

Public Review Draft Groundwater Enhancement and Recommendations

California Water Plan Plenary

October 29, 2013

Session Overview Summary of Work

Navigating Water Plan Update 2013

California Water Plan Update 2013 (Update 2013) provides a wide range of information, from a detailed description of California's current and potential future conditions to a "Roadmap For Action" intended to achieve desired benefits and outcomes. Update 2013 applies at statewide, regional, and local scales, and serves to advise a diverse audience, including elected officials, planners and resource managers, tribal governments and communities, academia, and the general public. The plan is organized in five volumes. Volumes 1, 2, and 3 are outlined below. The *Highlights* booklet, Volume 4, *Reference Guide*, and Volume 5, *Technical Guide*, will be released with the Final Update 2013 document in March 2014.

Volume 1, The Strategic Plan

- Executive summary.
- Call to action, new features for Update 2013, progress toward implementation.
- Update 2013 themes.
- Comprehensive picture of current water, flood and environmental conditions.
- Strengthening government alignment and water governance.
- Planning (data, analysis and public outreach) in the face of uncertainty.
- Framework for financing the California Water Plan.
- Roadmap for Action – Vision, mission, goals, principles, objectives & actions.



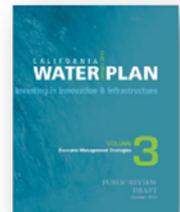
Volume 2, Regional Reports

- State of the region — watersheds, groundwater aquifers, ecosystems floods, climate, demographics, land use, water supplies and uses, governance.
- Current relationships with other regions and states.
- Accomplishments and challenges.
- Looking to the future — future water demands, resource management strategies, climate change adaptation.



Volume 3, Resource Management Strategies

- Integrated Water Management Toolbox
30+ management strategies to:
- Reduce water demand.
 - Increase water supply.
 - Improve water quality.
 - Practice resource stewardship.
 - Improve flood management.
 - People & water.



Update 2013 Public Review Draft Groundwater Enhancements - Purpose

- Expand information about statewide and regional groundwater conditions
- Compile and summarize groundwater data and analysis
- Better inform groundwater management actions

Update 2013 Public Review Draft

Key Contents - Expanded Features

- **Aquifers, wells, and GW monitoring**
- **GW supply**
- **GW quality**
- **Land subsidence**
- **GW conditions**
- **GW governance**
- **Conjunctive management**

1. **Statewide groundwater summary - Vol. 1**
2. **HR groundwater summary - Vol. 2**
3. **CM & GW Storage RMS - Vol. 3**
4. **Standalone GW report - Vol. 4**

Update 2013 Public Review Draft

Groundwater Enhancements - Key Messages

1. California - highly dependent on groundwater, 40 percent of supply.
2. Groundwater extraction varies by hydrologic region (avg. 16 maf):
Tulare L. (38%); San Joaquin R (19%); Sac R (17%); South Coast (10%).
3. 1980 DWR Bulletin 118: 11 basins subject to critical overdraft; 31 basins with evidence of overdraft; 5 basins with special problems.
Today - 30 years later - many of these basins show signs of continued depletion and impacts have not yet been adequately addressed.
4. Renewed land subsidence threatens buildings, infrastructure, water delivery & flood protection systems, and long-term water supply capacity.
5. Only 17% of B118 groundwater basin area (61,900 sq. miles) covered by GWMPs that include all SB 1938 CA Water Code requirements.
6. Significant efforts have been made to improve gw management, but Bolder Actions are needed.

Update 2013 Public Review Draft Groundwater Enhancements – Recommendations

- Promote public education regarding groundwater
- Improve collaboration and coordination among agencies
- Increase availability and sharing of groundwater information.
- Strengthen/expand CASGEM Program for long-term sustainability
- Under CASGEM, improve understanding of California GW basins
- Assess SB 1938 GWMPs and develop guidelines to promote best practices in groundwater management
- Develop better analytical tools to assess conjunctive management strategies
- Increase statewide groundwater recharge and storage
- *Advance IRWM to improve alignment with GWM Planning*
- *Develop and adopt stronger standards for GWM Planning*
- *Consider legislation to provide needed local/regional authority*

Update 2013 Public Review Draft Questions for Reviewers

Groundwater Enhancements

1. What key contents/messages do you think should be included in the CWP 2013 Highlights document?
2. What are your suggestions to present the key contents/messages in a more compelling way?

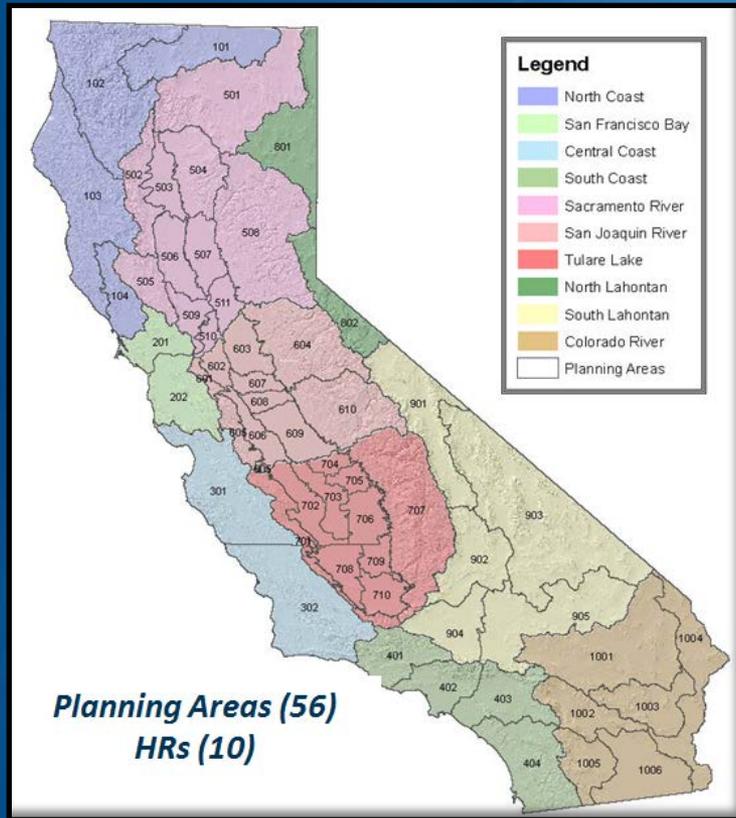
Groundwater Recommendations

1. Which among the recommendations would you like to see included in the Highlights document?
2. Are we missing any critical recommendations that should be included?

Topic 1. Groundwater Supply

Information is Presented by:

- Planning Area
- Hydrologic Region
- County Area
- Type of Use: Ag. Urban, and Managed Wetlands



Key Message: See handout or report for additional information

<http://www.waterplan.water.ca.gov/cwpu2013/index.cfm>

Topic 1. Groundwater Supply

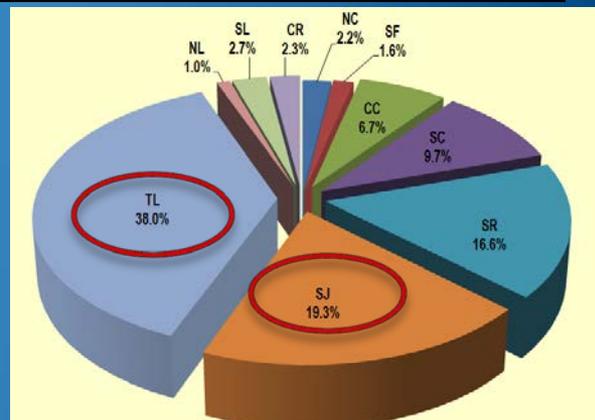
2005-10 Average Annual Groundwater Supply: *Volume & % Total Supply Met by GW*

Tulare Lake HR: 2005-10 Average Annual Groundwater Use and % of Use met by Groundwater									
PA Number	PA Name	Ag		Urban		Managed Wetlands		Total	
		TAF	%	TAF	%	TAF	%	TAF	%
701	Western Uplands	0.3	13%	2.0	87%	0.0	0%	2.3	100%
702	San Luis West Side	598.5	41%	7.5	1%	0.0	0%	606.0	41%
703	Lower Kings-Tulare	1,466.9	67%	44.5	2%	1.1	0%	1,512.4	69%
704	Fresno - Academy	56.1	7%	204.5	27%	0.0	0%	260.6	34%
705	Alta - Orange Cove	435.8	43%	59.3	6%	0.0	0%	495.1	49%
706	Kaweah Delta	1,547.5	58%	112.8	4%	3.2	0%	1,663.5	62%
707	Uplands	32.6	62%	14.3	27%	0.0	0%	46.9	89%
708	Semitropic - Buena Vista	622.7	51%	17.7	1%	24.7	2%	665.0	54%
709	Kern Valley Floor	322.0	38%	31.9	4%	0.0	0%	353.9	42%
710	Kern Delta	580.3	38%	109.7	7%	0.0	0%	690.0	45%
2005-10 Ave Total:		5,662.5	48%	604.1	5%	28.9	0%	6,295.5	54%

Note: TL HR 2005-10 Precip. = 93% of the 30-yr average

Key Messages:

- TL GW Use: 38% of CA average annual
- Twice as much as next highest HR
- One-half TL GW is from PA 703 & 706
- 48% of TL Agricultural Water Use is from GW
- 54% of TL total supply is from GW...highly dependent
- 87% of Western Uplands Urban supply is from GW



