



Agricultural Demand Estimate and Basin Management Report

May 14, 2014

Prepared for:

SCGA Sacramento Central
Groundwater Authority

Presenter:

Jim Blanke, PG CHG

Acknowledgements

- SCGA member agencies
- Aerojet
- SCGA staff
- Davids Engineering and RMC staff

Background

- Groundwater Management Plan accepted February 2006
- Plan calls for regular reporting
- Reporting includes BMO analysis, which requires pumping information

Pumping Data and Estimates

- Pumping data available from most public entities and remediation sites
 - Values estimated where not provided
- Agricultural and agricultural-residential pumping requires estimates

Ag Demand Estimates: Overall Process

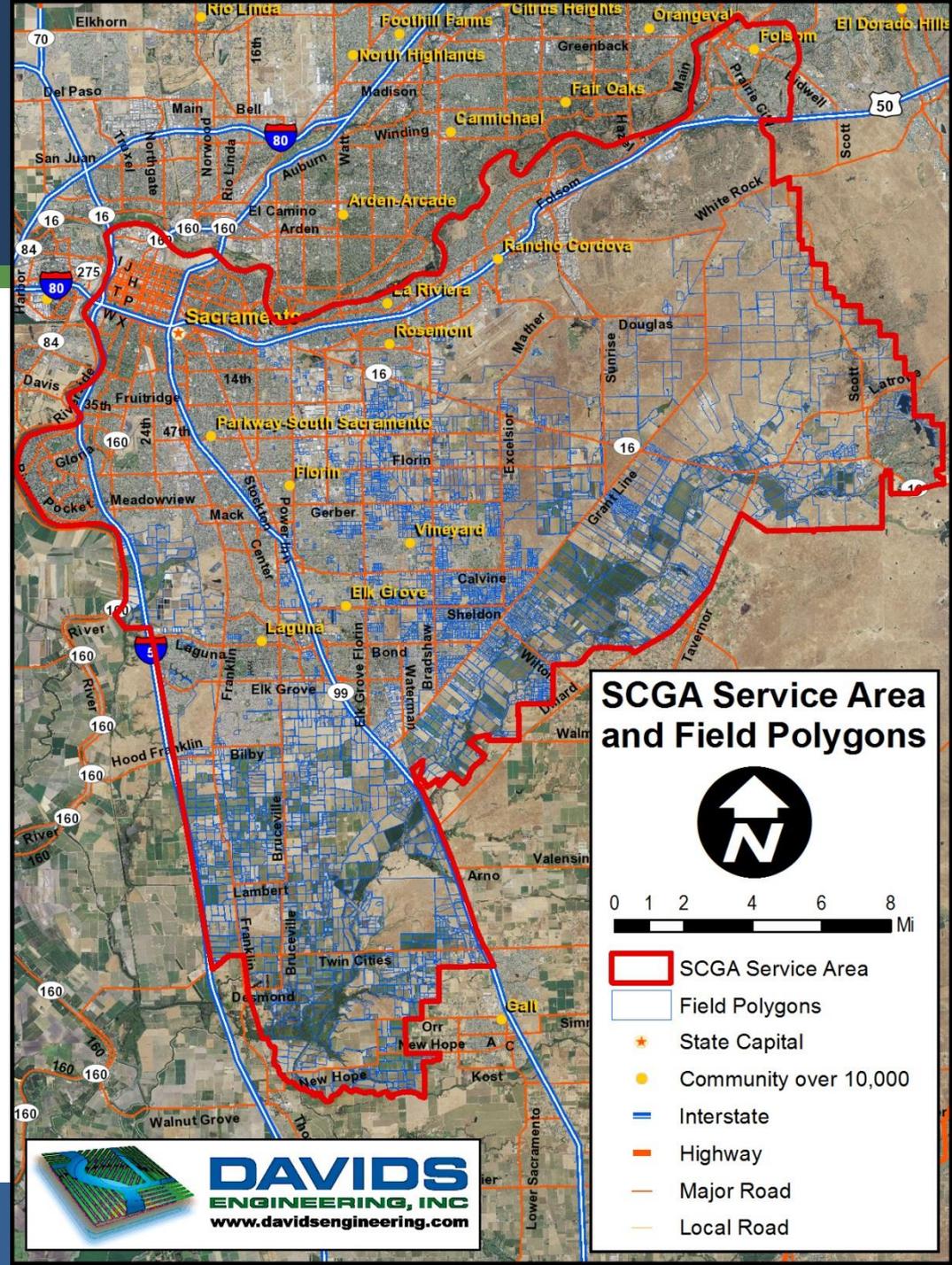
- SACOG 2008 Land Use Data
- Updated using 2011 and 2012 data from the National Agricultural Statistics Service
- Applied evapotranspiration data developed based on previous detailed remote sensing study
- Applied the IWFM Demand Calculator (IDC) for root zone water balance
- Result: estimated applied water need (pumping)

Ag Demand Estimates

- Six generalized land uses developed
 - Field and truck crops
 - Pasture and hay
 - Vineyards and orchards
 - Native
 - Riparian / wetlands
 - Rural residential

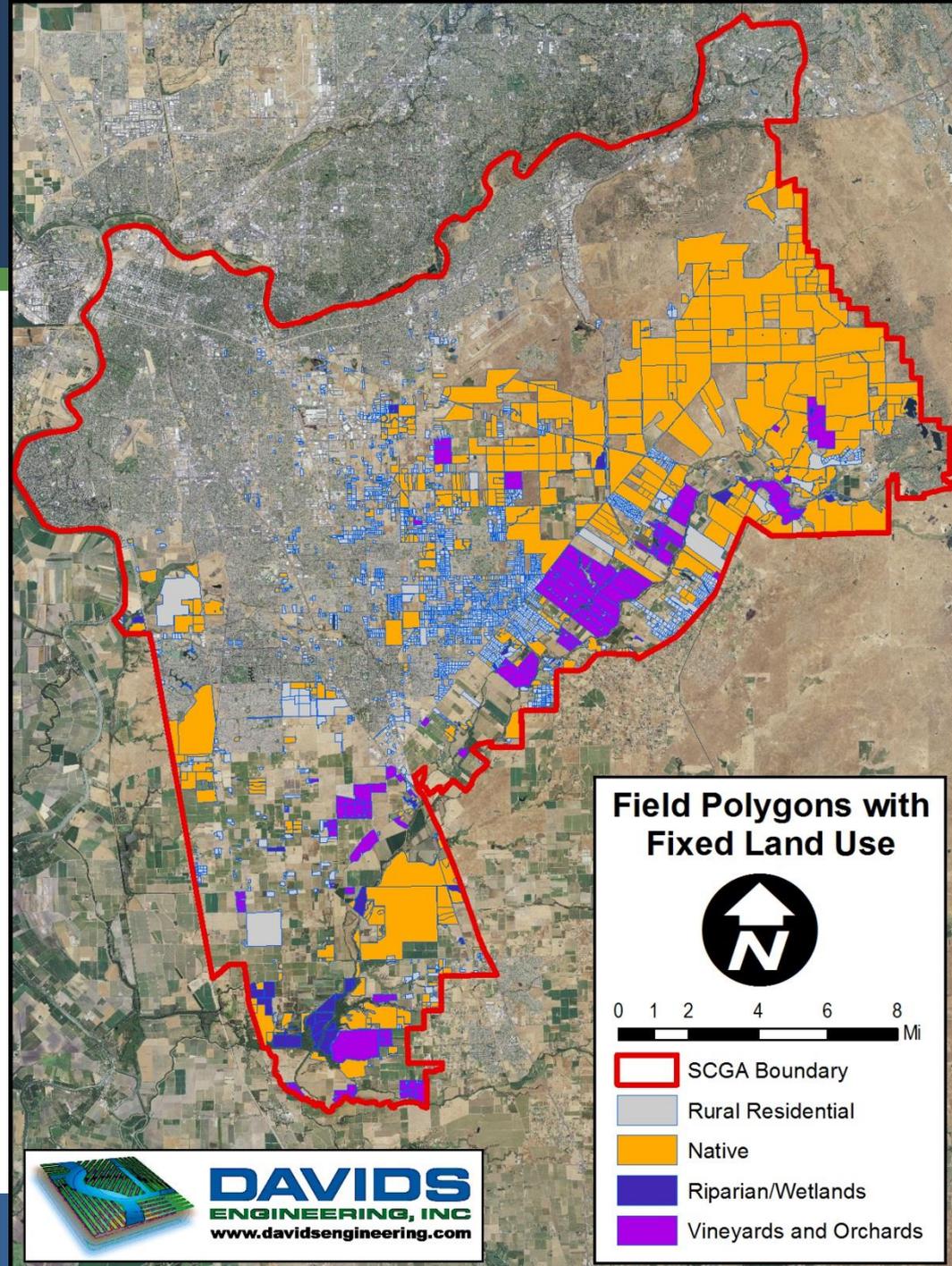
Ag Demand Estimates

- Field polygons based on 2008 SACOG land use



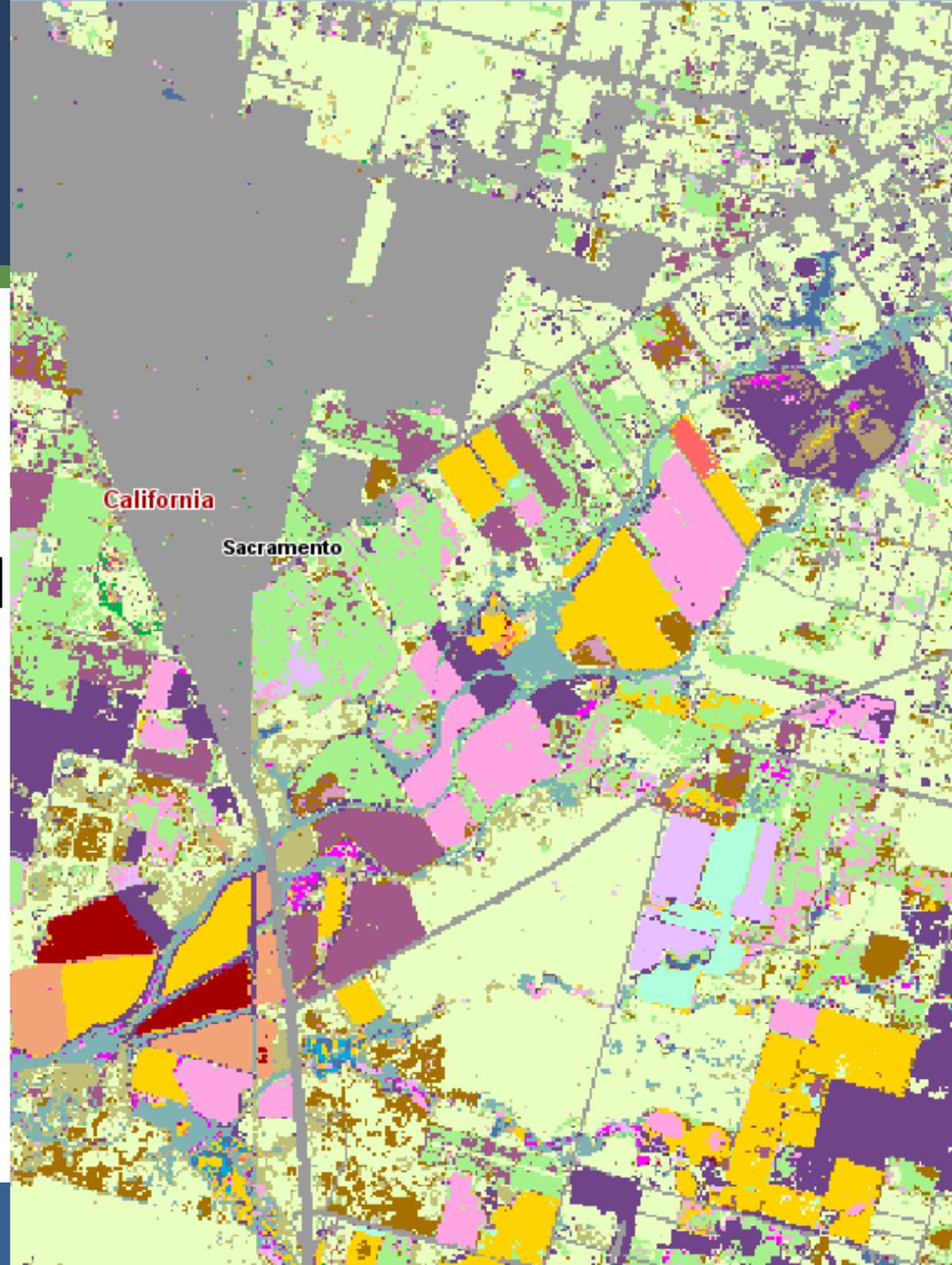
Ag Demand Estimates

- Selected polygons have “fixed” land use:
 - Ag-Res
 - Native
 - Riparian/Wetlands
 - Vineyard/Orchards



