

# ATMOSPHERIC RIVERS AND RESERVOIR RESPONSE WY2023

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California Marine Affairs and  
Navigation Conference

Date: 15 SEP 2023



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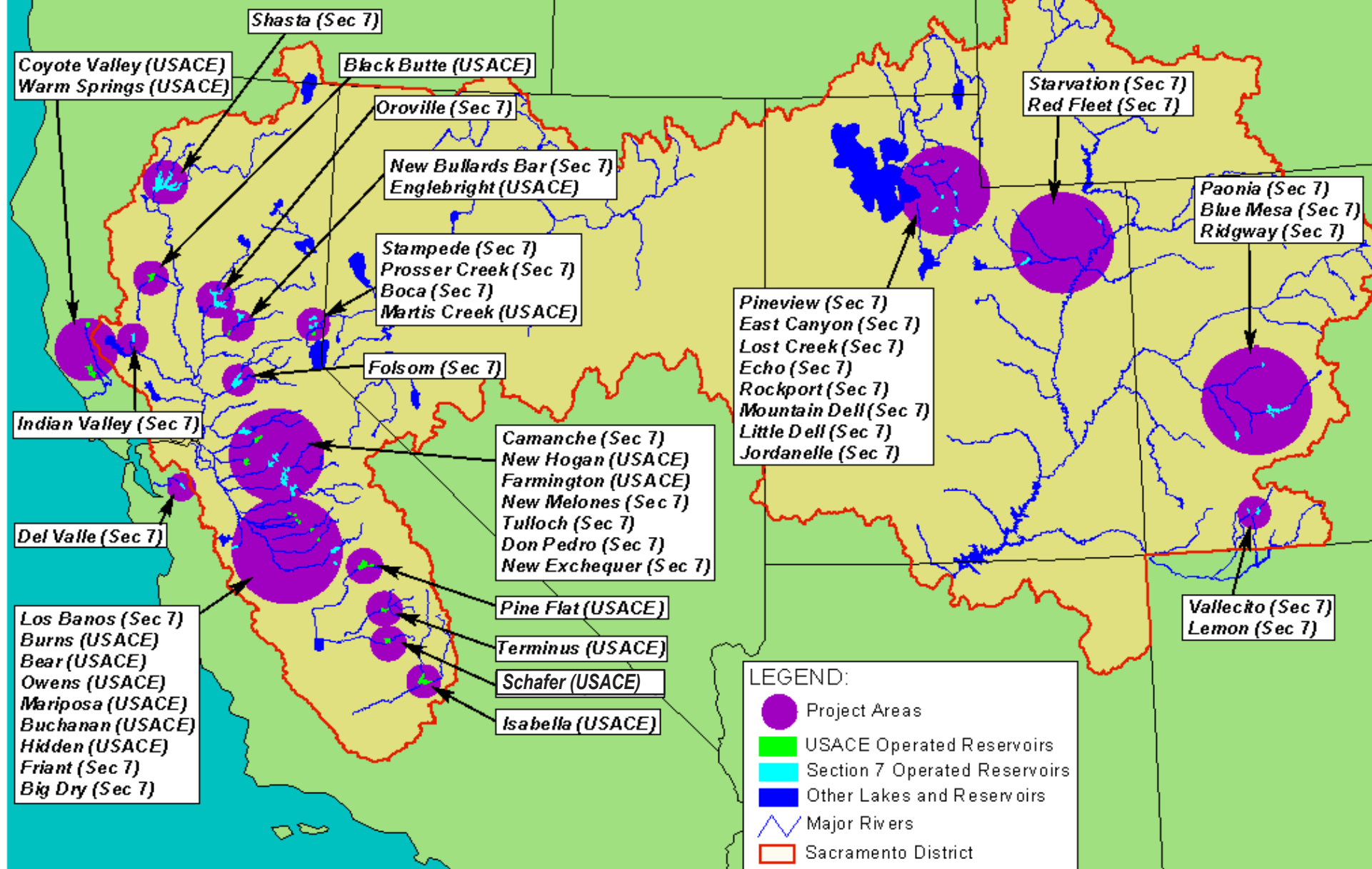
# CORPS AUTHORITY FOR MANAGEMENT OF FLOOD CONTROL SPACE

2

Section 7 of the Flood Control Act of 1944  
(58 Stat. 890, 33 U.S.C. 709)

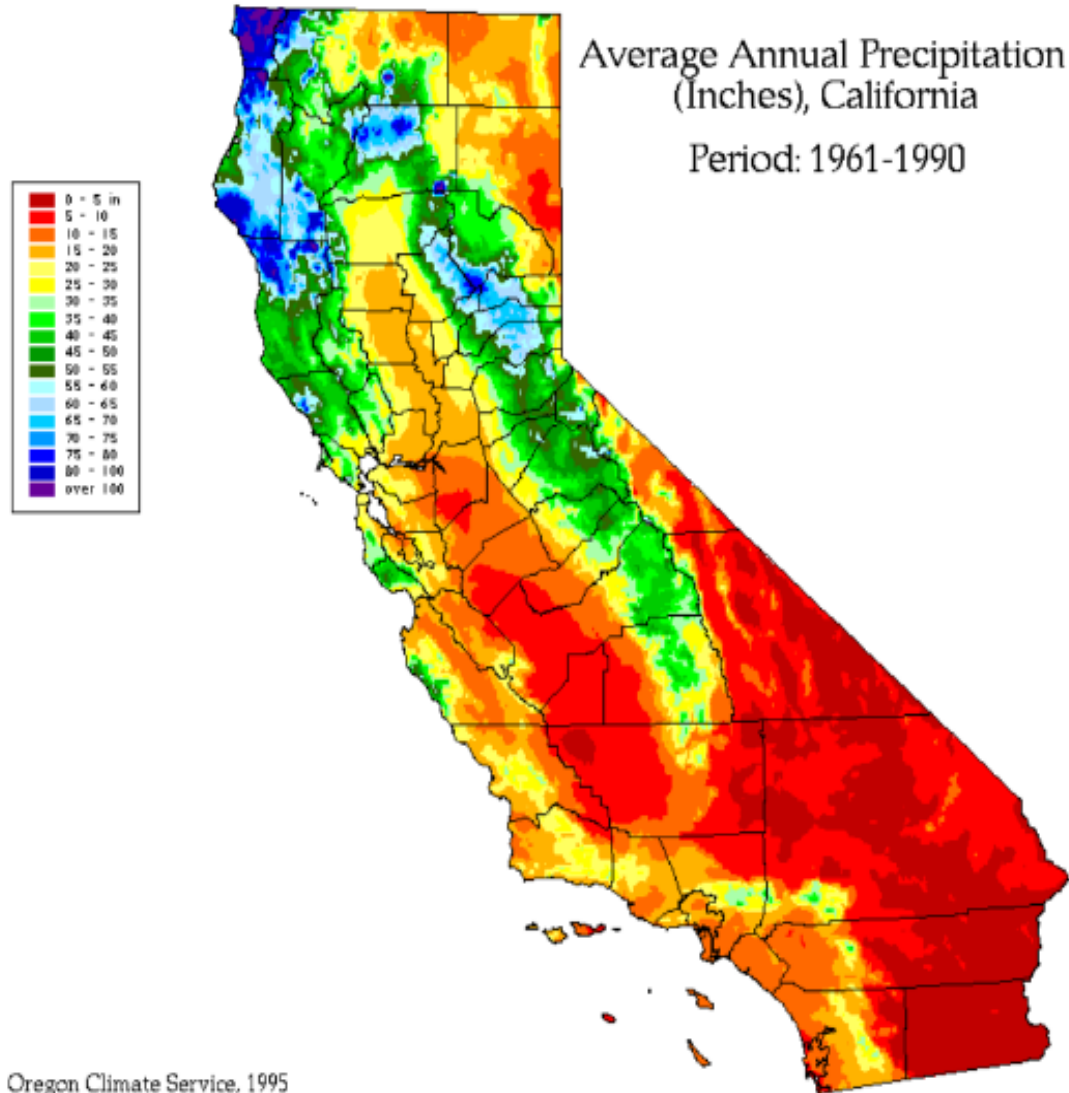
- Prescribe rules and regulations in the interest of flood control
- The project owner is responsible for real-time implementation of the water control plan, but the Corps has authority to determine flood releases in the flood control space with input from the owner.

