

PEAK FLOW FORECASTS

FLOW EXTREMES, NOT SUPPLY

Peak flow forecasts are fundamentally different than water supply volume forecasts. Although the watershed snowpack is a principal component in both analyses, peak flows are not a supply question at all. Rather, peak flows characterize runoff extremes by predicting maximum mean daily flow at a single point during the spring snowmelt season. This extreme is related to the water supply volume, but the relationship is not direct or constant from year to year. As such, peak flow forecasts contain much more uncertainty than water supply volume forecasts.

REGULATED VS. NATURAL FLOWS

An even more fundamental limitation is that peak forecasts describe regulated (actual or observed) in-stream flow well into the future, something difficult to do considering the quantity and changing nature of diversions in the Colorado River and Great Basin watersheds. (Note: supply forecasts deal with hypothetical "natural" flow - that which would have resulted in the absence of regulation). The Colorado Basin River Forecast Center routinely forecasts regulated streamflow, but only for several days into the future. Further into the future the ability to forecast reservoir regulation becomes more limited.

DIFFERENT USES AND USERS

Peak flow forecasts are used for different purposes than water supply volume forecasts. Users of these forecasts would include river recreationists, flood control agencies, emergency service directors, wildlife managers and anyone interested in the combined effect of watershed yield and human regulation on the actual (observed) in-stream maximum mean daily flows at a site.

FLOOD FLOWS

The National Weather Service defines flood flow as the flow at which damage to structures begins to occur. Over-bank flow may occur but still be below the defined flood flow. Flood flows contained in this document change from year to year due to such channel processes as deposition and scouring. Therefore, the flood flows that follow should only be applied to the current runoff season. It should also be noted that they are instantaneous flows and not maximum mean daily flows. **Forecast mean daily flows above the instantaneous flood flow will be highlighted in red.**

IMPORTANT NOTE

The latest forecasts can be accessed through the CBRFC homepage (<http://www.cbrfc.gov>) or by calling the appropriate Service Hydrologist (see page 8 and 9).

INTERPRETIVE NOTES

PEAK FLOW DEFINED

The peak flow forecast represents the maximum mean daily flow (the highest average flow for an entire day during the runoff season) at a point during the April through July period, unless otherwise noted. It does not represent the instantaneous peak (the maximum flow at a single moment). In the case of smooth snowmelt regimes (hydrographs), it may be acceptable to approximate one with the other. In Arizona, the normal snowmelt period is from February to May. Occasionally, heavy rainfall events can produce higher peak flows than the snowmelt peak flows. For verification and calibration purposes, the maximum mean daily flow during the February through May period was used regardless of the runoff source. The Average Peak and Normal Time of Peak (defined as the average date of peak plus/minus one standard deviation which should include approximately 70% of the peaks) for a given gage are all derived from 1971 through 2000 data whereas the Historic Peak is derived from the period of record, including the most recent years, after reservoir regulation began.

FORECAST PROBABILITIES

Peak flow forecasts are presented in terms of probabilities or, more specifically, exceedance probabilities. The forecast labeled “most probable” is actually the 50% exceedance level meaning there are equal chances of being below the value or above the value (i.e., 50 chances out of 100 of being exceeded). The other exceedance probabilities associate the likelihood of exceeding other levels. In general, a close bunching of the exceedance forecasts indicates low variability and that the user can have a high degree of confidence in the forecast information. Conversely, a large spread in the exceedance forecasts indicates high variability.

MODELLING TECHNIQUES

The peak flow forecasts that follow have been derived using a combination of (1) physically-based conceptual models and (2) statistical regression models. The conceptual model is the National Weather Service River Forecasting System in the Ensemble Streamflow Prediction (ESP) mode. Since the conceptual model requires reservoir operation plans for up to five months into the future, ESP application is limited to basins where regulation is minimal (mostly in the headwater areas).

The farther downstream a forecast point is, the more likely it is that a statistical regression was used between natural snowmelt runoff volume and the observed maximum mean daily flow to generate the forecast. Such an approach performs better when the correlation between regulated and unregulated flow is strong and is constant from year to year.

