



— BUREAU OF —  
RECLAMATION

# Navajo Unit Operations Coordination Spring Meeting Slides

April 21, 2020

Reclamation

Western Colorado Area Office



# MEETING NOTICE



In response to the recommendations from the CDC, local authorities, and Department of Interior guidance, the spring coordination meeting for the operation of the Navajo Unit, scheduled for Tuesday, April 21<sup>st</sup>, at 1:00 pm, was canceled.



These slides are being provided in lieu of the meeting, along with an operational summary document. Please contact Susan Behery ([sbehery@usbr.gov](mailto:sbehery@usbr.gov), 970-385-6560) for any questions or comments you might have.



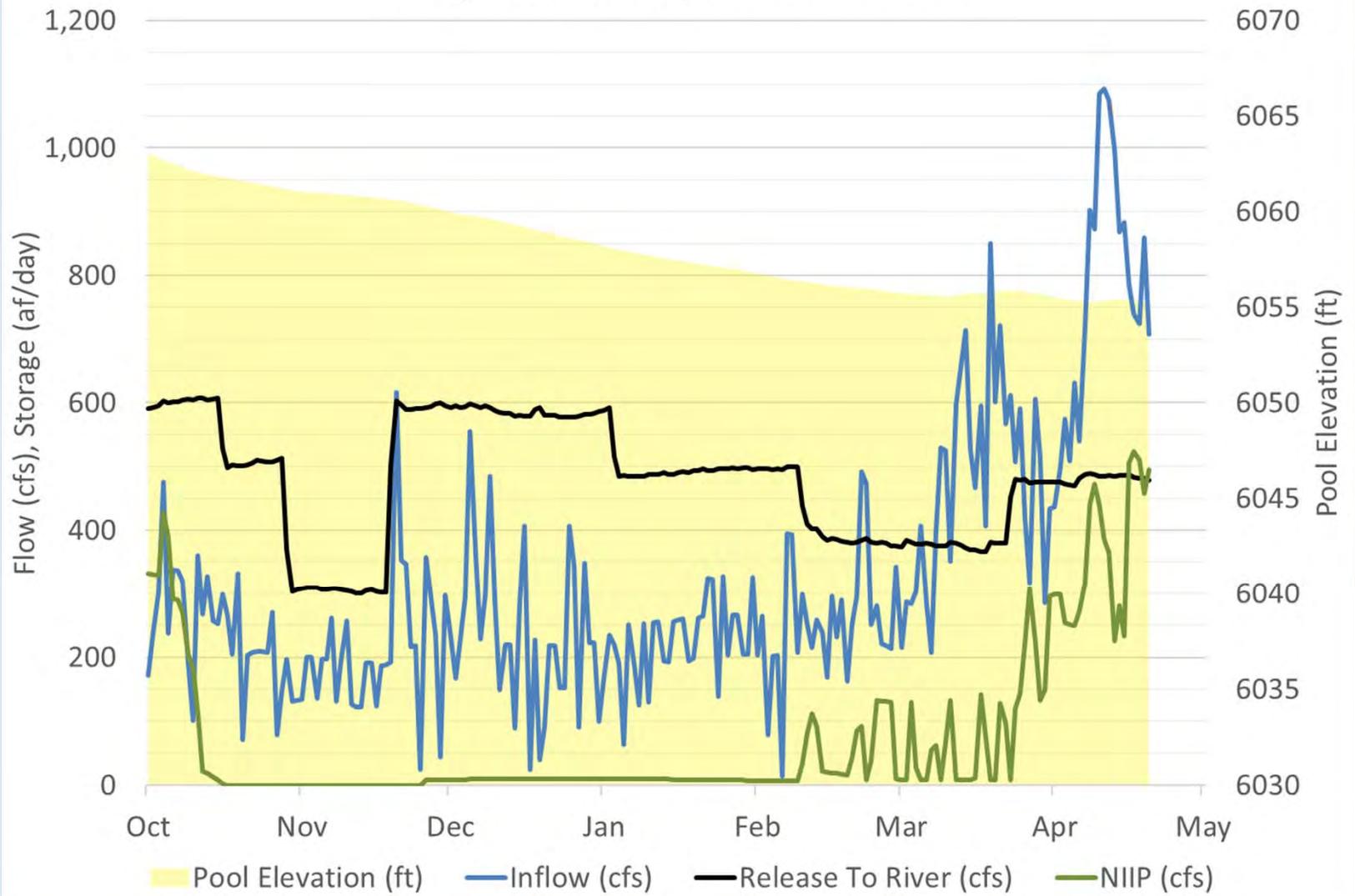
The next coordination meeting for the Navajo Unit is being scheduled for late August. A notice will be sent out when the date is finalized.

# Summary

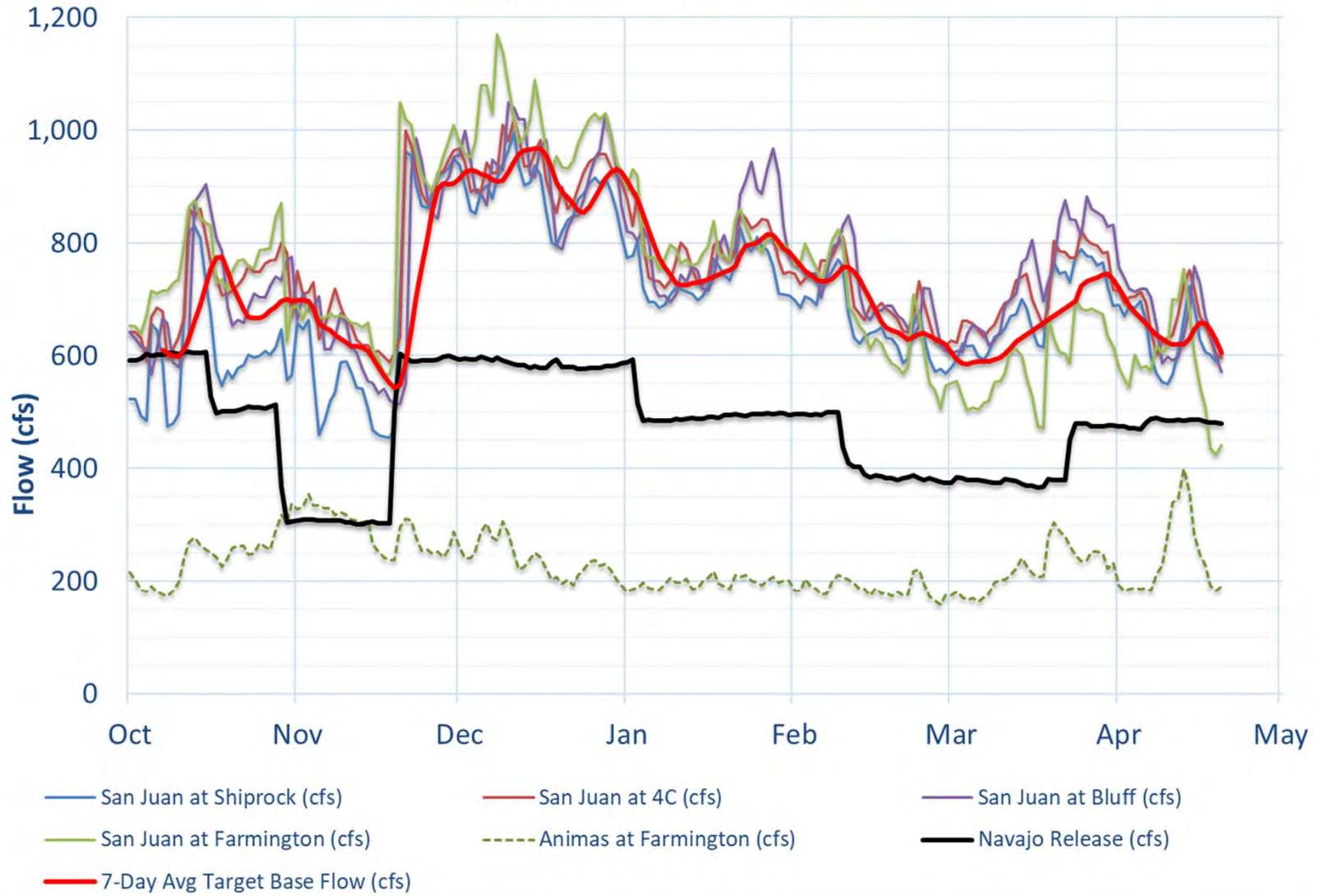
- Despite near-average snowpack, dry soils persist and are expected to have an effect on runoff efficiency. Runoff forecasts throughout the basin are below-average for this reason.
- Navajo Reservoir is expected to peak between 6060 and 6065 ft. No high releases are planned for this spring. Releases from Navajo Reservoir are expected to remain at or near the current level through spring runoff.
- After runoff ends, Navajo releases will likely increase to accommodate irrigation season while maintaining the recommended target baseflow range in the critical habitat reach. Releases are expected to vary between 500 and 1,000 cfs.
- Other Reclamation projects in the San Juan River Basin are not projected to fill under the most recent runoff forecasts.



