FINAL WORKPLAN | SEPTEMBER 2, 2021

Workplan to Develop the Coachella Valley Salt and Nutrient Management Plan

PREPARED FOR

The Coachella Valley SNMP Agencies

PREPARED BY

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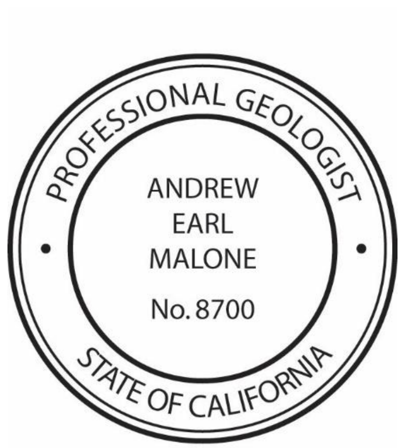
Project No. 943-80-20-01



Project Manager: Andy Malone, PG	Sept 2, 2021 Date
QA/QC Review: Samantha Adams	Sept 2, 2021 Date

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LIST OF ACRONYMS AND ABBREVIATIONS

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

1.0 BACKGROUND AND OBJECTIVES OF THE CV-SNMP

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

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

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

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

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

1.1 Regulatory Framework

1.1.1 2009 Recycled Water Policy

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

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

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

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

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

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

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

1.1.2 2018 Recycled Water Policy

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

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

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

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

Technical challenges included:

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

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

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

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

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

1.2 2015 Coachella Valley Salt and Nutrient Management Plan

1.2.1 Overview of the 2015 SNMP

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

The 2015 SNMP included the following:

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

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

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

1.2.2 Regional Board Response to the 2015 SNMP

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

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

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

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

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

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

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

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

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

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

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

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

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

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

1.3 Update of the CV-SNMP

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

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

1.3.1 Process to Prepare the CV-SNMP Development Workplan

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

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

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

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

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

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

- Demonstrate that beneficial uses are protected.

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

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

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

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

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

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

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

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

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

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

d) *Economic considerations*.

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

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

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

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

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

1.3.2 Workplan Organization

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

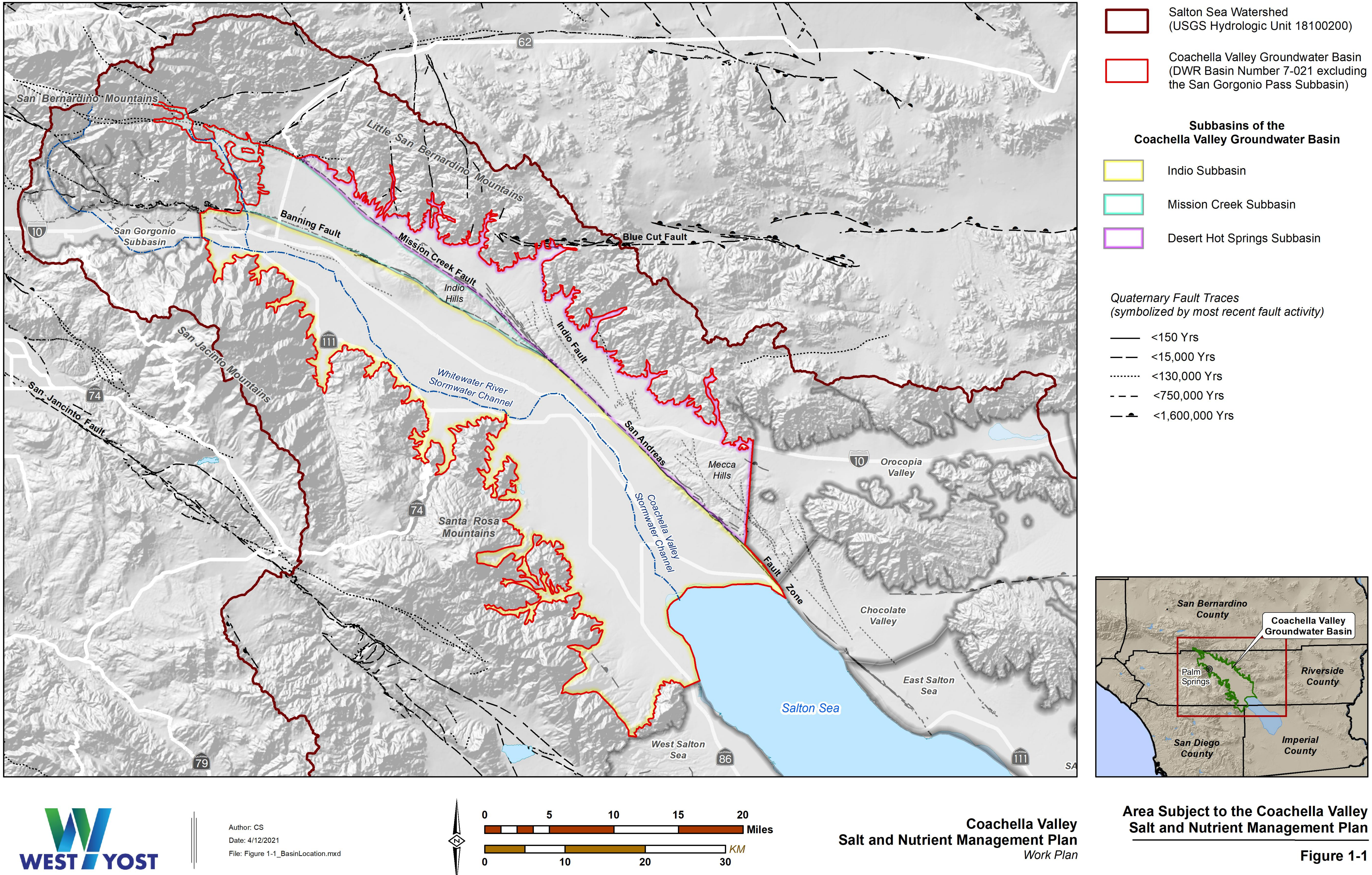
The remainder of the CV-SNMP Development Workplan is organized as follows:

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

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

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

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



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Date: 4/12/2021
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Coachella Valley
Salt and Nutrient Management Plan
Work Plan

Area Subject to the Coachella Valley Salt and Nutrient Management Plan

Figure 1-1

2.0 STUDY AREA SETTING

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

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

2.1 Basin Setting

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

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

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

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

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

2.2 Hydrogeology

2.2.1 Subbasins and Subareas

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

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

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

2.2.2 Occurrence and Movement of Groundwater

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

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

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

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

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

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

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

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

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

2.3 Origin and Fate and Transport of N/TDS

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

2.3.1 Loading of N/TDS

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

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

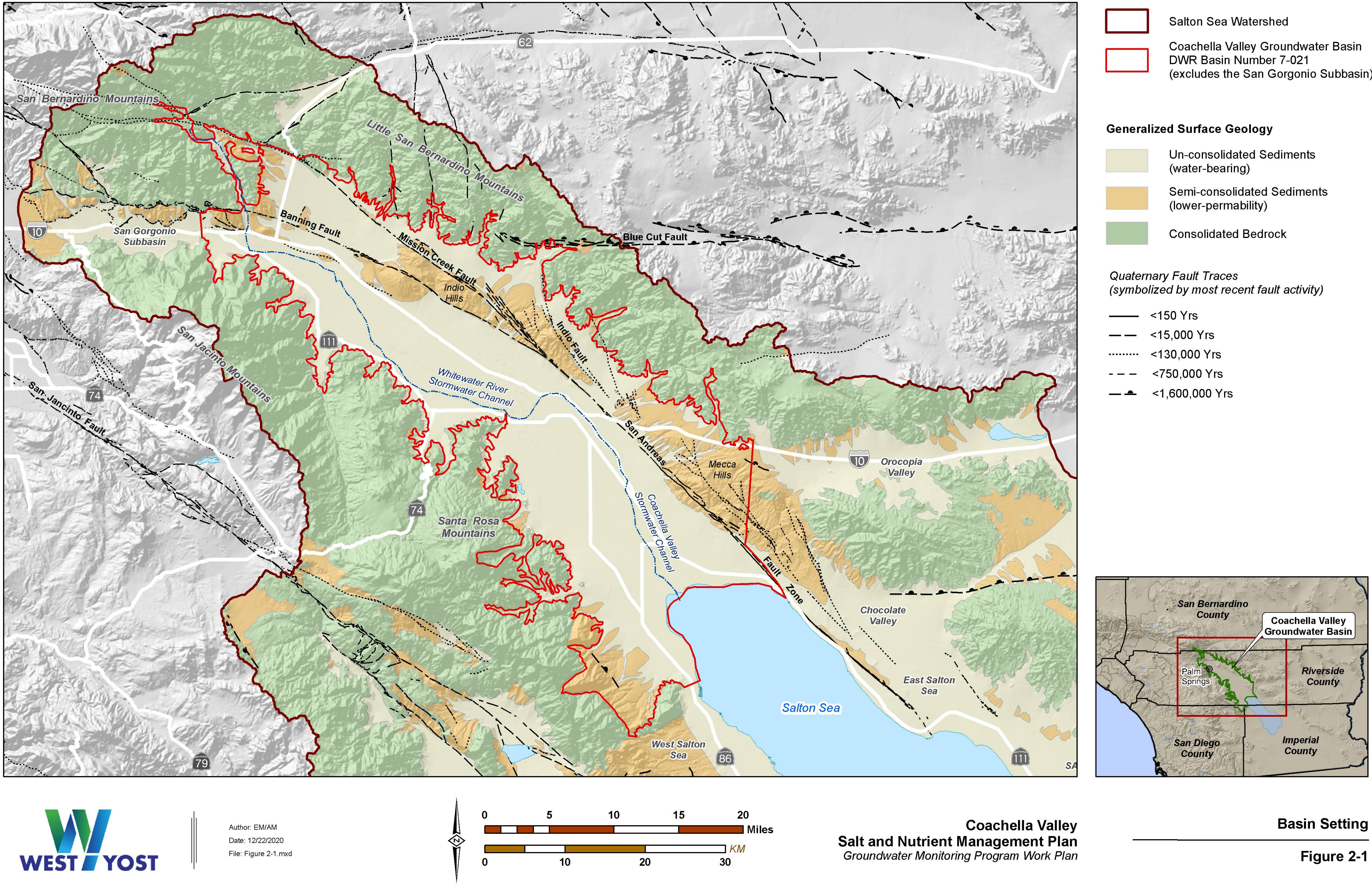
- Artificial recharge of imported Colorado River Water at the Groundwater Replenishment Facilities (GRF).
- Percolation of treated wastewater discharge to unlined ponds.
- Seepage from septic systems.
- Deep infiltration of precipitation on the land surface.
- Return flows from irrigation waters applied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

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

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

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

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



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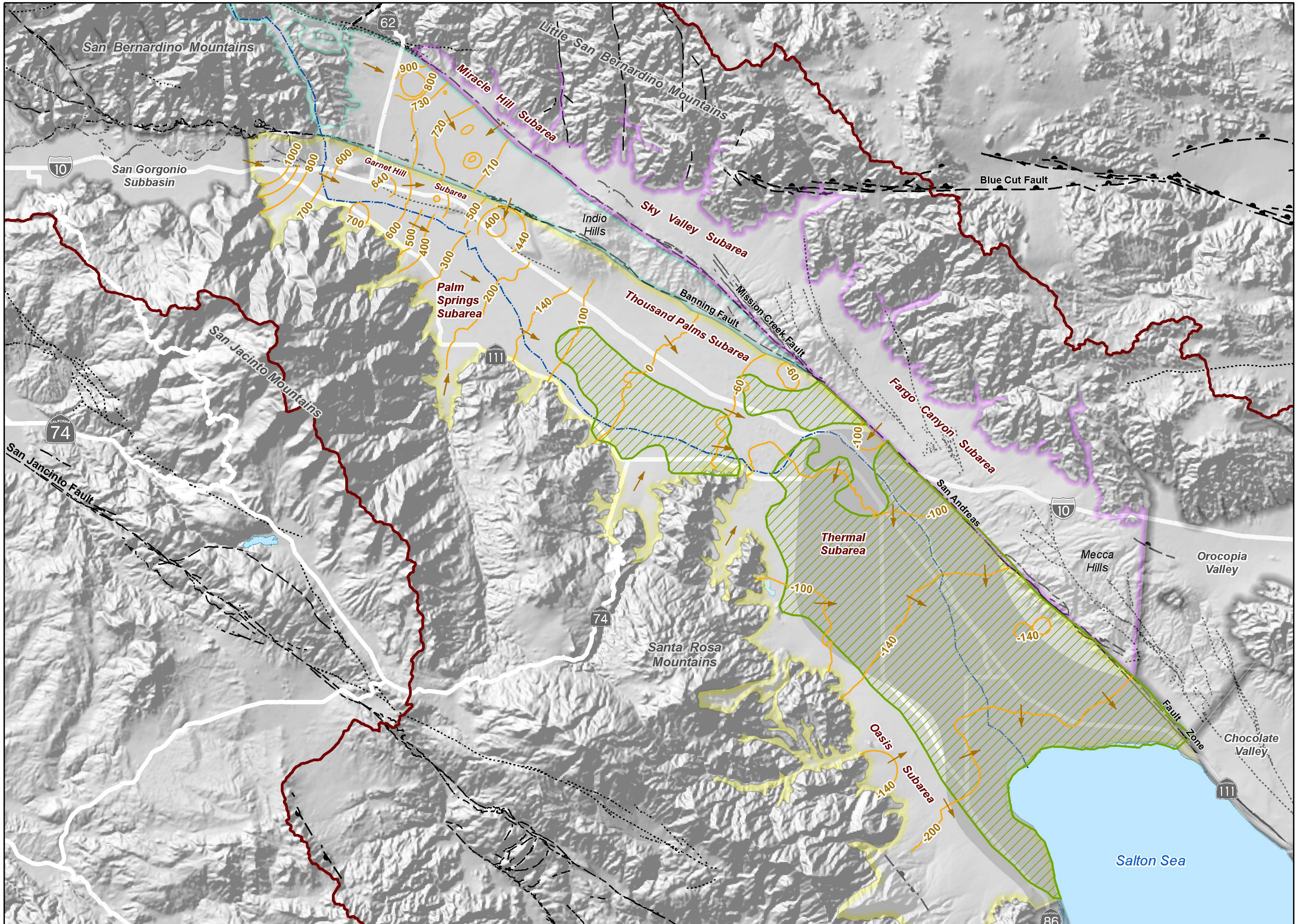
Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

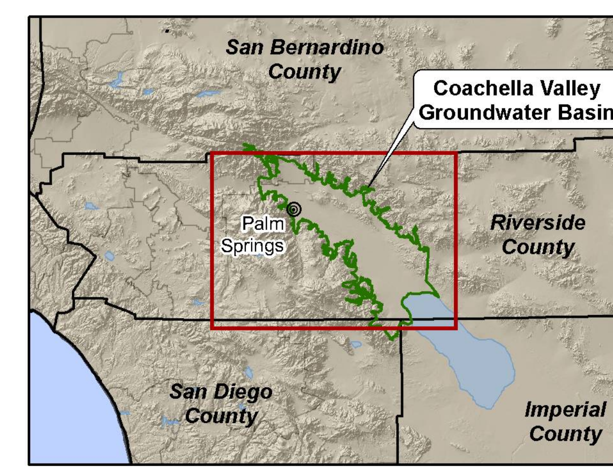
Basin Setting

Figure 2-1



Subbasins of the Coachella Valley Groundwater Basin

- Indio Subbasin
- Mission Creek Subbasin
- Desert Hot Springs Subbasin
- 2019 Groundwater-Elevation Contours *feet above mean sea-level* Source: Todd Groundwater and Wood (drawn for SGMA annual reports)
- General Direction of Groundwater Flow
- Estimated Extent of Perched Aquifer
- Estimated Extent of Regional Aquitard
- Salton Sea Watershed
- Other Groundwater Basin/Subbasin



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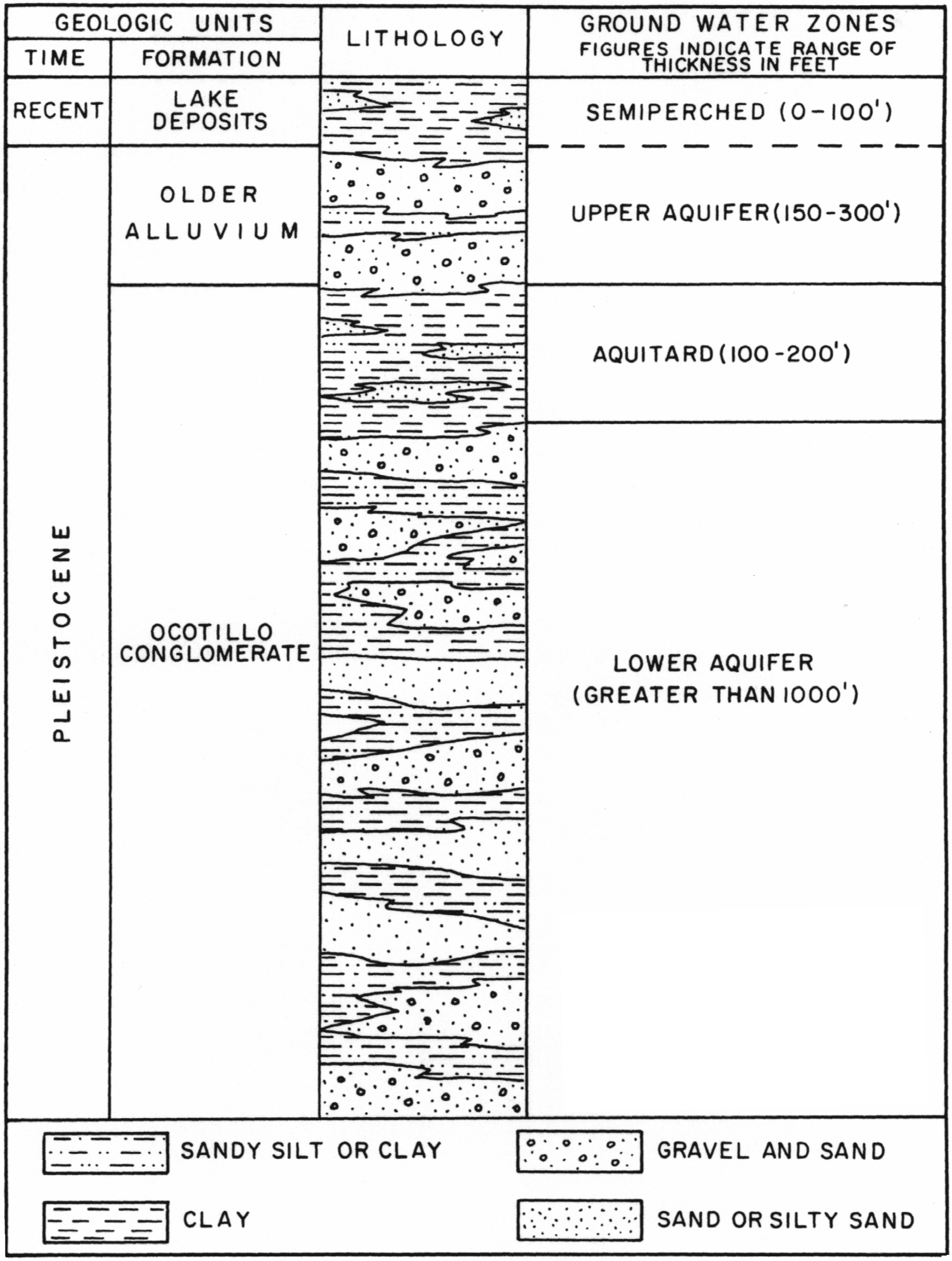
0 5 10 Miles
0 10 20 KM

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

Hydrogeologic Map

Figure 2-2

Figure 2-3
Generalized Stratigraphic Column in Eastern Coachella Valley



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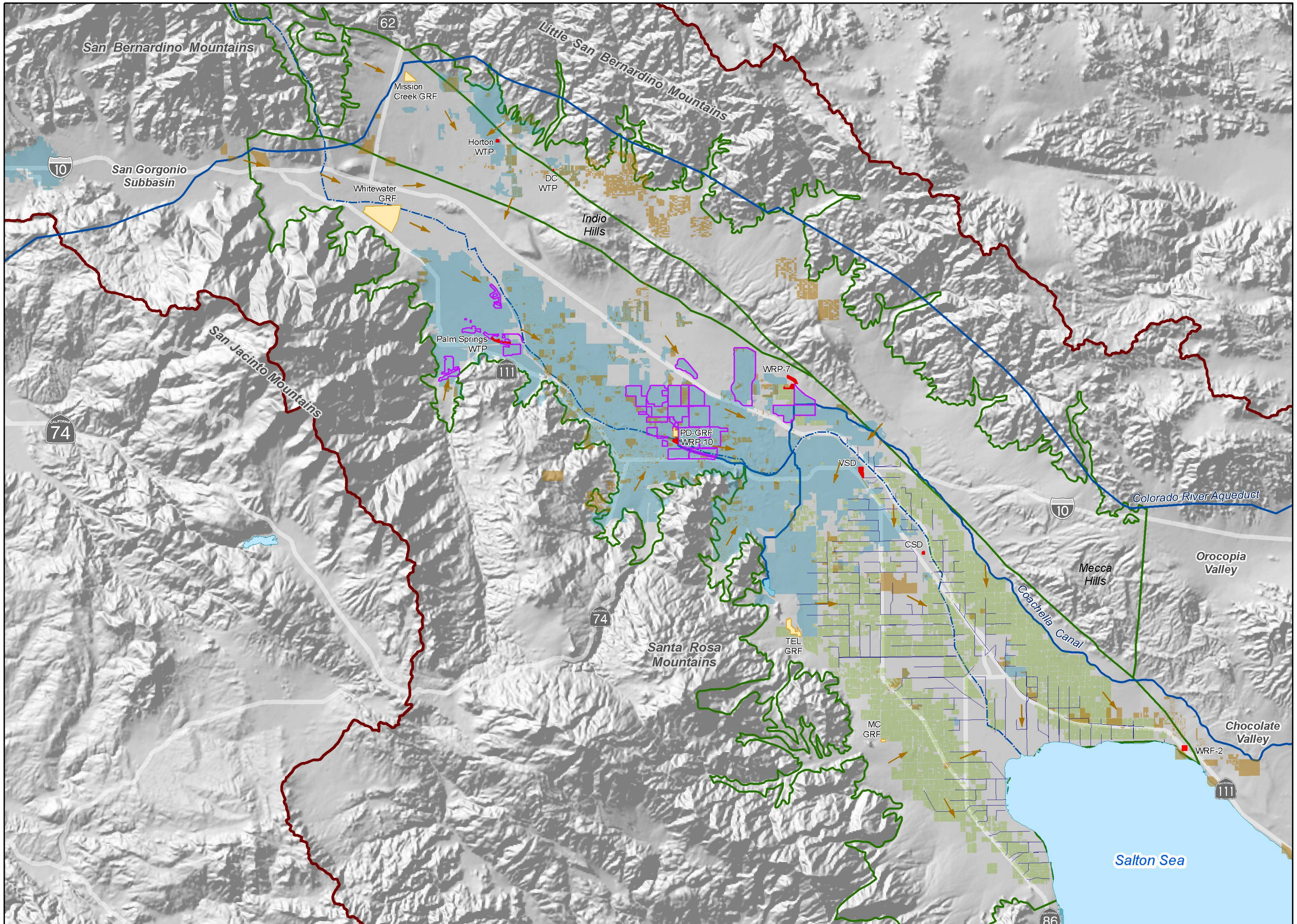
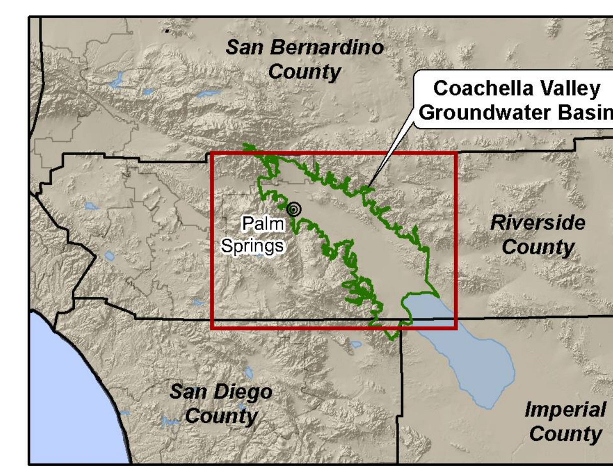


Sources of Salt and Nutrient Loading

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

Generalized Land Use

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



0 5 10 Miles

0 10 20 KM

Author: EM/AM
Date: 12/22/2020
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Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Salt and Nutrient Loading, Transport, and Discharge

Figure 2-4

3.0 CV-SNMP GROUNDWATER MONITORING PROGRAM WORKPLAN

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

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

3.1 Groundwater Monitoring Network

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

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

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

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

3.1.1 Methods for Selection of the Groundwater Monitoring Network

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

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

3.1.2 *Monitoring Network and Gaps* – Shallow Aquifer System

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

3.1.3 *Monitoring Network and Gaps* – Deep Aquifer System

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

3.1.4 *Monitoring Network and Gaps* – Perched Aquifer System

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

3.2 Chemical Analytes and Sampling Frequency

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

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

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

3.3 Monitoring and Reporting

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

3.3.1 Groundwater Sampling and Laboratory Analysis

For groundwater sampling and analysis:

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

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

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

3.3.2 Reporting of Laboratory Results

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

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

3.4 Filling of Gaps in the Monitoring Network

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

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

Table 3-3. SNMP Groundwater Monitoring Network -- *Perched Aquifer System*								
Map_ID	SWN	Well Owner	Well Name	Well Status[(a)']	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Justification for Inclusion in SNMP Monitoring Program
182		Coachella Valley Water District	WRP2 MW3	Active	Monitoring	<90	P	At WRP-2; represents subsurface discharge to Salton Sea
183	06S07E27J03S	Coachella Valley Water District	TEL-GRF MW-8	Active	Monitoring	25-45	P	North/downgradient of TEL-GRF; near golf course and agriculture
184	06S07E34A03S	Coachella Valley Water District	TEL-GRF MW-9	Active	Monitoring	25-45	P	Downgradient from TEL-GRF and golf course
185	06S08E31R01S	Coachella Valley Water District	TEL-GRF MW-10	Active	Monitoring	25-45	P	Downgradient from TEL-GRF; agricultural area
186	07S08E06P01S	Coachella Valley Water District	TEL-GRF MW-11	Active	Monitoring	25-45	P	Downgradient from TEL-GRF; agricultural area
187		Coachella Valley Water District	PEW-1	Active	Monitoring	10-55	P	At WRP-4; agricultural area