# SACRAMENTO DISTRICT PROJECTS





# CENTRAL VALLEY HYDROLOGY



Oregon Climate Service, 1995

- Extreme spatial variation in precipitation from valley to Sierra Nevada Mountains
    - Orographic effect
    - Northern precipitation bias
    - Southern elevation bias
    - Rapid runoff
  - Dominated by Atmospheric Rivers
  - Heavily regulated by multi-purpose reservoirs
- Distinct extreme temporal variability in precipitation
    - Year to year: floods or drought
    - Annually -
      - Wet: Oct-Apr
      - Dry: May-Sept
    - Snowmelt: spring-summer
    - Climate change predictions: warmer temps
      - More precipitation will fall as rain (less as snow)
      - Increased precipitation intensity and frequency
      - Higher flood frequency

# CENTRAL VALLEY WATERSHEDS

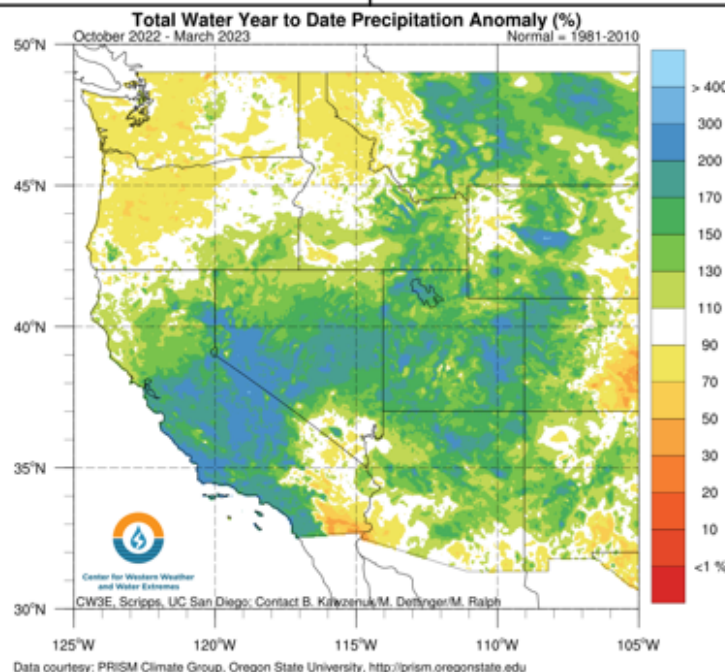
- Sacramento River
- San Joaquin River
- Tulare Lake Basin



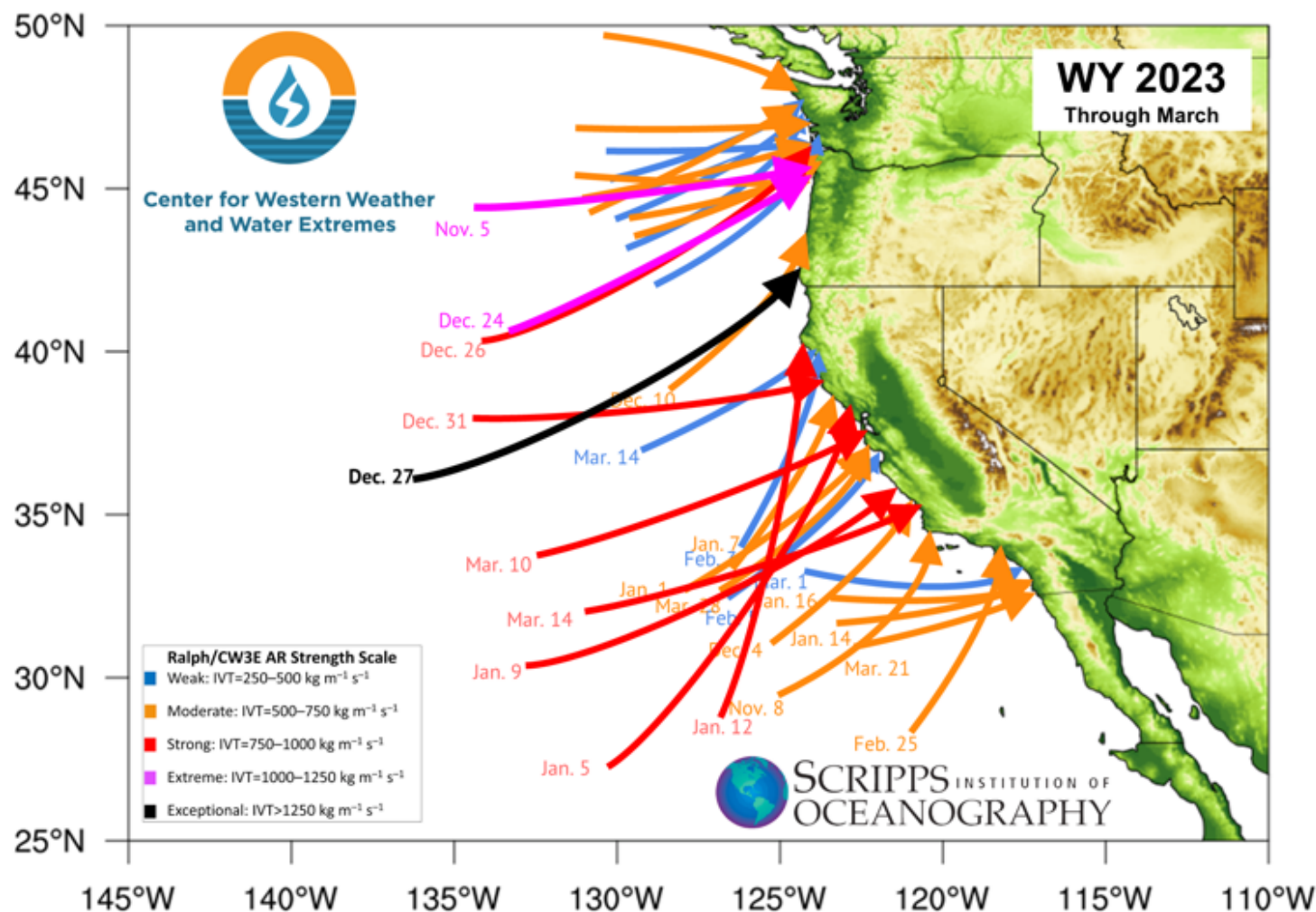


# WY2023 ATMOSPHERIC RIVERS

Breakdown by Strength	
Strength	Number of ARs
Weak	11
Moderate	13
Strong	6
Extreme	1
Exceptional	0
<b>Total</b>	<b>31</b>