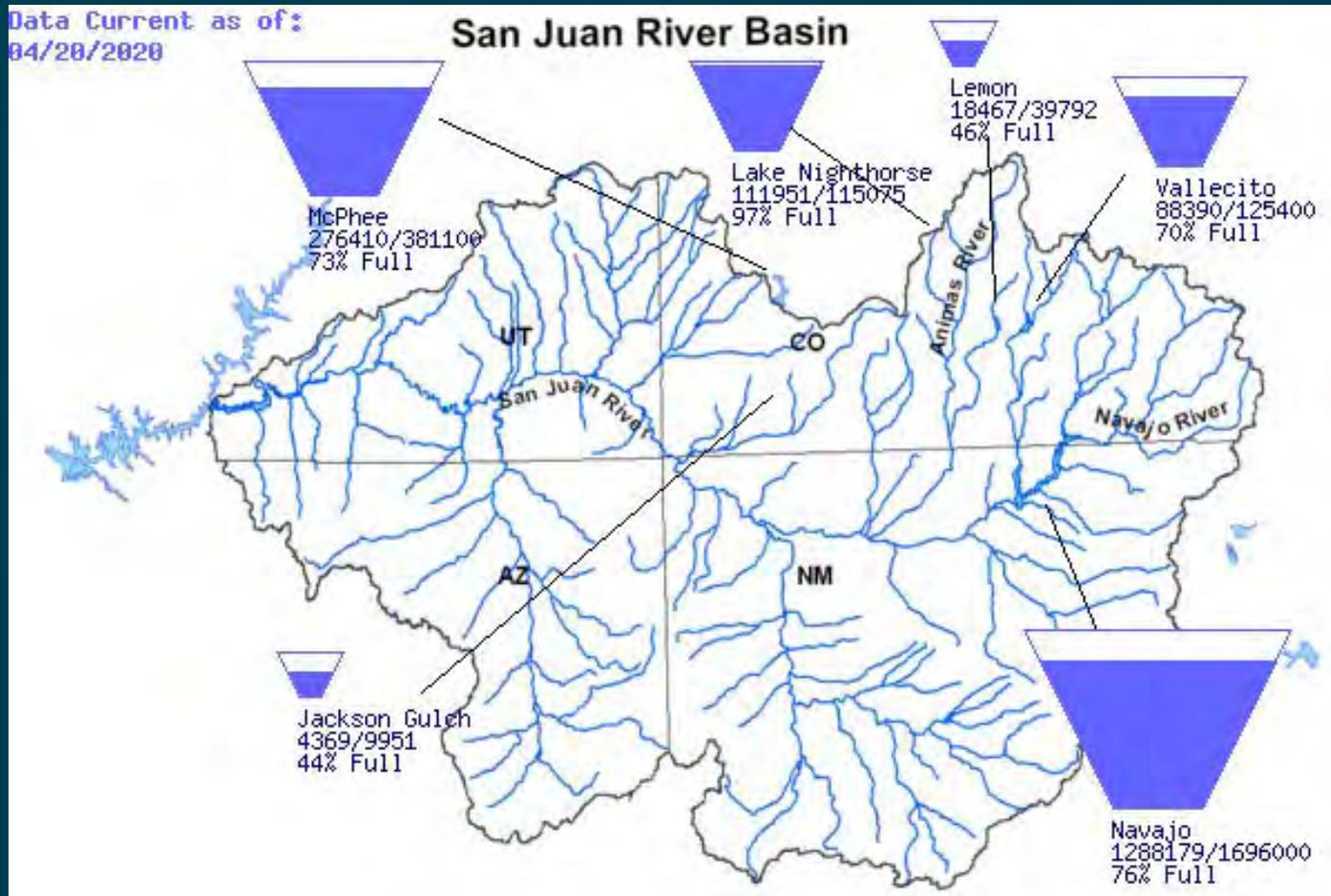
# Navajo Reservoir Operations WY 2020



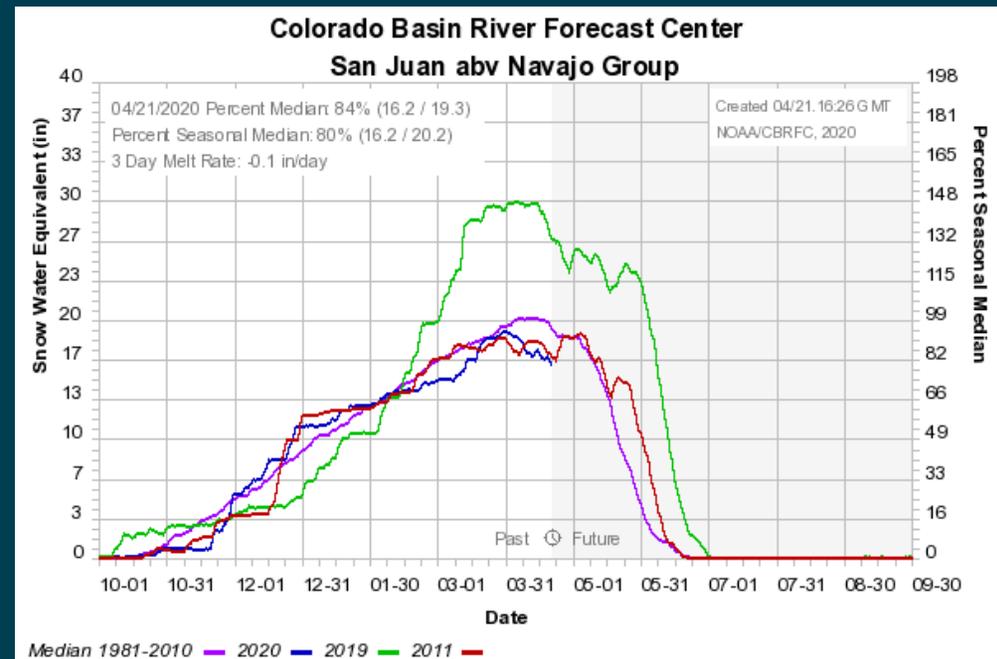
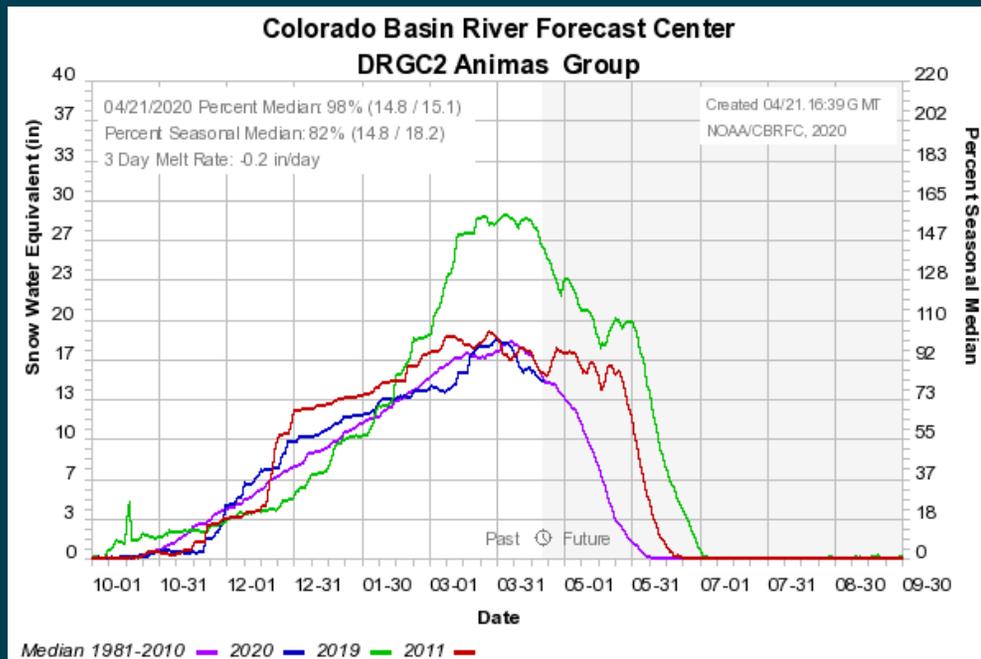
### San Juan River Flows WY 2020



# Current Reservoir Status



# Current Snowpack Status



WY 2019 (last year) and WY 2011 shown similar SWE Peak) for comparison.







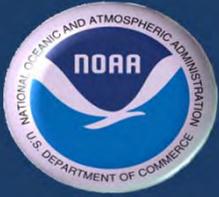
# Weather Outlook

## April 2020



### Discussion / Outline

- Since the first of the year over southeastern Utah cooler than normal and over southwestern Colorado warmer than normal. For Precipitation well below normal over the headwaters since the first of the year.
- So far for the beginning of April warmer than normal with precipitation well below normal since the first of the month.
- The latest storm last week and into the weekend brought some relief to northern Colorado but very little to southwestern Colorado. The melt did slow slightly but there were no increases in snowpack for the major southwestern river basins.



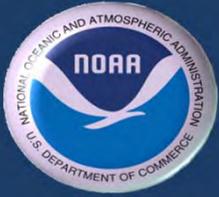
# Weather Outlook

## April 2020



### Discussion / Outline

- Moderate drought remains entrenched over the head waters with severe drought over the lower elevations of southeastern Utah and southwestern Colorado.
- ENSO-neutral conditions are present and are expected to continue into the fall of 2020.
- Late spring into summer equal chance of either above, below or normal precipitation. Higher chances of above normal temperatures
- Drought is predicted to remain.



# The Past

## April 2020

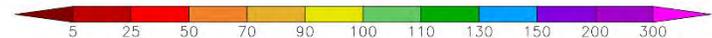
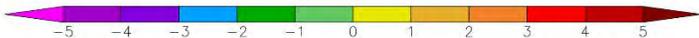
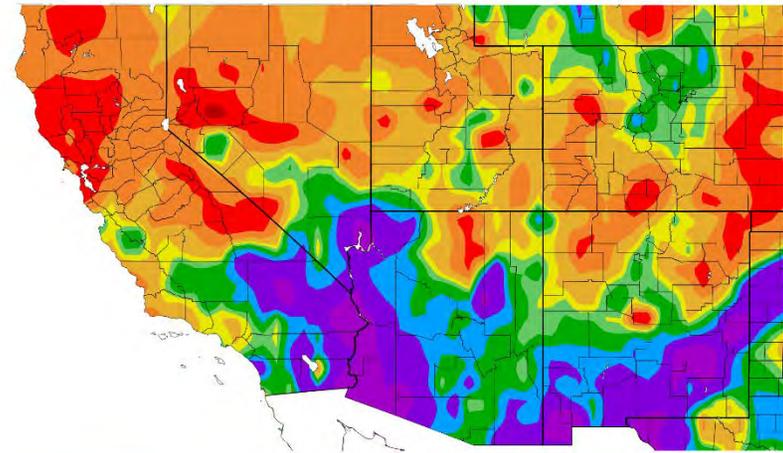
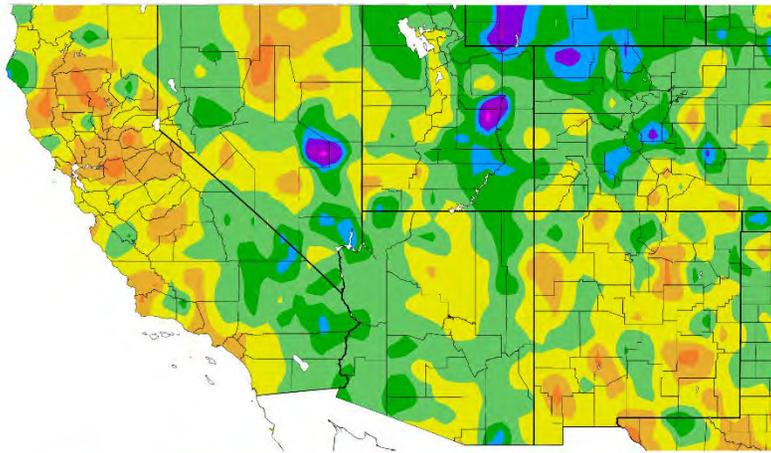


### Temperature Departure from normal

### Precipitation % of normal

Departure from Normal Temperature (F)  
10/1/2019 - 4/18/2020

Percent of Normal Precipitation (%)  
10/1/2019 - 4/18/2020



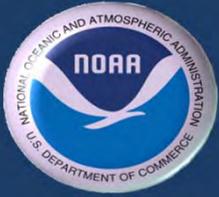
Generated 4/19/2020 at IPRCC using provisional data.

NOAA Regional Climate Centers

Generated 4/19/2020 at IPRCC using provisional data.

NOAA Regional Climate Centers

## Water Year 2020



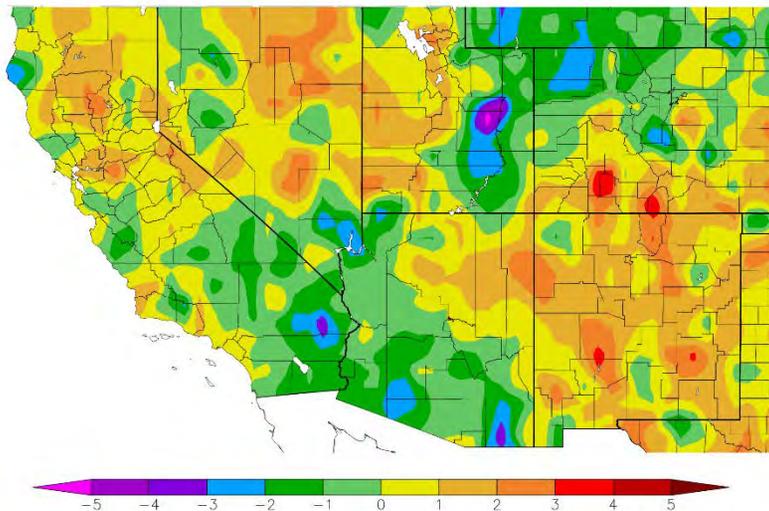
# The Past

## April 2020



### Temperature Departure from normal

Departure from Normal Temperature (F)  
1/1/2020 - 4/18/2020

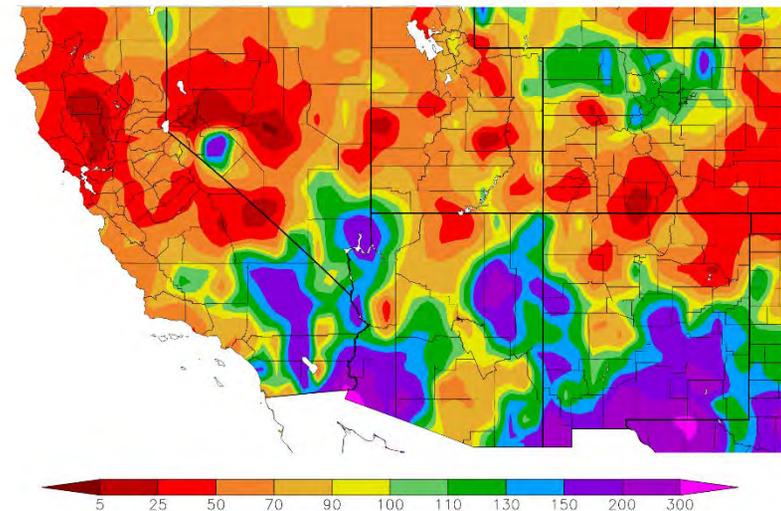


Generated 4/19/2020 at IPRCC using provisional data.

NOAA Regional Climate Centers

### Precipitation % of normal

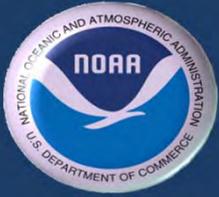
Percent of Normal Precipitation (%)  
1/1/2020 - 4/18/2020



Generated 4/19/2020 at IPRCC using provisional data.

NOAA Regional Climate Centers

## From January 1, 2020



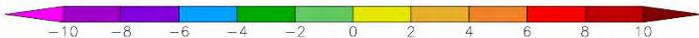
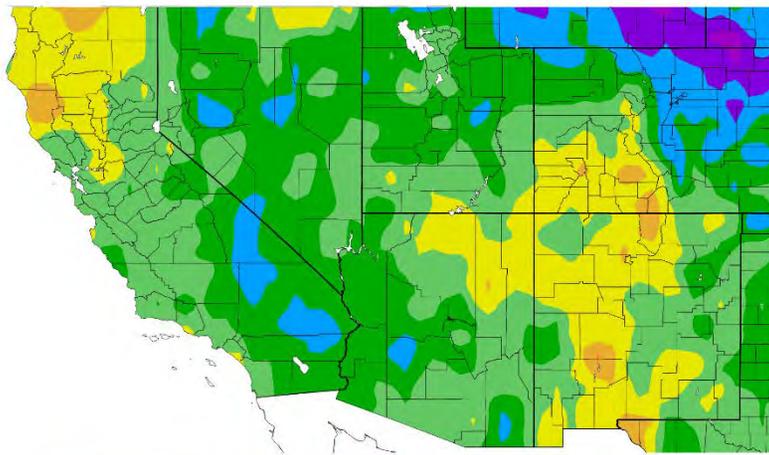
# The Past

## April 2020



### Temperature Departure from normal

Departure from Normal Temperature (F)  
4/1/2020 - 4/18/2020

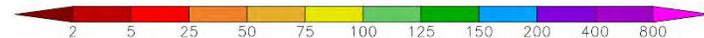
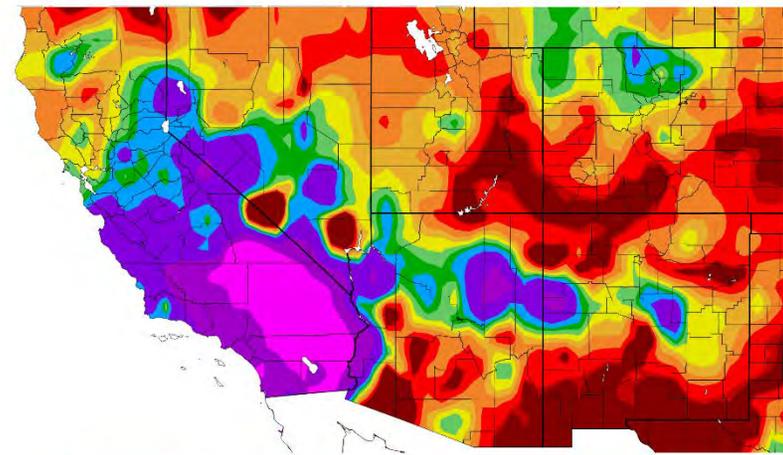


Generated 4/19/2020 at IPRCC using provisional data.

NOAA Regional Climate Centers

### Precipitation % of normal

Percent of Normal Precipitation (%)  
4/1/2020 - 4/18/2020



Generated 4/19/2020 at IPRCC using provisional data.