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

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

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

Table 3-4. Gaps in SNMP Groundwater Monitoring Network

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

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

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

Table 3-5. Analyte List for the SNMP Groundwater Monitoring Program

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

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

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

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

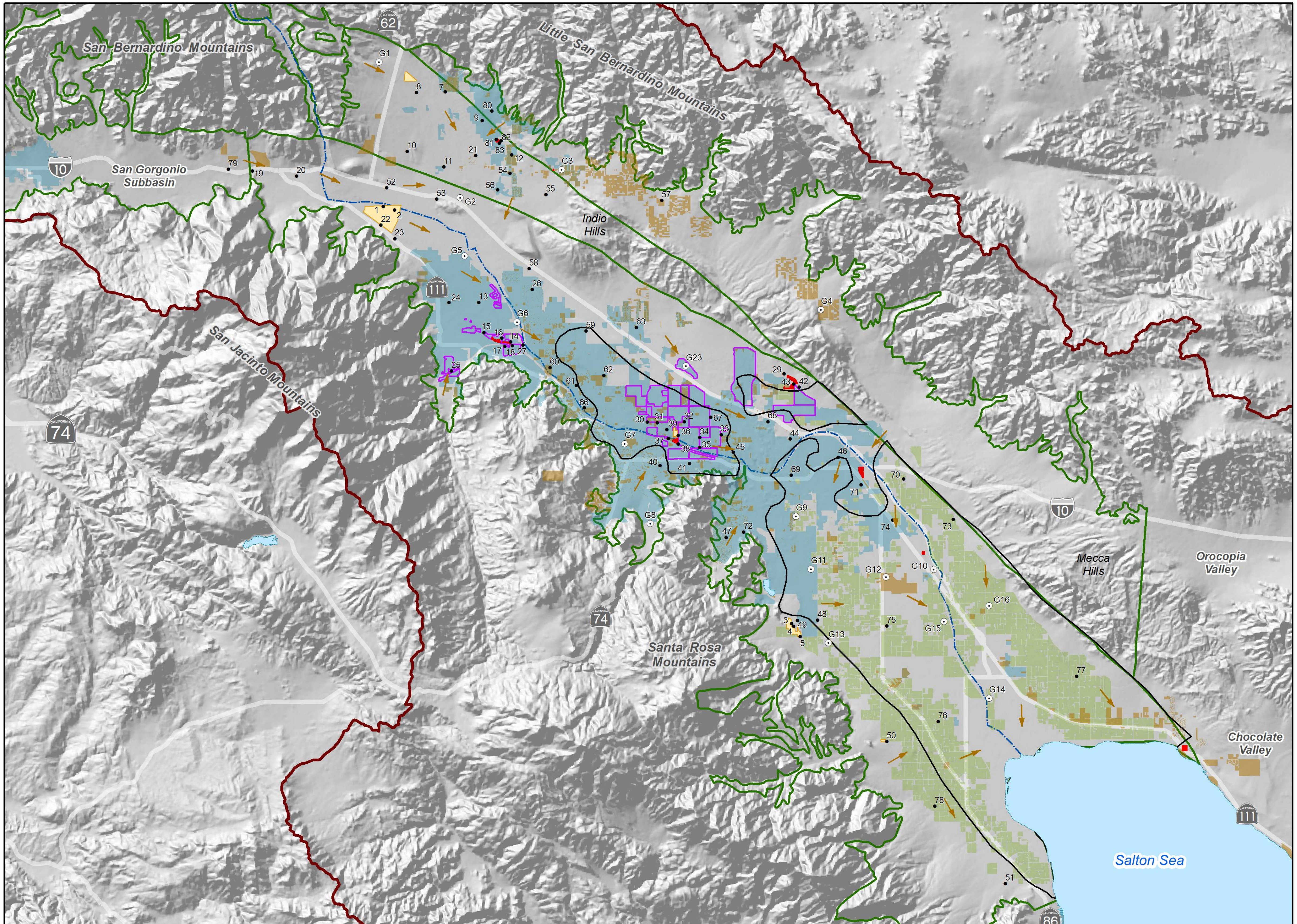
Table 3-6. Responsibilities for Groundwater Sampling and Laboratory Analyses								
Map_ID	SWN	Well Owner	Well Name	Well Status[(a)]	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Overlying SNMP Agency[(d)]
133	05S07E03D01S	Coachella Valley Water District	WRP7 MW-4D	Active	MUN	245-395	D	CVWD
134	05S07E04A01S	Coachella Valley Water District	WRP7 MW-1	Active	Monitoring	147-367	D	CVWD
135	05S07E15N01S	Indio Water Authority	Well AA	Active	MUN	550-1230	D	IWA
136	05S07E19A01S	Coachella Valley Water District	CVWD Well 5708-1	Inactive	MUN	450-970	D	CVWD
137	05S07E20J01S	Indio Water Authority	Well T	Active	MUN	580-1305	D	IWA
138	05S07E26E02S	Indio Water Authority	Well 3B	Active	MUN	500-1200	D	IWA
139	05S07E27P01S	Indio Water Authority	Well Z	Active	MUN	580-1290	D	IWA
140	05S07E33E01S	Indio Water Authority	Well S	Active	MUN	460-1260	D	IWA
141	05S07E34P04S	Indio Water Authority	Well V	Active	MUN	460-1270	D	IWA
142	05S07E35R02S	Indio Water Authority	Well U	Active	MUN	480-1190	D	IWA
143	05S07E36D03S	Coachella Water Authority	Well 19	Active	MUN	650-1250	D	CWA/CSD
144	05S08E31C03S	Coachella Water Authority	Well 11	Active	MUN	513-818	D	CWA/CSD
145	06S07E06B01S	Coachella Valley Water District	CVWD Well 6701-1	Active	MUN	580-800	D	CVWD
146	06S07E22B02S	Coachella Valley Water District	CVWD Well 6726-1	Active	MUN	640-1160	D	CVWD
147	06S07E34A01S	Coachella Valley Water District	CVWD Well 6728-1	Active	MUN	500-750	D	CVWD
148	06S07E34D01S	Coachella Valley Water District	CVWD Well 6729-1	Active	MUN	500-780	D	CVWD
149	06S08E06K02S	Coachella Water Authority	Well 12	Active	MUN	500-1010	D	CWA/CSD
150	06S08E09N02S	Coachella Water Authority	Well 16	Active	Monitoring	480-730	D	CWA/CSD
151	06S08E19D05S	Coachella Valley Water District	CVWD Well 6808-1	Active	MUN	675-1200	D	CVWD
152	06S08E22D02S	Coachella Valley Water District	CVWD Well 6803-1	Inactive	MUN	500-1100	D	CVWD
153	06S08E25P04S	Coachella Valley Water District	CVWD Well 6807-1	Active	MUN	665-1300	D	CVWD
154	06S08E28N06S	Coachella Water Authority	Well 18	Active	Monitoring	900-1190	D	CWA/CSD
155	07S08E17A04S	Coachella Valley Water District	CVWD Well 7803-1	Active	MUN	250-710	D	CVWD
156	07S09E23N01S	Coachella Valley Water District	CVWD Well 7990-1	Inactive	Unknown	530-560	D	CVWD
157		Indio Water Authority	Well 13A	Active	Irrigation	550-1171	D	IWA
158	03S05E08B01S	R.C Roberts	03S05E08B01S	Undetermined	Irrigation	356-516	D	DWA
159	03S05E17M01S	Desert Dunes Golf Club	03S05E17M01S	Active	Unknown	305-412	D	CVWD
160	03S05E20H02S	Donald Franklin	03S05E20H02S	Active	Irrigation	240-360	D	CVWD
161	03S06E21R01S	Joel Rosenfeld	03S06E21R01S	Undetermined	Irrigation	355-495	D	CVWD
162	05S05E12B03S	Tandika Corp	05S05E12B03S	Active	Irrigation	410-800	D	CVWD
163	05S06E13F01S	PD Golf Operations LLC	05S06E13F01S	Active	Irrigation	400-700	D	CVWD
164	05S06E15H01S	Toscana Country Club	05S06E15H01S	Active	Irrigation	430-950	D	CVWD
165	05S06E22C02S	Desert Horizons Country Club	05S06E22C02S	Active	Irrigation	550-990	D	CVWD
166	05S06E27A01S	El Dorado Country Club	05S06E27A01S	Active	MUN	458-596	D	CVWD
167	05S06E29P04S	Bighorn Golf Club	05S06E29P04S	Active	MUN	530-720	D	CVWD
168	05S07E07F04S	Myoma Dunes Mutual Water Company	Well 4	Active	MUN	430-730	D	MDMWC
169	05S07E08L01S	Myoma Dunes Mutual Water Company	Well 11	Active	Unknown	500-1060	D	MDMWC
170	05S07E17K01S	Myoma Dunes Mutual Water Company	Well 12	Active	Irrigation	450-950	D	MDMWC
171	05S08E09N03S	Jamie Brack	05S08E09N03S	Undetermined	Unknown	480-580	D	CVWD, IWA
172	06S07E27B01S	Andalusia Golf Club	06S07E27B01S	Active	Irrigation	300-780	D	CVWD
173	06S07E35L02S	Castro Bros	Castro Bros	Active	Unknown	300-400	D	CVWD
174	06S08E11A01S	Cocopah Nurseries Inc	06S08E11A01S	Active	Unknown	400-842	D	CVWD, CWA/CSD
175	06S08E31P01S	Deer Creek	Deer Creek	Active	Irrigation	400-550	D	CVWD
176	06S08E35E02S	Otto L. Zahler	06S08E35E02S	Undetermined	Unknown	521-596	D	CVWD
177	07S07E02G02S	Warren Webber	Warren Webber	Active	Irrigation	380-700	D	CVWD
178	07S08E01L02S	Bill Wordon	07S08E01L02S	Undetermined	Domestic	500-880	D	CVWD
179	07S08E27A02S	Gimmway Enterprises Inc	07S08E27A02S	Active	MUN	491-811	D	CVWD
180	07S09E10F01S	Prime Time International	07S09E10F01S	Active	Monitoring	360-500	D	CVWD
181		Mission Springs Water District	Well 31	Active	Monitoring	270-670	D	MSWD
182		Coachella Valley Water District	WRP2 MW3	Active	Monitoring	<90	P	CVWD
183	06S07E27J03S	Coachella Valley Water District	TEL-GRF MW-8	Active	Monitoring	25-45	P	CVWD
184	06S07E34A03S	Coachella Valley Water District	TEL-GRF MW-9	Active	Monitoring	25-45	P	CVWD
185	06S08E31R01S	Coachella Valley Water District	TEL-GRF MW-10	Active	Monitoring	25-45	P	CVWD
186	07S08E06P01S	Coachella Valley Water District	TEL-GRF MW-11	Active	Monitoring	25-45	P	CVWD
187		Coachella Valley Water District	PEW-1	Active	Monitoring	10-55	P	CVWD

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

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

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

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



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

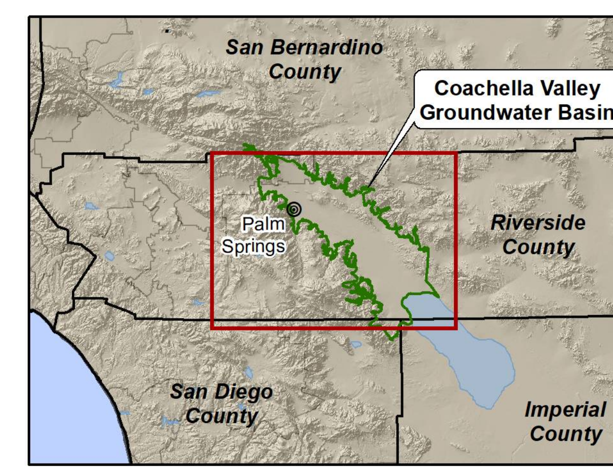
Map_ID ⊙ Gap in Monitoring Network
See Table 3-2

Sources of Salt and Nutrient Loading

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

Generalized Land Use

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



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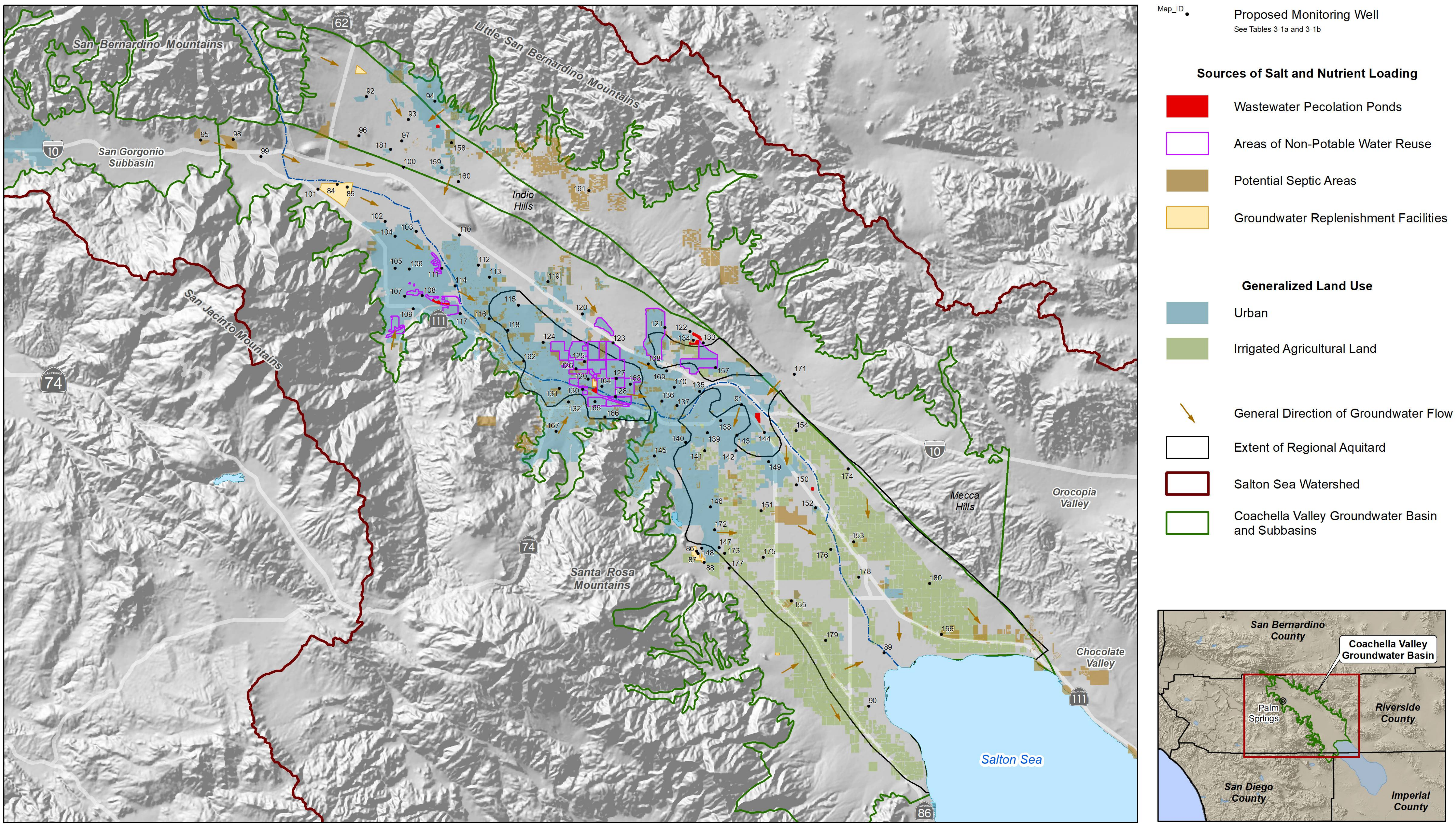
Date: 12/11/2020
File: Figure 3-1.mxd

0 5 10 Miles
0 10 20 KM

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

Groundwater Monitoring Network and Gaps
Shallow Aquifer System

Figure 3-1

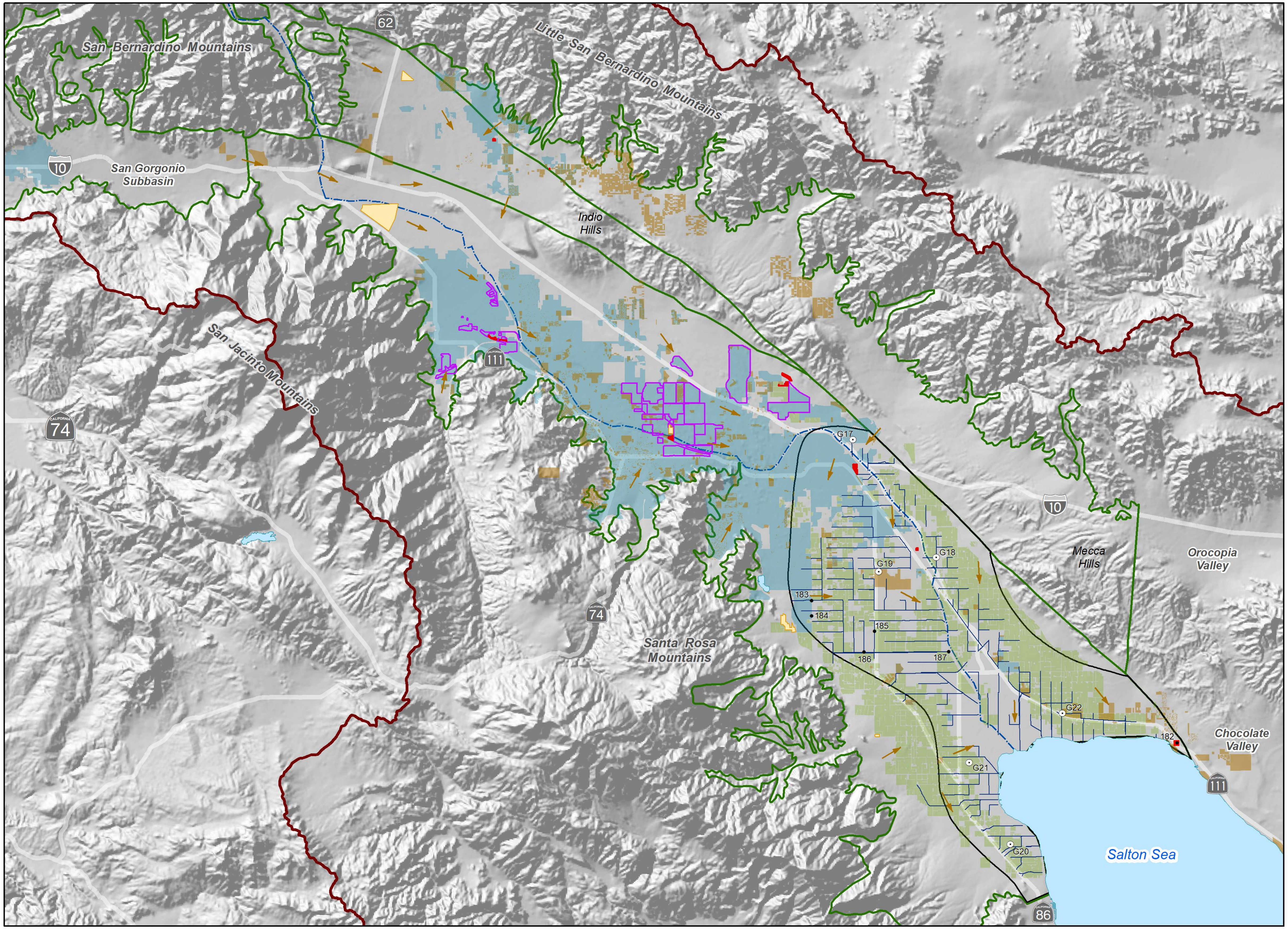


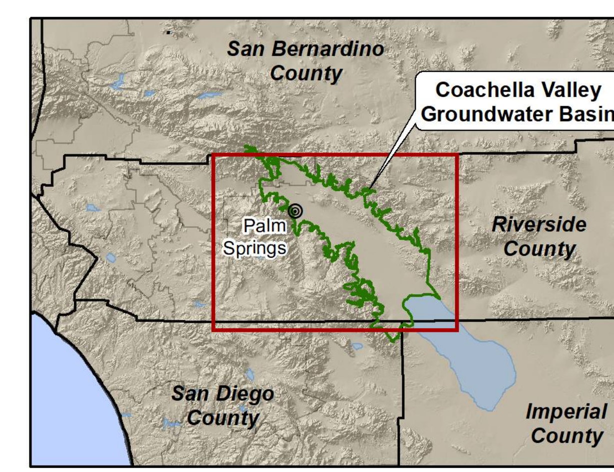
Author: EM/AM
Date: 12/11/2020
File: Figure 3-2.mxd

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

Groundwater Monitoring Network
Deep Aquifer System

Figure 3-2





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

Map_ID ⊙ Gap in Monitoring Network
See Table 3-2

Sources of Salt and Nutrient Loading

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

Generalized Land Use

- Urban
- Irrigated Agricultural Land

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

WEST YOST

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

0 5 10 Miles
0 10 20 KM

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

Groundwater Monitoring Network and Gaps
Perched Aquifer System

Figure 3-3

4.0 CV-SNMP DEVELOPMENT WORKPLAN

This section describes:

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

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

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

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

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

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

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

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

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

d) *Economic considerations*.

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

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

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

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

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

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

Task 4.3 Characterize N/TDS Loading to the Groundwater Basin

Task 4.4 Characterize Current Groundwater Quality

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

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

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

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

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

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

Task 4.11 Prepare Final CV-SNMP

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

4.1 Select Consultants for CV-SNMP Facilitation and Technical Services

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

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

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

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

4.2 Establish CV-SNMP Stakeholder Group and Technical Advisory Committee

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

4.2.1 Convene the CV-SNMP Stakeholder Group

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

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

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

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

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

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

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

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

4.2.2 Convene the CV-SNMP Technical Advisory Committee

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

The objectives of the TAC are:

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

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

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

4.3 Characterize N/TDS Loading to the Groundwater Basin

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

The results of this task will:

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

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

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

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

4.3.1 Collect Data and Information

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

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

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

4.3.2 Characterize Historical and Current N/TDS Loading

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

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

4.3.3 Prepare Task Memorandum

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

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

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

4.4 Characterize Current Groundwater Quality

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

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

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

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

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

4.4.1 Collect Data and Information

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

- Well information
  - Well ID (State Well Number)
  - Well owner
  - Well name
  - Well use
  - Well status
  - XYZ coordinates
  - Well screen depth intervals

- Historical groundwater-elevation data at wells
- Historical water-quality data at wells for the following constituents:
  - TDS
  - Nitrate
  - Major cations: K, Na, Ca, Mg
  - Major anions: Cl, SO4
  - Total alkalinity: HCO3, CO3, OH

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

4.4.2 Prepare Tables, Maps, and Data Graphics

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

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

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

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

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

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

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

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

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

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

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

- Northern portion of the Indio subbasin (including the Garnet Hill and Palm Springs subareas)
  - Shallow aquifer system (Layers 1-3)
  - Deep aquifer system (Layer 4)

- Central portion of the Indio subbasin (including the Thousand Palms subarea)
  - Shallow aquifer system (Layers 1-3)
  - Deep aquifer system (Layer 4)

- Southern portion of the Indio subbasin (including the Thermal and Oasis subareas)
  - Perched aquifer system (Layer 1)
  - Shallow aquifer system (Layers 2/3)
  - Deep aquifer system (Layer 4)

- Mission Creek subbasin
  - Shallow aquifer system (Layers 1-3)
  - Deep aquifer system (Layer 4)

- Desert Hot Springs subbasin

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

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

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

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

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

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

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

4.4.3 Prepare Task Memorandum

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

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

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

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

The objectives of this task are to:

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

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

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

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

4.5.1 Delineate Draft Groundwater Management Zones

The delineation of draft management zones will be based on:

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

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

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

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

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

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

4.5.3 Define AWQ Metrics and Determine Current Protection of Beneficial Uses

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

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

Figure 4-1 is a chart that conceptually illustrates:

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

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

4.5.4 Prepare Task Memorandum

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

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

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

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

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

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

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

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

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

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

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

4.6.1 Evaluate Existing MODFLOW Models

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

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

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

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

4.6.2 Develop Procedures for Simulating Vadose Zone Processes

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

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

4.6.3 Define the Appropriate Planning Period

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

4.6.4 Develop Procedures for Simulating Feedback Processes

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

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

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

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

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

4.6.6 Develop Procedures for Verifying the N/TDS Forecasting Tools

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

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

4.6.7 Develop Procedures for Post-Processing Model Results

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

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

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

4.6.8 Prepare Task Memorandum

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

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

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

The objectives of this task will be to:

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

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

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

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

4.7.1 Develop a Baseline Scenario based on the SGMA Alternative Plans

The Baseline Scenario will be based on:

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

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

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

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

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

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

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

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

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

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

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

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

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

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

4.7.3 Prepare Task Memorandum

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

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

4.8 Forecast N/TDS Concentrations for CV-SNMP Scenarios

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

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

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

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

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

4.8.1 Evaluate Baseline Scenario Results and Recommend Implementation Measures

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

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

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

4.8.2 Evaluate CV-SNMP Scenarios

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

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

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

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

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

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

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

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

4.8.3 Prepare Task Memorandum

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

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

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

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

4.9.1 Develop Cost-Estimating Planning Criteria and a Cost Model

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

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

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

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

If applicable, the cost model will include the costs associated with the effects of potential future increases in groundwater salinity.

A description of the planning criteria and the cost model will be shared with the TAC to receive feedback from the TAC. The planning criteria and cost model will be finalized based on TAC feedback.

4.9.2 Develop Cost Estimates for the Baseline and CV-SNMP Scenarios

The engineering cost model will be applied to the Baseline and CV-SNMP Scenarios to estimate and compare the annual melded unit cost of the aggregate water supply in the Coachella Valley over the planning period. These costs will be summarized into an annual melded unit cost of the aggregate water supply over the planning period and a net-present value cost for each Scenario.

This task will also include a description of the funding mechanisms available to the agencies responsible for CV-SNMP implementation and the cost impacts to those agencies and their rate payers.

4.9.3 Prepare Task Memorandum

A task memorandum will be prepared to describe and document the planning criteria and the methods, assumptions, and results of the cost analyses and cost comparisons, as described below:

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

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

The objective of this task is to select a preferred CV-SNMP Scenario, which will form the basis for a CV-SNMP implementation plan and any recommended updates to the Basin Plan, which could include:

- Establishment of management zone delineations and descriptions.
- Groundwater beneficial use descriptions for each management zone.
- Addition of numeric TDS objectives for each management zone.

- Addition of CV-SNMP implementation measures and associated time schedules.

4.10.1 Evaluate All Forecasted Information and Select a Preferred CV-SNMP Scenario

In this task, the results of the Baseline and CV-SNMP Scenarios will be compared and ranked based on the following criteria:

1. The ability of the scenario to protect the beneficial uses over the planning period.
2. The feasibility of implementation.
3. The melded unit cost of the total water supply.
4. The funding mechanisms available to the agencies responsible for CV-SNMP implementation and the cost impacts to those agencies and their rate payers.

At this stage, it is possible that results of the scenarios indicate the need for refinements to the management zone delineations and/or the AWQ metrics that are meant to represent ambient N/TDS concentrations in the management zones. If so, the model results will be re-processed to compute the revised AWQ metrics.

Based on the evaluation and ranking of the Baseline and CV-SNMP Scenarios, the consultant(s) will recommend a preferred CV-SNMP Scenario, including the final management zones, beneficial use designations, and TDS objectives.[15] The evaluation, ranking, and the recommended CV-SNMP Scenario will be shared with the TAC to receive feedback. The TAC will then select the preferred CV-SNMP Scenario.

4.10.2 Recommend TDS Objectives based on CWC 13241

California Water Code (CWC) section 13241 lists the factors to consider when establishing water quality objectives without unreasonably affecting beneficial uses. These factors include:

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

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

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

d) Economic considerations.

e) The need for developing housing within the region.

f) The need to develop and use recycled water.

A written demonstration will be prepared, referencing all work performed in prior tasks, to illustrate how the preferred CV-SNMP Scenario and the recommended TDS objectives collectively satisfy the requirements of CWC 13241.

[15] A numeric nitrate-nitrogen objective for groundwater in the Basin is already established in the Basin Plan at 10 mgl.

4.10.3 Document Antidegradation Demonstration Pursuant to State Board Policy 68-16

An antidegradation demonstration will be prepared as required by Section 6.2.4.5 of the 2018 Policy. The objective will be to illustrate how the preferred CV-SNMP Scenario and the recommended N/TDS objectives collectively satisfy the requirements of State Board Resolution 68-16 (the Antidegradation Policy). The key components of an antidegradation demonstration include:

- Identifying the water quality parameters and beneficial uses that will be impacted by the proposed action and the extent of the impact. In this case, the proposed action is the adoption of the CV-SNMP (including implementation of the preferred CV-SNMP Scenario) and the proposed changes to the Basin Plan (e.g. management zones, TDS objectives, and beneficial use designations).
- The scientific rationale for the determination that the proposed action will or will not lower water quality in the impacted receiving waters.
- A discussion of the alternative measures that were considered.
- A socio-economic evaluation.
- The rationale for determining that the proposed action is or is not justified by socio-economic considerations.
- Comparing the potential water-quality outcomes.
- Demonstrating that any water quality degradation allowed by the CV-SNMP provides maximum benefit to the people of California.

Figure 4-5 is a chart that conceptually illustrates the evaluation of a hypothetical preferred SNMP Scenario in a hypothetical management zone. In this example, the TDS concentration objective in the management zone is selected based upon an evaluation of all factors listed in CWC 13241 and a demonstration that the scenario and the recommended TDS objective collectively satisfy the requirements of Antidegradation Policy (see Section 4.10.3 below). These types of charts will be prepared for N/TDS concentrations for each scenario in each management zone over the planning period.

4.10.4 Prepare Task Memorandum

A task memorandum will be prepared to describe: the evaluation and ranking of the Baseline and CV-SNMP Scenarios; the preferred CV-SNMP Scenario; the final management zones, beneficial use designations, and recommended TDS objectives; and how the CV-SNMP and the recommended TDS objectives collectively satisfy the requirements of CWC 13241 and the Antidegradation Policy. “Buy-in” from the Regional Board is mandatory at this stage. The memorandum will be completed as described below:

- An administrative draft task memorandum will be prepared and distributed to the TAC for review and comment. Review and comment by Regional Board staff is mandatory.
- A TAC meeting will be held to review the administrative draft memorandum and receive feedback. Attendance by Regional Board staff is mandatory.
- A draft memorandum will be prepared based on the feedback from the TAC. An appendix of comments and responses-to-comments will be included in the draft memorandum. Additional review and comment on the draft memorandum by Regional Board staff is mandatory.

- The CV-SNMP Stakeholder Group will be notified of the availability of the draft memorandum for review and comment.
- A public meeting will be held to review the draft memorandum and receive feedback. Attendance by Regional Board staff is mandatory.
- A final memorandum will be prepared addressing the feedback. An appendix of comments and responses-to-comments will be included in the final memorandum.
- Regional Board staff approval of the final memorandum by letter from the Executive Officer is required before proceeding with Task 4.11.

4.11 Prepare Final CV-SNMP

The complete findings and recommendations from the work performed to implement this CV-SNMP Development Workplan will be documented in a final plan titled: *Final Coachella Valley Salt and Nutrient Management Plan* (CV-SNMP). The CV-SNMP will be a compilation of the final technical memorandums and interim work products prepared in Tasks 4.1 through 4.10. The CV-SNMP will define the management activities that the CV-SNMP Agencies will implement, including the ongoing monitoring programs, to comply with the N/TDS objectives of the defined groundwater management zones.

The CV-SNMP will include a plan and schedule to implement the preferred CV-SNMP Scenario and perform the monitoring, reporting, and update activities as required by Sections 6.2.4.1.3 and 6.2.6 of the 2018 Policy. The CV-SNMP will address:

- Milestones, triggers, and schedules for implementation of any programs or facilities included in the preferred CV-SNMP Scenario.
- Milestones and schedules for implementing and updating the CV-SNMP Groundwater Monitoring Program. The monitoring program may need to be updated to address new information and data gaps identified in the implementation of this CV-SNMP Development Workplan (or during ongoing monitoring efforts) and to ensure monitoring program is robust enough to assess the impacts of implementing the preferred CV-SNMP Scenario.
- A process for performing the five-year data assessment, which must include an evaluation of:
    - Observed trends in water quality data as compared with trends predicted in the CV-SNMP.
    - The ability of the monitoring network to adequately characterize groundwater quality in the Basin.
    - Potential new data gaps.
    - Groundwater quality impacts predicted in the CV-SNMP based on most recent trends and any relied-upon models, including an evaluation of the ability of the models to simulate groundwater quality.
    - Available assimilative capacity based on observed trends and most recent water quality data.
    - New projects that are reasonably foreseeable at the time of the data assessment but may not have been considered when the CV-SNMP was prepared or last updated.

CV-SNMP Development Workplan

The process to prepare the final CV-SNMP will include the following:

- An administrative draft CV-SNMP will be prepared and distributed to the TAC for review and comment. Review and comment by Regional Board staff is mandatory.
- A TAC meeting will be held to review the administrative draft CV-SNMP and receive feedback. Attendance by Regional Board staff is mandatory.
- A draft CV-SNMP will be prepared based on the feedback from the TAC for additional review and comment. An appendix of comments and responses-to-comments will be included in the draft memorandum. Review and comment on the draft memorandum by Regional Board staff is mandatory.
- The CV-SNMP Stakeholder Group will be notified of the availability of the draft memorandum for review and comment.
- A public meeting will be held to review the draft CV-SNMP and receive feedback. Attendance by Regional Board staff is mandatory.
- The CV-SNMP will be prepared addressing the feedback. An appendix of comments and responses-to-comments will be included in the final memorandum.
- The final CV-SNMP will be submitted to the Regional Board for approval.

