



Water Education Foundation

Water 101

February 18, 2014

Drought, Groundwater and Stuff



Crisis Management vs. Resource Management



U.S. Drought Monitor California

February 4, 2014

(Released Thursday, Feb. 6, 2014)

Valid 7 a.m. EST

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	1.43	98.57	94.18	89.91	67.13	9.81
Last Week <i>1/28/2014</i>	1.43	98.57	94.18	89.91	67.13	8.77
3 Months Ago <i>11/5/2013</i>	2.62	97.38	95.98	84.12	11.36	0.00
Start of Calendar Year <i>12/31/2013</i>	2.61	97.39	94.25	87.53	27.59	0.00
Start of Water Year <i>10/1/2013</i>	2.63	97.37	95.95	84.12	11.36	0.00
One Year Ago <i>2/5/2013</i>	34.20	65.80	47.18	21.57	0.00	0.00

Intensity:



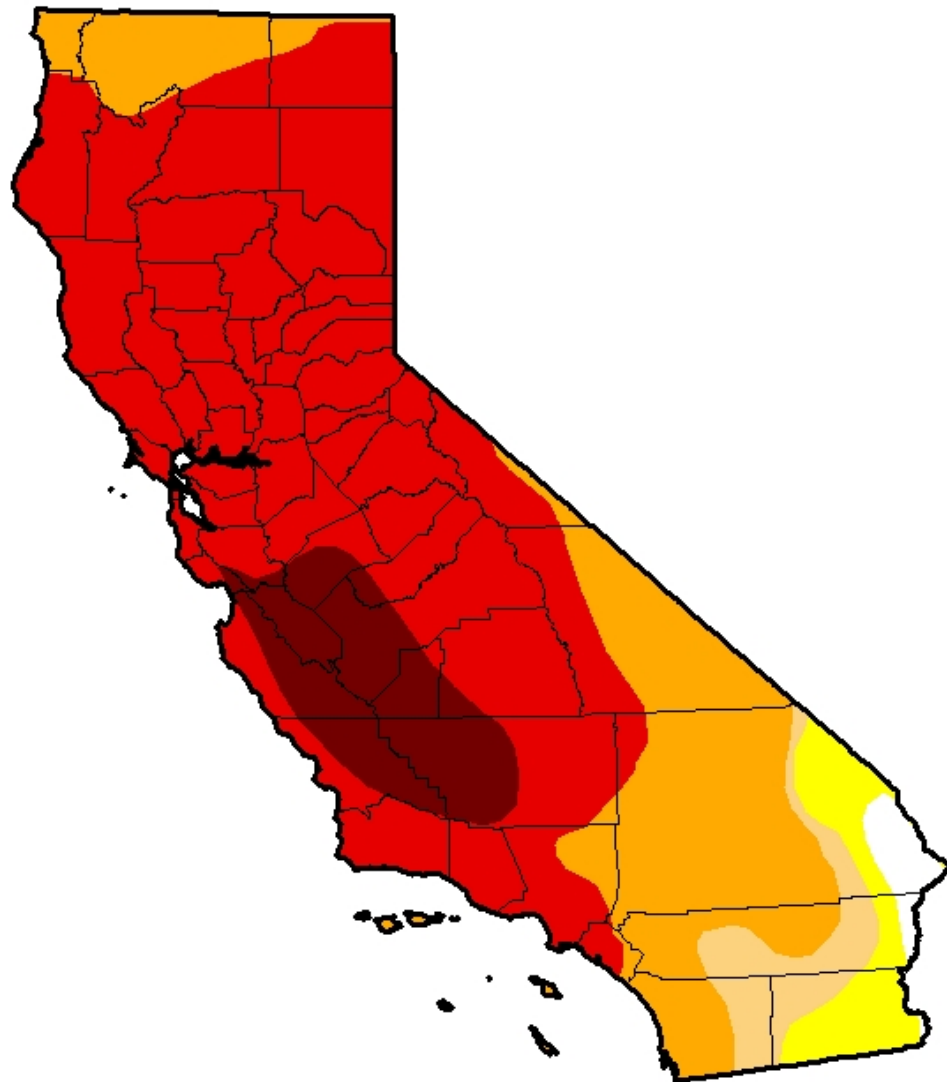
The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

Author:

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NOAA/NWS/NCEP/CPC*



<http://droughtmonitor.unl.edu/>

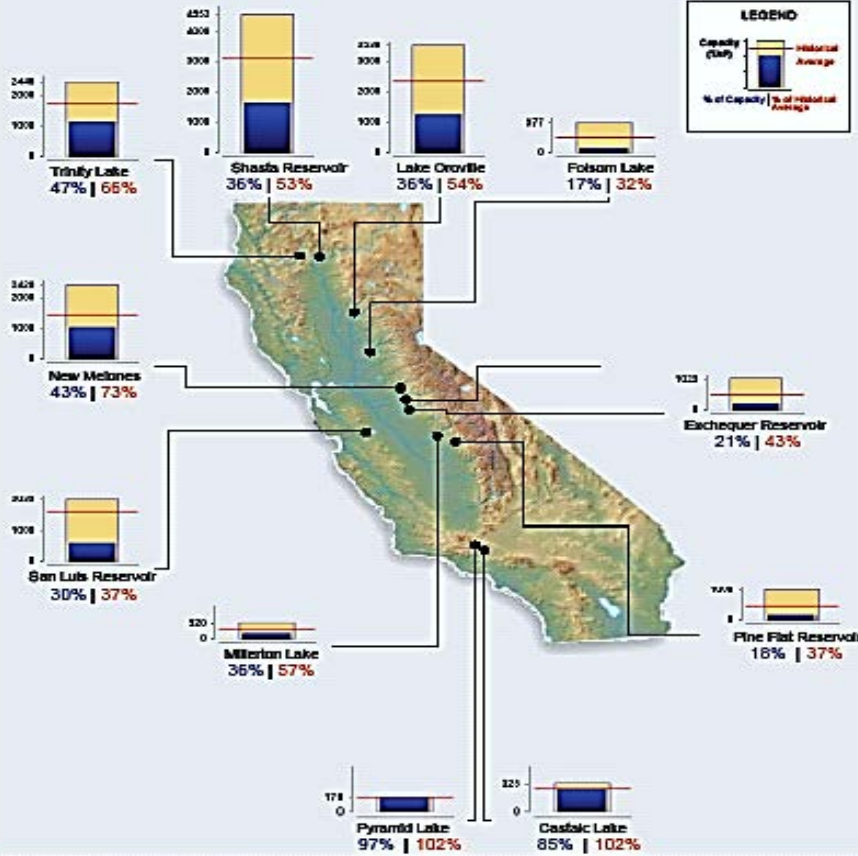




Reservoir Conditions

Ending At Midnight - February 5, 2014

CURRENT RESERVOIR CONDITIONS



Graph Updated 02/06/2014 10:15 AM





December 2012 It Snowed...