UPPER COLORADO PEAK FLOW FORECASTS

Mean daily flows in cubic feet per second (cfs)

STATION NAME	Historic Peak	Average Peak	Flood* Flow	2004 Peak	2004 Date	2005 Forecast Exceedance Probability					Normal time of peak
						90%	75%	50%	25%	10%	
COLORADO - KREMMLING, NR	12,700	3,900	10,100	905	7/18	N/A	N/A	N/A	N/A	N/A	5/15 - 6/27
EAGLE - GYPSUM, BLO	6,580	3,600	6,650	1,960	6/08	1,700	2,200	2,800	3,400	4,300	6/1 - 6/21
ROARING FORK - GLENWOOD SPRINGS	11,200	6,150	14,000	3,550	6/08	4,000	5,000	5,900	7,500	8,500	6/3 - 6/18
COLORADO - CAMEO, NR	38,000	17,500	23,700	7,010	6/09	8,000	10,000	13,500	17,000	21,000	5/29 - 6/18
PLATEAU CK - CAMEO, NR	4,100	1,460	5,550	455	5/11	1,200	2,000	2,800	3,500	4,300	5/9 - 6/11
EAST - ALMONT, NR	5,000	2,080	2,900	1,180	5/21	1,600	1,800	2,100	2,400	2,700	5/28 - 6/17
NF GUNNISON - SOMERSET, NR	7,080	3,310	14,000	1,700	5/20	3,600	4,200	4,700	5,300	5,800	5/11 - 6/2
SURFACE CK - CEDAREEDGE	640	210	1,400	95	5/05	250	300	400	450	520	5/3 - 6/8
UNCOMPAHGRE - COLONA, NR	1,900	1,390	3,000	720	6/08	N/A	N/A	N/A	N/A	N/A	5/20 - 6/27
COLORADO - CO-UT STATELINE, NR	68,300	26,150	47,700	9,230	5/12	15,000	19,000	25,000	31,000	38,000	5/22 - 6/16
DOLORES - DOLORES	6,950	2,980	8,500	2,430	5/10	2,800	3,200	3,600	4,200	5,000	5/9 - 6/4
SAN MIGUEL - PLACERVILLE, NR	2,740	1,310	2,700	870	6/08	1,100	1,250	1,400	1,700	2,000	5/26 - 6/23
DOLORES - CISCO, NR (see note1 below)	12,900	6,050	N/A	1,340	3/26	N/A	N/A	N/A	N/A	N/A	4/26 - 6/5
COLORADO - CISCO, NR	69,500	28,800	61,200	10,400	5/12	16,000	21,000	29,500	35,000	42,000	5/20 - 6/15
GREEN - DANIEL, NR, WARREN BRIDGE, AT	5,620	2,975	N/A	2,100	6/11	1,900	2,200	2,600	3,000	3,400	5/30 - 6/30
NEW FORK - BIG PINEY, NR	9,110	5,285	N/A	3,870	7/01	3,400	4,100	5,000	6,100	7,300	5/31 - 6/24
GREEN - LABARGE, NR	18,800	9,270	11,400	5,540	6/12	N/A	N/A	N/A	N/A	N/A	5/30 - 6/24
BIG SANDY - FARSON, NR	1,690	820	1,300	500	6/10	N/A	N/A	N/A	N/A	N/A	5/28 - 6/23
GREEN - GREEN RVR WY, NR	15,400	7,110	15,500	3,220	7/05	N/A	N/A	N/A	N/A	N/A	5/23 - 7/11
HAMS FORK - FRONTIER, NR, POLE CK, BLO	2,000	825	1,600	240	6/10	1,000	1,200	1,500	1,800	2,200	5/10 - 6/9
BLACKS FORK - LITTLE AMERICA, NR	6,970	2,440	5,500	200	7/02	1,400	2,000	2,400	3,000	3,600	5/2 - 6/27

N/A - NOT AVAILABLE (NOT A FLOOD FORECAST POINT OR NO FORECAST PROCEDURE EXISTS)

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note1 - for releases below McPhee Reservoir call 970-565-7562

* Flood flow is for current year only and is an instantaneous value

UPPER COLORADO PEAK FLOW FORECASTS (continued)

Mean daily flows in cubic feet per second (cfs)