Table 4-1. CV-SNMP Development Workplan Compliance with the 2018 Recycled Water Policy	
Recommended and Required Components of SNMPs pursuant to 2018 Recycled Water Policy	**Workplan Section that Complies with the 2018 Policy**
Section 6.2 Development and adoption of salt and nutrient management plans	
6.2.1 The State Water Board encourages collaborative work among salt and nutrient management planning groups, the agricultural community, the regional water boards, Integrated Regional Water Management groups, and groundwater sustainability agencies formed under the Sustainable Groundwater Management Act to achieve the goals of groundwater sustainability, recycled water use, and water quality protection. For basins identified pursuant to 6.1.3, the State Water Board encourages local water suppliers, wastewater treatment agencies, and recycled water producers, together with local salt and nutrient contributing stakeholders, to continue locally driven and controlled, collaborative processes open to all stakeholders and the regional water board that will result in the development of salt and nutrient management plans for groundwater basins and the management of salts and nutrients on a basin-wide basis.	**Section 4.2 -** Establish CV-SNMP Stakeholder Group and Technical Advisory Committee
6.2.4.1. A basin- or subbasin-wide monitoring plan that includes an appropriate network of monitoring locations to provide a reasonable, cost effective means of determining whether the concentrations of salts, nutrients, and other constituents of concern as identified in the salt and nutrient management plans are consistent with applicable water quality objectives. The number, type, and density of monitoring locations to be sampled and other aspects of the monitoring program shall be dependent upon basin-specific conditions and input from the regional water board.	**Section 3 -** CV-SNMP Groundwater Monitoring Program Workplan
6.2.4.2. Water recycling use goals and objectives.	**Section 4.7 -** Construct N/TDS Forecasting Tools and Evaluate the Baseline Scenario
6.2.4.3. Salt and nutrient source identification, basin or subbasin assimilative capacity and loading estimates, together with fate and transport of salts and nutrients.	**Section 4.3** - Characterize N/TDS Loading to the Groundwater Basin **Section 4.4** - Characterize Current Groundwater Quality **Section 4.5** - Delineate Draft Management Zones and Describe Metrics to Characterize Beneficial Use Protection **Section 4.7** - Construct N/TDS Forecasting Tools and Evaluate Baseline Scenario
6.2.4.4. Implementation measures to manage or reduce the salt and nutrient loading in the basin on a sustainable basis and the intended outcome of each measure.	**Section 4.8** - Forecast N/TDS for up to Eight CV-SNMP Scenarios
6.2.4.5. An antidegradation analysis demonstrating that the existing projects, reasonably foreseeable future projects, and other sources of loading to the basin included within the plan will, cumulatively, satisfy the requirements of State Water Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality of Waters in California (Antidegradation Policy).	**Section 4.10** - Select the Preferred CV-SNMP Scenario, Finalize Management Zones and Beneficial Uses, and Set TDS Objectives

Figure 4-1. Conceptual Chart to Characterize Beneficial Use Protection in a Management Zone

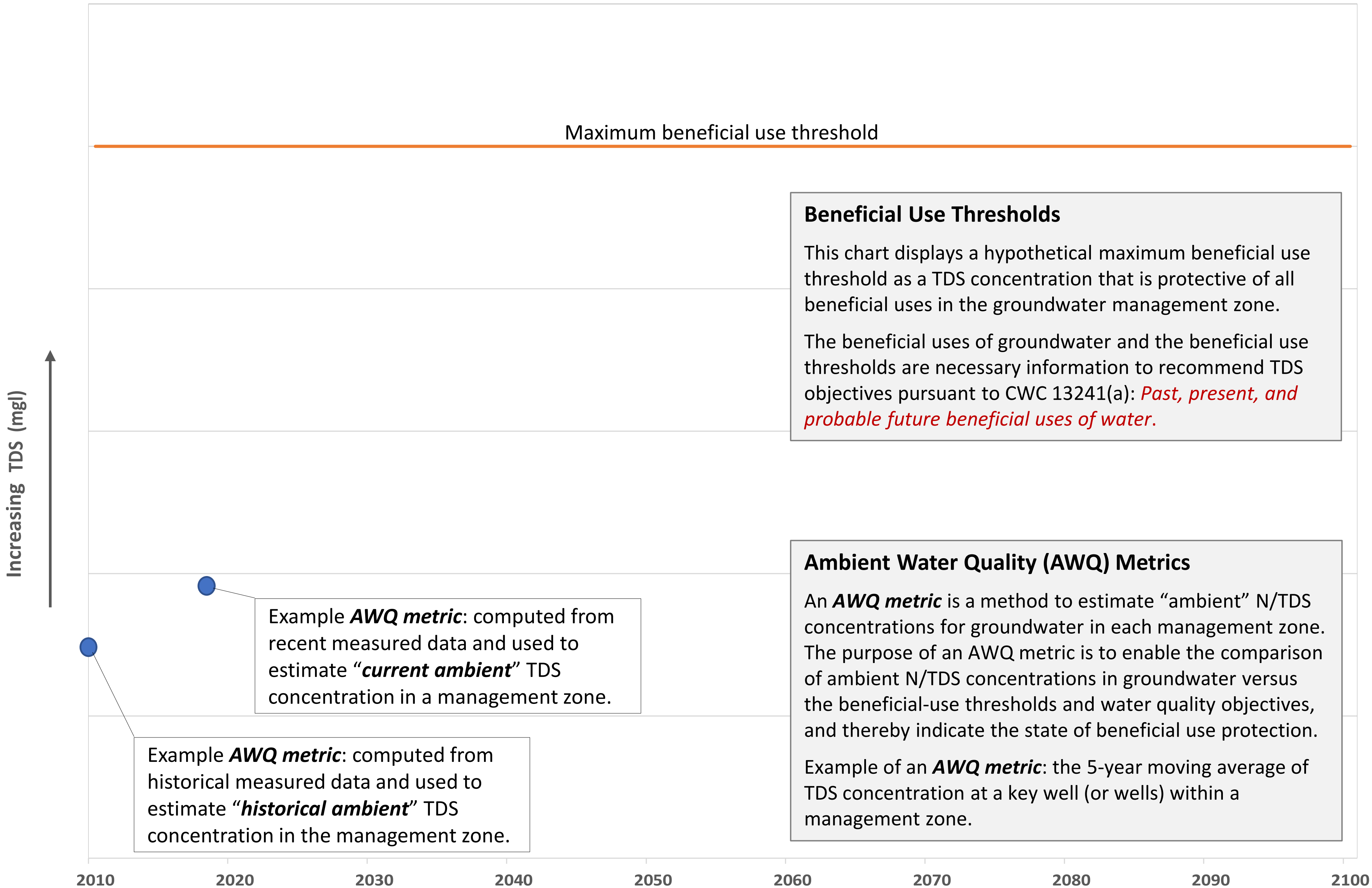


Figure 4-2. Conceptual Evaluation of a Hypothetical Baseline Scenario in a Management Zone

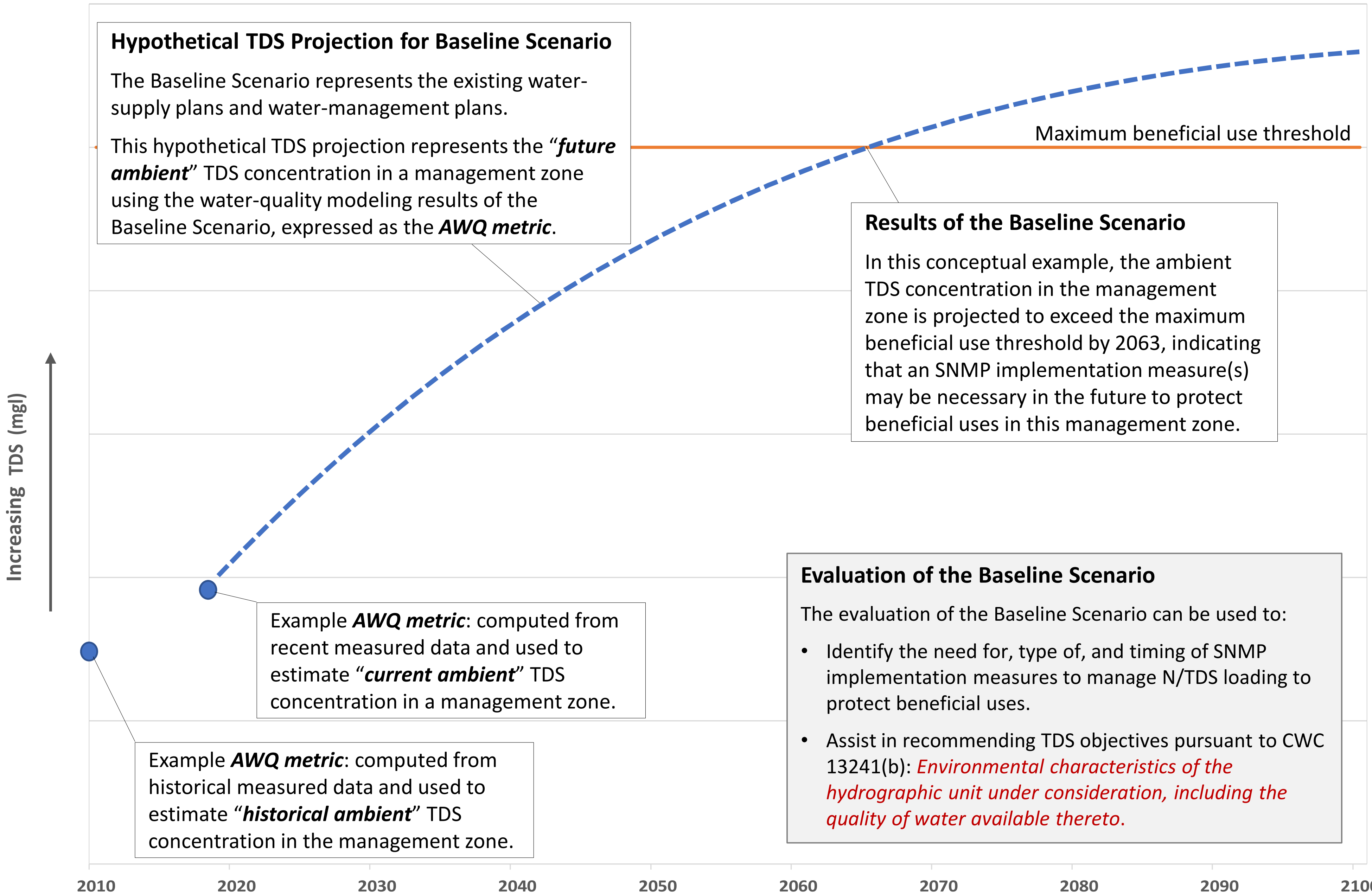


Figure 4-3. Conceptual Evaluation of Hypothetical SNMP Scenario #1 in a Management Zone

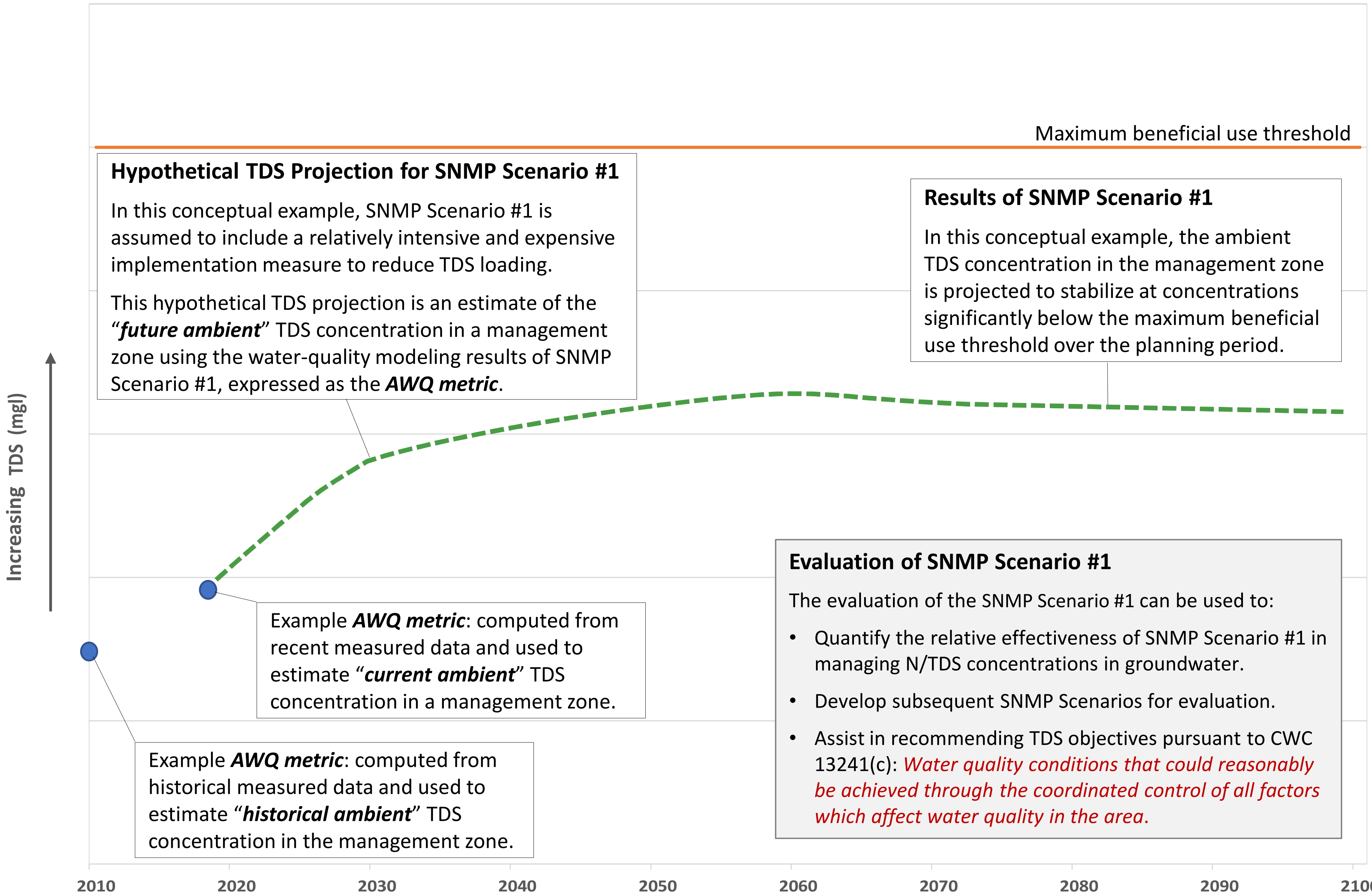


Figure 4-4. Conceptual Evaluation of Hypothetical SNMP Scenario #2 in a Management Zone

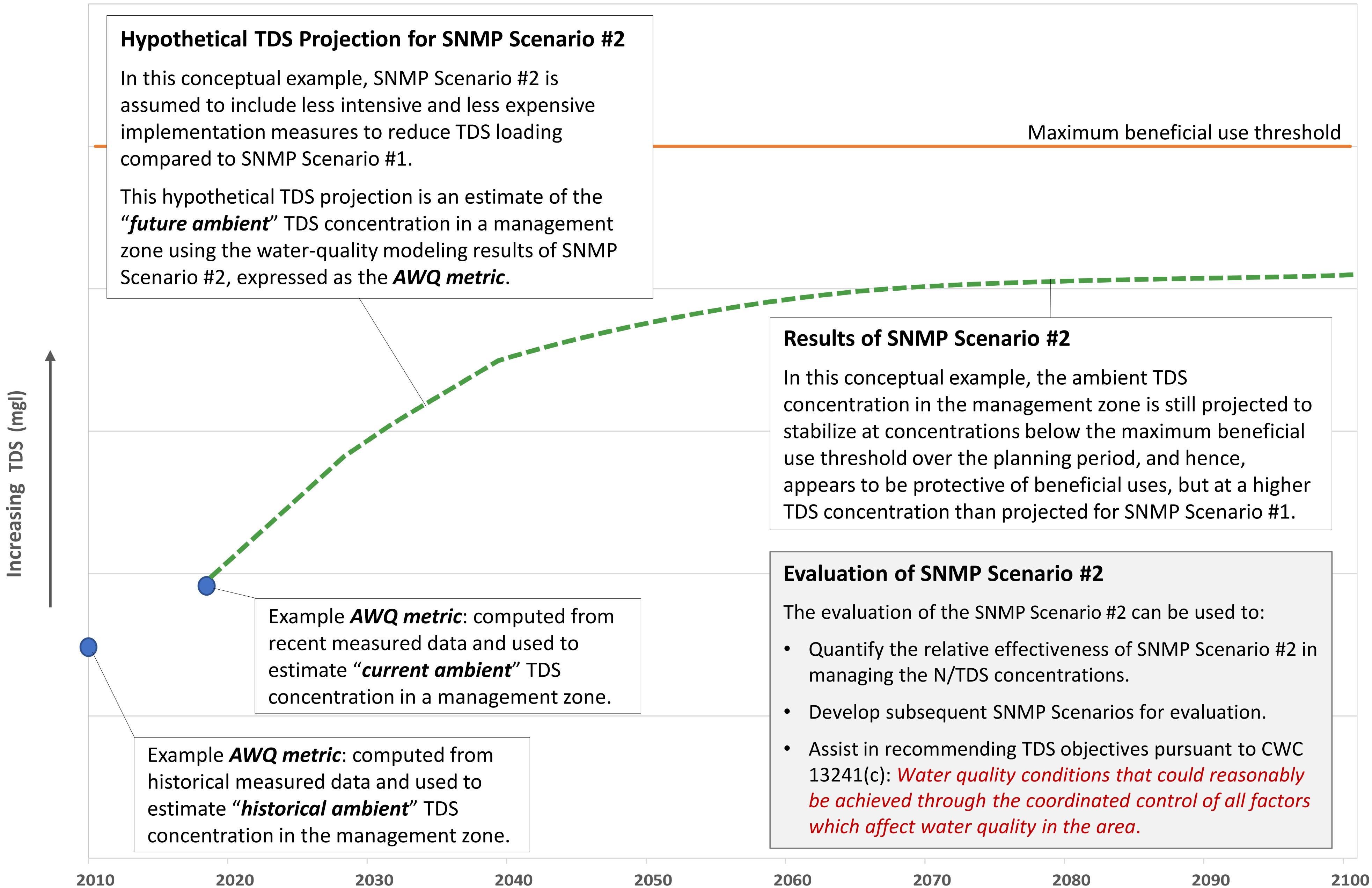
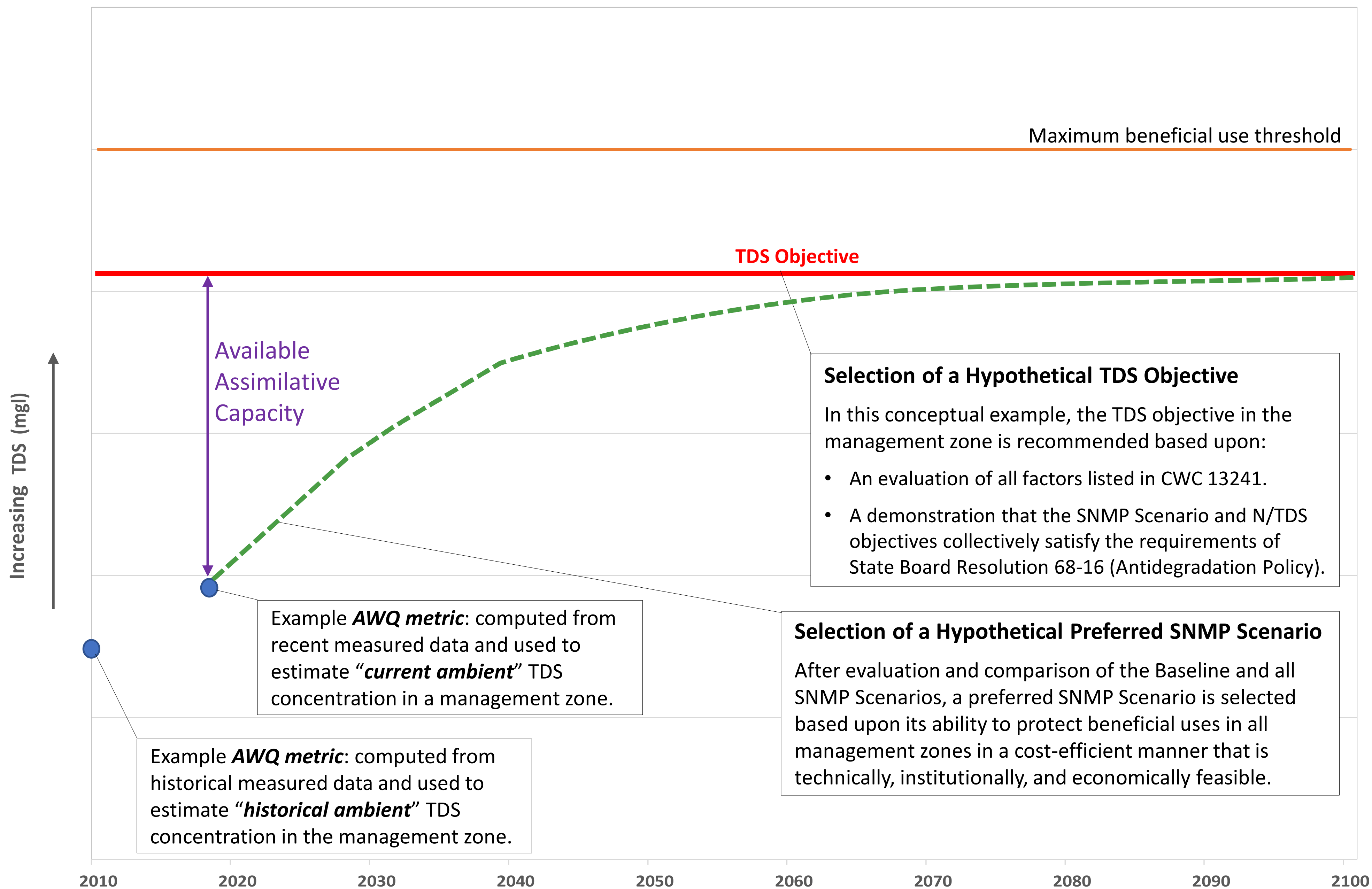


Figure 4-5. Selection of a Hypothetical SNMP Scenario and TDS Objective in a Management Zone



5.0 CV-SNMP DEVELOPMENT WORKPLAN IMPLEMENTATION

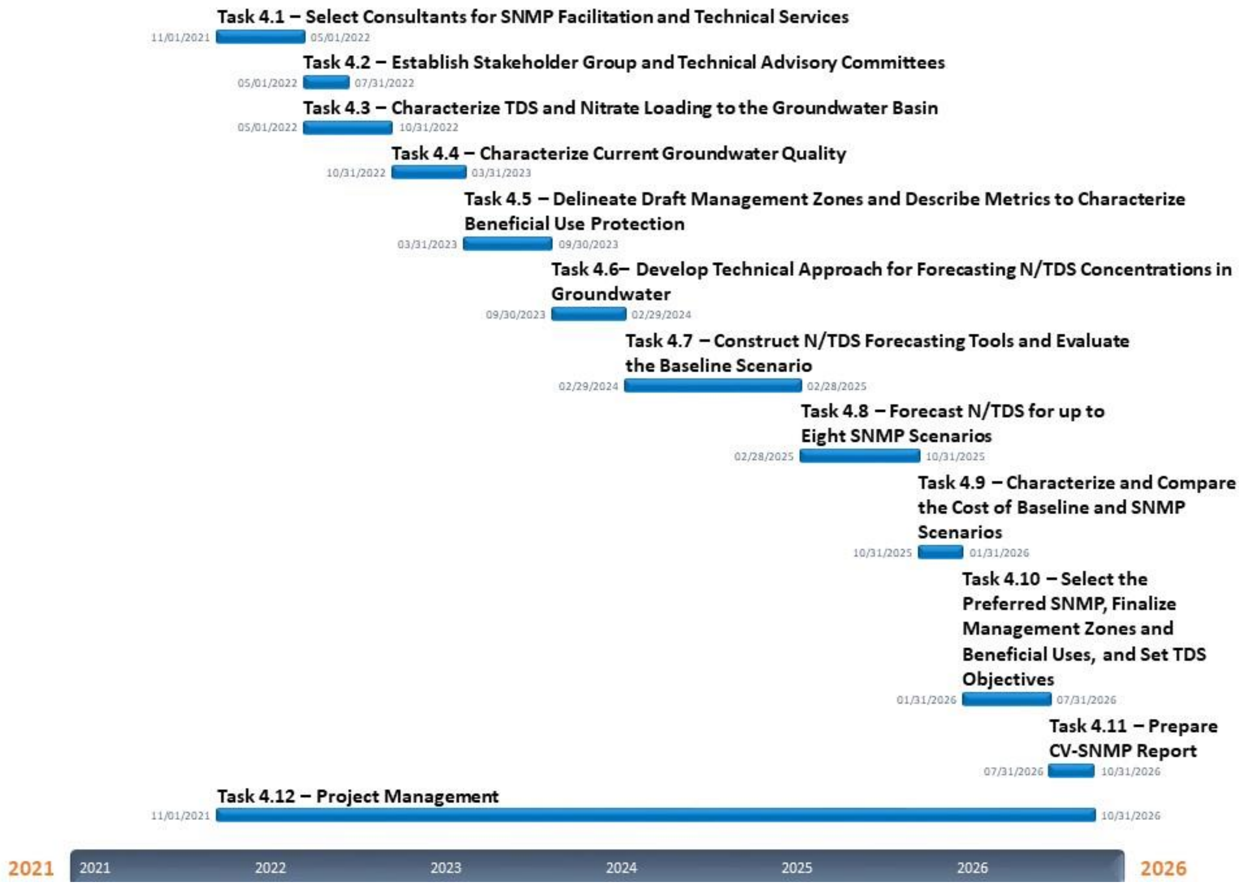
5.1 Schedule

The schedule of activities to implement the CV-SNMP Development Workplan is shown in **Table 5-1** and **Figure 5-1** below. The schedule assumes that Task 4.1 begins on November 1, 2021. The CV-SNMP Agencies are developing a Memorandum of Understanding (MOU) to implement this CV-SNMP Development Workplan.

Table 5-1. CV-SNMP Development Workplan Implementation Schedule

Task	Task Duration	Task Completion Date
Task 4.1 – Select Consultants for CV-SNMP Facilitation and Technical Services	6 months	May 1, 2022
Task 4.2 – Establish CV-SNMP Stakeholder Group and Technical Advisory Committees	3 months	July 31, 2022
Task 4.3 – Characterize N/TDS Loading to the Groundwater Basin	6 months	October 31, 2022
Task 4.4 – Characterize Current Groundwater Quality	5 months	March 31, 2023
Task 4.5 – Delineate Draft Management Zones and Describe Metrics to Characterize Beneficial Use Protection	6 months	September 30, 2023
Task 4.6– Develop Technical Approach for Forecasting N/TDS Concentrations in Groundwater	5 months	February 29, 2024
Task 4.7 –Construct N/TDS Forecasting Tools and Evaluate Baseline Scenario	12 months	February 28, 2025
Task 4.8 – Forecast N/TDS for CV-SNMP Scenarios	8 months	October 31, 2025
Task 4.9 – Characterize and Compare the Cost of Baseline and CV-SNMP Scenarios	3 months	January 31, 2026
Task 4.10 – Select the Preferred CV-SNMP Scenario, Finalize Management Zones and Beneficial Uses, and Recommend TDS Objectives	6 months	July 30, 2026
Task 4.11 – Prepare Final CV-SNMP	3 months	October 30, 2026
Task 4.12 – Project Management	Throughout	

Figure 5-1. Implementation of the CV-SNMP Development Workplan



5.2 Progress Reporting to the Regional Board

To keep the Regional Board informed of progress and future activities during implementation of the CV-SNMP Development Workplan, the CV-SNMP Agencies will add a section to the annual progress report that will be submitted to the Regional Board for the Groundwater Monitoring Program Workplan. The annual progress report will be retitled: *Annual Progress Report on Implementation of the CV-SNMP Groundwater Monitoring Program and CV-SNMP Development Workplan.* It will be submitted to the Regional Board by March 31 of each year of implementation. The first annual progress report will be due by March 31, 2022 to report progress achieved during calendar year 2021.

5.3 Cost Estimates

This section summarizes the total costs to implement the CV-SNMP Development Workplan as described in Section 4 and to implement the CV-SNMP Groundwater Monitoring Program Workplan as described in Section 3.

Total Costs to implement the CV-SNMP Development Workplan. **Table 5-2** below summarizes the cost estimates by major task for the implementation of the CV-SNMP Development Workplan (excluding the costs to implement the CV-SNMP Groundwater Monitoring Program). The costs in **Table 5-2** are first-order estimates for work performed by the consultant(s) and are based on the 2021 rates for West Yost

Associates. Total costs to prepare the final CV-SNMP are estimated to be about $2,870,000, which does not include the costs associated with CV-SNMP Agency staff efforts.

Table 5-2. Cost Estimates to Implement the CV-SNMP Development Workplan

Task	Cost
Task 4.1 – Select Consultants for CV-SNMP Facilitation and Technical Services	$0
Task 4.2 – Establish CV-SNMP Stakeholder Group and Technical Advisory Committees	$25,000
Task 4.3 – Characterize N/TDS Loading to the Groundwater Basin	$150,000
Task 4.4 – Characterize Current Groundwater Quality	$150,000
Task 4.5 – Delineate Draft Management Zones and Describe Metrics to Characterize Beneficial Use Protection	$200,000
Task 4.6 – Develop Technical Approach for Forecasting N/TDS Concentrations in Groundwater	$130,000
Task 4.7 – Construct N/TDS Forecasting Tools and Evaluate Baseline Scenario	$850,000
Task 4.8 – Forecast N/TDS for up to Eight CV-SNMP Scenarios	$500,000
Task 4.9 – Characterize and Compare the Cost of Baseline and CV-SNMP Scenarios	$200,000
Task 4.10 – Select the Preferred CV-SNMP Scenario, Finalize Management Zones and Beneficial Uses, and Recommend TDS Objectives	$200,000
Task 4.11 – Prepare Final CV-SNMP	$75,000
Task 4.12 – Project Management	$80,000
Task 5.2 – Progress Reporting to the Regional Board	$50,000
Contingency (10%)	$260,000
Total	**$2,870,000**

Total Costs to implement the CV-SNMP Groundwater Monitoring Program Workplan. **Table 5-3** summarizes the cost estimates by task and subtask for the first six-year period of monitoring program implementation. Total costs for the first six-year period of monitoring program implementation are estimated to be about $4,100,000 (including a contingency of 25%). Total costs are likely to be higher because these estimates do not include land acquisition, site improvement costs for new monitoring well sites, or CV-SNMP Agency staff efforts.

