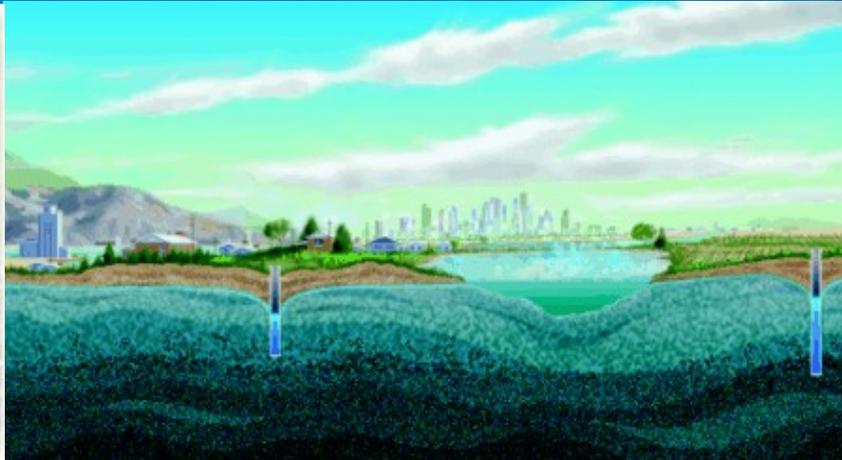




California Water Plan Update 2013 ***Groundwater Content Enhancements***

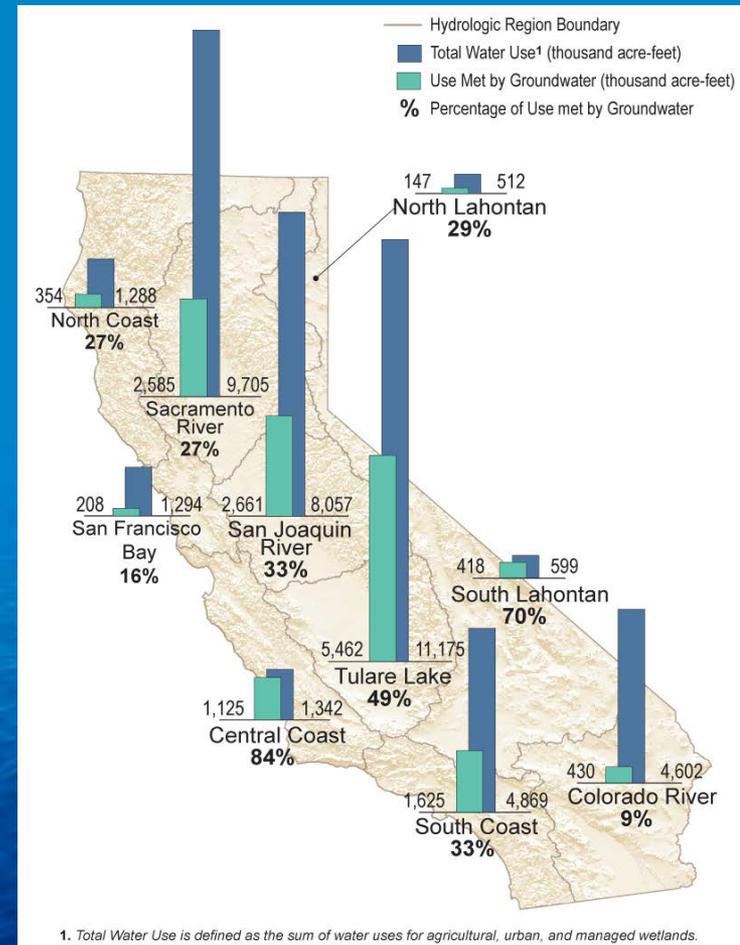
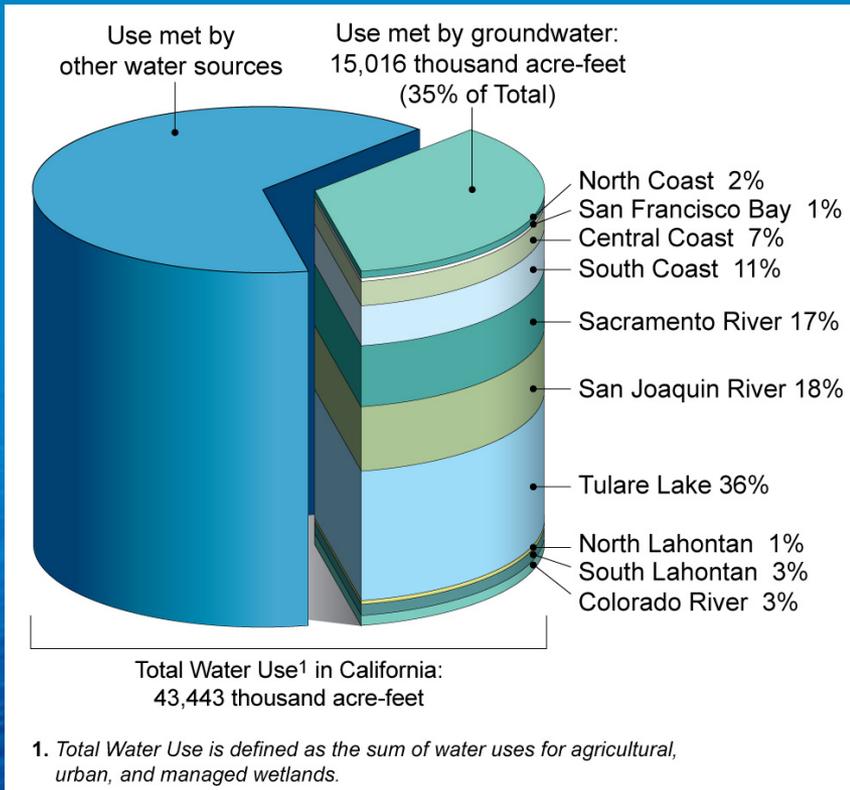
Abdul Khan and Dan McManus
California Department of Water Resources
October 17, 2012

California Water Commission





Water Use Met by Groundwater in California: Statewide and by Hydrologic Region



California Water Plan Update 2009
(1998-2005 average annual data)



