CBRFC WFO Teleconference

NOAA/NWS Colorado Basin River Forecast Center

Feb 26, 2013

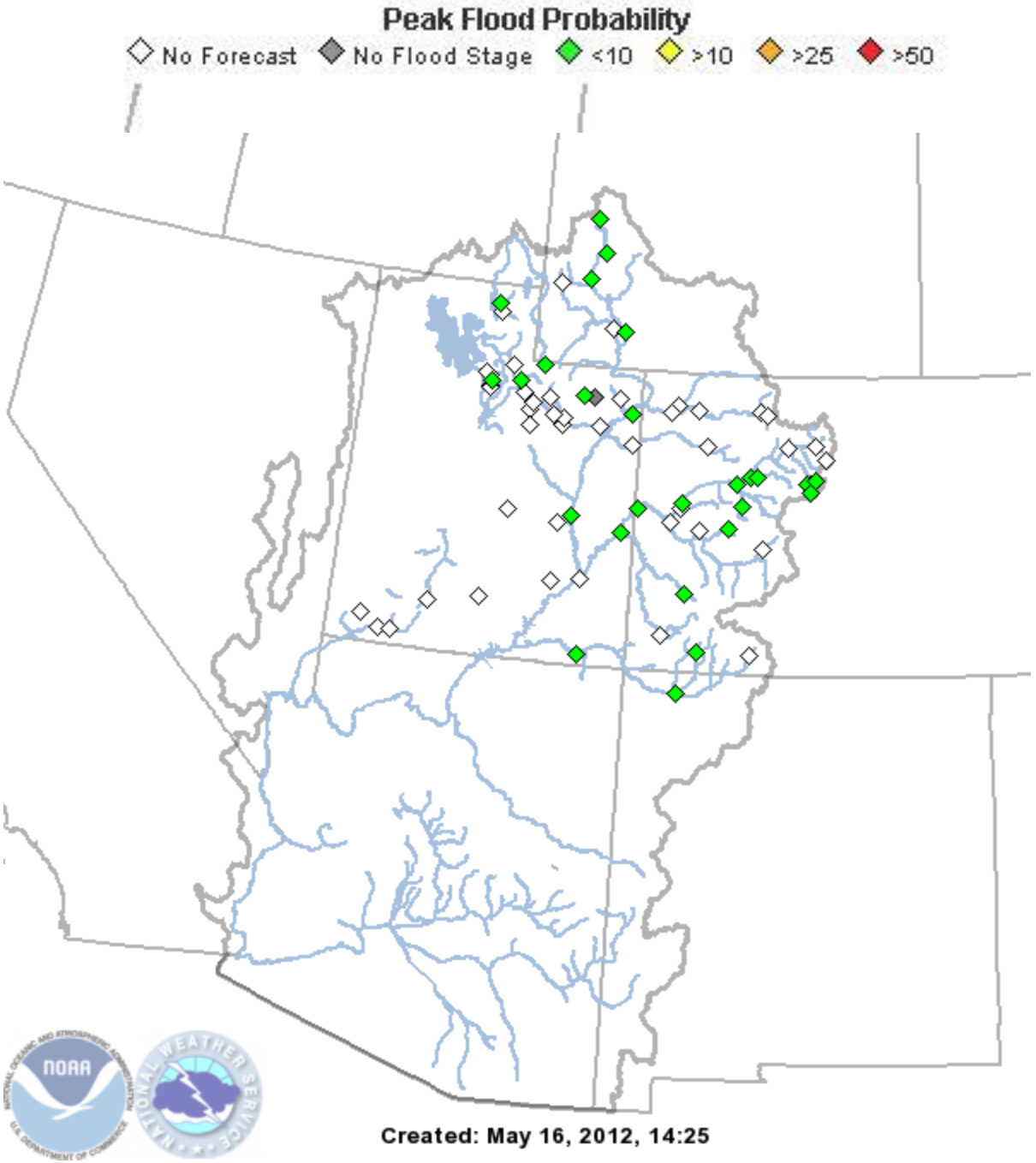
Outline

- WRH Hydrology Activities (Chad Kahler/Mike Schaffner-WRH)
- Seasonal Peak Flow Forecasts (Greg/Ashley – CBRFC)
- WFO Comments/Issues?
- Future Calls

What is a Peak Flow Forecast?