Table 5-3. Cost Estimates to Implement the CV-SNMP Groundwater Monitoring Program

Task	Cost by Sub-Task	Cost by Task
Task 1 – Sampling and Analysis of Private Wells		*$260,175*
Perform field canvass of private wells; develop access agreements	$21,001	
Development/execution of private well access agreements	$79,924	
Devise and construct and wellhead improvements to enable sample collection	$103,733	
Perform two sampling and laboratory analysis events over the five-year period	$55,518	
Task 2 – Filling of Gaps in the Monitoring Network		*$2,858,957*

Table 5-3. Cost Estimates to Implement the CV-SNMP Groundwater Monitoring Program

Task	Cost by Sub-Task	Cost by Task
Perform field work and research; prepare plan to fill gaps in monitoring network	$53,776	
Prepare well-siting study to identify 23 well sites	$50,828	
Prepare technical specifications for of two monitoring well types	$32,378	
Acquire well sites and/or execute lease agreements	$14,996	
Conducting a bid process to select a well drilling/construction subcontractor	$6,172	
Obtain permits and CEQA clearance	$27,899	
Drill, construct, and develop six wells in the Perched aquifer system	$231,144	
Drill, construct, and develop 16 wells in the Shallow aquifer system	$1,999,104	
Drill, construct, and develop one deep monitoring well	$216,294	
Prepare well completion reports for 23 new monitoring wells/file with DWR	$226,366	
Task 3 - Preparing Annual Progress Reports to the Regional Board		*$139,800*
Subtotal		*$3,258,932*
Contingency (25%)		*$814,733*
Total		**$4,073,665**

Appendix A

Groundwater Monitoring Program Workplan

Coachella Valley Salt and Nutrient Management Plan Update

(Approved by Regional Board on February 21, 2021)

FINAL REPORT | DECEMBER 23, 2020

Groundwater Monitoring Program Workplan
Coachella Valley Salt and Nutrient Management Plan Update

PREPARED FOR

The Coachella Valley SNMP Agencies

PREPARED BY

WEST YOST
Water. Engineered.

Groundwater Monitoring Program Workplan
Coachella Valley Salt and Nutrient Management Plan Update

Prepared for

The Coachella Valley SNMP Agencies

Project No. 943-80-20-01

PROFESSIONAL GEOLOGIST
ANDREW
EARL
MALONE
No. 8700
STATE OF CALIFORNIA

Project Manager: Andrew E. Malone, PG — 12/23/2020 Date

QA/QC Review: Samantha Adams — 12/23/2020 Date

WEST YOST
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FINAL REPORT | DECEMBER 23, 2020

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LIST OF ACRONYMS AND ABBREVIATIONS

CPS	City of Palm Springs
CV-SNMP	Salt and Nutrient Management Plan for the Coachella Valley Groundwater Basin
CVSC	Coachella Valley Stormwater Channel
CVWD	Coachella Valley Water District
CWA/CSD	Coachella Water Authority and Coachella Sanitary District
DWA	Desert Water Agency
DWR	California Department of Water Resources
ft-bgs	Feet below ground surface
IWA	Indio Water Authority
GAMA	Groundwater Ambient Monitoring & Assessment
MC-GRF	Mission Creek Groundwater Replenishment System
MDMWC	Myoma Dunes Mutual Water Company
MOU	Memorandum of Understanding
MSWD	Mission Springs Water District
PD-GRF	Palm Desert Groundwater Replenishment Facility
POTW	Publicly Owned Treatment Works
TDS	Total Dissolved Solids
TEL-GRF	Thomas E. Levy Groundwater Replenishment Facility
USGS	United States Geological Survey
VSD	Valley Sanitary District
WRP	Water Reclamation Plant
WW-GRF	White Water Groundwater Replenishment Facility

1.0 BACKGROUND AND OBJECTIVES

The Salt and Nutrient Management Plan for the Coachella Valley Groundwater Basin (CV-SNMP) must include a monitoring and reporting program pursuant to Section 6.2.4.1 of the 2018 Recycled Water Policy (Policy):

> 6.2.4.1. A basin- or subbasin-wide monitoring plan that includes an appropriate network of monitoring locations to provide a reasonable, cost effective means of determining whether the concentrations of salts, nutrients, and other constituents of concern as identified in the salt and nutrient management plans are consistent with applicable water quality objectives. The number, type, and density of monitoring locations to be sampled and other aspects of the monitoring program shall be dependent upon basin-specific conditions and input from the regional water board. Salts, nutrients, and the constituents identified in 6.2.1.1 shall be monitored. The frequency of monitoring shall be proposed in the salt and nutrient management plan for review by the regional water board pursuant to 6.2.3.
>
>> 6.2.4.1.1. The monitoring plan must be designed to effectively evaluate water quality in the basin. The monitoring plan must focus on water supply wells, areas proximate to large water recycling projects, particularly groundwater recharge projects, and other potential sources of salt and nutrients identified in the salt and nutrient management plan. Also, monitoring locations shall, where appropriate, target groundwater and surface waters where groundwater has connectivity with adjacent surface waters.
>>
>> 6.2.4.1.2. The monitoring plan may include water quality data from existing wells where the wells are located and screened appropriately to determine water quality throughout the most critical areas of the basin. The State Water Board supports monitoring approaches that leverage the use of groundwater monitoring wells from other regulatory programs, such as the Irrigated Lands Regulatory Program and the Sustainable Groundwater Management Act.
>>
>> 6.2.4.1.3. The monitoring plan shall identify those stakeholders responsible for conducting, compiling, and reporting the monitoring data. Where applicable, the regional water board will assist by encouraging other dischargers in the basin or subbasin to participate in the monitoring program. The data shall be electronically reported annually in a format that is compatible with a Groundwater Ambient Monitoring & Assessment (GAMA) information system and must be integrated into the GAMA information system or its successor.

In its evaluation of the 2015 CV-SNMP, the Colorado River Basin Regional Water Quality Control Board (Regional Board) perceived insufficiencies in the proposed monitoring program, including: (i) a lack of data necessary to characterize groundwater quality in all areas and sub-areas of the basin; (ii) a lack of data in critical areas of salt loading (e.g., water recycling and recharge projects); and (iii) it did not propose a plan/timeline to fill the data gaps (Regional Board letter; February 19, 2020). Hence, the Regional Board is requiring the CV-SNMP stakeholders (CV-SNMP Agencies) to prepare a revised Groundwater Monitoring Program Workplan (Workplan) for the Coachella Valley Groundwater Basin (Basin) by December 2020 (Regional Board letter; April 27, 2020).

The CV-SNMP Agencies include: Coachella Valley Water District (CVWD); Coachella Water Authority and Coachella Sanitary District (CWA/CSD); Desert Water Agency (DWA); Indio Water Authority (IWA); Myoma Dunes Mutual Water Company (MDMWC); Valley Sanitary District (VSD); Mission Springs Water District (MSWD); and City of Palm Springs (CPS).

To achieve the requirements of the Policy and address the concerns of the Regional Board, this Workplan describes the following:

1. The physical setting of the Coachella Valley which includes the basic hydrology and hydrogeology of the Basin and its subbasins. The physical understanding of how the groundwater basin functions is necessary to select a monitoring network that is capable of characterizing groundwater quality in all areas and subareas of the Basin, both spatially and vertically.
2. An initial sampling network, including the locations planned for sampling, justifications for the sampling locations, well construction details, and the SNMP Agencies responsible for conducting monitoring at each site.
3. The existing spatial and vertical gaps in the monitoring network, why the gaps were identified, and how the gaps will be filled.
4. A proposed plan to implement the monitoring program.

2.0 HYDROGEOLOGIC CONCEPTUAL MODEL OF THE BASIN

This section summarizes the physical characteristics and dynamics of the Basin regarding surface water, groundwater, and the origin, fate and transport of salts and nutrients within the Basin. Understanding the physical characteristics and dynamics of the Basin provides the foundation for selecting a monitoring network that will meet the objectives of the Policy.

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

2.1 Basin Setting

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

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

> **Unconsolidated water-bearing sediments**. These are the pervious formations that comprise the Basin.
>
> **Bedrock formations**. These are the semi-consolidated sediments and the consolidated bedrock formations that come to the surface in the hills and mountains that surround and bound the Basin. The permeability of the bedrock formations is much less than the water-bearing sediments.

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

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

2.2 Hydrogeology

2.2.1 Subbasins and Subareas

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

The DWR has defined three main subbasins within the study area that are separated by geologic faults or changes in formation permeability that limit and control the movement of groundwater: the Indio Subbasin (DWR Subbasin 7-021.01), the Mission Creek Subbasin (7-021.02), and the Desert Hot Springs Subbasin (7-021.03).[1] These subbasins have been further subdivided into subareas based on one or more of the following geologic or hydrogeologic characteristics: type(s) of water-bearing formations, water quality, areas of confined groundwater, forebay areas, and groundwater or surface drainage divides.

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

2.2.2 Occurrence and Movement of Groundwater

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

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

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

Indio Subbasin. The Indio Subbasin is bordered on the southwest by the crystalline bedrock of the Santa Rosa and San Jacinto Mountains. It is separated from the Mission Creek Subbasin by the Banning Fault, and from the Desert Hot Springs Subbasin by the San Andreas Fault. Both faults are barriers to

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

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

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

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

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

2.3 Origin, Fate and Transport of Salts and Nutrients

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

2.3.1 Salt and Nutrient Loading

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

- Subsurface inflow from saturated sediments and bedrock fractures in the surrounding mountains and hills and from upgradient groundwater subbasins.
- Recharge of precipitation runoff in unlined stream channels that cross the Basin.
- Artificial recharge of imported Colorado River Water at the Groundwater Replenishment Facilities (GRF).
- Percolation of treated wastewater discharge to unlined ponds.

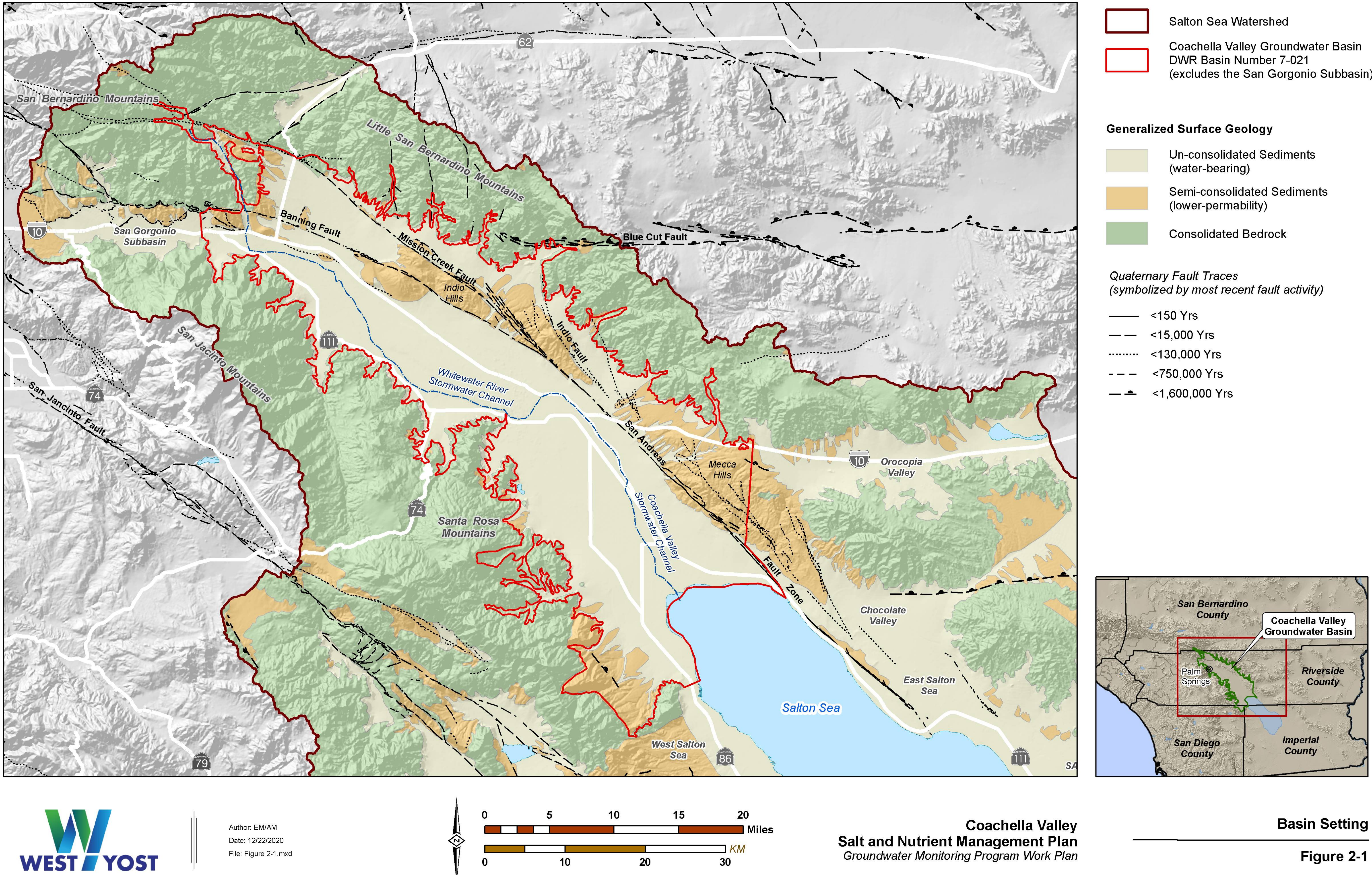
- Seepage from septic systems.
- Return flows from precipitation and irrigation waters applied to the overlying land uses (e.g., agriculture, golf courses, etc.). Loading from return flows is a complex process that is influenced by:
  - The combination of precipitation and irrigation waters that ultimately result in the return flows (and their associated TDS and nitrate concentrations) that migrate past the root zone.
  - During the downward migration of return flows through the unsaturated (vadose) zone, the TDS and nitrate concentrations of the return flows can be influenced by past TDS and nitrate loading to the vadose zone by historical overlying land uses.

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

2.3.2 Transport and Discharge of Salts and Nutrients

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

- Groundwater pumping.
- Discharge to agricultural drains. As described above, throughout the lower Basin, CVWD maintains a network of surface and subsurface drains to convey shallow groundwater away from the crop root zones. These drains convey water to the Coachella Valley Stormwater Channel (CVSC) and 26 smaller open channel drains that discharge directly to the Salton Sea.
- Subsurface outflow to downgradient subbasins. In the Indio Subbasin, subsurface outflow occurs to groundwater beneath the Salton Sea.
- Phreatophyte consumptive use.



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Date: 12/22/2020
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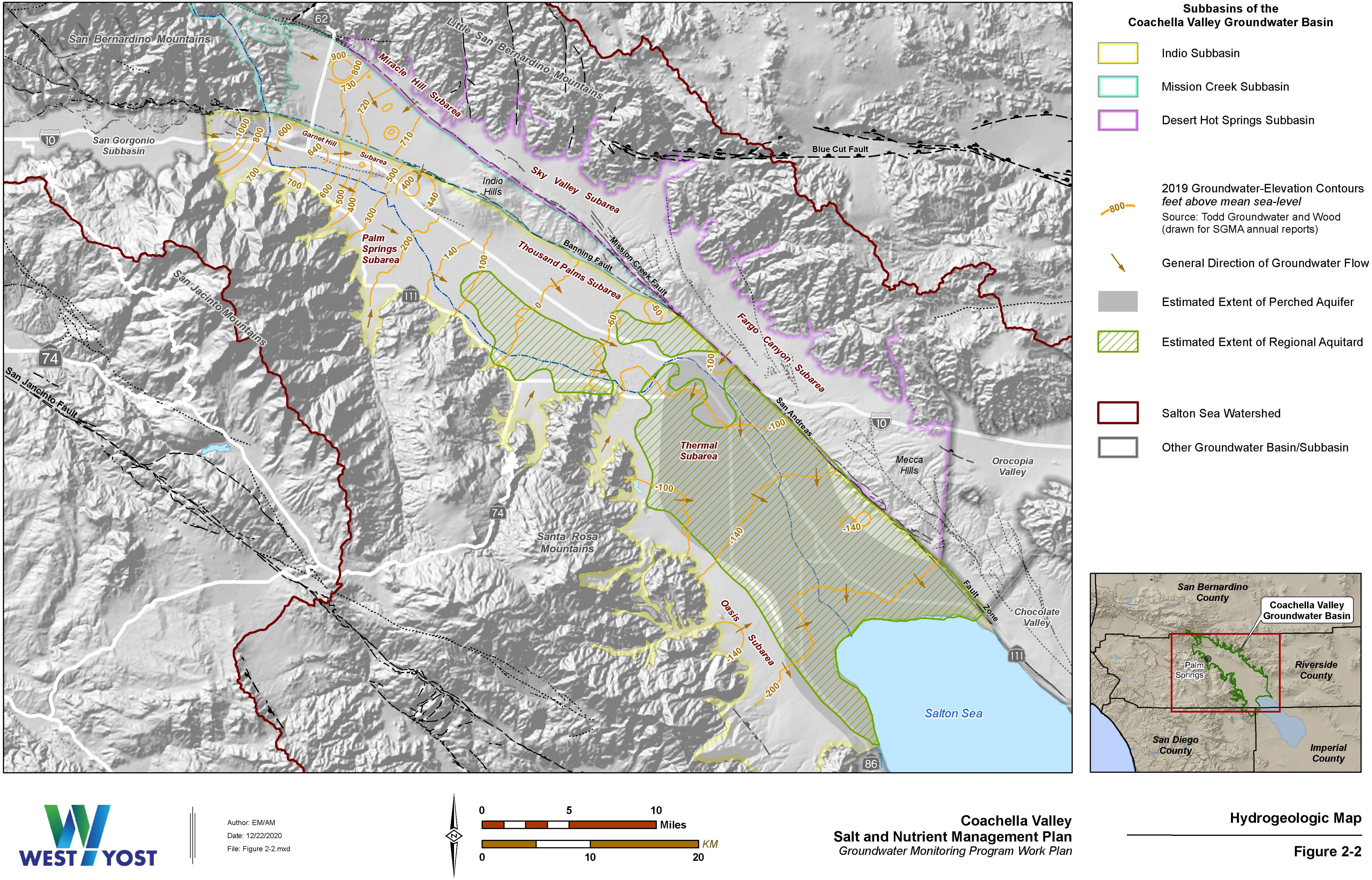
Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Basin Setting

Figure 2-1



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Date: 12/22/2020
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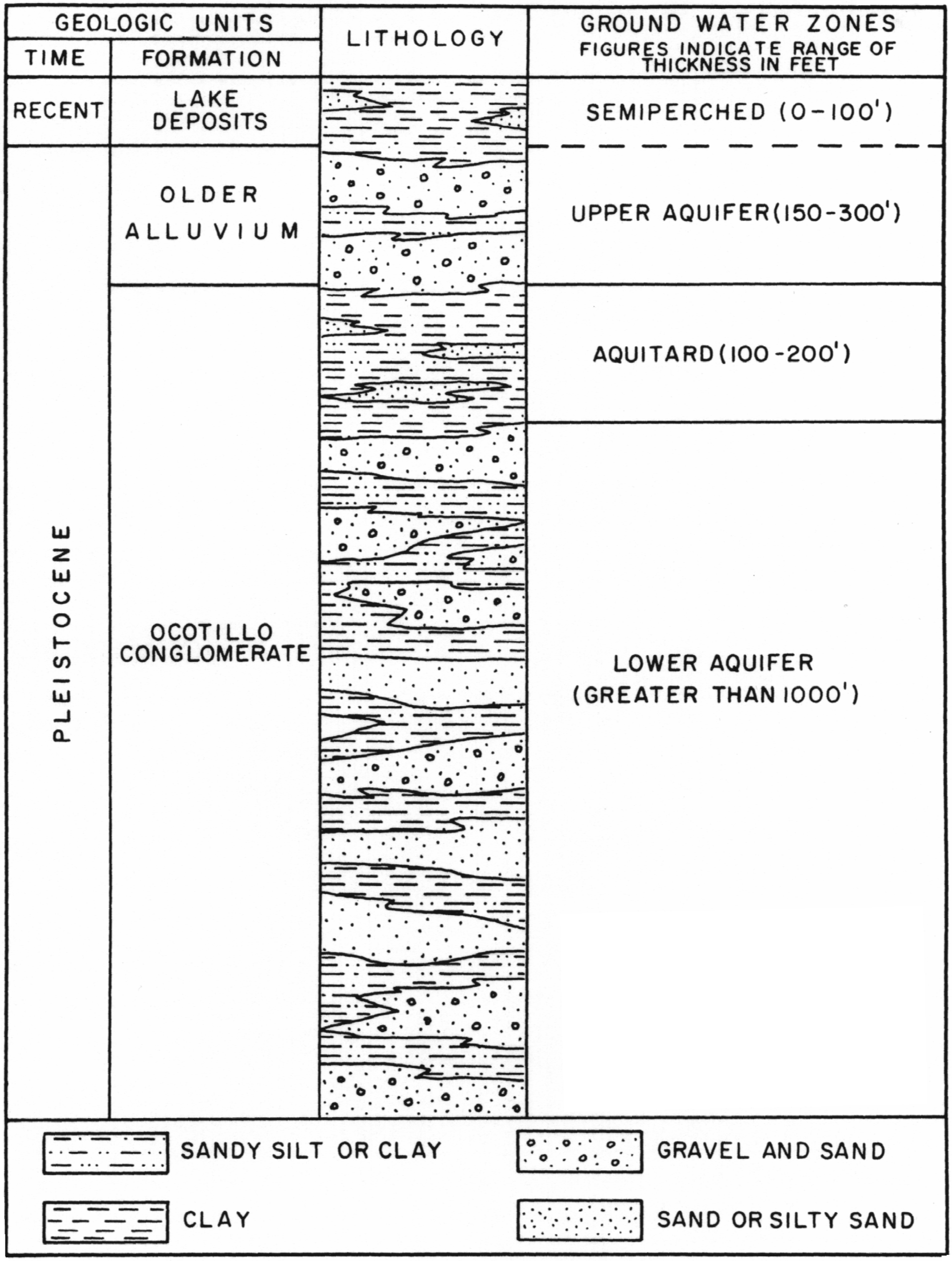
Coachella Valley
Salt and Nutrient Management Plan
Groundwater Monitoring Program Work Plan

Hydrogeologic Map

Figure 2-2

Figure 2-3
Generalized Stratigraphic Column in Lower Coachella Valley



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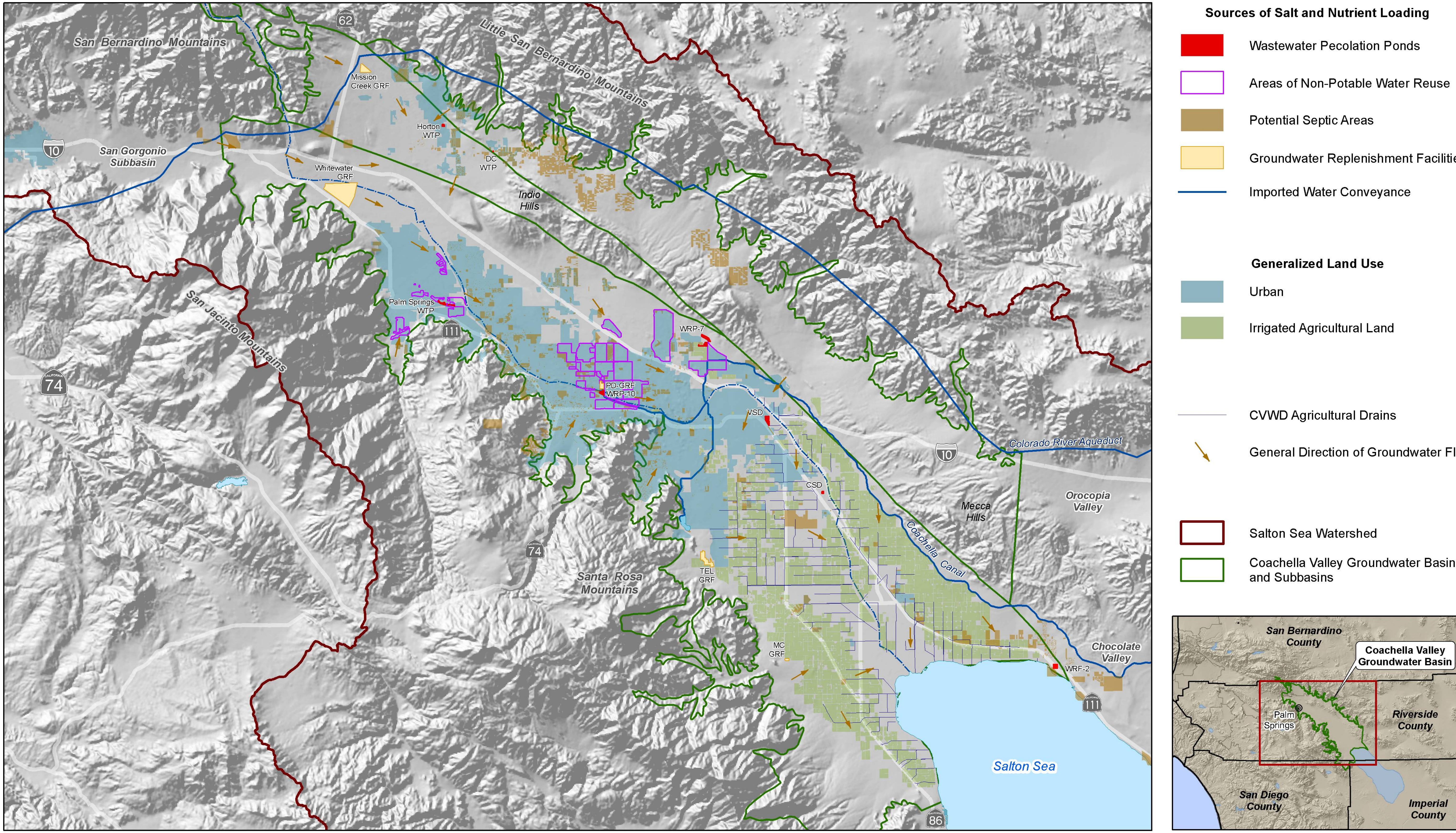

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Author: EM/AM
Date: 12/22/2020
File: Figure 2-4.mxd

0 5 10 Miles
0 10 20 KM

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

Salt and Nutrient Loading, Transport, and Discharge

Figure 2-4

3.0 GROUNDWATER MONITORING PROGRAM

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

- Groundwater Monitoring Network
- Chemical Analytes and Sampling Frequency
- Monitoring and Reporting

3.1 Groundwater Monitoring Network

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

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

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

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

3.1.1 Methods for Selection of the Groundwater Monitoring Network

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

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

3.1.2 Monitoring Network and Gaps – Shallow Aquifer System

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

3.1.3 Monitoring Network and Gaps – Deep Aquifer System

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

3.1.4 Monitoring Network and Gaps – Perched Aquifer System

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

3.2 Chemical Analytes and Sampling Frequency

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

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

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

3.3 Monitoring and Reporting

3.3.1 Groundwater Sampling and Laboratory Analysis

The SNMP Agencies have the following responsibilities for sampling of the wells in the monitoring network (described in Section 3.1) and the laboratory analysis of chemical analytes (described in Section 3.2):

- Municipal well owners are responsible for the groundwater sampling and laboratory analyses for their own wells.
- For private wells within their service area, the overlying SNMP Agency is responsible for coordinating with the private well owners to conduct groundwater sampling and the laboratory analyses. In areas of overlapping jurisdictions of SNMP Agencies, the agencies

must jointly coordinate to assign responsibility for sampling and analysis of private wells that fall within the overlapping jurisdictions. Agency responsibilities may include developing administrative agreements with the well owners (e.g., right-of-entry agreement) and making physical modifications to the wellhead to enable collection of a sample (e.g., installation of a sampling port on the well discharge pipe).

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

3.3.2 Reporting of Laboratory Results

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

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

3.4 Filling of Gaps in the Monitoring Network

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

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

1. Field identification of an existing well that: (i) is located near the identified gap; (ii) can be sampled, and (iii) has well screens across the appropriate depth interval (e.g., across the Shallow aquifer system). This may require the following activities: field canvassing to identify a candidate well; research and/or exploratory well surveys to confirm well screen depth intervals; and constructing any well/wellhead modifications that are necessary to collect groundwater samples.
2. Construction of a new monitoring well with well screens across the appropriate depth interval. This may require the following activities: a well-siting study; well-site acquisition or easement; development of technical specifications for a monitoring well; conducting a bid process to select a well drilling/construction subcontractor; obtaining the necessary permits and CEQA clearance; performing well construction with oversight; performing well development and testing; preparing a well completion report; equipping the well for sampling, and wellhead completion including any needed site improvements.

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

Filling the gaps in the monitoring network is likely the most expensive, complicated element of the monitoring program. Therefore, the filling of gaps will be executed over a six-year period, subject to funding availability. The SNMP Agencies will pursue grant funding to support the filling of gaps under State-run programs such as Integrated Regional Water Management and the Sustainable Groundwater Management Act. The SNMP Agencies also are developing a Memorandum of Understanding (MOU) to implement the CV-SNMP Monitoring Program Workplan. The MOU will assign responsibilities and cost-sharing agreements between the SNMP Agencies for the filling of the gaps in the monitoring network.

By March 31 of each year, the SNMP Agencies will report to the Regional Board on progress made toward the filling the gaps in the monitoring network over the preceding calendar year (see Section 4.2 below).

