National Weather Service

California Nevada River Forecast Center

Fall 2007 Newsletter

HIC's Corner

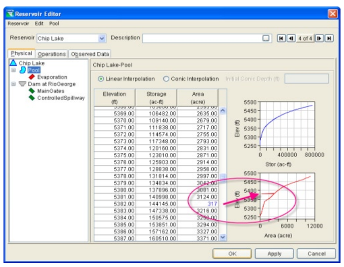
By Rob Hartman

Last Spring I mentioned the Yuba-Feather Forecast Coordinated Operations (FCO) project. This is an interagency effort involving NOAA, California Department of Water Resources (Division of Flood Management and State Water Project), Yuba County Water Agency, and the US Corps of Engineers. The project goal is to improve our joint ability to keep flood discharges below levee capacities downstream of the confluence of the Feather and Yuba Rivers during major runoff events like January 1997 through improvements in collaboration and coordination.

Aerial view of Englebright Dam and Lake on the Yuba River. The storage capacity is 45,000 acre feet.

The centerpiece of our coordination is the use of a common reservoir simulation model. As a group, we decided to use the Army Corps of Engineers HEC-ResSim model. Over the past year and a half our team has worked with HEC to improve the model so it will function properly in the Yuba-Feather system. It's a bit tricky because the model needs to optimize the reservoir releases for two reservoirs with multiple downstream controls and a whole host of criteria, restrictions, and rules. Work on the model is done by the Army Corps of Engineers, Hydrologic Engineering Center (HEC) in Davis, CA. The HEC-ResSim model is currently running as a part of our forecasting system (NWSRFS) as well as the FCO User interface that is supported by the DWR's California Data Exchange Center (CDEC). Data and forecast exchange between these two platforms allows the reservoir operators (DWR and YCWA), the Corps of Engineers, and the NWS to work more closely and base decisions on the same information. We're expecting the system to be up and running in a prototype mode for evaluation within the next few weeks.

"Once proven, we feel that the FCO model of collaboration can be extended to the majority of river systems in our area where reservoirs impact downstream flow and stage forecasts."



HEC-Res Sim Graphical User Interface.

The potential for the FCO doesn't end with the Yuba-Feather system. Once proven, we feel that the FCO model of collaboration can be extended to the majority of river systems in our area where reservoirs impact downstream flow and stage forecasts. This is really a win-win situation for everyone; the reservoir operators, the forecasters, and most importantly our customers who rely on accurate and reliable forecasts.

Inside this issue:

Thank you for taking the time to look through our newsletter. The CNRFC is keenly interested in meeting the needs of our customers and partners. We realize that requirements change and our products and services must evolve and adapt. If you have suggestions about how we could improve the value of our service, please give us a call or send us an email.

U.S. Dept. of Commerce

National Oceanic and Atmospheric Administration

National Weather Service
California-Nevada River Forecast Center
3310 El Camino Avenue, Room 227
Sacramento, CA 95821-6373

Tel: (916) 979-3056
Fax: (916) 979-3067

http://www.cnrfc.noaa.gov

NOAA's Science On A Sphere comes to the California State Fair

By Alan Haynes

Staff members from the National Weather Service Forecast Office in Sacramento, along with the California Nevada River Forecast Center, and the California Department of

Senior Meteorologist Elissa Lynn from the California Department of Water Resources makes a presentation using the Science On A Sphere® globe as a large crowd gathers at the California State Fair.

Water Resources (DWR), teamed up to organize an exhibit at the 2007 California State Fair featuring NOAA's Science On A Sphere® (SOS) as the centerpiece to the DWR's exhibit.

SOS is a room sized, global display system that uses computers and video projectors to display planetary data onto a six foot diameter sphere, analogous to a giant animated globe.

The SOS allowed animated images to be projected of such phenomena as current weather around the globe, atmospheric rivers, remotely sensed North American snow cover, climate change, El Niño, the Solar System, and a simulation of the 2004 Indian Ocean tsunami. These images were projected onto a suspended 68 inch sphere allowing people to see and understand what are sometimes complex environmental processes, in a way that was simultaneously intuitive and captivating.

