



August 2014

Basin Management Report 2011–2012





Basin Management Report

2011-2012

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in association with Davids Engineering

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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 2011 and 2012 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 (BMO) 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 on the west, and the foothills of the Sierra

Nevada on the east (see Figure 1). The Authority is recognized as an essential part in implementing the groundwater management element of the Water Forum Agreement (WFA¹).

Currently, the Authority consists of sixteen members² 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).

¹ 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/>.

² 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

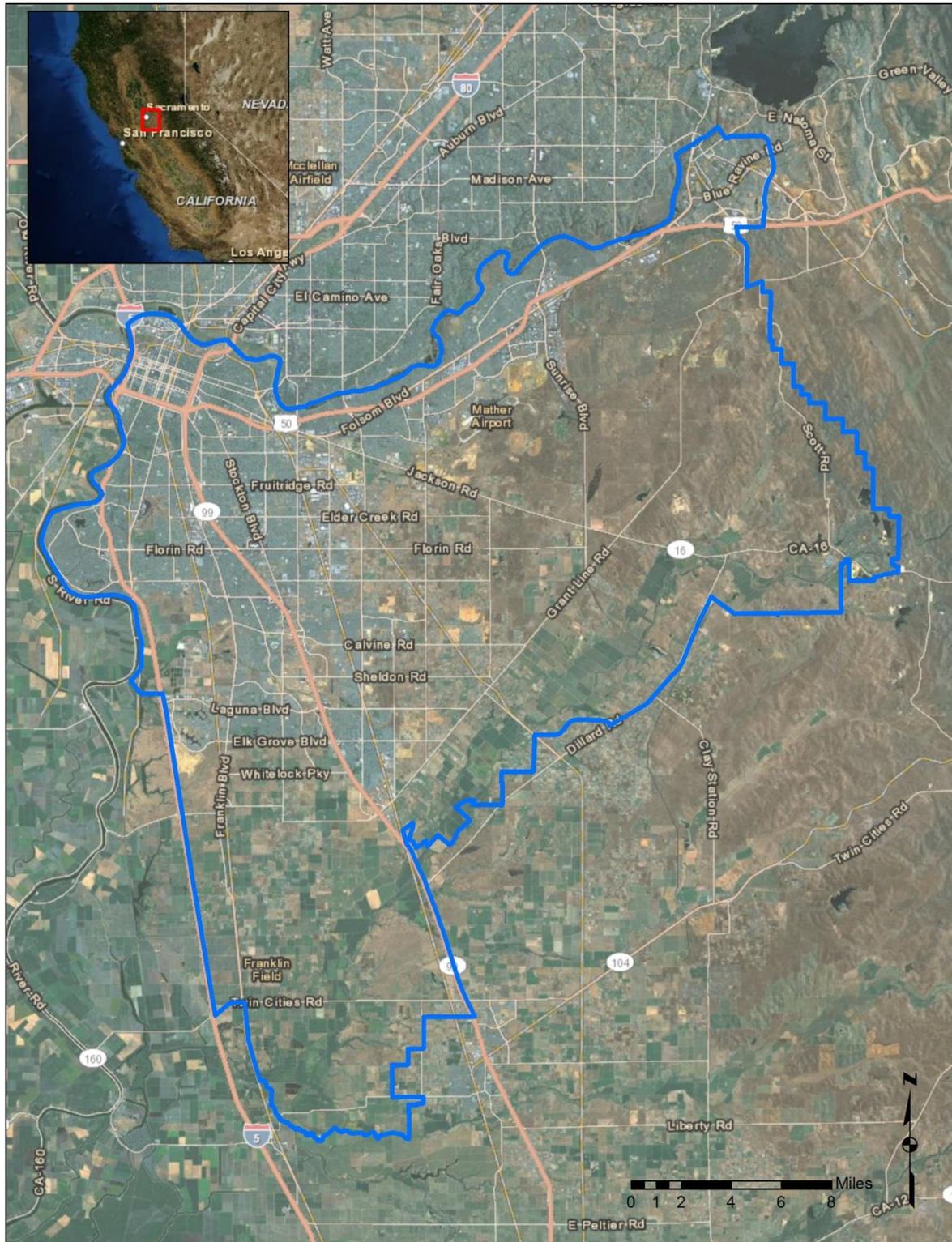


Figure 1 Sacramento Central Groundwater Basin

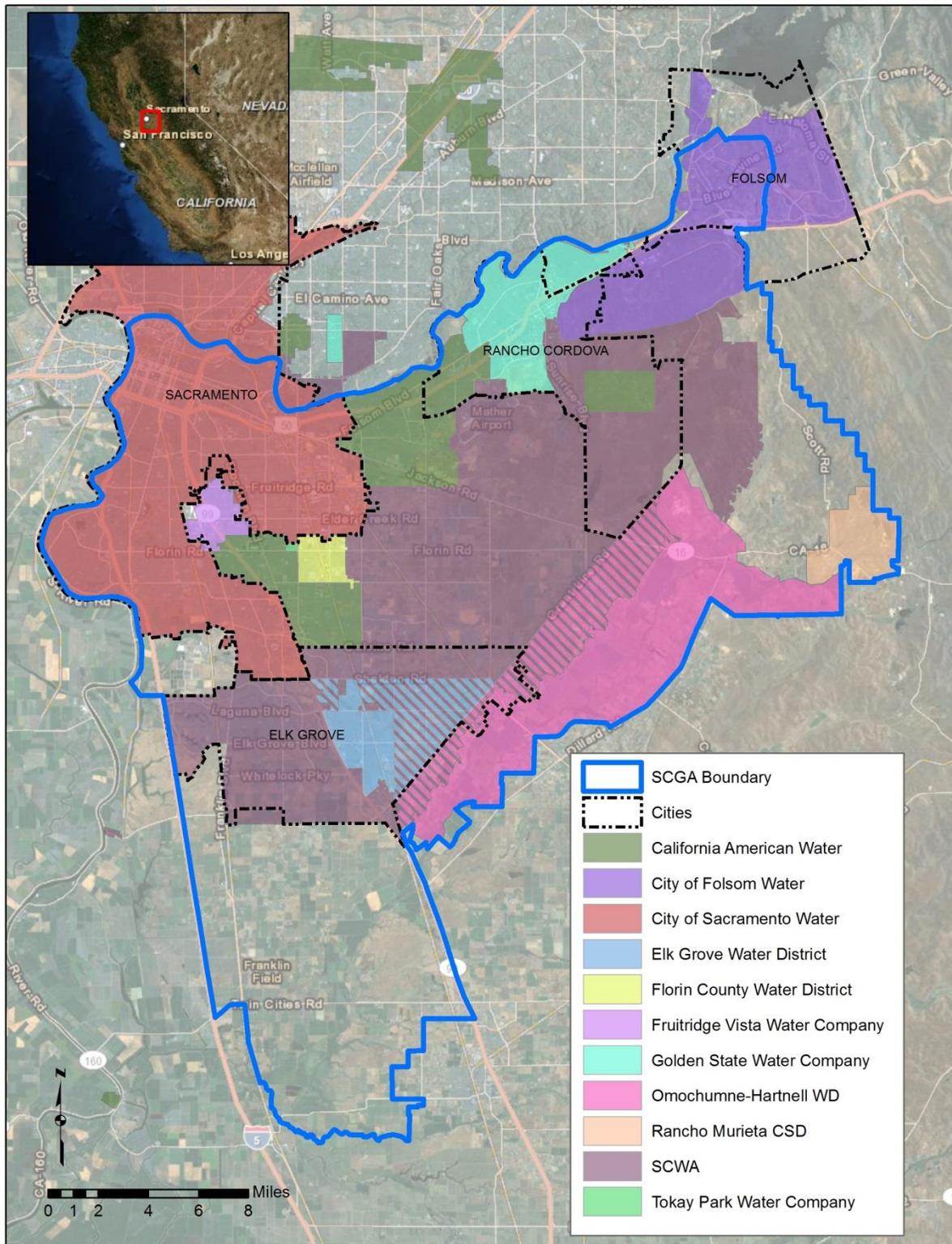


Figure 2 Cities and Public Water Purveyors in SCGA

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 managing and monitoring 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:

- Maintain the long-term average groundwater extraction rate at or below 273,000 acre-feet/year (Section 3.1.1);
- Maintain specific groundwater elevations within all areas of the basin consistent with the Water Forum “solution” (Section 3.1.2);
- 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 (Section 3.1.3);
- Protect against any adverse impacts to surface water flows in the American, Cosumnes, and Sacramento Rivers (Section 3.1.4); and
- Meet water quality objectives (Section 3.1.5) including:
 - Total Dissolved Solids (TDS) concentration of less than 1,000 mg/l,
 - Nitrate concentration of less than 45 mg/l, and
 - Volatile Organic Compounds (VOC).

The GMP also describes the development and implementation of the Central Basin WPP (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 (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 Year Type, and 3) Precipitation Data. Each of these is described in more detail below.

Sacramento Valley Water Year

The Sacramento Valley Water Year Type is determined by the California Department of Water Resources (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 (2008 to 2012). Overall, the region is experiencing a dry period with four of the last five years classified as below normal or drier. The 2008 water year was classified as critical.

Table 1 Sacramento Valley Water Year Type, 2008-2012

Water Year ¹	Sacramento Valley Water Year Index	Sacramento Valley Water Year Type ²
2008	5.1	Critical
2009	5.8	Dry
2010	7.1	Below Normal
2011	10	Wet
2012	6.9	Below Normal

Notes:

- 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/iodir/WSIHIST>.
- 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 Year Type

The WFA year type is determined based on March-through-November total unimpaired inflow into Folsom Lake. This data dictates 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 classifications include wet, average, drier, and driest. Table 2 shows the water year type for the past five years (2008 to 2012). With the exception of the “drier” 2008, the data shows that the WFA years have been average or wetter, indicating that the unimpaired flows have been greater than 950,000 acre-feet since 2009.

Table 2 Water Forum Agreement Year Type, 2008-2012

Water Year	Unimpaired Inflow to Folsom Lake, March-November (Thousand Acre-Feet) ^{1,2}	Water Forum Agreement Year Type ³
2008	914	Drier
2009	1,455	Average
2010	1,700	Wet
2011	3,115	Wet
2012	1,415	Average

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 on 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 3.

- 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 2008 – 2012 recorded at these stations was retrieved from CDEC’s website: <http://cdec.water.ca.gov>.

Table 3 shows the annual precipitation for CRT, CSU, EGN, ELG, PRC, SCR, and from Sacramento Executive Airport from water year 2008 to 2012. These precipitation data 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. In the valley floor, there also appears to be somewhat higher precipitation in the northern portion of the region (CSU and SCR) compared to the southern portion of the region (CRT, EGN, and ELG). This is consistent with Central Valley trends of higher precipitation in the north and lower precipitation in the south.

The long-term average annual rainfall at the NOAA Sacramento Executive Airport station is approximately 18.1 inches³. The data in show that rainfall at Sacramento Executive Airport was below the long-term average in 2008, 2009 and 2012, recording 13.64 inches, 16.48 inches and 12.24 inches in each of these years, respectively. In 2010 and 2011, rainfall was above average, with 20.64 inches and 24.00 inches, respectively. The average rainfall over the past five years at Sacramento Executive Airport is 17.40 inches, indicating that recent rainfall has been below average relative to the long-term average.

Table 3 Annual Precipitation in SCGA Vicinity, 2008-2012

Water Year	CDEC Rainfall Stations						NOAA Sacramento Executive Airport Station	Average for NOAA and CDEC Stations
	CRT	CSU	EGN	ELG	PRC	SCR		
2008	12.13	14.73	13.54	13.03	15.20	14.68	13.64	13.85
2009	14.29	16.79	14.84	14.17	17.60	16.66	16.48	15.83
2010	19.06	19.35	18.70	17.87	20.47	20.37	20.64	19.49
2011	22.28	24.71	22.80	21.77	31.26	23.74	24.00	24.37
2012	13.23	13.10	10.98	12.13	14.61	14.33	12.24	12.95
Average	17.22	17.74	16.17	15.79	19.83	17.96	17.40	17.30

³ Based on 50-year average rainfall at the Sacramento Executive Airport from 1962-2012. Data provided from www.ncdc.noaa.gov

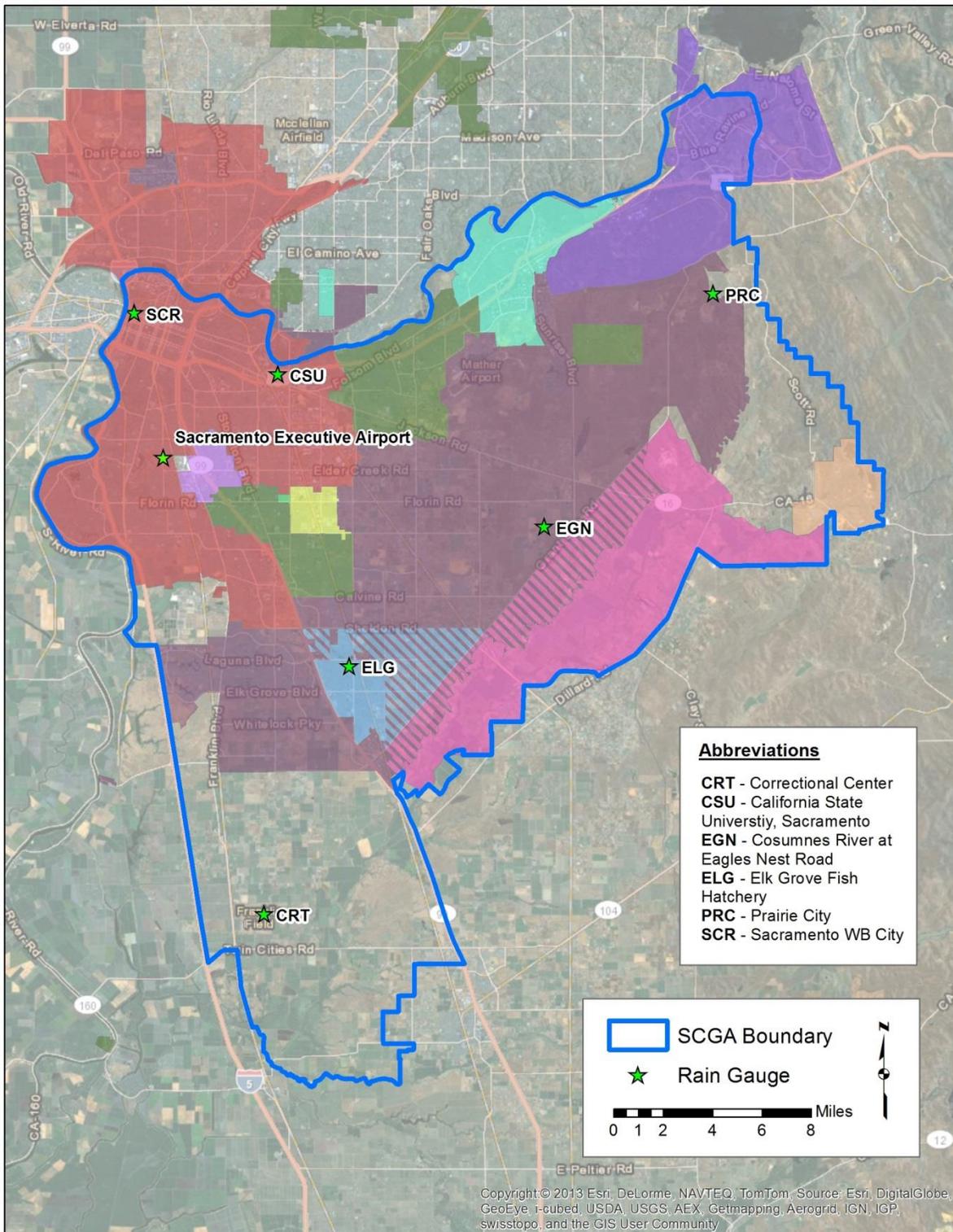


Figure 3 Rain Gauge Stations in SCGA

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 4 indicates groundwater pumping in the Central Basin for the 2008-2012 timeframe. Remediated groundwater pumping is included for the purpose of showing total groundwater pumping, although a portion of the remediated groundwater is currently not put to beneficial use. 2011 and 2012 present 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 and 2012. Total groundwater pumping within the Central Basin is estimated to be 233,000 acre-feet in 2011 and 253,200 acre-feet in 2012. Variability between these years is largely due to weather conditions and related agricultural irrigation demands.