**31 atmospheric rivers** impacted California between October 1<sup>st</sup> 2022 and March 31<sup>st</sup> 2023

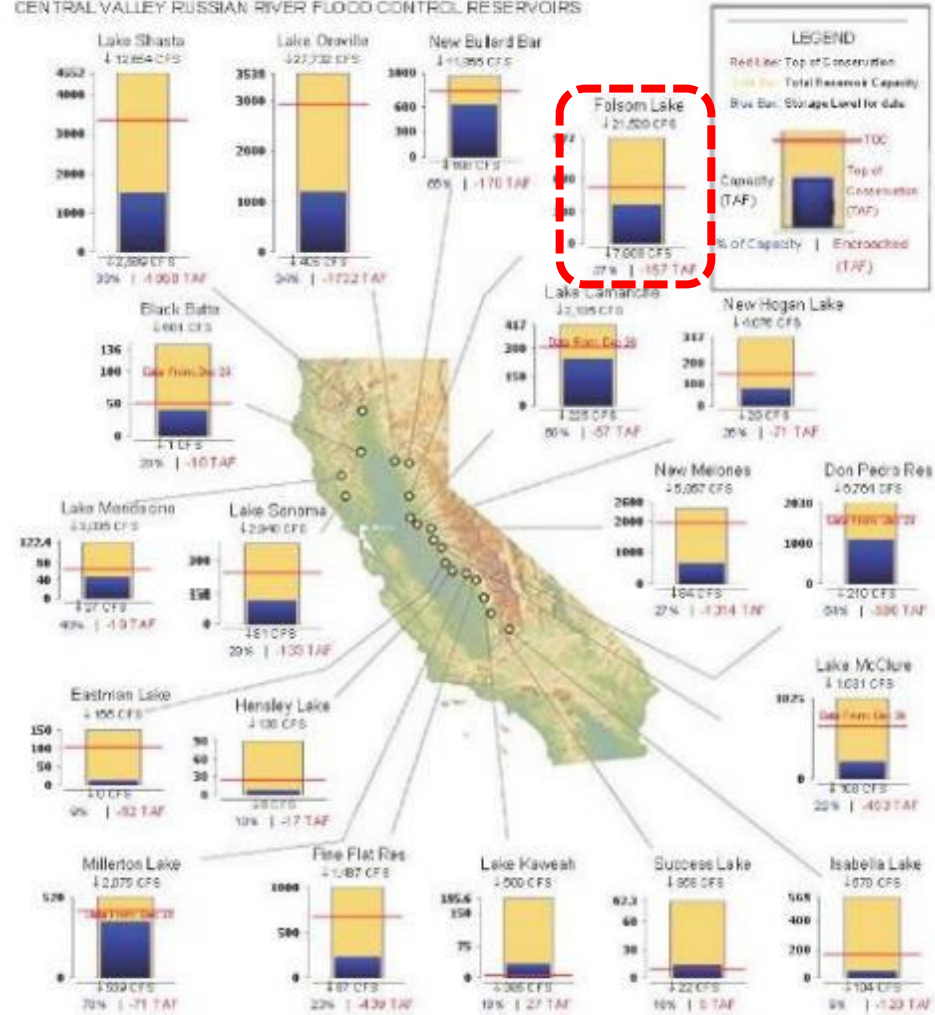


# 30 DECEMBER 2022 RESERVOIR STATUS

7

## TOP OF CONSERVATION CONDITIONS (TOC) CENTRAL VALLEY RUSSIAN RIVER FLOOD CONTROL RESERVOIRS

Midnight - December 30, 2022



Updated 12/01/2022 09:10 AM

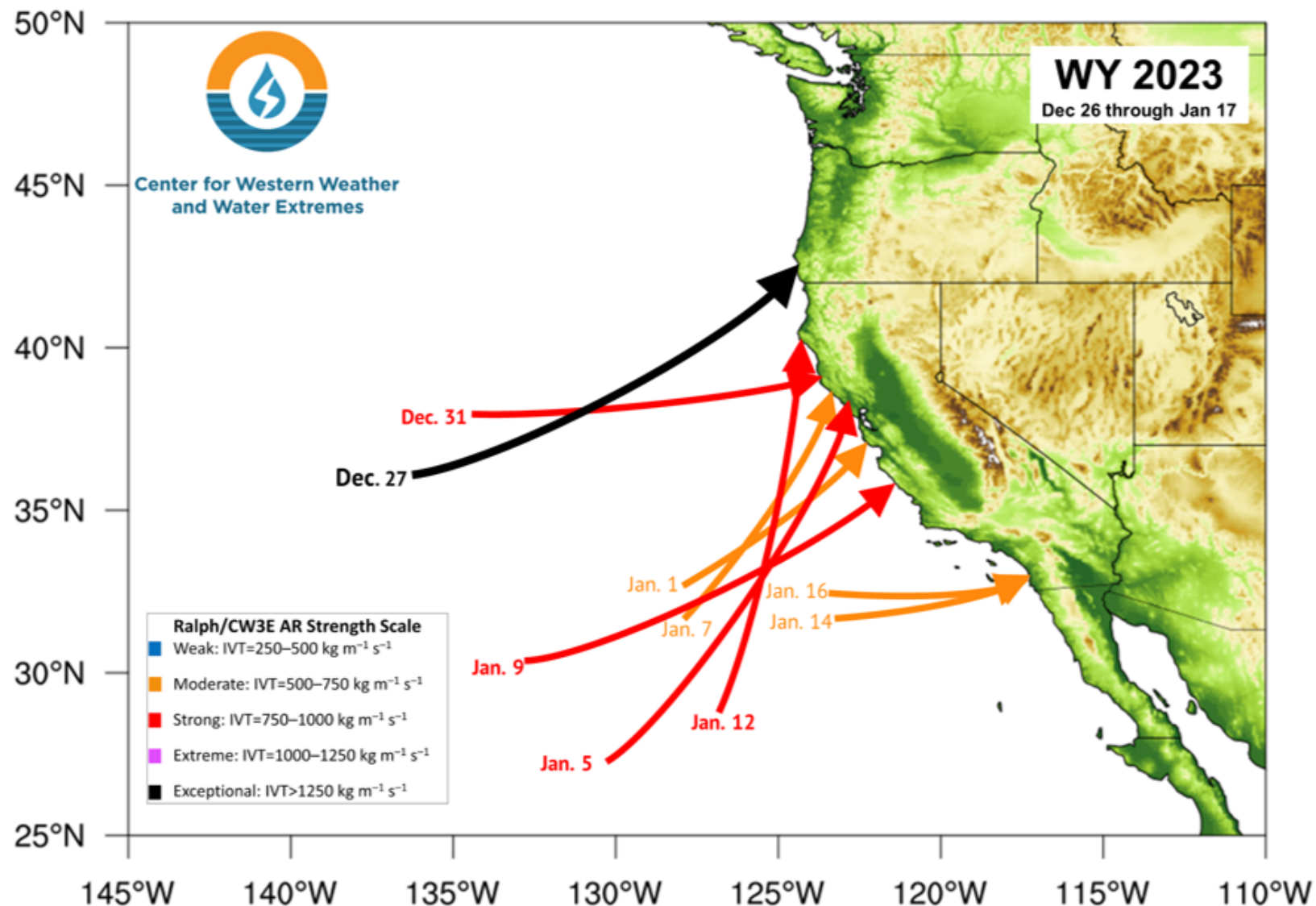


Folsom Dam-Lake (USBR) – 02 JAN 2023 – 25,000 cfs



# ATMOSPHERIC RIVERS FROM 27 DEC – 17

- 9 Atmospheric Rivers made landfall between December 26 and January 17
- Of the 9 ARs, 5 were of strong or greater magnitude
- California has averaged ~6 strong or greater magnitude ARs per water year since 2012
- For reference, California experienced 13 strong+ ARs during Water Year 2017





