Comprehensive Water Budget Pilots for Tulare Lake and Central Coast Hydrologic Regions

California Water and Environmental Modeling Forum

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Objectives for Water Budget Analysis

- Develop a defensible framework for water budget
- Collaborate with and support GSAs, IRWM groups, and local agencies
- Test and evaluate the water budget and water reliability mapping framework through pilot projects
- Develop water budget for state of California
- Secure long-term funding for implementing vision and strategies for water budget

Water Budget Pilots: Tulare Lake & Central Coast Hydrologic Regions

Objectives:

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- Collaborate with and support GSAs, IRWM groups, and local agencies
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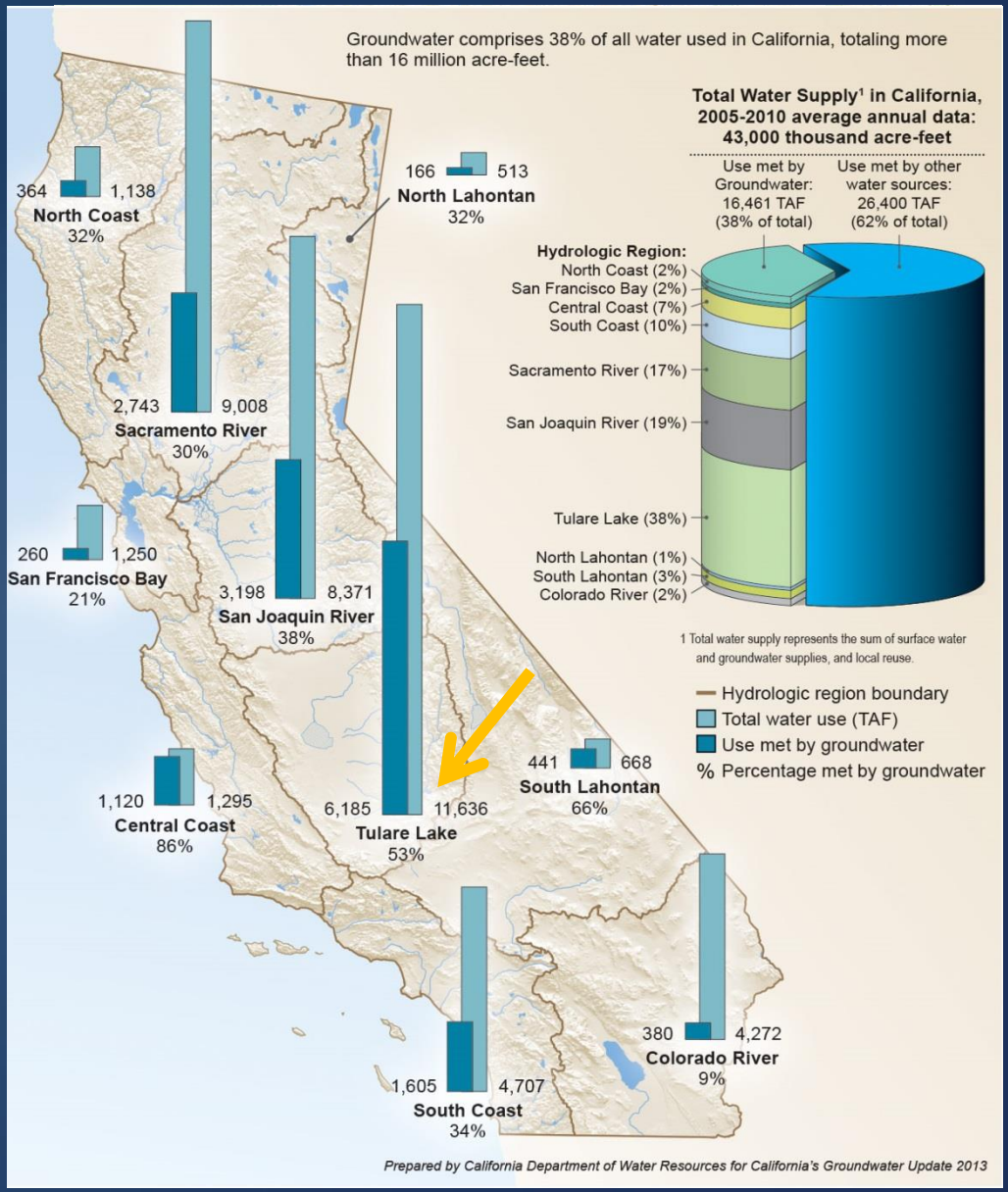
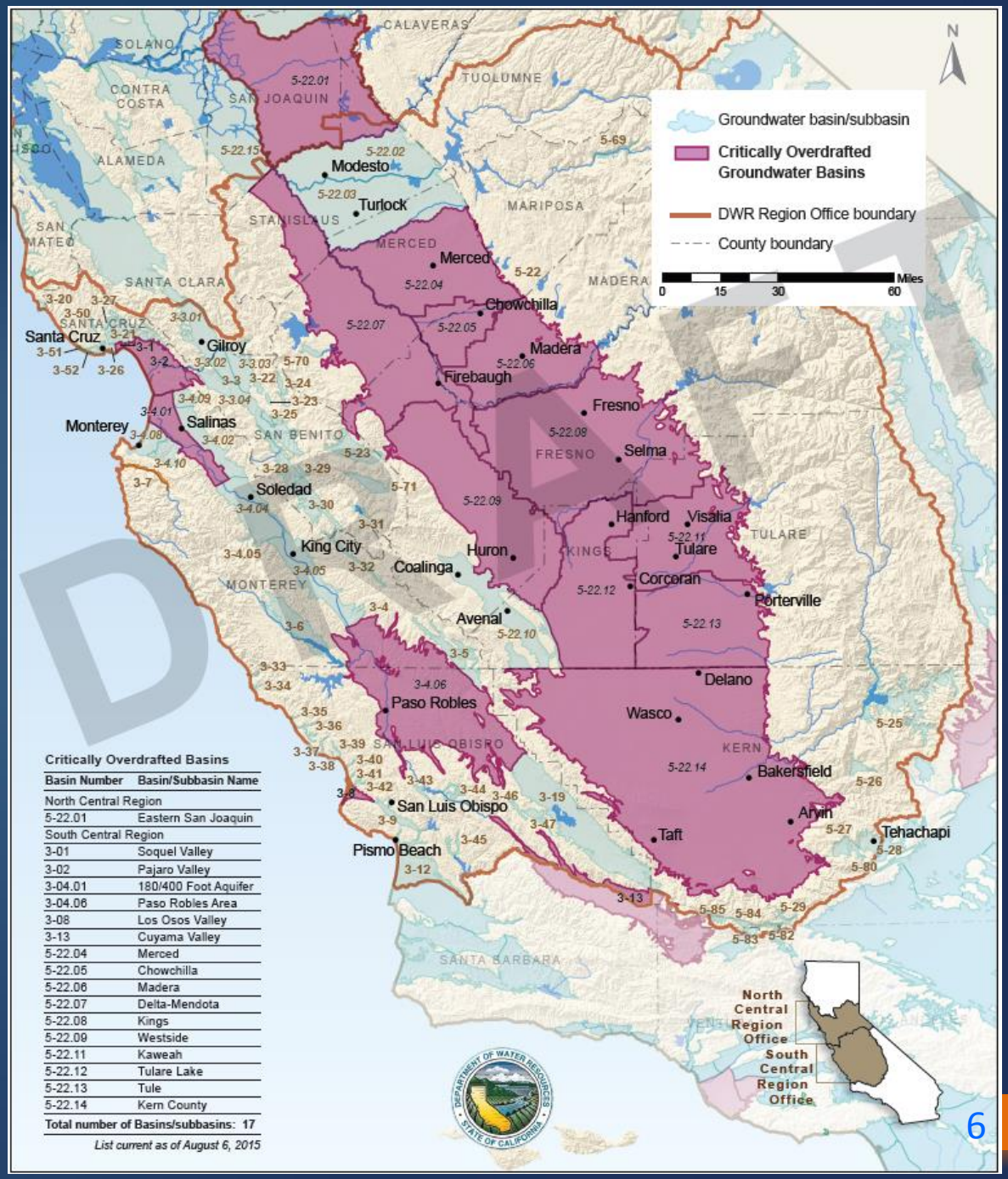
Tulare Lake HR

- Total Supply: 11.6 maf
  GW: 6.2 maf (53% of total supply).
- Contains 19 DWR Bulletin 118-2003 basins and subbasins.
- CASGEM Basin Prioritization
  - High 7
  - Medium 1
- These 8 basins account for 99% of average annual GW use, and 98% of the overlying population within GW basin boundaries.



