Drought on the Midcoast

- **What's going on?**
- **What can we do about it?**

Adapted from 7/28/21
MCC Presentation by
Gregg Dieguez

Discussion Outline

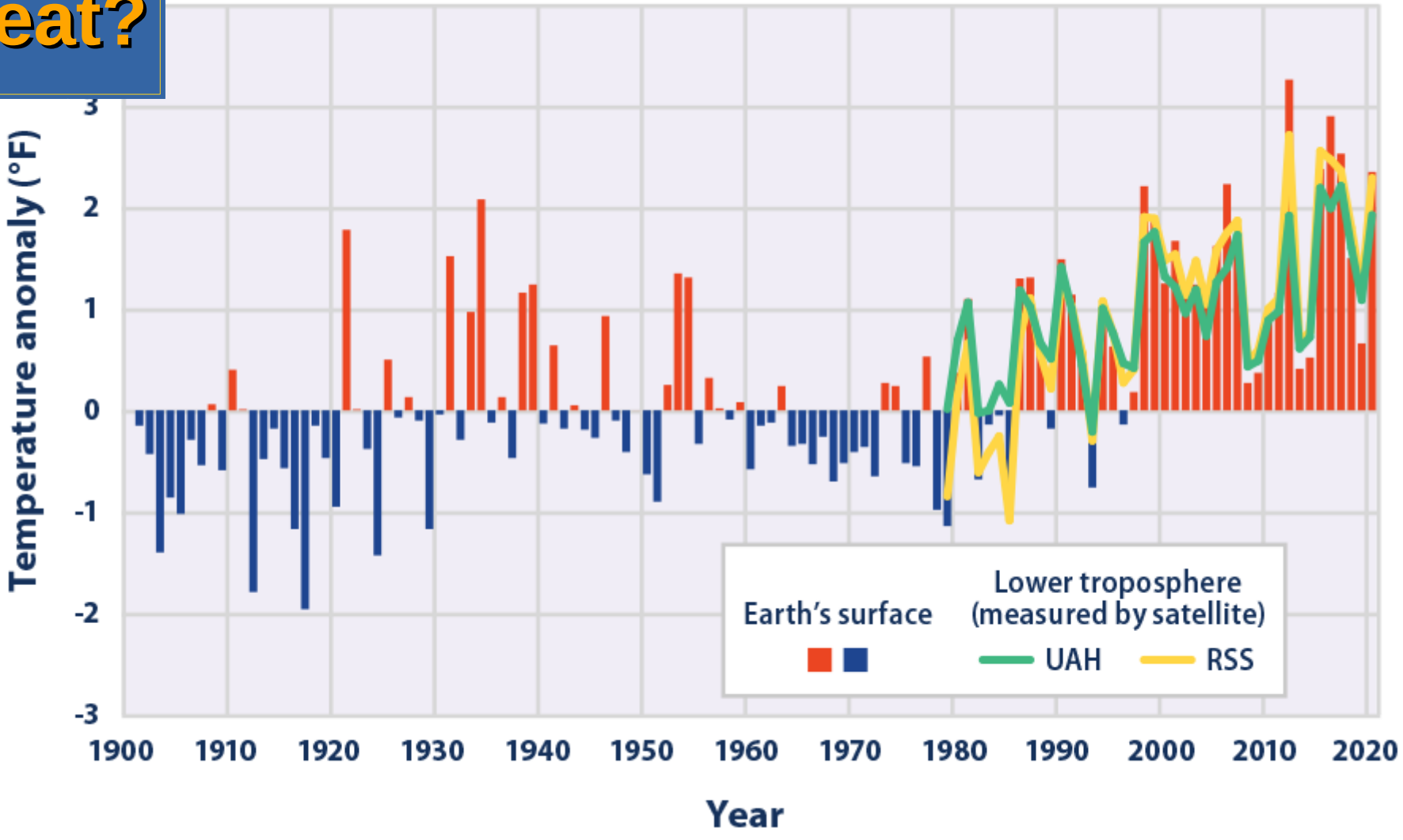
- History of drought/water in CA
- Current status regionally
- Recent local water plan updates
- Questions
- Next Steps

History of Drought Here

- Longest droughts*
  - Middle Ages had two long ones, at 140 and 220 years
    - Killed off several civilizations in the Americas
  - U.S. Temp. was similar to 1961-90
    - not a global change, only a regional one
  - U.S. now hotter by 2°F
- Climate Crisis vs. Climate Change
  - Things will be more extreme now, than then