- Snowmelt Mean Daily Maximum Flow (April-July)
- Probabilistic Forecasts

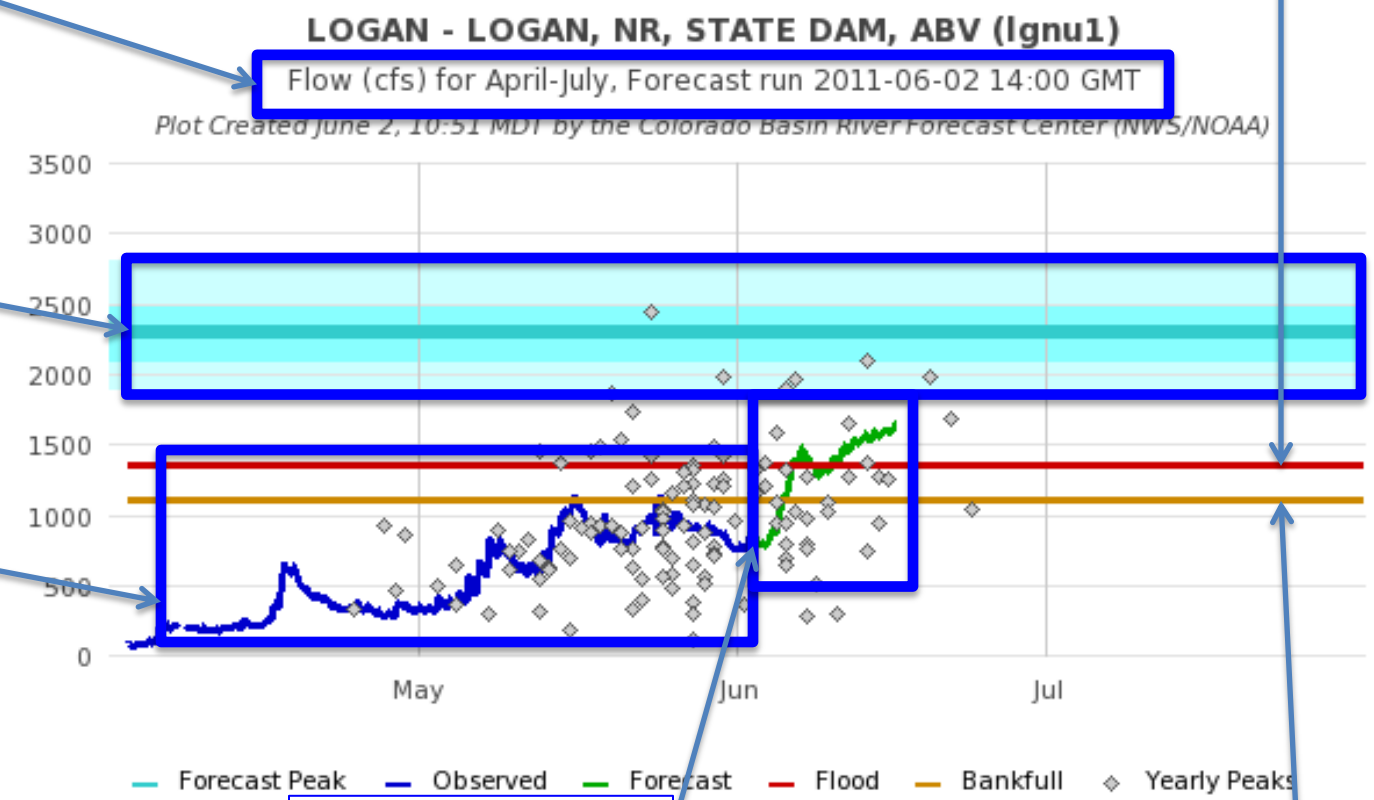
  Exceedence Probabilities -10%,25%,50%, 75%, 90%
- Issued (at least) monthly from March-June.
- ~75 forecast points – some unregulated, some regulated
- Updated as needed
- Forecast Users include:
  - Emergency Managers
  - USGS hydrologists
  - Water Managers
  - River Recreation


