Appendix A Supplemental Material

A.1 List of Preparers

Table A-1.
Lead NEPA and CEQA Agencies

Preparers	Agency	Participation
Frances Mizuno	San Luis & Delta-Mendota Water Authority	Lead CEQA Agency Project Manager
Russ Grimes	Reclamation	Chief, Environmental Compliance and Habitat Conservation
Sheri Looper	Reclamation	Deputy Regional Resources Manager

Table A-2.
Consultants

Name	Qualifications	Background/Expertise	Participation
CDM Smith			
Anusha Kashyap	M.S. Environmental Engineering 7 years experience	Environmental Engineer	Project Manager, Technical Review, Primary Author: Groundwater
Carrie Buckman, P.E.	M.S. Environmental Engineering 18 years experience	Water Resources Engineer	Technical Review, Primary Author: Alternatives and Water Quality
Abbie Woodruff	M.S. Urban and Environmental Planning 3 years experience	Water Resources Planner	Contributing Author: Groundwater
Laura Lawson	B.S. Environmental Studies: Natural Resource Management and Conservation 2 years experience	Water Resources Planner	Deliverable Support, Contributing Author: Climate Change
Gwen Pelletier, ENV SP	M.S. Environmental Studies 16 years experience	Environmental Scientist	Primary Author: Climate Change

Name	Qualifications	Background/Expertise	Participation
MBK Engineers			
Lee Bergfeld	M.S. Civil Engineering 22 years experience	Civil Engineer	Primary Author: Climate Change Modeling Appendix
Shankar Parvathinathan	Ph.D. Environmental Engineering 12 years experience	Environmental Engineer	Primary Author: Climate Change Modeling Appendix
ICF			
Angela Alcala	B.S. Biology 15 years experience	Wildlife Biologist	Primary Author: Vegetation and Wildlife, Fisheries
Rick Wilder	Ph.D. Biology 14 years experience	Fisheries Biologist	Primary Author: Fisheries

Key:
ENV SP = Envision Sustainability Professional
P.E. = Professional Engineer

A.2 Acronyms

AF	acre-feet
Banks Pumping Plant	Harvey O. Banks Pumping Plant
BMO	basin management objective
BOs	Biological Opinions
C2VSIM	Central Valley Groundwater-Surface Water Simulation Model
CEQA	California Environmental Quality Act
CFR	Code of Federal Regulations
CGPS	Continuous Global Position Station
COA	Coordinated Operations Agreement
CVHM	Central Valley Hydrologic Model
CVP	Central Valley Project
CVPIA	Central Valley Project Improvement Act
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
Delta	Sacramento-San Joaquin Delta
DWR	California Department of Water Resources
EIS/EIR	Environmental Impact Statement/ Environmental Impact Report
ETAW	evapotranspiration of applied water
GMP	Groundwater Management Plan
GSP	Groundwater Sustainability Plan
ID	Irrigation District
Joint Board	Joint Water District Board

Jones Pumping Plant	C.W. "Bill" Jones Pumping Plant
M&I	municipal and industrial
MCL	maximum contaminant level
mg/L	milligrams per liter
MGD	millions of gallons per day
MUD	Municipal Utility District
MWC	Municipal Water Company
NEPA	National Environmental Policy Act
NOAA Fisheries	National Oceanic and Atmospheric Administration Fisheries Service
NSV IRWMP	North Sacramento Valley Integrated Regional Water Management Plan
RDEIR/SDEIS	Revised Draft Environmental Impact Report/Supplemental Draft Environmental Impact Statement
SACFEM2013	Sacramento Valley Finite Element Groundwater Model
SJRRP	San Joaquin River Restoration Program
SLDMWA	San Luis & Delta-Mendota Water Authority
SWP	State Water Project
SWRCB	State Water Resources Control Board
TMDL	total maximum daily load
USFWS	United States Fish and Wildlife Service
USGS	United State Geological Survey
UST	underground storage tank
VOC	volatile organic compound
WD	Water District
WSP	Water Shortage Policy
WY	Water Year

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Appendix B Background

This appendix includes information on the Central Valley Project (CVP), water providers that may want to buy water, Federal and State regulations regarding water transfers, and water transfer history.

B.1 Project Background

B.1.1 Reclamation and the CVP

Reclamation's Mid-Pacific Region is responsible for managing the CVP, which stores and delivers irrigation water to the Sacramento and San Joaquin valleys, water to cities and industries in Sacramento, the San Joaquin Valley, and the east and south Bay Areas. The CVP also delivers water to fish hatcheries and wildlife refuges throughout the Central Valley, and for protection, restoration and enhancement of fish, wildlife, and associated habitats in the Central Valley. Figure B-1 shows major CVP facilities and the CVP service area.

The CVP has approximately 270 water service contracts. CVP water allocations for agricultural, environmental, municipal and industrial (M&I) users vary based on factors such as hydrology, water rights, reservoir storage, environmental considerations, and operational limitations. Each year Reclamation determines the amount of water that can be delivered to each district and municipality based on conditions for that year. These allocations are expressed as a percentage of the maximum contract volumes of water according to the contracts, or historical use for M&I contractors in a water short year, held between Reclamation and the various water districts, municipalities, and other entities. Reclamation and the CVP contractors recognize that delivery of full contract quantities is not likely to occur every year (in most years). Table B-1 summarizes CVP allocations, as percentages of Contract Total, delivered to agricultural and M&I water contractors north and south of the Delta from 2000 through 2014. Water shortages lead to severe water constraints especially in the southern portion of the CVP.

Figure B-1.
Major CVP Facilities and CVP Service Areas

Table B-1.
CVP Water Supply Allocation Percentages 2000 through 2014

Year	Year Type[1]	Irrigation[2]		M&I	
		North of Delta (%)	South of Delta (%)	North of Delta (%)	South of Delta (%)
2000	AN	100	65	100	90
2001	D	60	49	85	77
2002	D	100	70	100	95
2003	AN	100	75	100	100
2004	BN	100	70	100	95
2005	AN	100	90	100	100
2006	W	100	100	100	100
2007	D	100	50	100	75
2008	C	40	40	75	75
2009	D	40	10	100	60
2010	BN	100	45	100	75
2011	W	100	80	100	100
2012	BN	100	40	100	75
2013	D	75	20	100[3]	70
2014	C	0	0	50	50
2015	C	0	0	25	25
2016	BN	100	5	100	55
2017	W	100	100	100	100
2018	--	100	50	100	70

Source: Reclamation 2014a

Notes:

[1] Based on the Sacramento Valley Water Year Index

[2] Includes water service contracts, does not include Sacramento River Settlement and San Joaquin River Exchange Contractors

[3] In 2013, American River M&I users received 75 percent of contract amount.

Key:

M&I = municipal and industrial
C = Critical
D = Dry
BN = Below Normal
AN = Above Normal
W = Wet

B.1.2 Water Agencies Requesting Transfers

A number of CVP contractors have identified interest in purchasing transfer water to reduce potential water shortages and have requested to be included in the Environmental Impact Statement/ Environmental Impact Report (EIS/EIR). Table B-2 summarizes all purchasing agencies, further referred to as buyers.

Table B-2.
Potential Buyers

San Luis & Delta-Mendota Water Authority Participating Members
Byron-Bethany Irrigation District
Del Puerto Water District
Eagle Field Water District
Mercy Springs Water District
Pacheco Water District
Panoche Water District
San Benito County Water District
San Luis Water District
Santa Clara Valley Water District
Westlands Water District
Contra Costa Water District
East Bay Municipal Utility District

San Luis Delta-Mendota Water Authority

San Luis Delta-Mendota Water Authority (SLDMWA) consists of 28 member agencies representing water service contractors and San Joaquin River Exchange Contractors. Figure B-2 shows the SLDMWA service area and identifies participating members included in Table B-2. Not all of SLDMWA member agencies are participating in this EIS/EIR.

Reclamation has an operation and maintenance agreement with SLDMWA to operate and maintain the physical works and appurtenances associated with the Jones Pumping Plant, the Delta-Mendota Canal, the O'Neill Pump/Generating Plant, the San Luis Drain, and associated works. One function SLDMWA serves is to negotiate and purchase water transfers with and on behalf of its member agencies when CVP allocations have been reduced and there is a need for supplemental water.

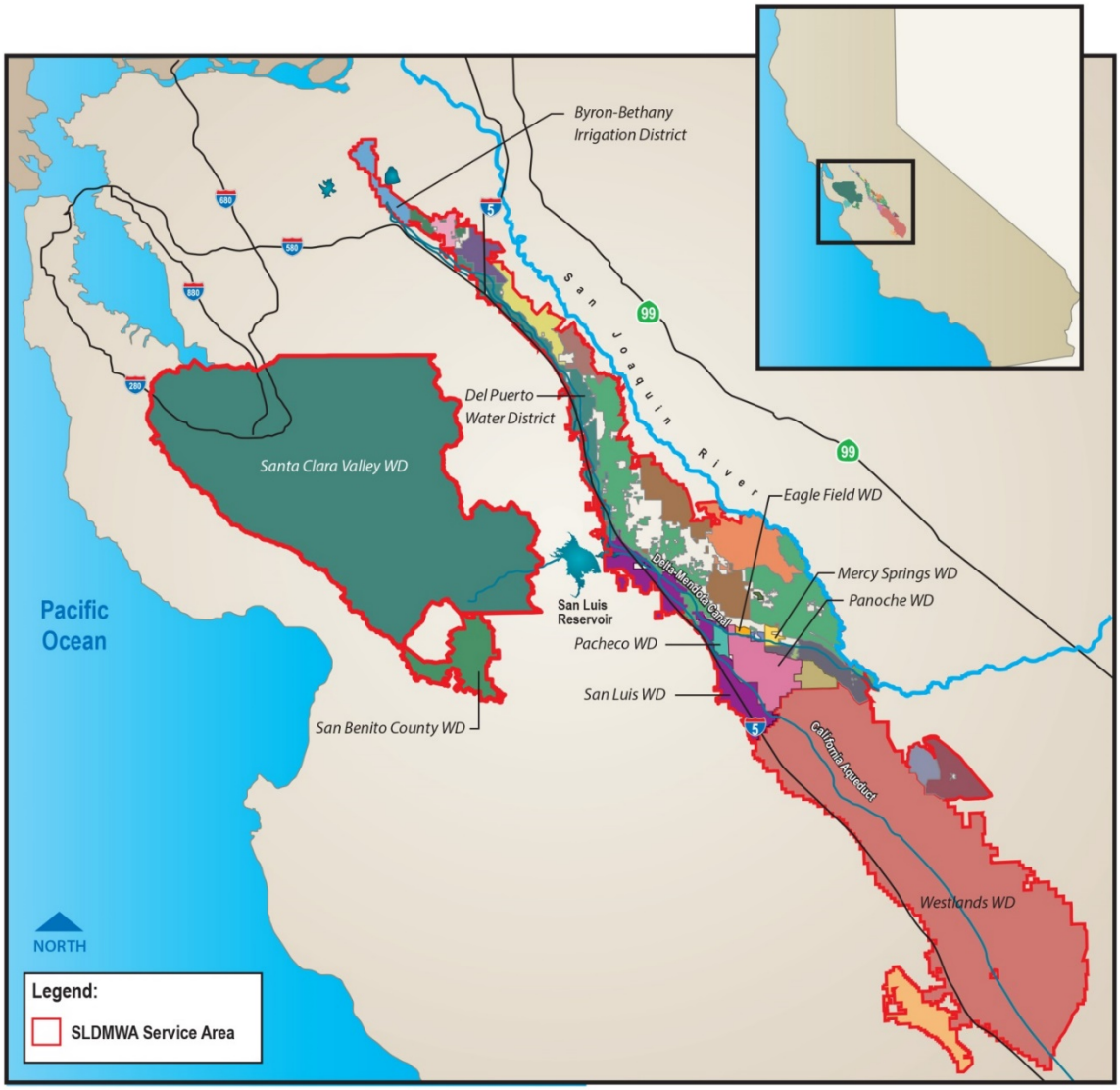

Figure B-2.
SLDWMA Service Area and Participating Member Agencies

The SLDMWA service area consists primarily of agricultural lands on the west side of the San Joaquin Valley. Agricultural water use occurs on approximately 850,000 irrigated acres. Water for habitat management occurs on approximately 120,000 acres of refuge lands, which receive approximately 250,000 to 300,000 acre-feet (AF) of water per year. Relative to agricultural uses, there is limited M&I water use in the San Joaquin Valley area. The majority of the M&I use in the SLDMWA service area occurs in the San Felipe Division, primarily the Santa Clara Valley Water District (WD). From 2001 to 2010, average annual M&I water use in the San Joaquin Valley area was about 22,000 AF and approximately 86,000 AF in the San Felipe Division.

As shown in Table B-1, south-of-Delta agricultural contractors, many of which are members of the SLDMWA, experience severe cutbacks in CVP allocations in most years. In 2009, deliveries were cut back to ten percent of Contract Total for agricultural water service contracts. In 2014 and 2015, agricultural water service contractors received a zero percent allocation. Note that the Exchange Contractors are not included in these allocations. SLDMWA member agencies use water transfers as a method to supplement water supplies in years when CVP allocations are reduced.

Contra Costa WD

The Contra Costa WD was formed in 1936 to purchase and distribute CVP water for irrigation and industrial uses. Today, the Contra Costa WD encompasses more than 214 square miles, serves a population of approximately 500,000 people in Central and East Contra Costa County, and is Reclamation's largest urban CVP contractor in terms of Contract Total. Figure B-3 shows the Contra Costa WD service area.

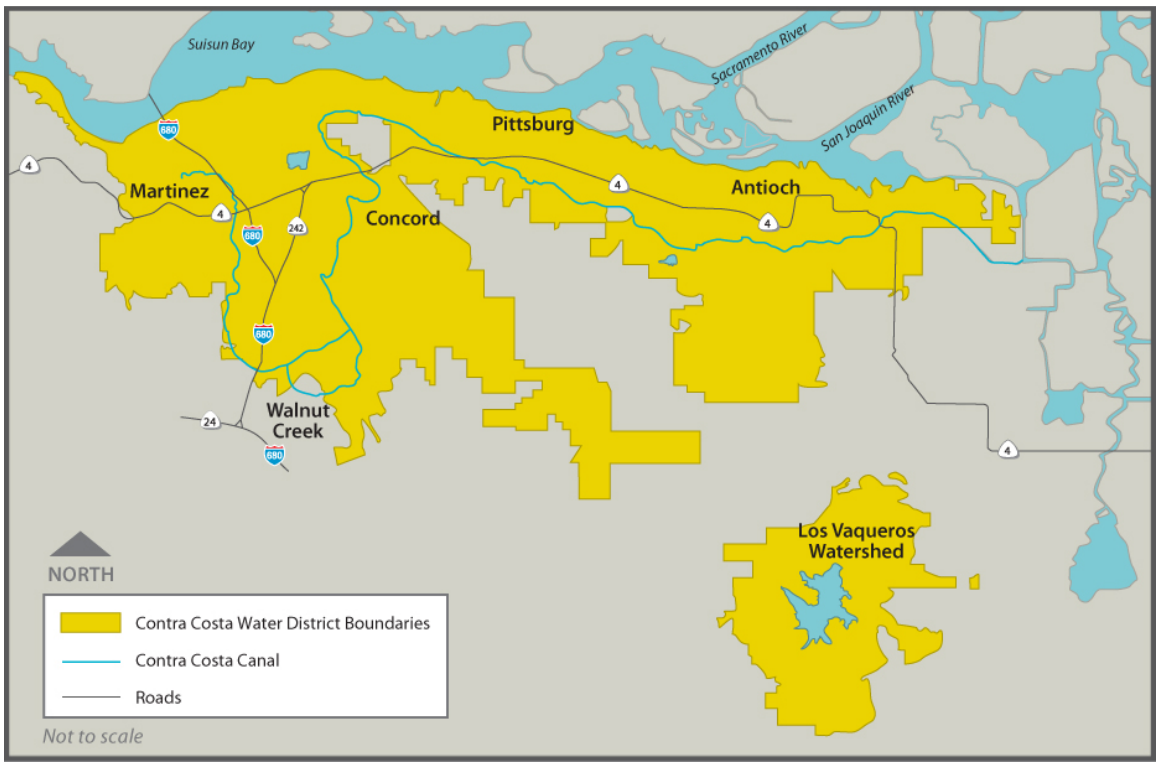

Figure B-3.
Contra Costa WD Service Area

Contra Costa WD is almost entirely dependent on diversions from the Delta. Pursuant to its water service contract with Reclamation, for its water supply. The 48-mile Contra Costa Canal conveys water throughout the service area. Contra Costa WD's long-term CVP contract with Reclamation was renewed in May 2005 and has a term of 40 years. The contract with Reclamation provides for a Contract Total of 195,000 AF per year from the CVP for M&I purposes, with a reduction during water shortages including

regulatory restrictions and drought. Contra Costa WD also has limited water supply from groundwater, recycled water, and some long-term water purchase agreements.

Figure B-4 shows Water Delivered to Contra Costa WD for the contract years 2001 through 2010. The figure shows that deliveries are typically well below the Contract Total of 195,000 AF.

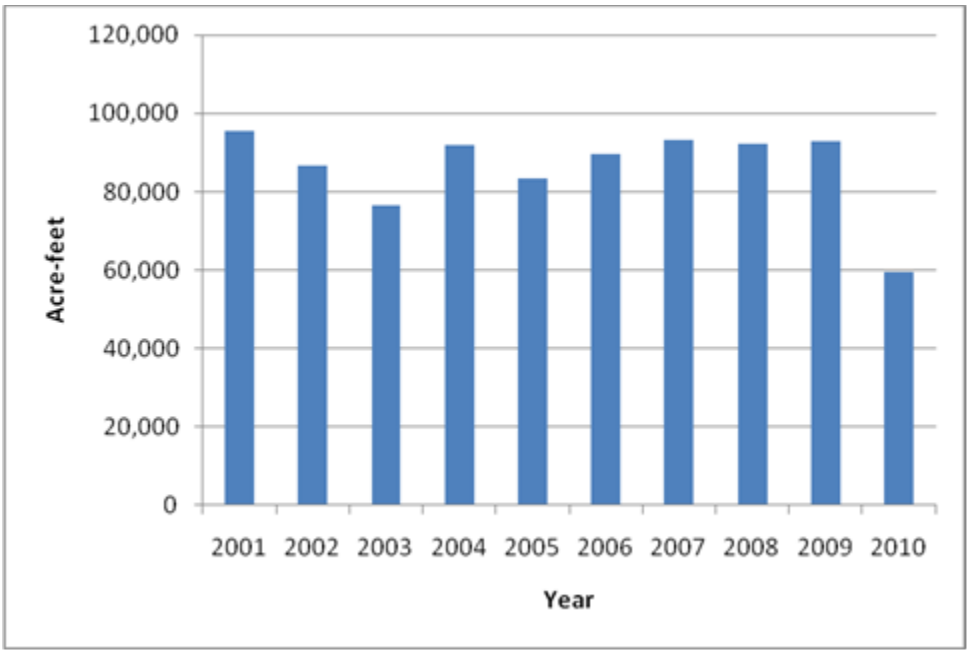

Figure B-4.
Water Delivered to Contra Costa WD, Contract Years 2001-2010

State Water Resources Control Board (SWRCB) Decision 1629 provides that Contra Costa WD may divert water under Permit No. 20749 from Old River to Los Vaqueros Reservoir from November through June during excess conditions in the Delta. Decision 1629 also specifies the maximum diversion rates at 250 cubic feet per second (cfs) and annual diversion to storage (95,800 AF annually at a rate of 200 cfs) by Contra Costa WD to Los Vaqueros Reservoir. These water rights are in addition to Contra Costa WD's CVP (195,000 AF) supply.

In the July 2011 Urban Water Management Plan (UWMP), Contra Costa WD estimates that CVP water supplies in the near term could be reduced from 170,000 AF in a normal year to 127,500 AF in a single year drought and 110,500 AF in the third year of a multi-year drought (Contra Costa WD 2011). The UWMP identifies use of water transfers to bridge the gap between supply and demand. Transfers would assist in meeting demands of existing customers during a drought and compensating them for possible reductions in the availability of CVP supplies (Contra Costa WD 2011).

East Bay Municipal Utility District (MUD)

East Bay MUD was organized in 1923 to provide water service to the east San Francisco Bay Area. Today, East Bay MUD provides water to approximately 1.4 million people over a 332 square mile area in Alameda and parts of Contra Costa counties. Figure B-5 shows the East Bay MUD service area.

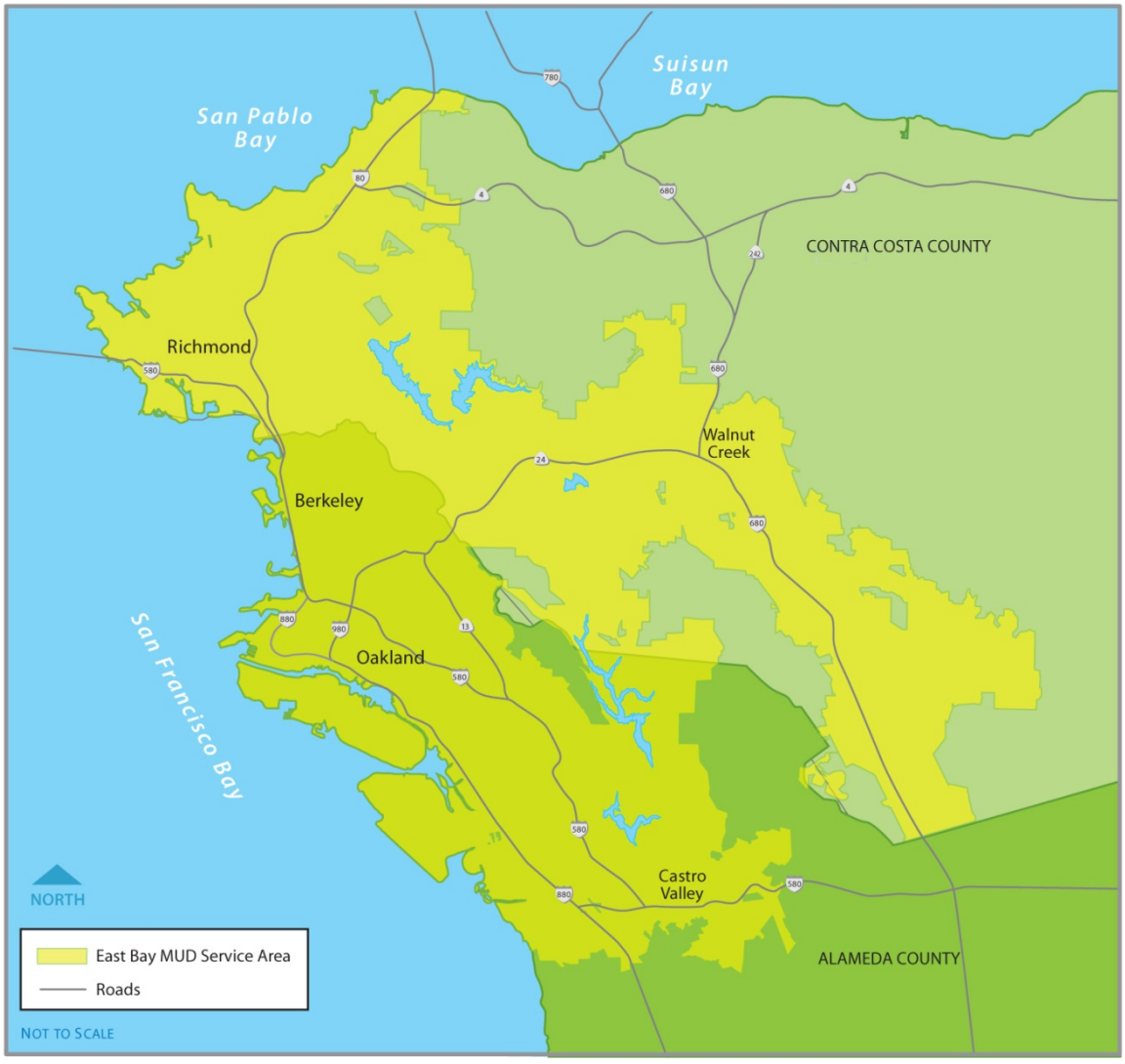

Figure B-5.
East Bay MUD Service Area

Ninety percent of East Bay MUD's water supply comes from the Mokelumne River watershed in the Sierra Nevada. In the long term, during drought, the Mokelumne River and local runoff cannot meet EBMUD's projected customer demands, even with mandatory water use restrictions.

In April 2006, EBMUD signed a Long Term Renewal Contract (LTRC) with USBR that has a term of 40 years. The LTRC provides for delivery of up to 133,000 AF in a single

qualifying year, not to exceed a total of 165,000 AF in three consecutive qualifying years. Qualifying years are those in which EBMUD's total stored water supply is forecast as of March 1 to be below 500 TAF on September 30 of that year. EBMUD will generally qualify for CVP deliveries during dry periods.

EBMUD exercised its LTRC and delivered CVP water for the first time during the 2014 2015 drought, with both deliveries subject to M&I water shortage allocations. In 2014, EBMUD received 18,641 acre-feet of CVP supply. In 2015, EBMUD received 33,250 acre-feet of CVP water.

East Bay MUD's Water Supply Management Program (WSMP) 2040 plan and 2015 UWMP both identify water transfers as a supplemental supply option to meet EBMUD's future dry year need for water, with transfer water diverted in dry years at the Freeport Project intake along the Sacramento River. EBMUD may seek short and long term water transfers to address supply deficiencies. (East Bay MUD 2015)

B.2 Federal and State Regulations Governing Water Transfers

This section discusses federal and state regulations relevant to water transfers. Local ordinances have been adopted in the sellers' service areas that address groundwater-related transfers. These local ordinances are discussed in Section 3.3, Groundwater Resources.

B.2.1 Federal Regulations

Central Valley Project Improvement Act (CVPIA) of 1992

The CVPIA[1] is a federal statute passed in 1992 with the following purposes:

> *"To protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley and Trinity River basins of California; To address impacts of the Central Valley Project on fish, wildlife and associated habitats; To improve the operational flexibility of the Central Valley Project; To increase water-related benefits provided by the Central Valley Project to the State of California through expanded use of voluntary water transfers and improved water conservation; To contribute to the State of California's interim and long-term efforts to protect the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; To achieve a reasonable balance among competing demands for use of Central Valley Project water, including the requirements of fish and wildlife, agricultural, municipal and industrial and power contractors."*

[1] Title 34 of Public Law 102-575, the Reclamation Projects Authorization and Adjustment Act of 1992, signed October 30, 1992.

The CVPIA granted the right to all individuals who receive CVP water (through contracts for water service, repayment contracts, water rights settlements, or exchange contracts) to sell this water to other parties for reasonable and beneficial purposes. According to the CVPIA Section 3405(a), the following principles must be satisfied for any transfer.

- Transfer may not violate the provisions of Federal or state law.
- Transfer may not cause significant adverse effects on Reclamation's ability to deliver CVP water to its contractors.
- Transfer will be limited to water that would be consumptively used or irretrievably lost to beneficial use.
- Transfer will not significantly adversely affect water supplies for fish and wildlife purposes.
- Transfers cannot exceed the average annual quantity of water under contract actually delivered to the contracting district or agency during the last three years of normal water delivery prior to the enactment of the CVPIA.

Reclamation must approve each transfer and will not approve a transfer if it will violate CVPIA principles and other state and federal laws. Reclamation issues its decision regarding potential CVP transfers in coordination with the U.S. Fish and Wildlife Service (USFWS), contingent upon the evaluation of impacts on fish and wildlife. A CVP transfer approval must be accompanied by appropriate documentation under National Environmental Policy Act (NEPA).

Biological Opinions on the Coordinated Operations of the CVP and SWP

On December 15, 2008, USFWS released a biological opinion on the effects of coordinated long-term operations of the CVP and State Water Project (SWP) on Delta smelt (USFWS 2008). The biological opinion concluded that continued long term operations of the CVP and SWP, as proposed, were "likely to jeopardize" the continued existence of delta smelt without further flow conditions in the Delta for their protection and the protection of designated delta smelt critical habitat. The USFWS developed a Reasonable and Prudent Alternative (RPA) aimed at protecting delta smelt, improving and restoring habitat, and monitoring and reporting results.

Similar to the USFWS biological opinion on delta smelt, National Oceanic Atmospheric Administration Fisheries Service (NOAA Fisheries) released a biological opinion on June 4, 2009 on the effects of continued long term coordinated operations of the CVP and SWP on listed andromous fish (NOAA Fisheries 2009). This biological opinion concluded that continued long term operations of the CVP and SWP, as proposed, were "likely to jeopardize" the continued existence of Sacramento River winter run Chinook salmon, Central Valley spring run Chinook salmon, Central Valley steelhead, and the southern Distinct Population Segment of North American green sturgeon and were "likely to destroy or adversely modify" designated or proposed critical habitat of these species. NOAA Fisheries also concluded that CVP and SWP operation both "directly

altered the hydrodynamics of the Sacramento-San Joaquin River basins and have interacted with other activities affecting the Delta to create an altered environment that adversely influences salmonid and green sturgeon population dynamics." The biological opinion identified an RPA to address these issues and protect anadromous fish species.

The Opinions included the following operational parameters applicable to water transfers:

- A maximum amount of water transfers is 600,000 AF per year in critical years and dry years (following dry or critical years). For all other year types, the maximum transfer amount is up to 360,000 AF.

- Transfer water will be conveyed through DWR's Harvey O. Banks (Banks) Pumping Plant or Jones Pumping Plant during July through September.

Several lawsuits were filed challenging the validity of the 2008 USFWS and 2009 NOAA Fisheries Biological Opinions and Reclamation's acceptance of the RPA included with each (Consolidated Salmonid Cases, Delta Smelt Consolidated Cases). The District Court issued findings that concluded Reclamation had violated NEPA by failing to perform any NEPA analysis before provisionally adopting the 2008 USFWS RPA and 2009 NOAA Fisheries RPA. On December 14, 2010, the District Court found the 2008 USFWS Biological Opinion to be unlawful and remanded the Biological Opinion to USFWS. The District Court issued a similar ruling for the 2009 NOAA Fisheries Biological Opinion on September 20, 2011. On March 13, 2014, the United States Court of Appeals for the Ninth Circuit affirmed in part and reversed in part the finding from the District Court on the USFWS Biological Opinion. The Court of Appeals upheld the determination that Reclamation must complete NEPA analysis, but it reversed on all arguments related to the adequacy of the Biological Opinion. On December 22, 2014, the United States Court of Appeals for the Ninth Circuit released similar findings related to the Consolidated Salmonid Cases and reversed the arguments about the adequacy of the Biological Opinion. Reclamation is working to complete NEPA analysis on the Biological Opinions, but the 2008 USFWS and 2009 NOAA Fisheries biological opinions will guide operations of potential water transfers.

B.2.2 State Regulations

Several sections of the California Water Code provide the SWRCB with the authority to approve transfers of water involving post-1914 water rights. The Water Code defines processes for short- and long-term water transfers. The SWRCB is responsible for reviewing transfer proposals and issuing petitions for temporary transfers related to post-1914 water rights. The SWRCB generally considers transfers of water under CVP water service or repayment contracts, water rights settlement contracts, or exchange contracts within the CVP place of use authorized in Reclamation's water rights to be internal actions and not subject to SWRCB review. Transfers of CVP water outside of the CVP place of use require SWRCB review and approval. The Water Code includes protections for impacts related to water transfers for other legal users of water, as well as fish, wildlife, and other instream beneficial uses.

Pre-1914 water rights are not subject to SWRCB jurisdiction, but transfers of water involving pre-1914 water rights are subject to review under CEQA and accordingly are analyzed in this EIS/EIR. Transfers involving pre-1914 water rights are also subject to the same "no injury rule" as set forth in Water Code Section 1706. Pre-1914 water rights are not subject to the provisions of the Water Code discussed below unless specifically mentioned.

Short-Term Transfers

Short-term (i.e., temporary) transfers are those that take place over a period of one year or less. Water Code Section 1725 allows a permittee or licensee to temporarily change a point of diversion, place of use, or purpose of use of water due to a transfer of water. Short-term transfers under Section 1725 are limited to water that would have been used consumptively or stored absent the water transfer. Section 1725 defines consumptively used water as "the amount of water which has been consumed through use by evapotranspiration, has percolated underground, or has been otherwise removed from use in the downstream water supply as a result of direct diversion." Return flows (water that returns to a stream or a useable underground aquifer after being applied to land) are typically used by other users; therefore, they are generally not available for transfer because the transfer of this water could injure these downstream users. The most common ways to reduce consumptive use are to idle land, shift to less water-intensive crops, or substitute groundwater in-lieu of surface water.

Section 1725 allows expedited processing of short-term transfers of post-1914 water rights. Short-term transfers qualify for this expedited process because the action is limited to one year, minimizing the risk of potential impacts. Transfers qualified under Section 1725 are exempt from CEQA pursuant to Section 1729 of the Water Code; the Water Code relies on notice to the affected parties and findings made by the SWRCB rather than the development of environmental documents under CEQA.

Short-term transfers must not injure any legal user of water or unreasonably affect fish, wildlife, or instream uses. Petitions for transfer must document the identifying permit or license as the basis for the transfer and support the claims of no injury to any legal user of the water and no unreasonable effects to fish and wildlife or other instream beneficial uses. The petition is publicly noticed and persons may file with the SWRCB objections or comments to the petition. The SWRCB is required to act upon the petition in accordance with the procedures set forth in Water Code Section 1726.

Water Code Section 1728 specifies that the one-year transfer period does not include any time required for monitoring, reporting, or mitigation before or after the temporary change is carried out. If, within a period of one year or less, the water is transferred to off-stream storage outside of the watershed where it was originated, the water may be put to beneficial use in the place of use during or after that period.

Long-Term Transfers

Long-term transfers are those that take place over a period of more than one year. Long-term transfers of water under post-1914 water rights are governed under Section 1735 of the Water Code. Long-term transfers need not necessarily involve the amount of water

consumptively used or stored, but the transfers are evaluated to assure that they will not cause substantial injury to any legal user of water and will not unreasonably affect fish, wildlife, or other instream beneficial uses. The Water Code does not provide for the expedited processing of long-term transfer petitions that is provided for short-term transfer petitions. Long-term transfers under Section 1735 are subject to the requirements of CEQA and must also comply with the standard SWRCB public noticing and protest process. If valid protests to the proposed change cannot be resolved through negotiation between the parties, a hearing must be held prior to the SWRCB's decision on the requested transfer. Section 1745.07 specifically indicates that transfers approved pursuant to provisions of law are deemed to be a beneficial use of water and protect the water rights of the seller during the transfer period.

No Injury Rule

A change in water rights involving a transfer is subject to the no injury rule. The no injury rule requires that a transfer may not injure other legal users of water. This rule applies to modern water rights through sections 1725 and 1736 of the Water Code and applies to pre-1914 appropriative water rights through Section 1706 of the Water Code. The SWRCB has jurisdiction over changes to post-1914 water rights, and the courts have jurisdiction over any claimed violations of Section 1706.

Effects on Fish and Wildlife

Water Code Sections 1725 and 1736 require that the SWRCB make a finding that proposed transfers not result in unreasonable effects on fish and wildlife or other instream beneficial uses prior to approving a change in post-1914 water rights. California Code of Regulations Title 23 section 794 requires the petitioner to 1) provide information identifying any effects of the proposed changes on fish, wildlife, and other instream beneficial uses, and 2) request consultation with California Department of Fish and Wildlife (CDFW) and the Regional Water Quality Control Board regarding potential effects of the proposed changes on water quality, fish, wildlife, and other instream beneficial uses. The petition for change will not be accepted by the SWRCB unless it contains the required information and consultation request. Early communication with CDFW would streamline the consultation process through "up front" coordination regarding assessment of the potential impact to fish and wildlife resources. The SWRCB will use this information in making their finding that proposed transfers do not result in unreasonable impacts on fish and wildlife or other instream beneficial uses.

Local Economic Effects

Cropland idling/crop shifting transfers have the potential to affect the overall economy of the county from which the water is being transferred. Parties that depend on farming-related activities can experience decreases in business if land idling becomes extensive. To minimize the socioeconomic effects on local areas, State agencies evaluate transfer proposals to ensure that the provisions of Water Code Section 1745.05(b) are implemented. Water Code Section 1745.05 (b) provides that if the amount of water made available by land fallowing (idling) exceeds 20 percent of the water that would have been applied absent the proposed water transfer, a public hearing by the water supply agency is required. Water supply agencies interested in participating in cropland idling/crop shifting transfers need to be aware of this Water Code section and conduct a public

hearing if they propose a transfer in which cropland idling would exceed the 20 percent threshold.

B.3 History of Water Transfers

Water transfers have been a common water resources planning practice in the past decades. The Lead Agencies have participated in transfers through previous programs or agreements. Transfers have included both in-basin and out-of-basin transfers. Out-of-basin transfers often involve movement of water through the Delta. The following sections briefly describe past water transfer programs and their associated environmental documentation.

The water transfers history highlights the complexities of the water transfer approval process. Reclamation, buyers, and sellers spend significant resources to complete environmental documents that cover water transfers for a single year or a few years. Completing this EIS/EIR to cover six years of transfers will streamline the environmental review process and make transfers more implementable relative to NEPA and CEQA requirements, especially when hydrologic conditions and available pumping capacity are unknown until right before the transfer season. A six-year document will also help address requests from USFWS for a more comprehensive evaluation of water transfers on biological resources and listed species.

B.3.1 In-Basin Transfers and NEPA/CEQA

In-basin transfers are a routine practice for water agencies that are within the same region. In-basin transfers occur among agencies within both the Sacramento Valley and the San Joaquin Valley. In-basin transfers are generally one-year transfers used to meet irrigation requirements or existing M&I water needs. Water agencies have also transferred water to nearby refuges to meet refuge habitat requirements.

In-basin transfers among CVP contractors require NEPA documentation. Reclamation typically completes Environmental Assessments (EAs) to cover these transfers. In accordance with the CVPIA, Reclamation has evaluated in-basin transfers over a multi-year period to accelerate approval. Most recently in 2010, Reclamation signed two Finding of No Significant Impact (FONSI) statements for accelerated water transfers and exchanges from 2011 through 2015. One FONSI covered transfers between CVP South of Delta Contractors and the other covered transfers between Friant Division and Cross Valley CVP Contractors. Reclamation also issued a FONSI for accelerated water transfers among CVP contractors and wildlife refuges within the Sacramento Valley from April 2010 through February 2015.

Reclamation also worked with the Exchange Contractors to complete an EIS/EIR to examine the environmental impacts of the transfer and exchange of the Exchange Contractors' CVP water (up to 130,000 AF per year for ten years) from 2005 through 2014 (Reclamation 2004). In 2013, Reclamation released a Final EIS/EIR for the transfer of up to 150,000 AF of substitute water from the Exchange Contractors to potential water users over a 25-year timeframe, from 2014-2038 (Reclamation 2013a).

B.3.2 Out-of-Basin Transfers and NEPA/CEQA

Since the late-1980s, use of out-of-basin water transfers to meet water needs during dry years increased on a statewide level. In response to the drought in the early 1990s, Reclamation and DWR sponsored drought-related programs, including the DWR-run Drought Water Bank initiated in 1991 and 1992, to negotiate and facilitate the exchange of water. A series of wet years in the late 1990s reduced the need for transfers.

In 2000, CALFED Record of Decision (ROD) established the Environmental Water Account (EWA) as a management tool to protect Delta fisheries and maintain water supply reliability for the CVP and SWP. The EWA included purchase of water to help meet these objectives. The CALFED ROD defined the EWA as a four-year program. However, with efficient water purchase practices, the program was able to acquire all the required assets for the EWA each year and extend the allocated funding into a seven-year program implemented from 2001 through 2007. During this time, over two million AF of water assets were acquired for the EWA environmental purposes. To meet NEPA/CEQA requirements, Reclamation and DWR developed the 2004 EWA EIS/EIR, which was a comprehensive evaluation of environmental impacts of the EWA through 2007.

In responses to dry conditions in 2009, Reclamation and DWR cooperatively implemented the 2009 Drought Water Bank to support through-Delta transfers. Reclamation completed the 2009 Drought Water Bank Environmental Assessment (EA) and FONSI that evaluated CVP-related transfers that occurred under the 2009 Drought Water Bank. Total CVP-related transfers under the program totaled approximately 390,000 AF.

In 2010, Reclamation completed a 2010-2011 Water Transfer Program EA and FONSI that evaluated out-of-basin transfers for 2010 and 2011 contract years (Reclamation 2010). However, because of wetter hydrologic conditions, no CVP-related transfers occurred in 2010 and 2011.

