

California's Water Management: An update—where are we going and where are we now?



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Overview

- ▶ California and the west overview
- ▶ Dealing with a new reality
 - ▶ Challenges
 - ▶ Efforts
 - ▶ Signs of hope
- ▶ What it will take—thinking and acting differently

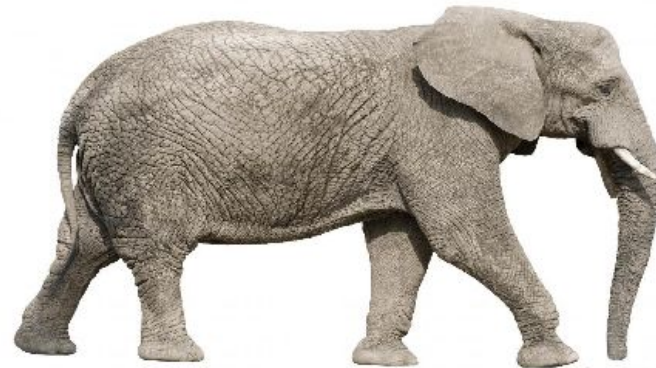
“Our relationship with water has to evolve.” Los Angeles

Mayor Eric Garcetti, October 14, 2014



California Setting—the whole elephant

- **Most Variable hydrology**
 - Year to year
 - Location to Location
 - Time of year
- **Mix of sources**
 - Surface Water local or imported (storage/conveyance)
 - Groundwater (intensely local)
 - Every locale different mix
 - Mix of water rights varies greatly
 - Impact of drought varies greatly
- **Mix of solutions**
 - Conservation/Recycling/Stormwater/Desal
 - Integrated Water Management in regions and statewide
 - Storage, storage, storage, storage
- **Basics**
 - 39 million people □ 50 million
 - 169,000 square miles
 - Majority of population lives in large cities 100s of miles from water source
 - One of 5 Mediterranean large scale agricultural opportunities in world
 - Most biodiversity; losing biodiversity most rapidly
 - Institutional setting: local control; 4000+ water supply systems; 2600+ water agencies (411 “large”)



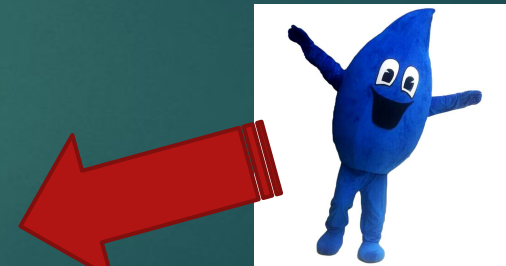
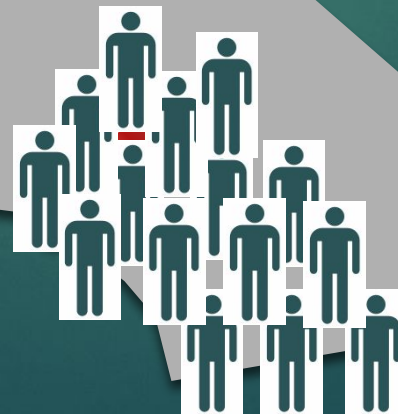
wiseGEEK

Climate change and other drivers as gamechangers

Managing Hydrologic and Geographic Imbalances



- Precipitation vs. Population
- Feast or Famine



And, let's not forget
the Colorado
River....
Why do we forget
the Colorado?

Major Water Projects

- Federal – Central Valley Project (CVP)
- State – State Water Project (SWP)
- Local – Many other projects throughout state, including Colorado River system, Hetch Hetchy, EBMUD, Owens Valley

Source: Water Environment Foundation

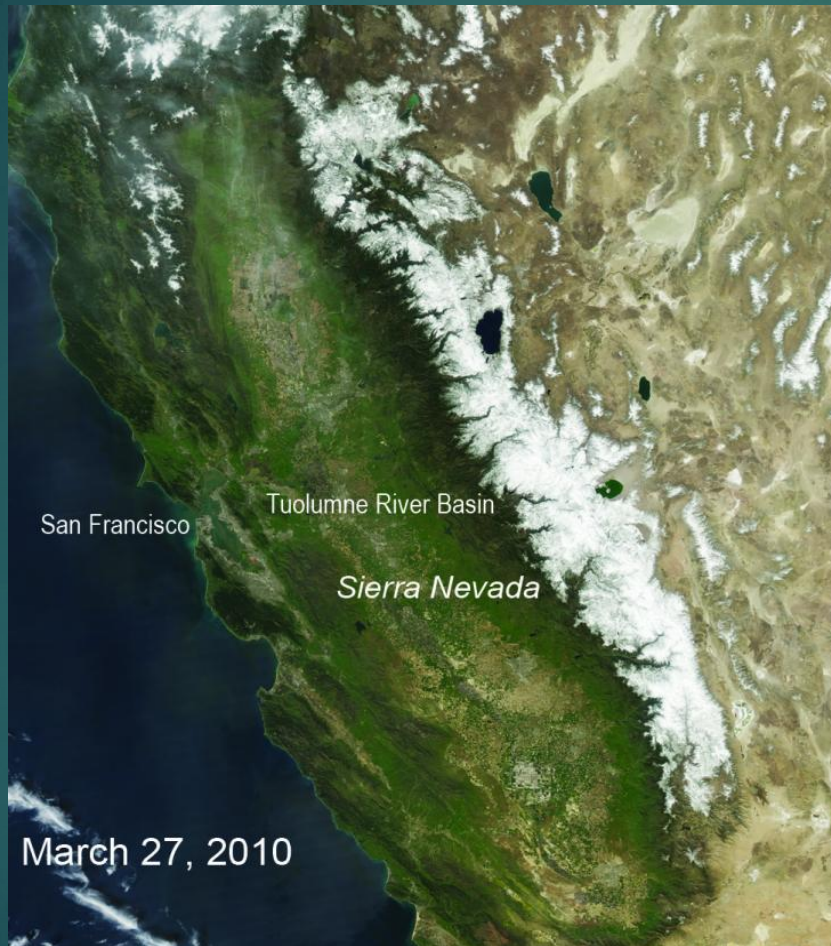


Future drivers require change

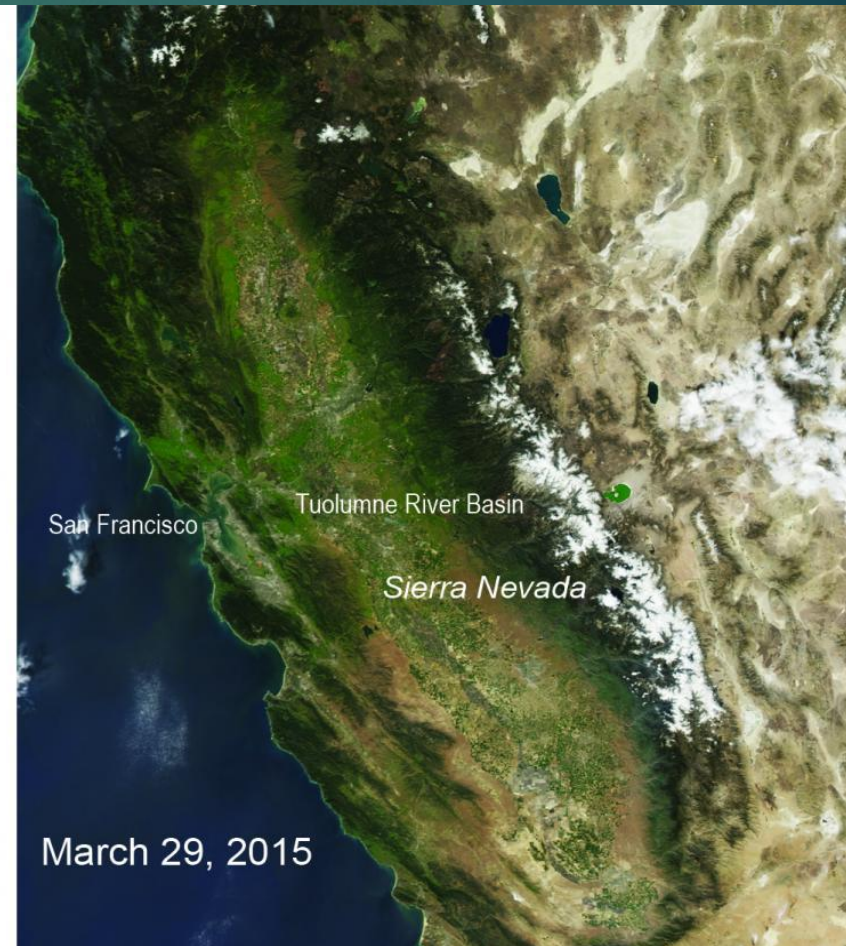


- ▶ Climate change □ particularly loss of snowpack
- ▶ Limitations of looking at “recorded history”
- ▶ Population growth
- ▶ Food security
- ▶ Importance of protecting nature

