

# Peak Flow Forecast Briefing

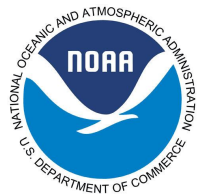
March 24th, 2020

Ashley Nielson  
Colorado Basin River Forecast Center  
National Weather Service  
NOAA

**Phone: 1-877-929-0660**

**Passcode: 1706374**

**Please mute your phone until the question period**



# Today's Presentation

- Peak flow forecast products overview
  - Mean daily peaks
  - Instantaneous peaks
  - Peak flow map, list, graphics
  - Peak Percentiles
- Flood Potential Dashboard (new Spring 2019)
- Current conditions driving peak flow forecasts
- Specific peak flow forecast graphics
- Spring weather impacts
- Upcoming weather
- Summary of flood concerns

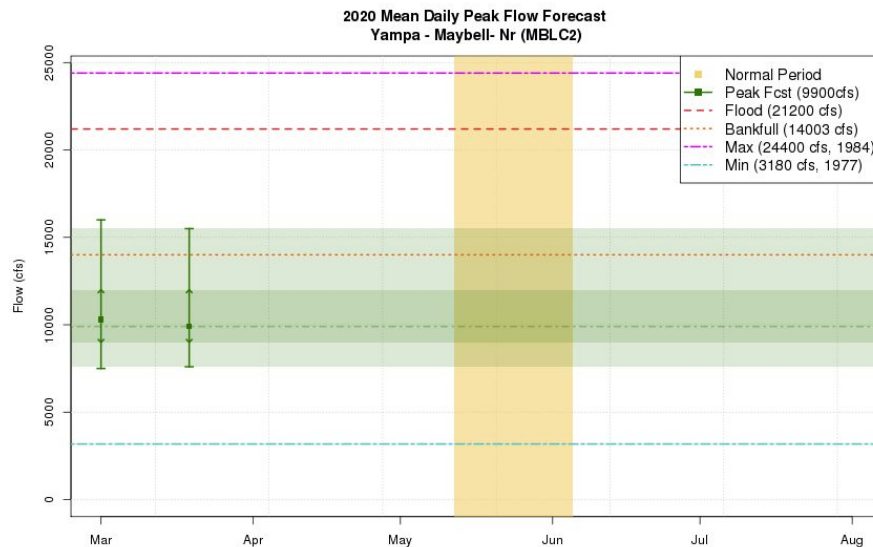
**Phone: 1-877-929-0660**

**Passcode: 1706374**

**Please mute your phone until the question period**

# Mean Daily Snowmelt Peak Flow Forecast Overview

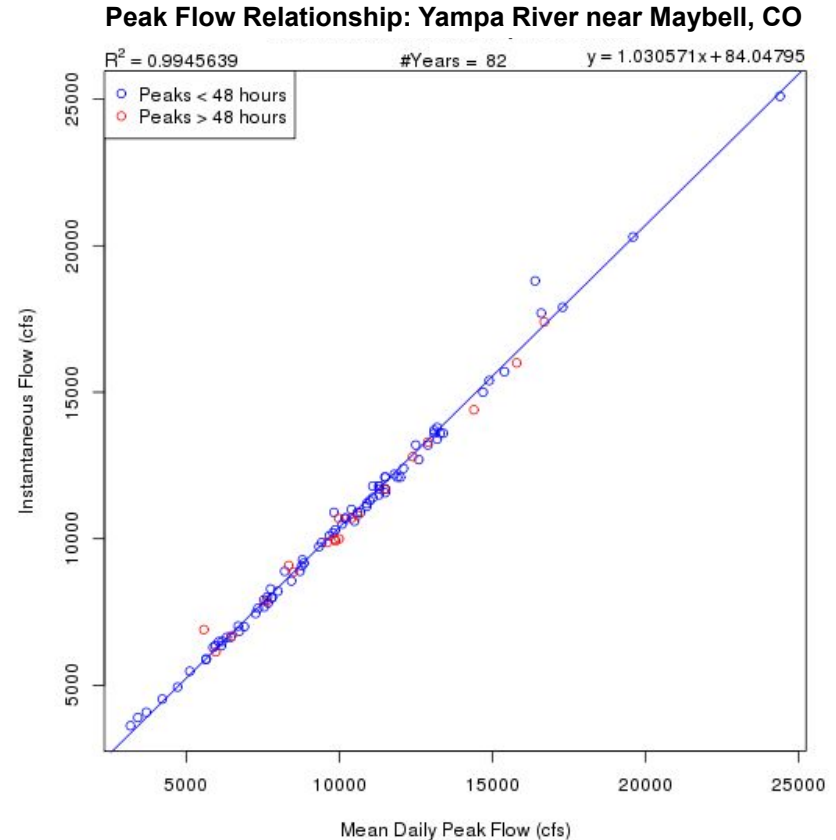
- Probabilistic (regulated ESP)
  - Long range outlook of peak magnitude
  - Likelihood of exceeding flood thresholds
  - Accounts for reservoirs/diversions
  - Updated bi-weekly March - May
- Do not provide specific date of peak
  - *Typically only have a 5-10 day forecast lead time for timing the peak*
- Challenges:
  - Peak timing
  - Infrequent updates
  - Lack of late season guidance
  - Only for locations with defined thresholds
  - Lacks historical relevance



These graphics are updated approximately every two weeks between 3/1 and 5/1  
Plot Created 2020-03-19 12:50:10  
CBRFC / NWS / NOAA

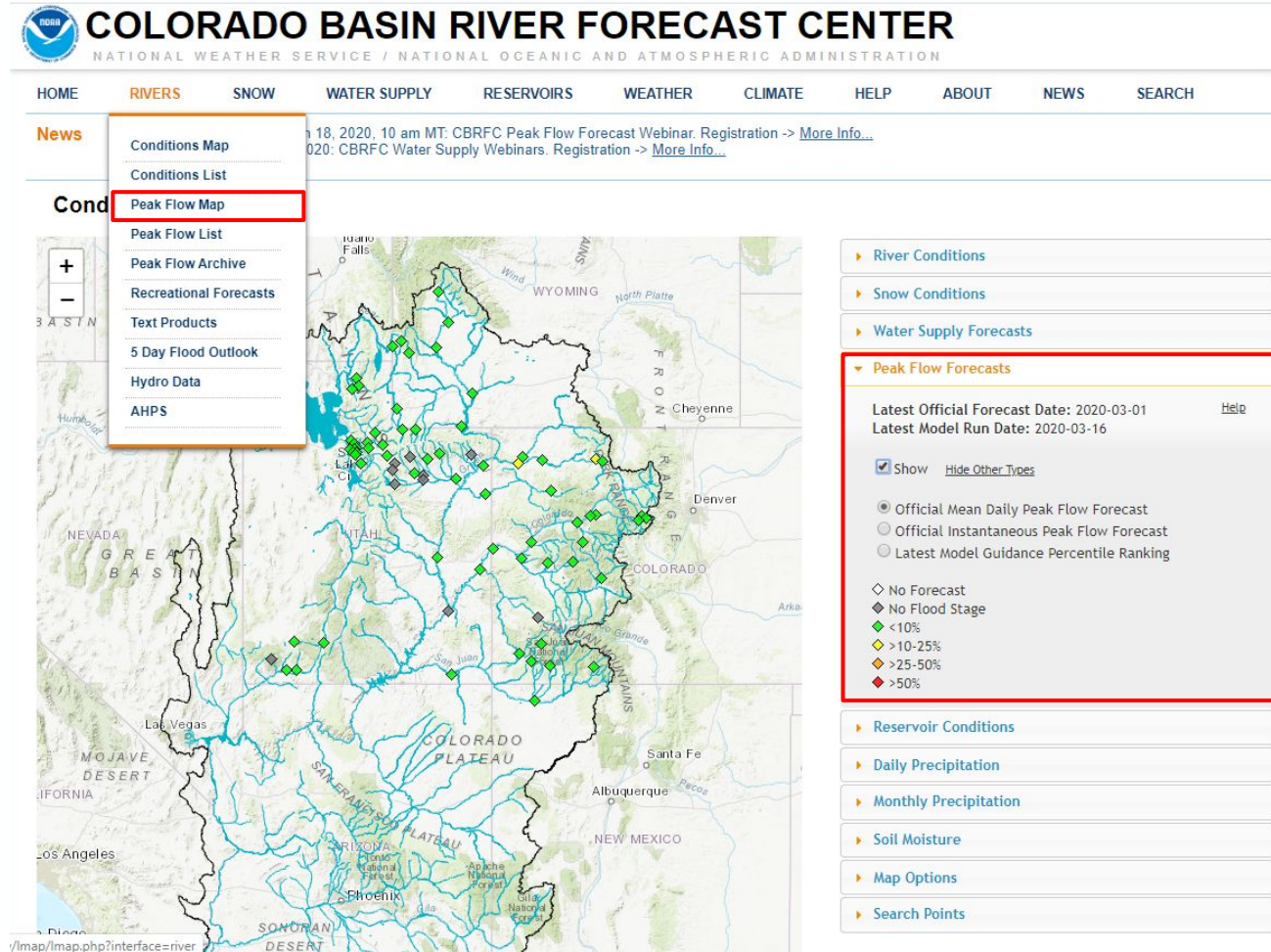
# Instantaneous Peak Flow Forecasts Overview

- Relationship between max daily flow and instantaneous peak
- Only available for locations with strong correlations & historical data
- Sites with frequent heavy rain have poor relationships