Peak Flood Probability
No Forecast
No Flood Stage
<10
>10
>25
>50
NOAA
NATIONAL WEATHER SERVICE
Created: May 16, 2012, 14:25

Peak Flow Charts

Flood Stage

Forecast Creation Time



Long lead peak forecast

Observed streamflow since April 1

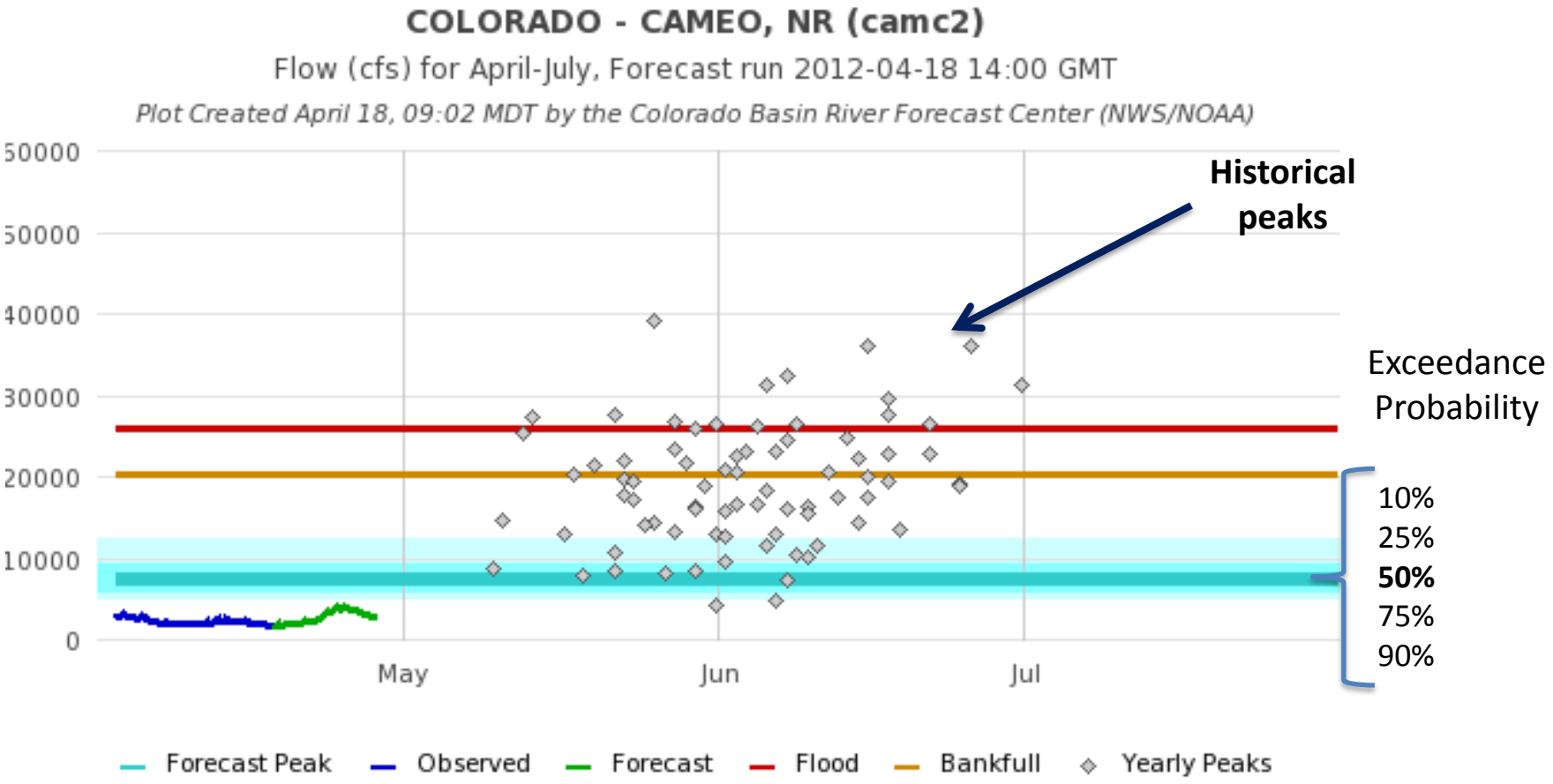
Daily forecast

Bankfull

web reference: www.cbrfc.noaa.gov/gmap/cmap.php

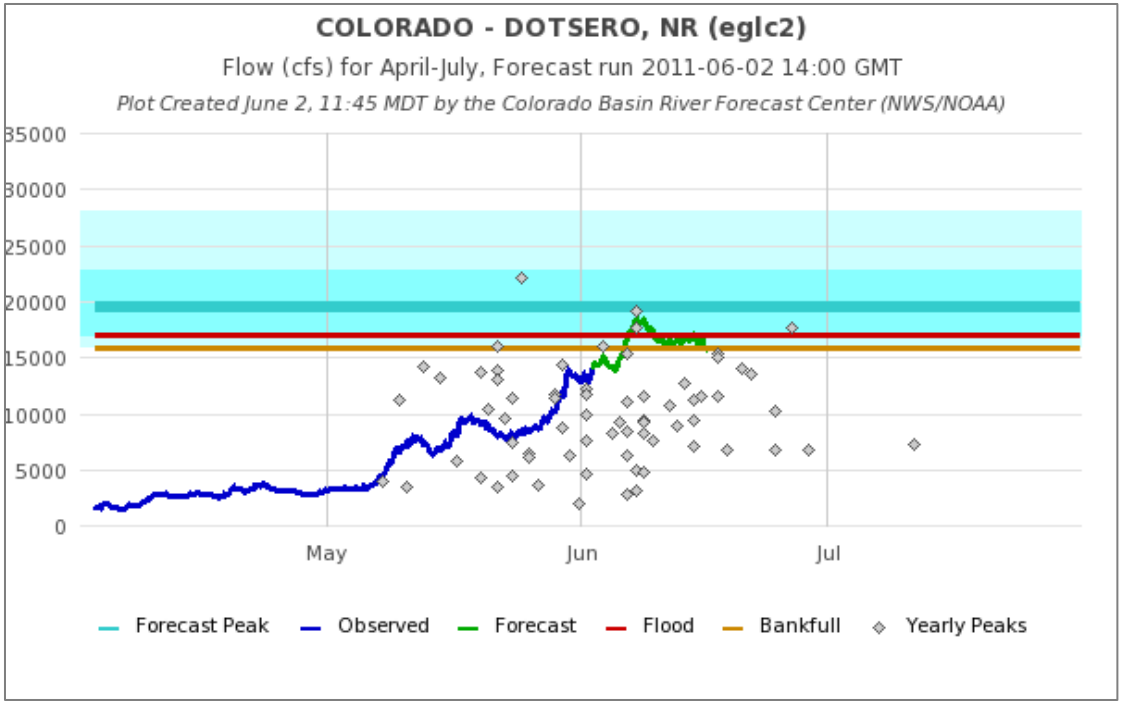
Peak Flow Forecast Graphic

Accessible from peak flow map, peak list, and CBRFC main web page