January 2013 Snowpack
134% of Normal

Photo: Brant Ward,
The San Francisco
Chronicle



...Then It Stopped.



San Luis Reservoir near Los Banos, Calif., at record low levels in August 2013. (Patrick Tehan, Bay Area News Group)



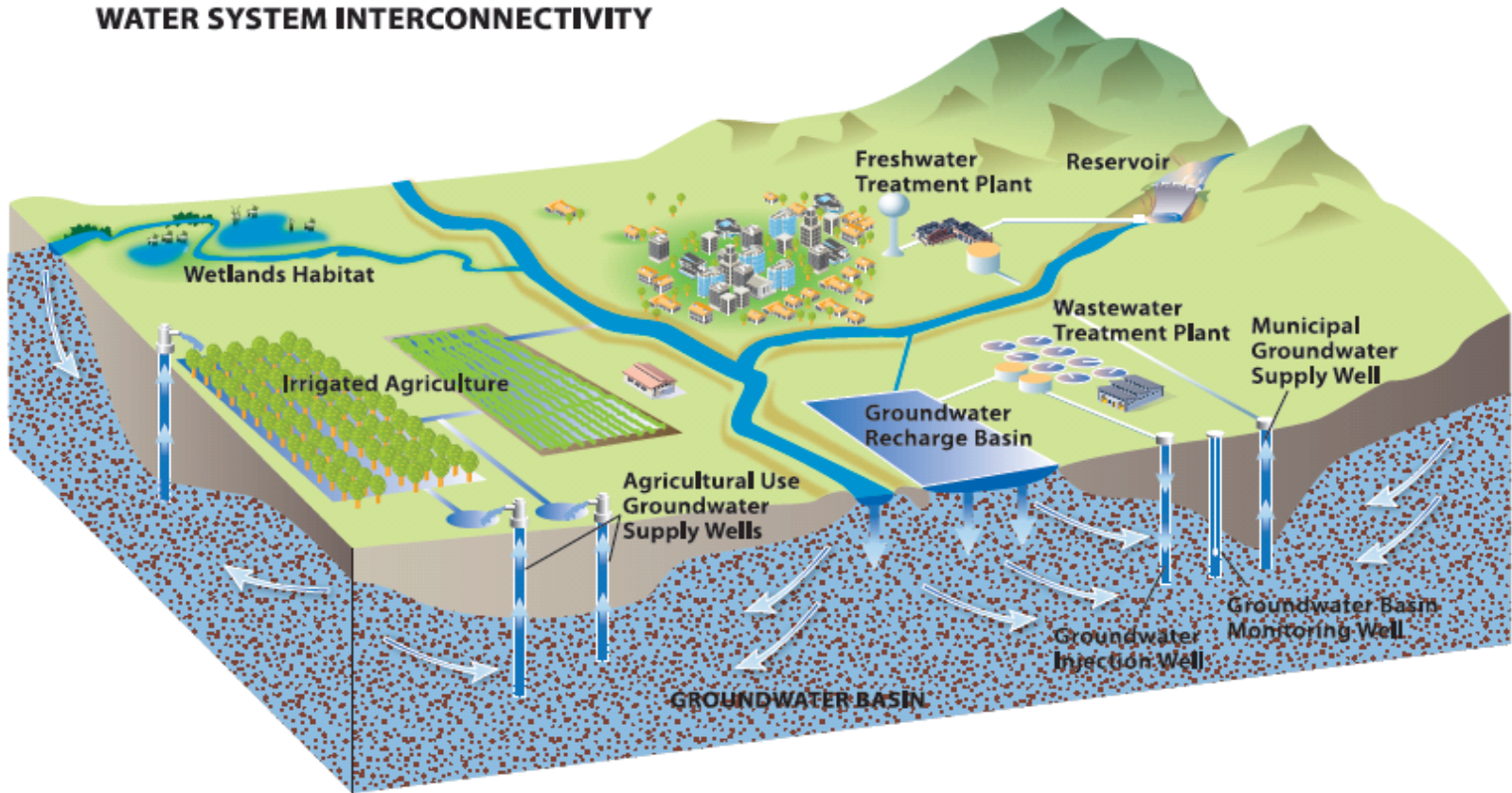


Never Waste a Crisis

- Environmental Rollback
- Advance Sustainable Resources Management

Integrated Water Management

WATER SYSTEM INTERCONNECTIVITY





Historical Context

- Swamp and Overflow Act
- Central Valley Flood System
- Water System



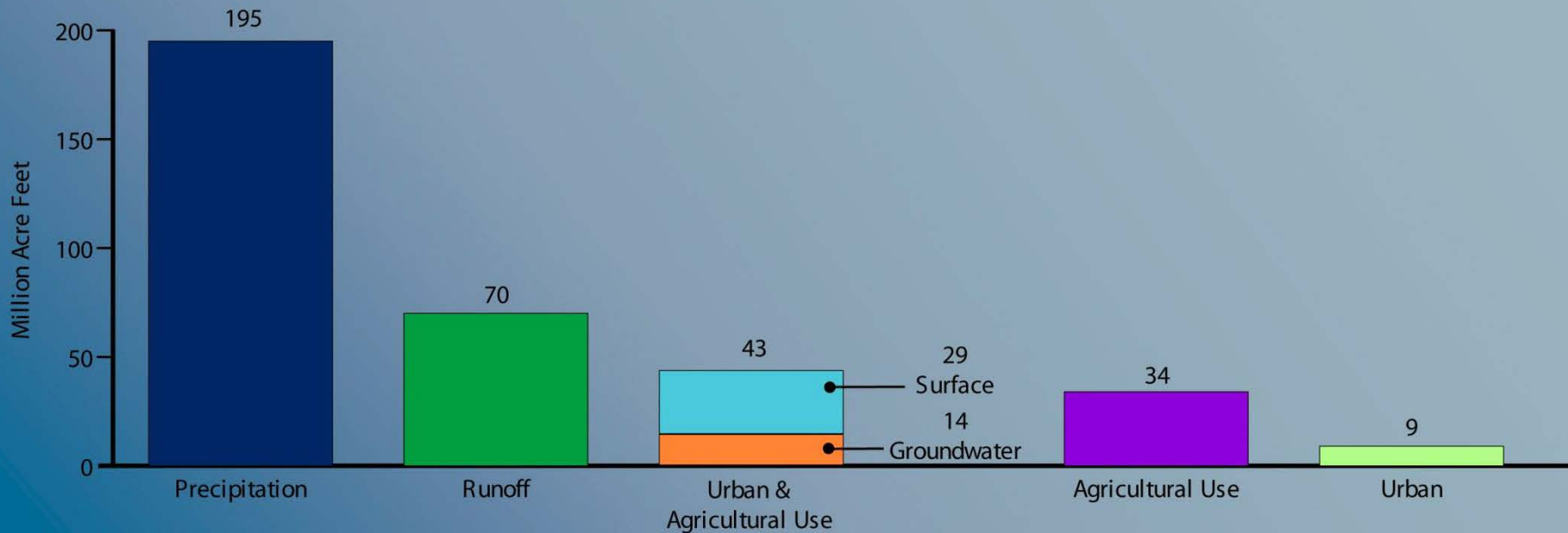
California Water Systems



