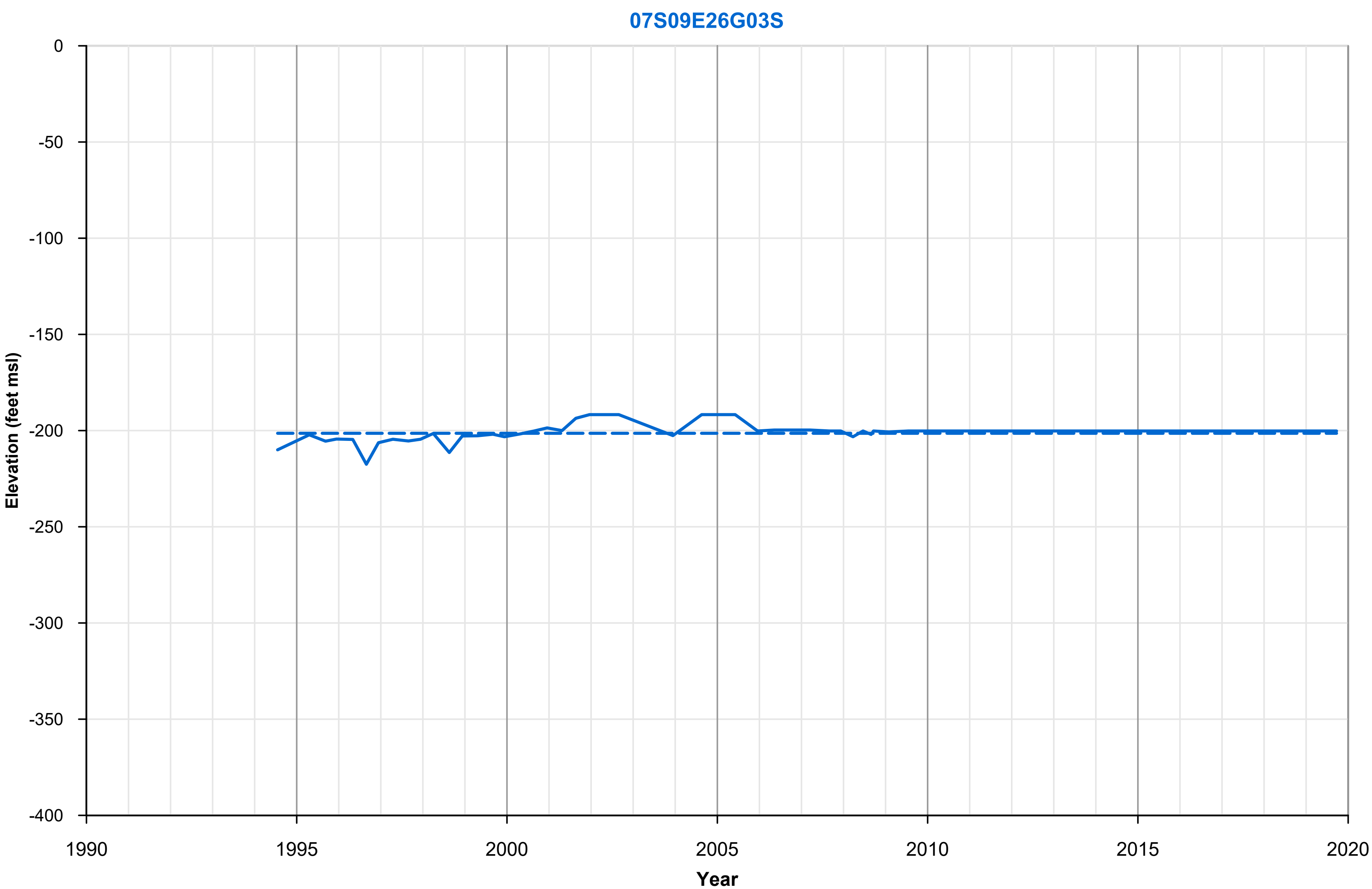
TODD GROUNDWATER

Appendix A-36
Groundwater Elevation Hydrographs
07S08E36B01S



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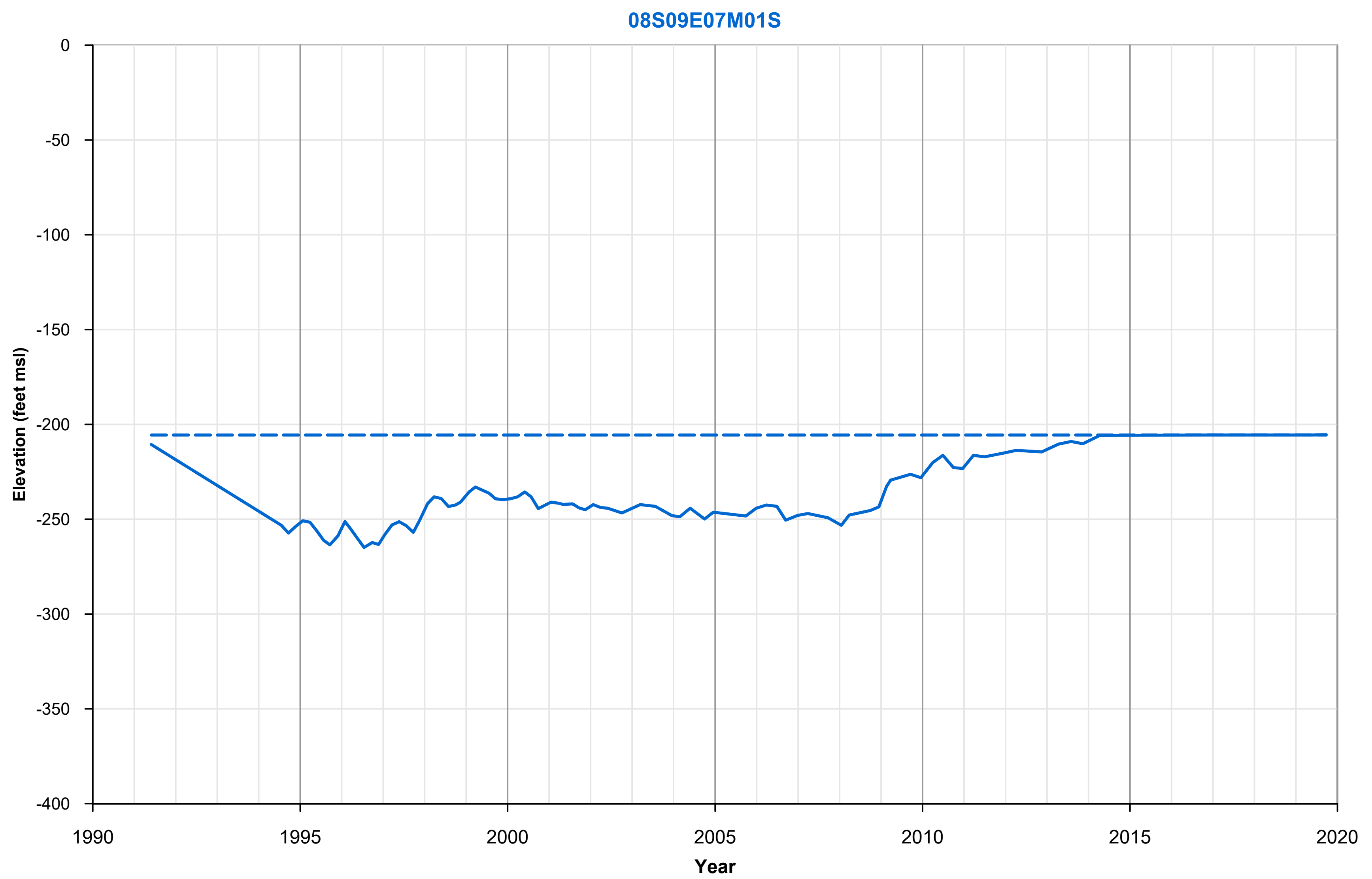
FINAL

TODD GROUNDWATER

Appendix A-37
Groundwater Elevation Hydrographs
07S09E26G03S



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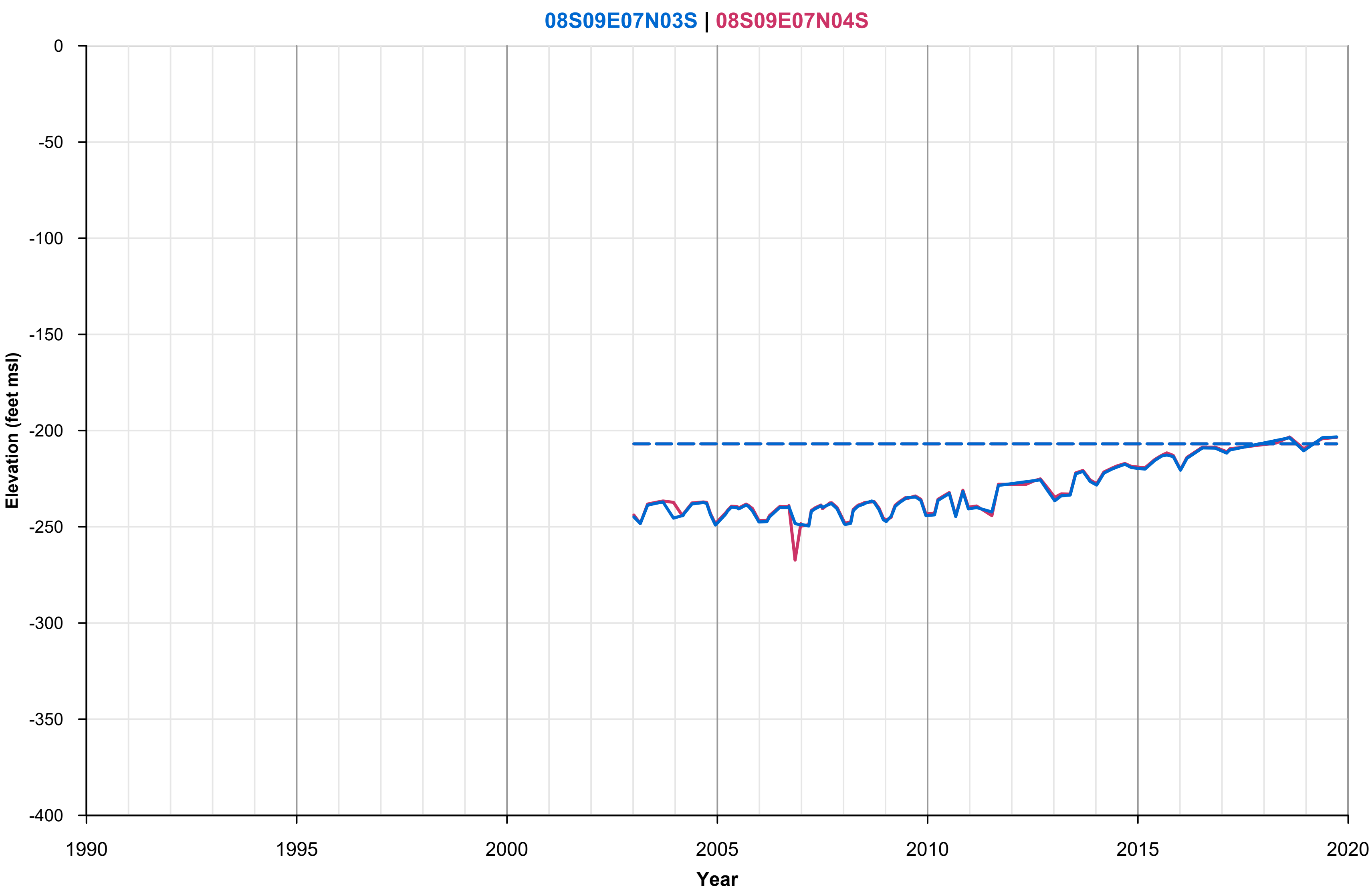
TODD GROUNDWATER

Appendix A-38
Groundwater Elevation Hydrographs
08S09E07M01S



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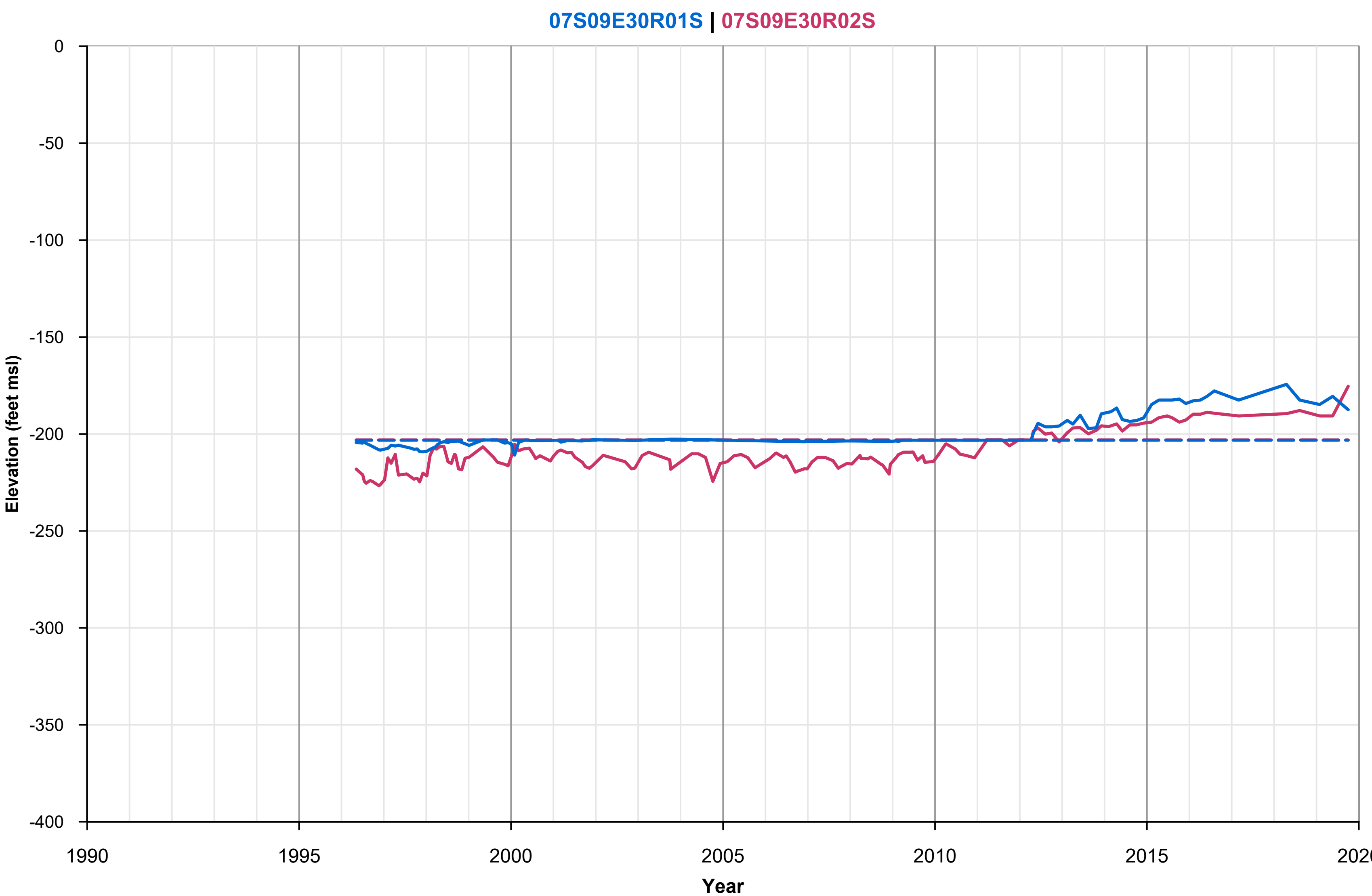
TODD GROUNDWATER

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



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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: November 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. Data resources included, but were not limited to, the following:

- Aerial photography, including USDA-NRCS National Agricultural Imagery Program (NAIP) data and Microsoft Bing aerial imagery
- United States Geological Services (USGS) 7.5-minute topography
- USGS Geological Survey Hydrologic Atlas: National Hydrography Dataset (NHD) and USGS Hydrologic Unit Code (HUC) 8-digit maps
- USDA-NRCS Soil Surveys
- United States Fish and Wildlife Service (USFWS) National Wetland Inventory (NWI) data
- USFWS Critical Habitat mapper
- National Oceanic and Atmospheric Administration (NOAA) Essential Fish Habitat (EFH) mapper
- NRCS land use/land cover and conservation plan data
- California DWR list of impaired (303d/305b) waters (latest approved)
- United States National Vegetation Classification (USNVC) data
- USFWS Information for Planning and Consultation (IPaC) online data
- California Department of Fish and Wildlife (CDFW) Biogeographic Information and Observation System (BIOS)
- CDFW California Natural Diversity Database (CNDDB)
- LIDAR (as available for the project counties)

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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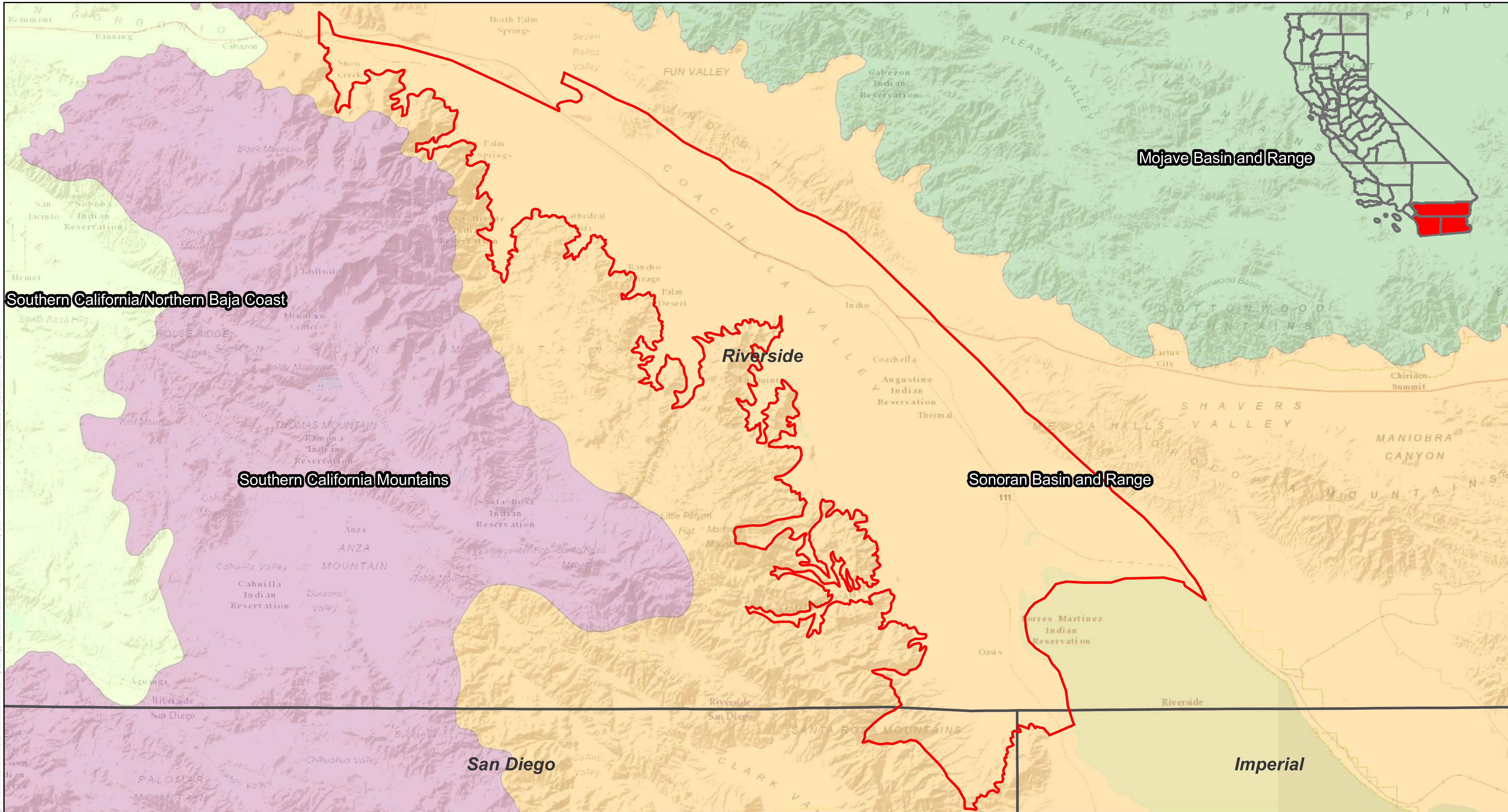

Figure 1
Project Location and Ecoregions
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

Legend

EPA Level III Ecoregion
- Mojave Basin and Range
- Sonoran Basin and Range
- Southern California Mountains
- Southern California/Northern Baja Coast

- Indio Groundwater Basin
- California Counties

1 inch = 5 miles
0 2.5 5 10 Miles

N

WOODARD & CURRAN
Project #: 0011492.02
Map Created: May 2020

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: ESRI World Terrain Basemap; USEPA Level III Ecogregions**

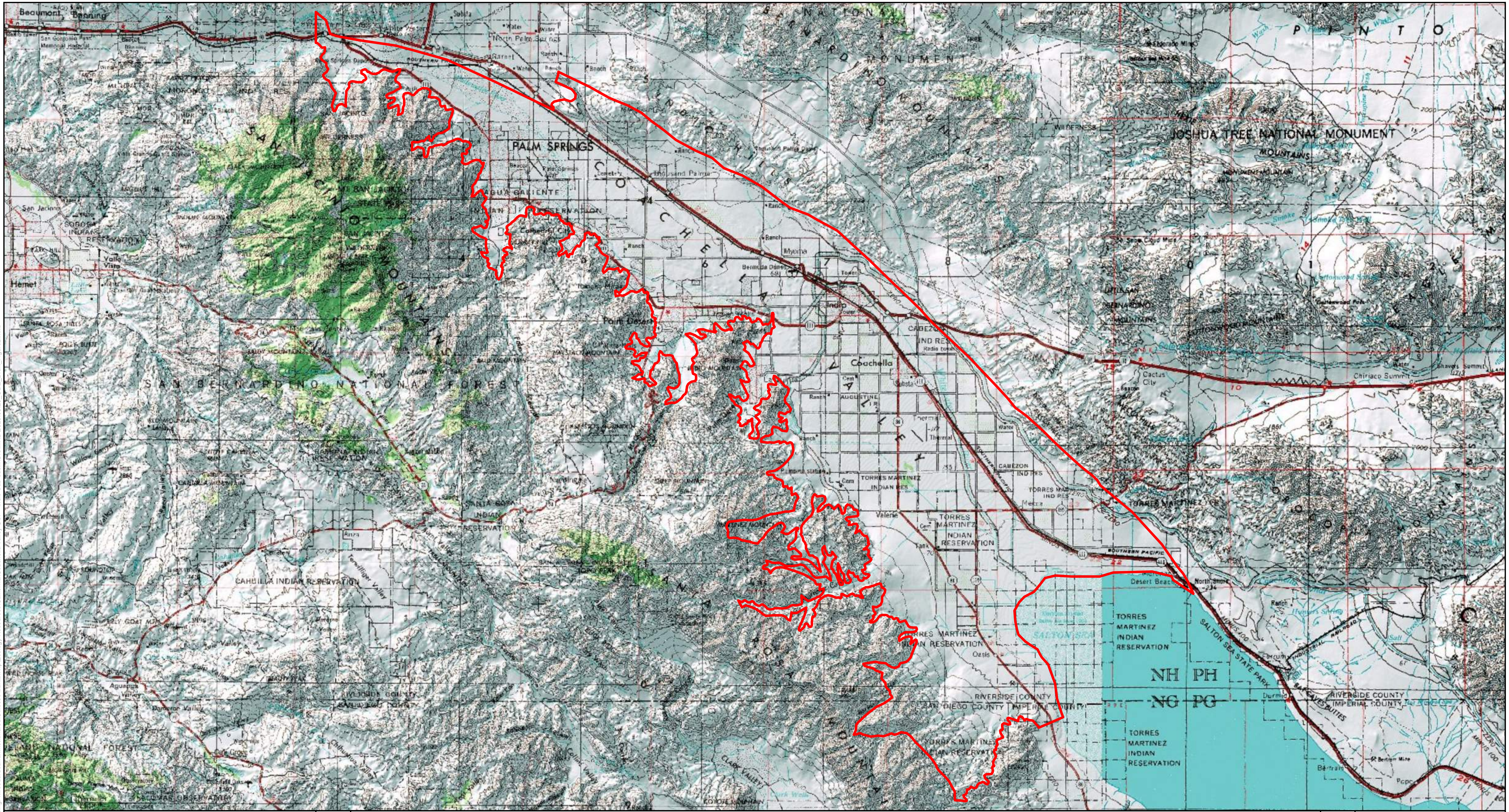

Figure 2
USGS Topography
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

Legend
Indio Groundwater Basin

1 inch = 5 miles
0 2.5 5 10 Miles

N

Project #: 0011492.02
Map Created: May 2020

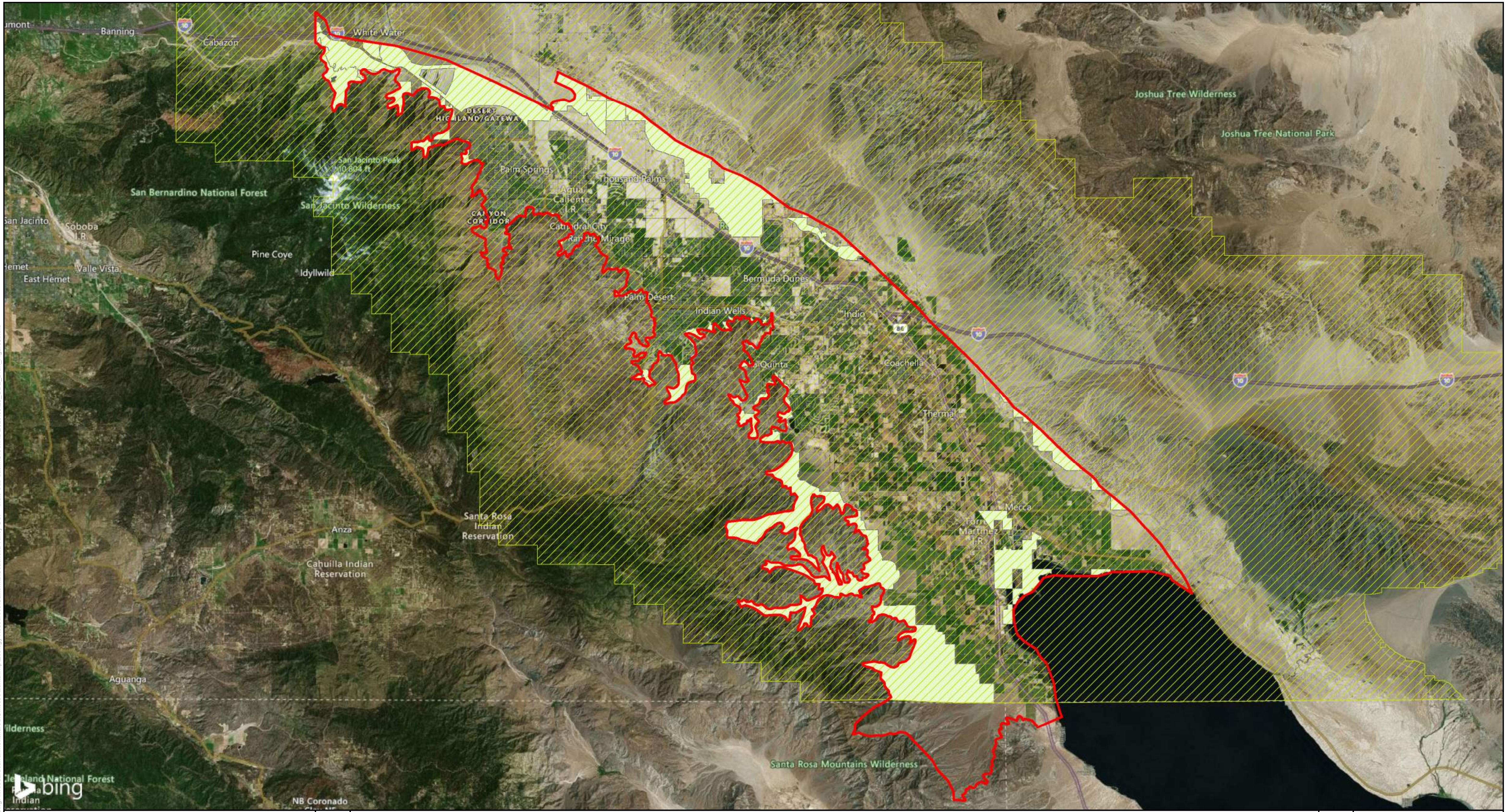

Figure 3
Coachella Valley Protected Areas
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

Legend

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

1 inch = 5 miles

0 2.5 5 10 Miles

N

WOODARD & CURRAN

Project #: 0011492.02
Map Created: May 2020

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:ESRI USGS 7.5 Minute Topography**

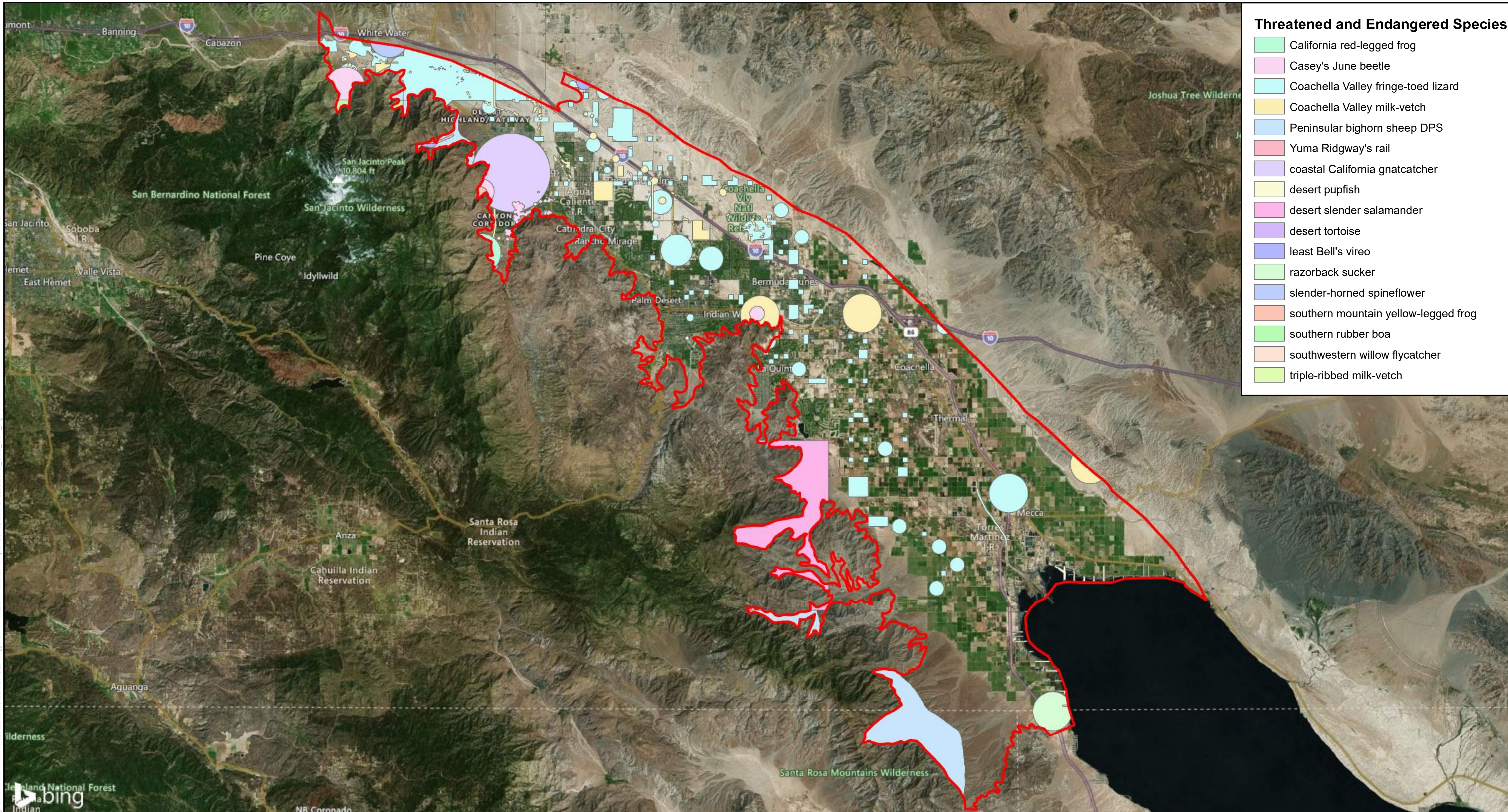

Figure 4
Threatened and Endangered Species

Indio Groundwater Basin
Coachella Valley Water District

Imperial, Riverside, and San Diego Counties, CA

Legend

Indio Groundwater Basin

1 inch = 5 miles

0 2.5 5 10 Miles

N

WOODARD & CURRAN

Project #: 0011492.02
Map Created: June 2020

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.**

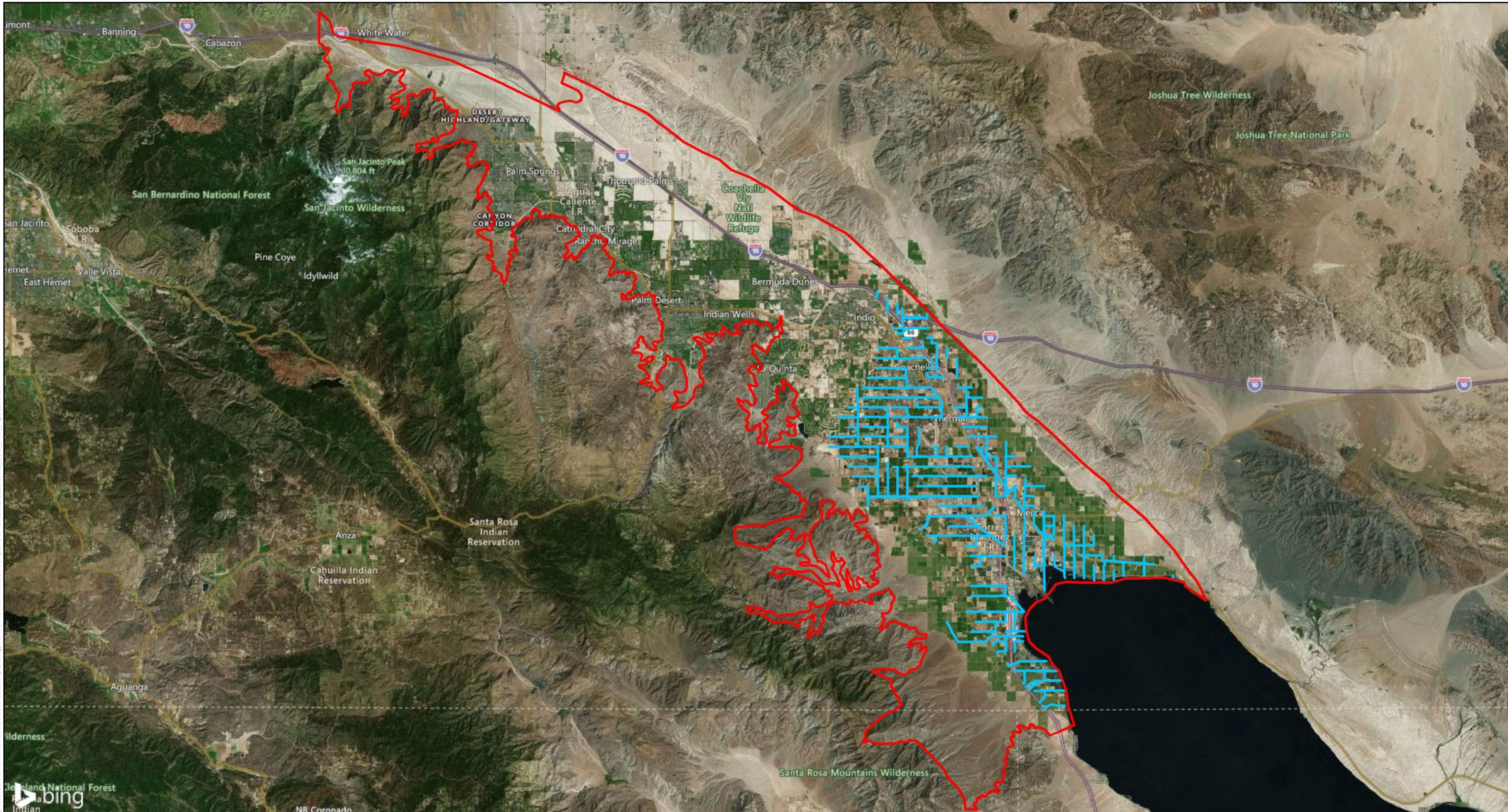

Figure 5
Agricultural Drains

Indio Groundwater Basin
Coachella Valley Water District

Imperial, Riverside, and San Diego Counties, CA

Legend

- Indio Groundwater Basin
- Agricultural Drains

WATER DISTRICT

1 inch = 5 miles

0 2.5 5 10 Miles

N

WOODARD & CURRAN

Project #: 0011492.02
Map Created: June 2020

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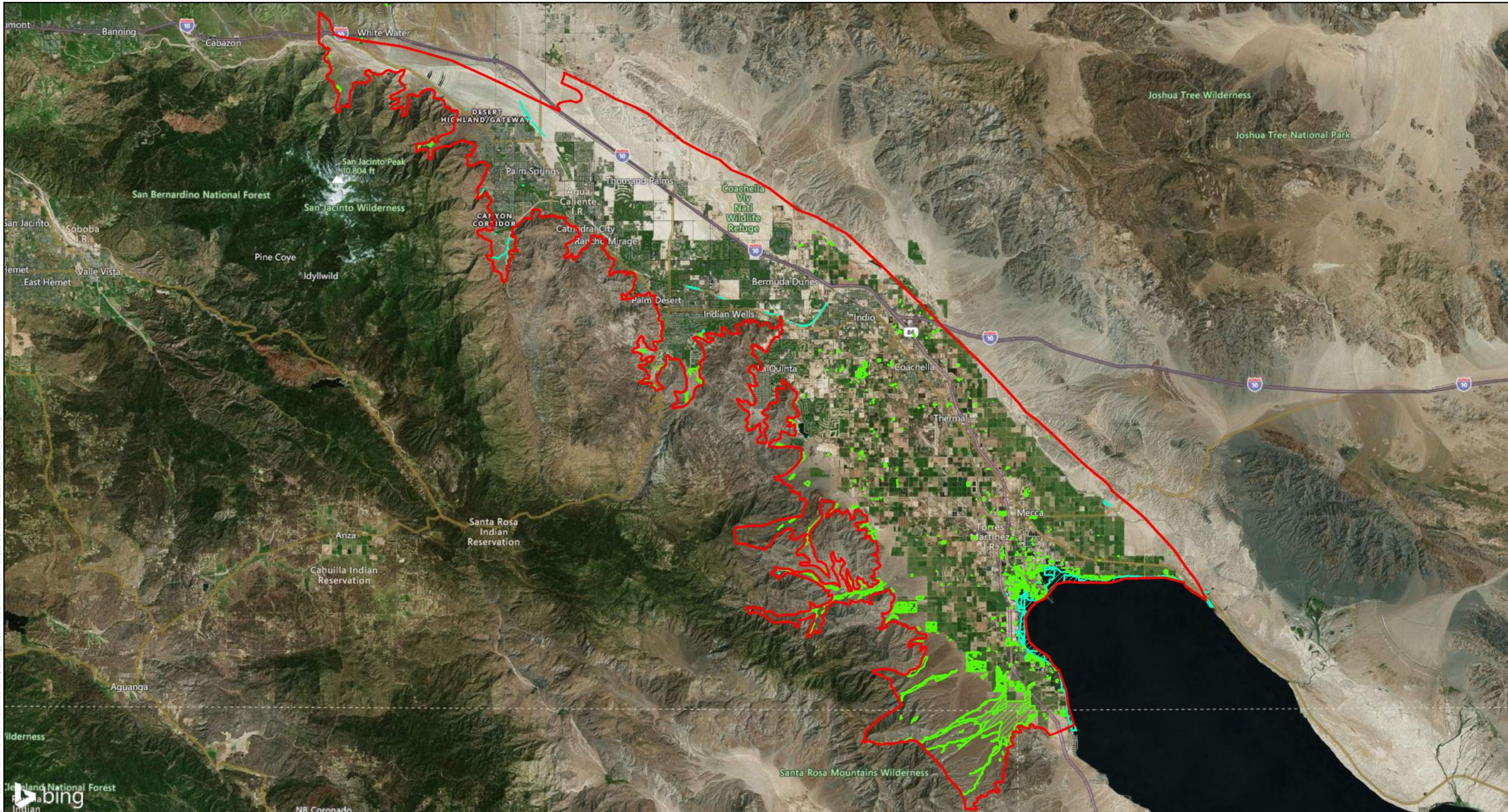

Figure 6
GDE Indicators

Indio Groundwater Basin
Coachella Valley Water District

Imperial, Riverside, and San Diego Counties, CA

Legend

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

WATER DISTRICT

1 inch = 5 miles

0 2.5 5 10 Miles

N

WOODARD & CURRAN

Project #: 0011492.02
Map Created: June 2020

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.**

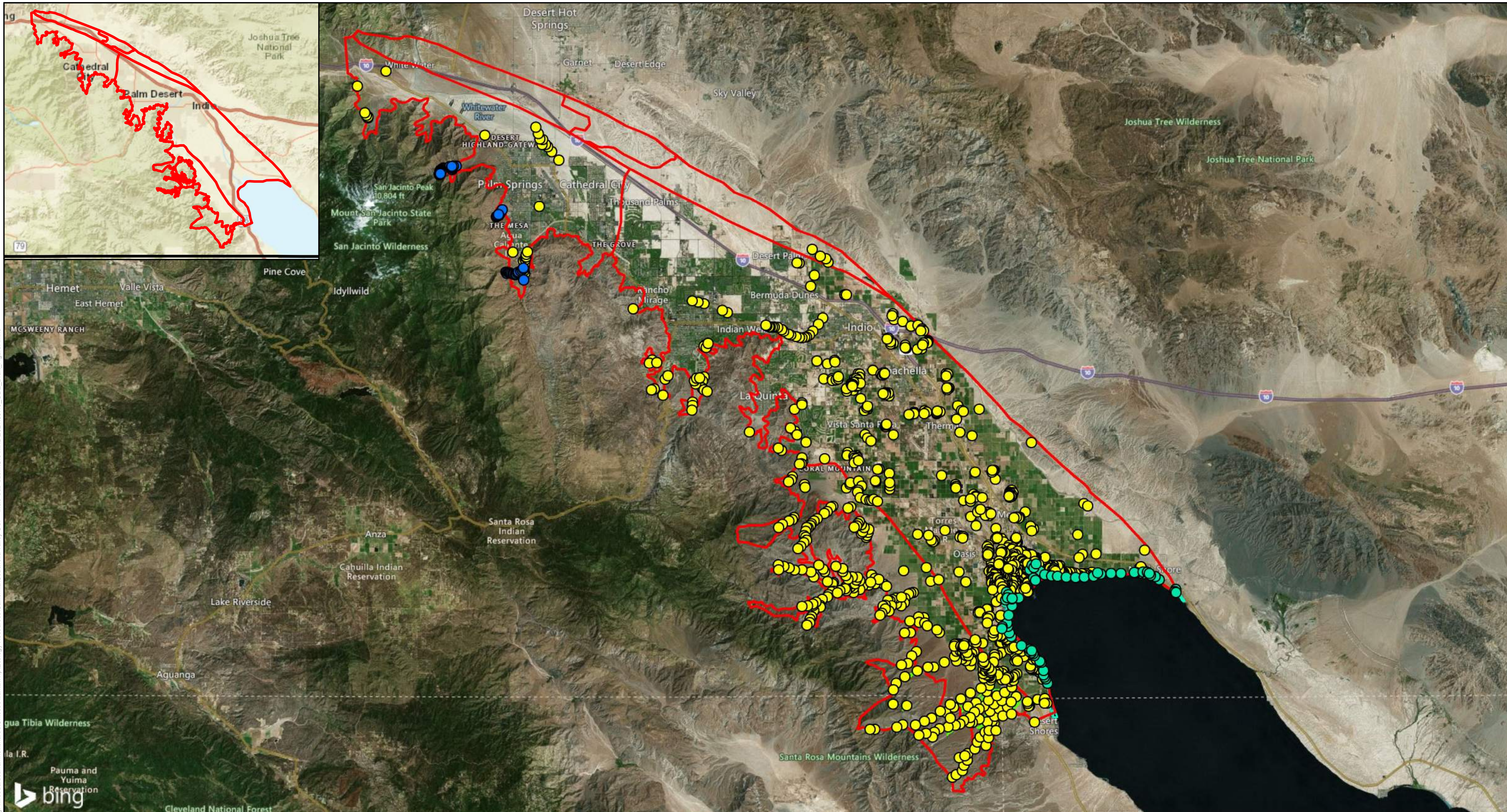

Figure 7
Preliminary GDE Assessment
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

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

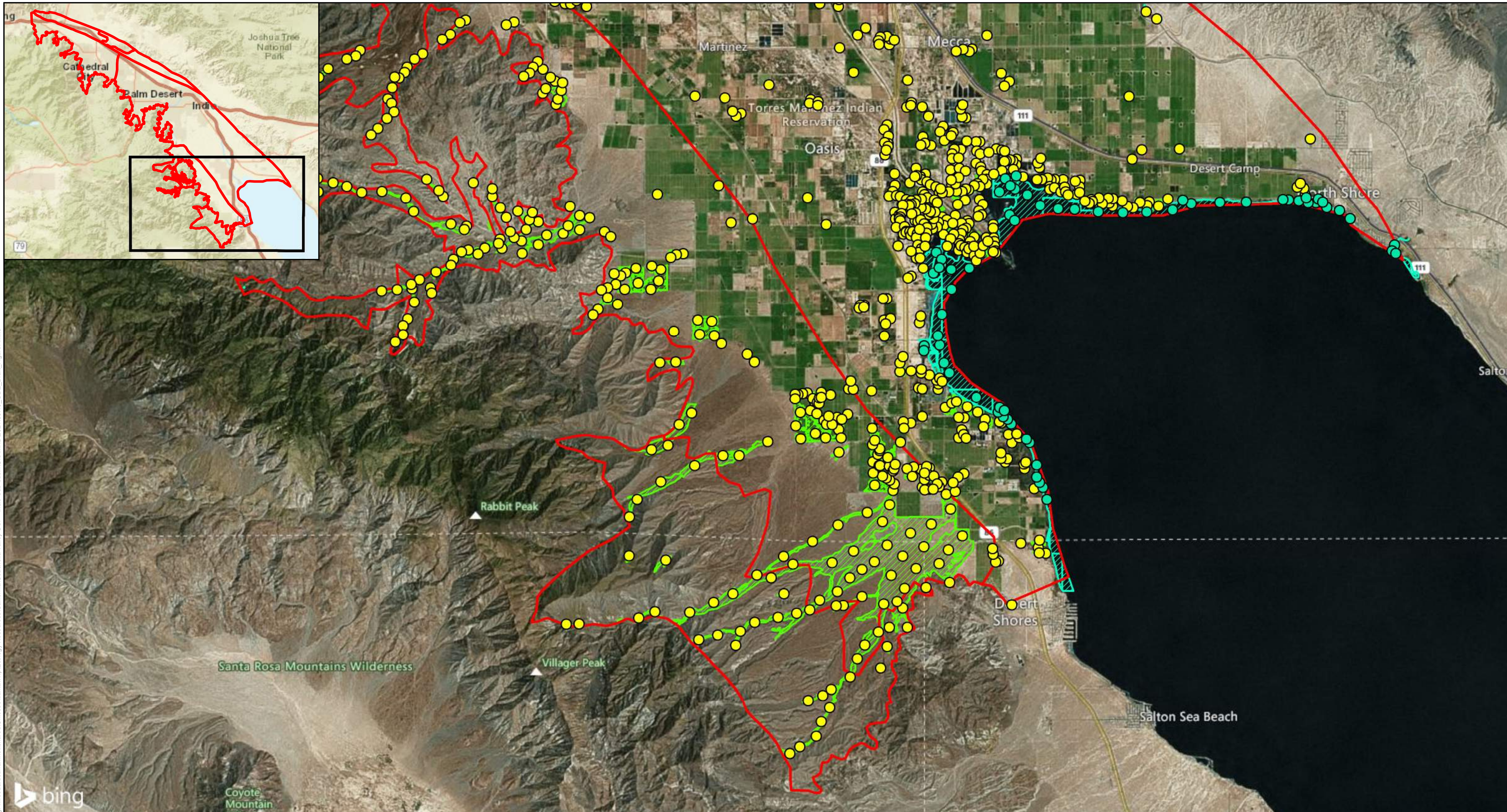

Figure 7a
Preliminary GDE Assessment
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

Legend

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

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.**

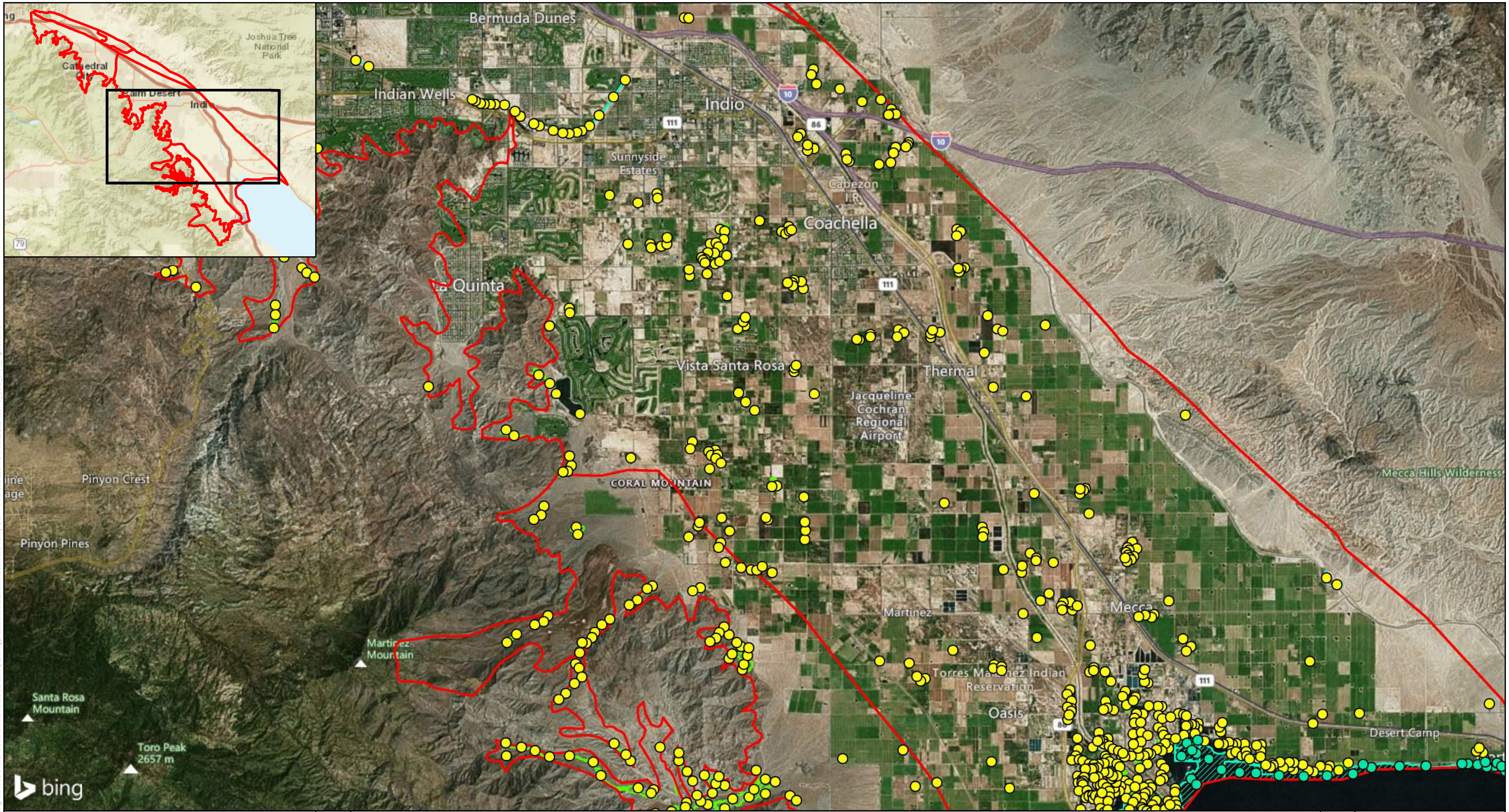

Figure 7b
Preliminary GDE Assessment

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

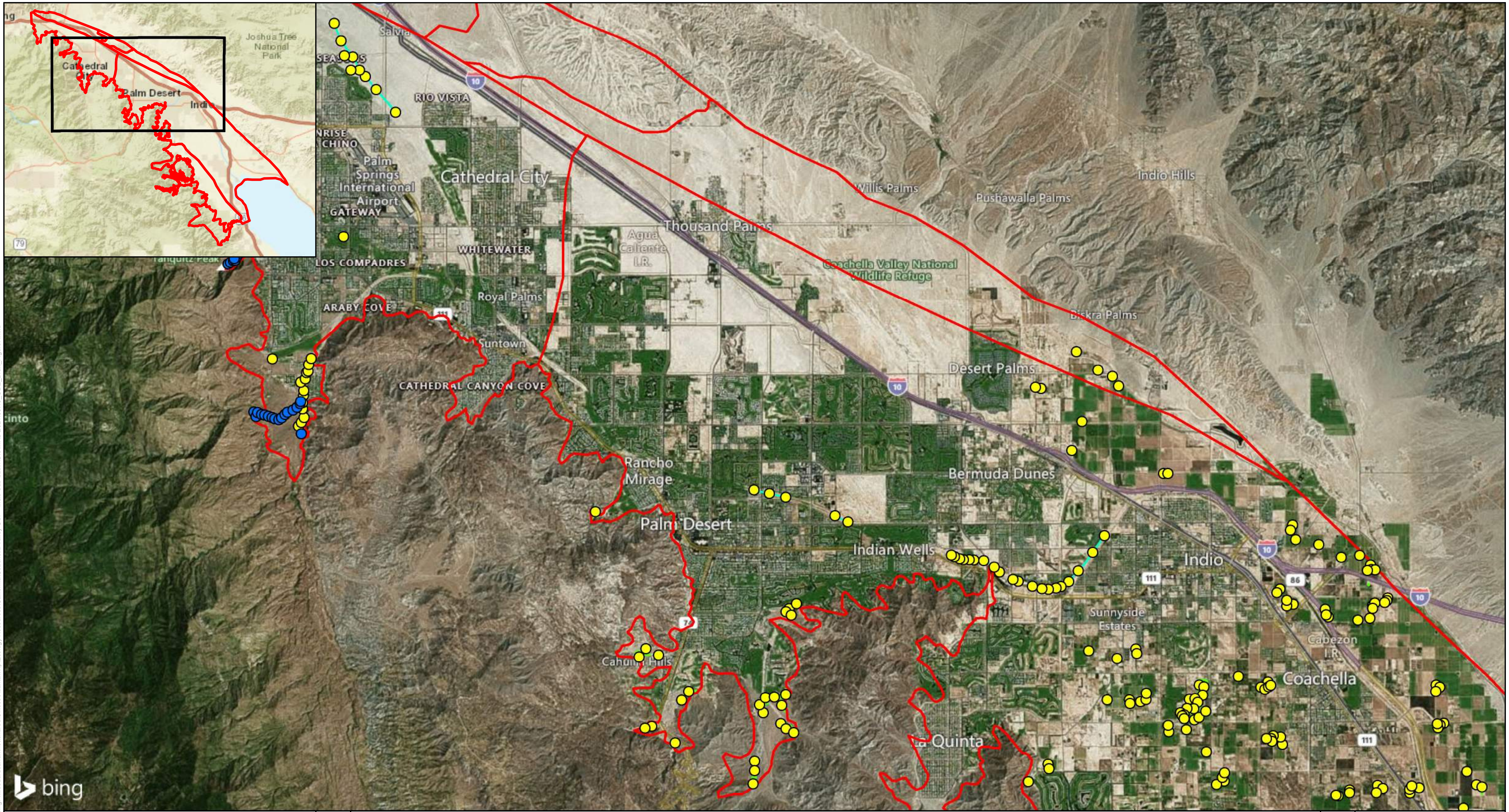

Figure 7c
Preliminary GDE Assessment
Indio Groundwater Basin
Coachella Valley Water District
Imperial, Riverside, and San Diego Counties, CA

