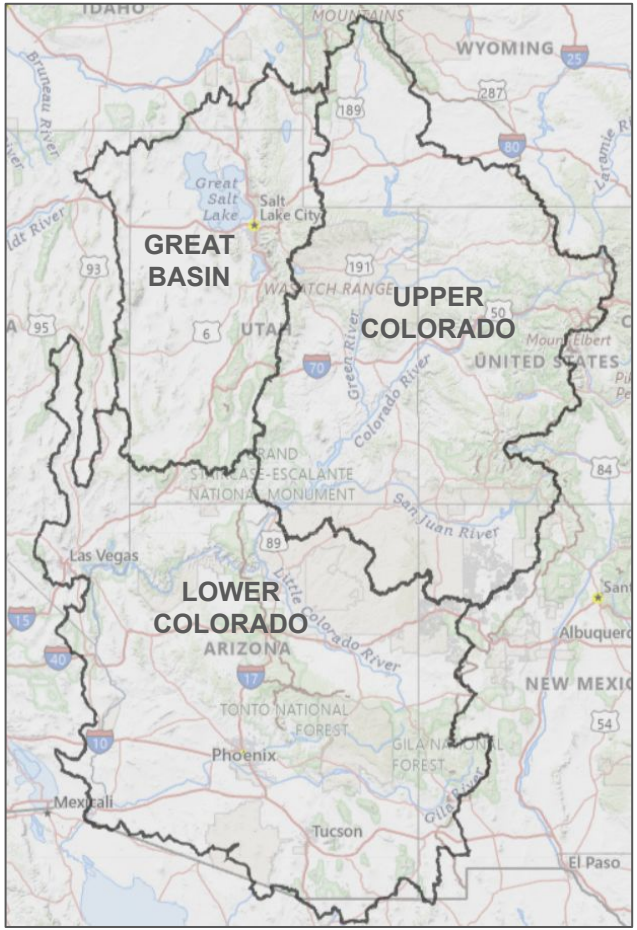
Spring 2025
Peak Flow Outlook

Colorado Basin
River Forecast Center
National Weather Service

Presentation Overview

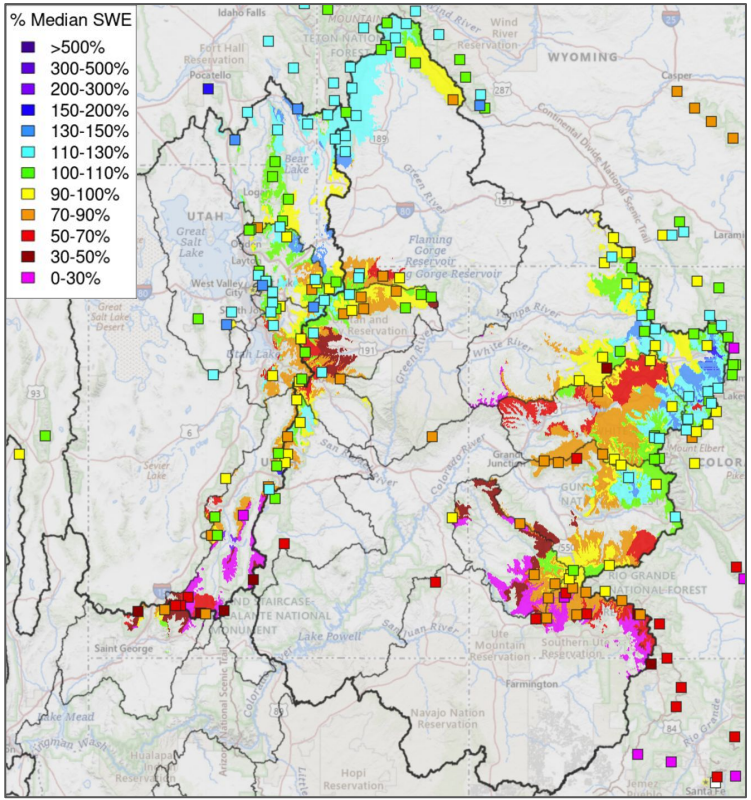
- Current Snowpack Conditions
- Peak Flow Forecasts
  - Products Overview
  - Peak Flow Dashboard Page
- Mid-March Peak Flow Forecasts
- Spring Weather Impacts on Peak Flow
- Summary



Current Snowpack Conditions

March 18 SWE Conditions

NRCS SNOTEL Observed (Squares)
CBRFC Model (Significant Areas)



SWE = Snow Water Equivalent
The amount of water in snow.

Snow above and below SNOTEL stations is modeled in CBRFC's hydrologic model.

Water Year 2025
CBRFC Model SWE (Major Contributing Areas)
Percent of 1991-2020 Median

UPPER COLORADO RIVER BASIN	Mar1	Mar18	Change
Above Lake Powell	87	95	8
Green River Basin			
Above Fontenelle	101	106	5
Above Flaming Gorge	97	104	7
Yampa/White	102	102	0
Duchesne	79	96	17
Price/San Rafael/Dirty Devil	77	92	15
Colorado River Headwaters			
Above Kremmling	115	116	1
Eagle	110	110	0
Roaring Fork	90	99	9
Above Cameo	103	106	3
Southwest Colorado			
Gunnison	88	96	8
Dolores	59	73	14
San Juan	53	65	12
GREAT BASIN			
Bear	105	112	7
Weber	92	104	12
Six Creeks	89	104	15
Provo/Utah Lake	86	101	15
Sevier	40	64	24

Upper Colorado
65-115%

Great Basin
65-110%

CBRFC Peak Flow Forecasts - Overview

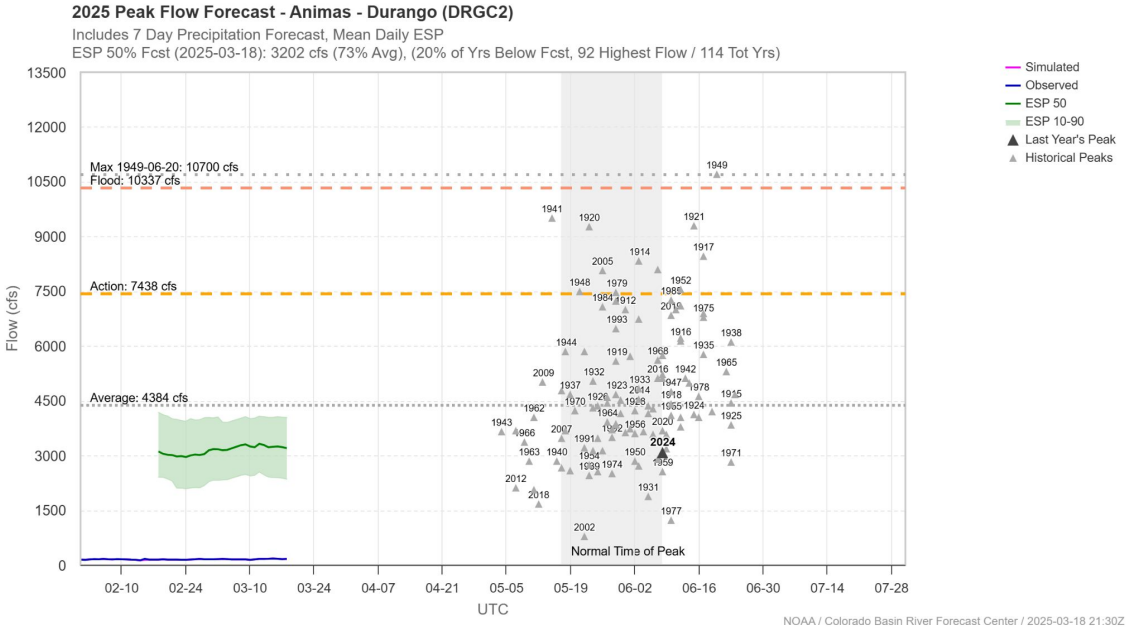
The peak flow forecast represents the maximum mean daily flow due to snowmelt at a location during the April through July period.

-Long range outlook of peak magnitude
-Likelihood of exceeding flood thresholds

The specific date of peak flow is not forecast. Peak flow forecasts have a high level of uncertainty and are highly dependent on spring weather.

Typically only have a 5-10 day forecast lead time for peak timing.

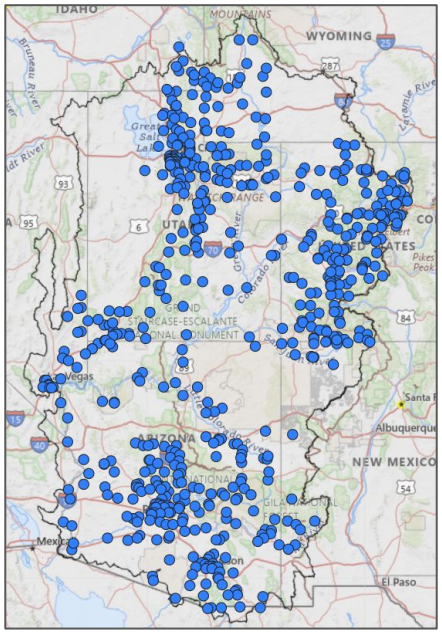
We estimate, where possible, an instantaneous flow for each mean daily flow forecast.