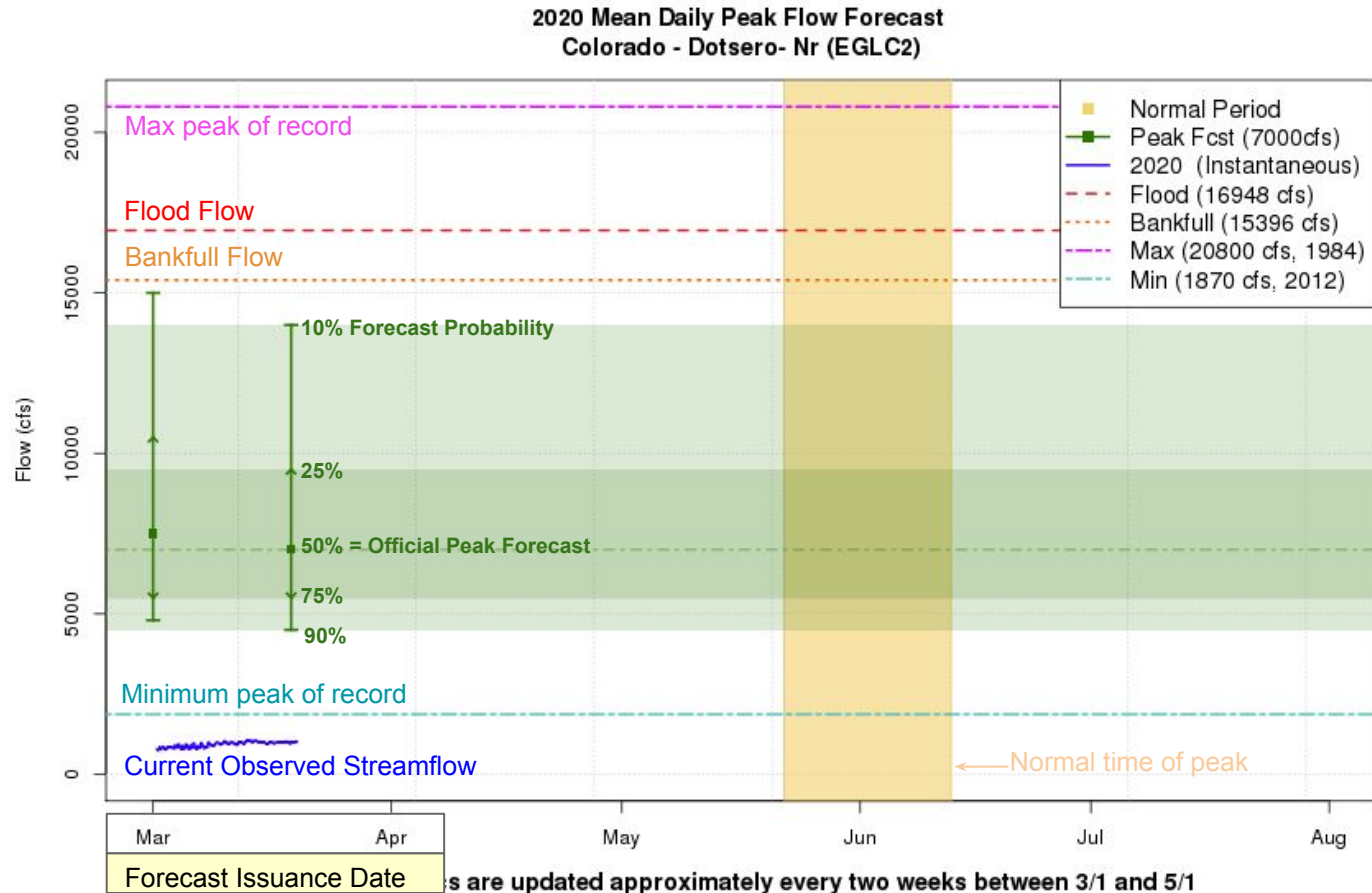


# Peak Flow Map Overview

<https://www.cbrfc.noaa.gov/>



# Peak Flow Graphic Overview



Forecasts are updated approximately every two weeks between 3/1 and 5/1

Plot Created 2020-03-19 12:51:09  
CBRFC / NWS / NOAA

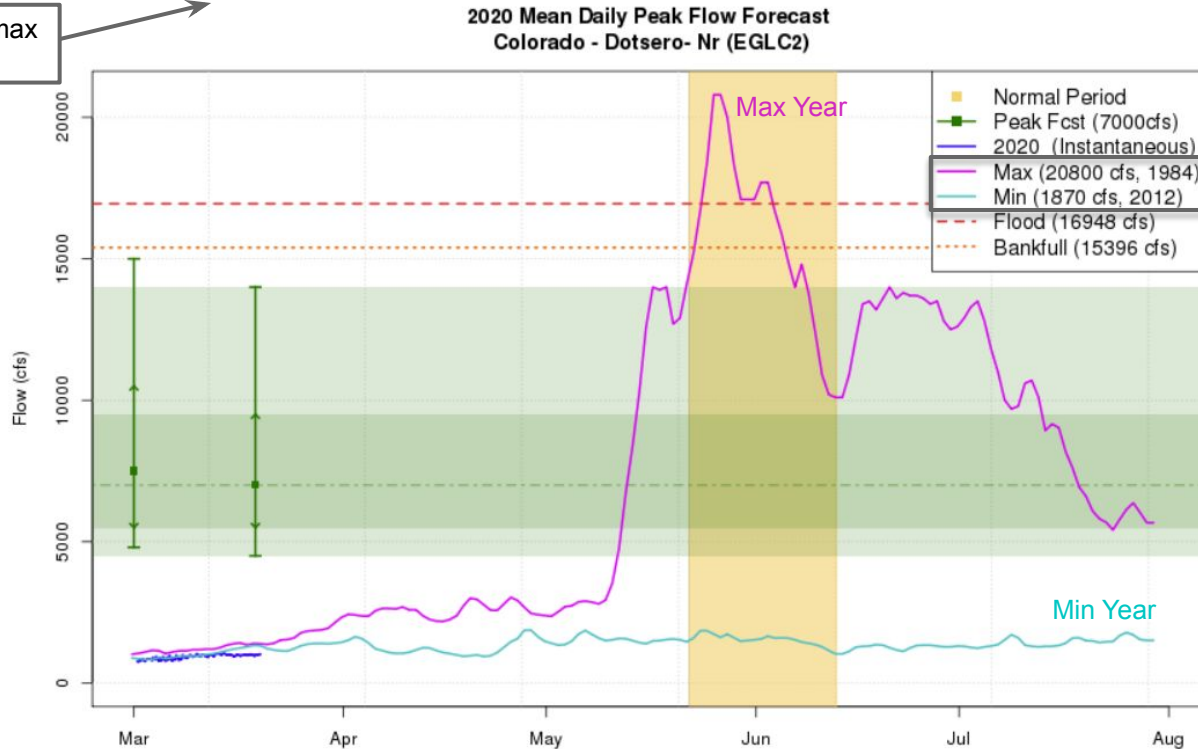
# Peak Flow Graphic Overview

## EGLC2 Peak Flow Forecasts

[Mean Daily Plot](#) [Instantaneous Plot](#) [Forecasts](#) [Observations](#) [Yearly Peak Ranking](#) [Help](#)

Plot Options (on/off): [Record Year Data](#) [Yearly Peaks](#) [Flood Flow](#)

Select to plot min and max year hydrographs



These graphics are updated approximately every two weeks between 3/1 and 5/1

Plot Created 2020-03-19 12:51:10

CBRFC / NWS / NOAA

# Peak Flow Graphic Overview

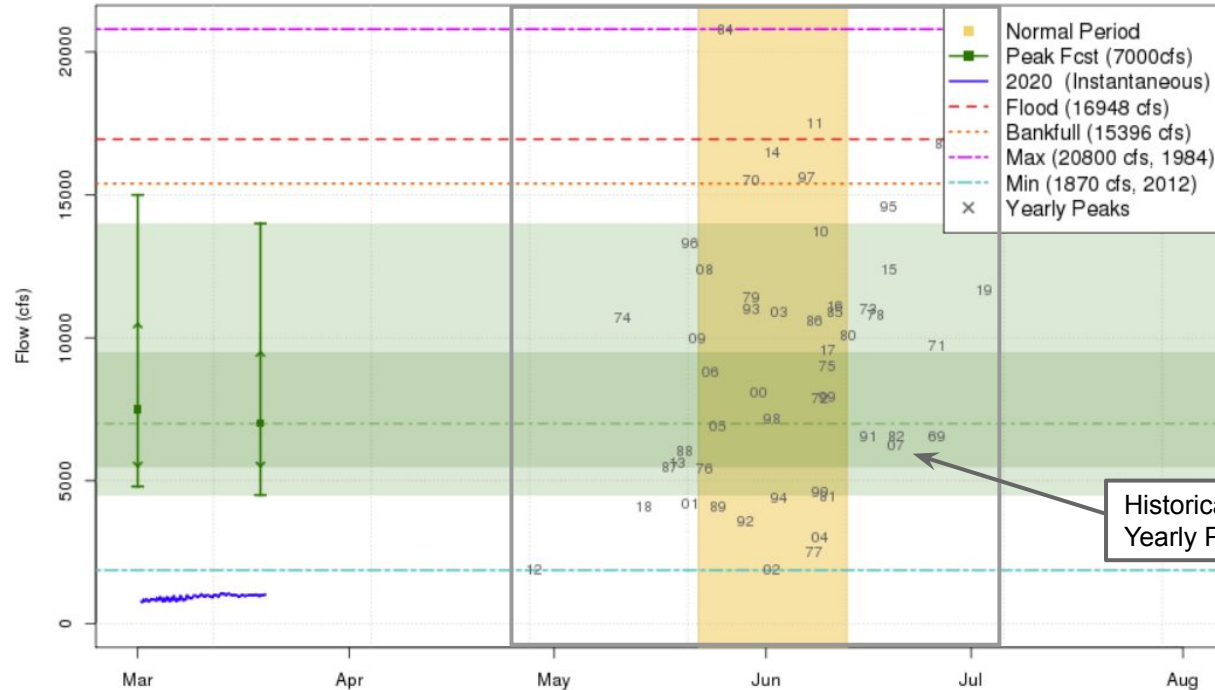
## EGLC2 Peak Flow Forecasts

[Mean Daily Plot](#) [Instantaneous Plot](#) [Forecasts](#) [Observations](#) [Yearly Peak Ranking](#) [Help](#)

Plot Options (on/off): [Record Year Data](#) [Yearly Peaks](#) [Flood Flow](#)

Select to plot historical years

2020 Mean Daily Peak Flow Forecast  
Colorado - Dotsero- Nr (EGLC2)




Historical  
Yearly Peaks

These graphics are updated approximately every two weeks between 3/1 and 5/1

Plot Created 2020-03-19 12:51:09

CBRFC / NWS / NOAA

# Peak Flow List Overview


**COLORADO BASIN RIVER FORECAST CENTER**  
NATIONAL WEATHER SERVICE / NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

[HOME](#)
[RIVERS](#)
[SNOW](#)
[WATER SUPPLY](#)
[RESERVOIRS](#)
[WEATHER](#)
[CLIMATE](#)
[HELP](#)
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[NEWS](#)
[SEARCH](#)

[News](#)

- Conditions Map
- Conditions List
- Peak Flow Map
- Peak Flow List

## Peak Flow Forecast List [Help](#) | [Download Data](#) | [Requery](#) | [Rebuild Plots](#)

### Peak Flood Probability Legend

◇ No Forecast ◇ No Flood Stage ◇ <10 ◇ >10 ◇ >25 ◇ >50

Options (on/off): [Mean Daily Forecasts](#) [Instantaneous Forecasts](#) [Plot](#)

Select by Area: [CBRFC](#) [Green](#) [Colorado](#) [San Juan](#) [Great](#) [Sevier](#) [Virgin](#) [Low Col](#)

Columns (on/off): [ID](#) [River](#) [Location](#) [Flood Flow](#) [PI](#) [Issue Date](#) [Observed Peak to Date](#) [Observed Date](#) [Historic Peak](#) [Hist Peak Date](#) [Average Peak](#) [Normal Earliest Date](#) [Normal Latest Date](#) [Last Year Peak](#) [Last Year Date](#) [Notes](#)

Click column heading to sort by that data. Click ID to view point info.

