ABRFC

National Weather Service
Arkansas-Red Basin
River Forecast Center
10159 E. 11th St.
Suite 300
Tulsa, OK 74128

www.srh.noaa.gov/abrfc

In This Issue

The Gage Staff

Diane Cooper ***Publisher***

James Paul ***Editor***

Recent Rains Easing Water Concerns in the West

By Diane Cooper

For the past few years, water supply has been a concern for those living in Western Oklahoma and Kansas as well as the Texas Panhandle, Northeastern New Mexico and Southeastern Colorado. Historical Palmer Drought Severity Indices (PDSI), which gauges the relative dryness or wetness of the soils for water sensitive economies, indicated that with the exception of 2002, much of the western sections of the Arkansas-Red Basin River Forecast Center (ABRFC) Basin have experienced some level of drought conditions since 2000. (Palmer drought information obtained from the Climate Prediction website at http://www.cpc.ncep.noaa.gov/products/monitoring_and _data/drought.shtml)

As 2004 draws to a close, what is the current water situation? For anyone who lives in these areas, it probably does not come as a surprise that conditions as of November 30th were moist to extremely moist for all areas except Southeast Colorado. But this description does truly describe just how wet the Red, Canadian and Washita River Basins (which includes New Mexico, the Texas Panhandle, and western Oklahoma) have been this past year, especially during the month of November. **Figure 1**, shows the cumulative rainfall from January 2004 through the end of November 2004 for the ABRFC Basin. As one would expect from climatology, the eastern half of the ABRFC Basin has received more rainfall than the western half. However, an anomaly is slightly evident from Tucumcari, NM to Childress, TX. When analyzing the Percent of Normal graphic, which is derived from the comparison of the actual precipitation to the PRISM Climatological precipitation data (**Figure 2**), the anomaly from Tucumcari to Childress becomes much more obvious where year to date precipitation amounts are at least 175% of normal. A secondary bulls eye of around 200% of normal also becomes evident to the west of Tucumcari. The telling graphic, however, is the Percent of Normal graphic for the month of November (**Figure 3**). The majority of the western ABRFC basin is at least 200% above normal while much of the Texas Panhandle, parts of New Mexico, and western Kansas and Oklahoma are over 500% above normal.

(Continued on page 2)

Photograph above shows Arkansas River near Leadville, Colorado.
The view is looking upstream of the gage and river is at 2.3 feet.

Picture Courtesy: Michael Boehmke, an ABRFC Hydrologist

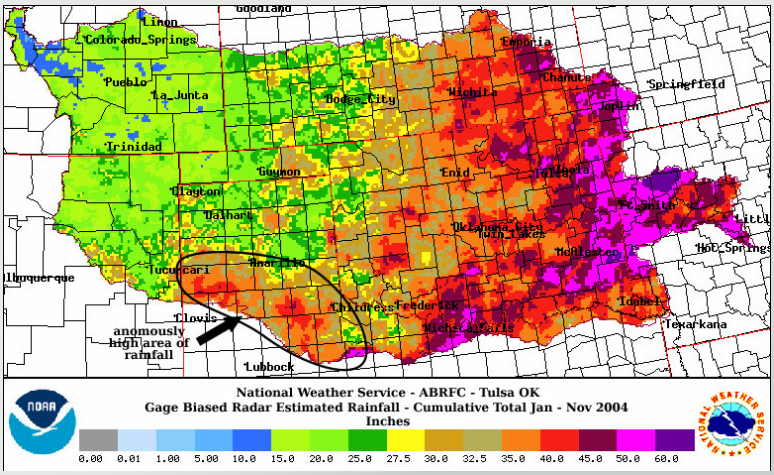
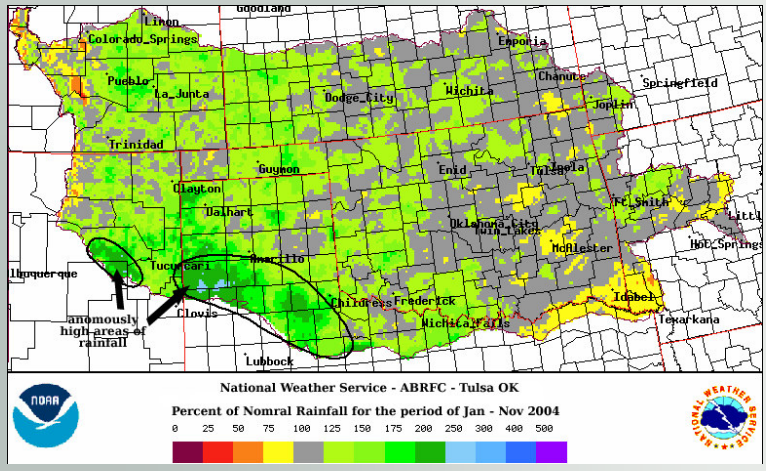