Water Plan Update 2013

Groundwater Content Enhancement

Objective



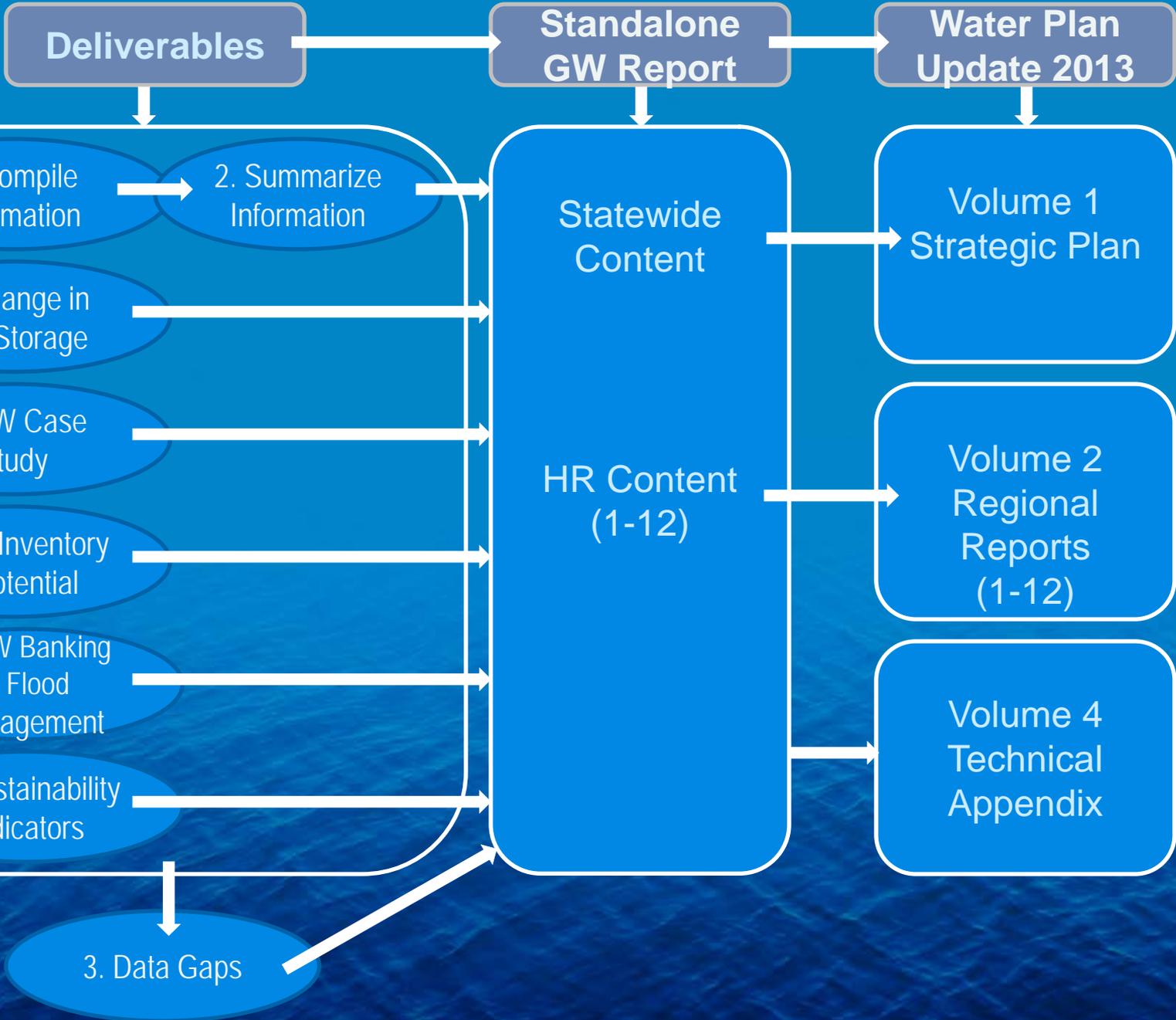
Expand information about statewide and regional groundwater conditions

to

better inform groundwater management actions

through

compilation and summarization of data and analysis



Standalone GW Report

Table of Contents

1. GW Supply & Development

Alluvial Aquifers
Fractured Rock
Aquifer
Well Infrastructure
& Distribution
Priority Basins

2. Groundwater Use

3. GW Monitoring Efforts

GW Level
GW Quality
Land Subsidence
Remote
Sensing/Satellite
Groundwater
Modeling

4. Aquifer Conditions

GW Occurrence &
Movement
GW Levels
GW Level Trends
Change in Storage
GW Quality
Land Subsidence

5. GW Mgm Activities

GW Mgm Plans
GW Ordinances
Court Adjudications
Other GW Mgm
Planning

6. Case Studies

7. Integrated GW Management

8. GW Budget & Sustainability

9. Data Gap Analysis

Hydrologic Region Report
(draft outline with groundwater content)

- Summary and Recommendations ← (Groundwater Content)
- Current State of the Region
 - Watersheds
 - Groundwater Aquifers ←
 - Ecosystems
 - Climate
 - Demographics
 - Land Use Patterns
 - Tribal Communities
- Regional Resource Management Conditions
 - Water in the Environment ←
 - Water Governance ←
 - Water Supplies ←
 - Water Uses ←
 - Project Operations
 - Surface Water Quality
 - Groundwater Quality
 - Aquifer Conditions and Issues ←
 - Near Coastal Issues
 - Flood Management
- Current Relationships with Other Regions and States
- Implementation Activities (2009-2013)
 - Drought Contingency Plans ←
 - Resource Management Strategies ←
 - Water Governance ←
 - State Funding Received
 - Local Investment
 - Water Conservation Act of 2009 (SB x7-7) Implementation Status and Issues
 - Interregional and Interstate Activities
- Looking to the Future
 - Future Conditions
 - Future Scenarios
 - Interregional and Interstate Planning Activities ←
 - Flood Risk Characterization
 - Future Vision
 - Regional Future Vision
 - Tribal Objectives/Vision
 - Relevant Statewide Interests and Objectives
 - Regional Water Planning and Management
 - Integrated Regional Water Management Coordination and Planning ←
 - Accomplishments ←
 - Challenges ←
 - Drought and Flood Planning
- Resource Management Strategies
 - Strategy Availability
 - Regional Strategies ←
- References