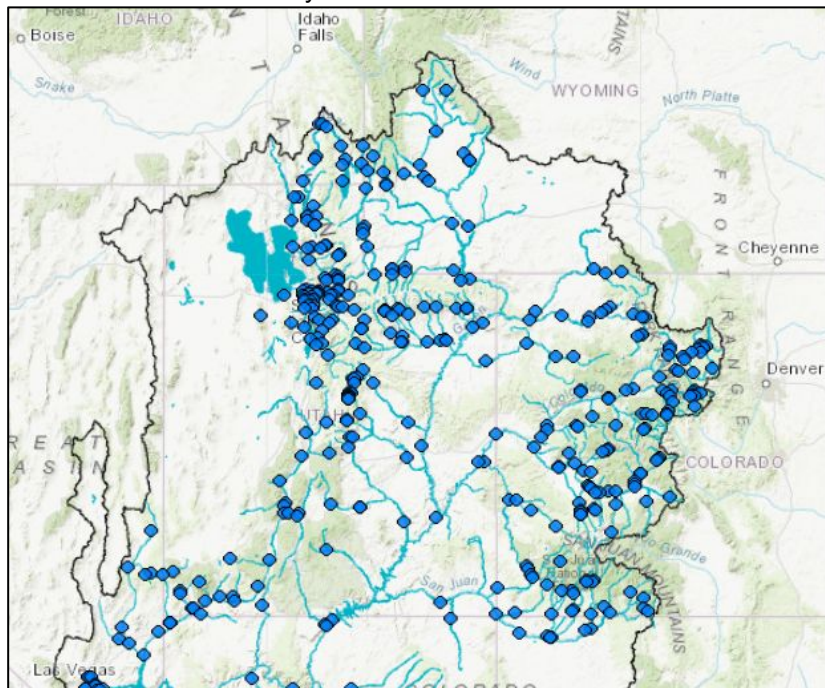
	ID	River	Location	Flood Flow	PI	Issue Date	Mean Daily 90	Mean Daily 75	Mean Daily 50	Mean Daily 25	Mean Daily 10	Inst 90	Inst 75	Inst 50	Inst 25	Inst 10	Historic Peak	Average Peak	Normal Earliest Date	Normal Latest Date	Last Year Peak	Last Year Date	Notes
1	<a href="#">ENMC2</a>	Elk	Milner	5920		2020-03-19	2900	3400	3800	4800	6000	3300	3800	4300	5400	6800	7000	3865	05-17	06-03	6410	2019-06-22	
2	<a href="#">YDLC2</a>	Yampa	Deerlodge Park	20750		2020-03-19	10300	12000	13500	16000	21000	11000	12000	14000	17000	22000	32300	13470	05-11	06-04	15800	2019-06-24	
3	<a href="#">TADU1</a>	Duchesne	Tabiona	1810		2020-03-19	130	200	350	750	950	220	290	450	890	1100	2810	925	05-14	06-12	1730	2019-06-15	Peak Flow Forecasts Are Regulated Forecasts Based On Upstream Diversions And Regulation
4	<a href="#">YLLU1</a>	Yellowstone	Altonah	2080		2020-03-19	460	600	700	950	1100	660	740	880	1200	1400	1980	950	05-22	06-16	1480	2019-06-15	
5	<a href="#">NEUU1</a>	Uinta	Neola	3540		2020-03-19	480	600	750	1100	1300	NA	NA	NA	NA	NA	3000	1245	05-15	06-11	1910	2019-06-15	
6	<a href="#">DURU1</a>	Duchesne	Randlett	6220		2020-03-19	350	450	1000	2100	3500	770	870	1400	2600	3600	8450	3070	04-29	06-28	6850	2019-06-18	Peak Flow Forecasts Are Regulated Forecasts Based On Upstream Diversions And Regulation
7	<a href="#">JESU1</a>	Green	Jensen	24100		2020-03-19	13500	15500	17000	20000	23000	14000	16000	18000	21000	24000	38500	16990	05-11	06-07	20800	2019-06-12	Peak Flow Forecasts On The Green River Below Flaming Gorge Reservoir Are Based On Usbr Planned Regul
8	<a href="#">GRVU1</a>	Green	Green River	36400		2020-03-19	14500	16500	19000	24000	29000	15000	17000	19000	24000	30000	47200	21700	05-16	06-11	28600	2019-06-20	Peak Flow Forecasts On The Green River Below Flaming Gorge Reservoir Are Based On Usbr Planned Regul
9	<a href="#">WBRW4</a>	Green	Daniel	8620		2020-03-19	1600	1800	2200	2500	2900	1600	1800	2300	2600	3000	5620	2695	05-27	06-28	2930	2019-06-10	
10	<a href="#">BPNW4</a>	New Fork	Big Piney	8850		2020-03-19	2200	2500	3100	3800	4600	2300	2600	3200	3600	4700	9110	4730	05-26	06-23	6660	2019-06-10	

# Peak Flow Forecast Overview

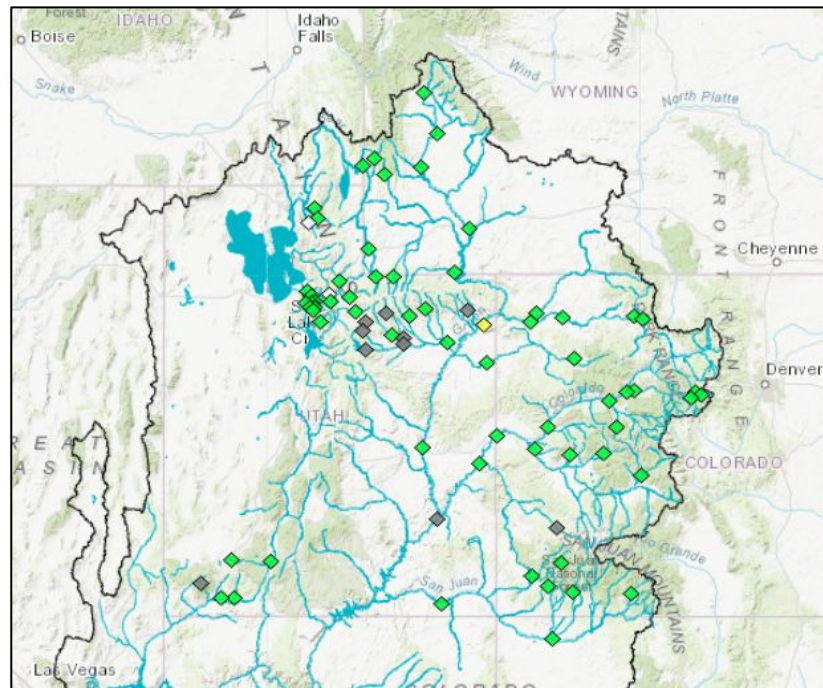
- Peak flow forecast points are a subset of our modeled daily river forecast points
- Many peak flow forecast points were originally developed with recreation interests in mind
- Most peak flow sites have established flood stages and provide some flood threat information
- The daily model becomes increasingly more important when runoff begins

**Peak flow forecast points alone are not a comprehensive summary of any flood threat**

Daily River Forecast Points



Peak Flow Forecast Points



# Peak Flow Percentiles Overview

Different set of sites than legacy peak flow forecast points (some overlap, more locations).

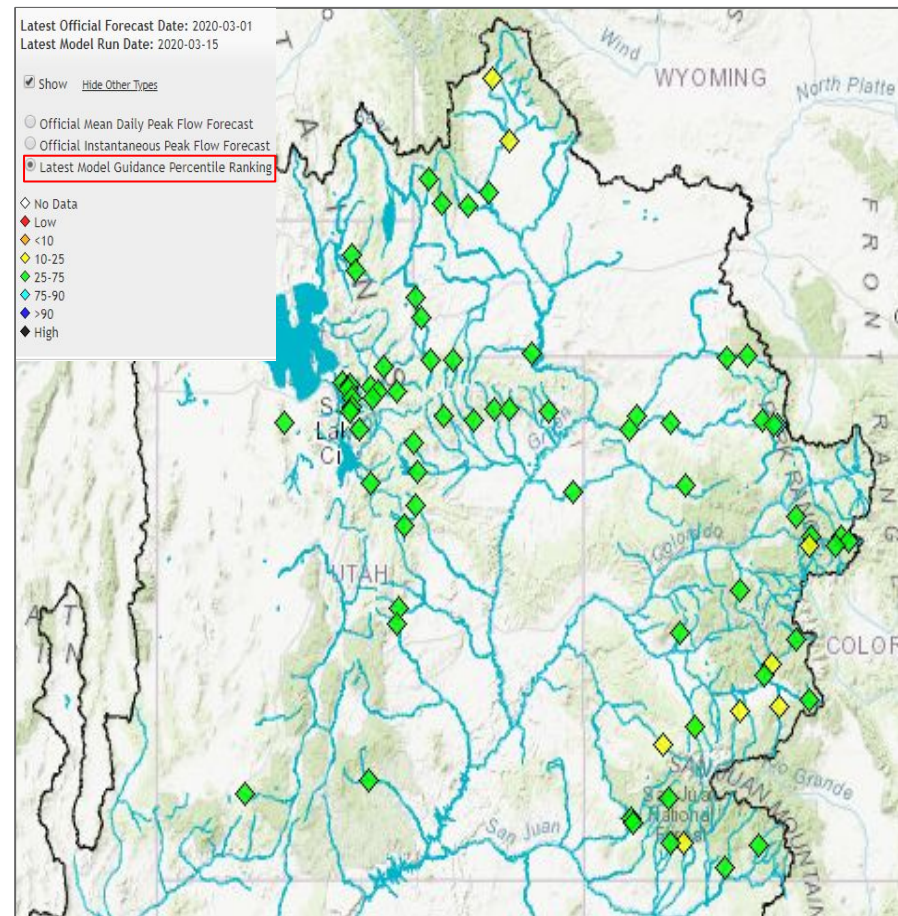
- Limited regulation (e.g head waters)
- Long period of record
- Daily updates

Colors based on historical rank instead of forecast flood.