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 past two years (2011-2012) was approximately 243,100 acre-feet/year.

Table 4 Groundwater Pumping in the Central Basin, 2008-2012

Groundwater Pumping (Acre-Feet)						
Groundwater Pumper		2008	2009	2010	2011	2012
Reported Metered Data	Elk Grove Water District ¹	6,460	5,407	3,784	4,615	5,562
	Cal-Am ¹	24,769	23,659	21,525	19,413	19,173
	GSWC ¹	9,162	8,197	6,650	5,731	6,684
	SCWA ¹	34,220	34,248	32,171	29,809	25,363
	City of Sacramento, Utilities ¹	930	837	668	544	600 ¹⁰
Estimated Values	Tokay Park WC ²	160	160	160	160	160
	Florin County WD ²	2,600	2,600	2,600	2,600	2,600
	Fruitridge Vista WC ²	7,236	7,236	7,236	7,236	7,236
	Parks and Golf Courses ³	2,000	2,000	2,000	2,000	2,000
	Cemetery Districts ³	n/a	n/a	n/a	n/a	n/a
Agricultural and Agriculture-Residential	Agricultural ⁴	n/a	n/a	n/a	116,500	134,600
	Agricultural – Residential ⁴	n/a	n/a	n/a	17,200	23,400
SUBTOTAL		n/a	n/a	n/a	205,800	227,400
Remediated Groundwater ⁵	Aerojet ⁶	19,121	17,816	20,893	21,003	20,492
	IRCTS ⁷	3,405	4,123	4,674	4,872	4,786
	Mather Field ⁸	160	160	160	160	160
	Kiefer Landfill ⁹	1,422	1,228	1,079	1,142	391
SUBTOTAL		24,100	23,300	26,800	27,200	25,800
GRAND TOTAL		n/a	n/a	n/a	233,000	253,200

Notes:

- n/a = not available.
- 1. Annual urban groundwater pumping data was provided to the Authority by the individual water purveyors.
- 2. No production data was provided by the purveyor. Values are estimated based on information presented for 2010 groundwater use in the purveyor's 2010 UWMP.
- 3. 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.
- 4. Annual groundwater pumping for Agricultural and Agricultural Residential groundwater users were estimated based on land use. For details, see the separate technical memorandum: *Sacramento Central Groundwater Authority, 2011-2012 Agricultural Demand and Groundwater Pumping Estimates*.
- 5. See Chapter 3 for more details.
- 6. Based on data from Aerojet (pers comm. R. Fricke, March 31, 2014). Includes all remediation wells except those pumping north of the American River: GET L-A, GET L-B, and 40% of ARGET.
- 7. Inactive Rancho Cordova Test Site. Based on data from Aerojet (pers comm. R. Fricke, March 31, 2014).
- 8. Based on a presentation made by Mather/Air Force staff to the SCGA Board in May 2011 regarding the groundwater cleanup progress at Mather Field. Meeting minutes are available online at www.scgah2o.org. The average pumping rate is approximately 1,600 gpm with all but 100 gpm injected directly back into the basin the remainder discharged into Morrison Creek. Value presented represents the pumping minus the direct injection.
- 9. Based on personal communication (AC David May 15 2014 and June 23, 2014). In 2011, approximately 372.2 million gallons total was pumped, with 15 million gallons discharged to Kiefer Landfill sedimentation-basin and the remainder to Deer Creek. In 2012, approximately 127.5 million gallons total was pumped with 5 million gallons discharged to Kiefer Landfill sedimentation-basin and the remainder to Deer Creek.
- 10. Data not available. Value of 600 AF is used for City of Sacramento 2012 pumping to estimate the subtotals and total.

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 is 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 single 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 Basin Management Objectives (BMOs) and to create groundwater basin management reports. 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 2012.

Groundwater Elevation Contour Map

Groundwater elevation contour maps that estimate groundwater level conditions in the Central Basin are generated based on data from the CASGEM program. These data are provided by DWR and is incorporated into HydroDMS. Two sets of groundwater elevation maps were developed to illustrate both seasonal and time related changes in groundwater elevations. The first set of maps is for spring 2002 and 2012 (Figure 4 and 5), and the second set is for fall 2002 and 2012 (Figure 6 and 7).

Historical groundwater production and distance from surface water sources of recharge resulted in the development of a persistent, regionally-extensive cone of depression in the Elk Grove area of the Central Basin, apparent in both the 2002 maps. As of 2012, 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 2012 maps in Figures 5 and 7.

By comparing the contour maps for 2002 and 2012, 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)⁴ in 2002 to approximately 30 feet below MSL in 2012. Overall, groundwater elevations have exhibited a rising trend over that last

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

ten years in this part of the basin. This recovery is also shown through the groundwater level trends shown in the following section.

Groundwater Level Trends

Groundwater hydrographs are developed from groundwater elevation data that has been collected over time. The graphic depiction of these hydrographs delineates groundwater level trends in various locations throughout the basin. Figure 8 through Figure 10 show the location of groundwater hydrographs with the most complete period of record. Groundwater data to develop these hydrographs was obtained from the DWR CASGEM and WDL programs. 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 5 below. The SWP IDs will be referred to through the remainder of the report. Future reports will refer to the CASGEM ID.

Table 5 CASGEM and Well IDs

Well ID	Basin Location	CASGEM ID
SWP-004	West	383009N1214224W001
SWP-054	Central	384082N1213845W001
SWP-058	West	383884N1214167W001
SWP-063	West	383510N1213741W001
SWP-107	West	384664N1214774W001
SWP-115	West	384343N1214615W001
SWP-121	Central	384756N1213352W001
SWP-124	Central	384798N1212614W001
SWP-128	Central	384425N1213031W001
SWP-149	Central	384468N1212226W001
SWP-170	West	385021N1214948W001
SWP-177	Central	385343N1214280W001
SWP-185	East	385469N1213389W001
SWP-188	Central	385287N1213347W001
SWP-202	East	385541N1211812W001
SWP-209	East	385038N1212203W001
SWP-244	East	385974N1212706W001
SWP-250	East	386312N1212295W001
SWP-255	East	385914N1212475W001

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 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 8 (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.

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 9 (SWP-177, SWP-149, SWP-154, SWP-121, SWP-124, SWP-128, SWP-188, and SWP-054).

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 10 (SWP-185, SWP-250, SWP-244, SWP-255, SWP-202, and SWP-209).

