HYDROLOGY UPDATE FOR THE BAY-DELTA WATERSHED

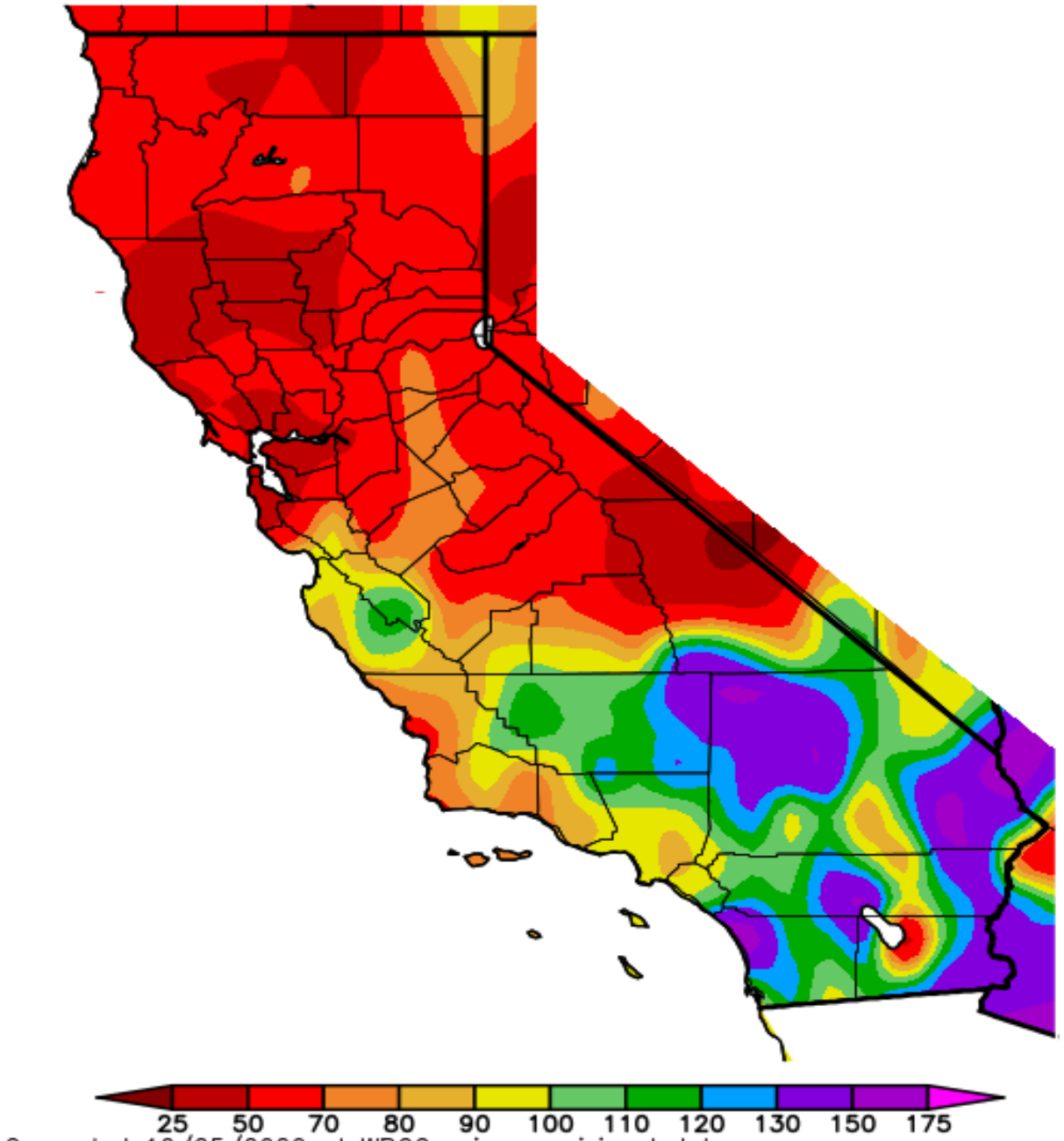
CALIFORNIA
Water Boards
STATE WATER RESOURCES CONTROL BOARD
REGIONAL WATER QUALITY CONTROL BOARDS

NOVEMBER 4, 2020 – ITEM #4

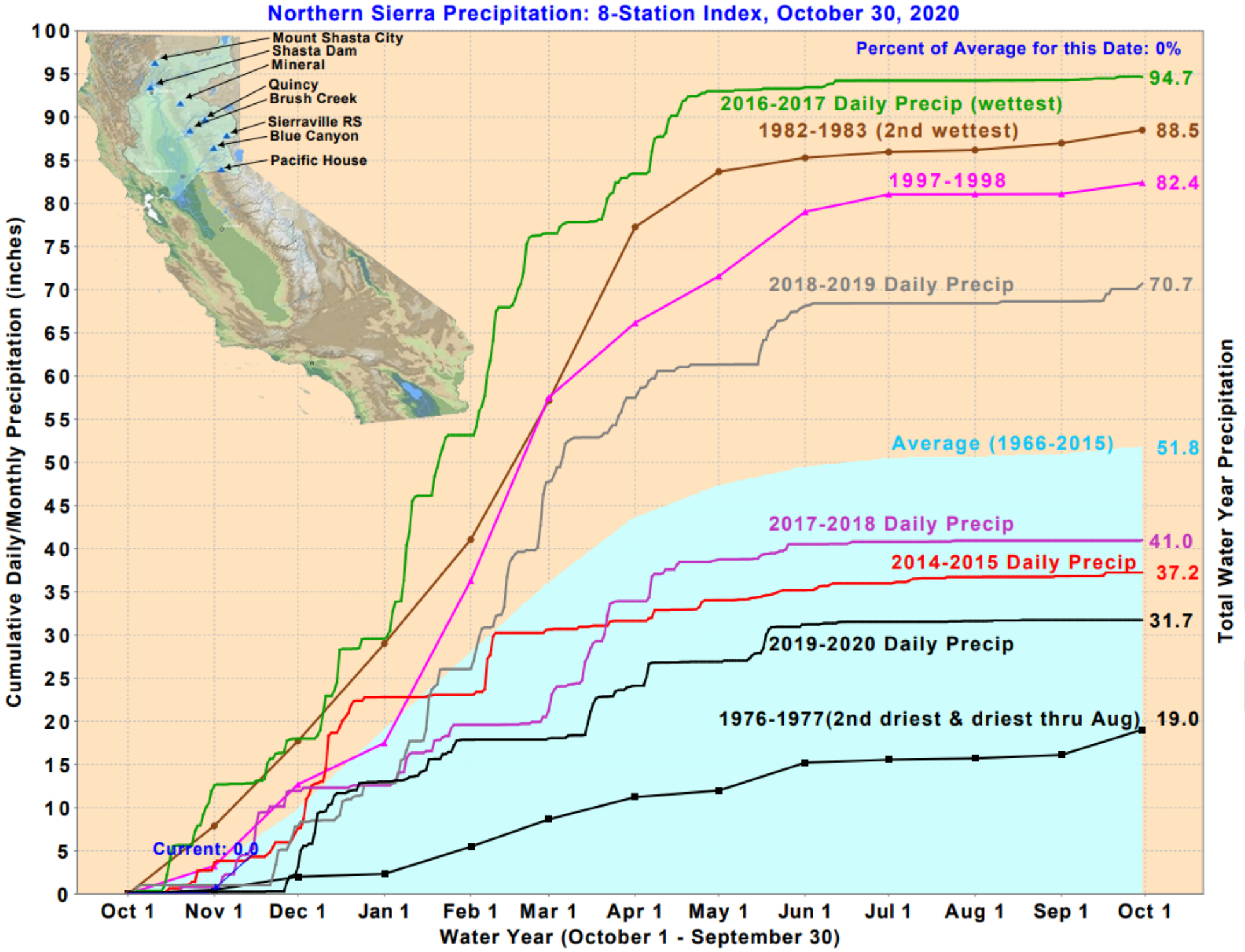
Water Year 2020 and Current Hydrologic/Reservoir Conditions and Operations

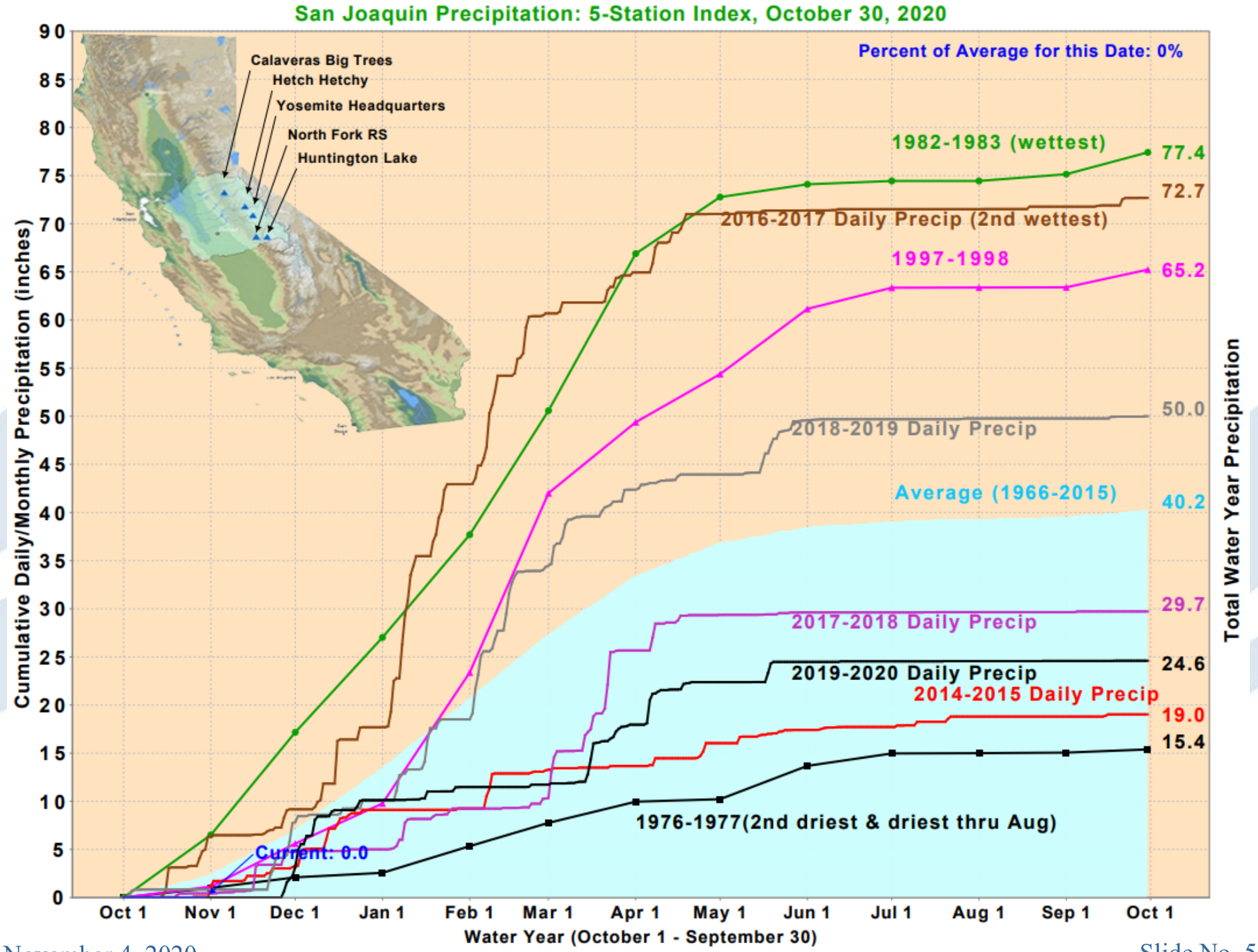
John Leahigh, DWR
Kristin White, USBR

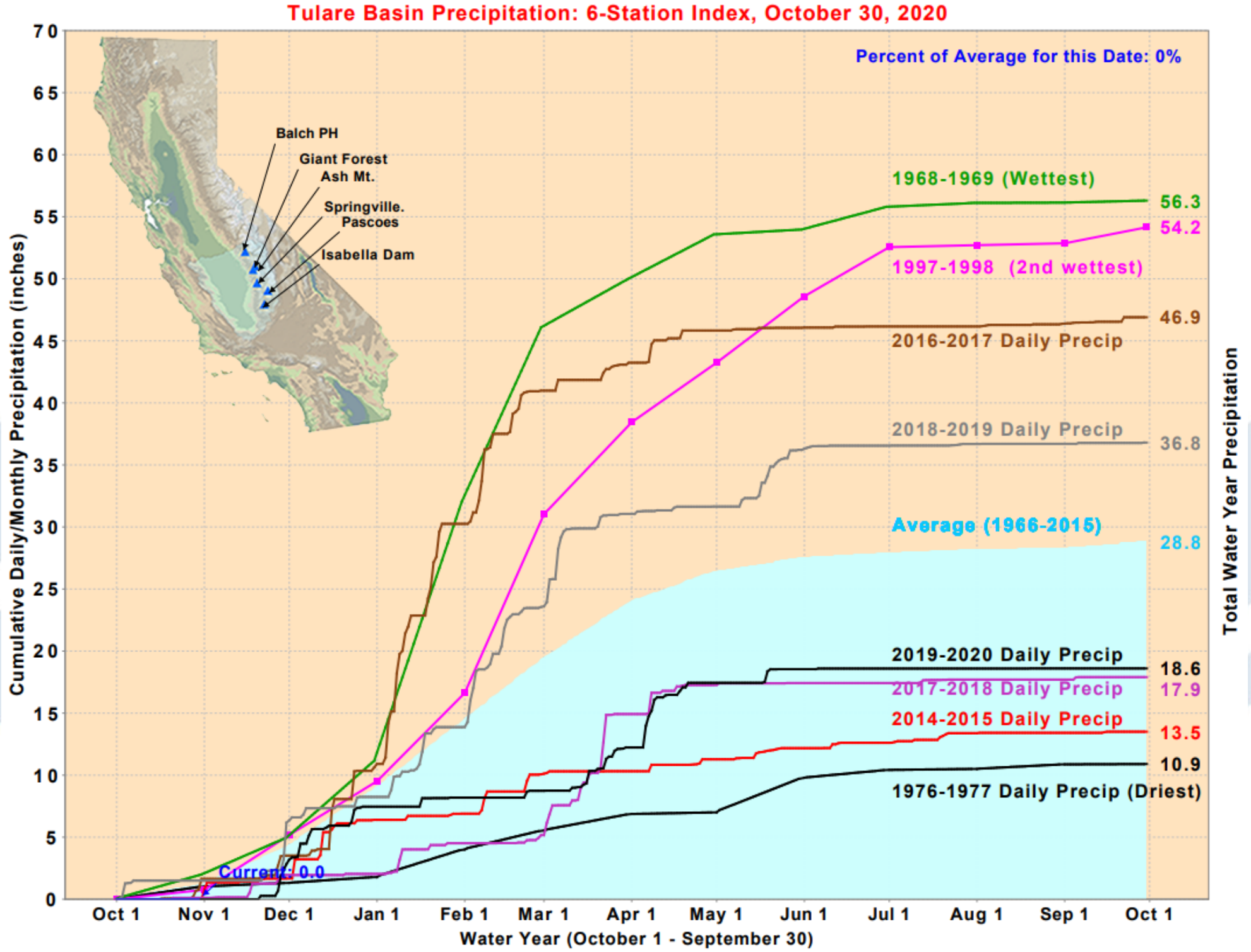
Percent of Average Precipitation (%)
10/25/2019 – 10/24/2020