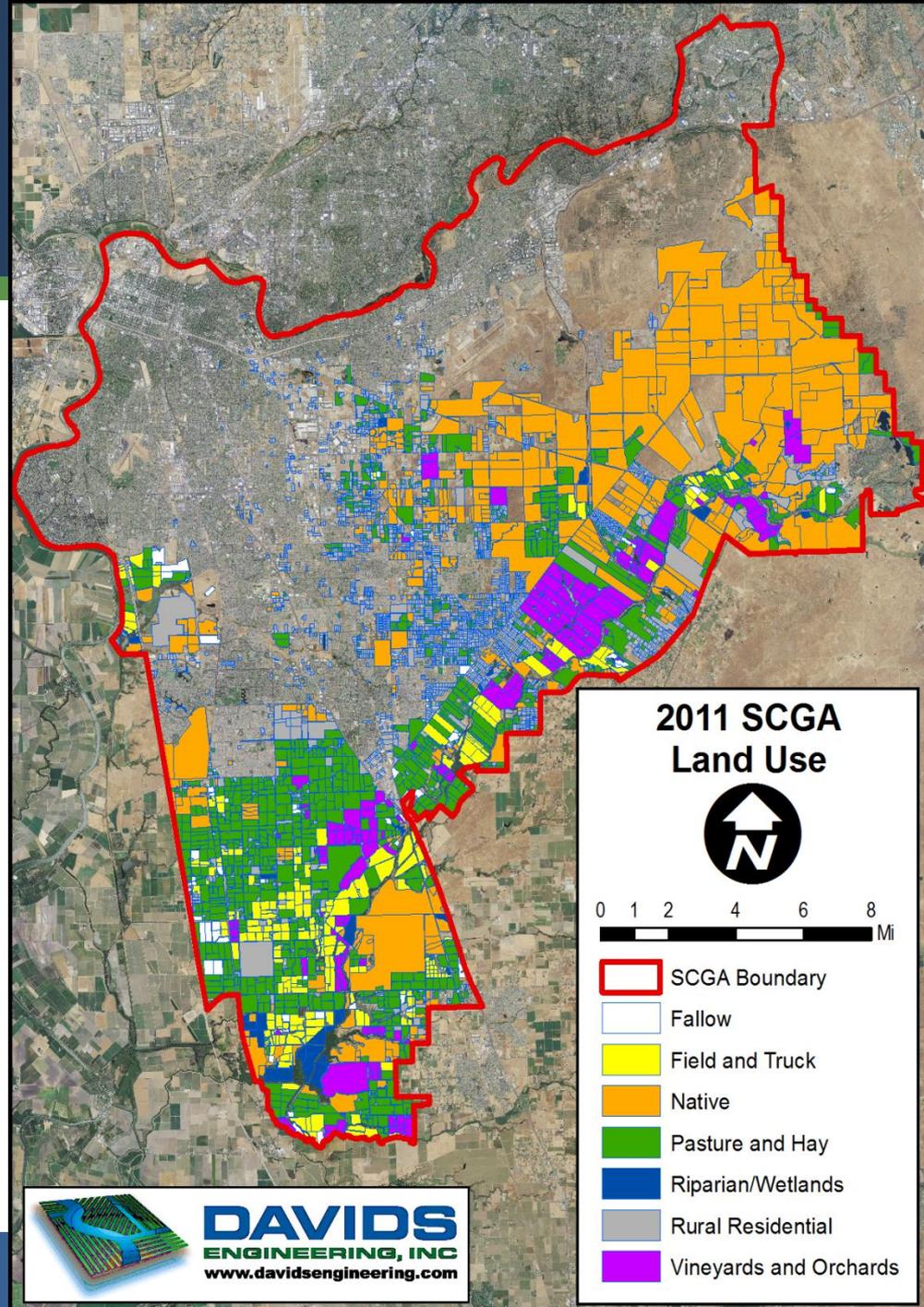
Ag Demand Estimates

- 2011/2012 Cropland Data Layer from USDA NASS applied to field polygons
- Polygons with <80% single land use subject to additional QC



Ag Demand Estimates

- Classified 2011 land use

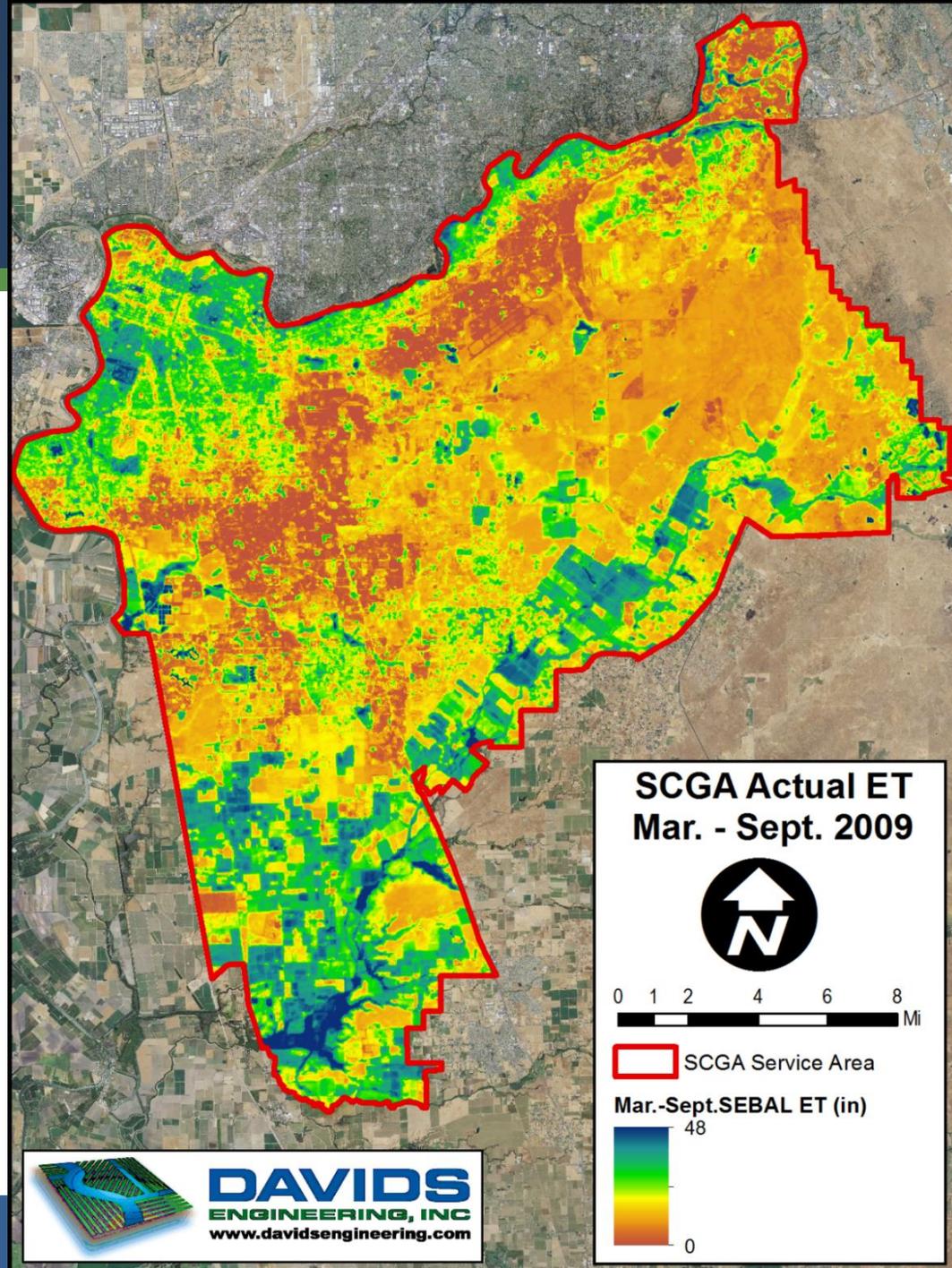


Ag Demand Estimates: Acreage Estimate

Land Use	2011	2012
Fallow	1,838	1,423
Field and Truck	8,568	7,166
Pasture and Hay	30,346	32,073
Vineyards and Orchards	9,175	9,036
Native	48,477	48,477
Riparian/Wetlands	1,721	1,873
Rural Residential	13,878	13,955
Total	114,003	114,003

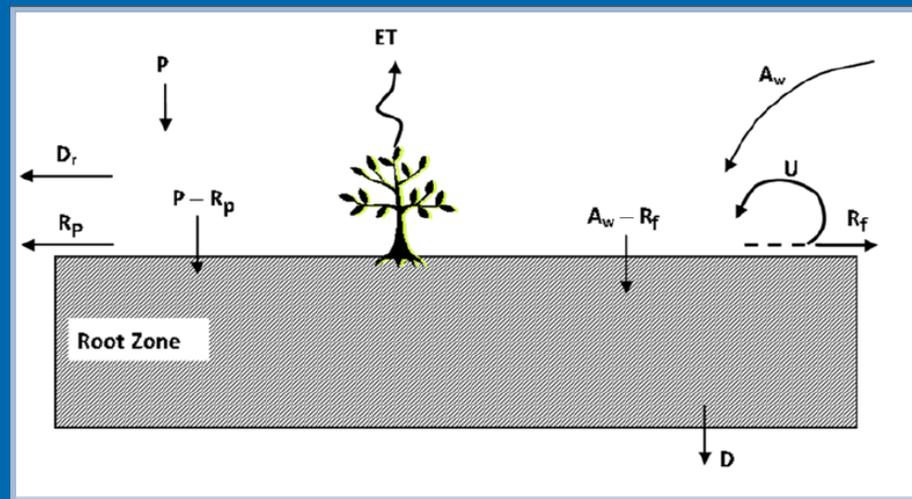
Ag Demand Estimates

- Crop Coefficients developed based on 2009 study of ET and CIMIS reference ET
- Coefficients used with 2011/12 CIMIS ET_0 data



Ag Demand Estimate – Root Zone Model

- Utilized DWR's IWFM Demand Calculator (IDC)



