



California's Groundwater Update 2013:

A Compilation of Enhanced Content for
California Water Plan Update 2013

San Francisco Bay, South Coast, and Sacramento River

July 27, 2015

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Chronology of Groundwater Content in Previous Water Plans

CWP UPDATE	CHRONOLOGY OF GROUNDWATER CONTENT IN THE CALIFORNIA WATER PLAN
1957	<ul style="list-style-type: none"> Groundwater is discussed primarily in terms of additional storage capacity and water supply.
1970	<ul style="list-style-type: none"> Discussed what is required to locally manage groundwater basins, including potential new regulations.
1974	<ul style="list-style-type: none"> Discussed groundwater policy to limit development. Described groundwater basin by region. Provided map of San Joaquin Valley aquifer levels in wet and dry periods.
1983	<ul style="list-style-type: none"> Acknowledged groundwater data limitations.
1987	<ul style="list-style-type: none"> Discussed overdraft. Provided examples of managed basins. Mentioned conjunctive use and the Kern Water Bank.
1993	<ul style="list-style-type: none"> Provided groundwater supply estimates. Provided groundwater use by hydrologic region.
1998	<ul style="list-style-type: none"> Described overdraft as unsustainable. Acknowledged relationship between overdraft rates and surface water supply availability.
2005	<ul style="list-style-type: none"> Introduced groundwater-related resource management strategies.
2009	<ul style="list-style-type: none"> Expanded discussion of groundwater-related resource management strategies: <ul style="list-style-type: none"> Conjunctive management and groundwater storage. Groundwater and aquifer remediation. Recycled Municipal Water. Recharge Area Protection.
	<ul style="list-style-type: none"> Recommended expanded groundwater content for future CWP updates.

California's Groundwater Update 2013



Three Main Goals

1. Improve statewide and regional understanding of groundwater conditions and management.
2. Identify data gaps and groundwater management challenges.
3. Develop recommendations to improve groundwater management in California.

California's Groundwater Update 2013

A Compilation of
Enhanced Content for
California Water Plan
Update 2013

April 2015

State of California
Natural Resources Agency
Department of Water Resources

California's Groundwater Update 2013

Report Organization

- Findings, Data Gaps, and Recommendations
- Chapter 1 – Introduction, Scope, and Future Directions
- Chapter 2 – Statewide Update
- Chapter 3 – North Coast
- Chapter 4 – San Francisco Bay
- Chapter 5 – Central Coast
- Chapter 6 – South Coast
- Chapter 7 – Sacramento River
- Chapter 8 – San Joaquin River
- Chapter 9 – Tulare Lake
- Chapter 10 – North Lahontan
- Chapter 11 – South Lahontan
- Chapter 12 – Colorado River



California's Groundwater Update 2013

Report Organization

Technical Appendices

- Appendix A – Methods and Assumptions
- Appendix B – CASGEM Basin Prioritization
- Appendix C – Groundwater Use Data
- Appendix D – Conjunctive Management Survey Results
- Appendix E – Changes in Groundwater in Storage Data
- Appendix F – Land Subsidence





California's Groundwater Update 2013

A Comprehensive Report

1. Introduction

2. Findings, Data Gaps, and Recommendations

3. Groundwater Supply and Development

Alluvial Aquifers

Fractured-Rock Aquifers

Well Infrastructure ←

CASGEM Basin Prioritization ←

4. Groundwater Supply

Average Annual Groundwater Supply ←

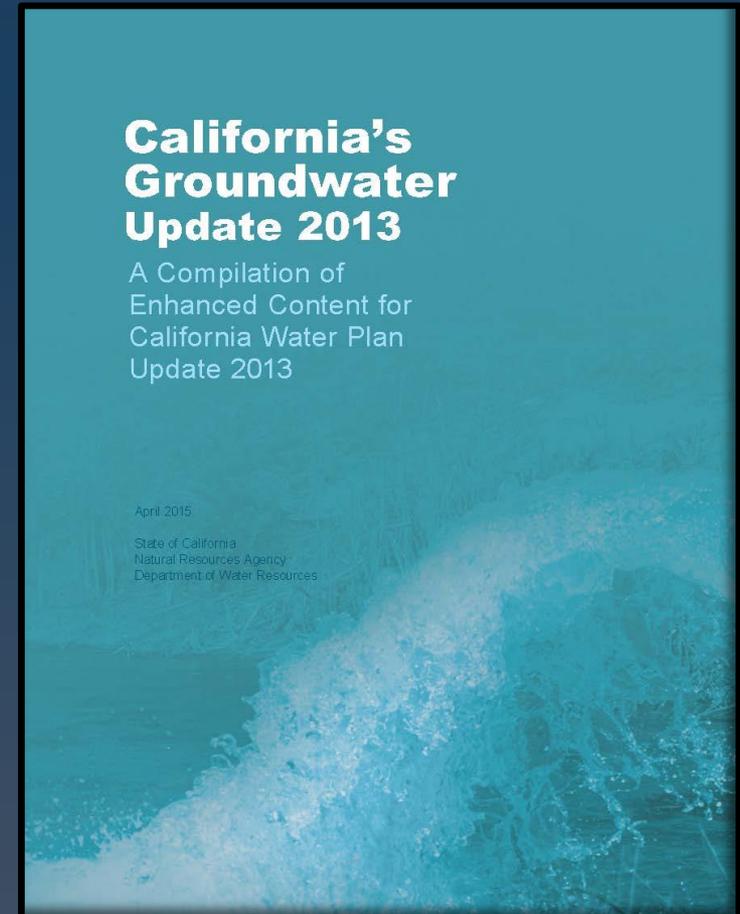
Change in Annual Groundwater Supply ←

5. Groundwater Monitoring Efforts

Groundwater Level Monitoring

Groundwater Quality Monitoring

Land Subsidence Monitoring





California's Groundwater Update 2013

A Comprehensive Report

6. Aquifer Conditions

- Depth to Groundwater ←
- Groundwater Elevations ←
- Change in Groundwater in Storage ←
- Groundwater Level Trends ←
- Groundwater Quality
- Land Subsidence

7. Groundwater Management

- GWMP Inventory ←
- GWMP Assessment ←
- Court Adjudications ←
- Groundwater Ordinances ←
- Special Act Districts
- Other Groundwater Management Planning Efforts

8. Conjunctive Management Inventory

- Conjunctive Management Inventory Results

9. References



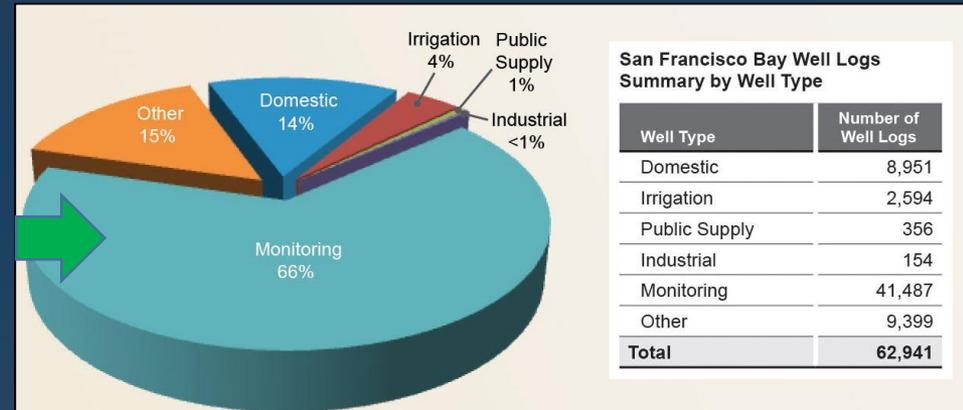


San Francisco Bay South Coast Sacramento River

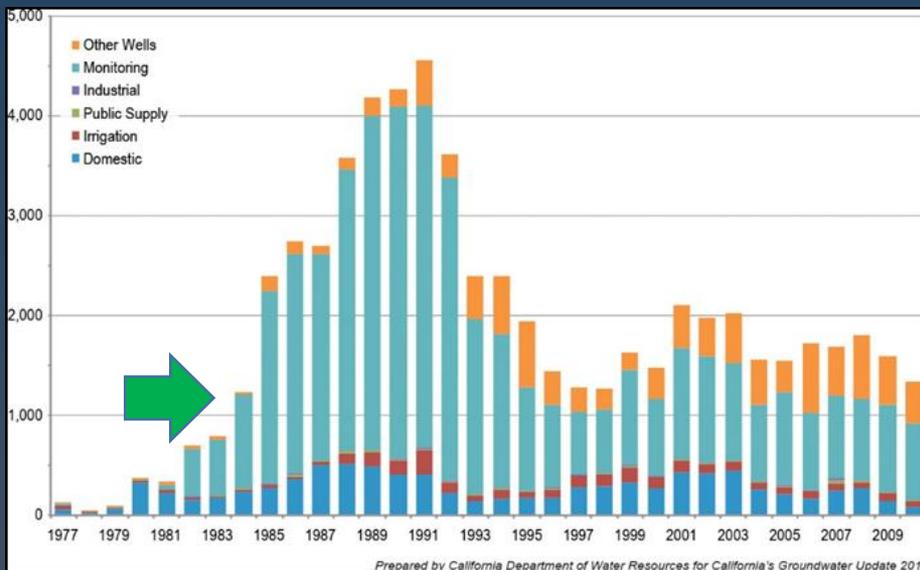
Well Infrastructure and Distribution

San Francisco Bay HR

- Monitoring - 1984 Underground Storage Tank program
- Housing trends – little impact to domestic well construction



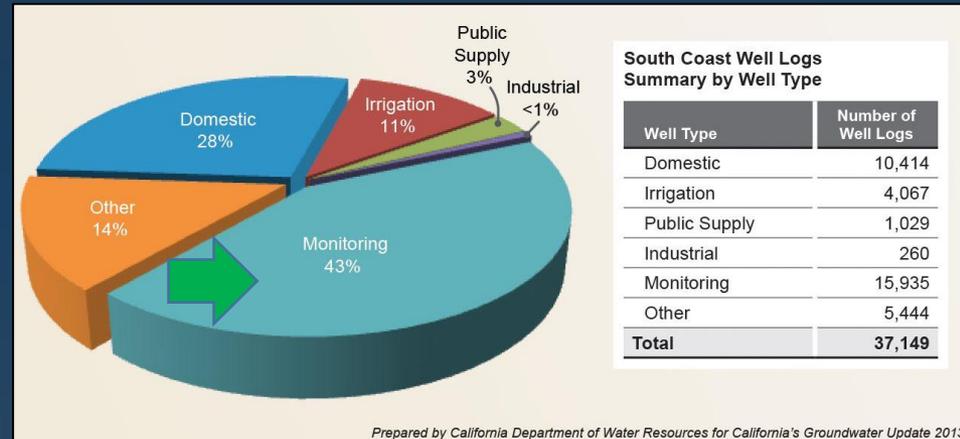
Prepared by California Department of Water Resources for California's Groundwater Update 2013



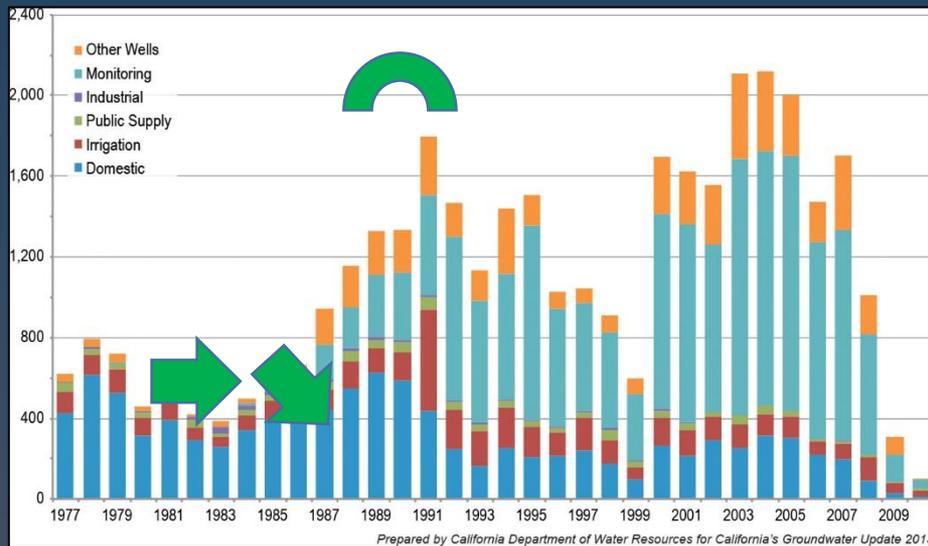
Well Infrastructure and Distribution

South Coast HR

- Dry years 87-92
- Monitoring – UGST
- New housing trends showing up in the domestic wells #



