Appendix B. Delta-Mendota Subbasin Common Chapter

DELTA-MENDOTA SGMA

July 20, 2022

Paul Gosselin
California Department of Water Resources
715 P Street
Sacramento, CA 95814

Re: Response to 'Incomplete' Determination Letter for the Delta-Mendota Subbasin

Dear Mr. Gosselin:

The Delta-Mendota Subbasin (Subbasin) received a Consultation Initiation Letter (CIL) on January 21, 2022 from the California Department of Water Resources (DWR). The CIL identified four potential deficiencies across the six Subbasin Groundwater Sustainability Plans (GSPs) which may preclude DWR's approval of the GSPs, as well as potential corrective actions to address each potential deficiency. The CIL initiated consultation between DWR, the Basin Manager, GSP Managers, and the Subbasin's 23 Groundwater Sustainability Agencies (GSAs) on February 18, 2022 regarding the amount of time needed to address the potential deficiencies and corrective actions. Subsequent meetings with DWR were held on March 7, March 30, April 19, and May 24, 2022 to discuss the Subbasin's proposed approach to addressing the identified deficiencies.

This letter has been prepared in response to the deficiencies identified in the CIL, based on direction provided by the Delta-Mendota Subbasin Coordination Committee (Coordination Committee), the Delta-Mendota Technical Working Group (Technical Working Group), the Subbasin GSAs, and DWR. It is intended to document how the deficiencies identified in the CIL were addressed in the revised GSPs and associated Common Chapter, and where those revisions are addressed in the Common Chapter.

The four deficiencies identified in DWR's CIL are summarized as follows:

Potential Deficiency 1: The GSPs do not use the same data and methodologies.

Potential Deficiency 2: The GSPs have not established common definitions of undesirable results in the Subbasin.

Potential Deficiency 3: The GSPs in the Subbasin have not set sustainable management criteria in accordance with GSP regulations.

Potential Deficiency 4: The management areas established in the Plan have not sufficiently addressed the requirements specified in 23 CCR §354.20.

Response to Potential Deficiency 1

DWR's Deficiency 1 focused on the water budget (and associated water budget components), change in groundwater storage and sustainable yield as presented in the Common Chapter. For this deficiency, DWR stated that "...the Plan lacks detail and confirmation that the six GSPs not only consider the other

GSPs within and adjacent to the Subbasin but have addressed the regulatory aspects of Sustainable Groundwater Management Act (SGMA) in a manner that substantially complies with the GSP Regulations." Additionally, DWR stated that "Department staff find that the Plan for the Subbasin does not utilize same data and methodologies to support the various water budget, change in storage, and sustainable yield approaches; therefore, it is unclear how the GSAs will reach, let alone track, sustainability throughout the Subbasin in a coordinated manner." To address this deficiency, DWR recommended that "The 23 GSAs developing the six GSPs should provide supporting information that is sufficiently detailed and provide explanations that are sufficiently thorough and reasonable to explain how the various components of each GSP will together achieve the Subbasin's common sustainability goal. The explanation should describe how the sustainable management criteria established for each GSP (including management areas if applicable) relate to each other and how they are collectively informed by the basin setting, including the water budget, change in groundwater storage, and sustainable yield, on the Subbasin-wide level."

To address Deficiency 1, the Technical Working Group and Coordination Committee met on multiple occasions during the period from February through June of 2022 to clarify and explain how the six GSPs utilized common data and methodologies to develop the Subbasin water budget, change in groundwater storage, and sustainable yield.

Use of Common Data and Methodologies

The CIL indicates that "a statement that the GSPs are coordinated without accompanying explanation is not sufficient coordination" and goes on to state that "Department staff find that the Plan for the Subbasin does not utilize same data and methodologies to support the various water budget, change in storage, and sustainable yield approaches; therefore, it is unclear how the GSAs will reach, let alone track, sustainability throughout the Subbasin in a coordinated manner."

The following subsections summarize how the 23 GSAs and their respective six GSPs coordinated and used the same data and methodologies to support the "sum-of-the-parts" approach to compiling water budgets at the Subbasin-level using the same data and methods, as required by the SGMA and GSP Emergency Regulations, and is intended to explain and document revisions to the Common Chapter regarding the water budgets, change in storage, and calculation of Subbasin sustainable yields.

Water Budget

Regarding coordination and use of the same data and methodologies for water budget development, the CIL states that "while the categories of inflows and outflows were agreed upon by the Coordination Committee for the land surface budget and groundwater budget, each of the GSP areas prepared separate water budgets using different modeling methods while often relying upon customized hydrogeological conceptual models which were then 'rolled-up' to the Subbasin level." DWR stated that "it is uncertain whether the outflow from a particular GSP within the Subbasin is comparable to the inflow from an adjacent GSP area, as there is no coordinated explanation provided in the Plan." Additionally, the CIL states that "some of the GSP groups used numerical models to calculate the inflows and outflows from the respective GSP areas while others used non-numerical and spreadsheet models – there was no explanation in the Common Chapter that indicated how these differing modeling approaches used the same data or methodology." The CIL also references Technical Memoranda #1 and #3, *Common Datasets and Assumptions used in the Delta-Mendota Subbasin GSPs* and *Assumptions for the Historic, Current and Projected Water Budgets of the Delta-Mendota Subbasin, Change in Storage Cross-Check and Sustainable Yield*, respectively.

The purpose of the eight Technical Memoranda appended to the Common Chapter is to document the use of common data and methodologies across the six Subbasin GSPs pursuant to Water Code Section 10727.6 and Title 23, California Code of Regulations (CCR), Section 357.4 and as described in the Subbasin Coordination Agreement. In preparing the water budgets, each GSP group coordinated use of publicly available data sets along with the best available data for their GSP region. While the same data sources were used, the terminology used to describe those data sets were not consistent across the Subbasin. The Delta-Mendota Subbasin GSAs acknowledge additional detail is needed to demonstrate that all water budget components across the six Subbasin GSPs utilize the same data sources and methodologies. As such, subsequent to receipt of the CIL, the Technical Working Group met to identify the specific data used and to develop a consistent terminology for the various water budget components. Additionally, the Technical Working Group attempted to simplify the presentation of the Subbasin water budgets.

During development of the original GSPs, the Technical Working Group met monthly to ensure modeling methods and approaches were comparable and consistent between the six Subbasin GSP water budgets, including using comparable inflows and outflows between GSP regions. (Please note that all meetings were held according to the Brown Act and meeting notes available at deltamendota.org). Technical Memorandum #1 appended to the Common Chapter states that "boundary flows were evaluated by comparing inflows and outflows assessed by each GSP Group's water budget analyses and associated data, as well as groundwater flow trends from groundwater contours and hydrogeologist input. Each set of neighboring GSP Groups had independent meetings to coordinate and compare their respective contributions to inflows and outflows, and the results were provided and discussed by the Technical Working Group and Coordination Committee." Regarding the use of numerical, analytical, and spreadsheet models by the six Delta-Mendota GSP groups, Technical Memorandum #3 appended to the Common Chapter documents meetings held in September and November 2017 with DWR representatives to discuss the use of numerical and analytical models in the Subbasin, demonstrating that the hydrologic principles and equations used for both types of modeling in the Delta-Mendota Subbasin are the same.

Following receipt of the CIL, the six Delta-Mendota GSP groups agreed to a set of common simplified definitions for water budget components, and mapped their prior water budget components to the new common definitions. Table CC-8 in the revised Common Chapter documents the data sources utilized in each of the six Subbasin GSPs' historical (Water Year [WY] 2003 to 2012) and current (WY 2013) water budgets according to the common simplified water budget component definitions, and Table CC-9 includes the same information for the projected (WY 2014-2070) water budget. No water budget data were modified during this mapping process. And, as previously noted, efforts were made to use the same data sources throughout the Subbasin where available, due to variability in data availability throughout the Subbasin, the best available data were used and characterized appropriately.

The revised water budgets contained in the redline version of the Common Chapter utilize the simplified list of coordinated water budget components that use the same data sources and methods as contained in the original water budgets, but mapped to the agreed-upon set of consistent terminology. The revised land surface budget and groundwater budget tables that align with the revised data categories are presented respectively for the historical water budget in Tables CC-10 and CC-11, for the current water budget in Tables CC-12 and CC-13, and for the projected water budget with climate change factors and projects and management actions in Tables CC-14 and CC-15. Narrative describing the simplified set of water budget components can be found starting on page CC-131 of the revised Common Chapter.

Change in Storage

DWR's CIL states that "additional explanation of historical, current, and projected change in groundwater storage for the Subbasin is warranted, as well as a straightforward quantification of overdraft throughout the Subbasin. The compilation of water budgets and the estimation of change in groundwater storage for the Subbasin does not appear to use the same data and methodology, or the Plan lacks adequate explanation for how or why the various approaches in the GSPs can be considered as using the same data and methodologies."

Additionally, the CIL stated "The explanation related to coordinated change in storage calculations and water budgets is insufficient, especially since information presented in text, and data displayed in figures and tables, do not seem to correlate with each other and it is uncertain what the current loss of storage is throughout the Subbasin. Statements in Common Chapter Section 4.2.3, state that, 'For information on how change in storage was calculated, refer to Section 4.3.3 – *Water Budgets of this Common Chapter.*' However, Section 4.3.2 only states, 'Individual historical, current, and projected water budgets were developed by each GSP Group for their respective Plan Area. For more information on the development of those water budgets, as well as tabular and graphical representation of the results, refer to the respective sections of the individual GSPs.' This fragmented and multi-staged presentation of information is insufficient to demonstrate that the various GSPs are coordinated – Section 4.2.3 of the Common Chapter refers readers to Section 4.3.2, which then refers readers to six different GSP sections. For the Upper Aquifer, four methods [were] chosen by the respective GSP regions and summed to a subbasin total." The CIL also noted, for the Lower Aquifer, "... two methods [were] chosen by the respective GSP regions and summed to a Subbasin total."

The change in groundwater storage from the Upper Aquifer was calculated using the coordinated water budgets at the Subbasin level. Water level hydrographs and groundwater storage coefficients were used to cross-check the inputs to the water budget. All six GSPs used observed land subsidence to determine Lower Aquifer change in groundwater storage. Where data were available, water budgets for the Lower Aquifer were used as a cross-check. In response to both comments (Upper and Lower Aquifer changes in groundwater storage), please refer to Table CC-8 and Table CC-9 in the revised Common Chapter (with associated narrative found on pages CC-137 through CC-138) for information regarding the use of same data and methodologies used to calculate change in storage across the six Subbasin GSPs for the historical, current, and projected water budgets, respectively, with Subbasin-level change in storage presented in Table CC-11 for the historical water budget, Table CC-13 for the current water budget, and Table CC-15 for the projected water budget.

Finally, the CIL noted a discrepancy in compiled cumulative change in storage values presented in the Common Chapter. The text on page CC-98 of the Common Chapter has been edited to address a typographical error and provide the correct cumulative change in storage in each principal aquifer between WYs 2003 and 2013, which is -624,000 acre-feet in the Upper Aquifer and -375,000 acre-feet in the Lower Aquifer.

Sustainable Yield

The CIL states: "The Common Chapter (Section 4.3.4) and Technical Memoranda #3 address the methodology for calculating sustainable yield in the Subbasin. Of the six GSPs, three provide a sustainable yield specifically for the GSP area while the other three rely upon the estimate for the entire Subbasin." The CIL also notes that "as indicated throughout the Plan, a sustainable yield estimate is not established for each GSP area and those estimates are not correlated with undesirable results." The CIL also notes, under Deficiency 2, that common definitions for significant and unreasonable were not established at the Subbasin level and there were 17 management areas that created uncertainties as to how the SMCs were coordinated with the sustainable yield.

In response to these comments, the Subbasin has now established common definitions in response to Deficiency 2, and has removed the designation of management areas in response to Deficiency 4. Sustainable yield for each principal aquifer is discussed starting on page CC-150.

Additional Coordination Components

DWR's CIL also questions the use of same data and methodologies for groundwater elevation data, groundwater extraction data, surface water supply data, and total water use data (defined as evapotranspiration in the historical, current, and projected water budgets). All of these components are inputs into the coordinated water budget; see Tables CC-8 and CC-9 and the associated water budget narrative beginning on page CC-131 of this revised Common Chapter.

Response to Potential Deficiency 2

The CIL for potential deficiency 2 states, "The GSPs have not established common definitions of undesirable results in the Subbasin." To address this deficiency, DWR's recommended corrective action was that the GSAs "...should modify each of their respective GSPs, as well as any applicable coordination materials, to substantially comply with the GSP Regulations and define undesirable results in a manner that addresses groundwater conditions occurring throughout the Subbasin..."

The Technical Working Group and Coordination Committee met to develop, at a Subbasin level, coordinated definitions and methods for establishing sustainable management criteria (SMC) for each applicable sustainability indicator. These revised definitions, and the associated numeric SMC developed using the agreed-upon methodologies, are summarized in the revised Common Chapter (see Tables CC-16 through CC-23 and Figures CC-65 through CC-70) and in the respective Sustainable Management Criteria chapters of each Subbasin GSP. Additionally, see the Response to Potential Deficiency 3, below, for more information relative to the development of the coordinated SMC.

Response to Potential Deficiency 3

DWR's Deficiency 3 comments built on their Deficiency 2 comments, stating that the Subbasin did not comply with the Emergency GSP Regulations in establishing common definitions and methodologies for SMC. In response to these comments, the six individual GSPs have been revised to reflect the agreed-upon Subbasin-wide sustainability goal as stated on page CC-153 of the revised Common Chapter, and the Technical Working Group and Coordination Committee met to develop common definitions of significant and unreasonable impacts, common methodologies for establishing numeric MTs and MOs, and common interim milestones for each sustainability indicator. See Tables CC-16 through CC-23 for these revised SMC, and narrative describing the process starting on page CC-154 of the revised Common Chapter.

Response to Potential Deficiency 4

Deficiency 4, as detailed in DWR's CIL, pertains to the use of a total of 17 management areas in four of the six GSPs prepared for the Subbasin, stating "The Management Areas established in the Plan have not sufficiently addressed the requirements" ...defined in SGMA.

In response to the DWR comments, the Subbasin GSAs agreed to eliminate or rename the formerly identified management areas as monitoring zones throughout the six GSPs and Common Chapter, and to continue to monitor and manage groundwater use in these monitoring zones according to the metrics previously set forth. Therefore, in the six GSPs and Common Chapter, all management areas have been renamed monitoring zones.

Please feel free to contact me at (209) 826-1872 if there are any questions regarding our responses to the January 21, 2022 CIL, the work conducted by the Subbasin to prepare those responses, and revisions made to the six Subbasin GSPs and Common Chapter.

Sincerely,

John Brodie
Delta-Mendota Subbasin Plan Administrator

DELTA-MENDOTA SGMA

Common Chapter

For the Delta-Mendota Subbasin Groundwater Sustainability Plan

August 2019; revised June 2022

PROP 1 WATER BOND 2014 · Department of Water Resources, State of California · San Joaquin River Exchange Contractors GSP Group · The County of Fresno 1856 · Grassland Water District · Northern & Central Delta-Mendota · Aliso Water District Groundwater Sustainability Agency · Farmers Water District

Delta-Mendota Groundwater Subbasin

Groundwater Sustainability Plan: Revised Common Chapter

Prepared by:

August 2019; Revised June 2022

Difficulty Accessing Material

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Tables

Figures

Appendices

Acronyms

AB 3030	1992 California Assembly Bill 3030
AWMP	Agricultural Water Management Plan
BMP	Best Management Practice
CASGEM	California Statewide Groundwater Elevation Monitoring
CCC	Columbia Canal Company
CCF	Climate Change Factors
CCID	Central California Irrigation District
CDEC	California Data Exchange Center
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
CVO	Central Valley Operations
CVP	Central Valley Project
CVRWQCB	Central Valley Regional Water Quality Control Board
DAC	Disadvantaged Community
DMC	Delta-Mendota Canal
DPWD	Del Puerto Water District
DWR	California Department of Water Resources
ET	Evapotranspiration
ET_c	Total Crop Evapotranspiration
ET_{iw}	Crop Evapotranspiration of Irrigation Water
ET_{misc}	Miscellaneous Evapotranspiration including; canal evaporation, consumptive use of phreatophytes, etc.
FCWD	Firebaugh Canal Water District
FNF	Full Natural Flow
GAMA	Groundwater Ambient Monitoring and Assessment
gpm	gallons per minute
GRCD	Grassland Resource Conservation District
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
GWD	Grassland Water District

Acronyms

HCM	Hydrogeologic Conceptual Model
HMRD	Henry Miller Reclamation District
IM	interim milestone
IRWM	Integrated Regional Water Management
JPA	Joint Powers Authority
KDSA	Kenneth D. Schmidt and Associates
MAF	million acre-feet
MO	measurable objective
MSL	Mean Sea Level
MT	minimum threshold
NASA JPL	National Aeronautics and Space Administration Jet Propulsions Laboratory
P&P	Provost and Pritchard Consulting Group
RCD	Resource Conservation District
RWQCB	Regional Water Quality Control Board
SB 372	2017 California Senate Bill 372
SGMA	Sustainable Groundwater Management Act
SGWP	Sustainable Groundwater Planning
SJREC	San Joaquin River Exchange Contractors
SJRECWA	San Joaquin River Exchange Contractors Water Authority
SJRIP	San Joaquin River Improvement Program
SJRRP	San Joaquin River Restoration Program
SLDMWA	San Luis & Delta-Mendota Water Authority
SMC	Sustainable Management Criteria
SWP	State Water Project
SWRCB	State Water Resources Control Board
TAF	thousand acre-feet
TDS	Total Dissolved Solids
TIWD	Turner Island Water District
TNC	The Nature Conservancy
UNAVCO	University NAVSTAR Consortium

Acronyms

USACE	U.S. Army Corps of Engineers
USBR	U.S. Bureau of Reclamation
USF&WS	U.S. Fish & Wildlife Service
USGS	United States Geological Survey
UWMP	Urban Water Management Plan
WDL	Water Data Library
WMP	Water Management Plan
WSIP	Water Storage Investment Program
WWD	Westlands Water District
WY	Water Year

DELTA-MENDOTA SGMA

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DISCLAIMER

The work products presented in this Common Chapter and associated Technical Memoranda (Appendix B) are a compilation of work completed by the six (6) individual Groundwater Sustainability Plan (GSP) regions under the direction of a Professional Geologist (PG) or Professional Engineer (PE) as indicated by the stamps on the respective GSP Executive Summaries. The signature here represents work completed in compiling the Common Chapter from these individual GSPs, and the signing Professional Engineer assumes no responsibility for any errors or misleading statements presented therein. Compilation of the Common Chapter, exclusive of work conducted for the individual GSPs, and revisions to this Common Chapter have been prepared under the oversight of Leslie Dumas, P.E. and the signature below is specifically for that compilation.

REGISTERED PROFESSIONAL ENGINEER
LESLIE S. DUMAS
C 43897
EXP 6/30/23
CIVIL
STATE OF CALIFORNIA

1. INTRODUCTION

1.1 Purpose of Common Chapter

The 23 Groundwater Sustainability Agencies (GSAs) overlying the Delta-Mendota Subbasin (Subbasin) have prepared six Groundwater Sustainability Plans (GSPs) that, together, encompass the entire Subbasin area (**Figure CC-1**). These GSPs have been prepared in a coordinated manner under the oversight of the Delta-Mendota Subbasin Coordination Committee (Coordination Committee) and in accordance with the Delta-Mendota Subbasin Coordination Agreement (Coordination Agreement) for the Subbasin. This Common Chapter has been prepared as means of integrating key parts of the six GSPs to meet subbasin-level requirements per the Sustainable Groundwater Management Act (SGMA) and the Emergency GSP regulations (DWR, 2016).

On January 21, 2022, the Subbasin received a Consultation Initiation Letter (CIL) from the California Department of Water Resources (DWR). The CIL identified four potential deficiencies across the six Subbasin GSPs which may preclude DWR's approval, as well as potential corrective actions to address each potential deficiency. The CIL thus initiated consultation between DWR, the Subbasin Point of Contact, Plan Managers, and the Subbasin's GSAs. This Common Chapter has been revised to incorporate changes required to reflect the Subbasin's response to the deficiencies identified in the CIL, based on direction provided by the Coordination Committee, the Delta-Mendota Technical Working Group (Technical Working Group), the Subbasin GSAs and DWR. This revised Common Chapter, along with the attached cover letter, are intended to document how the deficiencies identified in the CIL were addressed in the revised Subbasin GSPs and this revised Common Chapter.

This revised Common Chapter, along with the six Subbasin GSPs, Coordination Agreement (**Appendix A**) and Common Technical Memoranda (**Appendix B**), meets regulatory requirements established by DWR as shown in the completed *Preparation Checklist for GSP Submittal* (**Appendix C**). The Common Technical Memoranda summarize the common data sets, assumptions and methodologies used during preparation of the six Subbasin GSPs. The reader is referred to the individual GSP (and their associated Executive Summaries) for information, data, and GSP requirements specific to each GSP Plan Area.

1.2 Delta-Mendota Subbasin

The Delta-Mendota Subbasin (DWR Basin 5-022.07) is located in the San Joaquin Valley Groundwater Basin and adjoins nine (9) subbasins of the San Joaquin Valley Groundwater Basin. The Delta-Mendota Subbasin boundaries generally correspond to DWR's California's Groundwater Bulletin 118 – Update 2003 (Bulletin 118) groundwater basin boundaries. Changes made to the Subbasin boundaries as part of the SGMA planning process include the following:

- A jurisdictional internal boundary modification made in 2016 to extend the boundary of the Delta-Mendota Subbasin eastward to include all of Aliso Water District.
- A jurisdictional internal boundary modification made in 2016 to bring areas that straddle the Delta-Mendota Subbasin and adjacent subbasins fully within the Delta-Mendota Subbasin. This modification adjusted areas from the southern boundary of the Delta-Mendota Subbasin and the Westside Subbasin in coordination with Westlands Water District, and moved the eastern boundary of the Delta-Mendota Subbasin from the Madera Subbasin into the Delta-Mendota

- Subbasin in coordination with Aliso Water District. The modification also moved areas from the Tracy Subbasin into the Delta-Mendota Subbasin so that Del Puerto Water District and West Stanislaus Irrigation District were fully within the Delta-Mendota Subbasin, and cleaned up boundaries between the Delta-Mendota Subbasin and the Kings Subbasin to conform with the boundaries of Tranquillity Irrigation District and the Traction Ranch property (bounded on the east by Mid-Valley Water District).
- A jurisdictional internal boundary modification made in 2018 to modify the boundary between the Delta-Mendota and the Chowchilla Subbasins to follow the western boundary of Triangle T Water District and the southern boundary of Clayton Water District. This modification moved approximately 700 acres of land from the Chowchilla Subbasin into the Delta-Mendota Subbasin.

The western San Joaquin Valley is a highly agricultural region with an economy dependent on that industry. There are no large cities or industries in the Delta-Mendota Subbasin to provide an alternative economic base; hence the availability of Central Valley Project (CVP) imported supplies and surface water supplies (primarily from the San Joaquin and Kings River) are essential elements to the economic health of the region. Other uses of CVP and surface water in the Subbasin are for municipal and industrial (M&I) purposes and wildlife refuge water supply.

Groundwater is a key component of overall water supplies in the Delta-Mendota Subbasin. Agricultural and wildlife refuge needs may be supplemented by groundwater for areas with access to CVP water. Other landowners within the Subbasin may rely wholly on groundwater for irrigation and/or potable purposes. Municipal and industrial (M&I) water use, which is a small share of total water use in the Subbasin, occurs primarily within the cities, and predominantly uses groundwater to meet those demands. The largest M&I use areas in the Delta-Mendota Subbasin, based on 2015 population estimates from the U.S. Census Bureau, are the cities of Patterson (population 21,498) and Los Banos (population 37,457) (U.S. Census Bureau, 2015).

As previously noted, most communities within the Delta-Mendota Subbasin have economies greatly dependent on agricultural production. These communities include Patterson, Grayson, Tranquillity, Mendota, Firebaugh, Dos Palos, Los Banos, Santa Nella, Newman, Gustine, Crows Landing, Westley, Volta, and Vernalis.

1.3 Disadvantaged Communities within the Delta-Mendota Subbasin

A disadvantaged community (DAC) is defined as a community with a Median Household Income (MHI) less than 80% of the California statewide MHI. The California Department of Water Resources (DWR) compiled U.S. Census Bureau’s American Community Survey (ACS) data from 2012 to 2016; these data were used in GIS to identify DACs within the Delta-Mendota Subbasin. California’s average statewide MHI from 2012 to 2016 is $63,783; thus, a community with an MHI less than or equal to $51,026 is considered a DAC. Based on these criteria, 93% of the geographic area of the Subbasin is considered disadvantaged. Furthermore, a community with an MHI of less than 60% of the California statewide MHI, meaning an MHI of less than or equal to $38,270, is considered a severely disadvantaged community (SDAC). According to the U.S. Census ACS 2012-2016 data, there are a number of SDACs throughout the Subbasin. See **Figure CC-2** for a map of the DACs and SDACs throughout the Delta-Mendota Subbasin.

As noted above, a significant portion of the Subbasin contains DACs. Of the total population of 117,120 within the Subbasin, 80% of the population lives within a DAC, with 93% of the Subbasin's total geographic area consisting of DACs. **Table CC-1** includes the proportion of DACs in the Subbasin based on population and geographic area.

Table CC-1: DACs as a Percentage of the Delta-Mendota Subbasin

Area	Geographic Area (Square Miles)	% Based on Geographic Area	Population	% Based on Population
DAC (including SDAC)	1,109	93%	93,786	80%
Delta-Mendota Subbasin	1,194		117,120	

Table CC-2 includes Census Designated Places that are DACs in the Delta-Mendota Subbasin, with their associated MHIs and percentage of the California MHI from the ACS 5-Year 2012-2016 average. Several DACs in the Subbasin have considerably lower MHI than 80% of the California Statewide MHI and are further designated as Severely Disadvantaged Communities (SDACs). In **Table CC-2**, SDACs are indicated in bold text. Note that according to the U.S. Department of the Interior Indian Affairs, as of January 2017, there are no listed federally recognized tribes within the Region (Mosley, 2017).

Table CC-2: DAC and SDAC Census Designated Places in Delta-Mendota Subbasin

Census Designated Place (CDP)	Median Household Income (MHI)	% of CA MHI
City of Dos Palos	**$36,509**	**57%**
City of Firebaugh	**$36,181**	**57%**
City of Gustine	**$37,770**	**59%**
City of Los Banos	$45,751	72%
City of Mendota	**$26,094**	**41%**
City of Newman	$52,783	83%
Crows Landing	**$26,786**	**42%**
Dos Palos Y (CDP)	**$16,656**	**26%**
Grayson	**$29,787**	**47%**
Madera County	$45,490	74%
Merced County	$43,066	70%
Fresno County	$45,963	72%
Santa Nella	**$27,778**	**44%**
South Dos Palos	$41,992	66%
Tranquillity	**$30,441**	**48%**
Volta	$48,250	76%
Westley	**$23,375**	**37%**

Data Sources:
1. U.S. Census ACS data from 2012 to 2016 provided by DWR Mapping Tool.

Census Designated Place (CDP)	Median Household Income (MHI)	% of CA MHI
2. MHI data are from the 2016 Census, and percent of CA MHI is calculated based on the 2012-2016 Statewide MHI. Bold rows indicate severely disadvantaged communities (less than 60% of CA Statewide MHI).		

1.4 Economically Disadvantaged Areas within the Delta-Mendota Subbasin

An economically distressed area (EDA) is defined by the State of California as a "municipality with a population of 20,000 persons or less, a rural county, or a reasonably isolated and divisible segment of a larger municipality where the segment of the population is 10,000 persons or less, with an annual median household income that is less than 85% of the statewide median household income, and with one or more of the following conditions as determined by the (sic) Department of Water Resources:

1. Financial hardship
2. Unemployment rate at least two percent higher than the statewide average
3. Low population density (CA Assembly, 2014)."

U.S. Census GIS data provided by DWR were used to identify EDAs in the Delta-Mendota Subbasin. **Figure CC-3** shows the location of EDAs within the Delta-Mendota Subbasin

A significant portion of the Subbasin contains EDAs. Of the total population of 117,120 within the Subbasin, 87% live in areas that meet EDA Criterion 2, 20% live in areas that meet EDA Criterion 3, and 87% live in areas that meet Criteria 2 or 3. In all, 93% of the geographic area within the Subbasin consists of areas considered to meet either EDA Criteria 2 or 3. **Table CC-3** includes the proportion of EDAs in Subbasin based on population and geographic area.

Table CC-3: EDAs as a Percentage of the Delta-Mendota Subbasin

Area	Geographic Area (Square Miles)	% Based on Geographic Area	Population	% Based on Population
EDA Criterion 2	1,112	93%	102,407	87%
EDA Criterion 3	1,004	84%	23,688	20%
EDA Criteria 2 or 3	1,112	93%	102,407	87%
Delta-Mendota Subbasin	1,194		117,120	

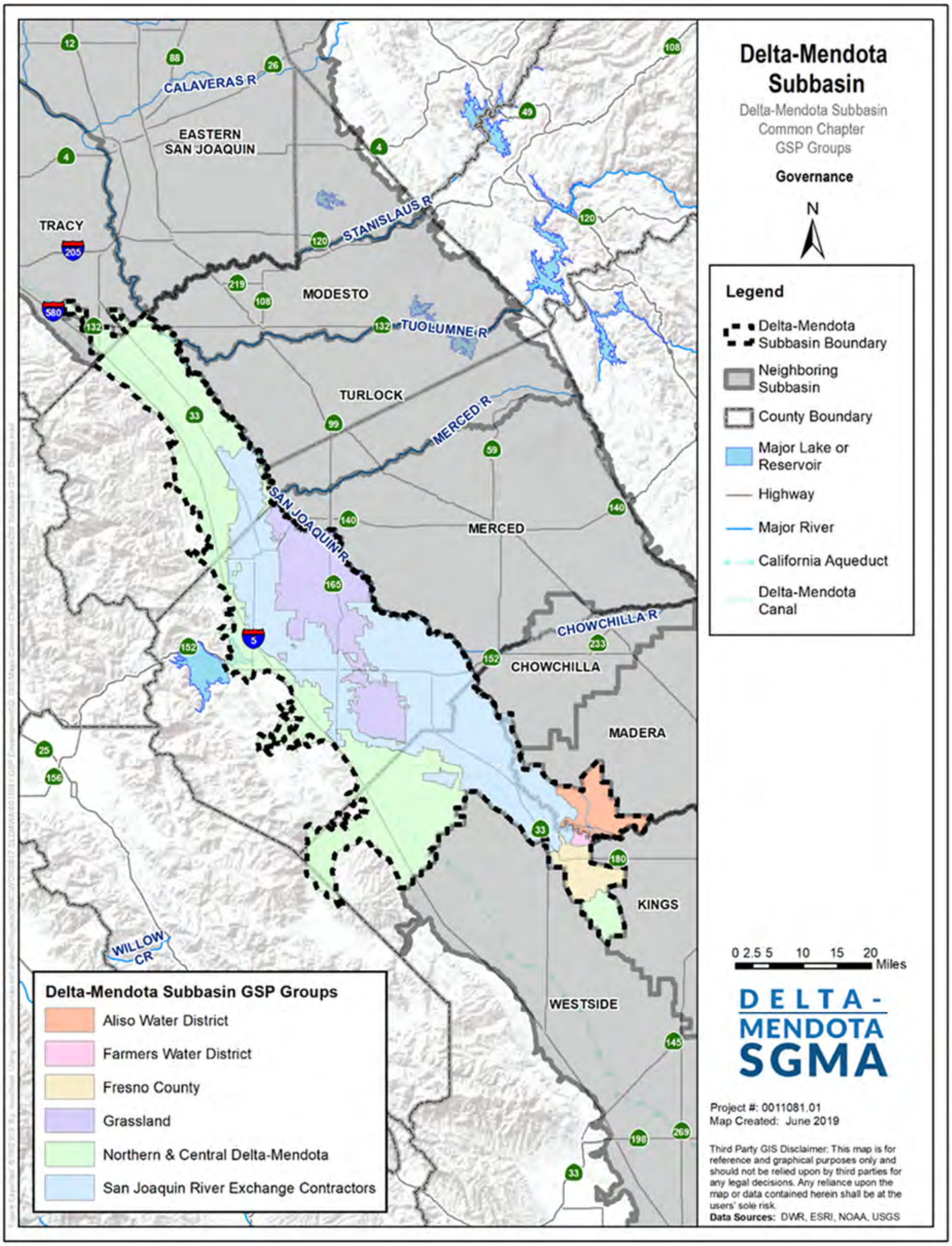


Figure CC-1: Delta-Mendota Subbasin and GSP Regions

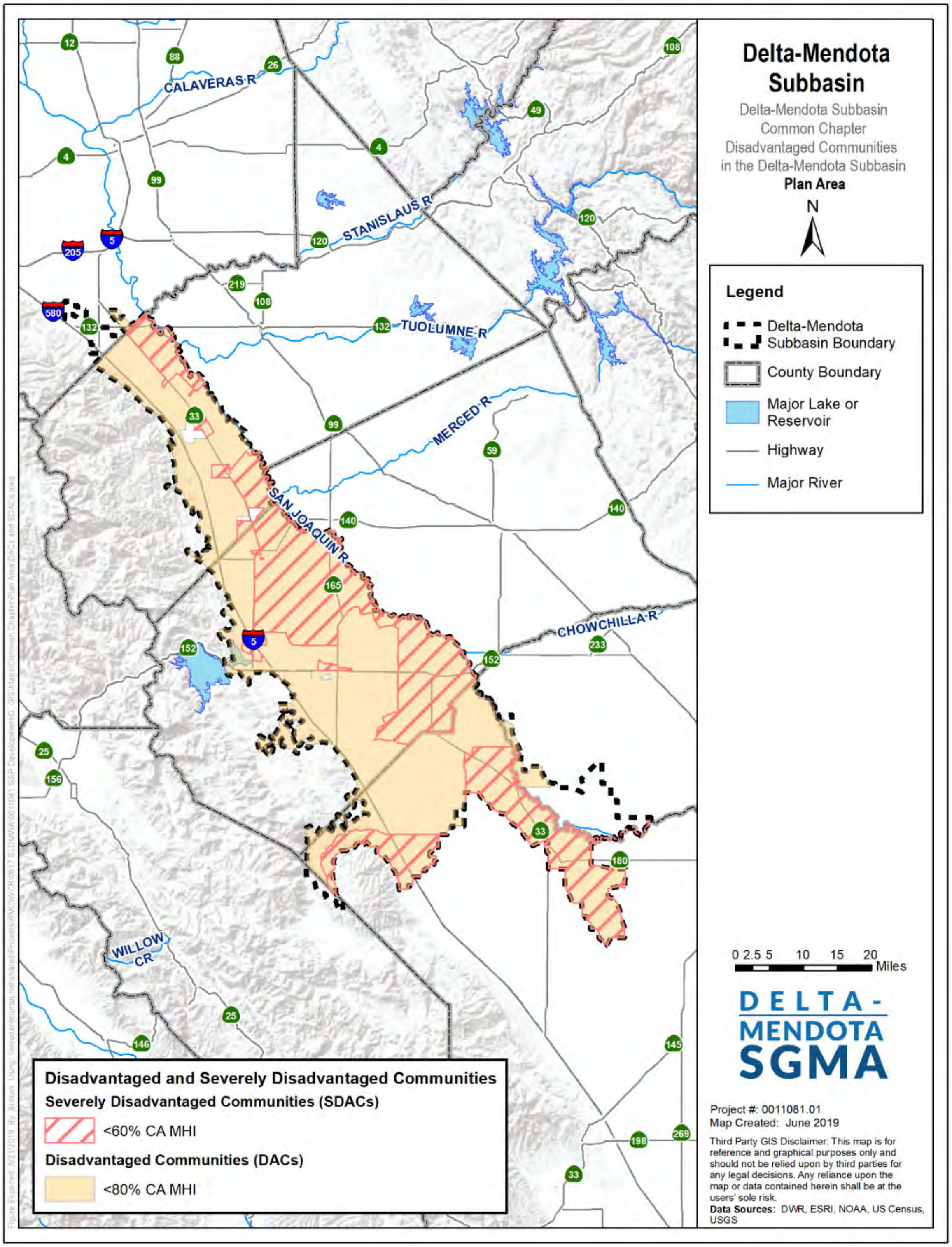


Figure CC-2: Disadvantaged and Severely Disadvantaged Communities in the Delta-Mendota Subbasin

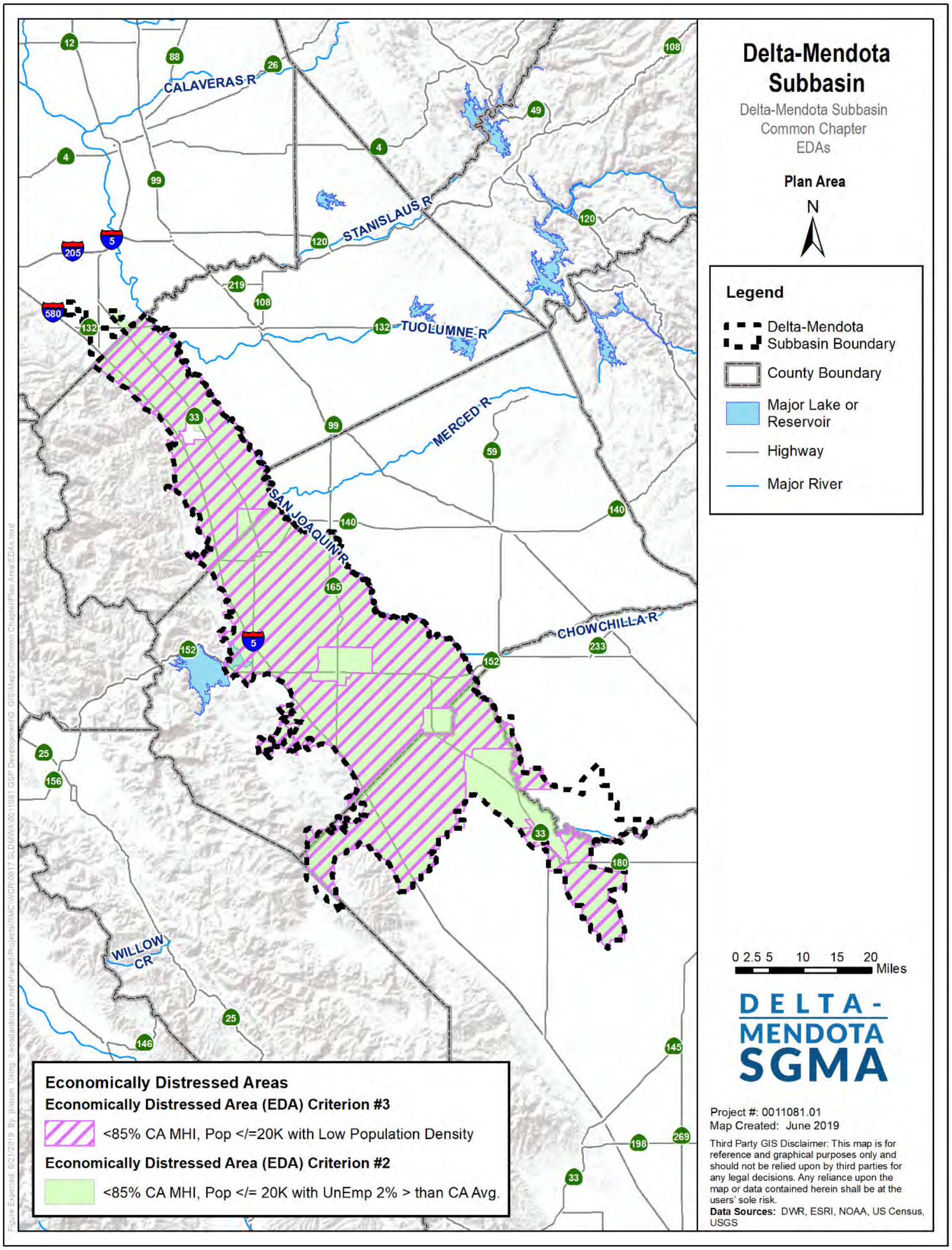


Figure CC-3: Economically Distressed Areas in the Delta-Mendota Subbasin

2. DELTA-MENDOTA SUBBASIN GOVERNANCE

This section includes information pursuant to Article 5. Plan Contents, Subarticle 1. Administrative Information, § 354.6 (Agency Information) as well as Subarticle 8. Interagency Agreements (§ 357.2 Interbasin Agreements and § 357.4 Coordination Agreements), as required by the Groundwater Sustainability Plan (GSP) Regulations. Agency Contact information for the Delta-Mendota Subbasin and the plan manager is included in this section. The organization and management structure, as well as the legal authority of each Groundwater Sustainability Agency (GSA) in the Delta-Mendota Subbasin, is detailed and accompanied by GSA boundary maps and a description of intra-basin and inter-basin coordination agreements in place for the development and implementation of the GSPs overlying the Delta-Mendota Subbasin.

Agency Contact Information

This Common Chapter to the six GSPs for the Delta-Mendota Subbasin has been prepared in a cooperative manner by the following GSAs in the Delta-Mendota Subbasin:

Northern & Central Delta-Mendota Region GSP

- Patterson Irrigation District GSA
- West Stanislaus Irrigation District GSA
- DM-II GSA
- City of Patterson GSA
- Northwestern Delta-Mendota GSA
- Central Delta-Mendota GSA
- Widren Water District GSA
- Oro Loma Water District GSA

San Joaquin River Exchange Contractors (SJREC) GSP

- San Joaquin River Exchange Contractors Water Authority GSA
- Turner Island Water District-2 GSA
- City of Mendota GSA
- City of Firebaugh GSA
- City of Los Banos GSA
- City of Dos Palos GSA
- City of Gustine GSA
- City of Newman GSA
- Madera County – 3 GSA
- Portion of Merced County – Delta-Mendota GSA
- Portion of Fresno County Management Area B GSA

Grassland GSP

- Grassland GSA
- Portion of Merced County – Delta-Mendota GSA

Aliso Water District GSP

- Aliso Water District GSA

Farmers Water District GSP

- Farmers Water District GSA

Fresno County GSP

- Fresno County Management Area A GSA
- Portion of Fresno County Management Area B GSA

The plan areas covered by each of the six Subbasin GSPs is show in **Figure CC-1**. **Figure CC-4** through **Figure CC-6** show the location of the GSAs comprising the six GSP regions. These GSAs are coordinating development and implementation of the six GSPs under the Coordination Agreement, as described below in Section 2.1.

The current Plan Manager for the coordinated Delta-Mendota Subbasin GSPs is John Brodie, Water Resources Program Manager for San Luis & Delta-Mendota Water Authority (SLDMWA). Mr. Brodie can be contacted as follows:

Mr. John Brodie, Plan Manager
Delta-Mendota Subbasin
842 6th Street
Los Banos, CA 93635
Phone: (209) 826-1872/ Fax (209) 833-1034
john.brodie@sldmwa.org

Contact information for each GSP plan administrator can be found in the respective GSPs. The DWR Point of Contact is shown below.

Department of Water Resources Point of Contact

The point of contact for the Delta-Mendota Subbasin is:

Christopher Olvera
Department of Water Resources
Christopher.Olvera@water.ca.gov
(559) 230-3373

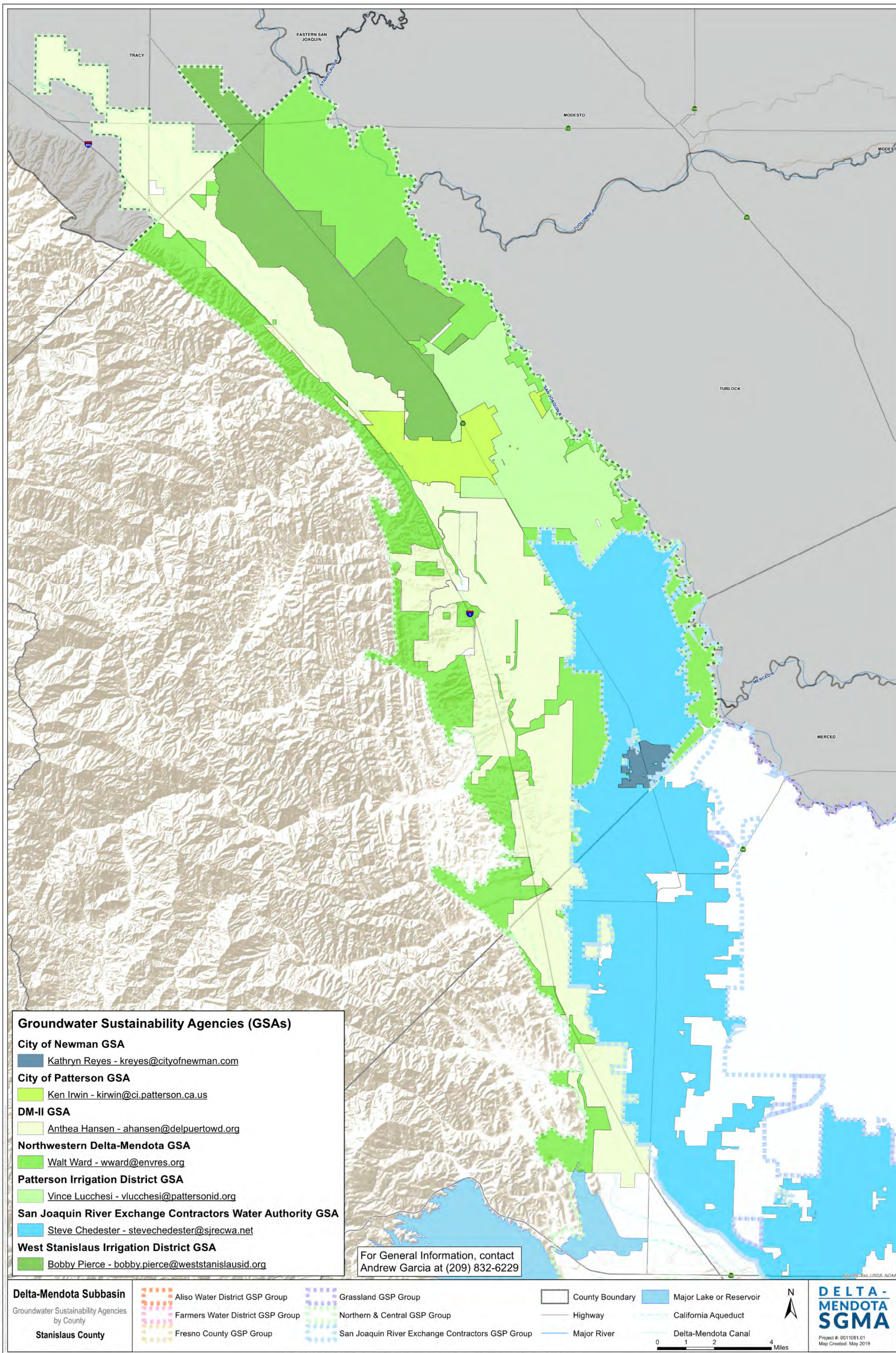


Figure CC-4: GSAs in the Delta-Mendota Subbasin – Stanislaus County

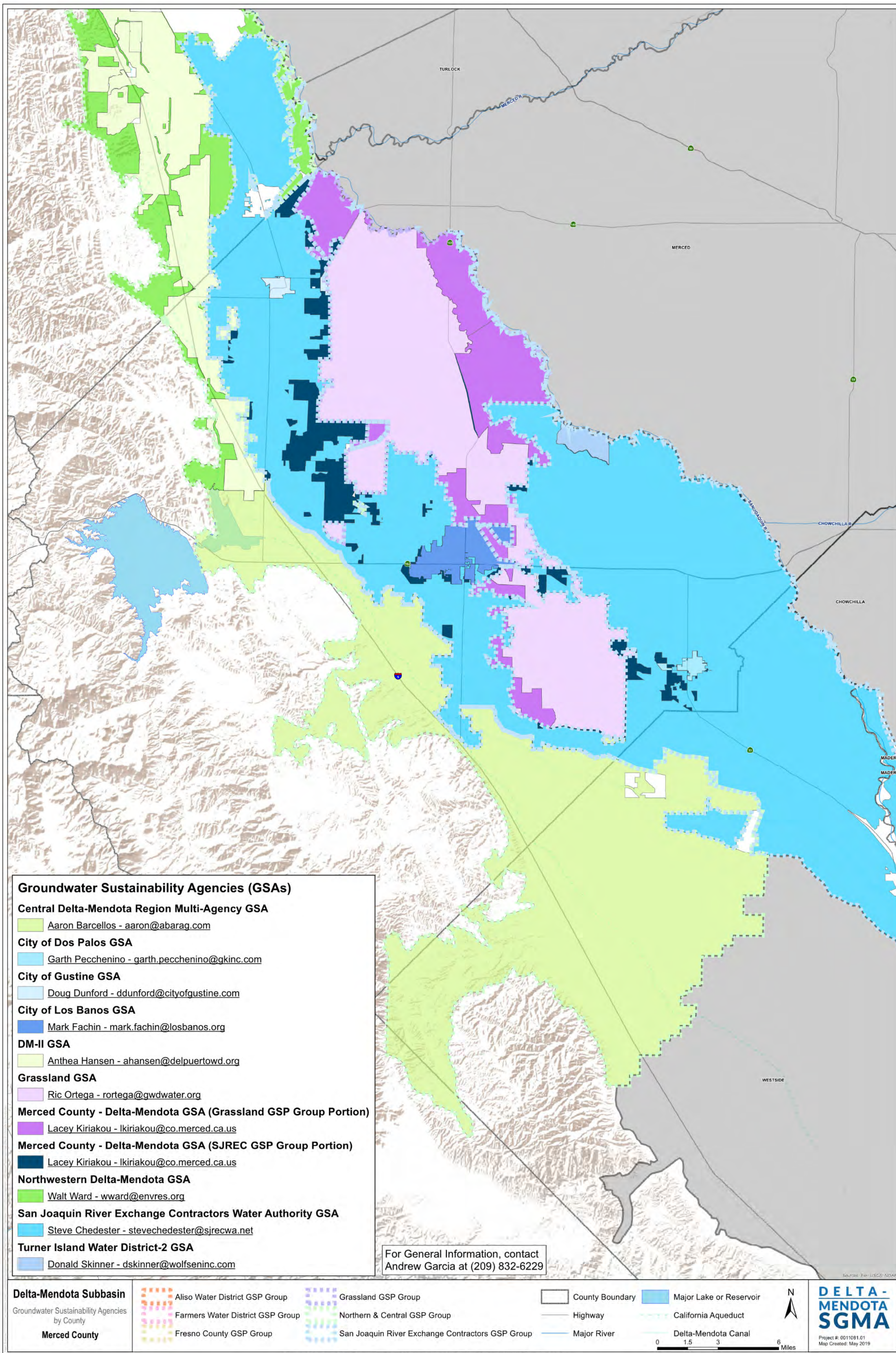


Figure CC-5: GSAs in the Delta-Mendota Subbasin – Merced County

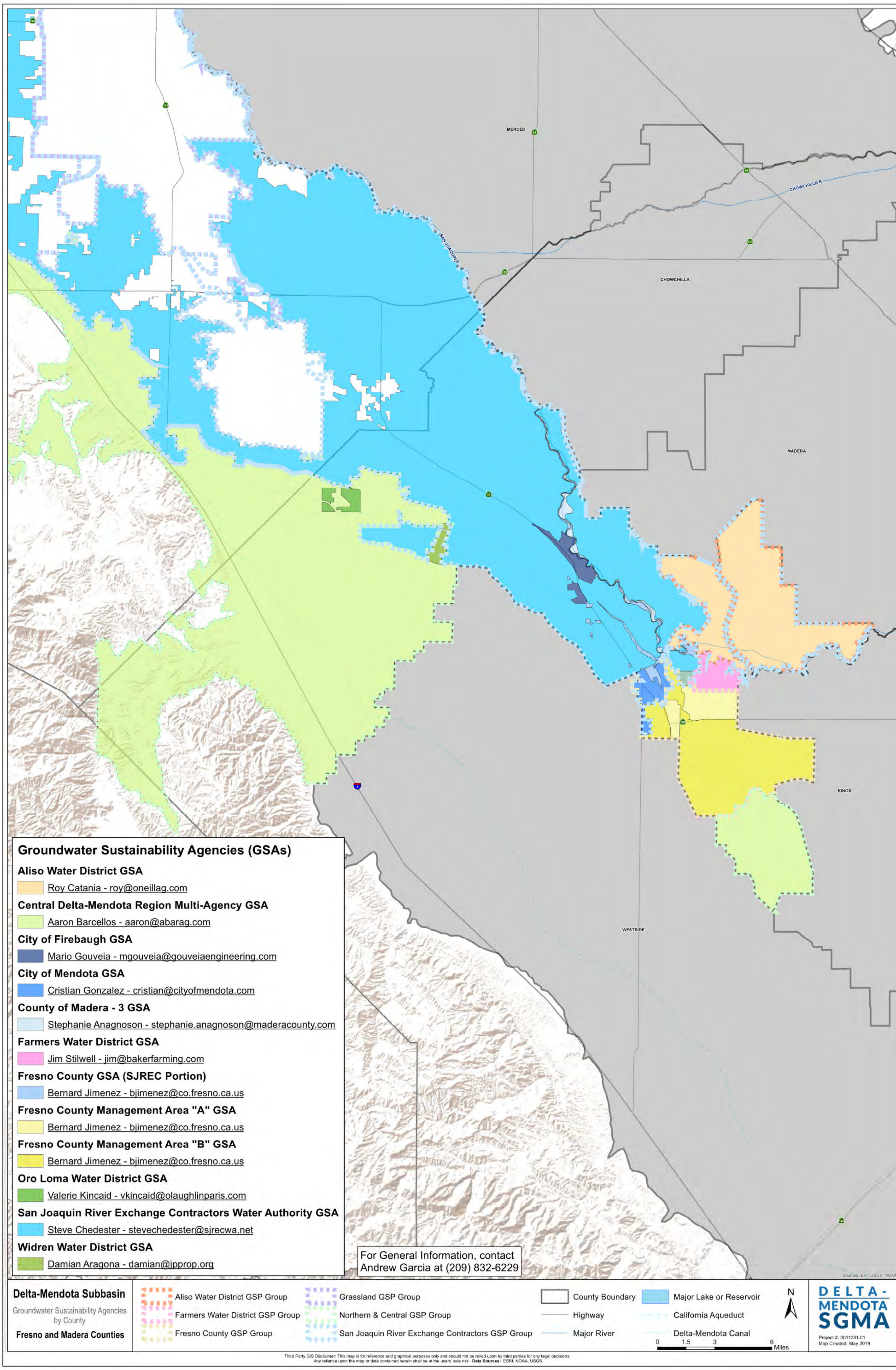


Figure CC-6: GSAs in the Delta-Mendota Subbasin – Fresno and Madera Counties

2.1 GSA and GSP Coordination and Governance

This section includes a description of intra-basin coordination agreements, which are required where there is more than one GSP prepared for a groundwater basin, and inter-basin coordination agreements, which are optional agreements between neighboring groundwater subbasins, pursuant to Article 8. Interagency Agreements, § 357.4. Coordination Agreements and § 357.2 Interbasin Agreements.

2.1.1 Delta-Mendota Subbasin SGMA Governance Structure

The GSAs within the Delta-Mendota Subbasin adopted and executed a Coordination Agreement on December 12, 2018 to comply with the SGMA requirement that multiple GSAs within a given subbasin must coordinate when developing and implementing their GSPs (see Intra-Agency Coordination subsection above for more information). Additionally, a Cost Sharing Agreement was signed and executed by the same parties on December 12, 2018. **Figure CC-5** shows the SGMA governance structure within the Delta-Mendota Subbasin. In addition to the two members appointed to represent each of the Northern & Central Delta-Mendota GSP Region and the San Joaquin River Exchange Contractors (SJREC) GSP Region on the Delta-Mendota Subbasin Coordination Committee as voting members, the Grassland GSP Region, Farmers Water District GSP Region, Fresno County Management Areas A & B GSP Region, and Aliso Water District GSP Region all have appointed one voting member each for a total of eight voting members.

Three working groups were formed under the auspices of the Delta-Mendota Subbasin Coordination Committee: the Technical Working Group, the Communications Working Group and the DMS Working Group. Representatives of each GSP region participate in each working group.

Table CC-4: Delta-Mendota Subbasin Coordination Committee Members

GSP		GSA	Agency	Coordination Committee Members: Primary	Coordination Committee Members: Alternate
Northern & Central Delta-Mendota Region GSP	Northern Delta Mendota Region Management Committee	Patterson Irrigation District GSA	Patterson Irrigation District	Vince Lucchesi	Walt Ward
			Twin Oaks Irrigation District		
		West Stanislaus Irrigation District GSA	West Stanislaus Irrigation District		
		DM-II GSA	Del Puerto Water District		
			Oak Flat Water District		
		City of Patterson GSA	City of Patterson		
		Northwestern Delta-Mendota GSA	Merced County		
			Fresno County		
	Central Delta-Mendota Region Management Committee	Central Delta-Mendota GSA	San Luis Water District	Ben Fenters	Lacey Kiriakou
			Panoche Water District		
			Tranquillity Irrigation District		
			Fresno Slough Water District		
			Eagle Field Water District		
			Pacheco Water District		
			Santa Nella County Water District		
			Mercy Springs Water District		
			Merced County		
			Fresno County		
		Widren Water District GSA	Widren Water District		
		Oro Loma Water District GSA	Oro Loma Water District		

GSP	GSA	Agency	Coordination Committee Members	
			Primary	Alternate
San Joaquin River Exchange Contractors GSP	San Joaquin River Exchange Contractors Water Authority GSA	Central California Irrigation District	Jarrett Martin, Alejandro Paolini	Chris White, John Wiersma
		Columbia Canal Company		
		Firebaugh Canal Water District		
		San Luis Canal Company		
	Turner Island Water District-2 GSA	Turner Island Water District		
	City of Mendota GSA	City of Mendota		
	City of Firebaugh GSA	City of Firebaugh		
	City of Los Banos GSA	City of Los Banos		
	City of Dos Palos GSA	City of Dos Palos		
	City of Gustine GSA	City of Gustine		
	City of Newman GSA	City of Newman		
	County of Madera – 3 GSA	County of Madera		
	Portion of Merced County – Delta-Mendota GSA	County of Merced		
	Portion of Fresno County Management Area B GSA	County of Fresno		
Grassland GSP	Grassland GSA	Grassland Water District	Ric Ortega	Ken Swanson
		Grassland Resource Conservation District		
	Portion of Merced County Delta-Mendota GSA	County of Merced		
Farmers Water District GSP	Farmers Water District GSA	Farmers Water District	Jim Stilwell	Don Peracchi
Fresno County GSP	Fresno County – Management Area A	County of Fresno	Buddy Mendes	Glenn Allen or Augustine Ramirez

GSP	GSA	Agency	Coordination Committee Members	
			Primary	Alternate
	Fresno County – Management Area B	County of Fresno		
Aliso Water District GSP	Aliso Water District GSA	Aliso Water District	Joe Hopkins	Board Secretary (Ross Franson)

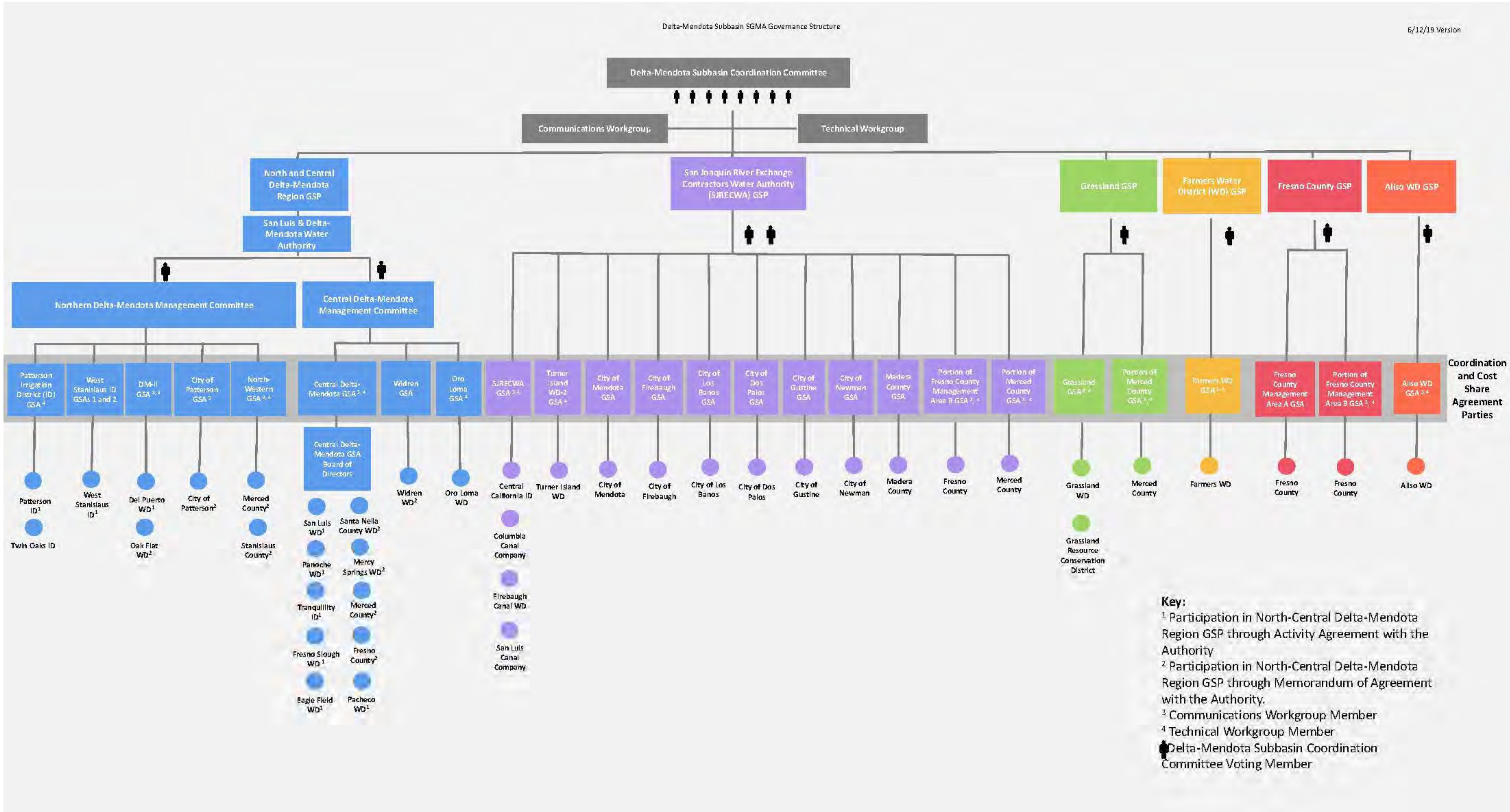


Figure CC-7: Governance Structure of the Delta-Mendota Subbasin

2.1.2 Intra-Basin Coordination

The Delta-Mendota Subbasin Coordination Agreement (Coordination Agreement), effective as of December 12, 2018, has been signed by all participating agencies in the Delta-Mendota Subbasin; a copy of this agreement is included in **Appendix A**. The purpose of the Agreement, including technical reports to be developed after the initial execution of this Agreement, is to comply with SGMA requirements and to ensure that the multiple GSPs within the Subbasin are developed and implemented utilizing the same datasets, methodologies and assumptions, that the elements of the GSPs are appropriately coordinated to support sustainable subbasin management of groundwater resources, and to ultimately set forth the information necessary to show how the multiple GSPs in the Subbasin will achieve the sustainability goal as determined for the Subbasin in compliance with SGMA and its associated regulations.

A key goal of basin-wide coordination is to ensure that the Subbasin GSPs utilize the same data and methodologies during their plan development and that elements of the Plans necessary to achieve the sustainability goal for the basin are based upon consistent interpretations of the basin setting, as required by SGMA and associated regulations. The Coordination Agreement defines how the coordinated efforts will be achieved and documented, and also sets out the process for identifying the Plan Manager. The Coordination Agreement is part of each individual GSP within the Delta-Mendota Subbasin.

The Coordination Agreement for the Delta-Mendota Subbasin covers the following topics:

1. Purpose of the Agreement, including:
    a. Compliance with SGMA and
    b. Description of Criteria and Function;
2. General Guidelines, including:
    a. Responsibilities of the Parties and
    b. Adjudicated or Alternative Plans in the Subbasin;
3. Role of San Luis & Delta-Mendota Water Authority (SLDMWA), including:
    a. Agreement to Serve,
    b. Reimbursement of SLDMWA, and
    c. Termination of SLDMWA's Services;
4. Responsibilities for Key Functions, including:
    a. Coordination Committee,
    b. Coordination Committee Officers,
    c. Coordination Committee Authorized Action and Limitations,
    d. Subcommittees and Workgroups,
    e. Coordination Committee Meetings, and
    f. Voting by Coordination Committee;
5. Approval by Individual Parties;
6. Exchange of Data and Information, including:
    a. Exchange of Information and
    b. Procedure for Exchange of Information;
7. Methodologies and Assumptions, including:
    a. SGMA Coordination Agreements,
    b. Pre-GSP Coordination, and

   c. Technical Memoranda Required;
8. Monitoring Network
9. Coordinated Water Budget
10. Coordinated Data Management System
11. Adoption and Use of the Coordination Agreement, including:
    a. Coordination of GSPs and
    b. GSP and Coordination Agreement Submission;
12. Modification and Termination of the Coordination Agreement, including:
    a. Modification or Amendment of Exhibit "A" (Groundwater Sustainability Plan Groups including Participation Percentages),
    b. Modification or Amendment of Coordination Agreement, and
    c. Amendment for Compliance with Law;
13. Withdrawal, Term, and Termination;
14. Procedures for Resolving Conflicts;
15. General Provisions, including:
    a. Authority of Signers,
    b. Governing Law,
    c. Severability,
    d. Counterparts, and
    e. Good Faith; and
16. Signatories of all Parties

Coordination During GSP Implementation

The Coordination Agreement ensures that the multiple GSAs are working cooperatively and collaboratively to ensure GSPs within the Subbasin are developed and implemented utilizing the same methodologies and assumptions and to ultimately establish the processes necessary to show how the multiple GSPs in the Subbasin will be sustainably managed to achieve the Delta-Mendota Subbasin's sustainability goal. The Coordination Committee intends to continue to meet and confer following the submittal of the Subbasin's GSPs and will develop guidelines for GSP implementation between the GSP Groups and update the Coordination Agreement as the Parties to the Agreement deem necessary.

The Coordination Committee will continue meeting regularly following submittal of the Subbasin GSPs in order to develop the guidelines for coordinated implementation of GSPs. The intent of the guidelines will be to outline processes that will ensure the GSAs are progressing toward the Subbasin sustainability goal, while meeting the Annual Reporting requirements or any other requirements agreed upon for purposes of coordination.

Agency Responsibilities

In meeting the terms of the Coordination Agreement, all Parties (meaning the Delta-Mendota Subbasin GSAs) agree to work collaboratively to meet the objectives of SGMA and the Coordination Agreement. Each Party to the Agreement is a GSA and acknowledges that it is bound by the terms of the Coordination Agreement as an individual party.

The Parties have established a Coordination Committee to provide a forum to accomplish the coordination obligations of SGMA. The Coordination Committee operates in full compliance with the Brown Act and is composed of a Chairperson and Vice Chairperson, Secretary, Plan Manager, and a GSP Group Representative and Alternate Representative for each of the six GSP groups. The Chairperson and Vice Chairperson are rotated annually among GSP Groups in alphabetical order. The Secretary assumes primary responsibility for Brown Act compliance. The GSP Group Representatives, who are identified in **Table CC-4**, are selected by each respective GSP Group at the discretion of the respective GSP Group, and such appointments are effective upon providing written notice to the Secretary and to each Group Contact. The Coordination Committee recognizes each GSP Group Representative and GSP Group Alternate Representative until the Group Contact provides written notice of removal and replacement to the Secretary and to every other Group Contact. Each GSP Group is required to promptly fill any vacancy created by the removal of its Representative or Alternate Representative so that each GSP Group has the number of validly designated representatives.

Each GSP Group Representative is entitled to one vote at the Coordination Committee, where the Alternate Representative is authorized to vote in the absence of the GSP Group Representative. The unanimous vote of the GSP Representatives from all GSP Groups is required on most items upon which the Coordination Committee is authorized to act, with the exception of certain ministerial and administrative items. Voting procedures to address a lack of unanimity take place upon a majority vote of a quorum of the Coordination Committee and include straw polls, provisional voting, and delay of voting (see Section 5.6.3 – *Voting Procedures to Address Lack of Unanimity* of the Coordination Agreement). Where the law or the Coordination Agreement require separate written approval by each of the Parties, such approval is evidenced in writing by providing the resolution, Motion, or Minutes of their respective Board of Directors to the Secretary of the Coordination Committee. Minutes of the Coordinate Committee are kept and prepared by the Secretary's appointee and maintained by the Secretary as Coordination Agreement records and are available to the Parties and the public upon request. Meeting agenda and minutes are posted on the Delta-Mendota website (www.deltamendota.org).

The Coordination Committee may appoint subcommittees, working groups, and otherwise direct staff made available by the Parties. Subcommittees or working groups may include qualified individuals possessing the knowledge and expertise to advance the goals of the Coordination Agreement on the topics being addressed by the subcommittee or working group, whether or not such individuals are GSP Group Representatives or Alternate Representatives. Tasks assigned to subcommittees, working groups, or staff made available by the Parties may include developing technical data, supporting information, and/or recommendations on specialized matters to the Coordination Committee. One GSP Group Representative or Alternate Representative is required to vote on behalf of the GSP Group at the subcommittee level. If no GSP Group Representative or Alternate Representative is present, one individual working on a subcommittee on behalf of the Parties in a GSP Group votes on behalf of the GSP Group. Subcommittees report voting results and provide information to the Coordination Committee but are not entitled to make determinations or decisions that are binding on the Parties.

The Coordination Committee is authorized to act upon the following items:

1. The Coordination Committee reviews, and consistent with the requirements of SGMA, approves the Technical Memoranda that compose the Common Chapter (see *Coordinated Data and Methodology*);
2. The Coordination Committee is responsible for ongoing review and updating of the Technical Memoranda as needed; assuring submittal of annual reports; providing five-year assessments and recommending any needed revisions to the Coordination Agreement; and providing review and assistance with coordinated projects and programs, once the GSPs have been submitted to and approved by DWR;
3. The Coordination Committee reviews and approves work plans, and in accordance with the budgetary requirements of the respective Parties, approves annual budget estimates of Coordinated Plan Expenses presented by the Secretary and any updates to such estimates provided that such estimates or updates with supporting documentation are circulated to all Parties for comment at least thirty (30) days in advance of the meeting at which the Coordination Committee will consider approval of the annual estimate;
4. The Coordination Committee is authorized to approve changes to Exhibit "A" (Groundwater Sustainability Plan Groups including Participation Percentages) to the Agreement and to recommend amendments to terms of the Agreement;
5. The Coordination Committee may assign work to subcommittees and workgroups as needed, provide guidance and feedback and ensure that subcommittees and workgroups prepare work products in a timely manner;
6. The Coordination Committee directs the Plan Manager in the performance of its duties under SGMA; and
7. The Coordination Committee provides direction to its Officers concerning other administrative and ministerial issues necessary for the fulfillment of the above-enumerated tasks.

Additional information regarding the roles, responsibilities, and duties of the Coordination Committee can be found in Section 5 – *Responsibilities for Key Functions* of the Coordination Agreement.

Exchange of Information

Timely exchange of information is a critical aspect of GSP coordination. All parties to the Coordination Agreement have agreed to exchange public and non-privileged information through collaboration and/or informal requests made at the Coordination Committee level or through subcommittees designated by the Coordination Committee. To the extent it is necessary to make a written request for information to another Party, each Party designates a representative to respond to information requests and provides the name and contact information of the designee to the Coordination Committee. Requests may be communicated in writing and transmitted in person or by mail, facsimile machine, or other electronic means to the appropriate representative as named in the Coordination Agreement. The designated representative is required to respond in a reasonably timely manner. Nothing in the Agreement shall be construed to prohibit any Party from voluntarily exchanging information with any other Party by any other mechanism separate from the Coordination Committee.

The Parties agree that each GSP Group shall provide the data required to develop the Subbasin-wide coordinated water budget but, unless required by law, will not be required to provide individual well or parcel-level information in order to preserve confidentiality of individuals to the extent authorized by law, including but not limited to Water Code Section 10730.8, subdivision (b). To the extent that a court order, subpoena, or the California Public Records Act is applicable to a party, the Party in responding to a request made pursuant to that Act for release of information exchanged from another Party shall notify each other Party in writing of its proposed release of information in order to provide the other Parties with the opportunity to seek a court order preventing such release of information.

Dispute Resolution

Procedures for conflict resolution have been established within the Coordination Agreement. In the event that a dispute arises among Parties as it relates to the Coordination Agreement, the disputing Party or Parties are to provide written notice of the basis of the dispute to the other Parties within thirty (30) calendar days of the discovery of the events giving rise to the dispute. Within thirty (30) days after such written notice, all interested Parties are to meet and confer in good faith to informally resolve the dispute. All disputes that are not resolved informally shall be settled by arbitration. In such an event, within ten (10) days following the failed informal proceedings, each interested Party is to nominate and circulate to all other interested Parties the name of one arbitrator. Within ten (10) days following the nominations, the interested Parties are to rank their top three among all nominated arbitrators, awarding three points to the top choice, two points to the second choice, and one point to the third choice and zero points to all others. Each interested Party will then forward its tally to the Secretary, who tabulates the points and notifies the interested Parties of the arbitrator with the highest cumulative score, who shall be the selected arbitrator. The Secretary may also develop procedures for approval by the Parties for selection of an arbitrator in the case of tie votes or in order to replace the selected arbitrator in the event such arbitrator declines to act. The arbitration is to be administered in accordance with the procedures set forth in the California Code of Civil Procedure, Section 1280, *et seq.*, and of any state or local rules then in effect for arbitration pursuant to said section. Upon completion of arbitration, if the controversy has not been resolved, any Party may exercise all rights to bring legal action relating to the controversy.

Coordinated Data and Methodology

Pursuant to SGMA, the Coordination Agreement ensures that the individual GSPs utilize the same data and methodologies for developing assumptions used to determine: 1) groundwater elevation; 2) groundwater extraction data; 3) surface water supply; 4) total water use; 5) changes in groundwater storage; 6) water budgets; and 7) sustainable yield. The Parties have agreed to develop agreed-upon methodologies and assumptions for the aforementioned items prior to or concurrent with the individual development of GSPs. This development is facilitated through the Coordination Committee's delegation to a subcommittee or working group of the technical staff provided by some or all of the Parties. The basis upon which the methodologies and assumptions have been developed includes existing data/information, best management practices, and/or best modeled or projected data available and may include consultation with DWR as appropriate.

The data and methodologies for assumptions described in Water Code §10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans are set forth in Technical Memoranda prepared by the Coordination Committee for each of the following elements: Data and Assumptions; Hydrogeologic Conceptual Model; Coordinated Water Budgets; Sustainable Management Criteria (SMC); Coordinated Monitoring Network; Coordinated Data Management System, and Adoption and Use of the Coordination Agreement. The Technical Memoranda have been subject to the unanimous approval of the Coordination Committee and once approved, have been attached to and incorporated by reference into the Coordination Agreement without formal amendment of the Coordination Agreement being required. The Parties have agreed that they will not submit this Coordination Agreement to DWR until the Technical Memoranda described herein have been added to the Coordination Agreement. The Technical Memoranda created pursuant to the Coordination Agreement are to be utilized by the Parties during the development and implementation of their individual GSPs in order to assure coordination of the GSPs is in compliance with SGMA. The Technical Memoranda have been included as an appendix to this GSP as a part of the Common Chapter.

Plan Implementation and Submittal

Under the Coordination Agreement, the Parties have agreed to submit their respective GSPs to DWR through the Coordination Committee and Plan Manager, in accordance with all applicable requirements. Subject to the subsequent attachment of the Technical Memoranda as appendices to the Common Chapter, the Parties intend that the described Coordination Agreement fulfill the requirements of providing an explanation of how the GSPs implemented together satisfy the requirements of SGMA for the entire Subbasin. The Coordination Agreement does not otherwise affect each Party's responsibility to implement the terms of its respective GSP in accordance with SGMA. Rather, this Coordination Agreement is the mechanism through which the Parties will coordinate their respective GSPs to the extent necessary to ensure that such GSP coordination complies with SGMA.

Each Party is responsible for ensuring that its own GSP complies with the statutory requirements of SGMA, including but not limited to the filing deadline. The Parties to this Coordination Agreement intend that their individual GSPs be coordinated together in order to satisfy the requirements of SGMA and to be in substantial compliance with the California Code of Regulations. The collective GSPs will satisfy the requirements of Water Code Sections 10727.2 and 10727.4 by providing a description of the physical setting and characteristics of the separate aquifer systems within the Subbasin, the measurable objectives for each such GSP, interim milestones (IMs), and monitoring protocols that together provide a detailed description of how the Subbasin as a whole will be sustainably managed.

The Parties agree to submit their respective GSPs to DWR through the Coordination Committee and Plan Manager, in accordance with all applicable requirements. The Coordination Committee is responsible for assuring submittal of annual reports, five-year updates, and for providing assessments recommending any needed revisions to the Coordination Agreement.

Coordinated Data Management System

The Delta-Mendota Subbasin GSAs have developed and will maintain a coordinated Data Management System that is capable of storing and reporting information relevant to the reporting requirements and/or implementation of the GSPs and monitoring network of the Subbasin.

The Parties may also develop and maintain separate Data Management Systems. Each separate Data Management System developed for each GSP will store information related to implementation of each individual GSP, monitoring network data and monitoring sites requirements, and water budget data requirements. Each system will be capable of reporting all pertinent information to the Coordination Committee. After providing the Coordination Committee with data from the individual GSPs, the Coordination Committee will ensure the data are stored and managed in a coordinated manner throughout the Subbasin and reported to DWR on an annual basis.

Adjudicated Areas and Alternative Plans

There are no adjudicated areas within the Delta-Mendota Subbasin, and no Alternative Plans have been submitted by the local agencies within the Subbasin.

Legal Bindings of the Delta-Mendota Subbasin Coordination Agreement

The Coordination Agreement, as contained herein, is reflected in the same manner and form as in the six Subbasin GSPs. All parties understand that the Delta-Mendota Subbasin Coordination Agreement is part of the GSPs for participating Subbasin GSAs and will be a primary mechanism by which the six Subbasin

GSPs will be implemented in a coordinated fashion. Further, all parties to the Coordination Agreement understand that DWR will evaluate the agreement for compliance with the procedural and technical requirements of GSP Regulations §357.4 (Coordination Agreement) to ensure that the agreement is binding on all parties and that provisions of the agreement are sufficient to address any disputes between or among parties to the agreement.

The Coordination Agreement will continue to be the framework under which the six Delta-Mendota Subbasin GSPs will be implemented and will be reviewed as part of the five-year assessment and revised as necessary, dated, and signed by all parties.

2.1.3 Inter-basin Agreements

SLDMWA, on behalf of the Northern and Central Delta-Mendota Regions, and the SJREC GSA executed inter-basin data sharing agreements with Westlands Water District (the lead entity encompassing the adjoining Westside Subbasin). The purpose of the agreement is to establish a set of common assumptions on groundwater conditions on either side of the boundary between the Westside Subbasin and the Delta-Mendota Subbasin to be used for the development of GSPs in support of implementation of SGMA. In this agreement, the parties agree to provide each other with recorded, measured, estimated, and/or simulated modeling data located within five (5) miles of the boundary between the Westside Subbasin and the Delta-Mendota Subbasin. A list of data types to be shared between the parties to the agreement can be found in **Appendix D**.

Data provided under this agreement are understood to be shared with consultants and other stakeholders in the respective basins (Delta-Mendota Subbasin and Westside Subbasin), and that the information will be made public through the development of the respective Parties' (meaning SLDMWA/SJREC and Westlands Water District) GSPs and the supporting documentation of the GSPs. Other than publishing information for those purposes, neither Party will disclose the other Party's information to any third party, except if the other Party determines, at its sole discretion, the disclosure is required by law. Each Party may review preliminary results before publishing the information.

It is recognized that many of the sustainability indicators, notably groundwater quality, inelastic land subsidence and change in storage, are regional issues that may require future inter-basin discussions and coordination. Memorandum of Intent (MOI) are being discussed with the surrounding subbasins to demonstrate/confirm the subbasins' desires to coordinate during GSP implementation. These agreements, to be discussed further following submittal of GSPs, will allow for thoughtful consideration of the intent, structure, and need for future coordination with respect to data collection, reporting, regular meetings, and updates prior to annual reporting.

3. DELTA-MENDOTA SUBBASIN PLAN AREA

This section describes the Delta-Mendota Subbasin, including major streams and creeks, institutional entities, agricultural and urban land uses, locations of state lands (including wetlands), and geographic boundaries of surface water runoff areas. The reader is referred to the individual Subbasin GSPs for descriptions of existing surface water and groundwater monitoring programs, existing water management programs, and general plans in the individual GSP Plan Areas. The information contained in this section reflects information from publicly available sources and may not reflect all information that will be used for GSP technical analysis.

This section of the GSP satisfies Section 354.8 of the SGMA regulations.

3.1 Plan Area Definition

The Plan Area for the six coordinated GSPs is the Delta-Mendota Subbasin (DWR Basin 5-022.07). As previously noted, the Delta-Mendota Subbasin is one of nine subbasins that lie completely within the San Joaquin Valley Hydrologic Region and adjoins the following subbasins (**Figure CC-8**):

- Tracy
- Eastern San Joaquin
- Modesto
- Turlock
- Merced
- Chowchilla
- Madera
- Kings
- Westside

As described in *California's Groundwater*, DWR Bulletin 1188 (2016), the Delta-Mendota Subbasin is in the San Joaquin Valley Groundwater Basin, located along the western edge of the San Joaquin Valley and includes portions of San Joaquin, Stanislaus, Merced, Fresno, San Benito, and Madera Counties. The northern boundary begins just south of Tracy in San Joaquin County, and the eastern boundary generally follows the San Joaquin River and Fresno Slough. The southern boundary is near the small town of San Joaquin, and the Subbasin is bounded on the west by the Coast Range. The Subbasin boundaries are further described in Section 4.1.5, Basin Boundaries, and is shown in relation to each of the six counties in **Figure CC-9**.

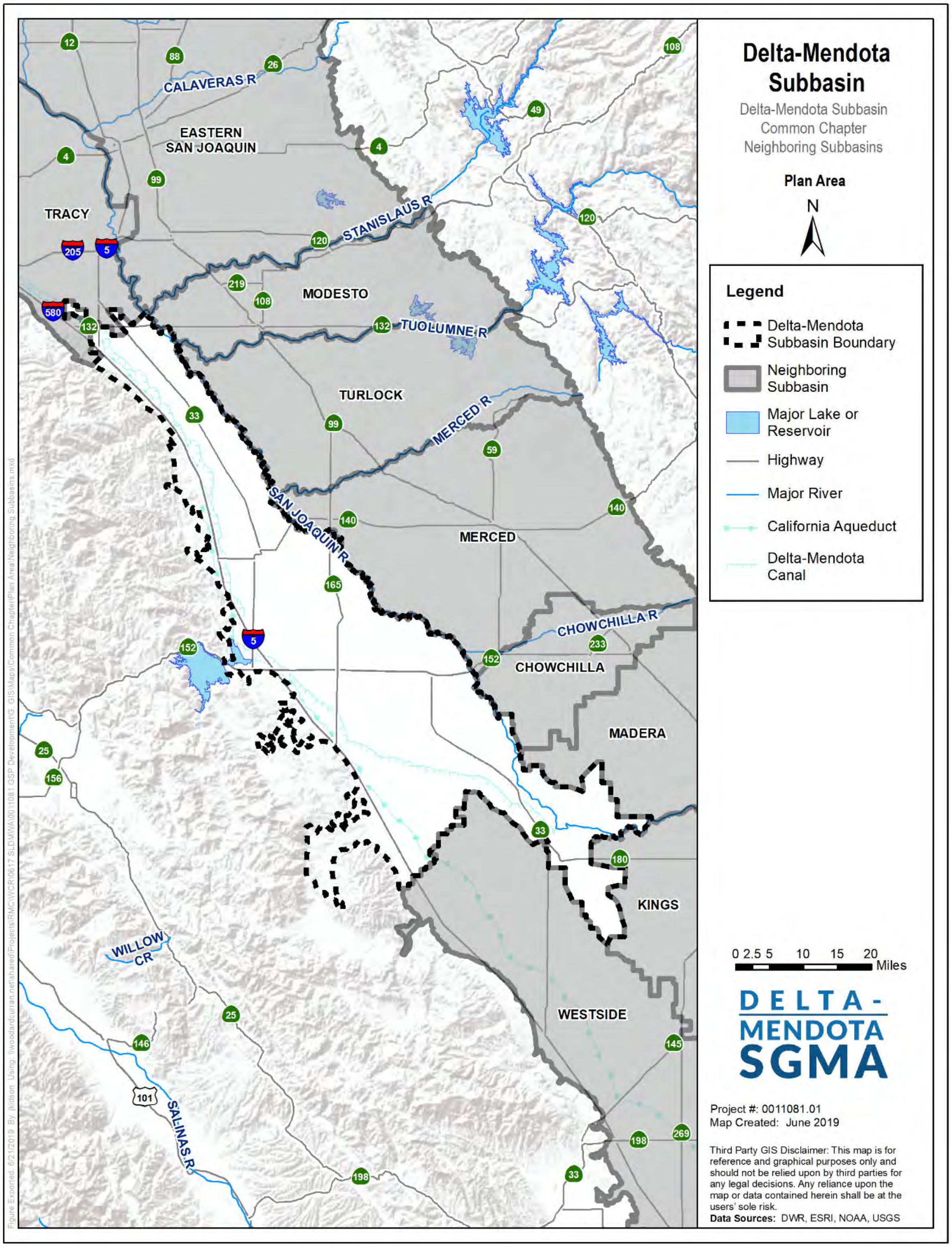


Figure CC-8: Neighboring Subbasins of the Delta-Mendota Subbasin

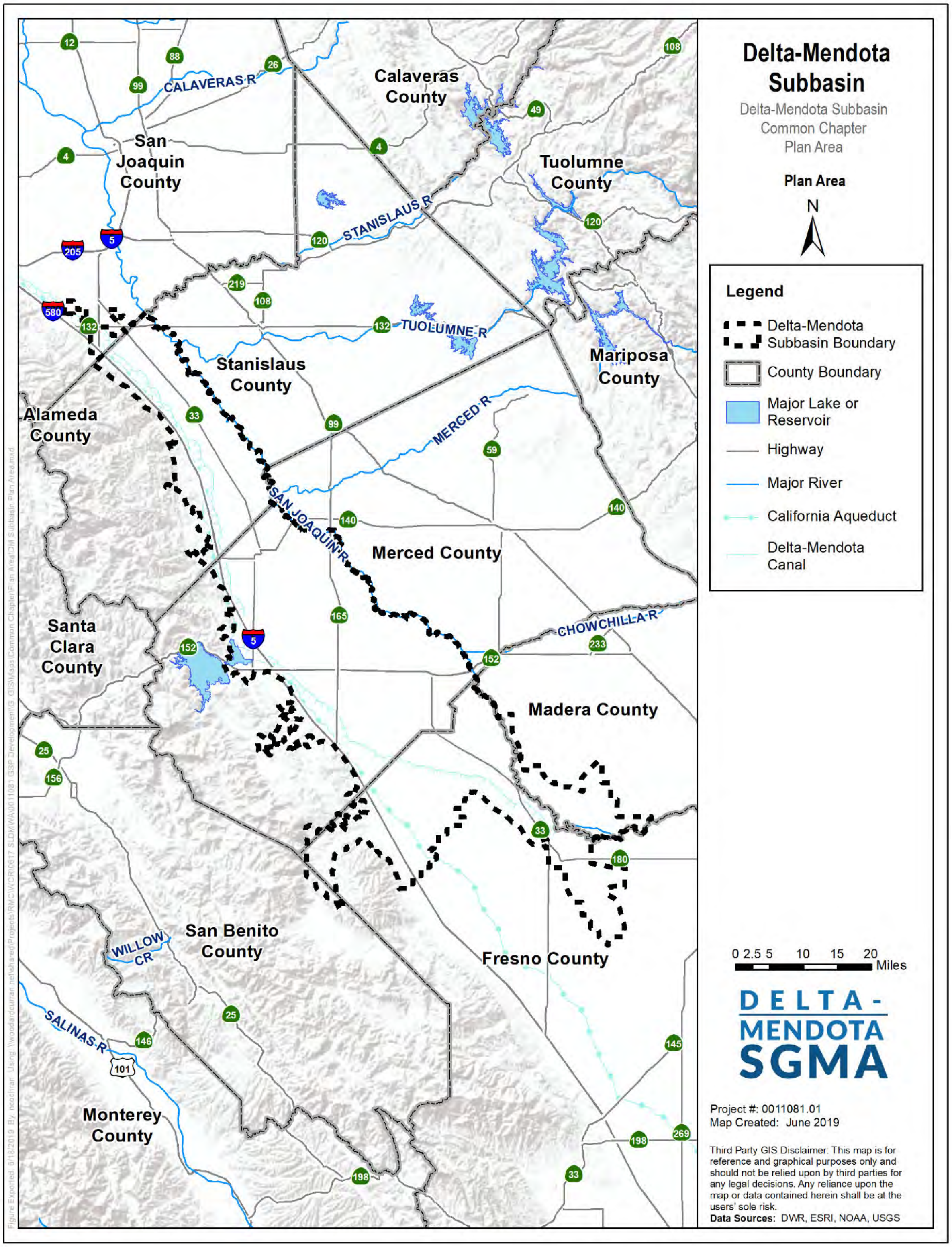


Figure CC-9: Delta-Mendota Groundwater Subbasin Plan Area

3.2 Plan Area Setting

As previously noted, the Delta-Mendota Subbasin lies along the western margin of the San Joaquin Valley. This valley is part of the large, northwest-to-southeast-trending asymmetric trough of the Central Valley, which has been filled with up to six vertical miles of sediment. This sediment includes both marine and continental deposits ranging in age from Jurassic to Holocene. The San Joaquin Valley lies between the Coast Range Mountains on the west and the Sierra Nevada on the east and extends northwestward from the San Emigdo and Tehachapi Mountains to the Sacramento-San Joaquin Delta (Delta) near the City of Stockton. The San Joaquin Valley is 250 miles long and 50 to 60 miles wide. The relatively flat alluvial floor is interrupted occasionally by low hills. Foothills adjacent on the west are composed of folded and faulted beds of mainly marine shale in the north and sandstone and shale in the south.

The San Joaquin Valley floor is divided into several geomorphic land types, including dissected uplands, low alluvial fans and plains, river floodplains and channels, and overflow lands and lake bottoms. Alluvial plains cover most of the valley floor and comprise some of the most intensely developed agricultural lands in the San Joaquin Valley. In general, alluvial sediments of the western and southern parts of the San Joaquin Valley tend to have lower permeability than east side deposits.

This section provides additional information relating to water resources in and around the Delta-Mendota Subbasin.

Watersheds

The Delta-Mendota Subbasin lies in the Middle San Joaquin-Lower Merced-Lower Stanislaus watershed and the Middle San Joaquin-Lower Chowchilla watershed (**Figure CC-10**). Historically, the San Joaquin Valley Basin was a large floodplain of the San Joaquin River that supported vast expanses of permanent and seasonal marshes, lakes, and riparian areas. Approximately 90 percent of the basin's wetlands have been lost, with approximately 58,000 flooded acres remaining on State, federal and private wildlife refuges. Approximately 100,000 acres of managed wetland, upland and riparian habitat is found within the Grassland Plan area, and together with the 12,000-acre Mendota Wildlife Area (found in the Fresno County Plan area), encompasses the vast majority of the remaining wetlands found in the basin (**Figure CC-11**).

The San Joaquin River Basin (Basin) includes the entire area drained by the San Joaquin River. The San Joaquin River Basin drains 13,513 square miles (mi^2) before it flows into the Sacramento-San Joaquin Delta near the town of Vernalis. The Merced, Tuolumne and Stanislaus Rivers are the three major tributaries that join the mainstream San Joaquin River from the east before it flows into the Delta.

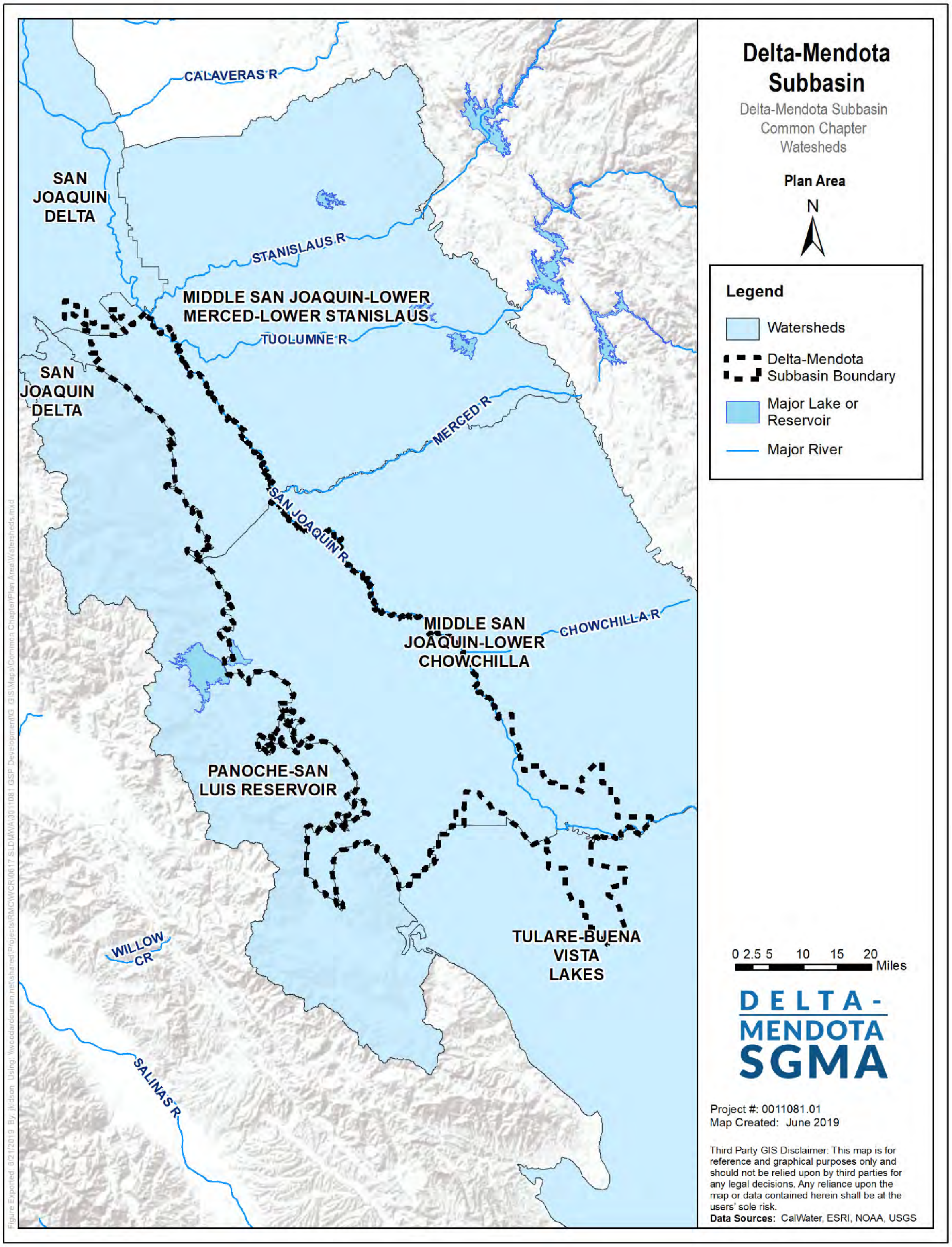


Figure CC-10: Local Watersheds

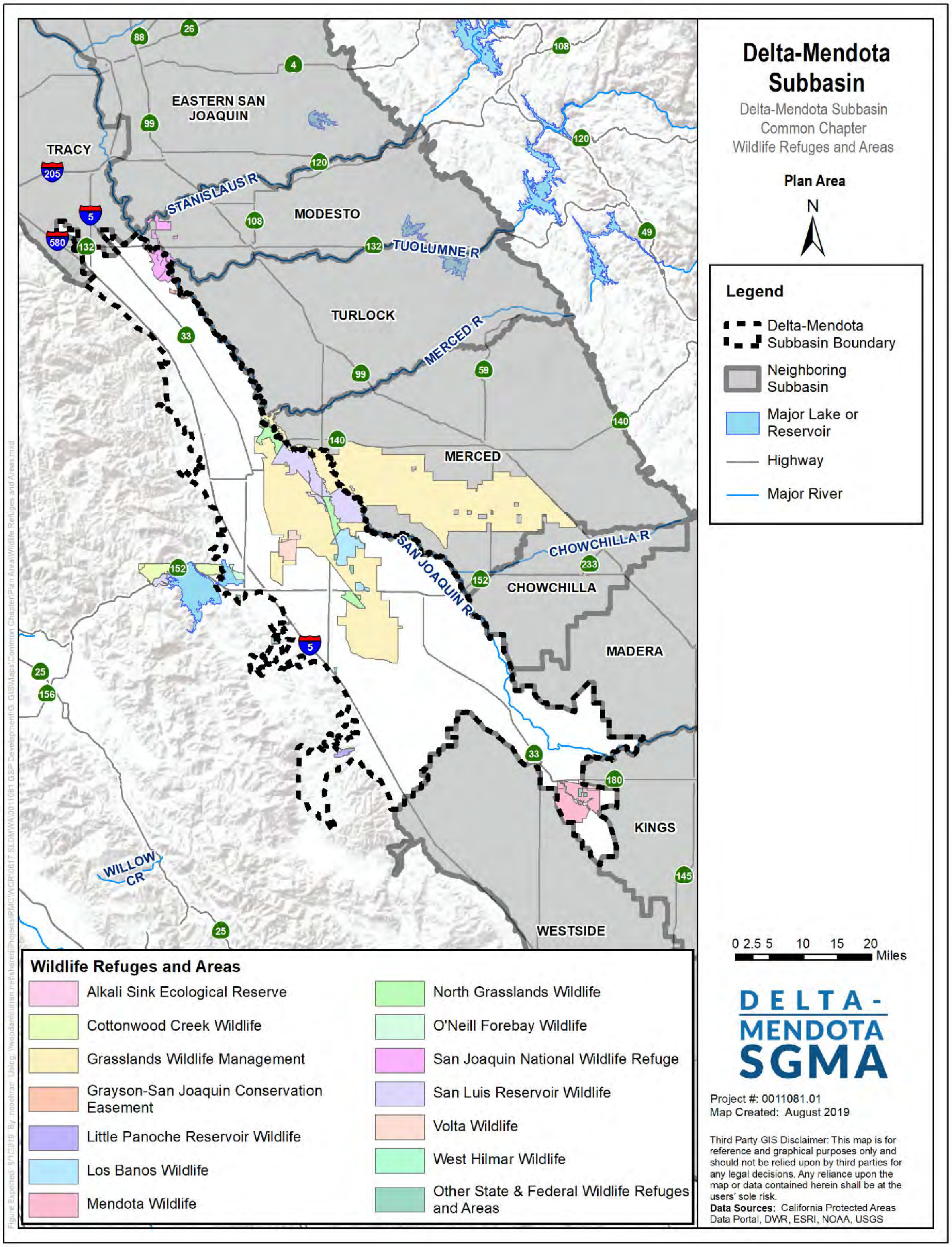


Figure CC-11: Wildlife Refuges and Wetland Habitat Areas in the Delta-Mendota Subbasin

Surface Water Use

Surface water is a primary water supply for agriculture within the Delta-Mendota Subbasin. Surface water supplies are brought into the Subbasin using an extensive series of water systems relied upon by multiple water agencies, cities, and private water users. Major water-related infrastructure in the Subbasin includes the facilities required to deliver Central Valley Project (CVP) supplies to CVP water supply contractors, in addition to key infrastructure of the State Water Project (SWP) utilized to deliver water to SWP water supply contractors and surface water diversions (e.g., intakes) to divert and distribute water from the San Joaquin and Kings Rivers.

The San Luis & Delta-Mendota Water Authority (SLDMWA) is a joint powers authority consisting of 28 member agencies that provide water to approximately 1.2 million acres of highly productive farmland, 2 million California residents, and millions of waterfowl dependent upon the nearly 200,000 acres of managed wetlands within this area of the Pacific Flyway. The SLDMWA operates and maintains portions of the CVP, including the Delta Cross Channel, the C.W. "Bill" Jones Pumping Plant, the Delta-Mendota Canal (DMC), O'Neill Pumping-Generating Plant, and the San Luis Drain, and provides emergency assistance when requested on the Delta Cross Channel and the Tracy Fish Collection Facility. The California Department of Water Resources (DWR) operates and maintains the SWP facilities, designed to deliver nearly 4.2 million acre-feet of water per year to 29 long-term SWP water supply contractors. Joint federal-state facilities include the California Aqueduct, Banks Pumping Plant, O'Neill Dam and Forebay, Sisk Dam and San Luis Reservoir, and Dos Amigos Pumping Plant. Surface water diversion facilities are owned and operated by individual water and irrigation districts and typically include some form of intake (e.g., fish screen, open water intake, flumes) plus facilities to convey the diverted surface water to a distribution system.

Groundwater Use

Groundwater is a key component of water supplies in the Delta-Mendota Subbasin. To protect the long-term sustainability of groundwater resources, pumping has significantly reduced in past years (2017-2019), allowing the groundwater levels in the Subbasin to recover to some extent. During the most recent drought period, groundwater was heavily relied upon throughout the Subbasin for irrigation as surface water deliveries were significantly severely reduced for many water users (especially those with junior surface water rights), resulting in increased groundwater pumping.

There are many communities within the Subbasin that are partially or completely reliant on groundwater for municipal and domestic water supplies, including the cities of Patterson, Newman, Gustine, Los Banos, Firebaugh, and Mendota and the communities of Grayson, Westley, Crows Landing, Santa Nella, Volta, Dos Palos Y, and Tranquillity (**Figure CC-12**). Other unincorporated areas of the Subbasin also rely on groundwater as the sole water supply source. There are several areas of *de minimis* groundwater extractors in the Subbasin, which are defined as well owners who extracts two acre-feet or less per year from a parcel for domestic purposes (SWRCB, n.d. (a)).

Figure CC-13, **Figure CC-14**, and **Figure CC-15** show the density per square mile (PLSS Section) of domestic, production, and public wells in the Delta-Mendota Subbasin as identified by DWR's Well Completion Report Map Application. Domestic wells are defined as individual domestic wells which supply water for the domestic needs of an individual residence or systems of four or less service connections (DWR, 1981). Within the Delta-Mendota Subbasin, the majority of PLSS Sections contain five or fewer domestic wells (**Figure CC-13**). Production well statistics include wells that are designated as irrigation, municipal, public, and industrial on well completion reports, generally indicating wells designed to obtain water from productive zones containing good-quality water (DWR, 1991). The majority of PLSS Sections in the Subbasin contain only zero, one, or two production wells (**Figure CC-**

14). The highest concentration of production wells can be found in the south of the Subbasin, near Mendota. Public wells are defined as wells that provide water for human consumption to 15 or more connections or regularly serves 25 or more people daily for at least 60 days out of the year (SWRCB, n.d. (b)). Compared to domestic and production wells, public wells are less common in the Subbasin. The status of the wells (e.g., active, abandoned, destroyed) contained in the DWR Well Completion Report Map Application has not been independently confirmed. Additionally, the reader is referred to each of the six Subbasin GSPs for more information regarding wells in the Delta-Mendota Subbasin.

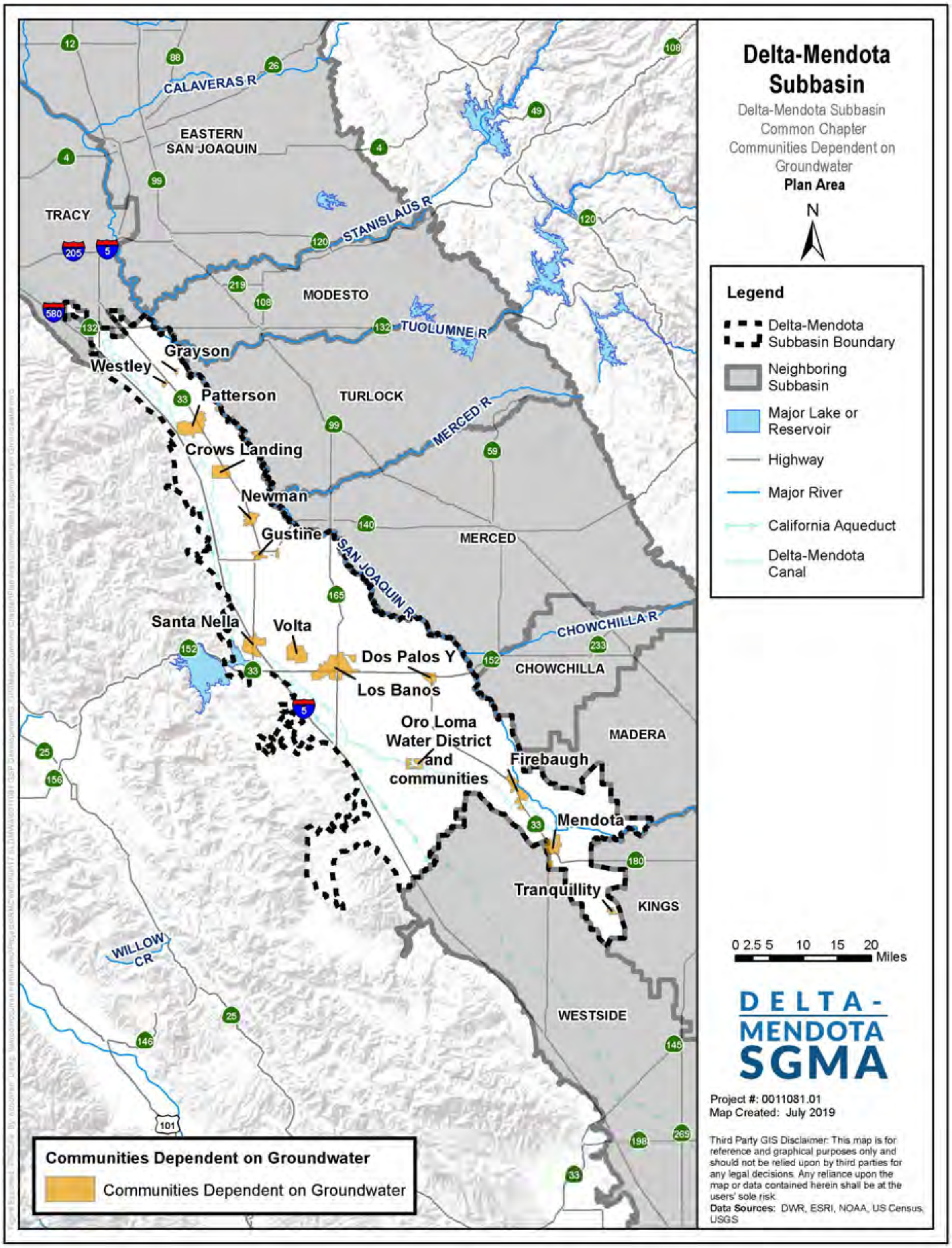


Figure CC-12: Communities Dependent on Groundwater

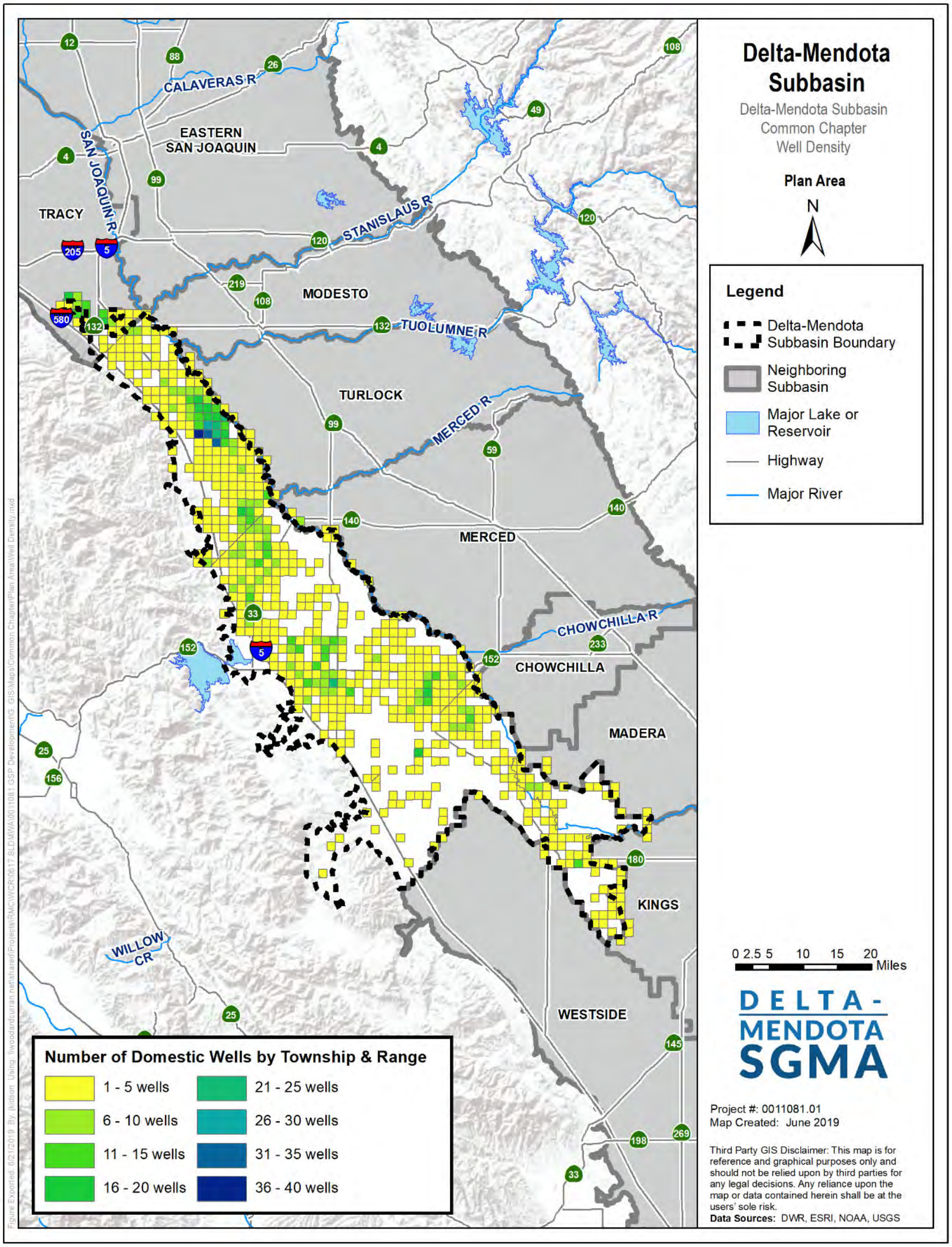


Figure CC-13: Domestic Well Density in the Delta-Mendota Subbasin

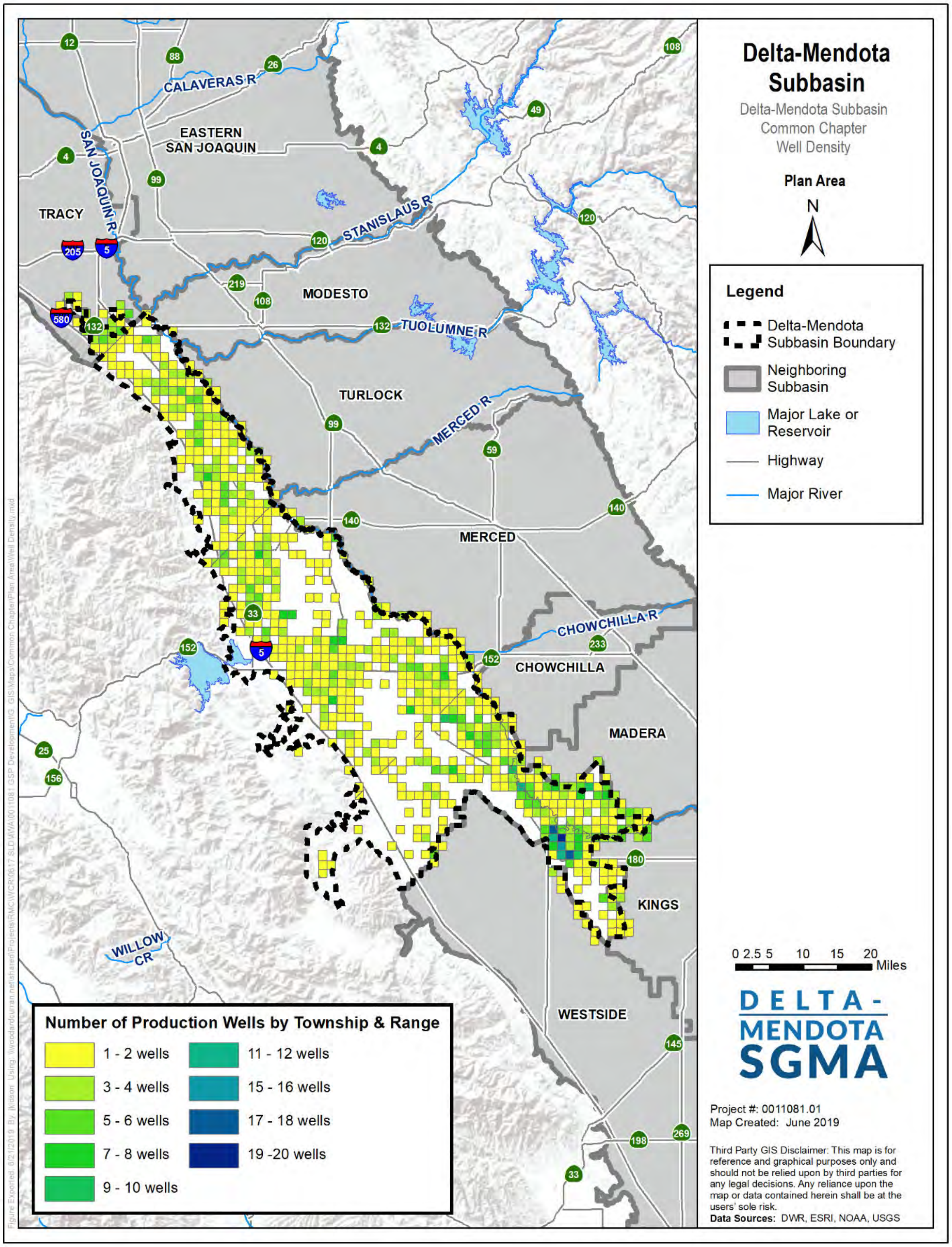


Figure CC-14: Production Well Density in the Delta-Mendota Subbasin

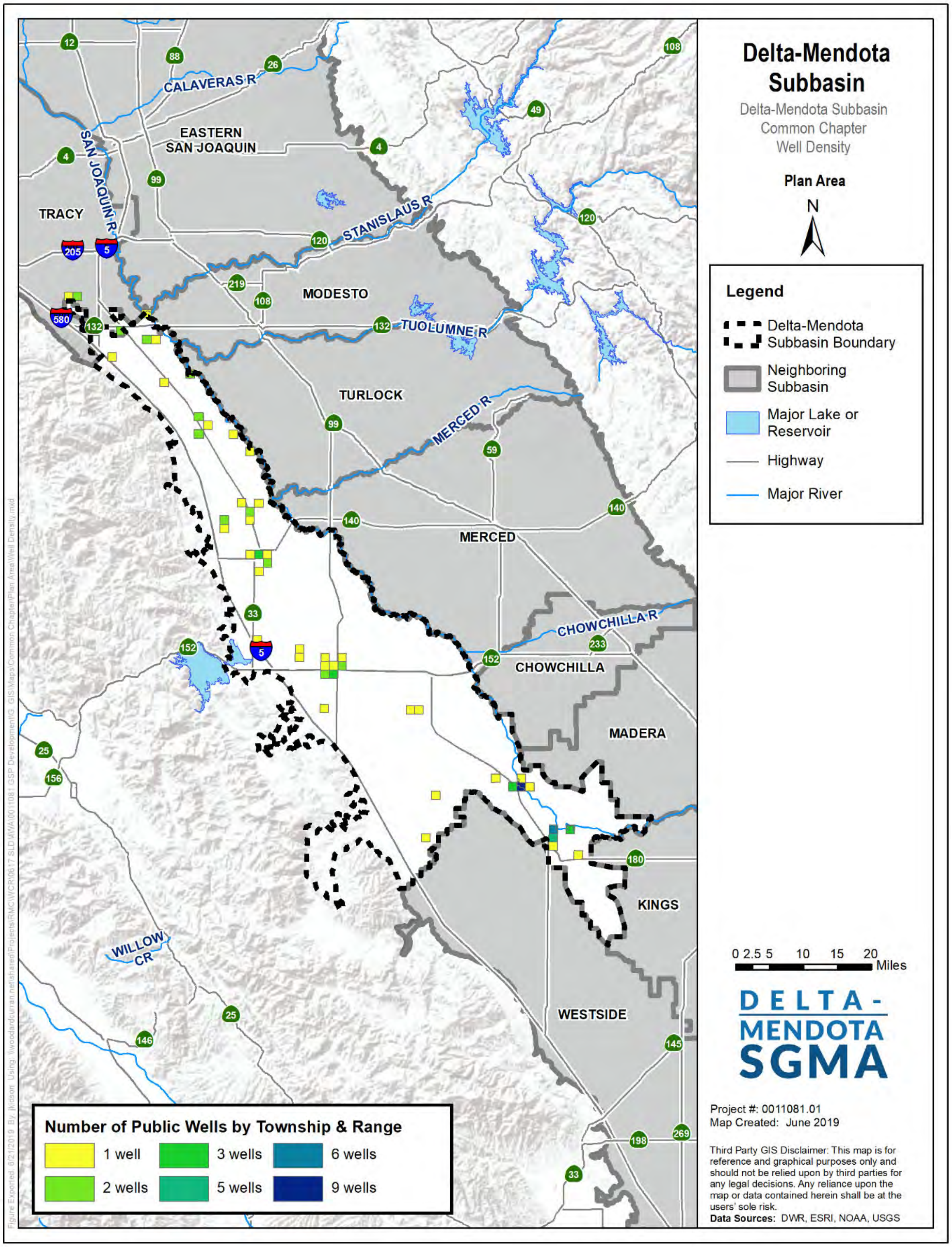


Figure CC-15: Public Well Density in the Delta-Mendota Subbasin

Flood Management

In general, the Delta-Mendota Subbasin slopes toward the San Joaquin River with steeper slopes along the western boundary (near the Coast Range), tapering off closer to the San Joaquin River. The flood management system in the San Joaquin Valley includes reservoirs to regulate snowmelt from elevations greater than 5,000 feet, bypasses at lower elevations, and levees that line major rivers.

Severe rain events in 1997/98, 2005/2006, 2011 and 2017 flooded communities, agricultural lands and refuges adjacent to the San Joaquin River in the Delta-Mendota Subbasin (specifically the communities of Firebaugh, Newman, Gustine and Mendota) and produced some localized flooding of farmland and refuges caused by runoff impoundment by elevated canal banks. Based on the recent historical events, the primary threat of flooding to urban areas will be for those along (and immediately adjacent to) the San Joaquin River. Areas within the 100-year floodplain within the Subbasin are shown in **Figure CC-16**.

Major Land Use Divisions

The Delta-Mendota Subbasin consists mostly of agricultural land use types (**Figure CC-17**). Typical land uses are described in the following sections and consist predominantly of the following:

- Pasture/Rangeland
- Agricultural Land (including rice, field crops and grains)
- Deciduous Forest
- Idle and Retired Farmland/Rangeland
- Riparian/Wetland
- Urban

The primary land use planning entities in the Delta-Mendota Subbasin include San Joaquin, Stanislaus, Merced, Fresno, and Madera Counties, as well as the cities of Patterson, Newman, Gustine, Los Banos, Dos Palos, Firebaugh, and Mendota, and Community of Santa Nella, as shown in **Figure CC-18**.

Pasture/Rangeland

Grasslands in the Central Valley were originally dominated by native perennial grasses such as needlegrass and alkali sacaton. Currently, grassland vegetation is characterized by a predominance of annual or perennial grasses in an area with few or no trees and shrubs. Annual grasses found in grassland vegetation include wild oats, soft chess, ripgut grass, medusa head, wild barley, red brome, and slender fescue. Perennial grasses found in grassland vegetation are purple needlegrass, Idaho fescue, and California oatgrass. Forbs commonly encountered in grassland vegetation include long-beaked filaree, redstem filaree, dove weed, clovers, Mariposa lilies, popcornflower, and California poppy. Vernal pools found in small depressions with an underlying impermeable layer are isolated wetlands within grassland vegetation. Pastures can consist of both irrigated and unirrigated lands dominated by perennial grasses used predominantly for grazing.

Rangeland communities are composed of similar grasses, grass-like plants, forbs, or shrubs which are grazed by livestock. Rangelands are classified into three basic types: shrub and brush rangeland, mixed rangeland, and herbaceous rangeland. The shrub and brush rangeland are dominated by woody vegetation and is typically found in arid and semiarid regions. Mixed rangelands are ecosystems where more than one-third of the land supports a mixture of herbaceous species and shrub or brush rangeland species. Herbaceous rangelands are dominated by naturally occurring grasses and forbs as well as some areas that have been modified to include grasses and forbs as their principal cover. Rangelands are, by definition, areas where a variety of commercial livestock are actively maintained.

Agricultural Land

General agricultural types occurring in the Delta-Mendota Subbasin include row crops, grains, orchards, and vineyards. Management of agricultural lands often includes intensive management, including soil preparation activities, crop rotation, grazing, and the use of chemicals.

Row Crops

Most row crops grown in the San Joaquin Valley and harvested for food are annual species and are managed with a crop rotation system. During the year, several different crops may be produced on a given parcel of land either concurrently or in succession. Typical crops grown in the Delta-Mendota Subbasin include tomatoes, melons, grain crops (such as barley, wheat, corn, and oats), rice, cotton, and beans.

Orchards and Vineyards

Orchard and vineyards consist of cultivated fruit or nut-bearing trees or grapevines. Orchards are typically open, single-species, tree-dominated habitats and are planted in a uniform pattern and intensively managed. Understory vegetation is usually sparse. Vineyards are typically managed in a similar manner for producing grapes for wine and/or direct consumption.

Deciduous Forest

Deciduous forests are composed of trees that lose their leaves in the winter. These include species such as the various California oaks, California buckeye, Fremont Cottonwoods, Goodding Willows, and California Sycamores. The interior live oak, which is not deciduous, is also found in deciduous forests. Valley oak woodlands are found in the Sacramento and San Joaquin Valleys and usually occur below elevations of 2,000 feet.

Idle or Retired Farmland/Rangeland

Lands of this category are similar to abandoned farmlands in ruderal (disturbed) areas. Plants on these parcels may consist of either native and/or non-native species.

Riparian/Wetland

Riparian and wetland communities are both natural and man-made. Managed wetlands are classified as riparian and are flooded for overwintering migratory bird habitat. In the spring the wetlands are drained to promote grasses such as swamp timothy and watergrass which are an important waterfowl food supply. Although some grazing continues on managed wetlands, historically, many of these lands were irrigated and used as rangeland throughout the summer months. Today, managed wetlands are irrigated in the spring to maximize wetland productivity and provide nesting and sensitive species habitat. Managed wetlands also contain emergent vegetation such as cattail and tule and are often adjacent to riparian corridors.

Urban

Urban land uses include cities and smaller communities, in addition to other lands used for industrial and/or commercial practices.