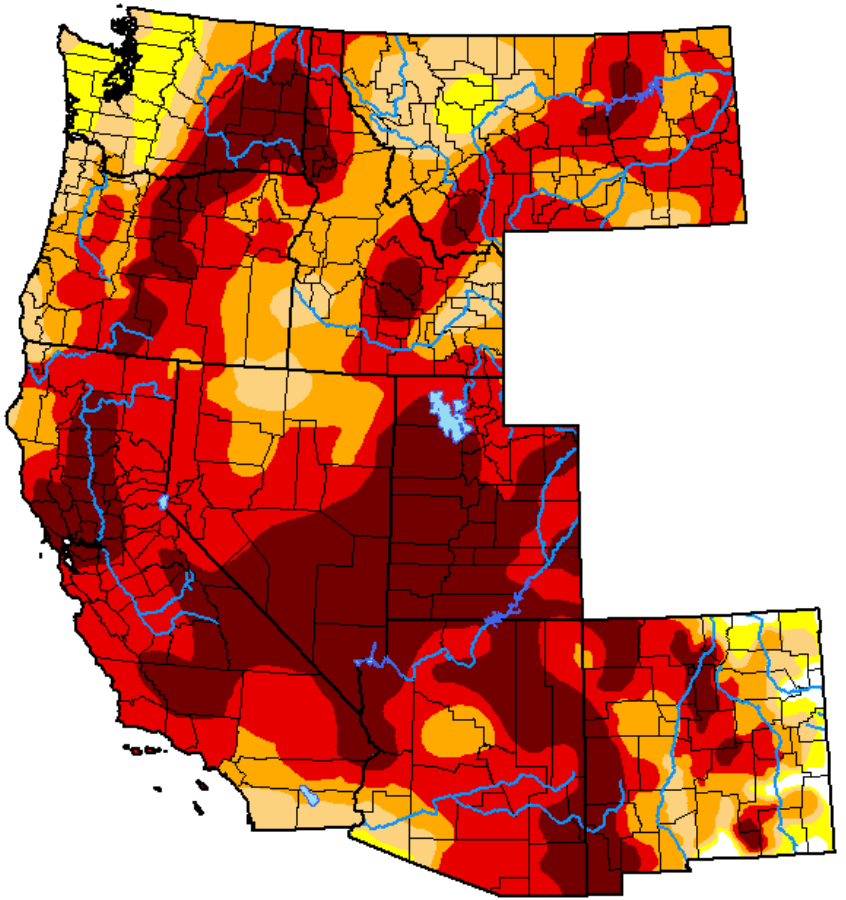
*A 1,200-year perspective of 21st century drought in southwestern North America
Connie A. Woodhousea,b,1, David M. Mekob, Glen M. MacDonaldc, Dave W. Stahled, and Edward R. Cooke

Got Heat?


Temperature anomaly (°F)
3
2
1
0
-1
-2
-3
1900
1910
1920
1930
1940
1950
1960
1970
1980
1990
2000
2010
2020
Year
Earth's surface
Lower troposphere
(measured by satellite)
UAH
RSS

Got Drought?

U.S. Drought Monitor
West



July 20, 2021
(Released Thursday, Jul. 22, 2021)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.88	99.12	95.25	85.75	65.42	28.03
Last Week *07-13-2021*	0.88	99.12	94.78	84.50	63.55	27.68
3 Months Ago *04-20-2021*	5.28	94.72	81.93	65.44	47.14	23.82
Start of Calendar Year *12-29-2020*	13.52	86.48	75.49	63.25	45.40	23.76
Start of Water Year *09-29-2020*	9.96	90.04	73.14	51.29	32.19	2.50
One Year Ago *07-21-2020*	29.55	70.45	51.63	23.53	3.29	0.00

Intensity:

- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to https://droughtmonitor.unl.edu/About.aspx