P = precipitation

A_w = applied water

R_p = direct runoff

U = re-use

R_f = net return flow

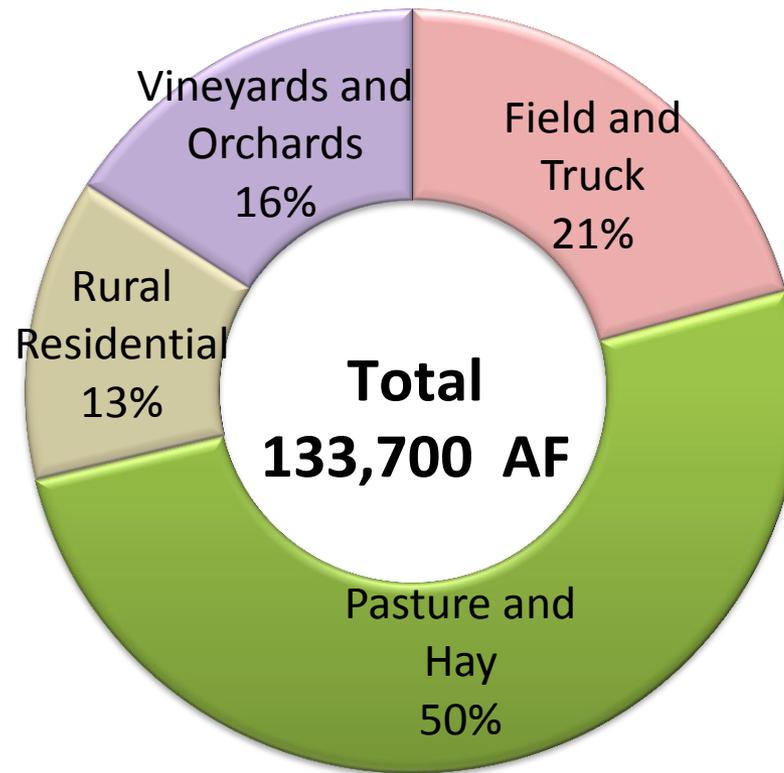
ET = evapotranspiration

D_r = drain from ponds

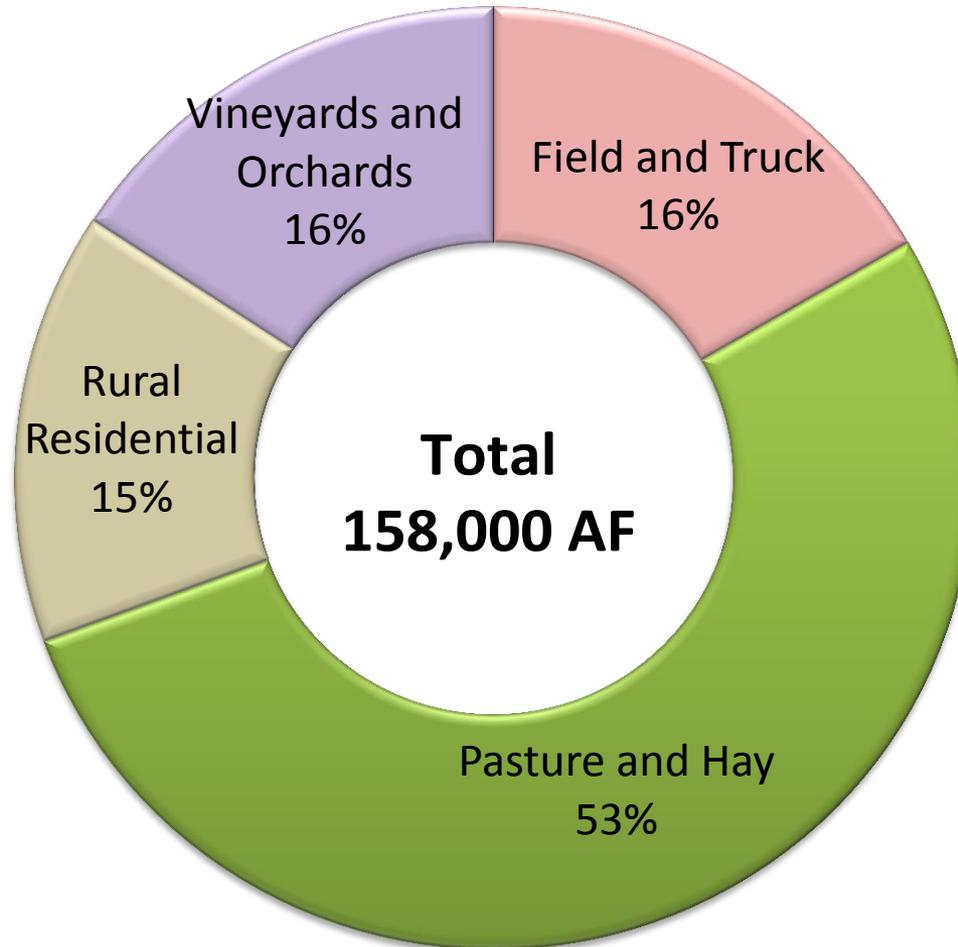
D = deep percolation

Figure source: DWR

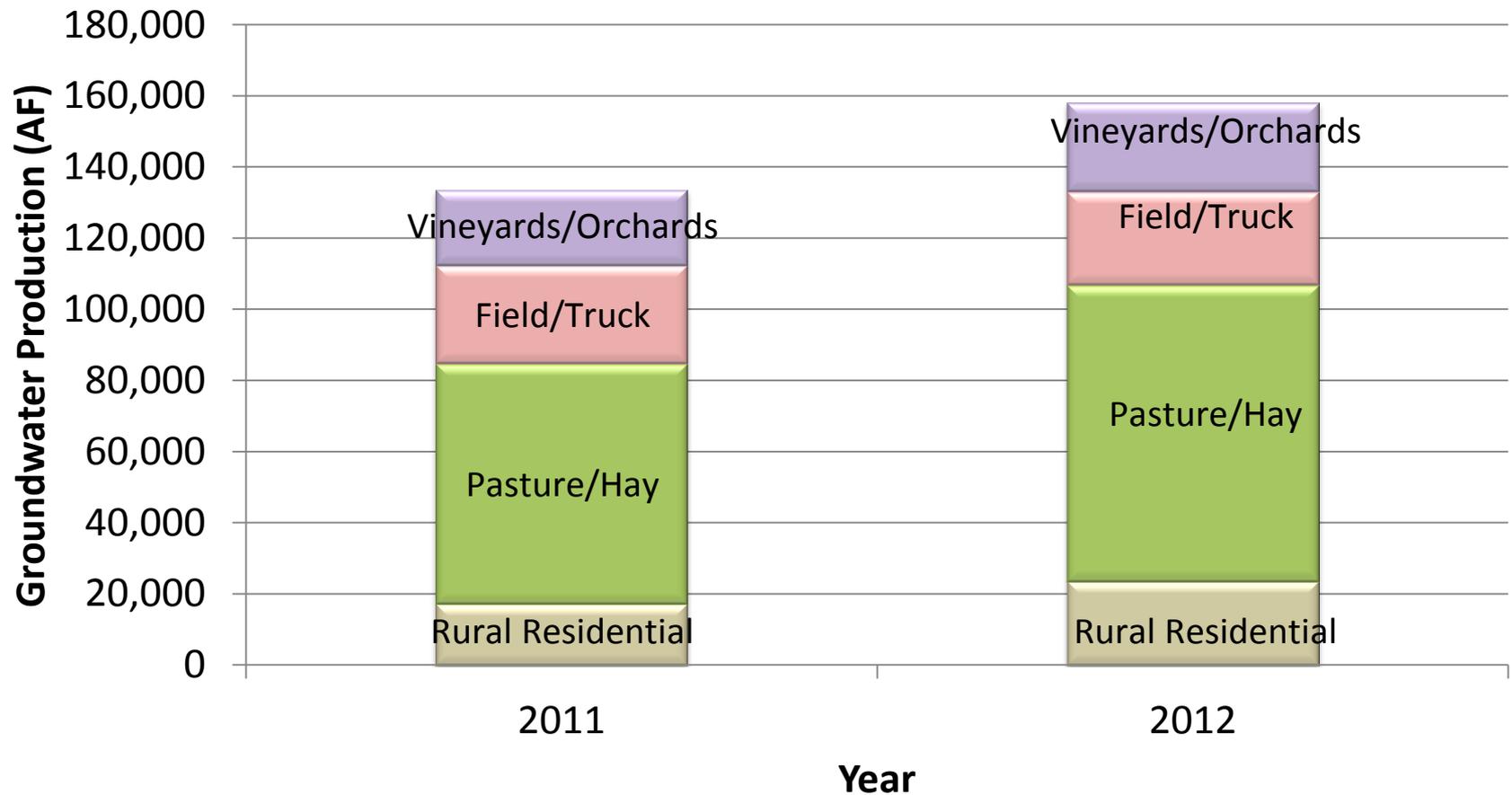
2011 Ag Demand Estimates



2012 Ag Demand Estimates



2011/2012 Ag Demand Estimates

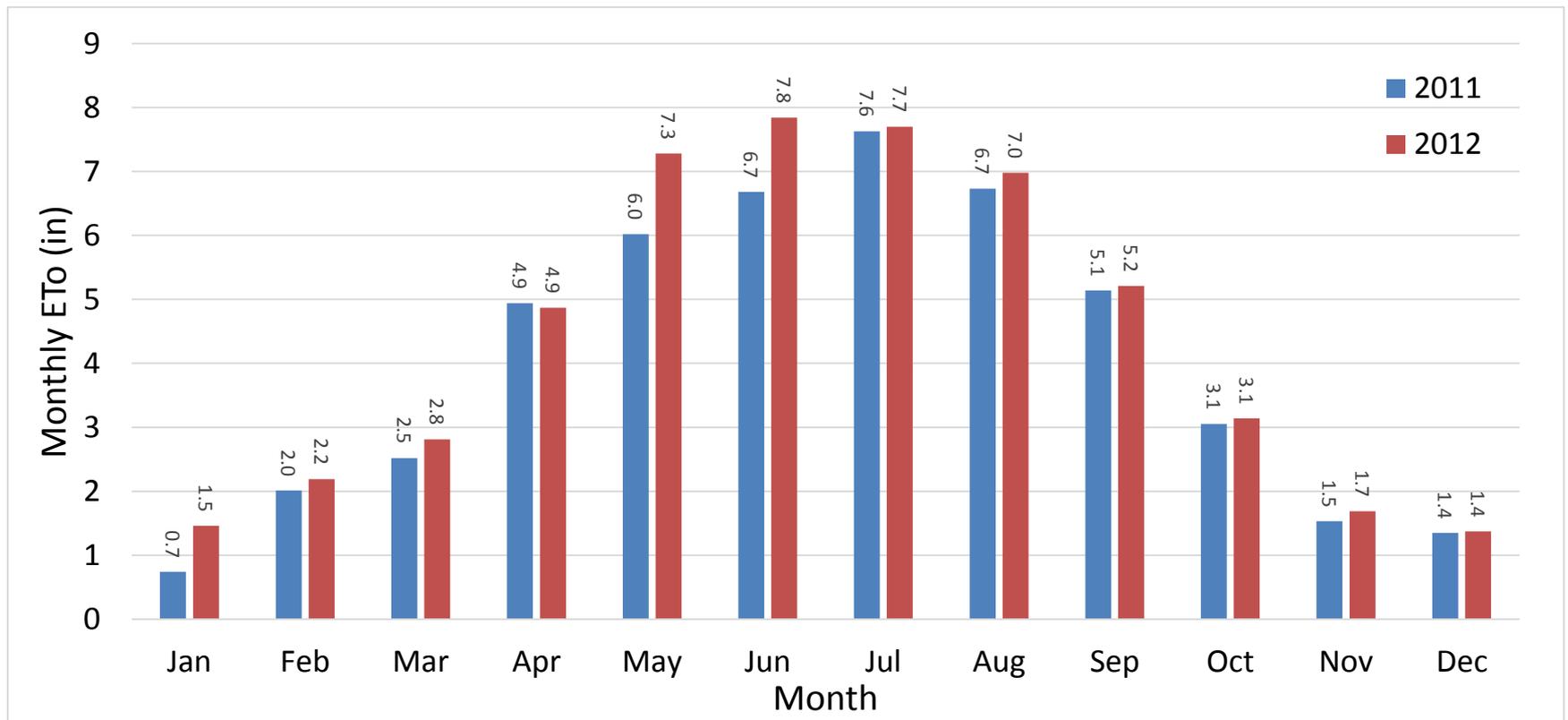


Ag Demand Estimates

- Increase from 2011 and 2012 due to weather
- Land use and cropping is similar
- 2012 weather, compared to 2011:
 - Higher ET
 - Lower growing season precipitation