This is California on Climate Change



March 27, 2010

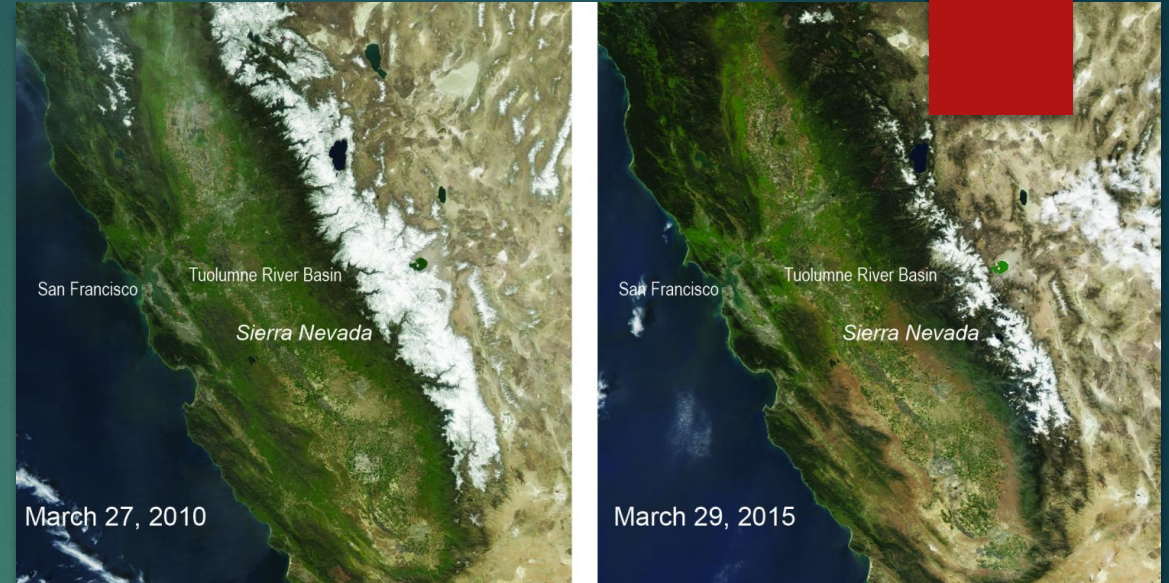


March 29, 2015

Source: NASA

California in the crosshairs – drier and more frequent “dries”

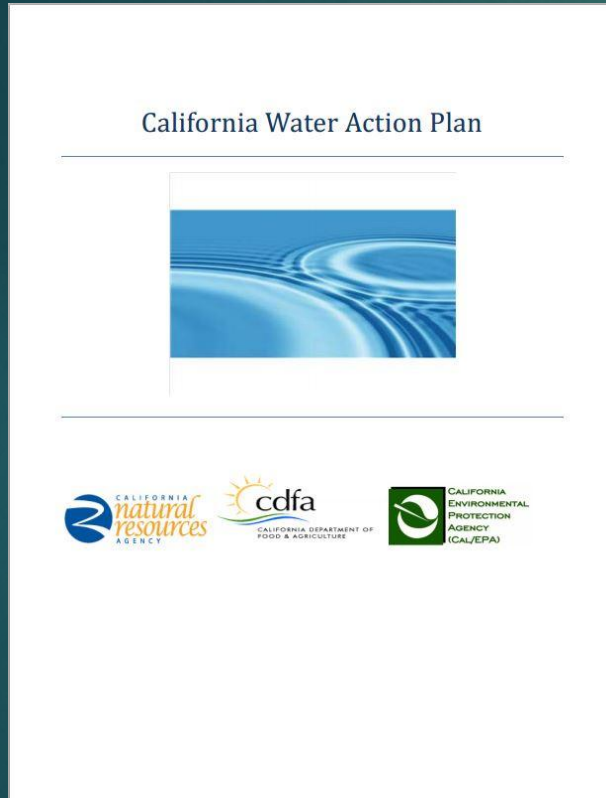
- ▶ Region dependent upon imported water from hundreds of miles away for 50-60% of its current water use.
- ▶ Climate change, natural disasters, and need for increased environmental flows threaten that source.
- ▶ Drought on Colorado and Sierra systems punctuated by historic snowpack this year.
- ▶ **Key adaptation efforts:**
 - ▶ Conservation/efficiency (over decades)
 - ▶ Water recycling
 - ▶ Stormwater capture + multi-benefits
 - ▶ Groundwater cleanup



Wake up call 2013-14; groundhog days 2021-2



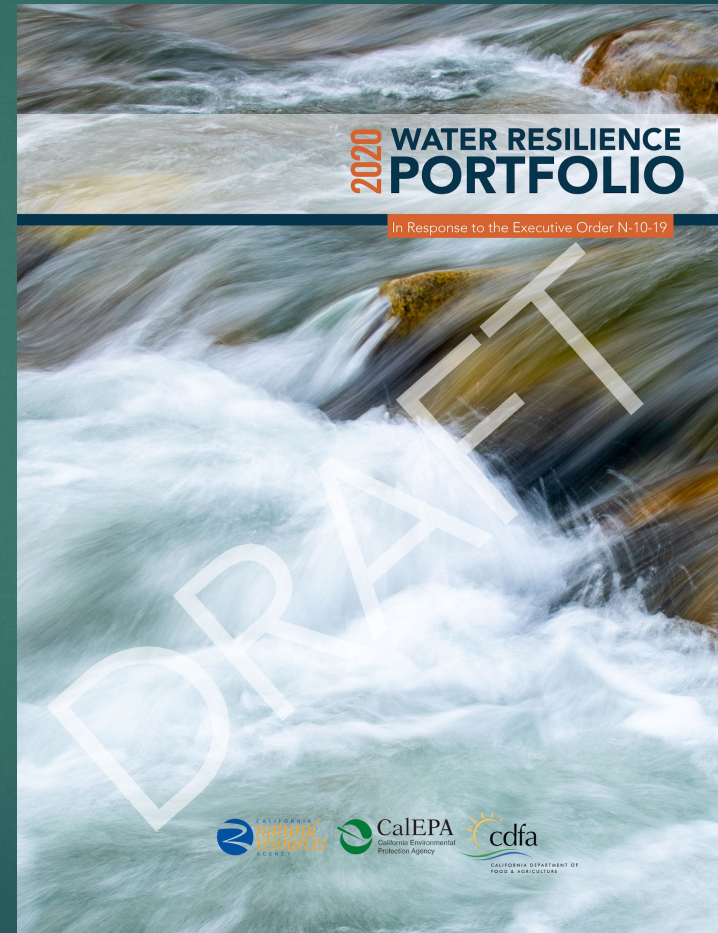
California Water Action Plan



- ▶ Make Conservation a California Way of Life
- ▶ Increase Regional Self-Reliance and Integrated Water Management Across All Levels of Government
- ▶ Achieve the Co-Equal Goals for the Delta
- ▶ Protect and Restore Important Ecosystems
- ▶ Manage and Prepare for Dry Periods
- ▶ Expand Water Storage Capacity and Improve Groundwater Management
- ▶ Provide Safe Water for All Communities
- ▶ Increase Flood Protection
- ▶ Increase Operational and Regulatory Efficiency
- ▶ Identify Sustainable and Integrated Financing Opportunities

