



April 2017

# Basin Management Report 2013–2014





# **Basin Management Report**

## **2013-2014**

**Prepared by:**



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## List of Acronyms and Abbreviations

µg/L	micrograms per liter
AFY	acre-feet per year
ARB IRWMP	American River Basin Integrated Regional Water Management Plan
Authority	Sacramento Central Groundwater Authority
BMO	Basin Management Objective
BMP	best management practice
Cal-Am	California-American Water Company
CASGEM	California Statewide Groundwater Elevation Monitoring
CDEC	California Data Exchange Center
CRT	Correctional Center precipitation gage
CSU	California State University, Sacramento precipitation gage
DDW	Division of Drinking Water, State Water Resources Control Board
DWR	California Department of Water Resources
EGN	Cosumnes River at Eagles Nest Road precipitation gage
ELG	Elk Grove Fish Hatchery precipitation gage
EMD	Sacramento County Environmental Management Department
EPA	U.S. Environmental Protection Agency
GAP	Groundwater Accounting Program
GMP	Central Sacramento County Groundwater Management Plan
GSA	groundwater sustainability agencies
GSP	groundwater sustainability plan
GSWC	Golden State Water Company
IRCTS	Inactive Rancho Cordova Test Site
IWFM	Integrated Water Flow Model
JPA	Joint Powers Authority
MCL	maximum contaminant level
mg/L	milligrams per liter
MSL	mean sea level
NDMA	n-nitrosodimethylamine
PCE	perchloroethylene
POP	Public Outreach Plan
PRC	Prairie City precipitation gage
SacIWRM	Sacramento Area Integrated Water Resource Model
SCGA	Sacramento Central Groundwater Authority
SCR	Sacramento WB City precipitation gage
SCWA	Sacramento County Water Agency
SEA	Sacramento Executive Airport precipitation gage
SGA	Sacramento Groundwater Authority
SGMA	Sustainable Groundwater Management Act of 2014

SMCL	secondary maximum contaminant level
SSCAWA	Southeast Sacramento County Agricultural Water Authority
State Board	State Water Resources Control Board
TCE	tetrachloroethylene
TDS	Total Dissolved Solids
USAF	United States Air Force
VOCs	Volatile Organic Compounds
WDL	Water Data Library
WELL	Water Efficiency on Large Landscapes
WFA	Water Forum Agreement
WPP	Well Protection Program

## **CHAPTER 1 INTRODUCTION**

This Biennial Basin Management Report documents the management activities of the Sacramento Central Groundwater Authority (“Authority” or “SCGA”) and its member agencies during the 2013 and 2014 calendar years. The intent of this report is to document basin-wide hydrologic conditions and management activities that help ensure the long-term sustainability of the region’s vital groundwater resources. This report is organized into the following chapters:

Chapter 1 – Introduction

Chapter 2 – Basin Conditions

Chapter 3 – Basin Management Activities

Chapter 4 – Conclusions and Recommendations

### **Background**

The Authority was formed on August 29, 2006 through a Joint Powers Agreement (JPA) signed by the Cities of Elk Grove, Folsom, Rancho Cordova, and Sacramento and the County of Sacramento for the following purposes:

- to maintain the long-term sustainable yield of the Sacramento Central Groundwater Basin (Central Basin);
- to ensure implementation of the Basin Management Objectives (BMOs) that are prescribed by the Central Sacramento County Groundwater Management Plan (GMP);
- to oversee the implementation of any Well Protection Program (WPP) that may be prescribed by the GMP;
- to manage the use of groundwater in the Central Basin and facilitate implementation of an appropriate conjunctive use program by water purveyors;
- to coordinate efforts among those entities represented on the governing body of the JPA to devise and implement strategies to safeguard groundwater quality; and
- to work collaboratively with other entities, including the Sacramento Groundwater Authority (SGA), the Southeast Sacramento County Agricultural Water Authority (SSCAWA), and other groundwater management authorities that may be formed in the County of Sacramento and adjacent political jurisdictions, in order to promote coordination of policies and activities throughout the region.

The Central Basin encompasses the area bounded by the American River on the north, north of the southern boundary the Omochumne-Hartnell Water District and the Cosumnes and Mokelumne Rivers on the south, the Sacramento River and Interstate 5 on the west, and the foothills of the Sierra Nevada on the east (see Figure 1). The majority of the SCGA area is

located within the South American Subbasin, while a small portion is located within the Cosumnes Subbasin. Agricultural lands west of Interstate 5 with the South American Subbasin were not addressed by SCGA because this area is located within the Delta and groundwater conditions in the Delta are different than elsewhere in the South American Subbasin.

Groundwater is considered a resource within the SCGA area while high groundwater levels must be drained below the root zone in the Delta area. The Authority is recognized as an essential part in implementing the groundwater management element of the Water Forum Agreement (WFA<sup>1</sup>).

Currently, the Authority consists of sixteen members<sup>2</sup> representing stakeholder interest groups that include agriculture, agriculture/residential users, business, environmental/community organizations, local governments/public agencies and water purveyors (see Figure 2 for the boundaries of the agencies and purveyors).

While this report covers the 2013 – 2014 time period, significant activities have occurred after that time but prior to the release of this report that are relevant to the overall understanding of groundwater conditions and groundwater management. To move towards compliance with the Sustainable Groundwater Management Act of 2014 (SGMA), the Board of Directors approved a resolution on April 20, 2016, directing staff to prepare an Alternative Submittal to explain and justify the continuance of SCGA management activities for the entire South American Subbasin. On July 13, 2016 the Authority's Board of Directors approved three resolutions for the Authority's election to be the Groundwater Sustainability Agency (GSA) for the portion of the South American Subbasin that is within the boundaries of SCGA. Staff is working with a consultant to develop an Alternative Submittal, with a planned submittal to the California Department of Water Resources (DWR) by January 1, 2017. Finally, the Authority is continuing to work on the development of the Groundwater Accounting Program (GAP), including the issuance of a request for proposals on July 25, 2016 for engineering firms to provide professional services to develop the GAP.

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<sup>1</sup> The two co-equal objectives of the WFA are: 1) to provide a reliable water supply for planned development to the year 2030, and 2) to preserve the Sacramento region's environmental crown jewel, the lower American River. For more information, please visit its website: <http://www.waterforum.org/>.

<sup>2</sup> California-American Water Company, City of Elk Grove, City of Folsom, City of Rancho Cordova, City of Sacramento, County of Sacramento, Florin Resource Conservation District/Elk Grove Water District, Golden State Water Company, Omochumne-Hartnell Water District, Rancho Murieta Community Services District, Sacramento Regional County Sanitation District, Agricultural Representative, Agricultural-Residential Representative, Commercial/Industrial Representative, Conservation Landowners, Public Agencies/Self-Supplied Representative

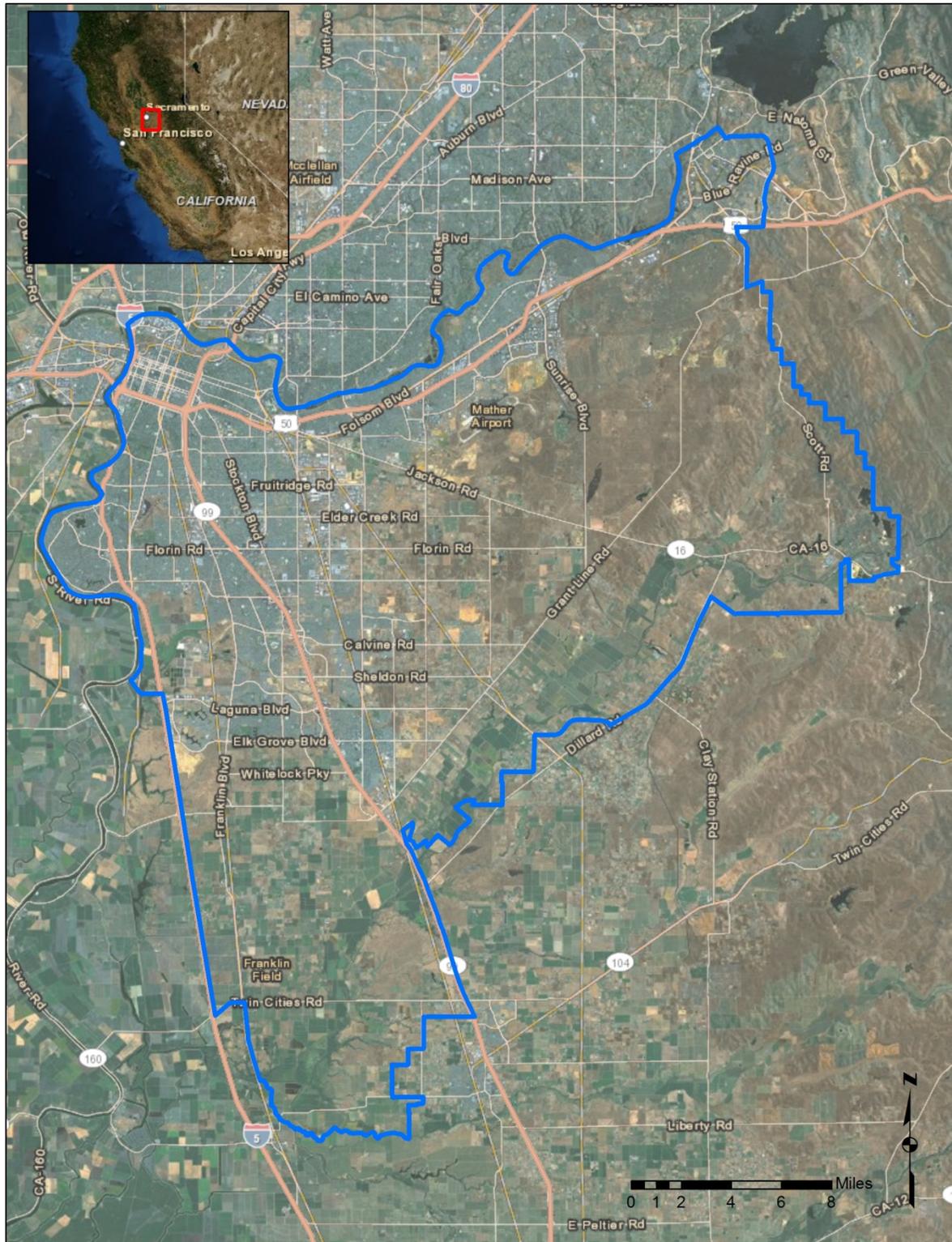
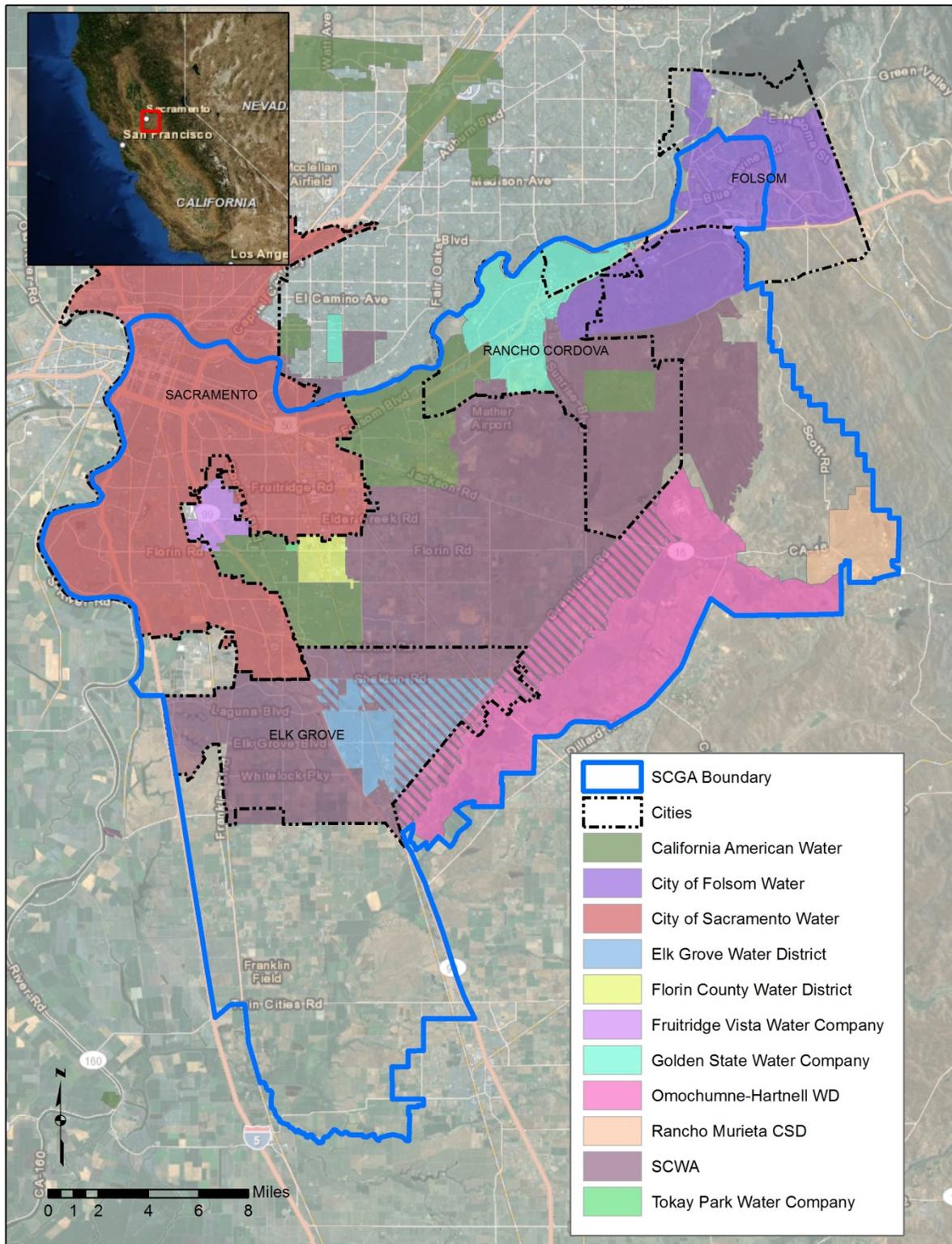


Figure 1 Sacramento Central Groundwater Basin



**Figure 2** Cities and Public Water Purveyors in SCGA

## Central Sacramento County Groundwater Management Plan

In February 2006, the GMP was accepted by the Central Sacramento County Groundwater Forum and the Water Forum Successor Effort. This document was the result of six years of negotiation and agreements between various stakeholders in the region. The GMP is a planning tool that assists basin stakeholders in maintaining a safe, sustainable, and high quality resource for all groundwater users within the Central Basin.

The GMP provides for the review of current and future water supply and demands and contains BMOs. Each BMO focuses on monitoring and managing the basin to benefit all groundwater users within the Central Basin. The GMP also contains “trigger points” and remedies to ensure full implementation of the individual BMOs. The five BMOs are described below, along with the relevant section in the GMP:

- BMO No. 1: Maintain the long-term average groundwater extraction rate at or below 273,000 acre-feet/year (GMP Section 3.1.1);
- BMO No. 2: Maintain specific groundwater elevations within all areas of the basin consistent with the Water Forum “solution” (GMP Section 3.1.2);
- BMO No. 3: Protect against any potential inelastic land surface subsidence by limiting subsidence to no more than 0.007 feet per one foot of drawdown in the groundwater basin (GMP Section 3.1.3);
- BMO No. 4: Protect against any adverse impacts to surface water flows in the American, Cosumnes, and Sacramento Rivers (GMP Section 3.1.4); and
- BMO No. 5: Meet water quality objectives (GMP Section 3.1.5) including:
  - Total Dissolved Solids (TDS) concentration of less than 1,000 milligrams per liter (mg/L),
  - Nitrate concentration of less than 45 mg/L, and
  - Volatile Organic Compounds (VOCs).

The GMP also describes the development and implementation of the Central Basin WPP (GMP Section 4.3). The Central Basin WPP is designed to protect existing private domestic well and agricultural well owners from declining groundwater levels resulting from new development in the basin.

Lastly, the GMP describes the development and implementation of the Groundwater Contamination Monitoring and Collaboration Program (GMP Section 4.4) to proactively address the groundwater contamination and remediation issues in the Central Basin. The program consists of three components:

- Use of remediated groundwater in urbanized areas;
- Survey private wells for potential contamination; and
- Assistance of the Sacramento County Environmental Management Department (EMD).

## **CHAPTER 2      BASIN CONDITIONS**

This chapter describes current Central Basin conditions including hydrologic conditions, groundwater pumping, groundwater elevation, and groundwater quality relative to the individual BMOs.

### **Hydrologic Conditions**

Typically, three indicators are widely used to describe hydrologic conditions in the Sacramento region: 1) Sacramento Valley Water Year Type, 2) Water Forum Agreement Water Year Type, and 3) precipitation data. Each of these is described in more detail below.

The dry conditions for 2012 through 2014 described in the following sections are the first three years in a serious drought that has continued past the end of the reporting period. On a statewide basis, according to DWR (2016), all but two years of the last decade have been dry in California – with the most recent prior drought of water years 2007-09 followed by the current five years of drought (water years 2012-16). Furthermore, water years 2012-2016 set a record for the driest four consecutive water years based on statewide precipitation. The statewide drought was felt locally through decreased surface water availability from Sierra Nevada snowpack and through decreased precipitation.

### **Sacramento Valley Water Year Index Year Type**

The Sacramento Valley Water Year Index is developed by DWR based on Sacramento River and tributary runoff necessary to meet Delta outflow criteria and Sacramento River system requirements (Water Year Index). Year Type classifications are based on the Water Year Index and include wet, above normal, below normal, dry, and critical. Table 1 summarizes the water year type over the past five years (2010 to 2014). Overall, the region is experiencing a dry period with four of the five years classified as below normal or drier.

**Table 1 Sacramento Valley Water Year Index Year Type, 2010-2014**

Water Year <sup>1</sup>	Sacramento Valley Water Year Index	Sacramento Valley Water Year Type <sup>2</sup>
2010	7.08	Below Normal
2011	10.54	Wet
2012	6.90	Below Normal
2013	5.83	Dry
2014	4.07	Critical

Notes:

1. For a complete view of the data for the past one hundred plus years as well as the methodology used to determine the Sacramento River Water Year Index Value, please visit the website: <http://cdec.water.ca.gov/cgi-progs/iudir/WSIHIST>.
2. Sacramento River Water Year Hydrologic Classifications and criteria:

Year Type	Water Year Index
Wet	Equal to or greater than 9.2
Above Normal	Greater than 7.8, and less than 9.2
Below Normal	Greater than 6.5, and equal to or less than 7.8
Dry	Greater than 5.4, and equal to or less than 6.5
Critical	Equal to or less than 5.4

**Water Forum Agreement Water Year Type**

The WFA Water Year Type is based on March-through-November total unimpaired inflow into Folsom Lake. These data dictate the amount of water that a purveyor may divert from Folsom Lake and the Lower American River as specified in their WFA purveyor specific agreement. The WFA Water Year Types include wet, average, drier, and driest. Table 2 shows the water year type for the past five years (2010 to 2014). In 2010 and 2011, data shows the WFA Water Year Type as “wet”, but in water years 2013 and 2014, since the last BMR, there have been less than 950,000 AF of unimpaired flows available annually, resulting in a WFA Water Year Type of “drier”. As mentioned earlier, 2012 through 2014 represent the start of a continuing drought locally and state-wide; Folsom Reservoir has been heavily impacted by the drought, as shown in Figure 3.



**Figure 3 Drought Conditions at Folsom Reservoir Boat Launch, December 2014**

**Table 2 Water Forum Agreement Water Year Type, 2010-2014**

Water Year	Unimpaired Inflow to Folsom Lake, March-November (Thousand Acre-Feet) <sup>1,2</sup>	Water Forum Agreement Water Year Type <sup>3</sup>
2010	1,700	Wet
2011	3,115	Wet
2012	1,415	Average
2013	778	Drier
2014	628	Drier

Notes:

1. Unimpaired flow data provided by Department of Water Resources, Bulletin 120. The data required for calculating the March-November unimpaired flow is acquired from DWR Bulletin 120, which is released four times a year (February, March, April, and May). If significant storm activity takes place after the May issuance of Bulletin 120, Water Forum staff will re-compute the values using mid-month data updates.
2. For the purpose of these computations, values of 30 thousand acre-feet for October and November were assumed and have been derived from historical data
3. WFA water year classifications and determination criteria:

WFA Water Year Type	Unimpaired Inflow into Folsom Lake, March through November (Thousand Acre-Feet)
Wet	Greater than 1,600
Average	Greater than 950, and less than 1,600
Drier	Greater than 400, and less than 950
Driest	Less than 400

**Precipitation Data**

DWR maintains precipitation data for six stations in the California Data Exchange Center (CDEC) within and adjacent to the Central Basin area. These stations represent different areas within the basin and are listed below and shown in Figure 4.

- Correctional Center (CRT)
- California State University, Sacramento (CSU)
- Cosumnes River at Eagles Nest Road (EGN)
- Elk Grove Fish Hatchery (ELG)
- Prairie City (PRC)
- Sacramento WB City (SCR)

The precipitation data for 2010-2014 recorded at these stations were retrieved from CDEC’s website: <http://cdec.water.ca.gov>.

Table 3 and Table 4 show the annual precipitation for CRT, CSU, EGN, ELG, PRC, SCR, and from Sacramento Executive Airport (SEA) reported from 2010 to 2014 in water years and calendar years, respectively. These precipitation datasets show the variability of rainfall in the region, notably with higher rainfall in the eastern, foothills portion of the region as shown by the PRC station. This is consistent with the orographic effect of increasing precipitation in the foothills and Sierra Nevada.

The long-term average annual rainfall at the NOAA SEA station is approximately 18.1 inches<sup>3</sup>. The data in Table 3 and Table 4 show that rainfall at SEA was below the long-term average in 2012, 2013, and 2014, recording 12.23 inches, 15.76 inches and 9.67 inches in each of these years, respectively. In 2010 and 2011, rainfall was above average, with 20.61 inches and 23.97 inches, respectively. The average rainfall over the past five years at Sacramento Executive Airport is 16.45 inches, indicating that recent rainfall has been below average relative to the long-term average.

As previously mentioned, 2012 through 2014 represent the start of a continuing drought, both locally and state-wide. Figure 5 shows the long term annual precipitation in Sacramento, based on water years, as well as the cumulative departure from annual mean precipitation. The cumulative departure line shows, cumulatively, whether the precipitation is above the mean or below the mean. In this manner, wet periods are represented by positive slopes (up and to the right), dry periods are presented by negative slopes (down and to the right), and normal periods are represented by values that change little over time (flat lines). The current drought is shown by the sharp downward slope during 2012-2016, which is emphasized by the generally wet periods from 1978-1986, 1993-2000 and a generally normal period from 2001 until 2011.