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

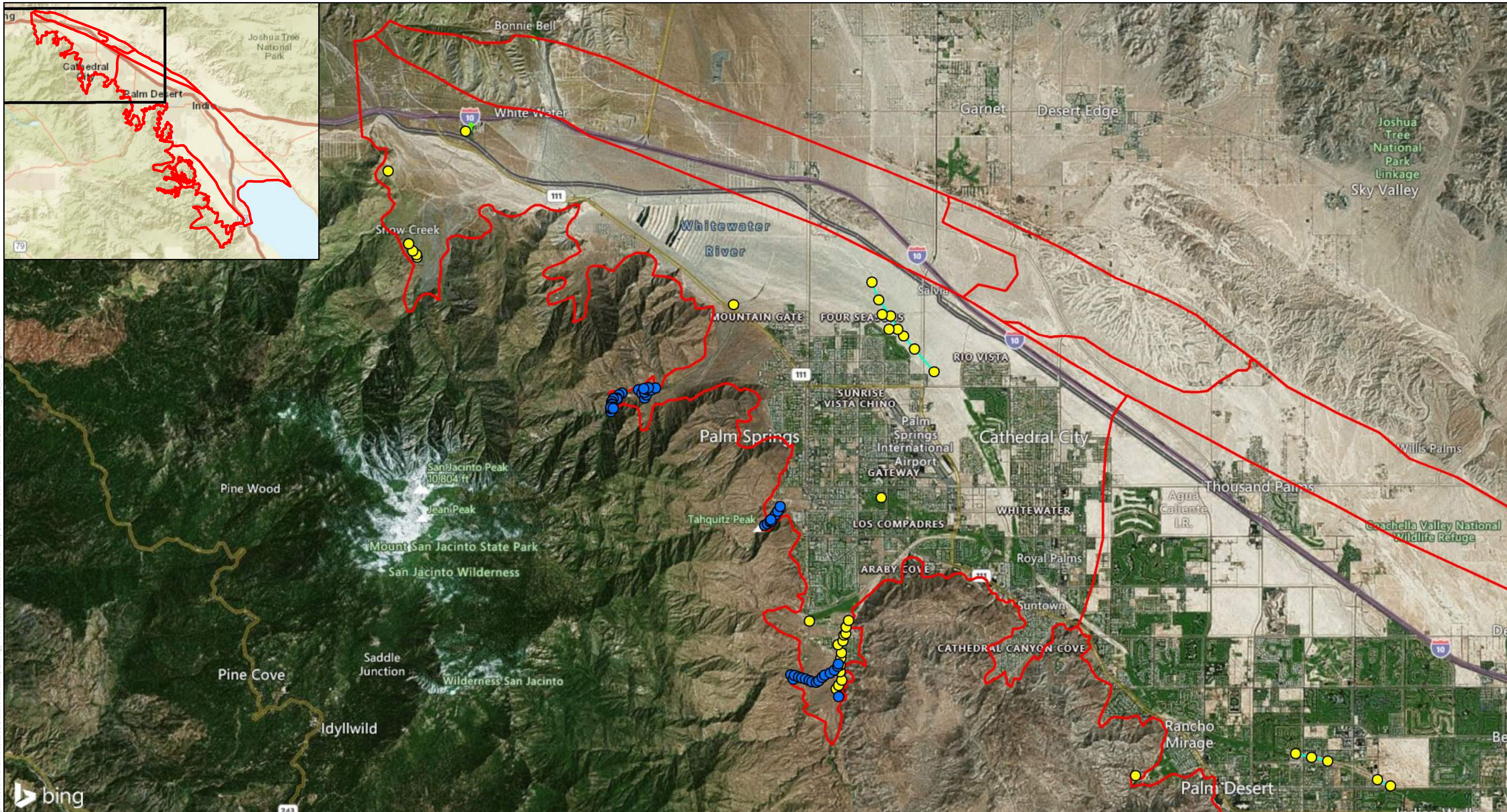

Figure 7d
Preliminary GDE Assessment

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

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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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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 (AFY)

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) (AFY)

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 (AFY)

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) (AFY)

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) (AFY)

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) (AFY)

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) (AFY)

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) (AFY)

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) (AFY)

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) (AFY)

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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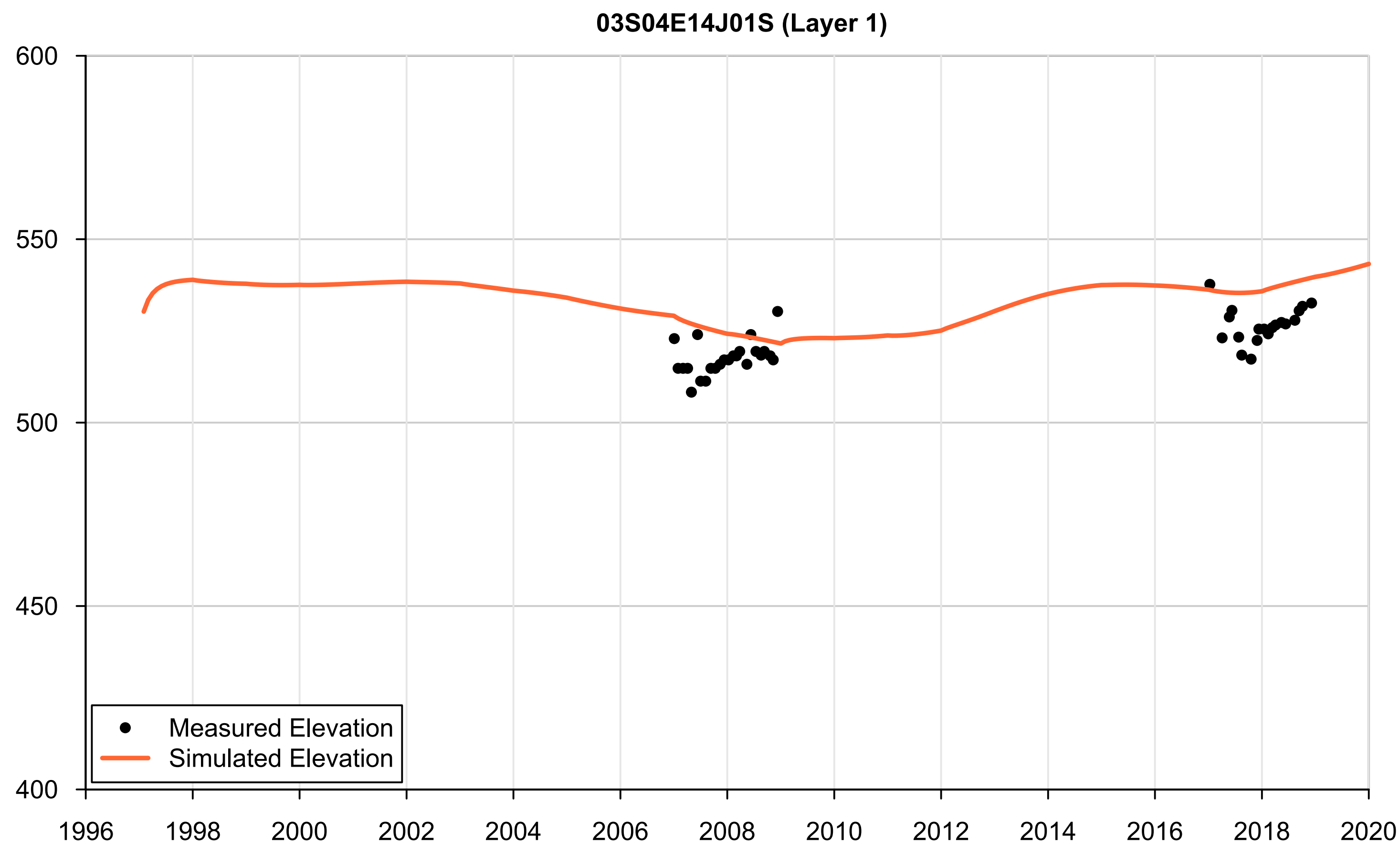
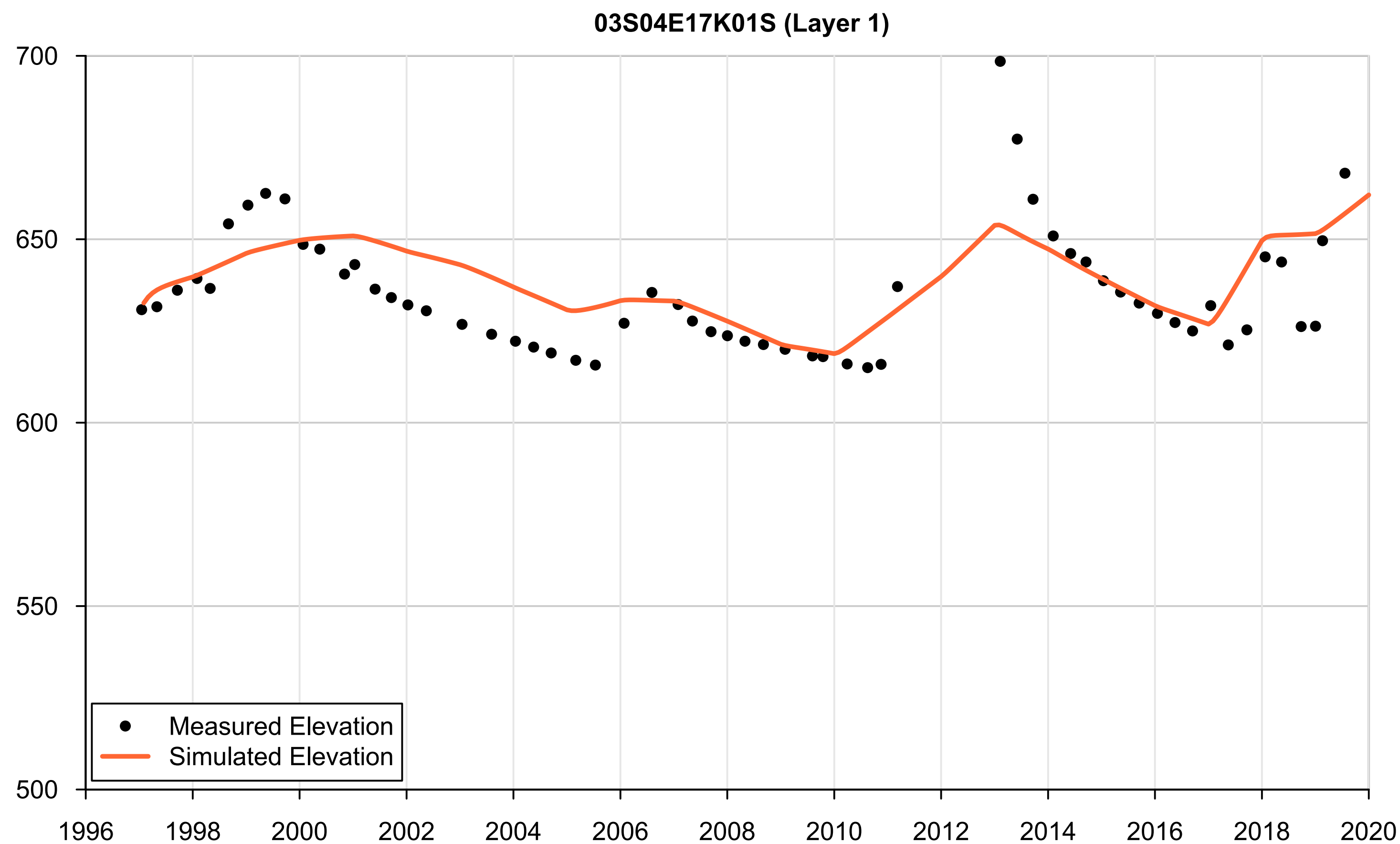


FINAL

WOODARD & CURRAN

TODD GROUNDWATER

Appendix 7-A1
Groundwater Elevation Hydrograph
03S04E14J01S



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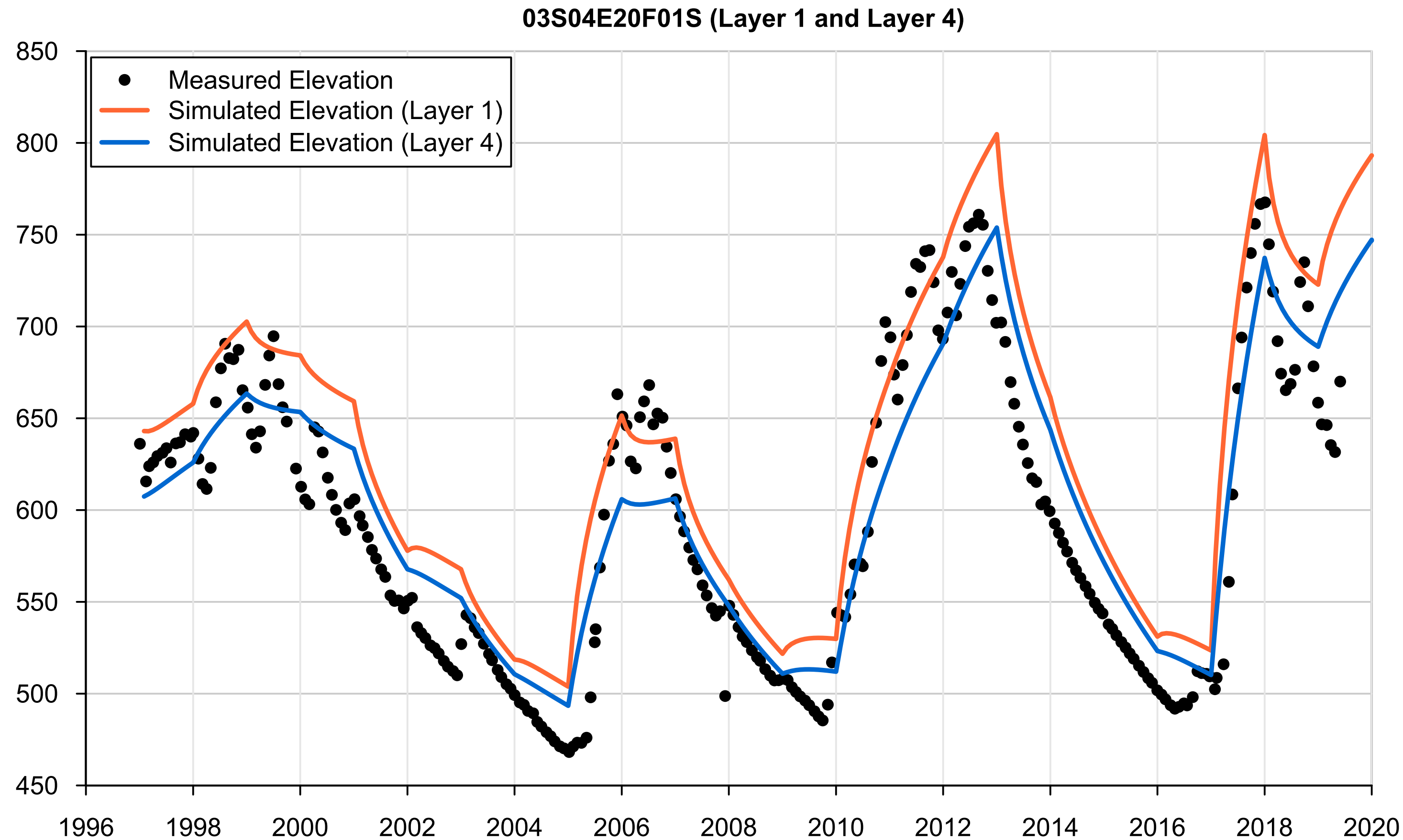
TODD GROUNDWATER

Appendix 7-A2
Groundwater Elevation Hydrograph
03S04E17K01S



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TODD GROUNDWATER

Appendix 7-A3
Groundwater Elevation Hydrograph
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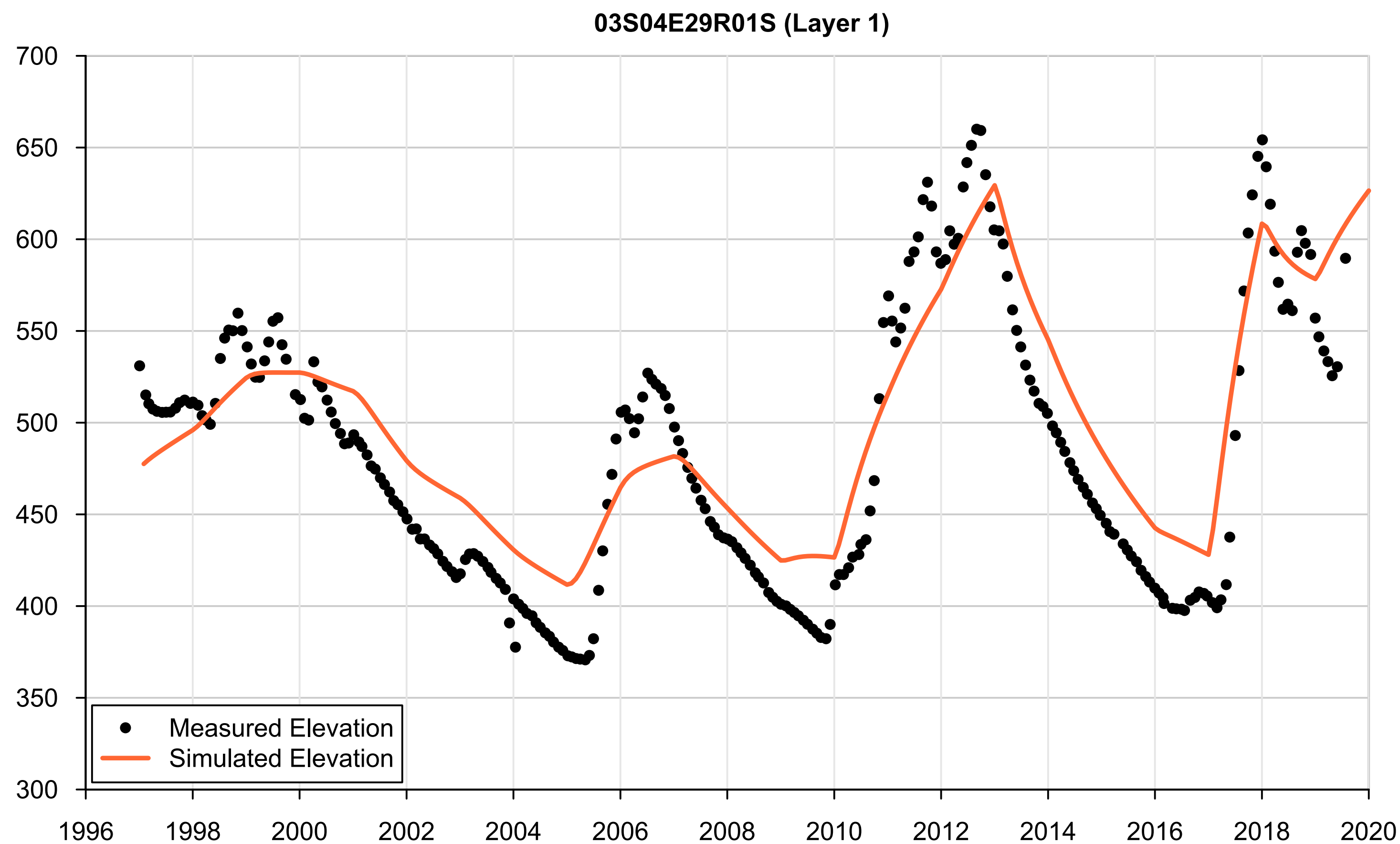

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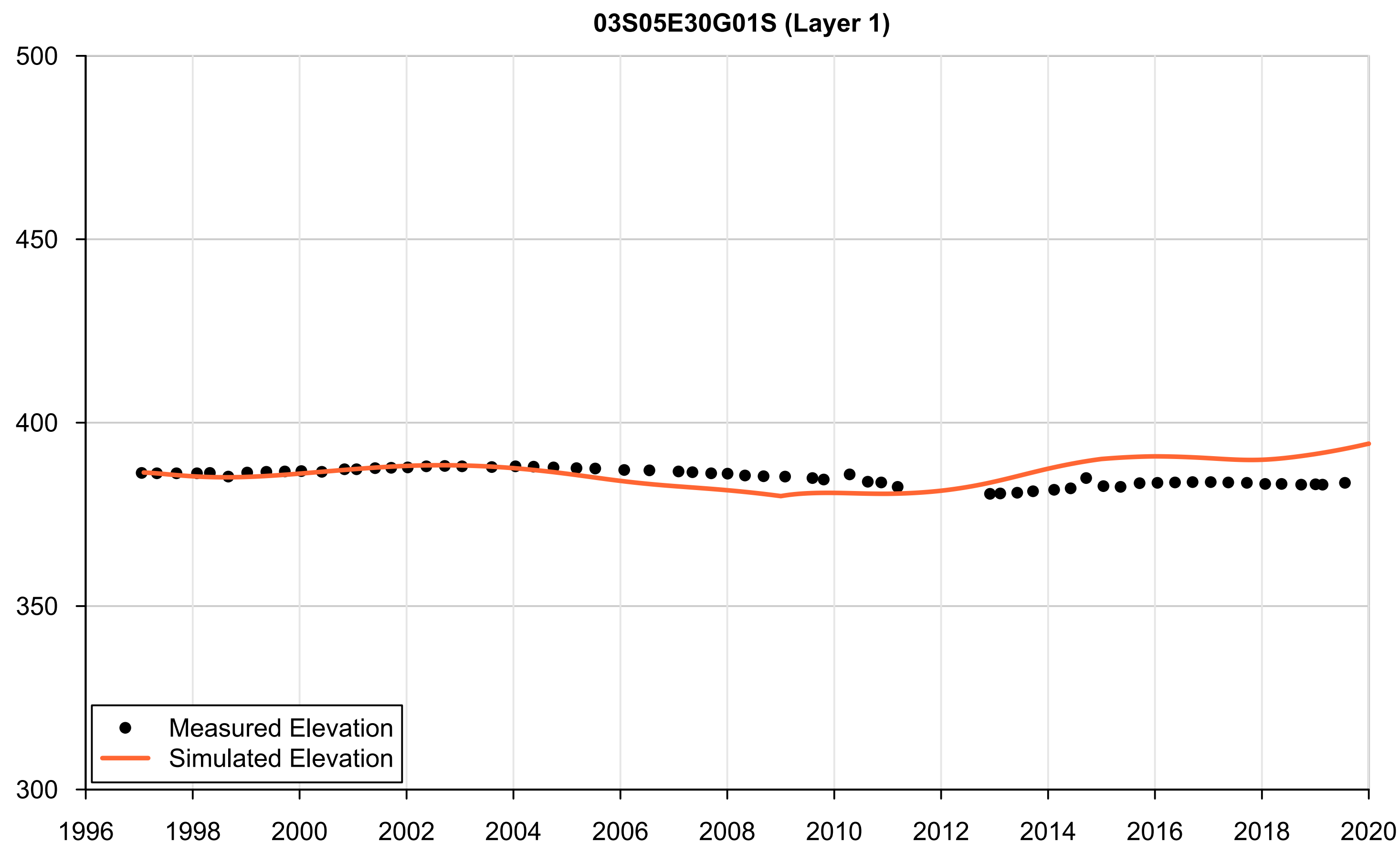
TODD GROUNDWATER

Appendix 7-A4
Groundwater Elevation Hydrograph
03S04E29R01S



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FINAL

TODD GROUNDWATER

Appendix 7-A5
Groundwater Elevation Hydrograph
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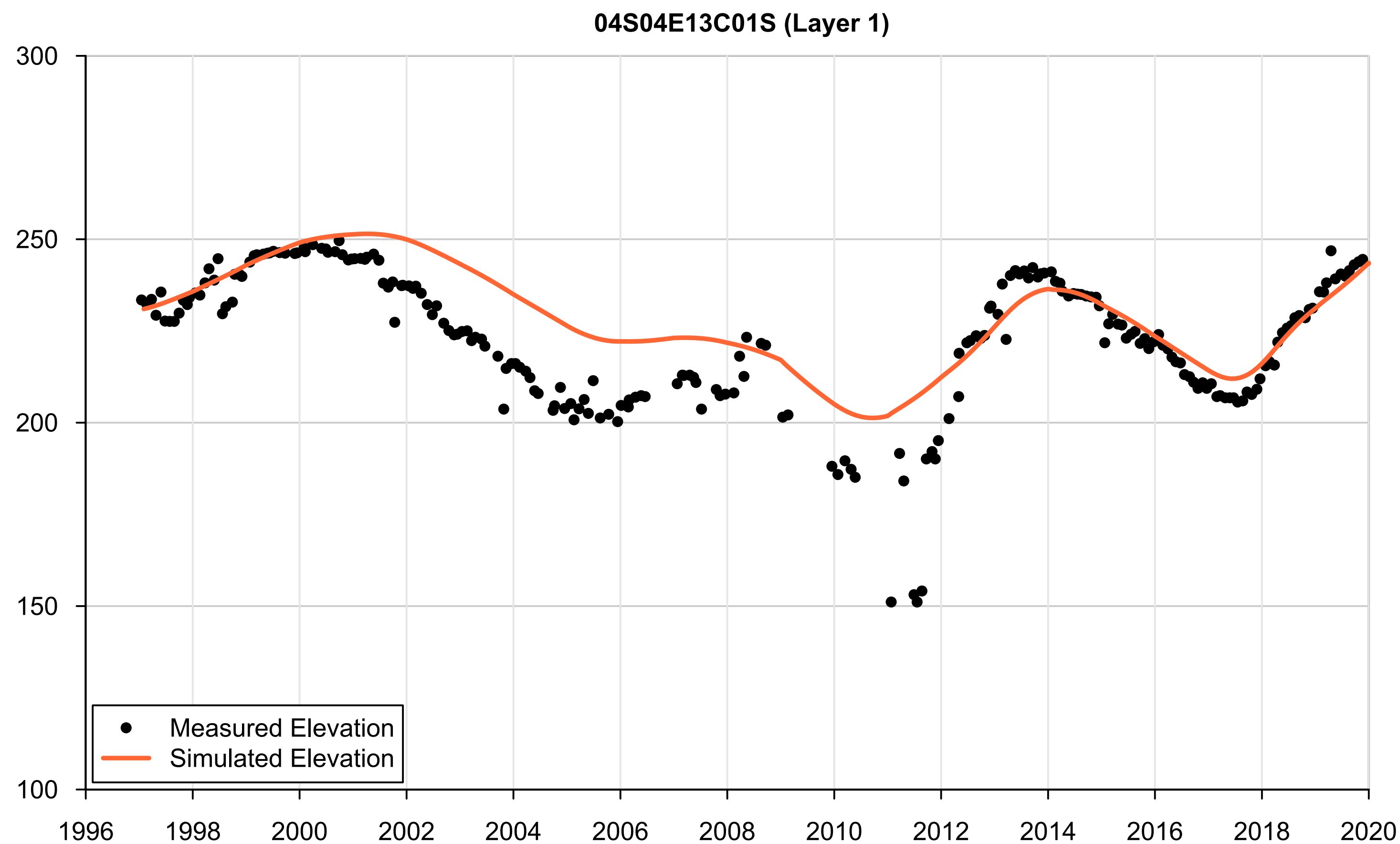

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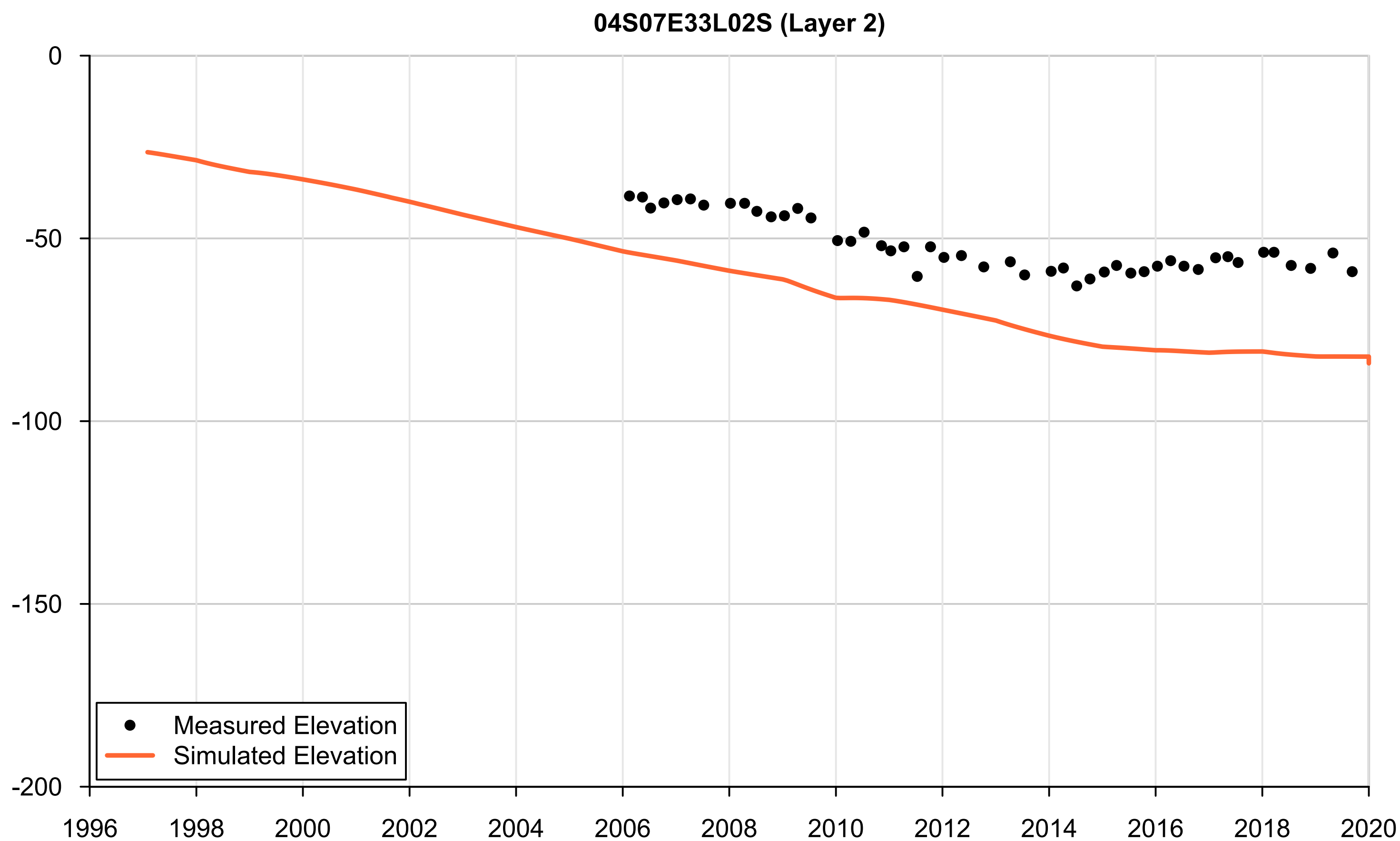
FINAL

TODD GROUNDWATER

Appendix 7-A6
Groundwater Elevation Hydrograph
04S04E13C01S



WOODARD & CURRAN

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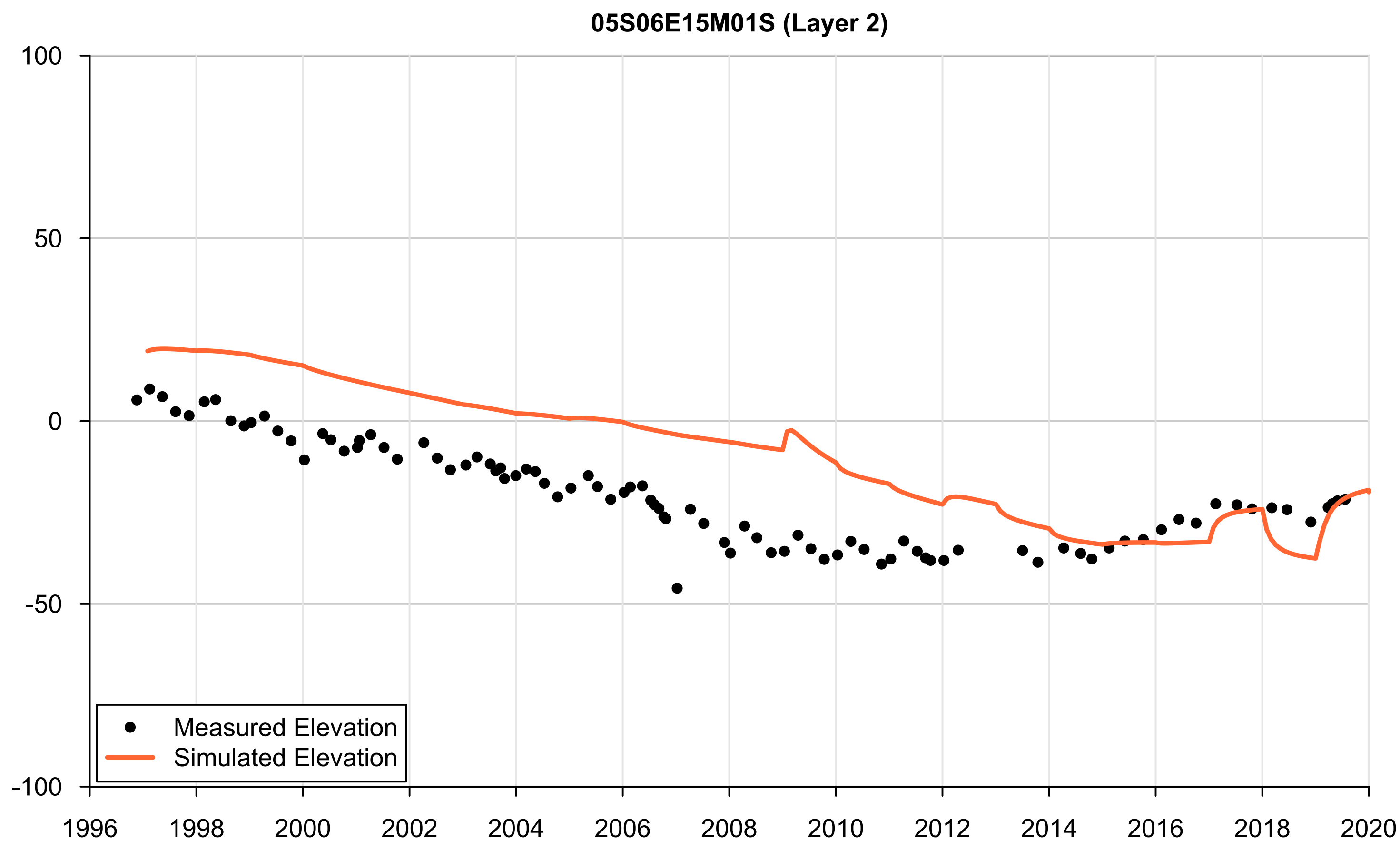
TODD GROUNDWATER

Appendix 7-A7
Groundwater Elevation Hydrograph
04S07E33L02S



WOODARD & CURRAN

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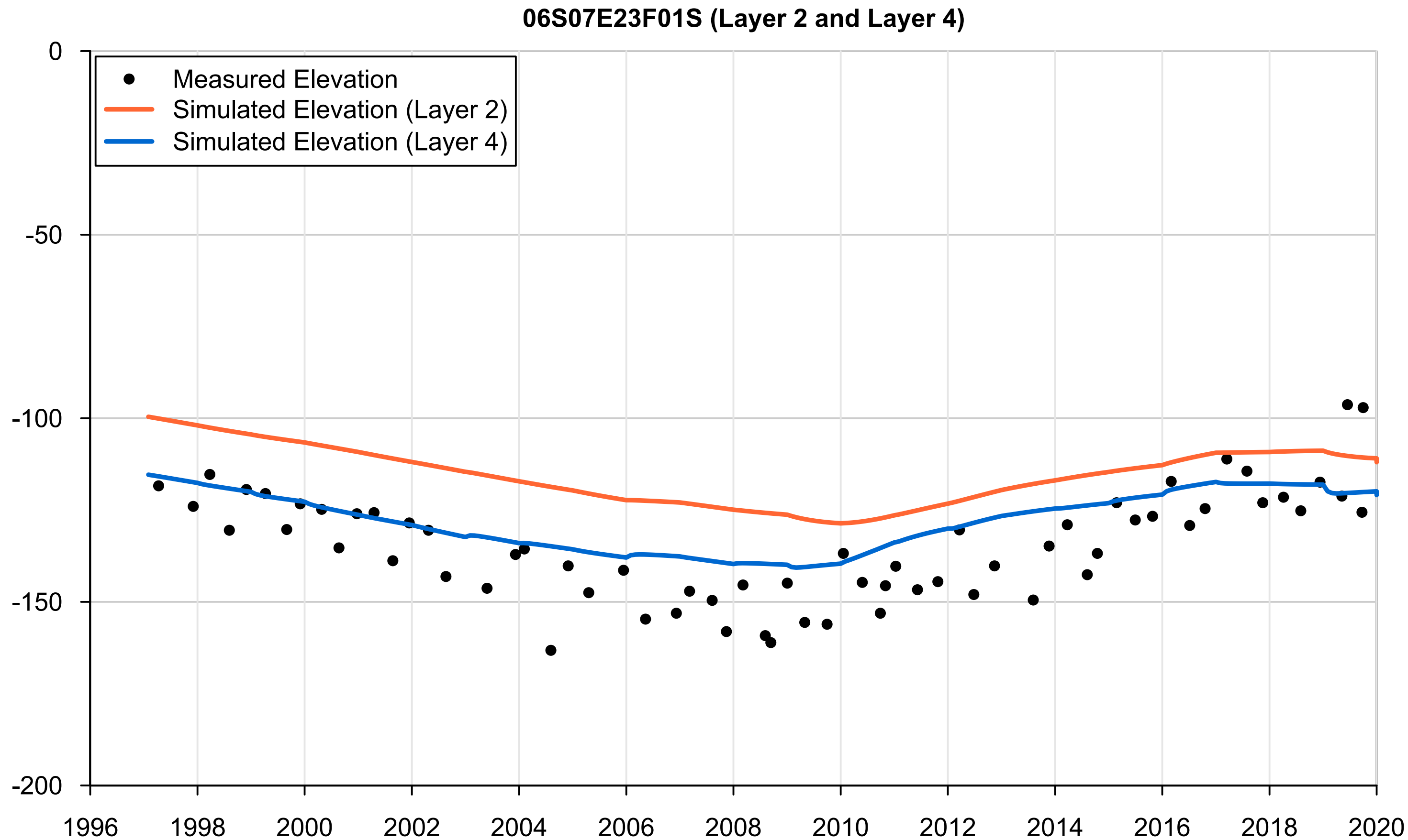
TODD GROUNDWATER

Appendix 7-A8
Groundwater Elevation Hydrograph
05S06E15M01S



WOODARD & CURRAN

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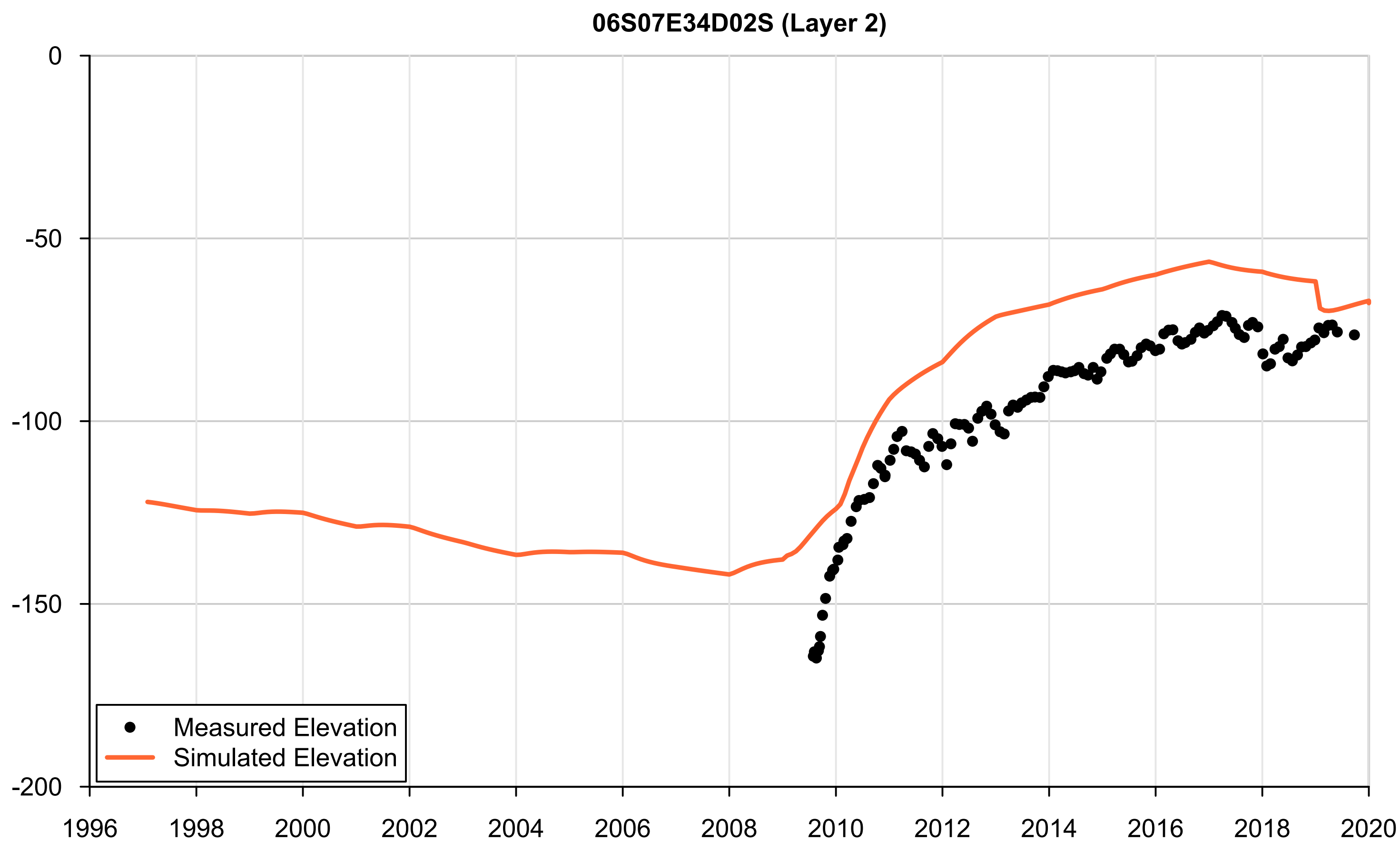
TODD GROUNDWATER

Appendix 7-A9
Groundwater Elevation Hydrograph
06S07E23F01S

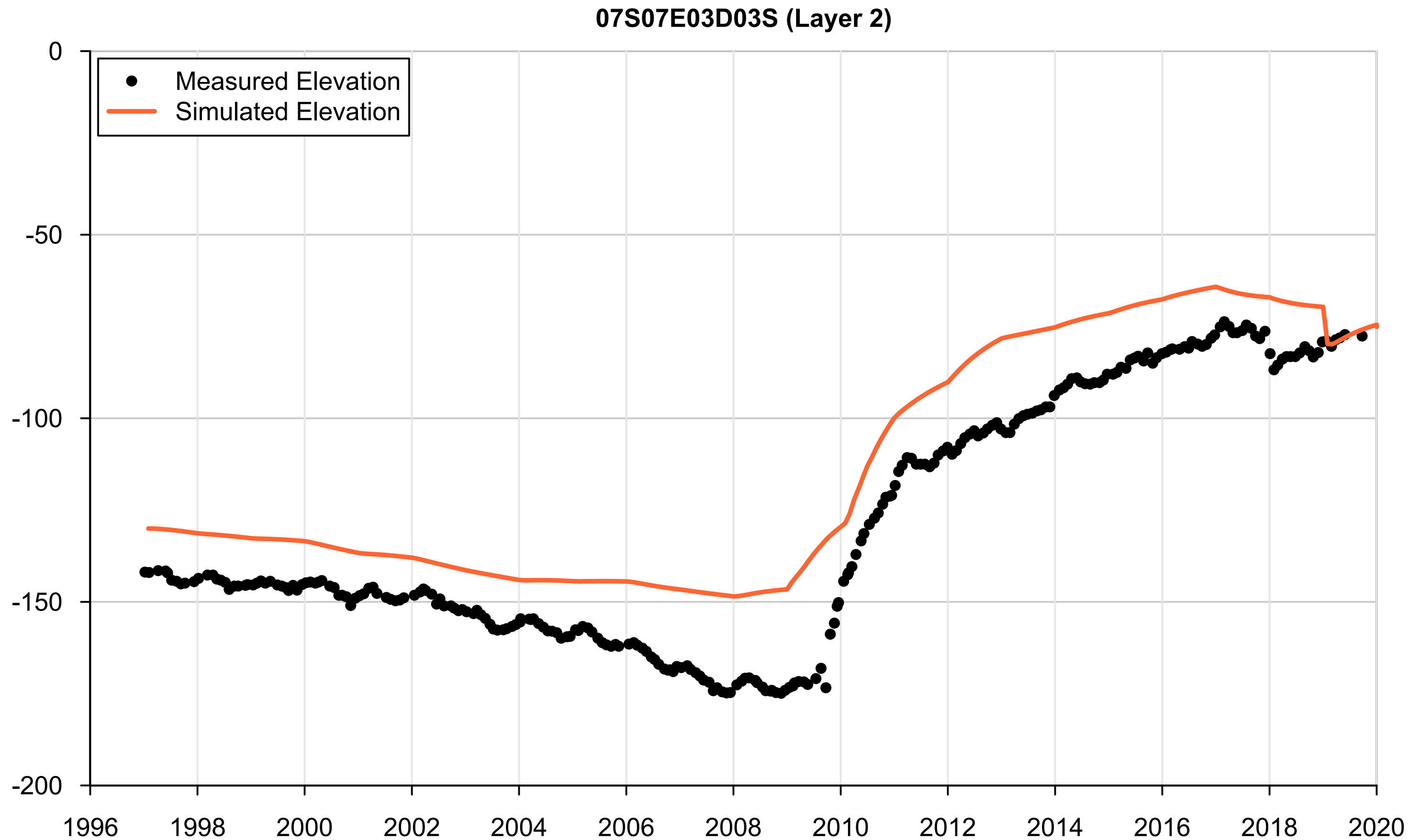


WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 7-A10
Groundwater Elevation Hydrograph
06S07E34D02S

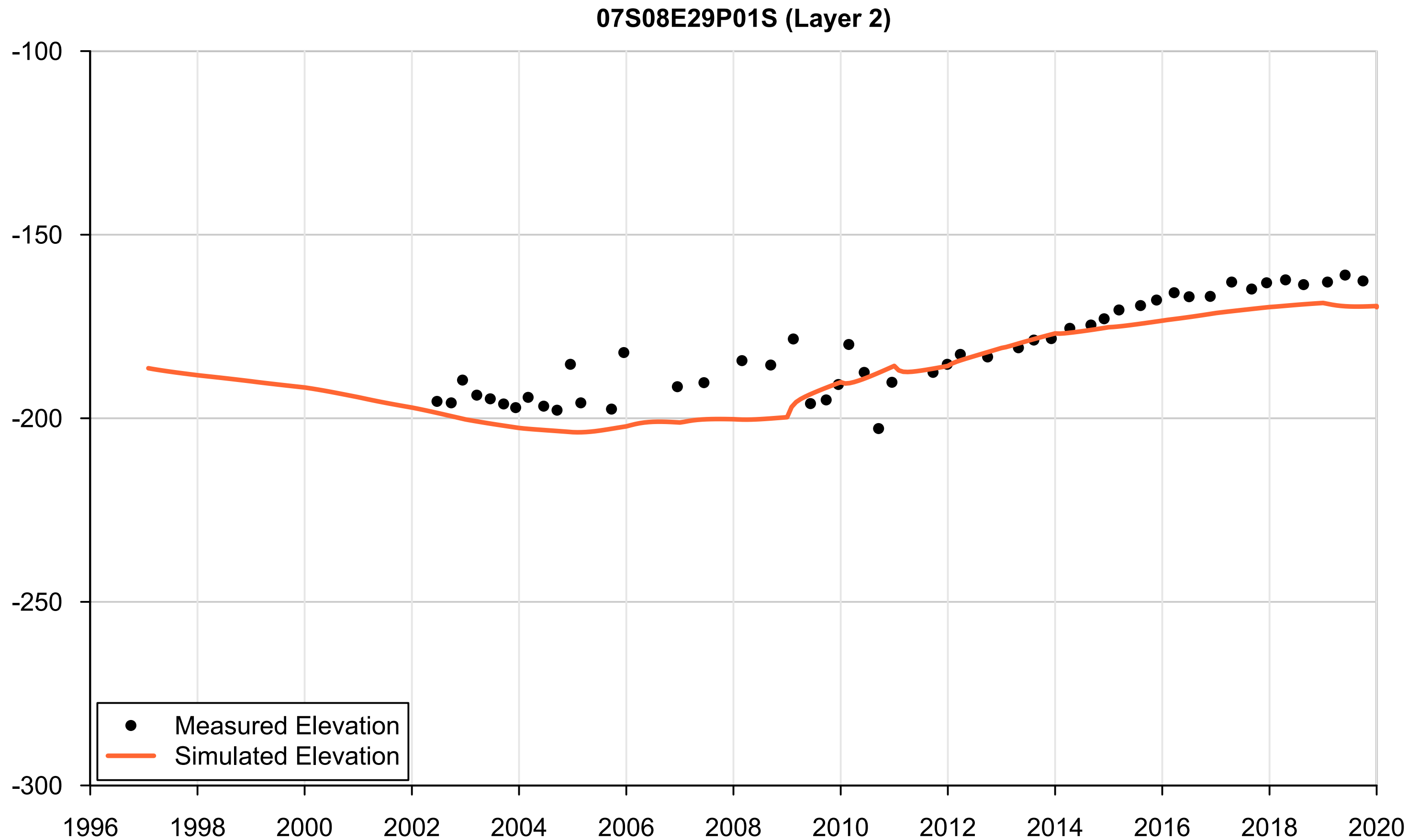


WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 7-A11
Groundwater Elevation Hydrograph
07S07E03D03S

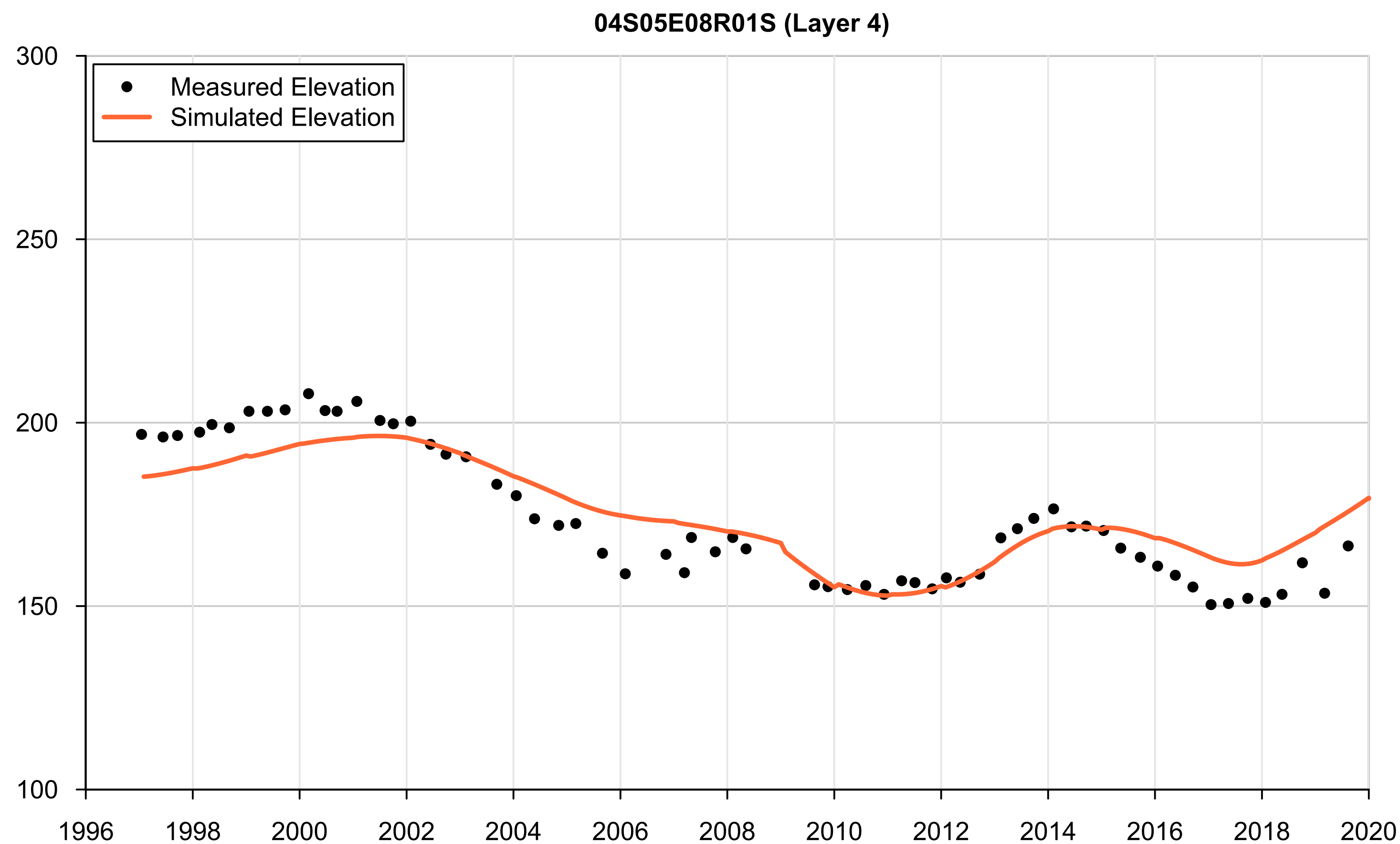


WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 7-A12
Groundwater Elevation Hydrograph
07S08E29P01S