There was considerable public interest in the real time weather throughout the State Fair and it is noteworthy that two category 5 hurricanes made landfall in the Atlantic Basin during the Fair.

The exhibit was well staffed and NOAA representatives were on hand to explain environmental processes, inform people of how NOAA is involved in monitoring and predicting changes in environmental conditions, and how NOAA is contributing to understanding these phenomena. Additionally, there was the opportunity to highlight the unique partnership between NOAA and the California DWR.

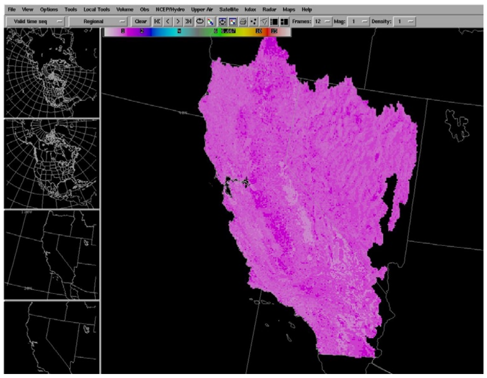
Total attendance at the sixteen day Fair was nearly three quarters of a million people and the SOS was a big draw, with an estimated 300,000 people attending the NOAA/DWR exhibit. Considering the vast numbers of visitors, the high popularity of the exhibit, and the extensive media coverage, the event was highly successful.

New CNRFC Flash Flood Guidance

By Eric Strem

How much rain would it take over 1, 3, or 6, hours to produce a flash flood over a particular area? The new CNRFC flash flood guidance (FFG) product is designed to answer that question. A flash flood is defined as a flood event that occurs within 6 hours of the causative event. The NWS WeatherForecast Offices use this flash flood guidance when issuing flash flood watches and warnings.

Greg Smith, a hydrologist at the NWS Colorado Basin RiverForecast Center in Salt Lake City, has developed what he calls the flash flood potential index or FFPI. To develop the FFPI, he determines how the character and distribution of land forms for an area increase or decrease that area's susceptibility to flash floods. For the CNRFC development, features such as soil type, land use, and slope were considered. He then combines this information into a single layer, the FFPI grid. Here at the CNRFC, this FFPI grid is then compared to statistics from observed flash floods which have occurred over the years. Using information from this comparison, we are able to convert the FFPI grid into FFG grids for rainfall of 1, 3, and 6 hour durations.



Gridded flash flood guidance for the CNRFC.

Currently, the FFG grids are static, that is, they don't change with time. This fall, we plan to modify the grids to take into account the impacts of the wildfires which have occurred over Southern California.

Future development will include incorporating the impact of changing soil moisture on flash flood guidance where it is important.

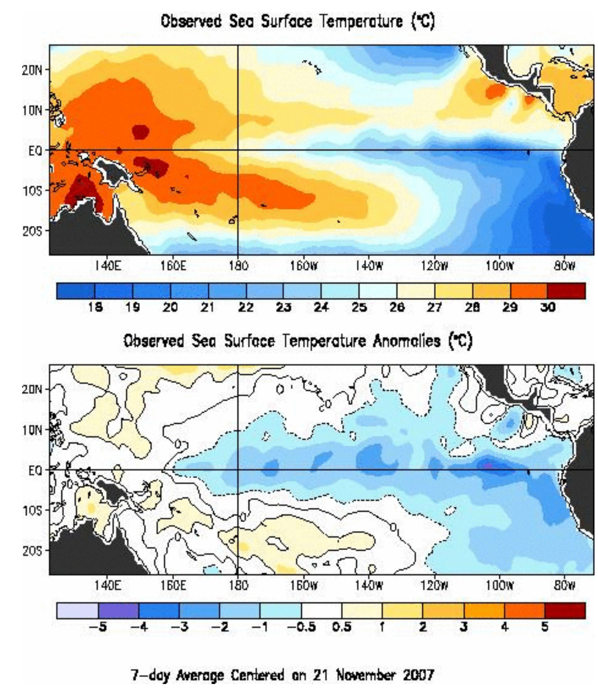
Climate Signals and Northern California Floods

