

Updates to CBRFC Projects and Collaborations



Overview

- Collaborative Snow Work
 - Snow Comparison Work
 - UofU Physically Based Snow Model Project
 - ASO update
- Collaborative Work with the Climate Prediction Center on S2S forecast improvement
- HEFS update
- USBR DSS Tool for HUP Collaboration



Collaborative Snow Work



Snow Product Comparisons

- Many external snow products exist within the Colorado River Basin
- We will look at the added value to ...
 - Operations
 - Water Supply Volumes
- Some examples include: SNODAS, SWANN, ASO, C.U. Boulder Snow Reconstruction, Sentinel Snow Depth



Snow Product Comparisons

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Current Focus

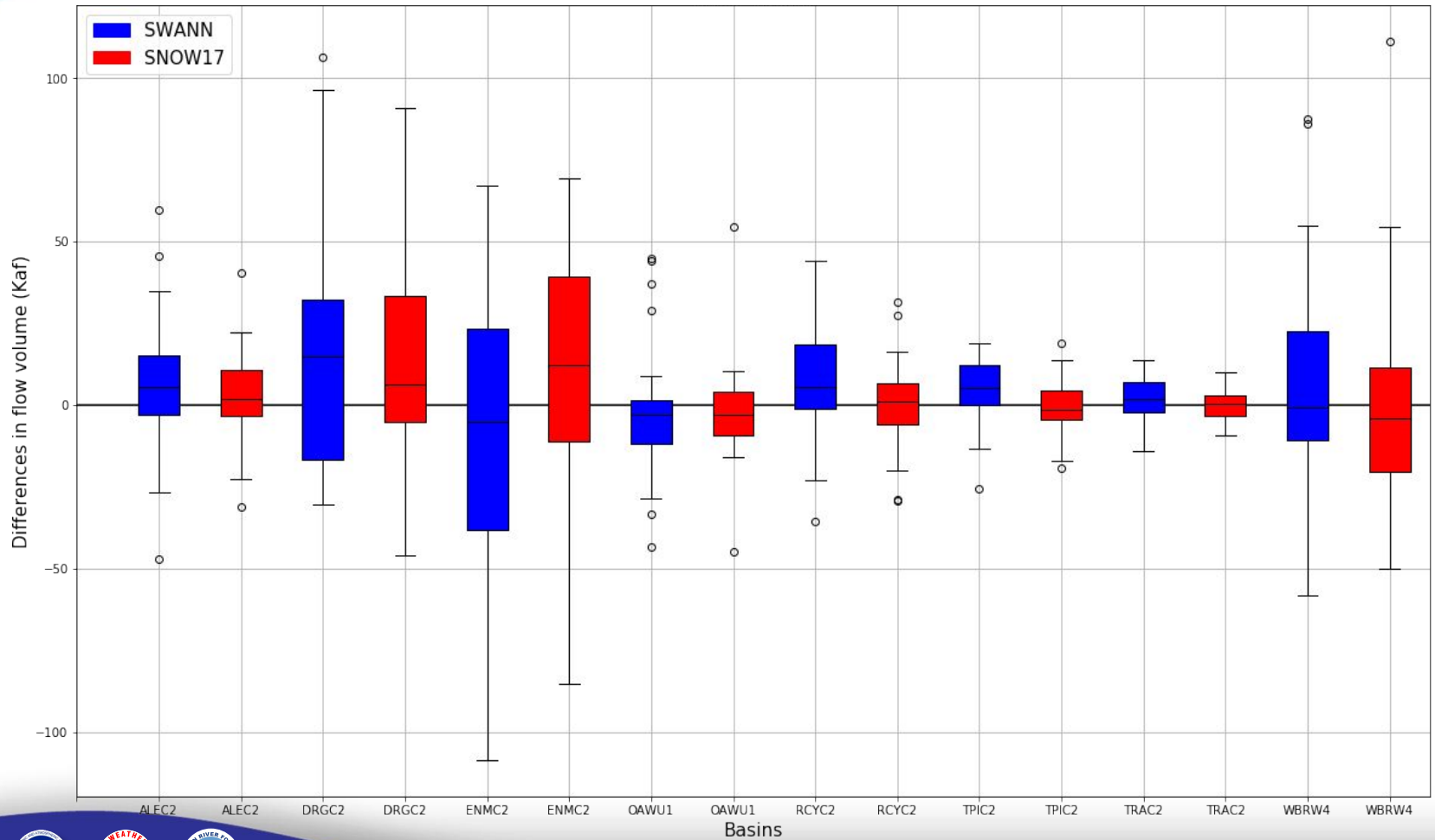
- SWANN - Snow Water Artificial Neural Network (University of Arizona)
- Summer Student has been looking at historic SWE 1981-2019 at 4 km
- Resulting framework can be used to analyze different products.