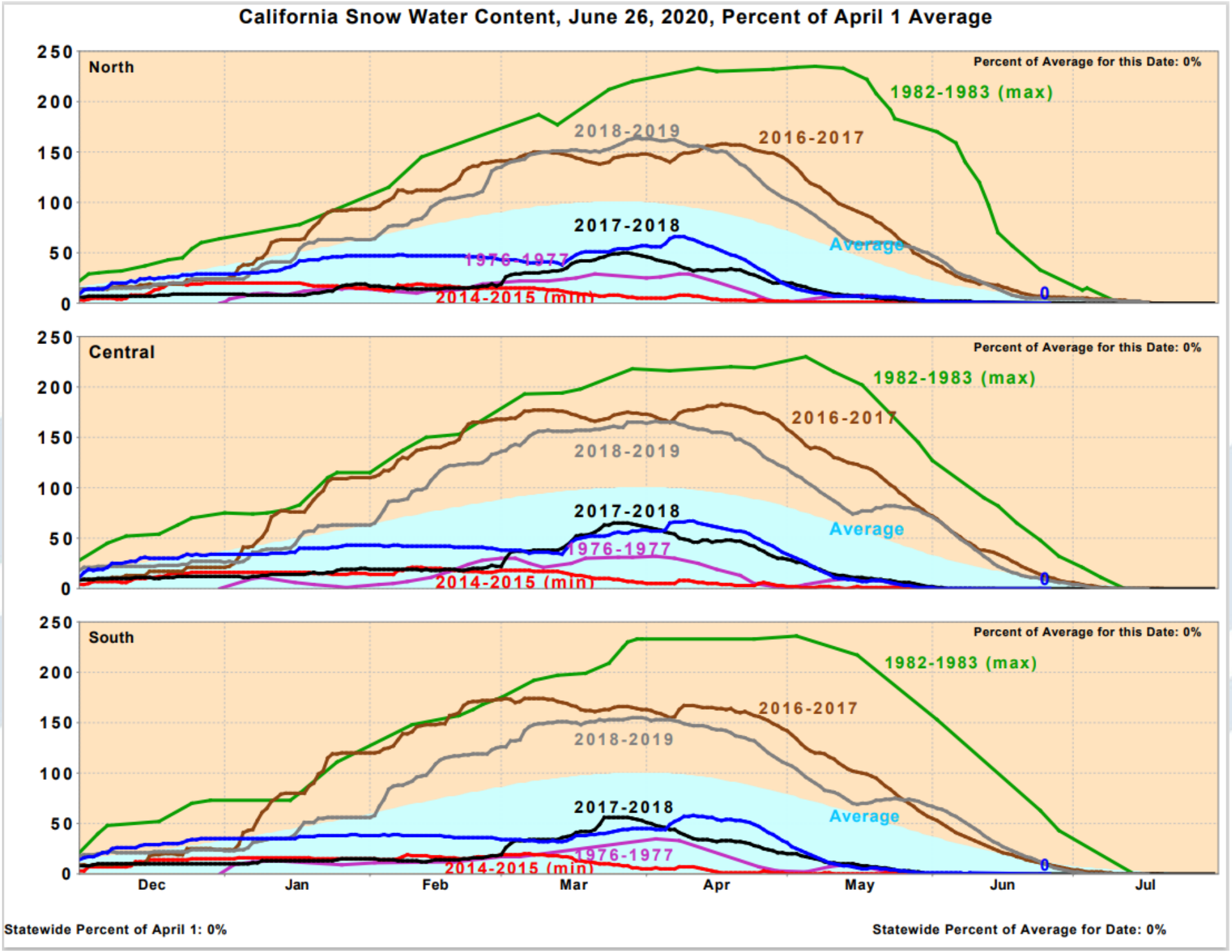


Generated 10/25/2020 at WRCC using provisional data.
NOAA Regional Climate Centers

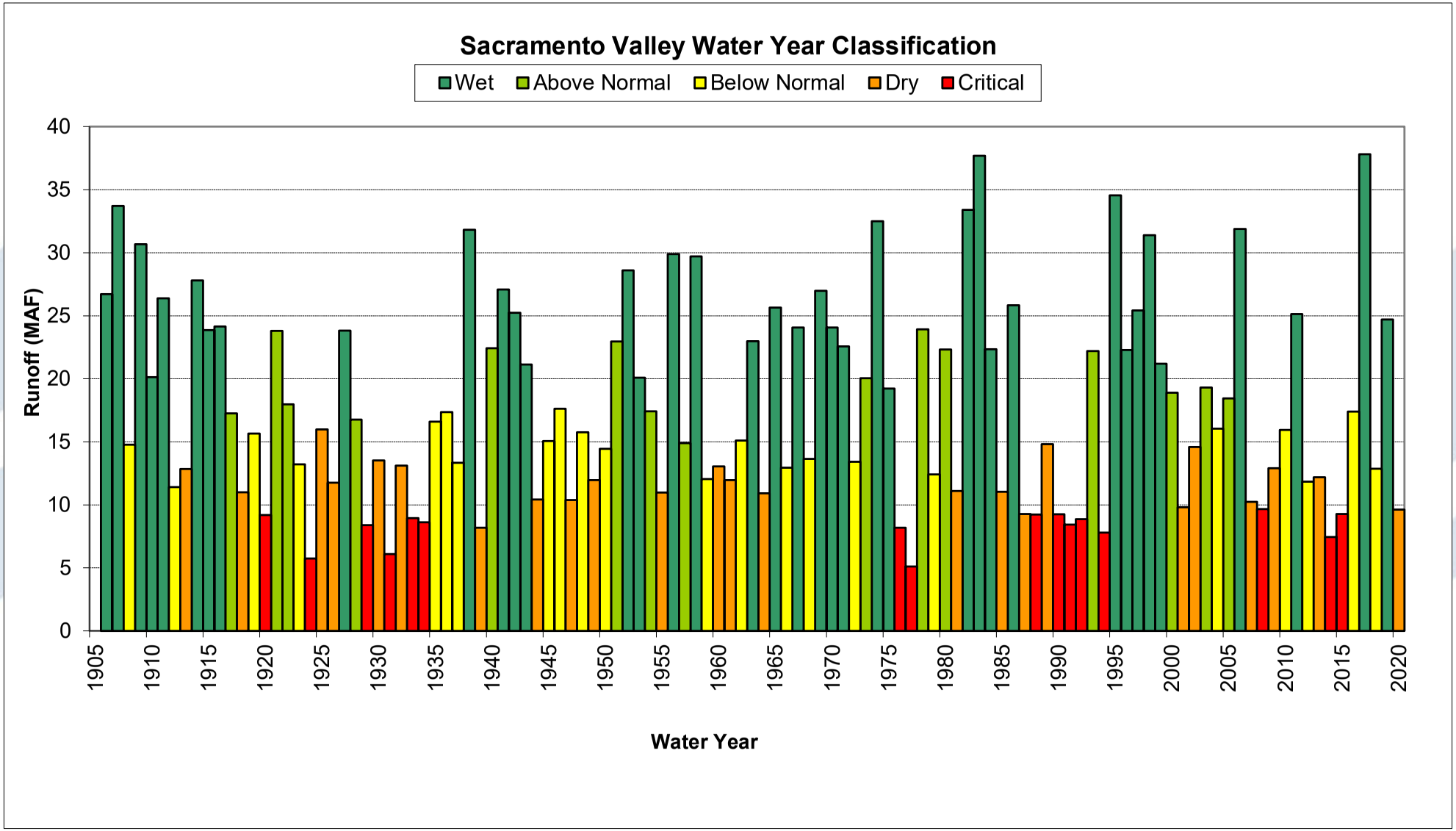

Northern Sierra Precipitation: 8-Station Index, October 30, 2020
Mount Shasta City
Shasta Dam
Mineral
Quincy
Brush Creek
Sierraville RS
Blue Canyon
Pacific House
Percent of Average for this Date: 0%
2016-2017 Daily Precip (wettest) 94.7
1982-1983 (2nd wettest) 88.5
1997-1998 82.4
2018-2019 Daily Precip 70.7
Average (1966-2015) 51.8
2017-2018 Daily Precip 41.0
2014-2015 Daily Precip 37.2
2019-2020 Daily Precip 31.7
1976-1977(2nd driest & driest thru Aug) 19.0
Current: 0.0
Cumulative Daily/Monthly Precipitation (inches)
Total Water Year Precipitation
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100
Oct 1 Nov 1 Dec 1 Jan 1 Feb 1 Mar 1 Apr 1 May 1 Jun 1 Jul 1 Aug 1 Sep 1 Oct 1
Water Year (October 1 - September 30)

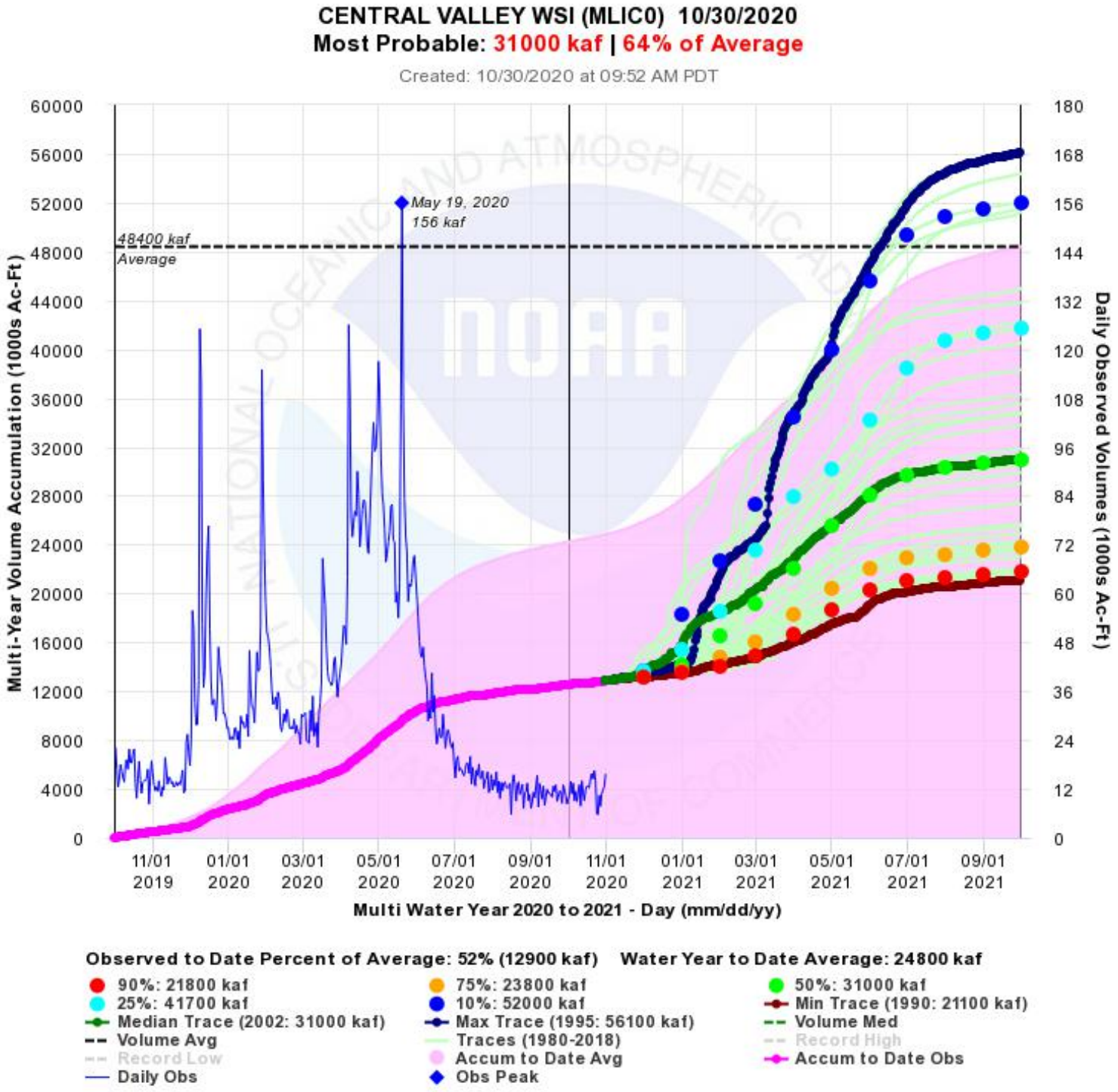

San Joaquin Precipitation: 5-Station Index, October 30, 2020
Percent of Average for this Date: 0%
Calaveras Big Trees
Hetch Hetchy
Yosemite Headquarters
North Fork RS
Huntington Lake
1982-1983 (wettest)
77.4
2016-2017 Daily Precip (2nd wettest)
72.7
1997-1998
65.2
2018-2019 Daily Precip
50.0
Average (1966-2015)
40.2
2017-2018 Daily Precip
29.7
2019-2020 Daily Precip
24.6
2014-2015 Daily Precip
19.0
1976-1977(2nd driest & driest thru Aug)
15.4
Current: 0.0
Cumulative Daily/Monthly Precipitation (inches)
Total Water Year Precipitation
Water Year (October 1 - September 30)
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Oct 1