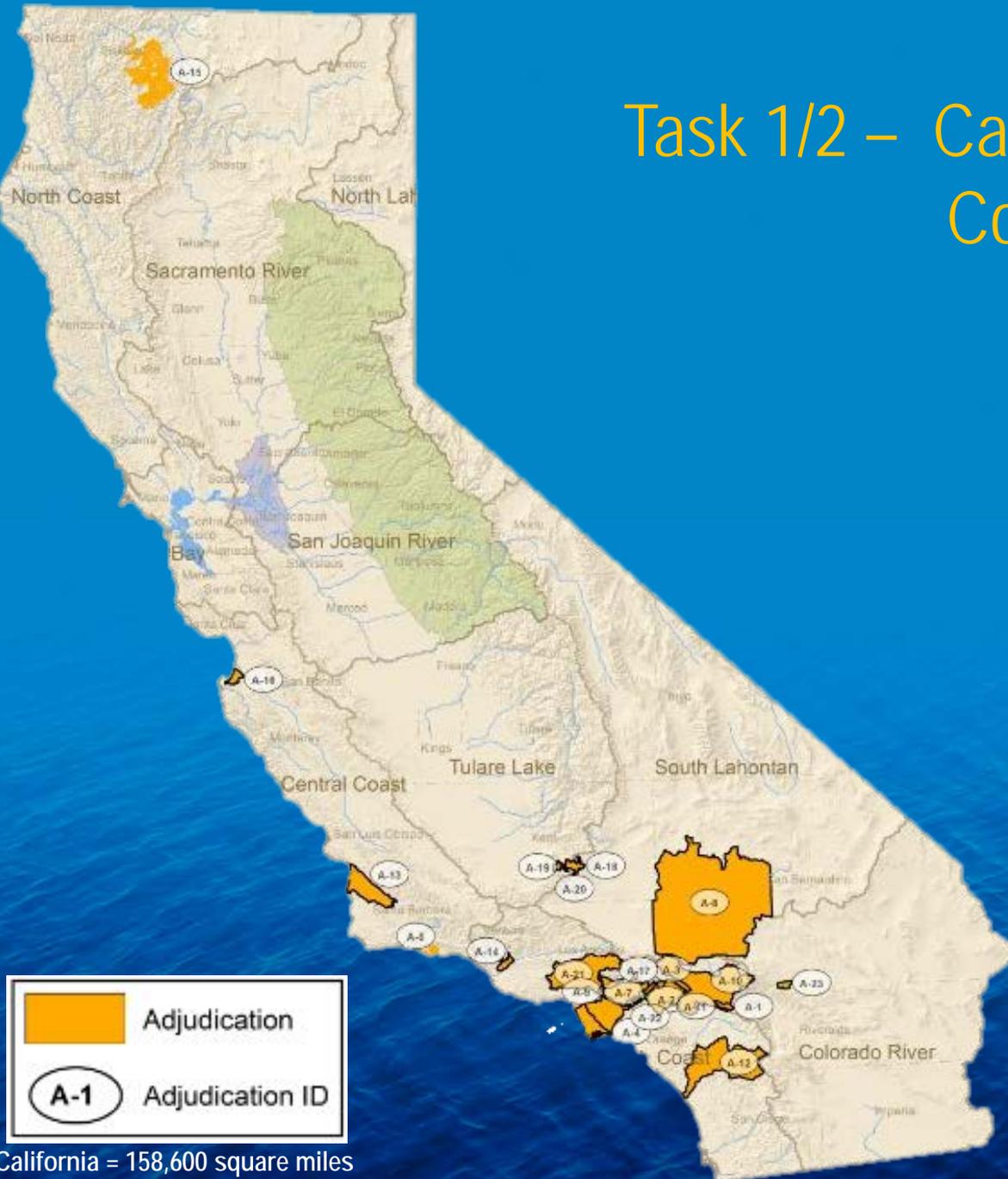
Draft Water Plan Update 2013 Hydrologic Region Report Outline and Groundwater Content (Included in Volume 2)



Task 1/2 – California Adjudication Coverage

As of August 2012:

- 23 Adjudicated Basins Statewide
- Plan coverage (All)
 - 6,900 square miles
 - 4% of California*
- GW Basins
 - 4,600 square miles



*California = 158,600 square miles

Task 1/2 - California GWMP Coverage

All GWMPs and GW Basins

- Groundwater Basins
 - 61,900 square miles
- GWMP Coverage
 - 118 Plans
- Area Coverage
 - 25,900 square miles
 - 42% of GW Basin area