Snow Product Comparison

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Upper Basin April-July Streamflow Differences
1982-2015



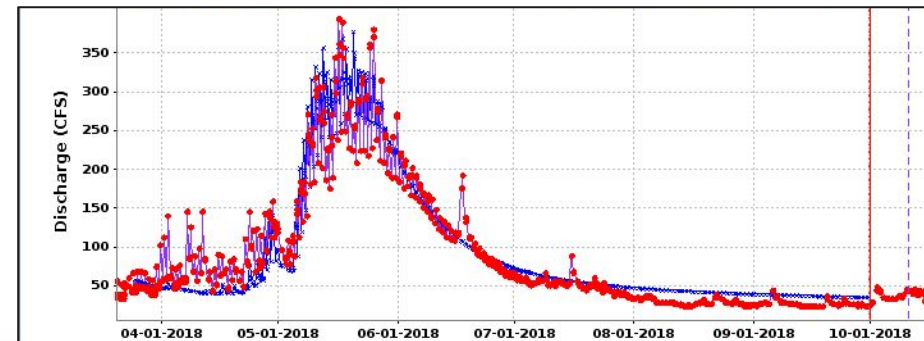
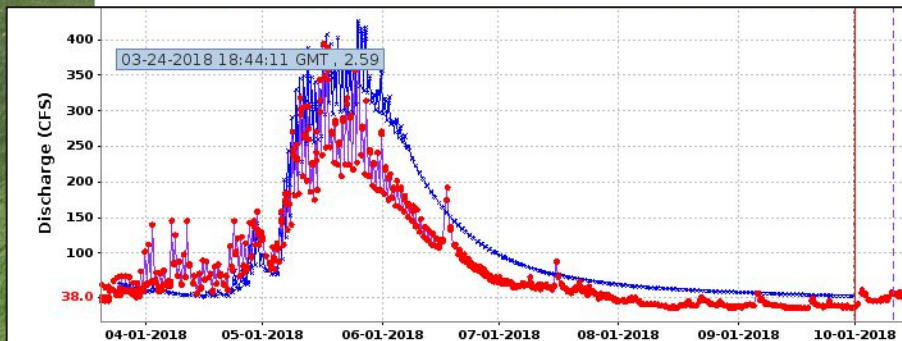
Physically Based Snow Model

- Project with University of Utah and Agricultural Research Service in Boise
- iSnoBal - distributed energy balance model
 - Test runs on East River WY 2018 (baseline)
 - Current work: Albedo Updates from MODIS
 - UofU Center for High Performance Computing
- Remote Sensing Component - Using GOES derived cloud cover to constrain net radiation
 - UofU Masters Student started in September



Airborne Snow Observatory Update

- We continue to evaluate the limited ASO data sets for use in our model.
- Currently not used operationally
- Data is being used as a research dataset to aid in calibration work



Collaborative Work with the Climate Prediction Center (CPC) on Seasonal to SubSeasonal (S2S) Forecasts



S2S Forecast

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- Project with CPC to utilize their long range forecasts
- Start with the 2 week median forecast for precipitation and temperature
 - We have received reforecast from 1985-2019
 - CPC is evaluating skill
- Expand to 3-4 week forecast
- Long term goal (FY 22) 6-5-4 month forecast starting with Oct 1st forecast
- Incorporate into HEFS system