- Fueled California economy
- All had unintended consequences
- All are less reliable today

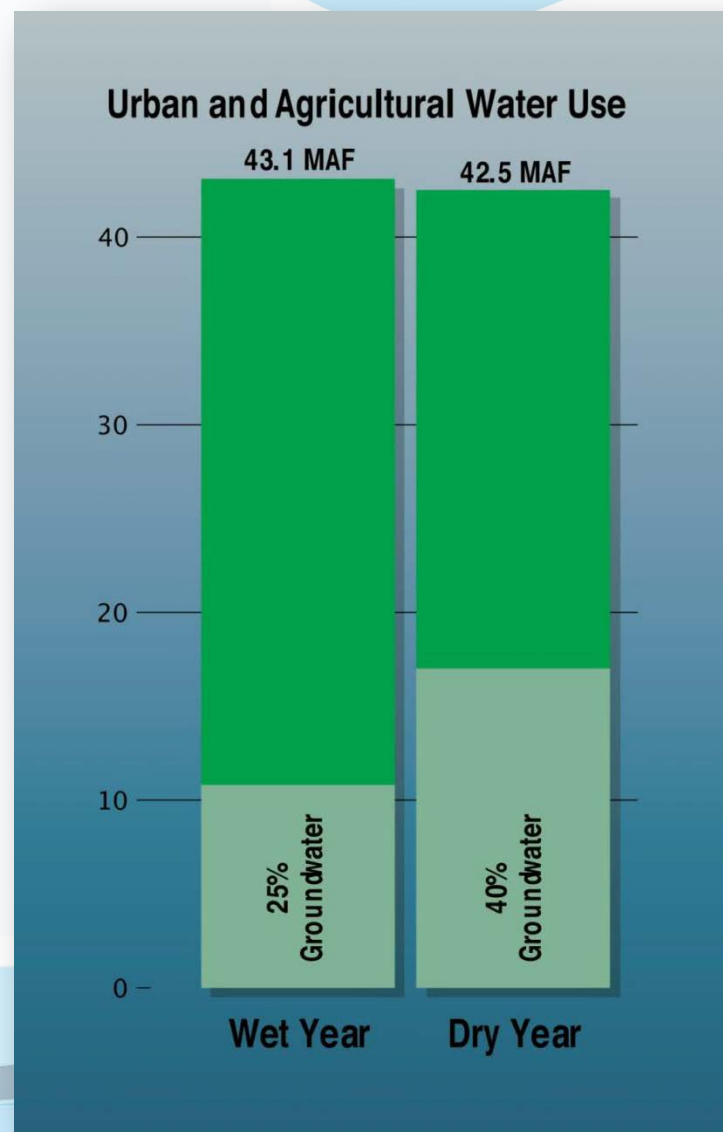
Average Year Water Use

(in million acre feet)



California's Groundwater

- On average, about 1/3 of California's urban and agricultural water supply (14 million acre feet)
- Important source of dry year supply
- Average overdraft: 2-4 MAF
- Increased groundwater storage is essential to water supply



Groundwater in California



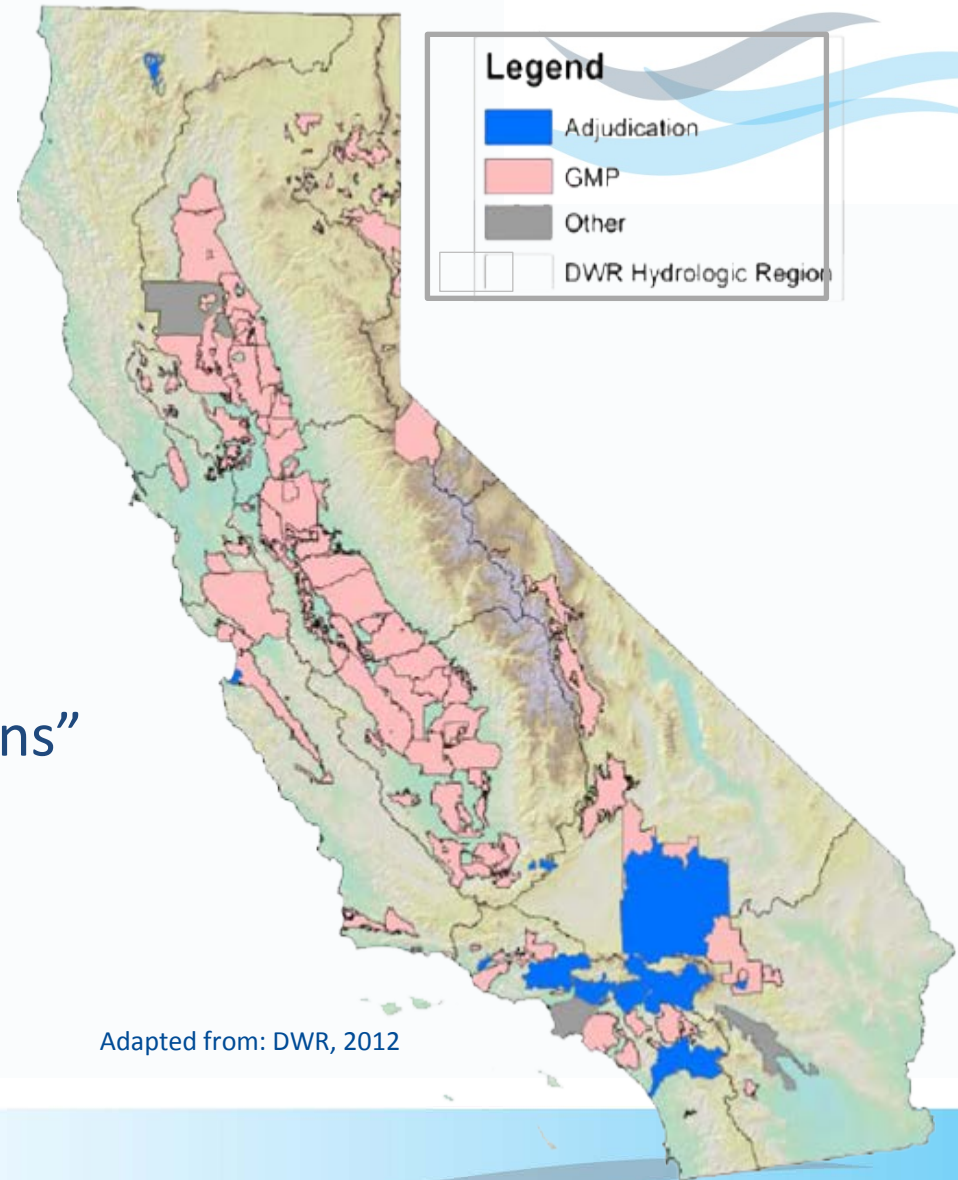
Groundwater critically important to California's overall water supply

