

# CASGEM Update for the California Water Commission

March 19, 2014

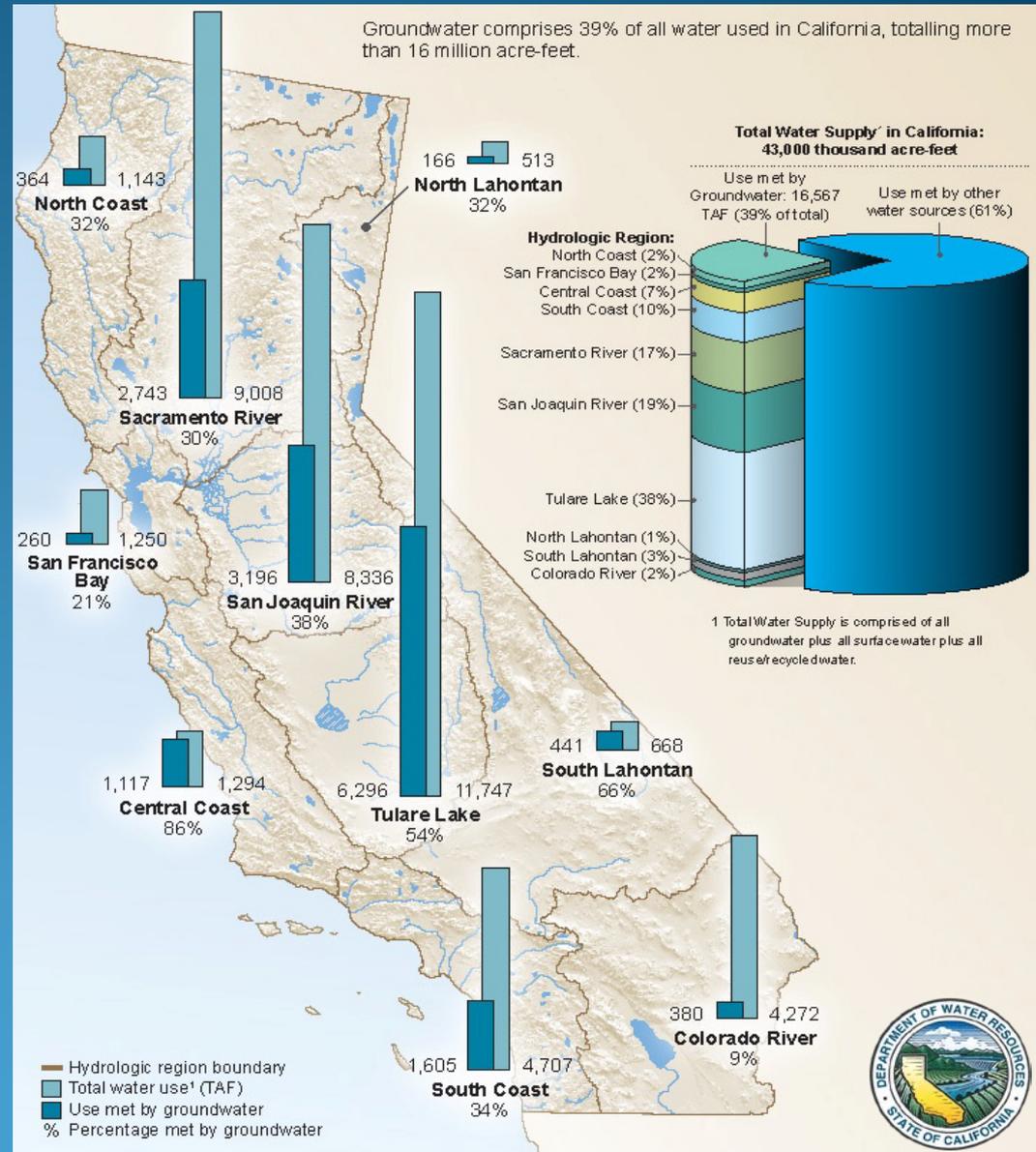
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Department of Water Resources



# Groundwater Use in California

Groundwater accounts for almost 40% of CA water supply

Average annual groundwater use  
16.5 Million acre-feet  
(2005 – 2010)



# California Water Action Plan

## Action 6 - Expand Water Storage Capacity & Improve Groundwater Management

- Provide Essential Data to Enable Sustainable Groundwater Management

Expand and fund CASGEM

Emergency Drought Funding CASGEM & WCR  
CASGEM/WCR in Governor's FY 14/15 budget

- Update Bulletin 118, California's Groundwater  
Systematic evaluation of groundwater basins  
No funding in FY 14/15 budget



# California Statewide Groundwater Elevation Monitoring (CASGEM)

Voluntary, long-term program to collect groundwater elevations statewide

- Collaboration between DWR and local agencies
- Local agencies collect groundwater elevation data to demonstrate seasonal and long-term trends
- Data readily and widely available to the public
- Requires DWR to prioritize groundwater basins, investigate groundwater basins, and provide status reports to Governor and Legislature
- CASGEM data augments groundwater data collected under other programs