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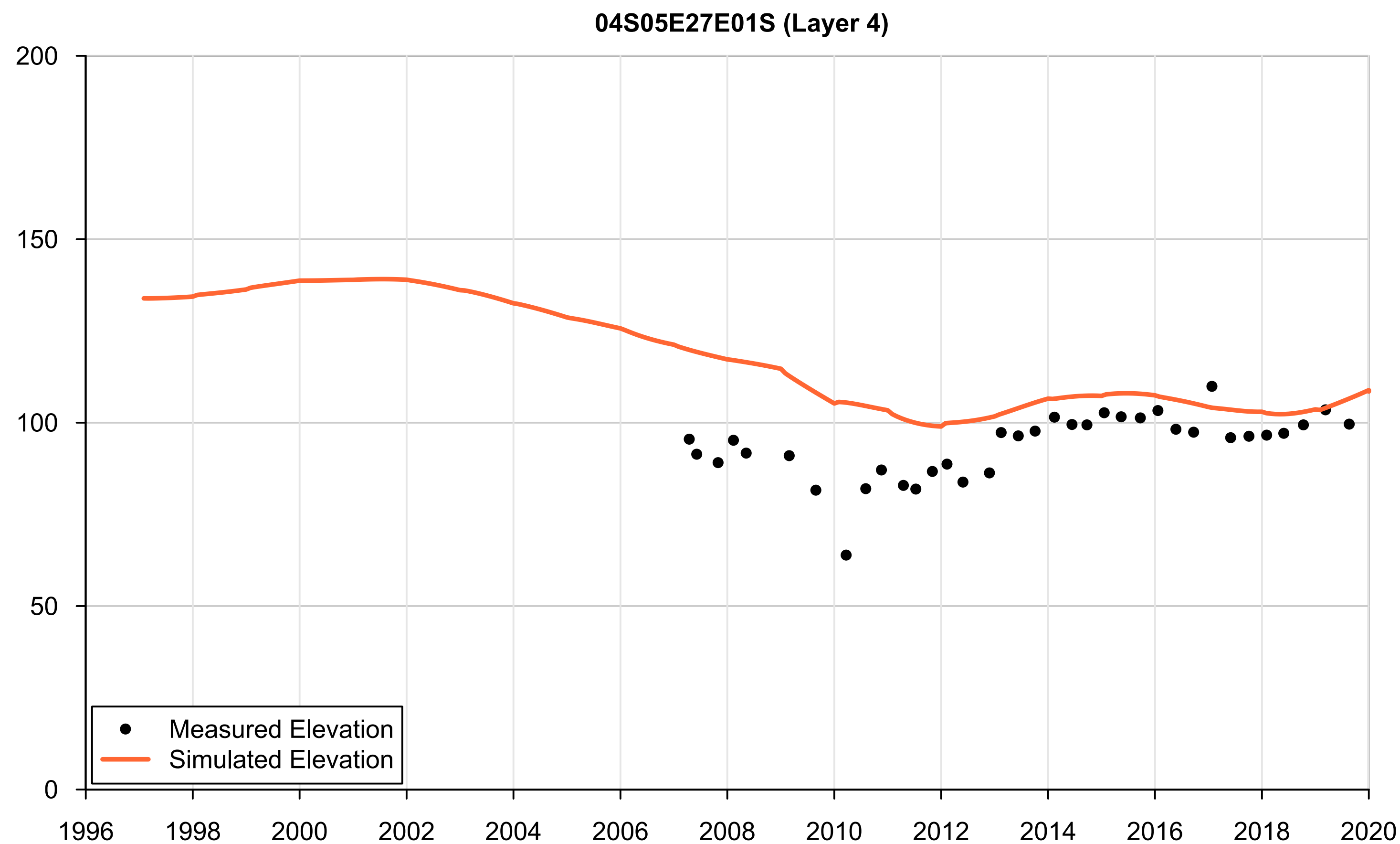
FINAL

TODD GROUNDWATER

Appendix 7-A13
Groundwater Elevation Hydrograph
04S05E08R01S



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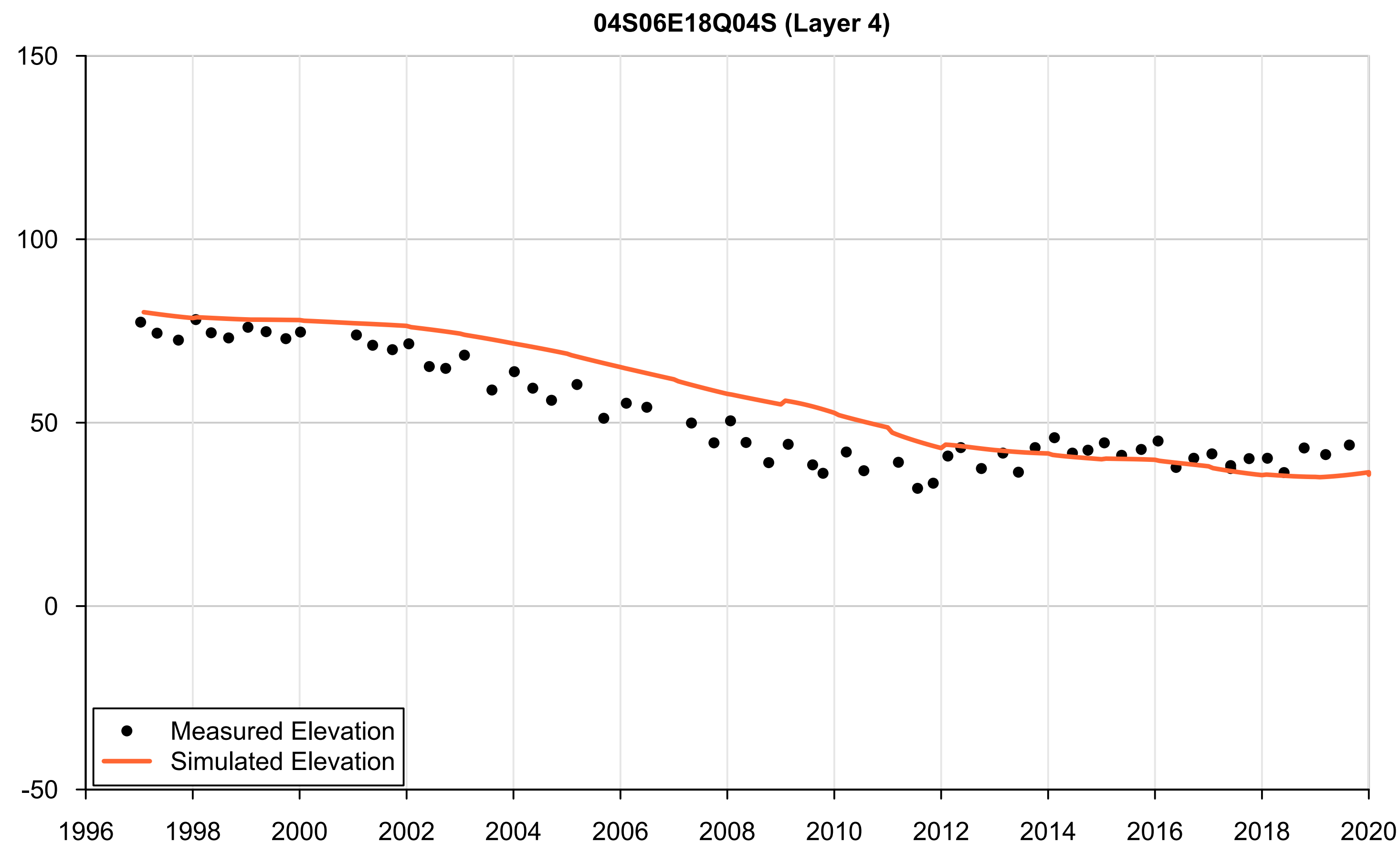
TODD GROUNDWATER

Appendix 7-A14
Groundwater Elevation Hydrograph
04S05E27E01S



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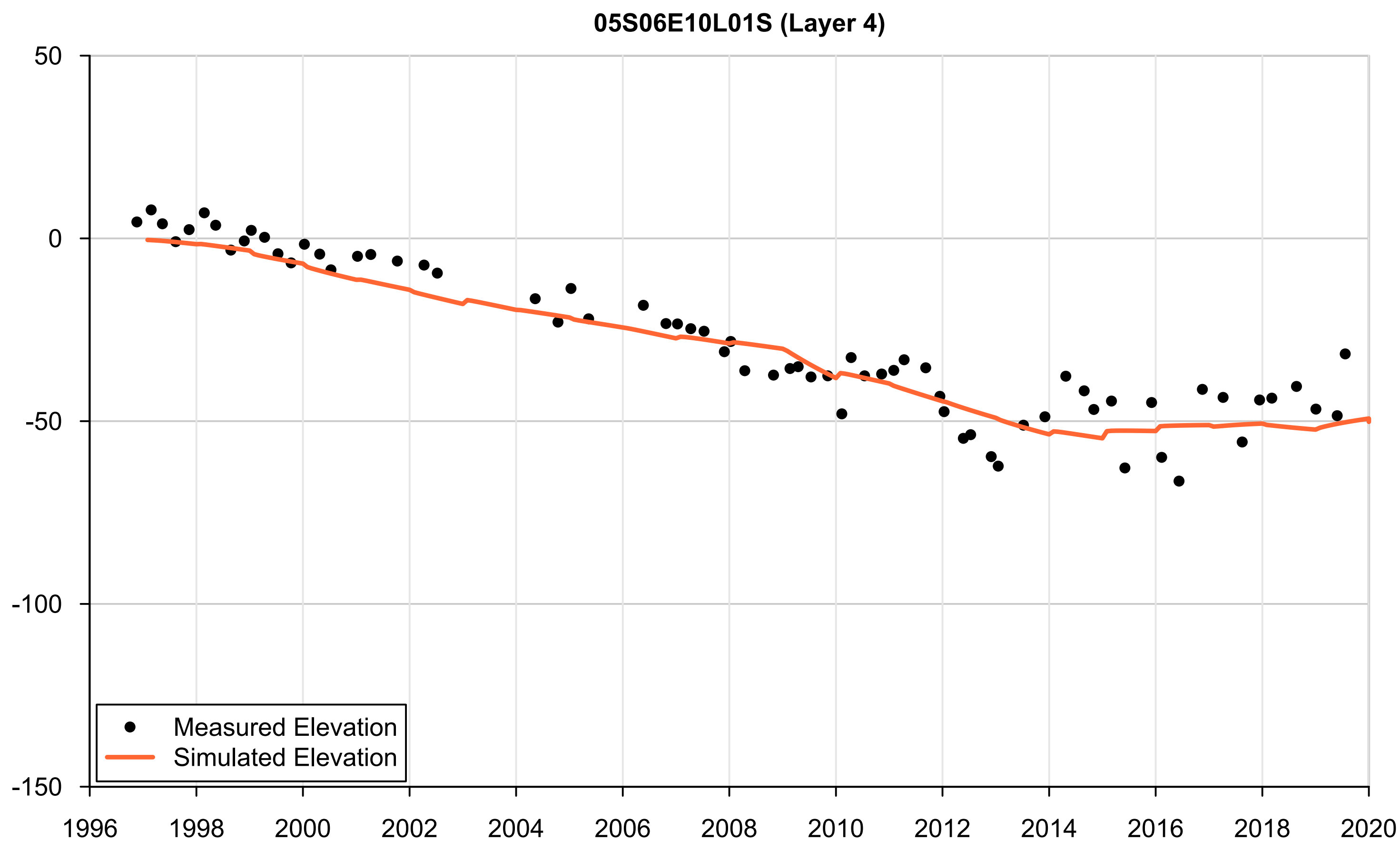
Appendix 7-A15
Groundwater Elevation Hydrograph
04S06E18Q04S

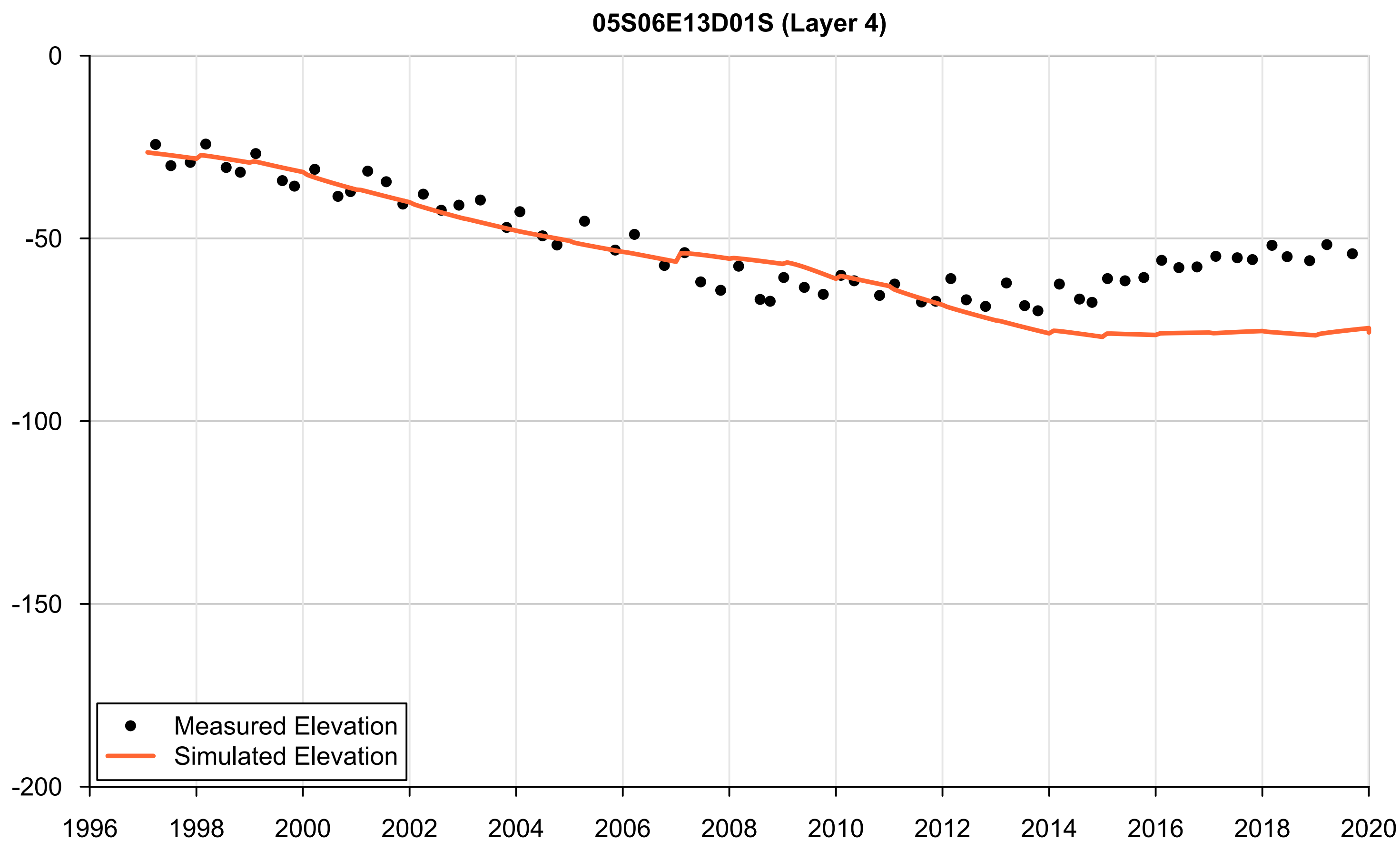


WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 7-A16
Groundwater Elevation Hydrograph
05S06E10L01S



FINAL

TODD GROUNDWATER

WOODARD & CURRAN

Appendix 7-A17
Groundwater Elevation Hydrograph
05S06E13D01S

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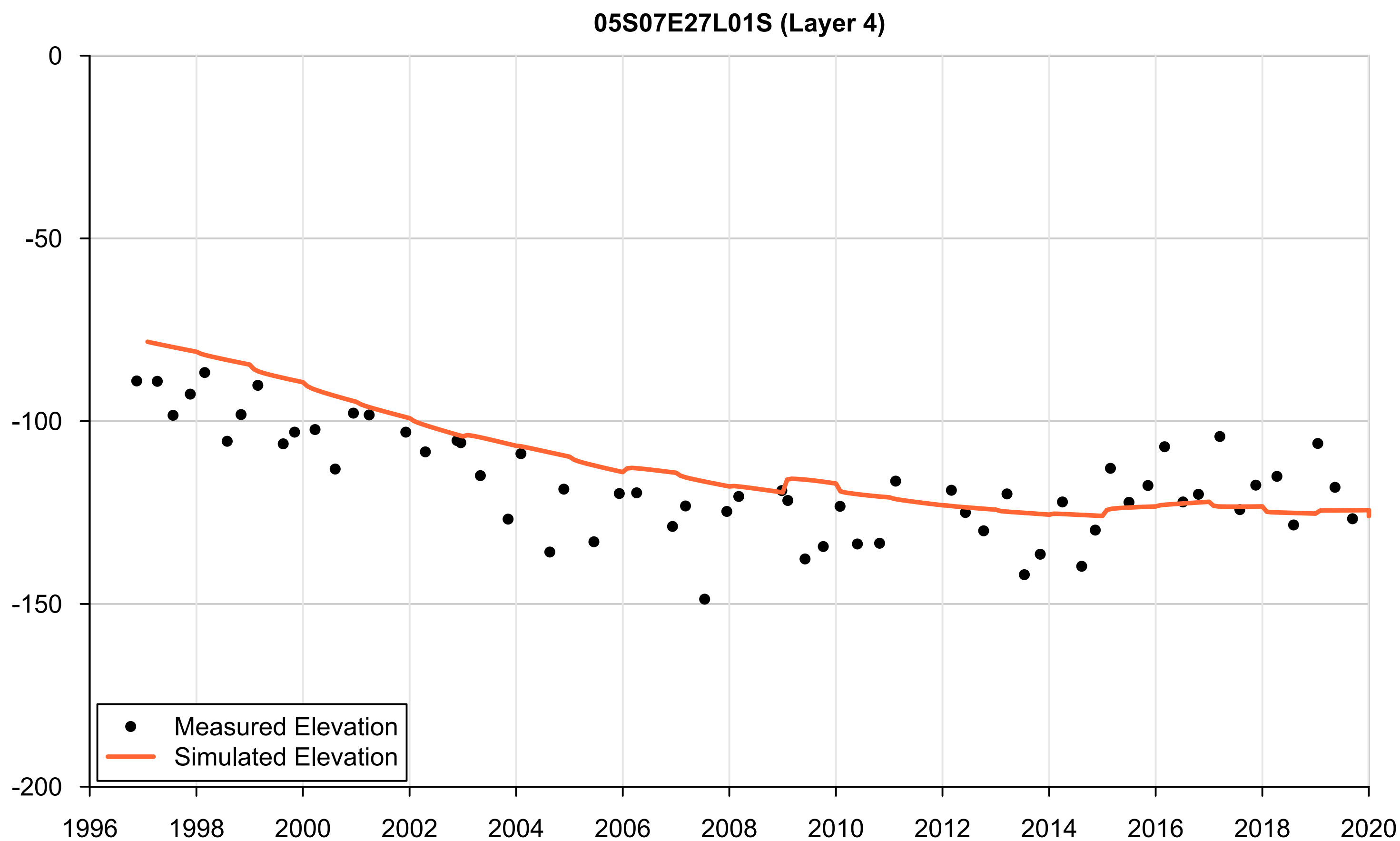
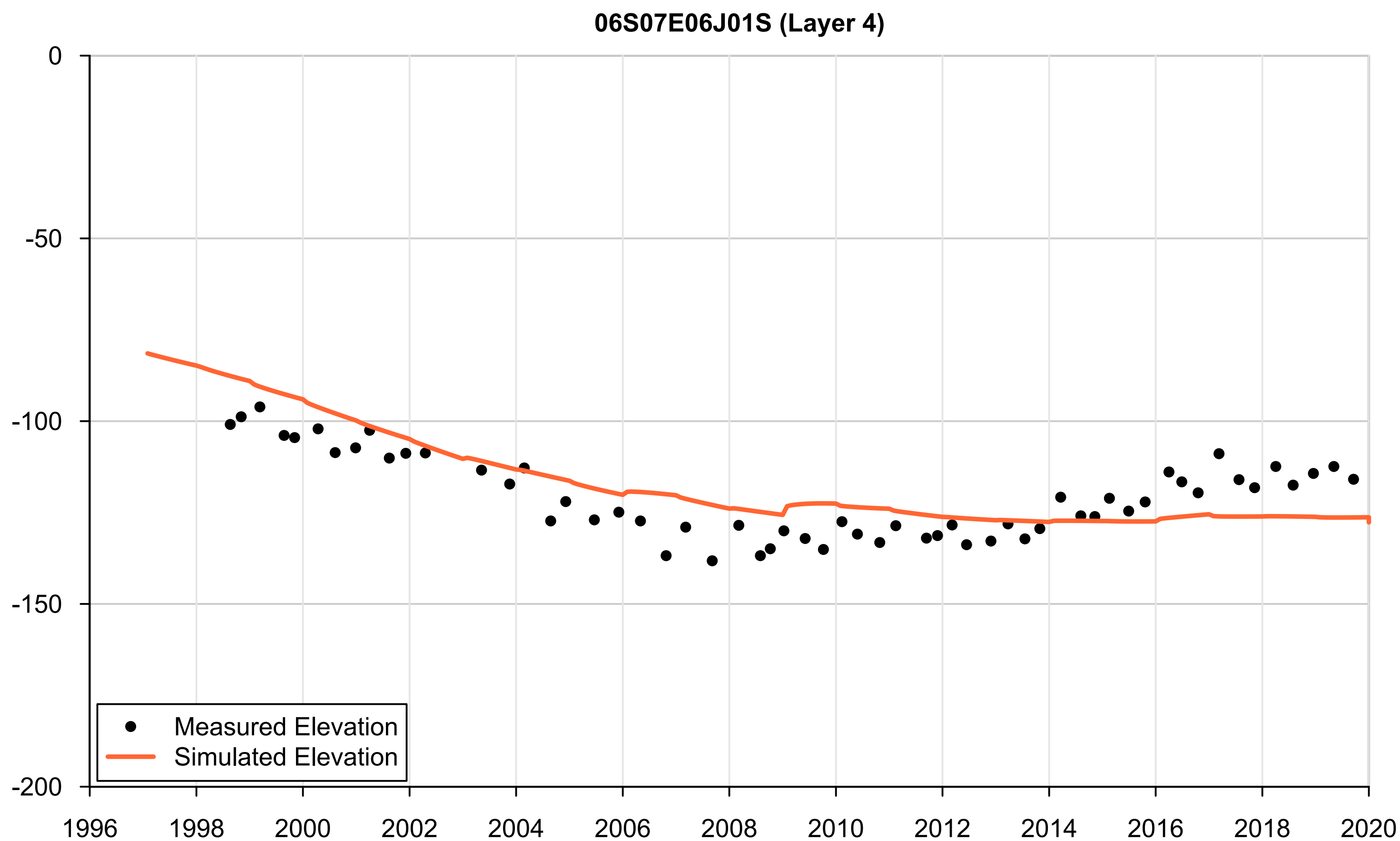


FINAL

TODD GROUNDWATER

WOODARD & CURRAN

Appendix 7-A18
Groundwater Elevation Hydrograph
05S07E27L01S

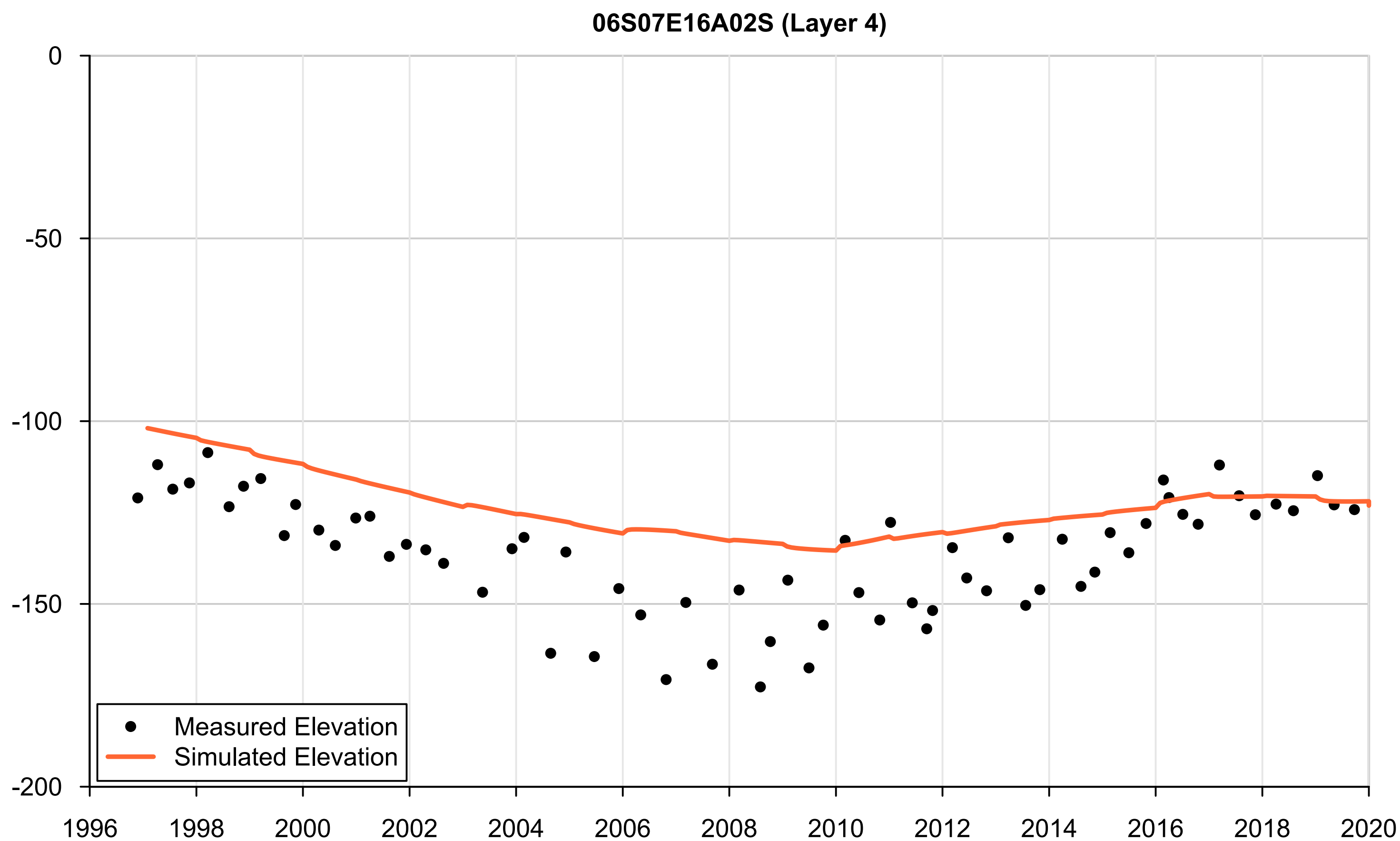


WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 7-A19
Groundwater Elevation Hydrograph
06S07E06J01S



FINAL

WOODARD & CURRAN

TODD GROUNDWATER

Appendix 7-A20
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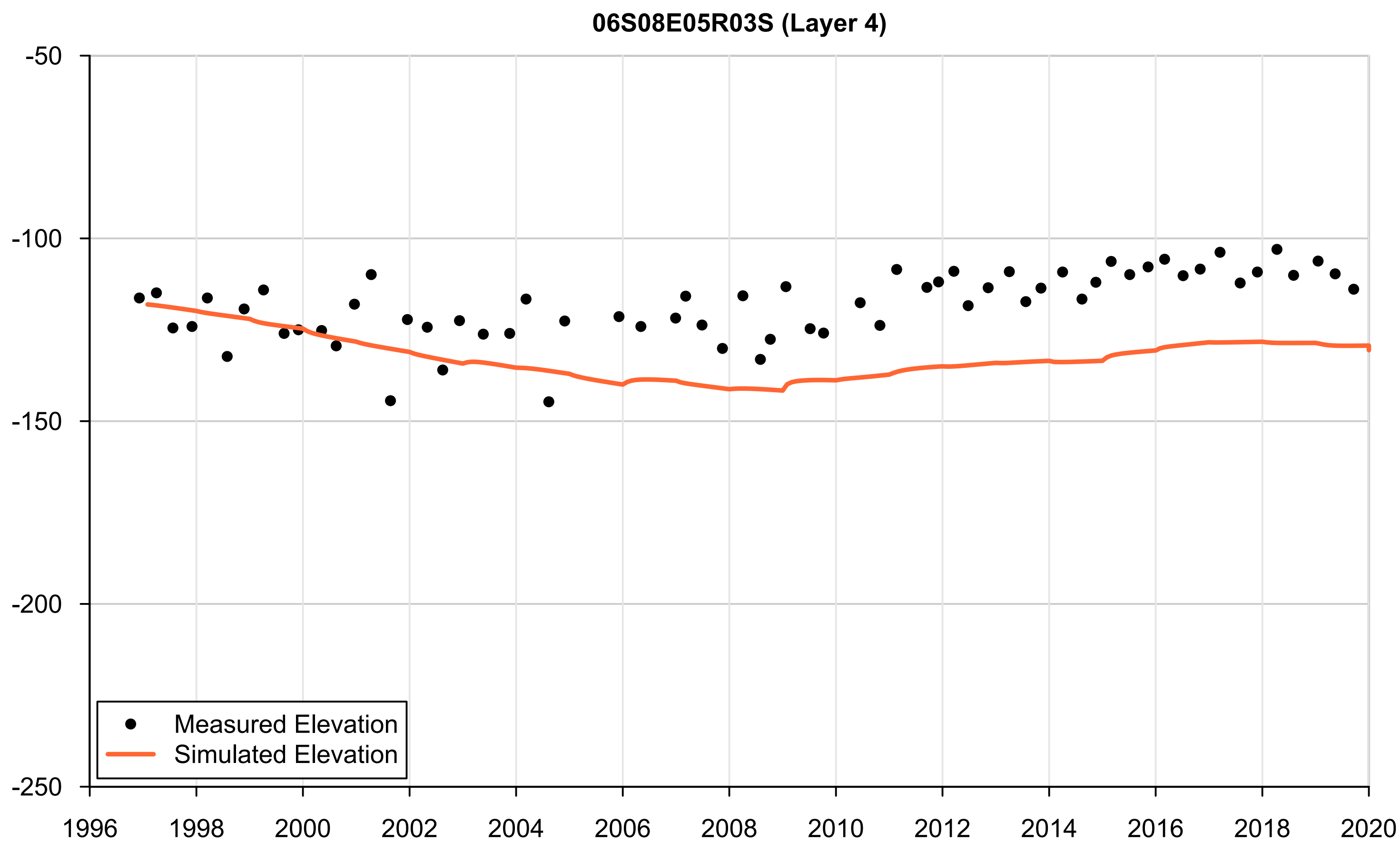
06S07E16A02S



WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 7-A21
Groundwater Elevation Hydrograph
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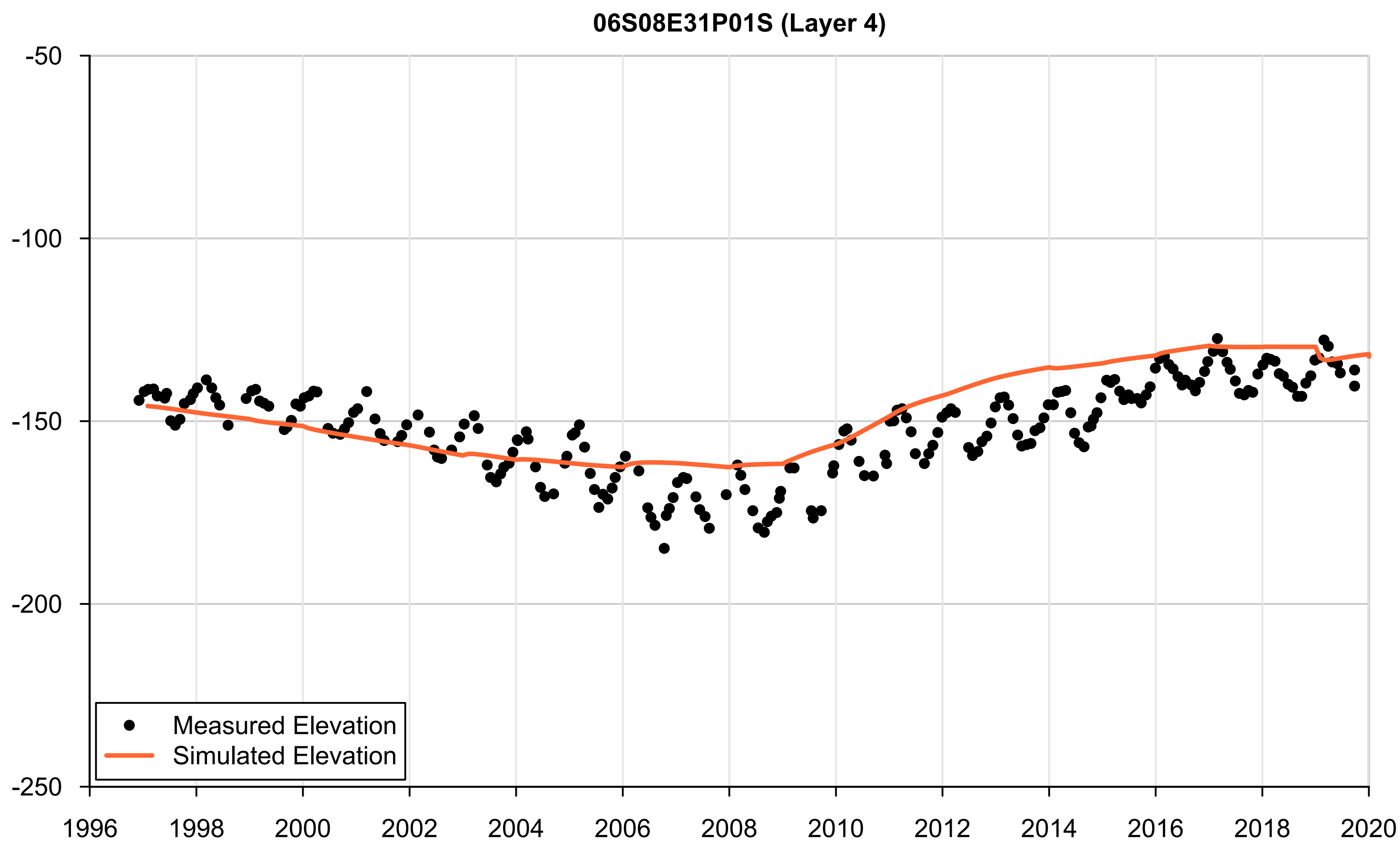

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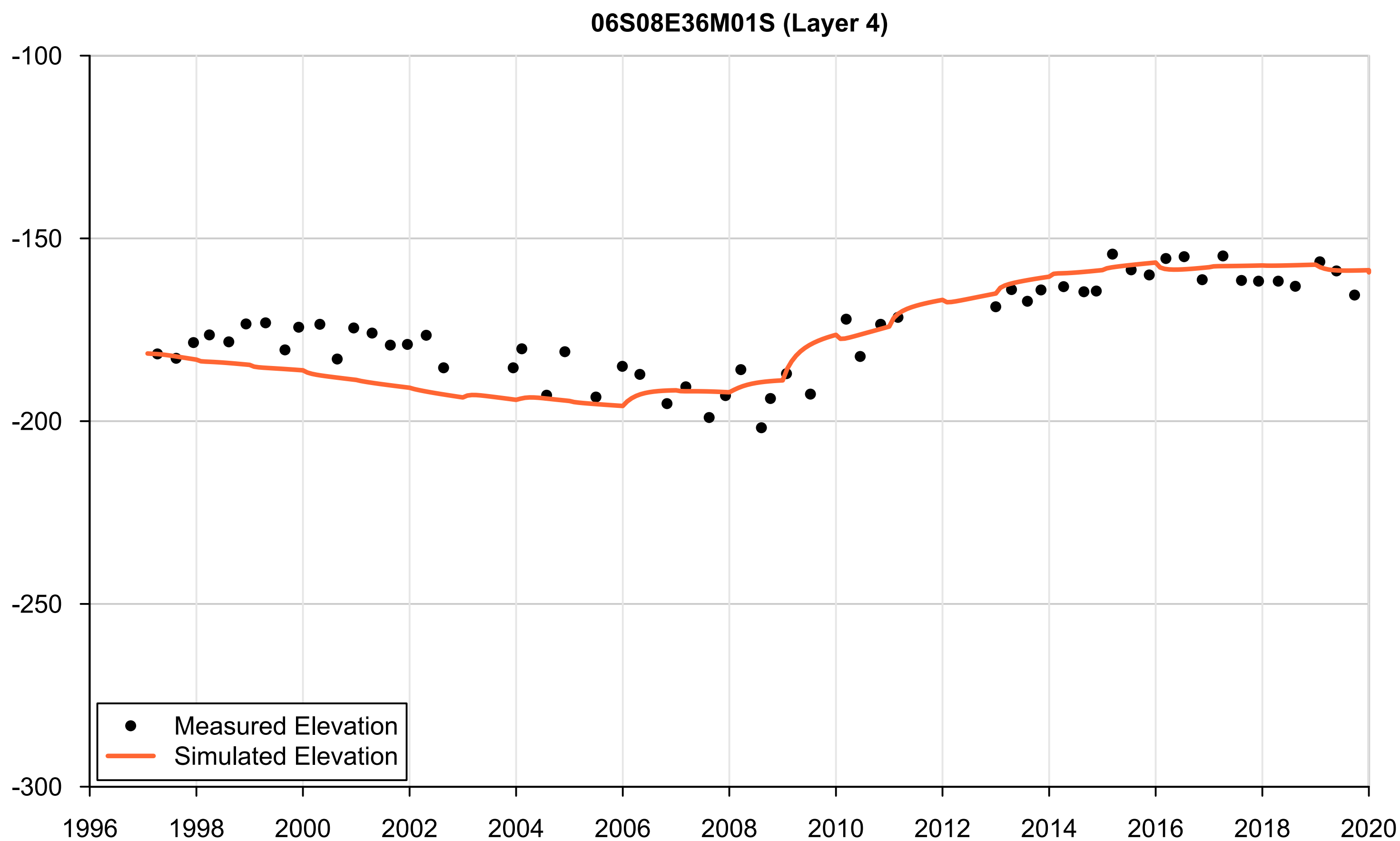
TODD GROUNDWATER

WOODARD & CURRAN

Appendix 7-A22
Groundwater Elevation Hydrograph
06S08E31P01S

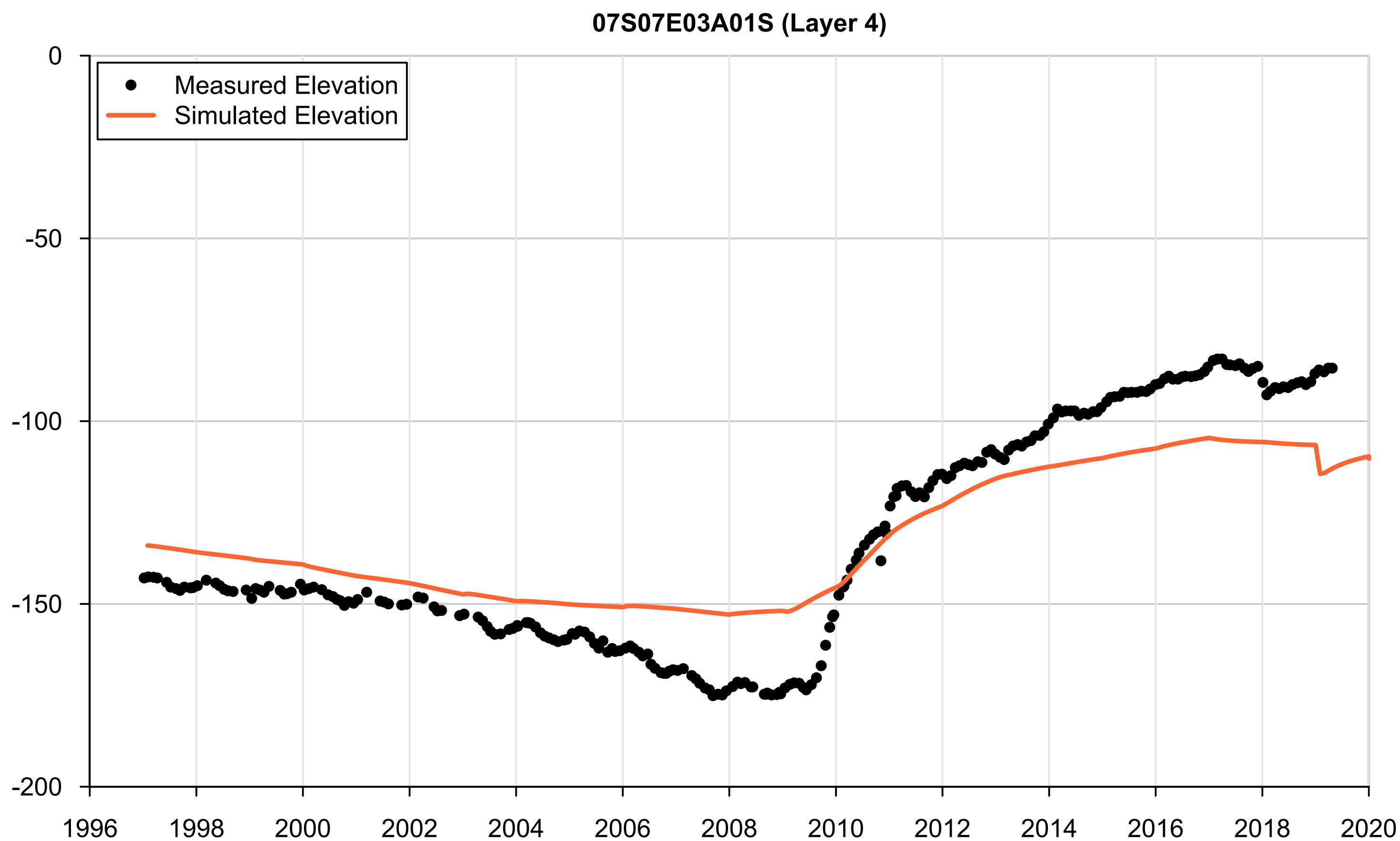


WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 7-A23
Groundwater Elevation Hydrograph
06S08E36M01S

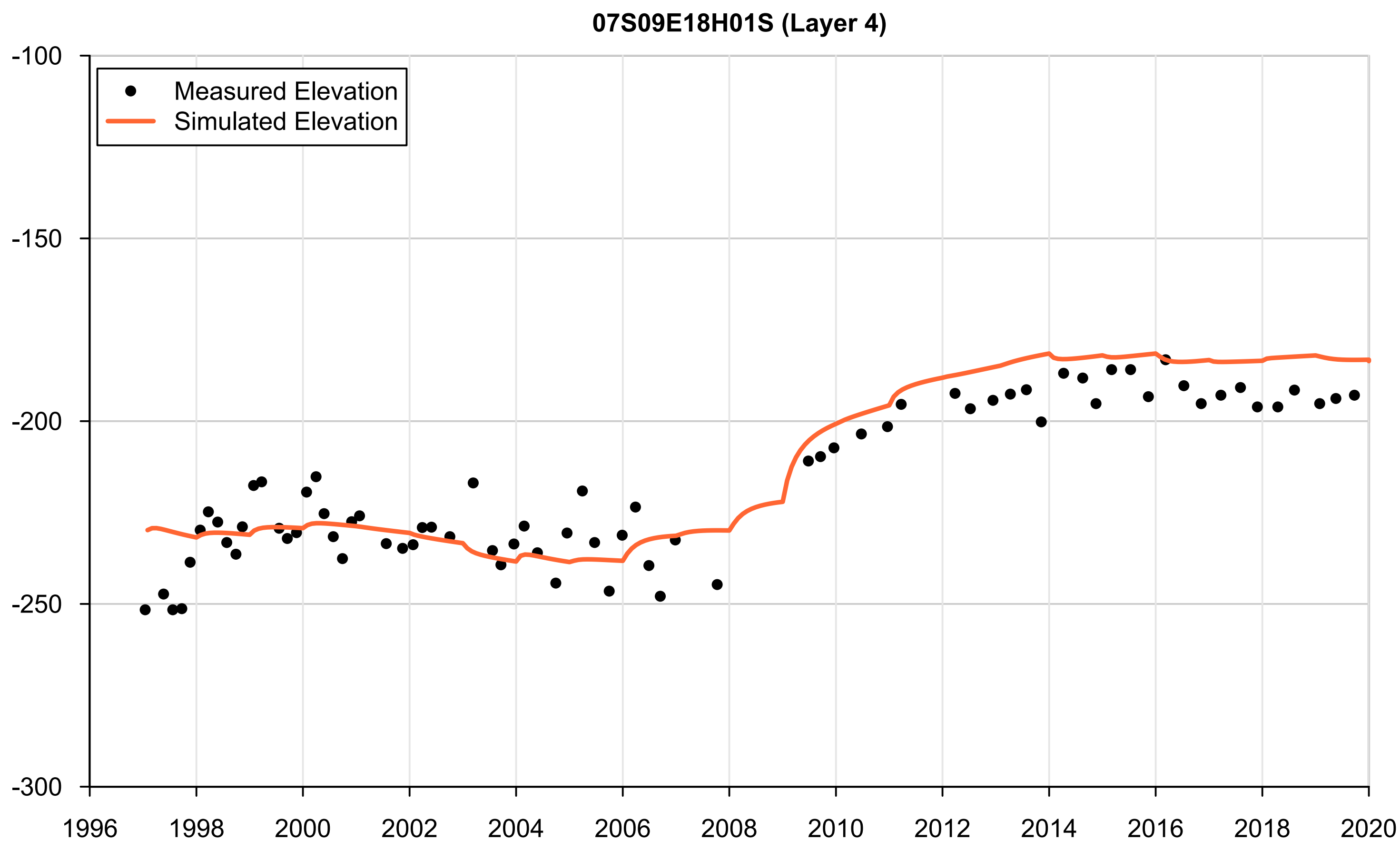


WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 7-A24
Groundwater Elevation Hydrograph
07S07E03A01S

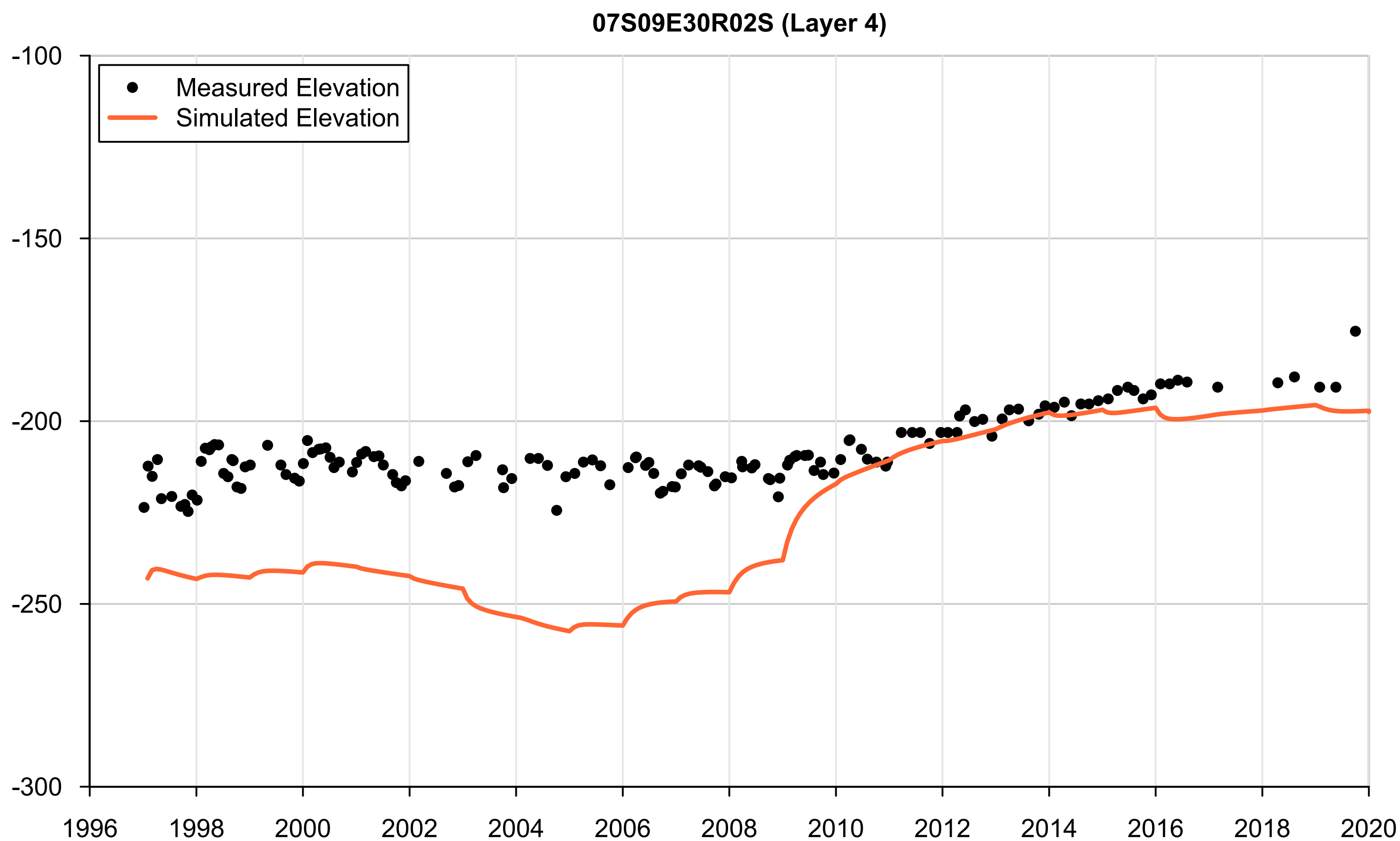


WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 7-A25
Groundwater Elevation Hydrograph
07S09E18H01S



FINAL

WOODARD & CURRAN

TODD GROUNDWATER

Appendix 7-A26
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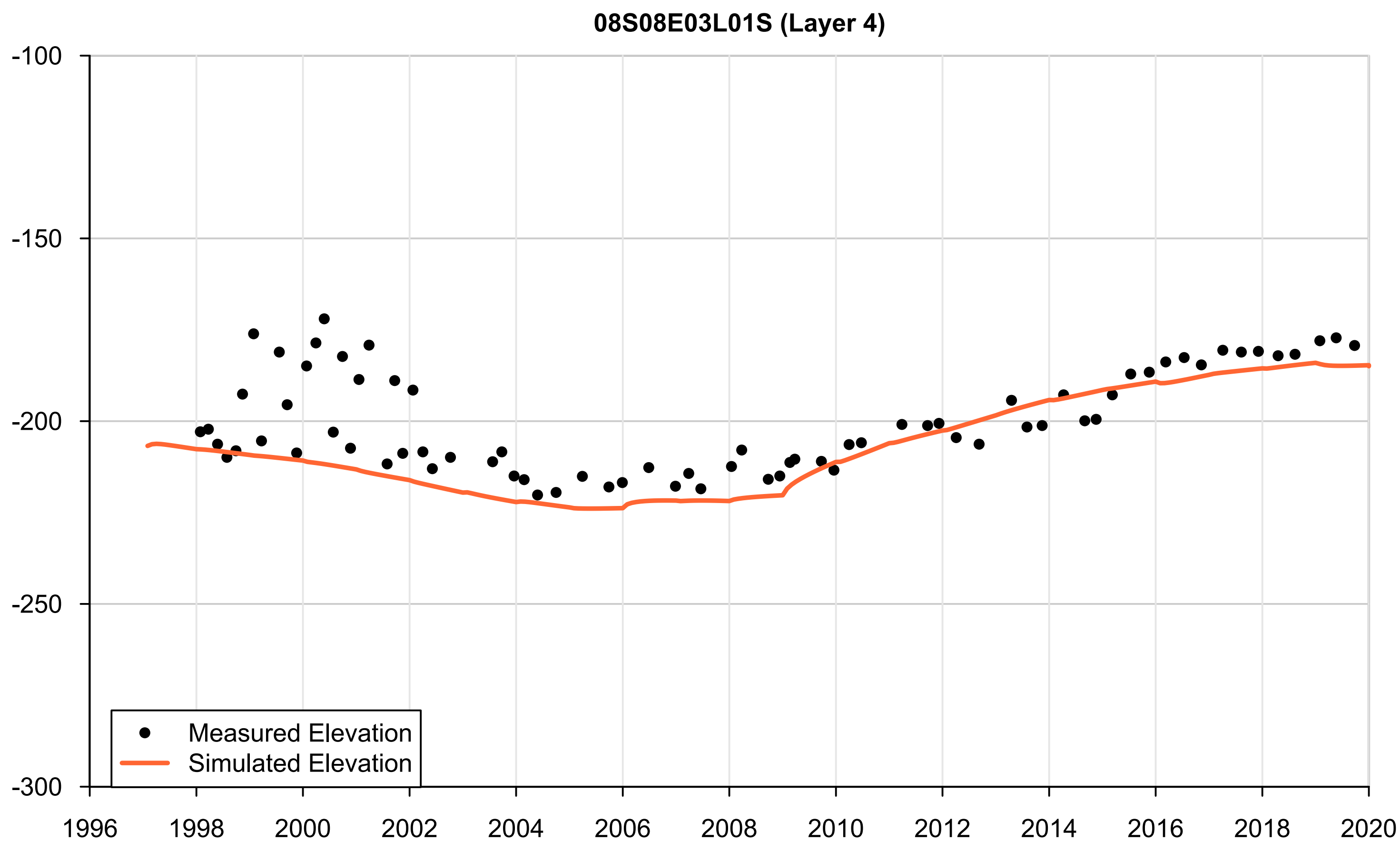

WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 7-A27
Groundwater Elevation Hydrograph
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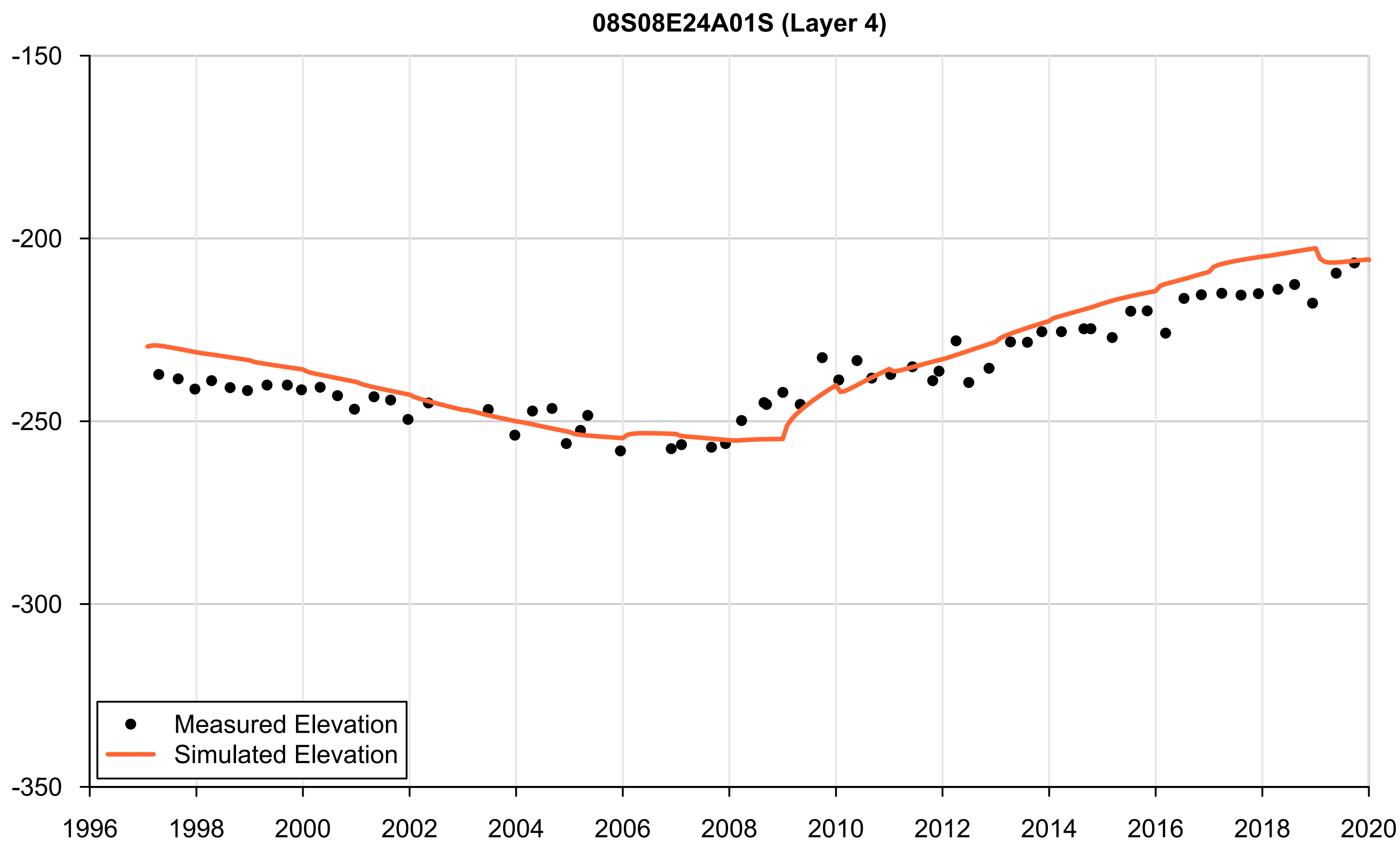

WOODARD & CURRAN

FINAL

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**

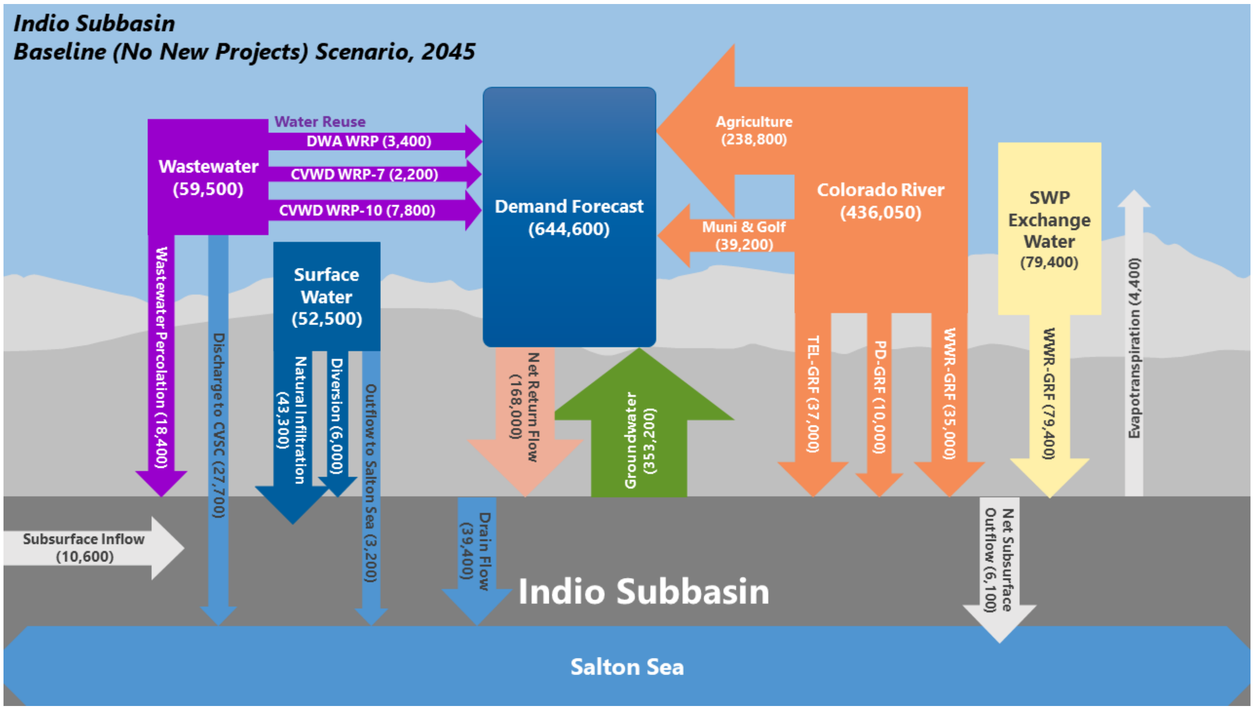
Note: Groundwater inflows and outflows (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, watershed runoff) are described in Section 7.6.