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

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

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

Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Justification for Inclusion in SNMP Monitoring Program
52	03S04E17K01S	Valley View MWC	03S04E17K01S	Undetermined	Unknown	340-375	S	Cross-gradient from Whitewater GRF in Garnet Hill subarea
53	03S04E22A01S	Erin Miner	03S04E22A01S	Active	Unknown	180-230	S	Downgradient of Whitewater GRF in Garnet Hill subarea; upgradient of West Valley WWTP
54	03S05E08P02S	Bluebeyond Fisheries	03S05E08P02S	Active	Fish Farm	200-400	S	Central Mission Creek subbasin; near golf course and septic areas
55	03S05E15N01S	Too Many Palms LLC	03S05E15N01S	Active	Irrigation	158-320	S	Distal area in Mission Creek subbasin; downgradient of DHS subbasin
56	03S05E18J01S	Desert Dunes Golf Club	03S05E18J01S	Active	Irrigation	76-340	S	Upgradient of Garnet Hill subarea; near golf course and septic areas
57	03S06E21G01S	Sky Valley Mobile Home Park	03S06E21G01S	Undetermined	Unknown	188-248	S	Western portion of Sky Valley subarea; near septic areas
58	04S05E04F01S	So Pacific Trans Co #32601	04S05E04F01S	Active	Irrigation	276-576	S	Eastern edge of Indio subbasin; downgradient from Garnet Hill subarea; near septic areas
59	04S05E23F01S	Westin Mission Hills Resort	04S05E23F01S	Active	Irrigation	275-1165	S	Center of Indio subbasin; near golf courses and septic areas
60	04S05E34C01S	Manufacture Home Community Inc	04S05E34C01S	Active	Irrigation	240-500	S	Western edge of Indio subbasin; near septic and areas served NPW
61	04S05E35Q01S	Tamarisk Country Club	04S05E35Q01S	Active	Irrigation	171-518	S	Western edge of Indio subbasin; near septic and areas served NPW
62	04S05E36L02S	Annenberg Estate	04S05E36L02S	Active	Irrigation	252-650	S	Center of Indio subbasin; near golf, septic, and areas served NPW
63	04S06E20C01S	Shenandoah Ventures LP	04S06E20C01S	Inactive	Irrigation	250-790	S	Upgradient in Thousand Palms area; upgradient of septic areas
66	05S05E12D01S	Thunderbird Country Club	05S05E12D01S	Active	Irrigation	125-360	S	Western edge of Indio subbasin; near septic and areas served NPW
67	05S06E12M01S	Palm Desert Resort Country Club	05S06E12M01S	Active	Irrigation	140-650	S	Center of Indio subbasin; near areas served NPW
68	05S07E08Q01S	Bermuda Dunes Airport	05S07E08Q01S	Active	Domestic	203-654	S	Center of Indio subbasin; near areas served NPW
69	05S07E28H02S	Tricon/COB Riverdale LP	05S07E28H02S	Active	Domestic	162-636	S	Center of Indio subbasin
70	05S08E28M02S	JS Cooper	05S08E28M02S	Undetermined	Unknown	208-268	S	Eastern edge of Indio subbasin; downgradient of VSD discharge point
71	05S08E30N03S	Carver Tract Mutual Water Co	05S08E30N03S	Active	Domestic	270-330	S	Eastern portion of Indio subbasin; downgradient from VSD plant
72	06S07E07B01S	Traditions Golf Club	06S07E07B01S	Active	Irrigation	200-480	S	Downgradient from The Cove; near golf courses and septic areas
73	06S08E02L01S	Prime Time International	06S08E02L01S	Undetermined	Irrigation	216-407	S	Eastern edge of Indio subbasin; near agriculture; upgradient from CWA/CSD WWTP
74	06S08E05K01S	Peter Rabbit Farms	06S08E05K01S	Active	Irrigation	126-375	S	Eastern portion of Indio subbasin in Coachella
75	06S08E32L01S	Guillermo Torres	06S08E32L01S	Undetermined	Unknown	127-227	S	Downgradient from TEL-GRF; agricultural area
76	07S08E27A01S	Gimmway Enterprises Inc	07S08E27A01S	Active	Domestic	147-215	S	Downgradient from Martinez Canyon GRF; near septic areas
77	07S09E14C01S	Tudor Ranch Inc.	07S09E14C01S	Active	Domestic	93-290	S	Southeastern corner of Indio subbasin; near agriculture and septic areas; near Salton Sea
78	08S08E15G02S	Thermiculture Management LLC	08S08E15G02S	Active	Irrigation	260-500	S	Southern corner of Indio subbasin; near agriculture; near Salton Sea
79		Mission Springs Water District	Well 25	Active	MUN	330-455	S	Monitoring of subsurface inflow from San Gorgonio Pass subbasin
80		Mission Springs Water District	Well 1	Inactive	Monitoring		S	Northern Miracle Hill subarea; upgradient of Mission Creek subbasin
81		Mission Springs Water District	Horton WWTP MW-1	Active	Monitoring	186-236	S	Monitoring wells upgradient and downgradient of the Horton WWTP
82		Mission Springs Water District	Horton WWTP MW-2	Active	Monitoring	220-270	S	Monitoring wells upgradient and downgradient of the Horton WWTP
83		Mission Springs Water District	Horton WWTP MW-3	Active	Monitoring	200-250	S	Monitoring wells upgradient and downgradient of the Horton WWTP

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

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

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

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

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

Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Justification for Inclusion in SNMP Monitoring Program
135	05S07E15N01S	Indio Water Authority	Well AA	Active	MUN	550-1230	D	Center of Indio subbasin; downgradient from areas served NPW
136	05S07E19A01S	Coachella Valley Water District	CVWD Well 5708-1	Inactive	MUN	450-970	D	Western portion of Indio subbasin; near golf courses and areas served NPW
137	05S07E20J01S	Indio Water Authority	Well T	Active	MUN	580-1305	D	Western portion of Indio subbasin; near golf courses and areas served NPW
138	05S07E26E02S	Indio Water Authority	Well 3B	Active	MUN	500-1200	D	Center of Indio subbasin
139	05S07E27P01S	Indio Water Authority	Well Z	Active	MUN	580-1290	D	Center of Indio subbasin
140	05S07E33E01S	Indio Water Authority	Well S	Active	MUN	460-1260	D	Western portion of Indio subbasin; near golf courses and septic areas
141	05S07E34P04S	Indio Water Authority	Well V	Active	MUN	460-1270	D	Western portion of subbasin; near golf courses and septic areas
142	05S07E35R02S	Indio Water Authority	Well U	Active	MUN	480-1190	D	Center of Indio subbasin
143	05S07E36D03S	Coachella Water Authority	Well 19	Active	MUN	650-1250	D	Center of Indio subbasin
144	05S08E31C03S	Coachella Water Authority	Well 11	Active	MUN	513-818	D	Eastern portion of Indio subbasin; downgradient from VSD plant
145	06S07E06B01S	Coachella Valley Water District	CVWD Well 6701-1	Active	MUN	580-800	D	Downgradient from The Cove; near golf courses and septic areas
146	06S07E22B02S	Coachella Valley Water District	CVWD Well 6726-1	Active	MUN	640-1160	D	North/downgradient of TEL-GRF; near golf courses, septic, and agricultural areas
147	06S07E34A01S	Coachella Valley Water District	CVWD Well 6728-1	Active	MUN	500-750	D	Downgradient from TEL-GRF; near golf courses
148	06S07E34D01S	Coachella Valley Water District	CVWD Well 6729-1	Active	MUN	500-780	D	Directly north/downgradient of TEL-GRF
149	06S08E06K02S	Coachella Water Authority	Well 12	Active	MUN	500-1010	D	Eastern portion of Indio subbasin
150	06S08E09N02S	Coachella Water Authority	Well 16	Active	Monitoring	480-730	D	Eastern portion of Indio subbasin; upgradient from CWA/CSD WWTP
151	06S08E19D05S	Coachella Valley Water District	CVWD Well 6808-1	Active	MUN	675-1200	D	Center of Indio subbasin; near septic and agricultural areas
152	06S08E22D02S	Coachella Valley Water District	CVWD Well 6803-1	Inactive	MUN	500-1100	D	Downgradient from CWA/CSD WWTP; near septic and agricultural areas
153	06S08E25P04S	Coachella Valley Water District	CVWD Well 6807-1	Active	MUN	665-1300	D	Upgradient of WRP-4; downgradient of CWA WWTP; near agriculture and septic areas
154	06S08E28N06S	Coachella Water Authority	Well 18	Active	Monitoring	900-1190	D	Eastern edge of Indio subbasin; downgradient of VSD discharge point
155	07S08E17A04S	Coachella Valley Water District	CVWD Well 7803-1	Active	MUN	250-710	D	Downgradient from TEL-GRF; in agricultural and septic areas
156	07S09E23N01S	Coachella Valley Water District	CVWD Well 7990-1	Inactive	Unknown	530-560	D	Southeastern corner of the basin; near agricultural and septic areas; near Salton Sea
157		Indio Water Authority	Well 13A	Active	Irrigation	550-1171	D	East in subbasin; downgradient from WRP-7 ponds and NPR areas
158	03S05E08B01S	R.C Roberts	03S05E08B01S	Undetermined	Irrigation	356-516	D	Downgradient of DHS subbasin; near golf course and septic areas
159	03S05E17M01S	Desert Dunes Golf Club	03S05E17M01S	Active	Unknown	305-412	D	Upgradient of Garnet Hill subarea; near golf course and septic areas
160	03S05E20H02S	Donald Franklin	03S05E20H02S	Active	Irrigation	240-360	D	Distal area in Mission Creek subbasin; upgradient of Garnet Hill subarea; near septic
161	03S06E21R01S	Joel Rosenfeld	03S06E21R01S	Undetermined	Irrigation	355-495	D	Western portion of Sky Valley subarea; near septic
162	05S05E12B03S	Tandika Corp	05S05E12B03S	Active	Irrigation	410-800	D	Western edge of Indio subbasin; near NPR and septic areas
163	05S06E13F01S	PD Golf Operations LLC	05S06E13F01S	Active	Irrigation	400-700	D	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
164	05S06E15H01S	Toscana Country Club	05S06E15H01S	Active	Irrigation	430-950	D	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
165	05S06E22C02S	Desert Horizons Country Club	05S06E22C02S	Active	Irrigation	550-990	D	Downgradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
166	05S06E27A01S	El Dorado Country Club	05S06E27A01S	Active	MUN	458-596	D	South/cross-gradient of WRP-10/PD-GRF; near golf, septic, and areas served NPW
167	05S06E29P04S	Bighorn Golf Club	05S06E29P04S	Active	MUN	530-720	D	Upgradient of Palm Desert; near golf courses and septic areas
168	05S07E07F04S	Myoma Dunes Mutual Water Company	Well 4	Active	MUN	430-730	D	Center of Indio subbasin; near areas served NPW
169	05S07E08L01S	Myoma Dunes Mutual Water Company	Well 11	Active	Unknown	500-1060	D	Center of Indio subbasin; near areas served NPW
170	05S07E17K01S	Myoma Dunes Mutual Water Company	Well 12	Active	Irrigation	450-950	D	Center of Indio subbasin; near areas served NPW
171	05S08E09N03S	Jamie Brack	05S08E09N03S	Undetermined	Unknown	480-580	D	Downgradient of septic areas in Fargo subarea; upgradient of Indio subbasin
172	06S07E27B01S	Andalusia Golf Club	06S07E27B01S	Active	Irrigation	300-780	D	Downgradient of TEL-GRF; near golf course and agricultural areas
173	06S07E35L02S	Castro Bros	Castro Bros	Active	Unknown	300-400	D	Downgradient from TEL-GRF; near golf courses and agricultural areas
174	06S08E11A01S	Cocopah Nurseries Inc	06S08E11A01S	Active	Unknown	400-842	D	Eastern edge of Indio subbasin; near agriculture; upgradient from CWA/CSD WWTP
175	06S08E31P01S	Deer Creek	Deer Creek	Active	Irrigation	400-550	D	Downgradient from TEL-GRF, in agricultural area
176	06S08E35E02S	Otto L. Zahler	06S08E35E02S	Undetermined	Unknown	521-596	D	Center of Indio subbasin; directly upgradient of WRP-4; in agricultural area
177	07S07E02G02S	Warren Webber	Warren Webber	Active	Irrigation	380-700	D	Downgradient from TEL-GRF; in agricultural area
178	07S08E01L02S	Bill Wordon	07S08E01L02S	Undetermined	Domestic	500-880	D	Center of Indio subbasin; downgradient of WRP-4, in agricultural area
179	07S08E27A02S	Gimmway Enterprises Inc	07S08E27A02S	Active	MUN	491-811	D	Downgradient from Martinez Canyon GRF; in agricultural area
180	07S09E10F01S	Prime Time International	07S09E10F01S	Active	Unknown	360-500	D	Southeast Indio subbasin; in agricultural area; near Salton Sea
181		Mission Springs Water District	Well 31	Active	MUN	270-670	D	Upgradient of Garnet Hill subarea; near potential septic areas in N. Palm Springs

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

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

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

Table 3-3. SNMP Groundwater Monitoring Network -- *Perched Aquifer System*								
Map_ID	SWN	Well Owner	Well Name	Well Status[(a)]'	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Justification for Inclusion in SNMP Monitoring Program
182		Coachella Valley Water District	WRP2 MW3	Active	Monitoring	<90	P	At WRP-2; represents subsurface discharge to Salton Sea
183	06S07E27J03S	Coachella Valley Water District	TEL-GRF MW-8	Active	Monitoring	25-45	P	North/downgradient of TEL-GRF; near golf course and agriculture
184	06S07E34A03S	Coachella Valley Water District	TEL-GRF MW-9	Active	Monitoring	25-45	P	Downgradient from TEL-GRF and golf course
185	06S08E31R01S	Coachella Valley Water District	TEL-GRF MW-10	Active	Monitoring	25-45	P	Downgradient from TEL-GRF; agricultural area
186	07S08E06P01S	Coachella Valley Water District	TEL-GRF MW-11	Active	Monitoring	25-45	P	Downgradient from TEL-GRF; agricultural area
187		Coachella Valley Water District	PEW-1	Active	Monitoring	10-55	P	At WRP-4; agricultural area

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

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

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

Table 3-4. Gaps in SNMP Groundwater Monitoring Network

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

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

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

Table 3-5. Analyte List for the SNMP Groundwater Monitoring Program

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

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

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

Table 3-6. Responsibilities for Groundwater Sampling and Laboratory Analyses								
Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Overlying SNMP Agency[d]
61	04S05E35Q01S	Tamarisk Country Club	04S05E35Q01S	Active	Irrigation	171-518	S	CVWD
62	04S05E36L02S	Annenberg Estate	04S05E36L02S	Active	Unknown	252-650	S	CVWD
63	04S06E20C01S	Shenandoah Ventures LP	04S06E20C01S	Inactive	Irrigation	250-790	S	CVWD
66	05S05E12D01S	Thunderbird Country Club	05S05E12D01S	Active	Domestic	125-360	S	CVWD
67	05S06E12M01S	Palm Desert Resort Country Club	05S06E12M01S	Active	Domestic	140-650	S	CVWD
68	05S07E08Q01S	Bermuda Dunes Airport	05S07E08Q01S	Active	Unknown	203-654	S	CVWD, MDMWC
69	05S07E28H02S	Tricon/COB Riverdale LP	05S07E28H02S	Active	Domestic	162-636	S	CVWD, IWA, VSD
70	05S08E28M02S	JS Cooper	05S08E28M02S	Undetermined	Irrigation	208-268	S	CVWD, CWA/CSD
71	05S08E30N03S	Carver Tract Mutual Water Co	05S08E30N03S	Active	Irrigation	270-330	S	CVWD, VSD
72	06S07E07B01S	Traditions Golf Club	06S07E07B01S	Active	Irrigation	200-480	S	CVWD
73	06S08E02L01S	Prime Time International	06S08E02L01S	Undetermined	Unknown	216-407	S	CVWD, CWA/CSD
74	06S08E05K01S	Peter Rabbit Farms	06S08E05K01S	Active	Domestic	126-375	S	CVWD, CWA/CSD
75	06S08E32L01S	Guillermo Torres	06S08E32L01S	Undetermined	Domestic	127-227	S	CVWD
76	07S08E27A01S	Gimmway Enterprises Inc	07S08E27A01S	Active	Irrigation	147-215	S	CVWD
77	07S09E14C01S	Tudor Ranch Inc.	07S09E14C01S	Active	MUN	93-290	S	CVWD
78	08S08E15G02S	Thermiculture Management LLC	08S08E15G02S	Active	Monitoring	260-500	S	CVWD
79		Mission Springs Water District	Well 25	Active	Monitoring	330-455	S	MSWD
80		Mission Springs Water District	Well 1	Inactive	Monitoring		S	MSWD
81		Mission Springs Water District	Horton WWTP MW-1	Active	Monitoring	186-236	S	MSWD
82		Mission Springs Water District	Horton WWTP MW-2	Active	Monitoring	220-270	S	MSWD
83		Mission Springs Water District	Horton WWTP MW-3	Active	Monitoring	200-250	S	MSWD
84	03S04E20F02S	USGS	335348116352702	Active	Monitoring	850-890	D	CVWD
85	03S04E20J03S	USGS	335339116345303	Active	Monitoring	850-890	D	CVWD
86	06S07E33G01S	Coachella Valley Water District	TEL-GRF MW-21D	Active	Monitoring	390-410	D	CVWD
87	06S07E33J01S	Coachella Valley Water District	TEL-GRF MW-22D	Active	Monitoring	520-540	D	CVWD
88	06S07E34N02S	Coachella Valley Water District	TEL-GRF MW-23D	Active	Monitoring	525-545	D	CVWD
89	07S09E30R03S	Coachella Valley Water District	Peggy	Active	MUN	730-770	D	CVWD
90	08S09E07N02S	Coachella Valley Water District	Rosie	Active	MUN	720-780	D	CVWD
91	05S07E24L03S	Indio Water Authority	Well 1E	Active	MUN	552-815	D	IWA
92	02S04E28J01S	Mission Springs Water District	Well 35	Active	Monitoring	725-1020	D	MSWD
93	02S04E36P01S	Mission Springs Water District	Well 37	Active	MUN	450-1080	D	MSWD
94	02S05E31H01S	Mission Springs Water District	Well 5	Inactive	Unknown	274-784	D	MSWD
95	03S03E07D01S	Mission Springs Water District	Well 25A	Active	MUN	500-740	D	MSWD
96	03S04E04P01S	CPV Sentinel	03S04E04P01S	Active	MUN		D	DWA, MSWD
97	03S04E11A02S	Mission Springs Water District	Well 32	Active	Unknown	320-980	D	MSWD
98	03S03E08A01S	Mission Springs Water District	Well 26A	Active	MUN	320-600	D	MSWD
99	03S03E10P01S	Unknown	DWA P04	Active	MUN	476-776	D	DWA
100	03S04E14J01S	Mission Springs Water District	Well 33	Active	MUN	360-650	D	MSWD
101	03S04E19L01S	Desert Water Agency	DWA Well 43	Active	MUN	500-900	D	DWA
102	03S04E34H02S	Desert Water Agency	DWA Well 35	Active	MUN	600-1000	D	DWA
103	03S04E36Q01S	Desert Water Agency	DWA Well 38	Active	MUN	620-1000	D	DWA
104	04S04E02B01S	Desert Water Agency	DWA Well 22	Active	MUN	570-1003	D	DWA
105	04S04E11Q02S	Desert Water Agency	DWA Well 18	Standby	MUN	535-948	D	DWA
106	04S04E13C01S	Desert Water Agency	DWA Well 23	Active	MUN	512-912	D	DWA
107	04S04E24E01S	Desert Water Agency	DWA Well 32	Active	MUN	600-1000	D	DWA
108	04S04E24H01S	Desert Water Agency	DWA Well 29	Active	MUN	600-1000	D	DWA
109	04S04E25C01S	Desert Water Agency	DWA Well 39	Active	MUN	580-750	D	DWA
110	04S05E05A01S	Coachella Valley Water District	CVWD Well 4568-1	Active	MUN	800-955	D	CVWD
111	04S05E08N01S	Desert Water Agency	DWA Well 41	Active	MUN	610-1000	D	DWA
112	04S05E09R01S	Coachella Valley Water District	CVWD Well 4567-1	Active	MUN	855-1150	D	CVWD
113	04S05E15G01S	Coachella Valley Water District	CVWD Well 4521-1	Active	MUN	500-800	D	CVWD
114	04S05E17Q02S	Desert Water Agency	DWA Well 31	Active	MUN	600-1000	D	DWA
115	04S05E25D02S	Coachella Valley Water District	CVWD Well 4507-2	Active	MUN	860-1320	D	CVWD
116	04S05E27K01S	Coachella Valley Water District	CVWD Well 4527-1	Active	MUN	850-1155	D	CVWD
117	04S05E29H01S	Desert Water Agency	DWA Well 26	Active	MUN	590-990	D	DWA
118	04S05E35G04S	Coachella Valley Water District	CVWD Well 4504-1	Active	MUN	600-1000	D	CVWD
119	04S06E18Q04S	Coachella Valley Water District	CVWD Well 4630-1	Active	MUN	480-990	D	CVWD
120	04S06E28K04S	Coachella Valley Water District	CVWD Well 4629-1	Active	Monitoring	496-796	D	CVWD

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

Map_ID	SWN	Well Owner	Well Name	Well Status[(a)]	Well Use[(b)]	Screen Interval *ft-bgs*	Depth Code[(c)]	Overlying SNMP Agency[(d)]
121	04S07E31H01S	Coachella Valley Water District	CVWD Well 4722-1	Active	MUN	570-1160	D	CVWD
122	04S07E33L01S	Coachella Valley Water District	WRP7 MW-2D	Active	MUN	245-395	D	CVWD
123	05S06E02C01S	Coachella Valley Water District	CVWD Well 5664-1	Active	MUN	500-930	D	CVWD
124	05S06E06B03S	Coachella Valley Water District	CVWD Well 5630-1	Active	Monitoring	455-890	D	CVWD
125	05S06E09A01S	Coachella Valley Water District	CVWD Well 5682-1	Active	Monitoring	850-1300	D	CVWD
126	05S06E09F01S	Coachella Valley Water District	CVWD Well 5637-1	Inactive	MUN	450-830	D	CVWD
127	05S06E14B02S	Coachella Valley Water District	CVWD Well 5665-1	Inactive	MUN	400-600	D	CVWD
128	05S06E14P02S	Coachella Valley Water District	CVWD Well 5603-2	Active	MUN	720-975	D	CVWD
129	05S06E16A04S	Coachella Valley Water District	CVWD Well 5620-2	Active	MUN	1040-1360	D	CVWD
130	05S06E16K03S	Coachella Valley Water District	CVWD Well 5681-1	Active	Monitoring	900-1200	D	CVWD
131	05S06E17L01S	Coachella Valley Water District	CVWD Well 5667-1	Active	Monitoring	470-800	D	CVWD
132	05S06E20A02S	Coachella Valley Water District	CVWD Well 5674-1	Inactive	Monitoring	750-1050	D	CVWD
133	05S07E03D01S	Coachella Valley Water District	WRP7 MW-4D	Active	MUN	245-395	D	CVWD
134	05S07E04A01S	Coachella Valley Water District	WRP7 MW-1	Active	Monitoring	147-367	D	CVWD
135	05S07E15N01S	Indio Water Authority	Well AA	Active	MUN	550-1230	D	IWA
136	05S07E19A01S	Coachella Valley Water District	CVWD Well 5708-1	Inactive	MUN	450-970	D	CVWD
137	05S07E20J01S	Indio Water Authority	Well T	Active	MUN	580-1305	D	IWA
138	05S07E26E02S	Indio Water Authority	Well 3B	Active	MUN	500-1200	D	IWA
139	05S07E27P01S	Indio Water Authority	Well Z	Active	MUN	580-1290	D	IWA
140	05S07E33E01S	Indio Water Authority	Well S	Active	MUN	460-1260	D	IWA
141	05S07E34P04S	Indio Water Authority	Well V	Active	MUN	460-1270	D	IWA
142	05S07E35R02S	Indio Water Authority	Well U	Active	MUN	480-1190	D	IWA
143	05S07E36D03S	Coachella Water Authority	Well 19	Active	MUN	650-1250	D	CWA/CSD
144	05S08E31C03S	Coachella Water Authority	Well 11	Active	MUN	513-818	D	CWA/CSD
145	06S07E06B01S	Coachella Valley Water District	CVWD Well 6701-1	Active	MUN	580-800	D	CVWD
146	06S07E22B02S	Coachella Valley Water District	CVWD Well 6726-1	Active	MUN	640-1160	D	CVWD
147	06S07E34A01S	Coachella Valley Water District	CVWD Well 6728-1	Active	MUN	500-750	D	CVWD
148	06S07E34D01S	Coachella Valley Water District	CVWD Well 6729-1	Active	MUN	500-780	D	CVWD
149	06S08E06K02S	Coachella Water Authority	Well 12	Active	MUN	500-1010	D	CWA/CSD
150	06S08E09N02S	Coachella Water Authority	Well 16	Active	Monitoring	480-730	D	CWA/CSD
151	06S08E19D05S	Coachella Valley Water District	CVWD Well 6808-1	Active	MUN	675-1200	D	CVWD
152	06S08E22D02S	Coachella Valley Water District	CVWD Well 6803-1	Inactive	MUN	500-1100	D	CVWD
153	06S08E25P04S	Coachella Valley Water District	CVWD Well 6807-1	Active	MUN	665-1300	D	CVWD
154	06S08E28N06S	Coachella Water Authority	Well 18	Active	Monitoring	900-1190	D	CWA/CSD
155	07S08E17A04S	Coachella Valley Water District	CVWD Well 7803-1	Active	MUN	250-710	D	CVWD
156	07S09E23N01S	Coachella Valley Water District	CVWD Well 7990-1	Inactive	Unknown	530-560	D	CVWD
157		Indio Water Authority	Well 13A	Active	Irrigation	550-1171	D	IWA
158	03S05E08B01S	R.C Roberts	03S05E08B01S	Undetermined	Irrigation	356-516	D	DWA
159	03S05E17M01S	Desert Dunes Golf Club	03S05E17M01S	Active	Unknown	305-412	D	CVWD
160	03S05E20H02S	Donald Franklin	03S05E20H02S	Active	Irrigation	240-360	D	CVWD
161	03S06E21R01S	Joel Rosenfeld	03S06E21R01S	Undetermined	Irrigation	355-495	D	CVWD
162	05S05E12B03S	Tandika Corp	05S05E12B03S	Active	Irrigation	410-800	D	CVWD
163	05S06E13F01S	PD Golf Operations LLC	05S06E13F01S	Active	Irrigation	400-700	D	CVWD
164	05S06E15H01S	Toscana Country Club	05S06E15H01S	Active	Irrigation	430-950	D	CVWD
165	05S06E22C02S	Desert Horizons Country Club	05S06E22C02S	Active	Irrigation	550-990	D	CVWD
166	05S06E27A01S	El Dorado Country Club	05S06E27A01S	Active	MUN	458-596	D	CVWD
167	05S06E29P04S	Bighorn Golf Club	05S06E29P04S	Active	MUN	530-720	D	CVWD
168	05S07E07F04S	Myoma Dunes Mutual Water Company	Well 4	Active	MUN	430-730	D	MDMWC
169	05S07E08L01S	Myoma Dunes Mutual Water Company	Well 11	Active	Unknown	500-1060	D	MDMWC
170	05S07E17K01S	Myoma Dunes Mutual Water Company	Well 12	Active	Irrigation	450-950	D	MDMWC
171	05S08E09N03S	Jamie Brack	05S08E09N03S	Undetermined	Unknown	480-580	D	CVWD, IWA
172	06S07E27B01S	Andalusia Golf Club	06S07E27B01S	Active	Irrigation	300-780	D	CVWD
173	06S07E35L02S	Castro Bros	Castro Bros	Active	Unknown	300-400	D	CVWD
174	06S08E11A01S	Cocopah Nurseries Inc	06S08E11A01S	Active	Unknown	400-842	D	CVWD, CWA/CSD
175	06S08E31P01S	Deer Creek	Deer Creek	Active	Irrigation	400-550	D	CVWD
176	06S08E35E02S	Otto L. Zahler	06S08E35E02S	Undetermined	Unknown	521-596	D	CVWD
177	07S07E02G02S	Warren Webber	Warren Webber	Active	Irrigation	380-700	D	CVWD
178	07S08E01L02S	Bill Wordon	07S08E01L02S	Undetermined	Domestic	500-880	D	CVWD