Statewide GW Use by HR

Topic 1. Groundwater Supply

2005-10 Average Annual Groundwater Supply: % GW Use by PA and HR

Tulare Lake Hydrologic Region		Groundwater for Agricultural Use	Groundwater for Urban Use	Groundwater for Managed Wetlands Use	GW Use by PA
PA Number	PA Name	%	%	%	%
701	Western Uplands	13%	87%	0%	0%
702	San Luis West Side	99% *	1%	0%	10%
703	Lower Kings-Tulare	97% *	3%	0%	24%
704	Fresno - Academy	22%	78%	0%	4%
705	Alta - Orange Cove	88%	12%	0%	8%
706	Kaweah Delta	93% *	7%	0%	26%
707	Uplands	69%	31%	0%	1%
708	Semitropic - Buena Vista	94% *	3%	4%	11%
709	Kern Valley Floor	91% *	9%	0%	6%
710	Kern Delta	84%	16%	0%	11%
2005-10 Annual Average HR Total:		90%	10%	0%	100%

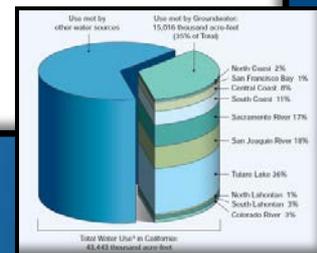
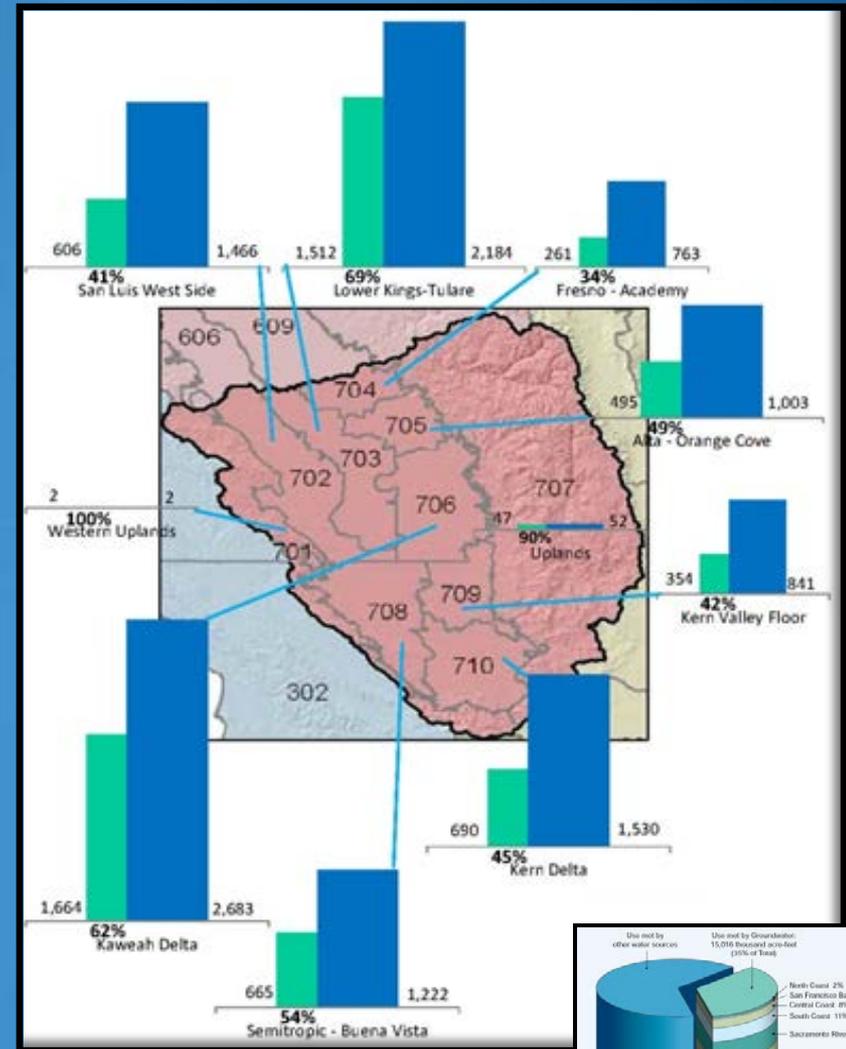
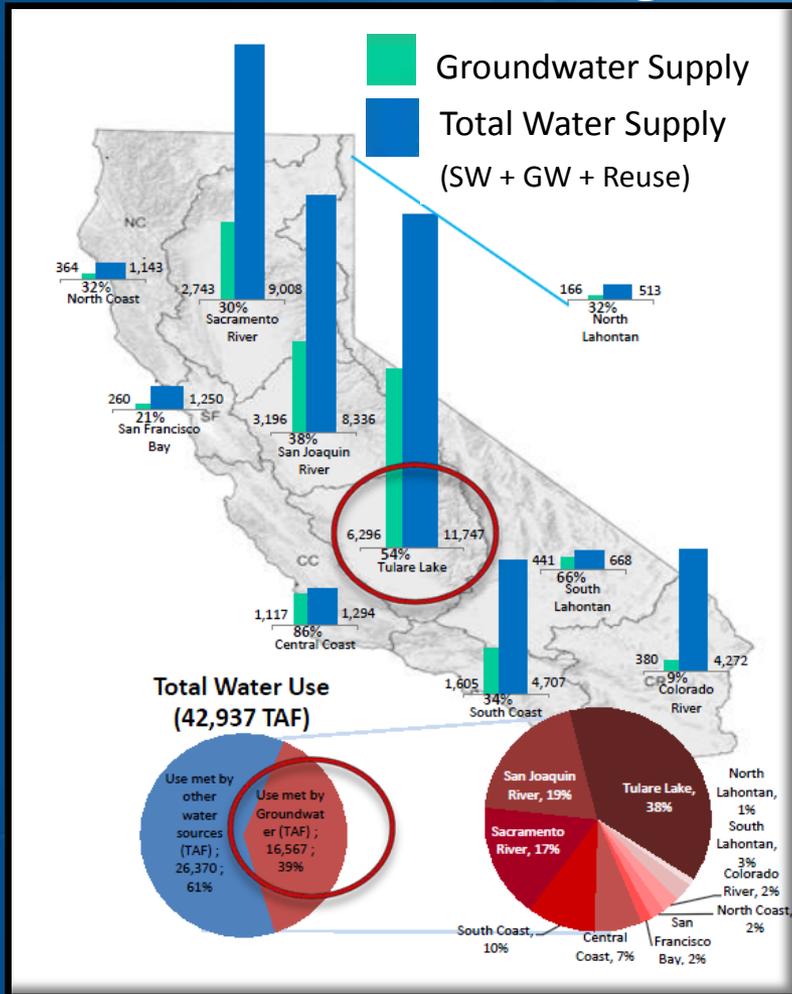
Note: 1) Percent use is average annual groundwater use by planning area and type of use, compared to the total groundwater use for the hydrologic region.

Key Messages:

- 90% of TL groundwater goes toward Agricultural Use
- One-half the TL PAs use > 90% of gw for Agricultural Use
- PAs 703 & 706 comprise 50% of TL average annual GW Use

Topic 1. Groundwater Supply

2005-10 Average Annual Groundwater Supply:

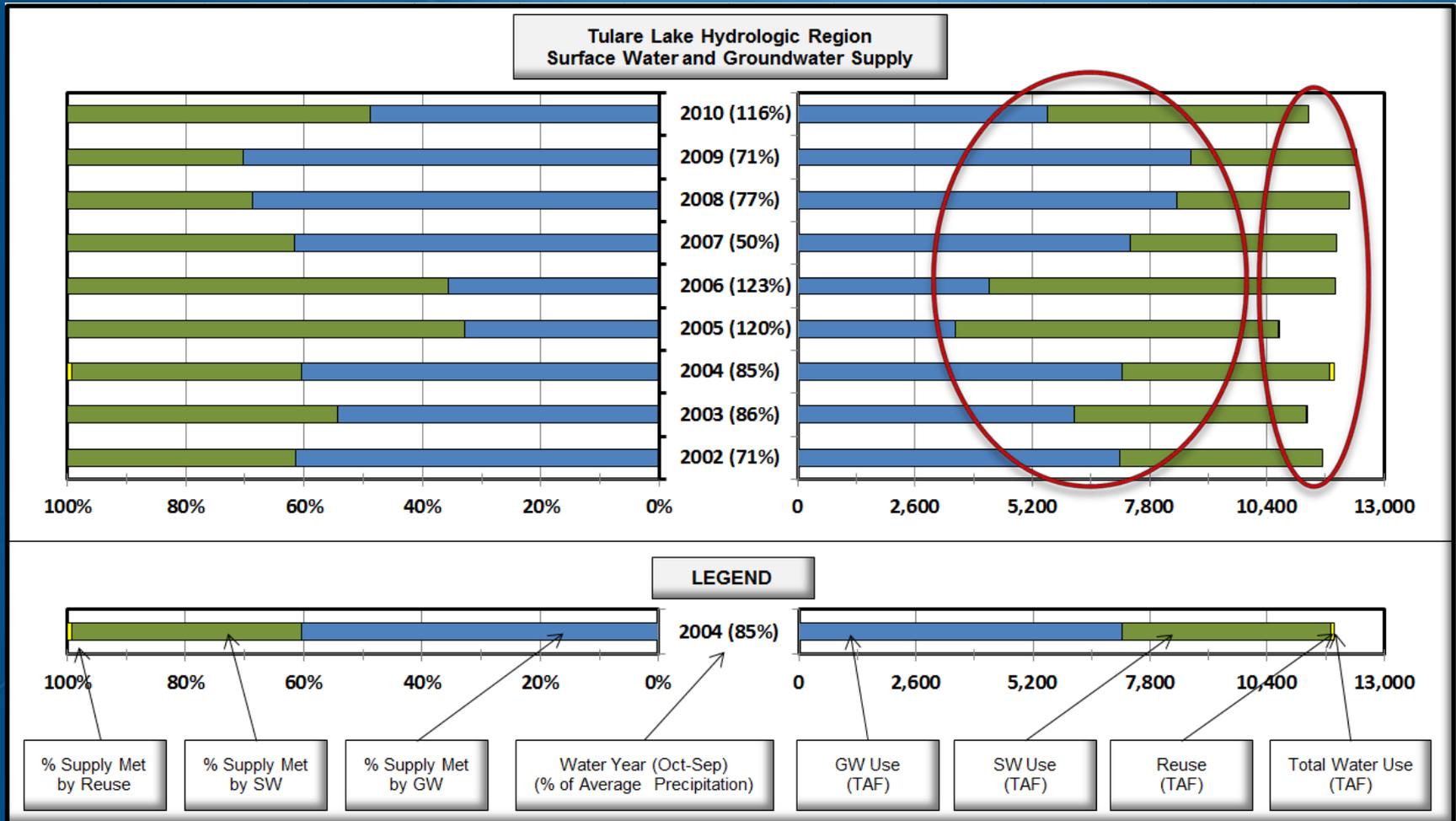


Key Messages:

