

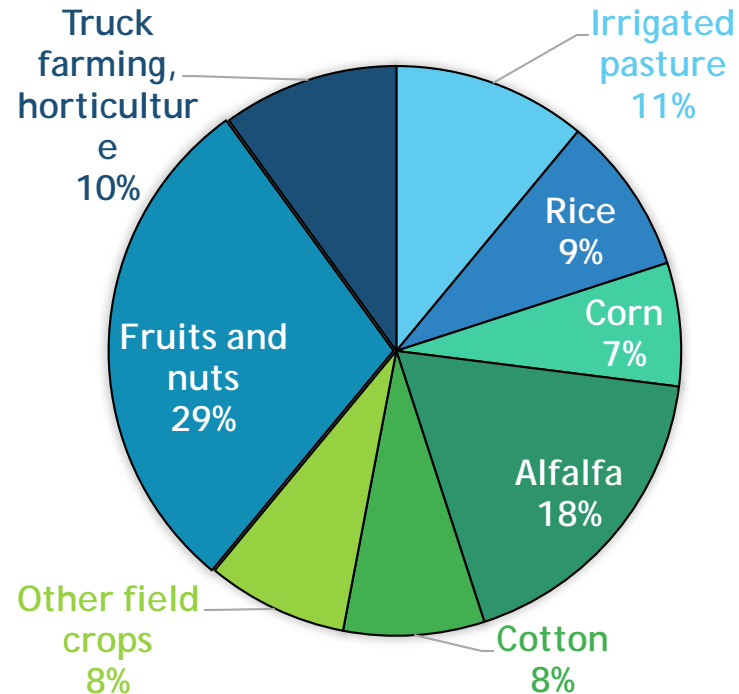
California's Water Systems of the Future

Jennifer Stokes Draut

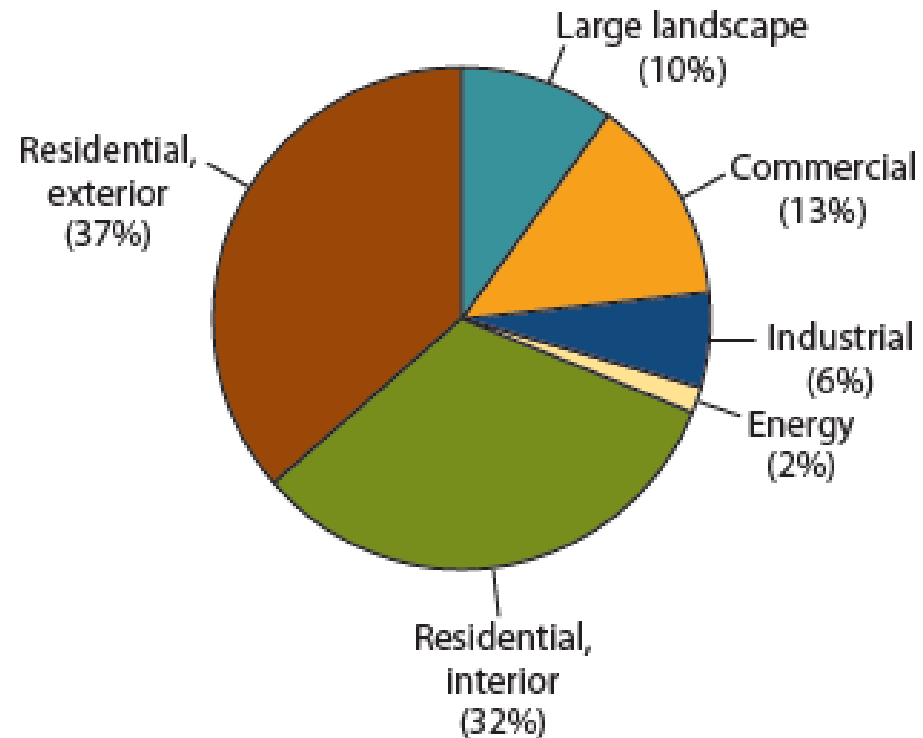
October 17, 2017

California Water Stats

80% for agriculture



20% for cities



California average urban residential water consumption

State: 200 gallons per capita per day (gpcd)

Central Coast and SF Bay: ~150 gpcd

Colorado River region: >350 gpcd

Source: PPIC California Water Today; agriculture figure created from reported data

10/17/2017

2

The Challenges

Wallace Stegner, writer, when asked
what a newcomer needed to know about
California, said:

“Water. It’s about water.”