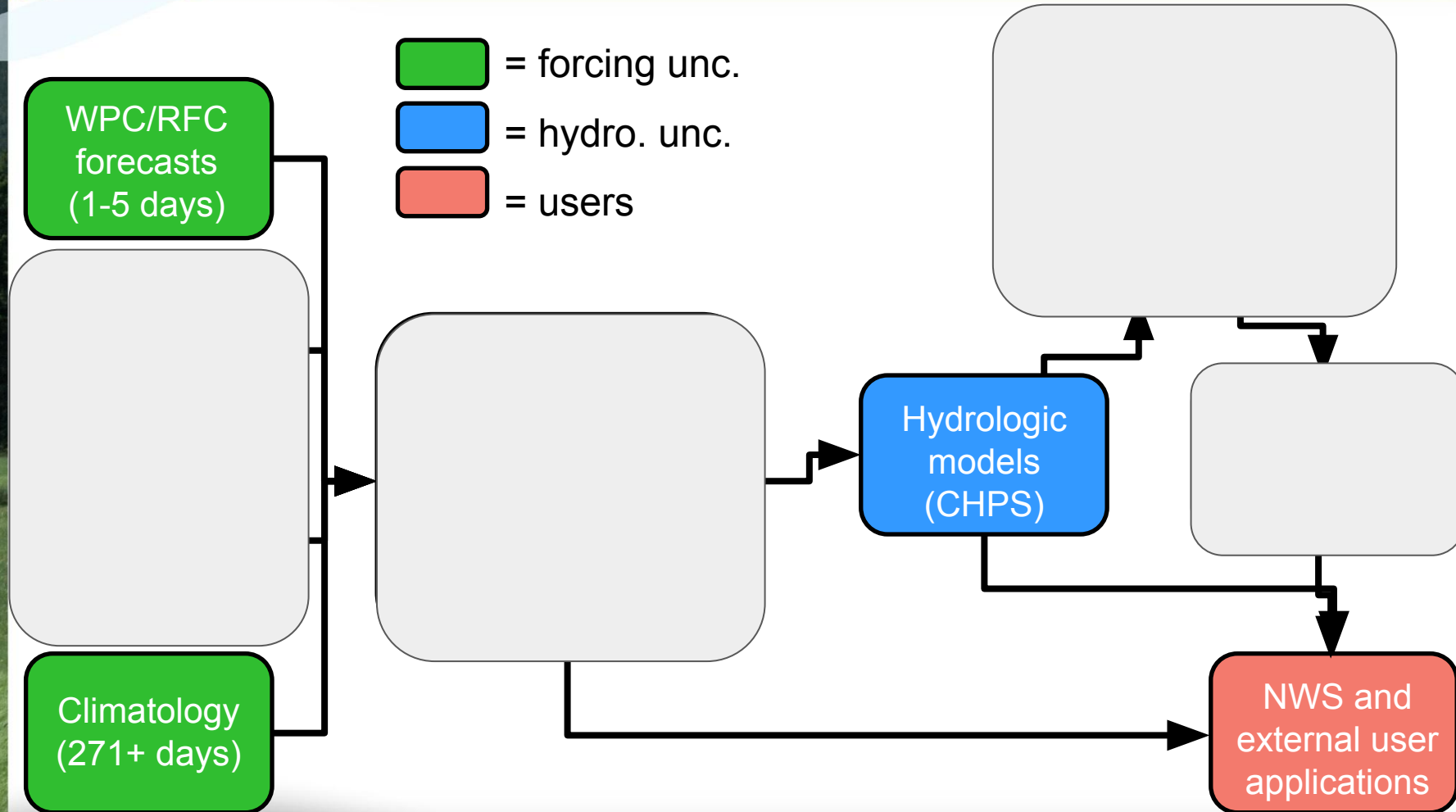


HEFS Update

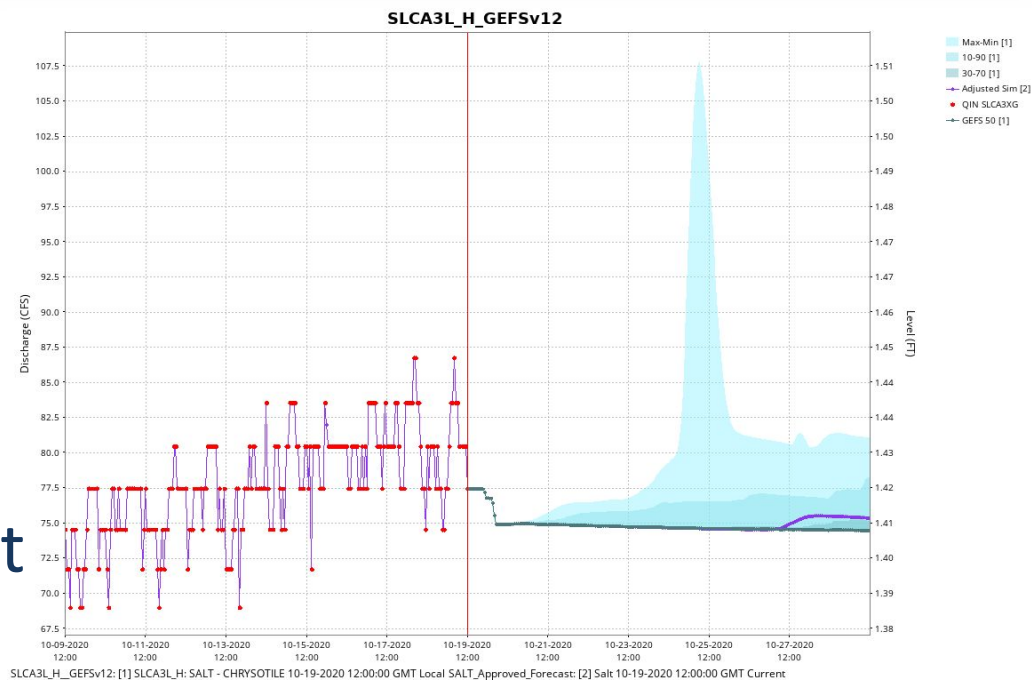


HEFS quick review

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- Migration to GEFSv12
- Plan to use for 10-15 day contingency forecast



- Hopeful S2S project will provide more skill for longer range volume forecasts

USBR Decision Support Tool Project Collaboration



Project Background

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- 15-mile reach: Colorado River section extending upstream from the Gunnison River confluence to the Grand Valley Diversion dam at Palisade, CO
- Significant decision support area for CBRFC:
 - HUP group (low flows/irrigation season)
 - CROS group (peak flow/snowmelt season)
- Weekly HUP coordination meetings to share information regarding flow forecasts, weather forecast, quantity and timing of reservoir releases, diversions and return flows that impact flows in the 15-mile reach
- This reach is identified as a critical stream reach for the recovery effort of Colorado River endangered fish. The U.S. Fish and Wildlife Service has defined a suite of recommended flows for this reach that are tiered to the hydrologic condition.
 - Irrigation has a significant impact on 15-mile river reach flows