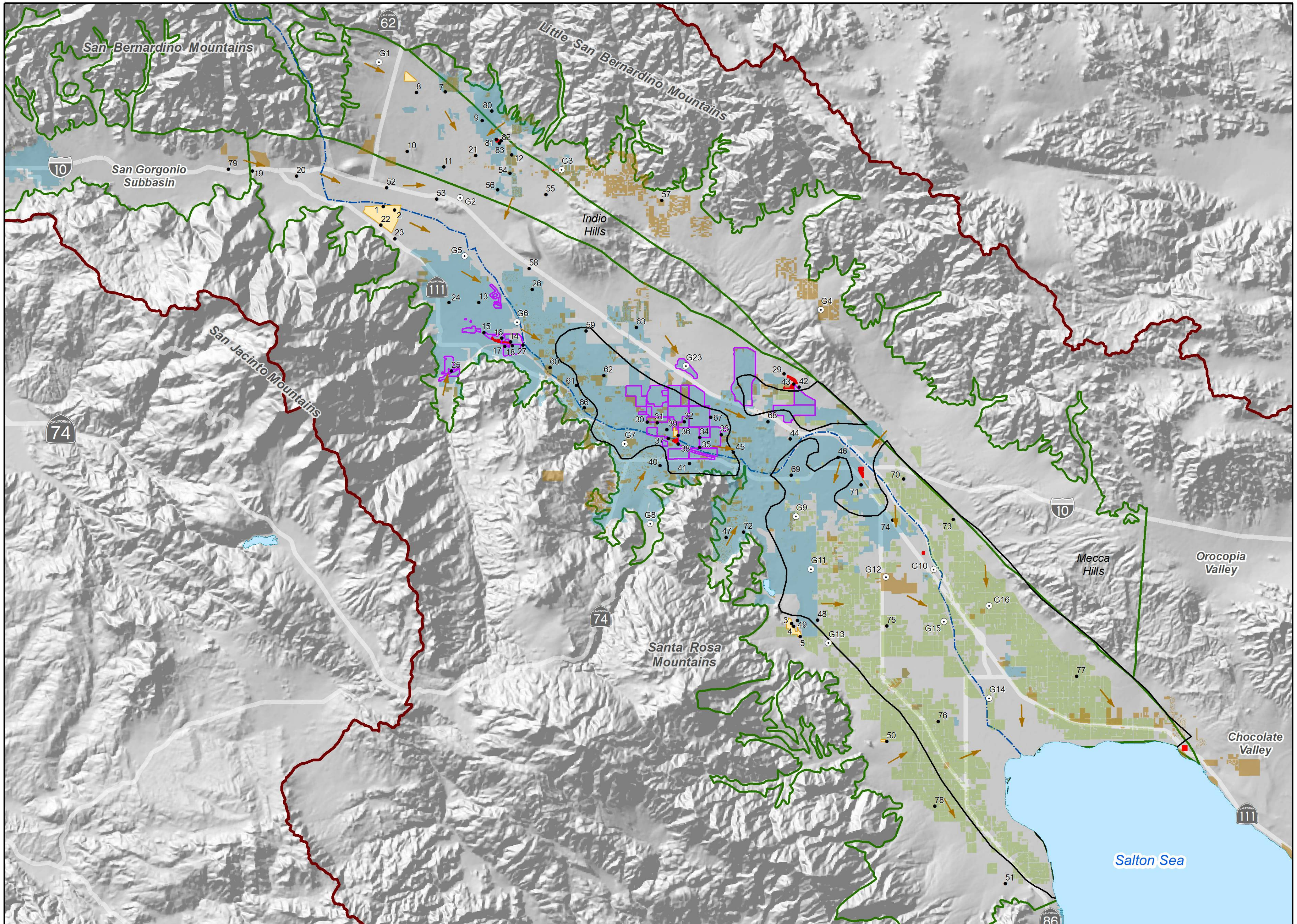
Table 3-6. Responsibilities for Groundwater Sampling and Laboratory Analyses								
Map_ID	SWN	Well Owner	Well Name	Well Status[a]	Well Use[b]	Screen Interval *ft-bgs*	Depth Code[c]	Overlying SNMP Agency[d]
179	07S08E27A02S	Gimmway Enterprises Inc	07S08E27A02S	Active	MUN	491-811	D	CVWD
180	07S09E10F01S	Prime Time International	07S09E10F01S	Active	Monitoring	360-500	D	CVWD
181		Mission Springs Water District	Well 31	Active	Monitoring	270-670	D	MSWD
182		Coachella Valley Water District	WRP2 MW3	Active	Monitoring	<90	P	CVWD
183	06S07E27J03S	Coachella Valley Water District	TEL-GRF MW-8	Active	Monitoring	25-45	P	CVWD
184	06S07E34A03S	Coachella Valley Water District	TEL-GRF MW-9	Active	Monitoring	25-45	P	CVWD
185	06S08E31R01S	Coachella Valley Water District	TEL-GRF MW-10	Active	Monitoring	25-45	P	CVWD
186	07S08E06P01S	Coachella Valley Water District	TEL-GRF MW-11	Active	Monitoring	25-45	P	CVWD
187		Coachella Valley Water District	PEW-1	Active	Monitoring	10-55	P	CVWD

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

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

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

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



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

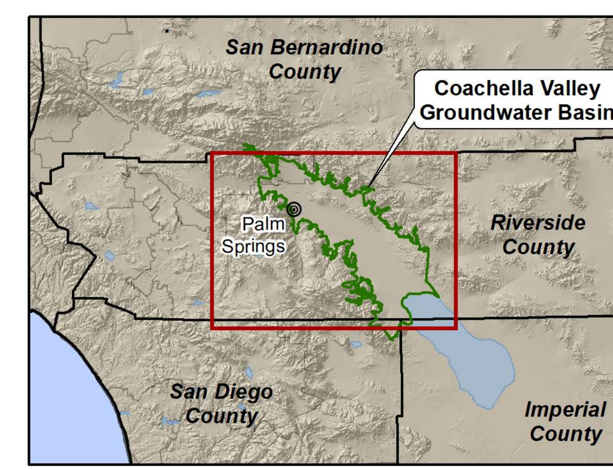
Map_ID ⊙ Gap in Monitoring Network
See Table 3-2

Sources of Salt and Nutrient Loading

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

Generalized Land Use

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



WEST YOST

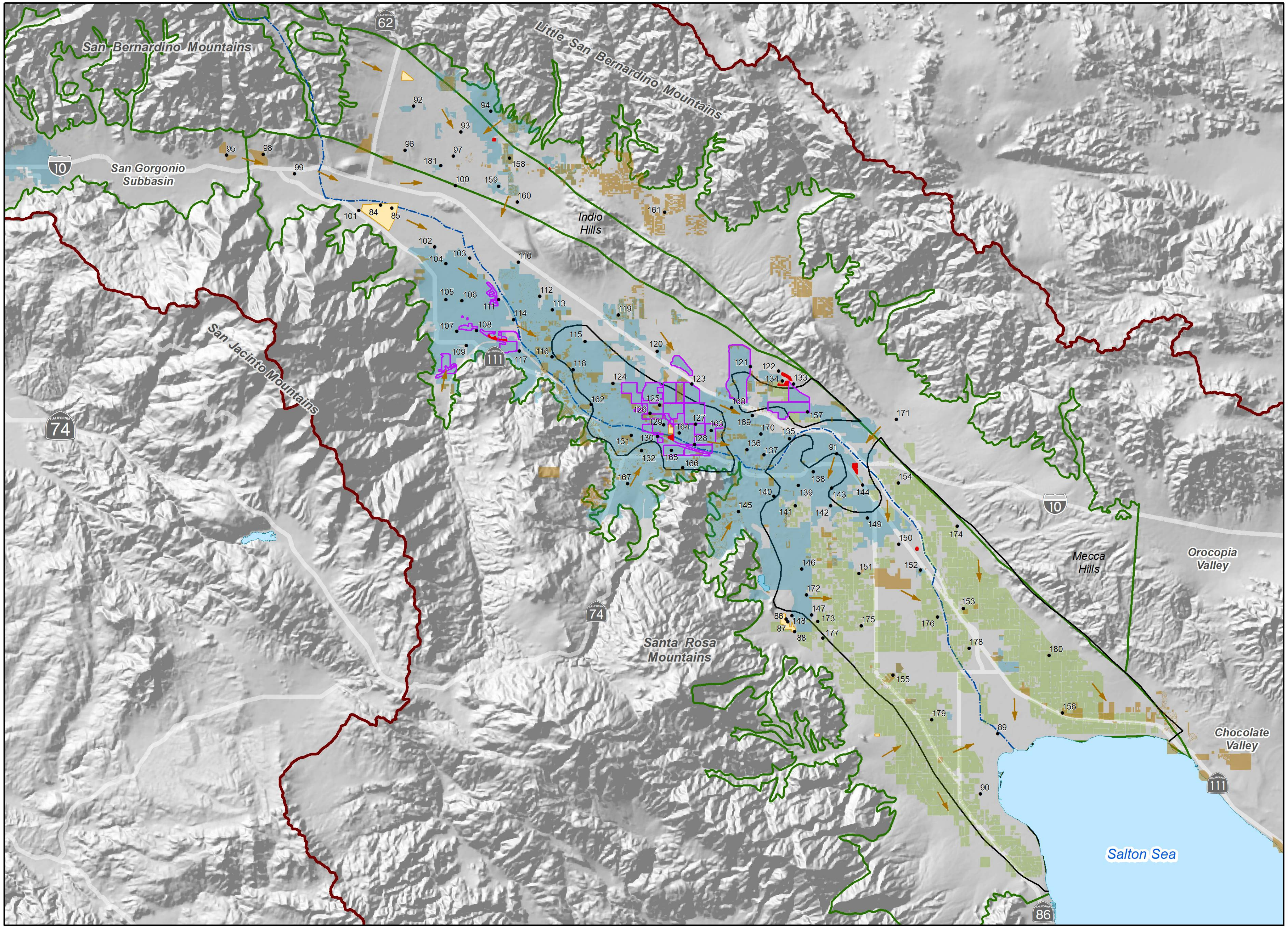
Author: EM
Date: 12/11/2020
File: Figure 3-1.mxd

0 5 10 Miles
0 10 20 KM

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

Groundwater Monitoring Network and Gaps
Shallow Aquifer System

Figure 3-1



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

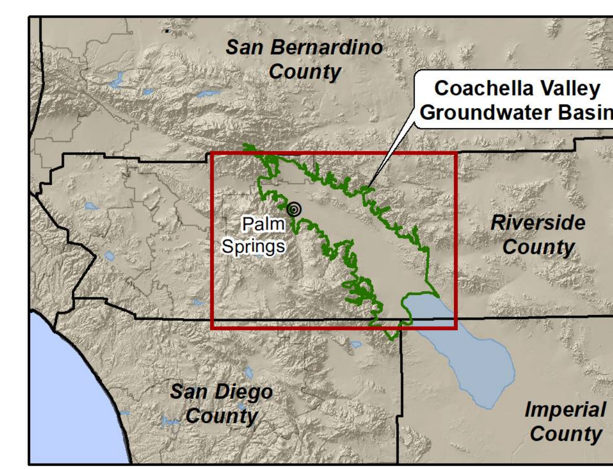
Sources of Salt and Nutrient Loading

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

Generalized Land Use

- Urban
- Irrigated Agricultural Land

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



WEST YOST

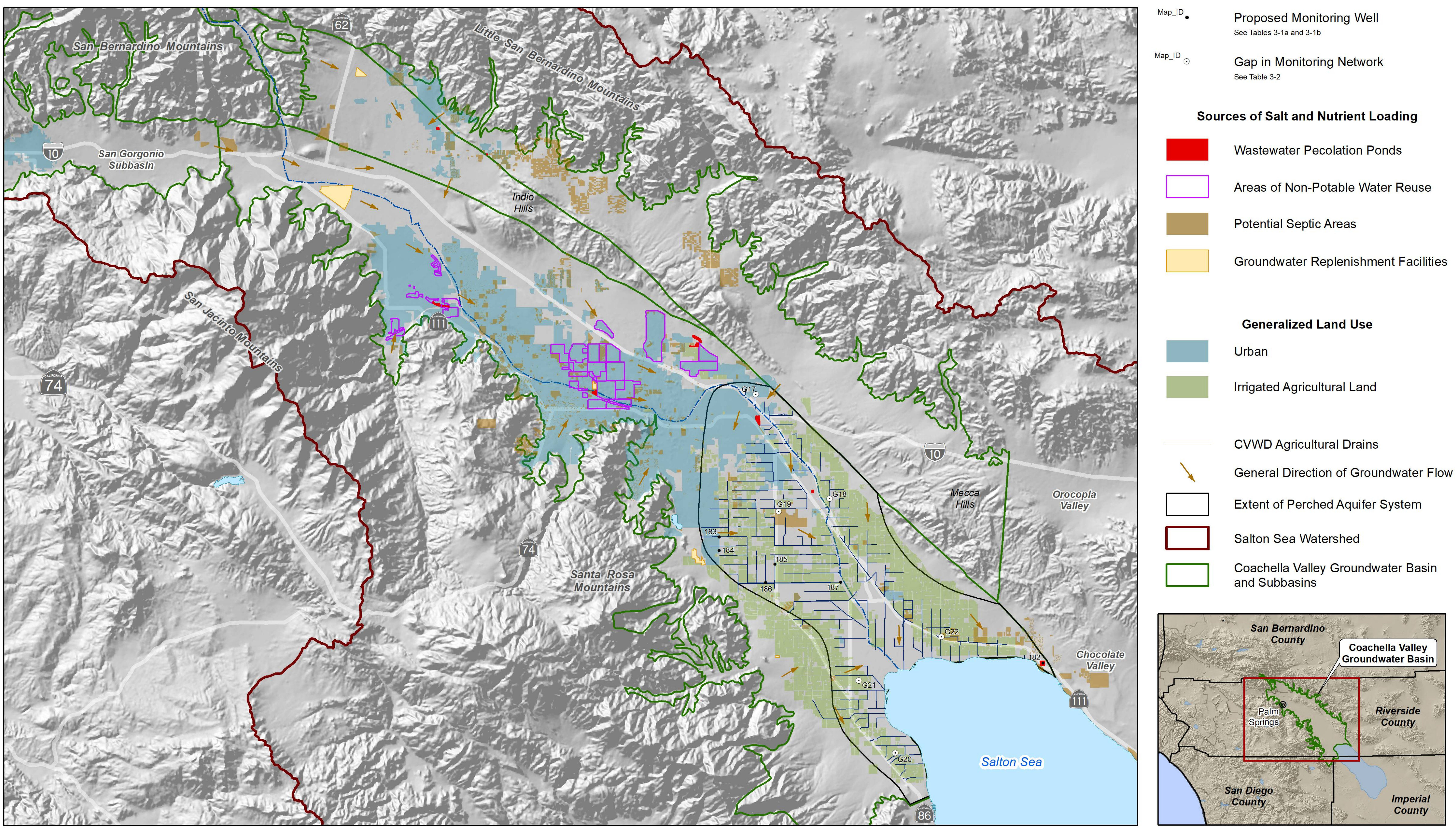
Author: EM/AM
Date: 12/11/2020
File: Figure 3-2.mxd

0 5 10 Miles
0 10 20 KM

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

Groundwater Monitoring Network
Deep Aquifer System

Figure 3-2



WEST YOST

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

0 5 10 Miles
0 10 20 KM

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

Groundwater Monitoring Network and Gaps
Perched Aquifer System

Figure 3-3

4.0 IMPLEMENTATION PLAN

4.1 Schedule of Activities

The objective of the SNMP Agencies is to have a fully functioning groundwater monitoring program by March 31, 2027, including: (i) implementing the monitoring program at existing wells in the monitoring network; (ii) filling all gaps in the monitoring network identified in this Workplan; (iii) analysis of at least one groundwater sample for the constituents listed in **Table 3-5** from all monitoring wells in the network; and (iv) reporting of all laboratory results to the GAMA information system or its successor.

The schedule of activities to implement the groundwater monitoring program is described below:

- **Active and standby municipal production wells.**
  - All active and standby municipal production wells, identified in this SNMP groundwater monitoring program under a DDW monitoring order, will be sampled pursuant to their existing DDW Groundwater Monitoring Schedules. Most municipal production wells are sampled at least once every three years, or more frequently for some analytes like nitrate.
  - By March 31 of each year beginning in 2022, the SNMP Agencies will report to the GAMA information system the laboratory results from all groundwater samples collected during the prior calendar year for the analytes listed in **Table 3-5**.
- **Active monitoring wells.**
  - All monitoring wells identified in this SNMP groundwater monitoring program that are participating in regulatory or voluntary monitoring programs will be sampled pursuant to their existing monitoring schedules. Typically, such monitoring wells are sampled at least once every three years, and most are sampled more frequently. At least one sample must be analyzed for the constituents listed in **Table 3-5** every three years.
  - By March 31 of each year beginning in 2022, the SNMP Agencies will report to the GAMA information system the laboratory results from all groundwater samples collected during the prior calendar year for the analytes listed in **Table 3-5**.
- **Private wells and inactive wells.**
  - Starting 2021, SNMP Agencies responsible for sampling at private wells or inactive wells will initiate steps to collect the first groundwater sample from these wells. This may include executing access agreements and devising and/or implementing a method to collect a groundwater sample.
  - By the end of 2023, the responsible SNMP Agencies will collect and analyze one groundwater sample for every private and inactive well in the monitoring network, where feasible. By March 31 of each year beginning in 2022, the SNMP Agencies will report to the GAMA information system the laboratory results from all groundwater samples collected during the prior calendar year for the analytes listed in **Table 3-5**.
  - Thereafter, each private and inactive well will be sampled at least once every three years. It is the objective of this program to collect and analyze at least two groundwater samples for all private and inactive wells during the initial six-year implementation period.

- **Filling of Gaps in the Monitoring Network.**
  - In 2021, the SNMP Agencies that are responsible for filling gaps in the monitoring network will perform the necessary research and field work and develop plans to fill each gap. These plans will be summarized in the first annual progress report to the Regional Board by March 31, 2022.
  - Starting in 2022, the SNMP Agencies will initiate steps to fill the gaps. The objective is to fill all gaps in the monitoring network and collect and analyze at least one groundwater sample by December 31, 2026.
  - By March 31 of each year beginning in 2023, the SNMP Agencies will report to the GAMA information system the laboratory results from all groundwater samples collected during the prior calendar year for the analytes listed in **Table 3-5**.
  - It should be expected that new gaps in the monitoring network may be identified during implementation of the monitoring program. This may occur if a well in the monitoring network can no longer be sampled because it was destroyed, becomes inoperable, or otherwise is no longer available for monitoring. In such cases, the SNMP Agencies will attempt to identify a suitable replacement well (similar location and well construction) or develop a plan to fill this new gap in the monitoring network. These challenges and plans to address new data gaps will be summarized in the annual progress reports to the Regional Board (see Section 4.2 below).

4.2 Progress Reporting to the Regional Board

To keep the Regional Board informed of progress and future activities during implementation of the monitoring program, the SNMP Agencies will submit an *Annual Progress Report on Implementation of the CV-SNMP Groundwater Monitoring Program* to the Regional Board. The first progress report will be due by March 31, 2022 to report progress achieved during calendar year 2021. The contents of the progress report will include:

Section 1. Summary of Groundwater Monitoring Program and Implementation Schedule

Section 2. Activities Accomplished or In-Progress during the Prior Calendar Year

- Sampling and analysis of existing municipal production wells and monitoring wells.
- Progress made towards sampling and analysis of inactive and private wells.
- Progress made towards filling gaps in the monitoring network.
- Wells that can no longer be sampled and other challenges in sampling.

Section 3. Activities Planned for the Next Calendar Year

- Plans for sampling at wells, including addressing sampling challenges.
- Activities to replace wells that can no longer be sampled and fill gaps in the monitoring network.

Figures.

- Updated map of Groundwater Monitoring Network – *Shallow Aquifer System*.
- Updated map of Groundwater Monitoring Network – *Deep Aquifer System*.
- Updated map of Groundwater Monitoring Network – *Perched Aquifer System.*

Tables.

- Updated list of wells in Groundwater Monitoring Network.
- Updated list of gaps in Groundwater Monitoring Network.

Appendix A. 2020 CV-SNMP Groundwater Monitoring Program Workplan

4.3 Cost Estimates

Cost estimates were derived for the first six-year period of monitoring program implementation. Costs were estimated for only those additional activities that the monitoring program would cause the SNMP Agencies to perform (that they otherwise would not perform). These activities include: (i) sampling and analysis of private wells; (ii) filling of gaps in the monitoring program; and (iii) preparing the annual progress reports to the Regional Board.

Table 4-1 summarizes the cost estimates by task and subtask. The costs described herein are first-order estimates. Actual costs may vary because monitoring program implementation may unfold differently than assumed herein. For example, a gap in the monitoring network may be filled by identifying an existing suitable well, as opposed to constructing a new well. In addition, these costs do not include land acquisition costs for new monitoring well sites or any needed site improvements, including grading, block walls, or fencing.

Sampling of private wells. **Table 3-6** indicates there are 58 private wells that are proposed to participate in the monitoring program. Each well is assumed to be sampled twice over the first six years (116 samples).

The main activities associated with the sampling of private wells include:

1. Performing a field canvass of each well to: initiate coordination with the well owners; document the condition of the well; and determine the current ability to collect a water-quality sample.
2. Developing and executing an access agreement with the private well owner.
3. If necessary, hiring a subcontractor to construct wellhead improvements to enable sample collection. It is assumed that about half of the private wells will require such improvements at $3,000 per well.
4. Perform two sampling events and laboratory analyses over the six-year period. Laboratory costs are about $77 per sample.

Total costs for sampling of private wells over the first six-year implementation period are estimated at about $260,000.

Filling gaps in the monitoring network. **Table 3-4** indicates that there are 23 gaps in the monitoring network that need to be filled over the first six-year period. For cost estimating purposes, it is assumed that each gap will be filled with the construction of a new monitoring well.

Six of the proposed monitoring wells are targeted for the Perched aquifer system with well depths of less than about 100 ft-bgs—these well boreholes are assumed to be drilled via a sonic method. Sixteen of the proposed wells are targeted for the Shallow aquifer system with well depths of less than about 500 ft-bgs—these well boreholes are assumed to be drilled via a mud-rotary method. One of the proposed wells is estimated to have a total depth of about 1,000 ft-bgs—this well borehole is assumed to be drilled via a mud-rotary method.

The main activities associated with the drilling and construction of new monitoring wells are listed below.

1. Perform a well-siting study to select 23 available and appropriate well sites.
2. Prepare two sets of standard technical specifications for the drilling, construction, and development of two types of monitoring wells: (i) a monitoring well in the Perched aquifer system and (ii) a monitoring well in the Shallow or Deep aquifer systems.
3. Acquire well-site property and/or execute easements. The cost associated with land purchase or long-term land leases are unknown at this time and were therefore not estimated; however, such costs are likely to be significant.
4. Prepare bid package and conduct the bid process to select a well drilling/construction subcontractor. It is assumed that one contractor will construct all 23 wells.
5. Obtain all permits and CEQA clearance.
6. Drill, construct, and develop 23 monitoring wells. The wells are assumed to be comprised of 4" PVC Schedule 80 pipe with 40 feet of well screens. Well head completions are assumed to be an above ground 10-inch diameter stovepipe casing with a locking cap. Any needed well-site improvements are unknown at this time and were therefore not estimated; however, such costs are likely to be significant.
7. Prepare well completion reports for 23 new monitoring wells and file Well Completion Reports with the California Department of Water Resources. New monitoring wells will be added to the SNMP database.

Total costs to fill all gaps in the monitoring network over the first six-year implementation period are estimated to be about $2,900,000. These estimates do not include land acquisition costs for new monitoring well sites or any needed site improvements.

Task 3 – Preparing the Annual Progress Report to the Regional Board. As described above in Section 4.2, the SNMP Agencies will prepare an *Annual Progress Report on Implementation of the CV-SNMP* Groundwater *Monitoring Program* to the Regional Board each year to keep it abreast of progress and future activities.

Total costs to prepare five annual progress reports over the first six-year implementation period are estimated to be about $140,000.

Total Costs. Total costs for the first six-year period of monitoring program implementation are estimated to be about $4,100,000 (including a contingency of 25%). Total costs are likely to be higher because these estimates do not include land acquisition or site improvement costs for new monitoring well sites.

Table 4-1. Cost Estimates -- *Initial Six-Year Implementation Period of CV-SNMP Groundwater Monitoring Program*

Task and Subtask Descriptions	Notes	Labor Cost		Other Direct Costs								Total Project Costs	
										Total Reimbursable Expenses			
		Sub-Task	Task	Travel	Well Construction Services (Sub)	E-Logging Services (Sub)	Permits and CEQA	Field Equip	Lab	Sub-Task	Task	Sub-Task	Task
Task 1 - Sampling and Analysis of Private Wells			**$152,146**								**$108,030**		**$260,175**
1.1 Perform field canvass of private wells; develop access agreements		$19,529		$1,472						$1,472		$21,001	
1.2 Development/execution of private well access agreements		$79,924								$0		$79,924	
1.3 Devise and construct and wellhead improvements to enable sample collection		$16,733			$87,000					$87,000		$103,733	
1.4 Perform two sampling and laboratory analysis events over the five-year period		$35,960						$10,626	$8,932	$19,558		$55,518	
Task 2 - Filling of Gaps in the Monitoring Network			**$1,089,443**								**$1,769,514**		**$2,858,957**
2.1 Perform field work and research; prepare plan to fill gaps in monitoring network		$53,776								$0		$53,776	
2.2 Prepare well-siting study to identify 23 well sites		$50,828								$0		$50,828	
2.3 Prepare technical specifications for of two monitoring well types		$32,378								$0		$32,378	
2.4 Acquire well sites and/or execute lease agreements		$14,996								$0		$14,996	
2.5 Conducting a bid process to select a well drilling/construction subcontractor		$5,988		$184						$184		$6,172	
2.6 Obtain permits and CEQA clearance		$3,299					$24,600			$24,600		$27,899	
2.7 Drill, construct, and develop six wells in the Perched aquifer system	a	$94,608		$1,536	$89,820	$42,000			$3,180	$136,536		$231,144	
2.8 Drill, construct, and develop 16 wells in the Shallow aquifer system	a	$555,712		$8,192	$1,314,720	$112,000			$8,480	$1,443,392		$1,999,104	
2.9 Drill, construct, and develop one deep monitoring well	a	$51,492		$512	$158,260	$5,500			$530	$164,802		$216,294	
2.10 Prepare well completion reports for 23 new monitoring wells/file with DWR		$226,366										$226,366	
Task 3 - Preparing Annual Progress Reports to the Regional Board			**$139,800**								**$0**		**$139,800**
Project Subtotals			**$1,381,389**	**$11,896**	**$1,649,800**	**$159,500**	**$24,600**	**$10,626**	**$21,122**		**$1,877,544**		**$3,258,932**
Contingency (25%)													**$814,733**
Project Total													**$4,073,665**

Notes:

a = These estimates do not include land acquisition costs for new monitoring well sites or any needed site improvements, including grading, block walls, or fencing.

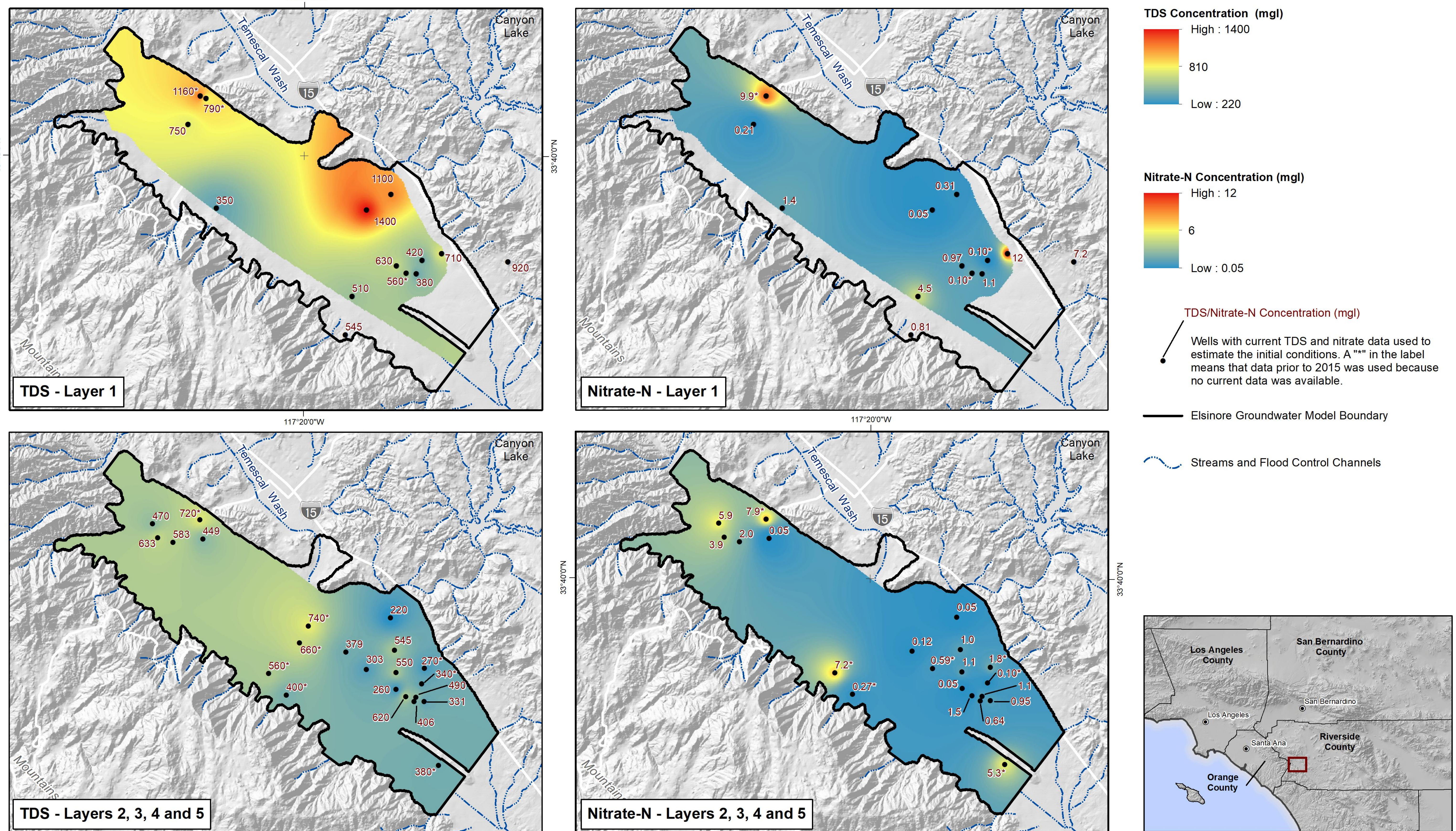
Appendix B

Example Maps and Data Graphics to Characterize Groundwater Quality

Table B-1: Example of Summary Statistics for N/TDS Concentrations at Wells

Well_ID	Well Name	Well Owner	Well Status	Management Zone	Aquifer Layer(s)	Number of TDS Sample Results	Mean of Annual Average Concentration Values	Standard Error	Standard Deviation
1025698	MW1	Alcoa	Monitoring	Chino-3/Chino-North	1	49	789.49	60.13	255.12
1025699	MW2	Alcoa	Monitoring	Chino-3/Chino-North	1	46	1519.88	76.30	275.12
1025700	Offsite MW1	Alcoa	Monitoring	Chino-3/Chino-North	2	32	444.13	12.06	41.77
1025701	Offsite MW2	Alcoa	Monitoring	Chino-3/Chino-North	1	23	500.72	10.40	32.88
1025702	Offsite MW3	Alcoa	Monitoring	Chino-3/Chino-North	1	33	518.14	31.35	113.03
1025703	Offsite MW4	Alcoa	Monitoring	Chino-3/Chino-North	1	30	678.56	57.31	198.53
1025704	MW2A	Alcoa	Monitoring	Chino-3/Chino-North	1	6	2700.00	237.54	411.43
1025705	NA_1006182	Almo, M.C.	Monitoring	Beaumont	unknown	5	339.04	10.57	23.63
1025706	Arco Well 14	Arco Facility 5172	Monitoring	Yucaipa	12	2	275.00		
1025707	Arco Well 18	Arco Facility 5172	Monitoring	Yucaipa	12	2	310.00		
1025708	Arco Well 19	Arco Facility 5172	Monitoring	Yucaipa	12	1	320.00		
1025709	Arco Well 20	Arco Facility 5172	Monitoring	Yucaipa	12	2	295.00		
1025710	Arco Well 21	Arco Facility 5172	Monitoring	Yucaipa	1	2	290.00		
1025711	Arco Well 22	Arco Facility 5172	Monitoring	Yucaipa	12	2	320.00		
1025712	Arco Well 23	Arco Facility 5172	Monitoring	Yucaipa	12	2	280.00		
1025713	Arco Well 24	Arco Facility 5172	Monitoring	Yucaipa	12	2	300.00		
1025714	Arco Well 25	Arco Facility 5172	Monitoring	Yucaipa	12	2	300.00		
1025715	3	Baseline Gardens Mutual Water Company	Active	Bunker Hill A	23	1	331.40		
1025716	PS & B 2	Baseline Gardens Mutual Water Company	Active	Bunker Hill B	1	1	579.00		
1025717	BV 5th Ave. 1	Bear Valley Mutual Water Company	Active	Yucaipa	3	2	340.00		
1025718	Cemetery Well 1	Beaumont Cemetery	Active	Beaumont	1	3	346.67	21.70	37.58
1025719	Cemetery Well 2	Beaumont Cemetery	Active	Beaumont	12	3	388.80	35.82	62.04
1025720	BCVWD 13	Beaumont Cherry Valley Water District	Active	Beaumont	123	2	230.00		
1025721	BCVWD 12	Beaumont Cherry Valley Water District	Active	Beaumont	123	8	240.86	9.75	25.80

Figure B-1: Example of Point and Raster Map of N/TDS Concentrations in Groundwater



Prepared by:

WEI
WILDERMUTH ENVIRONMENTAL, INC.