# Program Accomplishments

- ✓ Conducted outreach with local agencies
- ✓ Developed and implemented the online system
- ✓ Notifications from prospective monitoring entities began January 2011
- ✓ Groundwater elevation data submittal began by January 2012
- ✓ DWR completed report for the Governor and Legislature in January 2012
- ✓ Monitoring entities designated for basins/subbasins
- ✓ Addressed alternate monitoring where appropriate
- ✓ Groundwater elevation data continues to be uploaded



# Selected CASGEM Statistics

(as of February 13, 2014)



- 200 Designated Notifications
  - ✓ 167 basins/subbasins (or portion)
  - ✓ 76 Designated Monitoring Entities
- 4,484 CASGEM wells (since 2012)
- >100,000 records (includes historical data)



# CASGEM Statewide Basin Prioritization Process

## Statewide Data Sets

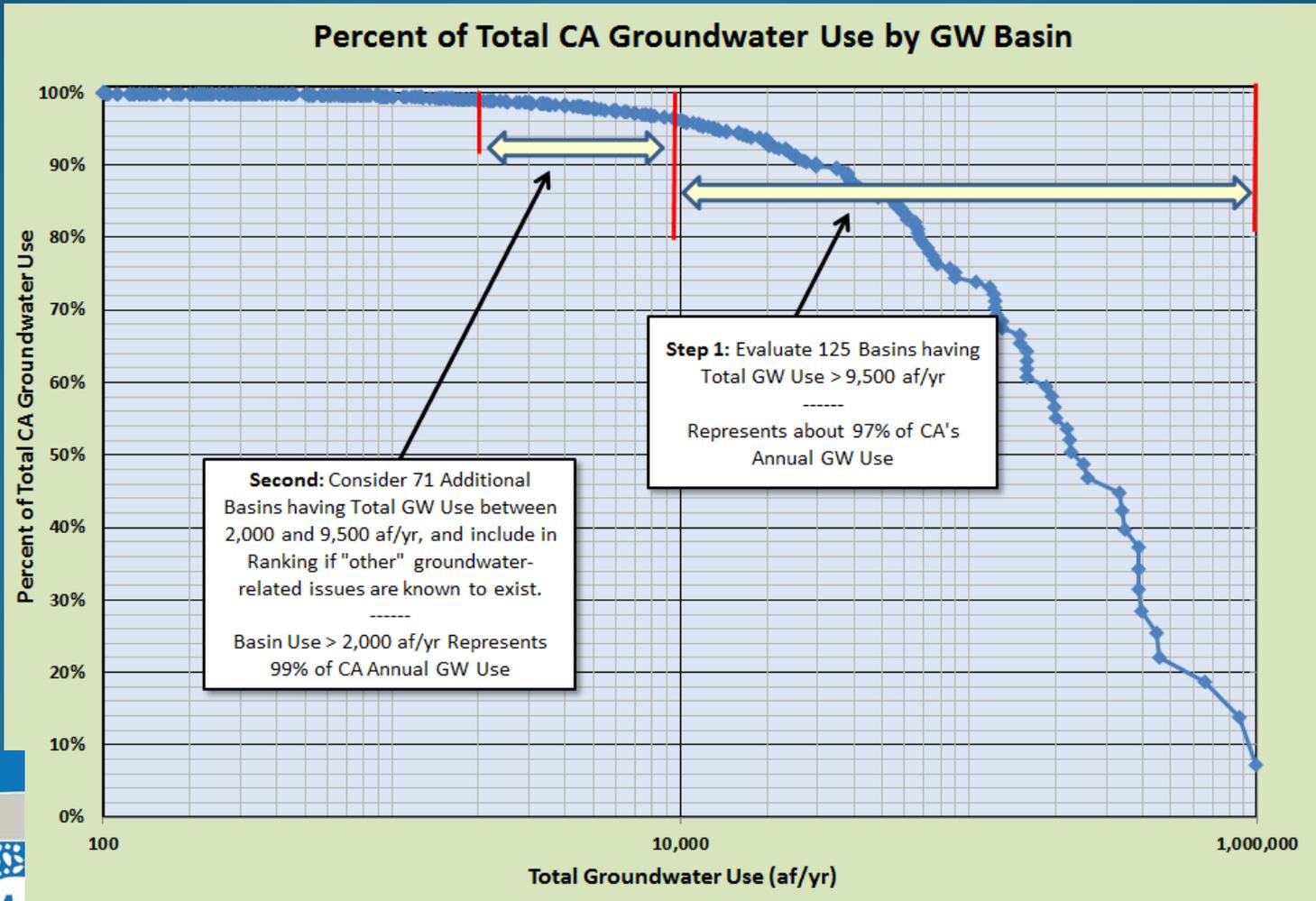
1. Population
2. Population Growth
3. Number of Public Supply Wells
4. Total Number of Wells
5. Irrigated Acreage
6. Groundwater Reliance
7. Documented Impacts
8. Other Information