NOAA Regional Climate Centers

## From April 1, 2020

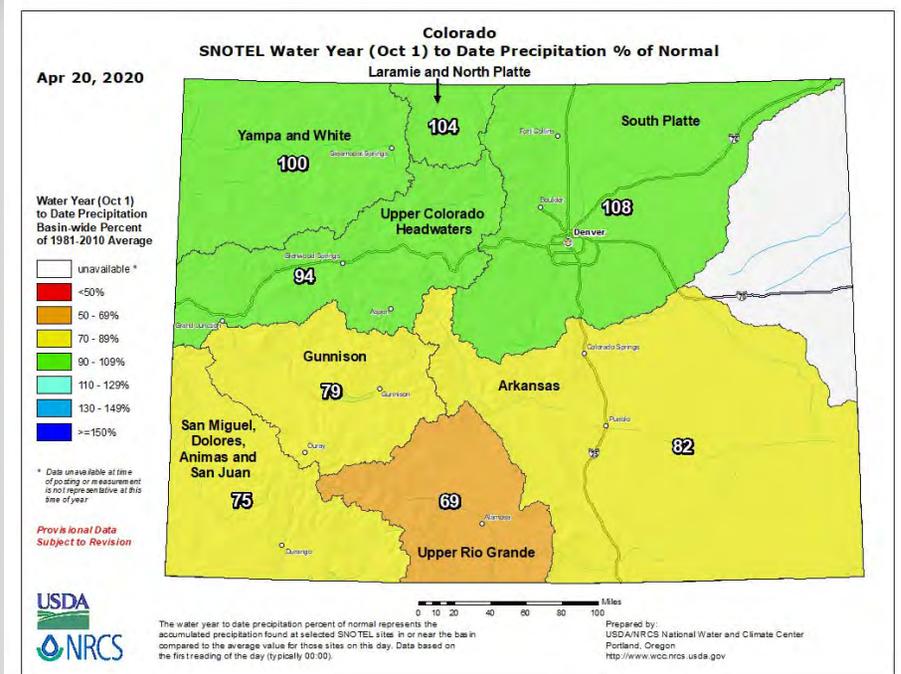
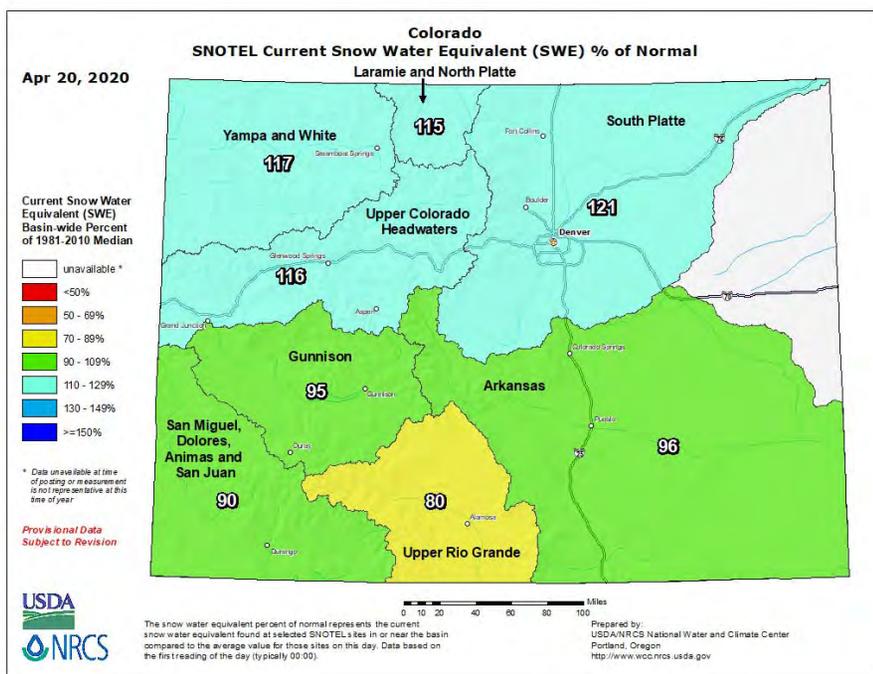


# Snotel April 2020



## SWE

## Precipitation



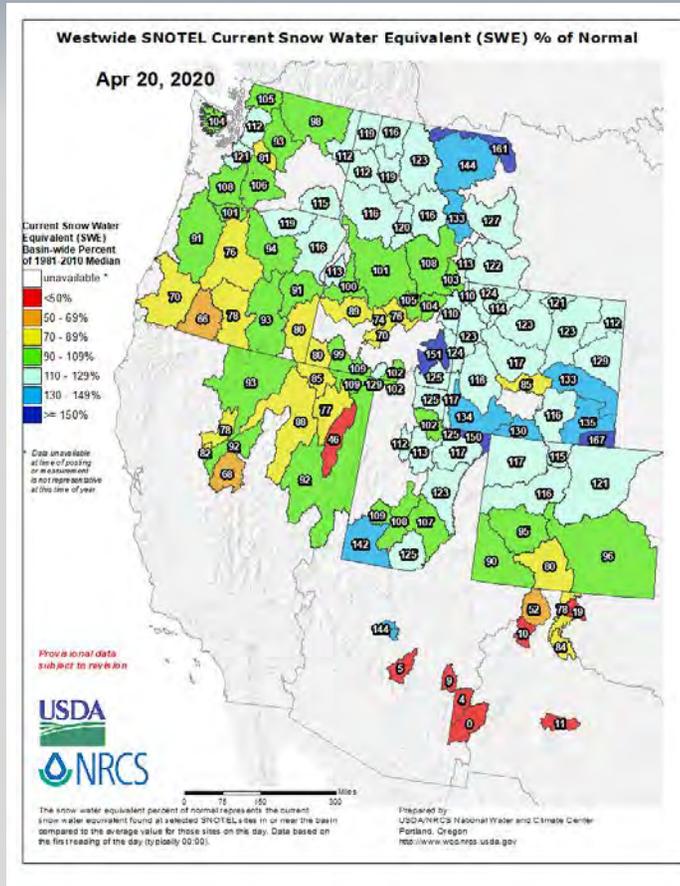
# SNOTEL - Percent of Normal - Colorado Water Year 2020



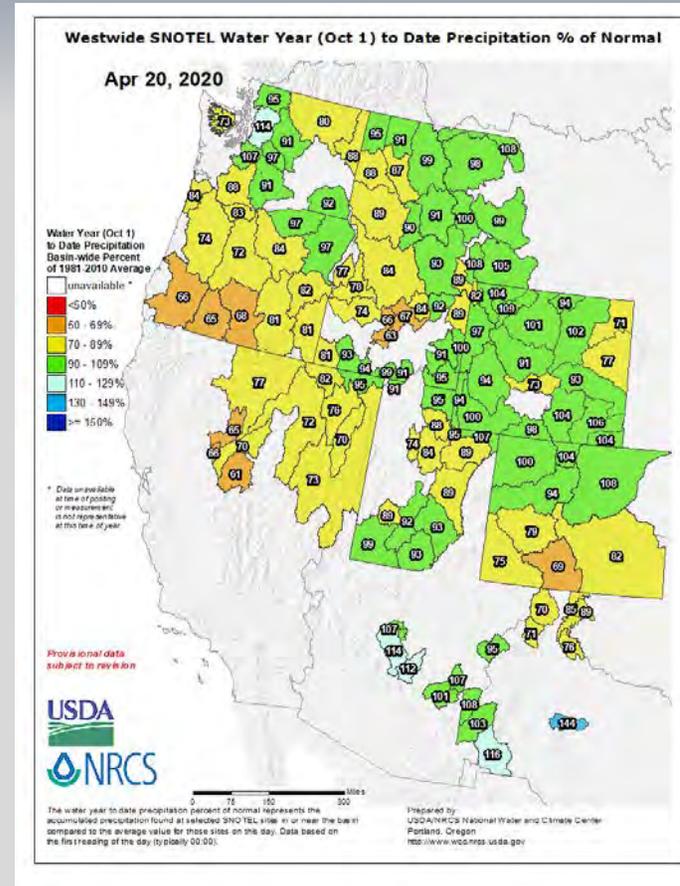
# Snotel April 2020



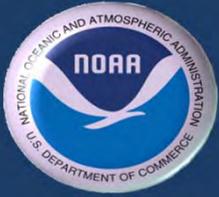
## SWE



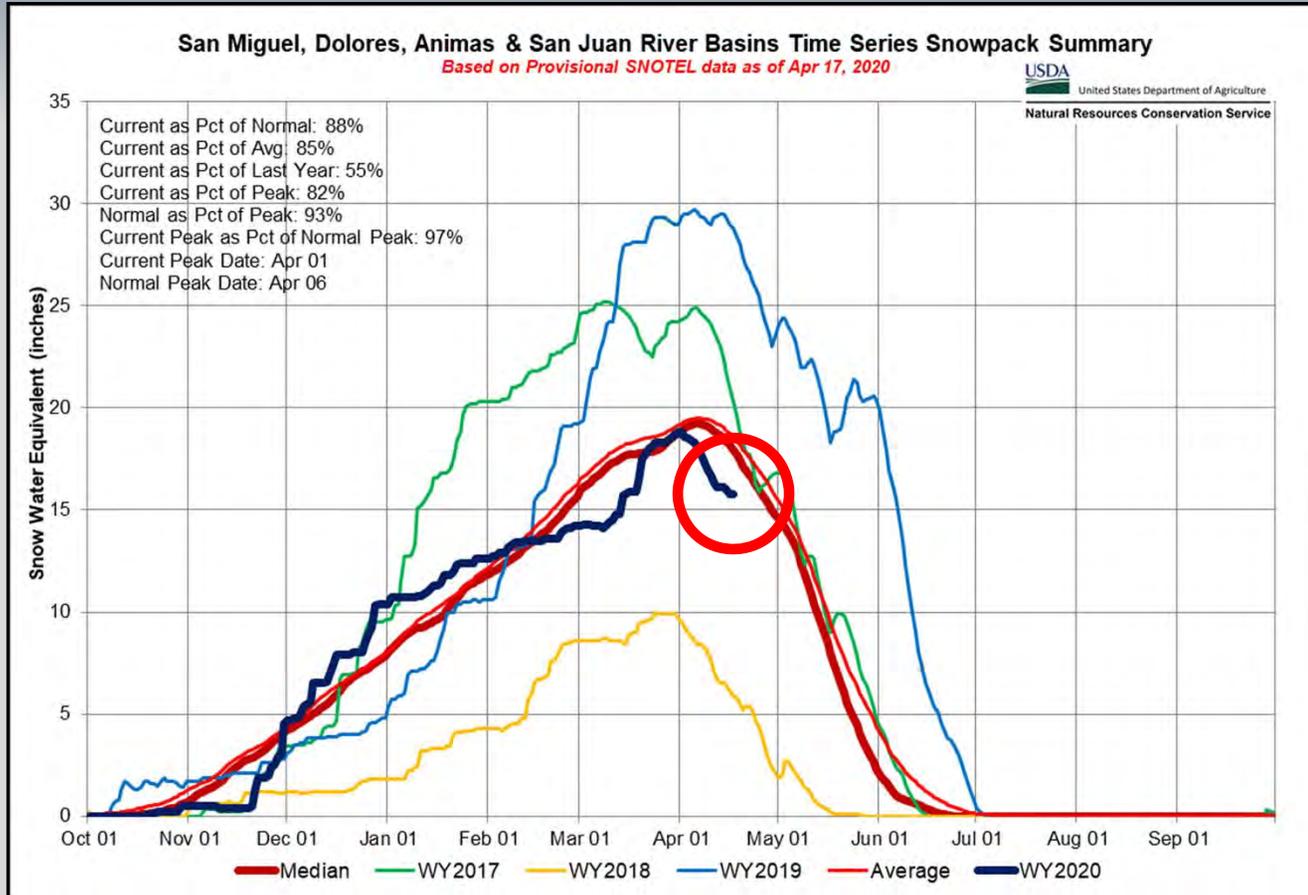
## Precipitation



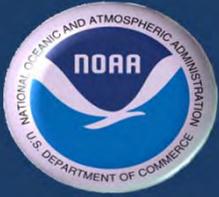
# SNOTEL - Percent of Normal Water Year 2020