Peak Flow Forecast Locations

- Official mean daily peak flow forecast points are a subset of CBRFC daily river forecast points
- Many of these peak flow forecast points were originally developed with recreation interests in mind

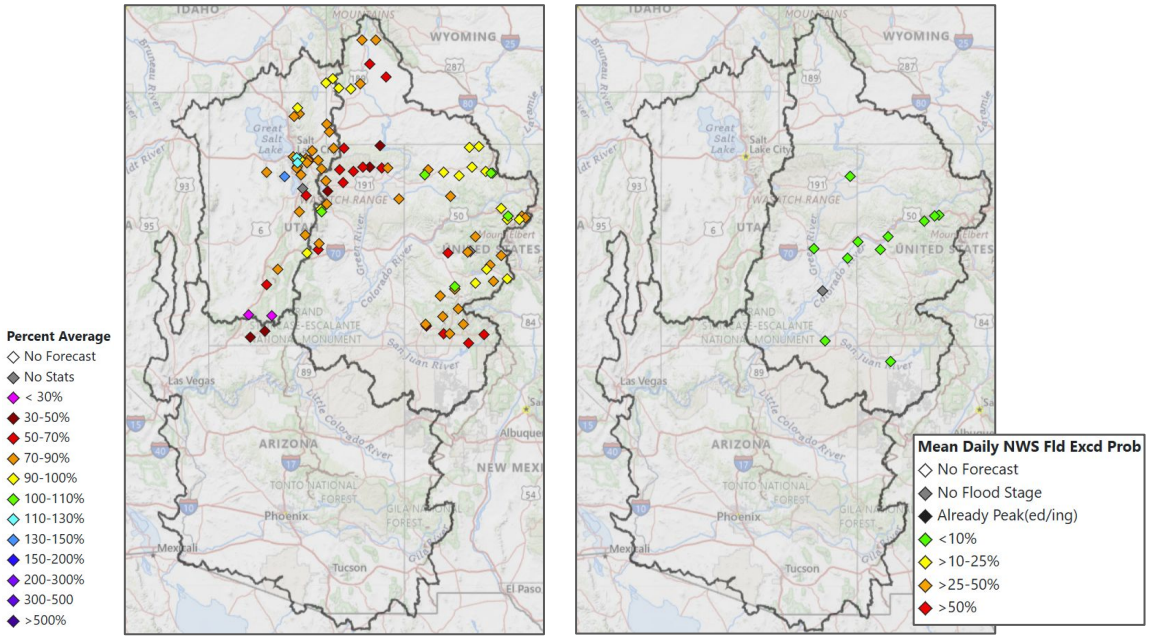
Daily River Forecast Points



Peak Flow Forecast Points

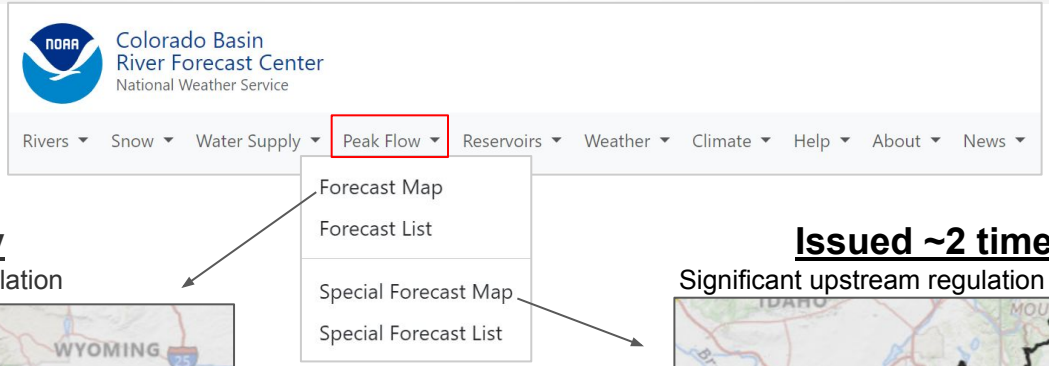
Daily ESP Peak Forecasts
Minimal upstream regulation

Special Peak Flow Forecasts
Significant upstream regulation



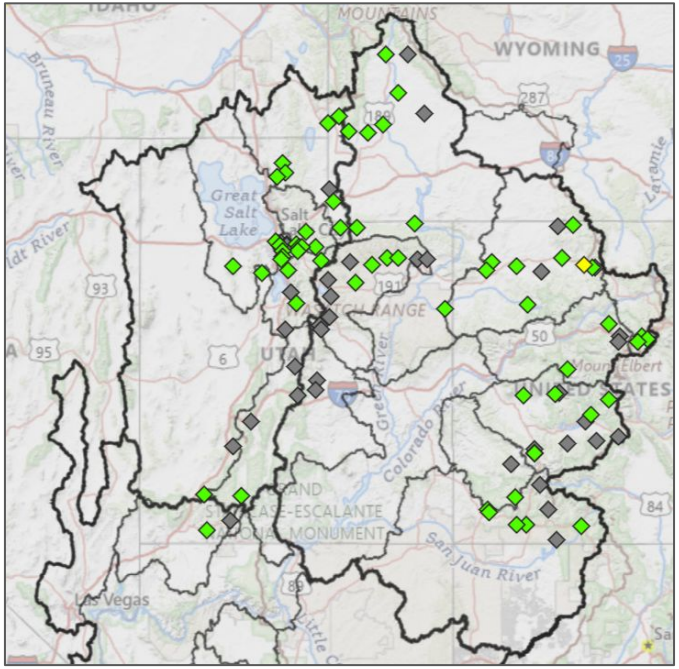
Peak Flow Forecasts - Daily Points vs. Special Points

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



Issued Daily

Minimal upstream regulation

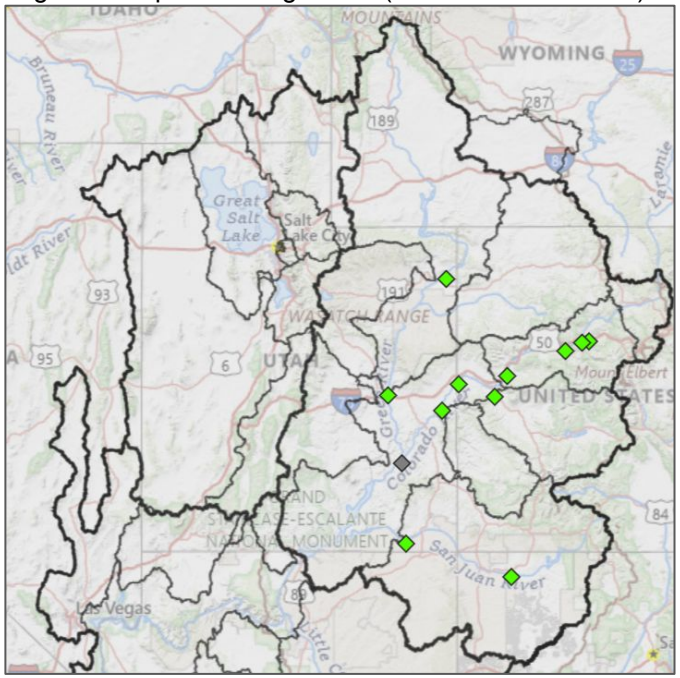


Mean Daily NWS Fld Excd Prob

- ◇ No Forecast
- ◆ No Flood Stage
- ◆ Already Peak(ed/ing)
- ◆ <10%
- ◆ >10-25%
- ◆ >25-50%
- ◆ >50%

Issued ~2 times/month

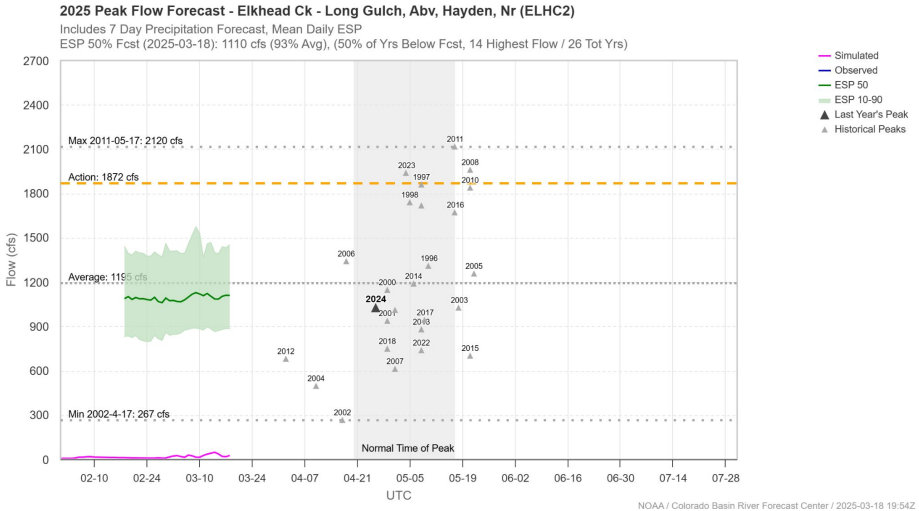
Significant upstream regulation (reservoirs/diversions)