In 2013, Reclamation developed an EA for one-year transfers from sellers in the Sacramento River basin to SLDMWA (Reclamation 2013b). The EA analyzed up to 37,715 AF of groundwater substitution transfers. Approximately 29,217 AF were transferred under actions and approvals addressed and cleared by this environmental document. As a separate action, Contra Costa WD purchased 2,000 AF from Woodbridge Irrigation District (ID) that was conveyed through East Bay MUD's Mokelumne Aqueduct to Contra Costa WD (Woodbridge ID 2013). Reclamation was not involved in this transfer because it did not involve CVP supplies or CVP facilities.

In 2014, Reclamation and SLDMWA completed an EA/Initial Study for one-year transfers from sellers in the Sacramento River Basin (Reclamation 2014b). The document analyzed transfers up to 175,226 AF made available from groundwater substitution or cropland idling. Transfers up to 74,030 AF was negotiated, but all of these transfers were not moved based on operational limitations. Reclamation also completed environmental documentation on transfers from Contra Costa WD to Alameda County WD (5,000 AF) and Byron-Bethany ID (4,000 AF) (Reclamation 2014c and Reclamation 2014d). Also in 2014, Reclamation completed NEPA documentation on a

transfer Placer County Water Agency to East Bay MUD of about 5,000 AF (Reclamation 2014e).

SLDMWA is a common participant in most water transfers and has negotiated water transfers in past years on behalf of the member agencies. SLDMWA member agencies have been identified as a potential buyer in Reclamation's past transfer programs and many have purchased water in previous years. Table B-3 shows previous quantities of water transfers purchased by SLDMWA member agencies from 2000 through 2018.

Table B-3.
North of Delta Water Transferred to SLDMWA Member Agencies (2000-2018)

Year	Water Transfer Quantity (AF)
2000	No Transfers
2001	No Transfers
2002	8,685
2003	No Transfers
2004	15,600
2005	3,100
2006	No Transfers
2007	3,100
2008	12,195
2009	106,322
2010	No Transfers
2011	No Transfers
2012	No Transfers
2013	66,500
2014	74,030[1]
2015	164,153[2]
2016	No Transfers
2017	No Transfers
2018	No Transfers

Source: SLDMWA 2014
[1]SLDMWA 2015
[2]Reclamation 2018

B.4 References

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Woodbridge Irrigation District (ID). 2013. Notice of Exemption: Water Transfer/Sale by Woodbridge Irrigation District to the Contra Costa Water District.

Appendix C Impact Summary

A summary of the environmental impacts identified for the Action Alternatives (including beneficial effects pursuant to NEPA) is presented in Tables C-1 and C-2. The No Action/No Project Alternative considers the potential for changed conditions during the 2015-2024 period when transfers could occur, but because this period is relatively short, the analysis did not identify changes from existing conditions. Alternative 1 is therefore not included in the tables.

The purpose of Table C-1 is to consolidate and disclose the significance determinations made pursuant to CEQA made throughout the Long-Term Water Transfers EIS/EIR (the 2014 draft and this RDEIR/SDEIS). Some impacts specifically related to Vegetation and Wildlife have been revised based on the revised analysis summarized in Section 3.8 of this this RDEIR/SDEIS. These revisions to CEQA determinations are also consolidated and presented in Table C-1. Impact determination highlighted in Table C-1 have been revised since the release of the Long-Term Water Transfers 2014 Draft EIS/EIR. The impacts listed in Table C-1 are NEPA impacts as well as CEQA impacts, but they are judged for significance only under CEQA. Pursuant to NEPA, significance is used to determine whether an EIS or some other level of documentation is required, and once the decision to prepare an EIS is made, the magnitude of the impact is evaluated and no further judgment of significance is required.

Table C-2 summarizes impacts for resources that were analyzed only under NEPA and do not include findings of significance. These impacts have not been revised since the release of the Long-Term Water Transfers EIS/EIR.

Table C-1.
Potential Impacts Summary

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Water Supply							
Groundwater substitution transfers could decrease flows in surface water bodies following a transfer while groundwater basins recharge, which could decrease pumping at Jones and Banks Pumping Plants and/or require additional water releases from upstream CVP reservoirs.	2, 3	S	WS-1: Streamflow Depletion Factor	LTS	S	WS-1: Streamflow Depletion Factor	LTS
Water supplies on the rivers downstream of reservoirs could decrease following stored reservoir water transfers, but would be limited by the refill agreements	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Changes in Delta diversions could affect Delta water levels	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Transfers would increase water supplies in the Buyers Service Area	2, 3, 4	B	None	B	B	None	B
Water Quality							
Cropland idling transfers could result in increased deposition of sediment on water bodies.	2, 4	LTS	None	LTS	LTS	None	LTS
Cropland idling/shifting transfers could change the water quality constituents associated with leaching and runoff.	2, 4	LTS	None	LTS	LTS	None	LTS
Cropland idling/shifting transfers could change the quantity of organic carbon in waterways.	2, 4	LTS	None	LTS	LTS	None	LTS

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Groundwater substitution transfers could introduce contaminants that could enter surface waters from irrigation return flows.	2, 3	LTS	None	LTS	LTS	None	LTS
Water transfers could change reservoir storage in CVP and SWP reservoirs and could result in water quality impacts.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Water transfers could change reservoir storage non-Project reservoirs participating in reservoir release transfers, which could result in water quality impacts.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Water transfers could change river flow rates in the Seller Service Area and could affect water quality.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Water transfers could change Delta inflows and could result in water quality impacts.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Water transfers could change Delta outflows and could result in water quality impacts.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Water transfers could change Delta salinity and could result in water quality impacts.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Diversion of transfer water at Banta Carbona ID, West Stanislaus ID, and Patterson ID could affect water quality in the Delta-Mendota Canal.	2, 3, 4	LTS	None	LTS	LTS	None	LTS

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Use of transfer water in the Buyer Service Area could result in increased irrigation on drainage impaired lands in the Buyer Service Area which could affect water quality.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Water transfers could change reservoir storage in San Luis Reservoir and could result in water quality impacts.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Groundwater Resources							
Groundwater substitution transfers could cause a reduction in groundwater levels in the Seller Service Area.	2, 3	S	GW-1: Mitigation and Monitoring Plans	LTS	S	GW-1: Mitigation and Monitoring Plans	LTS
Groundwater substitution transfers could cause subsidence in the Seller Service Area.	2, 3	S	GW-1: Mitigation and Monitoring Plans	LTS	S	GW-1: Mitigation and Monitoring Plans	LTS
Groundwater substitution transfers could cause changes to groundwater quality in the Seller Service Area.	2, 3	LTS	None	LTS	LTS	None	LTS
Cropland idling transfers could cause reduction in groundwater levels in the Seller Service Area due to decreased applied water recharge.	2, 4	LTS	None	LTS	LTS	None	LTS

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Water transfers via cropland idling could cause groundwater level declines in the Seller Service Area that lead to permanent land subsidence or changes in groundwater quality.	2, 4	LTS	None	LTS	LTS	None	LTS
Water transfers could reduce groundwater pumping during shortages in the Buyer Service Area, which could increase groundwater levels, decrease subsidence, and improve groundwater quality.	2, 3, 4	B	None	B	B	None	B
Geology and Soils							
Cropland idling transfers in the Seller Service Area that temporarily convert cropland to bare fields could increase soil erosion.	2, 4	LTS	None	LTS	LTS	None	LTS
Cropland idling water transfers could cause expansive soils in the Seller Service Area to shrink due to the reduction in applied irrigation water.	2, 4	LTS	None	LTS	LTS	None	LTS
Use of transfer water on agricultural fields in the Buyer Service Area could increase soil erosion.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Use of transfer water on agricultural fields in the Buyer Service Area could increase soil movement.	2, 3, 4	LTS	None	LTS	LTS	None	LTS

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Changes in streamflows in the Sacramento and San Joaquin Rivers and their tributaries as a result of water transfers could result in increased soil erosion.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Air Quality							
Increased groundwater pumping for groundwater substitution transfers would increase emissions of air pollutants in the Sellers Service Area.	2, 3	S	AQ-1: Reducing pumping to reduce emissions, AQ-2: Operate electric engines	LTS	S	AQ-1: Reducing pumping to reduce emissions, AQ-2: Operate electric engines	LTS
Water transfers via cropland idling could reduce vehicle exhaust emissions from reduced operations in the Sellers Service Area.	2, 4	B	None	B	B	None	B
Water transfers via cropland idling would increase fugitive dust emissions from wind erosion of bare fields and decrease fugitive dust emissions associated with land preparation and harvesting in the Sellers Service Area.	2, 4	B	None	B	B	None	B
Use of water from transfers on agricultural fields in the Buyer Service Area could reduce windblown dust.	2, 3, 4	B	None	B	B	None	B

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Water transfers via groundwater substitution and cropland idling could exceed the general conformity de minimis thresholds.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Climate Change							
Increased groundwater pumping for groundwater substitution transfers could increase emissions of greenhouse gases.	2, 3	LTS	None	LTS	LTS	None	LTS
Water transfers via cropland idling could reduce vehicle exhaust emissions from reduced operations in the study area.	2, 4	LTS	None	LTS	LTS	None	LTS
Changes to the environment from climate change could affect the action alternatives.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Use of water from transfers on agricultural fields in the Buyer Service Area could affect emissions.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Fisheries							
Transfer actions could affect reservoir storage and reservoir surface area in reservoirs supporting fisheries resources	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Groundwater substitution could reduce stream flows supporting fisheries resources in small streams	2, 3	LTS	None	LTS	LTS	None	LTS

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Transfer actions could alter flows of rivers and creeks supporting fisheries resources in the Sacramento and San Joaquin river watersheds	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Transfer actions could alter hydrologic conditions in the Delta, altering associated habitat availability and suitability	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Transfer actions could affect the habitat of special-status species associated with mainstem rivers, tributaries, and the Delta.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Vegetation and Wildlife							
Groundwater substitution could reduce groundwater levels and available groundwater for natural communities	2, 3	LTS	None	LTS	LTS	None	LTS
Transfers could impact reservoir storage and reservoir surface area and alter habitat availability and suitability associated with those reservoirs	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Groundwater substitution could reduce stream flows supporting natural communities in small streams	2, 3	S	GW-1	LTS	S	GW-1, VEG and WILD-1	LTS
Cropland Idling/shifting could alter habitat availability and suitability for upland species	2, 4	LTS	None	LTS	LTS	None	LTS

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Transfers could reduce flows in large rivers in the Sacramento and San Joaquin River watersheds, altering habitat availability and suitability associated with these rivers	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Transfer actions could alter hydrologic conditions in the Delta, altering associated habitat availability and suitability	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Transfer actions could impact San Luis Reservoir storage and surface area.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Cropland idling/shifting under could alter the amount of suitable habitat for natural communities, special-status wildlife species, and migratory birds associated with seasonally flooded agriculture and associated irrigation waterways	2, 4	LTS	None	LTS	S	VEG and WILD-1	LTS
Transfer actions could alter planting patterns and urban water use in the Buyer Service Area	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Transfers could affect wetlands that provide habitat for special status plant species.	2, 3, 4	LTS	None	LTS	S	GW-1, VEG and WILD- 1	LTS
Transfers could affect giant garter snake and Pacific pond turtle by reducing aquatic habitat.	2, 3, 4	LTS	None	LTS	S	GW-1, VEG and WILD-1	LTS

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Transfers could affect the San Joaquin kit fox by reducing available habitat.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Transfers could impact special status bird species and migratory birds.	2, 3, 4	LTS	None	LTS	S	GW-1, VEG and WILD-1	LTS
Agricultural Land Use							
Cropland idling water transfers could decrease the amount of lands categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP.	2	LTS	None	LTS	LTS	None	LTS
Cropland idling water transfers could decrease the amount of lands categorized as Prime Farmland, Farmland of Statewide Importance, or Unique Farmland under the FMMP.	4	S	Mitigation Measure LU-1: Avoiding changes in FMMP land use classifications	LTS	S	Mitigation Measure LU-1: Avoiding changes in FMMP land use classifications	LTS
Cropland idling water transfers could convert agricultural lands under the Williamson Act and other land resource programs to an incompatible use.	2, 4	LTS	None	LTS	LTS	None	LTS
Cropland idling water transfers could conflict with local land use policies.	2, 4	NI	None	NI	NI	None	NI
Water transfers could provide water to irrigators in the Buyer Service Area to irrigate existing crop fields and maintain agricultural land uses.	2, 3, 4	B	B	B	B	B	B

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Cultural Resources							
Transfers that draw down reservoir surface elevations beyond historically low levels could result in a potentially significant effect on cultural resources.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Stored reservoir release transfers that draw down reservoir surface elevations at local reservoirs beyond historically low levels could affect cultural resources.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Visual Resources							
Water transfers could degrade the existing landscape character or scenic attractiveness of Class A and B visual resources at CVP and SWP reservoirs	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Water transfers could degrade the existing landscape character or scenic quality of Class A and B visual resources along surface water bodies	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Stored reservoir release transfers could substantially degrade the existing landscape character or scenic attractiveness of Class A and B visual resources participating reservoirs	2, 3, 4	LTS	None	LTS	LTS	None	LTS

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Cropland idling transfers could substantially degrade the existing landscape character and scenic attractiveness of Class A and B visual resources	2, 4	LTS	None	LTS	LTS	None	LTS
Water transfers could substantially degrade the existing landscape character and quality in the Buyer's Service Area	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Recreation							
Changes in surface water elevation at Shasta, Folsom, Merle Collins, Oroville, Camp Far West, and Lake McClure reservoirs as a result of water transfers could affect reservoir-based recreation.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Changes in surface water elevations at Hell Hole and French Meadows Reservoirs as a result of water transfers could affect reservoir-based recreation.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Changes in river flows from water transfers could affect river-based recreation on the Sacramento, Yuba, Feather, American, San Joaquin, and Merced rivers.	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Changes in average flow into the Delta from the San Joaquin River from water transfers could affect river-based recreation.	2, 3, 4	NI	None	NI	NI	None	NI

Potential Impact	Alternative	Significance to CEQA	Proposed Mitigation	Significance After Mitigation Pursuant to CEQA	Revised Significance to CEQA	Revised Proposed Mitigation	Revised Significance After Mitigation Pursuant to CEQA
Changes in surface water elevation at San Luis Reservoir as a result of water transfers could affect reservoir-based recreation	2, 3, 4	NI	None	NI	NI	None	NI
Power							
Acquisition of water via groundwater substitution or crop idling may cause changes in power generation from CVP and SWP reservoirs	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Acquisition of water via stored reservoir water may cause changes in power generation from the facilities that provide water	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Flood Control							
Water transfers would change storage levels in CVP and SWP reservoirs, potentially affecting flood control	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Water transfers would change storage levels in non-Project reservoirs and potentially affecting flood control	2, 3, 4	B	None	B	B	None	B
Water transfers could increase river flows, potentially affecting flood capacity or levee stability	2, 3, 4	LTS	None	LTS	LTS	None	LTS
Water transfers would change storage at San Luis Reservoir, potentially affecting flood control	2, 3, 4	LTS	None	LTS	LTS	None	LTS

Key:
B = beneficial; LTS = less than significant; NI = no impact; None = no feasible mitigation identified and/or required; S = significant

Table C-2.
Impacts for NEPA-Only Resources

Potential Impact	Alternative	Impact
REGIONAL ECONOMICS		
Seller Service Area		
Revenues from cropland idling water transfers could increase incomes for farmers or landowners selling water.	2, 4	Beneficial
Cropland idling transfers in Glenn, Colusa, and Yolo counties could reduce employment, labor income, and economic output for businesses and households linked to agricultural activities.	2, 4	Employment: -492 Labor Income: -$19.38 Million Output: -$90.43 Million
Cropland idling transfers in Sutter and Butte counties could reduce economic output, value added, and employment for businesses and households linked to agricultural activities.	2, 4	Employment: -163 Labor Income: -$5.50 Million Output: -$26.76 Million
Cropland idling transfers in Solano County could reduce economic output, labor income, and employment for businesses and households linked to agricultural activities.	2, 4	Employment: -32 Labor Income: -$1.13 Million Output: -$4.58 Million
Cropland idling transfers could have adverse local economic effects.	2, 4	Adverse
Water transfers from idling alfalfa could increase costs for dairy and other livestock feed.	2, 4	Adverse, but minimal
Cropland idling transfers could decrease net revenues to tenant farmers whose landowners choose to participate in transfers.	2, 4	Adverse
Crop shifting transfers could change economic output, value added, and employment for businesses and households linked to agricultural activities.	2, 4	Adverse, but minimal
Crop shifting transfers could change economic output, value added, and employment for businesses and households linked to agricultural activities.	2, 4	Adverse, but minimal
Economic effects associated with cropland idling could conflict with economic policies and objectives set forth in local plans.	2, 4	Adverse
Economic effects associated with cropland idling could conflict with economic policies and objectives set forth in local plans.	2, 4	Adverse
Reductions in local sales associated with cropland idling transfer effects could reduce tax revenues and increase costs to county governments.	2, 4	Adverse, but minimal
Groundwater substitution transfers could increase groundwater pumping costs for water users in areas where groundwater levels decline as a result of the transfer.	2, 3	Adverse
Revenues from groundwater substitution water transfers could increase incomes for farmers or landowners selling water.	2, 3	Beneficial
Groundwater substitution water transfers could increase management costs for local water districts.	2, 3	Adverse

Potential Impact	Alternative	Impact
Revenues received from stored reservoir and conservation transfers could increase operating incomes for sellers.	2, 3, 4	Beneficial, but minimal
Buyer Service Area		
Water transfers would provide water for agricultural uses that could support revenues, economic output, and employment.	2, 3, 4	Beneficial
Water transfers would provide water for M&I uses that could support revenues, economic output, and employment.	2, 3, 4	Beneficial
ENVIRONMENTAL JUSTICE		
Cropland idling transfers could adversely and disproportionately affect minority and low-income farm workers in the Seller Service Area.	2, 4	No disproportionately high or adverse effect
Crop shifting transfers could adversely and disproportionately affect minority and low-income farm workers in the Seller Service Area.	2, 3	No disproportionately high or adverse effect
Use of cropland modification transfers could adversely and disproportionately affect minority and low-income farm workers in the Buyer Service Area.	2, 3, 4	Beneficial
INDIAN TRUST ASSETS		
Groundwater substitution transfers could adversely affect ITAs by decreasing groundwater levels, which would potentially interfere with the exercise of a federally-reserved water right use, occupancy, and or character	2, 3	No effect
Groundwater substitution transfers could adversely affect ITAs by reducing the health of tribal members by decreasing water supplies	2, 3	No effect
Groundwater substitution transfers could affect ITAs by affecting fish and wildlife where there is a federally-reserved hunting, gathering, or fishing right.	2, 3	No effect
Groundwater substitution transfers could adversely affect ITAs by causing changes in stream flow temperatures or stream depletion, which would potentially interfere with the exercise of a federally-reserved Indian right	2, 3	No effect
Use of groundwater substitution transfers could affect reservations or Rancherias in the Buyer Service Area to reduce CVP shortages.	2, 3, 4	Beneficial

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Appendix D Regulatory Settings

Applicable groundwater related regulatory settings are described below in Section D.1, Groundwater. All water transfers will have to comply with applicable regulations: State regulations; Central Valley Project (CVP) and State Water Project (SWP) contractual requirements; and local regulations, as described below. Section D.2, Biological Resources, describes laws, rules, regulations and policies that apply to the natural communities, common plants and wildlife, fisheries, and special-status species that occur within the area of analysis. Climate change is governed by several federal and state laws and policies described in Section D.3.

D.1 Groundwater

D.1.1 Federal Regulation

Central Valley Project Improvement Act (Section 3405)

Reclamation approves water transfers consistent with provisions of the Central Valley Project Improvement Act (CVPIA) and State law that protect against injury to other legal users of water. According to the CVPIA Section 3405, the following principles must be satisfied for any transfer:

- Transfer may not violate the provisions of Federal or state law;
- Transfer may not cause significant adverse effects on Reclamation's ability to deliver CVP water to its contractors or other legal user;
- Transfer will be limited to water that would be consumptively used or irretrievably lost to beneficial use;
- Transfers cannot exceed the average annual quantity of water under contract actually delivered; and
- Transfer will not adversely affect water supplies for fish and wildlife purposes.

Reclamation will not approve a water transfer if these basic principles are not satisfied and will issue its decision regarding potential CVP transfers in coordination with the U.S. Fish and Wildlife Service (USFWS), contingent upon the evaluation of impacts on fish and wildlife.

D.1.2 State Regulation

Groundwater use is subject to limited statewide regulation; however, all water use in California is subject to constitutional provisions that prohibit waste and unreasonable use of water (State Water Resources Control Board [SWRCB] 1999). In general, groundwater and groundwater-related transfers are subject to a number of provisions in the California Water Code (Water Code). Some of these provisions are listed below.

Water Code (Section 1745.10)

Section 1745.10 of the Water Code requires that for water transfers pursuant to Sections 1725[1] and 1735[2], the transferred water may not be replaced with groundwater unless the following criteria are met (SWRCB 1999):

- The transfer is consistent with applicable Groundwater Management Plans (GMPs); or
- The transferring water supplier approves the transfer and, in the absence of a GMP, determines that the transfer will not create, or contribute to, conditions of long-term overdraft in the groundwater basin.

Water Code (Section 1220)

Section 1220 of the Water Code regulates the direct export of groundwater from the combined Sacramento and Delta-Central Sierra Basins. It states that groundwater cannot be exported from these basins unless pumping complies with a GMP, adopted by the county board of supervisors in collaboration with affected water districts, and approved by a vote from the counties that lie within the basin. This excludes water seepage into groundwater from water supply project or export facilities, which may be returned to the facilities. In certain cases, the county board of supervisors may select a county water agency to represent the board.

In addition to these requirements, state well standards and local ordinances govern well placement, and the Water Code requires submission of well completion reports. Any groundwater substitution transfers would be subject to these regulations, as well as other applicable local regulations and ordinances. Reclamation requires sellers to submit well completion reports (if they are available) or video logs to evaluate proposed groundwater substitution transfers. Groundwater substitution transfers are not contingent on the submission of well completion reports.

Water Code (Section 1810) "no injury" provisions

Several provisions of the Water Code (including Sections 1702, 1706, 1725, 1735, and 1810, among others) provide that transfers cannot cause "injury to any legal user of the water involved." Both surface and groundwater users are protected by these provisions as long as they are legal users of water.

Water Code (Section 10750) or Assembly Bill (AB) 3030

AB 3030, commonly referred to as the Groundwater Management Act, permits local agencies to develop GMPs that cover certain aspects of management. Subsequent legislation has amended this chapter to make the adoption of a management program mandatory if an agency is to receive

[1] Section 1725 of the Water Code pertains to short-term/temporary transfers of water under post 1914 water rights that involve the amount of water that would have been consumptively used or stored by the transferee in the absence of the change or transfer. Such changes or transfers are exempt from CEQA, but require findings of "no injury to other legal users" and "no unreasonable effects on fish and wildlife."

[2] Section 1735 of the Water Code pertains to long-term transfers of water or water rights involving a change of point of diversion, place of use, or purpose of use. A transfer is considered long-term if it exceeds a period of one year.

public funding for groundwater projects, creating an incentive for the development and implementation of plans.

Water Code (Section 10753.7) or Senate Bill (SB) 1938

SB 1938, requires local agencies seeking State funds for groundwater construction or groundwater quality projects to have the following: (1) a developed and implemented GMP that includes basin management objectives[3] (BMOs) and addresses the monitoring and management of groundwater levels, groundwater quality degradation, inelastic land subsidence, and surface water/ groundwater interaction; (2) a plan addressing cooperation and working relationships with other public entities; (3) a map showing the groundwater subbasin the project is in, neighboring local agencies, and the area subject to the GMP; (4) protocols for the monitoring of groundwater levels, groundwater quality, inelastic land subsidence, and groundwater/surface water interaction; and (5) GMPs with the components listed above for local agencies outside the groundwater subbasins delineated by the Department of Water Resources' (DWR) California's Groundwater Bulletin 118 (Bulletin 118), published in 2003 (DWR 2003).

Water Code (Section 10920-10936 and 12924) or SB X7 6

SB X7 6, established a voluntary statewide groundwater monitoring program and requires that groundwater data collected be made readily available to the public. The bill requires DWR to: (1) develop a statewide groundwater level monitoring program to track seasonal and long-term trends in groundwater elevation; (2) conduct an investigation of the state's groundwater basins delineated by Bulletin 118 and report its findings to the Governor and Legislature no later than January 1, 2012 and thereafter in years ending in five or zero; and (3) work cooperatively with local Monitoring Entities to regularly and systematically monitor groundwater elevations to demonstrate seasonal and long-term trends. AB 1152, Amendment to Water Code Sections 10927, 10932 and 10933, allows local Monitoring Entities to propose alternate monitoring techniques for basins meeting certain conditions and requires submittal of a monitoring plan to DWR for evaluation.

Water Code (Section 10927, 10933, 12924, 10750.1 and 10720) or SB 1168

SB 1168 requires the establishment of Groundwater Sustainability Agencies (GSA) and adoption of Groundwater Sustainability Plans (GSP). GSAs must be formed by June 30, 2017. GSAs are new entities that consist of local agency(ies) and include new authority to: 1) investigate and determine the sustainable yield of a groundwater basin; 2) regulate groundwater extractions; 3) impose fees for groundwater management; 4) require registration of groundwater extraction facilities; 5) require groundwater extraction facilities to use flow measurement devices; and 6) enforce the terms of a GSP.

Additionally, this bill requires groundwater basins to be prioritized as high-, medium-, low- or very low- with respect to groundwater conditions, adverse impacts on local habitat and adverse impacts on local stream flow no later than January 31, 2015. DWR has determined that the initial basin prioritization developed in June 2014 will be the initial prioritization adopted under

[3] BMOs are management tools that define the acceptable range of groundwater levels, groundwater quality, and inelastic land subsidence that can occur in a local area without causing significant adverse impacts.

this legislation. DWR has not identified basins with critical overdraft conditions as of January 31, 2015.

GSPs for groundwater basins designated by DWR as high- and medium-priority with critical overdraft conditions (per SB X7 6) are required to be developed by January 31, 2020. GSPs for the remaining high- and medium-priority groundwater basins are to be developed by January 31, 2022. GSPs are encouraged to be developed for groundwater basins prioritized as low- or very low-priority (Pavley 2014a). All high- and medium-priority basins must achieve sustainability within 20 years of adopting a GSP.

Water Code (Section 10729, 10730, 10732, 10733 and 10735) or AB 1739

AB 1739 establishes the following: (1) provides the specific authorities to a GSA (as defined by SB 1168); (2) requires DWR to publish best management practices for the sustainable management of groundwater by January 1, 2017; and (3) requires DWR to estimate and report the amount of water available for groundwater replenishment by December 31, 2016. The bill authorizes DWR to approve and periodically review all GSPs (Dickinson 2014).

The bill authorizes SWRCB to: (1) conduct inspections and obtain an inspection warrant; (2) designate a groundwater basin as a probationary groundwater basin; (3) develop interim plans for probationary groundwater basins in consultation with DWR if the local agency fails to remedy a deficiency resulting in the designation of probationary; and (4) issue cease and desist orders or violations of restrictions, limitations, orders, or regulations issued under AB 1739 (Dickinson 2014).

Water Code (Section 10735.2 and 10735.8) or SB 1319

SB 1319 would authorize the SWRCB to designate high- and medium-priority basins (defined by SB 1168) as a probationary basin after January 31, 2025. This bill allows the SWRCB to develop interim management plans that may override a local agency. However, if the appointed GSA can demonstrate compliance with sustainability goals for the basin, then the SWRCB has to exclude the groundwater basin or a portion of the groundwater basin from probationary status (Pavley 2014b).

Other Groundwater Regulations

Groundwater quality issues are monitored through a number of different legislative acts and are the responsibility of several different State agencies including:

- SWRCB and nine Regional Water Quality Control Boards (RWQCB) - responsible for protecting water quality for present and future beneficial use;
- California Department of Toxic Substances Control - responsible for protecting public health from improper handling, storage, transport, and disposal of hazardous materials;
- California Department of Pesticide Regulation - responsible for preventing pesticide pollution of groundwater;
- California Department of Public Health (CDPH) - responsible for drinking water supplies and standards;

- California Integrated Waste Management Board - oversees non-hazardous solid waste disposal, and

- California Department of Conservation - responsible for preventing groundwater contamination due to oil, gas, and geothermal drilling and related activities.

D.1.3 Local Regulation

Local GMPs and county ordinances vary by authority/agency and region, but typically involve provisions to limit or prevent groundwater overdraft, regulate transfers, prevent subsidence and protect groundwater quality.

Sustainable Groundwater Management Act

SB 1168 requires the establishment of GSA and adoption of GSPs. GSPs for groundwater basins designated by DWR as high- and medium-priority with critical overdraft conditions (per SB X7 6) are required to be developed by January 31, 2020. GSPs for the remaining high- and medium-priority groundwater basins are to be developed by January 31, 2022. All high- and medium-priority basins must achieve sustainability within 20 years of adopting a GSP. Table D-1 describes actions and agencies related to the Sustainable Groundwater Management Act.

Table D-1.
Actions and Agencies related to the Sustainable Groundwater Management Act

Groundwater Basin/Subbasin	CASGEM Priority	Groundwater Sustainability Agencies (GSA)	Groundwater Sustainability Plan (GSP)	Notes
Redding Area Groundwater Basin- Anderson subbasin	High-priority basin due to participation in Type A groundwater transfers	Enterprise-Anderson GSA	GSP will be developed by January 31, 2022	The Enterprise-Anderson GSA began the GSP development process in September 2018. Website: - www.cityofredding.org/departments/public-works/eagsa
Sacramento Valley Groundwater Basin- Colusa subbasin	High-priority basin due to declining groundwater levels, localized groundwater quality issues, and increased housing development	Glenn Groundwater Authority and Colusa Groundwater Authority	GSP will be developed by January 31, 2022	Glenn Groundwater Authority and Colusa Groundwater Authority released a Notice of Intent to develop the GSP for the Colusa Subbasin in May 2018. Websites: - www.countyofglenn.net/dept/agriculture/water-resources/glenn-groundwater-authority - colusagroundwater.org

Groundwater Basin/Subbasin	CASGEM Priority	Groundwater Sustainability Agencies (GSA)	Groundwater Sustainability Plan (GSP)	Notes
Sacramento Valley Groundwater Basin- West Butte subbasin	High-priority basin due to declining groundwater levels and localized groundwater quality issues	Glenn County, Reclamation District No. 1004, Butte County, Durham Irrigation District, Reclamation District 2106, and Western Canal Water District	GSP will be developed by January 31, 2022	The GSA managers are holding facilitated discussions and will begin holding public workshops on governance and GSP development in the spring of 2018. Website: - www.buttecounty.net/waterresourceconservation/SustainableGroundwaterManagementAct.aspx
Sacramento Valley Groundwater Basin- Sutter subbasin	High-priority basin due to participation in Type A groundwater transfers	Sutter Community Service District, Reclamation District No. 1500, City of Yuba City, Reclamation District No. 70, Reclamation District No. 1660, and Sutter Extension Water District	Not Applicable (Alternative analysis submitted)	The GSAs submitted the *Sutter County Alternative Submittal to a Groundwater Sustainability Plan for Sutter Subbasin* to DWR in December 2016 demonstrating that the basin has operated within its sustainable yield over a period of at least 10 years. Website: - https://sgma.water.ca.gov/portal/alternative/print/17
Sacramento Valley Groundwater Basin- Yolo subbasin	High-priority basin due to localized groundwater quality issues and subsidence	Yolo Subbasin Groundwater Agency and Reclamation District No. 999	GSP will be developed by January 31, 2022	In March 2018 the Yolo Subbasin Groundwater Agency Board adopted Resolution 2018-1 formalizing the initiation of developing the Yolo Subbasin GSP. Website: - yologroundwater.org/index.php/yolo-subbasin-groundwater-sustainability-plan/
Sacramento Valley Groundwater Basin- Solano subbasin	High-priority basin due to declining groundwater levels and salt intrusion	Solano Irrigation District, City of Vacaville GSA, Solano Subbasin GSA, and Northern Delta GSA	GSP will be developed by January 31, 2022	Solano GSA accepted funding under the Proposition 1 Sustainable Groundwater Planning Grant Program in May 2018 to prepare the GSP. Website: http://www.scwa2.com/resources-management/ground-water/solano-gsa-bod

Groundwater Basin/Subbasin	CASGEM Priority	Groundwater Sustainability Agencies (GSA)	Groundwater Sustainability Plan (GSP)	Notes
Sacramento Valley Groundwater Basin- North American subbasin	High-priority basin due to localized groundwater contamination and declining groundwater levels	Sacramento Groundwater Authority, West Placer GSA, South Sutter Water District, Sutter County, and Reclamation District 1001	GSP will be developed by January 31, 2022	The GSAs have agreed to work together and prepare one GSP for the entire North American subbasin. Websites: https://www.sgah2o.org/ https://westplacergroundwater.com/ http://www.southsutterwd.com/
Sacramento Valley Groundwater Basin- South American subbasin	High-priority basin due to localized groundwater contamination and declining groundwater levels	Sloughhouse Resource Conservation District, Sacramento Central Groundwater Authority, Omochumne-Hartnell Water District, Northern Delta GSA, and County of Sacramento	Not Applicable (Alternative analysis submitted)	Sacramento Central Groundwater Authority submitted the *South American Subbasin Alternative Submittal* to DWR in December 2016 demonstrating that the basin has operated within its sustainable yield over a period of at least 10 years. Website: https://sgma.water.ca.gov/portal/alternative/print/15

Source: DWR 2018

Groundwater Management Plans

AB 3030, the Groundwater Management Act, encourages local water agencies to establish local GMPs. The Groundwater Management Act lists 12 elements that should be included within the GMPs to ensure efficient groundwater use, good groundwater quality, and safe production of water.

While GMPs aid in establishing best practices, not all of the GMPs set quantitative groundwater elevation triggers for their BMOs. Table D-2 lists the counties in the Sacramento Valley with existing GMPs. The table also provides a description of the BMOs, as described in each GMP. This list is provided for the entire Sacramento Valley; however, in addition to listing counties that contain potential groundwater substitution pumping sellers, the list also contains counties that do not (e.g., Butte County).

Table D-2.
Groundwater Management Plans and BMOs in the Sacramento Valley

County	Basin Management Plan	Groundwater Basin Management Objective
Shasta (Anderson Cottonwood Irrigation District Groundwater Management Plan)	http://www.andersoncottonwoodirrigationdistrict.org/uploads/2/7/2/8/2728665/acid_gwmp.pdf	Pg. 3-2: No set elevation thresholds.
Shasta County (Shasta County Water Agency)	http://www.co.shasta.ca.us/index/pw_index/engineering/water_agency.aspx	No elevation thresholds.
Tehama County (Tehama County Flood Control and Water Conservation District)	http://www.tehamacountypublicworks.ca.gov/Flood/ Groundwater trigger levels for each sub-basin located here: http://www.tehamacountypublicworks.ca.gov/Flood/groundwater.htm	Trigger levels vary based on groundwater measurements in each monitoring well. Trigger levels generally follow a pattern of: • Historical low of spring measurements plus 20% of the range of spring measurements: notify and inform public. • Second consecutive year of groundwater levels at or below spring trigger level 1: monitor and investigate cause. • Historical low of spring measurements: consider management options. • Historical low of late groundwater measurements: notify public and begin investigations.
Glenn County	http://www.glenncountywater.org/documents/GlennCoBMOdocument_000.pdf	There are 17 basin management sub-areas in the basin. BMOs for groundwater levels are established separately for each sub-area. There are no clear BMOs established yet. Objectives for the sub-areas are qualitative and relate to maintaining groundwater surface elevations at a level that will assure an adequate and affordable irrigation water supply; sustainable agricultural water supply; adequate groundwater supply for all domestic users. Additionally, some BMOs state that the objective is to develop an understanding of groundwater levels in the sub-area. Elevation thresholds vary depending on sub-area and monitoring well within each sub-area.
Butte County	http://www.buttecounty.net/Portals/26/GWMP/Section_3__1-7-05_2.pdf	Pg. 3-4: Groundwater level declines in many areas of the county have been observed. These range from 0.8 to 2.0 feet per year. Declining groundwater levels are used as a trigger for close observation of groundwater level trends.

County	Basin Management Plan	Groundwater Basin Management Objective
Colusa County	http://colusagroundwater.ucdavis.edu/Technical%20Materials%20for%20Posting/ColusaCo_GMP_Volume-1_9-10-08.pdf	Pg. 34: From a review of the groundwater level hydrographs on Figure II.5, it can be seen that the extent to which the groundwater basin is utilized throughout the County varies significantly. Accordingly, the assessment of changes in groundwater levels in the respective areas must be performed with full consideration of the historic levels. It is premature to attempt to set groundwater level targets or thresholds in Colusa County. It is, however, very important to evaluate the groundwater level data in relation to historic data and report the results of that evaluation together with an assessment of overall hydrologic conditions, known changes in land use, etc.
Sutter County	http://www.co.sutter.ca.us/pdf/pw/wr/gmp/Sutter_County_Final_GMP_20120319.pdf	There are three BMOs for groundwater levels. One is related to low groundwater levels: Avoid ongoing declines in groundwater levels during water year types identified by DWR to be "above normal" or "wet" for the Sacramento Valley. The BMO also states "groundwater levels are to be managed to ensure adequate water supplies while avoiding adverse impacts and mitigating them if and when they do occur. Adverse impacts related to groundwater levels can occur from excessively high or low groundwater levels. What constitutes an excessively high or low groundwater level may change over time, and will also vary by land use and hydrologic and climatic conditions.
Yuba County Water Agency	http://www.ycwa.com/documents/943	Pg. 3-12: No specific threshold. Qualitative objectives: • Avoid potential unreasonable impacts that may occur from changes in groundwater surface elevations because of external transfers. • Monitor any lowering of groundwater surface elevations that may occur as a result of groundwater extraction to meet local demands in drier years.
Nevada County (Martis Valley Groundwater Management Plan)	http://www.pcwa.net/files/docs/enviro/MartisValleyGMPFinal07.22.2013.pdf	Very general BMO about protecting groundwater quantity. Plan includes details on the establishment of a groundwater elevation monitoring program.
Placer County Water Agency (Western Placer County Groundwater Management Plan)	http://www.pcwa.net/general-information/environmental-and-planning-documents.html and http://www.pcwa.net/files/docs/enviro/WPCGMP_Groundwater_Managerment_Plan_07.pdf	Pg. 3-8: discusses the need to create a uniform groundwater elevation monitoring program. No thresholds are set because historically, data have not been collected consistently.

County	Basin Management Plan	Groundwater Basin Management Objective
Sacramento Groundwater Authority	http://www.sgah2o.org/sga/files/2008-SGA-GMP-FINAL-20090206-print_ready.pdf	Pg. 29: "SGA members intend that overall groundwater elevations in the basin be improved over time, and that the groundwater basin be managed such that the impacts during drier years will be minimized when surface water supplies are curtailed and are replaced by increased groundwater supplies. This is accomplished, similar to what is done in the Central Sacramento Basin, by measuring groundwater levels in more than 30 wells throughout the SGA. A similar 5 square mile grid pattern is used to monitor groundwater levels over time throughout the basin. SGA monitors groundwater elevations twice a year.
Central Sacramento County	http://www.amwater.com/files/CSCGMP_final.pdf	Pg. 3-3: An operating range for groundwater elevations in the basin define the upper and lower groundwater elevation thresholds. Upper and lower elevation limits are defined for 5 square mile polygons throughout the basin. Each polygon represents its own management unit with lower and upper elevation attributes. Groundwater elevation contour maps are on pages 3-4 and 3-5 of the plan. Lower groundwater thresholds range from -90 feet msl in the southwestern part of the basin to 150 feet msl in the northeastern part of the basin. Upper groundwater thresholds range from -70 feet msl in the southwestern part of the basin to 200 feet msl in the northeastern part of the basin.
South Area Water Council	http://www.water.ca.gov/groundwater/docs/GWMP/SJ-20_SouthBasin_GWMP_2011.pdf	Similar to the Sacramento Groundwater Authority and Central Sacramento County, the South Area Water Council's groundwater management plan uses several wells throughout the basin to gather groundwater elevation data and high/low thresholds would be based on individual wells. The BMO, on p. 2-2, states generally: Maintain or enhance groundwater elevations to meet the long-term needs of groundwater users within the Groundwater Management Area.
Yolo County	http://www.water.ca.gov/groundwater/docs/GWMP/SR-35_YoloCountyFCWCD_GWMP_2006.pdf	p. 12: "when ¾ of monitoring wells reach within 25% of the lowest water level recorded for that well. Spring and fall measurements will be analyzed separately."