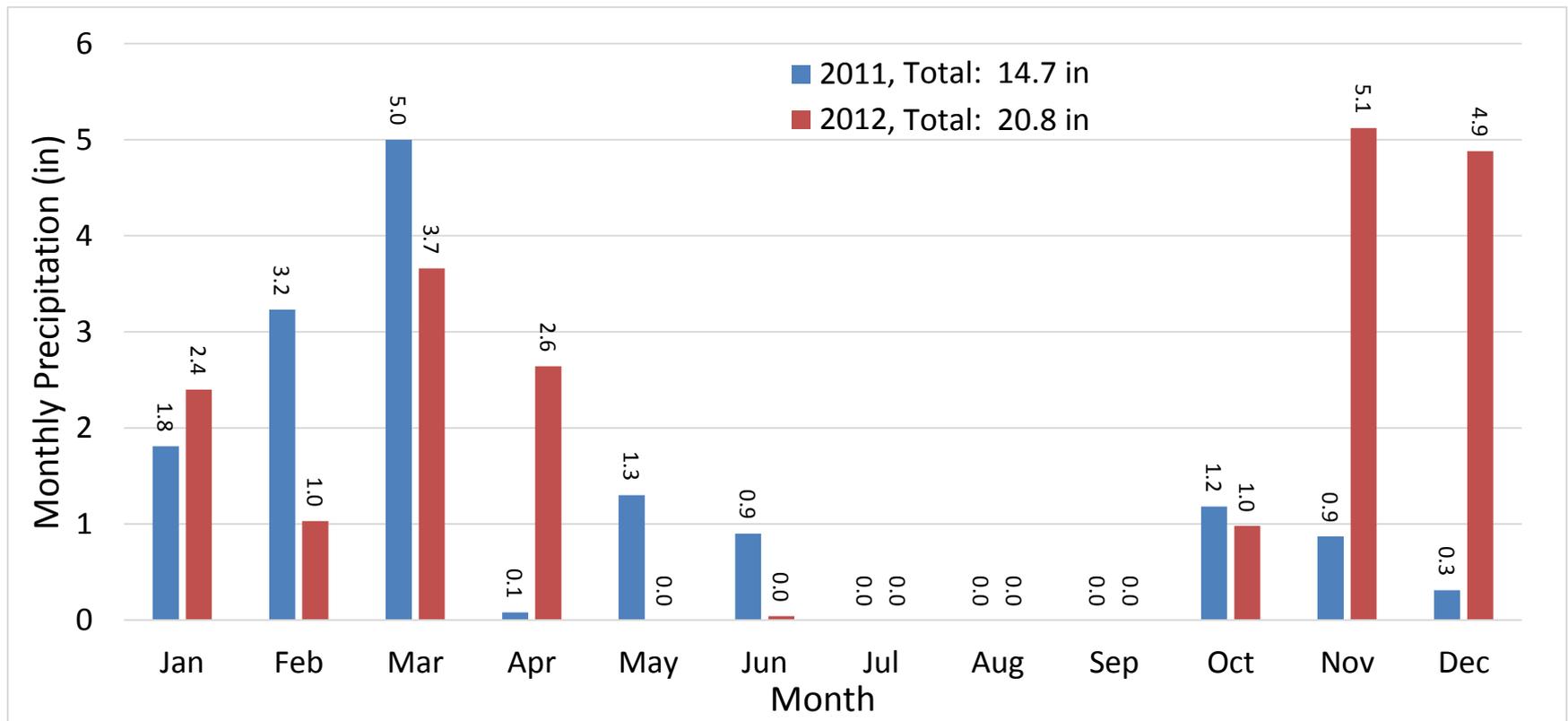
2011/2012 Reference ET – Lodi West

- 2012 had higher ET_o



2011/2012 Precipitation – Elk Grove Fish Hatchery

- 2012 had lower rainfall in growing season



Ag Demand Estimates

- Important component of overall pumping estimates
 - Developed for Basin Management Report
 - Measure for BMO compliance
 - Utilizes Ag and Ag-Res estimates
 - Incorporates data and estimates from other users

Basin Management Report Update

- Basin Conditions
- Basin Management Activities
- Conclusions and Recommendations

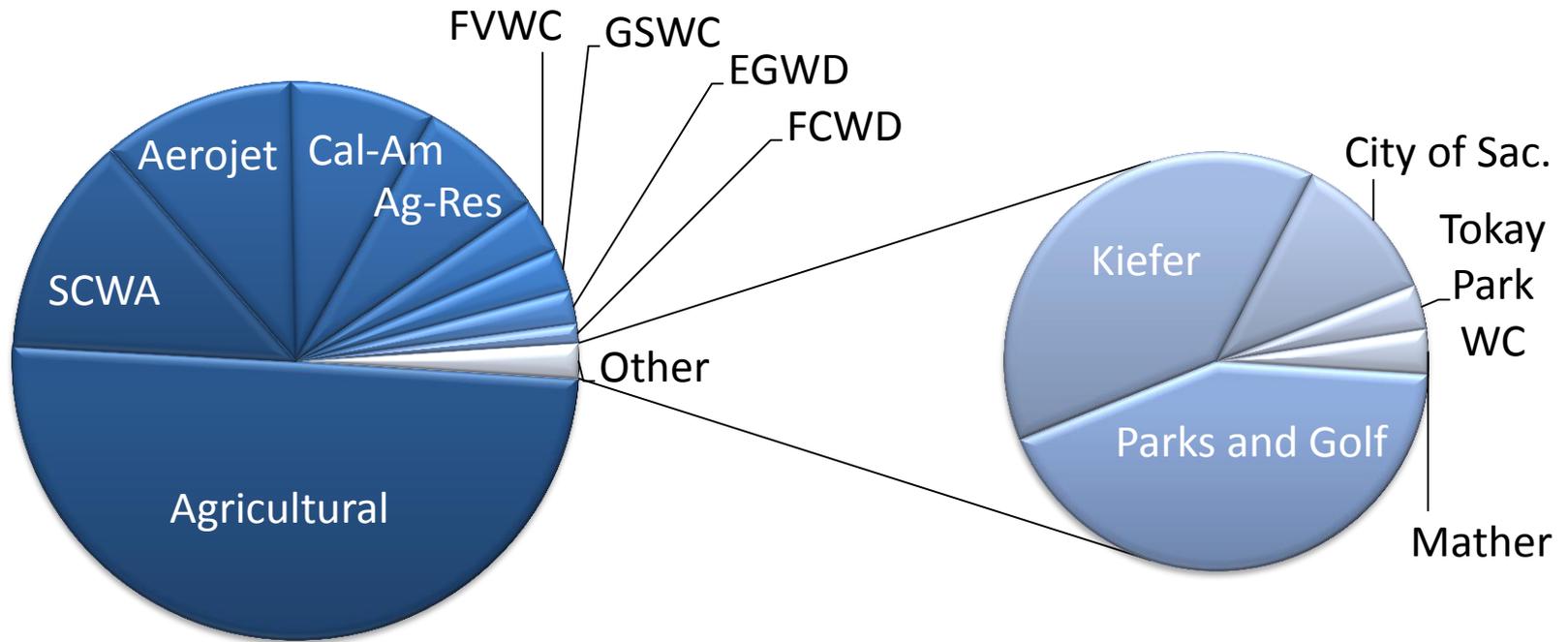
Year Type

- Sacramento Valley Water Year Type
 - 2011: Wet Year
 - 2012: Below Normal Year
- Water Forum Agreement Water Year Type
 - 2011: Wet Year
 - 2012: Average Year

BMO 1: Groundwater Production

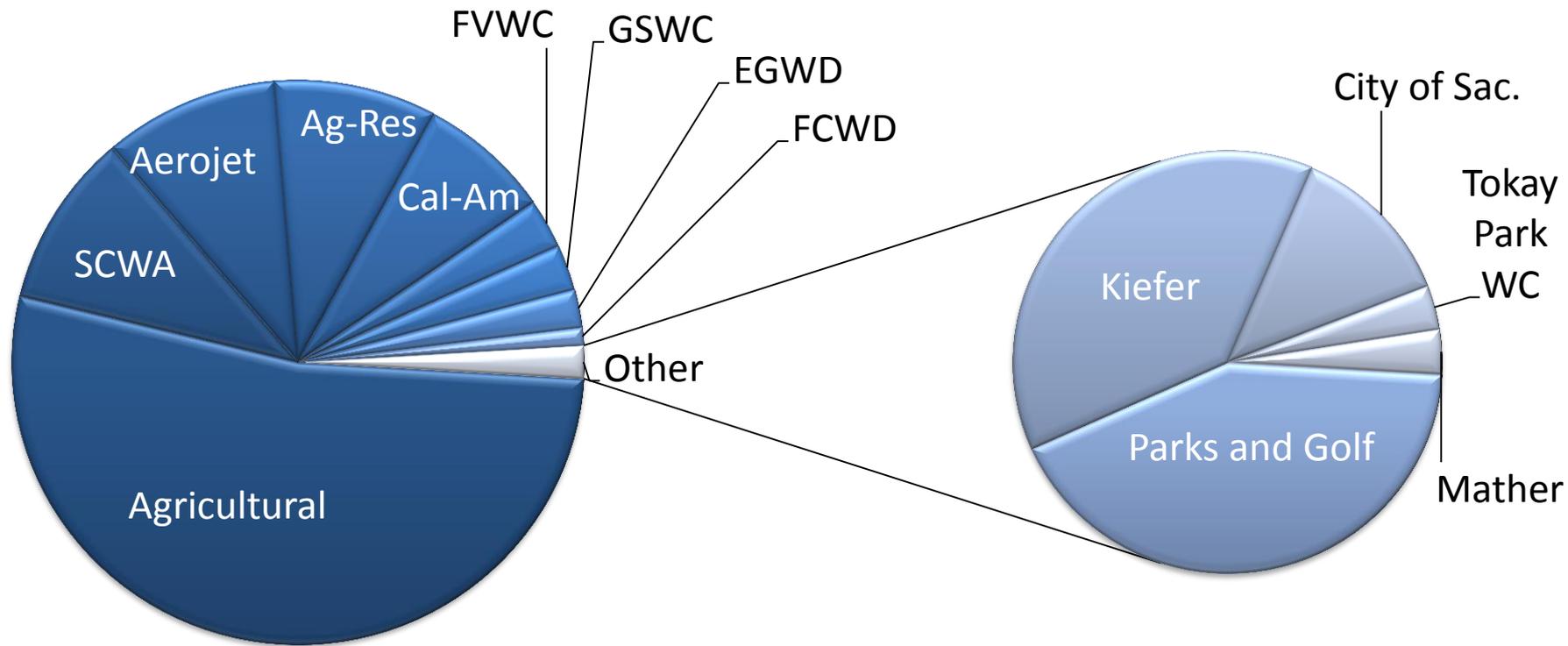
- “Maintain the long-term average extraction rate at or below 273,000 acre-feet/year”
- Production based on
 - Reported metered data
 - Large purveyors, Aerojet, and IRCTS
 - Estimated values
 - Tokay Park
 - Florin County
 - Fruitridge Vista
 - Parks, Golf Courses
 - Agriculture
 - Agriculture-Residential
 - Mather Field and Kiefer Landfill