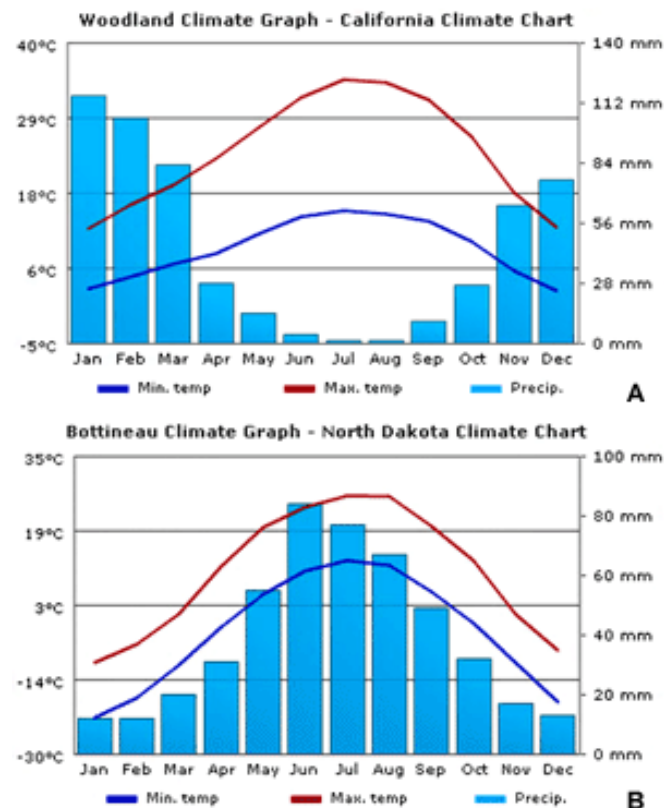
California's Challenge: Matching supply and demand