- Statewide GW Use & Reliance = High (16.5 MAF & 39% reliance)
- TL Region GW Use & Reliance = Very High (6.3 MAF & 54% reliance)

Topic 1. Groundwater Supply

Groundwater Supply Trends: Butterfly-Type Chart

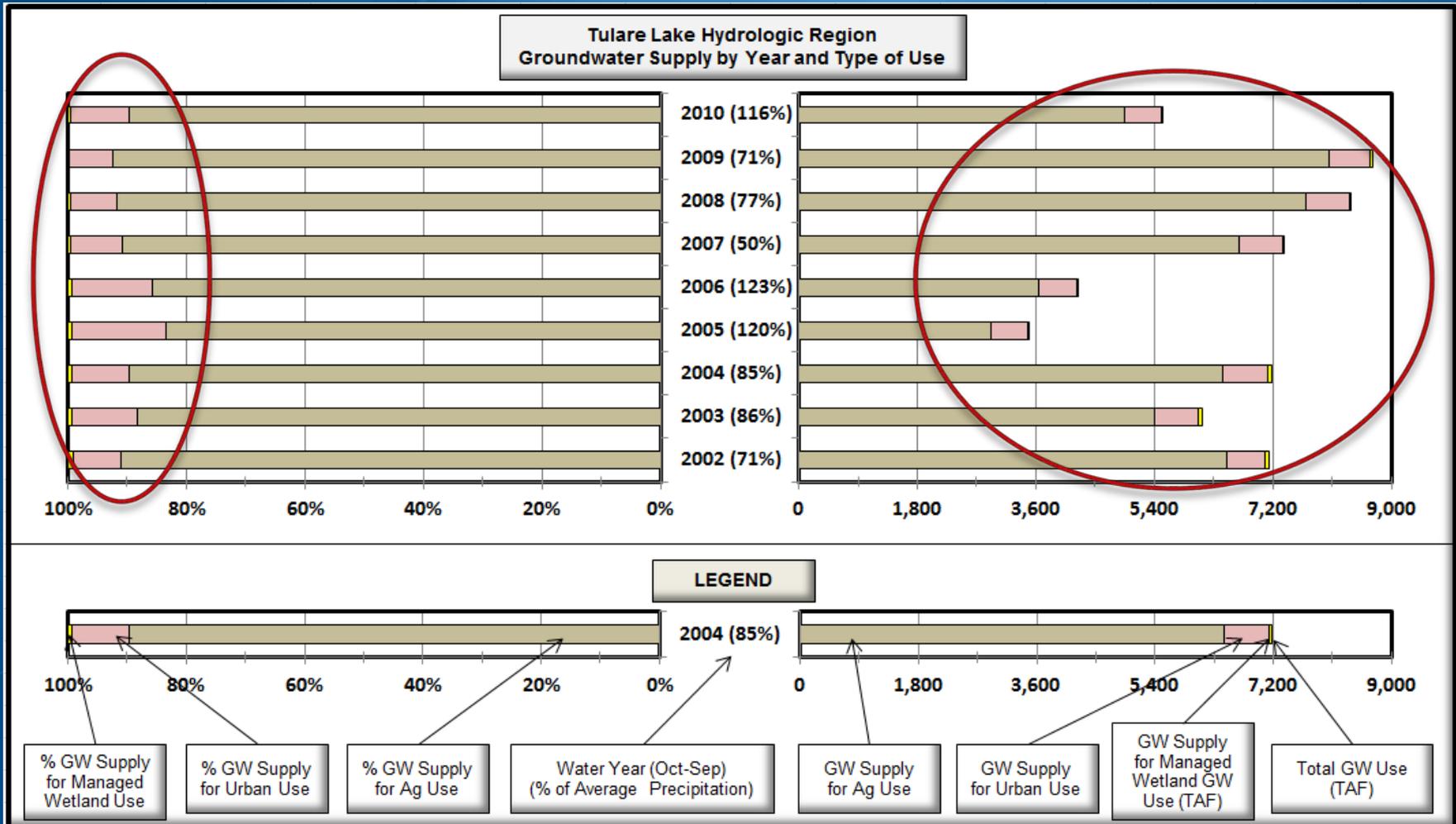


Key Messages:

- Small Variability in Total Supply (15% of ave.): Indication of increasing permanent crops
- Highly Variable SW & GW Supply :GW = 30 - 70% of the total water supply

Topic 1. Groundwater Supply

Groundwater Supply Trends: Butterfly-Type Chart



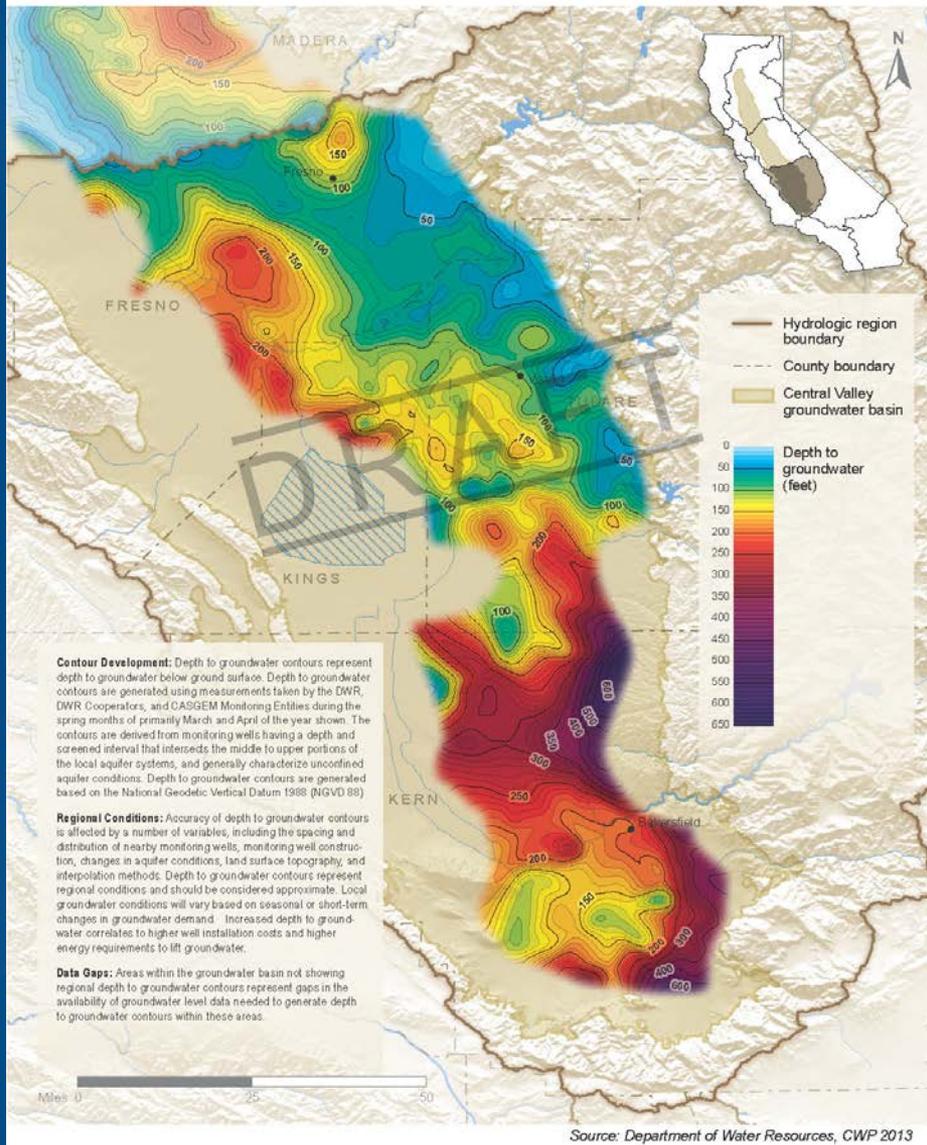
Key Messages:

- Highly Variable Volume of GW Use...but
- Relatively stable division by type of use (90% Ag., 10% Urban)