Groundwater Production, 2011



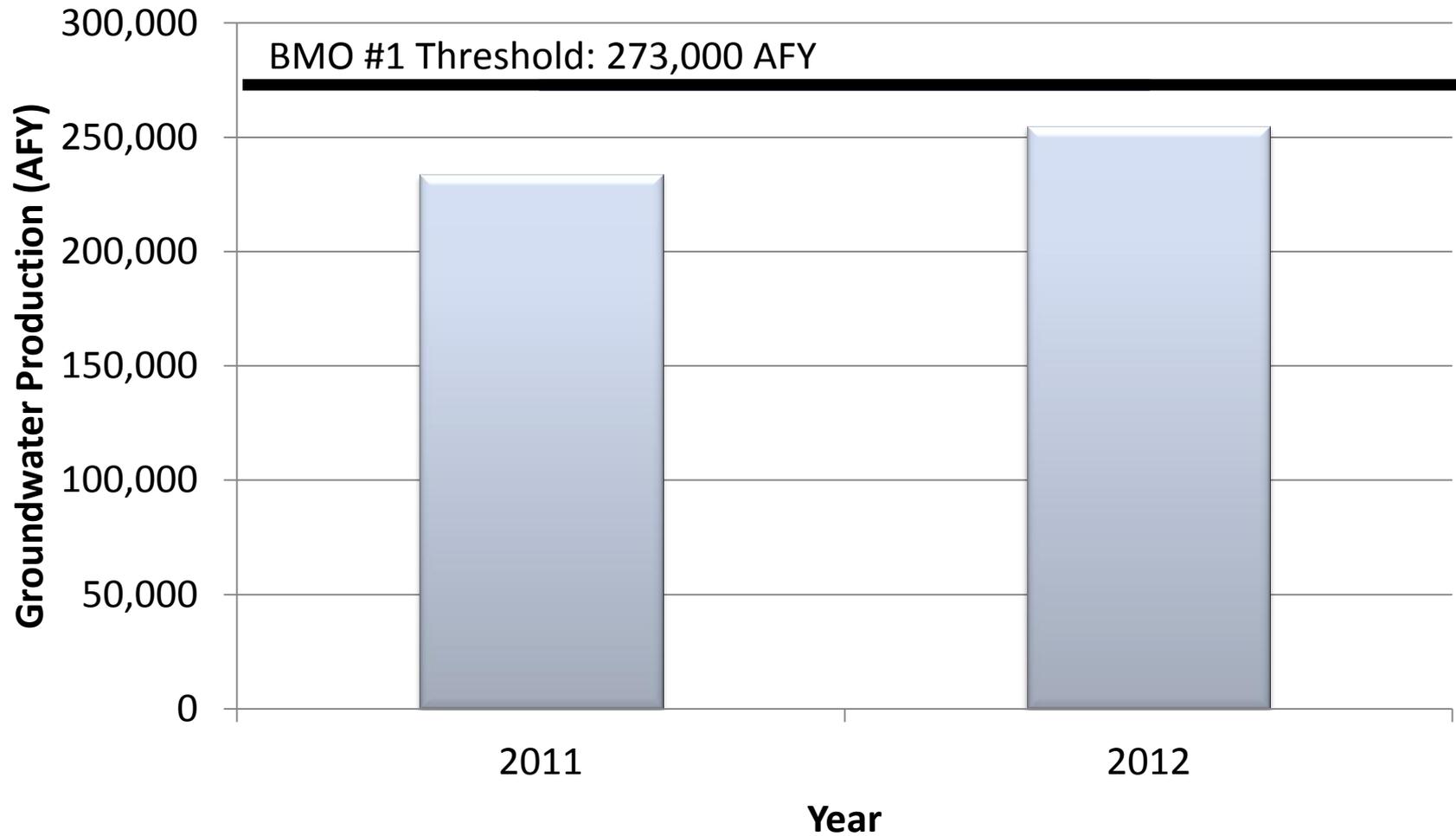
Total 2011 Production: 233,600 AF

Groundwater Production, 2012



Total 2012 Production: 254,600 AF

Groundwater Production



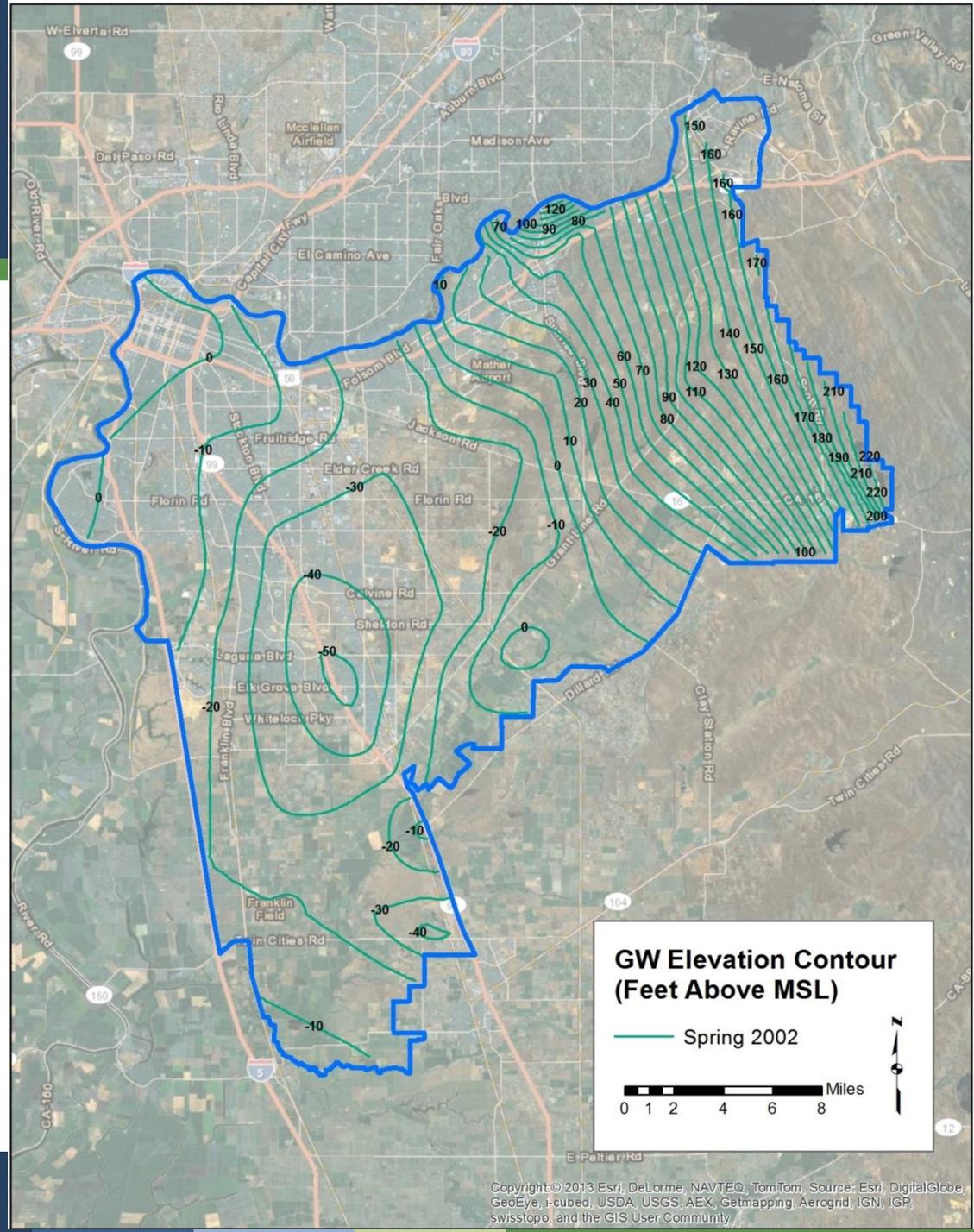
Groundwater Pumping

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 ⁹
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	Aerojet ⁵	19,121	17,816	20,893	21,003	20,492
	IRCTS ⁶	3,405	4,123	4,674	4,872	4,786
	Mather Field ⁷	160	160	160	160	160
	Kiefer Landfill ⁸	1,800	1,800	1,800	1,800	1,800
SUBTOTAL		24,500	23,900	27,500	27,800	27,200
GRAND TOTAL		n/a	n/a	n/a	233,600	254,600

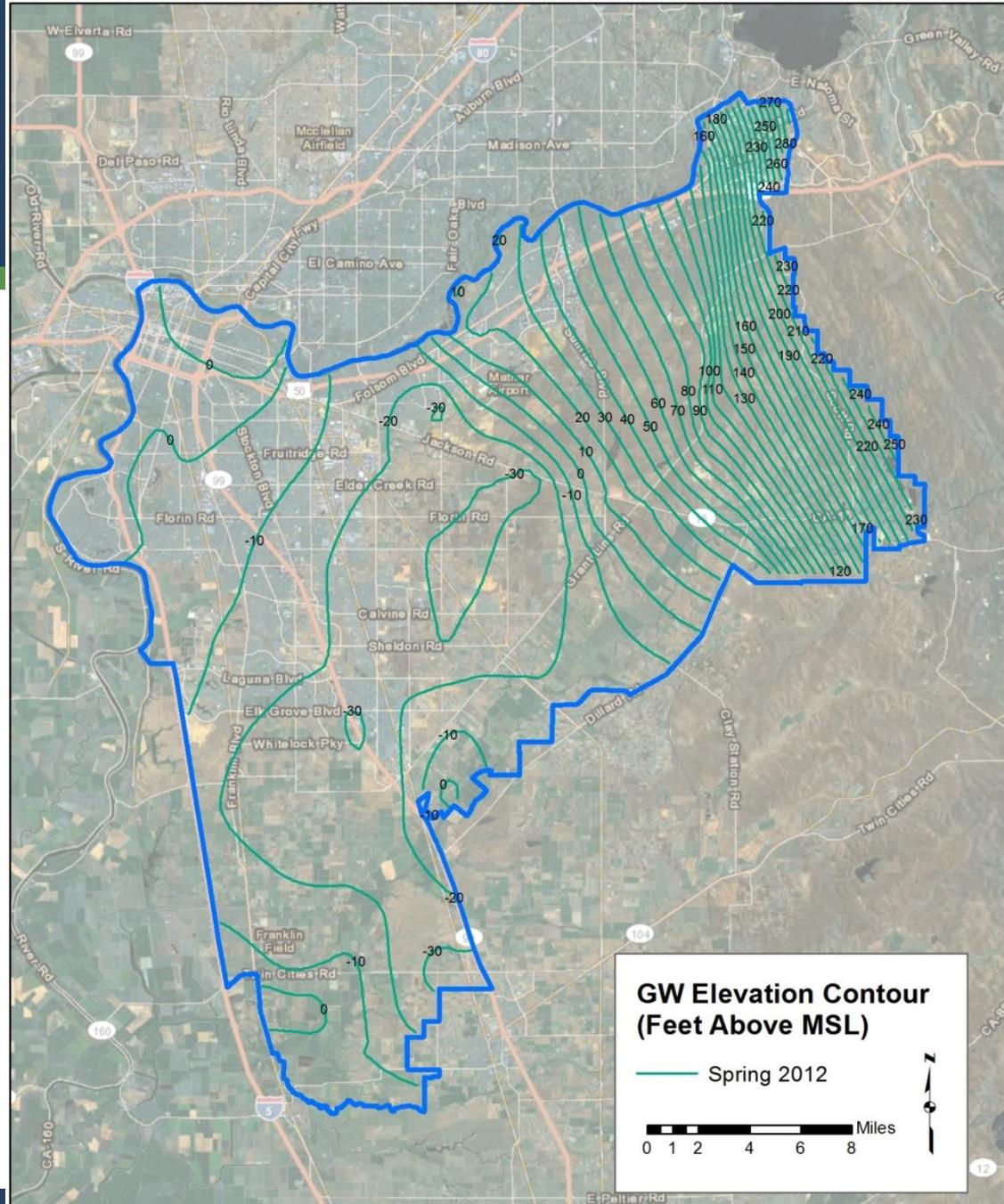
BMO 2: Groundwater Levels

- “Maintain specific groundwater elevations within all areas of the basin consistent with the Water Forum ‘solution.’”
- Groundwater elevations presented as contour maps and hydrographs

Spring 2002

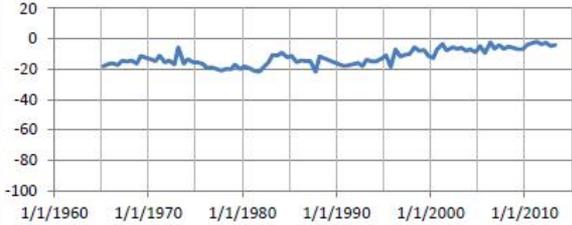


Spring 2012



Western Hydrographs

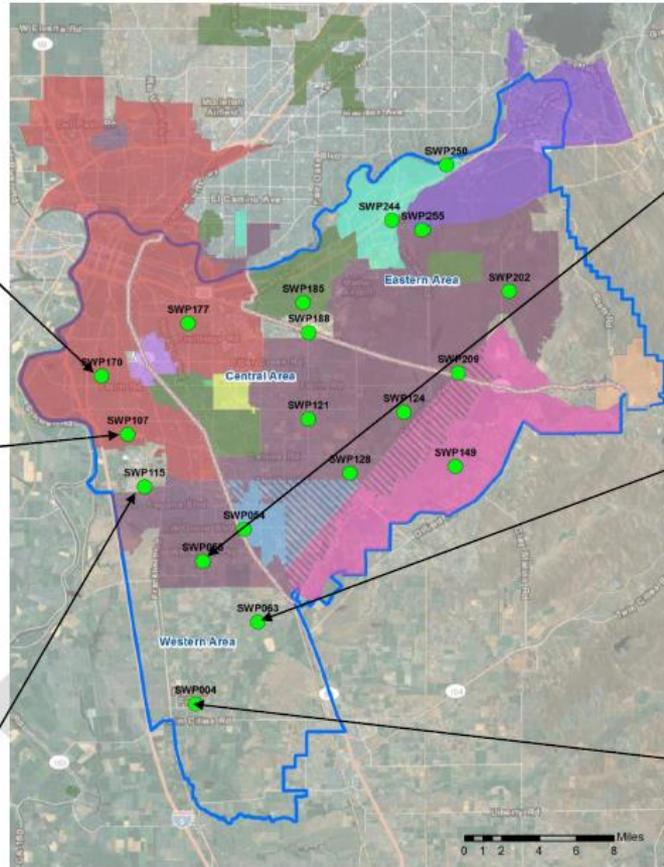
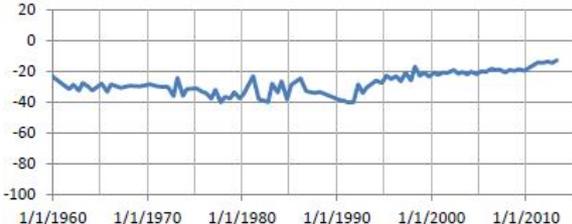
SWP-170