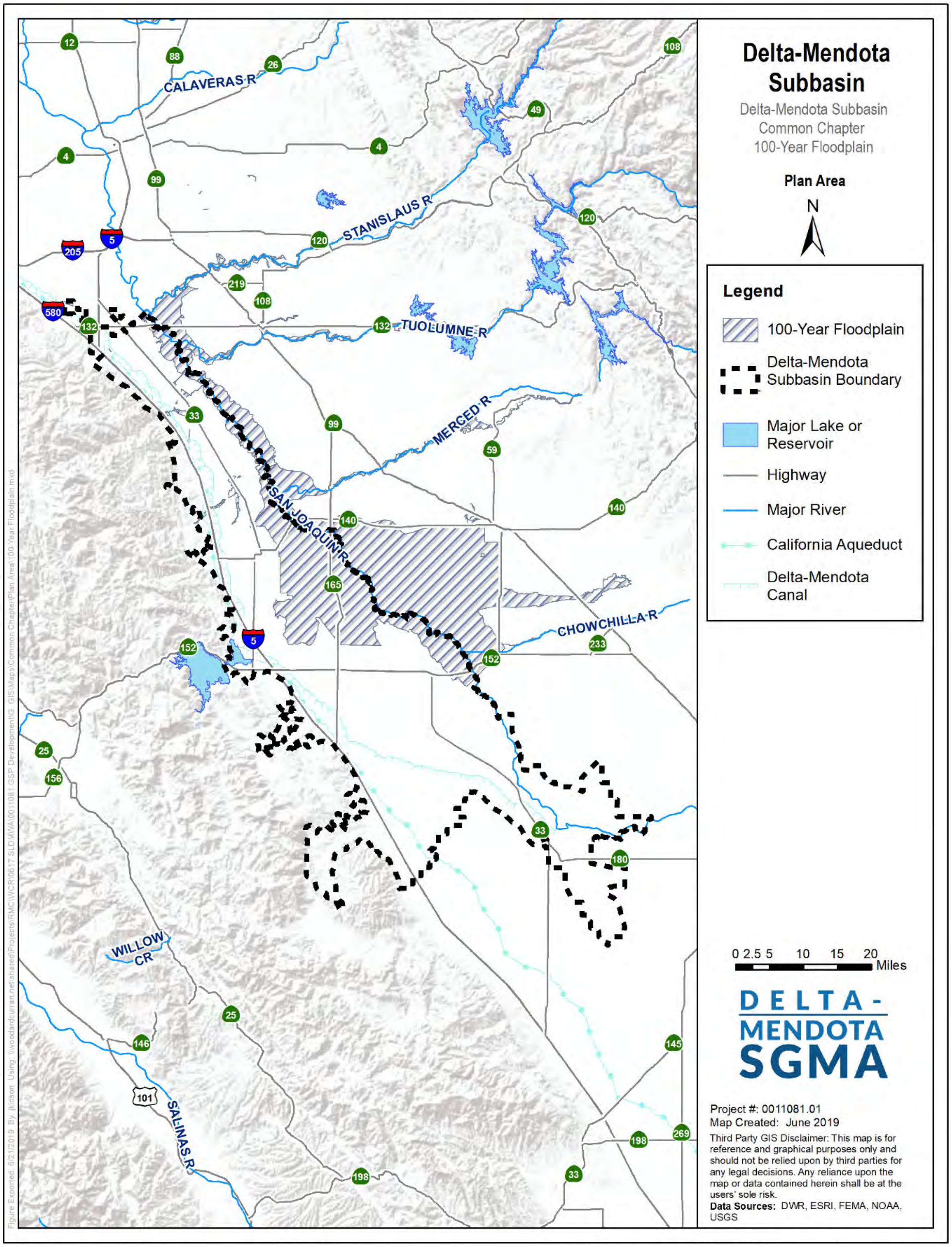


Figure CC-16: 100-Year Floodplain, Delta-Mendota Subbasin

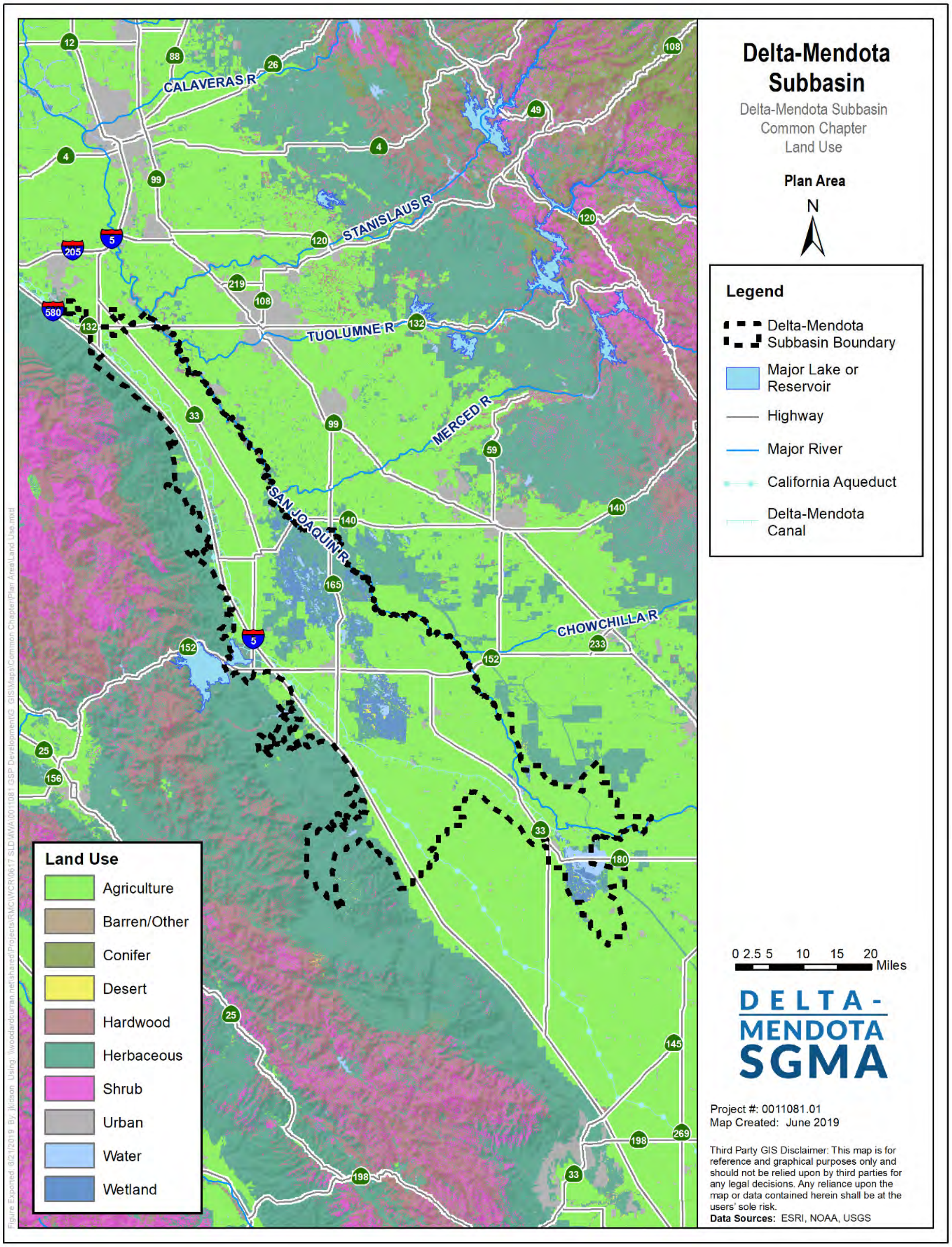


Figure CC-17: Typical Land Use

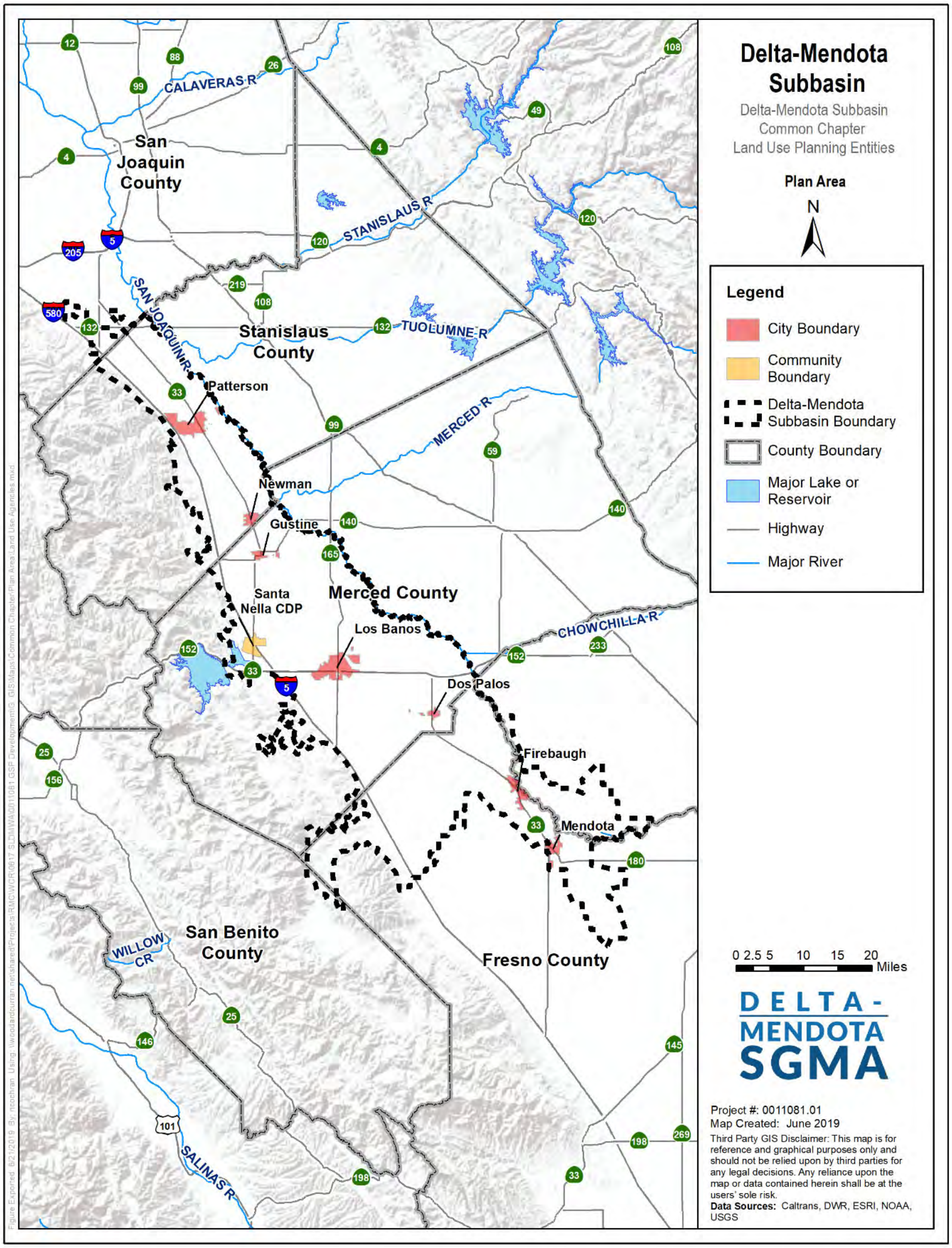


Figure CC-18: Land Use Planning Entities

Regional Economic Issues and Trends

The western San Joaquin Valley is a highly agricultural region. There are no large cities or industries in the Subbasin to provide an alternative economic base. The economy of this region is predominately driven by agricultural production and therefore, the availability of surface water supplies (predominantly in the form of CVP agricultural water and diversions from the San Joaquin and Kings Rivers) is an essential element to the economic health of the region. Other uses of surface water in the Subbasin are used for M&I purposes and wildlife refuge water supply.

Depending on water supply conditions, about 800,000 acres in the Delta-Mendota Subbasin are partially or solely irrigated with surface water. Other economic base industries include travel on the Interstate 5 (I-5) corridor, some petroleum extraction, and tourism. State, federal, and private wildlife refuges benefit local economies by attracting hunters, anglers, outdoor recreationists to the region. Managed wetland water conveyance infrastructure is maintained and improved by many contractors and local agency staff. Large scale conveyance improvements and habitat restoration projects, including mitigation banks, are also common throughout the Subbasin. M&I water use, which is a small share of total water use in the Subbasin, occurs primarily within the cities and smaller communities. The largest M&I use areas in the Delta-Mendota Subbasin, based on 2018 population estimates from the U.S. Census Bureau, are the cities of Patterson (population 22,352) and Los Banos (population 30,074) (U.S. Census Bureau, 2017).

All communities within the Delta-Mendota Subbasin have economies greatly dependent on agricultural production. These communities include Patterson, Tranquillity, Grayson, Mendota, Firebaugh, Dos Palos, Los Banos, Santa Nella, Newman, Gustine, Crows Landing, and Westley. All of these communities are strongly affected by the reliability of agricultural water supplies. Some of them are dependent upon groundwater for M&I use.

Plan Area Jurisdictional Boundaries

Jurisdictional areas within the Delta-Mendota Subbasin include counties, cities, water districts, irrigation districts, mutual water companies, and federal and state agencies. There are no federal- or state-recognized tribal communities in the Subbasin. Federal and State Lands are shown in **Figure CC-19**. More detail on specific jurisdictional areas within each GSP area can be found in the respective GSP.

In general, all municipal, water/irrigation districts and counties within the Delta-Mendota Subbasin are participating in GSP development either as a separate GSA or as members of a GSA. The California Department of Fish and Wildlife boundaries and the U.S. Fish and Wildlife Service boundaries overlay the wildlife refuges and areas and state parks within the Subbasin. DWR manages the SWP and the California Aqueduct, and the U.S. Bureau of Reclamation (USBR), through the SLDMWA, manages the CVP and the Delta-Mendota Canal. The California Department of Transportation (Caltrans) is responsible for managing the State and Interstate highways in the Subbasin, including Interstate- (I-) 5, and State Highways 132, 33, 140, 152, and 165.

Figure CC-9 depicts the Subbasin's extent relative to the boundaries of the various counties that overlie the Subbasin. Merced County has jurisdiction over the largest portion of the Subbasin (525 square miles), in the central portion of the Subbasin. Stanislaus County has jurisdiction over most of the area on the northern end of the Subbasin (covering 223 square miles). Fresno and Madera Counties have jurisdiction over the southern extent of the Delta-Mendota Subbasin (400 square miles). Finally, San Benito County covers the smallest portion of the Subbasin (5 square miles) in the southwestern portion of the Subbasin near San Luis Reservoir.

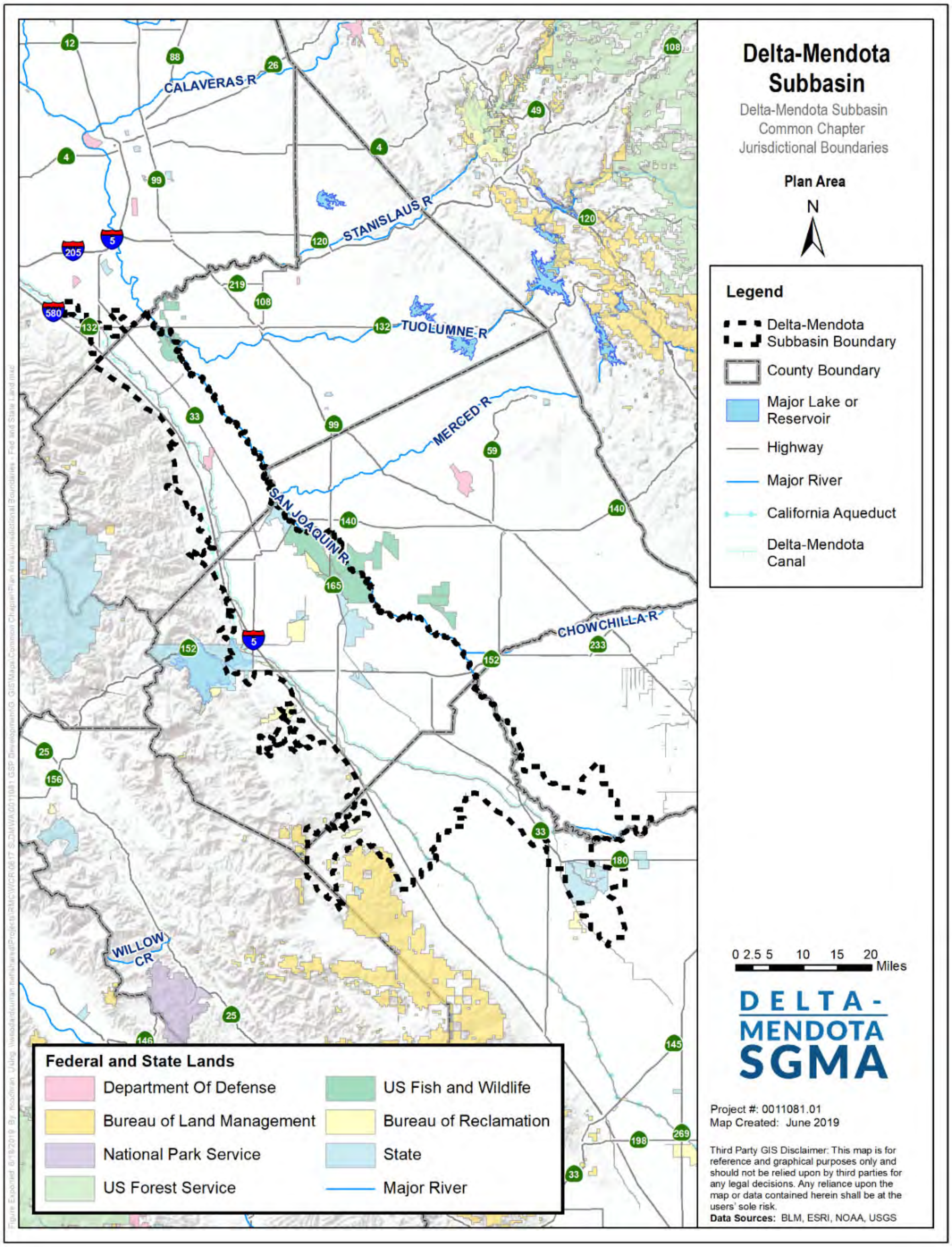


Figure CC-19: Federal and State Lands

Land Use Elements

Land use in the Delta-Mendota Subbasin is predominantly agricultural with wildlife habitat areas and areas of municipal, industrial, and commercial use. Predominant crops grown in the region include grain and hay crops, nut and fruit trees, and row crops. **Figure CC-20** shows the distribution of different land use types across the Delta-Mendota Subbasin.

Conjunctive use of surface water and groundwater is practiced throughout much of the Delta-Mendota Subbasin. Urban centers, such as the City of Patterson, and most unincorporated county areas rely solely on groundwater for their water supplies. Several water and irrigation districts hold water rights to divert from the San Joaquin River and/or the Kings Rivers. Other water purveyors receive water from the CVP and use groundwater and non-CVP-acquired surface waters to supplement demand, while some water districts rely solely on groundwater for their supplies. Refer to each GSP for detailed discussions of the water sources used by each agricultural, wetland, and urban water supplier.

Agriculture is the predominant water use sector throughout the Delta-Mendota Subbasin (**Figure CC-20**). Urban water uses are mostly concentrated within and surrounding cities (such as Patterson and Los Banos). Non-irrigated land includes any idle or native riparian land classifications, which are scattered throughout the Regions.

3.3 General Plans in Plan Area

Within each GSP, General Plans and/or Community Specific Plans overlie the area. These include County general plans for Fresno, Merced, San Benito, San Joaquin, Stanislaus, and Madera Counties, and specific plans for cities and communities. Each GSP contains a detailed list of General Plan policies and objectives relevant to water resources management in the applicable GSP area. Refer to discussions in the individual GSPs which satisfy §354.8(f) of the GSP Emergency Regulations under SGMA.

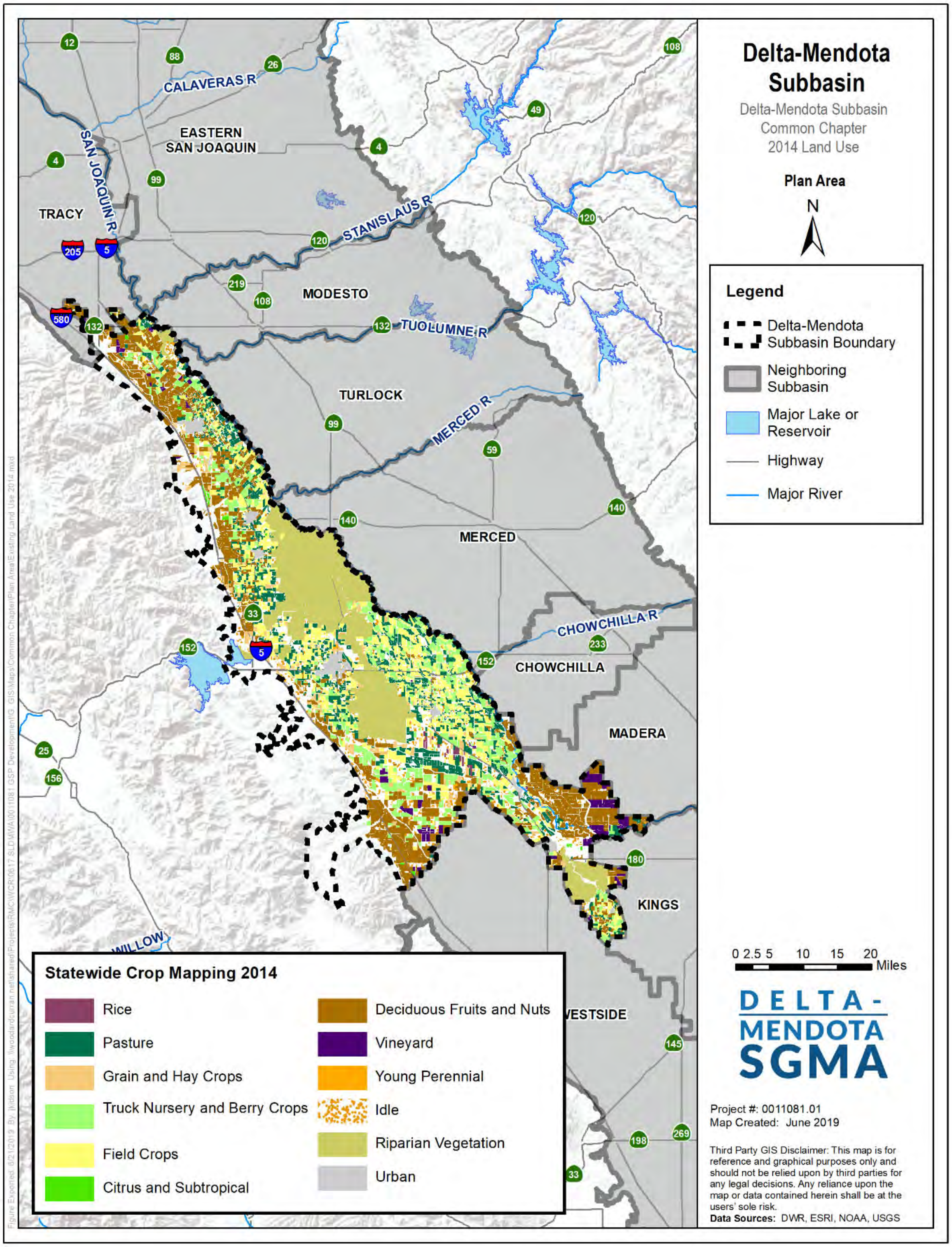


Figure CC-20: 2014 Land Use in the Delta-Mendota Subbasin

3.4 Existing Land Use Plans and Impacts to Sustainable Groundwater Management

Numerous policies in each County's and Community's General Plan compliment the GSPs' plans to conserve and sustainably manage groundwater resources. In general, the County and City General Plans guide future growth and development (and associated demands) within their respective jurisdictional areas. This additional growth may impact groundwater sustainability by placing additional demands on groundwater resources in an area where surface water resources are scarce or are otherwise unavailable. The General Plans also promote water conservation (in both the urban and agricultural sectors), which could potentially offset the additional demands associated with future urban development. In addition to conservation, some (though not all) General Plans promote groundwater recharge, the protection of recharge areas and wetlands, and the use of water transfers to further benefit groundwater sustainability.

Most General Plans within the Delta-Mendota Subbasin include goals focused on preserving agriculture, efficient use of existing and future water sources in both the urban and agricultural sectors, connecting smaller rural communities to larger water systems, and water quality protection. With respect to the protection of water quality and groundwater dependent ecosystems, the General Plans generally protect riparian and wetland habitats, encourage the protection of water quality (including through the remediation of contamination that may impact groundwater quality, requiring the use of septic systems in rural areas that are designed to be protective of groundwater quality and/or the use of community wastewater systems in urban areas), and promote flood control and management (including the associated impacts of erosion and sedimentation of surface water-courses).

The Fresno County General Plan, in particular, promotes sustainability by managing new wells in urban areas, supporting monitoring of water resources and associated habitats, and through the formation of a water resources document repository.

While the magnitude of impacts of these policies over the planning and implementation horizon are not known, such policies have been considered in this GSP, primarily through the use of the General Plans and associated zoning maps to identify future land use types and projected growth areas. These General Plans and mapping were used along with available water master plans, urban water management plans, agricultural water management plans, and other relevant planning documents to determine projected future land use and estimate future water demands by land use sector for use in the projected future water budgets.

Just as the General Plans complement the GSPs, the GSPs in the Delta-Mendota Subbasin may influence the General Plans' goals and policies. Sustainable management of groundwater resources through a GSP may change the pace, location, and type of development and/or land use that will occur in the Subbasin. GSP implementation is anticipated to be consistent with the General Plans' goals to sustainably manage land development and water resources in the Subbasin.

3.5 Existing Water Resources Monitoring and Management Programs

As required by §354.8I and (d) of the GSP Emergency Regulations, the following section describes key existing water resources-related management and monitoring programs, and a discussion of how these programs will either impact GSP implementation and/or will be incorporated into the GSPs. The information shown below is a high-level summary of key existing programs; please see the individual GSPs for additional relevant management and monitoring programs.

Irrigated Lands Regulatory Program (ILRP)

In 1999, the California Legislature passed Senate Bill 390, which eliminated a blanket waiver of water quality regulations for agricultural waste discharges. The Bill required the Regional Water Quality Control Boards to develop a program to regulate agricultural lands under the Porter-Cologne Water Quality Control Act. In 2003, the Central Valley Regional Water Quality Control Board (CV-RWQCB) issued an order that sets Waste Discharge Requirements (WDRs) for irrigated lands to protect both surface and groundwater throughout the Central Valley, primarily to address nitrates, pesticides, and sediment discharge. The resulting Irrigated Lands Regulatory Program (ILRP) regulates wastes from commercial irrigated lands that discharge into surface and groundwater. The program is administered by the CV-RWQCB working directly with a regional or crop-based coalition as well as directly with irrigators. The goal of the ILRP is to protect surface water and groundwater and to reduce impacts of irrigated agricultural discharges to waters of the State. As a result of the ILRP, monitoring reports, assessment reports, management plans, surface water quality data, and groundwater quality data are made available to the public.

Implementation of the IRLP in the Delta-Mendota Subbasin is managed primarily by the Westside San Joaquin River Watershed Coalition and the Grassland Drainage Area Coalition under the San Joaquin Valley Drainage Authority, a California Joint Powers Authority (JPA). This region specifically emphasizes nitrogen, sediment, and erosion control.

CV-SALTS

The Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) is an initiative to reduce salt and nitrate impacts, restore groundwater quality, and provide safe drinking water supplies. Developed by a group of stakeholders (federal, state, and local agencies, dischargers and growers, and environmental groups) called the Central Valley Salinity Coalition, the Central Valley Salt and Nitrate Management Plan (SNMP) was released in 2017.

The Central Valley SNMP recommends revised and flexible regulations for existing Basin Plans and includes recommended interim solutions for salt and nutrient management in high priority basins in addition to long-term salt management strategies. Under the Central Valley SNMP, dischargers are provided two compliance pathways: (1) traditional permitting as an individual discharger or as a coalition (i.e., irrigated lands coalition), or (2) groundwater management zone permitting. Zone permitting allows dischargers to work as a collective in collaboration with the CV-RWQCB to provide safe drinking water with the option to extend time to achieve nitrogen balance. At this time, the Central Valley SNMP is not currently enforced.

Integrated Regional Water Management Program

Three Integrated Regional Water Management Plans (IRWMPs) overlie the Delta-Mendota Subbasin. The Westside-San Joaquin IRWMP covers most of the Subbasin, while smaller portions of the Subbasin are covered by the East Stanislaus and Madera IRWM Plans.

Integrated Regional Water Management (IRWM) is a collaborative effort to identify and implement water management solutions on a regional scale that increase regional self-reliance, reduce conflict, and manage water to concurrently achieve social, environmental, and economic objectives. Developed by Regional Water Management Groups, the IRWMPs seek to deliver higher value for investments in water resources and management by considering all interests, providing multiple benefits, and working across jurisdictional boundaries. Examples of multiple benefits include improved water quality, better flood management, restored and enhanced ecosystems, and more reliable surface and groundwater supplies.

Please see the individual GSPs for additional details regarding the IRWM program in their GSP Plan areas.

California State Groundwater Elevation Monitoring Program (CASGEM)

Since 2009, the California Statewide Groundwater Elevation Monitoring (CASGEM) Program has tracked seasonal and long-term groundwater elevation trends in groundwater basins statewide. The program's mission is to establish a permanent, locally-managed program of regular and systematic monitoring in all of California's alluvial groundwater basins. This early attempt to monitor groundwater continues to exist as a tool to help achieve the goals set out under the Sustainable Groundwater Management Act (SGMA) with mandatory annual water elevation monitoring and reporting.

San Joaquin River Restoration Program (SJRR)

The San Joaquin River Restoration Program (SJRRP) is a comprehensive, long-term effort to restore flows to the San Joaquin River from Friant Dam to the confluence of Merced River and restore a self-sustaining Chinook salmon fishery in the river while reducing or avoiding adverse water supply impacts from Restoration Flows. The program has two general goals resulting from the San Joaquin River Restoration Settlement reached in 2006:

- **Restoration:** To restore and maintain fish populations in "good condition" in the main stem of the San Joaquin River below Friant Dam to the confluence of the Merced River, including naturally reproducing and self-sustaining populations of salmon and other fish.

- **Water Management:** To reduce or avoid adverse water supply impacts to all of the Friant Division long-term contractors that may result from the Interim Flows and Restoration Flows provided for in the Settlement.

The program includes the implementation of projects, reintroduction activities and associated monitoring to assess progress towards achieving the Settlement goals.

USGS Land Subsidence Monitoring

The USGS maintains and monitors a large system of monitoring locations nationwide using interferometric synthetic aperture radar (InSAR), continuous GPS (CGPS) measurements, campaign global positioning system (GPS) surveying, and spirit-leveling surveying. Aquifer-system compaction is measured by using extensometers to aid in the understanding of the depths at which compaction is occurring. The USGS shares these results to support decision making relative to groundwater basin management with the goal of minimizing future inelastic land subsidence.

3.6 County Well Construction/Destruction Standards and Permitting

DWR has developed well standards for the state per California Water Code Sections 13700 to 13806. These standards have been adopted by the State Water Resources Control Board (SWRCB) into a statewide model well ordinance (Resolution No. 89-98) for use by the Regional Boards for enforcing well construction standards where no local well design ordinance exists that meets or exceeds the DWR standards. DWR's Well Standards are presented in Bulletin 74-81 and Bulletin 74-90.

Each GSP lists the counties within their GSP Plan areas and the respective permitting agencies and local ordinances for well construction and destruction standards. Discussion of these standards and the respective permitting process as well as well abandonment and destruction procedures can be found in the individual GSPs.

3.7 Existing and Planned Conjunctive Use Programs

Conjunctive use programs in the Subbasin are currently implemented and planned by single agencies as well as through multi-agency partnerships. Maximizing the beneficial use of surface water, groundwater, and recycled water resources is of critical concern to water managers throughout the Delta-Mendota Subbasin with the ultimate goal of using all of these water sources more efficiently to avoid overdraft and to sustainably manage groundwater resources. Each GSP describes efforts to utilize existing water resources conjunctively and demonstrate feasibility to continue to implement conjunctive use projects in the future. These may include projects such as groundwater recharge and conveyance facilities, new wells, improved monitoring systems, improved delivery efficiency, water recycling, and water quality improvements and treatment.

Underground recharge and storage occur throughout the Delta-Mendota Subbasin through stormwater applied water and managed wetland recharge. Stormwater collects both naturally and artificially and eventually percolates through the ground and into aquifers for beneficial use for both urban and agriculture. Recharge from agricultural and wetland water conveyance and irrigation percolates into the ground and eventually into aquifers where it can be pumped again for use. This natural and unmanaged recharge creates future opportunities for conjunctive use programs; however, this recharge may decline as farmers move toward more precise and water efficient irrigation methods.

3.8 Plan Elements from California Water Code Section 10727.4

Each GSP may contain, as deemed appropriate, a detailed discussion of the additional plan elements as identified in California Water Code (CWC) Section 10727.4. These elements are:

- Control of saline water intrusion
- Wellhead protection areas and recharge areas
- Migration of contaminated groundwater
- Well abandonment and well destruction programs
- Activities implementing, opportunities for, and removing impediments to conjunctive use or underground storage
- Measures addressing groundwater contamination cleanup, groundwater recharge, in-lieu use, diversions to storage, conservation, water recycling, conveyance, and extraction projects
- Efficient Water Management Practices, as defined in Section 10902, for the delivery of water and water conservation methods to improve the efficiency of water use
- Efforts to develop relationships with state and federal regulatory agencies
- Processes to review land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risk to groundwater quality or quantity
- Impacts on Groundwater Dependent Ecosystems

4. SUBBASIN SETTING

This Delta-Mendota Subbasin Settings section contains three main subsections as follows:

- **Hydrogeologic Conceptual Model (HCM)** – The HCM section (Section 4.1) provides the geologic information needed to understand the framework that water moves through in the Subbasin. It focuses on geologic formations, aquifers, structural features, and topography.
- **Groundwater Conditions** – The Groundwater Conditions section (Section 4.2) describes and presents groundwater trends, levels, hydrographs and level contour maps, estimates changes in groundwater storage, identifies groundwater quality issues, addresses subsidence, and addresses surface water interconnection.
- **Water Budget** – The Water Budget section (Section 4.3) describes the data used to develop the water budget. Additionally, this section discusses how the budget was calculated, provides water budget estimates for historical conditions, and current conditions and projected conditions

4.1 Hydrogeologic Conceptual Model

This section describes the hydrogeologic conceptual model (HCM) for the Delta-Mendota Subbasin based on technical studies and qualified maps that characterize the physical components and interaction of the surface water and groundwater systems, pursuant to Article 5, Plan Contents, Subarticle 2, Basin Setting, § 354.14 Hydrogeologic Conceptual Model of the GSP Emergency Regulations. The physical description of the Delta-Mendota Subbasin is based on information originally published in the *Western San Joaquin River Watershed Groundwater Quality Assessment Report* (GAR) (LSCE, 2015), *Grassland Drainage Area Groundwater Quality Assessment Report* (LSCE, 2016), and *Groundwater Overdraft in the Delta-Mendota Subbasin* (KDSA, 2015).

4.1.1 Regional Geologic and Structural Setting

The Delta-Mendota Subbasin is located in the northwestern portion of the San Joaquin Valley Groundwater Basin within the southern portion of the Central Valley (**Figure CC-21**). The San Joaquin Valley is a structural trough up to 200 miles long and 70 miles wide filled with up to 32,000 feet of marine and continental sediments deposited during periodic inundation by the Pacific Ocean and by erosion of the surrounding Sierra Nevada and Coast Range mountains, respectively (DWR, 2006). Continental deposits shed from the surrounding mountains form an alluvial wedge that thickens from the valley margins toward the axis of the structural trough. This depositional axis is slightly west of the series of rivers, lakes, sloughs, and marshes which mark the current and historic axis of surface drainage in the San Joaquin Valley.

The Delta-Mendota Subbasin (DWR Basin No. 5-22.07) is bounded on the west by the tertiary and older marine sediments of the Coast Ranges, on the north generally by the San Joaquin-Stanislaus County line, on the east generally by the San Joaquin River and Fresno Slough, and on the south by the Tranquillity Irrigation District boundary near the community of San Joaquin. Surface waters converge from the Fresno, Merced, Tuolumne, and Stanislaus Rivers into the San Joaquin River, which drains to the north toward the Sacramento-San Joaquin Delta.

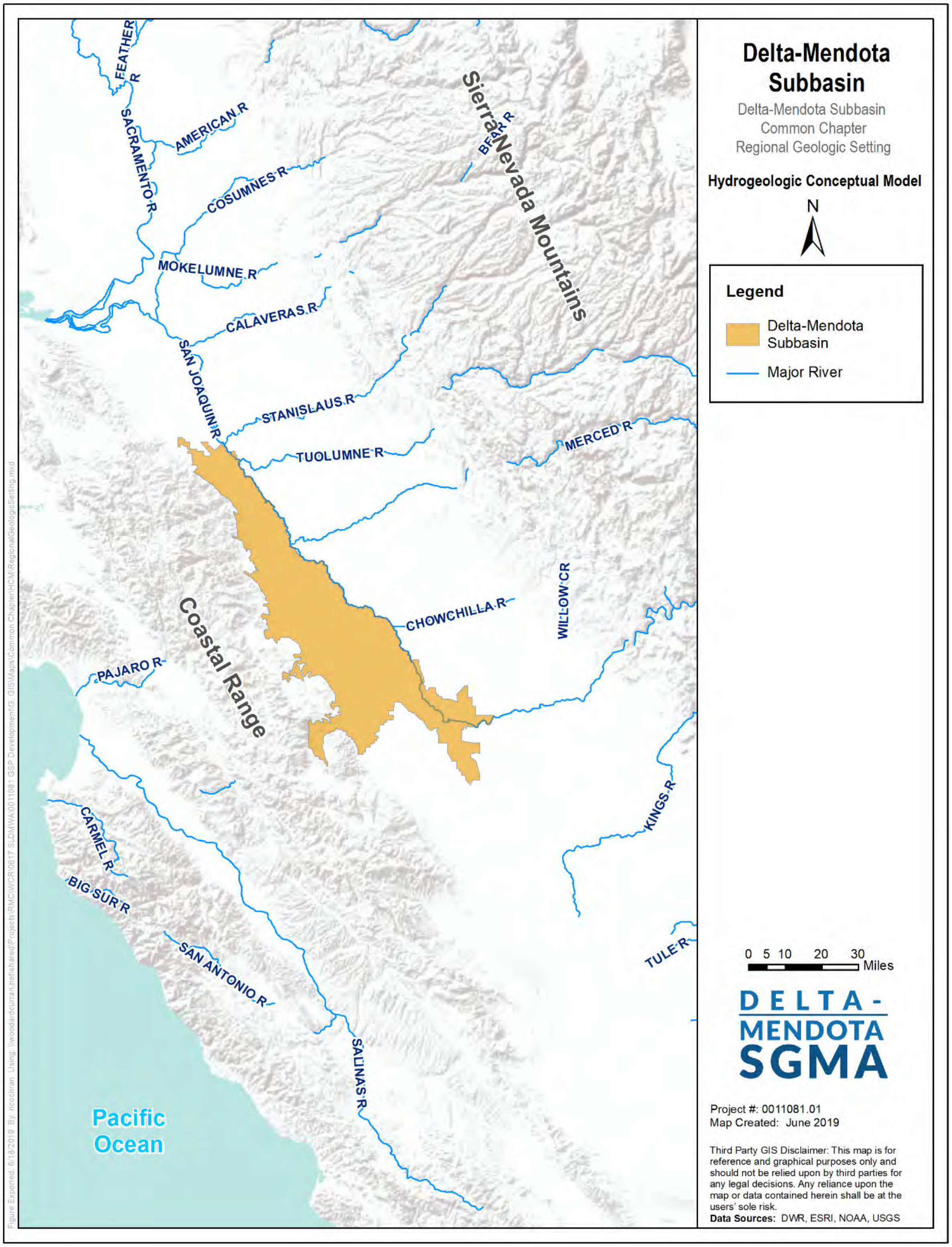


Figure CC-21: Regional Geologic Setting

4.1.2 Geologic History

Approximately three million years ago, tectonic movement of the Oceanic and Continental plates associated with the San Andreas Fault system resulted in the formation of the Coast Range which sealed off the Central Valley from the Pacific Ocean (LSCE, 2015). As this occurred, the floor of the San Joaquin Valley began to transition from a marine depositional environment to a freshwater system with ancestral rivers bringing alluvium to saltwater bodies (Mendenhall et al., 1916). The Coast Ranges on the western side of the San Joaquin Valley consist mostly of complexly folded and faulted consolidated marine and non-marine sedimentary and crystalline rocks ranging from Jurassic to Tertiary age, dipping eastward and overlying the basement complex in the region (Croft, 1972; Hotchkiss and Balding, 1971). The Central Valley Floor, in which the Delta-Mendota Subbasin lies, consists of Tertiary and Quaternary-aged alluvial and basin fill deposits (**Figure CC-22**). The fill deposits mapped throughout much of the valley extend vertically for thousands of feet, and the texture of sediments varies in the east-west direction across the valley. Coalescing alluvial fans have formed along the sides of the valley created by the continuous shifting of distributary stream channels over time. This process has led to the development of thick fans of generally coarse texture along the margins of the valley and a generally fining texture towards the axis of the valley (Faunt et al., 2009 and 2010).

Deposits of Coast Range and Sierra Nevada sources interfinger within the Delta-Mendota Subbasin. Steeper fan surfaces, with slopes as high as 80 feet per mile, exist proximal to the Coast Range, whereas more distal fan surfaces consist of more gentle slopes of 20 feet per mile (Hotchkiss and Balding, 1971). In contrast to the east side of the valley, the more irregular and ephemeral streams on the western side of the valley floor have less energy and transport smaller volumes of sediment resulting in less developed alluvial features, including alluvial fans which are less extensive, although steeper, than alluvial fan features on the east side of the valley (Bertoldi et al., 1991). Lacustrine and floodplain deposits also exist closer to the valley axis as thick silt and clay layers. Lakes present during the Pleistocene epoch in parts of the San Joaquin Valley deposited great thicknesses of clay sediments.

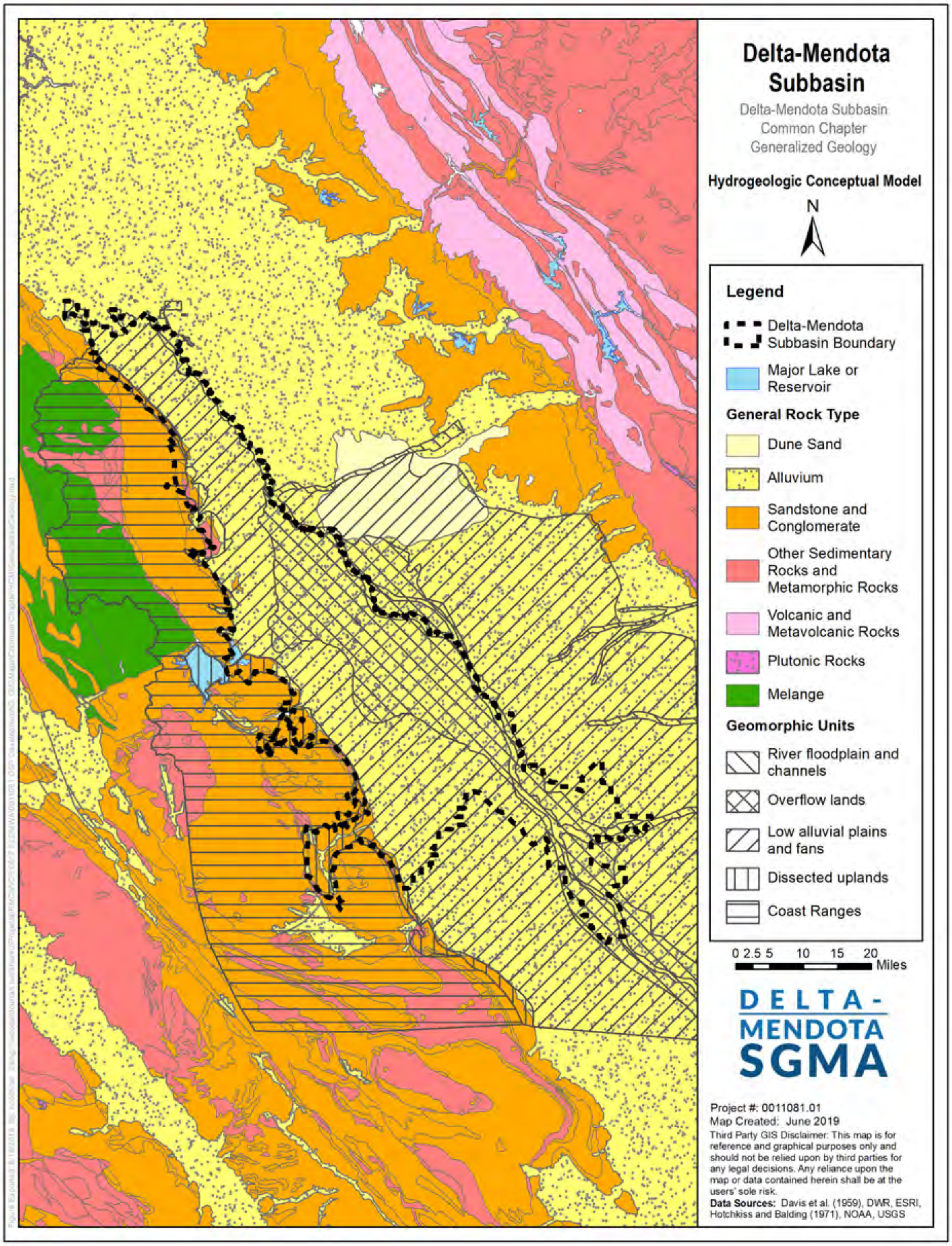


Figure CC-22: Generalized Geology

4.1.3 Geologic Formations and Stratigraphy

Distinct geomorphic units exist within the Delta-Mendota Subbasin defining areas of unique hydrogeologic environments. The geomorphic units are mapped and described by Hotchkiss and Balding (1971) and Davis et al. (1959) and are shown in **Figure CC-22**. The two primary geomorphic units within the Central Valley Floor area of the Delta-Mendota Subbasin include the overflow lands geomorphic unit and the alluvial fans and plains geomorphic unit. Overflow lands are defined as areas of relatively poorly draining soils with a shallow water table. The overflow lands geomorphic unit is located in the southeastern portion of the Subbasin and is dominated by finer-grained floodplain deposits that are the result of historical episodic flooding of this low-land area. This has formed poorly-draining soils with generally low hydraulic conductivity characteristics. In contrast, the alluvial fans and plains geomorphic unit is characterized by relatively better drainage conditions, with sediments comprised of coalescing and somewhat coarser-grained alluvial fan materials deposited by higher-energy streams flowing out of the Coast Range (Hotchkiss and Balding, 1971). The alluvial fans and plains geomorphic unit covers much of the Delta-Mendota Subbasin along the western margins of the Central Valley Floor at the base of the Coast Range.

The primary groundwater bearing units within the Delta-Mendota Subbasin consist of Tertiary and Quaternary-aged unconsolidated continental deposits and older alluvium of the Tulare Formation. Subsurface hydrogeologic materials covering the Central Valley Floor consist of lenticular and generally poorly sorted clay, silt, sand, and gravel that make up the alluvium and Tulare Formation. These deposits are thickest along the axis of the valley with thinning along the margins towards the Coast Range mountains (DWR, 2003; Hotchkiss and Balding, 1971). A zone of very shallow groundwater, generally within 25 feet of the ground surface, exists throughout large areas of the Subbasin, with considerable amounts (greater than 50 percent) of farmland in the area estimated to have very shallow depths to groundwater of less than 10 feet (Hotchkiss and Balding, 1971). Many of these areas are naturally swampy lands adjacent to the San Joaquin River.

The Tulare Formation extends to several thousand feet in depth and to the base of freshwater throughout most of the area and consists of interfingered sediments ranging in texture from clay to gravel of both Sierra Nevadan and Coast Range origin. The formation is composed of beds, lenses, and tongues of clay, sand, and gravel that have been alternatively deposited in oxidizing and reducing environments (Hotchkiss and Balding, 1971).

Terrace deposits of Pleistocene age lie up to several feet higher than present streambeds and are comprised of yellow, tan, and light-to-dark brown silt, sand, and gravel with a matrix that varies from sand to clay (Hotchkiss and Balding, 1971). The water table generally lies below the bottom of the terrace deposits; however, the relatively large grain size of the terrace deposits suggests their value as possible recharge sites. Alluvium is composed of interbedded, poorly to well-sorted clay, silt, sand, and gravel and is divided based on its degree of dissection and soil formation. The flood-basin deposits are generally composed of light-to-dark brown and gray clay, silt, sand, and organic material with locally high concentrations of salt and alkali. Stream channel deposits of coarse sand and gravel are also included.

The Tulare Formation also includes the Corcoran Clay (E-Clay) member, a diatomaceous clay or silty clay of lakebed origin which is a prominent aquitard in the San Joaquin Valley, separating the upper zone from the lower zone and distinguishing the semi-confined Upper Aquifer from the confined Lower Aquifer (Hotchkiss and Balding, 1971). The depth and thickness of the Corcoran Clay are variable within the Central Valley Floor, and it is not present in peripheral areas (outside the Central Valley Floor) of the Subbasin. Within the Upper Aquifer, additional clay layers exist and also provide varying degrees of confinement, including other clay members of the Tulare Formation and layers of white clay identified by Hotchkiss and Balding (1971). These clays are variable in extent and thickness, but the white clay is noted to be as much as 60 feet thick in areas providing very effective confinement of underlying zones (Croft, 1972; Hotchkiss and Balding, 1971). The Tulare Formation is hydrologically the most important geologic formation in the Delta-Mendota Subbasin because it contains most of the fresh water-bearing deposits. Most of the natural recharge that occurs in the Subbasin is in the alluvial fan apex areas along Coast Range stream channels (Hotchkiss and Balding, 1971).

4.1.4 Faults and Structural Features

The valley floor portion of the Delta-Mendota Subbasin contains no known major faults and is fairly geologically inactive. There are few faults along the western boundary of the Subbasin within the Coast Range mountains, but they are not known to inhibit groundwater flow or impact water conveyance infrastructure (**Figure CC-23**).

4.1.5 Basin Boundaries

The Delta-Mendota Subbasin is defined by both geological and jurisdictional boundaries. The Delta-Mendota Subbasin borders all subbasins within the San Joaquin Valley Hydrologic Region with the exception of the Cosumnes Subbasin. The following subsections describe the lateral boundaries of the Subbasin, boundaries with neighboring subbasins, and the definable bottom of the Delta-Mendota Subbasin.

Lateral Boundaries

The Delta-Mendota Subbasin is geologically and topographically bounded to the west by the Tertiary and older marine sediments of the Coast Ranges, and to the east generally by the San Joaquin River. The northern, central, and southern portion of the eastern boundary are dictated by jurisdictional boundaries of water purveyors within the Delta-Mendota Subbasin.

As described in *California's Groundwater*, DWR Bulletin 118 (2016), the Delta-Mendota Subbasin is in the San Joaquin Valley Groundwater Basin, located along the western edge of the San Joaquin Valley. The northern boundary begins just south of Tracy in San Joaquin County. The eastern boundary generally follows the San Joaquin River and Fresno Slough. The southern boundary is near the small town of San Joaquin. The subbasin is bounded on the west by the coast range. The Subbasin boundary is defined by 20 segments detailed in the descriptions below. The Delta-Mendota Subbasin extends into six (6) counties: San Joaquin, Stanislaus, Merced, Fresno, San Benito, and Madera and is shown in relation to each of the six counties in **Figure CC-9**.

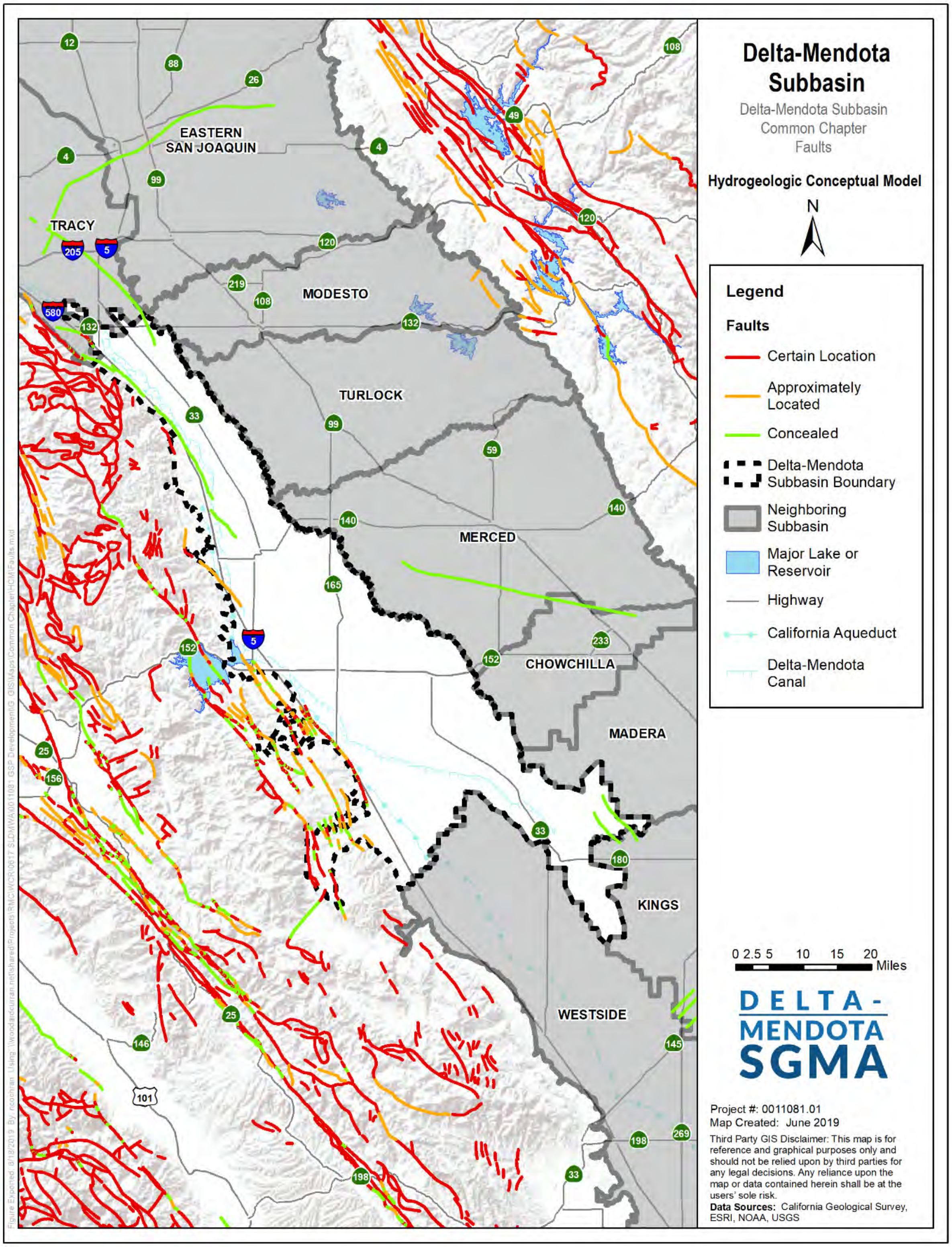


Figure CC-23: Subbasin Faults

4.1.6 Definable Bottom of Basin

In the San Joaquin Valley, the bottom of the Delta-Mendota Subbasin is defined as the interface of saline water of marine origin (base of fresh water) within the uppermost beds of the Tulare Formation. The Tulare Formation is characterized by blue and green fine-grained rocks and principally composed of fine-grained silty sands, silt, and clay (Foss and Blaisdell 1968). The Tulare Formation is predominantly marine in origin and is considered late Pliocene and possibly early Pleistocene in age. This formation is the upper shaley part of the Pliocene sequence. The top of the Tulare Formation is generally encountered around -2,000 feet mean sea level throughout the Delta-Mendota Subbasin. As agreed upon by the Delta-Mendota Subbasin GSP Groups, the base of freshwater is specifically defined by an electrical conductivity of 3,000 micromhos per centimeter at 25 °C, as presented by Page (1973). If and when significant use of water beyond the defined bottom takes place, the definition of the bottom will be revised appropriately.

4.1.7 Principal Aquifers and Aquitards

DWR's Groundwater Glossary defines an aquifer as "a body of rock or sediment that is sufficiently porous and permeable to store, transmit, and yield significant or economic quantities of groundwater to wells, and springs". There are two primary aquifers within the Delta-Mendota Subbasin: a semi-confined aquifer above the Corcoran Clay and a confined aquifer below the Corcoran Clay, with the Corcoran Clay acting as the principal aquitard within the Delta-Mendota Subbasin. **Figure CC-24** shows the locations of the representative cross-sections for the Delta-Mendota Subbasin, where **Figure CC-25** through **Figure CC-30** show the hydrostratigraphy of the representative cross-sections.

While the two-aquifer system described above is generally true across the Delta-Mendota Subbasin, there are portions of the Subbasin where the Corcoran Clay does not exist (predominantly along the western margin of the Subbasin) and hydrogeology is generally controlled by localized interfingering clays, and/or where local hydrostratigraphy results in shallow groundwater conditions that differ, to some extent, from that seen in the Subbasin as a whole. Additionally, in the southern portion of the Subbasin in the Mendota, Aliso and Tranquillity areas, there are A and C Clay layers in addition to the Corcoran Clay that inhibit vertical groundwater flow. However, while there are localized complexities throughout the Subbasin, the Corcoran Clay (or E Clay) extends through much of the Delta-Mendota Subbasin, generally creating a two-aquifer system.

Principal Aquifers

In the Delta-Mendota Subbasin, there are two primary aquifers composed of alluvial deposits separated by the Corcoran Clay (KDSA, 2015): a semi-confined Upper Aquifer (generally the ground surface to the top of the Corcoran Clay), and a confined Lower Aquifer starting at the bottom of the Corcoran Clay to the base of fresh water. However, as previously described, the localized presence of the A and C Clay layers in the southern portion of the Subbasin, the absence of the Corcoran Clay at the western margin of the Subbasin, and/or local hydrostratigraphy result in differing shallow groundwater conditions and/or perched groundwater conditions in some portions of the Subbasin. See the individual GSPs for more detailed descriptions of hydrostratigraphy in the respective Plan areas.

Upper Aquifer

The Upper Aquifer is represented by materials extending from the upper groundwater table to the top of the Corcoran Clay. The Upper Aquifer includes shallow geologic units of younger and older alluvium and upper parts of the Tulare Formation. Sediments within the upper Tulare Formation have variable sources, and subdivision of units can be distinguished between eastern and western sourced materials. Alluvial fan materials above the Corcoran Clay in the Delta-Mendota Subbasin are generally more extensive than older alluvial fan deposits within the Tulare Formation below the Corcoran Clay. As shown in Figure CC-31 by the depth to the top of the Corcoran Clay, the Upper Aquifer extends to depths ranging between approximately 150 feet and greater than 350 feet. Other notable mapped clay units also exist within the upper part of the Tulare Formation in the Delta-Mendota Subbasin, including the A and C Clay members of the Tulare Formation and a white clay mapped by Hotchkiss and Balding (1971).

Lower Aquifer

The Lower Aquifer is the portion of the Tulare Formation that is confined beneath the Corcoran Clay, extending downward to the underlying San Joaquin Formation and the interface of saline water of marine origin within its uppermost beds. The Lower Aquifer is generally characterized by groundwater that tends to be dominantly sodium-sulfate type, which is often of better quality than the Upper Aquifer (Davis et al., 1957; Hotchkiss and Balding, 1971). Exceptions to this quality do exist in the Subbasin, particularly in the southwestern portion of the Subbasin. Because of its relatively shallow depth within the Delta-Mendota Subbasin and lower salinity in areas when compared to other groundwater resources, the Lower Aquifer is heavily utilized as a source of groundwater for agricultural and drinking water uses within the Subbasin.

The base of the Lower Aquifer generally decreases from south to north, changing in depth from about 1,100 to 1,200 feet deep in the south to about 600 feet to the north. Depth to the top of the Corcoran Clay ranges from less than 100 feet on the west near Interstate 5 (I-5) to more than 500 feet in the area near Tranquillity. The Corcoran Clay pinches out or is above the water level near the California Aqueduct in the western part of the Subbasin, where the Upper and Lower Aquifers merge into interfingered layers of sand, gravel, and clay.

Corcoran Clay

The Corcoran Clay, as a regional aquitard, is a notable hydrogeologic feature throughout most of the Delta-Mendota Subbasin, impeding vertical flow between the Upper and Lower Aquifers. The Corcoran Clay is present at varying depths across most of the Central Valley floor (**Figure CC-31** and **Figure CC-33**). The depths to the top of the Corcoran Clay ranges between approximately 100 and 500 feet below the ground surface throughout most of the Subbasin, with a general spatial pattern of deepening to the south and east. In the far southeastern area of the Subbasin, in the vicinity of Mendota and Tranquillity, the top of the Corcoran Clay is at depths of greater than 350 feet (**Figure CC-31**). The thickness of the Corcoran Clay, which likely influences the degree of hydraulic separation between the Upper and Lower Aquifers, is greater than 50 feet across most of the Delta-Mendota Subbasin with thicknesses of more than 75 feet in central Subbasin areas in the vicinity of Los Banos and Dos Palos, and 140 feet in the eastern portions of the Subbasin. The Corcoran Clay appears thinner in areas north of Patterson, between Patterson and Gustine, and also in the vicinity of Tranquillity to the south (**Figure CC-33**). Along the westernmost portions of the Delta-Mendota Subbasin, the Corcoran Clay layer is generally non-existent or it exists as Corcoran-equivalent clays (clays existing at the same approximate depth but not part of the mapped aquitard).

Aquifer Properties

The following subsections include discussion of generalized aquifer properties within the Delta-Mendota Subbasin. These include hydraulic conductivity, transmissivity, specific yield and specific storage.

DWR defines hydraulic conductivity as the "measure of a rock or sediment's ability to transmit water" and transmissivity as the "aquifer's ability to transmit groundwater through its entire saturated thickness" (DWR, 2003). High hydraulic conductivity values correlate with areas of transmissive groundwater conditions with transmissivity generally equaling hydraulic conductivity times the saturated thickness of the formation. Storage of water within the aquifer system can be quantified in terms of the specific yield for unconfined groundwater flow and the storage coefficient for confined flow, respectively (Faunt et al., 2009). Specific yield represents gravity-driven dewatering of shallow, unconfined sediments at a declining water table, but also accommodates a rising water table. The specific yield is dimensionless and represents the volume of water released from or taken into storage per unit head change per unit area of the water table. Specific yield is a function of porosity and specific retention of the sediments in the zone of water-table fluctuation.

Where the aquifer system is confined, storage change is governed by the storage coefficient, which is the product of the thickness of the confined-flow system and its specific storage. The specific storage is the sum of two component specific storages – the fluid (water) specific storage and the matrix (skeletal) specific storage, which are governed by the compressibility of the water and skeleton, respectively (Jacob, 1940). Specific storage has units of 1 over length and represents the volume of water released from or taken into storage in a confined flow system per unit change in head per unit volume of the confined flow system (Faunt et al., 2009). Therefore, the storage coefficient of a confined flow system is dimensionless and, similar to specific yield, represents the volume of water released from or taken into storage per unit head change.

Hydraulic Conductivity

Figure CC-34 shows the saturated C-horizon hydraulic conductivity of surficial soils within the Delta-Mendota Subbasin based on the National Resource Conservation Service (NRCS) Soil Survey Geographic Database (SSURGO). Soil survey data for counties within the Subbasin were combined using the weighted harmonic mean of these representative layers to depict the saturated hydraulic conductivity of the C-horizon for each soil map unit. The soil profile represented by these data is variable but commonly extends to a depth of six or more feet.

Floodplain deposits are evident as soils with relatively low hydraulic conductivity (less than 0.5 feet per day [ft/day]) blanket much of the Central Valley Floor, although localized areas of soils with higher hydraulic conductivity are present in association with modern and ancient surface waterways and alluvial fan features (**Figure CC-34**). Coarse soils of distributary alluvial fan sediments deposited by Del Puerto Creek, Orestimba Creek, Los Banos Creek, Ortigalita Creek, and Little Panoche Creek, in addition to other ephemeral northeasterly creek flows off the Coast Ranges, are notably apparent as areas of soils of high hydraulic conductivity located along active and inactive stream channels extending eastward from the fan apex areas along the Valley Floor margins to the current alignment of the San Joaquin River in the valley axis. Additionally, soils in areas adjacent to the active channel of the San Joaquin River also exhibit high hydraulic conductivities, including values of greater than 4 ft/day which are particularly apparent in an area north of Mendota. Soils of similarly high hydraulic conductivity trending as linear features in a general northwest-southeast alignment to the north of Dos Palos and Los Banos are likely the result of historical depositional processes and paleochannels associated with the San Joaquin River (**Figure CC-34**). In areas peripheral to the Central Valley floor, soils tend to be characterized by relatively low hydraulic conductivity, although soils of somewhat higher hydraulic conductivity associated with distinct geologic units are mapped across much of the peripheral area to the west of Patterson and Gustine and also in localized bands associated with surface water courses.

Transmissivity

Transmissivity varies greatly above the Corcoran Clay, within the Corcoran Clay, and below the Corcoran Clay within the Delta-Mendota Subbasin, with transmissivities in the confined Lower Aquifer generally being larger than those in the semi-confined Upper Aquifer. Based on testing conducted at multiple locations within both the Upper and Lower Aquifers of the Delta-Mendota Subbasin, average transmissivities in the Subbasin are approximately 109,000 gallons per day per square foot (gpd/ft^2) (KDSA, 1997b).

Specific Yield

DWR defines specific yield as the “amount of water that would drain freely from rocks or sediments due to gravity and describes the proportion of groundwater that could actually be available for extraction” (DWR, 2003). Specific yield is a measurement specific to unconfined aquifers.

The estimated specific yield of the Delta-Mendota Subbasin is 0.118 (DWR, 2006). Within the southern portion of the Delta-Mendota Subbasin, specific yield ranges from 0.2 to 0.3 (Belitz et al., 1993). Specific yield estimates for the Delta-Mendota Subbasin are fairly limited in literature since the Upper Aquifer above the Corcoran Clay is semi-confined and the Lower Aquifer below the Corcoran Clay is confined. Therefore, specific yield values only characterize the shallow, unconfined groundwater within the Subbasin.

Specific Storage

Values for specific storage were extracted from the Central Valley Hydrologic Model 2 (CVHM2), which is currently under development by the United States Geological Survey (USGS) and includes refinements for the Delta-Mendota Subbasin. Specific storage varies above, within, and below the Corcoran Clay with CVMH2. Above the Corcoran Clay, specific storage ranges from 1.34×10^{-6} to 6.46×10^{-2} meters^{-1} (m^{-1}) with average values ranging from 6.16×10^{-3} to 1.97×10^{-2} m^{-1}. Specific storage within the Corcoran Clay is considerably smaller than above the Corcoran Clay, ranging between 1.41×10^{-6} and 2.35×10^{-6} m^{-1} and average values between 1.96×10^{-6} and 2.02×10^{-6} m^{-1}. Below the Corcoran Clay, specific storage is comparable to within the Corcoran Clay with overall ranges the same as within the Corcoran Clay and average values ranging from 1.86×10^{-6} to 2.01×10^{-6} m^{-1}. Therefore, specific storage is greatest within the semi-confined aquifer overlying the Corcoran Clay layer, with considerably smaller specific storage values within the low permeability Corcoran Clay and confined aquifer underlying the Corcoran Clay layer.

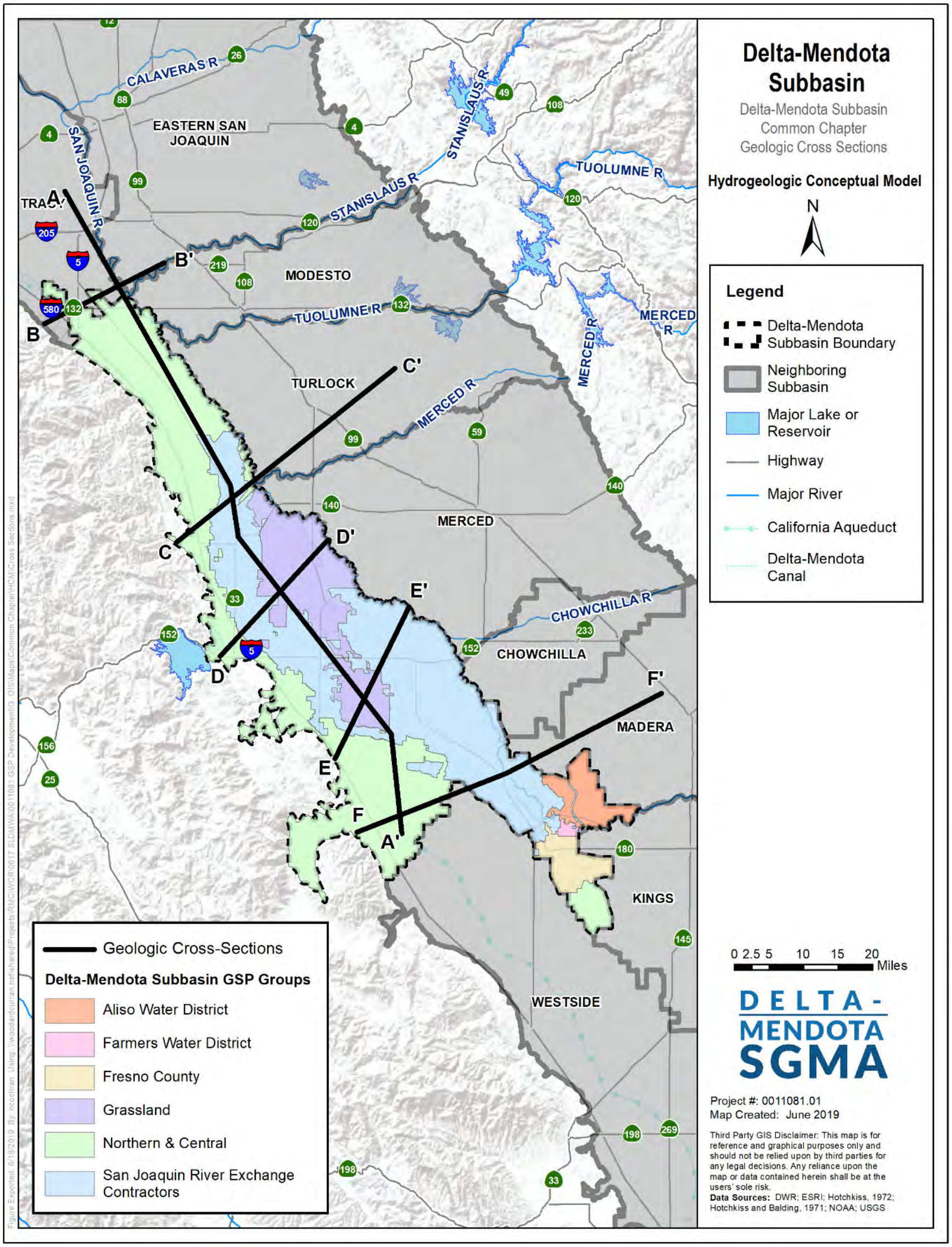


Figure CC-24: Representative Cross-Sections

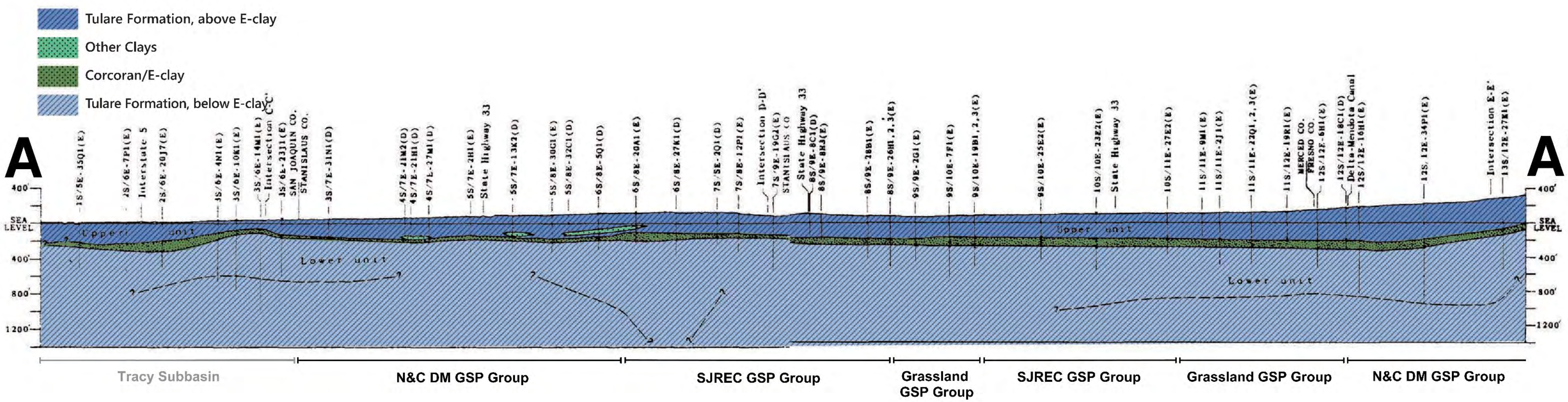


Figure CC-25: Cross-Section A-A' (Hotchkiss, 1972)

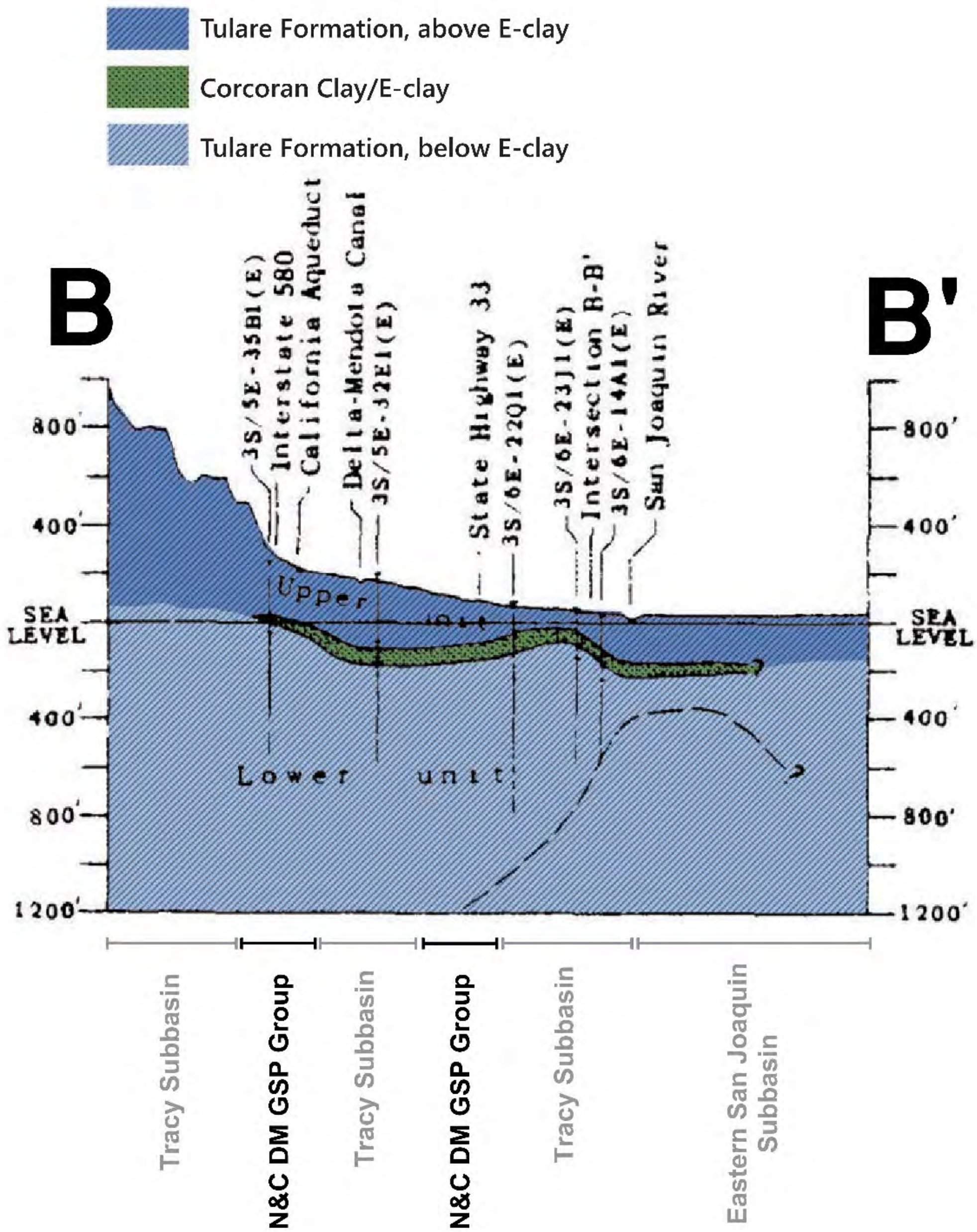


Figure CC-26: Cross-Section B-B’ (Hotchkiss, 1972)

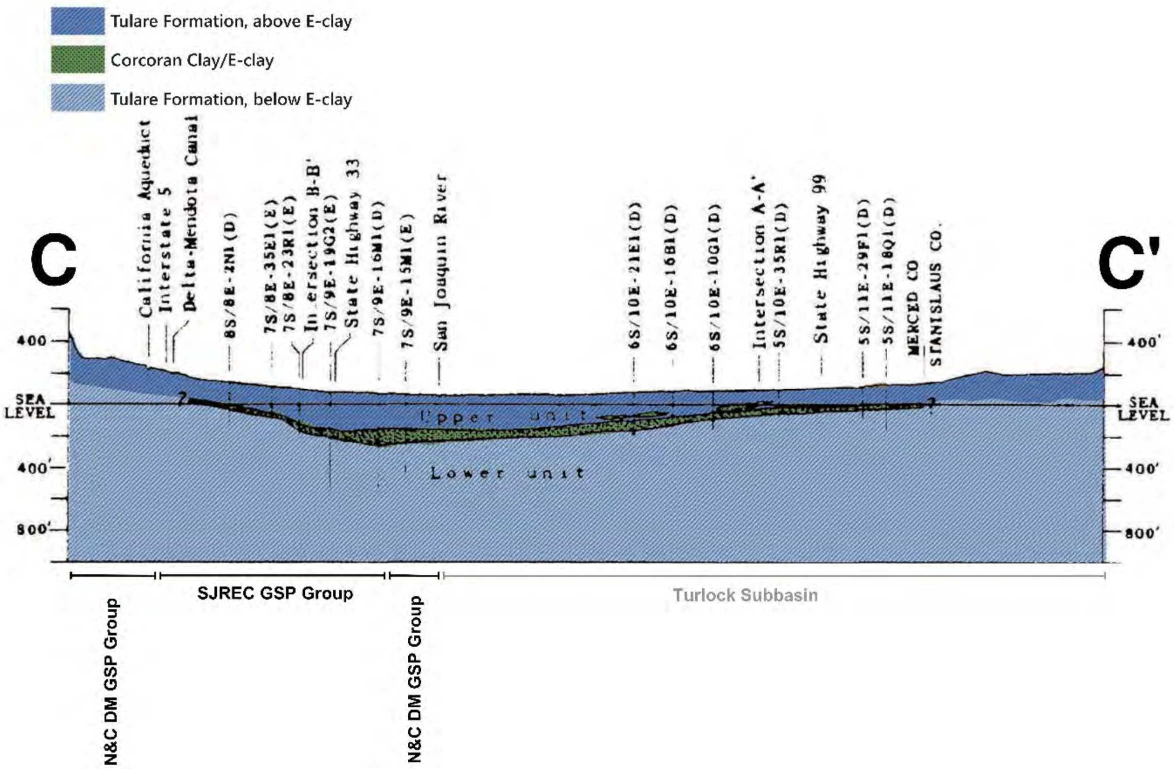


Figure CC-27: Cross-Section C-C' (Hotchkiss, 1972)

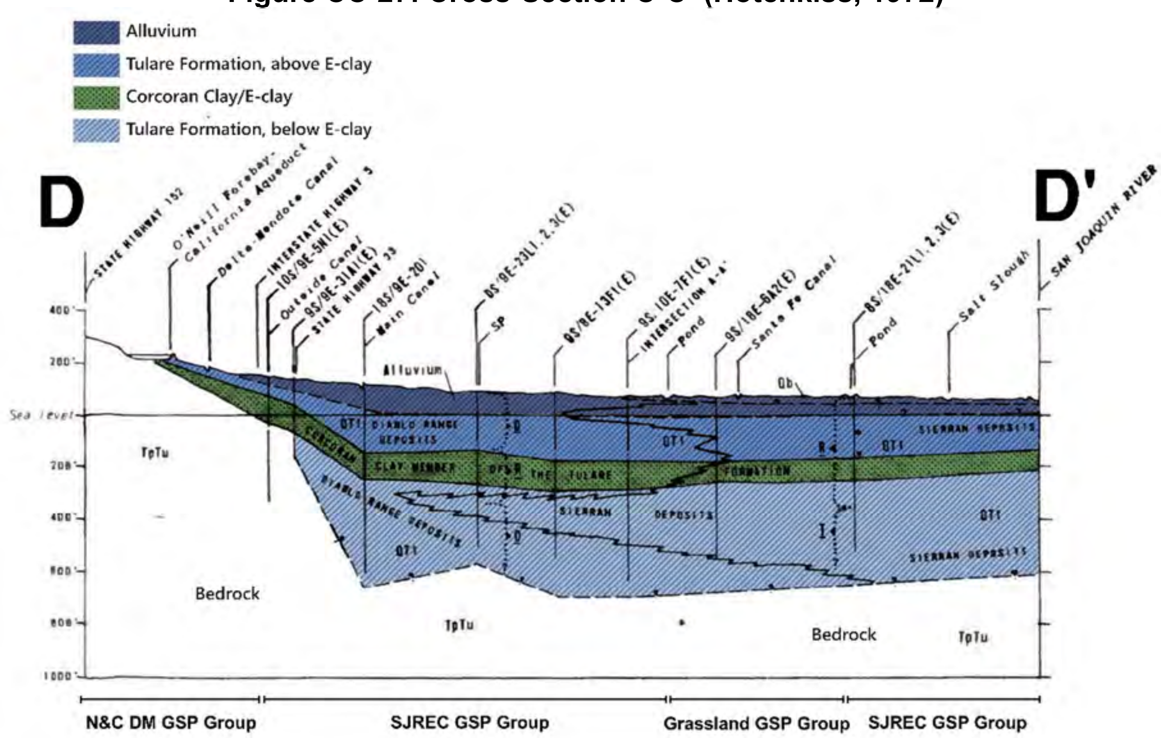


Figure CC-28: Cross-Section D-D' (Hotchkiss & Balding, 1971)

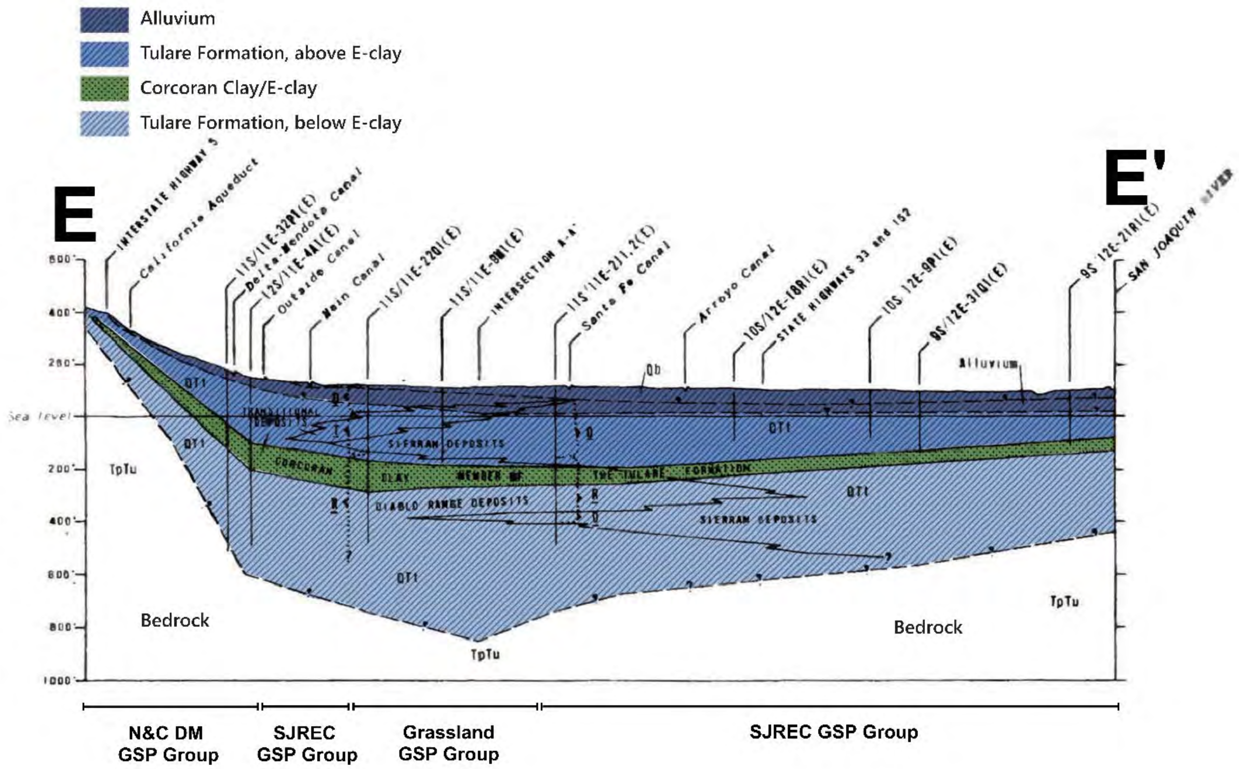


Figure CC-29: Cross-Section E-E' (Hotchkiss & Balding, 1971)

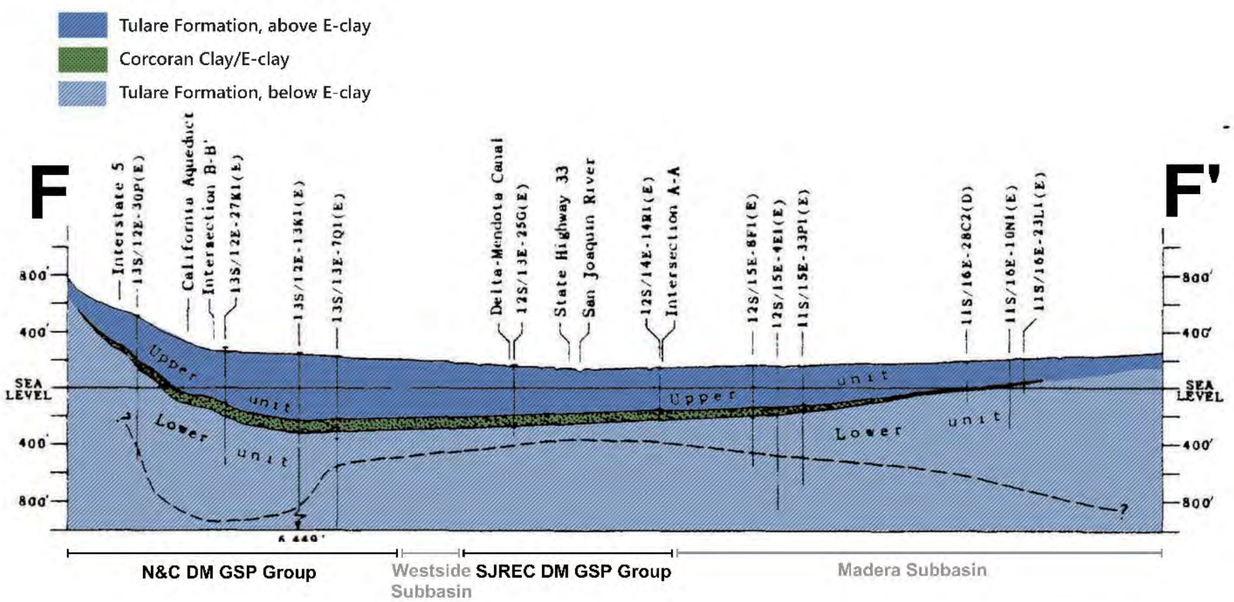


Figure CC-30: Cross-Section F-F' (Hotchkiss, 1972)

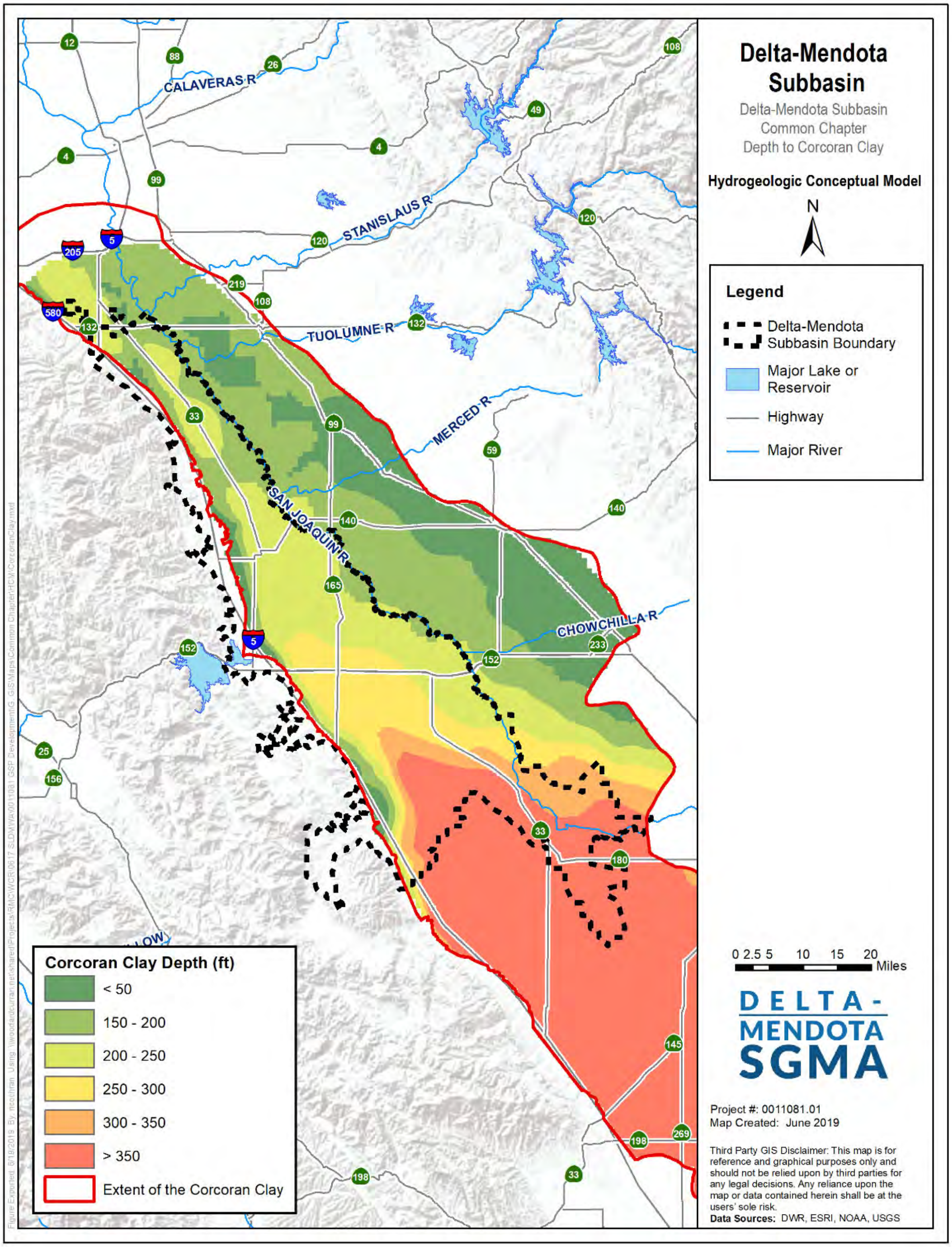


Figure CC-31: Depth to Corcoran Clay

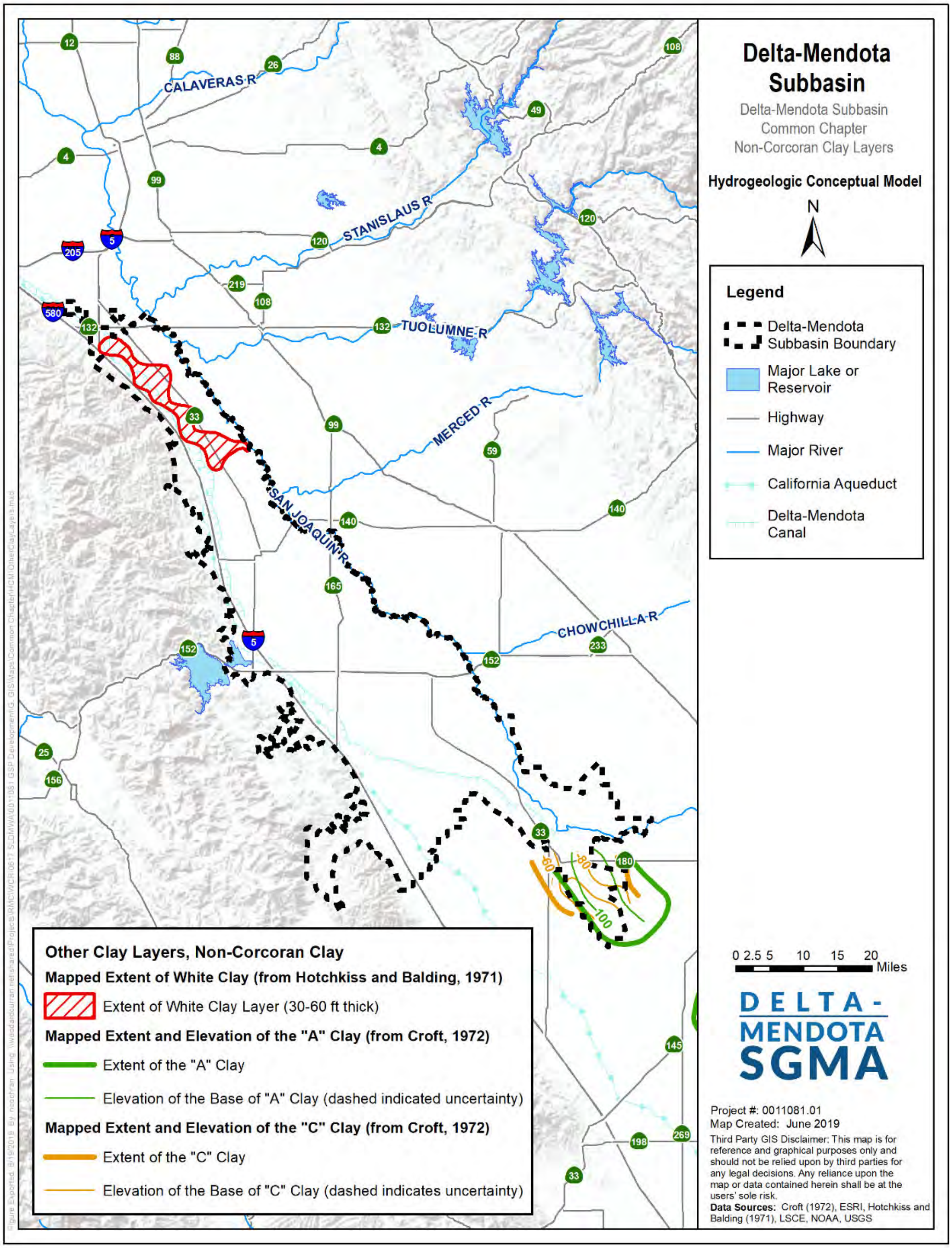


Figure CC-32: Non-Corcoran Clay Layers

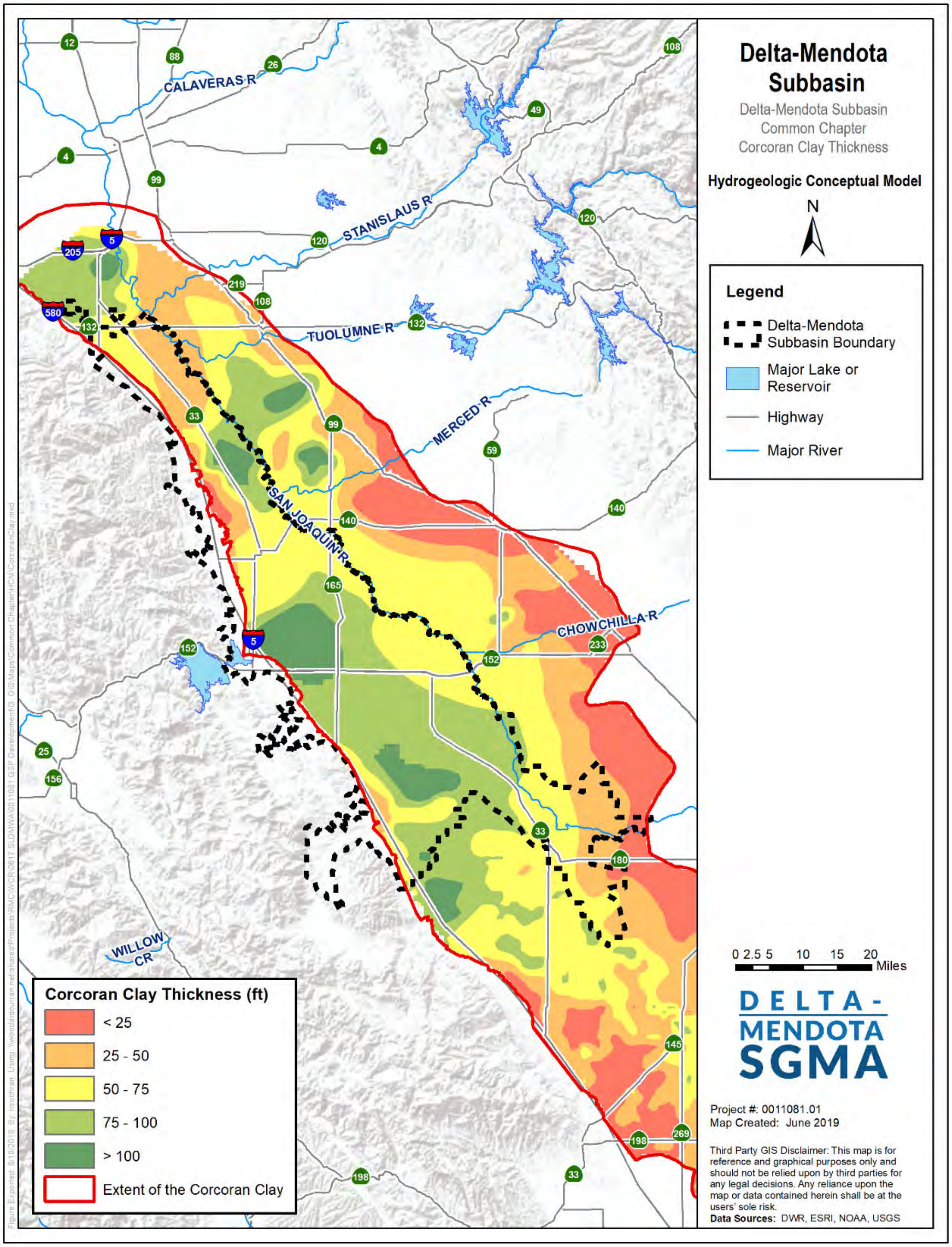


Figure CC-33: Thickness of Corcoran Clay

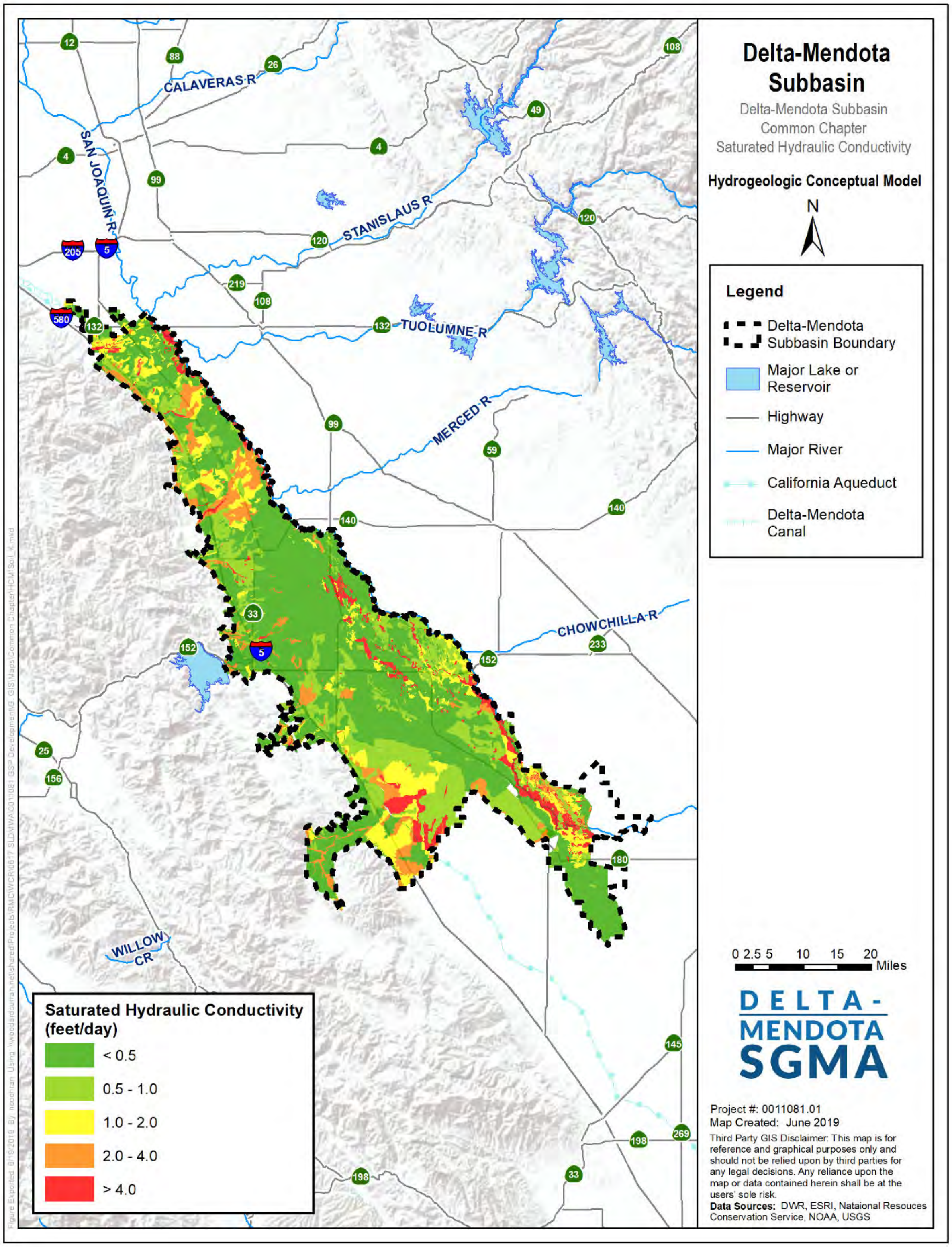


Figure CC-34: Soil Hydraulic Conductivity

4.1.8 Structural Properties and Restricted Groundwater Flow

Under natural (pre-development) conditions, the prevailing groundwater flow within the Upper and Lower Aquifer systems of the western San Joaquin Valley was predominantly in a generally northeasterly direction from the Coast Range towards and parallel to the San Joaquin River and the Sacramento-San Joaquin Delta (LSCE, 2015; Hotchkiss and Balding, 1971; KDSA, 2015). Historically, numerous flowing artesian wells within the Lower Aquifer existed throughout the Delta-Mendota Subbasin (Mendenhall et al., 1916) and the pressure gradient for groundwater flow was upward from the Lower Aquifer to the Upper Aquifer. These flowing artesian conditions have disappeared in many areas as a result of increased development of groundwater resources within the Tulare Formation (Hotchkiss and Balding, 1971). Additionally, the Delta-Mendota Subbasin has experienced periods of considerable decline in groundwater levels during which hydraulic heads in the Lower Aquifer decreased considerably in some areas due to heavy pumping (Bertoldi et al., 1991).

Despite the presence of local pumping depressions within parts of the Subbasin, the prevailing northeastward flow direction for groundwater in the Upper Aquifer within the region has remained (AECOM, 2011; DWR, 2010; Hotchkiss and Balding, 1971). Groundwater generally flows outward from the Delta-Mendota Subbasin, except along the southern and western margins where there is some recharge from local streams and canal seepage (KDSA, 2015), in addition to northward subbasin boundary flows. Within the Upper Aquifer, there are similar groundwater flow directions in most of the Subbasin with groundwater outflow to the northeast or towards the San Joaquin River in much of the Subbasin during wet and normal periods. One exception is in the Orestimba Creek area west of Newman where groundwater flows to the west during drought conditions and east during wet periods. Calculations based on aquifer transmissivity indicate the net groundwater outflow in the Upper Aquifer has been about three times greater during drought periods than during normal periods (KDSA, 1997a and 1997b).

Within the Lower Aquifer, there is a groundwater divide generally in the area between Mendota and the point near the San Joaquin River in the Turner Island area, northeast of Los Banos. Groundwater southwest of this divide generally flows southwest toward Panoche Water District and Westlands Water District. Groundwater northeast of this divide flows to the northeast into Madera and Merced Counties. Net groundwater outflow in the Lower Aquifer under drought conditions has been about two and a half times greater than for normal conditions (KDSA, 1997a and 1997b). Based on current and historical groundwater elevation maps, groundwater barriers do not appear to exist in the Delta-Mendota Subbasin (DWR, 2006).

The combined effect of pumping below the Corcoran Clay and increased leakage from the Upper Aquifer to the Lower Aquifer where the Corcoran Clay does not exist or has been perforated has developed a generally downward flow gradient in the Tulare Formation which changes with variable pumping and irrigation over time (Bertoldi et al., 1991). Periods of great groundwater level declines have also resulted in inelastic compaction of fine-grained materials in some locations, particularly between Los Banos and Mendota, potentially resulting in considerable decreases (between 1.5 and 6 times) in permeability of clay members within the Tulare Formation, including the Corcoran Clay (Bertoldi et al., 1991). However, the number of wells penetrating the Corcoran Clay may be enabling vertical hydraulic communication across the Corcoran Clay aquitard and other clay layers (Davis et al., 1959; Davis et al., 1964).

4.1.9 Water Quality

Groundwater in the Delta-Mendota Subbasin is characterized by mixed sulfate to bicarbonate water types in the northern and central portion of the Subbasin, with areas of sodium chloride and sodium sulfate waters in the central and southern portions (DWR, 2003). Total Dissolved Solids (TDS) values range from 400 to 1,600 mg/L in the northern portion, and 730 to 6,000 mg/L in the southern portion of the

Delta-Mendota Subbasin (Hotchkiss and Balding, 1971). The Department of Health Services (currently the Division of Drinking Water), which monitors Title 22 water quality standards, reports TDS values in 44 public supply wells in the Subbasin ranging in value from 210 to 1,750 mg/L, with an average value of 770 mg/L. Shallow, saline groundwater also occurs within about 10 feet of the ground surface over a large portion of the Delta-Mendota Subbasin. There are also localized areas of high iron, fluoride, nitrate, selenium, and boron in the Delta-Mendota Subbasin (Hotchkiss and Balding, 1971).

Alluvial sediments derived from west-side streams are composed of material from serpentine, shale, and sandstone parent rock, which results in soil and groundwater types entirely different from those on the east side of the San Joaquin Valley (LSCE, 2015). In contrast with the siliceous mineralogy of the alluvial sands and gravels on the eastern side of the Central Valley that are derived from the Sierra granitic rocks (which are coarser and more resistant to chemical dissolution), the sulfate and carbonate shales and sandstones of Coast Range sediments on the western side are more susceptible to dissolution processes. Some soils and sediments within the western San Joaquin Valley that are derived from marine rocks of the Coast Range have notably high concentrations of naturally-occurring nitrogen, with particularly higher nitrate concentrations in younger alluvial sediments (Strathouse and Sposito, 1980; Sullivan et al., 1979). These naturally-occurring nitrogen sources may contribute to nitrate concentrations in groundwater within the Delta-Mendota Subbasin, although it is not well known where this may occur and to what degree. Naturally high concentrations of TDS in groundwater are known to have existed historically within parts of the Subbasin due to the geochemistry of the Coast Range rocks and the marine depositional environment, the resulting naturally-high TDS of recharge derived from Coast Range streams, the dissolvable materials within the alluvial fan complexes, and the naturally-poor draining conditions which tend to concentrate salts in the system. The chemical quality of waters in the Coast Range streams can be closely correlated with the geologic units within their respective catchments. Groundwater flows discharging from these marine and non-marine rocks into streams introduce a variety of dissolved constituents resulting in variable groundwater types. The water quality and chemical makeup in westside streams can be highly saline, especially in more northern streams, including Corral Hollow, Panoche and Del Puerto Creeks, where historical baseflow TDS concentrations have typically exceeded 1,000 mg/L with measured concentrations as high as 1,790 mg/L (Hotchkiss and Balding, 1971). This is in contrast with TDS concentrations typically below 175 mg/L in streams draining from the Sierras. The contribution of water associated with these Coast Range sediments has resulted in naturally high salinity in groundwater within and around the Delta-Mendota Subbasin, which has been recognized as early as the 1900s (Mendenhall et al., 1916). Groundwater in some areas within the immediate vicinity of the San Joaquin River is influenced by lower-salinity surface water discharging from the east side of the San Joaquin Valley Groundwater Basin (Davis et al., 1957).

Areas of historical high saline groundwater documented by Mendenhall *et al*. (1916) indicate somewhat high TDS concentrations approaching or greater than 1,000 mg/L in wells sampled throughout many parts of the Delta-Mendota Subbasin. Areas of locally higher TDS concentrations (1,500-2,400 mg/L) have existed between Mendota and Los Banos; whereas the trend in deeper groundwater (average well depth of 450 feet) south of Mendota near Tranquillity indicates slightly lower historical salinity conditions, but still somewhat high with an average TDS concentration of greater than 1,000 mg/L. In the northern part of the Subbasin, north of Gustine, the average historical TDS concentration of wells was also relatively high (930 mg/L). Historically low TDS concentrations (<500 mg/L) existed in groundwater from wells with an average depth of 209 feet in the central Subbasin area between Los Banos and Gustine.

The general chemical composition of groundwater in the Subbasin is variable based on location and depth. Groundwater within the Upper Aquifer is largely characterized as transitional type with less area characterized as predominantly of chloride, bicarbonate, and sulfate water types. Transitional water types, in which no single anion represents more than 50 percent of the reactive anions, occurs in many different combinations with greatly ranging TDS concentrations. Chloride-type waters occur generally in grassland areas east of Gustine and around Dos Palos, with sodium chloride water present in northern areas near Tracy and also extending south from Dos Palos. These waters also exhibit greatly varying salinity with typical TDS concentrations, ranging from less than 500 mg/L to greater than 10,000 mg/L and of high sodium makeup (50-75 percent of cations present) (Hotchkiss and Balding, 1971). Areas of bicarbonate groundwater within the Upper Aquifer of relatively lower TDS concentrations are directly associated with intermittent streams of the Coast Range near Del Puerto, Orestimba, San Luis, and Los Banos Creeks. Sulfate water in the central and southern Subbasin areas has TDS concentrations decreasing from west (1,200 mg/L) to east (700 mg/L) towards the San Joaquin River, similar to the bicarbonate water areas, although areas of sulfate water south of Dos Palos have much higher TDS concentrations (1,900 to 86,500 mg/L) (Hotchkiss and Balding, 1971).

Groundwater in the Lower Aquifer below the Corcoran Clay is also spatially variable, consisting of mostly transitional sulfate waters in the northern part of the Delta-Mendota Subbasin to more sodium-rich water further south in the grassland areas. In the northern part of the Delta-Mendota Subbasin, the Lower Aquifer exhibits relatively lower TDS concentrations, ranging from 400 to 1,600 mg/L, with a sulfate-chloride type makeup near the valley margin trending to sulfate-bicarbonate type near the valley axis. Farther south, TDS concentrations in the Lower Aquifer increase (Hotchkiss and Balding, 1971).

Natural conditions of groundwater salinity exist throughout the Upper and Lower Aquifers as a result of the contribution of salts from recharge off the Coast Range mountains. Surface water and groundwater flowing over and through Coast Range sediments of marine origin have dissolved naturally-occurring salts, contributing to the historical and current presence of salinity in groundwater within the Delta-Mendota Subbasin. In addition to natural salinity contributed from the Coast Range sediments, a number of other mechanisms are believed to further contribute to increased salinity in the groundwater in the region. Poorly draining soil conditions are extensive within some of the southern and eastern areas of the Subbasin, extending from the vicinity of Tranquillity to near Gustine, and these types of soil, combined with a shallow water table, contribute to a build-up of soil salinity.

4.1.10 Topography, Surface Water, Recharge, and Imported Supplies

This section describes the topography, surface water, soils, and groundwater recharge potential in the Delta-Mendota Subbasin.

Topography

As previously described, the Delta-Mendota Subbasin lies on the western side of the Central Valley and extends from the San Joaquin River on the east, along the axis of the Valley, to the Coast Range on the west side (LSCE, 2015). The Subbasin has ground surface elevations ranging from less than 100 feet above mean sea level (msl) along parts of the eastern edge to greater than 1,600 feet msl in the Coast Range mountains (**Figure CC-35**). Most of the lower elevation areas occur east of Interstate 5, in the eastern parts of the Delta-Mendota Subbasin; although some lower elevation areas also extend westward into the Coast Range, such as in Los Banos Creek Valley. Low elevation areas generally coincide with the extent of the Central Valley floor. Topography within the Delta-Mendota Subbasin consists largely of flat areas across the Central Valley floor, where slopes are generally less than 2 percent, with steepening slopes to the west. The topography outside of the Central Valley floor in the Coast Range mountains is characterized by steeper slopes, generally greater than 6 percent.

Surface Water Bodies

The San Joaquin River and its tributaries is the primary natural surface water feature within the Delta-Mendota Subbasin, flowing from south to north along the eastern edge of the Subbasin (LSCE, 2015).

During the 1960s, the San Joaquin River exhibited gaining flow conditions through much of the Subbasin (Hotchkiss and Balding, 1971). Numerous intermittent streams from the Coast Range enter the Delta-Mendota Subbasin from the west; however, none of these maintain perennial flow and only Orestimba Creek, Los Banos Creek and Del Puerto Creek have channels that extend eastward to a junction with the San Joaquin River. Most of the flow in other notable west-side creeks, including Quinto Creek, San Luis Creek, Little Panoche Creek, and Ortigalita Creek, is lost to infiltration (Hotchkiss and Balding, 1971). Flow from Los Banos and San Luis Creeks are impounded by dams on their respective systems. When flood releases are made from Los Banos Creek Reservoir, the vast majority of flows pass through Grassland Water District to the San Joaquin River as they tend to occur during times when agricultural and wetland demand is low. San Luis Reservoir on San Luis Creek, which is located along the western boundary of the Delta-Mendota Subbasin, is an artificial water storage facility for the Central Valley Project and California State Water Project and has no notable natural surface water inflows. Outflows from the reservoir go into the system of federal- and state-operated canals and aqueducts comprising the Central Valley and State Water Projects. Surface water use within the Delta-Mendota Subbasin is derived largely from water deliveries provided by these projects, including from the California Aqueduct (referred to as San Luis Canal in the joint-use area of the California Aqueduct) and Delta-Mendota Canal, and also from the San Joaquin River (**Figure CC-36**).

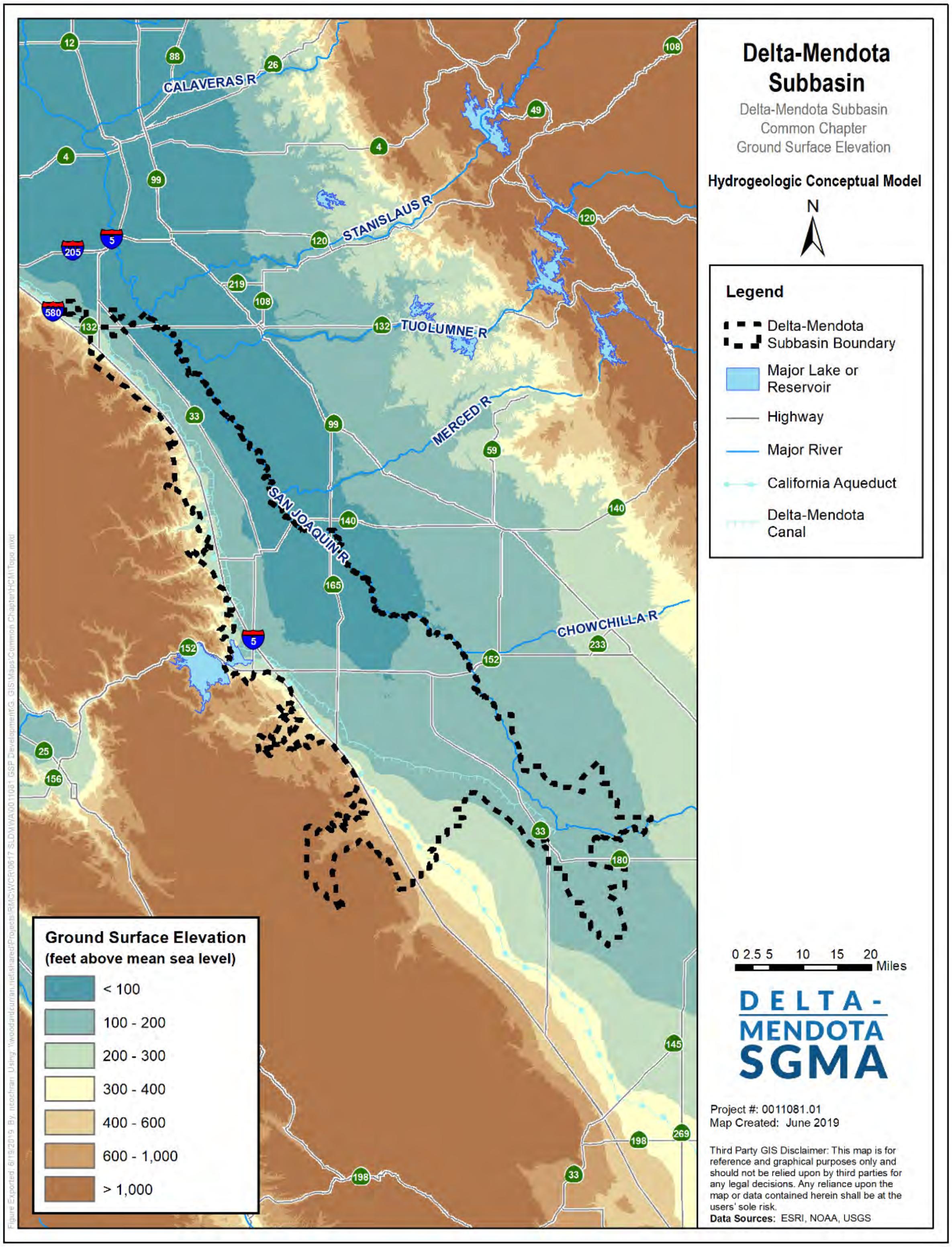


Figure CC-35: Ground Surface Elevation

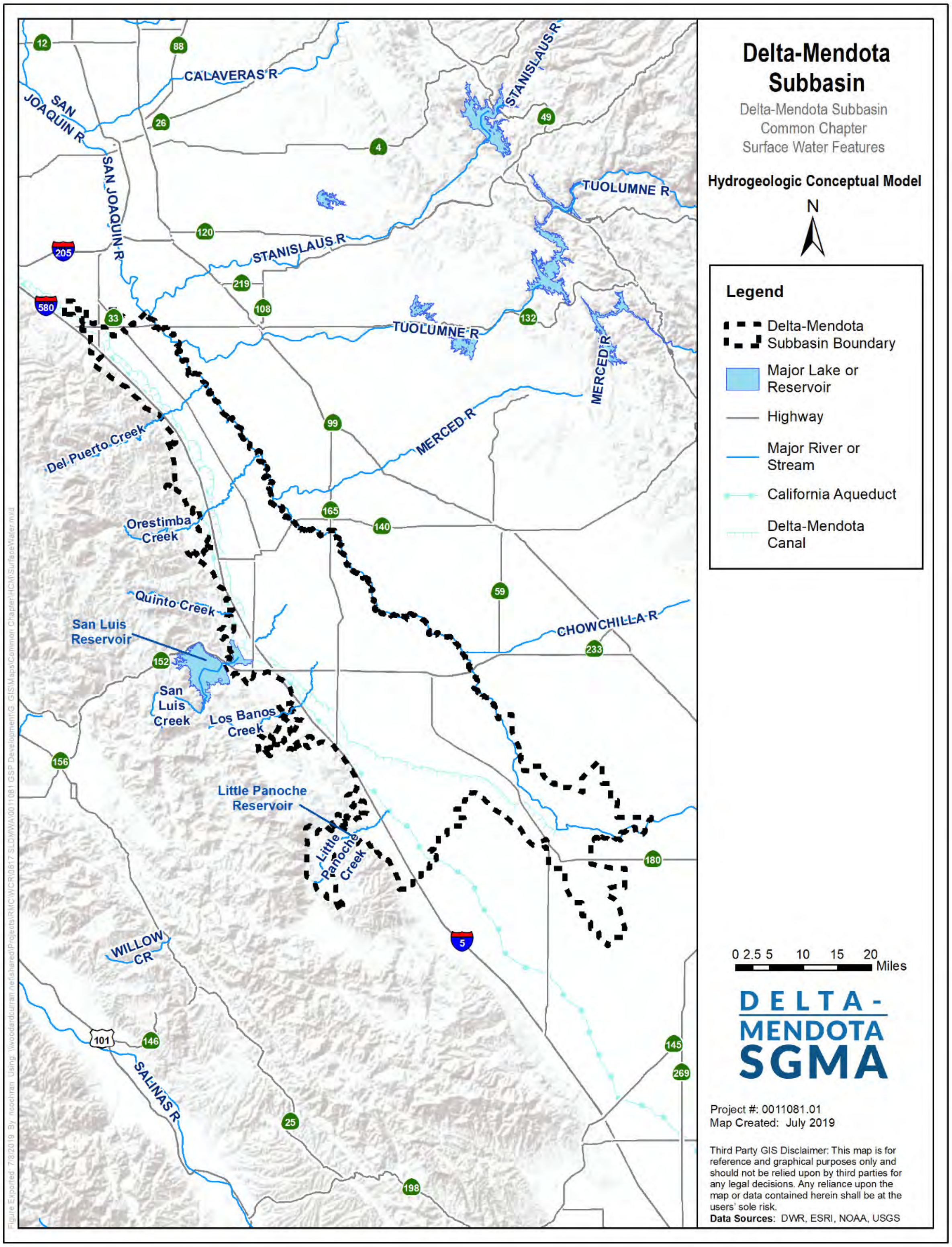


Figure CC-36: Surface Water Features

Soils

The NRCS provides soil mapping in the region. One of the combining soil groupings mapped includes hydrologic groups. The predominant soil hydrologic groups within the Delta-Mendota Subbasin are soil types C and D (**Figure CC-37**). Group C soils have moderately high runoff potential when thoroughly wet (NRCS, 2009) with water transmission through the soil somewhat restricted. Group C soils typically have between 20 percent and 40 percent clay and less than 50 percent sand and have loam, silt loam, sandy clay loam, clay loam, and silty clay loam textures. Group D soils have a high runoff potential when thoroughly wet and water movement through the soil is restricted or very restricted. Group D soils typically have greater than 40 percent clay, less than 50 percent sand, and have clayey textures. In some areas, they also have high shrink-swell potential.