Author:
Brad Rippey
U.S. Department of Agriculture

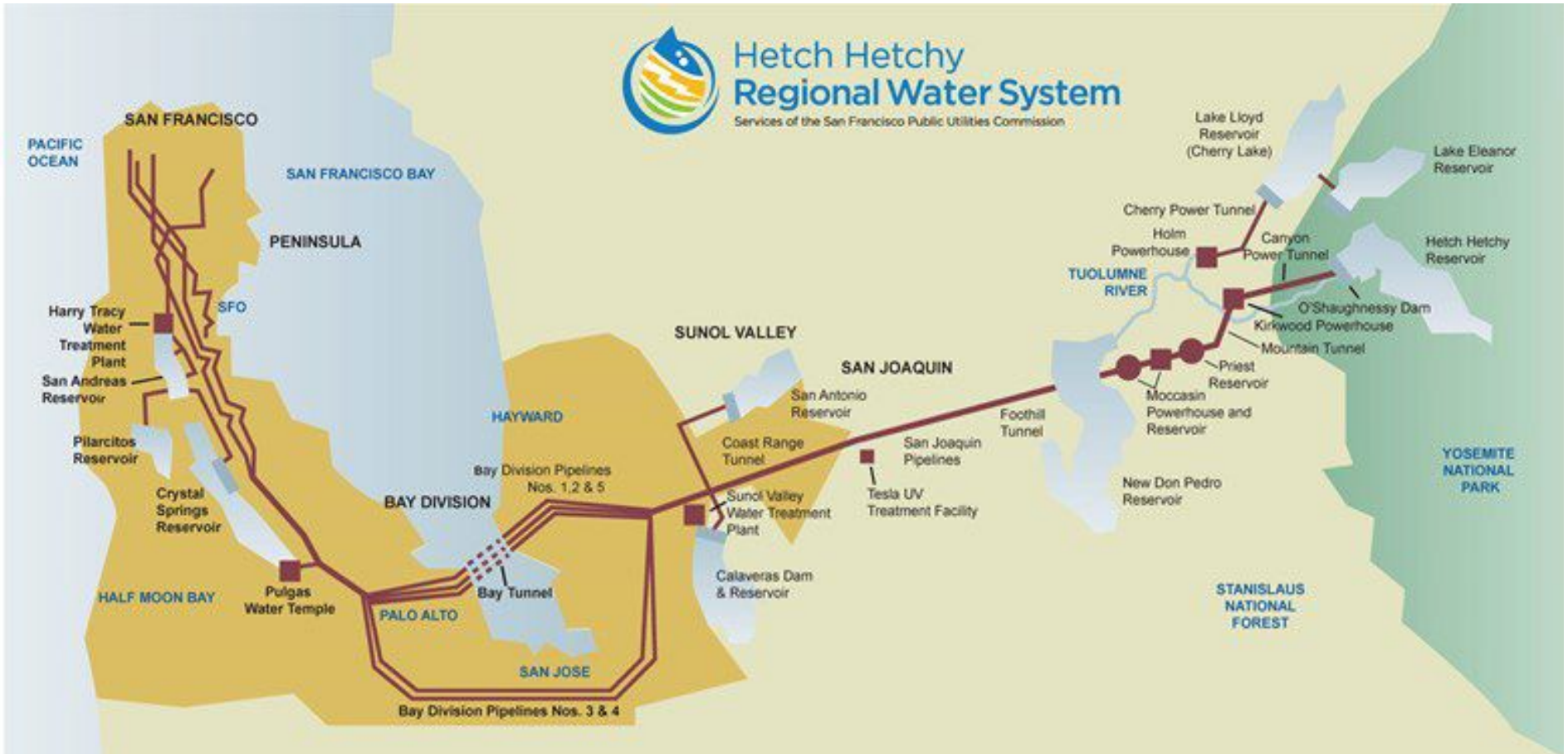
droughtmonitor.unl.edu

Current Status

- Entire Southwestern U.S. in Megadrought - last 22 years
- 1,200 year 'worst drought', based on dryness*
- Bay Delta Plan – "Fish got a good lawyer"
  - Preserves Tuolumne River by mandating dry year flows
  - Leads to SFPUC cutbacks of 51 to 68% depending on years and length of drought forecast
  - Delayed years by two SFPUC lawsuits – expected 2023
- No one really knows how bad drought(s) will be