155 inches
per year

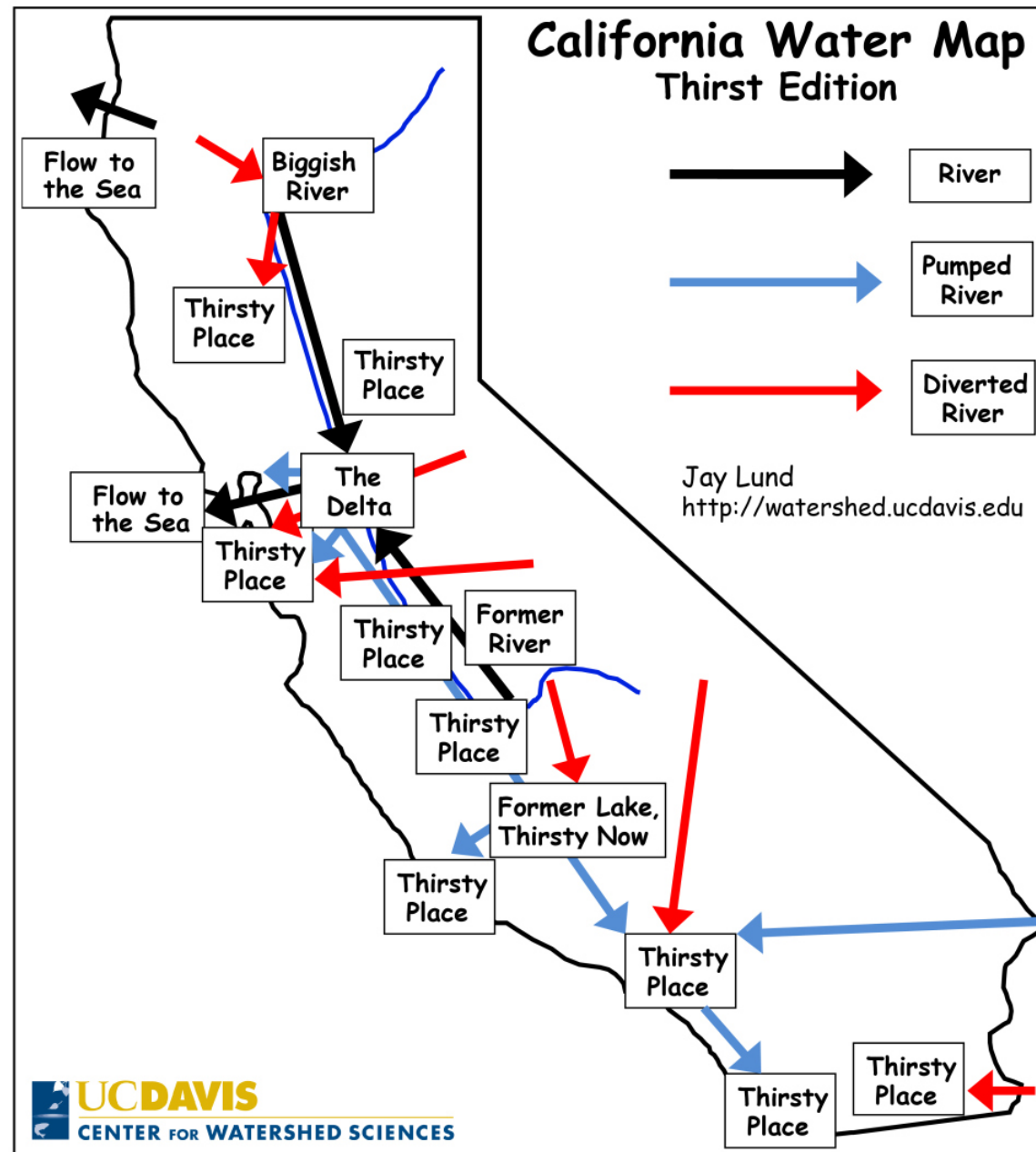
in space and in time



1 inch
per year