Author: CS
Date: 8/30/2018
Document Name: Figure_B-10_Initial_Conditions_pts

0 1 2 3 Miles
0 1 2 3 4 KM

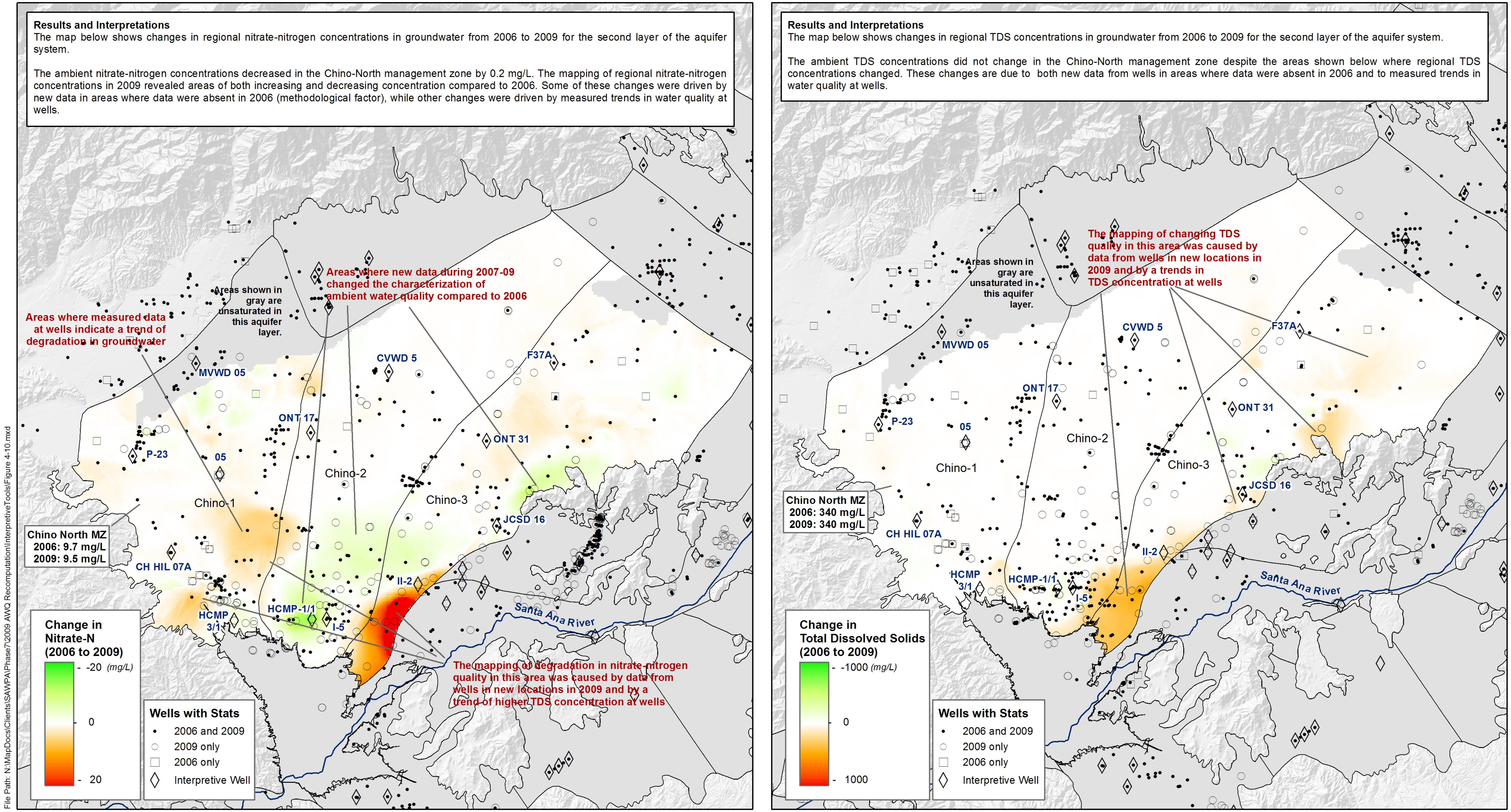
EVMWD

TDS and Nitrate Concentration Projections for the Elsinore GMZ
Elsinore Management Zone

TDS and Nitrate-N Concentrations Initial Conditions

Figure B-10

Figure B-2: Example of Water Quality Change Exhibit



Produced by:

WILDERMUTH™ ENVIRONMENTAL INC.

23692 Birtcher Drive
Lake Forest, CA 92630
949.420.3030
www.wildermuthenvironmental.com

Author: ETL
Date: 20110817
File: Figure 4-10

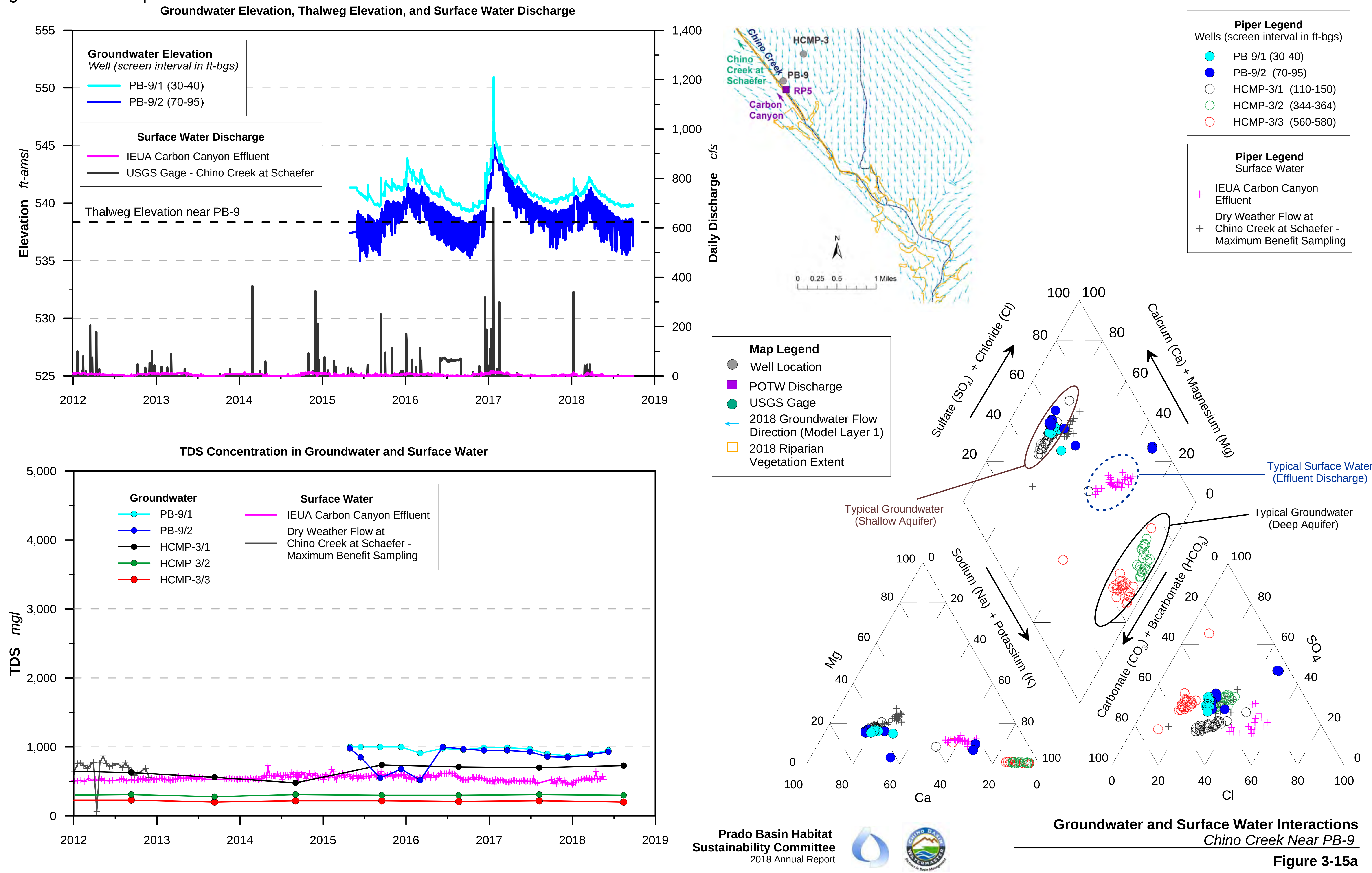
Basin Monitoring Program Task Force
Recomputation of Ambient Water Quality for the Period 1990 to 2009

SAWPA

Change Maps of Nitrate-N and TDS
Chino North Management Zone - 2006 to 2009
Layer 2

Figure 4-10

Figure B-3: Example of a Multi-variate Exhibit of Groundwater and Surface Water



Appendix C

Responses to Comments on the Draft CV-SNMP Development Workplan

Appendix C: Responses to Comments on the Draft CV-SNMP Development Workplan

Staff at the Regional Water Quality Control Board, Colorado River Basin (Regional Board) received and reviewed the draft CV-SNMP Development Workplan dated April 30, 2021. The Coachella Valley Water District (representing the CV-SNMP Agencies) received a letter from the Regional Board dated June 30, 2021 with comments and suggested revisions to the draft CV-SNMP Development Workplan. The Regional Board comment letter is attached to this Appendix C.

The CV-SNMP Agencies prepared responses to the Regional Board comments and revised the CV-SNMP Development Workplan to address the comments. The Regional Board's comments and the CV-SNMP Agencies' responses are described below.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
1	Section 1.0	Page 1 of the Workplan states: *The objective of the CV-SNMP is to sustainably manage salt and nutrient loading in the Coachella Valley Groundwater Basin in a manner that protects its beneficial uses*. Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs. The Sustainable Groundwater Management Act (SGMA) considers sustainable groundwater management to be occurring within a basin that is operated in such a way so as not to cause "undesirable results," such as chronic depletion of groundwater, groundwater degradation, or land subsidence. The Regional Water Board recommends the TAC develop a plan to manage identified salt and nutrient loading sources and provide a definition of what beneficial use protection will consist of, integrating the antidegradation analysis into the stakeholder's definition of protected.	The CV-SNMP Agencies, which include Groundwater Sustainability Agencies in the Indio and Mission Creek Subbasins, understand the SGMA definitions and requirements for sustainable groundwater management. SGMA compliance work for the two medium-priority basins in the Coachella Valley is being conducted under separate efforts and will leverage the development and implementation of the CV-SNMP for the sustainable management of salts and nutrients. The CV-SNMP Agencies believe the CV-SNMP Development Workplan addresses the Regional Board's recommendation to develop an SNMP that will manage identified salt and nutrient loading (see Section 4.3 of the Workplan) to protect defined beneficial uses (Section 4.5), and will include an anti-degradation analysis that satisfies the requirements of State Board Resolution 68-16 (Section 4.10).

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
2	Section 1.3	Page 7 of the Workplan states: *CV-SNMP Agencies have concluded that numeric objectives for [total dissolved solids] TDS and nitrate in groundwater are necessary to resolve the concerns of the Regional Board*. Identifying a water quality objective is necessary to determine the assimilative capacity of the aquifer. To assess the assimilative capacity of salts, the 2015 CV SNMP cited the "upper limit" Secondary Maximum Contaminant Level (SMCL) of 1,000 milligrams per liter (mg/l) as the water quality objective for total dissolved solids (TDS) excluding the more protective and "recommended limit" SMCL of 500 mg/l. The water quality data indicated that many areas within the basin had TDS concentrations that were less than 500 mg/l (the lower "recommended limit" of the SMCL range). Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California (Antidegradation Policy) states "Whereas the quality of some waters of the State is higher than that established by the adopted policies and it is the intent and purpose of this Board that such higher quality shall be maintained to the maximum extent possible consistent with the declaration of the Legislature; ..." The Regional Water Board recommends that the SNMP provide the scientific basis including an antidegradation analysis for any proposed water quality objectives.	The CV-SNMP Agencies believe that the approach presented in the CV-SNMP Development Workplan addresses the Regional Board's recommendation to provide the scientific basis for setting water quality objectives pursuant to CWC Section 13241 and will include an anti-degradation analysis that satisfies the requirements of State Board Resolution 68-16 (see Section 4.10 of the Workplan).

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
3	Section 1.3.1	Page 8 of the Workplan states: *The CV-SNMP Development Workplan must address each of these factors in setting the TDS objectives for groundwater management zones*. California Water Code § 13241 [Water quality objectives] states that "Each regional board shall establish water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance;..." The CV SNMP stakeholders may present recommendations regarding TDS water quality objectives, which the Regional Water Board will review and make a final determination regarding adoption into the Water Quality Control Plan for the Colorado River Basin Region (Basin Plan). The Regional Water Board recommends deleting the word 'setting' and using the word 'recommending' TDS objectives for groundwater.	The CV SNMP Development Workplan has been revised to replace the word "setting" with the word "recommending."
4	Section 2.2.2	Page 12 of the Workplan describes the general occurrence of groundwater, and how groundwater flows through and discharges from each subbasin. Publicly available data on the San Jacinto Tunnel installed through fractured bedrock in the 1930's and operated by Metropolitan Water District (MWD) reports that the fractured crystalline bedrock units contain and convey a substantial amount of water in the subsurface. The concept of a "mega-watershed groundwater system" from mountain block recharge is provided in the works of Robert Bisson and Jay Lehr.[1] In that mountain front recharge is identified later in the CV SNMP, Regional Water Board suggests the inclusion of a discussion on the water bearing nature of the surrounding fractured bedrock units.	Section 2.1 has been updated to recognize that the bedrock formations in the hills and mountains that surround the groundwater basin can contain groundwater within pore spaces and fractures. Subsurface inflow from the bedrock formations will be included in the technical analysis of salt and nutrient loading (Sections 4.3, 4.7, and 4.8 of the Workplan).

[1] https://www.oregondigital.org/downloads/oregondigital:df710j60x

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
5	Section 2.3.2	Page 14 identifies the mechanisms by which salts and nutrients are discharged from each subbasin. Dr. John Wilson's (New Mexico Tech) work provides strong research in regard to the removal of salts and nutrients through microbial activity. Specifically, see Dr. Wilson's study of salt and nutrient uptake and removal where there is mixing of shallow groundwater and surface water (hyporheic zone). [2] The Regional Water Board recommends evaluating microbial uptake as a salt and nutrient management mechanism.	Section 2.3.1 has been revised to include "microbial processes" in the description of the complexities of the N/TDS loading process.
6	Section 4.2	Page 39 of the Workplan states: *The objective of this task is to convene a CV-SNMP Stakeholder Group and the CV-SNMP Technical Advisory Committee (TAC). The CV-SNMP Agencies and the selected consultants will organize and run both groups during the implementation of the CV-SNMP Development Workplan*. A locally driven and controlled, collaborative process open to all stakeholders and the regional water board will contribute to the development of a CV SNMP that will manage salts and nutrients on a basin-wide basis and achieve the goals of groundwater sustainability, recycled water use, and water quality protection. The Regional Water Board recommends deleting the word "run" and adding a different word or words such as "will facilitate."	Section 4.2 has been revised to replace the word "run" with "facilitate."

[2] https://www.sciencedirect.com/topics/earth-and-planetary-sciences/hyporheic-zone

<table>
<tr><th>Item</th><th>Location</th><th>Regional Board Comment</th><th>Response from CV-SNMP Agencies</th></tr>
<tr><td>7</td><td>Section 4.2.1</td><td>
Page 40 of the Workplan states: Potential stakeholders include but are not limited to: the agricultural community and groups; golf course industry groups; tribes; the Coachella Valley Regional Water Management Group; the Groundwater Sustainability Agencies in the Coachella Valley; all major water and wastewater agencies; industrial dischargers; county and city land use planning agencies; Federal and State agencies; and nongovernmental organizations (NGOs).
A critical first step will be to solicit input from the CV-SNMP Stakeholder Group as to their issues, needs and wants. This information will be collected up front so the CV-SNMP Agencies and consultants can proactively address stakeholder concerns, and potentially incorporate them in the CV-SNMP development process.
Achieving the goals of groundwater sustainability, recycled water use, and water quality protection is best achieved through the management of salts and nutrients on a basinwide basis through collaborative processes open to all stakeholders. Documenting and addressing the input from an all-inclusive stakeholder group will help identify the water use needs of a diverse population and address historical and state-wide SNMP development challenges identified during the 2018 Policy revision such as managing salt and nutrient loading to the basin from sources other than recycled water and the ability/authority of the stakeholders to implement best management practices and salt and nutrient management measures.
The Regional Water Board encourages the CV SNMP Agencies to keep all-inclusiveness as a priority and involve all major stakeholders within the basin. The CV SNMP Agencies should also consider the inclusion of significant stakeholders from outside the basin such as The Colorado River Basin Salinity Control Program and the MWD.
</td><td>
Section 4.2.1 has been revised to:
- Add the Colorado River Basin Salinity Control Forum and the Metropolitan Water District of Southern California to the list of potential CV-SNMP stakeholders.
- Include the following bullet to describe the objectives of convening the CV-SNMP Stakeholder Group:
Understand the ability/authority of the stakeholders to implement best management practices and salt and nutrient management measures.
</td></tr>
</table>

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
8	Section 4.2.2	Page 40 of the Workplan states: *Regional Board staff will be encouraged to participate on the TAC in an advisory role*. Regional Water Board understands that critical details and decisions to develop an adequate CV SNMP will be established through the TAC and are committed to working with this committee.	Comment noted and appreciated.
9	Section 4.3	Page 40 of the Workplan states: *The objective of this task is to quantify the individual components of N/TDS (nitrate and TDS) loading to groundwater*. Mountain front recharge has been identified as a potential source of aquifer recharge originating from within the basin's watershed. The Regional Water Board recommends quantifying the salt and nutrient loading from the mountain front recharge component through evaluation of representative bedrock springs as indicators of the hydrologic conditions of the fractured bedrock units.	Section 4.3.1 has been revised to include the collection of historical "Water-quality data from bedrock springs, wells, and streamflow within the watersheds tributary to the Coachella Valley" to characterize the water quality of subsurface inflow from the surrounding mountains and hills.
10	Section 4.3	Page 41 of the Workplan states: *The characterization of N/TDS loading will be performed for a recent historical period to the present to characterize seasonal variations and long-term trends in loading and generate estimates of N/TDS loads in the vadose zone. The length of the historical period will be defined as part of this task but should be long enough to characterize the N/TDS loads in the vadose zone*. The required antidegradation analysis component of the CV SNMP, discussed in Section 4.10.3 of the Workplan, will need to incorporate a discussion on the impacts of elevated salinity to the public and the public infrastructure since 1968. The Regional Water Board recommends evaluation of past nitrate and salt (TDS) loading estimates for each management zone extending at least to 1968.	Comment noted. The SNMP Agencies will conduct the required antidegradation analysis in accordance with the requirements of the Antidegradation Policy. The exact length of the "historical period" will be defined as part of this task. Considerations will include the requirements of the Antidegradation Policy, as well as the availability of data and information and solute travel times through the vadose zone.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
11	Section 4.3.2	Page 42 of the Workplan states: *Once the methods are finalized, the time-history of the volumes and associated N/TDS concentrations will be estimated and described for each N/TDS loading term*. The CV SNMP must identify what 'methods' the Workplan is referring to.	Refer to the preceding paragraph. The "methods" are the "the types of tables, maps, and data graphics that can be prepared with the available data to characterize historical and current N/TDS loading to groundwater." The text in 4.3.2 has been revised to replace the word "methods" with "types of tables, maps, and data graphics."
12	Section 4.4	The introduction to Section 4.4 states: *The objective of this task is to characterize nitrate and TDS concentrations in groundwater as of 2020 (i.e. current conditions). The characterization will include an analysis of the time history of nitrate and TDS concentrations in groundwater that led to current conditions*. The Regional Water Board concurs that establishing existing water quality is necessary to compute the potential existence and magnitude of assimilative capacity for a basin, subbasin, or management zone and supports other proposed Workplan tasks; and also agree that the proposed evaluation of past water quality will assist with an understanding of nitrate and TDS historical trends in groundwater. The Regional Water Board expects the fully developed groundwater monitoring plan to provide groundwater quality data that is representative of the management zones and encourages the TAC to develop a technically defensible method to evaluate the ambient water quality of each area.	The CV-SNMP Agencies completed the CV-SNMP Groundwater Monitoring Program Workplan (final report dated December 23, 2020), and the Regional Board approved the CV-SNMP Groundwater Monitoring Program Workplan in a letter dated February 21, 2021. The intent of the monitoring program is to provide groundwater data that is representative of all subbasins, subareas, and depth-specific aquifer systems within the Basin. The approved CV-SNMP Groundwater Monitoring Program Workplan is included as Appendix A and is summarized in Sections 2 and 3 of this workplan. Section 4.5 describes the process to define the *ambient water quality (AWQ) metric* in each management zone that will be used to estimate ambient water quality conditions and assess beneficial use protection. An AWQ metric is a technical method to estimate "ambient" N/TDS concentrations in each groundwater management zone. The purpose of AWQ metrics is to enable the comparison of ambient N/TDS concentrations in groundwater versus the beneficial-use thresholds and water quality objectives, and thereby indicate the state of beneficial use protection.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
13	Section 4.5	Page 47 of the Workplan states: The results of this task will provide the necessary information to: - Support subsequent tasks in this workplan to: • Set TDS objectives pursuant to CWC 13241(a): Past, present, and probable future beneficial uses of water As previously stated, per California Water Code § 13241 water quality objectives are established by the regional boards. It is appropriate for the CV SNMP stakeholders to recommend TDS water quality objectives, which the Regional Water Board will review and make a final determination regarding adoption into the Basin Plan. The Regional Water Board recommends deleting the word 'Set' TDS objectives and using the word 'Recommend' TDS objectives.	The CV SNMP Development Workplan has been revised to replace the word "Set" with the word "Recommend."
14	Section 4.5.1	Hydrologically vulnerable areas, as identified in the Groundwater Ambient Monitoring Assessment (GAMA) Groundwater Information System database, exist where soil or rock conditions are more vulnerable (or susceptible) to groundwater contamination, and where aggressive salt and nutrient management practices may be warranted. The Regional Water Board recommends including hydrologically vulnerable areas as one of the criteria to assist with delineation of management zones.	The CV SNMP Development Workplan has been revised to add "Location of hydrologically vulnerable areas as identified in the GAMA Groundwater Information System database" as one of the criteria to assist with delineation of management zones.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
15	Section 4.5.3	Page 48 of the Workplan states: *The current ambient nitrate and TDS concentrations will be compared to the beneficial-use thresholds to assess the current state of beneficial use protection*. Assimilative capacity is not synonymous with the amount of allowable degradation. The Regional Water Board recommends that the CV SNMP not only provide the technical basis for determining the degree of water quality degradation allowable, but to also identify the potential impacts/injury to the members of the public. The SNMP should identify costs associated with using water with elevated nitrates and TDS levels and if there are potential impacts to human health, safety, or the environment with the proposed changes to water quality [and assimilative capacity] over time.	Section 4.10 of the CV SNMP Development Workplan addresses the Regional Board recommendation in this comment. The numeric TDS objectives proposed in the CV-SNMP will be derived through a documented technical analysis described in the Workplan. The TDS objectives can be used by the Regional Board to determine the degree of water quality degradation allowable (if any). Section 4.10.2 describes that a written demonstration will be prepared, referencing all technical work performed in prior tasks, to illustrate how the CV-SNMP and its recommended TDS objectives collectively satisfy the requirements of CWC 13241, including the protection of beneficial uses. Section 4.10.3 describes that an antidegradation demonstration will be prepared to illustrate how the CV-SNMP and its recommended TDS objectives collectively satisfy the requirements of State Board Resolution 68-16 (the Antidegradation Policy), again including the protection of beneficial uses. The antidegradation demonstration also will include a socio-economic evaluation of, but not limited to: - The melded unit cost of the total water supply under the CV-SNMP. - The funding mechanisms available to the agencies responsible for CV-SNMP implementation and the cost impacts to those agencies and their rate payers. - The potential costs associated with using groundwater if the CV-SNMP projects higher N/TDS concentrations in the future. The antidegradation demonstration also will include the rationale for determining that the CV-SNMP is or is not justified by the socio-economic considerations.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
16	Section 4.5.3	Page 50 of the Workplan states: *The MODFLOW output files need to be assessed to determine whether they meet the requirements of the water-quality modeling and its cascading modeling approach*. The Regional Water Board recommends calibrating the model to demonstrate the model's ability to return reasonable results for historical measured conditions.	The two MODFLOW models are calibrated and are currently being updated and used to support SGMA compliance in the Mission Creek subbasin and the Indio subbasin.
17	Section 4.6.2	Page 50 of the Workplan states: *Vadose zone processes may be important to timing and magnitude of N/TDS loading to the saturated zone, particularly for return flows from the land surface through partially saturated sediments*. The Regional Water Board recommends the consideration of previously mentioned hyporheic zone research, which has demonstrated that the potential for salt and nutrient removal via vadose zone processes is measurable.	Section 4.6.2 has been revised to include "microbial processes in the hyporheic zone" as criteria to consider in developing modeling procedures for simulating the vadose zone.
18	Section 4.6.5	Page 51 of the Workplan states: *Colorado River water is a major source of supplemental water that supports groundwater basin sustainability and the economy of the Coachella Valley. The future N/TDS concentrations of Colorado River water will affect the quality of groundwater*. The Regional Water Board recommends that the CV SNMP include an evaluation of climate change on the availability and quality of the Colorado River water source. If the evaluation indicates that the Colorado River water quality will be negatively impacted, potentially degrading the quality of the Coachella Valley groundwater, mitigation measures must be identified and evaluated for potential implementation.	Climate change could potentially impact the quality of Colorado River Water. The following phrase has been added to Section 4.6.5 to describe what the Technical Consultant should review before recommending assumptions for N/TDS concentrations of Colorado River water for water-quality modeling over the planning period: "review available information on salinity projections for Colorado River water including any predicted impacts from climate change."

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
19	Section 4.6.6	Page 51 of the Workplan states: *The water-quality models will not be calibrated using traditional methods of model calibration to historical data targets*. The Regional Water Board recommends the SNMP include proxy tests for the calibration of the model to historically verifiable datasets.	The CV-SNMP Agencies agree that the water-quality models should be capable of simulating historically verifiable datasets. The introduction of Section 4.6 has been modified to state that the water-quality models should have "the ability to reasonably simulate groundwater-quality conditions over a historical period" and a new subsection has been added to the Workplan: *Section 4.6.6 Develop Procedures for Verifying the N/TDS Forecasting Tools*.
20	Section 4.7.1	The objective of this section is to develop a 'baseline' planning scenario that represents the current water supply plans and water management plans for the Coachella Valley. The baseline scenario must provide a discussion of the water quality of both imported (allochthonous) water and sources of groundwater replenishment originating in the basin (autochthonous). Also include a reasonable economic forecast of the direct effects associated with the projected nutrient and salt loading in the baseline scenario. A similar economic evaluation was conducted in the Central Valley Region.[3]	The CV-SNMP Development Workplan lays out a strategy to perform a holistic evaluation of *all* sources of salt and nutrient loading for the Baseline Scenario (as well as all CV-SNMP Scenarios). The economic analysis for the Baseline Scenario (and the CV-SNMP Scenarios) is described in Section 4.9. The text in Section 4.9.1 has been revised to include the potential need to analyze the costs associated with the effects of potential future increases in groundwater salinity.