County Regulations and Ordinances

The following are descriptions of local regulations/ordinances which may need to be considered during a water transfer:

Shasta County Ordinance SCC 98-1

This ordinance requires a permit for extraction and export of groundwater, either directly or indirectly, for use outside the county. Groundwater substitution transfers as defined in Chapter 2 of this document will be subject to this ordinance. Applications for a transfer permit should be submitted to Shasta County Water Agency. Permits may only be granted if the proposed

groundwater extraction (1) will not cause or increase an overdraft of the groundwater underlying the county; (2) will not adversely affect the long term ability for storage or transmission of groundwater; (3) will not exceed the annual yield of the groundwater underlying the county; (4) will not result in an injury to water replenishment, storage, or restoration project; (5) is in compliance with Water Code 1220; and (6) will not be detrimental to the health, safety and welfare of property owners overlying or in the vicinity of the proposed extraction site(s).

Glenn County Ordinance No. 1115

This ordinance does not prohibit the export of water nor does it prohibit groundwater management practices that may involve the export of water. The ordinance clearly states that groundwater management practices including water exports shall not cause harm to adjacent areas. The ordinance cites modification, reduction, or termination of wells involved with water exports as a first priority in a sequence of management actions to be taken in the event groundwater levels become critical.

Colusa County Ordinance No. 615

This ordinance prohibits direct or indirect extraction of groundwater for transfer outside county boundaries without permit approval, except in certain circumstances. The permit approval process includes public and environmental reviews. Permits may only be approved after the environmental review determines that the Proposed Action would not result in the following: (1) overdraft or increased overdraft, (2) damage to aquifer storage or transmissivity, (3) exceedance of the annual yield or foreseeable injury to beneficial overlying groundwater users and property users, (4) injury to water replenishment, storage, or restoration projects, or (5) noncompliance with Water Code Section 1220. If Colusa County grants a three-year permit under Ordinance 615, the permit may also be subject to additional conditions to avoid adverse effects. Violators of this permitting process may be subject to a fine (Colusa County 1999). The ordinance does have an exemption process that would allow transfers to occur without obtaining a permit.

Sacramento County Ordinance (Title 3 Section 3.40.090)

This ordinance requires a permit to be issued for groundwater or surface water export of any manner from Sacramento County. The Director of the Sacramento County Department of Water Resources (or his designated representative) is required to (1) issue a permit for each source of transfer (i.e. pumping location); (2) conduct necessary investigations to determine if the transfers in in conformance with county water planning policies; (3) investigate if transfers could cause adverse impacts on the source, the area of use or the environment; and (4) determine if transfers is consistent with the general plan of the County of Sacramento, or the water plan of the Sacramento County Water Agency, or a specific plan of the county or water agency that may be affected by the work or activity.

Yolo County Export Ordinance No. 1617

Yolo County Export Ordinance No. 1617 is similar to the Colusa County ordinance described above. Indirect or direct export of groundwater outside Yolo County requires a permit. In addition to review by the county, the Director of Community Development may review the permit application with other affected county departments, DWR, RWQCB, and any other interested local water agency neighboring the area of the proposed transfer. Following a California Environmental Quality Act (CEQA) environmental review and a public review, the Yolo County Board of Supervisors may grant the permit if the evidence suggests that the

extraction would not cause (1) adverse effects to long-term storage and transmissivity of the aquifer, (2) exceedance of safe yield unless it is in compliance with an established conjunctive use program, (3) noncompliance with Water Code section 1220, or (4) injury to water replenishment, storage, or restoration projects. The Yolo County Board of Supervisors may impose additional conditions to the permit to ensure compliance with the aforementioned criteria. This ordinance subjects violators to fines (Yolo County 1996).

Water Forum Agreement (WFA)

The WFA consists of seven major elements designed to meet the following overall objective to: "Provide a reliable and safe water supply for the region's economic health and planned development to the year 2030; and preserve the fishery, wildlife, recreational, and aesthetic values of the Lower American River." The WFA's Groundwater Element encourages the management of the limited groundwater resources in three hydrogeologic areas within Sacramento County (Water Forum 2000). The WFA areas that could be affected by the proposed action include the areas termed as the North Area and Central Area. The major outcomes of this agreement included (Water Forum 2000):

- Formation of the Sacramento Groundwater Authority (SGA) and the American River Basin Cooperating Agencies (ARBCA); and

- A recommended sustainable yield of 131,000 acre-feet (AF) per year for the North Area and 273,000 AF per year for the Central Area.

Groundwater management negotiations in the Central area and the South area will continue.

SGA's primary mission is to protect the basin's safe yield, defined in the WFA, and water quality. Additional goals and objectives of the SGA include: (1) develop/facilitate a regional conjunctive use program consistent with the WFA; (2) mitigate conditions of regional groundwater overdraft; (3) replenish groundwater extraction; (4) mitigate groundwater contaminant migration; (5) monitor groundwater elevations and quality; and (6) develop relationships with State and Federal Agencies. The basin has approximately 600,000 AF of evacuated storage that could be exercised in such a program. The ultimate potential wet year in-lieu banking potential is about 100,000 AF per year, with a potential dry year surface water exchange potential of over 50,000 AF per year.

American River Basin Regional Conjunctive Use Program (ARBCUP)

A partnership between the SGA and the ARBCA resulted in the ARBCUP.

An outcome of the WFA, the ARBCUP intends to assist in meeting the WFA objectives, discussed above, by using the overdrafted basin in the North Area for groundwater banking. Groundwater recharge as part of the ARBCUP consists of either (1) direct recharge using surface water from the American River and/or Sacramento River or (2) in lieu of recharge in which surface water is substituted for groundwater. The ARBCUP includes a combination of the use of groundwater and surface water to maximize "banking" of both groundwater below ground and surface water in reservoirs. ARBCUP assists in maintaining the WFA American River environmental flow standards. When the ARBCUP was completed in 2008, the program increased water supplies by 20,000 AF per year (Regional Water Authority [RWA] 2012).

D.2 Biological Resources

D.2.1 Federal Regulation

Endangered Species Act (ESA)

The Federal ESA defines "endangered" species as those in danger of extinction throughout all or a significant portion of their range. A "threatened" species is any species that is likely to become an endangered species within the foreseeable future throughout all or a significant portion of its range. Additional special-status species include "candidate" species and "species of concern." Candidate species are those for which the U.S. Fish and Wildlife Service (USFWS), or National Oceanic and Atmospheric Administration Fisheries Service (NOAA Fisheries) if applicable, has enough information on file to propose listing as endangered or threatened. A species that has been "delisted" is one whose population has met its recovery goal target and is no longer found to be in jeopardy of extinction. These agencies also may designate Critical Habitat for listed species.

Section 4 of the Federal ESA prohibits "take" of federally listed species without a permit that specifically authorizes that take. Take may be authorized through either a Section 10a1(a) permit for directed take of the species for scientific research, or through an incidental take permit, which allows an action to take of the species (under specifically prescribed conditions) where such take is incidental to the implementation of an otherwise lawful activity. Incidental take of a federally listed species may be addressed for a proposed project in one of two ways depending on whether the or not the project has a federal nexus. A federal nexus occurs when a project is authorized or funded by a federal agency. Projects without a federal nexus may address potential adverse impacts to species protected under Federal ESA Section 10, or (2) a federal lead agency regulates a proposed project in accordance with Federal ESA Section 7. As this project has a federal nexus, the Section 7 process will be followed. Section 7 defines a process for the federal lead agency to consult with the responsible federal resource agency (the USFWS or NOAA Fisheries), to determine whether proposed long-term water transfers are likely to adversely affect species that are listed or proposed for listing. The Section 7 process typically requires the preparation of a biological assessment (BA) by the federal lead agency followed by the preparation of biological opinion (BO) by the responsible federal resource agency.

Fish and Wildlife Coordination Act (FWCA)

The FWCA (16 U.S. Code [USC] 661 et seq.) requires Federal agencies to consult with USFWS, or, in some instances, with NOAA Fisheries and with State fish and wildlife resource agencies before undertaking or approving water projects that control or modify surface water. The purpose of this consultation is to ensure that wildlife concerns receive equal consideration water resource development projects and are coordinated with the features of these projects. The consultation is intended to promote the conservation of fish and wildlife resources by preventing their loss or damage and to provide for the development and improvement of fish and wildlife resources in connection with water projects. Federal agencies undertaking water projects are required to fully consider recommendations made by USFWS, NOAA Fisheries, and State fish and wildlife resource agencies in project reports and to include measures to reduce impacts on fish and wildlife in project plans.

The 1988 amendment to the Fish and Wildlife Conservation Act mandates USFWS to identify species, subspecies, and populations of all migratory nongame birds that, without additional conservation actions, are likely to become candidates for listing under the ESA of 1973. In 2008, USFWS issued the most recent version of the National list of *Bird Species of Conservation Concern.*

Magnuson-Stevens Fisheries Act of 2006

The Amended Magnuson-Stevens Fishery Conservation and Management Act, also known as the Sustainable Fisheries Act (Public Law 104-297) is the primary law governing the marine fisheries of the United States. The law establishes requirements to provide for the sustainable management of these fisheries and to promote the protection of essential fish habitat. This Act requires all Federal agencies to consult with the Secretary of Commerce on activities, or proposed activities, authorized, funded, or undertaken by that agency that may adversely affect Essential Fish Habitat. The Essential Fish Habitat provisions of the Sustainable Fisheries Act are designed to protect fisheries habitat from being lost due to disturbance and degradation.

Migratory Bird Treaty Act (MBTA)

The MBTA domestically implements a series of international treaties that provide for migratory bird protection. The MBTA authorizes the Secretary of the Interior to regulate the taking of migratory birds. The act further provides that it is unlawful, except as permitted by regulations, "to pursue, take, or kill any migratory bird, or any part, nest or egg of any such bird…" (16 USC 703). This prohibition includes both direct and indirect acts, although harassment and habitat modification are not included unless they result in direct loss of birds, nests, or eggs. The current list of species protected by the MBTA can be found in the March 1, 2010 Federal Register (75 FR 9281). This list comprises several hundred species, including essentially all native birds. Permits for take of nongame migratory birds can be issued only for specific activities, such as scientific collecting, rehabilitation, propagation, education, taxidermy, and protection of human health and safety and of personal property. USFWS publishes a list of birds of conservation concern (BCC) to identify migratory nongame birds that are likely to become candidates for listing under ESA without additional conservation actions. The BCC list is intended to stimulate coordinated and collaborative conservation efforts among federal, state, tribal, and private parties.

Executive Order 11990 (Protection of Wetlands)

Executive Order 11990 (Protection of Wetlands) requires Federal agencies to take actions to minimize the destruction, loss, or degradation of wetlands, and to preserve and enhance the natural and beneficial values of wetlands when undertaking Federal activities and programs. Any agency considering a proposal that might affect wetlands must evaluate factors affecting wetland quality and survival. These factors should include the proposal's effects on the public health, safety, and welfare due to modifications in water supply and water quality; maintenance of natural ecosystems and conservation of flora and fauna; and other recreational, scientific, and cultural uses.

D.2.2 State Regulation

California Endangered Species Act (CESA)

CESA (California Fish and Game Code Sections 2050–2116) was implemented in 1984 to prohibit the take of species that are listed as endangered and or threatened. CESA defines "endangered" species as those whose continued existence in California is jeopardized. State-listed "threatened" species are those not presently threatened with extinction, but which may become endangered if their environments change or deteriorate. Section 86 of the California Department of Fish and Game Code defines take as to "hunt, pursue, catch, capture, or kill, or attempt to hunt, pursue, catch, capture, or kill." California Department of Fish and Wildlife (CDFW) administers CESA and authorizes incidental take through either California Fish and Game Code Section 2080.1 (consistency determination) or Section 2081 (Incidental Take Permit).

Fully Protected Species

Sections 3511, 3513, 4700, and 5050 of the California Fish and Game Code pertain to fully protected wildlife species (birds in Sections 3511 and 3513, mammals in Section 4700, and reptiles and amphibians in Section 5050) and strictly prohibit the take of these species. CDFW cannot issue a take permit for fully protected species, except under narrow conditions for scientific research or the protection of livestock, or if a Natural Community Conservation Plan (NCCP) has been adopted. Specifically, Section 3513 prohibits any take or possession of birds designated by the MBTA as migratory nongame birds except as allowed by federal rules and regulations pursuant to the MBTA.

Protection of Birds and Raptors

Section 3503 of the Fish and Game Code prohibits the killing of birds and/or the destruction of bird nests. Section 3503.5 prohibits the killing of raptor species and/or the destruction of raptor nests. Typical violations include destruction of active bird and raptor nests as a result of tree removal, and failure of nesting attempts (loss of eggs and/or young) as a result of disturbance of nesting pairs caused by nearby human activity.

California Native Plant Protection Act (CNPPA)

The CNPPA of 1977 prohibits importation of rare and endangered plants into California, take of rare and endangered plants, or sale of rare and endangered plants. CESA defers to the CNPPA, which ensures that state-listed plant species are protected when state agencies are involved in projects subject to California Environmental Quality Act.

Natural Community Conservation Planning Act (NCCPA)

The NCCPA, California Fish and Game Code, Section 2800, et seq., was enacted to form a basis for broad-based planning to provide for effective protection and conservation of the State's wildlife heritage, while continuing to allow appropriate development and growth. The purpose of natural community conservation planning is to sustain and restore those species and their habitat identified by CDFW that are necessary to maintain the continued viability of biological communities impacted by human changes to the landscape. A NCCP identifies and provides for those measures necessary to conserve and manage natural biological diversity within the plan area while allowing compatible use of the land. CDFW may authorize the take of any identified species, including listed and non-listed species, pursuant to Section 2835 of the NCCPA, if the

conservation and management of such species is provided for in an NCCP approved by CDFW. NCCPs in the planning area are described in greater detail in Section 3.6.1.2.5 Regional/Local Requirements. The proposed water transfers occurring in NCCP planning areas will not require separate incidental take permits pursuant to CESA for covered species if the project adheres to the requirements of the relevant plans.

Requirements of the 1995 Bay Delta Plan Water Quality Control Plan (1995 Delta WQCP) and Decision 1641

The State Water Resources Control Board (SWRCB) adopted its WQCP for the San Francisco Bay/Sacramento-San Joaquin Delta Estuary in May 1995 and incorporated several elements of U.S. Environmental Protection Agency (USEPA), NOAA Fisheries, and USFWS regulatory objectives for water salinity and endangered species protection. The WQCP identifies the beneficial uses of the Bay-Delta that are to be protected and includes flow and water quality objectives that are intended to protect the beneficial uses. The plan also includes an implementation program for achieving the water quality objectives. Under the Clean Water Act, the water quality standards comprise the uses and the quality objectives established to protect them.

Features of the current WQCP affect the proposed water transfers because they require certain Delta outflows and regulate actions that may be used to protect fish and benefit the environment.

D.2.3 State and Federal Laws and Regulations Governing Water Transfers and Water Acquisitions

The Water Code

Both State and Federal laws contain provisions that authorize, acknowledge, or support water transfers. The Water Code protects legal users of water and fish and wildlife during water transfers through the "no injury rule," analyses of impacts to fish and wildlife, evaluation of third-party impacts, and the 1707 process.

Water Code Sections 1435, 1725, and 1736 require that the SWRCB make a finding that certain proposed transfers not result in unreasonable effects on fish and wildlife or other instream beneficial uses. These Code Sections apply to specific types of water transfers (urgent, temporary, and long-term transfers) related to post-1914 water rights. Pre-1914 water rights are not subject to the permit system, although a change in use for instream flow may be permitted under Section 1707 on petition to the SWRCB. The proposed water transfers were conceived in compliance with these codes.

In the context of the proposed water transfers "third parties" are any persons and resources other than the entities transferring or receiving water. Although the Water Code does not define "third party impacts," they traditionally include impacts related to downstream water rights; adjacent groundwater users; fish and wildlife; and recreation, economic, and social impacts. Most third-party impacts are evaluated under Water Code Sections that protect prior rights and fish and wildlife as discussed above. However, Water Code Sections 386 and 1810 require evaluation of other third-party impacts for some specific transfers and prohibit such transfers from affecting the overall economy of the area or county from which the water is being transferred. Water Code Section 1810 states that transferors can utilize public water conveyance facilities as long as

"this use of a water conveyance facility is to be made without injuring any legal user of water and without unreasonably affecting fish, wildlife, or other instream beneficial uses and without unreasonably affecting the overall economy or the environment of the county from which the water is being transferred."

Section 1707 of the Water Code allows water rights holders, including riparian rights holders, to dedicate their rights to instream uses "for the purpose of preserving or enhancing wetlands, fish and wildlife resources, or recreation in, or on, the water." These transfers, from a consumptive use to a non-consumptive use with an identified need, may be temporary or permanent. The transfer must meet the following requirements for the SWRCB to consider approving the change in use:

- Will not increase the amount of water the person is entitled to use;
- Will not unreasonably affect any legal user of water; and
- Otherwise meets the requirements of Division 2 of the Water Code.

The petitioner can request that the water subject to transfer approval be in addition to water required for "Federal, State, or local regulatory requirements governing water quantity, water quality, instream flows, fish and wildlife, wetlands, recreation and other instream beneficial uses." If the petitioner does not submit this request to the SWRCB, then the water shall be used to meet any of the above requirements.

D.2.4 Other Pertinent Programs, Documents, Laws, and Agreements

Potential biological effects of water transfers in the project area have been previously addressed in documents.

CVPIA

The CVPIA is a Federal statute passed in 1992 with the following purposes:

> *"To protect, restore, and enhance fish, wildlife, and associated habitats in the Central Valley and Trinity River basins of California; To address impacts of the Central Valley Project on fish, wildlife and associated habitats; To improve the operational flexibility of the Central Valley Project; To increase water-related benefits provided by the Central Valley Project to the State of California through expanded use of voluntary water transfers and improved water conservation; To contribute to the State of California's interim and long-term efforts to protect the San Francisco Bay/Sacramento-San Joaquin Delta Estuary; To achieve a reasonable balance among competing demands for use of Central Valley Project water, including the requirements of fish and wildlife, agricultural, municipal and industrial and power contractors."*

The CVPIA changed the relative priorities of the various project purposes of the CVP by making fish and wildlife protection, as a project purpose, equal to water supply for agricultural and urban uses.

CVPIA Section 3406(b)(2) (CVPIA[b][2]) authorized and directed the Secretary to dedicate and manage 800,000 AF of CVP yield annually for the primary purpose of implementing the fish,

wildlife, and habitat restoration purposes and measures authorized in CVPIA, to assist the State of California in its efforts to protect the waters of the Bay-Delta Estuary, and to help meet obligations legally imposed on the CVP under State or Federal law following the date of enactment of the CVPIA. This dedicated 800,000 AF of water, known as (b)(2) water, was included as a component of the CALFED Programmatic Environmental Impact Statement/Environmental Impact Report (PEIS/EIR) existing regulatory baseline for fishery protection conditions for environmental and fisheries protection measures.

The operation of CVP and the SWP facilities is subject to BOs issued by USFWS and the NOAA Fisheries. These BOs are subject to ongoing litigation and are currently under review by the two services:

- Biological Opinion on Implementation of the CVPIA and Continued Operation and Maintenance of the Central Valley Project (NOAA Fisheries 2000),
- Biological Opinion on the Effects of the Long-Term Central Valley Project and State Water Project Operations Criteria and Plan (NOAA Fisheries 2004),
- Consultation on Long-Term Renewal of Water Service Contracts in the Delta-Mendota Canal Unit (NOAA Fisheries 2005),
- Reinitiation of Formal and Early Section 7 Endangered Species Consultation on the Coordinated Operations of the Central Valley Project and State Water Project and the Operational Criteria and Plan to Address Potential Critical Habitat Issues (USFWS 2005a),
- Conclusion of Consultation on Long-Term Renewal of Water Service Contracts in the Delta-Mendota Canal Unit (USFWS 2005b),
- Formal Endangered Species Consultation on the Operations and Maintenance Program Occurring on Bureau of Reclamation Lands within the South-Central California Area Office: Biological Opinion (USFWS 2005c),
- Biological opinions for CVP Water contracts,
- Biological Opinion on the Coordinated Operations of the CVP and SWP in California. (USFWS 2008), and
- Biological Opinion on California's Central Valley Water Project (NOAA Fisheries 2009).

D.2.5 Local Regulation

Both the ESA and the NCCPA include provisions for the development of conservation plans to protect vegetation and wildlife resources.

A Habitat Conservation Plan (HCP) is a planning document that is required for issuance of an incidental take permit under section 10 of the ESA. The HCP process provides opportunities to conserve listed species, while streamlining permitting for participants' development projects

within the planning area. HCP documents typically includes the following information: the anticipated take of the proposed project; measures to avoid, minimize or mitigate impacts to the maximum extent practicable, and a funding mechanism for acquiring and managing lands containing the habitats on which the covered species depend. Covered species may include both listed and non-listed species. This may provide an extra level of certainty for permittees, given that no amendments to the plan would be required if a covered species becomes listed under the ESA before the completion of project activities.

A NCCP is a similar process provided under state law, with some key differences. While the federal and state ESAs focus on protection and recovery of species that have already declined, NCCPs take a broader approach, seeking to anticipate and avoid future conflicts between preservation and development, as well as compliance with the CESA. NCCPs focus on regional-scale protection of ecosystems along with compatible development. A local agency oversees cooperative development of an NCCP by landowners, environmental groups, and other stakeholders, with support provided by CDFW and USFWS.

Project actions within the HCP/NCCP areas will comply with applicable requirements for covered activities within plan areas for existing HCPs/NCCPs. A separate Section 7 Consultation will also be undertaken for the long-term water transfers.

There are 11 HCPs or NCCPs that are either adopted or under development for areas that overlap with, or occur in the vicinity of, the long-term water transfers area of analysis (CDFW 2014a):

- Butte Regional Conservation Plan (BRCP) – The BRCP is a cooperative planning effort between the Cities of Biggs, Chico, Gridley, Oroville, County of Butte, and Butte County Association of Governments. The plan will provide streamlined ESA permitting for transportation projects, land development and covered activities such as construction and maintenance of facilities and infrastructure, residential construction, and recreational activity-related construction. The BRCP also aims to provide comprehensive conservation of species, wetlands and ecosystems, specifically contributing to the protection of 41 plant, fish, and wildlife species within the 564,270 acre plan area (CDFW 2014b). The BRCP covers nine of the focal species for the long-term water transfers including Red Bluff dwarf rush, Sacramento River winter-run Chinook salmon, and green sturgeon. This plan is under development.

- Bay-Delta Conservation Plan (BDCP) – The BDCP is a comprehensive conservation strategy for the Sacramento–San Joaquin River Delta (Delta) to protect ecosystem health, water quality, water supply, and California's economy, while permitting the operation of the CVP and SWP. The BDCP covers 56 species, including 11 of the focal species for the long-term water transfers including Central Valley Spring-run Chinook salmon, longfin smelt, and greater sandhill crane. This plan is under development. The draft BDCP and its corresponding draft EIS/EIR were published for public review and comment in December 2013 (Reclamation et al. 2013).

- East Contra Costa County HCP/NCCP – The East Contra Costa County HCP/NCCP was developed partially to address indirect and cumulative effects on terrestrial species from development supported by increases in water supply provided by Contra Costa Water

District. Activities covered under the plan include public infrastructure projects, construction of residential and business development, and public infrastructure projects. The plan has been adopted by Contra Costa County, the Cities of Brentwood, Clayton, Pittsburg, and Oakley. The HCP/NCCP provides regional conservation and development guidelines to protect natural resources while improving the permit process for endangered species and wetland regulations. The plan will encompass a preserve system covering 30,300 acres of land that will be managed for the benefit of 28 species and the natural communities they depend upon (East Contra Costa County HCP Association 2006). The East Contra Costa County HCP covers 4 of the focal species for the long-term water transfers including giant garter snake, San Joaquin kit fox, and Western pond turtle.

- Natomas Basin HCP (NBHCP) - The NBHCP establishes a multi-species conservation program to mitigate the expected loss of habitat and incidental take and/or loss of covered species that would result from planned urban development. The plan covers 53,537 acres within the levees surrounding the Natomas Basin and 22 plant and wildlife species (The Natomas Basin Conservancy 2003). Covered activities under the plan include urban development, public and drainage improvements, water agency projects, and approved activities of the Natomas Basin Conservancy. Plan participants include the City of Sacramento, Sutter County, Sacramento County, and the acting regulatory agencies. The NBHCP covers four of the focal species for the long-term water transfers including giant garter snake, Western pond turtle, and white-faced ibis.

- Placer County Conservation Plan (PCCP) HCP/NCCP – The PCCP HCP/NCCP is intended to address the impacts associated primarily with unincorporated growth in western Placer County in addition to growth associated with the build-out of Lincoln's updated General Plan. The PCCP is intended to protect 31 special status species and federally regulated wetlands, as well as indirectly protect the habitat of hundreds of plant and wildlife species across approximately 201,000 acres of Western Placer County (Placer County Planning Services Division 2011). Covered activities include: urban development, in-stream projects, capital projects, operation and maintenance, rural development, conservation strategy implementation, and other Placer County conservation programs. Participants include the City of Lincoln, Placer County, Placer County Water Agency and South Placer Regional Transportation Authority. PCCP covers five of the focal species for the long-term water transfers including Ahart's dwarf rush, Red bluff dwarf rush, and Central Valley Steelhead. This plan is under development.

- San Joaquin County Multi-Species Habitat Conservation and Open Space Plan (SJMSCP) – The SJMSCP was developed to provide guidelines for converting open space to other land uses, preserving agriculture, and protecting plant and wildlife species. Activities covered under the plan include urban development, mining, non-agricultural activities occurring outside of urban boundaries, transportation projects, non-federal flood control projects, maintenance activities, and similar public agency projects. San Joaquin County, the Cities of Stockton, Lodi, Manteca, Tracy, Ripon, Escalon, and Lathrop are the plan participants. The plan addresses 97 special-status plant, fish and wildlife species in over 900,000 acres of the San Joaquin County (San Joaquin County 2000). The SJMSCP

covers 12 of the focal species for the long-term water transfers including Sandford's arrowhead, Red Bluff dwarf rush, and Delta smelt.

- Santa Clara Valley (SCV) HCP/NCCP – The SCV HCP/NCCP is a regional partnership between the County of Santa Clara, Santa Clara Valley Transportation Authority, Santa Clara Valley Water District, and the Cities of San Jose, Gilroy and Morgan Hill, and regulatory agencies. The plan encompasses approximately 440,318 acres and will address impacts primarily associated with the future uses of land identified in the plan area (CDFW 2014c). Land preservation would mitigate for the environmental impacts of planned urban and rural development, instream activities, public infrastructure operations and maintenance activities (e.g. water, transportation, etc.) and would enhance the long term viability of 21 threatened or endangered plant and wildlife species (CDFW 2014c). SCV HCP/NCCP covers three of the focal species for the long-term water transfers including San Joaquin kit fox, Western pond turtle, and tricolored blackbird.

- Solano Multispecies HCP (SMSHCP) – The SMSHCP plan area covers 585,000 acres (Solano County Water Agency 2012). It was developed to address species conservation in conjunction with urban development, flood control/infrastructure improvement activities, and to support the issuance of an incidental take permit under the Federal ESA for the Bureau of Reclamation's Solano Project Contract Renewal. Activities covered under the plan include preservation, restoration, invasive species control, and water quality improvement. Covered species include federally and state-listed fish species and other wildlife species of concern. Plan participants include Solano County, a small portion of Yolo County, Solano County Water Agency's contract service area, including the Cities of Fairfield, Vacaville, Vallejo, Suisun City, Solano Irrigation District, and the Main Prairie Water District. The SMSHCP covers eight of the focal species for the long-term water transfers including winter-run Chinook salmon, Central Valley steelhead, and longfin smelt. This plan is still under development.

- South Sacramento HCP (SSHCP) – The proposed SSHCP would address issues related to species conservation, agricultural protection, and urban development in 341,000 acres of south Sacramento County. Activities covered under the plan include construction of residential, commercial, and industrial buildings, and associated infrastructure. The plan is being prepared by Sacramento County, the Cities of Sacramento, Elk Grove, and Galt, and Rancho Powers Authority. The plan would cover 40 plant and wildlife species, including ten species that are listed by the state or federal governments. The SSHCP covers five of the focal species for the long-term water transfers including Ahart's dwarf rush, Greater sandhill crane, and giant garter snake. This plan is still under development.

- Yolo Natural Heritage Program (YNHP) – This plan is still under development and the program released a draft plan on June 28, 2013 (Yolo Natural Heritage Program 2013). This 653,818-acre county-wide HCP/NCCP will provide for the conservation of 32 sensitive species in five habitat types: wetland, riparian, oak woodland, grassland, and agriculture (Yolo Natural Heritage Program 2013). No aquatic species will be addressed in the YNHP. The plan describes measures that local agencies will implement to conserve biological resources, obtain permits for urban growth and public infrastructure projects, maintain the agricultural heritage of the county, and acquire permanent

conservation easements for sensitive plant and wildlife species in the plan area. Plan participants include Yolo County, the Cities of Davis, Woodland, West Sacramento, and Winters. The YNHP covers four of the focal species for the long-term water transfers including giant garter snake, Western pond turtle, and purple martin.

- Yuba-Sutter NCCP/HCP – This plan is still under development. The Yuba-Sutter NCCP/HCP is a cooperative planning effort initiated by Yuba and Sutter Counties in connection with improvements to Highways 99 and 70, as well as future development in the area surrounding those highways. The plan covers approximately 210,000 acres and provides for the regional protection and management of 31 listed and other special-status species and their habitats (CDFW 2014d). Plan participants include the Counties of Yuba and Sutter, Cities of Yuba, Live Oak, and Wheatland. The Yuba-Sutter HCP covers five of the focal species for the long-term water transfers including greater sandhill crane, Western pond turtle, and tricolored blackbird.

D.3 Climate Change

D.3.1 Federal Regulations

Department of the Interior (DOI) Secretarial Order No. 3289, Amendment No. 1

In 2009, the DOI issued a Secretarial Order on climate change that expands DOI bureaus' responsibilities in addressing climate change (amended on February 22, 2010). The purpose of Secretarial Order No. 3289 is to provide guidance to bureaus and offices within the DOI on how to provide leadership by developing timely responses to emerging climate change issues. This Order replaces Secretarial Order No. 3226, signed on January 19, 2001, entitled "Evaluating Climate Change Impacts in Management Planning." It reaffirms efforts within DOI that are ongoing with respect to climate change. Among the requirements of the Order is one that requires each bureau and office of DOI to "consider and analyze potential climate change impacts when undertaking long-range planning exercises, setting priorities for scientific research and investigations, and/or when making major decisions affecting DOI resources" (DOI 2010).

Interior's Plan for a Coordinated, Science-Based Response to Climate Change Impacts on Our Land, Water, and Wildlife Resources

DOI subsequently released *Interior's Plan for a Coordinated, Science-Based Response to Climate Change Impacts on Our Land, Water, and Wildlife Resources*. The plan provides a framework for DOI's conservation strategies related to climate change. DOI relies on three main resources – climate change impact science, data integration and dissemination, and enabling science-based adaptation strategies – to implement its vision. As part of its response to climate change, DOI established Climate Science Centers and Landscape Conservation Cooperatives to form the foundation of an integrated approach to climate change science and adaptation (DOI n.d.).

Reclamation National Environmental Policy Act (NEPA) Handbook

The DOI, Reclamation's *NEPA Handbook* (Reclamation 2012) recommends that climate change be considered, as applicable, in every NEPA analysis. The *NEPA Handbook* acknowledges that there are two interpretations of climate change in regards to Reclamation actions: 1)

Reclamation's action is a potentially significant contributor to climate change and 2) climate change could affect a Reclamation proposed action. The *NEPA Handbook* recommends considering different aspects of climate change (e.g., relevance of climate change to the proposed action, timeframe for analysis, and relevant regional/local projections of climate change) to determine the extent to which it should be discussed under NEPA.

Principles and Requirements for Federal Investments in Water Resources

Furthermore, Reclamation is subject to *Principles and Requirements for Federal Investments in Water Resources* (Council on Environmental Quality [CEQ] 2013). This document requires areas of risk and uncertainty to be identified, described, and considered when analyzing potential investments in water resources. It specifically requires climate change impacts to be accounted for and addressed.

D.3.2 State Regulations

Revised Climate Change Scoping Plan

The initial Scoping Plan (CARB 2008) provides a framework for the State's strategy to reduce greenhouse gas (GHG) emissions to 1990 levels by 2020. This reduction goal means reducing GHG emissions by approximately 30 percent from business-as-usual emission levels projected for 2020 or approximately 15 percent from 2005 levels. Key features of the State's plan for reducing emissions include six main recommendations:

- Expand and strengthen existing energy efficiency programs and building and appliance standards
- Achieve a statewide renewables energy mix of 33 percent
- Develop a cap-and-trade program that links other partner programs to create a regional market system
- Establish targets for transportation-related GHG emissions for regions throughout the State, and pursue policies and incentives to achieve those targets
- Adopt and implement measures, including California's clean car standards, goods movement measures, and the low carbon fuel standard
- Create targeted fees to fund the administrative costs of the State's long-term commitment to AB 32 implementation

The Scoping Plan recommends 39 measures that would achieve an emissions reduction of 174 million metric tons of carbon dioxide equivalent per year ($MMTCO_2e$/year) if fully implemented. The recommended measures cover nine sectors: 1) transportation, 2) electricity and natural gas, 3) green buildings, 4) water, 5) industry, 6) recycling and waste management, 7)

forests, 8) high global warming potential (GWP) gases[4], and 9) agriculture. Additionally, nine discrete early actions were adopted to reduce GHG emissions.

The First Update to the Climate Change Scoping Plan (CARB 2014) builds on the 2008 Scoping Plan by identifying the next steps that are required to meet the State's emission reductions beyond 2020 (i.e., 80 percent below 1990 levels by 2050). The update adjusts the 2020 statewide limit to 431 $MMTCO_2e$ to reflect updated GWPs.

In November 2017, CARB finalized *California's 2017 Climate Change Scoping Plan* to describe potential policies that could be implemented to achieve the 2030 target established by EO B-30-15 (CARB 2017).

California Environmental Quality Act (CEQA) Guidelines

On March 18, 2010, the California Natural Resources Agency (CNRA) adopted amendments to CEQA Guidelines to include provisions for evaluating the significance of GHG emissions. The amended guidelines give the lead agency leeway in determining whether GHG emissions should be evaluated quantitatively or qualitatively, but requires that the following factors be considered when assessing the significance of impacts from GHG emissions (14 California Code of Regulations 15064.4):

- The extent to which the project may increase or reduce GHG emissions as compared to the existing environmental setting.
- Whether the project emissions exceed a threshold of significance that the lead agency determines applies to the project.
- The extent to which the project complies with regulations or requirements adopted to implement a statewide, regional, or local plan for the reduction or mitigation of GHG emissions.

The amended guidelines also specify that lead agencies must analyze potentially significant impacts associated with placing projects in locations susceptible to hazardous conditions (e.g., floodplains, coastlines, and wildfire risk areas), including those that could be affected by climate change (Section 15126.2(a)).

Furthermore, the guidelines also suggest measures to mitigate GHG emissions, including implementing project features to reduce emissions, obtaining carbon offsets to reduce emissions, or sequestering GHG.

California EO S-13-08

State of California EO S-13-08, signed in November 2008, tasked state agencies to develop California's first climate change adaptation strategy to identify and prepare for expected climate change impacts, including sea level rise, increased temperature, shifting precipitation, and extreme weather events. In response, the 2009 California Climate Adaptation Strategy (CAS)

[4] GWP is a metric that measures how much energy the emissions of 1 ton of a gas will absorb over a given period of time, relative to 1 ton of CO_2.

report (CNRA 2009) was released; the report summarized the best-known science on climate change impacts and outlined possible solutions to promote resiliency and reduce California's vulnerability to climate impacts.

The CAS included 12 recommendations that are largely geared toward state agencies but have implications for project-level analyses. For example, the CAS recommends that the potential impacts of climate change be considered for all significant state projects to the extent required by CEQA Guidelines Section 15126.2, which relates to the consideration and discussion of significant environmental impacts[5]. This CEQA section requires Lead Agencies to identify and focus on the significant environmental effects of the Proposed Action; describe any significant impacts, including those that can be mitigated but not reduced to a level of insignificance; evaluate significant irreversible environmental changes that would be caused by the Proposed Action; and discuss growth-inducing impacts of the Proposed Action.

In 2010, the CNRA released the First Year Progress Report (CNRA 2010) that describes California's progress toward completing the tasks outlined in the CAS. *Safeguarding California: Reducing Climate Risk* was subsequently published in 2014 to provide further updates on the CAS (CNRA 2014). The 2014 plan highlights climate risks in key sectors, discusses progress to date, and makes sector-specific recommendations. In 2016, implementation plans were published that show how the State is acting on the 2014 recommendations (CNRA 2016).

D.3.3 Regional and Local Regulations

The following air pollution control districts (APCDs) and air quality management districts (AQMDs) regulate air quality within the area of analysis:

- Bay Area AQMD
- Butte County AQMD
- Colusa County APCD
- Feather River AQMD
- Glenn County APCD
- Monterey Bay Unified APCD
- Placer County APCD
- Sacramento Metropolitan AQMD
- San Joaquin Valley APCD
- Shasta County AQMD
- Tehama County APCD
- Yolo-Solano APCD

[5] In evaluating significance, CEQA defines "direct" physical changes in the environment to be those caused by and immediately related to the project. "Indirect" physical changes are not immediately related to the project but are caused by the project. These definitions are consistent with NEPA's interpretation of direct and indirect effects.

Although these air districts do not regulate GHG emissions directly, they may have GHG-specific significance criteria in their respective CEQA guidelines.