Task 1/2 - California GWMP Coverage

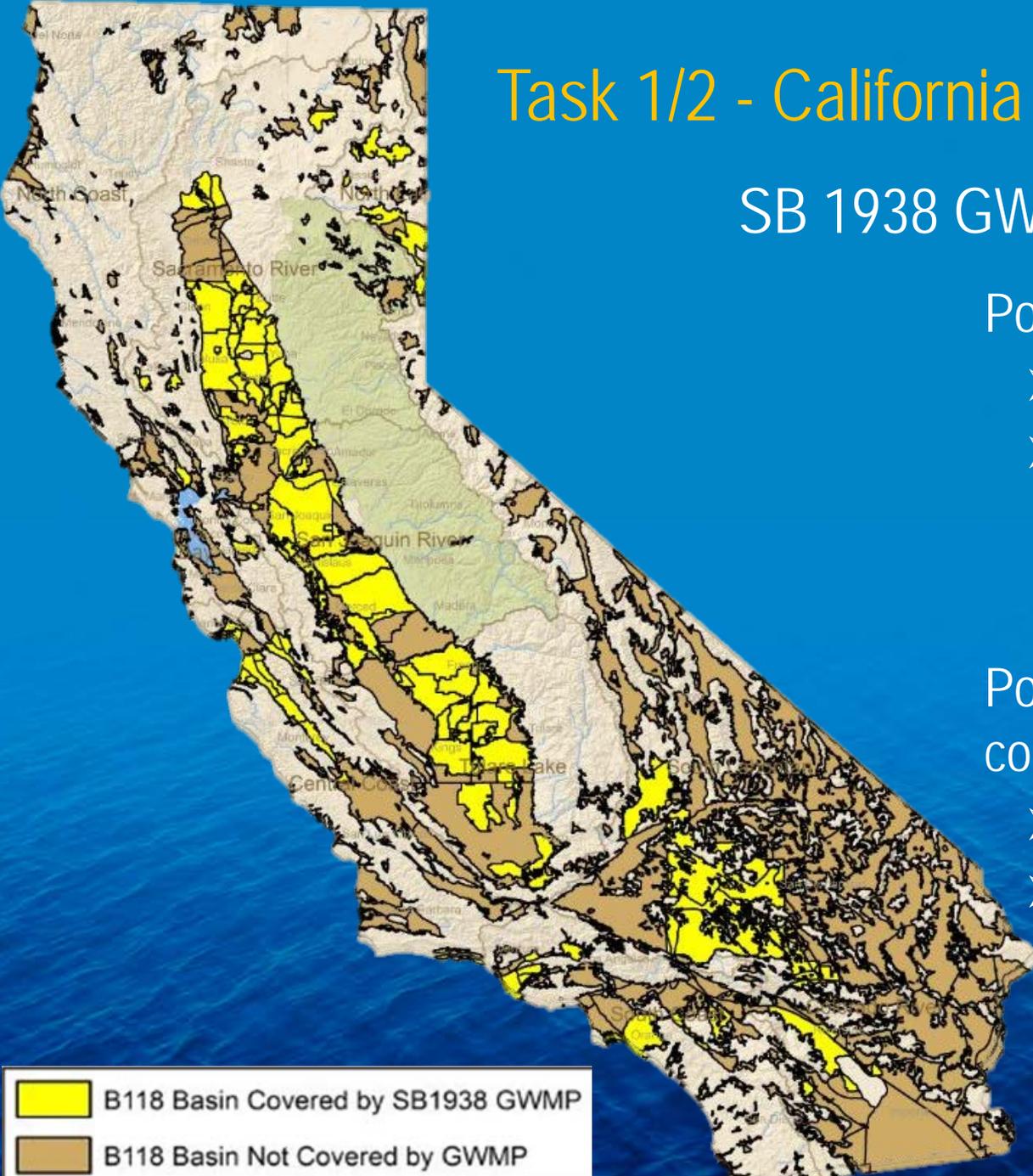
SB 1938 GWMPs and GW Basins

Post SB 1938 Plan (2002)

- GWMPs – 82 (70%)
- Coverage
 - 20,100 square miles
 - 32% of GW Basin area

Post SB 1938 plan w reqrd components fully addrsd

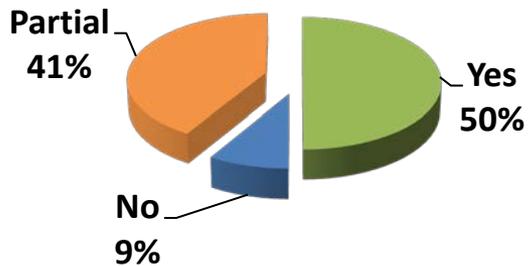
- GWMPs – 35 (43%)
- Coverage
 - 10,300 square miles
 - 17% of GW Basin area





Task 1/2 - Preliminary Results of Statewide GWMP Assessment

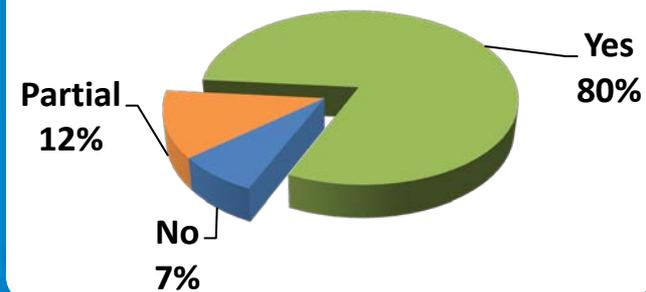
Basin Management Objectives



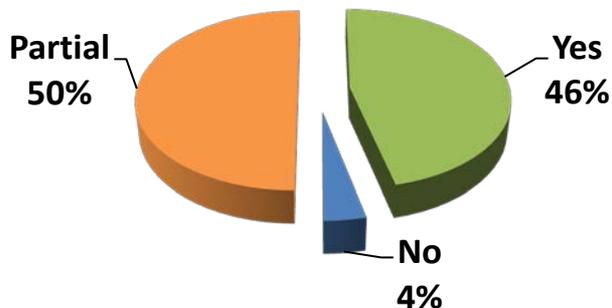
ALL SB 1938 Requirements Addressed



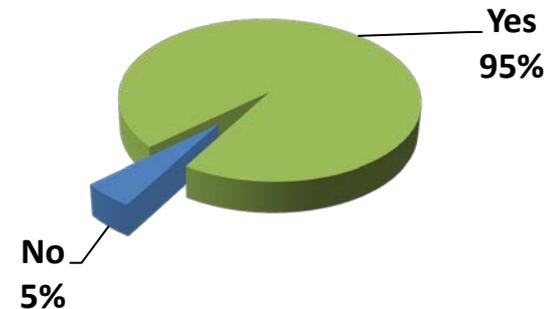
Map



Monitoring Protocols



Agency Cooperation





Task 4 - Annual Change in Groundwater Storage Estimates - Spring 2005 to Spring 2010