Soil hydraulic conductivity groups are closely related to soil drainage characteristics and hydraulic conductivity. The fine-grained floodplain deposits present across much of the southeastern area of the Subbasin are evidenced as soils with lower hydraulic conductivity in **Figure CC-37** and accordingly, these characteristics also make these areas poorly drained. Poorly draining soil conditions are extensive within the southern and eastern areas of the Subbasin, extending from the vicinity of Tranquillity to near Gustine (Fio, 1994; Hotchkiss and Balding, 1971). Soils in the northern and western parts of the Delta-Mendota Subbasin exhibit better drainage characteristics, although areas of poorly drained soils are also present in the north and west in proximity to surface water courses, including most notably directly adjacent to portions of the San Joaquin River and Los Banos Creek channels. Many of the upland soils, which are of generally coarser texture and located proximal to sediment sources derived from the Coast Range hill slopes, are characterized as moderately well drained.

In areas with low hydraulic conductivity, corresponding to areas without adequate natural drainage, tile drains are present to remove shallow groundwater from the rooting zone. Known tile drain locations are shown in **Figure CC-38,** which are primarily located along the eastern boundary of the Delta-Mendota Subbasin as well as the southern portion of the Subbasin in the Grassland Drainage Area. The Grassland Drainage Area contains a tile drainage system connected to the San Joaquin River Improvement Project, which uses tile drainage water for irrigated agriculture with a high salinity tolerance.

Areas of Recharge, Potential Recharge, and Groundwater Discharge Areas

The primary process for groundwater recharge within the Central Valley floor area is from percolation of applied irrigation water and seepage from canals and stream beds, although some groundwater recharge does occur in the Delta-Mendota Subbasin along the western boundary of the Subbasin due to mountain front recharge. In sandier areas, recharge ponds have been constructed within certain districts (CCC, Aliso Water District, CCID and Del Puerto Water District) to promote managed aquifer recharge.

Groundwater recharge potential on agricultural land based on the Soil Agricultural Groundwater Banking Index (SAGBI) is shown in **Figure CC-39**. The SAGBI is based on five major factors: deep percolation, root zone residence time, topography, chemical limitations, and soil surface conditions. Within the Delta-Mendota Subbasin, SAGBI data categorizes 160,248 acres out of 744,237 acres (21%) of agricultural and grazing land within the regions as having Excellent, Good, and Moderately Good (**Figure CC-39**) recharge properties, and 571,573 acres out of 744,237 acres (or 77%) of agricultural and grazing land as having Moderately Poor, Poor, or Very Poor recharge properties. "Modified" SAGBI data shows higher potential for recharge than unmodified SAGBI data because the modified data assumes that soils have been or will be ripped to a depth of six feet, which can break up fine grained materials at the surface to improve percolation. The modified data set was determined to more accurately represent the Delta-Mendota Subbasin due to the heavy presence of agriculture. In almost all cases, recharge from applied water on irrigated lands recharges the Upper Aquifer of the Subbasin. However, the use of percolation ponds and other managed aquifer recharge techniques must consider existing water quality in addition to soil composition and may be limited in areas where poor water quality currently exists.

The Corcoran Clay is a known barrier restricting vertical flow between the Upper and Lower Aquifers; therefore, natural recharge of the Lower Aquifer from downward percolating water is most likely restricted where the Corcoran Clay is present, including across most of the Central Valley floor. Primary recharge areas to the Lower Aquifer are most likely in western parts of the Central Valley floor where percolating water can enter formations feeding the Lower Aquifer, particularly in the vicinity and west of Los Banos, Orestimba, and Del Puerto Creeks, along the western margin of the Subbasin.

Groundwater discharge areas are identified as springs located within the Delta-Mendota Subbasin and the San Joaquin River. **Figure CC-39** shows the location of historic springs identified by USGS. There are only six springs/seeps identified by USGS in their National Hydrograph Dataset, which are located in the southwestern corner of the Subbasin. The springs shown represent a dataset collected by USGS and are not a comprehensive map of springs in the Subbasin.

Imported Supplies

Both the California Aqueduct and Delta-Mendota Canal run the length of the Delta-Mendota Subbasin, primarily following the Interstate 5 corridor (**Figure CC-40**). The following water purveyors in the Delta-Mendota Subbasin are SLDMWA Member Agencies and thus receive water from the Central Valley Project via the Delta-Mendota Canal: California Department of Fish and Wildlife, Central California Irrigation District, Columbia Canal Company, Del Puerto Water District, Eagle Field Water District, Firebaugh Canal Water District, Fresno Slough Water District, Grassland Water District, Laguna Water District, Mercy Springs Water District, Oro Loma Water District, Pacheco Water District, Panoche Water District, Patterson Irrigation District, San Luis Canal Company, San Luis Water District, Tranquillity Irrigation District, Turner Island Water District, U.S. Fish and Wildlife Service, and West Stanislaus Irrigation District. Oak Flat Water District is the only recipient of State Water Project (SWP) water in the Delta-Mendota Subbasin; Oak Flat Water District initially bought into the SWP in 1968.

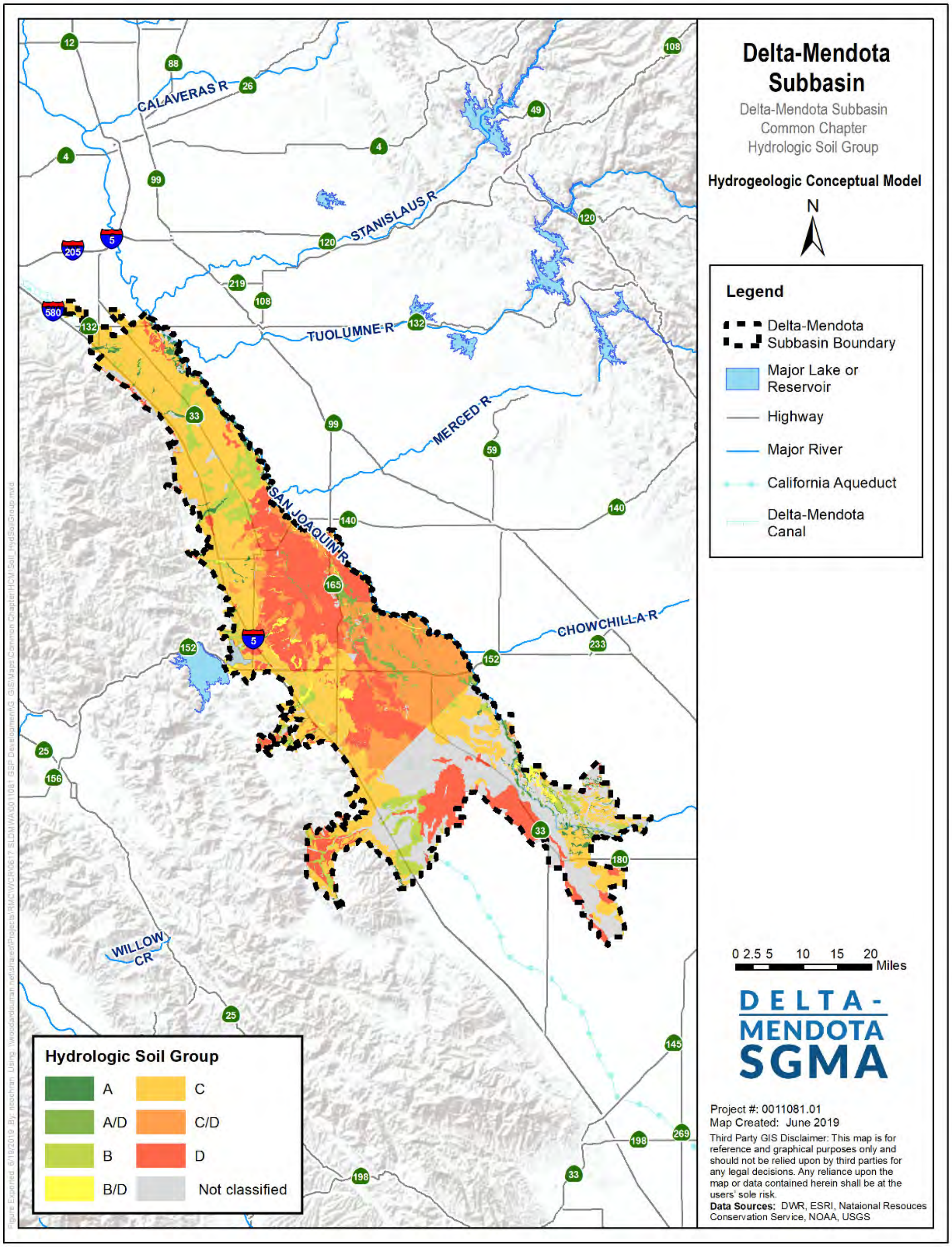


Figure CC-37: SAGBI Soils Map

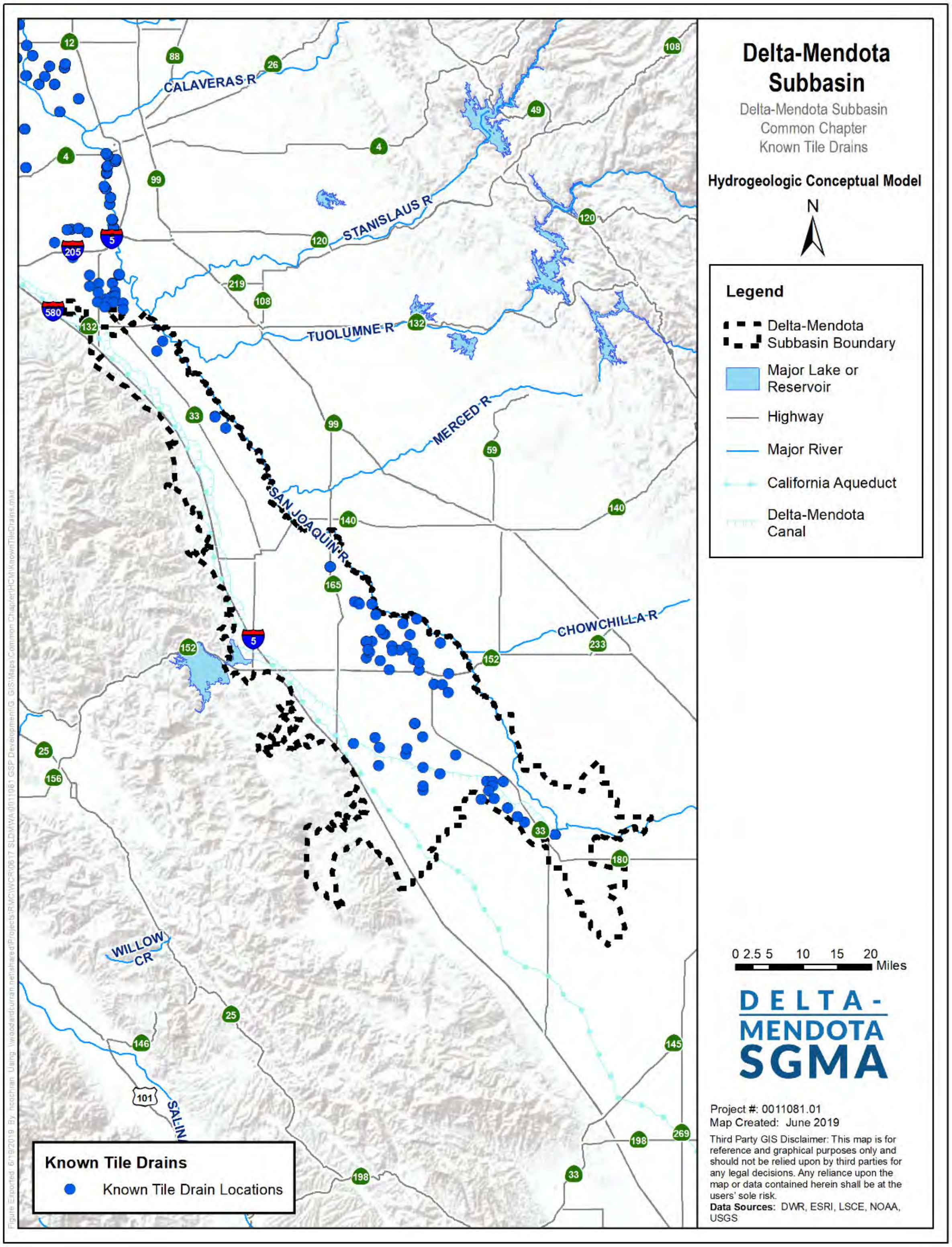


Figure CC-38: Tile Drains

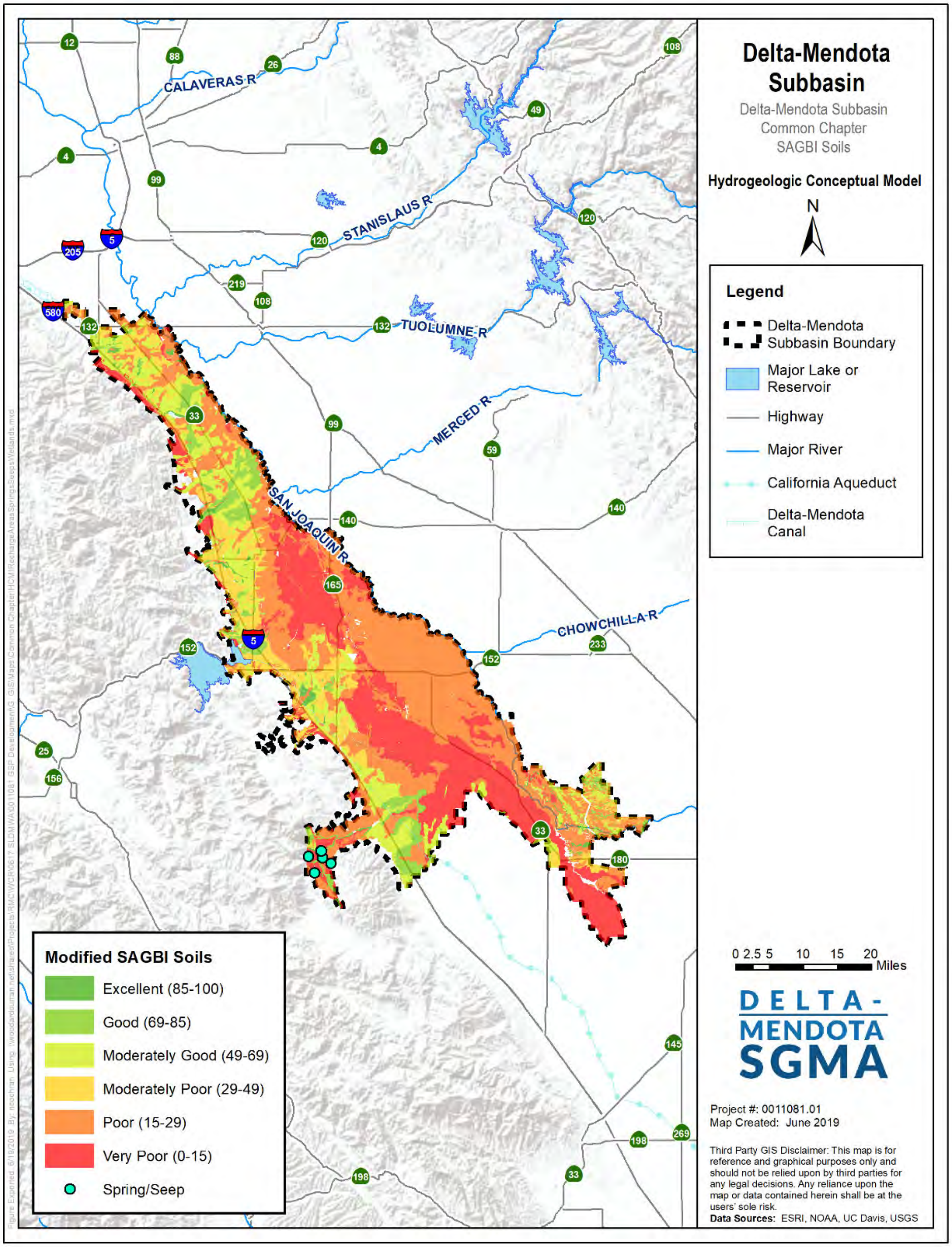


Figure CC-39: Recharge Areas, Seeps and Springs

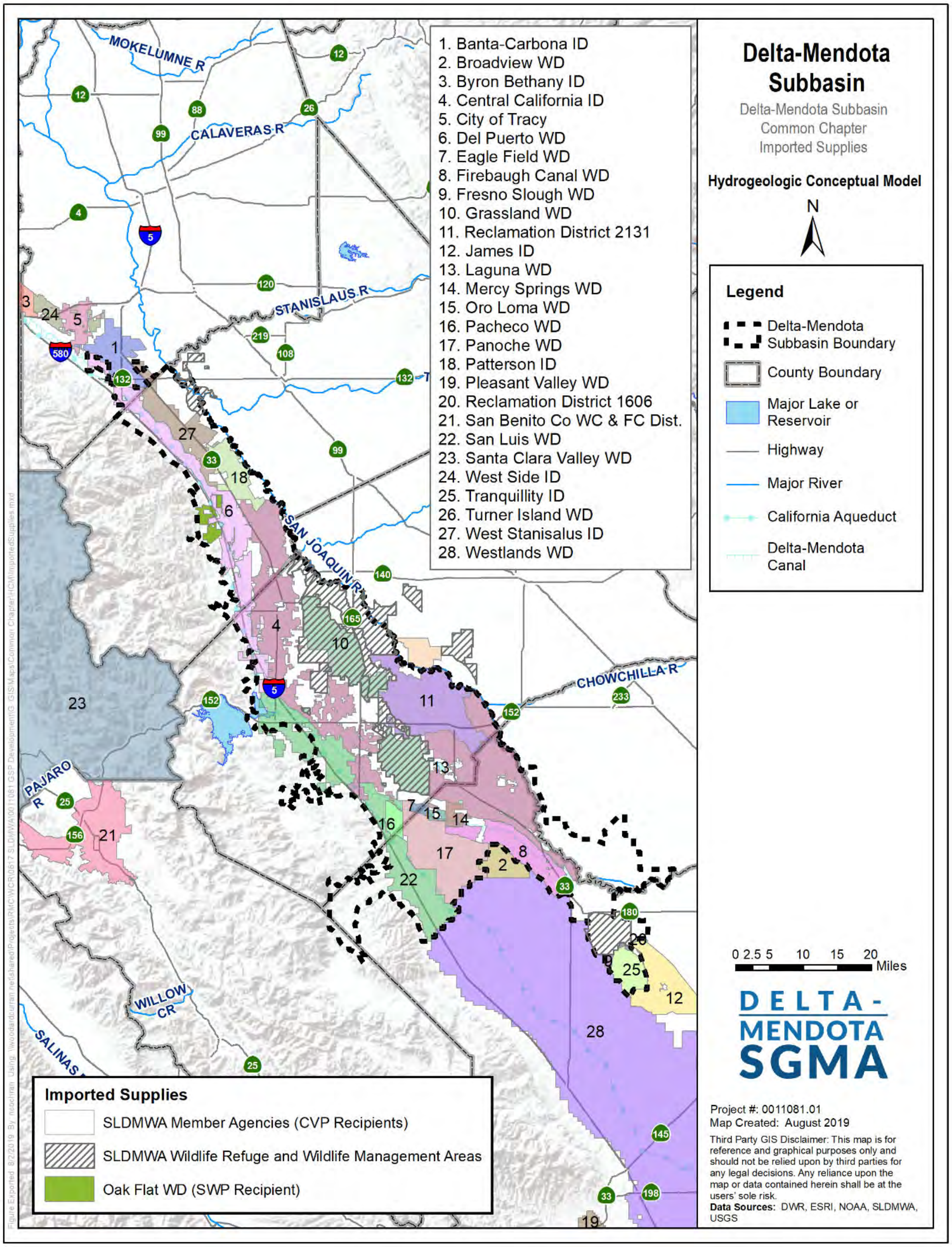


Figure CC-40: Imported Supplies

4.2 Delta-Mendota Subbasin Groundwater Conditions

This section describes the current and historic groundwater conditions in the Delta-Mendota Subbasin, including data from January 1, 2015 to recent conditions for the following parameters: groundwater elevations, groundwater storage, groundwater quality, land subsidence, interconnected surface water systems, and groundwater dependent ecosystems (GDEs) (pursuant to Article 5 Plan Contents, Subarticle 2 Basin Setting, § 354.16 Groundwater Conditions of the GSP Emergency Regulations). Seawater intrusion is not discussed herein as the Delta-Mendota Subbasin is inland and is not impacted by seawater intrusion. For the purposes of this GSP, "current conditions" is represented by Water Year (WY) 2013 conditions, which is consistent with the year representing the Current Conditions Water Budget (see Section 4.3 for more information about Water Budgets). Data post-WY 2013 through present day are presented when available.

The purpose of describing groundwater conditions, as contained in this section and described in the individual GSPs, is to establish baseline conditions that will be used to monitor changes relative to measurable objectives (MOs) and minimum thresholds (MTs). Therefore, these established baseline conditions will help support monitoring to demonstrate measurable efforts in achieving the sustainability goal for the Delta-Mendota Subbasin.

4.2.1 Useful Terminology

This groundwater conditions section includes descriptions of the amounts, quality, and movement of groundwater, among other related components. A list of technical terms and a description of the terms are listed below. The terms and their descriptions are identified here to guide readers through the section and are not a definitive definition of each term:

- **Depth to Groundwater** – The distance from the ground surface to first-detected non-perched groundwater, typically reported at a well.
- **Upper Aquifer** – The alluvial aquifer above the Corcoran Clay (or E-clay) layer.
- **Lower Aquifer** – The alluvial aquifer below the Corcoran Clay (or E-clay) layer.
- **Horizontal gradient** – The slope of the groundwater surface from one location to another when one location is higher or lower than the other. The gradient is shown on maps with an arrow showing the direction of groundwater flow in a horizontal direction.
- **Vertical gradient** – Describes the movement of groundwater perpendicular to the ground surface. Vertical gradient is measured by comparing the elevations of groundwater in wells that are of different depths. A downward gradient is one where groundwater is moving down into the ground towards deeper aquifers and an upward gradient is one where groundwater is upwelling towards the ground surface.
- **Contour Map** – A contour map shows changes in groundwater elevations by interpolating groundwater elevations between monitoring sites. The elevations are shown on the map with the use of a contour line, which represents groundwater being at the indicated elevation along the contour line. Contour maps can be presented in two ways:
    - Elevation of groundwater above mean sea level (msl), which can be used to identify the horizontal gradients of groundwater, and
    - Depth to water (i.e., the distance from the ground surface to groundwater), which can be used to identify areas of shallow or deep groundwater.
- **Hydrograph** – A graph that shows the changes in groundwater elevation or depth to groundwater over time at a specific location. Hydrographs show how groundwater elevations change over the years and indicate whether groundwater is rising or descending over time.

- **Maximum Contaminant Level (MCL)** – MCLs are standards that are set by the State of California and the U.S. Environmental Protection Agency for drinking water quality. MCLs are legal threshold limits on the amount of an identified constituent that is allowed in public drinking water systems. At both the State and Federal levels, there are Primary MCLs, set to be protective of human health, and Secondary MCLs for constituents that do not pose a human health hazard but do pose a nuisance through either smell, odor, taste, and/or color. MCLs are different for different constituents and have not been established for all constituents potentially found in groundwater.
- **Elastic Land Subsidence** – Reversible and temporary fluctuations in the elevation of the earth's surface in response to seasonal periods of groundwater extraction and recharge.
- **Inelastic Land Subsidence** – Irreversible and permanent decline in the elevation of the earth's surface resulting from the collapse or compaction of the pore structure within the fine-grained portions of an aquifer system. This form of subsidence is what is required by SGMA to be monitored and reported.
- **Gaining Stream** – A stream in which groundwater flows into a streambed and contributes to a net increase in surface water flows across an identified reach.
- **Losing Stream** – A stream in which surface water is lost through the streambed to the groundwater, resulting in a net decrease in surface water flows across an identified reach.
- **Conjunctive Use** – The combined use of surface water and groundwater supplies, typically with more surface water use in wet years and more groundwater use in dry years.

4.2.2 Groundwater Elevations

This section describes groundwater elevation data utilized and elevation trends in the Delta-Mendota Subbasin. Groundwater conditions vary widely across the Subbasin. Historic groundwater conditions through present day conditions, the role of imported surface water in the Subbasin, and how conjunctive use has impacted groundwater trends temporally and spatially are discussed. Groundwater elevation contour maps associated with current seasonal high and seasonal low for each principal aquifer, as well as hydrographs depicting long-term groundwater elevations, historical highs and lows, and hydraulic gradients (both horizontal and vertical), are also described.

Available Data

Groundwater elevation data, and accompanying well construction information, within the Delta-Mendota Subbasin from the following sources and associated programs were utilized in the development of the Delta-Mendota Subbasin GSPs:

- California Department of Water Resources (DWR)
  - California Statewide Groundwater Elevation Monitoring Program (CASGEM)
  - Water Data Library (WDL)
- Water level data from local monitoring programs

Data provided by these sources included well information (such as location, well construction, owner, ground surface elevation and other related components), as well as groundwater elevation data (including information such as date measured, depth to water, groundwater surface elevation, questionable measurement code, and comments). At the time that these analyses were performed, groundwater elevation data were available for the time period from 1930 through 2018. There are many wells with monitoring data from some time in the past but no recent data, while a small number of wells have monitoring data recorded for periods of greater than 50 years.

Not all groundwater elevation data received were used in preparing the groundwater elevation contour maps for both principal aquifers (defined in this Common Chapter as the Upper and Lower Aquifers which are divided by the Corcoran Clay or E-clay layer). Some groundwater elevation data were associated with wells with unknown screened depths and/or composite well screens constructed across the Corcoran Clay. Groundwater elevation data associated with wells with composite screens and/or unknown screened depths were removed from the data set in most instances, along with any data point that appears to be an outlier when compared with surrounding data from the same period. Select wells with unknown construction were evaluated for inclusion in contour mapping efforts in areas of limited data. Duplicate well measurements were also removed prior to contouring and only one observation for a given well was used for the identified season, rather than averaging all measurements at a given well during the same season.

Figure CC-41 shows the locations of wells with known screened depths within the Delta-Mendota Subbasin as well as known spatial gaps where no well information is currently available. These wells include those monitored under CASGEM, the Delta-Mendota Canal Well Pump-in Program, and by local owners or agencies. Monitoring data available for these wells varies by local owner and agency. Well locations were provided by local agencies to the best of their knowledge at the time of writing and may include wells that have been destroyed or are no longer in service.

Historic Conditions

Historic groundwater trends changed significantly with the first deliveries of imported water deliveries to the Delta-Mendota Subbasin. Construction of the Delta-Mendota Canal and the California Aqueduct heralded the introduction of significant surface water supplies into the Subbasin and reduced dependence on groundwater as the primary water supply. These conveyance systems have resulted in significant increases in the conjunctive use of surface water and groundwater throughout the Subbasin. Various drought periods and regulations reducing delivery of supplies from the Sacramento-San Joaquin Delta also punctuate critical understandings of groundwater use patterns throughout the Subbasin, as well as what is known regarding response and recovery of groundwater levels following notable droughts.

Prior to Imported Water Deliveries (1850-1950s)

Prior to 1850, the majority of agriculture and development in the San Joaquin Valley consisted of rain-fed grain and cattle production, with irrigated development beginning sporadically during this time via river (primarily San Joaquin River) and perennial stream diversions (SWRCB, 2011). Construction of the railroad through the San Joaquin Valley from 1869 through 1875 increased demand for more extensive agriculture, making markets in larger coastal cities more accessible to valley farmers. Significant irrigation sourced from surface water and resulting production began in the western side of the San Joaquin Valley in 1872 when the San Joaquin River was diverted through the Miller and Lux canal system west of Fresno (DWR, 1965). By the 1890s and early 1900s, sizable areas of the southern San Joaquin Valley were being forced out of production by salt accumulation and shallow water tables. Much of this land lay idle until the 1920s when development of reliable electric pumps and the energy to power them accelerated the expansion of irrigated agriculture with the availability of vast groundwater resources. The resultant groundwater pumping lowered the water table in many areas (SWRCB, 1977 and Ogden, 1988) and allowed the leaching of salts, particularly near the valley trough and western side of the valley. Groundwater pumping for irrigation from around 1920 to 1950 drew the water table down as much as 200 feet in areas along the westside of the San Joaquin River (Belitz and Heimes, 1990). Declining water tables were causing higher pumping costs and land subsidence, and farmers were finding poorer quality water as water tables continued to decline. These issues created a desire for new surface water supplies, which would be fulfilled by the Central Valley Project.

Post-Imported Water Deliveries (1950s-2012)

Surface water deliveries from the Central Valley Project via the DMC began in the early 1950s, and from the State Water Project via the California Aqueduct in the early 1970s (Sneed et al., 2013). The CVP is the primary source of imported surface water in the Delta-Mendota Subbasin, where only Oak Flat Water District receives deliveries from the SWP. Introduction of imported water supplies to the Delta-Mendota Subbasin resulted in a decrease in groundwater pumping from some parts of the Subbasin and the greater Central Valley, which was accompanied by a steady recovery of water levels. During the droughts of 1976-1977 and 1987-1992, diminished deliveries of imported surface water prompted increased pumping of groundwater to meet irrigation demands, bringing water levels to near-historic lows. Following periods of drought, recovery of pre-drought water levels has been rapid, especially in the Upper Aquifer. This trend has been observed in historic hydrographs for wells across the Subbasin.

Current Conditions

Trends similar to historic drought and subsequent recovery conditions were observed during the 2012 to 2016 drought and the 2016 to present recovery period.

Recent Drought (2012-2016)

During the most recent drought, from 2012 through 2016, similar groundwater trends were observed as during the 1976-1977 and 1987-1992 droughts. With diminished imported surface water deliveries, groundwater pumping increased throughout the Subbasin to meet irrigation needs. This resulted in historic or near-historic low groundwater levels during the height of the drought in 2014 and 2015, when CVP and SWP allocations for agricultural water service contractors were 0%, Exchange Contractors and refuge deliveries were less than 75%, and post-1914 surface water rights in the San Joaquin River watershed were curtailed. In June 2015, senior water rights holders with a priority date of 1903 or later in the San Joaquin and Sacramento watersheds and the Delta were ordered by the State Water Resources Control Board to curtail diversions (State of California, 2015). This marked the first time in recent history that pre-1914 water rights holders were curtailed.

Post-Drought (2016-present)

With wetter conditions following the 2012-2016 drought, groundwater levels began to recover. This was largely a result of increased surface water availability with CVP allocations reaching 100% and full water rights supplies available for diversion from the San Joaquin River in 2017. Additionally, inelastic land subsidence rates also drastically decreased in 2017 as imported water supplies were once again available, resulting in decreased groundwater pumping particularly from the Lower Aquifer. This pattern of increased drought-driven groundwater pumping, accompanied by declining groundwater elevations, followed by recovery is a predominant factor to be considered in the sustainable management of the Delta-Mendota Subbasin. Furthermore, subsidence mitigation projects were developed which drastically reduced the observed subsidence rate on the eastern and southern boundaries of the Subbasin.

Groundwater Trends

Groundwater levels can fluctuate greatly throughout time due to various natural and anthropogenic factors, including long-term climatic conditions, adjacent well pumping, nearby surface water flows, and seasonal groundwater recharge or depletion (LSCE, 2015). As discussed in the Hydrogeologic Conceptual Model section of this Common Chapter (Section 4.1), the Delta-Mendota Subbasin is generally a two-aquifer system consisting of an Upper and Lower Aquifer that are subdivided by the Corcoran Clay layer, a regional aquitard. The Corcoran Clay layer, or E-Clay equivalent, restricts flow between the upper semi-confined aquifer and lower confined aquifer. The presence of a tile drain network along the Grassland Drainage Area and the Subbasin's eastern boundary affects the lateral and vertical water movement in the shallow groundwater zone (LSCE, 2016).

The Delta-Mendota Subbasin has a general flow direction to the east in the Upper Aquifer, where it loses groundwater to the San Joaquin River and its neighboring subbasins. Most recharge throughout the Subbasin is attributed to applied irrigation water, where other sources of recharge include local streams, canal seepage, and infiltration along the western margin of the Subbasin from the Coast Range. The figures that follow were developed for inclusion in the Western San Joaquin River Watershed Groundwater Quality Assessment Report (LSCE, 2015) and the Grassland Drainage Area Groundwater Quality Assessment Report (LSCE, 2016) and are included herein with the intent of demonstrating general trends in groundwater elevations around the Delta-Mendota Subbasin. These figures are not to scale.

Please see the individual GSPs for more specific information relating to similar trends in those respective GSP Plan areas. Additionally, it is important to note that groundwater trends, such as these, are dependent on climatic conditions and are not necessarily representative of the historic and current water budgets for those respective GSP Plan areas.

Upper Aquifer

For the Upper Aquifer, **Figure CC-42** presents select hydrographs illustrating temporal groundwater level trends in the Upper Aquifer wells within the Subbasin. Hydrographs shown on **Figure CC-42** are displayed with different ranges of elevation values on the vertical axes. Wells in the Upper Aquifer exhibit decreasing trends to somewhat stable water levels until the mid-1980s, and increasing or stable water levels thereafter.

Similarly, **Figure CC-43** presents select hydrographs illustrating temporal groundwater level trends in the areas covered by the Central Delta-Mendota, Oro Loma Water District, and Widren Water District GSAs in the Northern & Central Delta-Mendota Region GSP Group at various depths. The three select hydrographs representing wells in the Upper Aquifer each show less than 10 years of available data with two wells showing slight declines of about 10 feet or less from about 2003 through 2013, and one well showing a more drastic elevation change, ranging from 100 feet above mean sea level (ft msl) to -20 ft msl over a 5-year period from 2010 to 2016.

Lower Aquifer

Figure CC-44 presents select hydrographs illustrating temporal groundwater level trends in Lower Aquifer wells within the Subbasin. Note, hydrographs shown on **Figure CC-44** displayed different ranges of elevation on the vertical axes. In the Lower Aquifer, piezometric head typically increased or remained relatively stable during the period from the 1980s through the early 2000s.

Again, similarly, **Figure CC-43** presents select hydrographs illustrating temporal groundwater level trends in the Central Delta-Mendota, Oro Loma Water District, and Widren Water District GSA areas of the Northern & Central Delta-Mendota Region GSP Group at various depths. The two select hydrographs representing wells in the Lower Aquifer each show similar elevation patterns post-2010 with a total elevation change of 50 ft msl or more. USGS1000489 shows stable and increasing groundwater elevation trends from the late 1950s through the mid-1980s with a data gap from the mid-1980s through 2010, whereafter 2010 groundwater levels have a steep decline through 2016.

Vertical Gradients

Throughout most of the Delta-Mendota Subbasin, the Corcoran Clay layer acts as a regional aquitard, limiting the vertical migration of groundwater. In areas outside the Corcoran Clay layer (along the western margin of the Subbasin), localized interfingered clays minimize the downward migration of groundwater; although in areas where the clay layers are not competent or non-existent, groundwater migrates from shallower to deeper groundwater zones. Similarly, in areas where the Corcoran Clay has been compromised (due to well construction across the clay), groundwater generally flows from the Upper Aquifer to the Lower Aquifer, especially in areas where the Lower Aquifer is actively used as a water supply (lowering the potentiometric head in that zone).

Groundwater Contours

The Subbasin-wide groundwater contours reflected in **Figure CC-45** and **Figure CC-46** evaluate the seasonal high (Spring 2013) and seasonal low (Fall 2013) conditions of the current year (defined as WY2013 for the GSP analyses) for the Upper Aquifer. Spring is defined as groundwater surface elevation measurements collected between January 1 and April 8; where Fall is defined as groundwater surface elevation measurements collected between September 1 and October 31. For wells where multiple Spring 2013 or Fall 2013 measurements were available, the highest elevation for each season was used for contouring. Gaps in data and contours can be attributed to a lack of wells present, level measurements, or requirements to report level readings groundwater level data. Consistent with traditional contouring efforts, the quality of outlier water level data was investigated. In instances of poor quality data, the associated data was eliminated for the groundwater contouring effort. Furthermore, implementation of the CASGEM program in 2014 has reduced temporal and spatial gaps in groundwater level datasets, and implementation of the Delta-Mendota Subbasin GSPs' monitoring programs will add to the improved data quantity and quality.

In the Upper Aquifer, during Spring 2013, the general flow of groundwater in the Delta-Mendota Subbasin was from the Coast Range along the western boundary of the Subbasin toward the San Joaquin River along the eastern boundary. Groundwater elevations tend to increase moving south throughout the Subbasin. Within Stanislaus County, groundwater elevations are the lowest, ranging between 40 and 80 feet above msl, becoming increasingly higher in Madera County, ranging between 80 and 100 feet above msl, and in Merced and Fresno counties, ranging between 80 and 140 feet above msl (**Figure CC-45**). Similar flow directions (west to east and northeast) are observed in the Fall 2013. Within Stanislaus County, groundwater elevations are the lowest ranging between 40 and 80 feet above msl, showing little difference compared to Spring 2013; become increasingly higher in Madera County ranging between 60 and 100 feet above msl; in Merced County ranging between 60 and 140 feet above msl; and in Fresno County ranging from 60 and 120 feet above msl (**Figure CC-46**). Both maps indicate a prevailing southwest to northeast flow gradient above the Corcoran Clay. In general, little variation is apparent in groundwater elevation between seasonal high and low periods in 2013.

Due to insufficient data, groundwater elevation contour maps for the Lower Aquifer for the seasonal high and low (Spring 2013 and Fall 2013, respectively) could not be accurately prepared. **Figure CC-47** and **Figure CC-48** show the available groundwater elevation measurements for Spring 2013 and Fall 2013. Available Spring 2013 measurements range from -127 to 12 feet above msl in Stanislaus County, -65 to

124 feet above msl in Merced County, and -5 to 88 feet above msl in Fresno County (**Figure CC-47**), where no measurements are available for this time period in Madera County. Available Fall 2013 measurements range from -138 to 156 feet above msl in Stanislaus County, -94 to 19 feet above msl in Merced County, and -72 to -4 feet above msl in Fresno County (**Figure CC-48**), where no measurements are available for this time period in Madera County. The Lower Aquifer exhibits less seasonal difference in groundwater elevations than the Upper Aquifer. Throughout most of the Subbasin, the Lower Aquifer shows lower piezometric heads than the Upper Aquifer suggesting that potential exists for downward vertical gradient.

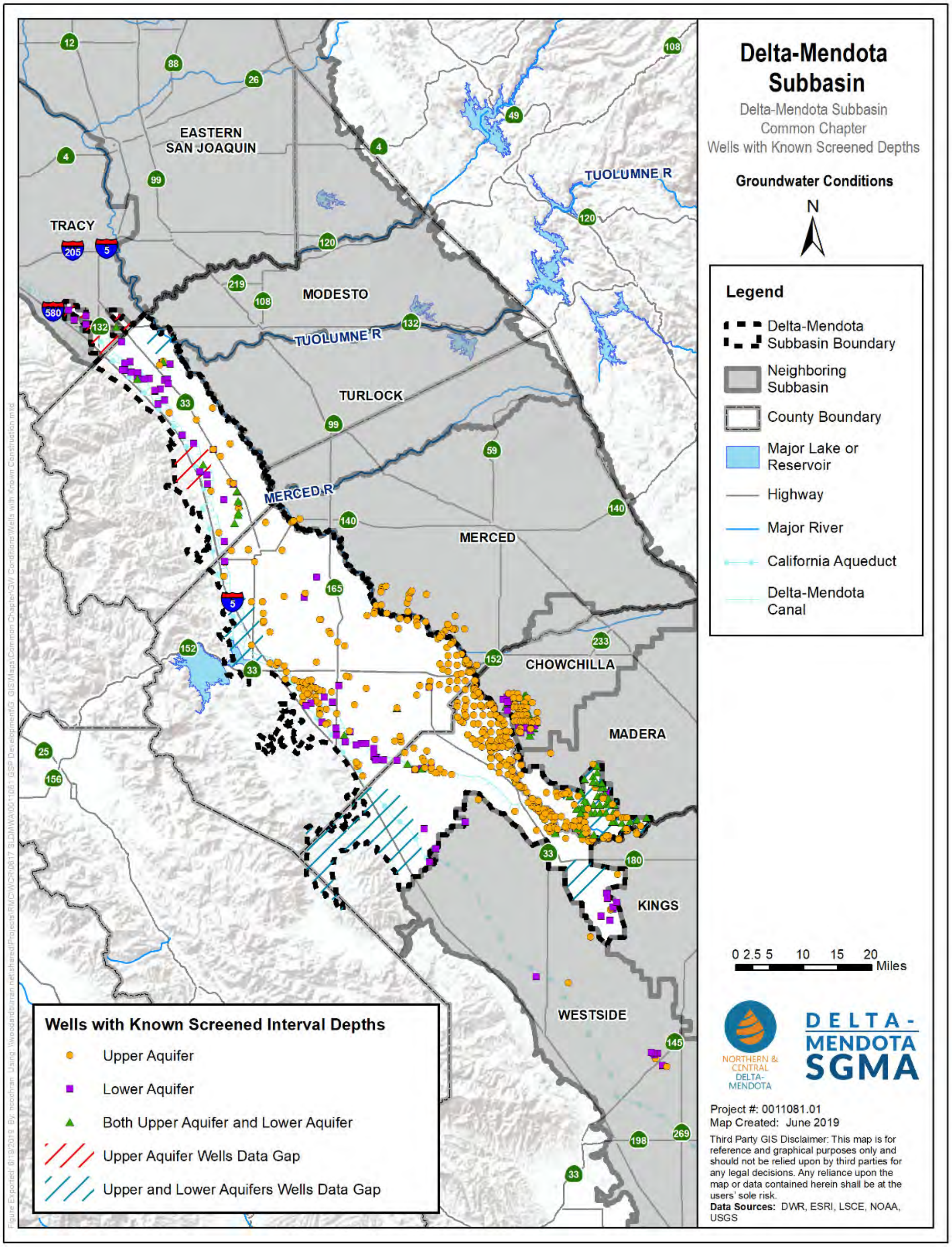
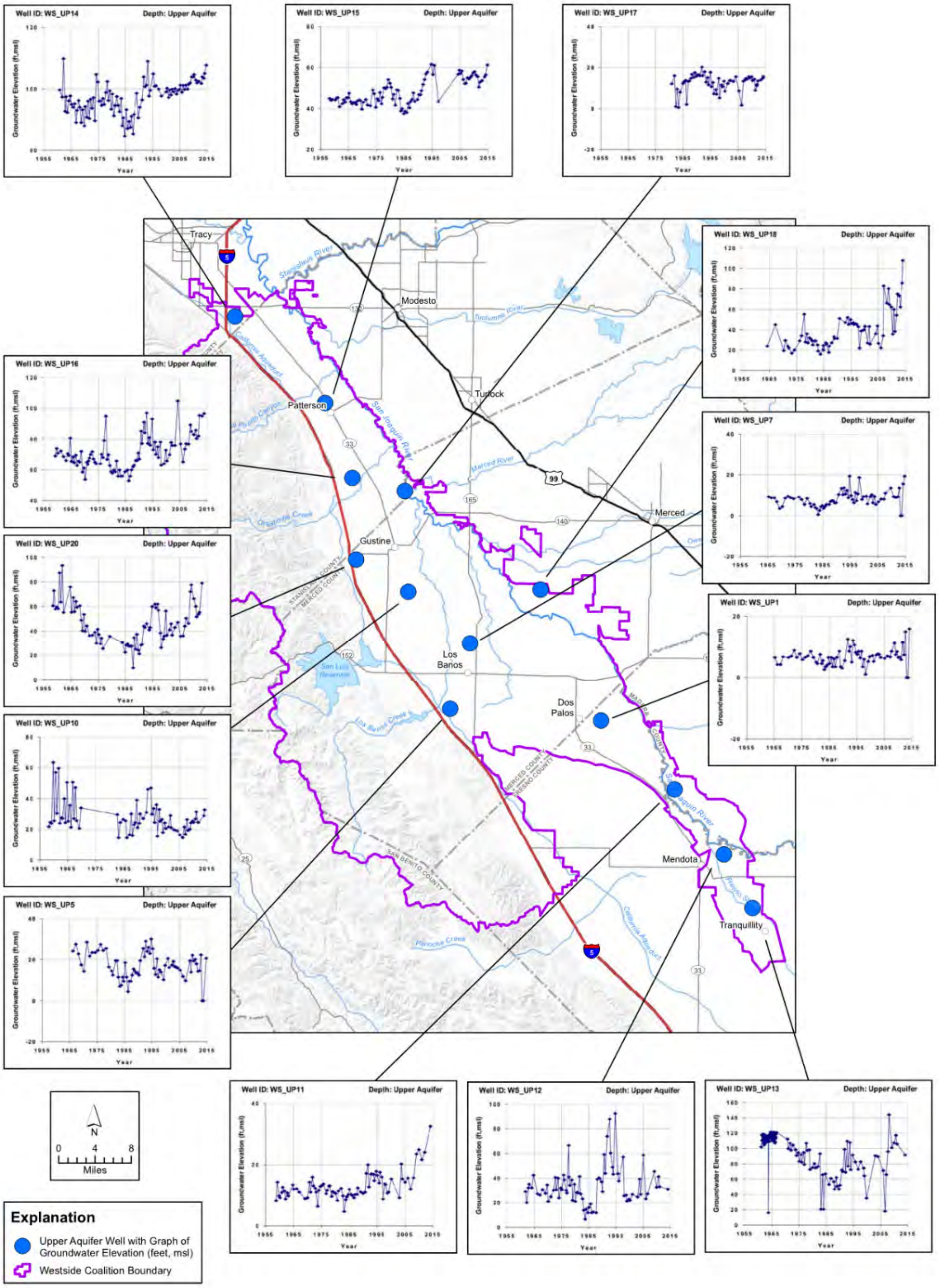
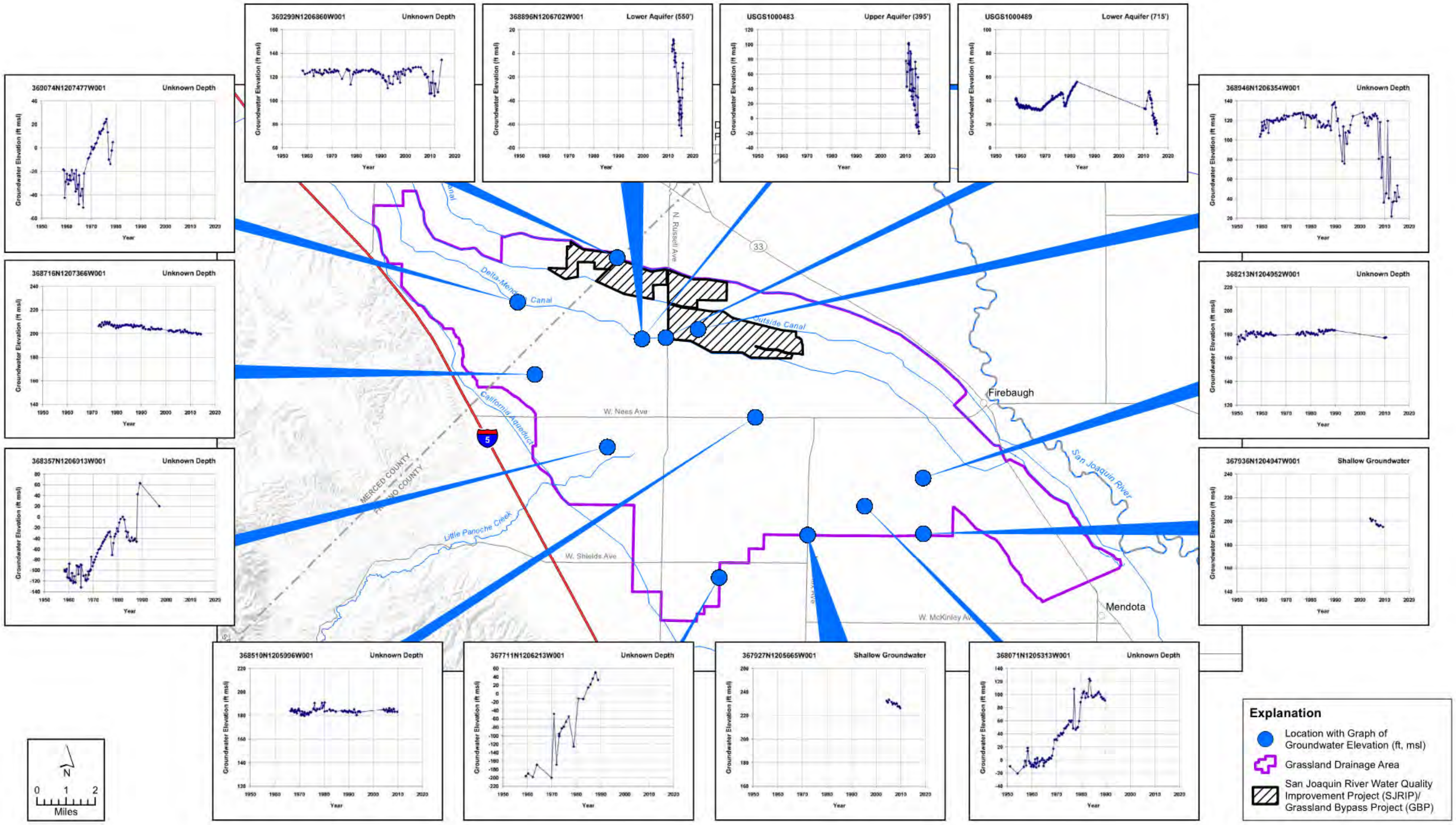


Figure CC-41: Wells with Known Screened Interval Depths



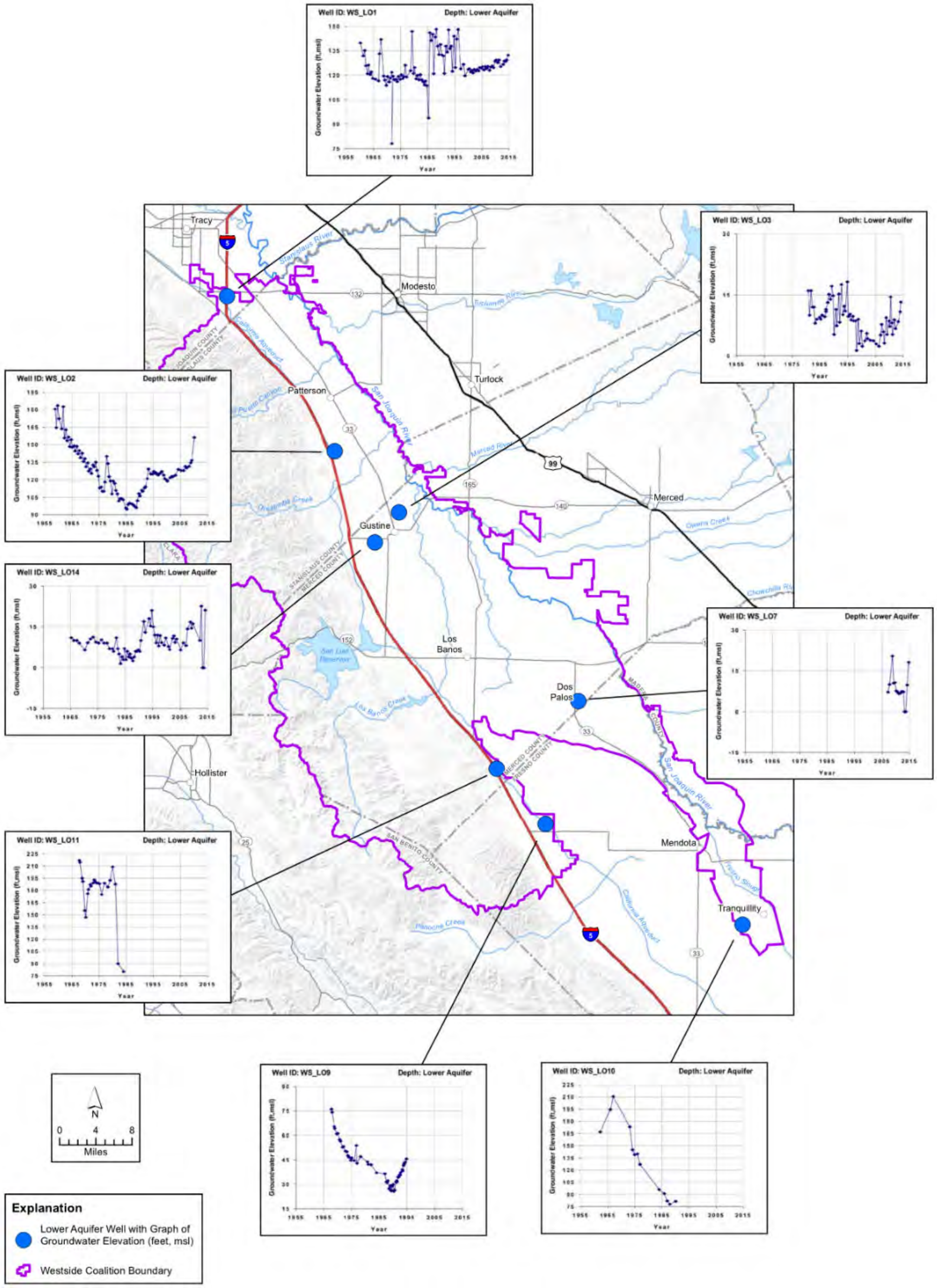
Note: Figure not to scale.
Source: *Western San Joaquin River Watershed Groundwater Quality Assessment Report*, 2016

Figure CC-42: Select Graphs of Groundwater Elevations, Upper Aquifer



Note: Figure not to scale.
Source: *Western San Joaquin River Watershed Groundwater Quality Assessment Report*, 2016.

Figure CC-43: Select Graphs of Groundwater Elevations, Various Depths



Note: Figure not to scale.
Source: *Western San Joaquin River Watershed Groundwater Quality Assessment Report*, 2016.

Figure CC-44: Select Graphs of Groundwater Elevations, Lower Aquifer

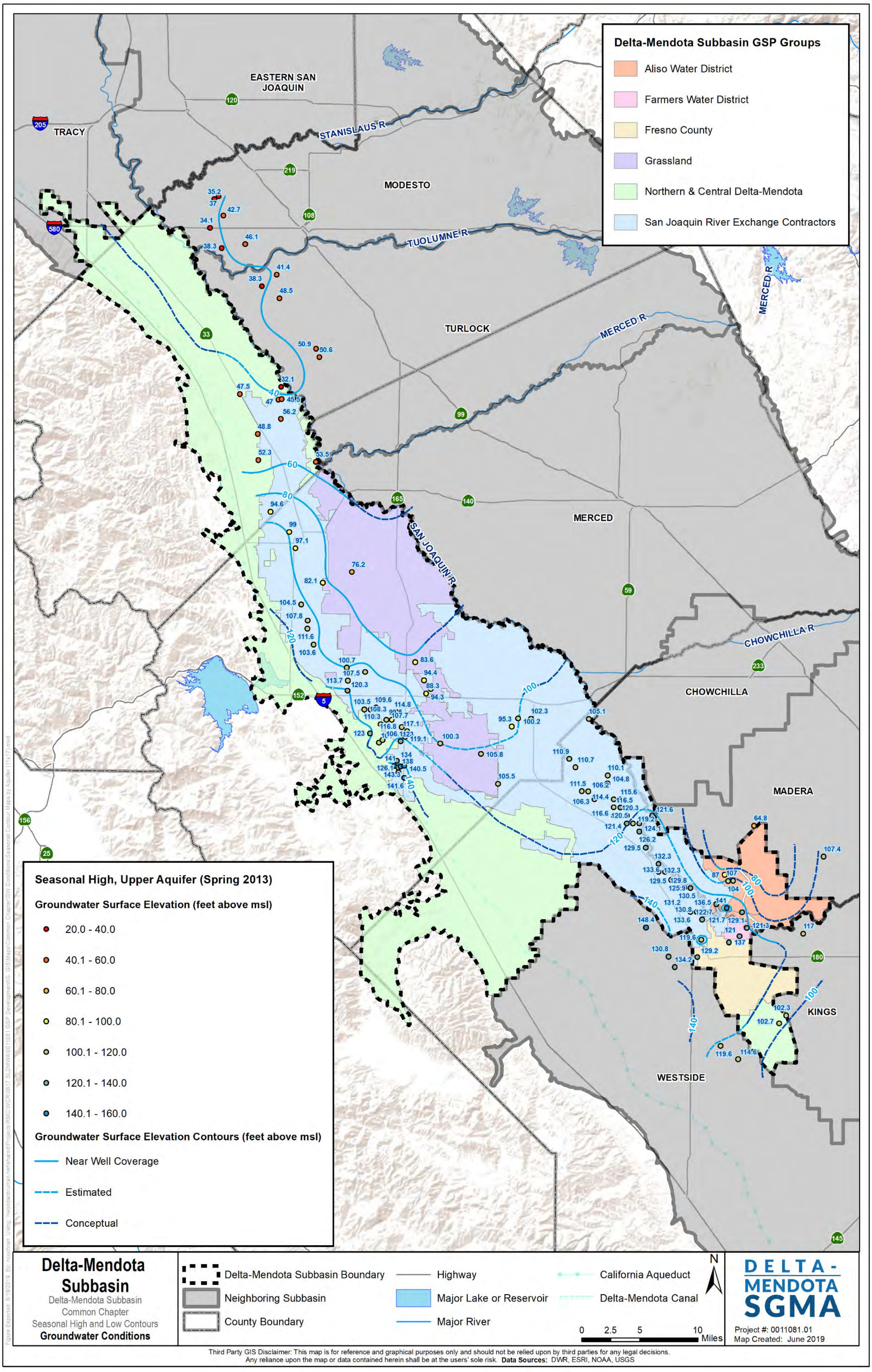


Figure CC-45: Spring 2013 Upper Aquifer Groundwater Contour Map

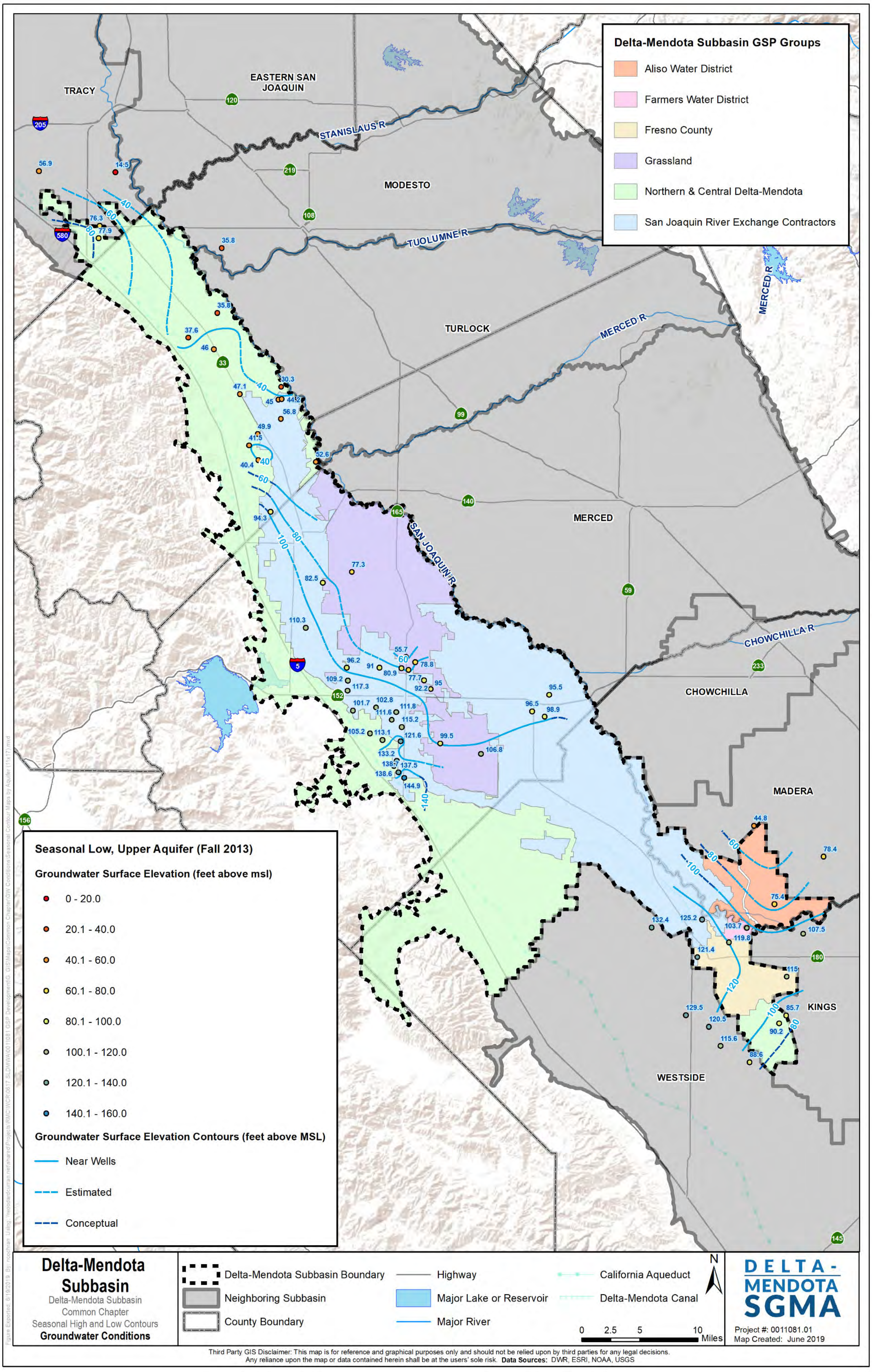


Figure CC-46: Fall 2013 Upper Aquifer Groundwater Contour Map

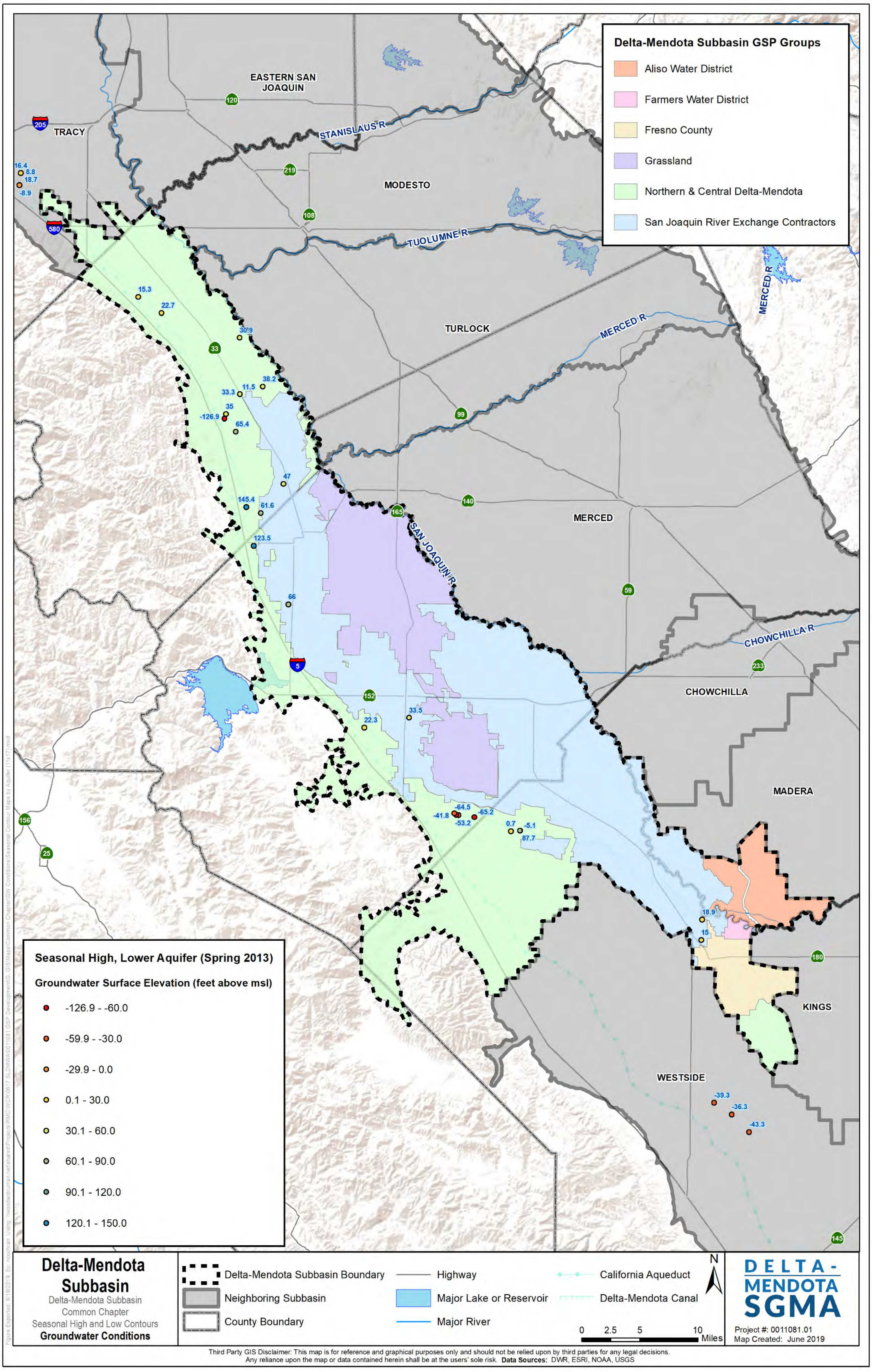


Figure CC-47: Spring 2013 Lower Aquifer Groundwater Elevation Measurements

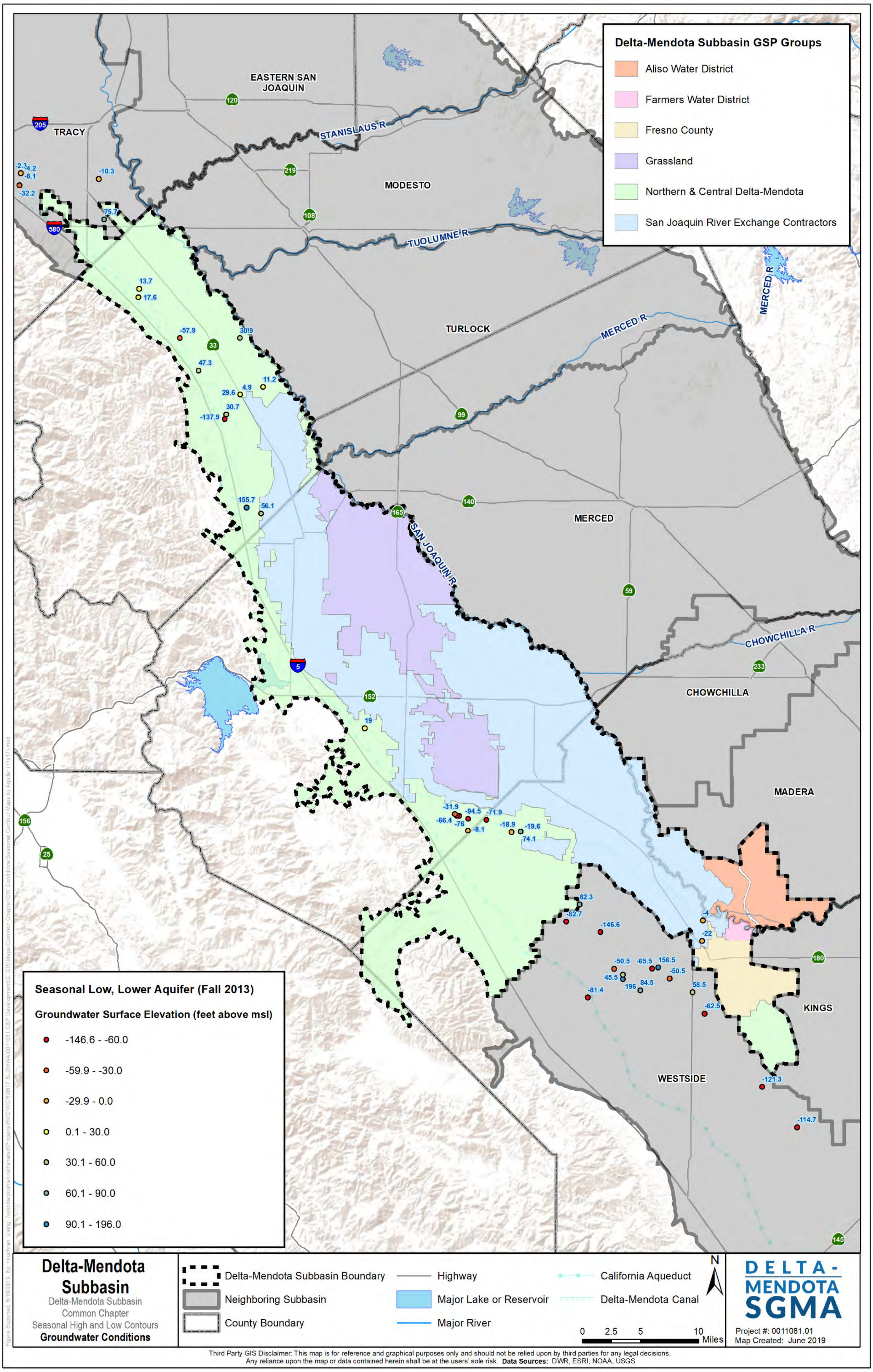


Figure CC-48: Fall 2013 Lower Aquifer Groundwater Elevation Measurements

4.2.3 Groundwater Storage

Annual changes in groundwater storage for both the Upper and Lower Aquifers in the Delta-Mendota Subbasin were estimated as part of the development of the Historic (WY2003-2012), Current (WY2013) and Projected Water Budgets (WY2014-2070). For information on how change in storage was calculated, refer to Section 4.3.2 – Water Budgets of this Common Chapter. **Figure CC-49** and **Figure CC-50** show annual change in storage, cumulative change in storage, and water year type for the Upper Aquifer and Lower Aquifer, respectively, from WY 2003 through 2013 for the Delta-Mendota Subbasin. For the purposes of the water budget four water year types were utilized, wet, average (corresponding to above and below normal water years), dry (corresponding to dry and critical water years) and Shasta critical.

Change in storage is negative for 6 out of the 11-year historic and current water budget period for the Upper Aquifer, and 9 out of 11 years for the Lower Aquifer. Despite periods of wet conditions with recharge outpacing extractions, an overall declining trend in groundwater storage can be observed in both the Upper Aquifer and Lower Aquifer. Cumulative change in storage declined more rapidly in the Upper Aquifer compared to the Lower Aquifer, declining by about 624,0000 AF in the Upper Aquifer and 375,000 AF in the Lower Aquifer between WY2003 to 2013.

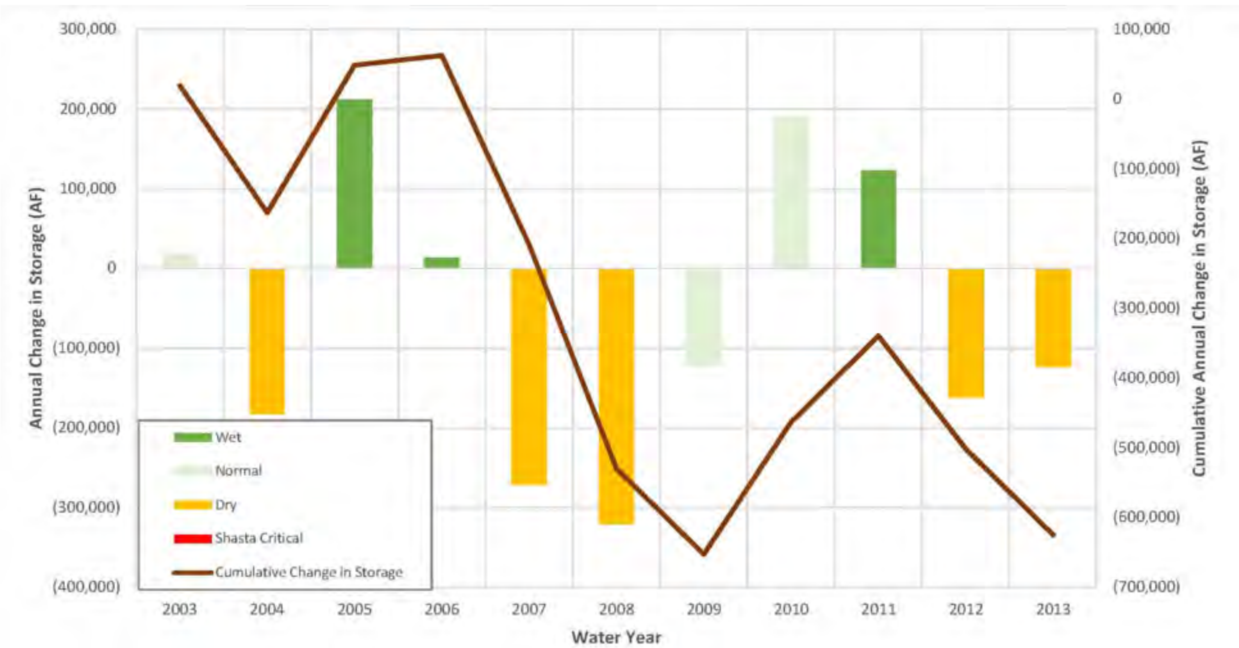


Figure CC-49: Calculated Upper Aquifer Change in Storage, Annual and Cumulative

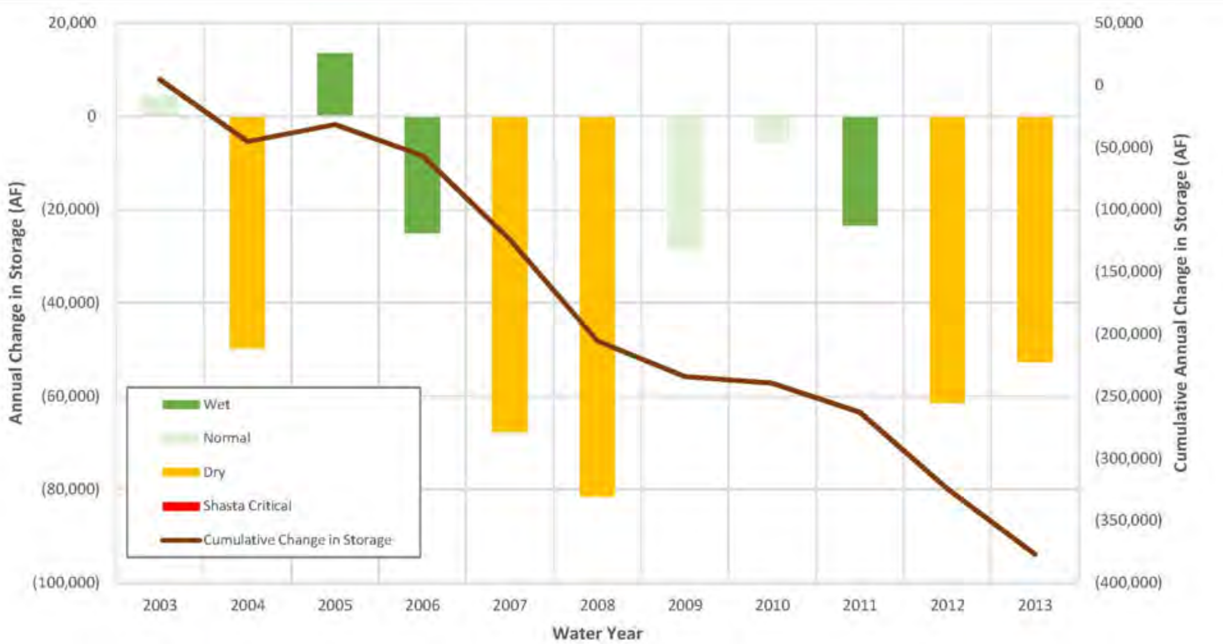


Figure CC-50: Calculated Lower Aquifer Change in Storage, Annual and Cumulative

4.2.4 Seawater Intrusion

Seawater intrusion is not an applicable sustainability indicator for the Delta-Mendota Subbasin. The Subbasin is located inland from the Pacific Ocean; thus, groundwater conditions related to seawater intrusion are not applicable to the Delta-Mendota Subbasin.

4.2.5 Groundwater Quality

Groundwater quality varies considerably from west to east and north to south throughout the Delta-Mendota Subbasin. In general, Upper Aquifer water quality has historically been impacted by overlying land uses with some areas showing increasing concentrations of nitrate and TDS. Areas of elevated salt concentrations can be found in the Subbasin, generally along the southern portion of the San Joaquin River and in the southern portion of the Subbasin. Lower Aquifer groundwater has, and remains in most cases, to be of generally good quality. For more information about historic and current conditions relative to groundwater quality in each GSP Group area, refer to the individual GSPs.

4.2.6 Land Subsidence

Long-term groundwater level declines can result in a one-time release of “water of compaction” from compacting silt and clay layers (aquitards) resulting in inelastic land subsidence (Galloway et al., 1999). There are several other types of subsidence in the San Joaquin Valley, including subsidence related to hydrocompaction of moisture-deficient deposits above the water table, subsidence related to fluid withdrawal from oil and gas fields, subsidence caused by deep-seated tectonic movements, and subsidence caused by oxidation of peat soils that is a major factor in the Sacramento-San Joaquin Delta (Sneed et al., 2013). However, aquifer-system compaction caused by groundwater pumping causes the largest magnitude and areal extent of land subsidence in the San Joaquin Valley (Poland et al., 1975; Ireland et al., 1984; Farrar and Bertoldi, 1988; Bertoldi et al., 1991; Galloway and Riley, 1999).

Land subsidence is a prevalent issue in the Delta-Mendota Subbasin as it has impacted prominent infrastructure of statewide importance, namely the DMC and the California Aqueduct, as well as local canals, causing serious operational, maintenance, and construction-design issues (Sneed et al., 2013). Reduced freeboard and flow capacity for the DMC and California Aqueduct have rippling effects on imported water availability throughout the State. Even small amounts of subsidence in critical locations, especially where canal gradients are small, can impact canal operations (Sneed and Brandt, 2015). While some subsidence is reversible (referred to as elastic subsidence), inelastic or irreversible subsidence is caused mainly by pumping groundwater from below the Corcoran Clay, thus causing compaction and reducing storage in the fine-grained materials in the lower confined aquifer as well as damaging well infrastructure. As a result, important and extensive damages and repairs have resulted in the loss of conveyance capacity in canals that deliver water or remove floodwaters, the realignment of canals as their constant gradient becomes variable, the raising of infrastructure such as canal check stations, and the releveling of furrowed fields.

Available Data

There are six UNAVCO Continuous GPS (CGPS) locations that monitor subsidence within the Delta-Mendota Subbasin (**Figure CC-51**). Changes in land surface elevation have also been measured at DMC Check Structures. **Figure CC-52** through **Figure CC-57** show the vertical change in land surface elevation from a given time point (specified on charts) for the UNAVCO CGPS stations within the Delta-Mendota Subbasin, along with annual CVP allocations. **Table CC-5** summarizes the greatest monthly land subsidence rate and corresponding year(s) of that change at each UNAVCO CGPS station. Overall, the greatest monthly subsidence rates occurring after January 1, 2015 occurred during the Spring of 2016 to the Spring of 2017. Land subsidence rates (in feet per year), as measured by USBR from December 2011 to December 2014, are shown in **Figure CC-58**. Based on these data, within the majority of the Delta-Mendota Subbasin, annual subsidence rates were between -0.15 and -0.3 feet/year during this period (or between -0.45 and -0.9 feet of total subsidence over this three-year period).

Table CC-5: Subsidence Monitoring Trends
UNAVCO CGPS Stations

Station ID	Greatest Monthly Land Subsidence Rate as of January 1, 2015 (feet)	Year(s) of Greatest Monthly Subsidence Rate
P255	-0.0292	Spring 2016 to 2017
P259	-0.0183	Spring 2016 to 2017
P252	-0.033	Spring 2016 to 2017
P303	-0.2190	Spring 2016 to 2017
P301	-0.0029	Spring 2016 to 2017
P304	-0.0003	Spring 2013 to 2017

Historic Conditions

Along the DMC, in the northern portion of the San Joaquin Valley, extensive groundwater extraction from unconsolidated deposits caused subsidence exceeding 8.5 meters (or about 28 feet) between 1926 and 1970 (Poland et al., 1975), reaching 9 meters (or about 30 feet) in 1980 (Ireland, 1986). Land subsidence from groundwater pumping began in the San Joaquin Valley in the mid-1920s (Poland et al., 1975; Bertoldi et al., 1991; Galloway and Riley, 1999), and by 1970, about half of the San Joaquin Valley had land subsidence of more than 0.3 meters (or about 1 foot) (Poland et al., 1975). When groundwater pumping decreased in the Delta-Mendota Subbasin following imported water deliveries from the CVP via the DMC in the early 1950s, compaction rates were reduced in certain areas and water levels recovered. Notable droughts of 1976-1977 and 1987-1992 saw renewed compaction during these periods, with increased groundwater pumping as imported supplies were reduced or unavailable. However, following these droughts, compaction virtually ceased, and groundwater levels rose to near pre-drought levels quite rapidly (Swanson, 1998; Galloway et al., 1999).

Subsidence contours for 1926-1970 (Poland et al., 1975) show the area of maximum active subsidence was southwest of the community of Mendota. Historical subsidence rates in the Mendota area exceeded 500 millimeters/year (or about 20 inches/year) during the mid-1950s and early 1960s (Ireland et al., 1984). The area southwest of Mendota has experienced some of the highest levels of subsidence in California, where from 1925 to 1977, this area sustained over 29 feet of subsidence (USGS, 2017). Historical subsidence rates along Highway 152 calculated from leveling-survey data from 1972, 1988, and 2004 show that for the two 16-year periods (1972-1988 and 1988-2004), maximum subsidence rates of about 50 millimeters/year (or about 2 inches/year) were found just south of El Nido (Sneed et al., 2013). Geodetic surveys completed along the DMC in 1935, 1953, 1957, 1984, and annually from 1996-2001 indicated that subsidence rates were greatest between 1953 and 1957 surveys, and that the maximum subsidence along the DMC (about 3 meters, or about 10 feet) was just east of DMC Check Structure Number 18.

After 1974, land subsidence was demonstrated to have slowed or largely stopped (DWR, June 2017); however, land subsidence remained poised to resume under certain conditions. Such an example includes the severe droughts that occurred between 1976 and 1977 and between 1987 and 1991. Those droughts, along with other corroborating factors, led to diminished deliveries of imported water which prompted some water agencies and farmers (especially in the western Valley) to refurbish old pumps, drill new water wells, and begin pumping groundwater to make up for cutbacks in the imported water supply. The decisions to renew groundwater pumping were encouraged by the fact that groundwater levels had recovered to near-predevelopment levels. CGPS data collected between 2007 to 2014 show seasonally variable subsidence and compaction rates, including uplift as elastic rebound occurs during the fall and winter (Sneed and Brandt, 2015). Vertical displacement at P303, near Los Banos, indicates subsidence at fairly consistent rates during and between drought periods (Sneed and Brandt, 2015). Vertical displacement at P304, near Mendota, indicates that most subsidence occurred during drought periods with very little occurring between drought periods. Finally, data from extensometers 12S/12E-16H2, located on the DMC west of Los Banos, and 14S/13E-11D6, located between the DMC and California Aqueduct west of Mendota, showed subsidence rate increases during 2014, the third year of the most recent drought (Sneed and Brandt, 2015).

Subsidence impacts to the California Aqueduct, which runs parallel and in close proximity to the Delta-Mendota Canal across the Subbasin, is of statewide importance. During the construction of the California Aqueduct, it was thought that subsidence within the San Joaquin Valley would cease with the delivery of water from the Central Valley Project, though additional freeboard was incorporated into the design and construction of the Aqueduct in an attempt to mitigate for future subsidence (DWR, June 2017). After water deliveries from the Aqueduct began, subsidence rates decreased to an average of less than 0.1 inches/year during normal to wet hydrologic years. During dry to critical hydrologic years, subsidence increased to an average of 1.1 inches per year. The 2012-2015 drought produced subsidence similar to those seen before the Aqueduct began delivering water, with some areas experiencing nearly 1.25 inches of sinking per month (based on NASA UAVSAR flight measurements). Dry and critically dry water years since Aqueduct deliveries began have resulted in extensive groundwater withdrawals, causing some areas near the Aqueduct to subside nearly 6 feet.

Current Conditions

Based on subsidence rates observed over the last decade, it is anticipated that without mitigation, subsidence will continue to impact operations of the DMC and California Aqueduct. For example, recently, Reach 4A of the San Joaquin River near Dos Palos experienced between 0.38 and 0.42 feet/year in subsidence between 2008 and 2016. As a result of subsidence, freeboard in Reach 4A is projected to be reduced by 0.5 foot by 2026 as compared to 2016, resulting in a 50 percent reduction in designed flow capacity (DWR, May 2018). Reduced flow capacities in the California Aqueduct will impact deliveries and transfers throughout the State and result in the need to pump more groundwater, thus contributing to further subsidence.

More recent subsidence measuring indicates subsidence hot spots within the Subbasin include the area east of Los Banos and the Tranquillity Irrigation District (TRID) area. USGS began periodic measurements of the land surface in parts of the San Joaquin Valley over the last decade. Between December 2011 and December 2014, total subsidence in the area east of Los Banos, located within the Merced Subbasin (also referred to as the El Nido-Red Top area), over the three-year period ranged from 0.15 to 0.75 feet, or 1.8 to 9 inches respectively (KDSA, 2015). The Jet Propulsion Laboratory (JPL) at the California Institute of Technology has also been monitoring subsidence in California using interferometric synthetic aperture radar (or InSAR), and a recent progress report documenting data for the period from May of 2015 to September of 2016 indicates that the two previously-identified primary subsidence areas near the community of Corcoran and centered on El Nido was joined by a third area of significant subsidence near TRID. For the study period (as shown in **Figure CC-59**), maximum total subsidence of 22 inches was measured near Corcoran, while the El Nido area subsided 15 inches and the TRID area subsided around 20 inches. Analyses at two particular stations near El Nido show interesting trends. At Station P303, between 2007 and 2014, 50 mm (or nearly 2 inches) of subsidence occurred at this location. Vertical displacement at P303 (**Figure CC-55**) show subsidence at fairly consistent rates during and between drought periods, indicating that these areas continued to pump groundwater despite climatic variations (possibly due to a lack of surface water availability) (Sneed and Brandt, 2015). Residual compaction may also be a factor. Vertical displacement at Station P304 indicated that most subsidence in this particular area occurred during drought periods and very little occurred between drought periods (**Figure CC-57**). This suggests that this area received other sources of water (most likely surface water available between drought periods) and that residual compaction was not very important in this area. These two areas demonstrate a close link between the availability of surface water, groundwater pumping, and inelastic land subsidence.

Total land subsidence from April 2015 to April 2016 in the San Joaquin Valley is shown in

Figure CC-60: Vertical Displacement, April 2015 to April 2016 . Subsidence monitoring in the Delta-Mendota Subbasin, and in the San Joaquin Valley as a whole, demonstrated significant inelastic land subsidence as a result of the last drought, with effects continuing to the present time (as evidenced by continued subsidence between 2016 and 2018 through surveys of the DMC). While the impacts appeared to have slowed, the temporal and spatial impacts of continued subsidence have not yet been evaluated.

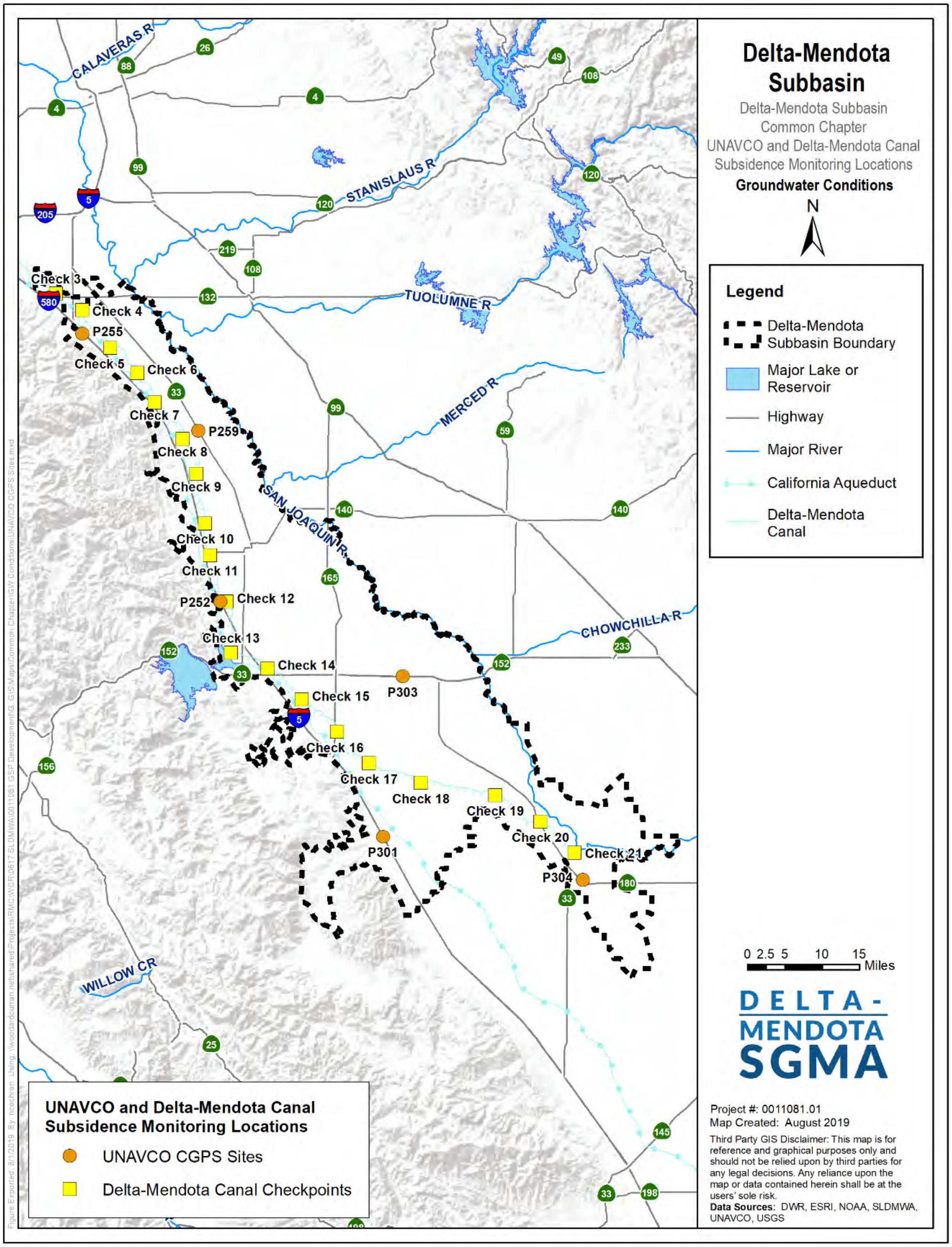


Figure CC-51: UNAVCO and Delta-Mendota Canal Subsidence Monitoring Locations

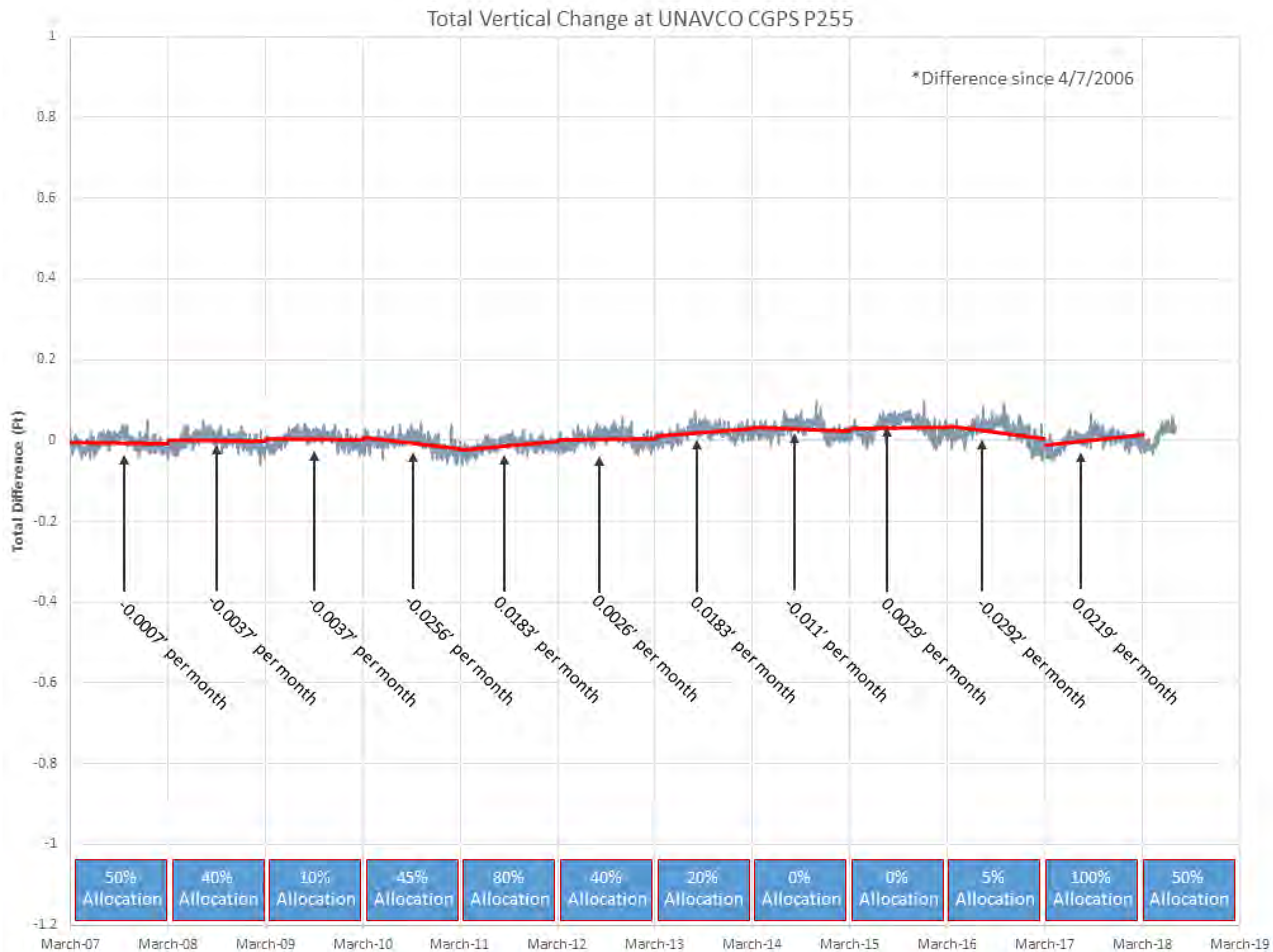


Figure CC-52: Vertical Elevation Change at UNAVCO CGPS P255, Spring 2007 to 2018

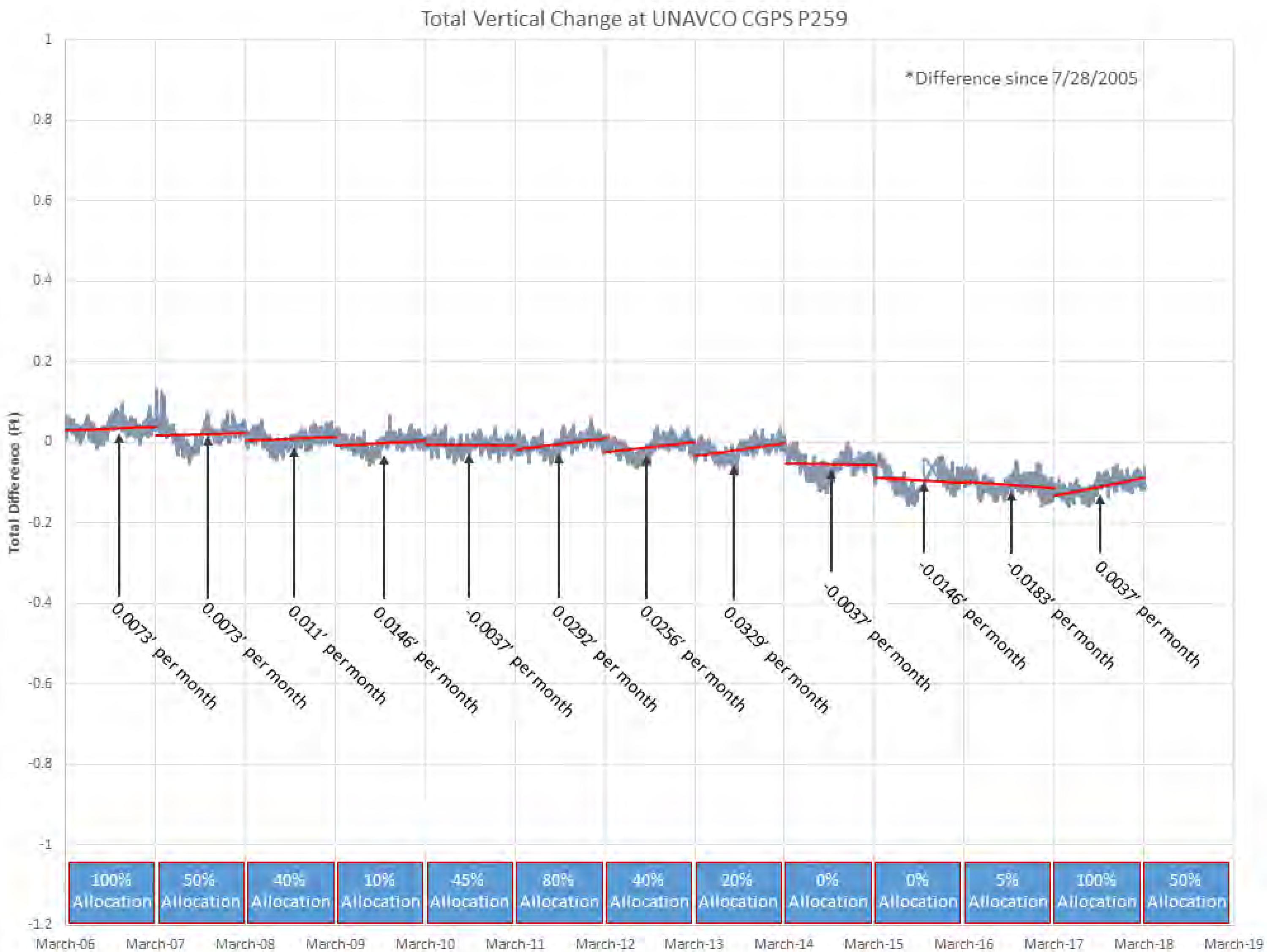


Figure CC-53: Vertical Elevation Change at UNAVCO CGPS P259, Spring 2006 to 2018

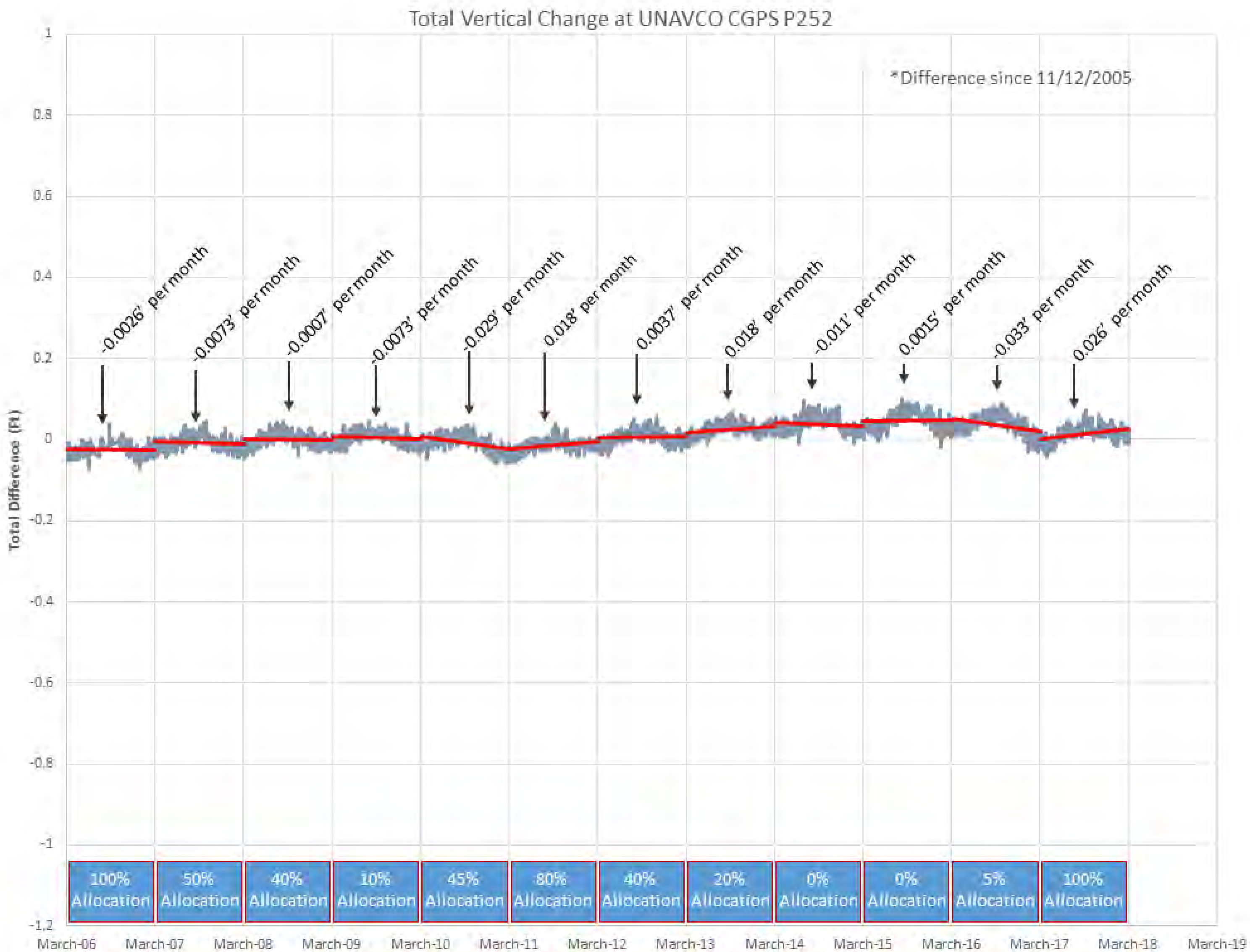


Figure CC-54: Vertical Elevation Change at UNAVCO CGPS P252, Spring 2006 to 2018

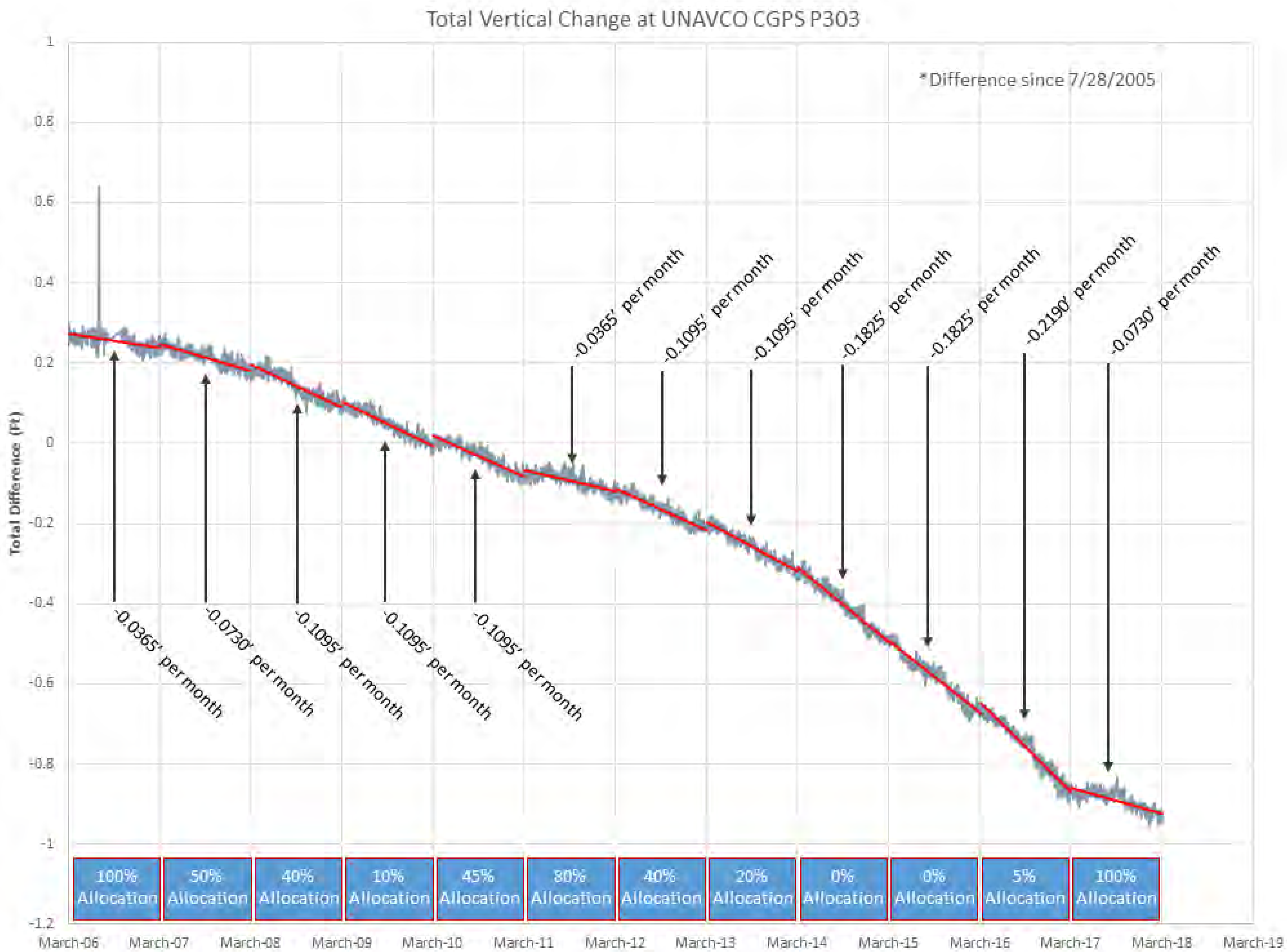


Figure CC-55: Vertical Elevation Change at UNAVCO CGPS P303, Spring 2006 to 2018

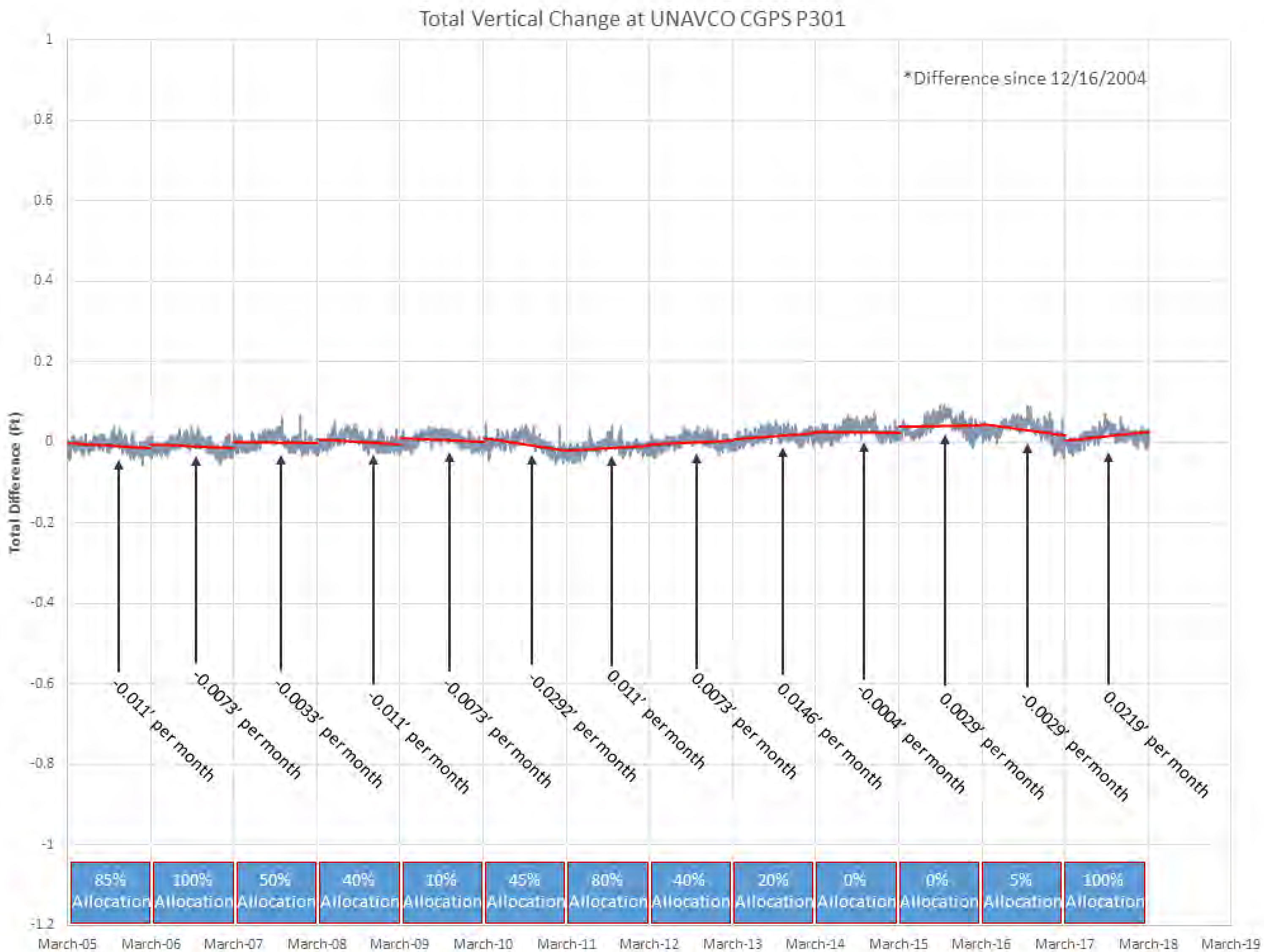


Figure CC-56: Vertical Elevation Change at UNAVCO CGPS P301, Spring 2005 to 2018

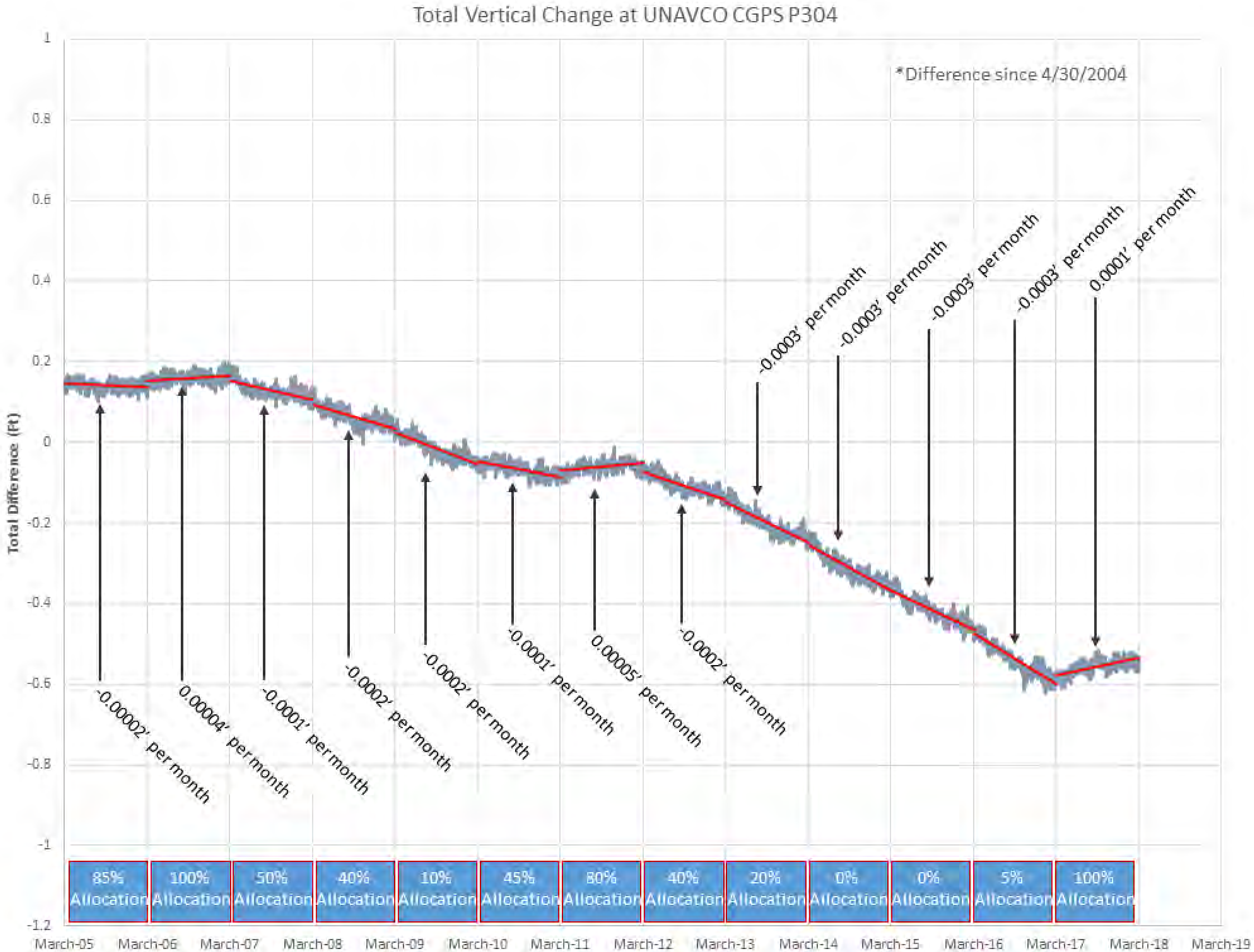


Figure CC-57: Vertical Elevation Change at UNAVCO CGPS P304, Spring 2005 to 2018

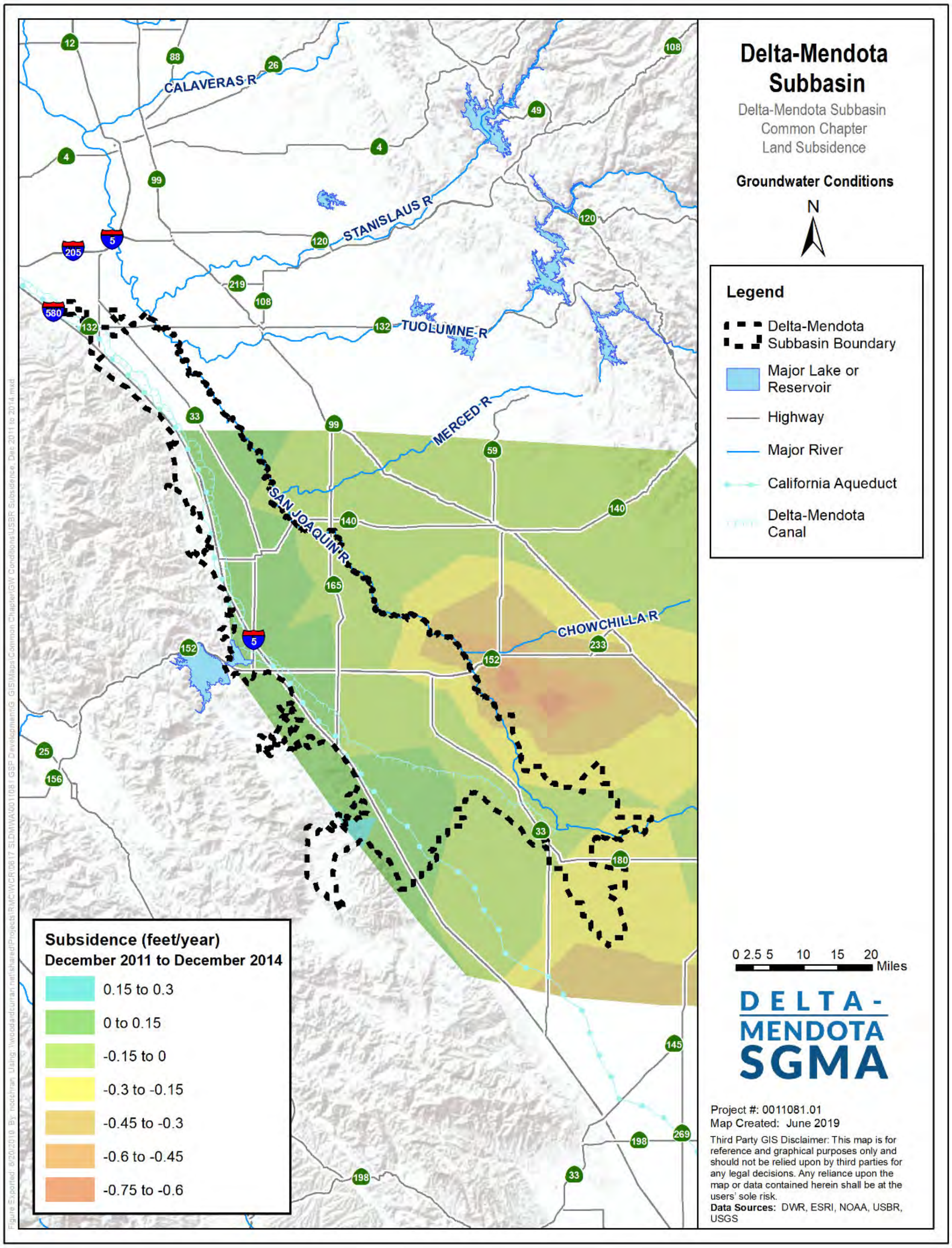


Figure CC-58: Land Subsidence, December 2011 to December 2014

Source: Progress Report: Subsidence in California, March 2015 – September 2016, Farr et. Al. JPL, 2017

Figure CC-59: Recent Land Subsidence at Key San Joaquin Valley Locations

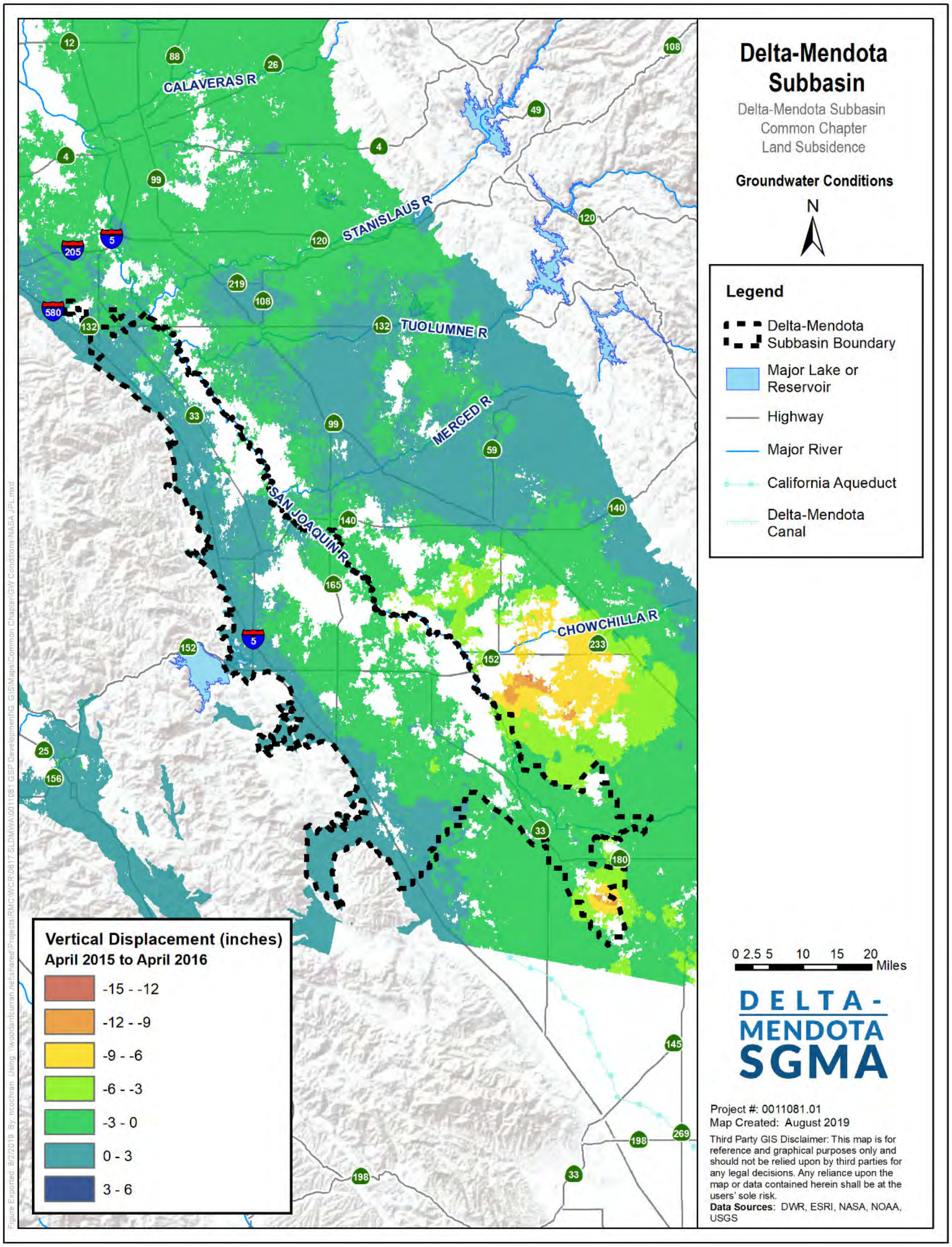


Figure CC-60: Vertical Displacement, April 2015 to April 2016

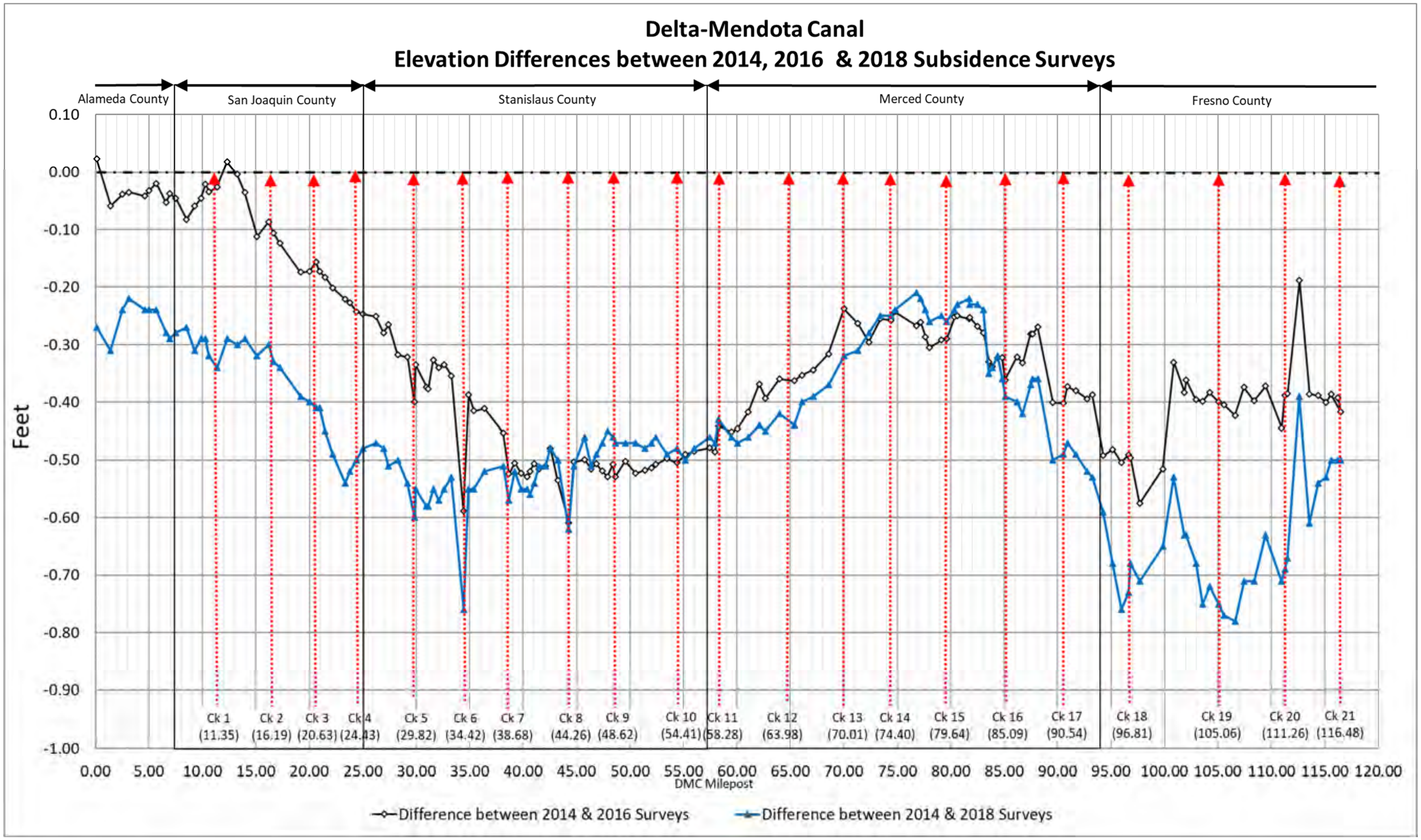


Figure CC-61: Elevation Change along the Delta-Mendota Canal, 2014 through 2018

4.2.7 Interconnected Surface Water Systems

Understanding the location, timing and magnitude of groundwater pumping impacts on interconnected surface water systems is important for the proper management of groundwater resources in order to minimize impacts on interconnected surface waters and the biological communities and permitted surface water diverters that rely on those resources. Historically, throughout the San Joaquin Valley, many interconnected stream reaches have transitioned from net-gaining to net-losing streams (TNC, 2014). Gaining streams occur when streamflows increase as a result of groundwater contribution and losing streams occur when streamflows decrease due to infiltration into the bed of the stream (McBain & Trush, Inc., 2002). Increased groundwater pumping has the ability to contribute to the depletion of interconnected waters with the nature, rate, and location of increased pumping being a function of distance to the river, as well as depth, timing, and rate of groundwater pumping.