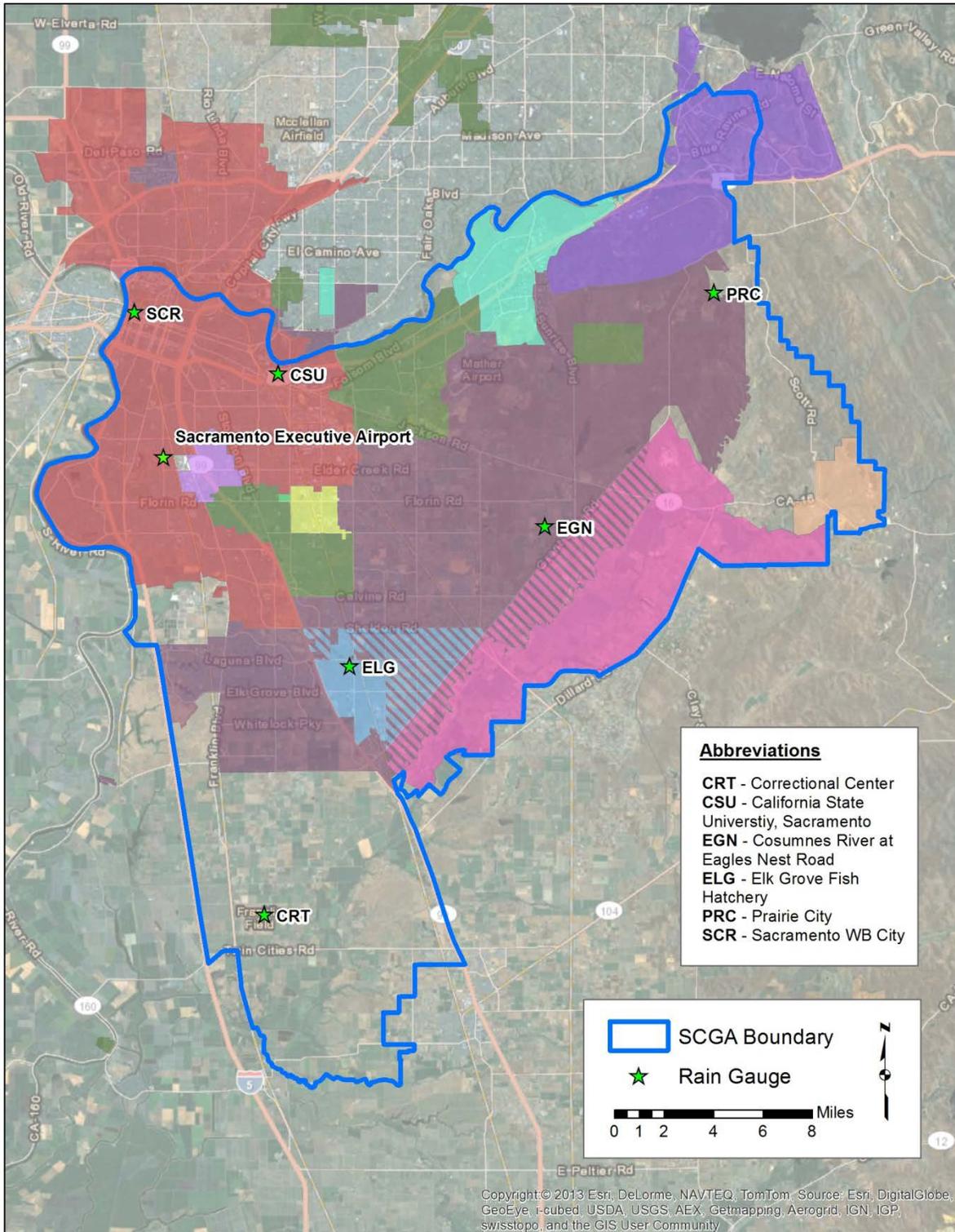
**Table 3 Annual Precipitation in SCGA Vicinity, Water Years 2010-2014**

Water Year	CDEC Rainfall Stations						NOAA SEA	Average
	CRT	CSU	EGN	ELG	PRC	SCR		
2010	19.06	19.35	18.70	17.87	20.47	22.80	20.61	19.84
2011	22.28	24.71	22.80	21.77	31.26	17.03	23.97	23.40
2012	13.23	13.10	10.98	12.13	14.61	21.79	12.23	14.01
2013	17.09	17.05	20.39	16.30	17.28	5.86	15.76	15.68
2014	13.29	10.37	10.36	46.19	18.14	18.79	9.67	18.12
Average	16.99	16.92	16.65	22.85	20.35	17.25	16.45	18.21

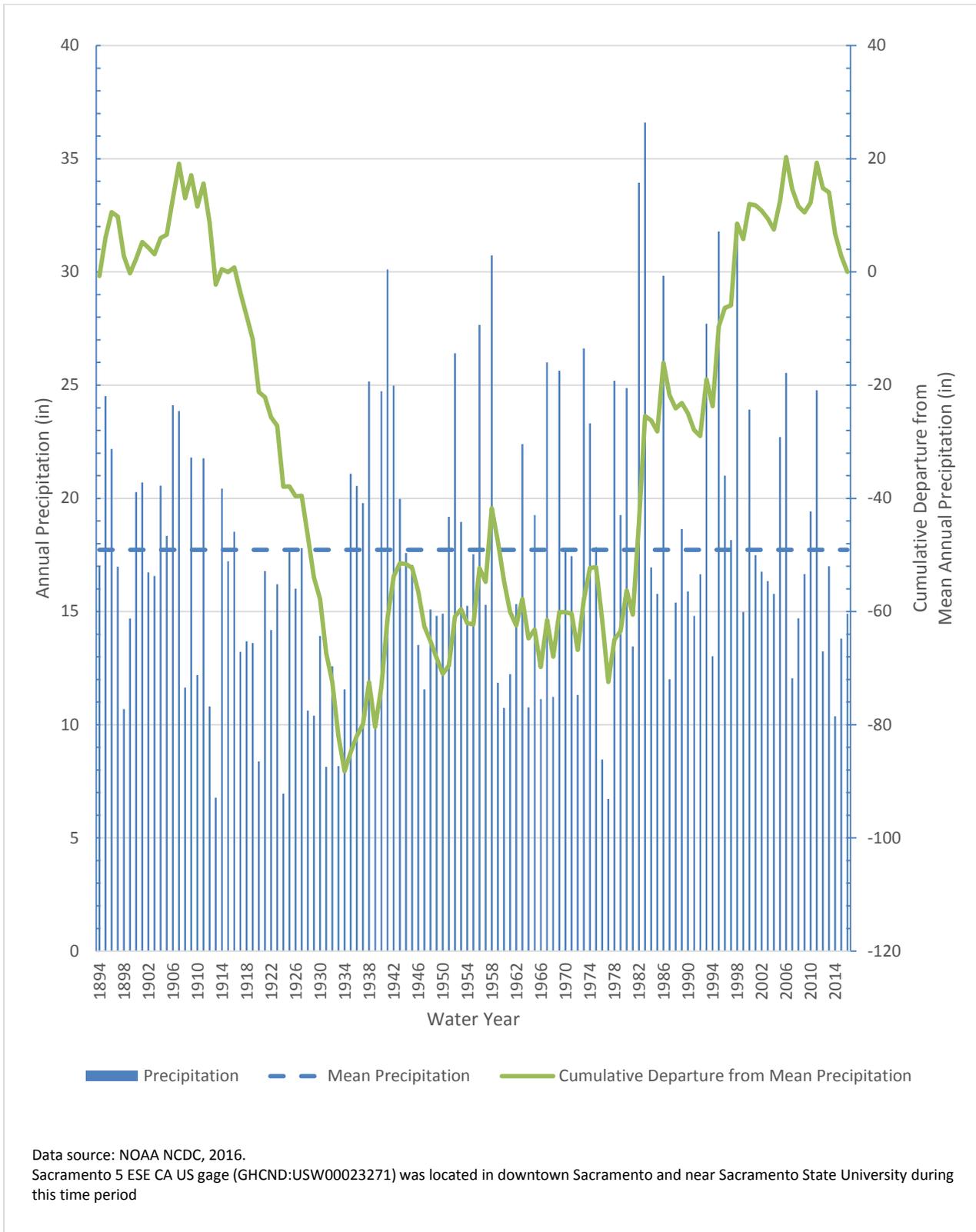
**Table 4 Annual Precipitation in SCGA Vicinity, Calendar Years 2010-2014**

Water Year	CDEC Rainfall Stations						NOAA SEA	Average
	CRT	CSU	EGN	ELG	PRC	SCR		
2010	23.71	22.44	22.95	21.85	28.03	20.37	22.84	23.17
2011	14.64	17.46	15.44	14.68	20.98	23.74	16.94	17.70
2012	23.03	22.51	19.36	20.75	23.82	13.05	21.15	20.52
2013	6.31	6.17	11.30	6.58	6.65	16.06	5.81	8.41
2014	21.20	18.47	20.35	54.65	27.16	9.61	18.74	24.31
Average	17.78	17.41	17.88	23.70	21.33	16.57	17.10	18.82

<sup>3</sup> Based on 50-year average rainfall at the Sacramento Executive Airport from 1962-2012. Data provided from [www.ncdc.noaa.gov](http://www.ncdc.noaa.gov)



**Figure 4 Rain Gauge Stations in SCGA**



**Figure 5 Historical Precipitation and Cumulative Departure from Mean Precipitation, City of Sacramento**

**BMO No. 1 – Maintain the Long-Term Average Extraction Rate at or Below 273,000 Acre-Feet/Year**

Not all water users in the Central Basin rely on groundwater to meet their water supply needs. Some purveyors rely on a combination of groundwater and surface water called conjunctive use; these include California-American Water Company (Cal-Am), Golden State Water Company (GSWC), and Sacramento County Water Agency (SCWA). The City of Sacramento currently relies almost entirely on surface water to serve its customers within the Central Basin, however, the City of Sacramento utilizes a limited amount of groundwater capacity within the Central Basin for municipal supply and irrigation at parks and plans on increasing production in the future.

Table 5 presents typical groundwater pumping in the Central Basin for the 2010-2014 timeframe, along with remediation pumping, which accounted for 9% to 11% of the total. After treatment, most of the remediated groundwater is discharged to surface water, primarily the American River where a small portion is withdrawn downstream for beneficial use within the basin. In the future, additional withdrawal will occur to increase the beneficial uses of the remediated groundwater. For 2011 through 2014, the table presents more robust estimates of agricultural, agricultural-residential, and remediation pumping. Values for available data within earlier time frames are provided, however, totals are presented only for 2011 through 2014. Total groundwater pumping within the Central Basin is estimated to have been 264,900 acre-feet in 2013 and 236,700 acre-feet in 2014. Variability between these years is largely due to weather conditions and related agricultural irrigation demands. Of note, is higher than usual agricultural groundwater use in 2013. This 13% increase over 2012 is largely driven by very low precipitation during the growing season and reference evapotranspiration approximately 9% higher during that year. Also of note is the decrease in groundwater use by urban users during 2014. On January 17, 2014, Governor Jerry Brown proclaimed a State of Emergency which, among other measures, directed local water suppliers to immediately implement local water shortage contingency plans. Metered urban water use shown in Table 5 was approximately 50,000 AFY in 2014, compared to between 60,000 AFY and 69,000 AFY for the previous four years.

The amount of groundwater pumped for agricultural and agricultural-residential groundwater users was estimated using local land use data, spatial cropping data, estimates of evapotranspiration, and root-zone water balance calculations. Details of this process are provided in a separate technical memorandum: *Sacramento Central Groundwater Authority, 2011-2012 Agricultural Demand and Groundwater Pumping Estimates*.

The average groundwater pumping rate (including pumping for groundwater remediation) within the Central Basin over the two-year reporting period was approximately 250,800 acre-feet per year (AFY), with a four-year average of 244,600 AFY.

**Table 5 Groundwater Pumping in the Central Basin, 2010-2014**

Groundwater Pumping (Acre-Feet)						
Groundwater Pumper		2010	2011	2012	2013	2014
Reported Metered Data	Elk Grove Water District <sup>1</sup>	3,784	4,615	5,562	5,194	4,118
	Cal-Am <sup>1</sup>	21,525	19,413	19,173	18,906	16,555
	GSWC <sup>1</sup>	6,650	5,731	6,684	7,273	5,111
	SCWA <sup>1</sup>	32,171	29,809	25,363	23,274	19,683
	City of Sacramento, Utilities <sup>1</sup>	668	544	1,063	1,106	1,133
	Fruitridge Vista WC <sup>1</sup>	4,059	3,752	3,816	3,986	3,207
Estimated Values	Tokay Park WC <sup>2</sup>	160	160	160	160	160
	Florin County WD <sup>2</sup>	2,600	2,600	2,600	2,600	2,600
	Parks and Golf Courses <sup>3</sup>	2,000	2,000	2,000	2,000	2,000
	Cemetery Districts <sup>3</sup>	n/a	n/a	n/a	n/a	n/a
Agricultural and Agriculture-Residential	Agricultural <sup>4</sup>	n/a	116,500	134,600	152,400	133,900
	Agricultural – Residential <sup>4</sup>	n/a	17,200	23,400	22,900	23,100
<b>SUBTOTAL</b>		<b>n/a</b>	<b>202,324</b>	<b>224,421</b>	<b>239,799</b>	<b>211,568</b>
Remediated Groundwater	Kiefer Landfill <sup>5</sup>	1,079	1,142	391	520	507
	Aerojet <sup>6</sup>	19,753	19,510	18,827	19,183	19,855
	IRCTS <sup>7</sup>	4,674	4,872	4,786	4,534	4,576
	Mather Field <sup>7</sup>	209	264	814	980	437
	Union Pacific <sup>7</sup>	298	288	333	339	277
	Sacramento Army Depot <sup>7</sup>	78	91	116	16	1
<b>SUBTOTAL</b>		<b>25,011</b>	<b>25,025</b>	<b>24,877</b>	<b>25,052</b>	<b>25,147</b>
<b>GRAND TOTAL</b>		<b>n/a</b>	<b>227,350</b>	<b>249,297</b>	<b>264,852</b>	<b>236,715</b>

Notes:

n/a = not available.

- Annual urban groundwater pumping data was provided to the Authority by the individual water purveyors. Note that estimates presented in the previous Basin Management Report for Fruitridge Vista and for the City of Sacramento are replaced with data from the purveyor in this table.
- No production data was provided by the purveyor. Values are estimated based on data from the SacIWRM groundwater model.
- Groundwater is used by park districts, cemetery districts, and municipal park departments. Parks and golf course usage is estimated for 819 acres of land (Elk Grove Regional Park, Valley High Golf Course, William Land Park, Wildhawk Golf Course, and Mather Golf Course). The estimate of 2,000 AFY is based on average monthly ET using the West Lodi CIMIS station for April - September, a crop coefficient of 0.8, and assuming 90% of the land is irrigated. Demand met from rainfall is not included in the estimate. For cemeteries, water sources are not currently known and these volumes are not estimated.
- Annual groundwater pumping for Agricultural and Agricultural Residential groundwater users were estimated based on land use. For details regarding methodology, see the separate technical memorandum: *Sacramento Central Groundwater Authority, 2011-2012 Agricultural Demand and Groundwater Pumping Estimates*. Note that due to availability, reference evapotranspiration source data was altered such that Manteca and Davis are used as the primary and secondary CIMIS stations, respectively.
- Based on data from communications with AC David, August 22, 2016. Values are net of extraction and recharge.
- Based on data from GEI (pers comm. R. Fricke, August 23, 2016). Includes all remediation wells except those pumping north of the American River: GET L-A, GET L-B, and 40% of ARGET. Values are net of extraction and recharge.
- Based on data from GEI (pers comm. R. Fricke, August 23, 2016). Note that data on Union Pacific and Sacramento Army Depot were not included in the previous Basin Management Report and are incorporated in this table for all listed years. Data provided in this report replace estimated data used in the previous Basin Management Report.

## **BMO No. 2 – Maintain Specific Groundwater Elevations within All Areas of the Basin Consistent with the Water Forum “Solution”**

Regional groundwater elevations are measured through a network of public and private wells throughout Sacramento County. Collected data are submitted to and maintained by DWR in their California Statewide Groundwater Elevation Monitoring (CASGEM) and Water Data Library (WDL) programs. These are the primary sources of groundwater level data for the Authority’s HydroDMS.

The HydroDMS is a centralized database which contains SCGA’s groundwater related data. It combines the data entry and management capabilities of a typical Microsoft Access database with powerful web-enabled tools for viewing and analyzing data. These tools can be used to monitor BMOs and to support groundwater basin management report development. HydroDMS also provides password protected web based access allowing users with different levels of access to enter, view, and analyze the data (WRIME, 2010).

Data from the entire county is included in the HydroDMS so that accurate, detailed groundwater level analysis can be conducted. The HydroDMS currently incorporates WDL data from 1930 to 2014.

### **Groundwater Elevation Contour Maps**

Groundwater elevation contour maps illustrate groundwater conditions in the Central Basin, based on data from the CASGEM online database. Two sets of groundwater elevation maps were prepared to illustrate both seasonal and time related changes in groundwater elevations. The first set of maps is for spring 2004 and 2014 (Figure 6 and Figure 7), and the second set is for fall 2004 and 2014 (Figure 8 and Figure 9).

Historical groundwater production resulted in the development of a persistent, regionally-extensive cone of depression in the Elk Grove area of the Central Basin, apparent in both of the 2004 maps. The 2014 groundwater elevations show that there has been recovery in the groundwater levels in this area, as seen by the less pronounced cone of depression and the increase in elevations shown in the 2014 maps in Figure 7 and Figure 9.

By comparing the contour maps for 2004 and 2014, the change in shape and location of the cone of depression can be seen over the last ten years. The elevation at the base of the cone has risen from approximately 50 feet below mean sea level (MSL)<sup>4</sup> in 2004 to approximately 30 feet below MSL in 2014. Overall, groundwater elevations have exhibited a rising trend over that last ten years in this part of the basin. However, groundwater elevations are generally lower in the

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<sup>4</sup> Elevations in this report are presented using the North American Vertical Datum of 1988 (NAVD 88)

central and eastern parts of the basin. These trends are also shown by the hydrographs in the following section.

### **Groundwater Level Trends**

Groundwater hydrographs illustrate groundwater elevation data that have been collected over time, and selected hydrographs delineate groundwater level trends in various locations throughout the basin. Figure 10 through Figure 12 show the location of groundwater hydrographs with the most complete period of record. The GMP and the previous Basin Management Report utilized “SWP” Well IDs for the wells that are no longer in use in the CASGEM or WDL programs. The CASGEM IDs and the associated “SWP” IDs are indexed in Table 6 below. The SWP IDs will be referred to through the remainder of the report. Future reports will refer to the CASGEM ID.

**Table 6 CASGEM and Well IDs with Historical Groundwater Elevation Trends**

Well ID	Basin Location	CASGEM ID	Period of Record	Trend <sup>1</sup>
SWP-004	West	383009N1214224W001	9/3/1969 to 4/12/2016	No significant trend
SWP-054	Central	384082N1213845W001	4/26/1961 to 4/5/2007	Decreasing
SWP-058	West	383884N1214167W001	10/15/1959 to 3/1/2004	Decreasing
SWP-063	West	383510N1213741W001	9/25/1990 to 4/12/2016	No significant trend
SWP-107	West	384664N1214774W001	5/2/1990 to 10/23/2015	Increasing
SWP-115	West	384343N1214615W001	11/1/1959 to 10/23/2015	Increasing
SWP-121	Central	384756N1213352W001	4/4/1950 to 10/19/2015	Decreasing
SWP-124	Central	384798N1212614W001	11/10/1959 to 10/19/2015	Decreasing
SWP-128	Central	384425N1213031W001	4/11/1961 to 10/19/2015	Decreasing
SWP-149	Central	384468N1212226W001	3/22/1990 to 4/18/2016	Decreasing
SWP-170	West	385021N1214948W001	3/19/1965 to 10/20/2015	Increasing
SWP-177	Central	385343N1214280W001	10/1/1959 to 10/20/2015	Increasing
SWP-185	East	385469N1213389W001	7/12/1963 to 5/17/2013	Decreasing
SWP-188	Central	385287N1213347W001	10/9/1962 to 3/1/2004	Decreasing
SWP-202	East	385541N1211812W001	11/6/1959 to 11/16/2012	No significant trend
SWP-209	East	385038N1212203W001	2/15/1960 to 10/19/2015	Decreasing
SWP-244	East	385974N1212706W001	1/19/1981 to 10/30/2007	Decreasing
SWP-250	East	386312N1212295W001	11/4/1981 to 4/19/2016	Decreasing
SWP-255	East	385914N1212475W001	4/30/1962 to 4/19/2016	No significant trend

<sup>1</sup> Groundwater level trends were performed using the Mann-Kendall test

The hydrographs shown indicate a consistent decline in groundwater levels of approximately 20 to 30 feet beginning in 1960s until about 1980. From 1980 through 1983, water levels recovered by about 10 feet and remained relatively stable until the beginning of the 1987 - 1992 drought. During this period, water levels generally declined about 15 feet, and as much as 30 feet in some locations. Between 1995 and 2003, most water levels recovered to levels typically higher than

those prior to the 1987 - 1992 drought. In some locations, this recovery has continued through this reporting period.

For the purpose of further discussion, the wells are grouped by their geographic locations as described below:

**Western Area.** The western portion of the basin is generally the area between Interstate 5 and Highway 99. Groundwater level trends in this area are illustrated in the hydrographs shown in Figure 10 (SWP-170, SWP-107, SWP-004, SWP-063, SWP-115, and SWP-058). These hydrographs show groundwater levels varying between 15 feet above and 90 feet below MSL during the period of record. Mann-Kendall tests for trends in groundwater elevation for the Western Area showed 1 well with a decreasing trend, 2 wells with no significant trend, and 3 wells with an increasing trend.

**Central Area.** The central portion of the basin is the area between Highway 99 and Highway 16 (Jackson Highway). Groundwater level trends in this area are illustrated in the hydrographs shown in Figure 11 (SWP-177, SWP-149, SWP-121, SWP-124, SWP-128, SWP-188, and SWP-054). Mann-Kendall tests for trends in groundwater elevation for the Central Area showed 6 wells with a decreasing trend and 1 well with an increasing trend.

**Eastern Area.** The eastern portion of the basin is the area north of Highway 16 (Jackson Highway). Groundwater level trends in this area are illustrated in the hydrographs shown in Figure 12 (SWP-185, SWP-250, SWP-244, SWP-255, SWP-202, and SWP-209). Mann-Kendall tests for trends in groundwater elevation for the Eastern Area showed 4 wells with a decreasing trend and 2 wells with no significant trend.

### **Preliminary Threshold Status**

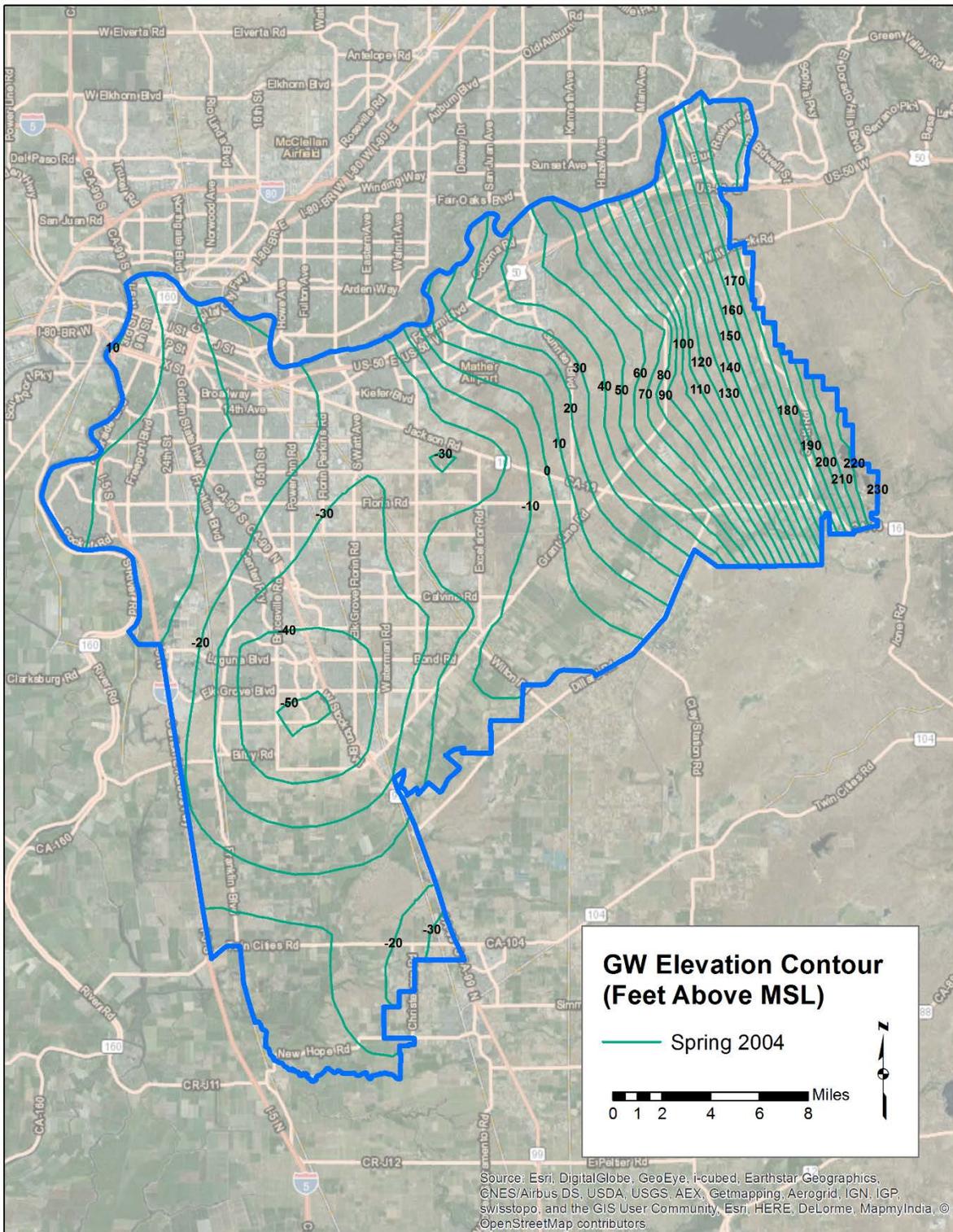
In December 2015, SCGA completed a study to move towards establishing groundwater elevation thresholds that define specific objectives to manage groundwater elevations according to the BMO No. 2. The work was partially funded by a Local Groundwater Assistance grant from DWR.