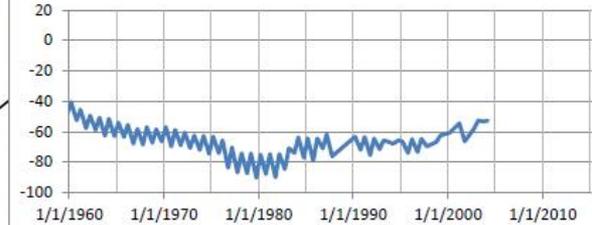
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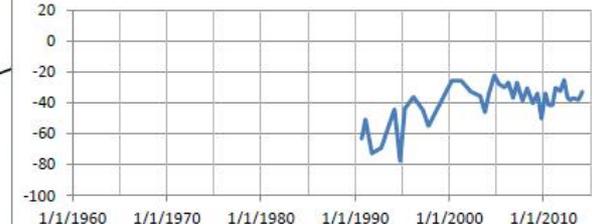
SWP-115



SWP-058



SWP-063



SWP-004



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

Central Hydrographs

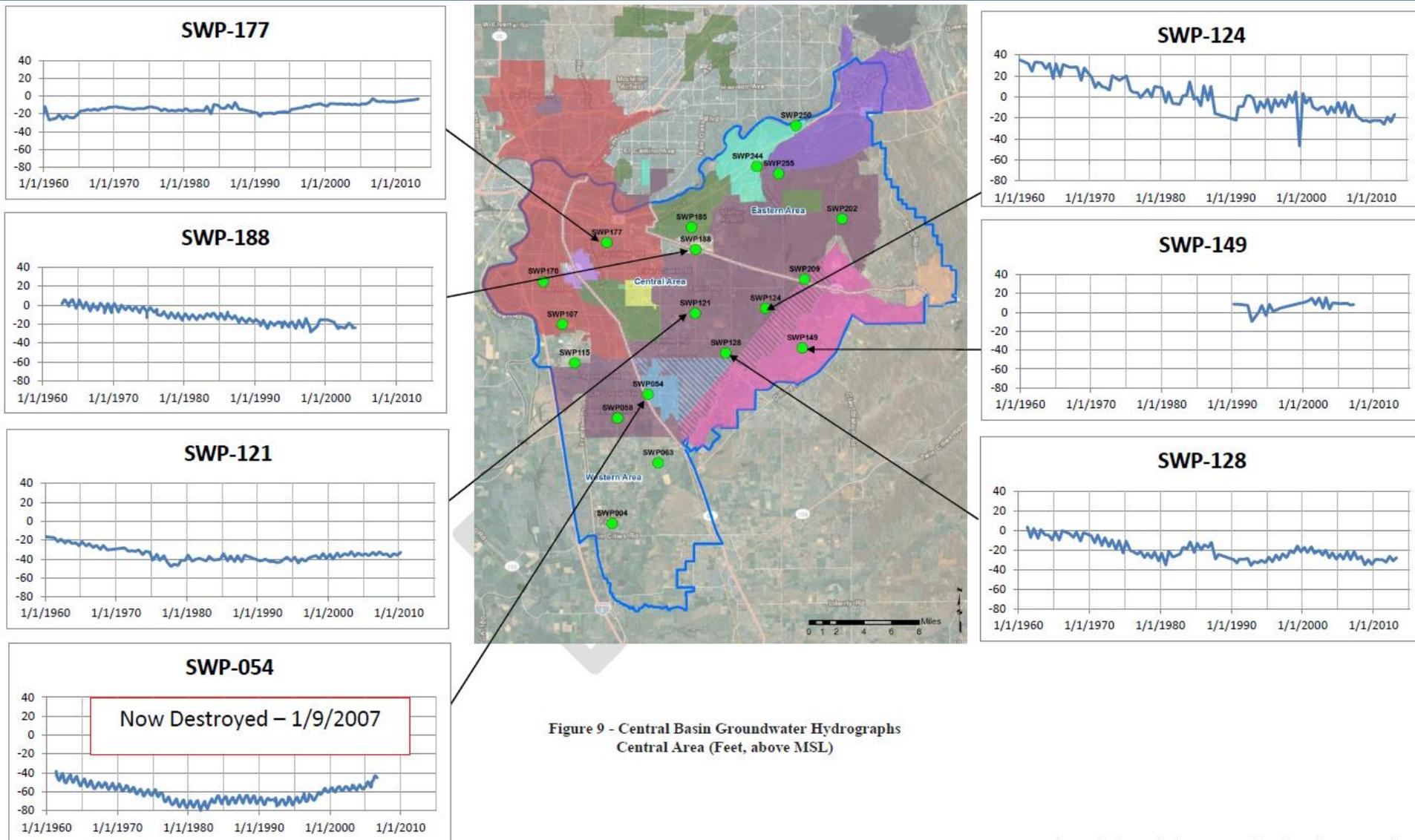
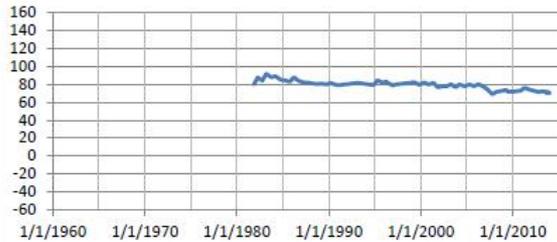


Figure 9 - Central Basin Groundwater Hydrographs
Central Area (Feet, above MSL)

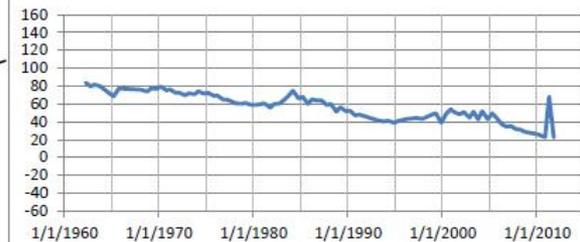
Note: Groundwater hydrograph elevations are based on the NAVD88 datum.

Eastern Hydrographs

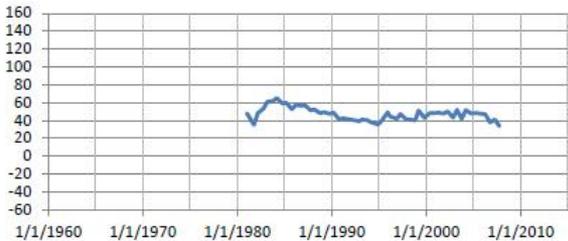
SWP-250



SWP-255



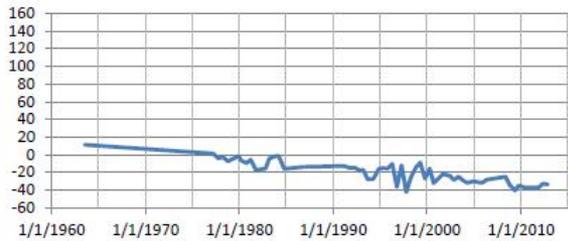
SWP-244



SWP-202



SWP-185



SWP-209

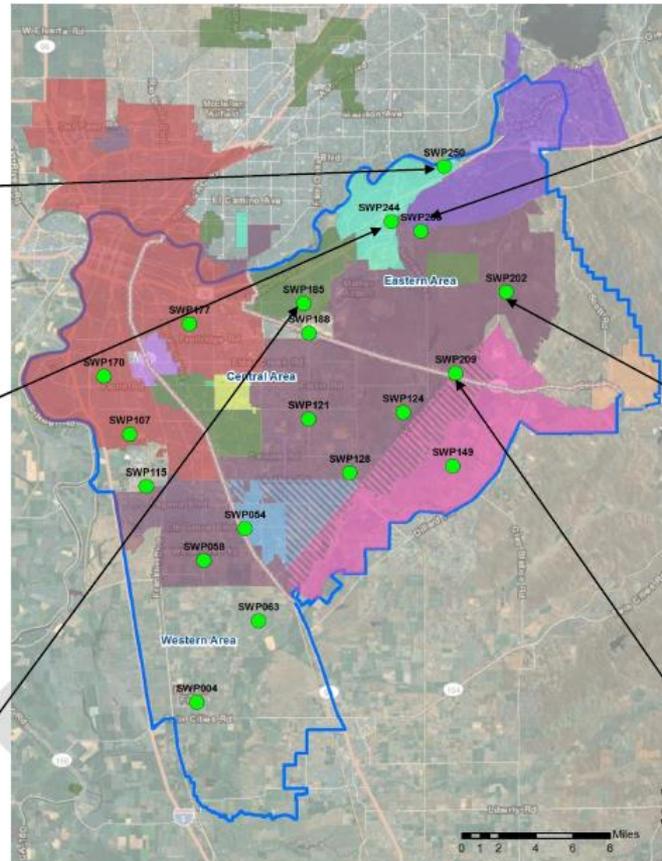
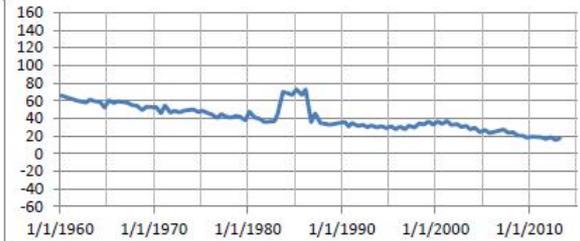


Figure 10 - Central Basin Groundwater Hydrographs Eastern Area (Feet, above MSL)

BMO 3: Subsidence

- “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.”
- No monitoring performed within SCGA during the reporting period
- SGA reported subsidence measurements northeast of McClellan
 - 0.3’ of subsidence from 1947-1969
 - 1.9’ from 1969-1989
 - Associated with at least 68’ of water level decline in area

BMO 4: Surface Water

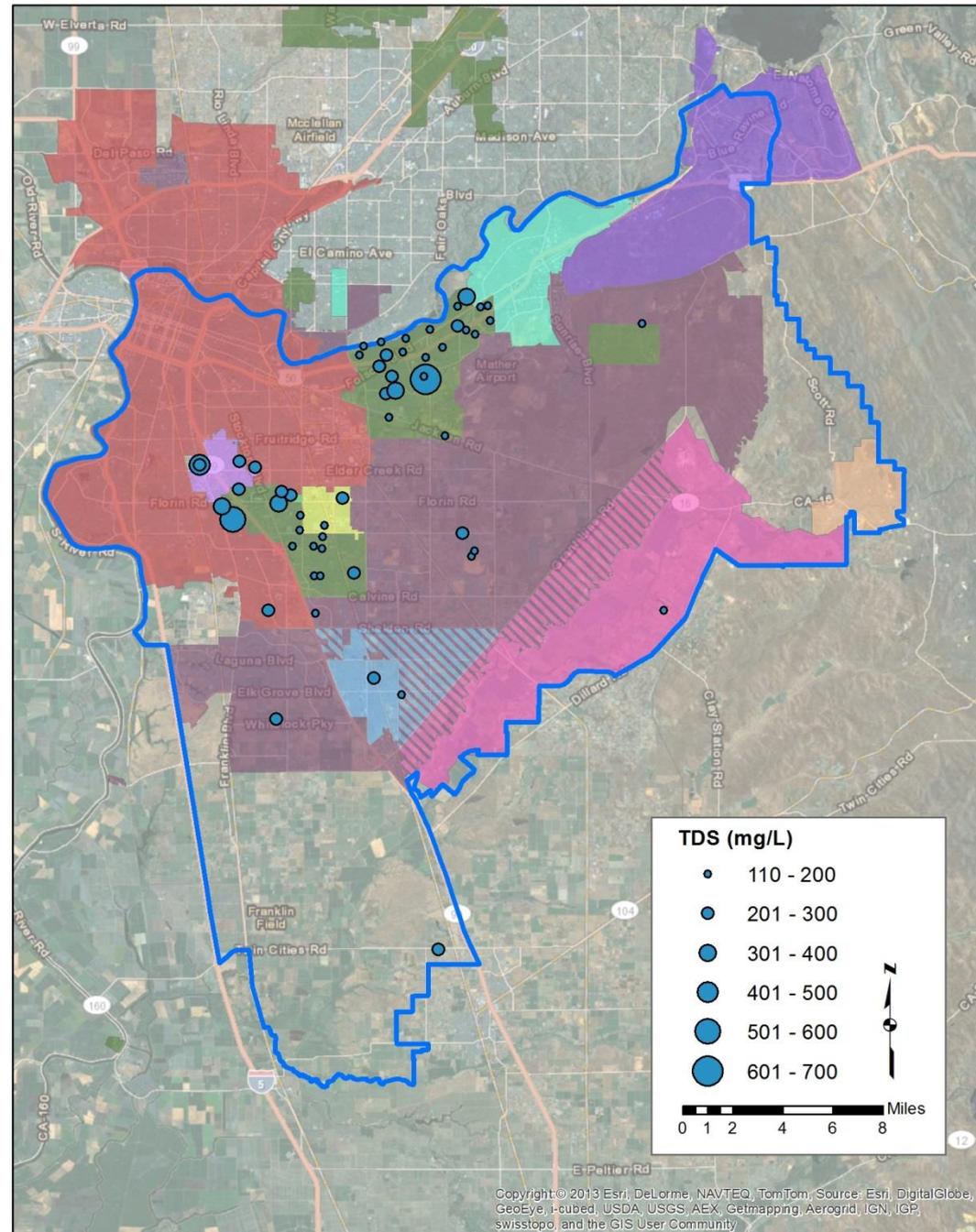
- “Protect against any adverse impacts to surface water flows in the American, Cosumnes, and Sacramento Rivers.”
- Information on gages and streamflows compiled and updated in 2011 modeling document
- Upcoming AB303-funded water quality and isotope study will increase understanding