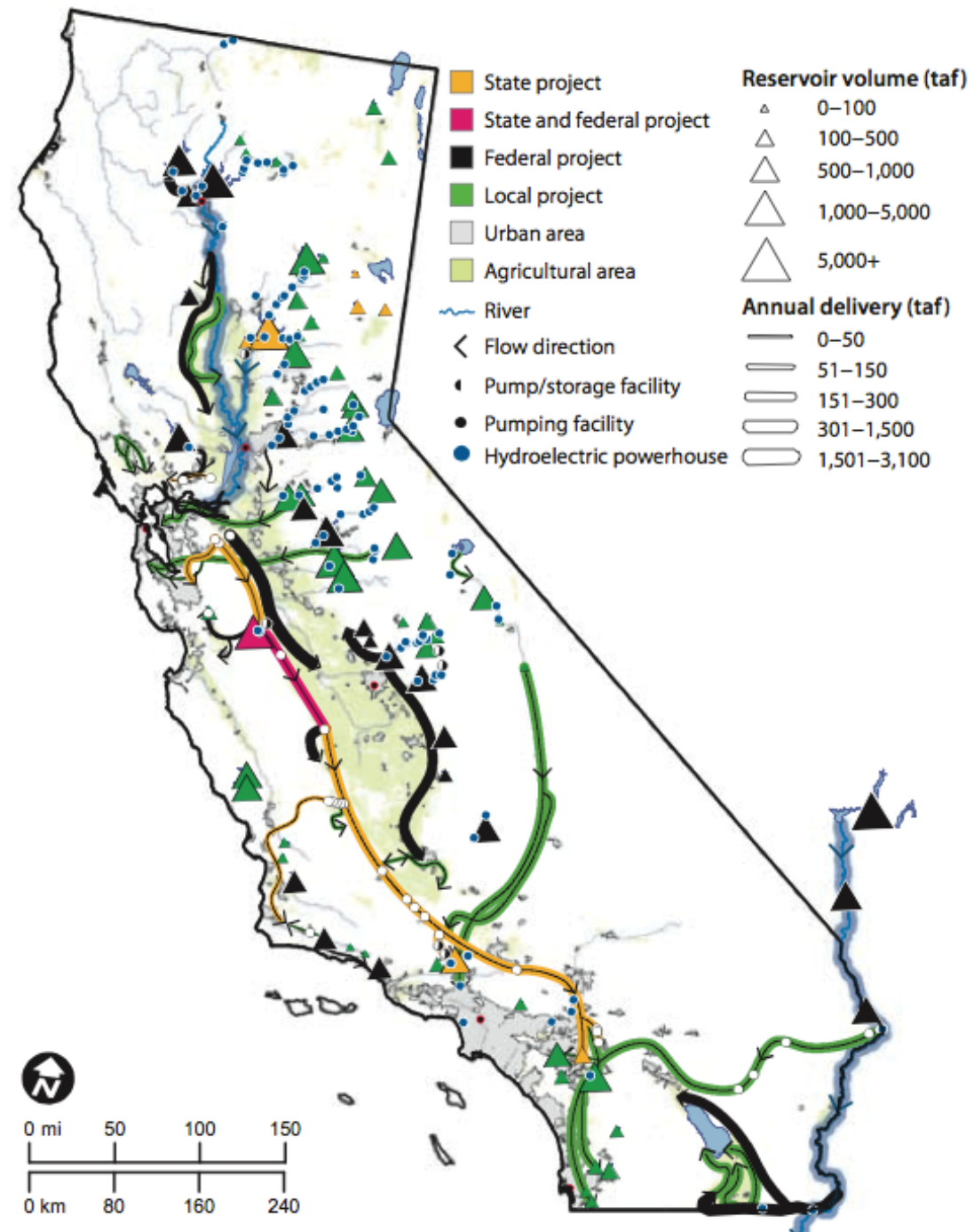
Solution: MASSIVE Water Works Projects



Or another view...

FYI...