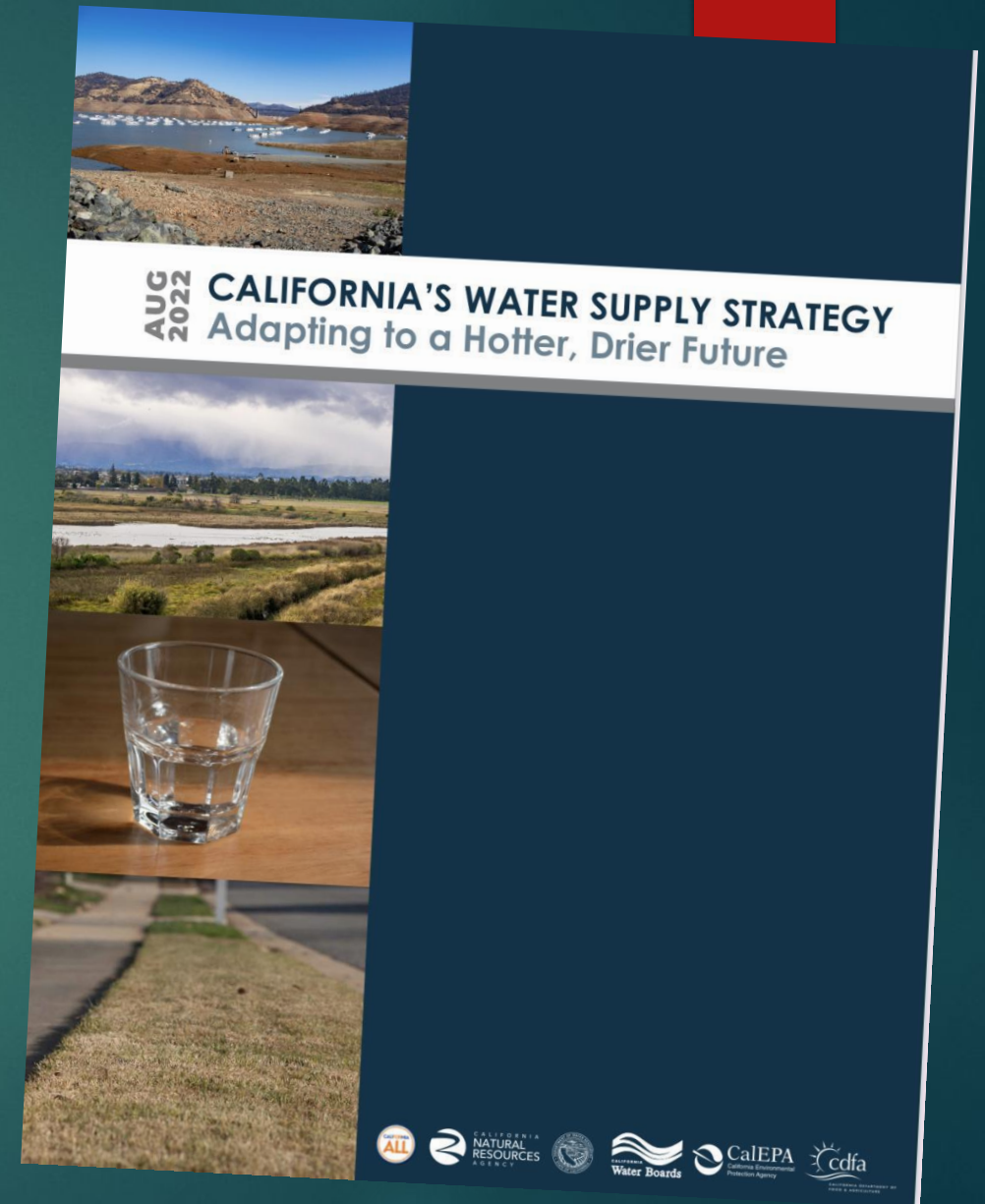
Governor Newsom takes the baton...

- ▶ Water Resilience Portfolio
- ▶ Based on portfolio approach; “All of the above” too
 - ▶ Regional approach
 - ▶ Multi-benefit prioritization
 - ▶ Tech/innovation/data
- ▶ Climate Smart California Plan and 30x30 (2022)
- ▶ Water Supply Plan 2023



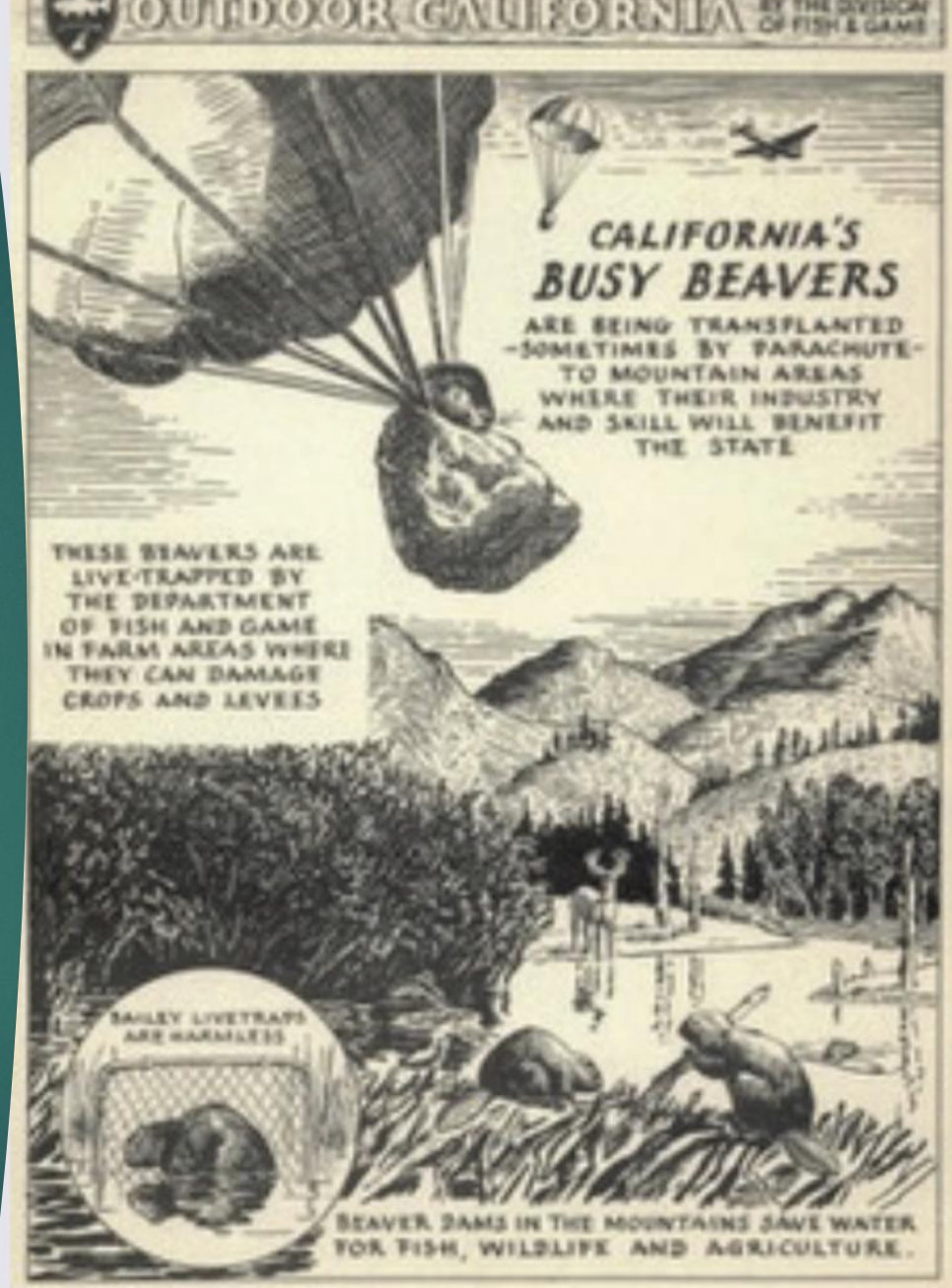
The Governor's Water Supply Strategy in Brief