- 30% of entire water supply in average year
- Significant buffer in times of drought – 40% or more
- Some areas of the state rely on groundwater for 100% of their supply.



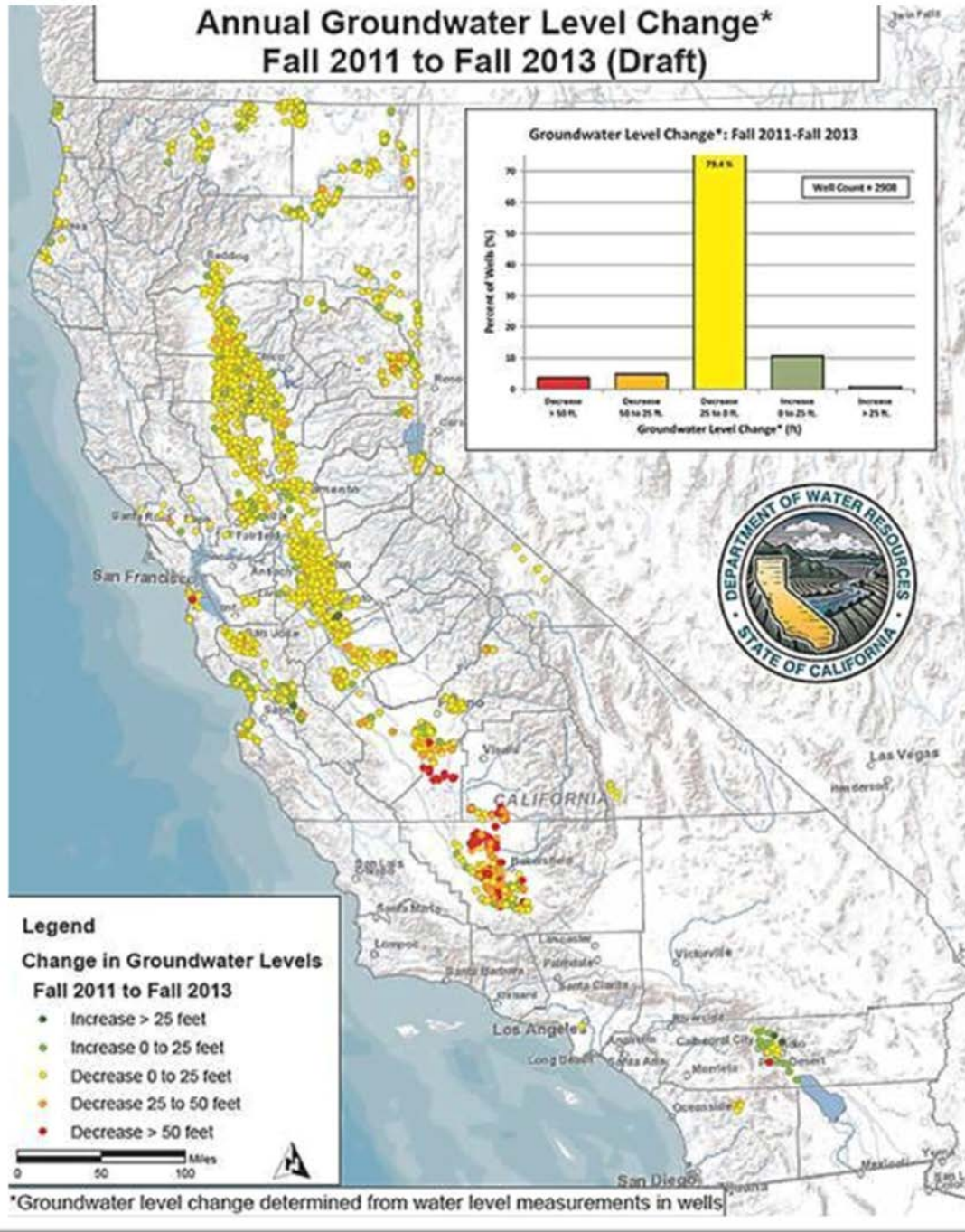
Groundwater Management

- 129 Groundwater Management Plans
- 24 Adjudications
- 6 “Water Management Plans” or county ordinance



Adapted from: DWR, 2012

Annual Groundwater Level Change* Fall 2011 to Fall 2013 (Draft)