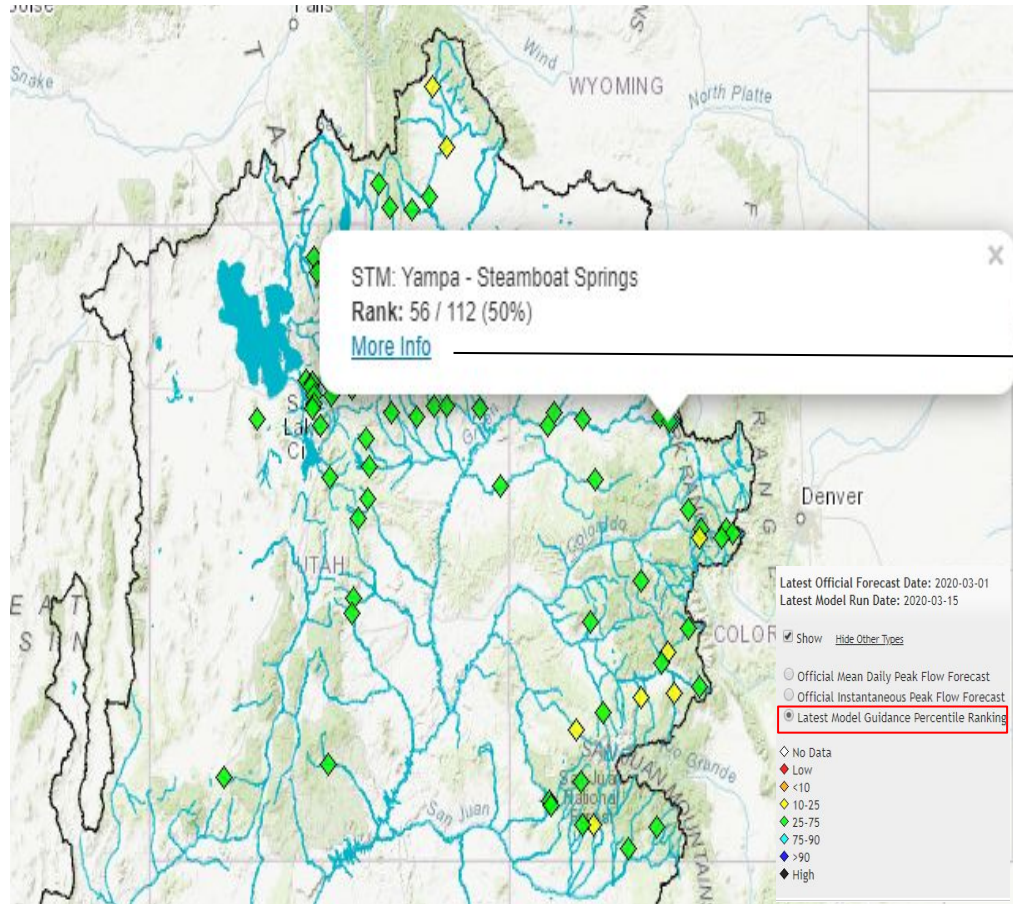
- Provides context to historical record
- Includes points without defined critical levels

Will be available throughout spring snowmelt period

- Legacy peak flow forecasts stop May 1 (if not before).
- Helpful for tracking flood/high water potential in late melts and for flows after seasonal peak.

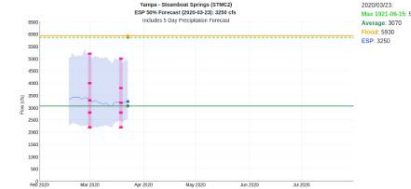


# Flood Potential Dashboard



Peak Flood Potential - STMC2 - Rank: 49 / 104 (53%)

ESP Peak Flow Evolution Plot



ESP Peak Flow Forecast Table

STMC2 ESP Mean Daily Peak Includes 5 Day Precipitation Forecast Forecast Date: 2020-03-23 Flood Flow: 5830 CFS		STMC2 ESP Date of Peak Includes 5 Day Precipitation Forecast Forecast Date: 2020-03-23 Normal Time of Peak: 05/19 - 06/10	
Exceedance Probability	Mean Flow CFS	Exceedance Probability	Date of Peak
min	2200	min	2020-05-17
90%	2510	90%	2020-05-20
75%	2840	75%	2020-05-26
50%	3250	50%	2020-06-04
25%	3790	25%	2020-06-09
10%	4930	10%	2020-06-19
max	5340	max	2020-06-24

10 Day Streamflow Forecast

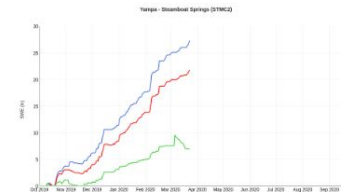


10 day Streamflow Forecast Table

YAMPA - STEAMBOAT SPRINGS  
Daily Average Forecast Flow (ending at given date/time)  
Units: CFS/D  
[csv file](#)

DATE	TIME	FLOW
3/24/2020	12Z	195
3/25/2020	12Z	193
3/26/2020	12Z	191
3/27/2020	12Z	190
3/28/2020	12Z	186
3/29/2020	12Z	180
3/30/2020	12Z	174
3/31/2020	12Z	170
4/1/2020	12Z	172
4/2/2020	12Z	190

Model Snow



Apr-Jul Historical Peaks

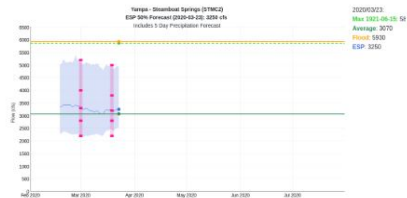
STMC2 QRD5ZZZ Apr-Jul Historical Peaks  
High -> Low (reverse table order)  
[csv file](#)

RANK	YEAR	PEAK	DATE
1	1921	5670.0	6/15
2	1984	5550.0	5/26
3	1917	5280.0	6/20
4	1952	5190.0	6/5
5	1914	5120.0	6/4
6	1957	5100.0	6/8
7	1997	5090.0	6/4
8	1983	5040.0	6/26
9	2011	4970.0	6/8
10	1928	4920.0	5/31

# Flood Potential Dashboard

Peak Flood Potential - STMC2 - Rank: 49 / 104 (53%)

ESP Peak Flow Evolution Plot

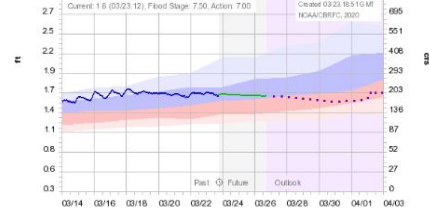


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25%	3790	25%	2020-06-09
10%	4930	10%	2020-06-19
max	5340	max	2020-06-24

*Long Range Probabilistic Peak Flow Guidance: Planning Tool*

10 Day Streamflow Forecast



10 day Streamflow Forecast Table

YAMPA - STEAMBOAT SPRINGS  
Daily Average Forecast Flow (ending at given date/time)  
Units: CFS

csv file

DATE	TIME	FLOW
3/24/2020	12Z	195
3/25/2020	12Z	193
3/26/2020	12Z	191
3/27/2020	12Z	190
3/28/2020	12Z	186
3/29/2020	12Z	180
3/30/2020	12Z	174
3/31/2020	12Z	170
4/1/2020	12Z	172
4/2/2020	12Z	190

*Daily Deterministic Streamflow Forecast: Use as the time of peak nears*

Model Snow



Apr-Jul Historical Peaks

STMC2 QRD5ZZZ Apr-Jul Historical Peaks  
High -> Low (reverse table order)  
csv file

RANK	YEAR	PEAK	DATE
1	1921	5870.0	6/15
2	1984	5550.0	5/26
3	1917	5280.0	6/20
4	1952	5190.0	6/5
5	1914	5120.0	6/4
6	1957	5100.0	6/8
7	1997	5090.0	6/4
8	1983	5040.0	6/26
9	2011	4970.0	6/8
10	1928	4920.0	5/31

*Supplemental Information*

ESP Peak Flow Forecast Table

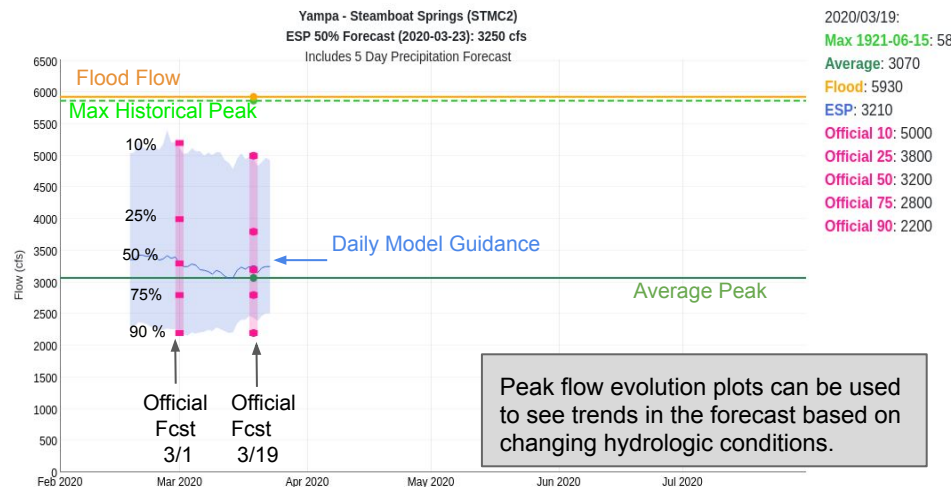
STMC2 ESP Mean Daily Peak Includes 5 Day Precipitation Forecast Forecast Date: 2020-03-23 Flood Flow: 5930 CFS	
Exceedance Probability	Mean Flow CFS
min	2200
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min	2020-05-17
90%	2020-05-20
75%	2020-05-26
50%	2020-06-04
25%	2020-06-09
10%	2020-06-19
max	2020-06-24

ESP Tables includes:

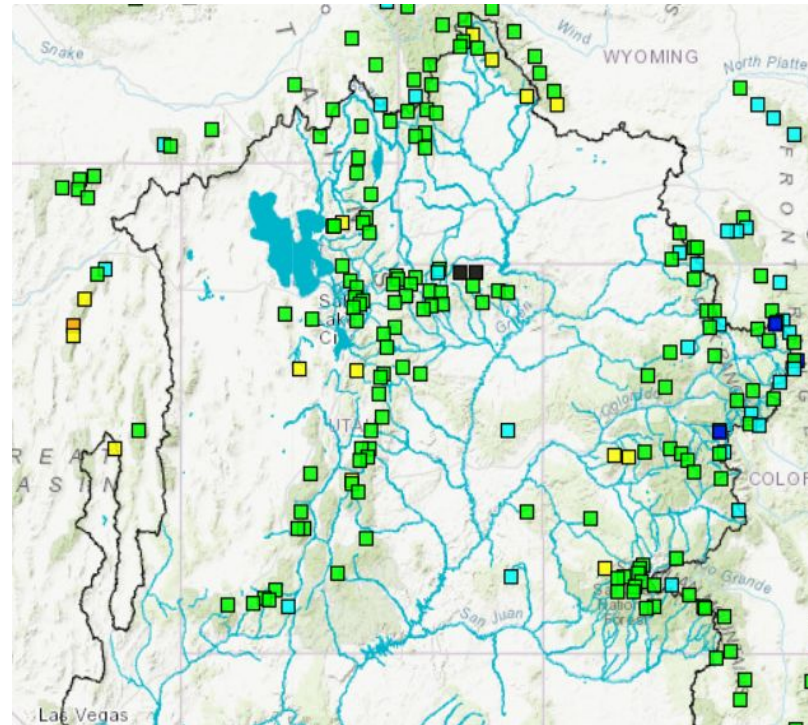
- Probability of peak magnitude
- Probability of peak timing