BMO No. 2 was established in the GMP with defined actions, but without fully quantified thresholds. Threshold values were based on percentages of a range of groundwater elevations, but that range of groundwater elevations was not defined in the GMP (see Figure 13). Instead, a methodology was presented to define the groundwater elevation range, termed the bandwidth, relative to specific wells.

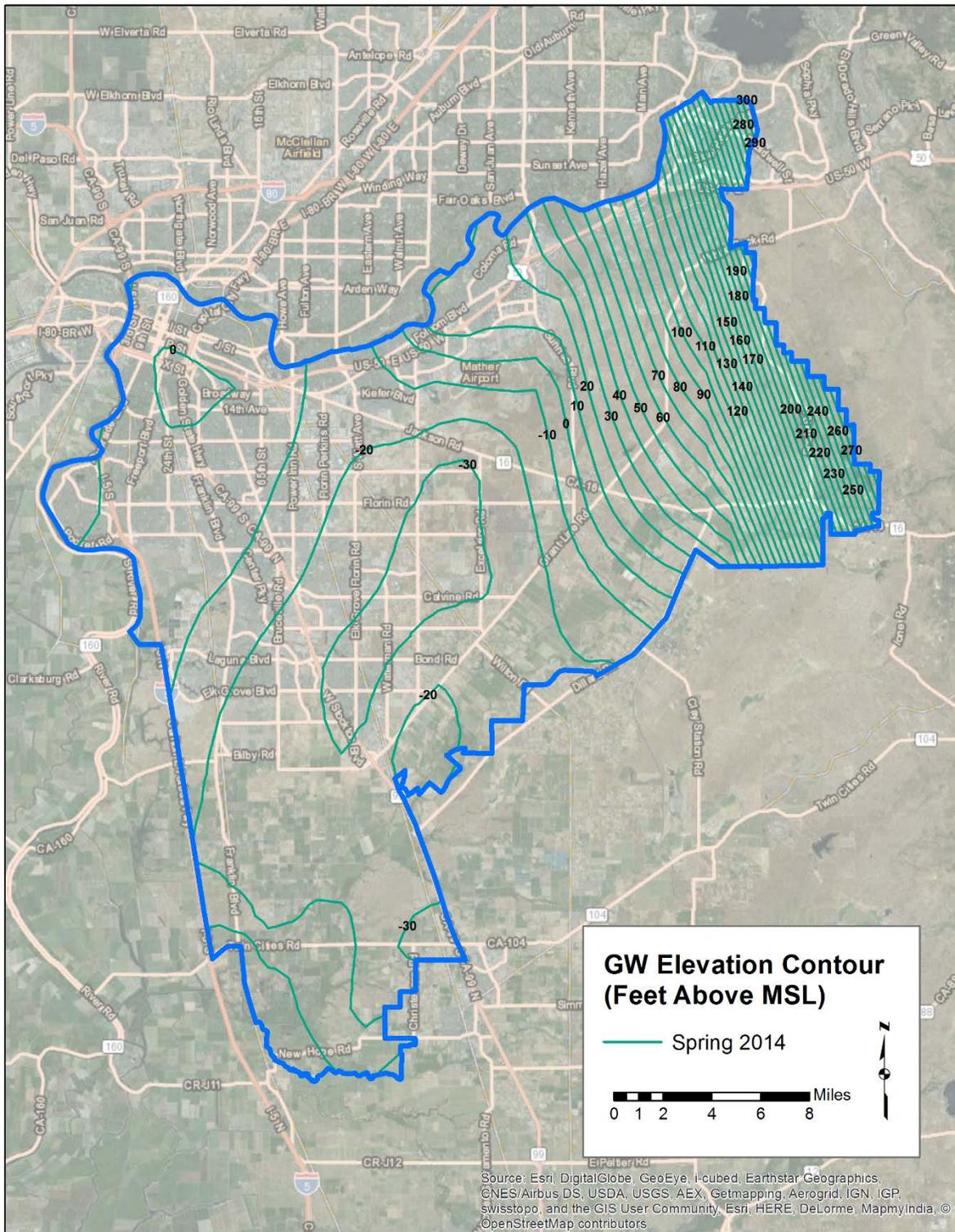
This new effort implemented that methodology, adjusting for changes that have occurred in the basin from both a management and technical standpoint, to move towards fully implementing BMO No. 2. Results were documented in a technical memorandum titled *Groundwater Elevation BMO Threshold Development* (RMC Water and Environment, 2015).

Given the changes in groundwater management brought by SGMA, the thresholds were not adopted, and are presented here for information purposes only. Figure 13 shows the trigger levels and actions defined in the GMP. The 2015 effort established a method for determining the Bandwidth Status for six Management Zones. The Bandwidth Status could then be compared to the thresholds in the GMP for action. Table 7 shows how Management Zone Bandwidth Status is developed based on averaging Bandwidth Status of key wells within each Management Zone. The location of the Management Zones and a spatial display of the status is shown in Figure 14, with two Management Zones indicated past Trigger Point 1 (Confluence and Sacramento River) with the remaining Management Zones indicated past Trigger Point 2. Two Management Zones are nearly at Trigger Point 3. If adopted, these Management Zones would be recommended for the actions listed in Figure 13. For instance, the zones past Trigger Point 2 would be recommended for initiating a requirement to collect a fee to secure supplemental water supplies or to reduce pumping in a predefined area(s).

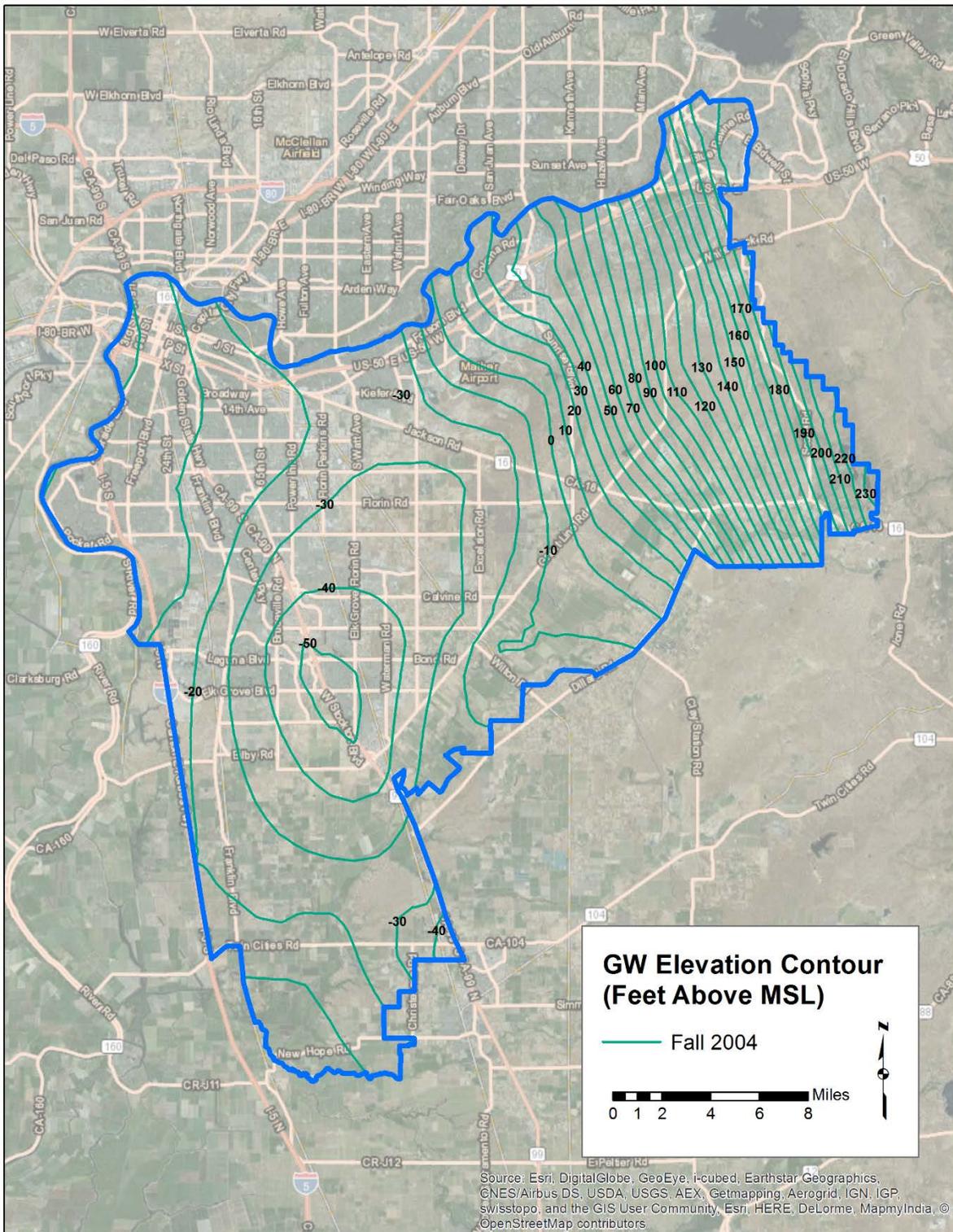
Prior to full implementation of this approach to BMO No. 2, the SCGA Board will need to consider if the proposed GMP actions are consistent with the groundwater conditions developed through this process. This effort is anticipated to occur through activities associated with SGMA compliance.



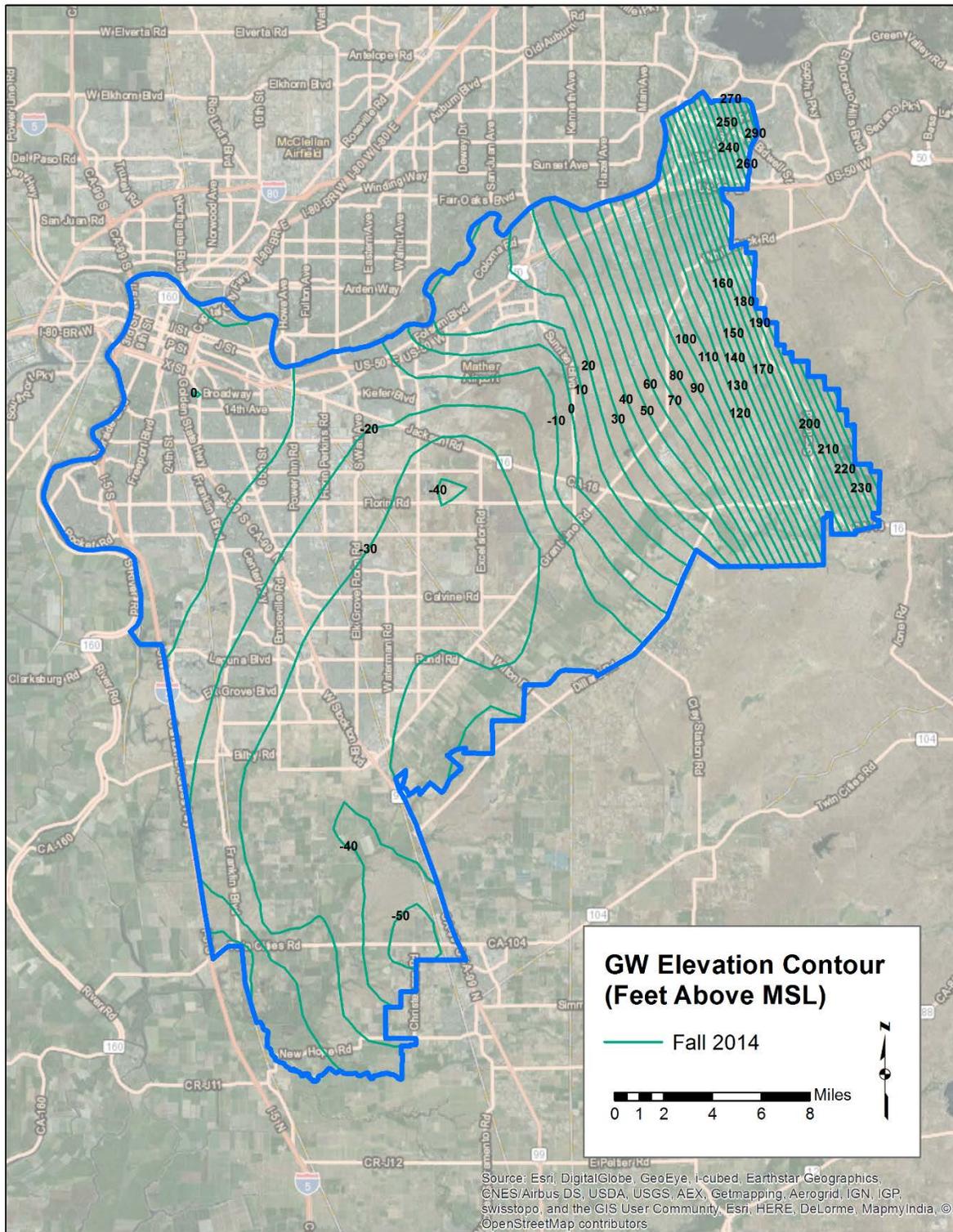
**Figure 6 Spring 2004 Groundwater Elevation Contour Map**



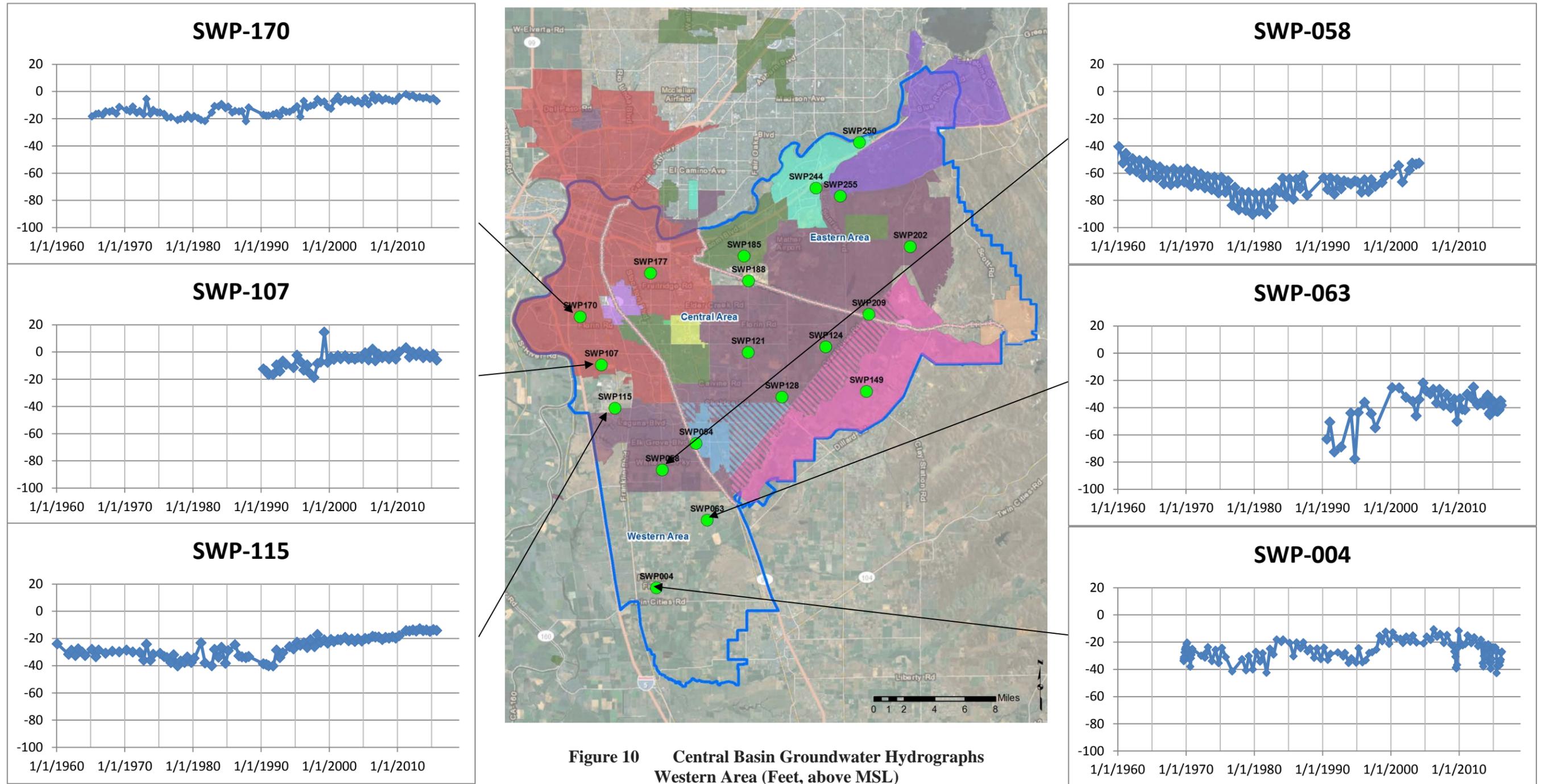
**Figure 7 Spring 2014 Groundwater Elevation Contour Map**



**Figure 8** Fall 2004 Groundwater Elevation Contour Map



**Figure 9** Fall 2014 Groundwater Elevation Contour Map



Note: Groundwater hydrograph elevations are based on the NAVD88 datum

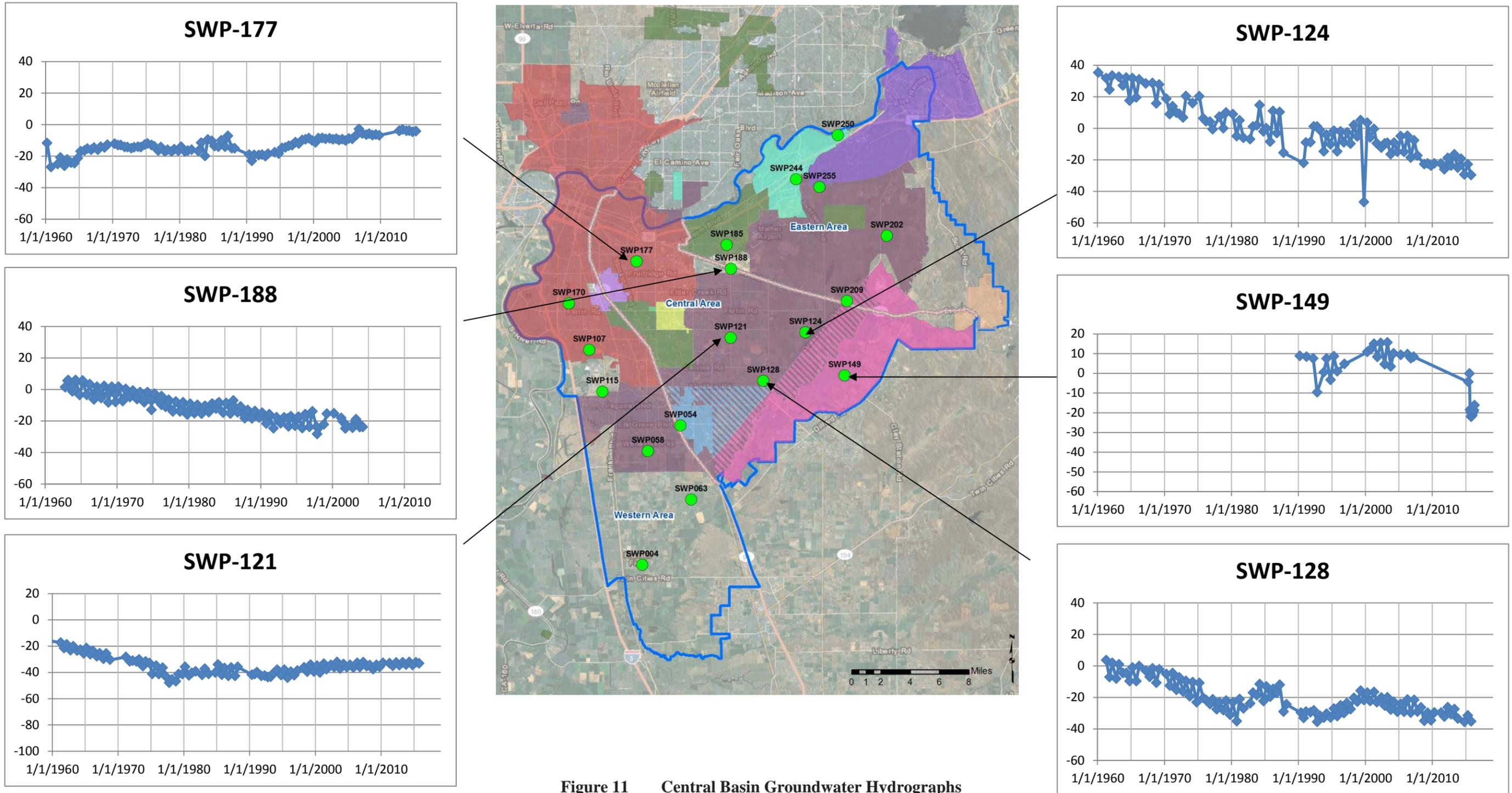


Figure 11 Central Basin Groundwater Hydrographs  
Central Area (Feet, above MSL)

Note: Groundwater hydrograph elevations are based on the NAVD88 datum

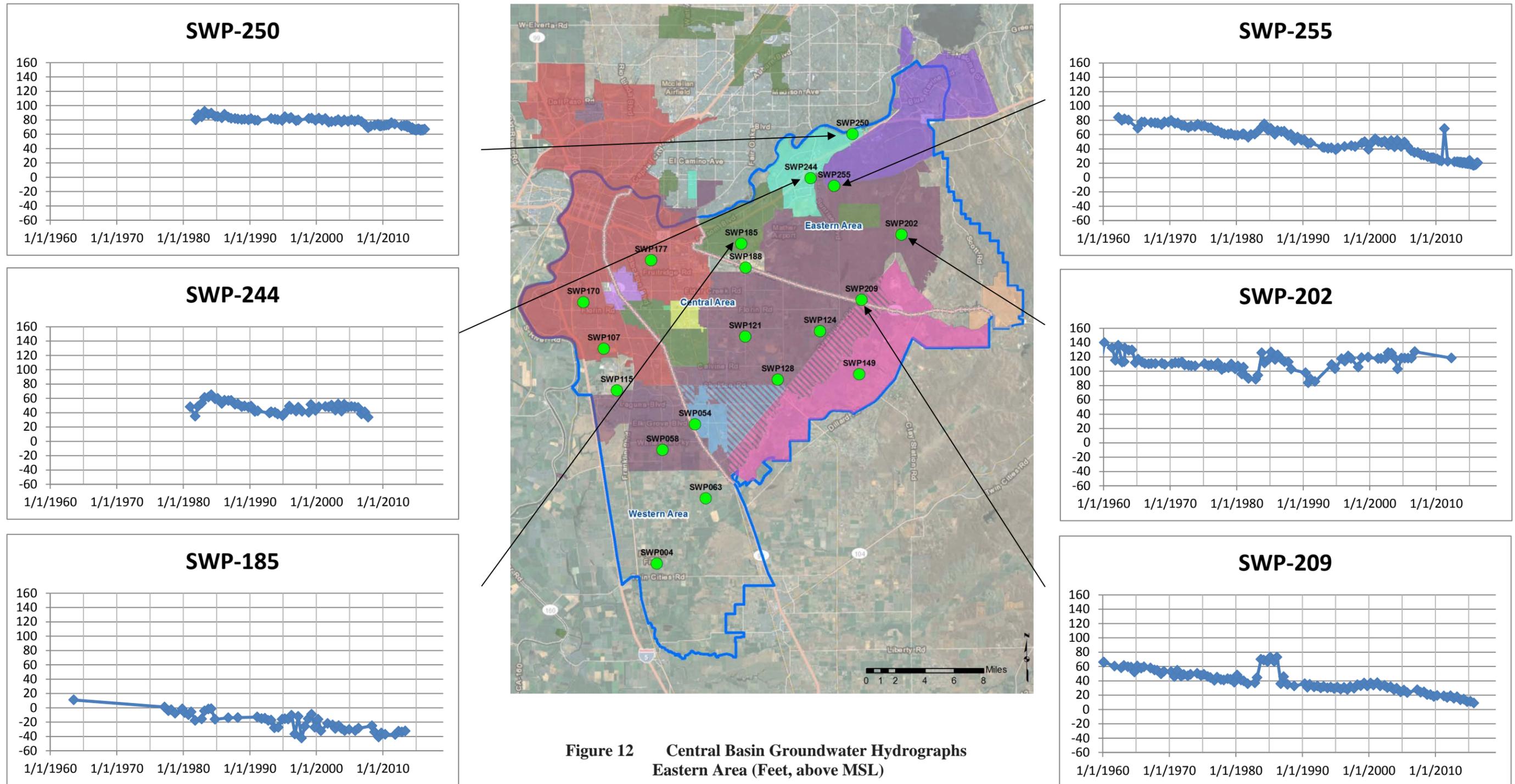


Figure 12 Central Basin Groundwater Hydrographs Eastern Area (Feet, above MSL)