Available Data

Two communities in the Delta-Mendota Subbasin are likely most vulnerable to the loss of interconnected surface water as a result of groundwater pumping: San Joaquin River surface water diverters and groundwater dependent ecosystems (GDEs). These communities represent the primary beneficial users of interconnected surface water and groundwater. Streams stemming from the west side of the Delta-Mendota Subbasin are ephemeral in nature, and only two of these creeks reach the San Joaquin River (Del Puerto Creek and Orestimba Creek). These creeks lose their flows to the underlying vadose zone (net-losing streams) and therefore do not represent areas of potential GDEs.

Groundwater dependent ecosystems are defined under Article 2 Definitions, § 351 Definitions of the GSP Emergency Regulations as “ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface.” The Natural Communities Commonly Associated with Groundwater (NCCAG) dataset (2018) provided by DWR in conjunction with The Nature Conservancy (TNC) was initially used to identify GDEs within the Delta-Mendota Subbasin, following the associated guidance document provided by TNC (Rohde et al., 2018). Local verification efforts were conducted in the Delta-Mendota Subbasin by different GSA representatives to ground-truth GDEs based on local knowledge. Specifically, areas where natural communities have been urbanized or otherwise modified prior to 2015 were eliminated from the data set used to identify GDEs.

Identification of Interconnected Surface Water Systems

The San Joaquin River and Fresno Slough are the primary surface water bodies interconnected with Delta-Mendota Subbasin groundwater. For information about the sources used to determine the interconnected segments of the San Joaquin River and Fresno Slough within the Delta-Mendota Subbasin, refer to the individual GSPs.

Historic Conditions

The San Joaquin River and its tributaries drain approximately 13,500 mi^2 (measured at the USGS gaging station at Vernalis) along the western flank of the Sierra Nevada and eastern flank of the Coast Range, and flows northward into the Sacramento-San Joaquin Delta where it is joined by the Calaveras and Mokelumne Rivers before combining with the Sacramento River. Typical of Mediterranean climate catchments, river flows vary widely seasonally and from year to year. Three major tributaries join the San Joaquin from the east: the Merced, Tuolumne, and Stanislaus Rivers. Smaller tributaries include the Fresno River, Chowchilla River, Bear Creek, and Fresno Slough (from the Kings River). Precipitation is predominantly snow above about 5,500 to 6,000 feet in the Sierra Nevada, with rain in the middle and lower elevations of the Sierra foothills and in the Coast Range. As a result, the natural hydrology historically reflected a mixed runoff regime dominated by winter-spring rainfall runoff and spring-summer snowmelt runoff. Most flow is derived from snowmelt from the Sierra Nevada, with relatively little runoff contributed from the western side of the drainage basin in the rain shadow of the Coast Range. The unimpaired average annual water yield (WY1906-2002) of the San Joaquin River, as measured immediately above Millerton Reservoir, is 1,801,000 acre-feet (USBR, 2002); the post-Friant Dam average annual water yield (WY 1950-2000) to the lower San Joaquin River is 695,500 acre-feet (USGS, 2000). As average precipitation decreases from north to south, the San Joaquin River basin (including the Stanislaus, Tuolumne, and Merced Rivers) contributes about 22% of the total runoff to the Delta (DWR, 1998).

Current Conditions

Historically, most of the San Joaquin River, which forms the great majority of the Delta-Mendota Subbasin's eastern border, was a gaining reach. Snowmelt runoff during the spring and early summer resulted in these conditions through a good portion of the year. However, significant decreases in groundwater elevations due to a myriad of factors, including pumping, tile drains, the channelizing of flood flows, and upstream diversions on the river, have reversed this condition so most reaches are now losing reaches. Some localized gaining reaches still remain on the lower river, such as between the Stanislaus and Merced Rivers; however, many reaches along these rivers (and along localized streams) may transition from gaining to losing depending on hydrology.

Estimates of Timing and Quantity of Depletions

Using available data and where feasible, each Delta-Mendota Subbasin GSP Group quantified the gains and/or losses from the groundwater at each interconnected reach of the San Joaquin River adjoining the Delta-Mendota Subbasin. **Table CC-6** summarizes these estimates. For more information about the sources or methods used to estimate the timing and quantity of depletions, refer to the individual GSPs.

Table CC-6: Estimated Quantity of Gains/Depletions for Interconnected Stream Reaches, San Joaquin River

	Landmark	River Mile	GSP Group	Interconnected?	Gaining or Losing?	Quantity Gained/Loss (cfs)	Notes
REACH 1		*267.5 to 229.0*	Located outside the Delta-Mendota Subbasin				
A	Friant Dam	267.5					
	North Fork Road Bridge	266.8					
	Cobb Island Bridge	259.0					
	State Route 41 (Lanes Bridge)	255.2					
	Scout Island Bend	250.0					
	ATSF Railroad Bridge	245.0					
B	State Route 99	243.2					
	Southern Pacific Railroad	243.2					
	State Route 145 Bridge (Skaggs Bridge)	234.1					
	Gravelly Ford	229.0					
REACH 2		*229.0 to 204.8*					
A	Gravelly Ford	229.0		Yes	Losing when flowing		
	Upstream Limit of Right Bank Levee	227.0					
	Upstream Limit of Left Bank Levee	225.0					
B	Chowchilla Bypass Control Structure	216.1	Farmers Water District	Yes	Losing when flowing	-4	2003 to 2013 average. High in 2010 (-8 cfs), low in 2004 and 2009 (-1 cfs)
	Mendota Dam	204.8					
	Mendota Pool			Yes	Losing	-40	-29,000 AFY
REACH 3		*204.8 to 182.0*		Yes	Losing	-25	-18.000 AFY
	Mendota Dam	204.8					
	Avenue 7.5 Bridge (Firebaugh)	195.2					
	Sack Dam	182.0					
REACH 4		*182.0 to 135.8*				-–0 - 0	Losses when wet; gaining in some areas (but unquantifiable)
A	Sack Dam	182.0		Y–s - first 2 miles –o - next 1.5 miles Y–s - remaining miles	Losing		
	State Route 152 Bridge	173.9		Yes	Gaining		
B	Sand Slough Control Structure	168.5					
	Mariposa Slough Control Structure	168.4					
	Turner Island Road Bridge	157.2					
	Mariposa Bypass confluence	147.2					

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Landmark	River Mile	GSP Group	Interconnected?	Gaining or Losing?	Quantity Gained/Loss (cfs)	Notes
Bear Creek/Eastside Bypass confluence	135.8					
REACH 5	*135.8 to 118.0*		Yes	Gaining	unquantifiable	Likely gaining from ag/refuge draining but unquantifiable
Bear Creek/Eastside Bypass confluence	135.8					
State Route 165 Bridge (Lander Avenue)	132.9					
Salt Slough con fluence	127.7					
State Route 140 Bridge (Fremont Ford)	125.1					
Mud Slough confluence	121.2					
Merced River confluence (Hills Ferry Bridge)	118.0					
Newman to Crows Landing		Northern & Central Delta-Mendota	Yes	Gaining	50	50
Crows Landing to Patterson		Northern & Central Delta-Mendota Region	Yes	Gaining	-50 to 200	-50 to 200
Patterson to Vernalis		Northern & Central Delta-Mendota Region	Yes	Gaining	190	6.1 cfs/mi for 30.8 miles. Based on Cooley, W. 2001. *Groundwater flow net analysis for lower San Joaquin River Basin.* Memo to CRWQCB, August 8, 2001

Groundwater Dependent Ecosystems

A groundwater dependent ecosystem (GDE) is defined under the GSP Emergency Regulations as referring "to ecological communities or species that depend on groundwater emerging from aquifers or on groundwater occurring near the ground surface" (§351(m)). Under §354.16(g) of the GSP Emergency Regulations, each Plan is required to identify GDEs within the subbasin utilizing data provided by DWR or the best available information. The following section describes the process for verifying GDEs within the Delta-Mendota Subbasin and the location of verified and potential GDEs.

The Natural Communities Commonly Associated with Groundwater (NCCAG) dataset (2018c) provided by DWR was used in conjunction with information provided by The Nature Conservancy (TNC) to identify GDEs within the Delta-Mendota Subbasin. To further screen available information regarding GDEs, each GSP Group developed individualized criteria. Additional details regarding the screening process implemented by each GSP can be found in the individual GSPs.

Based on the screening process implemented by each individual GSP Group, GDE polygons determined not to be GDEs were removed from the mapping. **Figure CC-62** and **Figure CC-63** summarize the results of the GDE analysis for the Subbasin. Results are compiled into two habitat classes: wetlands (**Figure CC-62**) and vegetation (**Figure CC-63**). Wetland features are commonly associated with surface expression of groundwater under natural, unmodified conditions. Vegetation feature types are commonly associated with the sub-surface presence of groundwater (phreatophytes – deep rooted plants). Confirmed GDEs have been grouped into larger polygons based on proximity and aquifer connection.

In general, identified Possible GDEs are primarily located along the San Joaquin River corridor, within the northern portion of the Northern & Central Delta-Mendota Region GSP, the SJREC GSP, the Grassland GSP, and the Fresno GSP Plan Areas, where some possible GDEs have been identified along ephemeral streams that originate from the Coast Range. Table CC-7 includes all freshwater species within the Delta-Mendota Subbasin as identified by TNC (2018). Per TNC data, these species (listed in Table CC-7) have either been observed or have the potential to exist within the Delta-Mendota Subbasin; however, the actual presence of these species have not been verified. As a result of the identification of Possible GDEs for the purpose of SGMA, no land use protections for GDEs are conveyed unless otherwise required. Additionally, the Delta Mendota Subbasin recognizes the opportunity to present further-refined GDE delineations in the subsequent GSP Updates.

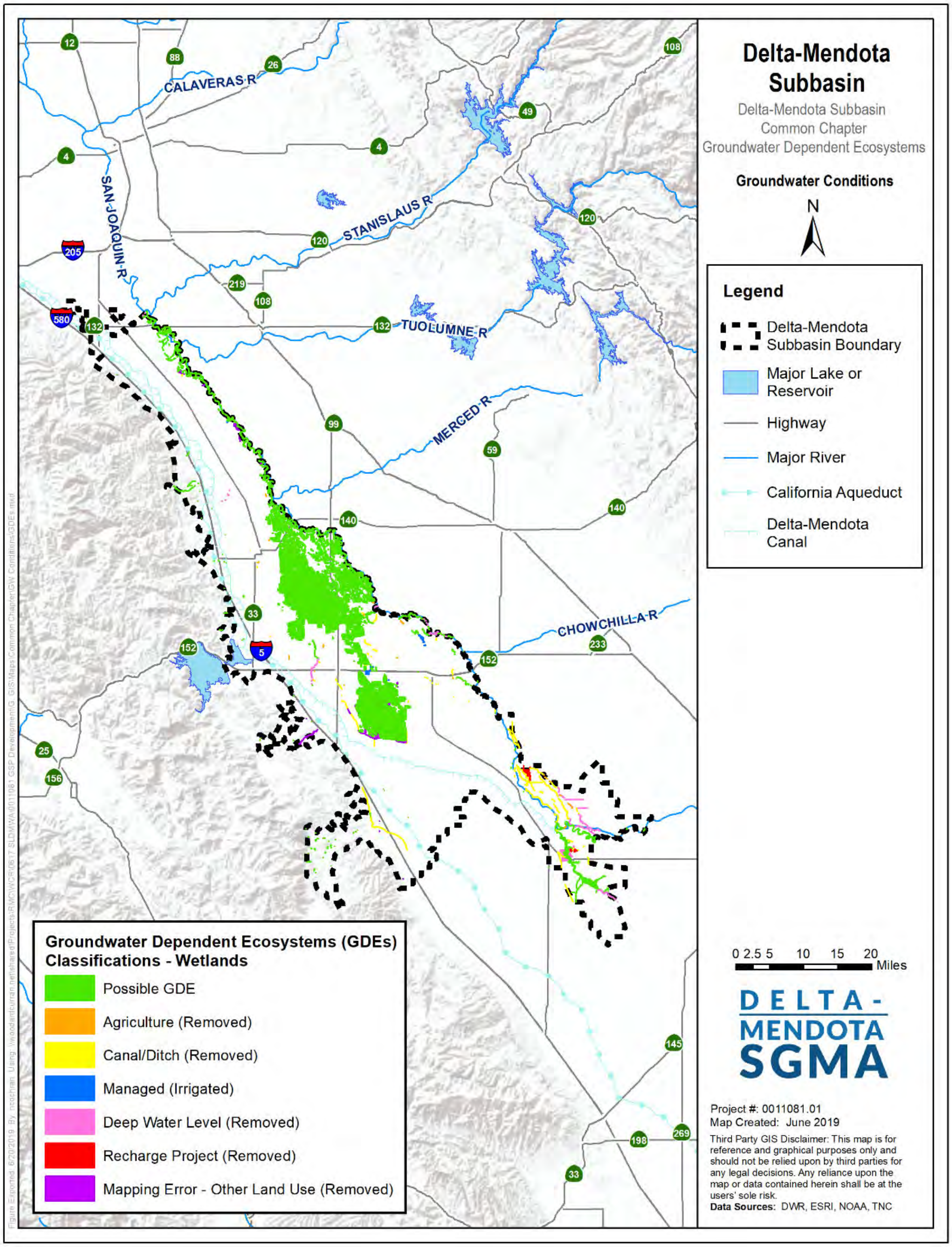

Figure CC-62: Groundwater Dependent Ecosystems, Wetlands

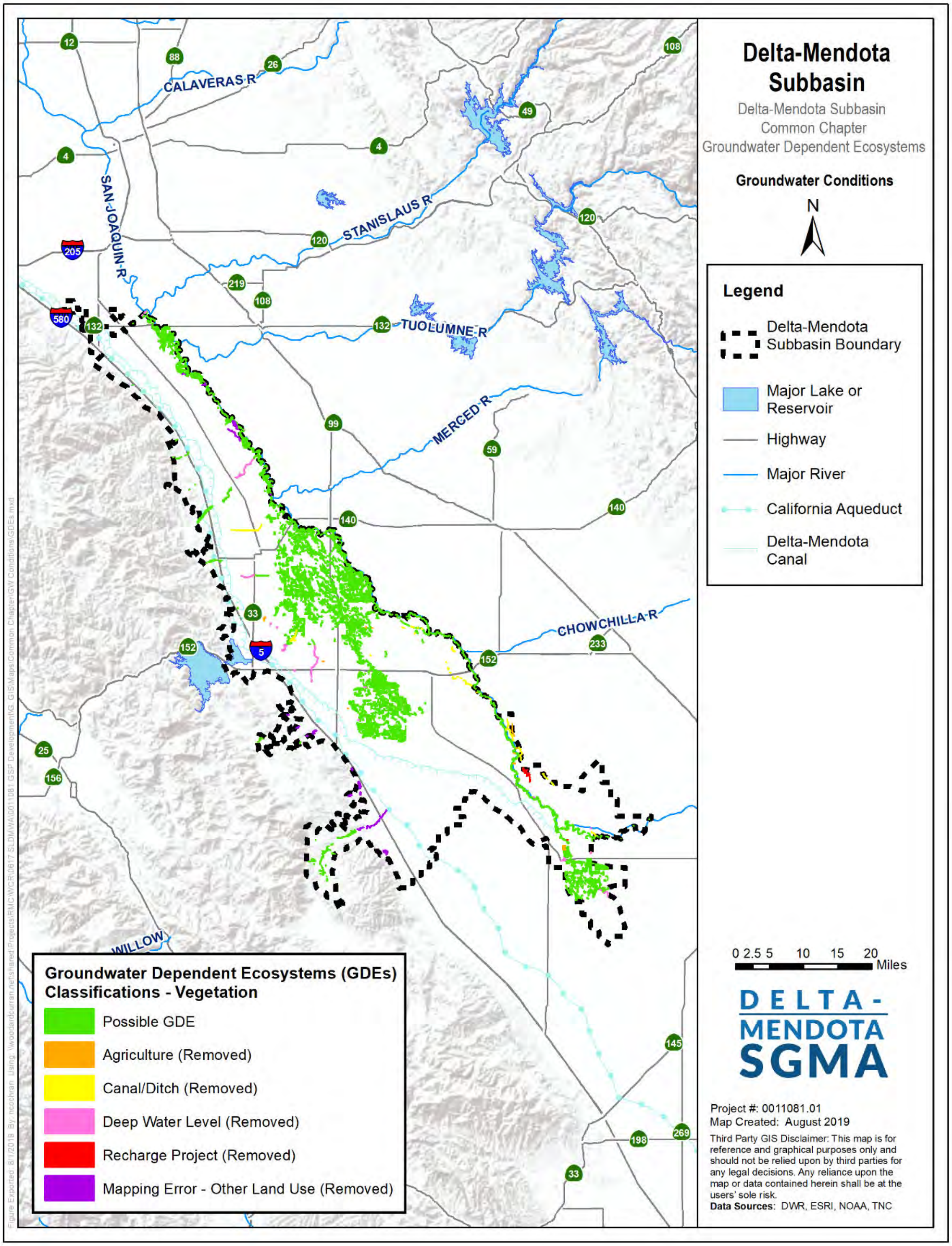

Figure CC-63: Groundwater Dependent Ecosystems, Vegetation

Table CC-7: List of Potential Freshwater Species

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Actitis macularius	Spotted Sandpiper	Birds		
Aechmophorus clarkii	Clark's Grebe	Birds		
Aechmophorus occidentalis	Western Grebe	Birds		
Agelaius tricolor	Tricolored Blackbird	Birds	Bird of Conservation Concern	Special Concern
Aix sponsa	Wood Duck	Birds		
Anas acuta	Northern Pintail	Birds		
Anas americana	American Wigeon	Birds		
Anas clypeata	Northern Shoveler	Birds		
Anas crecca	Green-winged Teal	Birds		
Anas cyanoptera	Cinnamon Teal	Birds		
Anas discors	Blue-winged Teal	Birds		
Anas platyrhynchos	Mallard	Birds		
Ariescriser albifrons	Greater White-fronted Goose	Birds		
Ardea alba	Great Egret	Birds		
Ardea herodias	Great Blue Heron	Birds		
Aythya affinis	Lesser Scaup	Birds		
Aythya americana	Redhead	Birds		Special Concern
Aythya collaris	Ring-necked Duck	Birds		
Aythya marila	Greater Scaup	Birds		
Aythya valisineria	Canvasback	Birds		Special
Botaurus lentiginosus	American Bittern	Birds		
Bucephala albeola	Bufflehead	Birds		
Bucephala clangula	Common Goldeneye	Birds		
Butorides virescens	Green Heron	Birds		
Calidris alpina	Dunlin	Birds		
Calidris mauri	Western Sandpiper	Birds		
Calidris minutilla	Least Sandpiper	Birds		
Chen caerulescens	Snow Goose	Birds		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Chen rossii	Ross's Goose	Birds		
Chlidonias niger	Black Tern	Birds		Special Concern
Chroicocephalus philadelphia	Bonaparte's Gull	Birds		
Cistothorus palustris	Marsh Wren	Birds		
Cygnus columbianus	Tundra Swan	Birds		
Cypseloides niger	Black Swift	Birds	Bird of Conservation Concern	Special Concern
Dendrocygna bicolor	Fulvous Whistling-Duck	Birds		Special Concern
Egretta thula	Snowy Egret	Birds		
Empidonax traillii	Willow Flycatcher	Birds	Bird of Conservation Concern	Endangered
Fulica americana	American Coot	Birds		
Gallinago delicata	Wilson's Snipe	Birds		
Gallinula chloropus	Common Moorhen	Birds		
Geothlypis trichas	Common Yellowthroat	Birds		
Grus canadensis	Sandhill Crane	Birds		
Haliaeetus leucocephalus	Bald Eagle	Birds	Bird of Conservation Concern	Endangered
Himantopus mexicanus	Black-necked Stilt	Birds		
Icteria virens	Yellow-breasted Chat	Birds		Special Concern
Limnodromus scolopaceus	Long-billed Dowitcher	Birds		
Lophodytes cucullatus	Hooded Merganser	Birds		
Megaceryle alcyon	Belted Kingfisher	Birds		
Mergus merganser	Common Merganser	Birds		
Mergus serrator	Red-breasted Merganser	Birds		
Numenius americanus	Long-billed Curlew	Birds		
Numenius phaeopus	Whimbrel	Birds		
Nycticorax	Black-crowned Night-Heron	Birds		
Oxyura jamaicensis	Ruddy Duck	Birds		
Pandion haliaetus	Osprey	Birds		Watch list
Pelecanus erythrorhynchos	American White Pelican	Birds		Special Concern

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Phalacrocorax auritus	Double-crested Cormorant	Birds		
Phalaropus tricolor	Wilson's Phalarope	Birds		
Plegadis chihi	White-faced Ibis	Birds		Watch list
Pluvialis squatarola	Black-bellied Plover	Birds		
Podiceps nigricollis	Eared Grebe	Birds		
Podilymbus podiceps	Pied-billed Grebe	Birds		
Porzana carolina	Sora	Birds		
Rallus limicola	Virginia Rail	Birds		
Recurvirostra americana	American Avocet	Birds		
Riparia	Bank Swallow	Birds		Threatened
Setophaga petechia	Yellow Warbler	Birds		
Tachycineta bicolor	Tree Swallow	Birds		
Tringa melanoleuca	Greater Yellowlegs	Birds		
Tringa semipalmata	Willet	Birds		
Tringa solitaria	Solitary Sandpiper	Birds		
Vireo bellii	Bell's Vireo	Birds		
Vireo bellii pusillus	Least Bell's Vireo	Birds	Endangered	Endangered
Xanthocephalus	Yellow-headed Blackbird	Birds		Special Concern
Artemia franciscana	San Francisco Brine Shrimp	Crustaceans		
Branchinecta conservatio	Conservancy Fairy Shrimp	Crustaceans	Endangered	Special
Branchinecta lindahli	Versatile Fairy Shrimp	Crustaceans		
Branchinecta longiantenna	Longhorn Fairy Shrimp	Crustaceans	Endangered	Special
Branchinecta lynchi	Vernal Pool Fairy Shrimp	Crustaceans	Threatened	Special
Lepidurus packardi	Vernal Pool Tadpole Shrimp	Crustaceans	Endangered	Special
Linderiella occidentalis	California Fairy Shrimp	Crustaceans		Special
Oncorhynchus myki–s - CV	Central Valley steelhead	Fishes	Threatened	Special
Oncorhynchus mykiss irideus	Coastal rainbow trout	Fishes		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Pogonichthys macrolepidotus	Sacramento splittail	Fishes		Special Concern
Actinemys marmorata	Western Pond Turtle	Herps		Special Concern
Ambystoma californiense	California Tiger Salamander	Herps	Threatened	Threatened
Anaxyrus boreas	Boreal Toad	Herps		
Pseudacris regilla	Northern Pacific Chorus Frog	Herps		
Rana boylii	Foothill Yellow-legged Frog	Herps	Under Review in the Candidate or Petition Process	Special Concern
Rana draytonii	California Red-legged Frog	Herps	Threatened	Special Concern
Spea hammondii	Western Spadefoot	Herps	Under Review in the Candidate or Petition Process	Special Concern
Thamnophis atratus	Santa Cruz Gartersnake	Herps		
Thamnophis elegans	Mountain Gartersnake	Herps		
Thamnophis gigas	Giant Gartersnake	Herps	Threatened	Threatened
Thamnophis hammondii	Two-striped Gartersnake	Herps		Special Concern
Thamnophis sirtalis	Common Gartersnake	Herps		
Aeshnidae fam.	Aeshnidae fam.	Insects & other inverts		
Anax junius	Common Green Darner	Insects & other inverts		
Brillia spp.	Brillia spp.	Insects & other inverts		
Callicorixa spp.	Callicorixa spp.	Insects & other inverts		
Capnia hitchcocki	Arroyo Snowfly	Insects & other inverts		
Chironomus spp.	Chironomus spp.	Insects & other inverts		
Coenagrionidae fam.	Coenagrionidae fam.	Insects & other inverts		
Corisella spp.	Corisella spp.	Insects & other inverts		
Cricotopus spp.	Cricotopus spp.	Insects & other inverts		
Ischnura cervula	Pacific Forktail	Insects & other inverts		
Ischnura denticollis	Black-fronted Forktail	Insects & other inverts		
Mesocapnia bulbosa	Bulbous Snowfly	Insects & other inverts		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Paraleptophlebia associata	A Mayfly	Insects & other inverts		
Paratanytarsus spp.	Paratanytarsus spp.	Insects & other inverts		
Phaenopsectra spp.	Phaenopsectra spp.	Insects & other inverts		
Procladius spp.	Procladius spp.	Insects & other inverts		
Psectrocladius spp.	Psectrocladius spp.	Insects & other inverts		
Tanypus spp.	Tanypus spp.	Insects & other inverts		
Tipulidae fam.	Tipulidae fam.	Insects & other inverts		
Trichocorixa spp.	Trichocorixa spp.	Insects & other inverts		
Castor canadensis	American Beaver	Mammals		
Lontra canadensis	North American River Otter	Mammals		
Neovison vison	American Mink	Mammals		
Ondatra zibethicus	Common Muskrat	Mammals		
Anodonta californiensis	California Floater	Mollusks		Special
Margaritifera falcata	Western Pearlshell	Mollusks		Special
Pyrgulopsis diablensis	Diablo Range Pyrg	Mollusks		Special
Alopecurus saccatus	Pacific Foxtail	Plants		
Ammannia coccinea	Scarlet Ammannia	Plants		
Anemopsis californica	Yerba Mansa	Plants		
Arundo donax	NA	Plants		
Azolla filiculoides	NA	Plants		
Azolla microphylla	Mexican mosquito fern	Plants		Special
Baccharis salicina		Plants		
Bacopa eisenii	Gila River Water-hyssop	Plants		
Bidens laevis	Smooth Bur-marigold	Plants		
Bolboschoenus glaucus	NA	Plants		
Bolboschoenus maritimus paludosus	NA	Plants		
Callitriche marginata	Winged Water-starwort	Plants		
Ceratophyllum demersum	Common Hornwort	Plants		
Chloropyronmoesclle hispidum		Plants		Special
Chloropyron palmatum	NA	Plants	Endangered	Special

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Cotula coronopifolia	NA	Plants		
Crassula aquatica	Water Pygmyweed	Plants		
Crypsis vaginiflora	NA	Plants		
Cyperus erythrorhizos	Red-root Flatsedge	Plants		
Cyperus squarrosus	Awned Cyperus	Plants		
Downingia bella	Hoover's Downingia	Plants		
Downingia pulchella	Flat-face Downingia	Plants		
Echinodorus berteroi	Upright Burhead	Plants		
Elatine brachysperma	Shortseed Waterwort	Plants		
Elatine californica	California Waterwort	Plants		
Eleocharis acicularis	Least Spikerush	Plants		
Eleocharis atropurpurea	Purple Spikerush	Plants		
Eleocharis coloradoensis		Plants		
Eleocharis macrostachya	Creeping Spikerush	Plants		
Eleocharis montevidensis	Sand Spikerush	Plants		
Eleocharis quadrangulata	NA	Plants		
Elodea canadensis	Broad Waterweed	Plants		
Epilobium cleistogamum	Cleistogamous Spike-primrose	Plants		
Eragrostis hypnoides	Teal Lovegrass	Plants		
Eryngium castrense	Great Valley Eryngo	Plants		
Eryngium racemosum	Delta Coyote-thistle	Plants		Endangered
Eryngium spinosepalum	Spiny Sepaled Coyote-thistle	Plants		Special
Eryngium vaseyi vallicola		Plants		
Eryngium vaseyi	Vasey's Coyote-thistle	Plants		
Euthamia occidentalis	Western Fragrant Goldenrod	Plants		
Hydrocotyle verticillata	Whorled Marsh-pennywort	Plants		
Juncus acuminatus	Sharp-fruit Rush	Plants		
Juncus xiphioides	Iris-leaf Rush	Plants		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Lasthenia ferrisiae	Ferris' Goldfields	Plants		Special
Lasthenia fremontii	Fremont’s Goldfields	Plants		
Lemna aequinoctialis	Lesser Duckweed	Plants		
Lemna gibba	Inflated Duckweed	Plants		
Lemna minor	Lesser Duckweed	Plants		
Lepidium jaredii	Jared’s Peppergrass	Plants		Special
Lepidium oxycarpum	Sharp-pod Peppergrass	Plants		
Limnanthes douglasii	Douglas' Meadowfoam	Plants		
Limosella acaulis	Southern Mudwort	Plants		
Lipocarpha micrantha	Dwarf Bulrush	Plants		
Ludwigia peploides	NA	Plants		
Ludwigia repens	Creeping Seedbox	Plants		
Lythrum californicum	California Loosestrife	Plants		
Marsilea vestita	NA	Plants		
Mimulus cardinalis	Scarlet Monkeyflower	Plants		
Mimulus guttatus	Common Large Monkeyflower	Plants		
Montia fontana	Fountain Miner’s-lettuce	Plants		
Myosurus minimus	NA	Plants		
Myosurus sessilis	Sessile Mousetail	Plants		
Myriophyllum aquaticum	NA	Plants		
Najas guadalupensis	Southern Naiad	Plants		
Navarretia heterandra	Tehama Navarretia	Plants		
Navarretia leucocephala	White-flower Navarretia	Plants		
Navarretia prostrata	Prostrate Navarretia	Plants		Special
Neostapfia colusana	Colusa Grass	Plants	Threatened	Endangered
Panicum dichotomiflorum	NA	Plants		
Paspalum distichum	Joint Paspalum	Plants		
Persicaria hydropiperoides		Plants		
Persicaria lapathifolia		Plants		
Persicaria maculosa	NA	Plants		
Persicaria pensylvanica	NA	Plants		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Phacelia distans	NA	Plants		
Phyla lanceolata	Fog-fruit	Plants		
Phyla nodiflora	Common Frog-fruit	Plants		
Pilularia americana	NA	Plants		
Plagiobothrys acanthocarpus	Adobe Popcorn-flower	Plants		
Plagiobothrys greenei	Greene's Popcorn-flower	Plants		
Plagiobothrys humistratus	Dwarf Popcorn-flower	Plants		
Plagiobothrys leptocladus	Alkali Popcorn-flower	Plants		
Plantago elongata	Slender Plantain	Plants		
Pluchea odorata	Scented Conyza	Plants		
Pogogyne douglasii	NA	Plants		
Pogogyne zizyphoroides		Plants		
Potamogeton diversifolius	Water-thread Pondweed	Plants		
Potamogeton foliosus	Leafy Pondweed	Plants		
Potamogeton nodosus	Longleaf Pondweed	Plants		
Potamogeton pusillus	Slender Pondweed	Plants		
Psilocarphus brevissimus	Dwarf Woolly-heads	Plants		
Psilocarphus oregonus	Oregon Woolly-heads	Plants		
Psilocarphus tenellus	NA	Plants		
Puccinellia simplex	Little Alkali Grass	Plants		
Ranunculus sceleratus	NA	Plants		
Rorippa curvisiliqua	Curve-pod Yellowcress	Plants		
Rorippa palustris	Bog Yellowcress	Plants		
Rotala ramosior	Toothcup	Plants		
Ruppia cirrhosa	Widgeon-grass	Plants		
Ruppia maritima	Ditch-grass	Plants		
Sagittaria longiloba	Longbarb Arrowhead	Plants		
Sagittaria montevidensis calycina		Plants		
Salix exigua	Narrowleaf Willow	Plants		
Salix gooddingii	Goodding's Willow	Plants		

Scientific Name	Common Name	Group	Federal Protection Status	State Protection Status
Schoenoplectus acutus occidentalis	Hardstem Bulrush	Plants		
Schoenoplectus americanus	Three-square Bulrush	Plants		
Sinapis alba	NA	Plants		
Sparganium eurycarpum		Plants		
Stuckenia pectinata		Plants		
Typha domingensis	Southern Cattail	Plants		
Typha latifolia	Broadleaf Cattail	Plants		
Veronica americana	American Speedwell	Plants		
Wolffiella lingulata	Tongue Bogmat	Plants		
Zannichellia palustris	Horned Pondweed	Plants		

Source: The Nature Conservancy (TNC). 2018. Identifying Environmental Surface Water Use–s - Freshwater Species List for Each Groundwater Basin dataset. https://groundwaterresourcehub.org/gde-tools/environmental-surface-water-beneficiaries/

4.2.8 Data Gaps

The Delta-Mendota Subbasin is an extensive subbasin covering a large area extending along the northwestern end of the San Joaquin Valley. While there is a significant amount of data available regarding various groundwater-related aspects of the Subbasin, much is still not known in multiple locations around the Subbasin. To this end, the following data gaps have been identified and will be addressed as part of the interim period between adoption of this GSP and its first 5-year update.

- Information regarding subsidence varies in extent around the region. While there is a large amount of land elevation survey data available in association with the DMC and the San Joaquin River Restoration Program, other areas in the Delta-Mendota Subbasin require additional data collection to both further establish and monitor future land subsidence rates.

- Only three shallow groundwater wells exist proximate to the northern end of the San Joaquin River (outside of the area being addressed by the San Joaquin River Restoration Program). Additional nested or clustered monitoring wells are required adjacent to the river on the northern end of the Subbasin to evaluate horizontal and vertical groundwater gradients, and in connection with river stage monitoring, to assess the interconnection between the San Joaquin River and the northeastern end of the Delta-Mendota Subbasin.

- There are a large number of wells in the Delta-Mendota Subbasin where no well construction information exists or is readily available. Video surveys and other surveys should be conducted on selected wells that may potentially be added to the Subbasin monitoring network to (1) identify where the wells are screened, and (2) determine if the well(s) are appropriate as additions to the GSP Groups' groundwater monitoring programs.

- Mapping of GDEs in the Delta-Mendota Subbasin, as contained in this Common Chapter, is an initial assessment of their location. This mapping may be refined using most recent groundwater elevation/depth to water contour mapping.

- Monitoring networks contained herein are preliminary and were formulated based on existing well information. As additional wells are installed in the Subbasin and additional well construction information is obtained for existing wells, these networks may need to be refined to improve on the spatial (areal and vertical) distribution of monitoring points and the data collected for evaluation of conditions of the groundwater basin.

- The sustainable yield estimates and water budgets contained in this Common Chapter for both the Upper and Lower Aquifers were developed using limited data. As additional data are collected over the first five years, improved sustainable yield estimates and estimates of water in storage in both principal aquifers should be prepared utilizing the new data.

In addition to these Subbasin-level data gaps, additional data gaps have been identified for each GSP Plan Area. Please see the individual GSPs for additional identified data gaps.

4.3 Delta-Mendota Subbasin Water Budgets

This section describes the common coordinated assumptions agreed upon and utilized by each GSP Group in the Delta-Mendota Subbasin in developing the historical, current, and projected water budgets for their respective GSP Plan Areas. These coordinated historical, current, and projected water budgets were then compiled to prepare the subbasin-level water budgets required under the GSP Regulations §

357.4(b)(3)(B), presented below. The sustainable yield for the Upper Aquifer and Lower Aquifer developed at the Subbasin-level and agreed upon by all GSP Groups in the Delta-Mendota Subbasin is also presented along with a description as to how the sustainable yield for each primary aquifer was calculated.

4.3.1 Coordinated Assumptions

All common coordinated assumptions agreed upon and utilized by each GSP Group in preparing their respective historical, current, and projected water budgets are presented in Technical Memoranda 3 (*Assumptions for the Historical, Current, and Projected Water Budgets of the Delta-Mendota Subbasin*), which is included in **Appendix B** of this Common Chapter.

The data and methodologies used to develop the water budgets in the six individual GSPs (and compiled herein as the Subbasin Water Budgets) were coordinated with the express objective to "rely on the best available information and best available science to quantify the water budget for the basin" (Title 23 of the California Code of Regulations [23 CCR] § 354.18(e)). Given the complex nature of the Subbasin, different data sets and methodologies were appropriate for and/or available in different portions of the Subbasin. As such, a significant effort was made by the Subbasin GSAs to: (1) identify the different sources and accuracy of the available data; (2) consolidate these data and associated methodologies into a general hierarchy for use by the GSAs to honor the local conditions, while maintaining consistency with the intent of 23 CCR § 354.18(e); and (3) standardize the terminology for purposes of the Common Chapter presentation of the Subbasin Water Budget. These standardized water budget components and data sources are presented in Error! Reference source not found. and **Table CC-9** for the historic and current, and projected water budgets, respectively, and are further described below, while acknowledging that significant additional detail is presented in the six underlying GSPs. In some cases, data were not available or applicable, as acknowledged below and in the tables. Additionally, in some cases the specific terminology and/or the details of the calculations included in each underlying GSP remains unique relative to the standardized terminology and descriptions presented below; a full reconciliation of water budget nomenclature will be conducted as part of the 2025 GSP updates, as well as updates to the datasets and methodologies employed. Water use in the Subbasin is largely for agricultural purposes, with local municipal and industrial (M&I) uses. As appropriate, these M&I uses were quantified and incorporated in the individual GSP water budgets.

LAND SURFACE WATER BUDGET

The data sources/methodologies used to estimate the six major components of the Historical and Current Land Surface Water Budgets are summarized in **Table CC-8** and for the Projected Land Surface Water Budgets in **Table CC-9**. A general description of each component and the data hierarchy that was applied by the GSAs is provided below, with further detail provided in the Water Budget sections of the six underlying GSPs. For purposes of the Subbasin GSPs, the Historical and Current Water Budgets represent Water Year (WY) 2003-2013, where the historical period is WY 2003-2012 and the current year is WY 2013. The Projected Water Budgets reflect projected conditions through 2070[1] and consider the impacts

[1] The Subbasin GSAs agreed to use actual data from WYs 2014-2017 and assume a repeat of the historical hydrology for the years WY 2018-2070. The selected period for the projected water budgets meets SGMA requirements by establishing a 50-year period, where the timeframe is continuous between the historic, current, and projected water budgets. The historic hydrologic period for simulating the projected water budget hydrologic

of climate change and projects and management actions (PMAs). To the extent possible the data sources and methodology used were consistent with those identified by the California Department of Water Resources (DWR) in *Table 2 – Potential Data Sources to Support Water Budget Development* and other sections of the Best Management Practices (BMP) –4 - Water Budget.[1] As applicable and available, models and tools (e.g., the Central Valley Hydrologic Model 2 [CVHM2]) were used to support the local sources and assumptions incorporated into the development of the Subbasin Groundwater Water Budget.

(1) **Precipitation (Inflow).** For the Historical and Current Land Surface Water Budgets, total precipitation across the Subbasin was estimated using either: (1) PRISM: the Precipitation-Elevation Regressions on Independent Slopes Model (PRISM); (2) CIMIS: area-weighted data from the California Irrigation Management Information System (CIMIS) stations located in the Subbasin; California Data Exchange Center (CDEC) and/or (3) data from the National Water Service Station located in Los Banos, CA. Total precipitation was further parsed into effective and non-effective precipitation, as applicable to each GSP area, based on assumptions regarding deep percolation percentages and other losses.

For the Projected Land Surface Water Budgets, for WY 2014-2017, actual data were provided consistent with the process described above for the Historical and Current Water Budgets. For the projected WY 2018-2070 period, the 2030 Central Tendency and 2070 Central Tendency climate change factors and guidance provided by DWR were applied to the historical precipitation record to project the impact of climate change on precipitation across the Subbasin. For example, either (1) the Gridded Statewide Precipitation and Change Factors developed for the Water Storage Investment Program (WSIP) using the Variable Infiltration Capacity (VIC) Macroscale Hydrology Model (DWR, 2018) were applied to the available precipitation data sets for the Subbasin, or (2) recommendations from the *Perspectives and Guidance for Climate Change Analysis* document prepared by the DWR Climate Change Technical Advisory Group (CCTAG) were incorporated (DWR CCTAG, 2015).

(2) **Applied Water – Groundwater (Inflow).** To estimate the volume of applied groundwater for the Historical and Current Land Surface Water Budgets (including both agricultural and M&I pumping, as applicable to each GSP area), the total pumping within the Subbasin was estimated using the following hierarchy of sources, depending upon existing records: (1) Flow meters: volumetric flow meter records from pumping wells; (2) Power bills: electricity bills from pumping wells (wherein information related to the number of kilowatt-hours used was converted to a pumping volume based on assumptions related to pumping lift and efficiency); and/or (3) Consumptive use: reported crop acreages and consumptive use data based on either Irrigation Training and Research Center (ITRC)[2] Mapping of Evapotranspiration with Internal Calibration (METRIC) procedure or crop coefficient methodologies (e.g., those provided in the Food and Agricultural Organization of the United States (FAO) Irrigation and Drainage Paper No. 56

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schema was chosen as WY 1979-2017, then wrapping around to include WY 1965-1978 hydrology. Actual data and hydrology were used for WY 2014- 2017 with the representative water years simulating WY 2018 and beyond (e.g., WY2018 is represented by the hydrology from WY1979; WY2019 is represented by the hydrology from WY1980, and so forth, with the caveat that 1979 would represent the fifth year of the projection and following sequentially the historical water year 1965 would represent the forty-fourth year of the projection).

[1] https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-4-Water-Budget_ay_19.pdf

[2] California Polytechnic State University, San Luis Obispo

(FAO-56) (Snyder *et. al.*, 2000, Snyder and Bali, 2008) or the ITRC Crop Coefficient data for Zone 14), corrected as applicable, for applied local and imported surface water. This volume of applied groundwater is consistent with the volume estimated under Water Budget Component (9) Extraction of the Groundwater Water Budget (see below).

For the Projected Land Surface Water Budgets, for WY 2014-2017, actual data were provided, consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, the volume of applied groundwater was estimated using various, complementary methods, including: (1) as the difference between projected demand and the assumed volumes of precipitation, surface water deliveries, and tile drainage available to meet the demand, or (2) assuming future groundwater production rates would be equivalent to historical extractions for a given year type (e.g., future dry year production rates would be equivalent to average dry year production rates over the historical record). Climate change impacts and the effects of the planned projects and management actions (PMAs) are implicitly, rather than explicitly, accounted for (i.e., to the extent that climate change and PMAs increase or decrease the amount of water otherwise available to meet applied water demands, the volume of applied groundwater will be adjusted accordingly). Total inflow to Shasta Lake dictates the amount of imported surface water available for use in the Subbasin. The WSIP model was used to analyze the impacts of climate change on the Subbasin and anticipate projected inflow to Shasta Lake, and as to whether or not the water year would be classified as Shasta Critical under the Exchange Contract, the Refuge Contract, and by municipal users.

(3) **Surface Water Inflow (Inflow).** Surface water serves as an inflow to Subbasin water budget as both applied surface water and as seepage from streams and rivers. To estimate the volume of applied surface water for the Historical and Current Land Surface Water Budgets, the total diversions within the Subbasin over the historical and current water budget time periods were reported using the best available data for each source. Deliveries from the Central Valley Project (CVP), State Water Project (SWP), the San Joaquin River, and other local streams and rivers were compiled from records from the following sources, including, but not limited to: State Water Resources Control Board (SWRCB) diversion reports; United States Bureau of Reclamation (USBR) Central Valley Operations (CVO); Meyers Water Bank Records; CVP refuge water supply delivery data; and GSA member agency records.

To account for seepage of surface water into the Subbasin from streams and rivers for the Historical and Current Water Budgets, California Data Exchange Center (CDEC) data were used (i.e., by comparing the reductions in measured flow at successive gauging stations after accounting for other diversions) and/or from estimates of seepage losses from certain water bodies from prior water infiltration studies or modeling efforts, as described in the individual GSPs. Seepage from streams and rivers is counted either towards the Groundwater Water Budget directly or towards the Land Surface Water Budget and then, because of the lack of storage capacity in the land surface system and by way of mass balance principles, some or all of this water adds to the Groundwater Water Budget through Water Budget Component (6) Deep Percolation (see below).

For the Projected Land Surface Water Budgets, the volume of applied surface water was estimated as (1) the records of actual delivery data as available for the respective service areas for WY 2014-2017; and (2) estimates of anticipated future deliveries by WY type for WY 2018-2070, inclusive of climate change considerations to the extent they could be reasonably estimated (i.e., directly modeled based on data provided by DWR and the USBR), or using water year types as a proxy (i.e., future dry year deliveries would reflect historical average dry year deliveries over the historical record). The impacts of planned PMAs on the availability of applied surface water volumes were also incorporated, as applicable.

For the Projected Land Surface Water Budgets, the volume of surface water seepage was adjusted, as applicable and available, based on climate change factors provided by DWR. Changes to surface water seepage were directly estimated as a result of PMAs or other program implementation (e.g., the impact on seepage resulting from the San Joaquin River Restoration Program [SJRRP] implemented by the USBR).

(4) **Surface Water Outflow (Outflow).** As described above, total precipitation was parsed into effective and non-effective precipitation (i.e., the latter being that portion of the total precipitation that cannot be used by the plants because it either runs off or percolates beyond the root zone). Similarly, a portion of the applied water can run off or deep percolate (typically termed "irrigation inefficiency"). Other surface water outflows (losses) from the Subbasin Land Surface Water Budget include agency-measured or estimated "spills" (i.e., outflow from tile drained fields, canal spills, field runoff, and precipitation runoff) and stream gauge readings, flow meter readings, and transfer pumping data. These collective data sets, sources, and methodologies were used to estimate the historical and current outflows from this component of the Subbasin Land Surface Water Budget.

For the Projected Land Surface Water Budgets, for WY 2014-2017, the data were provided consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, the volume of surface water outflows was estimated based on estimates provided by the GSA member agencies (using water year types as a proxy), while those components that may be impacted by climate change (e.g., runoff) were adjusted to reflect changes to precipitation and reference evapotranspiration (ETo). Changes to surface water outflows were directly estimated as a result of PMAs or other program implementation (e.g., water conservation programs to reduce spills) as information was available.

(5) **Evapotranspiration (Outflow).** The largest outflow for the Historical and Current Land Surface Water Budget is evapotranspiration (consumptive use) by crops. As such, a combination of CIMIs ETo data, crop acreage, and crop coefficient data and methodologies (e.g., ITRC data and methodologies) were utilized to estimate the consumptive use, including municipal uses, of water in the Subbasin. In addition, direct evaporation from surface water bodies and phreatophytes (i.e., groundwater dependent ecosystems [GDEs]) was estimated based on the surface area and time period it was wetted.

For the Projected Land Surface Water Budgets, for WY 2014-2017, the actual data were provided consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, the 2030 Central Tendency and 2070 Central Tendency climate change factors or guidance provided by DWR were applied to the historical ETo record to project the impact of climate change on ETo across the Subbasin. For example, either the Gridded Statewide Precipitation and Change Factors developed for the WSIP using the VIC Macroscale Hydrology Model (DWR, 2018) were applied to the available ETo data sets for the Subbasin, or (2) recommendations from the *Perspectives and Guidance for Climate Change Analysis* document prepared by the DWR CCTAG (2015) were incorporated.

(6) **Deep Percolation (Outflow).** For the Historical, Current, and Projected Land Surface Water Budgets, this water budget component is estimated as the sum of the other Outflow components (Water Budget Components 4 and 5) of the Land Surface Water Budget subtracted from the sum of the Inflow components (Water Budget Components 1 through 3) and represents the total

volume of water that seeps past the root zone and into the Subbasin aquifer(s). This includes applied water seepage, as well as stream seepage (from the San Joaquin River, Delta-Mendota Canal, and California Aqueduct, and other canals), and delivery losses. To the extent that climate change and PMA implementation affects the volumes of Water Budget Components 1 through 5, these impacts are reflected in the resultant Outflow component, Water Budget Component (6) Deep Percolation, which serves as the inflow component, and Water Budget Component (7) Deep Percolation to the Groundwater Water Budget (see below).

GROUNDWATER WATER BUDGET

The data sources/methodologies used to estimate the Historical and Current Groundwater Water Budgets are summarized in **Table CC-8** and for the Projected Groundwater Water Budgets in **Table CC-9**. A general description of each component and the data hierarchy that was applied by the GSAs is provided below, with further detail provided in the Water Budget sections of the six underlying GSPs. The time periods for the Groundwater Water Budgets are consistent with those used for the Land Surface Water Budgets, and likewise, to the extent possible, the data sources and methodology used were consistent with those identified by DWR in *Table 2 – Potential Data Sources to Support Water Budget Development* and other sections of the BMP –4 - Water Budget.[1] As identified in **Table CC-8** and **Table CC-9**, significant data gaps were identified in several of the GSPs on key aspects of the Groundwater Water Budget; additional efforts are on-going to address those data gaps and refine the water budgets as part of the 2025 GSP update. As applicable and available, models and tools (e.g., CVHM2, Westside Subbasin Groundwater Model, and a numerical flow model for the Farmers Water District and Fresno County areas) were used to validate the local sources and support assumptions used to develop the Subbasin Groundwater Water Budget.

(7) **Deep Percolation (Inflow).** In all instances, this component of the Groundwater Water Budget is directly linked to the Water Budget Component (6) Deep Percolation of the Land Surface Water Budget. To the extent that climate change is factored into the Historical, Current, and Projected Land Surface Water Budgets, those impacts are reflected in the varying volumes of deep percolation that are assumed to recharge the aquifer system(s) via infiltration.

(8) **Lateral Subsurface Flow (Inflow).** For the Historical and Current Groundwater Water Budgets, this component is estimated somewhat differently for the Upper and Lower Aquifer portions of the Subbasin.

8A. Upper Aquifer. For the Upper Aquifer, lateral inflows were generally estimated using Darcy's equation[2] and estimated aquifer characteristics, or a groundwater flow model, as available. Aquifer transmissivity values were compiled from aquifer tests, model parameters and other sources, while observed or simulated water level maps for wet, normal, and dry water year types and hydrographs were prepared to determine the elevation and direction of groundwater flow between GSP areas within the Subbasin and across Subbasin boundaries. Mountain front recharge

[1] https://water.ca.gov/-/media/DWR-Website/Web-Pages/Programs/Groundwater-Management/Sustainable-Groundwater-Management/Best-Management-Practices-and-Guidance-Documents/Files/BMP-4-Water-Budget_ay_19.pdf

[2] Darcy's equation in which groundwater flow velocity is identified as a function of the aquifer hydraulic conductivity and hydraulic gradient based upon measured water levels and aquifer properties. Freeze, R.A. and Cherry, J.A. 1979. Groundwater. Prentice Hall, Inc. Englewood Cliffs, NJ. p 16.

from the Coastal Range was also assumed to provide an additional source of inflow to the Upper Aquifer.

8B. Lower Aquifer. To the extent possible, lateral inflows to the Lower Aquifer were estimated, primarily using Darcy's equation and estimated aquifer characteristics, and coarse assumptions regarding contributions of other sources of inflow, or via a groundwater flow model, as available. However, this portion of the Groundwater Budget was acknowledged as a significant data gap, which the GSAs are working to address through the collection of additional data, etc.

In instances where there was significant downward flow between the Upper and Lower Aquifers, vertical flow was estimated using Darcy's equation, estimated aquifer characteristics, and groundwater gradients. Aquifer transmissivity values were compiled from aquifer tests, model parameters and other sources, while water level maps for wet, normal, and dry water year types were prepared to determine the elevation and groundwater gradient. Furthermore, flow to the Lower Aquifer from the Upper Aquifer is acknowledged as a data gap.

Projected Groundwater Water Budget. For the Projected Groundwater Water Budgets, for WY 2014-2017, the data were provided consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, this component is generally estimated using historical inflows by water year type as a proxy (i.e., the underflows used in the Historical and Current Water Budgets were averaged by WY type and used throughout the Projected Water Budget period). Impacts of climate change are implicitly incorporated, and expected increases in inflows as a result of PMAs (including projected groundwater banking activities) are directly incorporated to the extent the information was provided by the GSAs. As additional data are obtained during implementation of the GSPs, the inputs will be updated and improved to revise the Projected Groundwater Water Budget.

(9) **Extraction (Outflow).** Consistent with the methodology used to estimate Water Budget Component (2), Applied Groundwater, of the Historical and Current Land Surface Water Budgets, the total pumping from the Subbasin aquifers was estimated using the following hierarchy of sources depending upon available records: (1) Flow meters: Volumetric flow meter records from pumping wells; (2) Power bills: Electricity bills from pumping wells (wherein information related to the number of kilowatt-hours used was converted to a pumping volume based on assumptions related to pumping lift and efficiency and duration of operation); and/or (3) Consumptive use: crop acreages and consumptive use data based on either ITRC-METRIC or crop coefficient methodologies. While the exact distribution of pumping from the Upper and Lower Aquifers is acknowledged as a data gap, total extractions were assumed to be partitioned between the aquifers, with the majority of extractions (80-90%) occurring in the Upper Aquifer. Information regarding well construction obtained and compiled from the local and Subbasin Well Census and Inventory projects completed by the GSAs in 2022 will be used to further improve the estimated allocation of groundwater extraction between the aquifers in the 2025 GSP update.

For the Projected Groundwater Water Budgets, for WY 2014-2017, the data were provided, consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, the volume of pumped groundwater was estimated using various, complimentary methods, including (1) as the difference between projected demand and the assumed volumes of precipitation, surface water deliveries, and tile drainage available to meet the demand, or (2) assuming future groundwater production would be equivalent to historical extractions for a given year type (e.g., future dry year production rates would be equivalent to average dry year production rates over the historical record, with the exception of M&I pumping which was projected based on information provided in various source documents such as Urban

Water Management Plans). Climate change impacts and the effect of the planned PMAs are implicitly, rather than explicitly, accounted for.

(10) **Lateral Subsurface Flow (Outflow).** For the Historical and Current Groundwater Water Budgets, this component was estimated somewhat differently for the Upper and Lower Aquifer portions of the Subbasin, but similarly to Water Budget Component (8) of the Groundwater Water Budget.

10A. Upper Aquifer. Lateral outflows were generally estimated using Darcy's equation and estimated aquifer characteristics, and validated by a groundwater flow model, as available. Aquifer transmissivity values were compiled from aquifer tests, model parameters and other sources, while observed or simulated water level maps for wet, normal, and dry water year types and hydrographs were prepared to determine the elevation and direction of groundwater flow between GSP areas within the Subbasin and across Subbasin boundaries.

10B. Lower Aquifer. To the extent possible, lateral outflows from the Lower Aquifer were estimated, primarily using Darcy's equation and estimated aquifer characteristics, and validated by a groundwater flow model, as available. However, this portion of the Groundwater Water Budget was acknowledged as a significant data gap which the GSAs are working to address through the collection and evaluation of additional data, etc.

Projected Groundwater Water Budget. For the Projected Groundwater Water Budgets, for WY 2014-2017, the data were provided, consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, this component is generally estimated using historical outflows by water year type as a proxy (i.e., the underflows used in the Historical and Current Water Budgets were averaged by WY type and used throughout the Projected Water Budget period). Impacts of climate change are implicitly incorporated, and expected increases in outflows as a result of PMAs (including projected groundwater banking activities) are directly incorporated to the extent the information was provided by the GSAs.

(11) **Change in Storage.** For the Historical and Current Groundwater Water Budgets, this component was estimated somewhat differently for the Upper and Lower Aquifer portions of the Subbasin.

11A. Upper Aquifer. A sum of the Outflow components (Water Budget Components 9 through 10) of the Groundwater Water Budget was subtracted from the Inflow components (Water Budget Components 7 and 8) to assess the change in storage. These estimates were also compared in some of the GSPs to the available hydrographs, water level contour maps, and assumed aquifer storativity values from local data sets and models to assess and confirm change in storage, and assumed consumptive use data.

11B. Lower Aquifer. Approaches varied among the GSPs given the limited available data, which the GSAs are working to address through the collection of additional data, etc. Change in storage was estimated using measured subsidence as a proxy (i.e., due to compaction caused by inelastic land subsidence), as the difference between inflows and outflows based on modeled results, or as an assumed proportion of overall groundwater change in storage. These estimates were also compared in some of the GSPs to the available hydrographs, water level contour maps, and assumed aquifer storativity values from local data sets and models to assess and confirm change in storage, and assumed consumptive use data.

Projected Groundwater Water Budgets. For the Projected Groundwater Water Budgets, for WY 2014-2017, the data were provided, consistent with the process described above for the Historical and Current Water Budgets. For the projected (WY 2018-2070) period, the change in storage volumes used in the Historical and Current Water Budgets were averaged by water year type and used throughout the projected water budget period, or were calculated as the difference between inflows and outflows.

Table CC-8: Historical and Current Water Budgets Data Sources

<table>
<tr><th>Water Budget</th><th>Flow Direction</th><th>Flow Budget Category</th><th>Aliso Water District</th><th>Farmers Water District</th><th>Fresno County</th><th>Grassland</th><th>Northern & Central Delta-Mendota</th><th>San Joaquin River Exchange Contractors</th></tr>
<tr><td>Land Surface</td><td>Inflow</td><td>Precipitation</td><td>Precipitation-Elevation Regressions on Independent Slopes Model (PRISM) and California Irrigation Management Information System (CIMIS)</td><td colspan="2">PRISM</td><td>PRISM and CIMIS</td><td>PRISM and CIMIS</td><td>CIMIS and National Weather Service (NWS)</td></tr>
<tr><td>Land Surface</td><td>Inflow</td><td>Applied Wat–r - Groundwater</td><td>Consumptive use</td><td>Flow meters</td><td>Flow meters, power bills, and consumptive use</td><td colspan="2">Flow meters and consumptive use</td><td>Flow meters</td></tr>
<tr><td>Land Surface</td><td>Inflow</td><td>Surface Water Inflow</td><td>State Water Resources Control Board (SWRCB) diversion reports; landowner records</td><td>San Joaquin River inflows</td><td>United States Bureau of Reclamation (USBR) Central Valley Operations (CVO); Meyers Water Bank Records</td><td>Central Valley Project (CVP) refuge water supply delivery data</td><td>USBR CVO and SWRCB diversion reports</td><td>USBR CVO; California Data Exchange Center (CDEC) where available, water infiltration study used otherwise</td></tr>
<tr><td>Land Surface</td><td>Outflow</td><td>Surface Water Outflow</td><td>Non-effective precipitation</td><td>Transfer pumping and San Joaquin River outflows</td><td>Transfer pumping that exceeds applied groundwater</td><td>Non-effective precipitation and agency measured spills</td><td>Evapotranspiration and non-effective precipitation)</td><td>Non-effective precipitation and flow meter readings</td></tr>
<tr><td>Land Surface</td><td>Outflow</td><td>Evapotranspiration</td><td colspan="6">Vegetation coefficients and CIMIS</td></tr>
<tr><td>Land Surface</td><td>Outflow</td><td>Deep Percolation</td><td colspan="6">Land Surface Budget Inflow - Outflow</td></tr>
<tr><td>Groundwater</td><td>Inflow</td><td>Infiltration</td><td colspan="6">Land Surface Budget Inflow - Outflow</td></tr>
<tr><td>Groundwater</td><td>Inflow</td><td>Lateral subsurface flow - Upper Aquifer</td><td colspan="6">Darcy’s equation (groundwater levels and transmissivities)</td></tr>
<tr><td>Groundwater</td><td>Inflow</td><td>Lateral subsurface flow - Lower Aquifer</td><td>Unused - Data Gap</td><td colspan="3">Darcy’s equation (groundwater levels and transmissivities)</td><td>Data G–p - Assumed 20% of total inflows.</td><td>Darcy’s equation (groundwater levels and transmissivities)</td></tr>
<tr><td>Groundwater</td><td>Outflow</td><td>Extraction - Upper Aquifer</td><td>Consumptive use and irrigation efficiency</td><td>Flow meters</td><td>Flow meters, power bills and consumptive use</td><td colspan="2">Flow meters and consumptive use</td><td>Flow meters</td></tr>
<tr><td>Groundwater</td><td>Outflow</td><td>Extraction - Lower Aquifer</td><td>Unused - Data Gap</td><td>Flow meters</td><td>Flow meters, power bills and consumptive use</td><td colspan="2">Flow meters and consumptive use</td><td>Assumed 10% of total pumping</td></tr>
<tr><td>Groundwater</td><td>Outflow</td><td>Lateral subsurface flow - Upper Aquifer</td><td colspan="6">Darcy’s equation (groundwater levels and transmissivities)</td></tr>
<tr><td>Groundwater</td><td>Outflow</td><td>Lateral subsurface flow - Lower Aquifer</td><td>Unused - Data Gap</td><td colspan="5">Darcy’s equation (groundwater levels and transmissivities)</td></tr>
<tr><td>Groundwater</td><td>Change in Storage</td><td>Upper Aquifer</td><td colspan="6">Inflow - Outflow</td></tr>
<tr><td>Groundwater</td><td>Change in Storage</td><td>Lower Aquifer</td><td>Land subsidence as proxy</td><td colspan="2">Inflow - Outflow</td><td colspan="3">Land subsidence as proxy</td></tr>
</table>

Table CC-9: Projected Water Budgets Data Sources

Water Budget	Flow Direction	Flow Budget Category	Aliso Water District	Farmers Water District	Fresno County	Grassland	Northern & Central Delta-Mendota	San Joaquin River Exchange Contractors
Land Surface	Inflow	Precipitation	Precipitation-Elevation Regressions on Independent Slopes Model (PRISM), applying climate change factors (CCF)			PRISM and California Irrigation Management Information System (CIMIS), applying CCF		CIMIS and National Weather Service (NWS), applying CCF
Land Surface	Inflow	Applied Wat–r - Groundwater	Consumptive use			Flow meters and consumptive use		Flow meters
Land Surface	Inflow	Surface Water Inflow	State Water Resources Control Board (SWRCB) diversion reports, using water year (WY) types as a proxy	San Joaquin River inflows (CDEC and United States Geological Survey [USGS])	Mendota Pool inflows - USBR CVO	USBR CVO and SWRCB diversion reports, using WY types as a proxy		USBR CVO; California Data Exchange Center (CDEC) where available, using WY types as a proxy; Water infiltration study used otherwise
Land Surface	Outflow	Surface Water Outflow	Non-effective precipitation calculated with CCF and WY types as a proxy for quantity	San Joaquin River outflows (CDEC and USGS)	Mendota Pool outflows (USBR CVO)	Non-effective precipitation and agency measured spills calculated with CCF and WY types as a proxy for quantity	Non-effective precipitation calculated with CCF and WY types as a proxy for quantity	Non-effective precipitation and agency measured spills calculated with CCF and WY types as a proxy for quantity
Land Surface	Outflow	Evapotranspiration	Vegetation coefficients and CIMIS (calculated with CCFs and WY types as a proxy)					
Land Surface	Outflow	Deep Percolation	Land Surface Inflow - Outflow					
Groundwater	Inflow	Infiltration	Land Surface Budget Inflow - Outflow					
Groundwater	Inflow	Lateral subsurface flow - Upper Aquifer	Darcy's equation (groundwater levels and transmissivities) using WY types as a proxy					
Groundwater	Inflow	Lateral subsurface flow - Lower Aquifer	Unused - Data Gap	Darcy's equation (groundwater levels and transmissivities) using WY types as a proxy			Data Gap - Assumed 20% of total inflows.	Darcy's equation (groundwater levels and transmissivities) using WY types as a proxy
Groundwater	Outflow	Extraction - Upper Aquifer	Consumptive use and irrigation efficiency using WY type as a proxy with CCFs and PMAs	Adjusted historic metered data using WY type as a proxy with CCFs and PMAs		Adjusted historic metered data and consumptive use using WY type as a proxy with CCFs and PMAs		
Groundwater	Outflow	Extraction - Lower Aquifer	Unused - Data Gap	Not Applicable		Unused - Data Gap	Adjusted historic metered data and consumptive use using WY type as a proxy with CCFs and PMAs	
Groundwater	Outflow	Lateral subsurface flow - Upper Aquifer	Darcy's equation (groundwater levels and transmissivities) using WY types as a proxy with CCFs					
Groundwater	Outflow	Lateral subsurface flow - Lower Aquifer	Unused – Data Gap	Darcy's equation (groundwater levels and transmissivities) using WY types as a proxy with CCFs			Data Gap - Assumed 20% of total inflows.	Darcy's equation (groundwater levels and transmissivities) with CCFs
Groundwater	Change in Storage	Upper Aquifer	Inflow - Outflow					
Groundwater	Change in Storage	Lower Aquifer	Unused – Data Gap	Inflow - Outflow		Projected land subsidence and WY types used as a proxy with CCFs and PMAs	Inflow - Outflow	Projected land subsidence and WY types used as proxy with CCFs and PMAs

4.3.2 GSP-Level Water Budgets

Individual historical, current, and projected water budgets were developed by each GSP Group for their respective Plan Area. For more information on the development of those water budgets, as well as tabular and graphical representation of the results, refer to the respective sections of the individual GSPs.

All historical, current, and projected water budgets developed within the Delta-Mendota Subbasin are consistent with GSP Regulations §354.18 Water Budget, and DWR's *Best Management Practices for the Sustainable Management of Groundwater Water Budget BMP* (2016c) document was used when and where applicable at the discretion of each GSP Group.

4.3.3 Coordinated Water Budgets

The land surface budget, groundwater budget, and annual change in storage for the historical water budget, current water budget, and projected water budget with climate change factors (CCFs) and projects and management actions for the Delta-Mendota Subbasin were developed by compiling the water budgets prepared by each of GSP Group. The land surface budget is an accounting of water flows into and out of the land surface above an aquifer within with Delta-Mendota Subbasin, where inflows and outflows include flow between GSP Groups and neighboring subbasins, the atmosphere, and the groundwater aquifer below. The groundwater budget is an accounting of groundwater flows into and out of the two principal groundwater aquifers (Upper Aquifer and Lower Aquifer) within the Delta-Mendota Subbasin, where inflows and outflows include flow between GSP Groups and neighboring subbasins as well as the above land surface.

Subsequent to the submittal of the Delta-Mendota GSP in January 2022, and in response to the Consultation Initiation Letter (CIL) received from DWR on January 21, 2022 in which DWR stated that, while the same data may have been used in developing the water budgets, the terminology used to describe those data sets were not consistent across the basin, the Delta-Mendota Subbasin GSAs acknowledge additional detail was needed to demonstrate that all water budget components across the six Subbasin GSPs utilize the same data and methodologies. As such, subsequent to receipt of the CIL, the Technical Working Group and Coordination Committee met to identify the specific data used and to develop a consistent terminology for the various water budget components. Additionally, the Technical Working Group attempted to simplify the presentation of the Subbasin water budgets through a reduction in the number of water budget components. The mapping of the original GSP water budget components into the revised simplified coordinated water budget component terminology is discussed in the prior section (Section 4.3.1 of this revised Common Chapter).

After agreeing to the set of common simplified definitions for water budget components, the six Delta-Mendota GSP groups mapped their prior water budget components to the new common definitions. The revised land surface budget and groundwater budget are presented respectively for the historical water budget in **Table CC-10** and **Table CC-11,** for the current water budget in **Table CC-12** and **Table CC-13**, and for the projected water budget with climate change factors and projects and management actions in **Table CC-14** and **Table CC-15**. All categories presented in the land surface budget and groundwater budget tables were agreed upon by all Delta-Mendota GSP Groups, with representatives from each GSP group tasked with filling out these budget tables as appropriate to account for the unique hydrology, land use, and water use within their respective GSP regions. The tables below are simply compilations of the individual GSP water budget data as provided by their respective plan preparers, and no water budget data were modified during the mapping process.

Individual GSAs and agencies in the Delta-Mendota Subbasin understand that the historical, current, and projected water budgets were completed using best available science and data, and efforts were made to use the same data sources throughout the Subbasin where available, though due to variability in data availability throughout the Subbasin, the best available data were used and characterized appropriately. Where data gaps exist, the individual GSAs and agencies intend to conduct the work necessary to substantiate or improve the estimates and assumptions developed for determining their water budgets. Nothing in this part, or in any groundwater sustainability plan adopted pursuant to this part, determines, or alters surface water rights or groundwater rights under common law or any provision of law that determines or grants surface water rights.

Figure CC-64 shows the revised average annual and cumulative change in storage in both principal aquifers under the Subbasin projected water budget (including application of climate change factors and the addition of projects and management actions).

Table CC-10: Delta-Mendota Subbasin Historical Water Budget, Land Surface Budget

Land Surface Budget									
		Inflows				Outflows			
Water Year	Water Year Type	Precipitation	Applied Wat–r - Groundwater	Surface Water Inflows	Total Inflows	Surface Water Outflows	Evapotranspiration	Deep Percolation	Total Outflows
2003	N	450,000	395,000	2,501,000	3,346,000	1,306,000	1,772,000	293,000	3,371,000
2004	D	412,000	417,000	2,433,000	3,262,000	1,206,000	1,760,000	315,000	3,281,000
2005	W	739,000	303,000	2,764,000	3,806,000	1,614,000	1,810,000	352,000	3,776,000
2006	W	571,000	293,000	3,311,000	4,175,000	2,111,000	1,804,000	296,000	4,211,000
2007	D	258,000	474,000	2,485,000	3,217,000	1,230,000	1,701,000	310,000	3,241,000
2008	D	328,000	527,000	2,295,000	3,150,000	1,140,000	1,769,000	331,000	3,240,000
2009	N	304,000	511,000	2,191,000	3,006,000	1,017,000	1,813,000	327,000	3,157,000
2010	N	539,000	380,000	2,637,000	3,556,000	1,515,000	1,655,000	406,000	3,576,000
2011	W	626,000	279,000	3,283,000	4,188,000	2,013,000	1,799,000	414,000	4,226,000
2012	D	275,000	470,000	2,582,000	3,327,000	1,301,000	1,679,000	355,000	3,335,000

Table CC-11: Delta-Mendota Subbasin Historical Water Budget, Groundwater Budget

Groundwater Budget													
		Inflows				Outflows					Change in Storage		
Water Year	Water Year Type	*Infiltration*	Lateral Subsurface Flow		Total Inflows	Groundwater Extraction		Lateral Subsurface Flow		Total Outflows	Estimated Annual Change in Groundwater Storage		
			Upper Aquifer	*Lower Aquifer*		*Upper Aquifer*	*Lower Aquifer*	*Upper Aquifer*	*Lower Aquifer*		*Upper Aquifer*	*Lower Aquifer*	*Total*
2003	N	324,000	196,000	117,000	637,000	357,000	39,000	260,000	106,000	762,000	17,000	5,000	22,000
2004	D	345,000	180,000	114,000	639,000	376,000	42,000	286,000	132,000	836,000	(180,000)	(48,000)	(228,000)
2005	W	424,000	223,000	128,000	775,000	268,000	36,000	269,000	78,000	651,000	223,000	14,000	237,000
2006	W	394,000	203,000	120,000	717,000	260,000	34,000	264,000	75,000	633,000	18,000	(23,000)	(5,000)
2007	D	358,000	161,000	99,000	618,000	431,000	48,000	280,000	130,000	889,000	(282,000)	(67,000)	(349,000)
2008	D	371,000	169,000	106,000	646,000	481,000	55,000	293,000	141,000	970,000	(341,000)	(80,000)	(421,000)
2009	N	361,000	195,000	112,000	668,000	466,000	53,000	273,000	117,000	909,000	(134,000)	(28,000)	(162,000)
2010	N	470,000	211,000	124,000	805,000	350,000	39,000	264,000	116,000	769,000	180,000	(4,000)	176,000
2011	W	515,000	205,000	124,000	844,000	248,000	32,000	277,000	83,000	640,000	125,000	(23,000)	102,000
2012	D	417,000	168,000	107,000	692,000	432,000	45,000	288,000	141,000	906,000	(171,000)	(62,000)	(233,000)

Table CC-12: Delta-Mendota Subbasin Current Water Budget, Land Surface Budget

Land Surface Budget									
Water Year	Water Year Type	Inflows				Outflows			
		Precipitation	Applied Wat–r - Groundwater	Surface Water Inflows	Total Inflows	Surface Water Outflows	Evapotranspiration	Deep Percolation	Total Outflows
2013	D	318,000	521,000	2,597,000	3,436,000	1,386,000	1,671,000	402,000	3,459,000

Table CC-13: Delta-Mendota Subbasin Current Water Budget, Groundwater System

Groundwater Budget														
Water Year	Water Year Type	Inflows				Outflows					Change in Storage		
		Infiltration	Lateral Subsurface Flow		Total Inflows	Groundwater Extraction		Lateral Subsurface Flow		Total Outflows	Estimated Annual Change in Groundwater Storage		
			Upper Aquifer	*Lower Aquifer*		*Upper Aquifer*	*Lower Aquifer*	*Upper Aquifer*	*Lower Aquifer*		*Upper Aquifer*	*Lower Aquifer*	*Total*
2013	D	467,000	173,000	112,000	752,000	477,000	51,000	278,000	136,000	942,000	(128,000)	(55,000)	(183,000)

Table CC-14: Delta-Mendota Subbasin Projected Water Budget, Land Surface Budget (containing climate change factors and projects and management actions)

Land Surface Budget																
		Inflows							Outflows							
		Precipitation	Applied Wat–r - Groundwater	Surface Water Inflow	Applied Wat–r - Groundwater (Project Effect–) - NCDM Only	Applied Wat–r - Imported Surface Water (Project Effect–) - NCDM Only	Project Effects - All GSP Groups	Total Inflows	Surface Water Outflow	Evapotranspiration	Crop Evapotranspiration - Aliso Only	Canal/Reservoir Evaporation - Aliso Only	Deep Percolation	Runoff (Project Effect–) - NCDM Only	Project Effects - All GSP Groups	Total Outflows
2014	SC	283,000	601,000	1,725,000	0	0	1,000	2,610,000	852,000	1,616,000	0	0	230,000	0	0	2,698,000
2015	SC	363,000	650,000	1,247,000	0	0	0	2,260,000	479,000	1,528,000	0	0	287,000	0	0	2,294,000
2016	D	712,000	392,000	1,605,000	0	0	0	2,709,000	631,000	1,618,000	0	0	403,000	0	0	2,652,000
2017	W	686,000	303,000	3,651,000	0	0	6,000	4,646,000	2,423,000	1,773,000	0	0	445,000	0	0	4,641,000
2018	N	527,000	389,000	2,628,000	(6,000)	0	7,000	3,545,000	1,506,000	1,660,000	0	0	403,000	0	0	3,569,000
2019	W	712,000	266,000	3,162,000	(7,000)	2,000	6,000	4,141,000	1,975,000	1,810,000	0	0	368,000	0	0	4,153,000
2020	D	434,000	394,000	2,187,000	(6,000)	9,000	7,000	3,025,000	939,000	1,726,000	0	0	343,000	0	0	3,008,000
2021	W	808,000	261,000	3,261,000	(7,000)	7,000	6,000	4,336,000	2,025,000	1,821,000	0	0	403,000	0	0	4,249,000
2022	W	1,021,000	249,000	3,266,000	(7,000)	7,000	6,000	4,542,000	2,190,000	1,834,000	0	0	449,000	0	0	4,473,000
2023	N	580,000	389,000	2,658,000	(8,000)	6,000	7,000	3,632,000	1,470,000	1,711,000	0	0	403,000	0	0	3,584,000
2024	D	573,000	387,000	2,176,000	(3,000)	6,000	6,000	3,145,000	963,000	1,726,000	0	0	374,000	0	0	3,063,000
2025	W	884,000	261,000	3,256,000	(7,000)	7,000	6,000	4,407,000	1,993,000	1,847,000	0	0	424,000	0	0	4,264,000
2026	D	575,000	483,000	2,098,000	(43,000)	52,000	9,000	3,174,000	914,000	1,785,000	0	0	412,000	0	0	3,111,000
2027	D	653,000	481,000	2,078,000	(41,000)	49,000	9,000	3,229,000	914,000	1,766,000	0	0	419,000	0	0	3,099,000
2028	D	534,000	484,000	2,115,000	(42,000)	50,000	9,000	3,150,000	934,000	1,789,000	0	0	353,000	0	0	3,076,000
2029	D	462,000	484,000	2,099,000	(46,000)	55,000	9,000	3,063,000	910,000	1,744,000	0	0	356,000	0	0	3,010,000
2030	SC	417,000	575,000	1,800,000	(47,000)	49,000	3,000	2,797,000	833,000	1,624,000	0	0	363,000	0	0	2,820,000
2031	SC	492,000	573,000	1,780,000	(48,000)	51,000	2,000	2,850,000	815,000	1,633,000	0	0	406,000	0	0	2,854,000
2032	W	832,000	269,000	3,250,000	(31,000)	46,000	6,000	4,372,000	1,963,000	1,830,000	0	0	490,000	1,000	0	4,284,000
2033	D	466,000	490,000	2,001,000	(46,000)	60,000	10,000	2,981,000	869,000	1,741,000	0	0	364,000	1,000	0	2,975,000
2034	W	851,000	252,000	3,258,000	(29,000)	47,000	7,000	4,386,000	2,003,000	1,791,000	0	0	465,000	1,000	0	4,260,000
2035	W	731,000	280,000	3,163,000	(32,000)	48,000	7,000	4,197,000	1,969,000	1,849,000	0	0	422,000	1,000	0	4,241,000
2036	W	774,000	316,000	3,268,000	(31,000)	50,000	7,000	4,384,000	2,052,000	1,867,000	0	0	494,000	1,000	0	4,414,000
2037	W	1,194,000	252,000	3,274,000	(28,000)	49,000	7,000	4,748,000	2,254,000	1,780,000	0	0	607,000	1,000	0	4,642,000
2038	N	448,000	431,000	2,689,000	(47,000)	53,000	10,000	3,584,000	1,529,000	1,660,000	0	0	381,000	0	0	3,570,000
2039	N	488,000	446,000	2,655,000	(46,000)	52,000	10,000	3,605,000	1,487,000	1,698,000	0	0	411,000	0	0	3,596,000
2040	D	534,000	423,000	2,200,000	(46,000)	66,000	9,000	3,186,000	1,001,000	1,712,000	0	0	411,000	1,000	0	3,125,000
2041	D	384,000	437,000	2,139,000	(52,000)	62,000	9,000	2,979,000	879,000	1,704,000	0	0	374,000	1,000	0	2,958,000
2042	N	530,000	469,000	2,730,000	(46,000)	51,000	10,000	3,744,000	1,532,000	1,795,000	0	0	400,000	0	0	3,727,000

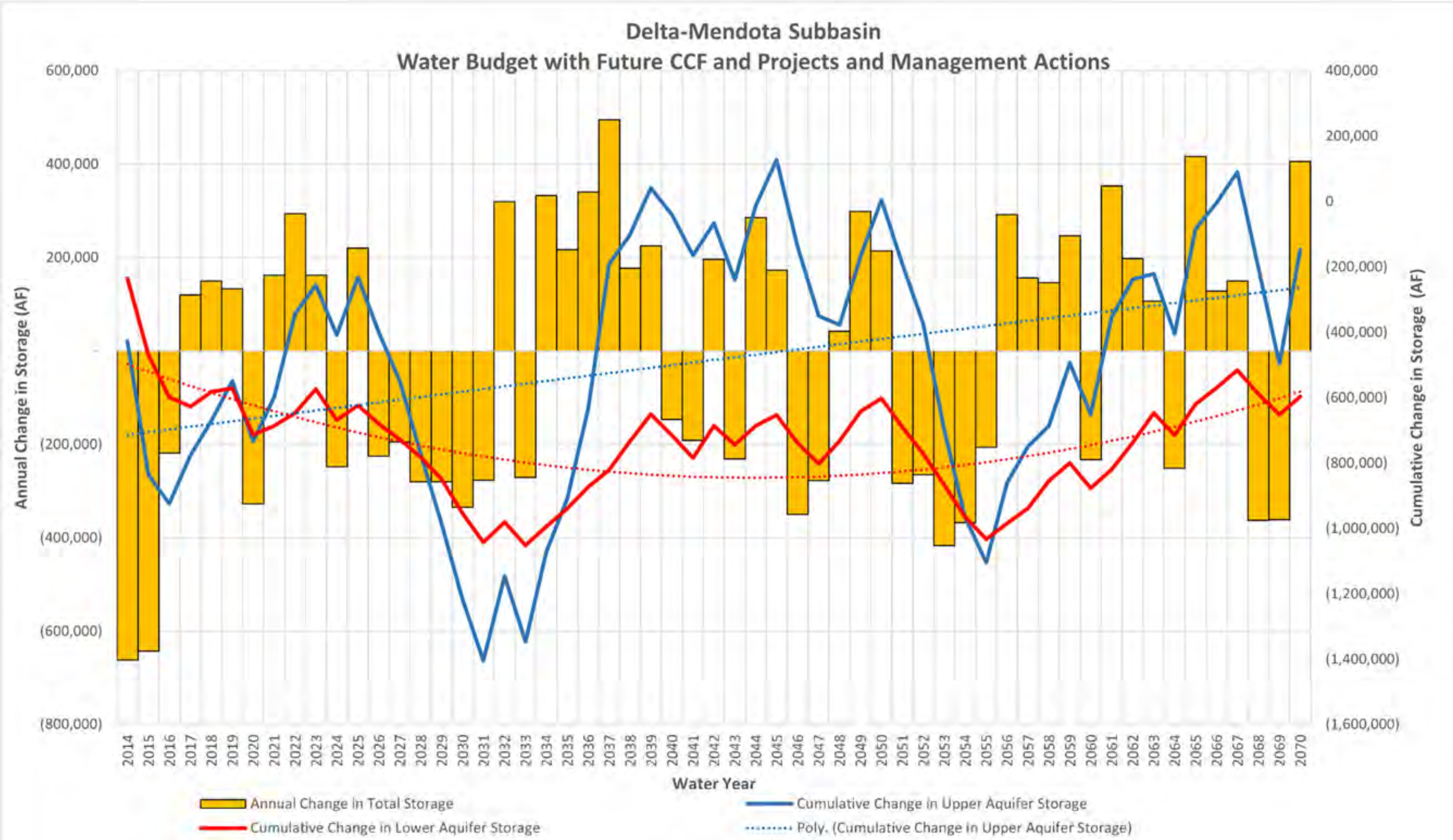
		Land Surface Budget														
		Inflows							Outflows							
		Precipitation	Applied Wat–r - Groundwater	Surface Water Inflow	Applied Wat–r - Groundwater (Project Effect–) - NCDM Only	Applied Wat–r - Imported Surface Water (Project Effect–) - NCDM Only	Project Effects - All GSP Groups	Total Inflows	Surface Water Outflow	Evapotranspiration	Crop Evapotranspiration - Aliso Only	Canal/Reservoir Evaporation - Aliso Only	Deep Percolation	Runoff (Project Effect–) - NCDM Only	Project Effects - All GSP Groups	Total Outflows
2043	D	488,000	437,000	2,101,000	(48,000)	68,000	11,000	3,057,000	884,000	1,797,000	0	0	331,000	1,000	0	3,013,000
2044	W	875,000	286,000	3,231,000	(37,000)	53,000	11,000	4,419,000	2,141,000	1,831,000	0	0	419,000	1,000	0	4,392,000
2045	W	622,000	313,000	3,263,000	(45,000)	53,000	12,000	4,218,000	1,971,000	1,847,000	0	0	355,000	1,000	0	4,174,000
2046	D	268,000	571,000	2,149,000	(57,000)	68,000	12,000	3,011,000	893,000	1,794,000	0	0	346,000	1,000	0	3,034,000
2047	D	402,000	575,000	2,067,000	(55,000)	64,000	12,000	3,065,000	834,000	1,820,000	0	0	383,000	0	0	3,037,000
2048	N	331,000	593,000	2,696,000	(49,000)	49,000	12,000	3,632,000	1,457,000	1,893,000	0	0	358,000	0	0	3,708,000
2049	N	658,000	407,000	2,683,000	(29,000)	62,000	12,000	3,793,000	1,525,000	1,706,000	0	0	474,000	2,000	0	3,707,000
2050	W	708,000	316,000	3,145,000	(40,000)	54,000	13,000	4,196,000	1,974,000	1,878,000	0	0	376,000	1,000	0	4,229,000
2051	D	350,000	447,000	2,110,000	(51,000)	69,000	13,000	2,938,000	858,000	1,738,000	0	0	302,000	1,000	0	2,899,000
2052	D	390,000	553,000	2,103,000	(46,000)	67,000	14,000	3,081,000	873,000	1,727,000	0	0	416,000	1,000	0	3,017,000
2053	SC	306,000	634,000	1,765,000	(44,000)	47,000	8,000	2,716,000	801,000	1,699,000	0	0	304,000	0	0	2,804,000
2054	SC	340,000	632,000	1,678,000	(29,000)	34,000	7,000	2,662,000	750,000	1,657,000	0	0	354,000	0	0	2,761,000
2055	D	630,000	453,000	1,831,000	(39,000)	49,000	14,000	2,938,000	855,000	1,742,000	0	0	385,000	1,000	0	2,983,000
2056	W	745,000	351,000	3,073,000	(44,000)	46,000	12,000	4,183,000	1,935,000	1,894,000	0	0	450,000	0	0	4,279,000
2057	W	693,000	313,000	3,150,000	(34,000)	55,000	12,000	4,189,000	1,932,000	1,893,000	0	0	401,000	1,000	0	4,227,000
2058	N	478,000	547,000	2,688,000	(49,000)	54,000	15,000	3,733,000	1,417,000	1,871,000	0	0	446,000	0	0	3,734,000
2059	W	739,000	309,000	3,154,000	(33,000)	55,000	13,000	4,237,000	1,941,000	1,888,000	0	0	425,000	1,000	0	4,255,000
2060	D	405,000	441,000	2,111,000	(52,000)	69,000	15,000	2,989,000	847,000	1,786,000	0	0	360,000	1,000	0	2,994,000
2061	W	910,000	300,000	3,276,000	(33,000)	55,000	13,000	4,521,000	2,106,000	1,896,000	0	0	512,000	1,000	0	4,515,000
2062	N	466,000	459,000	2,687,000	(50,000)	58,000	16,000	3,636,000	1,482,000	1,757,000	0	0	420,000	0	0	3,659,000
2063	N	477,000	544,000	2,674,000	(49,000)	54,000	16,000	3,716,000	1,454,000	1,861,000	0	0	397,000	0	0	3,712,000
2064	D	338,000	447,000	2,123,000	(49,000)	70,000	16,000	2,945,000	818,000	1,780,000	0	0	341,000	1,000	0	2,940,000
2065	N	725,000	443,000	2,688,000	(47,000)	58,000	17,000	3,884,000	1,502,000	1,739,000	0	0	573,000	1,000	0	3,815,000
2066	W	668,000	323,000	3,153,000	(34,000)	55,000	15,000	4,180,000	1,929,000	1,897,000	0	0	383,000	1,000	0	4,210,000
2067	W	690,000	321,000	3,262,000	(33,000)	55,000	15,000	4,310,000	1,942,000	1,898,000	0	0	394,000	1,000	0	4,235,000
2068	D	448,000	558,000	1,859,000	(52,000)	69,000	12,000	2,894,000	872,000	1,695,000	0	0	327,000	1,000	0	2,895,000
2069	D	382,000	561,000	1,824,000	(50,000)	66,000	12,000	2,795,000	788,000	1,688,000	0	0	328,000	1,000	0	2,805,000
2070	W	962,000	302,000	3,388,000	(34,000)	55,000	16,000	4,689,000	2,130,000	1,887,000	0	0	557,000	1,000	0	4,575,000

Table CC-15: Delta-Mendota Subbasin Projected Water Budget, Groundwater Budget (containing climate change factors and projects and management actions)

Groundwater Budget																			
		Inflows								Outflows							Change in Storage		
		Infiltration	Lateral Subsurface Flow		Seepage Through Corcoran Clay - SJREC Only	Applied Water Infiltration (Project Effects) - NCDM Only	Deep Percolation (Project Effects) - NCDM Only	Project Effects	Total Inflows	Groundwater Extraction		Lateral Subsurface Flow		Flow to Lower Aquifer - Grassland Only	Discharge to Surface Water/Consumptive Use by GDEs/Lateral Flow - Grassland Only	Total Outflows	Estimated Annual Change in Groundwater Storage		
			Upper Aquifer	*Lower Aquifer*						*Upper Aquifer*	*Lower Aquifer*	*Upper Aquifer*	*Lower Aquifer*				*Upper Aquifer*	*Lower Aquifer*	*Total*
2014	SC	275,000	162,000	115,000	0	0	0	0	552,000	513,000	101,000	321,000	191,000	0	0	1,126,000	(428,000)	(234,000)	(662,000)
2015	SC	333,000	154,000	113,000	0	0	0	0	600,000	558,000	101,000	325,000	202,000	0	0	1,186,000	(408,000)	(234,000)	(642,000)
2016	D	487,000	152,000	112,000	0	0	0	0	751,000	354,000	60,000	313,000	156,000	0	0	883,000	(89,000)	(130,000)	(219,000)
2017	W	525,000	198,000	128,000	0	0	0	10,000	861,000	254,000	50,000	307,000	91,000	0	0	702,000	148,000	(28,000)	120,000
2018	N	465,000	190,000	115,000	0	0	0	0	770,000	347,000	59,000	264,000	101,000	0	0	771,000	105,000	44,000	149,000
2019	W	461,000	216,000	124,000	0	0	0	10,000	811,000	231,000	38,000	279,000	74,000	0	0	622,000	122,000	11,000	133,000
2020	D	385,000	153,000	106,000	0	0	3,000	0	647,000	354,000	57,000	298,000	136,000	0	0	845,000	(185,000)	(142,000)	(327,000)
2021	W	464,000	218,000	125,000	0	0	10,000	0	817,000	224,000	39,000	280,000	72,000	0	0	615,000	135,000	27,000	162,000
2022	W	553,000	218,000	125,000	0	0	10,000	10,000	916,000	214,000	37,000	276,000	77,000	0	0	604,000	254,000	40,000	294,000
2023	N	449,000	186,000	117,000	0	0	3,000	0	755,000	348,000	55,000	264,000	111,000	0	0	778,000	89,000	74,000	163,000
2024	D	417,000	151,000	108,000	0	0	3,000	0	679,000	349,000	58,000	301,000	134,000	0	0	842,000	(153,000)	(94,000)	(247,000)
2025	W	493,000	214,000	125,000	0	0	10,000	10,000	852,000	227,000	38,000	278,000	73,000	0	0	616,000	176,000	44,000	220,000
2026	D	451,000	152,000	107,000	0	0	6,000	0	716,000	413,000	51,000	302,000	137,000	0	0	903,000	(169,000)	(56,000)	(225,000)
2027	D	470,000	152,000	106,000	0	0	9,000	0	737,000	411,000	52,000	303,000	131,000	0	0	897,000	(148,000)	(47,000)	(195,000)
2028	D	390,000	153,000	104,000	0	0	9,000	0	656,000	414,000	51,000	304,000	130,000	0	0	899,000	(225,000)	(55,000)	(280,000)
2029	D	395,000	154,000	103,000	0	0	10,000	0	662,000	410,000	51,000	303,000	129,000	0	0	893,000	(213,000)	(67,000)	(280,000)
2030	SC	400,000	159,000	97,000	0	0	9,000	0	665,000	454,000	84,000	312,000	127,000	0	0	977,000	(230,000)	(104,000)	(334,000)
2031	SC	442,000	158,000	97,000	0	0	9,000	0	706,000	453,000	82,000	313,000	118,000	0	0	966,000	(188,000)	(89,000)	(277,000)
2032	W	545,000	220,000	115,000	0	0	22,000	0	902,000	213,000	35,000	279,000	68,000	0	0	595,000	258,000	61,000	319,000
2033	D	400,000	157,000	98,000	0	0	10,000	0	665,000	402,000	50,000	308,000	133,000	0	0	893,000	(201,000)	(70,000)	(271,000)
2034	W	547,000	220,000	118,000	0	0	22,000	10,000	917,000	203,000	29,000	273,000	70,000	0	0	575,000	275,000	57,000	332,000
2035	W	459,000	220,000	119,000	0	0	22,000	0	820,000	225,000	34,000	276,000	76,000	0	0	611,000	162,000	55,000	217,000
2036	W	552,000	221,000	119,000	0	0	22,000	10,000	924,000	243,000	51,000	275,000	76,000	0	0	645,000	275,000	65,000	340,000
2037	W	719,000	217,000	122,000	0	0	23,000	10,000	1,091,000	202,000	31,000	269,000	80,000	0	0	582,000	442,000	53,000	495,000
2038	N	415,000	185,000	114,000	0	0	15,000	0	729,000	350,000	58,000	258,000	111,000	0	0	777,000	90,000	87,000	177,000
2039	N	455,000	197,000	117,000	0	0	15,000	0	784,000	360,000	63,000	262,000	108,000	0	0	793,000	142,000	82,000	224,000
2040	D	457,000	151,000	104,000	0	0	10,000	0	722,000	348,000	53,000	299,000	136,000	0	0	836,000	(82,000)	(65,000)	(147,000)
2041	D	410,000	150,000	101,000	0	0	10,000	0	671,000	352,000	56,000	299,000	130,000	0	0	837,000	(123,000)	(68,000)	(191,000)
2042	N	448,000	197,000	111,000	0	0	15,000	0	771,000	385,000	62,000	264,000	100,000	0	0	811,000	98,000	98,000	196,000
2043	D	368,000	151,000	100,000	0	0	10,000	0	629,000	357,000	55,000	298,000	109,000	0	0	819,000	(173,000)	(58,000)	(231,000)

		Groundwater Budget																	
		Inflows								Outflows							Change in Storage		
		Infiltration	Lateral Subsurface Flow		Seepage Through Corcoran Clay - SJREC Only	Applied Water Infiltration (Project Effects) - NCDM Only	Deep Percolation (Project Effects) - NCDM Only	Project Effects	Total Inflows	Groundwater Extraction		Lateral Subsurface Flow		Flow to Lower Aquifer - Grassland Only	Discharge to Surface Water/Consumptive Use by GDEs/Lateral Flow - Grassland Only	Total Outflows	Estimated Annual Change in Groundwater Storage		
			Upper Aquifer	*Lower Aquifer*						*Upper Aquifer*	*Lower Aquifer*	*Upper Aquifer*	*Lower Aquifer*				*Upper Aquifer*	*Lower Aquifer*	*Total*
2044	W	502,000	209,000	119,000	0	0	23,000	28,000	881,000	220,000	38,000	282,000	71,000	0	0	611,000	227,000	59,000	286,000
2045	W	413,000	215,000	121,000	0	0	22,000	28,000	799,000	235,000	43,000	271,000	77,000	0	0	626,000	141,000	32,000	173,000
2046	D	382,000	151,000	101,000	0	0	10,000	0	644,000	469,000	68,000	296,000	112,000	0	0	945,000	(264,000)	(85,000)	(349,000)
2047	D	422,000	150,000	99,000	0	0	10,000	0	681,000	471,000	71,000	298,000	105,000	0	0	945,000	(214,000)	(64,000)	(278,000)
2048	N	393,000	187,000	109,000	0	0	14,000	0	703,000	475,000	92,000	263,000	100,000	0	0	930,000	(27,000)	69,000	42,000
2049	N	545,000	188,000	110,000	0	0	16,000	0	859,000	345,000	56,000	262,000	103,000	0	0	766,000	209,000	90,000	299,000
2050	W	436,000	217,000	120,000	0	0	23,000	28,000	824,000	239,000	46,000	274,000	73,000	0	0	632,000	173,000	41,000	214,000
2051	D	343,000	152,000	101,000	0	0	10,000	0	606,000	361,000	58,000	296,000	136,000	0	0	851,000	(195,000)	(88,000)	(283,000)
2052	D	466,000	150,000	98,000	0	0	10,000	0	724,000	463,000	66,000	296,000	105,000	0	0	930,000	(183,000)	(82,000)	(265,000)
2053	SC	341,000	156,000	97,000	0	0	9,000	0	603,000	499,000	99,000	312,000	104,000	0	0	1,014,000	(322,000)	(95,000)	(417,000)
2054	SC	392,000	156,000	96,000	0	0	8,000	0	652,000	514,000	98,000	312,000	102,000	0	0	1,026,000	(270,000)	(98,000)	(368,000)
2055	D	422,000	152,000	96,000	0	0	9,000	0	679,000	376,000	62,000	296,000	101,000	0	0	835,000	(138,000)	(69,000)	(207,000)
2056	W	511,000	222,000	115,000	0	0	22,000	28,000	898,000	258,000	58,000	278,000	67,000	0	0	661,000	244,000	48,000	292,000
2057	W	437,000	222,000	116,000	0	0	23,000	0	798,000	249,000	41,000	279,000	73,000	0	0	642,000	110,000	46,000	156,000
2058	N	479,000	205,000	108,000	0	0	15,000	0	807,000	453,000	69,000	266,000	105,000	0	0	893,000	63,000	83,000	146,000
2059	W	482,000	221,000	120,000	0	0	23,000	28,000	874,000	245,000	40,000	275,000	74,000	0	0	634,000	192,000	55,000	247,000
2060	D	395,000	150,000	101,000	0	0	10,000	0	656,000	361,000	51,000	293,000	136,000	0	0	841,000	(157,000)	(76,000)	(233,000)
2061	W	581,000	218,000	120,000	0	0	23,000	28,000	970,000	238,000	40,000	274,000	72,000	0	0	624,000	297,000	56,000	353,000
2062	N	454,000	198,000	113,000	0	0	15,000	0	780,000	372,000	60,000	262,000	109,000	0	0	803,000	115,000	83,000	198,000
2063	N	431,000	200,000	113,000	0	0	15,000	0	759,000	448,000	71,000	264,000	107,000	0	0	890,000	17,000	90,000	107,000
2064	D	376,000	152,000	101,000	0	0	11,000	0	640,000	368,000	52,000	299,000	134,000	0	0	853,000	(183,000)	(68,000)	(251,000)
2065	N	657,000	186,000	111,000	0	0	15,000	0	969,000	360,000	60,000	263,000	103,000	0	0	786,000	321,000	95,000	416,000
2066	W	419,000	218,000	120,000	0	0	23,000	0	780,000	258,000	42,000	280,000	74,000	0	0	654,000	78,000	50,000	128,000
2067	W	430,000	217,000	121,000	0	0	23,000	0	791,000	257,000	42,000	277,000	77,000	0	0	653,000	96,000	54,000	150,000
2068	D	362,000	155,000	102,000	0	0	10,000	0	629,000	451,000	64,000	311,000	113,000	0	0	939,000	(291,000)	(72,000)	(363,000)
2069	D	364,000	154,000	98,000	0	0	10,000	0	626,000	457,000	62,000	312,000	105,000	0	0	936,000	(297,000)	(64,000)	(361,000)
2070	W	638,000	211,000	118,000	0	0	23,000	28,000	1,018,000	237,000	42,000	270,000	70,000	0	0	619,000	350,000	55,000	405,000

Figure CC-64: Change in Storage, Delta-Mendota Subbasin Projected Water Budget



4.3.4 Sustainable Yield

Under SGMA, sustainable yield is defined as "the maximum quantity of water, calculated over a base period representative of long-term conditions in the basin and including any temporary surplus, that can be withdrawn annually from a groundwater supply without causing an undesirable result." (CWC 10721(w)). Sustainable yield estimates for the Upper Aquifer and Lower Aquifer have been developed in a coordinated fashion for the Delta-Mendota Subbasin by the Delta-Mendota Technical Working Group and approved by the Delta-Mendota Coordination Committee.

Upper Aquifer Sustainable Yield Estimate

Methodologies for calculating Upper Aquifer sustainable yield were discussed by both the Delta-Mendota Coordination Committee and an ad-hoc Technical Working Group of the Coordination Committee. During a workshop dedicated to this effort, several basic concepts and principles were discussed to calculate the Upper Aquifer sustainable yield estimate. Consideration was given to several potential options with increasing detail, including a combination of the following: total Subbasin Upper Aquifer pumping volumes, total Subbasin Upper Aquifer change in storage, and Subbasin Upper Aquifer subsurface inflows and outflows. Inflow from certain neighboring subbasins, based on groundwater flow direction, as well as subsurface inflow from the Coast Range at existing gradients (as part of the inflow to the Northern & Central Delta-Mendota Region GSP area) was considered. Outflow to neighboring subbasins at existing gradients was also considered in certain applicable areas along the Delta-Mendota Subbasin boundary based on groundwater flow characteristics.

An overarching goal of this Subbasin is to maintain a balanced water budget by managing groundwater extractions (pumping). Therefore, the Upper Aquifer sustainable yield was estimated using the change in storage from the historic water budget (WY2003-2012). Based on these considerations, the following formula was selected for estimating Upper Aquifer sustainable yield utilizing the consolidated historic water budget components:

Upper Aquifer Sustainable Yield = (Pumping + Change in Storage) + (Subsurface Outflow – Subsurface Inflow)

The formula for determining Upper Aquifer sustainable yield was applied to the following compiled Delta-Mendota Subbasin projected water budgets (WY2014-2070):

- Projected Baseline values with Climate Change Factors
- Projected Baseline values with Climate Change Factors and Projects and Management Actions

This analysis resulted in an Upper Aquifer Sustainable Yield estimate of 403,000 acre-feet.

The Upper Aquifer sustainable yield value, derived from calculations using the best available but limited data, is considered to be a preliminary estimation only and will be updated to an anticipated higher level of accuracy in future GSP updates. The intention of the Delta-Mendota Subbasin GSAs, following GSP submission in 2020, is to increase subbasin-wide data collection efforts. Improved data, modeling results, and understanding of subsurface flows will allow the GSAs and each GSP Group to improve estimated sustainable yield values for future GSP updates. The GSP Groups are in the process of developing GSP implementation guidelines that will address future data collection efforts and other GSP implementation activities.

The Upper Aquifer sustainable yield calculated range reflects the principle that the GSAs within the Delta-Mendota Subbasin reserve the right to claim or retain some portion of subbasin outflow generated by the lowering of groundwater levels from neighboring subbasins and the equitable portion of sources of recharge shared between two subbasins, by physical or non-physical means, in the future if the Delta-Mendota Subbasin GSAs determine that doing so will improve Subbasin sustainability or will prevent undesirable results due to the chronic lowering of groundwater levels. Furthermore, intra-basin coordination during GSP development, followed by continuing inter-basin coordination discussions and data collection after GSP adoption, will allow the GSAs to further refine these determinations.

Lower Aquifer Sustainable Yield Estimate

Currently, within the Delta-Mendota Subbasin, the distribution of known Lower Aquifer water level data and extraction volume data are not sufficient to allow for an accurate calculation of Lower Aquifer sustainable yield utilizing the same methodology as for the Upper Aquifer. Following discussions by both the Coordination Committee and the Technical Working Group of the Coordination Committee, a consensus was reached to establish a Lower Aquifer sustainable yield estimate for the Subbasin based on a projection of existing subsidence rates as measured along the DMC with the minimum threshold established for inelastic land subsidence. In the original 2020 submittal, the calculation for the Lower Aquifer sustainable yield was based on the following. The Westlands Water District GSA recently conducted a study using groundwater modeling, in conjunction with the Westside GSP development, to estimate sustainable yield for the Westside Subbasin. Based on an analysis of available data and an initial assumption of Lower Aquifer sustainable yield equivalent to approximately 0.35 acre-feet per acre within the Westside Subbasin (Westlands Water District GSA, Groundwater Management Strategy Concepts presentation to the WWD Board on October 16, 2018), the GSA estimates a sustainable yield of 230,000 to 250,000 acre-feet, with historic conditions suggesting a range from 250,000 to 300,000 acre-feet (Westlands Water District GSA, Westside Subbasin’s Groundwater Model Forecast and Augmentation Strategies presentation to the WWD Board on April 3, 2019). Using Westlands Water District GSA’s analysis, the Delta-Mendota Coordination Committee recommended a slightly more conservative sustainable yield value of one-third (0.33) an acre-foot per acre for the Delta-Mendota Subbasin. Using this more conservative value, the estimated Lower Aquifer sustainable yield is approximately 250,000 acre-feet per year over the approximately 750,000-acre subbasin. It should be noted that sustainable management of the Lower Aquifer is governed by significant and unreasonable subsidence rather than sustainable yield. The distribution of sustainable yield is not uniform throughout the Subbasin, and it will be the responsibility of each GSA in the Subbasin to manage Lower Aquifer pumping to prevent significant and unreasonable subsidence.

Acknowledging that land subsidence is occurring at localized areas in the Subbasin, the DMCC refined the Lower Aquifer sustainable yield calculation, adjusting the value from 250,000 AF to 101,000 AF, based on observed extractions from the Lower Aquifer during WY2015. This refinement is consistent with the common definitions established across the Subbasin for all SMCs. It is important to note that subsidence will be the primary factor influencing the allowable volume of groundwater that can be extracted from the Lower Aquifer without incurring significant and unreasonable impacts on beneficial uses and users. As such, this number will be updated as data gaps are filled, particularly using the Proposition (Prop) 68 grant-funded well inventory and subsidence study and the results of the Airborne Electromagnetic (AEM) survey recently completed by DWR. Furthermore, the Subbasin will investigate the feasibility to recharge the Lower Aquifer as a means of reducing subsidence and managing future Lower Aquifer sustainable yield.

The Lower Aquifer sustainable yield estimate will be refined in the future based on data collected and compiled for the Subbasin. This current sustainable yield approximation highlights the importance of an accepted Subbasin-level subsidence monitoring program concurrent with improved estimates of sub-Corcoran Clay groundwater extractions.

5. SUSTAINABLE MANAGEMENT CRITERIA

As required by Subarticle 3. Sustainable Management Criteria of the GSP regulations, the GSPs must include a sustainability goal and definitions of undesirable results, in addition to defining what is considered to be significant and unreasonable and establishing minimum thresholds, measurable objectives and 5-year interim goals. Given the variability of conditions within the Delta-Mendota Subbasin, a subbasin-wide sustainability goal and definitions of undesirable results were developed at the subbasin-level, while the definitions of significant and unreasonable, minimum thresholds, measurable objectives and 5-year interim goals were established at the GSP Plan area-level.

This section describes the coordinated sustainability goal and definition of undesirable results at a subbasin-level and the sustainable management criteria at a GSP-level. Sustainable management criteria developed by each GSP Group were further compared and coordinated between neighboring GSP Groups to avoid conflicts, particularly in setting numeric minimum thresholds, measurable objectives, and interim milestones at boundary locations. The sustainable management criteria for each GSP Group for each applicable sustainability indicator are presented herein.

5.1 Coordinated Assumptions and Data

All common coordinated assumptions and data agreed upon and implemented by each GSP Group in developing their respective sustainable management criteria for each applicable sustainability indicator are presented in Technical Memoranda 4 (*Assumptions for Delta-Mendota Subbasin Management Areas, Sustainability Indicators, and GSP Documentation*), which is included in **Appendix B** of this Common Chapter.

During preparation of the January 2020 GSP, each GSP Group drafted their respective sustainable management criteria for each applicable sustainability indicator and then met with their neighboring GSP Groups to coordinate minimum thresholds and measurable objectives to avoid conflicts and ensure each GSP Group would not negatively impact their neighboring GSP Groups from achieving sustainability. In the CIL received on January 21, 2022, DWR stated that "The GSPs have not established common definitions of undesirable results in the Subbasin." nor did they comply with the Emergency GSP Regulations in establishing common definitions and methodologies for SMC. In response, subsequent to receipt of the CIL, the Technical Working Group and Coordination Committee met to develop, at a subbasin level, singular coordinated definitions and methods for establishing SMC for each applicable sustainability indicator.

5.2 Coordinated Sustainability Goal and Undesirable Results

The sustainability goal for the Delta-Mendota Subbasin was established to succinctly state the objectives and desired conditions of the Subbasin that culminates in the absence of undesirable results by 2040. The sustainability goal for the Delta-Mendota Subbasin is as follows and was approved by the Delta-Mendota Subbasin Coordination Committee during the June 10, 2019 meeting:

> *The Delta-Mendota Subbasin will manage groundwater resources for the benefit of all users of groundwater in a manner that allows for operational flexibility, ensures resource availability under drought conditions, and does not negatively impact surface water diversion and conveyance and delivery capabilities. This goal will be achieved through the implementation of the proposed projects and management actions to reach identified measurable objectives and milestones through the implementation of the GSP(s), and through continued coordination with neighboring subbasins to ensure the absence of undesirable results by 2040.*

The following definitions of "undesirable results" were agreed upon during the 20222 revision of this Common Chapter for the following applicable sustainability indicators:

- **Chronic lowering of groundwater levels -** Chronic changes in groundwater levels that diminish access to groundwater, causing significant and unreasonable impacts to beneficial uses and users of groundwater.

- **Reduction in groundwater storage -** A chronic decrease in groundwater storage that causes a significant and unreasonable impact to the beneficial uses and users of groundwater.

- **Degraded water quality -** Degradation of groundwater quality as a result of groundwater management activities that causes significant and unreasonable impacts to beneficial uses and users of groundwater.

- **Land subsidence -** Changes in ground surface elevation that cause damage to critical infrastructure, including significant and unreasonable reductions of conveyance capacity, impacts to natural resource areas, or conditions that threaten public health and safety.

- **Depletions of interconnected surface wat–r -** Depletions of interconnected surface water as a direct result of groundwater pumping that cause significant and unreasonable impacts on natural resources or downstream beneficial uses and users.

5.3 GSP-Level Sustainable Management Criteria

In the original 2020 GSP submittals for the Delta-Mendota Subbasin, each GSP Group defined what was considered significant and unreasonable in their Plan Area for each applicable sustainability indicator, in addition to establishing minimum thresholds, measurable objectives and 5-year interim goals for their Plan Area, consistent with GSP Regulations Article 5. Plan Contents, Subarticle 3. Sustainable Management Criteria (§ 354.2 through 354.30). DWR's *Draft Best Management Practices for the Sustainable Management of Groundwater Sustainable Management Criteria BMP* (2017) document was also used when and where applicable at the discretion of each GSP Group.

Subsequent to this submittal, the Technical Working Group and Coordination Committee met to develop consistent definitions and methodologies for establishing numeric metrics for each applicable sustainability indicator. These revised SMC are discussed in the next section.

5.4 Delta-Mendota Subbasin Sustainable Management Criteria

The sustainable management criteria for each sustainability indicator contains the following components: the subbasin-wide definitions of an undesirable result and of significant and unreasonable, sustainability goals, minimum thresholds (MTs), measurable objectives (MOs), and five-year interim milestones (IMs). Separate tables show the sustainable management criteria for chronic lowering of groundwater levelsError! Reference source not found., reduction in groundwater storageError! Reference source not found., degraded water quality, land subsidence, and depletions of interconnected surface water Error! Reference source not found.with maps showing representative monitoring sites with corresponding numeric MTs and MOs, and a table summarizing the MTs and MOs by representative monitoring location.

5.4.1 Chronic Lowering of Groundwater Levels

Chronic Lowering of Groundwater Levels is arguably the most fundamental Sustainability Indicator, as it directly and indirectly influences several other Sustainability Indicators, such as Reduction of Groundwater Storage, Land Subsidence, and Degraded Water Quality. The Subbasin GSAs are committed to maintaining groundwater levels above historic low conditions in order to avoid undesirable results to beneficial uses and users of groundwater and to prevent further decrease of groundwater levels due to groundwater management actions performed within the Subbasin.

The GSAs developed SMCs for Chronic Lowering of Groundwater Levels using readily available historic records of groundwater level data for 61 of the 75 Representative Monitoring Sites (RMS). The MTs and MOs were developed for each RMS using common data and coordinated assumptions, as detailed in **Table CC-16**, and are consistent with the requirement of Title 23 of the California Code of Regulations (23 CCR) § 354.28(c) to consider trends in historic groundwater levels, water year type, projected water use in the Basin, and relationship with other sustainability indicators. The equivalent process was used in both the Upper Aquifer and Lower Aquifer within the Subbasin.

The MT is currently established as a fixed elevation at each RMS, equivalent to the historic seasonal low prior to the end of WY2016, based on available groundwater level data. The MO is to maintain water levels at or above the Water Year 2015 seasonal high at more than 50% of RMS in a GSP area. The GSAs will conduct a minimum of bi-annual groundwater level monitoring to track progress towards sustainability at the 75 RMS.

Per the definition of Undesirable Results for Chronic Lowering of Groundwater Levels, the exceedance of a MT at a single RMS is not indicative of an Undesirable Result; rather, the exceedance of MTs at 50% or more RMS within a GSP area is considered to cause significant and unreasonable impacts to locally-specific beneficial uses and users of groundwater, namely the increased costs associated with modifying wells to access groundwater, securing alternative sources, or required mitigation of groundwater dependent ecosystems. To account for future year-to-year variations in hydrology, compliance will be assessed by comparing a four-year rolling average of groundwater level measurements to the fixed MT at each RMS within a GSP area.

In addition to the SMCs developed as part of this GSP, the GSAs will continue to coordinate to develop shorter-term ("acute") groundwater level thresholds in the five-year GSP update that will be submitted in 2025. These thresholds will be set at levels that avoid short-term undesirable results, particularly for domestic water users, groundwater dependent ecosystems, and interconnected surface waters and subsidence when present. Each year, both the historic seasonal low MT value and the acute groundwater elevation thresholds will apply, whichever is more protective.

Table CC-16: Delta-Mendota Subbasin SMC for Chronic Lowering of Groundwater Levels	
Definition of Undesirable Results	Chronic changes in groundwater levels that diminish access to groundwater, causing significant and unreasonable impacts to beneficial uses and users of groundwater.
Definition of Significant and Unreasonable	Significant and unreasonable impacts to beneficial uses and users of groundwater are substantially increased costs associated with higher total pumping lift, lowering pumps, drilling deeper wells, or otherwise modifying wells to access groundwater, securing alternative water sources, or required mitigation of groundwater dependent ecosystems. Significant

Table CC-16: Delta-Mendota Subbasin SMC for Chronic Lowering of Groundwater Levels	
	and unreasonable is quantitatively defined as exceeding the MT at more than 50% of representative monitoring sites by aquifer in a GSP area.
Sustainability Goal	Maintain groundwater levels that are comparable to existing conditions (historic low conditions as of Water Year 2016) in order to continue meeting the demand of beneficial uses and users of groundwater and prevent a trend of decreasing groundwater levels. The Delta-Mendota Subbasin will continue successful and ongoing coordination with neighboring Subbasins to address chronic lowering of groundwater levels caused by pumping outside of the Subbasin.
Minimum Threshold	The groundwater elevation indicating a chronic lowering of groundwater levels that may lead to undesirable results is an elevation that is lower than the historical seasonal low. The historic seasonal low is a fixed elevation at each site, based on available groundwater level data prior to the end of Water Year 2016. To account for future year-to-year variations in hydrology, compliance with the fixed historic seasonal low threshold will be compared with a 4-year rolling average of annual groundwater level measurements. Shorter-term ("acute") groundwater elevation thresholds will also be established at each representative monitoring site by 2025 using a coordinated methodology. Acute thresholds will be established at levels that are intended to avoid short-term undesirable results, particularly for domestic water wells, groundwater dependent ecosystems, and interconnected surface waters where present in the Upper Aquifer, and for subsidence in the Lower Aquifer. Each year, both the historic seasonal low and the acute groundwater elevation thresholds will apply, whichever is more protective. Groundwater levels are measured as water surface elevation (WSE). Each GSP area includes multiple representative monitoring sites (RMS) to which the minimum threshold applies. See **Table CC-17**for numeric MTs. For any RMS without data prior to Water Year 2016, MTs and acute thresholds will be established using the aforementioned methodologies and the data resulting from the first five years of monitoring following Water Year 2016 or following construction of the well.
Measurable Objective	Maintain seasonal high groundwater levels at an elevation that is at or above the Water Year 2015 seasonal high at more than 50% of representative monitoring sites in a GSP area. The Water Year 2015 seasonal high is a fixed elevation at each site, based on available groundwater level data. If data are unavailable for Water Year 2015 at a representative monitoring site, either a Water Year 2014 or Water Year 2016 Seasonal High will be used. To account for future year-to-year variations in hydrology, compliance with the fixed seasonal high threshold will be compared with a 4-year rolling average of annual groundwater level measurements. Groundwater levels are measured as water surface elevation (WSE). Each GSP area includes multiple representative monitoring sites (RMS) to which the measurable objective applies. See **Table CC-17** for numeric MOs. For any RMS without data prior to Water Year 2016, Measurable Objectives will be established using the aforementioned methodology and

Table CC-16: Delta-Mendota Subbasin SMC for Chronic Lowering of Groundwater Levels	
	the data resulting from the first five years of monitoring following Water Year 2016 or following the construction of the well.
5-Year Interim Milestones	**Year 5:** Gather data and complete the establishment of seasonal low and seasonal high elevations at representative monitoring sites in the Lower Aquifer for the Grassland GSP area. Develop a coordinated methodology and complete the establishment of acute groundwater elevation thresholds. Identify chronic lowering of groundwater levels caused by pumping outside the Subbasin. **Year 10:** Maintain groundwater levels at MOs. Where chronic lowering of groundwater levels is caused by pumping outside of the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. **Year 15:** Maintain groundwater levels at MOs. Where chronic lowering of groundwater levels is caused by pumping outside of the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs.

The numeric MTs and MOs by RMS are shown below in **Figure CC-65** for the Upper Aquifer and **Figure CC-66** for the Lower Aquifer, with the numeric SMC tabulated in **Table CC-17**.

Table CC-17: Numeric SMC for the Chronic Lowering of Groundwater Levels

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (ft above MSL, NAVD88)	Measurable Objective (ft above MSL, NAVD88)
09-001	Aliso Water District	Upper	40.5	114.3
09-002	Aliso Water District	Upper (Composite)	-4.0	17.1
09-003	Aliso Water District	Upper	37.4	52.9
09-004	Aliso Water District	Upper	37.7	51.9
10-001	Farmers Water District	Upper	34.0	102.7
12-001	Fresno County	Upper	98.2	103.2
13-001	Fresno County	Upper	109.4	120.5
13-003	Fresno County	Upper	48.6	116.1
13-004	Fresno County	Lower	-59.0	-27.0
11-001	Grassland	Lower	TBD	TBD
11-002	Grassland	Lower	TBD	TBD
11-003	Grassland	Lower	TBD	TBD
11-004	Grassland	Lower	TBD	TBD

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (ft above MSL, NAVD88)	Measurable Objective (ft above MSL, NAVD88)
11-005	Grassland	Lower	TBD	TBD
11-006	Grassland	Lower	TBD	TBD
11-007	Grassland	Upper	79.9	91.1
11-008	Grassland	Upper	82.3	93.2
11-009	Grassland	Upper	63.4	77.3
11-013	Grassland	Upper	76.8	80.4
11-014	Grassland	Upper	68.1	80.7
11-015	Grassland	Upper	72.8	75.7
11-016	Grassland	Upper	83.1	92.8
11-017	Grassland	Upper	90.2	116.6
11-019	Grassland	Upper	27.0	27.0
19-003	Grassland	Upper	90.5	91.8
01-001	NCDM	Lower	-44.9	-13.4
01-002	NCDM	Lower	-36.1	-18.9
01-003	NCDM	Lower	-21.8	62.3
01-004	NCDM	Upper	158.9	161.8
01-005	NCDM	Upper	110.6	179.6
01-006	NCDM	Lower	77.1	94.0
01-007	NCDM	Lower	12.3	56.7
01-008	NCDM	Lower	-44.9	2.4
02-002	NCDM	Lower	-18.3	33.7
02-009	NCDM	Upper	-6.2	29.8
03-001	NCDM	Upper	30.7	46.7
03-002	NCDM	Upper	7.7	67.2
03-003	NCDM	Upper	TBD	TBD
04-001	NCDM	Lower	-17.6	-3.6
06-001	NCDM	Lower	-52.3	16.1
06-002	NCDM	Upper	31.5	44.6
06-003	NCDM	Lower	-9.1	18.5
06-004	NCDM	Upper	14.8	30.5
07-002	NCDM	Lower	1.6	10.8
07-003	NCDM	Upper	62.5	89.9
07-005	NCDM	Lower	-84.7	-41.8
07-007	NCDM	Lower	-53.4	-26.6
07-008	NCDM	Lower	-63.0	-47.0
07-009	NCDM	Upper	49.3	73.9
07-010	NCDM	Upper	64.0	96.2
07-012	NCDM	Upper	TBD	TBD
07-014	NCDM	Lower	-133.5	-47.2

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (ft above MSL, NAVD88)	Measurable Objective (ft above MSL, NAVD88)
07-015	NCDM	Lower	-147.0	-65.0
07-016	NCDM	Lower	-2.4	74.6
07-017	NCDM	Upper	TBD	TBD
07-018	NCDM	Upper	TBD	TBD
07-028	NCDM	Lower	-88.2	-64.8
07-029	NCDM	Upper	TBD	TBD
07-030	NCDM	Lower	TBD	TBD
07-031	NCDM	Lower	TBD	TBD
07-032	NCDM	Lower	TBD	TBD
07-035	NCDM	Upper	-99.8	95.2
08-002	NCDM	Upper	50.7	83.7
14-001	SJREC	Upper	24.0	48.5
14-002	SJREC	Upper	96.5	125.7
14-003	SJREC	Upper	81.3	92.2
14-004	SJREC	Upper	78.7	92.6
14-005	SJREC	Upper	92.2	106.2
14-006	SJREC	Upper	76.7	98.2
14-007	SJREC	Upper	73.5	98.5
14-008	SJREC	Upper	70.5	98.5
14-019	SJREC	Lower	-48.8	35.0
14-020	SJREC	Lower	38.1	57.4
14-021	SJREC	Lower	-33.0	14.8
23-001	SJREC	Upper	102.3	120.2

T–D - Numeric SMC to be determined after five years of data have been collected for this representative monitoring site.