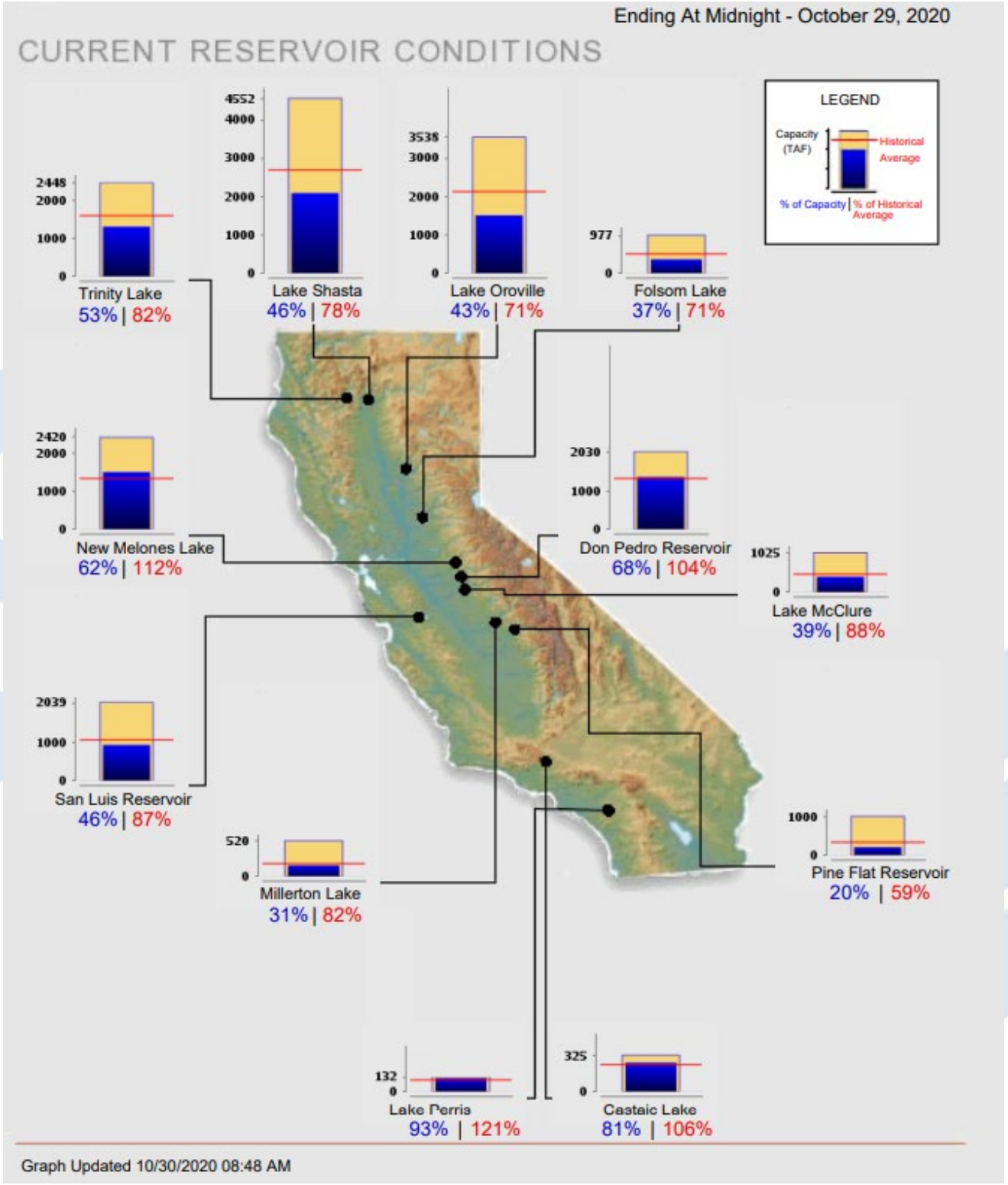

Tulare Basin Precipitation: 6-Station Index, October 30, 2020
Percent of Average for this Date: 0%
Balch PH
Giant Forest
Ash Mt.
Springville.
Pascoes
Isabella Dam
1968-1969 (Wettest)
56.3
1997-1998 (2nd wettest)
54.2
2016-2017 Daily Precip
46.9
2018-2019 Daily Precip
36.8
Average (1966-2015)
28.8
2019-2020 Daily Precip
18.6
2017-2018 Daily Precip
17.9
2014-2015 Daily Precip
13.5
10.9
1976-1977 Daily Precip (Driest)
Current: 0.0
Cumulative Daily/Monthly Precipitation (inches)
Total Water Year Precipitation
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Oct 1
Water Year (October 1 - September 30)

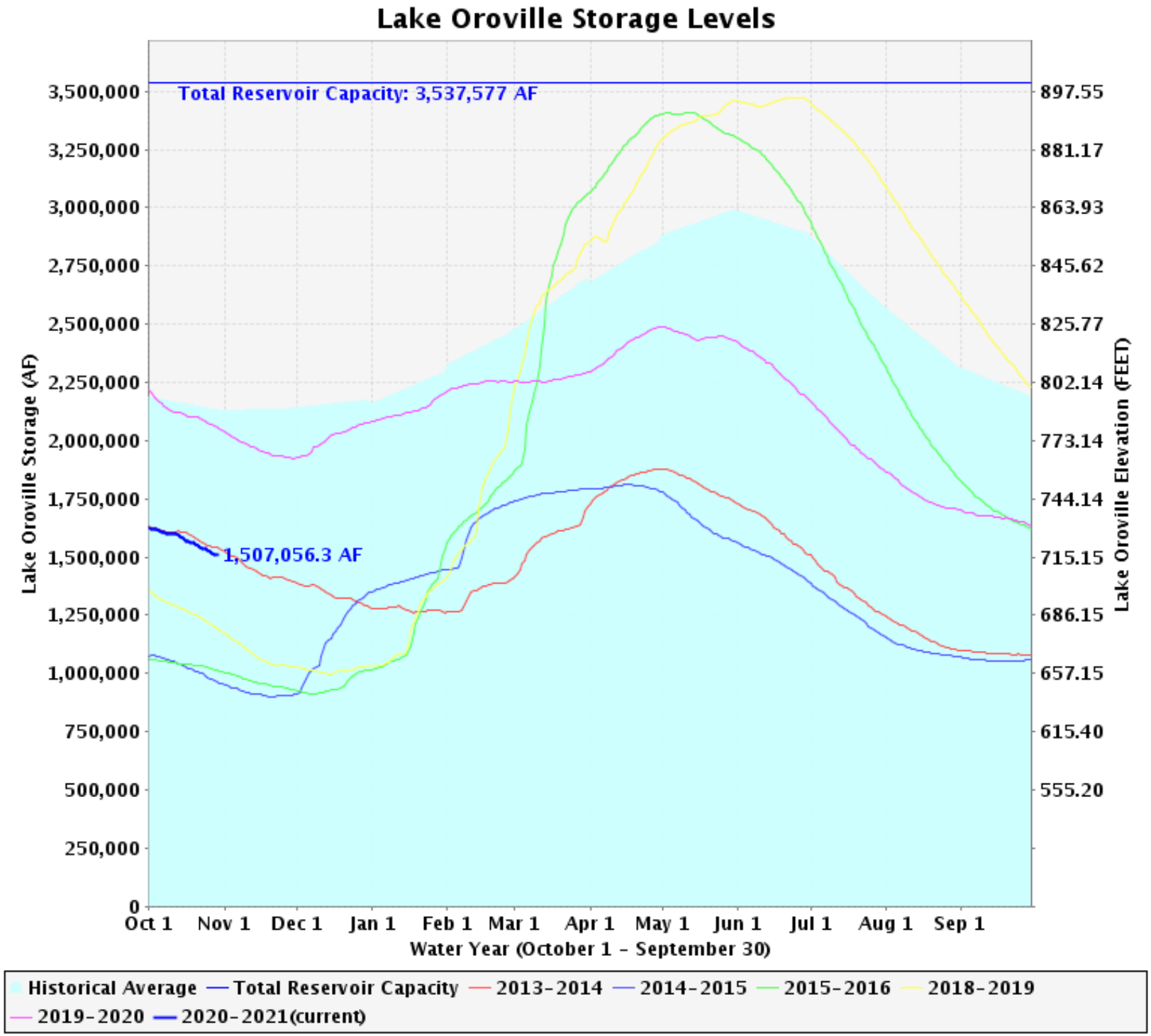

California Snow Water Content, June 26, 2020, Percent of April 1 Average
North
Percent of Average for this Date: 0%
1982-1983 (max)
2018-2019
2016-2017
2017-2018
Average
1976-1977
2014-2015 (min)
0
Central
Percent of Average for this Date: 0%
1982-1983 (max)
2016-2017
2018-2019
2017-2018
Average
1976-1977
2014-2015 (min)
0
South
Percent of Average for this Date: 0%
1982-1983 (max)
2016-2017
2018-2019
2017-2018
Average
1976-1977
2014-2015 (min)
0
250
200
150
100
50
0
Dec
Jan
Feb
Mar
Apr
May
Jun
Jul
Statewide Percent of April 1: 0%
Statewide Percent of Average for Date: 0%

Sacramento Valley Runoff



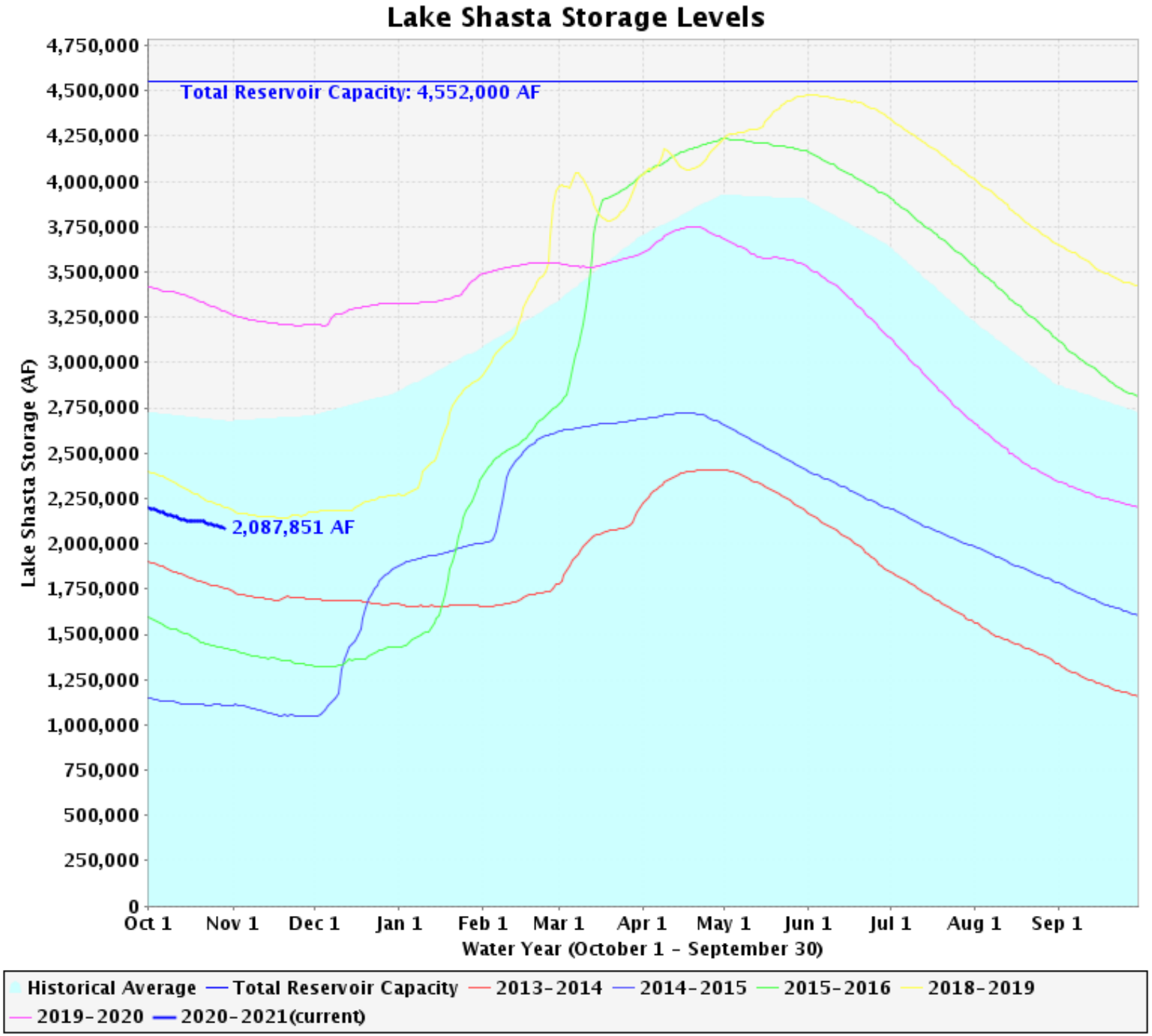

CENTRAL VALLEY WSI (MLIC0) 10/30/2020
Most Probable: 31000 kaf | 64% of Average
Created: 10/30/2020 at 09:52 AM PDT
May 19, 2020
156 kaf
48400 kaf
Average
Multi-Year Volume Accumulation (1000s Ac-Ft)
Daily Observed Volumes (1000s Ac-Ft)
Multi Water Year 2020 to 2021 - Day (mm/dd/yy)
Observed to Date Percent of Average: 52% (12900 kaf)
Water Year to Date Average: 24800 kaf
90%: 21800 kaf
75%: 23800 kaf
50%: 31000 kaf
25%: 41700 kaf
10%: 52000 kaf
Min Trace (1990: 21100 kaf)
Median Trace (2002: 31000 kaf)
Max Trace (1995: 56100 kaf)
Volume Med
Volume Avg
Traces (1980-2018)
Record High
Record Low
Accum to Date Avg
Accum to Date Obs
Daily Obs
Obs Peak

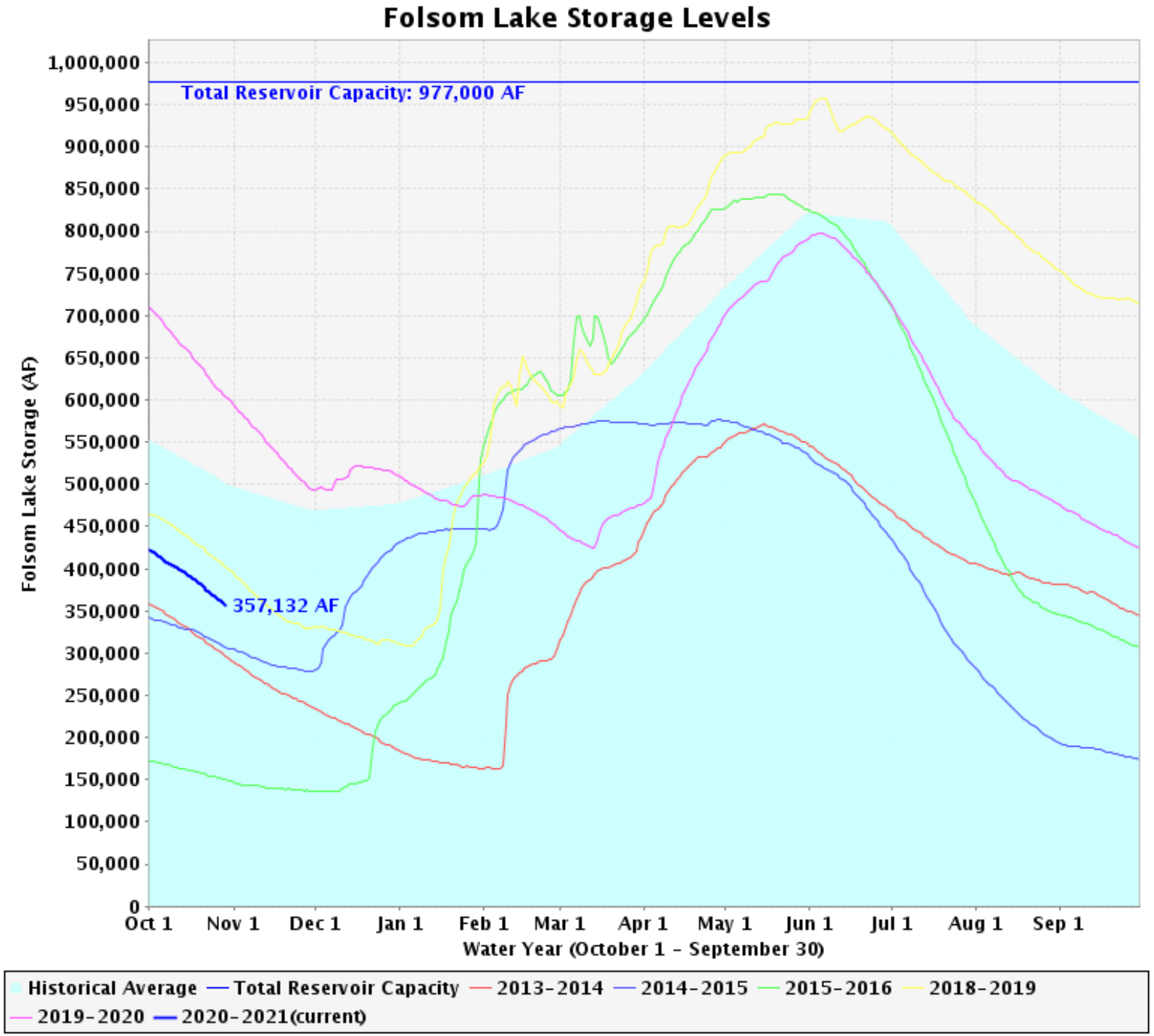

Ending At Midnight - October 29, 2020
CURRENT RESERVOIR CONDITIONS
LEGEND
Capacity (TAF)
Historical Average
% of Capacity | % of Historical Average
Trinity Lake
53% | 82%
Lake Shasta
46% | 78%
Lake Oroville
43% | 71%
Folsom Lake
37% | 71%
New Melones Lake
62% | 112%
Don Pedro Reservoir
68% | 104%
Lake McClure
39% | 88%
San Luis Reservoir
46% | 87%
Millerton Lake
31% | 82%
Pine Flat Reservoir
20% | 59%
Lake Perris
93% | 121%
Castaic Lake
81% | 106%
Graph Updated 10/30/2020 08:48 AM