[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**

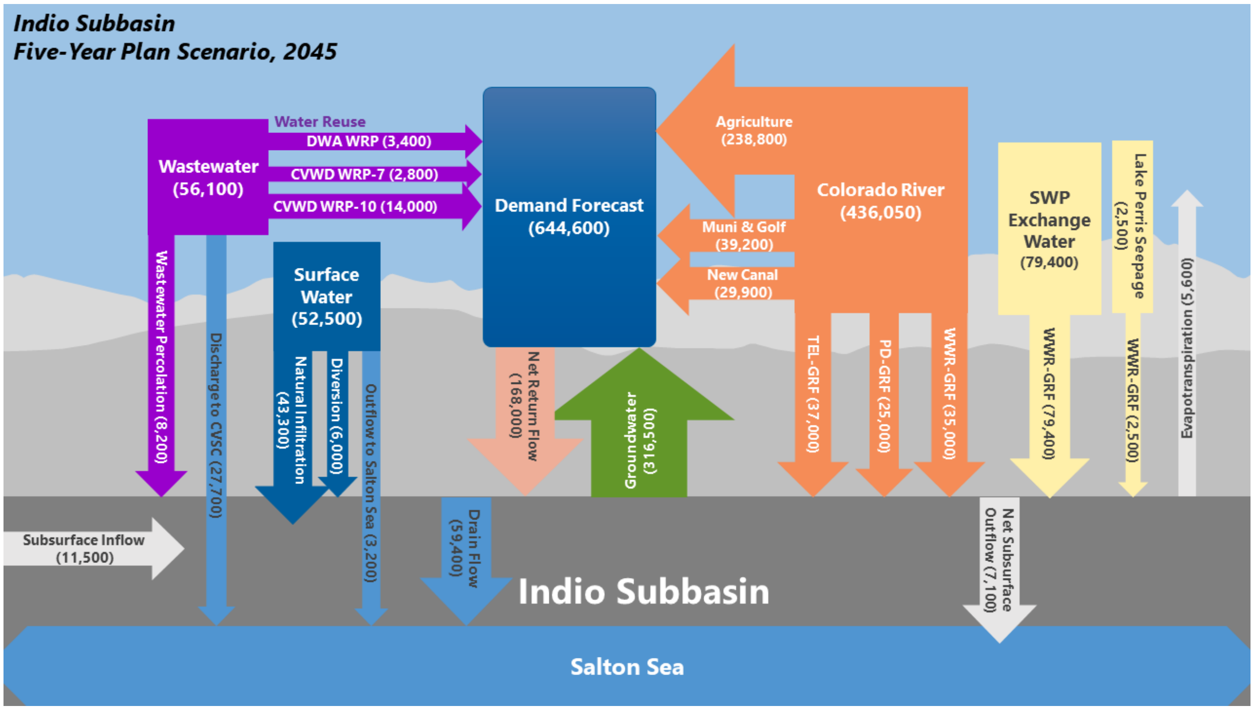
Note: Groundwater inflows and outflows (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, watershed runoff) are described in Section 7.6.

[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**

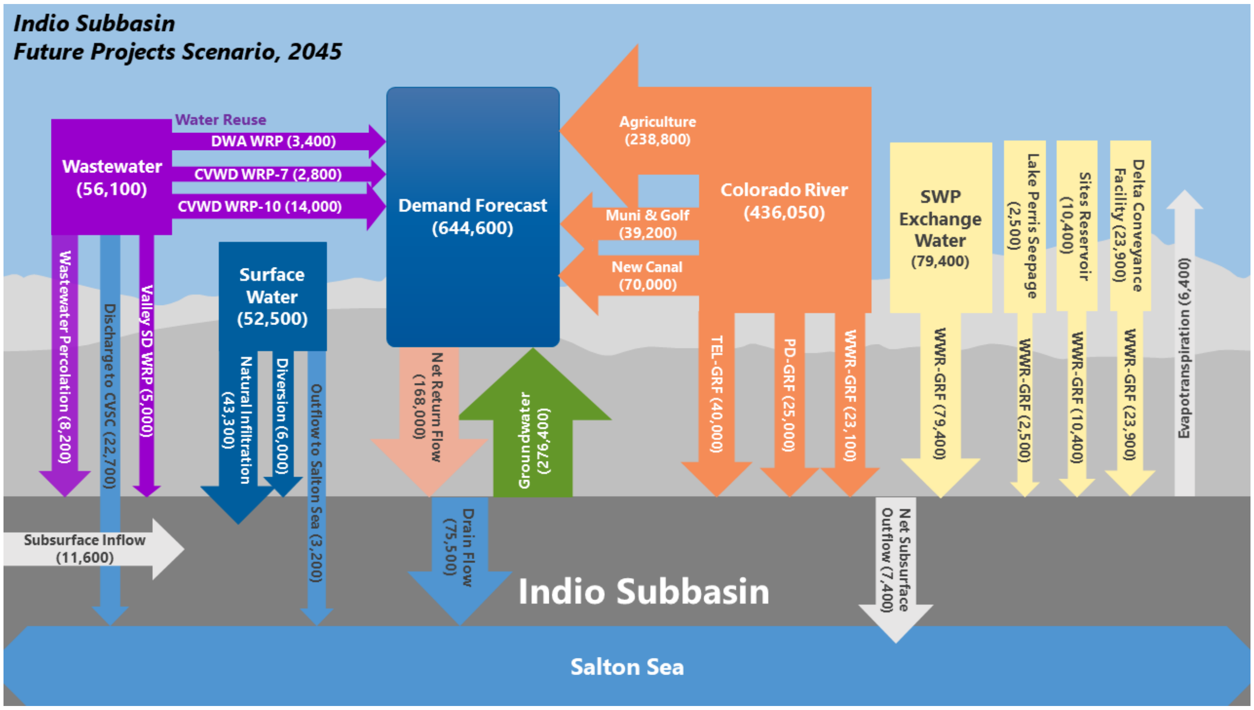
Note: Groundwater inflows and outflows (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, watershed runoff) are described in Section 7.6.

[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**

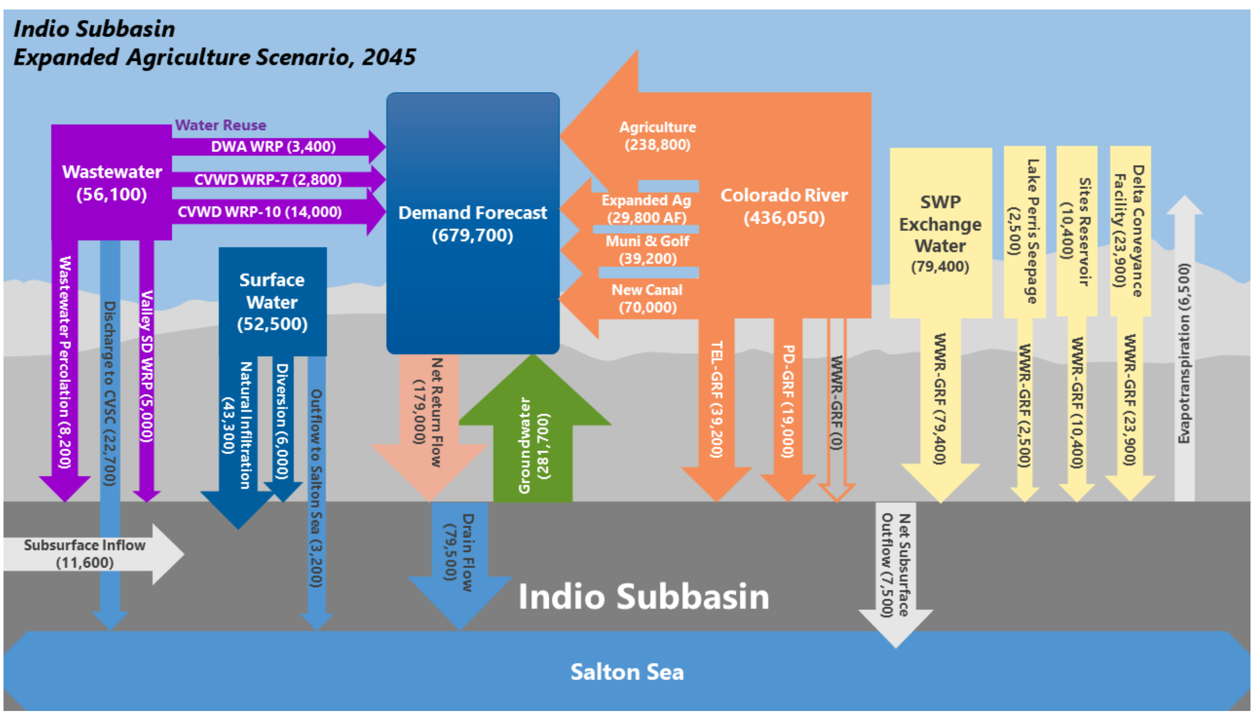
Note: Groundwater inflows and outflows (septic systems, return flows, subsurface inflow and outflow, drain flows, evapotranspiration, watershed runoff) are described in Section 7.6.

[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.

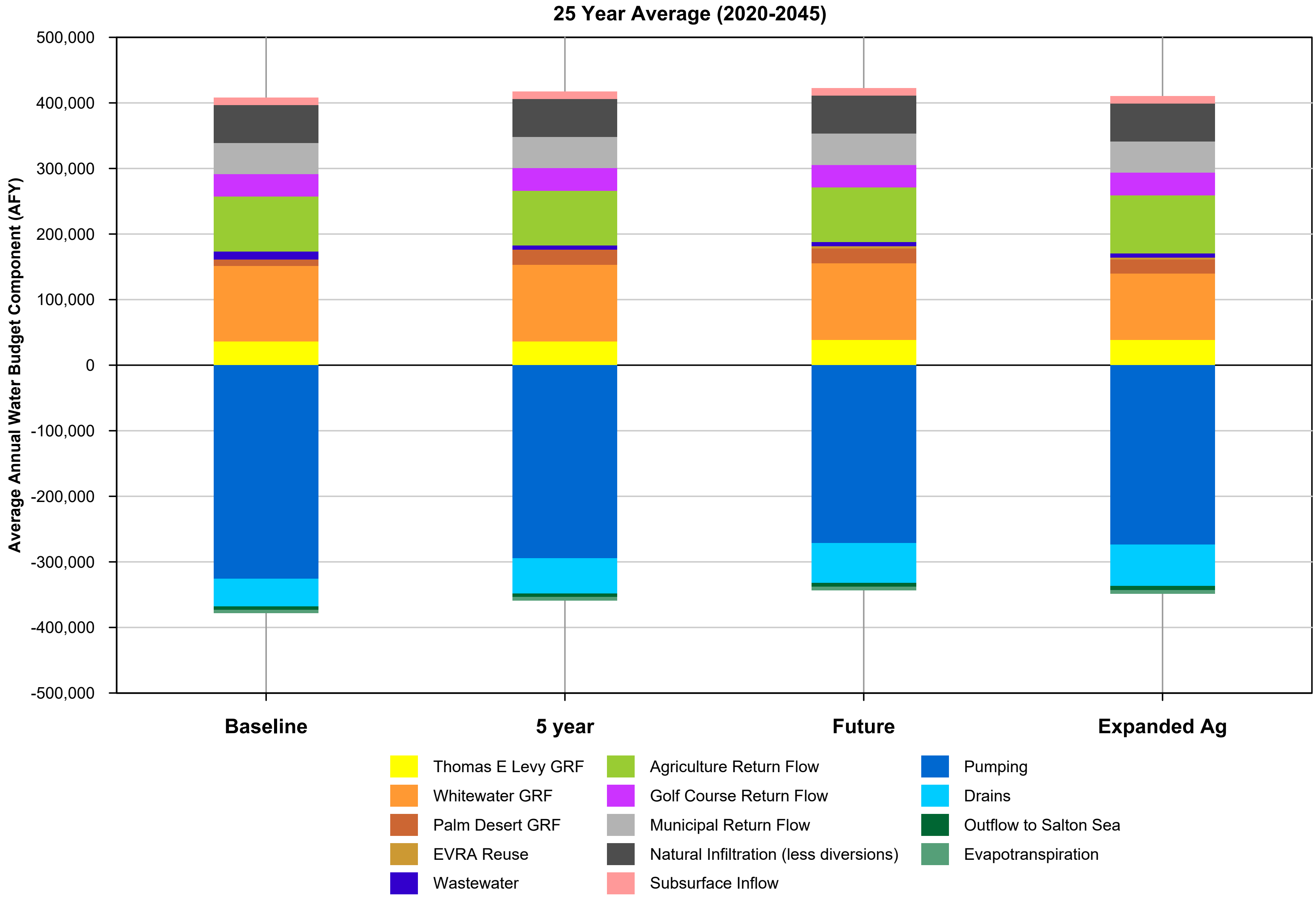
While extending beyond foreseeable land use and water resource planning projections, the second 25-year projections allow long-term evaluation of water supply and demand conditions, effectively testing Indio Subbasin sustainability under long-term hydrologic variability over 50 years.

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:



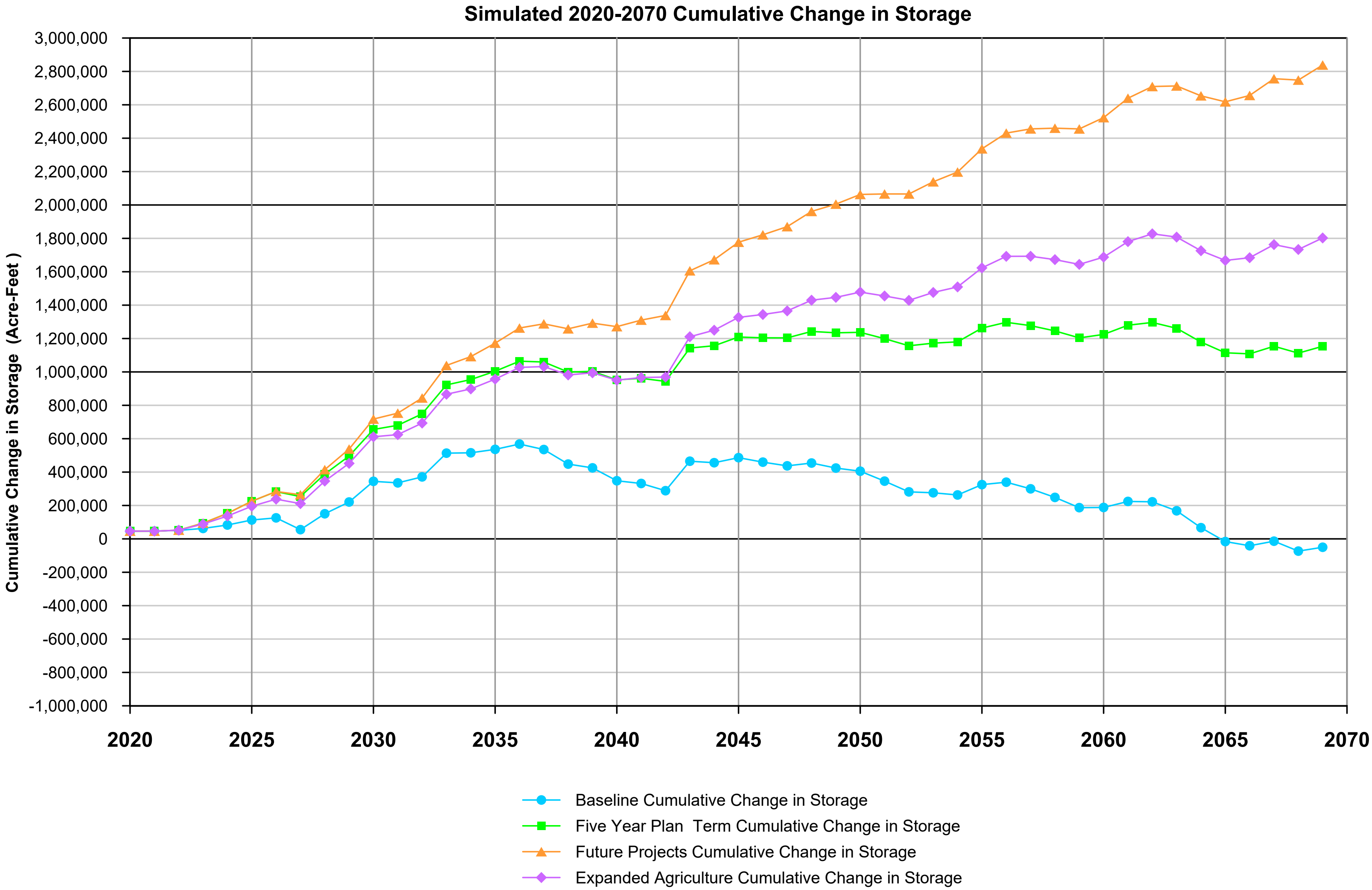
Path: T:\Projects\Coachella On-Call SGMA Services 2019 - 75004\Task Order 2 - Alternative Plan Update\GRAPHICS\Figure 7-C1 Annual Model Water Budget for Additional Scenarios.gpj

WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Figure 7-C1
Model Inflows and Outflows By Scenario



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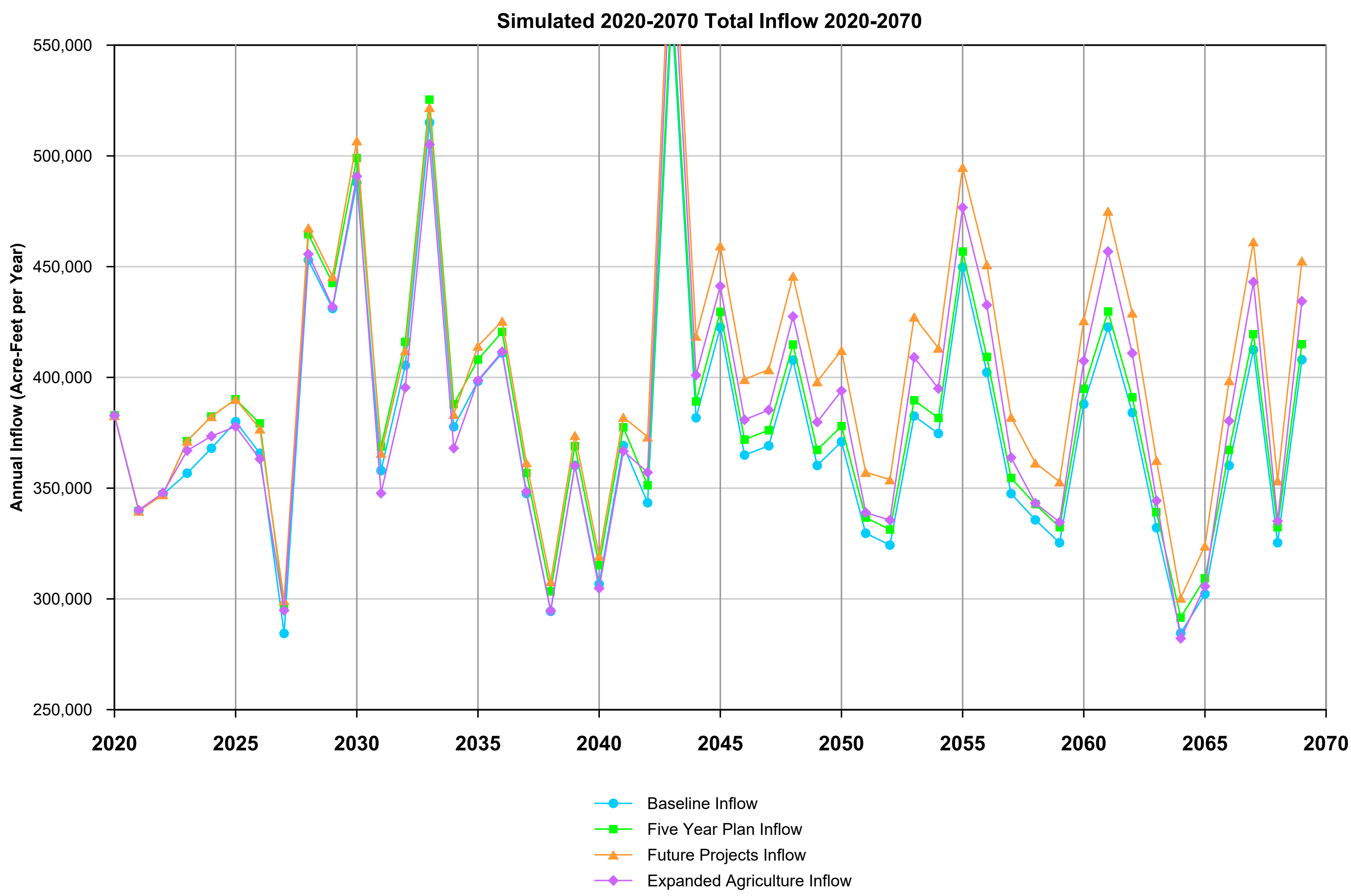
TODD GROUNDWATER

Figure 7-C2
Cumulative Change in Storage for Additional Scenarios



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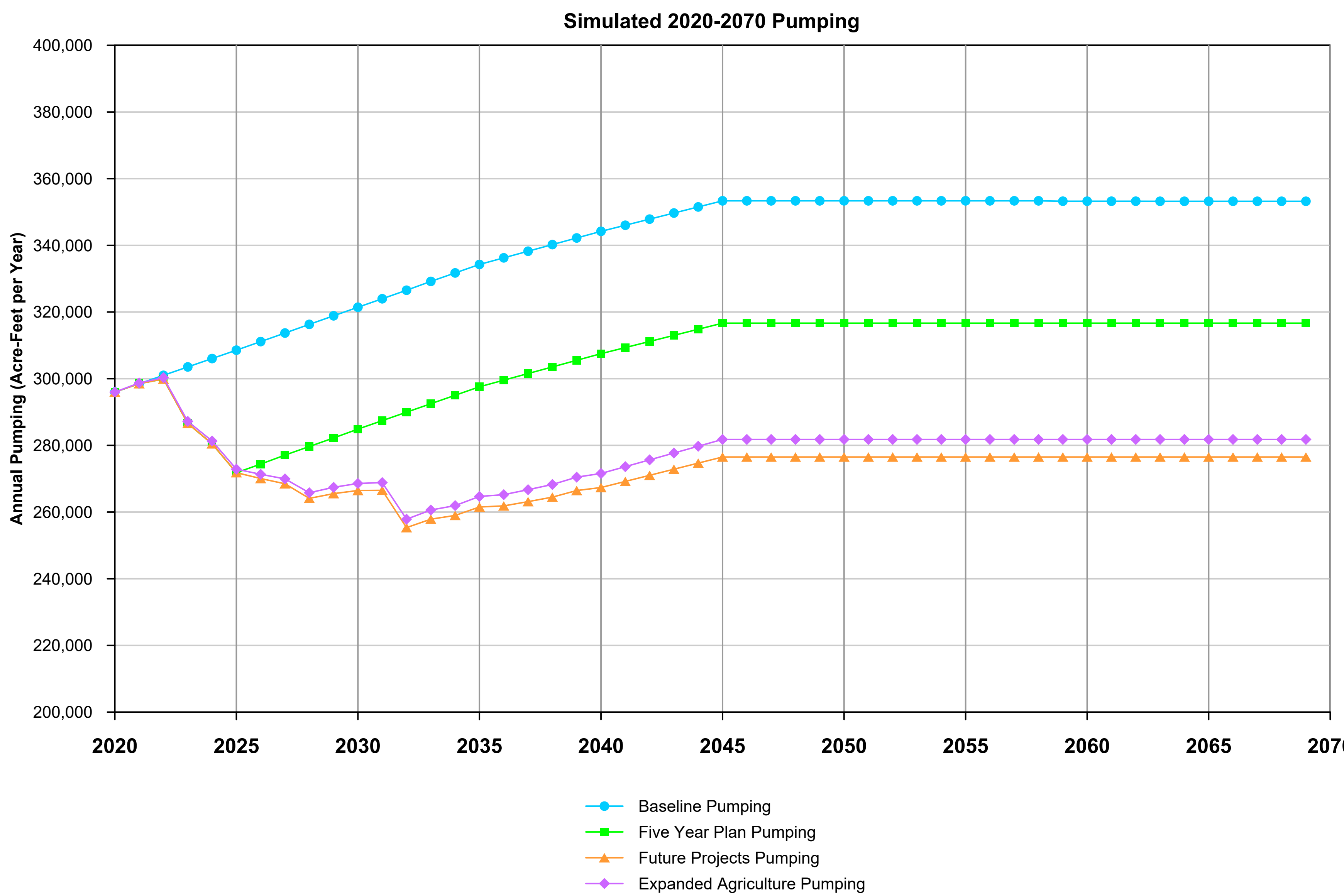
TODD GROUNDWATER

Figure 7-C3
Total Model Inflow for Additional Scenarios



FINAL

Figure 7-C4
Simulated Pumping for Additional Scenarios

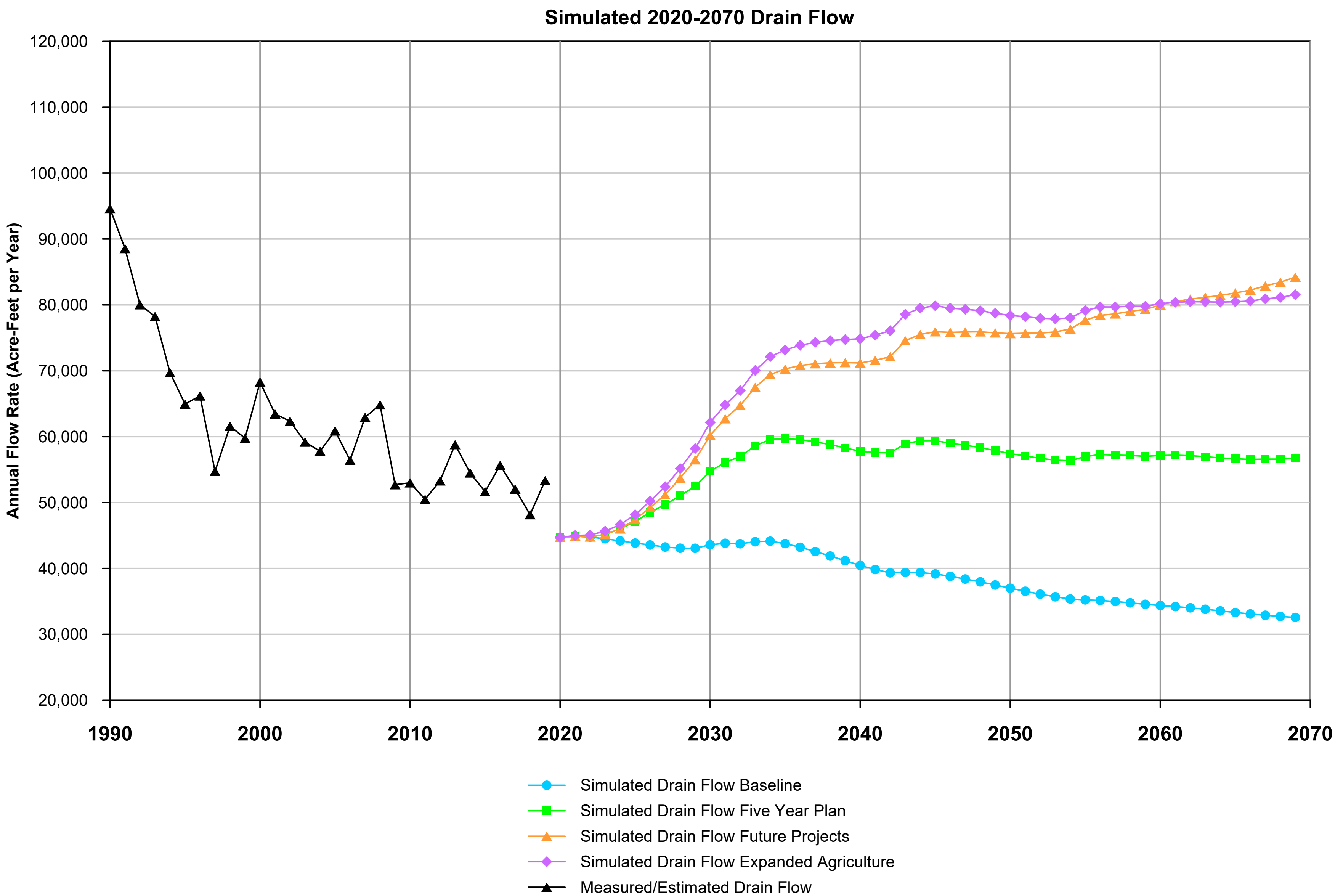


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Figure 7-C5
Simulated Drain Flow for Additional Scenarios

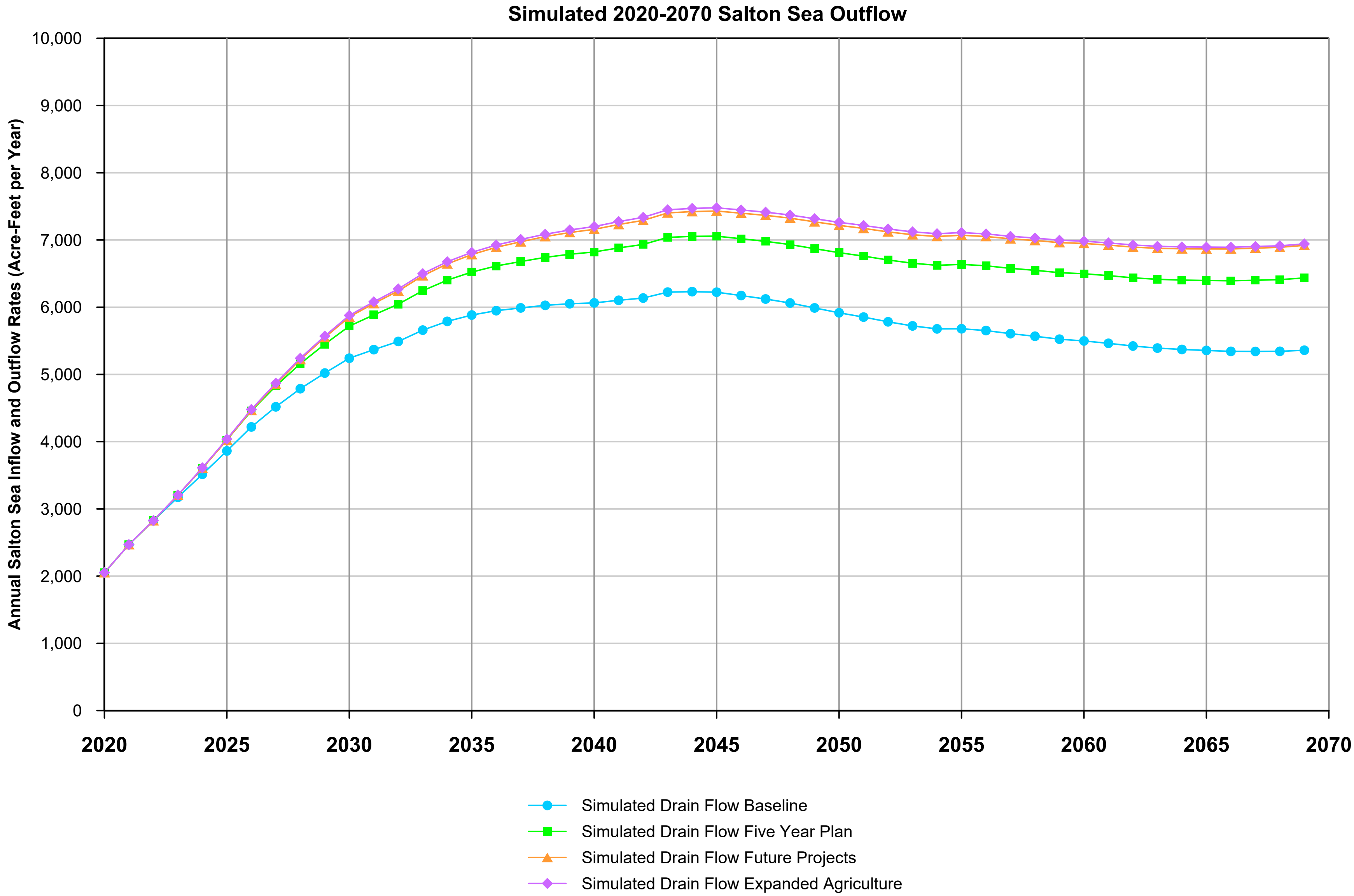

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Figure 7-C6
Simulated Salton Sea Net Outflow for Additional Scenarios

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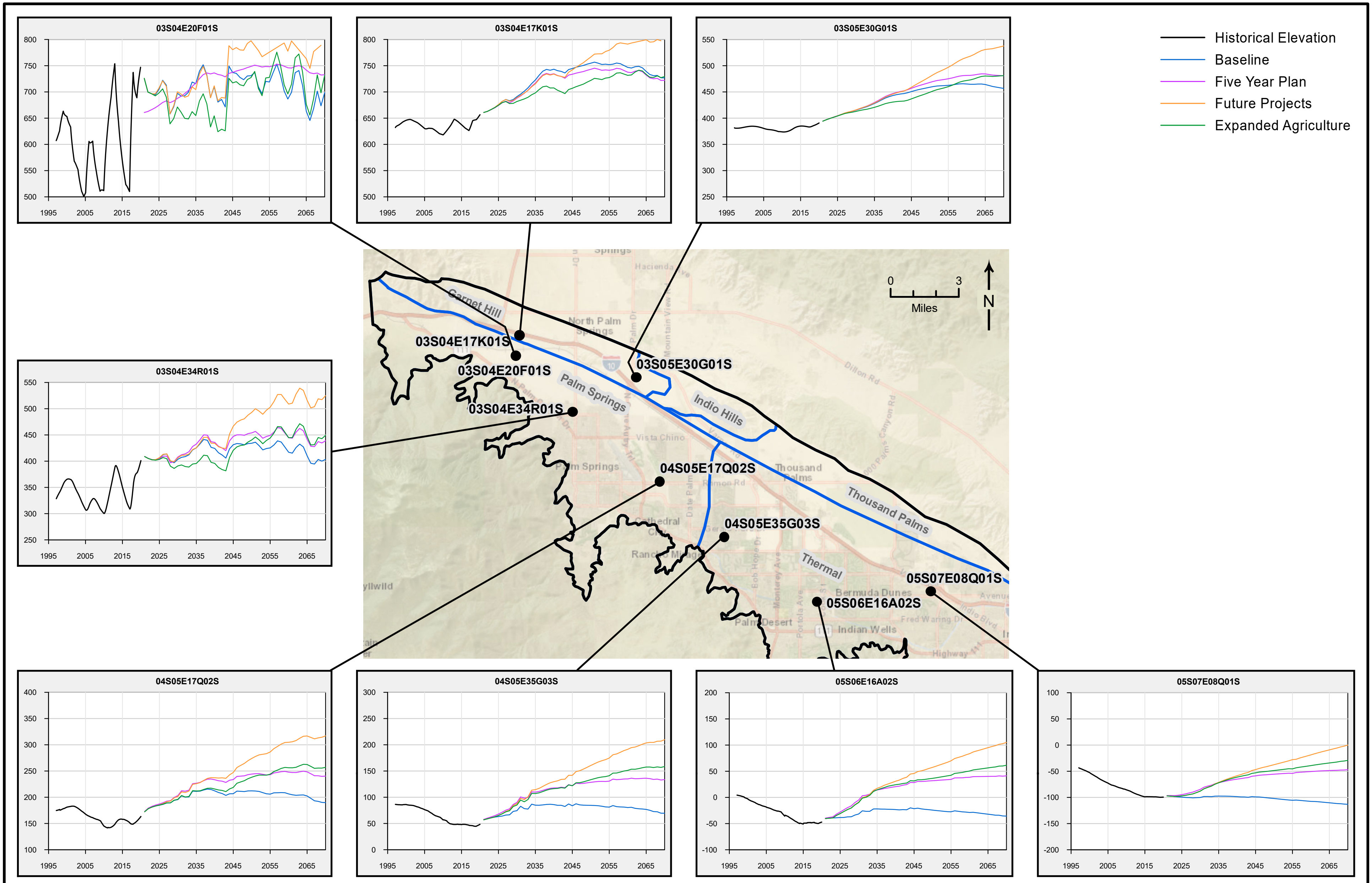

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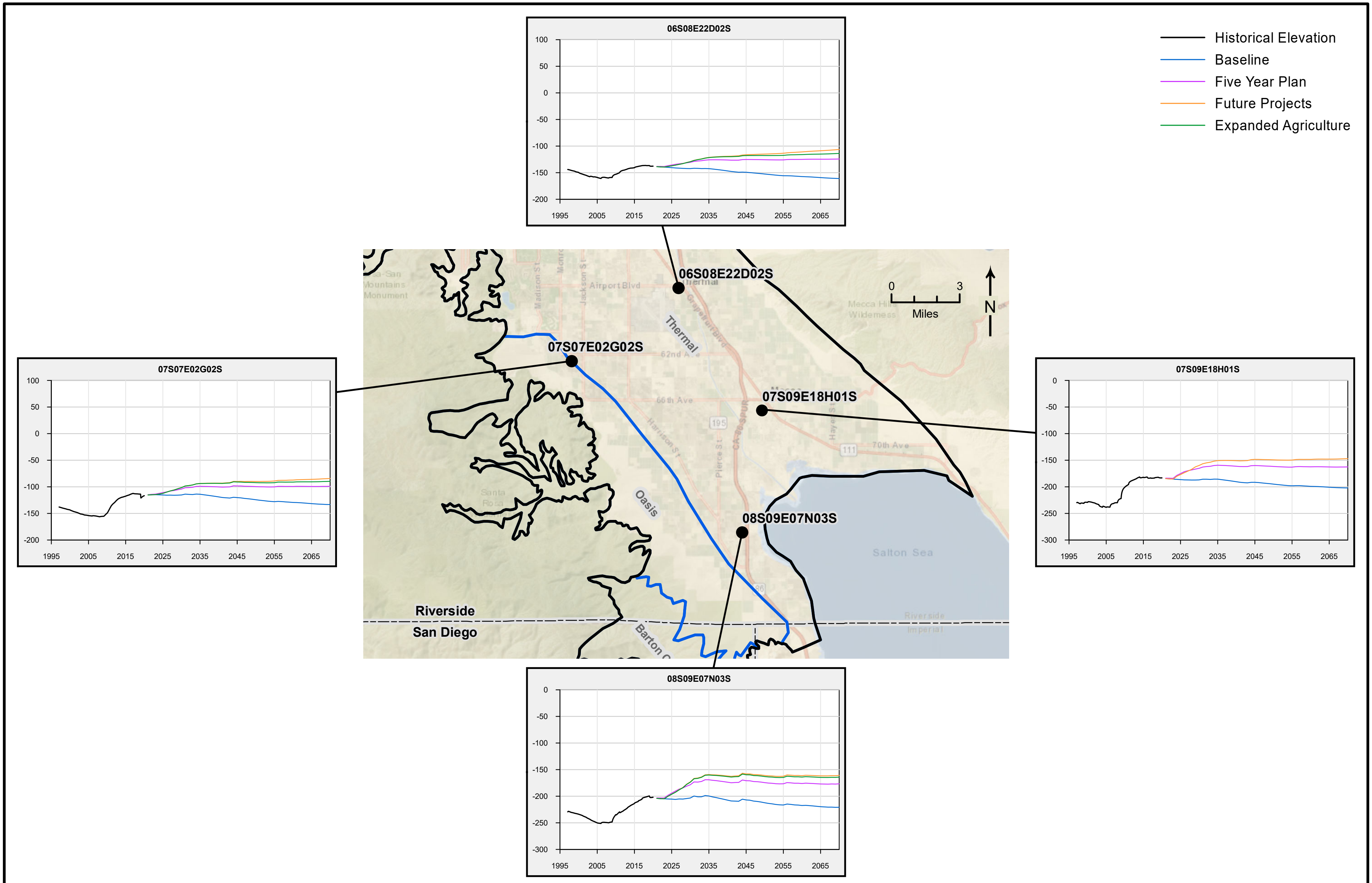
TODD GROUNDWATER

Figure 7-C7
Additional Scenarios
Hydrographs, West Valley
2020-2069



Model Results Hydrographs
Indio Subbasin
Indio Subbasin Subareas
California County

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TODD GROUNDWATER

Figure 7-C8
Additional Scenarios Hydrographs, East Valley
2020-2069

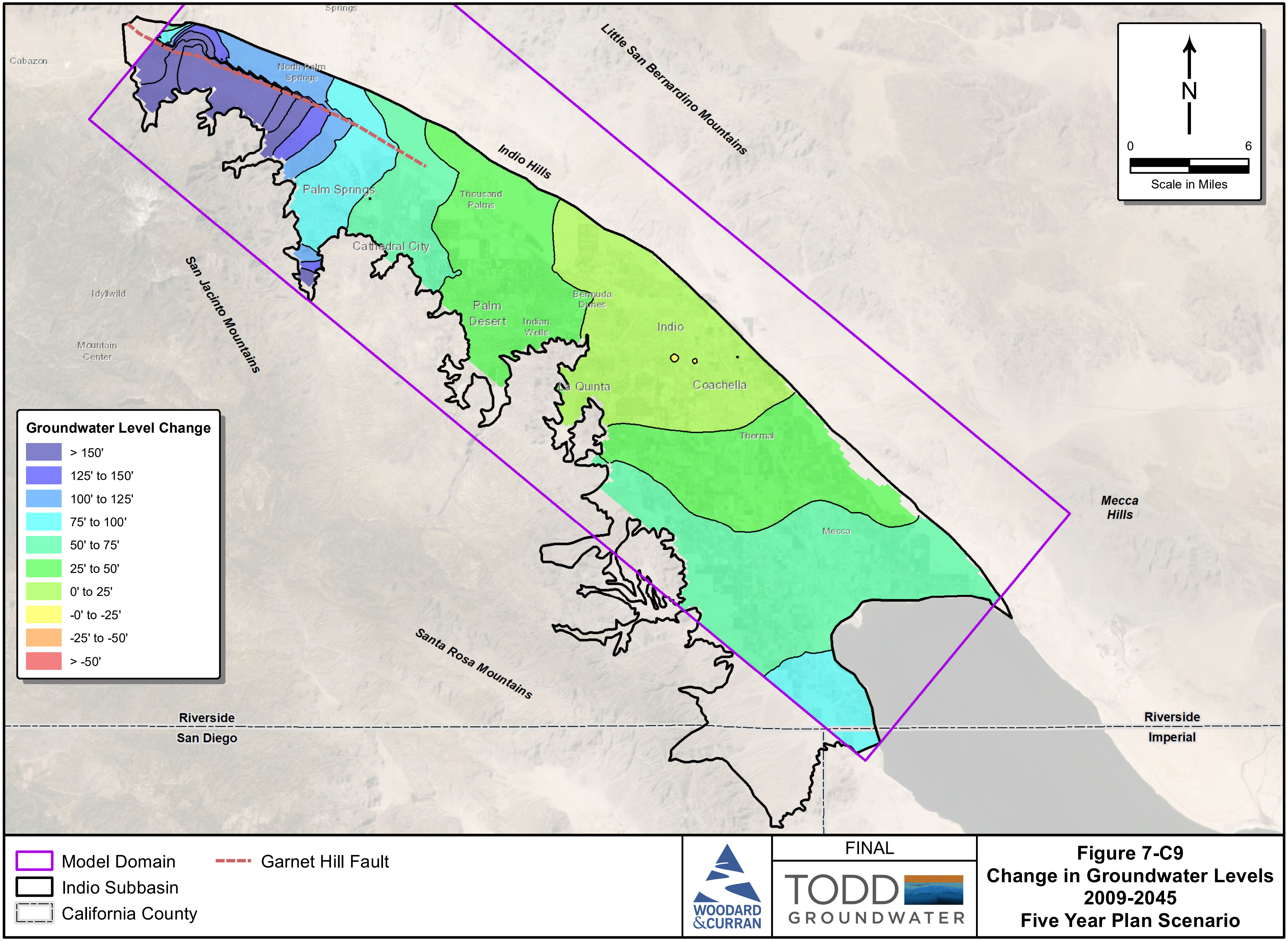
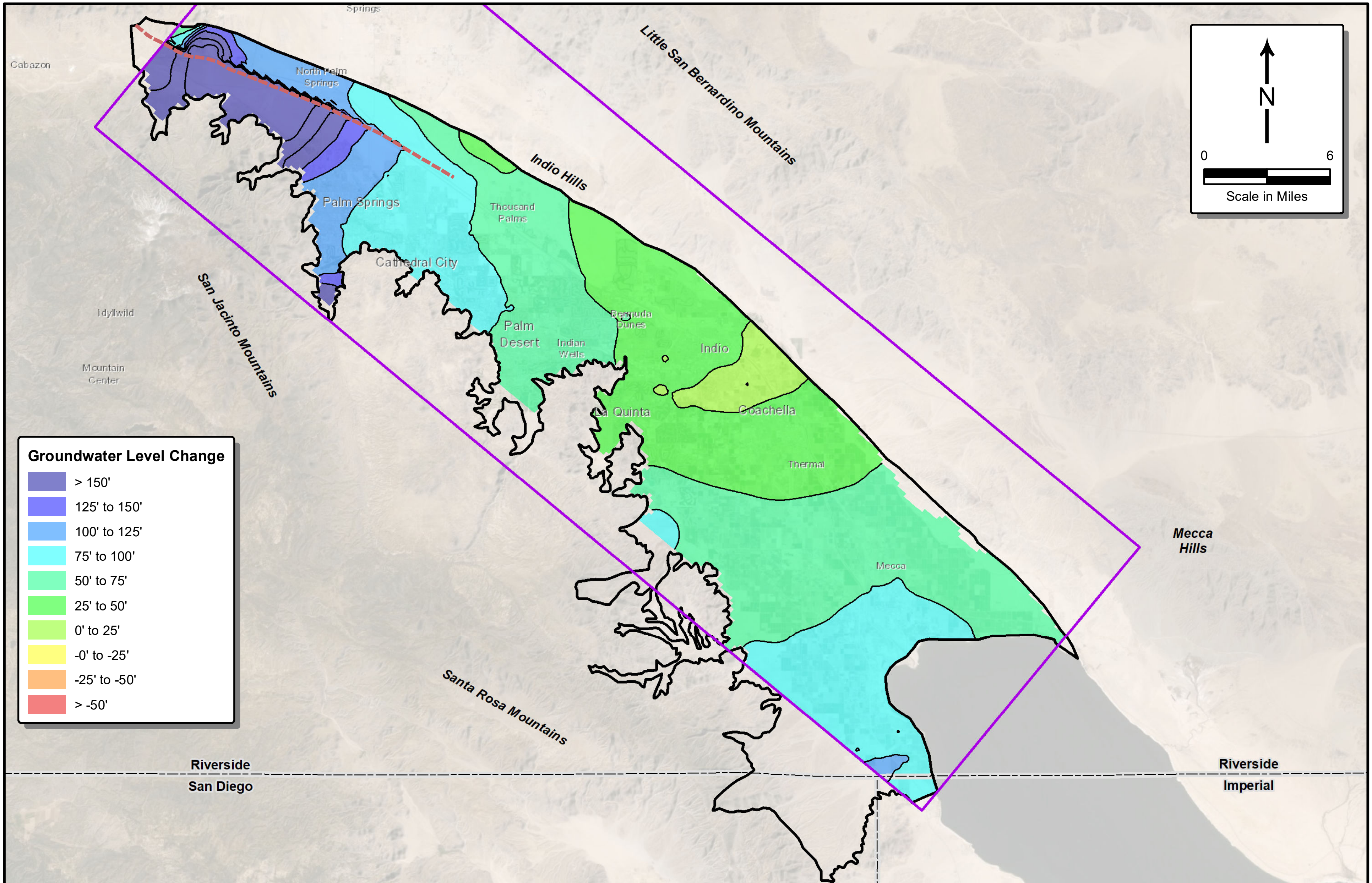


