

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	Average	Flood*	2005	2005	2006 Forecast Exceedance Probability					Normal time of peak
	Peak	Peak	Flow	Peak	Date	90%	75%	50%	25%	10%	
COLORADO - KREMMLING, NR	12,700	3,900	10,100	2,510	6/25	N/A	N/A	N/A	N/A	N/A	5/15 - 6/27
EAGLE - GYPSUM, BLO	6,580	3,600	6,600	3,400	5/23	2,500	3,000	4,000	5,000	6,000	6/1 - 6/21
ROARING FORK - GLENWOOD SPRINGS	11,200	6,150	16,800	5,720	6/24	4,000	5,000	5,900	7,500	8,500	6/3 - 6/18
COLORADO - CAMEO, NR	38,000	17,500	23,500	16,800	5/25	10,000	14,000	18,000	22,000	27,000	5/29 - 6/18
PLATEAU CK - CAMEO, NR	4,100	1,460	3,260	2,310	5/24	-	-	1,100	1,500	2,000	5/9 - 6/11
EAST - ALMONT, NR	5,000	2,080	3,100	2,070	5/25	1,000	1,400	1,700	2,200	2,800	5/28 - 6/17
NF GUNNISON - SOMERSET, NR	7,080	3,310	12,400	4,730	5/21	-	-	2,500	3,500	4,200	5/11 - 6/2
SURFACE CK - CEDAREEDGE	640	210	1,400	685	5/24	-	-	160	230	280	5/3 - 6/8
UNCOMPAHGRE - COLONA	1,900	1,390	3,100	1,130	6/25	N/A	N/A	N/A	N/A	N/A	5/20 - 6/27
COLORADO - CO-UT STATELINE, NR	68,300	26,150	47,800	30,300	5/25	17,000	21,000	25,000	29,000	34,000	5/22 - 6/16
DOLORES - DOLORES	6,950	2,980	8,700	4,890	5/23	1,000	1,200	1,600	2,200	3,000	5/9 - 6/4
SAN MIGUEL - PLACERVILLE, NR	2,740	1,310	2,650	1,380	5/23	500	700	900	1,300	1,500	5/26 - 6/23
DOLORES - CISCO, NR (see note1 below)	12,900	6,050	N/A	9,030	5/26	N/A	N/A	N/A	N/A	N/A	4/26 - 6/5
COLORADO - CISCO, NR	69,500	28,800	61,300	39,500	5/25	19,000	23,000	27,000	31,000	28,000	5/20 - 6/15
GREEN - DANIEL, NR, WARREN BRIDGE, AT	5,620	2,975	N/A	2,850	6/25	2,250	2,450	2,900	3,100	3,400	5/30 - 6/30
NEW FORK - BIG PINEY, NR	9,110	5,285	N/A	5,330	6/23	3,500	4,450	5,600	6,200	7,000	5/31 - 6/24
GREEN - LABARGE, NR	18,800	9,270	14,600	8,590	6/25	N/A	N/A	N/A	N/A	N/A	5/30 - 6/24
BIG SANDY - FARSON, NR	1,690	820	1,300	926	6/22	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	6,510	6/03	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	1,030	6/21	850	1,000	1,150	1,300	1,400	5/10 - 6/9
BLACKS FORK - LITTLE AMERICA, NR	6,970	2,440	5,500	5,500	5/19	2,350	2,550	3,650	4,950	6,250	5/2 - 6/27

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

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*	2005	2005	2006 Forecast Exceedance Probability					Normal time of peak
	Peak	Peak	Flow	Peak	Date	90%	75%	50%	25%	10%	
YAMPA - STEAMBOAT SPRINGS	5,870	3,240	4,500	3,000	6/23	2,550	2,950	3,350	3,800	4,500	5/19 - 6/12
YAMPA - MAYBELL, NR	24,400	10,475	26,900	12,500	5/24	7,650	8,800	9,600	10,400	11,150	5/13 - 6/10
LITTLE SNAKE - LILY, NR	13,400	4,745	19,400	3,830	5/24	3,050	3,750	4,350	5,100	5,700	5/5 - 6/12
YAMPA - DEERLODGE PARK	32,300	13,955	17,500	15,200	5/24	9,950	12,000	12,900	14,250	17,000	5/11 - 6/6
GREEN - JENSEN, NR (see note1 below)	38,500	17,600	23,600	19,500	5/26	13,000	14,000	18,600	19,500	21,000	5/14 - 6/11
ROCK CK - UPR STILLWATER RES	2,080	1,350	N/A	1,325	5/26	1,200	1,350	1,450	1,600	1,700	5/25 - 6/20
DUCHESNE - TABIONA, NR	2,320	765	4,040	1,900	5/26	875	1,000	1,150	1,425	1,550	5/15 - 6/15
DUCHESNE - RANDLETT, NR	11,500	2,755	7,400	3,350	5/26	2,200	2,600	3,200	4,500	5,400	4/27 - 7/5
WHITE - MEEKER, NR	6,320	3,200	6,500	2,890	5/24	2,100	2,250	2,600	2,850	3,050	5/21 - 6/14
GREEN - GREEN RIVER, UT (see note1 below)	47,200	22,560	48,500	34,900	5/29	16,500	18,600	22,000	34,500	40,000	5/18 - 6/16
SAN RAFAEL - GREEN RIVER, NR	3,600	910	N/A	2,010	6/05	650	700	1,100	1,250	1,550	5/17 - 7/16
MUDDY CK - EMERY, NR	515	205	N/A	456	6/03	150	200	250	300	325	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	-	-	95	135	160	3/24 - 6/2
CATARACT CANYON (estimated)	116,700	51,350	N/A	69,900	5/26	35,000	42,000	49,000	66,000	78,000	5/20 - 6/16
SAN JUAN - PAGOSA SPRINGS	4,640	2,485	6,760	4,420	5/23	1,090	1,400	1,650	1,830	2,090	5/15 - 6/12
ANIMAS - DURANGO	10,700	4,675	10,300	8,070	5/25	2,350	2,750	3,300	3,850	4,300	5/28 - 6/14
SAN JUAN - BLUFF, NR (see note2 below)	15,600	7,340	40,700	12,100	5/28	6,900	7,225	7,600	8,000	8,400	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 USBR planned regulation.