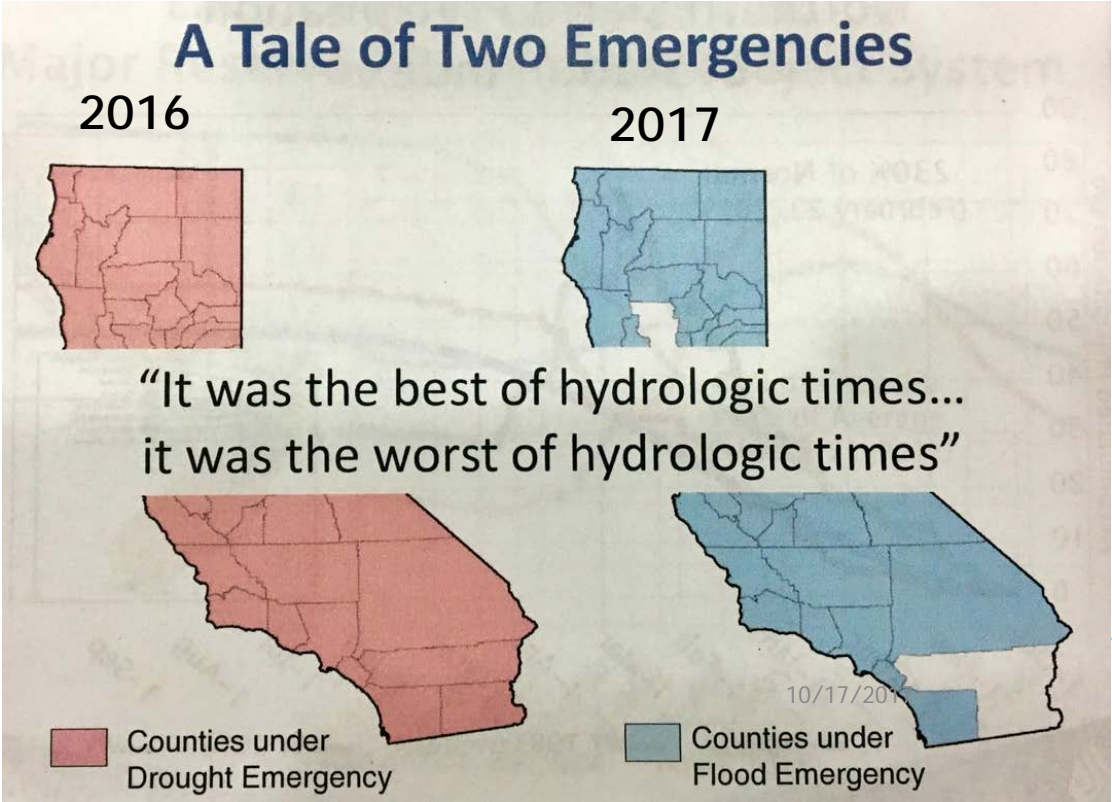
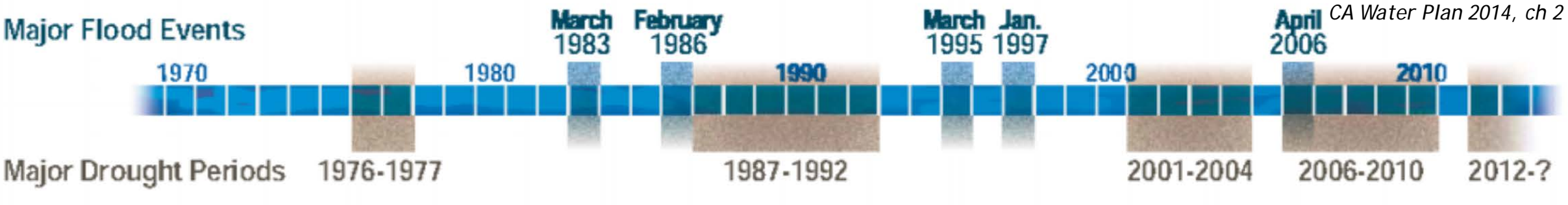
- ▶ Taf = thousand acre feet
- ▶ An acre-foot provides the annual water needs of 2-5 California households



Large Water Transfers Changed California

- ▶ We got:
 - ▶ Agriculture and cheap food
 - ▶ Cheap hydropower
 - ▶ Industry and its jobs
 - ▶ More people in different areas (with better weather)
- ▶ We lost:
 - ▶ Wildlife habitat
 - ▶ Environmental quality (water pollution, salts in soils)
 - ▶ Small ag and with it some of our social equity