Figure 7-C9
Change in Groundwater Levels
2009-2045
Five Year Plan Scenario



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TODD GROUNDWATER

Figure 7-C10
Change in Groundwater Levels
2009-2045
Future Projects Scenario

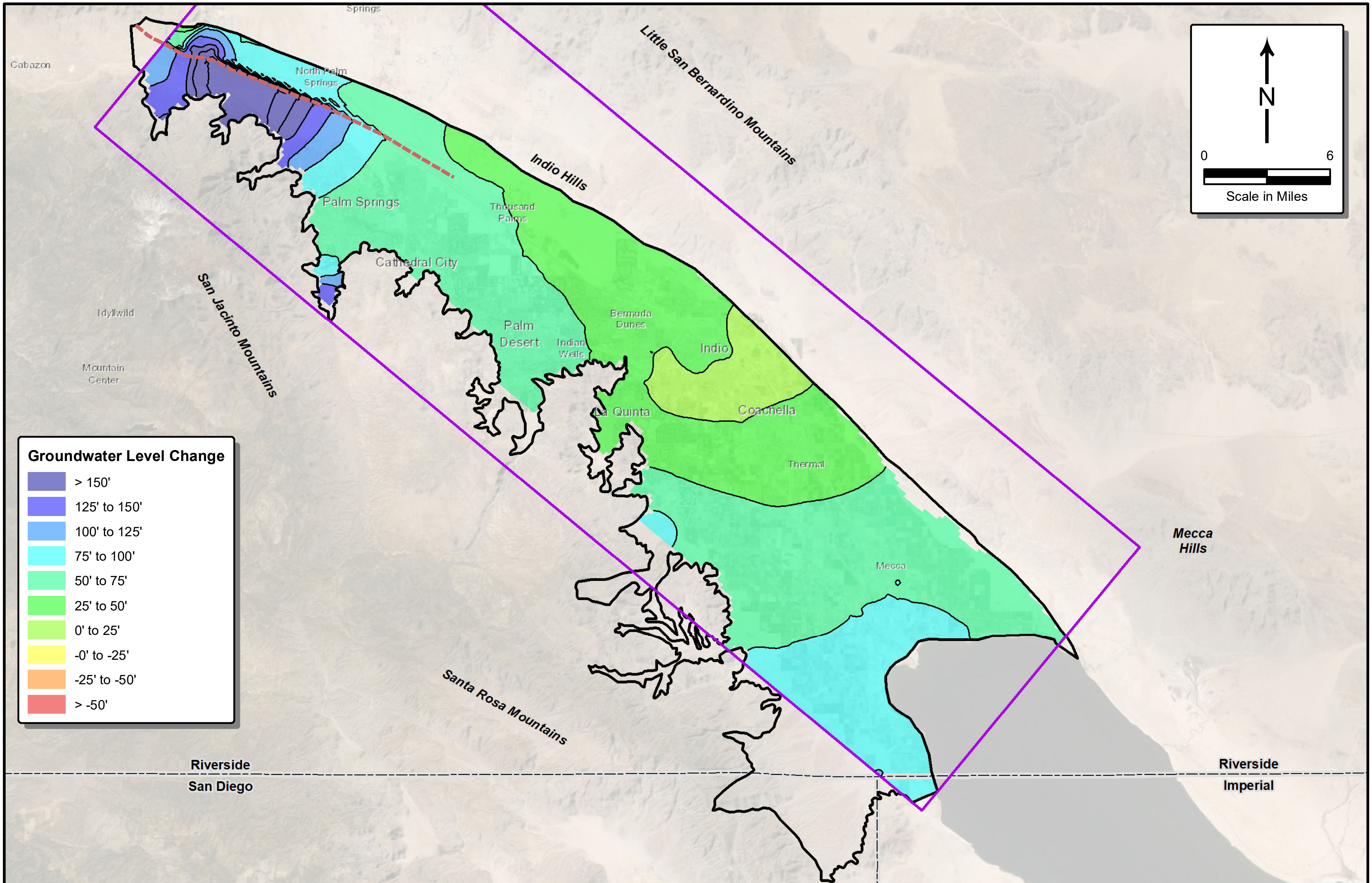

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Figure 7-C11
Change in Groundwater Levels
2009-2045
Expanded Agriculture Scenario

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APPENDIX 9-A
KEY WELL GROUNDWATER LEVEL HYDROGRAPHS WITH MINIMUM THRESHOLDS

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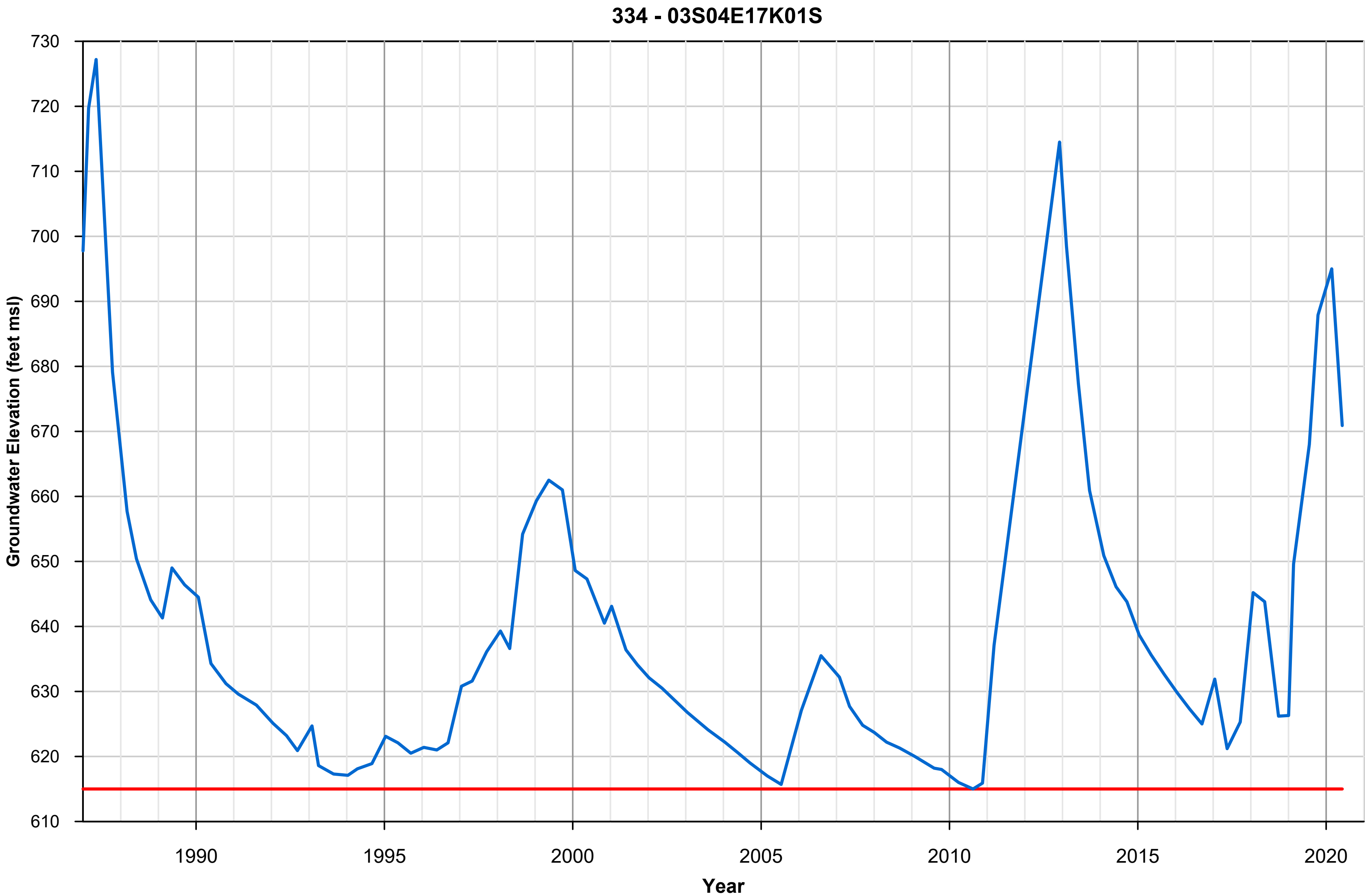

Note:
Minimum groundwater elevation occured in 1968.

Groundwater Elevation (feet msl)
Minimum Threshold (feet msl)

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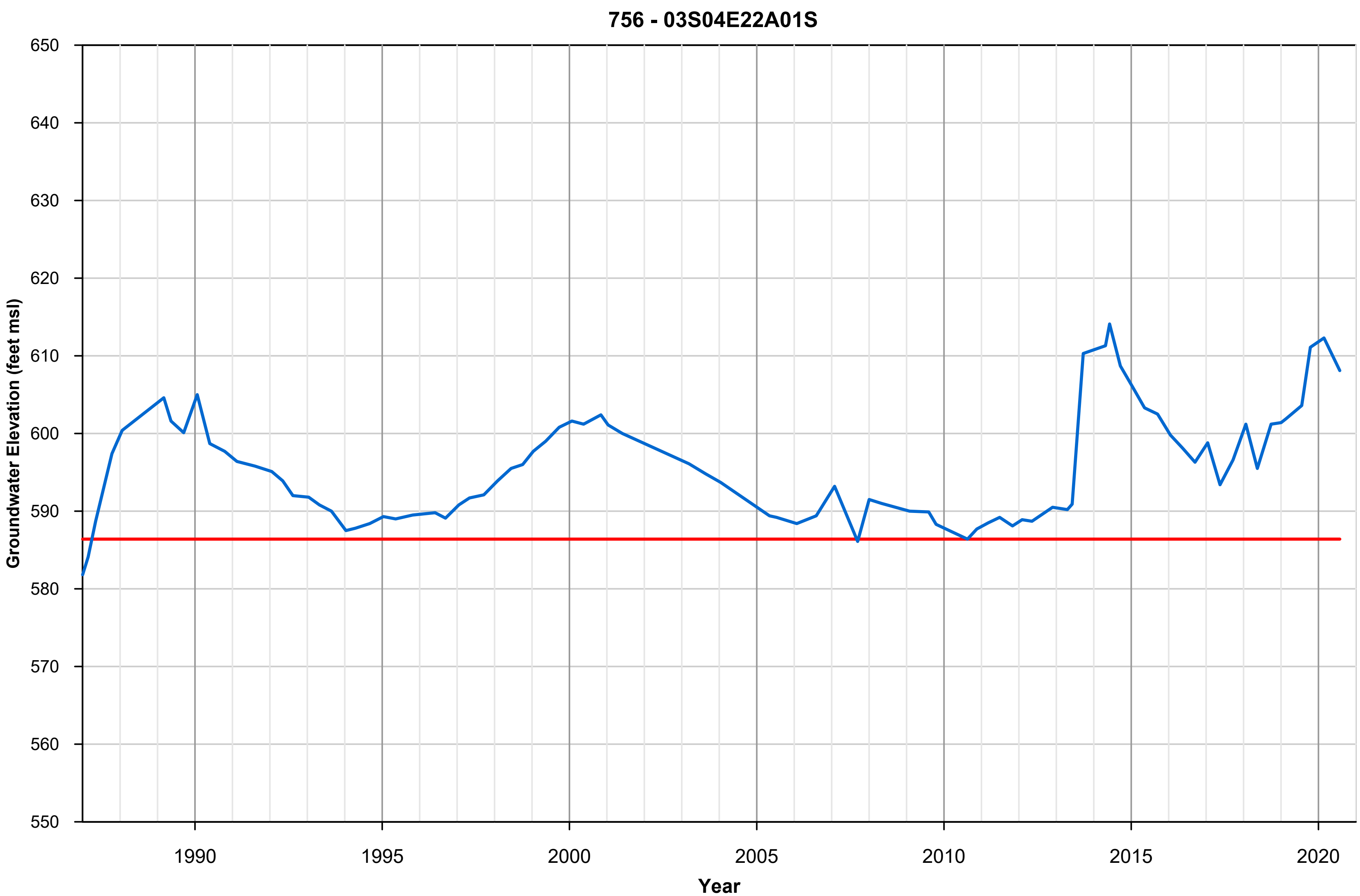
Appendix 9A-1
Groundwater Elevation Hydrograph
334 - 03S04E17K01S



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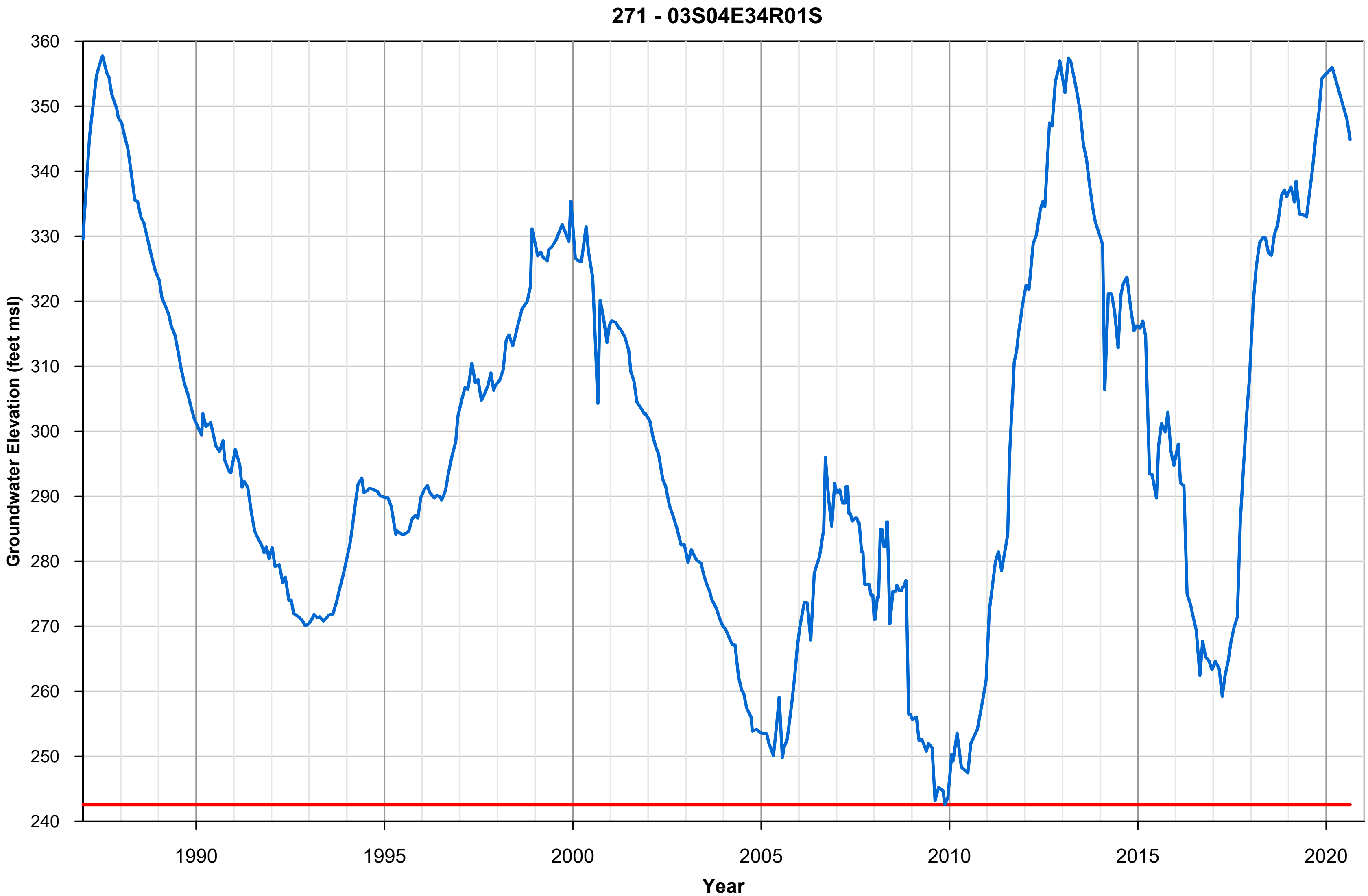
TODD GROUNDWATER

Appendix 9A-2
Groundwater Elevation Hydrograph
756 - 03S04E22A01S



FINAL

TODD GROUNDWATER

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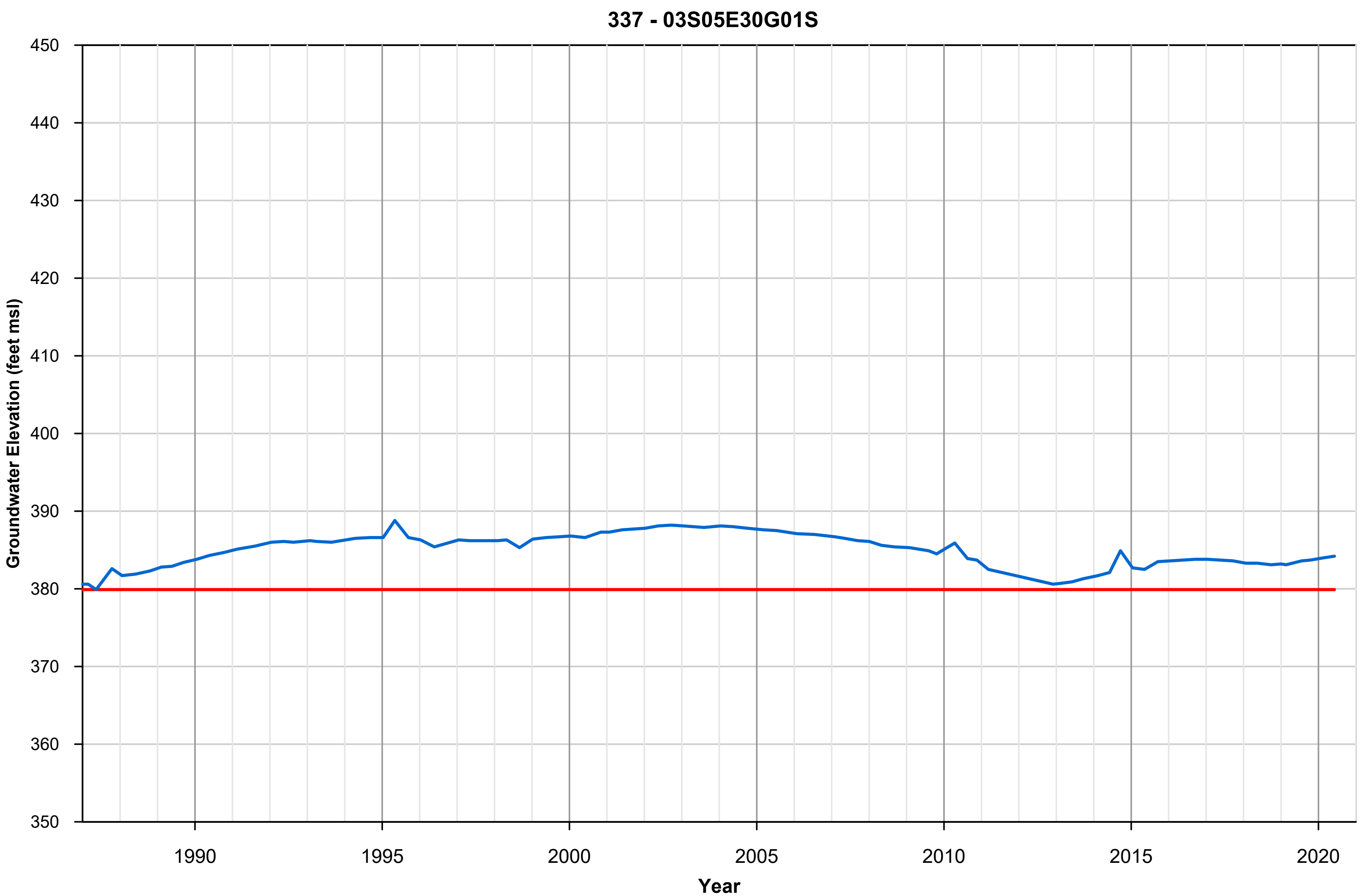
Appendix 9A-3
Groundwater Elevation Hydrograph
271 - 03S04E34R01S



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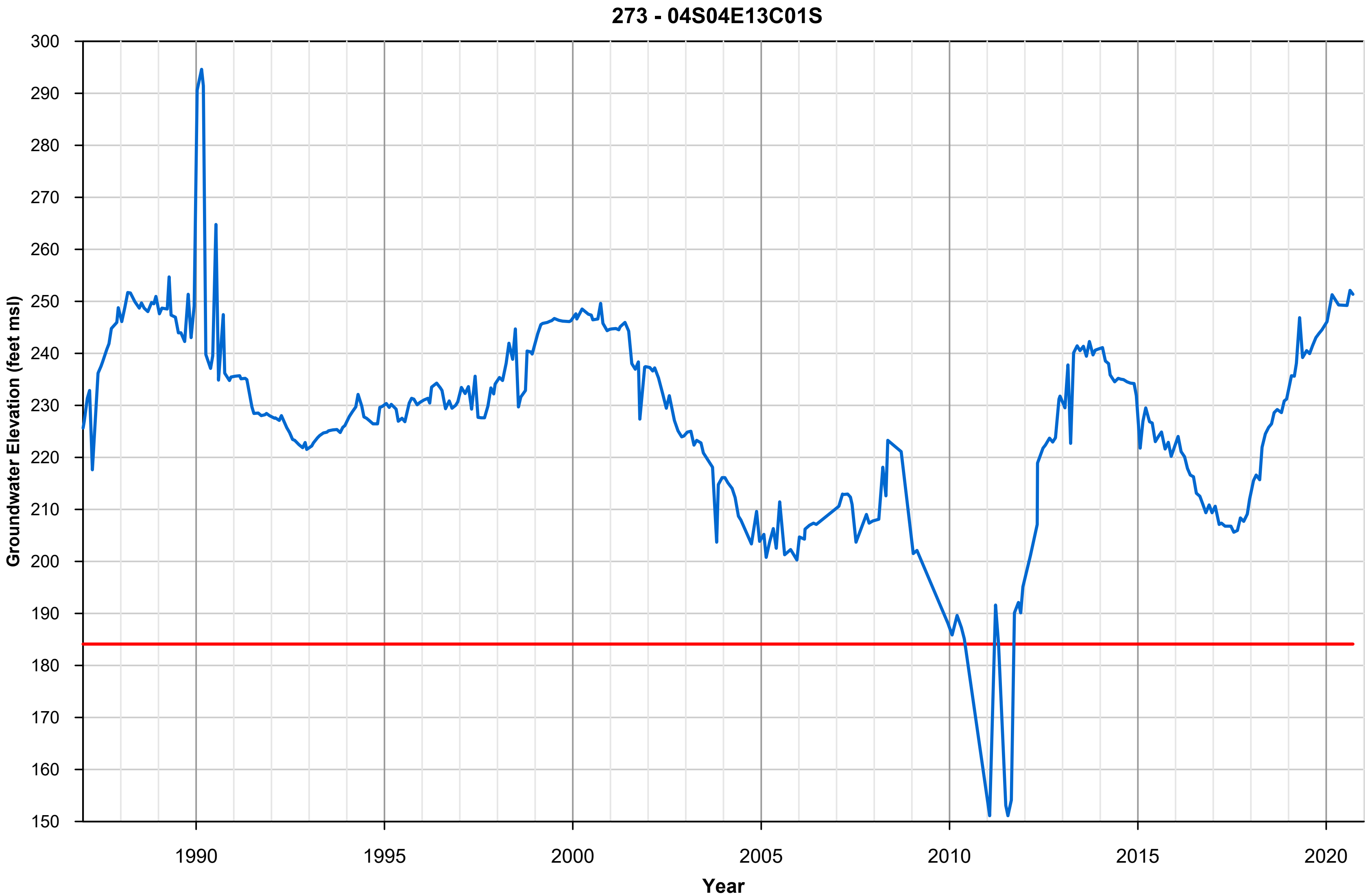
FINAL

TODD GROUNDWATER

Appendix 9A-4
Groundwater Elevation Hydrograph
337 - 03S05E30G01S



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FINAL

TODD GROUNDWATER

Appendix 9A-5
Groundwater Elevation Hydrograph
273 - 04S04E13C01S

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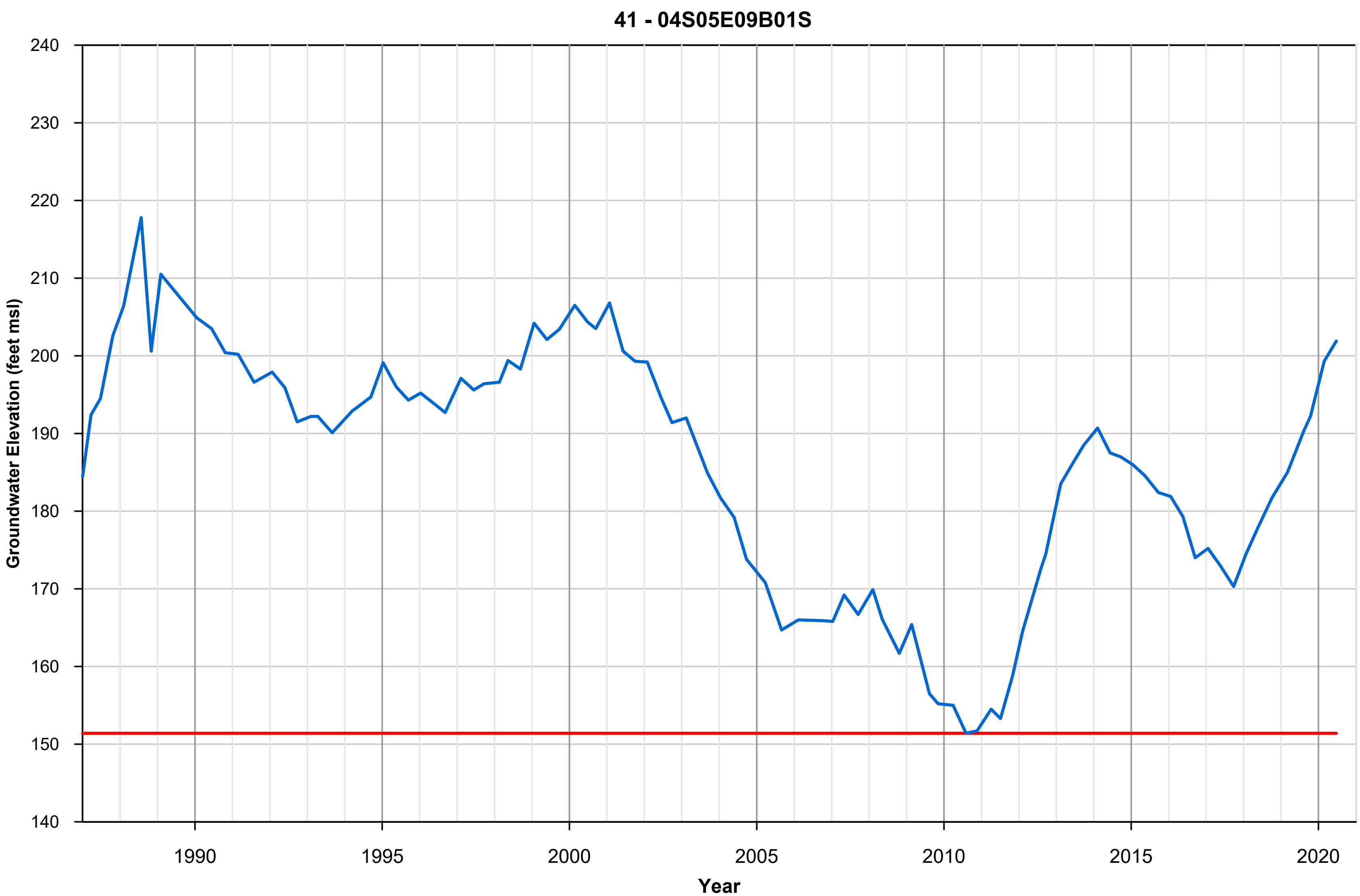
FINAL

TODD GROUNDWATER

Appendix 9A-6
Groundwater Elevation Hydrograph
274 - 04S04E24D01S



WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 9A-7
Groundwater Elevation Hydrograph
41 - 04S05E09B01S

WOODARD & CURRAN

FINAL

TODD GROUNDWATER

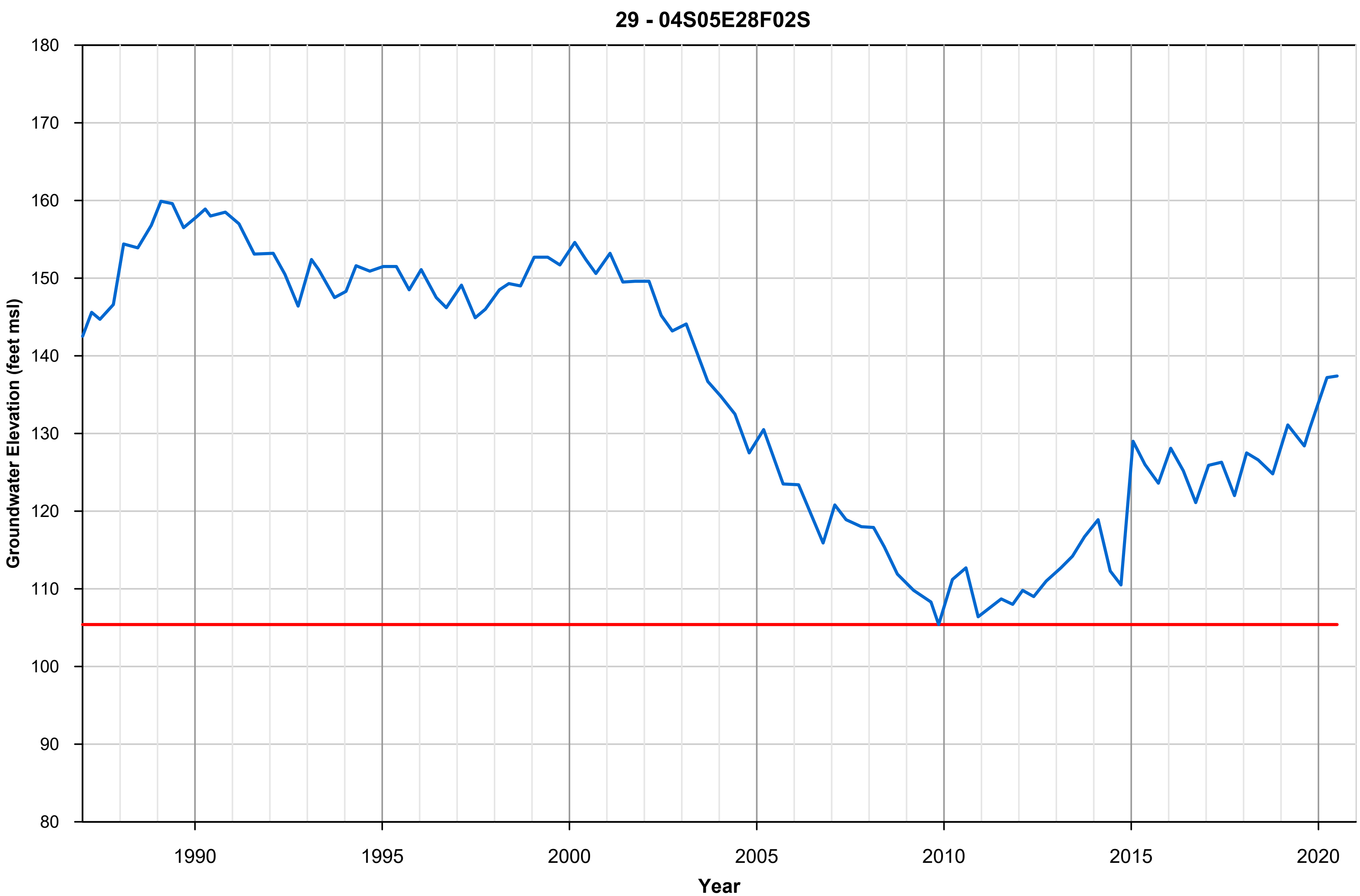
Appendix 9A-8
Groundwater Elevation Hydrograph
350 - 04S05E15R02S

WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 9A-9
Groundwater Elevation Hydrograph
282 - 04S05E17Q02S



WOODARD &CURRAN

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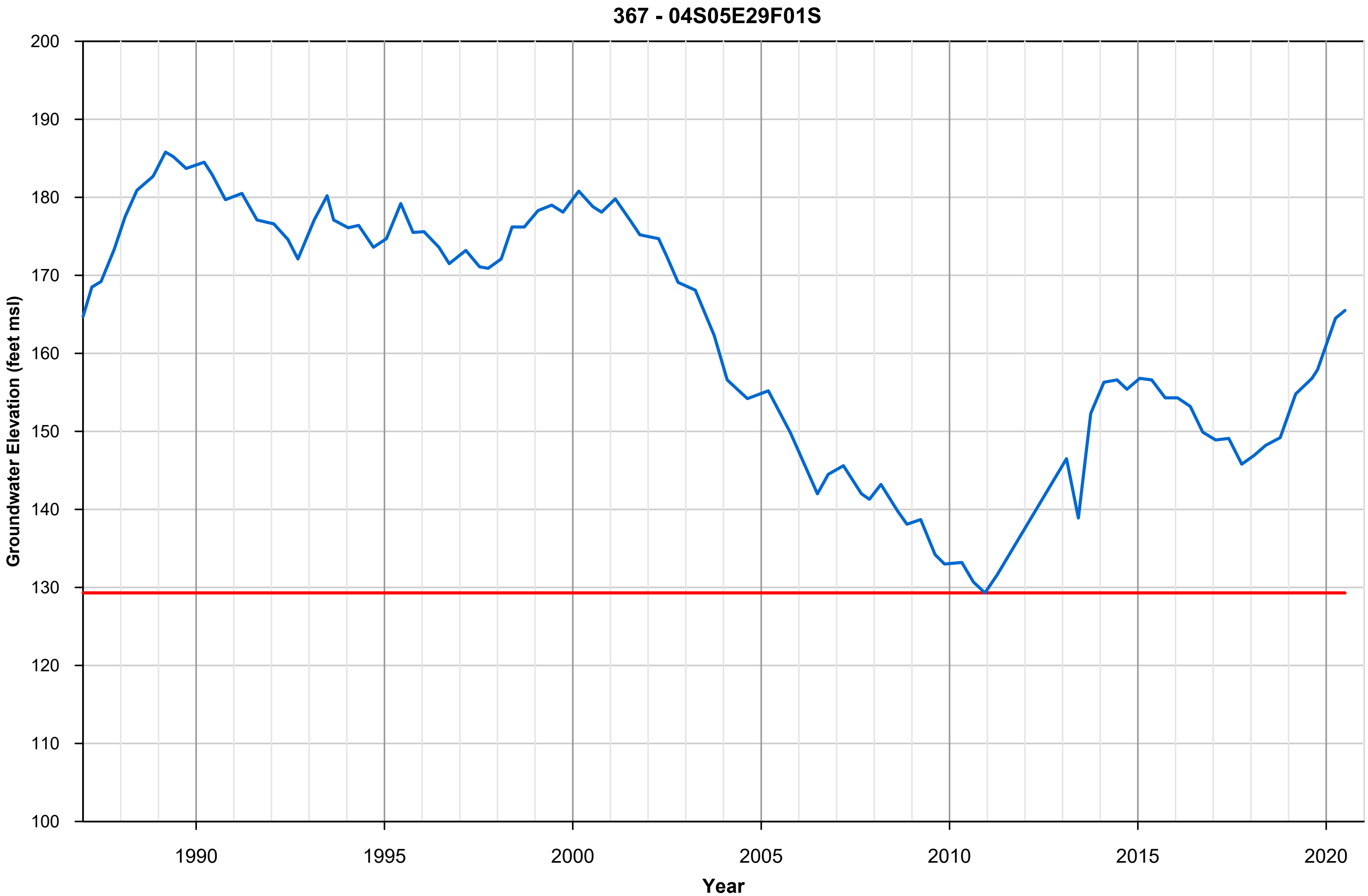
TODD GROUNDWATER

Appendix 9A-10
Groundwater Elevation Hydrograph
29 - 04S05E28F02S

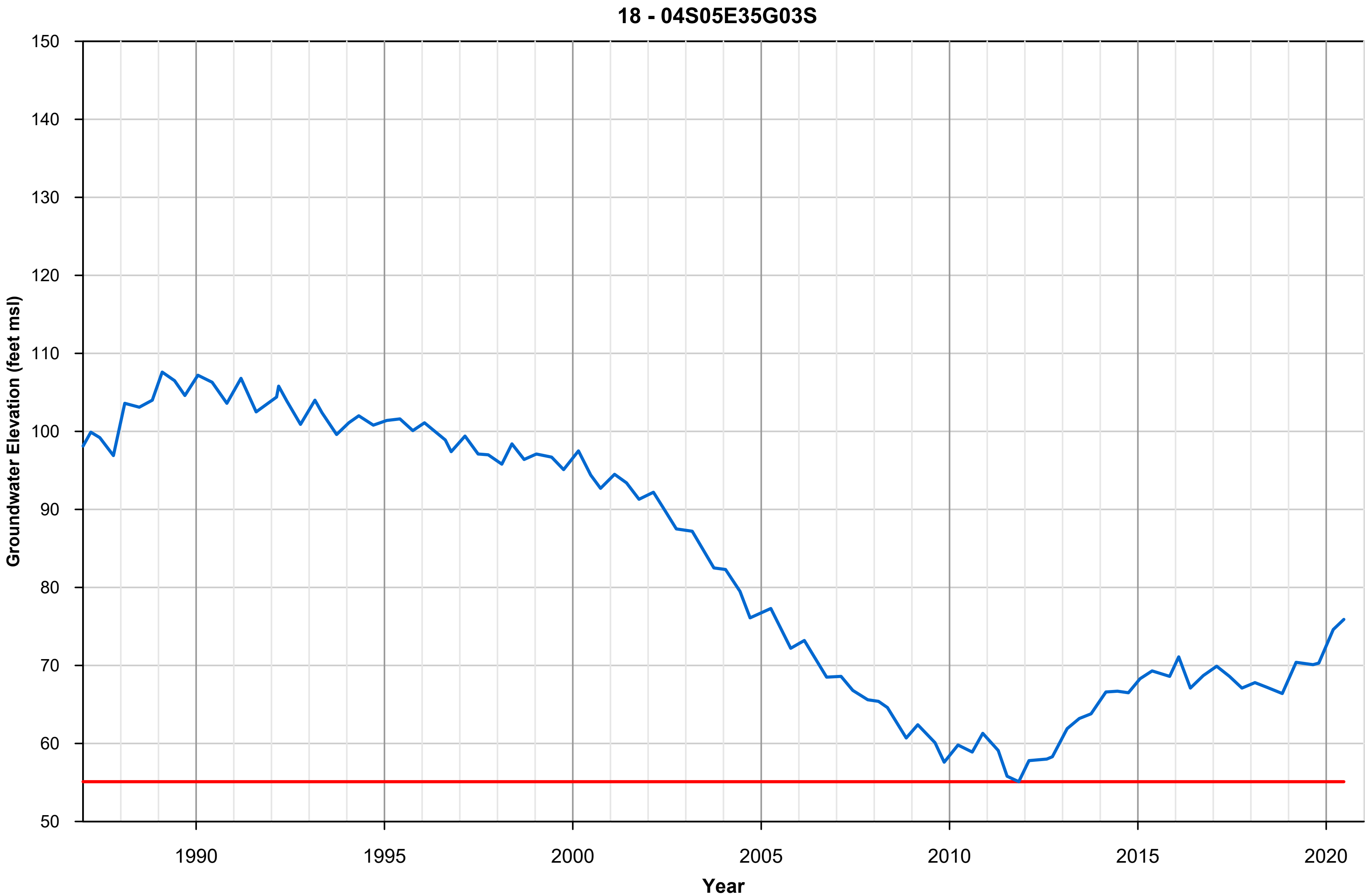


WOODARD & CURRAN

FINAL

TODD GROUNDWATER

Appendix 9A-11
Groundwater Elevation Hydrograph
367 - 04S05E29F01S



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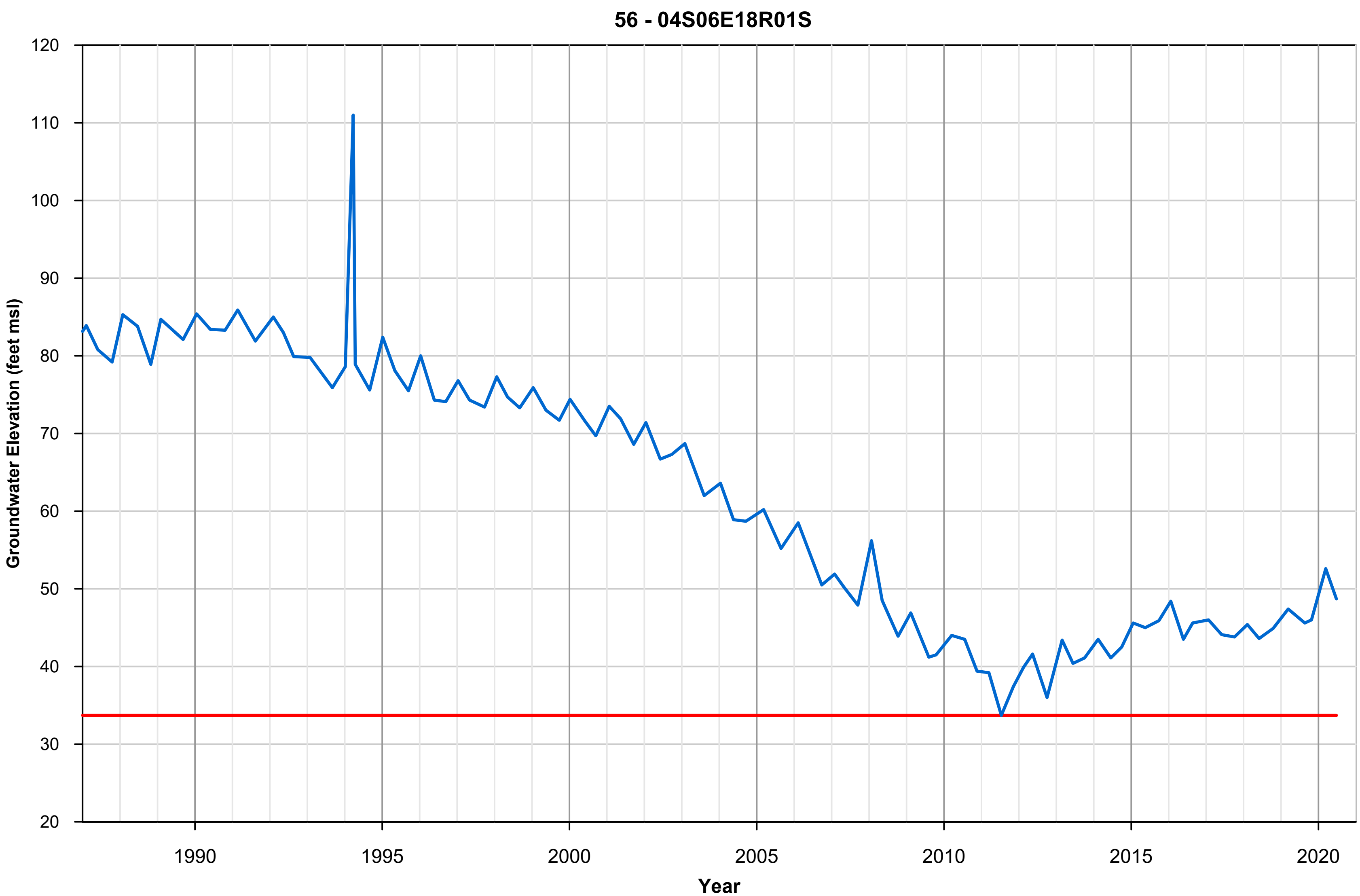
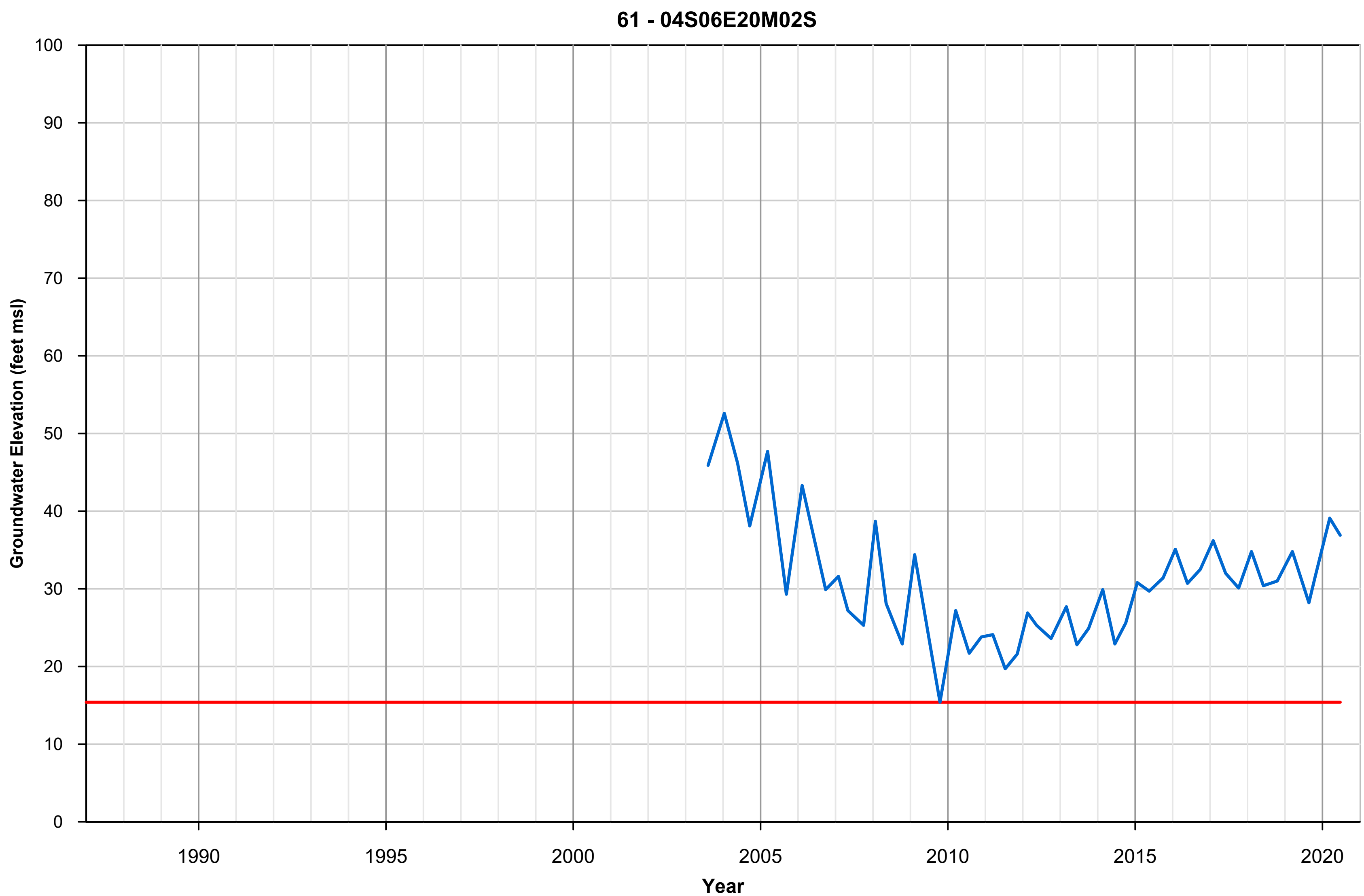
TODD GROUNDWATER

Appendix 9A-12
Groundwater Elevation Hydrograph
18 - 04S05E35G03S



FINAL

Appendix 9A-13
Groundwater Elevation Hydrograph
56 - 04S06E18R01S



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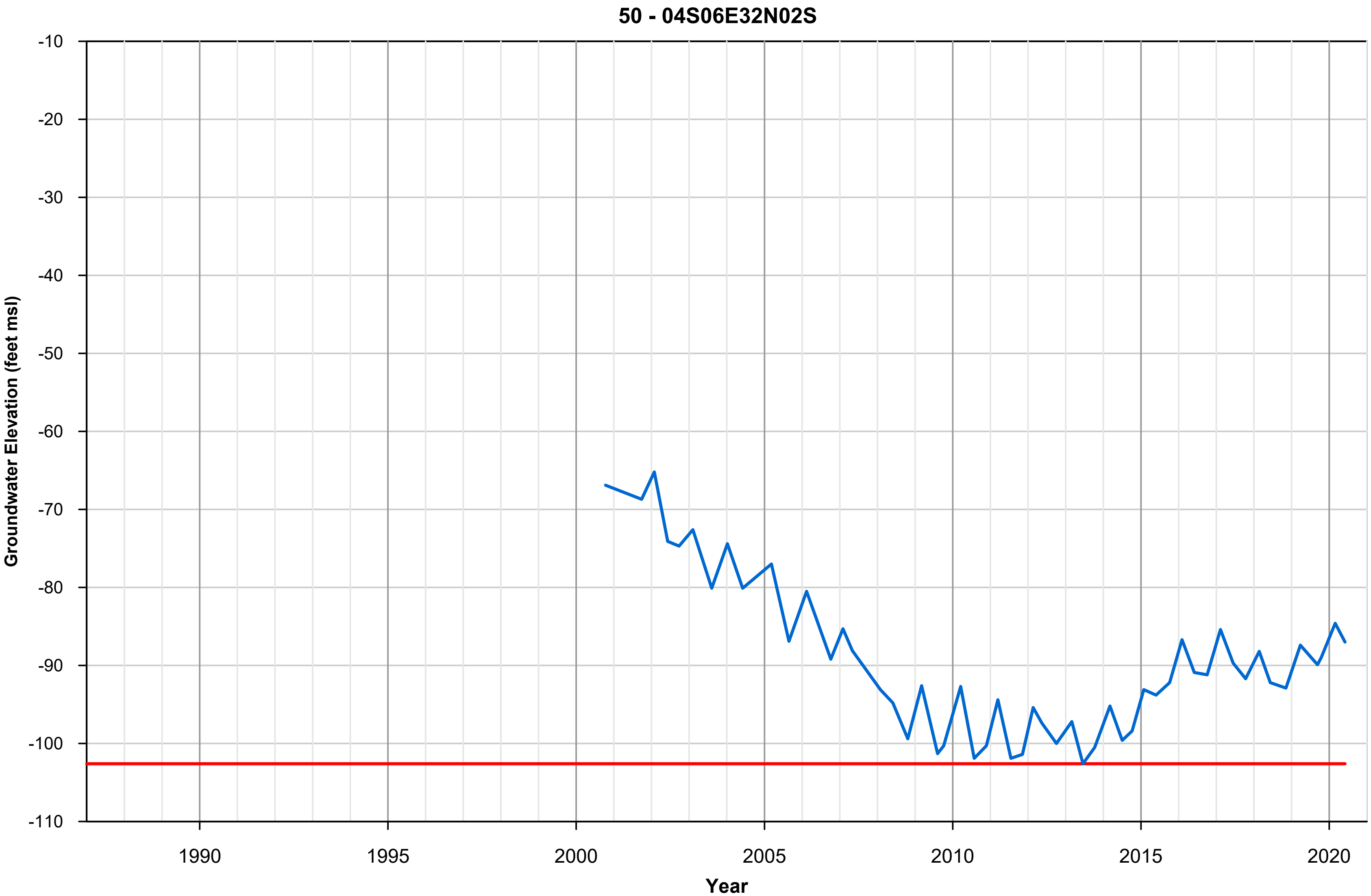
TODD GROUNDWATER

Appendix 9A-14
Groundwater Elevation Hydrograph
61 - 04S06E20M02S



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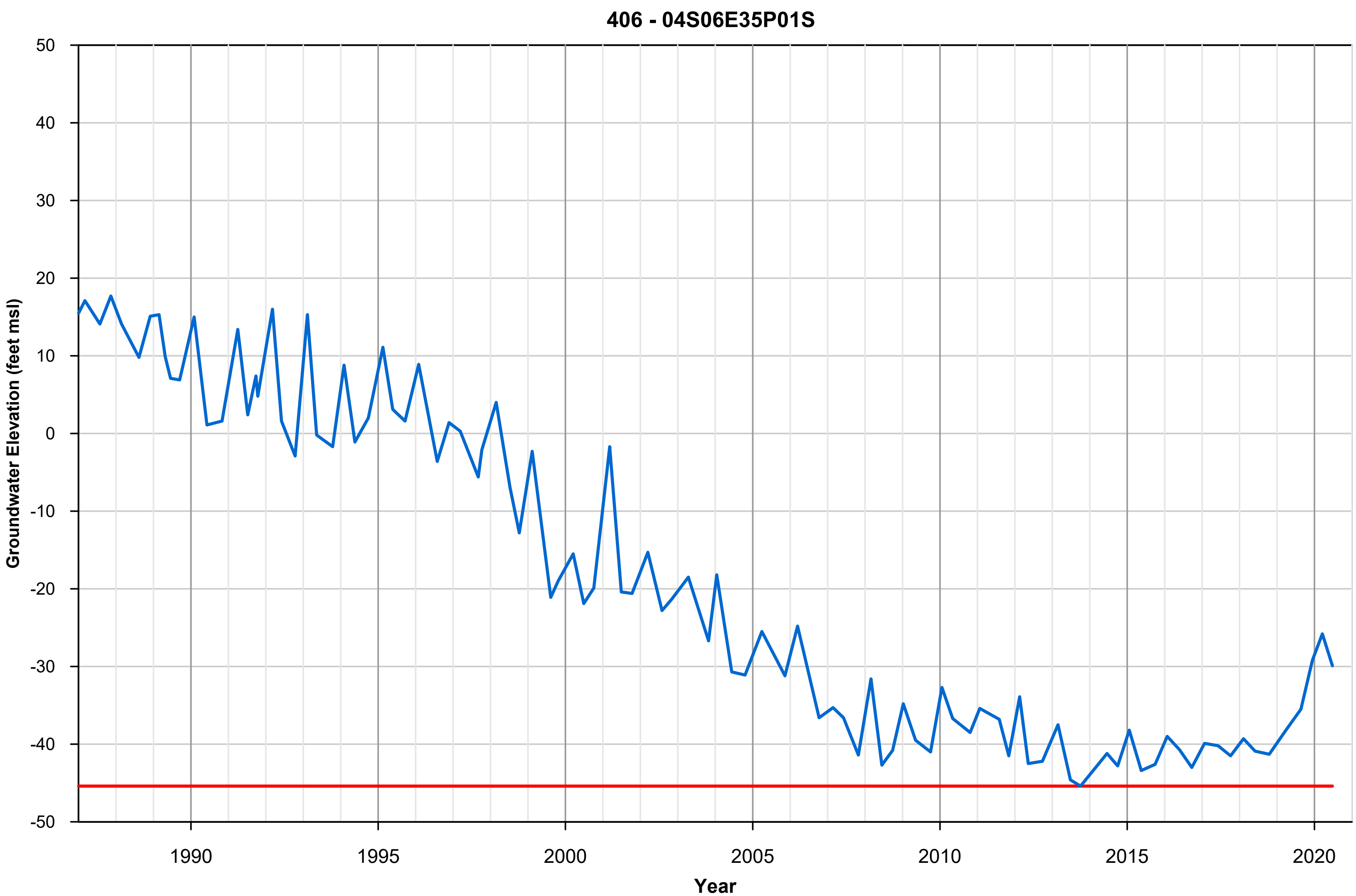
TODD GROUNDWATER