Peak Flow Forecast Plots - Daily Points vs. Special Points

Issued Daily

Minimal upstream regulation



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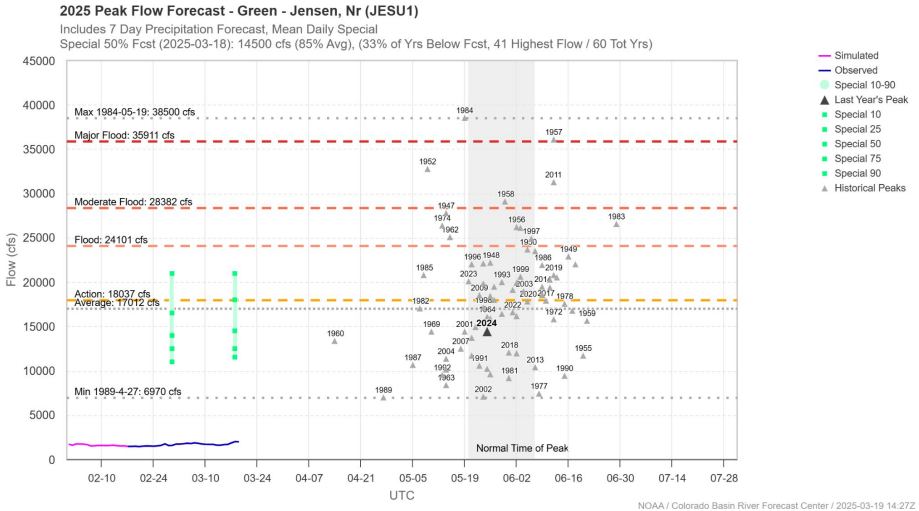
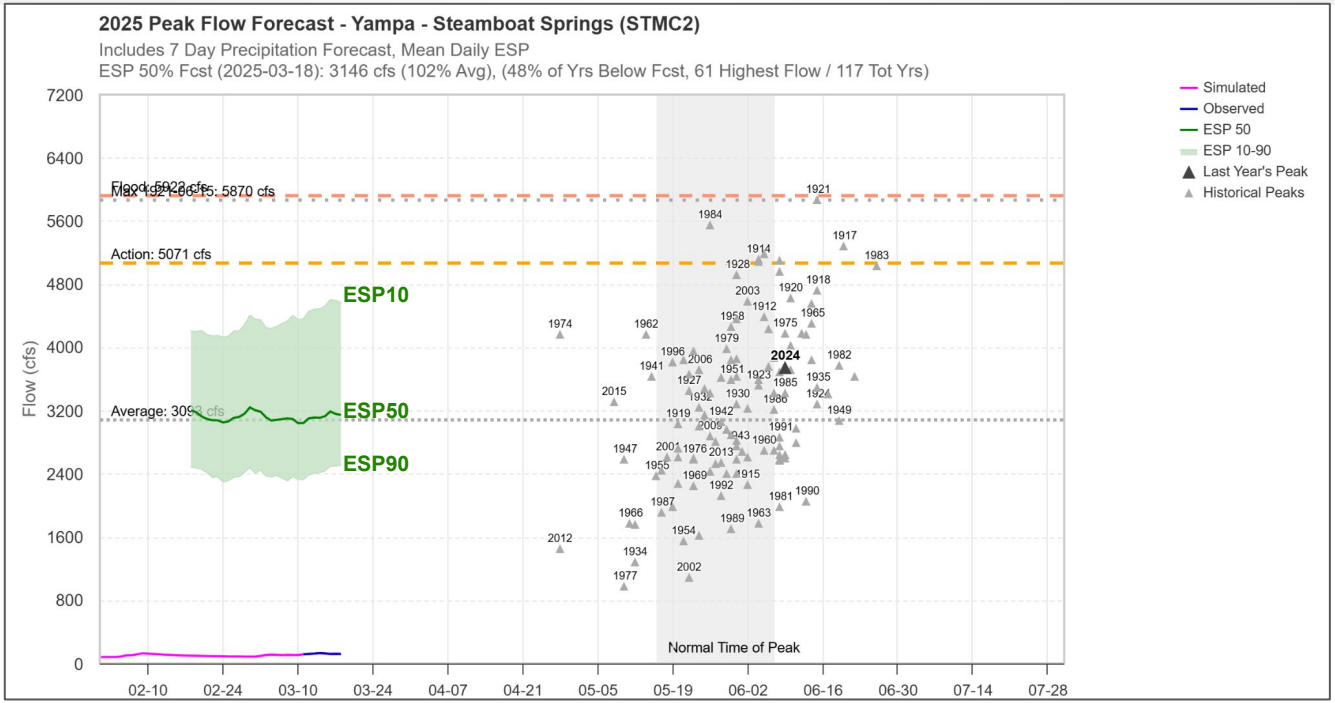


Peak Flow Forecast Evolution Plot

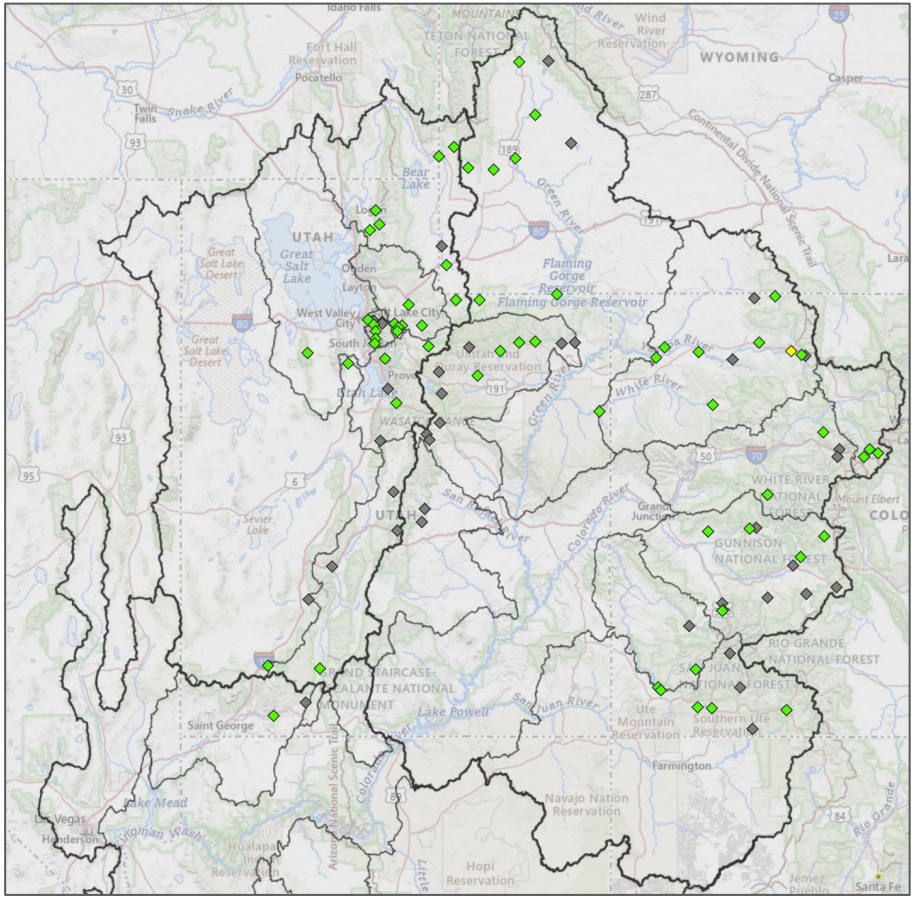


ESP 50	ESP 50% peak flow forecast exceedance value. ESP documentation here.
ESP 10-90	ESP 90%-10% peak flow forecast exceedance values/range
Observed	observed mean daily flow, when available
Simulated	CBRFC hydrologic model mean daily simulated flow
Average	1991-2020 average peak flow
Min/Max	observed historical min/max peak flows
Action	National Weather Service defined action threshold (not available at all locations)
Flood	National Weather Service defined flood threshold (not available at all locations)

Normal Time of Peak

The average date of peak +/- 1 standard deviation

Daily Peak Flow Forecasts - Map View



Peak Flow Forecasts

Show | Hide Other

Data | Label

Percentile [?]

Percent Average [?]

NWS Flood Stage Exceedance Probability

Mean Daily [?]

Instantaneous [?]

Peak Flow Help

Mean Daily NWS Fld Excd Prob

- ◇ No Forecast
- ◆ No Flood Stage
- ◆ Already Peak(ed/ing)
- ◆ <10%
- ◆ >10-25%
- ◆ >25-50%
- ◆ >50%

Map view of peak flow forecast points that are issued daily.

Locations with minimal upstream regulation.

<u>3 Map Layers/Variables:</u>
-Percentile
-Percent Average
-NWS Flood Stage Exceedance Probability

Help and documentation available

Clicking on a point takes you to the site's peak flow dashboard page.