- ▶ Next steps for focus
- ▶ A few defining additions, e.g.
 - ▶ Storage expansion above and **below ground**
 - ▶ Expand **groundwater recharge** and **stormwater capture**
 - ▶ Expand **water recycling**
 - ▶ Increase water **conservation and efficiency**
 - ▶ Desalination—especially the **brackish** kind



Other distinctive efforts:

- ▶ Nature-based Solutions (NbS)
- ▶ Water Efficiency Regulations (at last! Maybe...)
- ▶ Consideration of permanent limitations on "non-functional" turf
- ▶ SGMA implementation – the long haul
- ▶ Land Repurposing to deal with SGMA impacts
- ▶ Tribal Co-Management and other efforts
- ▶ Klamath Dam Removal
- ▶ Water Plan Updates
- ▶ Central Valley Flood Plan
- ▶ Water Rights "Modernization"



Occidental, 2022

Reality: Loss of snowpack

(plus more frequent and drier “drys”, punctuated by floods)



Jan 18, 2013

Jan 18, 2014

Reality: Sea Level Rise



Reality: Our infrastructure is aging and inadequate to the times





Reality: The Delta is the central challenge

Spotlight: Bay-Delta

- ▶ *Conflict of the ages between ag/urban/ environment/commercial fisheries
 - ▶ *Also *between* water users—Sac Valley/Delta/SJTribes/Export
 - ▶ *Plumbing, sure, but also trust and operations
- ▶ Watch for:
 - ▶ WQCP—will they or won't they/how will tribes and EJ fare?
 - ▶ Tunnels
 - ▶ Sites reservoir



The Importance of the Bay-Delta (just via total in Bay Area)



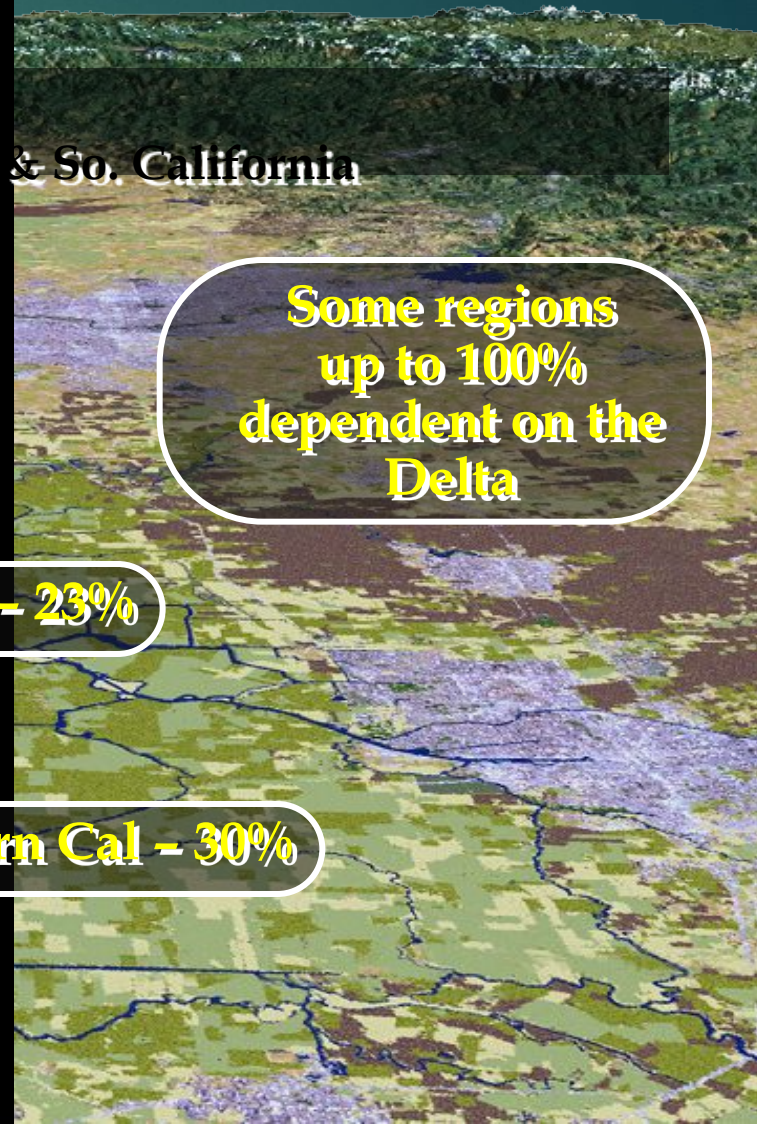
Water Supplies for Bay Area, Central Valley & So. California

Bay Area - 33%

Kern County - 23%

Southern Cal - 30%

**Some regions
up to 100%
dependent on the
Delta**



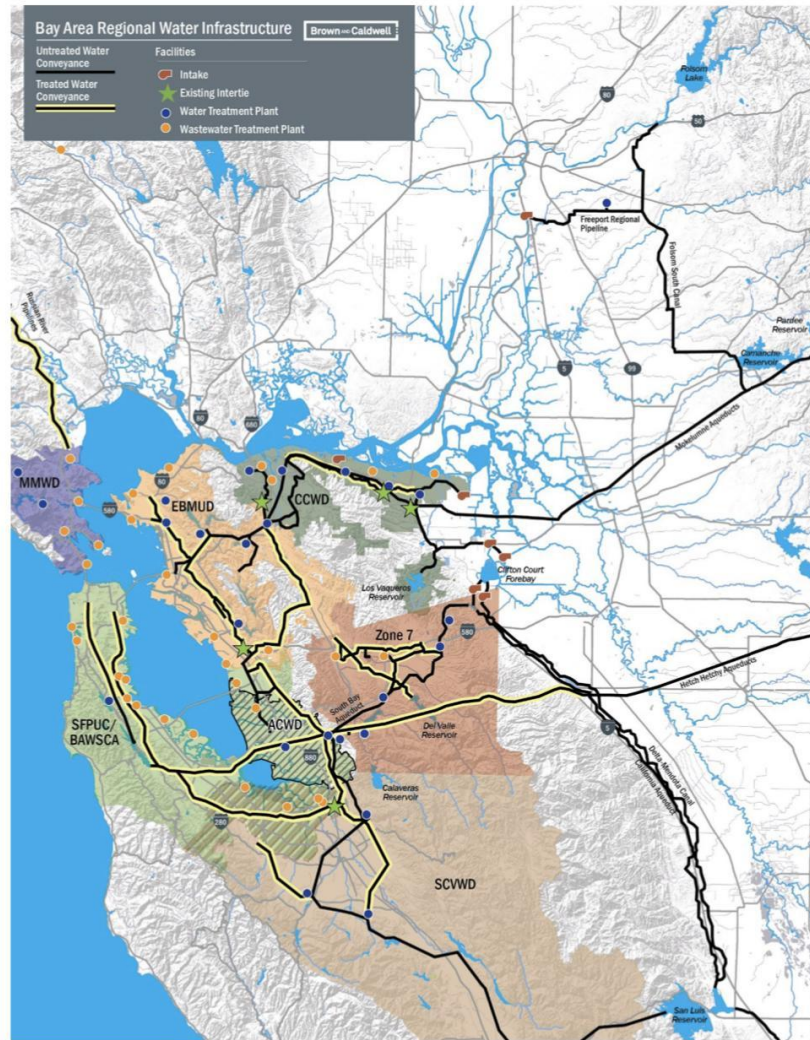


Figure ES-1. BARR agencies, which include eight of the Bay Area's largest water providers, are working together to optimize regional water supply reliability.