D.4 References

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Appendix E Groundwater Existing Conditions

E.1 Redding Groundwater Basin

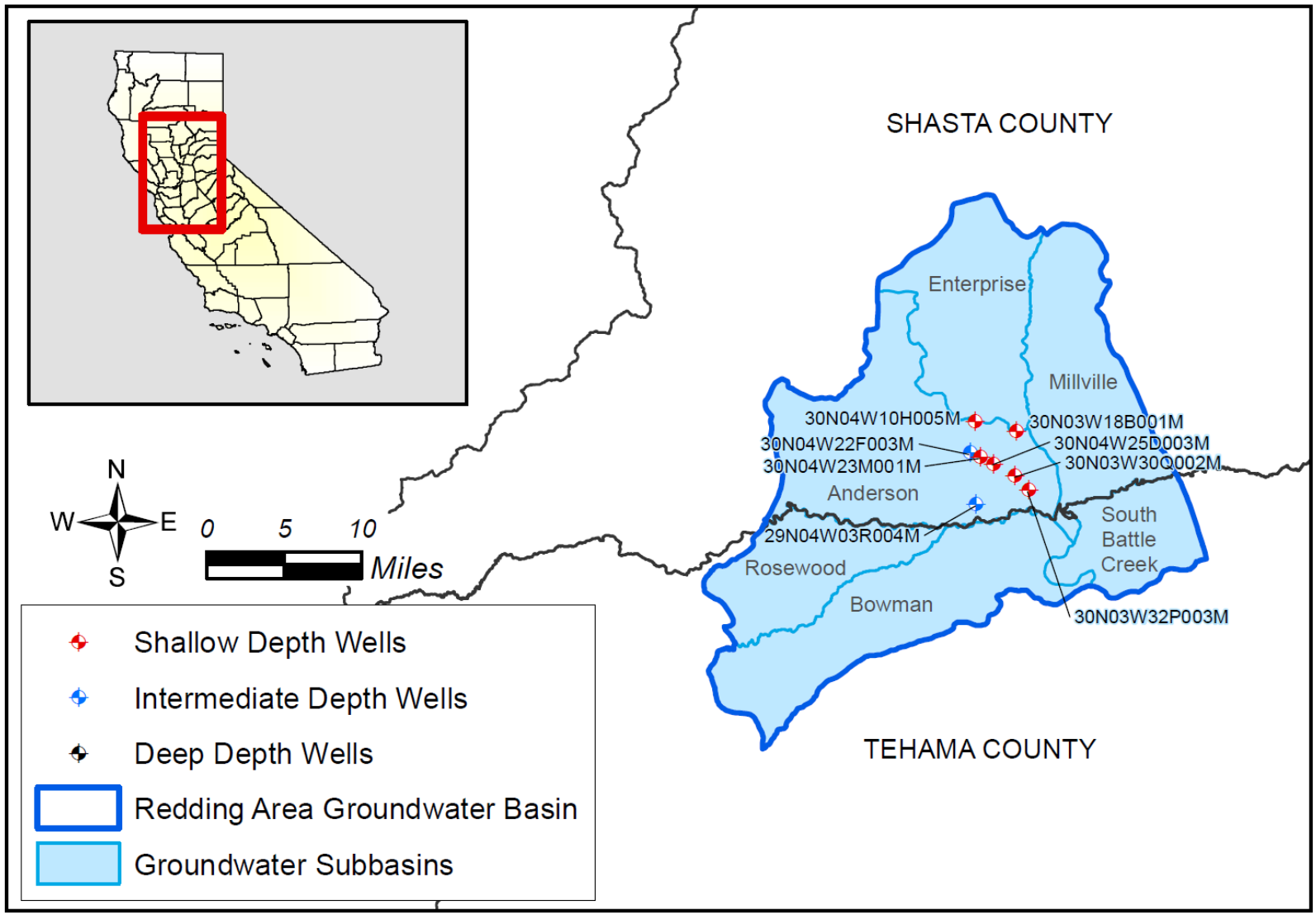

Figure E-1.
Location of Groundwater wells in Redding Area Groundwater Basin

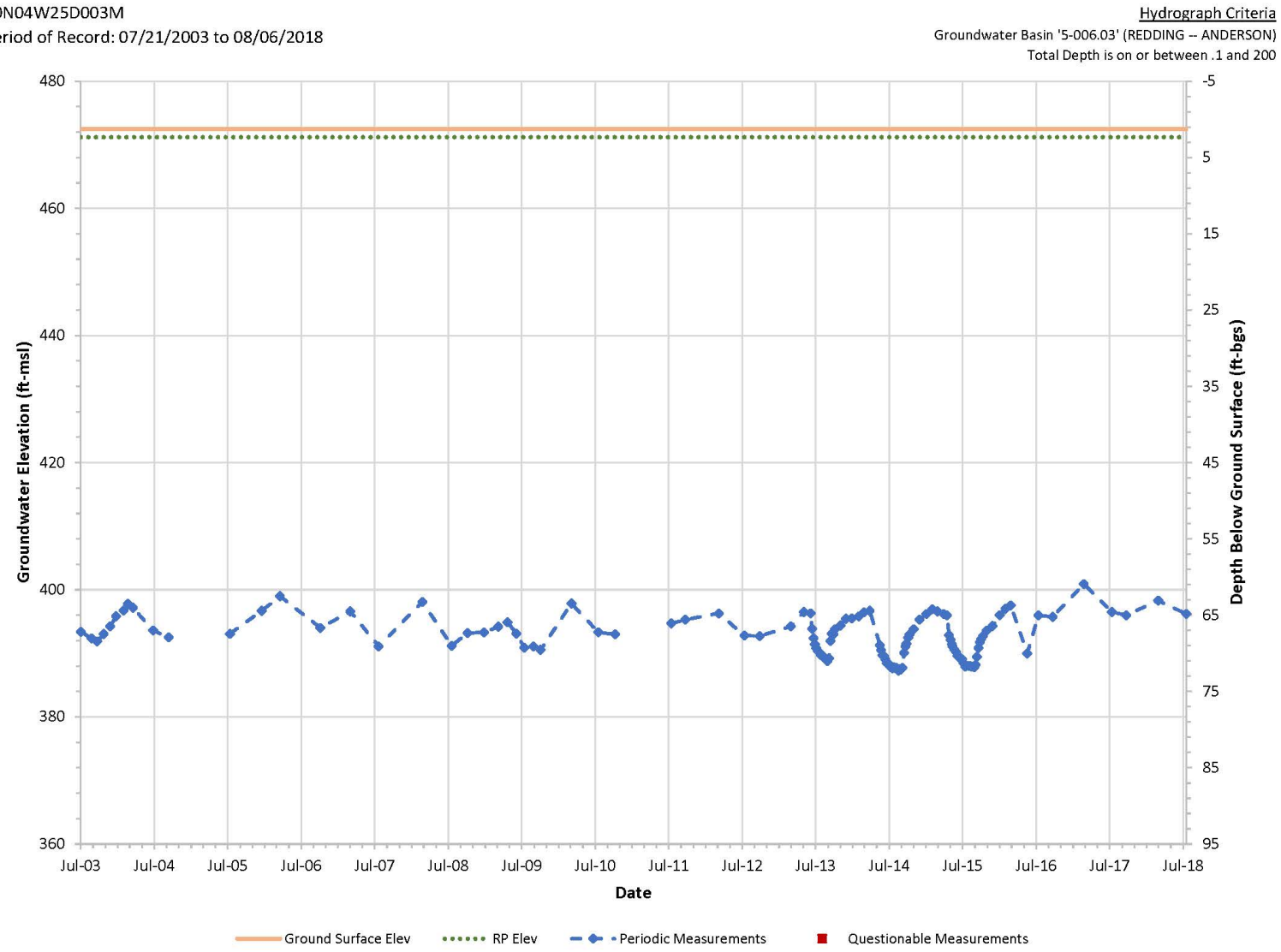

Figure E-2.
Hydrograph for 30N04W25D003M

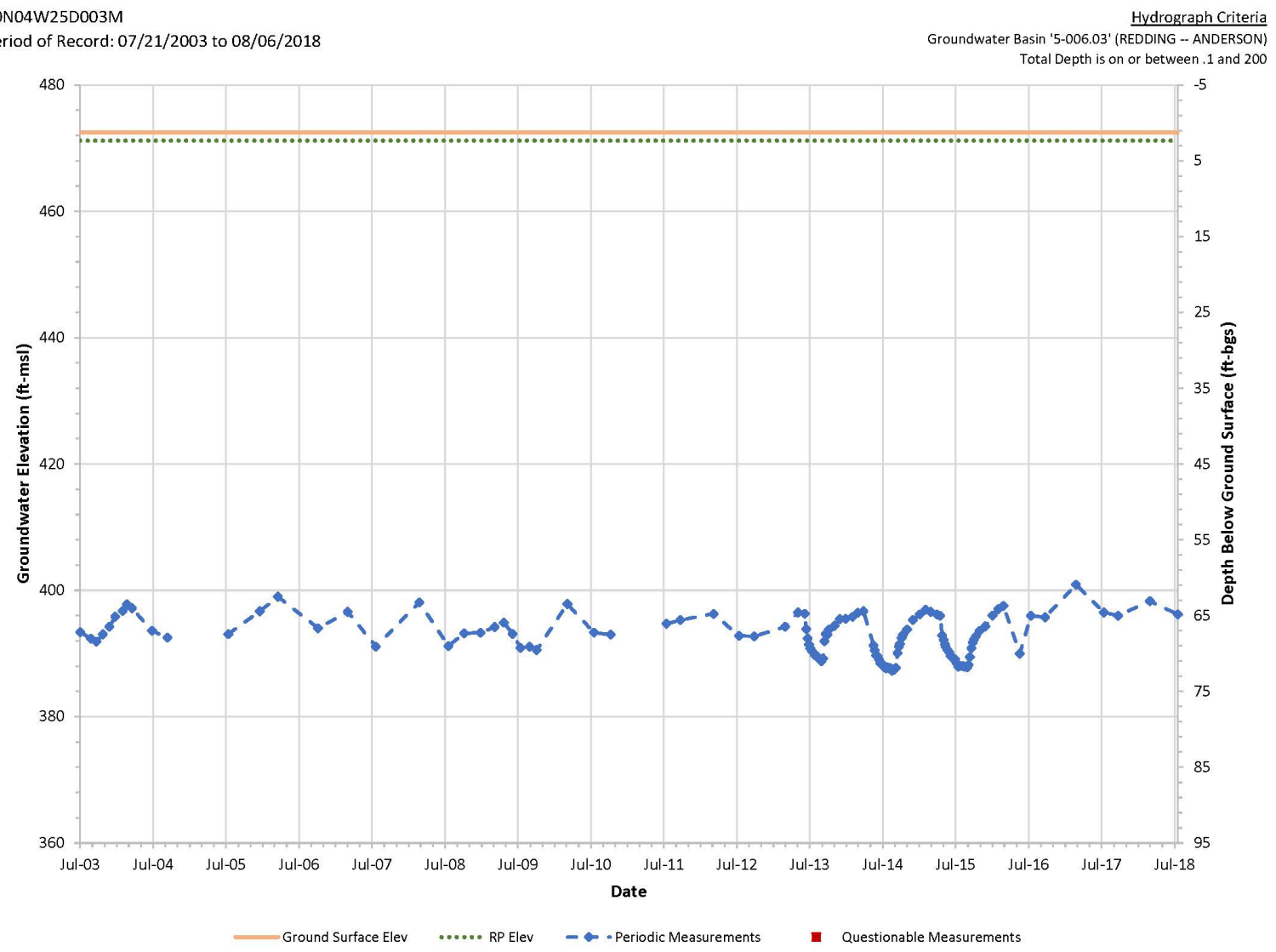

Figure E-3.
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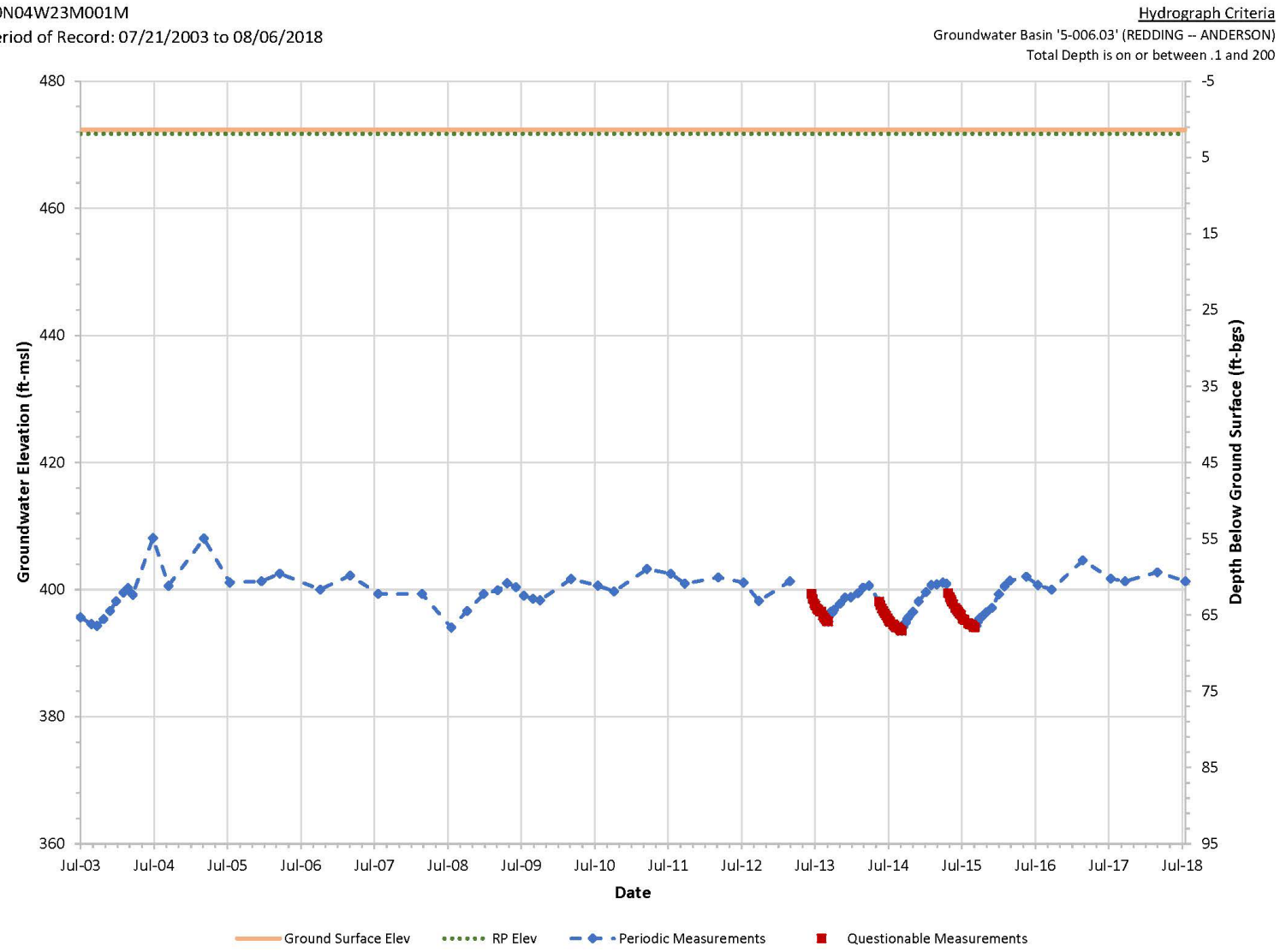


Figure E-4.
Hydrograph for 30N04W23M001M

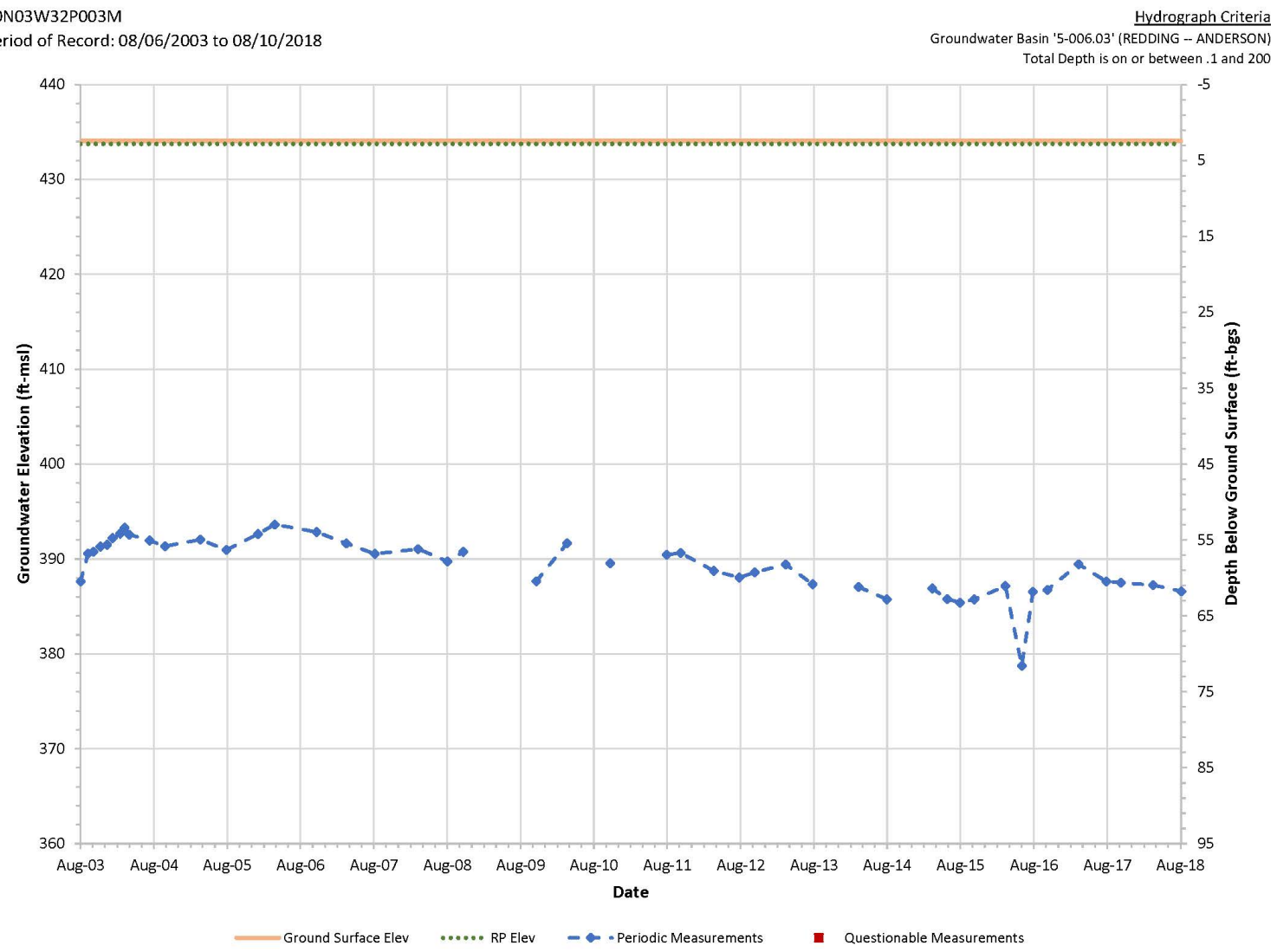


Figure E-5.
Hydrograph for 30N03W32P003M

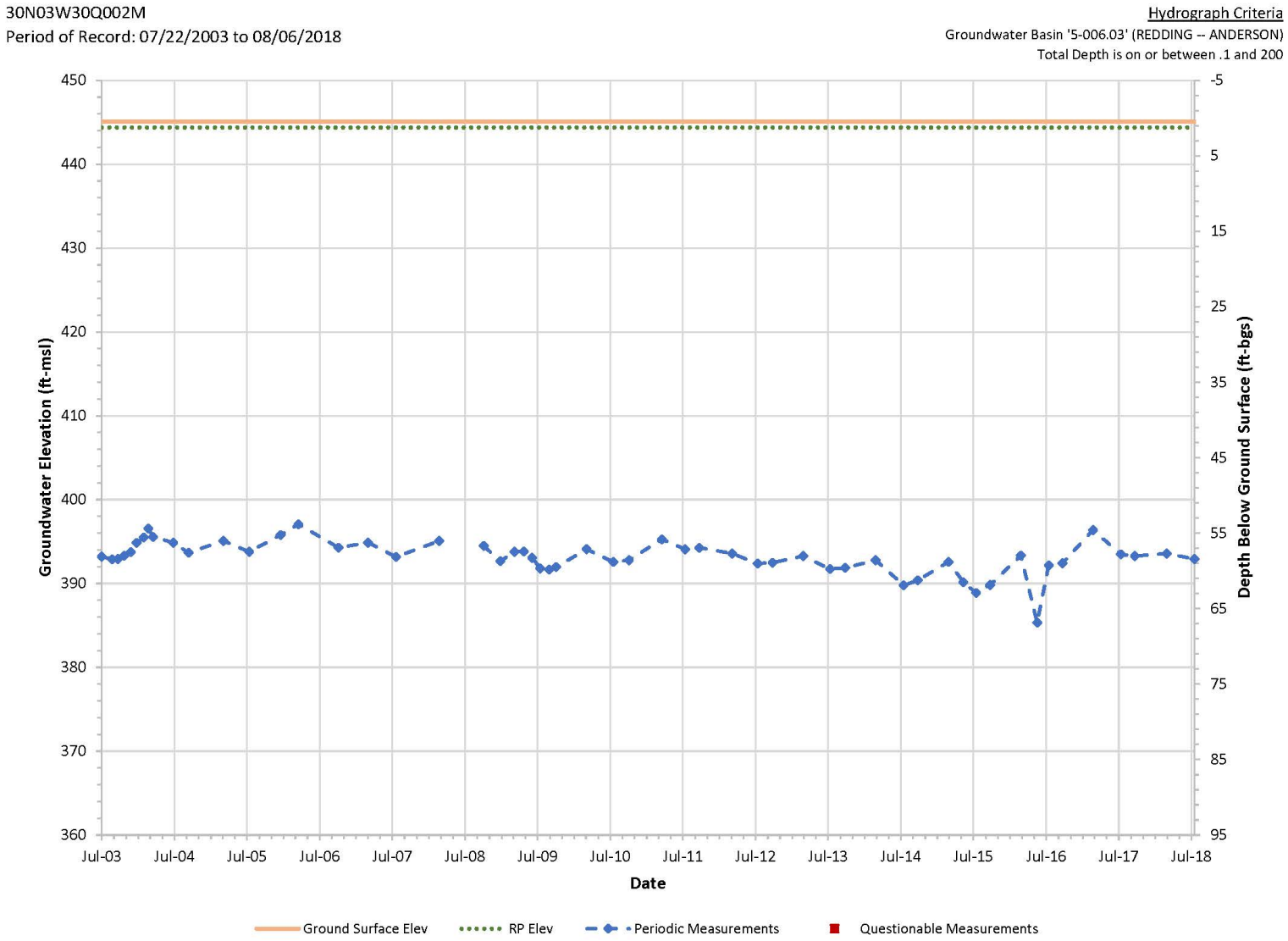


Figure E-6.
Hydrograph for 30N03W30Q002M

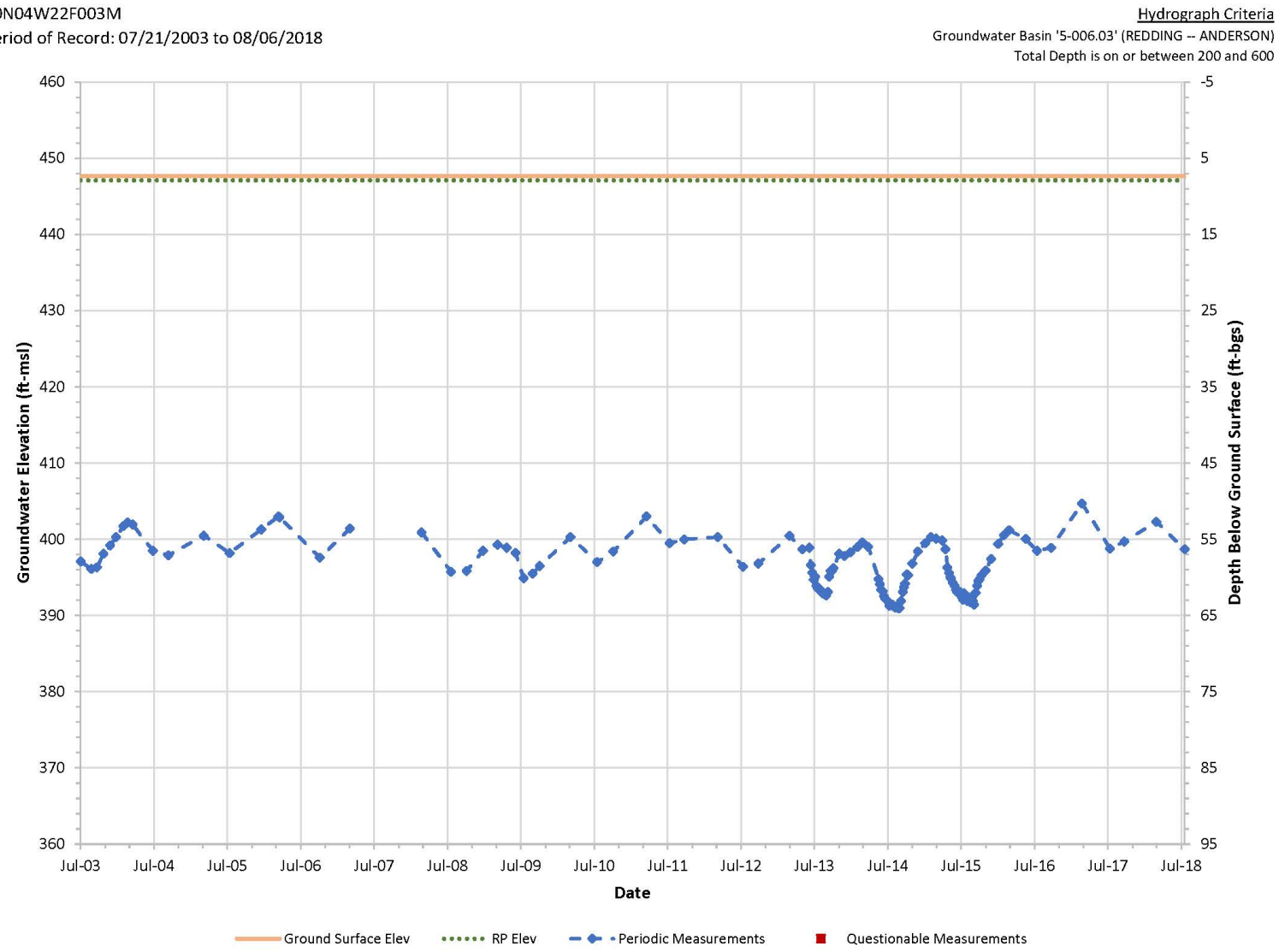
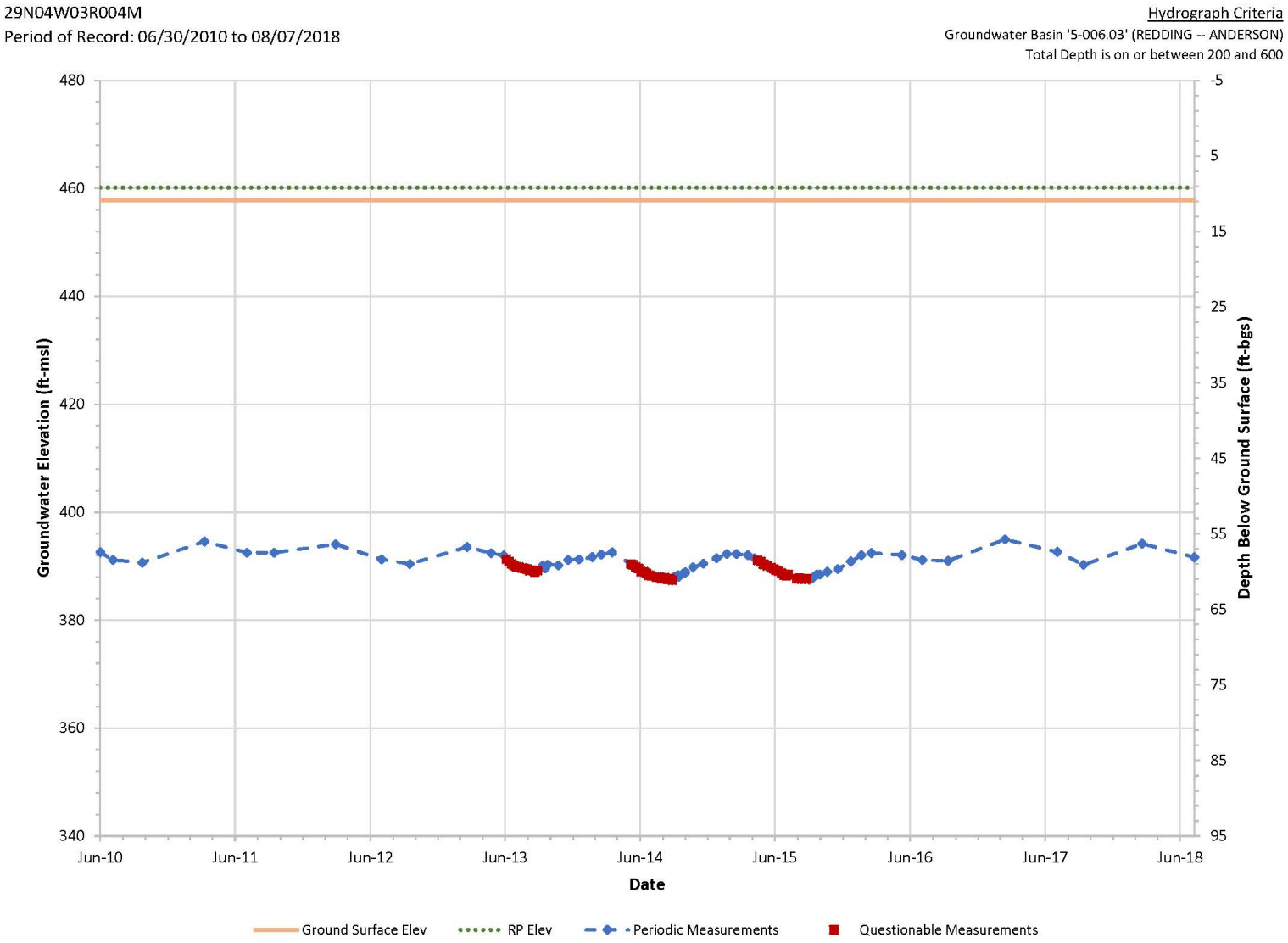


Figure E-7.
Hydrograph for 30N04W22F003M



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Hydrograph for 29N04W03R004M

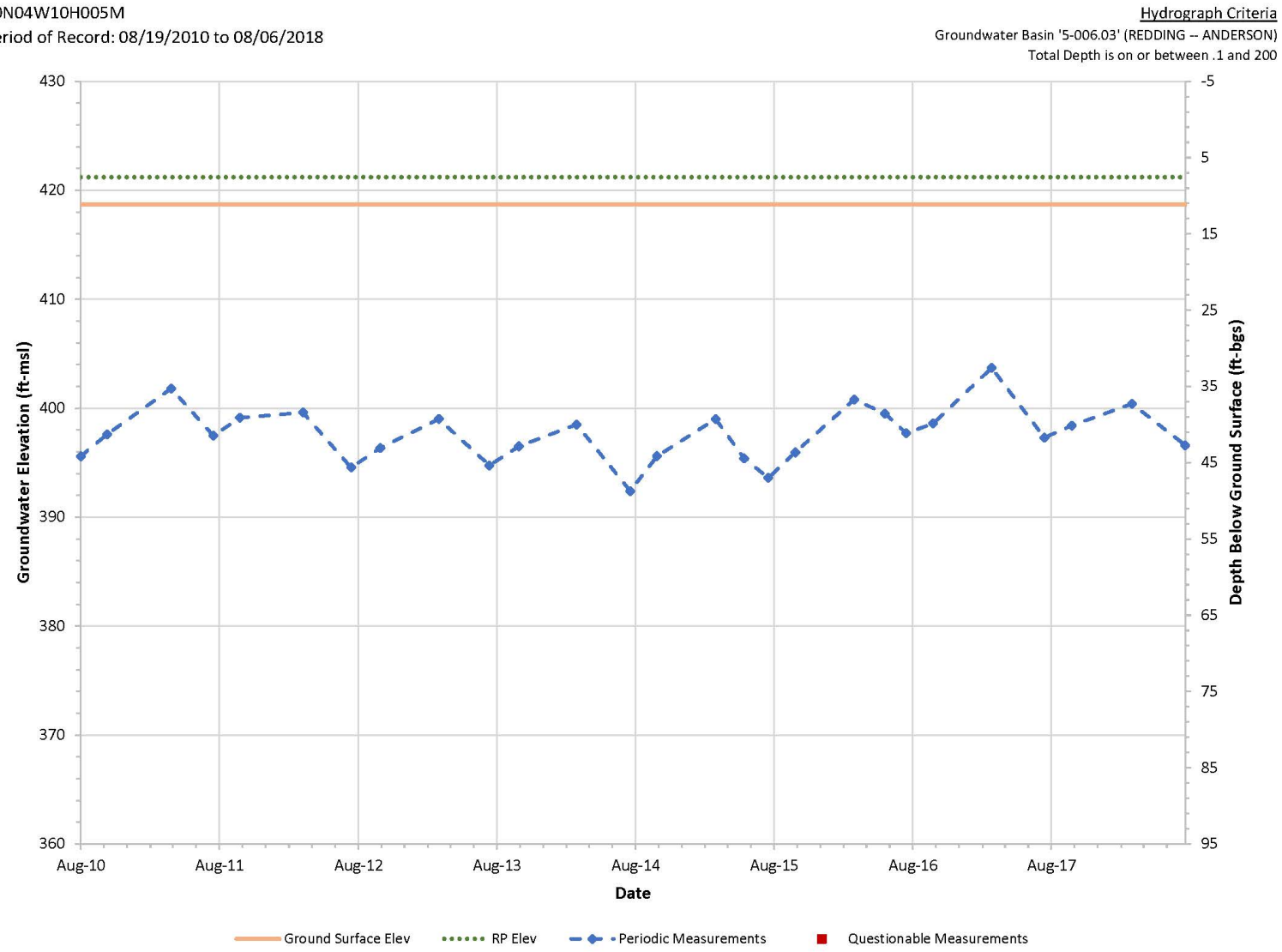

Figure E-9.
Hydrograph for 30N04W10H005M

E.2 Sacramento Valley Groundwater Basin

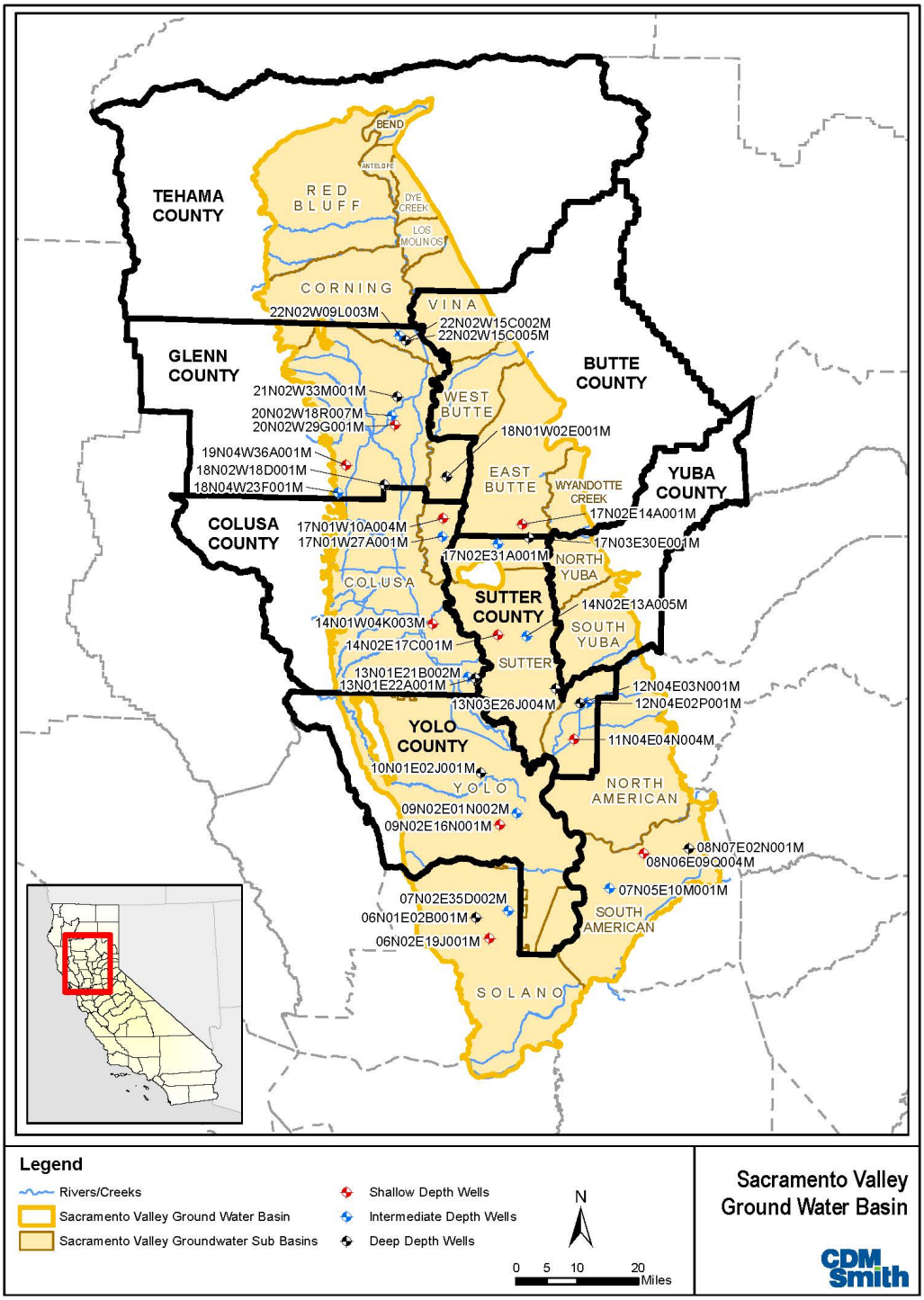

Figure E-10.
Location of Groundwater well in Sacramento Valley Groundwater Basin

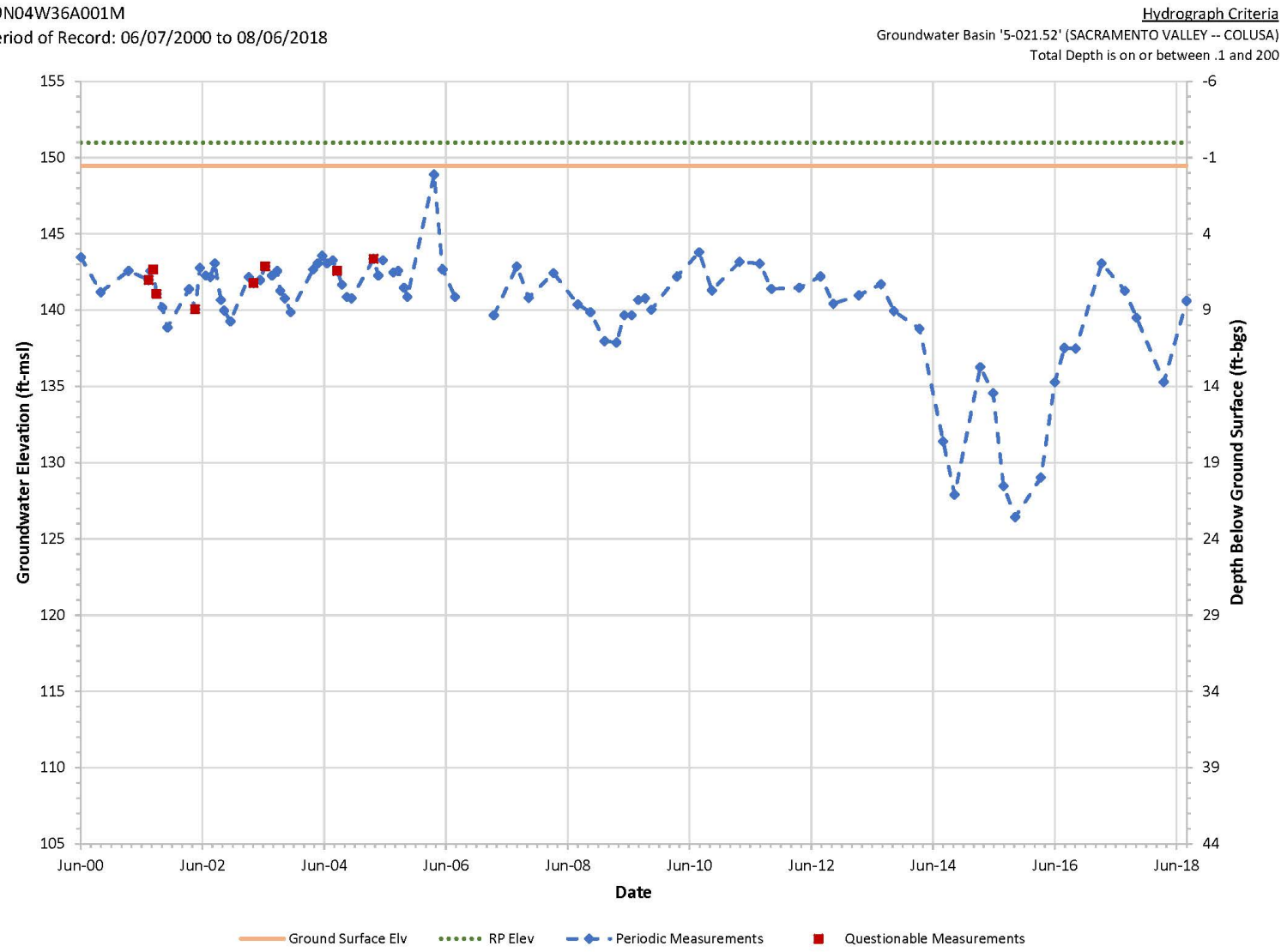

Figure E-11.
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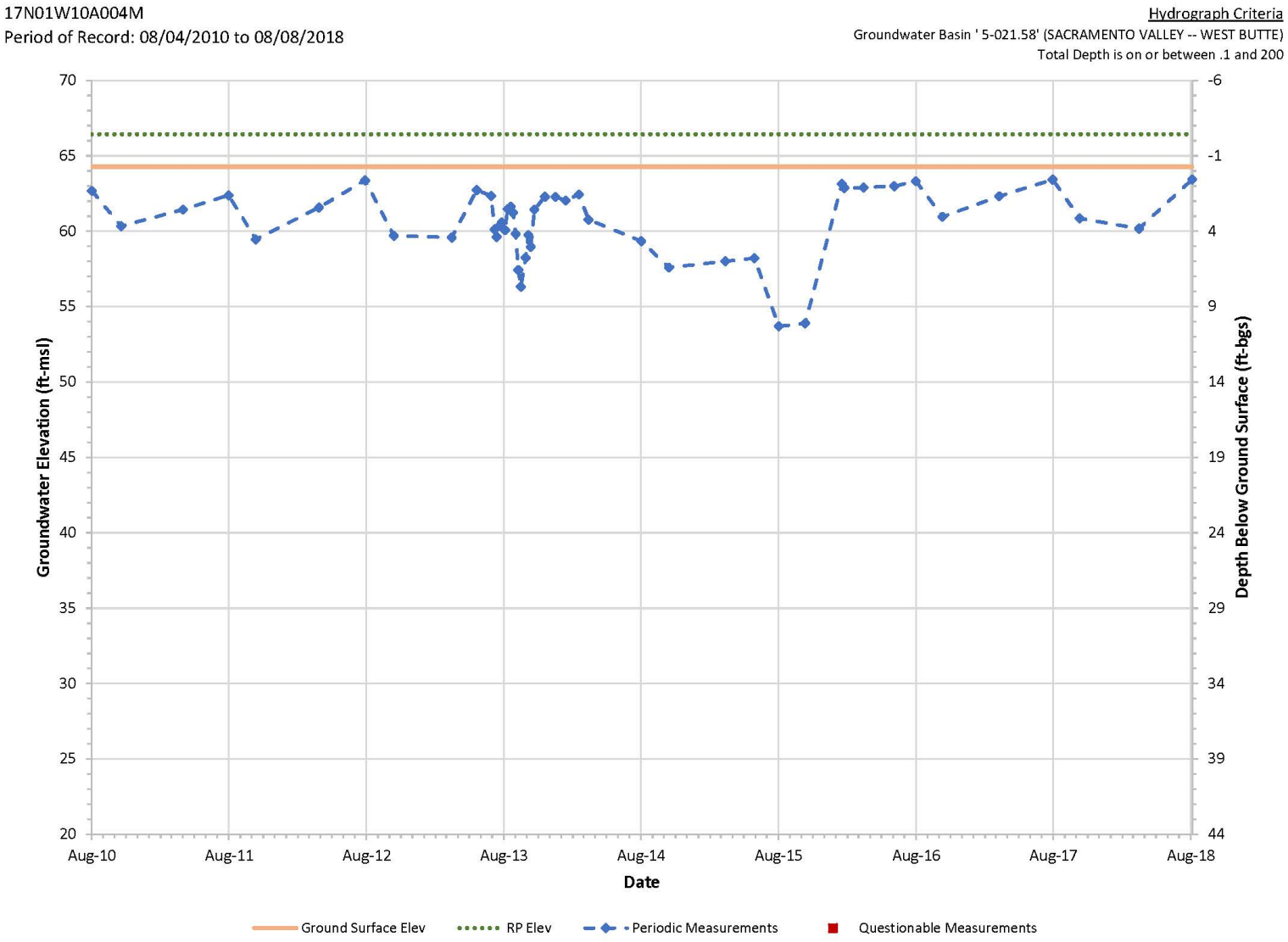