 - **Water/Flow management: fish vs. irrigation vs. reservoir water availability**



Project Objective

Develop a DSS to improve coordination and transparency of water management operations in the river during the Historic User Pool (HUP) phone calls

- Provides a visual representation of river response to actual and anticipated reservoir releases
- Relies on local flow forecasts from CBRFC
- Relies on routing parameters from CBRFC
- Leverage existing tools and models to generate on the fly streamflow forecast



- CBRFC Project Role: provide USBR 4 CO River adjusted local flow time series
 - Adjusted local flow time series - > do not include upstream reservoir releases
 - Tool allows USBR/CODWR/etc to run what-if reservoir outflow/Colorado River flow scenarios
 - Kremmling, Dotsero, Cameo, Palisade

DSS Tool Web Interface

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<https://www.usbr.gov/lc/region/g4000/riverops/ecaodss.html>

USBR has set up capability to ingest CBRFC adjusted flow forecast time series and run what-if reservoir outflow scenarios in near-real time and view impacts on Colorado River flow magnitude and timing

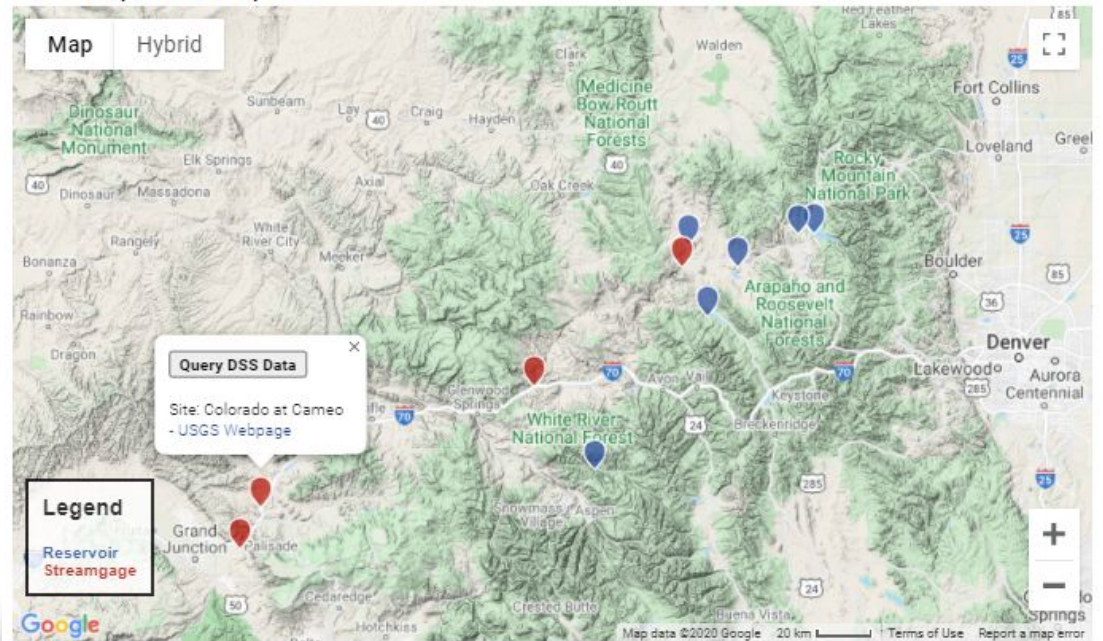
Upper Colorado River Basin Decision Support System