Appendix 9A-15
Groundwater Elevation Hydrograph
50 - 04S06E32N02S



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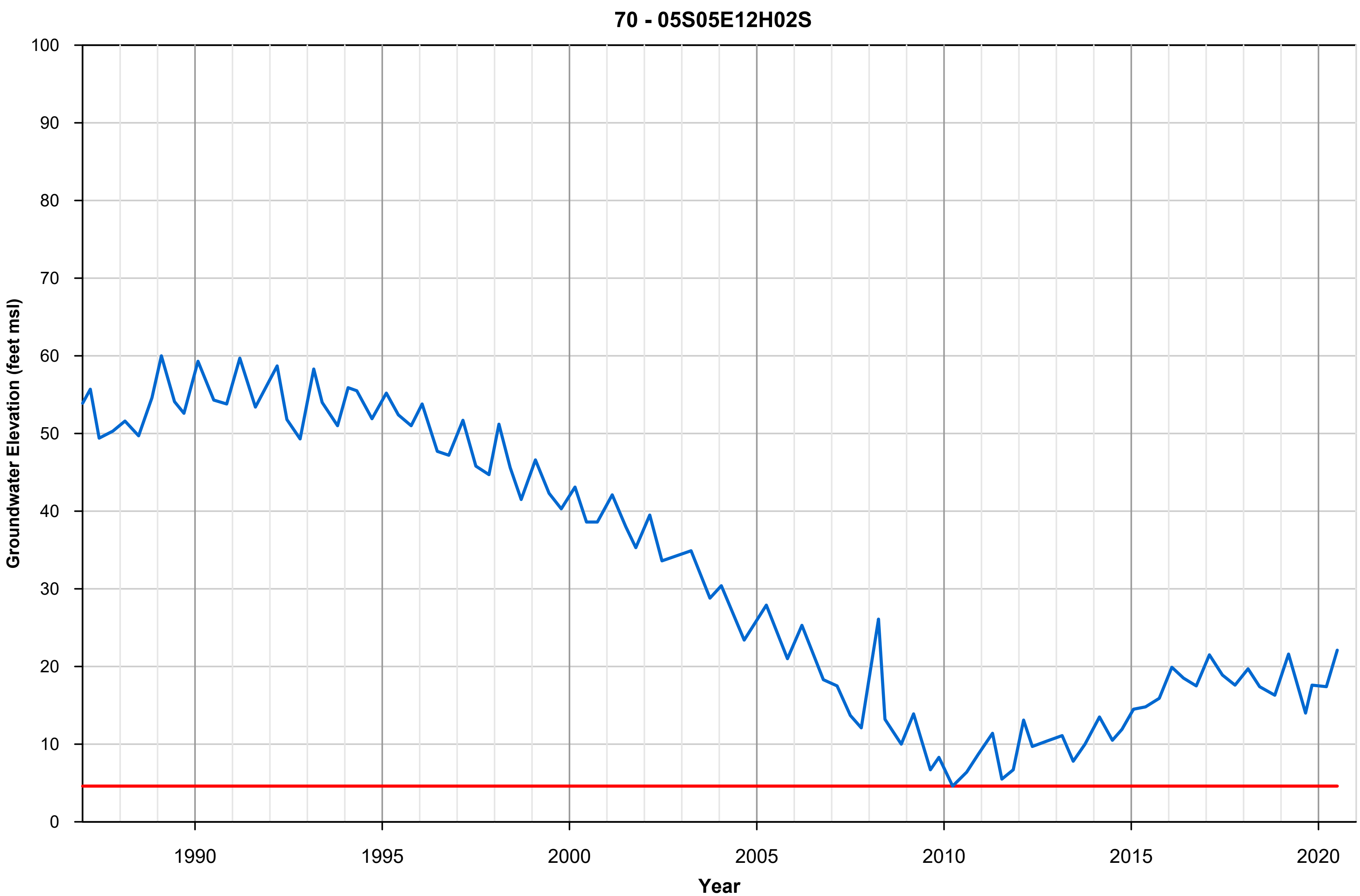
TODD GROUNDWATER

Appendix 9A-16
Groundwater Elevation Hydrograph
406 - 04S06E35P01S



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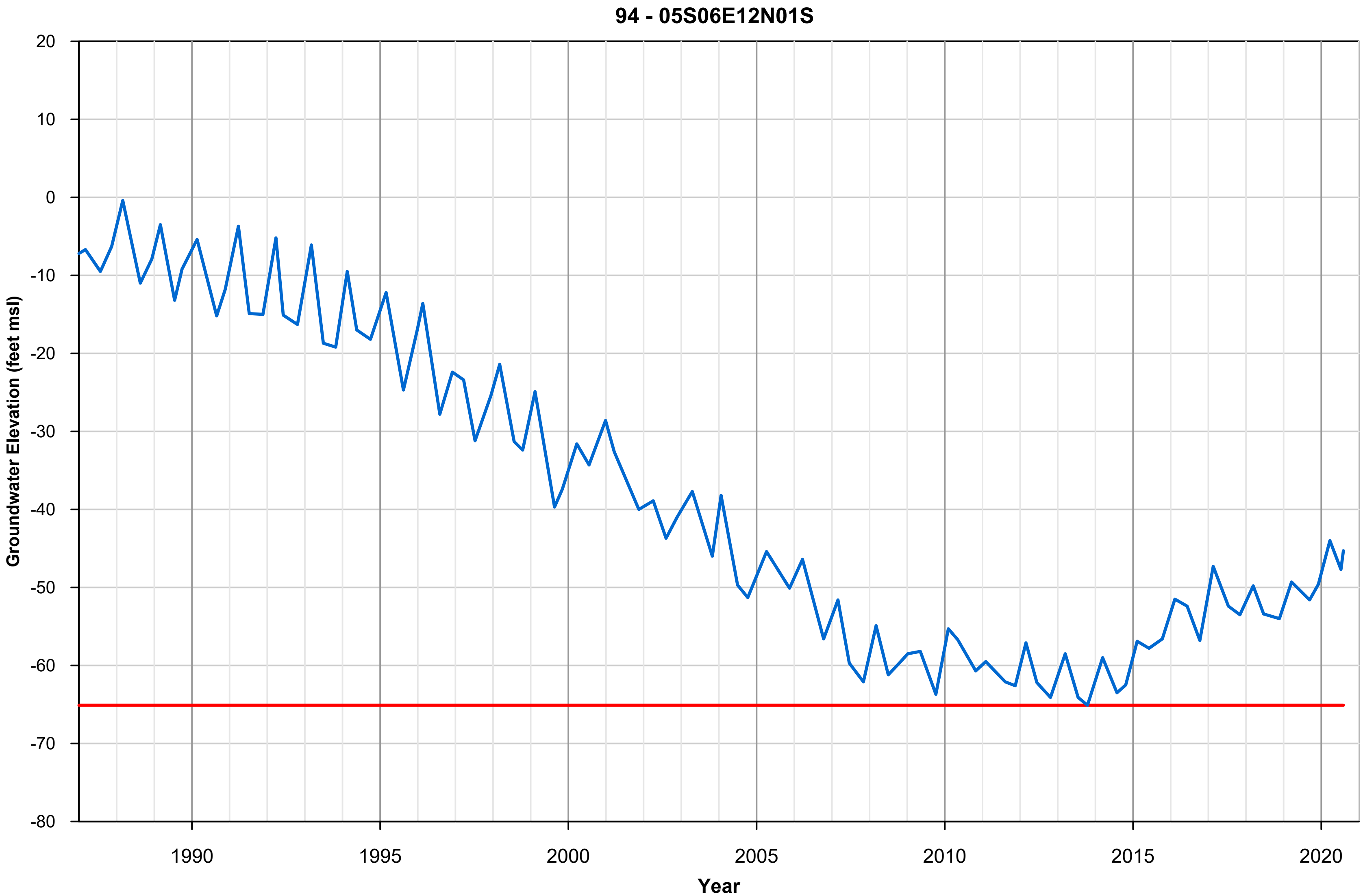
TODD GROUNDWATER

Appendix 9A-17
Groundwater Elevation Hydrograph
70 - 05S05E12H02S



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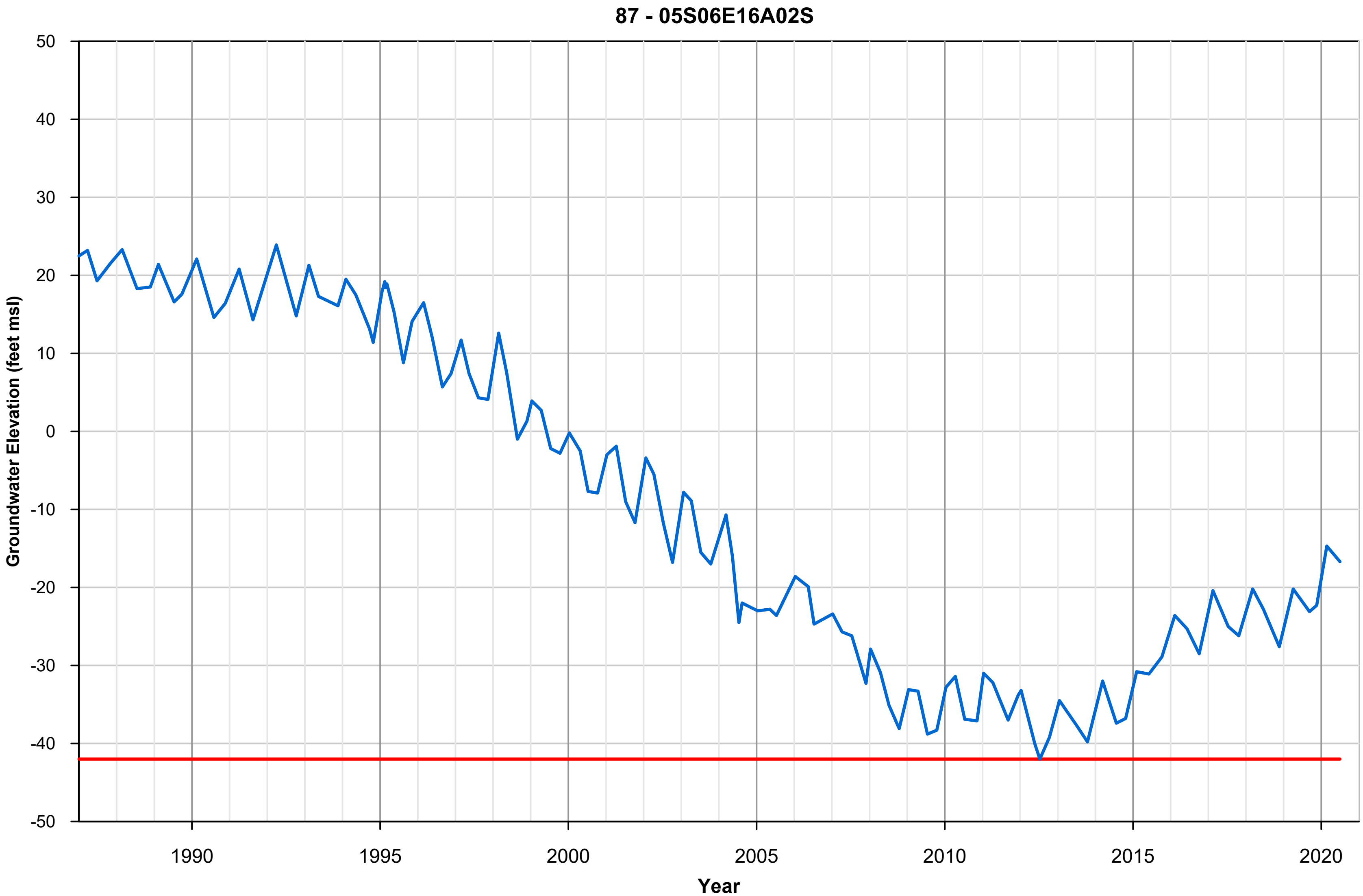
TODD GROUNDWATER

Appendix 9A-18
Groundwater Elevation Hydrograph
94 - 05S06E12N01S



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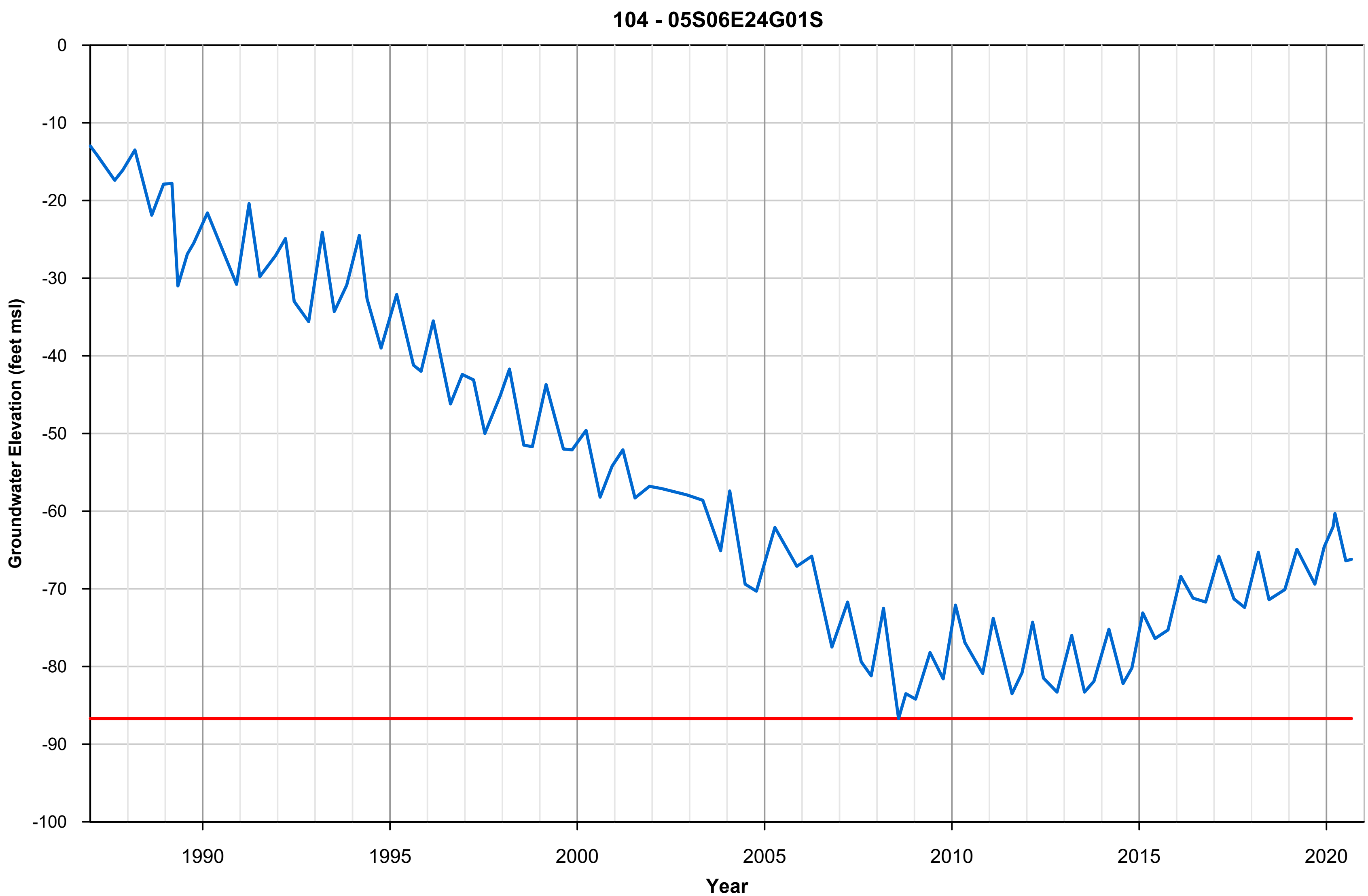
TODD GROUNDWATER

Appendix 9A-19
Groundwater Elevation Hydrograph
87 - 05S06E16A02S



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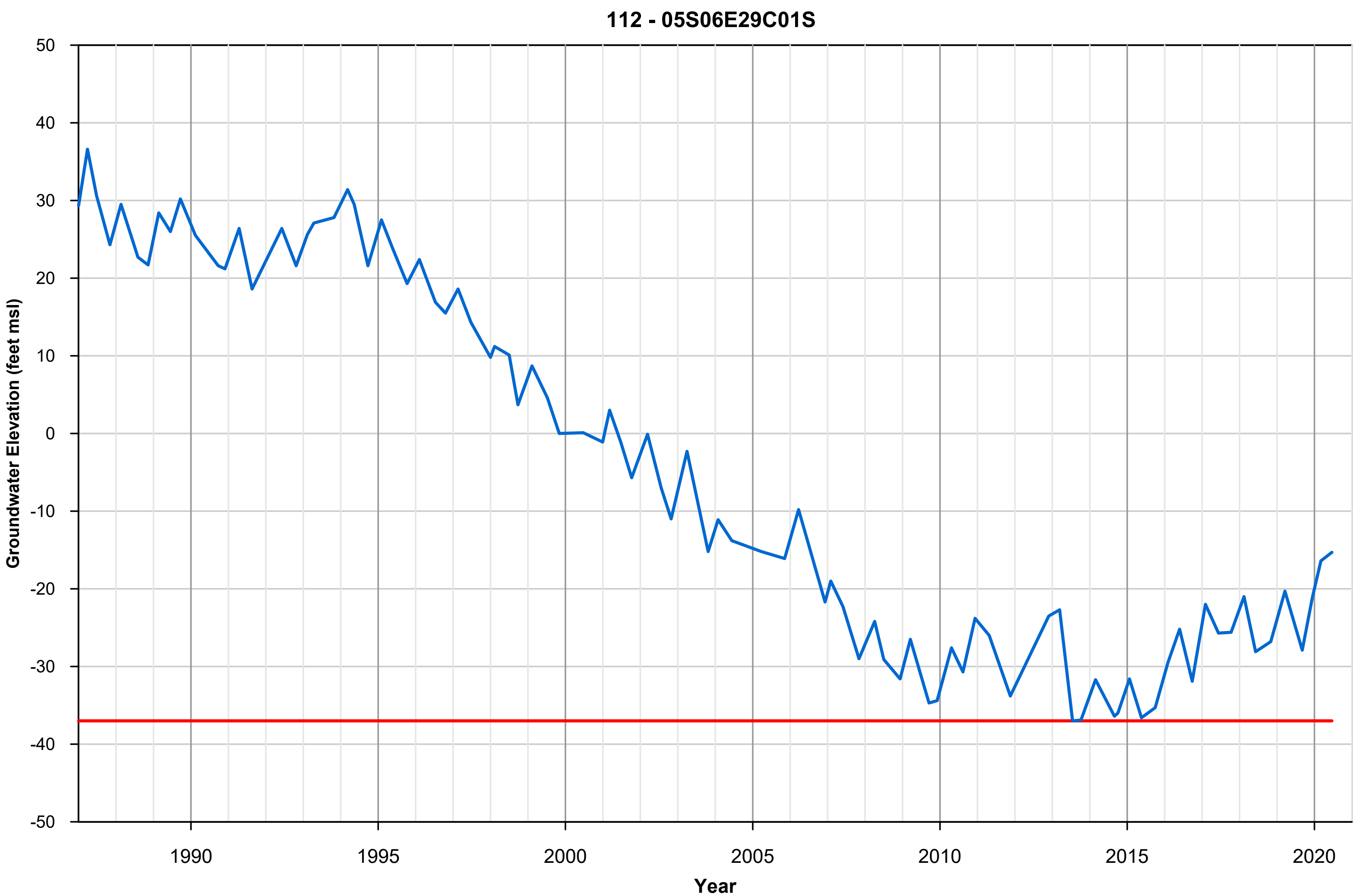
TODD GROUNDWATER

**Appendix 9A-20
Groundwater Elevation Hydrograph
104 - 05S06E24G01S**



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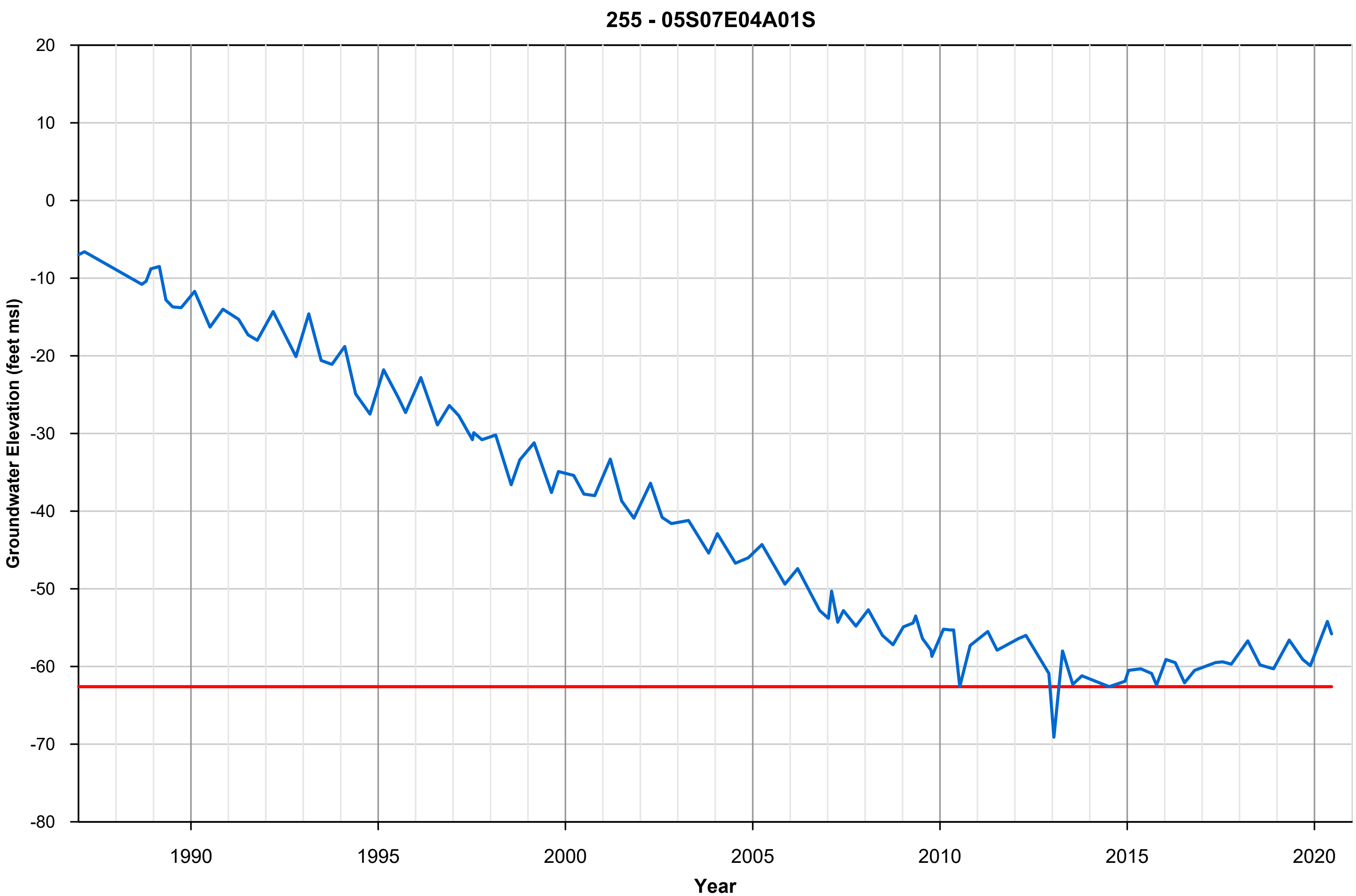
TODD GROUNDWATER

Appendix 9A-21
Groundwater Elevation Hydrograph
112 - 05S06E29C01S



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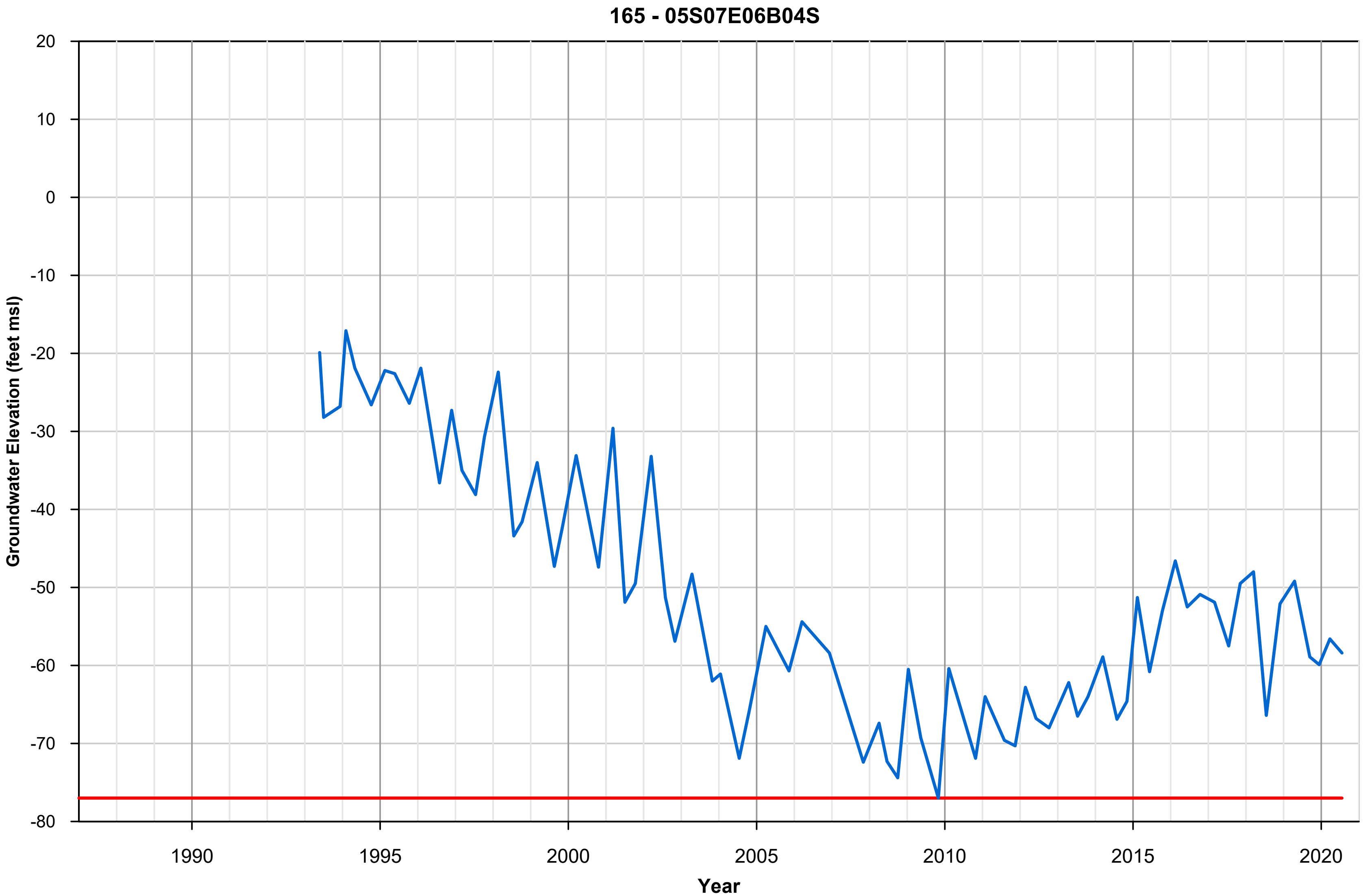
TODD GROUNDWATER

Appendix 9A-22
Groundwater Elevation Hydrograph
255 - 05S07E04A01S



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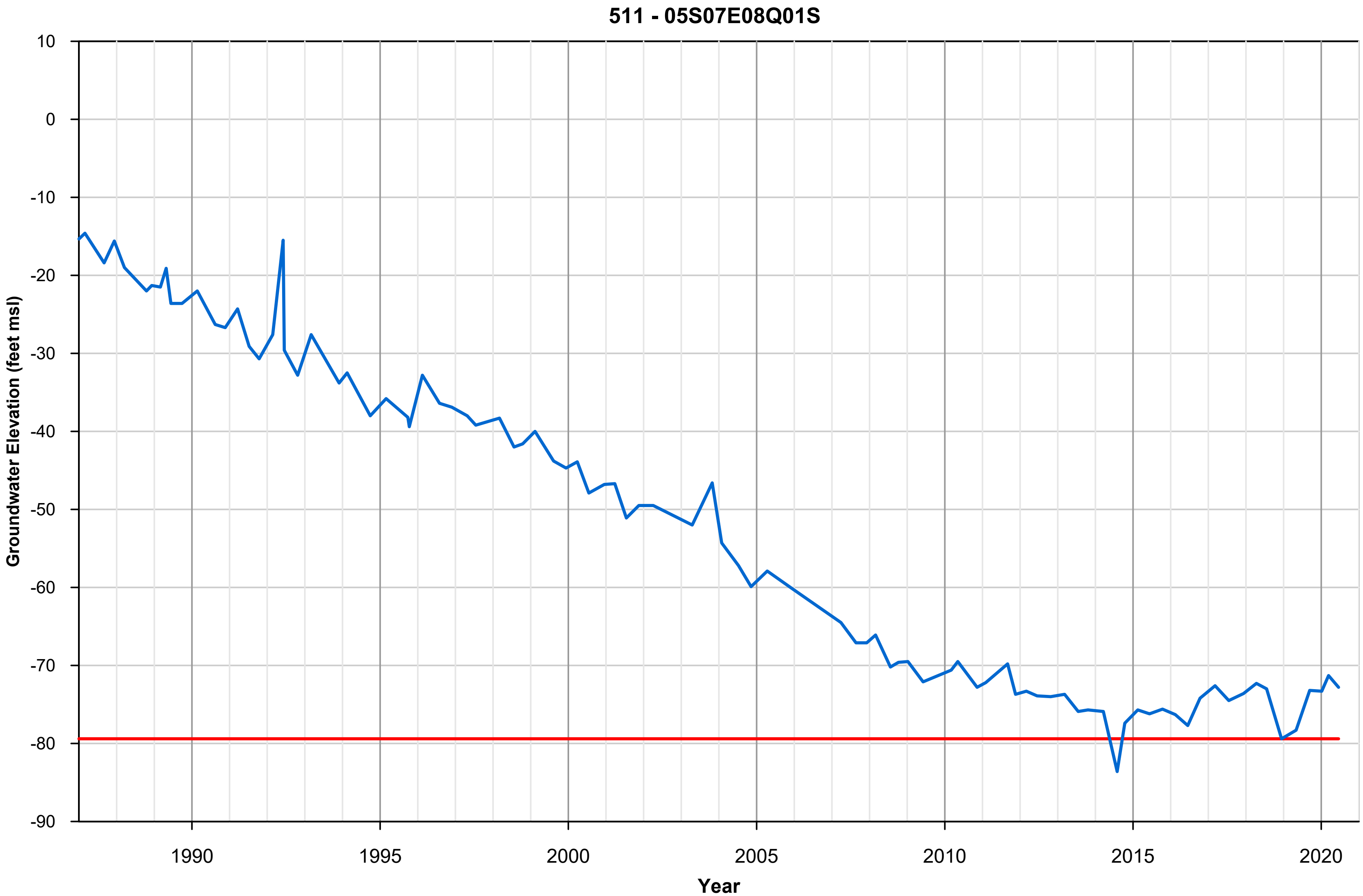
TODD GROUNDWATER

Appendix 9A-23
Groundwater Elevation Hydrograph
165 - 05S07E06B04S



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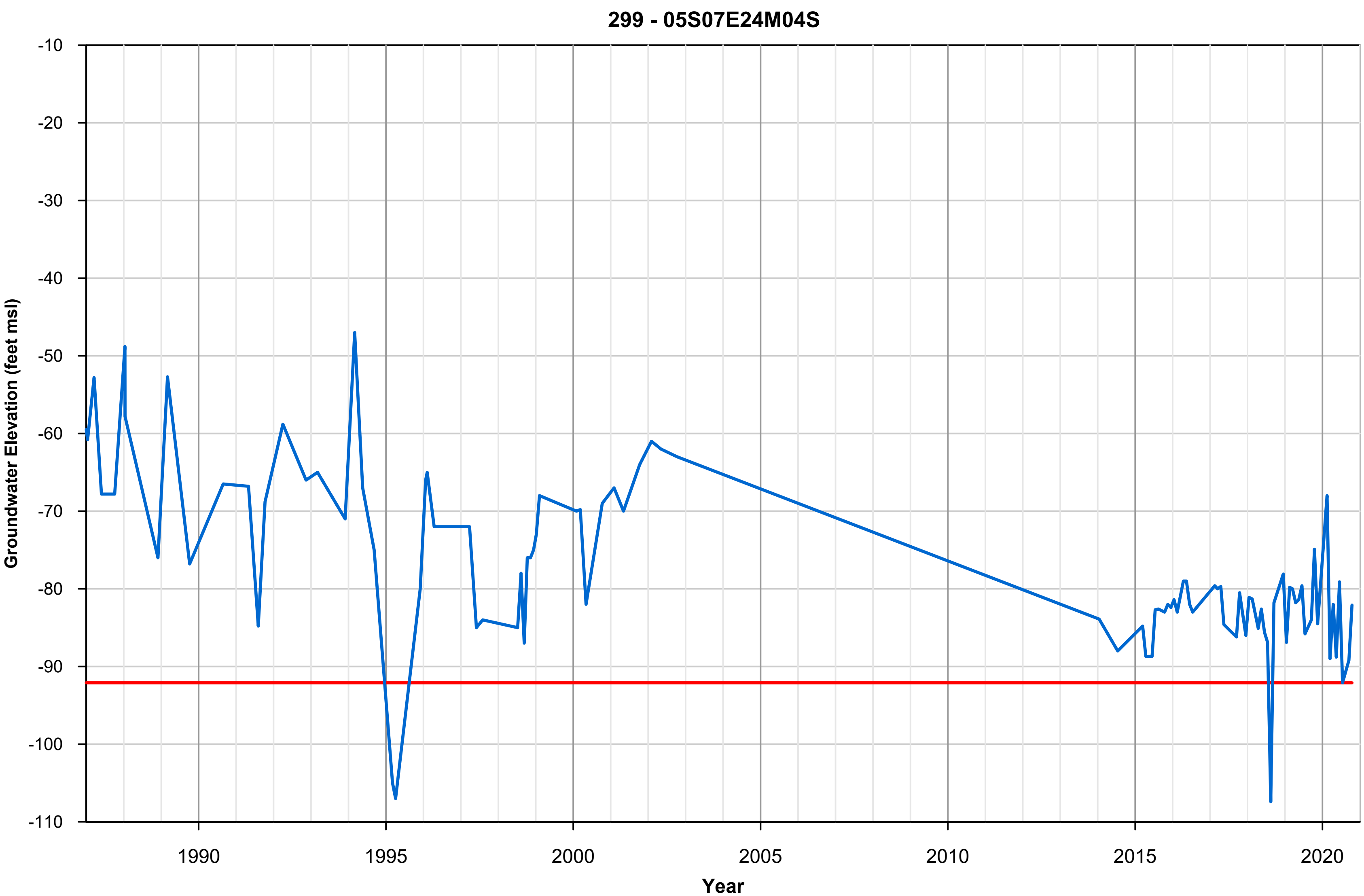
TODD GROUNDWATER

Appendix 9A-24
Groundwater Elevation Hydrograph
511 - 05S07E08Q01S



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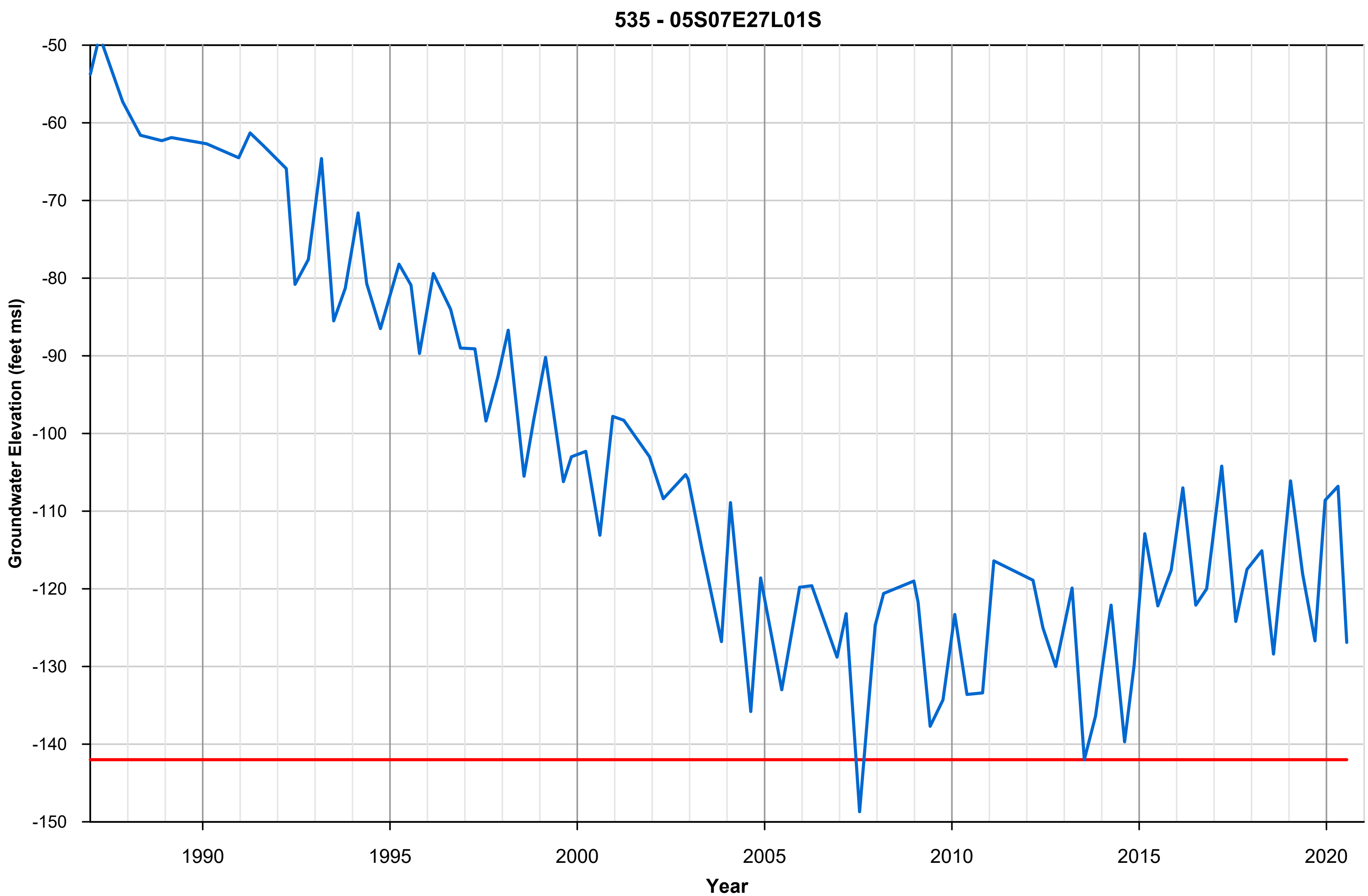
TODD GROUNDWATER

Appendix 9A-25
Groundwater Elevation Hydrograph
299 - 05S07E24M04S



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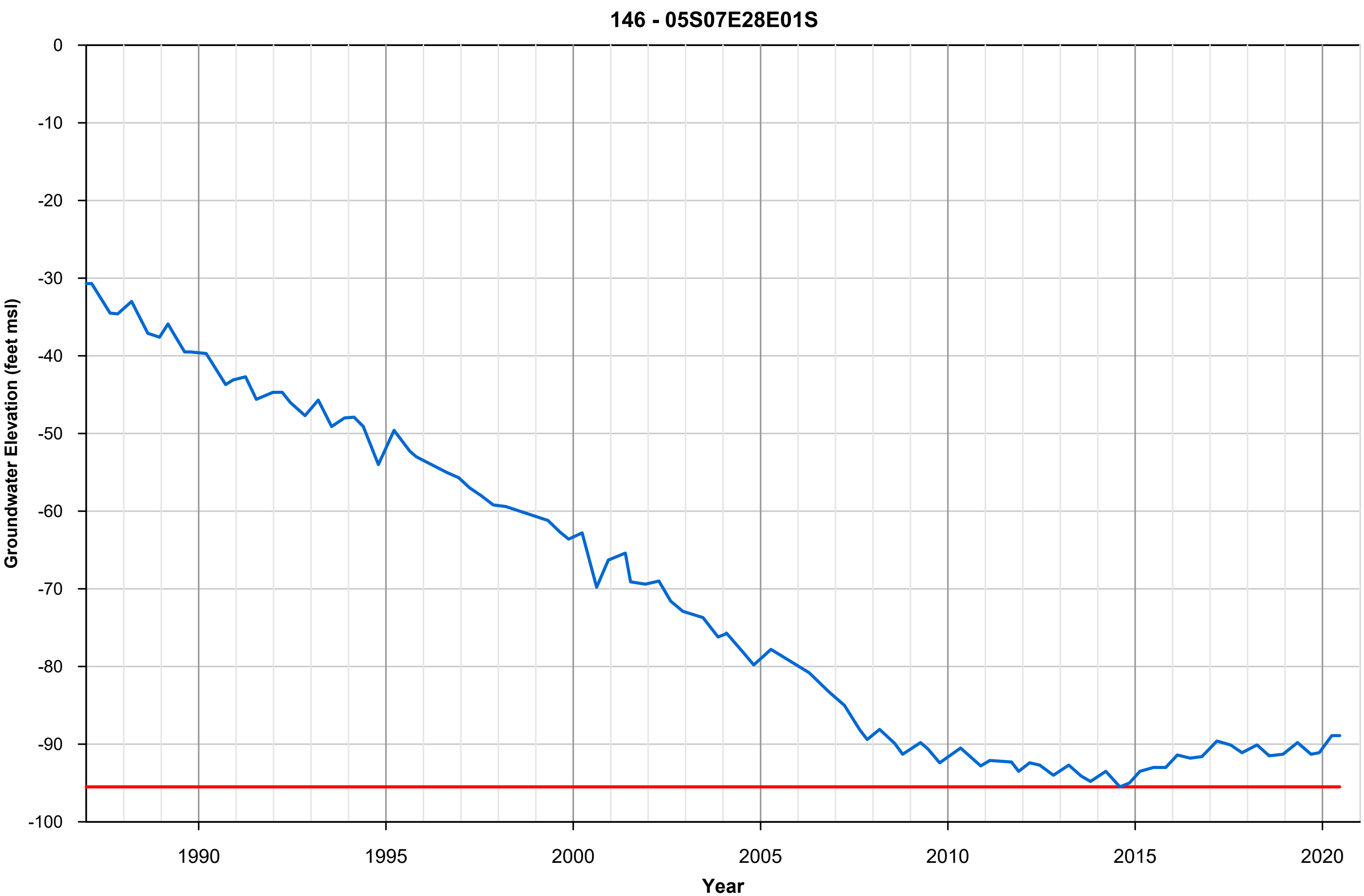
TODD GROUNDWATER

Appendix 9A-26
Groundwater Elevation Hydrograph
535 - 05S07E27L01S



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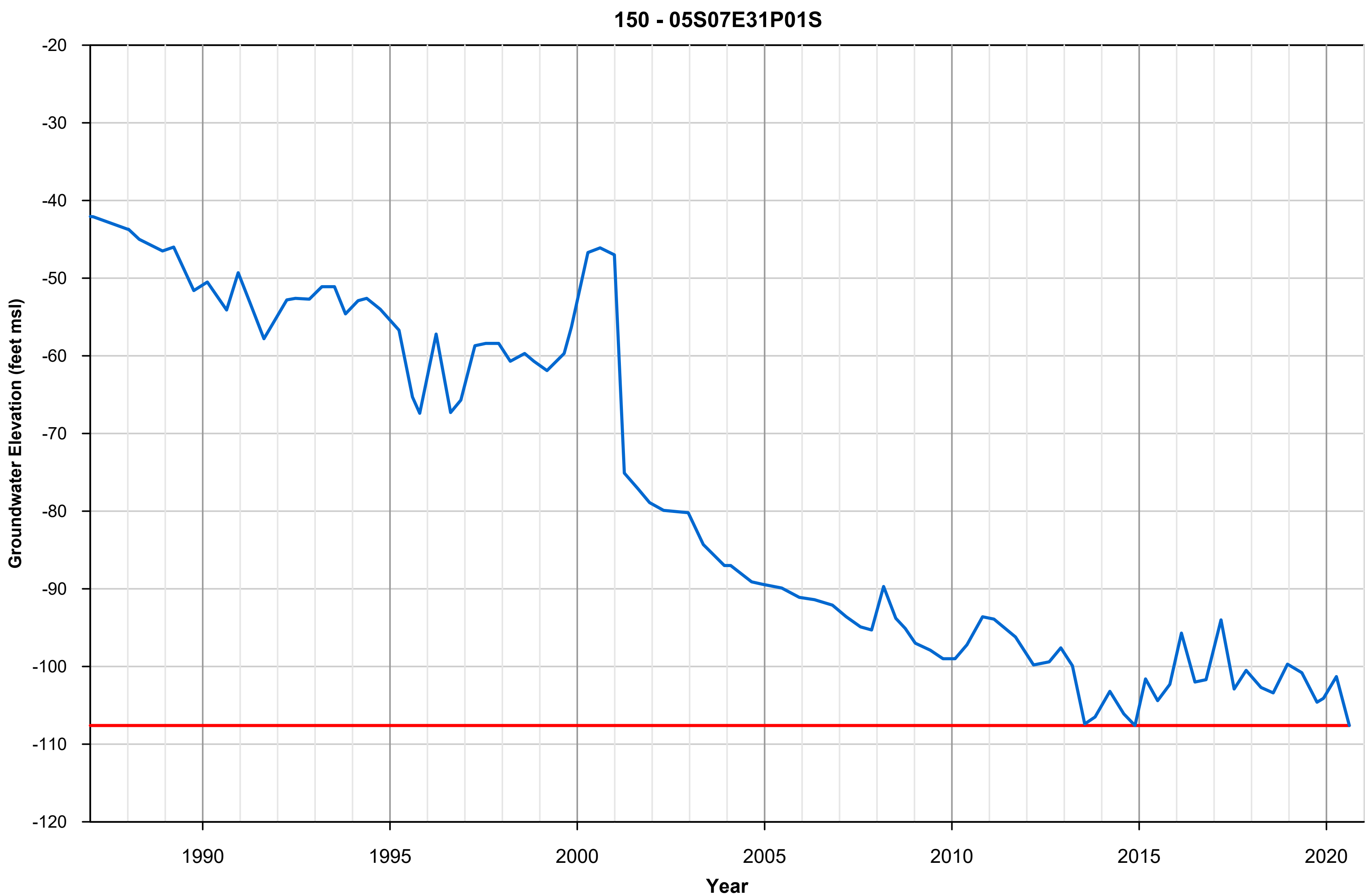
TODD GROUNDWATER

Appendix 9A-27
Groundwater Elevation Hydrograph
146 - 05S07E28E01S



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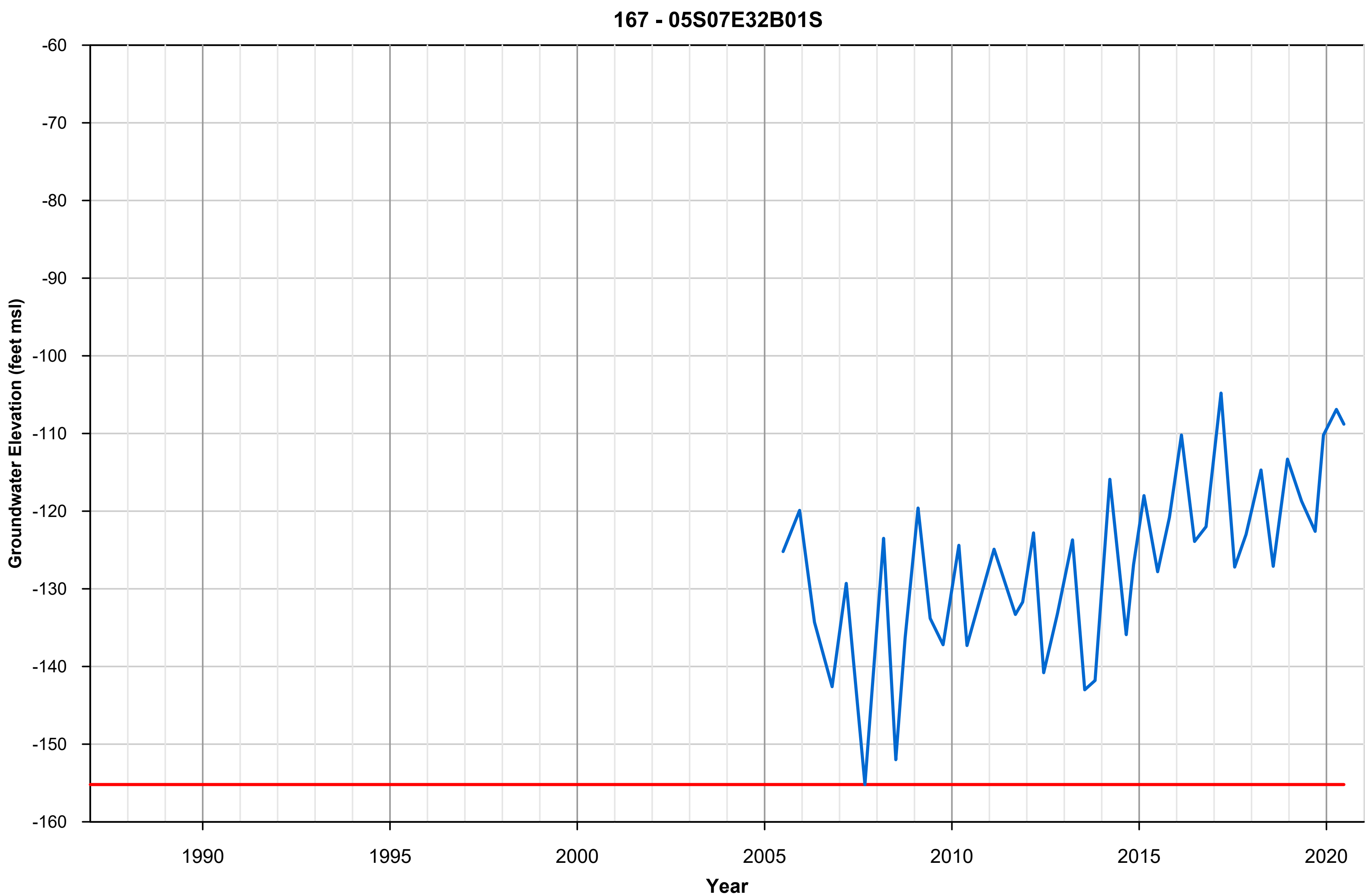
TODD GROUNDWATER