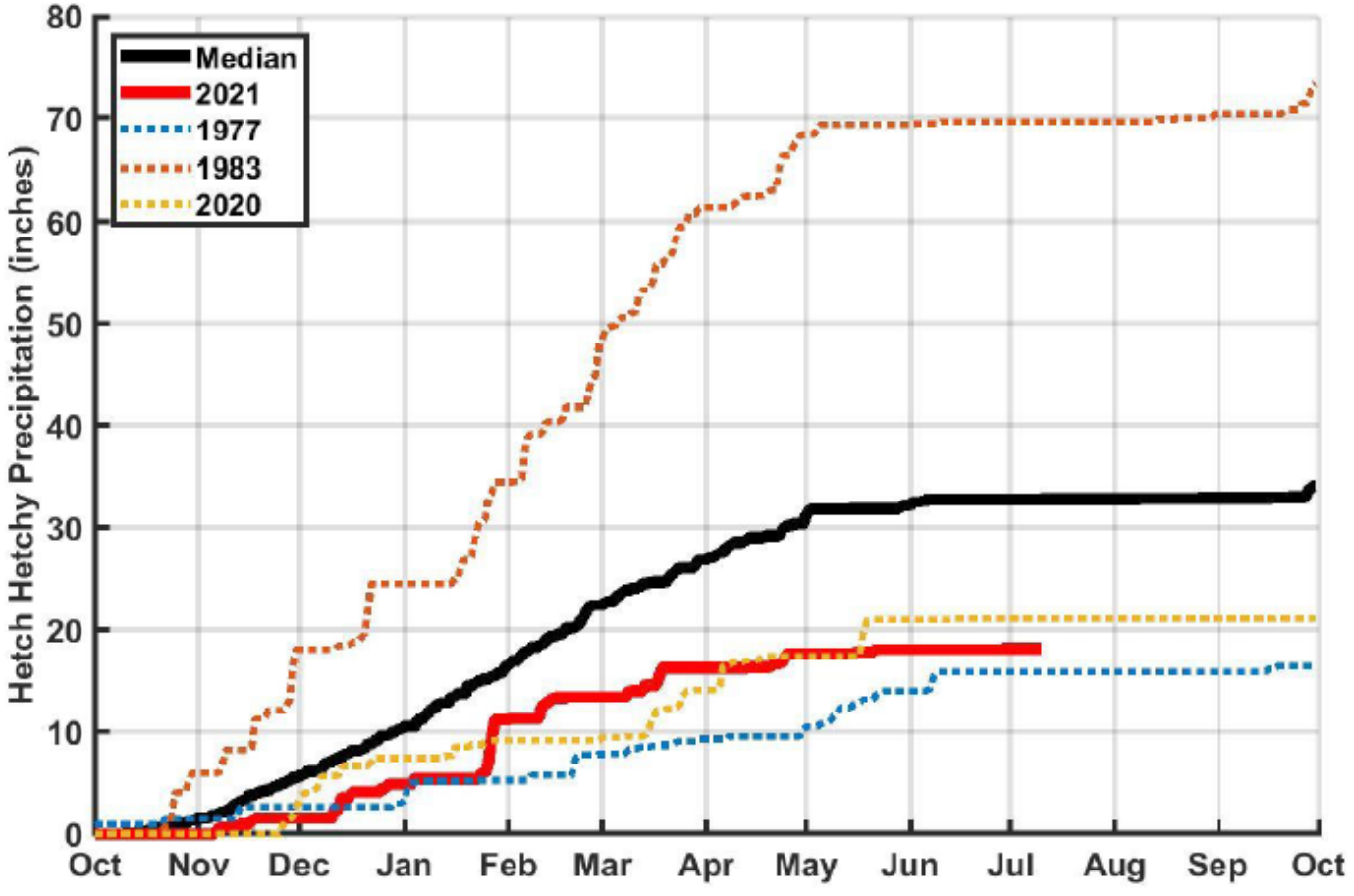
*‘Potentially the worst drought in 1,200 years’: scientists on the scorching US heatwave
https://www.theguardian.com/us-news/2021/jun/18/us-heatwave-west-climate-crisis-drought
The West is the driest it's been in 1,200 years — raising questions about a livable future
https://news.yahoo.com/drought-wests-normal-083006545.html