Peak Flow Forecasts - List View

Daily Peak Flow Forecasts - Upper Region - 2025-03-18 - Sorted by Forecast Group

Region | Sort By | Show/Hide | Legend | CSV Data

Forecast Date 03/18/2025 | River, Location, ID, HUC, HSA, etc. | Filter

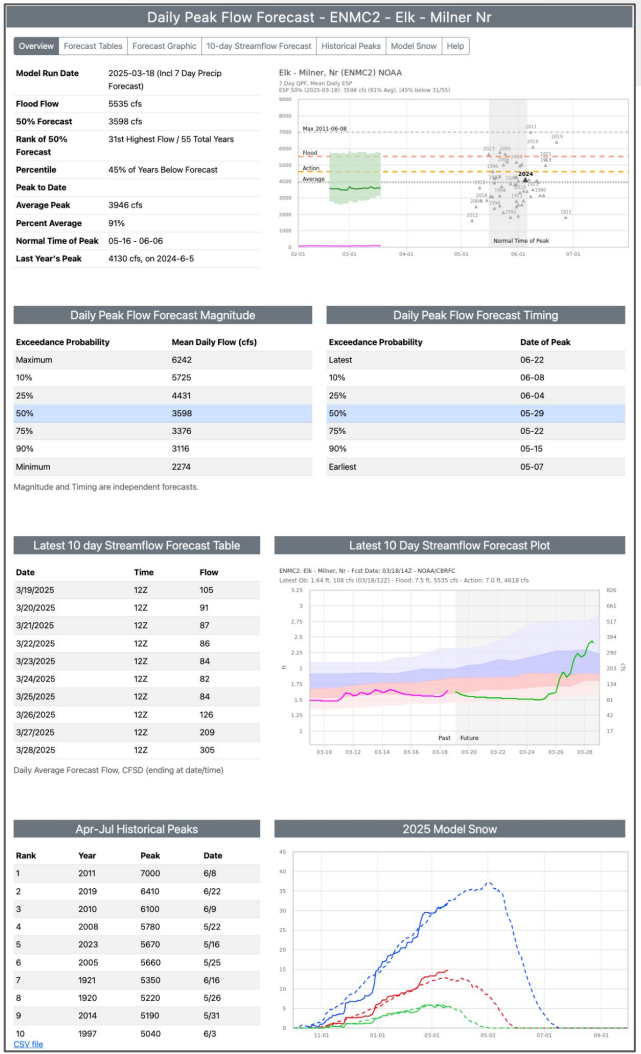
Slot	Forecast Group	NWS ID	River	Location	Forecast Created	Forecast 50	Forecast 25	Forecast 10	Percentile Cond	Percentile	Rank	Total Years	Percent Average Cond	Percent Average	Average Peak	Flood Cond	Flood Flow	Observed Peak to Date	Observed Date	Historic Peak	Hist Peak Date	Forecast Earliest Date	Forecast 50 Date	Forecast Latest Date	Normal Earliest Date	Normal Latest Date	Last Year Peak	Last Year Date
1	Col abv Kremmling	SKEC2	Snake	Montezuma; Nr	2025-03-18	381	451	549	◆	36	50	77	◆	82	464	◆	2195			870	1995-06-23	05-31	06-14	07-12	05-29	06-18	666	2024-6-9
2	Col abv Kremmling	TCFC2	Tenmile Ck	Frisco; N Tenmile Ck; Blo	2025-03-18	732	839	945	◆	49	35	67	◆	92	791	◆	2004			1480	1965-06-18	05-24	06-10	07-10	05-27	06-15	982	2024-6-11
5	Col abv Kremmling	SLAC2	Straight Ck	Laskey Gulch; Blo	2025-03-18	96.6	115	126	◆	42	23	38	◆	88	109	◆	299			226	1995-06-18	06-01	06-21	07-11	06-01	06-22	115	2024-6-11
19	Dolores	DRRC2	Dolores	Rico; Blo	2025-03-18	677	755	876	◆	28	52	71	◆	75	897	◆	1563			1810	1952-06-11	04-28	05-31	06-25	05-10	06-09	553	2024-6-6
20	Dolores	DOLC2	Dolores	Dolores	2025-03-18	1919	2166	2479	◆	27	83	113	◆	73	2622	◆	7337			6950	1922-05-06	04-28	05-19	06-19	05-07	06-03	1300	2024-5-21
21	Dolores	SMPC2	San Miguel	Placerville; Nr	2025-03-18	974	1101	1321	◆	37	57	89	◆	85	1141	◆				2740	1983-06-22	05-24	06-12	07-02	05-23	06-14	1220	2024-6-22
101	Dolores	LCCC2	Lost Canyon Ck	Dolores; Nr	2025-03-18	66.0	97.6	146	◆	19	34	41	◆	30	217	◆	666			560	1986-04-03	04-06	04-29	07-29	04-13	05-11	36.4	2024-4-26
21	Duchesne-Price	STIU1	Strawberry	Strawberry Reservoir; Soldier Springs	2025-03-18	365	546	696	◆	29	32	44	◆	45	805	◆				2770	1983-06-01	04-09	05-11	06-09	04-27	05-31	1307	2024-5-29
22	Duchesne-Price	CRUU1	Currant Ck	Currant Ck Reservoir	2025-03-18	226	260	331	◆	38	28	44	◆	72	312	◆				675	1995-06-03	04-27	05-15	06-14	05-06	05-26	214	2024-5-20
25	Duchesne-Price	TADU1	Duchesne	Tabiona; Nr	2025-03-18	435	718	927	◆	30	50	71	◆	52	823	◆	1860			2810	2011-06-17	04-30	06-06	07-05	05-13	06-12	1270	2024-6-9
26	Duchesne-Price	USTU1	Rock Ck	Upper Stillwater Reservoir	2025-03-18	778	1018	1186	◆	27	33	44	◆	65	1189	◆				2090	1986-06-04	05-06	06-03	07-07	05-17	06-13	1706	2024-6-3
28	Duchesne-Price	YLLU1	Yellowstone	Altonah; Nr	2025-03-18	476	576	775	◆	15	69	80	◆	52	911	◆	2497			1980	2010-06-07	04-25	06-06	07-18	05-19	06-15	989	2024-6-9
29	Duchesne-Price	NEUU1	Uinta	Neola; Nr	2025-03-18	594	771	1028	◆	20	71	88	◆	50	1169	◆	4506			3000	1995-06-16	05-06	06-08	07-01	05-15	06-13	1100	2024-6-9
30	Duchesne-Price	WTRU1	Whiterocks	Whiterocks; Nr	2025-03-18	362	492	640	◆	10	93	103	◆	49	728	◆	4363			2300	1983-06-23	05-06	05-31	07-01	05-08	06-16	600	2024-5-20
31	Duchesne-Price	ASHU1	Ashley Ck	Vernal; Nr	2025-03-18	483	635	818	◆	17	91	109	◆	59	811	◆				2530	1995-06-16	04-25	05-17	06-07	05-07	05-31	519	2024-5-19
108	Duchesne-Price	WRSU1	White	Blo Tabbyune Ck; Soldier Summit; Nr	2025-03-18	156	186	245	◆	46	32	58	◆	89	174	◆				927	1983-05-28	04-09	05-08	06-02	04-19	05-21	224	2024-4-27
109	Duchesne-Price	FCNU1	Fish Ck	Scofield; Nr; Reservoir; Abv	2025-03-18	390	444	548	◆	38	55	88	◆	92	421	◆				1310	1984-05-23	04-23	05-15	06-15	05-04	05-25	455	2024-5-20
110	Duchesne-Price	MCAU1	Mud Ck	Scofield; Winter Quarters; Blo	2025-03-18	92.7	117	148	◆	54	20	42	◆	100	92.0	◆				300	1984-05-25	04-26	05-17	06-14	05-05	06-02	109	2024-5-21
11	Eagle-Roaring Fork	RCYC2	Crystal	Redstone; Nr; Avalanche Ck; Abv	2025-03-18	1402	1628	1855	◆	15	59	69	◆	74	1873	◆	2931			3500	1983-06-26	05-17	06-10	07-01	05-25	06-18	2100	2024-6-10
103	Eagle-Roaring Fork	CSSC2	Cross Ck	Minturn; Nr	2025-03-18	380	435	530	◆	30	45	63	◆	91	415	◆				794	2011-07-09	06-02	06-14	07-11	05-30	06-24	580	2024-6-9
104	Eagle-Roaring Fork	GRVC2	Gore Ck	Vail; Red Sandstone Ck; Abv	2025-03-18	1070	1221	1502	◆	61	15	36	◆	105	1010	◆				1730	2003-06-02	05-21	06-12	07-09	05-28	06-18	1060	2024-6-9
105	Eagle-Roaring Fork	PSBC2	Piney	State Bridge; Nr	2025-03-18	597	647	826	◆	56	36	81	◆	95	623	◆	10369			1300	1984-05-26	05-08	06-02	06-18	05-16	06-07	601	2024-6-8
15	Gunnison	ALEC2	East	Almont	2025-03-18	1624	2065	2459	◆	31	71	102	◆	83	1949	◆	3119			5000	1918-06-13	05-14	06-02	06-23	05-21	06-09	2410	2024-6-10

Peak Flow Dashboard Page

Long Range Probabilistic Peak Flow Forecast: Planning Tool
- Peak forecast overview & evolution plot
- Tabular forecasts
- Probabilistic Forcings
  - 30 years of historical precipitation and temperature (1991-2020)

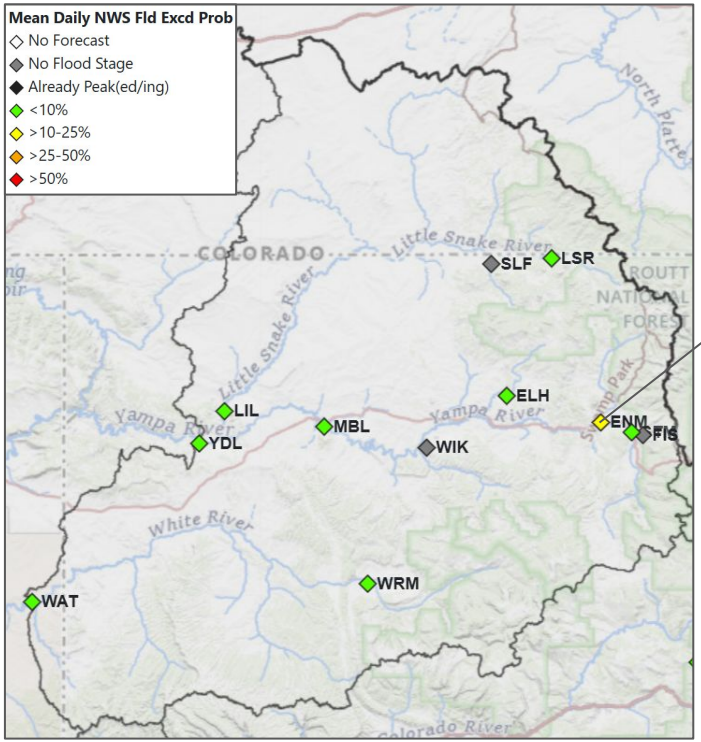
Daily Deterministic Streamflow Forecast: Use as time of peak nears
- 10-day streamflow forecast table & hydrograph
  - Deterministic Weather Forcings
    - 10 days of forecast temperature
    - 7 days of forecast precipitation

Supplemental Information:
- Historical April-July observed peak flows
- Model snow: driving peak flow forecasts



Peak Flow Dashboard Page

Yampa River Peak Flow Forecasts: March 18

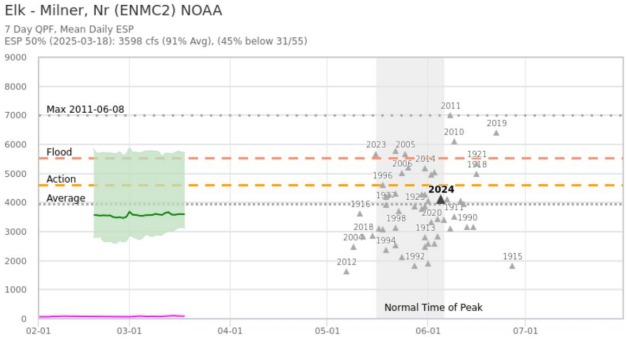


Clicking on a point takes you to the site's peak flow dashboard page.