Figure E-12.
Hydrograph for 17N01W10A004M

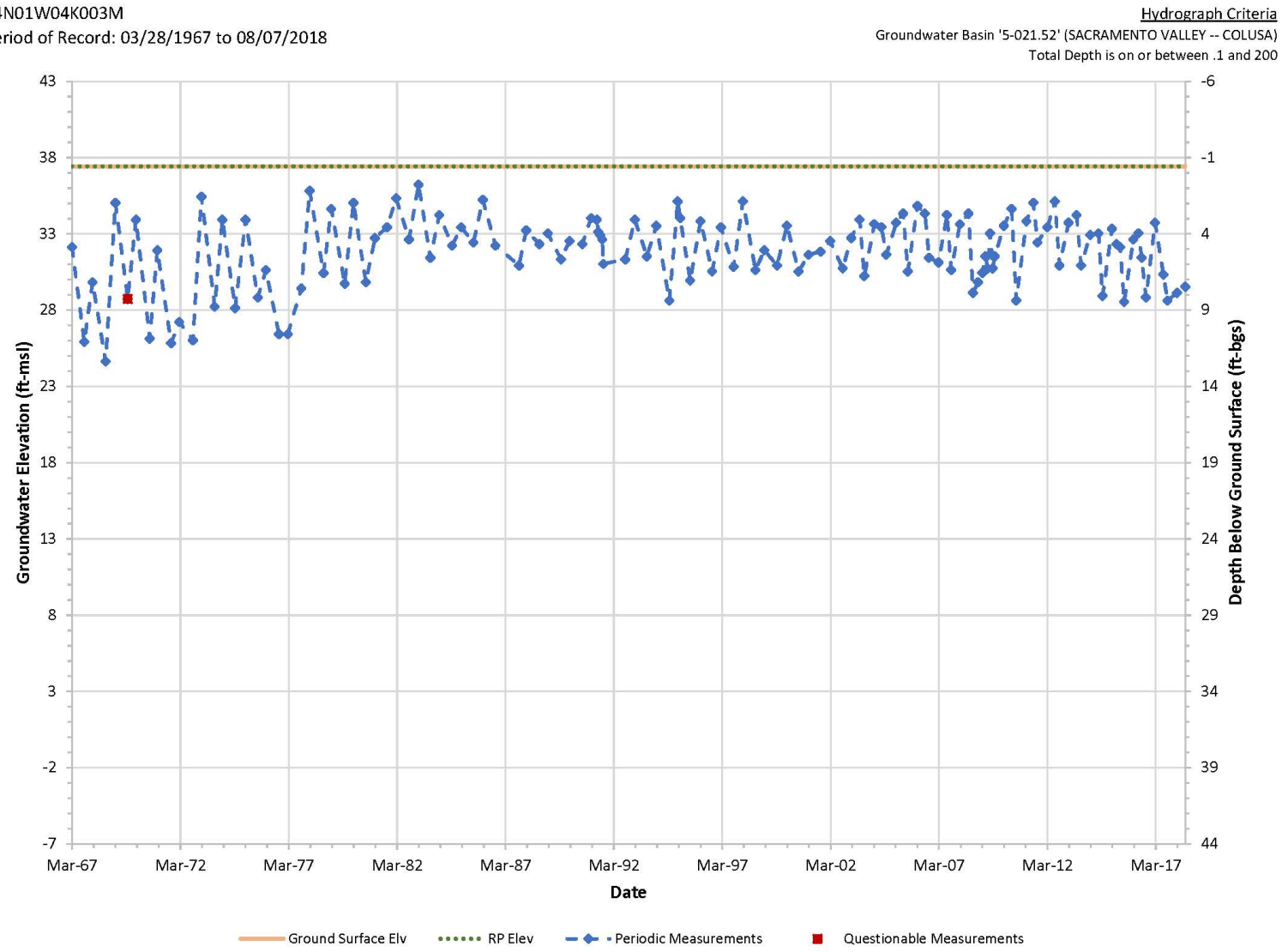


Figure E-13.
Hydrograph for 14N01W04K003M

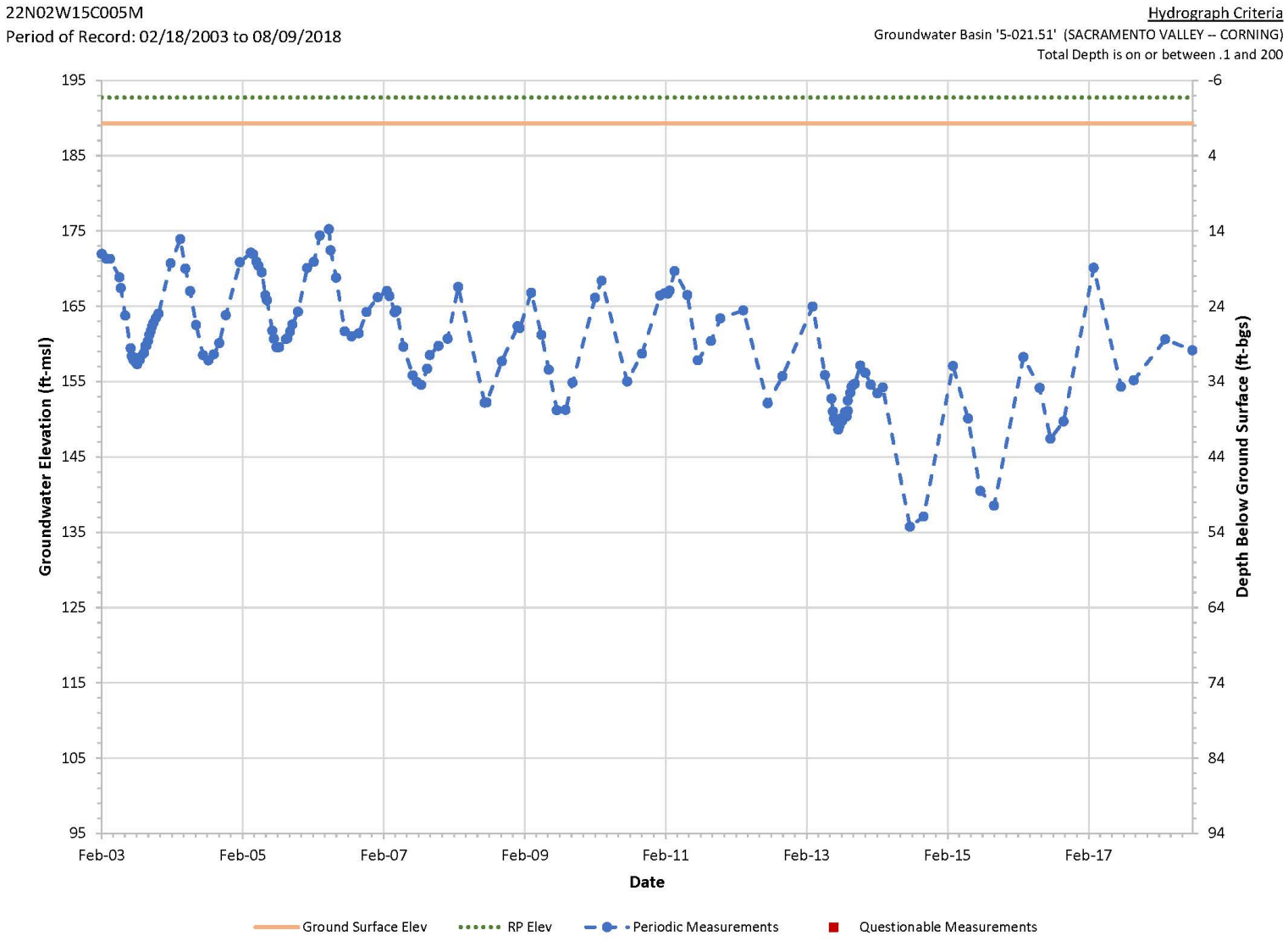
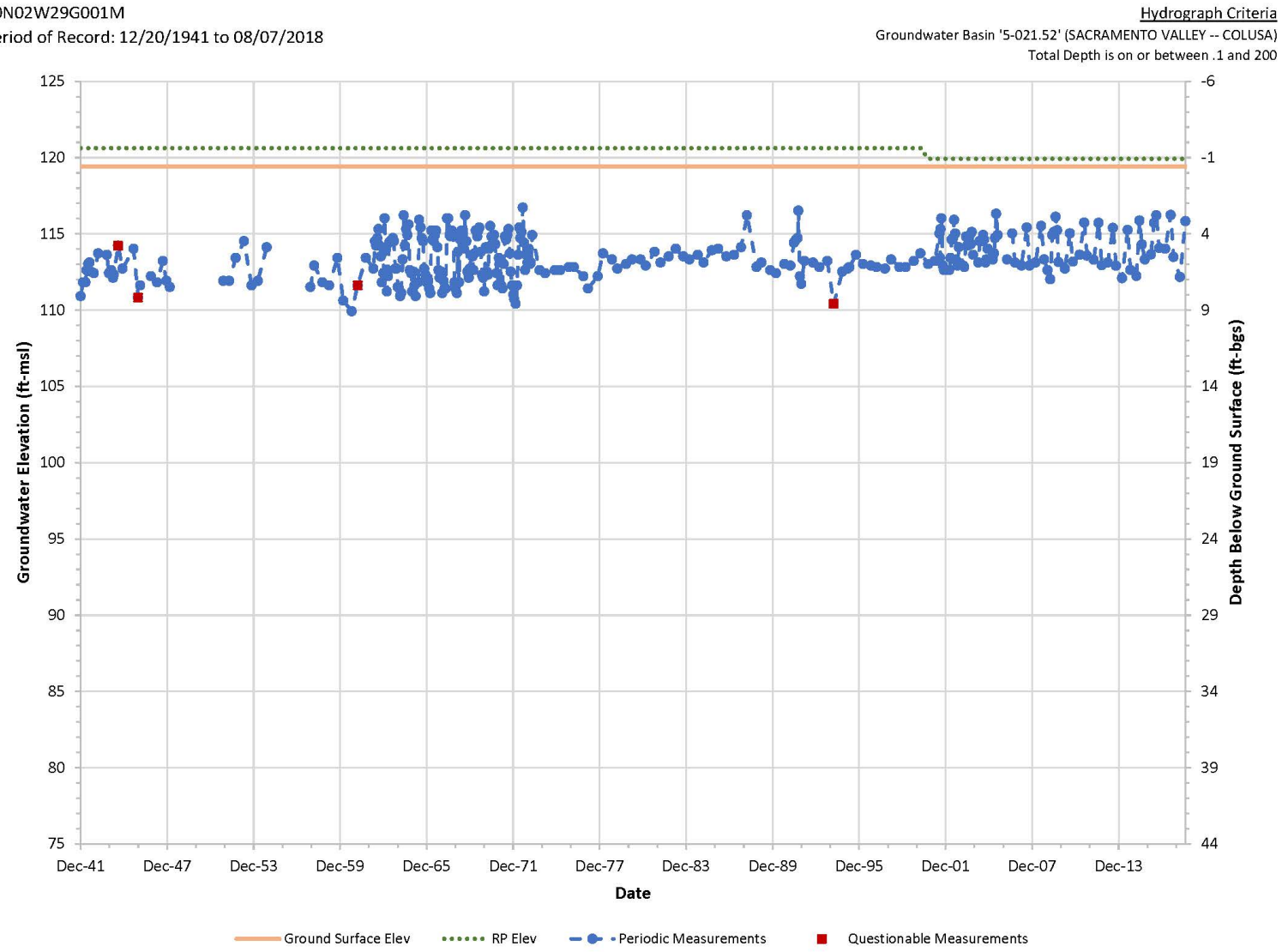


Figure E-14.
Hydrograph for 22N02W15C005M



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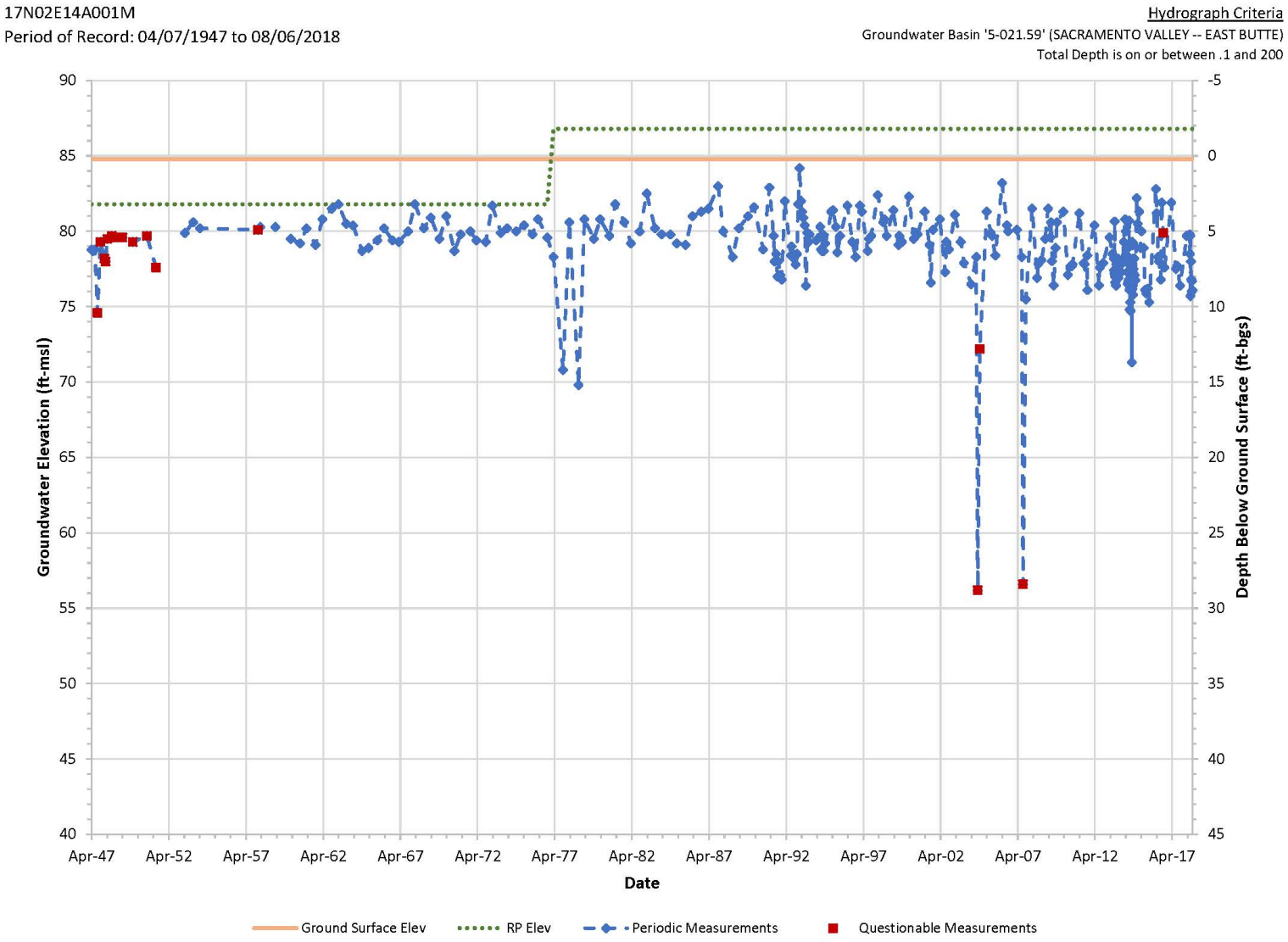

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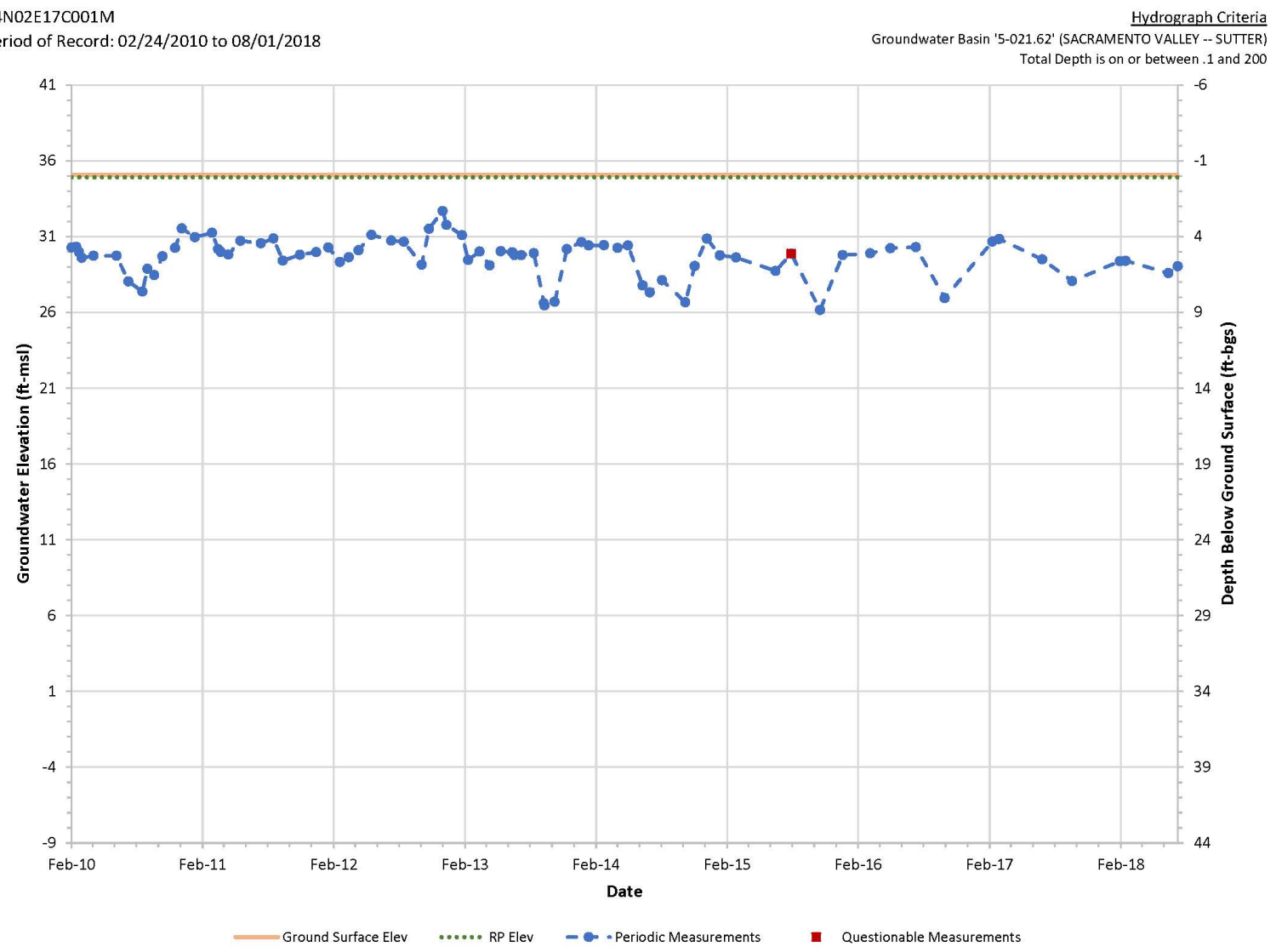
Hydrograph for 17N02E14A001M



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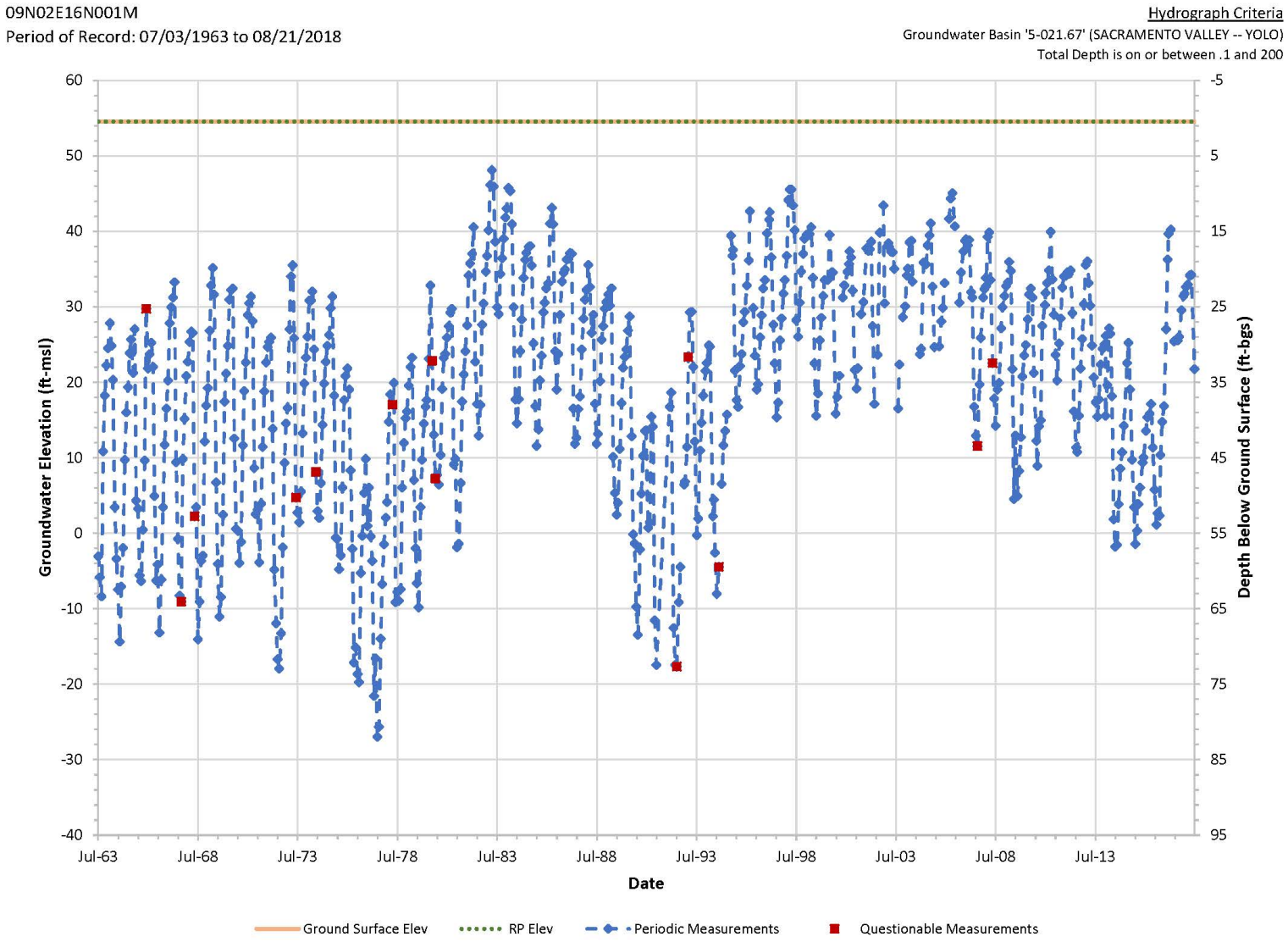

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Hydrograph for 09N02E16N001M

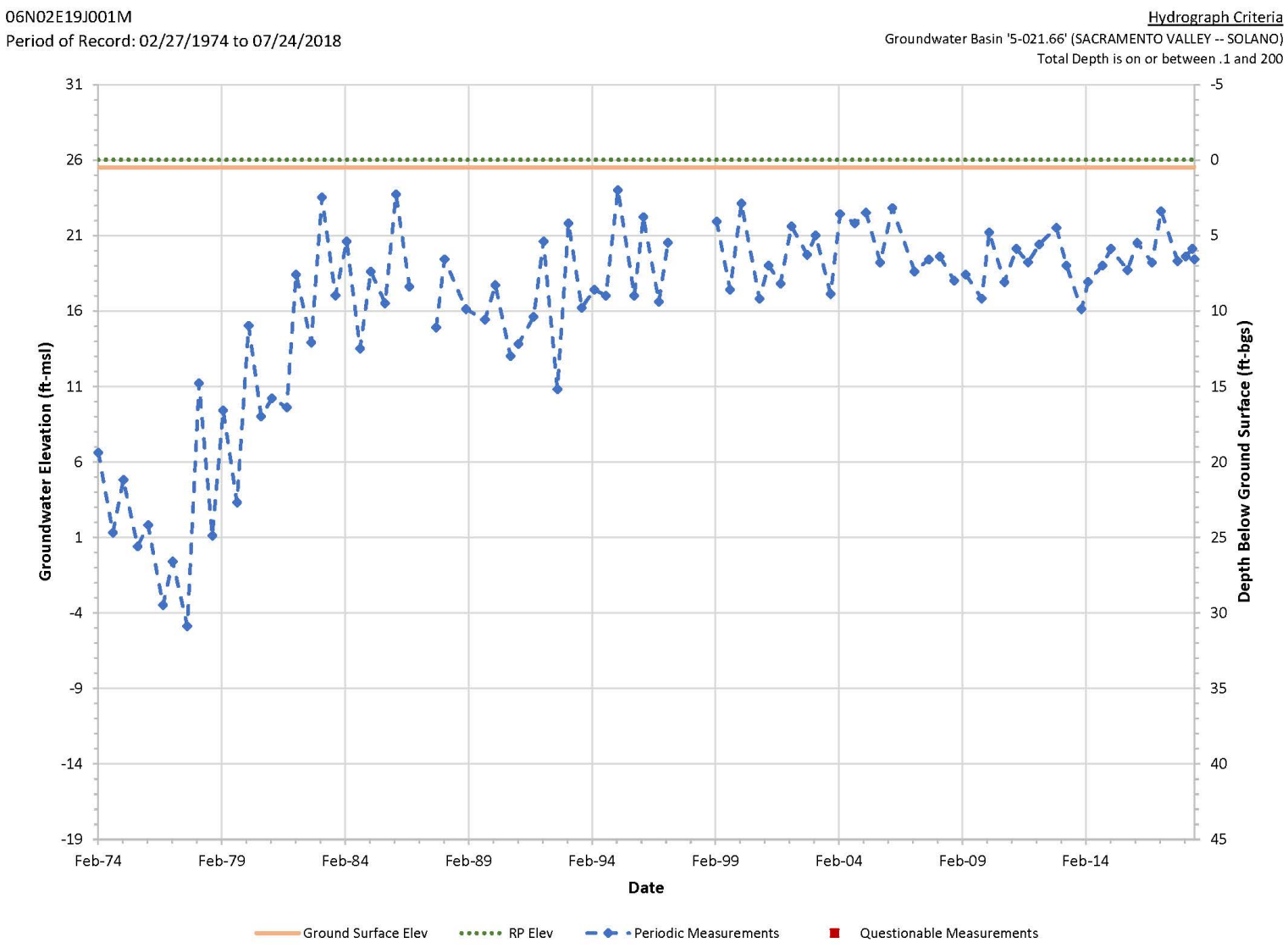


Figure E-19.
Hydrograph for 06N02E19J001M

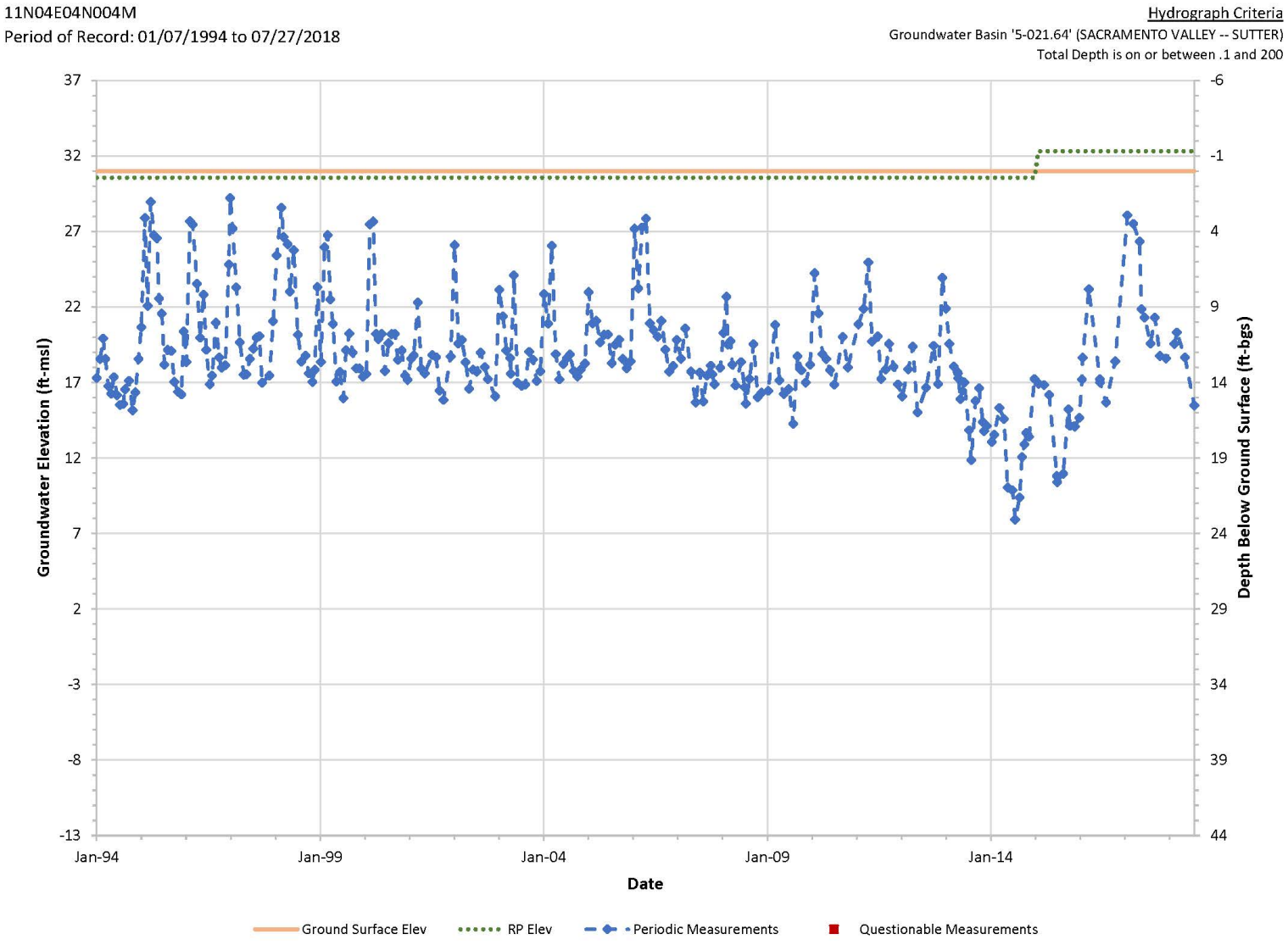
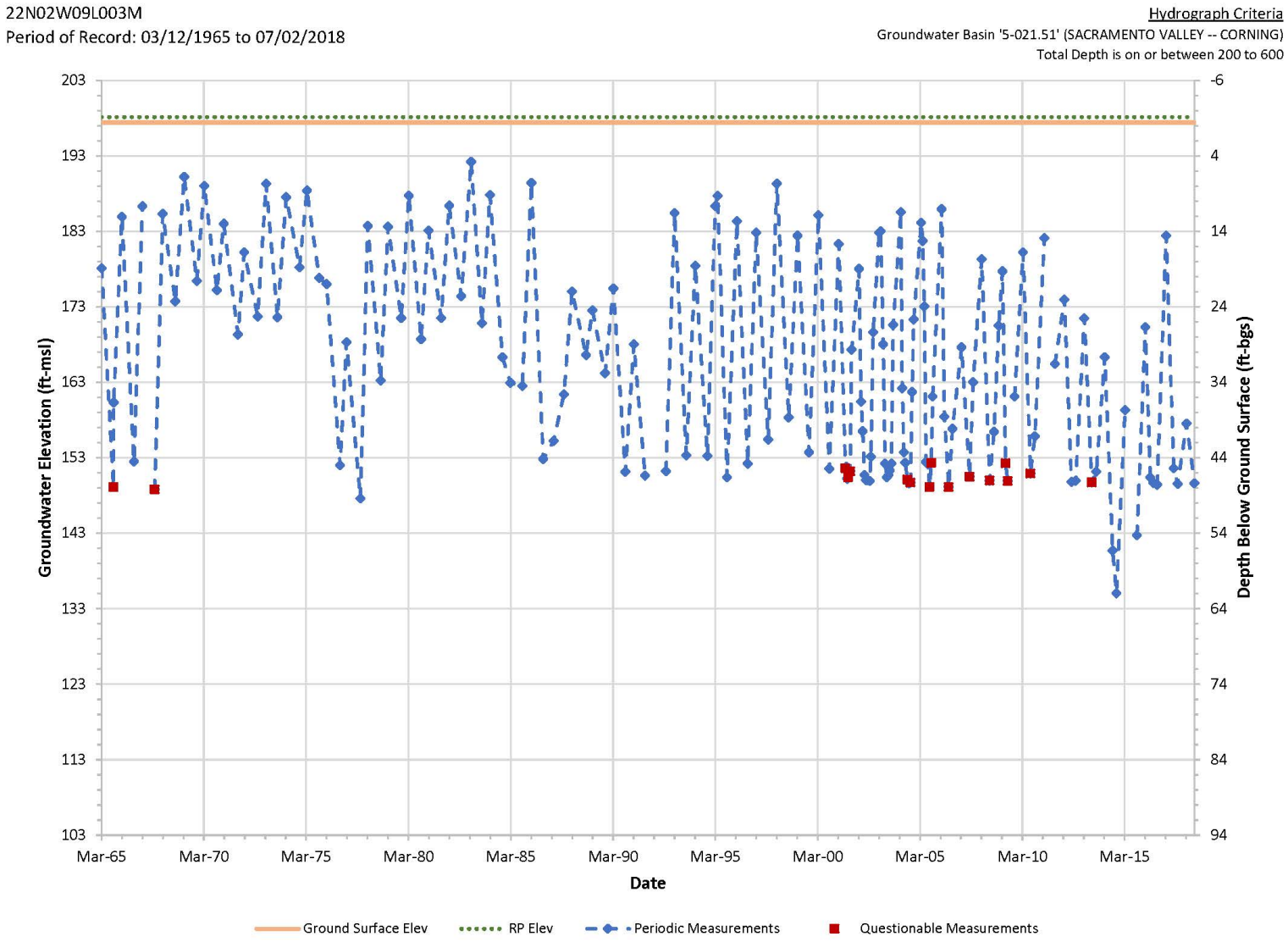


Figure E-20.
Hydrograph for 11N04E04N004M

Figure E-21.
Hydrograph for 08N06E09Q004M



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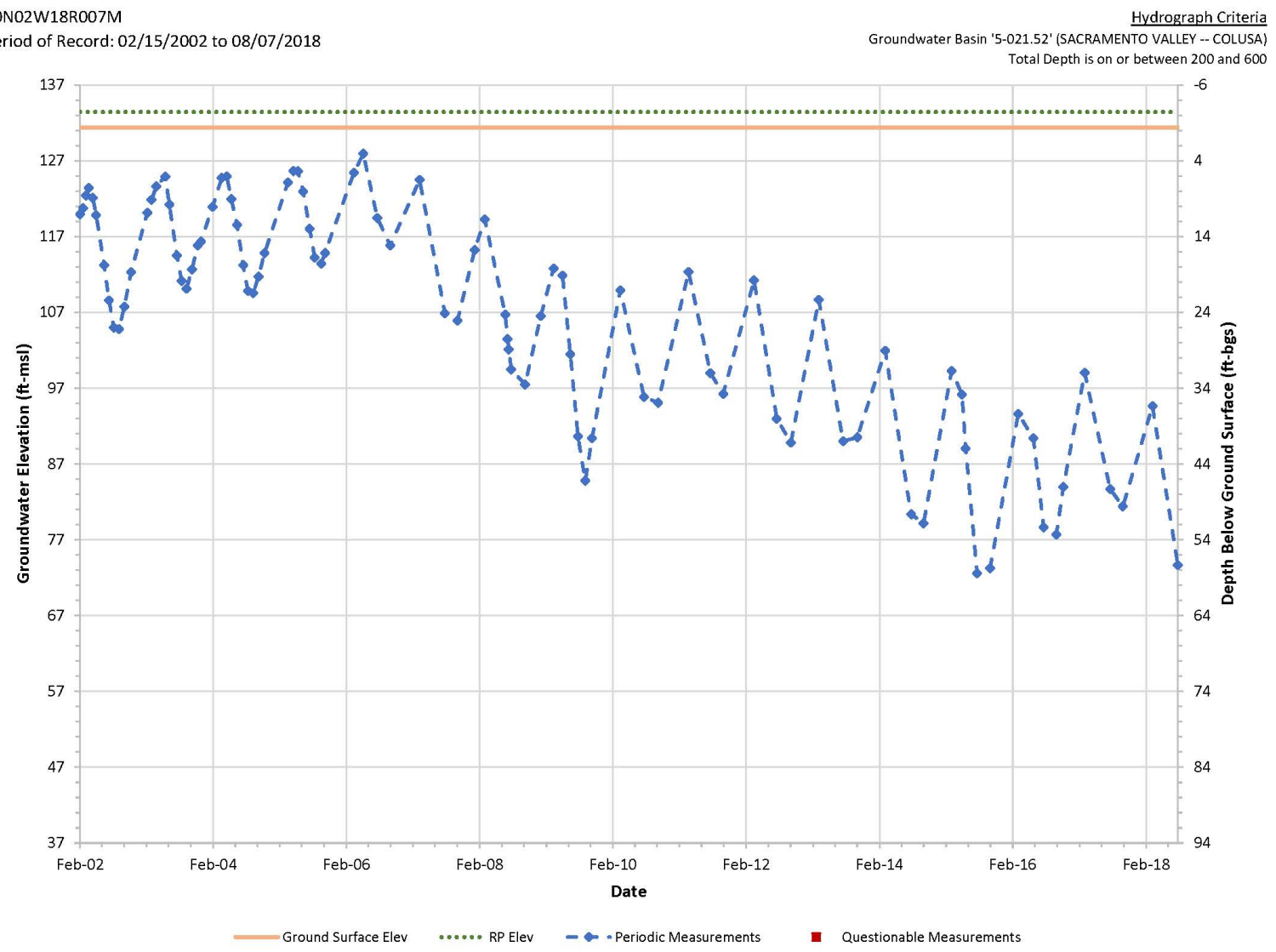