SFPUC/BAWSCA Water System



Hetch Hetchy Precipitation

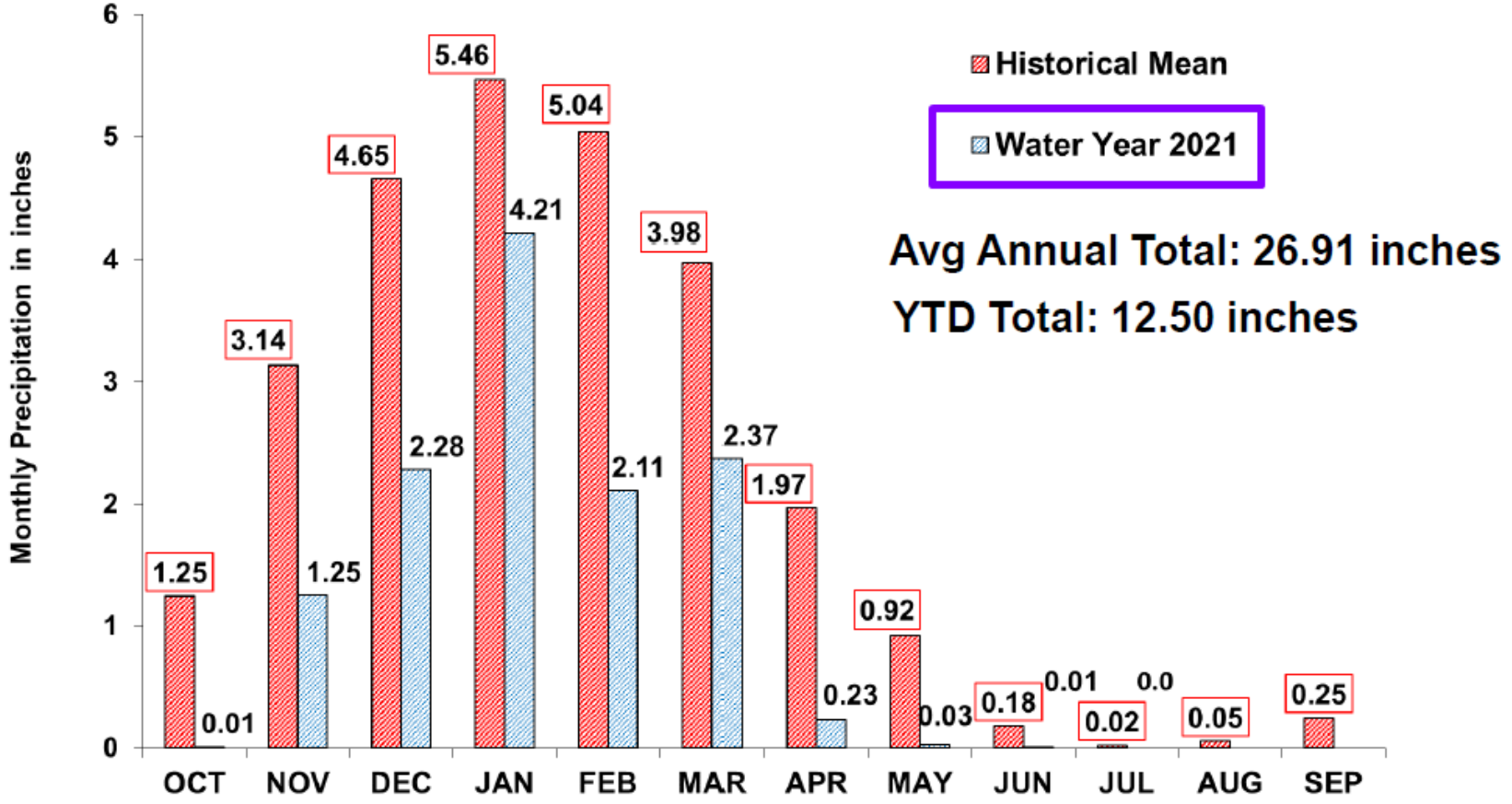
Our Water Storage



Hetch Hetchy Regional Water System

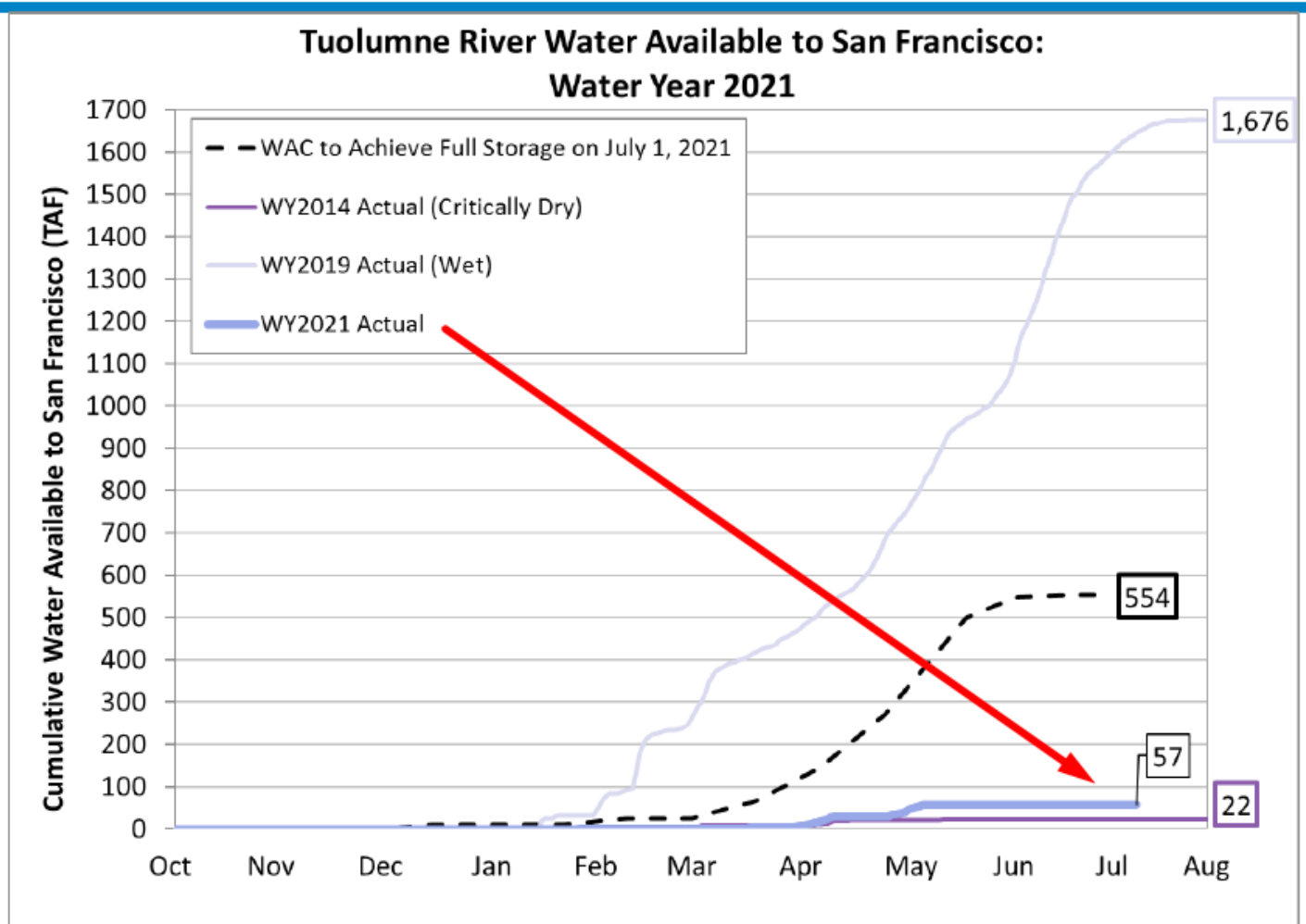
Bay Area 7-station Precipitation Index as of July 11, 2021