By Pete Fickenscher

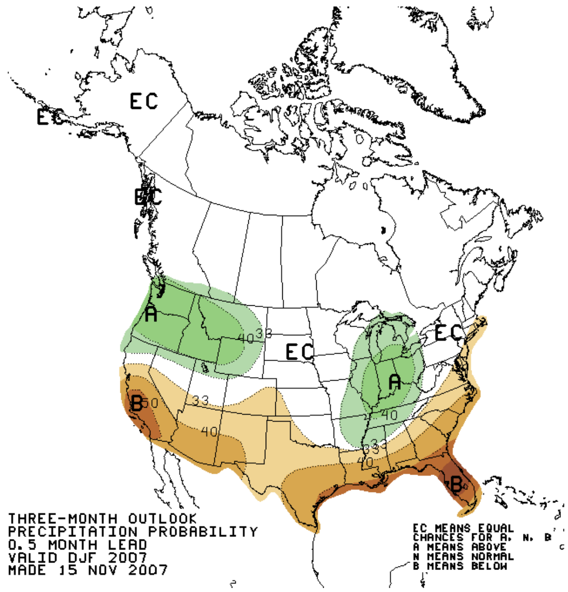
Forecasting the impact of climate signals is a risky venture at best. Every year is unique, and few climate signals provide a reason to be confident about how things will pan out. A great example is last year's moderate El Niño, which resulted in record dry conditions over Southern California.

Given that caveat, here's a few climate signals to consider for WY2008. First off, the equatorial Pacific has firmly shifted into a La Niña pattern, with cooler than average sea surface temperatures (SSTs). The Climate Prediction Center expects the Pacific waters to remain in the moderate La Niña category during the winter months of WY 2008. The general outlook for a moderate La Niña is for wetter conditions in the Pacific Northwest and drier conditions in Southern California. In Northern California, six out of the last nine moderate to strong La Niña's resulted in above average precipitation (looking at the 8 Station Index).

> *"Some broad climate signals seem to point toward a water year with a greater than average likelihood for a major flood in Northern California."*



In terms of major floods in Northern California, the December storms of 1955 and 1964 occurred under moderate to strong La Niña conditions. Water years 1986 and 1997 were neutral ENSO years, where the equatorial SSTs were slightly cooler than normal.



Three-month Precipitation Probability
November - December - January

A second factor to consider is the trend toward a warmer climate, which has been ongoing and certainly is not peculiar to this year. The main flood impact of this warming trend, is a tendency for higher than average snowlines. Higher snowlines result in greater proportions of the watersheds receiving rainfall and not snow, thereby increasing the runoff and the risk of a flooding storm.

Finally, I have noticed a curious pattern in major floods in Northern California. Over the past 100 years, the four largest floods (1955, 1964, 1986, 1997 - based on 3-day flood volumes into major Northern California reservoirs) all occurred near or just after the minimum in the 11-year sunspot cycle. Could this be coincidence? Probably, but the pattern is striking. Since we are currently at the minimum of sunspot cycle 23, this would be one year to be more vigilant in watching for massive winter storm systems.

Bottom line: Some broad climate signals seem to point toward a water year with a greater than average likelihood for a major flood in Northern California. While the probability may be higher for such an event this year, nothing is certain. We also could face prolonged dry periods, particularly in southern California. As always, anything is possible!