BMO 5: Water Quality Objectives

- Water quality summarized for
 - TDS
 - Iron
 - Manganese
 - Arsenic
 - Nitrate
 - Chromium 6
 - “Principal” Contaminant Plumes

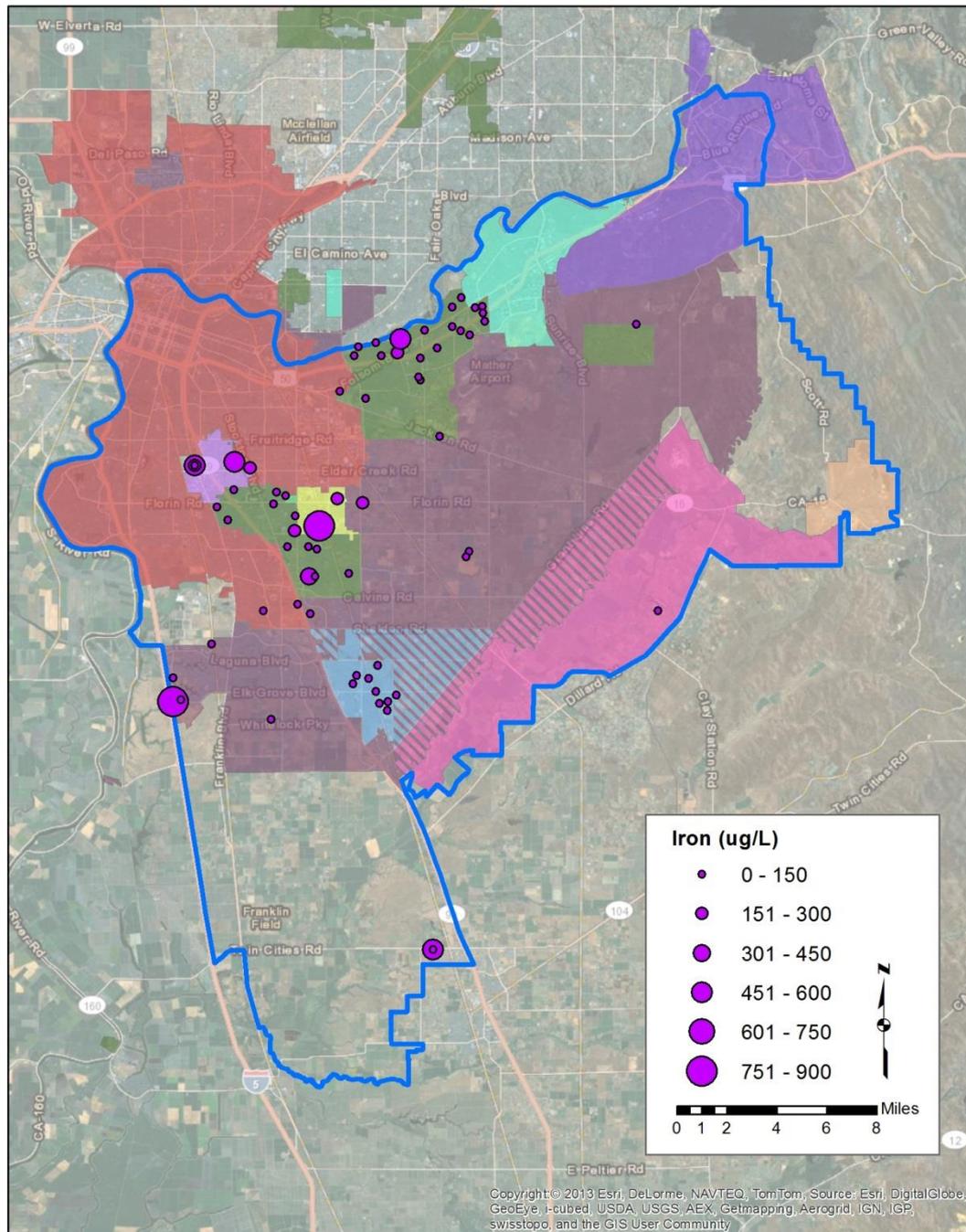
TDS, 2012

- SMCL
 - 500 mg/l
 - 1,000 mg/l
 - 1,500 mg/l



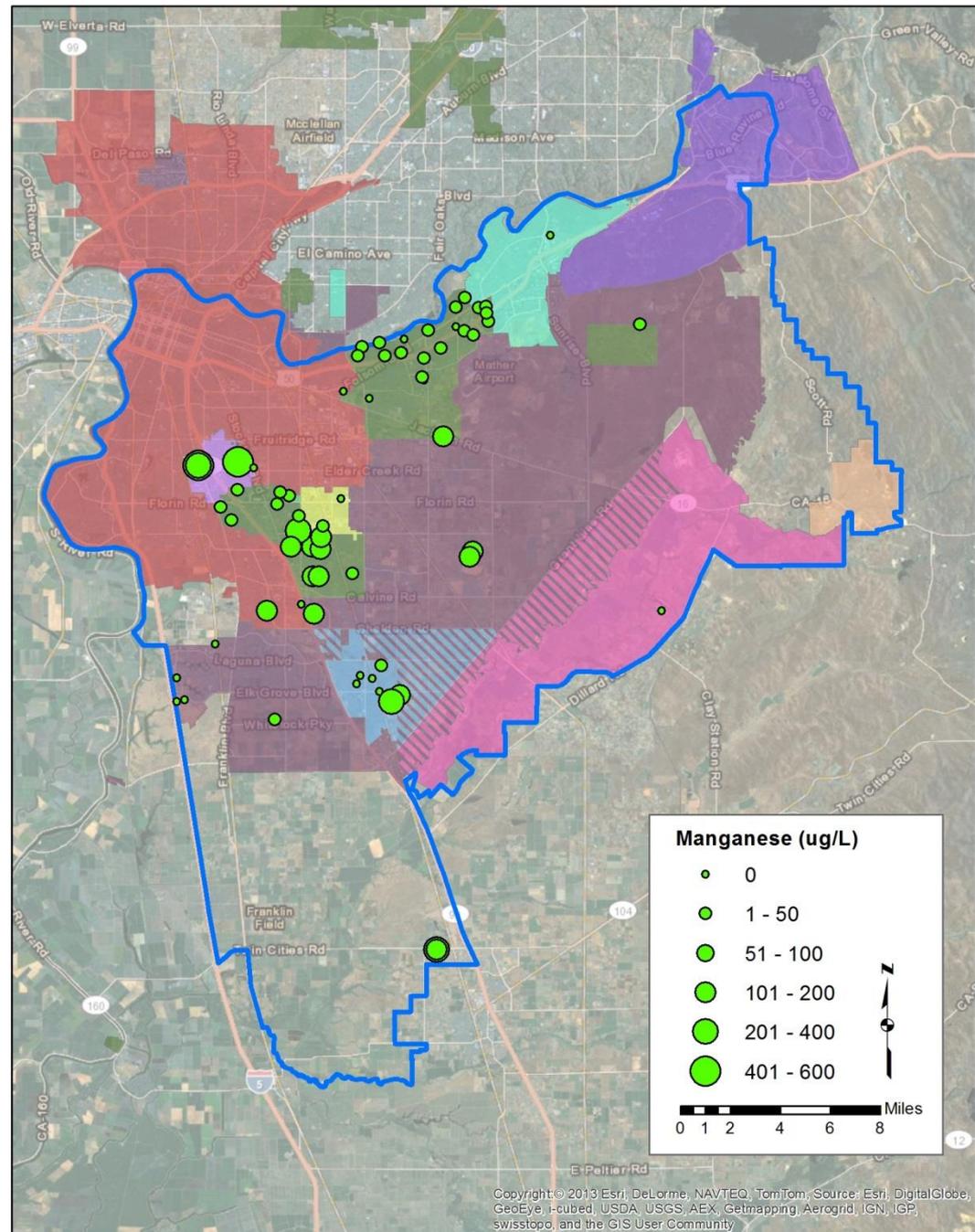
Iron, 2012

- SMCL 300 $\mu\text{g}/\text{l}$



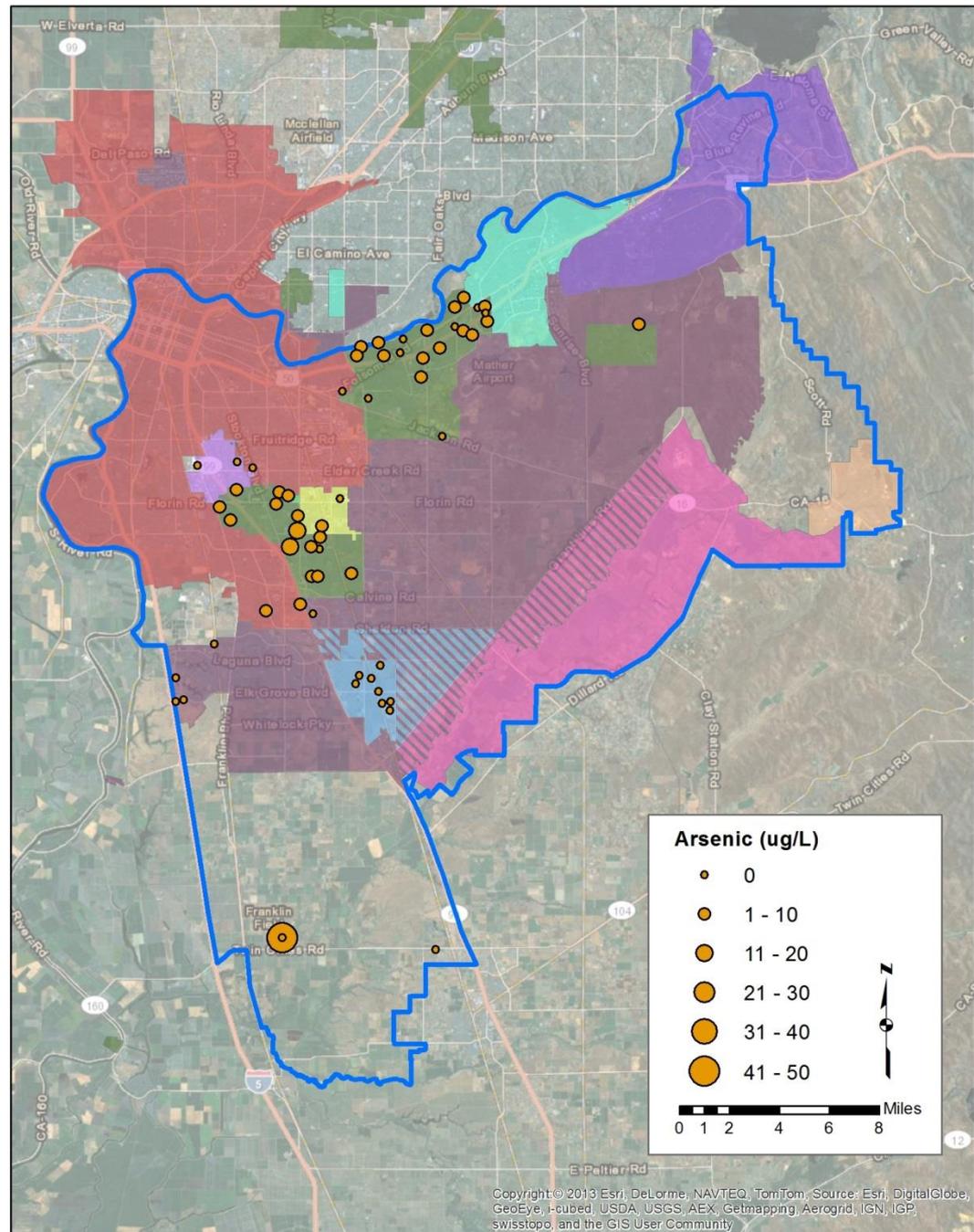
Manganese, 2012

- SMCL 50 $\mu\text{g}/\text{l}$



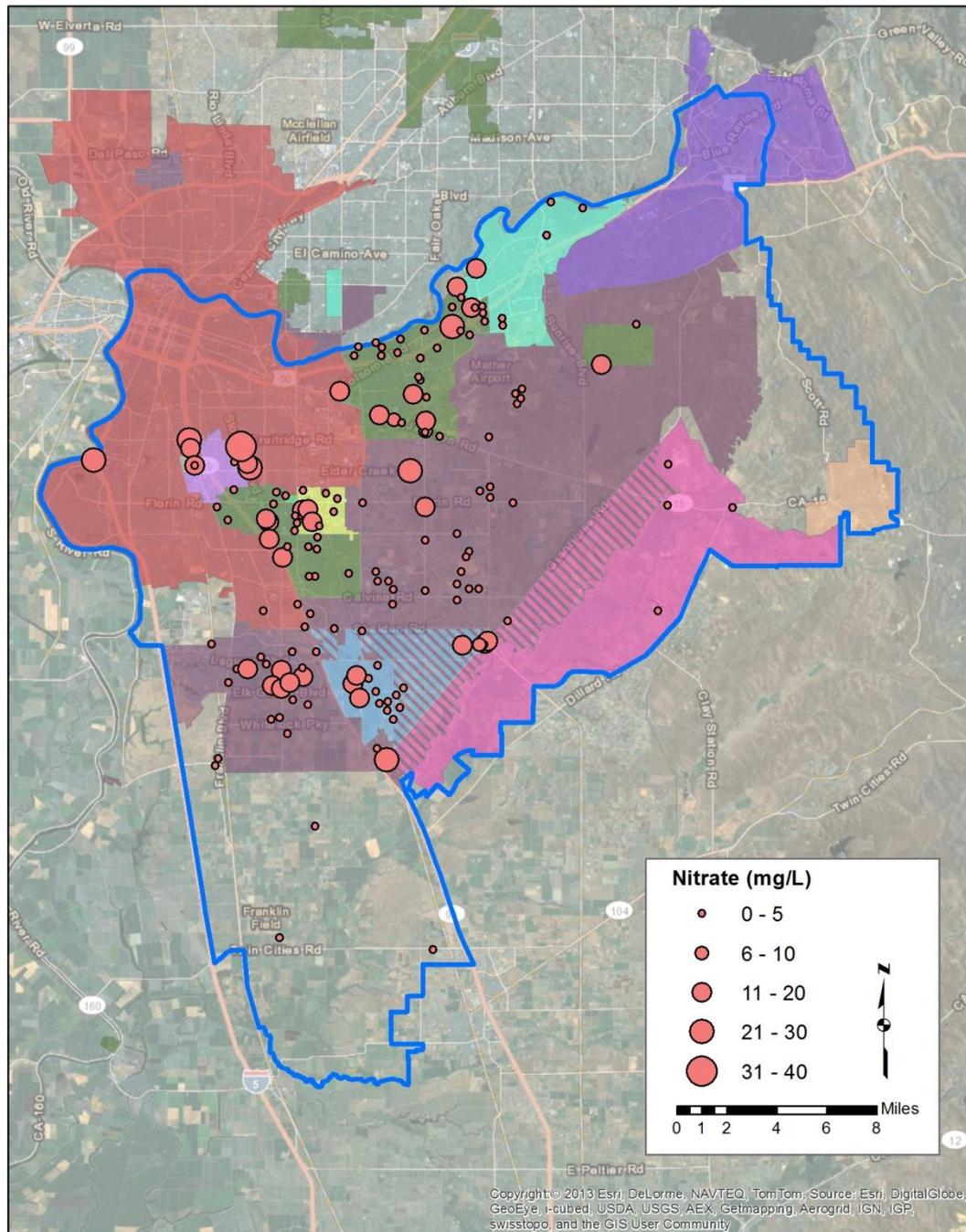
Arsenic, 2012

- MCL 10 $\mu\text{g}/\text{l}$



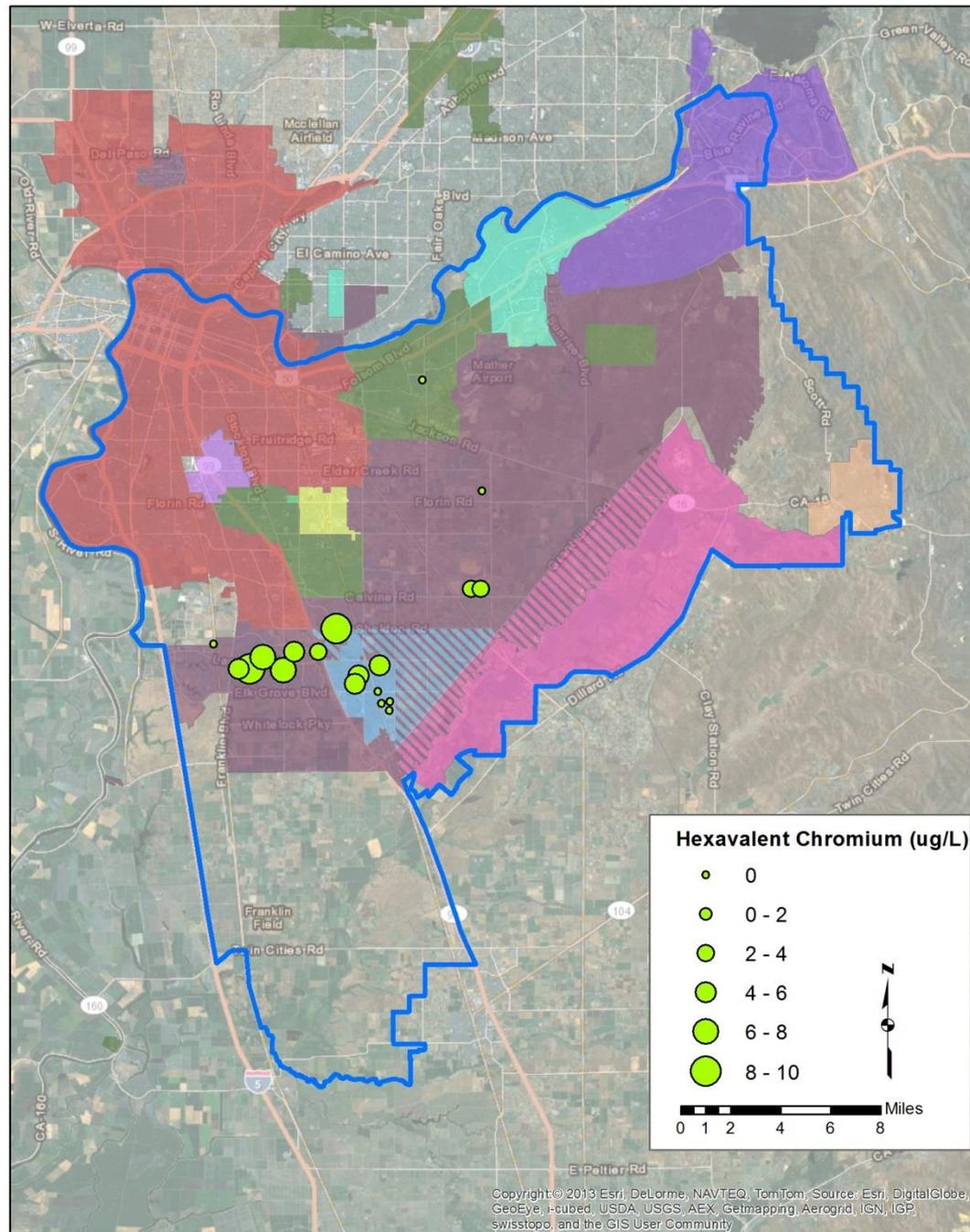
Nitrate, 2012