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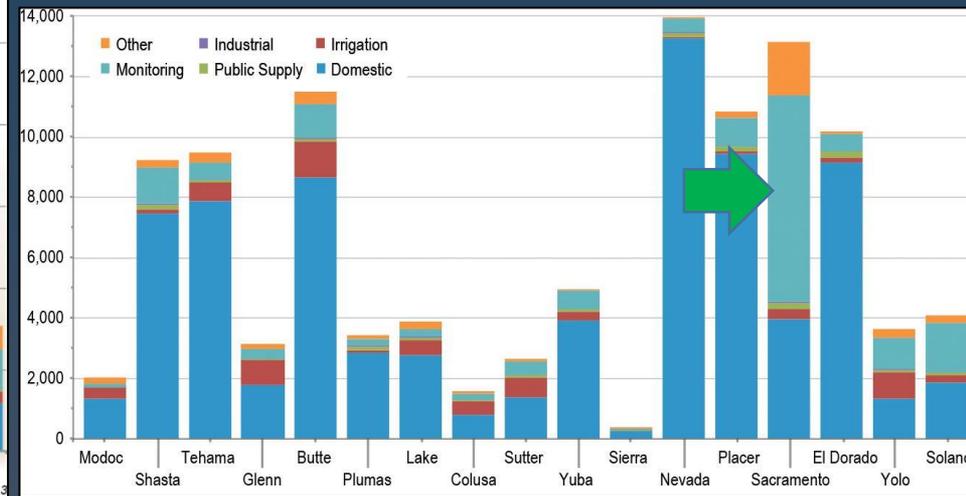
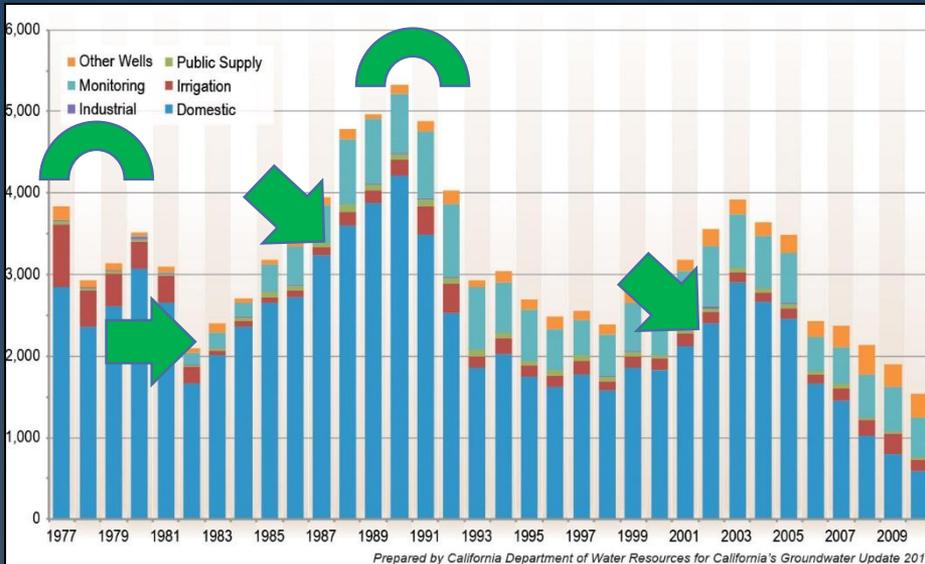
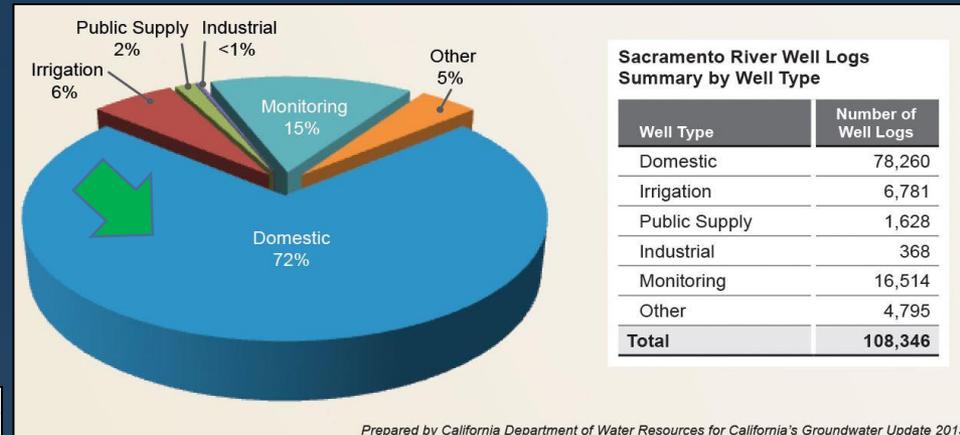
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Well Infrastructure and Distribution

Sacramento River HR

- Dry - late 70's, 87-92
- Monitoring – UGST
- New housing showing up in the domestic wells #





CASGEM Basin Prioritization

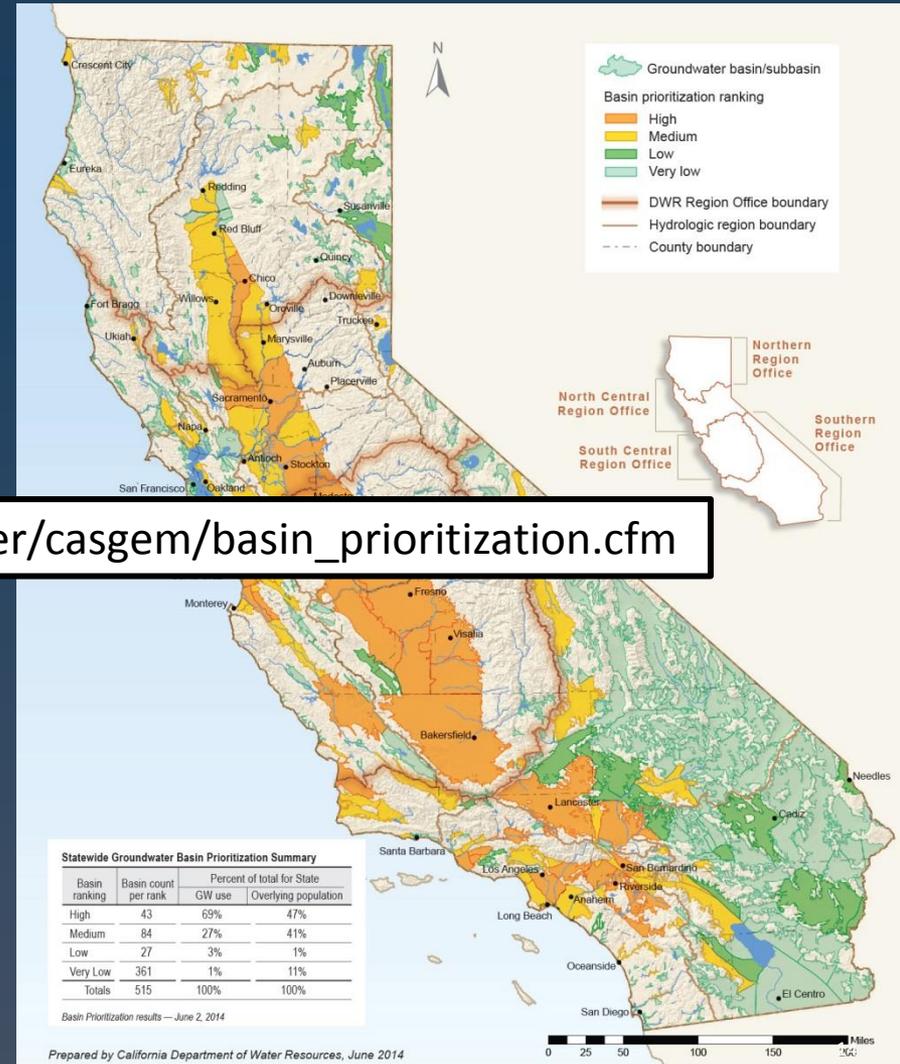
Statewide

- 515 alluvial basins/subbasins
- 127 high & medium priority basins account for:
 - 96% of average annual GW supply
 - 88% of 2010 population overlying basin area

• **SGMA**

http://water.ca.gov/groundwater/casgem/basin_prioritization.cfm

- 388 low and very low priority basins account for:
 - 4% of average annual GW supply
 - 12% of 2010 population overlying basin area



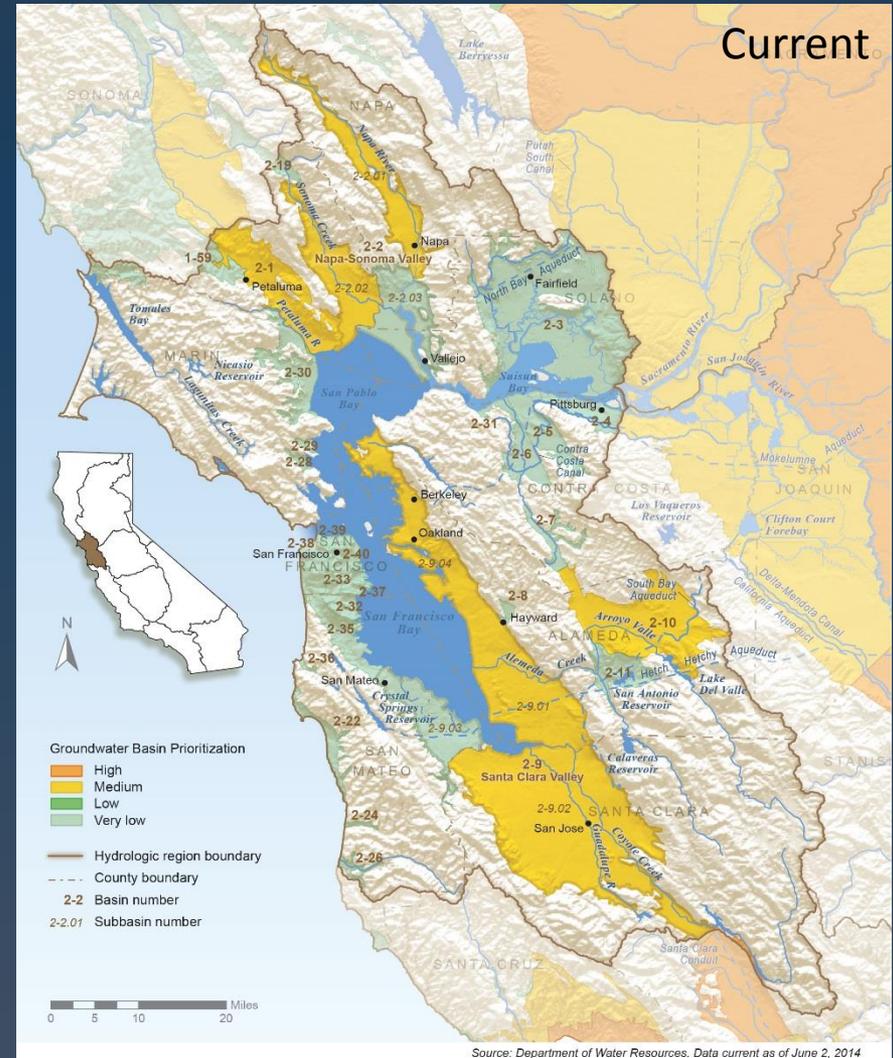
Basin Prioritization

San Francisco Bay HR

- Current Basin Priorities:

- High 0
- Medium 7
- Low 0
- Very Low 26

- High and Medium GW Use 90%
- High and Medium Population 63%

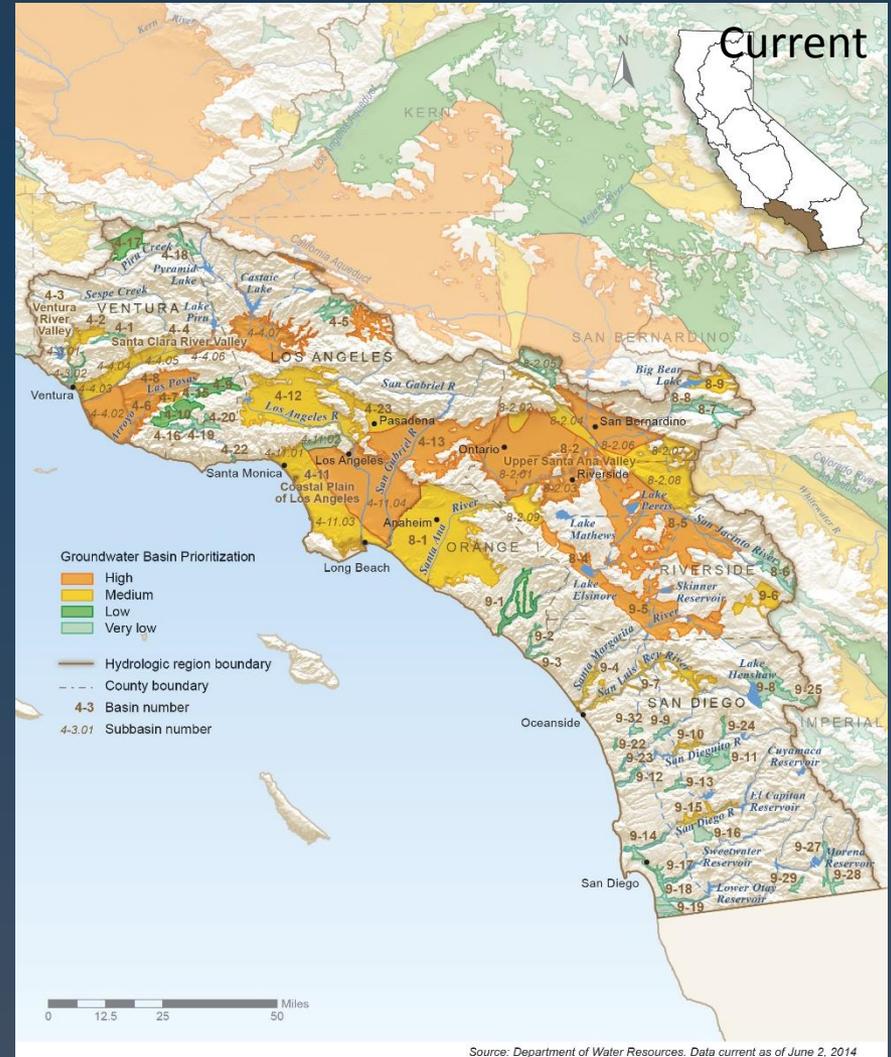


Basin Prioritization South Coast HR

- Current Basin Priorities:

- High 13
- Medium 22
- Low 4
- Very Low 34

- High and Medium GW Use 99%
- High and Medium Population 94%

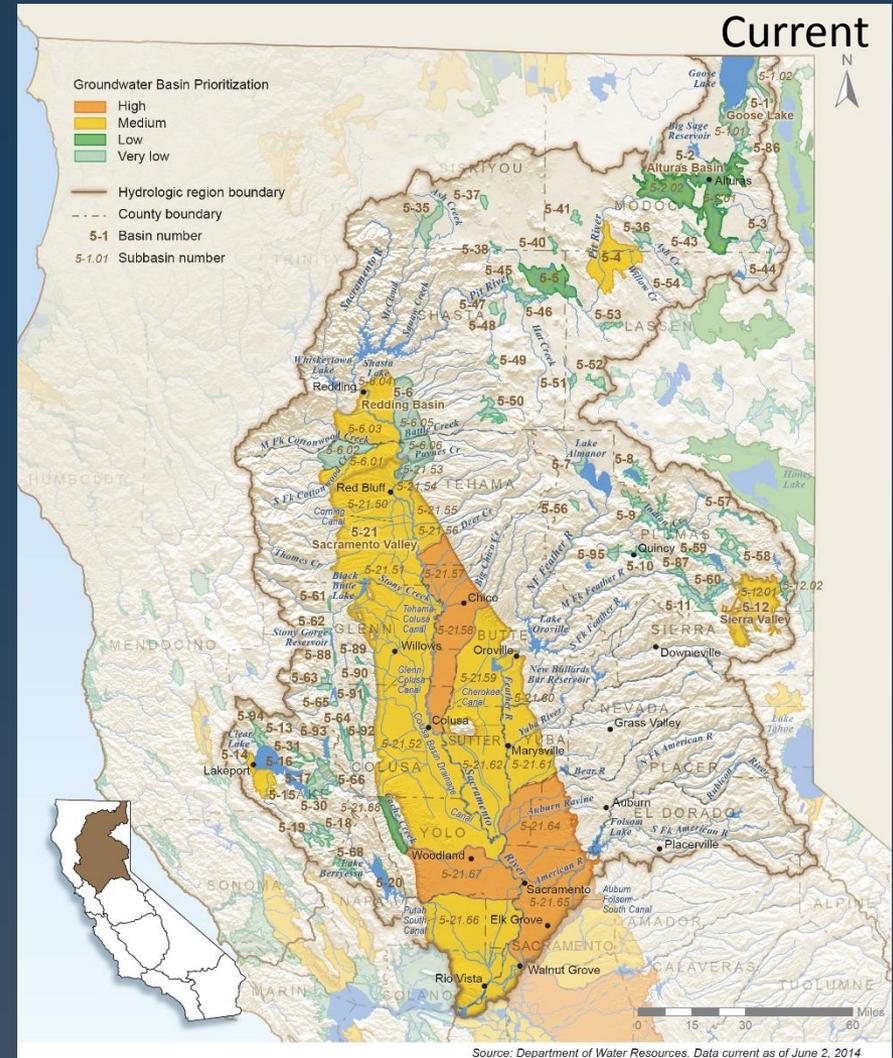


Basin Prioritization Sacramento River HR

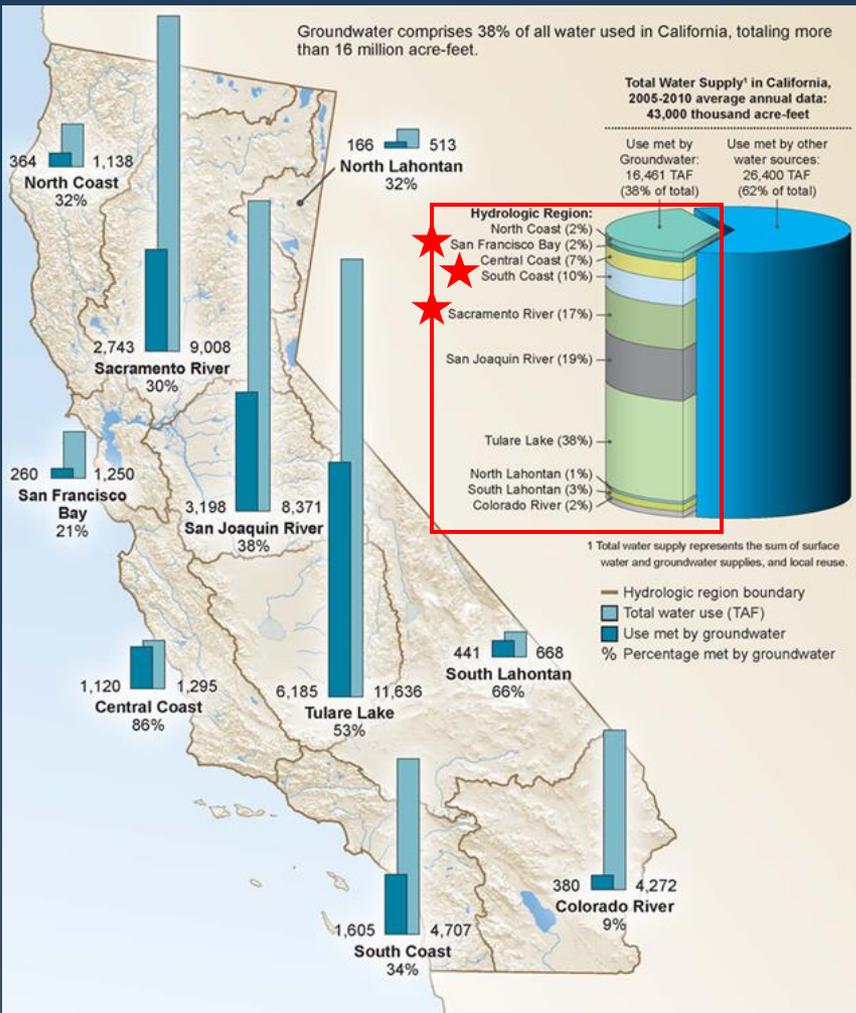
- Current Basin Priorities:

- High 5
- Medium 18
- Low 4
- Very Low 61

- High and Medium GW Use 96%
- High and Medium Population 98%



Groundwater Supply Data 2005-2010 Average



Total Water Supply

- 43 maf (43,000 taf)

Groundwater Supply

- 16.5 maf (16,461 taf)
- 38% of total supply

- GW Meets 39% of Total for Agricultural Use
- GW Meets 41% of Total for Urban Use

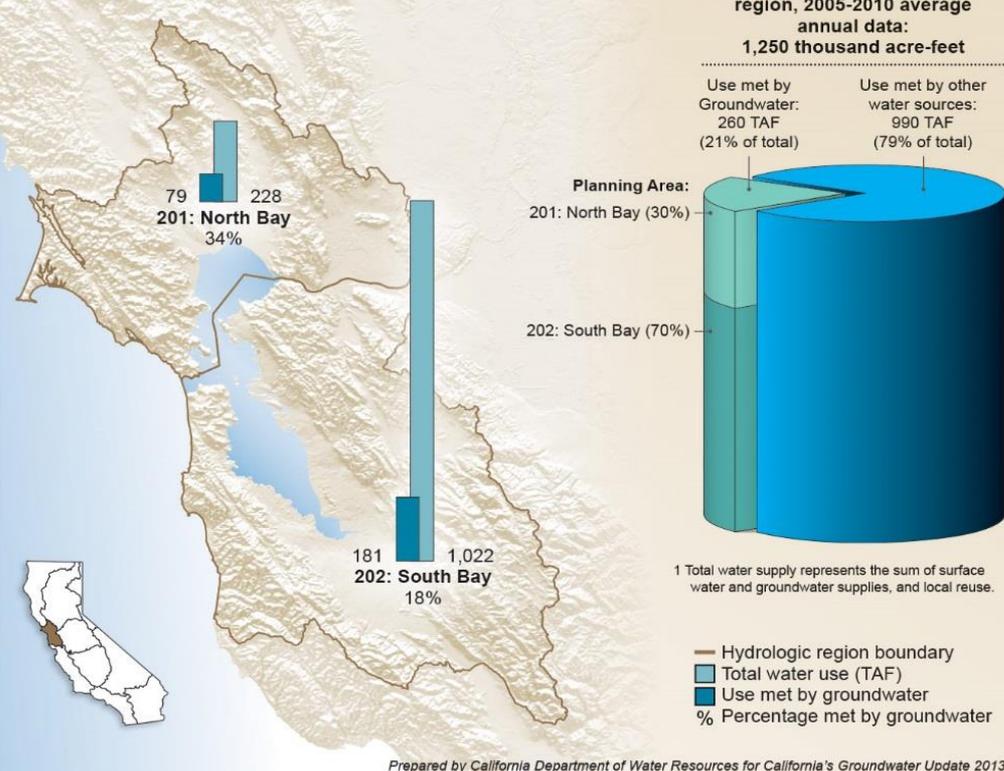
Average Annual Groundwater Use and Percent of Total Supply Met by Groundwater, by Hydrologic Region and by Type of Use (2005-2010)

Hydrologic Region	Agriculture Use Met by Groundwater		Urban Use Met by Groundwater		Managed Wetlands Use Met by Groundwater		Total Water Use Met by Groundwater	
	taf	%	taf	%	taf	%	taf	%
North Coast	301.3	41%	60.3	41%	2.5	1%	364.0	32%
San Francisco	76.1	74%	183.5	16%	0.0	0%	259.5	21%
Central Coast	906.1	91%	213.3	71%	0.0	0%	1,119.5	86%
South Coast	385.4	54%	1,219.6	31%	0.0	0%	1,605.0	34%
Sacramento River	2,294.2	30%	428.6	47%	20.1	4%	2,742.9	30%
San Joaquin	2,591.8	36%	415.9	58%	190.7	38%	3,198.4	38%
Tulare Lake	5,551.8	51%	604.0	82%	28.9	37%	6,184.8	53%
North Lahontan	118.4	27%	37.1	84%	10.7	48%	166.2	32%
South Lahontan	270.6	72%	170.3	58%	0.0	0%	440.9	66%
Colorado River	50.1	1%	329.7	53%	0.0	0%	379.7	9%
2005-2010 annual average California total:	12,545.7	39%	3,662.2	41%	252.9	18%	16,460.8	38%

Groundwater Supply (2005-2010)

San Francisco Bay HR

Groundwater comprises 21% of all water used in the San Francisco Bay hydrologic region, totaling more than 260 thousand acre-feet.



Total Water Supply

- 1,250 taf

Use met by surface water

- 990 taf or 79 percent of total supply

Use met by groundwater

- 260 taf or 21 percent of total supply

Groundwater Supply (2005-2010)

South Coast HR

Groundwater comprises 34% of all water used in the South Coast hydrologic region, totaling more than 1,605 thousand acre-feet.

Total Water Supply¹ in the South Coast hydrologic region, 2005-2010 average annual data: 4,707 thousand acre-feet

Use met by Groundwater: 1,605 TAF (34% of total)
 Use met by other water sources: 3,102 TAF (66% of total)

Planning Area:

401: Santa Clara (17%)

402: Metropolitan LA (40%)

403: Santa Ana (39%)

404: San Diego (4%)

Hydrologic region boundary

Total water use (TAF)

Use met by groundwater

% Percentage met by groundwater

¹ Total water supply represents the sum of surface water and groundwater supplies, and local reuse.

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Total Water Supply

- 4,707 taf

Use met by surface water

- 3,102 taf or 66 percent of total supply

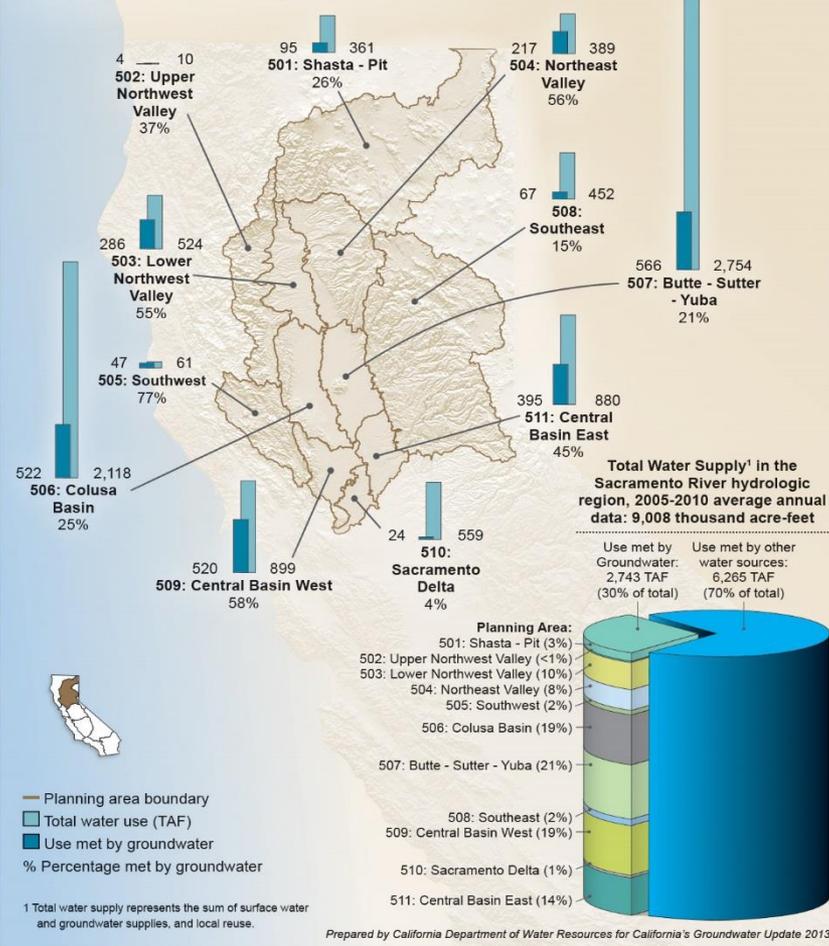
Use met by groundwater

- 1,605 taf or 34 percent of total supply

Groundwater Supply (2005-2010)

Sacramento River HR

Groundwater comprises 30% of all water used in the Sacramento River hydrologic region, totaling more than 2,743 thousand acre-feet.