# CASGEM Basin Prioritization Process

*Initial Steps: Statewide Assessment of GW Use by GW Basin*

Consider Prioritization of all basins with GW Use  $\geq 2,000$  ac-ft/year





# CASGEM Basin Prioritization Process

**Next Steps: Develop Data Distribution Ranking Ranges and Values for Data Components 1 - 6**

**Data Ranking Values = 0-5 for each Data Component**

Data Component Ranking	Data Component Ranking Value	Data Components and Ranking Ranges						
		Population		PSW Density	Total Well Density	Irrigated Acreage	Groundwater Reliance	
		Density	Projected Growth				GW Use	% of Total Supply
		per sq-mi	%	per sq.-mi	per sq. mi	ac/sq-mi	ac-ft/acre	%
Very Low	0	<7	<0	<0.01	<0.01	<0.1	<0.3	<0.1
Low	1	7 - 250	0 - 6.0	0.01 - 0.1	0.01 - 2.0	0.1 - 60	0.3 - 20	0.1 - 20
Moderately Low	2	251 - 1000	6.1 - 15	0.11 - 0.25	2.1 - 5.0	61 - 115	0.21 - 0.4	21 - 40
Medium	3	1001 - 2500	15.1 - 25	0.26 - 0.50	5.1 - 10.0	116 - 250	0.41 - 0.6	41 - 60
Moderately High	4	2501 - 4000	25.1 - 40	0.51 - 1.0	10.1 - 20	251 - 350	0.61 - 0.8	61 - 80
High	5	≥ 4000	≥ 40%	≥ 1.0	> 20	> 350	> 0.8	> 80%

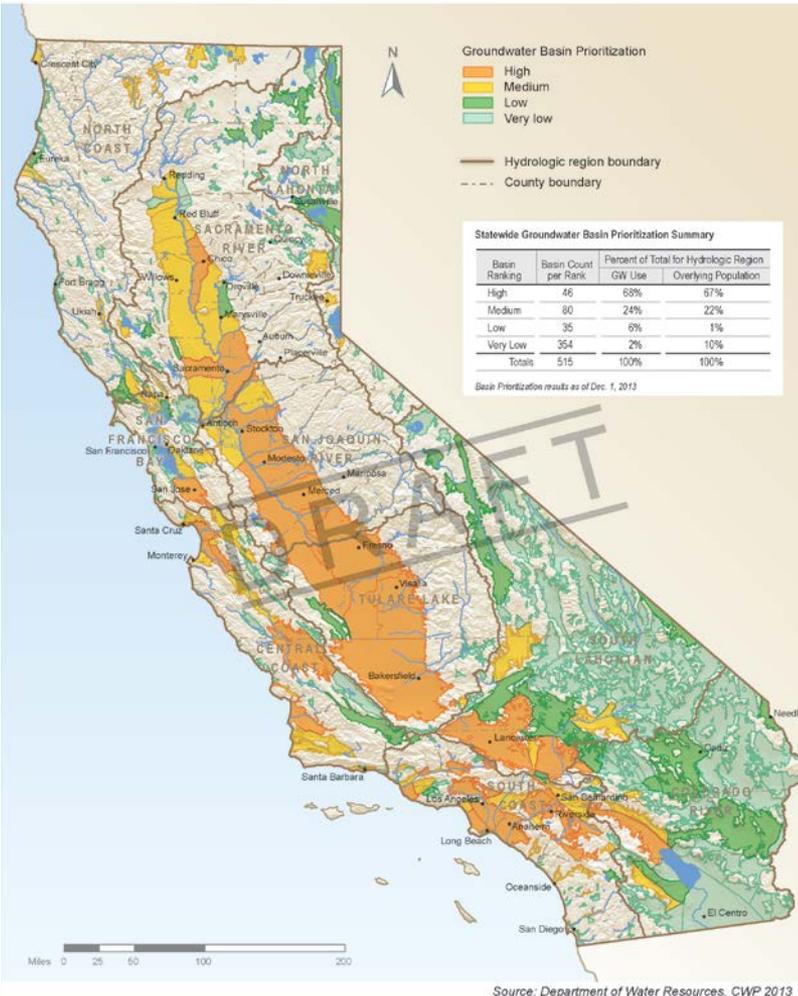
*Note: Population growth is percent growth from 2010 to 2030*

**Data Ranges based on Distribution of data for each Data Component**

# Draft CASGEM Basin Prioritization

## Statewide Results

California Groundwater Basins Prioritization



# CASGEM Basin Prioritization

## Statewide Breakdown by Hydrologic Region

Hydrologic Region	CASGEM Groundwater Basin Priority by Ranking Range and Hydrologic Region				HR Basin Count	Percent of Total Groundwater Use and Overlying Population for High & Medium Ranked Basins	
	High priority	Medium priority	Low priority	Very Low priority		Overlying Groundwater Use *	Overlying Population *
	Ranking Range > 19.7	Ranking Range 12.6 - 19.6	Ranking Range 5.5 - 12.5	Ranking Range < 5.4			
North Coast	0	8	2	53	63	84%	74%
San Francisco	1	6	1	25	33	88%	63%
Central Coast	8	16	1	35	60	91%	96%
South Coast	14	22	5	32	73	96%	94%
Sacramento River	5	16	7	60	88	89%	97%
San Joaquin River	7	2	0	2	11	99%	99%
Tulare Lake	7	1	1	10	19	98%	98%
North Lahontan	0	2	2	23	27	9%	55%
South Lahontan	2	3	7	65	77	55%	94%
Colorado River	2	4	9	49	64	77%	65%
<b>Statewide</b>	<b>46</b>	<b>80</b>	<b>35</b>	<b>354</b>	<b>515</b>	<b>92%</b>	<b>89%</b>