- Additional improvements to come
- Welcome feedback

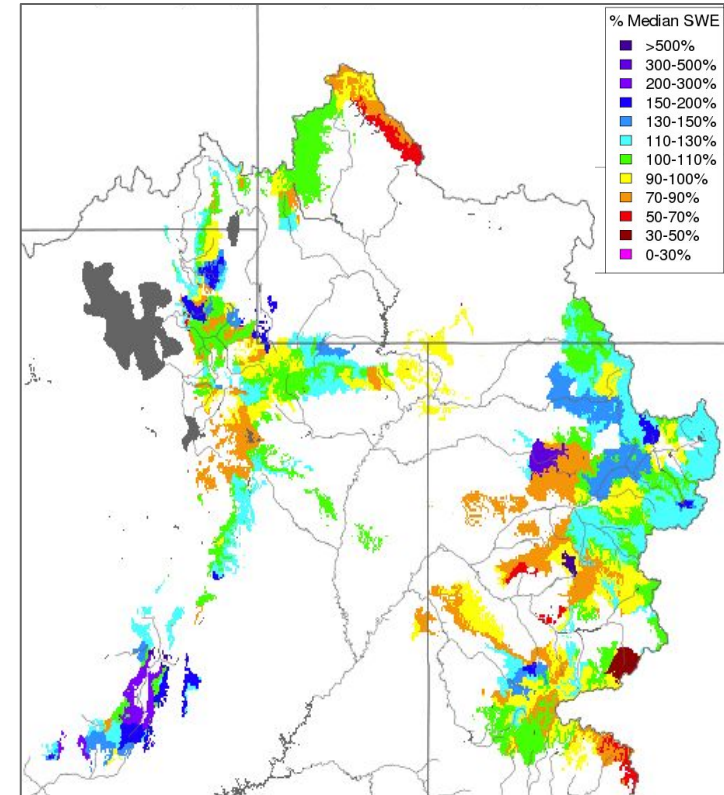


# Snow Conditions Impacting Peak Flows

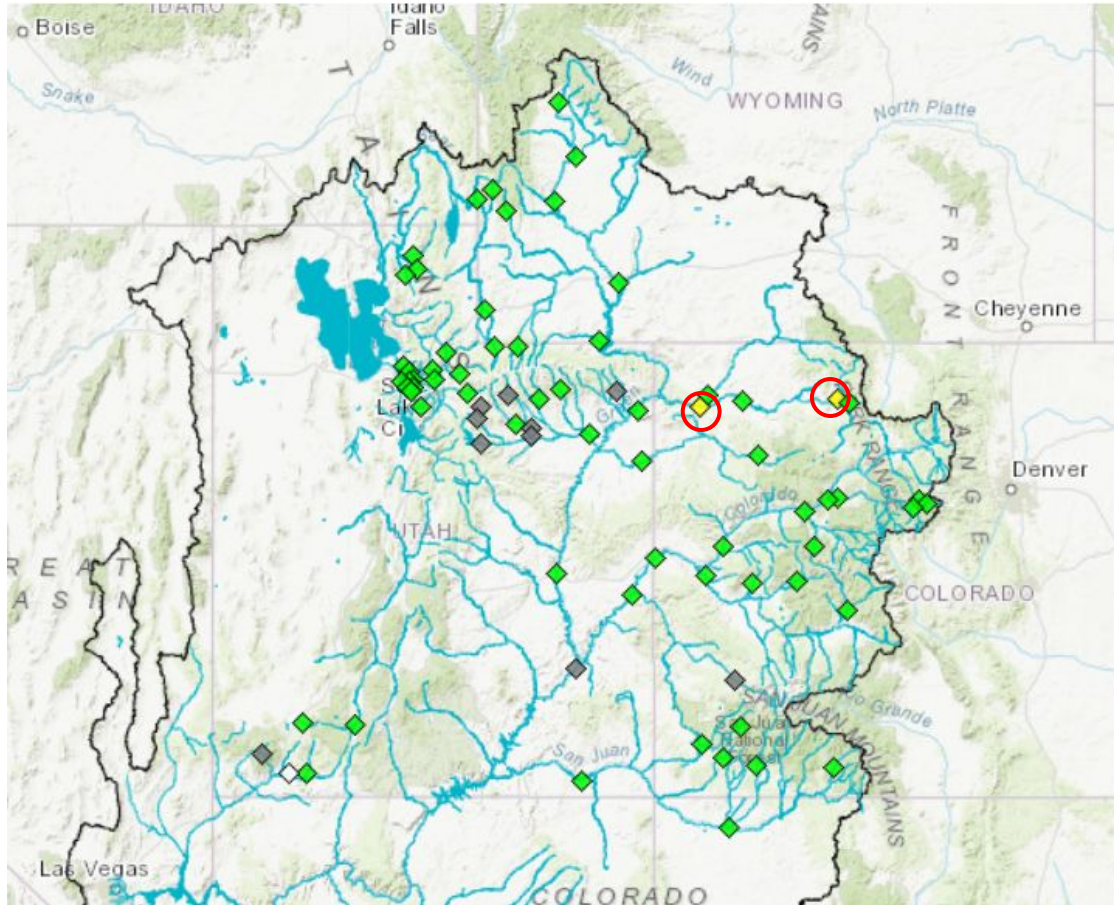
SNOTEL (Observed)  
Ranking as of 3/23/2020



CBRFC Model  
March 23 2020



# Mid-March 2020: Mean Daily Peaks



## Mid-March Peak Flow Probability

Latest Official Forecast Date: 2020-03-19  
Latest Model Run Date: 2020-03-22

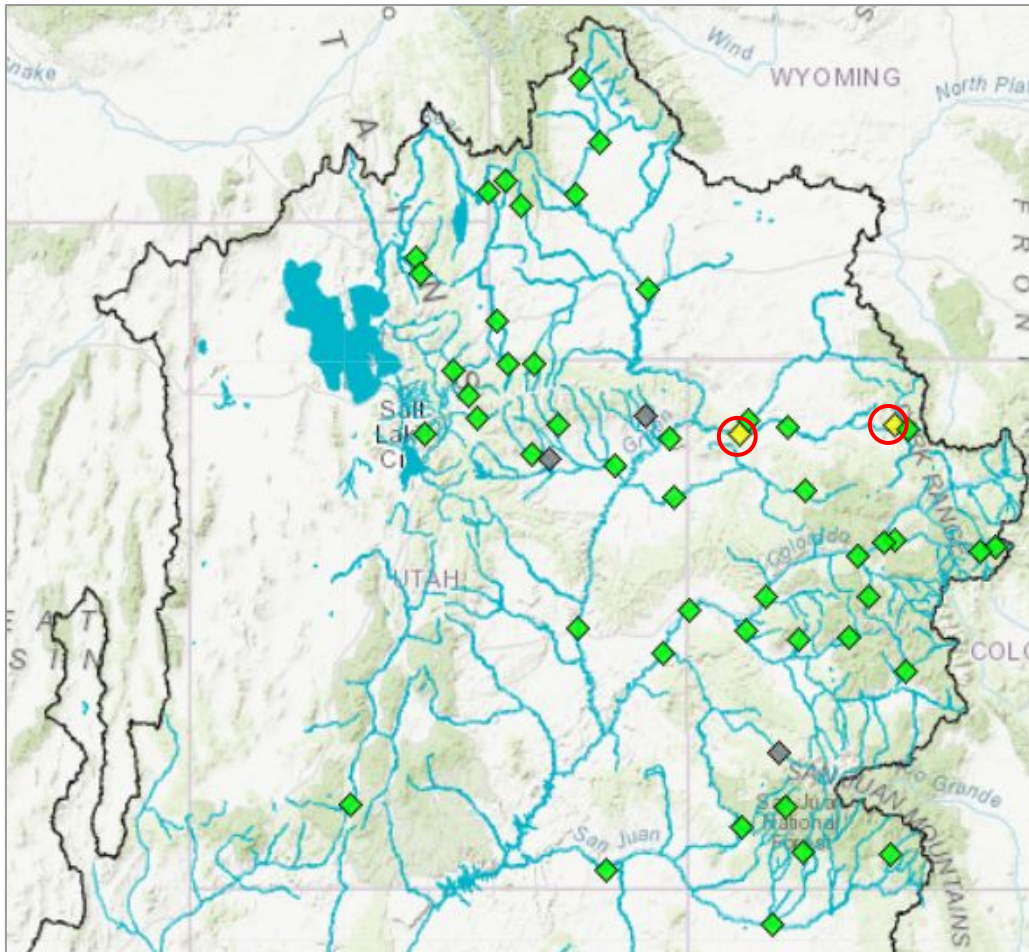
☒ Show [Hide Other Types](#)

- ☒ Official Mean Daily Peak Flow Forecast
- ☐ Official Instantaneous Peak Flow Forecast
- ☐ Latest Model Guidance Percentile Ranking

- ◇ No Forecast
- ◆ No Flood Stage
- ◇ <10%
- ◇ >10-25%
- ◇ >25-50%
- ◇ >50%

Elk River - Milner  
Yampa River - Deerlodge

# Mid-March 2020: Instantaneous Peaks



## Mid-March Peak Flow Probability

Latest Official Forecast Date: 2020-03-19  
Latest Model Run Date: 2020-03-22

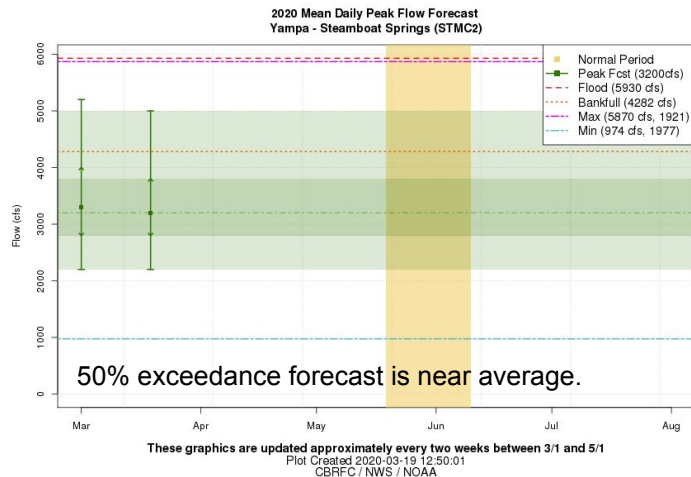
☒ Show [Hide Other Types](#)