Considerations

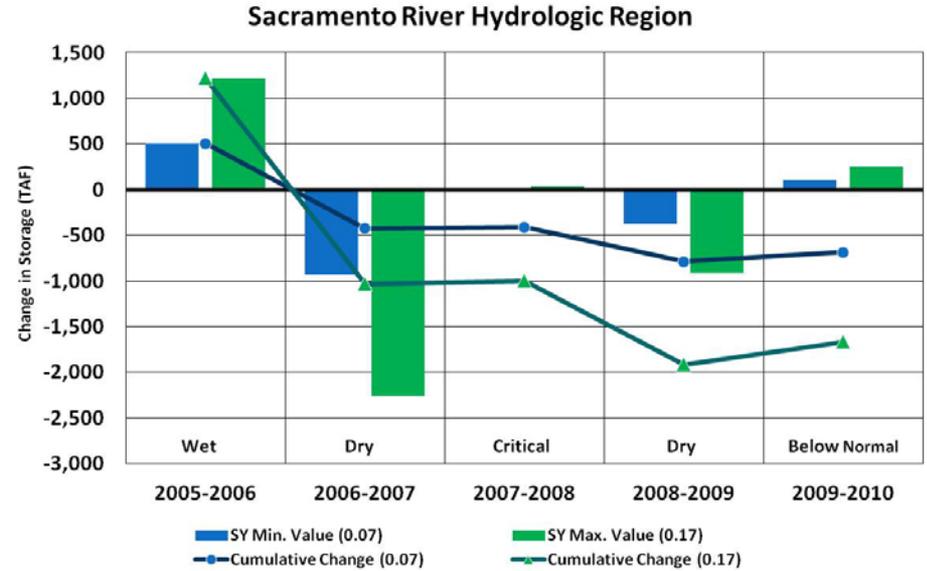
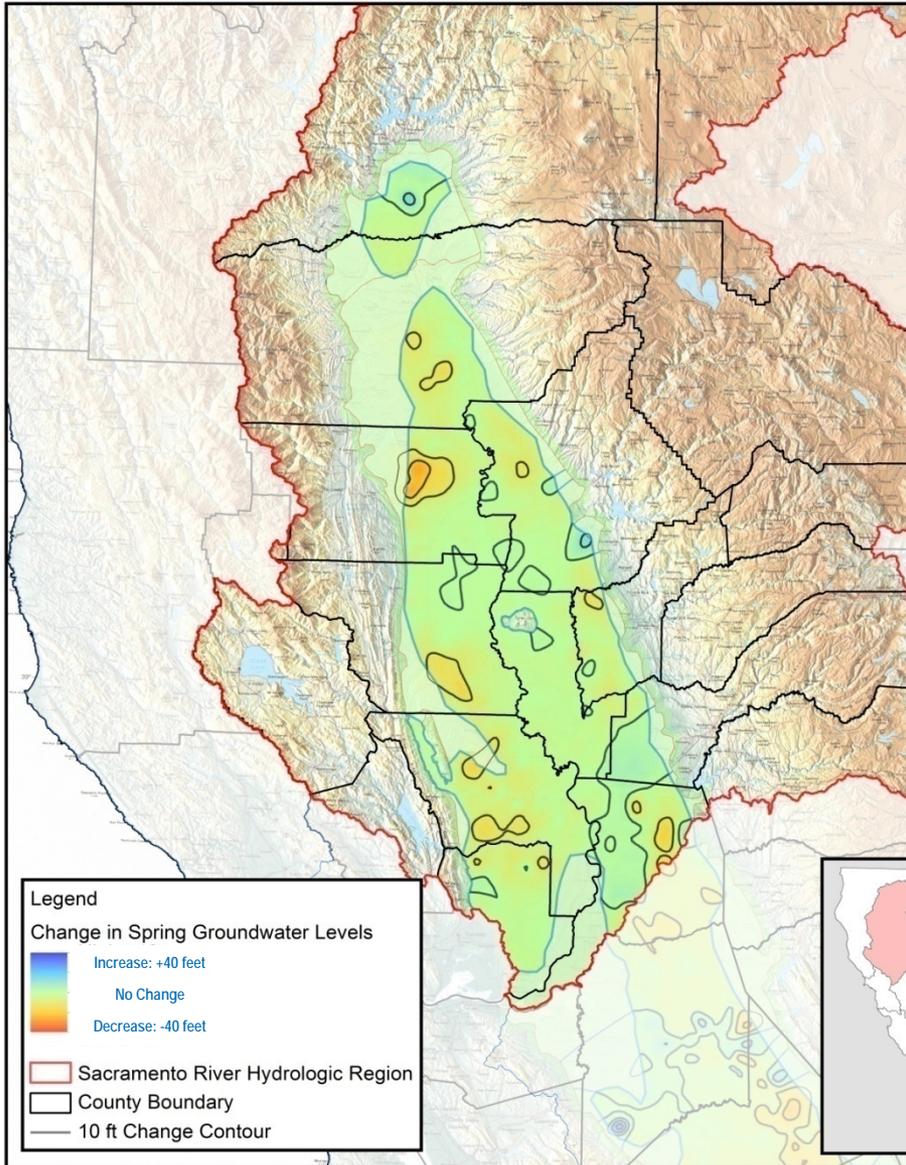
- Water Level Data Availability - focused on Central Valley for CWP Update 2012
- Time frame – 2005 to 2010, based on CWP Update 2013
- GW storage coefficients - to estimate change in groundwater volume based on a change in GW levels for an area; assumes “unconfined” aquifer conditions (S_y)

Method

- Collect, query and filter groundwater level data