CASGEM Groundwater Basin Prioritization — South Central Region

Critically Overdrafted Groundwater Basins — North Central and South Central Regions



Critically Overdrafted Basins

Basin Number	Basin/Subbasin Name
North Central Region	
5-22.01	Eastern San Joaquin
South Central Region	
3-01	Soquel Valley
3-02	Pajaro Valley
3-04.01	180/400 Foot Aquifer
3-04.06	Paso Robles Area
3-08	Los Osos Valley
3-13	Cuyama Valley
5-22.04	Merced
5-22.05	Chowchilla
5-22.06	Madera
5-22.07	Delta-Mendota
5-22.08	Kings
5-22.09	Westside
5-22.11	Kaweah
5-22.12	Tulare Lake
5-22.13	Tule
5-22.14	Kern County
Total number of Basins/subbasins: 17	

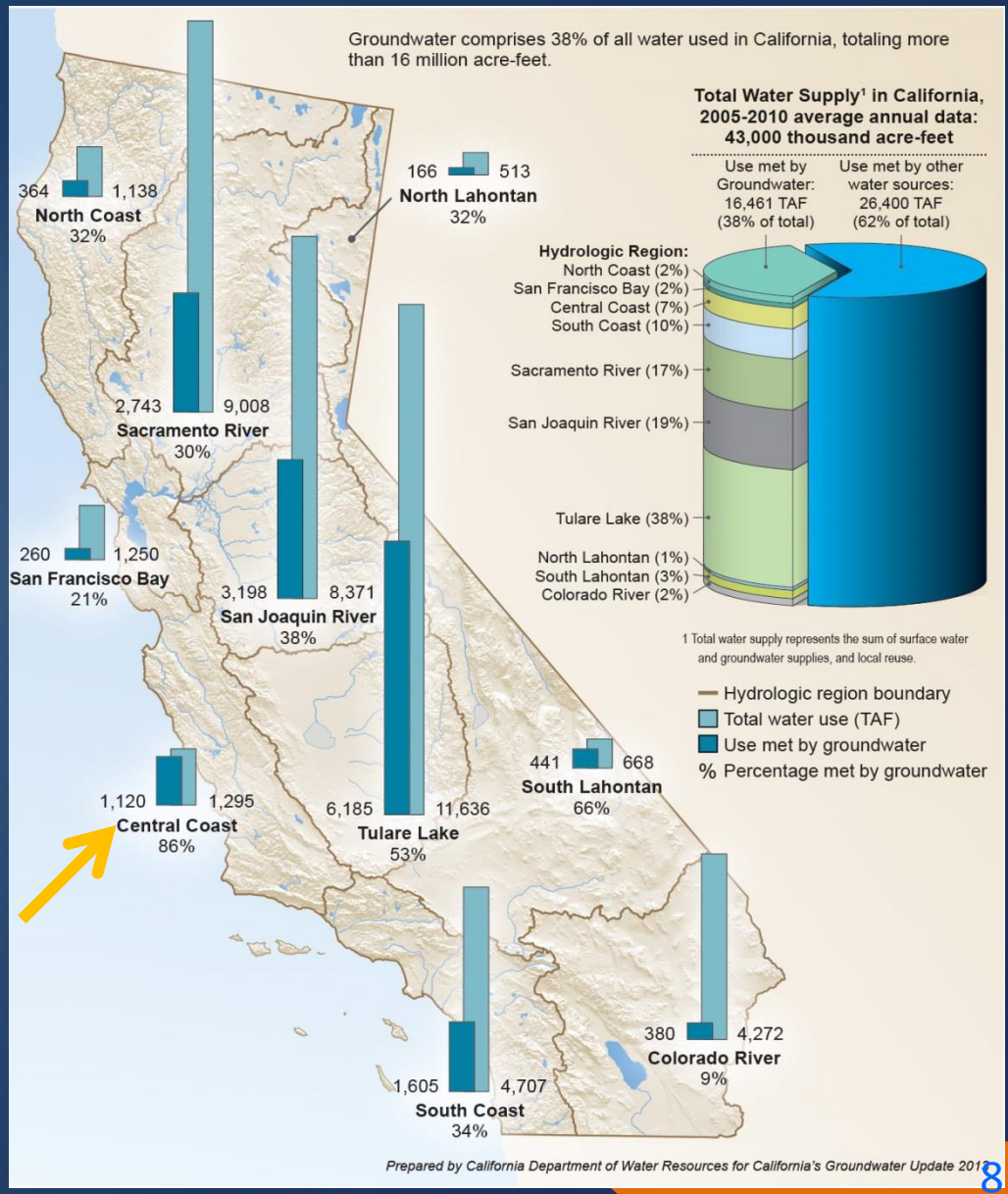
List current as of August 6, 2015

Tulare Lake HR High and Medium Priority Groundwater Basins

Basin Priority	Count	Basin/Subbasin Number	Basin/Subbasin Name	Critically Overdrafted