STATION NAME	Historic	Average	Flood*	2004	2004	2005 Forecast Exceedance Probability					Normal time of peak
	Peak	Peak	Flow	Peak	Date	90%	75%	50%	25%	10%	
YAMPA - STEAMBOAT SPRINGS	5,870	3,240	4,490	1,730	5/10	1,600	2,000	2,200	2,600	3,100	5/19 - 6/12
YAMPA - MAYBELL, NR	24,400	10,475	26,600	5,950	5/09	5,700	6,500	7,500	9,000	11,000	5/13 - 6/10
LITTLE SNAKE - LILY, NR	13,400	4,745	32,000	1,320	5/13		2,700	3,700	4,700	6,100	5/5 - 6/12
YAMPA - DEERLODGE PARK	32,300	13,955	17,000	6,980	5/09	7,100	7,900	9,500	12,900	15,000	5/11 - 6/6
GREEN - JENSEN, NR (see note1 below)	38,500	17,600	23,600	11,400	5/13	11,700	12,500	14,100	17,500	19,600	5/14 - 6/11
ROCK CK - UPR STILLWATER RES	2,080	1,350	N/A	625	5/10	1,400	1,700	2,000	2,200	2,500	5/25 - 6/20
DUCHESNE - TABIONA, NR	2,320	765	4,100	220	6/06	800	1,000	1,200	1,500	1,800	5/15 - 6/15
DUCHESNE - RANDLETT, NR	11,500	2,755	7,400	185	6/30	4,000	6,000	7,500	9,000	10,500	4/27 - 7/5
WHITE - MEEKER, NR	6,320	3,200	5,500	1,690	5/11	1,200	1,500	1,800	2,300	2,900	5/21 - 6/14
GREEN - GREEN RIVER, UT (see note1 below)	47,200	22,560	47,000	11,100	5/15	14,000	19,000	25,000	30,000	35,000	5/18 - 6/16
SAN RAFAEL - GREEN RIVER, NR	3,600	910	N/A	70	6/06	200	350	600	1,000	1,300	5/17 - 7/16
MUDDY CK - EMERY, NR	515	205	N/A	130	6/10	120	170	210	290	400	5/19 - 6/18
DIRTY DEVIL - HANKSVILLE, NR, POISON SPGS **	1,310	445	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	3/12 - 5/31
ESCALANTE - ESCALANTE, NR **	227	72	N/A	N/A	N/A		120	150	180	210	3/24 - 6/2
CATARACT CANYON (estimated)	116,700	51,350	N/A	19,860	5/14	30,000	39,000	54,500	64,000	76,000	5/20 - 6/16
SAN JUAN - PAGOSA SPRINGS	4,640	2,485	11,800	1,860	5/11	gage discontinued					5/15 - 6/12
ANIMAS - DURANGO	10,700	4,675	9,600	3,590	6/08	5,200	5,750	6,300	7,230	9,000	5/28 - 6/14
SAN JUAN - BLUFF, NR (see note2 below)	15,600	7,340	40,700	4,420	4/06	10,200	10,900	11,800	12,800	13,700	5/21 - 7/4

N/A - NOT AVAILABLE (NOT A FLOOD FORECAST POINT OR NO FORECAST PROCEDURE EXISTS)

NOTE1 - Peak flow forecasts on the Green River below Flaming Gorge Reservoir are based on assumed USBR release of 4600 cfs out of Flaming Gorge Reservoir. If this changes downstream forecasts will need to be adjusted accordingly.

NOTE2 - Peak flow forecasts on the San Juan below Navajo Reservoir are based on USBR planned regulation.

* Flood flow is for current year only and is an instantaneous value ** Runoff period March - June

LOWER COLORADO PEAK FLOW FORECASTS

Mean daily flows in cubic feet per second (cfs)

STATION NAME	Historic Average		Flood*	2004		2005 Forecast Exceedance Probability					Normal time of peak
	Peak	Peak		Flow	Peak	Date	90%	75%	50%	25%	
VIRGIN - LITTLEFIELD, NR	17,000	1,915	20,855	385	2/27			4,600	7,000	11,700	3/15 - 5/6
VIRGIN - HURRICANE, NR	9,620	1,520	6,590	330	4/03			3,770	5,000	7,060	3/14 - 5/9
SANTA CLARA - PINE VALLEY, NR	212	65	N/A	31	5/05	200	325	450	520	650	4/25 - 5/25

N/A - NOT AVAILABLE (NOT A FLOOD FORECAST POINT OR NO FORECAST PROCEDURE EXISTS)

** Flood flow is for current year only and is an instantaneous value*

GREAT BASIN PEAK FLOW FORECASTS

Mean daily flows in cubic feet per second (cfs)