Appendix 9A-28
Groundwater Elevation Hydrograph
150 - 05S07E31P01S



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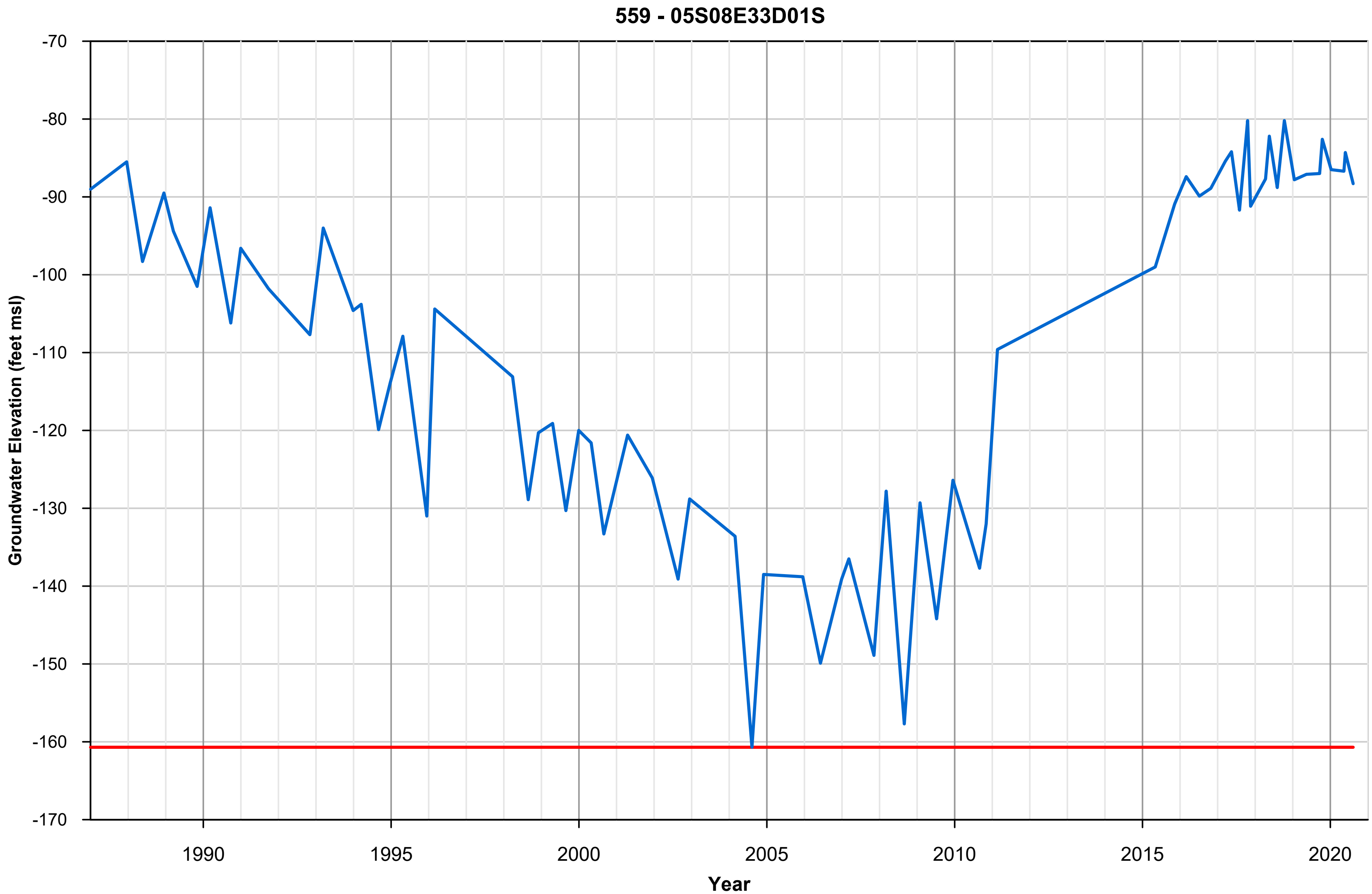
TODD GROUNDWATER

Appendix 9A-29
Groundwater Elevation Hydrograph
167 - 05S07E32B01S



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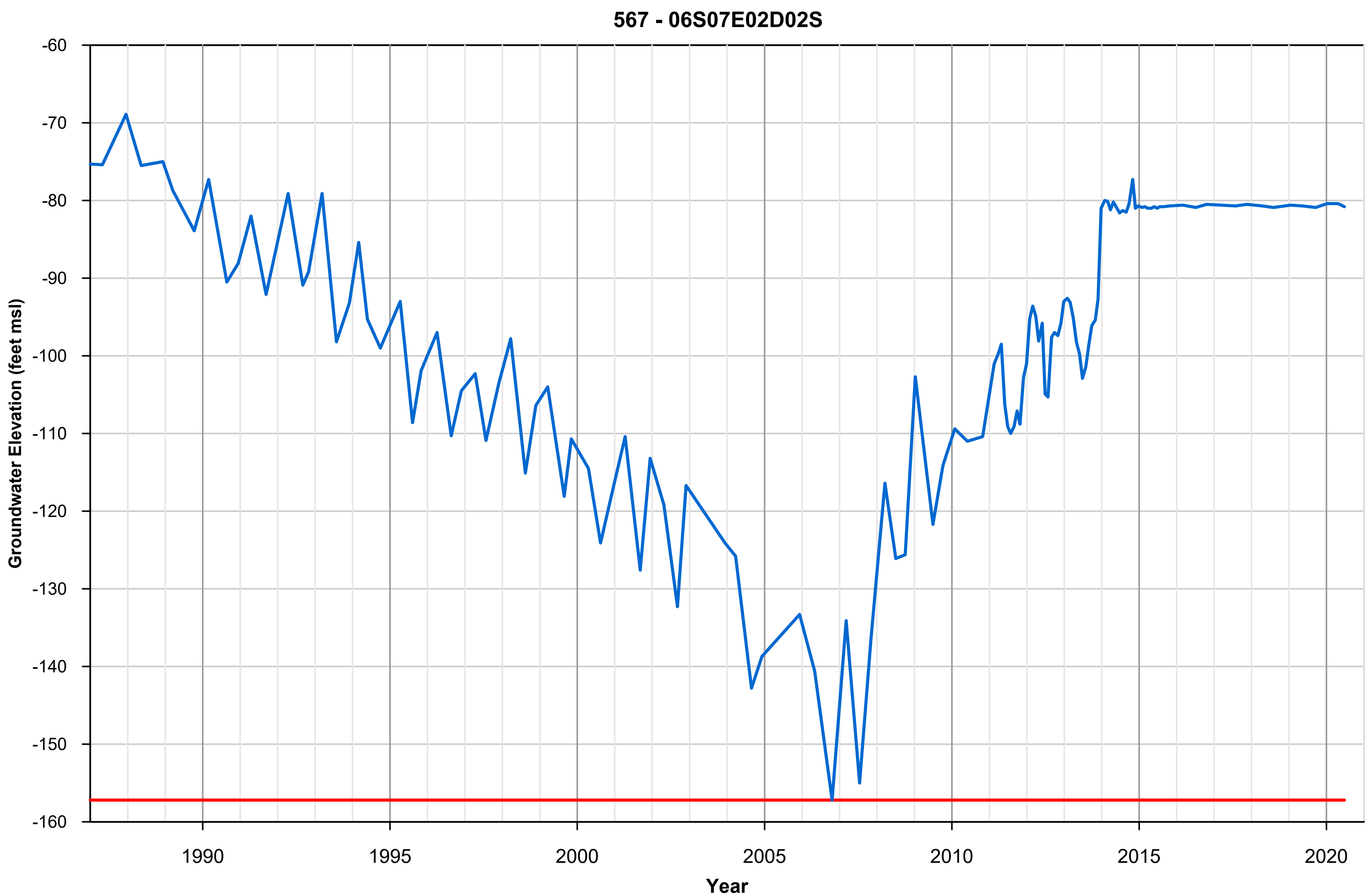
TODD GROUNDWATER

Appendix 9A-30
Groundwater Elevation Hydrograph
559 - 05S08E33D01S



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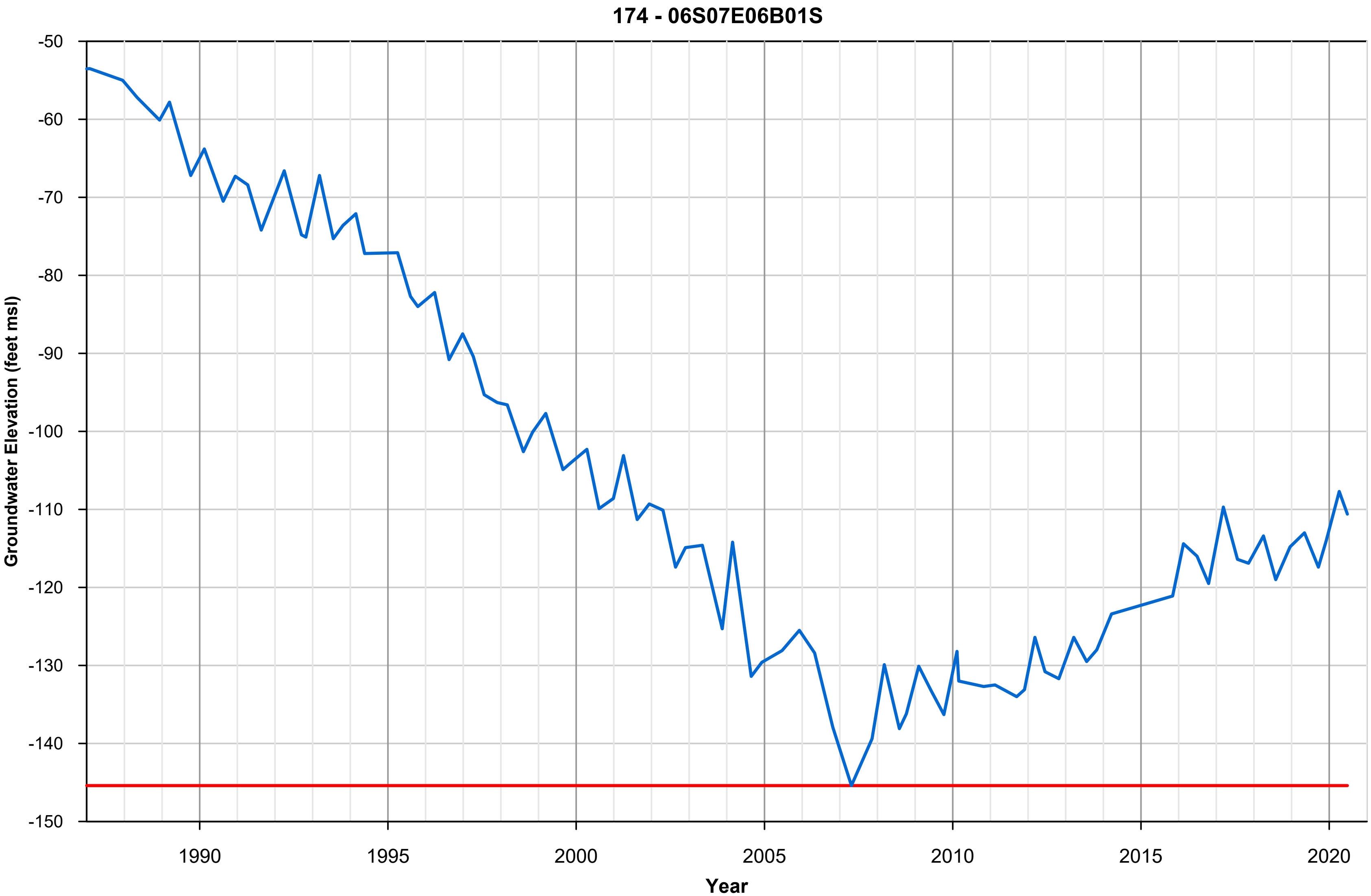
TODD GROUNDWATER

Appendix 9A-31
Groundwater Elevation Hydrograph
567 - 06S07E02D02S



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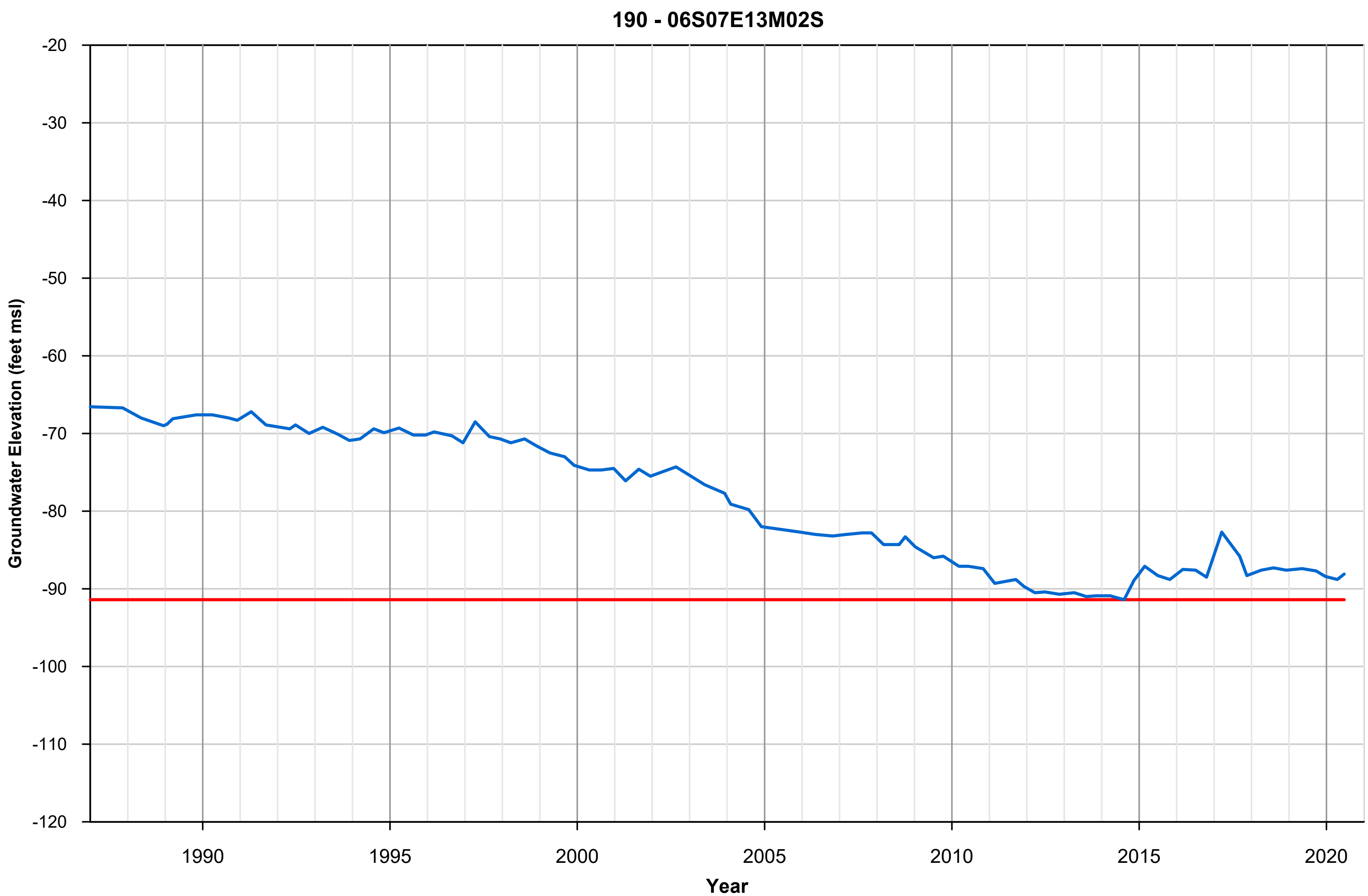
TODD GROUNDWATER

Appendix 9A-32
Groundwater Elevation Hydrograph
174 - 06S07E06B01S



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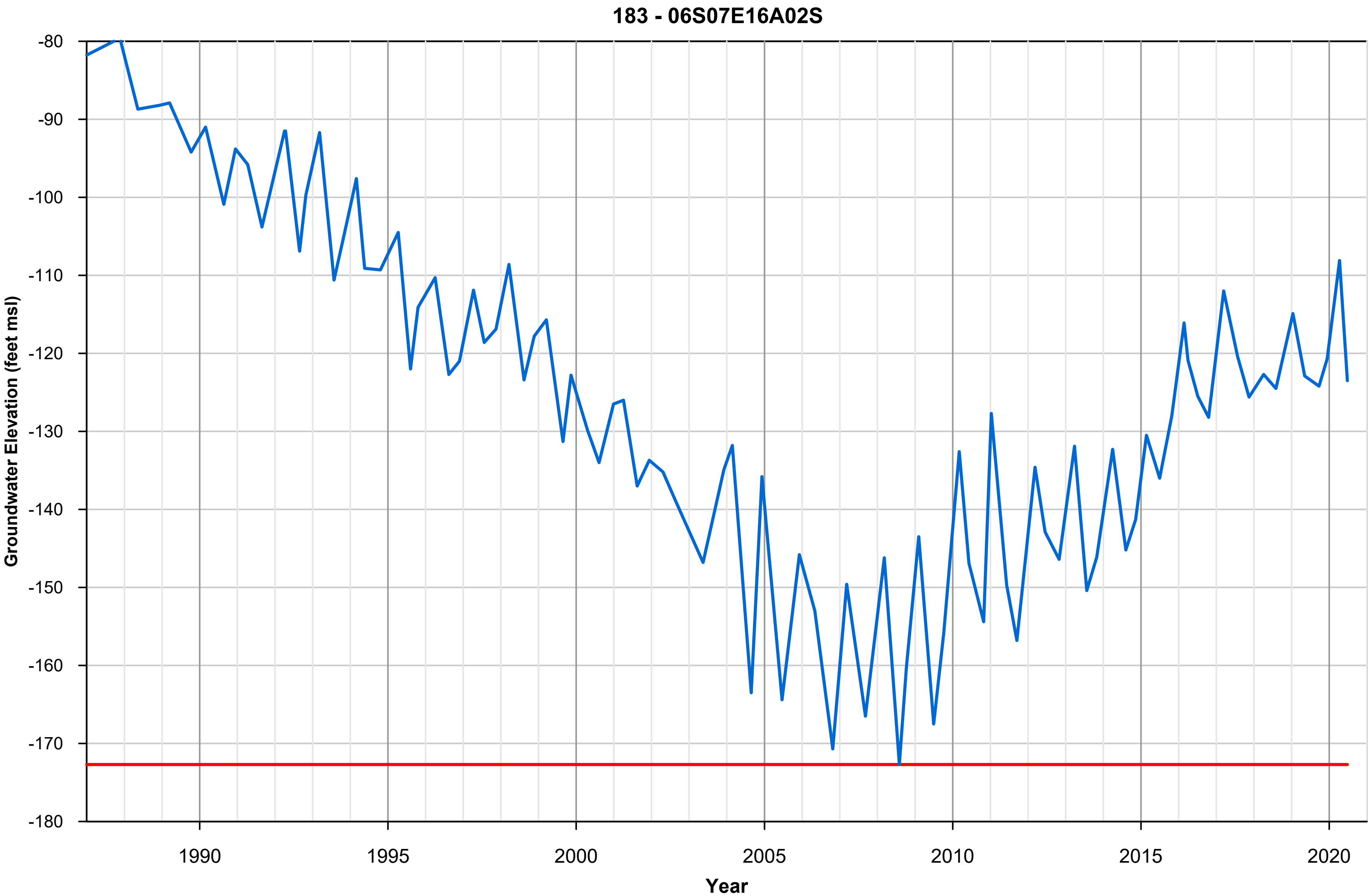
TODD GROUNDWATER

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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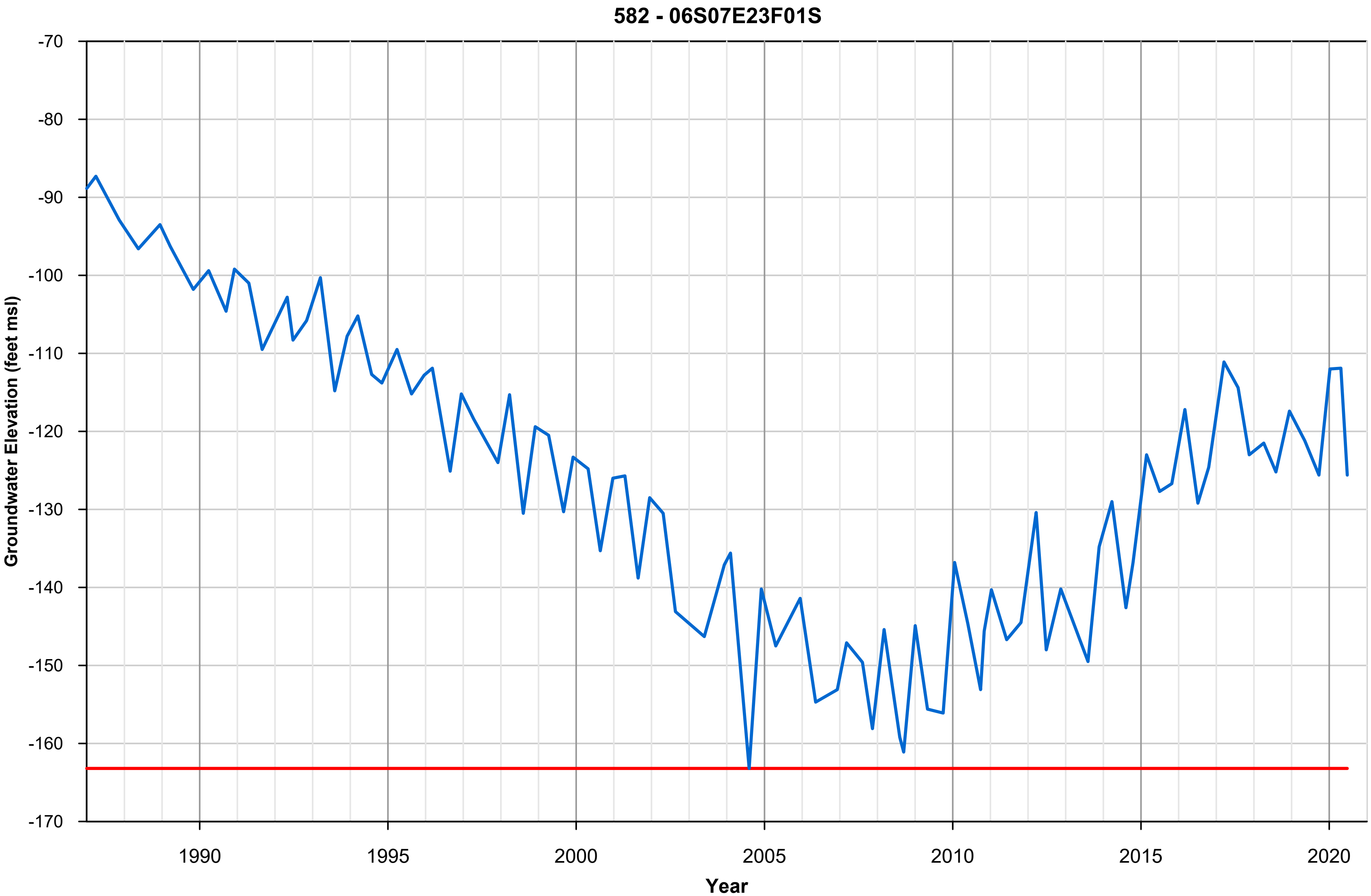

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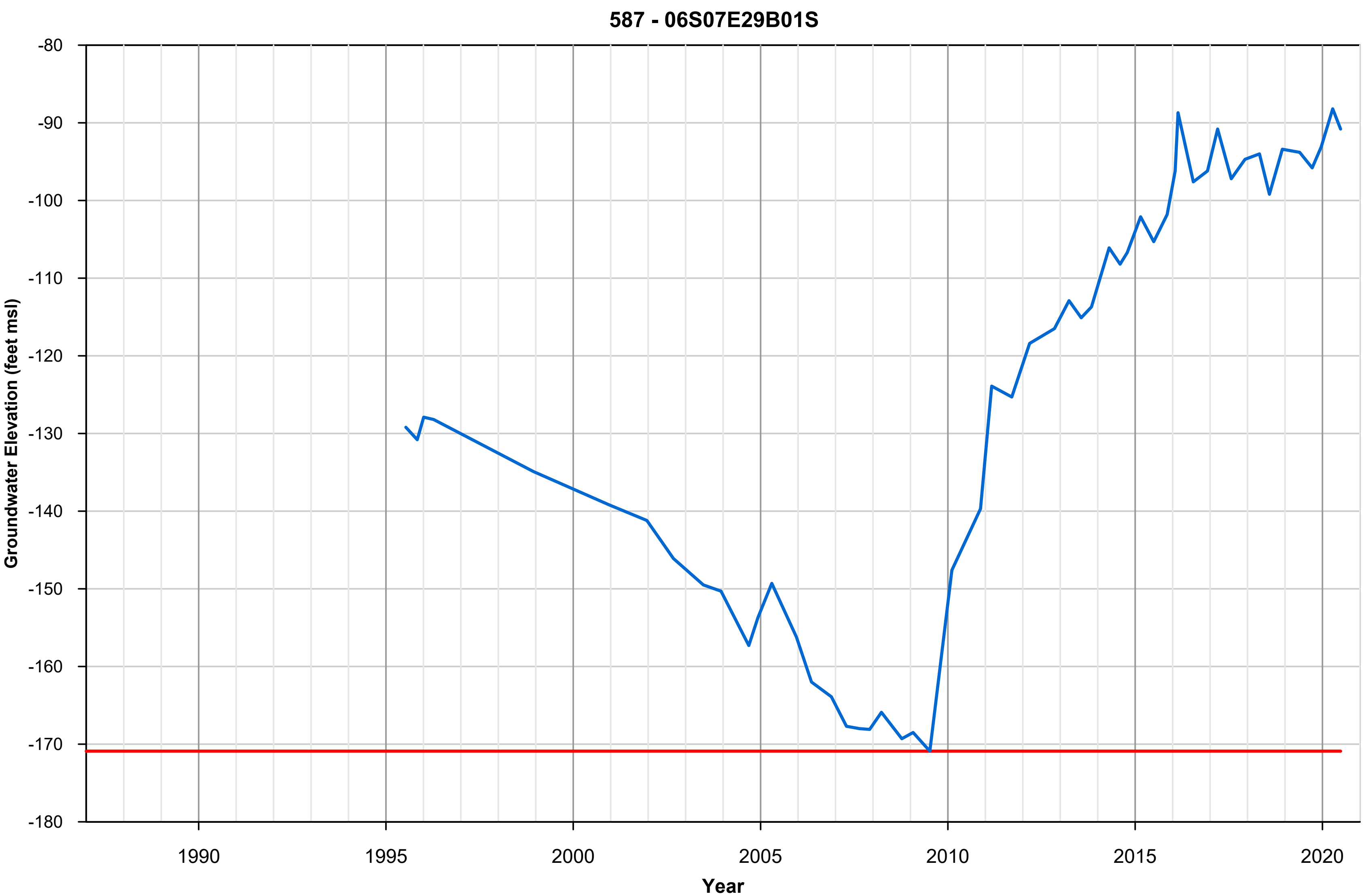
TODD GROUNDWATER

Appendix 9A-35
Groundwater Elevation Hydrograph
582 - 06S07E23F01S



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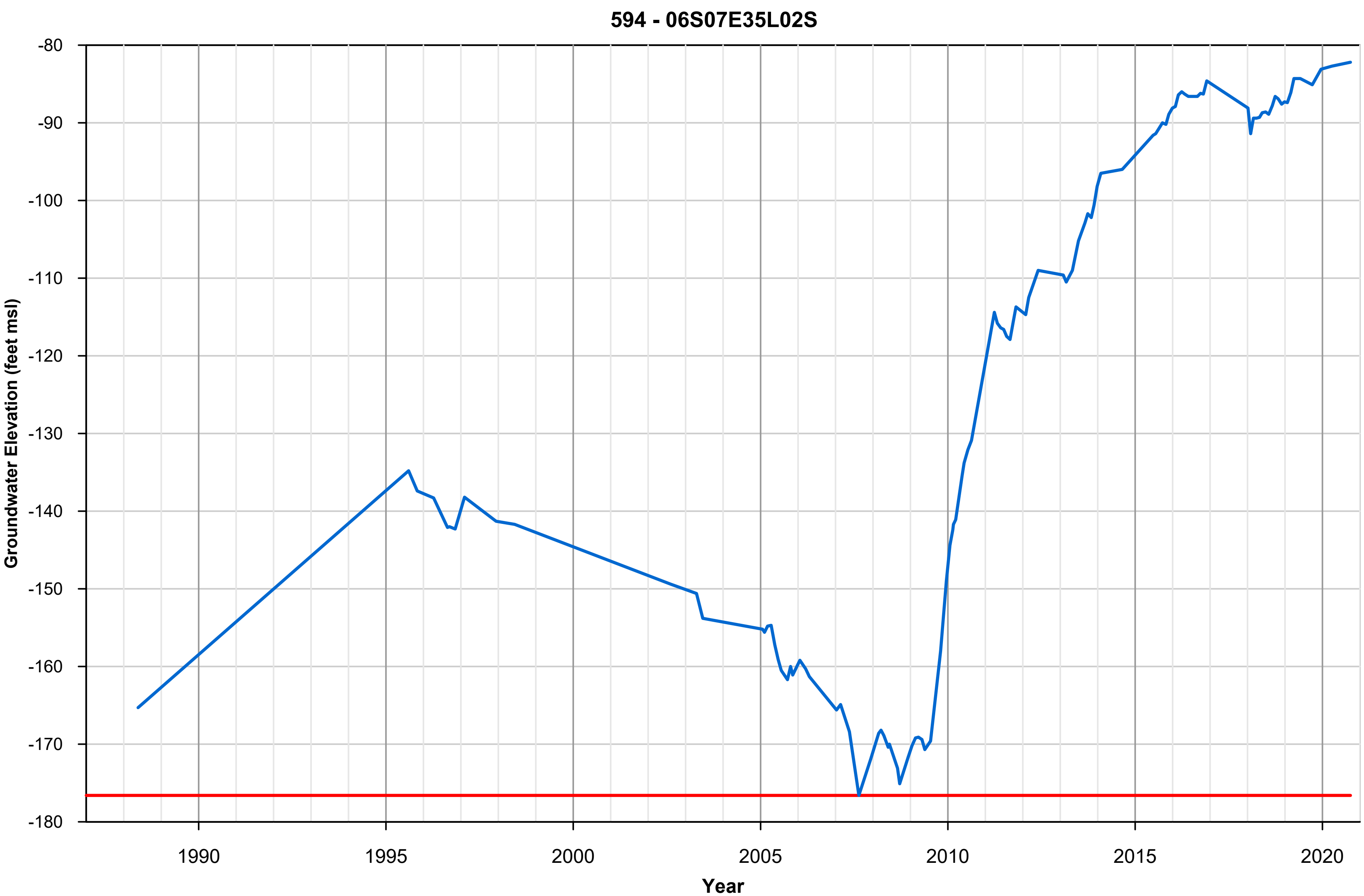
TODD GROUNDWATER

Appendix 9A-36
Groundwater Elevation Hydrograph
587 - 06S07E29B01S



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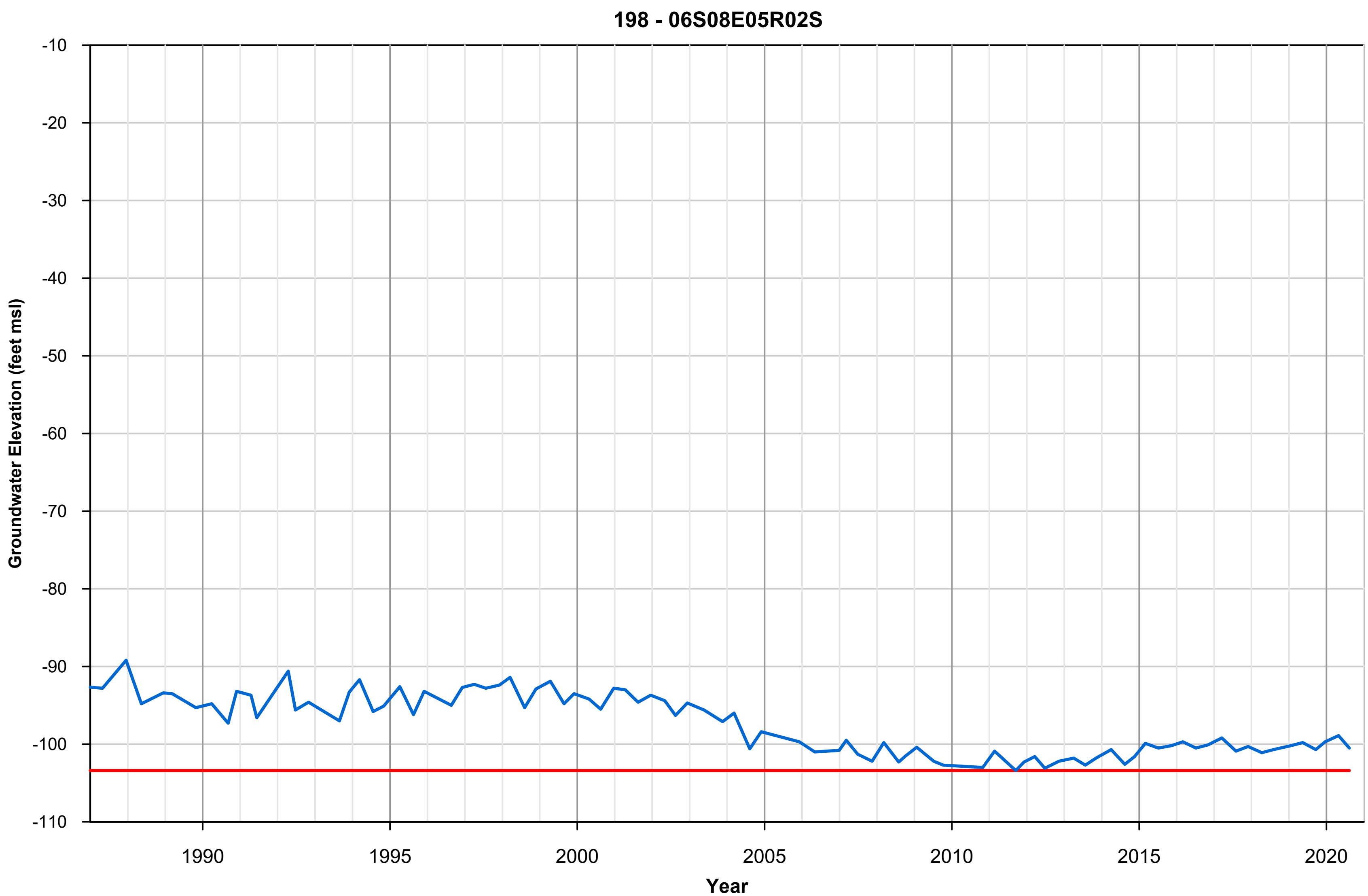
TODD GROUNDWATER

Appendix 9A-37
Groundwater Elevation Hydrograph
594 - 06S07E35L02S



FINAL

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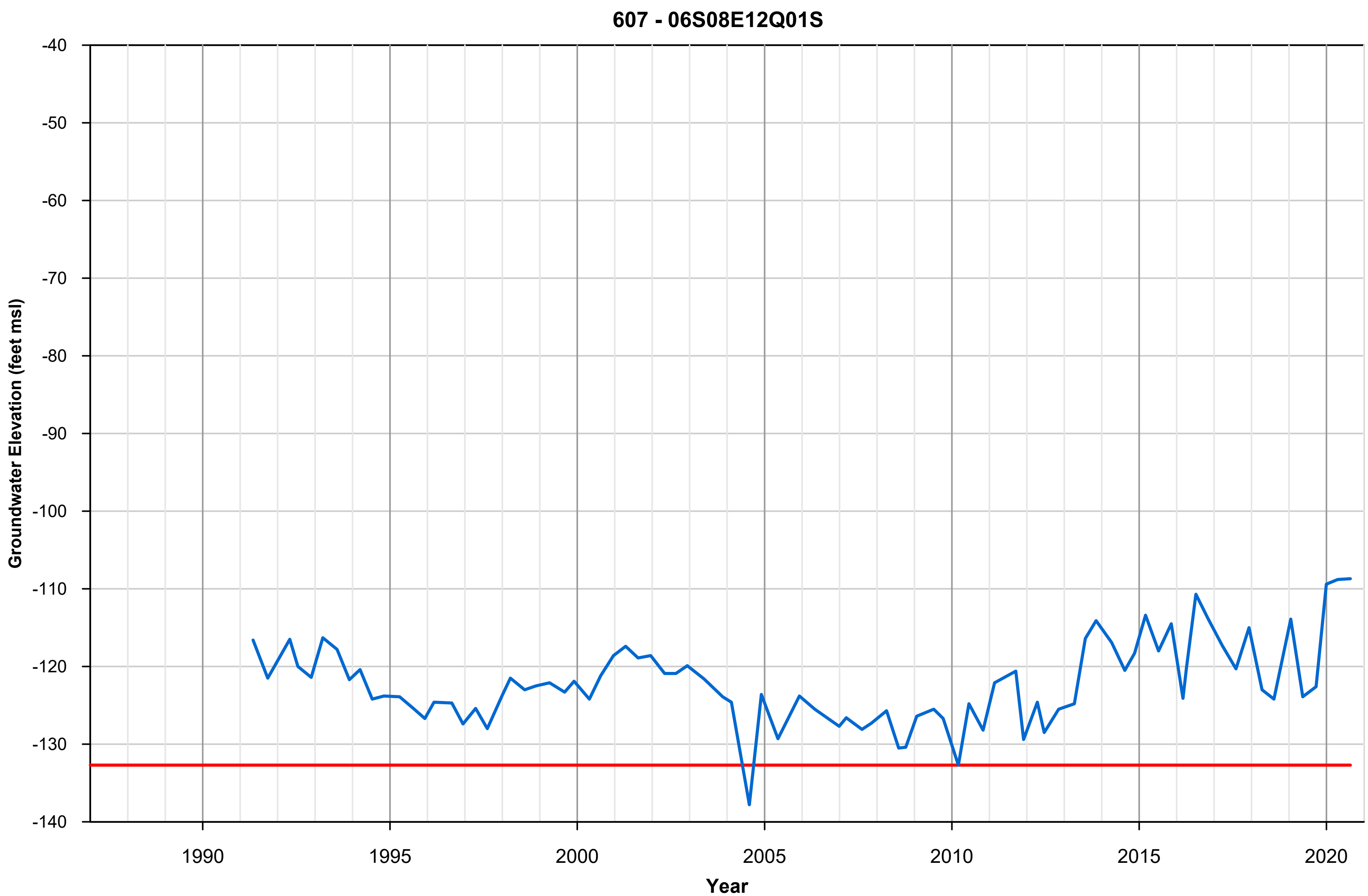
TODD GROUNDWATER

Appendix 9A-38
Groundwater Elevation Hydrograph
198 - 06S08E05R02S



FINAL

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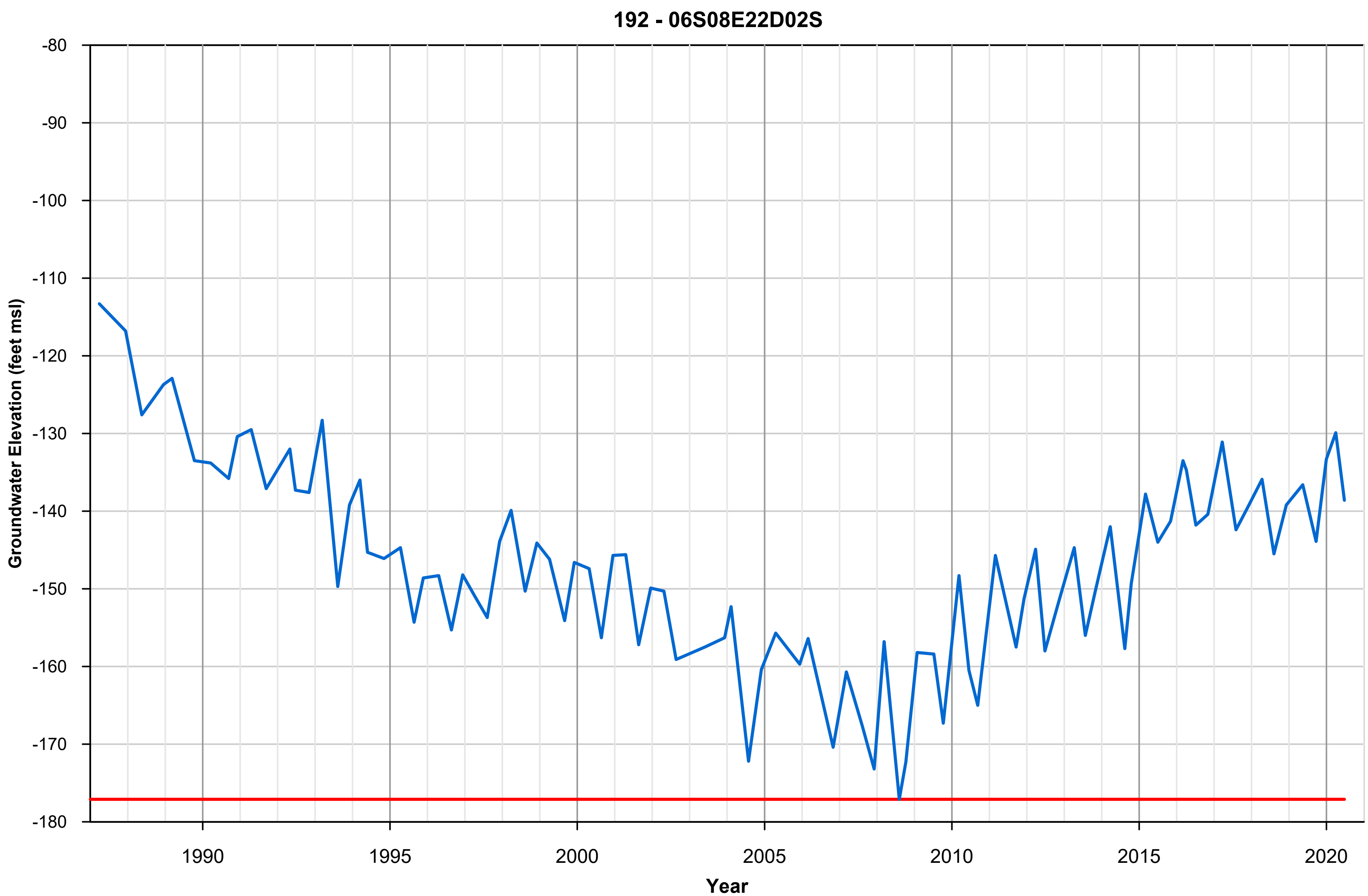
TODD GROUNDWATER

Appendix 9A-39
Groundwater Elevation Hydrograph
607 - 06S08E12Q01S



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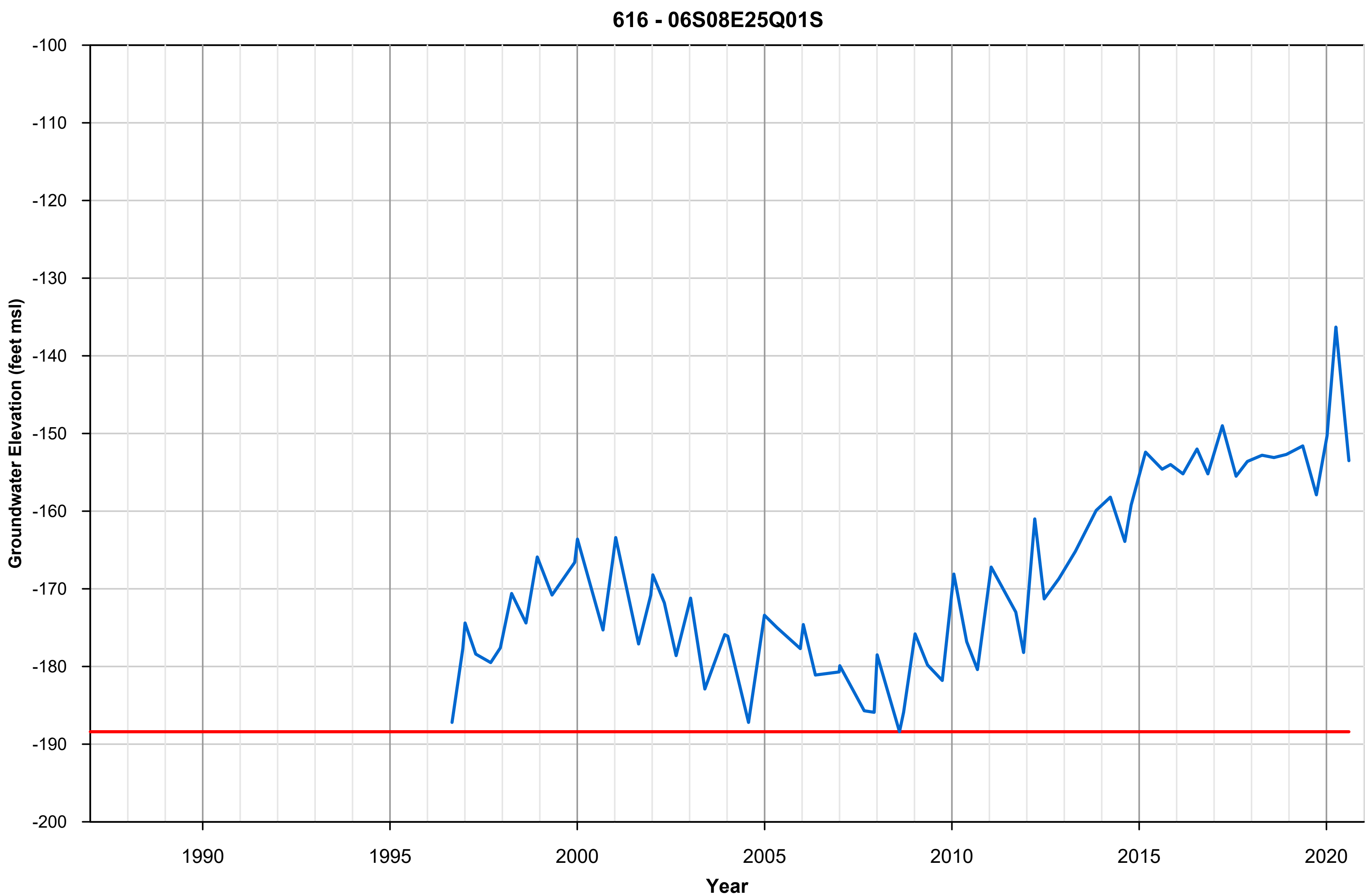
TODD GROUNDWATER

Appendix 9A-40
Groundwater Elevation Hydrograph
192 - 06S08E22D02S



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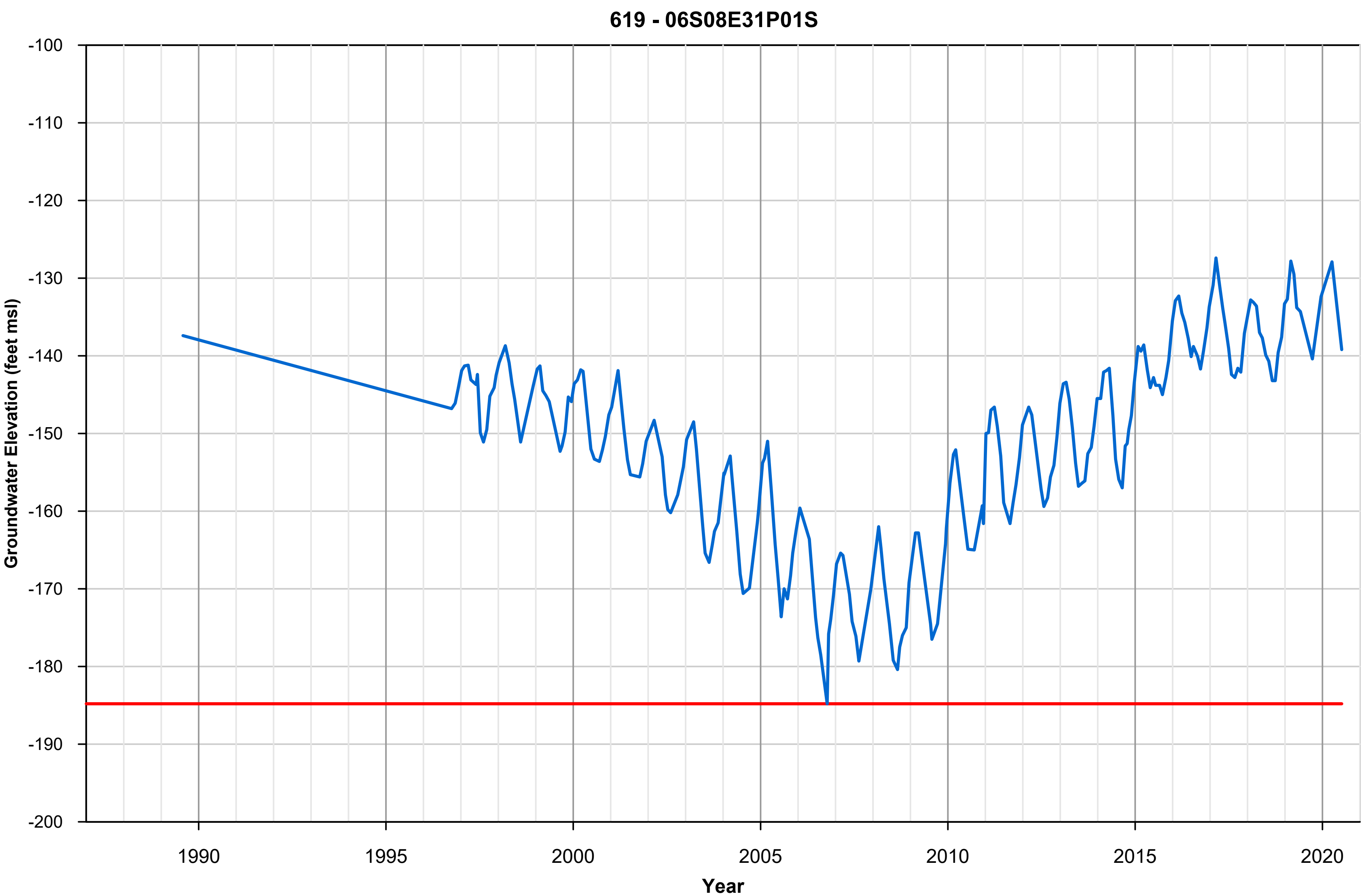
TODD GROUNDWATER

Appendix 9A-41
Groundwater Elevation Hydrograph
616 - 06S08E25Q01S



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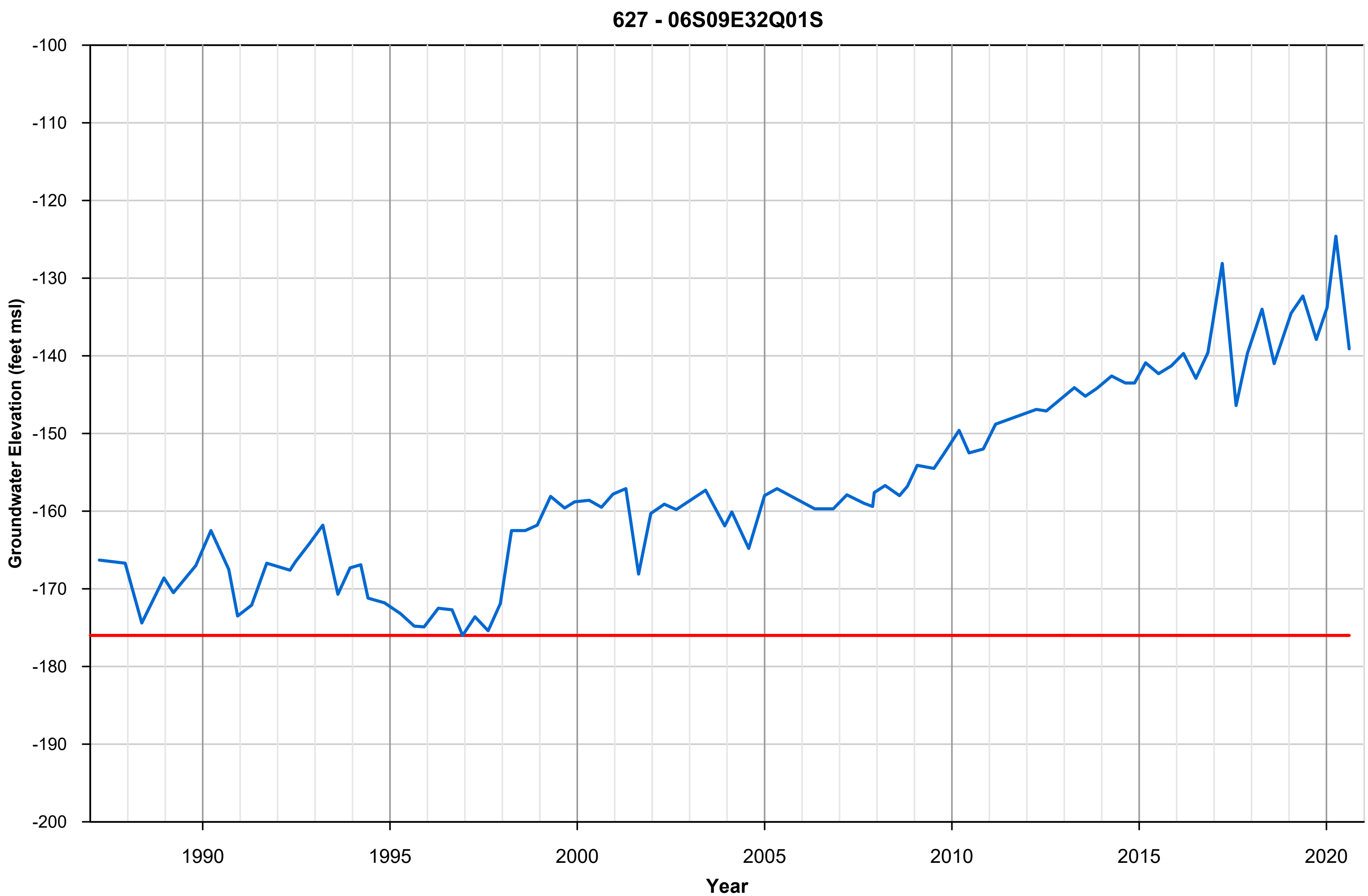
TODD GROUNDWATER