**Note:** \* Estimated percentages are based on total groundwater use and population overlying all alluvial groundwater basins in the hydrologic region.



# Basin Prioritization Results

- Prioritization does not reflect basin management or monitoring
- Preliminary Statewide Results
  - ✓ 46 High Priority Basins
  - ✓ 80 Medium Priority Basins
  - ✓ 35 Low Priority Basins
  - ✓ 354 Very Low Priority Basins
- 75% are Low and Very Low Priority Basins
- 25% are High and Medium Priority Basins
  - ✓ 92% of groundwater use, 89% of population overlying the groundwater basin



# How Will the CASGEM Program Use the Basin Prioritization?

- Utilize prioritized results and assess groundwater basins on a statewide scale.
- Focus on evaluating the status of groundwater level monitoring in High and Medium Priority groundwater basins, where monitoring has greatest benefit.
- Does not diminish importance of groundwater on the local scale



# How Else Could Basin Prioritization Be used?

- Promote informed decision making
- Provide a common understanding of the statewide significance of the 515 groundwater basins and subbasins
- Prioritize allocation of limited resources
- Identify and prioritize basins needing to improve groundwater management practices



# Next Steps for FY 13/14

- Identify High and Medium Priority Basins that are not monitored and/or not designated with a Monitoring Entity
  - Preliminary results (as of Feb 13, 2014):
    - 60% (75) of High and Medium Priority basins are monitored under CASGEM
    - 8% (10) of High and Medium Priority Basins are partially monitored under CASGEM
    - 32% (41) of High and Medium Priority Basins are not monitored under CASGEM



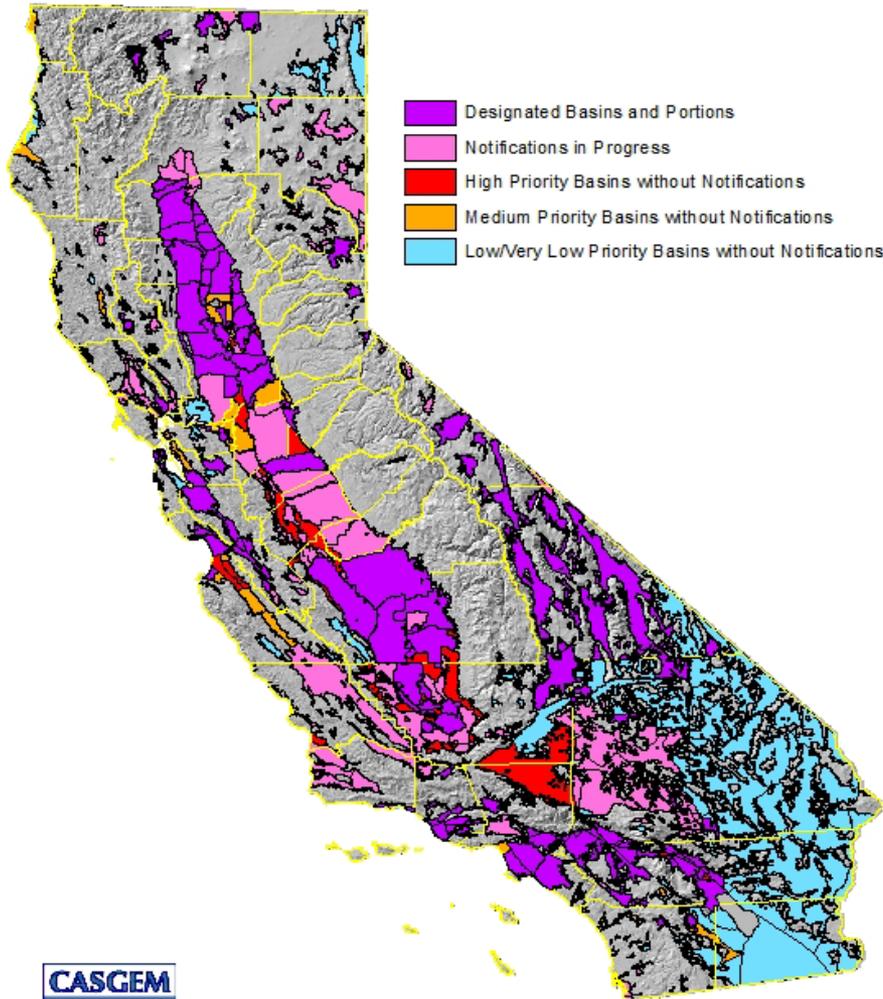
# Future CASGEM Efforts

## Emergency Drought Funding and Governor's Budget

- Continue designation of Monitoring Entities
- Evaluate extent of groundwater monitoring
- Using prioritization results, collaborate with local agencies to conduct groundwater basin assessments
- Identify regional trends
- Identify basins subject to overdraft
- Update Bulletin 118 boundaries
- Potentially INSAR data for subsidence