Daily Peak Flow Forecast - ENMC2 - Elk - Milner Nr

Overview | Forecast Tables | Forecast Graphic | 10-day Streamflow Forecast | Historical Peaks | Model Snow | Help

Model Run Date	2025-03-18 (Incl 7 Day Precip Forecast)
Flood Flow	5535 cfs
50% Forecast	3598 cfs
Rank of 50% Forecast	31st Highest Flow / 55 Total Years
Percentile	45% of Years Below Forecast
Peak to Date	
Average Peak	3946 cfs
Percent Average	91%
Normal Time of Peak	05-16 - 06-06
Last Year's Peak	4130 cfs, on 2024-6-5



Daily Peak Flow Forecast Magnitude

Exceedance Probability	Mean Daily Flow (cfs)
Maximum	6242
10%	5725
25%	4431
50%	3598
75%	3376
90%	3116
Minimum	2274

Daily Peak Flow Forecast Timing

Exceedance Probability	Date of Peak
Latest	06-22
10%	06-08
25%	06-04
50%	05-29
75%	05-22
90%	05-15
Earliest	05-07

Magnitude and Timing are independent forecasts.

Peak Flow Dashboard Page: Daily Peak Flow Forecast Tables

Daily Peak Flow Forecast Tables

- Probability of peak flow magnitude
- Probability of peak date
    - Forecast peak flow timing generally points to the ‘normal time of peak’ until the actual time of peak is near.
- Magnitude and timing are independent forecasts

Daily Peak Flow Forecast Magnitude

Exceedance Probability	Mean Daily Flow (cfs)
Maximum	6242
10%	5725
25%	4431
50%	3598
75%	3376
90%	3116
Minimum	2274

Daily Peak Flow Forecast Timing

Exceedance Probability	Date of Peak
Latest	06-22
10%	06-08
25%	06-04
50%	05-29
75%	05-22
90%	05-15
Earliest	05-07

Magnitude and Timing are independent forecasts.

Peak Flow Dashboard Page: 10-Day Streamflow Forecasts

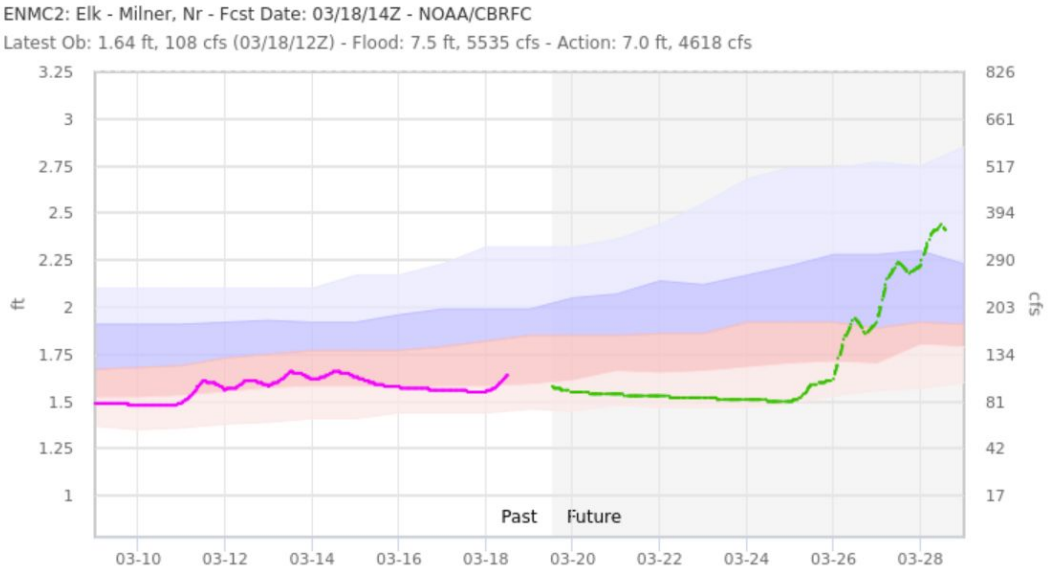
As the peak approaches, CBRFC 10-day streamflow forecasts are the best source of peak flow timing and magnitude. 10-day streamflow forecasts are updated daily.

Latest 10 day Streamflow Forecast Table

Date	Time	Flow
3/19/2025	12Z	105
3/20/2025	12Z	91
3/21/2025	12Z	87
3/22/2025	12Z	86
3/23/2025	12Z	84
3/24/2025	12Z	82
3/25/2025	12Z	84
3/26/2025	12Z	126
3/27/2025	12Z	209
3/28/2025	12Z	305

Daily Average Forecast Flow, CFSD (ending at date/time)

Latest 10 Day Streamflow Forecast Plot



Peak Flow Dashboard Page: Supplemental Information

Historical Peaks

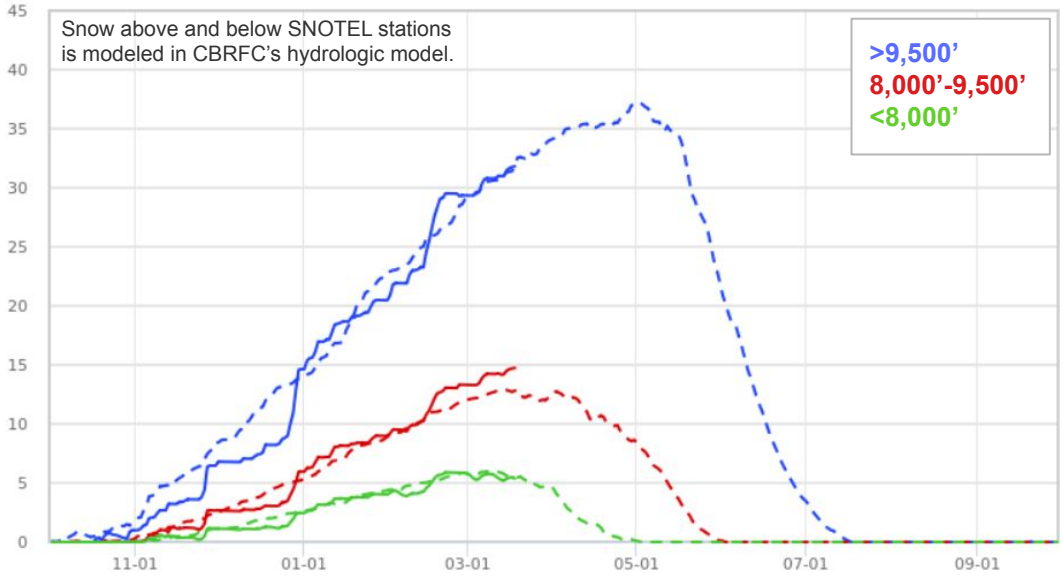
Apr-Jul Historical Peaks

Rank	Year	Peak	Date
1	2011	7000	6/8
2	2019	6410	6/22
3	2010	6100	6/9
4	2008	5780	5/22
5	2023	5670	5/16
6	2005	5660	5/25
7	1921	5350	6/16
8	1920	5220	5/26
9	2014	5190	5/31
10	1997	5040	6/3
11	2006	5030	5/24
12	1918	5000	6/16