Note: Groundwater hydrograph elevations are based on the NAVD88 datum

Monitoring Action	Trigger Points	Recommended Action
BMO No. 2. Maintain specific groundwater elevations within all areas of the basin consistent with the Water Forum "solution."		
<p>A monitoring methodology to meet specific objectives in managing groundwater levels requires a systematic, repeatable, and scientific approach. The objective of this monitoring program is to take measurements from selected monitoring wells that have sufficient construction and hydrogeologic data. Wells will be assigned to represent the polygon areas defined in <b>Appendix B</b>, and may be grouped within the basin in areas that are sufficiently distinct in the makeup of hydrogeology and land use. Monitored groundwater levels for a well will be compared with the designated upper and lower groundwater level threshold for each polygon that is assigned to the well. The upper and lower thresholds are termed the "bandwidth" of the polygon.</p>	<p>Trigger Point 1. A 25 to 50 percent encroachment into the designated bandwidth of a polygon.</p>	<p>Alert stage that informs the basin governance body and the overlying groundwater extractor(s) that a specific polygon area is being compromised. Activation of this trigger will take place only after the cause of the condition is thoroughly investigated.</p>
	<p>Trigger Point 2. A 50 to 75 percent encroachment into the designated bandwidth of a polygon.</p>	<p>In the event groundwater level measurements hit Trigger Point 2 without first initiating Trigger Point 1, the recommended actions of Trigger Point 1 still apply. Additionally, this stage initiates a requirement to collect a fee to secure supplemental water supplies or to reduce pumping in a predefined area(s).</p>
	<p>Trigger Point 3. A 75 to 100 percent encroachment into the designated bandwidth of a polygon. This indicates continuously declining groundwater levels in an area even during wet and normal hydrologic cycles, indicating that excessive pumping is the probable cause.</p>	<p>Well owners with operating wells in the affected area(s) will be identified and notified of the basin's condition in their area. An assessment will be levied against those owners who continue to pump at the higher level. Every attempt will be made by the governance body to ameliorate the impact assessments to private domestic groundwater pumpers.</p>
	<p>Trigger Point 4. Over 100 percent encroachment into the designated bandwidth of a polygon.</p>	<p>If the recommended actions from the first three trigger points do not result in an improvement to the affected area(s), the basin governance body will need to consider which of two actions it will take. The first is to consider whether a lower groundwater level in the area is acceptable. If so, the basin governance body has the ability to adapt to the actual monitoring data and change the model-based thresholds for management in the area.</p> <p>If lower groundwater levels are deemed unacceptable, the second action would require finding supplemental water supplies and construct infrastructure for the area(s) and reduce pumping to allow groundwater levels to recover to acceptable levels. Fees in addition to Trigger Point 3 fees will be assessed to cover costs associated with this action.</p>

**Figure 13 BMO No. 2 Trigger Actions**

**Table 7 Basis for Preliminary Bandwidth Status for Management Zones, Fall 2014**

<b>Management Zones and Associated CASGEM Well</b>	<b>Fall 2014</b>
<b><i>Confluence Management Zone</i></b>	<b>42.0%</b>
SCGA #10	43.6%
SCGA #11	40.3%
<b><i>American River</i></b>	<b>74.6%</b>
SCGA #12	n/a
SCGA #17	74.2%
SCGA #24	74.9%
<b><i>Inter-Riverine</i></b>	<b>70.8%</b>
SCGA #4	75.0%
SCGA #5	74.9%
SCGA #8	71.6%
SCGA #9	75.0%
SCGA #13	74.9%
SCGA #14	n/a
SCGA #15	75.0%
SCGA #16	75.0%
SCGA #20	49.2%
SCGA #22	66.7%
<b><i>Upper Cosumnes River</i></b>	<b>75.0%</b>
SCGA #6	75.0%
SCGA #7	75.0%
SCGA #23	75.0%
<b><i>Lower Cosumnes River</i></b>	<b>69.2%</b>
SCGA #25	73.2%
SCGA #26	65.3%
<b><i>Sacramento River</i></b>	<b>41.8%</b>
SCGA #1	33.0%
SCGA #3	38.1%
SCGA #18	54.1%

Footnote:

n/a: data not available

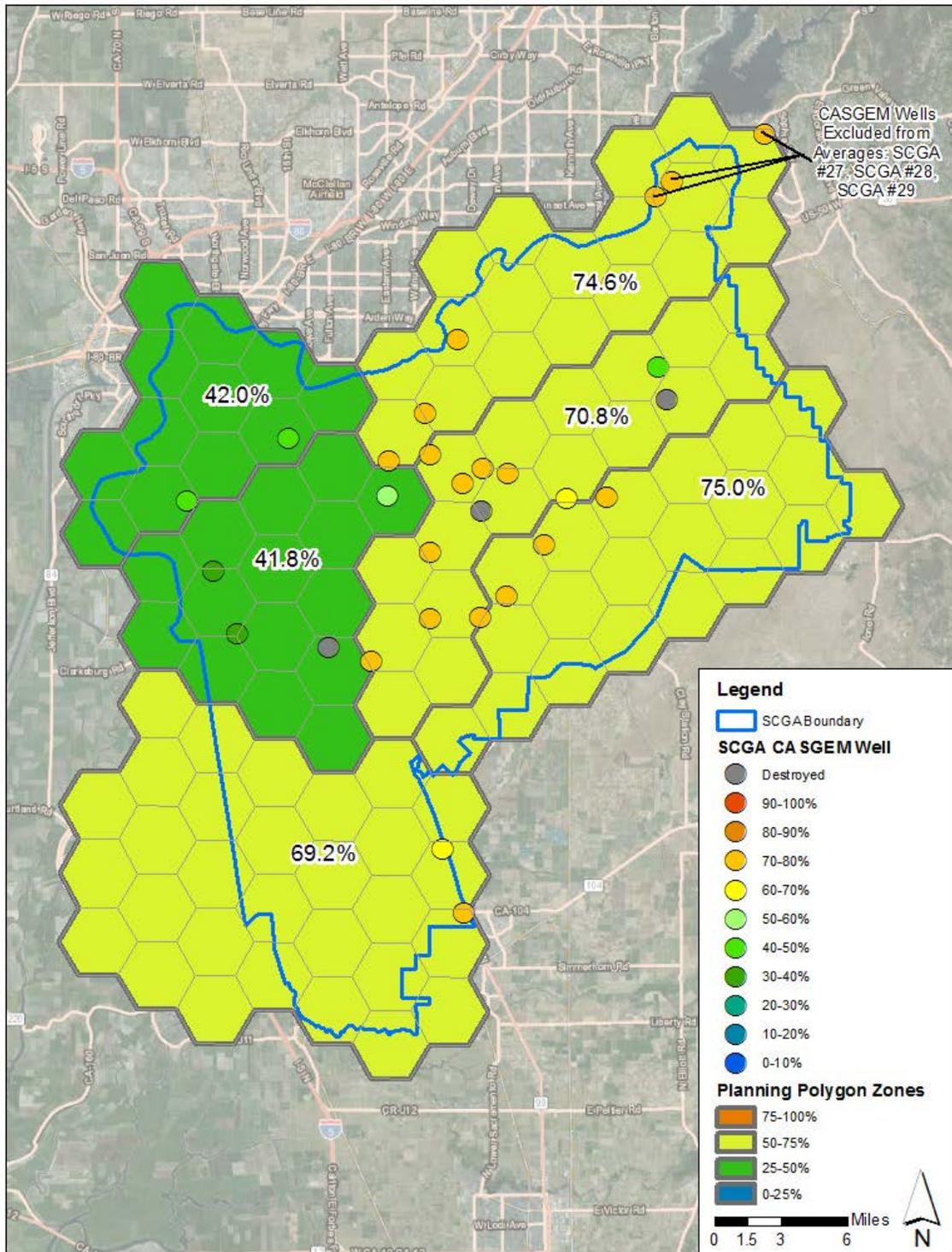


Figure 14 Preliminary Bandwidth Status, Fall 2014 Groundwater Elevation Data

### **BMO NO. 3 – Protect Against Any Potential Inelastic Land Surface Subsidence by Limiting Subsidence to No More than 0.007 Feet per 1 Foot of Drawdown in the Groundwater Basin**

Land subsidence can cause significant damage to essential infrastructure. Historical land surface subsidence within the Central Basin is believed to be minimal, with no known significant impacts to existing infrastructure. Given historical trends, the potential for significant land surface subsidence from groundwater extraction in the Central Basin appears to be small.

While no land subsidence study has been conducted in the Central Basin, there were some studies conducted in the SGA area that could potentially benefit SCGA. SGA (2013) reports that land surface is estimated to have subsided over 0.3 feet from 1947 to 1969 and an additional 1.9 feet from 1969 through 1989 at a benchmark near Greenback Lane, northeast of the former McClellan Air Force Base. This subsidence is associated with a decline in groundwater levels during that period, reflected by a decline of at least 68 feet in that 42-year period at a well 2.9 miles to the west of the benchmark. This 2.2 feet of subsidence with 68 feet of drawdown is equivalent to 0.03 feet of subsidence per foot of drawdown.

Authority staff will continue to cooperate with SGA and other entities in the region to cost-effectively quantify subsidence in the Central Basin and potential impact of subsidence.

### **BMO No. 4 – Protect Against Any Adverse Impacts to Surface Water Flows in the American, Cosumnes, and Sacramento Rivers**

Please refer to Table A-1, Component 2, Action Item 4 – Surface Water Groundwater Interaction Monitoring, of Appendix A for details of activities related to this BMO.

### **BMO No. 5 – Water Quality Objectives**

Generally, groundwater quality in the basin is suitable for nearly all uses, with the exception of documented areas of contamination and localized quality issues discussed later in this section.

Available groundwater quality data in the Central Basin are primarily from municipal wells operated by the various water purveyors in the basin. These data have been reported to the State Water Resources Control Board's Division of Drinking Water (DDW) by each purveyor and downloaded from the DDW website for this report<sup>5</sup>. Numerous wells with water quality data were not included in this report due to the lack of ability to match DDW well identification numbers with purveyor wells. It is recommended to have agencies provide DDW well identification numbers in the future for more comprehensive mapping and analysis. DDW does not provide well location information in their datasets.

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<sup>5</sup> Water quality data for 2014 provided from the State Water Resources Control Board's Division of Drinking Water through the Quality Analyses Data and Download Page. See [http://www.waterboards.ca.gov/drinking\\_water/certlic/drinkingwater/EDTlibrary.shtml](http://www.waterboards.ca.gov/drinking_water/certlic/drinkingwater/EDTlibrary.shtml) for more information

Values presented are for raw water and are not necessarily indicative of delivered water quality. Raw water may be treated or blended prior to delivery, or may not be utilized for water supply purposes. Water quality information is presented here to summarize aquifer conditions; information on delivered water quality can be obtained from each water purveyor through their annual Water Quality Report.

Reported water quality data for wells with multiple values over the 2014 sampling period were averaged. Any non-detect values greater than zero were taken at half of the non-detect threshold for graphing and analyzing purposes. Water quality data for total dissolved solids (TDS), iron and manganese, arsenic, nitrate, and hexavalent chromium are presented below.

- ***Total Dissolved Solids***

TDS is a measure of all dissolved constituents in water resulting primarily from rocks and sediments with which the water comes in contact as well as from irrigation and application of fertilizers and soil amendments. Some source waters, notably recycled water, may have higher TDS concentrations than others. TDS is regulated through a secondary standard which was established primarily for aesthetic concerns (e.g., staining of laundry and porcelain fixtures). California's secondary maximum contaminant level (SMCL) for TDS is divided into three different levels:

- Recommended Level: 500 milligrams per liter (mg/L)
- Upper Level: 1,000 mg/L
- Short Term Use Level: 1,500 mg/L

According to average sampling data from 2014 (Figure 15), nearly all municipal wells in the basin meet recommended SMCL for TDS, with only one well out of 56 (2%) recording values greater than 500 mg/L.

- ***Iron and Manganese***

Iron and manganese are naturally occurring elements in the earth's crust and are found in groundwater as a metallic ion. Iron and manganese are found in deeper municipal wells and treatment is required by the DDW when a new well is constructed. Regulation of iron and manganese concentrations is by a secondary standard, with an SMCL of 300 micrograms per liter ( $\mu\text{g/L}$ ) and 50  $\mu\text{g/L}$ , respectively. Concentrations for Central Basin wells are displayed in Figure 16 and Figure 17. Iron concentrations in these wells range from non-detect to 9260  $\mu\text{g/L}$ , and six out of 67 wells (9%) exceed the secondary standard. Manganese concentrations range from 0  $\mu\text{g/L}$  to 809  $\mu\text{g/L}$ , and 25 out of 67 wells (37%) exceed the SMCL standard. Note that these values represent raw water, which may be treated or blended prior to delivery to meet the standard, or may not be delivered for potable uses.

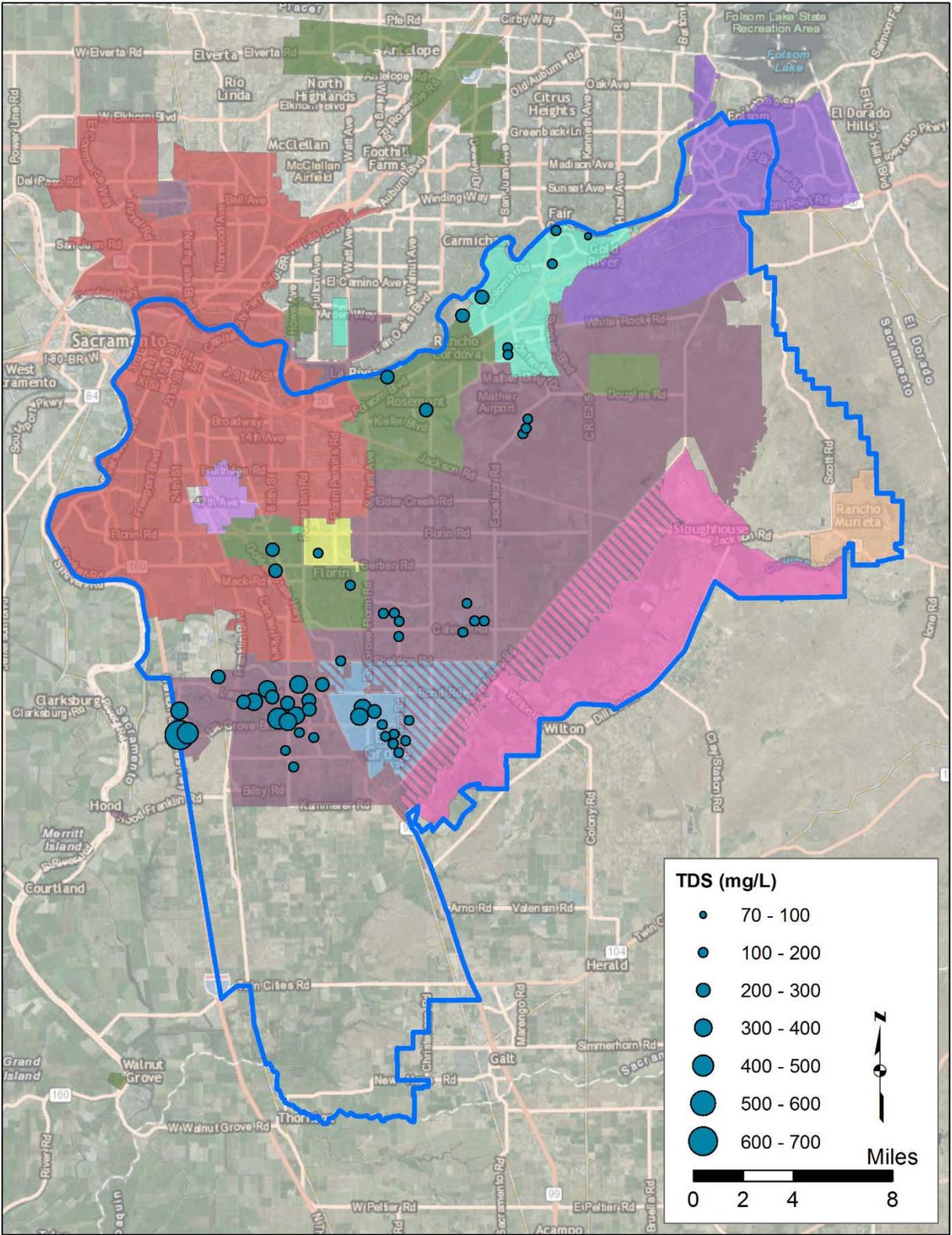


Figure 15 TDS Concentration in Public Supply Wells in the Central Basin (2014)

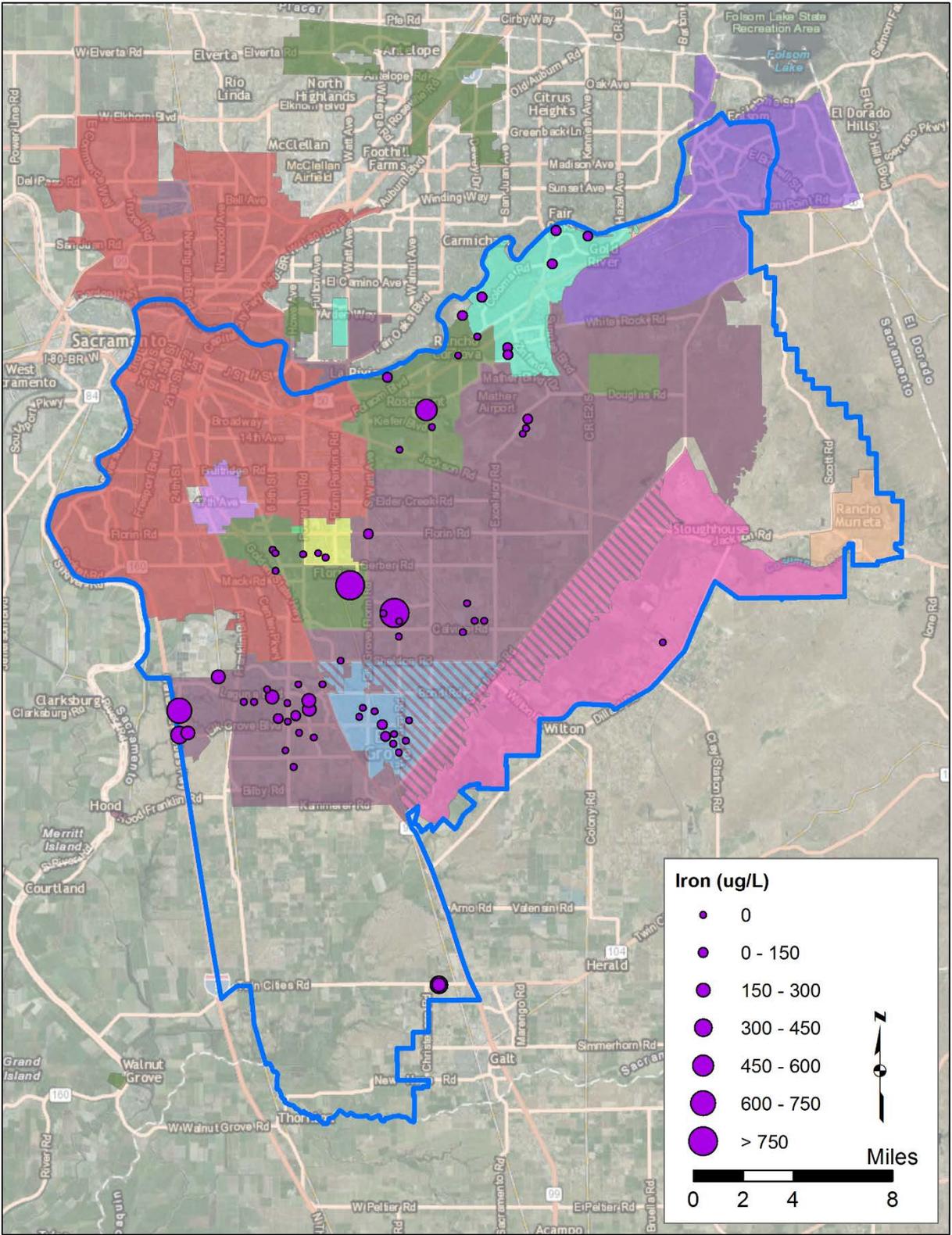


Figure 16 Iron Concentration in Public Supply Wells in the Central Basin (2014)

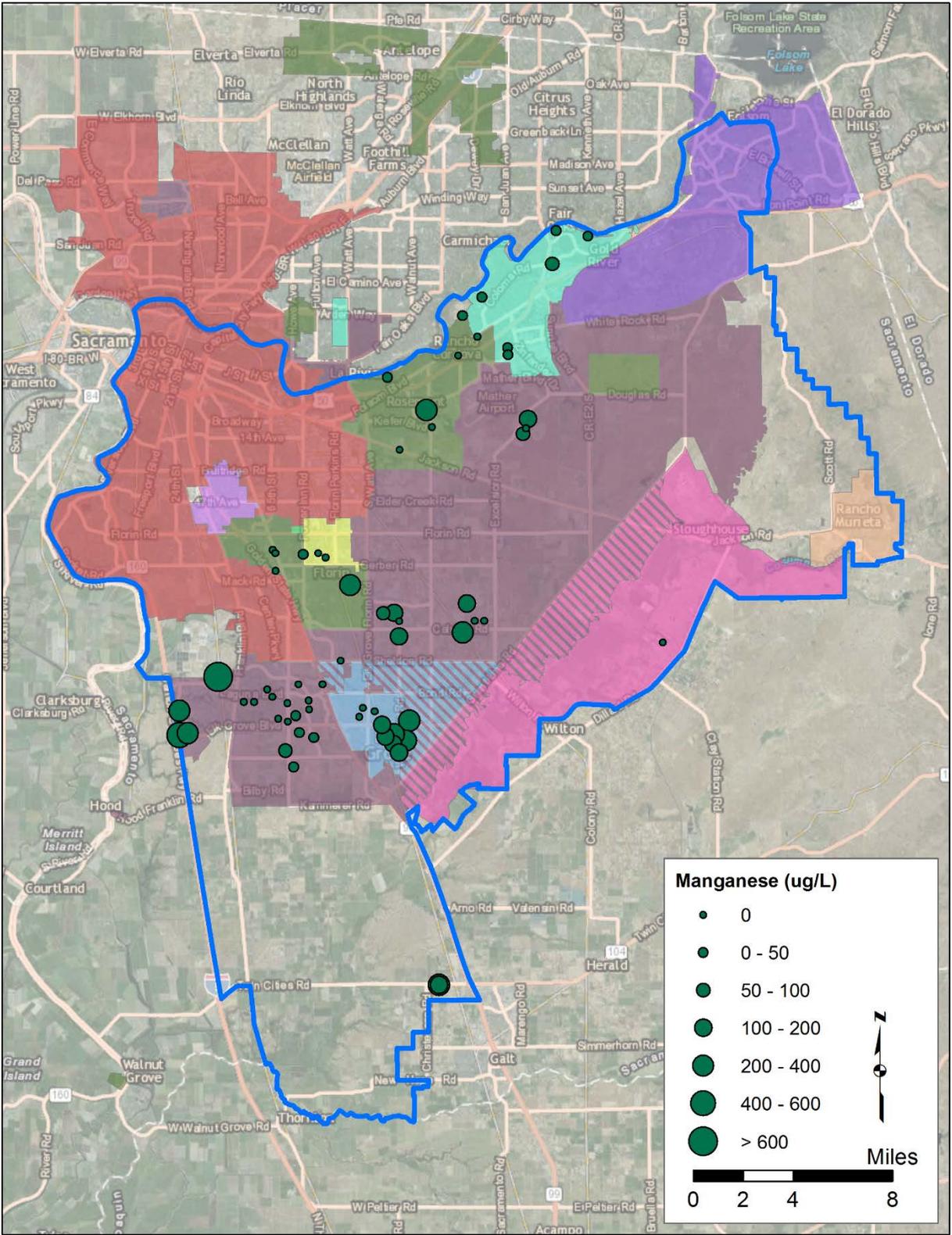


Figure 17 Manganese Concentration in Public Supply Wells in the Central Basin (2014)