Got Rain?



Tuolumne River Water Available to the City

Before Bay Delta Plan...



Emerging Emergency

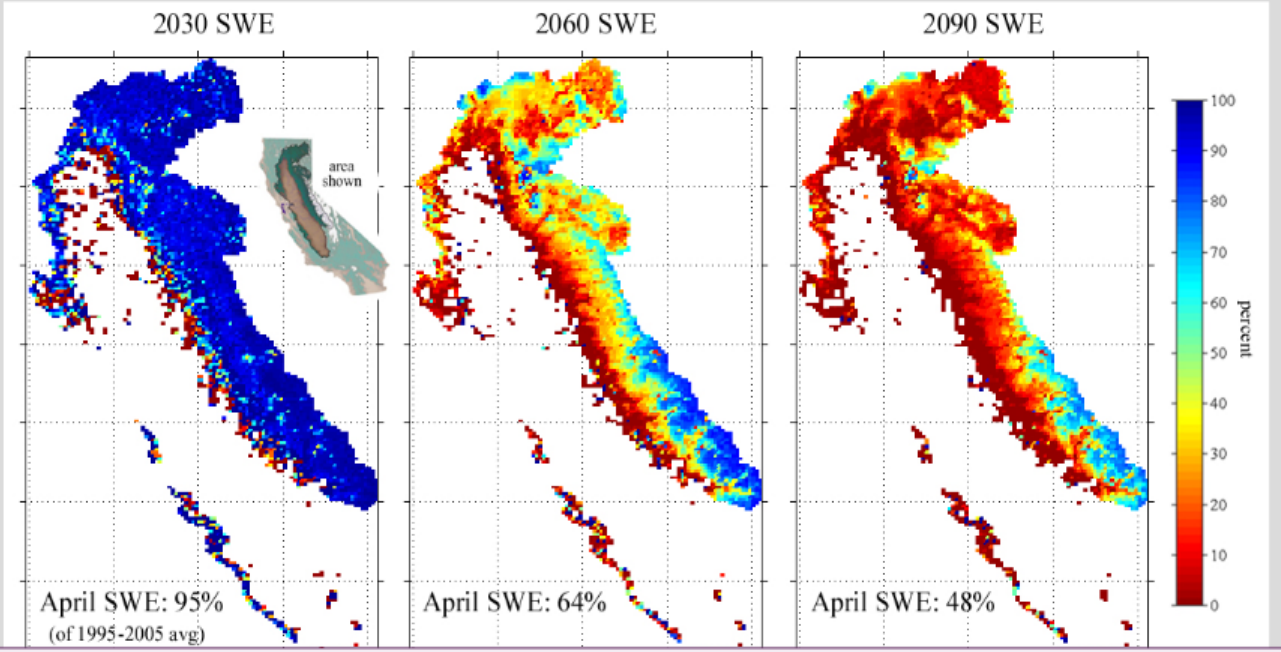
Hetch Hetchy Regional Water System

Governor's July 8, 2021 Drought Executive Order

- Expanded emergency to include San Mateo and Santa Clara counties (not San Francisco)
- All Californians to voluntarily reduce water use by 15 percent from their 2020 levels
- The State Water Board to track and report monthly on the State's progress toward achieving a 15-percent reduction in statewide urban water use as compared to 2020

Future Calif. Snow pack

Loss of California Spring Snowpack from 21st Century warming



•Under this scenario, California loses half of its spring (April 1) snow pack due to climate warming. Less snow, more rain, particularly at lower elevations. The result is earlier run-off, more floods, Less stored water. This simulation by Noah Knowles is guided by temperature changes from PCM's Business-as-usual coupled climate simulation. (this is a low-middle of the road emissions and warming scenario)

Knowles, N., and D.R. Cayan, 2002: Potential effects of global warming on the Sacramento/San Joaquin watershed and the San Francisco estuary. *Geophysical Research Letters*, **29**(18), 1891.

