

# CBRFC 2014 Stakeholder Forum

## Summary

NOAA's Colorado Basin River Forecast Center (CBRFC) held a stakeholder forum on February 25 and 26, 2014 at its Salt Lake City, UT office. This year's forum focused on product dissemination methods and interpretation and included a review of the CBRFC Model calibration and operational components. Presentations on the CBRFC products included those of both a deterministic and probabilistic nature as well as non streamflow informational products. Information about interpretation of the products produced by the CBRFC and impacts to forecast quality were included. Recent changes to the CBRFC web site were demonstrated and the web site philosophy discussed.

Presentations from CBRFC Stakeholders and partners focused on the utilization and role of CBRFC products in their operations.

Feedback (collated in appendix 2) was generally positive. Substantive requirements for CBRFC and/or NOAA services are summarized in this document.

More material, including workshop presentations, are available at the CBRFC website ([www.cbrfc.noaa.gov](http://www.cbrfc.noaa.gov) – “presentations” located under “office” at the bottom of the page or the drop down menu).

## Discussion Topics

Significant discussion took part on the format and type of information provided on the CBRFC web page. This included graphical forecast products as well as informational products. Many of these items are listed below with improved labeling and additional flexibility in viewing graphical information the most frequent recommendations. Healthy discussion also took place during the review of the CBRFC hydrologic models, in particular when the calibration process was presented. Insight was gained as to how the CBRFC characterizes components such as regulated and unregulated flow, diversions, and consumptive use with the model.

Additional discussion evolved around the Sacramento Soil Moisture model components and how they are adjusted and impact the model output. How stakeholders might view and interpret such information if it was available was brought up. The operational differences between daily deterministic and ESP probabilistic forecasts were spelled out with demonstrations of CBRFC daily operational functions provided.

Throughout the discussions, the following suggestions were made for changes/enhancements to our current products:

- Ability to view the model states (e.g. SWE, soil moisture) for a given basin (CRD and Others)
- Ability to zoom into hydrographs, daily ESP graphs and snow plots (NWS GJT)
- Ability to remove columns from listings (peaks, water supply, snow) (NWS GJT - Completed)
- Additional labeling on ESP plots (e.g. regulated vs unregulated, QPF vs Non-QPF) (consensus)
- Annotate jumps on daily ESP plots and what they are due to (consensus)
- Make notes from the water supply tool available to users (consensus)
- Take into account color blind users for graphics (USBR)
- For big years, would it be possible to have peak flows earlier than March 1<sup>st</sup>? (NWS GJT)
- More data in a friendly format for download (Colorado Mesa)
- More definition of rivers in the monthly precipitation maps (DWCD)

- Add inter-quartile range on box plots for ESP (CRD)
- Improve documentation on verification throughout the web site (consensus)
- Provide projects update information and development work on the website (CRD)
- Account for climate change in ESP forcings (CRD)
- Need representative precipitation and snow numbers for larger basins especially including Colorado above Powell (SNWA)
- Discuss peak flow forecast update frequency, charts, etc with key stakeholders (NWS GJT)
- Explore Central/Northern Nevada forecasting potential (SNWA)
- Post and send link to EOS water supply forecast paper
- Provide updates on ESP recalibration efforts when additional years added

The following requests/suggestions for expanding CBRFC services included:

- Monthly forecasts (out one water year) in addition to April-July water supply forecasts, including monthly verification statistics
- Develop a NIDIS like product that gives snapshot of our websites with links (CRD)
- Written document to explain post adjustment of ESP and how it will benefit the forecast process
- Verification of real time forecasts outside of the April-July runoff period (i.e. base flow period (CRD, USBR)
- Verification of monthly forecasts (USBR)
- Basin Pages - represent information accessible by river basin of interest (Consensus)
- Verification maps