# Snow April 2020



**SNOTEL Snow Water Equivalent – NRCS  
Southwestern Colorado**



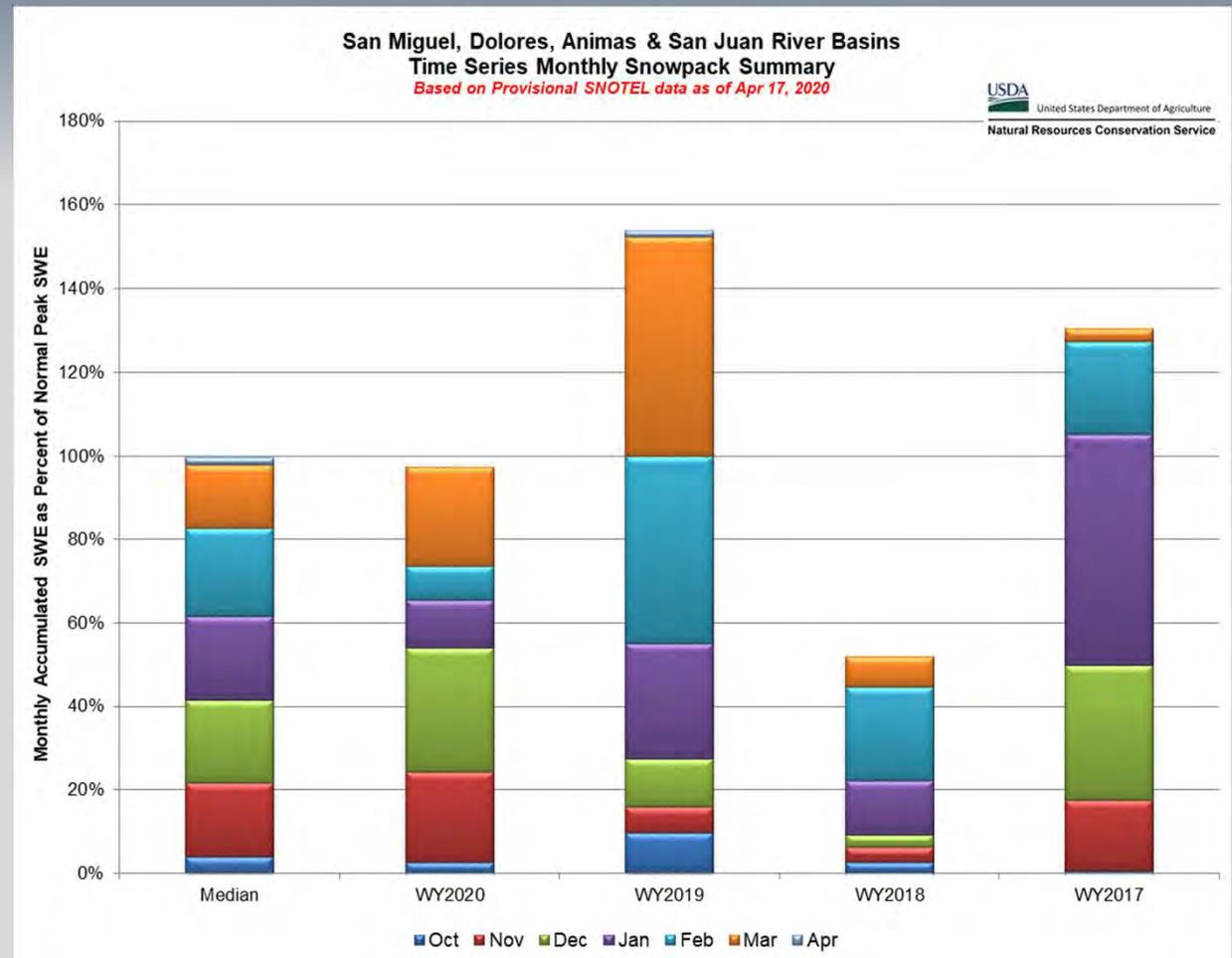
# Snow

## April 2020

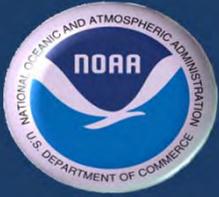


**SWE Pct of Normal  
As of Apr 20**

**Dolores Basin: 91%  
San Juan Basin: 84%  
Animas Basin: 94%**



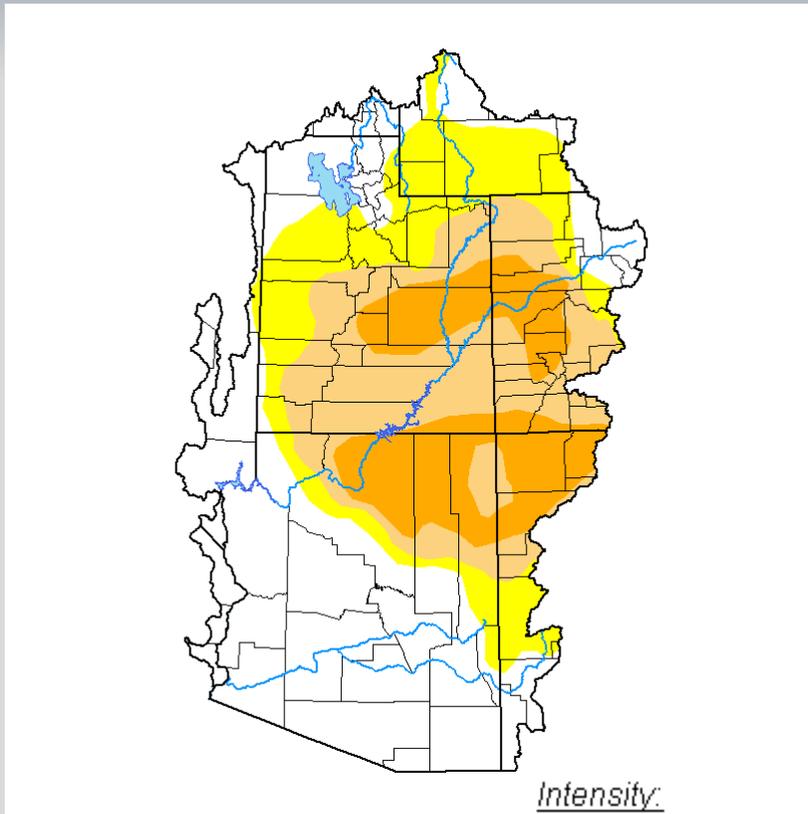
**SNOTEL Snow Water Equivalent – NRCS  
Southwestern Colorado**



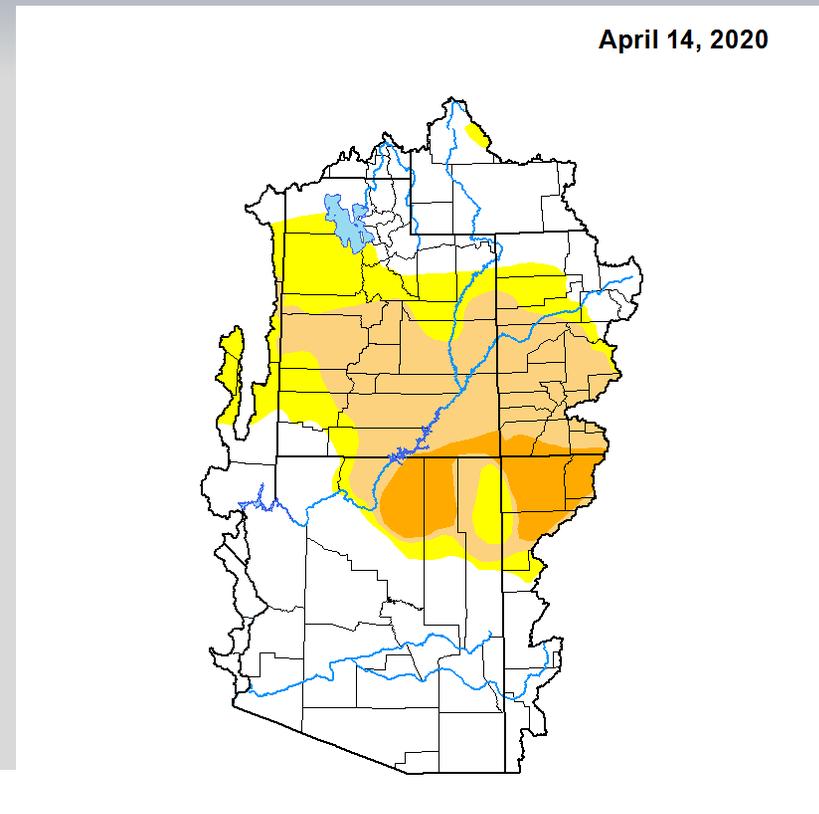
# Drought April 2020



January 14, 2020



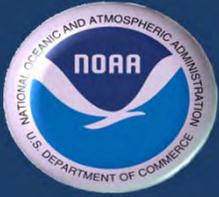
April 14, 2020



Intensity:

- |   |  |
|---|--|
|  D0 Abnormally Dry   |  D3 Extreme Drought     |
|  D1 Moderate Drought |  D4 Exceptional Drought |
|  D2 Severe Drought   |  |

## Drought – Monitor

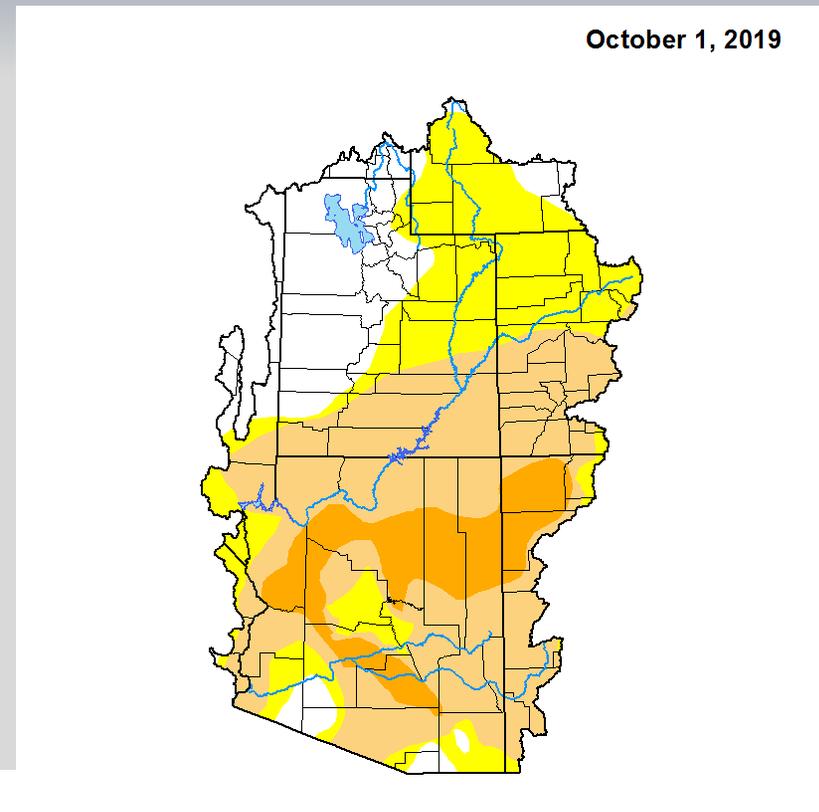
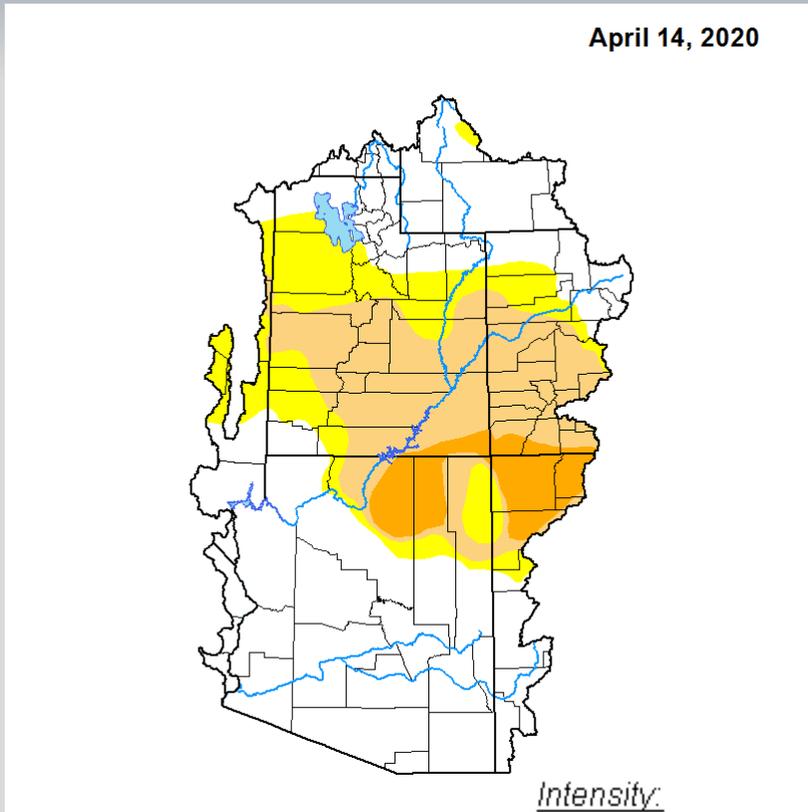


# Drought April 2020



April 14, 2020

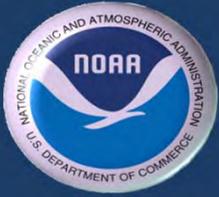
October 1, 2019



Intensity:

- |   |  |
|---|--|
|  D0 Abnormally Dry   |  D3 Extreme Drought     |
|  D1 Moderate Drought |  D4 Exceptional Drought |
|  D2 Severe Drought   |  |

## Drought – Monitor



# ENSO

## April 2020

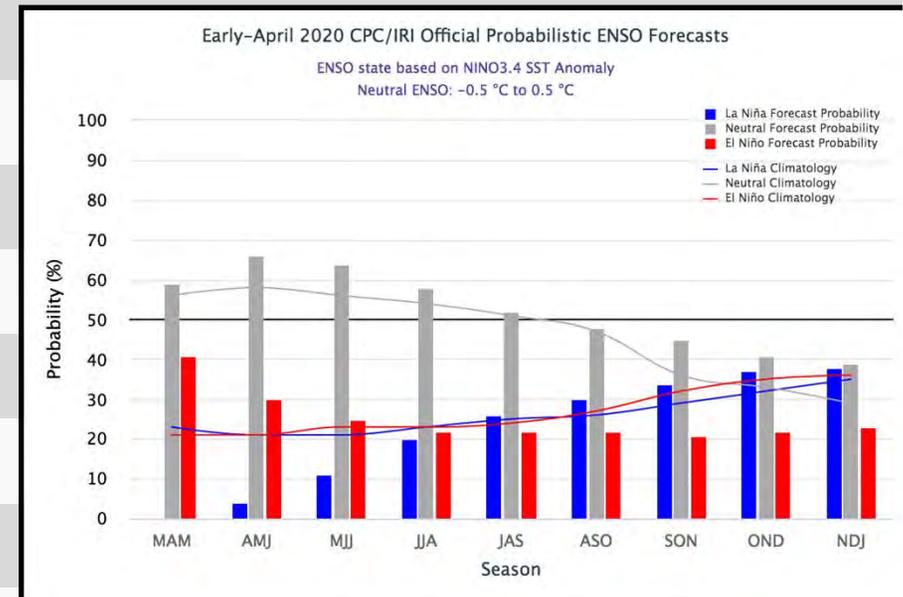


### CPC/IRI Early-Month Consensus ENSO Forecast

#### Probabilities

(using NWS CPC classification system)

Season	La Niña	Neutral	El Niño
MAM 2020	0%	59%	41%
AMJ 2020	4%	66%	30%
MJJ 2020	11%	64%	25%
JJA 2020	20%	58%	22%
JAS 2020	26%	52%	22%
ASO 2020	30%	48%	22%
SON 2020	34%	45%	21%
OND 2020	37%	41%	22%
NDJ 2020	38%	39%	23%