Bay Area Water Districts By Major Source of Supply

Water System Source Portfolio (11 Largest Bay Area Water Districts) & Annual Normal Supply

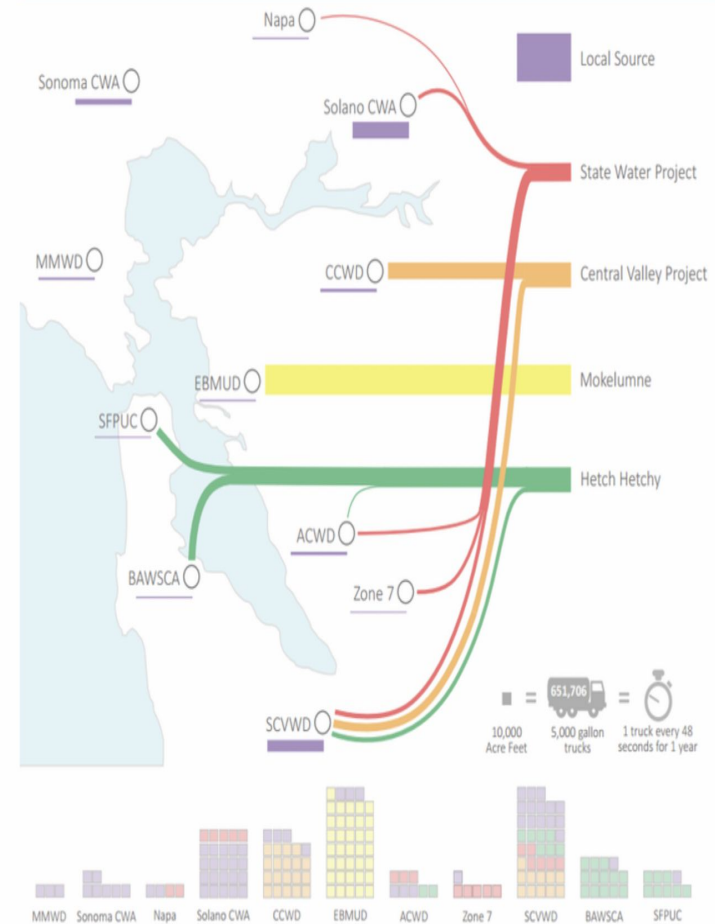


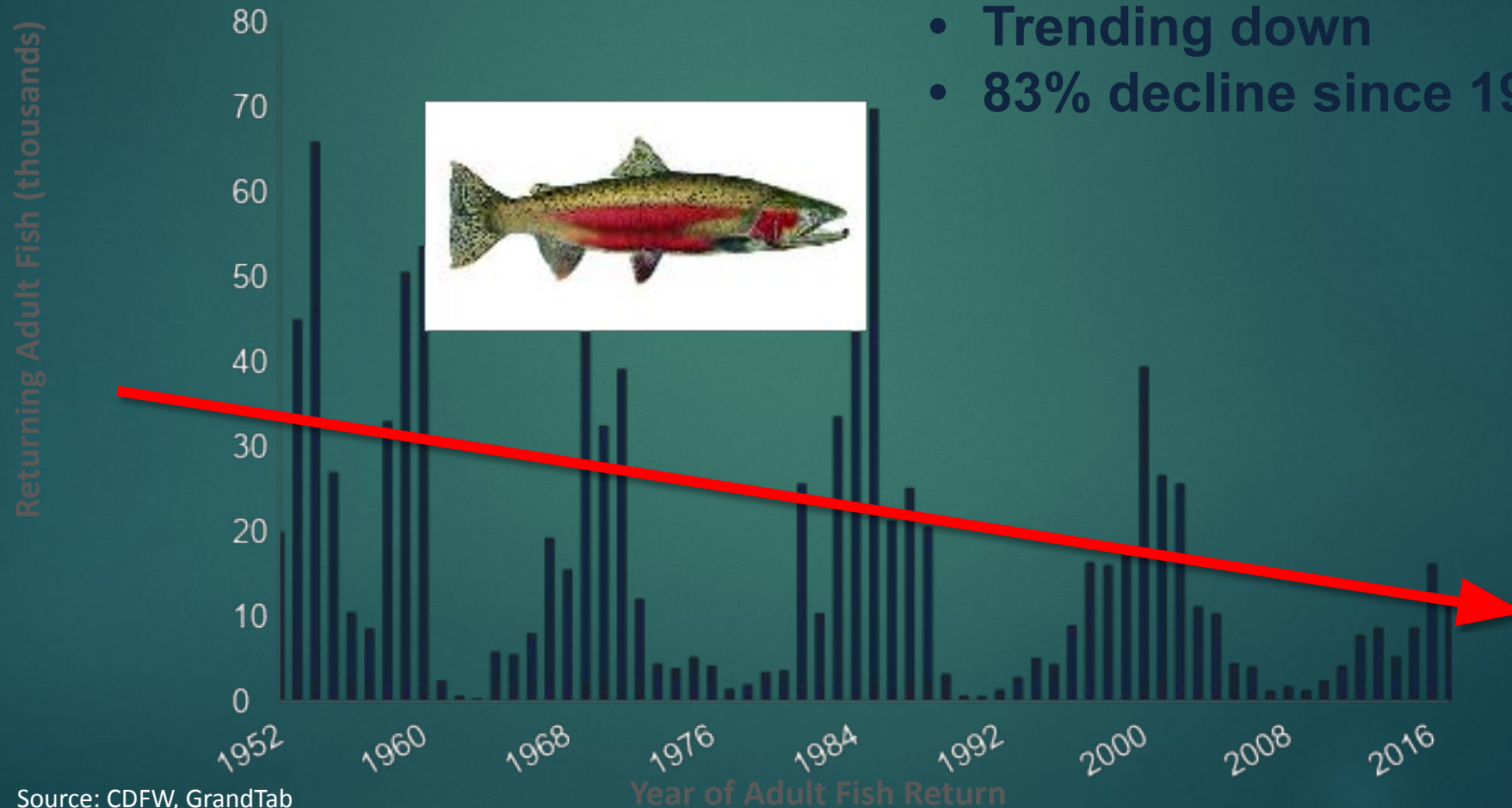
Figure Source: ABAG Infrastructure Vulnerability & Interdependency Study (2014)

A breakdown of where different regions of the Bay Area get their water. (Source: ABAG Infrastructure Vulnerability & Interdependencies Study (2014))