## Appendix 1: Participant List

Name	Organization
Aldis Strautins	NWS Grand Junction
Alexi Luganev	SNWA
Angela Rashid	Colorado River Board of California
Bobbie Klein	Western Water Assessment Colorado Basin River Forecast Center
Brenda Alcor	Center
Bryan Close	Stantec
Casey Collins	SNWA
Chad Kahler	NOAA NWS Western Region
Chris Hogge	Weber Basin Water Colorado Basin River Forecast Center
Craig Peterson	Center
Curtis McFadden	USACE
Dave Kanzer	Colorado River District
Don Meyer	Colorado River District
Edward Rumbold	
Erik Knight	USBR Grand Junction
Frank Kugel	UGRWCD
Gigi Rihards	Colorado Mesa University Water Ctr Colorado Basin River Forecast Center
Greg Smith	Center
Heather Patno	USBR
J.C. Chen	Colorado River Board of California
James Walter	SRP
Jared Manning	Utah Water Rights
Jason Christenson	USBR
Karen Murphy	MWDSC
Katrina Grantz	USBR
Ken Curtis	Dolores Water Conservancy District Colorado Basin River Forecast Center
Kevin Werner	Center
Lee Traynham	USBR
Mark Vanlack	Colorado River Board of California
Michael Eytel	CRWCD
Michale Schaffner	NOAA NWS Western Region Colorado Basin River Forecast Center
Michelle Stoke	Center

## Appendix 1 Continued: Participant List

Name	Organization
Nathan Elder	Denver Water
Noe Santos	USBR Lower Colorado
Paul Davidson	USBR Colorado Basin River Forecast Center
Paul Miller	Farmington City, NM
Paul Montoia	UMASS
Rebecca G.	
RG Fernando	
Sarah Smith	
Susan Behery	USBR Durango
Tim Bardsley	Western Water Assessment
Tom Maher	SNWA
Tom Ryan	MWDSC
Vernon Lamb	Dolores Water Conservancy District
Vevah Deheza	NOAA / NIDIS
Warren Turkett	CRC
WFO Riverton	NWS Riverton

## Appendix 2: Participant Feedback

### 1. How useful was the workshop to you?

It was very useful in many ways, such as: getting to meet the staff that I only have heard on webinars, meeting folks from other agencies, getting instruction on how to find items on the website, understanding how the ensemble forecasts are made, and learning the importance of accurate assumptions regarding antecedent soil moisture conditions. Probably the most important piece was the information about the antecedent soil moisture conditions because that really seems to have an important effect on the future runoff forecasts.

Very useful and informative. I always receive a further understanding of the ESP model. Each stakeholder meeting I learn new things. It is important to understanding the limitations and uses of the model.

The workshop is very valuable. The most important part for me was understanding the extremes ends of the forecast better, the minimum in our case. How the forecast has done, the variance graphics was helpful. How the 30 year average plays in was helpful

The workshop was very useful to me. It helped me understand the tools you have developed and the science behind them. The daily ESP will be very useful to us in planning for the distribution of water, particularly in the Great Basin and Sevier/Beaver, Virgin, and Duchesne Rivers. In the future I hope to develop a comprehensive water supply model for Weber River/Utah Lake/Jordan River basins in order to optimize the use and storage of available water in these basins. As such, any additional research into improving water supply forecasts such as the use of satellites in refining snow pack estimates would be of great benefit to our agency and to the people along the Wasatch Front. Thanks for the opportunity to participate.

### 2. What are your thoughts on future workshops? Would you recommend this workshop to others you work with? Would you attend again?

I think once a year is good. The time of year – February – was perfect (although I might have felt differently had it been snowy weather). At your offices in Salt Lake City was convenient – a good hotel nearby and good public transportation if staying farther away. Although with so many people in attendance, the room seemed a bit cramped at times. A lot is covered so two days is good, but maybe balance between the two days so both are closer to the same length. One idea of something to include might be to walk us through the work area and give demonstrations on what goes on at the workstations. To and from the coffee area I saw lots of stuff on the big screens (I definitely have monitor envy now that I am back looking at my tiny screen) that would likely be of interest to those of us that don't work there. I would recommend this workshop to others I work with (but maybe not well enough so that they get to attend in the future and I don't).

Of course I would attend again as well as others here. So far you have been getting the workshops correct. The only suggestion would be small break out groups at the end of the workshop for questions/comments related to their specific areas of interest. Also more interaction with the forecasters responsible for our sub basins.