## ENSO – Outlook

**ENSO- Neutral remaining Neutral until winter**



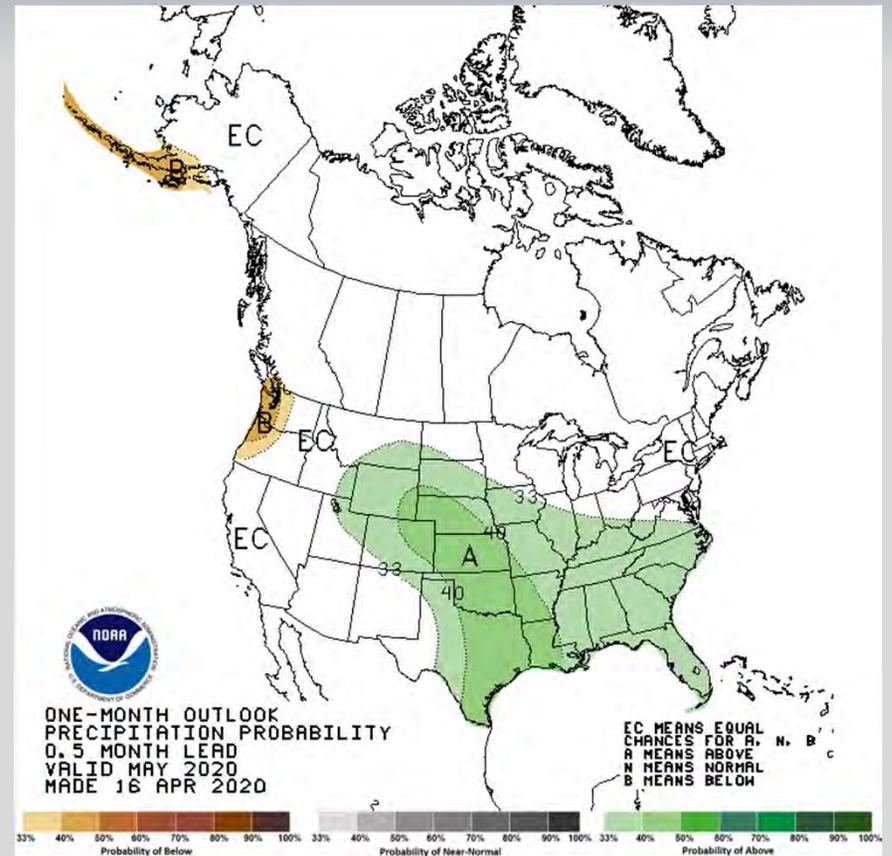
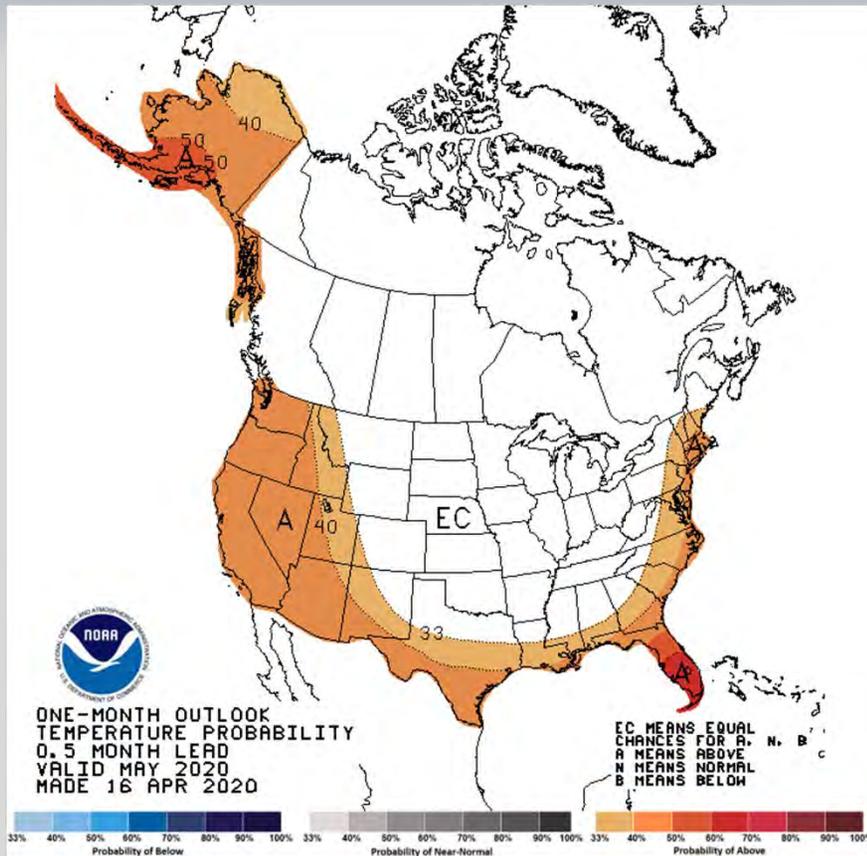
# Weather Outlook

## April 2020



### Temperature

### Precipitation



May – Outlook  
updated Apr 16



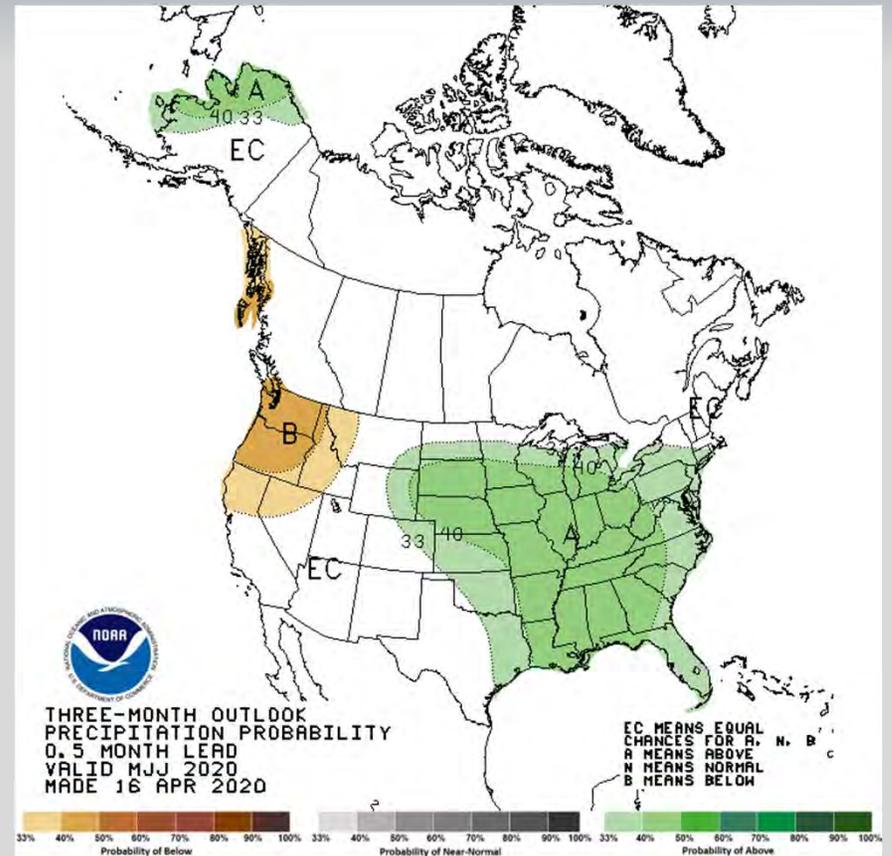
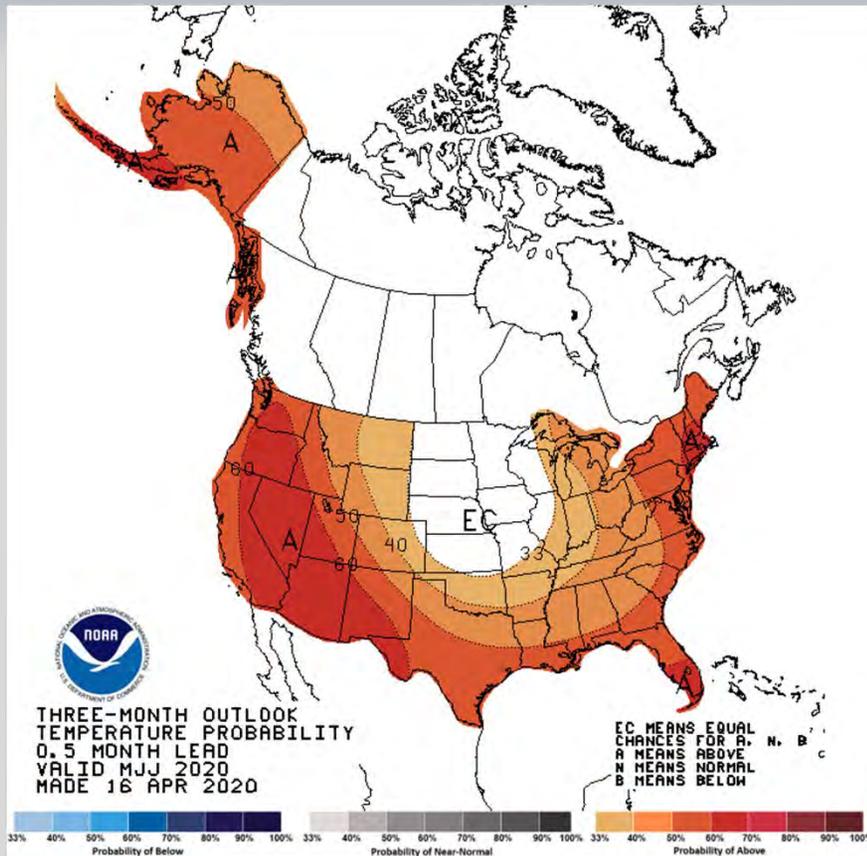
# Weather Outlook

## April 2020



### Temperature

### Precipitation



May/June/July – Outlook  
updated Apr 16



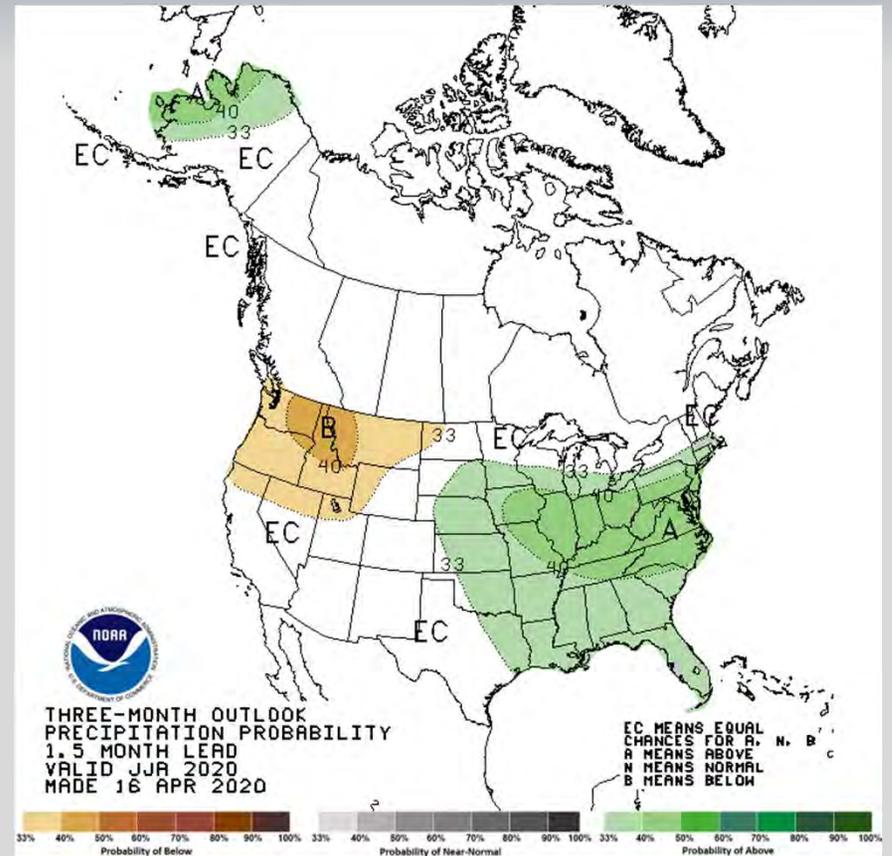
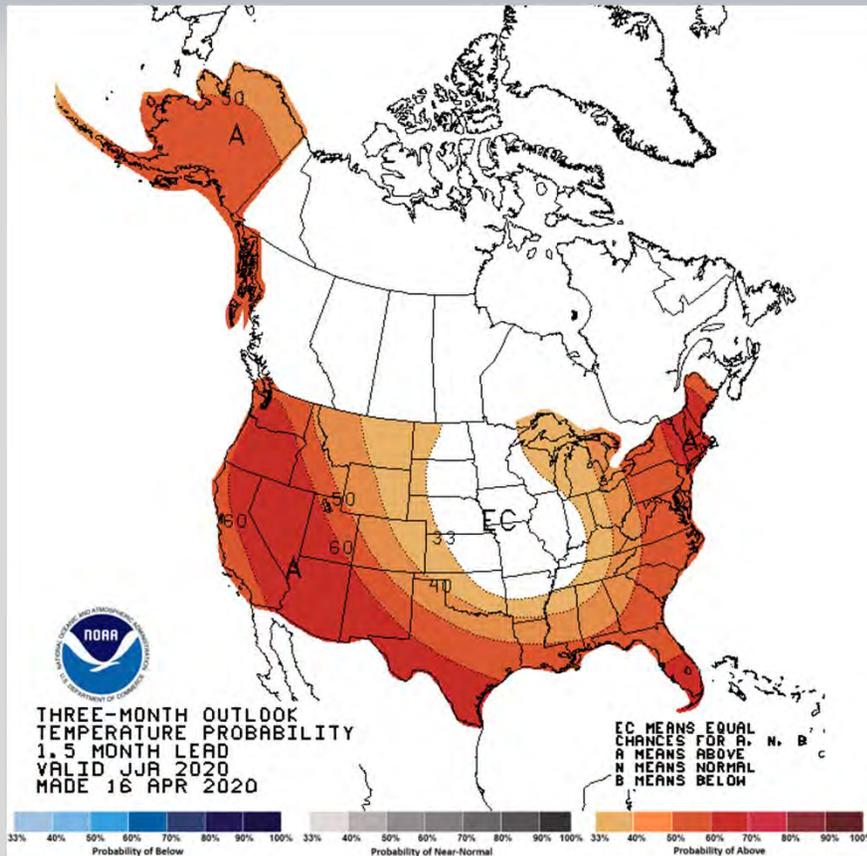
# Weather Outlook