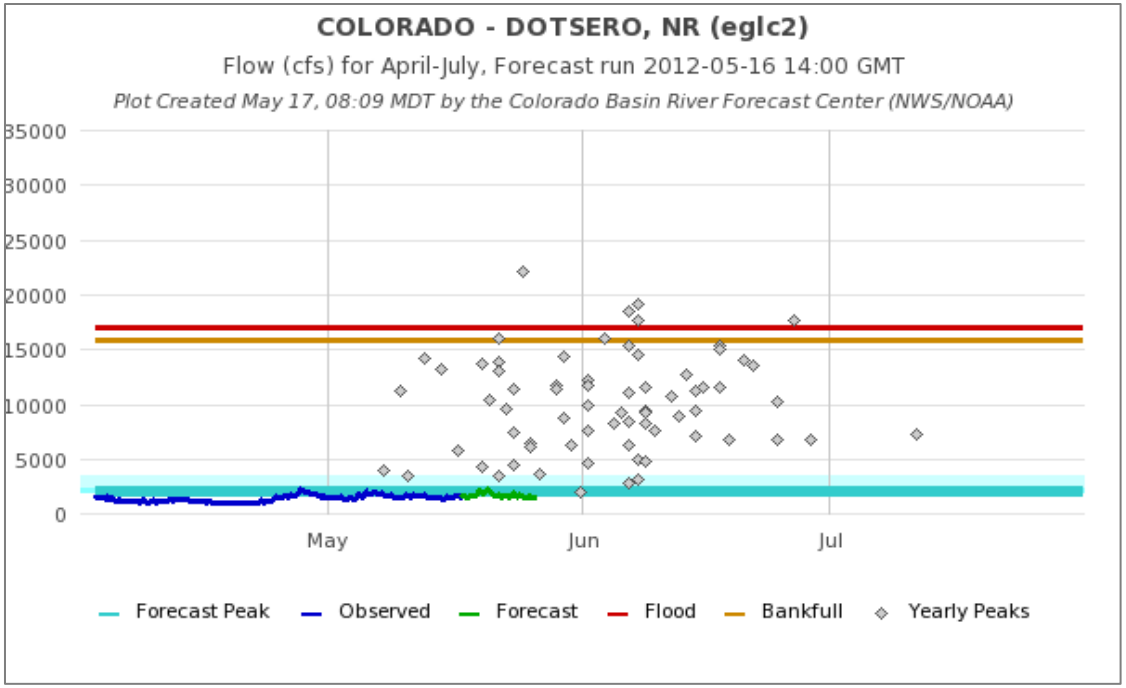


Historical yearly peaks are instantaneous , forecasts are mean daily peaks (CFS)

2011


COLORADO - DOTSERO, NR (eglc2)
Flow (cfs) for April-July, Forecast run 2011-06-02 14:00 GMT
Plot Created June 2, 11:45 MDT by the Colorado Basin River Forecast Center (NWS/NOAA)
35000
30000
25000
20000
15000
10000
5000
0
May
Jun
Jul
Forecast Peak
Observed
Forecast
Flood
Bankfull
Yearly Peaks

2012


COLORADO - DOTSERO, NR (eglc2)
Flow (cfs) for April-July, Forecast run 2012-05-16 14:00 GMT
Plot Created May 17, 08:09 MDT by the Colorado Basin River Forecast Center (NWS/NOAA)
35000
30000
25000
20000
15000
10000
5000
0
May
Jun
Jul
Forecast Peak
Observed
Forecast
Flood
Bankfull
Yearly Peaks

Peak Flow Forecast Points

Current points are a mix of :

- Unregulated and regulated
- Some but not all official forecast points with flood stage
- Not official flood points but:
  - Stakeholder Requested
  - Recreation Locations
- Not official, no flood stage, no stakeholder

Current forecast list is inconsistent.