High	1	5-22.08	SAN JOAQUIN VALLEY/Kings	Yes
High	2	5-22.09	SAN JOAQUIN VALLEY/Westside	Yes
High	3	5-22.11	SAN JOAQUIN VALLEY/Kaweah	Yes
High	4	5-22.12	SAN JOAQUIN VALLEY/Tulare Lake	Yes
High	5	5-22.13	SAN JOAQUIN VALLEY/Tule	Yes
High	6	5-22.14	SAN JOAQUIN VALLEY/Kern County	Yes
High	7	5-27	CUMMINGS VALLEY	
Medium	1	5-28	TEHACHAPI VALLEY WEST	
Total	**8**			**6**

Central Coast HR

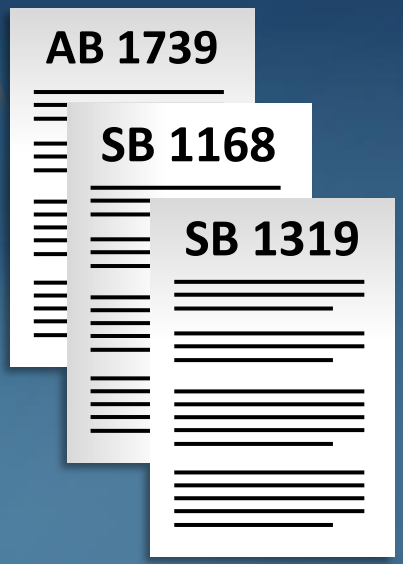
- Total Supply: 1.3 maf
  GW: 1.1 maf (86% of total supply).
- Contains 60 DWR Bulletin 118-2003 basins and subbasins.
- CASGEM Basin Prioritization
  - High 9
  - Medium 15
- These 24 basins account for 97% of average annual GW use, and 90% of the overlying population within GW basin boundaries.



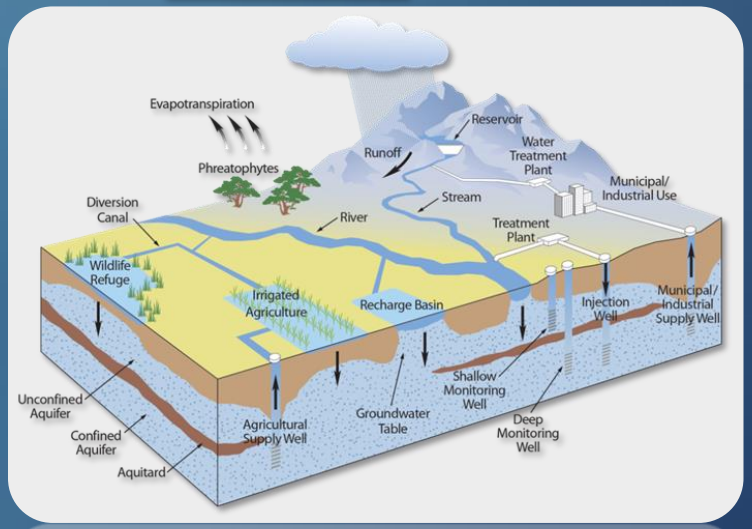
Central Coast HR High and Medium Priority Groundwater Basins