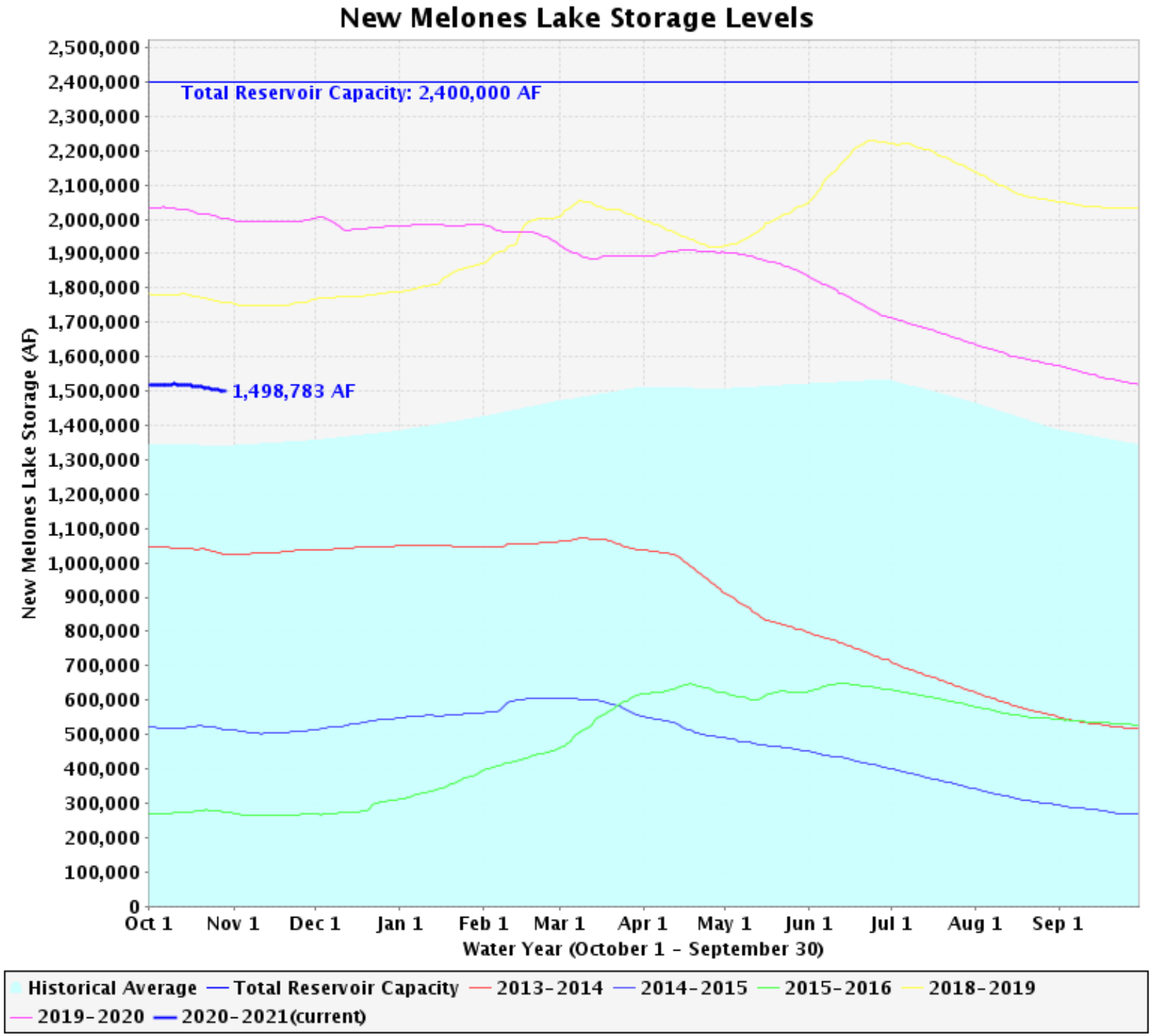

Lake Oroville Storage Levels
Total Reservoir Capacity: 3,537,577 AF
1,507,056.3 AF
Lake Oroville Storage (AF)
Lake Oroville Elevation (FEET)
3,500,000
3,250,000
3,000,000
2,750,000
2,500,000
2,250,000
2,000,000
1,750,000
1,500,000
1,250,000
1,000,000
750,000
500,000
250,000
0
897.55
881.17
863.93
845.62
825.77
802.14
773.14
744.14
715.15
686.15
657.15
615.40
555.20
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Water Year (October 1 - September 30)
Historical Average
Total Reservoir Capacity
2013-2014
2014-2015
2015-2016
2018-2019
2019-2020
2020-2021(current)

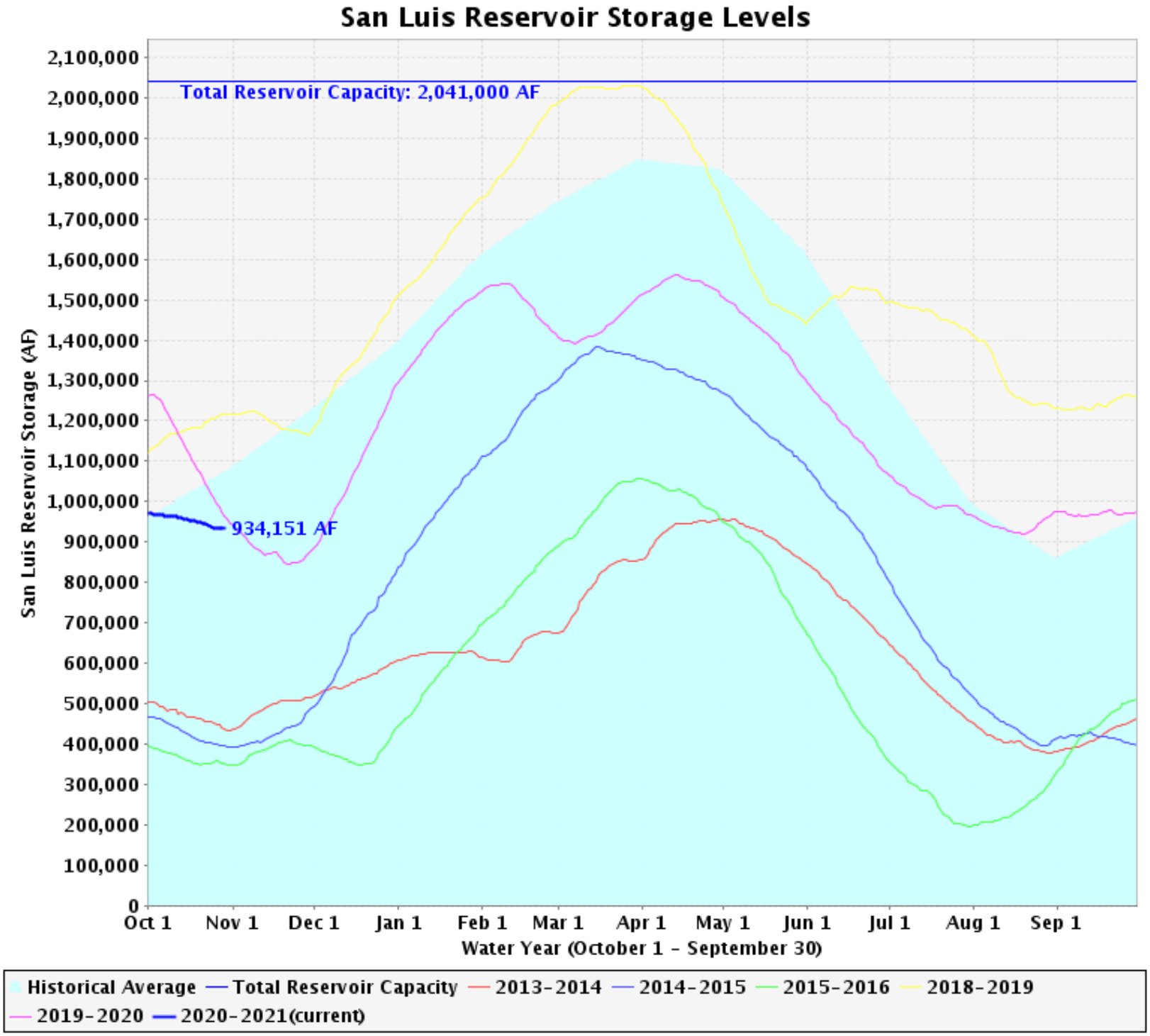
Fall 2020 SWP Operations

- Lake Oroville:
  - Conserve Storage: Releases are minimized to meet SWP share of Bay-Delta requirements and minimal export levels
  - Feather River Releases: Maintaining sustainable spawning level flows through November
  - Deliveries: Meet fall rice-decomp demands through mid-January
  - Temperature Management: Continue temperature management operations
- Delta:
  - Delta requirements: Meeting SWP share of minimum river flows at Rio Vista and Delta outflow/salinity requirements per 2018 COA addendum
  - Maintaining minimal SWP export levels for operational flexibility and SWP contractor deliveries not connected to San Luis Reservoir


Lake Shasta Storage Levels
Total Reservoir Capacity: 4,552,000 AF
2,087,851 AF
Lake Shasta Storage (AF)
4,750,000
4,500,000
4,250,000
4,000,000
3,750,000
3,500,000
3,250,000
3,000,000
2,750,000
2,500,000
2,250,000
2,000,000
1,750,000
1,500,000
1,250,000
1,000,000
750,000
500,000
250,000
0
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Water Year (October 1 - September 30)
Historical Average
Total Reservoir Capacity
2013-2014
2014-2015
2015-2016
2018-2019
2019-2020
2020-2021(current)


Folsom Lake Storage Levels
Total Reservoir Capacity: 977,000 AF
357,132 AF
Folsom Lake Storage (AF)
1,000,000
950,000
900,000
850,000
800,000
750,000
700,000
650,000
600,000
550,000
500,000
450,000
400,000
350,000
300,000
250,000
200,000
150,000
100,000
50,000
0
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Water Year (October 1 - September 30)
Historical Average
Total Reservoir Capacity
2013-2014
2014-2015
2015-2016
2018-2019
2019-2020
2020-2021(current)


New Melones Lake Storage Levels
Total Reservoir Capacity: 2,400,000 AF
1,498,783 AF
New Melones Lake Storage (AF)
2,500,000
2,400,000
2,300,000
2,200,000
2,100,000
2,000,000
1,900,000
1,800,000
1,700,000
1,600,000
1,500,000
1,400,000
1,300,000
1,200,000
1,100,000
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Water Year (October 1 - September 30)
Historical Average
Total Reservoir Capacity
2013-2014
2014-2015
2015-2016
2018-2019
2019-2020
2020-2021(current)


San Luis Reservoir Storage Levels
Total Reservoir Capacity: 2,041,000 AF
934,151 AF
San Luis Reservoir Storage (AF)
2,100,000
2,000,000
1,900,000
1,800,000
1,700,000
1,600,000
1,500,000
1,400,000
1,300,000
1,200,000
1,100,000
1,000,000
900,000
800,000
700,000
600,000
500,000
400,000
300,000
200,000
100,000
0
Oct 1
Nov 1
Dec 1
Jan 1
Feb 1
Mar 1
Apr 1
May 1
Jun 1
Jul 1
Aug 1
Sep 1
Water Year (October 1 - September 30)
Historical Average
Total Reservoir Capacity
2013-2014
2014-2015
2015-2016
2018-2019
2019-2020
2020-2021(current)

Fall 2020 CVP Operations

- Sacramento River:
  - Conserve Storage: Reduce Shasta releases to minimum flows by early December
  - Deliveries: Meet fall rice-decomp demands through mid-November (delayed to support fall run); reduce Trinity releases to ROD winter base flow.
  - Temperature: Reduce warmer Trinity imports
  - Delta requirements: Meet minimum river flows at Rio Vista and delta outflow/salinity requirements
- American River:
  - Conserve Storage: Reduce Folsom releases to winter base flow by early November
  - Temperature Management: Continue temperature management (if possible) until the reservoir turns over
  - Delta requirements: Meet delta outflow/salinity requirements

Fall 2020 CVP Operations

- Stanislaus River:
  - Finish fall pulse flow
  - Conserve Storage: Release minimum fall/winter base flows
- Delta:
  - Delta requirements: Modify exports to meet delta requirements and export available water; operate Delta cross channel gates for fish protection, Rio Vista flows and delta salinity
  - Water supply: Aim to fill San Luis Reservoir with available water in the Delta
- Dry year planning:
  - Develop Drought Toolkit