## Statewide Results as of February 13, 2014



167 groundwater basins/subbasins (including 68% of the 126 classified as high to moderate use) are fully or partially monitored under the California Statewide Groundwater Elevation Monitoring (CASGEM) Program

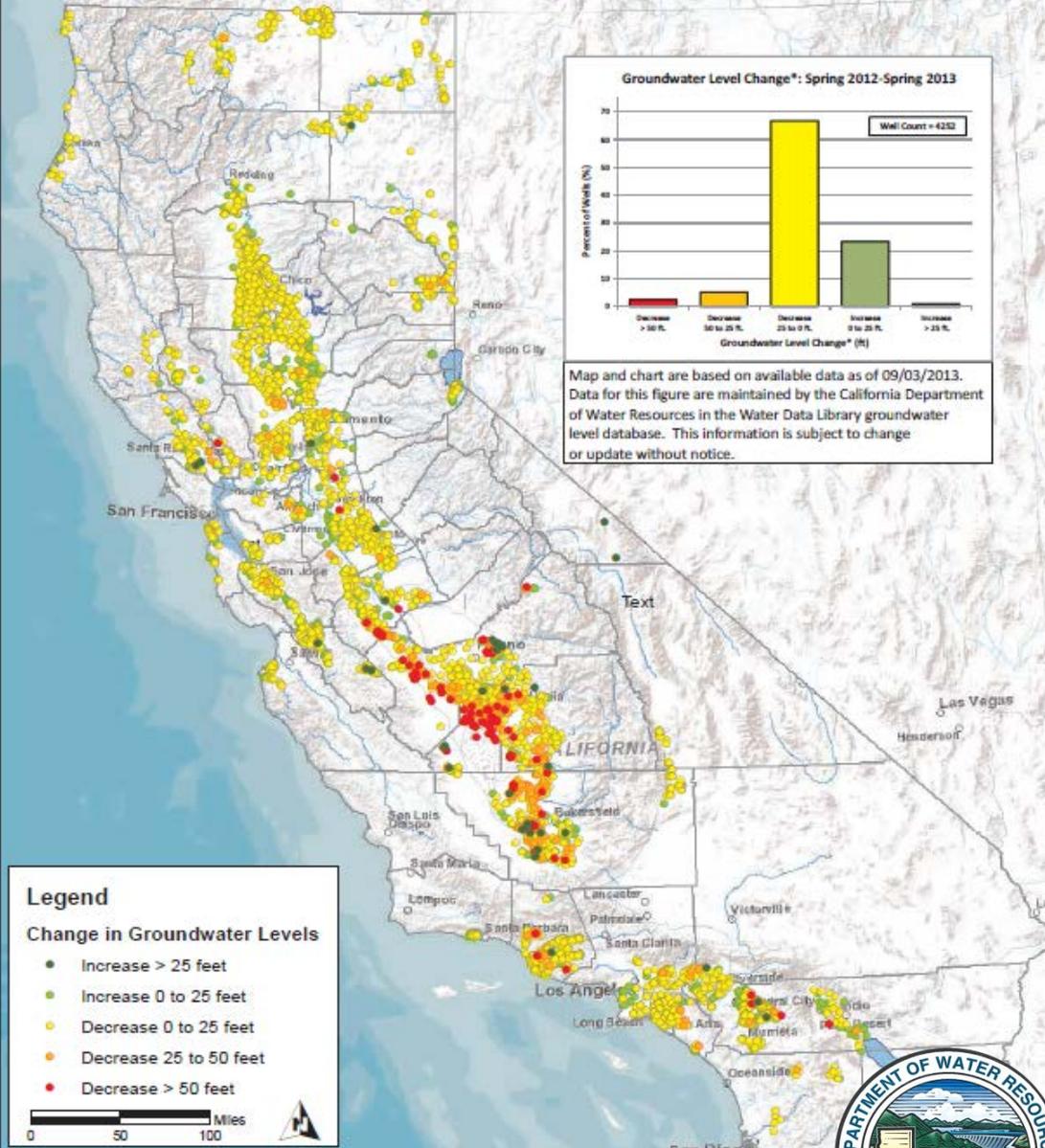


# Statewide Groundwater Level Change

Spring 2012 to Spring 2013



## Preliminary Annual Groundwater Level Change\* Spring 2012 to Spring 2013

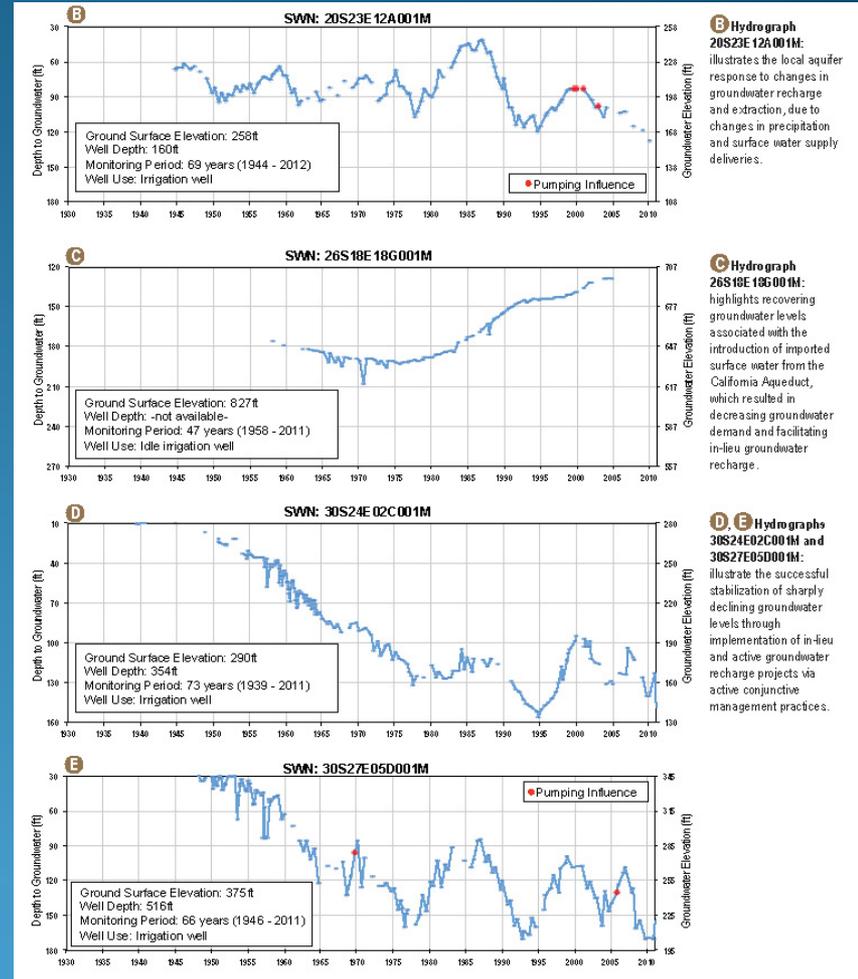


\*Groundwater level change determined from water level measurements in wells



# Tulare Lake Region

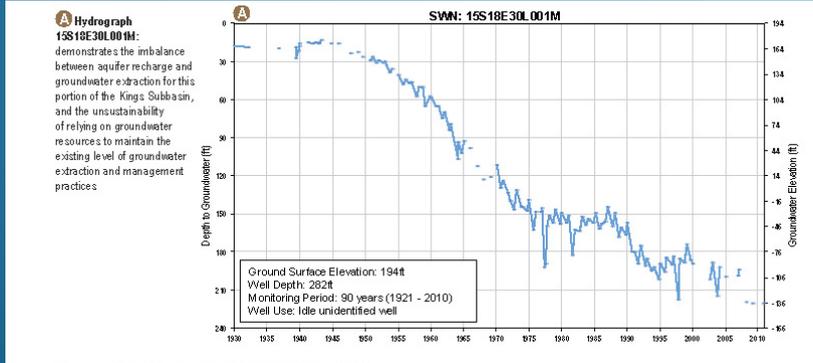
# Regional Hydrographs



**B Hydrograph 20S23E12A001M:** illustrates the local aquifer response to changes in groundwater recharge and extraction, due to changes in precipitation and surface water supply deliveries.

**C Hydrograph 26S18E18G001M:** highlights recovering groundwater levels associated with the introduction of imported surface water from the California Aqueduct, which resulted in decreasing groundwater demand and facilitating in-lieu groundwater recharge.

**D, E Hydrographs 30S24E02C001M and 30S27E05D001M:** illustrate the successful stabilization of sharply declining groundwater levels through implementation of in-lieu and active groundwater recharge projects via active conjunctive management practices.