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

*** Runoff Period March - June does not include contribution from Boulder Creek

LOWER COLORADO PEAK FLOW FORECASTS

Mean daily flows in cubic feet per second (cfs)

STATION NAME	Historic Peak	Average Peak	Flood* Flow	2005 Peak	2005 Date	2006 Forecast Exceedance Probability					Normal time of peak
						90%	75%	50%	25%	10%	
VIRGIN - LITTLEFIELD, NR	17,000	1,915	20,855	2,510	5/22	-	-	-	695	745	3/15 - 5/6
VIRGIN - HURRICANE, NR	9,620	1,520	5,295	2,270	5/22	-	-	-	-	980	3/14 - 5/9
SANTA CLARA - PINE VALLEY, NR	393	65	N/A	184	5/24	Peak 50 on 4/16/6					4/25 - 5/25
STATION NAME	Historic Peak	Average Peak	Flood* Flow								Normal time of peak
SALT - ROOSEVELT, NR	77,200	9,610	142,295	30,700	2/12	Peak 458 on 4/9/6					3/6 - 4/9
TONTO CK - ROOSEVELT, NR, GUN CK, ABV	32,200	4,090	53,100	19,100	2/12	Peak 32 on 3/23/6					3/3 - 4/4
OAK CREEK - SEDONA, NR	8,600	1,550	14,050	5,750	2/12	Peak 39 on 3/30/6					3/6 - 4/9
VERDE - HORSESHOE DAM, ABV, TANGLE CK	65,100	8,530	129,230	Gage Problems		Peak 194 on 3/22/6					3/6 - 4/9
AGUA FRIA - ROCK SPRINGS, NR	23,600	2,565	10,895	17,300	2/12	Peak 9 on 3/14/6					2/28 - 4/3

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	2005	2006 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	1,820	5/04	1,380	1,480	1,650	1,800	1,920	5/22 - 6/14
LOGAN - LOGAN, NR, STATE DAM, ABV	1,870	985	1,360	1,230	5/25	1,100	1,200	1,300	1,430	1,520	5/18 - 6/10
BLACKSMITH FORK - HYRUM, NR, UP&L DAM	1,530	490	850	980	4/28	-	-	660	750	800	4/24 - 5/20
WEBER - OAKLEY, NR	4,170	1,625	2,400	1,620	6/18	1,250	1,550	1,800	2,100	2,300	5/24 - 6/16
CHALK CK - COALVILLE	1,420	600	1,900	720	5/21	400	500	700	850	1,100	5/5 - 5/31
PROVO - WOODLAND, NR	2,530	1,685	3,150	1,750	6/01	1,200	1,350	1,500	1,800	1,900	5/11 - 6/6
LITTLE COTTONWOOD CK - SALT LAKE CITY, NR	762	470	700	451	6/24	540	590	630	670	730	5/23 - 6/20
BIG COTTONWOOD CK - SALT LAKE CITY, NR	980	430	700	607	6/22	400	460	550	600	650	5/18 - 6/9
MILL CK - SALT LAKE CITY, NR	153	65	180	80	5/21	70	75	85	100	120	5/18 - 6/10
PARLEYS CK - SALT LAKE CITY, NR	605	180	350	187	5/21	-	-	180	230	280	4/23 - 5/22
EMIGRATION CK - SALT LAKE CITY, NR	164	55	135	42	5/18	150 CFS on 4/16					4/11 - 5/19
CITY CK - SALT LAKE CITY, NR	322	90	150	120	5/24	100	130	160	180	210	5/12 - 6/1
SEVIER - HATCH	1,740	495	1,200	1,740	6/03	-	400	550	600	700	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



FLOOD POTENTIAL INFORMATION

SERVICE HYDROLOGISTS

Colorado Basin River Forecast Center

May 2006

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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	Melissa Goering	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	928-556-9161x229	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**