Peak Flow Forecast Points

Proposed Changes

ADD

1. Official flood forecast points or E19 that are either:
    a. NOT affected by regulation/diversions
    b. Regulation/diversions would be minimal during a snowmelt flooding event

DROP

1. Unofficial or no E19 with no user
2. Official flood forecast or E19 that are affected by regulation/diversions that do not have known users

ADD

TRAC2	Gunnison
DCKC2	Gunnison
MNRC2	San Juan
DRRC2	Dolores
SLAC2	Upper Colorado
YLLU1	Green
FCHW4	Green
HFMW4	Green
BNRU1	Green
AFPU1	Great Basin
LCWU1	Great Basin
LCJU1	Great Basin
BIGU1	Great Basin
SCJU1	Great Basin
MCLU1	Great Basin
ECPU1	Great Basin
ECAU1	Great Basin
WCGU1	Great Basin
BORW4	Great Basin
PRZU1	Great Basin
EVAW4	Great Basin
BRBW4	Great Basin
COAU1	Sevier

DROP

PCCC2	Upper Colorado
KRMC2*	Upper Colorado
WTRU1	Green
GRRW4	Green
LTAW4	Green
SRFU1	Green
MDCU1	Green
DDHU1*	Green
ESCU1	Green

* Only peak statistics

<u>FORECAST MADE ONLY PER REQUEST</u>

FRWC2	Upper Colorado
FRGC2	Upper Colorado
BUEC2	Upper Colorado
BSWC2	Upper Colorado
DURU1	Green
BRUU1	Green
STIU1	Green
CRUU1	Green
STAU1	Green
WFDU1	Green
TADU1	Green
USTU1	Green
DADU1	Green

Peak Flow Forecasts, April 1, 2012 www.cbrfc.noaa.gov

NOAA, National Weather Service
Colorado Basin River Forecast Center
Salt Lake City, Utah
www.cbrfc.noaa.gov

Contents

Introduction

NEW: Starting in May 2011, we now estimate, where possible, an instantaneous flow for each mean daily flow forecast. These instantaneous flows are estimated from a historical regression analysis at each point. For more information view the regression plots.

Streamflow varies dramatically over the course of the snowmelt season. To characterize the magnitude of a year with a single seasonal peak sometimes can be an oversimplification. Hydrographs (or graphs of mean daily flow versus time) for each site can be viewed by **clicking on the site name.** The hydrographs include an example high and low year alongside last year and this year.

River recreationists often ask what are the high and low years. Rankings of a sites peak flows can be viewed by clicking the site name below. Reservoir regulation plays a major role in determining observed peak flows. As would be expected, higher (but more short-lived) peaks are generally observed in the pre-regulatory era (before 1960).

Upper Colorado Peak Flow Forecasts

Prepared by: Alcorn, Smith, Nielson

	Historic Peak	Average Peak	Flood* Flow	2011 Peak	2011 Date	2012 Forecast Exceedance Probability 90%	75%	50%	25%	10%	Normal time of Peak	Issuance Date	Observed Peak	Observed Date
Blue														
Blue River														
Mean Daily Flow	580	185	835	410	7/20	65	80	100	130	180	5/28 - 7/5	4/1		
Dillon, Nr														
Mean Daily Flow	1,160	505	1,770	955	7/20	150	200	250	300	400	5/27 - 6/25	4/1		
Snake														
Montezuma, Nr														
Mean Daily Flow	870	435	2,080	790	7/02	150	170	200	250	350	5/31 - 6/18	4/1		
Tenmile Ck														
Frisco, Nr														
Mean Daily Flow	1,480	760	1,640	1,060	6/18	250	300	370	450	550	5/27 - 6/17	4/1		
Fraser														
Winter Park														
Mean Daily Flow	440	180	360	295	7/03	20	35	50	100	200	6/1 - 6/29	4/1		

Peak Flow Publication

COLORADO BASIN RIVER FORECAST CENTER

NATIONAL WEATHER SERVICE / NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

News: Recording: How to use this web page webinar

RIVERS SNOW WATER SUPPLY RESERVOIRS WEATHER

Conditions Map Active Points Peak Map Peak List Peak Pub Recreational Forecasts

Peak Flow List

New 1981-2010 Averages being used this year.