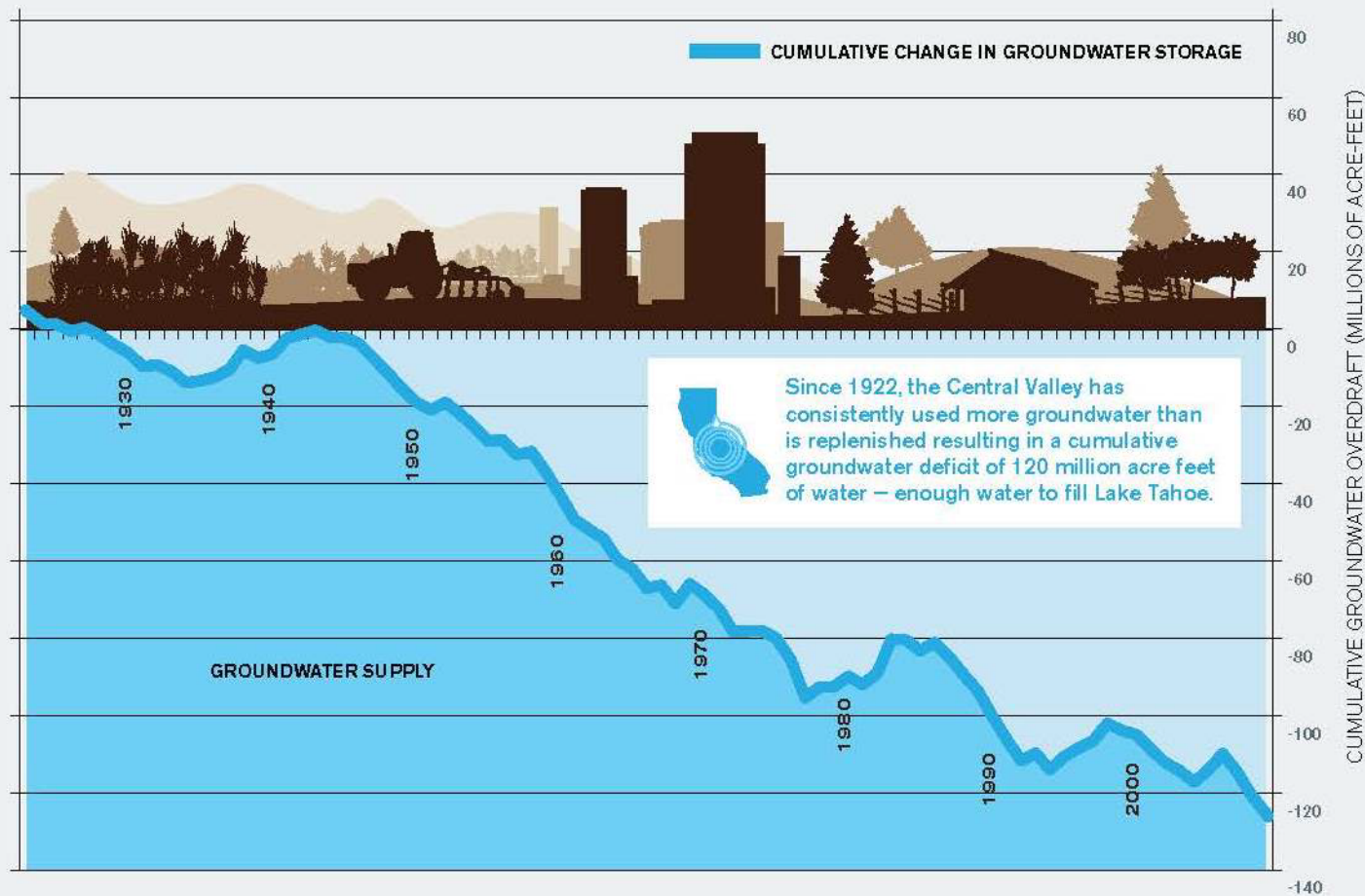


Decades of Overdraft in Groundwater Basins

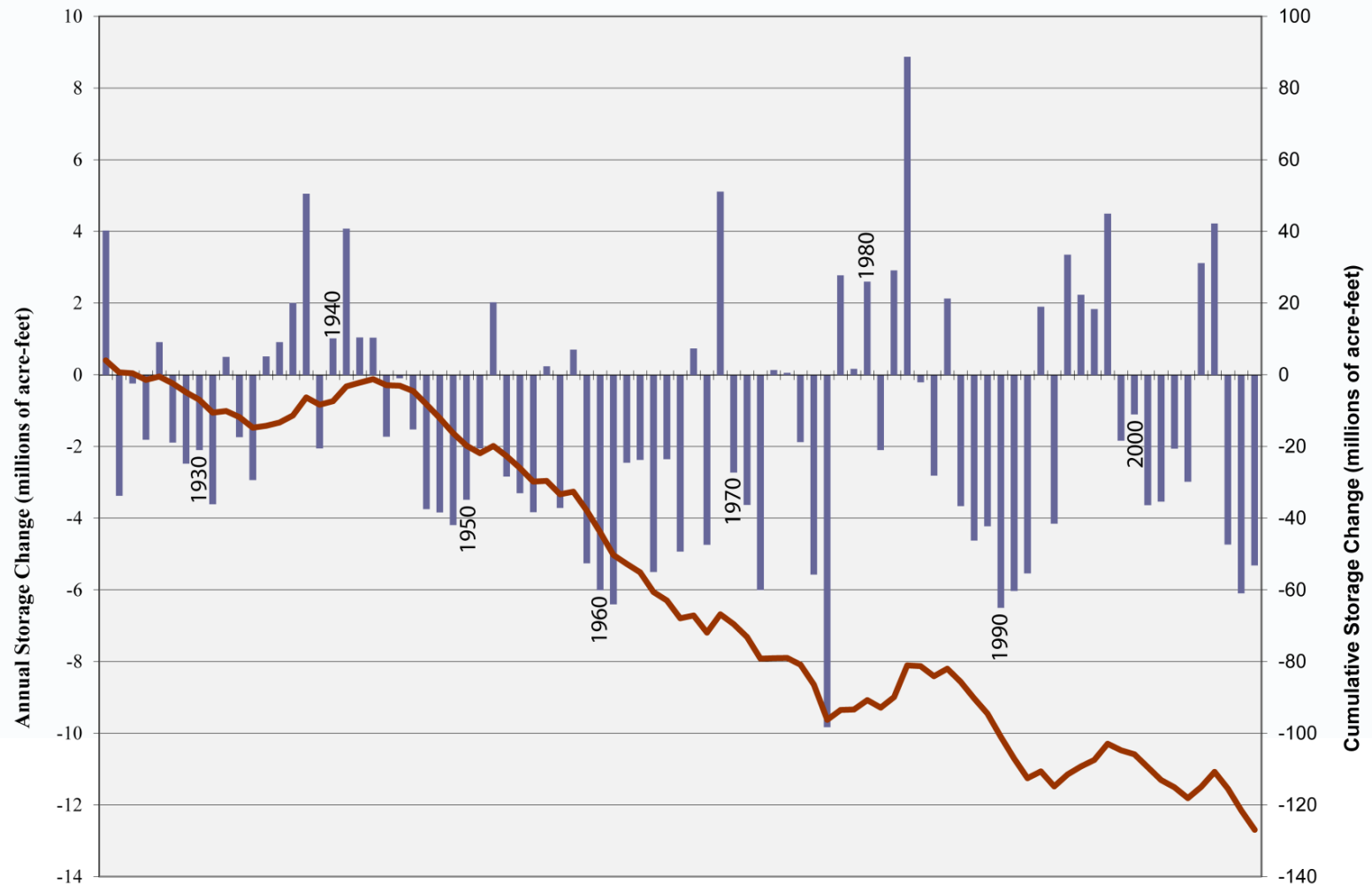


California's Water Reliability Crisis

Central Valley's Cumulative Change In Groundwater Storage Since 1922



Change in Groundwater Storage for the Central Valley



Source:
RMC analysis of C2VSIM historical simulation results, 2012.