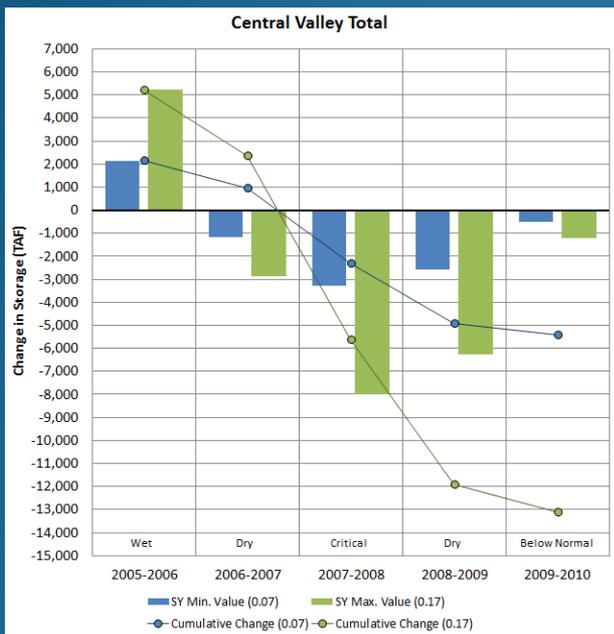


**A Hydrograph 15S18E30L001M:** demonstrates the imbalance between aquifer recharge and groundwater extraction for this portion of the Kings Subbasin, and the unsustainability of relying on groundwater resources to maintain the existing level of groundwater extraction and management practices