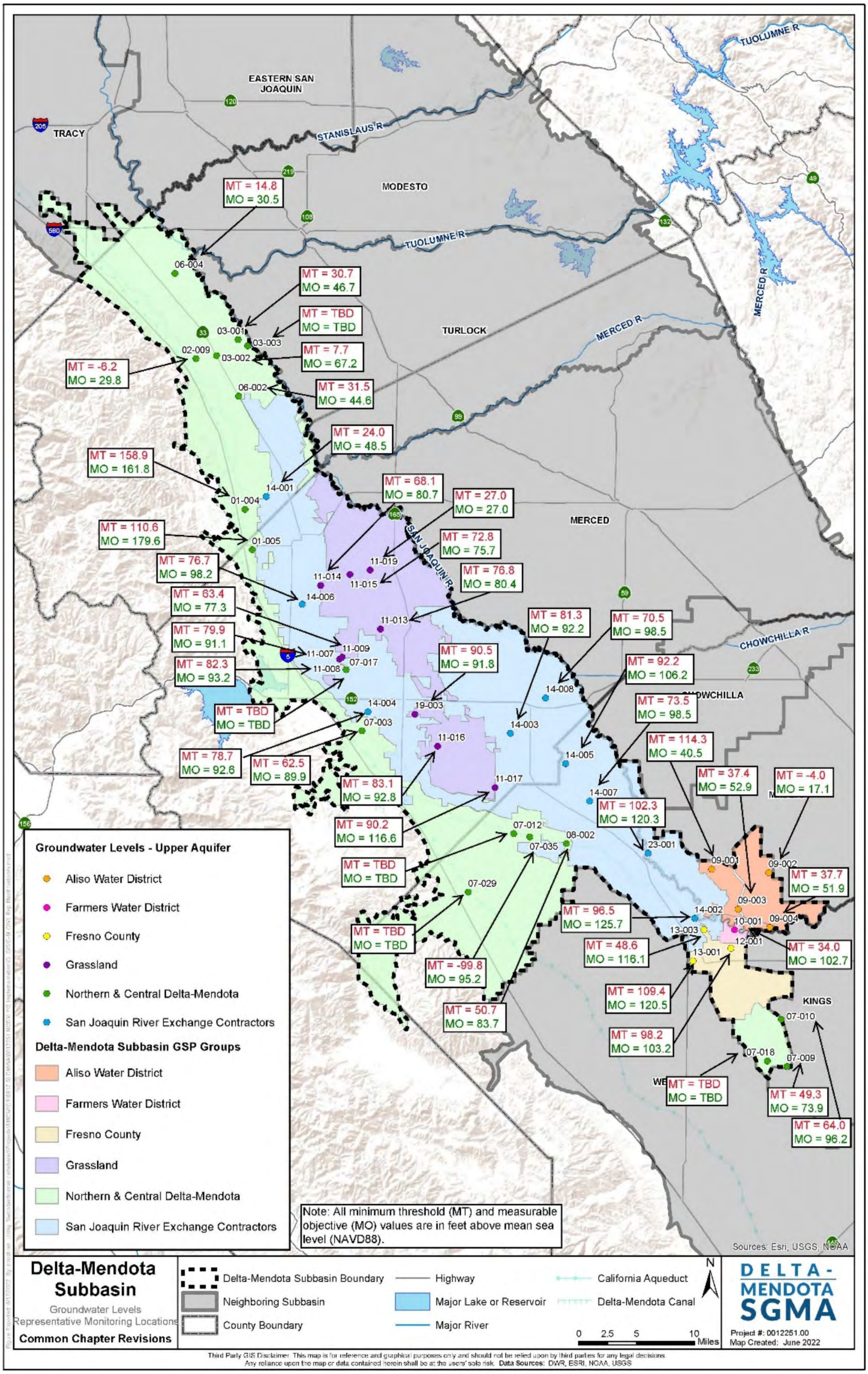


Figure CC-65: Groundwater Level Representative Monitoring Locations with SMC – Upper Aquifer

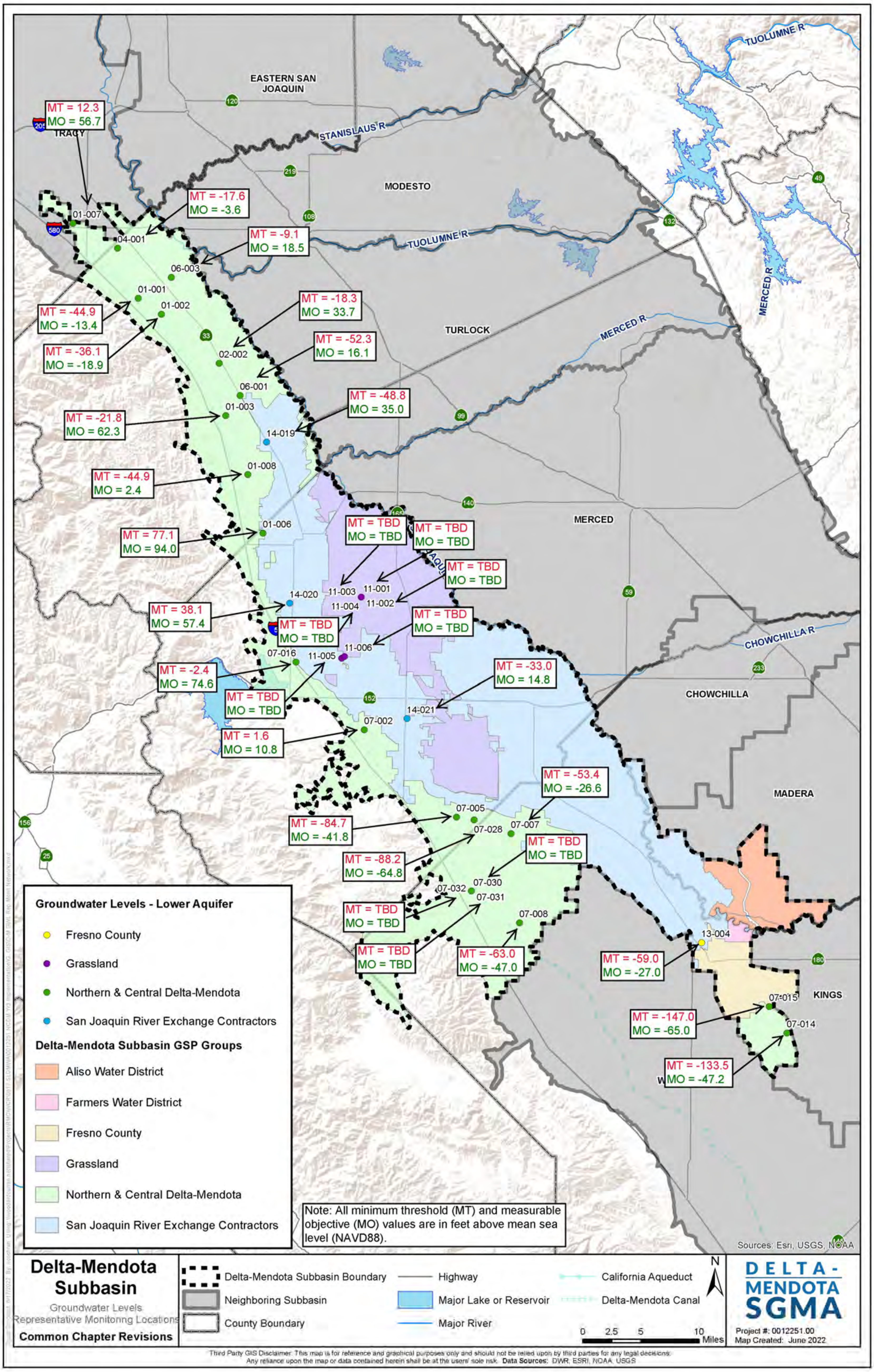


Figure CC-66: Groundwater Level Representative Monitoring Locations with SMC – Lower Aquifer

5.4.2 Reduction in Groundwater Storage

The GSAs intend to maintain groundwater storage at volumes that will continue to meet the demands of beneficial uses and users of groundwater, provide a three-year drought buffer, and minimize reductions in groundwater storage during extended dry periods. Further, the GSAs will coordinate with neighboring subbasins to address reductions in groundwater storage caused by pumping outside of the Subbasin. The SMCs were developed using common data and coordinated assumptions, as detailed in **Table CC-18** and will be monitored a minimum of bi-annually as detailed for Chronic Lowering of Groundwater Levels in Section 5.4.1 (**Table CC-16**) and consistent Land Subsidence monitoring as detailed in Section 5.4.4 (**Table CC-21**).

Pursuant to 23 CCR § 354.28(d), the MTs for Reduction of Groundwater Storage may be set by using groundwater levels as a proxy if it is demonstrated that a correlation exists between the two metrics. It is logical to link these two Sustainability Indicators for the Upper Aquifer, as the amount of groundwater in storage is directly, if not linearly, related to groundwater levels. As such, in the Upper Aquifer, it is not necessary to set a unique MT for Reduction of Groundwater Storage, and the MTs for Chronic Lowering of Groundwater Levels are used as a proxy for the Reduction of Groundwater Storage Sustainability Indicator. Similarly, the MOs for Chronic Lowering of Groundwater Levels serves as a proxy for Reduction of Groundwater Storage. Because the SMCs established for Chronic Lowering of Groundwater Levels are designed to maintain groundwater levels above historic low conditions, they are protective of the Reduction of Groundwater Storage Sustainability indicator and local beneficial uses and users of the Upper Aquifer, as the SMCs maintain sufficient water storage to maintain beneficial uses, including the conjunctive use of groundwater.

In the Lower Aquifer, the physical reduction in groundwater storage is caused by inelastic land subsidence, as detailed in Section 5.4.4 (**Table CC-21**). As such, the SMCs set for Land Subsidence (which are designed to reduce subsidence caused by groundwater extraction in the Subbasin, with no additional subsidence after 2040) are reasonably protective and used as a tool to calculate the Reduction of Groundwater Storage Sustainability Indicator SMCs in the Lower Aquifer[1].

[1] The most significant subsidence in the Subbasin observed between from 2014-2018 was a 0.6-foot decline at Check 18 of the Delta-Mendota Canal. During those same years, the water budget calculation estimated what the change in storage was in the Lower Aquifer. Given the apparent relationship between the loss in groundwater storage and the observed subsidence, the projected allowable additional subsidence (i.e., two feet by 2040) was converted to a groundwater storage volume in the Lower Aquifer and used as the SMC.

Table CC-18: Delta-Mendota Subbasin SMC for Reduction in Groundwater Storage	
Definition of Undesirable Results	A chronic decrease in groundwater storage that causes a significant and unreasonable impact to the beneficial uses and users of groundwater.
Definition of Significant and Unreasonable	A significant and unreasonable impact to beneficial uses and users of groundwater is insufficient water storage to maintain beneficial uses and natural resource areas in the Subbasin, including the conjunctive use of groundwater.
Sustainability Goal	Maintain historic groundwater storage volumes in order to continue meeting the demand of beneficial uses and users of groundwater and to provide a 3-year drought buffer. Minimize reductions in groundwater storage during extended dry periods. Work with neighboring Subbasins to address reduction in groundwater storage caused by pumping outside of the Subbasin.
Minimum Threshold	For the Upper Aquifer, as a reasonable proxy for an individual groundwater storage threshold, maintain groundwater levels in accordance with the minimum threshold set for Chronic Lowering of Groundwater Levels. For the Lower Aquifer, correlate the SMCs for inelastic land subsidence with the reduction in groundwater storage that would cause undesirable results, estimated to be 1.1 million acre-feet of storage loss by 2040 attributable to groundwater extraction in the Subbasin.
Measurable Objective	For the Upper Aquifer, maintain groundwater levels in accordance with the measurable objectives set for Chronic Lowering of Groundwater Levels. For the Lower Aquifer, minimize loss of groundwater storage caused by inelastic land subsidence.
5-Year Interim Milestones	**Year 5:** Maintain groundwater levels in accordance with the measurable objectives. Identify reduction in groundwater storage caused by pumping outside the Subbasin. **Year 10:** Maintain groundwater levels in accordance with the measurable objectives. Where reduction in groundwater storage is caused by pumping outside of the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. **Year 15:** Maintain groundwater levels in accordance with the measurable objectives. Where reduction in groundwater storage is caused by pumping outside of the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs.

5.4.3 Degraded Groundwater Quality

The GSP groups within the Delta-Mendota Subbasin are committed to preventing the migration or elevated concentrations of constituents of concern due to groundwater management activities. The primary constituent of concern in the Subbasin is salinity, frequently reported as total dissolved solids (TDS).

For drinking water, California has three secondary maximum contaminant level (SMCL) standards for TDS, all based on aesthetic considerations such as taste and odor, not public health concerns. These are 500 mg/L (recommended limit), 1,000 mg/L (upper limit), and 1,500 mg/L (short-term limit). To reflect the Subbasin's designation as a Municipal (MUN) beneficial use, as established in the Central Valley Water Control Plans (often referred to as Basin Plans), the Subbasin has selected the upper limit of 1,000 mg/L as the Minimum Threshold.

The Delta-Mendota GSAs also recognize that a Salt Control Program for the San Joaquin Valley was recently developed through the collaborative CV-SALTS Program and was adopted into the Central Valley Basin Plans to address the long-term problem of salt accumulation in the Valley. The program recognizes that salt accumulation and water uses vary widely across the Valley. The program approach is intended to protect beneficial uses by maintaining water quality that meets applicable objectives, allow some salt accumulation in areas where salt can be stored without impairing beneficial uses of water, and, through long-term management, restore water quality where reasonable, feasible, and practicable.

A Prioritization and Optimization (P&O) Study planning process is now underway to identify potential requirements that will protect beneficial uses, improve salt management, and restore water quality where possible. During the next ten years (Phase 1), the P&O Study will: characterize the salt conditions and trends in the Valley; identify salt management needs and mechanisms; evaluate the feasibility of potential solutions; prepare an implementation plan; and review and recommend revising salinity regulations as necessary. [1]

The minimum thresholds and measurable objectives for groundwater quality incorporate these standards and objectives for salinity. The minimum threshold is therefore set as 1,000 mg/L TDS, and the measurable objective is a concentration less than 1,000 mg/L TDS with acknowledgement that salinity standards are still being developed by water quality experts and regulatory agencies in the Central Valley, and thus may need to be revised in the future. Additionally, groundwater is frequently blended with other water supplies to reduce TDS concentrations to meet the salinity sensitivity of a particular beneficial use.

For any representative monitoring site that currently exceeds the TDS thresholds set forth above, the existing regulatory water quality compliance and remediation programs will apply. These include, but are not limited to, the CV-SALTS Salt Control Program, the County Drought Plan requirements for State Small Water Systems and Domestic Wells (SB 552), the Safe and Affordable Funding for Equity and Resilience (SAFER) program, and the Bureau of Reclamation's Refuge Water Supply Program. For any future exceedance of the TDS thresholds at representative monitoring sites that do not currently exceed the objectives, the applicable GSP group is required to coordinate and publish an assessment of the effect of groundwater management activities on the documented exceedance, and propose timely actions to manage groundwater differently in order to avoid exacerbating the exceedance.

The sustainable management criteria also incorporate by reference the specific requirements for preventing the migration of contaminants adopted by the Central Valley Regional Water Quality Control Board in Cleanup and Abatement Orders for individual contaminated sites.[2]

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[1] *See* https://www.cvsalinity.org/salt-program/; https://www.waterboards.ca.gov/centralvalley/water_issues/basin_plans/sacsjr_201805.pdf

[2] *E.g.*, the Cleanup and Abatement Order R5-2018-0033 for the Spreckels facility: https://www.waterboards.ca.gov/centralvalley/board_decisions/adopted_orders/fresno/r5-2018-0033.pdf

Table CC-19: Delta-Mendota Subbasin SMC for Degraded Groundwater Quality	
Definition of Undesirable Results	Degradation of groundwater quality as a result of groundwater management activities that causes significant and unreasonable impacts to beneficial uses and users of groundwater.
Definition of Significant and Unreasonable	Significant and unreasonable impacts to beneficial uses and users of groundwater as a result of groundwater management activities are the migration of contaminant plumes or elevated concentrations of constituents of concern that reduce groundwater availability, and the degradation of surface water quality as a result of groundwater migration that substantially impair an existing beneficial use. Significant and unreasonable is quantitatively defined as exceeding the MT at more than 50% of representative monitoring sites by aquifer in a GSP area where current groundwater quality (as established in the Subbasins GSPs) does not exceed 1,000 mg/L TDS.
Sustainability Goal	Minimize further impairment of water supplies resulting from groundwater management activities that cause the migration or concentration of contaminant plumes or the increased rate of movement or concentrations of constituents of concern. Coordinate with and support compliance with existing regulatory groundwater quality orders and objectives for drinking water, agricultural irrigation, and managed wetlands. Work with neighboring Subbasins to address existing or potential impairments of groundwater quality in the Subbasin caused by groundwater management activities outside the Subbasin.
Minimum Threshold	The minimum threshold for salinity is 1,000 mg/L TDS. For representative monitoring sites that currently exceed the minimum threshold, existing regulatory water quality compliance and remediation programs will apply, including but not limited to, the CV-SALTS Salt Control Program, the Irrigated Lands Regulatory Program, the County Drought Plan requirements for State Small Water Systems and Domestic Wells (SB 552), and the Safe and Affordable Funding for Equity and Resilience (SAFER) program. For any RMS without data prior to the end of Water Year 2016, current (ambient) groundwater quality will be established using data collected during the first five years of monitoring following Water Year 2016 or following construction of the well. For representative monitoring sites that do not currently exceed the minimum threshold, but are found to exceed minimum thresholds in the future, the applicable GSP group will conduct and publish an assessment of the effect of groundwater management activities on the documented exceedance, and propose timely actions to manage groundwater differently, if needed, to avoid exacerbating the exceedance. The applicable GSP group will also coordinate with the appropriate regulatory program to address the impact.
Measurable Objective	The measurable objective for salinity will be concentrations less than 1,000 mg/L TDS. Each GSP group will participate in, provide data for, and track and report on compliance with orders and objectives adopted by the State and Central Valley Regional Water Quality Control Boards and similar regulatory agencies, in coordination with the Central Valley Groundwater Monitoring Collaborative.

Table CC-19: Delta-Mendota Subbasin SMC for Degraded Groundwater Quality	
5-Year Interim Milestones	**Year 5:** Maintain salinity consistent with measurable objectives. Participate in, provide data for, and track and report on compliance with orders and objectives adopted by the State Water Resources and Central Valley Regional Water Quality Control Boards and similar regulatory agencies, in coordination with the Central Valley Groundwater Monitoring Collaborative. Develop correlation between groundwater quality and groundwater levels in order to establish methodology for the use of groundwater levels as a proxy for groundwater quality. **Year 10:** Maintain water quality consistent with measurable objectives. Continue monitoring and publishing groundwater quality data, and tracking and reporting on compliance with regulatory orders and objectives. Where water quality impairments are caused by activities outside the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. Utilizing the methodology developed by the Year 5 Interim Milestone, develop minimum thresholds and measurable objectives for groundwater quality that utilize groundwater elevations as a proxy for monitoring. **Year 15:** Maintain water quality consistent with measurable objectives. Continue monitoring and publishing groundwater quality data, and tracking and reporting on compliance with regulatory orders and objectives. Where water quality impairments are caused by activities outside the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs.

The numeric MTs and MOs by RMS are shown below in **Figure CC-67** for the Upper Aquifer and **Figure CC-68** for the Lower Aquifer, with the numeric SMC tabulated in **Table CC-20**.

Table CC-20: Numeric SMC for Degraded Groundwater Quality

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (TDS in mg/L)	Measurable Objective (TDS in mg/L)
09-002	Aliso Water District	Upper	1,000	< 1,000
09-003	Aliso Water District	Upper	1,000	< 1,000
09-005	Aliso Water District	Upper	1,000	< 1,000
09-196	Aliso Water District	Upper	1,000	< 1,000
10-001	Farmers Water District	Upper	1,000	< 1,000
10-005	Farmers Water District	Upper	1,000	< 1,000
12-002	Fresno County	Upper	N/A	N/A
12-003	Fresno County	Upper	N/A	N/A
12-004	Fresno County	Upper	N/A	N/A
12-005	Fresno County	Upper	N/A	N/A
12-006	Fresno County	Upper	1,000	< 1,000
12-007	Fresno County	Upper	N/A	N/A
13-006	Fresno County	Upper	N/A	N/A
13-007	Fresno County	Upper	N/A	N/A

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (TDS in mg/L)	Measurable Objective (TDS in mg/L)
13-008	Fresno County	Upper	N/A	N/A
11-010	Grassland	Lower	TBD	TBD
11-011	Grassland	Lower	1,000	< 1,000
11-012	Grassland	Lower	1,000	< 1,000
11-021	Grassland	Upper	N/A	N/A
19-002	Grassland	Upper	1,000	< 1,000
19-004	Grassland	Upper	N/A	N/A
01-001	NCDM	Lower	1,000	< 1,000
01-002	NCDM	Lower	1,000	< 1,000
01-003	NCDM	Lower	N/A	N/A
01-004	NCDM	Upper	1,000	< 1,000
01-006	NCDM	Lower	1,000	< 1,000
01-007	NCDM	Lower	1,000	< 1,000
01-008	NCDM	Lower	1,000	< 1,000
01-018	NCDM	Upper (assumed)	1,000	< 1,000
02-002	NCDM	Lower	1,000	< 1,000
02-009	NCDM	Upper	1,000	< 1,000
03-001	NCDM	Upper	N/A	N/A
03-003	NCDM	Upper	N/A	N/A
03-007	NCDM	Upper	1,000	< 1,000
04-001	NCDM	Lower	1,000	< 1,000
06-001	NCDM	Lower	1,000	< 1,000
06-002	NCDM	Upper	1,000	< 1,000
06-003	NCDM	Lower	1,000	< 1,000
06-004	NCDM	Upper	N/A	N/A
07-002	NCDM	Lower	1,000	< 1,000
07-003	NCDM	Upper	1,000	< 1,000
07-007	NCDM	Lower	1,000	< 1,000
07-008	NCDM	Lower	N/A	N/A
07-012	NCDM	Upper	N/A	N/A
07-014	NCDM	Lower	1,000	< 1,000
07-015	NCDM	Lower	1,000	< 1,000
07-016	NCDM	Lower	1,000	< 1,000
07-017	NCDM	Upper	1,000	< 1,000
07-018	NCDM	Upper	N/A	N/A
07-028	NCDM	Lower	N/A	N/A
07-029	NCDM	Upper	N/A	N/A
07-030	NCDM	Lower	N/A	N/A
07-031	NCDM	Lower	N/A	N/A
07-032	NCDM	Lower	N/A	N/A

DMS ID	GSP Region	Principal Aquifer	Minimum Threshold (TDS in mg/L)	Measurable Objective (TDS in mg/L)
07-033	NCDM	Upper	1,000	< 1,000
07-034	NCDM	Lower (assumed)	N/A	N/A
07-035	NCDM	Upper	N/A	N/A
08-002	NCDM	Upper	N/A	N/A
14-001	SJREC	Upper	1,000	< 1,000
14-002	SJREC	Upper	1,000	< 1,000
14-003	SJREC	Upper	N/A	N/A
14-004	SJREC	Upper	1,000	< 1,000
14-005	SJREC	Upper	N/A	N/A
14-006	SJREC	Upper	1,000	< 1,000
14-007	SJREC	Upper	N/A	N/A
14-008	SJREC	Upper	1,000	< 1,000
14-019	SJREC	Lower	1,000	< 1,000
14-020	SJREC	Lower	1,000	< 1,000
14-021	SJREC	Lower	N/A	N/A
23-001	SJREC	Upper	1,000	< 1,000

Notes:
1. Current TDS concentration is defined as prior to the end of WY 2016.
2. N/A - Current groundwater quality exceeds 1,000 mg/L TDS.
3. TBD - Numeric SMC to be determined after five years of data have been collected for this representative monitoring site.

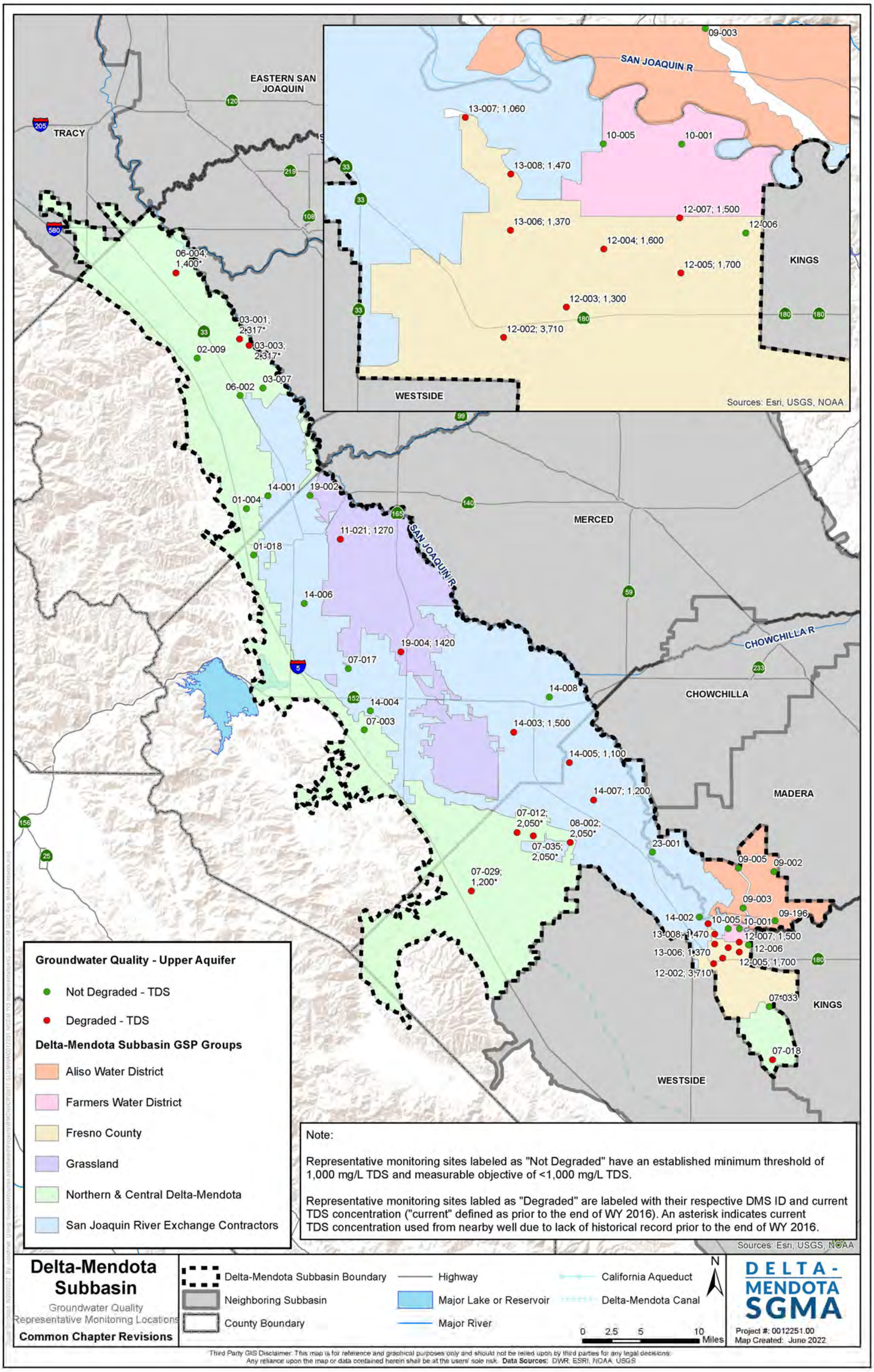

Figure CC-67: Groundwater Quality Representative Monitoring Locations with SMC – Upper Aquifer

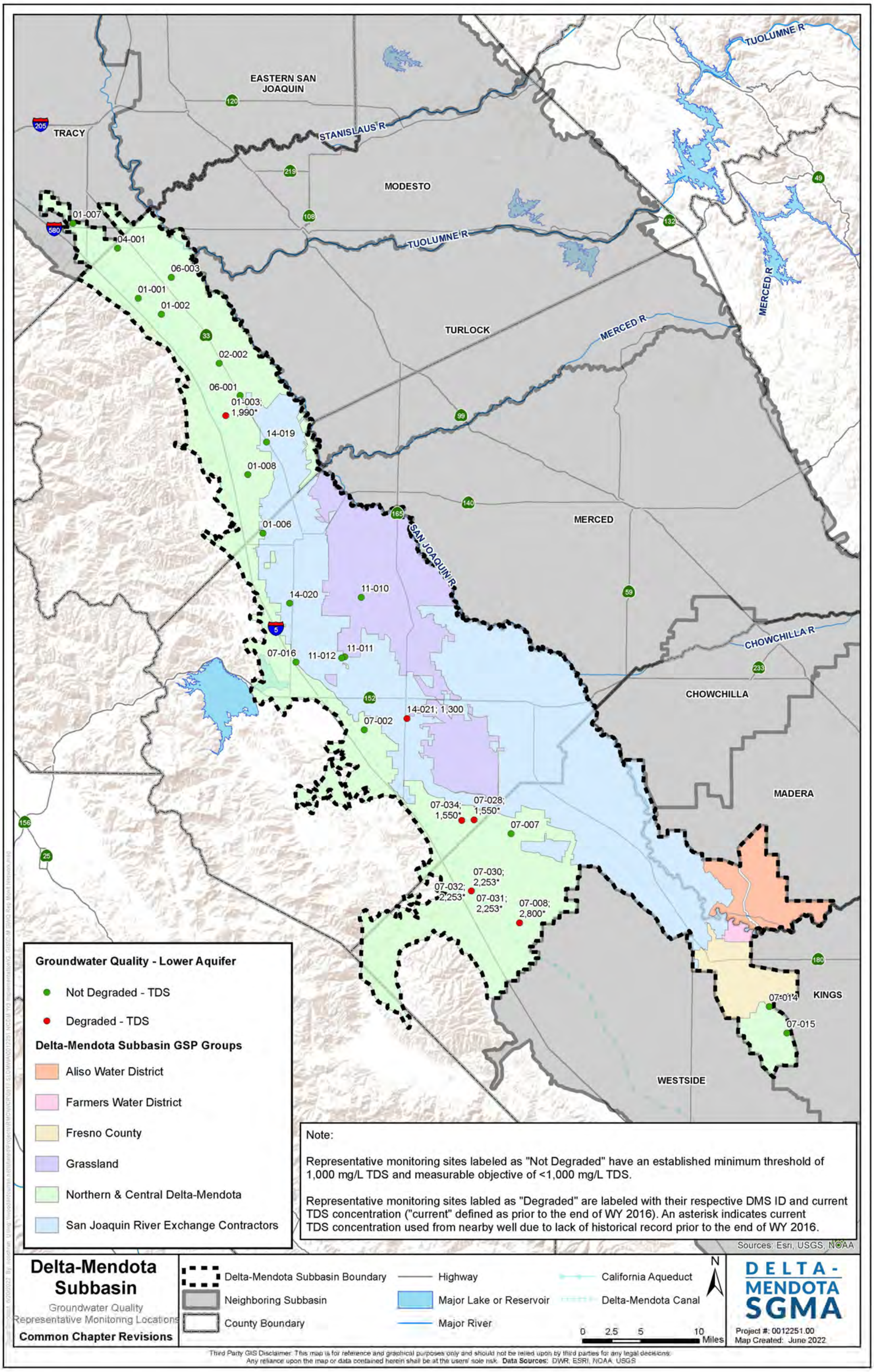

Figure CC-68: Groundwater Quality Representative Monitoring Locations with SMC – Lower Aquifer

5.4.4 Inelastic Land Subsidence

The Subbasin GSAs are committed to ramping down the amount of allowable subsidence caused by groundwater extraction in the Subbasin and eliminating additional subsidence within the Subbasin by 2040. Further, the GSAs will coordinate with neighboring subbasins to address inelastic land subsidence caused by groundwater management activities that occur outside of the Subbasin.

The SMCs for Land Subsidence were coordinated at the Subbasin level and are designed to be protective of critical infrastructure, including significant and unreasonable reductions of conveyance capacity (i.e., structural damage that creates an unmanageable reduction of design capacity), impacts to natural resource areas (i.e., unmitigated decreases in the ability to irrigate or drain these areas by gravity), or conditions that threaten public health and safety (i.e., unmitigated reduction of freeboard that allows for flooding, or unmitigated damage to roads and bridges). The Subbasin-wide MT is set to prevent subsidence that exceeds the corrective design standards or established triggers for critical infrastructure, including the Delta-Mendota Canal and California Aqueduct. At the RMS, the MT is defined as two feet of additional inelastic subsidence by 2040 attributable to groundwater extraction within the Subbasin. The MO is set at no additional subsidence after 2040 based on groundwater extractions within the Delta-Mendota Subbasin.

The GSAs further developed Interim Milestones (IMs) to periodically reduce the amount of allowable subsidence and meet the MO by 2040. The IMs allow for no more than 1.0 foot of additional subsidence by 2025, 0.5 feet of additional subsidence by 2030 (1.5 feet of cumulative subsidence), 0.25 feet of additional subsidence by 2035 (1.75 feet of cumulative subsidence), and 0.25 feet of additional subsidence by 2040 (2.0 feet of cumulative subsidence). The SMCs were defined at 45 RMS in the Subbasin, and the GSAs will conduct monitoring to track progress towards sustainability. Additionally, as part of the 5-year update to the GSPs, the Subbasin Hydrogeologic Conceptual Model (HCM) will be reviewed and revised to incorporate new data, including Airborne Electromagnetic (AEM) survey data provided by DWR and data/results from the Subsidence Study prepared using Prop 68 grant funding. Additionally, the GSAs will continue work with USBR on revisions to the CVHM2 model for simulating groundwater extraction-subsidence interactions, to re-evaluate inelastic land subsidence SMC to consider new data and studies, and to assess allowable land subsidence on a Subbasin and localized (subbasin subarea) basis.

Table CC-21: Delta-Mendota Subbasin SMC for Inelastic Land Subsidence	
Definition of Undesirable Results	Changes in ground surface elevation that cause damage to critical infrastructure, including significant and unreasonable reductions of conveyance capacity, impacts to natural resource areas, or conditions that threaten public health and safety.
Definition of Significant and Unreasonable	Significant and unreasonable damage to conveyance capacity from inelastic land subsidence is structural damage that creates an unmitigated and unmanageable reduction of design capacity or freeboard. Significant and unreasonable impacts to natural resource areas from inelastic land subsidence are unmitigated decreases in the ability to flood or drain such areas by gravity. Significant and unreasonable threats to public health and safety from inelastic land subsidence are those that cause an unmitigated reduction of freeboard that allows for flooding, or unmitigated damage to roads and bridges.

Table CC-21: Delta-Mendota Subbasin SMC for Inelastic Land Subsidence	
Sustainability Goal	Minimize inelastic land subsidence by ramping down allowable subsidence caused by groundwater extraction in the Subbasin, with no additional subsidence after 2040. Work with neighboring Subbasins to address inelastic land subsidence caused by groundwater extraction outside of the Subbasin.
Minimum Threshold	At representative monitoring sites, the change in ground surface elevation that would cause undesirable results is up to 2 feet of additional inelastic land subsidence attributable to groundwater extraction in the Subbasin. Prevent subsidence caused by groundwater extractions in the Delta-Mendota Subbasin that exceeds corrective design standards or established triggers for critical infrastructure including the Delta-Mendota Canal, California Aqueduct, and roads and bridges.
Measurable Objective	Minimize inelastic land subsidence attributable to groundwater extraction within the Subbasin, with no additional subsidence after 2040.
5-Year Interim Milestones	**Year 5:** Interim goal of no more than 1 foot of additional inelastic land subsidence attributable to groundwater extraction in the Subbasin during the first 5-year period of SGMA implementation. Review and revise Hydrogeologic Conceptual Model (HCM) to incorporate new data. Re-evaluate inelastic land subsidence SMC to consider new data and studies and to assess allowable land subsidence on a Subbasin and localized (subbasin subarea) basis. Gather data and complete the selection or establishment of representative monitoring sites (RMS) for land subsidence, with particular attention to the locations of critical infrastructure in the Subbasin, and in coordination with the Bureau of Reclamation and Department of Water Resources. Determine the relative proportion of subsidence caused by groundwater extraction within and outside the Subbasin for each RMS. Where subsidence is caused by pumping outside the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. **Year 10:** Interim goal of no more than 0.5 feet of additional inelastic land subsidence attributable to groundwater extraction in the Subbasin during the second 5-year period of SGMA implementation, for a cumulative total of 1.5 feet in the first 10 years. Where subsidence is caused by groundwater extraction outside the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. Continue work to improve understanding of interconnection between groundwater extractions and land subsidence, utilizing model simulations and/or data collection and analysis. **Year 15:** Interim goal of no more than 0.25 feet of additional inelastic land subsidence attributable to groundwater extraction in the Subbasin during the third 5-year period of SGMA implementation, for a cumulative total of 1.75 feet in the first 15 years. Where subsidence is caused by groundwater extraction outside the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs. Continue work to improve understanding of interconnection between groundwater extractions and land subsidence, utilizing model simulations and/or data collection and analysis.

The numeric MTs and MOs by RMS are shown below in **Figure CC-69**, with the numeric SMC tabulated in **Table CC-22**.

Table CC-22: Numeric SMC for Inelastic Land Subsidence

DMS ID	GSP Region	Minimum Threshold (Inelastic Land Subsidence in ft Attributable to Groundwater Extraction)	Measurable Objective (Inelastic Land Subsidence in ft Attributable to Groundwater Extraction)
09-006	Aliso Water District	2	0
09-007	Aliso Water District	2	0
09-008	Aliso Water District	2	0
10-008	Farmers Water District	2	0
12-010	Fresno County	2	0
13-010	Fresno County	2	0
11-018	Grassland	2	0
11-019	Grassland	2	0
11-020	Grassland	2	0
01-009	NCDM	2	0
01-010	NCDM	2	0
01-011	NCDM	2	0
01-012	NCDM	2	0
01-013	NCDM	2	0
01-014	NCDM	2	0
01-015	NCDM	2	0
01-016	NCDM	2	0
01-017	NCDM	2	0
02-003	NCDM	2	0
02-004	NCDM	2	0
02-005	NCDM	2	0
02-006	NCDM	2	0
02-007	NCDM	2	0
02-008	NCDM	2	0
03-004	NCDM	2	0
03-005	NCDM	2	0
03-006	NCDM	2	0
04-003	NCDM	2	0
04-004	NCDM	2	0
04-005	NCDM	2	0
06-006	NCDM	2	0
07-019	NCDM	2	0
07-020	NCDM	2	0
07-021	NCDM	2	0
07-022	NCDM	2	0

DMS ID	GSP Region	Minimum Threshold (Inelastic Land Subsidence in ft Attributable to Groundwater Extraction)	Measurable Objective (Inelastic Land Subsidence in ft Attributable to Groundwater Extraction)
07-023	NCDM	2	0
07-024	NCDM	2	0
07-025	NCDM	2	0
07-026	NCDM	2	0
07-027	NCDM	2	0
14-014	SJREC	2	0
14-015	SJREC	2	0
14-016	SJREC	2	0
14-017	SJREC	2	0
14-018	SJREC	2	0

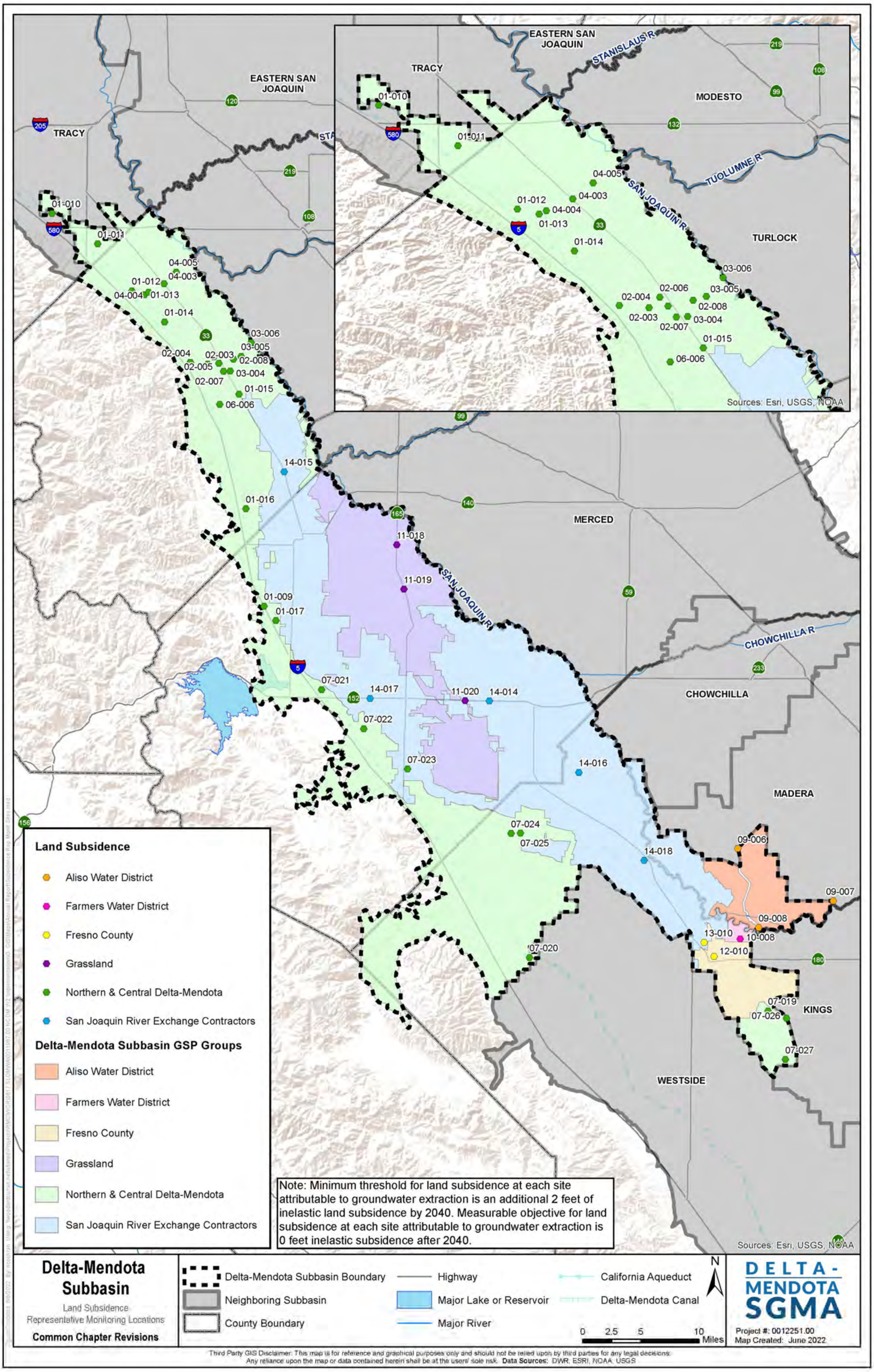

Figure CC-69: Land Subsidence Representative Monitoring Locations with SMC

5.4.5 Depletion of Interconnected Surface Water

The GSAs are committed to managing groundwater within the Subbasin to maintain interconnected surface waters comparable to existing conditions and prevent a trend of increasing interconnected surface water losses from the San Joaquin River. The GSAs will coordinate with neighboring subbasins to address interconnected surface water losses caused by groundwater management activities that occur outside of the Subbasin.

Presently, the Depletion of Interconnected Surface Water Sustainability Indicator is identified as a data gap within the Subbasin. Until the GSAs are able to collect the additional data necessary to set quantitative SMCs for this Sustainability Indicator, the SMCs for Chronic Lowering of Groundwater Levels serve as a proxy in the Upper Aquifer, pursuant to 23 CCR §354.28(d). Because the SMCs established for Chronic Lowering of Groundwater Levels are designed to maintain groundwater levels above historic low conditions, they are understood to be protective of the Depletion of Interconnected Surface Water Sustainability indicator and local natural resources and downstream beneficial uses and users. The RMS locations and frequency are consistent with that detailed in Section 6.

The GSAs plan to establish an Interconnected Surface Water monitoring network and develop SMCs as detailed in Table CC-18. By 2025, the GSAs anticipate completing an Interconnected Surface Water monitoring network that includes nine existing sites in the San Joaquin River Restoration Program and additional sites funded by the SGMA Implementation Grant award. The additional RMS will focus on the Northern & Central Delta-Mendota and Grassland GSP areas along the San Joaquin River. By 2030, the GSAs anticipate being able to gather and analyze data from these new RMS to estimate the influence of groundwater levels on gains and losses observed on the San Joaquin River. At this point, the Subbasin GSAs will establish Interconnected Surface Water SMCs as a rate or volume of surface water depletions that have adverse impacts on beneficial uses and users and may lead to undesirable results.

Table CC-23: Delta-Mendota Subbasin SMC for Depletions of Interconnected Surface Water	
Definition of Undesirable Results	Depletions of interconnected surface water as a direct result of groundwater pumping that cause significant and unreasonable impacts on natural resources or downstream beneficial uses and users.
Definition of Significant and Unreasonable	Significant and unreasonable impacts on natural resources or downstream beneficial uses and users of groundwater are a reduction in available surface water supplies for natural resource areas, and reductions in downstream water availability as a result of increased streamflow depletions along the San Joaquin River when compared to similar historic water year types.
Sustainability Goal	Maintain interconnected surface waters comparable to existing conditions (historic low conditions as of Water Year 2016) in order to prevent a trend of increasing interconnected surface water losses from the San Joaquin River. Work with neighboring Subbasins to address increased interconnected surface water losses caused by pumping outside of the Subbasin.
Minimum Threshold	Interconnected Surface Water is an identified data gap in the Delta-Mendota Subbasin. As an interim minimum threshold, use the Chronic Lowering of Groundwater Level Minimum Threshold as a proxy for impacts to interconnected surface waters (see below). The groundwater elevation indicating a chronic lowering of groundwater levels that may lead to undesirable results is an elevation that is lower than the historical seasonal low. The historic seasonal low is a fixed elevation at each

Table CC-23: Delta-Mendota Subbasin SMC for Depletions of Interconnected Surface Water	
	site, based on available groundwater level data prior to the end of Water Year 2016. To account for future year-to-year variations in hydrology, compliance with the fixed historic seasonal low threshold will be compared with a 4-year rolling average of annual groundwater level measurements. Groundwater levels are measured as water surface elevation (WSE). Each GSP area includes multiple representative monitoring sites (RMS) to which the minimum threshold applies. For any RMS without data prior to Water Year 2016, Minimum Thresholds and acute thresholds will be established using the aforementioned methodologies and the data resulting from the first five years of monitoring following Water Year 2016 or following construction of the well.
Measurable Objective	Interconnected Surface Water is an identified data gap in the Subbasin. As an interim measurable objective, use the Chronic Lowering of Groundwater Level Measurable Objective as a proxy for interconnected surface waters (see below). Maintain seasonal high groundwater levels at an elevation that is at or above the Water Year 2015 seasonal high at representative monitoring sites in a GSP area. The Water Year 2015 seasonal high is a fixed elevation at each site, based on available groundwater level data. If data are unavailable for Water Year 2015 at a representative monitoring site, either a Water Year 2014 or Water Year 2016 Seasonal High will be used. To account for future year-to-year variations in hydrology, compliance with the fixed seasonal high threshold will be compared with a 4-year rolling average of annual groundwater level measurements. Groundwater levels are measured as water surface elevation (WSE). Each GSP area includes multiple representative monitoring sites (RMS) to which the measurable objective applies. For any RMS without data prior to Water Year 2016, Measurable Objectives will be established using the aforementioned methodology and the data resulting from the first five years of monitoring following Water Year 2016 or following the construction of the well.
5-Year Interim Milestones	**Year 5:** Fill data gaps, establish, and manage groundwater use to avoid the rate or volume of surface water depletions that have adverse impacts on beneficial uses and users and may lead to undesirable results. The Subbasin will complete a monitoring network of Interconnected Surface Water sites that will include six existing sites and datasets. GSP groups will complete the monitoring network with additional sites installed with SGMA Implementation Grant funding awarded to the Subbasin. The existing nine sites are part of the San Joaquin River Restoration Program and are located along the San Joaquin River at the southern end of the Subbasin. These nine sites, and the associated datasets, will continue to be utilized by the Subbasin as part of its monitoring network. Additional representative monitoring network sites for Interconnected Surface Water will focus on the Northern & Central Delta-Mendota and Grassland GSP areas along the San Joaquin River. **Year 10:** Gather and analyze data from Subbasin's established representative monitoring network sites. Also gather and analyze available data in cooperation with neighboring subbasins, the U.S. Bureau of Reclamation's San Joaquin River Restoration Program, the U.S. Geological Survey, and DWR's California Data Exchange Center (CDEC), to estimate the influence of groundwater on gains and losses in the San Joaquin River. Establish minimum thresholds and

Table CC-23: Delta-Mendota Subbasin SMC for Depletions of Interconnected Surface Water	
	measurable objectives as a rate or volume of surface water depletions that have adverse impacts on beneficial uses and users and may lead to undesirable results. **Year 15:** Monitor and maintain interconnected surface waters in accordance with revised minimum thresholds and measurable objectives. Where increased interconnected surface water losses are caused by pumping outside of the Subbasin, seek remedies in coordination with the Department of Water Resources and neighboring GSAs.

The RMN for this sustainability indicator is shown below in **Figure CC-70**. Please see **Table CC-17** for the numeric SMC associated with the Chronic Lowering of Groundwater Levels.

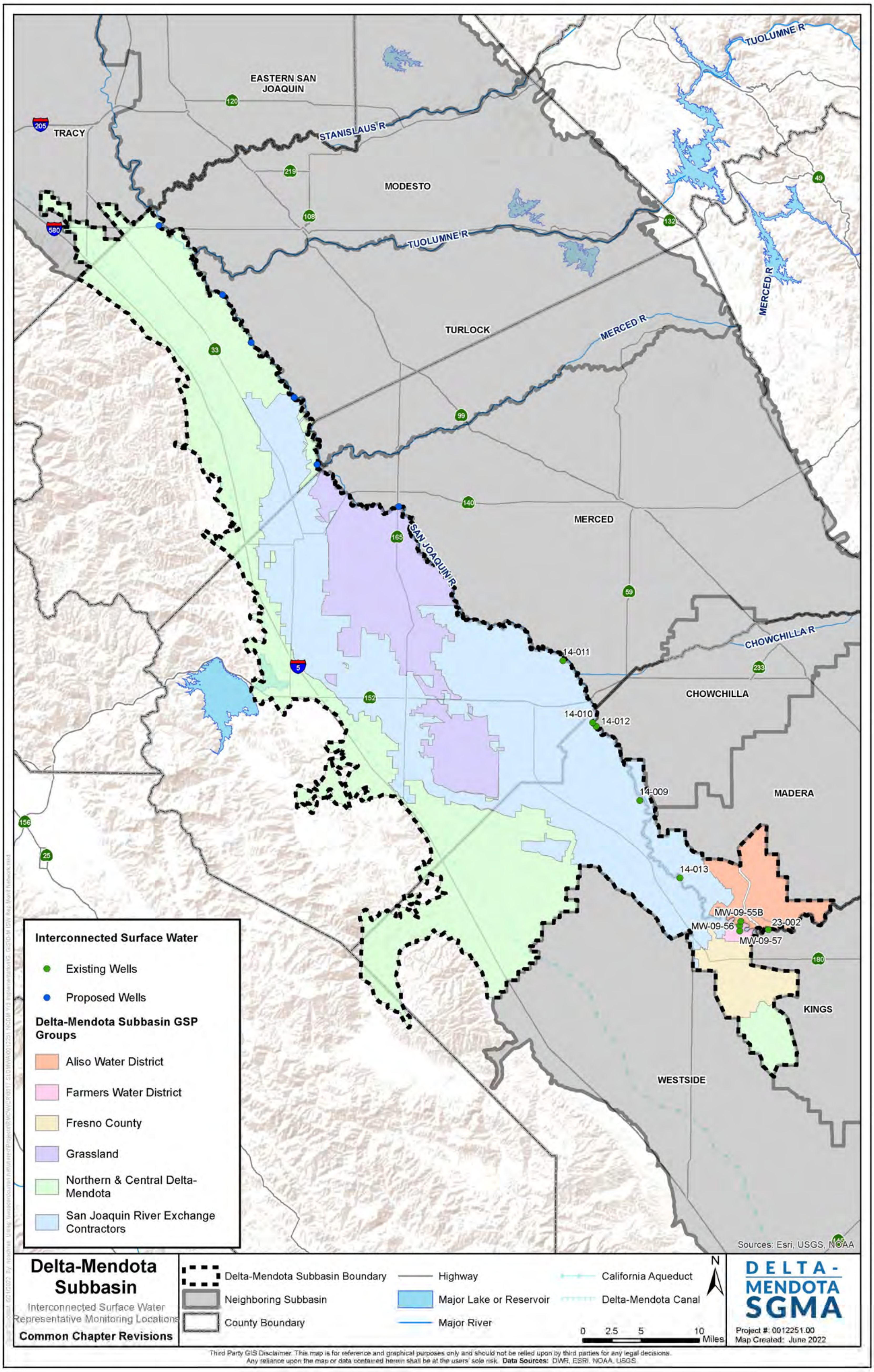

Figure CC-70: Interconnected Surface Water Representative Monitoring Locations with SMC

6. SUBBASIN MONITORING PROGRAM

As required by Subarticle 4. Monitoring Networks of the GSP regulations, the GSPs must include a monitoring network for each sustainability indicator, in addition to describing the monitoring protocols and data management to be followed in implementing the GSP monitoring program. Given the variability of conditions within the Delta-Mendota Subbasin, each GSP Group initially developed their individual monitoring networks, in coordination with their neighboring GSP Groups, such that the subbasin-wide monitoring program is simply a compilation of those coordinated individual monitoring networks. These representative monitoring networks were then re-evaluated as part of the update to the Subbasin GSP in 2022. Please see the individual GSPs for further discussion as to how the monitoring networks were developed.

The subbasin-wide monitoring networks presented herein are the representative monitoring networks for each of the applicable sustainability indicators, as defined according to the GSP Regulations § 354.36, *Representative Monitoring*. It is at the representative monitoring sites where each GSP Group has defined minimum thresholds, measurable objectives, and interim milestones to evaluate progress in achieving the Subbasin's sustainability goal by 2040. Data collected at the representative monitoring locations may be augmented with additional data, as available and appropriate, from other locations and/or publicly available datasets, in evaluating Subbasin conditions on an annual basis.

6.1.1 Coordinated Assumptions and Data

As previously noted, the required monitoring networks were initially developed at the GSP-level in order to appropriately capture the variability of hydrogeologic and water quality conditions in the Delta-Mendota Subbasin, and then re-evaluated at the Subbasin level to confirm that the monitoring networks meet the necessary requirements. All common coordinated assumptions agreed upon and implemented by each GSP Group in developing their respective monitoring networks are presented in Technical Memorandum 5 (*Assumptions for Delta-Mendota Subbasin Monitoring Network*) which is included in **Appendix B** of this Common Chapter.

6.1.2 Coordinated Monitoring Activities

All Delta-Mendota Subbasin GSP Groups have agreed to utilize the following monitoring protocols, data management, and roles and responsibilities for implementing and reporting from their respective monitoring plans under SGMA to ensure consistency in data collection, analysis and management allowing for subbasin-wide evaluation of groundwater conditions relative to the Subbasin sustainability goal, as defined and agreed upon by all GSP Groups.

Monitoring Protocols

Each GSP Group will utilize agreed-upon protocols, which may be the same as, or equal to, data collection protocols (i.e., industry standards and best management practices) to ensure the collection of comparable data using comparable methods. Additionally, the following minimum monitoring frequency for each applicable sustainability indicator was agreed upon by each GSP Group during the joint Delta-Mendota Subbasin Coordination Committee and Technical Working Group meeting on June 18, 2019:

- **Chronic lowering of groundwater levels/reduction in groundwater storage -** Twice per year, with seasonal high groundwater elevation data collected between February and April, and seasonal low groundwater elevation data collected between September and October. All measurements will be collected to a tenth of a foot.

- **Degraded water quality** – Once per year during irrigation season, typically between May and July.
- **Depletions of interconnected surface water** – Twice per year in conjunction with groundwater level monitoring.
- **Subsidence** – Publicly available subsidence data will be used along with locally-collected data. At a minimum, three data points will be collected within the first five years of GSP implementation, with a baseline value from 2019 or a date prior to that.

For non-monitored data to be reported as part of the annual reports (e.g., groundwater extractions, surface water deliveries), actual metered data will be used where such data exists, and when direct data do not exist, estimated quantities will be calculated based on existing indirect data (e.g., electrical usage, crop demand, ET) and/or other industry best practices. Additionally, where available and applicable, public datasets will be used to augment monitoring data collected by the Subbasin and analyzed on an annual basis.

Data Management

Each GSP Group will be responsible for conducting quality control reviews of data collected from the monitoring networks. As described in the Coordination Agreement, each GSP Group will exchange and share collected data in order to facilitate analysis and reporting at the Subbasin level. The Coordinated Data Management System (DMS) will be the primary vehicle by which data are shared amongst the GSP Groups, and it will be the responsibility of each GSP Group to conduct a quality control review of data entered into the DMS.

Roles and Responsibilities

It will be the responsibility of each GSP Group, and the GSAs included in that group, to conduct the monitoring program as agreed upon at the Subbasin level, for reviewing the data collected, and for ensuring that these data are available at the Subbasin level. **Figure CC-71** shows the general flow of data collected from the Delta-Mendota monitoring programs.

Figure CC-72 shows the roles and responsibilities of each GSA and GSP Group in the collecting, processing and reporting of data from the GSP monitoring networks. Additionally, it is the responsibility of each GSP Group, including their respective GSAs, to maintain the monitoring network and, as appropriate, revise and/or expand the monitoring networks to fill identified data gaps. Please see the individual GSPs for further information regarding data gaps and the GSAs plans for addressing those gaps.

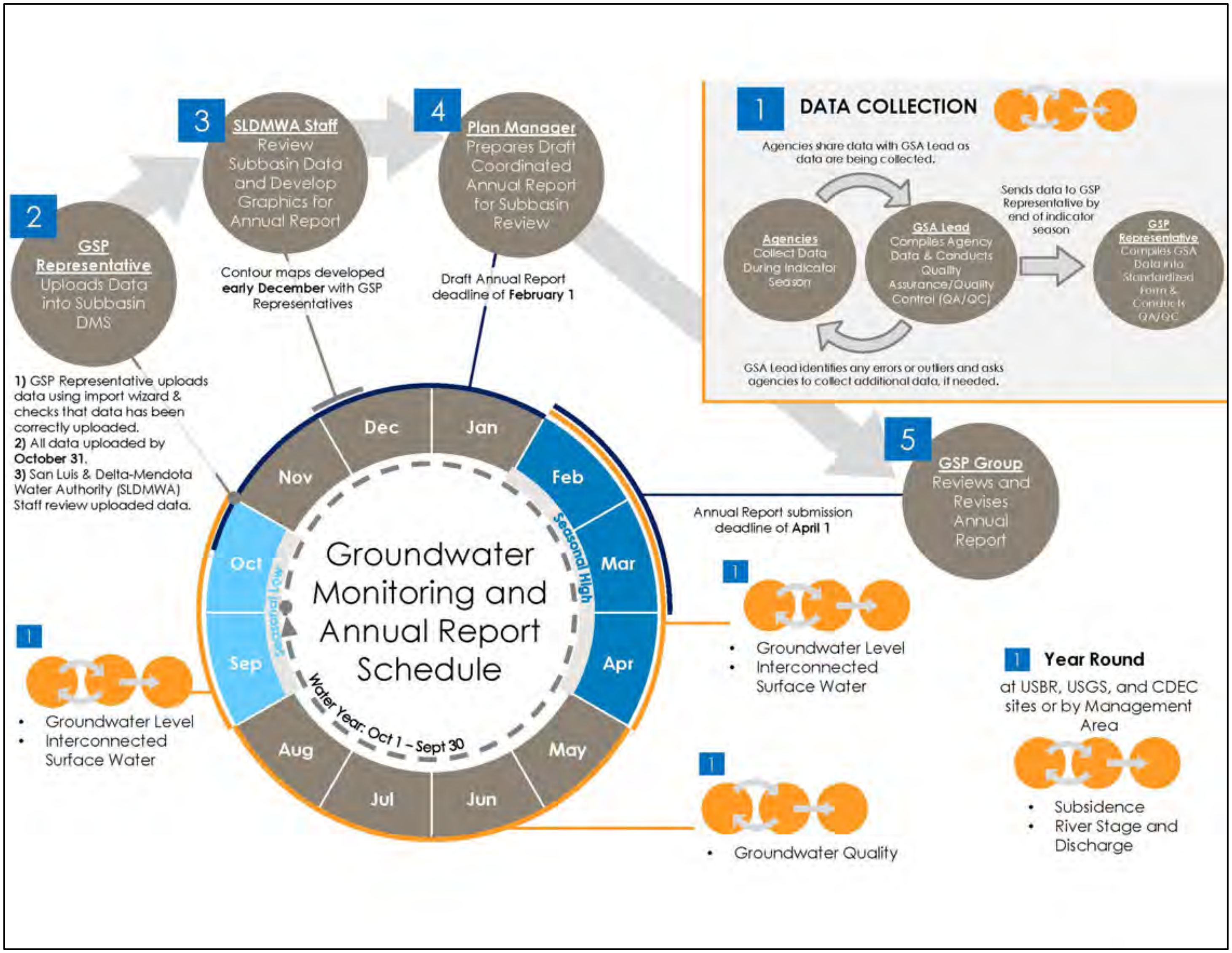

Figure CC-71: Data Flow in Delta-Mendota Subbasin

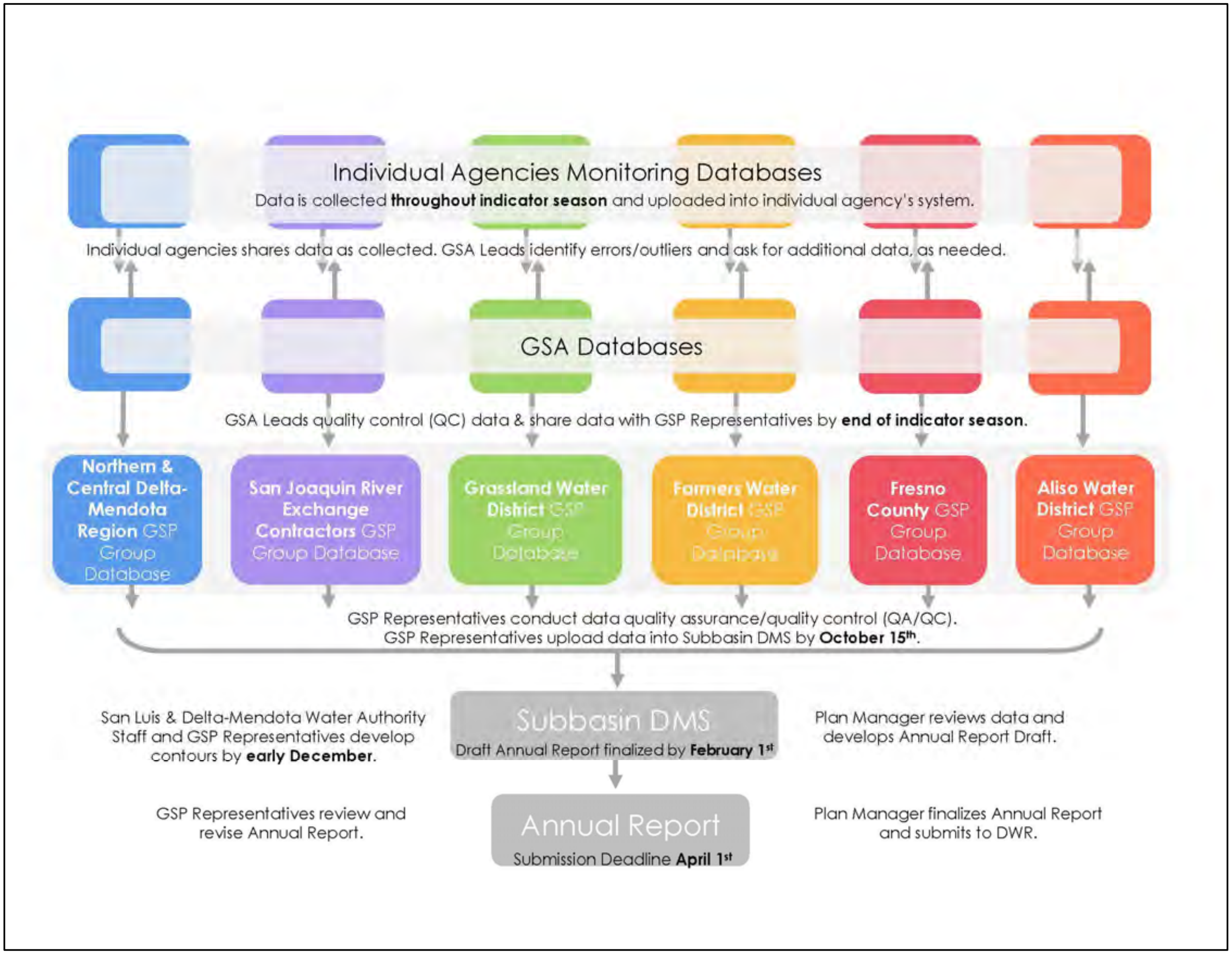

Figure CC-72: Delta-Mendota Monitoring and Data Management Roles and Responsibilities

6.1.3 GSP-Level Monitoring Networks

For more information on the individual GSP monitoring networks for each applicable sustainability indicator, including how the networks were developed, please refer to the individual GSPs. The monitoring networks for each applicable sustainability indicator for each GSP Group were developed in accordance with the GSP Regulations Article 5. Plan Contents, Subarticle 4. Monitoring Networks (§ 354.21 – 354.40). DWR's Best Management Practices for the *Sustainable Management of Groundwater Monitoring Protocols, Standards, and Sites BMP* (2016b) and *Monitoring Networks and Identification of Data Gaps BMP* (2016a) documents were used when and where applicable at the discretion of each GSP group in developing monitoring networks and monitoring protocols.

6.1.4 Delta-Mendota Subbasin Monitoring Networks

The subbasin-level monitoring networks are a compilation of the representative monitoring networks developed by each individual GSP Group and reviewed and modified at the Subbasin level for consistency and appropriate coverage. The monitoring network for the chronic lowering of groundwater sustainability indicator is comprised of two parts, the Upper Aquifer (**Figure CC-73**) and Lower Aquifer (**Figure CC-74**). The monitoring networks for the reduction in groundwater storage for the Upper Aquifer and Lower Aquifer are the same as those utilized for the chronic lowering of groundwater levels. The monitoring network for the degraded water quality sustainability indicator is also comprised of two parts, the Upper Aquifer (**Figure CC-75**) and Lower Aquifer (**Figure CC-76**). Data gaps (areas without wells of known construction) are shown for the Upper Aquifer and Lower Aquifer for the chronic lowering of groundwater and degraded water quality sustainability indicator. The interconnected surface water monitoring network for the Delta-Mendota Subbasin is shown in **Figure CC-77**, and the monitoring network for land subsidence for the Delta-Mendota Subbasin is shown in **Figure CC-78**.

The Delta-Mendota Subbasin representative monitoring networks will be periodically reviewed and revised, as appropriate, by the GSP Groups responsible for maintaining them and coordinated at the Subbasin level. Revised monitoring networks will be included in the five-year updates to the GSPs.

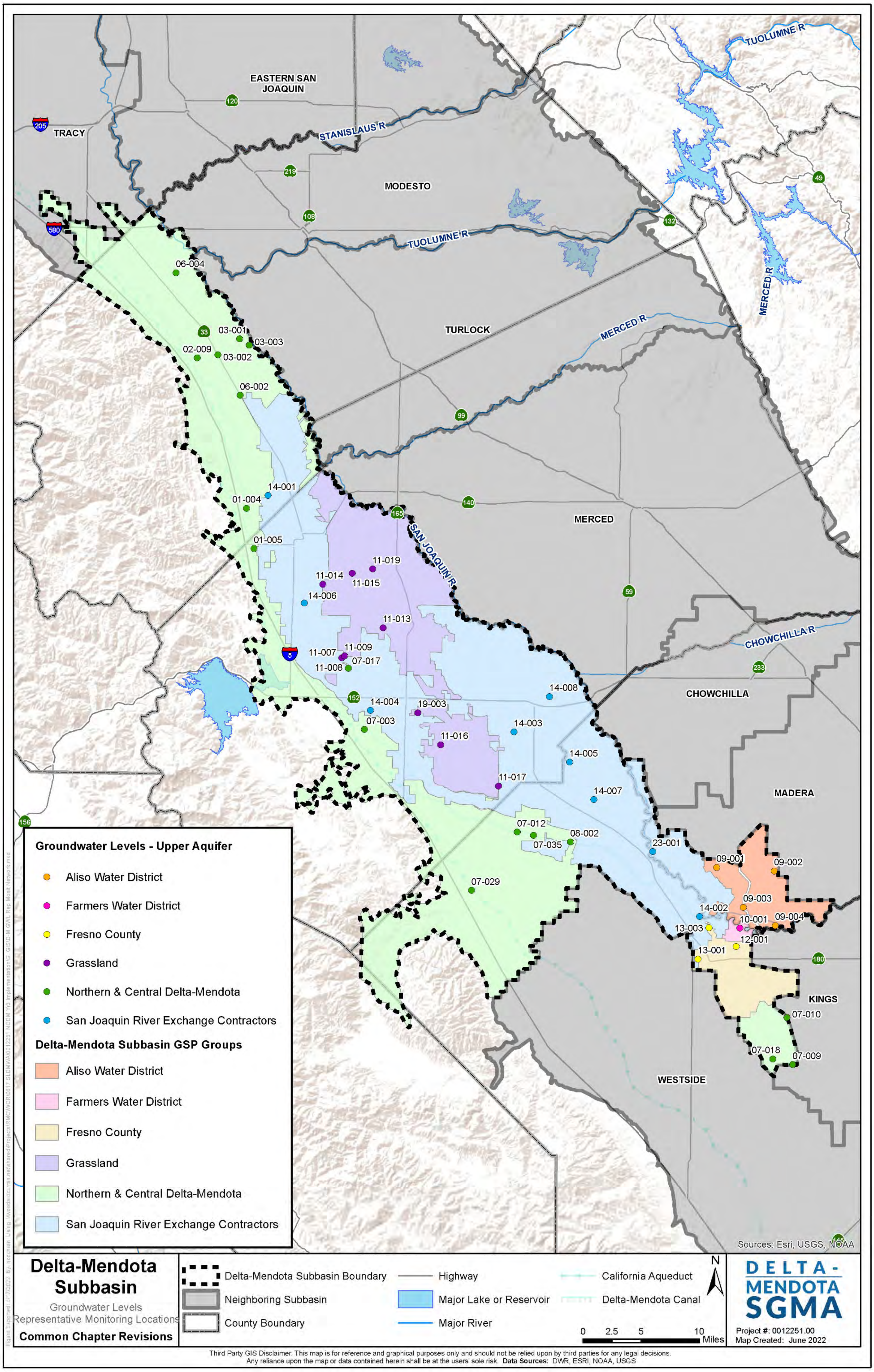

Figure CC-73: Upper Aquifer Groundwater Level Monitoring Network

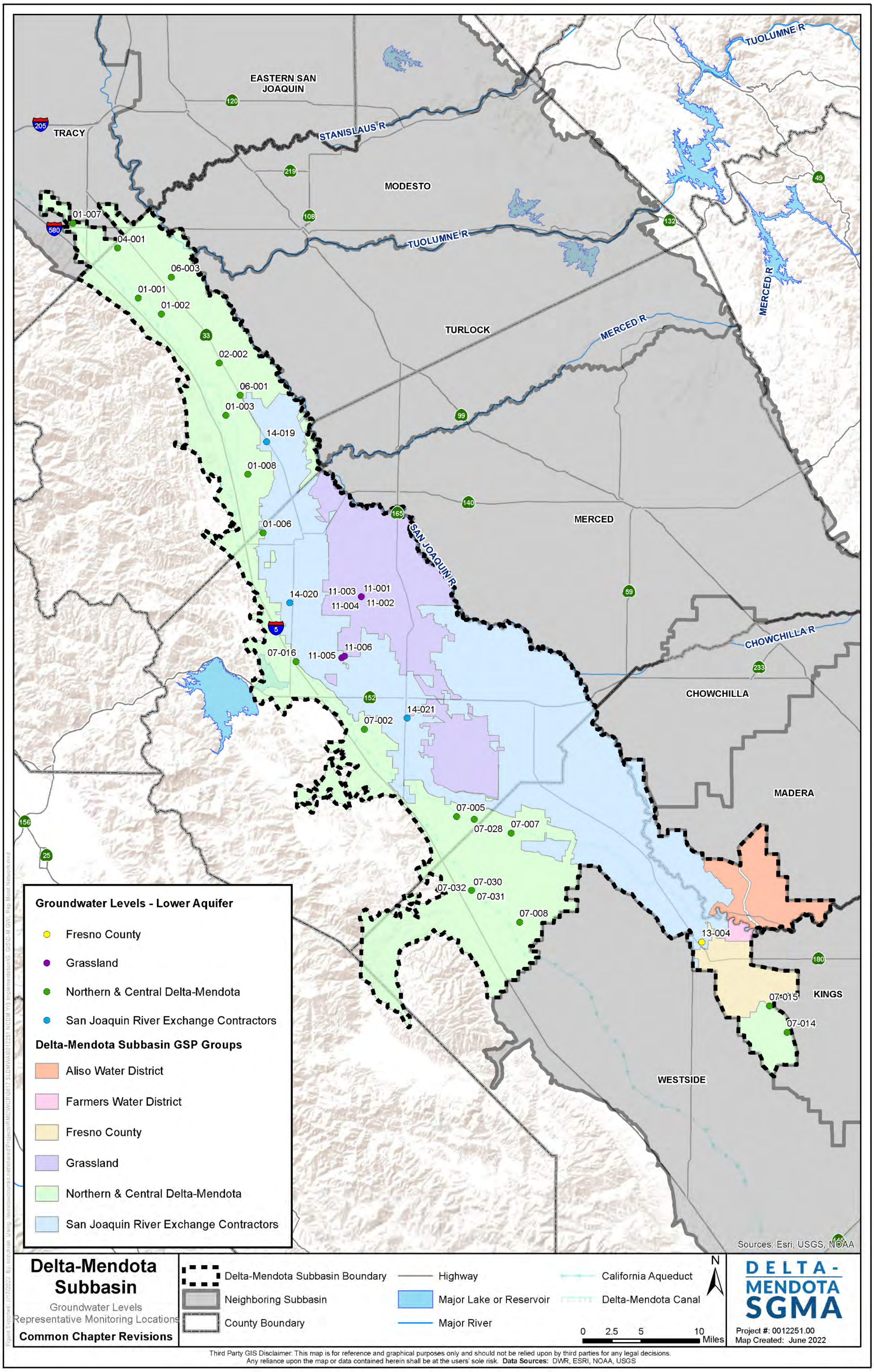

Figure CC-74: Lower Aquifer Groundwater Level Monitoring Network

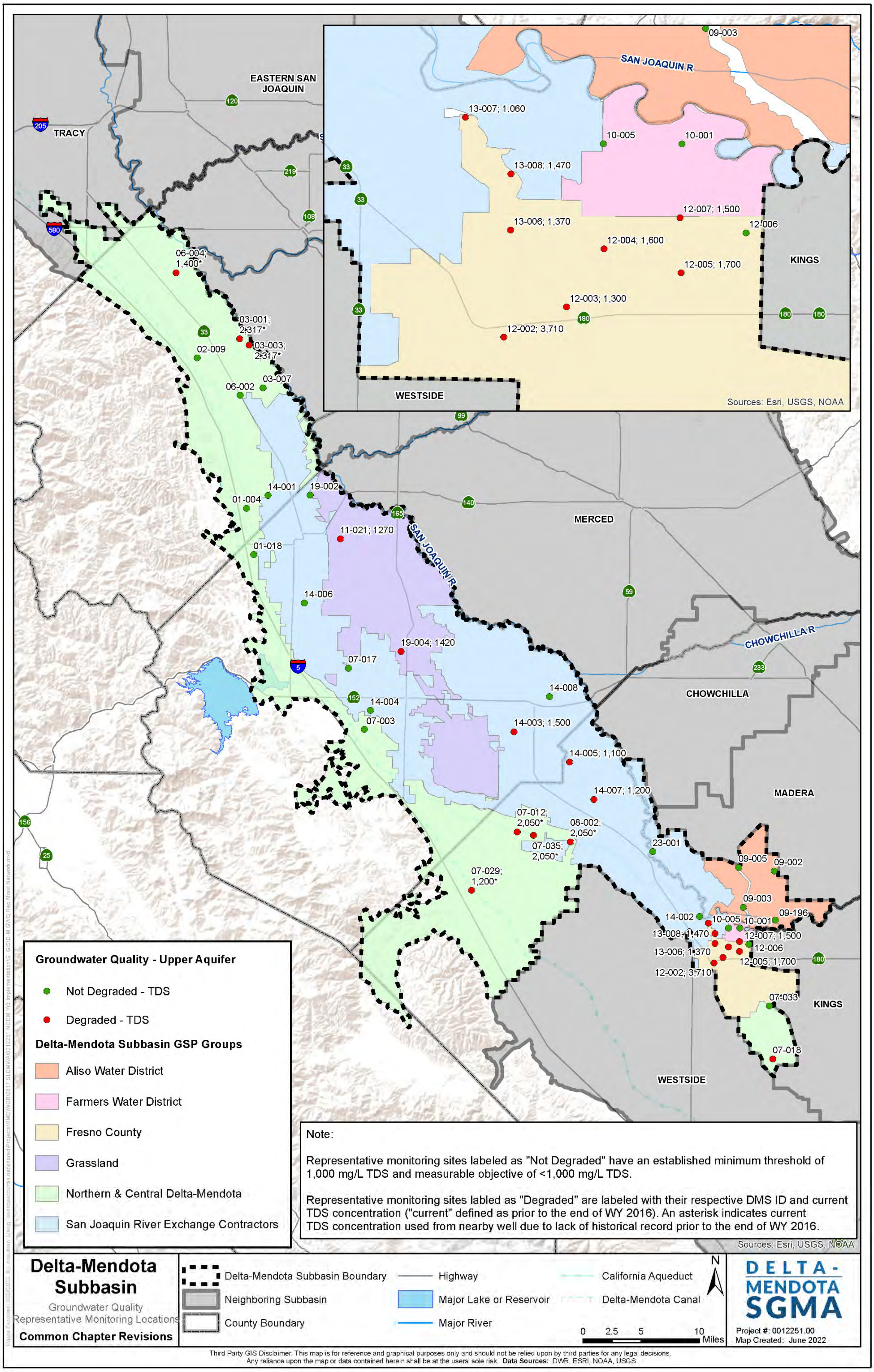

Figure CC-75: Upper Aquifer Groundwater Quality Monitoring Network

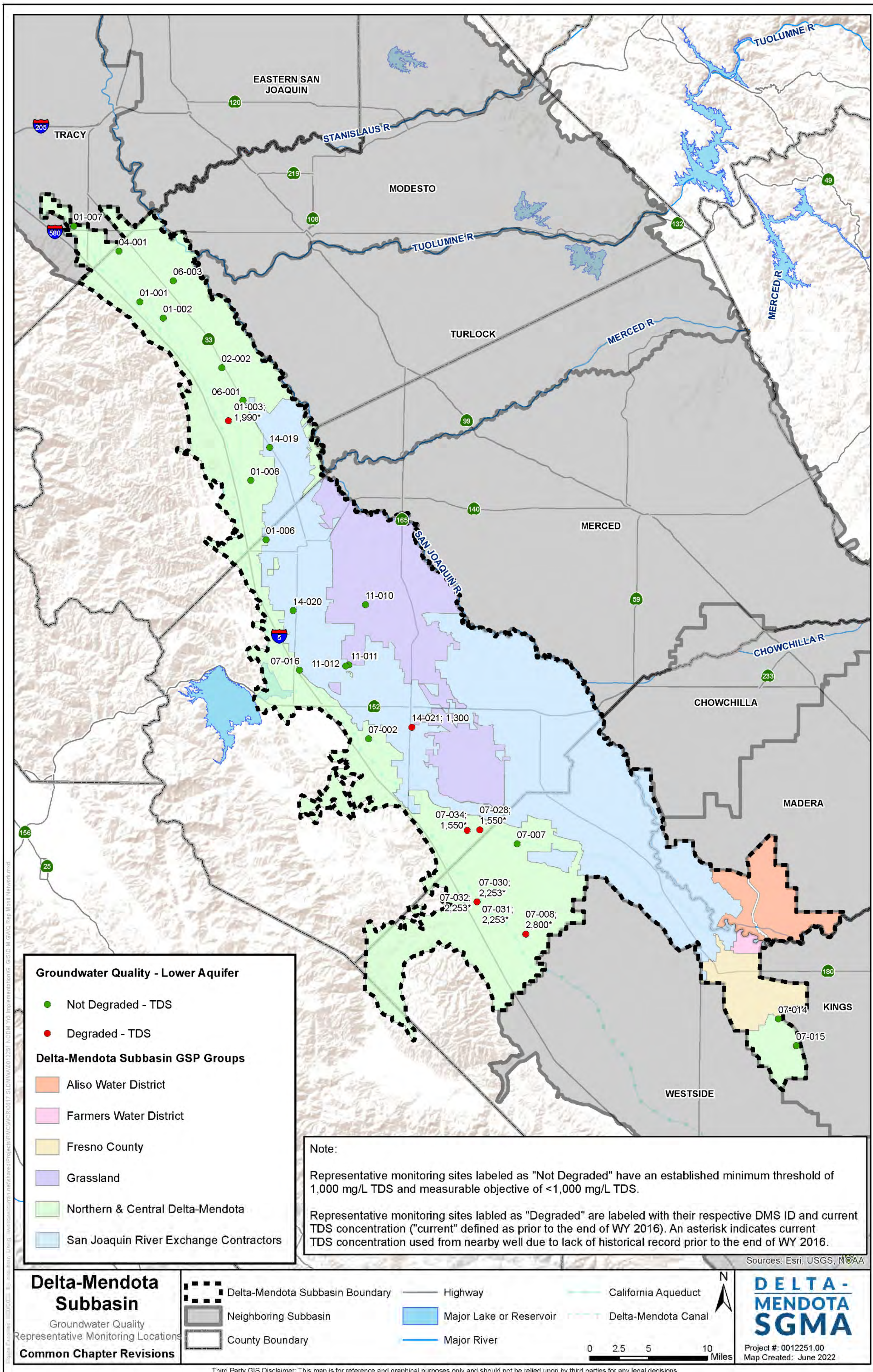

Figure CC-76: Lower Aquifer Groundwater Quality Monitoring Network

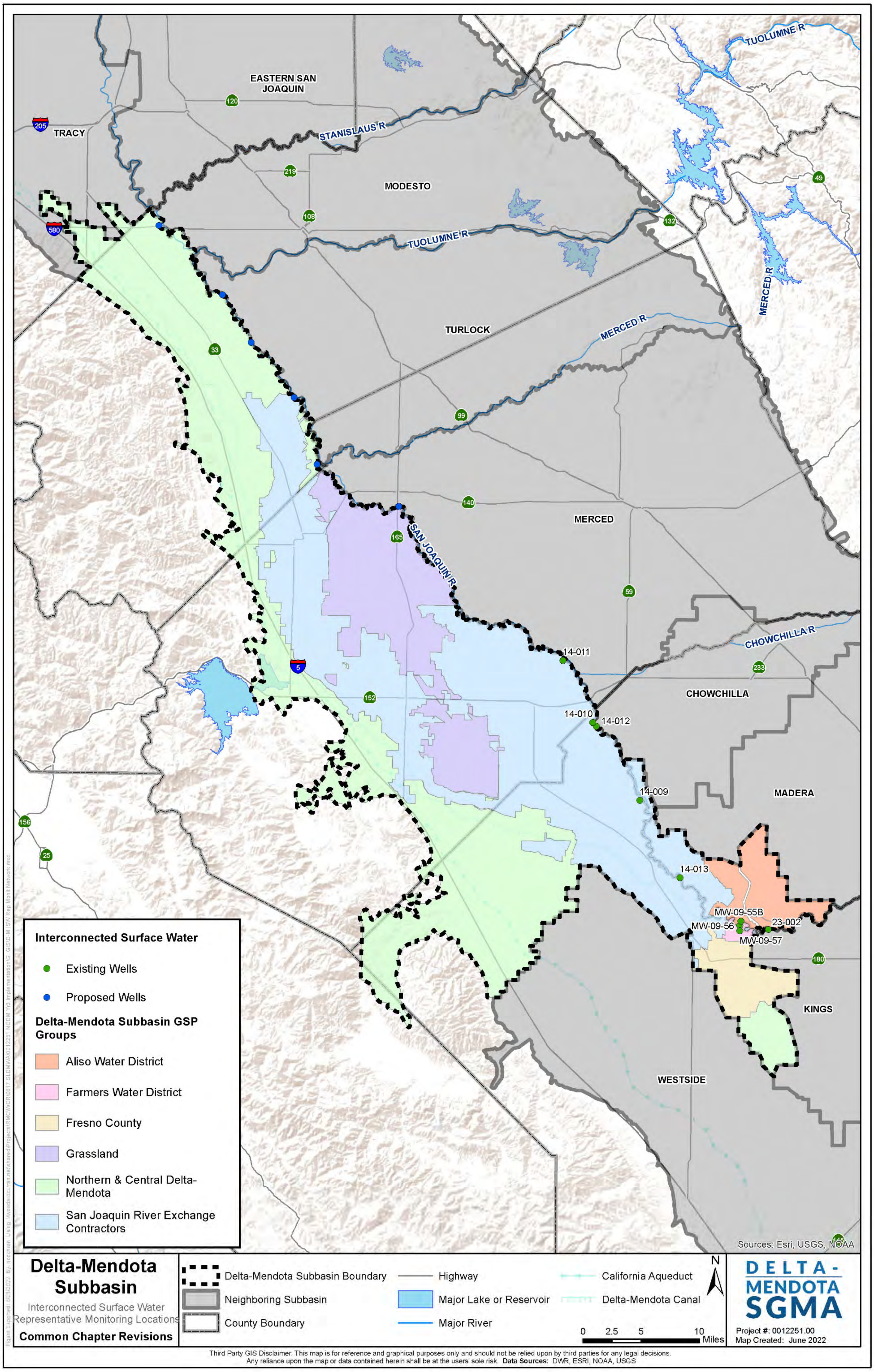

Figure CC-77: Interconnected Surface Water Monitoring Network

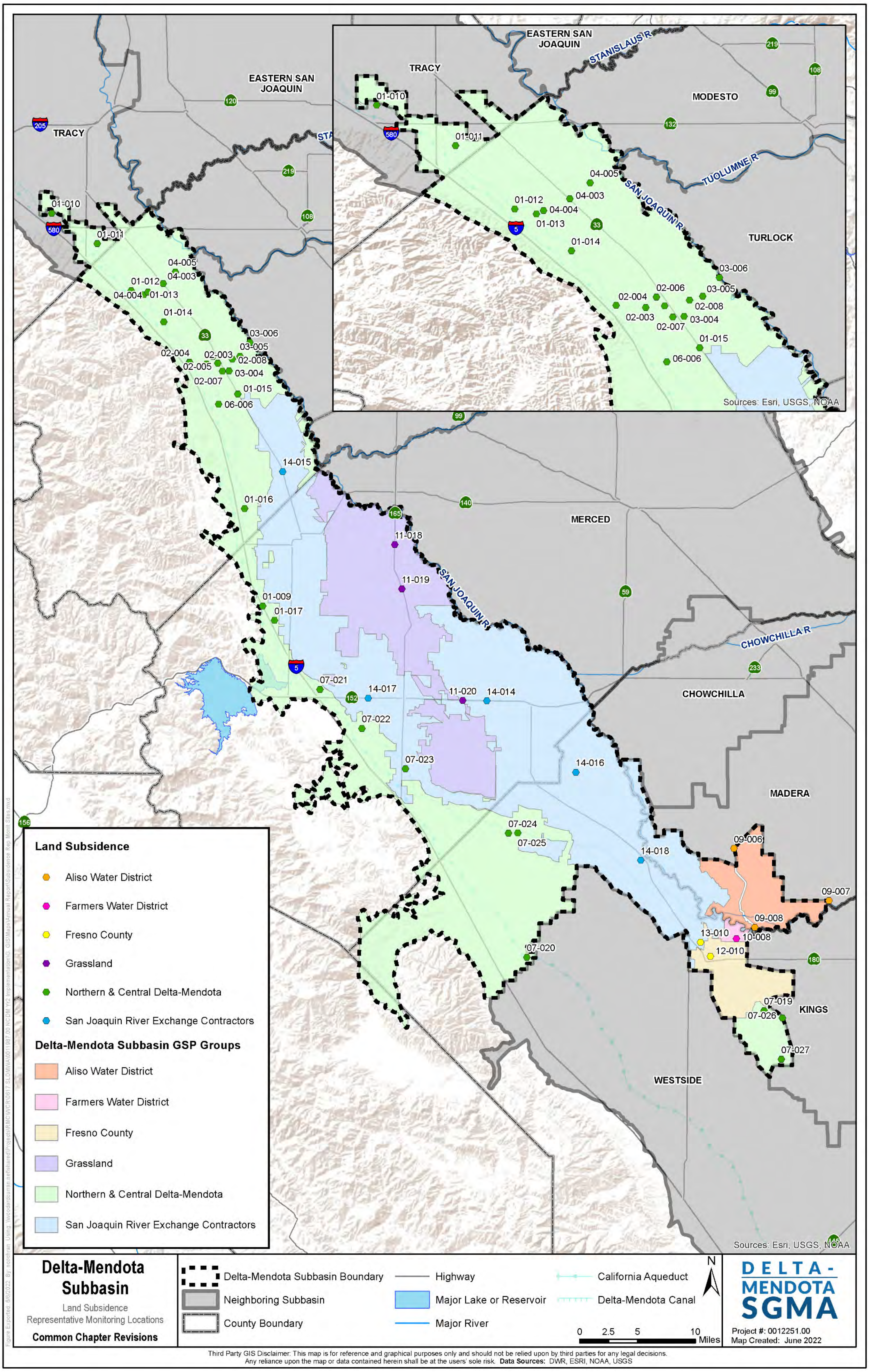

Figure CC-78: Land Surface Elevation Monitoring Network

7. SUBBASIN DATA COLLECTION AND MANAGEMENT

As required in §352.6, Data Management System of the GSP regulations, each GSA is required to develop and maintain a data management system (DMS) that is capable of storing and reporting information relevant to the development or implementation of the GSP(s). Additionally, per §354.4, Reporting Monitoring Data to the Department, all monitoring data is to be stored in a DMS with copies of the monitoring data included in the annual report and submitted electronically on forms provided by DWR. Recognizing that GSP implementation, including annual reporting, will require some efforts at the subbasin level, the 23 GSAs overlying the Delta-Mendota Subbasin have chosen to develop a coordinated DMS that can be utilized by each GSP Group for management of their data, but which will allow for the required compendium of data sets for preparation of Subbasin annual reports. The coordinated DMS will also provide a generic framework that can be used by any GSP Group or GSA in the Subbasin for individual data management while allowing for consistent formatting and the simplified uploading of compiled datasets into the Subbasin-wide coordinated DMS.

The individual GSP Groups have also developed and will maintain separate data storage processes or DMSs. Each separate DMS developed for each GSP will store information related to implementation of each individual GSP, monitoring network data and monitoring sites requirements, and water budget data requirements. Each system will be capable of reporting all pertinent information to the respective GSA and/or GSP Group, and ultimately to the Coordination Committee. After providing the Coordination Committee with data from the individual GSPs, the Subbasin Plan Manager and Coordination Committee will ensure the data are stored and managed in a coordinated manner throughout the Subbasin and reported to DWR on an annual basis.

The DMS constructed for the Delta-Mendota Subbasin is a secured web-based application hosted on Amazon Web Services (AWS). The DMS focuses on five core business requirements including: centralized data warehouse, security of data, permissioned based access, data visualization and reporting. Other goals of the DMS focus around improving data collection/aggregation processes, creating data standards, gaining efficiencies in reporting and improving data sharing with stakeholders. The DMS is designed to aggregate data through import processes by GSP to support data visualization and annual report generation.

Underlying the web application is a relationship database used to store the information aggregated from GSPs across primary data types identified to support monitoring and Annual Report development. Those data types include groundwater extractions, surface water deliveries, groundwater storage, groundwater elevations, groundwater quality, interconnected surface water and land subsidence. The web application functionality includes an embedded GIS viewer, screens to view tables of time series data, and charting capabilities for hydrographs. The embedded GIS viewer contains functionality to store map layers such as reference data, GSA/GSP boundaries and derived information such as water level contours.

Section 6.1.2 describes the process by which monitoring data are collected by each GSP Group and processed for inclusion in the Coordinated DMS. In order to be able to track data by location in the Subbasin, each monitoring locations in the Delta-Mendota Subbasin is assigned a unique identifier in the DMS. The number system is in a format of ##-####, where the first two digits indicates which GSA the monitoring location is associated with, the subsequent four digits indicate which specific monitoring location in that GSA area. As shown in **Figure CC-72**, the general methodology agreed upon for data import and management is as follows:

- Each GSA collects their respective data per agreed-upon monitoring protocols and transmits it to the GSA Representative.
- Each GSA Representative then compiles the data and conducts a quality control check.
- The GSA Representative then transmits the compiled data set to the GSP Lead or Representative, who then aggregates the data from all GSAs and conducts a second quality control check.
- The GSP Lead or Representative then uploads the data set into the DMS using import wizards designed specifically for this process.
- The Subbasin Plan Manager then uses the data in the DMS to compile information as required for the annual report.

Compiled data sets from the DMS are then augmented with required maps generated externally to produce the required annual report. Mapping prepared outside the DMS are subsequently imported into the DMS as GIS files to ensure all data are kept in one place and to allow for access by GSAs and other Subbasin stakeholders.

The DMS will be maintained by the San Luis & Delta-Mendota Water Authority, while acting as the Plan Manager, with a contract with the software vendor for hosting, maintenance and future maintenance. Each GSP will pay a maintenance fee for the continued hosting and support of the Subbasin coordinated DMS.

The Coordinated DMS as described herein may be supplemented by additional DMS developed and maintained by each GSP Group in the Subbasin. The reader is referred to each of the six Subbasin GSPs for specific information relative to data collection and management in each GSP Plan area.

8. STAKEHOLDER OUTREACH

California Code of Regulations, Title 23, §354.10 identifies the requirements for notice and communication information presented in a GSP, which includes:

- A summary of information relating to notification and communication by the GSAs with other agencies and interested parties;
- A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties;
- A list of public meetings at which the GSP was discussed or considered by the GSAs;
- Comments regarding the GSP received by the GSAs and a summary of any responses by the GSAs;
- A communication section of the GSP that includes an explanation of the GSAs' decision-making process, identification of opportunities for public engagement, a discussion of how public input and response was used, a description of how the GSAs encouraged the active involvement of diverse social, cultural and economic elements of the population within the basin, and the methods used by the GSAs to inform the public about progress implementing the GSP, including the status of projects and actions.

In meeting these requirements, outreach and educational activities were conducted at the Subbasin, GSP and GSA level throughout the GSP development process. This section describes the noticing and outreach conducted at the Delta-Mendota Subbasin level for GSP development. Please refer to each individual Subbasin GSP for specific details regarding noticing and communication, and descriptions of the beneficial uses and users of groundwater at the GSP and GSA level. Information regarding Subbasin coordination and committees can be found in Section 2, Delta-Mendota Subbasin Governance, of this document.

8.1 Situation Assessment and Communications Plan

To assist in GSA formation and GSP development, agencies in the Delta-Mendota Subbasin sought and received Facilitation Support Services funding from DWR in August 2016. Under this funding, a neutral, third-party facilitation team conducted a situation assessment on behalf of the Subbasin GSAs. The purpose of the assessment was to understand how stakeholders perceived the status of the Subbasin's groundwater resources and identify potential barriers to the successful development of the GSPs. The facilitation team, with input from local agencies, identified 30 stakeholders representing diverse interests and beneficial users in the Subbasin, together with disadvantaged communities, agricultural well owners, government and land use agencies, and environmental and ecosystem interests. From February 2017 to May 2017, the facilitators conducted over 30 phone and in-person interviews with stakeholders. The facilitators recorded the interview responses and summarized the results in a presentation made to the GSA representatives.

The assessment results were used to inform the development of the Delta-Mendota Subbasin Sustainable Groundwater Management Act Communications Plan (Communications Plan), which is provided with this document as **Appendix E**. The Communications Plan identifies near- and long-term outreach and engagement strategies, tactics, and tools for stakeholder engagement in GSP development and implementation. The Subbasin GSAs used the Communications Plan as a framework for conducting the stakeholder outreach and engagement activities described in this document.

The Delta-Mendota Subbasin is home to a large Hispanic or Latino population with many using Spanish as their primary language. As such, public noticing, educational materials and other outreach efforts were developed and presented in both English and Spanish throughout the GSP development process.

8.2 Public Noticing and Information

The Delta-Mendota Subbasin GSAs developed and used several coordinated tools, in addition to their own resources to inform members of the public about GSP development activities and promote opportunities for public engagement. These tools are described below.

- **Website:** The Subbasin website – www.deltamendota.org – is the primary location for information related to SGMA implementation in the Subbasin. Information provided on the website includes: an overview of SGMA, a description of each of the GSP groups, contact information for each of the GSAs, and upcoming workshops and public meetings. The website also serves as a repository for outreach collateral, workshop materials, and meeting packets and minutes for the Delta-Mendota Subbasin Coordination Committee, Technical Working Group, and Communications Working Group (described below), and provides links to the individual GSP websites maintained by each GSP Group.

- **Delta-Mendota Subbasin Newsletter:** The Delta-Mendota Subbasin Newsletter is distributed on a monthly basis and serves as an informational tool to keep interested parties, beneficial users, and members of the general public informed about the development and status of the GSPs. Newsletter topics include Subbasin-wide activities, general announcements, upcoming meetings and workshops, and past and upcoming GSP development activities. Copies of the newsletters are archived on the Subbasin website.

- **Informational Materials**: GSAs in the Subbasin developed a suite of materials in English and Spanish to educate and inform members of the public about SGMA and topics covered in the GSP. These materials include bilingual presentations, fact sheets, handouts, frequently asked questions, and videos. Copies of the materials are available on the Subbasin website. GSA representatives distributed these materials before and during meetings, workshops, and other outreach activities.

8.3 List of Public Meetings Where the GSPs were Discussed

Each GSP Group for the Delta-Mendota Subbasin has conducted individual outreach efforts relative to their own GSP Plan area in addition to those same efforts at the subbasin-level. Please refer to each of the individual GSPs for this information. Below is a list of the coordinated public workshops and meetings where the GSPs were discussed. These include meetings of the Delta-Mendota Subbasin Coordination Committee, the two Subbasin Working Groups and coordinated public workshops. All meetings were publicly noticed and held from June 2017 through July 2019. Meeting agenda, minutes and handouts are available on the Delta-Mendota Subbasin website at www.deltamendota.org.

Delta-Mendota Coordination Committee Meetings

The Delta-Mendota Subbasin Coordination Committee meets on the second Monday of each month at 9:30 am at the SLDMWA Administration Offices located at 842 6th Street, Los Banos, California. These meetings are noticed as required under the Brown Act and are open to the public.

In addition to the monthly meetings, a special meeting of the Coordination Committee was held on March 8, 2019 to discuss sustainable yield estimation methodologies.

Delta-Mendota Technical Working Group Meetings

The Delta-Mendota Technical Working Group meets on the third Tuesday of each month at 10:00 am at the SLDMWA Administration Offices located at 842 6th Street, Los Banos, California. These meetings are noticed as required under the Brown Act and are open to the public.

In addition to the monthly meetings, several special meetings of the Technical Working Group were held to discuss specific topics. These additional meetings were as follows:

- August 24, 2018 and September 19, 2018 meetings to discuss Groundwater Dependent Ecosystems
- August 8, 2018, October 30, 2018 and December 19, 2018 meetings to discuss water budgets

Delta-Mendota Communication Working Group Meetings

The Delta-Mendota Communications Working Group meets on the fourth Tuesday of each month at 1:00 pm. These meetings typically conducted via conference call. Meeting information for this working group is available on the Delta-Mendota Subbasin website.

Coordinated Public Workshops

Coordinated public workshops were held for the Delta-Mendota Subbasin shown in the table below. All workshops were advertised and conducted in both English and Spanish.

Table CC-24: Coordinated Public Workshops

Date	Location, Venue	Topic
Spring 2018 Workshops		
May 14, 2018	Los Banos, San Luis & Delta Mendota Water Authority	• Sustainable Groundwater Management Act overview • Delta-Mendota Subbasin overview • Opportunities for engagement
May 16, 2018	Patterson, Hammon Senior Center	
May 17, 2018	Mendota, Mendota Library	
Fall 2018 Workshops		
October 22, 2018	Firebaugh, Firebaugh Middle School	• GSP development and implementation process • Data collection • Hydrogeologic Conceptual Model • Numerical and analytical models • Water budgets
October 24, 2018	Los Banos, College Greens Building	
October 25, 2018	Patterson, Hammon Senior Center	
Winter 2019 Workshops		
February 19, 2019	Los Banos, College Greens Building	• Historic and current water budgets
February 20, 2019	Patterson, Patterson City Hall	

Date	Location, Venue	Topic
March 4, 2019	Santa Nella, Romero Elementary School	• Sustainability criteria • Undesirable results • Projects and management actions
Spring 2019 Workshops		
May 20, 2019	Patterson, Patterson City Hall	• Projected water budgets • Sustainable yield • Groundwater monitoring networks • Projects and management actions
May 21, 2019	Los Banos, College Greens Building	
May 22, 2019	Santa Nella, Romero Elementary School	
May 23, 2019	Mendota, Mendota Library	

Please see **Appendix F** for summaries of the coordinated public workshops, and **Appendix G** for example promotional materials for the public workshops.

8.4 Comments Regarding the GSPs

Key components of the six Subbasin GSPs were presented at the public workshops conducted throughout the GSP development process. **Appendix F** contains summaries of the coordinated public workshops, including comments received from and feedback provided to workshop participants. Additionally, each of the GSP Groups in the Delta-Mendota Subbasin are individually responsible for the public review of their plans and for addressing any public comments received. Please see the individual GSPs for additional information regarding plan review.

8.5 Subbasin Decision Making Process

The Delta-Mendota Subbasin Coordination Agreement outlines the responsibilities of all Subbasin parties, including decision making protocols and voting structure. These are further discussed in Chapter 2 of this document.

During the GSP development process, the Technical Working Group was charged with coordinating implementation of the required technical elements of the GSP (e.g., water budgets, monitoring networks), and to provide recommendations to the Delta-Mendota Subbasin Coordination Committee. Similarly, the Communications Working Group was charged with implementing the Subbasin Communications Plan and with providing recommendations for workshops and other outreach activities to the Coordination Committee. The Coordination Committee took actions and approved recommendations and work products and provided direction to both working groups and other ad hoc committees.

In general, the coordinated decision-making process included developing agendas for each meeting of the Delta-Mendota Subbasin Coordination Committee and for each Working Group meeting. The agendas were developed in concert with the Technical and Communications Working Groups, and the respective representatives of each GSP Group. Agenda items were either educational, informational, or required direction or decision. Meeting agendas, meetings minutes and handouts have been posted on the Delta-Mendota Subbasin website for public access.

8.6 Opportunities for Public Engagement and How Public Input was Used

Community input was encouraged and received at all meetings of the Coordination Committee, Technical Working Group, Communications Working Group meetings and at the public workshops. The Subbasin GSPs (and therefore, this Common Chapter) was shaped by community input, Working Group input, and Coordination Committee direction and decisions.

8.6.1 Opportunities for Public Engagement

Regular opportunities for public engagement were available throughout GSP development. The Coordination Committee, Technical and Communications Working Groups, and individual GSA staff encouraged public input throughout the development of the GSPs as described below. A list of stakeholder and community organizations contacted as part of the Subbasin coordinated outreach efforts is included in **Appendix H**.

Meetings and Direct Engagement

Open meetings and public workshops were held as described in Section 8.1. In addition, GSA staff made direct contact with community representatives to encourage their participation in the GSP development process. GSA representatives provided their contact information by phone, email, or mail both online (on the Subbasin website) and at workshops for stakeholder questions and comments.

Targeted Stakeholder Engagement

The Subbasin GSAs also conducted targeted outreach and engagement to hard-to-reach communities, interested parties, and stakeholders that were previously underrepresented in other engagement activities. This included outreach to the following stakeholder types:

- **Agricultural Interests:** Agricultural stakeholders in the Subbasin include agricultural well operators, growers, ranchers, farmworkers, and agricultural landowners. Strong agricultural representation exists within the leadership of the GSAs. To augment direct outreach being conducted by individuals GSAs, Subbasin representatives also coordinated closely with local county farm bureaus to disseminate information related to GSP development and public workshops.
- **School Districts:** Schools districts are considered for both beneficial users of groundwater (for drinking water), as well communication channels to disseminate information about SGMA and GSP development. GSA representatives directly contacted local school districts to notify them of the public workshops. Some schools also help distributed informational materials and workshop flyers to their students and parents.
- **Industrial Interests:** There are many industrial interested in the Subbasin, including packaging and processing plants, mining industries, and other similar facilities that use groundwater in some fashion. The GSP Groups have identified these interests within their respective Plan areas and have disseminated information related to GSP development during individual outreach efforts.
- **Environmental/Conservation Interests:** Environmental and conservation interests in the Subbasin have been contacted and communicated with during GSP development. Specific related interest groups contacted during GSP development include The Nature Conservancy, the California Department of Fish and Wildlife, Audubon, and various sportsman clubs and wetland managers.

- **Disadvantaged Communities:** The GSAs followed best practices identified in Collaborating for Success: Stakeholder Engagement for Sustainable Groundwater Management Act Implementation (Community Water Center, 2015) and other guidance documents to engage disadvantaged and severely disadvantaged communities. This included holding meetings in disadvantaged communities; holding meetings in the evening at known local venues, such as schools, civic centers, and community centers; translating fact sheets, meeting materials, and presentations into other languages; and providing interpreting services at all public workshops.
- **Other Interests:** Other potential groundwater users in the Subbasin (or those with groundwater-related interests) contacted during GSP development included the various counties in which the Delta-Mendota Subbasin lie and/or are adjoining (including San Joaquin County and San Benito County), Caltrans, the DWR State Water Project Division of Operations and Maintenance, the U.S. Bureau of Reclamation, the U.S. Geological Survey and the San Joaquin River Restoration Program.

The Reader should refer to each individual GSP for a more complete description of GSP-specific meetings and direct engagement.

GSP Section Review and Comment Periods

Each GSP Group was responsible for coordinating the individual review of their GSP. Please see each GSP for additional information as to their specific public review process. This Common Chapter to the six Delta-Mendota Subbasin GSPs was posted on the Subbasin's website (www.deltamendota.org) following submittal of the Subbasin GSPs.

8.6.2 How Public Input and Response was Used in the Development of the GSP

Each GSP Group was responsible for coordinating the individual review of their GSP and for determining how to incorporate public input and responses into their respective plans. Public input to the GSPs was solicited through the GSP development process through a number of means, including coordinated public workshops, Board of Directors presentations, City Council presentations, and growers' meetings. Please see the individual GSPs for more information regarding GSP-specific outreach efforts and how stakeholder and public input was received and factored into the GSPs.

8.7 Revisions to Common Chapter and Subbasin GSPs

As previously noted in this document, the Delta-Mendota Subbasin received a Consultation Initiation Letter on January 21, 2022 from DWR. The CIL identified four potential deficiencies across the six Subbasin GSPs which may preclude DWR's approval, as well as potential corrective actions to address each potential deficiency. The CIL thus initiated consultation between DWR, the Basin Manager, Plan Managers, and the Subbasin's 23 Groundwater Sustainability Agencies (GSAs) on February 18, 2022 regarding the amount of time needed to address the potential deficiencies and corrective actions. Subsequent meetings were held on March 7, March 30, April 19, May 24, and June 20 2022 to discuss the Subbasin's proposed approach to addressing the identified deficiencies.

The four deficiencies identified in DWR's CIL are summarized as follows:

Potential Deficiency 1: The GSPs do not use the same data and methodologies.

Potential Deficiency 2: The GSPs have not established common definitions of undesirable results in the Subbasin.

Potential Deficiency 3: The GSPs in the Subbasin have not set sustainable management criteria in accordance with GSP regulations.

Potential Deficiency 4: The management areas established in the Plan have not sufficiently addressed the requirements specified in 23 CCR §354.20.

This revised Common Chapter, and associated revisions to the six Subbasin GSPs, have been prepared in response to the deficiencies identified in the CIL based on direction provided by the Delta-Mendota Subbasin Coordination Committee, the Delta-Mendota Technical Working Group, the Subbasin GSAs and DWR. It is intended to document how the deficiencies identified in the CIL were addressed in the revised GSPs and associated Common Chapter, and where those revisions are addressed in the Common Chapter.

A Notice of Intent to Adopt the revised Common Chapter and six Subbasin GSPs (known as the Amended Groundwater Sustainability Plan) was distributed on March 15, 2022. Public meetings for the adoption of the Common Chapter and Subbasin GSPs were held in June and July of 2022; please see the Subbasin's website (www.deltamendota.org) for the respective dates for each GSAs meeting and adoption.

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DELTA-MENDOTA SGMA

Common Chapter - Appendices

For the Delta-Mendota Subbasin Groundwater Sustainability Plan

August 2019

Appendix A - Coordination Agreement

DELTA-MENDOTA SUBBASIN COORDINATION AGREEMENT

THIS DELTA-MENDOTA SUBBASIN COORDINATION AGREEMENT is made effective as of December 12, 2018 by and among the groundwater sustainability agencies within the Delta-Mendota Subbasin (each a "**Party**" and collectively the "**Parties**") and is made with reference to the following facts:

WHEREAS, On September 16, 2014, Governor Jerry Brown signed into law Senate Bills 1168 and 1319 and Assembly Bill 1739, known collectively as the Sustainable Groundwater Management Act ("**SGMA**");

WHEREAS, SGMA requires all groundwater subbasins designated as high or medium priority by the California Department of Water Resources ("**DWR**") to manage groundwater in a sustainable manner;

WHEREAS, the Delta-Mendota Subbasin (Basin Number 5-22.07, DWR Bulletin 118) within the San Joaquin Valley Groundwater Basin ("**Subbasin**"), has been designated as a high-priority basin by DWR;

WHEREAS, the Delta-Mendota Subbasin includes multiple groundwater sustainability agencies that intend to manage the Subbasin through the development and implementation of multiple different groundwater sustainability plans ("**GSP**");

WHEREAS, SGMA allows local agencies to engage in the sustainable management of groundwater, but requires groundwater sustainability agencies in all basins that are managed by more than one groundwater sustainability plan to enter into a coordination agreement to coordinate the multiple groundwater sustainability plans to sustainably manage the Subbasin pursuant to SGMA;

WHEREAS, pursuant to the requirements of SGMA, and the California Code of Regulations, and in recognition of the need to sustainably manage the groundwater within the Delta-Mendota Subbasin, the Parties desire to enter into this Agreement between their individual groundwater sustainability agencies;

WHEREAS, in order to efficiently coordinate among the large number of groundwater sustainability agencies ("**GSA**") in the Subbasin, the Parties intend to organize themselves into "**GSP Groups**" and to be represented by the "**GSP Group Representatives**," on terms to be developed and implemented by separate Agreements between each GSP Group and the Parties within such GSP Group; and

WHEREAS, this Coordination Agreement is being executed before the respective GSPs have been prepared, and the Parties anticipate attaching and incorporating technical reports covering such additional required information before submittal of this Agreement to DWR with the Parties' respective GSPs without separate amendment being required.

THEREFORE, in consideration of the facts recited above and of the covenants, terms and conditions set forth herein, the Parties agree as follows:

SECTION 1 – PURPOSE

1.1 Compliance with SGMA

In subbasins with multiple GSPs, SGMA requires the GSPs to be coordinated through a coordination agreement. The purpose of this Coordination Agreement including the anticipated attachment and incorporation of technical reports to be developed after the initial execution of this Agreement, is to comply with that SGMA requirement and ensure that the multiple GSPs within the Subbasin are developed and implemented utilizing the same methodologies and assumptions, that the elements of the GSPs are appropriately coordinated to support sustainable management, and to ultimately set forth the information necessary to show how the multiple GSPs in the Subbasin will achieve the sustainability goal, as determined for the Subbasin in compliance with SGMA and its associated regulations.

1.2 Description of Criteria & Function

An additional purpose of this Coordination Agreement is to describe the criteria for establishing the responsibilities of each Party for meeting the terms of this Coordination Agreement, the procedure for the exchange of information between the Parties, and procedures for resolving conflicts between the Parties. The goal of the coordination is to ensure that the Subbasin GSPs utilize the same data and methodologies, including but not limited to, groundwater elevation data, groundwater extraction data, surface water supply, total water use, changes in groundwater storage, water budgets, and sustainable yield during their development as required by SGMA and associated regulations. Additionally, this Coordination Agreement sets out the process for identifying a Plan Manager.

SECTION 2 – DEFINITIONS

2.1 "Coordinated Plan Expenses" shall mean any expenses incurred by the Secretary and the Plan Manager for purposes of developing and implementing the Coordination Agreement.

2.2 "**Coordination Agreement**" shall mean this Coordination Agreement.

2.3 "**Coordination Committee**" shall mean the committee of GSP Group Representatives established pursuant to this Coordination Agreement.

2.4 "**Group Contact"** shall mean one Party designated on Exhibit "A" attached hereto and by reference incorporated herein as responsible to supply notices and to circulate information and invoices for its respective Exhibit "A" GSP Group, as said Exhibit may be updated from time to time.

2.5 "**GSA**" shall mean a groundwater sustainability agency established in accordance with SGMA and its associated regulations, and "GSAs" shall mean more than one such groundwater sustainability agency. Each Party is a GSA.

2.6 "**GSP"** shall mean a groundwater sustainability plan as defined by SGMA and its regulations, and "GSPs" shall mean more than one such plan.

2.7 "**GSP Group**" shall mean a grouping of Parties, stakeholders, and interested parties developing an individual GSP within the Subbasin, as shown in Exhibit "A," who are combined for purposes of representation and voting on the Coordination Committee and for purposes of sharing Coordinated Plan Expenses as set forth in this Coordination Agreement.

2.8 "**GSP Group Alternate Representative," "Alternate Representative,"** or **"Alternate"** and their plural forms shall mean an alternate member of the Coordination Committee selected to represent the GSP Groups in accordance with Exhibit "A" and Section 5.1.2-5.1.4 of this Coordination Agreement who shall serve in the absence of the respective GSP Group Representative and shall be entitled to cast the vote for the absent GSP Representative.

2.9 "**GSP Group Representative"** or **"Representative"** and their plural forms as appropriate shall mean a member or members of the Coordination Committee selected to represent the GSP Groups in accordance with Exhibit "A" and Section 5.1.2 – 5.1.4 this Coordination Agreement.

2.10 "**Participation Percentages"** shall mean that percentage of Coordinated Plan Expenses allocated to each GSP Group as described on Exhibit "A" to this Coordination Agreement, which is attached and incorporated by reference herein, as updated from time to time.

2.11 "**Party**" or "**Parties**" shall mean a Groundwater Sustainability Agency or in the plural, two or more Groundwater Sustainability Agencies within the Delta-Mendota Subbasin.

2.12 "**Plan Manager**" shall mean an entity or individual, appointed at the pleasure of the Coordination Committee, or as provided in section 4.1.2 of this Coordination Agreement, to perform the role of the Plan Manager to serve as the point of contact to DWR as set forth in Section 5.2.3 of this Coordination Agreement.

2.13 "**Seasonal High**" shall mean the highest annual static groundwater elevation associated with stable aquifer conditions following a period of lowest annual groundwater demand.

2.14 "**Seasonal Low**" shall mean the lowest annual static groundwater elevation associated with a period of stable aquifer conditions following a period of highest annual groundwater demand.

2.15 "**San Luis & Delta-Mendota Water Authority**" or "**SLDMWA**" shall mean the San Luis & Delta-Mendota Water Authority, a California joint powers agency.

2.16 "**SGMA**" shall mean the Sustainable Groundwater Management Act, as amended from time to time, commencing at Water Code section 10720, together with its implementing regulations applicable to Groundwater Sustainability Plans, set forth at California Code of Regulations, Title 23, Division 2, Chapter 1.5, Subchapter 2.

2.17 "**SGMA Definitions**" shall mean those SGMA-specific definitions provided by statute or regulation and attached in the Appendix to this Coordination Agreement; in the event of any inconsistency between a term defined in this Section and a SGMA-specific definition, the definition contained in this Coordination Agreement shall prevail.

2.18 "**Subbasin**" shall mean the Delta-Mendota Subbasin (Basin Number 5-22.07, DWR Bulletin 118) within the San Joaquin Valley Groundwater Basin.

2.19 "**Technical Memoranda**" shall mean the memoranda prepared by the Coordination Committee that include the data and methodologies for assumptions described in Water Code section 10727.6 to prepare coordinated plans. Individually, the memoranda shall be referred to as a "**Technical Memorandum**."

2.20 "**Water Year**" shall mean the period from October 1 through the following September 30 as defined by SGMA.

2.21 "**Water Year Type**" shall mean the classification provided by DWR to assess the amount of annual precipitation in a basin and as defined by SGMA.

SECTION 3 – GENERAL GUIDELINES

3.1 Responsibilities of the Parties

3.1.1 Obligation to Coordinate

The Parties to this Coordination Agreement agree to work collaboratively to meet the objectives of SGMA and this Coordination Agreement. Each Party to this Coordination Agreement is a GSA and acknowledges that it is bound by the terms of this Coordination Agreement as an individual Party.

3.1.2 Obligations Outside of Coordination Agreement Regarding GSP Groups

a) Representation and Voting. Each Party understands its participation, as more fully set forth in Section 5 of this Coordination Agreement, is based on representation through and by its GSP Group Representative(s). It is the responsibility and obligation of each Party under this Coordination Agreement to develop its own arrangements for how its respective GSP Group Representative and Alternate Representative are selected and how required actions of GSAs within the GSP Group under its respective GSP are identified and implemented.

b) The Coordination Committee and its members shall have no requirement to recognize a voting status or other decisional authority of any Party to this Coordination Agreement other than through the designated GSP Group Representative(s). For purposes of this Coordination Agreement, it is assumed that GSP Group Representatives have been authorized by the Parties in their GSP Groups to participate as described herein.

c) By signing this Coordination Agreement, each Party commits to provide documentation to the Secretary and the Coordination Committee of the authorization of its GSP Group Representative(s). Provided, that the Secretary shall not be obligated to evaluate or provide an opinion on the legal sufficiency of the documentation.

d) It is the responsibility and obligation of each Party under this Coordination Agreement that is included on Exhibit "A" as part of a multi-party GSP Group to provide documentation to the Secretary and to the Coordination Committee establishing that such GSP Group has a binding agreement or mechanism assuring that the GSP Group will pay its Participation Percentage set forth on Exhibit "A," as said Exhibit "A" may be modified from time to time. Provided, that the Secretary shall not be obligated to evaluate or provide an opinion on the legal sufficiency of the documentation.

3.1.3 Non-Entity Status

The Parties acknowledge and agree that this Coordination Agreement does not create a legal entity with power to sue or be sued, to enter into contract, or to enjoy the benefits or accept the obligations of a legal entity.

3.1.4 Implementation of Individual GSPs

This Coordination Agreement does not otherwise affect each Party's responsibility to implement the terms of its respective GSP in accordance with SGMA. Rather, this Coordination Agreement is the mechanism through which the Parties will coordinate their respective GSPs to the extent necessary to ensure that such GSP coordination complies with SGMA.

3.2 Adjudicated or Alternate Plans in the Subbasin

As of the date of this Coordination Agreement, there are no portions of the Subbasin that have been adjudicated or approved to submit an alternative plan as defined by SGMA.

SECTION 4 – ROLE OF SAN LUIS & DELTA-MENDOTA WATER AUTHORITY

4.1 Agreement to Serve

By executing this Agreement, and not as a Party, the San Luis & Delta-Mendota Water Authority agrees to carry out the functions described in this Section 4 and its subparts consistent with the terms of this Section and under the direction and supervision of the Coordination Committee, subject to the reimbursement and the termination provisions contained in this Section.

4.1.1 Secretary

The SLDMWA agrees to perform the obligations of the Secretary described in this Coordination Agreement, by delegation to one or more of its employees or to a consultant under contract to the SLDMWA.

4.1.2 Plan Manager

The SLDMWA agrees to perform the obligations of the Plan Manager described in this Coordination Agreement, by delegation to one or more of its employees or to a consultant under contract to the SLDMWA.

4.2 Reimbursement of SLDMWA

The commitment of the SLDMWA to perform the designated functions under this Section is contingent upon the execution and performance of a separate cost sharing agreement between the SLDMWA and the Parties.

4.3 Termination of SLDMWA's Services

Either the Parties acting through the Coordination Committee or the SLDMWA at any time may terminate the services being provided by the SLDMWA under this Coordination Agreement upon thirty (30) days' written notice, if from the SLDMWA, to the Coordination Committee and each GSP Group Representative; and if from the Coordination Committee, to the SLDMWA and each GSP Group Representative.

SECTION 5 – RESPONSIBILITIES FOR KEY FUNCTIONS

5.1 Coordination Committee

5.1.1 The Parties agree to establish a Coordination Committee to provide the forum for the Parties to accomplish the coordination obligation of SGMA pursuant to this Coordination Agreement.

5.1.2 The Coordination Committee will consist of the GSP Group Representatives identified on Exhibit "A" attached hereto and incorporated herein by this reference, as said Exhibit "A" may be modified from time to time pursuant to Section 13 of this Agreement. Each GSP Group Representative shall have one Alternate Representative authorized to vote in the absence of the GSP Group Representative.

5.1.3 Individuals serving as GSP Group Representatives and Alternate Representatives shall be selected by each respective GSP Group in the discretion of the respective GSP Group, and such appointments shall be effective upon providing written notice to the Secretary and to each Group Contact listed on Exhibit "A".

5.1.4 The Coordination Committee will recognize each GSP Group Representative and GSP Group Alternate Representative until such time as the Group Contact provides written notice of removal and replacement to the Secretary and to every other Group Contact designated on Exhibit "A." Each GSP Group or GSP Subgroup shall promptly fill any vacancy created by the removal of such Representative or Alternate Representative so that each GSP

Group shall have the number of validly designated Representatives and Alternate Representatives specified on Exhibit "A".

5.1.5. Minutes of the Coordination Committee will be prepared and maintained as set forth in Section 5.5.4.

5.2 Coordination Committee Officers

The Officers of the Coordination Committee will include a Chairperson, Vice Chairperson, Secretary, and Plan Manager. Except where the Parties have named such Officers pursuant to Section 4 of this Coordination Agreement, Officers shall be selected at the initial meeting of the Committee or as soon thereafter as reasonably can be accomplished.

5.2.1 Chairperson and Vice Chairperson

a) A GSP Group Representative shall serve as Chairperson. The Vice Chairperson, who shall also be a GSP Group Representative, shall serve in the absence of the Chairperson. In the absence of both the Chairperson and Vice Chairperson, a meeting may be led by an Acting Chairperson selected on an ad hoc basis.

b) The positions of Chairperson and Vice Chairperson shall rotate among the GSP Groups on an annual basis according to alphabetical order, with the first rotation beginning on the date the first Chairperson is selected. The schedule for rotation among the GSP Groups will be set at the first meeting after the Chairperson is appointed and reviewed and adjusted annually. A GSP Group Representative may waive designation as Chairperson. In such a case the Chairperson office would rotate to the next designated entity.

5.2.2 Secretary

The Coordination Committee shall select a Secretary to carry out the functions described in this subsection, to serve at the pleasure of the Coordination Committee. The Secretary shall be a public agency who may be, but need not be a Party to this Coordination Agreement. The San Luis & Delta-Mendota Water Authority is hereby designated as the initial Secretary, to serve at the pleasure of the Coordination Committee.

a) The Secretary shall select an appointee to implement the Secretary's responsibilities under this Coordination Agreement, for example, to coordinate meetings; prepare agendas; circulate notices and agendas; provide written notice to all Parties that the Coordination Committee has made a recommendation requiring approval by the Parties; prepare and maintain minutes of meetings of the Coordination Committee; receive notices on behalf of the Coordination Committee and call to the Coordination Committee's attention the need for responding; and provide such other assistance in coordination as may be appropriate.

b) The Secretary shall assume primary responsibility for Brown Act compliance, including without limitation, the responsibility to: prepare an agenda and notice, publicly post, and distribute agendas to all GSP Group or Subgroup Representatives, the Parties, and any other interested persons who requests, in writing, such notices. The Agenda shall be of adequate detail to inform the public and the parties of the meeting and the matters to be transacted or discussed, and shall be posted in a public location and distributed to each of the parties to this Coordination Agreement at least seventy-two (72) hours prior to every regular meeting and at least twenty-four (24) hours prior to every special meeting.

5.2.3 Plan Manager

If the SLDMWA ceases to serve as Plan Manager as agreed under Section 4.1.2 of this coordination Agreement, then the Coordination Committee shall name a successor Plan Manager, who may be a consultant hired by the Secretary pursuant to the Coordination Agreement, the representative of an entity that has been selected as Secretary, or a public agency serving as or participating in a GSA that is a Party to this Coordination Agreement, and who shall serve as the point of contact for DWR as specified by SGMA. The San Luis & Delta-Mendota Water Authority is hereby designated as the initial Plan Manager, to serve at the pleasure of the Coordination Committee.

a) The Plan Manager shall carry out the duties of a "plan manager" as provided in Title 23, division 2, Chapter 1.5, Subchapter 2, California Code of Regulations.

b) The Plan Manager has no authority to make policy decisions or represent the Coordination Committee without the specific direction of the Coordination Committee. The Plan Manager is obligated to disclose all substantive communications he/she transmits and receives in his/her capacity as Plan Manager to the Coordination Committee.