■ Annual Storage Change

— Cumulative Storage Change

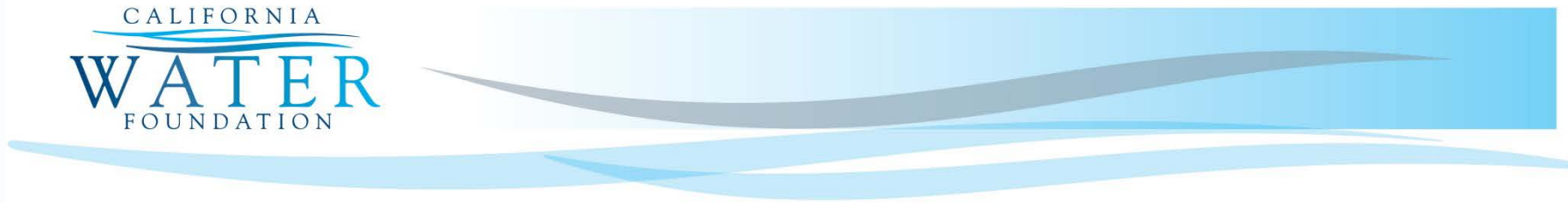
Problems with Overdraft



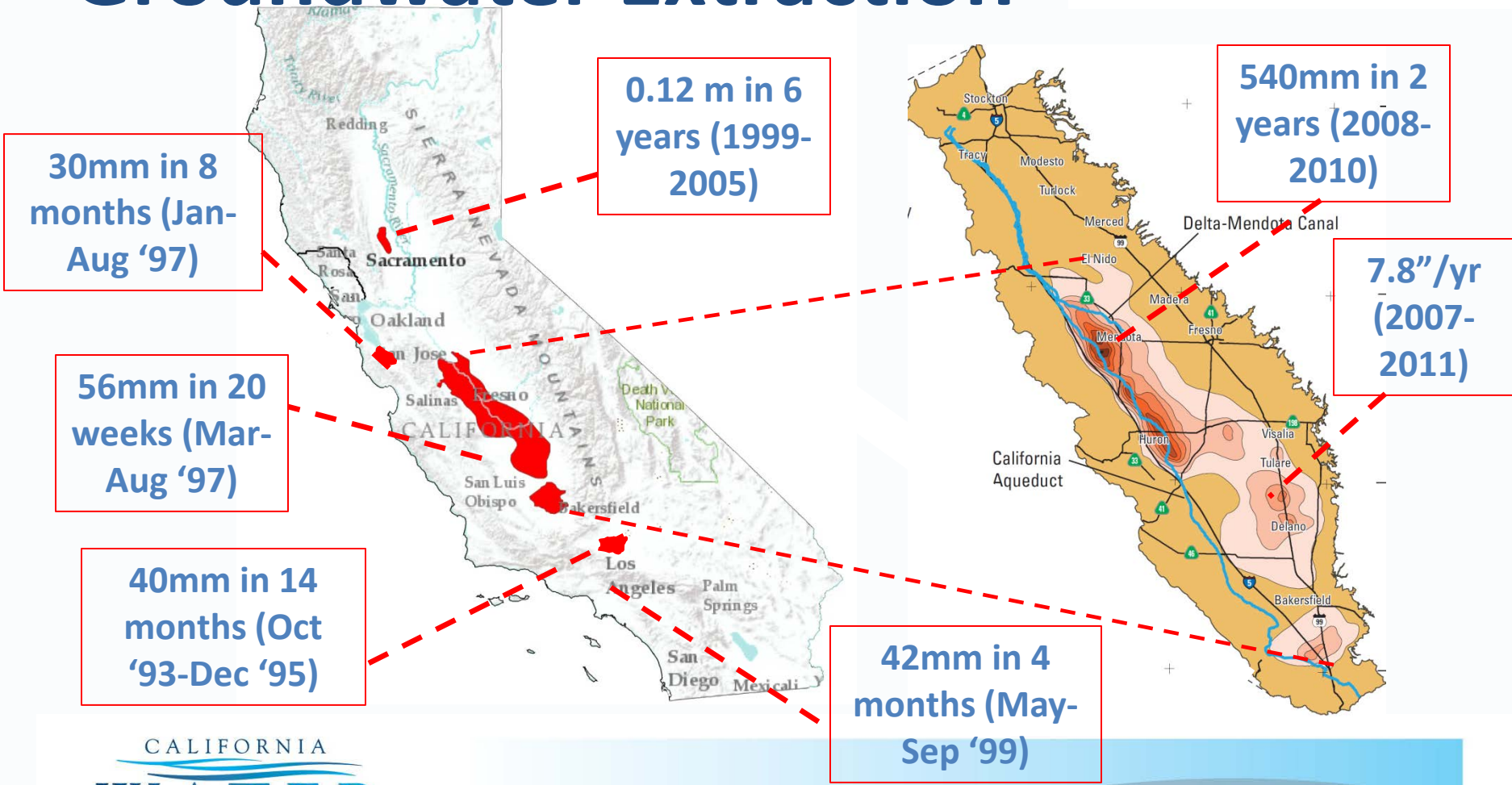
- Subsidence threatens infrastructure
- Reduced water for species
- Reduced surface supplies
- Increased drilling/pumping costs
- Increased costs for taxpayers, business, farmers