Table 3: Basis of Water Supply Data [For Table 7-1], 2020 Infrastructure Conditions With Bay Delta Plan

Year Type	Base Year	RWS Volume Available (mgd)	% of Average Supply	Wholesale Volume Available (mgd)	Notes on Calculation of Wholesale Supply
Average year	2020	265	100%	184	
Single dry year		238.5	90%	157.5	• At 10% shortage, wholesale allocation is 64%, or 152.6 mgd • Retail allocation is 36%, or 85.9 mgd • Retail allocations above 81 mgd are re-allocated to Wholesale Customers, per the 2018 WSA • 4.9 mgd added to wholesale allocation, bringing it to 157.5 mgd
Consecutive 1st Dry year		238.5	90%	157.5	• Same as above
Consecutive 2nd Dry year		212	80%	132.5	• At a 20% shortage, wholesale allocation is 62.5%, or 132.5 mgd • Retail allocation is 37.5%, or 79.5 mgd
Consecutive 3rd Dry year[1]		119.25	45%	74.5	• WSA does not define percentage split above a 20% shortage level • Assume same split as for a 20% shortage level, i.e. Wholesale Customers receive 62.5%
Consecutive 4th Dry year		119.25	45%	74.5	• Same as above
Consecutive 5th Dry year		119.25	45%	74.5	• Same as above

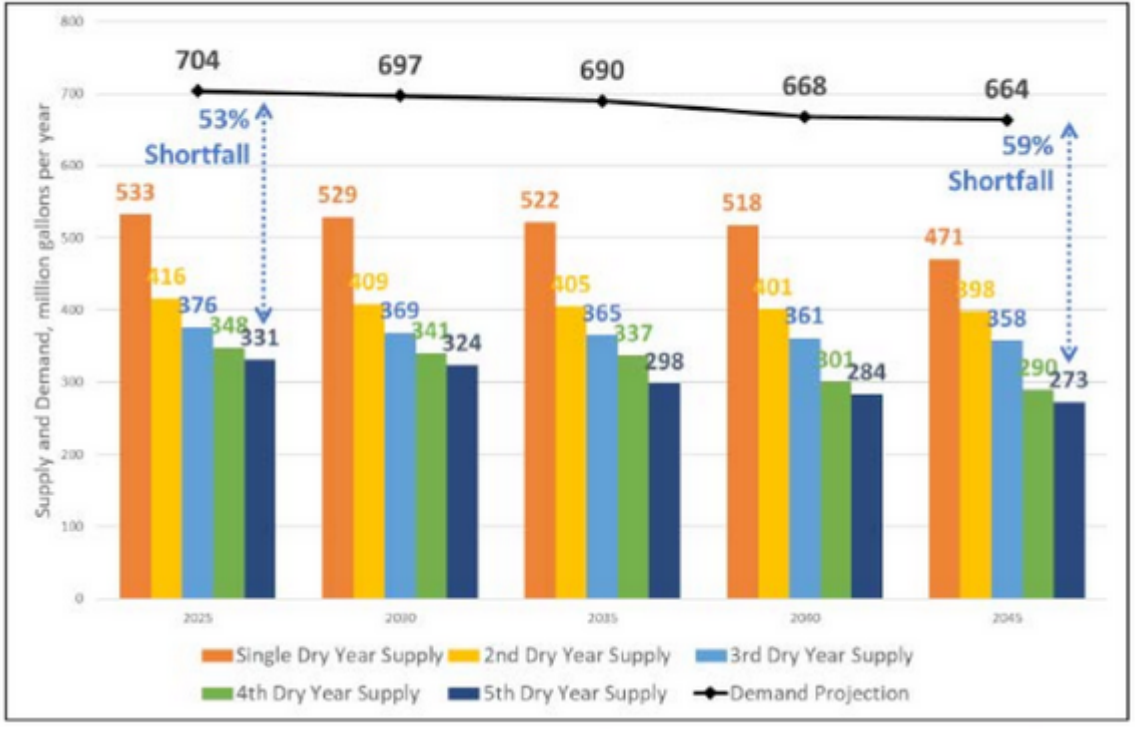
[1] Assuming this year represents 2023, when Bay Delta Plan Amendment would come into effect.