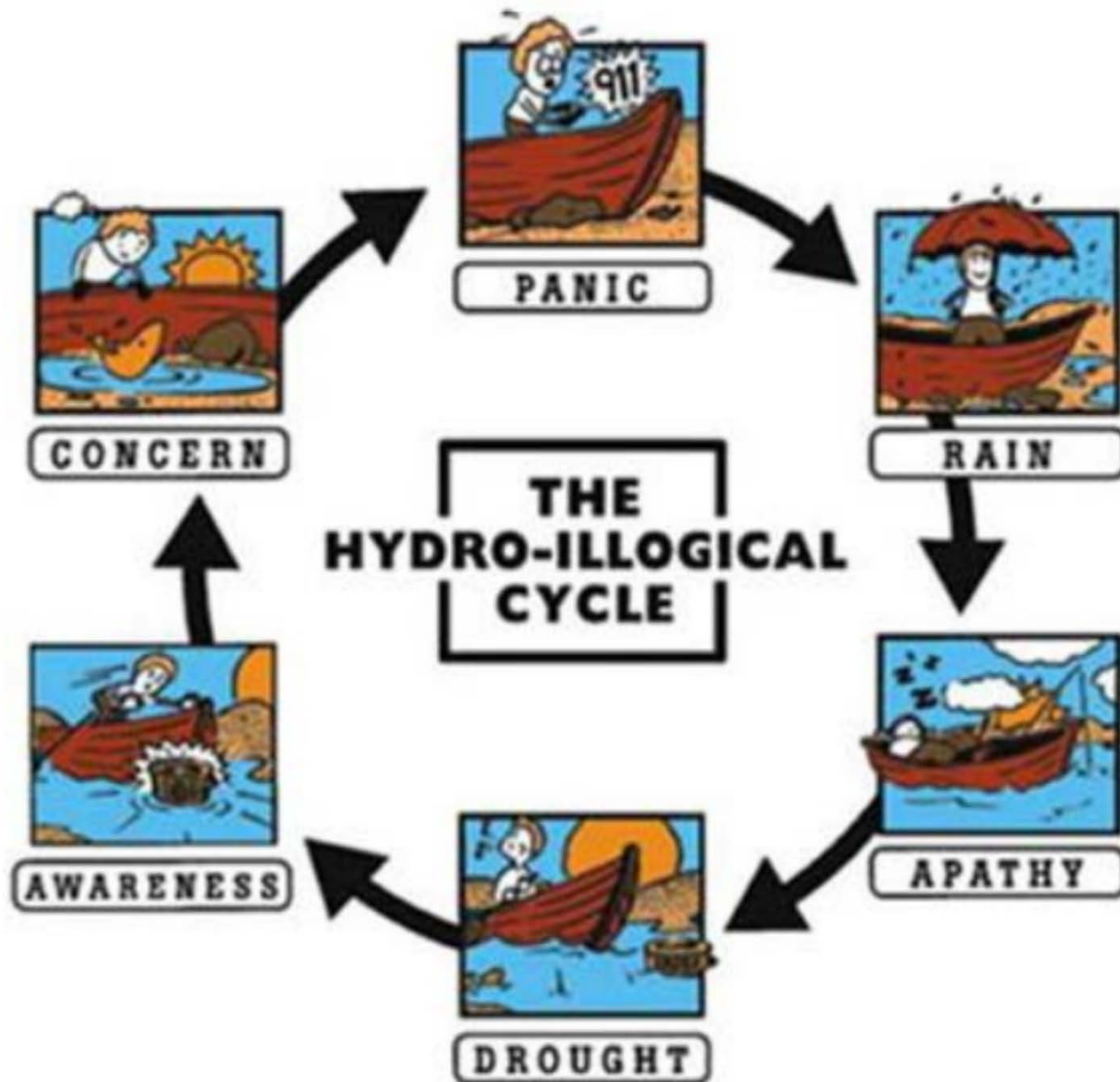
California: A History of Water Extremes



Or as told by Lake Oroville...



Overview: Wikipedia
2014 pic: The Atlantic;
2017 pics <https://wattsupwiththat.com/2017/02/12/oroville-dam-spillway-expected-to-collapse/> AND SF Chronicle