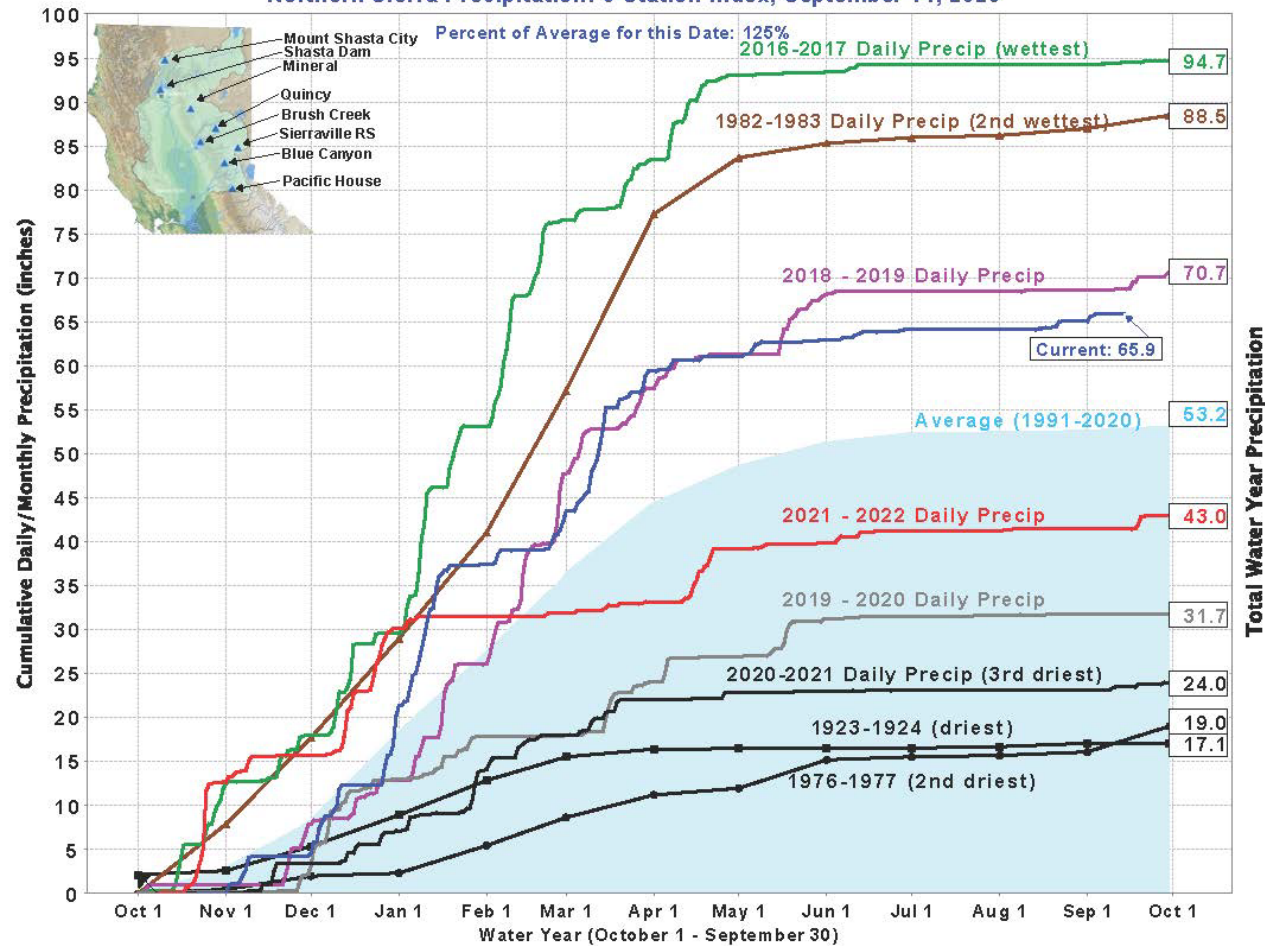


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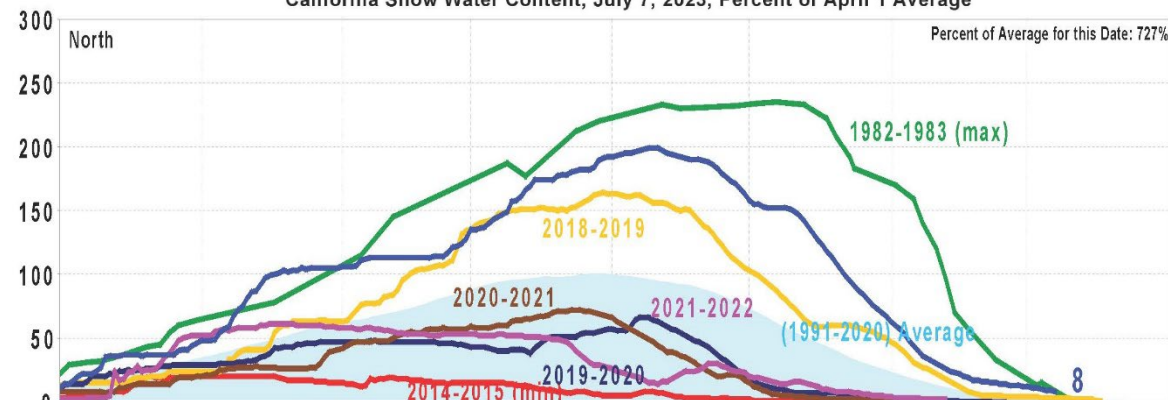
# NORTHERN SIERRA PRECIPITATION & SNOWPACK

9

Northern Sierra Precipitation: 8-Station Index, September 14, 2023

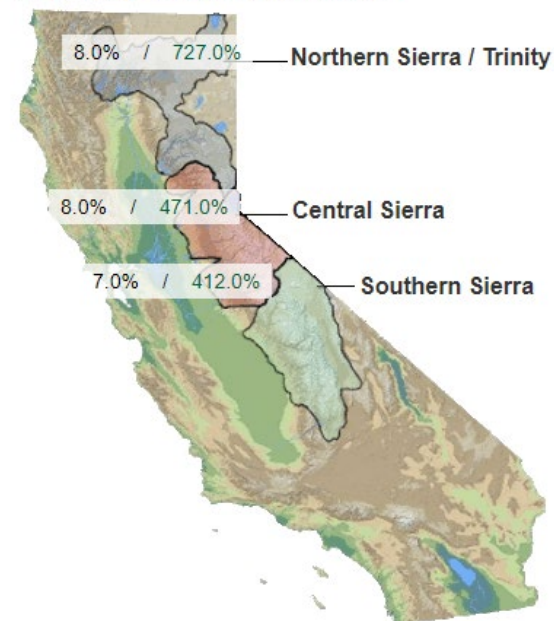


California Snow Water Content, July 7, 2023, Percent of April 1 Average



Data For: 07-Jul-2023

% Apr 1 Avg. / % Normal for this Date



NORTH

Data For: 07-Jul-2023

Number of Stations Reporting 24

Average snow water equivalent 2.5"

Percent of April 1 Average 8%

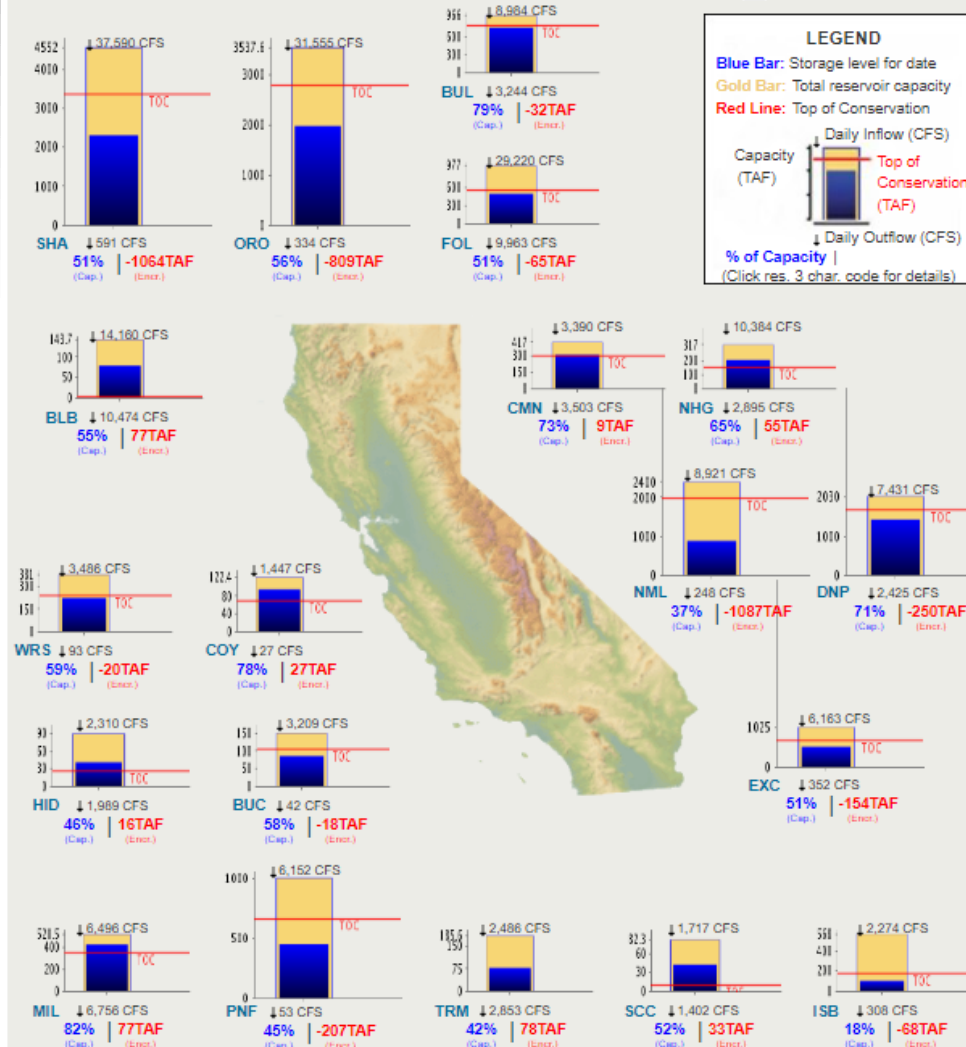
Percent of normal for this date 727%

# 16 JANUARY 2023 RESERVOIR STATUS

## CENTRAL VALLEY AND RUSSIAN RIVER FLOOD CONTROL RESERVOIRS: 15-JAN-2023

Midnight: 15-Jan-2023

Change Date: 15-Jan-2023



Click for printable version of current data.