Appendix 9A-42
Groundwater Elevation Hydrograph
619 - 06S08E31P01S



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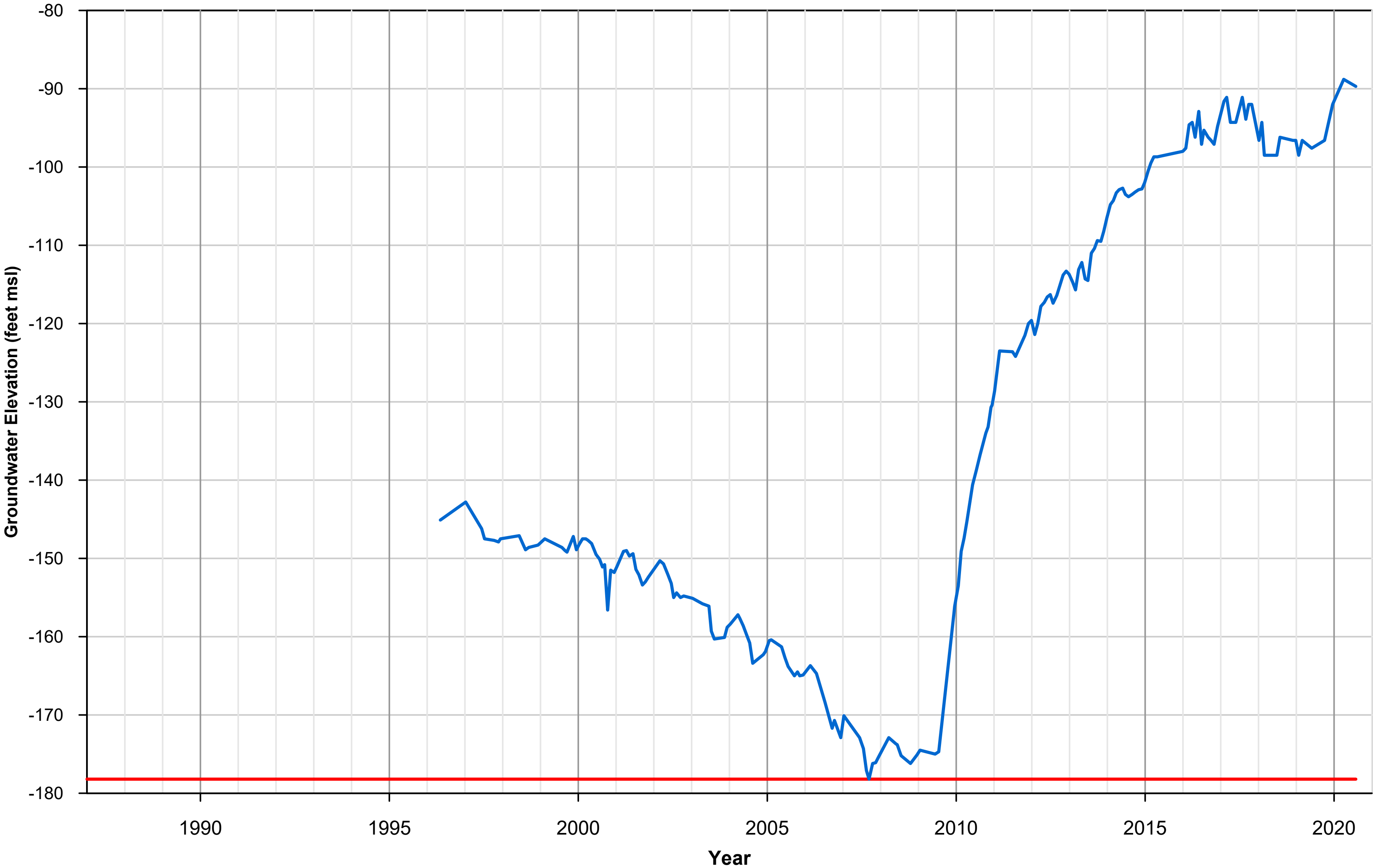
TODD GROUNDWATER

Appendix 9A-43
Groundwater Elevation Hydrograph
627 - 06S09E32Q01S

633 - 07S07E02G02S



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TODD GROUNDWATER

Appendix 9A-44
Groundwater Elevation Hydrograph
633 - 07S07E02G02S

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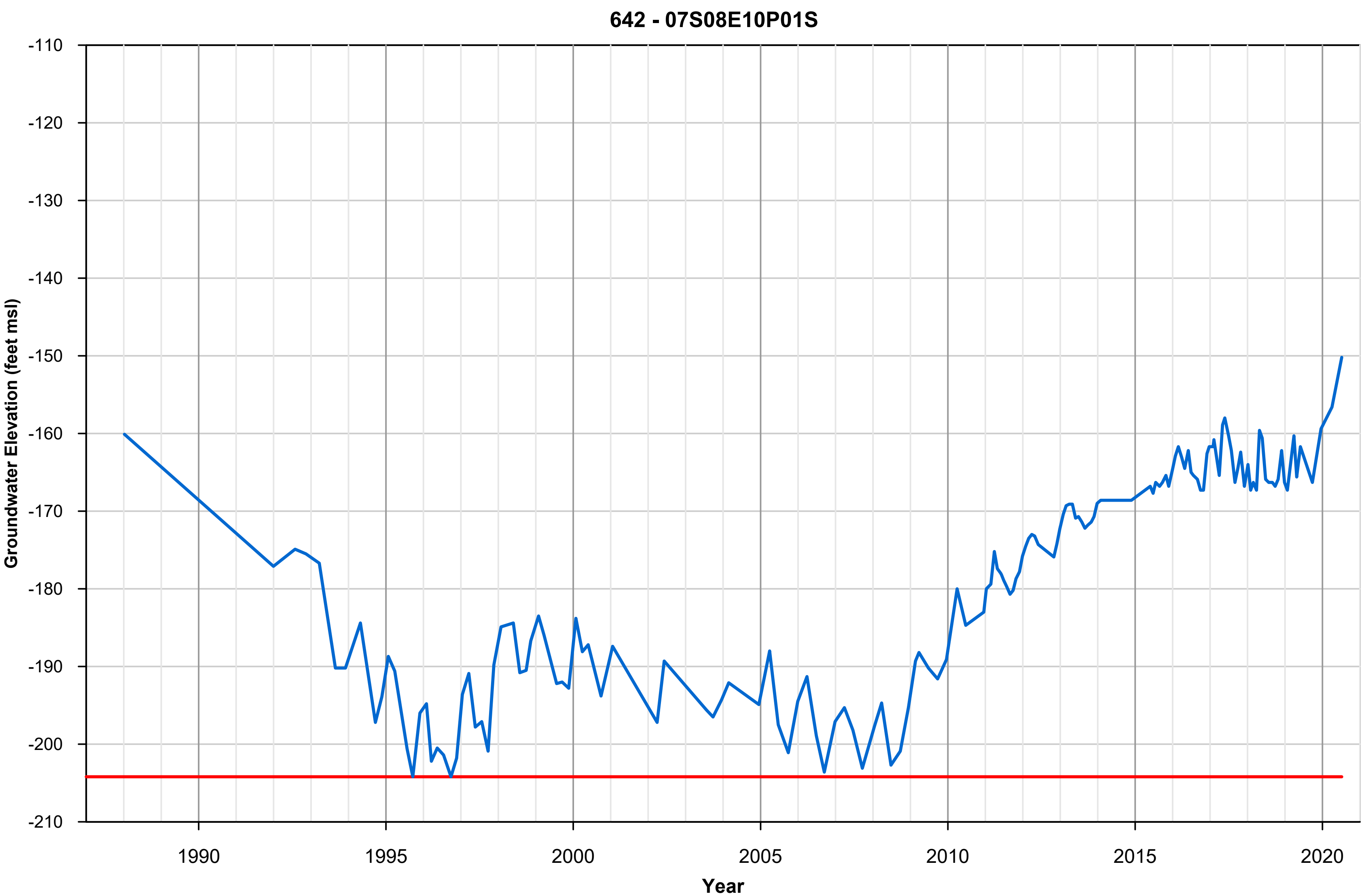

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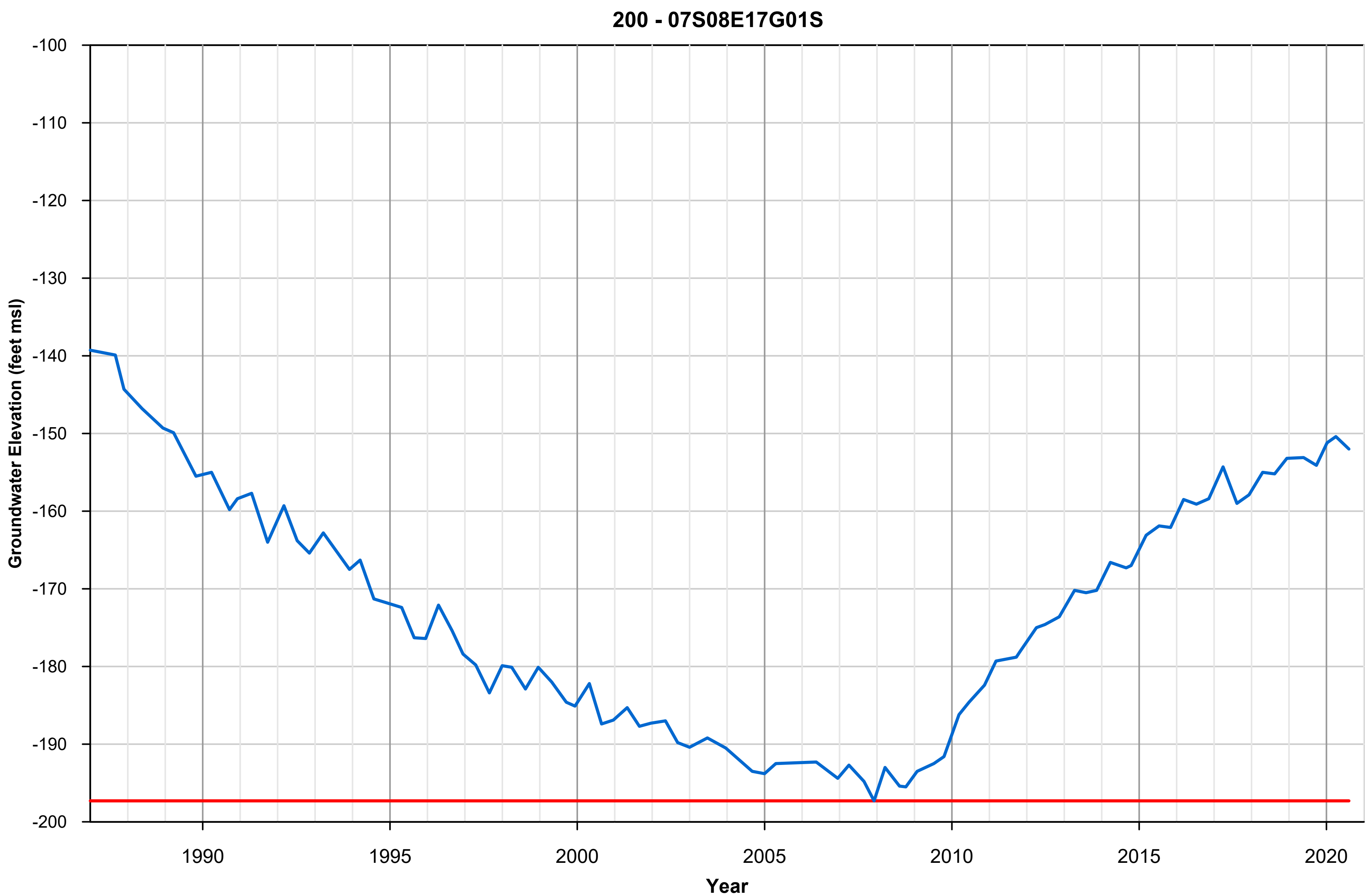
TODD GROUNDWATER

Appendix 9A-45
Groundwater Elevation Hydrograph
642 - 07S08E10P01S



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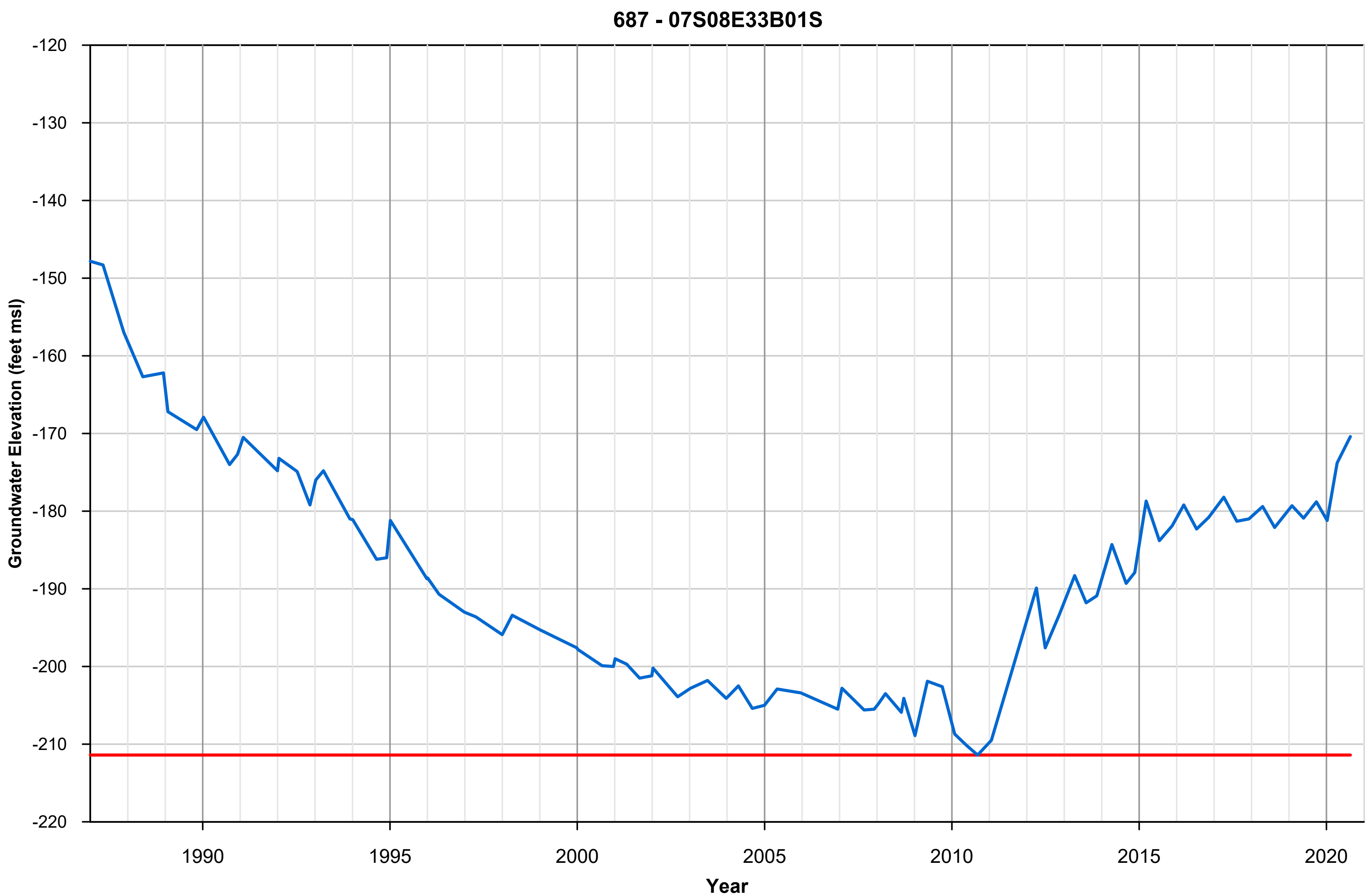
TODD GROUNDWATER

Appendix 9A-46
Groundwater Elevation Hydrograph
200 - 07S08E17G01S



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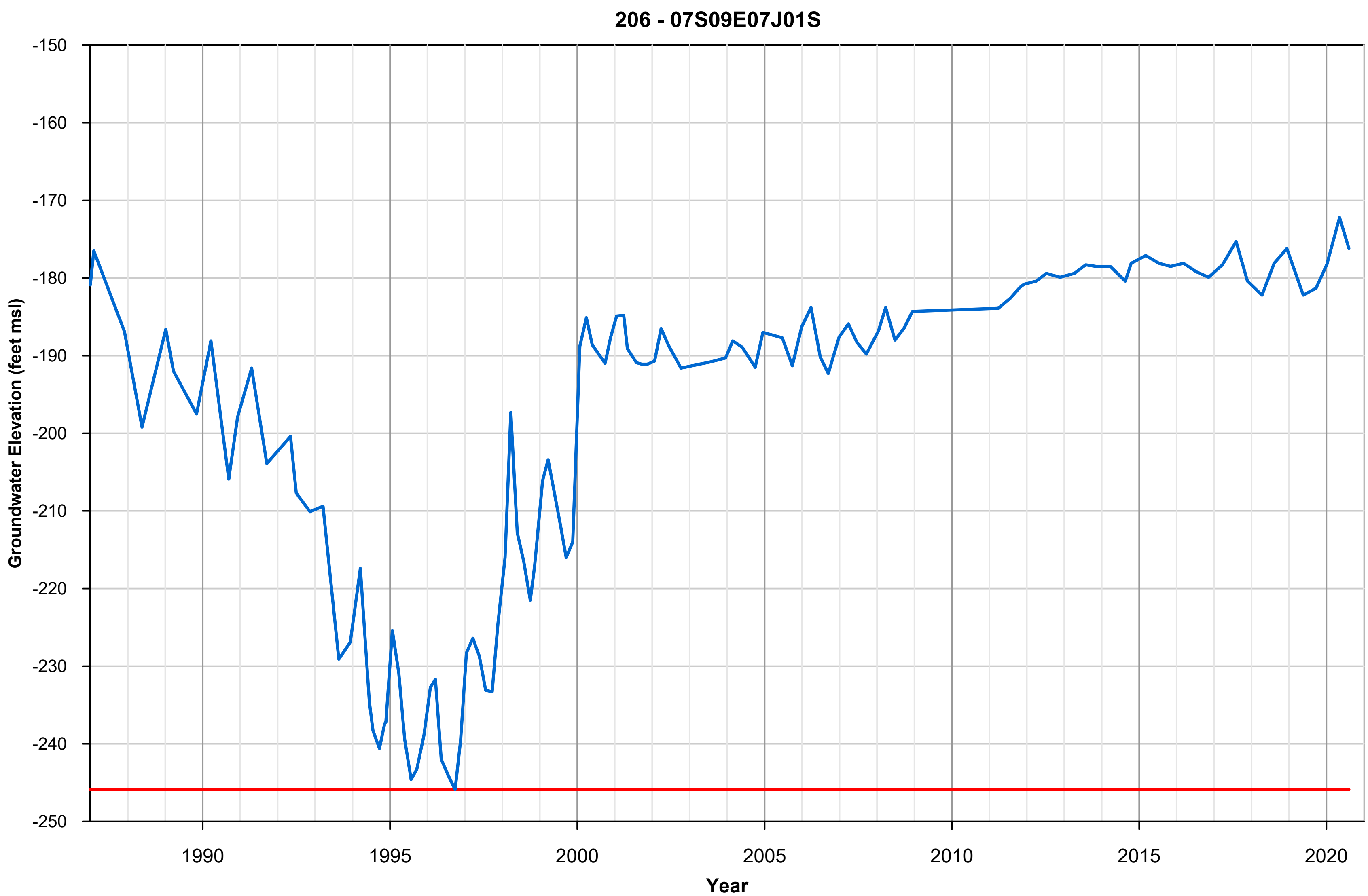
TODD GROUNDWATER

Appendix 9A-47
Groundwater Elevation Hydrograph
687 - 07S08E33B01S



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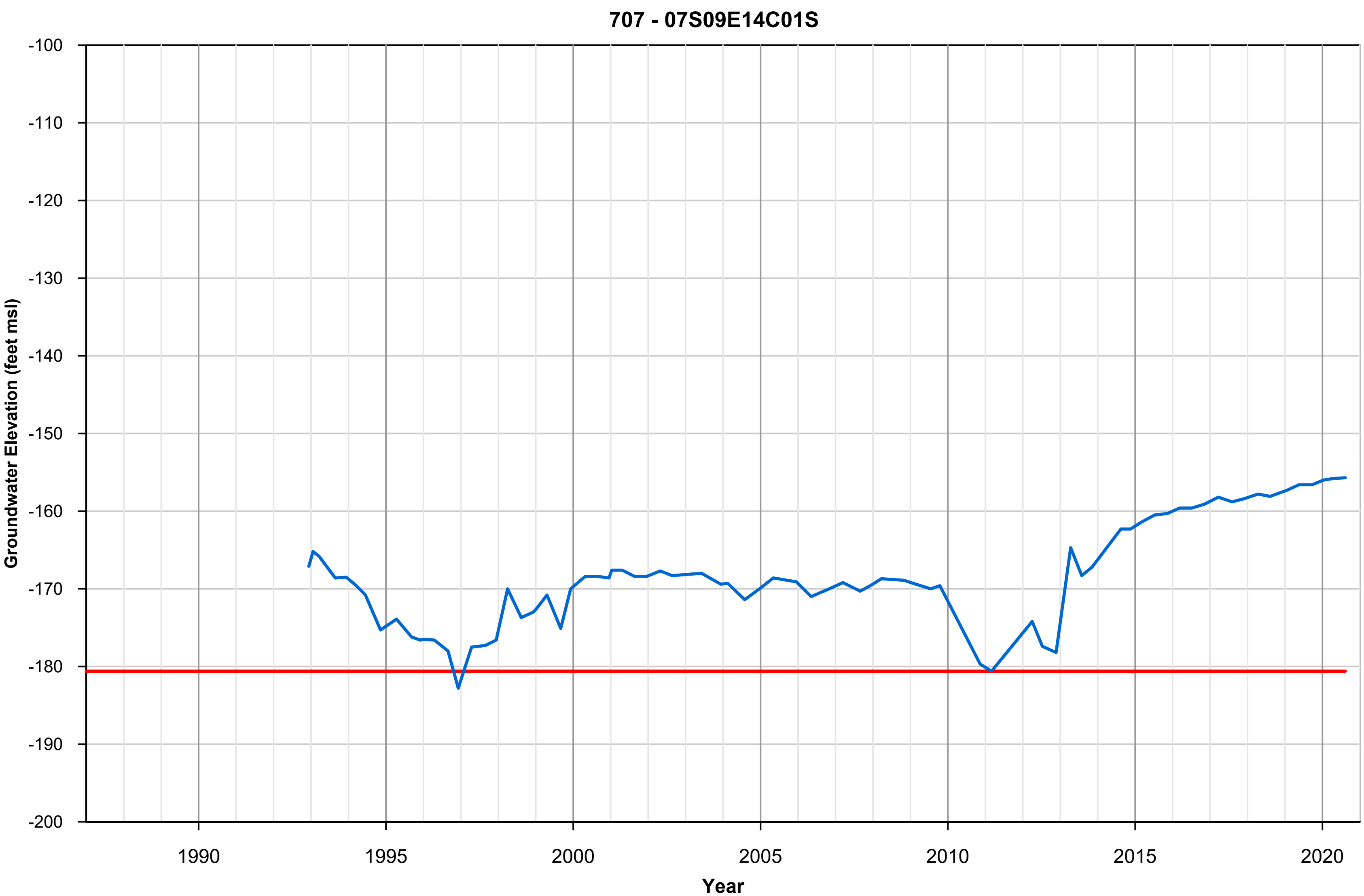
TODD GROUNDWATER

Appendix 9A-48
Groundwater Elevation Hydrograph
206 - 07S09E07J01S



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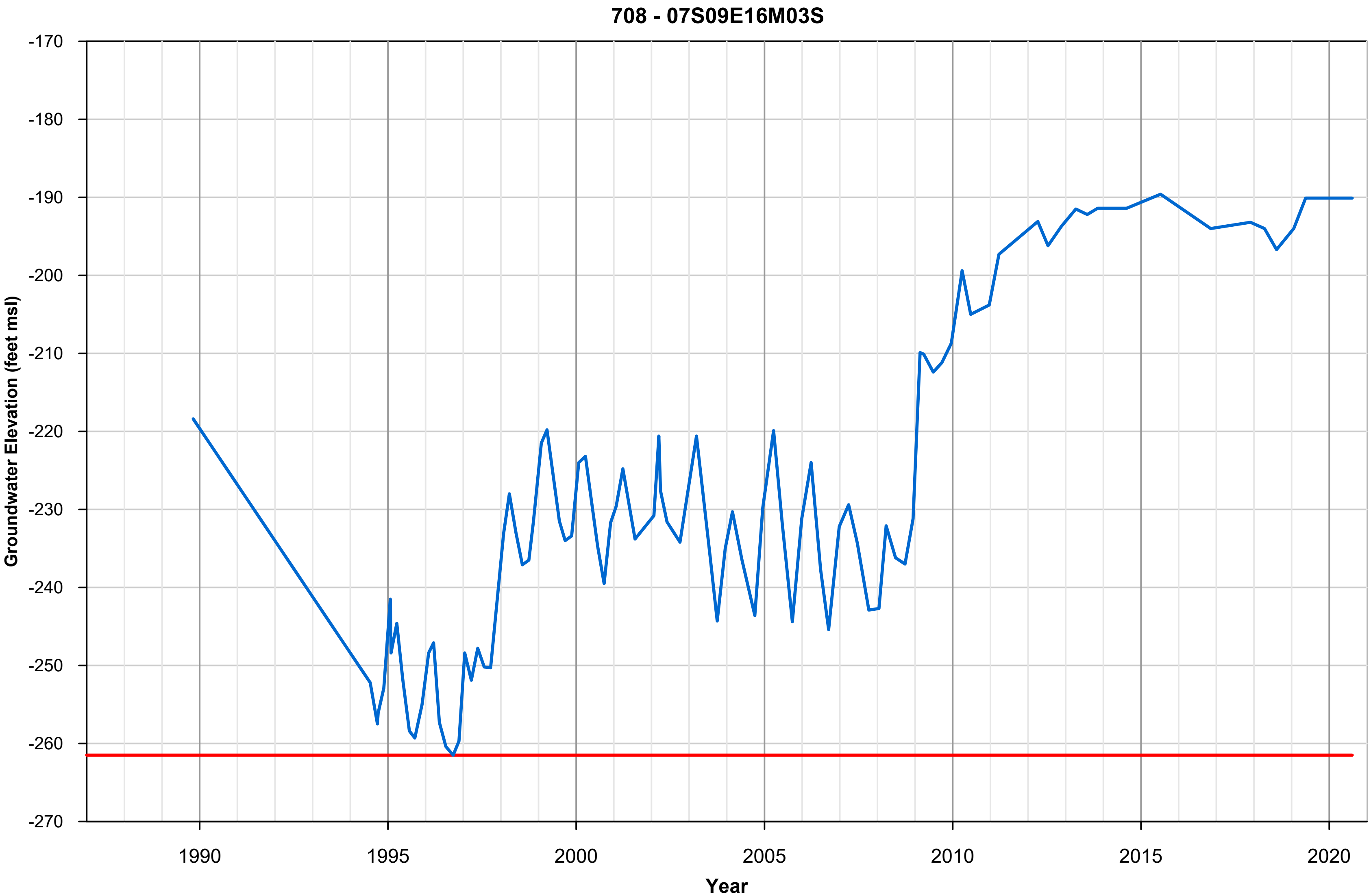
TODD GROUNDWATER

Appendix 9A-49
Groundwater Elevation Hydrograph
707 - 07S09E14C01S



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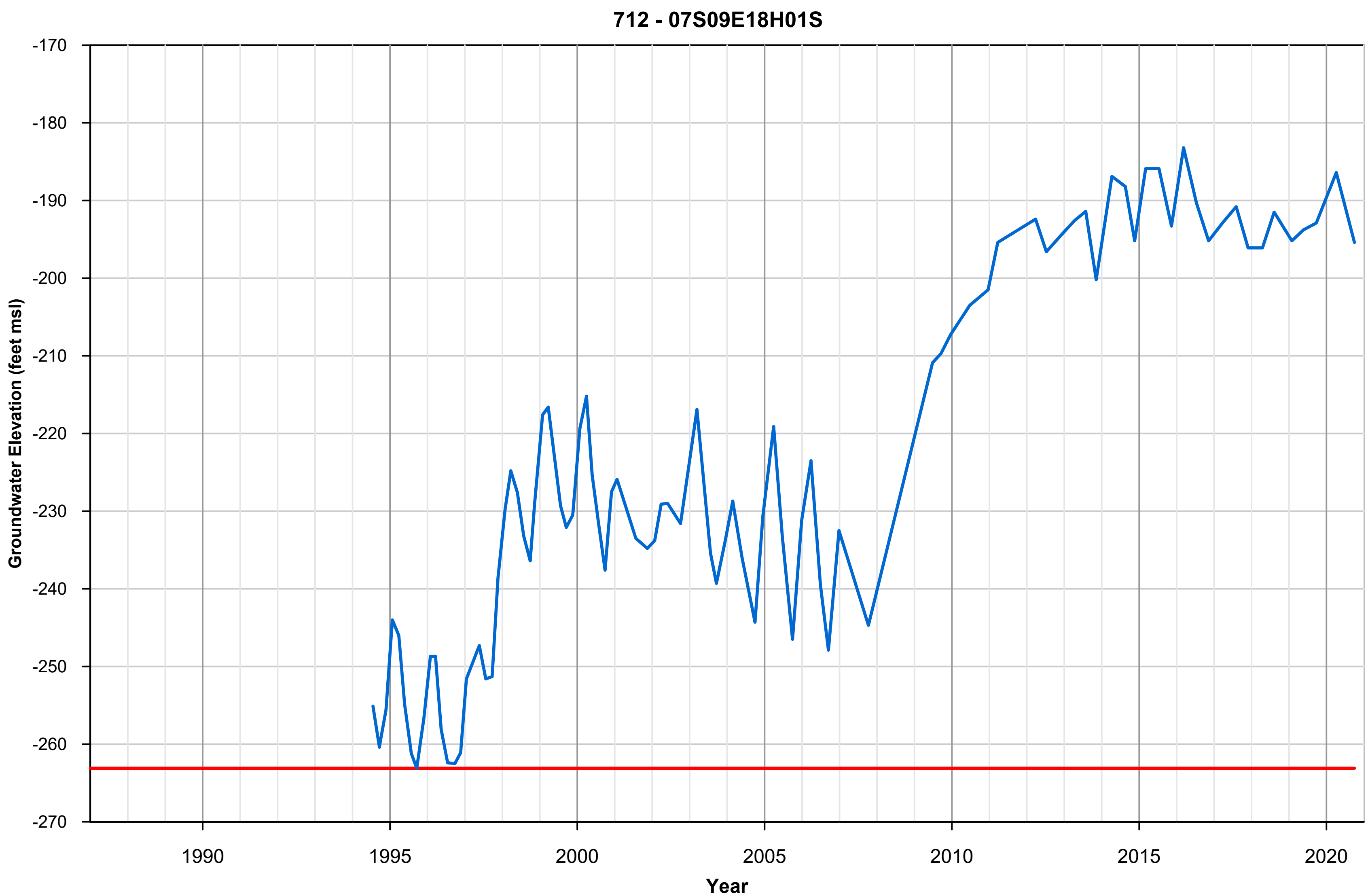
TODD GROUNDWATER

Appendix 9A-50
Groundwater Elevation Hydrograph
708 - 07S09E16M03S



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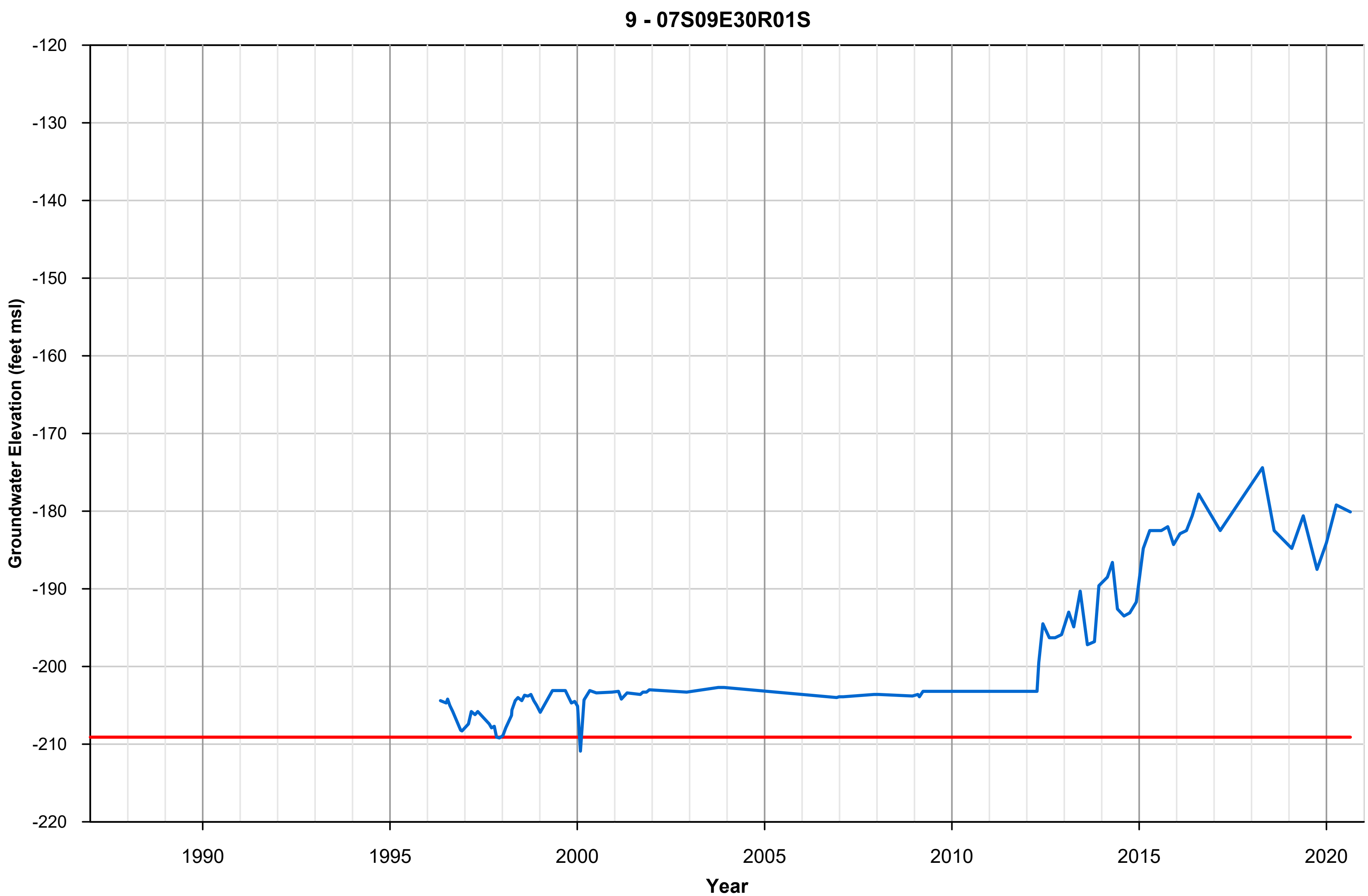
TODD GROUNDWATER

Appendix 9A-51
Groundwater Elevation Hydrograph
712 - 07S09E18H01S



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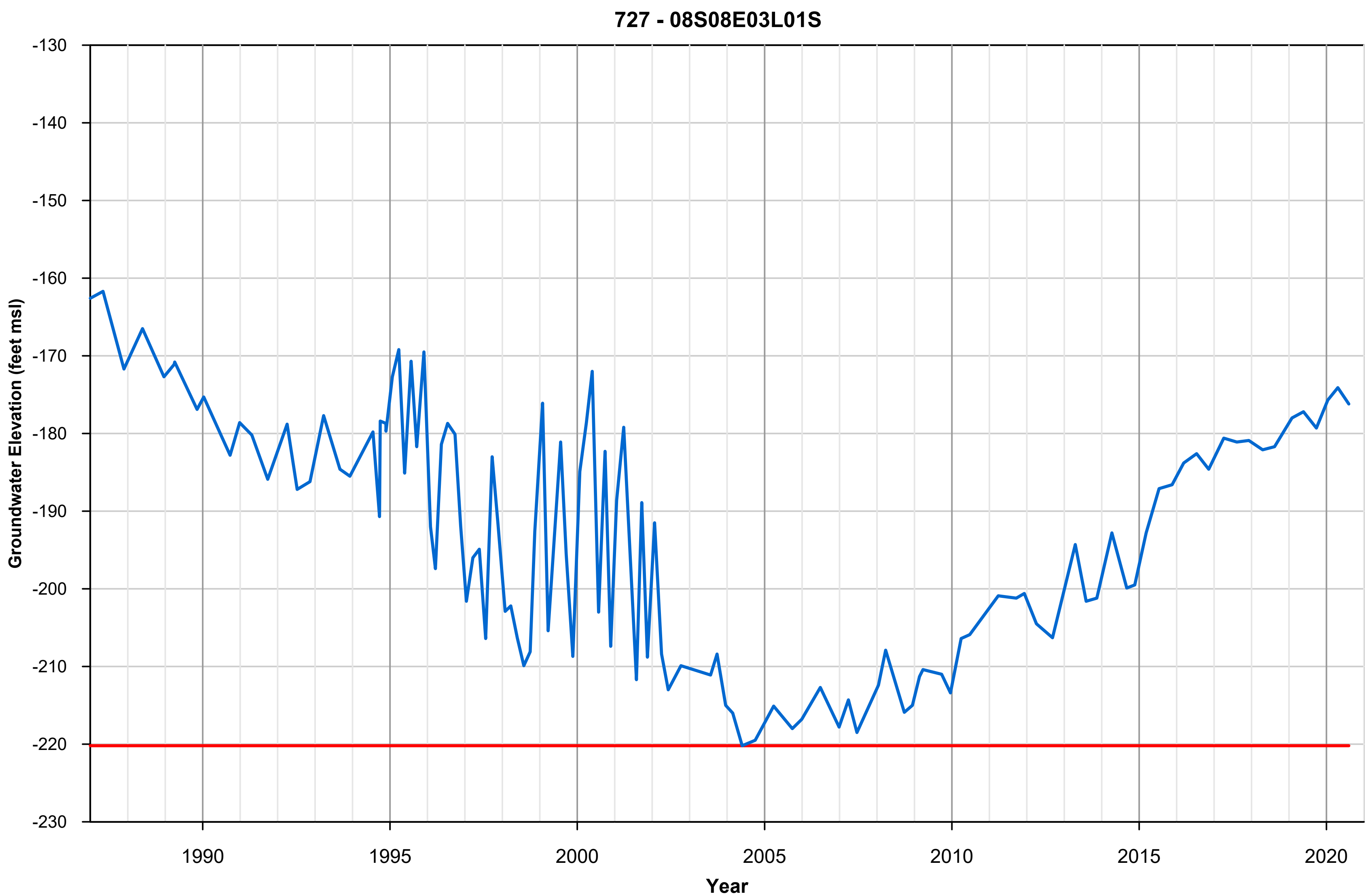
TODD GROUNDWATER

Appendix 9A-52
Groundwater Elevation Hydrograph
9 - 07S09E30R01S



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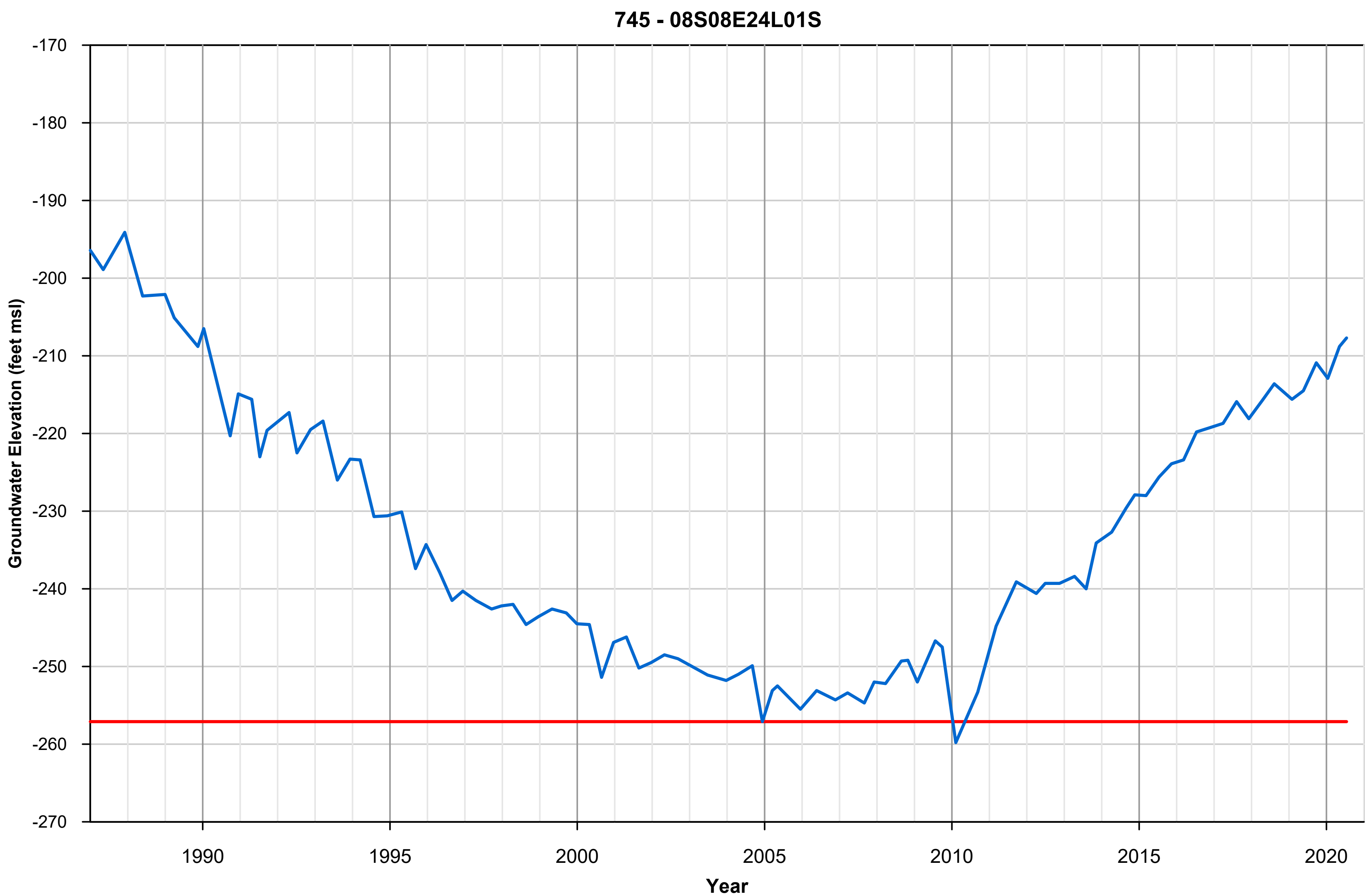
TODD GROUNDWATER

Appendix 9A-53
Groundwater Elevation Hydrograph
727 - 08S08E03L01S



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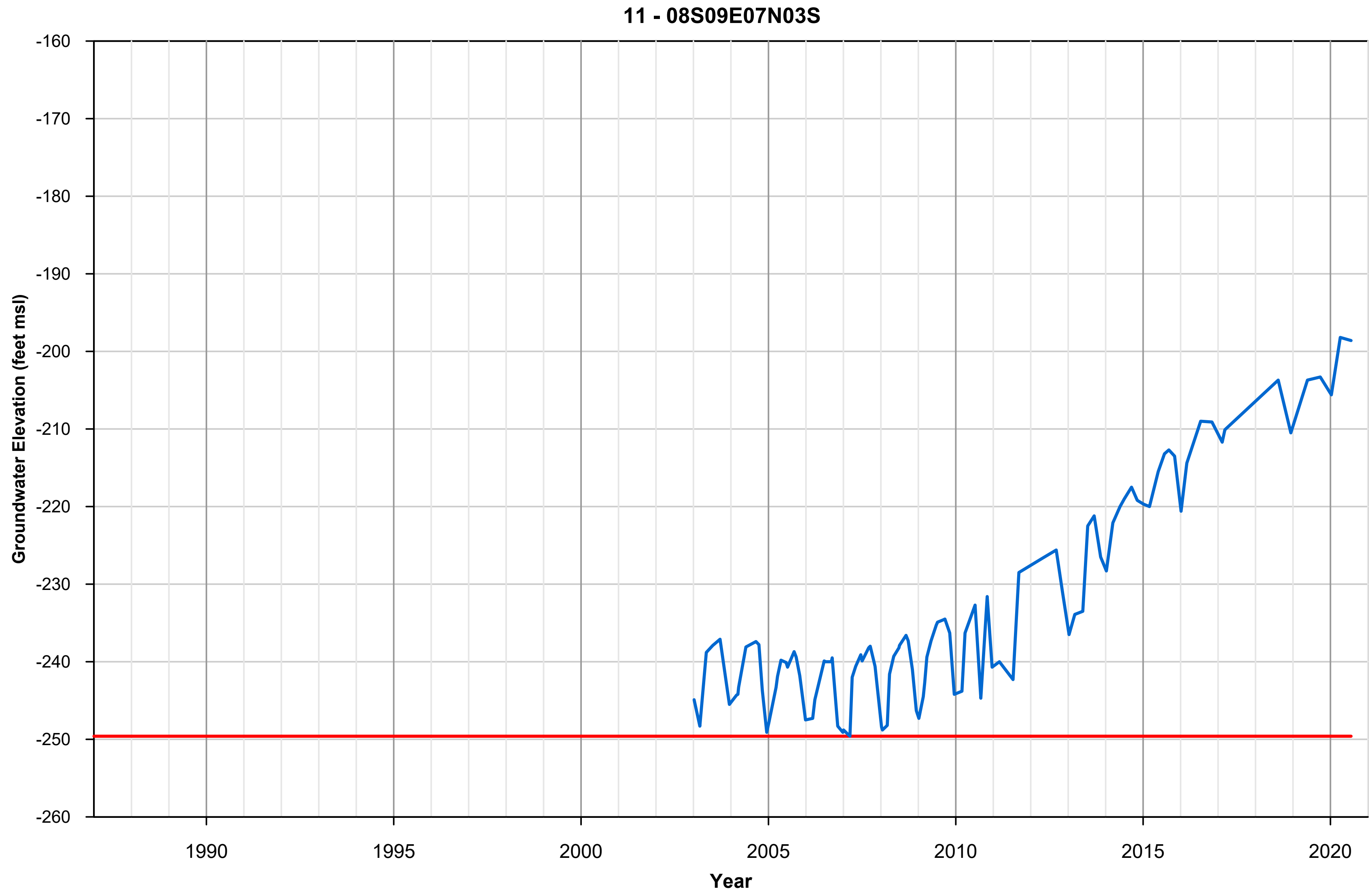
TODD GROUNDWATER

Appendix 9A-54
Groundwater Elevation Hydrograph
745 - 08S08E24L01S



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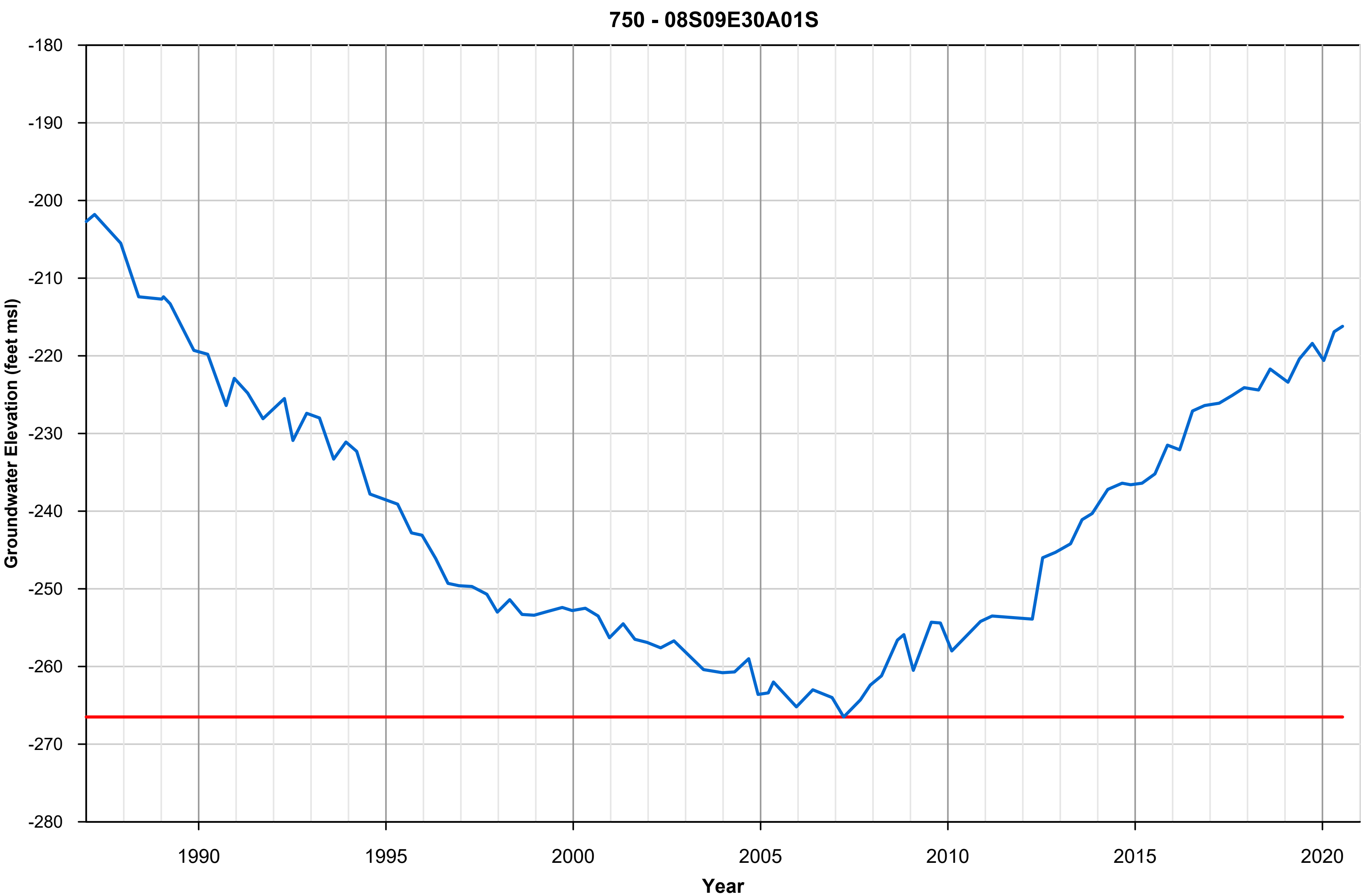
TODD GROUNDWATER

Appendix 9A-55
Groundwater Elevation Hydrograph
11 - 08S09E07N03S



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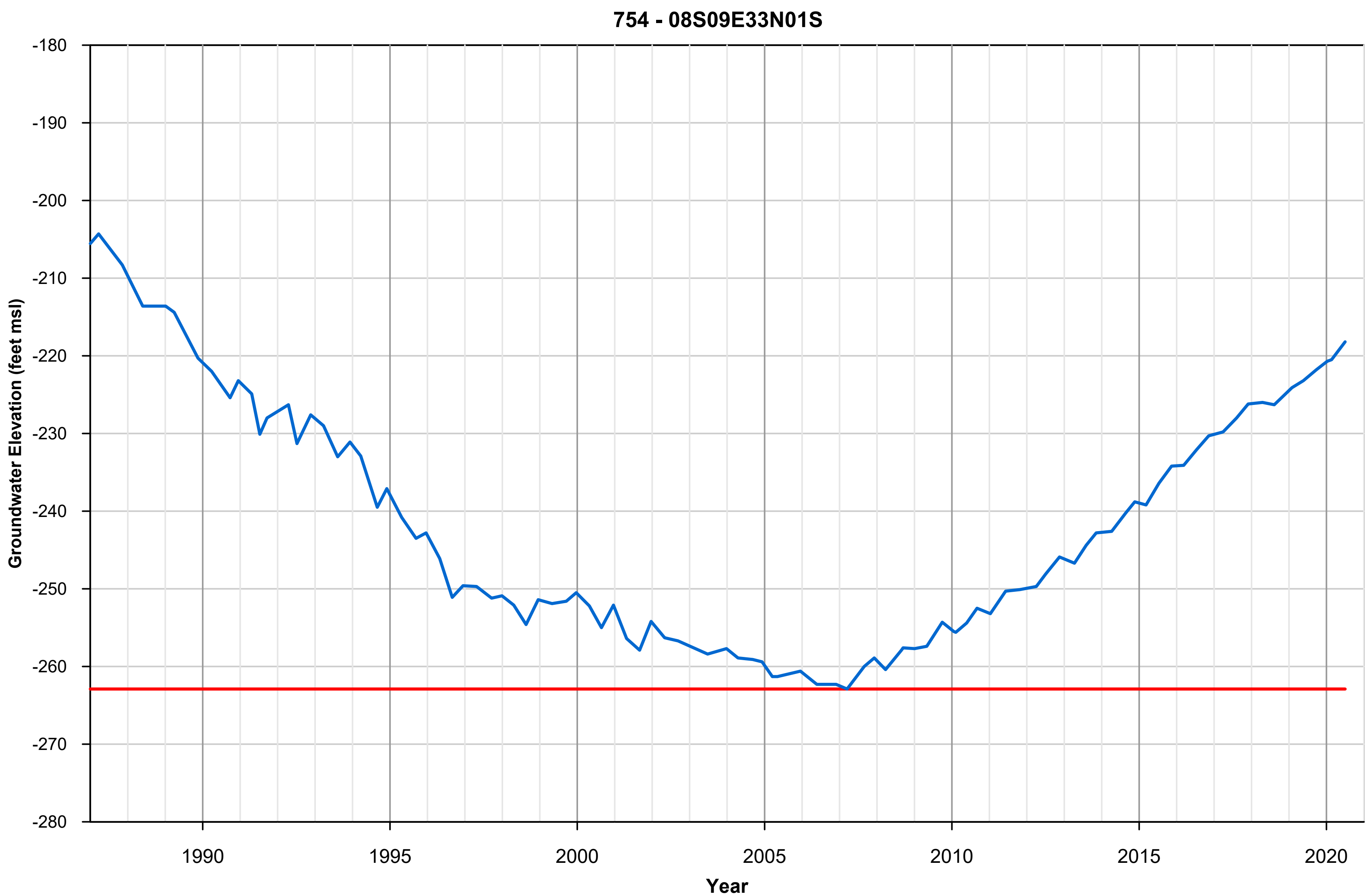
TODD GROUNDWATER

Appendix 9A-56
Groundwater Elevation Hydrograph
750 - 08S09E30A01S



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TODD GROUNDWATER

Appendix 9A-57
Groundwater Elevation Hydrograph
754 - 08S09E33N01S

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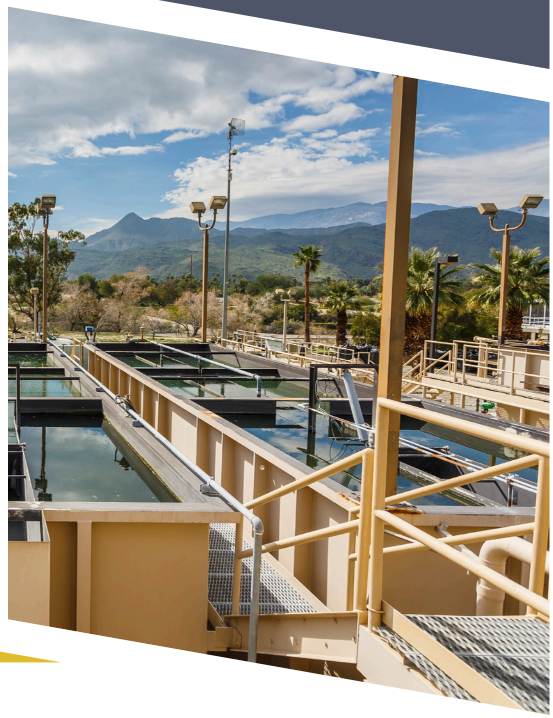

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