- MCL 45 mg/l

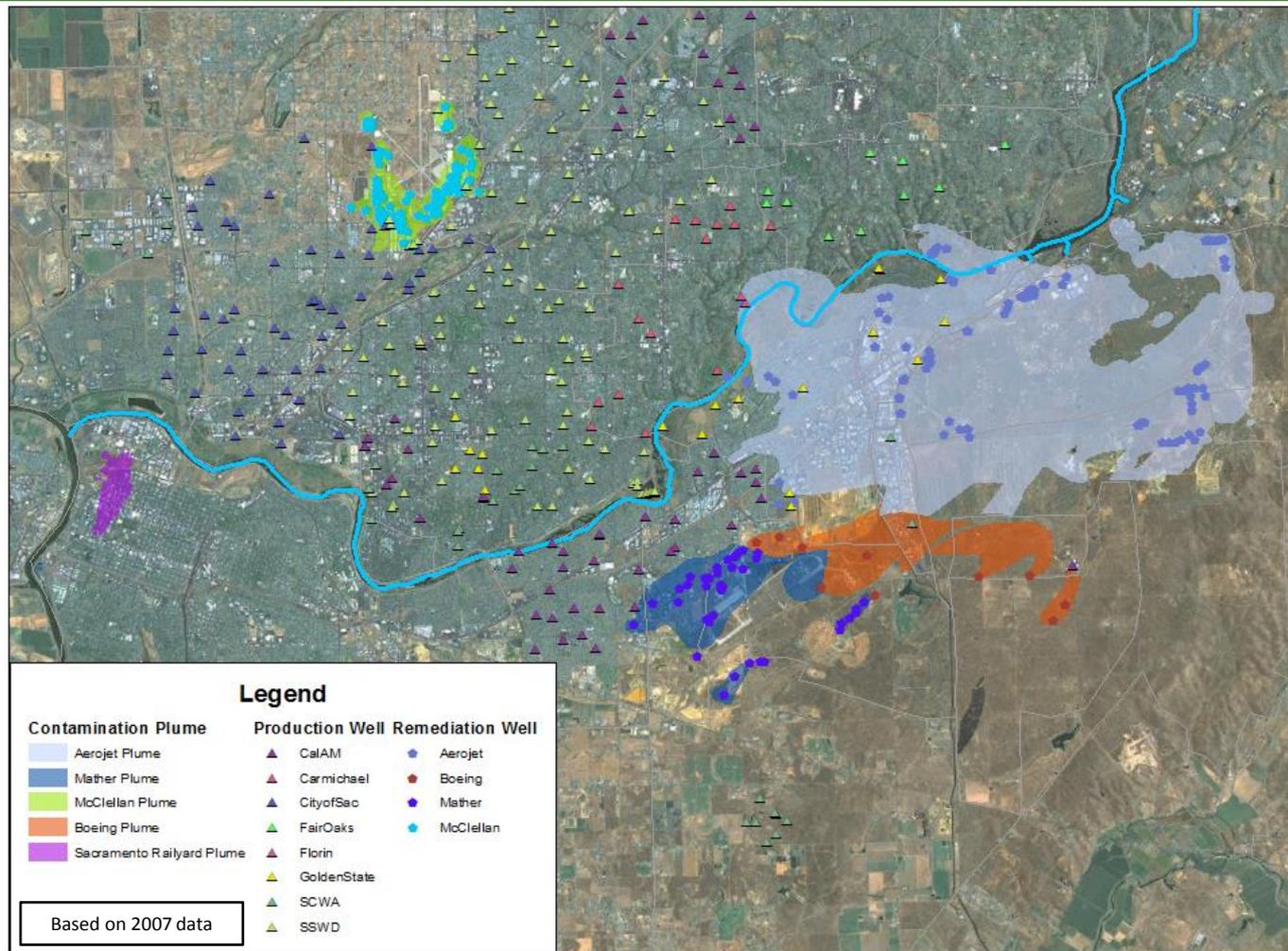


Hexavalent Chrome 2012

- Proposed MCL
 $10 \mu\text{g}/\text{l}$



“Principal” Contaminant Plumes, 2007



Activities

- Public Outreach
- HydroDMS
- Well Protection Plan
- Agriculture/Agriculture Residential Water Conservation
- Control of the Migration and Remediation of Contaminated Water
- CASGEM

Recommendations

- Develop Groundwater Accounting Program
- Maintain and Update HydroDMS and groundwater model
- Update the GMP
- Update Monitoring Program

Thank You

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