CSV file

CBRFC Hydrologic Model Snow

2025 Model Snow

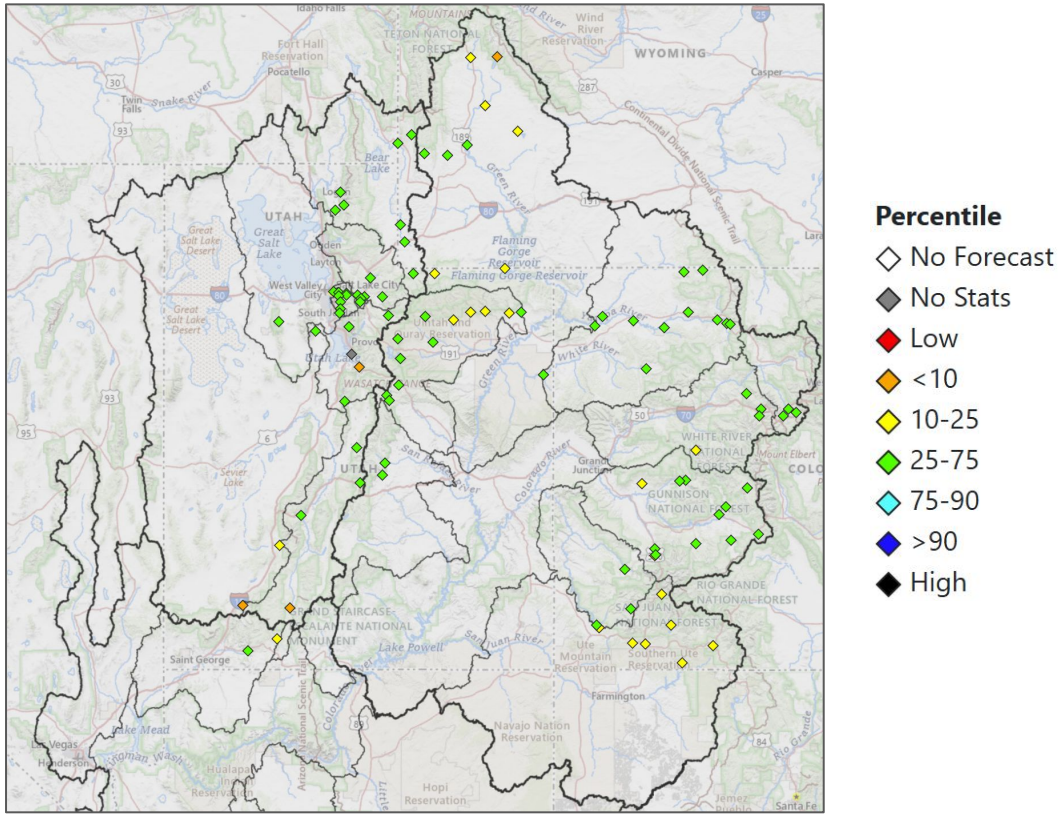


Mid-March Peak Flow Forecasts - Percentile

Percentile: the percent of historical annual peak flow values that are below the current peak flow forecast.

Legend: Percentile Categories

Peak flow forecasts with a higher percentile generally correspond to locations with better snowpack conditions.

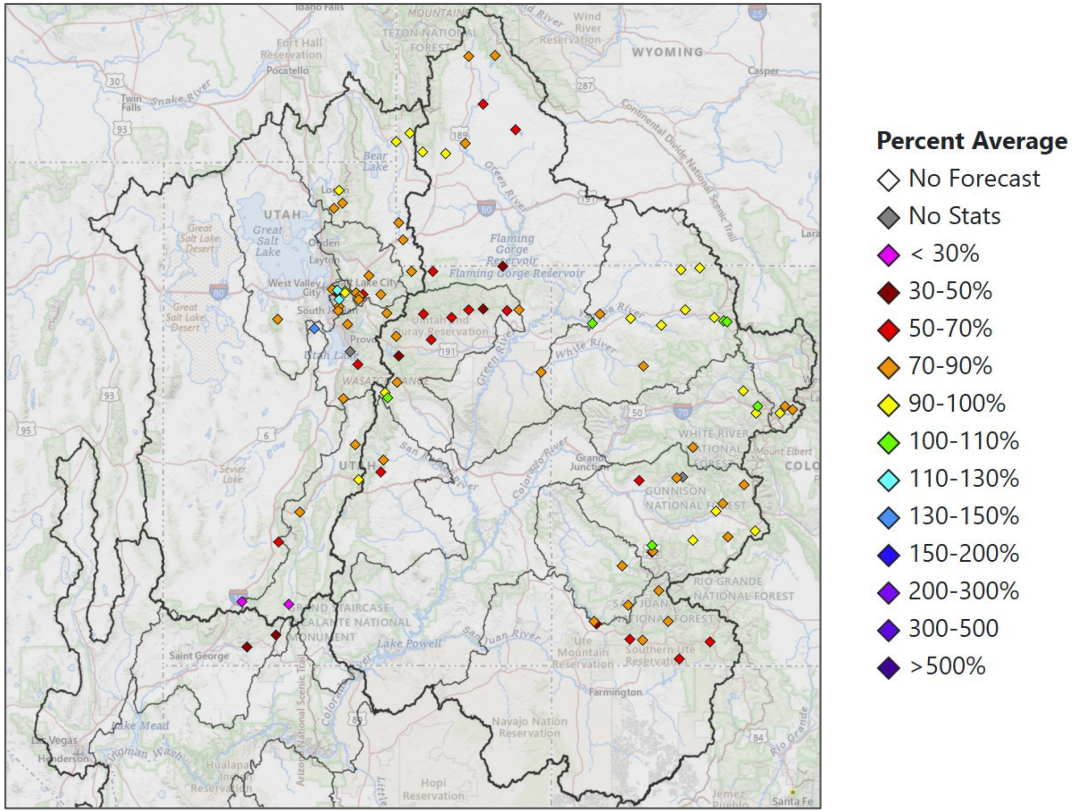


Mid-March Peak Flow Forecast - Percent of Average

Percent of Average: the peak flow forecast percent of the 1991-2020 average peak flow.

Legend: Percent of Average

Peak flow forecasts with a higher percent of average generally correspond to locations with better snowpack conditions.



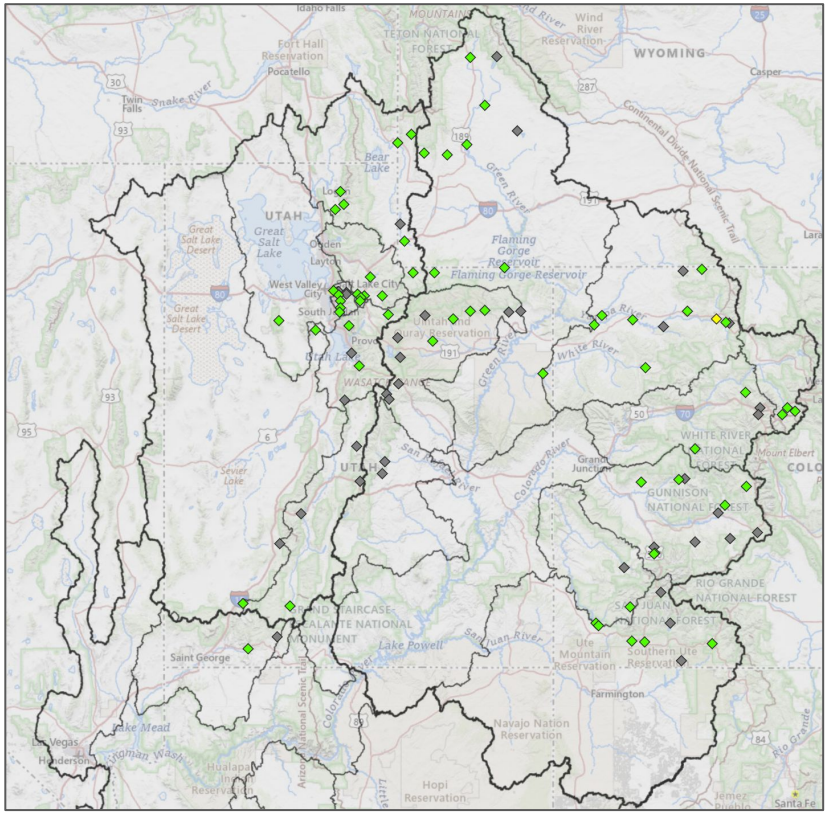
Mid-March Peak Flow Forecasts - Flood Stage Exceedance Probability

NWS Flood Stage Exceedance Probability: the probability of the peak flow forecast exceeding flood stage.

Legend: Flood Stage Exceedance Probability

Peak flow forecasts with a higher exceedance probability correspond to locations with increased flood potential.

**Note: flood stage not established at all peak flow forecast locations.*



Mid-March Special Peak Flow Forecasts

Legend: Flood Stage Exceedance Probability

Includes mainstem river locations

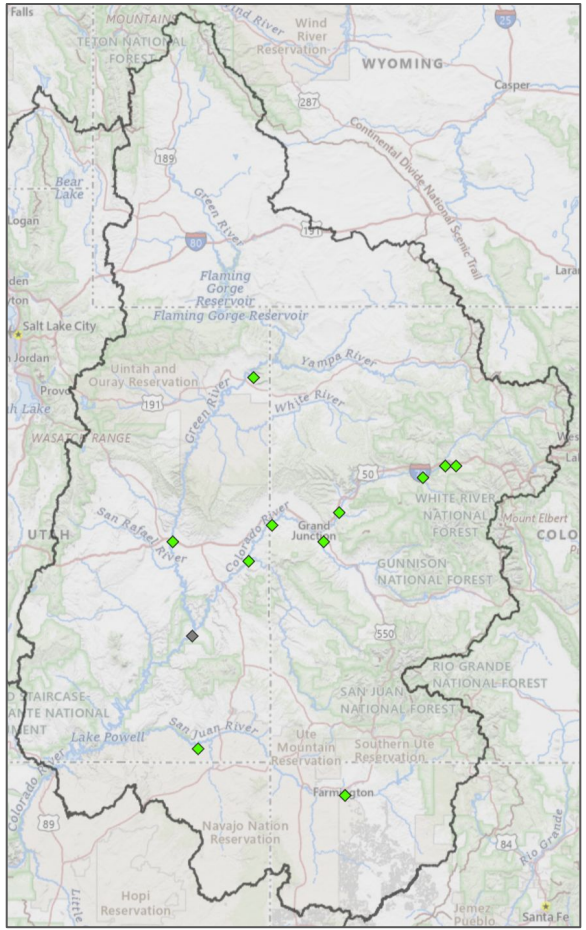
Upstream water management
impacts downstream flows:
- -reservoirs
- -diversions