Report Generated: 16-Jan-2023 9:48 AM

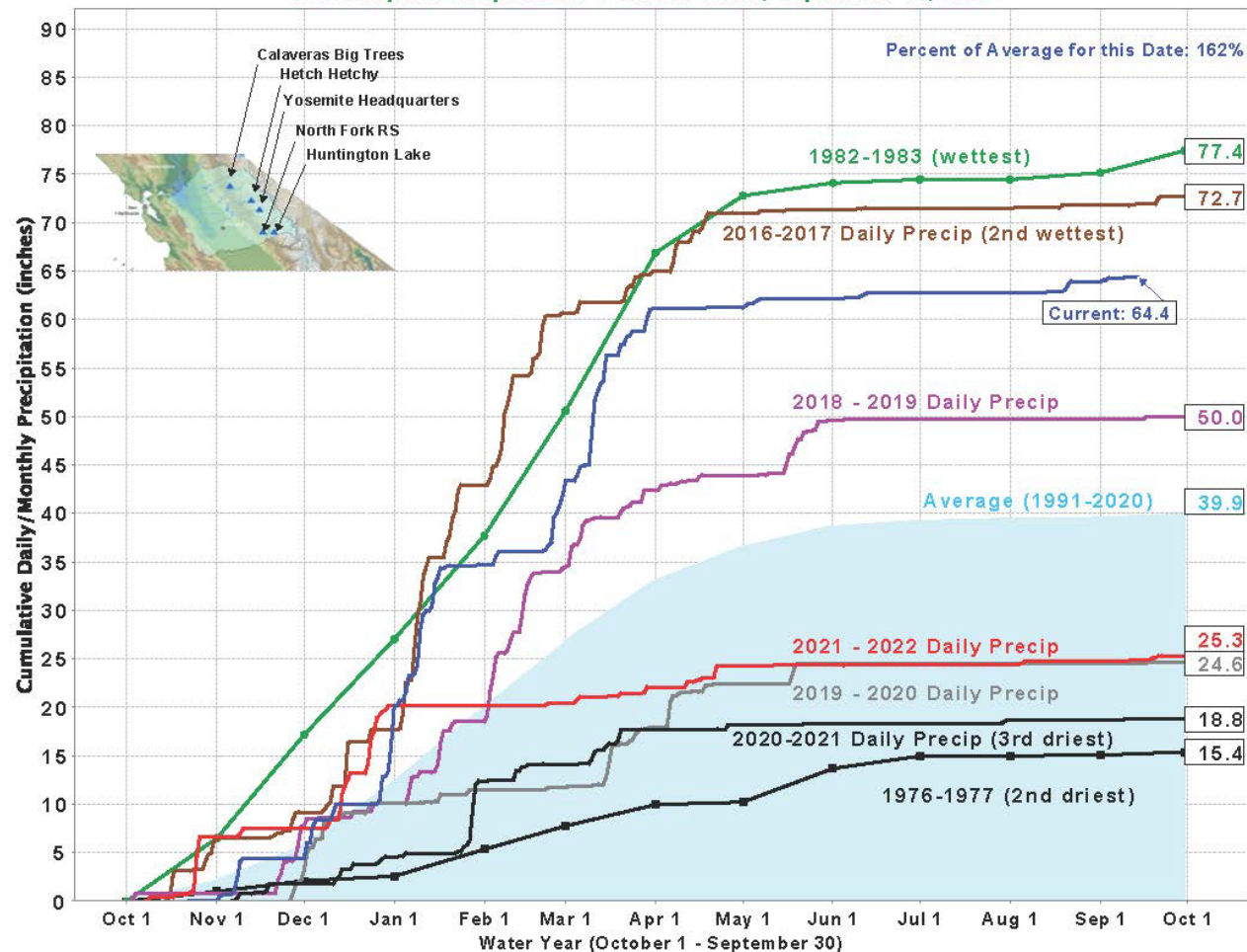




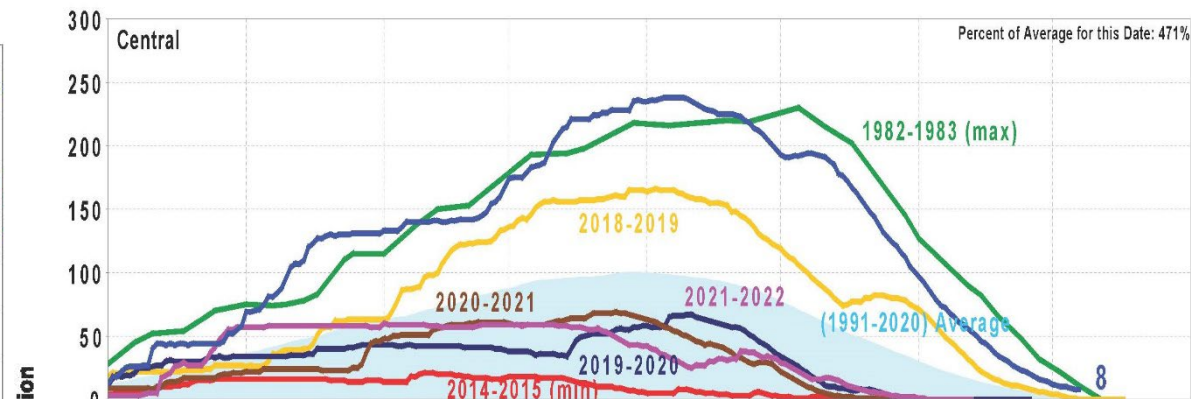
# CENTRAL SIERRA PRECIPITATION & SNOWPACK

11

San Joaquin Precipitation: 5-Station Index, September 14, 2023

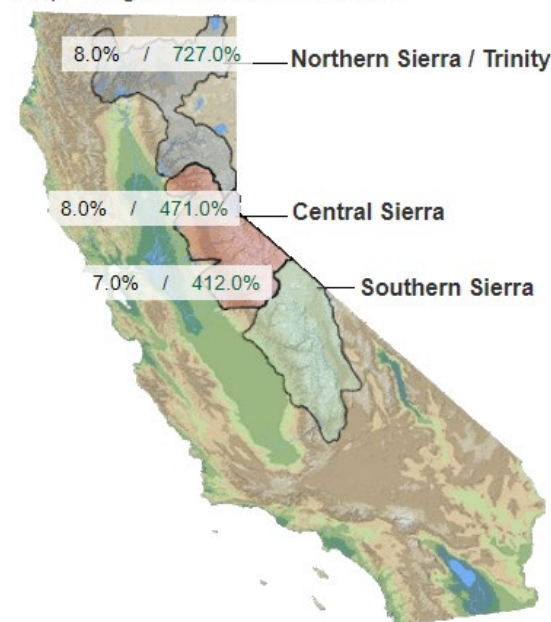


California Snow Water Content, July 7, 2023, Percent of April 1 Average



Data For: 07-Jul-2023

% Apr 1 Avg. / % Normal for this Date



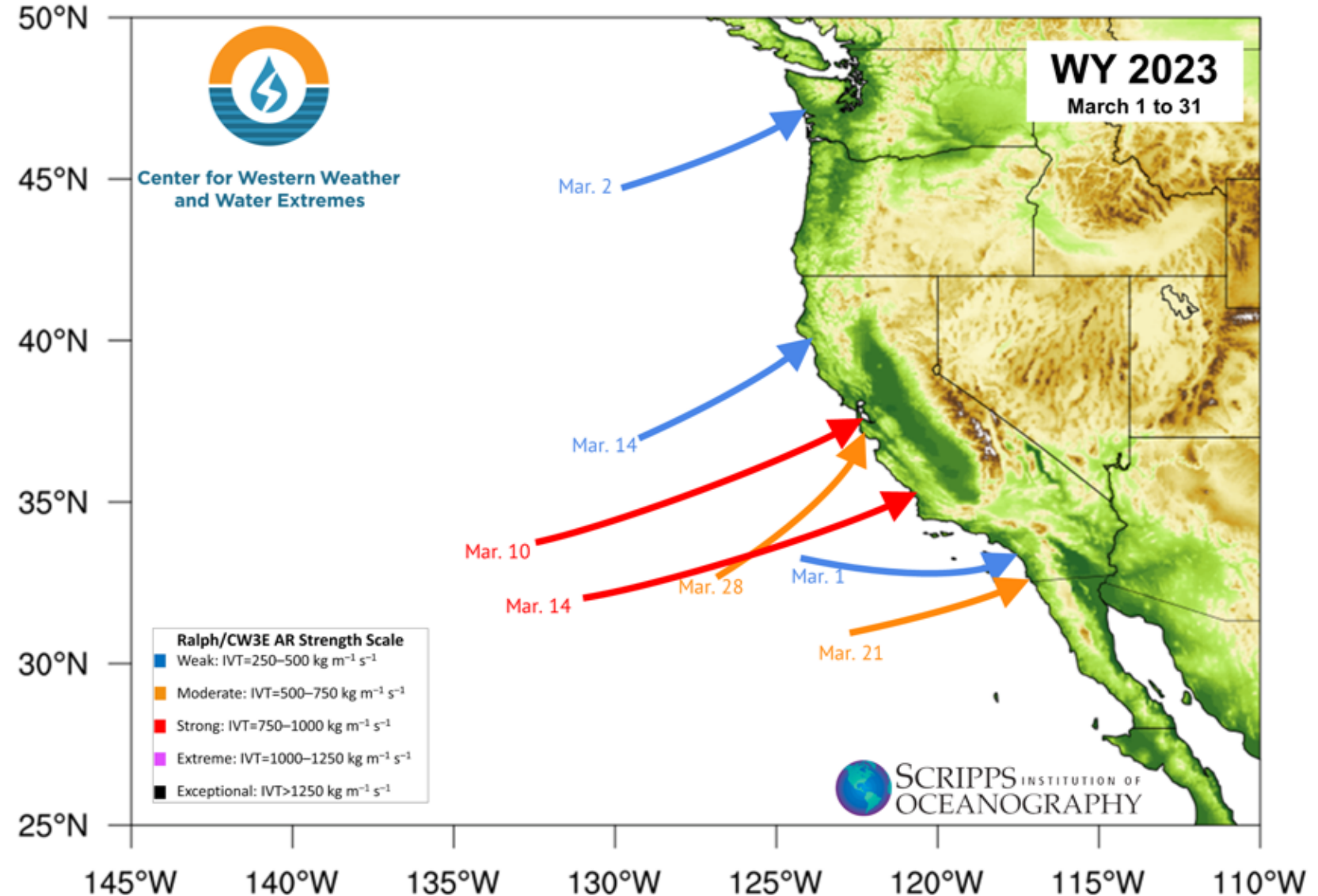
## CENTRAL

Data For: 07-Jul-2023

Number of Stations Reporting 41  
Average snow water equivalent 1.9"  
Percent of April 1 Average 8%  
Percent of normal for this date 471%

# ATMOSPHERIC RIVERS MARCH 2023

- 7 Atmospheric Rivers impacted California during March 2023
- Two of the Atmospheric Rivers were strong
- Central to Southern California averages <2 strong atmospheric rivers per Water Year