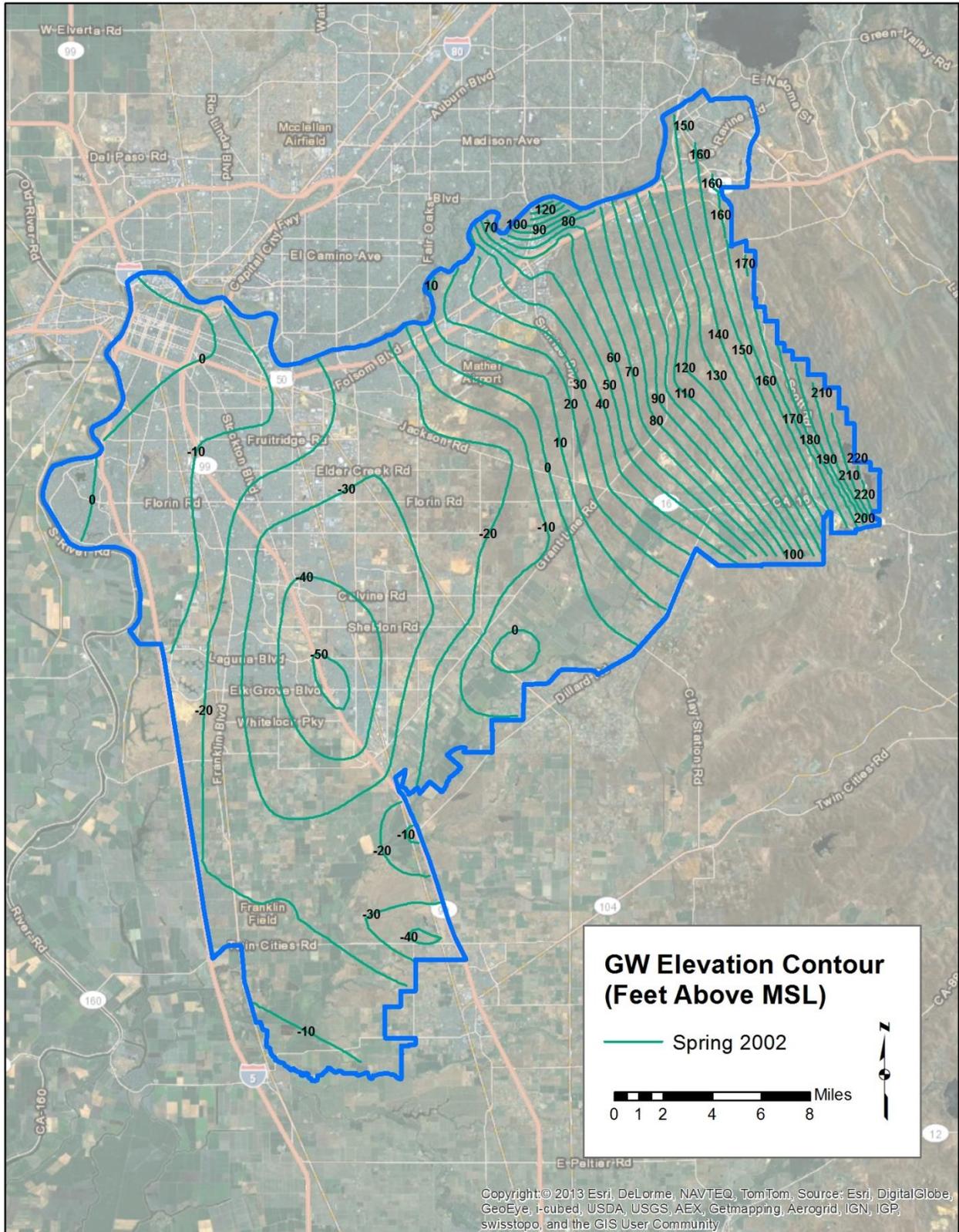


Figure 4 Spring 2002 Groundwater Elevation Contour Map

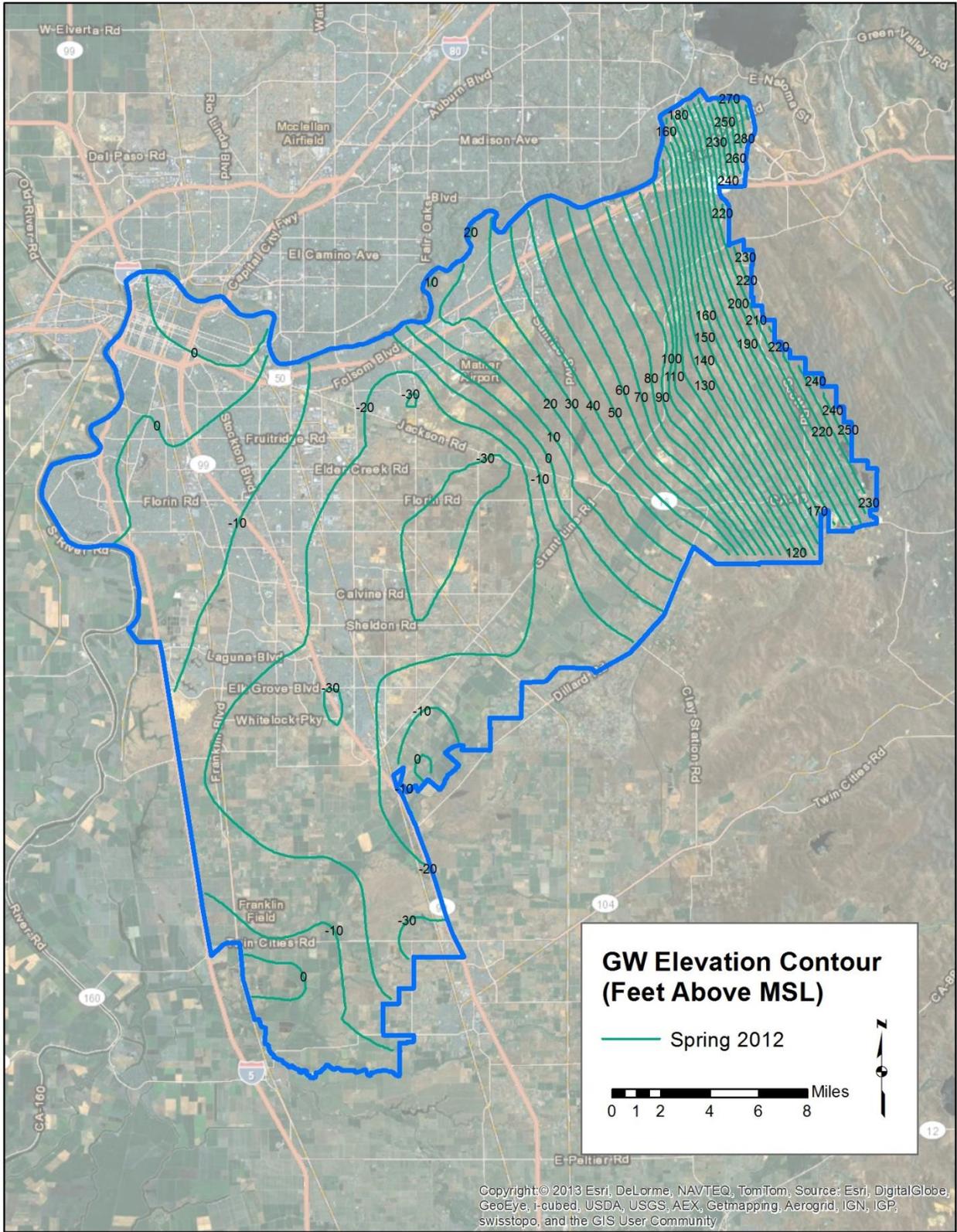


Figure 5 Spring 2012 Groundwater Elevation Contour Map

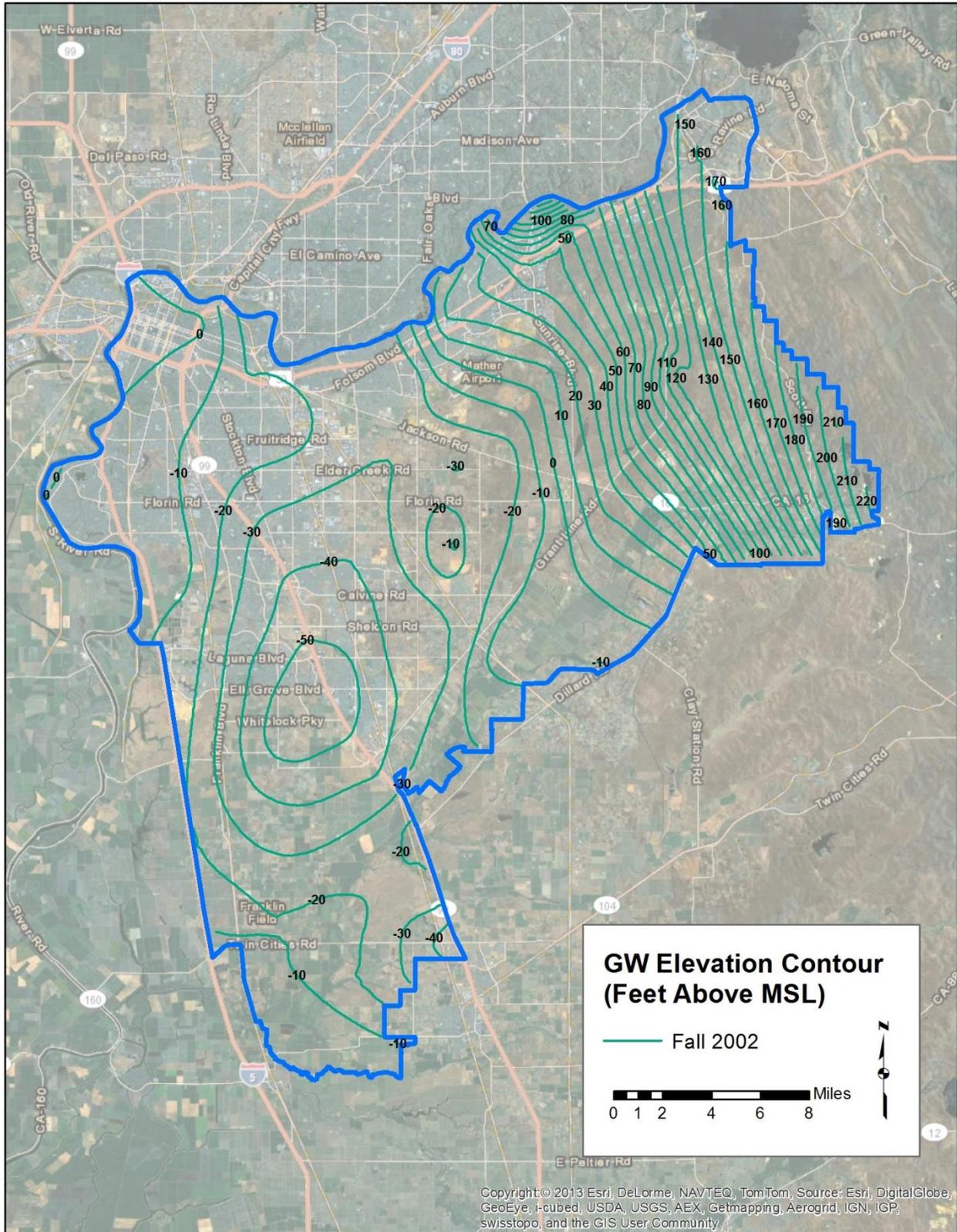


Figure 6 Fall 2002 Groundwater Elevation Contour Map

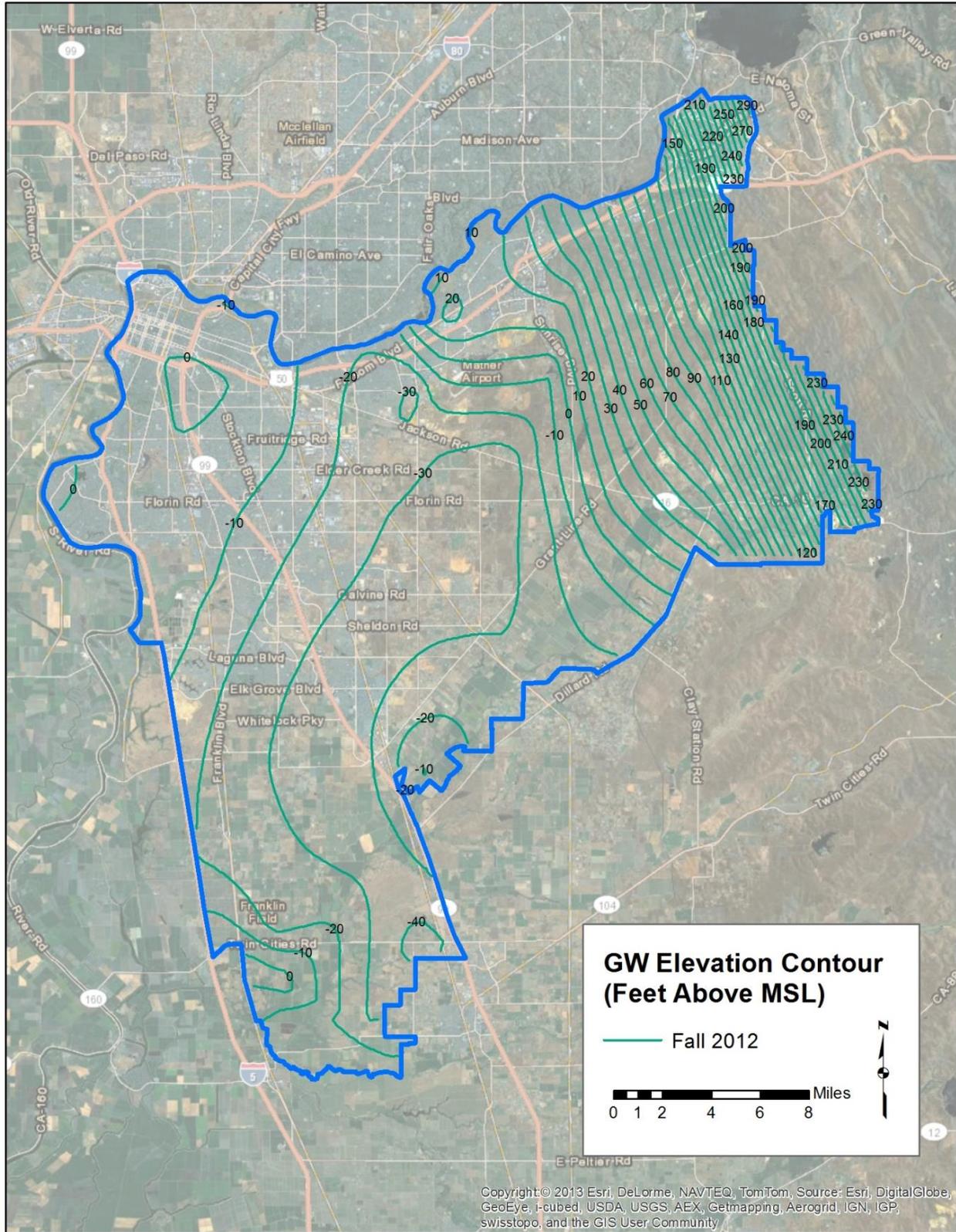


Figure 7 Fall 2012 Groundwater Elevation Contour Map

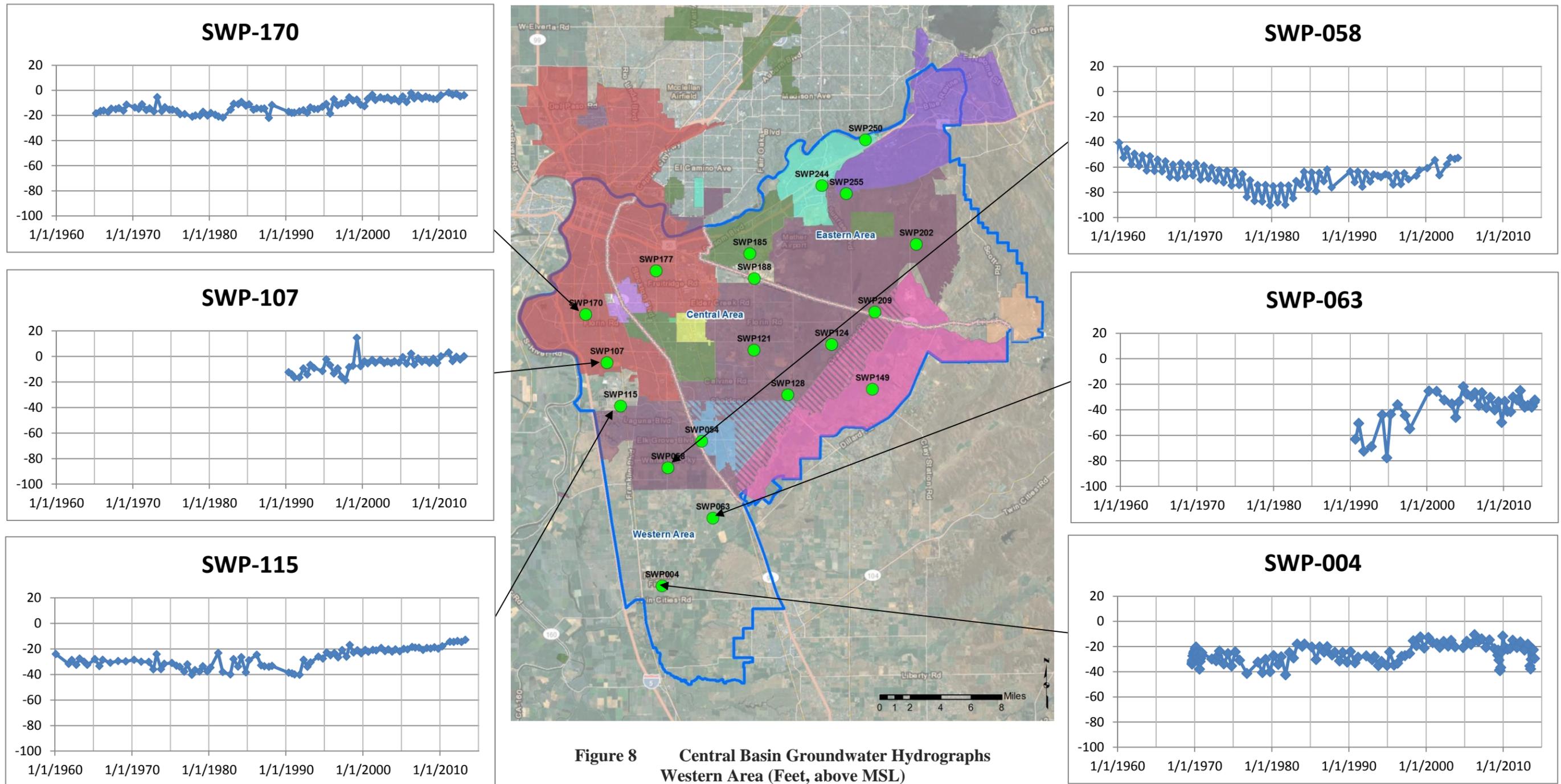
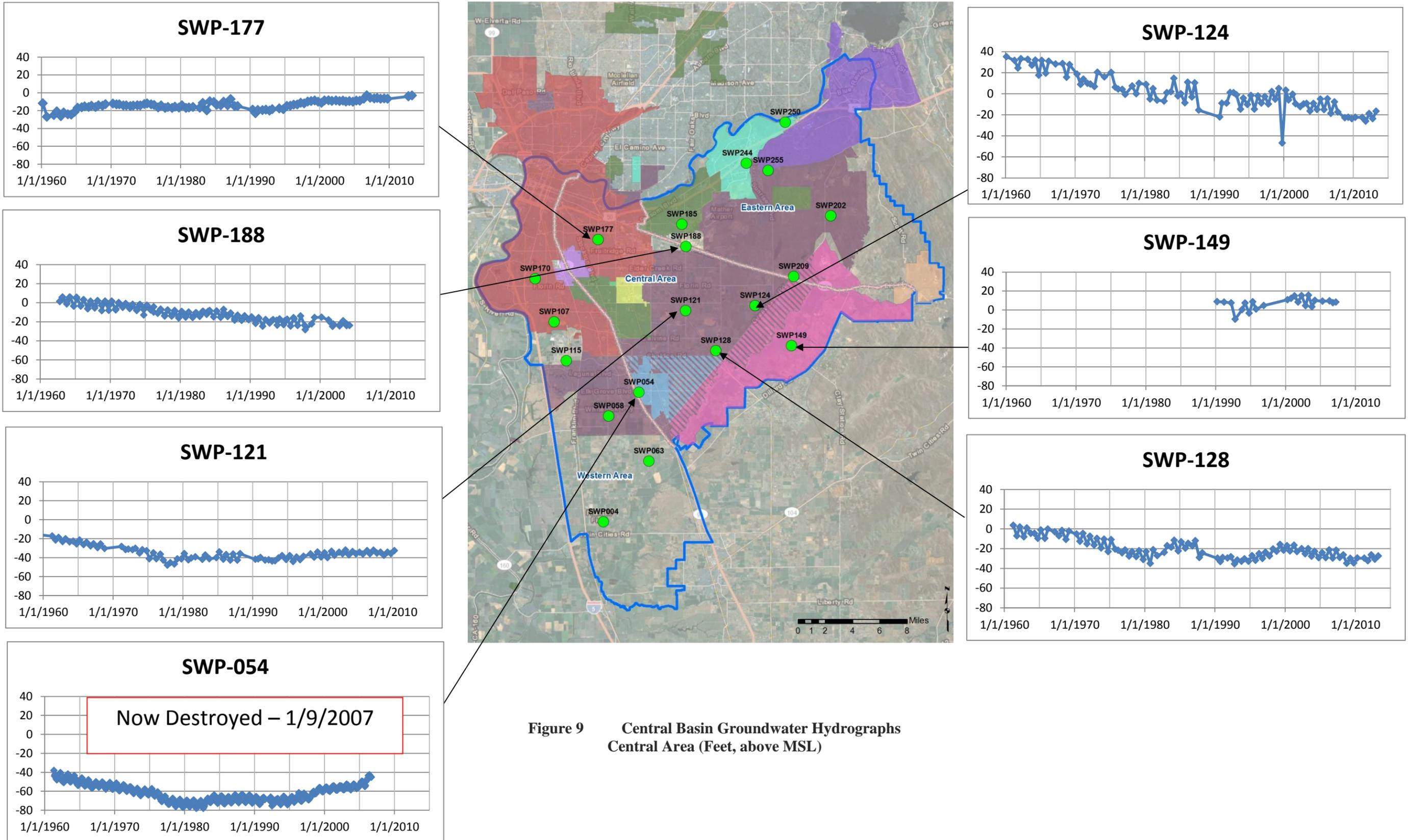
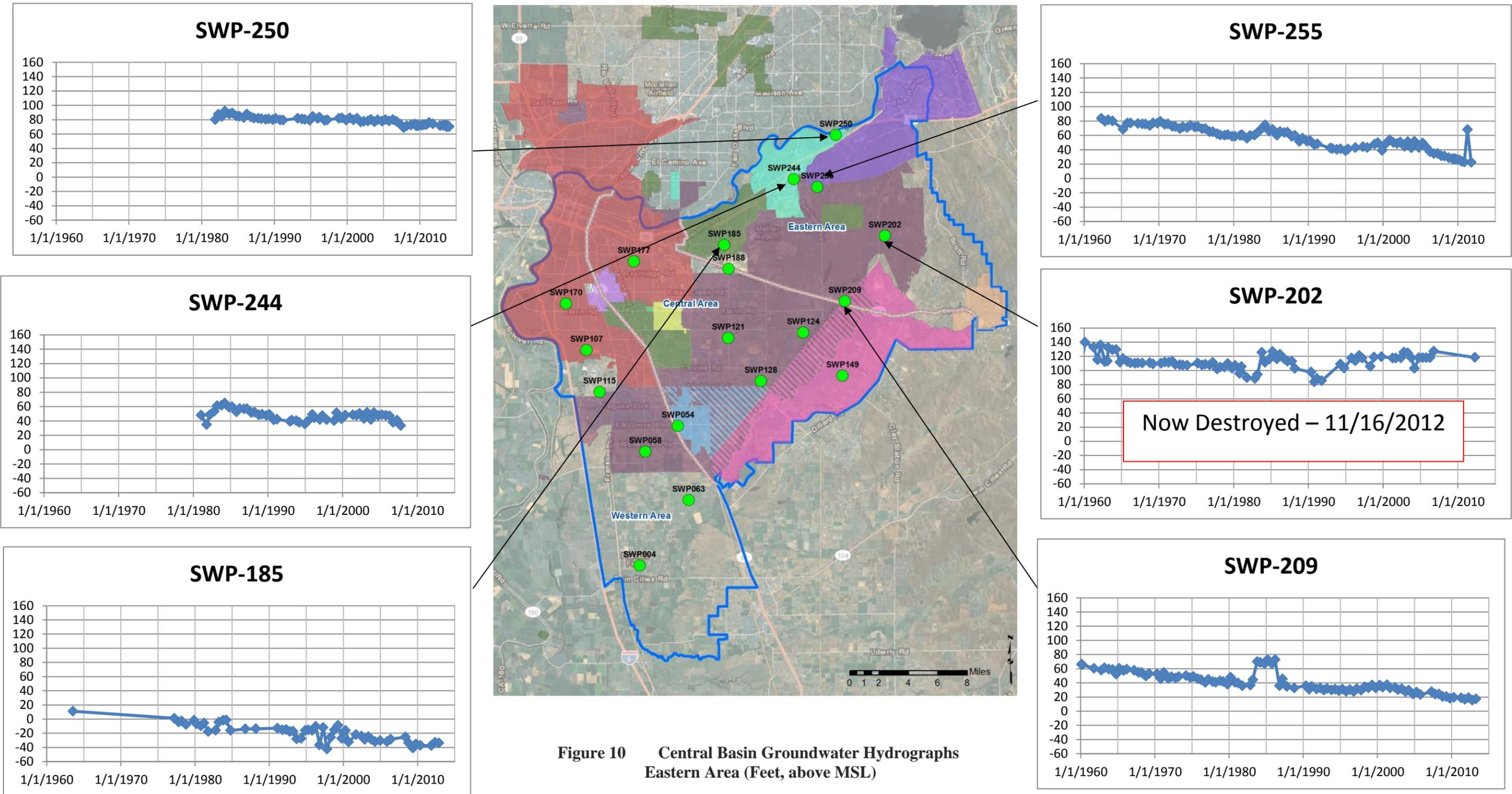


Figure 8 Central Basin Groundwater Hydrographs Western Area (Feet, above MSL)

Note: Groundwater hydrograph elevations are based on the NAVD88 datum



Note: Groundwater hydrograph elevations are based on the NAVD88 datum



Note: Groundwater hydrograph elevations are based on the NAVD88 datum

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. Historic 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 land surface subsidence from groundwater extraction in the Central Basin appears to be remote.

While no land subsidence study has been conducted in the Central Basin, there were some studies conducted in 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.

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 is primarily from municipal wells operated by the various water purveyors in the basin. These data have been reported to the California Department of Public Health (CDPH) by each purveyor and downloaded from the CDPH website for this report⁵. Numerous wells with water quality data were