[3] https://www.waterboards.ca.gov/rwqcb5/water_issues/salinity/library_reports_programs/econ_rpt_final.pdf

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
21	Section 4.7.2	Page 53 of the Workplan states: *The final simulation results of the Baseline Scenario will be evaluated to determine if CV-SNMP implementation measures are potentially necessary in the future to control N/TDS loading to protect the beneficial uses of groundwater in specific management zones*. Section 6.2.4.4 of the Policy states that a required component of the SNMP is "Implementation measures to manage or reduce the salt and nutrient loading in the basin on a sustainable basis and the intended outcome of each measure." Additionally, the Department of Water Resources (DWR) notified many of the CV SNMP Agencies through their affiliation as a Coachella Valley Groundwater Sustainability Agency (GSA) that their Groundwater Sustainability Plan (GSP) developed pursuant to the SGMA should continue investigations into ways to reduce water quality impacts associated with importing Colorado River water. The DWR recommended that the GSAs take aggressive steps to further quantify the nature and scope of water quality issues associated with importing water (allochthonous supply) into the Subbasin, establish reasonable and achievable standards, and begin to adopt and implement projects and management actions that will achieve sustainability with regard to groundwater quality, and to do so on an accelerated basis. The CV SNMP must identify and evaluate implementation measures that have the potential to control salt and nutrient loading and protect groundwater in the Coachella Valley on a sustainable basis.	The CV-SNMP Agencies believe that the CV-SNMP Development Workplan fully addresses the Regional Board's comment. The workplan lays out a strategy to perform a holistic evaluation of *all* sources of salt and nutrient loading, the expected future changes in groundwater quality, and any predicted impairment of beneficial uses of groundwater. Equipped with this information, the CV-SNMP Agencies will then explore and evaluate the effectiveness and costs of CV-SNMP implementation measures (i.e. projects and/or programs) to manage N/TDS loading, and then recommend a preferred CV-SNMP approach to the Regional Board that will protect beneficial uses of groundwater on a sustainable basis. This work will be performed in an open, transparent process through the TAC and CV-SNMP Stakeholder groups with Regional Board participation and input throughout.
22	Section 4.8	Pages 54 and 55 of the Workplan states: *Task 4.8 is necessary if Task 4.7 concludes that CV-SNMP implementation measures are potentially necessary in the future to protect the beneficial uses of groundwater in management zones. If not, then Tasks 4.8 and 4.9 in this workplan are not necessary to execute.* *The objective of Task 4.8 is to develop CV-SNMP implementation measures that have*	

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
		the potential to control N/TDS loading and protect beneficial uses of groundwater in the Coachella Valley on a sustainable basis. Section 4.8 of the Workplan is an essential component of the CV SNMP, and without it the impact of the SNMP is reduced to a groundwater monitoring plan. Including implementation measures in the CV SNMP is important as the SNMP has been identified as part of the groundwater management strategy for the Coachella Valley and is referenced in water management plans generated by the Coachella Valley Integrated Regional Water Management Planning (IRWMP) Group, the Urban Water Management Planning (UWMP) Group, and the GSAs. As previously stated, DWR's approval of the Coachella Valley GSP recommended implementing salt and nutrient management projects and actions that will achieve sustainability with regard to groundwater quality, and to do so on an accelerated basis. A major source of salt (TDS) entering the Coachella Valley groundwater resources is from groundwater augmentation using water imported into the basin from another location (allochthonous), i.e. the Colorado River. The CV SNMP must identify and evaluate management strategies that improve and enhance the allochthonous sources of groundwater augmentation and include how impacts to groundwater quality from imported supplies can be offset (mitigated) by replenishing the groundwater resource with higher quality water from sources originating in the basin (autochthonous), as demonstrated in other regions of the state,[4] as well as other strategies. The Regional Water Board recommends the CV SNMP propose management scenarios for consideration including descriptions of how implementation/mitigation measures will be specifically developed to manage or reduce	See response for Item 20 above. The CV-SNMP Agencies contend that it is premature to develop specific implementation measures at the "workplan stage" in the development of the CV-SNMP update. The CV-SNMP Development Workplan proposes to develop and evaluate implementation measures at the appropriate time: after the evaluation of historical and current groundwater quality; after the evaluation of all sources of N/TDS loading; after the delineation of management zones and the description of their beneficial uses; and after the evaluation of future N/TDS concentrations in management zones under the Baseline Scenario. Only then are the CV-SNMP Agencies, the Regional Board, and other CV-SNMP stakeholders in a knowledgeable position to recommend the appropriate location, type, and timing of implementation measures that will effectively and efficiently manage N/TDS concentration in groundwater to protect beneficial uses on a sustainable basis.

[4] https://www.usbr.gov/lc/socal/reports/LASGwtraugmentation/AppC.pdf

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
		the salt and nutrient loading in the basin on a sustainable basis and the intended outcome of each measure.	
23	Section 4.8.2	Page 56 of the Workplan states: *In this task, the recommended CV-SNMP Scenarios will be implemented in the models, the model simulations will be conducted, and the model results will be evaluated and compared against the Baseline Scenario for their effectiveness in controlling N/TDS loading and protecting beneficial uses*. If the groundwater model is not calibrated to historically verifiable accuracy, the use as a comparative tool may be subjective. The Regional Water Board recommends the SNMP include proxy tests for the calibration of the model to historically verifiable datasets.	A new subtask has been added to Task 4.6: *4.6.6 Develop Procedures for Verifying the N/TDS Forecasting Tools*. Task 4.7 has been revised to state that these procedures will be implemented during the construction of the water-quality models to demonstrate their ability to reasonably simulate historical groundwater-quality conditions.
24	Section 4.10	Page 58 of the Workplan states: *The objective of this task is to select a preferred CV-SNMP Scenario, which will form the basis for a CV-SNMP implementation plan and any required updates to the Basin Plan*. The Regional Water Board recommends deleting the word "required"' and using the word "recommended" in reference to updates to the Basin Plan.	The CV SNMP Development Workplan has been revised to replace the word "required" with the word "recommended."

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
25	Section 4.10.2	Page 59 of the Workplan states: *California Water Code (CWC) section 13241 lists the factors to consider when establishing water quality objectives without unreasonably affecting beneficial uses*. The Regional Water Board recommends that the economic evaluation include impacts related to elevated salinity in groundwater and consider the correlated impacts to the assigned beneficial use. The SNMP should also identify human health, safety, and environmental impacts associated with the potential adoption of TDS water quality objectives. It is the responsibility of the involved stakeholders developing the CV SNMP to solicit public input and approval.	The SNMP-Agencies agree that the CV-SNMP must include evidence and analysis to support findings required by California Water Code section 13241 and State Water Board Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality of Waters in California (Antidegradation Policy). In accordance with California Water Code section 13241, to establish water quality objectives in a water quality control plan, the Regional Board must consider certain factors related to the proposed water quality objectives, including "economic conditions" and the "need for developing housing within the region." Because the CV-SNMP may be used by the Regional Board to establish water quality objectives, the CV-SNMP will include sufficient evidence and analysis of all aspects of the "economic conditions," the "need for developing housing within the region" and the other factors in Section 13241 as they relate to the issues addressed in the CV-SNMP. In addition, in accordance with the Antidegradation Policy and Section 6.2.4.5 of the 2018 Water Quality Control Policy for Recycled Water, the CV-SNMP will include evidence and analysis demonstrating consistency with the Antidegradation Policy, including, but not limited to, evidence and analysis related to the "maximum benefit" to the people of the state related to the issues addressed in the CV-SNMP. The economic analysis for the Baseline Scenario (and the CV-SNMP Scenarios) is described in Section 4.9. The text in Section 4.9.1 has been revised to include the potential need to analyze the costs associated with the effects of potential future increases in groundwater salinity.

Item	Location	Regional Board Comment	Response from CV-SNMP Agencies
26	Section 4.10.3	Page 59 of the Workplan states: *An antidegradation demonstration will be prepared as required by Section 6.2.4.5 of the 2018 Policy. The objective will be to illustrate how the preferred CV-SNMP Scenario and N/TDS objectives collectively satisfy the requirements of State Board Resolution 68-16 (the Antidegradation Policy)*. Section 6.2.4.5 of the Policy states that one of the required components of the SNMP includes an antidegradation analysis. The antidegradation analysis must consider all past (since 1968), current, and future salt and nutrient loading that is anticipated to occur under the preferred CV SNMP Scenario, and how this has and will continue to affect groundwater quality. The analysis should consider the changes in population and land use practices and their impacts to groundwater quality. The results of the antidegradation analysis will potentially identify hydrologically sensitive areas and direct the CV SNMP Agencies to evaluate the need for and the degree of management or mitigation and regulatory oversight that will be required to protect water quality.	The CV-SNMP Development Workplan includes an anti-degradation analysis that will satisfy the requirements of State Board Resolution 68-16 (Section 4.10) and will address the Regional Board recommendations in this comment.

Colorado River Basin Regional Water Quality Control Board

June 30, 2021

Jim Barrett
General Manager
Coachella Valley Water District
75515 Hovley Lane East
Palm Desert, California 92211
jbarrett@cvwd.org

SUBJECT: COMMENTS TO DRAFT WORKPLAN TO DEVELOP THE COACHELLA VALLEY SALT AND NUTRIENT MANAGEMENT PLAN

Dear Mr. Barrett,

On May 3, 2021, the California Regional Water Quality Control Board, Colorado River Basin Region (Regional Water Board) received the *Draft Workplan to Develop the Coachella Valley Salt and Nutrient Management Plan* (Workplan), submitted by West Yost Associates on behalf of the Coachella Valley Salt and Nutrient Management Plan (CV SNMP) Agencies. The Workplan discusses the CV SNMP background and objectives, the basin setting, the groundwater monitoring program, the development and implementation of the CV SNMP Workplan. The Regional Water Board has reviewed the Workplan and provides the comments contained within this letter.

The Workplan addresses the required SNMP components listed in Section 6.2.4 of the State of California Water Quality Control Board's (State Water Board) Resolution No. 2018-0057 *Amendment to the Policy for Water Quality Control for Recycled Water* (Policy). The Regional Water Board understands the details of the SNMP components will be developed over time through the efforts of the Technical Advisory Committee (TAC) and is providing preliminary comments to promote development of a CV SNMP that will sustainably manage impacts from salts and nutrients now and in the long term, thereby protecting the groundwater resource for future generations.

The following are the Regional Water Board's comments on specific sections of the Workplan.

Section 1.0 Background and Objectives of the CV SNMP

Page 1 of the Workplan states:

The objective of the CV-SNMP is to sustainably manage salt and nutrient loading in the Coachella Valley Groundwater Basin in a manner that protects its beneficial uses.

Regional Water Board Comment

Sustainability focuses on meeting the needs of the present without compromising the ability of future generations to meet their needs. The Sustainable Groundwater Management Act (SGMA) considers sustainable groundwater management to be occurring within a basin that is operated in such a way so as not to cause "undesirable results," such as chronic depletion of groundwater, groundwater degradation, or land subsidence.

The Regional Water Board recommends the TAC develop a plan to manage identified salt and nutrient loading sources and provide a definition of what beneficial use protection will consist of, integrating the antidegradation analysis into the stakeholder's definition of protected.

Section 1.3 Update of the CV SNMP

Page 7 of the Workplan states:

CV-SNMP Agencies have concluded that numeric objectives for [total dissolved solids] TDS and nitrate in groundwater are necessary to resolve the concerns of the Regional Board.

Regional Water Board Comment

Identifying a water quality objective is necessary to determine the assimilative capacity of the aquifer. To assess the assimilative capacity of salts, the 2015 CV SNMP cited the "upper limit" Secondary Maximum Contaminant Level (SMCL) of 1,000 milligrams per liter (mg/l) as the water quality objective for total dissolved solids (TDS) excluding the more protective and "recommended limit" SMCL of 500 mg/l. The water quality data indicated that many areas within the basin had TDS concentrations that were less than 500 mg/l (the lower "recommended limit" of the SMCL range). Resolution No. 68-16, Statement of Policy with Respect to Maintaining High Quality Waters in California (Antidegradation Policy) states "Whereas the quality of some waters of the State is higher than that established by the adopted policies and it is the intent and purpose of this Board that such higher quality shall be maintained to the maximum extent possible consistent with the declaration of the Legislature; ..."

The Regional Water Board recommends that the SNMP provide the scientific basis including an antidegradation analysis for any proposed water quality objectives.

<u>Section 1.3.1 Process to Prepare the CV SNMP Development Workplan</u>

Page 8 of the Workplan states:
*The CV-SNMP Development Workplan must address each of these factors in **setting** the TDS objectives for groundwater management zones.*

Regional Water Board Comment

California Water Code § 13241 [Water quality objectives] states that "Each regional board shall establish water quality objectives in water quality control plans as in its judgment will ensure the reasonable protection of beneficial uses and the prevention of nuisance; ..." The CV SNMP stakeholders may present recommendations regarding TDS water quality objectives, which the Regional Water Board will review and make a final determination regarding adoption into the Water Quality Control Plan for the Colorado River Basin Region (Basin Plan).

The Regional Water Board recommends deleting the word 'setting' and using the word 'recommending' TDS objectives for groundwater.

<u>Section 2.0 Study Area Setting</u>
<u>Section 2.2.2 Occurrence and Movement of Groundwater</u>

Page 12 of the Workplan describes the general occurrence of groundwater, and how groundwater flows through and discharges from each subbasin.

Regional Water Board Comment

Publicly available data on the San Jacinto Tunnel installed through fractured bedrock in the 1930's and operated by Metropolitan Water District (MWD) reports that the fractured crystalline bedrock units contain and convey a substantial amount of water in the subsurface. The concept of a "mega-watershed groundwater system" from mountain block recharge is provided in the works of Robert Bisson and Jay Lehr[1].

In that mountain front recharge is identified later in the CV SNMP, Regional Water Board suggests the inclusion of a discussion on the water bearing nature of the surrounding fractured bedrock units.

<u>Section 2.3.2 Transport and Discharge of N/TDS in the Saturated Zone</u>

Page 14 identifies the mechanisms by which salts and nutrients are discharged from each subbasin.

Regional Water Board Comment

Dr. John Wilson's (New Mexico Tech) work provides strong research in regard to the removal of salts and nutrients through microbial activity[2]. Specifically, see Dr. Wilson's

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[1] https://www.oregondigital.org/downloads/oregondigital:df710j60x

[2] John Wilson: New Mexico Tech (nmt.edu)

study of salt and nutrient uptake and removal where there is mixing of shallow groundwater and surface water (hyporheic zone)[3].

The Regional Water Board recommends evaluating microbial uptake as a salt and nutrient management mechanism.

Section 4.0 Coachella Valley SNMP Development Workplan
Section 4.2 Establish CV-SNMP Stakeholder Group and Technical Advisory Committee

> Page 39 of the Workplan states:
> *The objective of this task is to convene a CV-SNMP Stakeholder Group and the CV-SNMP Technical Advisory Committee (TAC). The CV-SNMP Agencies and the selected consultants will organize and **run** both groups during the implementation of the CV-SNMP Development Workplan.*

Regional Water Board Comment
A locally driven and controlled, collaborative process open to all stakeholders and the regional water board will contribute to the development of a CV SNMP that will manage salts and nutrients on a basin-wide basis and achieve the goals of groundwater sustainability, recycled water use, and water quality protection.

The Regional Water Board recommends deleting the word "run" and adding a different word or words such as "will facilitate".

Section 4.2.1 Convene the CV-SNMP Stakeholder Group

> Page 40 of the Workplan states:
> *Potential stakeholders include but are not limited to: the agricultural community and groups; golf course industry groups; tribes; the Coachella Valley Regional Water Management Group; the Groundwater Sustainability Agencies in the Coachella Valley; all major water and wastewater agencies; industrial dischargers; county and city land use planning agencies; Federal and State agencies; and non-governmental organizations (NGOs).*
>
> *A critical first step will be to solicit input from the CV-SNMP Stakeholder Group as to their issues, needs and wants. This information will be collected up front so the CV-SNMP Agencies and consultants can proactively address stakeholder concerns, and potentially incorporate them in the CV-SNMP development process.*

Regional Water Board Comment
Achieving the goals of groundwater sustainability, recycled water use, and water quality protection is best achieved through the management of salts and nutrients on a basin-wide basis through collaborative processes open to all stakeholders. Documenting and addressing the input from an all-inclusive stakeholder group will help identify the water

[3] https://www.sciencedirect.com/topics/earth-and-planetary-sciences/hyporheic-zone

use needs of a diverse population and address historical and state-wide SNMP development challenges identified during the 2018 Policy revision such as managing salt and nutrient loading to the basin from sources other than recycled water and the ability/authority of the stakeholders to implement best management practices and salt and nutrient management measures.

The Regional Water Board encourages the CV SNMP Agencies to keep all-inclusiveness as a priority and involve all major stakeholders[4] within the basin. The CV SNMP Agencies should also consider the inclusion of significant stakeholders from outside the basin such as The Colorado River Basin Salinity Control Program[5] and the MWD.

Section 4.2.2 Convene the Technical Advisory Committee

Page 40 of the Workplan states:
Regional Board staff will be encouraged to participate on the TAC in an advisory role.

Regional Water Board Comment

Regional Water Board understands that critical details and decisions to develop an adequate CV SNMP will be established through the TAC and are committed to working with this committee.

Section 4.3 Characterize N/TDS Loading to the Groundwater Basin

Page 40 of the Workplan states:
The objective of this task is to quantify the individual components of N/TDS (nitrate and TDS) loading to groundwater.

Page 41 of the Workplan states:
The characterization of N/TDS loading will be performed for a recent historical period to the present to characterize seasonal variations and long-term trends in loading and generate estimates of N/TDS loads in the vadose zone. The length of the historical period will be defined as part of this task but should be long enough to characterize the N/TDS loads in the vadose zone.

Regional Water Board Comments

The following comment pertains to statements made on Page 40 of the Workplan: Mountain front recharge has been identified as a potential source of aquifer recharge originating from within the basin's watershed.

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[4] untitled (nationalaglawcenter.org)

[5] Colorado River Basin Salinity Control Program | Upper Colorado Basin | Bureau of Reclamation (usbr.gov)

The Regional Water Board recommends quantifying the salt and nutrient loading from the mountain front recharge component through evaluation of representative bedrock springs as indicators of the hydrologic conditions of the fractured bedrock units.

The following comment pertains to statements made on Page 41 of the Workplan: The required antidegradation analysis component of the CV SNMP, discussed in Section 4.10.3 of the Workplan, will need to incorporate a discussion on the impacts of elevated salinity to the public and the public infrastructure since 1968.

The Regional Water Board recommends evaluation of past nitrate and salt (TDS) loading estimates for each management zone extending at least to 1968.

Section 4.3.2 Characterize Historical and Current N/TDS Loading

Page 42 of the Workplan states:
Once the methods are finalized, the time-history of the volumes and associated N/TDS concentrations will be estimated and described for each N/TDS loading term.

Regional Water Board Comment
The CV SNMP must identify what 'methods' the Workplan is referring to.

Section 4.4 Characterize Current Groundwater Quality

The objective of this task is to characterize nitrate and TDS concentrations in groundwater as of 2020 (i.e. current conditions). The characterization will include an analysis of the time history of nitrate and TDS concentrations in groundwater that led to current conditions.

Regional Water Board Comment
The Regional Water Board concurs that establishing existing water quality is necessary to compute the potential existence and magnitude of assimilative capacity for a basin, subbasin, or management zone and supports other proposed Workplan tasks; and also agree that the proposed evaluation of past water quality will assist with an understanding of nitrate and TDS historical trends in groundwater.

The Regional Water Board expects the fully developed groundwater monitoring plan to provide groundwater quality data that is representative of the management zones and encourages the TAC to develop a technically defensible method to evaluate the ambient water quality of each area.

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

Page 47 of the Workplan states:
The results of this task will provide the necessary information to:

- *Support subsequent tasks in this workplan to:*
    - ***Set TDS objectives** pursuant to CWC 13241(a): Past, present, and probable future beneficial uses of water.*

Regional Water Board Comment
As previously stated, per California Water Code § 13241 water quality objectives are established by the regional boards. It is appropriate for the CV SNMP stakeholders to recommend TDS water quality objectives, which the Regional Water Board will review and make a final determination regarding adoption into the Basin Plan.

The Regional Water Board recommends deleting the word 'Set' TDS objectives and using the word 'Recommend' TDS objectives.

Section 4.5.1 Delineate Draft Groundwater Management Zones

The objective of this task is to identify criteria and delineate management zones.

Regional Water Board Comment
Hydrologically vulnerable areas, as identified in the Groundwater Ambient Monitoring Assessment (GAMA) Groundwater Information System database, exist where soil or rock conditions are more vulnerable (or susceptible) to groundwater contamination, and where aggressive salt and nutrient management practices may be warranted.

The Regional Water Board recommends including hydrologically vulnerable areas as one of the criteria to assist with delineation of management zones.

Section 4.5.3 Define Ambient Water Quality Metrics and Determine Current Protection of Beneficial Uses

Page 48 of the Workplan states:

The current ambient nitrate and TDS concentrations will be compared to the beneficial-use thresholds to assess the current state of beneficial use protection.

Regional Water Board Comment

Assimilative capacity is not synonymous with the amount of allowable degradation.

The Regional Water Board recommends that the CV SNMP not only provide the technical basis for determining the degree of water quality degradation allowable, but to also identify the potential impacts/injury to the members of the public. The SNMP should identify costs associated with using water with elevated nitrates and TDS levels and if there are potential impacts to human health, safety, or the environment with the proposed changes to water quality [and assimilative capacity] over time.

Section 4.6.1 Evaluate Existing MODFLOW Models

Page 50 of the Workplan states:

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

Regional Water Board Comment

The Regional Water Board recommends calibrating the model to demonstrate the model's ability to return reasonable results for historical measured conditions.

Section 4.6.2 Develop Procedures for Simulating Vadose Zone Processes

Page 50 of the Workplan states:

Vadose zone processes may be important to timing and magnitude of N/TDS loading to the saturated zone, particularly for return flows from the land surface through partially saturated sediments.

Regional Water Board Comment

The Regional Water Board recommends the consideration of previously mentioned hyporheic zone research, which has demonstrated that the potential for salt and nutrient removal via vadose zone processes is measurable.

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

Page 51 of the Workplan states:

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

Regional Water Board Comment

The Regional Water Board recommends that the CV SNMP include an evaluation of climate change on the availability and quality of the Colorado River water source. If the evaluation indicates that the Colorado River water quality will be negatively impacted, potentially degrading the quality of the Coachella Valley groundwater, mitigation measures must be identified and evaluated for potential implementation.

Section 4.6.6 Develop Procedures for Post-Processing Model Results

Page 51 of the Workplan states:

The water-quality models will not be calibrated using traditional methods of model calibration to historical data targets.

Regional Water Board Comment
The Regional Water Board recommends the SNMP include proxy tests for the calibration of the model to historically verifiable datasets.

Section 4.7.1 Develop a Baseline Scenario based on the SGMA Alternative Plans

The objective of this section is to develop a 'baseline' planning scenario that represents the current water supply plans and water management plans for the Coachella Valley.

Regional Water Board Comment
The baseline scenario must provide a discussion of the water quality of both imported (allochthonous) water and sources of groundwater replenishment originating in the basin (autochthonous). Also include a reasonable economic forecast of the direct effects associated with the projected nutrient and salt loading in the baseline scenario. A similar economic evaluation was conducted in the Central Valley Region[6].

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

Page 53 of the Workplan states:

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

Regional Water Board Comment
Section 6.2.4.4 of the Policy states that a required component of the SNMP is "Implementation measures to manage or reduce the salt and nutrient loading in the basin on a sustainable basis and the intended outcome of each measure." Additionally, the Department of Water Resources (DWR) notified many of the CV SNMP Agencies through their affiliation as a Coachella Valley Groundwater Sustainability Agency (GSA) that their Groundwater Sustainability Plan (GSP) developed pursuant to the SGMA should continue investigations into ways to reduce water quality impacts associated with importing Colorado River water. The DWR recommended that the GSAs take aggressive steps to further quantify the nature and scope of water quality issues associated with importing water (allochthonous supply) into the Subbasin, establish reasonable and achievable standards, and begin to adopt and implement projects and management actions that will achieve sustainability with regard to groundwater quality, and to do so on an accelerated basis.

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6 https://www.waterboards.ca.gov/rwqcb5/water_issues/salinity/library_reports_programs/econ_rpt_final.pdf

The CV SNMP must identify and evaluate implementation measures that have the potential to control salt and nutrient loading and protect groundwater in the Coachella Valley on a sustainable basis.

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

Pages 54 and 55 of the Workplan states:

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

The objective of Task 4.8 is to develop CV-SNMP implementation measures that have the potential to control N/TDS loading and protect beneficial uses of groundwater in the Coachella Valley on a sustainable basis.

Regional Water Board Comment

Section 4.8 of the Workplan is an essential component of the CV SNMP, and without it the impact of the SNMP is reduced to a groundwater monitoring plan. Including implementation measures in the CV SNMP is important as the SNMP has been identified as part of the groundwater management strategy for the Coachella Valley and is referenced in water management plans generated by the Coachella Valley Integrated Regional Water Management Planning (IRWMP) Group, the Urban Water Management Planning (UWMP) Group, and the GSAs. As previously stated, DWR's approval of the Coachella Valley GSP recommended implementing salt and nutrient management projects and actions that will achieve sustainability with regard to groundwater quality, and to do so on an accelerated basis.

A major source of salt (TDS) entering the Coachella Valley groundwater resources is from groundwater augmentation using water imported into the basin from another location (allochthonous), i.e. the Colorado River. The CV SNMP must identify and evaluate management strategies that improve and enhance the allochthonous sources of groundwater augmentation and include how impacts to groundwater quality from imported supplies can be offset (mitigated) by replenishing the groundwater resource with higher quality water from sources originating in the basin (autochthonous), as demonstrated in other regions of the state[7], as well as other strategies.

The Regional Water Board recommends the CV SNMP propose management scenarios for consideration including descriptions of how implementation/mitigation measures will be specifically developed to manage or reduce the salt and nutrient loading in the basin on a sustainable basis and the intended outcome of each measure.

[7] https://www.usbr.gov/lc/socal/reports/LASGwtraugmentation/AppC.pdf

Section 4.8.2 Evaluate CV-SNMP Scenarios

Page 56 of the Workplan states:

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

Regional Water Board Comment

If the groundwater model is not calibrated to historically verifiable accuracy, the use as a comparative tool may be subjective. The Regional Water Board recommends the SNMP include proxy tests for the calibration of the model to historically verifiable datasets.

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

Page 58 of the Workplan states:

*The objective of this task is to select a preferred CV-SNMP Scenario, which will form the basis for a CV-SNMP implementation plan and any **required** updates to the Basin Plan.*

Regional Water Board Comment

The Regional Water Board recommends deleting the word "required'" and using the word "recommended" in reference to updates to the Basin Plan.

Section 4.10.2 Set TDS Objectives based on CWC 13241

Page 59 of the Workplan states:

California Water Code (CWC) section 13241 lists the factors to consider when establishing water quality objectives without unreasonably affecting beneficial uses.

Regional Water Board Comment

The Regional Water Board recommends that the economic evaluation include impacts related to elevated salinity in groundwater and consider the correlated impacts to the assigned beneficial use. The SNMP should also identify human health, safety, and environmental impacts associated with the potential adoption of TDS water quality objectives. It is the responsibility of the involved stakeholders developing the CV SNMP to solicit public input and approval.

Section 4.10.3 Document Antidegradation Demonstration Pursuant to State Board Policy 68-16

Page 59 of the Workplan states:

An antidegradation demonstration will be prepared as required by Section 6.2.4.5 of the 2018 Policy. The objective will be to illustrate how the preferred CV-SNMP Scenario and N/TDS objectives collectively satisfy the requirements of State Board Resolution 68-16 (the Antidegradation Policy).

Regional Water Board Comment
Section 6.2.4.5 of the Policy states that one of the required components of the SNMP includes an antidegradation analysis. The antidegradation analysis must consider all past (since 1968), current, and future salt and nutrient loading that is anticipated to occur under the preferred CV SNMP Scenario, and how this has and will continue to affect groundwater quality. The analysis should consider the changes in population and land use practices and their impacts to groundwater quality. The results of the antidegradation analysis will potentially identify hydrologically sensitive areas and direct the CV SNMP Agencies to evaluate the need for and the degree of management or mitigation and regulatory oversight that will be required to protect water quality.

The Regional Water Board welcomes this opportunity to provide comments, appreciates your organization's efforts in assisting in the development of this Workplan and encourages continued outreach efforts to other stakeholders in the Coachella Valley. Please contact Greg Middleton, PG, CHG at (760) 776-8982 or greg.middleton@waterboards.ca.gov or Cathy Sanford at (760) 776-8934 or cathy.sanford@waterboards.ca.gov with any questions.

Sincerely,

Cassandra Owens
Assistant Executive Officer
Colorado River Basin
Regional Water Quality Control Board

PR/CS/gm

cc: City of Palm Springs Wastewater Treatment Plant
Joel Montalvo, Joel.Montalvo@palmspringsca.gov
Donn Uyeno, Donn.Uyeno@palmspringsca.gov

Coachella Valley Water District
J. M. Barrett, jbarrett@cvwd.org
Melanie Garcia, melanie.garcia@cvwd.org
Robert Cheng, rcheng@cvwd.org
Dan Charlton, dcharlton@cvwd.org
Steve Bigley, sbigley@cvwd.org
Zoe Rodriguez del Rey, zrodriguezdelrey@cvwd.org

Mailing List (continued)

Coachella Water Authority
Castulo Estrada, cestrada@coachella.org
Berlinda Blackburn, bblackburn@coachella.org

Desert Water Agency
Mark S. Krause, MKrause@dwa.org
Ashley Metzger, ametzger@dwa.org
Sarah Rapolla, sarah@dwa.org

Indio Water Authority
Trish Rhay, trhay@indio.org
Reymundo Trejo, rtrejo@indio.org

Mission Springs Water District
Arden Wallum, awallum@mswd.org
Brian Macy, bmacy@mswd.org
Steve Ledbetter, sledbetter@tkeengineering.com

Myoma Dunes Mutual Water Company
Mark Meeler, markmeeler@myomawater.com
Michele Donze, michele@myomawater.com
Audrey Dean, secretary@myomawater.com

Valley Sanitary District
Beverli Marshall, bmarshall@valley-sanitary.org
Ron Buchwald, rbuchwald@valley-sanitary.org

West Yost Associates
Andy Malone, amalone@westyost.com
Samantha Adams, sadams@westyost.com