Figure E-23.
Hydrograph for 20N02W18R007M

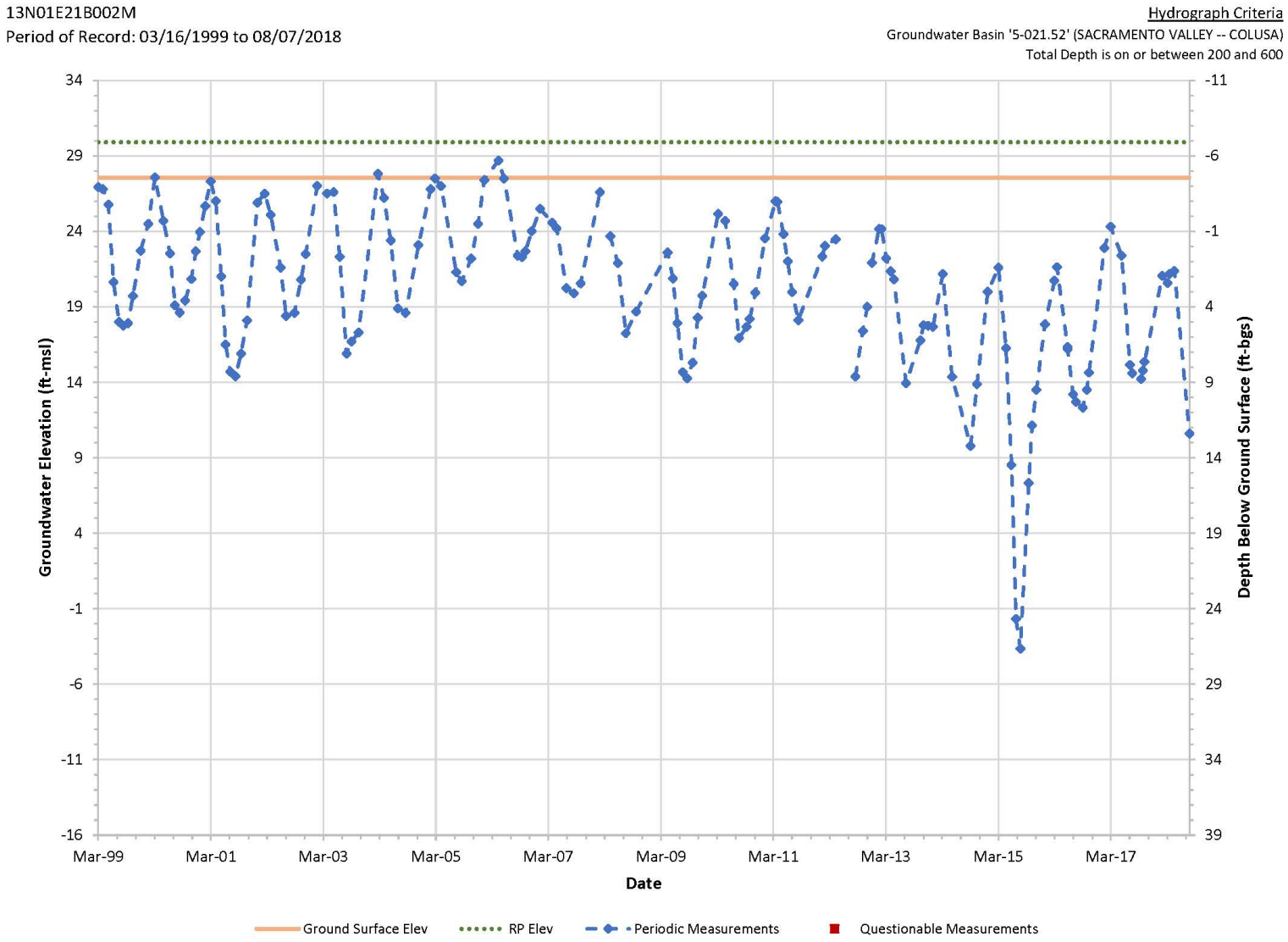


Figure E-24.
Hydrograph for 13N01E21B002M

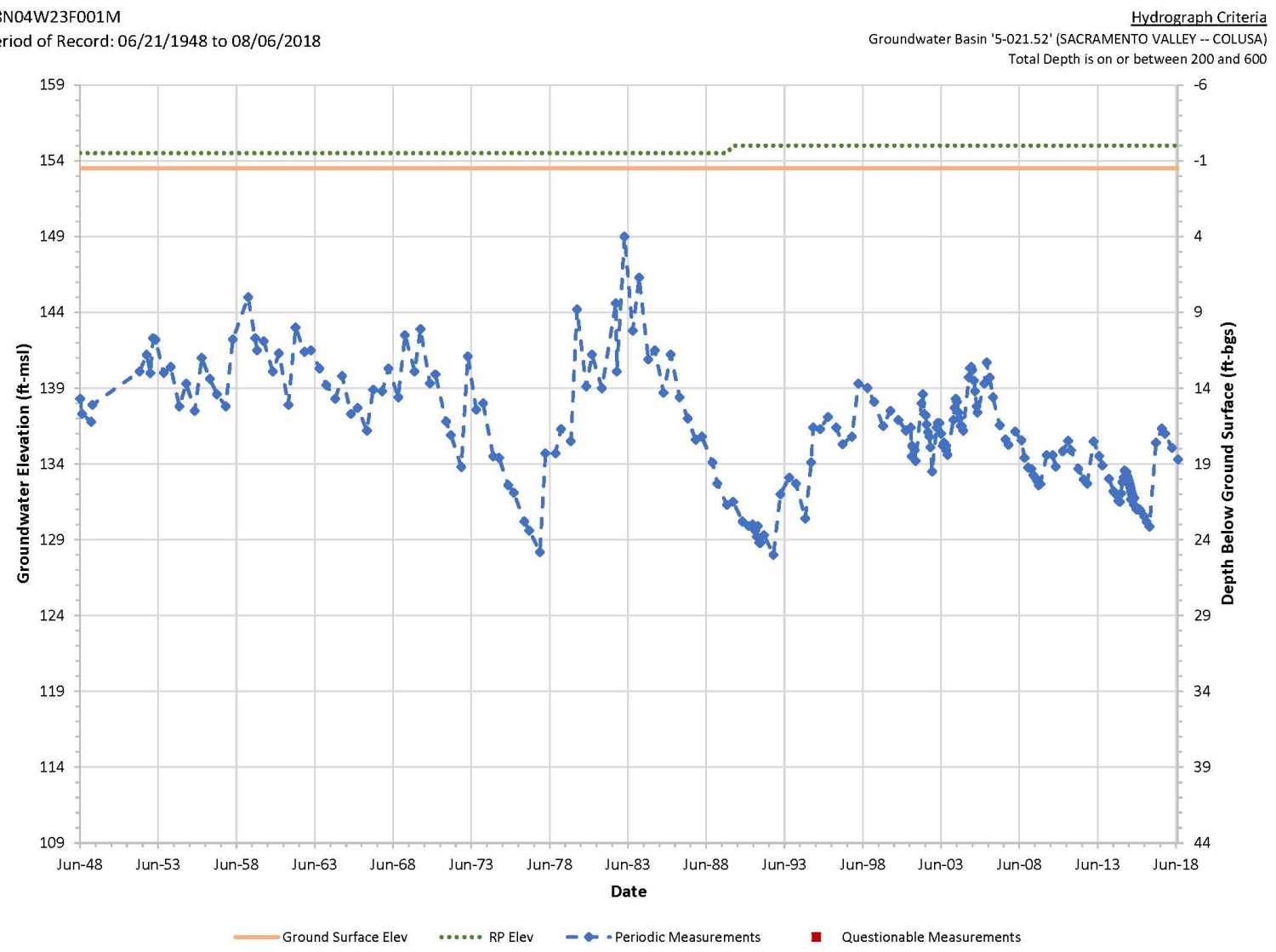


Figure E-25.
Hydrograph for 18N04W23F001M

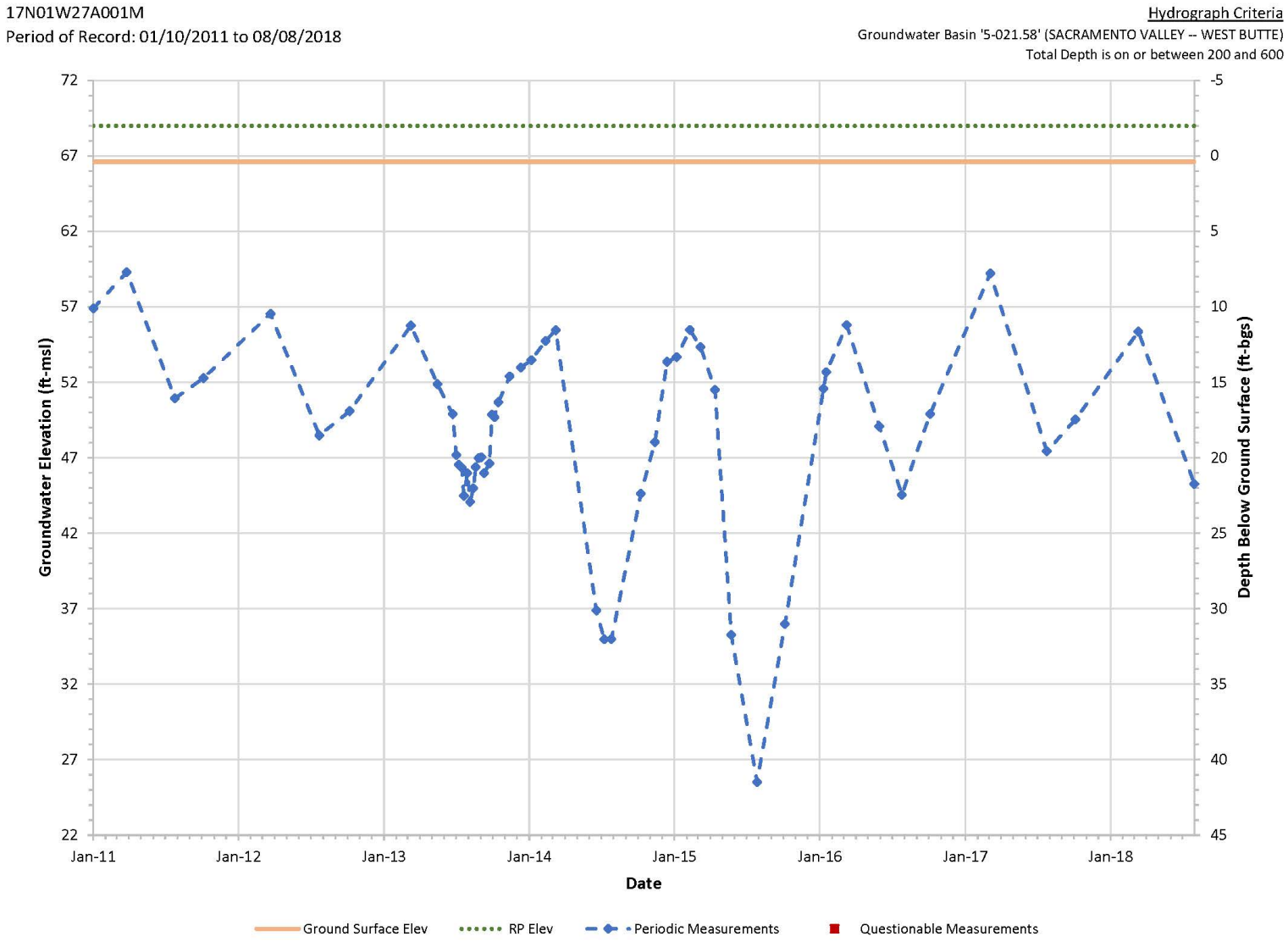


Figure E-26.
Hydrograph for 17N01W27A001M

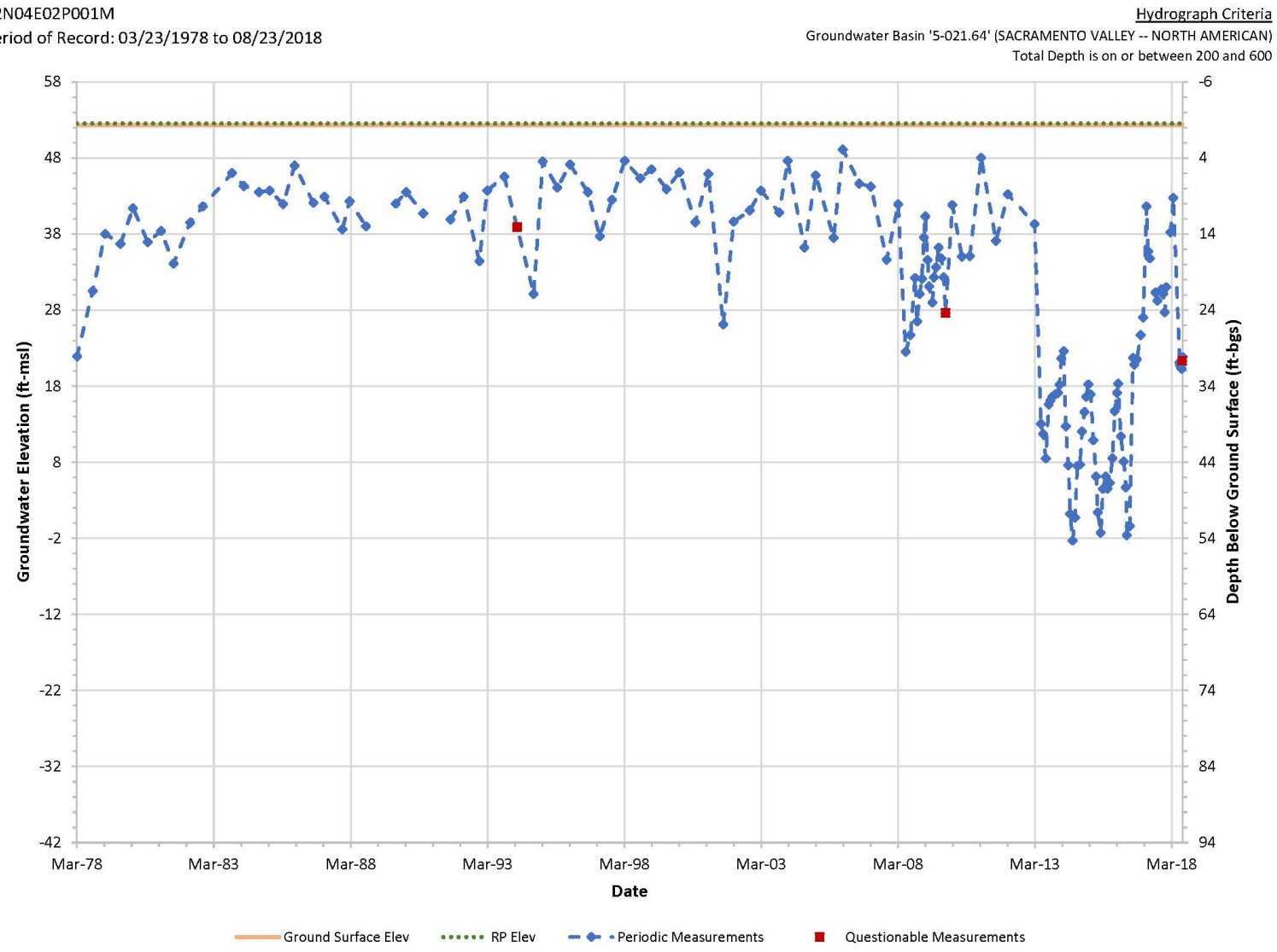


Figure E-27.
Hydrograph for 12N04E02P001M

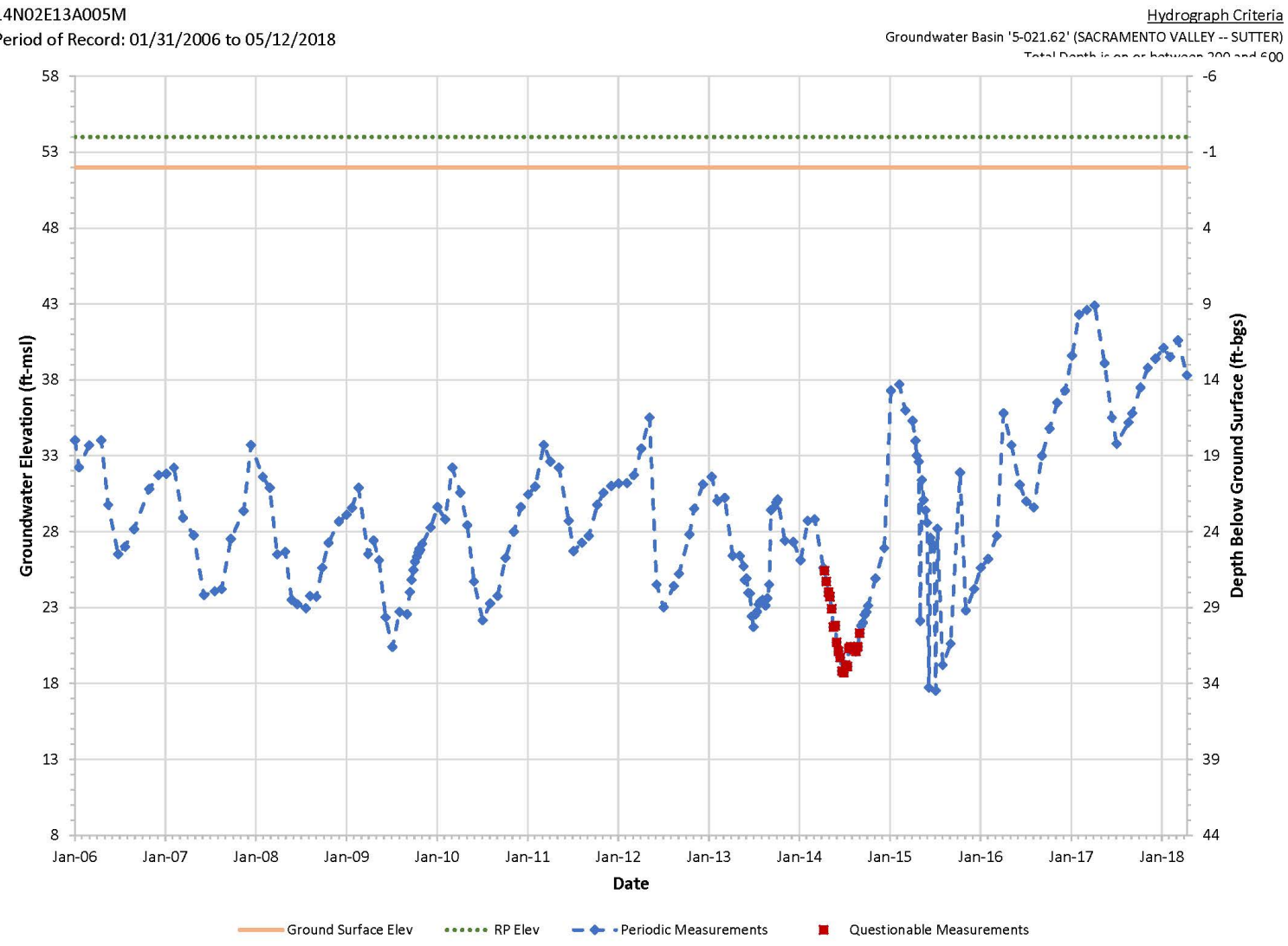


Figure E-28.
Hydrograph for 14N02E13A005M

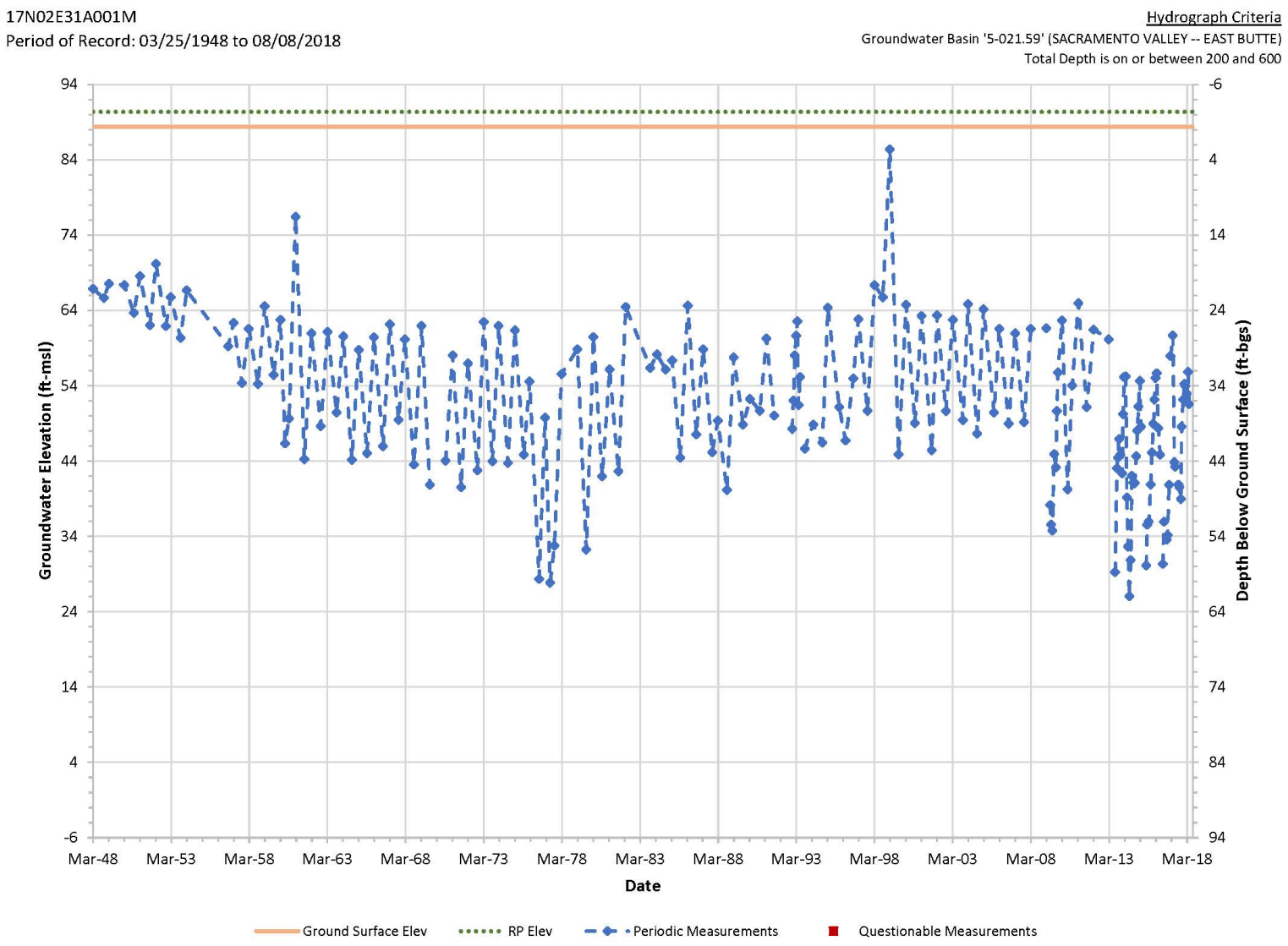


Figure E-29.
Hydrograph for 17N02E31A001M

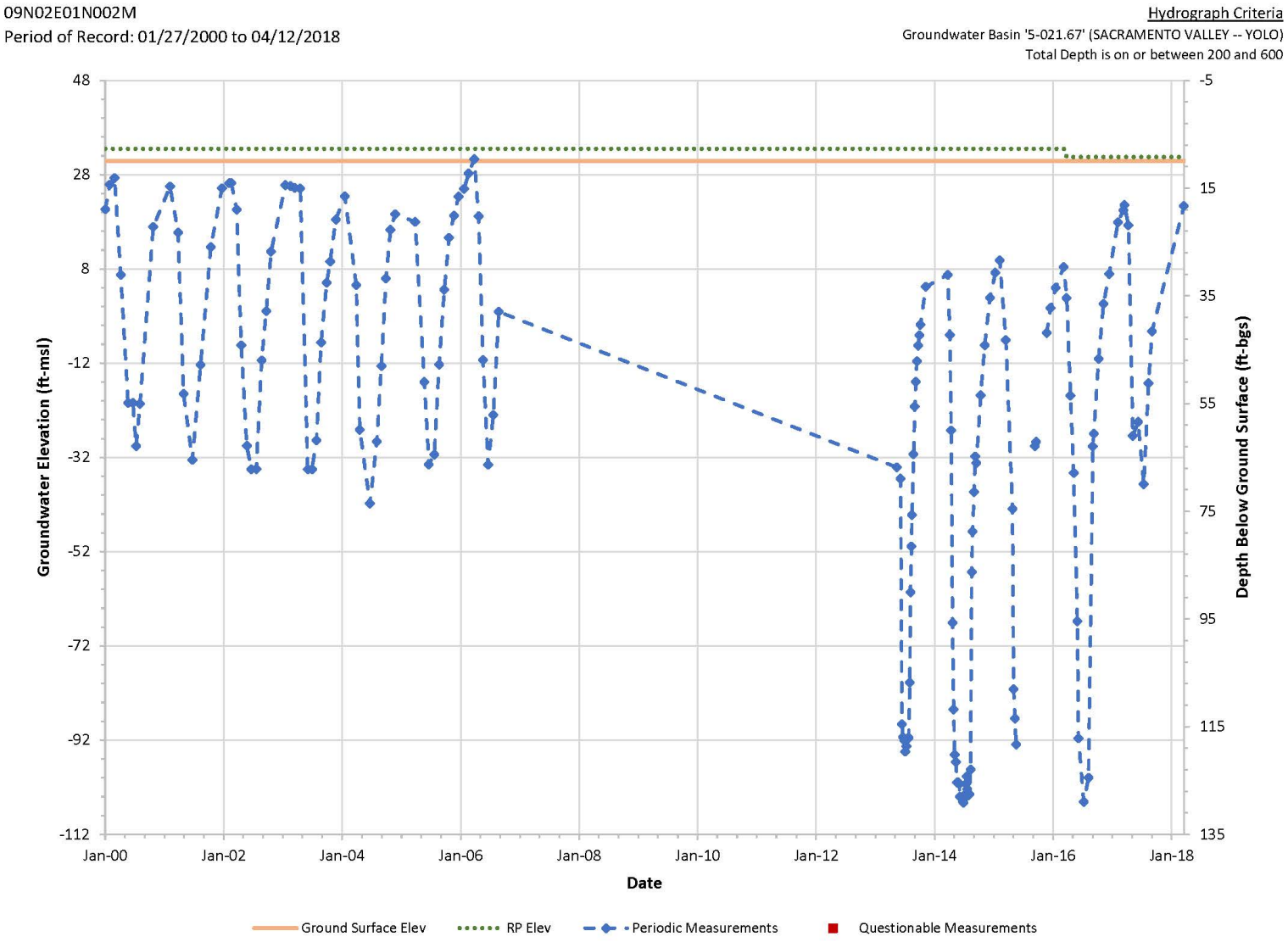


Figure E-30.
Hydrograph for 09N02E01N002M

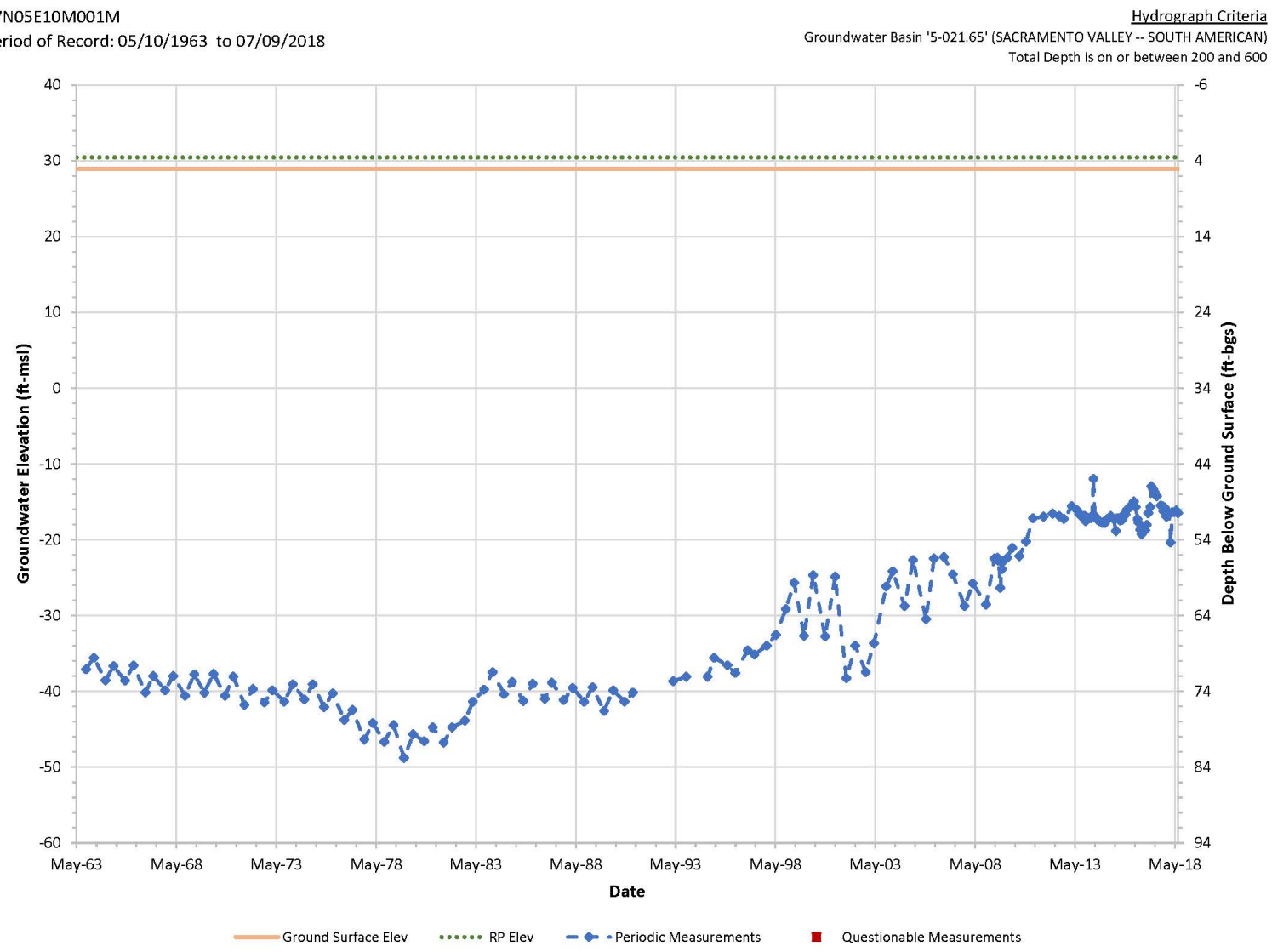


Figure E-31.
Hydrograph for 07N05E10M001M

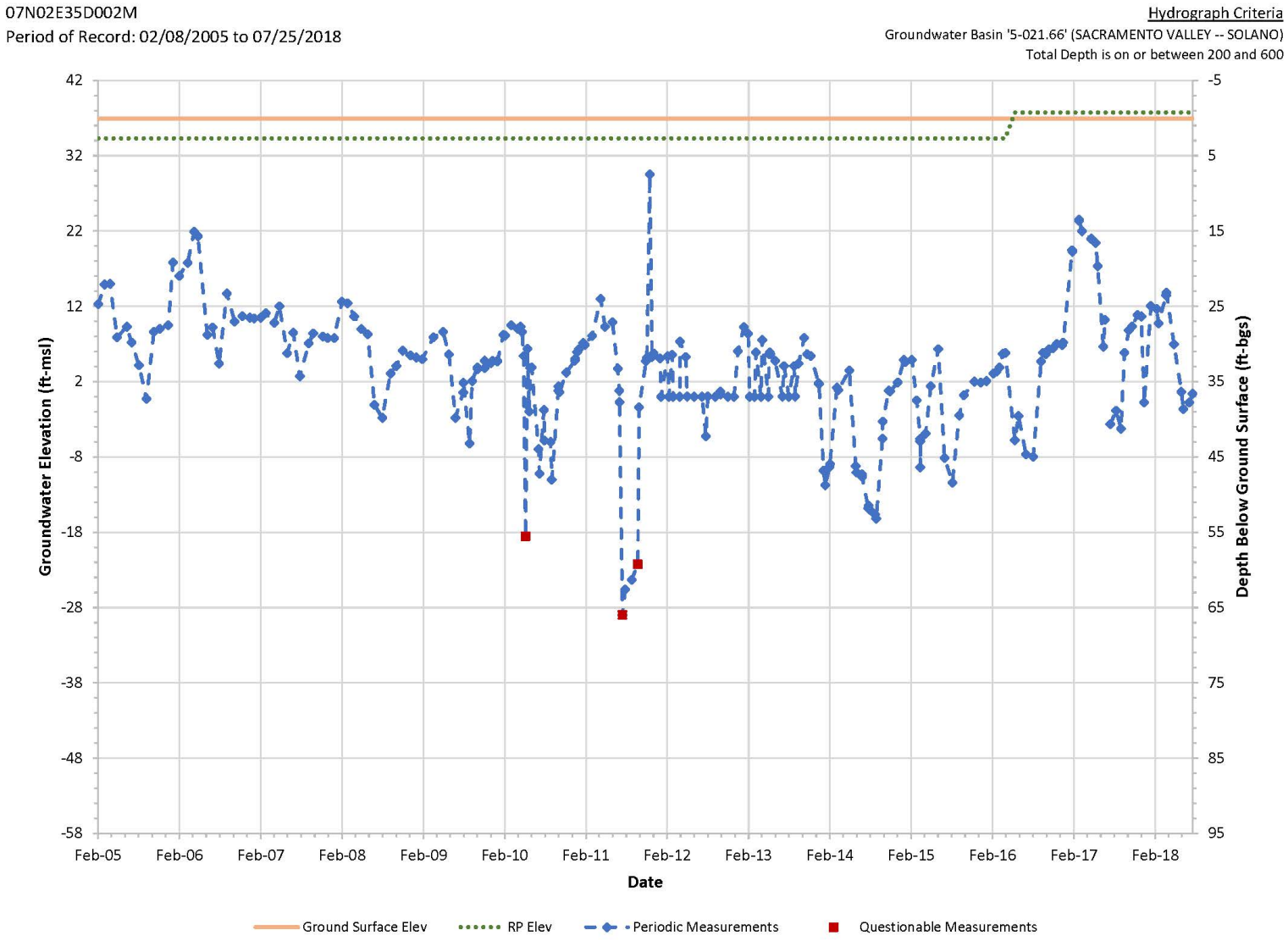


Figure E-32.
Hydrograph for 07N02E35D002M

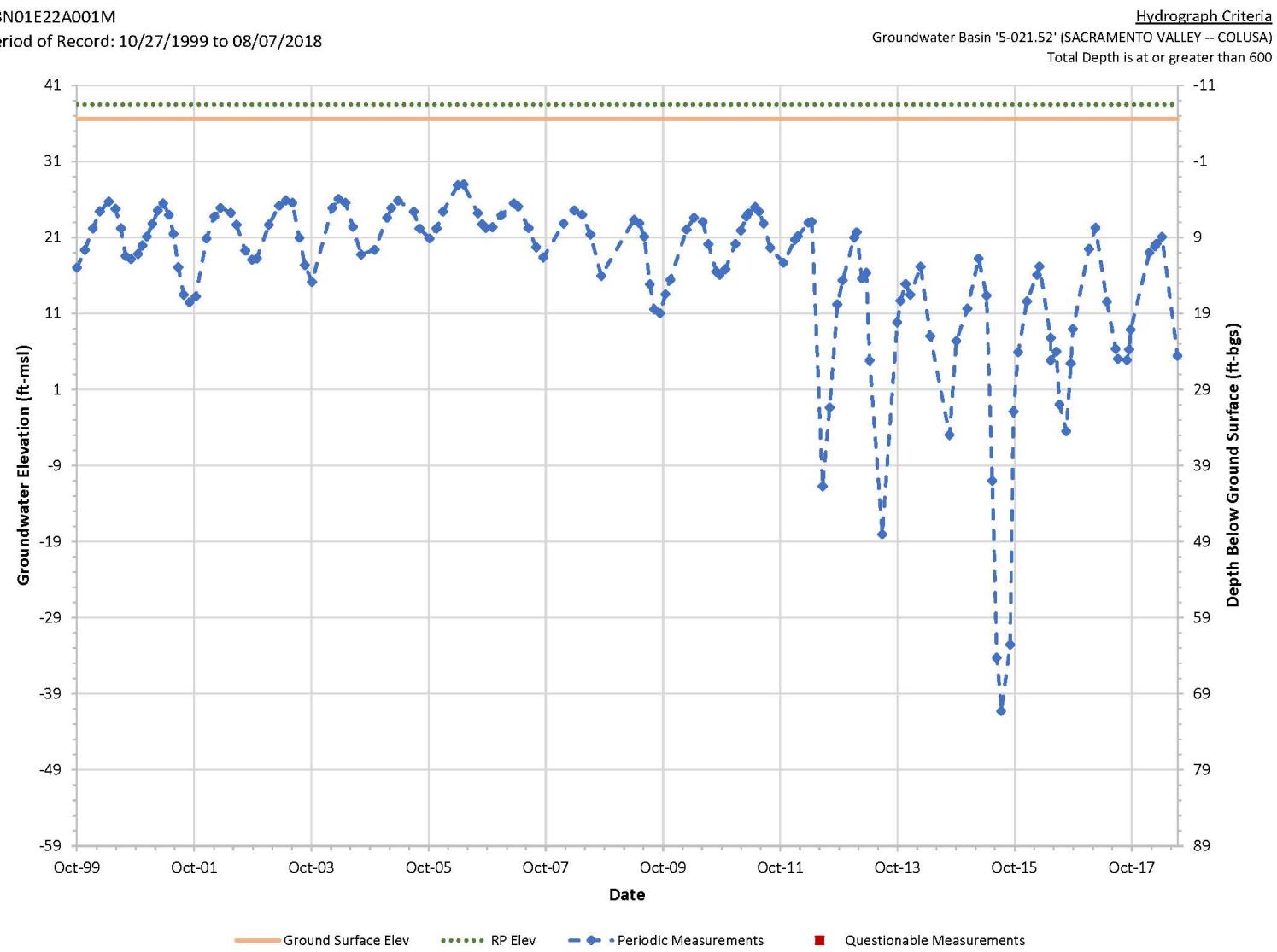


Figure E-33.
Hydrograph for 13N01E22A001M

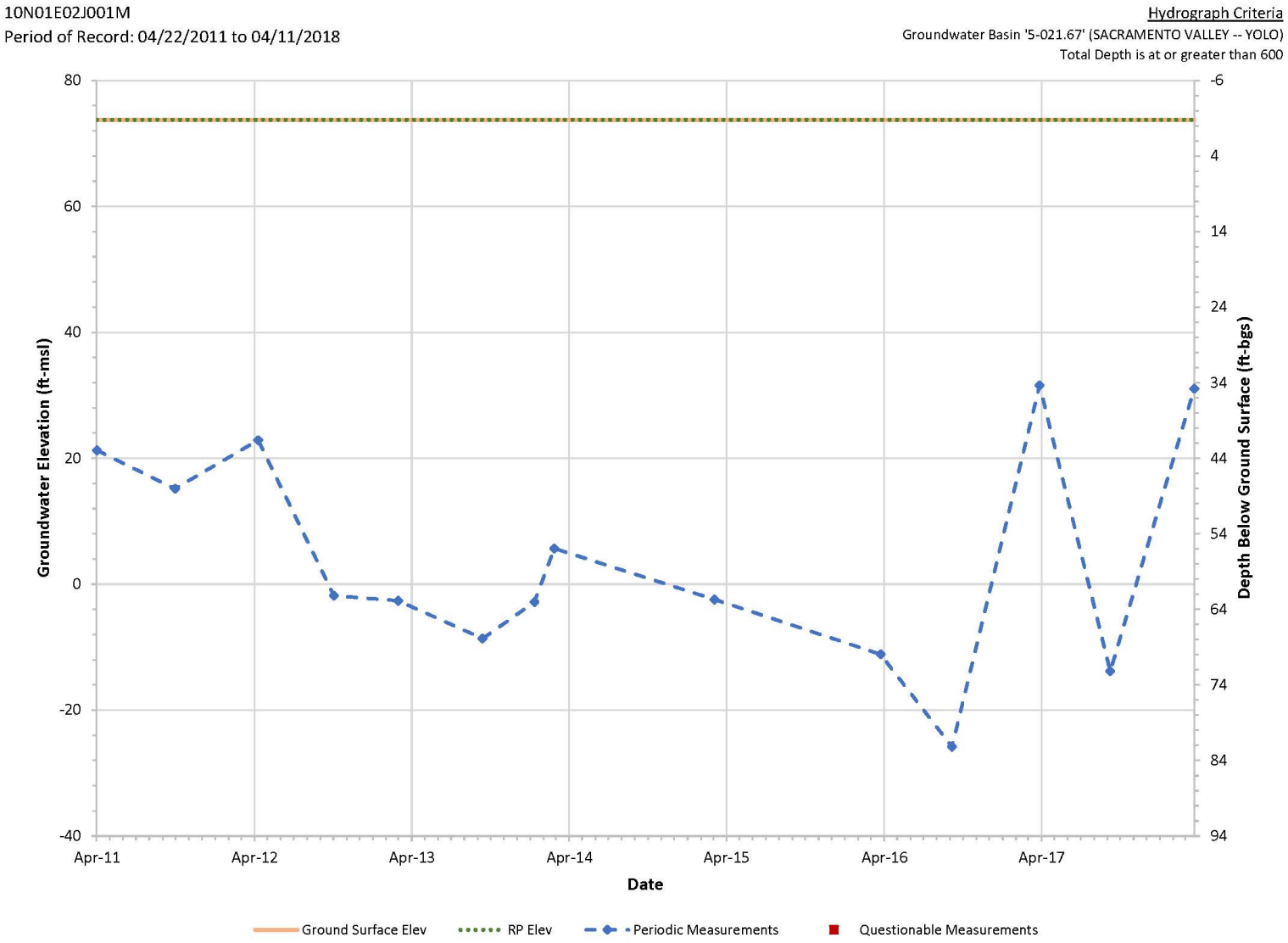


Figure E-34.
Hydrograph for 10N01E02J001M

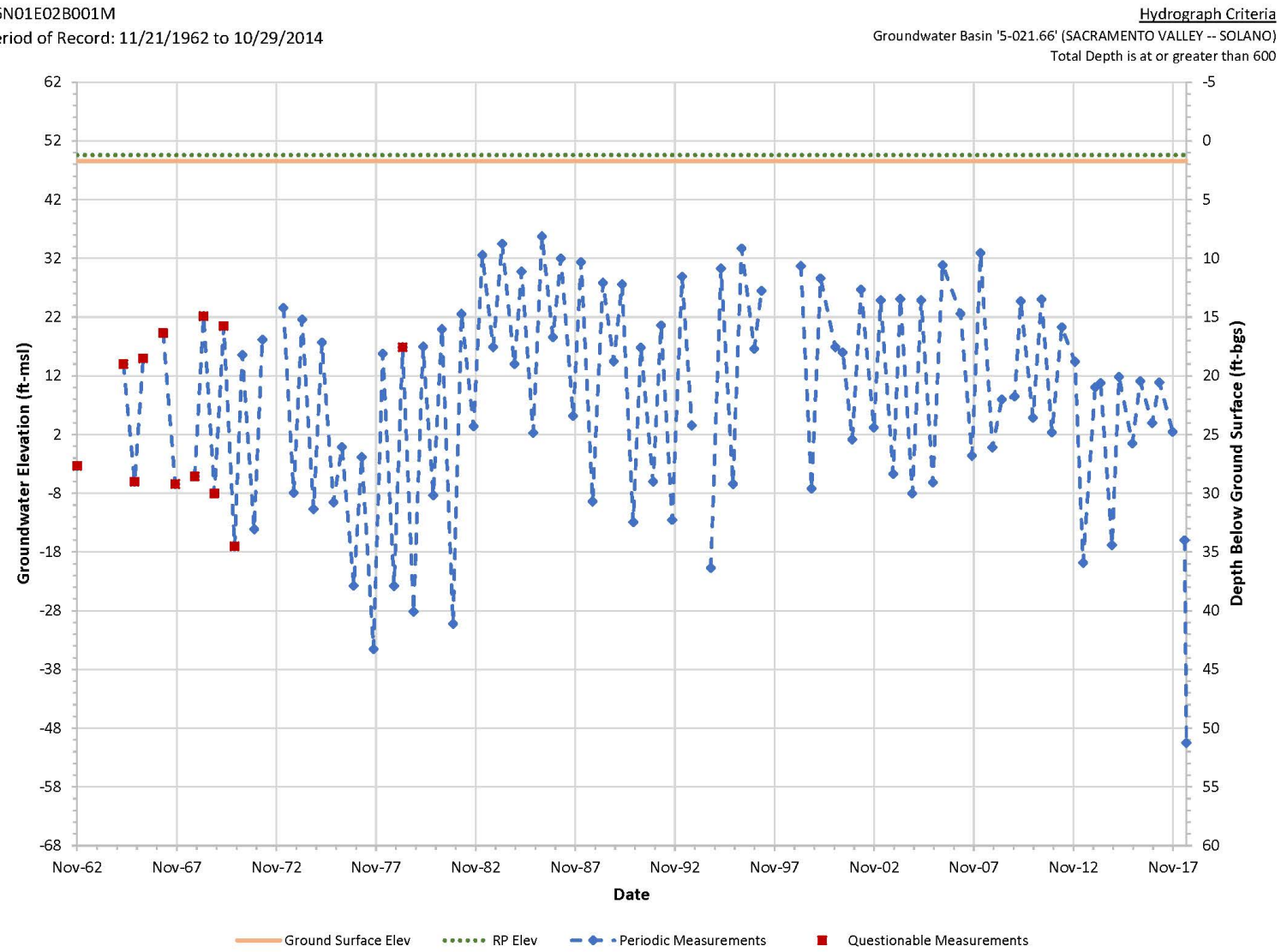