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# 16 MARCH 2023 RESERVOIR STATUS

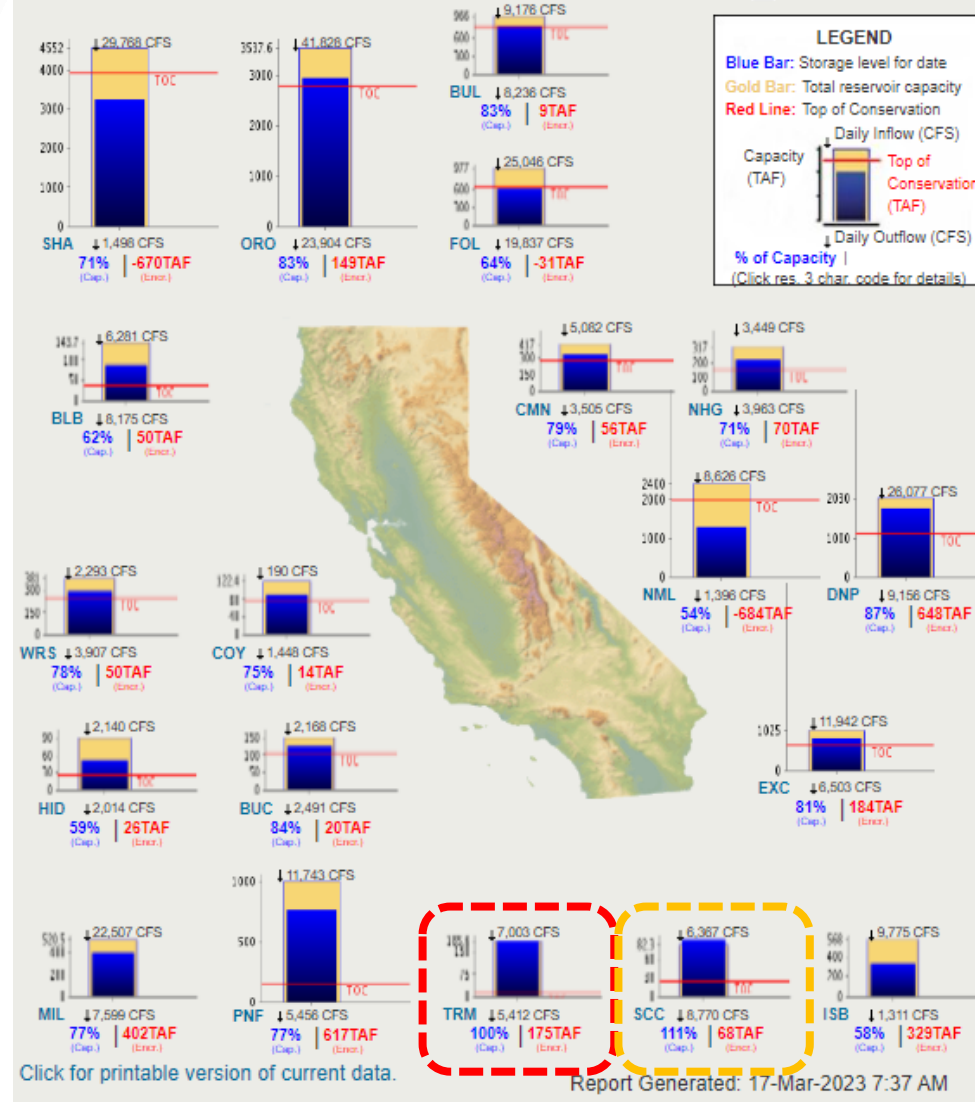
13

TOP OF CONSERVATION CONDITIONS:

CENTRAL VALLEY AND RUSSIAN RIVER FLOOD CONTROL RESERVOIRS: 16-MAR-2023

Midnight: 16-Mar-2023

Change Date: 16-Mar-2023



Terminus Dam-Lake Kaweah (Corps - CA) March 2023



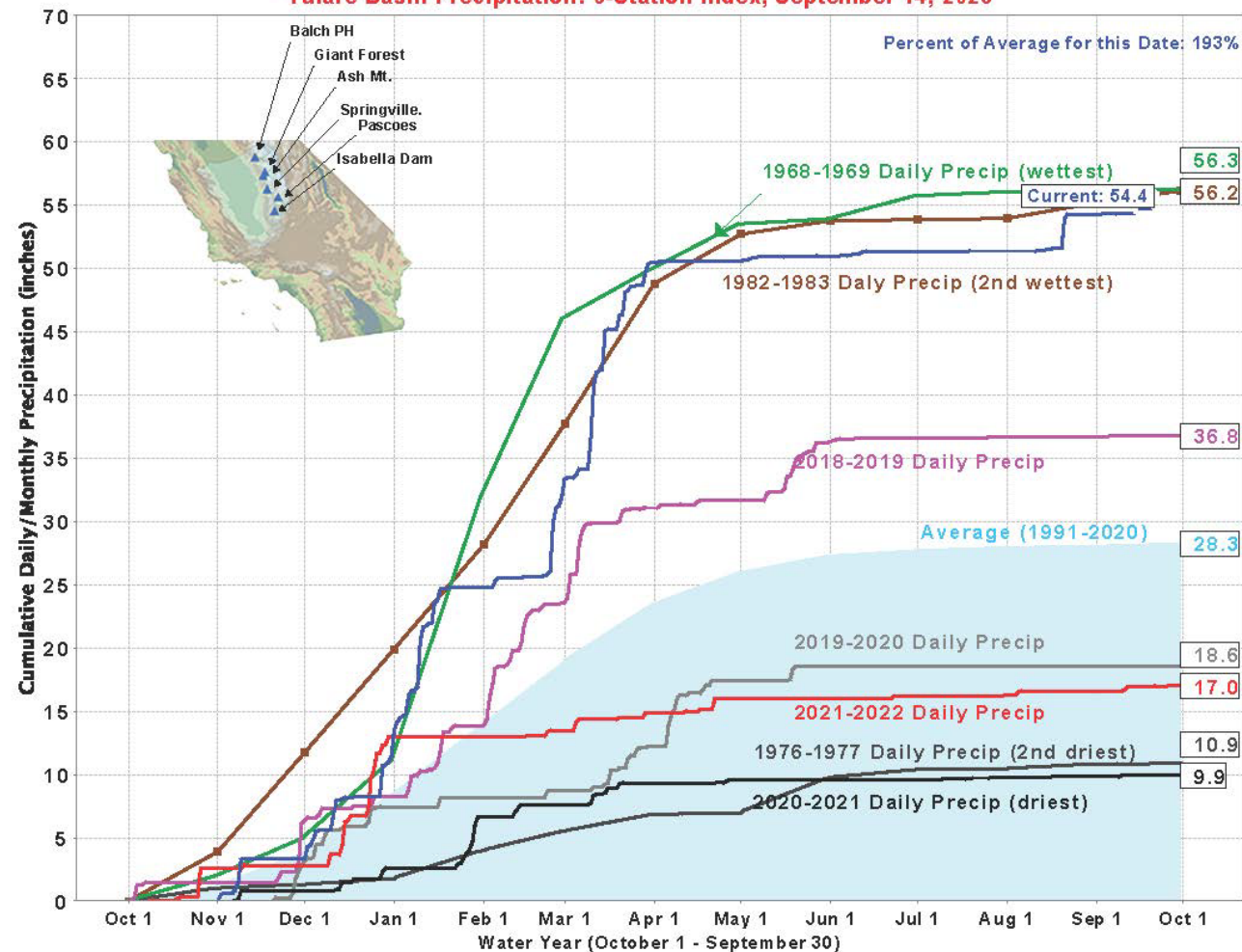
Schafer Dam-Success Lake (Corps - CA) March 2023



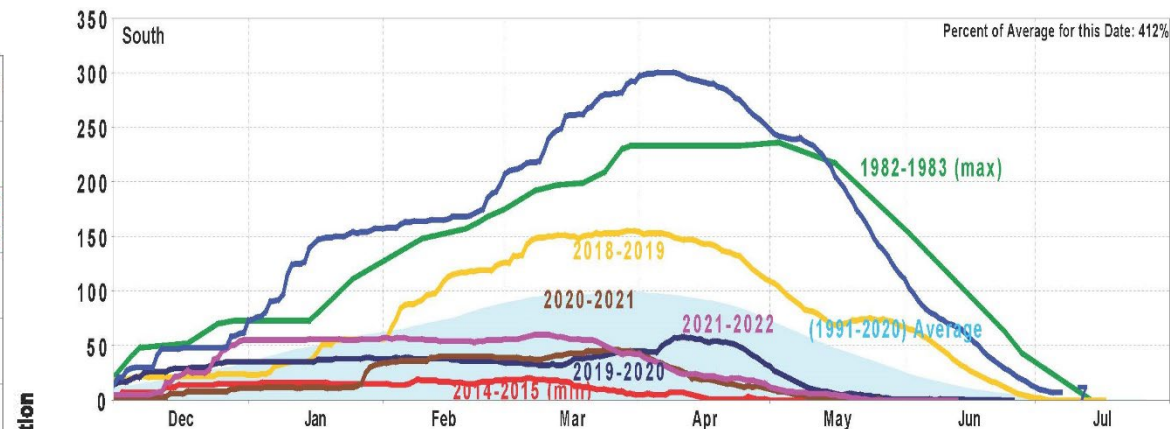
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# SOUTHERN SIERRA PRECIPITATION & SNOWPACK<sup>14</sup>