The State of Our Infrastructure

2017
INFRASTRUCTURE
REPORT CARD

MAKING THE GRADE AMERICA'S GRADES STATE BY STATE SOLUTIONS THE IMPACT GET INVOLVED NEWS

US CA
Drinking water D =
Dams D ↓
Wastewater D+ =

TAKE ACTION

America's Infrastructure Scores a
D+

GET THE FULL STORY

Category	US	CA
Drinking water	D	=
Dams	D	↓
Wastewater	D+	=

The Opportunities

Use water efficiently

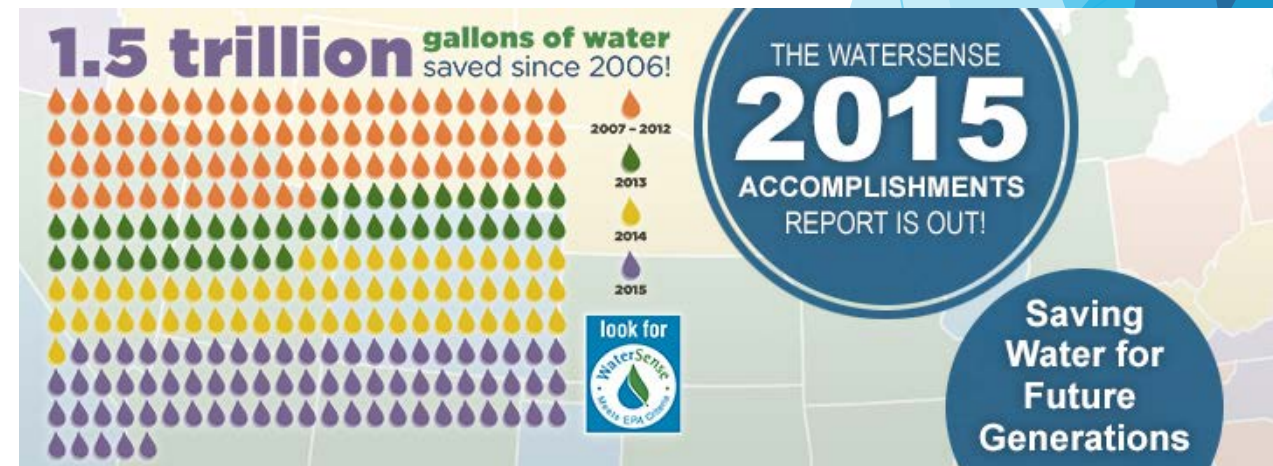
George Kostyrko, spokesperson for the
State Water Resources Control Board, said
“ongoing conservation”
of water in California is expected to
become
“a way of life.”

(http://grist.org/climate-energy/californias-drought-isnt-going-away-anytime-soon/?utm_medium=email&utm_source=newsletter&utm_campaign=daily-horizon)