Figure 1 (Left): *Cumulative precipitation across the ABRFC Basin from January 1 through November 30th. This information is derived from a mosaic of Radar estimated rainfall and gage measured rainfall.*

Figure 2 (Right): *Percent of Normal Precipitation for the cumulative period from January to November of 2004. The yellow/gray areas indicate where normal precipitation amounts were received. The yellow and orange highlight areas of below normal precipitation and the green and blue indicate areas of above normal precipitation.*



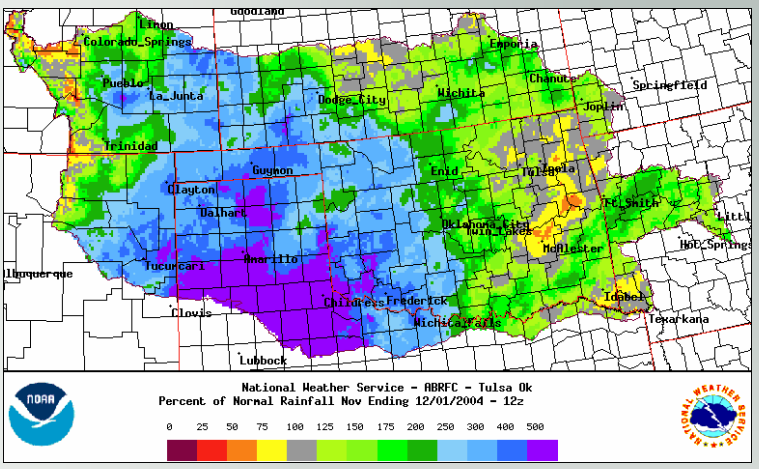


Figure 3 (Left): *Percent of Normal graphic for the cumulative rainfall for November 2004. Notice the large area of purple in Texas which represents greater than 500% of normal.*

(Continued from page 1)

With abnormally wet conditions already in place, what can be expected this winter, typically the driest time of year in this region? The most recent Climate Prediction Center (CPC) Winter outlook, released on November 18, 2004, indicates a weak El Nino is expected to continue into early 2005. This translates into expected wetter than normal conditions (**Figure 4**) and generally near normal temperatures. (**Figure 5**) for much of Oklahoma, Texas and New Mexico. The above normal rainfall will be welcomed as it will continue the recharge process in area reservoirs. For more information on the Winter Weather outlook, refer to http://www.noaanews.noaa.gov/stories2004/s2342.htm.