74.5 / 184 = 40.5% or 59.5% cutback

BAWSCA Cutbacks

CCWD Potential Shortfalls

Figure 7-3 Projected Demand vs. Multiple Dry Year Supplies



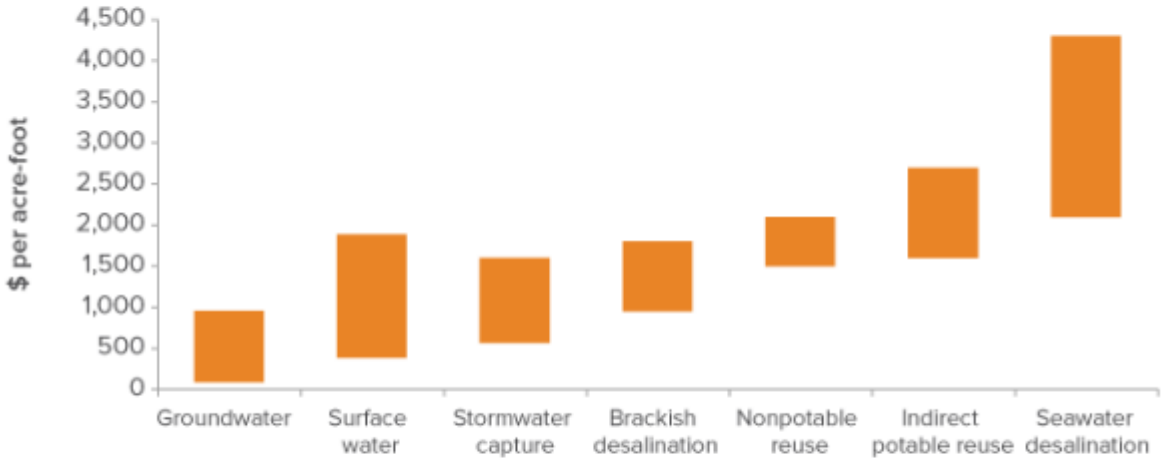
Water Supply Plans

- SFPUC/BAWSCA have ~ dozen capital projects to increase supply and conserve water
  - Costs unknown, both construction and ongoing
  - 20% of Calif. electricity costs are already spent just moving water….
- CCWD & NCCWD water agency projections include conservation ~17% by 2045….
- …. Thus shortages shown would be 17% GREATER without that conservation
  - No cost figures provided for the conservation measures

Cost of Alternative Water Supplies

Estimates range from 5x, 7x, 10x and ∞ times current costs

Alternative supplies generally cost more than new surface and groundwater sources



SOURCES: Groundwater costs: Perrone, D. and M. Rohde, "Benefits and Economic Costs of Managed Aquifer Recharge in California," 2016. Surface water costs: calculated by the authors using data from the Water Storage Investment Program of the California Water Commission. All other costs: Cooley, H. and R. Phurisamban, "The Cost of Alternative Water Supply and Efficiency Options in California," Pacific Institute, 2016.

NOTES: All cost estimates include annualized capital and operations and maintenance costs. Nonpotable reuse involves the use of treated municipal wastewater for irrigating landscapes or agriculture, restoring habitat, or incorporating into industrial processes. Indirect potable reuse is the storage of treated municipal wastewater in groundwater or surface storage before it is distributed as drinking water. New surface water costs were calculated based on the cost and estimated yield of five proposed storage projects. Chart shows 2015 dollars.

Local Issues

- Wells, unmetered, shipping water, undermining aquifers
  - Cost to connect de-motivates well conversion
  - Tragedy of the Commons
- Reserved water – is it truly 'reserved'?
- Cost of incremental water
- **“We can’t conserve our way out of this drought.”**
  - Felicia Marcus, former head of the state water board

MWSD issues

- Last Water System Master Plan Update was 2017
- Main aquifer was drawing 3,000 yr. old water in 2016, 4th year of drought
  - Flows were reduced to preserve
- Says things are Fine.
- Says we need to continue to Conserve
- Had Attorney present report on steps to initiate a connection moratorium…
- Couple of residents requested water moratorium

Questions

- If we need to conserve water now, why are we allowing more connections?
- If we're OK on supply, why do we need to conserve water?
- What are the initial and perpetual costs of the additional water required? Who will pay, and why?
- What is the capacity of the MWSD supply aquifers?
- Why should we continue conservation if the savings will just go to new joiners who undermine our ongoing water security and affordability?
- If you own land, are you entitled to build?
- What guarantees are provided that more water connections won't hurt existing users?
- Have we passed the Carrying Capacity of our State? Our County? Our region?
- Should New Joiners have the same water rights as existing?
- Should existing ratepayers pay the higher incremental costs of the water New Joiners require?
- Why aren't future costs part of the planning process?

Concept of the Day

Sustainability = Survival

Potential MCC Next Steps

- More questions?
- Do nothing
- Gather community input
- Testimony from the experts – CCWD, MWSD
- Request supply assessment from MWSD, now
- Ask SMC to declare drought emergency and suspend all construction
- Letters, petitions, ballot initiatives
- Screen River's End Film $300?

Concluding Quote

"A civilization, if you can keep it"

- Paraphase of Ben Frankin, 1787

Rapid Bibliography

Read these articles and follow the links and footnotes to expert sources:

- Lacking Water, Growth Must Stop
- Drought: What, Me Worry?
- High and Dry in Pacifica
- Half Moon Bay: Planning To Fail?