- ***Nitrate (NO<sub>3</sub>)***

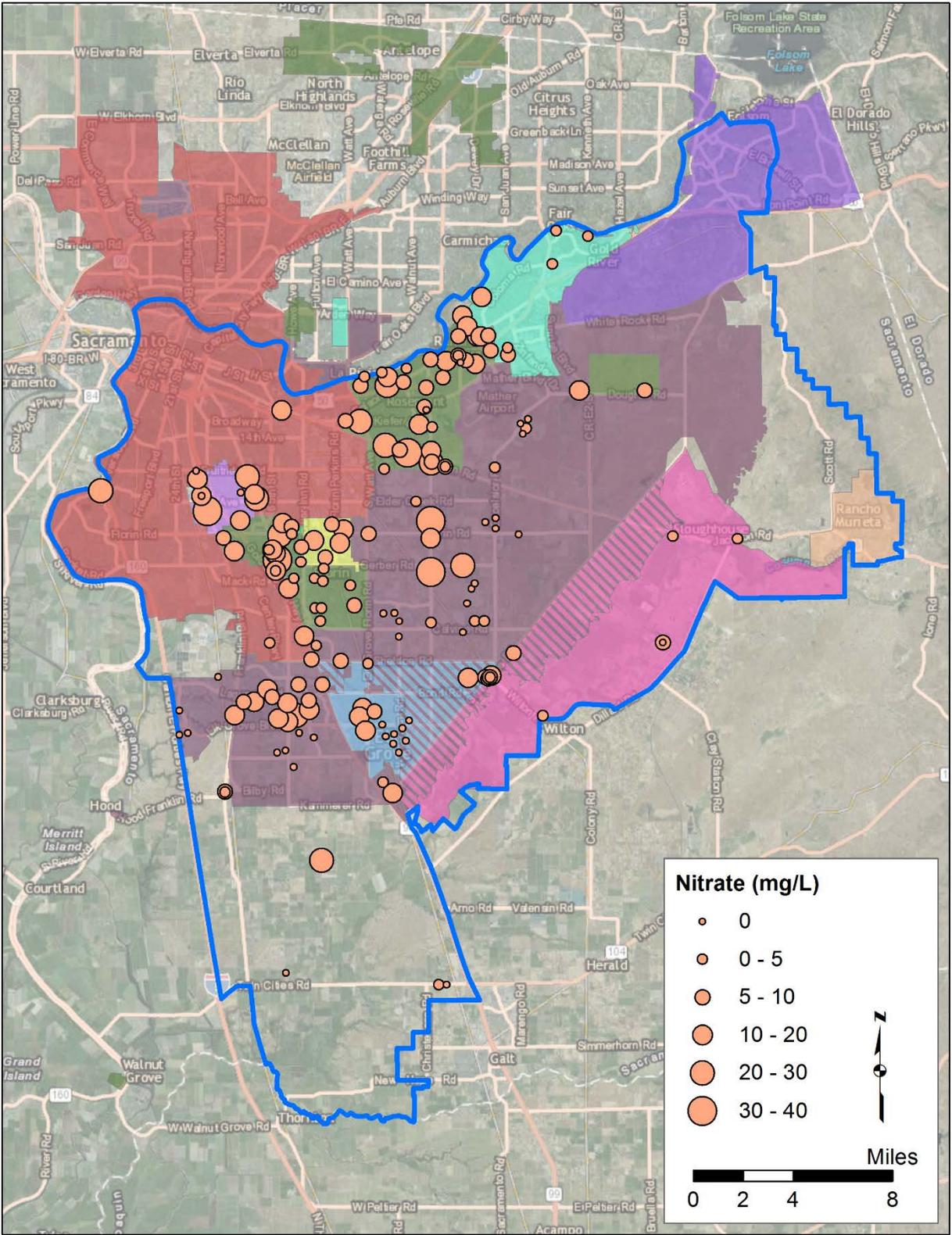
During the development of the GMP, the stakeholders expressed a concern regarding the possible presence of nitrate in groundwater, particularly in private wells. The use of on-site wastewater treatment systems and agricultural fertilizer application are two possible routes for nitrate to be introduced into groundwater. DDW has set a maximum contaminant level (MCL) for nitrate at 45 mg/L for public water systems. This standard should also be considered for private wells that are used as a source of potable water. Figure 18 shows the nitrate concentration sampled in 2014 for public water supply wells in the Central Basin. All wells recorded nitrate values below the MCL, and 44 of the 183 wells (24%) reported non-detect for nitrate. While there are no instances where groundwater exceeds the present standard, there are areas with higher concentrations. Additionally, private wells may be shallower than public water supply wells and may be more vulnerable to nitrate contamination. Information on water quality in private wells is limited, with shallow monitoring wells providing most available information on the portion of the aquifer that may be tapped by shallow private wells, such as studies by the USGS (Shelton, 2005).

- ***Hexavalent Chromium***

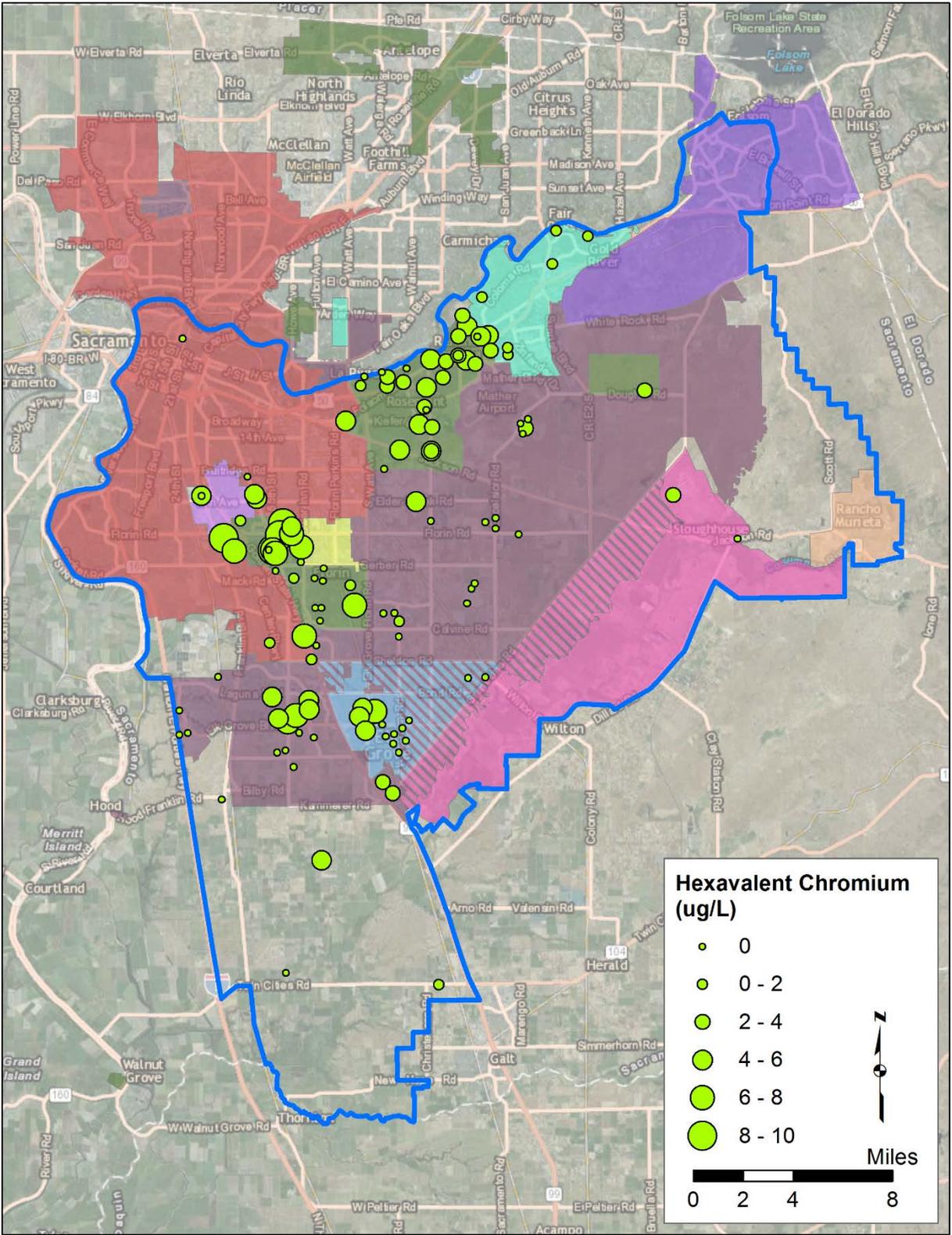
DDW's MCL for hexavalent chromium became effective on July 1, 2014 at 10 µg/L for public water systems. All 134 wells with data recorded values below 10 µg/L during 2014, as shown in Figure 19.

- ***Arsenic***

Arsenic is a naturally occurring element in the earth's crust. In 2004, the U.S. Environmental Protection Agency (EPA) adopted a revised MCL for arsenic (10 µg/L), along with monitoring requirements, arsenic health effects language, and best available technologies for arsenic mitigation in public drinking water systems. DDW initiated implementation of the new federal requirements in January 2006. In general, elevated arsenic concentrations in the Central Basin are not a significant problem. Figure 20 shows that most of the public water supply wells sampled in 2014 have arsenic concentrations below 10 µg/L. There are nine out of 72 wells (13%) that exceed the MCL, with the highest concentration recorded at 47 µg/L.



**Figure 18 Nitrate Concentration in Public Supply Wells in the Central Basin (2014)**



**Figure 19 Hexavalent Chromium Concentration in Public Supply Wells in the Central Basin (2014)**

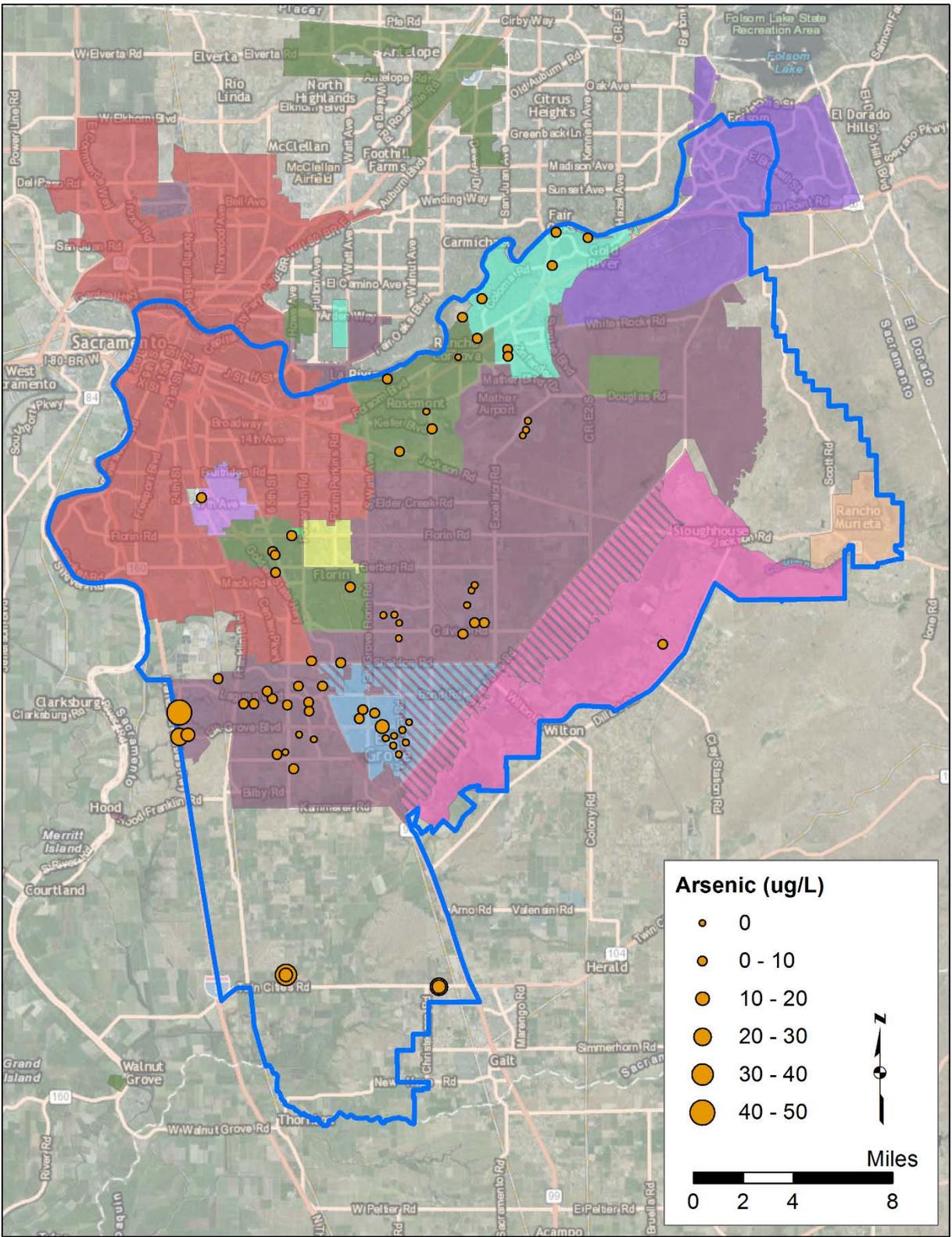


Figure 20 Arsenic Concentration in Public Supply Wells in the Central Basin (2014)

- ***Volatile Organic Compounds (VOCs) and Other Related Contaminants***

Several sources of VOCs currently exist within the basin, including old landfills, wrecking yards, military bases, and research and development facilities, as well as gas stations and dry cleaners. Significant concern exists regarding the movement of these compounds from the vadose or unsaturated zone of the soil matrix to the saturated zone or aquifer. Once these compounds are mobilized in groundwater, their movement is influenced by many different factors; one of which could be management activities within the basin. The GMP identified the need to monitor VOC migration within the basin for the protection of public and private wells. Groundwater quality data for numerous constituents that are grouped under the VOC category have been collected and stored in the HydroDMS. Constituents of primary concern include tetrachloroethylene (TCE), perchloroethylene (PCE), and carbon tetrachloride. Other related contaminants include the non-volatile organic compound n-nitrosodimethylamine (NDMA) and the inorganic compound perchlorate. Any measurable trace of these contaminants in a private or public well is considered significant and actions should be taken in accordance with programs identified in the GMP and by the regulatory agencies having jurisdiction in addressing the VOC contamination.

Within the reporting period there have been no reports of new sources of major VOC contamination or of the migration of previously identified plumes within the Central Basin. Data obtained from DDW for 2014 shows that the concentration of these constituents is either not detected or below the applicable MCL in municipal production wells in the Central Basin.

- ***Known “Principal” Contaminant Plumes***

Principal groundwater contaminant plumes within or near the Central Basin are known to exist from source areas such as the Mather Field Superfund Site (US Air Force), the Aerojet Superfund Site (Aerojet Rocketdyne), the Inactive Rancho Cordova Test Site or IRCTS (The Boeing Company and Aerojet), the former Army Depot, the former Southern Pacific and Western Pacific rail yards (Union Pacific), as well as various landfills. The plumes of primary concern are those involving historical activities at Mather Field, Aerojet/Boeing, and Kiefer Landfill (Sacramento County). The most recent mapping of the major plumes was conducted using data from 2007 and is shown in Figure 21. The presence of contaminant plumes is of great concern to SCGA members. To date, several municipal production wells have been removed from service because of groundwater contamination. Additionally, groundwater contamination impacts the availability of future groundwater supply and the basin’s ability to fully develop conjunctive use programs. The Authority continues to coordinate with the responsible parties and the Regional Water Quality Control Board and regularly receives updates on these sites at Board meetings. Additional detail can be found in the following section, “Implementation of the Central Basin GMP”.

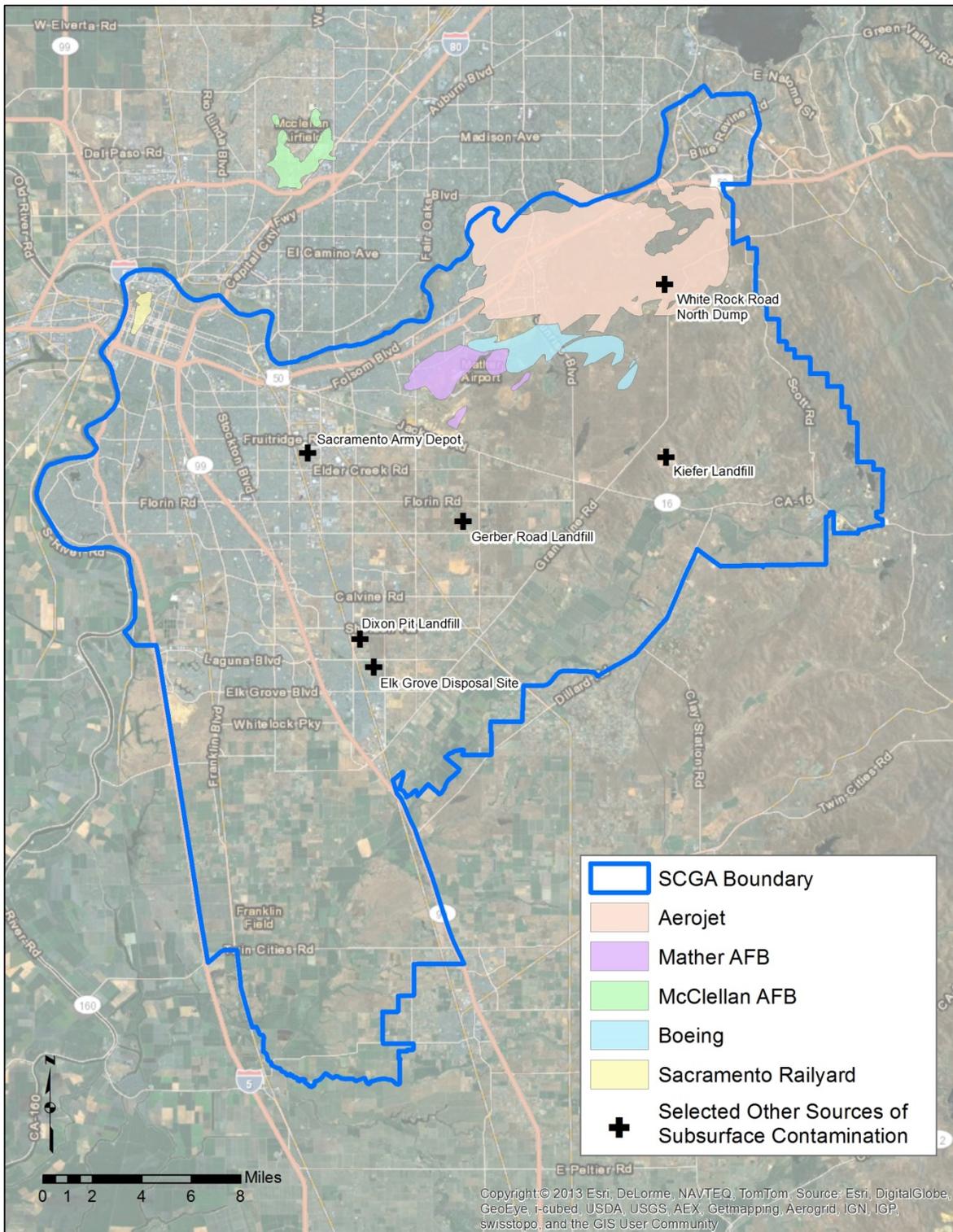


Figure 21 Delineation of Major Plumes, as of 2007

## CHAPTER 3 BASIN MANAGEMENT ACTIVITIES

The GMP identified 69 specific management actions for the groundwater basin. Significant progress has been made in implementing these actions. While many of the actions are considered on-going, there are many others that have been completed. Table A-1 in Appendix A provides a detailed status of each of the actions.

Several key management actions identified in the GMP warrant more detailed discussion. These actions are focused in the following areas: 1) Public Outreach, 2) Update of the HydroDMS, 3) Groundwater Accounting Program, 4) Agricultural/Agriculture Residential Water Conservation, 5) Control of the Mitigation and Remediation of Contaminated Groundwater, 6) CASGEM, 7) SGMA, 8) Groundwater Banking, and 9) Basin Management Objective Threshold Development and Recharge Mapping Project.

### Public Outreach

The Authority has made significant progress in implementing their public outreach program. Activities include:

- On-going implementation of the Public Outreach Plan (POP) (see Table A-2 in Appendix A).
- Holding regular noticed Board meetings.
- Posting meeting agendas, notes, Board items, presentation slides, as well as other related information to the Authority's website ([www.scgah2o.org](http://www.scgah2o.org)).
- Continuing to develop relationships with adjacent groundwater management entities, federal, state, and local regulatory agencies, and responsible parties for groundwater cleanup programs.
- Holding staff meeting on a regular basis with the Sacramento Groundwater Authority (North Basin) and the South Area Water Council (South Basin).
- Developing the 2011/2012 Basin Management Report.

In addition, Board meetings incorporated public outreach through presentations by other entities on items of interest in groundwater management. These included presentations on groundwater banking by The Nature Conservancy (March 13, 2013), recharge through dry wells by the Office of Environmental Health Hazard Assessment (November 13, 2013), well rehabilitation by Elk Grove Water District (January 8, 2014), remediation at Aerojet by the Regional Water Quality Control Board (March 12, 2014), groundwater management by Carl Hauge (May 14, 2014), pumping and groundwater elevations by SCGA staff (September 11, 2014), and numerous subjects within the Executive Director's Report and Director's Comments during each Board meeting.

**Update of the HydroDMS**

The HydroDMS is SCGA's web-based data management system. In 2014, SCGA completed a comprehensive update of the data in the HydroDMS to bring the production and groundwater level data up to date, along with well locations.

**Groundwater Accounting Program**

SCGA continued the development of the GAP, previously known as the Water Accounting Framework, to guide groundwater banking within the Central Basin. Activities included development of a GAP Subcommittee and development of a draft framework for the program. The GAP Subcommittee met four times in 2013 and two times in 2014 to continue moving towards a method of managing regional groundwater banking activities. This included distribution of a survey to gain input from member agencies on the GAP and GAP process.

In late 2014, with the passage of the SGMA, work on the GAP became more limited due to staffing constraints. The draft framework was left for completion at a later date, with the effort likely to resume in earnest in 2017.