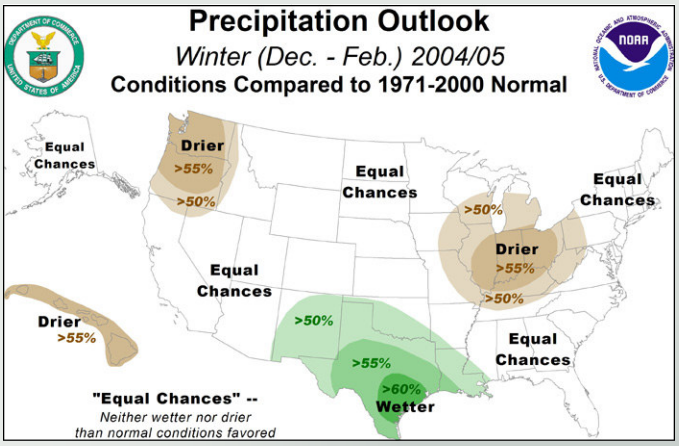


Figure 4: *Precipitation outlook for this winter.*

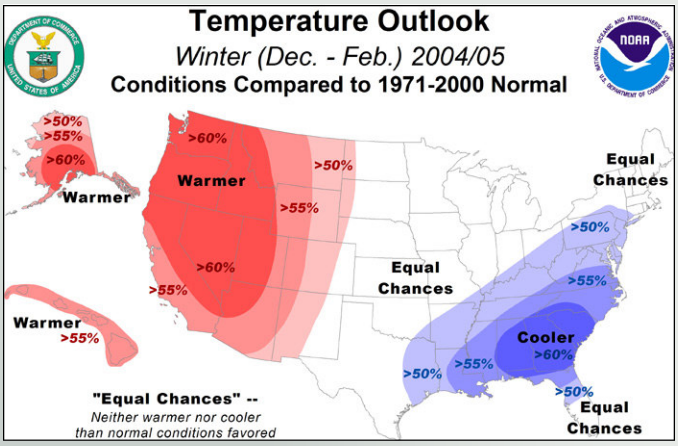


Figure 5: *Temperature outlook for this winter.*

ABRFC Staff Awarded the NWS Bronze Medal

By Diane Cooper

On December 2, 2004, ABRFC Operations Backup Team members were recently honored in Washington D.C. with a NWS Bronze Medal Award. The team consists of Michael Boehmke, Isaiah Daniels, Bill Lawrence, Jeff McMurphy, Billy Olsen, James Paul and Michael Pierce. The purpose of the team was to design, develop and implement an operational computer backup system for a River Forecast Center (RFC) in the event of a system failure of the operational system.

Prior to the formation of this team, the backup functionality available to the RFC's was, in many cases, not feasible due to the length of spin up and travel times to National Weather Service (NWS) headquarters. This issue was discussed at the 2001 Southern Region RFC Service Enhancement Technology Workshop and a team, spearheaded by ABRFC, was formed to find a solution. The first operational test was performed for ABRFC operations at a remote location in May of 2002. Since that first test, the system has proven itself useful during ABRFC Advanced Weather Interactive Processing System (AWIPS) outages. In the summer of 2003, ABRFC configured this system for the other Southern Region RFC's.

The basic operations of the RFC are run on a laptop with the capability to slave two additional laptops to accommodate additional forecasters. The backup system does not yet have the complete functionality of AWIPS; however, the critical products such as RVF's, HCM's, and FFG's can be generated and issued. Currently graphical products such as hydrographs and precipitation images are not created. However, the team is looking into possible methods to incorporate a graphical suite of products to the backup mode of operations.

Awaiting Award Ceremony Picture
from
NOAA Headquarters

Picture 1: *ABRFC Staff receiving the NWS Bronze Medal. Individuals shown: Jeff McMurphy, James Paul, Isaiah Daniels, Patrick Sneeringer (WGRFC), and Eric Jones (LMRFC)*

Updates to the ABRFC Website

By Ken Pavelle and Diane Cooper

ABRFC is continually enhancing its website to increase customer satisfaction and the availability of data. Several changes have been made during the past few months. In this edition of *The Gage*, some of these changes will be highlighted.

A **Quick Briefing** page has replaced the traditional Hydrometeorological Discussion. This page is "one-stop shopping" site for short term ABRFC hydrologic data. It shows river status in graphic and text form, 24-hour total observed rainfall, forecast rainfall for the next 24 hours, and COOP rain gauge reports. (See **Figure 1**).