5.3 Coordination Committee Authorized Actions and Limitations

5.3.1 Authorized Actions

The Coordination Committee is authorized to act upon the following enumerated items:

a) The Coordination Committee shall review, and consistent with the requirements of SGMA, approve the Technical Memoranda described in Sections 8-12 of this Coordination Agreement.

b) Once GSP Plans have been submitted to and approved by DWR, the Coordination Committee shall be responsible for ongoing review and updating of the Technical Memoranda as needed; assuring submittal of annual reports; providing five-year assessments and recommending any needed revisions to the Coordination Agreement; and providing review and assistance with coordinated projects and programs.

c) The Coordination Committee shall review and approve work plans, and in accordance with the budgetary requirements of the respective Parties, approve annual estimates of Coordinated Plan Expenses presented by the Secretary and any updates to such estimates; provided, that such estimates or updates with supporting documentation shall be circulated to all Parties for comment at least thirty (30) days in advance of the meeting at which the Coordination Committee will consider approval of the annual estimate.

d) Pursuant to Section 13, the Coordination Committee is authorized to approve changes to Exhibit “A” to this Coordination Agreement and to recommend amendments to terms of this Coordination Agreement.

e) The Coordination Committee shall assign work to subcommittees and workgroups as needed, provide guidance and feedback and ensure that subcommittees and workgroups prepare work products in a timely manner.

f) The Coordination Committee shall direct the Plan Manager in the performance of its duties under SGMA.

g) The Coordination Committee shall provide direction to its Officers concerning other administrative and ministerial issues necessary for the fulfillment of the above-enumerated tasks.

5.3.2 Limitations

When the terms of this Coordination Agreement or applicable law require the approval of a Party, that approval shall be required and evidenced as indicated in Section 6 of this Agreement.

5.4 Subcommittees and Workgroups

The Coordination Committee may appoint subcommittees, workgroups, or otherwise direct staff made available by the Parties. Such subcommittees or workgroups may include qualified individuals possessing the knowledge and expertise to advance the goals of the Coordination

Agreement on the topics being addressed by the subcommittee, whether or not such individuals are GSP Group Representatives or Alternate Representatives.

5.4.1 Work of Subcommittees and Workgroups

Tasks assigned to subcommittees, workgroups, or staff made available by the Parties may include developing technical data, supporting information, and/or recommendations on matters including, but not limited to:

a) Developing a process to update the Coordination Committee on the activities of the respective Parties, including the development, planning, financing, environmental review, permitting, implementation, and long-term monitoring of the multiple GSPs in the Subbasin;

b) Subject to the oversight of the Coordination Committee, scheduling meetings of the subcommittee or workgroup as necessary to coordinate development and implementation of the Technical Memoranda and Coordination Agreement. Attendance at these meetings may be augmented to include staff or consultants of all Parties to ensure that the appropriate expertise is available;

c) Determining common methodologies for GSP development;

d) Developing a Subbasin-wide monitoring network;

e) Preparing a coordinated water budget;

f) Developing a coordinated data management system;

g) Providing an explanation of how the respective GSPs implemented together satisfy the requirements of SGMA and are in substantial compliance with SGMA; and

h) Such other tasks as may be referred by the Coordination Committee from time to time.

5.4.2 Subcommittee Voting

One GSP Group Representative or Alternate Representative shall vote on behalf of the GSP Group at the subcommittee level; if no GSP Group Representative or Alternate Representative is present, one individual working on a subcommittee on behalf of the Parties in a GSP Group shall vote on behalf of the GSP Group. Subcommittees shall report voting results and provide information to the Coordination Committee but shall not be entitled to make determinations or determinations that are binding on the Parties.

5.5 Coordination Committee Meetings

5.5.1 Timing and Notice

The Chairperson of the Coordination Committee, any two GSP Group Representatives, or the Secretary may call meetings of the Coordination Committee as needed to carry out the activities described in this Coordination Agreement. The Coordination Committee may, but is not required to, set a date for regular meetings for the purposes described in this Coordination Agreement. All Coordination Committee Meetings shall be held in compliance with the Ralph M. Brown Act (Government Code Section 54950 *et seq*.).

5.5.2 Quorum

A majority of the GSP Group Representative(s) from every GSP Group listed on Exhibit "A" shall constitute a quorum of the Coordination Committee for purposes of holding a Coordination Committee meeting; provided, that the GSP Group Representative(s) from every GSP Group listed on Exhibit "A" must be present at a meeting for any Coordination Committee vote on a matter described in section 5.3.1 a) through 5.3 d) and 5.3.1 f) to take place. The GSP Group Alternate Representative(s) of each GSP Group shall be counted towards a quorum and as the voting representative(s) in the absence of the GSP Group Representative for which the GSP Group Alternate has been appointed. If less than a quorum is present, the GSP Group Representatives and Alternate Representatives may hear reports and discuss items on the agenda, but no action may be taken.

5.5.3 Open Attendance

Members of the public, stakeholders, and representatives of the Parties who are not appointed as GSP Group Representatives may attend all meetings and shall be provided with an opportunity to comment on matters on the meeting agenda, but shall have no vote.

5.5.4 Minutes

The Secretary's appointee shall keep and prepare minutes of all Coordination Committee meetings. Notes of subcommittee and workgroup meetings shall be kept by the Secretary's appointee or an assistant to the appointee. All minutes and subcommittee and workgroup meeting notes shall be maintained by the Secretary as Coordination Agreement records and shall be available to the Parties and the public upon request.

5.6 Voting by Coordination Committee

5.6.1. Each GSP Group Representative shall be entitled to one vote at the Coordination Committee. It shall be up to the Parties in each GSP Group to determine how the GSP Group vote(s) will be cast.

5.6.2 Except as set forth in Section 5.6.3, the unanimous vote of the GSP Representatives from all GSP Groups is required on all items upon which the Coordination Committee is authorized to act as identified in Section 5.3.1 a) through 5.3.1 d) and 5.3.1 f); the vote of a majority of a quorum shall be required for all other matters on which the Coordination Committee is authorized to act.

5.6.3 Voting Procedures to Address Lack of Unanimity

When it appears likely that the Coordination Committee will not be able to come to unanimous decision on any matter upon for which a unanimous decision is required, upon a majority vote of a quorum of the Coordination Committee, the matter may be subjected to the following additional procedures.

a) Straw Polls

Straw poll votes may be taken for the purpose of refining ideas and providing guidance to the Coordination Committee, subcommittees, or both.

b) Provisional Voting

Provisional votes may occur prior to final votes. This will be done when an initial vote is needed to refine a proposal but the GSP Group Representatives wish to consult with their respective GSP Group(s) before making a final vote.

c) A vote shall be delayed if any GSP Group Representative declares its intention to propose an alternative or modified recommended action, to be proposed at the next meeting, or as soon thereafter as the GSP Group Representative can obtain any further information or clarifying direction from its GSP Group or governing body, or both, as needed to proposed its alternative or modified recommended action.

d) If the process outlined in subsection 5.6.3(c) fails to result in a unanimous vote, any GSP Group Representative not voting in favor of the recommended action may request that the vote be delayed so that the Coordination Committee can obtain further information on the recommended action (for example, by directing a subcommittee established under this

Coordination Agreement), so the GSP Group Representative can obtain clarifying direction from its GSP Group or governing body, or both, as needed.

e) Each of the Parties acknowledges the limited time provided by SGMA to complete the GSP preparation process, and agrees to make its best efforts to cooperate through the Coordinating Committee in coming to require a unanimous vote.

SECTION 6 – APPROVAL BY INDIVIDUAL PARTIES

6.1 Where law or this Coordination Agreement require separate written approval by each of the Parties, such approval shall be evidenced in writing by providing the resolution, Motion, or Minutes of their respective Boards of Directors to the Secretary of the Coordination Committee.

SECTION 7 – EXCHANGE OF DATA AND INFORMATION

7.1 Exchange of Information

The Parties acknowledge and recognize pursuant to this Coordination Agreement that the Parties may need to exchange information amongst and between the Parties.

7.2 Procedure for Exchange of Information

7.2.1 The Parties shall exchange public and non-privileged information through collaboration and/or informal requests made at the Coordination Committee level or through subcommittees designated by the Coordination Committee. However, to the extent it is necessary to make a written request for information to another Party, each Party shall designate a representative to respond to information requests and provide the name and contact information of the designee to the Coordination Committee. Requests may be communicated in writing and transmitted in person or by mail, facsimile machine, or other electronic means to the appropriate representative as named in this Coordination Agreement. The designated representative shall respond in a reasonably timely manner.

7.2.2 Nothing in this Coordination Agreement shall be construed to prohibit any Party from voluntarily exchanging information with any other Party by any other mechanism separate from the Coordination Committee.

7.2.3 The Parties agree that each GSP Group shall provide the data required to develop the Subbasin-wide coordinated water budget but unless required by law, will not be required to provide individual well or parcel-level information in order to preserve confidentiality of individuals to the extent authorized by law, including but not limited to Water Code Section 10730.8, subdivision (b).

7.2.4 To the extent that a court order, subpoena, or the California Public Records Act is applicable to a Party, such Party in responding to a request made pursuant to that Act for release of information exchanged from another Party shall notify each other Party in writing of its proposed release of information in order to provide the other Parties with the opportunity to seek a court order preventing such release of information.

SECTION 8 – METHODOLOGIES AND ASSUMPTIONS

8.1 SGMA Coordination Requirements

Pursuant to SGMA, this Coordination Agreement must ensure that the individual GSPs utilize the same data and methodologies for developing assumptions used to determine: 1) groundwater elevation; 2) groundwater extraction data; 3) surface water supply; 4) total water use; 5) changes in groundwater storage; 6) water budgets; and 7) sustainable yield.

8.2 Pre-GSP Coordination

Prior to the individual development of GSPs, the Parties agree to develop agreed-upon methodologies and assumptions for 1) groundwater elevation; 2) groundwater extraction data; 3) surface water supply; 4) total water use; 5) changes in groundwater storage; 6) water budgets; and 7) sustainable yield. This development may be facilitated through the Coordination Committee’s delegation to a sub-committee or workgroup of the technical staff provided by some or all of the Parties. The basis upon which the methodologies and assumptions will be developed includes existing data/information, best management practices, and/or best modeled or projected data available and may include consultation with the DWR as appropriate.

8.3 Technical Memoranda Required

The data and methodologies for assumptions described in Water Code section 10727.6 and title 23, California Code of Regulations, section 357.4 to prepare coordinated plans shall be set forth in Technical Memoranda prepared by the Coordination Committee for each of the elements discussed in Sections 9, 10, 11, and 12 of this Coordination Agreement. The Technical Memoranda shall be subject to the unanimous approval of the Coordination Committee and once approved, shall be attached to and incorporated by reference into this Coordination Agreement without formal amendment of the Coordination Agreement being required. The Parties agree that they shall not submit this Coordination Agreement to DWR until the Technical Memoranda described herein have been added to the Coordination Agreement. The Technical Memoranda created pursuant to this Agreement shall be utilized by the Parties during the development and implementation of their GSPs in order to assure coordination of the GSPs in compliance with SGMA.

SECTION 9 – MONITORING NETWORK

9.1 In accordance with SGMA, the Parties hereby agree to coordinate the development and maintenance of a monitoring network at a Subbasin level through the coordination of the respective monitoring networks established pursuant to the GSPs in which each of the Parties hereto are participating. The Subbasin monitoring network description shall include monitoring objectives, protocols, and data reporting requirements specific to enumerated sustainability indicators. Each GSP Group's network shall facilitate the collection of data in order to characterize groundwater and related surface water conditions in the Subbasin and evaluate changing conditions that occur from implementation of the individual GSPs. Each Party's GSP will describe the monitoring network's objectives for the Subbasin, including an explanation of network development and implementation to monitor groundwater and related surface conditions, and the interconnection of surface water and groundwater.

9.2 Each GSP Group shall provide the Coordination Committee all relevant data and information for their respective representative monitoring sites established in accordance with Title 23, California Code of Regulations, section 354.36, as amended from time to time.

SECTION 10 – COORDINATED WATER BUDGET

10.1 In accordance with SGMA, the Parties hereby agree to prepare a single coordinated water budget for the Subbasin as described in this subsection for use in the respective GSP in which each of the Parties hereto are participating. The water budget will provide an estimate of the total annual volume of groundwater and surface water entering and leaving the Subbasin, including historical, current and projected water budget conditions, and the change in the volume of water stored and the safe yield for differing aquifers.

10.2 To the extent feasible, the Parties will consider the best available information and best available science to quantify the water budget for the Subbasin in order to provide an understanding of historical and projected hydrology, water demand, water supply, land use, population, climate change, sea level rise, groundwater and surface water interaction, and subsurface groundwater flow.

SECTION 11 – COORDINATED DATA MANAGEMENT SYSTEM

11.1 The Parties will develop and maintain a coordinated data management system that is capable of storing and reporting information relevant to the reporting requirements and/or implementation of the GSPs and monitoring network of the Subbasin.

11.2 The Parties also will develop and maintain separate data management systems. Each separate data management system developed for each GSP will store information related to implementation of each individual GSP, monitoring network data and monitoring sites requirements, and water budget data requirements. Each system will be capable of reporting all pertinent information to the Coordination Committee. After providing the Coordination Committee with data from the individual GSPs, the Coordination Committee will ensure the data is stored and managed in a coordinated manner throughout the Subbasin and reported to DWR annually as required.

SECTION 12 – ADOPTION AND USE OF THE COORDINATION AGREEMENT

12.1 Coordination of GSPs

Each Party is responsible to ensure that its own GSP complies with the statutory requirements of SGMA, including but not limited to the filing deadline. The Parties to this Coordination Agreement intend that their individual GSPs be coordinated together in order to satisfy the requirements of SGMA and to be in substantial compliance with the California Code of Regulations. The collective GSPs will satisfy the requirements of sections 10727.2 and 10727.4 of the Water Code by providing a description of the physical setting and characteristics of the separate aquifer systems within the Subbasin, the measurable objectives for each such GSP, interim milestones, and monitoring protocols that together provide a detailed description of how the Basin as a whole will be sustainably managed.

12.2 GSP and Coordination Agreement Submission

The Parties agree to submit their respective GSPs to DWR through the Coordination Committee and Plan Manager, in accordance with all applicable requirements. Subject to the subsequent attachment of the Technical Memoranda described in Sections 8-12, the Parties intend that this Coordination Agreement fulfill the requirements of providing an explanation of how the GSPs implemented together satisfy the requirements SGMA for the entire Subbasin.

SECTION 13 – MODIFICATION AND TERMINATION OF THE COORDINATION AGREEMENT

13.1 Modification or Amendment of Exhibit "A"

The Parties agree that Exhibit "A," except for the withdrawal or addition of Parties to this Agreement, may be updated by unanimous vote of the Coordination Committee from time to time. Upon such modification, the updated Exhibit "A" shall be attached to this Agreement as a replacement to the previously existing Exhibit "A." Upon such attachment, the updated "Exhibit "A" shall become a part of this Coordination Agreement without further Amendment of the Coordination Agreement being required. The Secretary shall provide notice of such change to all Group Contacts.

13.1.1 Addition of a Party

A Party may be added to this Coordination Agreement only upon its execution of a counterpart of this Agreement and its provision of any additional documentation required by Sections 3.1.2 a) through 3.1.2 d) of this Coordination Agreement. No Party may be added that is not within the Delta-Mendota Subbasin or that fails to execute an agreement to share in Coordinated Plan Expenses, unless such payment is waived by consent of all Parties.

13.2 Modification or Amendment of Coordination Agreement

Except as provided in Sections 13.1 and 13.3, the Parties hereby agree that this Coordination Agreement may be supplemented, amended, or modified only by a writing signed by all Parties.

13.3 Amendment for Compliance with Law

Should any provision of this Coordination Agreement be determined to be not in compliance with legal requirements under circumstances where amendment of the Agreement to include a provision addressing the legal requirement will cure the non-compliance, the Parties agree to promptly prepare and approve such amendment.

SECTION 14 – WITHDRAWAL, TERM, AND TERMINATION

14.1 Withdrawal

Subject to the requirements identified in SGMA and the any coordination guidelines or regulations issued by DWR, a Party may unilaterally withdraw from this Coordination Agreement without causing or requiring termination of this Coordination Agreement, effective upon thirty (30) days written notice to the Secretary and all other Parties. The Plan Coordinator shall report any such withdrawal to DWR within five (5) days of receipt of the written notice.

14.1.1 Any Party who withdraws shall remain obligated for Coordinated Plan Expenses as provided in a separate Cost Sharing Agreement. If no separate Cost Sharing Agreement is then in effect or enforceable against the withdrawing Party, the Party is obligated to pay its share of all debts, liabilities, and obligations the Party incurred or accrued under the Coordination Agreement prior to the effective date of such withdrawal, as established under its separate GSP Group agreement concerning such share of obligations.

14.1.2 Upon withdrawal, a Party agrees that it has a continuing obligation to comply with SGMA and any coordination guidelines or regulations issued by DWR, which require a coordination agreement if there are multiple GSPs in the Subbasin. This obligation shall survive the withdrawal from this Coordination Agreement and is for the express benefit of the remaining Parties.

14.1.3 In the event any GSP Group Representative(s) prevents/prevent a required unanimous vote of the Coordination Committee after following all procedures described in 5.3.1 or Section 15 of this Agreement, the Parties in such GSP Group agree to provide notice that such GSP Group has unilaterally withdrawn from this Agreement in accordance with this Section.

14.2 Term

As modified pursuant to Section 13 and unless terminated in accordance with Section 14.2.3, this Coordination Agreement shall continue for a term that is coterminous with the requirements of SGMA for the existence of a Coordination Agreement.

14.3 Termination

This Coordination Agreement may be terminated or rescinded and the coordinated implementation of GSPs terminated by unanimous written consent of all the Parties. Nothing in this Coordination Agreement shall prevent the Parties from entering into another coordination agreement for coordination with any other subbasin.

SECTION 15 – PROCEDURES FOR RESOLVING CONFLICTS

In the event of any dispute arising from or relating to this Agreement, the disputing Party shall, within thirty (30) calendar days of discovery of the events giving rise to the dispute, notify all Parties to this Agreement in writing of the basis for the dispute. Within thirty (30) calendar days of receipt of said notice, all interested Parties shall meet and confer in a good-faith attempt to informally resolve the dispute. All disputes that are not resolved informally shall be settled by arbitration. Within ten (10) days following the failed informal proceedings, each interested Party shall nominate and circulate to all other interested Parties the name of one arbitrator. Within ten (10) days following the nominations, the interested Parties shall rank their top three among all nominated arbitrators, awarding three points to the top choice, two points to the second choice, one point to the third choice and zero points to all others. Each interested Party shall forward its tally to the Secretary, who shall tabulate the points and notify the interested Parties of the arbitrator with the highest cumulative score, who shall be the selected arbitrator. The Secretary may also develop procedures for approval by the Parties, for selection in the case of tie votes or in order to replace the selected arbitrator in the event such arbitrator declines to act. The arbitration shall be administered in accordance with the procedures set forth in the California Code of Civil Procedure, section 1280, et seq., and of any state or local rules then in effect for arbitration pursuant to said section. Upon completion of arbitration, if the controversy has not been resolved, any Party may exercise all rights to bring a legal action relating to the controversy.

SECTION 16 – GENERAL PROVISIONS

16.1 Authority of Signers

The individuals executing this Coordination Agreement represent and warrant that they have the authority to enter into this Coordination Agreement and to legally bind the Party for whom they are signing to the terms and conditions of this Coordination Agreement.

16.2 Governing Law

The validity and interpretation of this Coordination Agreement will be governed by the laws of the State of California without giving effect to the principles of conflict of laws, with venue for all purposes to be proper only in the County of Merced, State of California.

16.3 Severability

Except as provided for cure by amendment in Section 13.3, if any term, provision, covenant, or condition of this Coordination Agreement is determined to be unenforceable by a court of competent jurisdiction, it is the Parties' intent that the remaining provisions of this Coordination Agreement will remain in full force and effect and will not be affected, impaired, or invalidated by such a determination.

16.4 Counterparts

This Coordination Agreement may be executed in any number of counterparts, each of which will be an original, but all of which will constitute one and the same agreement.

16.5 Good Faith

The Parties agree to exercise their best efforts and utmost good faith to effectuate all the terms and conditions of this Coordination Agreement and to execute such further instruments and documents as are reasonably necessary, appropriate, expedient, or proper to carry out the intent and purposes of this Coordination Agreement.

SECTION 17 – SIGNATORIES

PARTIES:

PATTERSON IRRIGATION DISTRICT GSA			
Patterson Irrigation District	**Date:** 05/22/2018		
Signature			
Name of Representative: Vince Lucchesi			
WEST STANISLAUS IRRIGATION DISTRICT GSA 1			
West Stanislaus Irrigation District	**Date:**		
Signature			
Name of Representative:			
DM II GSA			
Del Puerto Water District	**Date:**	**Oak Flat Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CITY OF PATTERSON GSA			
City of Patterson	**Date:**		
Signature			
Name of Representative:			

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SECTION 17 – SIGNATORIES

PARTIES:

<table>
<tr><td colspan="4">PATTERSON IRRIGATION DISTRICT GSA</td></tr>
<tr><td>Patterson Irrigation District</td><td colspan="3">Date:</td></tr>
<tr><td colspan="4">Signature</td></tr>
<tr><td colspan="4">Name of Representative:</td></tr>
<tr><td colspan="4">WEST STANISLAUS IRRIGATION DISTRICT GSA 1</td></tr>
<tr><td>West Stanislaus Irrigation District</td><td colspan="3">Date: 5/16/18</td></tr>
<tr><td colspan="4">Signature Robert Pierce</td></tr>
<tr><td colspan="4">Name of Representative: Robert Pierce, General Manager</td></tr>
<tr><td colspan="4">DM II GSA</td></tr>
<tr><td>Del Puerto Water District</td><td>Date:</td><td>Oak Flat Water District</td><td>Date:</td></tr>
<tr><td colspan="2">Signature</td><td colspan="2">Signature</td></tr>
<tr><td colspan="2">Name of Representative:</td><td colspan="2">Name of Representative:</td></tr>
<tr><td colspan="4">CITY OF PATTERSON GSA</td></tr>
<tr><td>City of Patterson</td><td colspan="3">Date:</td></tr>
<tr><td colspan="4">Signature</td></tr>
<tr><td colspan="4">Name of Representative:</td></tr>
</table>

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SECTION 17 – SIGNATORIES

PARTIES:

PATTERSON IRRIGATION DISTRICT GSA			
Patterson Irrigation District	**Date:**	**Twin Oaks Irrigation Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
WEST STANISLAUS IRRIGATION DISTRICT GSA 1			
West Stanislaus Irrigation District	**Date:**		
Signature			
Name of Representative:			
WEST STANISLAUS IRRIGATION DISTRICT GSA 2			
West Stanislaus Irrigation District	**Date:**		
Signature			
Name of Representative:			
DM II GSA			
Del Puerto Water District	**Date:** 8/28/18	**Oak Flat Water District**	**Date:** 8/28/18
Signature Anthea C Hansen		**Signature** Anthea C Hansen	
Name of Representative: Anthea C Hansen		**Name of Representative:** Anthea C Hansen	

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SECTION 17 – SIGNATORIES

PARTIES:

PATTERSON IRRIGATION DISTRICT GSA			
Patterson Irrigation District	**Date:**		
Signature			
Name of Representative:			
WEST STANISLAUS IRRIGATION DISTRICT GSA 1			
West Stanislaus Irrigation District	**Date:**		
Signature			
Name of Representative:			
DM II GSA			
Del Puerto Water District	**Date:**	**Oak Flat Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CITY OF PATTERSON GSA			
City of Patterson	**Date:** 9/20/18		
Signature			
Name of Representative: Ken Irwin			

CITY OF PATTERSON GSA			
City of Patterson	**Date:**		
Signature			
Name of Representative:			
NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:** 7/31/18	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative: Jerald R. O'Banion		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:** 7/31/18	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative: Jerald R. O'Banion		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	

CITY OF PATTERSON GSA			
City of Patterson	Date:		
Signature			
Name of Representative:			
NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	Date:	County of Stanislaus	Date: 10/9/18
Signature		Signature	
Name of Representative:		Jim DeMartini, Chariman:	
APPROVED AS TO FORM John P. Doering County Counsel Stanislaus County		BY: Asst County Counsel	Date: 10/3/18
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	Date:	Panoche Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Tranquillity Irrigation District	Date:	Fresno Slough Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Eagle Field Water District	Date:	Pacheco Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
Santa Nella County Water District	Date:	Mercy Springs Water District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
County of Merced	Date:	County of Fresno	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	Date:		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	Date:		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	Date:	Columbia Canal Company	Date:
Signature		Signature	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:** 8/13/18	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative: Lon Martin		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

CITY OF PATTERSON GSA			
City of Patterson	**Date:**		
Signature			
Name of Representative:			
NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature** 07/31/18	
Name of Representative:		**Name of Representative:** John Bennett	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature** 8/2/18	
Name of Representative:		**Name of Representative:** Aaron Barcellos	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:** 7/31/18
Signature		**Signature**	
Name of Representative:		**Name of Representative:** Michael Linneman	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	

CITY OF PATTERSON GSA			
City of Patterson	**Date:**		
Signature			
Name of Representative:			
NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:** 6/20/18	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative: Jerry Salvador		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:** 8-6-18
Signature		**Signature**	
Name of Representative:		**Name of Representative:** Elizabeth Reeves	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature Randall S Miles 6-27-18		**Signature**	
Name of Representative: Randall Miles		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative: Amy Montgomery		**Name of Representative:**	
Santa Nella County Water District	**Date:** 9/14/18	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:** 8/21/18
Signature		**Signature** Sal Quintero	
Name of Representative:		**Name of Representative:** Sal Quintero	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

ATTEST:
BERNICE E. SEIDEL
Clerk of the Board of Supervisors
County of Fresno, State of California
By ________ Deputy

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative: Steve Sloan			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative: Jean Sagouspe			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:** 9-7-2016	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative: James O'Banion		**Name of Representative:**	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

Mike Stearns

Jim Nickel

NORTHWESTERN DELTA-MENDOTA GSA			
County of Merced	**Date:**	**County of Stanislaus**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
CENTRAL DELTA-MENDOTA REGION MULTI-AGENCY GSA			
San Luis Water District	**Date:**	**Panoche Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Tranquillity Irrigation District	**Date:**	**Fresno Slough Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Eagle Field Water District	**Date:**	**Pacheco Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
Santa Nella County Water District	**Date:**	**Mercy Springs Water District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
County of Merced	**Date:**	**County of Fresno**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
ORO LOMA WATER DISTRICT GSA			
Oro Loma Water District	**Date:**		
Signature			
Name of Representative:			
WIDREN WATER DISTRICT GSA			
Widren Water District	**Date:**		
Signature			
Name of Representative:			
SAN JOAQUIN RIVER EXCHANGE CONTRACTORS GSA			
Central California Irrigation District	**Date:**	**Columbia Canal Company**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:** Kimberly Brown	
Firebaugh Canal Company	**Date:**	**San Luis Canal Company**	**Date:**
Signature		**Signature**	

Name of Representative:	**Name of Representative:**
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	**Date:** 8/6/2018
Signature President	
Name of Representative: DONALD SKINNER, President	
CITY OF MENDOTA GSA	
City of Mendota	**Date:**
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	**Date:**
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	**Date:**
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	**Date:**
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	**Date:**
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	**Date:**
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	**Date:**
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	**Date:**
Signature	
Name of Representative:	

Name of Representative:	**Name of Representative:**
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	**Date:**
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	**Date:** 12/12/18
Signature	
Name of Representative: Cristian Gonzalez	
CITY OF FIREBAUGH GSA	
City of Firebaugh	**Date:**
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	**Date:**
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	**Date:**
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	**Date:**
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	**Date:**
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	**Date:**
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	**Date:**
Signature	
Name of Representative:	

Name of Representative:	**Name of Representative:**
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	**Date:**
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	**Date:**
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	**Date:** 9-25-18
Signature	
Name of Representative: Ben Gallegos	
CITY OF LOS BANOS GSA	
City of Los Banos	**Date:**
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	**Date:**
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	**Date:**
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	**Date:**
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	**Date:**
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	**Date:**
Signature	
Name of Representative:	

Name of Representative:	**Name of Representative:**
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	**Date:**
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	**Date:**
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	**Date:**
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	**Date:** November 14, 2018
Signature	
Name of Representative: Alex Terrazas, City Manager	
CITY OF DOS PALOS GSA	
City of Dos Palos	**Date:**
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	**Date:**
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	**Date:**
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	**Date:**
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	**Date:**
Signature	
Name of Representative:	

Name of Representative:	Name of Representative:
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	Date:
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	Date:
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	Date:
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	Date:
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	Date:
Signature	7/9/2018
Name of Representative: April Hogue	
CITY OF GUSTINE GSA	
City of Gustine	Date:
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	Date:
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	Date:
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	Date:
Signature	
Name of Representative:	

Name of Representative:	**Name of Representative:**
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	**Date:**
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	**Date:**
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	**Date:**
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	**Date:**
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	**Date:**
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	**Date:** September 18, 2018
Signature	
Name of Representative: Doug Dunford	
CITY OF NEWMAN GSA	
City of Newman	**Date:**
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	**Date:**
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	**Date:**
Signature	
Name of Representative:	

Name of Representative:	Name of Representative:
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	Date:
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	Date:
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	Date:
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	Date:
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	Date:
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	Date:
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	Date: 15 AUG 18
Signature	
Name of Representative: Michael E. Holland	
COUNTY OF MADERA-3 GSA	
County of Madera	Date:
Signature	
Name of Representative:	
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	Date:

Name of Representative:	Name of Representative:
TURNER ISLAND WATER DISTRICT -2 GSA	
Turner Island Water District	Date:
Signature	
Name of Representative:	
CITY OF MENDOTA GSA	
City of Mendota	Date:
Signature	
Name of Representative:	
CITY OF FIREBAUGH GSA	
City of Firebaugh	Date:
Signature	
Name of Representative:	
CITY OF LOS BANOS GSA	
City of Los Banos	Date:
Signature	
Name of Representative:	
CITY OF DOS PALOS GSA	
City of Dos Palos	Date:
Signature	
Name of Representative:	
CITY OF GUSTINE GSA	
City of Gustine	Date:
Signature	
Name of Representative:	
CITY OF NEWMAN GSA	
City of Newman	Date:
Signature	
Name of Representative:	
COUNTY OF MADERA-3 GSA	
County of Madera	Date: 10-02-2018 9-11-18
Signature	
Name of Representative: Tom Wheeler	MICHAEL LINDEN, DEP COUNTY COUNSEL
COUNTY OF MERCED DELTA-MENDOTA GSA	
County of Merced	Date:
Signature	
Name of Representative:	

COUNTY OF MERCED DELTA-MENDOTA GSA			
County of Merced	Date: 7/31/18		
Signature			
Name of Representative: Jerald R. O'Banion			
GRASSLAND WATER DISTRICT GSA			
Grassland Water District	Date:	Grassland Resource Conservation District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
FARMERS WATER DISTRICT GSA			
Farmers Water District	Date:		
Signature			
Name of Representative:			
FRESNO COUNTY GSA			
County of Fresno	Date:		
Signature			
Name of Representative:			
ALISO WATER DISTRICT GSA			
Aliso Water District	Date:		
Signature			
Name of Representative:			

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	Date:
Signature	
Name of Representative:	

GRASSLAND WATER DISTRICT GSA			
Grassland Water District	Date: 7-10-2018	Grassland Resource Conservation District	Date: 7-10-2018
Signature		Signature	
Name of Representative: Pepper Snyder		Name of Representative: Dennis Campini	
FARMERS WATER DISTRICT GSA			
Farmers Water District	Date:		
Signature			
Name of Representative:			
FRESNO COUNTY MANAGEMENT AREA A and B GSAs			
County of Fresno	Date:		
Signature			
Name of Representative:			
ALISO WATER DISTRICT GSA			
Aliso Water District	Date:		
Signature			
Name of Representative:			

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	Date:
Signature	
Name of Representative:	

GRASSLAND WATER DISTRICT GSA			
Grassland Water District	Date:	Grassland Resource Conservation District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	
FARMERS WATER DISTRICT GSA			
Farmers Water District	Date: 9-14-18		
Signature			
Name of Representative: JIM STILWELL			
FRESNO COUNTY MANAGEMENT AREA A and B GSAs			
County of Fresno	Date:		
Signature			
Name of Representative:			
ALISO WATER DISTRICT GSA			
Aliso Water District	Date:		
Signature			
Name of Representative:			

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	Date:
Signature	
Name of Representative:	

GRASSLAND WATER DISTRICT GSA			
Grassland Water District	Date:	Grassland Resource Conservation District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	

FARMERS WATER DISTRICT GSA	
Farmers Water District	Date:
Signature	
Name of Representative:	

FRESNO COUNTY MANAGEMENT AREA A and B GSAs	
County of Fresno	Date: August 21, 2018
Signature Sal Quintero	
Name of Representative: Sal Quintero	

ATTEST:
BERNICE E. SEIDEL
Clerk of the Board of Supervisors
County of Fresno, State of California

By ______ Deputy

ALISO WATER DISTRICT GSA	
Aliso Water District	Date:
Signature	
Name of Representative:	

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	Date:
Signature	
Name of Representative:	

GRASSLAND WATER DISTRICT GSA			
Grassland Water District	**Date:**	**Grassland Resource Conservation District**	**Date:**
Signature		**Signature**	
Name of Representative:		**Name of Representative:**	
FARMERS WATER DISTRICT GSA			
Farmers Water District	**Date:**		
Signature			
Name of Representative:			
FRESNO COUNTY GSA			
County of Fresno	**Date:**		
Signature			
Name of Representative:			
ALISO WATER DISTRICT GSA			
Aliso Water District	**Date:** 10-23-18		
Signature Roy Catania			
Name of Representative: ROY CATANIA, BOARD PRESIDENT			

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	**Date:**
Signature	
Name of Representative:	

GRASSLAND WATER DISTRICT GSA			
Grassland Water District	Date:	Grassland Resource Conservation District	Date:
Signature		Signature	
Name of Representative:		Name of Representative:	

FARMERS WATER DISTRICT GSA	
Farmers Water District	Date:
Signature	
Name of Representative:	

FRESNO COUNTY MANAGEMENT AREA A and B GSAs	
County of Fresno	Date:
Signature	
Name of Representative:	

ALISO WATER DISTRICT GSA	
Aliso Water District	Date:
Signature	
Name of Representative:	

EXECUTING NOT AS A PARTY:

SAN LUIS & DELTA-MENDOTA WATER AUTHORITY	
San Luis & Delta-Mendota Water Authority	Date: 8/6/18
Signature Frances C Mizuno	
Name of Representative: Frances Mizuno	

EXHIBIT "A" – Groundwater Sustainability Plan (GSP) Groups

	Groundwater Sustainability Plan Group & Representation on Coordination Committee	Group Contact Agency	Participation Percentage
1	**Northern / Central Delta-Mendota Region – 2 Representatives** Central DM Subgroup – 1 Member representing the following: Central Delta-Mendota Multi-Agency GSA Oro Loma Water District GSA Widren Water District GSA Northern DM Subgroup – 1 Member representing the following: City of Patterson GSA DM-II GSA Northwestern Delta-Mendota GSA Oak Flat Water District GSA Patterson Irrigation District GSA West Stanislaus Irrigation District GSA	West Stanislaus Irrigation District	16.7%
2	**San Joaquin River Exchange Contractors – 2 Representatives** City of Dos Palos GSA City of Firebaugh GSA City of Gustine GSA City of Los Banos GSA City of Mendota GSA City of Newman GSA Madera County GSA Merced County Delta-Mendota GSA San Joaquin River Exchange Contractors GSA Turner Island Water District-2 GSA	San Joaquin River Exchange Contractors	16.7%
3	**Farmers Water District – 1 Representative** Farmers Water District GSA	Farmers Water District	16.7%

4	**Aliso Water District – 1 Representative** Aliso Water District GSA	Aliso Water District	16.7%
5	**Grassland Water District – 1 Representative** Grassland Water District GSA Grassland WD and Grassland Resource Conservation District Merced County Delta-Mendota GSA	Grassland Water District	16.7%
6	**Fresno County Management Area A & B – -1 Representatives** Fresno County Management Area A GSA Fresno County Management Area B GSA	Fresno County	16.7%

APPENDIX – SGMA DEFINITIONS

1. “**Agency**” or “**GSA**” shall mean a groundwater sustainability agency as defined in SGMA.

2. “**Coordination Agreement**” shall mean this Coordination Agreement, unless indicated otherwise.

3. “**Annual Report**” shall mean the report required by Water Code Section 10728 and SGMA Regulations Section 356.2.

4. “**Basin**” shall mean the Delta-Mendota subbasin and defined in Bulletin 118 as Basin 5- 22.07; for purposes of the Coordination Agreement, “Basin” and “Subbasin shall have the same meaning.

5. “**Basin Setting**” shall mean the information about the physical setting, characteristics, and current conditions of the basin as described by the Agency in the hydrogeologic conceptual model, the groundwater conditions, and the water budget, pursuant to California Code of Regulations, title 23, sections 354.12-354.20.

6. “**CASGEM**” shall mean the California Statewide Groundwater Elevation Monitoring Program developed by the DWR.

7. “**DWR**” shall mean the Department of Water Resources.

8. “**Groundwater**” shall mean the water beneath the surface of the earth within the zone below the water table in which the soil is completely saturated with water, but does not include water that flows in known and definite channels.

9. “**Groundwater flow**” shall mean the volume and direction of groundwater movement into, out of, or throughout a basin.

10. “**Interconnected surface water**” shall mean the surface water that is hydraulically connected at any point by a continuous saturated zone to the underlying aquifer and the overlying surface water is not completely depleted.

11. “**Measureable objectives**” shall mean specific, quantifiable goals for the maintenance or improvement of specified groundwater conditions that have been included in an adopted GSP to achieve the sustainability goal for the basin.

12. "**Principal Aquifers**" shall mean aquifers or aquifer systems that store, transmit, and yield significant or economic quantities of groundwater to wells, springs, or surface water systems.

13. "**Representative Monitoring**" shall mean a monitoring site within a broader network of sites that typifies one or more conditions within the basin or an area of the basin.

14. "**Sustainability Indicator**" shall mean any of the effects caused by groundwater conditions occurring throughout the basin that, when significant and unreasonable, cause undesirable results.

15. "**Water Source Type**" shall mean the source from which water is derived to meet the applied beneficial uses, including groundwater, precipitation, recycled water, reused water, and surface water sources.

16. "**Water Use Sector**" shall mean categories of water demand based on the general land uses to which the water is applied, including urban, industrial, agricultural, managed wetlands, managed recharge, and native vegetation.

Appendix B - Common Technical Memoranda

TECHNICAL MEMORANDUM #1

RE: Common Datasets and Assumptions used in the Delta-Mendota Subbasin GSPs

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

The Technical Memoranda will be utilized by the Coordination Agreement Parties (representing the twenty-three GSAs in the Subbasin) during the implementation of their GSPs in order to ensure coordination of the GSPs. The Coordination Committee is responsible for ongoing review and updating of the Technical Memoranda, as needed, during GSP implementation.

The following datasets and assumptions were used in a coordinated fashion by those preparing the six GSP for the Delta-Mendota Subbasin. These data sets and assumptions were agreed upon by the Delta-Mendota Subbasin Technical Working Group and approved by the Delta-Mendota Coordination Committee over the period extending from December 2017 through June 2019.

1. DATASETS

The technical development for the six GSPs in the Subbasin relied on the best available data for their respective Plan areas. The following outlines common datasets and instances of localized data use during the development of the GSPs.

<u>Groundwater Level Data and Contour Mapping</u>

1. Subbasin-wide groundwater level contour maps for the upper aquifer were developed for the selected historic water budget period (Spring 2003 and 2012) and current water budget period (Spring 2013 and Fall 2013). Contours were developed for the upper aquifer for the years identified. Thirty-foot contour intervals were used; individual GSAs compromised on this contour spacing following initial attempts at smaller contours due to variability in data. The lower aquifer's historic water surface elevation (WSE) data inventory was too limited to develop groundwater level contours for the entire Subbasin and is anticipated to be addressed in future GSPs and annual reports as these data gaps are addressed. Water level contour maps were composed from the following data sources:
    - i. California Department of Water Resources (DWR):
        1. California Statewide Groundwater Elevation Monitoring (CASGEM) Program
        2. Water Data Library (WDL)
    - ii. Water level data from local monitoring programs.

2. Subbasin-wide change in storage was evaluated for the upper aquifer using annual groundwater contour maps from Spring 2003 to Spring 2013 developed from the same datasets identified above and compared to each GSP's change in groundwater storage as calculated from historic and current water budgets for consistency. Change in storage for the lower aquifer was evaluated using specific yield and historic land subsidence provided by each GSP Group along with change in groundwater levels and storativity where lower aquifer groundwater level data were available. Datasets used to assess subsidence are discussed below.

Subsidence

3. Each GSP Group determined the historic rate of subsidence in their respective Plan area using the following data sources and period of record. The subsidence rates were combined using a 'sum-of-the-parts' methodology to develop an understanding of subsidence in the Subbasin.
    a. Aliso Water District GSP: United States Bureau of Reclamation (USBR) San Joaquin River Restoration Program (SJRRP) 2011-2017.
    b. Farmers Water District GSP: United States Geological Survey (USGS) and University-NAVSTAR Consortium (UNAVCO) 2004-2017.
    c. Fresno Management Areas A & B GSP: USGS and UNAVCO 2004-2017.
    d. Grassland GSP: USBR 2011-2017 with Ken D. Schmidt & Associates (KDSA) edits.
    e. Northern & Central Delta-Mendota GSP (without Tranquillity Irrigation District): USBR's Delta-Mendota Canal subsidence surveys interpolated from 1984 to 2014 (Pools 3 through 18) as well as the Department of Water Resources 2017 CA Aqueduct Subsidence Study.
    f. Northern & Central Delta-Mendota GSP (Tranquillity Irrigation District): Tranquillity Irrigation District's (TRID) local subsidence data from 2014 to 2018.
    g. San Joaquin River Exchange Contractors GSP: USBR's SJRRP subsidence monitoring network, USBR's Delta-Mendota Canal subsidence survey data, USGS continuous monitoring sites (including extensometers and CPGS sites), and local surveying data for years 2003-2012, 2013, and 2014-2018.

Water Budgets

4. Each GSP group developed Historic, Current, and Projected Water Budgets using the best available local and publicly available data for their respective Plan area. The six individually-developed water budgets were compared and combined for the Delta-Mendota Subbasin water budgets. Instances in which common data sources were used are as follows:
    a. The Historic, Current, and Projected Water Budgets relied on a common data source for water year type; the California Data Exchange Center (CDEC): San Joaquin River Index was used. The San Joaquin River Exchange Contractors water year type behavior is influenced by inflow to Shasta Reservoir, as does the managed wetlands in the Grassland GSP area that have federal contracts for refuge water supplies. Therefore, the Full Natural Flow (FNF) into Shasta Reservoir was considered to refine the water year type to distinguish between a critically dry year under the San Joaquin River Index and a critically dry year with reduced surface water deliveries to the San Joaquin River Exchange Contractors and the refuges due to a critical year under the Exchange Contract and refuge contracts (reduced inflows to Shasta Reservoir).
    b. The six GSP Groups also coordinated the use of DWR's 2030 and 2070 Climate Change Factors (CCF or CCFs) for the Projected Water Budget.

Groundwater Dependent Ecosystems

5. Groundwater Dependent Ecosystems (GDEs) were evaluated by each GSP Group. The Natural Communities (NC) Dataset Viewer's GDE delineations, produced by The Nature Conservancy (TNC) in partnership with the Department of Fish and Wildlife and DWR, was reviewed and vetted using the following data sources:

a. Aliso Water District GSP, Farmers Water District GSP, Fresno Management Areas A & B GSP, Northern & Central Delta-Mendota Regions GSP, and the San Joaquin River Exchange Contractors GSP used 2015 groundwater contours comprised of local and DWR's WDL depth to water data.

b. Grassland GSP used current Ducks Unlimited Wetland Inventory data for the Wetland GDE map, because the NC Dataset for wetland GDEs in this unique wetland habitat area is not accurate. The Wetland GDE map assumes that all wetlands identified by Ducks Unlimited are possible GDEs, and the Vegetative GDE map assumes that all TNC-delineated Vegetative GDEs are possible GDEs. The GSP Groups reserve the opportunity to gather more local data to refine the GDE maps in future updates.

c. Northern & Central Delta-Mendota Regions GSP used aerial satellite photos and field verification at locations with infrastructure, farms, ditches and canals, etc. to ground-truth the GDE data produced by TNC.

2. ASSUMPTIONS

Coordination and limited data required assumptions to be made to meet GSP requirements. Assumptions that affected the Delta-Mendota Subbasin's coordinated effort are outlined below along with the data and methodologies applied. The basis upon which the methodologies and assumptions were developed includes data and information provided by local agencies, State and federal data, best management practices, and/or best modeled or projected data available.

Mapping

1. Historic WSE Mapping – Assumed accurate and best available locally provided data

a. Upper Aquifer

i. Spring 2003 and Spring 2013 WSE contours were developed for the upper aquifer using datasets identified in item 1.1 above. Spring data was defined as being measured from January 1 through April 8.

ii. The groundwater levels at individual wells were plotted for both Spring 2003 and Spring 2013. Contours were refined by Luhdorff & Scalmanini, Consulting Engineers (LSCE) in the southern portion of the Subbasin and by KDSA for the entire Delta-Mendota Subbasin.

iii. The Spring 2003 and 2013 surfaces were overlaid to produce a change in groundwater level map for the historic period.

iv. The contour maps for the upper aquifer were developed on the following dates:
1. UPPER Change Spring 2003 vs. 2013 – Last edited February 7, 2019
2. UPPER Spring 2003 – Last edited February 6, 2019
3. UPPER Spring 2013 – Last edited February 6, 2019

a. Lower Aquifer

i. All available wells from the inventory identified in the datasets section above that had lower aquifer WSE readings in Spring 2013 and Fall 2013 were used to generate two maps showing lower aquifer 2003 and 2013 water levels (WSE values at individual wells). The spatial coverage was insufficient for contouring due to the distribution aligning linearly along the Delta-Mendota Canal and the limited well count. This effort was ultimately determined to be a data gap by the Technical Working Group on January 15, 2019.

1. Spring 2013: 37 water elevation measurements
2. Fall 2013: 48 water elevation measurements
3. Final maps for depiction of the lack of coverage and to meet GSP regulations were developed on February 6, 2019. Contours were unable to be developed for reasons noted above. Data will be collected in the future allowing for the development of lower aquifer contour maps as required in future annual reports.

2. Current WSE Mapping – Assumed accurate and best available locally provided data

a. Upper Aquifer

i. The upper aquifer Spring 2013 contour map developed on February 6, 2019 was also used to meet the requirements of the Current WSE contour maps. An additional upper aquifer Fall 2013 contour map was developed on March 1, 2019 using similar methodology and data from September 1 to October 31.

b. Lower Aquifer

i. As with the determination for the historic period, the spatial coverage was insufficient, and this effort has been determined to be a data gap by the Technical Working Group on January 15, 2019.

3. Groundwater Extraction Data

Extraction data were estimated or measured by local GSAs for use in the development of individual GSPs. Groundwater extraction volumes used for the Delta-Mendota Subbasin water budgets were compiled from the six individual GSP water budgets.

4. Surface Water Supply

Surface Water Supply allocations, deliveries, imports, and projected supplies were provided or estimated by local GSAs for use in the development of individual GSPs. Applied surface water volumes used for the Delta-Mendota Subbasin water budgets were compiled from the six individual GSP water budgets.

5. Total Water Use

Total Water Use was estimated or measured by local GSAs for use in the development of individual GSPs. Total water use included in the Delta-Mendota Subbasin water budgets was compiled from the individual GSP water budgets.

6. Change in Groundwater Storage

a. Upper Aquifer

i. Upper aquifer change in groundwater storage was evaluated using annual groundwater level contours from Spring 2003 to Spring 2013 developed using the same datasets identified above and applying specific yield (defined as the volume of water released from storage by an unconfined aquifer per unit surface area of aquifer per unit decline of the water table) provided by each individual GSP Group. The Delta-Mendota Subbasin upper aquifer change in groundwater storage assessment considered a 'sum-of-the-parts' methodology, combining the change in groundwater storage for each GSP to determine the overall change in groundwater storage for the Subbasin.

b. Lower Aquifer

i. On January 15, 2019, the Technical Working Group discussed addressing the historic period change in groundwater storage in the lower aquifer. Instead of using scarce data, the change was compared against loss of storage from inelastic land subsidence as calculated using change in land surface elevation multiplied by the area and supplemented by change in groundwater levels and storativity in areas of the Subbasin where those data were available.

7. GDEs

The Natural Communities Dataset Viewer's (NC Dataset Viewer) GDE delineations, produced by The Nature Conservancy (TNC) in partnership with the Department of Fish and Wildlife and DWR, were reviewed and vetted by each GSP Group. The primary reasons for not fully utilizing the NC Dataset Viewer GDE delineations were as follows: (1) A mapping error was identified, noting the land use is incompatible with the presence of GDEs; (2) for wetlands within the Grassland GSP, a more accurate and comprehensive wetland data set was available; and (3) The depth to groundwater exceeds 30 feet. The 30-foot criterion was used with the understanding that the deepest rooting depth of a vegetative GDE identified in NC Dataset Viewer is 30 feet, and further refined using effective rooting depths published by TNC. The GDE determinations and Spring 2015 depth to groundwater contours were compiled into a Wetland GDE map and Vegetative GDE map on May 29, 2019 and approved by the Subbasin Coordination Committee

The methods for GDE determinations are as follows.

a. Aliso Water District GSP:

   i. Spring 2013 and 2015 groundwater contours were assessed in Aliso Water District to evaluate areas in which the depth to water exceeded 30 feet, demonstrating unsuitable hydrologic conditions for vegetative or wetland GDEs. Aliso WD GSP's GDE determinations remained constant when using either Spring 2013 or Spring 2015 water levels for consideration.

   ii. GDEs identified within a 100-foot buffer from the San Joaquin River remained "Possible GDEs," as consistent with a typical wetland setback standard used by CalTrans. (See the Aliso Water District GSP for detailed references relating to this standard.)

b. Farmers Water District GSP:

   i. Using GIS, Spring 2015 groundwater elevation contours were overlain on the TNC GDE delineations identified in Farmers Water District to evaluate areas in which the depth to water exceeded 30 feet, demonstrating unsuitable hydrologic conditions for vegetative or wetland GDEs.

   ii. Local understanding of recent land use was also considered when vetting the TNC GDE delineations.

c. Fresno Management Areas A & B GSP:

   i. Spring 2015 groundwater contours were overlain on the TNC GDE delineations used for Fresno Management Areas A & B to evaluate areas in which the depth to water exceeded 30 feet, demonstrating unsuitable hydrologic conditions for vegetative or wetland GDEs.

   ii. Local understanding of recent land use was also considered when vetting the TNC GDE delineations.

DELTA-MENDOTA SGMA

d. Grassland GSP:

i. The Ducks Unlimited Wetland Inventory data were used in place of TNC GDE delineations for the identification of possible Wetland GDEs, with the understanding that the TNC GDE delineations for wetlands did not cover the full extent of wetlands in the Grassland Plan area. The Ducks Unlimited wetland delineations were more comprehensive and were developed with ground-truthing surveys which improved accuracy. This deviation in the use of a common dataset for the Subbasin was necessary as this GSP Plan area contains extensive acres of heavily vegetated, shallow seasonal wetlands and therefore required a supplemental approach to GDE delineation beyond the TNC GDE delineation.

ii. All TNC Vegetative GDEs were also considered "Possible GDEs" and the Grassland GSP Group recognizes the opportunity to gather more local data to refine this position in future GSP updates, if applicable.

e. Northern & Central Delta-Mendota Regions GSP:

i. Spring 2015 groundwater elevation contours were overlain on the TNC GDE delineations to identify areas in which the depth to water exceeded 30 feet, demonstrating unsuitable hydrologic conditions for vegetative or wetland GDEs.

ii. GDEs identified within a 100-foot buffer from the San Joaquin River remained "Possible GDEs," as consistent with a typical wetland setback standard in California.[1,2]

iii. Local understanding of recent land use was also considered when vetting the TNC GDEs.

f. San Joaquin River Exchange Contractors GSP:

i. Aerial imagery was reviewed for possible mapping errors based on land use and infrastructure. Remaining potential GDE's used Spring 2015 groundwater contours to identify areas in which the groundwater level exceeded the effective rooting depth published by TNC.

8. Subsidence

a. NASA JPL and USBR subsidence maps were provided to the Technical Working Group on October 16th, 2018.

i. These maps were used for discussion purposes.

b. Subsidence values were produced by each GSP Group, using the most temporally and spatially representative data for their respective GSP on February 7, 2019. The GSP-specific subsidence values are listed in the table below. See the individual GSPs for more detailed information as to how the GSP-specific subsidence values were derived.

GSP Region	Subsidence Rate	Units	Rate	Period of Record	Source	Additional Notes
Aliso	0.15	ft/year	Annual	2011-2017	USBR	Local Surveys and SJRRP monitoring data
Farmers	0.689	ft	Cumulative	2004-2017	USGS and UNAVCO	USGS Fordel-upper aquifer Compaction, Total = 0.031 ft P304-Total Subsidence = 0.72 ft Lower aquifer Compaction, Total = 0.689 ft
Fresno	0.689	ft	Cumulative	2004-2017	USGS and UNAVCO	USGS Fordel-upper aquifer Compaction, Total = 0.031 ft P304-Total Subsidence = 0.72 ft Lower aquifer Compaction, Total = 0.689 ft
Grassland	0.075	ft/year	Annual	2011-2017	USBR and KDSA	The estimated rate of subsidence is based on monitoring points outside of the GSA and therefore has not been verified; Initial data came from USBR, KDSA provided edits to that data.
Northern & Central	Varies by DMC Pool, ranges from 0.7 to -0.88	ft	Cumulative	2003-2013	SLDMWA	Interpolated from 1984 and 2014 Subsidence Surveys for Pools 3-18
Northern & Central	0.53	ft/year	Annual	2014-2018	TRID	Survey data
San Joaquin River Exchange Contractors	0.35	ft	Cumulative	2003-2012	Various datasets	Local surveys, CGPS/CORS/Extensometer data, SJRRP monitoring data, DMC surveys

HCM/Groundwater Conditions

1. Four distinct hydrogeologic layers were initially identified for the Hydrogeological Conceptual Model: shallow layer (0-30 ft), medium layer (30 ft – top of Corcoran Clay), Corcoran Clay, and below Corcoran Clay. However, given that some areas in the Subbasin have more complex hydrogeology than others, these layers were consolidated to three regionally-recognized hydrogeologic features with management areas used further define localized hydrogeologic complexities as needed for SGMA compliance. At the Subbasin level, the three regionally-recognized hydrogeologic features are two principle aquifers – an upper aquifer (unconfined to semi-confined above the Corcoran Clay) and a lower aquifer (confined below the Corcoran Clay), and the intervening regional aquitard known as the Corcoran Clay. This hydrogeologic conceptual model was recommended by the Technical Working Group and approved by the Coordination Committee.
2. SGMA requires a description of the definable bottom of the basin (§354.14 of the GSP Emergency Regulations). The agreed-upon definable bottom of the basin for the Delta-Mendota Subbasin is the base of fresh water consistent with the published definition of the Base of Fresh Water found in R. W. Paige (USGS, Hydrologic Investigations Atlas HA-489, 1973), defined as >3,000 micromhos/cm [µmhos/cm] at 25°C.
3. The current year (2013) seasonal high (spring) ranges from January to April, and seasonal low (fall) ranges from August to October. Data collected during these periods were used for WSE mapping.
4. Data collected during the aforementioned period (as noted in #3, above) were used to prepare water surface contour maps for the upper aquifer. No water surface elevation contour maps were prepared for the lower aquifer for 2013 Fall and Spring (as required by the GSP regulations) due to a lack of aquifer-specific data in most areas of the Subbasin. However, lower aquifer data collected during the aforementioned period were plotted on maps in lieu of the required contour maps. Woodard & Curran / Provost & Pritchard prepared 2013 Fall and Spring WSE contouring for the upper aquifer.

5. Timeframe for upper aquifer WSE mapping defined spring as January 1st to April 8th and fall as September 1st to October 31st.
6. The water year types for water year (WY) 2011 (wet water year), WY2012 (dry water year), and WY2015 (Shasta dry/critical water year) were used to compare WSE maps between GSP Plan areas.
7. Kenneth D. Schmidt & Associate's (KDSA) mapping of interconnected reaches of the San Joaquin River (SJR) based on the SJRRP was used for areas within the SJREC and Grassland GSP Plan areas. A table is included in the Common Chapter showing which SJR reaches are within each GSP Plan area and whether those reaches are gaining or losing. For other GSP Plan areas adjacent to the San Joaquin River, determinations of interconnectedness were provided by those preparing individual GSPs.

Water Budget

1. Historic Water Budget

The historic period was defined as WY2003 through WY2012 by the Technical Working Group on August 8, 2018 and confirmed by the Coordination Committee on August 13, 2018. The historic water budget period was ratified by the Coordination Committee on January 14, 2019 following the Coordination Agreement and Cost Share Agreement being finalized on December 12, 2018.

Each GSP Group determined the surface and groundwater inputs and outputs using the best available public and local data for each respective GSP Plan area. The historic water budget was split into 1) a land interactions water budget and 2) a groundwater budget. The parameters that each GSP Group evaluated were coordinated and summed to develop the Subbasin-wide water budget used to assess the change in storage in the upper aquifer for each GSP Group on February 15, 2019. For details regarding the approach to developing the Subbasin water budgets using numerical and non-numerical tools and the associated discussions with DWR staff, see Technical Memorandum #3 – Assumptions for the Historic, Current and Projected Water Budgets of the Delta-Mendota Subbasin, Change in Storage Cross-Check, and Sustainable Yield.

The change in lower aquifer groundwater storage considered the best available subsidence data per GSP Group and the respective specific yield. The lower aquifer change in storage for the Subbasin total was compiled on February 15, 2019.

2. Current Water Budget

The current Water Budget follows similar methodology to the historic water budgets for both upper and lower aquifer change in groundwater storage. The current period was defined as WY2013 by the Technical Working Group on August 8, 2018 and confirmed by the Coordination Committee on August 13, 2018. The current water budget period was formally ratified by the Coordination Committee on January 14, 2019 following the Coordination Agreement and Cost Share Agreement being finalized on December 12, 2018.

3. Projected Water Budget

Each GSP Group developed their own projected water budgets, using a similar comparison strategy to the historic and coordinated water budgets. The Subbasin-wide projected water budget was presented to the Technical Working Group and Coordination Committees on April 1, 2019. For more details regarding determinations of the projected water budget period and associated representative water years, see Technical Memorandum #3 – Assumptions for the Historic, Current and Projected Water Budgets of the Delta-Mendota Subbasin, Change in Storage Cross-Check, and Sustainable Yield.

The representative period, functioning as surrogate years, for a 50(+)-year historic period (WY2014-2070) was proposed by the Technical Working Group on January 15, 2019. Use of DWR's CCF modeling was also coordinated for changes in precipitation, evapotranspiration and streamflows.

For years 1 through 4 of the projected water budgets (WY2014 through WY2017), actual data were used and no CCF's were applied. Water year types are based on the SJR index except for Shasta Critical years. The following water year types will therefore be used: Shasta Critical, Critical, Dry, Below Normal, Above Normal, and Wet, with all designations based on the San Joaquin River Index except Shasta Critical, which is defined by Shasta indices under the Exchange Contract and refuge water supply contracts. For the projected simulation, four water year types were used for representative water years: Average (above or below normal), Dry (dry or critical), Wet and Shasta Critical.

Climate Change Factors for precipitation and evapotranspiration (ET) were applied considering representative historical water years surrogating for the future year until 2070. Fifty-three years of historical data (1965-2017) were used to model the projected water budget. However, to better match the existing hydrologic cycle, the six GSP Groups decided to begin the projected period with the representative year of 1979 for WY2018 (versus 1965 for WY2018). The coordinated representative year pattern is as follows:

- 1979 data represents WY2018
- 1980 data represents WY2019 (and so on until WY2056)
  and
- 1965 data represents WY2057
- 1966 data represents WY2058 (and so on until WY2070)

For years 38-43 (repeated WY2012-2017), the DWR model did not establish precipitation or ET CCF. The following CCFs for ET and precipitation were used:

- WY 2012 used 2001's 2070 CCF
- WY 2013 used 1992's 2070 CCF
- WY 2014 used 1976's 2070 CCF
- WY 2015 used 1977's 2070 CCF
- WY 2016 used 2002's 2070 CCF
- WY 2017 used 2011's 2070 CCF

For years 30 – 43 (repeated WY 2004-2017), the DWR modeling did not establish streamflow CCFs. For this reason, DWR suggested to use surrogate years' CCFs for the projection. The following CCFs were selected for streamflows:

- WY2004 used 2002's 2030 CCF
- WY2005 used 2002's 2030 CCF
- WY2006 used 1998's 2030 CCF
- WY2007 used 1992's 2070 CCF
- WY2008 used 1992's 2070 CCF
- WY2009 used 2002's 2070 CCF
- WY2010 used 2003's 2070 CCF
- WY2011 used 1997's 2070 CCF
- WY2012 used 1992's 2070 CCF
- WY2013 used 1992's 2070 CCF
- WY2014 used 1976's 2070 CCF
- WY2015 used 1977's 2070 CCF
- WY2016 used 2002's 2070 CCF
- WY2017 used 1998's 2070 CCF

9. Sustainable Yield

Methodologies for calculating upper aquifer sustainable yield were discussed by both the Coordination Committee and the Technical Working Group. After reviewing several options for this calculation, the Coordination Committee requested that the Technical Working Group further discuss potential options and provide a recommendation back to the Coordination Committee for adoption. On April 16, 2019, a joint workshop of the Coordination Committee and the Technical Working Group was held to discuss options for upper aquifer sustainable yield estimation and to identify a recommendation.

During the April workshop, several basic concepts and principles were discussed to calculate the upper aquifer sustainable yield value. Consideration was given to several potential options with increasing detail, including some combination of the following: total Subbasin upper aquifer pumping volumes, total Subbasin upper aquifer change in storage (which includes the effects of precipitation, evapotranspiration, and deep percolation), and Subbasin upper aquifer subsurface inflows and outflows. Inflow from certain neighboring subbasins, based on groundwater flow direction, as well as subsurface inflow from the Coast Range at existing gradients (as part of the inflow to the Northern & Central Delta-Mendota GSP area) was considered. Outflow to neighboring subbasins at existing gradients was also considered in certain applicable areas along the Delta-Mendota Subbasin boundary based on groundwater flow characteristics. Outflow from the Aliso GSP area, which lies east of the San Joaquin River, was not considered as outflow for purposes of developing these principles.

The formula for determining upper aquifer sustainable yield was applied to rolled-up Delta-Mendota Subbasin projected water budgets (WY2014-2070) in two categories:

- *Projected Baseline values with Climate Change Factors*
- *Projected Baseline values with Climate Change Factors and Projects and Management Actions*

If the projected baseline values for the Subbasin are expected to have undesirable results, the GSAs are required to implement projects or management actions that will offset the overdraft and result in a sustainable condition. The Technical Working Group recommended calculation of both a projected baseline for sustainable yield with applied climate change factors and a projected baseline for sustainable yield with climate change factors plus planned projects and management actions. Staff completed preliminary calculations for both baselines using average annual values from the Subbasin projected water budgets and following the formula below:

Upper Aquifer Sustainable Yield = Pumping + Change in Storage + (Outflow– Inflow)

The Technical Working Group determined that a +/- 10% factor should be applied to determine a range for the upper aquifer sustainable yield value. The +/- 10% factor is applied based on the percentage difference between the values from change in storage contour mapping (prepared by Provost & Pritchard) and reported changes in storage from the Subbasin consolidated historic water budgets (WY2003-2012) for the upper aquifer.

In summary, the most detailed range for the upper aquifer sustainable yield is calculated using the above formula for both categories of water budgets: projected baseline with climate change factors and projected baseline with climate change factors plus projects and management actions. The 10% factor is applied to the results for both categories. This range aims to demonstrate the Subbasin's upper aquifer sustainable yield without implementing any projects and management actions (low end of range) and how the Subbasin's upper aquifer sustainable yield will be impacted by implementing planned projects and management actions (high end of range).

Within the Delta-Mendota Subbasin, the distribution of known lower aquifer water level data and extraction volume data are limited and not sufficient to allow for a calculation of lower aquifer sustainable yield. The Technical Working Group therefore look to studies and/or analysis conducted in adjoining subbasins with similar hydrogeologic conditions for consideration in developing a preliminary sustainable yield estimate. A recent study conducted in the adjoining Westside Subbasin was identified and selected for use in developing this preliminary estimate.

The Westlands Water District GSA completed a recent study using groundwater modeling, in conjunction with the Westside Subbasin GSP development, to estimate sustainable yield for that subbasin. An analysis of their data reflected an initial assumption of lower aquifer sustainable yield equivalent to approximately 0.35 acre-feet per acre within the Westside Subbasin (Westlands Water District GSA, *Groundwater Management Strategy Concepts* presentation to the WWD Board on October 16, 2018). Using this analysis, a slightly lower (and therefore more conservative) sustainable yield value for the lower aquifer was selected (0.33 acre-feet per acre), amounting to approximately 250,000 acre-feet per year over the approximately 750,000-acre Delta-Mendota Subbasin.

The lower criteria for a lower aquifer sustainable yield estimation compared to that considered by Westlands Water District reflects DWR's classification of the Delta-Mendota Subbasin as critically overdrafted due to the subsidence issues and was therefore considered to be more protective against the potential for future inelastic land subsidence. After more data are obtained in future years, the lower aquifer sustainable yield value may undergo revisions.

For both the upper and lower aquifer sustainable yield, the Delta-Mendota Coordination Committee acknowledges that sustainable management criteria will be the primary indicator for managing lower aquifer extractions.

10. Boundary Flows

Boundary flows were evaluated by comparing inflows and outflows assessed by each GSP Group's water budget analyses and associated data, as well as groundwater flow trends from groundwater contours and hydrogeologist input. Each set of neighboring GSP Groups had independent meetings to coordinate and compare their respective contributions to inflows and outflows, and the results were provided and discussed by the Delta-Mendota Subbasin's Technical Working Group and Coordination Committee. More details on the applicable datasets can be found in the water budgets and groundwater contours sections of this Technical Memo.

TECHNICAL MEMORANDUM #2

RE: Assumptions for Hydrogeological Conceptual Model of the Delta-Mendota Subbasin

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

The Technical Memoranda will be utilized by the Coordination Agreement Parties (representing the twenty-three GSAs in the Subbasin) during the implementation of their GSPs in order to ensure coordination of the GSPs. The Coordination Committee is responsible for ongoing review and updating of the Technical Memoranda, as needed, during GSP implementation.

The following common assumptions for the Delta-Mendota Hydrogeological Conceptual Model were agreed upon by the Delta-Mendota Subbasin Technical Working Group and approved by the Delta-Mendota Coordination Committee over the period extending from December 2017 through April 2019.

1. Four distinct hydrogeologic layers were initially identified for the Hydrogeological Conceptual Model: shallow layer (0-30 ft), medium layer (30 ft – top of Corcoran Clay), Corcoran Clay, and below Corcoran Clay. However, given that some areas in the Subbasin have more complex hydrogeology than others, these layers were consolidated to three regionally-recognized hydrogeologic features with management areas used further define localized hydrogeologic complexities as needed for SGMA compliance. At the Subbasin level, the three regionally-recognized hydrogeologic features are two principle aquifers – an upper aquifer (unconfined to semi-confined above the Corcoran Clay) and a lower aquifer (confined below the Corcoran Clay), and the intervening regional aquitard known as the Corcoran Clay. This hydrogeologic conceptual model was recommended by the Technical Working Group and approved by the Coordination Committee.
2. SGMA requires a description of the definable bottom of the basin (§354.14 of the GSP Emergency Regulations). The agreed-upon definable bottom of the basin for the Delta-Mendota Subbasin is the base of fresh water consistent with the published definition of the Base of Fresh Water found in R. W. Paige (USGS, Hydrologic Investigations Atlas HA-489, 1973), defined as >3,000 micromhos/cm [µmhos/cm] at 25°C.
3. For the required water surface elevation mapping for the defined current year (WY2013), data from January to April were used for the seasonal high (spring) mapping, and data from August to October were used for the seasonal low (fall) mapping to provide sufficient spatial distribution of data for mapping (recommended by the Technical Working Group during the period from March 2018 through August 2018).
4. Data collected during the aforementioned period (as noted in #3, above) were used to prepare water surface contour maps for the upper aquifer. No water surface elevation contour maps were prepared for the lower aquifer for 2013 Fall and Spring (as required by the GSP regulations) due to a lack of aquifer-specific data in most areas of the Subbasin. However, lower aquifer data collected during the aforementioned period were plotted on maps in lieu of the required contour maps.

5. The Technical Working Group used WY2011 (wet water year), WY2012 (dry water year), and WY2015 (Shasta critical water year) to compare groundwater elevation mapping prepared by the various GSP Groups for their respective GSP Plan areas.
6. Kenneth D. Schmidt & Associates mapping of interconnected reaches of the San Joaquin River based on the San Joaquin River Restoration Program was used for areas within the SJREC and Grassland GSP Plan areas. For other GSP Plan areas adjacent to the San Joaquin River, determinations of interconnectedness were provided by those preparing individual GSPs. A table will be provided showing which San Joaquin River reaches are within each GSP Plan area and whether those reaches are interconnected. If necessary to implement the sustainability goal of the Subbasin, the GSAs will coordinate estimating volumes of gains and losses at these reaches of the San Joaquin River.

TECHNICAL MEMORANDUM #3

RE: Assumptions for the Historic, Current and Projected Water Budgets of the Delta-Mendota Subbasin, Change in Storage Cross-Check and Sustainable Yield

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

The Technical Memoranda will be utilized by the Coordination Agreement Parties (representing the twenty-three GSAs in the Subbasin) during the implementation of their GSPs in order to ensure coordination of the GSPs. The Coordination Committee is responsible for ongoing review and updating of the Technical Memoranda, as needed, during GSP implementation.

The following common assumptions were utilized by each GSP Group in the Subbasin in developing the historic and projected water budgets for their respective GSP Plan areas. These GSP-specific water budgets were then compiled (rolled-up) to the Subbasin level for inclusion in the Common Chapter. Also included herein are the assumptions used in developing Subbasin-level sustainable yield estimates for each principal aquifer. These assumptions were recommended by the Delta-Mendota Subbasin Technical Working Group and approved by the Delta-Mendota Coordination Committee.

1. Water Budgets

On September 25, 2017, the Delta-Mendota Subbasin Technical Working Group met with Trevor Joseph (Senior Engineering Geologist) and Mark Nordberg (Senior Engineering Geologist) from the California Department of Water Resources (DWR) to discuss how the development of six GSPs for the Subbasin will be coordinated to implement the best available science while also coordinating to use the same data and methodologies. DWR expressed concerns regarding coordination between those GSPs using a numerical model and those using a non-numerical (spreadsheet) model. Mr. Joseph advised that SGMA requires sustainability for the entire subbasin and was concerned about coordinating a subbasin water budget. The SJREC have experience sustainably managing groundwater using a non-numerical model. A follow-up meeting took place on November 17, 2017 with DWR representatives Trevor Joseph, Tyler Hatch (Senior Engineer) and Amanda Peisch-Derby (Regional SGMA Coordinator) to showcase how this spreadsheet model has been used. It was further discussed that the hydrogeologic principles and equations used for both types of modeling in the Delta-Mendota Subbasin are the same. DWR agreed that coordination amongst the GSP Groups, ensuring use of the same data and methodologies, can be achieved for SGMA modeling purposes in the Subbasin.

Historic Water Budget

The historic period adopted by the Subbasin Coordination Committee was defined as Water Year (WY) 2003 through WY2012. A water year is the period beginning October 1st and ending on September 30th of the subsequent year. The historic water budget period was ratified by the Coordination Committee on January 14, 2019.

Each GSP Group in the Delta-Mendota Subbasin developed land surface water budgets and groundwater budgets for the historic period using the best available public and local data for each respective GSP Plan area. The parameters (specific inputs and outputs) that each GSP Group evaluated were coordinated and summed to develop the Subbasin-wide water budget and to estimate the change in groundwater storage in the upper aquifer in each GSP Plan area. Parameters included pumping/tile drainage, subsurface inflows/outflows, and deep percolation of precipitation and applied surface water. Estimates of changes in groundwater levels in the upper aquifer over the historic water budget period were also utilized to estimate change in groundwater storage. The estimated change in groundwater storage for the upper aquifer from the compiled water budgets was compared to that estimated from changes in groundwater level. For purposes of developing a change in groundwater storage in the upper aquifer over the historic water budget period, the estimates developed from the water budget methodology were used for the Subbasin.

Development of the change in lower aquifer storage value was limited as a result of a lack of available aquifer-specific groundwater level data in most areas of the Subbasin. As a result, a methodology for estimating change in lower aquifer storage from subsidence, along with changes in potentiometric head (where groundwater level data were available), was used. For GSP Plan areas where groundwater level data were not available to support calculations of change in lower aquifer storage, change in land surface elevations was used as a proxy for estimates of change in lower aquifer storage. The best available subsidence data by GSP Group and representative specific yield values (defined as the volume of water released from storage by an unconfined aquifer per unit surface area of aquifer per unit decline of the water table) were used to estimate change in lower aquifer storage from subsidence.

Change in Storage Cross-Check

Groundwater elevation contour maps were developed for the upper aquifer for Spring 2003 and Spring 2013 to assess changes in groundwater storage during the historic and current water budget periods. The contour maps were used to estimate upper aquifer change in storage during the historic and current period by subtracting the Spring 2013 contours from the Spring 2003 contours and multiplying the change in groundwater elevations by GSP Plan area and specific yield of the aquifer. Estimates were made for each GSP Plan area and compared to the overall change in storage estimated in the individual GSP historic and current groundwater budgets. The results of the two methodologies were comparable (within 20%).

Change in land surface elevation is used as a proxy for lower aquifer change in storage using a similar methodology, multiplying the change in land surface elevation between 2003 and 2013 by the area covered by individual GSP Plan areas to estimate the change in lower aquifer storage.

Current Water Budget

The current year for the associated water budget was set as WY2013 by the Delta-Mendota Technical Working Group on August 8, 2018 and confirmed by the Delta-Mendota Coordination Committee on August 13, 2018. The current water budget and associated changes in storage (by principal aquifer) were calculated in the same manner as the historic water budgets. The current water budget period was ratified by the Coordination Committee.

Projected Water Budget

Each GSP Group developed their own GSP-specific projected water budgets using a similar methodology to the historic and current water budgets. GSP-specific water budgets were compiled at the Subbasin level, and the Subbasin projected water budget was recommended and approved at a joint meeting of the Delta-Mendota Technical Working Group and Coordination Committee.

Per SGMA and the GSP regulations, the projected water budget period begins with the year subsequent to the current water budget year and extends for a projection period of at least 50 years to WY2070 for application of the required climate change factors. For the Delta-Mendota Subbasin, the current water budget is WY2013, and the projected water budget period is WY2014 through WY2070.

As future hydrology (e.g. precipitation totals) is not known, historic hydrology is used to simulate projected future hydrology. As a result, each year in the projected water budget is assigned a representative water year from the historic period. For example, WY2018 is assumed to have hydrology similar to that of WY1979; WY2019 is assumed to have hydrology similar to that of WY1980; and so forth. The pattern of historic hydrology used to simulate future hydrology is established based on actual hydrology from WY2014 - WY2017 (known water year types at the start of the projected water budget period). This resulted in the following projected hydrologic pattern.

For the first four years of the projected water budget (WY2014 through WY2017), actual data are used and no climate change factor is applied. For WY2018 through WY2070, the following representative water year sequencing is used:

- WY2018 is equivalent to WY1979.
- Each subsequent projected water year (WY2019 through WY2056) will follow the equivalent subsequent historic water year (e.g. WY2019 is equivalent to WY1980; WY2020 is equivalent to WY1981, and so forth, with WY2056 being equivalent to WY2017).
- WY2057 is equivalent to WY1965 with each subsequent water year (WY2058 through WY2070) equivalent to the subsequent historic water year (with WY2070 being equivalent to WY1978).

Representative water years used the associated historic water year types for assumptions relative to projected hydrology (precipitation, stream flows, and evapotranspiration [ET]). Water year types were based on the San Joaquin River Index except for Shasta Critical Years, which required simulation of the SJREC and wildlife refuge surface water deliveries. Therefore, in summary, the following water year types were assigned to projected water years based on the associated representative water year type: Shasta Critical, Critical, Dry, Below Normal, Above Normal, and Wet, with all designations based on the San Joaquin River Index, except Shasta Critical defined by Shasta index (as recommended by the Technical Working Group). For projected simulations, water year types were 'lumped' into four categories as follows: wet, average (above and below normal), dry (dry and critical) and Shasta critical (as recommended by the Technical Working Group).

As agreed, upon, Climate Change Factors (CCFs) for precipitation and ET were applied considering representative historical year types surrogating for future years through WY2070. For projected years WY2038 through WY2043 (repeated WY2012 through WY2017), DWR did not establish precipitation or ET CCFs. Based on conversations with DWR, the following CCFs for precipitation and ET were used for this intervening period:

- WY 2012 used the 2001 2070 CCF
- WY 2013 used the 1992 2070 CCF
- WY 2014 used the 1976 2070 CCF
- WY 2015 used the 1977 2070 CCF
- WY 2016 used the 2002 2070 CCF
- WY 2017 used the 2011 2070 CCF

For projected years WY2030 - WY2043 (repeated WY2004 - WY2017), DWR did not establish streamflow CCFs. For this reason, DWR suggested to use surrogate years' CCFs for the projected period. The following CCFs were selected for streamflows:

- WY 2004 used the 2002 2030 CCF
- WY 2005 used the 2002 2030 CCF
- WY 2006 used the 1998 2030 CCF
- WY 2007 used the 1992 2070 CCF
- WY 2008 used the 1992 2070 CCF
- WY 2009 used the 2002 2070 CCF
- WY 2010 used the 2003 2070 CCF
- WY 2011 used the 1997 2070 CCF
- WY 2012 used the 1992 2070 CCF
- WY 2013 used the 1992 2070 CCF
- WY 2014 used the 1976 2070 CCF
- WY 2015 used the 1977 2070 CCF
- WY 2016 used the 2002 2070 CCF
- WY 2017 used the 1998 2070 CCF

The projected water budget period and associated representative water years were recommended by the Technical Working Group. Use of DWR's CCFs was also coordinated, and it was agreed that CCFs will only be applied to hydrology.

2. Sustainable Yield

The following methodologies were recommended by the Delta-Mendota Technical Working Group and approved by the Coordination Committee for establishing the required sustainable yield estimate for each principal aquifer:

Upper Aquifer Sustainable Yield

The following formula was agreed upon for the calculation of the sustainable yield of the upper aquifer:

Sustainable Yield = (Pumping + Change in Storage) + (Outflow – Inflow)

Data used in the calculation are from the Delta-Mendota Subbasin compiled projected water budget with Climate Change Factors and Projects/Management Actions, as well as Baseline Projected Water Budget with Climate Change Factors. A ± 10% factor was applied to the resulting sustainable yield estimate; this factor was estimated based on the percent difference in the WY2003-2012 upper aquifer change in storage calculations between the compiled historic water budget and the estimate of change in storage utilizing change in groundwater level contours cross-check analysis (see above). Data incorporated into the equation are the average annual values from the indicated projected water budgets (WY2014 - WY2070) using only upper aquifer values.

Sustainable management criteria (Minimum Thresholds and Measurable Objectives) will be the primary indicator governing upper aquifer extractions. The sustainable yield estimates will be updated as part of the five-year GSP review.

Lower Aquifer Sustainable Yield

Within the Delta-Mendota Subbasin, the distribution of known lower aquifer water level data and extraction volume data are limited and not sufficient to allow for a calculation of lower aquifer sustainable yield. A Northern & Central Delta-Mendota Region Management Committee memo dated April 10, 2019 outlined the alternative method used to estimate sustainable yield method for the lower aquifer and is summarized below.

The Westlands Water District GSA has completed a recent study using groundwater modeling, in conjunction with the Westside Subbasin GSP development, to estimate sustainable yield for that subbasin. Based on an analysis of their data and reflected an initial assumption of lower aquifer sustainable yield equivalent to approximately 0.35 acre-feet per acre within the Westside Subbasin (Westlands Water District GSA, Groundwater Management Strategy Concepts presentation to the WWD Board on October 16, 2018). Using this analysis, a slightly lower sustainable yield value for the lower aquifer was selected (0.33 acre-feet per acre), amounting to approximately 250,000 acre-feet per year over the approximately 750,000-acre Delta-Mendota Subbasin.

The lower criteria for a lower aquifer sustainable yield estimation compared to that considered by Westlands Water District reflects DWR's classification of the Delta-Mendota Subbasin as critically-overdrafted due to the subsidence issues. After more data are obtained in future years, the lower aquifer sustainable yield value may undergo revisions.

3. Other

The Technical Working Group of the Subbasin Coordination Committee discussed that not-yet implemented plans or programs (e.g. Delta conveyance, Updates to the Bay-Delta Water Quality Control Plan/SED, proposed large storage projects, etc.) would not be incorporated into the current GSPs. However, projects or programs may be qualitatively incorporated or described in individual GSPs, and such programs will be monitored during the next five years and incorporated into the GSPs in future updates as appropriate.

TECHNICAL MEMORANDUM #4

RE: Assumptions for Delta-Mendota Subbasin Management Areas, Sustainability Management Criteria

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

The Technical Memoranda will be utilized by the Coordination Agreement Parties (representing the twenty-three GSAs in the Subbasin) during the implementation of their GSPs in order to ensure coordination of the GSPs. The Coordination Committee is responsible for ongoing review and updating of the Technical Memoranda, as needed, during GSP implementation.

The following common assumptions were utilized by each GSP Group in the Subbasin for preparing a subbasin-level description of management areas and sustainable management criteria.

1. Management Areas

The Coordination Committee left management areas and management of their respective GSPs to the six GSP Groups. Management areas were determined individually by each GSP Group with Woodard & Curran preparing a map showing all management areas (‘sum of the parts’ approach).

2. Sustainable Management Criteria

Per the GSP Regulations, definitions of undesirable results must be provided at the Subbasin level. The Technical Working Group defined these as follows:

- Chronic Lowering of Groundwater Levels: Significant and unreasonable chronic change in water levels, as defined by each GSP Group, that has an impact on the beneficial users of groundwater in the Subbasin through either intra- and/or inter-basin actions.
- Long-term Reduction of Groundwater Storage: Significant and unreasonable chronic decrease in groundwater storage, as defined by each GSP Group, that has an impact on the beneficial users of groundwater in the Subbasin through either intra- and/or inter-basin actions.
- Degraded Water Quality: Significant and unreasonable degradation of groundwater quality, as defined by each GSP Group, that has an impact on the beneficial users of groundwater in the Subbasin through either intra- and/or inter-basin actions and/or activities.
- Depletions of Interconnected Surface Water: Depletions of interconnected surface water, as defined by each GSP Group, that have significant and unreasonable adverse impacts on the beneficial uses of surface water

- Land Subsidence: Changes in ground surface elevation that cause damage to critical infrastructure that would cause significant and unreasonable reductions of conveyance capacity, damage to personal property, impacts to natural resources or create conditions that threaten public health and safety.
- Seawater Intrusion: The Coordination Committee recognized that the Subbasin is not in a coastal location and therefore seawater intrusion is unable to occur and therefore a definition of an undesirable result is not necessary.

Each GSP Group individually defined significant and unreasonable for each sustainability indicator, as well as established sustainability goals, interim milestones, minimum thresholds and measurable objectives. This process was discussed during the February 2019 meetings of the Technical Working Group, and ultimately recommended and approved by the Coordination Committee.

TECHNICAL MEMORANDUM #5

RE: Assumptions for Delta-Mendota Subbasin Monitoring Network

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

The Technical Memoranda will be utilized by the Coordination Agreement Parties (representing the twenty-three GSAs in the Subbasin) during the implementation of their GSPs in order to ensure coordination of the GSPs. The Coordination Committee is responsible for ongoing review and updating of the Technical Memoranda, as needed, during GSP implementation.

The following common assumptions and approaches were utilized in developing the required Subbasin monitoring network for sustainability indicators:

- The required Subbasin-level monitoring networks will be a compilation of networks developed by each individual GSP Group.
- The compilation of the individual GSP monitoring networks will provide sufficient data in order to develop required water surface elevation contouring for each principal aquifer in the Subbasin, if applicable.
- The GSP groups will use CASGEM monitoring network data for 2018 and 2019 data collection and will supplement with locally collected data where available.
- Each monitoring location or point within the GSP network will be monitored, at a minimum, at the agreed upon frequency for each of the data types.
- Field Collection will follow agreed-upon protocols which may be the same as, or equal to, data collection protocols (i.e. industry standards and best management practices).
- For non-monitored data to be reported as part of the annual reports (e.g. groundwater extractions, surface water deliveries), actual metered data will be used where such data exists, and when direct data do not exist, estimated quantities will be calculated based on existing indirect data (e.g. electrical usage, crop demand, ET) and/or other industry best practices.
- Seasonal high groundwater elevation data will be collected between February and April, and seasonal low groundwater elevation data will be collected between September and October.
- Each GSP Group may use supplemental data in addition to the SGMA-required monitoring network documented in their GSP in order to comply with these requirements and those set forth in the Coordination Agreement.

- Individual data gaps in the monitoring networks and monitoring data identified in the GSPs will progressively be addressed by the applicable GSA or GSP Group during the 20-year GSP implementation timeframe (2020 to 2040).

TECHNICAL MEMORANDUM #6

RE: Coordination of the Delta-Mendota Subbasin Data Management System

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

The Technical Memoranda will be utilized by the Coordination Agreement Parties (representing the twenty-three GSAs in the Subbasin) during the implementation of their GSPs in order to ensure coordination of the GSPs. The Coordination Committee is responsible for ongoing review and updating of the Technical Memoranda, as needed, during GSP implementation. This Technical Memorandum describes the development and anticipated use of the coordinated Subbasin Data Management System (DMS) for GSP implementation.

Coordinated Data Management System

As required in Section 352.6, Data Management System, of the GSP regulations, the Delta-Mendota Subbasin GSAs will develop and maintain a data management system that is capable of storing and reporting information relevant to the reporting requirements, implementation of the GSPs, and the monitoring networks of the Subbasin. Additionally, per Section 354.4, Reporting Monitoring Data to the California Department of Water Resources (DWR), all monitoring data are to be stored in a DMS with copies of the monitoring data included in the annual report and submitted electronically on forms provided by DWR. Recognizing that GSP implementation, including annual reporting, will require some efforts at the subbasin level, the 23 GSAs overlying the Delta-Mendota Subbasin have chosen to develop a coordinated DMS that can be utilized by each GSP Group for management of their data but which will allow for the required compilation of data sets for preparation of Subbasin annual reports. The coordinated DMS, once developed, will provide a generic framework that can be used by any GSP Group or GSA in the Subbasin for individual data management while allowing for consistent formatting and the simplified uploading of compiled datasets into the Subbasin-wide coordinated DMS.

The Parties have also developed and will maintain separate data storage processes or Data Management Systems. Each separate DMS developed for each GSP will store information related to implementation of each individual GSP, monitoring network data and monitoring sites requirements, and water budget data requirements. Each system will be capable of reporting all pertinent information to the respective GSA and/or GSP Group, and ultimately to the Coordination Committee. After providing the Coordination Committee with data from the individual GSPs, the Subbasin Plan Manager and Coordination Committee will ensure the data are stored and managed in a coordinated manner throughout the Subbasin and reported to DWR on an annual basis.

Leading up to the development of the DMS, the Subbasin used an *ad hoc* DMS working group and survey to develop a conceptual design for the software requirements. This was followed by the software vendor creating wireframes to communicate the functionality of the DMS. This *ad hoc* working group developed data standards for each data type to make the aggregation feasible at a subbasin level and established weekly calls to develop import wizards, attribute tables, interpretations of reporting requirements, and an annual report format. Data provided by Santa Nella County Water District were used to beta-test the completed DMS prior to release as a generic system for Subbasin-wide use.

The DMS includes permissions and business rules so each GSP can only upload data for their GSP based upon usernames and roles. GSP Groups, or GSAs within a GSP Group, are also not allowed to see other GSP Groups' data until all annual reporting has been completed and accepted by the Plan Manager. DMS development is ongoing, with development concurrent with final GSP development, and has been designed to support the needs of the severely disadvantaged communities, disadvantaged communities, and GSAs within the Subbasin. The DMS is scheduled to be completed for use in developing annual reports by January 2020.

The DMS constructed for the Delta-Mendota Subbasin is a secured web-based application hosted on Amazon Web Services (AWS). The DMS focuses on five core business requirements including: centralized data warehouse, security of data, permissioned based access, data visualization and reporting. Other goals of the DMS focus around improving data collection/aggregation processes, creating data standards, gaining efficiencies in reporting and improving data sharing with stakeholders. The DMS is designed to aggregate data through import processes by GSP to support data visualization and annual report generation.

Underlying the web application is a relationship database used to store the information aggregated from GSPs across primary data types identified to support monitoring and Annual Report development. Those data types include groundwater extractions, surface water deliveries, groundwater storage, groundwater elevations, groundwater quality, interconnected surface water and land subsidence. The web application functionality includes an embedded GIS viewer, screens to view tables of time series data, and charting capabilities for hydrographs. The embedded GIS viewer contains functionality to store map layers such as reference data, GSA/GSP boundaries and derived information such as water level contours.

In order to facilitate data synthesis, the GSP Groups agreed on the following frequencies for monitoring data collection:

- Groundwater elevations – twice a year (seasonal high and seasonal low)
- Interconnected surface water – twice a year (seasonal high and seasonal low)
- Groundwater quality – once a year
- Land subsidence – continuous monitoring sites or by Management Area

These datasets will be augmented with other data collection required for annual report preparation, including estimates of groundwater extractions and surface water diversions.

Additionally, the GSP Groups agreed to utilize the same general monitoring protocols or similar industry standards to ensure that the data were collected in a consistent and coordinated fashion. All monitoring locations in the Delta-Mendota Subbasin were assigned a unique identifier in the DMS. The number system is in a format of ##-####, where the first two digits indicates which GSA the monitoring location is associated with, and the subsequent four digits indicate the specific monitoring location in that GSA area. The general methodology agreed upon for data import and management is as follows:

- Each GSA collects their respective data per agreed-upon protocols and transmits it to the GSA representative.
- Each GSA representative then compiles the data and conducts a quality control check.
- The GSP representative transmits the compiled data set to the GSP Lead or Representative, who then aggregates the data from all GSAs and conducts a second quality control check.
- The GSP Lead or Representative uploads the data set into the DMS using import wizards designed specifically for this process.

- The Subbasin Plan Manager then uses the data in the DMS to compile information as required for the annual report.

Compiled data sets from the DMS will be augmented with required maps generated externally to produce the required annual report. Mapping prepared outside the DMS will be subsequently imported into the DMS as GIS files to ensure all data are kept in one place.

The DMS will be maintained by the San Luis & Delta-Mendota Water Authority, while acting as the Plan Manager, with a contract with the software vendor for hosting, maintenance and future updates. Each GSP will pay a maintenance fee for the continued hosting and support of the Subbasin coordinated DMS.

The Subbasin-level DMS, as described herein, may be supplemented by additional DMSs developed and maintained by each GSP Group or GSA in the Subbasin. The reader is referred to each of the six Subbasin GSPs for specific information relative to data collection and management in each GSP Plan area.

TECHNICAL MEMORANDUM #7

RE: Adoption and Use of the Subbasin Coordination Agreement

PREPARED BY: Woodard & Curran

DATE: July 25, 2019

During development of the six coordinated Groundwater Sustainability Plans (GSPs) for the Delta-Mendota Subbasin (Subbasin), the twenty-three Groundwater Sustainability Agencies (GSAs) in the Subbasin agreed upon methodologies and assumptions for water budgets, change in storage, and sustainable yield. The common data and methodologies required in Water Code Section 10727.6 and Title 23, California Code of Regulations, Section 357.4 to prepare coordinated plans and utilized in preparation of the Delta-Mendota Subbasin GSPs are set forth in Technical Memoranda. Each of the individual Memoranda satisfies a requirement agreed upon in the Coordination Agreement and, collectively when combined with the Coordination Agreement, provides an explanation of how the six Subbasin GSPs implemented together satisfy the requirements of the Sustainable Groundwater Management Act (SGMA) for the entire Subbasin.

This Technical Memorandum describes the Delta-Mendota Subbasin governance structure, participating parties, the Delta-Mendota Subbasin Coordination Agreement (Coordination Agreement), and details of this Coordination Agreement. Each GSA in the Subbasin is included in this memorandum. Additional details of the organization, management structure, and legal authority of each GSA and their associated GSPs, and accompanying GSA boundary maps, are described in the Delta-Mendota Subbasin Common Chapter (Common Chapter). Descriptions of intrabasin and interbasin coordination agreements in place for the development and implementation of the GSPs overlying the Subbasin are also referenced.

1. GSP and Coordination Agreement Submission

A Delta-Mendota Subbasin Common Chapter has been developed to “knit” the six Delta-Mendota GSPs together for cohesive implementation. The Common Chapter includes a separate signature page that contains a disclosure statement and professional stamp for the consultant charged with compiling the chapter (Woodard & Curran), as agreed upon by the Technical Working Group on April 17, 2018 and January 15, 2019. Each Subbasin GSP is stamped and signed by the professional overseeing their preparation. The Common Chapter was developed as part of a collaborative process, with input from the various GSAs, technical consultants, and stakeholders. The Coordination Agreement, Common Chapter, and Technical Memoranda collectively serve as the mechanism through which the GSAs and individual GSPs are coordinated during implementation.

The GSAs have agreed to submit their respective GSPs to the California Department of Water Resources (DWR) through the Delta-Mendota Subbasin Coordination Committee (Coordination Committee) and the Plan Manager, along with all developed Common Chapter and Technical Memoranda, by January 31, 2020. When submitted to DWR, the collective documents will be available for public review and comment as part of the 60-day public comment period per SGMA regulations.

2. GSP Groups and GSAs in the Delta-Mendota Subbasin

Below is a summary of the six GSP Groups and twenty-three GSAs (and their respective signatories) to the Coordination Agreement. Some signatories (also referred to as parties) are participating in multiple GSAs and/or GSPs.

Northern & Central Delta-Mendota Region GSP

- Patterson Irrigation District GSA
  - Patterson Irrigation District, Twin Oaks Irrigation District
- West Stanislaus Irrigation District GSA
  - West Stanislaus Irrigation District
- DM-II GSA
  - Del Puerto Water District, Oak Flat Water District
- City of Patterson GSA
  - City of Patterson
- Northwestern Delta-Mendota GSA
  - Merced County, Stanislaus County
- Central Delta-Mendota GSA
  - San Luis Water District, Santa Nella County Water District, Panoche Water District, Mercy Springs Water District, Tranquillity Irrigation District, Merced County, Fresno Slough Water District, Fresno County, Eagle Field Water District, Pacheco Water District
- Widren Water District GSA
  - Widren Water District
- Oro Loma Water District GSA
  - Oro Loma Water District

San Joaquin River Exchange Contractors (SJREC) GSP

- San Joaquin River Exchange Contractors Water Authority GSA
  - Central California Irrigation District, Columbia Canal Company, Firebaugh Canal Water District, San Luis Canal Company
- Turner Island Water District-2 GSA
  - Turner Island Water District
- City of Mendota GSA
  - City of Mendota
- City of Firebaugh GSA
  - City of Firebaugh
- City of Los Banos GSA
  - City of Los Banos
- City of Dos Palos GSA
  - City of Dos Palos
- City of Gustine GSA
  - City of Gustine
- City of Newman GSA
  - City of Newman
- Madera County GSA
  - Madera County
- Portion of Fresno County Management Area B GSA
  - Fresno County
- Portion of Merced County – Delta-Mendota GSA
  - Merced County

Grassland GSP

- Grassland GSA
    - Grassland Water District, Grassland Resource Conservation District
- Portion of Merced County GSA
    - Merced County

Farmers Water District GSP

- Farmers Water District GSA
    - Farmers Water District

Fresno County GSP

- Fresno County Management Area A GSA
    - Fresno County
- Fresno County Management Area B GSA
    - Fresno County

Aliso Water District GSP

- Aliso Water District GSA
    - Aliso Water District

With respect to the San Benito County portion of the Delta-Mendota Subbasin, this area will be included in the Central Delta-Mendota GSA of the Northern & Central Delta-Mendota Region GSP. In 2017, the San Benito County Water District Groundwater Sustainability Agency indicated its intent to act as the GSA for certain areas within its jurisdiction, but not for the unmanaged *de minimis* area in the most southwest portion of the Delta-Mendota Subbasin. For purposes of assuring that all land within the Subbasin is part of a GSP as required by DWR regulations, the Central Delta-Mendota GSA entered into a Memorandum of Understanding with San Benito County to include the unmanaged *de minimis* area in the Northern & Central Delta-Mendota Region GSP.

3. Delta-Mendota Subbasin Intrabasin Coordination Agreement

The aforementioned GSAs are coordinating development and implementation of the six GSPs under the Delta-Mendota Subbasin Coordination Agreement. All GSAs within the Subbasin agree to work collaboratively to meet the objectives of SGMA and the Coordination Agreement. Each GSA acknowledges that it is bound by the terms of this Coordination Agreement.

The Coordination Agreement for the Delta-Mendota Subbasin covers the following topics:

1. Purpose of the Agreement, including:
    a. Compliance with SGMA and
    b. Description of Criteria and Function;
2. Definitions
3. General Guidelines, including:
    a. Responsibilities of the Parties and
    b. Adjudicated or Alternative Plans in the Subbasin;
4. Role of San Luis & Delta-Mendota Water Authority (SLDMWA), including:
    a. Agreement to Serve,
    b. Reimbursement of SLDMWA, and
    c. Termination of SLDMWA's Services;

5. Responsibilities for Key Functions, including:
    a. Coordination Committee,
    b. Coordination Committee Officers,
    c. Coordination Committee Authorized Action and Limitations,
    d. Subcommittees and Workgroups,
    e. Coordination Committee Meetings, and
    f. Voting by Coordination Committee;
6. Approval by Individual Parties;
7. Exchange of Data and Information, including:
    a. Exchange of Information and
    b. Procedure for Exchange of Information;
8. Methodologies and Assumptions, including:
    a. SGMA Coordination Agreements,
    b. Pre-GSP Coordination, and
    c. Technical Memoranda Required;
9. Monitoring Network
10. Coordinated Water Budget
11. Coordinated Data Management System
12. Adoption and Use of the Coordination Agreement, including:
    a. Coordination of GSPs and
    b. GSP and Coordination Agreement Submission;
13. Modification and Termination of the Coordination Agreement, including:
    a. Modification or Amendment of Exhibit "A" (Groundwater Sustainability Plan Groups including Participation Percentages),
    b. Modification or Amendment of Coordination Agreement, and
    c. Amendment for Compliance with Law;
14. Withdrawal, Term, and Termination;
15. Procedures for Resolving Conflicts;
16. General Provisions, including:
    a. Authority of Signers,
    b. Governing Law,
    c. Severability,
    d. Counterparts, and
    e. Good Faith; and
17. Signatories of all Parties

The Coordination Agreement, effective as of December 12, 2018, has been signed by all thirty-six parties in the Delta-Mendota Subbasin. These signatories to the Coordination Agreement have formed a total of 23 GSAs in the Subbasin. A key goal of basin-wide coordination is to ensure that the Subbasin GSPs utilize the same data and methodologies during their plan development and that the elements of the Plans necessary to achieve the sustainability goal for the Subbasin are based upon consistent interpretations of the basin setting, as required by SGMA and associated regulations. It is the intent that the Coordination Agreement become part of each individual GSP within the Delta-Mendota Subbasin.

Delta-Mendota Subbasin Coordination Committee

The Delta-Mendota Subbasin Coordination Agreement establishes the Delta-Mendota Subbasin Coordination Committee (Coordination Committee), which provides representation from each of the six GSP groups. The Coordination Committee complies with requirements of the Brown Act. The Coordination Agreement describes the Coordination Committee's requirements for meeting noticing, attendance, voting, data sharing, governance of subcommittees and working groups, and approval of Subbasin documents.

The Coordination Agreement allows for development of individual subcommittees or working groups to support the development of the Technical Memorandums and to coordinated data, methodologies, and assumptions. For this purpose, the Coordination Committee recommended formation of an ad hoc Technical Working Group, Communications Working Group, and Data Management System Working Group.

The Coordination Committee provides specific direction to the Plan Manager. The initial Plan Manager for the six coordinated GSPs is Andrew Garcia, Senior Civil Engineer for San Luis & Delta-Mendota Water Authority (SLDMWA); however, the Coordination Committee and Coordination Agreement allow for a consultant of the SLDMWA to act as Plan Manager, if necessary. If the SLDMWA ceases to serve as Plan Manager, the Coordination Committee can name a successor per the Coordination Agreement. In the meantime, Mr. Garcia's contact information is included below:

Mr. Andrew Garcia, Plan Manager
San Luis & Delta-Mendota Water Authority
842 6th Street
Los Banos, CA 93635
Phone: (209)-832-6200 / Fax (209)-833-1034
andrew.garcia@sldmwa.org

Contact information for each GSP plan administrator is included in the respective GSPs.

Technical Memoranda

The Coordination Agreement describes the development of Technical Memoranda. These memoranda collectively explain the data, methodologies, and assumptions approved and used by the six GSP Groups within the Subbasin. The Coordination Agreement specifically referenced four Technical Memoranda; the Technical Working Group of the Coordination Committee subsequently recommended development of additional Technical Memoranda during the GSP development efforts. The Technical Memoranda are subject to the Coordination Committee's review and unanimous approval and will be submitted along with the Coordination Agreement to DWR. The Technical Memoranda will be used throughout GSP implementation to ensure continued coordination and compliance with SGMA.

The Technical Memoranda include:

1. Common Datasets Used in the Delta-Mendota Subbasin GSPs
2. Assumptions for Hydrogeological Conceptual Model of the Delta-Mendota Subbasin
3. Assumptions for the Historic, Current and Projected Water Budgets of the Delta-Mendota Subbasin, Change in Storage Cross-Check and Sustainable Yield
4. Assumptions for Delta-Mendota Subbasin Management Areas, Sustainability Management Criteria
5. Assumptions for Delta-Mendota Subbasin Monitoring Network
6. Coordination of the Delta-Mendota Subbasin Data Management System
7. Adoption and Use of the Subbasin Coordination Agreement
8. Coordinated Noticing, Communication, and Outreach Activities in the Delta-Mendota Subbasin

Interbasin Coordination

The Delta-Mendota Subbasin adjoins nine neighboring subbasins. These subbasins range in basin condition as determined by DWR, so some subbasins are also on the January 31, 2020 GSP submission deadline, while others have a 2022 deadline. With this multitude of neighbors and variety of timelines, the Delta-Mendota Subbasin has initiated interbasin coordination efforts with all of the adjoining subbasins. The SLDMWA, on behalf of the Northern and Central Delta-Mendota Regions, executed an interbasin data sharing agreement with Westlands Water District, the coordinating agency for the Westside Subbasin. The agreement establishes common assumptions for groundwater conditions as well as a process for continued data sharing for data located within five miles of the boundary between Westside Subbasin and the Delta-Mendota Subbasin.

Additional interbasin coordination efforts have been initiated with other adjoining subbasins. No other agreements have been formalized at the time of the Delta-Mendota Subbasin's GSP submissions, but may be developed later. The Delta-Mendota Subbasin intends to coordinate with neighboring subbasins to develop shared understandings of data and technical approaches.

TECHNICAL MEMORANDUM #8

RE: Coordinated Noticing, Communication, and Outreach Activities in the Delta-Mendota Subbasin

PREPARED BY: Stantec

DATE: July 25, 2019

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1. Introduction

The Sustainable Groundwater Management Act of 2014 (SGMA) and subsequent Emergency Regulations developed by the California Department of Water Resources (DWR) in May 2016 identified a number of requirements for public notice and communication related to Groundwater Sustainability Agency (GSA) formation and Groundwater Sustainability Plan (GSP) development. California Code of Regulations §354.10 identifies the requirements for notice and communication information in a GSP:

> "Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following:
>
> (a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties.
>
> (b) A list of public meetings at which the Plan was discussed or considered by the Agency.
>
> (c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency.
>
> (d) A communication section of the Plan that includes the following:
>
> (1) An explanation of the Agency's decision-making process.
>
> (2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.
>
> (3) A description of how the Agency encourages the active involvement of diverse social, cultural and economic elements of the population within the basin.
>
> (4) The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions."

Pursuant to these requirements, GSAs in the Delta-Mendota Subbasin (Subbasin) conducted a number of activities to engage beneficial users of groundwater, interested parties, and the general public in the development of the six Subbasin GSPs. Each GSA was responsible for conducting outreach and engagement related to SGMA within its service area; however, recognizing efficiencies in pooling resources and the importance of consistent messaging, the GSAs also conducted a series of coordinated activities aimed at engaging stakeholders across the Subbasin. This document describes the coordinated tools, methods, and activities the GSAs used to inform and engage stakeholders in development of the Subbasin GSPs.

2. Situation Assessment and Communications Plan

To assist in GSA formation and GSP development, agencies in the Subbasin sought and received Facilitation Support Services funding from DWR in August 2016. Under this funding, a neutral, third-party facilitation team conducted a situation assessment on behalf of the Subbasin GSAs. The purpose of the assessment was to understand how stakeholders perceived the status of the Subbasin's groundwater resources and identify potential barriers to the successful development of the GSPs.

The facilitation team, with input from local agencies, identified 30 stakeholders representing diverse interests and beneficial users in the Subbasin, together with disadvantaged communities, agricultural well owners, government and land use agencies, and environmental and ecosystem interests. From February 2017 to May 2017, the facilitators conducted over 30 phone and in-person interviews with stakeholders. The facilitators recorded the interview responses and summarized the results in a presentation made to the GSA representatives.

The assessment results were used to inform the development of the Delta-Mendota Subbasin Sustainable Groundwater Management Act Communications Plan (Communications Plan), which is provided with this document as **Attachment A**. The Communications Plan identifies near- and long-term outreach and engagement strategies, tactics, and tools for stakeholder engagement in GSP development and implementation. The Subbasin GSAs used the Communications Plan as a framework for conducting the stakeholder outreach and engagement activities described in this document.

3. Public Noticing and Information

Legal Requirements:

> **§354.10 (d):** A communication section of the Plan that includes the following:
> (3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of population within the basin.

The Subbasin GSAs developed and used several tools to inform members of the public about GSP development activities and promote opportunities for public engagement. These tools are described below.

- Website: The Subbasin website – www.deltamendota.org – is the primary location for information related to SGMA implementation in the Subbasin. Information provided on the website includes: an overview of SGMA, a description of each of the GSP groups, contact information for each of the GSAs, and upcoming workshops and public meetings. The website also serves as a repository for outreach collateral, workshop materials, and meeting packets and minutes for the Delta-Mendota Subbasin Coordination Committee, Technical Working Group, and Communications Working Group (described below).

- Delta-Mendota Subbasin Newsletter: The Delta-Mendota Subbasin Newsletter is distributed on a monthly basis and serves as an informational tool to keep interested parties, beneficial users, and members of the general public informed about the development and status of the GSPs. Newsletter topics include Subbasin-wide activities, general announcements, upcoming meetings and workshops, and past and upcoming GSP development activities. Copies of the newsletters are archived on the Subbasin website.

- Informational Materials: GSAs in the Subbasin developed a suite of materials in English and Spanish to educate and inform members of the public about SGMA and topics covered in the GSP. These materials include bilingual presentations, fact sheets, handouts, frequently asked questions, and videos. Copies of the materials are available on the Subbasin website. GSA representatives distributed these materials during meetings, workshops, and other outreach activities.

4. Public Engagement in GSP Development

Legal Requirements:

> **§354.10(b): A list of public meetings at which the Plan was discussed or considered by the Agency;**
>
> **§354.10 (d): A communication section of the Plan that includes the following:**
> **(2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.**
> **(3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of population within the basin.**

This section describes outreach activities coordinated among the Subbasin GSAs to inform, engage, and consult stakeholders in GSP development. Coordinated outreach activities fell into two main categories: general public outreach and targeted outreach. General public outreach activities primarily consisted of committee and working group meetings, and coordinated workshops aimed at informing and receiving public input on the content of the GSPs. The GSAs also conducted outreach activities targeted at hard-to-reach communities and beneficial users, including agricultural interests, school districts, and disadvantaged communities.

General Public Engagement Activities

There were two primary opportunities for members of the public to engage in development of the Subbasin GSPs: Coordination Committee and working group meetings and coordinated public workshops. These activities are further described below. In addition, the GSAs also informed and engaged members of the public by posting information on the Subbasin and member-agency websites, distributing the monthly newsletter, disseminating bilingual informational materials, and tabling at public events.

Committee Meetings

Comprised of members representing the entities preparing the Subbasin GSPs, the Coordination Committee was formed to provide overall guidance and resolve conflicts among the GSAs to ensure that the GSPs were coordinated as required by SGMA. The Technical Working Group and Communications Working Group were formed under the Coordination Committee to specifically coordinate technical and communication activities, respectively. Public meetings of the Coordination Committee and working groups served as key opportunities for stakeholders to engage and consult in development of the GSPs. Public comments were recorded in the meeting minutes, posted on the Subbasin website, and considered during development of the GSPs.

Coordinated Public Workshops

The Subbasin GSAs planned and held a series of public workshops from May 2018 – May 2019 aimed at educating and soliciting input from the public about topics covered in the GSPs. Table 1 identifies the workshop dates, locations, and topics. At these workshops, GSA representatives and their technical consultants presented information on each GSP development phase. Presentations were followed by an open house period to allow participants to talk directly with their GSA representatives. Bilingual interpreters were present at all workshops to provide interpretation services. All workshop materials, in both English and Spanish, are available on the Subbasin website.

Questions, comments, and input from workshop participants were recorded by facilitation staff and summarized the workshop summaries, provided with this document as **Attachment B**. All public comments were taken in consideration by GSAs and technical consultants during development of the GSPs.

The GSAs used a variety of methods to promote the workshops. These methods included distribution of bilingual flyers and utility bill inserts, email notifications, social media posts, website posts, newspaper notices, and press releases. **Attachment C** includes example workshop promotion activities. GSA representatives also directly contacted local organizations throughout the Subbasin. A list of organizations contacted is provided with this document as **Attachment D**.

Table 1. Coordinated Public Workshops

Date	Location, Venue	Topic
	Spring 2018 Workshop	
May 14, 2018	Los Baños, San Luis & Delta-Mendota Water Authority	• Sustainable Groundwater Management Act overview • Delta-Mendota Subbasin overview • Opportunities for engagement
May 16, 2018	Patterson, Hammon Senior Center	
May 17, 2018	Mendota, Mendota Library	
	Fall 2018 Workshops	
October 22, 2018	Firebaugh, Firebaugh Middle School	• GSP development and implementation process • Data collection • Hydrogeologic Conceptual Model • Numerical & Analytical Models • Water budgets
October 24, 2018	Los Baños, College Greens Building	
October 25, 2018	Patterson, Patterson Senior Center	
	Winter 2019 Workshops	
February 19, 2019	Los Baños, College Greens Building	• Historic and current water budgets • Sustainability criteria • Undesirable results • Projects and management actions
February 20, 2019	Patterson, Patterson City Hall	
March 4, 2019	Santa Nella, Romero Elementary School	
	Spring 2019 Workshops	
May 20, 2019	Patterson, Patterson City Hall	• Projected water budgets • Sustainable yield • Groundwater monitoring networks • Projects and management actions
May 21, 2019	Los Baños, College Greens Building	
May 22, 2019	Santa Nella, Romero Elementary School	
May 23, 2019	Mendota, Mendota Library	

Targeted Stakeholder Engagement

The Subbasin GSAs also conducted targeted outreach and engagement to hard-to-reach communities, interested parties, and stakeholders that were previously underrepresented in other engagement activities. This included outreach to the following stakeholder types:

- *Agricultural Interests:* Agricultural stakeholders in the Subbasin include agricultural well operators, growers, ranchers, farmworkers, and agricultural landowners. Strong agricultural representation exists within the leadership of the GSAs. To augment direct outreach being conducted by individuals GSAs, Subbasin representatives also coordinated closely with local county farm bureaus to disseminate information related to GSP development and public workshops.

- *School Districts:* Schools districts are considered for both beneficial users of groundwater (for drinking water), as well communication channels to disseminate information about SGMA and GSP development. GSA representatives directly contacted local school districts to notify them of the public workshops. Some schools also help distributed informational materials and workshop flyers to their students and parents.

- *Disadvantaged Communities:* The GSAs followed best practices identified in Collaborating for Success: Stakeholder Engagement for Sustainable Groundwater Management Act Implementation (Community Water Center, 2015) and other guidance documents to engage disadvantaged and severely disadvantaged communities. This included holding meetings in disadvantaged communities; holding meetings in the evening at known local venues, such as schools, civic centers, and community centers; translating fact sheets, meeting materials, and presentations into other languages; and providing interpreting services at all public workshops.

5. GSP Implementation

Legal Requirements:

§ 354.10(b)(4): The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.

Each GSA will utilize its own methods to inform the public about progress implementing its GSP and the status of any projects and management actions. The Subbasin website will continue to be the main source of information for Subbasin- wide announcements, public meetings, workshops, and informational materials. In addition, the GSAs will continue to coordinate public outreach and stakeholder engagement activities related to GSP implementation as-needed.

Attachments: Attachment A - Delta-Mendota Subbasin Sustainable Groundwater Management Act Communications Plan Attachment B – Coordinated Public Workshop Summaries
Attachment C – Example Public Workshop Promotion Materials
Attachment D – Stakeholder and Community Organizations Contacted Regarding Coordinated SGMA Workshops

ATTACHMENT A. DELTA-MENDOTA SUBBASIN SUSTAINABLE GROUNDWATER MANAGEMENT ACT COMMUNICATIONS PLAN

Delta Mendota Subbasin Groundwater Management

Sustainable Groundwater Management Act Communications Plan

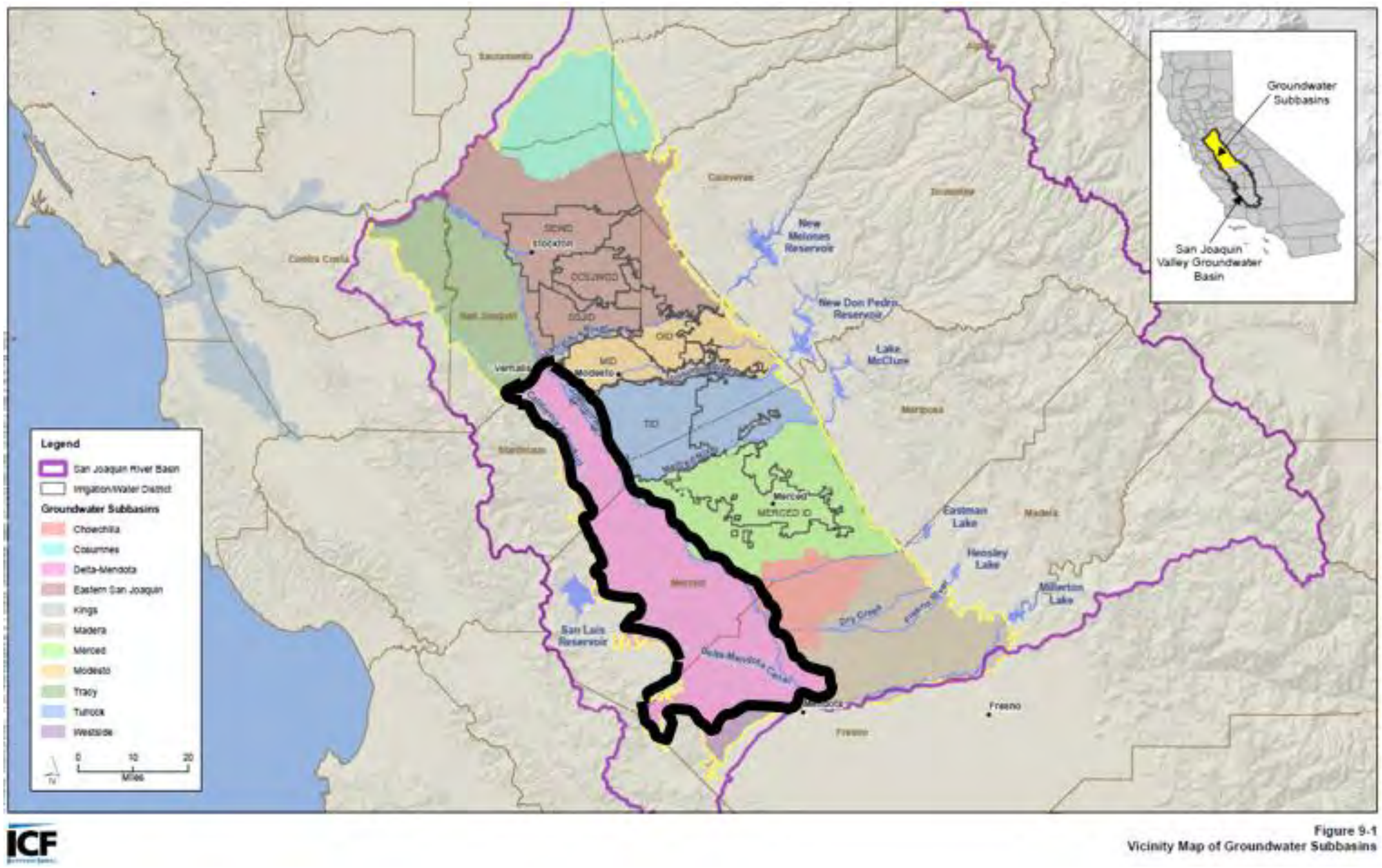

Figure 9-1
Vicinity Map of Groundwater Subbasins

Prepared by:
Lisa Beutler, MWH/Stantec,
Via CA Dept. of Water Resources,
Facilitation Services Technical Assistance

June 2017

MWH now part of Stantec

Forward: How to use this Plan

This Communication Plan provides a high-level overview of near and long-term outreach and engagement strategies, tactics and tools. Its purpose is to assist the Groundwater Sustainability Agencies (GSAs) of the Delta Mendota Subbasin with stakeholder outreach and other related actions as required by the Sustainable Groundwater Management Act (SGMA) of 2014. It is presented as a working public draft, and should be considered a living document that is continuously refined and updated as circumstances suggest.

Chapter 1*:* *Introduction and Background* provides text and information about SGMA and the Delta Mendota Subbasin that can be repurposed directly into websites or printed materials by agencies and/or entities with an interest in SGMA and how it will affect the subbasin. This section also describes the communications activities mandated by SGMA.

Chapter 2: *Communications Plan Overview* provides communications planning goals and objectives as well as the scope. This section can be used in support of project management activities.

Chapter 3: *Situation Assessment* provides some of the context for communications activities. This section can be used in developing required assessments of stakeholder issues and interests. It also informs project management activities.

Chapter 4: *Audiences and Messages* identifies key subbasin audiences and message points for specific audience segments. The goal of this chapter is to provide information that can be used by the subbasin GSAs in preparing to work with key stakeholders.

Chapter 5: *Risk Management* is the summary of a communications risk assessment that considers subbasin communications strengths and weakness and proposes on-going adjustments based on best communication management practices. This section informs project management activities and provides a context for some of the recommended communications tactics.

Chapter 6: *Tactical Approaches* offers a communications to do list with specific communications activities relevant for project phases and subbasin audiences.

Chapter 7: *Measurements and Evaluation* outlines methods to determine the effectiveness of outreach and engagement.

Chapter 8: *Roles and Responsibilities* provides a sample list of tasks and illustrates the types of communications roles and responsibilities which might be assigned. This section should be incorporated into project management plans.

Subbasin GSAs should feel free to repurpose any or all parts of the document that will assist them in meeting SGMA requirements.

This document was developed with technical support provided by the California Department of Water Resources' (DWR) SGMA Facilitation Support Services Program and completed by the Communication and Engagement Group of MWH/Stantec.

Delta Mendota Subbasin
Sustainable Groundwater Management Act
Communications Plan
Working Draft

Contents

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List of Acronyms and Abbreviations

Item	Description
Basin	Groundwater Basin or Subbasin
Coms Plan	Delta Mendota Subbasin, Sustainable Groundwater Management Act, Working Draft Communications Plan
CSD	Community Service District(s):
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
DAC	Disadvantaged Communities
DMC	Delta-Mendota Canal
DWR	California Department of Water Resources
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
IRWMP	Integrated Resource Water Management Plan
PDF	Portable Document Format
RCD	Resource Conservation District(s)
SGMA	Sustainable Groundwater Management Act
SLDMWA	San Luis Delta- Mendota Water Authority
State Board	State Water Resources Control Board

Item	Description
SA	Situation Assessment
USGS	United States Geological Survey

Revision History

Table 1. Revision History

Revision History			
Revision/Dock Title #	Date of Release	Author	Summary of Changes

INTRODUCTION AND BACKGROUND

The purpose of this Communication Plan is to assist the Groundwater Sustainability Agencies (GSAs) of the Delta Mendota Subbasin with stakeholder outreach and other related actions as required by the Sustainable Groundwater Management Act (SGMA) of 2014. Its chapters identify key stakeholders and provide a high-level overview of near and long-term outreach and engagement strategies, tactics and tools. The plan was developed with technical support provided by the California Department of Water Resources' (DWR) SGMA Facilitation Support Services Program.

1.1. SGMA Basics[1]

After decades of debate, in 2014 California lawmakers adopted SGMA. This far-reaching law seeks to bring the State's critically important groundwater basins into a sustainable regime of pumping and recharge. The change in water management laws has created new obligations for residents and water managers in the Delta-Mendota Groundwater Subbasin. The San Luis Delta- Mendota Water Authority (SLDMWA) is assisting its members in implementation of this law.

SGMA requires, **by June 30, 2017**, the formation of locally-controlled GSAs in many of the State's groundwater basins and subbasins (basins). A GSA is responsible for developing and implementing a **groundwater sustainability plan** (GSP). These plans assist the basins in meeting sustainability goals. The primary goal is to maintain sustainable yields without causing undesirable results.

1.1.1. GSAs & GSPs

Any local public agency that has water supply, water management, or land use responsibilities in a basin can decide to become a GSA. A single local agency can decide to become a GSA, or a combination of local agencies can decide to form a GSA by using either a Joint Power Authority (JPA), a memorandum of agreement (MOA), or other legal agreement. If no agency assumes this role the GSA responsibility defaults to the County; however, the County may decline.

A GSP may be any of the following *(Water Code § 10727(b)):*

- A single plan covering the entire basin developed and implemented by one GSA.
- A single plan covering the entire basin developed and implemented by multiple GSAs.

[1] Sections on SGMA are largely drawn, in whole or in part, from publicly available materials from the Department of Water Resources. For more see: http://www.water.ca.gov/groundwater/sgm

- Subject to Water Code Section 10727.6, multiple plans implemented by multiple GSAs and coordinated pursuant to a single coordination agreement that covers the entire basin.

If local agencies are unable to form an approved GSA and/or prepare an approved GSP in the required timeframe, then the basin or subbasin would be considered unmanaged. Unmanaged groundwater basins and subbasins are subject to State Water Resources Control Board (State Board) oversight. This is true even if the vast majority of the subbasin is covered by a plan. Should intervention occur, the State Board is authorized to recover its costs from the GSAs.