Total Water Supply

- 9,008 taf

Use met by surface water

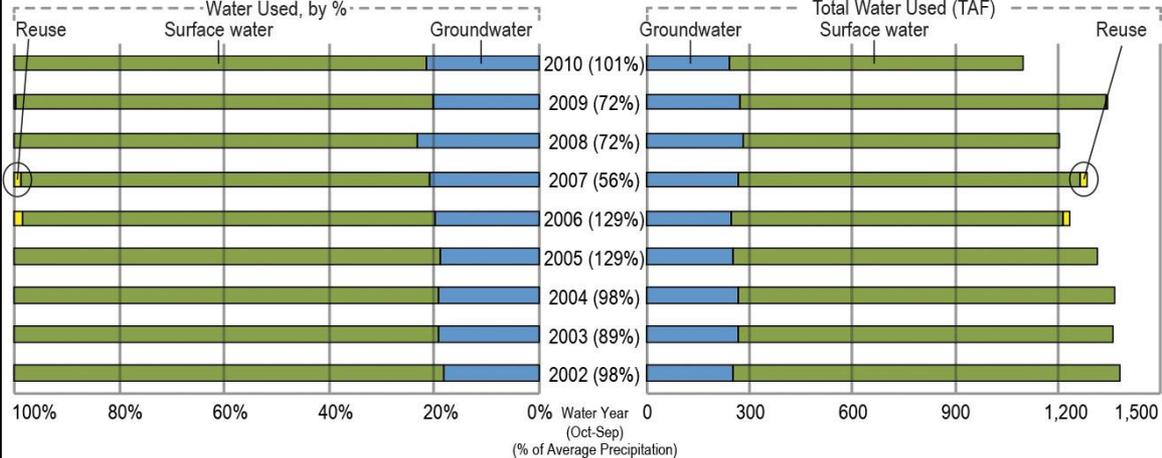
- 6,265 taf or 70 percent of total supply

Use met by groundwater

- 2,743 taf or 30 percent of total supply

Total Water Supply Trend (2002-2010)

SFB



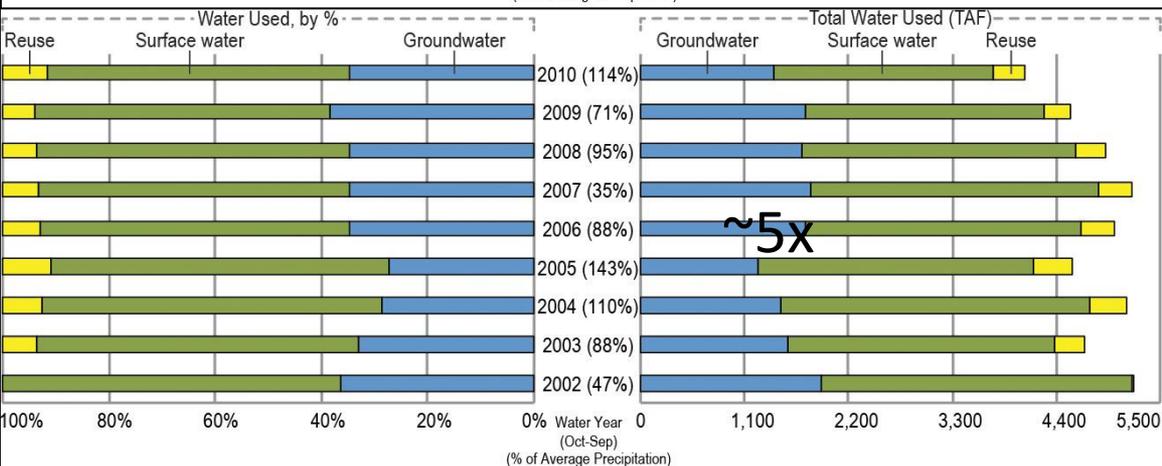
Water Year (% Precipitation)

Blue = groundwater

Green = surface water

Yellow = reuse water

SC



Right Side:

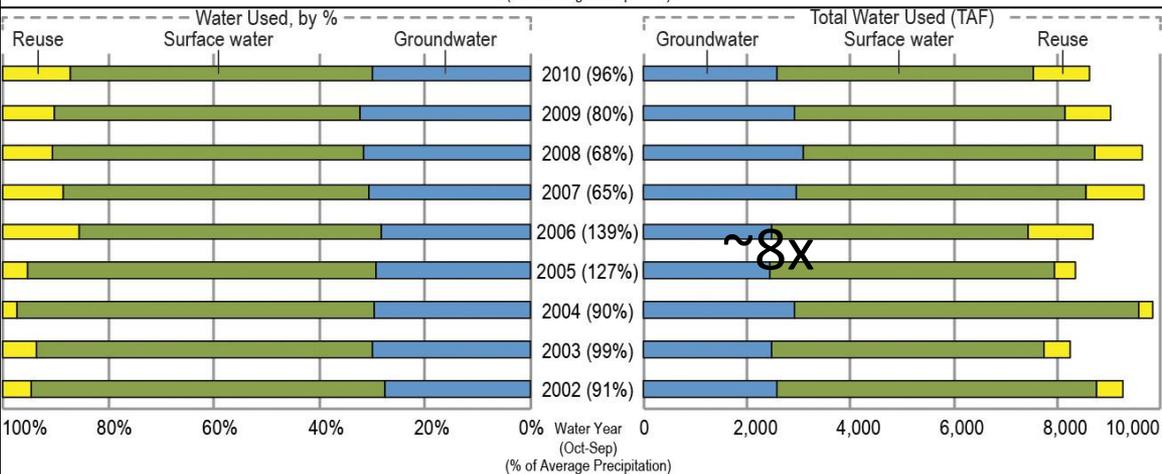
- Total Water Used by Supply

• Note: Charts do not use same horizontal scale

Left Side:

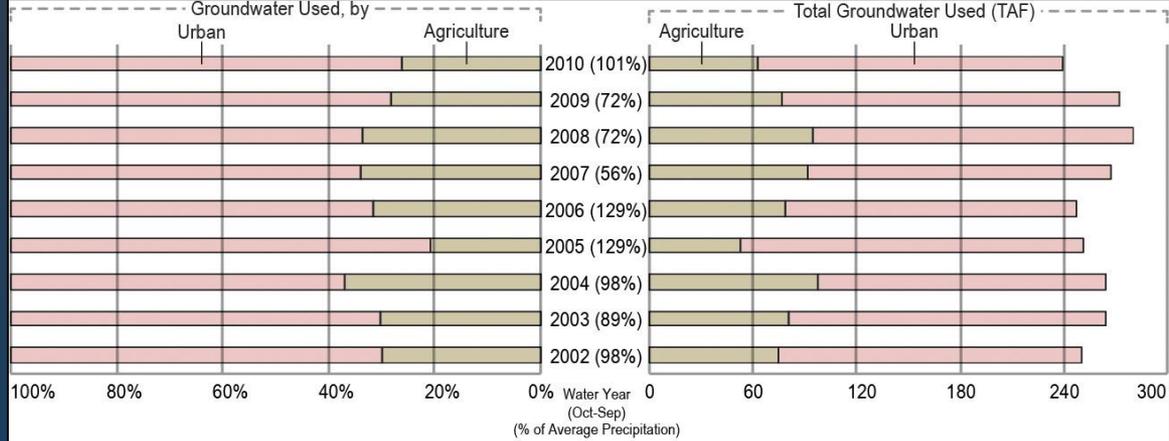
- Water Used by Percent by Supply

SR



Groundwater Supply Trend (2002-2010)

SFB



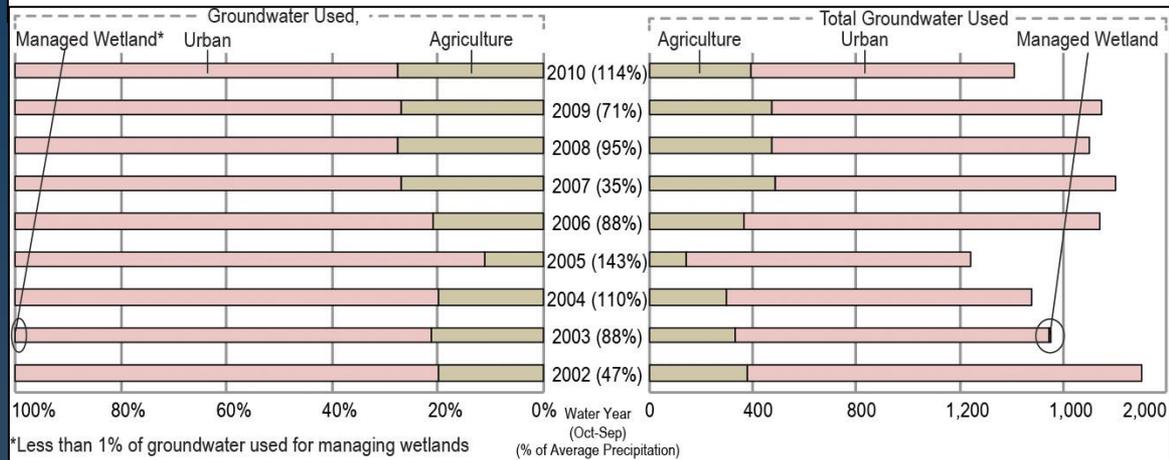
Water Year (% Precipitation)

Brown = agriculture

Pink = urban

Yellow = managed wetlands

SC



Right Side:

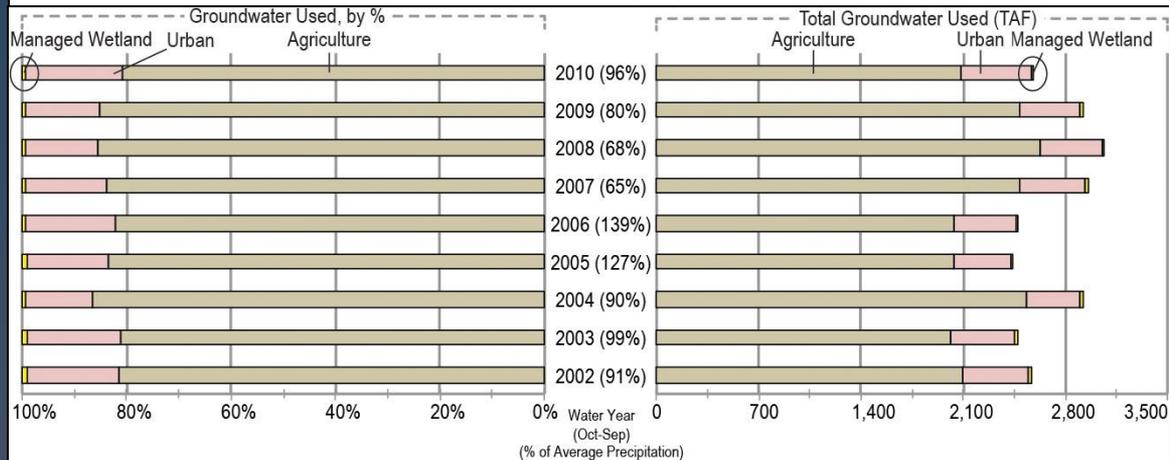
- Total Groundwater Used by Type

• Note: Charts do not use same horizontal scale

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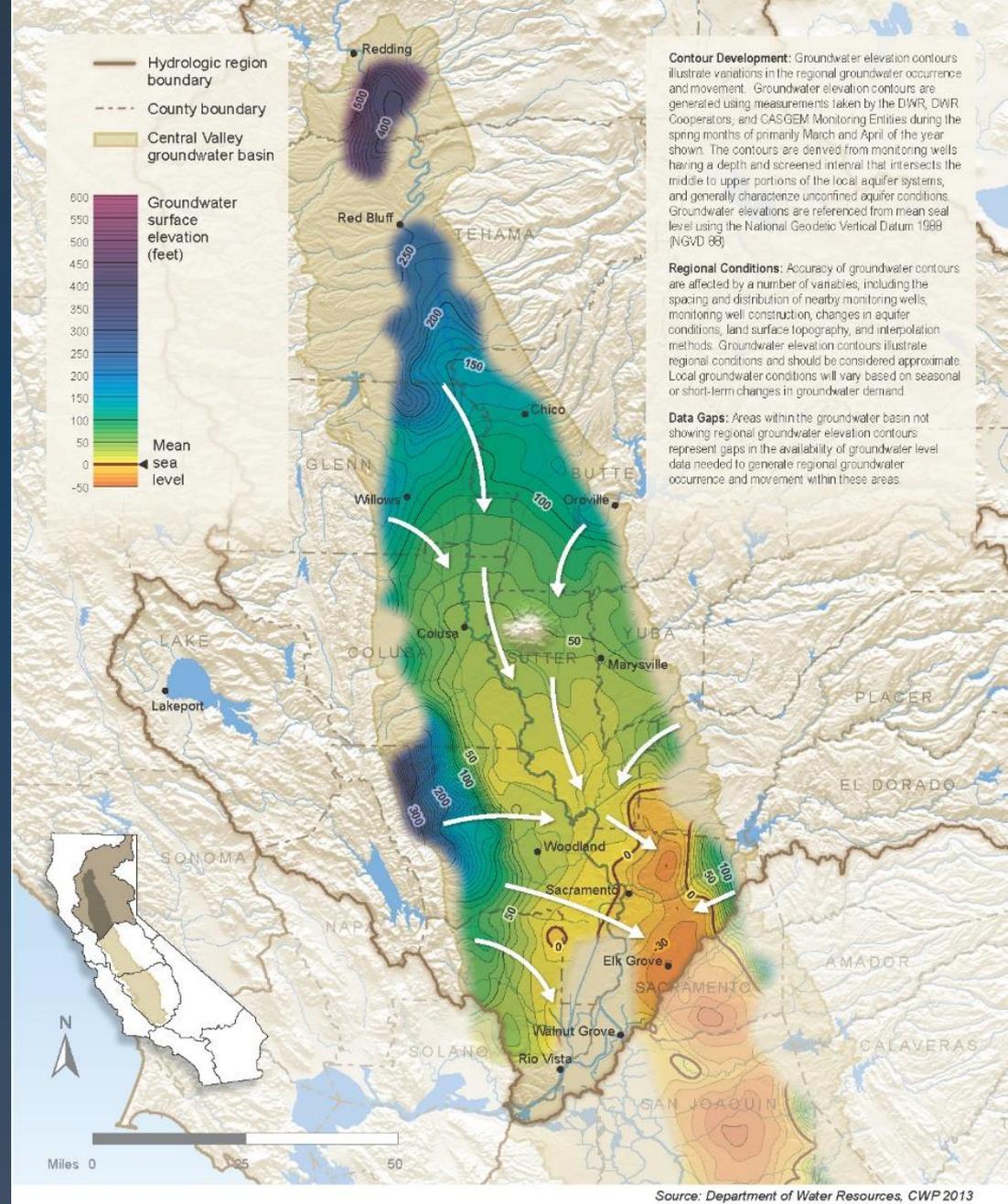
- Groundwater Used by Percent by Type

SR

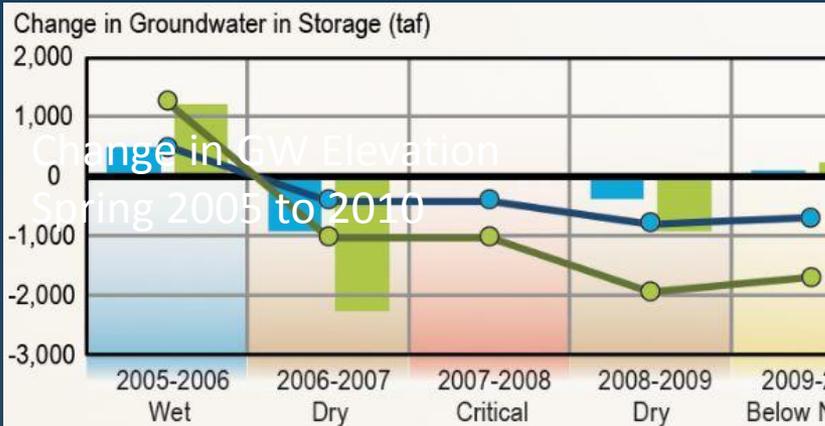


Aquifer Conditions Sacramento River Valley

- Spring 2010 Depth to Groundwater
- Spring 2010 Groundwater Elevation and Flow Direction