## April 2020

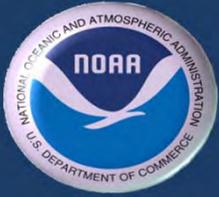


### Temperature

### Precipitation



**Jun/Jul/Aug – Outlook  
updated Apr 16**



# Weather Outlook

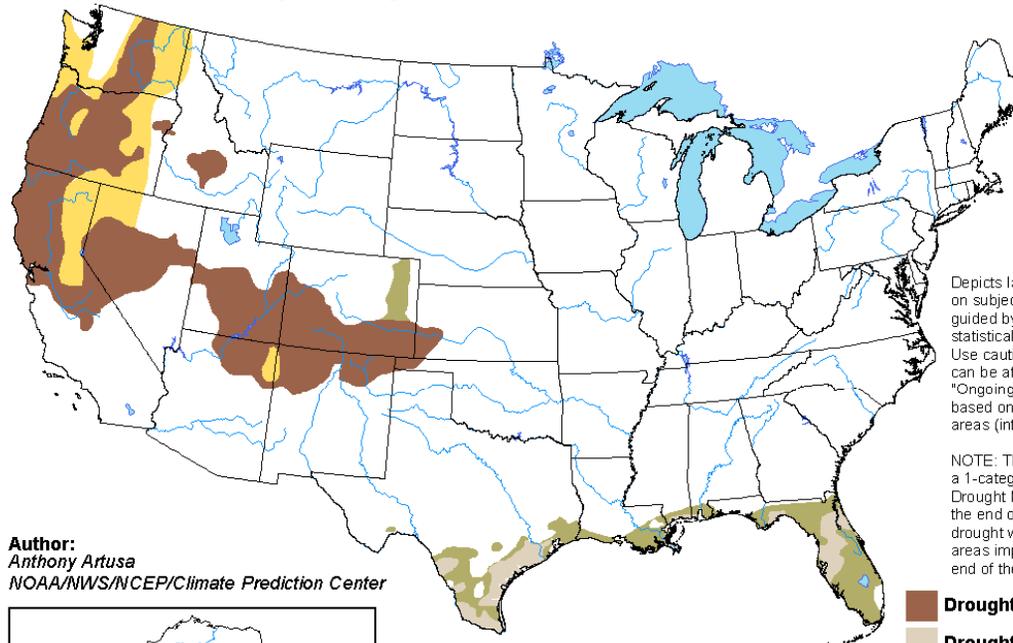
## April 2020



### Seasonal

#### U.S. Seasonal Drought Outlook Drought Tendency During the Valid Period

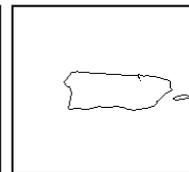
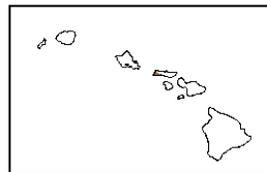
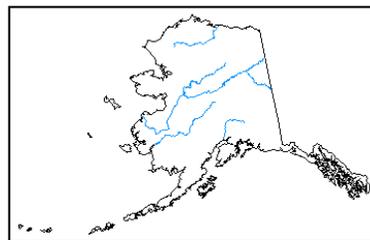
Valid for April 16 - July 31, 2020  
Released April 16



Depicts large-scale trends based on subjectively derived probabilities guided by short- and long-range statistical and dynamical forecasts. Use caution for applications that can be affected by short lived events. "Ongoing" drought areas are based on the U.S. Drought Monitor areas (intensities of D1 to D4).

NOTE: The tan areas imply at least a 1-category improvement in the Drought Monitor intensity levels by the end of the period, although drought will remain. The green areas imply drought removal by the end of the period (D0 or none).

Author:  
Anthony Artusa  
NOAA/NWS/NCEP/Climate Prediction Center



- Drought persists
- Drought remains but improves
- Drought removal likely
- Drought development likely



<http://go.usa.gov/3eZ73>

## Drought- Outlook

# Navajo Reservoir/San Juan Basin Water Supply Outlook April 2020

Ashley Nielson

Senior Hydrologist

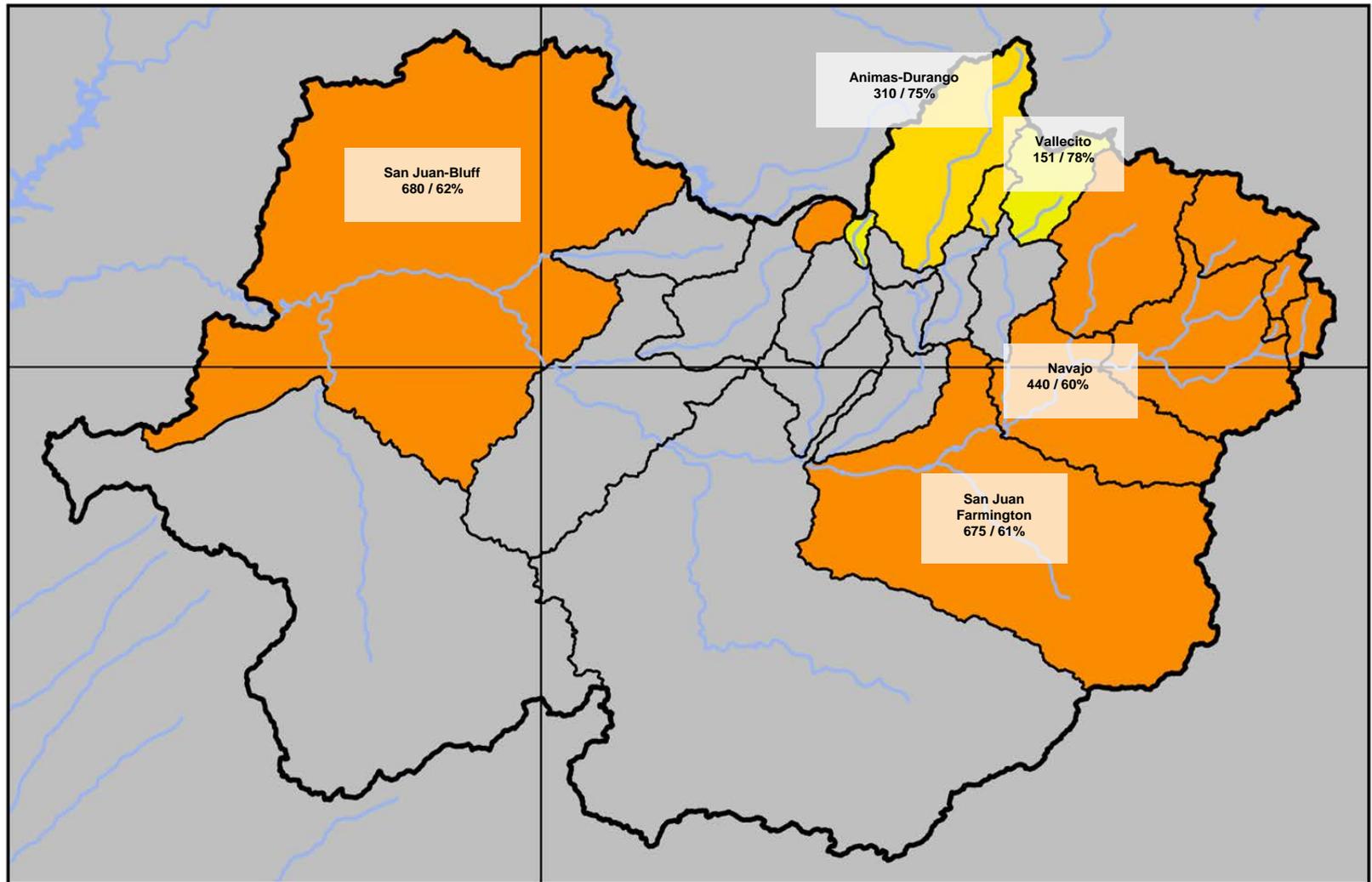
Colorado Basin River Forecast Center

National Weather Service/NOAA



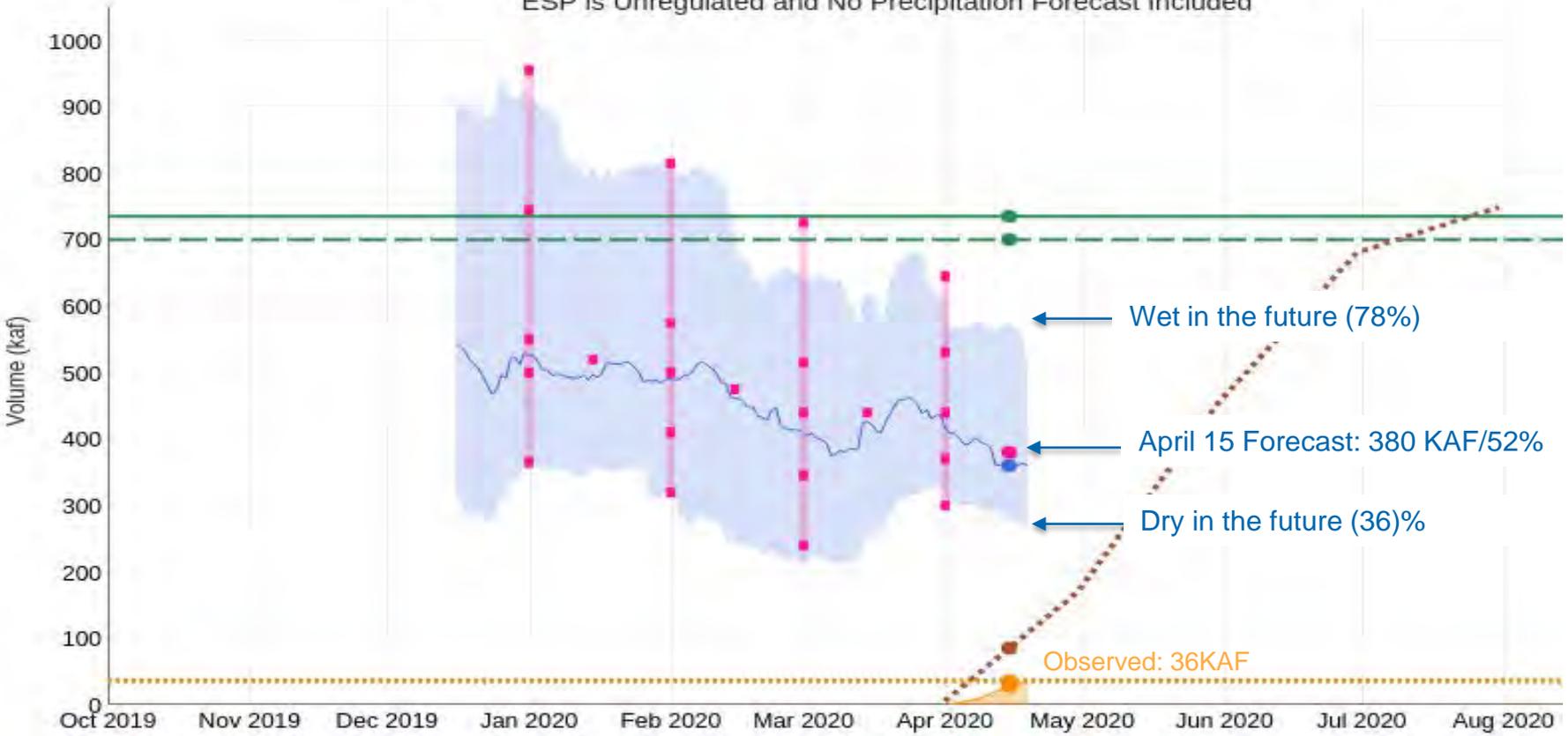
# April 1<sup>st</sup> Water Supply Forecasts: San Juan Basin

April-July Forecasts  
Volume in 1000's acre-feet / Percent of 1981-2010 average



# Water Supply Forecast Evolution: Navajo Inflow Forecast

San Juan - Navajo Reservoir, Archuleta, Nr (NVRN5)  
 Period: Apr-Jul, Official 50% Forecast (2020-04-15): 380 kaf (52% Average, 54% Median)  
 ESP is Unregulated and No Precipitation Forecast Included



Blue shading: Daily Raw Model Guidance 90% - 10% exceedance range  
 Blue line: Daily raw model guidance 50% exceedance  
 Pink line: Official forecast 90%, 70%, 50%, 30%, 10% exceedance

Green solid: 1981-2010 average April-July volume  
 Green dotted: 1981-2010 median April-July volume