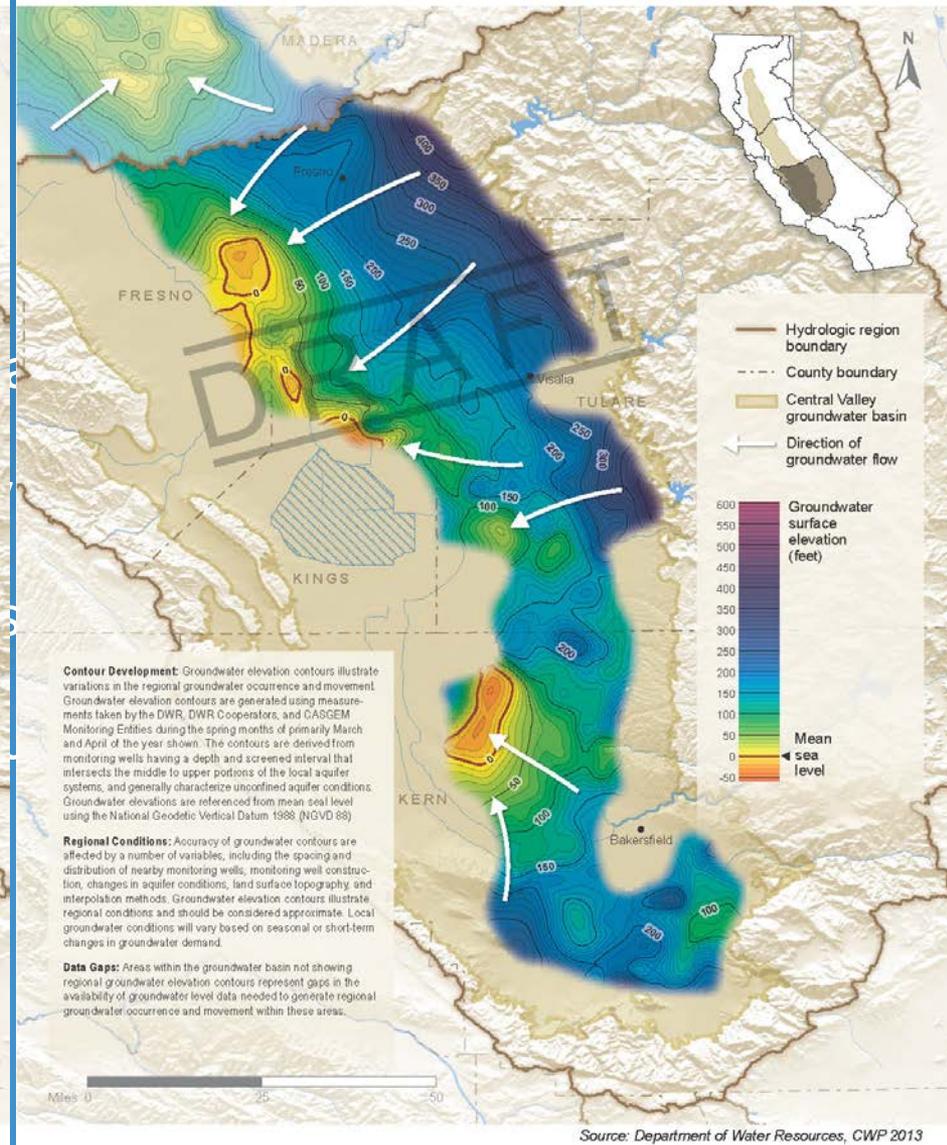
Topic 2. Groundwater Conditions

- Groundwater Levels and Trends
- Change in Groundwater Storage
- Land Subsidence

Depth to Groundwater in Tulare Lake Hydrologic Region (Spring 2010)

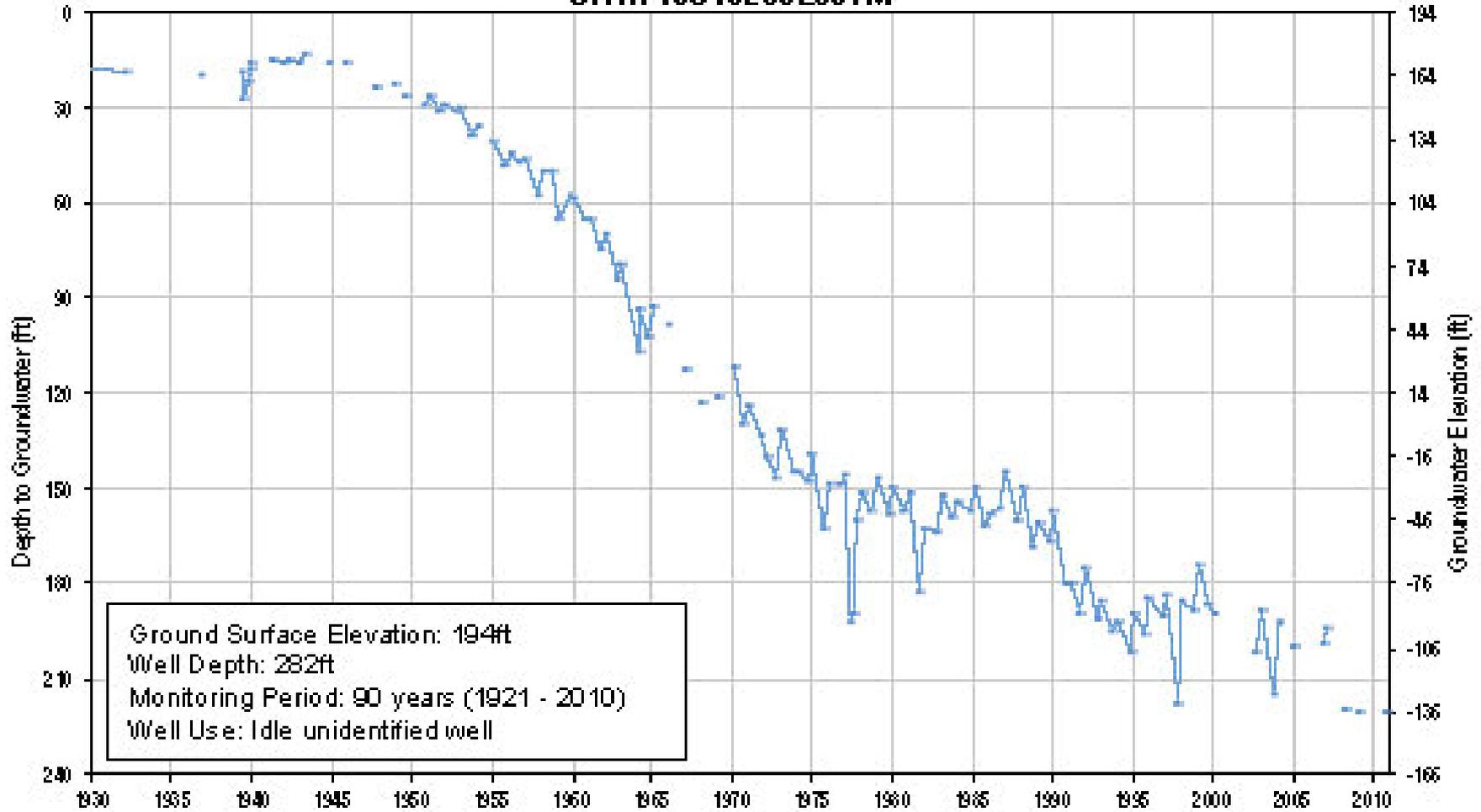


Groundwater Elevations in Tulare Lake Hydrologic Region (Spring 2010)



Groundwater Level Hydrographs

SWN: 15S18E30L001M



Change in Groundwater Storage

...begin with change in groundwater levels

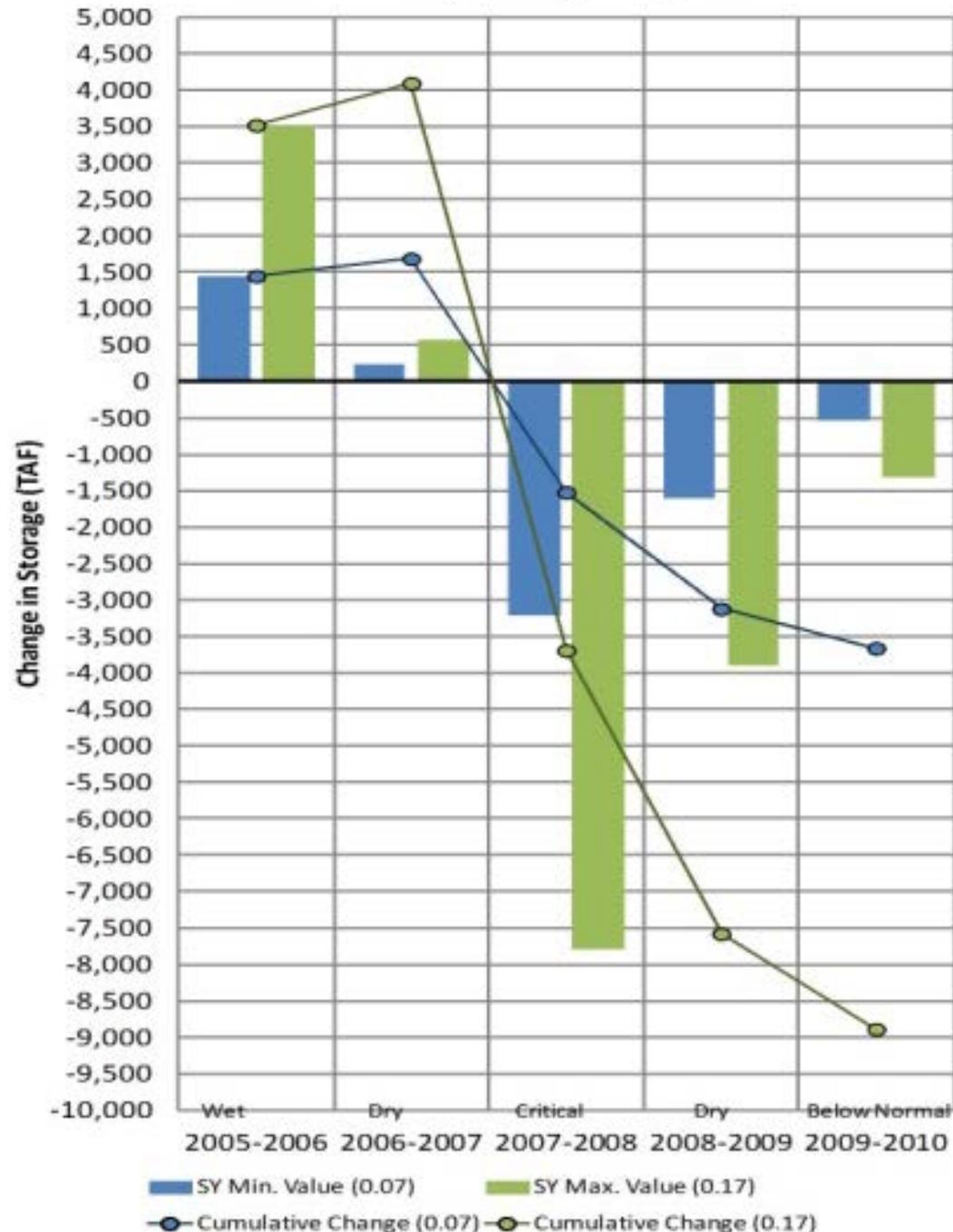
...then factor in aquifer characteristics