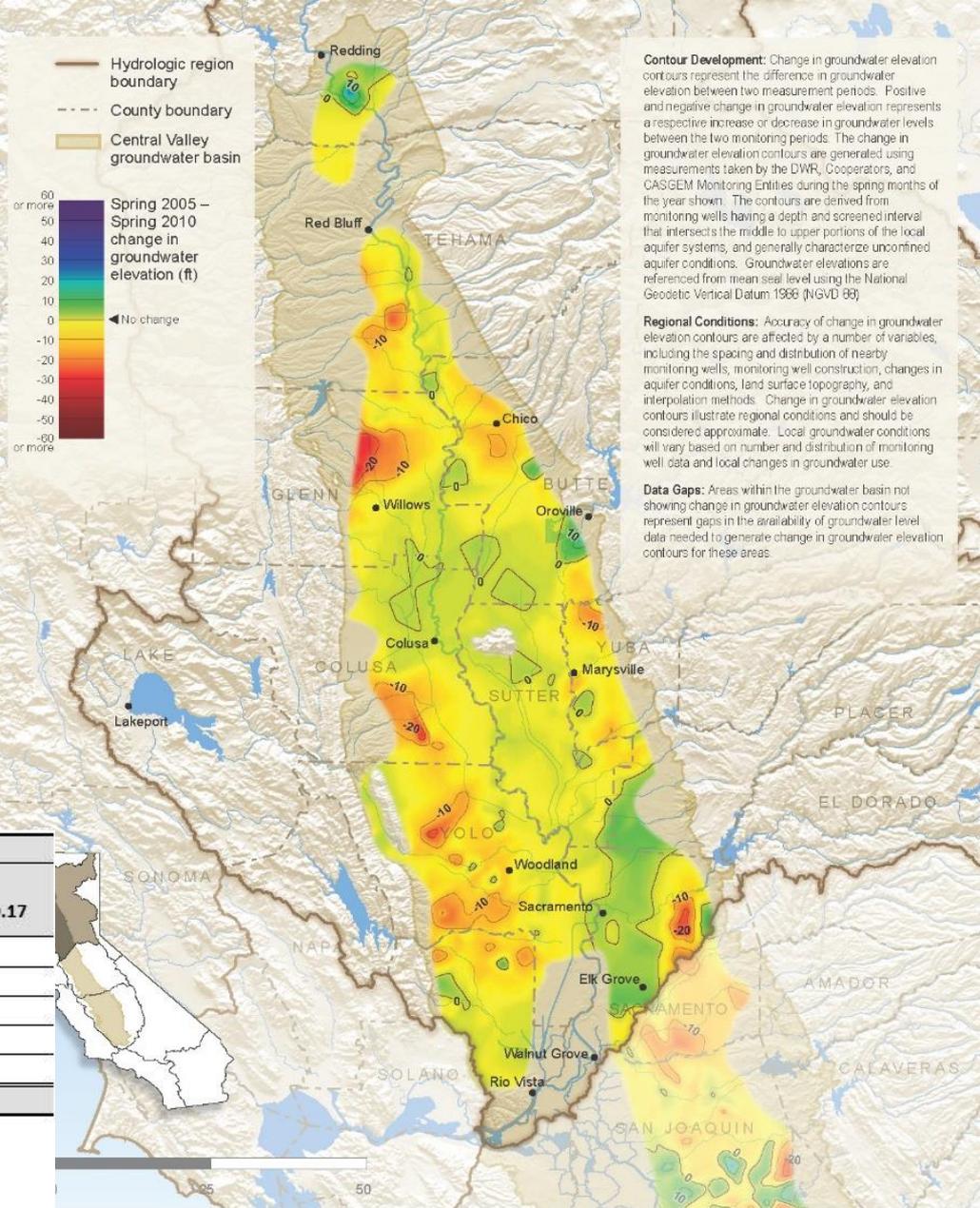
Aquifer Conditions Sacramento River Valley



Period Spring/Spring	Average change in groundwater elevation (ft)	Estimated Change in Storage in taf	
		Assuming Specific Yield = 0.07	Assuming Specific Yield = 0.17
2005-2006	2.3	503	1,221
2006-2007	-4.3	-929	-2,255
2007-2008	0.0	-2	-4
2008-2009	-1.8	-378	-918
2009-2010	0.5	103	250
Total (2005-2010)	-3.3	-703	-1,706

Notes:

1. taf = thousand acre feet
2. ft = feet
3. GW elevation and change in storage is estimates are calculated within reporting area only
4. Reporting Area (Acres): 3,070,427
5. Non-Reporting Area (Acres): 1,033,705



Groundwater Level Trends

San Francisco Bay HR

Aquifer response to changing demand and management practices

Hydrographs were selected to help tell a story of how local aquifer systems respond to changing groundwater demand and resource management practices. Additional detail is provided within the main text of the report.

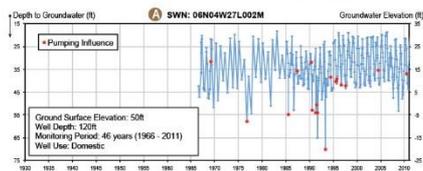
A B Hydrograph
06N04W27L002M and **05N03W05M001M**: illustrate the dramatically different aquifer conditions underlying the Napa Valley Subbasin. SWN 06N04W27L002M is completed in the upper Sonoma Volcanics where the alluvial deposits are young and unconsolidated, thus, more permeable and better connected to the surface water sources. SWN 05N03W05M001M is completed in deeper alluvial deposits which are less permeable and not well connected to the surface water source.

C Hydrograph
04N05W02B001M: highlights a well with recovering groundwater levels associated with the use of recycled water in lieu of pumping groundwater to meet the local agricultural water demand.

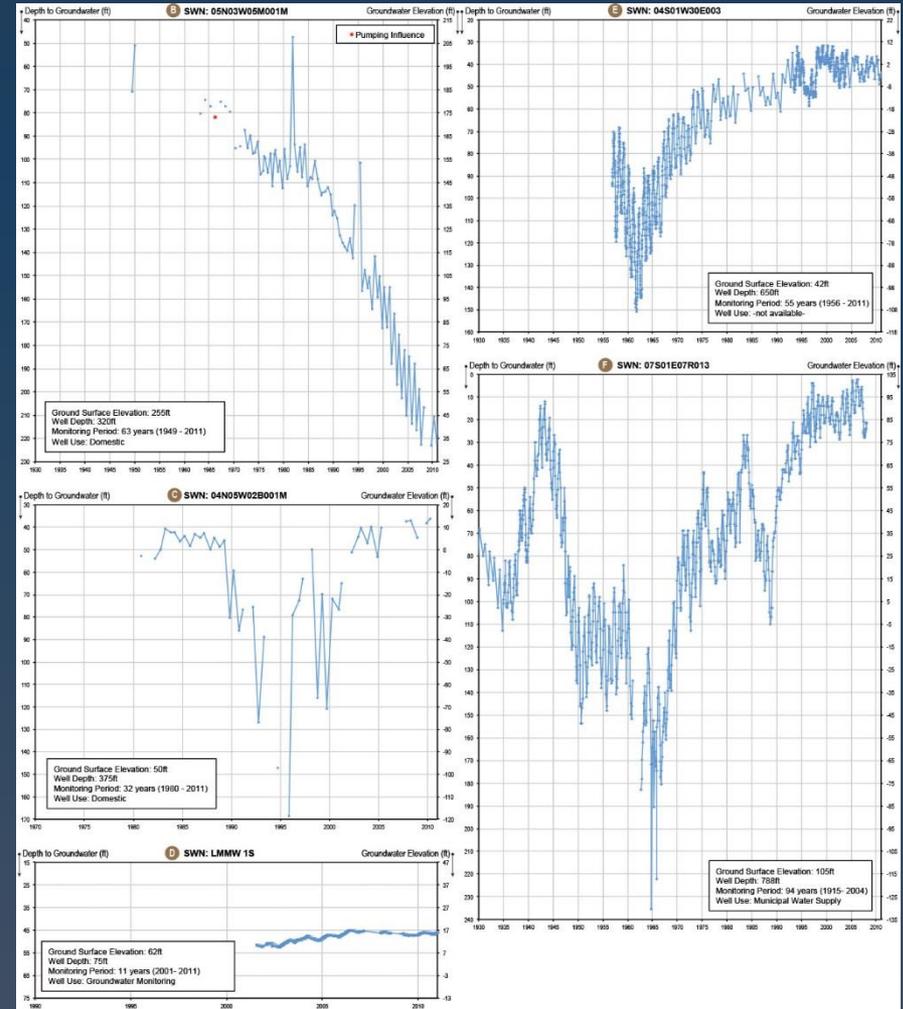
D Hydrograph LMMW-1S: illustrates an urban environment where groundwater level has generally remained stable over time, primarily due to use of surface water supplies for domestic consumption.

E F Hydrograph
04S01W30E003M and **07S01E07R013M**: illustrate the successful recovery of rapidly declining groundwater levels as a result of additional surface water deliveries, reduced groundwater pumping, and a local groundwater recharge program.

Regional locator map



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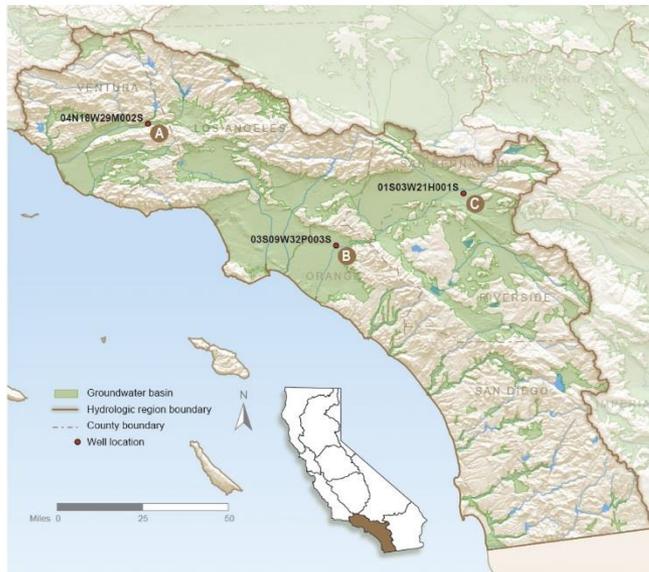
Groundwater Level Trends

South Coast HR

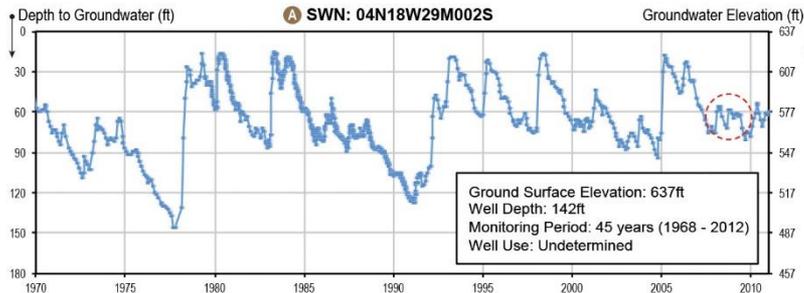
Aquifer response to changing demand and management practices

Hydrographs were selected to help tell a story of how local aquifer systems respond to changing groundwater demand and resource management practices. Additional detail is provided within the main text of the report.

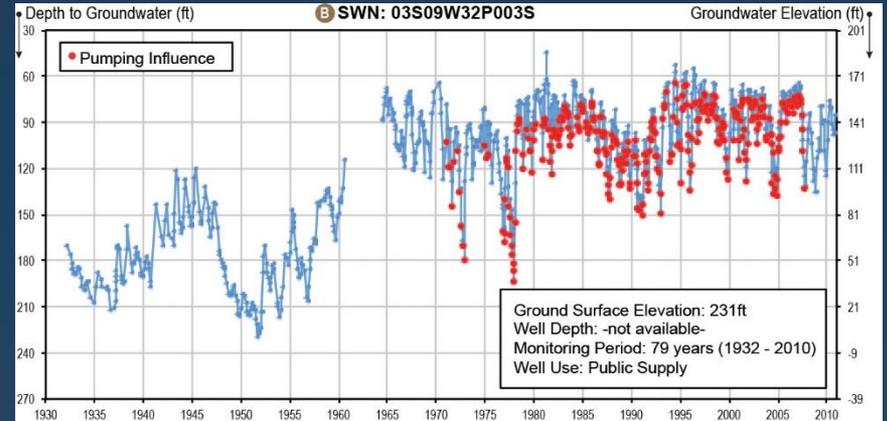
Regional locator map



A Hydrograph 04N18W29M002S: illustrates the aquifer response to the long-term hydrologic cycles and seasonal variations associated with the local precipitation conditions. The surrounding aquifer was successfully recharged using captured stormwater runoff during the drought of 2007-09 (circled in red).

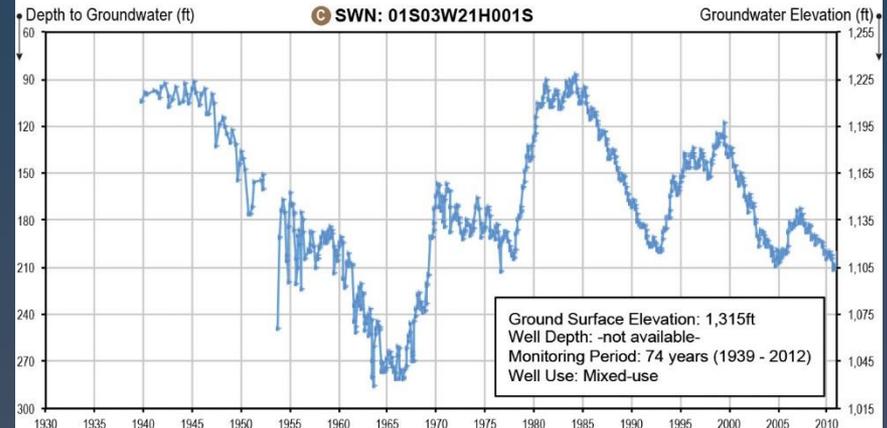


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B Hydrograph 03S09W32P003S: Shows the successful recovery of groundwater levels associated with use of recycled and imported water in lieu of pumping groundwater, and conjunctive management of surface water and groundwater supplies.