not included in this report due to the lack of ability to match CDPH well identification numbers with purveyor wells. It is recommended to have agencies provide CDPH well identification numbers in the future for more comprehensive mapping and analysis. CDPH does not provide well location information in their datasets.

⁵ Water quality data for 2012 provided from the California Department of Public Health Water through the Quality Analyses Data and Download Page. See <http://www.cdph.ca.gov/certlic/drinkingwater/Pages/EDTlibrary.aspx> 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 2012 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 2012 (Figure 11), nearly all municipal wells in the basin meet recommended SMCL for TDS, with only two wells out of 63 (3%) 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 CDPH when a new well is constructed. Both iron and manganese concentration is 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 12 and Figure 13. Iron concentrations in these wells range from non-detect to 941 $\mu\text{g/L}$, and 11 out of 72 wells (15%) exceed the secondary standard. Manganese concentrations range from 0 $\mu\text{g/L}$ to 597 $\mu\text{g/L}$, and 30 out of 72 wells (42%) 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.

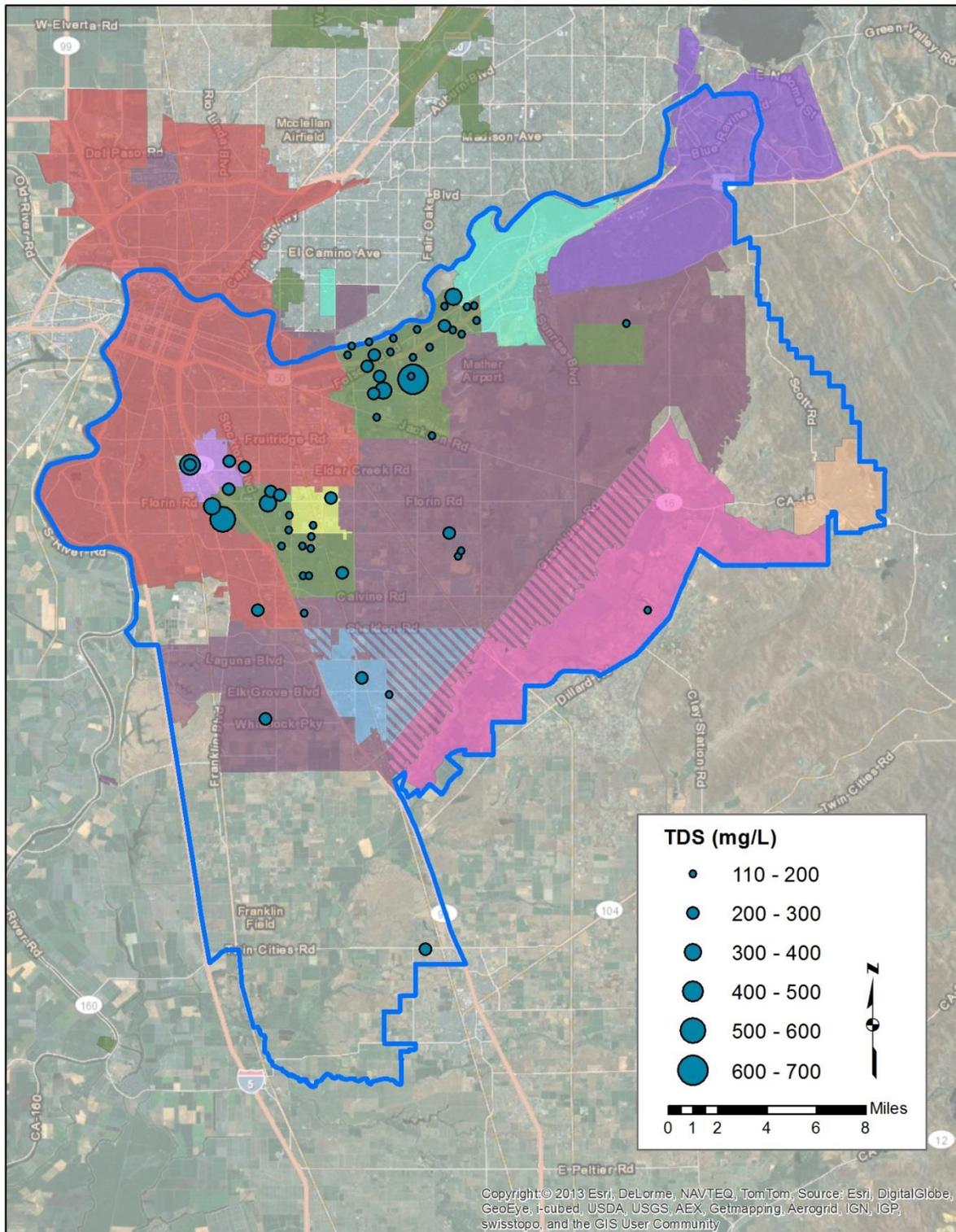


Figure 11 TDS Concentration in Public Supply Wells in the Central Basin (2012)

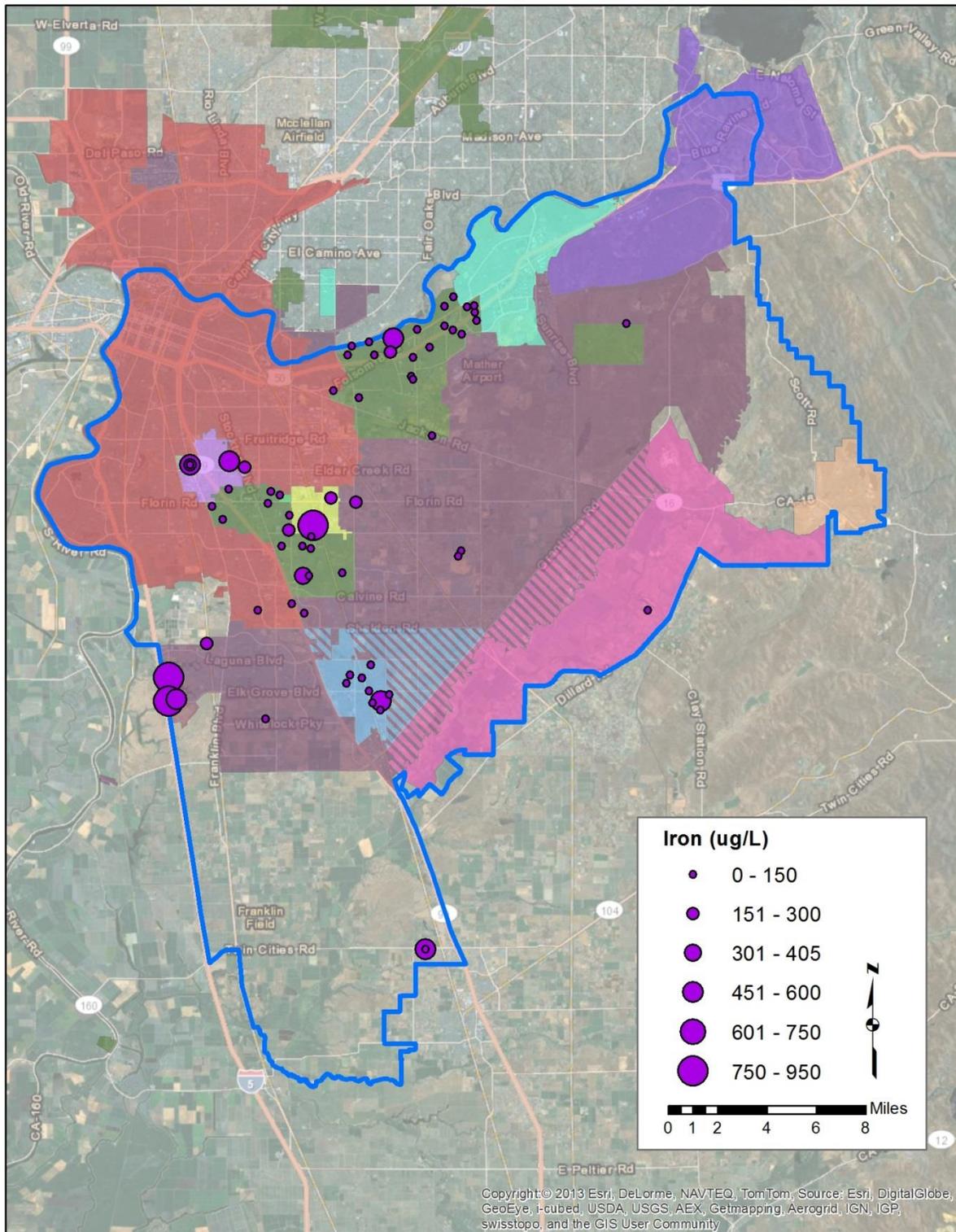


Figure 12 Iron Concentration in Public Supply Wells in the Central Basin (2012)