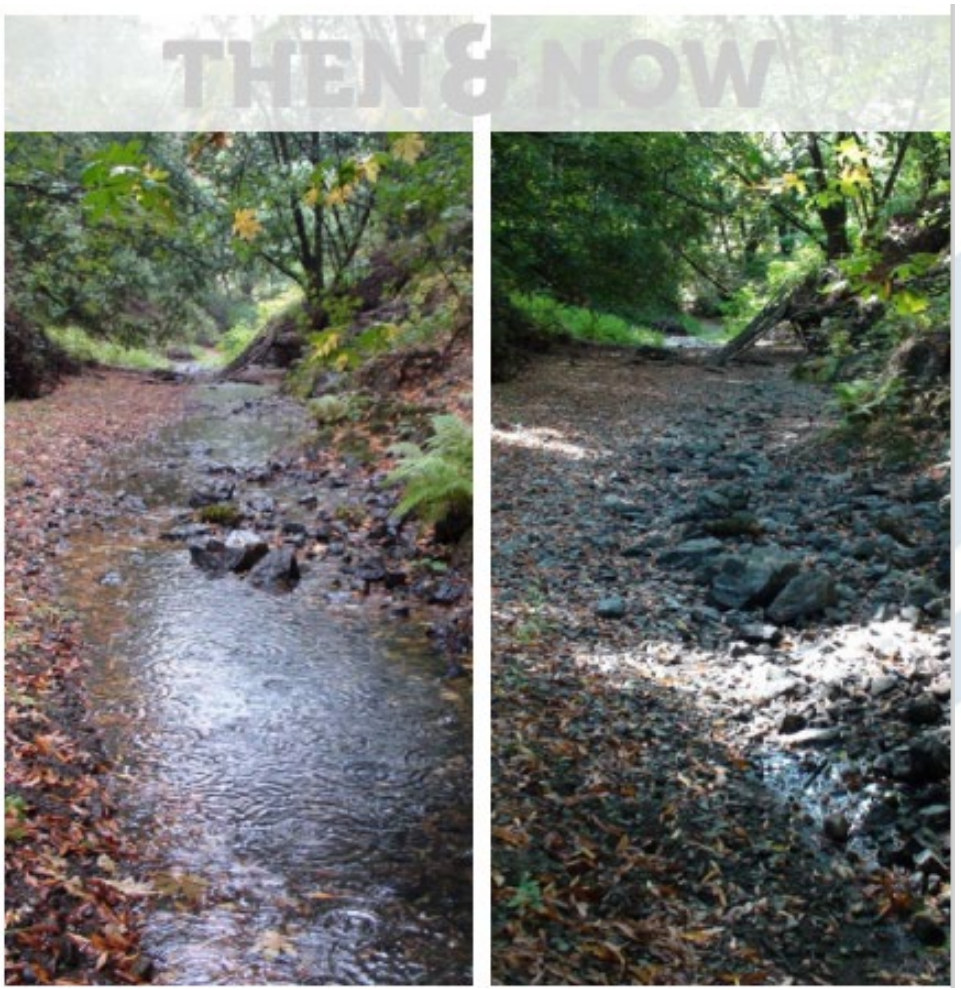
Other Reservoirs

Updated 10/30/2020

- **Cachuma Reservoir**: 130,546 acre-feet full out of 193,305 acre-foot capacity (68% of capacity and 88% of average)
- **Diamond Valley Lake**: = 706,047 acre-feet full out of 810,000 acre-foot capacity (87% of capacity)
- **San Luis Reservoir**: 934,151 acre-feet out of 2,041,000 acre-feet capacity (46% of capacity and 87% of average)

WY 2020 SWRCB Water Rights Outreach/Shortage Activities

Stanley Mubako

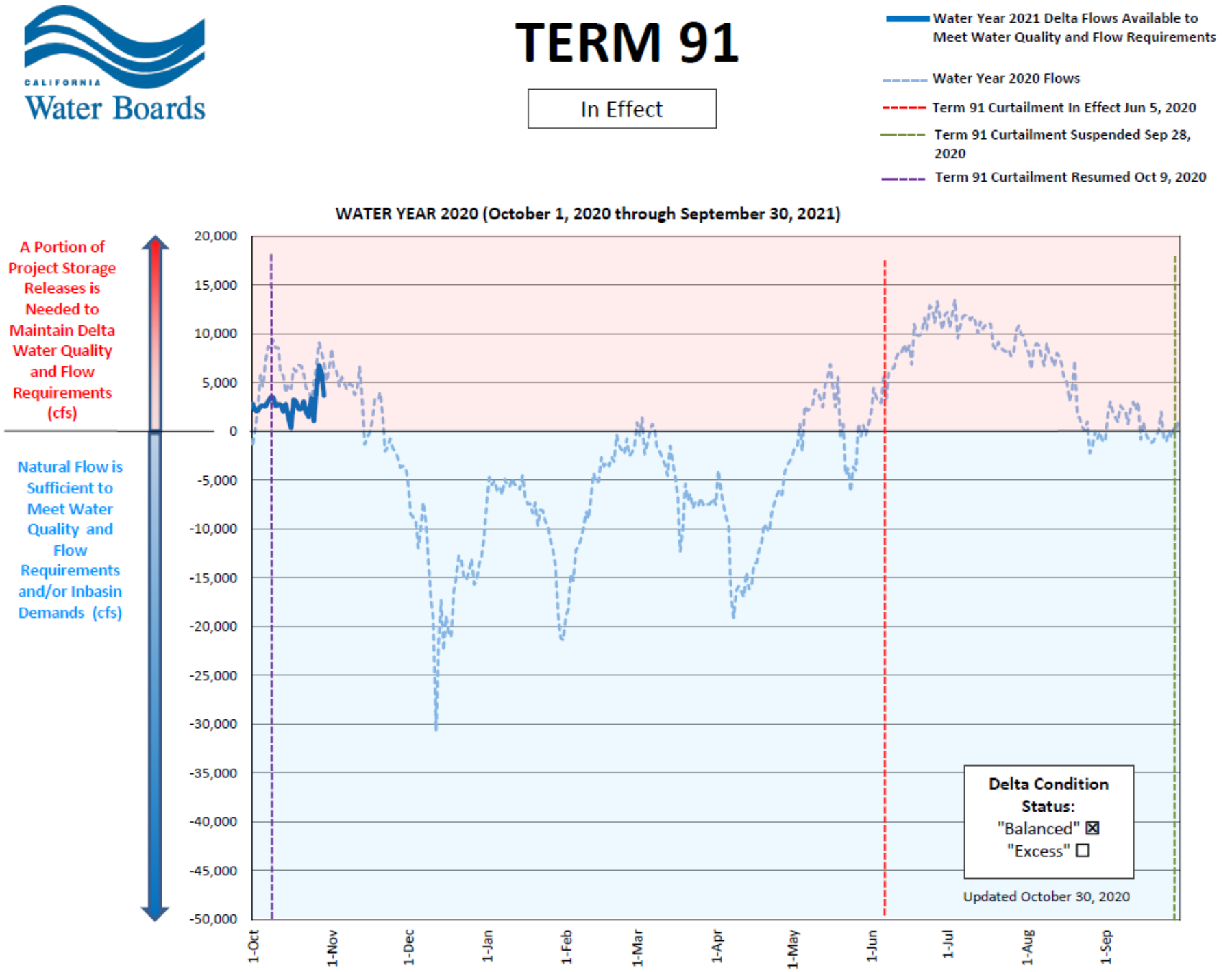


WY 2020 Water Rights Activities

- **North Coast streams**:
  - Extremely low flows in Russian River and other tributaries
  - Conducting outreach with state, federal, and local agency partners
- **Scott River**: Notices of Unavailability of Water issued June 19 to diverters due to limited precipitation and snowpack

TERM 91

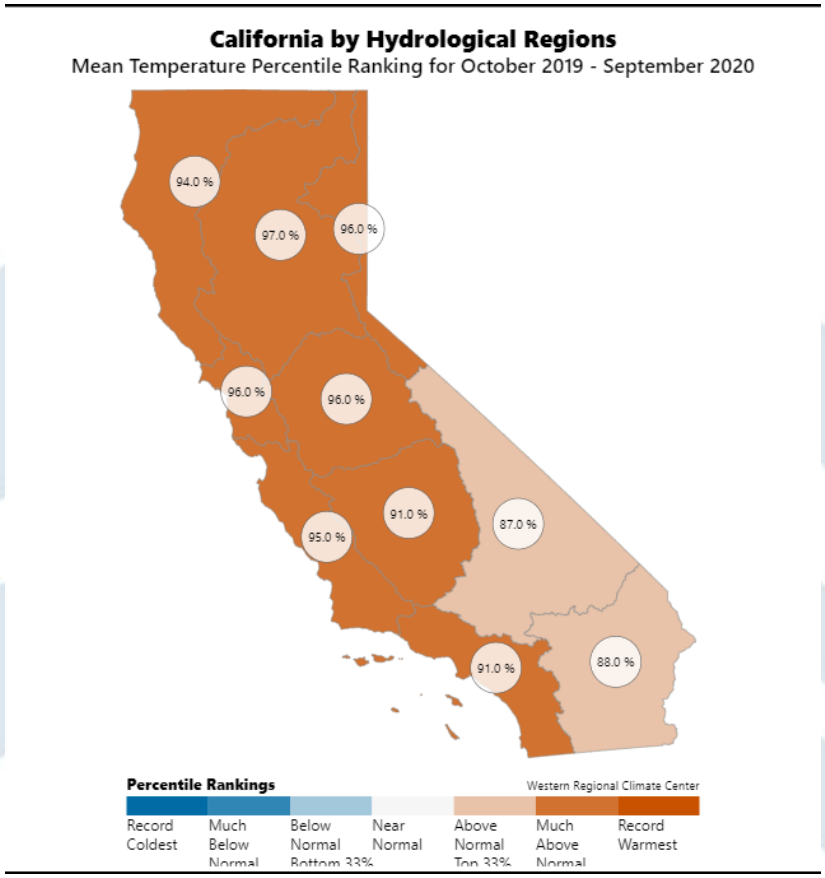
In Effect

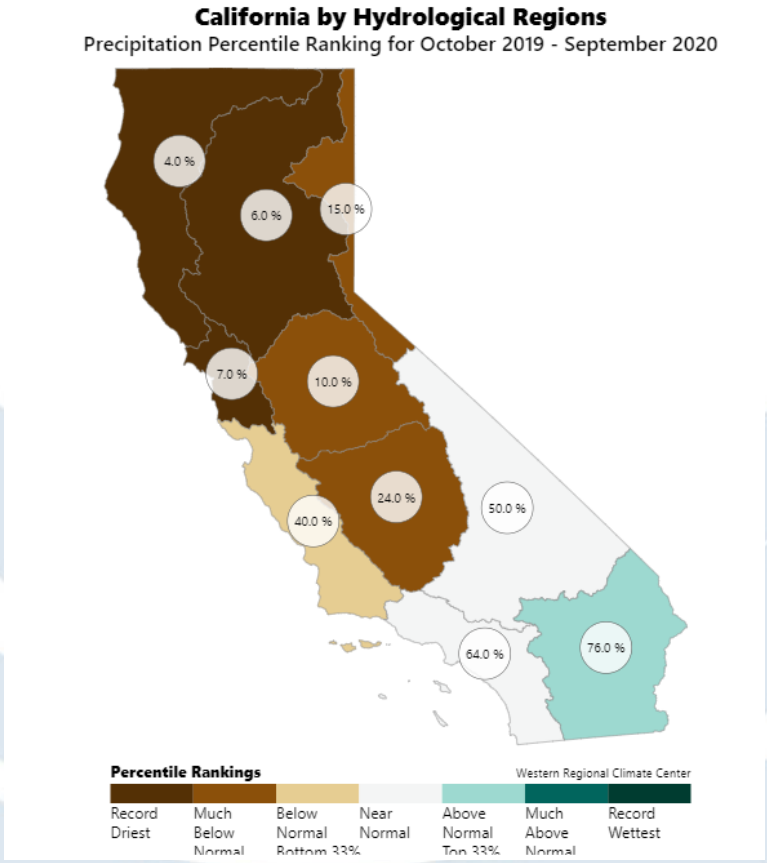


Drought Conditions and Outlook

Michael Anderson, DWR

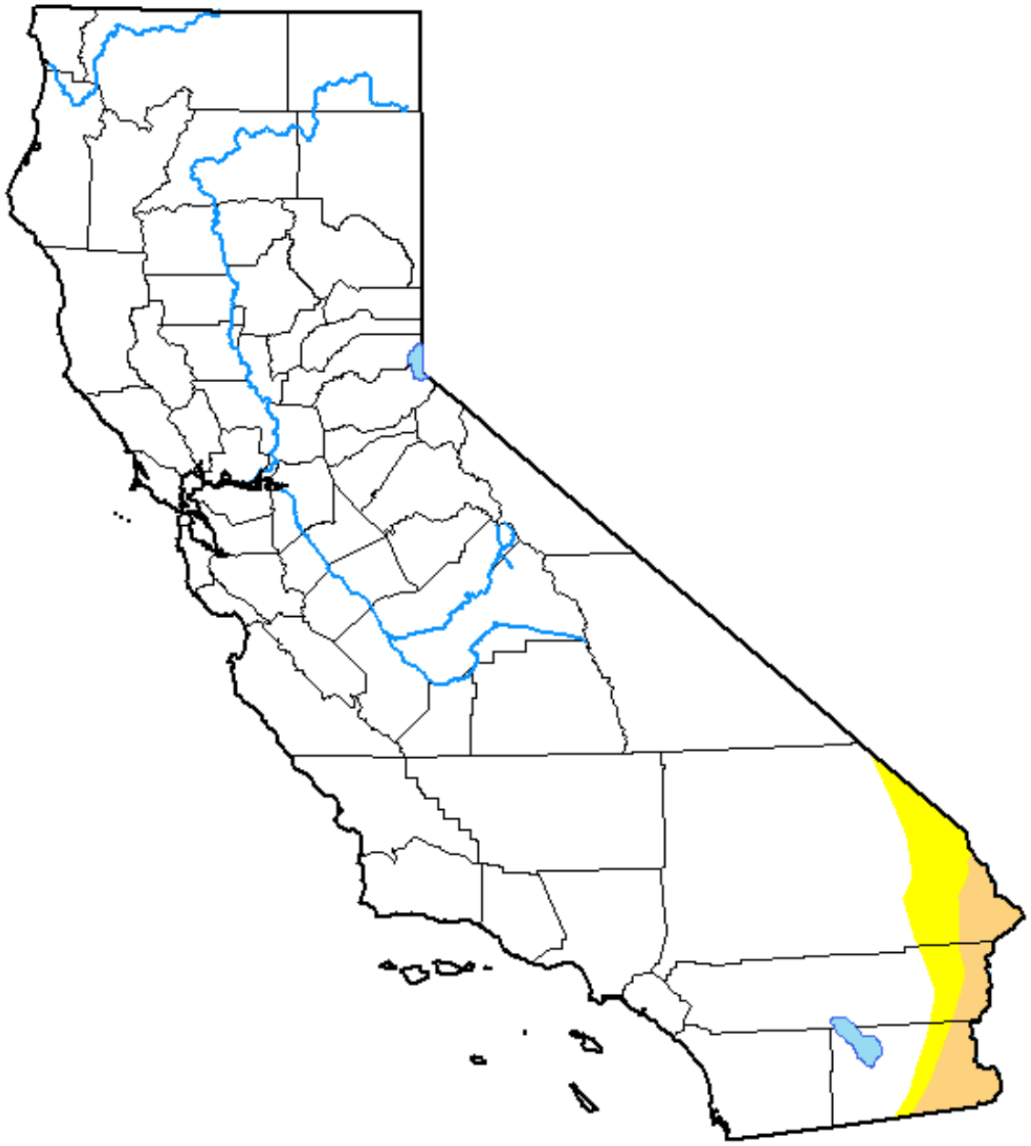
CA Temperature and Precipitation WY 2020





Graphics from California Climate Tracker hosted by Western Region Climate Center

U.S. Drought Monitor
California



October 1, 2019
(Released Thursday, Oct. 3, 2019)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	95.29	4.71	2.06	0.00	0.00	0.00
Last Week *09-24-2019*	89.73	10.27	2.06	0.00	0.00	0.00
3 Months Ago *07-02-2019*	95.68	4.32	0.00	0.00	0.00	0.00
Start of Calendar Year *01-01-2019*	7.77	92.23	75.17	14.12	2.10	0.00
Start of Water Year *10-01-2019*	95.29	4.71	2.06	0.00	0.00	0.00
One Year Ago *10-02-2018*	12.18	87.82	47.97	22.82	4.93	0.00

Intensity:

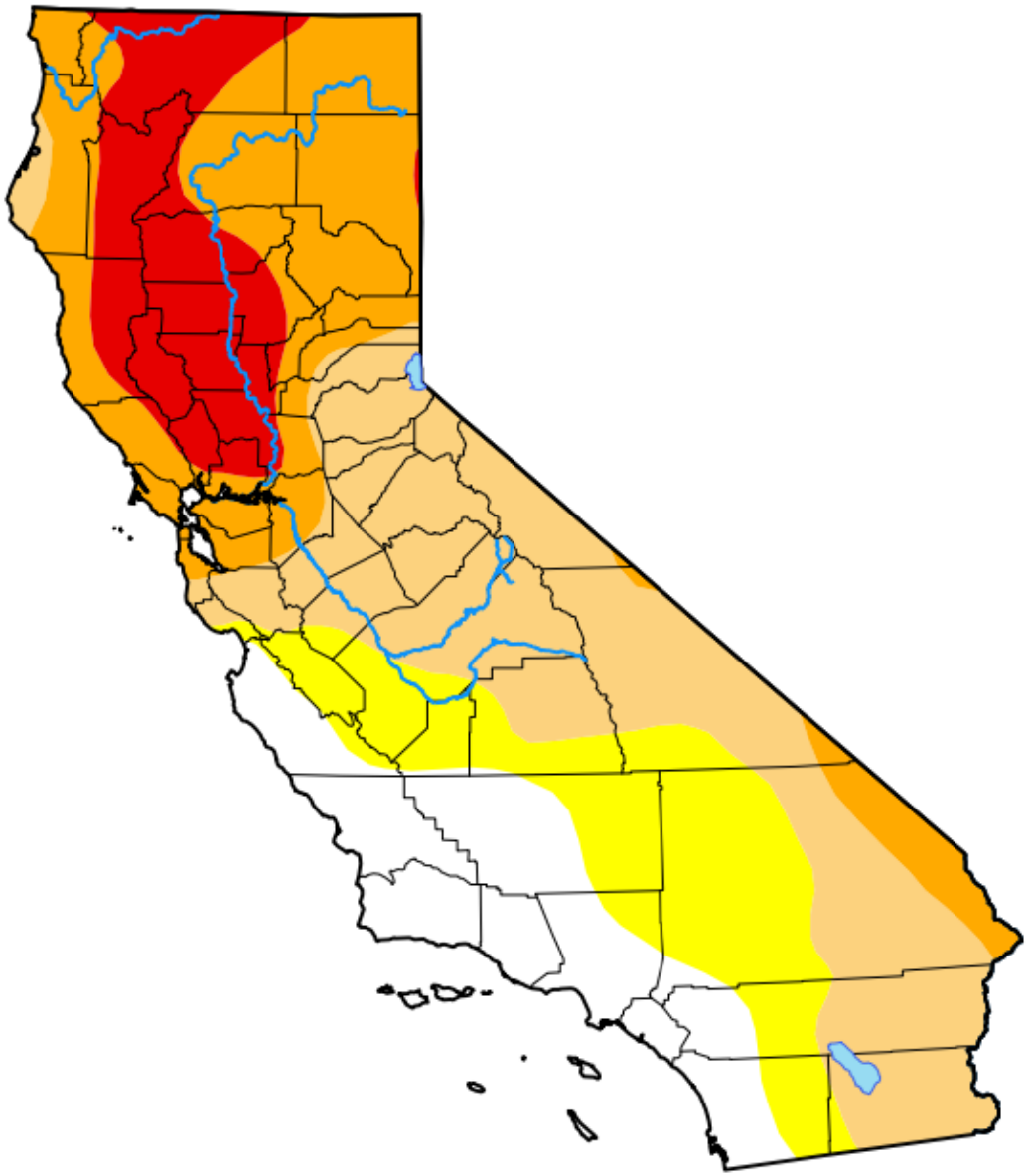
- None
- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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

Author:
Brian Fuchs
National Drought Mitigation Center

droughtmonitor.unl.edu

U.S. Drought Monitor
California



October 27, 2020
(Released Thursday, Oct. 29, 2020)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	15.40	84.60	67.54	35.61	12.74	0.00
Last Week *10-20-2020*	15.40	84.60	67.54	35.61	12.74	0.00
3 Months Ago *07-28-2020*	40.34	59.66	50.38	21.50	3.04	0.00
Start of Calendar Year *12-31-2019*	96.43	3.57	0.00	0.00	0.00	0.00
Start of Water Year *09-29-2020*	15.35	84.65	67.65	35.62	12.74	0.00
One Year Ago *10-29-2019*	82.26	17.74	2.06	0.00	0.00	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

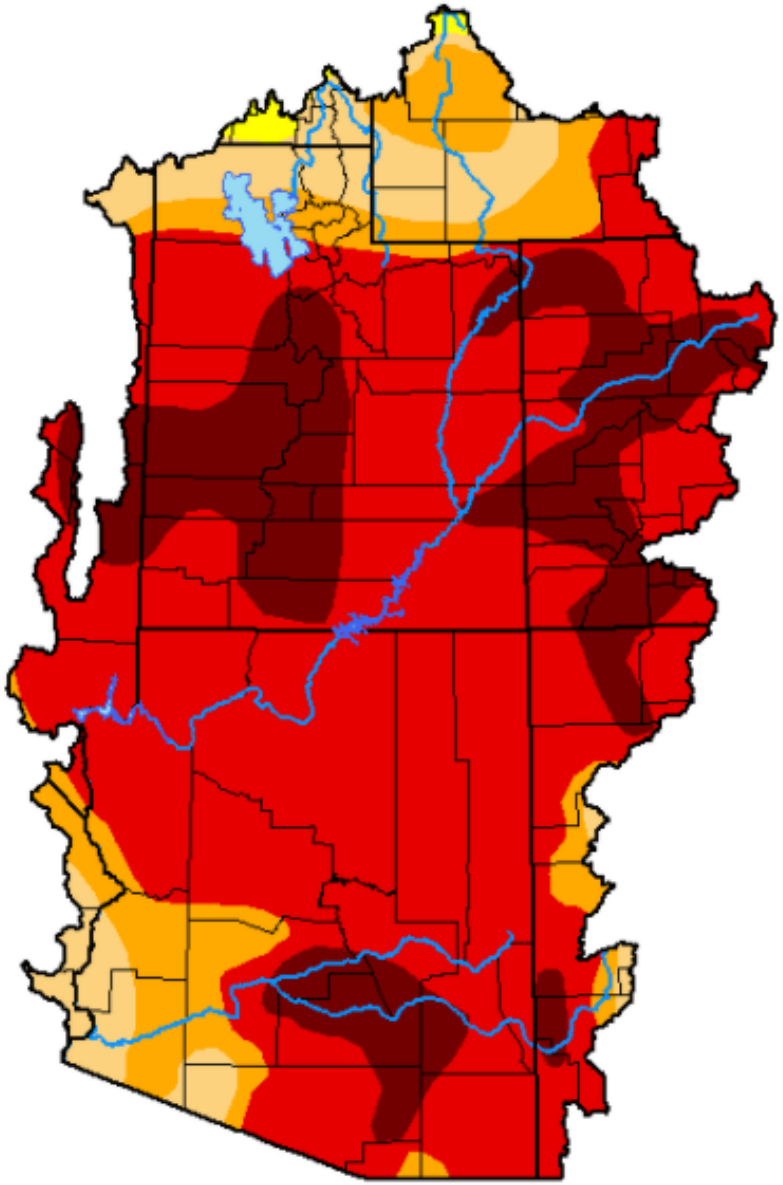
Author:

David Miskus
NOAA/NWS/NCEP/CPC

droughtmonitor.unl.edu

U.S. Drought Monitor

Colorado Basin RFC



October 27, 2020

(Released Thursday, Oct. 29, 2020)

Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	99.49	91.24	80.03	20.28
Last Week *10-20-2020*	0.00	100.00	99.49	91.24	80.03	20.28
3 Months Ago *07-28-2020*	9.57	90.43	71.31	37.15	7.19	0.00
Start of Calendar Year *12-31-2019*	43.63	56.37	37.54	23.59	0.00	0.00
Start of Water Year *09-29-2020*	0.00	100.00	98.78	87.92	72.58	7.10
One Year Ago *10-29-2019*	13.16	86.84	66.21	35.94	0.00	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

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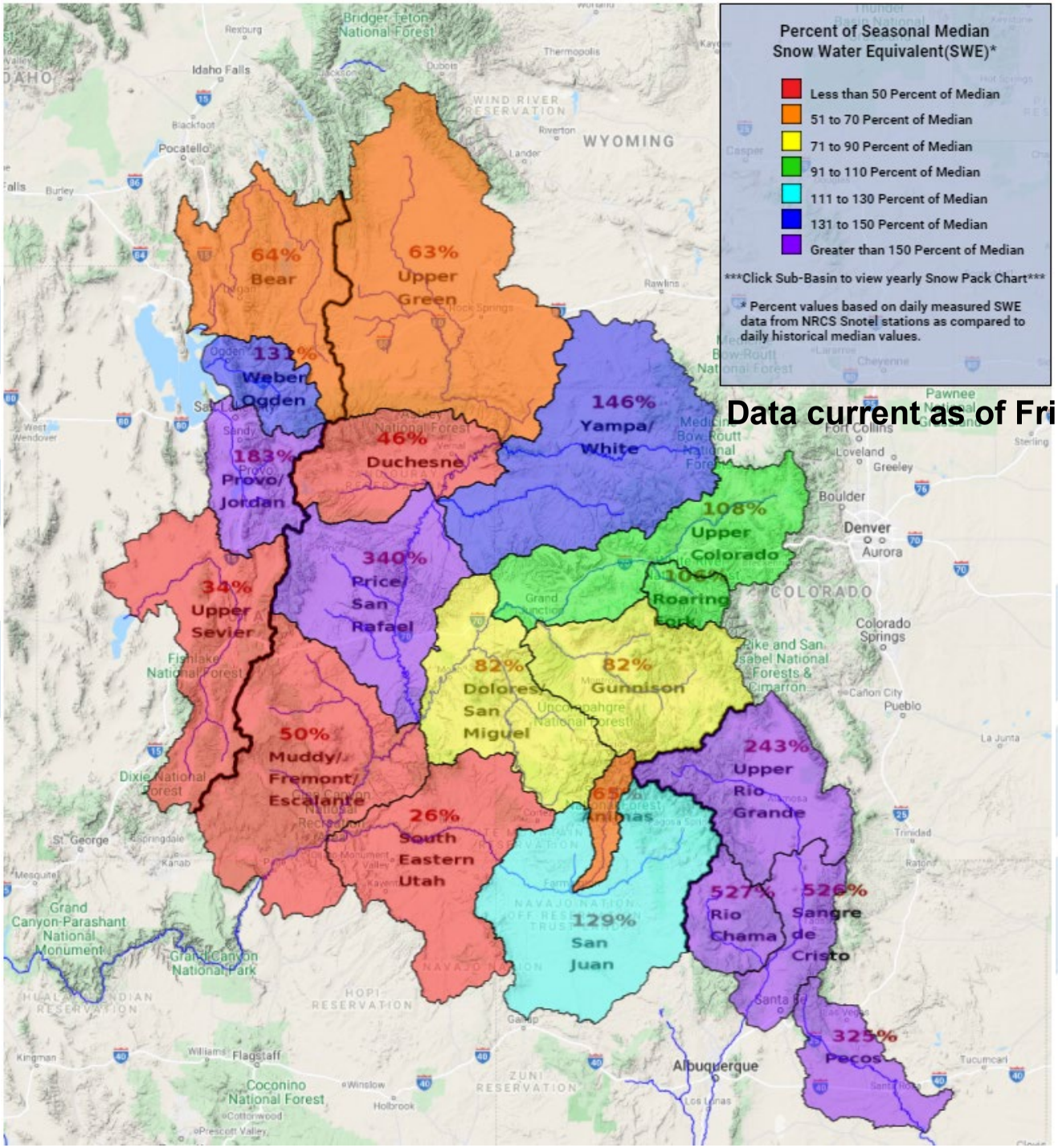
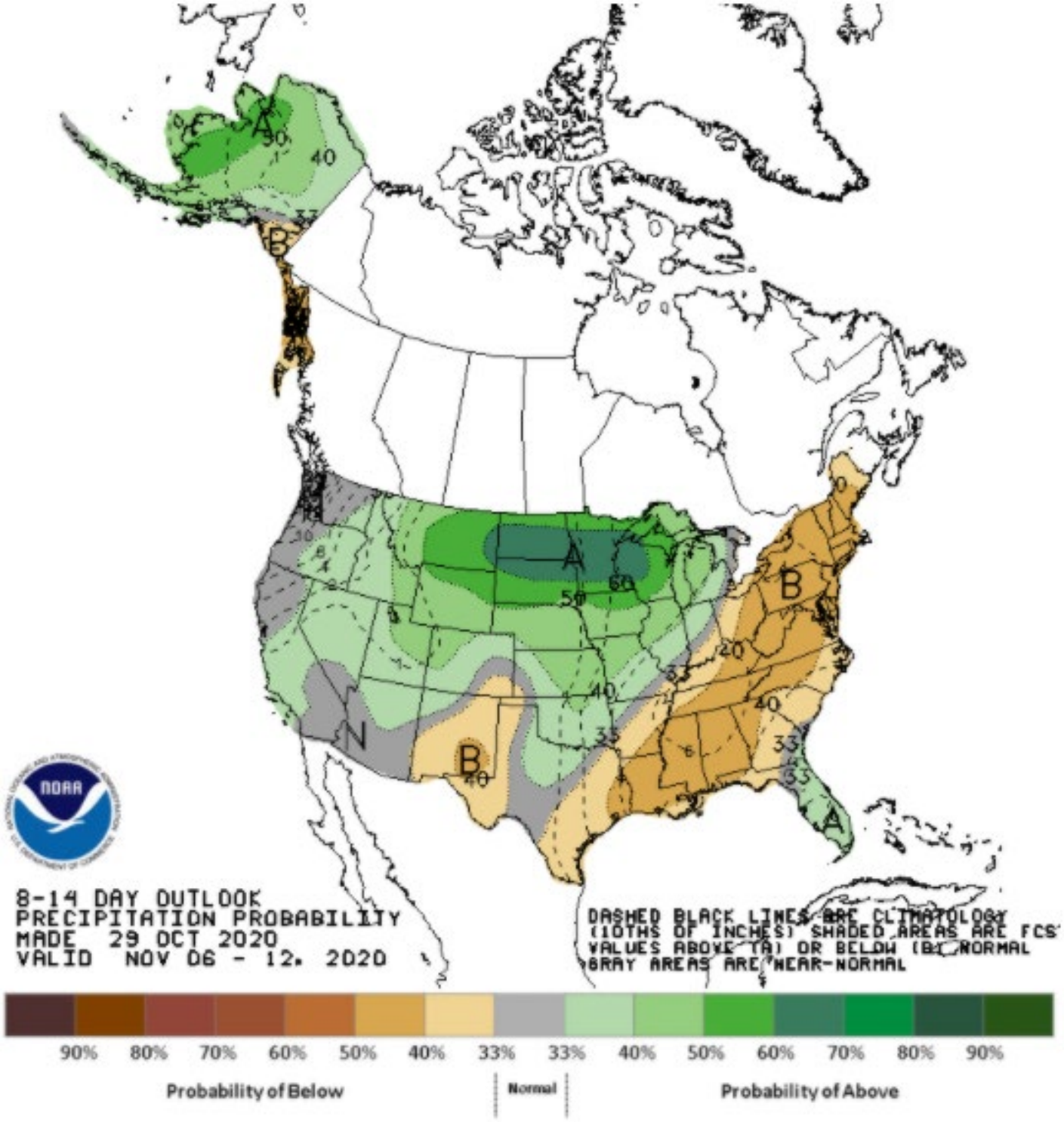
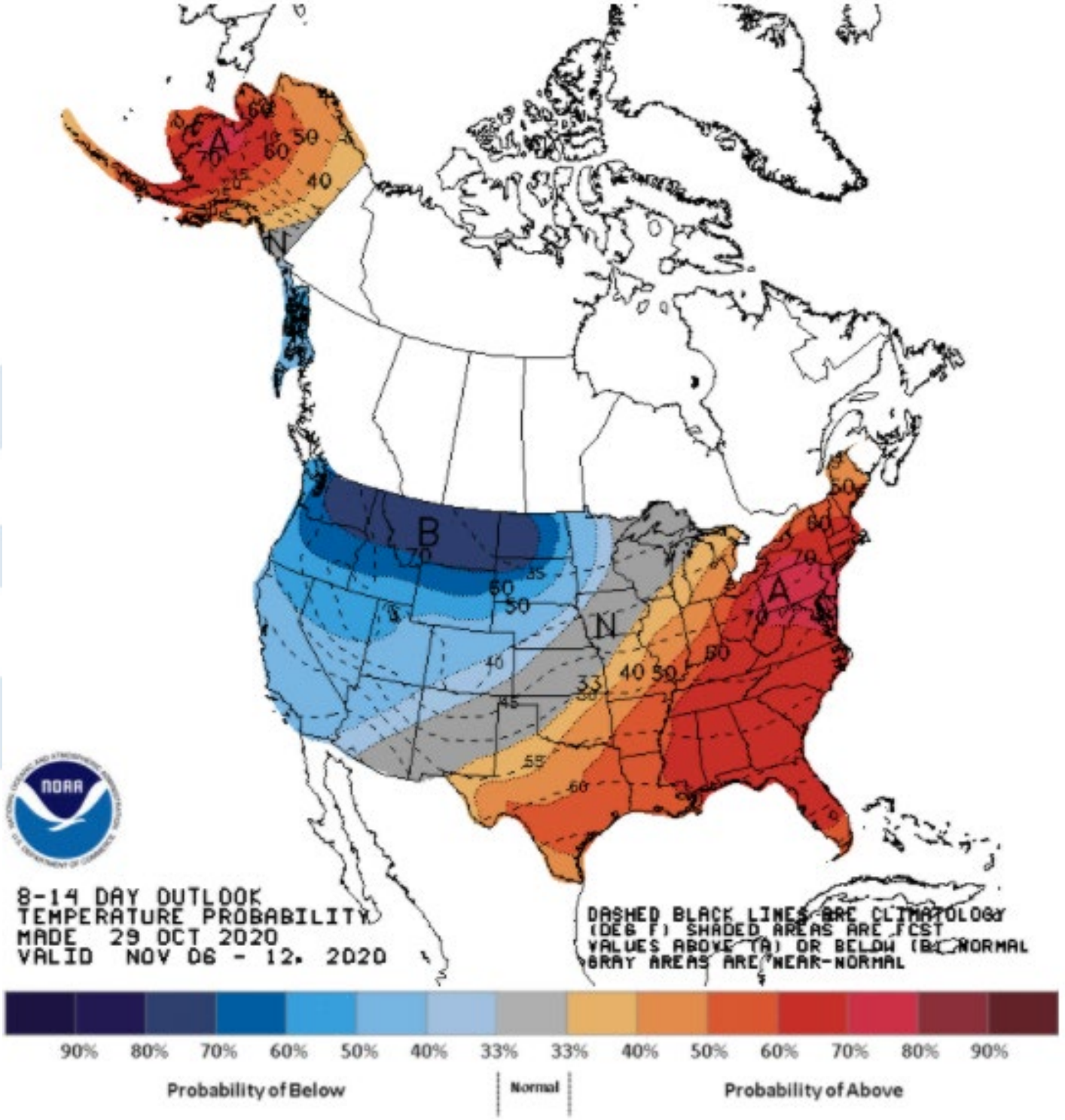
Colorado River Basin Snow Water Equivalent