Reality: Ecosystems are in Trouble

Chinook Salmon Stanislaus, Tuolumne, and Merced Rivers

- Peaks declining
- Trending down
- 83% decline since 1985



Source: CDFW, GrandTab

Reality: California agriculture is precious resource for all of us

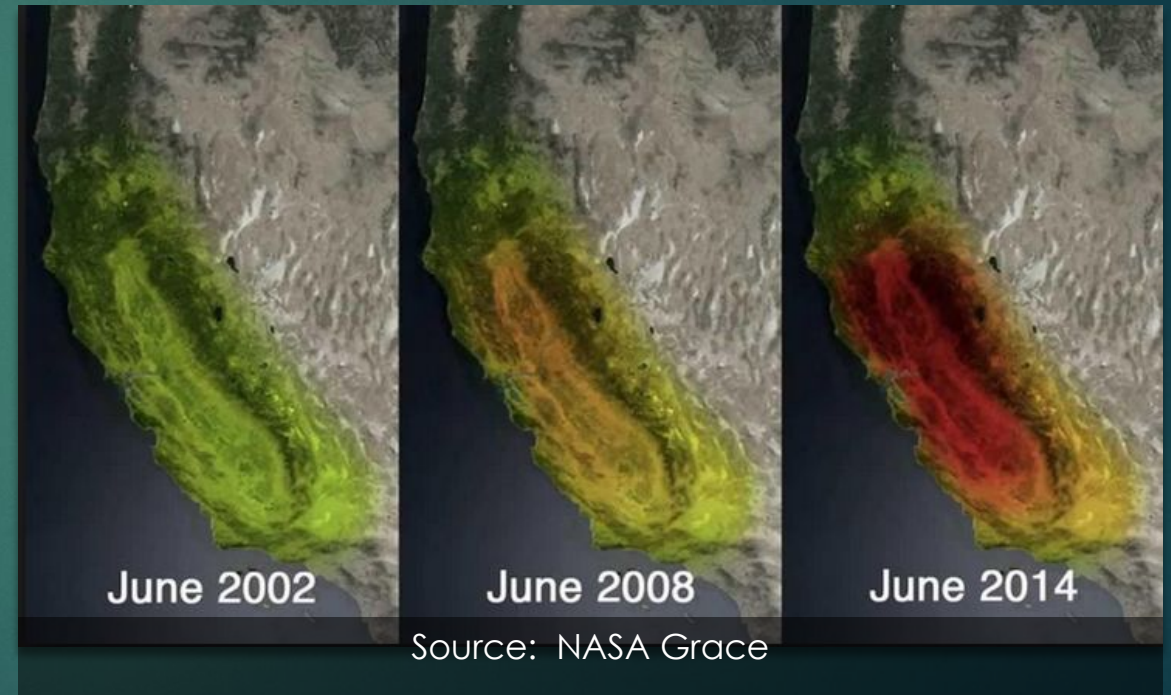


**Reality: Lack of
statewide groundwater
management has been
a problem**

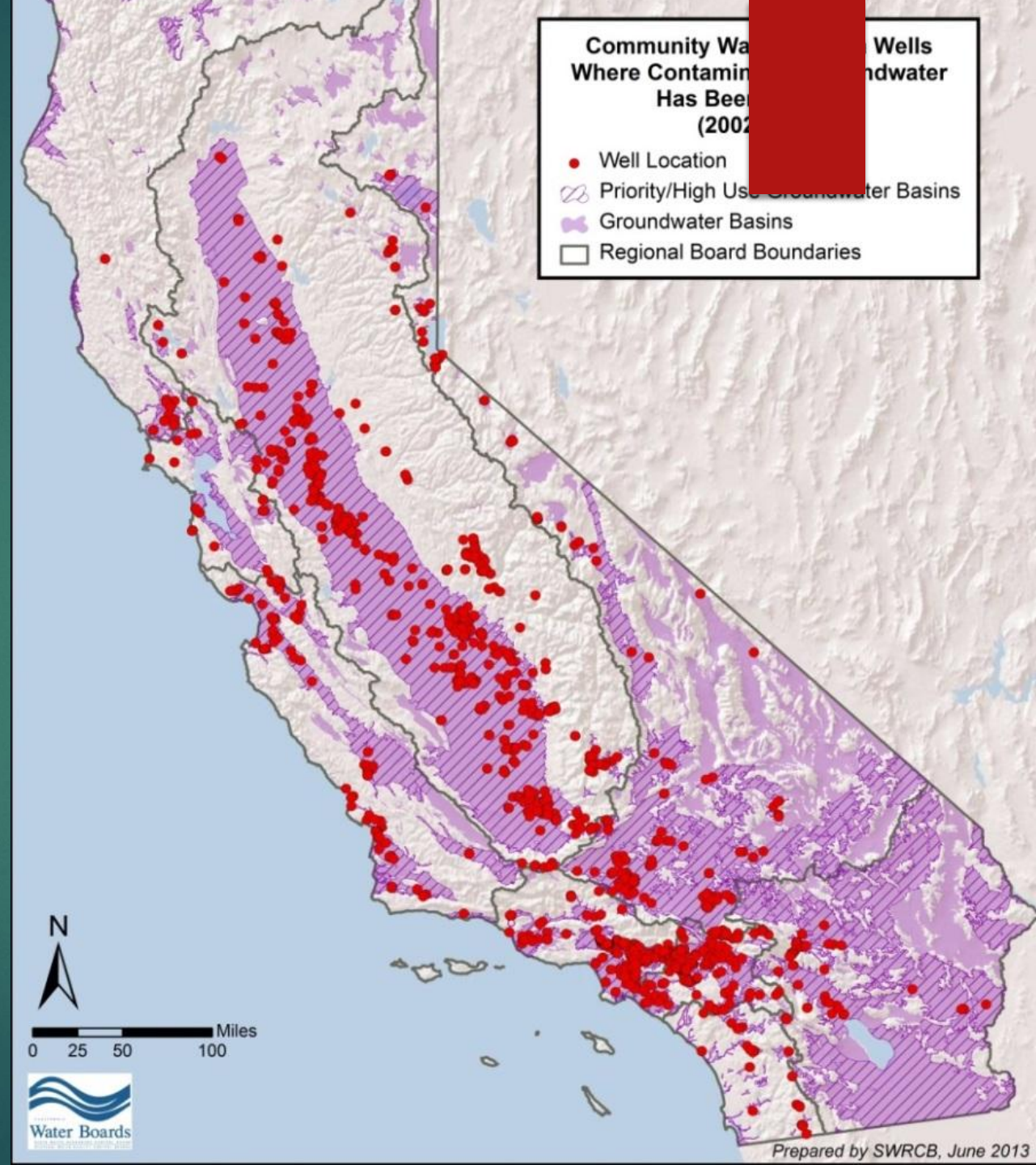


SGMA: work in progress

- ▶ Issues:
 - ▶ Math, equity, transition
- ▶ Point in time:
 - ▶ Grades in; 6 heading for probation—will they cure?
- ▶ What to watch for:
 - ▶ Early adopters—who succeeds
 - ▶ Probation—do they cure; can DWR/SWRCB hold the line?
 - ▶ Land Re-purposing—good start; can it take off



Reality: Community Well Systems Where Contamination has been Detected



Safe Drinking Water

- Standard setting—e.g., 123tcp, chromium6
- Consolidation work
- Prop 1 grants; SRF loans
- Irrigated Lands Regulatory Program
- SB200 Funding to help DACs obtain capacity to provide and treat clean, safe, and affordable drinking water





Reality 2020/2021/2022 but we dodged a bullet 2023

Reality: Our Water Rights System is not up to the task

▶ The good

- ▶ Public Trust
- ▶ Waste and Unreasonable Use
- ▶ Water Quality Control Plans
- ▶ Beneficial use designations
- ▶ Progress re: “the bad”

▶ The bad

- ▶ Lack of quantification
- ▶ Eternal processes
- ▶ Lack of staffing and resources
- ▶ Simplistic dialogue
- ▶ Extreme institutional fragmentation

□ The ugly

- Equity, or,
- It all depends upon when you think history begins



Reality: We've done a lot about it but still a long way to go

Progress

- ▶ “All of the Above” Strategy in Motion for a Decade
- ▶ Water conservation public response (24%) and Water Efficiency Legislation
- ▶ Safe Drinking Water legislation and funding
- ▶ Statewide Groundwater management legislation and progress: SGMA
- ▶ Recycled Water paradigm shift
- ▶ Stormwater Capture acceleration
- ▶ Updated standards for preventing pollution in agriculture
- ▶ Enormous strides and plans at local level
- ▶ Modest Tribal Engagement progress
- ▶ NBS uptake, and beavers!