Basin Priority	Count	Basin/Subbasin Number	Basin/Subbasin Name	Critically Overdrafted
High	1	3-1	SOQUEL VALLEY	Yes
High	2	3-12	SANTA MARIA	
High	3	3-2	PAJARO VALLEY	Yes
High	4	3-3.01	GILROY-HOLLISTER VALLEY/Llgas area	
High	5	3-4.01	SALINAS VALLEY/180/400 foot aquifer	Yes
High	6	3-4.02	SALINAS VALLEY/East Side aquifer	
High	7	3-4.06	SALINAS VALLEY/Paso Robles area	Yes
High	8	3-7	CARMEL VALLEY	
High	9	3-8	LOS OSOS VALLEY	Yes
Medium	1	3-13	CUYAMA VALLEY	Yes
Medium	2	3-14	SAN ANTONIO CREEK VALLEY	
Medium	3	3-15	SANTA YNEZ RIVER VALLEY	
Medium	4	3-16	GOLETA	
Medium	5	3-21	SANTA CRUZ PURISIMA FORMATION	
Medium	6	3-26	WEST SANTA CRUZ TERRACE	
Medium	7	3-3.02	GILROY-HOLLISTER VALLEY/Bolsa area	
Medium	8	3-3.03	GILROY-HOLLISTER VALLEY/Hollister area	
Medium	9	3-3.04	GILROY-HOLLISTER VALLEY/San Juan Bautista area	
Medium	10	3-4.04	SALINAS VALLEY/Forebay aquifer	
Medium	11	3-4.05	SALINAS VALLEY/Upper Valley aquifer	
Medium	12	3-4.08	SALINAS VALLEY/Seaside area	
Medium	13	3-4.09	SALINAS VALLEY/Langley area	
Medium	14	3-4.10	SALINAS VALLEY/Corral De Tierra area	
Medium	15	3-9	SAN LUIS OBISPO VALLEY	
Total	**24**			**6**

Water Budget Definition



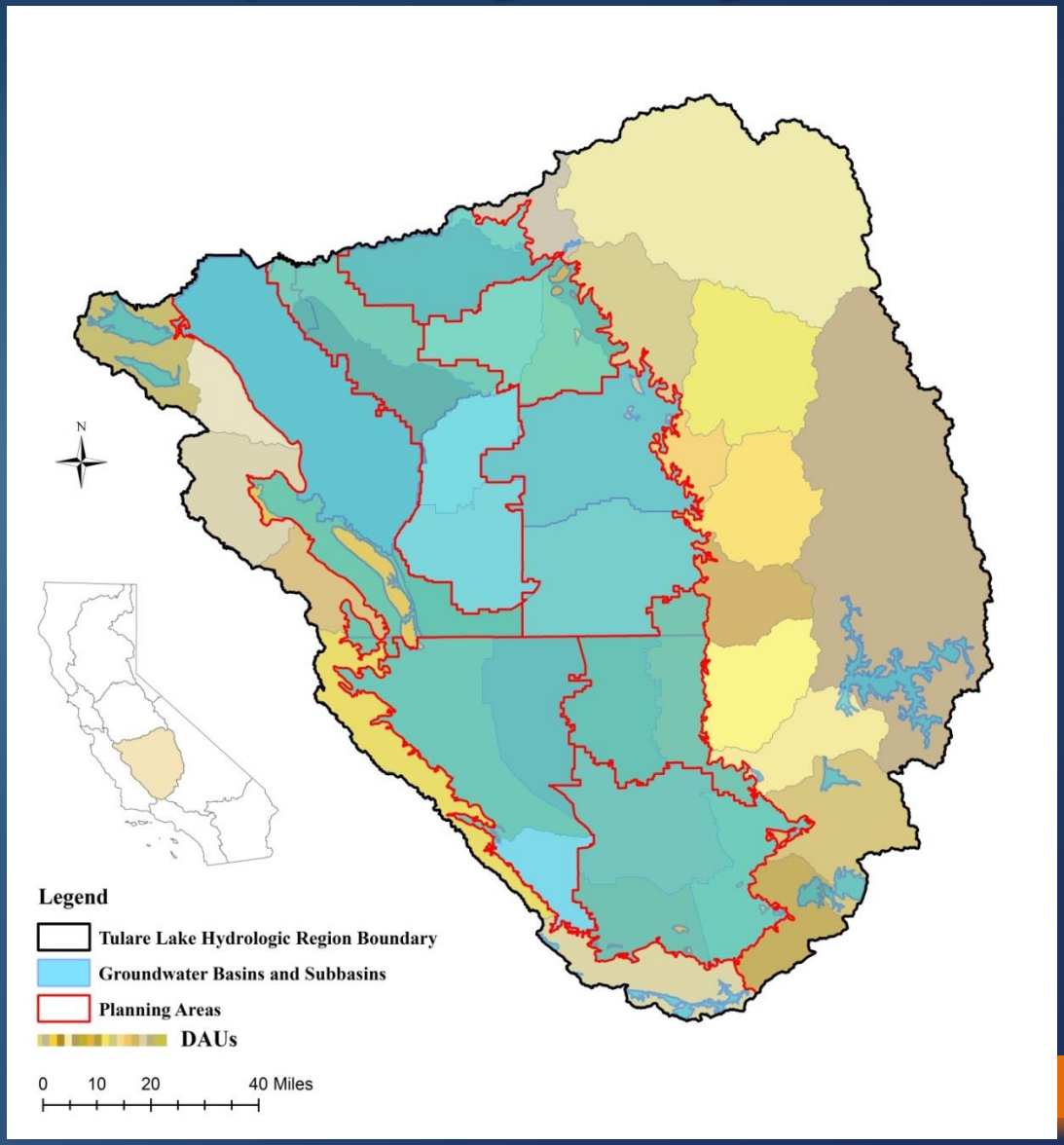
" ***Water budget*** means an accounting of the **total groundwater and surface water entering** and leaving a basin including the changes in the amount of water stored."