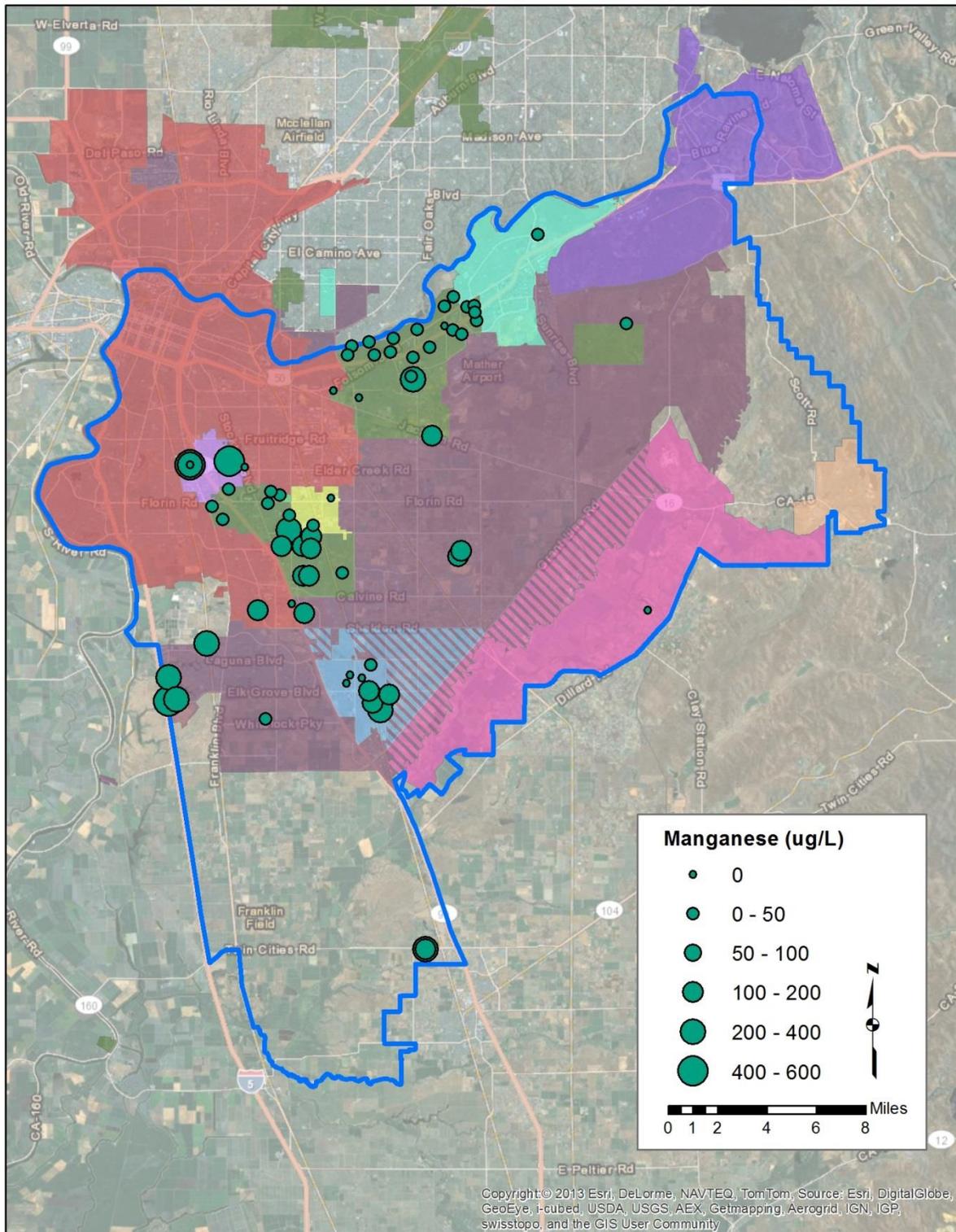


Figure 13 Manganese Concentration in Public Supply Wells in the Central Basin (2012)

- ***Nitrate (NO₃)***

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. CDPH has set a Primary Drinking Water 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 14 shows the nitrate concentration sampled in 2012 for public water supply wells in the Central Basin. All wells recorded nitrate values below the MCL, and 50 of the 181 wells (28%) 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***

CDPH's MCL for hexavalent chromium became effective on July 1, 2014 at 10 µg/l for public water systems. All 19 wells recorded values below the proposed MCL during 2012, as shown in Figure 15.

- ***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. CDPH 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 16 shows that most of the public water supply wells sampled in 2012 have arsenic concentrations below 10 µg/L. There are 11 out of 67 wells (16%) that exceed the MCL, with the highest concentration recorded at 53 µg/L. Several SCWA wells located west of Highway 99 have been phased out of production because arsenic concentrations are higher than 10 µg/L. These have been shallower wells developed in the Laguna Formation.

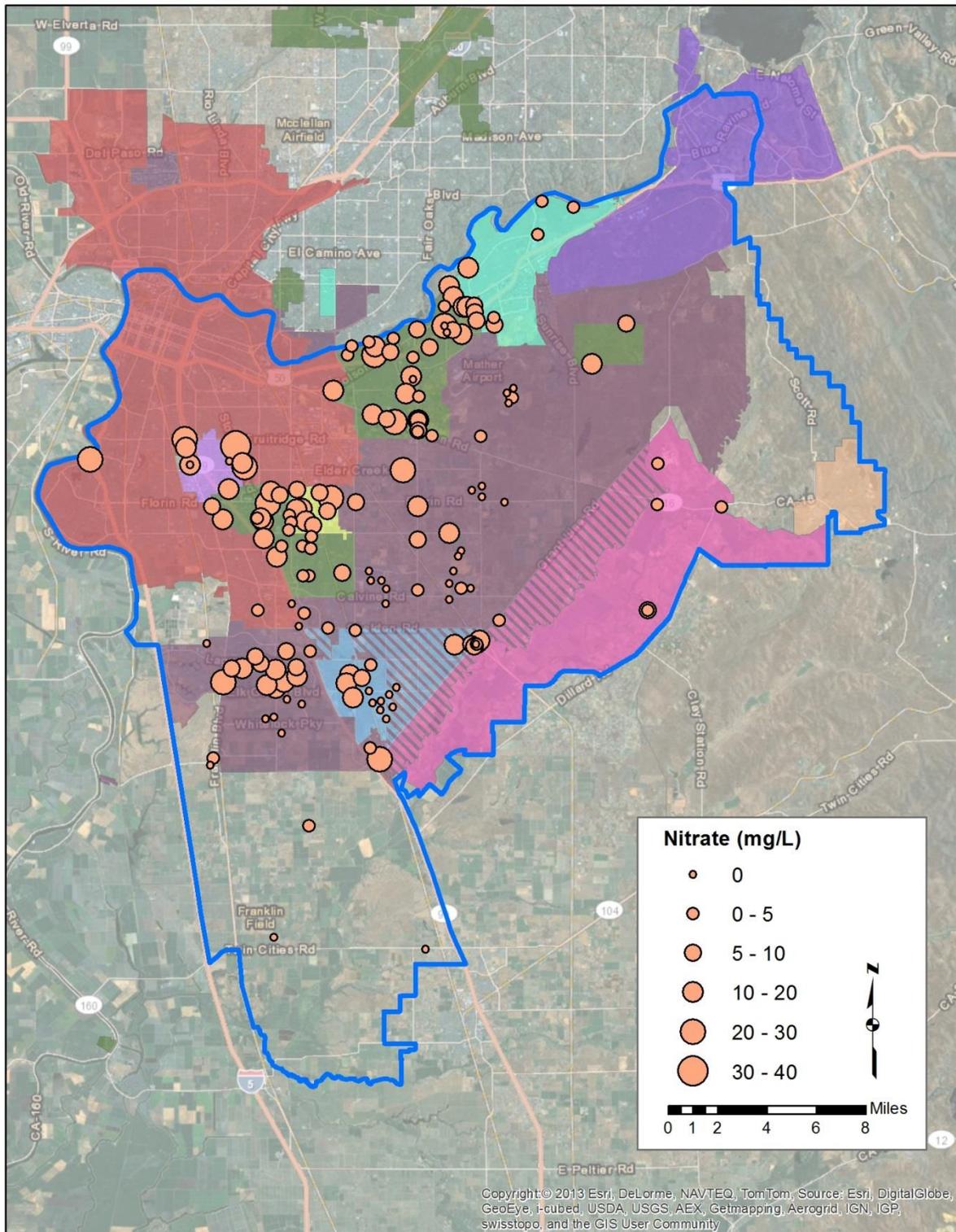


Figure 14 Nitrate Concentration in Public Supply Wells in the Central Basin (2012)

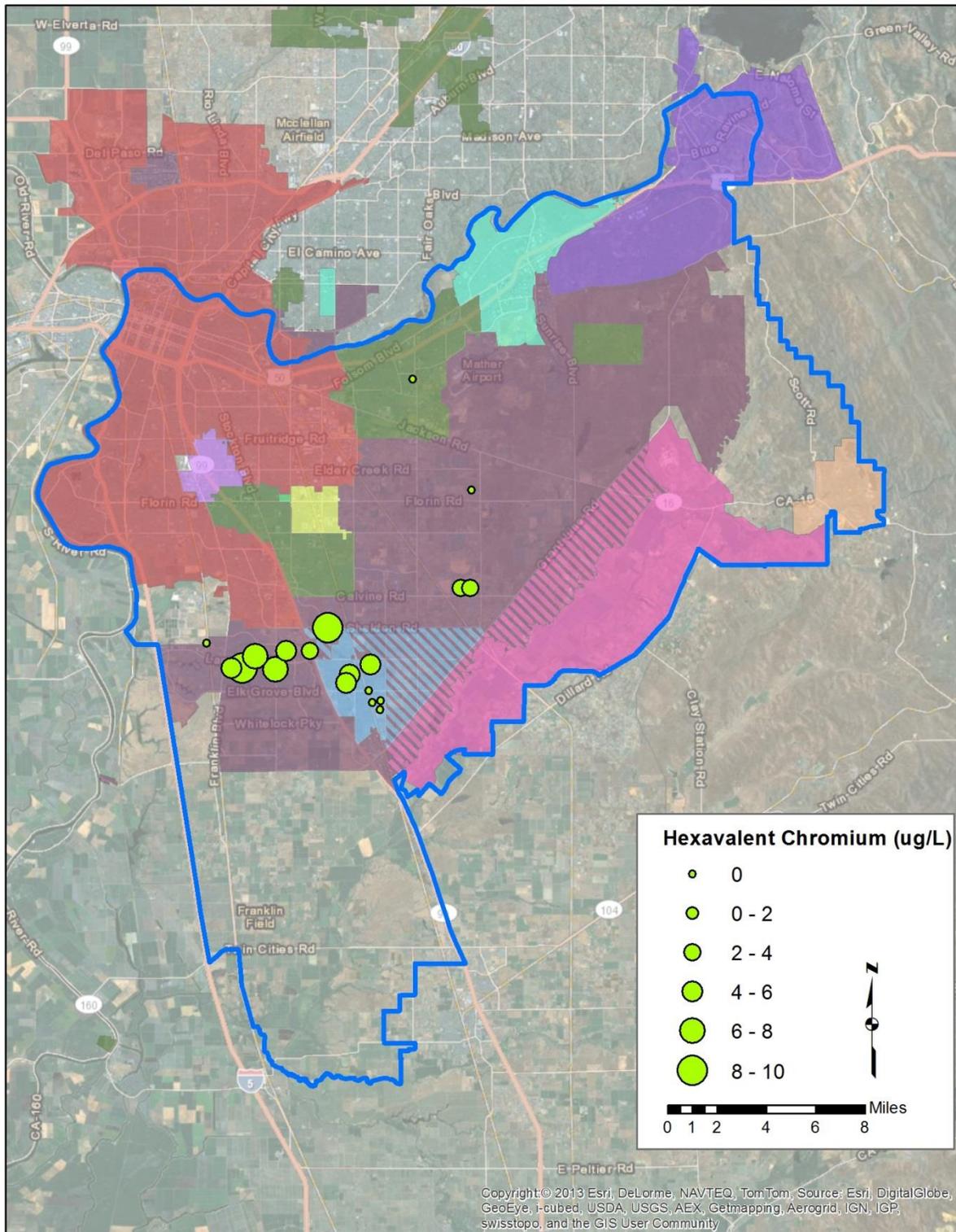


Figure 15 Hexavalent Chromium Concentration in Public Supply Wells in the Central Basin (2012)