Subsidence Due to Groundwater Extraction



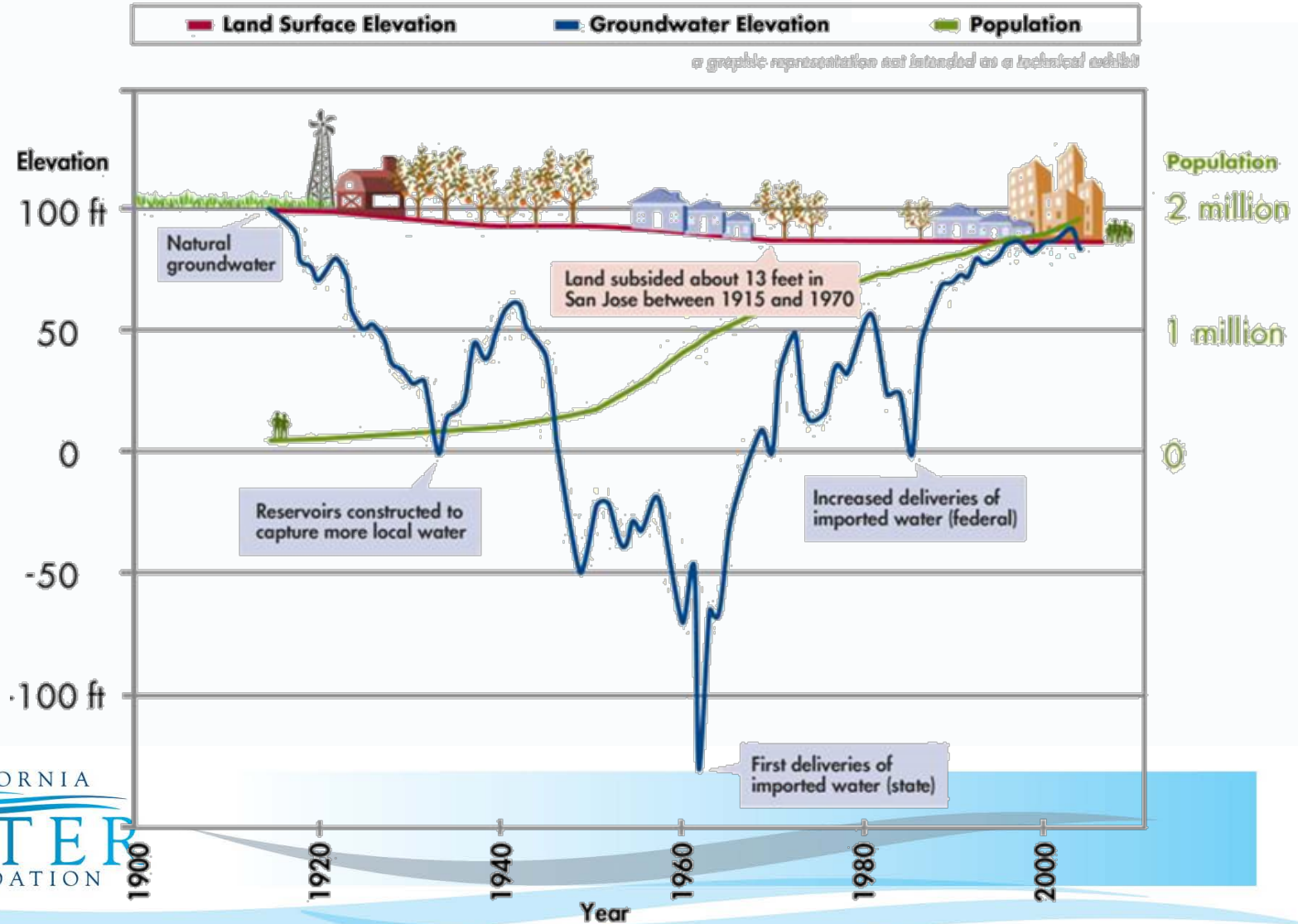
Subsidence Due to Groundwater Extraction



It's still happening...

Groundwater Lessons Learned: Santa Clara County

1800's > 1900's - 1920's > 1930's - 1950's > 1960's - 1970's > 1980's - 1990's > 2000's - 2010's > Today



Basins in Crisis



**THE PORTERVILLE
Recorder**
"Farmers experiencing
wells drying up"
August 9, 2013

AP Associated Press
"In drought, water
war in Calif. fought
underground"
September 7, 2013

Santa Maria Times
Lee Central Coast Newspapers
"Rural community
sinking because of
groundwater use"
July 18, 2013

The Fresno Bee
"Sinking land
makes Valley
levees unreliable"
January 19, 2013

Los Angeles Times
"In Paso Robles, vineyards'
thirst pits growers against
residents"
September 1, 2013

The Modesto Bee
modbee.com
"Denair neighbors
say farmer's drilling
sapped their wells"
July 7, 2013

VISALIA TIMES-DELTA
A GAMBETT COMPANY
"Tulare County
running dry?"
August 23, 2013

The Desert Sun
"Desert water
supply strained by
heavy pumping"
September 9, 2013

Newspaper of the Central Coast
THE TRIBUNE
"California's groundwater
management is like
Texas: It's the wild West"
June 16, 2013

Subsidence Impacts

- Canal impacts – Delta Mendota Canal



Loss of head space and constant repairs to bridge road and canal
(Outside Canal, north of Mendota; Damage to the Delta Mendota
Canal; photos courtesy of CCID, April 2013)

Improving Groundwater Management Through Regional Empowerment



- Regional managers need new authorities and resources
- Encourage and protect groundwater banking
- Monitor groundwater quality and quantity
- Invest