Requires more forecaster involvement
–updated ~2x/month

<u>Examples</u>
Colorado River Mainstem
-peak flow augmentation

Gunnison/Green River Basin
-downstream peak flow targets
- -magnitude/duration

-Real-time multi-agency coordination



Mean Daily NWS Fld Excd Prob

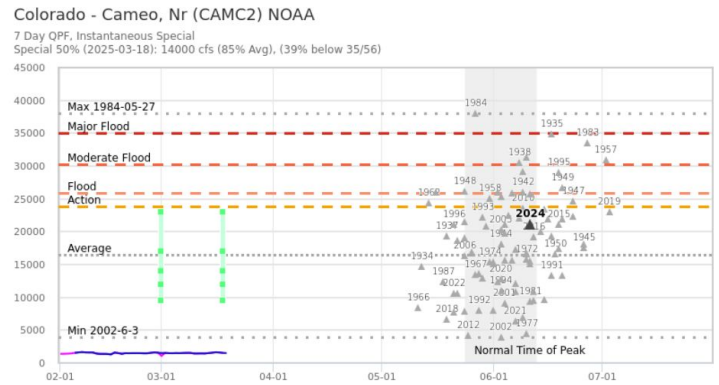
- ◇ No Forecast
- ◆ No Flood Stage
- ◆ Already Peak(ed/ing)
- ◆ <10%
- ◆ >10-25%
- ◆ >25-50%
- ◆ >50%

Mid-March Special Peak Flow Forecasts: Daily vs. Instantaneous

2025-03-18 Mean Daily Forecast Table

Exceedance Probability	Flow (cfs)
10%	22000
25%	16000
50%	13500
75%	11000
90%	9000

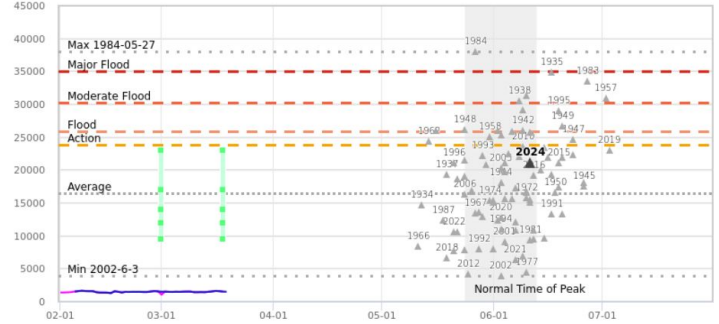
2025 Mean Daily Plot

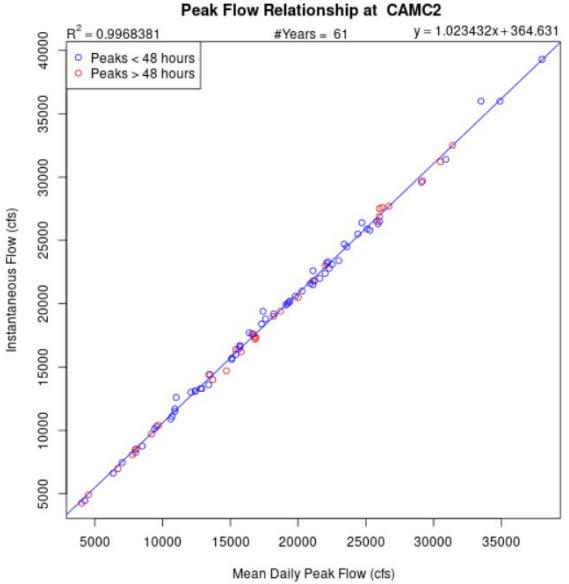


2025-03-18 Instantaneous Forecast Table

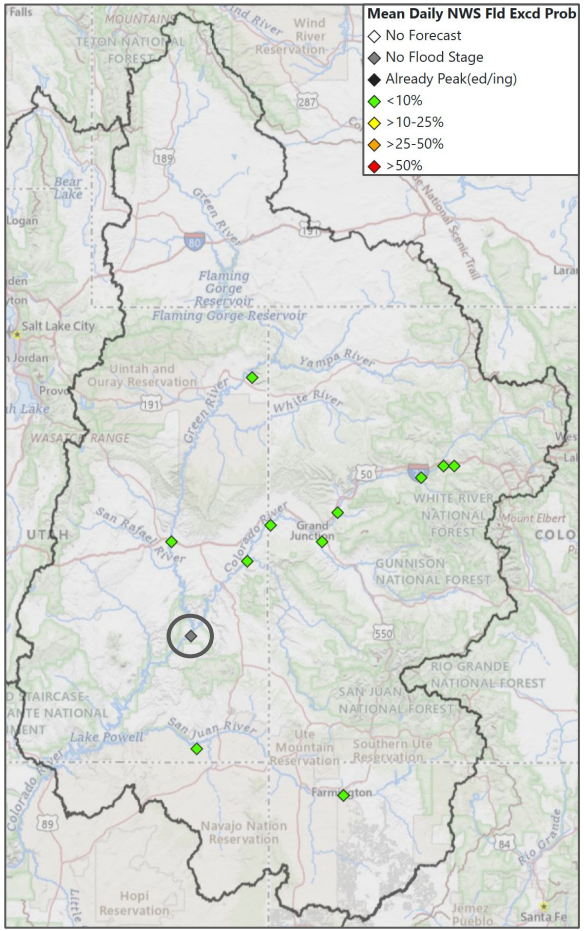
Exceedance Probability	Flow (cfs)
10%	23000
25%	17000
50%	14000
75%	12000
90%	9600

2025 Instantaneous Plot





Mid-March Special Peak Flow Forecasts

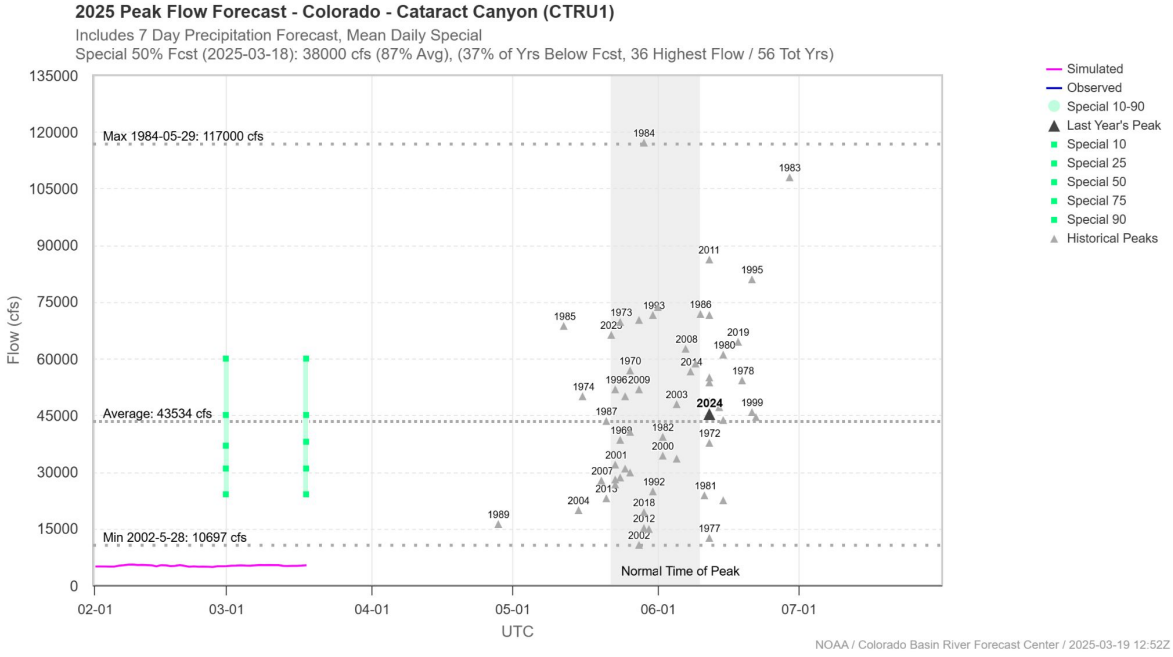


Colorado River - Cataract Canyon

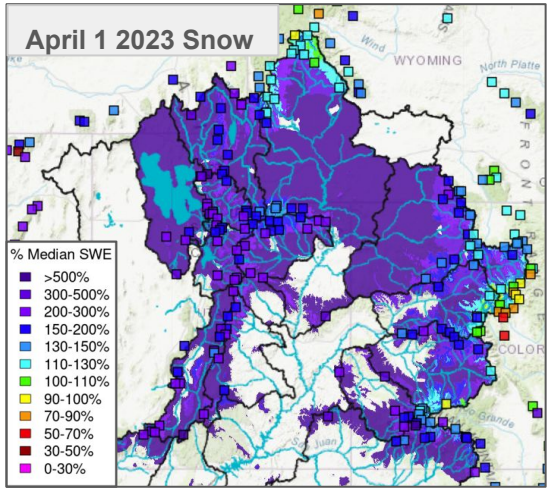
-a popular stretch of river for recreation