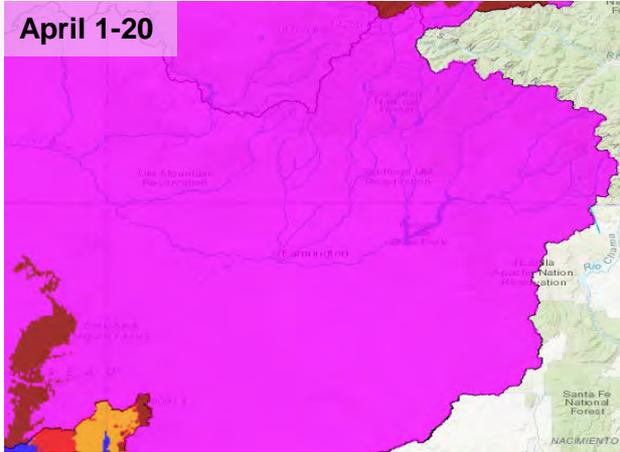
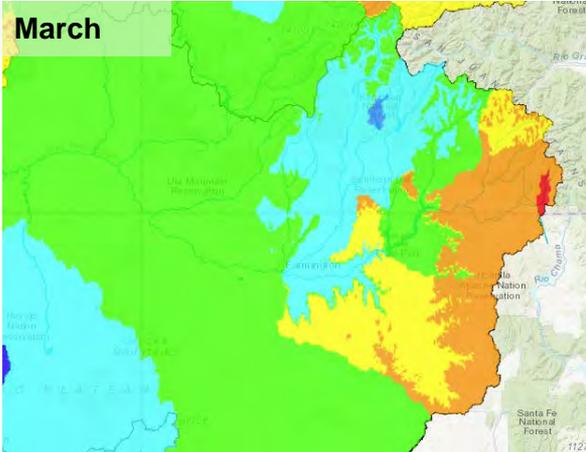
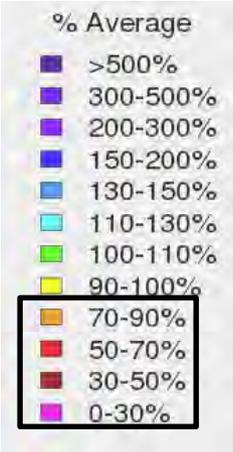
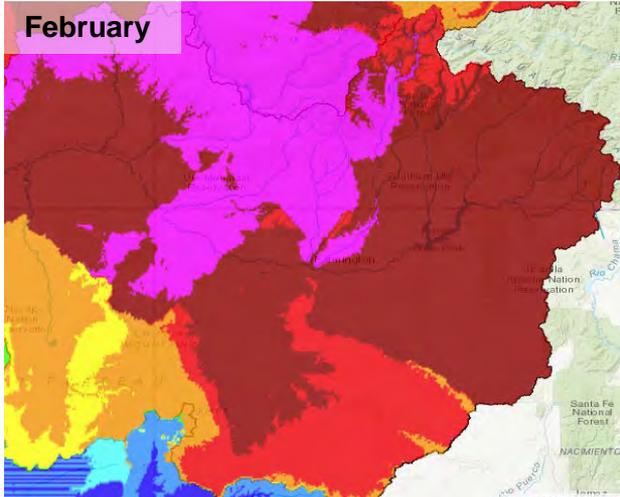
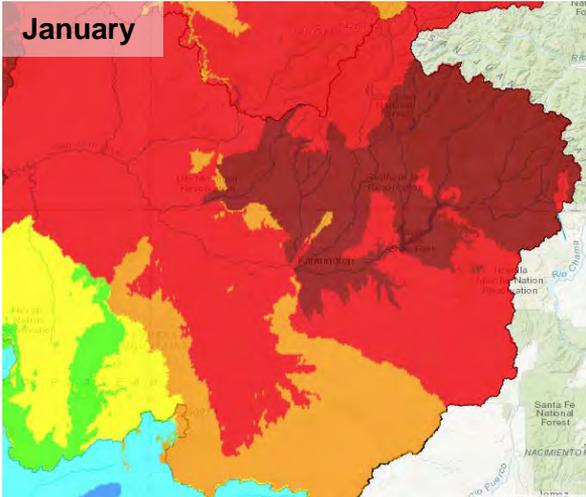
Orange shading: Observed volume to date  
 Brown dotted: Average observed

# Navajo Inflow forecast trend since January

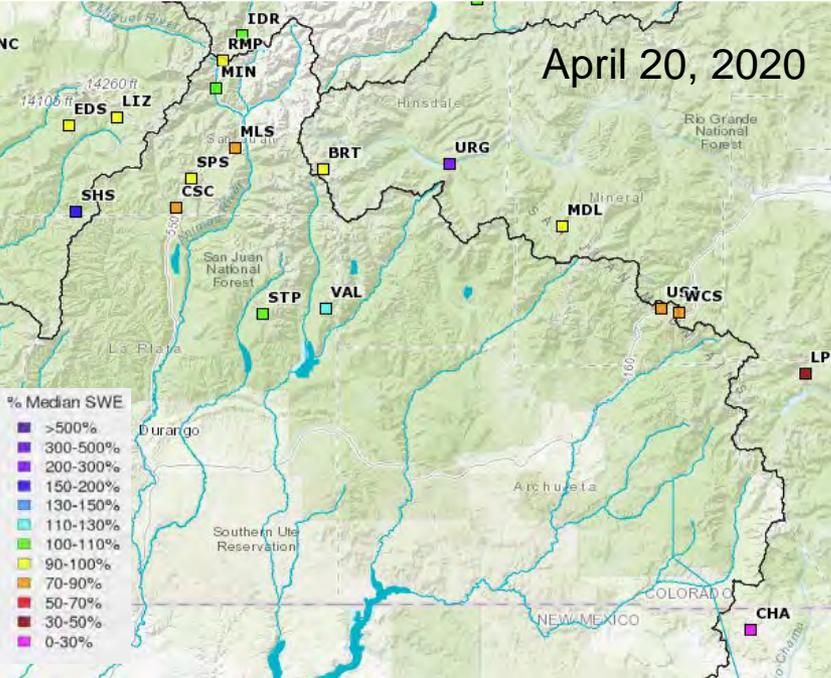
Overall, the Navajo inflow forecast has been decreasing since January due to below normal precipitation. The forecast did not change between March and April due to near normal precipitation in March.

Forecast Date	Forecast (KAF)	% of Avg (1981-2010)
January 1 <sup>st</sup>	550	75%
Mid-January	520	71%
February 1 <sup>st</sup>	500	68%
Mid-February	475	65%
March 1 <sup>st</sup>	440	60%
Mid-March	440	60%
April 1 <sup>st</sup>	440	60%
Mid-April	380	52%

Monthly Precipitation % of Average: San Juan Basin



# Snow Conditions: SNOTEL Snow Water Equivalent

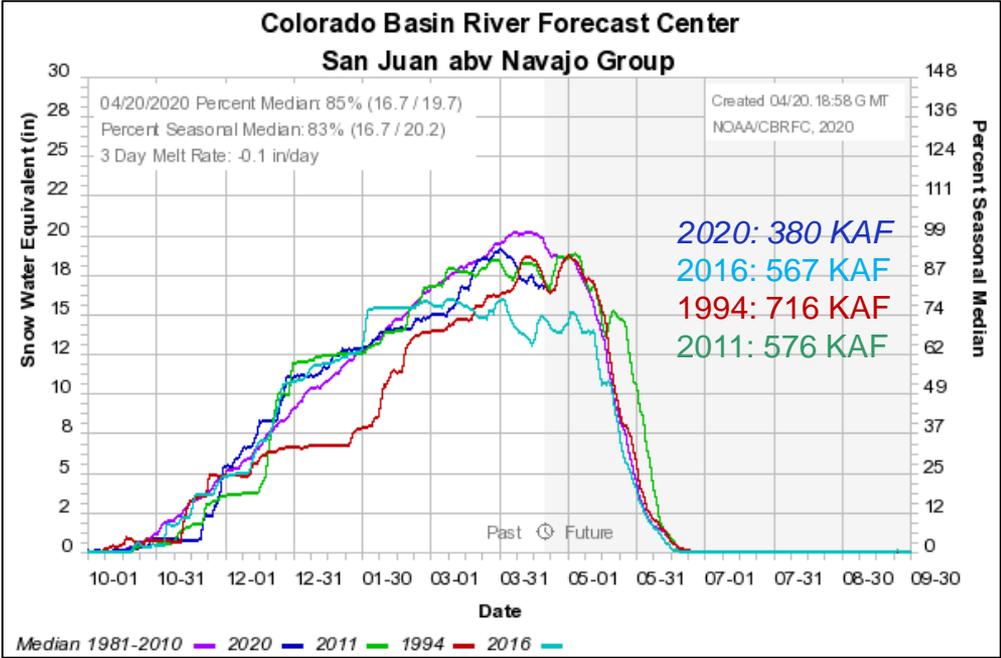


**% Median SWE**

San Juan Basin: 89%

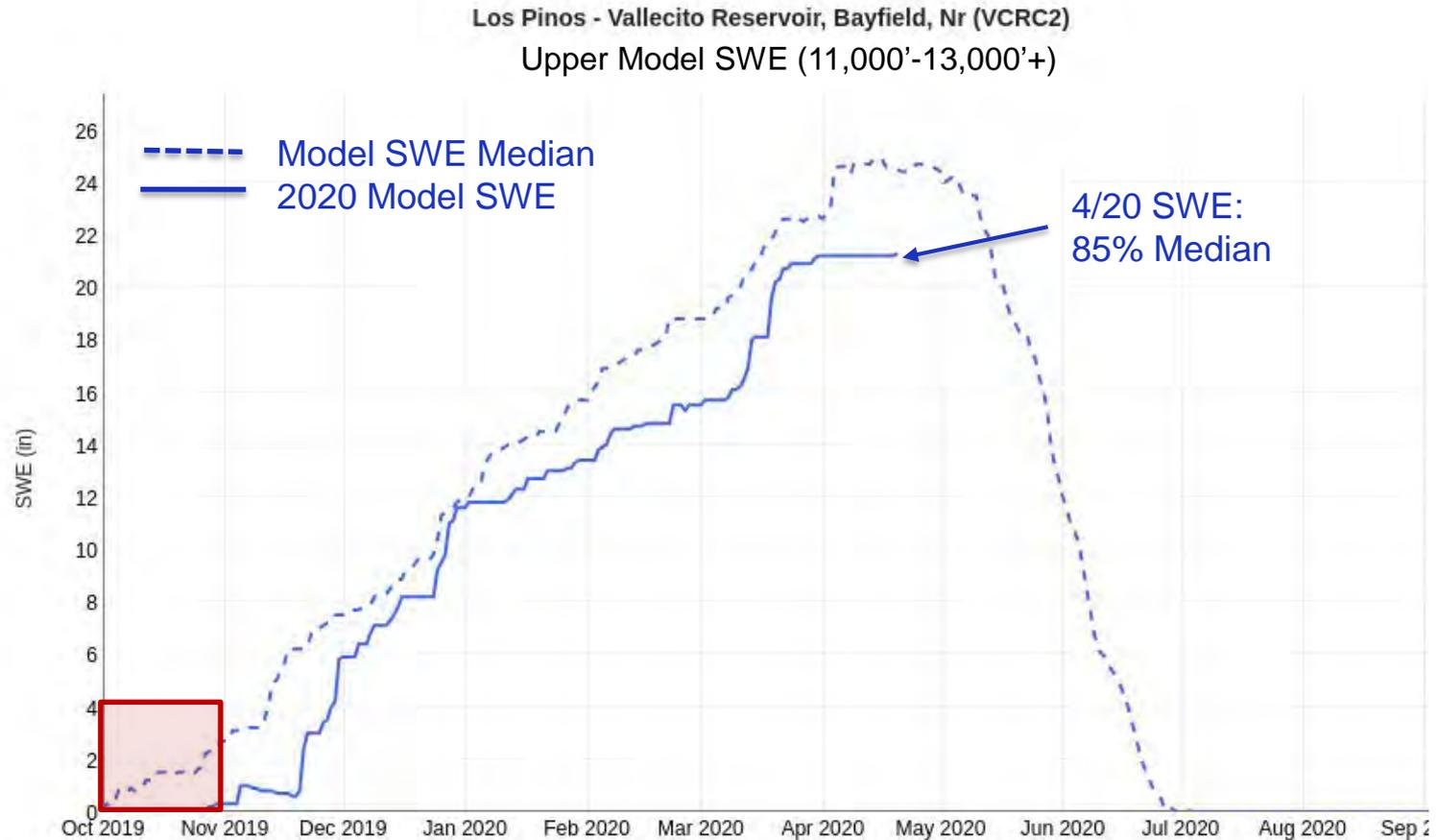
San Juan abv Navajo: 85%

Animas River Basin: 97%



SWE vs. runoff is not a 1-to-1 relationship; spring weather will play a role in the final outcome of observed volume.

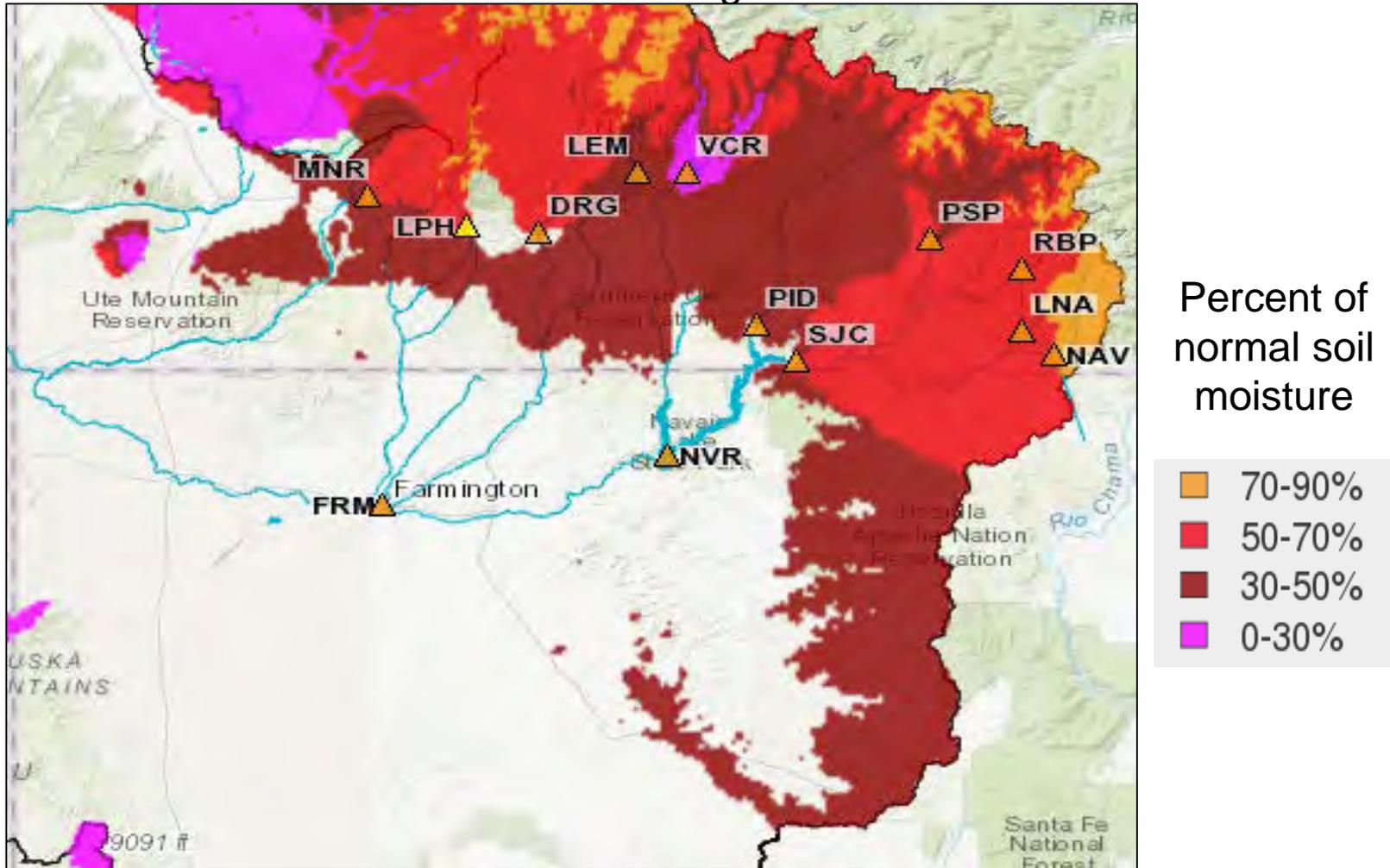
# What is driving the forecast: CBRFC Model Snow Conditions



Some SNOTEL locations have near normal conditions. However, upper elevation snow (>11,000') in the CBRFC model is below normal due to a dry October which resulted in a slow start to the high elevation snow accumulation season. November 1<sup>st</sup> modeled snow was anywhere from 2-4 inch below normal. This has resulted in lower forecasts throughout the basin.