- Develop groundwater level (WL) surfaces
- Compare WL surfaces - determine the distance (“space”) between two WL surfaces
- Estimate change in groundwater storage - apply storage coeff to estimate GW storage betn two WL surfaces for a given area and summarize by “reporting areas”



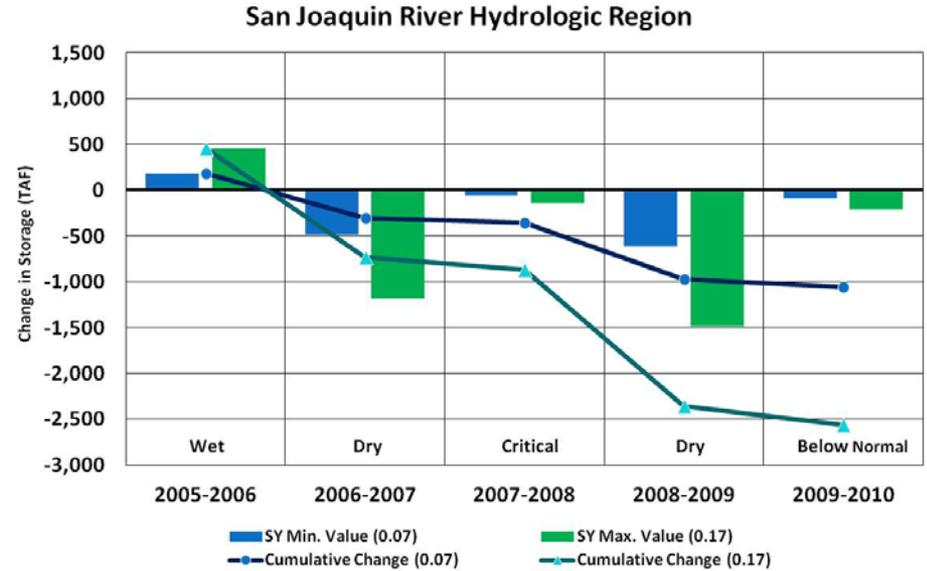
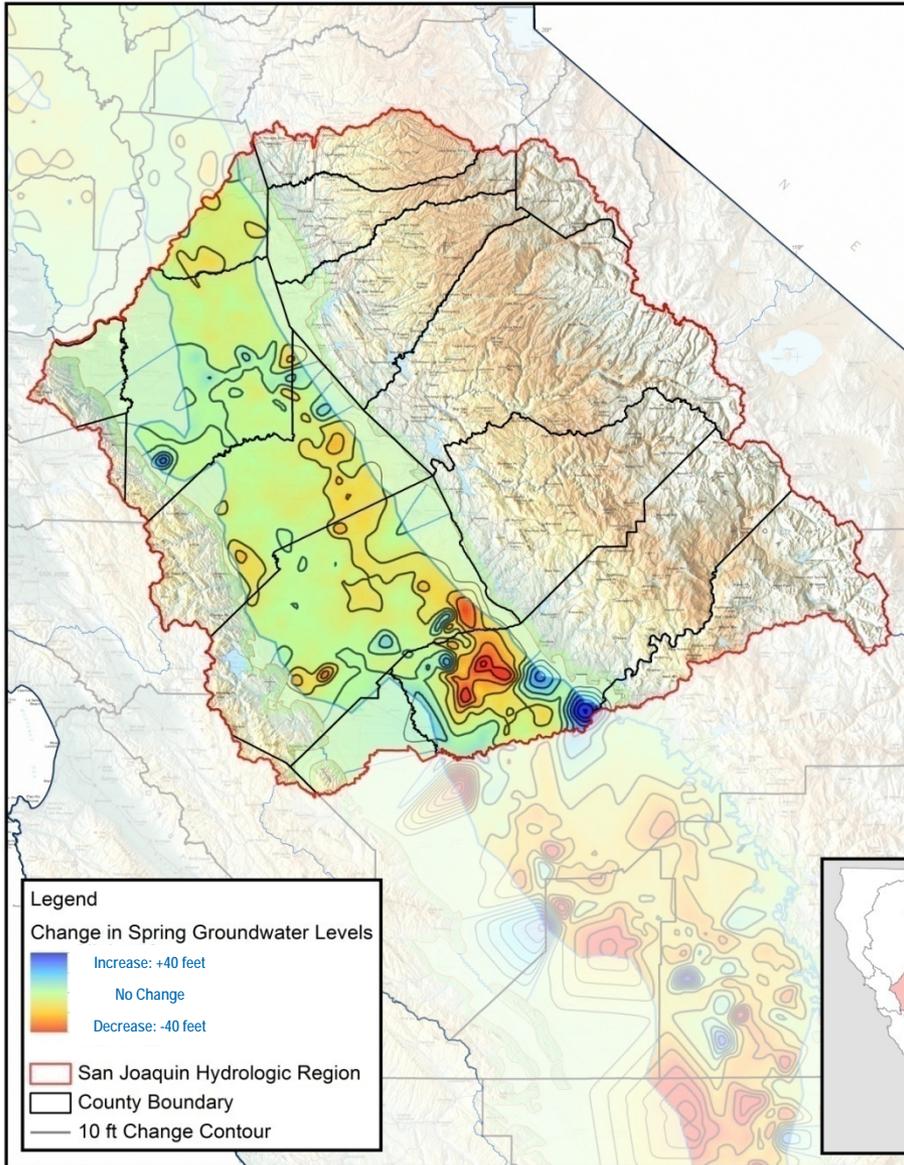
Sacramento River Hydrologic Region



