

CBRFC 2012 Stakeholder Forum

Summary

NOAA's Colorado Basin River Forecast Center (CBRFC) held a stakeholder forum on July 31, 2012 at its Salt Lake City, UT office. This year's forum focused on the observing system and its importance in making streamflow forecasts. Presentations included descriptions of the key networks utilized by CBRFC from partner agencies (NRCS SNOTEL, USGS Streamgaging, and NOAA networks), use of meteorological and hydrologic data in CBRFC modeling and forecasting, and discussion on the strengths and weaknesses of the observing system. The forum also included discussion on the water supply forecast program and its evolution away from a formal coordinated forecast toward a daily updating forecast paradigm utilizing the CBRFC forecast model.

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

More material, including workshop presentations, are available at the CBRFC website.

Discussion Topics

CBRFC briefed on the coming changes to the **water supply forecast program** including elimination of formal coordination with NRCS on a single forecast number, implementation of daily updating ensemble forecast runs at CBRFC, and redevelopment of CBRFC forecast services online. The later included possible elimination of the legacy forecast publication and addition of daily updating forecasts to the map and tabular interfaces online. Participants at the workshop were generally supportive of those proposals. Although no one at the workshop used the **forecast publication**, some knew of applications by public relations staff needing a simple, high level representation of the basin condition and forecasts. These remarks reinforced a standing requirement to develop a high level view that accurately represents the state of the basin including snow, precipitation, and volume forecasts for decision makers. Other requirements identified for the water supply forecast program include:

- Short and long lead **low flow forecasting** year round (CWCB and USBR)
- **Earlier season – especially December** – forecast issuances would help reduce temporal discontinuity in 24 month study (USBR and SNWA)
- **Daily updating volume forecasts** will be very helpful (consensus)
- **Volume forecasts incorporating QPF preferred** (PacifiCorp)

The **observing system** discussion elicited discussion in a number of areas. These included:

- Need to better connect USBR and CBRFC naturalized flow datasets
- Connecting USBR efforts to observe and model lake evaporation to CBRFC modeling
- Snow remote sensing – group very interested in status updates as CBRFC/JPL project progresses
- Are we nearing a point where CBRFC can quantitatively use NRCS soil moisture measurements?
- Importance of monitoring and modeling atmospheric river events

- Better overall management of data collection effort in the federal government – no single agency has responsibility which inevitably has led to gaps and weaknesses.
- Management agencies largely rely on CBRFC, NRCS, and USGS for expertise on the observing system.
- Ungauged side inflows between Lakes Powell and Mead is major uncertainty for lower basin stakeholders

Participants suggested the following for future CBRFC stakeholder meetings:

- More NRCS involvement especially in data collection
- Include year in review similar to fall webinar
- Remote sensing
- CCAWWG short term document

Appendix 1: Participant List

Name	Organization
Ashley Nielson	Colorado Basin River Forecast Center
Brenda Alcorn	Colorado Basin River Forecast Center
Chad Kahler	NWS Western Region Headquarters
Chris Hogge	Weber Basin Water Conservancy District
Chuck Cullom	Central Arizona Project
Connely Baldwin	Pacificorp
Colby Pellegrino	SNWA
Corey Loveland	NWS, Pocatello WFO
Dave Kanzer	Colorado River District
Ed Vidmar	USBR
Greg Smith	Colorado Basin River Forecast Center
Heather Hermansen	USBR
Jared Hansen	CUWCD
Jason Christensen	USBR
Ken Curtis	DWCD
Kevin Werner	Colorado Basin River Forecast Center
Kim Maloy	Colorado River Commission of Nevada
Larry Dunn	NWS Weather Forecast Office
Lee Traynham	USBR
Mark Hubble	Water Resource Operations
Matt Solum	NWS Western Region Headquarters
Michael Schaffner	NWS Western Region Headquarters
Michelle Garrison	Colorado Water Conservation Board
Mohammed Mahmoud	CAP
Noe Santos	Boulder Canyon Operations Office
Patrick Lambert	USGS
Paul Miller	Boulder Canyon Operations Office
Randy Julander	NRCS
Ryan Christianson	USBR Western Colorado Area Office
Ryan Luke	USBR
Sara Larsen	WSWC
Stacie Bender	Colorado Basin River Forecast Center
Steve Wolff	Wyoming State Engineer's Office
Susan Novak	USBR Western Colorado Area Office
Tim Bardsley	Colorado Basin River Forecast Center
Tracie Kirkham	Salt Lake City Dept. of Public Utilities

Appendix 2: Participant Feedback

1. How useful was the workshop?

Very useful. This was my first workshop so for me personally it was very beneficial. I am relatively new to the use of the CBRFC products so the background on the modeling and inputs was especially useful.