I would recommend every year, but could lessen to every other year with webinars on similar subjects in between. You could try only one day also to lessen time commitment for all, but has been well done so I don't see a need to change currently. There is additional interest in the Colorado Basin right now between studies and drought. Interest might wane some as the drought lessens in the basin.

### **3. What were the most important / relevant / useful topics covered? Did any of your questions go unanswered? If so, what were they?**

Probably not answering the question you have asked, but what I liked is that everything had substance. Not having attended before, I was expecting things to be a bit more lightweight. It was nice to have in depth information and some pretty technical things addressed and to actually have to use my brain to follow along. I definitely felt it was worth attending and knowing the level of the presentations would feel justified in requesting to attend again.

They would be topics surrounding the models. Some items of interest for us would be related to using our local knowledge for characterizing the sub basins of interest in the model as well as commenting on calibration and ensemble periods.

Continuing to understand how the forecast model works continues to help me use and explain to our constituents. Each year you continue upgrading so it helps to see what you are working on.

### **4. What were the least? If you could change one thing about the workshop, what would it have been?**

I think I would have balanced the days out more, maybe take an hour or an hour and a half off day one and put it onto day two. And definitely have breaks scheduled for morning and afternoon to stretch. It was a little hard to sit in the chairs for so long. I'm recalling the 2<sup>nd</sup> morning being pretty much nonstop and trying hard not to fade out as it went on.

The model verification. I think I understand what is trying to be done, but it confuses me when (a) the median forecast is verified as a deterministic forecast and (b) verification of the probabilistic forecast is done on the entire range of outcomes. In other words, (a) look at the ESP's skill, our 50% forecast gets pretty close most of the time, (b) look at the ESP's skill we were way off (90% and 10%) 2 out of the last 10 years and within the 30% to 70% 5 times out of 10. If I am completely wrong about this, maybe the audience needs a better understanding of the verification process and what it means

Some items are repetitive, but that goes with the audience experience level. You all do a good job of pacing to the audience.

**5. Are there any decision points, meetings, or other areas you would like to see the CBRFC more engaged with? How do you believe would be the best way for us to get involved with those efforts ?**

Not sure how to answer this one because I'm not sure of how the CBRFC fits in currently with other agencies or what role it is seeking to have. My current view is that the CBRFC provides information that is then used (or not used) by others in their decision making processes. You have a good idea of who is using your products. If you are seeing lots of questions from a particular agency, then a good approach would be to offer to do presentations at a meeting held by that agency. I seem to recall a presentation by the CBRFC at a USBR Basin States Technical Meeting a few years back (I don't attend regularly, so there may have been more) that helped in explaining the forecast process. Having your products understood is the best way to get people to use them.

No

Not currently, but as conditions change, and new boaters are back to hear about a "spill" forecast we will look for help in presenting your material

**6. Is there anything you will do differently because of this workshop?**

I will make better use of the website because I have a better idea of what things can be found there. All in all it was a very nice workshop. I had met some of the staff before, but not all and now it is nice to be able to picture who is sitting in the conference room speaking during your webinars. Also I will be less hesitant to contact the CBRFC with any questions. It was also nice that you all took time to host the happy hour get together. I had no idea that downtown Salt Lake City was such a happening place!

No. I am encouraged with the potential use of the CFS in seasonal modeling. I understand the upper basin is less driven by El Nino, PDO, AMO ect. Compared to the lower basin. The CFS could help with this and the need to weight the ESP would not be necessary. In addition, since the lower basin seems to be so dominated by multi-decadal teleconnections, maybe a longer ensemble and calibration period should be used. It seems that whatever portion of a 60 year teleconnection cycle we are currently could influence the model output.

I'm using the daily ESP & DR traces more. Reservoir storage and dry/drought conditions have made our constituents more anxious. Will fade as we getter wetter periods. You all do great listening and communicating with your forecast users. Hopefully you will maintain the resources to continue. Also looking for improvements, like using more satellite input, are positive signs to keep improving, which gives me continued confidence. You avoid the "black box" syndrome where no one can explain exactly what you do.