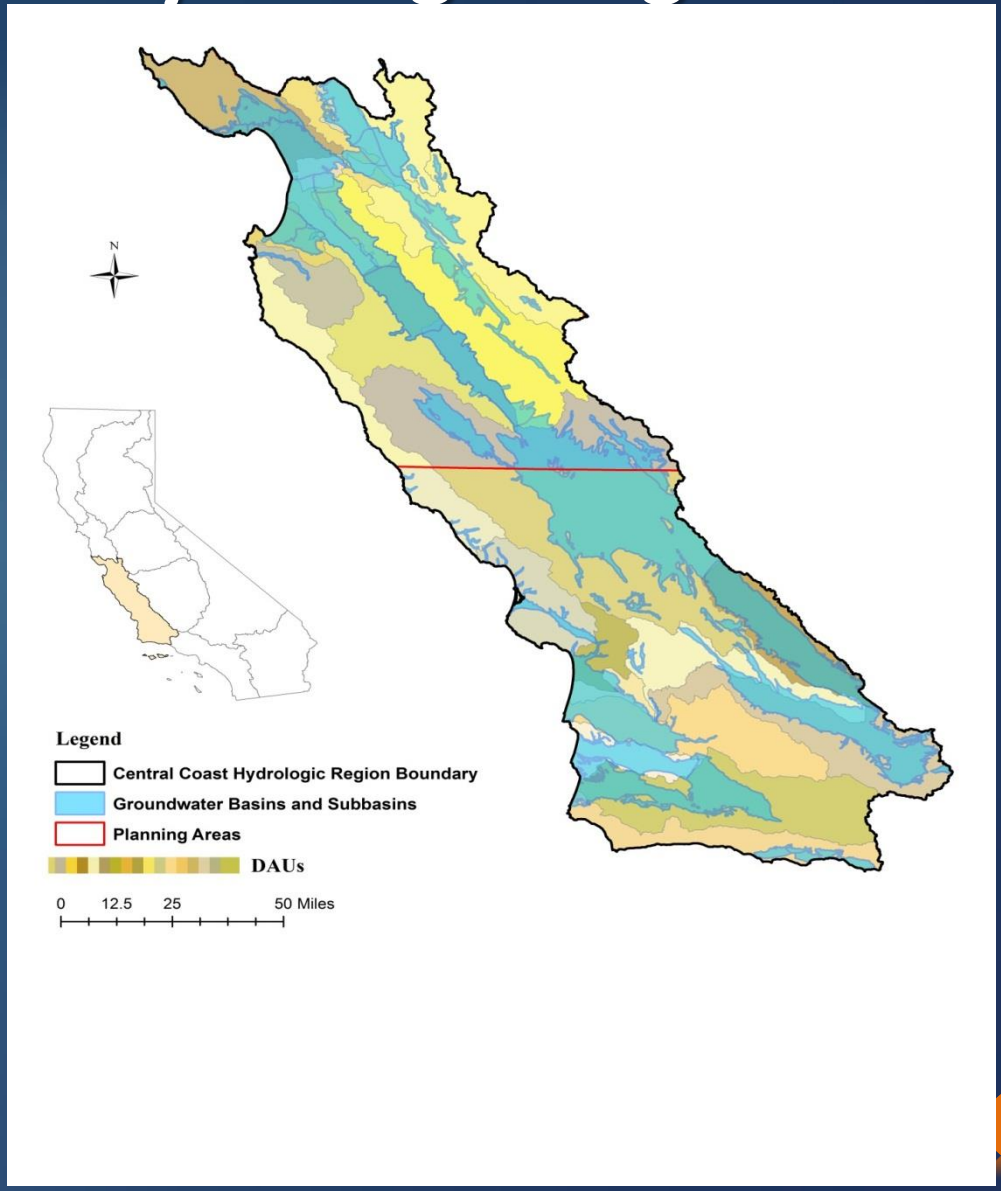
Why do a Water Budget?