**Agricultural/Agriculture Residential Water Conservation**

To ensure long-term viability of the Basin's groundwater supply, the Authority proactively seeks ways to maintain its long-term sustainable yield of 273,000 AF/year. One measure is through water demand reduction. The Authority's GMP documents a number of action items to explore ways to reduce water demands in the basin. Section 3.2.4.1 of the GMP, Demand Reduction, states, "The basin governance body shall develop BMPs [best management practices] for self-served agricultural and agricultural-residential water users."

A sub-committee was established on September 8, 2010 to study, evaluate, and make recommendations to the Board on appropriate water conservation best management practices for agricultural and agricultural-residential water users and to determine how best to inform those who would benefit from these BMPs. The sub-committee held meetings on June 15, 2011, January 17, 2012, and February 28, 2012. The meetings included discussions of outreach materials related to agricultural-residential BMPs and graywater collection and reuse. Methods of outreach were also discussed, including potential presentations to Community Planning Advisory Councils.

A draft plan was developed to coordinate outreach to established community organizations that had previously demonstrated interest or which had attended previous water efficiency workshops. Generally, the plan consisted of conducting 10-12 workshops, with each lasting 2-3 hours and covering three BMPs. The BMPs consist of 1) high efficiency landscaping; 2) grey water systems; and 3) rain water harvesting. Additionally, follow up home audits based on BMP implementation were also included in the plan. In addition to participation in the subcommittee and at Board meetings, the Authority participates in the implementation of the plan through partial funding of the effort. Regionally, the workshops have begun and have been popular, with

over 130 people in attendance. Workshops for the Central Basin being planned and will take place at Soil Born Farms.

Additionally, on May 8, 2013 SCGA entered into an agreement with the California Association of Resource Conservation Districts to provide \$9,160 to help fund the Water Efficiency on Large Landscapes (WELL) project. The WELL project provides a means to provide workshops and on-site surveys, including incentives for qualifying properties, for irrigation improvements to agriculture-residential properties.

### **Control of the Mitigation and Remediation of Contaminated Groundwater**

Major sources of contamination identified within the Central Basin are Mather Field, Aerojet/Boeing, and the Kiefer Landfill. Other sites of interest include the former Sacramento County Army Depot, Gerber Road Landfill (inactive), Dixon Pit Landfill (inactive), and the Elk Grove Disposal Site (inactive). The extent of the groundwater contaminant plumes emanating from Mather Field and Aerojet/Boeing are shown in Figure 21. While the Authority does not have the power or responsibility for remediation of contaminated groundwater, it is committed to coordinating with responsible parties and regulatory agencies to stay informed on the status and disposition of known contamination as well as planned and on-going remediation activities.

- **Coordination with responsible parties and regulatory agencies**

Various responsible parties and regulatory agencies for groundwater cleanup efforts in the basin were invited to SCGA regular meetings to provide updates on their respective cleanup activities.

#### ***Kiefer Landfill***

While SCGA did not receive an update on conditions at Kiefer Landfill in 2013/2014, the Sacramento County Department of Waste Management and Recycling previously provided a presentation on January 12, 2011, and SCGA plans to invite the county to provide additional updates in the future.

#### ***Mather Field***

While SCGA did not receive an update on conditions at Mather Field in 2013/2014, the United States Air Force (USAF) previously provided a presentation on May 11, 2011, and SCGA plans to invite the USAF to provide additional updates in the future.

#### ***Aerojet***

Alex MacDonald of the Regional Water Quality Control Board provided an update on groundwater remediation at Aerojet at the March 12, 2014 Board meeting. A presentation was provided that gave an overview of conditions at the Aerojet site, including historical background and past and current remediation activities. Groundwater flow was noted as

leaving the Aerojet site to the north, northwest, west, southwest, and south. These flow patterns are important as they may transport contaminants of concern: solvents (TCE, PCE, Freon, and chloroform), perchlorate, NDMA, and fuels. A historical overview was provided discussing the manufacturing and testing practices that occurred and the history of identification and remediation of contamination on the site. Source areas related to those historical activities on the site are spread across the Aerojet site, as shown on a map provided as part of the presentation. Given the size and complexity of the site, additional details on remediation were provided for specific areas: Western Groundwater Operable Unit, Perimeter Groundwater Operable Unit, and Boundary Operable Unit. Maps of the extent of the contaminant plumes were provided, showing TCE, perchlorate, and NDMA extending offsite generally to the west and southwest, including areas north of the American River in Carmichael and Fair Oaks. With regards to remediation, the location of the GET (groundwater extraction and treatment) facilities was shown along with planned new extraction wells, current and planned extraction and treatment, capture zones, and the reuse of treated groundwater.

### **CASGEM**

In compliance with the CASGEM program, SCGA continued the required monitoring and annual reporting for the South American Subbasin. SCGA has been designated as the monitoring entity in the subbasin, as defined in Bulletin 118 and roughly equivalent to the Central Basin.

### **SGMA**

The Sustainable Groundwater Management Act, effective January 1, 2015, establishes a new structure for managing groundwater in California.

SGMA will drive the development of projects and programs to achieve long-term basin sustainability. Generally, SGMA requires:

- Formation of GSAs for all basins designated as high or medium priority by DWR
- Development of a GSP or GSPs
- Implementation of the GSP(s) to avoid “undesirable results”
- SWRCB intervention when local agencies have been unable or unwilling to correct major problems

The majority of the SCGA area, the South American Subbasin, is designated as a High Priority Basin by DWR. The remaining areas are within the Cosumnes Subbasin, which is designated a Medium Priority Basin. As Medium and High Priority Basins, both the South American and the Cosumnes Subbasins must comply with SGMA, including development of a GSP by January 31, 2022 or an Alternative by January 1, 2017.

SCGA provided an overview of SGMA and distributed analysis of the legislation developed by the Butte County Water and Resource Conservation District. In the early phases of addressing SGMA, discussions focused on understanding the legislation and developing a strategy for

approaching it. Initial concerns of SCGA members expressed at the November 12, 2014 Board meeting included the potential effect of the legislation on the current structure of the Authority, expanded stakeholder participation in a GSA, the potential for increased scrutiny and reporting related to agricultural pumping, potential collaboration with adjacent subbasins, and specifics of DWR's definition of sustainability.

More recently, after the 2013-2014 reporting period of this document, the Board of Directors approved a resolution on April 20, 2016, directing staff to prepare an Alternative Submittal to explain and justify the continuance of SCGA management activities for the entire South American Subbasin. On July 13, 2016 the Authority's Board of Directors approved three resolutions for the Authority's election to be the Groundwater Sustainability Agency (GSA) for the portion of the South American Subbasin that is within the boundaries of SCGA. Staff is working with a consultant to develop that Alternative, with a planned submittal to the California Department of Water Resources (DWR) by January 1, 2017.

### **Groundwater Banking**

In tandem with the Groundwater Accounting Program work described previously, the agency received presentations on potential groundwater banking programs in the Central Basin. Presentations on groundwater banking were provided by the Nature Conservancy on Multi-Benefit Conjunctive Use Concepts (March 13, 2013), and Omochumne-Hartnell Water District indicated at the May 14, 2014 Board meeting the ability to irrigate dormant vineyards with water from the Cosumnes River to recharge at a rate of approximately 4 inches per day. SCGA received updates on Sacramento County Regional Sanitation District's South Sacramento County Agriculture & Habitat Lands Recycled Water Program from the representative on the Board of Directors. More recently, SCGA has been engaged in conversations with RWA on the Regional Groundwater Banking Program, an effort to establish a formal groundwater bank to increase storage in the basin and expand opportunities for conjunctive use in the region.

### **Basin Management Objective Threshold Development and Recharge Mapping Project**

The Authority began work on the Basin Management Objective Threshold Development and Recharge Mapping Project, which was partially funded by a Local Groundwater Assistance Fund grant from DWR.

The SCGA BMO Threshold Development and Recharge Mapping Project included the development of thresholds necessary to implement and monitor a quantitative, measureable BMO for groundwater levels and the completion of a recharge analysis and recharge study to improve the understanding of recharge in the Central Basin.

Thresholds for the groundwater level BMOs were to be developed using historical data and integrated hydrologic model simulations to establish a measureable "bandwidth" of groundwater levels based on the maximum and minimum simulated groundwater elevations shown through

the Sacramento Area Integrated Water Resource Model (SacIWRM) 2030 Baseline (2030 Baseline). The 2030 Baseline was to be updated as part of this proposed project to improve stakeholder acceptance.

The conceptual understanding of recharge was to be improved through two processes. The first process would merge available data from SacIWRM to map the spatial distribution of recharge sources to the Central Basin. This was to include river recharge, flows from the foothills, and surface recharge from rainfall and irrigation applied water within the SCGA area. Additionally, a field study analyzing primarily stable isotopes, cations, and anions would be used to identify the portions of the Central Basin that are recharged from surface water courses. This would allow for improved understanding of the importance of surface water recharge compared to areal recharge and recharge from the foothills to the east.

The effort was ongoing at the end of 2014 and was completed after the reporting period, in December 2015. The results are available for incorporation into future planning documents.

## CHAPTER 4 SUMMARY AND RECOMMENDATIONS

This section summarizes the state of the basin and provides recommendations for basin management activities for the 2015/2016 reporting period.

### Summary

Average groundwater pumping (including pumping for groundwater remediation) over the two-year reporting period was approximately 250,800 AFY, with a four-year average of 244,600 AFY (see Table 5). Higher than typical levels of groundwater production were seen for estimated agricultural use in 2013, likely due to limited precipitation and higher than normal evapotranspiration. Data for metered urban water use showed a decline in 2014, likely due to conservation efforts.

Groundwater elevations generally show increasing trends in the western part of the basin, and decreasing trends in the central and eastern part of the basin. Areas with increasing trends include the pumping depression that has been present near Elk Grove for decades.

The continued update of the HydroDMS maintains a useful tool for groundwater basin management. The HydroDMS provides the necessary data and modules to better evaluate and report basin conditions, and to ensure the implementation of the GMP. Further enhancement of the HydroDMS will include features that will enable the Authority to implement the Monitoring Action for BMO No.2 and could facilitate both CASGEM and SGMA compliance.

Based on data collected, groundwater quality in the Central Basin is good and suitable for public water supply needs. In accordance with the Groundwater Contamination Monitoring and Collaboration Program (Section 4.4), the Authority has taken a proactive approach to improve and protect the basin's groundwater quality by working with appropriate regulatory agencies and responsible parties. The Authority plans to continue developing this working relationship to ensure groundwater water quality is maintained or improved by their groundwater clean-up activities.

### Recommendations

During the 2015/2016 reporting period the Authority will review and prioritize activities related to the various action items described in the GMP and will develop an Alternative for SGMA compliance, based in part on the existing GMP and on an evaluation of past basin operations within its sustainable yield for a 10-year period. The Authority will also continue to seek funding opportunities for projects, including projects which may be incorporated into the American River Basin Integrated Regional Water Management Plan (ARB IRWMP). On-going and potential projects include:

- **Develop a Groundwater Accounting Program**

As discussed earlier, several preliminary discussions and subcommittee meetings have occurred amongst interested parties regarding the prospects of groundwater banking in the Central Basin. These parties include the Sacramento County Water Agency, Sacramento Regional County Sanitation District, the City of Folsom, and the East Bay Municipal Utility District. More recently, after the end of the reporting period for this document, coordination has occurred with RWA on their effort to establish a formal groundwater bank to increase storage in the basin and expand opportunities for conjunctive use in the region. While these discussions are no guarantee that these agencies will move forward with a groundwater banking proposal in the near future, it is in the best interest of the Authority to begin investigating how groundwater banking could be accommodated in the Basin while meeting the requirements of CASGEM and SGMA in an efficient and appropriate manner. Ultimately, groundwater banking would require the development of a groundwater accounting program. As discussed at previous Board meetings, a groundwater accounting program is used to not only track the volume of stored groundwater but can also be used to track changes in the volume of groundwater stored, estimated volumes of basin losses and rejected recharge, the volume of groundwater recovered, and the volume of surface water forbearance. The program will be used to manage the use of groundwater in the basin to further facilitate implementation of conjunctive use programs in the basin. SGA has completed work on a similar water accounting framework for the North Basin and has adopted and implemented the program. As the Authority moves forward with their own program, SGA's activities and experience will be used as a guide in developing a program that is tailored specifically to the Central Basin.

- **Measuring and Monitoring Program**

The GMP discusses the need to expand groundwater monitoring efforts in the basin. To achieve this goal, the Authority will need to examine existing monitoring programs and determine how these programs can be folded into a broader more comprehensive measuring and monitoring program for the basin. If necessary, expanding the measuring and monitoring program would include the identification and/or installation of additional monitoring wells in strategic locations throughout the Central Basin. This process will be supported by the updated HydroDMS.

Notably, the hydrographs shown in this report indicate that several wells do not have recent water level data. These wells should be investigated to determine the reason for the lack of data. Actions could include incorporation of data into the CASGEM and HydroDMS databases, restarting monitoring of the wells, or replacement of destroyed or inaccessible wells with appropriate alternate wells. Wells requiring investigation include the following:

- SWP-054
- SWP-058

- SWP-121
- SWP-149
- SWP-188
- SWP-202
- SWP-244

- **Maintain and Update HydroDMS**

The Authority's HydroDMS is an integral component in managing the groundwater basin. Regular updates of the data are critical to maintaining the viability of the HydroDMS and to ensure that accurate, up-to-date data are available for this report and other analyses. As the Authority relies on the water purveyor stakeholders to provide much of this data, it is important that this information be provided in a timely manner in order to continue to maintain the HydroDMS at a high level of reliability and credibility. It is recommended that annual reporting of monthly groundwater production data, along with supporting data on well locations and construction, be provided on an annual basis along with annual production reporting provided for the purposes of collecting fees for SCGA. This would allow regular updates and would provide consistency across the financial, modeling, and data realms.

Additional potential enhancements identified at the November 10, 2010 Board meeting include: CASGEM tools, well log images, reconciliation of overlap areas (SCGA/SGA boundaries), surface water data, and climatological data. Additionally, regular maintenance needs include: on-going user support, hosting, and software updates.

Additional outreach is needed to gain participation of those metered groundwater pumpers that are not currently providing data to the HydroDMS, including Tokay Park Water Company and Florin County Water District, parks, cemeteries, and golf courses. The lack of information on these entities resulted in the use of estimations in total production shown in Table 5.

Additionally outreach is also needed to link State Water Resources Control Board (State Board) identification numbers with member agency wells. The State Board database contains valuable water quality data that is updated regularly. As the State Board does not provide location information, the State Board identification number for each well should be compiled from the member agencies and entered into the HydroDMS, allowing for linking with State Board water quality data and spatial analysis of those data.

- **Comply with SGMA**

Near-term SGMA compliance requires formation of a GSA(s) and development of GSP(s) or the pursuit of an Alternative as defined by SGMA.

- **Groundwater Sustainability Agencies.** SGMA requires that GSAs provide complete geographic coverage of the South American Subbasin and the Cosumnes Subbasin by July 1, 2017. SCGA staff will closely monitor activities related to SGMA compliance and GSA formation. After the 2013-2014 reporting period of this document, on July 13, 2016 the Authority's Board of Directors approved three resolutions establishing the Authority's election to be the GSA for the portion of the South American Subbasin that is within the boundaries of SCGA.
- **Groundwater Sustainability Plan.** SGMA requires development of a GSP by January 31, 2022 or an Alternative by January 1, 2017. The current version of the GMP represents a critical first step in establishing a framework for maintaining a sustainable groundwater resource and represents a starting point for overall basin management. Again, after the end of the reporting period for this report, the Board of Directors approved a resolution on April 20, 2016, directing staff to prepare an Alternative Submittal. Staff is working with a consultant to develop that Alternative, with a planned submittal to the California Department of Water Resources (DWR) by January 1, 2017.

- **Sacramento Area Integrated Water Resource Model Hydrologic Model**

The SacIWRM model has been widely used in the region for a host of projects and programs, including water supply planning, basin yield estimation, sustainable groundwater management and planning, conjunctive use planning, surface water and groundwater interaction, regional water quality conditions, and water accounting. The model has evolved over time from a local integrated surface water and groundwater model to a powerful integrated water resources model, with many updates and upgrades on both data and simulation features, including the latest data update to water year 2013, and feature upgrade to include a water quality particle tracking module. The SacIWRM should continue to be updated and upgraded to meet the evolving needs of SCGA, particularly for regional groundwater banking and SGMA compliance. Recommended upgrades and updates include an upgrade to the latest DWR platform (Integrated Water Flow Model [IWFM]) as well as a comprehensive data upgrade to 2016 hydrology, with integration at the regional scale to include the entire North American, South American, and Cosumnes Subbasins under one unified platform. Cooperation with SGA, RWA, SSCAWA, and others can lower overall costs for each entity. SCGA staff will work with the staff and management from these other organizations on model updates to ensure that updates are beneficial to future hydrologic modeling needs in SCGA.

- **Agricultural-Residential Water Conservation**

The subcommittee will continue to study, evaluate, and make recommendations to the Board on appropriate water conservation BMPs for agricultural and agricultural-residential water users and to determine how to best to inform those who would benefit from these BMPs. Conservation efforts should build upon previous workshops and studies.

## REFERENCES

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## **APPENDIX A**

### **Basin Management Activities**

**Table A-1 Basin Management Activities Related to Program Component Action Items**

Description of Action	Status	Comments
<b>COMPONENT NO. 1: STAKEHOLDER INVOLVEMENT</b>		
<i>1. Involving the Public</i>		
I. Continue efforts to encourage public participation in the implementation process as opportunities arise	On-going	Notification of upcoming Board meetings and committee meetings are posted at each of the member agencies and in some cases on their website. These notifications are also posted at the meeting location and on SCGA's website.
II. Provide public notice and public comment periods on formal revisions to the GMP	On-going	The Authority has not encountered any issues that require revision to the current GMP, beyond needs related to utilizing that document to meet SGMA requirements. To date, the most effective way to notify the public has been through regular Board meetings and the Authority's website. The Authority's website includes a regularly updated announcement section on the main page where Board agendas, minutes, and items of interest can be viewed and downloaded.
III. Develop a Public Outreach Plan (POP) and periodically review the POP and take actions as appropriate while implementing the GMP	On-going	Staff developed a POP and presented it to the Board in May 2007, see <b>Table A-2</b> . Staff has reviewed the POP and taken actions as appropriate.
IV. Provide briefings to the Water Forum Successor Effort on the GMP implementation process	On-going	Authority staff is available to provide briefings upon request.
V. Maximize outreach for the GMP	On-going	The GMP and Board meeting minutes are posted on the Authority's website <a href="http://www.scgah2o.org">www.scgah2o.org</a> . The GMP is also posted on the Water Forum's website <a href="http://www.waterforum.org">www.waterforum.org</a> .
<i>2. Involving Other Agencies within and Adjacent to the Central Basin</i>		
I. Maintain a high level of involvement by stakeholders in implementing the GMP	On-going	Authority staff participates in regular meetings of the SGA and South Area Water Council (SAWC).
II. Provide copies of the adopted GMP and subsequent annual report to representatives of SGA, SSCAWA, TNC, San Joaquin County, and Water Forum Successor Effort, as needed	On-going	Copies of the GMP and biennial report were sent to the mentioned agencies and the GMP is accessible online at <a href="http://www.scgah2o.org">http://www.scgah2o.org</a> .
III. Meet with representatives from the SGA, SSCAWA, The Nature Conservancy (TNC), and the Water Forum Successor Effort	On-going	Authority staff periodically attend meetings of the SGA, SAWC, and the Water Forum Successor Effort, as well as meet with TNC staff on an as-needed basis.
IV. Coordinate meetings outside SCGA with agricultural and agricultural-residential self-supplied pumpers within the basin.	On-going	Authority staff, in accordance with the POP and in conjunction with direction from the Board, will coordinate meetings with agricultural and agricultural-residential self-supplied pumpers to inform them of the management responsibilities and activities relative to the GMP. An agricultural and agricultural-residential water conservation subcommittee was established on

		<p>September 8, 2010 to study, evaluate, and make recommendations on appropriate water conservation best management practices for agricultural and agricultural-residential water users. This sub-committee continued to meet throughout the reporting period and will report on the workshops planned to be held at Soil Born Farms.</p> <p>Additionally, on May 8, 2013 SCGA entered into an agreement with the California Association of Resource Conservation Districts to provide \$9,160 to help fund the Water Efficiency on Large Landscapes (WELL) project. The WELL project provides a means to provide workshops and on-site surveys, including incentives for qualifying properties, for irrigation improvements to agriculture-residential properties.</p>
V. Coordinate meetings with commercial/industrial self-supplied pumpers within the basin to inform them of the management responsibilities and activities relative to the basin	Deferred	<p>At this time, there is no representative for this group on the Board. Authority staff in accordance with the POP and in conjunction with direction from the Board will coordinate meetings with commercial/industrial self-supplied pumpers to inform them of the management responsibilities and activities relative to the groundwater management plan.</p>
VI. Coordinate GMP activities and work to the extent applicable with adjacent groundwater management entities, water interest groups, and state and federal regulatory agencies that have jurisdiction in areas related to the GMP activities	On-going	<ul style="list-style-type: none"> <li>The Authority continues to coordinate with Sacramento Regional County Sanitation District, Rancho Murrieta CSD, Omochumne-Hartnell WD, East Bay Municipal Utility District, SCWA, the City of Folsom, SAWC, TNC, and private property owners in identifying/evaluating potential groundwater recharge opportunities in the Central Basin.</li> <li>The Authority received updates on groundwater clean-up efforts at contaminated sites, notably a presentation by Alex MacDonald of the Regional Water Quality Control Board regarding Aerojet at the March 12, 2014 Board meeting.</li> </ul>
<b>3. Using Advisory Committees</b>		
I. Following adoption of the GMP, the basin government body will discuss the continuation and composition of advisory committees that will provide guidance in the implementation of the GMP	Deferred	<p>The Board has indicated a need to have an open discussion on the use and responsibility of advisory committees. No time has been set for this discussion.</p>
<b>4. Developing Relationship with Local, State and Federal Agencies</b>		
I. Continue to develop working relationship with local, state, and federal regulatory agencies	On-going	<ul style="list-style-type: none"> <li>The Authority will continue to work with local agencies such as Sacramento County Emergency Management Department (EMD) on issues related to well drilling and well abandonment in the Basin and with Sacramento County Waste Management and Recycling on groundwater cleanup efforts at Kiefer Landfill.</li> <li>The Authority has worked with State DWR to further develop BMO 2 through Local Groundwater Assistance Fund (AB303) grants. Staff will continue to develop a working relationship with State DWR regarding CASGEM and in pursuing future grant opportunities.</li> <li>The Authority will continue to work with the RWQCB and the Air Force on issues related to groundwater contamination at both Aerojet</li> </ul>

		and Mather Field.
<b>5. Pursuing Partnership Opportunities</b>		
I. Continue to promote partnerships that accomplish both local supply reliability and broader regional and statewide benefits	On-going	Authority staff will promote partnerships that accomplish both local water supply reliability and broader regional and statewide benefits. For example, groundwater recharge, recycled water use, etc. An example of this is the Authority's support of and participation in the Sacramento Water Recycling Coalition.
II. Continue to track grant opportunities to fund groundwater management activities and local water infrastructure projects	On-going	<ul style="list-style-type: none"> <li>The Authority was awarded a \$200,000 AB303 grant in 2013 to further develop BMO 2, analyze sources of recharge, and develop a recharge map compliant with AB359.</li> <li>Future grant opportunities may assist with SGMA compliance and other needs.</li> </ul>
<b>COPONENT NO. 2: MONITORING PROGRAM</b>		
<b>1. Groundwater Elevation Monitoring</b>		
I. Register to act as the reporting entity for the Central Basin in CASGEM	Complete	The Authority notified the State DWR in late 2010 that the Authority will act as the reporting entity for the Central Basin in CASGEM. DWR provided notification in January 2012 that the Authority had been designated as the monitoring entity in the South American Subbasin.
II. Prepare a groundwater elevation monitoring plan for CASGEM	Complete	On December 16, 2011 the Authority submitted a groundwater monitoring plan that met all requirements set forth in the CASGEM guidelines. The Authority submitted their first monitoring report under the program on December 28, 2011. The Authority has continued monitoring and reporting as required by the program.
III. Coordinate with DWR, SCWA, SGA to select monitoring wells to establish a long-term network for SCGA	On-going	The monitoring network will ultimately be part of the Authority's monitoring plan.
IV. Consider ways to fill gaps in the monitoring well network by identifying existing wells or identifying opportunities for constructing new monitoring wells	On-going	<ul style="list-style-type: none"> <li>Identify the causes of a lack of recent data in several monitoring wells.</li> <li>Coordinate with local water supply purveyors to convert abandoned municipal wells into groundwater monitoring wells for the Authority.</li> <li>Coordinate with USGS and the Sacramento Municipal Utility District (SMUD) to incorporate some of their wells into the Authority's monitoring network.</li> <li>Identify the need to construct new monitoring wells.</li> </ul>
V. Assess annually groundwater elevation trends and conditions based on the monitoring well network	On-going	In conjunction with the Biennial Basin Management Report, the HydroDMS will provide a tool for making this assessment. A Mann-Kendall trend analysis may be incorporated into the assessment.
VI. Assess annually the adequacy of the groundwater elevation monitoring network	On-going	In conjunction with the Biennial Basin Management Report, the HydroDMS will provide a tool for making this assessment.