This interface displays a map of HUP DSS monitoring locations with links to graphs and tables for related data for each location. Information regarding this interface, along with description of the DSS model and its major assumptions can be found at [THIS LINK](#).

Custom Tables:

Daily Reservoir Releases: Native, Total-1, Total-2

Show: Daily Data Hourly Data



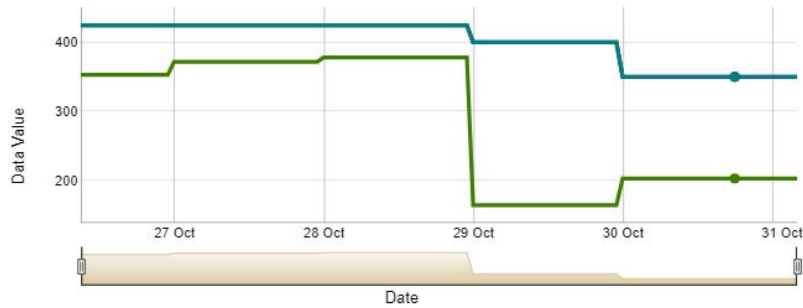
DSS Tool Flow Displays

Upstream Reservoir Outflow Scenarios → Impact on Colorado River flow downstream

Green Mountain Reservoir

Query Date: 10/26/2020 9:11:25 AM
[Raw Data Link](#)

2020/10/30 18:00:
 Native: 202.5
 Total-1: 350
 Total-2: 350



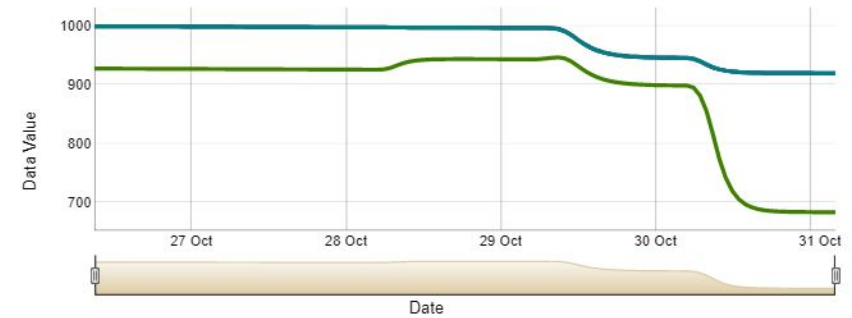
Show entries

Date-Time	Native	Total-1	Total-2
10/26/2020 9:00:00 AM	353	425	425
10/26/2020 10:00:00 AM	353	425	425

Colorado at Dotsero

Query Date: 10/26/2020 9:12:10 AM
[Raw Data Link](#)

Native
 Total-1
 Total-2



Show entries

Date-Time	Native	Total-1	Total-2
10/26/2020 9:00:00 AM	927.66	999.66	999.66
10/26/2020 10:00:00 AM	927.55	999.55	999.55

Project Status

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- Wrapping up first year of the two year project
- In year two, USBR has plans to collect the most likely future system operations from stakeholders:
 - Reservoir releases
 - Irrigation diversions
- CBRFC will have the ability to pull in best guess future reservoir releases and diversions from USBR hydrologic database (HDB) for use in operational forecast model
 - More accurate CBRFC flow forecasts during the crucial low flow/irrigation season