Click point type or enter search to change points displayed. Click column heading to sort by that data. Click ID to show plot for point.
Download pipe-delimited file of displayed points.

Help: Introduction Definitions River Permits Additional Information

Area: CBRFC Upper Colorado Green San Jaun Great Basin Sevier Virgin Lower Colorado

SEARCH POINTS

Plots: Auto Off On

Peak Flood Probability
◇ No Forecast ◆ No Flood Stage ◆ <10 ◆ >10 ◆ >25 ◆ >50

	NWS ID	River	Location	Flood Probability	Mean Daily 90%	75%	50%	25%	10%	Instantaneous 90%	75%	50%	25%	10%	Issue Date	Historic Peak	Average Peak	Flood	Last Year Peak	Last Year Date	Normal Earliest Date	Normal Latest Date	Observed Peak	Observed Date
1	ALEC2	East	Almont	◆	560	630	750	900	1100	570	650	790	960	1200	04-16	5000	2000	2980	2580	06-08	05-21	06-11		-
2	ARFN5	Animas	Farmington	◆	2100	2300	2700	3200	3700						04-16	11000	4710	8810	4860	06-08	05-20	06-09		-
3	BCTU1	Big Cottonwood Ck	Salt Lake City Nr	◆	210	240	270	290	340						04-17	925	430	800	698	06-24	05-18	06-07		-
4	BERU1	Bear	Utah	◆	800	920	1020	1120	1310	950	1100	1200	1400	1600	04-17	3030	1600	3670	3030	07-01	05-15	06-14		-
5	BFFU1	San Juan	Bluff Nr	◆	6100	6600	6900	7200	7600	7100	7700	8000	8300	8700	04-16	15200	7340	33838	4300	06-01	05-15	06-28		-
6	BPNW4	New Fork	Big Piney Nr	◆	3100	3400	4100	4800	5500	3200	3500	4200	4900	5700	04-16	9110	4730	8850	7750	07-03	05-26	06-23		-
7	BRUU1	Big Brush Ck	Vernal Nr Red Fleet Res Abv	◆	80	100	120	150	210						04-01	414	235		245	06-22	05-04	06-01		-
8	BSWC2	Blue	Dillon Nr	◆	140	160	200	260	340						04-16	1160	505	1770	955	07-20	05-27	06-25		-
9	BUEC2	Blue	Blue River	◆	60	70	90	120	160						04-16	580	185	835	410	07-20	05-28	07-05		-
10	CAMC2	Colorado	Cameo Nr	◆	5000	6000	7500	9500	12500	5500	6600	8100	10000	13000	04-16	38000	17000	26000	29200	06-09	05-24	06-12		-
11	CCSU1	City Ck	Salt Lake City Nr	◆	35	40	50	60	75						04-17	262	80	210	167	06-16	05-13	06-01		-
12	CCUC2	Colorado	Co	◆	4500	6500	9000	12000	15000	5100	7100	9700	13000	16000	04-16	68300	25500	46200	46800	06-10	05-19	06-11		-

Peak Flow List

Starting this year we will be dropping the Peak Flow Publication

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Plots: Auto Off On

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WRH Hydrology Activities

CBRFC WFO Call

Feb. 26,2013

Chad Kahler – STID

Mike Schaffner – PSD

CHPS

- Testing continues over this winter and spring snowmelt season at approximately 11 WFOs representing all 3 WR RFCs.
- This is a HIGH priority for WR.
- Reports have been very positive from WFOs.
- CHPS Sharing Calls have started up. WFO Reno and Portland have already presented.
- Documentation and training materials related to the use of CHPS at the WFO is ongoing.