- It allows us to track all water supply sources and water demand sinks in a geographic area to reduce vulnerability and risks to people, economy, and environment.
- It is required by sustainable groundwater management act (SGMA)

Various Geographic Scales in Tulare Lake Hydrologic Region



Various Geographic Scales in Central Coast Hydrologic Region



Water Budget Pilots: Tulare Lake & Central Coast Hydrologic Regions

Project Inputs:

1. Data, analysis, and results from C2VSIM model developed by DWR's Delta Modeling Branch
2. Water portfolio data developed by CWP's Water Supply and Balance Team
3. WEAP modeling results for the ten hydrologic regions of California developed by CWP's Scenario Analysis Team.
4. Coordination with similar efforts by the State Water Resources Control Board, other state and federal agencies as well as regional and local agencies.

Use C2VSIM/IWFM as a Framework to Develop Water Budget Components

Example: Land and Water Use Budget

IN = SUPPLY

- Effective Precipitation
- Ag. Pumping
- Ag. Diversion
- Ag. Re-use
- Urban Pumping
- Urban Diversion
- Urban Re-use
- Import

–

OUT= DEMAND

- Ag. Water Demand
- Urban Indoor Demand
- Urban Outdoor Demand
- Wetland/Habitat Demand
- Export

=Shortage/Surplus (Ag + Urban)