STATION NAME	Historic Average Flood*					2005 Forecast Exceedance Probability					Normal time of peak
	Peak	Peak	Flow	Peak	Date	90%	75%	50%	25%	10%	
BEAR - UTAH-WYOMING STATELINE, NR	2,680	1,610	4,400	680	5/09	900	1,300	1,650	2,000	2,500	5/22 - 6/14
LOGAN - LOGAN, NR, STATE DAM, ABV	1,870	985	1,400	530	5/29	& 1030 cfs 4/28			1,300	1,400	5/18 - 6/10
BLACKSMITH FORK - HYRUM, NR, UP&L DAM	1,530	490	800	140	4/8	& 940 cfs 4/28				850	4/24 - 5/20
WEBER - OAKLEY, NR	4,170	1,625	3,100	695	5/10	1,000	1,400	1,700	2,000	2,400	5/24 - 6/16
CHALK CK - COALVILLE	1,420	600	1,900	150	5/06	300	550	650	800	1,200	5/5 - 5/31
PROVO - WOODLAND, NR	2,530	1,685	3,600	1,160	5/10	900	1,400	1,900	2,400	2,700	5/11 - 6/6
LITTLE COTTONWOOD CK - SALT LAKE CITY, NR	762	470	700	300	6/07	400	500	600	700	800	5/23 - 6/20
BIG COTTONWOOD CK - SALT LAKE CITY, NR	980	430	700	180	5/06	300	400	500	600	750	5/18 - 6/9
MILL CK - SALT LAKE CITY, NR	153	65	180	20	5/11	30	50	70	90	120	5/18 - 6/10
PARLEYS CK - SALT LAKE CITY, NR	605	180	350	70	5/06	80	140	190	220	310	4/23 - 5/22
EMIGRATION CK - SALT LAKE CITY, NR	164	55	135	25	3/28	20	30	50	70	100	4/11 - 5/19
CITY CK - SALT LAKE CITY, NR	322	90	135	40	5/08	70	100	130	150	170	5/12 - 6/1
COAL CK - CEDAR CITY, NR	N/A	310	1,500	135	5/05	600	1,000	1,300	1,500	1,700	4/27 - 5/29
SEVIER - HATCH	1,430	495	1,200	315	5/09	1,000	1,300	1,600	1,900	2,400	5/6 - 6/2

N/A - NOT AVAILABLE (NOT A FLOOD FORECAST POINT OR NO FORECAST PROCEDURE EXISTS)

* Flood flow is for current year only and is an instantaneous value

& peak to date- exceedance values express probabilities for remainder of season



FLOOD POTENTIAL INFORMATION

SERVICE HYDROLOGISTS

The graphic on the following page depicts the areas of responsibility of the various Service Hydrologists or Hydro Focal Points. The following list links these individuals and their corresponding areas of responsibility. **A Service Hydrologist/Hydro Focal Point is the National Weather Service hydrologic coordinator and spokesperson for a given hydrologic service area and is the person to contact for current flood potential, streamflows, snowpack information and updates to peak flow forecasts.** Following their phone number is a URL to their homepage.

1) Albuquerque, NM	Ed Polasko	505-244-9147x228	http://www.srh.noaa.gov/abq/
2) Cheyenne, WY	Ray Gomez	307-772-2468x493	http://www.crh.noaa.gov/cys/
3) Boulder, CO	Treste Huse	303-494-3210x493	http://www.crh.noaa.gov/den/
4) El Paso, TX	Tim Brice	505-589-4088x308	http://www.srh.noaa.gov/elp/
5) Flagstaff, AZ	Tom Clemmons	928-556-9161x249	http://www.wrh.noaa.gov/fgz/
6) Grand Junction, CO	Brian Avery	970-243-7007x493	http://www.crh.noaa.gov/gjt/
7) Las Vegas, NV	Barry Pierce	702-263-9750	http://www.wrh.noaa.gov/vef/
8) Phoenix, AZ	Tom Zickus	602-275-8881x228	http://www.wrh.noaa.gov/psr/
9) Pocatello, ID	Sherrie Hebert	208-233-0834	http://www.wrh.noaa.gov/pih/
10) Pueblo, CO	Larry Walrod	719-948-3838	http://www.crh.noaa.gov/pub/
11) Riverton, WY	Jim Fahey	307-857-3898x493	http://www.crh.noaa.gov/riw/
12) Salt Lake City, UT	Brian McInerney	801-524-5142x228	http://www.wrh.noaa.gov/slc/
13) Tucson, AZ	Mike Schaffner	520-670-5156x228	http://www.wrh.noaa.gov/twc/

**NATIONAL WEATHER SERVICE HYDROLOGIC SERVICE AREAS
IN THE CBRFC AREA OF RESPONSIBILITY**