1.2. SGMA Communications and Engagement Requirements

SGMA includes specific requirements for communications and engagement by each planning phase. **Figure 1** (next page) illustrates the requirements and provides water code references. The GSP submittal guidelines also describe the outreach and engagement documentation to be submitted with the plan. **Table 2** describes the submittal requirements. A full list of codes and requirements is also provided in **Appendix 1**.

Table 2. GSP Submittal Requirements[2]

GSP Regulations Section	Requirement	Description
Article 5. Plan Contents, Sub-article 1. Administrative Information		
354.10	Notice and Communication	• Description of beneficial uses and users • List of public meetings with dates • GSP comments and responses • Decision-making process • Public engagement process • Method(s) to encouraging active involvement • Steps to inform the public on GSP implementation progress

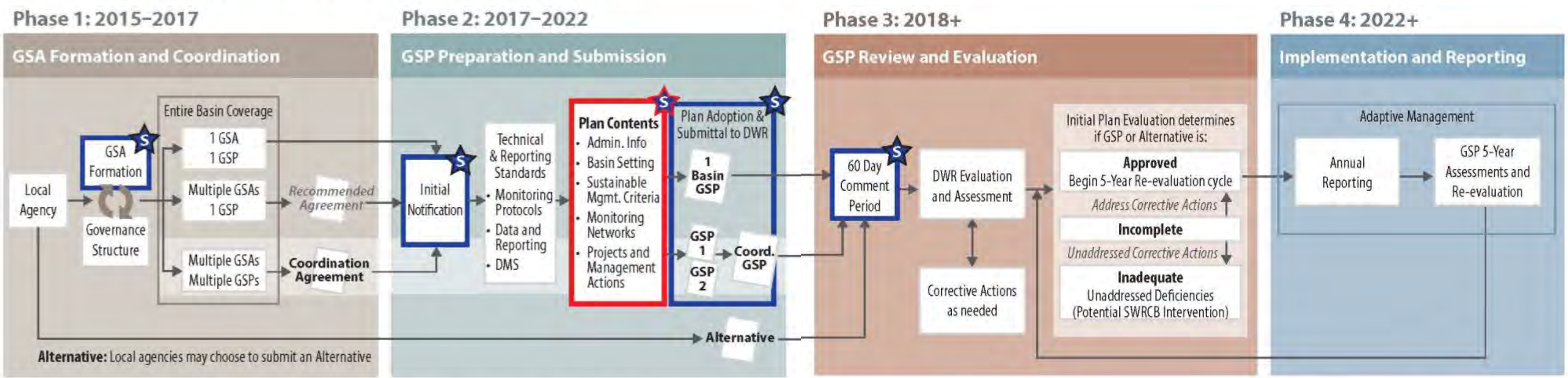
1.3. Planning Approach

While the SLDMWA is assisting with the coordination of GSP(s) development, this Communications Plan (Coms Plan) is offered for the voluntary use of all of the GSAs of the Delta-Mendota Subbasin. A full Coms Plan schedule should be developed in conjunction with the overall GSP(s) development schedule. One additional option is for the Coordination Committee of GSAs to provide overall communications guidance. This could potentially be included in a section of the Coordination Agreement.

[2] Guidance Document for the Sustainable Management of Groundwater, Preparation Checklist for GSP Submittal, Department of Water Resources, December 2016

Figure 1. Stakeholder Engagement Requirements

Stakeholder Engagement Requirements by Phase



Phase 1 Engagement Requirements

- **Establish and Maintain List of Interested Parties** §10723.4
- **GSA Formation Public Notice** §10723(b)
- **GSA Formation Public Hearing** §10723(b)
- **GSA Formation (due 6/30/17)** §10723(b)
  Notify DWR:
  - Include list of interested parties
  - Explain how parties' interests will be considered
- **Pre-GSP Development** §10727.8
  Provide a written statement describing how interested parties may participate to:
  - DWR
  - Cities within the GSA boundary
  - Counties within the GSA boundary

Phase 2 Engagement Requirements

- **GSP Initial Notification** §353.6*
- **GSP Preparation** §10727.8 and §10723.2
  - Encourage active involvement
  - Consider beneficial uses and users of groundwater when describing *Undesirable Results, Minimum Thresholds, and Projects & Actions*
- **GSP Communications Section** §354.10*
  - GSA decision-making process
  - Opportunities for engagement and how public input is used
  - How GSA encourages active involvement
  - Method of informing the public
- **Public Notice of Proposed Adoption** §10728.4
- **GSP Adoption Public Hearing** §10728.4
- **GSP Submittal** §354.10*
  - Include a summary of communications: description of beneficial uses/users, list of public meetings, comments received/responses

Phase 3 Engagement Requirements

- **60 Day Comment Period** §353.8*
  - Any person may provide comments to DWR regarding a proposed or adopted GSP via the SGMA Portal at http://sgma.water.ca.gov/portal/
  - Comments will be posted to DWR's website

Phase 4 Engagement Requirements

- **Public Notices and Meetings** §10730
  - Before amending a GSP
  - Prior to imposing or increasing a fee
- **Encourage Active Involvement** §10727.8

Engagement Requirements Applicable to ALL PHASES

- **Beneficial Uses and Users** §10723.2
  Consider interests of all beneficial uses and users of groundwater
- **Advisory Committee** §10727.8
  GSA may appoint and consult with an advisory committee
- **Public Notices and Meetings** §10730
  - Before electing to be a GSA
  - Before adopting or amending a GSP
  - Prior to imposing or increasing a fee
- **Encourage Active Involvement** §10727.8
  Encourage the active involvement of diverse social, cultural, and economic elements of the population within the groundwater basin
- **Native American Tribes** §10720.3
  - May voluntarily agree to participate
  - See Engagement with Tribal Government Guidance Document
- **Federal Government** §10720.3
  - May voluntarily agree to participate

Stakeholder Input

Stakeholders should be informed throughout the development of Plan Content

Code References: §(#) = SGMA, §(#)* = GSP Regulations

Source: Guidance Document for Groundwater Sustainability Plan Stakeholder Communication and Engagement Department of Water Resources, June 2017

An important additional step will be establishing, in conjunction with the multiple GSAs, the roles and responsibilities for implementing the Coms Plan.

1.4. SGMA and the Delta Mendota Subbasin[3]

The Delta-Mendota Subbasin of the San Joaquin Valley Groundwater Basin is a long, relatively narrow groundwater basin that covers portions of five counties, from north to south, San Joaquin, Stanislaus, Merced, Madera and Fresno Counties (see **Figure 2**). The Delta-Mendota sub-basin is bounded on the west by the Tertiary and older marine sediments of the Coast Ranges. The northern boundary (from west to east) begins on the west by following the Stanislaus/San Joaquin County line, then deviates to the north to encapsulate all of the Del Puerto Water District before returning back to the Stanislaus/San Joaquin County line. The boundary continues east then deviates north again to encapsulate all of the West Stanislaus Irrigation District before returning back to the Stanislaus/San Joaquin County line. The boundary continues to follow the Stanislaus/San Joaquin County line east until it intersects with the San Joaquin River.

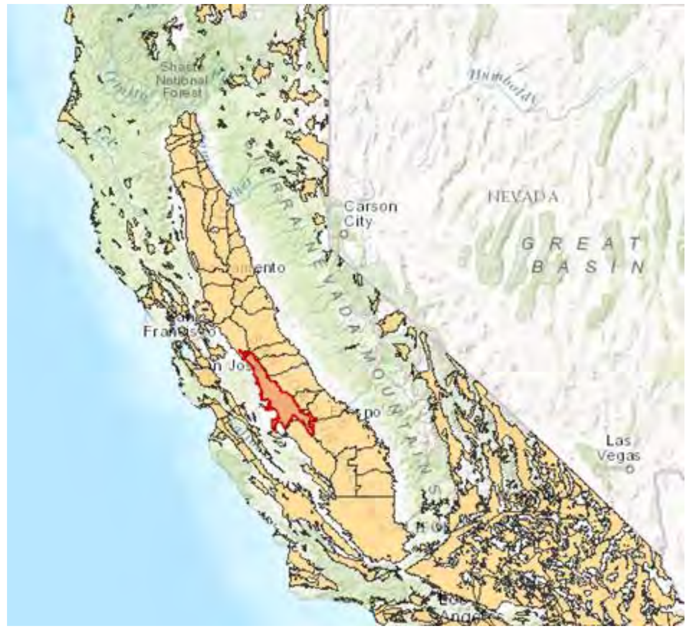


Figure 2. Delta Mendota Subbasin

The eastern boundary (from north to south) follows the San Joaquin River to within Township 11S, where it jogs eastward along the northern boundary of Columbia Canal Company and then follows the eastern boundary of Columbia Canal company until intersecting the northern boundary of the Aliso Water District. The boundary then heads east following the northern and then eastern boundary of the Aliso Water District until intersecting the Madera/Fresno County line. The boundary then heads westerly following the Madera/Fresno County line to the eastern boundary of the Farmers Water District. The boundary then heads southerly along the eastern boundary of the Farmers Water District, and continues southerly along the section line to the intersection with the northern right-of-way of the railroad. The boundary then heads east along the northern right-of-way of the railroad until intersecting with the western boundary of the Mid-Valley Water District. The boundary then heads south along the western boundary of the Mid-Valley Water District to the intersection with the northern boundary of Reclamation District 1606. The boundary then heads west and then south following the boundary of Reclamation District 1606 and James Irrigation District until its intersection with the Westlands Water District boundary.

The southern boundary (from east to west) matches the northerly boundaries of Westlands Water District legal jurisdictional boundary last revised in 2006. The boundary then

[3] Information related to the Delta Mendota subbasin is drawn directly from http://sgma.water.ca.gov/basinmod/basinrequest/preview/23.

proceeds west along the southernmost boundary of the San Luis Water District. The boundary then projects westward from this alignment until intersecting the Delta-Mendota sub-basin Western boundary described above.

1.5. Delta-Mendota Subbasin GSP Planning

The GSAs of the Delta-Mendota Subbasin intend to work together to meet Sustainable Groundwater Management Act (SGMA) requirements and prepare a Groundwater Sustainability Plan (GSP) or coordinated Sustainability Plans by June 31, 2020. The San Luis Delta- Mendota Water Authority (SLDMWA) is assisting its members and non-members in planning and implementation of this law and has been directly assisting a subset of the local GSA eligible agencies in organizing to accomplish required SGMA tasks. The SLDMWA has also hosted informal, information meetings with all of the subbasin GSAs.

While SLDMWA coordinated GSAs are confident in their ability to prepare a GSP for the areas under their jurisdiction, SGMA requires that an approved GSP or multiple coordinated GSPs are in place to provide sustainable management for the entire subbasin. The identified GSAs have been asked to determine how they wish to proceed in individual GSP development or a coordinated single GSP by July 2017 and whether or not they wish to participate in the Prop 1 Sustainable Groundwater Planning Grant as a joint request.

1.6. Delta Mendota Subbasin GSAs

Following are the DWR identified agencies (as of June 15, 2017).[4]

1. Aliso Water District
2. Central Delta-Mendota Region Multi-Agency GSA
3. City of Dos Palos
4. City of Firebaugh
5. City of Gustine
6. City of Los Baños
7. City of Mendota
8. City of Newman
9. City of Patterson
10. County of Madera—3
11. DM-II
12. Farmers Water District
13. Fresno County—Management Area ‘A’
14. Fresno County—Management Area ‘B’
15. Grasslands Groundwater Sustainability Agency
16. Merced County—Delta-Mendota

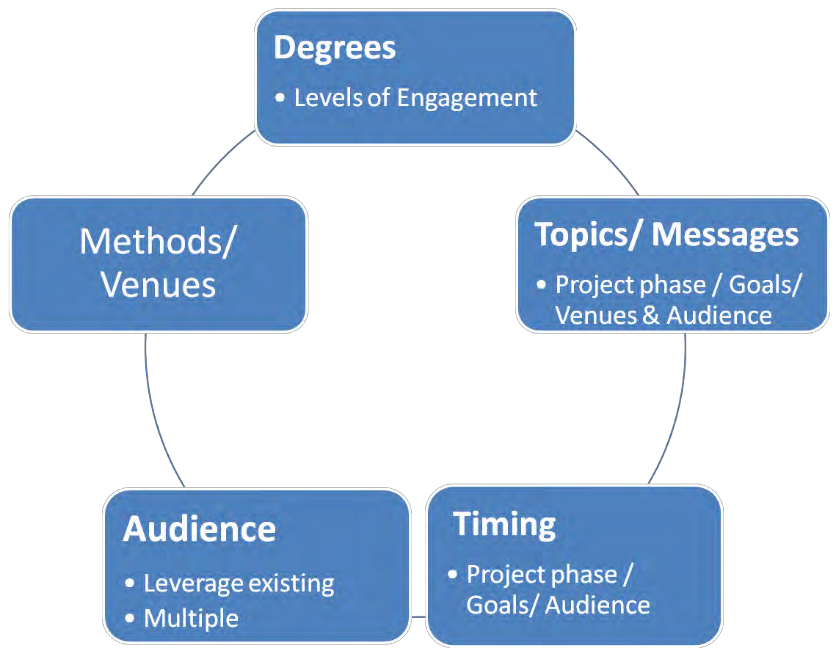
[4] See: http://sgma.water.ca.gov/portal/

17. Northwestern Delta-Mendota GSA
18. Ora Loma Water District
19. Patterson Irrigation District
20. San Joaquin River Exchange Contractors Water Authority
21. Turner Island Water District-2
22. West Stanislaus Irrigation District GSA
23. Widren Water District GSA

COMMUNICATIONS PLAN OVERVIEW

Communication is the process of transmitting ideas and information. According to the Project Management Institute, 75%-90% of a project manager's time is spent communicating. A Coms Plan provides the purpose, method, messages, timing, intensity, and audience of the communication, then describes who will do the communicating, and the frequency of the communication (see **Figure 3**.)

Figure 3. Elements of a Communications Plan



2.1. Purpose

The purpose of the Delta-Mendota Subbasin, Sustainable Groundwater Management Act, Coms Plan is to outline the information and communications needs of the project stakeholders and provide a roadmap to meet them. The Coms Plan then identifies how communications activities, processes, and procedures will be managed throughout the project life cycle.

2.2. Importance

While communications are important in every project, a well-executed communications strategy will be essential to the success of the GSP(s) development and adoption process. The financial and regulatory stakes are high and communication missteps can create project risks. Further, development of a viable GSP(s) will require an on-going collaboration among all the stakeholders, both organizational and external. The plan will be comprehensive and consider multiple variables, a range of system elements and project costs and benefits. Stakeholder input will be needed to refine GSP requirements and fully define the water management system, and potential impacts, costs and benefits that may result in managing for sustainability.

2.3. Scope

The plan focuses on formal communication elements. Other communication channels exist on informal levels and enhance those discussed within this plan. This plan is not intended to limit, but to enhance communication practices. Open, ongoing communication between stakeholders is critical to the success of the project.

2.4. Communications Goal

Development, adoption and implementation of the GSP(s) will require basin external stakeholders, other agencies, staff, managers, and the multiple GSA Boards to evaluate choices, make decisions and commit resources.

The core communications goal is to plan for and efficiently deliver clear and succinct information:

- At the right time
- To the right people
- With a resonating message

This is done to facilitate quality decision making and build accompanying public support

2.5. Communications Objectives

The Coms Plan Objectives are to present strategies and actions that are:

- Realistic and action-oriented
- Specific and measurable
- Minimal in number (a few well delivered are better than many mediocre efforts)
- Audience relevant

2.6. Strategic Approach

Three primary communications strategies have been identified for the GSP(s) development.

1) Fully leverage the activities of existing groups. This practical approach is cost effective and respectful of the limited time that stakeholders have to participate in collaborative processes.
2) Provide targeted, communications and outreach to opinion leaders in key stakeholder segments.
3) Provide user friendly information and intermittent opportunities through existing communication channels and open houses or workshops to allow interested stakeholders (internal and external) to engage commensurate with their degree of interest.

2.7. Communications Governance, Communications Team

Given the relatively large number of stakeholders, a recommendation for coordinated efforts, and the legal requirements for outreach[5], some form of communications governance is recommended. Several governance options for consideration are offered in Appendix 2. The actual form of the governance is less important than a clear understanding of the roles and responsibilities of those responsible for ensuring required communication. For the purpose of this document, an assumption is made that some form of governance will be identified and a communications team (which may be an individual or multiple individuals, and/or include the project consultants) is designated.

A driving consideration for this recommendation is the level of effort associated with required activities and the fact that communications are highly time dependent. That means that communications activities should be occurring that may happen outside of regularly scheduled GSA meetings. In this case delegation with guidance is efficient and effective.

2.8. Constraints

All projects are subject to limitations and constraints as they must be within scope and adhere to budget, scheduling, and resource requirements. These constraints can be even more challenging in projects with multiple agencies as will be the case with the development and coordination of multiple GSPs.

There are also legislative, regulatory, technology, and other organizational policy requirements which must be followed as part of communications management. These limitations must be clearly understood and communicated where appropriate. While communications management is arguably one of the most important aspects of project management, it must be done in an effective and strategic manner recognizing and balancing the multiple constraints.

All project communication activities should occur within the project’s approved budget, schedule, and resource allocations. The GSP(s) project managers and the leadership of the participating GSAs should have identified roles in ensuring that communication activities are performed.

To the extent possible, to support collaboration and reduce costs, GSP(s) partners should utilize standardized formats and templates as well as project file management and collaboration tools.

[5] See Appendix 1

SITUATION ASSESSMENT

3.1. *Introduction*

The challenges of asking a community to make changes in how things are done, or forging an agreement among multiple parties are often large. Prior to preparing a Coms Plan, a neutral, 3rd party facilitator conducted a stakeholder Situation Assessment (SA).

The facilitator's role was to provide an independent evaluation of potential stakeholder's interest in coordination and governance for GSA formation and GSP development and identify any barriers or concerns that would need to be addressed for the GSA formation process and GSP(s) development to be successful.

3.2. *Situation Assessments*

An SA is an information-gathering process that informs outreach, engagement and collaboration. As part of preparing the basin communication's process, it was important to know more about:

- Stakeholder Categories
- Opinion leaders
- Regulatory and political context
- Advocates and detractors
- Attitudes and knowledge
- Other elements useful to the crafting of decisions

An assessment is also a low risk approach to education and signaling a future relationship. It facilitates the community's appraisal of its needs, wants and values. A well-crafted assessment sets the stage for the parties to better understand and interpret their situation so that they can make informed decisions for actions, in the short term and for the future.

The Delta-Mendota subbasin SA included background research and interviews. Interviews were usually with individuals but in a few cases a very small group was convened. To encourage candor, the results of the input process were bundled so those interviewed were not individually identified unless they explicitly indicated they wished to share their individual response.

3.3. *Background Research*

The facilitator worked closely with the SLDMWA and DWR to identify useful documents, plans and activities that might inform the overall communications planning process.

3.4. *Interviews and Consultations*

Using information gathered during the background research and similar GSA formation efforts throughout the state, the facilitator worked with the SLDMWA to craft interview questions. The facilitator also provided some selection criteria to the SLDWMA to help identify a representative group of interview candidates. Once selected, the SLDMWA staff and facilitation team invited the interviewees to participate. In addition to full interviews, additional calls and in person communications were conducted to acquire amplifying information. **Figure 4** provides a quick overview.

Figure 4. Interview and Consultation Quick Facts

Number of Contacts: 30

Dates of Calls and Interviews Conducted:
February to May 2017

Average Length: 1 hr.
(Shortest = 20 mins., Longest = 1.5 hrs)

Selected participants were all engaged or otherwise stakeholders in some aspect of the basin GSA development process.

A project background sheet was provided in advance of each formal interview and used again during the interviewee discussions with the facilitator. Each interview followed the same format and included 16-18 questions (depending on whether or not a follow-up question was needed).

The questions covered the following topics pertaining to the GSA formations and GSP(s) development:

1. Overarching perspectives from each key stakeholder on general groundwater conditions, GSA governance; subbasin management and associated SGMA compliance
2. Preferred methods to achieve groundwater sustainability consistent with SGMA requirements
3. The level of agreement/conflict around groundwater governance across the range of stakeholder perspectives
4. Experience with facilitated processes, outreach and engagement, and the goals for such support
5. Potential configurations of governance and formations of GSAs and GSP development

3.5. *Summary of key findings*

Interview results indicate an overall positive environment for the project and project communications; however, the effort will require interactions of a large number of parties and planning for an extremely complex system. Following are the reflections, ideas and suggestions of those contacted.

3.5.1. Related to Groundwater Sources and Trends

- *Significant observed impacts associated with Weather, Water Project Deliveries and Cropping Patterns* – Participants observed a declining groundwater situation and were able to attribute it to drought and weather (particularly timing of seasonal rainfall and periods of prolonged, higher temperatures), conversion to permanent crops, and significant changes in access to surface water.

- *Surface & Groundwater Nexus* – As noted in comments related to access to surface water, there was a clear understanding of the surface/groundwater nexus. Many believed that any realistic solution would have to include a full assessment of the region's surface water future.

- *Extremely Complex Systems* – Many of those interviewed reported that parts of the subbasin were doing fine and could, with good management, be sustainable. They described problems as being primarily in pockets of the subbasin. They also characterized some parts of the subbasin as not being managed sustainably and indicated that they believe this would have continued had SGMA not passed. While it was generally agreed that it would have been better if SGMA was not driving the change, they felt change would not occur without something like SGMA. Several of the participants were able to describe specific locations and situations that illustrated this.

  Issues related to operations of the Bureau of Reclamation, the Delta-Mendota Canal (DMC), the Mendota Pool and restoration activities are of keen interest to all the stakeholders. Everyone was familiar with issues of subsidence and with the facts and figures represented in graphics like those in **Figure 5**, prepared by the United States Geological Survey (USGS).[6]

  Many perceived that groundwater supplies for municipal uses in some parts of the basin were at risk.

- *Historic Rights and Arrangements* – Access to surface water is based on numerous historic rights and agreements as well as more contemporary agreements. As such there is no **single** description of the status of surface water availability among the many subbasin GSAs,[7] although there is a strong understanding of the rights and arrangements that do exist.[8]

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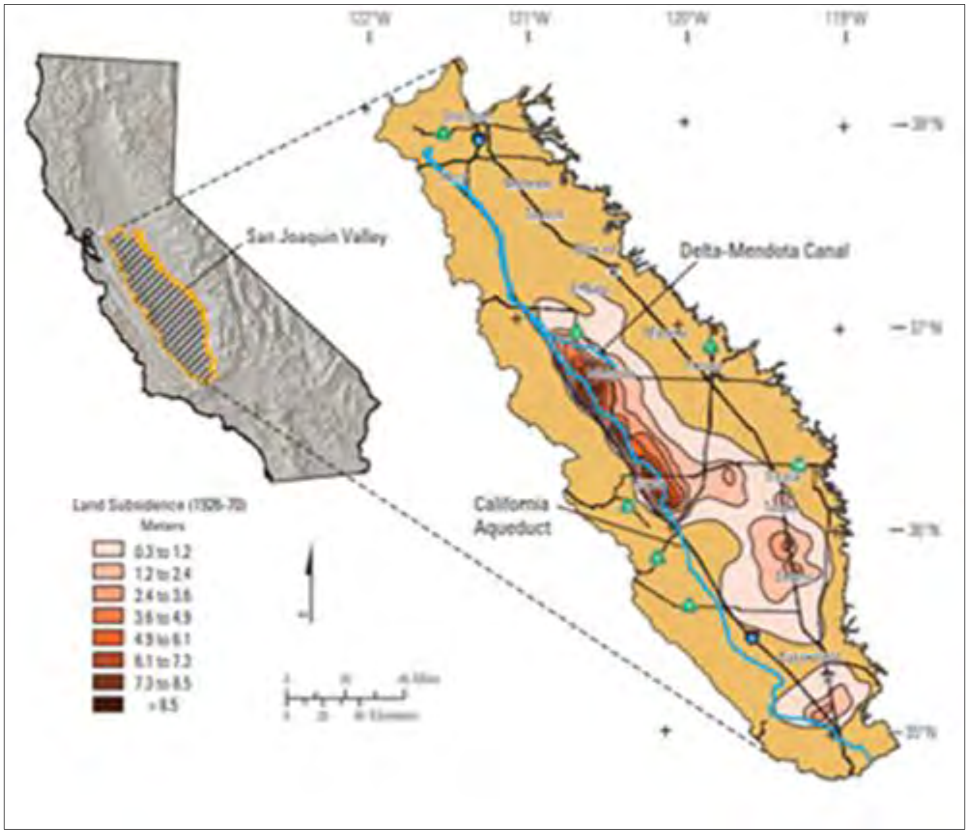
[6] U.S. Department of the Interior | U.S. Geological Survey: https://ca.water.usgs.gov/projects/central-valley/delta-mendota-canal.html, Page Last Modified: Monday, 20-Mar-2017 22:39:47 EDT

[7] A full inventory of water rights and arrangements for the subbasin GSAs is recommended to be prepared as part of the GSP planning process.

[8] In 2010 there were 1,403 water rights claimed in the San Joaquin Delta watershed, the largest number of any watershed in the State. [Source: Associated Press: Original data source is State Water Resources Control Board eWRIMS, Database

Figure 5. USGS Illustration of the DMC and Subsidence



The hierarchy of water rights as well as laws related to groundwater rights will be a significant factor in GSP negotiations.

Another historical factor related to sustainability is the character of land ownership. There was a perceived difference in the values placed on sustainability by multi-generational family farms versus investor driven agriculture and/or water development.

3.5.2. Related to GSA Governance; Subbasin Management and SGMA Compliance

- *Numbers* - The subbasin includes numerous Water Agencies (35) and other potential GSA eligible agencies including Cities and Counties (such as Dos Palos, Firebaugh, Gustine, Los Baños, Mendota, Newman, Patterson, Fresno, Madera, Merced, San Joaquin, and Stanislaus) and Community Service Districts (CSDs) including among others Grayson, Westley, and Volta, as well as multiple Resource Conservation Districts (RCDs) that for the most part were within the general boundaries of other GSA eligible authorities (Panoche, Poso and Grasslands as an example).

  By the June 30, 2017 filing deadline, 23 eligible entities had formally filed GSA formations and met SGMA requirements for subbasin coverage.

Even with this large number of GSA entities, during the SA interviews and in a follow-up survey, most agencies indicated a preference for a reduced number of GSPs and potentially just one or two.

At the time of this assessment there was not a full understanding of all of the potential requirements of being a GSA and ultimately what might be required to prepare a compliant GSP.

Table 3. Number of Subbasin Public Water Agencies

Number of Public Water Agencies

- Merced County
- Fresno County
- Broadview WD
- Centinella WD
- Central California ID,
- Davis WD
- Del Puerto WD
- Eagle Field WD
- El Solyo WD
- Farmers WD
- Firebaugh Canal WD
- Foothill WD
- Fresno Slough WD
- Grasslands WD
- Hospital WD
- Kern Canon WD
- Laguna WD
- Mercy Springs WD
- Mustang WD
- Oak Flat WD
- Orestimba WD
- Oro Loma WD
- Pacheco WD
- Panoche WD
- Patterson WD
- Romero WD
- Salado WD
- San Luis Canal Company
- San Luis WD
- Santa Nella C.WD
- Sunflower WD
- Tranquility ID
- West Stanislaus ID
- Widren WD
- Quinto WD

At the time of this assessment participants did not fully recognize the potential number of stakeholders and/or the requirements to conduct outreach.

- *Subbasin Governance Structures* – Many individuals and entities within the subbasin have experience working in cooperative governance and related structures. For example, the SLDMWA provides leadership for an Integrated Resource Water Management Plan (IRWMP) illustrated in **Figure 6**[9] on the following page. Many of the stakeholders are also involved with Irrigated Lands Coalitions (see **Figure 7**).[10]

  Likewise, many are also involved in efforts related to the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative (see **Figure 8**).

[9] Source : San Luis & Delta-Mendota Water Authority, Westside-San Joaquin Integrated Water Resources Plan, July 2014

[10] Source: Central Valley Regional Water Resources Control Board

Existing Cooperative / Collaborative Governance Structures with Delta Mendota Subbasin Stakeholders

Figure 6. Integrated Regional Water Management Groups

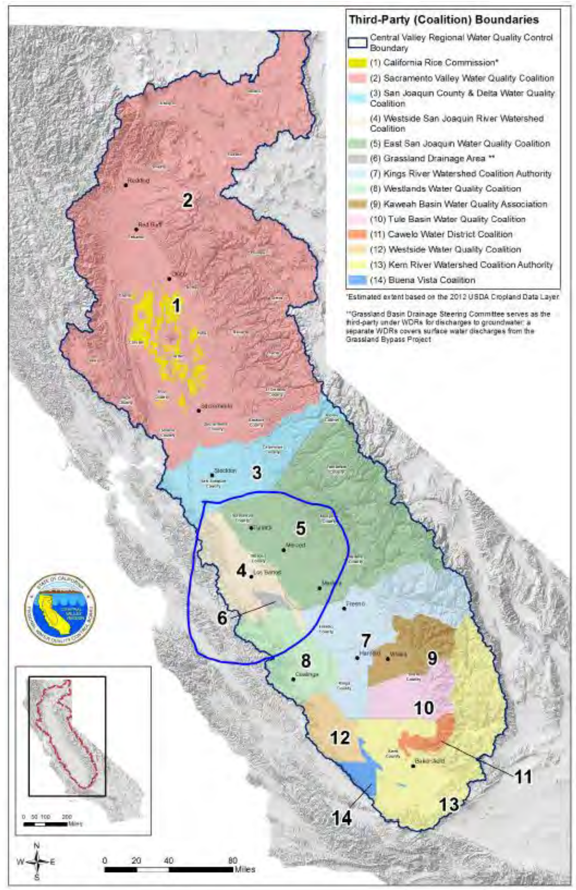


Figure 7. Irrigated Lands Coalitions

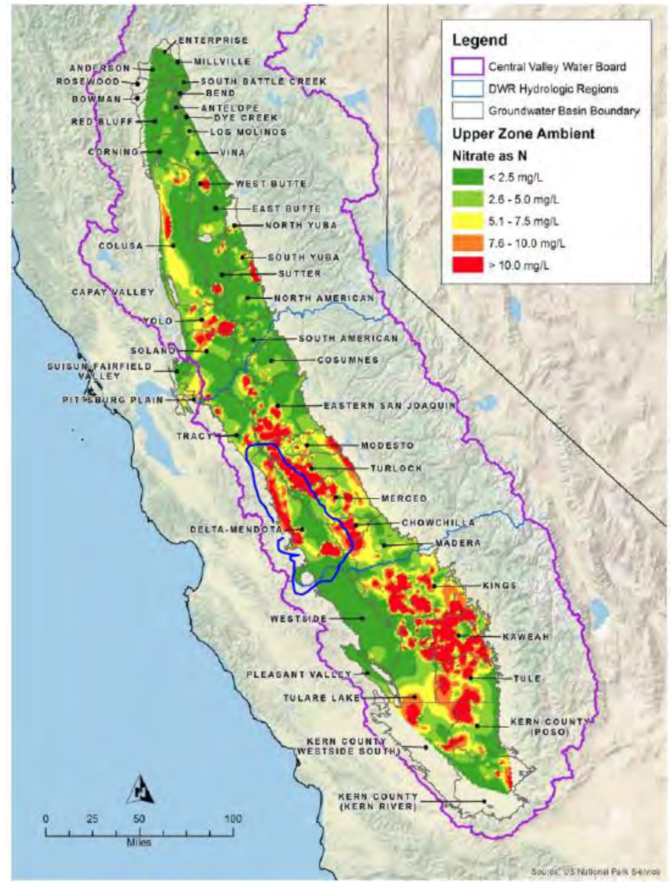


Figure 8. CV-Salts Initiative

CV-Salts was launched to develop sustainable salinity and nitrate management planning for the Central Valley. (See **Figure 8**.[11])

Finally, there are multiple arrangements in place related to surface water transfers and other previous groundwater management planning efforts.

Experience with these programs has created a capacity for collaborative planning that will be essential for GSP development. It also creates opportunities to access and leverage existing stakeholder meetings and events rather than needing to convene multiple new stakeholder processes.

3.5.3. Issues to be Addressed in Creating a Sustainability Plan

Some of the participants indicated they had an extremely good understanding of their section of the subbasin, with exact and extensive records to support their perspective. They found that making projections using historical data had been more reliable than some of the groundwater models that were in use.

In thinking about development of a GSP they felt there could be some difficulty in developing water balances due to lack of quality data for some locations. Another mild concern was the potential for disagreements about the selection of a groundwater model(s) or reconciling differences among methods.

Still another concern was the capacity of the GSAs and/or GSA members to fully participate. Some of these agencies are very lightly staffed and have varying levels of knowledge related to groundwater management. All of the participants had significant other duties prior to the passage of SGMA.

One concern, expressed after completion of the assessment, was the potential for some agencies to simply opt out of participating in the development of a GSP but still receive the benefits of the region having an approved plan without having contributed to the larger good of the subbasin.

3.5.4. Representation

The State Board lists the following as Required Interested Parties for the purpose of SGMA outreach:

- All Groundwater Users
- Holders of Overlying Rights (agriculture and domestic)
- Municipal Well Operators and Public Water Systems
- Tribes
- Counties
- Planning Departments /Land Use
- Local Landowners
- Disadvantaged communities
- Business

[11] Ibid

- Federal Government
- Environmental Uses
- Surface Water Users (if connection between surface and ground water)

All of these stakeholder categories were contacted in the interview process excepting tribes. In the case of tribes, there are no classified tribal lands in the Delta-Mendota subbasin, therefore no planning, outreach or communication needs are currently anticipated for tribes.

Due to subbasin characteristics, a primary focus of the assessment was on agricultural, disadvantaged communities (DACs) and municipal groundwater users.

- *Related to Agricultural Representation* - most respondents believed that the elected leadership of the GSA agencies would do a good job in representing agriculture and noted that many of them were growers themselves. It was also noted that farmers were busy and would be far more interested in any specifics of a GSP that would impact operations or the degree of certainty about water availability than the particulars of GSA governance.

- *Regarding DACs* - Much of the subbasin and its counties (San Joaquin, Stanislaus, Merced, and Fresno) have communities that meet the DAC definition and the region is generally considered disadvantaged. The ability of DACs to participate in GSP development was considered limited and it was thought that there would be a need for specific and direct outreach to DACs through elected leadership and via use of trusted community advocates. As part of the SA, several of those interviewed identified themselves as being able to represent a DAC perspective and one in particular was particularly concerned about the availability of Spanish language materials. As a result, Spanish language materials were included in the meeting materials of the public GSA adoption meetings and the SLDMWA provided a fluent Spanish speaker to assist with meetings.

In the past, to promote DAC identification and involvement, the Westside-San Joaquin IRWM previously conducted an extensive survey of private and public community representatives to educate and encourage understanding of the IRWM process, to help understand the issues confronted by DACs, and to better address the needs of minority and/or low-income communities. This effort resulted in identification of DACs in the Region and an initial list of 22 projects that would benefit DACs and low-income communities. Given known constraints on this community it is recommended that more focused DAC outreach should be coordinated with the IRWM. This effort is now in progress.

- *Regarding Municipals* - The SA outreach also included interviewing Municipal Stakeholders. A significant number of the Cities are fully dependent on wells for water supply and issues related groundwater management are of grave concern. These representatives all felt that even while it would be difficult to make time to participate in GSAs and GSP development, that they must make the time. Many had also determined that they wished to form their own GSA to reflect their specific interests in any kind of broader GSP negotiation.

- *Regarding Environmental Interests* - There appeared to be a less defined stakeholder segment representing traditional, environmentally focused issues. Outreach was made to subbasin government agencies that often serve as a surrogate for these interests and an informal consultation occurred with a representative of the Planning and Conservation League to identify any known, active stakeholders. However, no specific entity or individual was identified by those contacted. A general perception was that this community would desire engagement and would designate representatives if the GSP development was thought to potentially impact existing restoration or other environmental concerns but the formation of GSAs per-se, was of less interest. The next phase of communications should include outreach to organizations such as Audubon, the Nature Conservancy and Ducks Unlimited just to ensure due diligence. These connections will be important going forward, particularly if environmental issues are identified.

- *Regarding Industrial Users* – The region includes some industrial water users. This sector has a relatively lower percent of water use compared to other subbasins users; however, representatives of the sector pointed out how essential access to water was to their industry. The interviewees also emphasized how important these industries were to the local economies. There was a stated concern about representation since there didn't appear to be a direct way to engage, particularly with multiple GSAs being formed.

- *Regarding Counties & Planning Agencies* – All of the subbasin counties have designated representatives and all are assisting with GSA coverage for areas not otherwise covered by a GSA. All of the city and county representatives had direct engagement with the planning arms of their jurisdictions, or were staff to the planning departments. These representatives, like the municipal representatives, viewed this as critical issue even as it creates new workload for the already busy entities.

3.5.5. Communications and Facilitation Preferences

Participants were asked to describe their communications preferences. Several offered specific suggestions on written materials. Most did not believe there would be a need for a high frequency of communications directly with non-GSA stakeholders.

Several suggested using regularly scheduled activities of existing groups and gatherings to share information rather than creating stand-alone events. They listed annual meetings of the water agencies as one good venue as well as meetings related to the IRWM and Irrigated Lands. Several also thought that it would be good to go to places like Farmers Markets, particularly for the disadvantaged communities, and County Fairs.

Farm Bureau representatives also indicated a willingness to support outreach efforts. The Merced Farm Bureau, in particular, has already helped to advertise public meetings related to GSA formations.

Related to facilitation there was not a broad exposure to professional facilitators among many of the stakeholders. Even so, participants consistently listed qualities such as fairness and transparency, a good understanding of the issues, and confidence as helpful facilitator strengths. There was a sense that the GSAs would not need hand holding but that facilitation could be useful for helping the stakeholders forge decisions and making what many believed would need to be compromises.

3.5.6. Success Factors, Barriers to Success

The participants were asked to describe their view on the odds for success as well as any barriers that would prevent successful completion of a GSP.

Overall, most participants expressed a medium to high likelihood for success. They noted that the carrot (grants and technical support) and stick (significant regulatory intervention) by the State creates a dynamic that is supportive to success.

Participants stated barriers related to the capacity of the GSAs to participate and ultimately agree to, and implement changes. The much diffused governance structure of multiple GSAs amplifies this dilemma as do actions beyond the control of the subbasin entities (such as climate and water deliveries).

In addition to perceived barriers, participants outlined their thoughts on opportunities and success strategies.

- *Drought* – While the drought was unwelcome it increased awareness of the need for changes. Many felt it would be easier to move forward while the topic is prominent in everyone's minds.
- *Short and Long Game* – Several suggested it will be important to have a plan that includes long and short term strategies and activities.
- *Integrated Planning* – Many of the participants emphasized the importance of integrated planning.

3.5.7. Other Comments and Advice

Many participants expressed appreciation for being contacted and invited the facilitator to contact them again if there were questions.

3.6. ***Promising messages and methods***

Three primary communications strategies have already been identified for the GSP(s) development:

- Leveraging the activities of existing groups
- Providing targeted, communications and outreach to opinion leaders in key stakeholder segments
- Providing user friendly information and intermittent opportunities for a broader range of stakeholders

The same strategies aligned with the recommendations of the SA participants. These methods will allow stakeholders to engage commensurate with their degree of interest while providing sufficient information to ensure long-term success for plan development and implementation.

AUDIENCES AND MESSAGES

GSA formation and GSP(s) development, like most large planning efforts, consists of a broad range of stakeholders with differing interests and influence.

4.1. Two Core Audience Segments

This Coms Plan Anticipates two core audience segments. First is the subbasin GSA Boards and the communications among and between themselves. This audience segment is significant in size given that 23 GSAs will be working to develop a GSP(s) and each GSA has its own Board and audiences.

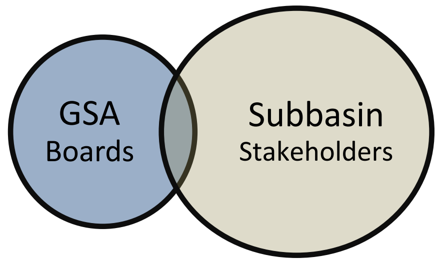


Figure 9. Two Core Audience Segments

The second audience is the subbasin stakeholders as identified in SGMA. This audience is also large. Many of the stakeholders are shared by the GSA Boards and some of the larger stakeholder segments are also represented on the GSA Boards (see **Figure 9**).

Nearly all of the communications strategies apply to both segments; however, some strategies apply to one or the other specifically and are so identified.

4.2. Communications and Change Management

The process of adopting and implementing a GSP will require significant change management. Communications planning should encompass basic change management approaches. Messages should also evolve over time and be tied to the planning process and key decision points. Then, for each audience and each major planning step, communications must do the following:

1. Describe what the actual proposed plan (change) is
2. Articulate how the change will directly impact the category of stakeholder involved
3. Outline the methods that will be used to implement the plan (change)
4. Define the costs and benefits of changing and not changing, and what future conditions will be if change does not occur
5. Consider unintended consequences and others that may also be impacted by the same change then develop a strategy to engage them
6. Offer opportunities for input and for stakeholders and others to improve the approach

The communications requirements for large changes are often underestimated. Some experts indicate that messages may need to be delivered up to 8 different times to be fully absorbed. Communications needs will also evolve as the GSP planning progresses. **Table 4** provides a sample of early communications that focus on SGMA and groundwater basics.

Table 4. Sample – Early Phase Message Elements for Subbasin Stakeholders

Element	What the Change Is	How it will affect the Stakeholder	How the change will be Implemented	Why it is a good idea
Early Phase GSP Development	• Locally governed GSAs will work together to sustainably manage ground water. • The Subbasin /Basin is required to ensure Sustainable Groundwater Management by submitting a sustainability plan by 2020. • The plan must be implemented and found to result in sustainable management by 2040.	(Unique to audience type) • Changes in the current methods of acquiring and utilizing groundwater may occur. • May affect future decisions related to crop types and decisions related to conjunctively using surface water. • May provide additional project resources to the DAC communities.	A collaborative approach is being undertaken to prepare the plan with multiple GSAs coordinating with the SLDMWA as the planning organizer.	• Sustainable and wise use of groundwater allows for the success of future generations and creates greater certainty for today's beneficial users. • Failure to act may result in negative regulatory consequences.

As part of the GSP planning process, the next phase of communications will also need to communicate the requirements for sustainability and how they are achieved in the context of the Delta-Mendota subbasin. Then, communications related to GSP specifics and adoption will require additional outreach, targeted to specific audiences.

4.3. Tied to Decision Making

Communications should also be tightly linked to decision making. For each anticipated decision, stakeholders for that decision should be identified and the following addressed.

1. Who (Is the stakeholder)
    a. An impacted party?
    b. A potential planning partner?
    c. A potential provider of services or resources?
    d. A regulator of the activity?
    (Note: Maybe more than one category.)

2. What (What is the interest of the stakeholder? How will the stakeholder be affected? What are the stakeholders' needs?)
3. Who (Who is the right messenger for the information)
4. How (How should the information be delivered? What are the best methods?)
5. When (What is the appropriate timing for the messages?)
6. Engagement and Knowledge Transfer (How do we create two-way communications?))

Table 5 illustrates some of these ideas.

Table 5. Communications Planning Questions

Who	Interest	Messenger	Delivery	Timing	Knowledge Transfer
• Impacted • Partner • Provider • Regulator	• How will decision affect? • What will stakeholder need?	• Who is a trusted information Source? • How do we ID and Partner	• What are the best delivery methods?	• When should we conduct outreach?	• What do the stakeholders know that we need to know?

4.4. GSA Boards

Due to the multiple subbasin GSAs, specific focus is needed on communications to keep them informed, provide consistent updates and information that the Boards can use in their own outreach, and support their decision making. Primary objectives for communications with the subbasin GSA Boards are to ensure:

- Consistent understanding of the requirements for a GSP and/or GSP coordination
- On-going access to current information
- Timely notice of any significant developments or decision points that may require changes to policies and/or require some other board action
- Confidence that the GSP(s) will be accepted by the GSA's stakeholders

Key communications activities involving the Board include;

1. Providing short and digestible pieces of information to ensure each Board member can quickly articulate to his/her constituents on key matters and remain sufficiently informed so that no decision points are surprises.
2. Provide user-friendly informational materials to be used with public audiences, and will support the Board with their own constituent outreach.
3. Utilize regular Board communications for routine updates and reserve specific Board agenda items for highly significant discussion items.

4.5. Primary Audiences

There are several core stakeholder groups that will require ongoing communications and tailored messaging throughout the planning process. They are:

- Agriculture
- Disadvantaged Communities
- Municipals

Other stakeholders requiring special consideration include:

- Industrial Users/ Business
- Regulators (State and Federal)
- Potential Partners
- Environmental Organizations
- Federal Agencies

While all of the stakeholder types are important to engage for development of a GSP, the first three will be most affected by any changes that might be proposed as a result of the *GSP(s)*.

The following provides an outline of key messages and activities in support of each of the audience types.

4.2.1. Agricultural

Messages about the GSP(s) development should feature the overall desirability of a sustainable management approach how the plan will contribute to management certainty and protect against regulatory oversight.

In thinking about irrigation users it is also important to remember that one size does not fit all.

4.2.2. Disadvantaged Communities

Messages developed for this sector should be tailored and specific to the community. This type of outreach is often best served by use of surrogates and trusted messengers. As identified in the SA, these messages should be aligned with activities of the IRWM, especially given the high, current dependence of many on unsustainable water sources. Messages about ways to access the increased availability of resources due to grant incentives should also be considered.

A specific outreach method to consider relates to the predominance of cells phones within the communities. According to the Pew Research Center, "over 50 percent of low-income households own a smartphone. Smartphone penetration in this demographic creates substantial opportunities for utilities to reach disadvantaged communities with software solutions like customer self-service platforms and targeted digital communications."[12]

4.2.3. Municipals

[12] Secondary Source: Water Smart. https://www.watersmart.com/rethinking-disadvantaged-community-engagement/ (accessed June 1, 2017)

Some care will be needed to address tensions related to the relative percentages of use by Municipal agencies and what constitutes highest and best beneficial uses within an agricultural region. A promising interaction with this community would involve collaboration on messaging to achieve mutually beneficial goals.

Some thought it might be possible for the municipal agencies to provide in-kind support to the GSP development process through support for project websites and mailing lists, production of meeting notices, assistance to the planning process from in-house public information professionals and offering access to physical meeting spaces.

Municipals may need assistance in making the case for the need to think at a Basin scale rather than more local terms.

4.2.4. Business and Industry Interests

Business and industry interests seek assurances about the availability of water for operations and the viability of the farming industry in the region. Messages for these audiences should focus on how the GSP(s) development will contribute to sustainability and how these audiences can participate in discussion specific to their interests.

4.2.5. Regional/Statewide Interests and Regulators

Some degree of uncertainty remains in the overall legal, legislative and regulatory environment as it relates to SGMA implementation.

It is in the interest of the subbasin stakeholders to engage state and federal agencies and regulators throughout the process. These parties may have resources to assist the subbasin and a cooperative attitude will build good will in the event that adjustments are needed to achieve SGMA compliance.

4.2.6. Potential Agency Partners

A variety of collaborations to achieve GSP(s) development goals may be possible. The GSAs should consider the potential for collaboration with non-GSA members and inter-basin (adjacent subbasin) partners, as part of plan deliberations.

4.2.7. GSP Coordinators Planning Forum

A planning forum for subbasin GSP coordinators should be established to further inform a coordination strategy. This forum would include agency representatives as well as the consultant teams and be used for the sole purpose of coordination and mutual support. It is anticipated that this body might meet on a quarterly or as needed basis. This forum would also provide a central point of contact for adjacent subbasin coordinators.

4.2.8. Environmental Community

As noted in the SA, this community will be interested in a GSP features. The focus of messaging for this group being on how the GSP(s) development will contribute to a sustainable regional water portfolio. Special effort should be made to identify specific topics of interest. For example, as part of GSP development, a list of groundwater dependent species may be created, or impacts to wetlands may be identified. These types of lists would highlight where input from the environmental community might be needed.

4.2.9. Federal Government

Federal representatives interviewed for the assessment asked to be kept informed of subbasin SGMA activities. These agencies have a direct interest in surface water integration as well as SGMA activities that could impact wetlands restoration efforts or groundwater dependent ecosystems and species.

RISK MANAGEMENT

Risk management is the identification, assessment, and prioritization of risks (defined as *the effect of uncertainty on achieving objectives*) followed by coordinated, efficient and economical strategies and actions to minimize, monitor, and control the probability and/or impact of negative events. Strategies and actions may also be used to avert risk by leveraging strengths and opportunities.

Risks can come from uncertainty in economic factors, threats from project failures (at any phase), regulatory and legal uncertainties, natural causes and disasters (drought, flood, etc.), as well as dissention from adversaries, or events of uncertain or unpredictable circumstances. Several risk management standards have been developed. This analysis utilizes those from the Project Management Institute.

Table 6 outlines standardized risk categories and translates them to outreach risks.

Table 6. Risk Factors

RISK CATEGORY	Outreach RISK FACTORS
Technical, quality, or performance	• Realistic performance goals, scope and objectives
Project management	• Quality of outreach design • Outreach deployment and change management • Appropriate allocation of time and resources • Adequate support for Outreach in project management plans
Organizational / Internal	• Executive Sponsorship • Proper prioritization of efforts • Conflicts with other functions • Distribution of workload between organizational and consultant teams
Historical	• Past experiences with similar projects • Organizational relations with stakeholders • Policy and data adequacy • Media and stakeholder fatigue*
External	• Legal and regulatory environment • Changing priorities • Risks related to political dynamics

5.1. Technical, quality, or performance

The subbasin is fortunate to have a high level of water knowledge and skilled personnel available to assist with GSP planning. In general, stakeholder expectations for outreach and performance goals, scope and objectives are attainable. The larger concern in this category is properly communicating the scope of the GSP(s) development and the need for extensive coordination and outreach among a number of parties. Communication of SGMA requirements for outreach as a planning requirement should be an ongoing consideration and appears to be underestimated in emphasis.

5.2. Project management

A number of positive project management factors are present for the GSP(s) development outreach. Project managers view outreach as an important planning element. The outreach design is based on best management practices and industry standards. It is not overly complicated and with technical services support from DWR and other sources, sufficient resources should be available to properly execute it. Procedures and practices are already in place that can be leveraged to achieve communication goals.

The primary concern in this category relates to GSP coordination. This type of outreach will require additional assessment as the individual GSAs will determine their own protocols for representation.

5.3. Organizational / Internal

Conflicts with other GSA member functions and/or conflicts with outreach activities by efforts that include the same stakeholders (e.g. Irrigated Lands, IRWM, and CV-Salts) should be monitored.

One additional consideration will be the distribution of workload between GSA, organizational and consultant teams. Clear roles and responsibilities must be defined and continuous interaction in place to ensure successful execution.

The GSP(s) development process will also need identified, high level spokespersons or champions. These individuals should be able to discuss subbasin planning with the media, in discussions with regulators and potentially at professional conferences.

5.4. External

The legal and regulatory environment of the GSP(s) development process is complex and evolving. Ongoing issues with surface water deliveries and changing agricultural market conditions are outside of the control of the parties. It will be important for mechanisms to be in place that allow for relatively rapid responses to changing conditions.

5.5. Historical

The primary stakeholders in this process generally view interactions and meetings as productive. There is a history of cooperation and a willingness to work together to save costs and achieve better outcomes.

TACTICAL APPROACHES

Following are specific tactical approaches that may be utilized to deliver the activities, messages, and recommendations of the previous chapters. These approaches are based on best communication practices and grounded in the public participation philosophy of the International Association for Public Participation, Public Participation Spectrum as illustrated in **Table 7**.

The Spectrum represents a philosophy that outreach should match the desired level of input from both the stakeholder and the organizational entity.

Table 7. IAP2 Public Participation Spectrum

IAP2 Public Participation Spectrum

Developed by the International Association for Public Participation

INCREASING LEVEL OF PUBLIC IMPACT

INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
Public Participation Goal:	**Public Participation Goal:**	**Public Participation Goal:**	**Public Participation Goal:**	**Public Participation Goal:**
To provide the public with balanced and objective information to assist them in understanding the problems, alternatives and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public issues and concerns are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision-making in the hands of the public.
Promise to the Public:	**Promise to the Public:**	**Promise to the Public:**	**Promise to the Public:**	**Promise to the Public:**
We will keep You informed.	We will keep you informed, listen to and acknowledge concerns and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and issues are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for direct advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.
Example Tools:	**Example Tools:**	**Example Tools:**	**Example Tools:**	**Example Tools:**
• Fact sheets • Web Sites • Open houses	• Public comment • Focus groups • Surveys • Public meetings	• Workshops • Deliberate polling	• Citizen Advisory Committees • Consensus-building • Participatory decision-making	• Citizen juries • Ballots • Delegated decisions

Based on the assessment findings for the GSP(s) development, most stakeholders would simply like to be INFORMED unless there is a potential for significant changes that may include that stakeholder. Tactics for this group will include fact sheets, websites, open houses, briefings, and informational items placed in publications they already read.

The next largest group of stakeholders, primarily groundwater pumpers and disadvantaged communities, wish to be CONSULTED. This group will have access to all the materials prepared as part of the informational phase. In addition they should be invited to provide comments on written materials and planning concepts and participate in focused workshops and/or briefings. They should also be invited to attend larger public meetings.

The development of some GSP features may require a higher degree of INVOLVEMENT. This would focus on engagement of a subset of stakeholders that may experience significant impacts associated with SGMA.

COLLABORATION opportunities have also been identified; however, they are of a different character than defined in the Spectrum. Collaboration in this GSP(s) development process will focus on working with partners that have mutual goals to achieve those goals together. This will more resemble a partnership than a public engagement activity.

6.1. Communications Coordination.

Each GSA is required to perform legally mandated outreach activities and the GSP submission guidelines require a minimum level of engagement.

The subbasin GSAs should coordinate outreach activities even if there is a decision to move forward with multiple GSPs. In addition to efficiency and cost savings (the GSAs can share resources) this strategy will allow for consistency in messaging and reduce confusion for stakeholders that may not know what GSA jurisdiction they are in, and/or are in multiple GSA jurisdictions. Following are suggested options for communications coordination.

1. Website
2. Meeting calendar
3. Branded informational Flyers, Templates, PowerPoint Presentations, etc.
4. Periodic newsletter
5. GSP related mailing lists
6. Descriptions of interested parties
7. Issues and interest statements for legally mandatory interested parties
8. Public workshops
9. Message calendar
10. Press releases and guest editorials
11. Speakers Bureau
12. Existing group venues
13. Outreach documentation

6.2. Tactics

6.2.1. Website

As part of the communications plan development, a list of website concepts and draft website content was prepared. The following describes the proposed approach:

a. Centralized – Establish a centralized website for the entire subbasin.
b. Individual GSAs – Posting of material to a website is part of the SGMA requirements. Those GSAs with their own webpages can link to and from the centralized site if they wish to provide their own customized information. For those GSAs without their own website, courtesy pages would be provided as an added feature of the main site. The courtesy pages would all use a single template with the same information to facilitate easy management and updates. Individual GSAs choosing to take advantage of the courtesy pages would be responsible for ensuring that information is current. The page should include a "Last Updated" box to indicate the timeliness of the information.
c. **Basic features** – A basic website framework has already been developed along with introductory information that has prepopulated each page. **Figure 10** illustrates the basic content of the site and includes:
    1. Background information
    2. Information about getting involved, including meeting information
    3. A separate link for Spanish Language materials
    4. Frequently asked questions
    5. Links to GSAs
    6. Contact information

Should a GSA decide to not participate in the Central website, a similar structure could be utilized.

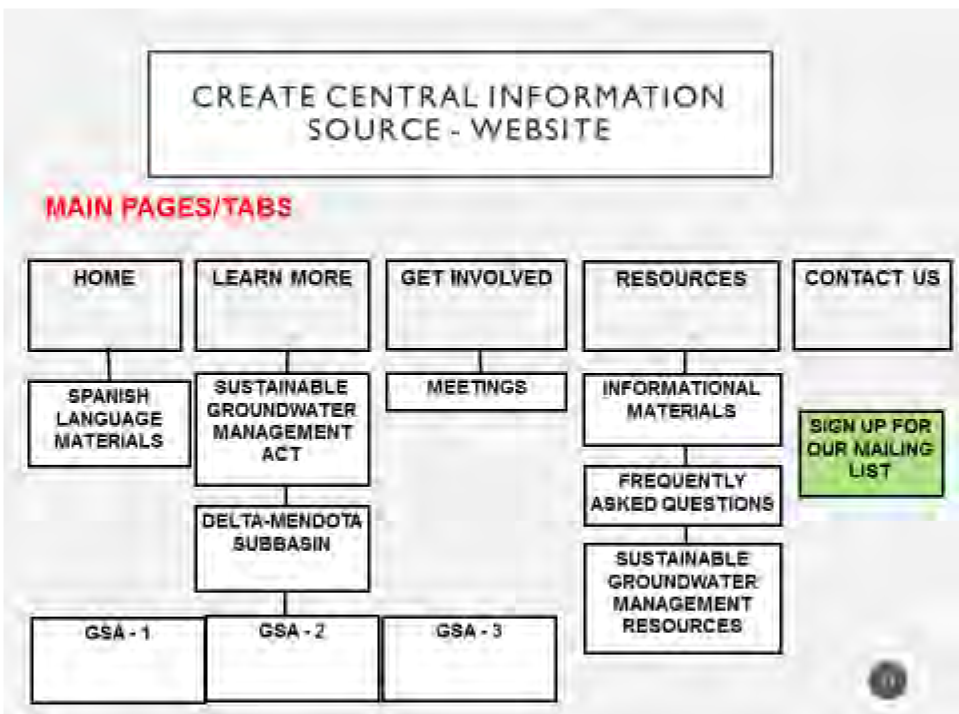


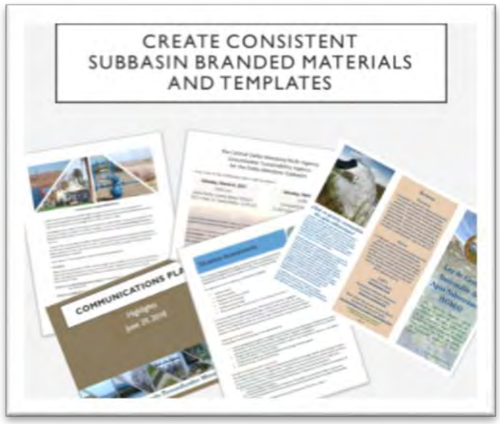
Figure 10. Website Structure

6.2.2. Meeting Calendar

A shared meeting calendar will provide a one-stop shop for stakeholders and assist in preventing meeting conflicts while creating more potential for shared activities. This calendar should include current and scheduled meetings and workshops as well as serve as the repository for agendas and meeting notes, along with copies of meeting materials and presentation.

An integrated project calendar should also be developed that links planning project milestones with communications milestones.

6.2.3. Branded Informational Flyers, Templates, PowerPoint Presentations, etc.



Subbasin level materials should have a single look and feel to create on-going consistency and visual recognition by stakeholders. Use of templates, shared presentations and flyers will create efficiencies and reinforce messaging. This communications plan incorporates some of this type of branding.

6.2.4. Periodic Newsletter

The need for regular communications cannot be overstated. One option is production of a periodic newsletter. Given the relatively short GSP(s) development process timeframe and the GSP development requirements for periodic outreach to identified stakeholders, a quarterly schedule would be realistic and achieve compliance with SGMA requirements for periodic updates to stakeholders. The newsletter should be designed so that individual GSAs can add tailored information if they choose to. For Portable Document Format (PDF) versions of the newsletter, a GSA could add a simple one or two page insert and the edition could be used as a handout or mailer. For a professional looking, email version of the newsletter, we recommend free or low cost services such as Mail Chimp or Constant Comment, which can be integrated with mailing lists.

Adding GSA specific information to an email newsletter can be done with web-links in the email to the very same PDF page prepared for the hardcopy mailer. An alternative is emailing the entire newsletter PDF as an attachment (although this format is less likely to be read than the mailer services).

6.2.5. GSP related mailing lists

Each GSA is required to develop notification lists. A central list may be utilized for GSP(s) related notifications.

6.2.6. Descriptions of Interested Parties

Each GSA is required to develop descriptions of interested parties. These lists should be updated and merged for use in the GSP(s) submittal(s). These can also be provided as background information on the website as part of constructing an administrative record. The SA in Chapter 4 provides an initial start for this documentation.

6.2.7. Issues and Interest Statements for Legally Mandatory Interested Parties

A GSP submission must include a statement of interests for listed stakeholders. As suggested earlier, this can also be included on the website.

6.2.8. Coordinated Public Workshops

SGMA requires a series of public hearings and some public workshops. Such workshops should be coordinated with other subbasin entities.

During the GSA formation process the County of Merced and a forming GSA body conducted a joint workshop to explain more about SGMA and the proposed GSA formation. Distribution of meeting flyers and notices was done concurrently, and DWR attended the event to answer questions. The GSP development process will offer similar opportunities, not only within the subbasin, but with adjacent subbasins.

6.2.9. Message Calendar

Basic messages should be associated with the planning schedule and each stage of GSP(s) development and serve as the theme for the communications materials being generated. For example, during the GSA formation period there was a need to communicate the basics of SGMA and groundwater management. During the GSP(s) initiation phase messages should focus on the basics of groundwater sustainability and the current state of the subbasin. As the GSP(s) begins to take form the specifics of the GSP(s) and what it means for each stakeholder would be the focus.

6.2.10. Press Releases and Guest Editorials

At some point in the GSP development and implementation process, it is likely that stakeholders will be asked to make changes and/or financially support a sustainability effort. It will be more productive for the GSAs and their GSP collaboration partners to frame discussions about these changes than to have others, perhaps with less knowledge, do so on their behalf. For that reason there is a need for press releases and/or guest editorials to offer the media and stakeholders accurate information offered in the context of SGMA. This type of outreach should be closely coordinated as consistency in messages is critical to stakeholder acceptance.

6.2.11. Speakers Bureau

Efforts should be made to conduct outreach at events and meetings that already occur (e.g. Farm Bureau meetings, Rotary Club, etc.). A list of knowledgeable presenters should be developed in the event an organization or other entity would like a presentation. Speakers Bureau engagements should be recorded on the planning project meeting calendar.

6.2.12. Existing Group Venues

Fully leverage the activities of existing groups.

- Maintain a roster of existing groups and typical meeting schedules with a nexus to GSP(s) development. Add the dates to the messaging calendar.
- The list of audiences, messages and existing groups should be referenced when there is a need to deploy information.
- Conduct informal outreach with the leaders of such groups to determine the best way to interact.
- Determine what communications channels these groups are using and equally leverage these, for example by placement of articles in newsletters.

6.2.13. Outreach Documentation

A central point of contact should be identified on the website and an outreach statistics inventory should be established that identifies dates, times, audiences and attendance. This information will be also be useful in conducting follow up with stakeholders as well as documenting outreach as part of GSP submittal guidelines.

6.3. Procedural and Legally Mandated Outreach

A discussion of SGMA outreach requirements was provided in Chapter 1 and a full list of requirements is contained in Appendix 1. One major feature of the requirements is a submission to DWR of the opportunities that interested parties will be given to participate in the GSP deliberations. The Situation Assessment provides an initial description that can be added to with additional outreach.

Following are the Required Interested Parties for the purpose of mandated outreach:

Table 9 provides a list of the mandated outreach and the timeframe in which is required.

Table 8. Mandated Outreach

Timeframe	Item
Prior to initiating plan development	1. Statement of how interested parties may contact the Agency and participate in development and implementation of the plan submitted to DWR.

Timeframe	Item
	2. Web posting of same information.
Prior to plan development	1. Must establish and maintain an interested persons list. 2. Must prepare a written statement describing the manner in which interested parties may participate in GSP development and implementation. Statement must be provided to: a. Legislative body of any city and/or county within the geographic area of the plan b. Public Utilities Commission if the geographic area includes a regulated public water system regulated by that Commission c. DWR d. Interested parties (see Section 10927) e. The public
Prior to and with GSP submission	1. Statements of issues and interests of beneficial users of basin groundwater, including types of parties representing the interests and consultation process 2. Lists of public meetings 3. Inventory of comments and summary of responses 4. Communication section in plan that includes: • Agency decision making process • ID of public engagement opportunities and response process • Description of process for inclusion • Method for public information related to progress in implementing the plan (status, projects, actions)
90 days prior to GSP Adoption Hearing	1. Prior to Public Hearing for adoption or amendment of the GSP, the GSP entities must notify cities and/or counties of geographic area 90 days in advance.
90 days or less prior to GSP Adoption Hearing	2. Prior to Public Hearing for adoption or amendment of the GSP, the GSP entities must: a. Consider and review comments b. Conduct consultation within 30 days of receipt with cities or counties so requesting
GSP Adoption or Amendment	1. GSP must be adopted or amended at Public Hearing.
60 days after plan submission	1. 60-day comment period for plans under submission to DWR. Comments will be used to evaluate the submission.
Prior to adoption of fees	1. Public meeting required prior to adoption of, or increase to fees. Oral or written presentations may be made as part of the meeting. 2. Public notice shall include: a. Time and place of meeting b. General explanation of matter to be considered

Timeframe	Item
	c. Statement of availability for data required to initiate or amend such fees d. Public posting on Agency Website and provision by mail to interested parties of supporting data (at least 20 days in advance) 3. Mailing lists for interested parties are valid for 1 year from date of request and may be renewed by written request of the parties on or before April 1 of each year. 4. Includes procedural requirements per Government Code, Section 6066.
Prior to conducting a fee adoption hearing.	1. Must publish notices in a newspaper of general circulation as prescribed. 2. Publication shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. 3. The period of notice begins the first day of publication and terminates at the end of the fourteenth day, (which includes the first day.)

6.4. Items for Future Consideration

This GSP(s) Coms Plan outlines an outreach effort based on project and stakeholder needs and preferences. This document has been prepared as a working draft living document and should be updated as new information and the GSP(s) development process needs are developed.

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MEASUREMENTS & EVALUATION

A guiding principle for evaluation and measurement of the Coms Plan's success is to provide regular, unbiased reporting of progress toward achieving goals. Success may be evaluated in several ways, including process measures, outcome measures, and an annual evaluation of accomplishments. Optional evaluation measures are described below.

As part of each outreach effort debrief the following process and outcome measures will be discussed and recorded in a check sheet. The check sheets will be prepared with the goal of continuous improvement rather than criticisms.

7.2. Process Measures

Process measures track progress toward meeting the goals of the Coms Plan. These include:

- Level of attendance at outreach meetings
- Shared understanding of the overarching aims, activities, and opportunities presented by different planning approaches and project activities
- Productive dialogue among participants at meetings and events
- Sense of authentic engagement; people understand why they have been asked to participate, and feel that they can contribute meaningfully
- Timely and accurate public reporting of planning milestones
- Feedback from Coordinating Body and GSA members, regulators, stakeholders, and interested parties about the quality and availability of information materials
- Level of stakeholder interest in the GSP(s) development process information

7.3. Outcome Measures

Outcome measures track the level of success of the Coms Plan in meeting its overall goals. Some outcome measures considered for the GSP(s) development process include the following:

- Consistent participation by key stakeholders and interested parties in essential activities. Participants should have no difficulty locating the meetings, and should be informed as to when and where they will be held.
- Response from meeting participants that the engagement methods provided for a fair and balanced exchange of information.
- Feedback from interested parties that they understand how their input is used, where to track data, and what results to expect.
- The project receives quality media coverage that is accurate, complete and fair.

7.4. Mid-cycle Evaluation of Accomplishments

A mid-cycle evaluation provides an opportunity to examine the current effectiveness of the Coms Plan and provides a chance to reevaluate strategies to meet the GSP(s) development process objectives. The evaluation tasks may include:

- Preparation of an executive-level summary detailing high-level initiatives and accomplishments of the previous cycle. This evaluation should also include positive news, best practices, goals and objectives, notable changes, timelines, and priorities.
- Identifying gaps and areas for improvement.
- Highlighting how gaps and areas for improvement in the cycle has been addressed.
- Outlining process and outcome measures and their current results.

ROLES AND RESPONSIBILITIES

The GSP(s) development Coms Plan outlines numerous strategies, activities and tactics. While none are highly complex, there is a requirement for coordination and clarity regarding who will be responsible for executing the tasks.

After the planning team evaluates the timelines and priorities for each of the communications activities a recommended next step is completion of a Responsible, Accountable, Consulted, and Informed (RACI) Chart. This Chart, as displayed in **Table 10**, outlines key tasks and the assignment of roles and responsibilities for accomplishing them.

Table 9. Sample RACI Chart

Activity TYPE	SPECIFIC PRODUCT	RESPONSIBLE	ACCOUNTABLE	CONSULTED	INFORMED
Internal Staff Communications, information materials for/briefings	Draft	Person A	Person E	Person I	
	Final Draft	Person A	Person E	Person I	Project Team
List Serves, mailing lists	Customer Contacts	Person B - Person A	Person E	Person I	Project Team
	Concurrent jurisdictions	Lisa Beutler/MWH	Person G	Person I	Project Team
	Other - identified stakeholders	Person A	Person G	Person I	Project Team
Web Content and Maintenance	Draft Content and Content Refresh	Lisa Beutler/MWH/	Person G	Person H	Project Team
	Site Administration	Person A	Person G	Person H	
General public Intro Packets, Fact Sheets and Brochures	Draft	Person D	Person E	Person I- Subject Matter Experts	Person J
	Revised Draft	Person D	Person E	Person I- Subject Matter Experts	Person J
	Final Draft	Person D	Person E	Person I- Subject Matter Experts	Project Team
Newsletter Content	Draft	Lisa Beutler/MWH	Person E	Person I- Subject Matter Experts	Person J
	Revised Draft	Person D	Person E	Person I- Subject Matter Experts	Person J
	Final Draft	Person D	Person E	Person I- Subject Matter Experts	Project Team

Responsible
Those who do the work to achieve the task. There is at least one person with a role of *responsible*, although others can be delegated to assist in the work required.

Accountable (also approver or final approving authority)
This is the person ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those responsible. <u>There **may only** be only one *accountable*</u> specified for each task or deliverable.

Consulted
Those whose opinions are sought, typically subject matter experts were people that are impacted by the activity; and with whom there is two-way communication.

Informed
Those who are kept up-to-date on progress, typically on the launch and completion of the task or deliverable. This is one way communication.

Role distinction
There is a distinction between a role and the individual assigned the task. Role is a descriptor of an associated set of tasks that could be performed by just one or many people.

In the case of the RACI Chart, the team may list as many people as is logical except for the Accountable role.

Scope of Work
Completion of the RACI Chart will also support development of any future scopes of work for consultant provided communication and outreach services.

LIST OF APPENDICES

Appendix 1. Public Outreach Requirements under SGMA

GSP Regulations

CODE	PUBLIC OUTREACH REQUIREMENT
§ 353.6. Initial Notification (a) Each Agency shall notify the Department, in writing, prior to initiating development of a Plan. The notification shall provide general information about the Agency's process for developing the Plan, including the manner in which interested parties may contact the Agency and participate in the development and implementation of the Plan. The Agency shall make the information publicly available by posting relevant information on the Agency's website.	1. Statement of how interested parties may contact the Agency and participate in development and implementation of the plan submitted to DWR. 2. Web posting of same information. **Timing**: *Prior to initiating development of a plan.*
§ 353.8. Comments (a) Any person may provide comments to the Department regarding a proposed or adopted Plan. (b) Pursuant to Water Code Section 10733.4, the Department shall establish a comment period of no less than 60 days for an adopted Plan that has been accepted by the Department for evaluation pursuant to Section 355.2. (c) In addition to the comment period required by Water Code Section 10733.4, the Department shall accept comments on an Agency's decision to develop a Plan as described in Section 353.6, including comments on elements of a proposed Plan under consideration by the Agency.	1. 60-day comment period for plans under submission to DWR. Comments will be used to evaluate the submission. 2. Parties may also comment on a GSA's (or GSAs') statements submitted under section 353.6 **Timing**: For GSP Submittal - *60 days after submission to DWR*
§ 354.10. Notice and Communication Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following: (a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties. (b) A list of public meetings at which the Plan was discussed or considered by the Agency. (c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency. (d) A communication section of the Plan that includes the following: (1) An explanation of the Agency's decision-making process. (2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.	5. Statements of issues and interests of beneficial users of basin groundwater, including types of parties representing the interests and consultation process 6. Lists of public meetings 7. Inventory of comments and summary of responses 8. Communication section in plan that includes: • Agency decision making process • ID of public engagement opportunities and response process • Description of process for inclusion • Method for public information related to progress in implementing the plan (status, projects, actions) **Timing**: For GSP Submittal – *with plan* For GSP Development – *continuous. [Note: activities should be included*

CODE	PUBLIC OUTREACH REQUIREMENT
(3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin. (4) The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.	*in the project schedule and information posted on web.]*
§ 355.2. (c) Department Review of Adopted Plan (c) The Department (DWR) shall establish a period of no less than 60 days to receive public comments on the adopted Plan, as described in Section 353.8.	1. 60 day public review period for public comment on submitted plan. **Timing**: After GSP Submittal to DWR – *60 days*
§ 355.4. & 355.10 Criteria for Plan Evaluation The basin shall be sustainably managed within 20 years of the applicable statutory deadline consistent with the objectives of the Act. The Department shall evaluate an adopted Plan for compliance with this requirement as follows: (b) (4) Whether the interests of the beneficial uses and users of groundwater in the basin, and the land uses and property interests potentially affected by the use of groundwater in the basin, have been considered. … (10) Whether the Agency has adequately responded to comments that raise credible technical or policy issues with the Plan.	1. Required public outreach and stakeholder information is submitted, including statement of issues and interests of beneficial users. 2. Public and stakeholder comments and questions adequately addressed during planning process. **Timing**: For GSP Submittal – *with plan* For resubmittal related to corrective action *– with submittal*

California Water Code

CODE	PUBLIC OUTREACH REQUIREMENT
10720. This part shall be known, and may be cited, as the "Sustainable Groundwater Management Act." **10720.3** (a) This part applies to all groundwater basins in the state. … (c) The federal government or any federally recognized Indian tribe, appreciating the shared interest in assuring the sustainability of groundwater resources, may voluntarily agree to participate in the preparation or administration of a groundwater sustainability plan or groundwater management plan under this part through a joint powers authority or other agreement with local agencies in the basin. A participating tribe shall be eligible to participate fully in planning, financing, and management under this part, including eligibility for grants and technical assistance, if any exercise of regulatory authority, enforcement, or imposition and collection of fees is pursuant to	1. Tribes and the federal government may voluntarily participate in GSA governance and GSP development. **Timing**: *Prior to initiating development of a plan.*

CODE	PUBLIC OUTREACH REQUIREMENT
the tribe's independent authority and not pursuant to authority granted to a groundwater sustainability agency under this part.	
CHAPTER 4. Establishing Groundwater Sustainability Agencies [10723 - 10724]	
10723. a) Except as provided in subdivision (c), any local agency or combination of local agencies overlying a groundwater basin may decide to become a groundwater sustainability agency for that basin. (b) Before deciding to become a groundwater sustainability agency, and after publication of notice pursuant to Section 6066 of the Government Code, the local agency or agencies shall hold a public hearing in the county or counties overlying the basin.	1. Must hold public hearing in the county or counties overlying the basin, prior to becoming a GSA **Timing**: *Prior to becoming a GSA.*
10723.2 The groundwater sustainability agency shall consider the interests of all beneficial uses and users of groundwater, as well as those responsible for implementing groundwater sustainability plans. These interests include, but are not limited to, all of the following: (a) Holders of overlying groundwater rights, including: (1) Agricultural users. (2) Domestic well owners. (b) Municipal well operators. (c) Public water systems. (d) Local land use planning agencies. (e) Environmental users of groundwater. (f) Surface water users, if there is a hydrologic connection between surface and groundwater bodies. (g) The federal government, including, but not limited to, the military and managers of federal lands. (h) California Native American tribes. (i) Disadvantaged communities, including, but not limited to, those served by private domestic wells or small community water systems. (j) Entities listed in Section 10927 that are monitoring and reporting groundwater elevations in all or a part of a groundwater basin managed by the groundwater sustainability agency.	1. Must consider interest of all beneficial uses and users of groundwater. 2. Includes specific stakeholders as listed. **Timing**: *During development of a GSP.*
10723.4. The groundwater sustainability agency shall establish and maintain a list of persons interested in receiving notices regarding plan preparation, meeting announcements, and availability of draft plans, maps, and other relevant documents. Any person may request, in writing, to be placed on the list of interested persons.	3. Must establish and maintain an interested persons list. 4. Any person may ask to be added to the list **Timing**: *On forming a GSA.*
10723.8. (a) Within 30 days of deciding to become or form a groundwater sustainability agency, the local agency or combination of local agencies shall inform the department of its decision and its intent to undertake sustainable groundwater management. The	1. Creates notification requirements that include: a. A list of interested parties b. An explanation of how interests will be considered

CODE	PUBLIC OUTREACH REQUIREMENT
notification shall include the following information, as applicable: … (4) A list of interested parties developed pursuant to Section 10723.2 and an explanation of how their interests will be considered in the development and operation of the groundwater sustainability agency and the development and implementation of the agency's sustainability plan.	**Timing**: *On forming a GSA & with submittal of GSP*
10727.8 (a) Prior to initiating the development of a groundwater sustainability plan, the groundwater sustainability agency shall make available to the public and the department a written statement describing the manner in which interested parties may participate in the development and implementation of the groundwater sustainability plan. The groundwater sustainability agency shall provide the written statement to the legislative body of any city, county, or city and county located within the geographic area to be covered by the plan. The groundwater sustainability agency may appoint and consult with an advisory committee consisting of interested parties for the purposes of developing and implementing a groundwater sustainability plan. The groundwater sustainability agency shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the groundwater basin prior to and during the development and implementation of the groundwater sustainability plan. If the geographic area to be covered by the plan includes a public water system regulated by the Public Utilities Commission, the groundwater sustainability agency shall provide the written statement to the commission. (b) For purposes of this section, interested parties include entities listed in Section 10927 that are monitoring and reporting groundwater elevations in all or a part of a groundwater basin managed by the groundwater sustainability agency.	2. Agencies preparing a GSP must prepare a written statement describing the manner in which interested parties may participate in its development and implementation. 3. Statement must be provided to: a. Legislative body of any city and/or county within the geographic area of the plan b. Public Utilities Commission if the geographic area includes a regulated public water system regulated by that Commission c. DWR d. Interested parties (see Section 10927) e. The public 4. GSP entities may form an advisory committee for the GSP preparation and implementation. 5. The GSP entities are to encourage active involvement of diverse social, cultural and economic elements of the affected populations. **Timing**: *On initiating GSP*
10728.4 Public Notice of Proposed Adoption, GSP Adoption Pubic Hearing A groundwater sustainability agency may adopt or amend a groundwater sustainability plan after a public hearing, held at least 90 days after providing notice to a city or county within the area of the proposed plan or amendment. The groundwater sustainability agency shall review and consider comments from any city or county that receives notice pursuant to this section and shall consult with a city or county that requests consultation within 30 days of receipt of the notice. Nothing in this section is intended to	3. GSP must be adopted or amended at Public Hearing. 4. Prior to Public Hearing for adoption or amendment of the GSP, the GSP entities must: a. Notify cities and/or counties of geographic area 90 days in advance. b. Consider and review comments

CODE	PUBLIC OUTREACH REQUIREMENT
preclude an agency and a city or county from otherwise consulting or commenting regarding the adoption or amendment of a plan.	c. Conduct consultation within 30 days of receipt with cities or counties so requesting
10730 Fees. (a) A groundwater sustainability agency may impose fees, including, but not limited to, permit fees and fees on groundwater extraction or other regulated activity, to fund the costs of a groundwater sustainability program, including, but not limited to, preparation, adoption, and amendment of a groundwater sustainability plan, and investigations, inspections, compliance assistance, enforcement, and program administration, including a prudent reserve. A groundwater sustainability agency shall not impose a fee pursuant to this subdivision on a de minimis extractor unless the agency has regulated the users pursuant to this part. (b) (1) Prior to imposing or increasing a fee, a groundwater sustainability agency shall hold at least one public meeting, at which oral or written presentations may be made as part of the meeting. (2) Notice of the time and place of the meeting shall include a general explanation of the matter to be considered and a statement that the data required by this section is available. The notice shall be provided by publication pursuant to Section 6066 of the Government Code, by posting notice on the Internet Web site of the groundwater sustainability agency, and by mail to any interested party who files a written request with the agency for mailed notice of the meeting on new or increased fees. A written request for mailed notices shall be valid for one year from the date that the request is made and may be renewed by making a written request on or before April 1 of each year. (3) At least 20 days prior to the meeting, the groundwater sustainability agency shall make available to the public data upon which the proposed fee is based. (c) Any action by a groundwater sustainability agency to impose or increase a fee shall be taken only by ordinance or resolution. (d) (1) As an alternative method for the collection of fees imposed pursuant to this section, a groundwater sustainability agency may adopt a resolution requesting collection of the fees in the same manner as ordinary municipal ad valorem taxes. (2) A resolution described in paragraph (1) shall be adopted and furnished to the county auditor-controller and board of supervisors on or before August 1 of each year that the alternative collection of the fees is being requested. The resolution shall include a list of parcels and the amount to be collected for each parcel. (e) The power granted by this section is in addition to any powers a groundwater sustainability agency has under any other law.	Related to GSAs 5. Public meeting required prior to adoption of, or increase to fees. Oral or written presentations may be made as part of the meeting. 6. Public notice shall include: a. Time and place of meeting b. General explanation of matter to be considered c. Statement of availability for data required to initiate or amend such fees d. Public posting on Agency Website and provision by mail to interested parties of supporting data (at least 20 days in advance) 7. Mailing lists for interested parties are valid for 1 year from date of request and may be renewed by written request of the parties on or before April 1 of each year. 8. Includes procedural requirements per Government Code, Section 6066. **Timing**: *Prior to adopting fees.*

California Government Code

CODE	PUBLIC OUTREACH REQUIREMENT
6060 Whenever any law provides that publication of notice shall be made pursuant to a designated section of this article, such notice shall be published in a newspaper of general circulation for the period prescribed, the number of times, and in the manner provided in that section. As used in this article, “notice” includes official advertising, resolutions, orders, or other matter of any nature whatsoever that are required by law to be published in a newspaper of general circulation. **6066** Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including therein the first day.	4. Must publish notices in a newspaper of general circulation as prescribed. 5. Publication shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. 6. The period of notice begins the first day of publication and terminates at the end of the fourteenth day, (which includes the first day.) **Timing**: *Prior to adopting fees*

Appendix 2. Communications Governance

Given the relatively large number of stakeholders, a recommendation for coordinated efforts, and the legal requirements for outreach[13] some form of communications governance is recommended.

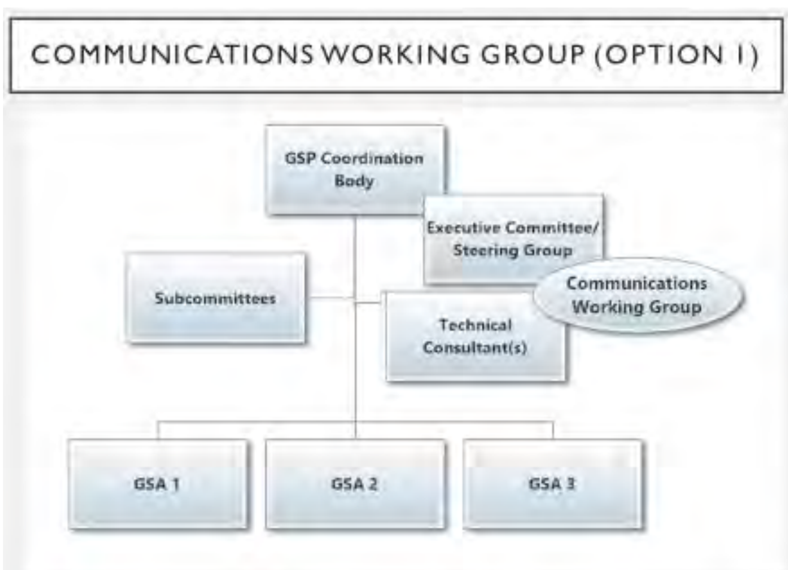
Execution of communications activities can be accomplished by an individual or multiple individuals, and/or include or be solely managed by project consultants. The actual form of the governance is less important than a clear understanding of the roles and responsibilities of those responsible for ensuring required communication. Also essential is a clear chain of command that ensures the elected representatives of GSAs are able to retain communications leadership and guidance.

A driving consideration for establishing a communications governance structure is the level of effort associated with required activities and the fact that communications are highly time dependent. That means that communications activities should be occurring that may happen outside of regularly scheduled GSA meetings. In this case delegation with guidance to a communications team is efficient and effective.

Several governance options for consideration are offered below.

Communications Option 1

Communications Option 1 is based on an overall GSP(s) development structure that includes a GSA member based leadership function that is guiding the Technical Consultants. A communications working group which might include staff, consultants and GSA elected officials, or some combination of those roles could be formed to serve as a communications working group that would ultimately report to the larger GSP coordinating body.



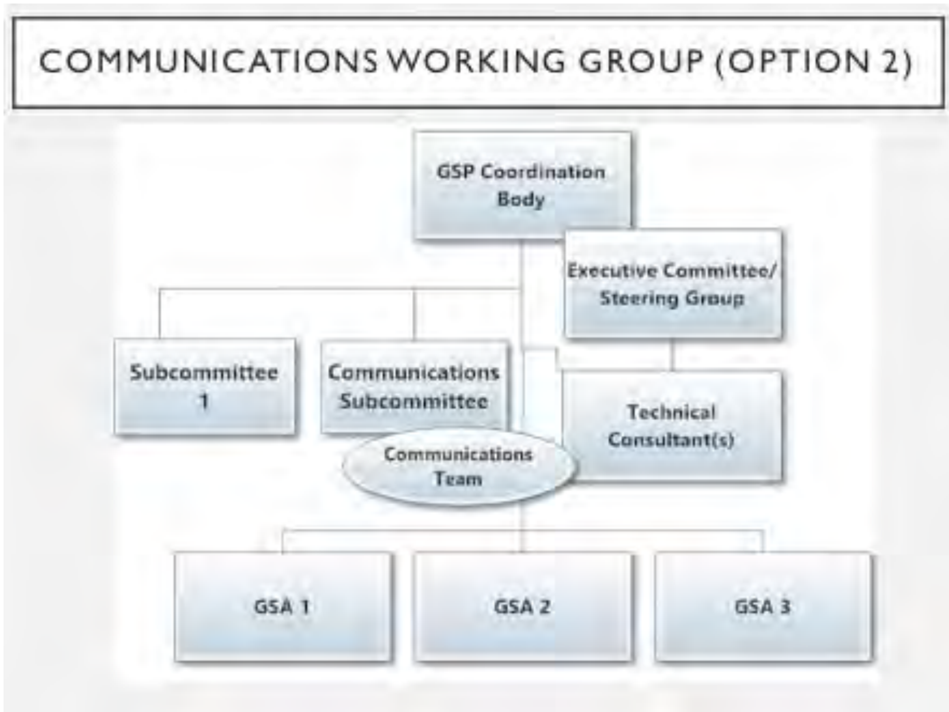
Communications Governance Option 1

Communications Option 2

[13] See Appendix 1

Appendix 1

Communications Option 1 is based on an overall GSP(s) development structure that includes a GSA member based subcommittee guiding the Technical Consultants. A communications working group which might include staff, consultants and GSA elected officials, or some combination of those roles could be formed to serve as a communications team that is affiliated with a subcommittee and would ultimately report to the larger GSP coordinating body



Communications Governance Option 2

ATTACHMENT B. COORDINATED PUBLIC WORKSHOP SUMMARIES

DELTA-MENDOTA SUBBASIN
SUSTAINABLE GROUNDATER MANAGEMENT ACT
SPRING 2018 COORDINATED WORKSHOPS

Monday, May 14, 2018, Los Banos
Wednesday, May 16, 2018, Patterson
Thursday, May 17, 2018, Mendota

WORKSHOP SUMMARY

- Three workshops were held in the northern, central, and southern parts of the Delta-Mendota Subbasin. The purpose of the workshops was to educate stakeholders and members about the public about the Sustainable Groundwater Management Act (SGMA) and introduce participants to their local Groundwater Sustainability Agency representatives. Topics covered during the workshop included what is SGMA, the Delta-Mendota Subbasin, and opportunities for public engagement.
- Workshop participants' questions and feedback are summarized as follows:
  - Are the local groundwater regulations going to be re-set on an annual basis based on the water year, snowpack, etc.?
  - Who is the governing board that will make these decisions?
  - If this is a state-wide initiative, who is the decision-making body?
  - Will the California Department of Fish and Wildlife be involved?
  - Has the State provided criteria to what is considered a "chronic loss" of groundwater?
  - Are natural springs included under SGMA?
  - What criteria will you use to measure whether or not springs are overused?
  - What is the ultimate goal of SGMA? What does it mean to us?
  - How is the water budget going to be developed?
  - The Irrigated Lands Program already has a lot of requirements for growers. Is this going to be the same level of detail and effort?
  - What is the goal SGMA is trying to achieve? How are we going to get to sustainability?
  - What will happen when the State and districts do not receive their full surface water allocation and cities keep expanding?
  - It seems to me that the biggest problem is that the State wants to export water to Southern California. How can we come up with a solution if there are factors out of our control?

- How will you know how much I am pumping?

DELTA-MENDOTA SUBBASIN
SUSTAINABLE GROUNDATER MANAGEMENT ACT
FALL 2018 COORDINATED WORKSHOPS

Monday, October 22, Firebaugh
5:00 – 7:00 PM
Firebaugh Middle School MPR

Wednesday, October 24, Los Banos
4:00 – 6:00 PM
College Greens Building

Thursday, October 25, Patterson
4:00 – 6:00 PM
Patterson Senior Center

WORKSHOP SUMMARY

- Three workshops were held in the northern, central, and southern parts of the Delta-Mendota Subbasin. The purpose of the workshops was to educate stakeholders and members about the public about key Sustainable Groundwater Management Act (SGMA) topics in preparation for Groundwater Sustainability Plan (GSP) development workshops in 2019.
- The format and content of each workshop was the same. The workshops began with a 45-minute presentation, followed by an open house period for participants to talk with their Groundwater Sustainability Agency (GSA) representative. Spanish interpretation was provided at each workshop.
- In total, approximately 45 individuals (not including GSA representatives and supporting staff) participated in the workshops. Attendance by location was as follows: Firebaugh – 5 participants; Los Banos – 23 participants; Patterson – 17 participants. Three participants requested Spanish interpretation.
- Most participants heard about the workshops through emails from their local water or irrigation district, or direct flyers and bill inserts sent to them by their water/irrigation district or municipality.
- Presentation topics included: Overview of SGMA, GSP development and implementation process, data management, hydrogeologic conceptual model, numerical and analytical models, and the water budget.
- Workshop participants' questions and feedback are summarized as follows:

  Data

    - How much historical data are the GSAs using to make their assumptions?
    - Will data from counties be used?

- Is the numerical data available on the Delta-Mendota website?
- How big will the GSAs' monitoring network be? Do the GSAs anticipate drilling new monitoring wells?
- How will the GSAs monitor water quality and subsidence? Do the GSAs already have subsidence monitoring wells and data?
- How much data have the GSAs gathered? When will the GSAs stop gathering data?
- How much data will the GSAs be collecting from individual landowners?

Models

- Will the models take into account availability of surface water supplies?
- Will the models take into account changing crops?
- Will the models take into account agricultural areas that are being converted to commercial or urban areas?

Water Budget and Sustainable Yield

- What is the sustainable yield for the Delta-Mendota Subbasin?
- It sounds like the sustainable yield will be a number that oscillates around a baseline. What is this baseline?
- How will the GSAs determine the minimum threshold for the subbasin?
- How will the water budgets account for existing and new wells?
- What are the years for the historic water budget? How was this period set?

Projects and Management Actions

- Based on what is currently known, will the GSAs be able to limit groundwater pumping in the future?
- When the GSAs come up with groundwater management policies, will the policies impact groundwater pumping on an individual level, regional level, or basin-wide level?
- Will the California Department of Water Resources (DWR) or the GSAs be the ones to limit pumping?
- Could a potential management action be limiting pumping?
- Will the GSAs be the agencies to determine if new wells can or cannot be drilled?

Integration with Other Programs/Organizations

- How much are the GSAs integrating with the Irrigated Lands Program?
- How closely do GSAs work with local farm bureaus?

Other

- Will there be an administrative fee for the GSAs to oversee GSP implementation?
- How will the costs for GSP development and implementation be covered?
- Do the GSAs know what DWR's GSP review and certification process will consist of?

- Will the GSAs in the region have influence over how surface water resources are managed on a state-wide level?
- How many GSAs were formed after SGMA passed in 2014?

DELTA-MENDOTA SUBBASIN
SUSTAINABLE GROUNDATER MANAGEMENT ACT
WINTER 2019 COORDINATED WORKSHOPS

Tuesday, February 19, 2019, Los Banos
4:00 – 6:00 PM
College Greens Building

Wednesday, February 20, 2019, Patterson
4:00 – 6:00 pm
City of Patterson City Hall

Monday, March 4, 2019, Santa Nella
6:00 – 8:00 PM
Romero Elementary School

WORKSHOP SUMMARY

- Three workshops were held in the northern, central, and southern parts of the Delta-Mendota Subbasin during February and March 2019. The purpose of the workshops was to educate stakeholders and members about the public about topics covered in the draft Groundwater Sustainability Plans (GSP) being developed for the subbasin. Topics covered during the workshop included historic and current water budgets, sustainability criteria, undesirable results, and projects and management actions.
- Workshops were promoted via emails sent to each GSA's interested parties database, flyers and utility bill inserts, and social media posts.
- The format and content of each workshop was the same. The workshops began with a short presentation, followed by an open house period for participants to talk with their Groundwater Sustainability Agency (GSA) representative. Spanish interpretation was provided at each workshop.
- In total, approximately 30 individuals (not including GSA representatives and supporting staff) participated in the workshops. Attendance by location was as follows: Patterson – 14, Los Banos – 4, and Santa Nella – 12. Participants represented a range of beneficial users in the subbasin, including domestic well owners, agricultural water users, public water systems, and disadvantaged communities.

- Workshop participants' questions and feedback are summarized as follows:

  Water Budgets

    - Does the land surface budget include inflows from precipitation and applied water to crops?
    - Who provides the information about the inflows and outflows of the aquifer?
    - How is the aquifer recharged?
    - Do reservoirs lose water?
    - What happened between 1985 – now [regarding the historic water budget]?
    - What affect does precipitation have on the aquifer?

  Projects and Management Actions

    - Who will make the decision on who can drill wells and how much can well owners can pump?
    - Will GSAs in the subbasin be able to restrict selling of groundwater outside of the subbasin?
    - Projects and management actions should emphasize flood and stormwater capture and increased stormwater storage.
    - Will use of recycled water in new developments be considered a source of water to balance the water budget?
    - Are there percolation ponds by golf course?

  Sustainability Criteria and Undesirable Results

    - Is it the GSAs' responsibility to set the sustainability criteria for the subbasin?
    - Could this region experience seawater intrusion?
    - What's going to happen in areas like Dos Palos that have poor groundwater quality?

  Other

  - Does the GSP only cover of agricultural uses of groundwater or does it also cover residential and commercial uses of groundwater?
  - Who is doing the work to prepare the GSP?
  - How much does it cost to prepare a GSP?
  - Are there any agencies currently monitoring groundwater pumping and levels?
  - How is groundwater currently being removed from the groundwater basin?
  - How many monitoring stations have been identified? Have GSAs already identified where these monitoring pumps are?
  - Does the California Aqueduct affect the water table in the subbasin?
  - What is the rationale for the North-Central GSP group's boundaries? The north and south areas of the North-Central GSP group are very different.
  - Do water agencies in the subbasin send water to the Santa Clara Valley Water District?
  - Where are the coordinated meetings are held? What time are these meetings?
  - Will this raise our water rates?
  - The community of Tranquillity is currently experiencing land subsidence.

DELTA-MENDOTA SUBBASIN
SUSTAINABLE GROUNDATER MANAGEMENT ACT
SPRING 2019 COORDINATED WORKSHOPS

Monday, May 20, 2019, Patterson
4:00 – 6:00 pm
City of Patterson City Hall

Tuesday, May 21, 2019, Los Banos
4:00 – 6:00 PM
College Greens Building

Wednesday, May 22, 2019, Santa Nella
6:30 – 8:30 PM
Romero Elementary School

Thursday, May 23, 2019, Mendota
6:00 – 8:00 PM
Mendota Library

WORKSHOP SUMMARY

- Four workshops were held in the northern, central, and southern parts of the Delta-Mendota Subbasin. The purpose of the workshops was to educate stakeholders and members about the public about topics covered in the draft Groundwater Sustainability Plans (GSP) being developed for the subbasin. Topics covered during the workshop included water budgets, sustainable yield, projects and management actions, and groundwater monitoring networks.
- Workshops were promoted via emails sent to each GSA's interested parties database, flyers and utility bill inserts, social media posts, and direct outreach to community stakeholders.
- The format and content of each workshop was the same. The workshops began with a short presentation, followed by an open house period for participants to talk with their Groundwater Sustainability Agency (GSA) representative. Spanish interpretation was provided at each workshop.
- In total, approximately 30 individuals participated in the workshops. Attendance by location was as follows: Patterson – 7, Los Banos – 10, Santa Nella – 4, and Mendota – 9. Participants represented a range of beneficial users in the subbasin, including domestic well owners, agricultural water users, public water systems, and disadvantaged communities.

- Workshop participants' questions and feedback are summarized as follows:

  Water Budgets

  - Why is there a difference between the water budgets for the upper and lower aquifers?
  - Why is the change in storage negative?
  - Is there a water budget for each aquifer?
  - When the projected water budgets are finalized, will they include specific projects and management actions?
  - How was the data for the climate change factors developed?
  - Historically, California goes through periodic droughts. Do the projected water budgets account for future droughts?
  - Do the projected water budgets account for future population growth and new developments?
  - Do the water budgets account for percolation from water applied to crops?

  Projects and Management Actions

  - Will management actions include a charge for water pumping?
  - Will pumping restrictions be implemented during dry periods or drought?
  - Will the GSPs identify specific projects and management actions?
  - Will GSAs in the subbasin form a water bank?
  - If pumping restrictions are enacted, GSPs should include a provision that allows private well owners to demonstrate that they aren't overpumping or causing undesirable results.
  - The region needs more surface water storage to supplement groundwater pumping.
  - There should be restrictions on development in the region.

  Sustainable Yield

  - Does increases in groundwater demand relate to the cost of surface water supplies?

  Groundwater Monitoring

  - When local agencies monitor for groundwater, how far down do they monitor?

  GSP Adoption, Implementation and Enforcement

  - What agency approves the GSPs?
  - Will the California Department of Water Resources be the lead agency for providing oversight after the GSP is submitted?
  - Could the State Water Resources Control Board mandate pumping restrictions?
  - Will the state be looking at the drawdown of individual, private wells?
  - Where does the funding to implement GSPs come from?
  - How much will GSP implementation cost?
  - Who has to submit the annual report?

  Other

  - GSAs should be divided into even smaller units to manage projects and management actions locally.

ATTACHMENT C. EXAMPLE PUBLIC WORKSHOP PROMOTION MATERIALS

Groundwater management in our community is changing.

Learn more about how this may impact you.

Collaborating local agencies are hosting a series of public workshops about the Sustainable Groundwater Management Act. Come learn how this landmark legislation may impact our community, what we are doing about it, and how you can get involved. Representatives from local groundwater sustainability agencies will be available to answer questions. You have three opportunities to attend:

Los Banos
Monday, May 14
4:00 - 6:00 PM
San Luis & Delta-Mendota
Water Authority Office
842 6th St, Los Banos

Patterson
Wednesday, May 16
4:00 - 6:00 PM
Hammon Senior Center
1033 W Las Palmas Ave, Patterson

Mendota
Thursday, May 17
4:00 - 6:00 PM
Mendota Branch Library
Mendota Meeting Room
1246 Belmont Ave, Mendota

The content of each workshop will be the same. The first thirty minutes of each workshop will consist of an informational presentation, followed by an open house until 6:00 PM. For more information, please visit our website at: www.deltamendota.org.

We look forward to seeing you there!

El manejo del agua subterránea en nuestra comunidad está cambiando.

Obtenga más información sobre como esto puede afectarlo.

Las agencias locales colaboradoras están organizando una serie de talleres públicos sobre la Ley de gestión sostenible del agua subterránea. Venga y aprenda como esta histórica legislación puede afectar a nuestra comunidad, que estamos haciendo al respecto y como puede participar. Los representantes de las agencias locales de sostenibilidad del agua subterránea estarán disponibles para responder preguntas. Tienes tres oportunidades para asistir:

Los Baños
Martes, 14 de Mayo
4:00 - 6:00 PM
San Luis & Delta-Mendota
Water Authority Office
842 6th St, Los Baños

Patterson
Miércoles, 16 de Mayo
4:00 - 6:00 PM
Hammon Senior Center
1033 W Las Palmas Ave, Patterson

Mendota
Jueves, 17 de Mayo
4:00 - 6:00 PM
Mendota Branch Library
Mendota Meeting Room
1246 Belmont Ave, Mendota

El contenido de cada taller será el mismo. Los primeros treinta minutos de cada taller serán consisten de una presentación informativa, seguida de una jornada de puertas abiertas hasta las 6:00 P.M. Para obtener más información, visite nuestro sitio web en: www.deltamendota.org.

Public Notice

Public Groundwater Meeting

Santa Nella County Water District and other local water agencies are developing plans for the future of our groundwater resources. We want to hear from you! Come to an upcoming public workshop to learn more:

Santa Nella
Monday, March 4, 6:000 - 8:00 PM
Romero Elementary School MPR
13500 Luis Ave, Gustine, CA 95322

The first forty minutes of the workshop will consist of a bilingual informational presentation. The presentation will be followed by an interactive discussion on the region's groundwater "budget" and how to define "sustainability" for our groundwater resources. This workshop is open to people with all level of knowledge about water.

Spanish-language interpreters and materials will be available.

For more information, please visit our website at www.deltamendota.org and www.sncwd.com.

For questions or comments, email DMSGMA@sldmwa.org or contact Amy Montgomery, Santa Nella County Water District, at amontgomery@sncwd.com.

We look forward to seeing you there!

Engage in the Future of Our Water Resources!

Week of May 20th

Delta-Mendota SGMA invite you to learn why your local agencies are developing groundwater sustainability plans for the future of our groundwater. Please come to one

- **Patterson**: Mon., May 20, 4:00 – 6:00pm Patterson City Hall 1 Plaza Circle
- **Los Banos**: Tue., May 21, 4:00 – 6:00pm College Greens Building 1815 Scripps Drive
- **Santa Nella**: Wed., May 22, 6:30 – 8:30pm Romero Elem. School 13500 Luis Ave.
- **Mendota**: Thu., May 23, 6:00 – 8:00pm Mendota Library 1246 Belmont Ave.

For more information please visit www.deltamendota.org, To register visit: tinyurl.com/y3bxw3yv

#DeltaMendotaSGMA | #SLDMWA | #SGMA2020

Su Opinión es Importante!

Participe en una serie de talleres sobre el futuro de sus recursos hídricos!

Semana del 20 de mayo

Agencias locales están desarrollando planes de sostenibilidad para el futuro de los recursos hídricos del agua subterránea en la región y necesitan su opinión.

Acompáñenos en uno de los siguientes talleres:

- Patterson: Lun.,20 de Mayo , 4–6pm Ayuntamiento de Patterson 1 Plaza Circle
-Los Banos: Mar., 21 de May, 4–6pm College Greens Building 1815 Scripps Dr.
-Santa Nella: Mie., 22 de Mayo, 6:30–8:30pm Escuela Pri. Romero 13500 Luis Ave.
-Mendota: Jue., 23 de Mayo, 6–8pm Biblioteca de Mendota 1246 Belmont Ave.

Para más información visite:
www.deltamendota.org
Tel: 916-418-8288
#DeltaMendotaSGMA | #SLDMWA

Contact: Kirsten Pringle, Delta-Mendota Subbasin, Stantec
(916) 418-8243, Kirsten.Pringle@stantec.com

FOR IMMEDIATE RELEASE
October 19, 2018

MEDIA ADVISORY

Sustainable Groundwater Management Act Public Workshops

What: Collaborating local agencies are hosting a series of public workshops about the Sustainable Groundwater Management Act. Learn how this landmark legislation may impact our communities, the planning process, and how people can get involved. Spanish translation will be provided.

Format: There are three workshop opportunities to attend; the content of each workshop will be the same. The first 45 minutes of each workshop will consist of an informational presentation, followed by an open house.

When:

Firebaugh – Monday, October 22, 2018
5:00 - 7:00 PM
Firebaugh Middle School MPR
1600 16th Street, Firebaugh, CA

Los Banos – Wednesday, October 24, 2018
4:00 – 6:00 PM
College Greens Building
1815 Scripps Drive, Los Banos, CA

Patterson – Thursday, October 25, 2018
4:00 – 6:00 PM
Hammon Senior Center
1033 W. Las Palmas Avenue, Patterson, CA

Who: Representatives from local groundwater sustainability agencies will be available to answer questions.

Additional Resources: The Sustainable Groundwater Management Act, www.deltamendota.org/,

Background: *The Sustainable Groundwater Management Act (SGMA) is a package of three bills (AB 1739, SB 1168, and SB 1319) that provides local agencies with a framework for managing groundwater basins in a sustainable manner. Recognizing that groundwater is most effectively managed at the local level, the SGMA empowers local agencies to achieve sustainability within 20 years.*

ATTACHMENT D. STAKEHOLDER AND COMMUNITY ORGANIZATIONS CONTACTED REGARDING COORDINATED PUBLIC WORKSHOPS

Stakeholder and Community Organizations Contacted Regarding Coordinated SGMA Workshops

Organization Name	Organization Type
Fresno County Farm Bureau	Agriculture
Merced County Farm Bureau	Agriculture
North Grassland Wildlife Foundation	Agriculture
Patterson Apricot Fiesta	Agriculture
Stanislaus County Farm Bureau	Agriculture
Asociación de Charros La Internacional del Valle de Patterson	Business
Adobe Valley Ranch	Business
Gustine Chamber of Commerce	Business
Los Banos Chamber of Commerce	Business
Patterson-Westley Chamber of Commerce	Business
Santa Nella Chamber of Commerce	Business
American Association of University Women	Civic
Gustine Rotary Club	Civic
International Association of Lions Clubs - Patterson	Civic
League of United Latin American Citizens	Civic
Los Banos Lions Club	Civic
Los Banos Rotary Club	Civic
Mendota Community Corporation	Civic
Newman Lions Club	Civic
Newman Rotary Club	Civic
Newman Women's Club	Civic
Patterson Lions Club	Civic
International Association of Lions Clubs - Mendota	Civic
International Association of the Lions Clubs - Los Banos	Civic
Italian Catholic Federation of CA Inc.	Civic
Kiwanis International	Civic
Rotary International - Los Banos	Civic
Rotary International - Patterson	Civic
Firebaugh Rotary Club Inc.	Community General Public
Casa Mobile Home Park	Community/General Public
Center for Environmental Science Accuracy & Reliability	Community/General Public
Firebaugh Senior Center	Community/General Public
Friends of Green Valley Charter	Community/General Public
Friends of the Public Library	Community/General Public
Habitat for Humanity International	Community/General Public
Los Banos Senior Center	Community/General Public
Mendota Community Center	Community/General Public
Mendota Senior Center	Community/General Public
Merced County Library - Dos Palos	Community/General Public
Merced County Library - Gustine	Community/General Public
Merced County Library - Los Banos	Community/General Public
Merced County Library - Santa Nella	Community/General Public
San Joaquin River Resource Mgmt. Coalition	Community/General Public

Santa Nella RV Park	Community/General Public
Stanislaus County Library - Newman	Community/General Public
Stanislaus County Library - Patterson	Community/General Public
Dos Palos Oro Loma Joint Unified School District	Education
Firebaugh-Las Deltas Unified School District	Education
Gustine Unified School District	Education
Los Banos Unified School District	Education
Mendota Unified School District	Education
Merced College	Education
Creekside Parent Club	Education
Academy West Insurance	Other
Academy West Insurance Firebaugh	Other
Amaral & Associates Realty	Other
American Legion	Other
American Legion Auxiliary Elijah B Hayes	Other
Andrea Brandt State Farm Insurance	Other
Benevolent & Protective Order of Elks	Other
Borelli Real Estate Services	Other
California Garden Clubs Inc.	Other
Century 21 M&M & Assoc - Los Banos	Other
Century 21 M&M & Assoc - Patterson	Other
Coldwell Banker Kaljian & Assoc	Other
Eric Rodriguez - Patterson	Other
Farmers Insurance Antonio Gonzales	Other
First Prioirty of the Central Valley	Other
Greg Nunes Real Estate	Other
Joe G. Gutierez State Farm Insurance	Other
Mendota Land Co	Other
Noah’s Ark Foundation of Tracy Inc.	Other
PMZ Real Estate - Patterson	Other
PMZ Real Estate - Los Banos	Other
Rafael Ruiz - Patterson	Other
Shane P. Donion Ranch Broker	Other
The Boyd Company	Other
Valley West Properties	Other
Adventure Christian Church of Patterson	Religious
Agape Baptist Church	Religious
Bethel Community Church	Religious
Church of Christ of Patterson	Religious
Church of God of Prophecy	Religious
Connections Christian Church	Religious
Evangelical Church of Los Banos	Religious
Family Christian Center	Religious
First Baptist Church	Religious
Full Gospel Businessmen’s Fellowship International	Religious
Harvest Samoan Assembly of God	Religious

Mountain House Foursquare Church	Religious
Movimiento Familiar Cristiano Catolico	Religious
Patterson Covenant Church	Religious
Patterson Christian Fellowship	Religious
Patterson Seventh Day Adventist Church	Religious

Appendix C - Checklist for GSP Submittal

Checklist for Submittal of Delta-Mendota Subbasin Coordinated GSPs

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 3. Technical and Reporting Standards				
352.2		Monitoring Protocols	• Monitoring protocols adopted by the GSA for data collection and management • Monitoring protocols that are designed to detect changes in groundwater levels, groundwater quality, inelastic surface subsidence for basins for which subsidence has been identified as a potential problem, and flow and quality of surface water that directly affect groundwater levels or quality or are caused by groundwater extraction in the basin	• Section 6 – Subbasin Monitoring Program; Section 7 – Subbasin Data Collection and Management • Appendix B, Technical Memorandum (TM) #5 (Assumptions for Delta-Mendota Subbasin Monitoring Network), TM #6 (Coordination of the Delta-Mendota Subbasin Data Management System)
Article 5. Plan Contents, Subarticle 1. Administrative Information				
354.4		General Information	• Executive Summary • List of references and technical studies	• See individual GSPs • Section 9 – References and individual GSPs
354.6		Agency Information	• GSA mailing address • Organization and management structure • Contact information of Plan Manager • Legal authority of GSA • Estimate of implementation costs	• Section 2 – Delta-Mendota Subbasin Governance; Section 2.1 GSA and GSP Coordination and Governance • See individual GSPs for estimate of implementation costs
354.8(a)	10727.2(a)(4)	Map(s)	• Area covered by GSP • Adjudicated areas, other agencies within the basin, and areas covered by an Alternative • Jurisdictional boundaries of federal or State land • Existing land use designations • Density of wells per square mile	• Figure CC-1: Delta-Mendota Subbasin and GSP Regions • Figure CC-18: Land Use Planning Entities • Figure CC-19: Federal and State Lands • Figure CC-20: 2014 Land Use in the Delta-Mendota Subbasin • Figures CC-13 through CC-15: Domestic, Production, and Public Well Density in the Delta-Mendota Subbasin
354.8(b)		Description of the Plan Area	• Summary of jurisdictional areas and other features	Section 3 – Delta-Mendota Subbasin Plan Area

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 1. Administrative Information (Continued)				
354.8(f)	10727.2(g)	Land Use Elements or Topic Categories of Applicable General Plans	• Summary of general plans and other land use plans • Description of how implementation of the GSP may change water demands or affect achievement of sustainability and how the GSP addresses those effects • Description of how implementation of the GSP may affect the water supply assumptions of relevant land use plans • Summary of the process for permitting new or replacement wells in the basin • Information regarding the implementation of land use plans outside the basin that could affect the ability of the Agency to achieve sustainable groundwater management	• Section 3.3 – General Plans in Plan Area • See individual GSPs for description of implementation impacts on water demands and sustainability • Section 3.4 – Existing Land Use Plans and Impacts to Sustainable Groundwater Management • Section 3.6 – County Well Construction/Destruction Standards & Permitting • Section 3.3 – General Plans in Plan Area
354.8(c) 354.8(d) 354.8(e)	10727.2(g)	Water Resource Monitoring and Management Programs	• Description of water resources monitoring and management programs • Description of how the monitoring networks of those plans will be incorporated into the GSP • Description of how those plans may limit operational flexibility in the basin • Description of conjunctive use programs	Section 3.5 – Existing Water Resources Monitoring and Management Plans; Section 3.7 – Existing and Planned Conjunctive Use Programs

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 1. Administrative Information (Continued)				
354.8(g)	10727.4	Additional GSP Contents	Description of Actions related to: • Control of saline water intrusion • Wellhead protection • Migration of contaminated groundwater • Well abandonment and well destruction program • Replenishment of groundwater extractions • Conjunctive use and underground storage • Well construction policies • Addressing groundwater contamination cleanup, recharge, diversions to storage, conservation, water recycling, conveyance, and extraction projects • Efficient water management practices • Relationships with State and federal regulatory agencies • Review of land use plans and efforts to coordinate with land use planning agencies to assess activities that potentially create risks to groundwater quality or quantity • Impacts on groundwater dependent ecosystems	Section 3.8 – Plan Elements from California Water Code Section 10727.4
354.10		Notice and Communication	• Description of beneficial uses and users • List of public meetings • GSP comments and responses • Decision-making process • Public engagement • Encouraging active involvement • Informing the public on GSP implementation progress	• Section 8 – Stakeholder Outreach • Appendix B, TM #8 (Coordinated Noticing, Communication, and Outreach Activities in the Delta-Mendota Subbasin)
Article 5. Plan Contents, Subarticle 2. Basin Setting				
354.14		Hydrogeologic Conceptual Model	• Description of the Hydrogeologic Conceptual Model • Two scaled cross-sections • Map(s) of physical characteristics: topographic information, surficial geology, soil characteristics, surface water bodies, source and point of delivery for imported water supplies	• Section 4.1 – Hydrogeologic Conceptual Model • Appendix B, TM #2 (Assumptions for Hydrogeologic Conceptual Model of the Delta-Mendota Subbasin)

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 2. Basin Setting (Continued)				
354.14(d)(4)	10727.2(a)(5)	Map of Recharge Areas	• Map delineating existing recharge areas that substantially contribute to the replenishment of the basin, potential recharge areas, and discharge areas	Figure CC-39: Recharge Areas, Seeps and Springs
	10727.2(d)(4)	Recharge Areas	• Description of how recharge areas identified in the plan substantially contribute to the replenishment of the basin	Section 4.1.10 – Topography, Surface Water, Recharge, and Imported Supplies
354.16	10727.2(a)(1) 10727.2(a)(2)	Current and Historical Groundwater Conditions	• Groundwater elevation data • Estimate of groundwater storage • Seawater intrusion conditions • Groundwater quality issues • Land subsidence conditions • Identification of interconnected surface water systems • Identification of groundwater-dependent ecosystems	Section 4.2 – Delta-Mendota Subbasin Groundwater Conditions
354.18	10727.2(a)(3)	Water Budget Information	• Description of inflows, outflows, and change in storage • Quantification of overdraft • Estimate of sustainable yield • Quantification of current, historical, and projected water budgets	• Section 4.3 – Delta-Mendota Subbasin Water Budgets • Appendix B, TM #3 (Assumptions for the Historic, Current and Projected Water Budgets of the Delta-Mendota Subbasin, Change in Storage Cross-Check and Sustainable Yield)
	10727.2(d)(5)	Surface Water Supply	• Description of surface water supply used or available for use for groundwater recharge or in-lieu use	Section 4.3 – Delta-Mendota Subbasin Water Budgets
354.20		Management Areas	• Reason for creation of each management area • Minimum thresholds and measurable objectives for each management area • Level of monitoring and analysis • Explanation of how management of management areas will not cause undesirable results outside the management area • Description of management areas	• Appendix B, TM #4 (Assumptions for Delta-Mendota Subbasin Management Areas, Sustainability Management Criteria) • See individual GSPs

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 3. Sustainable Management Criteria				
354.24		Sustainability Goal	• Description of the sustainability goal	Section 5.2 – Coordinated Sustainability Goal and Undesirable Results
354.26		Undesirable Results	• Description of undesirable results • Cause of groundwater conditions that would lead to undesirable results • Criteria used to define undesirable results for each sustainability indicator • Potential effects of undesirable results on beneficial uses and users of groundwater	• Section 5.2 – Coordinated Sustainability Goal and Undesirable Results • Section 5.4 – Delta-Mendota Subbasin Sustainable Management Criteria (Tables CC-14 through CC-18) • Appendix B, TM #4 (Assumptions for Delta-Mendota Subbasin Management Areas, Sustainability Management Criteria)
Article 5. Plan Contents, Subarticle 3. Sustainable Management Criteria (Continued)				
354.28	10727.2(d)(1) 10727.2(d)(2)	Minimum Thresholds	• Description of each minimum threshold and how they were established for each sustainability indicator • Relationship for each sustainability indicator • Description of how selection of the minimum threshold may affect beneficial uses and users of groundwater • Standards related to sustainability indicators • How each minimum threshold will be quantitatively measured	• Section 5.4 – Delta-Mendota Subbasin Sustainable Management Criteria (Tables CC-14 through CC-18) • Appendix B, TM #4 (Assumptions for Delta-Mendota Subbasin Management Areas, Sustainability Management Criteria)
354.30	10727.2(b)(1) 10727.2(b)(2) 10727.2(d)(1) 10727.2(d)(2)	Measurable Objectives	• Description of establishment of the measurable objectives for each sustainability indicator • Description of how a reasonable margin of safety was established for each measurable objective • Description of a reasonable path to achieve and maintain the sustainability goal, including a description of interim milestones	• Section 5.4 – Delta-Mendota Subbasin Sustainable Management Criteria (Tables CC-14 through CC-18) • Appendix B, TM #4 (Assumptions for Delta-Mendota Subbasin Management Areas, Sustainability Management Criteria)

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 5. Plan Contents, Subarticle 4. Monitoring Networks				
354.34	10727.2(d)(1) 10727.2(d)(2) 10727.2(e) 10727.2(f)	Monitoring Networks	• Description of monitoring network • Description of monitoring network objectives • Description of how the monitoring network is designed to: demonstrate groundwater occurrence, flow directions, and hydraulic gradients between principal aquifers and surface water features; estimate the change in annual groundwater in storage; monitor seawater intrusion; determine groundwater quality trends; identify the rate and extent of land subsidence; and calculate depletions of surface water caused by groundwater extractions • Description of how the monitoring network provides adequate coverage of Sustainability Indicators • Density of monitoring sites and frequency of measurements required to demonstrate short-term, seasonal, and long-term trends • Scientific rational (or reason) for site selection • Consistency with data and reporting standards • Corresponding sustainability indicator, minimum threshold, measurable objective, and interim milestone • Location and type of each monitoring site within the basin displayed on a map, and reported in tabular format, including information regarding the monitoring site type, frequency of measurement, and the purposes for which the monitoring site is being used • Description of technical standards, data collection methods, and other procedures or protocols to ensure comparable data and methodologies	• Section 6 – Subbasin Monitoring Program • Appendix B, TM #5 (Assumptions for Delta-Mendota Subbasin Monitoring Network) • Section 7 – Subbasin Data Collection and Management

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
354.36		Representative Monitoring	• Description of representative sites • Demonstration of adequacy of using groundwater elevations as proxy for other sustainability indicators • Adequate evidence demonstrating site reflects general conditions in the area	• Section 6 – Subbasin Monitoring Program • Appendix B, TM #5 (Assumptions for Delta-Mendota Subbasin Monitoring Network)
Article 5. Plan Contents, Subarticle 4. Monitoring Networks (Continued)				
354.38		Assessment and Improvement of Monitoring Network	• Review and evaluation of the monitoring network • Identification and description of data gaps • Description of steps to fill data gaps • Description of monitoring frequency and density of sites	• Section 6 – Subbasin Monitoring Program • Appendix B, TM #5 (Assumptions for Delta-Mendota Subbasin Monitoring Network)
Article 5. Plan Contents, Subarticle 5. Projects and Management Actions				
354.44		Projects and Management Actions	• Description of projects and management actions that will help achieve the basin's sustainability goal • Measurable objective that is expected to benefit from each project and management action • Circumstances for implementation • Public noticing • Permitting and regulatory process • Timetable for initiation and completion, and the accrual of expected benefits • Expected benefits and how they will be evaluated • How the project or management action will be accomplished. If the projects or management actions rely on water from outside the jurisdiction of the Agency, an explanation of the source and reliability of that water shall be included. • Legal authority required • Estimated costs and plans to meet those costs • Management of groundwater extractions and recharge	See individual GSPs
354.44(b)(2)	10727.2(d)(3)		• Overdraft mitigation projects and management actions	See individual GSPs

GSP Regulations Section	Water Code Section	Requirement	Description	Section(s) or Page Number(s) in the GSP
Article 8. Interagency Agreements				
357.4	10727.6	Coordination Agreements - Shall be submitted to the Department together with the GSPs for the basin and, if approved, shall become part of the GSP for each participating Agency.	Coordination Agreements shall describe the following: • A point of contact • Responsibilities of each Agency • Procedures for the timely exchange of information between Agencies • Procedures for resolving conflicts between Agencies • How the Agencies have used the same data and methodologies to coordinate GSPs • How the GSPs implemented together satisfy the requirements of SGMA • Process for submitting all Plans, Plan amendments, supporting information, all monitoring data and other pertinent information, along with annual reports and periodic evaluation • A coordinated data management system for the basin • Coordination agreements shall identify adjudicated areas within the basin, and any local agencies that have adopted an Alternative that has been accepted by the Department	• Section 2.1.2 – Intra-Basin Coordination; Section 2.1.3 – Inter-basin Agreements • Appendix B, TM #1 (Common Datasets and Assumptions used in the Delta-Mendota Subbasin GSPs), TM #6 (Coordination of the Delta-Mendota Subbasin Data Management System), TM #7 (Adoption and Use of the Subbasin Coordination Agreement)

Appendix D - Interbasin Agreements

Inter-Basin Agreement Between Northern & Central Delta-Mendota GSP Region and Westlands Water District

DATA SHARING AGREEMENT

Westlands Water District (Westlands) and the San Luis & Delta-Mendota Water Authority, on behalf of the Northern Delta-Mendota Region GSAs and the Central Delta-Mendota Region Multi-Agency GSA (GSAs), (collectively the Parties) desire to establish a set of common assumptions on groundwater conditions on either side of the boundary between Westlands' service area and the Delta-Mendota Subbasin to be used for development of Groundwater Sustainability Plans (GSPs) related to the implementation of the Sustainable Groundwater Management Act (SGMA). To further that effort to develop a set of common assumptions, the Parties agree to provide each other with the following recorded, measured, estimated and/or simulated modeling data located within five (5) miles of the boundary between Westlands' service area and the Delta-Mendota Subbasin:

- Well location (latitude and longitude, preferably in a GIS shapefile)
- Ground surface elevation at well location, including elevation datum
- Depth to groundwater readings from 1960s to present as available per well (preferably in excel or electronic tabular format)
- Water surface elevation (if already in tabular format, otherwise it will be calculated from elevation less depth measured)
- Well driller's log (if available)
- Well information (perforated intervals, seal depth, pumping capacity, water quality, etc., if available)
- Agricultural practices (crop type, irrigation method (flood or drip), surface or groundwater application, etc., if available)
- Canal and irrigation ditch Information (location, dimension, flow direction, etc., if available)
- Tile drain (location, depth, discharge, flow direction, etc., if available)
- Subsidence data (if available)
- Historical reports and associated data, including but not limited to the Grasslands Groundwater Quality Assessment Report

The Parties understand that the requested data will be shared with their consultants, to other stakeholders in their respective basins, and that the information may be made public through the development of Westlands' and the Northern and Central Delta-Mendota Region GSA's respective GSPs and the supporting documentation for those GSPs. Other than publishing information for such purposes, neither Party will disclose the other Party's information to any third party, except if that other Party determines, at its sole discretion, the disclosure is required by law. Each Party may review preliminary results before publishing the information; provided that if a review of preliminary results is desired, the Party seeking to review will make that request in writing to the other party.