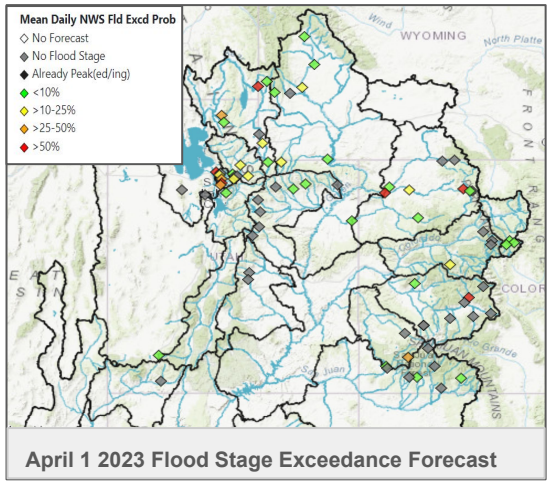
-peak flow forecast involves multi-agency coordination

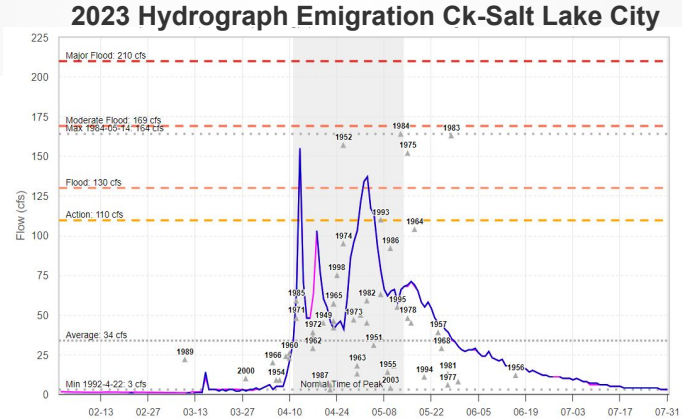
-Upper Green, Colorado River headwaters, Gunnison

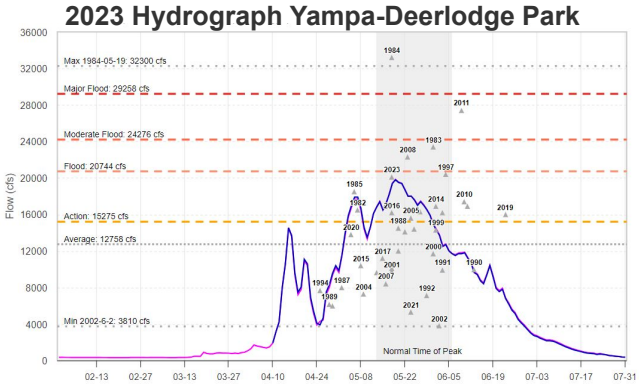


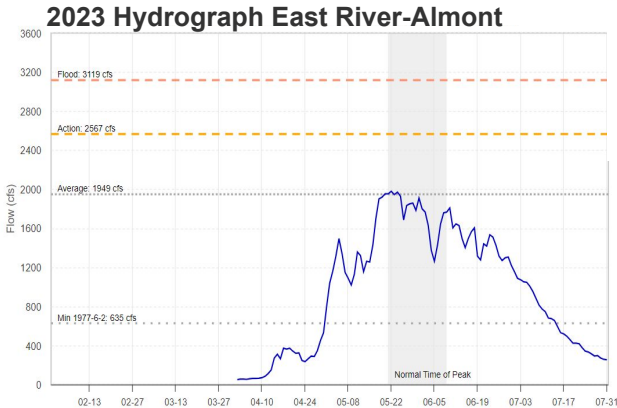
Impacts of Spring Weather





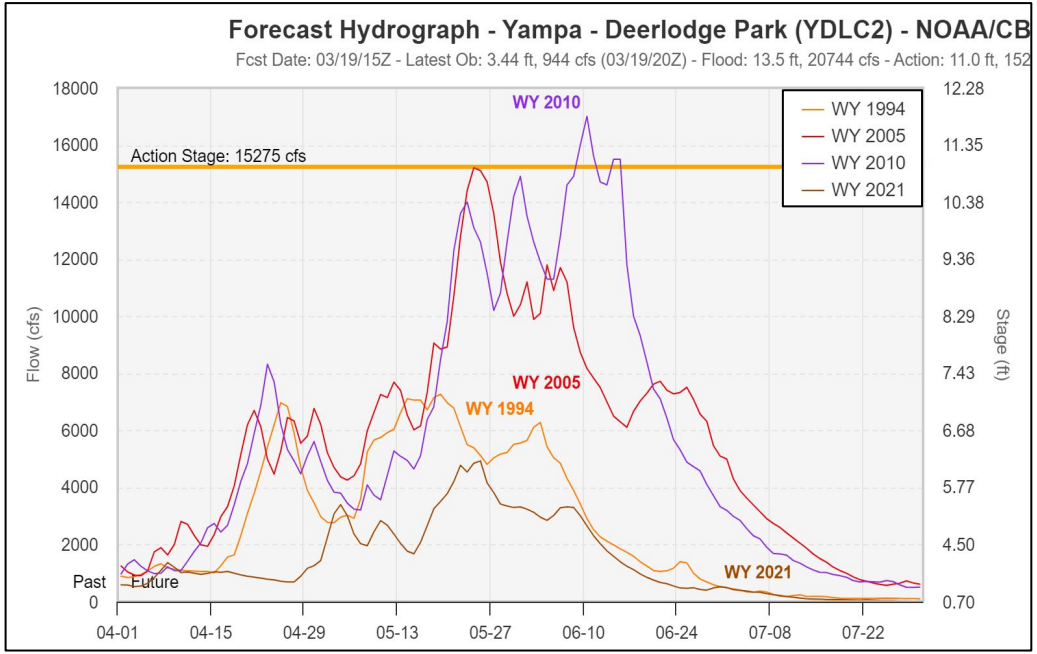






Impacts of Spring Weather on Peak Flow

Year	Mid-March SWE (in)	Peak SWE (in)	Peak Flow (CFS)	Peak Flow Date
1994	17.5	21.1	7270	May 20
2005	18.2	22.1	15200	May 25
2010	16.9	22.7	17000	June 11
2021	17.7	19.0	4930	May 26



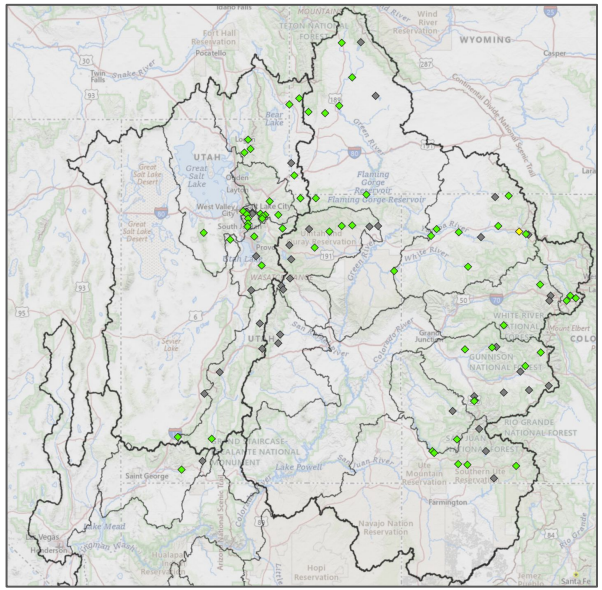
Peak flow forecasts have a high level of uncertainty and are highly dependent on spring weather.

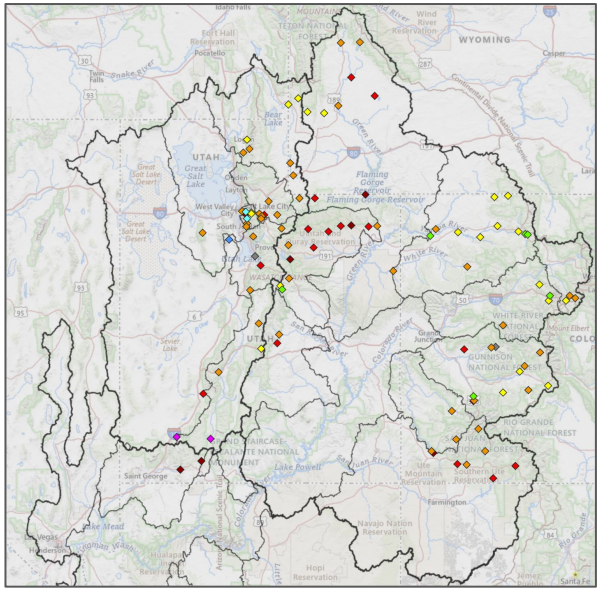
Summary

- Peak flow forecasts represent a long range outlook of peak flows due to snowmelt.
- Many, but not all, of these sites, have established flood stages and can provide some flood threat information.
- Peak flow forecasts have a high level of uncertainty and are highly dependent on spring weather.
  - Typically only have a 5-10 day forecast lead time for peak timing
    - As peak flow nears, 10-day streamflow forecasts are the best source of information
- **Peak flow forecast points alone are not a comprehensive summary of any flood threat.**

Mean Daily NWS Fld Excd Prob

- ◇ No Forecast
- ◆ No Flood Stage
- ◆ Already Peak(ed/ing)
- ◆ <10%
- ◆ >10-25%
- ◆ >25-50%
- ◆ >50%





Percent Average

- ◇ No Forecast
- ◆ No Stats
- ◆ < 30%
- ◆ 30-50%
- ◆ 50-70%
- ◆ 70-90%
- ◆ 90-100%
- ◆ 100-110%
- ◆ 110-130%
- ◆ 130-150%
- ◆ 150-200%
- ◆ 200-300%
- ◆ 300-500
- ◆ >500%

CBRFC Contacts & Water Year 2025 Basin Focal Points

Basin Focal Points (Forecasters)

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CBRFC Water Supply Presentations
https://www.cbrfc.noaa.gov/present/present.html

QUESTIONS?