# CWP Change in GW Storage

## 2005 – 2010 Central Valley

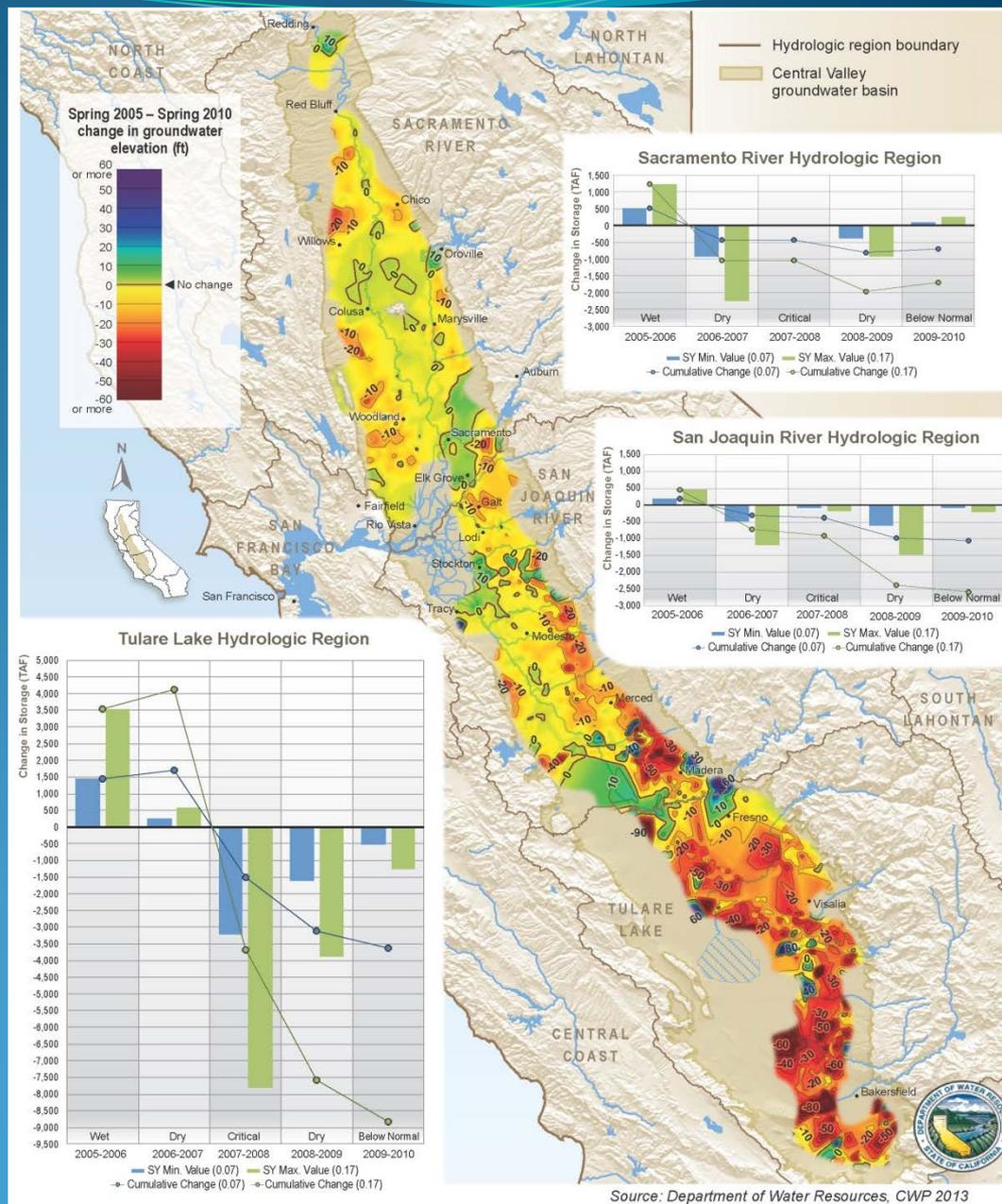


SR: -0.7 to -1.7 MAF

SJR: -1.0 to -2.6 MAF

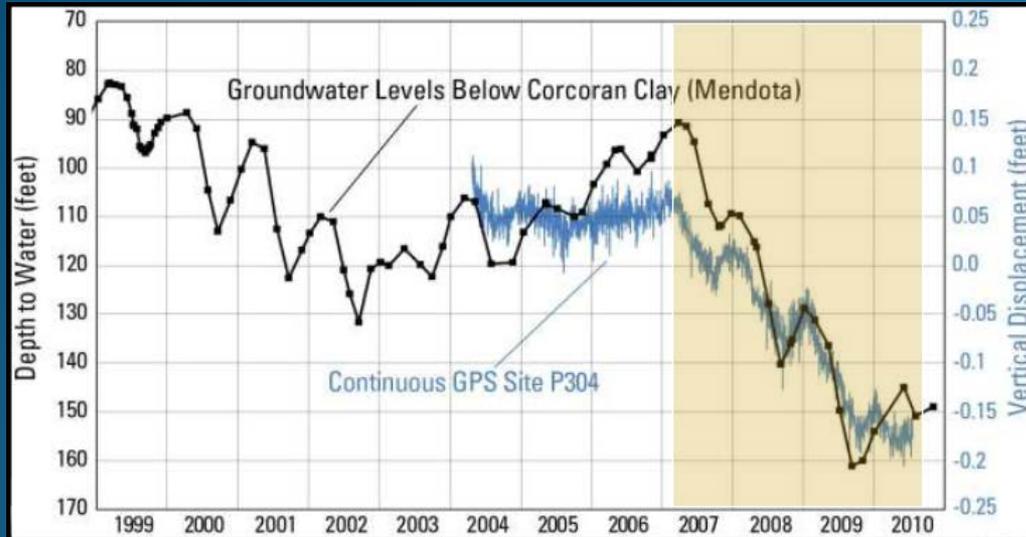
TL: -3.7 to -8.9 MAF

CV Total: -5.4 to -13.2 MAF

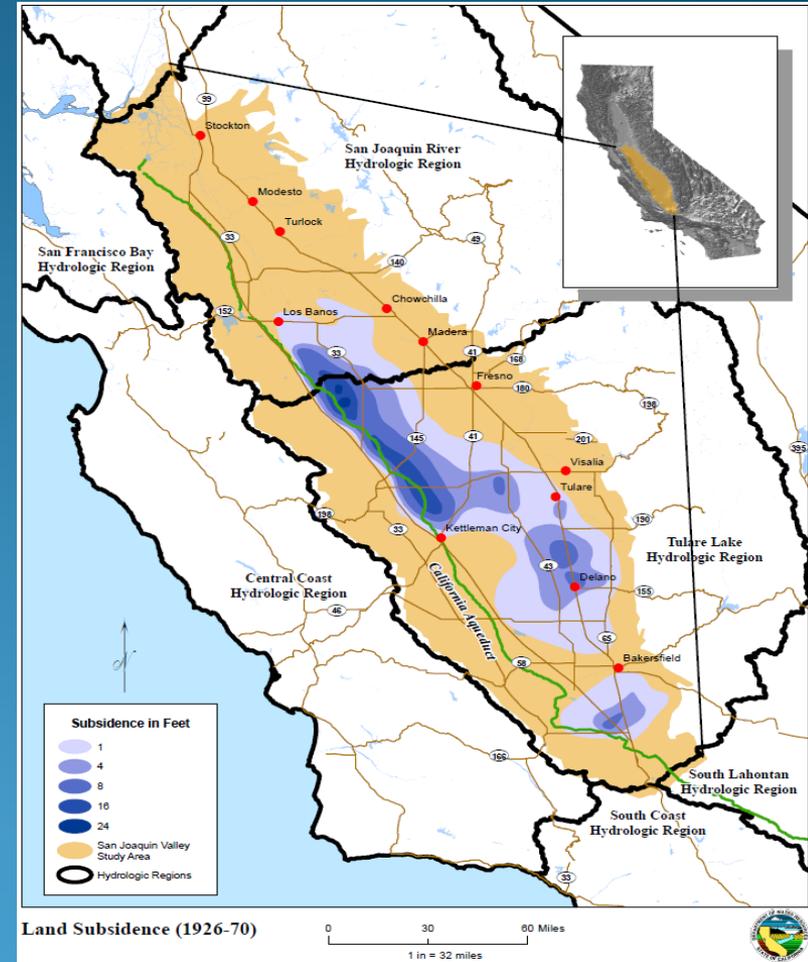


# CWP Groundwater Content

## Renewed Land Subsidence



Renewed land subsidence threatens infrastructure, buildings, water delivery systems, and long-term water supply capacity.



Adapted from Ireland, 1983.

# Historical Perspective

Harvey O. Banks, DWR Director, 1957

*“Groundwater looms very large in the total water picture in California and the formation and implementation of plans to meet our needs for water in the future.*

*.... We are seriously lacking in the data and information necessary for planned utilization of groundwater.*

*.... In planned utilization of groundwater basins, remember we are dealing not only with engineering and hydraulic problems; we are also dealing with legal and financial problems.”*



# Questions?



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