Much much more to do

- ▶ Water quality HUGE needs—PFAS/PFOA, Chromium 6, Lead, Nitrates, Salinity, vestigial contaminants/ongoing contaminants
- ▶ Water rights 19th century, infrastructure 20th century; problems 21st century
- ▶ Ecosystems in crisis
- ▶ Water system fragmentation/politicization
- ▶ Bay-Delta—
- ▶ Safe Drinking Water implementation, SGMA implementation
- ▶ Climate adaptation in face of drought, catastrophic wildfire, and inevitable record floods

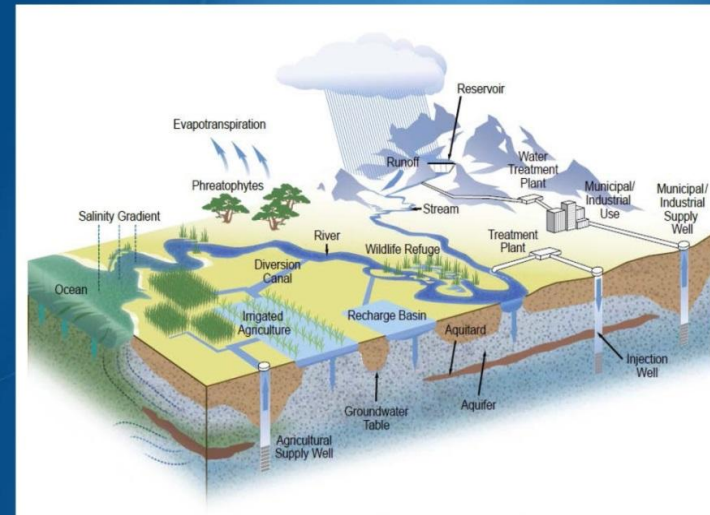
Key to future is integration and local and regional leadership

Efficiency/Recycling/Stormwater Capture/Parks+

- ▶ Santa Ana River Watershed/Orange County
- ▶ San Diego
- ▶ Los Angeles
 - ▶ LA
 - ▶ Met
 - ▶ LA County
- ▶ Sacramento writ large
- ▶ Santa Clara County/SF Bay agencies/Google et al
- ▶ San Joaquin Valley
 - ▶ Del Puerto
 - ▶ Brackish

A Call to Integrate

Interconnected Systems Require Integrated Solutions



Water Conservation and Efficiency

Mandatory drought conservation: 24%!

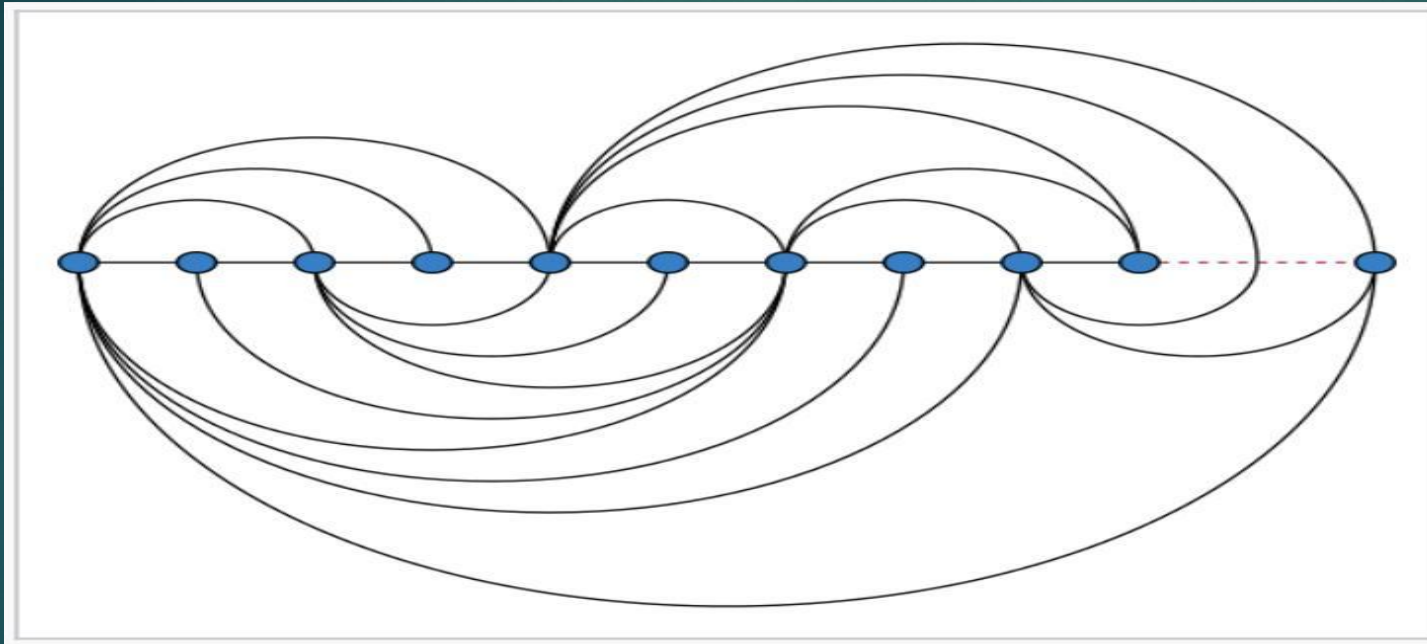
Long term efficiency standards and targets

Leak standards and audits



Arc of Progress

But still long way to go



credit Wikipedia



1970s

- uh oh
- urn off taps
- ...mellow
- ...yellow

Early 90s

- ❖ oh no, not again!
- ❖ turn off taps
- ❖ toilet and shower retrofits

Mid 20-teens

- ✓ holy crap!
- ✓ worst in 500 years, no 1 100 years, no. Just no.
- ✓ mandatory urban conservation

Just yesterday

- wait, not again?
- hotter, drier, 1200 years. Sierras and Colorado
- Efficiency Standards?

Recycling arc -- on steroids

- ▶ LA County Sanitation Districts (with WRD) since 1962
- ▶ Early years: non-potable; “purple pipe”
- ▶ Irvine dual plumbing (HK way ahead there but with different twist that makes recycling harder)
- ▶ Orange County Water District/Orange County San 130 MGD DONE
- ▶ San Diego plans
- ▶ City of Los Angeles—inland for years, now Operation NEXT/Hyperion 2035 214 MGD
- ▶ Metropolitan Water District/LA County Sanitation Districts 150 MGD
- ▶ And a whole bunch of others from purple pipe to IPR to DPR; Whole SAWPA region
- ▶ Role of state regulation: Timeline, expert panels, public process
 - ▶ GW recharge, ag use, IPR, DPR (2023), Onsite on the way. Predictability and scalability



Greater LA trifecta

*“Our relationship with
water has to evolve.”*

Los Angeles

Mayor Eric Garcetti, October 14, 2014



▶ City of LA-4 million

- ▶ 4 million
- ▶ Mayor Garcetti—Green PLAN, including ambitious water directive with direction to achieve 70% local water by 2035, where it was 5 in 2015
- ▶ LADWP and LAsan partner for largest recycling facility in the world (Operation NEXT/Hyperion 2035). 100% goal.
- ▶ 2130MGD
- ▶ Prop O \$500 m demonstration for stormwater multi-benefit

Metropolitan Water District of Southern California (w/LA County Sanitation Districts)-19 million

- ▶ 20 million served in whole or in part
- ▶ Largest wholesale water district in the nation
- ▶ Historically the imported water people
- ▶ Now shifting to greater overall responsibility, including taking on massive water recycling itself (150 MGD)
- ▶ Nearly \$400 m for lawn rebates last drought

County of LA-10 million

- ▶ Inspiration from Australia
- ▶ \$300 m/yr in perpetuity for multi-benefit stormwater capture and quality. “Safe, Clean Water program. Measure W.
- ▶ Flood control, water supply/groundwater augmentation, water quality, and much needed greenspace
- ▶ Key element—equity in allocation and governance