C Hydrograph 01S03W21H001S: demonstrates the successful reversal of long-term decline in the groundwater levels as a result of basin adjudication in 1969 which triggered conjunctive management of surface water and groundwater supplies.



Groundwater Level Trends Sacramento River HR

Aquifer response to changing demand and management practices

Hydrographs were selected to help tell a story of how local aquifer systems respond to changing groundwater demand and resource management practices. Additional detail is provided within the main text of the report.

A Hydrograph 38N07E23E001M: shows a well with long term declining groundwater levels. The increasing seasonal fluctuations in the recent years indicate increased groundwater use.

B Hydrograph 24N02W24D002-4M: large seasonal fluctuations at the shallow monitoring level show that most of the pumping activity is concentrated in the shallower aquifer zone. Increasing potentiometric head with depth indicates an upward gradient of groundwater flow, characterizing this location as a potential groundwater discharge versus recharge area.

C Hydrograph 23N03W13C003-7M: large fluctuations in the intermediate and deep monitoring levels show that pumping activity is largely concentrated in the intermediate and deep aquifer zones. Decreasing potentiometric head with depth indicates downward gradient of groundwater flow, characterizing this location as a potential groundwater recharge area.

D Hydrograph 21N03W33A004M: illustrates a well with declining groundwater levels as a result of increased irrigation pumping due to drought or dry conditions. More recently there have been significant changes in land use and irrigation methods that further increased local groundwater demand.

E Hydrograph 22N01E28J003M: shows the effect dry periods have on groundwater levels in areas of heavy reliance on groundwater. During the dry periods, groundwater withdraws tend to outpace recharge resulting in declining groundwater elevation. At this well, the recovery was weak or missing following the last two dry periods.

F Hydrograph 14N01E14G001M: shows a very stable water table with a seasonal fluctuation of generally less than 10 feet. The land use in area is dominated by agricultural rice production that uses predominantly surface water.

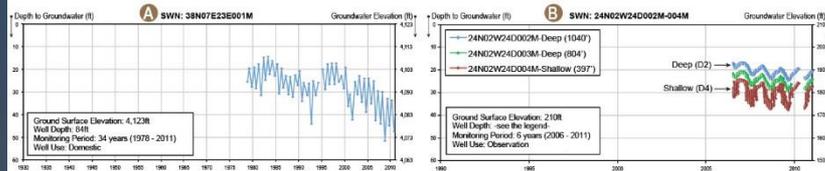
G Hydrograph 15N04E28D001M: shows the successful recovery of groundwater levels through the introduction of surface water supply in early 1980's, which resulted in reducing groundwater demand and facilitating in-lieu groundwater recharge.

H Hydrograph 10N01W06D001M: highlights the impact of drought conditions on groundwater elevations. The seasonal measurements fluctuate more during dry years than during wet years.

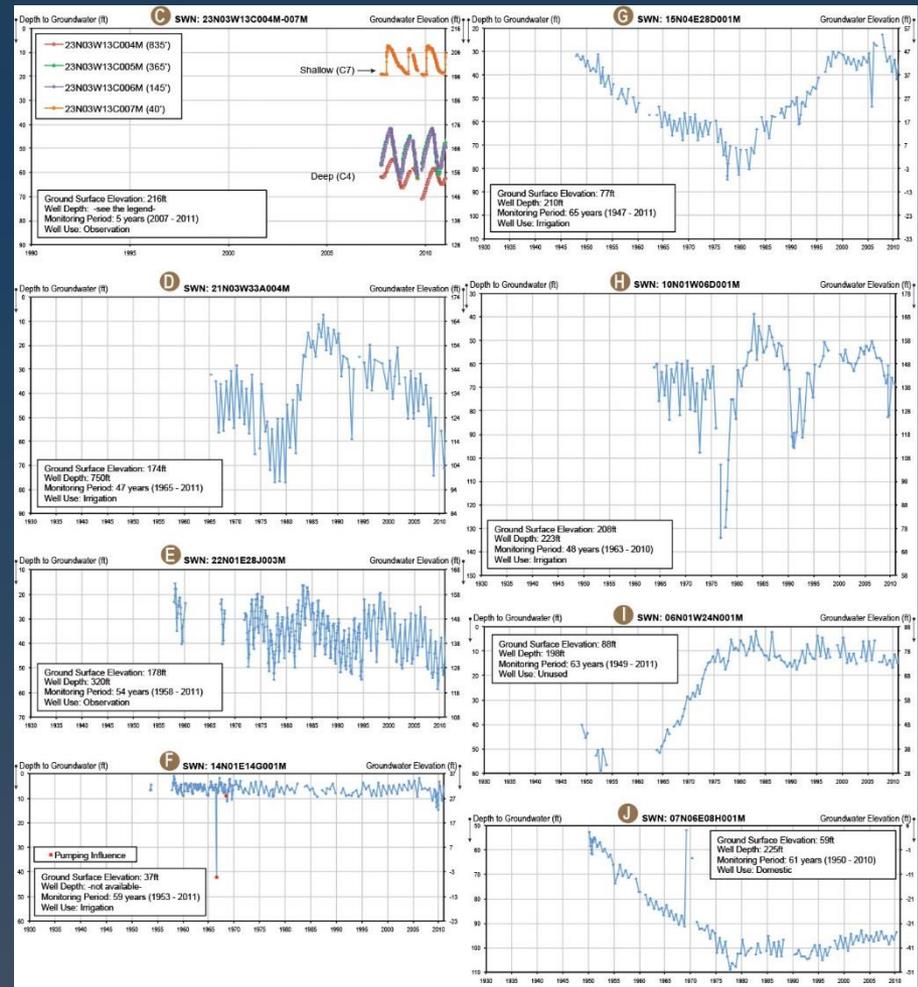
Regional locator map



- I Hydrograph 06N01W24N001M:** shows the successful recovery of groundwater levels through the introduction of surface water supply in 1959, which resulted in reducing groundwater demand and facilitating in-lieu groundwater recharge.
- J Hydrograph 07N06E08H001M:** illustrates the typical groundwater level trends observed in the wells located in Zone 40 portion of Sacramento County. The groundwater levels declined prior to the 1980s due to intensive groundwater use for domestic and agricultural purposes. After 1980s, the groundwater levels stabilized as surface water supplies became available for domestic use and as some of the agricultural land was transitioned into new residential developments.



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Groundwater Management Legislation

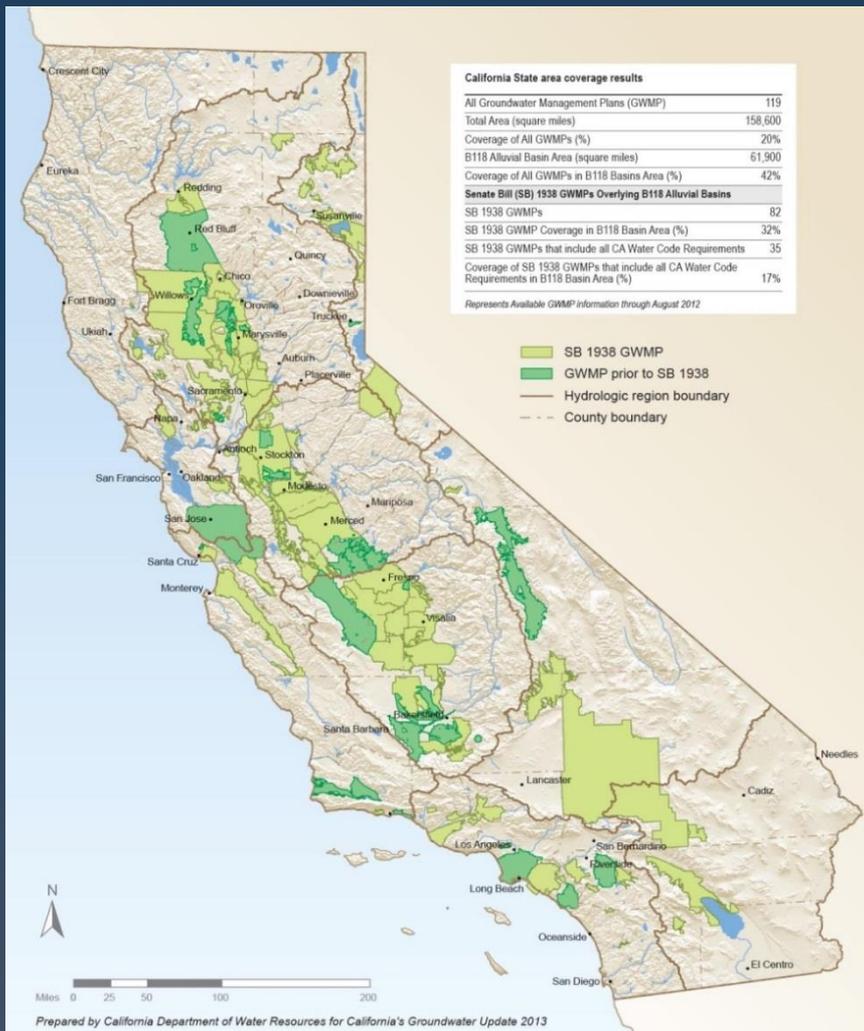
- 1992: Groundwater Management Plans (GWMP) – AB 3030
- 2000: Local Groundwater Assistance grants - AB 303
- 2002: GWMP requires specific elements to be eligible for GW related grant funds - SB 1938
- 2009: CASGEM – Statewide seasonal and long-term groundwater elevation monitoring and Basin Prioritization - SBx7-6
- 2011: GWMP require groundwater recharge mapping and GWMP submittal to DWR - AB 359
- 2014: Sustainable Groundwater Management Act (SGMA) - SB 1168, AB 1739, SB 1319

Notes:

California Water Code Sections, Part 2.74 and 2.75

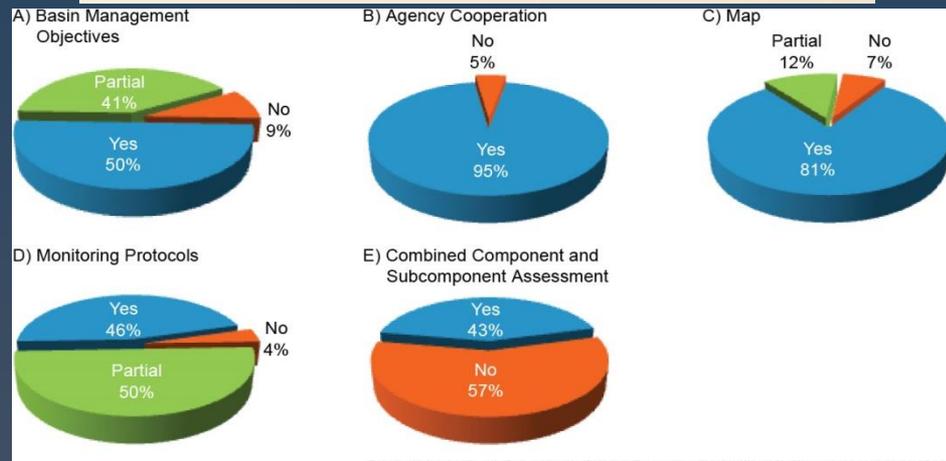
California Statewide Groundwater Elevation Monitoring

Groundwater Management Plan Statewide Inventory and Assessment

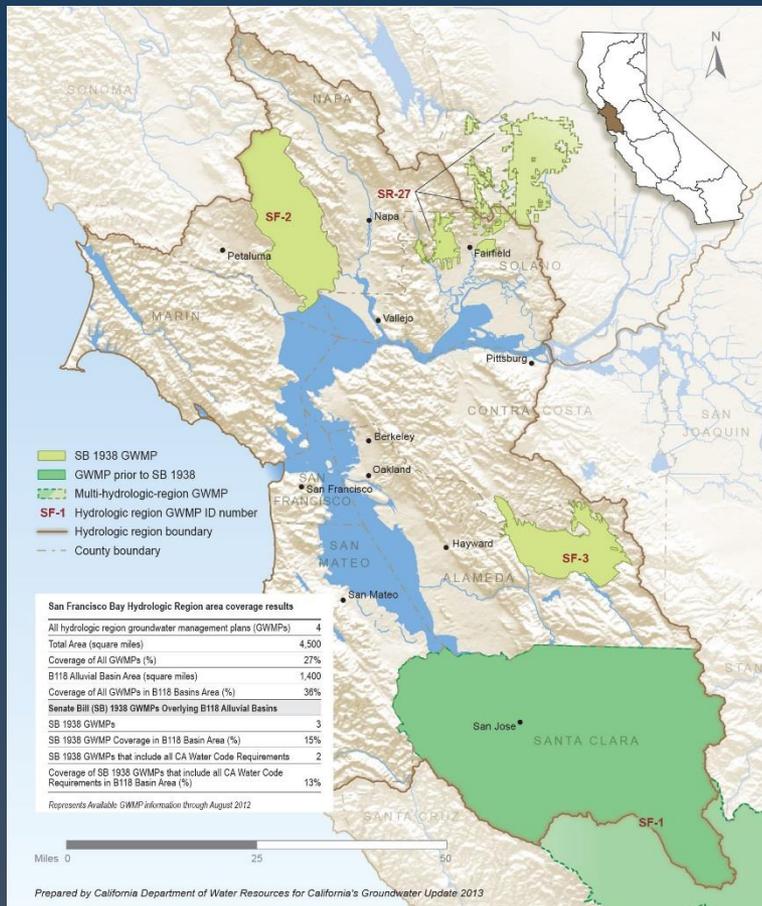


California State area coverage results	
All Groundwater Management Plans (GWMP)	119
Total Area (square miles)	158,600
Coverage of All GWMPs (%)	20%
B118 Alluvial Basin Area (square miles)	61,900
Coverage of All GWMPs in B118 Basins Area (%)	42%
Senate Bill (SB) 1938 GWMPs Overlying B118 Alluvial Basins	
SB 1938 GWMPs	82
SB 1938 GWMP Coverage in B118 Basin Area (%)	32%
SB 1938 GWMPs that include all CA Water Code Requirements	35
Coverage of SB 1938 GWMPs that include all CA Water Code Requirements in B118 Basin Area (%)	17%