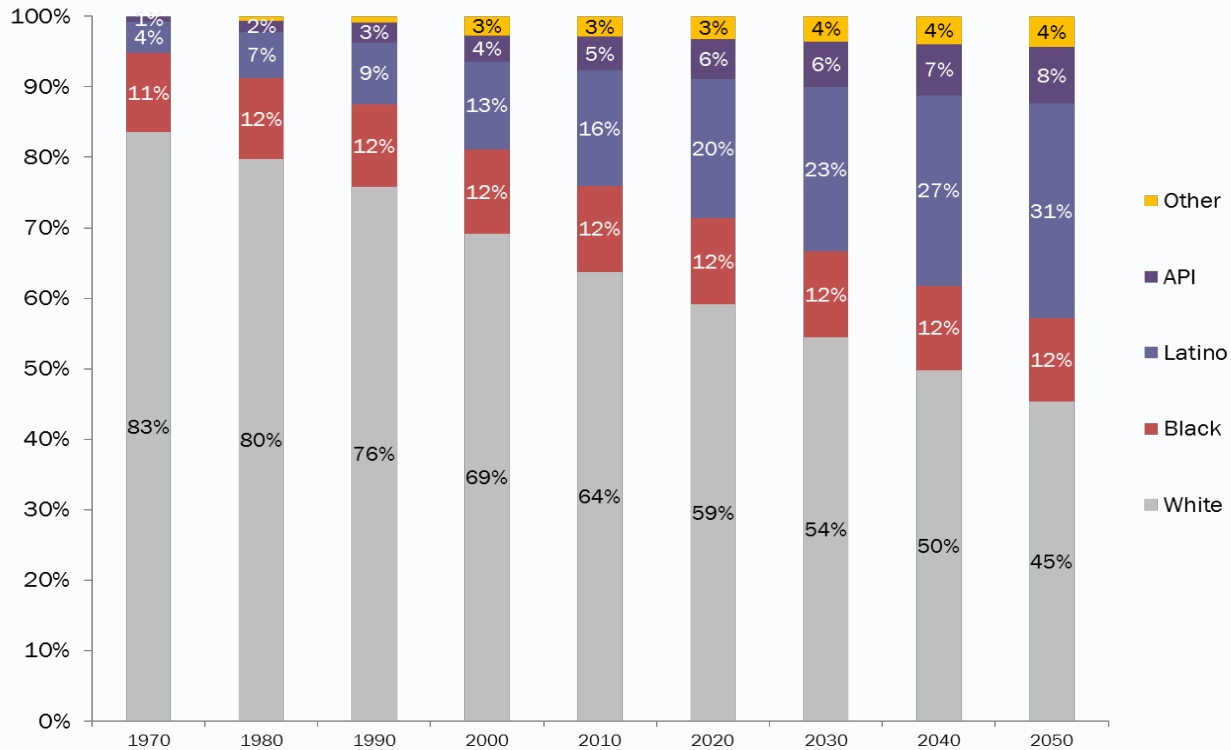
Environmental Impacts of Drought

- **Groundwater Dependent Ecosystems**
- **Refuge Water Supply**
- **Instream Flows**
- **G-Snake Habitat**
- **Pacific Coast Flyway**

New Realities



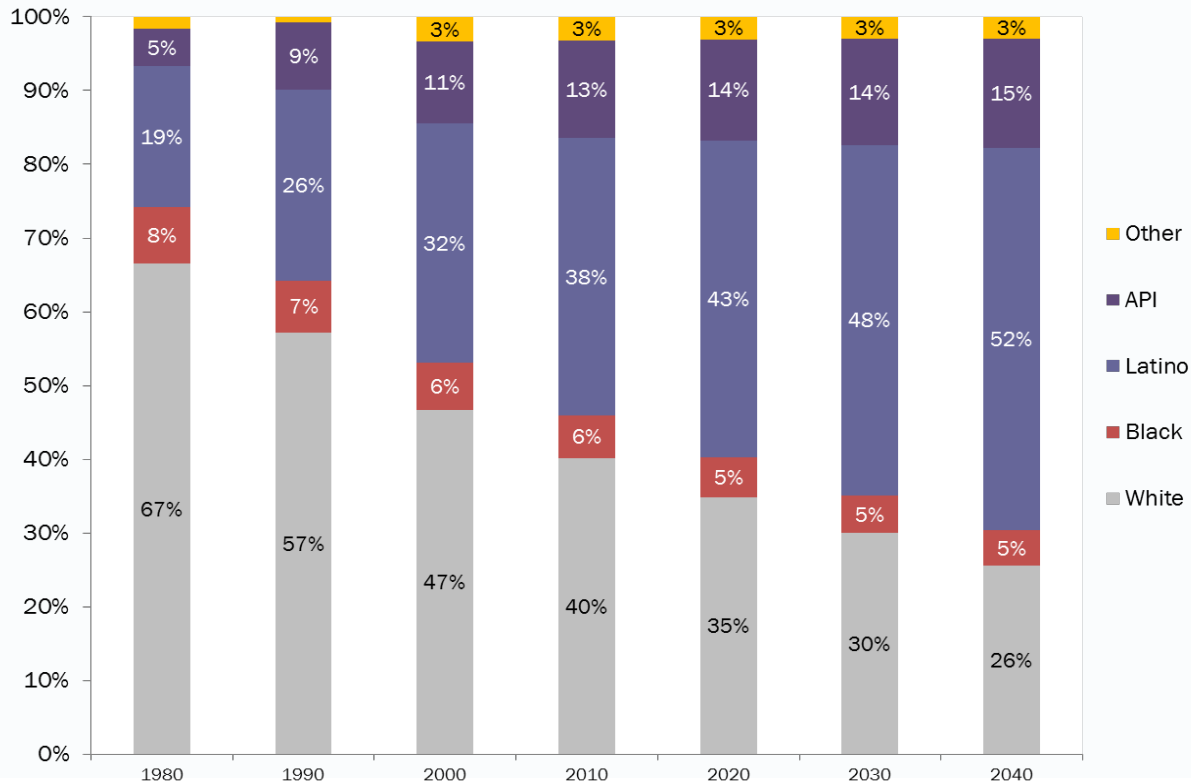
U.S. Changing Demographics, 1970-2050



New Realities



California Changing Demographics,
1980-2040



New Realities



Who are Millennials?

There are currently nearly 90 million Millennials (born 1980 – 1994)

- Gen X 1965 - 1979
- Boomers 1945 - 1964
- Traditionalists 1925 - 1944

Characterized as:

- Entrepreneurial
- Public service motivated
- Connected and protected
- Challenged by traditional hierarchy
- Tech-savvy
- Entitled and “over-educated”
- Community-oriented

Compared to other generations, Millennials are the most:

- Educated
- Underemployed
- Optimistic
- “Plugged-in”
- Non-religious
- Democratic
- Diverse

New Realities



Why should we care?

- Millennials represent the single largest generation in human history
- There are more Millennials in the U.S than any other age group
- Millennials will have the largest buying power in the United States by 2017
- Millennials will significantly influence determine the outcomes of the next six presidential elections, and the public policy priorities that will shape and influence conservation and advocacy efforts

New Directions



- Continue Focus on Delivering Outcomes
- Experiment with Governance Structures
- Set the Agenda on Climate Adaptation
- Build Millennial and Latino Leadership and Organizations

Integrated Water Management

WATER SYSTEM INTERCONNECTIVITY