I thought it was excellent. It was helpful for me to understand all the various observational data sources, and identifying potential problems with that data that are utilized by CBRFC. In addition it was helpful to hear about the possibility of new methods to determine snow coverage.

I think it's useful to meet annually. To me, I always learn a few more aspects of the modeling. Also as new things are introduced, it helps to review with the group. If people lose interest or they become too much to organize, you could back off to every other year.

The workshop was extremely useful. I think the information we obtained from the workshop allows for us to stress the importance of the observational network to our stakeholders and management, particularly with regards to the SNOTEL network. I was really interested in the soil moisture network and learning more about how that data might be made available in the future. I think the workshop also highlighted how Reclamation might be able to work better with the CBRFC and a couple of our other stakeholders. We're working on some ways to provide you with some daily operational data. Also really enjoyed seeing the CHPS framework for the first time.

I found the workshop to be very useful and informative. The layout of the workshop's content was very easy to follow (intuitive); as the topics first covered the sources of data (observing systems) and then moved towards the role these observing systems play in forecasts. All the while maintaining a good balance between presenting high-level information and specific details of observing systems that catered to both those that are unfamiliar with this content and those that are very knowledgeable in it.

As always the workshop was very useful. The updates on doing away with the formal publication were useful. Discussions of the observing system are helpful as well. We are willing to provide support (written, etc) where needed for additional monitoring but we look to CBRFC to make suggestions for the data that is necessary and useful.

2. Assuming it was useful, what your thoughts on future workshops? This might include topics, frequency (currently we do annual workshops), length, location, etc?

An annual frequency seems good. As far as location, of course holding it in SLC works well for our location here in Provo, especially considering current (and likely future) travel restrictions/limitations we are dealing with.

The annual workshops seems appropriate, Perhaps one less session would be better, ending about 3, would be my preference. Future workshop topics could include case studies around the Colorado Basin? I think it would be interesting to hear about other experiences, unless this has already been done in the previous year/(s).

The location was good for me. I'm not sure that I could travel to other places in the state or out of state.

I think one day is good and SLC is convenient. I think reviewing the previous year is always good, reviewing the model briefly annually with any updates such as QPF and reviewing new research such as the remote sensing would be good. This year I enjoyed the outside agencies and last year seeing how Denver was using the traces was good. I think other outside speakers possibly from a university on related topics could be good, such as covering soil moisture studies.

I really think having a theme was a great idea. As far as future workshops go, some ideas I have are:

- Uncertainty (causes, sources, ways to improve, ways to communicate, etc...
- CBRFC products with more emphasis on how they are being used. For instance, maybe a talk how Reclamation uses RFC tools, how Denver Water uses RFC tools, etc.... I think this would be a great opportunity to see how other stakeholders are using RFC products, and how they could be included in our own operations.

I think annual frequency and the 1-day duration are good. If it were to change, I would suggest a 2-day meeting, the first day being sort of an overview, followed by a more technical 2nd day.

SLC is pretty easy to get to, though with the hour time difference I think 8:30 is about the earliest you can start. I'll also offer up Vegas, Phoenix, Tucson, Reno, and San Diego as places with nice meeting areas that are also really easy for use to get to.

A possible topic for a future workshop can focus on understanding the development of forecasts (delving into skill, reliability, lead-times, methodologies, etc) and exploring different aspects that can enhance forecasts that are currently most beneficial to stakeholders (e.g. Lake Powell inflows). In other words, what can be done with or without stakeholder support, to produce better forecasts (especially forecasts that stakeholders utilize the most). The current workshop framework (annual one-day session) seems suitable, but depending on where most of your stakeholders are situated, rotating the workshop location to cities where the most engaged stakeholders reside could be an option.

Annual workshops are always welcome. I think there is a bit of a rift between the data needs of local scale water users and those of us more concerned with regional use of forecasts (like SNWA and other 7-states players.) It might be helpful to have two separate workshops. Every year the states technical team meets twice a year, we could add a day before or after to have this sort of regional scale annual review. A review of the previous year's hydrology is always helpful. The states

are receiving more and more pressure for long-lead models. We know this is far off but it would be good to receive regular updates about progress.

3. What were the most important / relevant / useful topics covered?

How various data used in the model & the NRCS soil moisture data.