Estimated change in groundwater storage in the Tulare Lake Hydrologic Region:

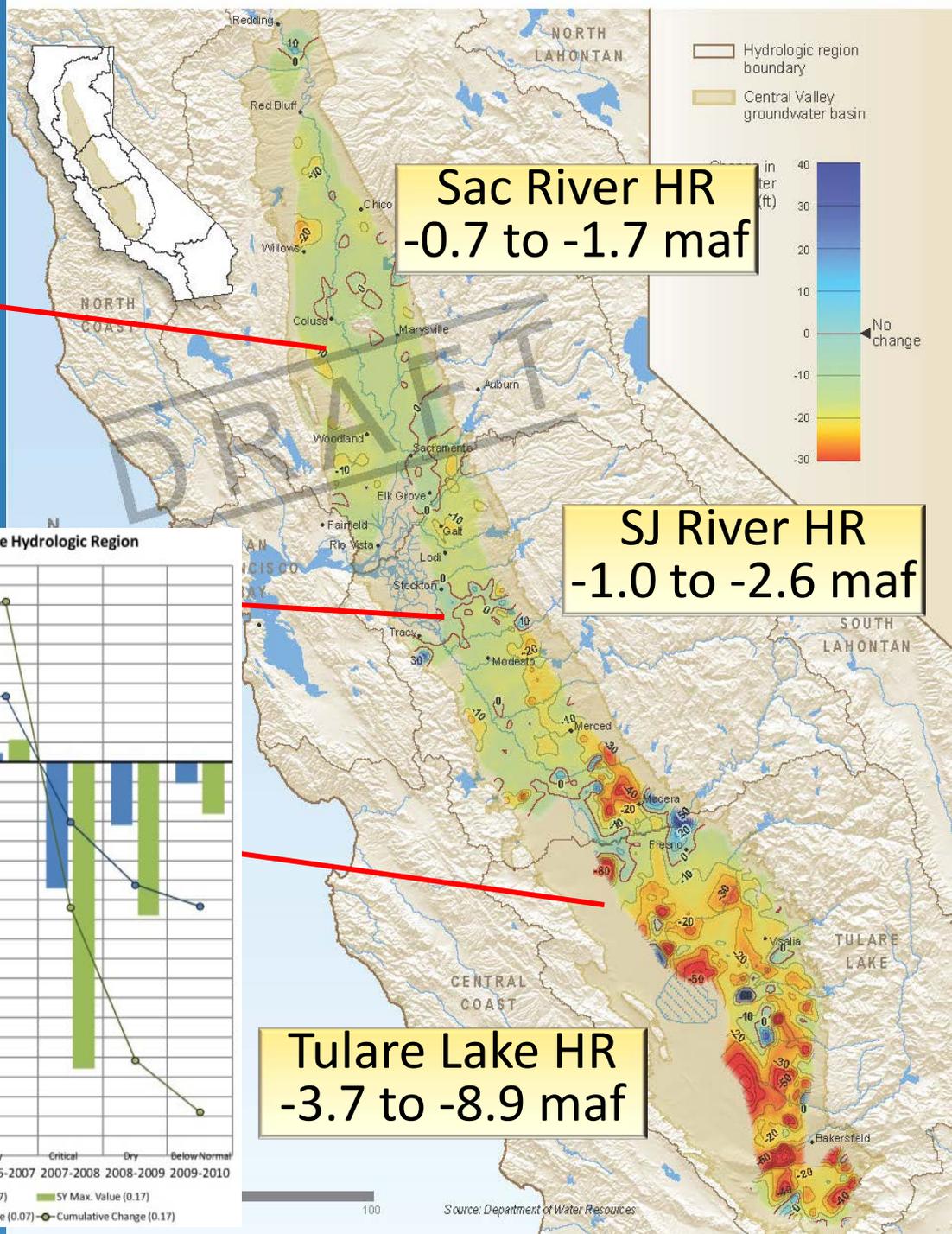
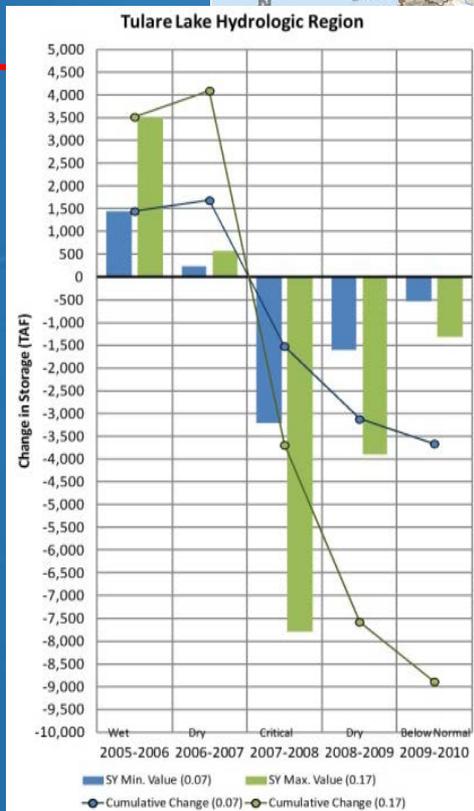
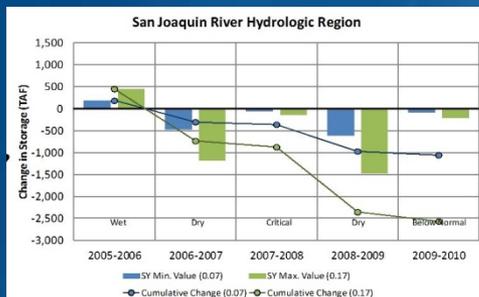
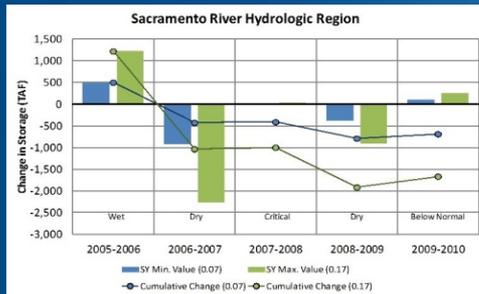
Min: -3.7 million acre-feet

Max: -8.9 million acre-feet

Tulare Lake Hydrologic Region



Change in Groundwater Storage



Land Subsidence

- Declining groundwater levels in aquifers with fine grained material can lead to inelastic subsidence
- Land subsidence can damage infrastructure, such as water supply and flood protection systems
- There is a long history of subsidence in the Tulare Lake Hydrologic Region:
 - First documented in 1935
 - Subsidence rates decreased after building major water delivery infrastructure (CVP, SWP, others)
 - Subsidence rates in some areas have increased recently