Flood Inundation Comparison

- At the current time, flood inundation mapping is an expensive (40 to 80K) and time consuming (2 years) endeavor.
- LMRFC has created a simplified method based solely on “filling up” a Digital Elevation Model (DEM). The LMRFC method does not involve hydrologic modeling. This method has been tested in SR and CR with some good results and the results have been presented at AMS.
- It is one possible method being considered to create flood inundation “risk maps” for the WFOs. Risk maps would display inundation at critical levels such as minor, moderate, and major flood stage.
- Inundation risk maps could in theory be produced more quickly and with considerably less funding expenditure. It might also be possible for a WFO and/or their partner to create such maps in-house.
- STID, PSD, and WFO Boise plan to test this method out along the Boise River at Boise using DEM and LIDAR datasets. The output from this method will be compared to the AHPS flood inundation maps at this same location. Comparisons will be done on various metrics such as similarity in area inundated.

Polygon Flood Warning (RiverPro)

- PSD continues to work with WFOs to make the necessary changes to produce polygons for their river flood warnings using RivePro.
- Polygons allow for a reduction in the area warned for and prevent having to light up the entire county on the WWA map.

Flood Stage/Impacts Training

- PSD is working with SHs from PSR, TWC, LOX, REV, and MFR to create flood stage and impacts training.
- The skillset in setting flood stage and defining impacts varies widely from one SH to another across the region.
- Furthermore there was a request/need identified to provide additional training to the 7 WFOs in WR without a SH in the area of setting flood stage and impacts.
- The training is being tentatively planned as a half-day workshop (about 3 hours) with several presentations and case studies covering terrestrial and tidal situations, semi-arid and humid rivers, and ones with and without forecast point services.

FFPI Output Standardization

- Approximately 5 WR WFO's are producing a Flash Flood Potential Index (FFPI) product.
- Most offices produce a graphical product, but some are text only
- Output categories of risk or threat vary from office to office
- WR would like to allow for variations with method that is used to calculate threat but would like to standardize the output
- Initial discussions occurred last fall and will resume this spring

WHAG

- Collect and prioritize small enhancement requests for WFO hydrologic functions operating on AWIPS.
  - Secondary goal is to prioritize bug-fix requests
- 1 representative from each region along with a few folks from the WHFS support group.
- Currently working on categorizing feedback

Hazard Services

- PSD serves on two teams related to the development of the Hazard Services software.
- Hazard Services will replace the warning capacity of RiverPro, GHG, and Warngen.
- Hazard Services will include GIS datasets.
- IOC planned this year.
- IOC will focus on hydro.

Hydro Verification

- Potential effort to create an operational hydrologic verification system for the western US RFC short range (1-10 day) single-value streamflow forecasts.
- Investigation of this topic was an action item from the WR Hydrology Workshop, held last fall.
- Objectives
  - Outlining a basic, achievable verification suite that addresses the primary questions about hydrologic predictions from both users and forecasters
  - Systematizing the collection and processing of hydrologic timeseries and other data required for diagnosis and verification of short range single-value hydrologic forecasts
  - Development of a standardized set of analyses and analysis products (graphics, reports) to verify hydrologic forecasts
  - Deployment of this verification suite for the majority of all short-range flow forecasts in the western US (some forecasts, e.g., estuary points and reservoir releases, may not be included).
  - Creation of a web-based dissemination platform to facilitate access to and analysis of RFC forecasts, with both internal and public-facing components.

Hydrology Workgroup

- The WRH Hydrology Workgroup brings together members of STID (Chad Kahler), PSD (Mike Schaffner), and ODSD (Matt Solum).
- The workgroup serves as a single point of contact for questions and inquiries related to hydrology.
- The workgroup also works on special projects assigned to it or taken on for the benefit of WR.
- The workgroup can be contacted via: **wr.hq.hydrowg@noaa.gov**