The Parties and their authorized representatives, by signatures below, agree to the Data Sharing Agreement.

Note: Return one signature copy to WWD

Westlands Water District:
By:
Title: CHIEF OPERATING OFFICER
Date: 4/23/18

SLDMWA on behalf of the Parties:
By:
Title: Assistant Executive Director
Date: 4/12/18

Note: Return one signature copy to WWD

Inter-Basin Agreement Between San Joaquin River Exchange Contractors GSP Region and Westlands Water District

DATA SHARING AGREEMENT

Westlands Water District (Westlands) and Central California Irrigation District (CCID), (collectively the Parties) desire to establish a set of common assumptions on groundwater conditions on either side of the boundary between Westlands' service area and the Delta-Mendota Subbasin to be used for development of Groundwater Sustainability Plans (GSPs) related to the implementation of the Sustainable Groundwater Management Act (SGMA). To further that effort to develop a set of common assumptions, the Parties agree to provide each other with the following recorded, measured, estimated and/or simulated modeling data located within five (5) miles of the boundary between Westlands' service area and the Delta-Mendota Subbasin:

- Well location (latitude and longitude, preferably in a GIS shapefile)
- Ground surface elevation at well location, including elevation datum
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- Water surface elevation (if already in tabular format, otherwise it will be calculated from elevation less depth measured)
- Well driller's log (if available)
- Well information (perforated intervals, seal depth, pumping capacity, water quality, etc., if available)
- Agricultural practices (crop type, irrigation method (flood or drip), surface or groundwater application, etc., if available)
- Canal and irrigation ditch Information (location, dimension, flow direction, etc., if available)
- Tile drain (location, depth, discharge, flow direction, etc., if available)
- Subsidence data (if available)
- Historical reports and associated data, including but not limited to the Grasslands Groundwater Quality Assessment Report

The Parties understand that the information will be shared with their consultants, to other stakeholders in their respective basins, and that the information will be made public through the development of Westlands' and CCID's GSA's respective GSPs and the supporting documentation for those GSPs. Other than publishing information for such purposes, neither Party will disclose the other Party's information to any third party, except if that other Party determines, at its sole discretion, the disclosure is required by law. Each Party may review preliminary results before publishing the information, provided that if a review of preliminary results is desired, the Party seeking to review will make that request in writing to the other party.

The Parties and their authorized representatives, by signatures below, agree to the Data Sharing Agreement.

Westlands Water District:	Central California Irrigation District:
By: [signature]	By: [signature]
Title: CHIEF OPERATING OFFICER	Title: General Manager
Date: May 16, 2018	Date: 5-14-18

Note: Return one signature copy to WWD

Appendix E - Delta-Mendota Subbasin Communications Plan

Appendix E

Delta Mendota Subbasin Groundwater Management

Sustainable Groundwater Management Act Communications Plan

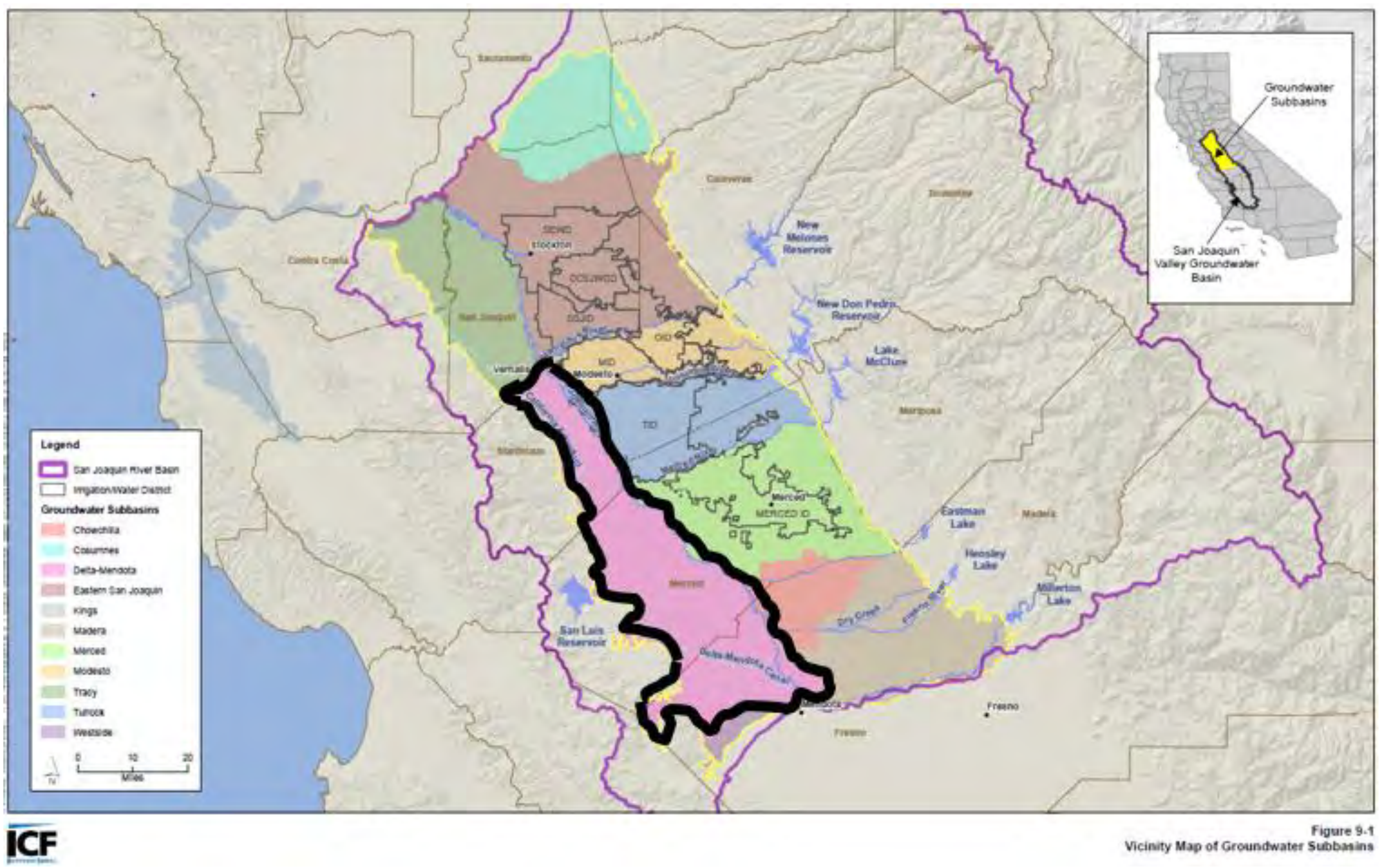


Figure 9-1
Vicinity Map of Groundwater Subbasins

Prepared by:
Lisa Beutler, MWH/Stantec,
Via CA Dept. of Water Resources,
Facilitation Services Technical Assistance

June 2017

Forward: How to use this Plan

This Communication Plan provides a high-level overview of near and long-term outreach and engagement strategies, tactics and tools. Its purpose is to assist the Groundwater Sustainability Agencies (GSAs) of the Delta Mendota Subbasin with stakeholder outreach and other related actions as required by the Sustainable Groundwater Management Act (SGMA) of 2014. It is presented as a working public draft, and should be considered a living document that is continuously refined and updated as circumstances suggest.

Chapter 1*:* *Introduction and Background* provides text and information about SGMA and the Delta Mendota Subbasin that can be repurposed directly into websites or printed materials by agencies and/or entities with an interest in SGMA and how it will affect the subbasin. This section also describes the communications activities mandated by SGMA.

Chapter 2: *Communications Plan Overview* provides communications planning goals and objectives as well as the scope. This section can be used in support of project management activities.

Chapter 3: *Situation Assessment* provides some of the context for communications activities. This section can be used in developing required assessments of stakeholder issues and interests. It also informs project management activities.

Chapter 4: *Audiences and Messages* identifies key subbasin audiences and message points for specific audience segments. The goal of this chapter is to provide information that can be used by the subbasin GSAs in preparing to work with key stakeholders.

Chapter 5: *Risk Management* is the summary of a communications risk assessment that considers subbasin communications strengths and weakness and proposes on-going adjustments based on best communication management practices. This section informs project management activities and provides a context for some of the recommended communications tactics.

Chapter 6: *Tactical Approaches* offers a communications to do list with specific communications activities relevant for project phases and subbasin audiences.

Chapter 7: *Measurements and Evaluation* outlines methods to determine the effectiveness of outreach and engagement.

Chapter 8: *Roles and Responsibilities* provides a sample list of tasks and illustrates the types of communications roles and responsibilities which might be assigned. This section should be incorporated into project management plans.

Subbasin GSAs should feel free to repurpose any or all parts of the document that will assist them in meeting SGMA requirements.

This document was developed with technical support provided by the California Department of Water Resources' (DWR) SGMA Facilitation Support Services Program and completed by the Communication and Engagement Group of MWH/Stantec.

Delta Mendota Subbasin
Sustainable Groundwater Management Act
Communications Plan
Working Draft

Contents

List of Figures

List of Tables

List of Acronyms and Abbreviations

Item	Description
Basin	Groundwater Basin or Subbasin
Coms Plan	Delta Mendota Subbasin, Sustainable Groundwater Management Act, Working Draft Communications Plan
CSD	Community Service District(s):
CV-SALTS	Central Valley Salinity Alternatives for Long-Term Sustainability
DAC	Disadvantaged Communities
DMC	Delta-Mendota Canal
DWR	California Department of Water Resources
GSA	Groundwater Sustainability Agency
GSP	Groundwater Sustainability Plan
IRWMP	Integrated Resource Water Management Plan
PDF	Portable Document Format
RCD	Resource Conservation District(s)
SGMA	Sustainable Groundwater Management Act
SLDMWA	San Luis Delta- Mendota Water Authority
State Board	State Water Resources Control Board

Item	Description
SA	Situation Assessment
USGS	United States Geological Survey

Revision History

Table 1. Revision History

Revision History			
Revision/Dock Title #	Date of Release	Author	Summary of Changes

INTRODUCTION AND BACKGROUND

The purpose of this Communication Plan is to assist the Groundwater Sustainability Agencies (GSAs) of the Delta Mendota Subbasin with stakeholder outreach and other related actions as required by the Sustainable Groundwater Management Act (SGMA) of 2014. Its chapters identify key stakeholders and provide a high-level overview of near and long-term outreach and engagement strategies, tactics and tools. The plan was developed with technical support provided by the California Department of Water Resources' (DWR) SGMA Facilitation Support Services Program.

1.1. SGMA Basics[1]

After decades of debate, in 2014 California lawmakers adopted SGMA. This far-reaching law seeks to bring the State's critically important groundwater basins into a sustainable regime of pumping and recharge. The change in water management laws has created new obligations for residents and water managers in the Delta-Mendota Groundwater Subbasin. The San Luis Delta- Mendota Water Authority (SLDMWA) is assisting its members in implementation of this law.

SGMA requires, **by June 30, 2017**, the formation of locally-controlled GSAs in many of the State's groundwater basins and subbasins (basins). A GSA is responsible for developing and implementing a **groundwater sustainability plan** (GSP). These plans assist the basins in meeting sustainability goals. The primary goal is to maintain sustainable yields without causing undesirable results.

1.1.1. <u>GSAs & GSPs</u>

Any local public agency that has water supply, water management, or land use responsibilities in a basin can decide to become a GSA. A single local agency can decide to become a GSA, or a combination of local agencies can decide to form a GSA by using either a Joint Power Authority (JPA), a memorandum of agreement (MOA), or other legal agreement. If no agency assumes this role the GSA responsibility defaults to the County; however, the County may decline.

A GSP may be any of the following *(Water Code § 10727(b)):*

- A <u>single plan</u> covering the entire basin developed and implemented by <u>one GSA</u>.
- A <u>single plan</u> covering the entire basin developed and implemented by <u>multiple GSAs</u>.

[1] Sections on SGMA are largely drawn, in whole or in part, from publicly available materials from the Department of Water Resources. For more see: http://www.water.ca.gov/groundwater/sgm

- Subject to Water Code Section 10727.6, multiple plans implemented by multiple GSAs and coordinated pursuant to a single coordination agreement that covers the entire basin.

If local agencies are unable to form an approved GSA and/or prepare an approved GSP in the required timeframe, then the basin or subbasin would be considered unmanaged. Unmanaged groundwater basins and subbasins are subject to State Water Resources Control Board (State Board) oversight. This is true even if the vast majority of the subbasin is covered by a plan. Should intervention occur, the State Board is authorized to recover its costs from the GSAs.

1.2. SGMA Communications and Engagement Requirements

SGMA includes specific requirements for communications and engagement by each planning phase. **Figure 1** (next page) illustrates the requirements and provides water code references. The GSP submittal guidelines also describe the outreach and engagement documentation to be submitted with the plan. **Table 2** describes the submittal requirements. A full list of codes and requirements is also provided in **Appendix 1**.

Table 2. GSP Submittal Requirements[2]

GSP Regulations Section	Requirement	Description
Article 5. Plan Contents, Sub-article 1. Administrative Information		
354.10	Notice and Communication	• Description of beneficial uses and users • List of public meetings with dates • GSP comments and responses • Decision-making process • Public engagement process • Method(s) to encouraging active involvement • Steps to inform the public on GSP implementation progress

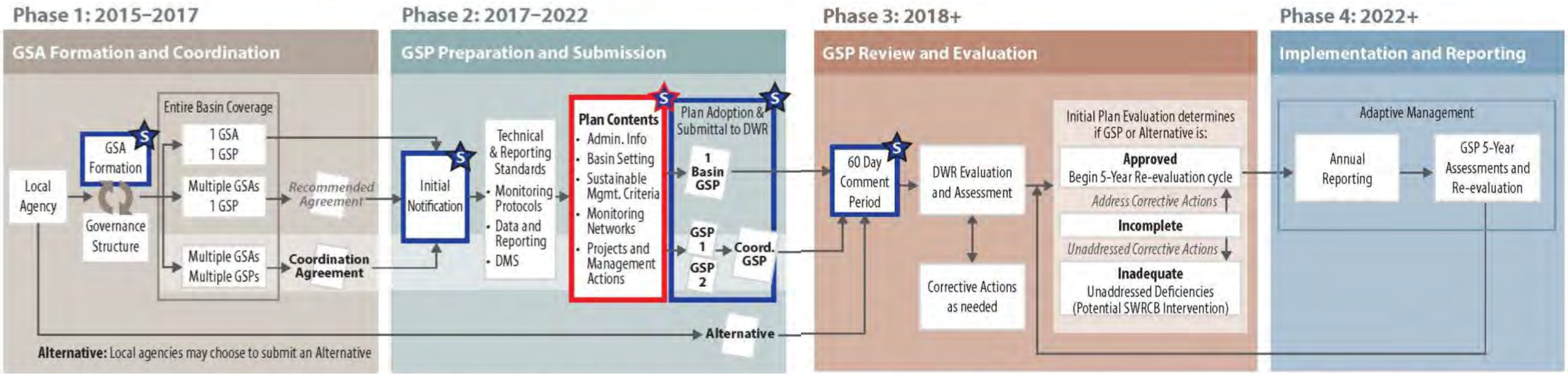
1.3. Planning Approach

While the SLDMWA is assisting with the coordination of GSP(s) development, this Communications Plan (Coms Plan) is offered for the voluntary use of all of the GSAs of the Delta-Mendota Subbasin. A full Coms Plan schedule should be developed in conjunction with the overall GSP(s) development schedule. One additional option is for the Coordination Committee of GSAs to provide overall communications guidance. This could potentially be included in a section of the Coordination Agreement.

[2] Guidance Document for the Sustainable Management of Groundwater, Preparation Checklist for GSP Submittal, Department of Water Resources, December 2016

Figure 1. Stakeholder Engagement Requirements

Stakeholder Engagement Requirements by Phase



Phase 1 Engagement Requirements

- **Establish and Maintain List of Interested Parties** §10723.4
- **GSA Formation Public Notice** §10723(b)
- **GSA Formation Public Hearing** §10723(b)
- **GSA Formation (due 6/30/17)** §10723(b)
  Notify DWR:
  - Include list of interested parties
  - Explain how parties' interests will be considered
- **Pre-GSP Development** §10727.8
  Provide a written statement describing how interested parties may participate to:
  - DWR
  - Cities within the GSA boundary
  - Counties within the GSA boundary

Phase 2 Engagement Requirements

- **GSP Initial Notification** §353.6*
- **GSP Preparation** §10727.8 and §10723.2
  - Encourage active involvement
  - Consider beneficial uses and users of groundwater when describing *Undesirable Results, Minimum Thresholds, and Projects & Actions*
- **GSP Communications Section** §354.10*
  - GSA decision-making process
  - Opportunities for engagement and how public input is used
  - How GSA encourages active involvement
  - Method of informing the public
- **Public Notice of Proposed Adoption** §10728.4
- **GSP Adoption Public Hearing** §10728.4
- **GSP Submittal** §354.10*
  - Include a summary of communications: description of beneficial uses/users, list of public meetings, comments received/responses

Phase 3 Engagement Requirements

- **60 Day Comment Period** §353.8*
  - Any person may provide comments to DWR regarding a proposed or adopted GSP via the SGMA Portal at http://sgma.water.ca.gov/portal/
  - Comments will be posted to DWR's website

Phase 4 Engagement Requirements

- **Public Notices and Meetings** §10730
  - Before amending a GSP
  - Prior to imposing or increasing a fee
- **Encourage Active Involvement** §10727.8

Engagement Requirements Applicable to ALL PHASES

- **Beneficial Uses and Users** §10723.2
  Consider interests of all beneficial uses and users of groundwater
- **Advisory Committee** §10727.8
  GSA may appoint and consult with an advisory committee
- **Public Notices and Meetings** §10730
  - Before electing to be a GSA
  - Before adopting or amending a GSP
  - Prior to imposing or increasing a fee
- **Encourage Active Involvement** §10727.8
  Encourage the active involvement of diverse social, cultural, and economic elements of the population within the groundwater basin
- **Native American Tribes** §10720.3
  - May voluntarily agree to participate
  - See Engagement with Tribal Government Guidance Document
- **Federal Government** §10720.3
  - May voluntarily agree to participate

Stakeholder Input

Stakeholders should be informed throughout the development of Plan Content

Code References: §(#) = SGMA, §(#)* = GSP Regulations

Source: Guidance Document for Groundwater Sustainability Plan Stakeholder Communication and Engagement Department of Water Resources, June 2017

An important additional step will be establishing, in conjunction with the multiple GSAs, the roles and responsibilities for implementing the Coms Plan.

1.4. SGMA and the Delta Mendota Subbasin[3]

The Delta-Mendota Subbasin of the San Joaquin Valley Groundwater Basin is a long, relatively narrow groundwater basin that covers portions of five counties, from north to south, San Joaquin, Stanislaus, Merced, Madera and Fresno Counties (see **Figure 2**). The Delta-Mendota sub-basin is bounded on the west by the Tertiary and older marine sediments of the Coast Ranges. The northern boundary (from west to east) begins on the west by following the Stanislaus/San Joaquin County line, then deviates to the north to encapsulate all of the Del Puerto Water District before returning back to the Stanislaus/San Joaquin County line. The boundary continues east then deviates north again to encapsulate all of the West Stanislaus Irrigation District before returning back to the Stanislaus/San Joaquin County line. The boundary continues to follow the Stanislaus/San Joaquin County line east until it intersects with the San Joaquin River.

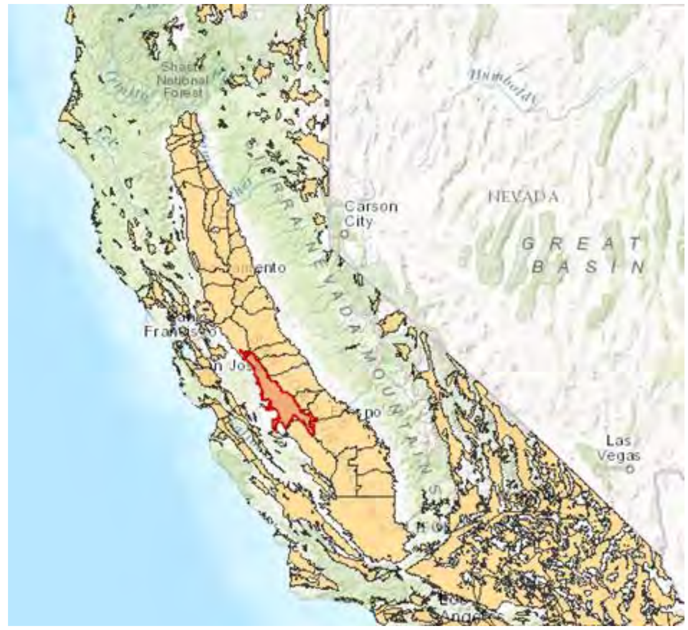


Figure 2. Delta Mendota Subbasin

The eastern boundary (from north to south) follows the San Joaquin River to within Township 11S, where it jogs eastward along the northern boundary of Columbia Canal Company and then follows the eastern boundary of Columbia Canal company until intersecting the northern boundary of the Aliso Water District. The boundary then heads east following the northern and then eastern boundary of the Aliso Water District until intersecting the Madera/Fresno County line. The boundary then heads westerly following the Madera/Fresno County line to the eastern boundary of the Farmers Water District. The boundary then heads southerly along the eastern boundary of the Farmers Water District, and continues southerly along the section line to the intersection with the northern right-of-way of the railroad. The boundary then heads east along the northern right-of-way of the railroad until intersecting with the western boundary of the Mid-Valley Water District. The boundary then heads south along the western boundary of the Mid-Valley Water District to the intersection with the northern boundary of Reclamation District 1606. The boundary then heads west and then south following the boundary of Reclamation District 1606 and James Irrigation District until its intersection with the Westlands Water District boundary.

The southern boundary (from east to west) matches the northerly boundaries of Westlands Water District legal jurisdictional boundary last revised in 2006. The boundary then

[3] Information related to the Delta Mendota subbasin is drawn directly from http://sgma.water.ca.gov/basinmod/basinrequest/preview/23.

proceeds west along the southernmost boundary of the San Luis Water District. The boundary then projects westward from this alignment until intersecting the Delta-Mendota sub-basin Western boundary described above.

1.5. Delta-Mendota Subbasin GSP Planning

The GSAs of the Delta-Mendota Subbasin intend to work together to meet Sustainable Groundwater Management Act (SGMA) requirements and prepare a Groundwater Sustainability Plan (GSP) or coordinated Sustainability Plans by June 31, 2020. The San Luis Delta- Mendota Water Authority (SLDMWA) is assisting its members and non-members in planning and implementation of this law and has been directly assisting a subset of the local GSA eligible agencies in organizing to accomplish required SGMA tasks. The SLDMWA has also hosted informal, information meetings with all of the subbasin GSAs.

While SLDMWA coordinated GSAs are confident in their ability to prepare a GSP for the areas under their jurisdiction, SGMA requires that an approved GSP or multiple coordinated GSPs are in place to provide sustainable management for the entire subbasin. The identified GSAs have been asked to determine how they wish to proceed in individual GSP development or a coordinated single GSP by July 2017 and whether or not they wish to participate in the Prop 1 Sustainable Groundwater Planning Grant as a joint request.

1.6. Delta Mendota Subbasin GSAs

Following are the DWR identified agencies (as of June 15, 2017).[4]

1. Aliso Water District
2. Central Delta-Mendota Region Multi-Agency GSA
3. City of Dos Palos
4. City of Firebaugh
5. City of Gustine
6. City of Los Baños
7. City of Mendota
8. City of Newman
9. City of Patterson
10. County of Madera—3
11. DM-II
12. Farmers Water District
13. Fresno County—Management Area ‘A’
14. Fresno County—Management Area ‘B’
15. Grasslands Groundwater Sustainability Agency
16. Merced County—Delta-Mendota

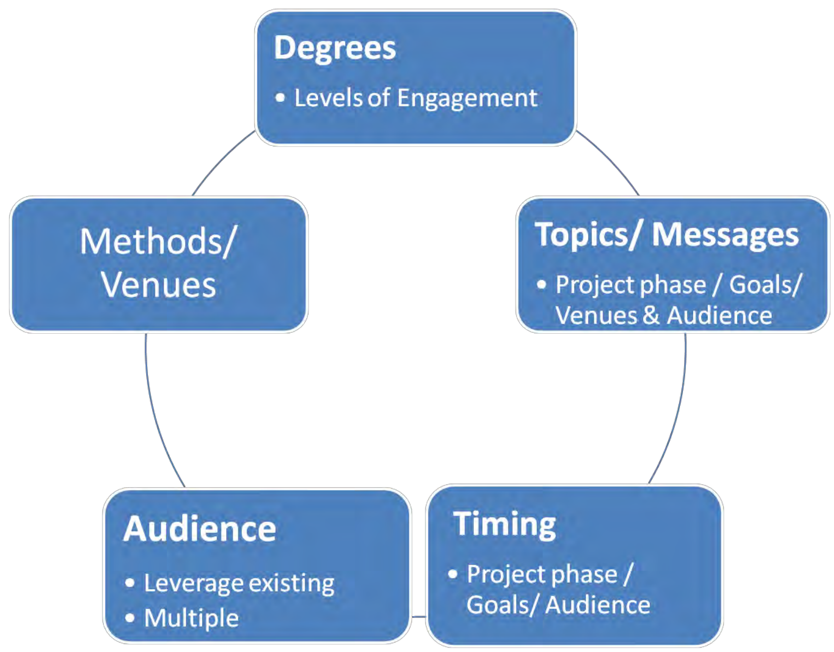
[4] See: http://sgma.water.ca.gov/portal/

17. Northwestern Delta-Mendota GSA
18. Ora Loma Water District
19. Patterson Irrigation District
20. San Joaquin River Exchange Contractors Water Authority
21. Turner Island Water District-2
22. West Stanislaus Irrigation District GSA
23. Widren Water District GSA

COMMUNICATIONS PLAN OVERVIEW

Communication is the process of transmitting ideas and information. According to the Project Management Institute, 75%-90% of a project manager's time is spent communicating. A Coms Plan provides the purpose, method, messages, timing, intensity, and audience of the communication, then describes who will do the communicating, and the frequency of the communication (see **Figure 3**.)

Figure 3. Elements of a Communications Plan



2.1. Purpose

The purpose of the Delta-Mendota Subbasin, Sustainable Groundwater Management Act, Coms Plan is to outline the information and communications needs of the project stakeholders and provide a roadmap to meet them. The Coms Plan then identifies how communications activities, processes, and procedures will be managed throughout the project life cycle.

2.2. Importance

While communications are important in every project, a well-executed communications strategy will be essential to the success of the GSP(s) development and adoption process. The financial and regulatory stakes are high and communication missteps can create project risks. Further, development of a viable GSP(s) will require an on-going collaboration among all the stakeholders, both organizational and external. The plan will be comprehensive and consider multiple variables, a range of system elements and project costs and benefits. Stakeholder input will be needed to refine GSP requirements and fully define the water management system, and potential impacts, costs and benefits that may result in managing for sustainability.

2.3. Scope

The plan focuses on formal communication elements. Other communication channels exist on informal levels and enhance those discussed within this plan. This plan is not intended to limit, but to enhance communication practices. Open, ongoing communication between stakeholders is critical to the success of the project.

2.4. Communications Goal

Development, adoption and implementation of the GSP(s) will require basin external stakeholders, other agencies, staff, managers, and the multiple GSA Boards to evaluate choices, make decisions and commit resources.

The core communications goal is to plan for and efficiently deliver clear and succinct information:

- At the right time
- To the right people
- With a resonating message

This is done to facilitate quality decision making and build accompanying public support

2.5. Communications Objectives

The Coms Plan Objectives are to present strategies and actions that are:

- Realistic and action-oriented
- Specific and measurable
- Minimal in number (a few well delivered are better than many mediocre efforts)
- Audience relevant

2.6. Strategic Approach

Three primary communications strategies have been identified for the GSP(s) development.

1) Fully leverage the activities of existing groups. This practical approach is cost effective and respectful of the limited time that stakeholders have to participate in collaborative processes.
2) Provide targeted, communications and outreach to opinion leaders in key stakeholder segments.
3) Provide user friendly information and intermittent opportunities through existing communication channels and open houses or workshops to allow interested stakeholders (internal and external) to engage commensurate with their degree of interest.

2.7. Communications Governance, Communications Team

Given the relatively large number of stakeholders, a recommendation for coordinated efforts, and the legal requirements for outreach[5], some form of communications governance is recommended. Several governance options for consideration are offered in Appendix 2. The actual form of the governance is less important than a clear understanding of the roles and responsibilities of those responsible for ensuring required communication. For the purpose of this document, an assumption is made that some form of governance will be identified and a communications team (which may be an individual or multiple individuals, and/or include the project consultants) is designated.

A driving consideration for this recommendation is the level of effort associated with required activities and the fact that communications are highly time dependent. That means that communications activities should be occurring that may happen outside of regularly scheduled GSA meetings. In this case delegation with guidance is efficient and effective.

2.8. Constraints

All projects are subject to limitations and constraints as they must be within scope and adhere to budget, scheduling, and resource requirements. These constraints can be even more challenging in projects with multiple agencies as will be the case with the development and coordination of multiple GSPs.

There are also legislative, regulatory, technology, and other organizational policy requirements which must be followed as part of communications management. These limitations must be clearly understood and communicated where appropriate. While communications management is arguably one of the most important aspects of project management, it must be done in an effective and strategic manner recognizing and balancing the multiple constraints.

All project communication activities should occur within the project's approved budget, schedule, and resource allocations. The GSP(s) project managers and the leadership of the participating GSAs should have identified roles in ensuring that communication activities are performed.

To the extent possible, to support collaboration and reduce costs, GSP(s) partners should utilize standardized formats and templates as well as project file management and collaboration tools.

[5] See Appendix 1

SITUATION ASSESSMENT

3.1. *Introduction*

The challenges of asking a community to make changes in how things are done, or forging an agreement among multiple parties are often large. Prior to preparing a Coms Plan, a neutral, 3rd party facilitator conducted a stakeholder Situation Assessment (SA).

The facilitator's role was to provide an independent evaluation of potential stakeholder's interest in coordination and governance for GSA formation and GSP development and identify any barriers or concerns that would need to be addressed for the GSA formation process and GSP(s) development to be successful.

3.2. *Situation Assessments*

An SA is an information-gathering process that informs outreach, engagement and collaboration. As part of preparing the basin communication's process, it was important to know more about:

- Stakeholder Categories
- Opinion leaders
- Regulatory and political context
- Advocates and detractors
- Attitudes and knowledge
- Other elements useful to the crafting of decisions

An assessment is also a low risk approach to education and signaling a future relationship. It facilitates the community's appraisal of its needs, wants and values. A well-crafted assessment sets the stage for the parties to better understand and interpret their situation so that they can make informed decisions for actions, in the short term and for the future.

The Delta-Mendota subbasin SA included background research and interviews. Interviews were usually with individuals but in a few cases a very small group was convened. To encourage candor, the results of the input process were bundled so those interviewed were not individually identified unless they explicitly indicated they wished to share their individual response.

3.3. *Background Research*

The facilitator worked closely with the SLDMWA and DWR to identify useful documents, plans and activities that might inform the overall communications planning process.

3.4. *Interviews and Consultations*

Using information gathered during the background research and similar GSA formation efforts throughout the state, the facilitator worked with the SLDMWA to craft interview questions. The facilitator also provided some selection criteria to the SLDWMA to help identify a representative group of interview candidates. Once selected, the SLDMWA staff and facilitation team invited the interviewees to participate. In addition to full interviews, additional calls and in person communications were conducted to acquire amplifying information. **Figure 4** provides a quick overview.

Figure 4. Interview and Consultation Quick Facts

Number of Contacts: 30

Dates of Calls and Interviews Conducted:
February to May 2017

Average Length: 1 hr.
(Shortest = 20 mins., Longest = 1.5 hrs)

Selected participants were all engaged or otherwise stakeholders in some aspect of the basin GSA development process.

A project background sheet was provided in advance of each formal interview and used again during the interviewee discussions with the facilitator. Each interview followed the same format and included 16-18 questions (depending on whether or not a follow-up question was needed).

The questions covered the following topics pertaining to the GSA formations and GSP(s) development:

1. Overarching perspectives from each key stakeholder on general groundwater conditions, GSA governance; subbasin management and associated SGMA compliance
2. Preferred methods to achieve groundwater sustainability consistent with SGMA requirements
3. The level of agreement/conflict around groundwater governance across the range of stakeholder perspectives
4. Experience with facilitated processes, outreach and engagement, and the goals for such support
5. Potential configurations of governance and formations of GSAs and GSP development

3.5. ***Summary of key findings***

Interview results indicate an overall positive environment for the project and project communications; however, the effort will require interactions of a large number of parties and planning for an extremely complex system. Following are the reflections, ideas and suggestions of those contacted.

3.5.1. Related to Groundwater Sources and Trends

- *Significant observed impacts associated with Weather, Water Project Deliveries and Cropping Patterns* – Participants observed a declining groundwater situation and were able to attribute it to drought and weather (particularly timing of seasonal rainfall and periods of prolonged, higher temperatures), conversion to permanent crops, and significant changes in access to surface water.

- *Surface & Groundwater Nexus* – As noted in comments related to access to surface water, there was a clear understanding of the surface/groundwater nexus. Many believed that any realistic solution would have to include a full assessment of the region's surface water future.

- *Extremely Complex Systems* – Many of those interviewed reported that parts of the subbasin were doing fine and could, with good management, be sustainable. They described problems as being primarily in pockets of the subbasin. They also characterized some parts of the subbasin as not being managed sustainably and indicated that they believe this would have continued had SGMA not passed. While it was generally agreed that it would have been better if SGMA was not driving the change, they felt change would not occur without something like SGMA. Several of the participants were able to describe specific locations and situations that illustrated this.

  Issues related to operations of the Bureau of Reclamation, the Delta-Mendota Canal (DMC), the Mendota Pool and restoration activities are of keen interest to all the stakeholders. Everyone was familiar with issues of subsidence and with the facts and figures represented in graphics like those in **Figure 5**, prepared by the United States Geological Survey (USGS).[6]

  Many perceived that groundwater supplies for municipal uses in some parts of the basin were at risk.

- *Historic Rights and Arrangements* – Access to surface water is based on numerous historic rights and agreements as well as more contemporary agreements. As such there is no **single** description of the status of surface water availability among the many subbasin GSAs,[7] although there is a strong understanding of the rights and arrangements that do exist.[8]

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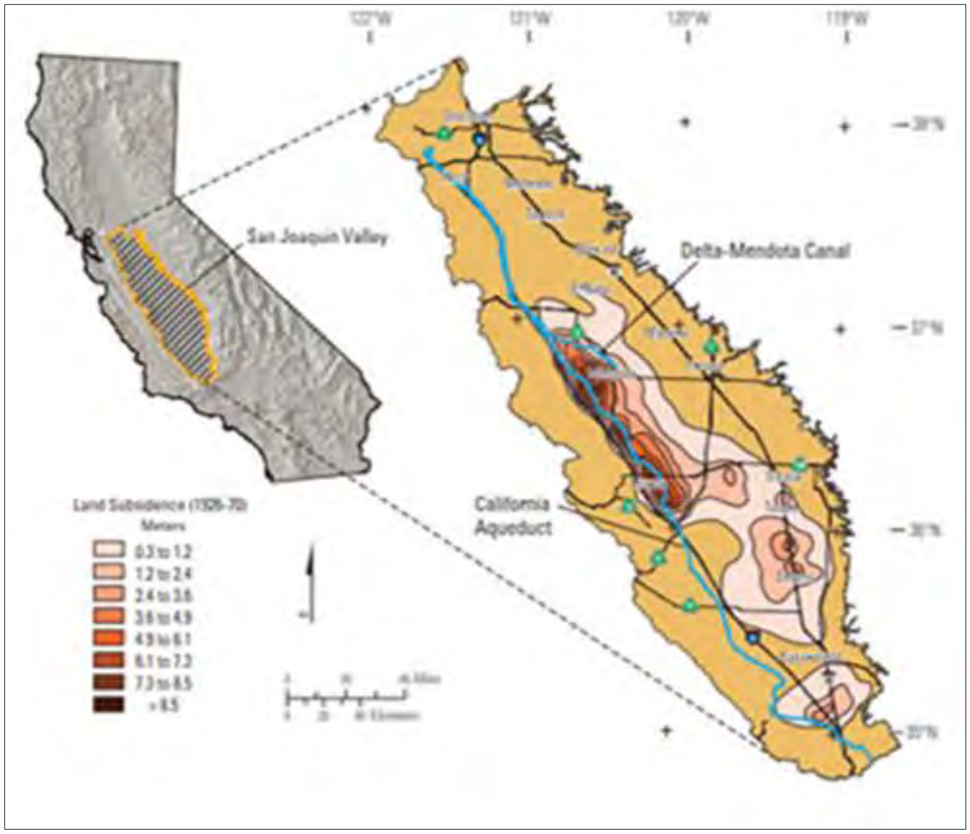
[6] U.S. Department of the Interior | U.S. Geological Survey: https://ca.water.usgs.gov/projects/central-valley/delta-mendota-canal.html, Page Last Modified: Monday, 20-Mar-2017 22:39:47 EDT

[7] A full inventory of water rights and arrangements for the subbasin GSAs is recommended to be prepared as part of the GSP planning process.

[8] In 2010 there were 1,403 water rights claimed in the San Joaquin Delta watershed, the largest number of any watershed in the State. [Source: Associated Press: Original data source is State Water Resources Control Board eWRIMS, Database

Figure 5. USGS Illustration of the DMC and Subsidence



The hierarchy of water rights as well as laws related to groundwater rights will be a significant factor in GSP negotiations.

Another historical factor related to sustainability is the character of land ownership. There was a perceived difference in the values placed on sustainability by multi-generational family farms versus investor driven agriculture and/or water development.

3.5.2. Related to GSA Governance; Subbasin Management and SGMA Compliance

- *Numbers* - The subbasin includes numerous Water Agencies (35) and other potential GSA eligible agencies including Cities and Counties (such as Dos Palos, Firebaugh, Gustine, Los Baños, Mendota, Newman, Patterson, Fresno, Madera, Merced, San Joaquin, and Stanislaus) and Community Service Districts (CSDs) including among others Grayson, Westley, and Volta, as well as multiple Resource Conservation Districts (RCDs) that for the most part were within the general boundaries of other GSA eligible authorities (Panoche, Poso and Grasslands as an example).

By the June 30, 2017 filing deadline, 23 eligible entities had formally filed GSA formations and met SGMA requirements for subbasin coverage.

Even with this large number of GSA entities, during the SA interviews and in a follow-up survey, most agencies indicated a preference for a reduced number of GSPs and potentially just one or two.

At the time of this assessment there was not a full understanding of all of the potential requirements of being a GSA and ultimately what might be required to prepare a compliant GSP.

Table 3. Number of Subbasin Public Water Agencies

Number of Public Water Agencies

- Merced County
- Fresno County
- Broadview WD
- Centinella WD
- Central California ID,
- Davis WD
- Del Puerto WD
- Eagle Field WD
- El Solyo WD
- Farmers WD
- Firebaugh Canal WD
- Foothill WD
- Fresno Slough WD
- Grasslands WD
- Hospital WD
- Kern Canon WD
- Laguna WD
- Mercy Springs WD
- Mustang WD
- Oak Flat WD
- Orestimba WD
- Oro Loma WD
- Pacheco WD
- Panoche WD
- Patterson WD
- Romero WD
- Salado WD
- San Luis Canal Company
- San Luis WD
- Santa Nella C.WD
- Sunflower WD
- Tranquility ID
- West Stanislaus ID
- Widren WD
- Quinto WD

At the time of this assessment participants did not fully recognize the potential number of stakeholders and/or the requirements to conduct outreach.

- *Subbasin Governance Structures* – Many individuals and entities within the subbasin have experience working in cooperative governance and related structures. For example, the SLDMWA provides leadership for an Integrated Resource Water Management Plan (IRWMP) illustrated in **Figure 6**[9] on the following page. Many of the stakeholders are also involved with Irrigated Lands Coalitions (see **Figure 7**).[10]

  Likewise, many are also involved in efforts related to the Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) initiative (see **Figure 8**).

[9] Source : San Luis & Delta-Mendota Water Authority, Westside-San Joaquin Integrated Water Resources Plan, July 2014

[10] Source: Central Valley Regional Water Resources Control Board

Existing Cooperative / Collaborative Governance Structures with Delta Mendota Subbasin Stakeholders

Figure 6. Integrated Regional Water Management Groups

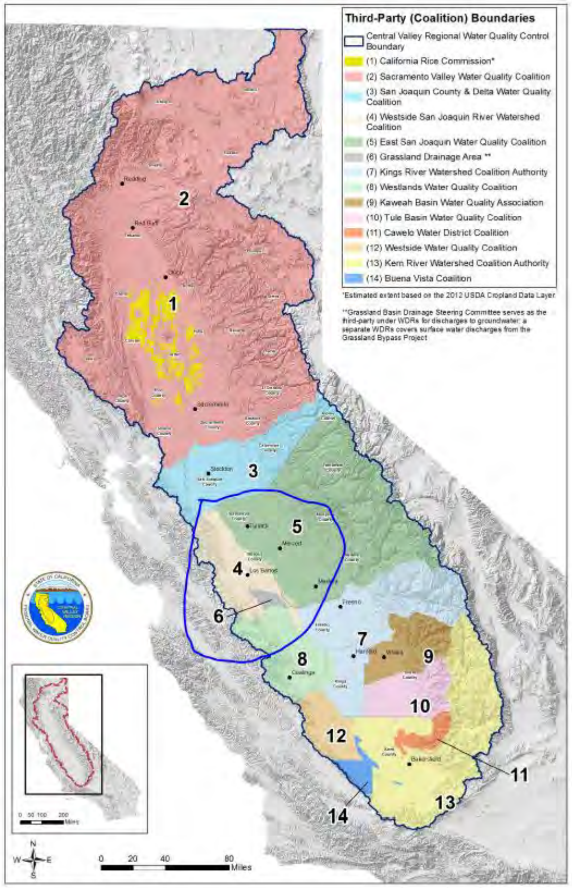


Figure 7. Irrigated Lands Coalitions

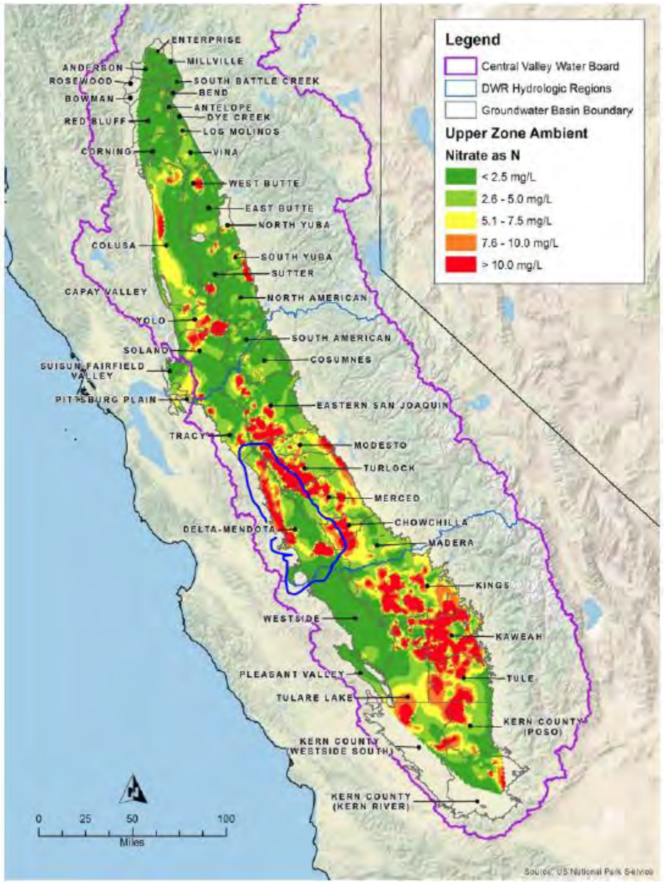


Figure 8. CV-Salts Initiative

CV-Salts was launched to develop sustainable salinity and nitrate management planning for the Central Valley. (See **Figure 8**.[11])

Finally, there are multiple arrangements in place related to surface water transfers and other previous groundwater management planning efforts.

Experience with these programs has created a capacity for collaborative planning that will be essential for GSP development. It also creates opportunities to access and leverage existing stakeholder meetings and events rather than needing to convene multiple new stakeholder processes.

3.5.3. Issues to be Addressed in Creating a Sustainability Plan

Some of the participants indicated they had an extremely good understanding of their section of the subbasin, with exact and extensive records to support their perspective. They found that making projections using historical data had been more reliable than some of the groundwater models that were in use.

In thinking about development of a GSP they felt there could be some difficulty in developing water balances due to lack of quality data for some locations. Another mild concern was the potential for disagreements about the selection of a groundwater model(s) or reconciling differences among methods.

Still another concern was the capacity of the GSAs and/or GSA members to fully participate. Some of these agencies are very lightly staffed and have varying levels of knowledge related to groundwater management. All of the participants had significant other duties prior to the passage of SGMA.

One concern, expressed after completion of the assessment, was the potential for some agencies to simply opt out of participating in the development of a GSP but still receive the benefits of the region having an approved plan without having contributed to the larger good of the subbasin.

3.5.4. Representation

The State Board lists the following as Required Interested Parties for the purpose of SGMA outreach:

- All Groundwater Users
- Holders of Overlying Rights (agriculture and domestic)
- Municipal Well Operators and Public Water Systems
- Tribes
- Counties
- Planning Departments /Land Use
- Local Landowners
- Disadvantaged communities
- Business

[11] Ibid

- Federal Government
- Environmental Uses
- Surface Water Users (if connection between surface and ground water)

All of these stakeholder categories were contacted in the interview process excepting tribes. In the case of tribes, there are no classified tribal lands in the Delta-Mendota subbasin, therefore no planning, outreach or communication needs are currently anticipated for tribes.

Due to subbasin characteristics, a primary focus of the assessment was on agricultural, disadvantaged communities (DACs) and municipal groundwater users.

- *Related to Agricultural Representation* - most respondents believed that the elected leadership of the GSA agencies would do a good job in representing agriculture and noted that many of them were growers themselves. It was also noted that farmers were busy and would be far more interested in any specifics of a GSP that would impact operations or the degree of certainty about water availability than the particulars of GSA governance.

- *Regarding DACs* - Much of the subbasin and its counties (San Joaquin, Stanislaus, Merced, and Fresno) have communities that meet the DAC definition and the region is generally considered disadvantaged. The ability of DACs to participate in GSP development was considered limited and it was thought that there would be a need for specific and direct outreach to DACs through elected leadership and via use of trusted community advocates. As part of the SA, several of those interviewed identified themselves as being able to represent a DAC perspective and one in particular was particularly concerned about the availability of Spanish language materials. As a result, Spanish language materials were included in the meeting materials of the public GSA adoption meetings and the SLDMWA provided a fluent Spanish speaker to assist with meetings.

In the past, to promote DAC identification and involvement, the Westside-San Joaquin IRWM previously conducted an extensive survey of private and public community representatives to educate and encourage understanding of the IRWM process, to help understand the issues confronted by DACs, and to better address the needs of minority and/or low-income communities. This effort resulted in identification of DACs in the Region and an initial list of 22 projects that would benefit DACs and low-income communities. Given known constraints on this community it is recommended that more focused DAC outreach should be coordinated with the IRWM. This effort is now in progress.

- *Regarding Municipals* - The SA outreach also included interviewing Municipal Stakeholders. A significant number of the Cities are fully dependent on wells for water supply and issues related groundwater management are of grave concern. These representatives all felt that even while it would be difficult to make time to participate in GSAs and GSP development, that they must make the time. Many had also determined that they wished to form their own GSA to reflect their specific interests in any kind of broader GSP negotiation.

- *Regarding Environmental Interests* - There appeared to be a less defined stakeholder segment representing traditional, environmentally focused issues. Outreach was made to subbasin government agencies that often serve as a surrogate for these interests and an informal consultation occurred with a representative of the Planning and Conservation League to identify any known, active stakeholders. However, no specific entity or individual was identified by those contacted. A general perception was that this community would desire engagement and would designate representatives if the GSP development was thought to potentially impact existing restoration or other environmental concerns but the formation of GSAs per-se, was of less interest. The next phase of communications should include outreach to organizations such as Audubon, the Nature Conservancy and Ducks Unlimited just to ensure due diligence. These connections will be important going forward, particularly if environmental issues are identified.

- *Regarding Industrial Users* – The region includes some industrial water users. This sector has a relatively lower percent of water use compared to other subbasins users; however, representatives of the sector pointed out how essential access to water was to their industry. The interviewees also emphasized how important these industries were to the local economies. There was a stated concern about representation since there didn't appear to be a direct way to engage, particularly with multiple GSAs being formed.

- *Regarding Counties & Planning Agencies* – All of the subbasin counties have designated representatives and all are assisting with GSA coverage for areas not otherwise covered by a GSA. All of the city and county representatives had direct engagement with the planning arms of their jurisdictions, or were staff to the planning departments. These representatives, like the municipal representatives, viewed this as critical issue even as it creates new workload for the already busy entities.

3.5.5. Communications and Facilitation Preferences

Participants were asked to describe their communications preferences. Several offered specific suggestions on written materials. Most did not believe there would be a need for a high frequency of communications directly with non-GSA stakeholders.

Several suggested using regularly scheduled activities of existing groups and gatherings to share information rather than creating stand-alone events. They listed annual meetings of the water agencies as one good venue as well as meetings related to the IRWM and Irrigated Lands. Several also thought that it would be good to go to places like Farmers Markets, particularly for the disadvantaged communities, and County Fairs.

Farm Bureau representatives also indicated a willingness to support outreach efforts. The Merced Farm Bureau, in particular, has already helped to advertise public meetings related to GSA formations.

Related to facilitation there was not a broad exposure to professional facilitators among many of the stakeholders. Even so, participants consistently listed qualities such as fairness and transparency, a good understanding of the issues, and confidence as helpful facilitator strengths. There was a sense that the GSAs would not need hand holding but that facilitation could be useful for helping the stakeholders forge decisions and making what many believed would need to be compromises.

3.5.6. Success Factors, Barriers to Success

The participants were asked to describe their view on the odds for success as well as any barriers that would prevent successful completion of a GSP.

Overall, most participants expressed a medium to high likelihood for success. They noted that the carrot (grants and technical support) and stick (significant regulatory intervention) by the State creates a dynamic that is supportive to success.

Participants stated barriers related to the capacity of the GSAs to participate and ultimately agree to, and implement changes. The much diffused governance structure of multiple GSAs amplifies this dilemma as do actions beyond the control of the subbasin entities (such as climate and water deliveries).

In addition to perceived barriers, participants outlined their thoughts on opportunities and success strategies.

- *Drought* – While the drought was unwelcome it increased awareness of the need for changes. Many felt it would be easier to move forward while the topic is prominent in everyone's minds.
- *Short and Long Game* – Several suggested it will be important to have a plan that includes long and short term strategies and activities.
- *Integrated Planning* – Many of the participants emphasized the importance of integrated planning.

3.5.7. Other Comments and Advice

Many participants expressed appreciation for being contacted and invited the facilitator to contact them again if there were questions.

3.6. *Promising messages and methods*

Three primary communications strategies have already been identified for the GSP(s) development:

- Leveraging the activities of existing groups
- Providing targeted, communications and outreach to opinion leaders in key stakeholder segments
- Providing user friendly information and intermittent opportunities for a broader range of stakeholders

The same strategies aligned with the recommendations of the SA participants. These methods will allow stakeholders to engage commensurate with their degree of interest while providing sufficient information to ensure long-term success for plan development and implementation.

AUDIENCES AND MESSAGES

GSA formation and GSP(s) development**,** like most large planning efforts, consists of a broad range of stakeholders with differing interests and influence.

4.1. Two Core Audience Segments

This Coms Plan Anticipates two core audience segments. First is the subbasin GSA Boards and the communications among and between themselves. This audience segment is significant in size given that 23 GSAs will be working to develop a GSP(s) and each GSA has its own Board and audiences.

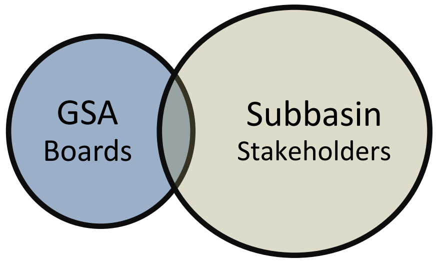


Figure 9. Two Core Audience Segments

The second audience is the subbasin stakeholders as identified in SGMA. This audience is also large. Many of the stakeholders are shared by the GSA Boards and some of the larger stakeholder segments are also represented on the GSA Boards (see **Figure 9**).

Nearly all of the communications strategies apply to both segments; however, some strategies apply to one or the other specifically and are so identified.

4.2. Communications and Change Management

The process of adopting and implementing a GSP will require significant change management. Communications planning should encompass basic change management approaches. Messages should also evolve over time and be tied to the planning process and key decision points. Then, for each audience and each major planning step, communications must do the following:

1. Describe what the actual proposed plan (change) is
2. Articulate how the change will directly impact the category of stakeholder involved
3. Outline the methods that will be used to implement the plan (change)
4. Define the costs and benefits of changing and not changing, and what future conditions will be if change does not occur
5. Consider unintended consequences and others that may also be impacted by the same change then develop a strategy to engage them
6. Offer opportunities for input and for stakeholders and others to improve the approach

The communications requirements for large changes are often underestimated. Some experts indicate that messages may need to be delivered up to 8 different times to be fully absorbed. Communications needs will also evolve as the GSP planning progresses. **Table 4** provides a sample of early communications that focus on SGMA and groundwater basics.

Table 4. Sample – Early Phase Message Elements for Subbasin Stakeholders

Element	What the Change Is	How it will affect the Stakeholder	How the change will be Implemented	Why it is a good idea
Early Phase GSP Development	• Locally governed GSAs will work together to sustainably manage ground water. • The Subbasin /Basin is required to ensure Sustainable Groundwater Management by submitting a sustainability plan by 2020. • The plan must be implemented and found to result in sustainable management by 2040.	(Unique to audience type) • Changes in the current methods of acquiring and utilizing groundwater may occur. • May affect future decisions related to crop types and decisions related to conjunctively using surface water. • May provide additional project resources to the DAC communities.	A collaborative approach is being undertaken to prepare the plan with multiple GSAs coordinating with the SLDMWA as the planning organizer.	• Sustainable and wise use of groundwater allows for the success of future generations and creates greater certainty for today's beneficial users. • Failure to act may result in negative regulatory consequences.

As part of the GSP planning process, the next phase of communications will also need to communicate the requirements for sustainability and how they are achieved in the context of the Delta-Mendota subbasin. Then, communications related to GSP specifics and adoption will require additional outreach, targeted to specific audiences.

4.3. Tied to Decision Making

Communications should also be tightly linked to decision making. For each anticipated decision, stakeholders for that decision should be identified and the following addressed.

1. Who (Is the stakeholder)
    a. An impacted party?
    b. A potential planning partner?
    c. A potential provider of services or resources?
    d. A regulator of the activity?
    (Note: Maybe more than one category.)

2. What (What is the interest of the stakeholder? How will the stakeholder be affected? What are the stakeholders' needs?)
3. Who (Who is the right messenger for the information)
4. How (How should the information be delivered? What are the best methods?)
5. When (What is the appropriate timing for the messages?)
6. Engagement and Knowledge Transfer (How do we create two-way communications?))

Table 5 illustrates some of these ideas.

Table 5. Communications Planning Questions

Who	Interest	Messenger	Delivery	Timing	Knowledge Transfer
• Impacted • Partner • Provider • Regulator	• How will decision affect? • What will stakeholder need?	• Who is a trusted information Source? • How do we ID and Partner	• What are the best delivery methods?	• When should we conduct outreach?	• What do the stakeholders know that we need to know?

4.4. *GSA Boards*

Due to the multiple subbasin GSAs, specific focus is needed on communications to keep them informed, provide consistent updates and information that the Boards can use in their own outreach, and support their decision making. Primary objectives for communications with the subbasin GSA Boards are to ensure:

- Consistent understanding of the requirements for a GSP and/or GSP coordination
- On-going access to current information
- Timely notice of any significant developments or decision points that may require changes to policies and/or require some other board action
- Confidence that the GSP(s) will be accepted by the GSA's stakeholders

Key communications activities involving the Board include;

1. Providing short and digestible pieces of information to ensure each Board member can quickly articulate to his/her constituents on key matters and remain sufficiently informed so that no decision points are surprises.
2. Provide user-friendly informational materials to be used with public audiences, and will support the Board with their own constituent outreach.
3. Utilize regular Board communications for routine updates and reserve specific Board agenda items for highly significant discussion items.

4.5. *Primary Audiences*

There are several core stakeholder groups that will require ongoing communications and tailored messaging throughout the planning process. They are:

- Agriculture
- Disadvantaged Communities
- Municipals

Other stakeholders requiring special consideration include:

- Industrial Users/ Business
- Regulators (State and Federal)
- Potential Partners
- Environmental Organizations
- Federal Agencies

While all of the stakeholder types are important to engage for development of a GSP, the first three will be most affected by any changes that might be proposed as a result of the *GSP(s)*.

The following provides an outline of key messages and activities in support of each of the audience types.

4.2.1. Agricultural

Messages about the GSP(s) development should feature the overall desirability of a sustainable management approach how the plan will contribute to management certainty and protect against regulatory oversight.

In thinking about irrigation users it is also important to remember that one size does not fit all.

4.2.2. Disadvantaged Communities

Messages developed for this sector should be tailored and specific to the community. This type of outreach is often best served by use of surrogates and trusted messengers. As identified in the SA, these messages should be aligned with activities of the IRWM, especially given the high, current dependence of many on unsustainable water sources. Messages about ways to access the increased availability of resources due to grant incentives should also be considered.

A specific outreach method to consider relates to the predominance of cells phones within the communities. According to the Pew Research Center, "over 50 percent of low-income households own a smartphone. Smartphone penetration in this demographic creates substantial opportunities for utilities to reach disadvantaged communities with software solutions like customer self-service platforms and targeted digital communications."[12]

4.2.3. Municipals

[12] Secondary Source: Water Smart. https://www.watersmart.com/rethinking-disadvantaged-community-engagement/ (accessed June 1, 2017)

Some care will be needed to address tensions related to the relative percentages of use by Municipal agencies and what constitutes highest and best beneficial uses within an agricultural region. A promising interaction with this community would involve collaboration on messaging to achieve mutually beneficial goals.

Some thought it might be possible for the municipal agencies to provide in-kind support to the GSP development process through support for project websites and mailing lists, production of meeting notices, assistance to the planning process from in-house public information professionals and offering access to physical meeting spaces.

Municipals may need assistance in making the case for the need to think at a Basin scale rather than more local terms.

4.2.4. Business and Industry Interests

Business and industry interests seek assurances about the availability of water for operations and the viability of the farming industry in the region. Messages for these audiences should focus on how the GSP(s) development will contribute to sustainability and how these audiences can participate in discussion specific to their interests.

4.2.5. Regional/Statewide Interests and Regulators

Some degree of uncertainty remains in the overall legal, legislative and regulatory environment as it relates to SGMA implementation.

It is in the interest of the subbasin stakeholders to engage state and federal agencies and regulators throughout the process. These parties may have resources to assist the subbasin and a cooperative attitude will build good will in the event that adjustments are needed to achieve SGMA compliance.

4.2.6. Potential Agency Partners

A variety of collaborations to achieve GSP(s) development goals may be possible. The GSAs should consider the potential for collaboration with non-GSA members and inter-basin (adjacent subbasin) partners, as part of plan deliberations.

4.2.7. GSP Coordinators Planning Forum

A planning forum for subbasin GSP coordinators should be established to further inform a coordination strategy. This forum would include agency representatives as well as the consultant teams and be used for the sole purpose of coordination and mutual support. It is anticipated that this body might meet on a quarterly or as needed basis. This forum would also provide a central point of contact for adjacent subbasin coordinators.

4.2.8. Environmental Community

As noted in the SA, this community will be interested in a GSP features. The focus of messaging for this group being on how the GSP(s) development will contribute to a sustainable regional water portfolio. Special effort should be made to identify specific topics of interest. For example, as part of GSP development, a list of groundwater dependent species may be created, or impacts to wetlands may be identified. These types of lists would highlight where input from the environmental community might be needed.

4.2.9. Federal Government

Federal representatives interviewed for the assessment asked to be kept informed of subbasin SGMA activities. These agencies have a direct interest in surface water integration as well as SGMA activities that could impact wetlands restoration efforts or groundwater dependent ecosystems and species.

RISK MANAGEMENT

Risk management is the identification, assessment, and prioritization of risks (defined as *the effect of uncertainty on achieving objectives*) followed by coordinated, efficient and economical strategies and actions to minimize, monitor, and control the probability and/or impact of negative events. Strategies and actions may also be used to avert risk by leveraging strengths and opportunities.

Risks can come from uncertainty in economic factors, threats from project failures (at any phase), regulatory and legal uncertainties, natural causes and disasters (drought, flood, etc.), as well as dissention from adversaries, or events of uncertain or unpredictable circumstances. Several risk management standards have been developed. This analysis utilizes those from the Project Management Institute.

Table 6 outlines standardized risk categories and translates them to outreach risks.

Table 6. Risk Factors

RISK CATEGORY	Outreach RISK FACTORS
Technical, quality, or performance	• Realistic performance goals, scope and objectives
Project management	• Quality of outreach design • Outreach deployment and change management • Appropriate allocation of time and resources • Adequate support for Outreach in project management plans
Organizational / Internal	• Executive Sponsorship • Proper prioritization of efforts • Conflicts with other functions • Distribution of workload between organizational and consultant teams
Historical	• Past experiences with similar projects • Organizational relations with stakeholders • Policy and data adequacy • Media and stakeholder fatigue*
External	• Legal and regulatory environment • Changing priorities • Risks related to political dynamics

5.1. Technical, quality, or performance

The subbasin is fortunate to have a high level of water knowledge and skilled personnel available to assist with GSP planning. In general, stakeholder expectations for outreach and performance goals, scope and objectives are attainable. The larger concern in this category is properly communicating the scope of the GSP(s) development and the need for extensive coordination and outreach among a number of parties. Communication of SGMA requirements for outreach as a planning requirement should be an ongoing consideration and appears to be underestimated in emphasis.

5.2. Project management

A number of positive project management factors are present for the GSP(s) development outreach. Project managers view outreach as an important planning element. The outreach design is based on best management practices and industry standards. It is not overly complicated and with technical services support from DWR and other sources, sufficient resources should be available to properly execute it. Procedures and practices are already in place that can be leveraged to achieve communication goals.

The primary concern in this category relates to GSP coordination. This type of outreach will require additional assessment as the individual GSAs will determine their own protocols for representation.

5.3. Organizational / Internal

Conflicts with other GSA member functions and/or conflicts with outreach activities by efforts that include the same stakeholders (e.g. Irrigated Lands, IRWM, and CV-Salts) should be monitored.

One additional consideration will be the distribution of workload between GSA, organizational and consultant teams. Clear roles and responsibilities must be defined and continuous interaction in place to ensure successful execution.

The GSP(s) development process will also need identified, high level spokespersons or champions. These individuals should be able to discuss subbasin planning with the media, in discussions with regulators and potentially at professional conferences.

5.4. External

The legal and regulatory environment of the GSP(s) development process is complex and evolving. Ongoing issues with surface water deliveries and changing agricultural market conditions are outside of the control of the parties. It will be important for mechanisms to be in place that allow for relatively rapid responses to changing conditions.

5.5. Historical

The primary stakeholders in this process generally view interactions and meetings as productive. There is a history of cooperation and a willingness to work together to save costs and achieve better outcomes.

TACTICAL APPROACHES

Following are specific tactical approaches that may be utilized to deliver the activities, messages, and recommendations of the previous chapters. These approaches are based on best communication practices and grounded in the public participation philosophy of the International Association for Public Participation, Public Participation Spectrum as illustrated in **Table 7**.

The Spectrum represents a philosophy that outreach should match the desired level of input from both the stakeholder and the organizational entity.

Table 7. IAP2 Public Participation Spectrum

IAP2 Public Participation Spectrum

Developed by the International Association for Public Participation

INCREASING LEVEL OF PUBLIC IMPACT

INFORM	CONSULT	INVOLVE	COLLABORATE	EMPOWER
Public Participation Goal:	**Public Participation Goal:**	**Public Participation Goal:**	**Public Participation Goal:**	**Public Participation Goal:**
To provide the public with balanced and objective information to assist them in understanding the problems, alternatives and/or solutions.	To obtain public feedback on analysis, alternatives and/or decisions.	To work directly with the public throughout the process to ensure that public issues and concerns are consistently understood and considered.	To partner with the public in each aspect of the decision including the development of alternatives and the identification of the preferred solution.	To place final decision-making in the hands of the public.
Promise to the Public:	**Promise to the Public:**	**Promise to the Public:**	**Promise to the Public:**	**Promise to the Public:**
We will keep You informed.	We will keep you informed, listen to and acknowledge concerns and provide feedback on how public input influenced the decision.	We will work with you to ensure that your concerns and issues are directly reflected in the alternatives developed and provide feedback on how public input influenced the decision.	We will look to you for direct advice and innovation in formulating solutions and incorporate your advice and recommendations into the decisions to the maximum extent possible.	We will implement what you decide.
Example Tools:	**Example Tools:**	**Example Tools:**	**Example Tools:**	**Example Tools:**
• Fact sheets • Web Sites • Open houses	• Public comment • Focus groups • Surveys • Public meetings	• Workshops • Deliberate polling	• Citizen Advisory Committees • Consensus-building • Participatory decision-making	• Citizen juries • Ballots • Delegated decisions

Based on the assessment findings for the GSP(s) development, most stakeholders would simply like to be INFORMED unless there is a potential for significant changes that may include that stakeholder. Tactics for this group will include fact sheets, websites, open houses, briefings, and informational items placed in publications they already read.

The next largest group of stakeholders, primarily groundwater pumpers and disadvantaged communities, wish to be CONSULTED. This group will have access to all the materials prepared as part of the informational phase. In addition they should be invited to provide comments on written materials and planning concepts and participate in focused workshops and/or briefings. They should also be invited to attend larger public meetings.

The development of some GSP features may require a higher degree of <u>INVOLVEMENT</u>. This would focus on engagement of a subset of stakeholders that may experience significant impacts associated with SGMA.

<u>COLLABORATION</u> opportunities have also been identified; however, they are of a different character than defined in the Spectrum. Collaboration in this GSP(s) development process will focus on working with partners that have mutual goals to achieve those goals together. This will more resemble a partnership than a public engagement activity.

6.1. Communications Coordination.

Each GSA is required to perform legally mandated outreach activities and the GSP submission guidelines require a minimum level of engagement.

The subbasin GSAs should coordinate outreach activities even if there is a decision to move forward with multiple GSPs. In addition to efficiency and cost savings (the GSAs can share resources) this strategy will allow for consistency in messaging and reduce confusion for stakeholders that may not know what GSA jurisdiction they are in, and/or are in multiple GSA jurisdictions. Following are suggested options for communications coordination.

1. Website
2. Meeting calendar
3. Branded informational Flyers, Templates, PowerPoint Presentations, etc.
4. Periodic newsletter
5. GSP related mailing lists
6. Descriptions of interested parties
7. Issues and interest statements for legally mandatory interested parties
8. Public workshops
9. Message calendar
10. Press releases and guest editorials
11. Speakers Bureau
12. Existing group venues
13. Outreach documentation

6.2. Tactics

6.2.1. <u>Website</u>

As part of the communications plan development, a list of website concepts and draft website content was prepared. The following describes the proposed approach:

a. Centralized – Establish a centralized website for the entire subbasin.
b. Individual GSAs – Posting of material to a website is part of the SGMA requirements. Those GSAs with their own webpages can link to and from the centralized site if they wish to provide their own customized information. For those GSAs without their own website, courtesy pages would be provided as an added feature of the main site. The courtesy pages would all use a single template with the same information to facilitate easy management and updates. Individual GSAs choosing to take advantage of the courtesy pages would be responsible for ensuring that information is current. The page should include a "Last Updated" box to indicate the timeliness of the information.
c. **Basic features** – A basic website framework has already been developed along with introductory information that has prepopulated each page. **Figure 10** illustrates the basic content of the site and includes:
    1. Background information
    2. Information about getting involved, including meeting information
    3. A separate link for Spanish Language materials
    4. Frequently asked questions
    5. Links to GSAs
    6. Contact information

Should a GSA decide to not participate in the Central website, a similar structure could be utilized.

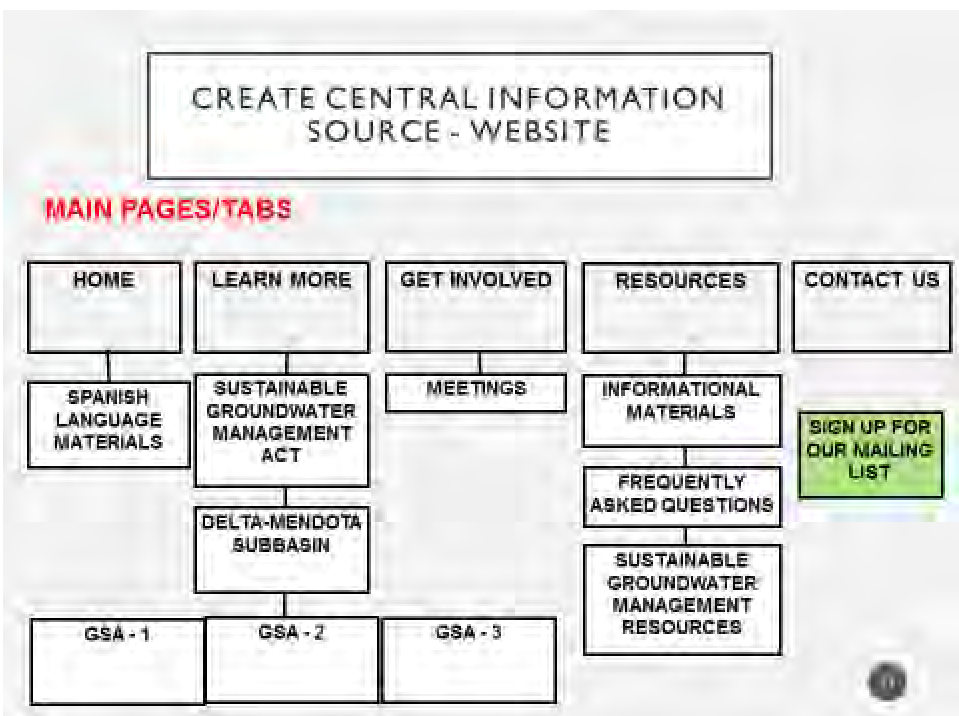


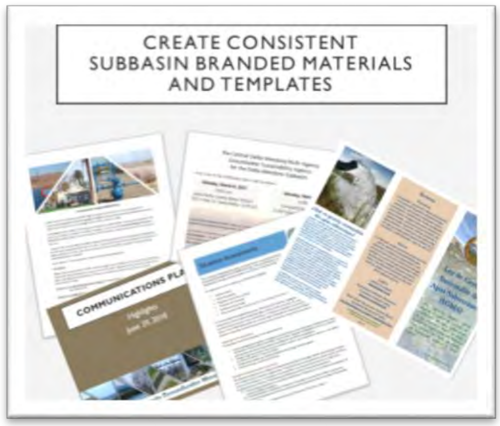
Figure 10. Website Structure

6.2.2. Meeting Calendar

A shared meeting calendar will provide a one-stop shop for stakeholders and assist in preventing meeting conflicts while creating more potential for shared activities. This calendar should include current and scheduled meetings and workshops as well as serve as the repository for agendas and meeting notes, along with copies of meeting materials and presentation.

An integrated project calendar should also be developed that links planning project milestones with communications milestones.

6.2.3. Branded Informational Flyers, Templates, PowerPoint Presentations, etc.



Subbasin level materials should have a single look and feel to create on-going consistency and visual recognition by stakeholders. Use of templates, shared presentations and flyers will create efficiencies and reinforce messaging. This communications plan incorporates some of this type of branding.

6.2.4. Periodic Newsletter

The need for regular communications cannot be overstated. One option is production of a periodic newsletter. Given the relatively short GSP(s) development process timeframe and the GSP development requirements for periodic outreach to identified stakeholders, a quarterly schedule would be realistic and achieve compliance with SGMA requirements for periodic updates to stakeholders. The newsletter should be designed so that individual GSAs can add tailored information if they choose to. For Portable Document Format (PDF) versions of the newsletter, a GSA could add a simple one or two page insert and the edition could be used as a handout or mailer. For a professional looking, email version of the newsletter, we recommend free or low cost services such as Mail Chimp or Constant Comment, which can be integrated with mailing lists.

Adding GSA specific information to an email newsletter can be done with web-links in the email to the very same PDF page prepared for the hardcopy mailer. An alternative is emailing the entire newsletter PDF as an attachment (although this format is less likely to be read than the mailer services).

6.2.5. GSP related mailing lists

Each GSA is required to develop notification lists. A central list may be utilized for GSP(s) related notifications.

6.2.6. Descriptions of Interested Parties

Each GSA is required to develop descriptions of interested parties. These lists should be updated and merged for use in the GSP(s) submittal(s). These can also be provided as background information on the website as part of constructing an administrative record. The SA in Chapter 4 provides an initial start for this documentation.

6.2.7. Issues and Interest Statements for Legally Mandatory Interested Parties

A GSP submission must include a statement of interests for listed stakeholders. As suggested earlier, this can also be included on the website.

6.2.8. Coordinated Public Workshops

SGMA requires a series of public hearings and some public workshops. Such workshops should be coordinated with other subbasin entities.

During the GSA formation process the County of Merced and a forming GSA body conducted a joint workshop to explain more about SGMA and the proposed GSA formation. Distribution of meeting flyers and notices was done concurrently, and DWR attended the event to answer questions. The GSP development process will offer similar opportunities, not only within the subbasin, but with adjacent subbasins.

6.2.9. Message Calendar

Basic messages should be associated with the planning schedule and each stage of GSP(s) development and serve as the theme for the communications materials being generated. For example, during the GSA formation period there was a need to communicate the basics of SGMA and groundwater management. During the GSP(s) initiation phase messages should focus on the basics of groundwater sustainability and the current state of the subbasin. As the GSP(s) begins to take form the specifics of the GSP(s) and what it means for each stakeholder would be the focus.

6.2.10. Press Releases and Guest Editorials

At some point in the GSP development and implementation process, it is likely that stakeholders will be asked to make changes and/or financially support a sustainability effort. It will be more productive for the GSAs and their GSP collaboration partners to frame discussions about these changes than to have others, perhaps with less knowledge, do so on their behalf. For that reason there is a need for press releases and/or guest editorials to offer the media and stakeholders accurate information offered in the context of SGMA. This type of outreach should be closely coordinated as consistency in messages is critical to stakeholder acceptance.

6.2.11. Speakers Bureau

Efforts should be made to conduct outreach at events and meetings that already occur (e.g. Farm Bureau meetings, Rotary Club, etc.). A list of knowledgeable presenters should be developed in the event an organization or other entity would like a presentation. Speakers Bureau engagements should be recorded on the planning project meeting calendar.

6.2.12. Existing Group Venues

Fully leverage the activities of existing groups.

- Maintain a roster of existing groups and typical meeting schedules with a nexus to GSP(s) development. Add the dates to the messaging calendar.
- The list of audiences, messages and existing groups should be referenced when there is a need to deploy information.
- Conduct informal outreach with the leaders of such groups to determine the best way to interact.
- Determine what communications channels these groups are using and equally leverage these, for example by placement of articles in newsletters.

6.2.13. Outreach Documentation

A central point of contact should be identified on the website and an outreach statistics inventory should be established that identifies dates, times, audiences and attendance. This information will be also be useful in conducting follow up with stakeholders as well as documenting outreach as part of GSP submittal guidelines.

6.3. Procedural and Legally Mandated Outreach

A discussion of SGMA outreach requirements was provided in Chapter 1 and a full list of requirements is contained in Appendix 1. One major feature of the requirements is a submission to DWR of the opportunities that interested parties will be given to participate in the GSP deliberations. The Situation Assessment provides an initial description that can be added to with additional outreach.

Following are the Required Interested Parties for the purpose of mandated outreach:

Table 9 provides a list of the mandated outreach and the timeframe in which is required.

Table 8. Mandated Outreach

Timeframe	Item
Prior to initiating plan development	1. Statement of how interested parties may contact the Agency and participate in development and implementation of the plan submitted to DWR.

Timeframe	Item
	2. Web posting of same information.
Prior to plan development	1. Must establish and maintain an interested persons list. 2. Must prepare a written statement describing the manner in which interested parties may participate in GSP development and implementation. Statement must be provided to: a. Legislative body of any city and/or county within the geographic area of the plan b. Public Utilities Commission if the geographic area includes a regulated public water system regulated by that Commission c. DWR d. Interested parties (see Section 10927) e. The public
Prior to and with GSP submission	1. Statements of issues and interests of beneficial users of basin groundwater, including types of parties representing the interests and consultation process 2. Lists of public meetings 3. Inventory of comments and summary of responses 4. Communication section in plan that includes: • Agency decision making process • ID of public engagement opportunities and response process • Description of process for inclusion • Method for public information related to progress in implementing the plan (status, projects, actions)
90 days prior to GSP Adoption Hearing	1. Prior to Public Hearing for adoption or amendment of the GSP, the GSP entities must notify cities and/or counties of geographic area 90 days in advance.
90 days or less prior to GSP Adoption Hearing	2. Prior to Public Hearing for adoption or amendment of the GSP, the GSP entities must: a. Consider and review comments b. Conduct consultation within 30 days of receipt with cities or counties so requesting
GSP Adoption or Amendment	1. GSP must be adopted or amended at Public Hearing.
60 days after plan submission	1. 60-day comment period for plans under submission to DWR. Comments will be used to evaluate the submission.
Prior to adoption of fees	1. Public meeting required prior to adoption of, or increase to fees. Oral or written presentations may be made as part of the meeting. 2. Public notice shall include: a. Time and place of meeting b. General explanation of matter to be considered

Timeframe	Item
	c. Statement of availability for data required to initiate or amend such fees d. Public posting on Agency Website and provision by mail to interested parties of supporting data (at least 20 days in advance) 3. Mailing lists for interested parties are valid for 1 year from date of request and may be renewed by written request of the parties on or before April 1 of each year. 4. Includes procedural requirements per Government Code, Section 6066.
Prior to conducting a fee adoption hearing.	1. Must publish notices in a newspaper of general circulation as prescribed. 2. Publication shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. 3. The period of notice begins the first day of publication and terminates at the end of the fourteenth day, (which includes the first day.)

6.4. Items for Future Consideration

This GSP(s) Coms Plan outlines an outreach effort based on project and stakeholder needs and preferences. This document has been prepared as a working draft living document and should be updated as new information and the GSP(s) development process needs are developed.

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MEASUREMENTS & EVALUATION

A guiding principle for evaluation and measurement of the Coms Plan's success is to provide regular, unbiased reporting of progress toward achieving goals. Success may be evaluated in several ways, including process measures, outcome measures, and an annual evaluation of accomplishments. Optional evaluation measures are described below.

As part of each outreach effort debrief the following process and outcome measures will be discussed and recorded in a check sheet. The check sheets will be prepared with the goal of continuous improvement rather than criticisms.

7.2. Process Measures

Process measures track progress toward meeting the goals of the Coms Plan. These include:

- Level of attendance at outreach meetings
- Shared understanding of the overarching aims, activities, and opportunities presented by different planning approaches and project activities
- Productive dialogue among participants at meetings and events
- Sense of authentic engagement; people understand why they have been asked to participate, and feel that they can contribute meaningfully
- Timely and accurate public reporting of planning milestones
- Feedback from Coordinating Body and GSA members, regulators, stakeholders, and interested parties about the quality and availability of information materials
- Level of stakeholder interest in the GSP(s) development process information

7.3. Outcome Measures

Outcome measures track the level of success of the Coms Plan in meeting its overall goals. Some outcome measures considered for the GSP(s) development process include the following:

- Consistent participation by key stakeholders and interested parties in essential activities. Participants should have no difficulty locating the meetings, and should be informed as to when and where they will be held.
- Response from meeting participants that the engagement methods provided for a fair and balanced exchange of information.
- Feedback from interested parties that they understand how their input is used, where to track data, and what results to expect.
- The project receives quality media coverage that is accurate, complete and fair.

7.4. Mid-cycle Evaluation of Accomplishments

A mid-cycle evaluation provides an opportunity to examine the current effectiveness of the Coms Plan and provides a chance to reevaluate strategies to meet the GSP(s) development process objectives. The evaluation tasks may include:

- Preparation of an executive-level summary detailing high-level initiatives and accomplishments of the previous cycle. This evaluation should also include positive news, best practices, goals and objectives, notable changes, timelines, and priorities.
- Identifying gaps and areas for improvement.
- Highlighting how gaps and areas for improvement in the cycle has been addressed.
- Outlining process and outcome measures and their current results.

ROLES AND RESPONSIBILITIES

The GSP(s) development Coms Plan outlines numerous strategies, activities and tactics. While none are highly complex, there is a requirement for coordination and clarity regarding who will be responsible for executing the tasks.

After the planning team evaluates the timelines and priorities for each of the communications activities a recommended next step is completion of a Responsible, Accountable, Consulted, and Informed (RACI) Chart. This Chart, as displayed in **Table 10**, outlines key tasks and the assignment of roles and responsibilities for accomplishing them.

Table 9. Sample RACI Chart

Activity TYPE	SPECIFIC PRODUCT	RESPONSIBLE	ACCOUNTABLE	CONSULTED	INFORMED
Internal Staff Communications, information materials for/briefings	Draft	Person A	Person E	Person I	
	Final Draft	Person A	Person E	Person I	Project Team
List Serves, mailing lists	Customer Contacts	Person B - Person A	Person E	Person I	Project Team
	Concurrent jurisdictions	Lisa Beutler/MWH	Person G	Person I	Project Team
	Other - identified stakeholders	Person A	Person G	Person I	Project Team
Web Content and Maintenance	Draft Content and Content Refresh	Lisa Beutler/MWH/	Person G	Person H	Project Team
	Site Administration	Person A	Person G	Person H	
General public Intro Packets, Fact Sheets and Brochures	Draft	Person D	Person E	Person I- Subject Matter Experts	Person J
	Revised Draft	Person D	Person E	Person I- Subject Matter Experts	Person J
	Final Draft	Person D	Person E	Person I- Subject Matter Experts	Project Team
Newsletter Content	Draft	Lisa Beutler/MWH	Person E	Person I- Subject Matter Experts	Person J
	Revised Draft	Person D	Person E	Person I- Subject Matter Experts	Person J
	Final Draft	Person D	Person E	Person I- Subject Matter Experts	Project Team

Responsible
Those who do the work to achieve the task. There is at least one person with a role of *responsible*, although others can be delegated to assist in the work required.

Accountable (also approver or final approving authority)
This is the person ultimately answerable for the correct and thorough completion of the deliverable or task, and the one who delegates the work to those responsible. There **may only** be only one *accountable* specified for each task or deliverable.

Consulted
Those whose opinions are sought, typically subject matter experts were people that are impacted by the activity; and with whom there is two-way communication.

Informed
Those who are kept up-to-date on progress, typically on the launch and completion of the task or deliverable. This is one way communication.

Role distinction
There is a distinction between a role and the individual assigned the task. Role is a descriptor of an associated set of tasks that could be performed by just one or many people.

In the case of the RACI Chart, the team may list as many people as is logical except for the Accountable role.

Scope of Work
Completion of the RACI Chart will also support development of any future scopes of work for consultant provided communication and outreach services.

LIST OF APPENDICES

Appendix 1. Public Outreach Requirements under SGMA

GSP Regulations

CODE	PUBLIC OUTREACH REQUIREMENT
§ 353.6. Initial Notification (a) Each Agency shall notify the Department, in writing, prior to initiating development of a Plan. The notification shall provide general information about the Agency's process for developing the Plan, including the manner in which interested parties may contact the Agency and participate in the development and implementation of the Plan. The Agency shall make the information publicly available by posting relevant information on the Agency's website.	1. Statement of how interested parties may contact the Agency and participate in development and implementation of the plan submitted to DWR. 2. Web posting of same information. **Timing**: *Prior to initiating development of a plan.*
§ 353.8. Comments (a) Any person may provide comments to the Department regarding a proposed or adopted Plan. (b) Pursuant to Water Code Section 10733.4, the Department shall establish a comment period of no less than 60 days for an adopted Plan that has been accepted by the Department for evaluation pursuant to Section 355.2. (c) In addition to the comment period required by Water Code Section 10733.4, the Department shall accept comments on an Agency's decision to develop a Plan as described in Section 353.6, including comments on elements of a proposed Plan under consideration by the Agency.	1. 60-day comment period for plans under submission to DWR. Comments will be used to evaluate the submission. 2. Parties may also comment on a GSA's (or GSAs') statements submitted under section 353.6 **Timing**: For GSP Submittal - *60 days after submission to DWR*
§ 354.10. Notice and Communication Each Plan shall include a summary of information relating to notification and communication by the Agency with other agencies and interested parties including the following: (a) A description of the beneficial uses and users of groundwater in the basin, including the land uses and property interests potentially affected by the use of groundwater in the basin, the types of parties representing those interests, and the nature of consultation with those parties. (b) A list of public meetings at which the Plan was discussed or considered by the Agency. (c) Comments regarding the Plan received by the Agency and a summary of any responses by the Agency. (d) A communication section of the Plan that includes the following: (1) An explanation of the Agency's decision-making process. (2) Identification of opportunities for public engagement and a discussion of how public input and response will be used.	5. Statements of issues and interests of beneficial users of basin groundwater, including types of parties representing the interests and consultation process 6. Lists of public meetings 7. Inventory of comments and summary of responses 8. Communication section in plan that includes: • Agency decision making process • ID of public engagement opportunities and response process • Description of process for inclusion • Method for public information related to progress in implementing the plan (status, projects, actions) **Timing**: For GSP Submittal – *with plan* For GSP Development – *continuous.* *[Note: activities should be included*

CODE	PUBLIC OUTREACH REQUIREMENT
(3) A description of how the Agency encourages the active involvement of diverse social, cultural, and economic elements of the population within the basin. (4) The method the Agency shall follow to inform the public about progress implementing the Plan, including the status of projects and actions.	*in the project schedule and information posted on web.]*
§ 355.2. (c) Department Review of Adopted Plan (c) The Department (DWR) shall establish a period of no less than 60 days to receive public comments on the adopted Plan, as described in Section 353.8.	1. 60 day public review period for public comment on submitted plan. **Timing**: After GSP Submittal to DWR – *60 days*
§ 355.4. & 355.10 Criteria for Plan Evaluation The basin shall be sustainably managed within 20 years of the applicable statutory deadline consistent with the objectives of the Act. The Department shall evaluate an adopted Plan for compliance with this requirement as follows: (b) (4) Whether the interests of the beneficial uses and users of groundwater in the basin, and the land uses and property interests potentially affected by the use of groundwater in the basin, have been considered. … (10) Whether the Agency has adequately responded to comments that raise credible technical or policy issues with the Plan.	1. Required public outreach and stakeholder information is submitted, including statement of issues and interests of beneficial users. 2. Public and stakeholder comments and questions adequately addressed during planning process. **Timing**: For GSP Submittal – *with plan* For resubmittal related to corrective action *– with submittal*

California Water Code

CODE	PUBLIC OUTREACH REQUIREMENT
10720. This part shall be known, and may be cited, as the "Sustainable Groundwater Management Act." **10720.3** (a) This part applies to all groundwater basins in the state. … (c) The federal government or any federally recognized Indian tribe, appreciating the shared interest in assuring the sustainability of groundwater resources, may voluntarily agree to participate in the preparation or administration of a groundwater sustainability plan or groundwater management plan under this part through a joint powers authority or other agreement with local agencies in the basin. A participating tribe shall be eligible to participate fully in planning, financing, and management under this part, including eligibility for grants and technical assistance, if any exercise of regulatory authority, enforcement, or imposition and collection of fees is pursuant to	1. Tribes and the federal government may voluntarily participate in GSA governance and GSP development. **Timing**: *Prior to initiating development of a plan.*

CODE	PUBLIC OUTREACH REQUIREMENT
the tribe's independent authority and not pursuant to authority granted to a groundwater sustainability agency under this part.	
CHAPTER 4. Establishing Groundwater Sustainability Agencies [10723 - 10724]	
10723. a) Except as provided in subdivision (c), any local agency or combination of local agencies overlying a groundwater basin may decide to become a groundwater sustainability agency for that basin. (b) Before deciding to become a groundwater sustainability agency, and after publication of notice pursuant to Section 6066 of the Government Code, the local agency or agencies shall hold a public hearing in the county or counties overlying the basin.	1. Must hold public hearing in the county or counties overlying the basin, prior to becoming a GSA **Timing**: *Prior to becoming a GSA.*
10723.2 The groundwater sustainability agency shall consider the interests of all beneficial uses and users of groundwater, as well as those responsible for implementing groundwater sustainability plans. These interests include, but are not limited to, all of the following: (a) Holders of overlying groundwater rights, including: (1) Agricultural users. (2) Domestic well owners. (b) Municipal well operators. (c) Public water systems. (d) Local land use planning agencies. (e) Environmental users of groundwater. (f) Surface water users, if there is a hydrologic connection between surface and groundwater bodies. (g) The federal government, including, but not limited to, the military and managers of federal lands. (h) California Native American tribes. (i) Disadvantaged communities, including, but not limited to, those served by private domestic wells or small community water systems. (j) Entities listed in Section 10927 that are monitoring and reporting groundwater elevations in all or a part of a groundwater basin managed by the groundwater sustainability agency.	1. Must consider interest of all beneficial uses and users of groundwater. 2. Includes specific stakeholders as listed. **Timing**: *During development of a GSP.*
10723.4. The groundwater sustainability agency shall establish and maintain a list of persons interested in receiving notices regarding plan preparation, meeting announcements, and availability of draft plans, maps, and other relevant documents. Any person may request, in writing, to be placed on the list of interested persons.	3. Must establish and maintain an interested persons list. 4. Any person may ask to be added to the list **Timing**: *On forming a GSA.*
10723.8. (a) Within 30 days of deciding to become or form a groundwater sustainability agency, the local agency or combination of local agencies shall inform the department of its decision and its intent to undertake sustainable groundwater management. The	1. Creates notification requirements that include: a. A list of interested parties b. An explanation of how interests will be considered

<table>
<tr><th>CODE</th><th>PUBLIC OUTREACH REQUIREMENT</th></tr>
<tr><td>notification shall include the following information, as applicable:
…
(4) A list of interested parties developed pursuant to Section 10723.2 and an explanation of how their interests will be considered in the development and operation of the groundwater sustainability agency and the development and implementation of the agency’s sustainability plan.</td><td>Timing: On forming a GSA & with submittal of GSP</td></tr>
<tr><td>10727.8
(a) Prior to initiating the development of a groundwater sustainability plan, the groundwater sustainability agency shall make available to the public and the department a written statement describing the manner in which interested parties may participate in the development and implementation of the groundwater sustainability plan. The groundwater sustainability agency shall provide the written statement to the legislative body of any city, county, or city and county located within the geographic area to be covered by the plan. The groundwater sustainability agency may appoint and consult with an advisory committee consisting of interested parties for the purposes of developing and implementing a groundwater sustainability plan. The groundwater sustainability agency shall encourage the active involvement of diverse social, cultural, and economic elements of the population within the groundwater basin prior to and during the development and implementation of the groundwater sustainability plan. If the geographic area to be covered by the plan includes a public water system regulated by the Public Utilities Commission, the groundwater sustainability agency shall provide the written statement to the commission.
(b) For purposes of this section, interested parties include entities listed in Section 10927 that are monitoring and reporting groundwater elevations in all or a part of a groundwater basin managed by the groundwater sustainability agency.</td><td>2. Agencies preparing a GSP must prepare a written statement describing the manner in which interested parties may participate in its development and implementation.
3. Statement must be provided to:
a. Legislative body of any city and/or county within the geographic area of the plan
b. Public Utilities Commission if the geographic area includes a regulated public water system regulated by that Commission
c. DWR
d. Interested parties (see Section 10927)
e. The public
4. GSP entities may form an advisory committee for the GSP preparation and implementation.
5. The GSP entities are to encourage active involvement of diverse social, cultural and economic elements of the affected populations.

Timing: On initiating GSP</td></tr>
<tr><td>10728.4 Public Notice of Proposed Adoption, GSP Adoption Pubic Hearing
A groundwater sustainability agency may adopt or amend a groundwater sustainability plan after a public hearing, held at least 90 days after providing notice to a city or county within the area of the proposed plan or amendment. The groundwater sustainability agency shall review and consider comments from any city or county that receives notice pursuant to this section and shall consult with a city or county that requests consultation within 30 days of receipt of the notice. Nothing in this section is intended to</td><td>3. GSP must be adopted or amended at Public Hearing.
4. Prior to Public Hearing for adoption or amendment of the GSP, the GSP entities must:
a. Notify cities and/or counties of geographic area 90 days in advance.
b. Consider and review comments</td></tr>
</table>

CODE	PUBLIC OUTREACH REQUIREMENT
preclude an agency and a city or county from otherwise consulting or commenting regarding the adoption or amendment of a plan.	c. Conduct consultation within 30 days of receipt with cities or counties so requesting
10730 Fees. (a) A groundwater sustainability agency may impose fees, including, but not limited to, permit fees and fees on groundwater extraction or other regulated activity, to fund the costs of a groundwater sustainability program, including, but not limited to, preparation, adoption, and amendment of a groundwater sustainability plan, and investigations, inspections, compliance assistance, enforcement, and program administration, including a prudent reserve. A groundwater sustainability agency shall not impose a fee pursuant to this subdivision on a de minimis extractor unless the agency has regulated the users pursuant to this part. (b) (1) Prior to imposing or increasing a fee, a groundwater sustainability agency shall hold at least one public meeting, at which oral or written presentations may be made as part of the meeting. (2) Notice of the time and place of the meeting shall include a general explanation of the matter to be considered and a statement that the data required by this section is available. The notice shall be provided by publication pursuant to Section 6066 of the Government Code, by posting notice on the Internet Web site of the groundwater sustainability agency, and by mail to any interested party who files a written request with the agency for mailed notice of the meeting on new or increased fees. A written request for mailed notices shall be valid for one year from the date that the request is made and may be renewed by making a written request on or before April 1 of each year. (3) At least 20 days prior to the meeting, the groundwater sustainability agency shall make available to the public data upon which the proposed fee is based. (c) Any action by a groundwater sustainability agency to impose or increase a fee shall be taken only by ordinance or resolution. (d) (1) As an alternative method for the collection of fees imposed pursuant to this section, a groundwater sustainability agency may adopt a resolution requesting collection of the fees in the same manner as ordinary municipal ad valorem taxes. (2) A resolution described in paragraph (1) shall be adopted and furnished to the county auditor-controller and board of supervisors on or before August 1 of each year that the alternative collection of the fees is being requested. The resolution shall include a list of parcels and the amount to be collected for each parcel. (e) The power granted by this section is in addition to any powers a groundwater sustainability agency has under any other law.	Related to GSAs 5. Public meeting required prior to adoption of, or increase to fees. Oral or written presentations may be made as part of the meeting. 6. Public notice shall include: a. Time and place of meeting b. General explanation of matter to be considered c. Statement of availability for data required to initiate or amend such fees d. Public posting on Agency Website and provision by mail to interested parties of supporting data (at least 20 days in advance) 7. Mailing lists for interested parties are valid for 1 year from date of request and may be renewed by written request of the parties on or before April 1 of each year. 8. Includes procedural requirements per Government Code, Section 6066. **Timing**: *Prior to adopting fees.*

California Government Code

CODE	PUBLIC OUTREACH REQUIREMENT
6060 Whenever any law provides that publication of notice shall be made pursuant to a designated section of this article, such notice shall be published in a newspaper of general circulation for the period prescribed, the number of times, and in the manner provided in that section. As used in this article, “notice” includes official advertising, resolutions, orders, or other matter of any nature whatsoever that are required by law to be published in a newspaper of general circulation. **6066** Publication of notice pursuant to this section shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. The period of notice commences upon the first day of publication and terminates at the end of the fourteenth day, including therein the first day.	4. Must publish notices in a newspaper of general circulation as prescribed. 5. Publication shall be once a week for two successive weeks. Two publications in a newspaper published once a week or oftener, with at least five days intervening between the respective publication dates not counting such publication dates, are sufficient. 6. The period of notice begins the first day of publication and terminates at the end of the fourteenth day, (which includes the first day.) **Timing**: *Prior to adopting fees*

Appendix 2. Communications Governance

Given the relatively large number of stakeholders, a recommendation for coordinated efforts, and the legal requirements for outreach[13] some form of communications governance is recommended.

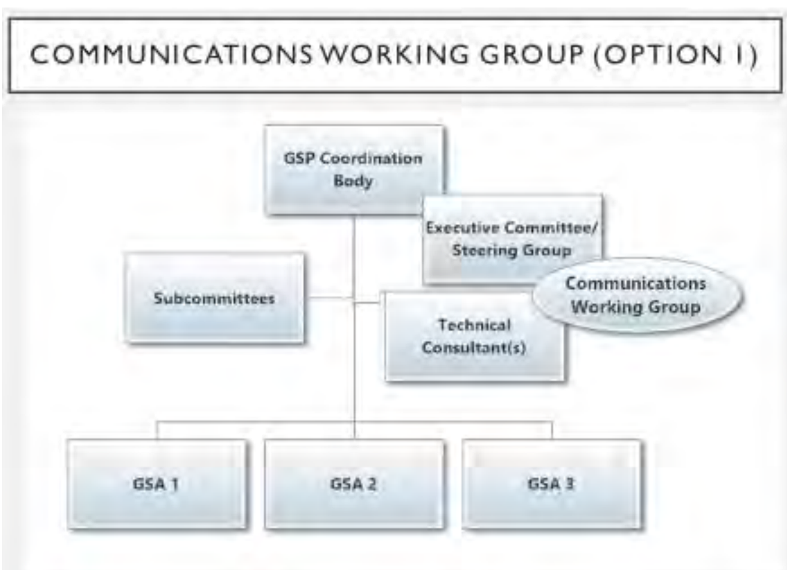
Execution of communications activities can be accomplished by an individual or multiple individuals, and/or include or be solely managed by project consultants. The actual form of the governance is less important than a clear understanding of the roles and responsibilities of those responsible for ensuring required communication. Also essential is a clear chain of command that ensures the elected representatives of GSAs are able to retain communications leadership and guidance.

A driving consideration for establishing a communications governance structure is the level of effort associated with required activities and the fact that communications are highly time dependent. That means that communications activities should be occurring that may happen outside of regularly scheduled GSA meetings. In this case delegation with guidance to a communications team is efficient and effective.

Several governance options for consideration are offered below.

Communications Option 1

Communications Option 1 is based on an overall GSP(s) development structure that includes a GSA member based leadership function that is guiding the Technical Consultants. A communications working group which might include staff, consultants and GSA elected officials, or some combination of those roles could be formed to serve as a communications working group that would ultimately report to the larger GSP coordinating body.



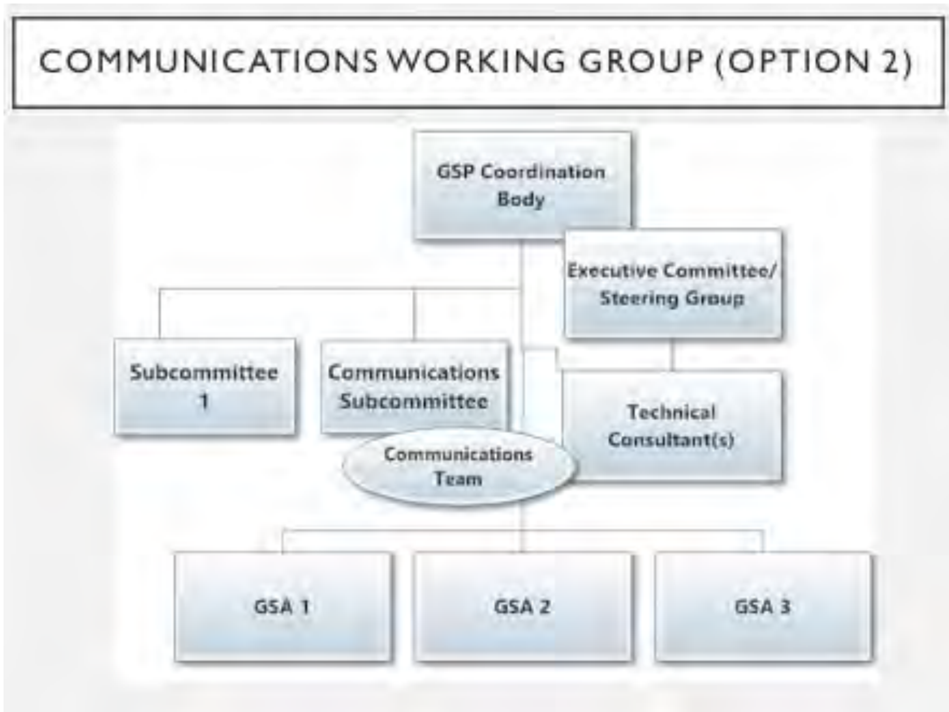
Communications Governance Option 1

Communications Option 2

[13] See Appendix 1

Appendix 1

Communications Option 1 is based on an overall GSP(s) development structure that includes a GSA member based subcommittee guiding the Technical Consultants. A communications working group which might include staff, consultants and GSA elected officials, or some combination of those roles could be formed to serve as a communications team that is affiliated with a subcommittee and would ultimately report to the larger GSP coordinating body



Communications Governance Option 2

Appendix F - Summaries of Coordinated Workshops

DELTA-MENDOTA SUBBASIN
SUSTAINABLE GROUNDATER MANAGEMENT ACT
SPRING 2018 COORDINATED WORKSHOPS

Monday, May 14, 2018, Los Banos
Wednesday, May 16, 2018, Patterson
Thursday, May 17, 2018, Mendota

WORKSHOP SUMMARY

- Three workshops were held in the northern, central, and southern parts of the Delta-Mendota Subbasin. The purpose of the workshops was to educate stakeholders and members about the public about the Sustainable Groundwater Management Act (SGMA) and introduce participants to their local Groundwater Sustainability Agency representatives. Topics covered during the workshop included what is SGMA, the Delta-Mendota Subbasin, and opportunities for public engagement.
- Workshop participants' questions and feedback are summarized as follows:
  - Are the local groundwater regulations going to be re-set on an annual basis based on the water year, snowpack, etc.?
  - Who is the governing board that will make these decisions?
  - If this is a state-wide initiative, who is the decision-making body?
  - Will the California Department of Fish and Wildlife be involved?
  - Has the State provided criteria to what is considered a "chronic loss" of groundwater?
  - Are natural springs included under SGMA?
  - What criteria will you use to measure whether or not springs are overused?
  - What is the ultimate goal of SGMA? What does it mean to us?
  - How is the water budget going to be developed?
  - The Irrigated Lands Program already has a lot of requirements for growers. Is this going to be the same level of detail and effort?
  - What is the goal SGMA is trying to achieve? How are we going to get to sustainability?
  - What will happen when the State and districts do not receive their full surface water allocation and cities keep expanding?
  - It seems to me that the biggest problem is that the State wants to export water to Southern California. How can we come up with a solution if there are factors out of our control?

- How will you know how much I am pumping?

DELTA-MENDOTA SUBBASIN
SUSTAINABLE GROUNDATER MANAGEMENT ACT
FALL 2018 COORDINATED WORKSHOPS

Monday, October 22, Firebaugh
5:00 – 7:00 PM
Firebaugh Middle School MPR

Wednesday, October 24, Los Banos
4:00 – 6:00 PM
College Greens Building

Thursday, October 25, Patterson
4:00 – 6:00 PM
Patterson Senior Center

WORKSHOP SUMMARY

- Three workshops were held in the northern, central, and southern parts of the Delta-Mendota Subbasin. The purpose of the workshops was to educate stakeholders and members about the public about key Sustainable Groundwater Management Act (SGMA) topics in preparation for Groundwater Sustainability Plan (GSP) development workshops in 2019.
- The format and content of each workshop was the same. The workshops began with a 45-minute presentation, followed by an open house period for participants to talk with their Groundwater Sustainability Agency (GSA) representative. Spanish interpretation was provided at each workshop.
- In total, approximately 45 individuals (not including GSA representatives and supporting staff) participated in the workshops. Attendance by location was as follows: Firebaugh – 5 participants; Los Banos – 23 participants; Patterson – 17 participants. Three participants requested Spanish interpretation.
- Most participants heard about the workshops through emails from their local water or irrigation district, or direct flyers and bill inserts sent to them by their water/irrigation district or municipality.
- Presentation topics included: Overview of SGMA, GSP development and implementation process, data management, hydrogeologic conceptual model, numerical and analytical models, and the water budget.
- Workshop participants' questions and feedback are summarized as follows:

  Data

    - How much historical data are the GSAs using to make their assumptions?
    - Will data from counties be used?

- Is the numerical data available on the Delta-Mendota website?
- How big will the GSAs' monitoring network be? Do the GSAs anticipate drilling new monitoring wells?
- How will the GSAs monitor water quality and subsidence? Do the GSAs already have subsidence monitoring wells and data?
- How much data have the GSAs gathered? When will the GSAs stop gathering data?
- How much data will the GSAs be collecting from individual landowners?

Models

- Will the models take into account availability of surface water supplies?
- Will the models take into account changing crops?
- Will the models take into account agricultural areas that are being converted to commercial or urban areas?

Water Budget and Sustainable Yield

- What is the sustainable yield for the Delta-Mendota Subbasin?
- It sounds like the sustainable yield will be a number that oscillates around a baseline. What is this baseline?
- How will the GSAs determine the minimum threshold for the subbasin?
- How will the water budgets account for existing and new wells?
- What are the years for the historic water budget? How was this period set?

Projects and Management Actions

- Based on what is currently known, will the GSAs be able to limit groundwater pumping in the future?
- When the GSAs come up with groundwater management policies, will the policies impact groundwater pumping on an individual level, regional level, or basin-wide level?
- Will the California Department of Water Resources (DWR) or the GSAs be the ones to limit pumping?
- Could a potential management action be limiting pumping?
- Will the GSAs be the agencies to determine if new wells can or cannot be drilled?

Integration with Other Programs/Organizations

- How much are the GSAs integrating with the Irrigated Lands Program?
- How closely do GSAs work with local farm bureaus?

Other

- Will there be an administrative fee for the GSAs to oversee GSP implementation?
- How will the costs for GSP development and implementation be covered?
- Do the GSAs know what DWR's GSP review and certification process will consist of?

- Will the GSAs in the region have influence over how surface water resources are managed on a state-wide level?
- How many GSAs were formed after SGMA passed in 2014?

DELTA-MENDOTA SUBBASIN
SUSTAINABLE GROUNDATER MANAGEMENT ACT
WINTER 2019 COORDINATED WORKSHOPS

Tuesday, February 19, 2019, Los Banos
4:00 – 6:00 PM
College Greens Building

Wednesday, February 20, 2019, Patterson
4:00 – 6:00 pm
City of Patterson City Hall

Monday, March 4, 2019, Santa Nella
6:00 – 8:00 PM
Romero Elementary School

WORKSHOP SUMMARY

- Three workshops were held in the northern, central, and southern parts of the Delta-Mendota Subbasin during February and March 2019. The purpose of the workshops was to educate stakeholders and members about the public about topics covered in the draft Groundwater Sustainability Plans (GSP) being developed for the subbasin. Topics covered during the workshop included historic and current water budgets, sustainability criteria, undesirable results, and projects and management actions.
- Workshops were promoted via emails sent to each GSA's interested parties database, flyers and utility bill inserts, and social media posts.
- The format and content of each workshop was the same. The workshops began with a short presentation, followed by an open house period for participants to talk with their Groundwater Sustainability Agency (GSA) representative. Spanish interpretation was provided at each workshop.
- In total, approximately 30 individuals (not including GSA representatives and supporting staff) participated in the workshops. Attendance by location was as follows: Patterson – 14, Los Banos – 4, and Santa Nella – 12. Participants represented a range of beneficial users in the subbasin, including domestic well owners, agricultural water users, public water systems, and disadvantaged communities.

- Workshop participants' questions and feedback are summarized as follows:

  Water Budgets

  - Does the land surface budget include inflows from precipitation and applied water to crops?
  - Who provides the information about the inflows and outflows of the aquifer?
  - How is the aquifer recharged?
  - Do reservoirs lose water?
  - What happened between 1985 – now [regarding the historic water budget]?
  - What affect does precipitation have on the aquifer?

  Projects and Management Actions

  - Who will make the decision on who can drill wells and how much can well owners can pump?
  - Will GSAs in the subbasin be able to restrict selling of groundwater outside of the subbasin?
  - Projects and management actions should emphasize flood and stormwater capture and increased stormwater storage.
  - Will use of recycled water in new developments be considered a source of water to balance the water budget?
  - Are there percolation ponds by golf course?

  Sustainability Criteria and Undesirable Results

  - Is it the GSAs' responsibility to set the sustainability criteria for the subbasin?
  - Could this region experience seawater intrusion?
  - What's going to happen in areas like Dos Palos that have poor groundwater quality?

  Other

  - Does the GSP only cover of agricultural uses of groundwater or does it also cover residential and commercial uses of groundwater?
  - Who is doing the work to prepare the GSP?
  - How much does it cost to prepare a GSP?
  - Are there any agencies currently monitoring groundwater pumping and levels?
  - How is groundwater currently being removed from the groundwater basin?
  - How many monitoring stations have been identified? Have GSAs already identified where these monitoring pumps are?
  - Does the California Aqueduct affect the water table in the subbasin?
  - What is the rationale for the North-Central GSP group's boundaries? The north and south areas of the North-Central GSP group are very different.
  - Do water agencies in the subbasin send water to the Santa Clara Valley Water District?
  - Where are the coordinated meetings are held? What time are these meetings?
  - Will this raise our water rates?
  - The community of Tranquillity is currently experiencing land subsidence.

DELTA-MENDOTA SUBBASIN
SUSTAINABLE GROUNDATER MANAGEMENT ACT
SPRING 2019 COORDINATED WORKSHOPS

Monday, May 20, 2019, Patterson
4:00 – 6:00 pm
City of Patterson City Hall

Tuesday, May 21, 2019, Los Banos
4:00 – 6:00 PM
College Greens Building

Wednesday, May 22, 2019, Santa Nella
6:30 – 8:30 PM
Romero Elementary School

Thursday, May 23, 2019, Mendota
6:00 – 8:00 PM
Mendota Library

WORKSHOP SUMMARY

- Four workshops were held in the northern, central, and southern parts of the Delta-Mendota Subbasin. The purpose of the workshops was to educate stakeholders and members about the public about topics covered in the draft Groundwater Sustainability Plans (GSP) being developed for the subbasin. Topics covered during the workshop included water budgets, sustainable yield, projects and management actions, and groundwater monitoring networks.
- Workshops were promoted via emails sent to each GSA's interested parties database, flyers and utility bill inserts, social media posts, and direct outreach to community stakeholders.
- The format and content of each workshop was the same. The workshops began with a short presentation, followed by an open house period for participants to talk with their Groundwater Sustainability Agency (GSA) representative. Spanish interpretation was provided at each workshop.
- In total, approximately 30 individuals participated in the workshops. Attendance by location was as follows: Patterson – 7, Los Banos – 10, Santa Nella – 4, and Mendota – 9. Participants represented a range of beneficial users in the subbasin, including domestic well owners, agricultural water users, public water systems, and disadvantaged communities.

- Workshop participants’ questions and feedback are summarized as follows:

  Water Budgets

    - Why is there a difference between the water budgets for the upper and lower aquifers?
    - Why is the change in storage negative?
    - Is there a water budget for each aquifer?
    - When the projected water budgets are finalized, will they include specific projects and management actions?
    - How was the data for the climate change factors developed?
    - Historically, California goes through periodic droughts. Do the projected water budgets account for future droughts?
    - Do the projected water budgets account for future population growth and new developments?
    - Do the water budgets account for percolation from water applied to crops?

  Projects and Management Actions

    - Will management actions include a charge for water pumping?
    - Will pumping restrictions be implemented during dry periods or drought?
    - Will the GSPs identify specific projects and management actions?
    - Will GSAs in the subbasin form a water bank?
    - If pumping restrictions are enacted, GSPs should include a provision that allows private well owners to demonstrate that they aren’t overpumping or causing undesirable results.
    - The region needs more surface water storage to supplement groundwater pumping.
    - There should be restrictions on development in the region.

  Sustainable Yield

    - Does increases in groundwater demand relate to the cost of surface water supplies?

  Groundwater Monitoring

    - When local agencies monitor for groundwater, how far down do they monitor?

  GSP Adoption, Implementation and Enforcement

    - What agency approves the GSPs?
    - Will the California Department of Water Resources be the lead agency for providing oversight after the GSP is submitted?
    - Could the State Water Resources Control Board mandate pumping restrictions?
    - Will the state be looking at the drawdown of individual, private wells?
    - Where does the funding to implement GSPs come from?
    - How much will GSP implementation cost?
    - Who has to submit the annual report?

  Other

    - GSAs should be divided into even smaller units to manage projects and management actions locally.

Appendix G - Examples of Promotional Materials

Groundwater management in our community is changing.

Learn more about how this may impact you.

Collaborating local agencies are hosting a series of public workshops about the Sustainable Groundwater Management Act. Come learn how this landmark legislation may impact our community, what we are doing about it, and how you can get involved. Representatives from local groundwater sustainability agencies will be available to answer questions. You have three opportunities to attend:

Los Banos
Monday, May 14
4:00 - 6:00 PM
San Luis & Delta-Mendota
Water Authority Office
842 6th St, Los Banos

Patterson
Wednesday, May 16
4:00 - 6:00 PM
Hammon Senior Center
1033 W Las Palmas Ave, Patterson

Mendota
Thursday, May 17
4:00 - 6:00 PM
Mendota Branch Library
Mendota Meeting Room
1246 Belmont Ave, Mendota

The content of each workshop will be the same. The first thirty minutes of each workshop will consist of an informational presentation, followed by an open house until 6:00 PM. For more information, please visit our website at: www.deltamendota.org.

We look forward to seeing you there!

El manejo del agua subterránea en nuestra comunidad está cambiando.

Obtenga más información sobre como esto puede afectarlo.

Las agencias locales colaboradoras están organizando una serie de talleres públicos sobre la Ley de gestión sostenible del agua subterránea. Venga y aprenda como esta histórica legislación puede afectar a nuestra comunidad, que estamos haciendo al respecto y como puede participar. Los representantes de las agencias locales de sostenibilidad del agua subterránea estarán disponibles para responder preguntas. Tienes tres oportunidades para asistir:

Los Baños
Martes, 14 de Mayo
4:00 - 6:00 PM
San Luis & Delta-Mendota
Water Authority Office
842 6th St, Los Baños

Patterson
Miércoles, 16 de Mayo
4:00 - 6:00 PM
Hammon Senior Center
1033 W Las Palmas Ave, Patterson

Mendota
Jueves, 17 de Mayo
4:00 - 6:00 PM
Mendota Branch Library
Mendota Meeting Room
1246 Belmont Ave, Mendota

El contenido de cada taller será el mismo. Los primeros treinta minutos de cada taller serán consisten de una presentación informativa, seguida de una jornada de puertas abiertas hasta las 6:00 P.M. Para obtener más información, visite nuestro sitio web en: www.deltamendota.org.

Public Notice

Public Groundwater Meeting

Santa Nella County Water District and other local water agencies are developing plans for the future of our groundwater resources. We want to hear from you! Come to an upcoming public workshop to learn more:

Santa Nella
Monday, March 4, 6:000 - 8:00 PM
Romero Elementary School MPR
13500 Luis Ave, Gustine, CA 95322

The first forty minutes of the workshop will consist of a bilingual informational presentation. The presentation will be followed by an interactive discussion on the region's groundwater "budget" and how to define "sustainability" for our groundwater resources. This workshop is open to people with all level of knowledge about water.

Spanish-language interpreters and materials will be available.

For more information, please visit our website at www.deltamendota.org and www.sncwd.com.

For questions or comments, email DMSGMA@sldmwa.org or contact Amy Montgomery, Santa Nella County Water District, at amontgomery@sncwd.com.

We look forward to seeing you there!

Engage in the Future of Our Water Resources!

Week of May 20th

Delta-Mendota SGMA invite you to learn why your local agencies are developing groundwater sustainability plans for the future of our groundwater. Please come to one

- **Patterson**: Mon., May 20, 4:00 – 6:00pm Patterson City Hall 1 Plaza Circle
- **Los Banos**: Tue., May 21, 4:00 – 6:00pm College Greens Building 1815 Scripps Drive
- **Santa Nella**: Wed., May 22, 6:30 – 8:30pm Romero Elem. School 13500 Luis Ave.
- **Mendota**: Thu., May 23, 6:00 – 8:00pm Mendota Library 1246 Belmont Ave.

For more information please visit www.deltamendota.org, To register visit: tinyurl.com/y3bxw3yv

PROP 1 WATER BOND 2014

#DeltaMendotaSGMA | #SLDMWA | #SGMA2020

DELTA-MENDOTA SGMA

Su Opinión es Importante!

Participe en una serie de talleres sobre el futuro de sus recursos hídricos!

Semana del 20 de mayo

Agencias locales están desarrollando planes de sostenibilidad para el futuro de los recursos hídricos del agua subterránea en la región y necesitan su opinión.

Acompáñenos en uno de los siguientes talleres:

- Patterson: Lun.,20 de Mayo , 4–6pm Ayuntamiento de Patterson 1 Plaza Circle
- Los Banos: Mar., 21 de May, 4–6pm College Greens Building 1815 Scripps Dr.
- Santa Nella: Mie., 22 de Mayo, 6:30–8:30pm Escuela Pri. Romero 13500 Luis Ave.
- Mendota: Jue., 23 de Mayo, 6–8pm Biblioteca de Mendota 1246 Belmont Ave.

Para más información visite:

www.deltamendota.org

Tel: 916-418-8288

#DeltaMendotaSGMA | #SLDMWA

PROP 1 WATER BOND 2014

DELTA-MENDOTA SGMA

DELTA-
MENDOTA
SGMA

Contact: Kirsten Pringle, Delta-Mendota Subbasin, Stantec
(916) 418-8243, Kirsten.Pringle@stantec.com

FOR IMMEDIATE RELEASE
October 19, 2018

MEDIA ADVISORY

Sustainable Groundwater Management Act Public Workshops

What: Collaborating local agencies are hosting a series of public workshops about the Sustainable Groundwater Management Act. Learn how this landmark legislation may impact our communities, the planning process, and how people can get involved. Spanish translation will be provided.

Format: There are three workshop opportunities to attend; the content of each workshop will be the same. The first 45 minutes of each workshop will consist of an informational presentation, followed by an open house.

When:

Firebaugh – Monday, October 22, 2018
5:00 - 7:00 PM
Firebaugh Middle School MPR
1600 16th Street, Firebaugh, CA

Los Banos – Wednesday, October 24, 2018
4:00 – 6:00 PM
College Greens Building
1815 Scripps Drive, Los Banos, CA

Patterson – Thursday, October 25, 2018
4:00 – 6:00 PM
Hammon Senior Center
1033 W. Las Palmas Avenue, Patterson, CA

Who: Representatives from local groundwater sustainability agencies will be available to answer questions.

Additional Resources: The Sustainable Groundwater Management Act, www.deltamendota.org/,

Background: *The Sustainable Groundwater Management Act (SGMA) is a package of three bills (AB 1739, SB 1168, and SB 1319) that provides local agencies with a framework for managing groundwater basins in a sustainable manner. Recognizing that groundwater is most effectively managed at the local level, the SGMA empowers local agencies to achieve sustainability within 20 years.*

Appendix H - List of Stakeholders and Community Organizations Contacted

Stakeholder and Community Organizations Contacted Regarding Coordinated SGMA Workshops

Organization Name	Organization Type
Fresno County Farm Bureau	Agriculture
Merced County Farm Bureau	Agriculture
North Grassland Wildlife Foundation	Agriculture
Patterson Apricot Fiesta	Agriculture
Stanislaus County Farm Bureau	Agriculture
Asociación de Charros La Internacional del Valle de Patterson	Business
Adobe Valley Ranch	Business
Gustine Chamber of Commerce	Business
Los Banos Chamber of Commerce	Business
Patterson-Westley Chamber of Commerce	Business
Santa Nella Chamber of Commerce	Business
American Association of University Women	Civic
Gustine Rotary Club	Civic
International Association of Lions Clubs - Patterson	Civic
League of United Latin American Citizens	Civic
Los Banos Lions Club	Civic
Los Banos Rotary Club	Civic
Mendota Community Corporation	Civic
Newman Lions Club	Civic
Newman Rotary Club	Civic
Newman Women's Club	Civic
Patterson Lions Club	Civic
International Association of Lions Clubs - Mendota	Civic
International Association of the Lions Clubs - Los Banos	Civic
Italian Catholic Federation of CA Inc.	Civic
Kiwanis International	Civic
Rotary International - Los Banos	Civic
Rotary International - Patterson	Civic
Firebaugh Rotary Club Inc.	Community General Public
Casa Mobile Home Park	Community/General Public
Center for Environmental Science Accuracy & Reliability	Community/General Public
Firebaugh Senior Center	Community/General Public
Friends of Green Valley Charter	Community/General Public
Friends of the Public Library	Community/General Public
Habitat for Humanity International	Community/General Public
Los Banos Senior Center	Community/General Public
Mendota Community Center	Community/General Public
Mendota Senior Center	Community/General Public
Merced County Library - Dos Palos	Community/General Public
Merced County Library - Gustine	Community/General Public
Merced County Library - Los Banos	Community/General Public
Merced County Library - Santa Nella	Community/General Public
San Joaquin River Resource Mgmt. Coalition	Community/General Public

Santa Nella RV Park	Community/General Public
Stanislaus County Library - Newman	Community/General Public
Stanislaus County Library - Patterson	Community/General Public
Dos Palos Oro Loma Joint Unified School District	Education
Firebaugh-Las Deltas Unified School District	Education
Gustine Unified School District	Education
Los Banos Unified School District	Education
Mendota Unified School District	Education
Merced College	Education
Creekside Parent Club	Education
Academy West Insurance	Other
Academy West Insurance Firebaugh	Other
Amaral & Associates Realty	Other
American Legion	Other
American Legion Auxiliary Elijah B Hayes	Other
Andrea Brandt State Farm Insurance	Other
Benevolent & Protective Order of Elks	Other
Borelli Real Estate Services	Other
California Garden Clubs Inc.	Other
Century 21 M&M & Assoc - Los Banos	Other
Century 21 M&M & Assoc - Patterson	Other
Coldwell Banker Kaljian & Assoc	Other
Eric Rodriguez - Patterson	Other
Farmers Insurance Antonio Gonzales	Other
First Prioirty of the Central Valley	Other
Greg Nunes Real Estate	Other
Joe G. Gutierez State Farm Insurance	Other
Mendota Land Co	Other
Noah’s Ark Foundation of Tracy Inc.	Other
PMZ Real Estate - Patterson	Other
PMZ Real Estate - Los Banos	Other
Rafael Ruiz - Patterson	Other
Shane P. Donion Ranch Broker	Other
The Boyd Company	Other
Valley West Properties	Other
Adventure Christian Church of Patterson	Religious
Agape Baptist Church	Religious
Bethel Community Church	Religious
Church of Christ of Patterson	Religious
Church of God of Prophecy	Religious
Connections Christian Church	Religious
Evangelical Church of Los Banos	Religious
Family Christian Center	Religious
First Baptist Church	Religious
Full Gospel Businessmen’s Fellowship International	Religious
Harvest Samoan Assembly of God	Religious

Mountain House Foursquare Church	Religious
Movimiento Familiar Cristiano Catolico	Religious
Patterson Covenant Church	Religious
Patterson Christian Fellowship	Religious
Patterson Seventh Day Adventist Church	Religious

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