Use C2VSIM/IWFM as a Framework to Develop Water Budget Components

Example: Groundwater Budget

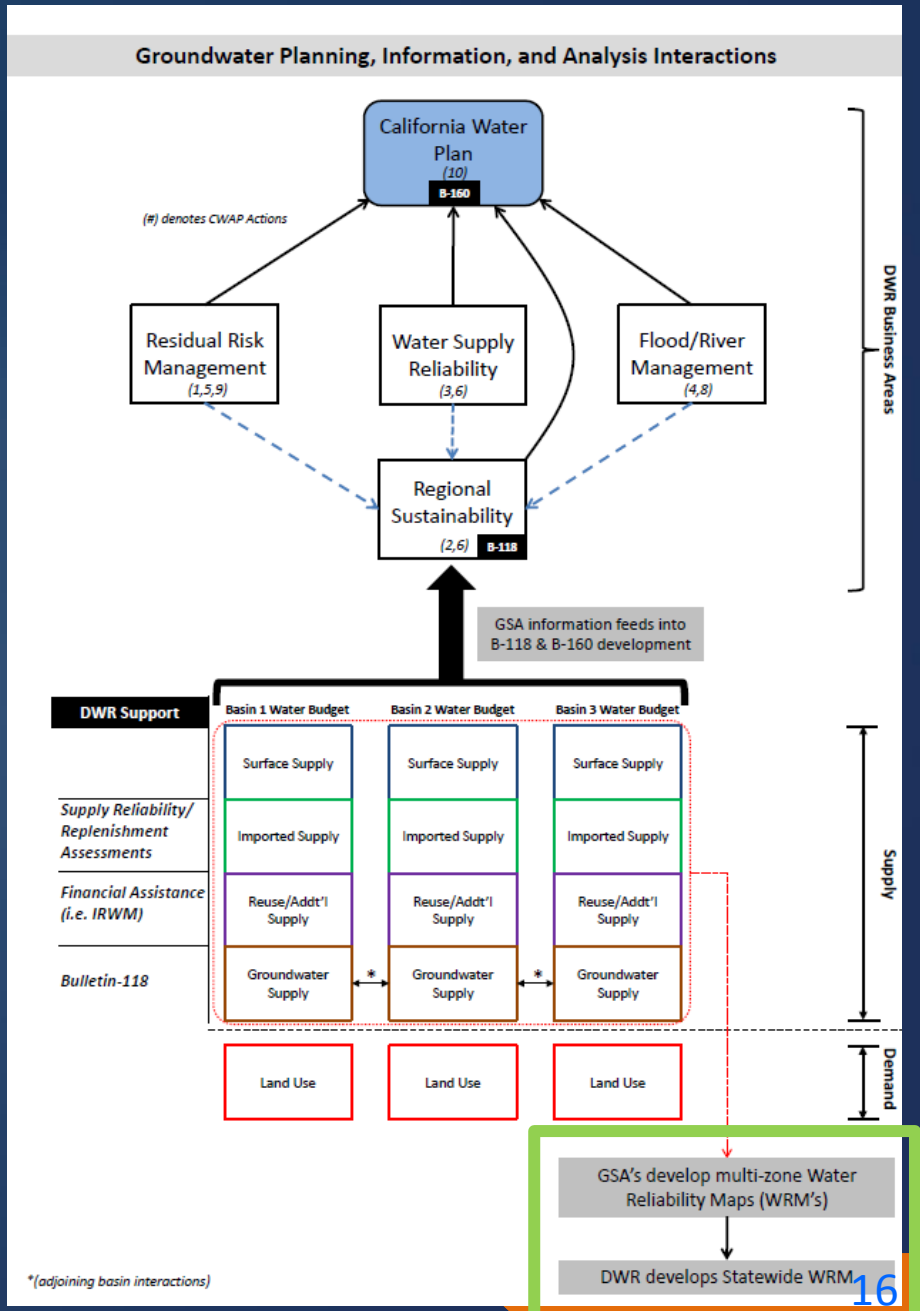
Beginning Storage

+ IN	– OUT
• Deep Percolation (+) • Gain from Stream (+) • Recharge (+) • Gain from Lake (+) • Boundary Inflow (+) • Gain from Compaction (+) • Subsurface Irrigation (+)	• Loss to Stream (-) • Pumping (-) • Loss to Lake (-) • Boundary Outflow (-) • Loss to Expansion (-) • Tile Drain Outflow (-)

=Ending Storage

From Water Budget to Water Reliability Maps (WRMs)

- Basins with Groundwater Sustainability Agencies (GSAs) will develop WRMs; DWR will provide technical assistance.
- For basins without GSAs, DWR will develop WRMs.
- Develop basin-wide, GSA wide, regional and statewide WRMs to help guide water planning and development at various levels of water management in the state.



Water Budget Pilots: Tulare Lake & Central Coast Hydrologic Regions

Project Outputs:

1. Water Budgets:
   - Groundwater budget
   - Land/Water Use budget
   - Stream Reach budget
   - Soil Moisture budget
2. Water Reliability Maps (WRMs)
3. Water Budget Framework

Water Budget Pilot Phase 1
Tulare Lake Hydrologic Region

Deliverables and Time-line:

1. Data Mapping Tables between C2VSIM and CWP Water Portfolio Water Budget Elements: June, 2016
2. Draft Conversion/Transformation Formulas between C2VSIM Water Budget Components and CWP Water Portfolio Data Elements: July, 2016
3. Preliminary Water Budget: August, 2016
4. Preliminary Water Reliability: September, 2016
5. Workshops for SGM Program Advisory Groups and GRA Technical Advisory Group: July & September, 2016

Water Budget Pilot Phase 2
Tulare Lake & Central Coast HRs

Deliverables and Time-line:

1. Central Coast HR Water Budget and Water Reliability Maps: June/2017
2. Preliminary Water Budget Framework: December/2016
3. Enhanced Tulare Lake HR Water Budget and Water Reliability Maps : March/2017
4. Refined Water Budget Framework: June/2017
5. Workshops for SGM Program Advisory Groups and GRA Technical Advisory Group: November/2016 & March/2017

Thank you!

- Questions?

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