- ☐ Official Mean Daily Peak Flow Forecast
- ☒ Official Instantaneous Peak Flow Forecast
- ☐ Latest Model Guidance Percentile Ranking

- ◇ No Forecast
- ◆ No Flood Stage
- ◇ <10%
- ◇ >10-25%
- ◇ >25-50%
- ◇ >50%

Elk River - Milner  
Yampa River - Deerlodge

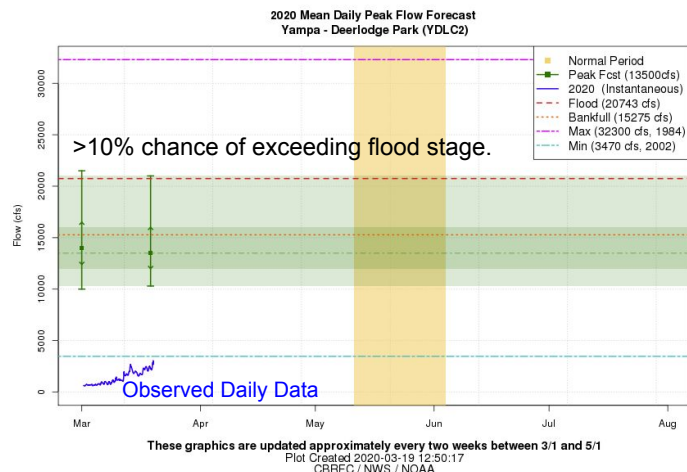
# Peak Flow Forecasts: Yampa River Basin



## Yampa River-Steamboat Springs

**Forecast Range: 2200-5000 CFS**  
**50% Forecast: 3200 CFS**  
Average: 3070 CFS  
Flood: 5930 CFS  
Last Year: 3640 CFS\*

\*June rain event. Not a snowmelt peak

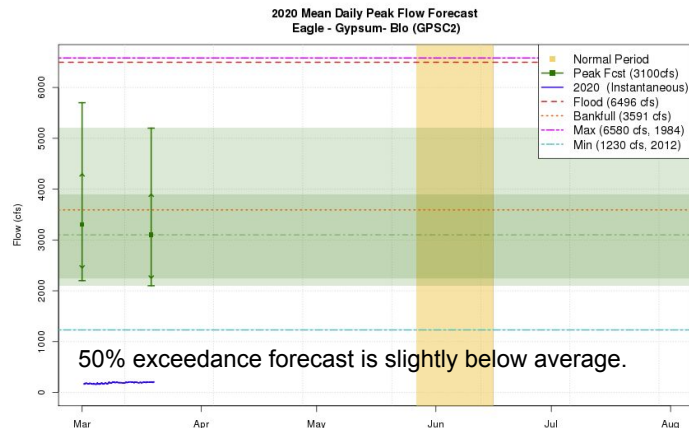


## Yampa River-Deerlodge

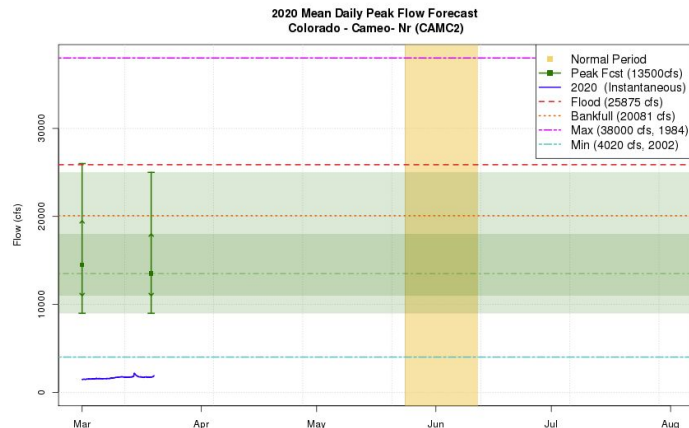
**Forecast Range: 10300-21000 CFS**  
**50% Forecast: 13500 CFS**  
Average: 13470 CFS  
Flood: 20750 CFS  
Last Year: 15800 CFS\*

\*June rain event. Not a snowmelt peak

# Peak Flow Forecasts: Upper Colorado River Mainstem



These graphics are updated approximately every two weeks between 3/1 and 5/1  
Plot Created 2020-03-19 12:51:05  
CBRFC / NWS / NOAA



These graphics are updated approximately every two weeks between 3/1 and 5/1  
Plot Created 2020-03-19 12:51:21  
CBRFC / NWS / NOAA

## Eagle River - Gypsum

**Forecast Range: 2100-5200 CFS**

**50% Forecast: 3100 CFS**

Average: 3600 CFS

Flood: 6500 CFS

Last Year: 6450 CFS

Impacted by upstream regulation

## Colorado River - Cameo

**Forecast Range: 9000-25000 CFS**

**50% Forecast: 13500 CFS**

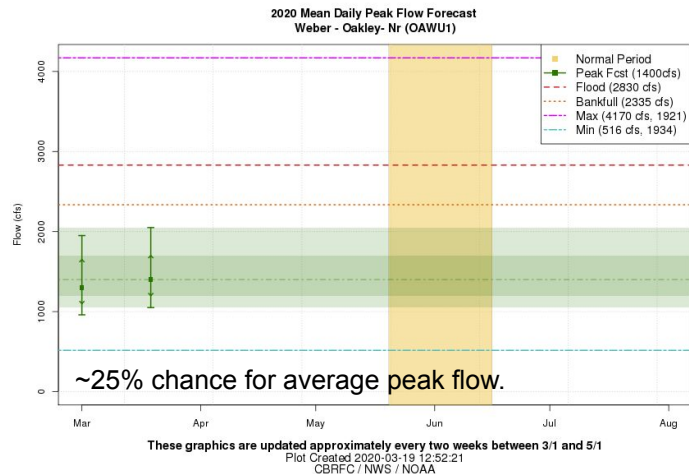
Average: 17000 CFS

Flood: 26000 CFS

Last Year: 23000 CFS

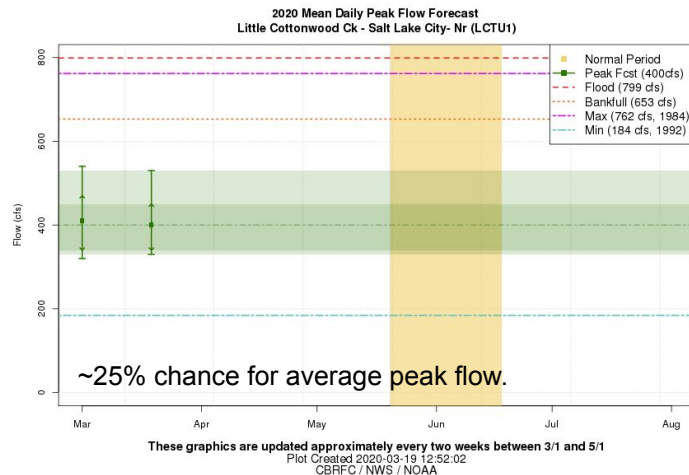
Impacted by upstream regulation

# Peak Flow Forecasts: Great Basin



## Weber River - Oakley

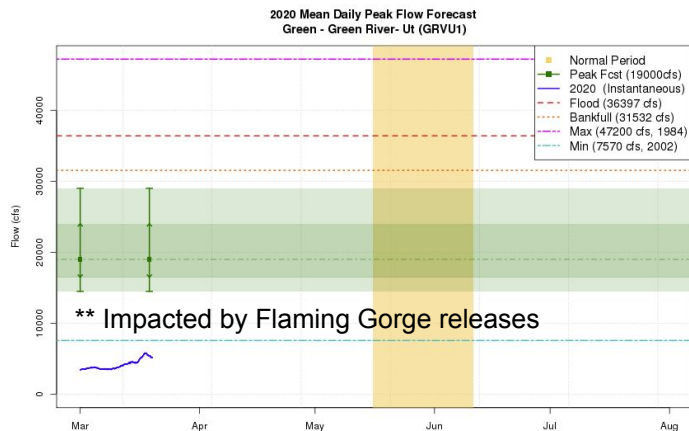
**Forecast Range: 1050-2050 CFS**  
**50% Forecast: 1400 CFS**  
Average: 1650 CFS  
Flood: 3120 CFS  
Last Year: 1850 CFS



## Little Cottonwood - Salt Lake City

**Forecast Range: 330-530 CFS**  
**50% Forecast: 400 CFS**  
Average: 455 CFS  
Flood: 800 CFS  
Last Year: 515 CFS

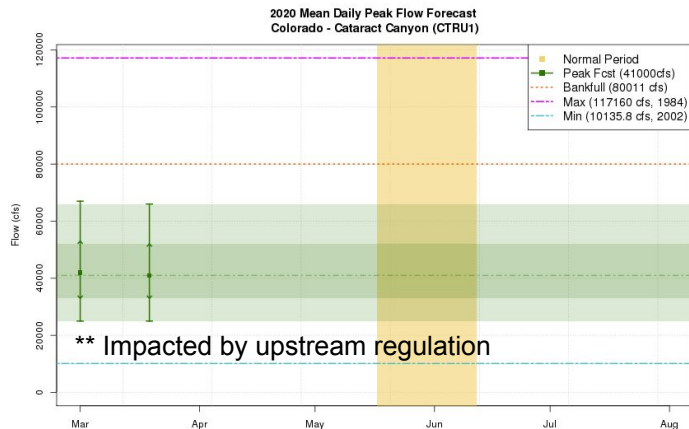
# Peak Flow Forecasts: Southeast Utah Green & Colorado River Basins



These graphics are updated approximately every two weeks between 3/1 and 5/1  
Plot Created 2020-03-19 12:49:32  
CBRFC / NWS / NOAA

## Green River - Green River

**Forecast Range: 14500-29000 CFS**  
**50% Forecast: 19000 CFS**  
Average: 21700 CFS  
Flood: 36400 CFS  
Last Year: 28600 CFS



These graphics are updated approximately every two weeks between 3/1 and 5/1  
Plot Created 2020-03-19 12:51:33  
CBRFC / NWS / NOAA