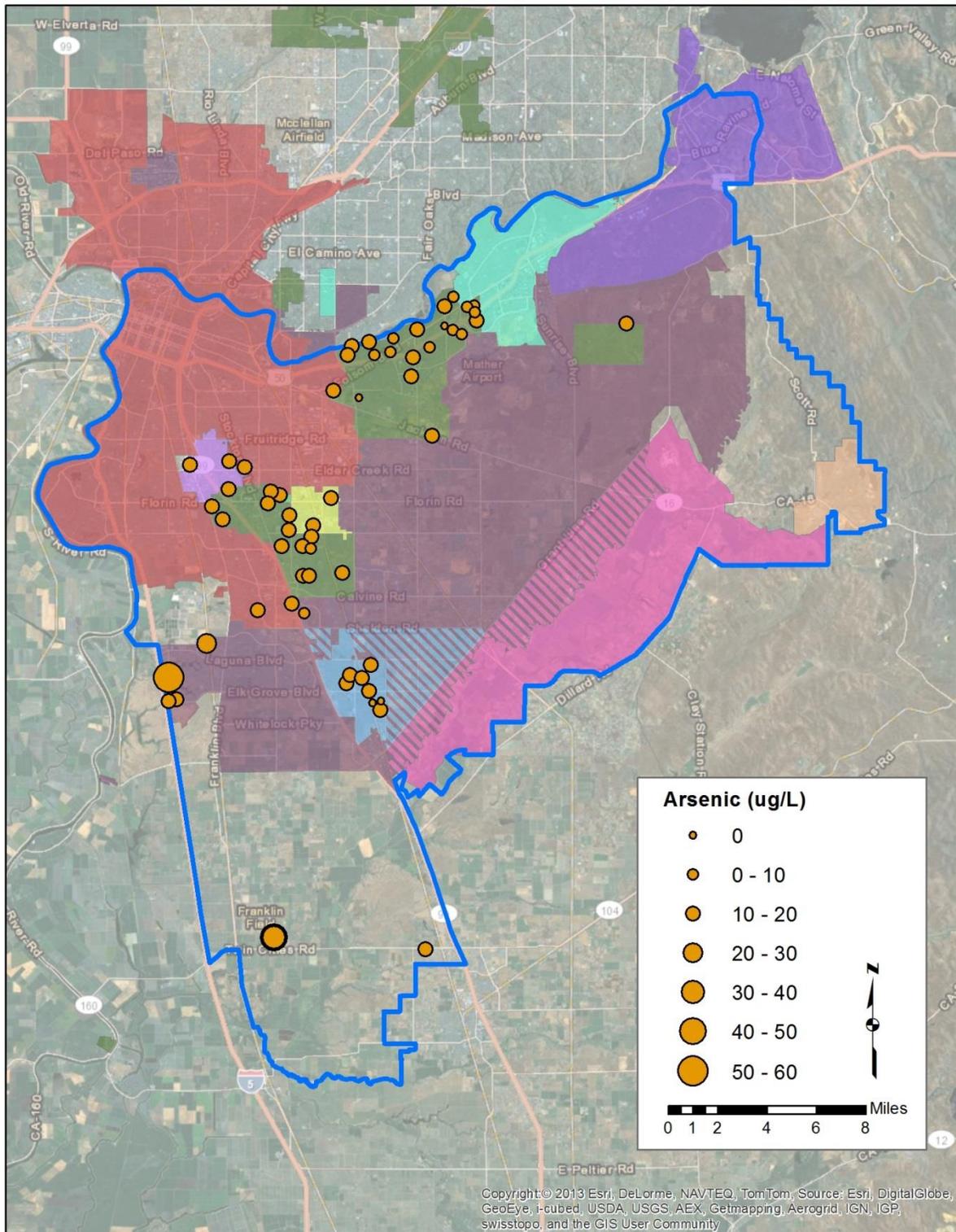


Figure 16 Arsenic Concentration in Public Supply Wells in the Central Basin (2012)

- ***Volatile Organic Compounds (VOC)***

Several sources of VOCs currently exist within the basin; these include old landfills, wrecking yards, military bases, and research and development facilities. 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), carbon tetrachloride, n-nitrosodimethylamine (NDMA), and perchlorate. Any measurable trace of VOCs 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 provided by CDPH for 2012 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 Mather Field, Aerojet, Boeing (the Inactive Rancho Cordova Test Site or IRCTS), the former Army Depot, the former Southern Pacific and Western Pacific rail yards, as well as various landfills. The plumes of primary concern are those involving historical activities at Mather Field, Aerojet/Boeing, and Kiefer Landfill. The most recent mapping of the major plumes was conducted using data from 2007 and is shown in Figure 17. 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”.

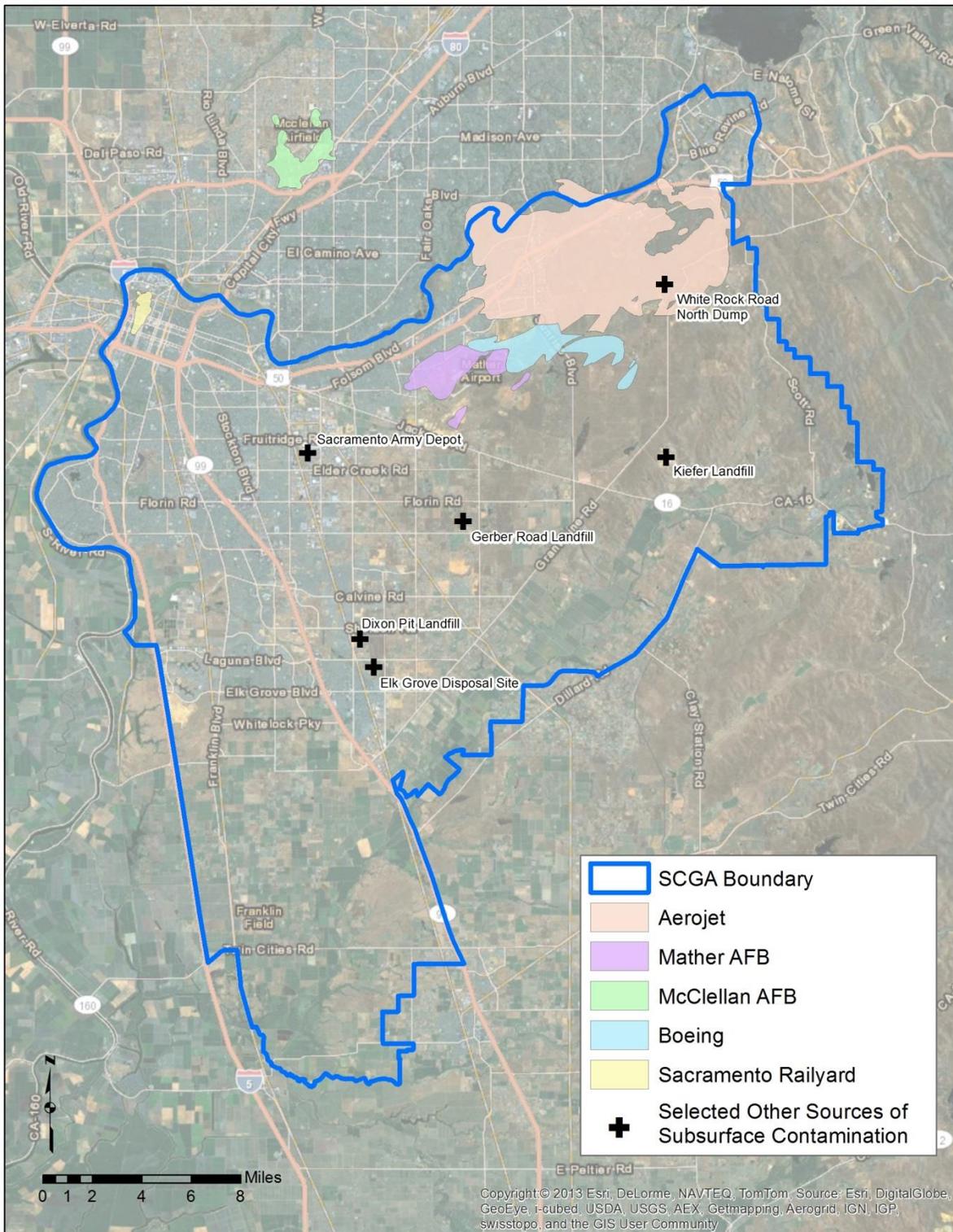


Figure 17 Delineation of Major Plumes, as of 2007

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) Completion of HydroDMS, 3) Well Protection Plan, 4) Agricultural/Agriculture Residential Water Conservation, 5) Control of the Mitigation and Remediation of Contaminated Groundwater, 6) CASGEM, and (7) Groundwater Banking.

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).
- Continuing to develop relationships with adjacent groundwater management entities, federal, state, and local regulatory agencies, and responsible parties for groundwater cleanup programs.
- Staff meeting on a regular basis with the Sacramento Groundwater Authority (North Basin) and the South Area Water Council (South Basin).

Update and Enhancement of HydroDMS

The HydroDMS is SCGA's web-based data management system. In 2011, the HydroDMS was updated in order to have a more robust tool that incorporates groundwater data from the area north of the American River which is managed by SGA. Access to data from across the river is important when conducting regional analyses. The update includes unique access privileges to data in the two regions so that stakeholders within SCGA or within SGA have appropriate levels of access to view, modify, or add data.

Additionally, SCGA began a comprehensive update of the data in the HydroDMS in 2012 to bring the production data up to date.

Well Protection Plan

As defined in the GMP, the Central Basin WPP is a program designed to protect private domestic and agricultural well owners from being damaged as a result of increased groundwater pumping necessary to support future growth in the Central Basin.

Because of the significant challenges associated with establishing a well protection fee during the current housing market downturn, the Board decided at their January 12, 2011 meeting to postpone work on the WPP “until such time as it is practical to proceed.” As the housing market improves, discussions will occur on the status of the WPP effort.

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 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 to best 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 Best Management Practices 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 Best Management Practices (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 are in planning and will take place at Soil Born Farms.

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 17. 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 update on their respective cleanup activities.

Kiefer Landfill

On January 12th 2011, Keith Goodrich and Eric Vanderbilt (Sacramento County Department of Waste Management and Recycling) provided an update on groundwater remediation efforts at Kiefer Landfill. Mr. Vanderbilt noted that Sacramento County began operation of Kiefer Landfill in 1967, that it currently occupies 302 acres with an ultimate design area of 660 acres, and that volatile organic compound (VOC) contamination of local groundwater was first detected in 1987. Mr. Vanderbilt stated that Kiefer Landfill sits atop a valley alluvium containing three water bearing zones organized into an upper Zone A (top of zone 30 ft. MSL), middle Zone B (top of zone 0 to -50 ft. MSL), and lower Zone C (top of zone -150 to -200 ft. MSL). Mr. Vanderbilt further detailed that 90% of the contamination was contained in Zone A while essentially no contamination is found in Zone C which is also the primary source from which drinking water is drawn in the region. Mr. Vanderbilt reported that, during 2010, in the most impacted areas of Zone A the total VOC levels were less than 20 parts per billion (ppb), while in Zone B the VOC levels were less than 5 ppb with 5 ppb representing the drinking water standard for the most commonly detected VOCs.

Mr. Vanderbilt provided an estimate of the total VOC contamination for Zone A that showed a decline from 663 lbs. in 1995, to 118 lbs. in 2009, and that over the same period for Zone B, the VOC totals went from 54lbs to 23 lbs. Mr. Vanderbilt described the remediation operations as consisting of 14 groundwater extraction wells, pumped to a central treatment plant where the VOCs are stripped then discharged to Deer Creek at a rate of 1,000 gallons per minute (gpm). The remediation project has been in operation for 15 years and will continue until the Regional Water Quality Control Board approves modification. Mr. Vanderbilt stated that the County will begin implementation of biological remediation techniques through the injection of a biological agent into the groundwater which will assist in the breakdown of contaminants before extraction and treatment. Mr. Vanderbilt announced that the contaminated groundwater is under hydraulic control and that no downstream users have been impacted.

Mather Field

On May 11th 2011, Doug Fortun, Environmental Coordinator for United States Air Force (USAF) at Mather Field, and William Hughes, ASE Inc., provided an update on groundwater remediation efforts at the former Mather Air Force Base. Mr. Fortun began the presentation by identifying the Air Force Real Property Agency (AFRPA) as the entity responsible for environmental clean-up at Mather Field. Mr. Fortun then stated that the investigation of groundwater contamination began in 1982 with the sampling of wells for trichloroethylene (TCE) and that remediation of that contamination commenced in 1994. By the end of 2010 there had been a total of ten billion gallons of groundwater treated and 4,000 pounds of solvents removed. Mr. Fortun added that this represented a long-term average pumping rate of 1,600 gallons per minute (gpm) with all but 100 gpm re-injected back into the aquifer. Mr. Hughes also mentioned that perchlorate (PCE) contamination was present at a slightly deeper aquifer level, and having originated from the Inactive Rancho Cordova Test Site. Mr. Hughes then discussed the four identified contaminant plumes underlying Mather: Main Base/SAC Area Plume, Site 7 Plume, Aircraft Control and Warning (AC&W) Plume, and the Northeast Plume.

Aerojet

While SCGA did not receive an update on conditions at Aerojet in 2011/2012, RWQCB staff presented on November 10, 2010, and SCGA plans to invite Aerojet to provide additional updates in the future.

- **Regional Groundwater Contamination Particle Tracking Modeling**

In September 2010 the Authority joined with SGA in an effort to examine the effectiveness of remediation activities in the region. The original study was initiated by SGA in 2008 and was funded through a Local Groundwater Assistance (LGA) grant authorized by DWR.

To accomplish this item, a modeling simulation was performed using the Sacramento Area Integrated Water Resource Model (SacIWRM), formerly known as the SacIGSM. Because of the nature of the model, the simulation will not attempt to characterize contaminant transport of known plumes; rather, it provides a conservative estimate as to the potential pathway of contaminant particles under current and future planned pumping patterns in the aquifer system over a long period of time. The simulation will not take into consideration the effects of dilution, dispersion, or soil absorption. Additionally, the simulation does not consider future potential modifications to remediation efforts that may be required in the event the present system is deemed ineffective. The findings of this analysis are summarized below for plumes at Aerojet, Mather/Boeing, and the former Sacramento Union Pacific Railyard.

The simulation results show that 100% of the Aerojet Core Plume (defined as perchlorate above 4 ppb) was captured for the whole simulation period. However, 4% of the particles for the Aerojet Detect Level Plume (above the detection level) escaped to the north of American River within 5 years. Most of these particles that escaped were at the leading edge of the plume and were already at the north of the American River. The percent of particles escaped increases to 5% after 50 years and remains the same for the rest of the simulation. This is a conservative simulation that should be considered together with the localized studies performed specific to the site, including monitoring of the GET facilities.