Conservation

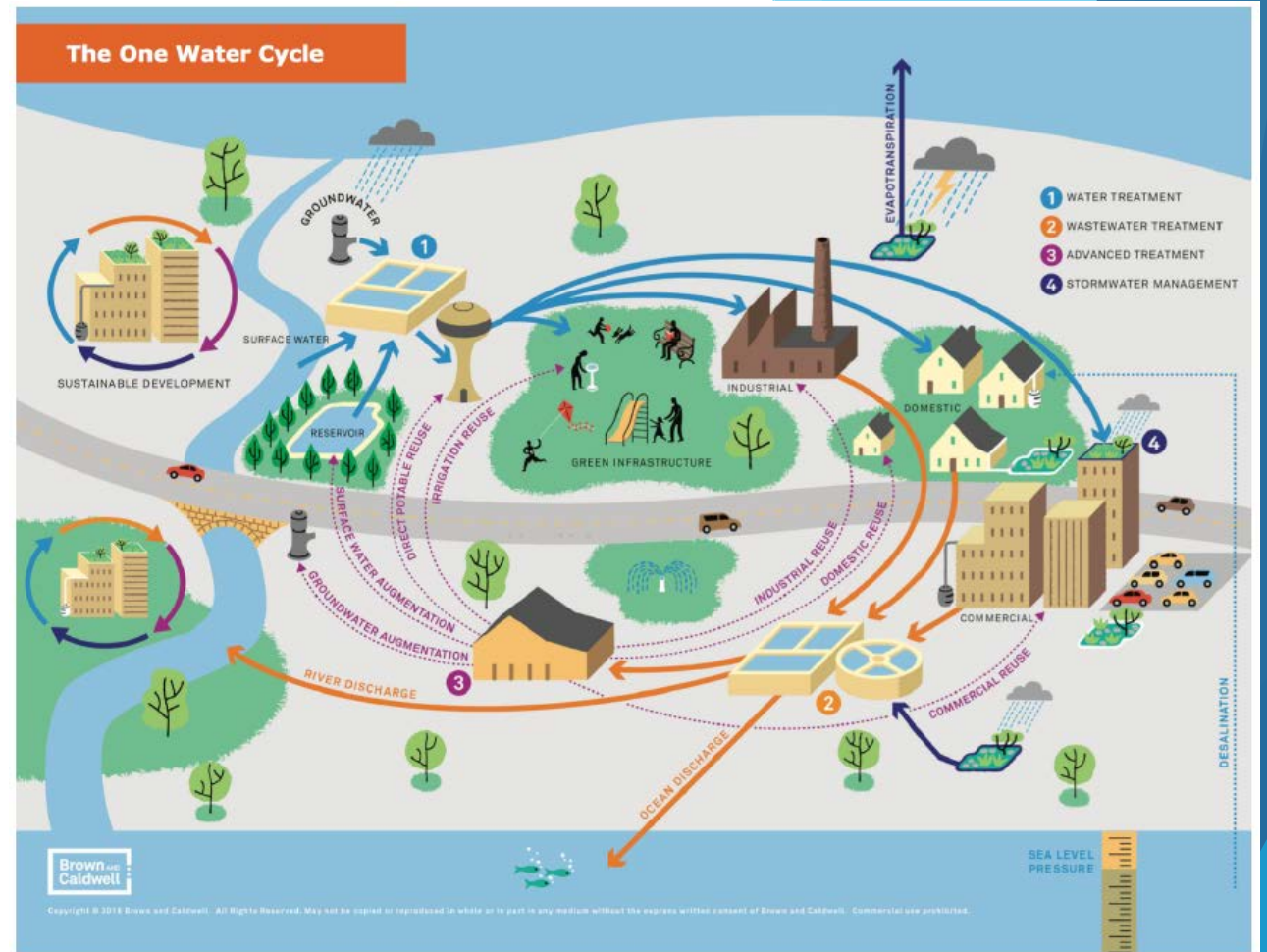
- ▶ Ag: crop switching (farmers and consumers), efficiency
- ▶ Urban:
 - ▶ Utilities- fix leaks in distribution systems, pressure management, meter water use, enact equitable price which represents true costs, educate consumers
 - ▶ Outdoor: Xeriscaping/drip irrigation/ smart controllers
 - ▶ Indoor: low flow toilets, showerheads, washing machines, dishwashers, etc.
 - ▶ Industrial (washwater recycling, steam efficiency, cooling tech)
- ▶ All: change behaviors, reuse water (building, neighborhood, or community scale)

<https://www3.epa.gov/watersense/>



Do things differently

- ▶ Manage the system
 - ▶ Integratively
 - ▶ Regionally
- ▶ Diversify supply
 - ▶ Harvest stormwater
 - ▶ Reuse water
 - ▶ Desalinate saline sources
- ▶ Enhance storage, especially underground
- ▶ Recover resources



For more on the first 3 options:

https://www.ted.com/talks/david_sedlak_4_ways_we_can_avoid_a_catastrophic_drought

In the future, we need to...

Build for RESILIENCE.

- ▶ Prioritize proactive maintenance.
- ▶ Invest in and redesign institutions, not just infrastructure.
- ▶ Design for climate change.
- ▶ Manage infrastructure as interconnected and interdependent.
- ▶ Create flexible infrastructure.
- ▶ Design infrastructure for everyone.

Questions?

► Email: jsdraut@berkeley.edu