## Colorado River - Cataract Canyon

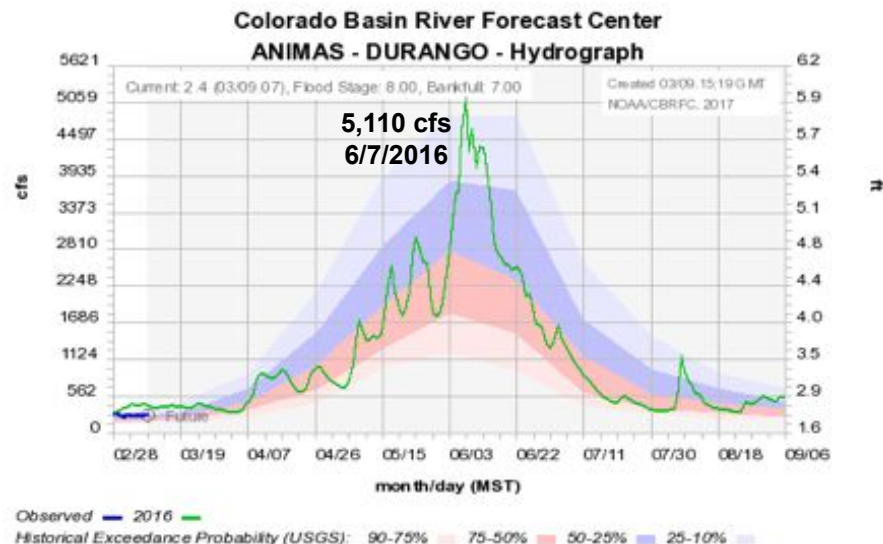
**Forecast Range: 25000-66000 CFS**  
**50% Forecast: 41000 CFS**  
Average: 48000 CFS  
Last Year: 64550 CFS

# Impacts of Spring Weather (Temperature)

Animas River at Durango, CO - March 1, 2016 Peak Flow Forecast

90%	75%	50%	25%	10%
2800	3100	3600	4300	4700

Normal Peak Period: 5/20 - 6/8



## Durango, CO Temperatures

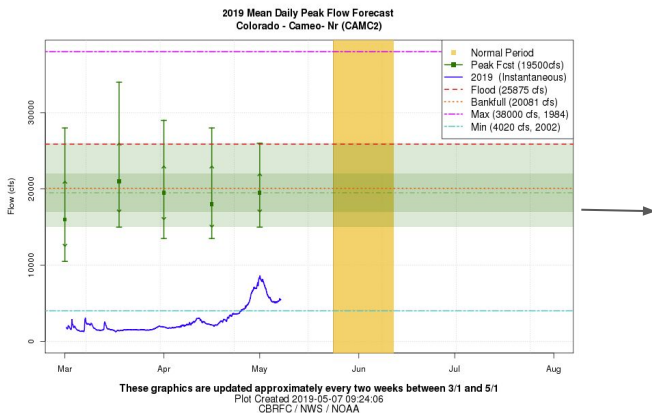
2-6 degrees below normal last 10 days of May

10 degrees above normal by June 5th

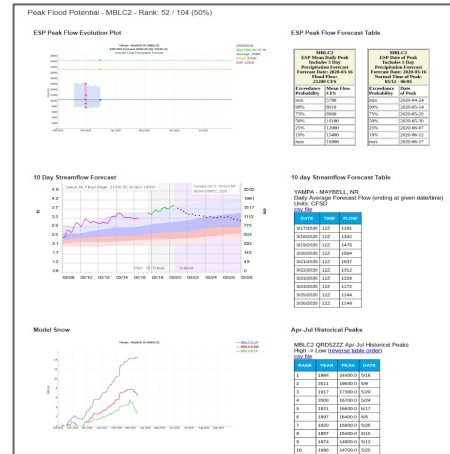
# Transition to using daily model for guidance

- As the time of the peak nears- transition from using probabilistic guidance to output from the daily deterministic hydrologic model forecast. Daily model forecasts are for 10 days into the future.
- The daily model uses 5 days of precipitation forecasts and 10 days of temperature forecasts from meteorological models instead of climatology.
- The daily model will also have observed reservoir releases (& planned if known) that are routed to points downstream.
- The probabilistic peak flow graphics are discontinued at that time (usually early May) and the forecasts list indicates 'peaking soon' or 'peak has already occurred'.

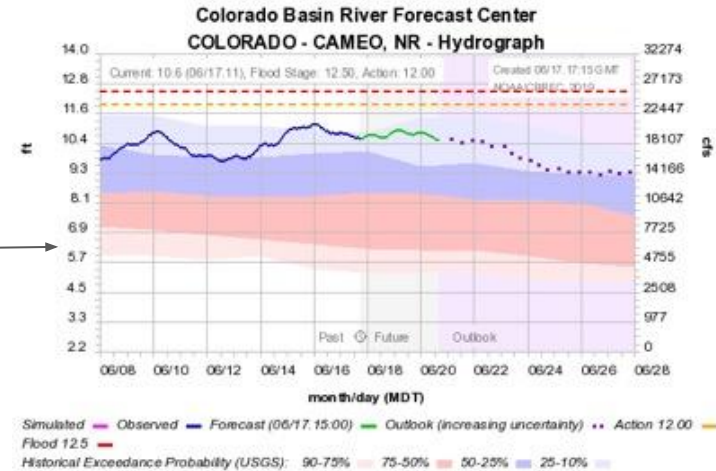
## Probabilistic Peak Flow Forecast



## Flood Potential Dashboard



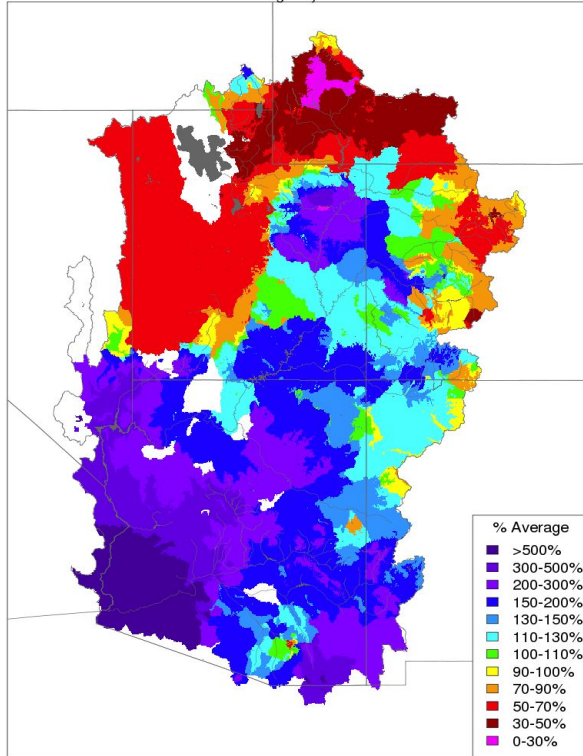
## Deterministic Flow Forecast



# Weather through March So Far

Month to Date Precipitation - March 23 2020

Averaged by Basin



Prepared by NOAA, Colorado Basin River Forecast Center  
Salt Lake City, Utah, [www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov)

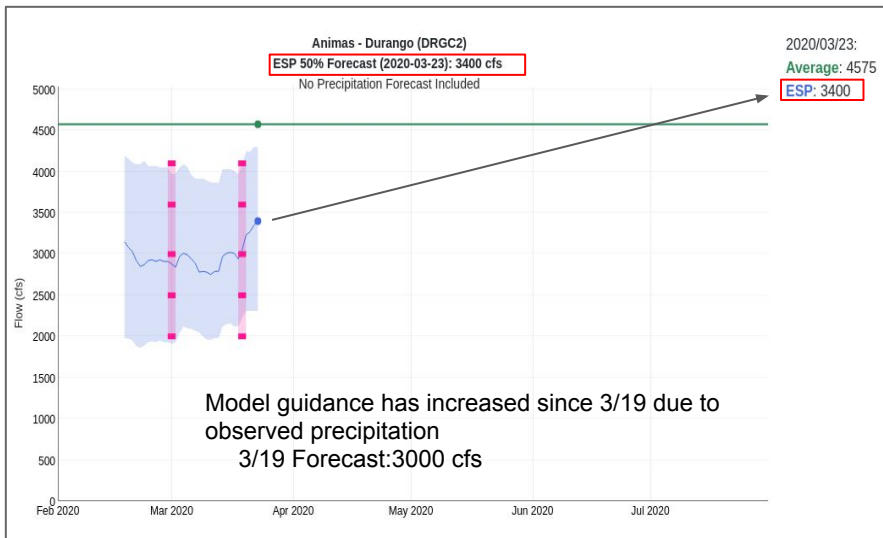
*Temp Stats from March 1-22*

Site	Avg High Temp	Departure from Climo
Salt Lake	56.4	+3.9
Rock Springs	44.1	+1.8
St George	65.3	-1.0
Grand Junction	58.9	+3.7

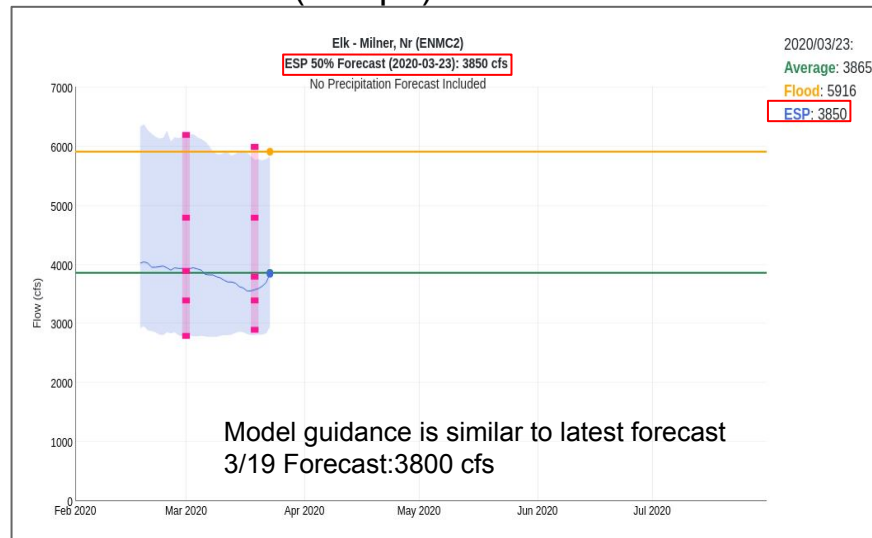
Wet across Lower Basin extending into western CO. Generally drier than normal over northern Utah/Colorado and Wyoming.