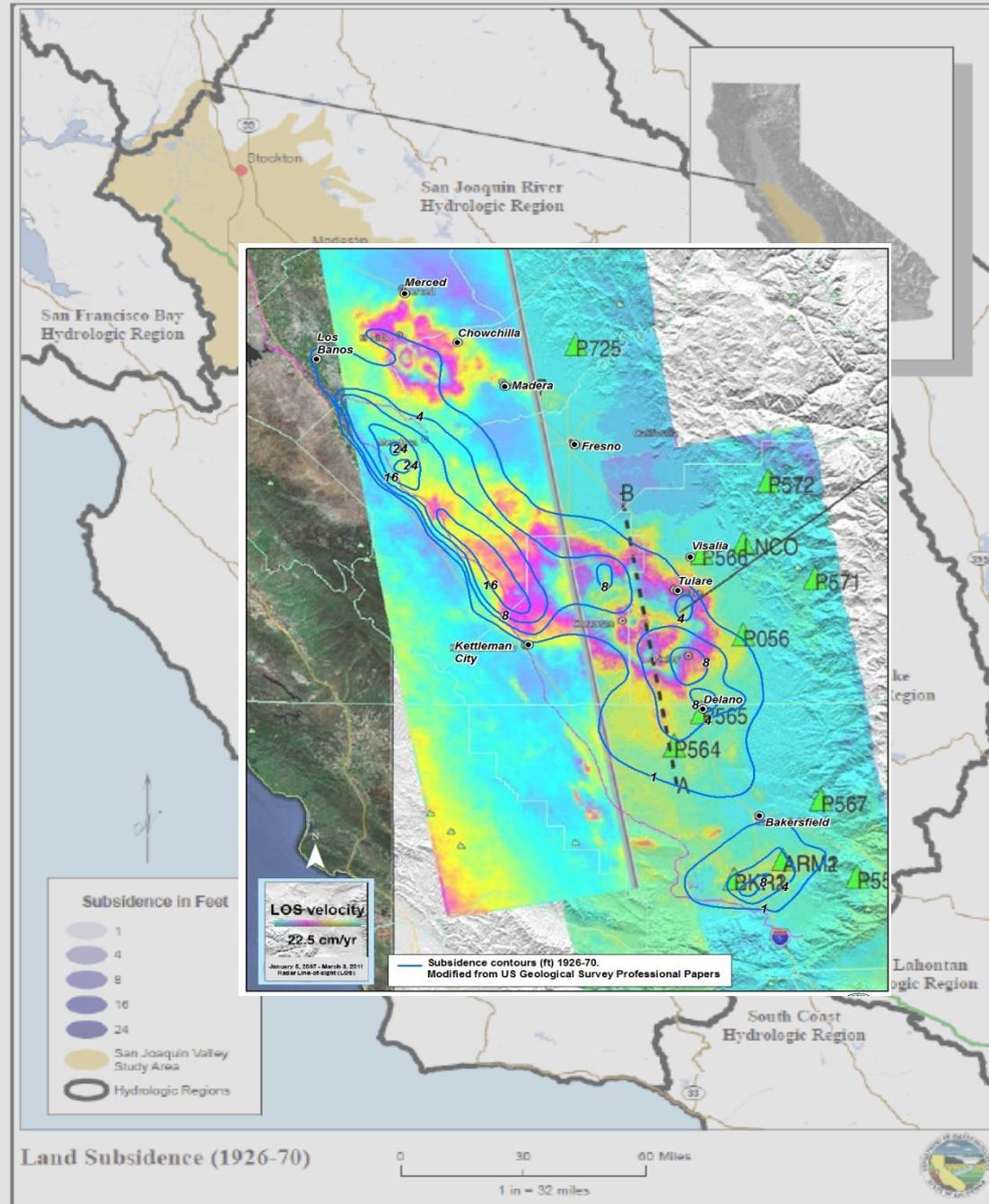
Land Subsidence

...between 1926 and 1970 there was more than 24 feet of land subsidence in some areas (Ireland, 1984)

...subsidence rates were as high as 1 foot per year

...recent studies show renewed land subsidence (USGS)

Figure TL-18 Land Subsidence in the San Joaquin Valley — 1926 to 1970 (Adapted from Ireland, 1984)



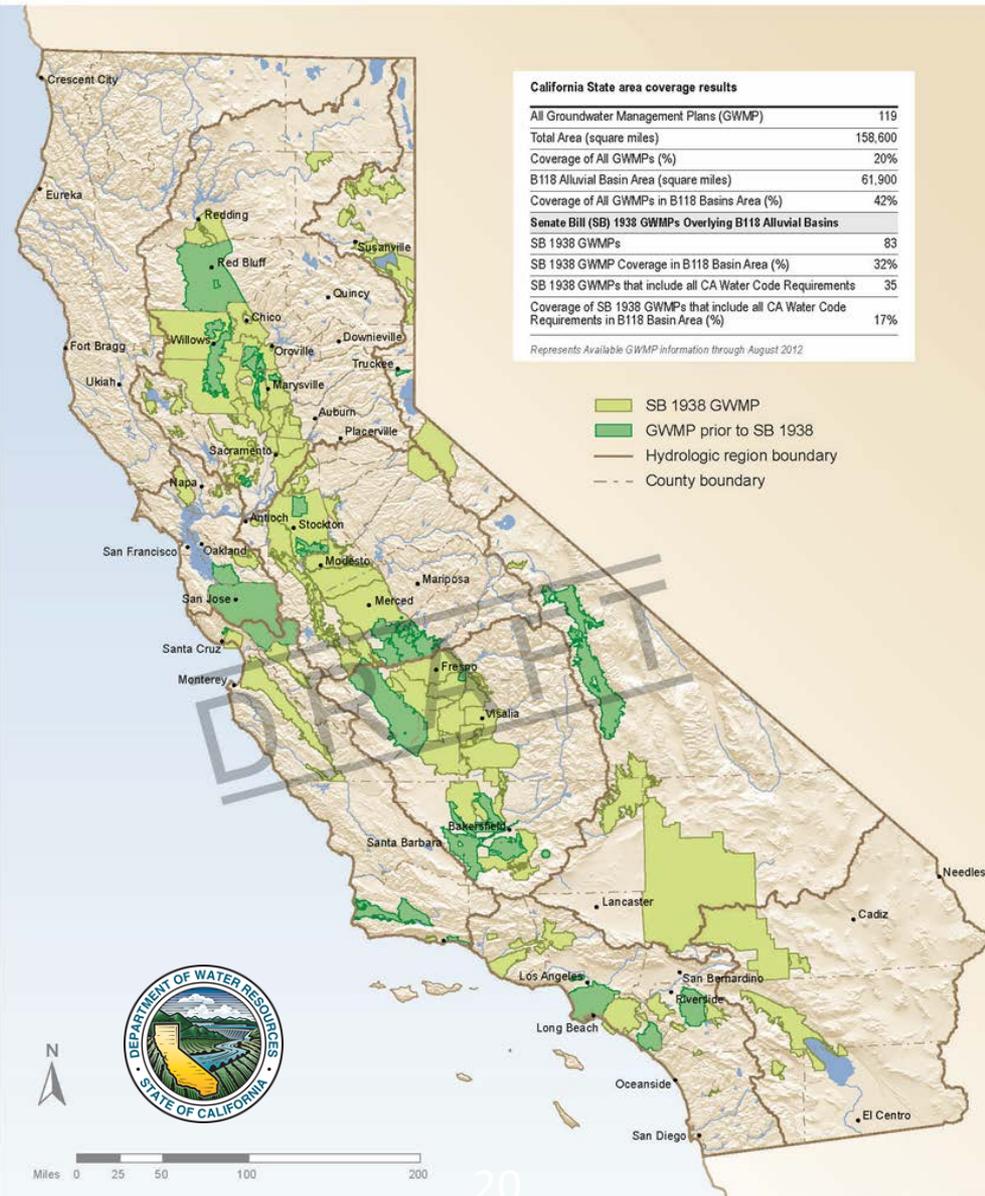
Topic 3

California Groundwater Management Plans

- GWMP assessment collected all plans and compared them to the California Water Code (*GWMPs received by August 2012*)
- GWMPs prepared after the SB 1938 legislation was passed in 2002 are considered “active” plans
- DWR recommends all GWMPs be updated to comply with CWC §10753.7

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	83
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%

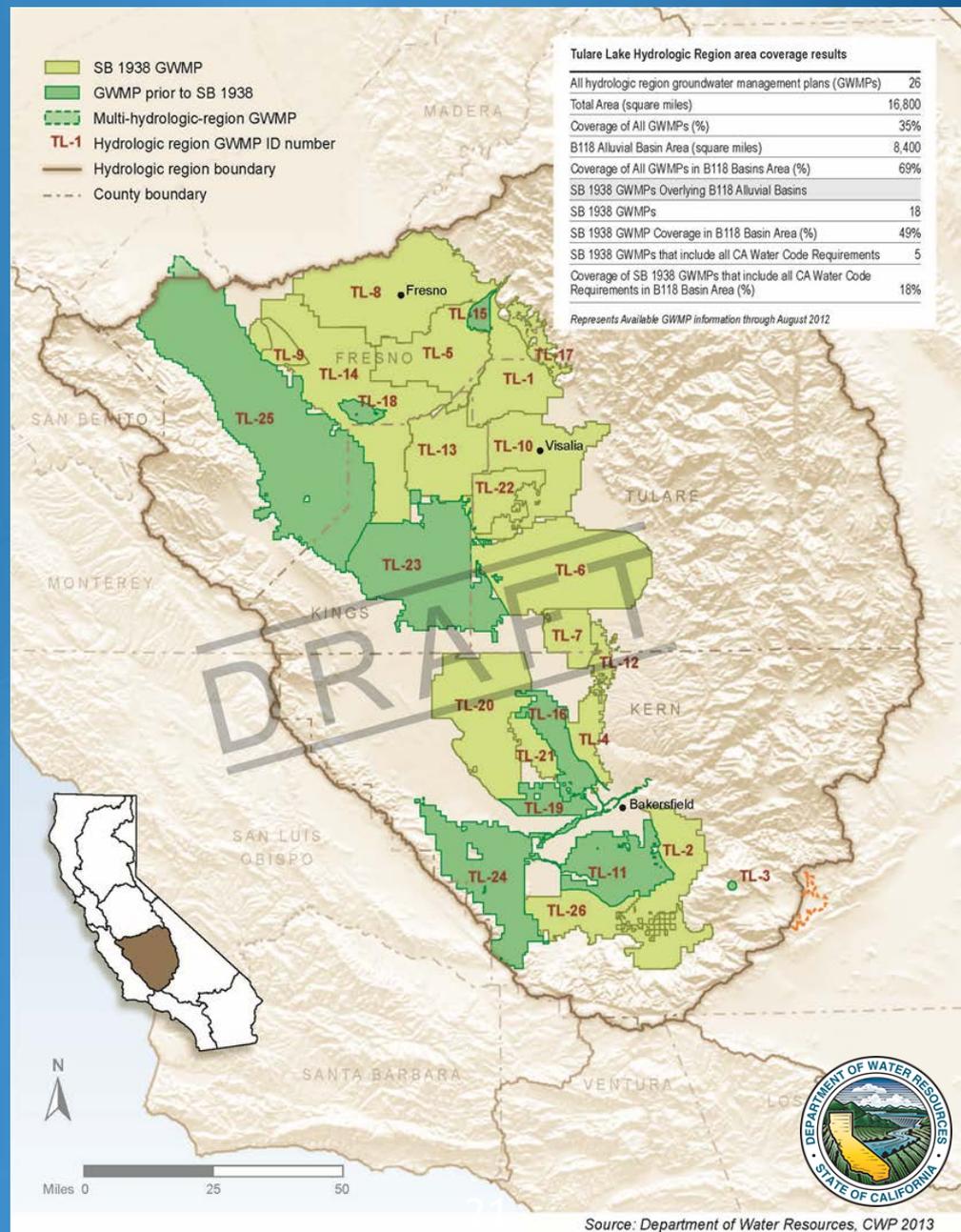
California Groundwater Management Plans



Source: Department of Water Resources, CWP 2013

Tulare Lake Region Groundwater Management Plans

- 26 GWMPs in Tulare Lake Region
 - 69% of B-118-03 basin area
- 18 GWMPs are post-SB 1938 (2002)
 - 49% of B-118-03 basin area
- 5 GWMPs include all CWC §10753.7 requirements
 - 18% of B-118-03 basin area
- 19 GW basins and subbasins in Tulare Lake Region
 - 7 high use basins
 - 1 medium use basin
 - 1 low use basin