Figure E-35.
Hydrograph for 06N01E02B001M

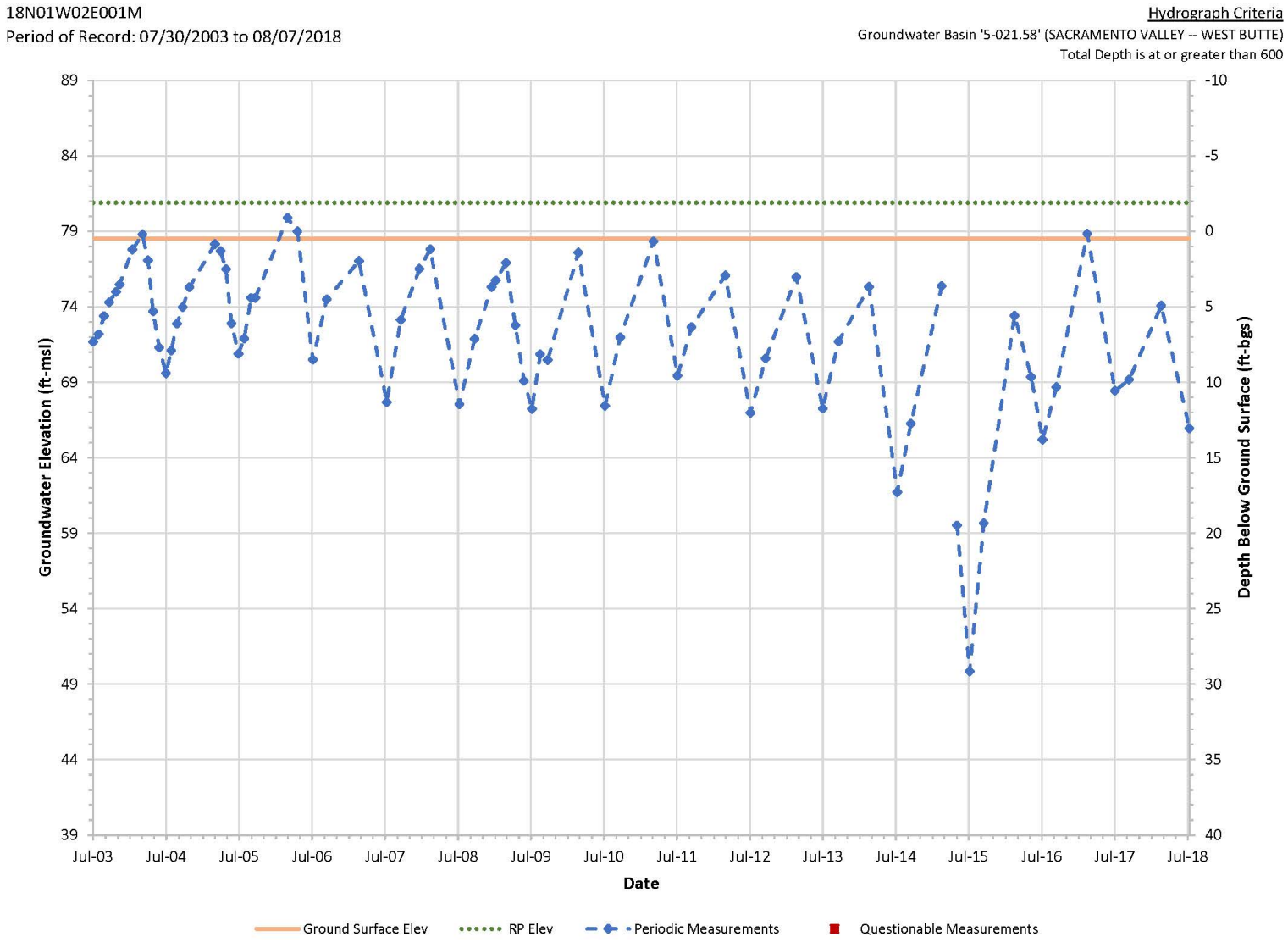


Figure E-36.
Hydrograph for 18N01W02E001M

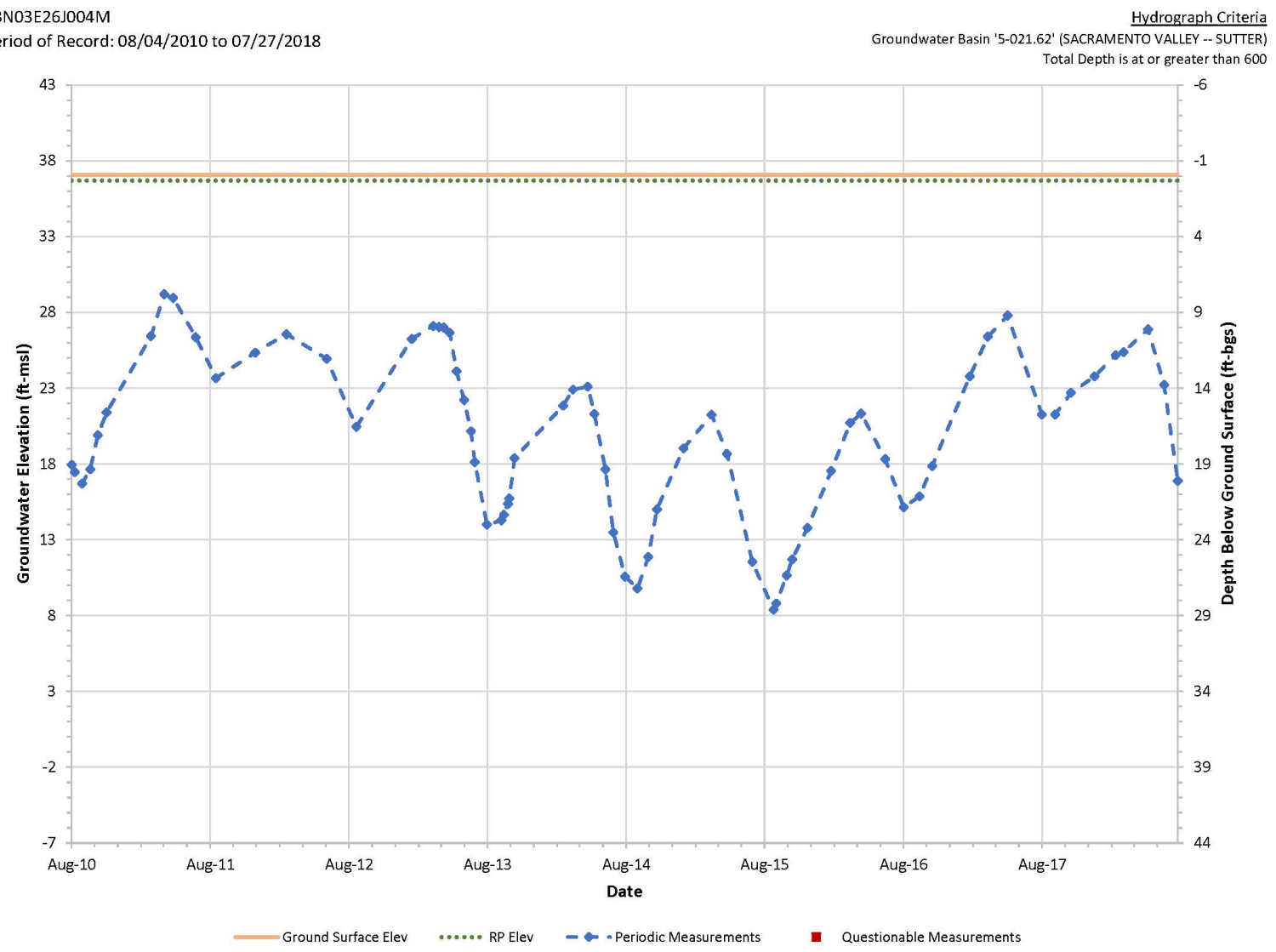


Figure E-37.
Hydrograph for 13N03E26J004M

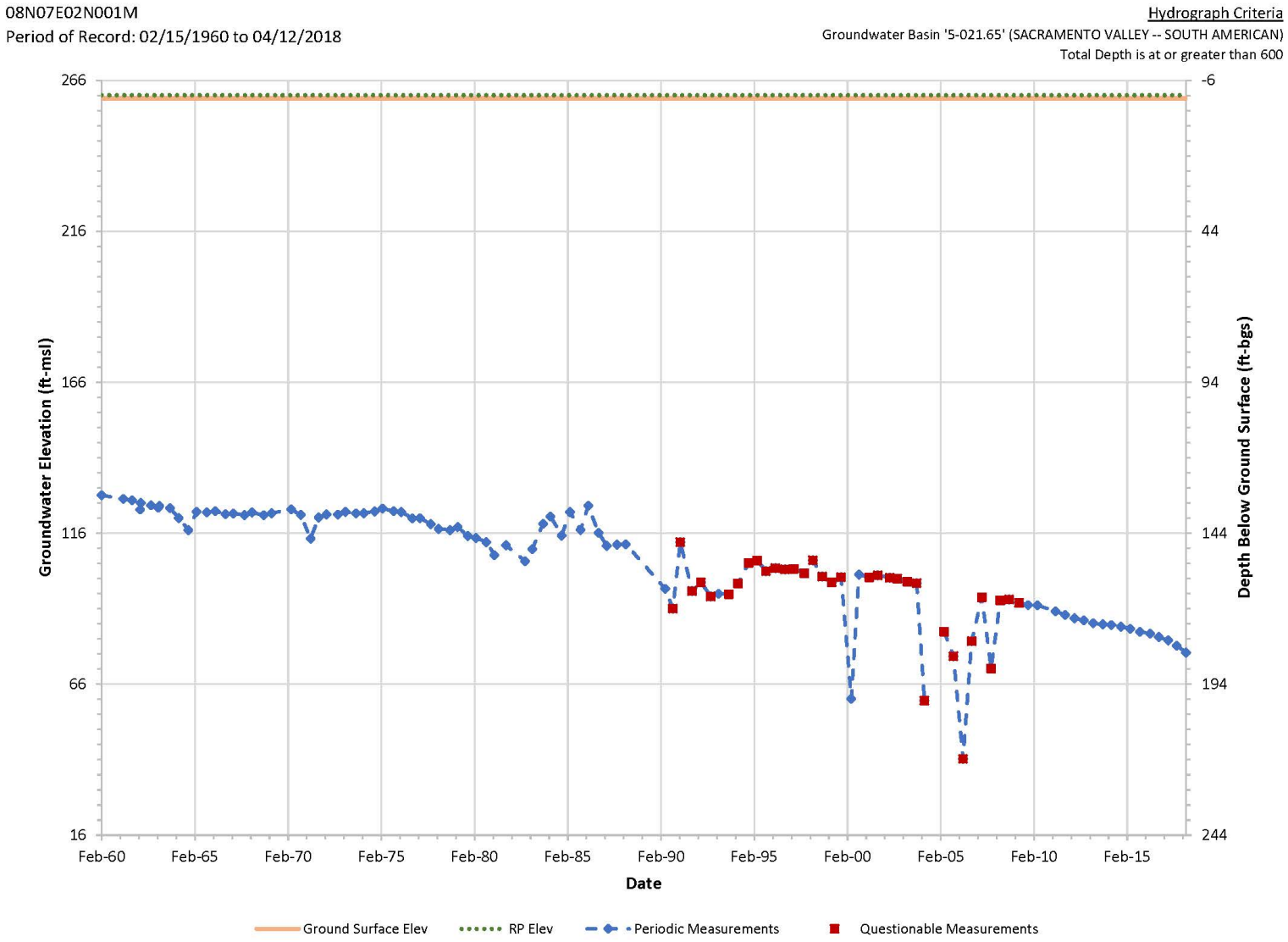


Figure E-38.
Hydrograph for 08N07E02N001M

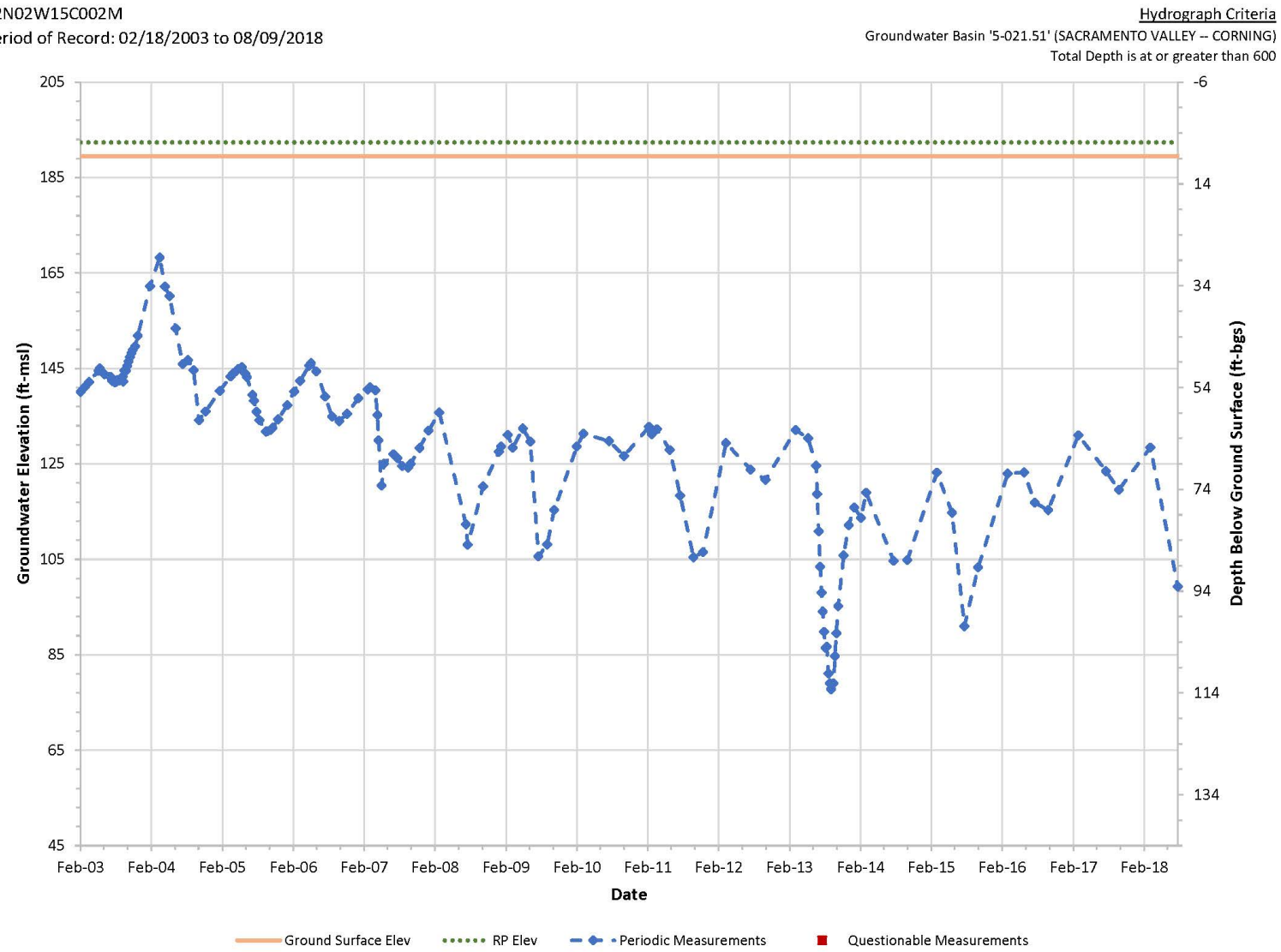


Figure E-39.
Hydrograph for 22N02W15C002M

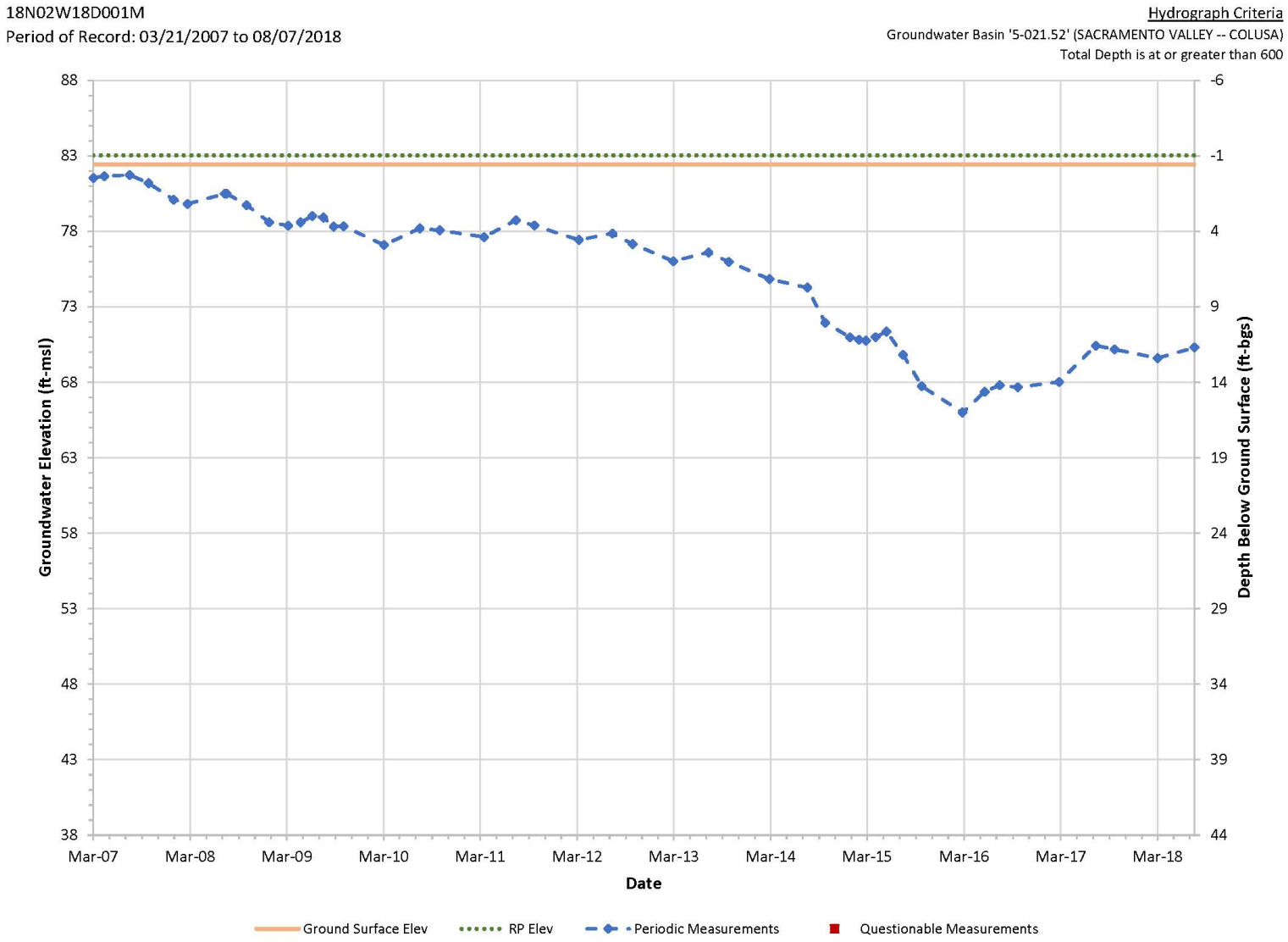


Figure E-40.
Hydrograph for 18N02W18D001M

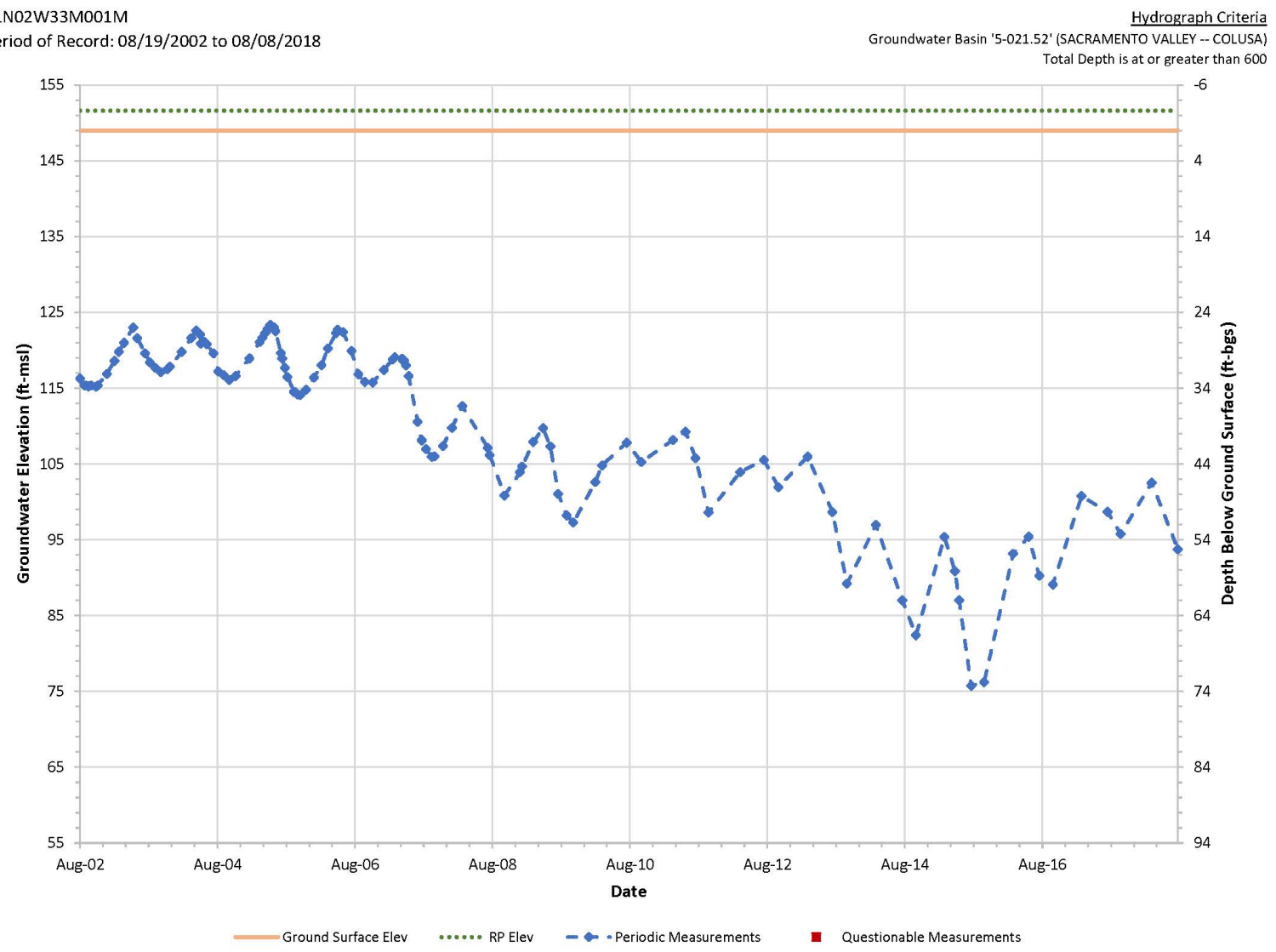


Figure E-41.
Hydrograph for 21N02W33M001M

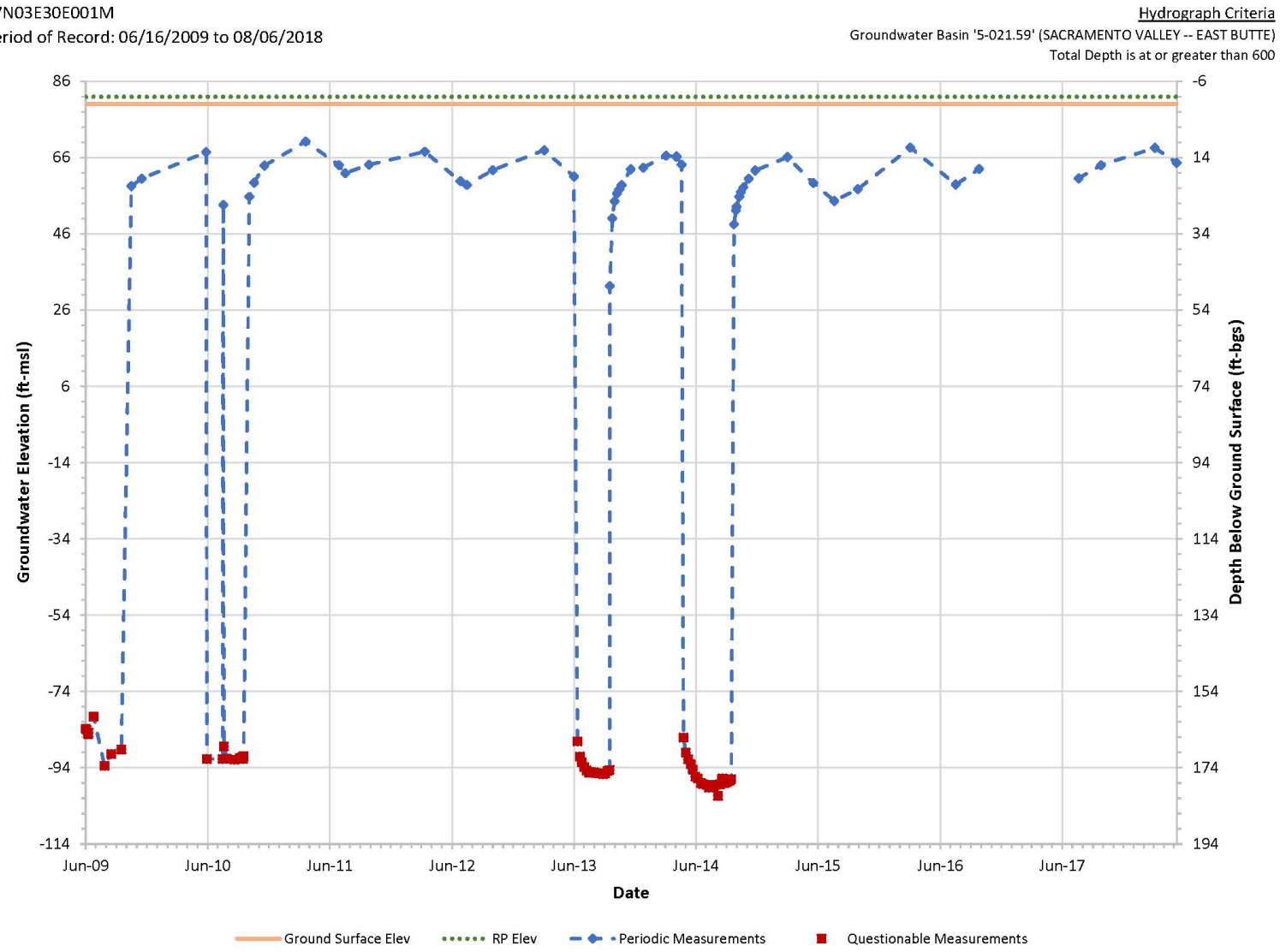


Figure E-42.
Hydrograph for 17N03E30E001M

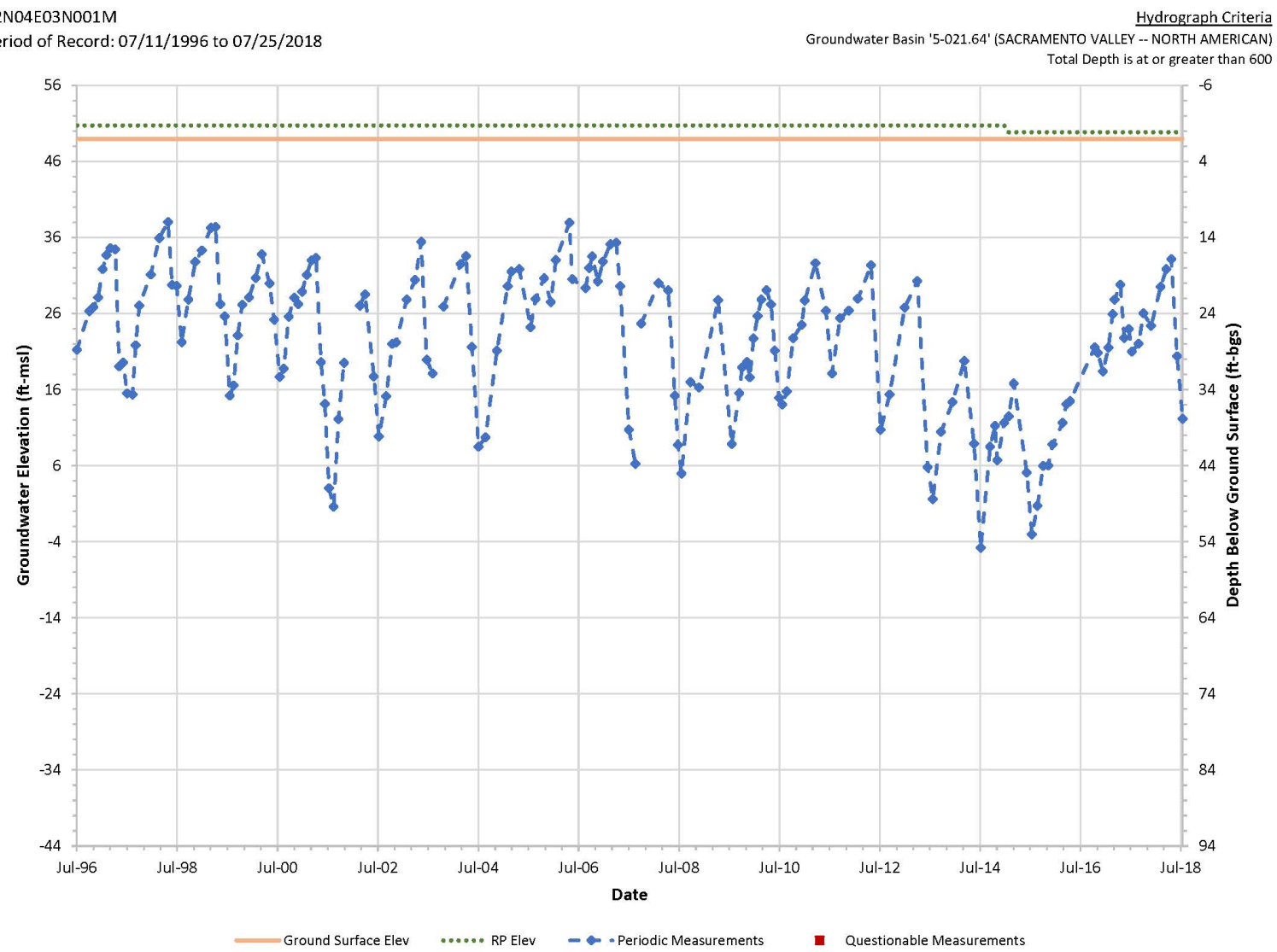
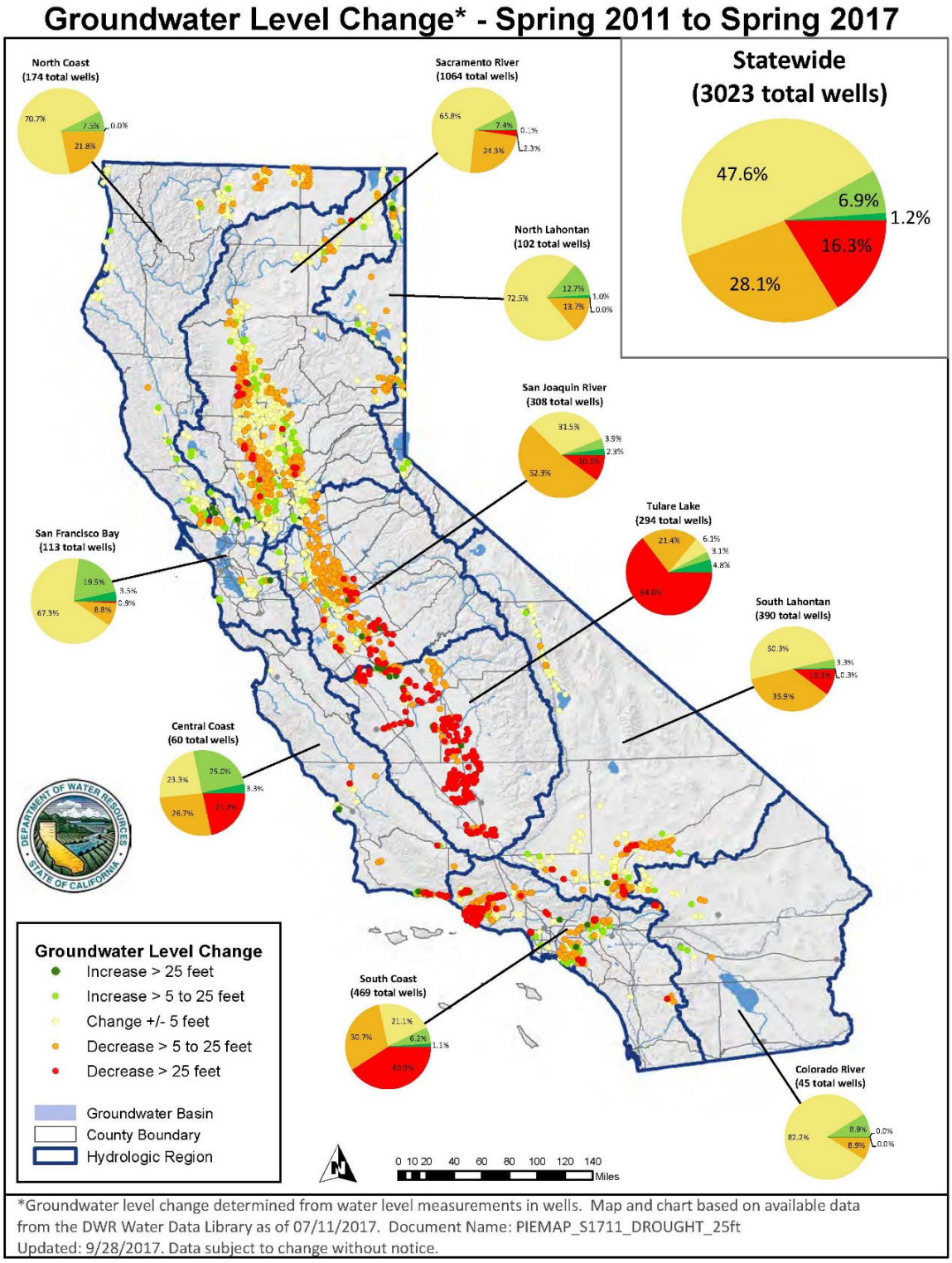


Figure E-43.
Hydrograph for 12N04E03N001M



*Groundwater level change determined from water level measurements in wells. Map and chart based on available data from the DWR Water Data Library as of 07/11/2017. Document Name: PIEMAP_S1711_DROUGHT_25ft
Updated: 9/28/2017. Data subject to change without notice.