For the Mather Plume, the simulation results show that five percent of the particles escaped the plume boundary after 5 years. This percent increased gradually during the simulation period and stabilized at 20% after 100 years. None of the particles from the Boeing Plume escaped the plume boundary for the first 10-15 years of the simulation. Seven percent of the particles escaped the boundary after 15 years; this value remained constant for the remainder of the simulation. Discussions were held to share the results with those overseeing remediation operations at Mather, including a meeting on June 30, 2011. These discussions recognized the extensive monitoring performed at Mather and the ability of the remediation operations to be altered should the monitoring indicate that contaminants are escaping off-site. The discussion also highlighted possibilities of utilizing data from the regional groundwater model to improve the accuracy of more detailed site models and the need for coordination between Sacramento County and Mather with regards to development that could result in new production or the loss of monitoring facilities. This is a conservative simulation that should be considered together with the localized studies performed specific to the site, including monitoring of remediation and purveyor wells.

All of the particles from the Sacramento Railyard Plume remained south of the American River for the first 20-25 years of the simulation. Four percent (1 particle) of the particles escaped to the north of American River after 25 years. The percent of escaping particles increased to 12% (3 particles) after 50 years and remained constant after that. This is a conservative simulation that should be considered together with the localized studies performed specific to the site.

Again, the simulation did not attempt to characterize contaminant transport of known plumes, but rather provided a conservative estimate as to the potential pathway of contaminant particles under current and future planned pumping patterns in the aquifer system over a long period of time. The results indicate the need to continue remediation and monitoring efforts by the responsible parties and regulators. The Authority will continue to monitor these activities.

CASGEM

On November 4, 2009 the State Legislature amended the Water Code with SBx7-6, which mandates a statewide groundwater elevation monitoring program to track seasonal and long-term

trends in groundwater elevations in California's groundwater basins. To achieve that goal, the amended Water Code establishes a structure for collaboration between local monitoring entities and DWR to collect and report groundwater elevation data.

In accordance with this legislation, DWR developed the California Statewide Groundwater Elevation Monitoring (CASGEM) program. The intent of the CASGEM program is to establish a permanent, locally-managed program of regular and systematic monitoring in all of California's alluvial groundwater basins. The CASGEM program will rely and build on the many, established local long-term groundwater monitoring and management programs. DWR's role is to coordinate the CASGEM program, to work cooperatively with local entities, and to maintain the collected elevation data in a readily and widely available public database. DWR will also continue to monitor its current network of groundwater monitoring as funding allows.

On December 16, 2011 the Authority submitted a groundwater monitoring plan that met all requirements set forth in the CASGEM guidelines. In advance of the January 1, 2012 deadline, the Authority submitted their first monitoring report under the program on December 28, 2011. DWR provided notification in January 2012 that the Authority had been designated as the monitoring entity in the South American Subbasin (as defined in Bulletin 118, roughly equivalent to the Central Basin). The Authority has continued monitoring and reporting as required by the program.

Groundwater Banking

The Authority began a process to develop a Framework for groundwater recharge in the Central Basin. Presentations on groundwater banking were provided by representatives of Kennedy/Jenks (March 14, 2012) and SGA (May 9, 2012). This presentation by Rob Swartz of SGA included information on SGA's Framework and discussions of the similarities and differences between conditions in SGA compared to SCGA.

To date (May 2012), the following agencies and/or programs have indicated an interest in groundwater banking operations within or in close proximity to the Central Basin that could have an effect on basin management and operations described in the GMP.

- Sacramento Regional County Sanitation District (South County Agriculture Project);
- Rancho Murieta Community Services District/Omochumne-Hartnell Water District (project currently funded by a Proposition 84 grant);
- Sacramento County Water Agency (expansion of current Zone 40 conjunctive use program);
- City of Folsom (Water System Optimization Review Program);
- East Bay Municipal Utility District (2040 Water Plan);
- The Nature Conservancy; and
- South Basin Groundwater Management Plan

Additional presentations on groundwater banking were provided by Sacramento Regional County Sanitation District and RMC Water and Environment (September 12, 2012) and by East Bay Municipal Utilities District (November 14, 2012) to provide background on various facets of groundwater recharge. The Nature Conservancy provided a presentation after the 2011-2012 reporting period on Multi-Benefit Conjunctive Use Concepts (March 13, 2013).

CHAPTER 4 CONCLUSIONS AND RECOMMENDATIONS

This section summarizes the state of the basin and provides recommendations for basin management activities for the 2013/2014 reporting period.

Conclusions

Average groundwater pumping (including pumping for groundwater remediation) over the two-year reporting period was approximately 243,100 acre-feet per year (see Table 4).

The continued enhancement and update of the HydroDMS maintains this 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 Hydro DMS will include features that will enable the Authority to implement the Monitoring Action for BMO No.2.

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.

During the reporting period, the Authority postponed work on the Central Basin WPP "until such time as it is practical to proceed." A solid foundation has been laid and a strategy developed that should guarantee the success of the program, should the housing market improve sufficiently to warrant implementation.

Recommendations

During 2013/2014 the Authority will review and prioritize activities related to the various action items described in the GMP. 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/potential projects include:

- **Develop a Groundwater Accounting Program.**

Several preliminary discussions have occurred amongst interested parties regarding the prospects of groundwater banking in the Central Basin. These include the Sacramento County Water Agency, the City of Folsom, and the East Bay Municipal Utility District. 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. 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 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 abandoned wells with appropriate alternate wells. Well 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 files 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 Hydro DMS at a high level of reliability and credibility. Future enhancements to the HydroDMS include development of threshold levels for BMO 2 and incorporation of those thresholds into the HydroDMS to provide a visual representation of compliance across the Central Basin. This effort is being advanced with the assistance of a Local Groundwater Assistance Fund Grant (commonly referred to as an AB303 Grant) from DWR. 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 issues 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, Florin County Water District, and Fruitridge Vista Water Company, parks, cemeteries, and golf courses. The lack of information on these entities resulted in the use of estimations in total production shown in Table 4.

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

- **Update the GMP.** 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. As more information about the basin is acquired and as groundwater demands and/or basin operations change, there will be a need to revise and update the GMP. The GMP indicated that the entire document will be reevaluated within five years of adoption. With adoption of the GMP in 2006, the time to reevaluate and potentially update the document is now. Staff will closely monitor activities that may necessitate an amendment or update to the GMP.
- **Sacramento Area Integrated Water Resource Model (SacIWRM) Hydrologic Model.** The SacIWRM model has been widely used in the region for water supply planning and surface water and groundwater impact analyses. The model has recently been reviewed by the Regional Water Authority along with the Sacramento Regional Model, developed for the City of Roseville. The review results are pending. Although, there may be discussions on converting the database from the SacIWRM to a different platform, there are currently no plans and/or actions to make this change. While discussions have continued over the “best”

modeling approach in the Sacramento region, it remains critical to maintain a robust integrated hydrologic modeling tool. Since the current tool is the SacIWRM, it is critical to continue updating the data and nurturing this tool, until other plans are defined in more concrete form, including the funding mechanisms to develop any new tools. Staff will work to keep the model updated and to ensure that updates are beneficial to future modeling needs and/or modeling platforms.

- **Agricultural-Residential Water Conservation.** The sub-committee 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 the workshops planned for the Central Basin, which will take place at Soil Born Farms.

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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
COMPONENT NO. 1: STAKEHOLDER INVOLVEMENT		
<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 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. 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 Table A-2 . 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 on the GMP	On-going	The GMP and Board meeting minutes are posted on the Authority’s website www.scgah2o.org . The GMP is also posted on the Water Forum’s website www.waterforum.org .
<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 http://www.scgah2o.org .
III. Meet with representatives from the SGA, SSCAWA, TNC, and the Water Forum Successor Effort	On-going	Periodically attend meetings of the SGA, SAWC, and the Water Forum Successor Effort. 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 groundwater management plan. An agricultural and agricultural residential water conservation sub-committee was established on 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.
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	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.
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"> The Authority continues to coordinate with Sacramento Regional County Sanitation District, Rancho Murrieta CSD, Omochumne-Hartnell WD, EBMUD, SCWA, the City of Folsom, SAWC, TNC, and private property owners in identifying/evaluating potential groundwater recharge opportunities in the Central Basin. The Authority invited RWQCB staff and responsible parties from contaminated sites to provide an update on progress of their groundwater cleanup effort.
3. Using Advisory Committees		
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	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.
4. Developing Relationship with Local, State and Federal Agencies		
I. Continue to develop working relationship with local, state, and federal regulatory agencies.	On-going	<ul style="list-style-type: none"> The Authority will continue to work with local agencies such as 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. The Authority has worked with DWR to complete the HydroDMS project and to further develop BMO 2 through Local Groundwater Assistance Fund grants. Staff will continue to develop a working relationship with State DWR regarding CASGEM and in pursuing any future grant opportunities. The Authority will continue to work with the RWQCB and the Air Force on issues related to groundwater contamination at both Aerojet and Mather Field.
5. Pursuing Partnership Opportunities		
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"> The Authority was awarded \$200,000 AB303 grant in 2013 to further develop BMO 2, analyze sources of recharge, and develop a recharge map compliant with AB359.

COPONENT NO. 2: MONITORING PROGRAM		
1. Groundwater Elevation Monitoring		
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	On-going	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"> Identify the causes of a lack of recent data in several monitoring wells. Coordinate with local water supply purveyors to convert abandoned municipal wells into groundwater monitoring wells for the Authority. Coordinate with USGS, SMUD to incorporate some of their wells into the Authority’s monitoring network. Identify the need to construct new monitoring wells.
V. Assess annually groundwater elevation trends and conditions based on the monitoring well network	On-going	In conjunction with 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 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 Biennial Basin Management Report, the HydroDMS will provide a tool for making this assessment.
2. Groundwater Quality Monitoring		
I. Coordinate with cooperating agencies to verify that uniform protocols are used when collecting water quality data.	Complete	Each of the member agencies follow CDPH protocols in the collection of water quality data. The primary source for water quality data in the HydroDMS is the California CDPH 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 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 CDPH database, making it infeasible to combine the two databases in to 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 CDPH database.
IV.	Assess annually the adequacy of the groundwater quality monitoring well network	On-going	To be assessed through the preparation of future Basin Management Reports.
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 CDPH database, making it infeasible to combine the two databases in to one unified metadata table.
3. Land Surface Elevation Monitoring			
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	Survey data from benchmarks in Arden Arcade area indicate that subsidence is not a significant concern at this time. 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 there are other suitable benchmark locations exist in the area to aid in analysis of potential land surface subsidence.	Deferred	Surveys data from benchmarks in Arden Arcade area indicate that subsidence is not a significant concern at this time. Because of limited staff time this item is being deferred.
4. Surface Water Groundwater Interaction Monitoring			
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 (RMC, 2011)</i>
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.	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 http://www.sacriver.org/aboutwatershed/reportcard . Authority staff will continue to research to find out if there is any available data

<p>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.</p>		<p>for the Cosumnes River. The latest available data can be found on the following website: http://watershed.ucdavis.edu/research/cosumnes.html</p>
<p>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.</p>	<p>On-going</p>	<p>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.</p>
<p>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.</p>	<p>On-going</p>	<p>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. Identify and review any data available for the Cosumnes and Sacramento Rivers. Additional study will be performed through a Local Groundwater Assistance Fund 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.</p>
<p>V. Coordinate with SGA, to analyze data obtained from recently constructed monitoring wells on the CSUS campus to better understand the relationship between groundwater basin and surface water flows at that location.</p>	<p>On-going</p>	<p>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 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.</p>
<p>5. Protocols for Collection of Groundwater Data</p>		
<p>I. The governance body will develop within one year a Standard Operating Procedure (SOP) for collection of water level data</p>	<p>Complete</p>	<p>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.</p>
<p>II. Provide cooperating agencies with guidelines developed by CDPH for the collection, pretreatment, storage, and transportation of water quality samples (CDPH, 1995).</p>	<p>Complete</p>	<p>Water purveyors within the Central Basin have been provided a copy of the guidelines developed by CDPH for the collection, pretreatment, storage, and transport of water quality samples.</p>
<p>III. Provide training on implementing the SOPs.</p>	<p>Deferred</p>	<p>Authority staff will investigate to see if the training is necessary. If yes, who is responsible for collecting the data? This item is deferred.</p>
<p>6. Data Management System</p>		
<p>I. Continue to update the HydroDMS with current water purveyor data</p>	<p>On-going</p>	<p>The HydroDMS contains data through 2012. Updates will continue in the future to keep the HydroDMS current.</p>
<p>II. Make recommendations to RMC on utilities to add to the HydroDMS to increase its functionality</p>	<p>On-going</p>	<p>Will be coordinated as part of the HydroDMS maintenance. Incorporation of a tool to assist in monitoring BMO 2 is planned as part of a Local Groundwater Assistance Fund grant from DWR.</p>

COMPONENT NO. 3: GROUNDWATER RESOURCE PROTECTION		
1. Well Construction Policies		
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 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 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.
2. Well Abandonment and Destruction Policies		
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 HydroDMS population. 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	Deferred	This item is deferred.

<p>properly destroyed. It should be noted that EMD has no jurisdiction over gas wells.</p>		
<p>3. Well Protection Measures</p>		
<p>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.</p>	<p>Complete</p>	<p>The information is available online at: http://swap.ice.ucdavis.edu/TSinfo/TSsystemc.asp?myCounty=34</p>
<p>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.</p>	<p>Deferred</p>	<p>This item is deferred.</p>
<p>4. Protection of Recharge Areas</p>		
<p>I. Continue to work with mining companies, TNC, and SSCAWA to explore the possibilities for enhancing recharge into the Central Basin.</p>	<p>Deferred</p>	<p>This item is deferred.</p>
<p>5. Control of the Migration and Remediation of Contaminated Groundwater</p>		
<p>I. Coordinate with appropriate regulatory agencies (EMD, DTSC, EPA, RWQCB, and CDPH) and known responsible parties (such as Aerojet, the Air Force, and Kiefer Landfill) to develop a network of monitoring wells to act as sentry wells for public supply wells.</p>	<p>On-going</p>	<p>The Authority received updates at Board meeting on groundwater remediation efforts from:</p> <ul style="list-style-type: none"> • Mather Field on May 11, 2011 and • Kiefer Landfill on January 12, 2011 <p>The Authority will continue such coordination.</p>
<p>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.</p>	<p>Deferred</p>	<p>This item is deferred.</p>
<p>III. Use the information on mapped contaminant plumes and LUST sites in developing groundwater extraction patterns and in locating future production or monitoring wells.</p>	<p>Complete</p>	<p>In 2010, SCGA, in conjunction with SGA, conducted a regional groundwater contamination particle tracking model. 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.</p>
<p>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.</p>	<p>Deferred</p>	<p>This item is deferred.</p>

6. Control of Saline Water Intrusion		
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 in future Basin Management Reports as more temporal data becomes available.
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.
COMPONENT NO. 4: GROUNDWATER SUSTAINABILITY		
1. Conjunctive Management Activities		
I. Continue to investigate conjunctive use opportunities within the Central Basin area. Groundwater users within the Central Basin will coordinate any recharge efforts.	On-going	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. 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.
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)	On-going	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 at by SCWA at the Triangle Rock quarry on Jackson Highway and by OHWD along the Cosumnes River.
2. Demand Reduction		
I. Participate in RWA’s WEP to ensure that Central Basin	On-going	All water purveyor members of the Authority are also members of RWA.