# What is driving the forecast: CBRFC Model Soil Moisture Conditions

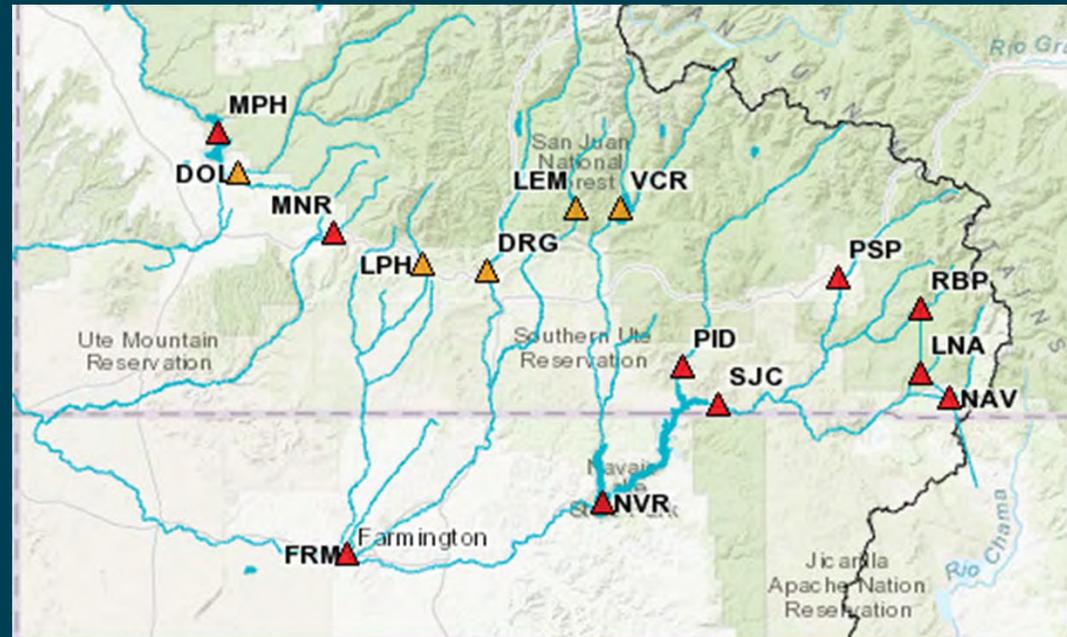
## San Juan River Basin Soil moisture conditions entering the winter season



Depending on spring weather and snow melt evolution, it is possible a portion of the runoff will be lost to the dry soils. The forecasts are accounting for this possibility.

# Water Supply Forecasts (April-July)

Navajo: 380 kaf (52% avg)  
Vallecito: 133 kaf (69% avg)  
Lemon: 37 kaf (67% avg)  
Animas: 270 kaf (65% avg)  
McPhee: 167 kaf (57% avg)  
Powell: 5300 kaf (74% avg)



Most Probable forecasts  
as of April 21<sup>st</sup>, 2020



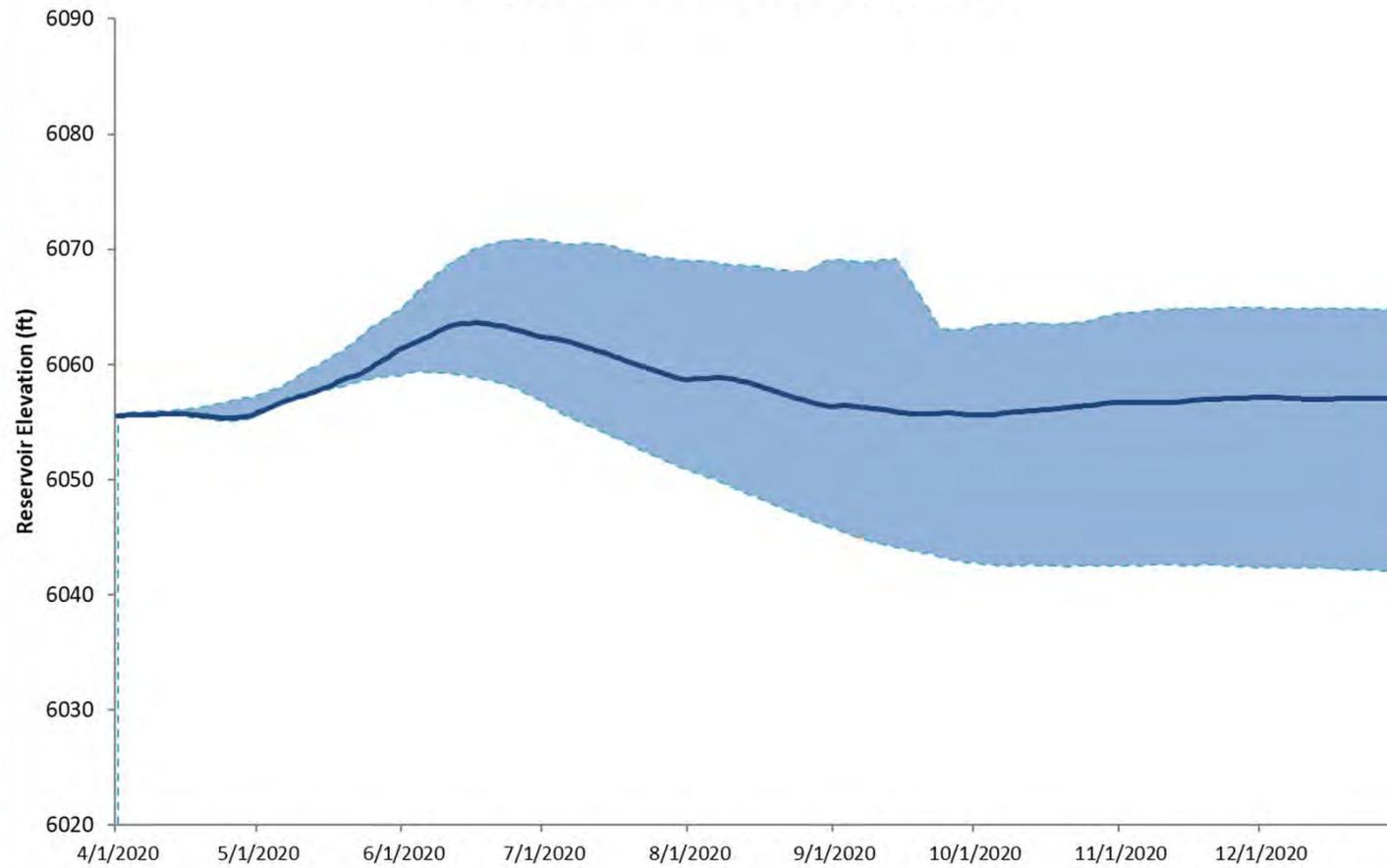
# Latest Available Water Calculation

CBRFC Forecast Date:		4/17/2020					
Current Forecast	2020	Available Water over 6050 (kaf)	Available Days at Peak (need min of 21 for SPR)	Proposed Release	Proposed Release Volume (kaf)	Available for Adaptive Management (Remaining water >6063 ft) (kaf)	Sept 30 Pool Elevation (ft) with proposed release
	MIN	-65	0	none	0	0	6043
	MOST	83	0	none	0	0	6056
	MAX	266	16	none	0	105	6063

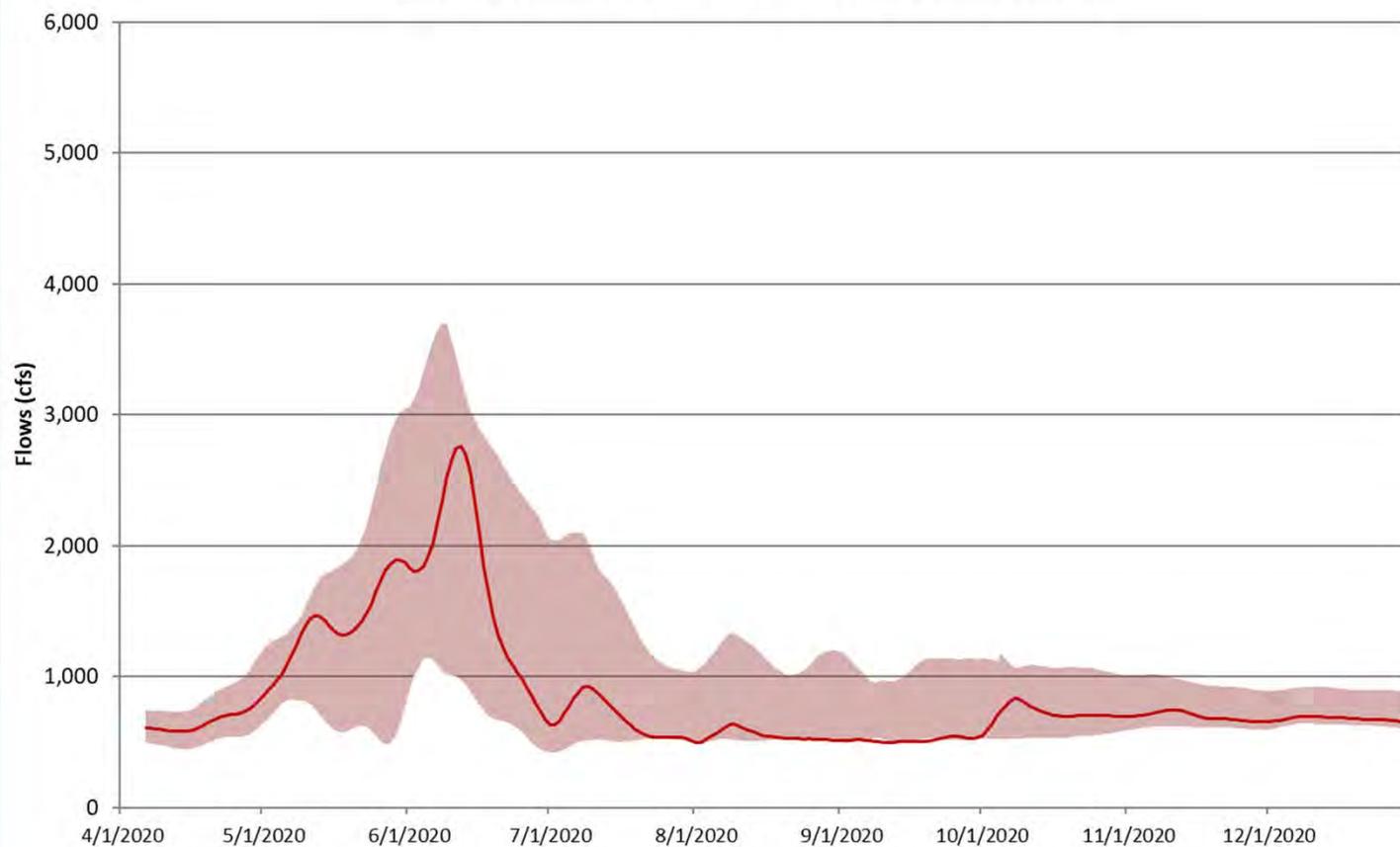
With no spring peak release planned, releases are expected to vary between 500 and 1,000 cfs throughout the summer to maintain the SJRIP recommended target baseflow in the critical habitat reach.



# Navajo Reservoir Forecast Operations WY 2020 Range of Likely Reservoir Elevations



### Navajo Reservoir Forecast Operations WY 2020 Range of likely flows in Critical Habitat Reach



# Summary

- Despite near-average snowpack, dry soils persist and are expected to have an effect on runoff efficiency. Runoff forecasts throughout the basin are below-average for this reason.
- Navajo Reservoir is expected to peak between 6060 and 6065 ft. No high releases are planned for this spring. Releases from Navajo Reservoir are expected to remain at or near the current level through spring runoff.
- After runoff ends, Navajo releases will likely increase to accommodate irrigation season while maintaining the recommended target baseflow range in the critical habitat reach. Releases are expected to vary between 500 and 1,000 cfs.
- Other Reclamation projects in the San Juan River Basin are not projected to fill under the most recent runoff forecasts.



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— BUREAU OF —  
RECLAMATION

**Useful Links**

Reclamation: [www.usbr.gov/uc](http://www.usbr.gov/uc)

USGS: [water.usgs.gov/nwis](http://water.usgs.gov/nwis)

CBRFC: [cbrfc.noaa.gov](http://cbrfc.noaa.gov)