Tulare Basin Precipitation: 6-Station Index, September 14, 2023

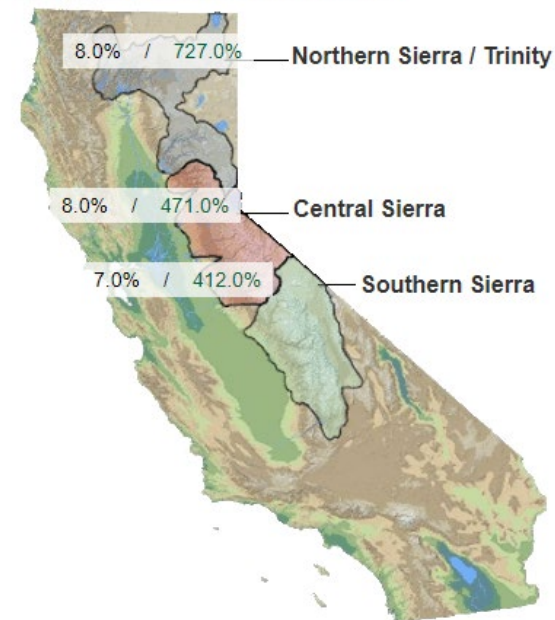


California Snow Water Content, July 7, 2023, Percent of April 1 Average



Data For: 07-Jul-2023

% Apr 1 Avg. / % Normal for this Date



## SOUTH

Data For: 07-Jul-2023

Number of Stations Reporting 23

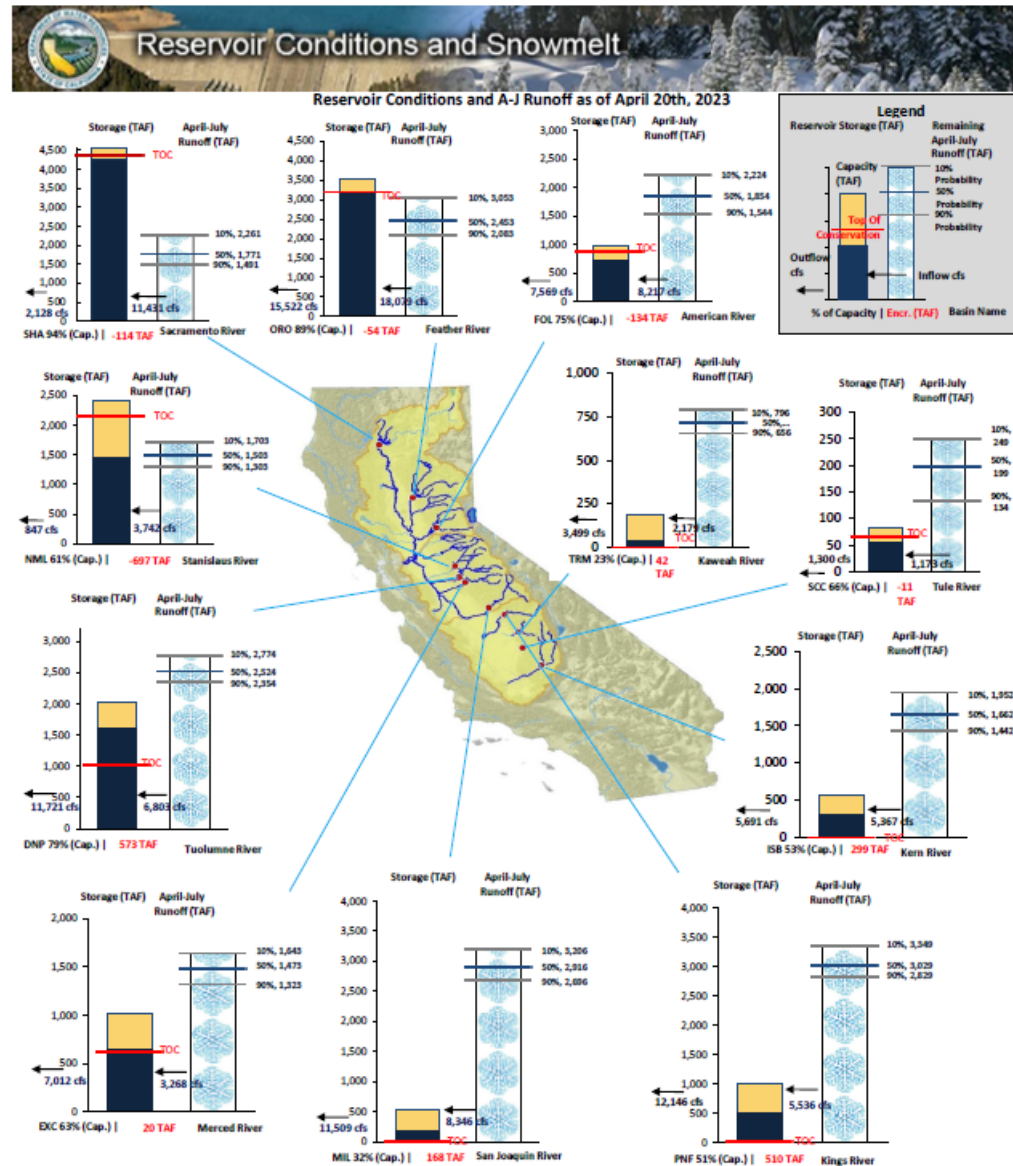
Average snow water equivalent 1.3"

Percent of April 1 Average 7%

Percent of normal for this date 412%



# 26 APRIL 2023 RESERVOIR STATUS



Goal of each reservoir – to route the snowmelt while following the Water Control Manual (WCM) and have a full reservoir at the end of the season (July)



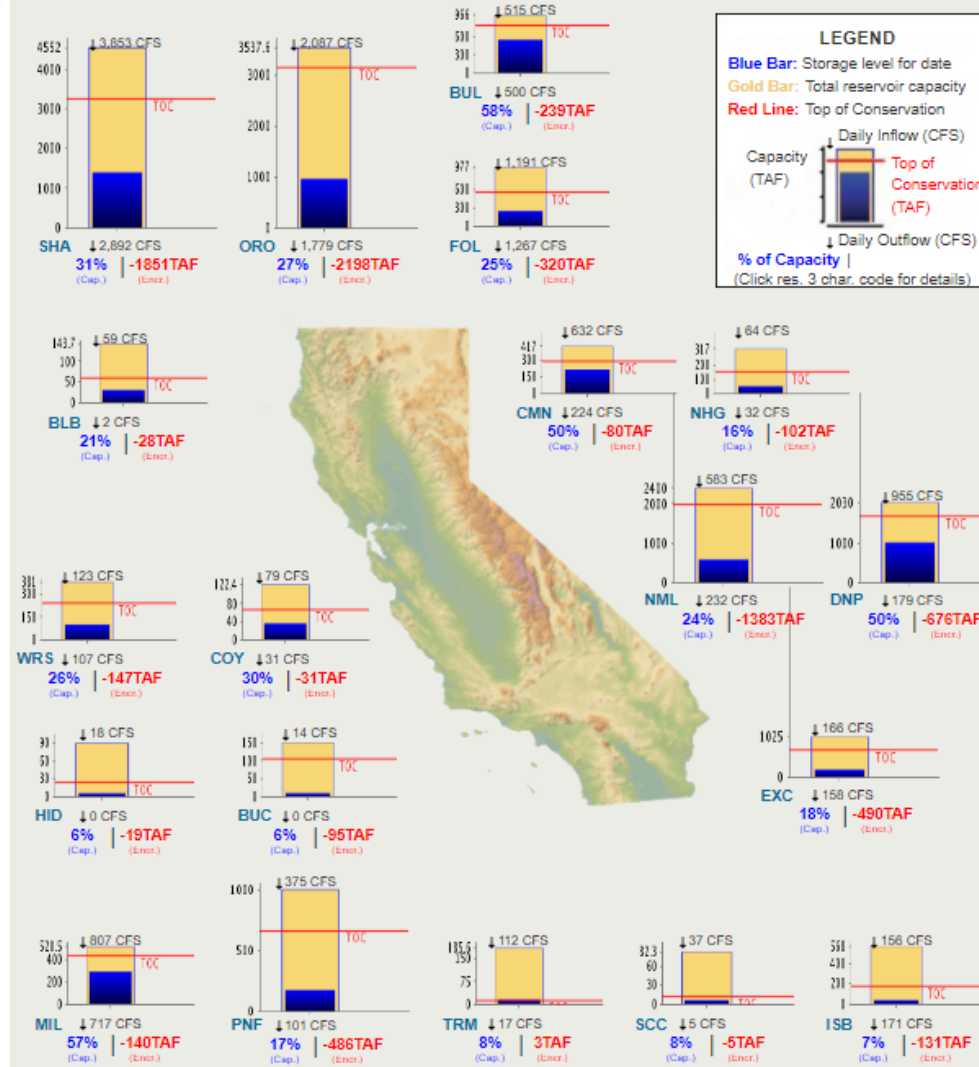
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# WY2023