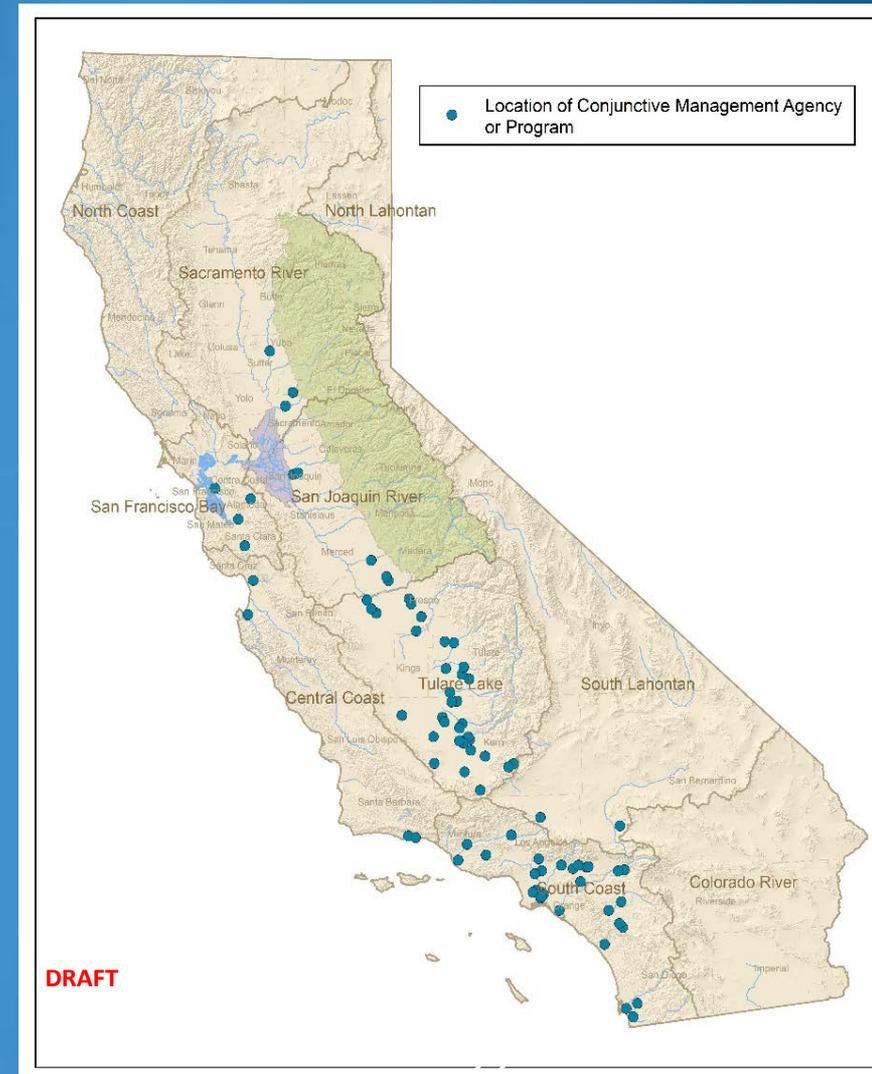




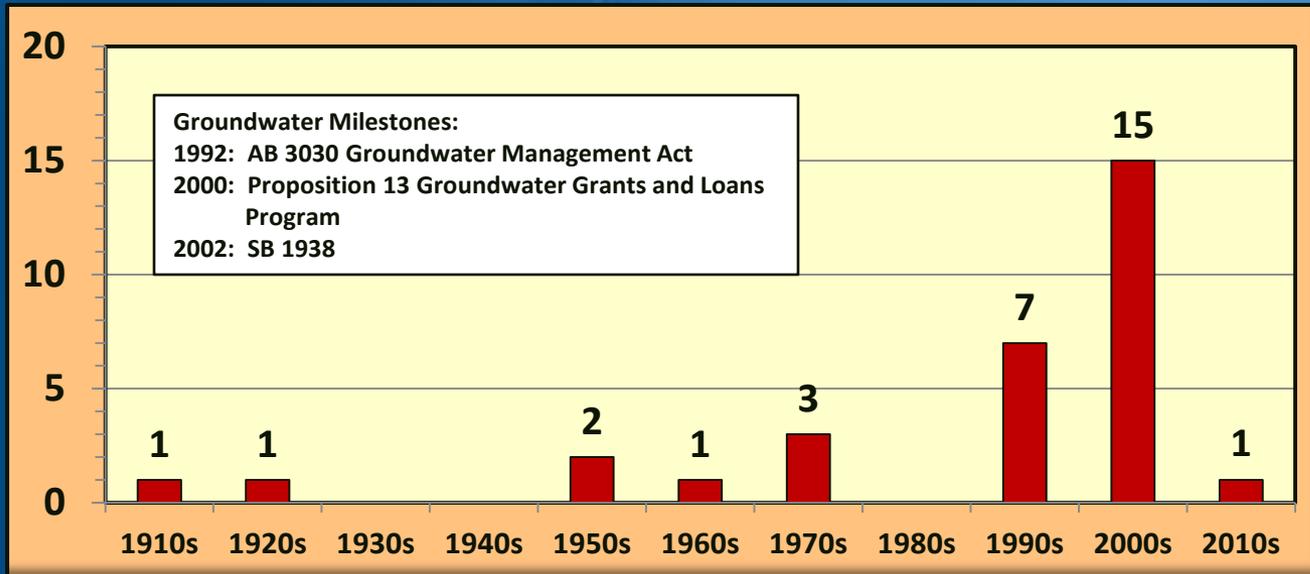
Topic 3 (cont.)

Conjunctive Management in California

- DWR conducted a statewide survey to gather conjunctive management program information
- 89 (operating) conjunctive management programs identified statewide
 - 37 programs in Tulare Lake Region
 - 32 programs in South Coast Region
 - TL + SC = 78% of programs Statewide
- Minimal information was reported by local agencies when contacted by DWR
- More details are needed to fully evaluate California's conjunctive management operations
- *Vol. 3, Ch. 9: Conjunctive Management and Groundwater Storage Resource Management Strategy*

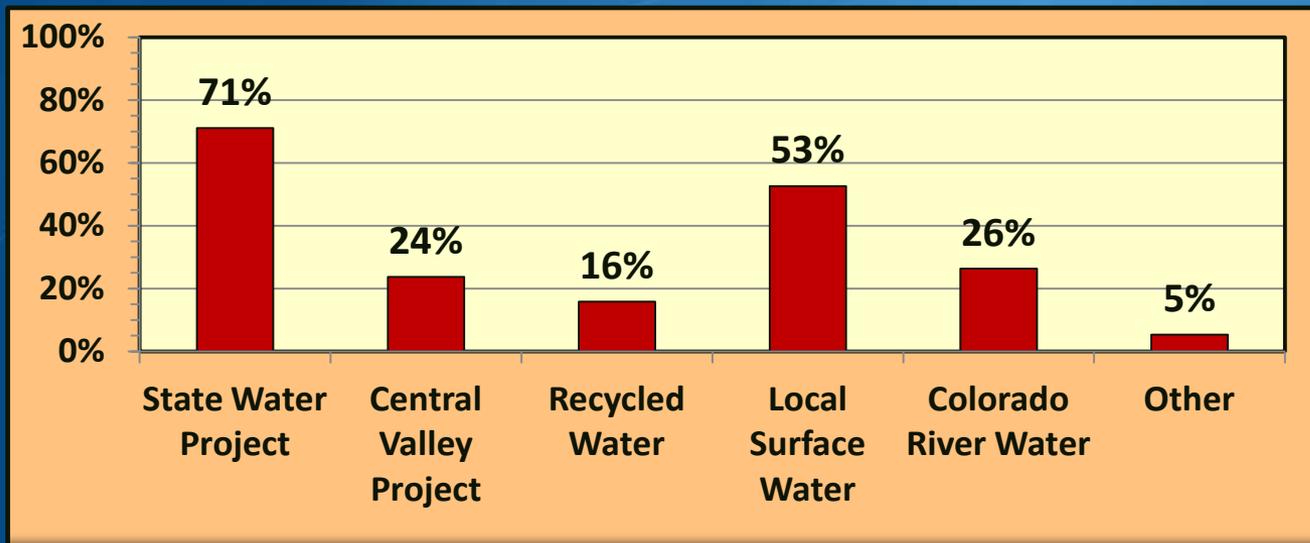


Statewide Conjunctive Management Summary



Projects Developed per Decade

(Note: 31 out of 89 programs reporting data)