Figure E-44.
Change in Groundwater Level, Spring 2011 to Spring 2017

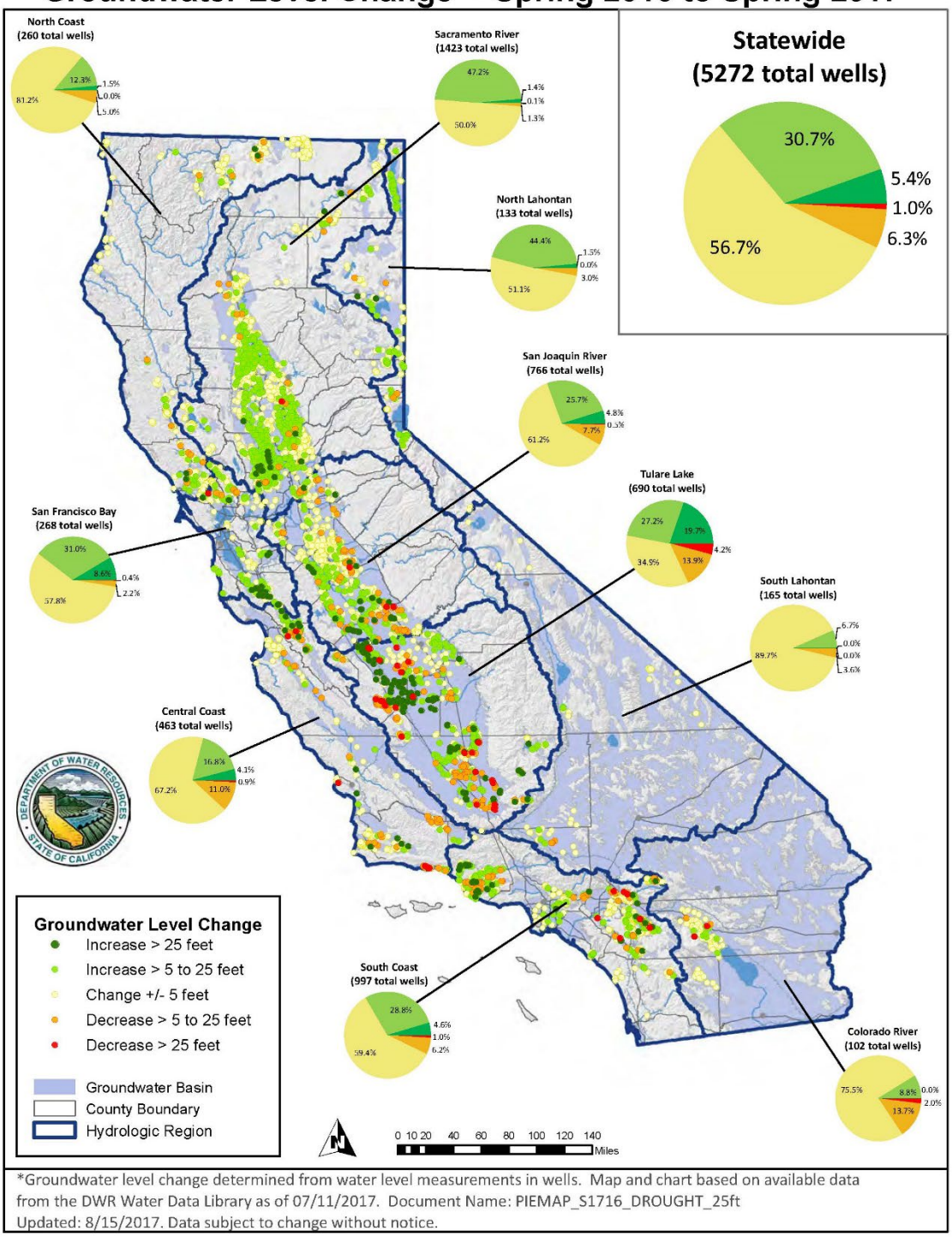


Figure E-45.
Change in Groundwater Level, Spring 2016 to Spring 2017

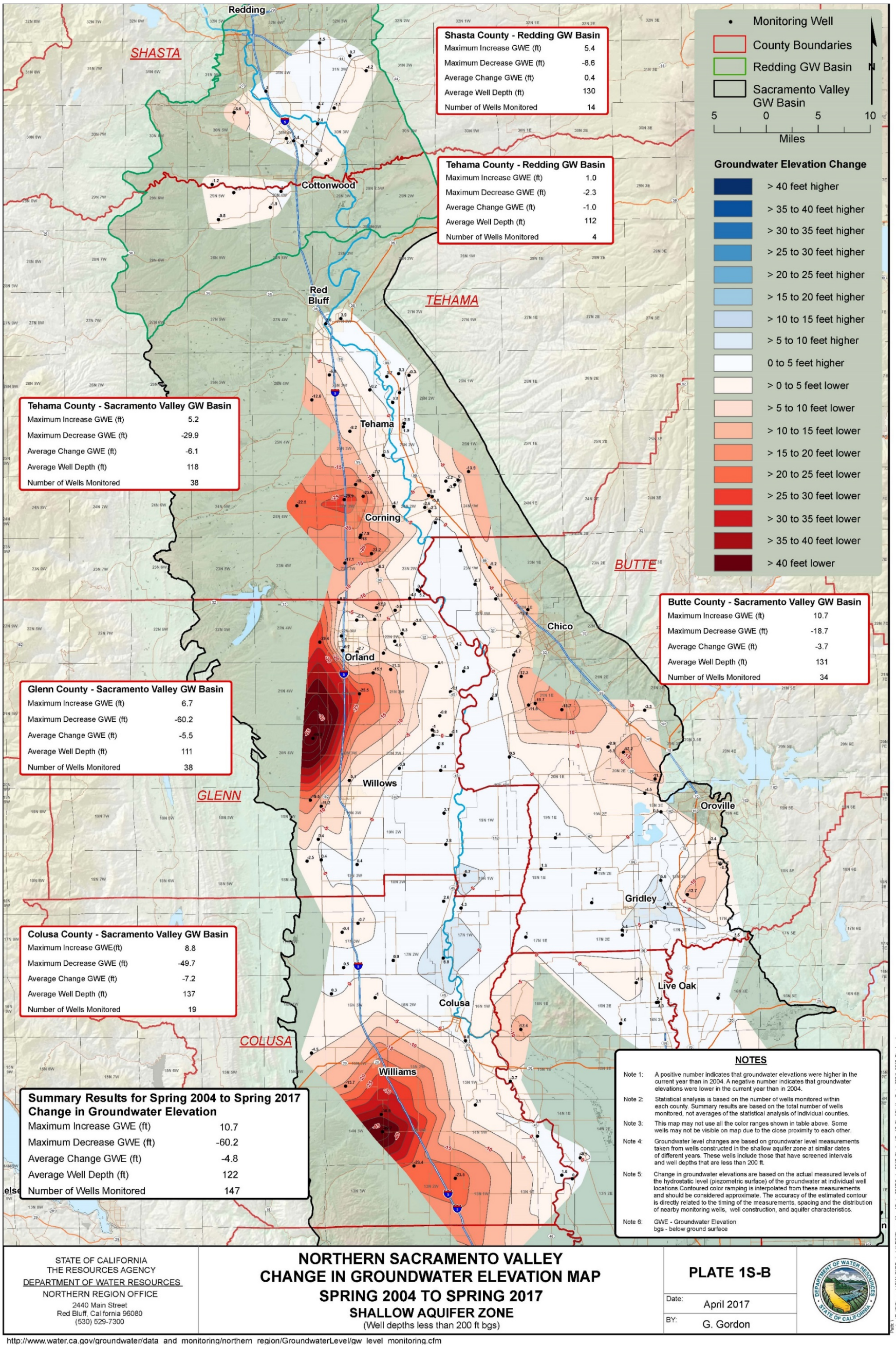


Figure E-46.
Change in Groundwater Levels in Shallow Aquifer Zone, Spring 2004 to Spring 2017

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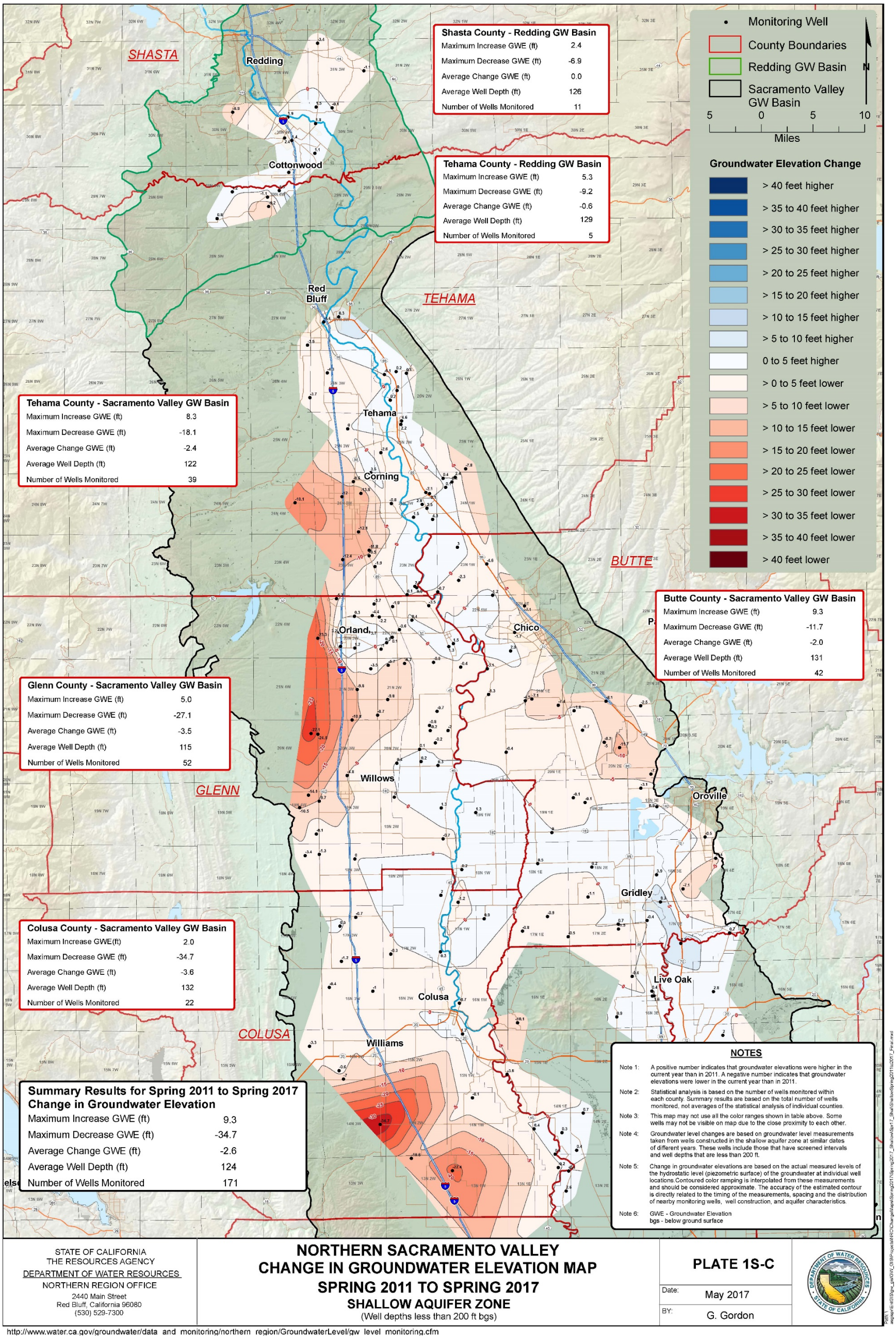

Figure E-47.
Change in Groundwater Levels in Shallow Aquifer Zone, Spring 2011 to Spring 2017

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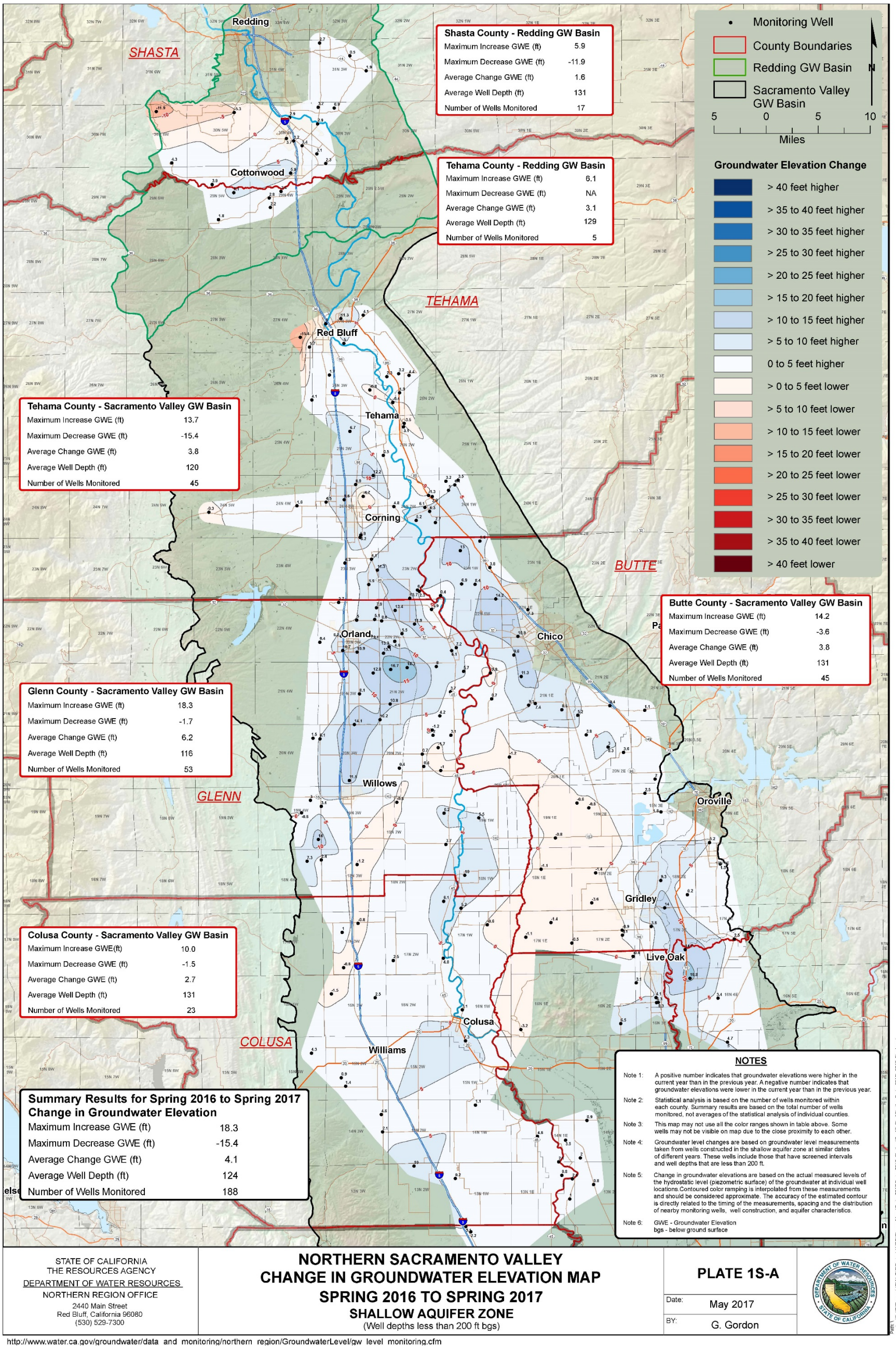

Figure E-48.
Change in Groundwater Levels in Shallow Aquifer Zone, Spring 2016 to Spring 2017

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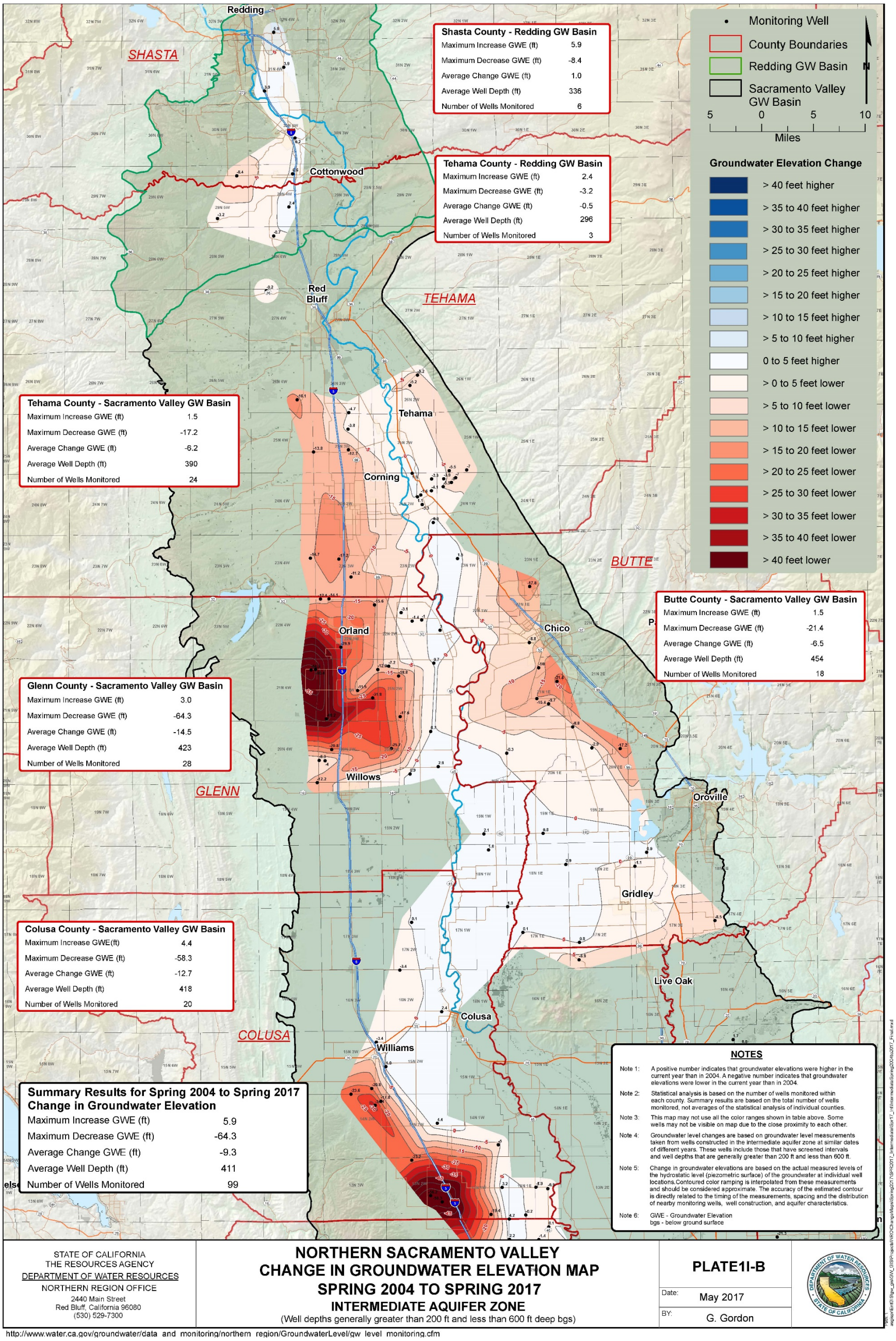

Figure E-49.
Change in Groundwater Levels in Intermediate Aquifer Zone, Spring 2004 to Spring 2017

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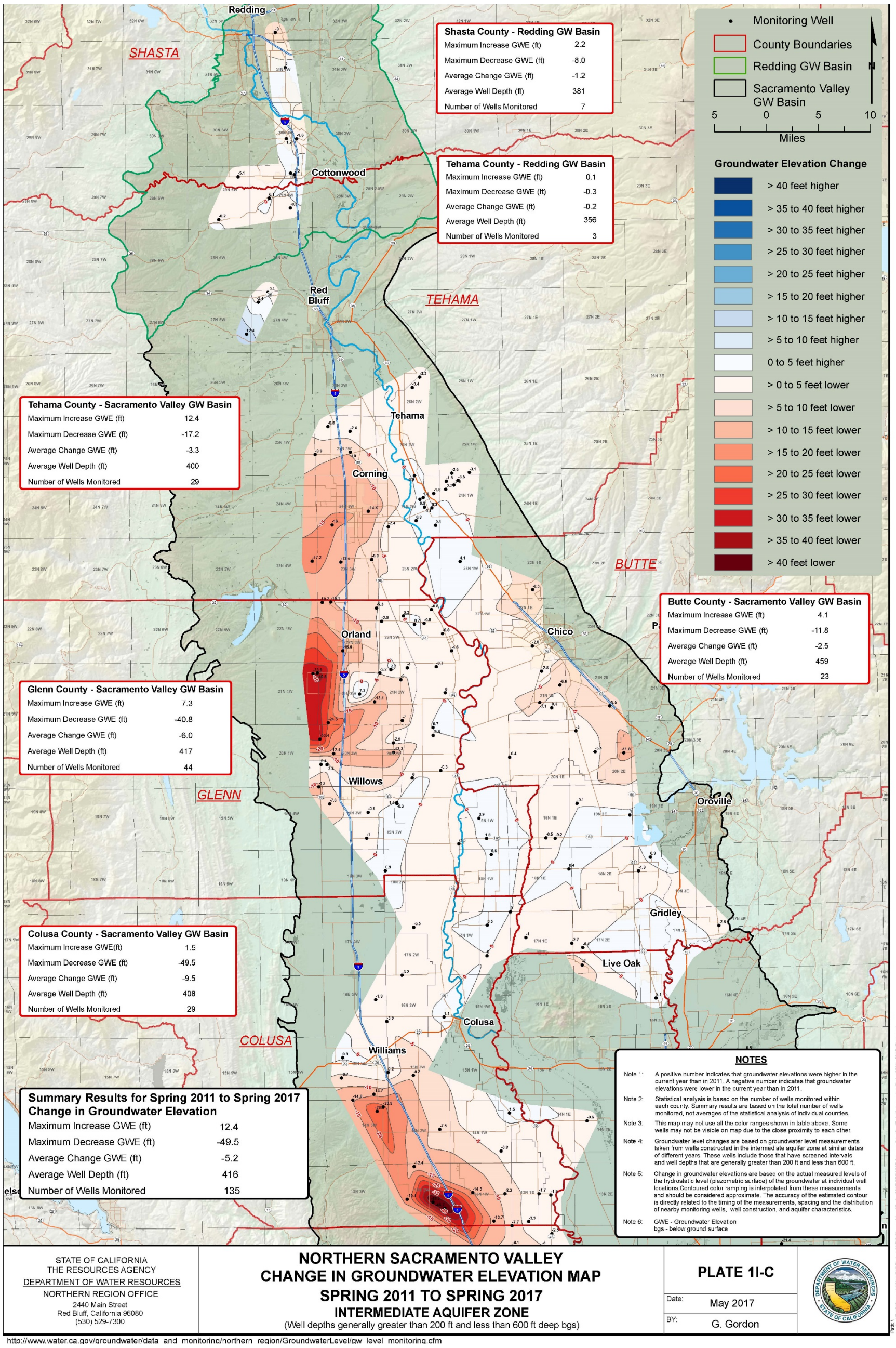

Figure E-50.
Change in Groundwater Levels in Intermediate Aquifer Zone, Spring 2011 to Spring 2017

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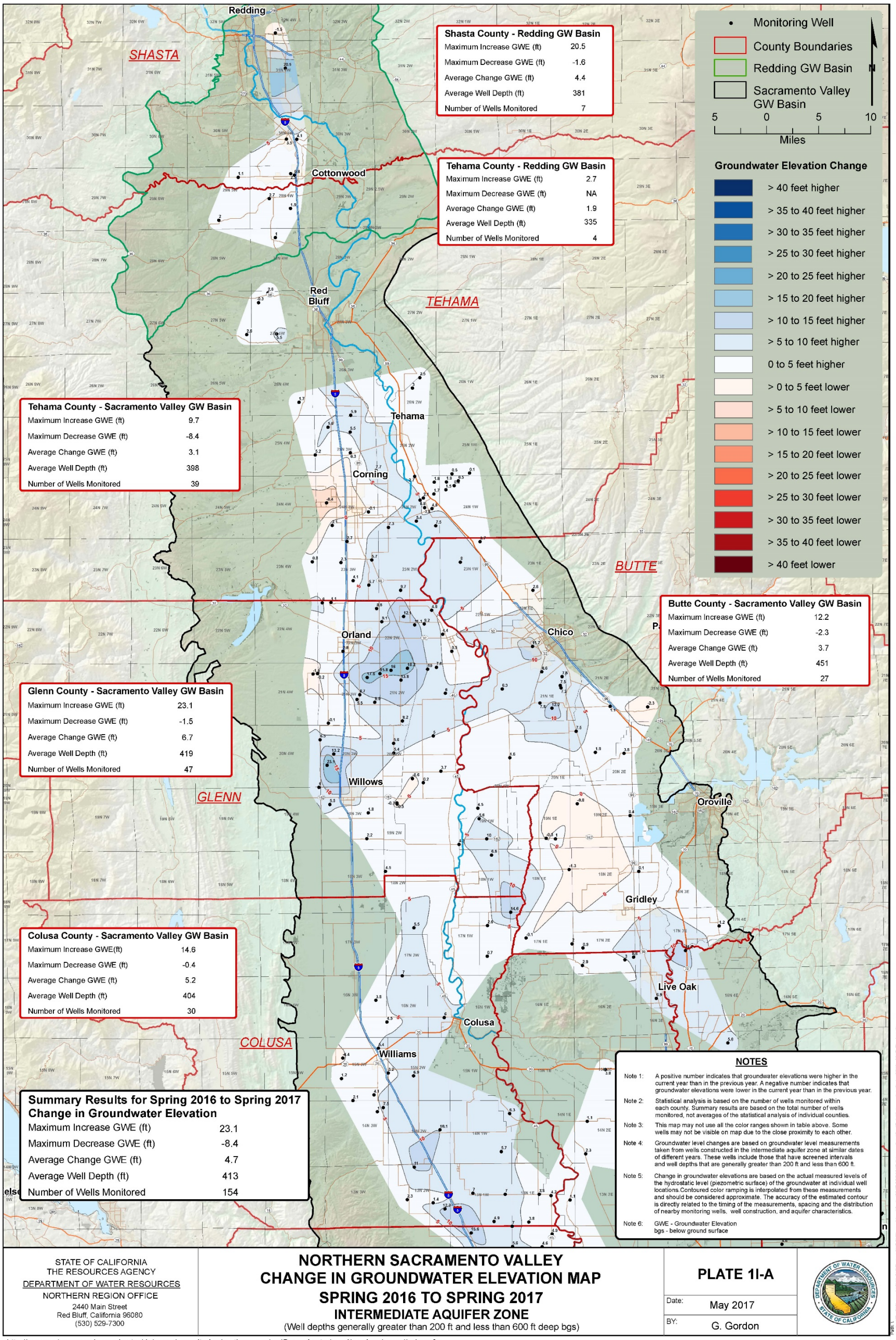

Figure E-51.
Change in Groundwater Levels in Intermediate Aquifer Zone, Spring 2016 to Spring 2017

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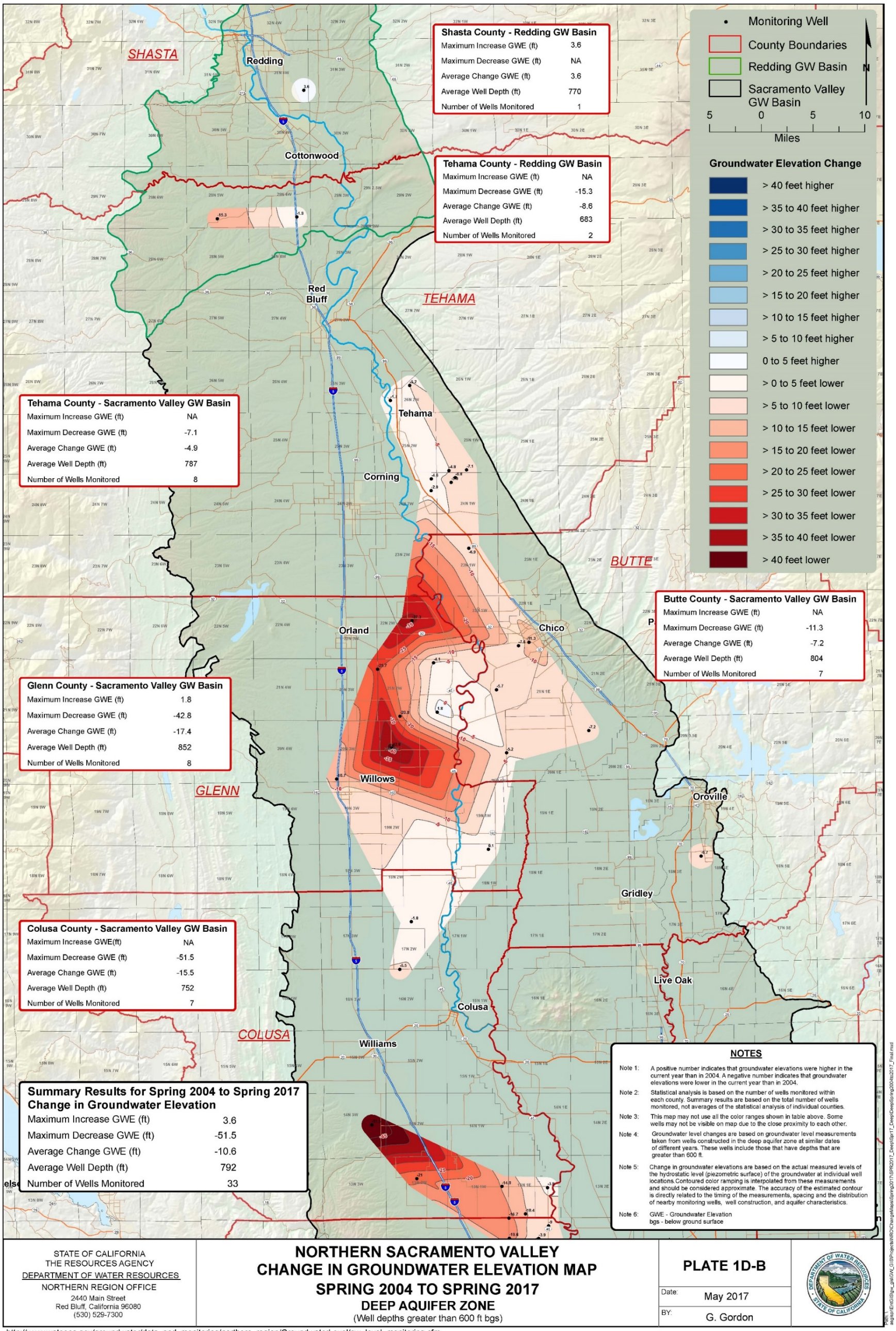

Figure E-52.
Change in Groundwater Levels in Deep Aquifer Zone, Spring 2004 to Spring 2017

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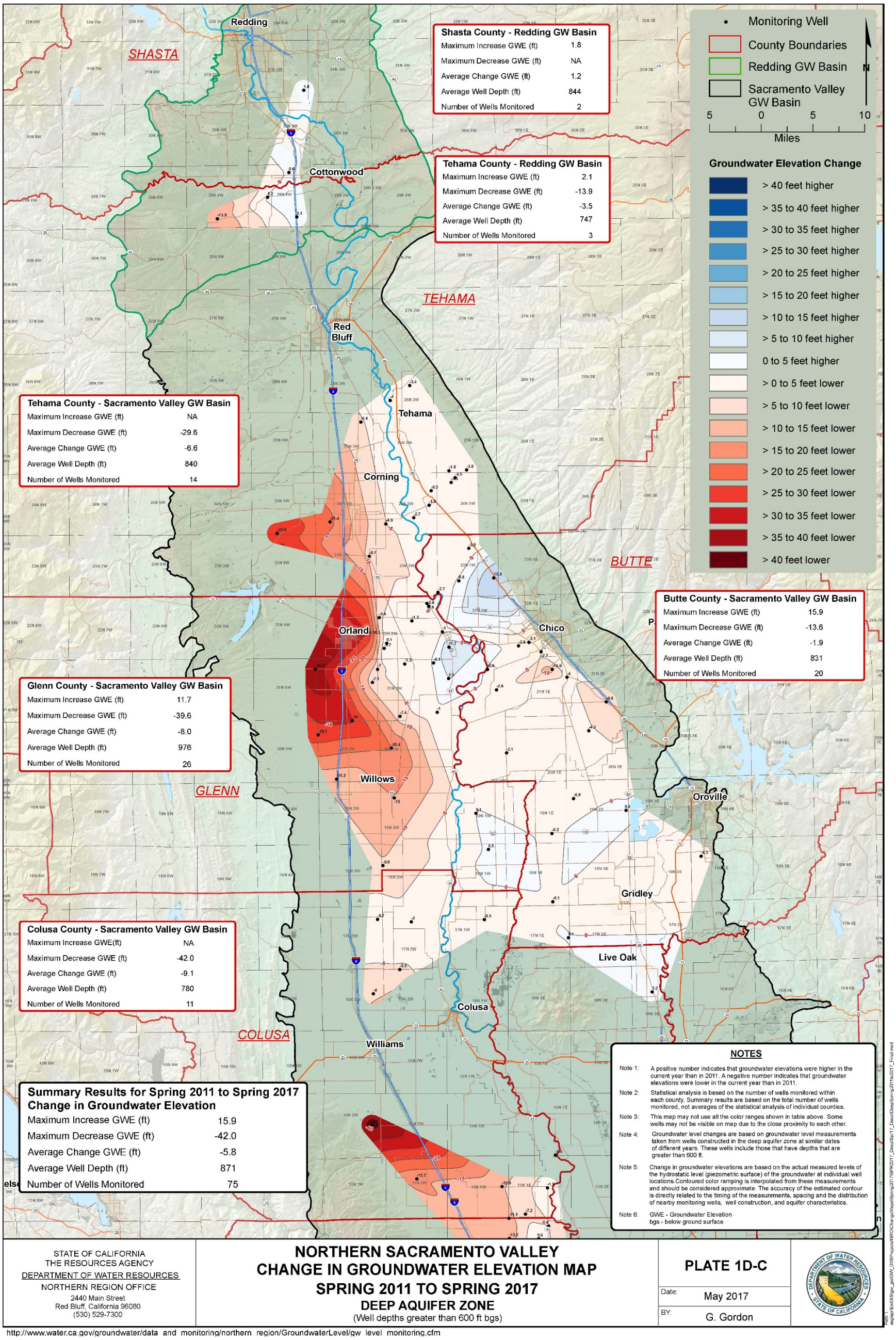

Figure E-53.
Change in Groundwater Levels in Deep Aquifer Zone, Spring 2011 to Spring 2017

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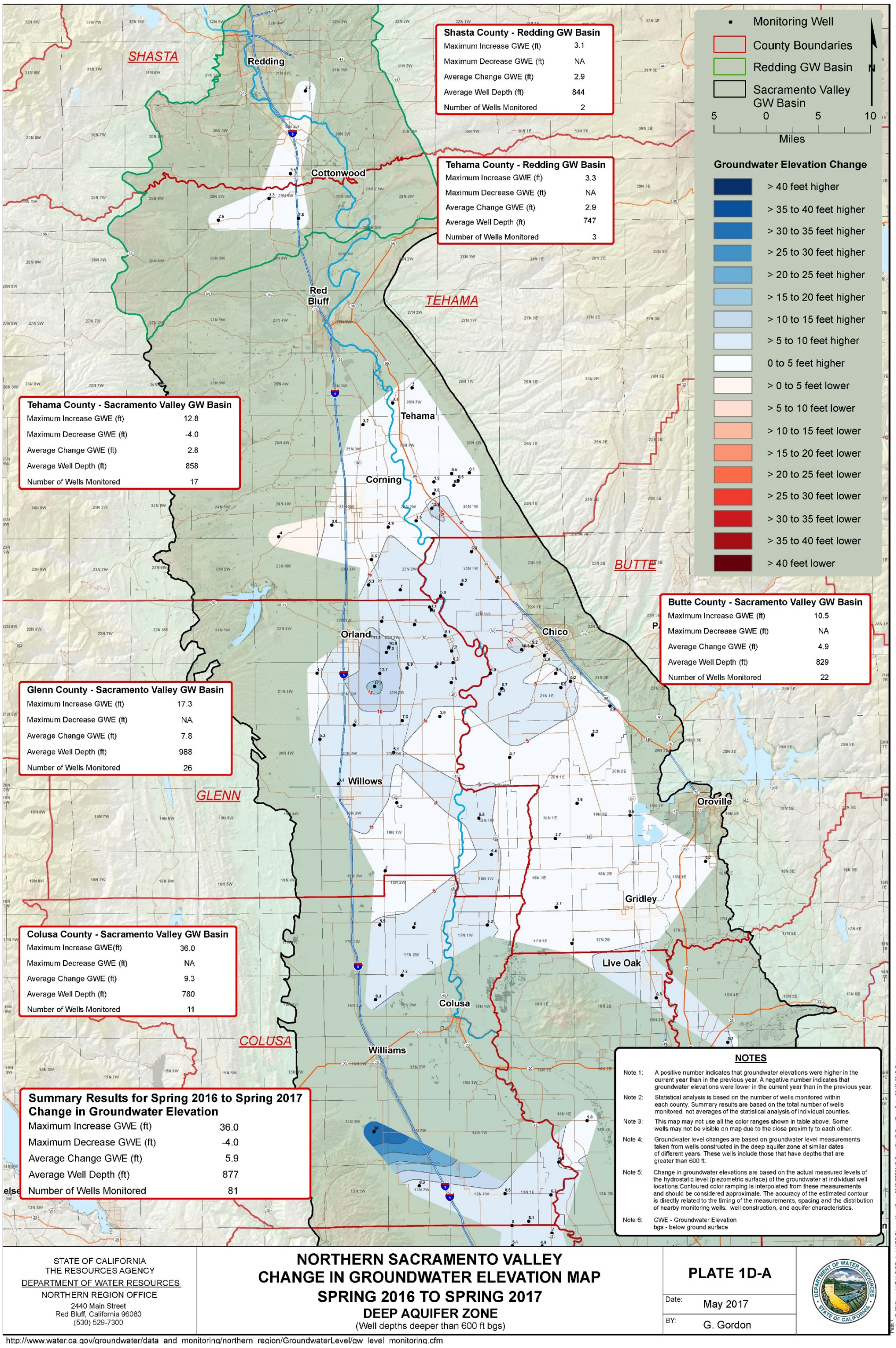

Figure E-54.
Change in Groundwater Levels in Deep Aquifer Zone, Spring 2016 to Spring 2017

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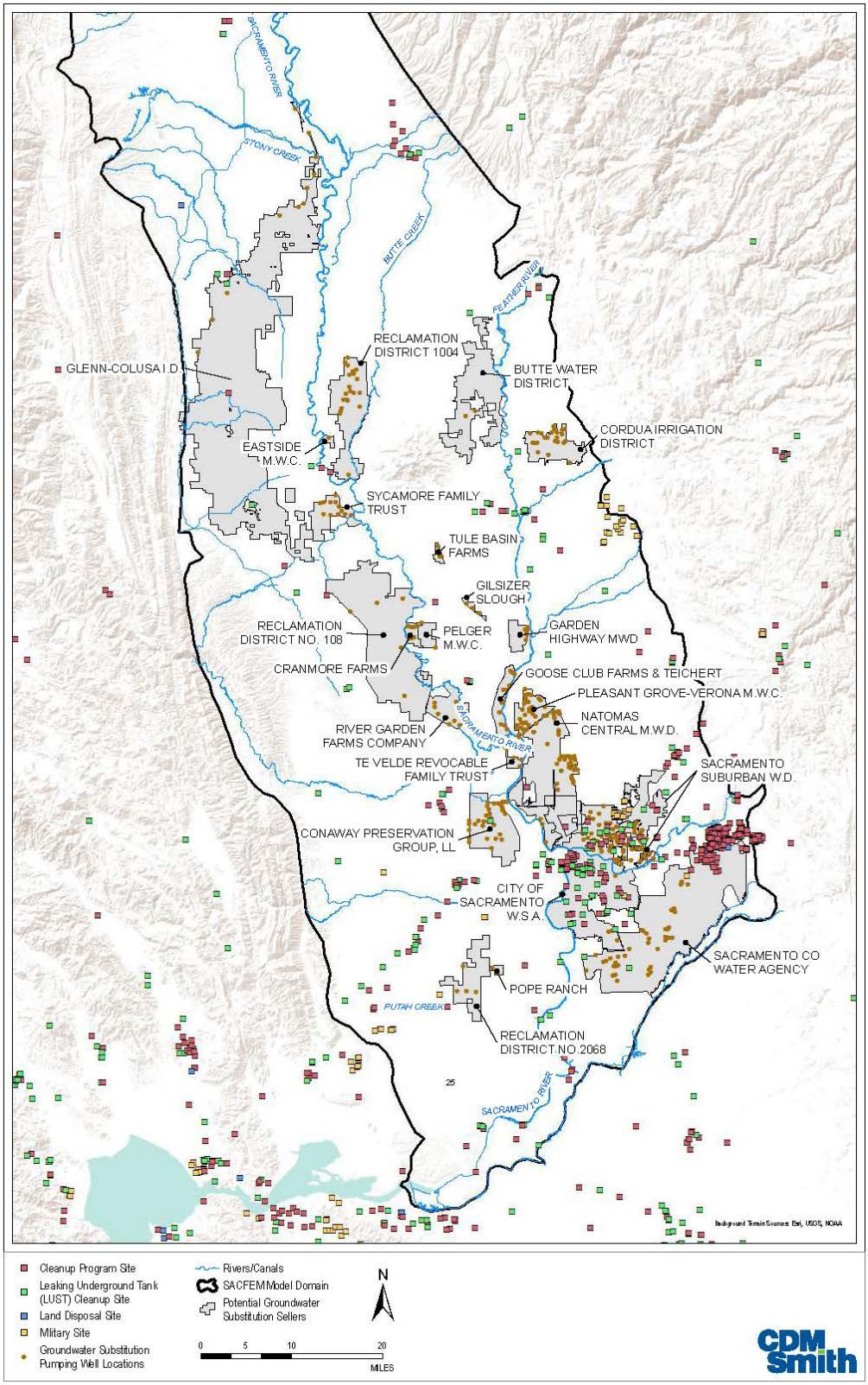

Figure E-55.
Active Geotracker Clean-Up Sites as of August 29, 2018

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