VII.	Identify a subset of monitoring wells that will be monitored more frequently than twice annually to improve understanding of aquifer responses to pumping throughout the year	On-going	In conjunction with the Biennial Basin Management Report, the HydroDMS will provide a tool for making this assessment.
<b>2. Groundwater Quality Monitoring</b>			
I.	Coordinate with cooperating agencies to verify that uniform protocols are used when collecting water quality data.	Complete	Each of the member agencies follow Division of Drinking Water (DDW) protocols in the collection of water quality data. The primary source for water quality data in the HydroDMS is the California DDW database.
II.	Coordinate with USGS to obtain historic water quality data for NAWQA wells, determine timing and frequency for monitoring under USGS program, and discuss the potential for integrating USGS monitoring resources with other portion of the Central Basin monitoring network	Complete	During the development of the HydroDMS, water quality data from USGS National Water-Quality Assessment (NAWQA) wells was collected, with 42 such wells identified. However, water quality data from these wells were not included in the HydroDMS because they lacked well identifiers that could be used to relate the wells to other wells in the HydroDMS. Additionally, the water quality constituent characteristics tables for each of these wells were in a different format than the DDW database, making it infeasible to combine the two databases into one unified metadata table.
III.	Coordinate with local, state, and federal agencies to identify where wells may exist in areas with sparse groundwater quality data. Identify opportunities for collecting and analyzing water quality samples for those wells.	Complete	Water quality data from local water purveyors, primarily SCWA, was collected during the development of the HydroDMS. However, this data was found to be identical to the data provided from the DDW database.
IV.	Assess annually the adequacy of the groundwater quality monitoring well network	On-going	This will be assessed through the preparation of this Basin Management Report and future SGMA-related documentation.
V.	Coordinate with DWR on the groundwater quality data they collect	Complete	In the development of the HydroDMS water quality data was collected from DWR's Water Data Library Water Quality Data Reports, which included 52 wells. However, water quality data from these wells was not included in the HydroDMS because they lacked well identifiers that could be used to relate the wells to other wells in the HydroDMS. Additionally, the water quality constituent characteristics tables for each of these wells were in a different format than the DDW database, making it infeasible to combine the two databases in to one unified metadata table.
<b>3. Land Surface Elevation Monitoring</b>			
I.	Coordinate with SGA to obtain pertinent information of well surveying in Sacramento Suburban Water District, which were last measured in 1991	On-going	Sacramento Suburban Water District was awarded an AB303 grant to conduct additional surveying of these and other locations in 2006. Staff obtained the final project report from the DWR's website, but no well surveying information was found. Staff will continue to coordinate with SGA to obtain this information.
II.	Coordinate with USGS to ascertain the suitability of the use of Interferometric Synthetic Aperture Radar (InSAR) images of the Central Basin and the surrounding area. If the technology appears suitable, identify the costs of determining ground surface elevations and identify potential cost sharing partners.	Deferred	SGA (2013) reports that land surface is estimated to have subsided over 0.3 feet from 1947 to 1969 and an additional 1.9 feet from 1969 through 1989 at a benchmark near Greenback Lane, northeast of the former McClellan Air Force Base. This subsidence is associated with a decline in groundwater levels during that period, reflected by a decline of at least 68 feet in that 42-year period at a well 2.9 miles to the west of the benchmark. This 2.2 feet of subsidence with 68 feet of drawdown is equivalent to 0.03 feet of subsidence per foot of drawdown.

		InSAR may be considered if the cost is appropriate for the relatively low level of risk seen for subsidence. Studies may exclude areas that are above historical low groundwater level conditions.
III. Coordinate with other agencies, particularly the City and County of Sacramento and the NGS to determine if other suitable benchmark locations exist in the area to aid in analysis of potential land surface subsidence	Deferred	Surveys data from benchmarks in the Arden Arcade area indicate that subsidence is not a significant concern at this time. Because of limited staff time, and because of InSAR options, this item is being deferred.
<b>4. Surface Water Groundwater Interaction Monitoring</b>		
I. Work cooperatively with SGA, TNC, OHWD, and the Sacramento Valley Conservancy to compile available stream gage data and information on tributary inflows and diversions from the American, Cosumnes, and Sacramento rivers to quantify net groundwater recharge or discharge between gages in the Central Basin area.	On-going	A memorandum report on available data on the American River was prepared for SGA by MWH on September 22, 2004, which included a summary of known inputs and outputs to the stream budget of the American River. Authority staff will request the memorandum from SGA.  Additional information on stream gage location is contained in <i>Sacramento Area Integrated Water Resources Model (SacIWRM) Model Development and Baseline Scenarios</i> (RMC, 2011).
II. Coordinate with local, state, and federal agencies to identify available surface water quality data from the American, Cosumnes, and Sacramento rivers proximate to the Central Basin area.  Ensure that surface water flows in other natural and restored streams in the area are not adversely impacted as a result of implementation of the CSCGMP.	On-going	The Sacramento Coordinated Water Quality Management Program completes an annual monitoring report including water quality and flow data at several locations along the American and Sacramento rivers. The report can be downloaded from <a href="http://www.sacriver.org/aboutwatershed/reportcard">http://www.sacriver.org/aboutwatershed/reportcard</a> . Authority staff will continue research to find out if there is any available data for the Cosumnes River. The latest available data can be found on the following website: <a href="http://watershed.ucdavis.edu/research/cosumnes.html">http://watershed.ucdavis.edu/research/cosumnes.html</a> .
III. Correlate groundwater level data from wells in the vicinity of river stage data to further establish whether the river and groundwater are in direct hydraulic connection, and if surface water is gaining or losing at those points	On-going	In late 2003, the State Board considered stream aquifer interaction along the American River as part of a fully appropriated stream hearing. Consultant studies associated with the report indicate that the American River is a losing stream along nearly its entirety below Nimbus Dam and that the river is substantially disconnected from the groundwater basin. Because of the availability of this data, no studies of the American River are planned at this time. The focus will be to identify and review any data available for the Cosumnes and Sacramento Rivers.
IV. Continue to coordinate with local, state, and federal agencies and develop partnerships to investigate cost-effective methods that could be applied to better understand surface water-groundwater interaction along the American, Cosumnes, and Sacramento Rivers.	On-going	As mentioned above, the result of the fully appropriated stream hearing on the American River in 2003 has made this item a low priority for the American River. Priority will instead be on identifying and reviewing data available for the Cosumnes and Sacramento Rivers. An additional study is being performed through a Local Groundwater Assistance Fund (AB303) grant from DWR to refine the understanding of the volume of recharge from the river systems compared to areal recharge and recharge from the foothills.
V. Coordinate with SGA, to analyze data obtained from recently constructed monitoring wells on the Sacramento	On-going	Dr. Dave Evans of CSUS indicated that several wells on the south side of the American River at CSUS are equipped with pressure transducers, which collect

	State University (CSUS) campus to better understand the relationship between groundwater basin and surface water flows at that location		continuous water elevation measurements. Data has been collected, but has not been processed to date. SCGA will contact SGA for the update of this effort. No progress was made during this reporting period.
<b>5. Protocols for Collection of Groundwater Data</b>			
I.	The governance body will develop within one year a Standard Operating Procedure (SOP) for collection of water level data	Complete	The water measurement protocol approved for use by SGA is the same used by SCWA and other agencies in the collection of water level data within the Central Basin.
II.	Provide cooperating agencies with guidelines developed by DDW for the collection, pretreatment, storage, and transportation of water quality samples (DDW [formerly part of CDPH], 1995)	Complete	Water purveyors within the Central Basin have been provided a copy of the guidelines developed by DDW for the collection, pretreatment, storage, and transport of water quality samples.
III.	Provide training on implementing the SOPs	Deferred	Authority staff will investigate to see if the training is necessary, and, if so, who is responsible for collecting the data. This item is deferred.
<b>6. Data Management System</b>			
I.	Continue to update the HydroDMS with current water purveyor data	On-going	The HydroDMS contains data through 2012. Updates will continue in the future to keep the HydroDMS current.
II.	Make recommendations to RMC on utilities to add to the HydroDMS to increase its functionality	On-going	This will be coordinated as part of the HydroDMS maintenance.
<b>COMPONENT NO. 3: GROUNDWATER RESOURCE PROTECTION</b>			
<b>1. Well Construction Policies</b>			
I.	Ensure that appropriate Sacramento County and Central Basin implementation staff and consultants are provided a copy of the County Well Ordinance and understand proper well construction procedures	Complete	Dana Booth, from the Sacramento County's EMD gave a presentation on the County's Well Ordinance to the Board on October 10, 2007. A copy of the County's Well Ordinance was provided to the member agencies afterward. It is anticipated that EMD will be invited to return in the future to provide an update.
II.	Adhere to Sacramento County's Consultation Zone and provide a copy of the boundary of the prohibition zone to appropriate agencies within the Central Basin	Deferred	Authority staff will contact the RWQCB to obtain a copy of the latest version of the Sacramento County Special Consultation Zone Groundwater Plume Site report. This item is deferred.
III.	Provide a copy of the most recently delineated plume extents at Mather Field and Aerojet/Boeing to EMD and appropriate staff for their review and possible use	Deferred	After obtaining the report mentioned above, Authority staff will provide a copy to EMD staff for their review and appropriate use. Authority staff will also check with EMD to see if they are regularly updated on this by RWQCB. This item is deferred.
IV.	Coordinate with other groundwater users in the Central Basin to provide guidance, as appropriate, on well construction	Complete	Dana Booth, from the Sacramento County's EMD gave a presentation on the County's Well Ordinance to the Board on October 10, 2007. Representatives of the major water purveyors in the Central Basin were in attendance. It is anticipated that EMD will be invited to return in the future to provide an update.
V.	Where feasible and appropriate, use subsurface geophysical tools prior to construction of the well to assist in well design	Complete	The design, construction, and development of municipal wells in the Central Basin take full advantage of available geophysical tools.
<b>2. Well Abandonment and Destruction Policies</b>			

I.	Complete a survey similar to one conducted in the North Basin of abandoned and/or destroyed wells in the Central Basin and populate DMS with data	On-going	Authority staff will contact SGA to find out the details on the survey conducted in the North Basin, and coordinate with RMC for incorporation into HydroDMS. No progress was made during this reporting period.
II.	Ensure that all public and private agencies in the Central Basin are provided a copy of the County Well Ordinance and that they understand proper well destruction procedures, and support implementation of these procedures	Complete	Dana Booth, from the Sacramento County's EMD gave a presentation on the County's Well Ordinance to the Board on October 10, 2007. As part of this discussion County well destruction policies and procedures were covered. A copy of the County's Well Ordinance was provided to the member agencies afterward. It is anticipated that EMD will be invited to return in the future to provide an update.
III.	Follow up with cooperating agencies and EMD on reported abandoned and/or destroyed wells to confirm the information collected from DWR	On-going	In August 2010, Sacramento County EMD started a well abandonment program. Authority staff will contact EMD to find out the progress of this program.
IV.	Obtain copies of any information on abandoned and/or destroyed wells in the Central Basin from EMD or other regulatory agencies to fill any gaps in the governance body's records	On-going	Authority staff will contact EMD to obtain the appropriate reports for the EMD's well abandonment program.
V.	Meet with EMD to discuss ways to ensure that wells in the Central Basin are properly abandoned or destroyed	On-going	Authority staff will meet with EMD to discuss its well abandonment program.
VI.	Obtain and review a copy of a "wildcat map" from California Division of Oil and Gas to ascertain the extent of historic gas well drilling operations in the area as these wells could function as conduits of contamination if not properly destroyed. It should be noted that EMD has no jurisdiction over gas wells.	Deferred	This item is deferred.
<b>3. Well Protection Measures</b>			
I.	Request that public water purveyor agencies within the Central Basin provide vulnerability summaries from the Drinking Water Source Assessment and Protection Program (DWSAP) to the basin governance body to be used for guiding management decisions in the basin	Complete	The information is available online at: <a href="http://swap.ice.ucdavis.edu/TSinfo/TSsystemc.asp?myCounty=34">http://swap.ice.ucdavis.edu/TSinfo/TSsystemc.asp?myCounty=34</a>
II.	Contact groundwater basin managers in other areas of the state for technical advice, effective management practices, and "lesson learned" regarding establishing well head protection areas	Deferred	This item is deferred.
<b>4. Protection of Recharge Areas</b>			
I.	Continue to work with mining companies, TNC, and SSCAWA to explore the possibilities for enhancing recharge into the Central Basin	Deferred	This item is deferred.
<b>5. Control of the Migration and Remediation of Contaminated Groundwater</b>			
I.	Coordinate with appropriate regulatory agencies (EMD, DTSC, EPA, RWQCB, and DDW) and known responsible parties (such as Aerojet, the Air Force, and	On-going	The Authority received an update at the Board meeting on groundwater remediation efforts from Aerojet on March 12, 2014. The Authority will continue such coordination and will also reach out to

	Kiefer Landfill) to develop a network of monitoring wells to act as sentry wells for public supply wells		representatives from Mather Field and Kiefer Landfill, who provided updates during the previous biennial reporting period.
II.	If detections occur in these monitoring wells, meet with the appropriate regulatory agencies and responsible parties to develop strategies to minimize the further spread of contaminants	Deferred	This item is deferred.
III.	Use the information on mapped contaminant plumes and LUST sites in developing groundwater extraction patterns and in locating future production or monitoring wells	Complete	In 2010, SCGA, in conjunction with SGA, conducted a regional groundwater contamination particle tracking modeling study. The objective of this study was to perform an assessment of the long-term sustainability of groundwater quality in the basin, specifically, to evaluate the potential movement of known contaminant plumes in the region. This study is complete.
IV.	Meet with representatives of EMD and RWQCB to establish a mutual understanding about the basin governance body's groundwater management responsibilities. Identify ways to have open and expedited communication with EMD regarding any new occurrence of LUSTs, particularly when contamination is believed to have reached the groundwater.	Deferred	This item is deferred.
<b>6. Control of Saline Water Intrusion</b>			
I.	Track the progression, if any, of saline water bodies moving toward the east from the Delta. Because this is a highly unlikely scenario, this action will be limited to communicating with DWR's North Central Region Office on a biennial basis to check for significant changes in TDS concentrations in wells. DWR has a regular program of sampling water quality in select production wells throughout the adjacent Solano, San Joaquin, and Yolo counties. This program will serve as an early warning system for potential saline water intrusion from the Delta.	Deferred	This item is deferred.
II.	Observe TDS concentrations in municipal wells that are routinely sampled under CCR Title 22. These data will be readily available as part of the DMS and will be reported on in the annual State of the Basin Report.	On-going	To be assessed through the preparation of this Basin Management Report and future SGMA-related documentation.
III.	Inform all stakeholders of the presence of the salinity interface and the approximate depth to the interface for their reference when locating potential wells. EMD, which issues well permits, is aware of the interface. SCWA will provide a map to EMD indicating the contour of the elevation of the base of fresh water in Sacramento County for its reference when issuing well permits.	On-going	No action on this item will be taken until after Authority staff has had an opportunity to discuss the TDS data from the Delta with DWR North Central Region Office staff.

<b>COMPONENT NO. 4: GROUNDWATER SUSTAINABILITY</b>		
<b>1. Conjunctive Management Activities</b>		
<p>I. Continue to investigate conjunctive use opportunities within the Central Basin area. Groundwater users within the Central Basin will coordinate any recharge efforts.</p>	<p>On-going</p>	<p>The Authority will assist any member upon request. Currently, the American River Basin Integrated Regional Water Management Planning Program is an on-going program under the RWA umbrella. This program identifies opportunities and facilities for implementing expanded conjunctive use in the region.</p> <p>The Authority has begun preparation of a Groundwater Accounting Program (GAP) for the Central Basin whereby participating members and others can establish groundwater banks to further promote conjunctive use.</p>
<p>II. Continue to investigate opportunities for development of direct recharge facilities in addition to in-lieu recharge (e.g., injection wells or surface spreading facilities, through constructed recharge basins or in riverbeds or streambeds)</p>	<p>On-going</p>	<p>As part of Sacramento County’s General Plan Update, SCWA is considering groundwater recharge as a way to meet projected water demands for new growth areas. Investigations for direct recharge have taken place by SCWA at the Triangle Rock quarry on Jackson Highway and by OHWD along the Cosumnes River.</p>
<b>2. Demand Reduction</b>		
<p>I. Participate in RWA’s WEP to ensure that Central Basin purveyor conservation efforts are focused and effective. For those who receive wholesale water supplies, the governance body of the Central Basin will ensure that they are informed of the benefits and regional importance of participating in the WEP.</p>	<p>On-going</p>	<p>All water purveyor members of the Authority are also members of RWA.</p>
<p>II. The basin governance body shall develop BMPs for self-served agricultural and agricultural residential water users</p>	<p>On-going</p>	<p>In accordance with the requirements of the GMP, a sub-committee was established on September 8, 2010 in order to study, evaluate, and make recommendations on appropriate water conservation best management practices for agricultural and agricultural-residential water users. Since then, the sub-committee has convened several times, developing a plan to coordinate outreach to established community organizations that had previously demonstrated interest or which had attended previous water efficiency workshops. This effort is ongoing, with workshops planned to be held at Soil Born Farms.</p> <p>Additionally, on May 8, 2013 SCGA entered into an agreement with the California Association of Resource Conservation Districts to provide \$9,160 to help fund the Water Efficiency on Large Landscapes (WELL) project. The WELL project provides a means to provide workshops and on-site surveys, including incentives for qualifying properties, for irrigation improvements to agriculture-residential properties.</p>
<p>III. Coordinate with Sacramento Regional County Sanitation District (Regional San) to investigate further opportunities for expanded use of recycled water throughout the Central Basin</p>	<p>On-going</p>	<p>Regional San has developed the proposed South County Ag Project and has presented information on the project to the Board on September 12, 2012. Along with an update on the project, Regional San requested continued support in the grant funding efforts, continued participation/input in planning, and</p>

		<p>support to develop a Water Accounting Framework for SCGA.</p> <p>The Authority supports and participates in the Sacramento Water Recycling Coalition and its effort to gain local, state, and federal support from expanding its water recycling projects.</p>
<b>COMPONENT NO. 5: PLANNING INTEGRATION</b>		
<b>1. Existing Integrated Planning Efforts</b>		
<b>I. Integrated Groundwater and Surface Water Modeling</b>		
<p>a. Prepare and adopt a formal integrated water management plan in accordance with CWC § 10540 et seq. The plan will include, but not be limited to, the elements listed in the CWC. The Central Basin governance body will seek to form an ad hoc committee with SCWA, RWA, SSCAWA, and TNC to determine which agency would be most appropriate to prepare that plan and to update and make use of the IGSM model.</p>	<p>Deferred</p>	<p>This item is deferred. The development of the American River Basin Integrated Regional Water Management Plan was led by RWA. The initial IRWMP was completed in June 2006 and a comprehensive update to the IRWMP was adopted in July 2013.</p>
<p>b. Review the Water Forum Land Use procedures and make recommendations on the type of role, if any, the basin governance body should take with respect to land use decisions within the basin.</p>	<p>Deferred</p>	<p>This item is deferred.</p>

**Table A-2. SCGA Public Outreach Plan**

**PROJECT GOAL: Implementation of the CSCGMP.**

**PUBLIC OUTREACH GOAL: Inform stakeholders and public regarding the CSCGMP implementation effort and solicit input.**

Target Audience	Objectives	Messages	Strategies	Tactics
Inter-SCGA				
<ul style="list-style-type: none"> <li>• SCGA Board Members</li> </ul>	<ul style="list-style-type: none"> <li>◆ Maintain a clear member awareness of CSCGMP BMO's, implementation schedule, and key political issues.</li> <li>◆ Keep members apprised of any impending breach of BMO "trigger point" monitoring levels.</li> <li>◆ <i>Maintain a high level of involvement by stakeholders.</i></li> <li>◆ Production of a "State of the Basin" report.</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Management actions taken by the basin governance body may impact a broad range of individuals and agencies that have a stake in the successful management of the basin. (3-8)</i></li> <li>◆ A GMP is designed to be equitable for large and small stakeholders.(L&amp;C:25)                             <ul style="list-style-type: none"> <li>▪ Implementing a groundwater management program will help small stakeholders overcome the political and financial challenges of independent participation in (?).</li> </ul> </li> <li>◆ While SCGA believes in local control, there is a tremendous value in regional planning and participating in projects that also may benefit areas outside our region.(L&amp;C:25)                             <ul style="list-style-type: none"> <li>▪ Funding will be more accessible if a GMP details a regional plan capable of producing broader, statewide benefits.</li> <li>▪ A groundwater management program may help investor-owned utilities demonstrate the need for rate increases.</li> </ul> </li> <li>◆ The goal is to develop a cooperative program with the SCGA member agencies that is implemented within the framework established by the Water Forum Agreement. (L&amp;C:25)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Ongoing internal information sharing to full SCGA membership.</li> <li>◆ Formation of inter-board member advisory committees.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Hold regularly scheduled SCGA Board Member meetings.</li> <li>◆ As needed, the basin governance body will discuss the formation of advisory committees that will provide guidance in the implementation of the Master Plan or in rectifying the breach of BMO monitoring trigger points.</li> <li>◆ Create and utilize DMS.</li> <li>◆ <i>Board to discuss continuation of advisory committees that will provide guidance in the implementation of the GMP. (3-10)</i></li> </ul>
	<ul style="list-style-type: none"> <li>◆ <i>Regional planning integration. (3.2.5)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>With a large number of water purveyors that serve the greater Sacramento area, the need to integrate water management planning on a regional scale is a high priority. (3-21)</i></li> </ul>		<ul style="list-style-type: none"> <li>◆ IRWMP participation.</li> <li>◆ <i>The basin governance body will encourage that all retail purveyors submit Urban Management Plans to DWR. (3-21)</i></li> </ul>