Preliminary Data – Subject to Revision



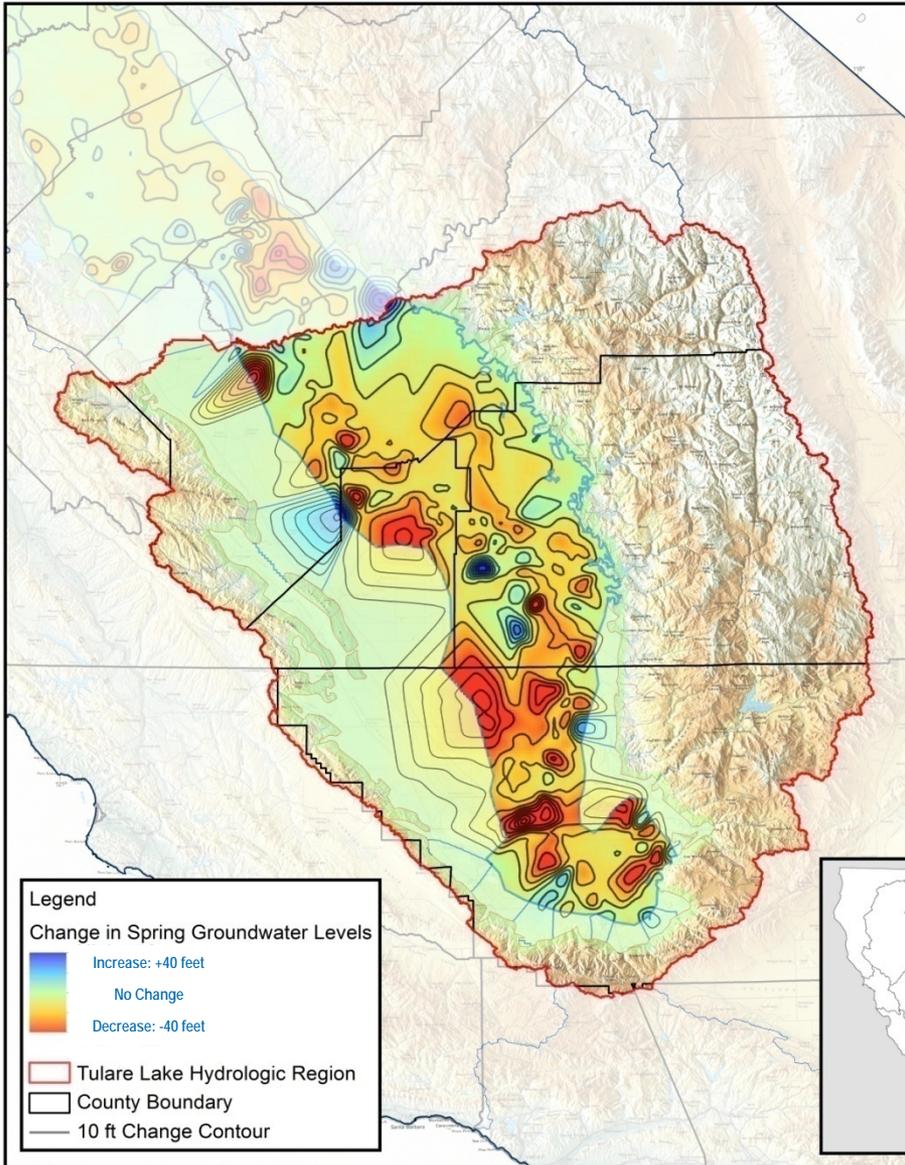
San Joaquin River Hydrologic Region



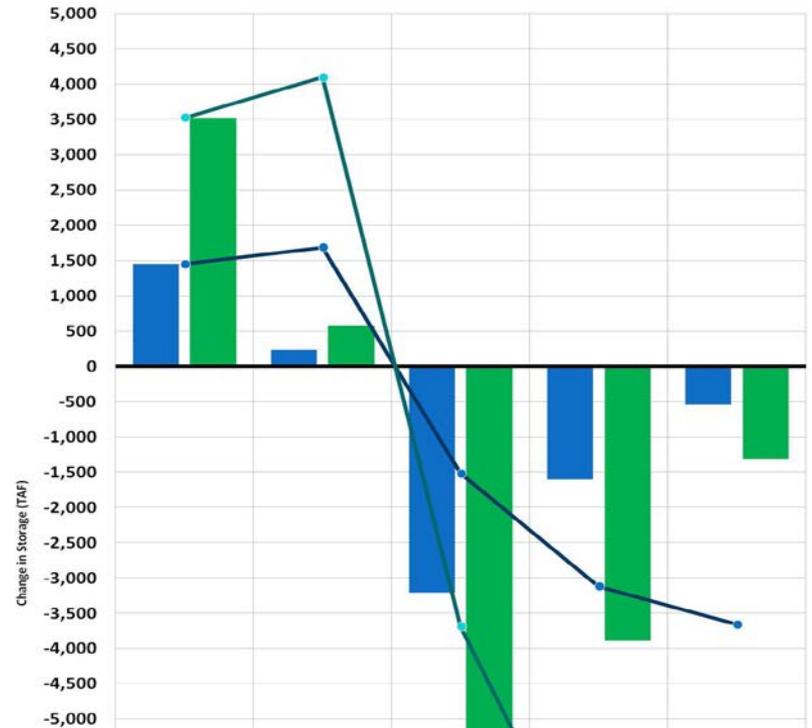
Preliminary Data – Subject to Revision



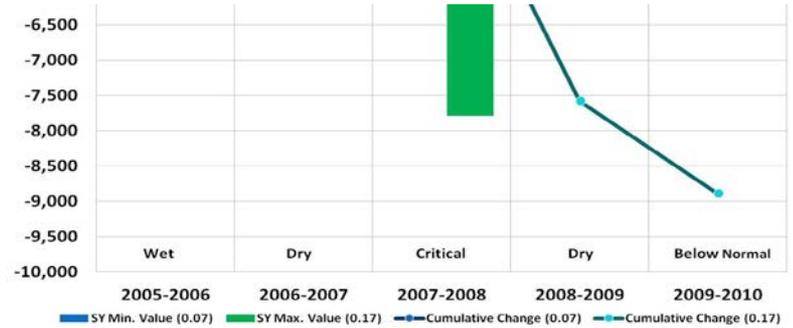
Tulare Lake Hydrologic Region



Tulare Lake Hydrologic Region



Preliminary Data – Subject to Revision





Task 6 - Conjunctive Management and Groundwater Storage

Three Main Goals of Update 2013 Survey:

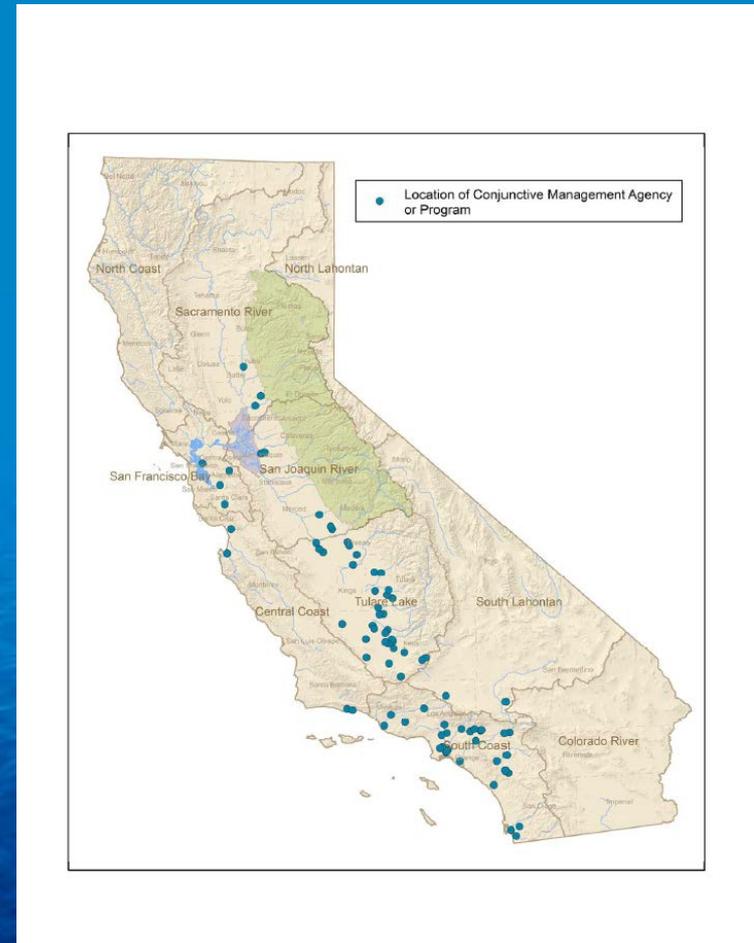
1. Inventory existing conjunctive use, recharge and groundwater banking projects
2. Determine future conjunctive management potential
3. Define program constraints





Inventory of Conjunctive Management Programs in California

Hydrologic Region	# Active Conjunctive Management Programs
North Coast	0
San Francisco Bay	4
Central Coast	5
South Coast	32
Sacramento River	3
San Joaquin River	5
Tulare Lake	37
North Lahontan	0
South Lahontan	2
Colorado River	1
TOTAL PROGRAMS	89