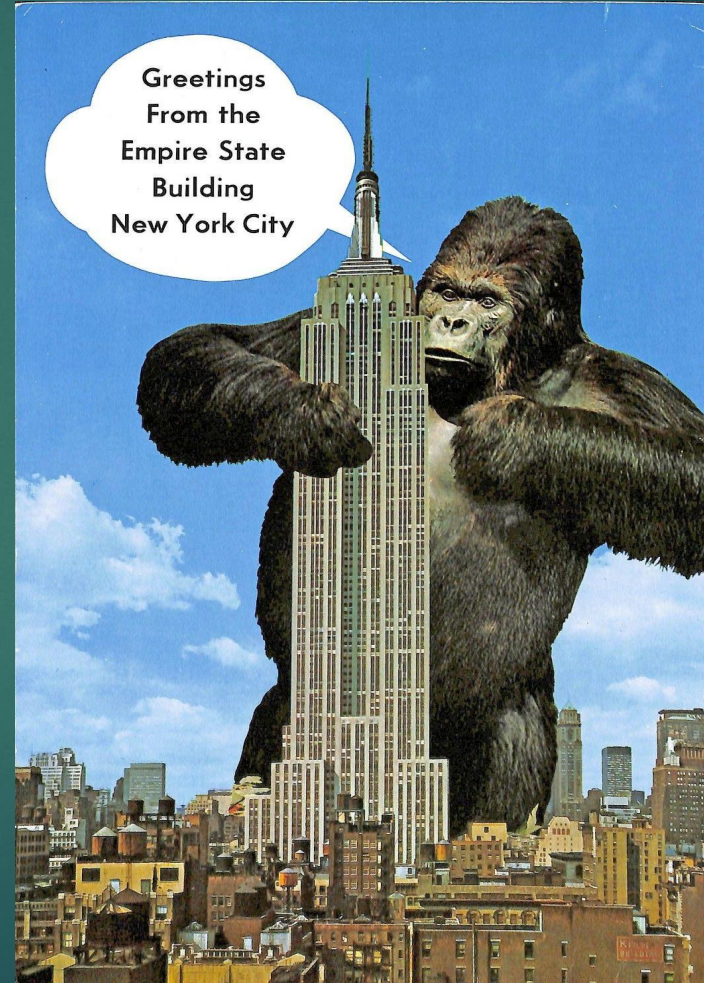
Stormwater capture and multi-benefit projects at scale



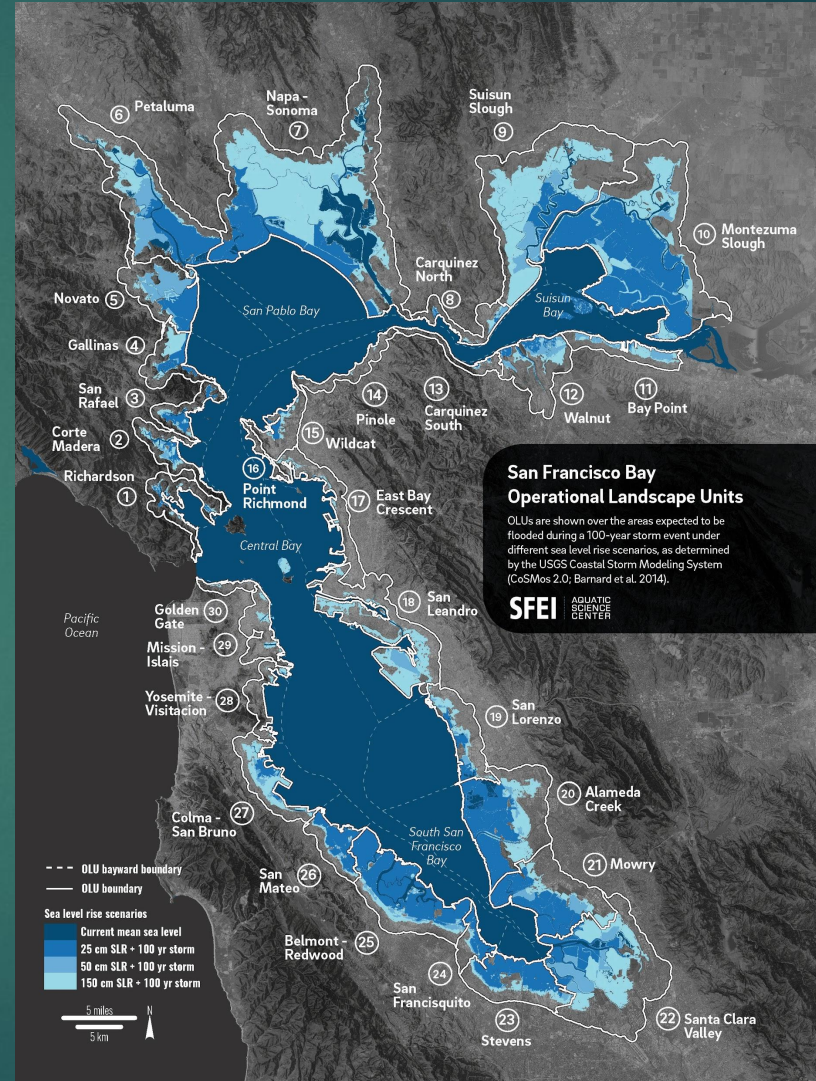
- ▶ Australia as inspiration—1980s+
- ▶ LA City Stormwater program early 90s
- ▶ TreePeople pilot with LA County Public Works 90s for \$90+million
- ▶ Proposition O – City of LA \$500 million of pilot water supply/water quality projects 2000s
- ▶ Measure W – 2020? \$300 million in perpetuity for multi-benefit stormwater capture for water supply, water quality, flood control, and urban greening. Clean, Safe Water program.
- ▶ Plus:
 - ▶ On top of decades of large scale capture across region LA County, San Gabriel Valley, Orange County
 - ▶ MS4 permit gives some incentives for “enhanced” watershed work that provides multiple benefits. Key will be meeting water quality goals with it.

Urban Sustainability challenge & opportunity : Sea Level Rise

- ▶ 2/3 economic impact of entire state
- ▶ 9 counties; 100 cities
- ▶ Bay Area analog to LA Measure W
- ▶ Measure AA--\$500 million
- ▶ Seawalls vs. wetland restoration
- ▶ 200+ Empire State Buildings of fill in area where any fill was a no-no
- ▶ Bay Restoration Authority



Adaptation Atlas



UC DAVIS & THE DELTA SCIENCE PROGRAM PRESENT

MEETING NATURE HALFWAY ON A FLOODWAY

THE YOLO BYPASS AS A RECONCILED ECOSYSTEM

A SCIENCE SYMPOSIUM
Free and open to the public

SAVE THE DATE

TUESDAY, DEC. 9, 2014
UC DAVIS CONFERENCE CENTER
BALLROOM B
9 AM - 5 PM

The Delta Science Program | UC Davis Center For Aquatic
Biology & Aquaculture (CABA) | UC Davis Center for
Watershed Sciences

Forests and Water in the Sierra Nevada: Sierra Nevada Watershed Ecosystem Enhancement Project

Roger C. Bales, John J. Battles, Yihsu Chen, Martha H. Conklin, Eric Holst, Kevin
L. O'Hara, Phillip Saksa, William Stewart

November 29, 2011



Sierra Nevada Research Institute,
UC Merced

Center for Forestry,
UC Berkeley

Environmental Defense
Fund

Data and Technology help on the people side and can bring hope

- ▶ Atmospheric river predictive capacity
- ▶ Measurement and reporting, especially when transparent
- ▶ Sensors
- ▶ Telemetry
- ▶ "Big Data"
- ▶ Long-term planning with
 - ▶ Real numbers! (TX)



...and so is the human factor...

The challenge is as much
“egosystem management” as
“ecosystem management”

Like a chicken talking to a duck...

就像一只鸡和一只鸭子



How do we get there?

- ▶ Clear-eyed focus on the decades ahead vs. the decades behind us
- ▶ Focus on Reality vs. Rhetoric; Practical vs. Theoretical
- ▶ Embrace complexity
- ▶ Action over Stasis
- ▶ Convergence over Conflict
- ▶ “All of the Above” vs. “Either/Or”
- ▶ Conservation/Efficiency and Precision Water Use Across Board
- ▶ Ag and Urban, Ag and Ecosystem, North and South, the Delta and the Projects, Agriculture and Safe Drinking Water

Thank you!!!