Data current as of Friday Oct-30-2020


8-14 DAY OUTLOOK
PRECIPITATION PROBABILITY
MADE 29 OCT 2020
VALID NOV 06 - 12, 2020
DASHED BLACK LINES ARE CLIMATOLOGY
(10THS OF INCHES) SHADED AREAS ARE FCS
VALUES ABOVE (A) OR BELOW (B) NORMAL
GRAY AREAS ARE NEAR-NORMAL
90% 80% 70% 60% 50% 40% 33% 33% 40% 50% 60% 70% 80% 90%
Probability of Below
Normal
Probability of Above


8-14 DAY OUTLOOK
TEMPERATURE PROBABILITY
MADE 29 OCT 2020
VALID NOV 06 - 12. 2020
DASHED BLACK LINES ARE CLIMATOLOGY
(DEG F) SHADED AREAS ARE FCST
VALUES ABOVE (A) OR BELOW (B) NORMAL
GRAY AREAS ARE NEAR-NORMAL
90% 80% 70% 60% 50% 40% 33% 33% 40% 50% 60% 70% 80% 90%
Probability of Below
Normal
Probability of Above

La Niña Advisory

La Niña emerged in the tropical Pacific in August 2020 and an 85% chance of these conditions is forecasted to last through Northern Hemisphere winter.

Source: NOAA (https://www.climate.gov/enso)

40 to >50% chances of below normal rainfall in Dec-Jan-Feb and Jan-Feb-Mar rainfall in southern CA and NV, and 33 to 40% chances of below for rest of the region/season, bar northernmost CA and NV.

Source: CA-NV DEWS drought & climate outlook webinar https://www.youtube.com/watch?v=1bbmvTCv4vA

Forecasting the Water Year – Going Beyond an Expectation of Wet or Dry

- Fall (October/November)
  - Precipitation Onset
  - Temperature Anomaly
  - Soil Moisture State with Snowpack Initiation
- Winter (December/January/February)
  - Wet/Dry
  - Notable Anomalies
- Spring (March/April/May)
  - Late-Season Bailout?
  - Peak Snowpack Timing and Magnitude

Dr. Anderson's WY2021 Outlook

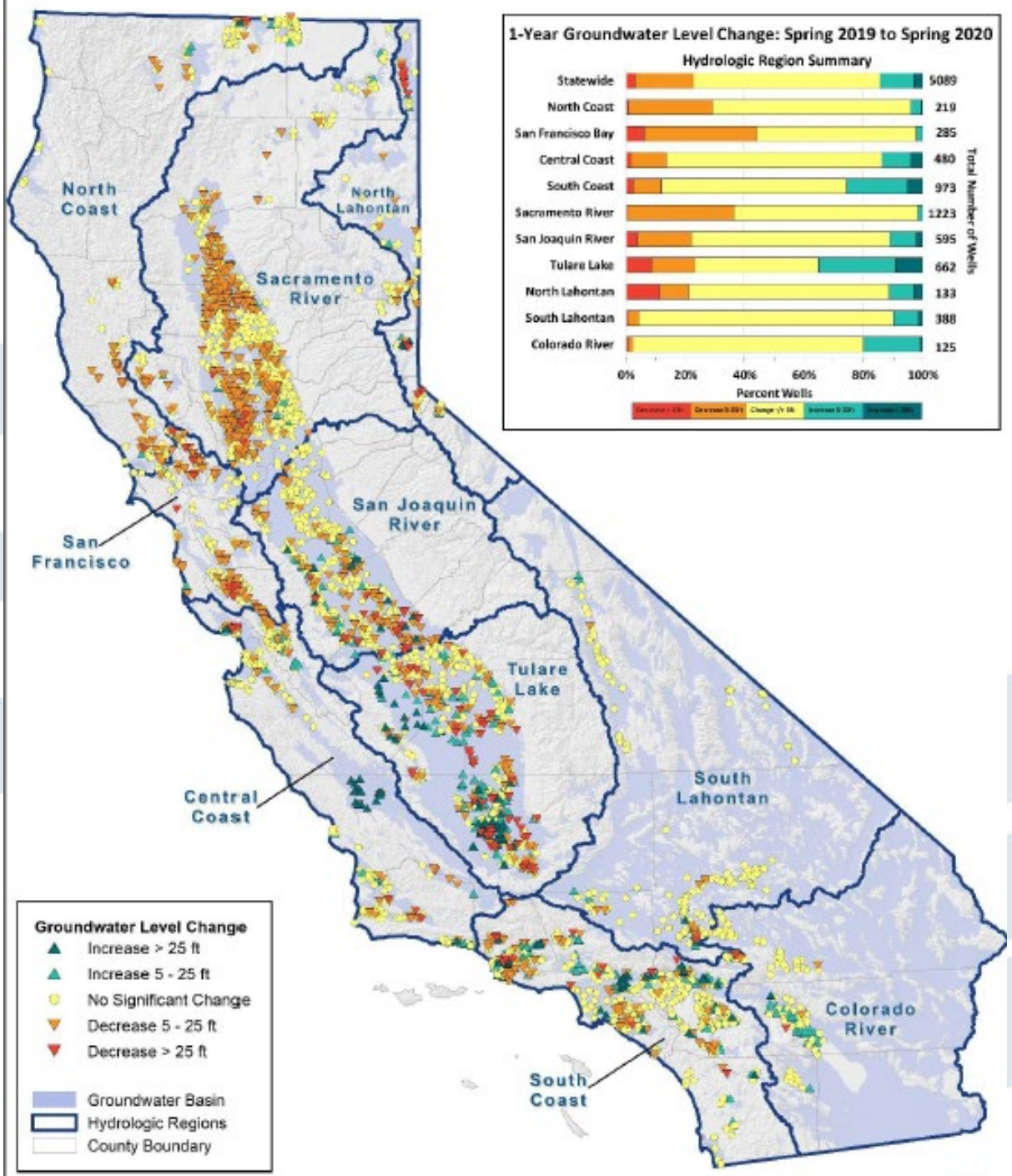
- Late start to precipitation onset- but before Thanksgiving?
- Dry soils for snowpack initiation
- More sunny days than not; likely chasing average through winter*
- *December and February may offer chances for wet episodes that can briefly push conditions above average
- Below-Average spring precipitation; warmer than average temperatures
- Below 75% of average snowpack on April 1

Caveat: I have no demonstrable skill in any of the information I have for my outlook.