## TOP OF CONSERVATION CONDITIONS: CENTRAL VALLEY AND RUSSIAN RIVER FLOOD CONTROL RESERVOIRS: 01-DEC-2022

Midnight: 01-Dec-2022

Change Date: 01-Dec-2022



[Click for printable version of current data.](#)

Report Generated: 07-Jul-2023 9:02 AM

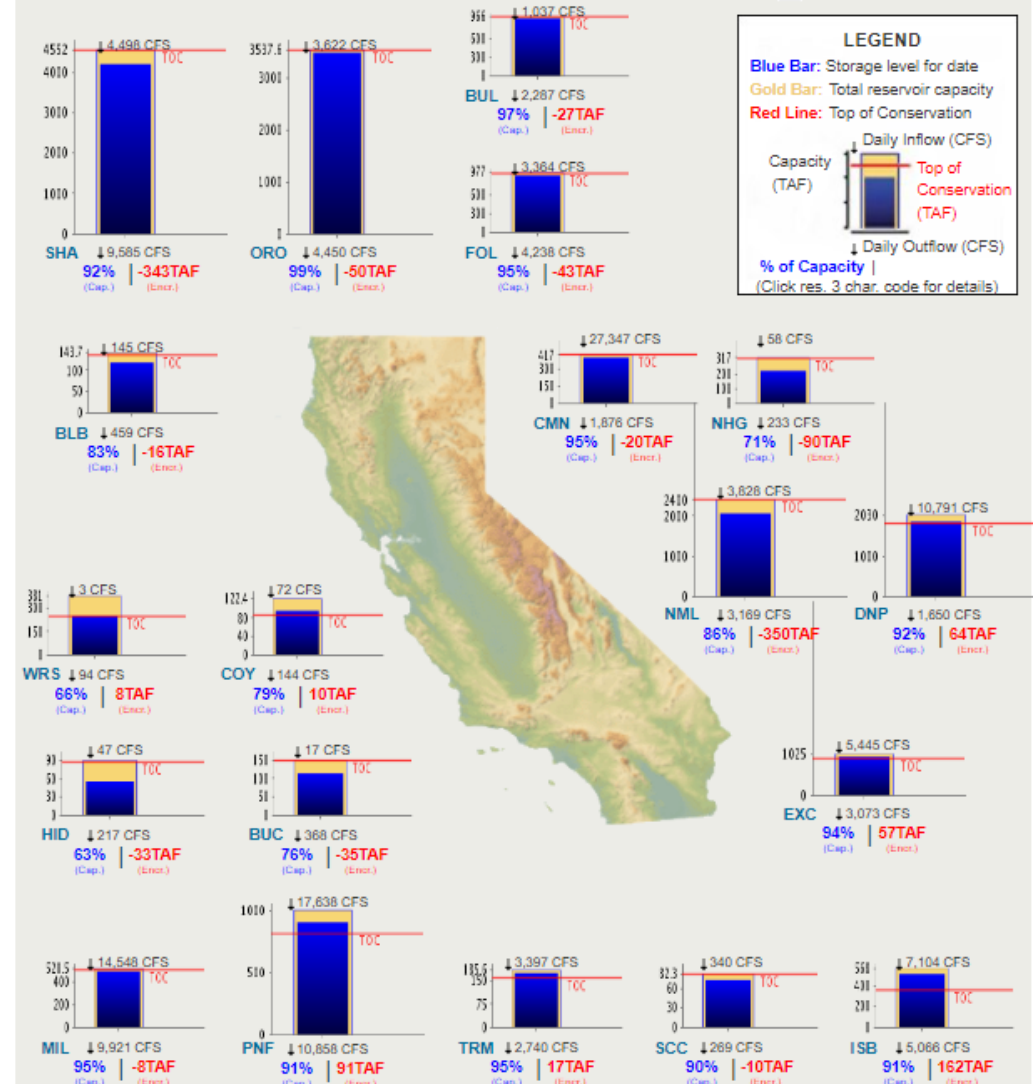


06 JUL 2023

## TOP OF CONSERVATION CONDITIONS: CENTRAL VALLEY AND RUSSIAN RIVER FLOOD CONTROL RESERVOIRS: 06-JUL-2023

Midnight: 06-Jul-2023

Change Date: 06-Jul-2023



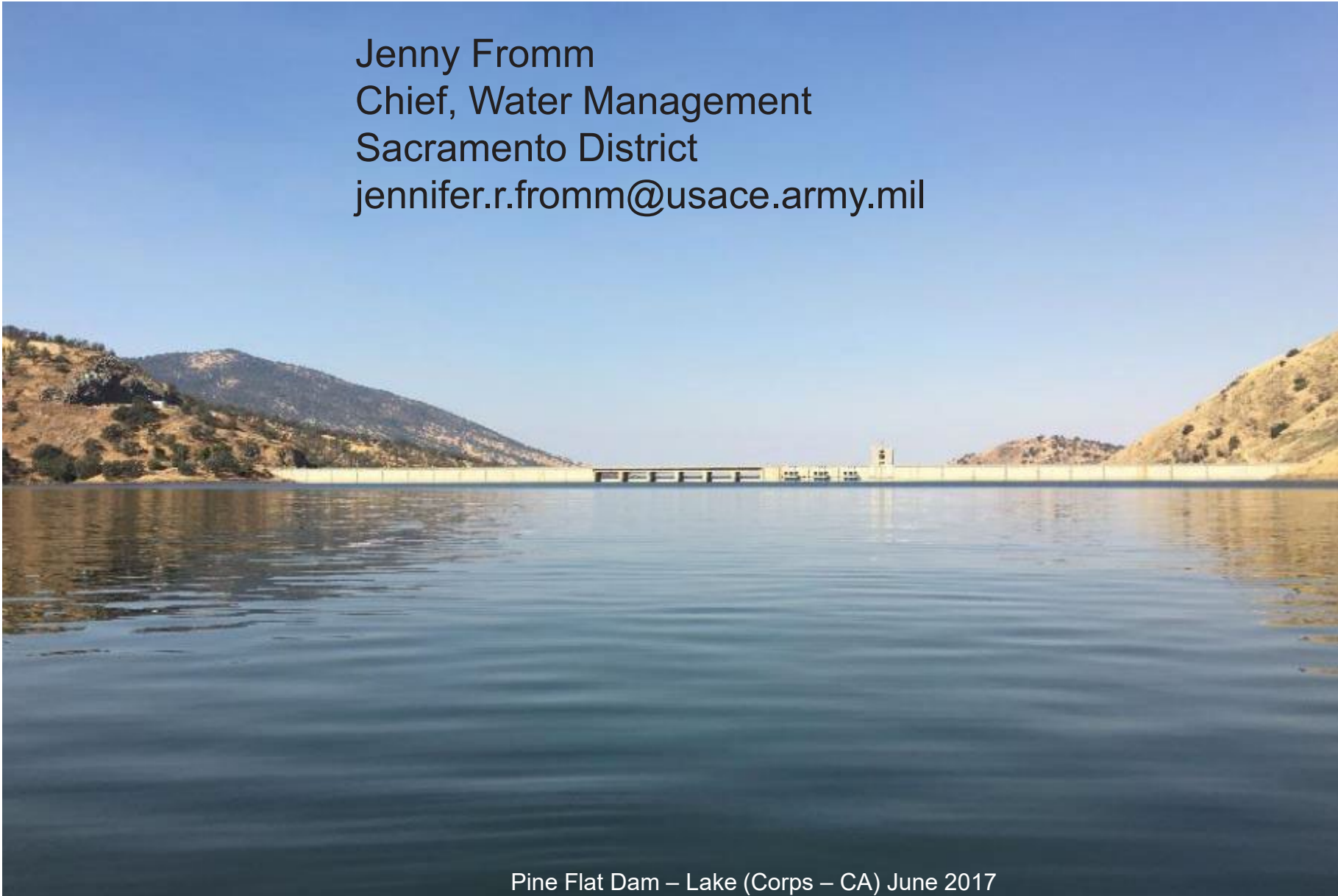
[Click for printable version of current data.](#)

Report Generated: 07-Jul-2023 12:24 PM



# QUESTIONS

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Pine Flat Dam – Lake (Corps – CA) June 2017