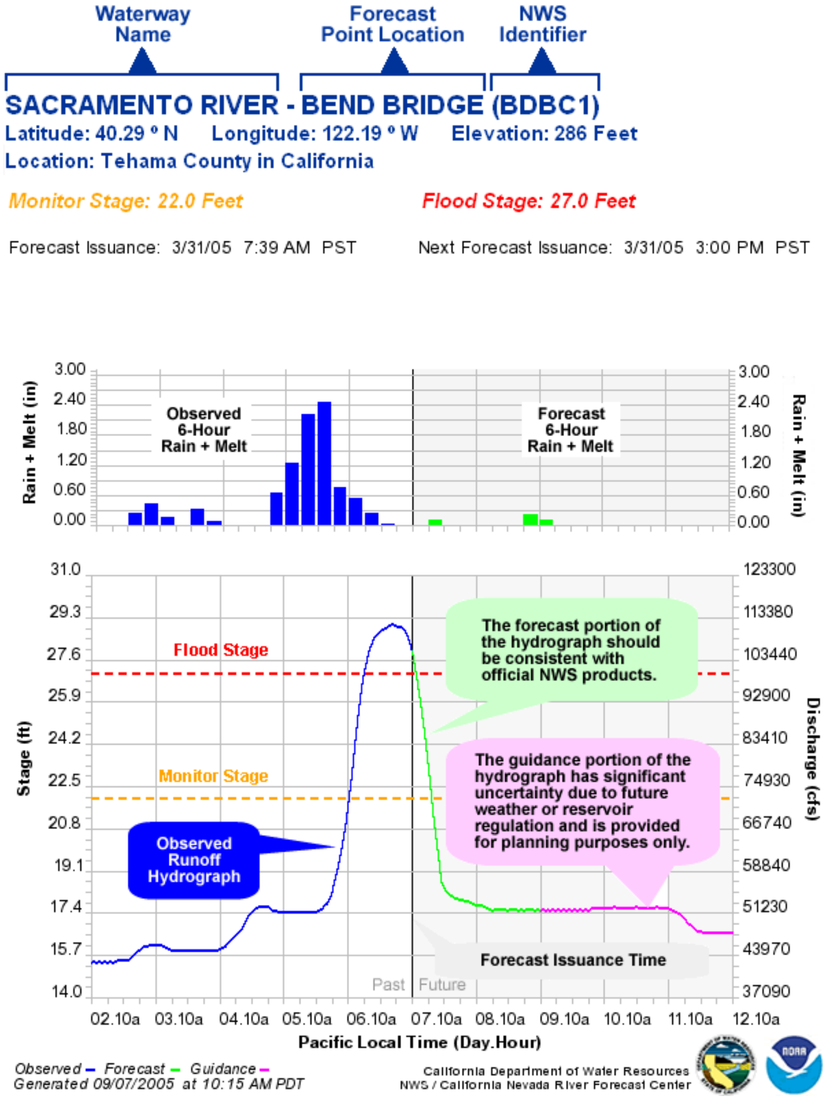
Graphical River Forecast - How to Use this Product

The graphical river forecast product is issued each morning and is updated as needed during significant runoff events. The information presented represents the output of the NWSRFS modeling system as adjusted by on-duty operational hydrologists. The forecast is specific for the river and location identified in bold letters across the top of the graphic. The monitor stage and flood stage for the specified forecast point location is located directly underneath the header. The forecast issuance time and the expected time of the next forecast are provided below the previous mentioned information.

The next graphic on the right depicts 10 days of rain plus snowmelt (rain+melt) in inches. Unless labeled otherwise, the values on this graph are reflective of the average over the entire watershed above this location on the river. The first 5 days are observed and the latter 5 are forecast. Observed rain+melt is computed from observed precipitation and air temperature. Forecast rain+melt is computed from forecast precipitation, air temperature, and snowline elevation.

The graphic below the rain+melt shows a total of 10 days of streamflow comprised of observed (blue), forecast (green) and guidance (magenta) periods. The axis on the left is stage in feet and the axis on the right is discharge in cubic feet per second (cfs). The observed period covers the past 5 days. Observed data are preliminary and subject to future change.

The future period also covers 5 days and is comprised of a forecast and guidance period. The duration of the forecast period varies from location to location and may vary from one flood event to the next. More predictable locations (and events) will have longer forecast periods; less predictable locations (and events) have shorter forecast periods. The information in the forecast period should be consistent with official products issued by NWS Forecast Offices.



The guidance period begins at the end of the forecast period and extends through 5 days. Guidance values may contain significant uncertainty due to future weather and/or reservoir regulation. Actual conditions may be significantly above or below those described in the guidance portion of the hydrograph.