Groundwater Conditions

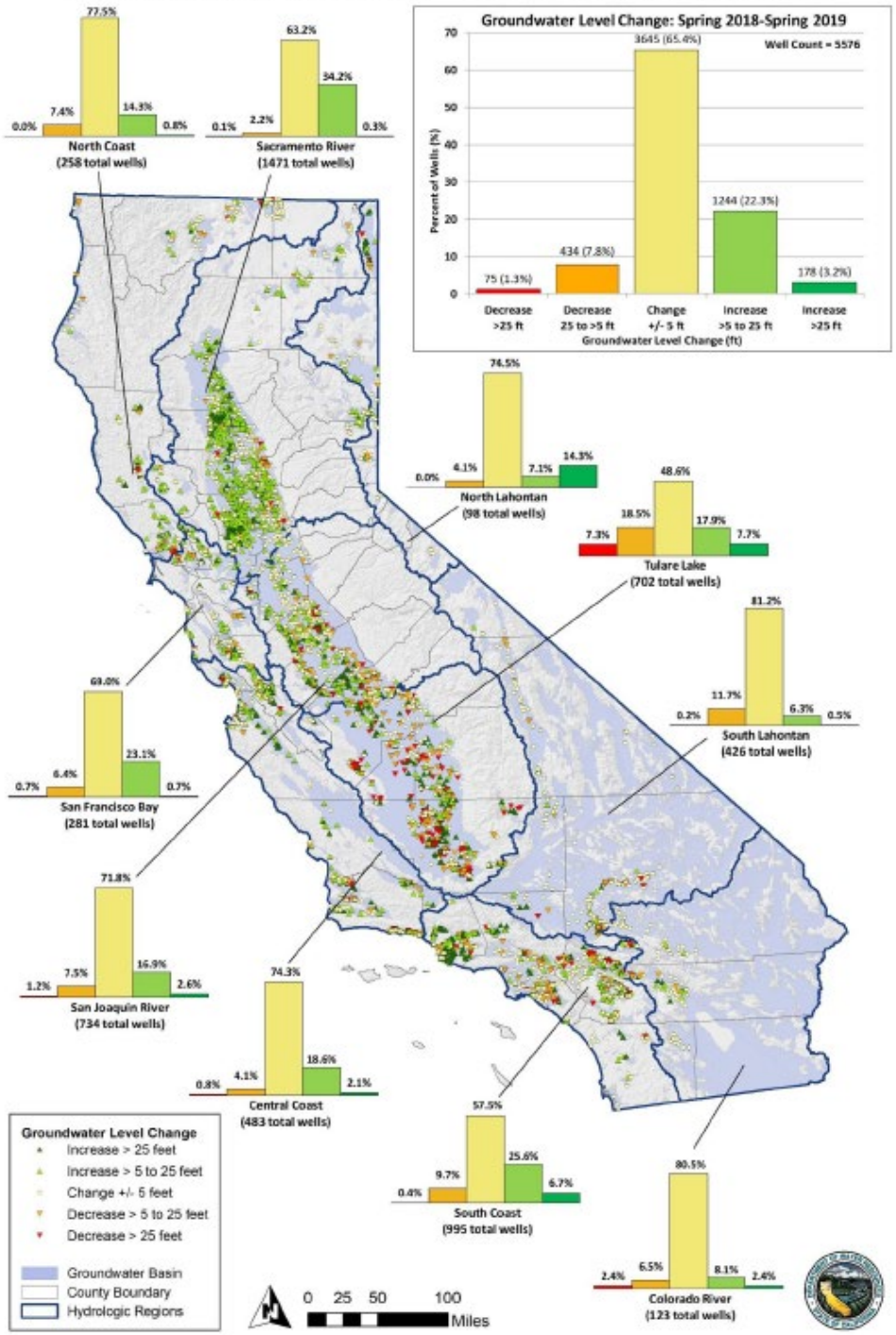
Stanley Mubako, SWRCB

Groundwater* Level Change - Spring 2019 to Spring 2020

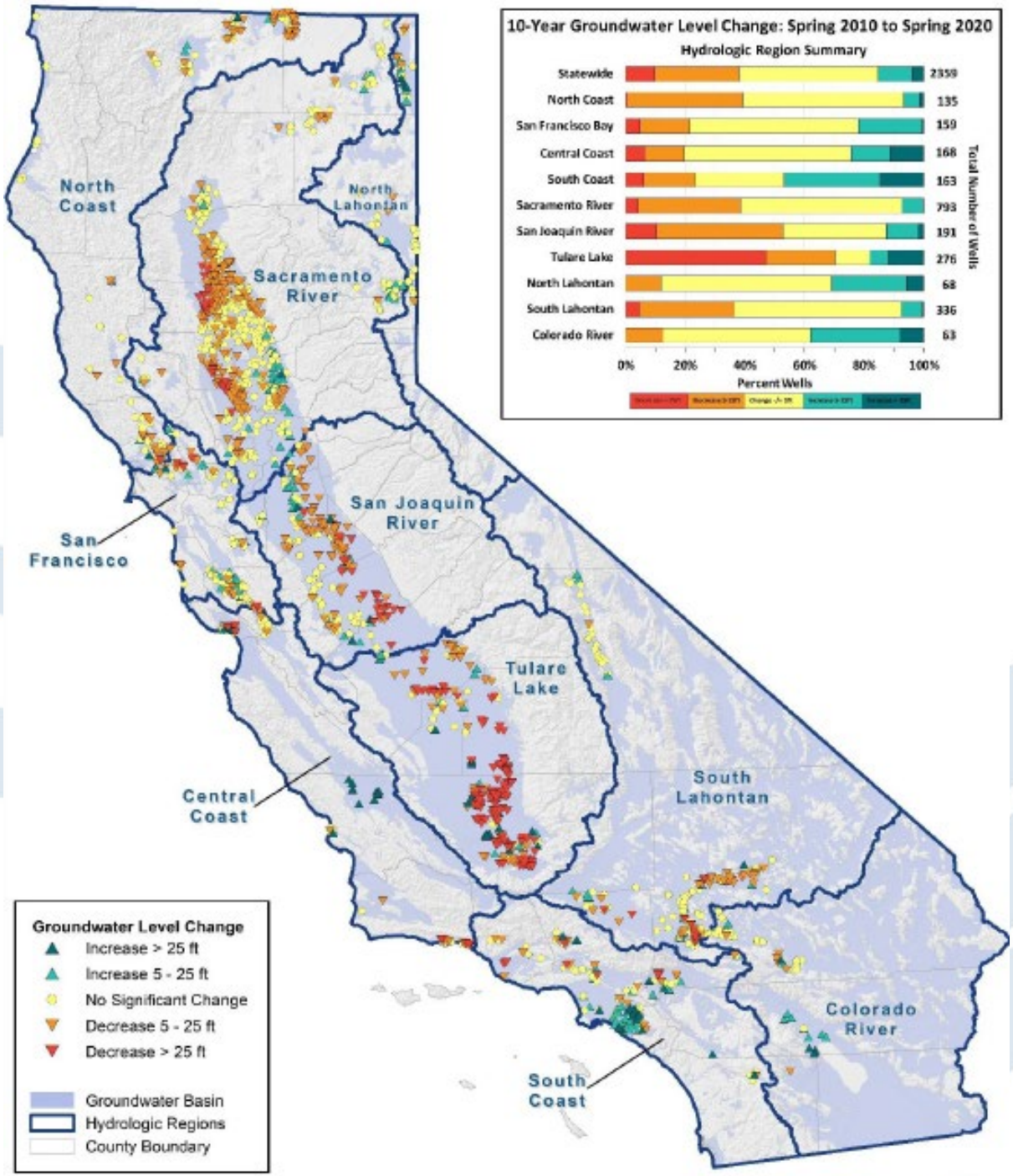


*Groundwater level change map for one-year comparison between springs 2019 and 2020. Groundwater level change determined from water level measurements in wells. Map and chart based on available data from the DWR Enterprise Water Management Database as of 09/22/2020. Map Updated: 09/22/2020.

Groundwater Level Change* - Spring 2018 to Spring 2019



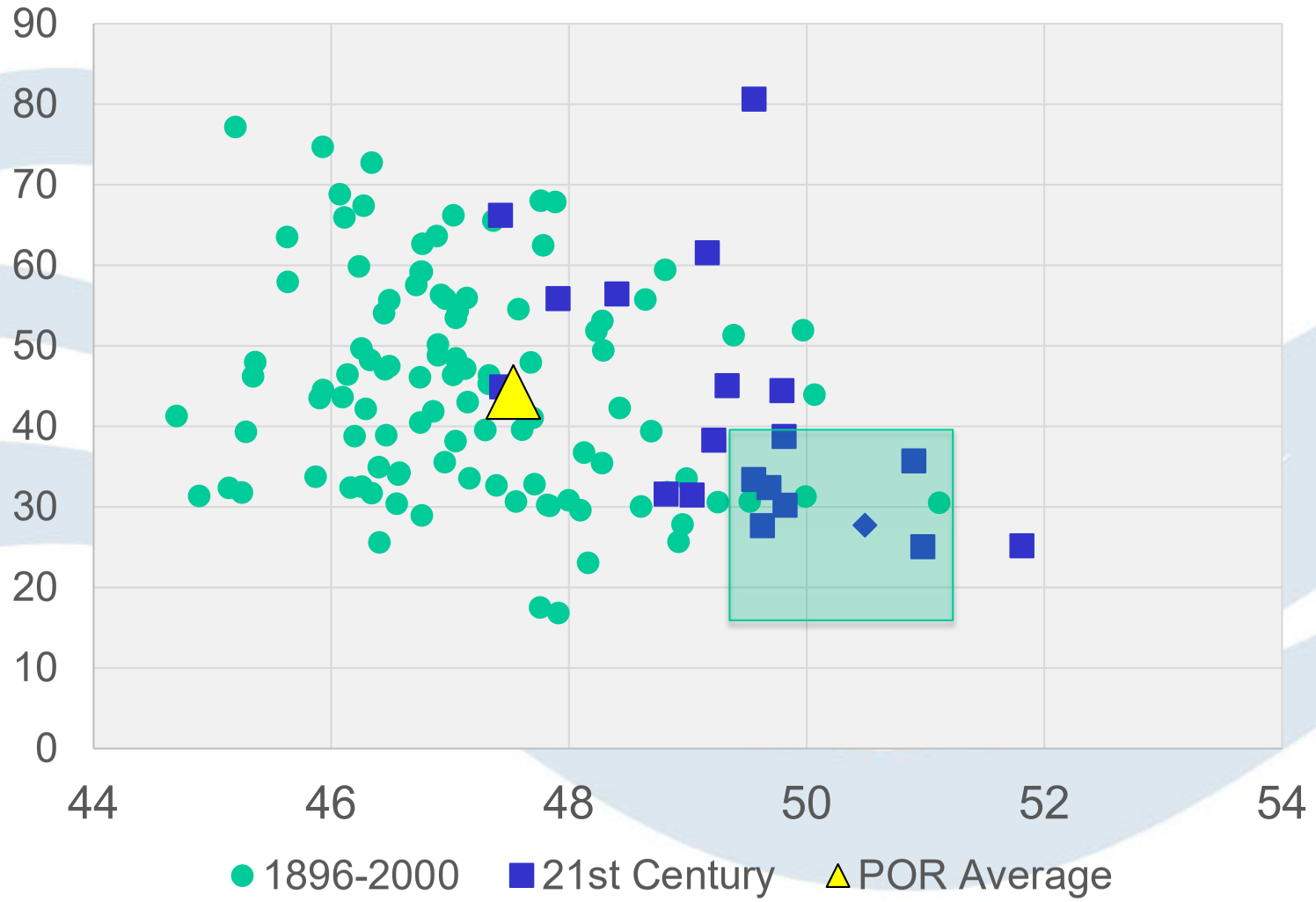
Groundwater* Level Change - Spring 2010 to Spring 2020



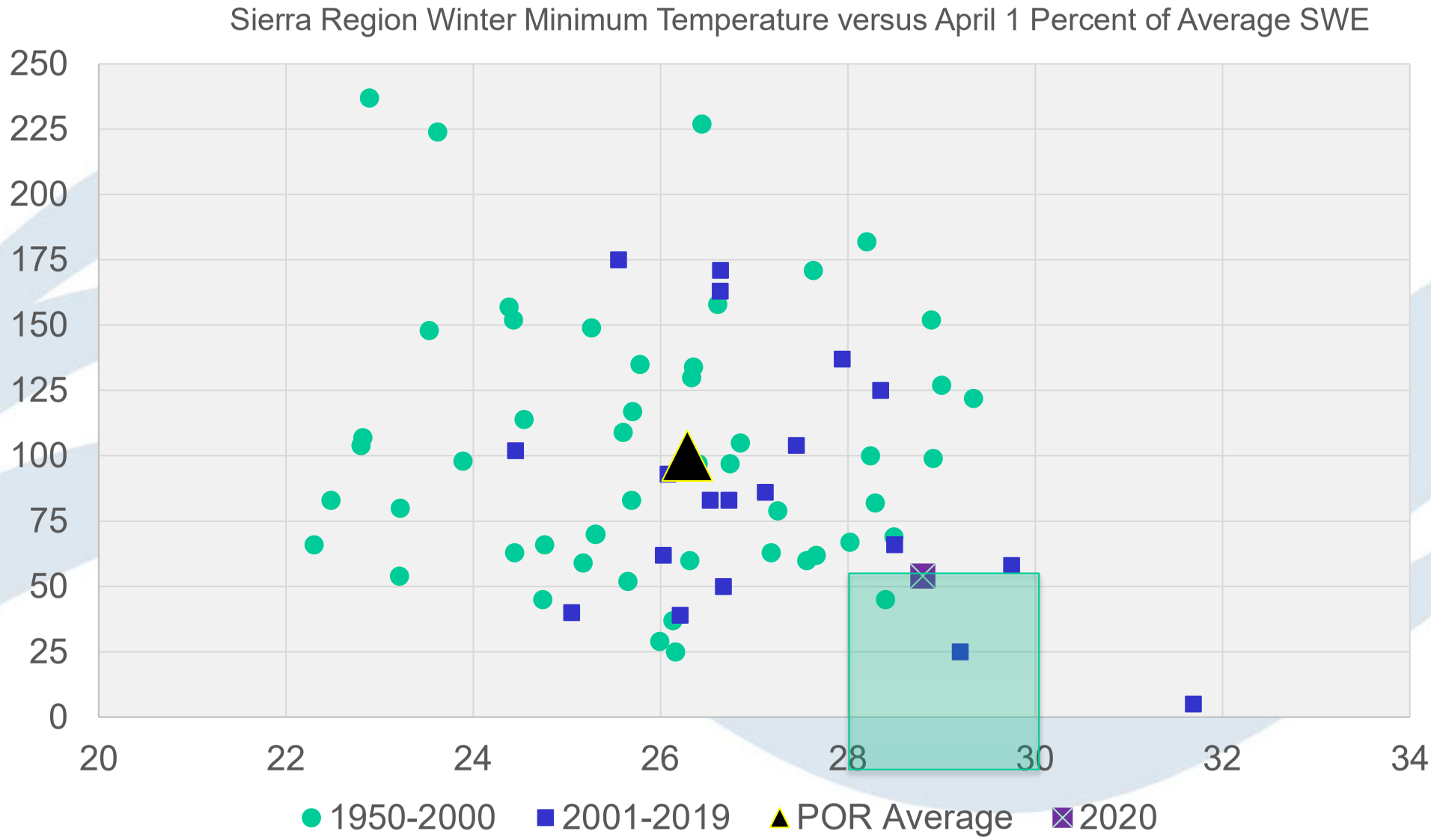
*Groundwater level change map for 10-year comparison between springs 2010 and 2020. Groundwater level change determined from water level measurements in wells. Map and chart based on available data from the DWR Enterprise Water Management Database as of 09/22/2020. Map Updated: 09/22/2020.

Questions?

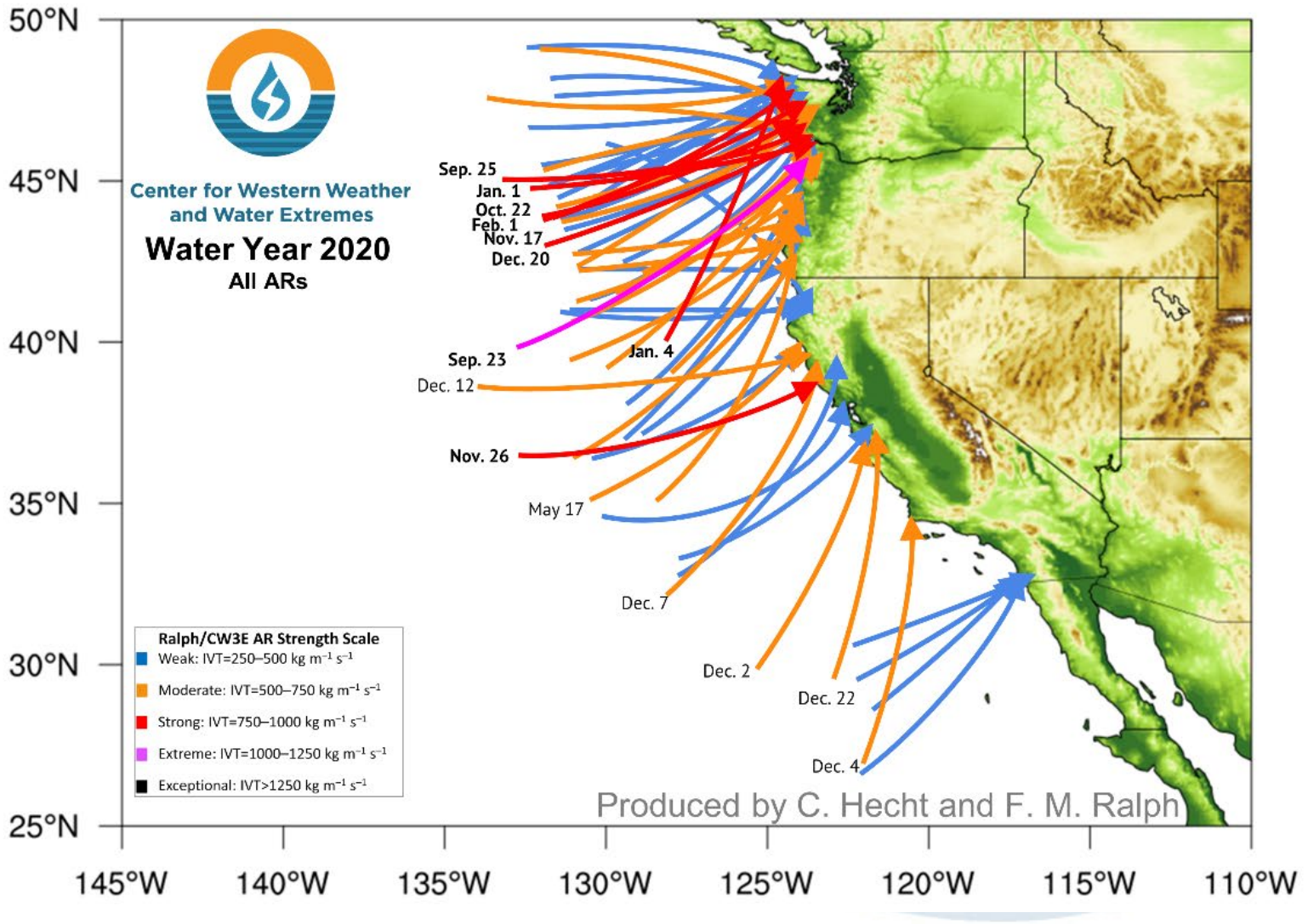
Sierra Temperature and Precipitation



Snowpack and Sierra Winter Minimum Temperature



Atmospheric River Landfalls for WY2020



Statewide Annual Precipitation