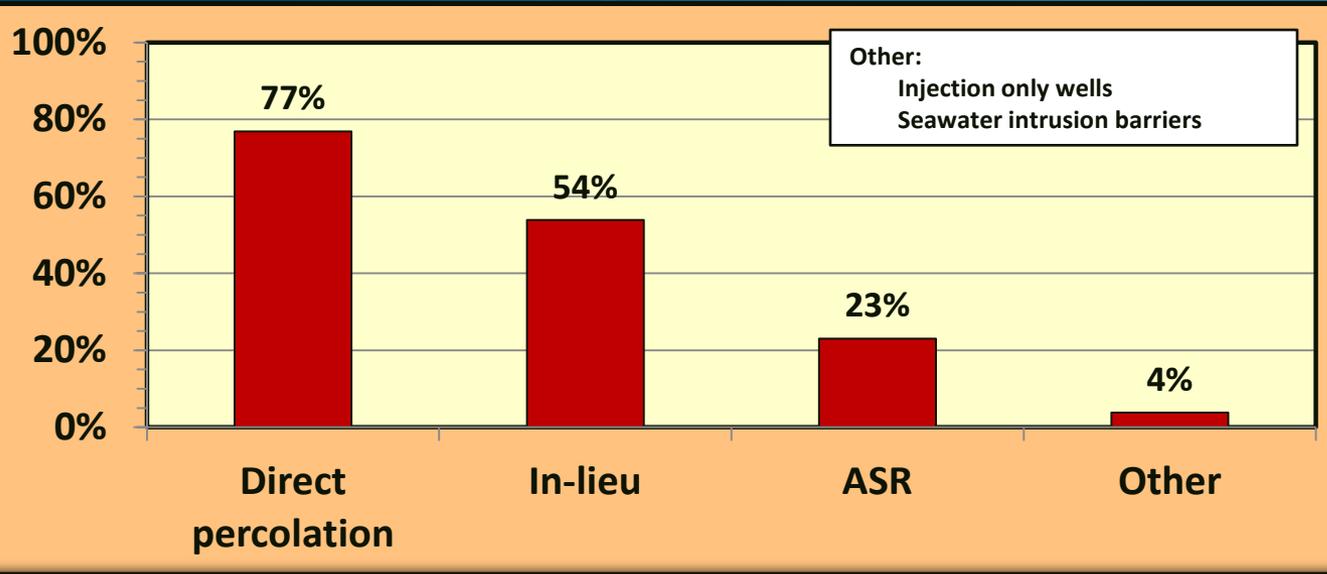
Source of Recharge Water

(Note: 38 out of 89 programs reporting data)

Statewide Conjunctive Management Summary

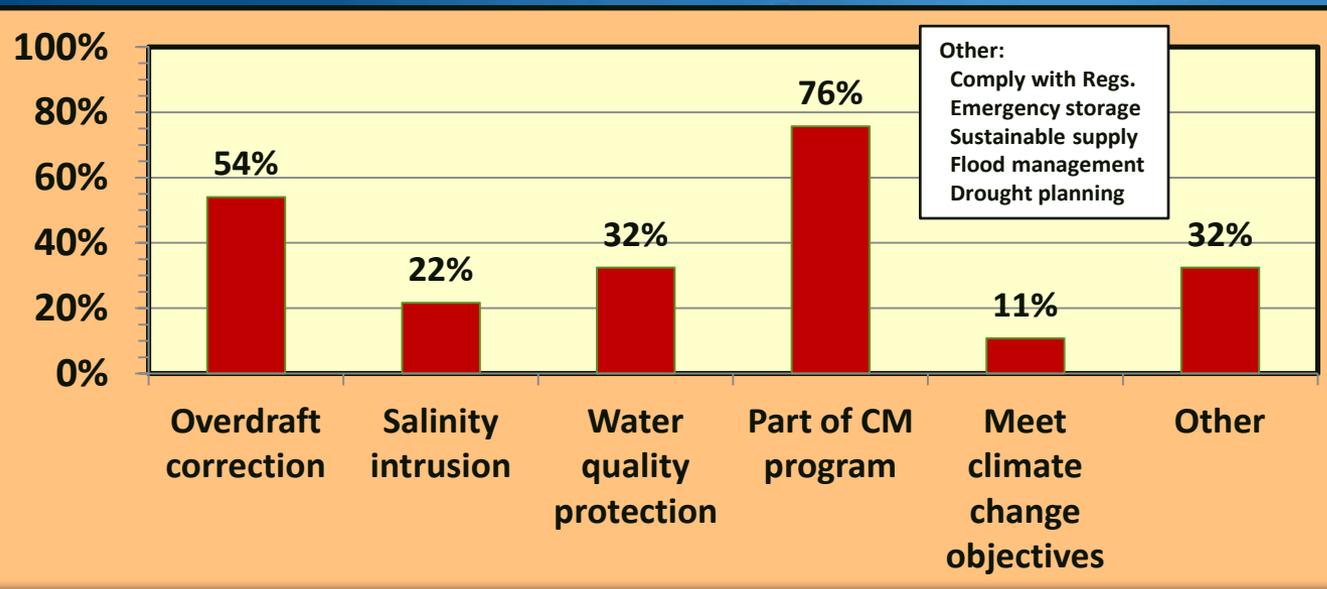
Method of Groundwater Recharge

(Note: 52 out of 89 programs reporting data)



Program Goals and Objectives

(Note: 37 out of 89 programs reporting data)



Update 2013 Public Review Draft Questions for Reviewers

Groundwater Enhancements

1. What key contents/messages do you think should be included in the CWP 2013 Highlights document?
2. What are your suggestions to present the key contents/messages in a more compelling way?

Topic 4. Groundwater Recommendations

Statewide

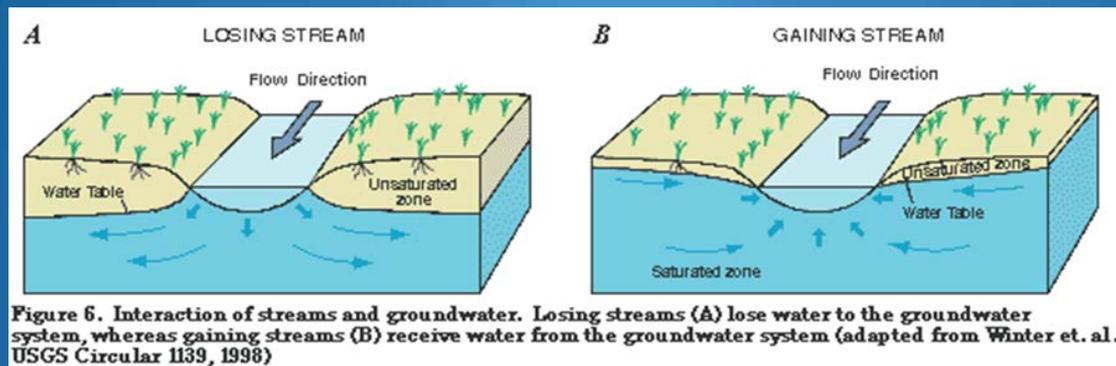
1. Promote public education regarding groundwater
2. Improve collaboration and coordination among agencies
3. Increase availability and sharing of groundwater information
4. Strengthen/expand CASGEM for long-term implementation
5. Under CASGEM, improve understanding California's high use groundwater basins
6. Assess GWMPs and develop guidelines to promote best practices in groundwater management



Topic 4. Groundwater Recommendations

Statewide

7. Develop better analytical tools to assist conjunctive management strategies
8. Increase statewide groundwater recharge and storage
9. *Advance IRWM to improve alignment with GW Mgmt. Planning*
10. *Develop and adopt stronger standards for GW Mgmt. Planning*
11. *Consider legislation to provide needed local/regional authority*



Topic 4. Groundwater Recommendations

Additional Recommendation to improve Standards for Sustainable Groundwater Mgmt.

1. Implementation of GWMPs
2. Goals, objectives, performance measures, and periodic updates
3. Detailed groundwater budgets
4. Addition of ecosystem services into basin management objectives.
5. Annual reporting of GWMP implementation and performance,
6. Forecasting of current trends for improvements/impacts
7. Online posting of GWMPs, annual reports, and lead entity POC

Update 2013 Public Review Draft Questions for Reviewers

Group Review and Discussion Topic 4 - Groundwater Recommendations

1. Which among the recommendations would you like to see included in the Highlights document?
2. Are we missing any critical recommendations that should be included?

Update 2013 Public Review Draft Groundwater Enhancements – Next Steps



We are pleased to release the **Public Review Draft (PRD) of California Water Plan Update 2013 (Update 2013)** for your review and comment according to this schedule. The content reflects input received from extensive collaboration with hundreds of stakeholders and dozens of State agencies.

Volume	Release Date	Comment Deadline
1. The Strategic Plan	October 2, 2013	November 18, 2013
3. 30 Resource Management Strategies	October 16, 2013	December 2, 2013
2. 12 Regional Reports	October 23, 2013	December 9, 2013

You may access and download the volume chapters in PDF format by using the Web link below. There are three options for sending us your comments — e-mail, fax, or postal mail. An Update 2013 navigation guide is also available to help expedite your review.

- **Public Review Draft Web page:**
<http://www.waterplan.water.ca.gov/cwpu2013/prd>
- **Navigating Update 2013 guide:**
<http://www.waterplan.water.ca.gov/docs/cwpu2013/2013-prd/NavigationGuide-2013PRD.pdf>
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Three Ways to Send Comments:
E-mail: cwpcom@water.ca.gov
Fax: 916-651-9289
Postal Mail: Attn: Paul Massera
California Water Plan Update 2013
California Department of Water Resources
P.O. Box 942836, Sacramento, CA 94236-0001

Update 2013 Public Review Draft Groundwater Enhancements – Next Steps

Finance Planning

- Vol. 1 Chapter 7, Finance Planning Framework
- October 29, 4:00 -5:15 p.m. (Ballroom): Questions and Public Comment for Public Review Draft Water Plan Vol. 1, Chapter 7
- October 30, 3:45 4:45 p.m. (Ballroom): Scoping Water Plan Update 2018 – New Budget Constraints & Prioritization