<p>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>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>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 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>
<p>COMPONENT NO. 5: PLANNING INTEGRATION</p>		
<p>1. Existing Integrated Planning Efforts</p>		
<p>I. Integrated Groundwater and Surface Water Modeling</p>		
<p>a. Prepare and adopt a formal integrated water management plan in accordance with CWC § 10540 et seq. The plan will include, but not limited to, the elements listed above. 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"> • SCGA Board Members 	<ul style="list-style-type: none"> ◆ Maintain a clear member awareness of CSCGMP BMO's, implementation schedule, and key political issues. ◆ Keep members apprised of any impending breach of BMO "trigger point" monitoring levels. ◆ <i>Maintain a high level of involvement by stakeholders.</i> ◆ Production of a "State of the Basin" report. 	<ul style="list-style-type: none"> ◆ <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> ◆ A GMP is designed to be equitable for large and small stakeholders.(L&C:25) <ul style="list-style-type: none"> • Implementing a groundwater management program will help small stakeholders overcome the political and financial challenges of independent participation in (?). ◆ 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&C:25) <ul style="list-style-type: none"> • Funding will be more accessible if a GMP details a regional plan capable of producing broader, statewide benefits. • A groundwater management program may help investor-owned utilities demonstrate the need for rate increases. ◆ 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&C:25) 	<ul style="list-style-type: none"> ◆ Ongoing internal information sharing to full SCGA membership. ◆ Formation of inter-board member advisory committees. 	<ul style="list-style-type: none"> ◆ Hold regularly scheduled SCGA Board Member meetings. ◆ 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. ◆ Create and utilize DMS. ◆ <i>Board to discuss continuation of advisory committees that will provide guidance in the implementation of the GMP. (3-10)</i>
	<ul style="list-style-type: none"> ◆ <i>Regional planning integration. (3.2.5)</i> 	<ul style="list-style-type: none"> ◆ <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> 		<ul style="list-style-type: none"> ◆ IRWMP participation. ◆ <i>The basin governance body will encourage that all retail purveyors submit Urban Management Plans to DWR. (3-21)</i>

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
Political Partnerships				
<ul style="list-style-type: none"> • Regional partners within and adjacent to the Central Basin: • SGA • SSCAWA • TNC • San Joaquin Co. • RWA 	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 1 - Stakeholder Involvement (3.2.1):</i> <ul style="list-style-type: none"> • <i>Involving Other Agencies Within and Adjacent to the Central Basin (3.2.1.2)</i> ◆ <i>Expansion of a basin-wide conjunctive use program to achieve broader regional and statewide benefits. (3-10)</i> 	<ul style="list-style-type: none"> ◆ <i>The basin governance body is committed to facilitating arrangements at the local, state, and, federal levels. (3-10)</i> ◆ <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&C:25)</i> ◆ <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&C:26)</i> ◆ <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&C:25)</i> <ul style="list-style-type: none"> • <i>Funding will be more accessible if a GMP details a regional plan capable of producing broader, statewide benefits.</i> 	<ul style="list-style-type: none"> ◆ <i>Meet with representatives of SGA, SSCAWA, TNC, San Joaquin Co., CSCGF, WFSE. (3-9)</i> ◆ <i>Pursue partnership opportunities. (3.2.1.5)</i> ◆ <i>WFSE briefing.</i> ◆ <i>Participate in the implementation of the IRWMP.</i> ◆ <i>Utilize SCGA Website.</i> ◆ <i>Create and utilize DMS.</i> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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> ◆ <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> ◆ <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> ◆ <i>Promote partnerships that accomplish both local supply reliability and broader regional and statewide benefits. (3-11)</i> ◆ <i>Track grant opportunities to fund groundwater management activities and local water infrastructure projects. (3-11)</i> ◆ <i>Provide copies of GMP and subsequent annual reports to SGA, SSCAWA, TNC, San Joaquin Co. (3-9)</i>
	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 5 - Regional planning integration. (3.2.5):</i> <ul style="list-style-type: none"> • <i>Integrated Groundwater and Surface Modeling (3.2.5.1.4)</i> 	<ul style="list-style-type: none"> ◆ <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> ◆ <i>The IGSM forms the basis for the WFA and the Zone 40 WSMP environmental analyses. (3-22)</i> ◆ <i>The IGSM is a suitable tool to analyze the effects of local projects on regional groundwater conditions. (3-22)</i> 	<ul style="list-style-type: none"> ◆ <i>Preparation and adoption of a formal integrated water management plan (IWMP) in accordance with CWC § 10540 et seq. (3-22)</i> 	<ul style="list-style-type: none"> ◆ <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>

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
Technical Partnerships				
<ul style="list-style-type: none"> • SGA • SSCAWA • TNC • San Joaquin Co. • RWA • USGS • SMUD 	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 2 - Monitoring Program (3.2.2):</i> <ul style="list-style-type: none"> • <i>Groundwater elevation monitoring. (3.2.2.1)</i> ◆ <i>BMO No. 2: Maintain specific groundwater elevations within all areas of the basin consistent with the Water Forum "solution". (3-23)</i> 	<ul style="list-style-type: none"> ◆ <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> ◆ <i>A monitoring methodology to meet specific objectives requires a systematic, repeatable, and scientific approach. (4-1)</i> 	<ul style="list-style-type: none"> ◆ <i>Coordinate CSCGMP activities with adjacent groundwater management.</i> ◆ <i>Promote partnerships that accomplish both local supply reliability and broader regional and statewide benefits.</i> ◆ <i>Pursue partnership opportunities. (3.2.1.5)</i> ◆ <i>Involve other agencies within and adjacent to the Central Basin.(3.2.1.1)</i> ◆ <i>Develop a standard operating procedure for collecting water level data.</i> 	<ul style="list-style-type: none"> ◆ <i>Coordinate with DWR and others to identify an appropriate group of wells for monitoring. (3-12)</i> ◆ <i>Coordinate with DWR and other to ensure that selected wells are maintained as part of a long-term monitoring network. (3-12)</i> ◆ <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> ◆ <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> ◆ <i>Coordinate with USGS to determine the potential for integrating NAWQA wells into the SCWA and SGA monitoring network. (3-12)</i> ◆ <i>Track grant opportunities to fund groundwater management activities and local water infrastructure projects. (3-11)</i> ◆ <i>Participate in the implementation of the IRWMP.</i> ◆ <i>Create and utilize DMS.</i> ◆ <i>Utilize SCGA Website.</i> ◆ <i>Meet with representatives of SGA, SSCAWA, TNC, San Joaquin Co., CSCGF, WFSE.</i>

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Target Audience	Objectives	Messages	Strategies	Tactics
Technical Partnerships				
<ul style="list-style-type: none"> • SGA • SSCAWA • TNC • San Joaquin Co. • RWA • USGS • SMUD 	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 2 - Monitoring Program (3.2.2):</i> <ul style="list-style-type: none"> • <i>Land Surface Elevation Monitoring (3.2.2.3)</i> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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> ◆ <i>Subsidence should be measured and thought of as a long-term process. (4-5)</i> ◆ <i>The North and Central Basins should collaborate to gain a better understanding of subsidence. (4-5)</i> 	<ul style="list-style-type: none"> ◆ <i>Pursue additional actions to continue to monitor potential land surface subsidence especially in the Central Basin. (3-13)</i> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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>

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Target Audience	Objectives	Messages	Strategies	Tactics
Technical Partnerships				
<ul style="list-style-type: none"> • SGA • SSCAWA • TNC • San Joaquin Co. • RWA • USGS • SMUD 	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 2 - Monitoring Program (3.2.2):</i> <ul style="list-style-type: none"> ▪ <i>Surface Water/Groundwater Interaction Monitoring (3.2.2.4)</i> ◆ <i>BMO No. 4: Protect against any adverse impacts to surface water flows in the American Consumnes, and Sacramento rivers.</i> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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> ◆ <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> ◆ <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>

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Target Audience	Objectives	Messages	Strategies	Tactics
Technical Partnerships				
<ul style="list-style-type: none"> • SGA • SSCAWA • TNC • San Joaquin Co. • RWA • USGS • SMUD 	<ul style="list-style-type: none"> ◆ CSCGMP Program Component No. 2 - Monitoring Program (3.2.2): <ul style="list-style-type: none"> ▪ Groundwater Quality Monitoring (3.2.2.2) ◆ BMO No. 5: Water Quality Objectives 	<ul style="list-style-type: none"> ◆ 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) ◆ 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) ◆ 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) 	<ul style="list-style-type: none"> ◆ Identify appropriate set of water quality monitoring wells. 	<ul style="list-style-type: none"> ◆ Coordinate with cooperating agencies to verify that uniform protocols are being used when collecting water quality data. (3-12) ◆ 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) ◆ 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) ◆ Coordinate with DWR on the groundwater quality data they collect. (3-12)

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Target Audience	Objectives	Messages	Strategies	Tactics
Technical Partnerships				
<ul style="list-style-type: none"> • SGA • SSCAWA • TNC • San Joaquin Co. • RWA • USGS • SMUD • Sacramento County Environmental Management Department (EMD) 	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 3 - Groundwater resource protection:</i> <ul style="list-style-type: none"> • <i>Well Construction Policies (3.2.3.1)</i> 	<ul style="list-style-type: none"> ◆ <i>The basin governance body considers groundwater resource protection a critical component in maintaining a sustainable groundwater resource. (3-16)</i> ◆ <i>The Sacramento County Environmental Management Department (EMD) administers the well permitting program for Sacramento County. (3-16)</i> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> ◆ <i>Coordinate with other groundwater users in the Central Basin to provide guidance, as appropriate, on well construction. (3-16)</i>
	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 3 - Groundwater Resource Protection:</i> <ul style="list-style-type: none"> • <i>Well Abandonment and Deconstruction Policies. (3.2.3.2)</i> 	<ul style="list-style-type: none"> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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> ◆ <i>Meet with EMD to discuss ways to ensure that wells in the Central Basin are properly abandoned or destroyed. (3-17)</i>

PROJECT GOAL: Implementation of the CSCGMP.

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Target Audience	Objectives	Messages	Strategies	Tactics
Technical Partnerships				
<ul style="list-style-type: none"> • DHS 	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 3 - Groundwater Resource Protection:</i> <ul style="list-style-type: none"> ▪ <i>Wellhead Protection Measures (3.2.3.3)</i> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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"> ▪ <i>Delineation of capture zones around sources (wells).</i> ▪ <i>Inventory of PCAs within protection areas.</i> ▪ <i>Vulnerability analysis to identify the PCAs to which the source is most vulnerable.</i> 	<ul style="list-style-type: none"> ◆ <i>PCA and capture zone information from the DWSAP will need to be added into the DMS. (3-17)</i> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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>
<ul style="list-style-type: none"> • TNC • SSCAWA • Mining Companies 	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 3 - Groundwater Resource Protection:</i> <ul style="list-style-type: none"> ▪ <i>Protection of Recharge Areas (3.2.3.4)</i> 	<ul style="list-style-type: none"> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> 	<ul style="list-style-type: none"> ◆ <i>Continue to work with mining companies, TNC, and SSCAWA to explore the possibilities for enhancing recharge into the Central Basin. (3-18)</i>

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Target Audience	Objectives	Messages	Strategies	Tactics
Technical Partnerships				
<ul style="list-style-type: none"> • EMD • DHS • DTSC • EPA • RWQCB 	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 3 - Groundwater Resource Protection:</i> <ul style="list-style-type: none"> ▪ <i>Control of the Migration and Remediation of Contaminated Groundwater (3.2.3.5)</i> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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> ◆ <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>
<ul style="list-style-type: none"> • DWR Central Office • EMD • All Central Basin Stakeholders 	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 3 - Groundwater Resource Protection:</i> <ul style="list-style-type: none"> ▪ <i>Control of Saline Water Intrusion (3.2.3.6)</i> 	<ul style="list-style-type: none"> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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>

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Target Audience	Objectives	Messages	Strategies	Tactics
Technical Partnerships				
<ul style="list-style-type: none"> • Central Basin Stakeholders • City of Roseville • SCWA 	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 4 - Groundwater Sustainability.</i> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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> 	<ul style="list-style-type: none"> ◆ <i>Coordinate with SCWA and other Central Basin groundwater users to investigate and develop groundwater recharge opportunities.</i> ◆ <i>Coordinate with SCWA and other Central Basin groundwater users to investigate and develop conjunctive use opportunities.</i> ◆ <i>Establish contact with the City of Roseville for the purpose of tracking the success of their ASR program.</i>
<ul style="list-style-type: none"> • RWA • DWR • SRCD • WFSE • Bureau of Reclamation • Self-served agricultural and agricultural-residential water users. 	<ul style="list-style-type: none"> ◆ <i>CSCGMP Program Component No. 4 - Groundwater Sustainability:</i> <ul style="list-style-type: none"> • <i>Demand Reduction (3.2.4.1)</i> 	<ul style="list-style-type: none"> ◆ <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> ◆ <i>RWA's efforts in developing and implementing a regional Water Efficiency Program (WEP) are well recognized by SCGA. (3-20)</i> ◆ <i>The SRCSD is developing a countywide Water Recycling Master Plan to provide up to 40 MGD of recycled water. (3-20)</i> 	<ul style="list-style-type: none"> ◆ <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> ◆ <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> 	<ul style="list-style-type: none"> ◆ <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> ◆ <i>The SCGA shall develop BMPs for self-served agricultural and agricultural-residential water users. (3-21)</i> ◆ <i>Coordinate with SRCSD to investigate further opportunities for expanded use of recycled water throughout the Central Basin. (3-21)</i>



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