# Peak Flow Forecasts Trends: Last 5 days

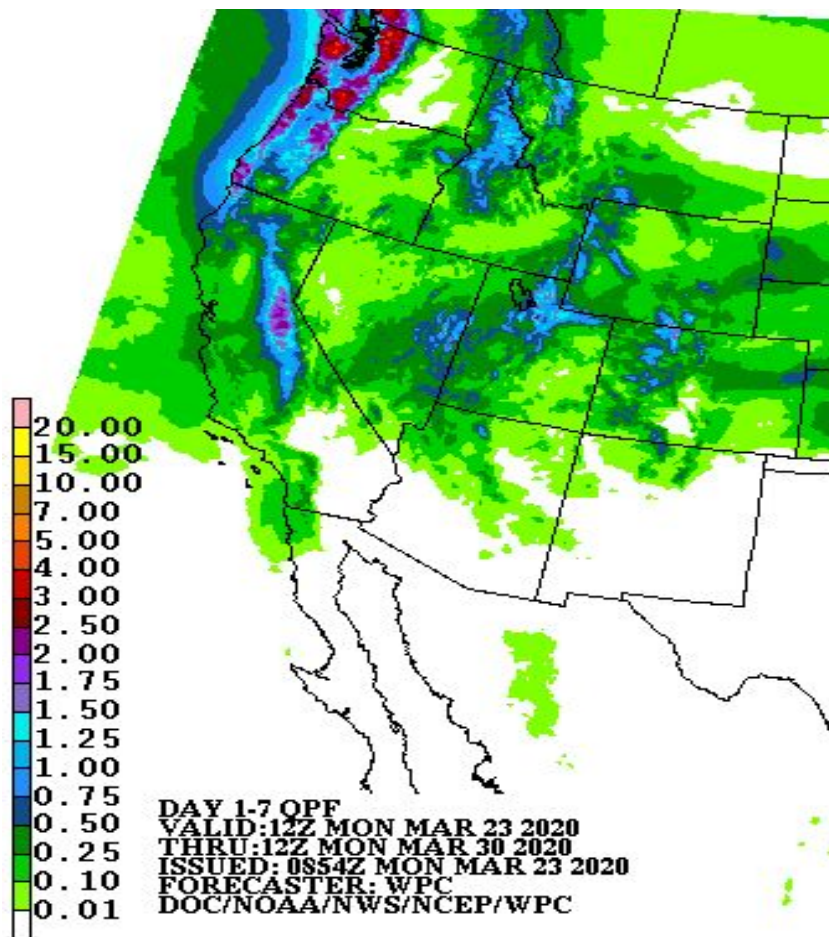
## Animas-Durango (San Juan)



## Elk River- Milner (Yampa)

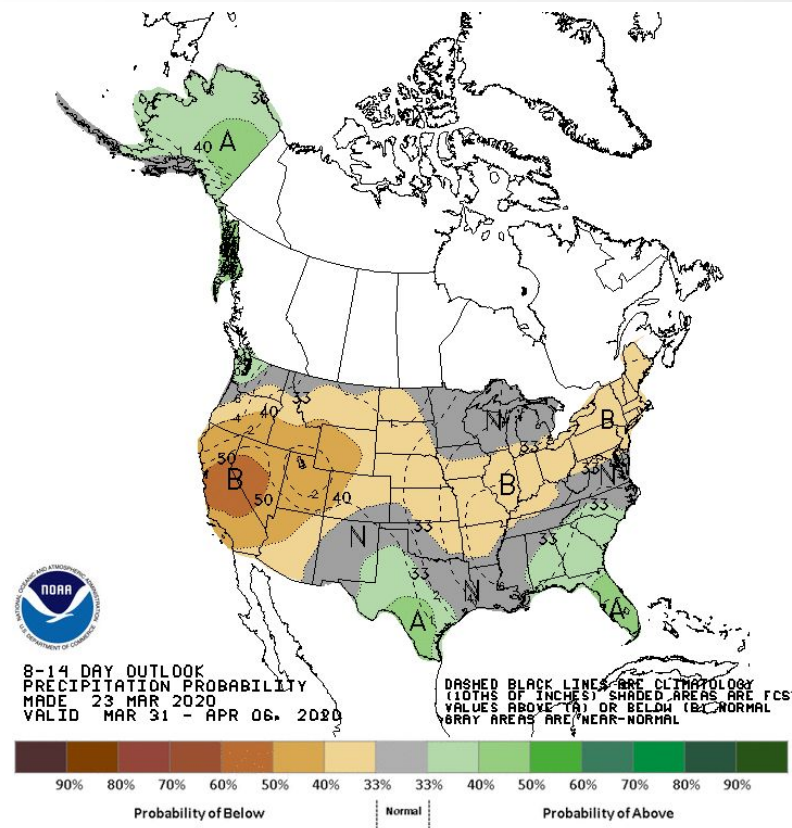
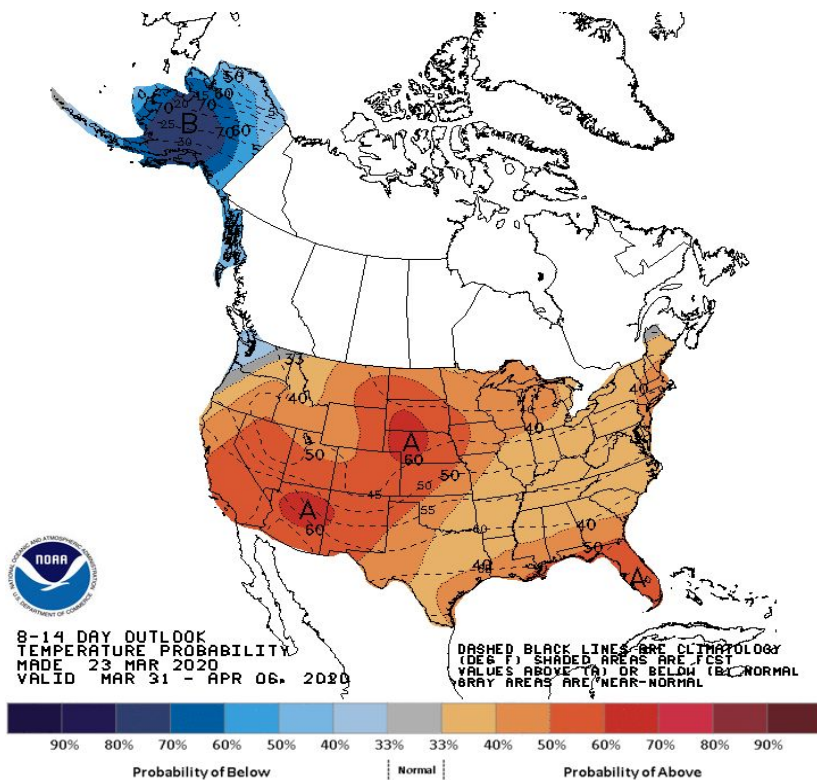


## Upcoming Weather: WPC March 23 - 30 Precipitation Outlook



- A persistent trough over the Great Basin will bring occasional precip to northern Utah and Wyoming through Thursday. This storm system will then move eastward into Colorado by Thursday/Friday, with precip increasing over the northern half of Colorado.
- Highest precip amounts will be in the northern Wasatch, an area that has been quite dry so far in March.
- Temperatures will be dropping to below normal, especially behind the storm system on Wednesday thru Friday.

# Upcoming Weather: 8 to 14 day outlook (March 31-April 6)



Weather models suggest ridging returns to Intermountain West for next week. Above normal temps and below normal precip is favored under this pattern.

## Peak Flow and Flood Threat Summary

- Snowmelt runoff peak flows are likely to be below to near average for most locations in the Great Basin and Colorado River basins.
- At this point in time, flows are expected to be much lower compared to last year.
- Forecast procedures do not exist for all locations. Areas that typically experience high water in a normal or above normal snow year will be susceptible during peak runoff this year.
- In most cases the significance of any snowmelt flood threat doesn't identify itself until April through mid-May.
- Peak flow forecasts have a high level of uncertainty and are highly dependent on Spring weather. A rigorous verification of ESP is being investigated.

# 2020 Water Supply Briefing Schedule

*\*All Times Mountain Time (MT)*

## Colorado River Basin

<del>Wednesday</del>	<del>Jan 8<sup>th</sup></del>	<del>10 am</del>
<del>Friday</del>	<del>Feb 7<sup>th</sup></del>	<del>10 am</del>
<del>Friday</del>	<del>Mar 6<sup>h</sup></del>	<del>10 am</del>
Tuesday	Apr 7 <sup>th</sup>	10 am
Thursday	May 7 <sup>th</sup>	10 am

## Great Basin

<del>Wednesday</del>	<del>Jan 8<sup>th</sup></del>	<del>11:30 am</del>
<del>Friday</del>	<del>Feb 7<sup>th</sup></del>	<del>11:30 am</del>
<del>Friday</del>	<del>Mar 6<sup>th</sup></del>	<del>11:30 am</del>
Tuesday	Apr 7 <sup>th</sup>	11:30 am
Thursday	May 7 <sup>th</sup>	11:30 am

Peak flow forecast updates twice a month. Date/Times are subject to change.

All registration information has been posted to the CBRFC web page.

# CBRFC Contacts

## **Basin Focal Points (Forecasters)**

Brenda Alcorn - Upper Green, White, Yampa, Duchesne  
[brenda.alcorn@noaa.gov](mailto:brenda.alcorn@noaa.gov)

Tracy Cox - San Rafael, Price  
[tracy.cox@noaa.gov](mailto:tracy.cox@noaa.gov)

Cody Moser – Upper Colorado Mainstem  
[cody.moser@noaa.gov](mailto:cody.moser@noaa.gov)

Ashley Nielson – San Juan, Gunnison, Dolores, Lake Powell  
[ashley.nielson@noaa.gov](mailto:ashley.nielson@noaa.gov)

Zach Finch – Virgin, Lower Colorado Basin  
[zach.finch@noaa.gov](mailto:zach.finch@noaa.gov)

Patrick Kormos – Bear, Weber  
[patrick.kormos@noaa.gov](mailto:patrick.kormos@noaa.gov)

Brent Bernard – Six Creeks, Provo , Sevier  
[brent.bernard@noaa.gov](mailto:brent.bernard@noaa.gov)

Michelle Stokes – Hydrologist In Charge  
[michelle.stokes@noaa.gov](mailto:michelle.stokes@noaa.gov)

Paul Miller– Service Coordination Hydrologist  
[paul.miller@noaa.gov](mailto:paul.miller@noaa.gov)

John Lhotak – Development and Operations Hydrologist  
[john.lhotak@noaa.gov](mailto:john.lhotak@noaa.gov)

Craig Peterson - Senior Hydro/Met  
[craig.peterson@noaa.gov](mailto:craig.peterson@noaa.gov)

CBRFC Webpage  
<https://www.cbrfc.noaa.gov/>

CBRFC Operations  
[cbrfc.operations@noaa.gov](mailto:cbrfc.operations@noaa.gov)  
801-524-4004

2020 Water Supply Presentations  
[www.cbrfc.noaa.gov/present/present2020.cgi](http://www.cbrfc.noaa.gov/present/present2020.cgi)

Questions?