Represents Available GWMP information through August 2012



Groundwater Management San Francisco Bay HR



San Francisco Bay Hydrologic Region area coverage results

All hydrologic region groundwater management plans (GWMPs)	4
Total Area (square miles)	4,500
Coverage of All GWMPs (%)	27%
B118 Alluvial Basin Area (square miles)	1,400
Coverage of All GWMPs in B118 Basins Area (%)	36%
Senate Bill (SB) 1938 GWMPs Overlying B118 Alluvial Basins	
SB 1938 GWMPs	3
SB 1938 GWMP Coverage in B118 Basin Area (%)	15%
SB 1938 GWMPs that include all CA Water Code Requirements	2
Coverage of SB 1938 GWMPs that include all CA Water Code Requirements in B118 Basin Area (%)	13%

Represents Available GWMP information through August 2012

Groundwater Management

South Coast HR

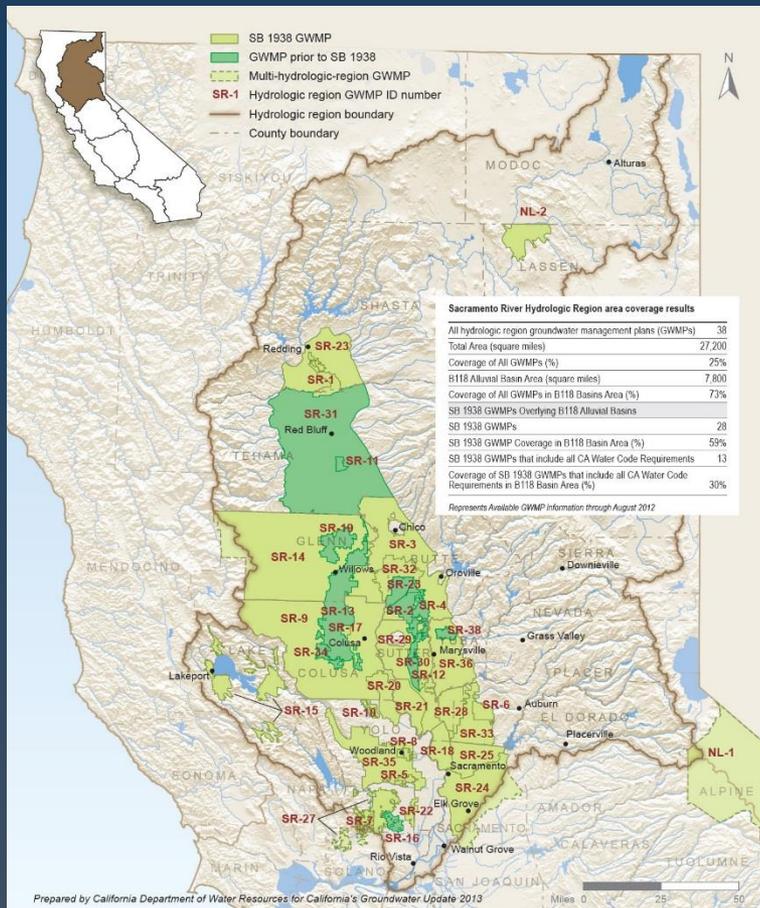


South Coast Hydrologic Region area coverage results

All hydrologic region groundwater management plans (GWMPs)	15
Total Area (square miles)	11,100
Coverage of All GWMPs (%)	17%
B118 Alluvial Basin Area (square miles)	3,500
Coverage of All GWMPs in B118 Basins Area (%)	40%
SB 1938 GWMPs Overlying B118 Alluvial Basins	
SB 1938 GWMPs	11
SB 1938 GWMP Coverage in B118 Basin Area (%)	22%
SB 1938 GWMPs that include all CA Water Code Requirements	7
Coverage of SB 1938 GWMPs that include all CA Water Code Requirements in B118 Basin Area (%)	19%

Represents Available GWMP information through August 2012

Groundwater Management Sacramento River HR



Sacramento River Hydrologic Region area coverage results

All hydrologic region groundwater management plans (GWMPs)	38
Total Area (square miles)	27,200
Coverage of All GWMPs (%)	25%
B118 Alluvial Basin Area (square miles)	7,800
Coverage of All GWMPs in B118 Basins Area (%)	73%
SB 1938 GWMPs Overlying B118 Alluvial Basins	
SB 1938 GWMPs	28
SB 1938 GWMP Coverage in B118 Basin Area (%)	59%
SB 1938 GWMPs that include all CA Water Code Requirements	13
Coverage of SB 1938 GWMPs that include all CA Water Code Requirements in B118 Basin Area (%)	30%

Represents Available GWMP information through August 2012

Groundwater Management Adjudications

- Groundwater Adjudications
 - Court established restrictions on groundwater extraction within a basin, basins, or portion of basin
- Bulletin 118
 - 19 GW Adjudications
- CWP – update 2013
 - 24 GW Adjudications
- Latest information:
 - http://water.ca.gov/groundwater/groundwater_management/index.cfm





Groundwater Management Ordinances

- All 58 counties surveyed as of 2012
- Most common: Well Policies
- Least common: GWM, Guidance

County	Groundwater Management	Guidance Committees	Export Permits	Recharge	Well Abandonment and Destruction	Well Construction Policies
Alameda	-	-	-	-	Yes	Yes
Alpine	-	-	Yes	-	Yes	Yes
Amador	-	-	-	-	Yes	Yes
Butte	Yes	Yes	Yes	-	Yes	Yes
Calaveras	-	-	Yes	-	Yes	Yes
Colusa	-	-	Yes	-	-	Yes
Contra Costa	-	-	-	-	Yes	-
Del Norte	-	-	-	-	Yes	-
El Dorado	-	-	-	-	Yes	Yes
Fresno	-	-	Yes	-	Yes	Yes



Groundwater Management Ordinances

- San Francisco Bay
- South Coast
- Sacramento River

County	Groundwater Management	Guidance Committees	Export Permits	Recharge	Well Abandonment and Destruction	Well Construction Policies
Alpine	-	-	Yes	-	Yes	Yes
Amador	-	-	-	-	Yes	Yes
Butte	Yes	Yes	Yes	-	Yes	Yes
Colusa	-	-	Yes	-	-	Yes
El Dorado	-	-	-	-	Yes	Yes
Glenn	Yes	Yes	-	-	Yes	Yes
Lake	-	-	Yes	-	Yes	Yes
Lassen	Yes	Yes	Yes	-	Yes	-
Modoc	-	-	Yes	-	-	Yes
Napa	-	-	-	-	Yes	Yes
Nevada	-	-	-	-	Yes	Yes
Placer	-	-	-	-	Yes	Yes
Plumas	-	-	-	-	Yes	Yes
Sacramento	-	-	Yes	-	Yes	Yes
Shasta	-	-	Yes	-	-	-
Sierra	-	-	Yes	-	-	-
Siskiyou	-	Yes	Yes	-	Yes	-
Solano	-	-	-	-	Yes	Yes
Sutter	-	-	-	-	Yes	Yes
Tehama	-	-	Yes	-	Yes	Yes
Yolo	-	-	Yes	-	-	-
Yuba	-	-	-	-	Yes	Yes

County	Groundwater Management	Guidance Committees	Export Permits	Recharge	Well Abandonment and Destruction	Well Construction Policies
San Francisco	-	-	-	-	Yes	Yes
Sonoma	-	-	-	-	Yes	Yes
Marin	-	-	-	-	-	-
Napa	-	Yes	-	-	Yes	Yes
Solano	-	-	-	-	Yes	Yes
San Mateo	-	-	-	-	Yes	Yes
Alameda	-	-	-	-	Yes	Yes

Notes:
 Table represents information as of August 2012.
 The Santa Clara Valley Water District adopted Ordinances 89-1 (groundwater management) and 90-1 (well construction and destruction). These ordinances do not apply to a specific county.

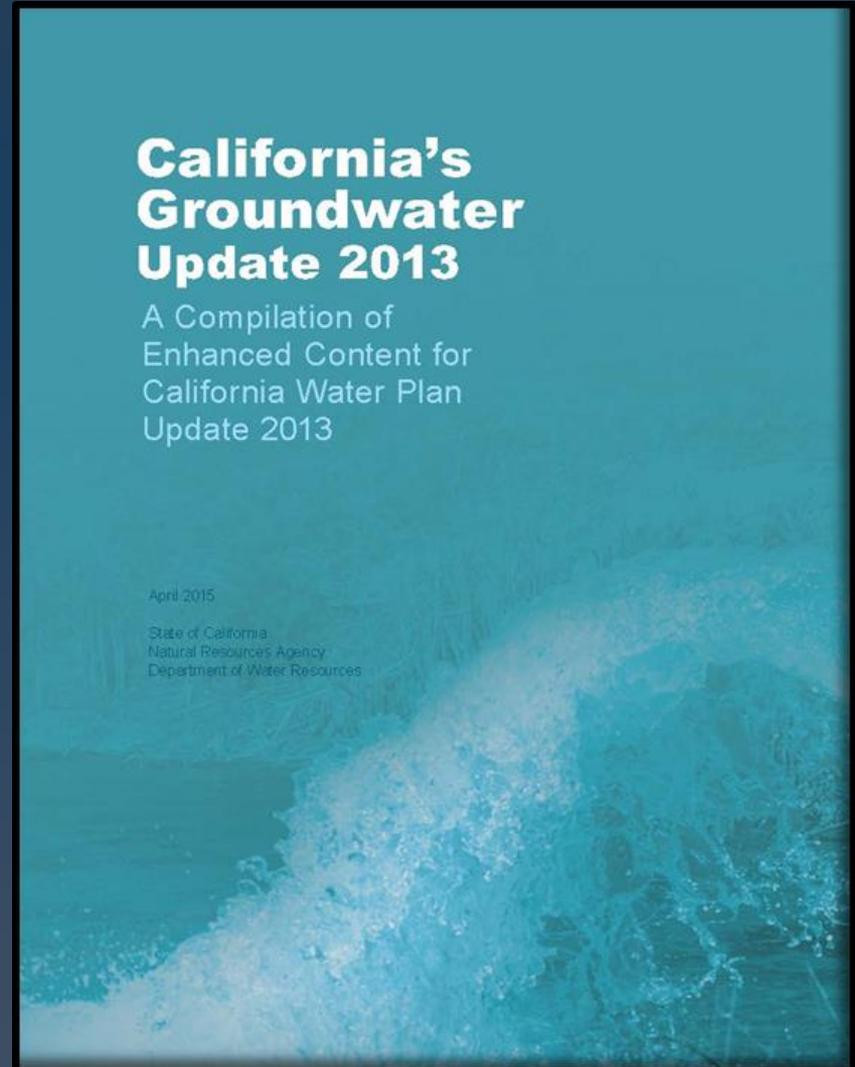
County	Groundwater Management	Recharge	Well Abandonment and Destruction	Well Construction Policies
Los Angeles	-	Yes	-	-
Orange	-	-	-	Yes
Riverside	-	-	Yes	Yes
San Bernardino	Yes ^a	-	Yes	Yes
San Diego	Yes ^b	-	-	-
Ventura	-	-	Yes	Yes

Notes:
^aOne or more ordinances exist that provide protection against exceeding the safe yield of a groundwater basin and impacts associated with exceeding the safe yield.
^bGeneral policies exist to reduce or prevent overdraft.
 Table represents information as of August 2012.

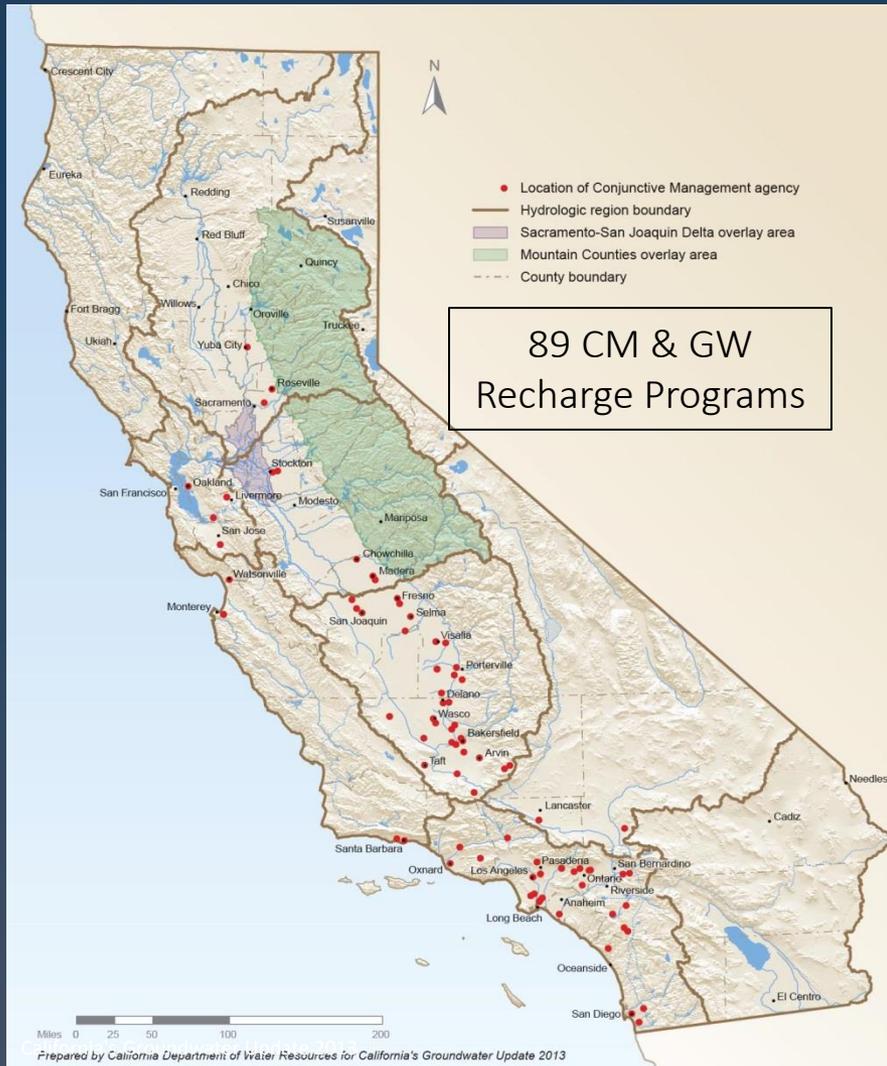


Groundwater Management

- Special “Act” Districts
- Other Groundwater Management Efforts
 - Integrated Regional Water Management Plans (49 regions)
 - Urban Water Management Plans
 - Agricultural Water Management Plans



Conjunctive Management Inventory



- Location of project
- Year project was developed
- Capital costs
- Annual operating cost
- Administrator/operator
- Capacity in units of acre-feet
- Source of water received
- Put and take capacity
- Type of project
- Program goals and objectives
- Constraints on development of program

Table of 89 survey responses will be included as Appendix D



California's Groundwater Update 2013

Hydrologic Region Recommendations

- **Findings**

- Groundwater Supply and Development
- Groundwater Use and Aquifer Conditions
- Groundwater Monitoring Efforts
- Groundwater Management and Conjunctive Management

- **Data Gaps**

- Data Collection and Analysis
- Basin Assessments
- Sustainable Management

- **Recommendations**

- Similar to Statewide recommendations but HR specific



California's Groundwater Update 2013

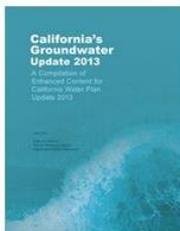
Statewide Recommendations

1. Promote **public education** about groundwater.
2. Improve **collaboration**, coordination, and alignment among agencies.
3. Develop a statewide groundwater management planning Web site to promote easy access to groundwater **information**.
4. Improve **essential data** to enable sustainable groundwater management by expanding and funding the CASGEM Program.
5. Improve understanding of California's high- and medium- priority groundwater basins by conducting groundwater **basin assessments**.
6. Develop a groundwater sustainability plan evaluation and implementation process.
7. Advance **sustainable groundwater management** within the framework of integrated water management.
8. Review and assist local agencies in developing improved **analytical tools** to assess conjunctive management and groundwater management strategies.
9. Increase local and regional **groundwater recharge and storage**.