- History and background of the modeling and inputs
- Statistics and discussion on forecast accuracy and reliability
- Updates on upcoming/potential changes
- SNOTEL presentation/discussion
- USGS streamgauging presentation/discussion
- Affect of reservoirs/diversions on forecast model development

The most useful for me was understanding how all the data gets incorporated into the modeling.

I think the forum was great in explaining the usefulness of the SNOTEL network. It was great to learn a bit more about how the gages are maintained, differences between regions, upgrades (i.e., soil moisture sensors). I also thought learning more about the types of input that the CBRFC currently uses was really beneficial. Learning about how Reclamation can help the RFC was very relevant.

I thought the brief overview of how the forecast is made with the new CHPS framework was pretty interesting.

The topics that I found most interesting include: the process by which erroneous data is corrected (model vs. gage) for the purpose of forecasting, the effect of changing lead-times on forecast reliability and skill, and the factors that affect skill of snowmelt forecasts in long lead-times (e.g. August snowmelt forecast dominated by soil moisture conditions).

Updates on what CBRFC is doing and improvements that are being made. We are constantly asked by scientists, the press, and our board members whether or not we are including the “latest and greatest” research, such as dust on snow. It is good for the layperson, like myself to have a succinct and direct explanation as to why we are or are not capturing them in our forecasts and why that is or is not appropriate at this time. This may seem like beating a dead horse to go over this every year but we forget! LOL.

4. What were the least?

The USGS stream gage presentation, primarily because I had heard elsewhere.

I thought everything was important and useful, and it very well put together.

I didn't think it was un-useful, but I think it would have been more beneficial to see more about the performance metrics with regards to the USGS streamgage data. I think Paul Davidson asked at one

point something along the lines of, “How do you know what you think is correct is correct?” and it never really got answered. The USGS presentation was informative, but didn’t seem to flow with the rest of the forum.

In my opinion, all the topics that were covered were important towards understanding and comprehensively covering the theme of the workshop.

Local scale issues in Upper Basin (simply because of my focus at SNWA).

5. Are there any decision points, meetings, or other areas you would like to see CBRFC more engaged with?

I appreciate you presenting at past Dolores meeting and will call again when the need arises. I do not have additional specific needs at the moment, but will work with Greg on possibly using the traces for Dolores.

I think it would be great if the CBRFC was more consistently invited to the Basin States Technical Committee meetings. It seems that there is always an opportunity where the CBRFC could chime in. Also, we were on the NIDIS drought page the other day (drought.gov) and it seems like some of the RFC products they link to might not be the most appropriate. In particular, there is a “forecast” link for the drought in the Upper Colorado River Basin Regional Drought Early Warning System page (<http://www.drought.gov/portal/server.pt/community/ucrb>). It links to the “Significant River Flood Outlook” product (<http://www.cbrfc.noaa.gov/fop/fop.cgi>). I don’t think this product really represents a “drought” forecast. You can have floods and be in a drought, and you can have floods when out of drought conditions. So maybe reaching out to NIDIS, because I think there is the opportunity for some collaboration there.

From CAP's perspective, we would be interested in updates to Lake Powell inflow associated with the 24-month study/interim guidelines (April forecast of September and August forecast of January) and winter forecasts (December, January, February) of spring snowmelt (April, May, June, July); as these forecasts help to inform some of our decisions.

It would be nice to see CBRFC engage more with the group that works on the 24-month study in the form of an annual review of operations and predictions. Why did we do good/bad and what could we do better. Was it the forecast or were we just close to a trigger in the guidelines, etc.

6. Other comments?

Very useful and informative workshop. The ability it provided to meet and network with operating personnel from other agencies and/or areas was beneficial, as was hearing some of the challenges others are dealing with.

It is unfortunate that other NRCS offices could not follow Utah’s lead on soil moisture and also join the CRBFC workshop.

*Comment from NRCS: Soil Moisture sensors are being added in all areas as resources allow with the goal of having all sites fully instrumented.

As we all agreed, using the QPF sounds valuable, but should be monitored and presented next year at the 2013 stakeholders meeting.

Soil moisture sounds like it may be a beneficial area of research, possibly by others to share with the group.

Long term forecasting, where can skill be improved.

We haven't reviewed many details on the snow model.

Why SWS vs. ESP look better in some areas like the San Juan?

I think it would be useful to follow-up on your discussion question regarding the current observing system and exploring how flow measurements into Lake Powell can be improved (gages/Snotel sites?).

Thank you as always for a great meeting. It is always good to sit down and hear a little bit of new information and keep tabs on where we are going.