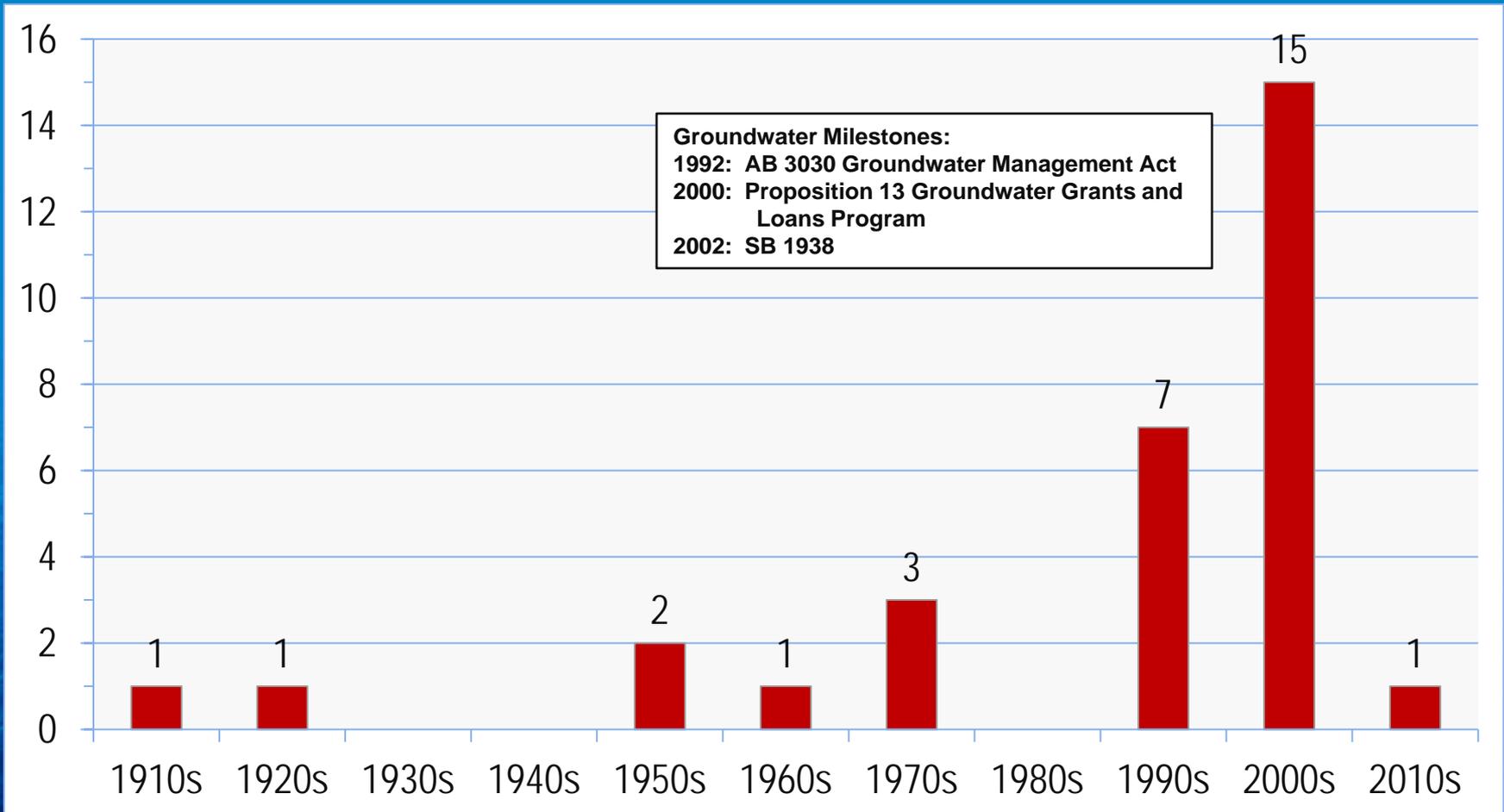


DRAFT MAP



Statewide Summary

Number of Conjunctive Management Projects Developed per Decade (31 out of 89)



Groundwater Content Enhancement

In summary

Paint a picture about California's groundwater



- ❑ Aquifer system
- ❑ Groundwater conditions
- ❑ Groundwater management practices

Identify gaps



- ❑ Data
- ❑ Monitoring
- ❑ Management

Make recommendations

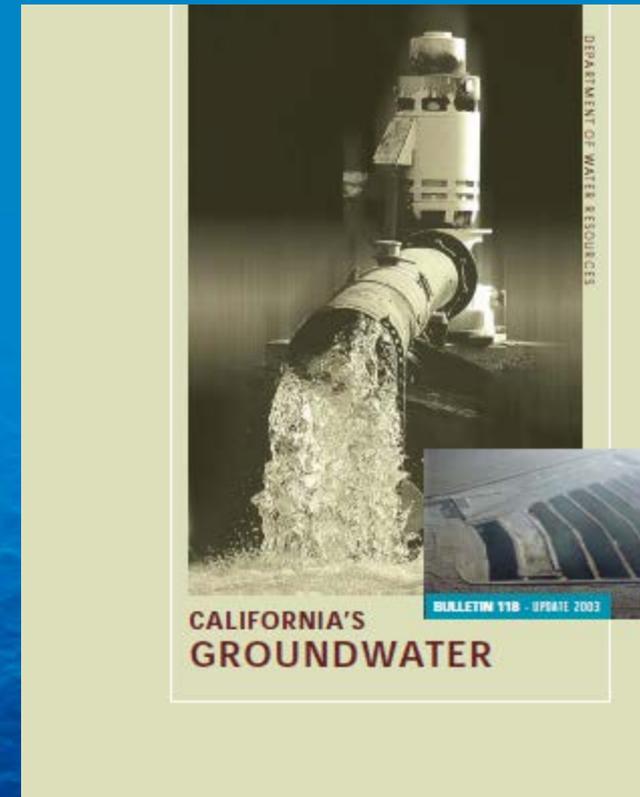


- ❑ GW mgm plan dev guideline
- ❑ GW mgm plan acceptance process
- ❑ GW mgm plan update & reporting
- ❑ State agency policy alignment
- ❑ Resource needs for analysis/synthesis



Relation to Bulletin 118 - Update 2003 California's Groundwater

- Description of current groundwater management efforts
- Required and recommended components of groundwater management plans
- Model groundwater management ordinance that can be used by local governments.
- Roles of state and federal agencies in protecting groundwater quantity and quality.



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





Relation to **CASGEM**

California Statewide Groundwater Elevation Monitoring

- Voluntary, long-term, statewide groundwater elevation program
- Builds on established local groundwater monitoring programs
- Uses local agencies designated as MEs to collect and submit groundwater elevation data
- Establishes an online system for data submittal
- Makes groundwater data readily and widely available online to public
- Requires DWR to prioritize groundwater basins, investigate groundwater basins, and provide status reports to Governor and Legislature

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



Groundwater Content Enhancement

Near Term Activities

Groundwater Workteam

- ❑ Continue to develop content
- ❑ Prepare draft GW Report: Oct-Nov/12
- ❑ Fold content in draft Regnl Report: Oct-Nov/12

State Agency Steering Committee

- ❑ Discuss state agency coordination and alignment on conjunctive management and groundwater storage and recharge: Nov-Dec/12

Public Advisory Committee

- ❑ Review content/provide feedback: Dec/12-Jan/13

Groundwater Caucus

- ❑ Review content/provide feedback: Dec/12-Jan/13
- ❑ Work on GW Case Studies and sustainability indicators: Jan/13

California Water Commission

- ❑ We invite you to participate, discuss, and provide guidance and direction on the GW initiative