California's Groundwater Update 2013



California's Groundwater Update 2013



California's Groundwater Update 2013: A Compilation of Enhanced Content for California Water Plan Update 2013 compiles and analyzes readily-available groundwater information to characterize California's groundwater basins, aquifers, and well infrastructure.

Although previous California Water Plan Updates had included groundwater-related resource management strategies, feedback from advisory committees and other stakeholder groups highlighted the lack of hydrologic region-specific groundwater information in the California Water Plan.

The Update expands and enhances baseline groundwater information on a regional scale, identifies challenges associated with sustainable groundwater management and helps guide implementation of diverse resource management strategies. Statewide and regional findings, data gaps and recommendations to improve groundwater management also are

included.

The report is organized into the following components:

→ California's Groundwater Update

- Front Cover
- Director's Foreword
- Front Matter and Table of Contents
- Statewide Findings, Data Gaps and Recommendations
- Introduction, Scope and Future Directions (Chapter 1)
- Statewide Groundwater Update (Chapter 2)
- Back Cover

→ Hydrologic Region Groundwater Update

- North Coast Hydrologic Region (Chapter 3)
- San Francisco Bay Hydrologic Region (Chapter 4)
- Central Coast Hydrologic Region (Chapter 5)
- South Coast Hydrologic Region (Chapter 6)
- Sacramento River Hydrologic Region (Chapter 7)
- San Joaquin River Hydrologic Region (Chapter 8)
- Tulare Lake Hydrologic Region (Chapter 9)
- North Lahontan Hydrologic Region (Chapter 10)
- South Lahontan Hydrologic Region (Chapter 11)
- Colorado River Hydrologic Region (Chapter 12)



→ Appendices:

- Front Cover
- Appendix A: Methods and Assumptions
- Appendix B: California Statewide Groundwater Elevation Monitoring (CASGEM) Basin Prioritization
- Appendix C: Groundwater Use Data
- Appendix D: Conjunctive Management Survey
- Appendix E: Change in Groundwater in Storage
- Appendix F: Land Subsidence
- Back Cover

Available Online At:

<http://www.waterplan.water.ca.gov/topics/groundwater/index.cfm>

California Water Plan eNews:

https://listserv.state.ca.gov/wa.exe?SUBED1=DWR_CWP_eNews&A=1

CALIFORNIA
WATER PLAN eNEWS



DWR Groundwater Information

<http://water.ca.gov/groundwater/>

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DWR California

Groundwater

Introduction

Groundwater resources play a vital role in maintaining California's economic and environmental sustainability. During an average year, California's 515 alluvial groundwater basins and subbasins contribute approximately 38 percent toward the State's total water supply. During dry years, groundwater contributes up to 46 percent (or more) of the statewide annual supply, and serves as a critical buffer against the impacts of drought and climate change. Many municipal, agricultural, and disadvantaged communities rely on groundwater for up to 100 percent of their water supply needs. Groundwater extraction in excess of natural and managed recharge has caused historically-low groundwater elevations in many regions of California.

DWR has a long-standing history of collecting and analyzing groundwater data, investigating and reporting groundwater conditions, implementing local groundwater assistance grants, encouraging integrated water management, and providing the technical expertise needed to improve statewide groundwater management practices. In addition, DWR is responsible for implementing the Sustainable Groundwater Management Act (SGMA), the California Statewide Groundwater Elevation Monitoring (CASGEM) Program, and characterizing California's groundwater basins through updates to Bulletin 118.

The Sustainable Groundwater Management (SGM) Program

To implement the increased responsibilities given to DWR by the 2014 Sustainable Groundwater Management Act (SGMA), DWR has expanded its existing local assistance programs in the Division of Integrated Regional Water Management (DIRWM) and has developed a Strategic Plan for the Sustainable Groundwater Management (SGM) Program. [More info.](#)

Groundwater Information Center (GIC)

The Groundwater Information Center (GIC) is DWR's portal for groundwater basins, technical groundwater information, groundwater management plans, water well basins, and statewide reports, maps, and figures. [More info.](#)

California Statewide Groundwater Elevation Monitoring (CASGEM) Program

Senate Bill X7 6 (SBX7 6) in 2009 added provisions for groundwater monitoring to the California Water Code and authorized DWR to establish permanent and locally-managed groundwater elevation monitoring and reporting in all of California's 515 alluvial groundwater basins. To implement SBX7 6, DWR developed the CASGEM Program. [More info.](#)

Bulletin 118

The DWR has long recognized the need for collection, summary, and evaluation of groundwater data as essential tools in planning for the optimal use of the groundwater resource. An example of this is DWR's Bulletin 118 series, which presents the results of groundwater basin evaluations and defines the boundaries of California's 515 alluvial groundwater basins. [More info.](#)

GROUNDWATER HOME

- SUSTAINABLE GROUNDWATER MANAGEMENT
- GROUNDWATER INFORMATION CENTER
- CASGEM
- BULLETIN 118

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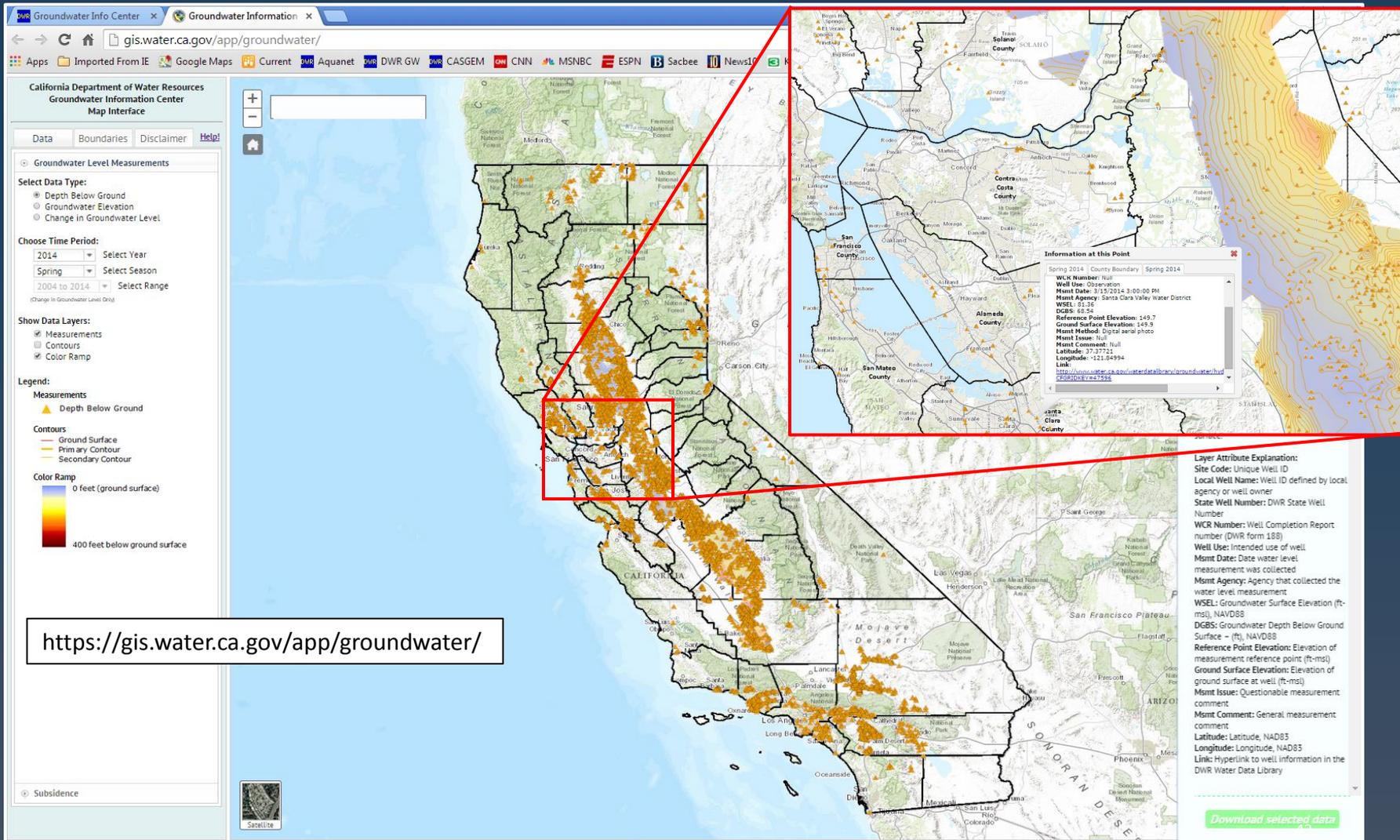
DWR's GROUNDWATER WEBSITE

- Sustainable Groundwater Management (SGM) Program
- Groundwater Information Center (GIC)
- CASGEM Program
- Bulletin 118

Sustainable Groundwater Management Act (SGMA)

- <http://www.groundwater.ca.gov/>

Groundwater Information Center GIS Map Interface – GW Level Data



<https://gis.water.ca.gov/app/groundwater/>

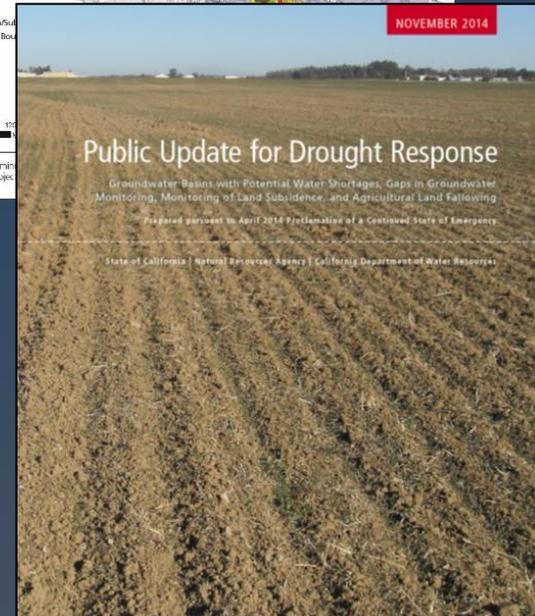
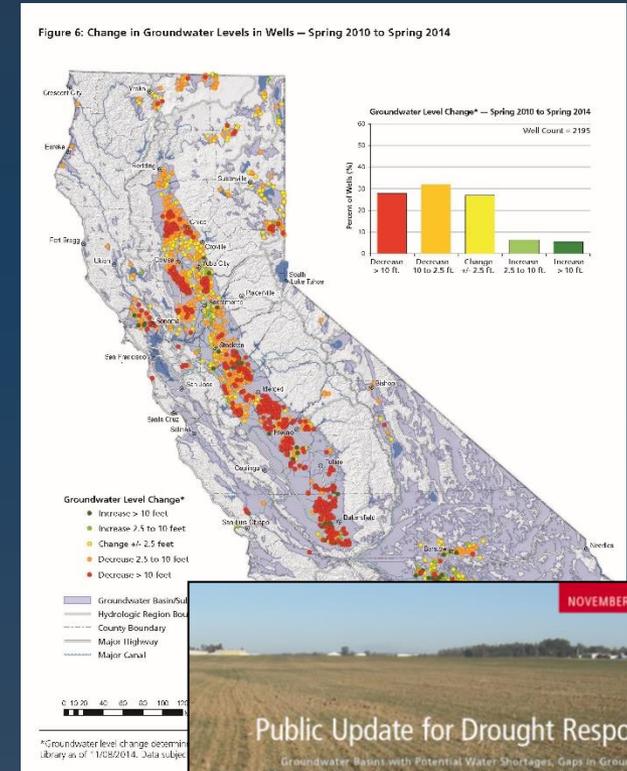
Updated Drought Information - 2014

- CA GW Update 2013 data is presented through 2010 - 2012
- CWP efforts helped facilitate presentation of data in 2014 Drought Updates
- **Drought Updates contain data up to 2014**
- Reports available on DWR's Groundwater Information Center Web site

<http://www.water.ca.gov/groundwater/gwinfo/index.cfm>

- DWR's Drought Information Web Site

<http://www.water.ca.gov/waterconditions/>





California's Groundwater Update 2013

Webinars

Hydrologic Region Webinar: June 4, 2015

- Tulare Lake, San Joaquin River, Central Coast
- <http://www.waterplan.water.ca.gov/topics/groundwater/index.cfm>

Hydrologic Region Webinar: July 27, 2015

- Sacramento River, San Francisco Bay, South Coast

Hydrologic Region Webinar and Technical Appendices Webinar: August 26, 2015

- North Coast, Colorado River, North & South Lahontan
- Technical Appendices