**PROJECT GOAL: Implementation of the CSCGMP.**

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Target Audience	Objectives	Messages	Strategies	Tactics
<b>Political Partnerships</b>				
<ul style="list-style-type: none"> <li>• Regional partners within and adjacent to the Central Basin:</li> <li>• SGA</li> <li>• SSCAWA</li> <li>• TNC</li> <li>• San Joaquin Co.</li> <li>• RWA</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 1 - Stakeholder Involvement (3.2.1):</i> <ul style="list-style-type: none"> <li>• <i>Involving Other Agencies Within and Adjacent to the Central Basin (3.2.1.2)</i></li> </ul> </li> <li>◆ <i>Expansion of a basin-wide conjunctive use program to achieve broader regional and statewide benefits. (3-10)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>The basin governance body is committed to facilitating arrangements at the local, state, and, federal levels. (3-10)</i></li> <li>◆ <i>The goal is to develop a cooperative program with the SCGA member agencies that is implemented within the framework established by the Water Forum Agreement. (L&amp;C:25)</i></li> <li>◆ <i>Groundwater management by the SCGA will significantly improve the reliability of water supply in the Sacramento region (Central Basin?), especially in times of drought. (L&amp;C:26)</i></li> <li>◆ <i>While SCGA believes in local control, there is a tremendous value in regional planning and participating in projects that also may benefit areas outside our region. (L&amp;C:25)</i> <ul style="list-style-type: none"> <li>• <i>Funding will be more accessible if a GMP details a regional plan capable of producing broader, statewide benefits.</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Meet with representatives of SGA, SSCAWA, TNC, San Joaquin Co., CSCGF, WFSE. (3-9)</i></li> <li>◆ <i>Pursue partnership opportunities. (3.2.1.5)</i></li> <li>◆ <i>WFSE briefing.</i></li> <li>◆ <i>Participate in the implementation of the IRWMP.</i></li> <li>◆ <i>Utilize SCGA Website.</i></li> <li>◆ <i>Create and utilize DMS.</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Coordinate CSCGMP activities and work to the extent practicable with adjacent groundwater management entities, water interest groups, and state and federal regulatory agencies that have jurisdiction in areas related to CSCGMP activities. (3-9)</i></li> <li>◆ <i>Coordinate meetings with commercial/industrial self-supplied pumpers within the basin to inform them of the management responsibilities and activities relative to the CSCGMP. (3-9)</i></li> <li>◆ <i>Coordinate meetings outside of the CSCGF with agricultural and agricultural-residential self-supplied pumpers within the basin to inform them of the management responsibilities and activities relative to the CSCGMP. (3-9)</i></li> <li>◆ <i>Maintain a high level of involvement by stakeholders in implementing the CSCGMP by continued participation with the various stakeholders listed in section 3.2.1.3 of the CSCGMP. (3-9)</i></li> <li>◆ <i>Promote partnerships that accomplish both local supply reliability and broader regional and statewide benefits. (3-11)</i></li> <li>◆ <i>Track grant opportunities to fund groundwater management activities and local water infrastructure projects. (3-11)</i></li> <li>◆ <i>Provide copies of GMP and subsequent annual reports to SGA, SSCAWA, TNC, San Joaquin Co. (3-9)</i></li> </ul>
	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 5 - Regional planning integration. (3.2.5):</i> <ul style="list-style-type: none"> <li>• <i>Integrated Groundwater and Surface Modelling (3.2.5.1.4)</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>By assuming custodial authority of the IGSM, the Basin Governance body will seek to increase its relevancy with respect to the regional planning efforts of the Bureau of Reclamation and DWR for projects such as ARWRI, CVPIA, and the CALFED process. (3-22)</i></li> <li>◆ <i>The IGSM forms the basis for the WFA and the Zone 40 WSMP environmental analyses. (3-22)</i></li> <li>◆ <i>The IGSM is a suitable tool to analyze the effects of local projects on regional groundwater conditions. (3-22)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Preparation and adoption of a formal integrated water management plan (IWMP) in accordance with CWC § 10540 et seq. (3-22)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>The Central Basin governance body will seek to form an ad hoc committee with SCWA, RWA, SSCAWA, and the TNC to determine which agency would be most appropriate to prepare a IWMP and to update and make use of the IGSM. (3-22)</i></li> </ul>

**PROJECT GOAL:** Implementation of the CSCGMP.

**PUBLIC OUTREACH GOAL:** Inform stakeholders and public regarding the CSCGMP implementation effort and solicit input.

Target Audience	Objectives	Messages	Strategies	Tactics
<b>Technical Partnerships</b>				
<ul style="list-style-type: none"> <li>• SGA</li> <li>• SSCAWA</li> <li>• TNC</li> <li>• San Joaquin Co.</li> <li>• RWA</li> <li>• USGS</li> <li>• SMUD</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 2 - Monitoring Program (3.2.2):</i> <ul style="list-style-type: none"> <li>▪ <i>Groundwater elevation monitoring. (3.2.2.1)</i></li> </ul> </li> <li>◆ <i>BMO No. 2: Maintain specific groundwater elevations within all areas of the basin consistent with the Water Forum "solution". (3-23)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Determining and maintaining the health of the Central Basin is the governance body's foremost concern and is accomplished through data collection and evaluation, remedial and/or restorative actions if necessary, and reporting. (4-1)</i></li> <li>◆ <i>A monitoring methodology to meet specific objectives requires a systematic, repeatable, and scientific approach. (4-1)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Coordinate CSCGMP activities with adjacent groundwater management.</i></li> <li>◆ <i>Promote partnerships that accomplish both local supply reliability and broader regional and statewide benefits.</i></li> <li>◆ <i>Pursue partnership opportunities. (3.2.1.5)</i></li> <li>◆ <i>Involve other agencies within and adjacent to the Central Basin.(3.2.1.1)</i></li> <li>◆ <i>Develop a standard operating procedure for collecting water level data.</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Coordinate with DWR and others to identify an appropriate group of wells for monitoring. (3-12)</i></li> <li>◆ <i>Coordinate with DWR and other to ensure that selected wells are maintained as part of a long-term monitoring network. (3-12)</i></li> <li>◆ <i>Coordinate with DWR to ensure that water level data collected by other agencies is collected within one month of DWR and SCWA data collection. (3-12)</i></li> <li>◆ <i>Coordinate with other agencies to ensure that needed water level elevations are collected and that uniform data collection protocols are used among the agencies. (3-12)</i></li> <li>◆ <i>Coordinate with USGS to determine the potential for integrating NAWQA wells into the SCWA and SGA monitoring network. (3-12)</i></li> <li>◆ <i>Track grant opportunities to fund groundwater management activities and local water infrastructure projects. (3-11)</i></li> <li>◆ <i>Participate in the implementation of the IRWMP.</i></li> <li>◆ <i>Create and utilize DMS.</i></li> <li>◆ <i>Utilize SCGA Website.</i></li> <li>◆ <i>Meet with representatives of SGA, SSCAWA, TNC, San Joaquin Co., CSCGF, WFSE.</i></li> </ul>

**PROJECT GOAL: Implementation of the CSCGMP.**

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Target Audience	Objectives	Messages	Strategies	Tactics
<b>Technical Partnerships</b>				
<ul style="list-style-type: none"> <li>• SGA</li> <li>• SSCAWA</li> <li>• TNC</li> <li>• San Joaquin Co.</li> <li>• RWA</li> <li>• USGS</li> <li>• SMUD</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 2 - Monitoring Program (3.2.2):</i> <ul style="list-style-type: none"> <li>• <i>Land Surface Elevation Monitoring (3.2.2.3)</i></li> </ul> </li> <li>◆ <i>BMO No. 3: Protect against any potential inelastic land surface subsidence by limiting subsidence to no more than 0.007 feet per 1 foot of draw down in the groundwater basin.</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Land subsidence can cause significant damage to essential infrastructure. Historic land surface subsidence with the Central Basin has been minimal, with no known significant impacts to existing infrastructure. Given historical trends, the potential for land surface subsidence from groundwater extraction in the Central Basin appears to be remote. (3-3)</i></li> <li>◆ <i>While some measurements have been made to determine the level of subsidence in the Sacramento area, some concern exists regarding the accuracy of the measurements and the sufficiency of the data. (4-5)</i></li> <li>◆ <i>Subsidence should be measured and thought of as a long-term process. (4-5)</i></li> <li>◆ <i>The North and Central Basins should collaborate to gain a better understanding of subsidence. (4-5)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Pursue additional actions to continue to monitor potential land surface subsidence especially in the Central Basin. (3-13)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Coordinate with USGS to ascertain the suitability of the use of Interferometric Synthetic Aperture Radar images. If the technology appears suitable, identify the costs of determining ground surface elevations and identify potential cost-sharing partners. (3-14)</i></li> <li>◆ <i>Coordinate with other agencies, particularly the City and County of Sacramento and the National Geodetic Survey, to determine if there are other existing suitable benchmark locations in the area to aid in analysis of potential land surface subsidence. (3-14)</i></li> </ul>

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Target Audience	Objectives	Messages	Strategies	Tactics
<b>Technical Partnerships</b>				
<ul style="list-style-type: none"> <li>• SGA</li> <li>• SSCAWA</li> <li>• TNC</li> <li>• San Joaquin Co.</li> <li>• RWA</li> <li>• USGS</li> <li>• SMUD</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 2 - Monitoring Program (3.2.2):</i> <ul style="list-style-type: none"> <li>▪ <i>Surface Water/Groundwater Interaction Monitoring (3.2.2.4)</i></li> </ul> </li> <li>◆ <i>BMO No. 4: Protect against any adverse impacts to surface water flows in the American Consumnes, and Sacramento rivers.</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>The SCGA is committed to the objectives of the WFA, which include preserving the fishery, wildlife, recreational, and aesthetic values of the lower American River. The CSCGMP also includes goals to restore and preserve the fishery, wildlife, recreational, and aesthetic resources of the lower Consumnes River and to assure stable supply of water for agriculture in the lower Consumnes River floodplain area. (3-7)</i></li> <li>◆ <i>It is the intent of the CSCGMP that controllable operations of the groundwater system would not negatively impact the water quality of the area's rivers and streams. The basin governance body will seek to gain a netter understanding, in cooperation with SGA and others, of the potential impacts of discharging local area groundwater to major rivers adjacent to the Central Basin. (3-7)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>The basin governance body shall coordinate with other responsible regional, county, and local agencies to ensure that surface water flows in the other natural and restored streams in the area are not adversely impacted as a result of implementation of the CSCGMP. (3-7)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Work cooperatively with SGA, TNC and OHWD to compile available stream gage data and information on tributary inflows and diversions from the American, Cosumnes and Sacramento rivers to quantify net groundwater recharge or discharge between gages in the Central Basin area. (3-14)</i></li> <li>◆ <i>Coordinate with local, state and federal agencies to identify available surface water quality data from the American, Cosumnes and Sacramento rivers proximate to the Central Basin. (3-14)</i></li> <li>◆ <i>Continue to coordinate with local, state and federal agencies and develop partnerships to investigate cost-effective methods that could be applied to better understand surface water-groundwater interaction along the American, Cosumnes and Sacramento rivers. (3-15)</i></li> <li>◆ <i>Coordinate with CSUS to analyze data obtained from recently constructed monitoring wells on the CSUS campus to better understand the relationship between the groundwater basin and surface water flows at that location. (3-15)</i></li> </ul>

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<b>Technical Partnerships</b>				
<ul style="list-style-type: none"> <li>• SGA</li> <li>• SSCAWA</li> <li>• TNC</li> <li>• San Joaquin Co.</li> <li>• RWA</li> <li>• USGS</li> <li>• SMUD</li> </ul>	<ul style="list-style-type: none"> <li>◆ CSCGMP Program Component No. 2 - Monitoring Program (3.2.2):                             <ul style="list-style-type: none"> <li>▪ Groundwater Quality Monitoring (3.2.2.2)</li> </ul> </li> <li>◆ BMO No. 5: Water Quality Objectives</li> </ul>	<ul style="list-style-type: none"> <li>◆ Many of the wells in the Central Basin are used for public water supply and an extensive record of water quality data is available for most wells. Water purveyors have compiled available historic water quality data for constituents monitored as required by DHS under CCR Title 22. This level of monitoring is sufficient under regulatory guidelines to ensure that the public is provided with a safe drinking water supply. (3-12)</li> <li>◆ Ultimately, it may be advisable to have in place a network of shallow sentry wells to serve as an early warning system for contaminants that could make their way to greater depths in the basin where groundwater purveyors primarily extract groundwater. (3-12)</li> <li>◆ CCR Title 22 water quality reporting is required by DHS for each public drinking water source with the Central Basin. The Central Basin monitoring network includes these wells. (3-12)</li> </ul>	<ul style="list-style-type: none"> <li>◆ Identify appropriate set of water quality monitoring wells.</li> </ul>	<ul style="list-style-type: none"> <li>◆ Coordinate with cooperating agencies to verify that uniform protocols are being used when collecting water quality data. (3-12)</li> <li>◆ Coordinate with USGS to obtain historic water quality data for NAWQA wells, determine timing and frequency of monitoring under USGS program and discuss the potential for integrating USGS monitoring resources with other portions of the monitoring network. (3-12)</li> <li>◆ Coordinate with other local, state and federal agencies to identify where wells may exist in areas with sparse groundwater quality data. Identify opportunities for collecting and analyzing water quality samples from those wells. (3-12)</li> <li>◆ Coordinate with DWR on the groundwater quality data they collect. (3-12)</li> </ul>

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<b>Technical Partnerships</b>				
<ul style="list-style-type: none"> <li>• SGA</li> <li>• SSCAWA</li> <li>• TNC</li> <li>• San Joaquin Co.</li> <li>• RWA</li> <li>• USGS</li> <li>• SMUD</li> <li>• Sacramento County Environmental Management Department (EMD)</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 3 - Groundwater resource protection:</i> <ul style="list-style-type: none"> <li>• <i>Well Construction Policies (3.2.3.1)</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>The basin governance body considers groundwater resource protection a critical component in maintaining a sustainable groundwater resource. (3-16)</i></li> <li>◆ <i>The Sacramento County Environmental Management Department (EMD) administers the well permitting program for Sacramento County. (3-16)</i></li> <li>◆ <i>In addition to general well construction standards, Sacramento County has a policy of special review by appropriate regulatory agencies before granting a well permit within 2,000 feet of a known contaminant plume (referred to as Consultation Zones). Prohibitions have been established by various State regulatory agencies for drilling new public supply wells at Mather Field or near the Aerojet or Boeing facilities. As part of the development of the DMS, the extent of contaminant plumes associated with MatherField, Aerojet, and Boeing were delineated for SGA and SCWA. (3-16)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Adhere to Sacramento County's Consultation Zone and provide a copy of the boundary of the prohibition zones to appropriate agencies within the Central Basin. (3-16)</i></li> <li>◆ <i>Ensure that appropriate Sacramento County and Central Basin implementation staff and consultants are provided a copy of the County Well Ordinance and understand proper well construction procedures. (3-16)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Provide a copy of the most recently delineated plume extents at Mather Field and Aerojet/Boeing to EMD and appropriate staff for their review and possible use. (3-16)</i></li> <li>◆ <i>Coordinate with other groundwater users in the Central Basin to provide guidance, as appropriate, on well construction. (3-16)</i></li> </ul>
	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 3 - Groundwater Resource Protection:</i> <ul style="list-style-type: none"> <li>• <i>Well Abandonment and Deconstruction Policies. (3.2.3.2)</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>EMD administers the well destruction program for Sacramento County. The standards for well destruction are identified in the County Well Ordinance. A concern of the basin governance body and EMD is that many abandoned supply wells have not been properly destroyed. As part of development of the DMS for SGA, DWR well records for all known wells in the North Basin were reviewed for reported destruction. Based on the information provided, each well was then rated based on the level of confidence that the well in question was actually destroyed properly. This information was then entered into the DMS. (3-16, 17)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Ensure that all public and private agencies in the Central Basin are provided a copy of the County Well Ordinance and that they understand proper well destruction procedures, and support implementation of these procedures. (3-17)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Follow up with cooperating agencies and EMD on reported abandoned and/or destroyed wells to confirm the information collected from DWR. (3-17)</i></li> <li>◆ <i>Obtain copies of any information on abandoned and/or destroyed wells in the Central Basin from EMD or other regulatory agencies to fill any gaps in the governance body's records. (3-17)</i></li> <li>◆ <i>Meet with EMD to discuss ways to ensure that wells in the Central Basin are properly abandoned or destroyed. (3-17)</i></li> </ul>

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<b>Technical Partnerships</b>				
<ul style="list-style-type: none"> <li>• DHS</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 3 - Groundwater Resource Protection:</i> <ul style="list-style-type: none"> <li>▪ <i>Wellhead Protection Measures (3.2.3.3)</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Identification of wellhead protection areas is an element of the Drinking Water Source Assessment and Protection (DWSAP) program administered by DHS. (3-17)</i></li> <li>◆ <i>DHS set a goal for all water systems statewide to complete Drinking Water Source Assessments by mid-2003. Most water purveyors in the basin have completed their required assessments by performing the three major elements required by DHS (3-17):</i> <ul style="list-style-type: none"> <li>▪ <i>Delineation of capture zones around sources (wells).</i></li> <li>▪ <i>Inventory of PCAs within protection areas.</i></li> <li>▪ <i>Vulnerability analysis to identify the PCAs to which the source is most vulnerable.</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>PCA and capture zone information from the DWSAP will need to be added into the DMS. (3-17)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Request that public water purveyor agencies within the Central Basin provide vulnerability summaries from the DWSAP to the basin governance body to be used for guiding management decisions in the basin. (3-17, 18)</i></li> <li>◆ <i>Contact groundwater basin managers in other areas of the state for technical advice, effective management practices, and "lessons learned" regarding establishing wellhead protection areas. (3-18)</i></li> </ul>
<ul style="list-style-type: none"> <li>• TNC</li> <li>• SSCAWA</li> <li>• Mining Companies</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 3 - Groundwater Resource Protection:</i> <ul style="list-style-type: none"> <li>▪ <i>Protection of Recharge Areas (3.2.3.4)</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Surface geology within and directly adjacent to the Central Basin's boundary was investigated as part of the 1993 Sacramento County General Plan for the purpose of delineating areas of potentially high recharge. Much of the surface area considered to have the highest potential for recharge along the American River is developed. Other recharge areas identified in the Sacramento County General Plan include areas around and adjacent to the streams that flow along and across the Central Basin such as the Cosumnes River and Morrison stream group. (3-18)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Track the progress and results of the pilot recharge program (coordinated through the Water Forum, SCWA, TNC, and SSCAWA) that conveys American River water through the Folsom South Canal and then discharges it to the Cosumnes River at the canal crossing. (3-18)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Continue to work with mining companies, TNC, and SSCAWA to explore the possibilities for enhancing recharge into the Central Basin. (3-18)</i></li> </ul>

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<b>Technical Partnerships</b>				
<ul style="list-style-type: none"> <li>• EMD</li> <li>• DHS</li> <li>• DTSC</li> <li>• EPA</li> <li>• RWQCB</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 3 - Groundwater Resource Protection:</i> <ul style="list-style-type: none"> <li>▪ <i>Control of the Migration and Remediation of Contaminated Groundwater (3.2.3.5)</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Major sources of contamination within the Central Basin are primarily from Mather Field, Aerojet, Boeing, and various active and inactive landfill sites. (3-18)</i></li> <li>◆ <i>Also of concern is localized contamination by industrial/commercial point sources such as dry cleaning facilities and numerous fuel stations throughout the basin. (3-18)</i></li> <li>◆ <i>While the basin governance body does not have the authority or responsibility for remediation of this contamination, it is committed to coordinating with responsible parties and regulatory agencies to stay informed on the status and disposition of known contamination in the basin. (3-18)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Coordinate with responsible parties and regulatory agencies to stay informed on the status and disposition of known contamination in the basin. (3-18)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Coordinate with appropriate regulatory agencies (EMD, DTSC, EPA, and DHS) and known responsible parties to develop a network of monitoring wells to act as sentry wells for public supply wells. (3-18)</i></li> <li>◆ <i>If detections occur in these monitoring wells, meet with the appropriate regulatory agencies and responsible parties to develop strategies to minimize the further spread of contaminants. (3-19)</i></li> <li>◆ <i>Meet with representatives of EMD and RWQCB to establish a mutual understanding about the basin governance body's groundwater management responsibilities. Identify ways to have open and expedited communication with EMD regarding any new occurrences of LUSTs, particularly when contamination is believed to have reached the groundwater. (3-19)</i></li> </ul>
<ul style="list-style-type: none"> <li>• DWR Central Office</li> <li>• EMD</li> <li>• All Central Basin Stakeholders</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 3 - Groundwater Resource Protection:</i> <ul style="list-style-type: none"> <li>▪ <i>Control of Saline Water Intrusion (3.2.3.6)</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Saline water intrusion from the Sacramento/San Joaquin Delta (Delta) is not currently a problem in the Central Basin, and is not expected to become a problem in the future. Higher groundwater elevations associated with recharge from the American and Sacramento rivers have maintained a historical positive gradient, preventing significant migration of any saline water from the Delta into the Sacramento County region. These groundwater gradients will continue to serve to prevent any localized pumping depressions in the basin from inducing flow from the Delta into the Central Basin. (3-19)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Track the progression, if any, of saline water bodies moving toward the east from the Delta. Because this is a highly unlikely scenario, this action will be limited to communicating with DWR's Central District Office on a biennial basis to check for significant changes in TDS concentrations in wells. DWR has a regular program of sampling water quality in select production wells throughout the adjacent Solano, San Joaquin, and Yolo counties. This program will serve as an early warning system for potential saline water intrusion from the Delta. (3-19)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Inform all stakeholders of the presence of the salinity interface and the approximate depth to the interface for their reference when locating potential wells. EMD, which issues well permits, is aware of the interface. SCWA will provide a map to EMD indicating the contour of the elevation of the base of fresh water in Sacramento County for its reference when issuing well permits. (3-19)</i></li> </ul>

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Target Audience	Objectives	Messages	Strategies	Tactics
<b>Technical Partnerships</b>				
<ul style="list-style-type: none"> <li>• Central Basin Stakeholders</li> <li>• City of Roseville</li> <li>• SCWA</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 4 - Groundwater Sustainability.</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Conjunctive management is a program that includes both conjunctive use and the development of banking and exchange opportunities with local in-basin partners after local needs are met. (3-20)</i></li> <li>◆ <i>The SCGA and SCWA are also interested in direct recharge and propose to investigate a variety of ways to recharge water into available storage space in the basin. (3-20)</i></li> <li>◆ <i>Opportunities for direct recharge exist through the use of recharge basins (e.g., abandoned aggregate mining pits) or through a aquifer storage and recovery (ASR) program. The City of Roseville is currently implementing an ASR program where treated surface water is injected into the groundwater and then recovered in the summer months and dry years through groundwater wells. The success of this program will be monitored closely by the SCGA. (3-20)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Continue to investigate conjunctive use opportunities within the Central Basin area. Groundwater users within the Central Basin will coordinate any recharge efforts. (3-20)</i></li> <li>◆ <i>Continue to investigate opportunities for development of direct recharge facilities in addition to in-lieu recharge (e.g., injection wells or surface spreading facilities, through constructed recharge basins or in riverbeds or streambeds). (3-20)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Coordinate with SCWA and other Central Basin groundwater users to investigate and develop groundwater recharge opportunities.</i></li> <li>◆ <i>Coordinate with SCWA and other Central Basin groundwater users to investigate and develop conjunctive use opportunities.</i></li> <li>◆ <i>Establish contact with the City of Roseville for the purpose of tracking the success of their ASR program.</i></li> </ul>
<ul style="list-style-type: none"> <li>• RWA</li> <li>• DWR</li> <li>• SRCD</li> <li>• WFSE</li> <li>• Bureau of Reclamation</li> <li>• Self-served agricultural and agricultural-residential water users.</li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>CSCGMP Program Component No. 4 - Groundwater Sustainability:</i> <ul style="list-style-type: none"> <li>• <i>Demand Reduction (3.2.4.1)</i></li> </ul> </li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>An important factor in maintaining the sustainable yield of the basin is by reducing demand for potable water supplies through conservation and the use of recycled water for landscape irrigation. (3-20)</i></li> <li>◆ <i>RWA's efforts in developing and implementing a regional Water Efficiency Program (WEP) are well recognized by SCGA. (3-20)</i></li> <li>◆ <i>The SRCSD is developing a countywide Water Recycling Master Plan to provide up to 40 MGD of recycled water. (3-20)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>The SCGA will work closely with the Water Forum Successor Effort and RWA to ensure that all applicable cost-effective BMPs are implemented in the Central Basin urban areas. (3-20)</i></li> <li>◆ <i>The SCGA shall develop BMPs for self-served agricultural and agricultural-residential water users. These BMPs will be based on applicable Reclamation and DWR data and recommendations. (3-20)</i></li> </ul>	<ul style="list-style-type: none"> <li>◆ <i>Participate in RWA's WEP to ensure that Central Basin purveyor conservation efforts are focused and effective. For those who receive wholesale water supplies, the governance body of the Central Basin will ensure that they are informed of the benefits and regional importance of participating in the WEP. (3-20)</i></li> <li>◆ <i>The SCGA shall develop BMPs for self-served agricultural and agricultural-residential water users. (3-21)</i></li> <li>◆ <i>Coordinate with SRCSD to investigate further opportunities for expanded use of recycled water throughout the Central Basin. (3-21)</i></li> </ul>



827 7th Street ▪ Room 301 ▪ Sacramento, CA 95814 ▪ 916.874.6851  
[www.scgah2o.org](http://www.scgah2o.org)