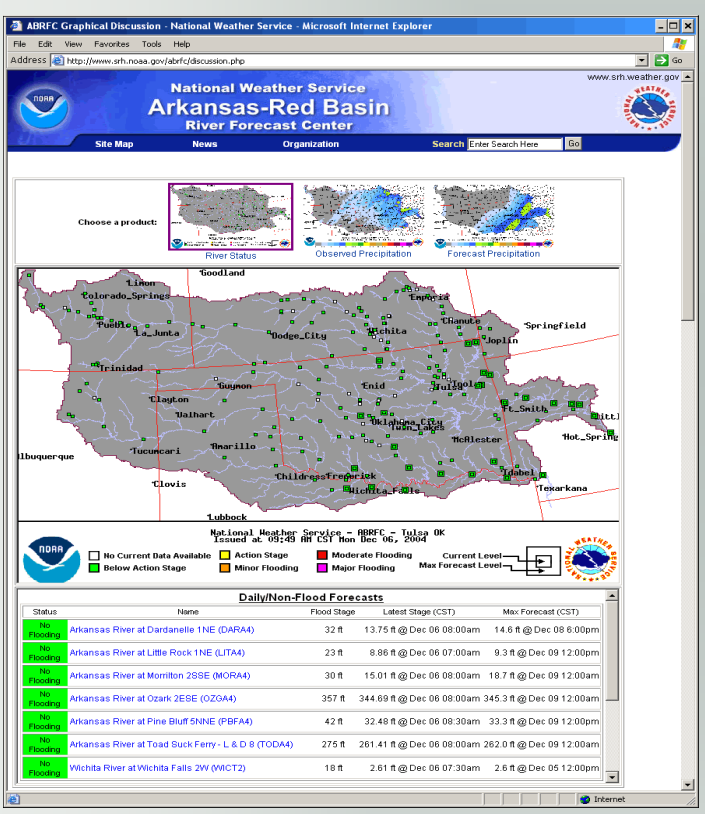


Figure 1: *An example of the "Quick Briefing" main page. The color coding of the Status box to the left of each forecast point on both the graphic and the table will change as current or forecast conditions warrant. Also, for locations which are only action/flood forecast points, their information will be added once forecasts are issued.*

The **precipitation pages** have been completely revamped, providing a standard look and feel for all ABRFC precipitation products. **Figure 2** shows an example of the new layout.

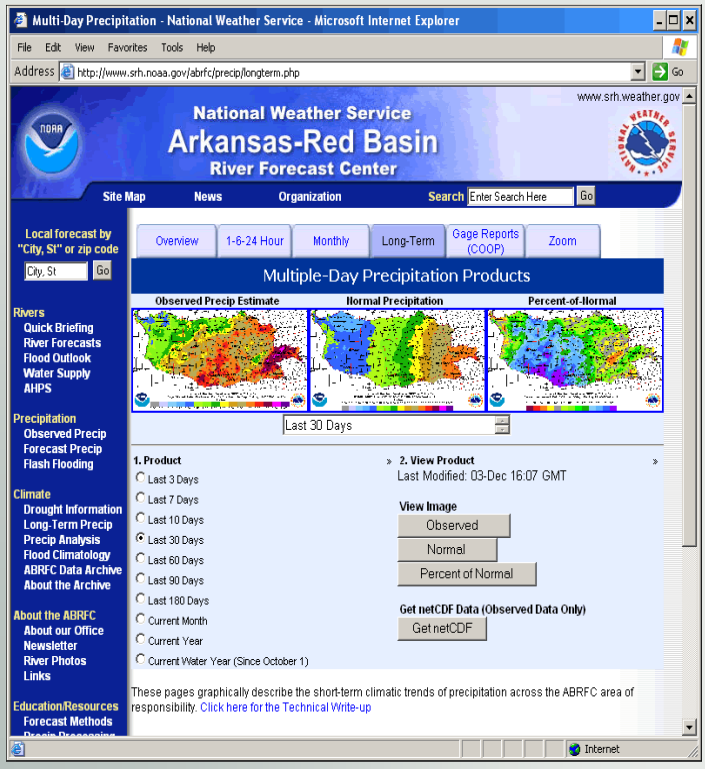


Figure 2: *"Long-Term Precipitation" page, with the new precipitation page layout. Each tab across the top of the page links to different options and precipitation data sets.*

Long-time ABRFC website users will remember the "**zoom tool**". That feature returns with a new, Java-based **"zoom"** applet. Once users select 1, 6 or 24-hour graphics, they can zoom in or out, making it easier to see the rainfall at the county or town level. Users can also choose from a variety of overlays, including state and county boundaries, towns, highways, and the RFC boundary. Note, Java must be loaded on the PC. (**Figure 3** shows an example of the precipitation zoom with the overlay options.)

Finally, the new **Illinois River Recreation Forecast** has been added**.** This forecast is generated based on the current and forecast stages and graphically indicates what floating conditions are expected, and the safety guidelines recommended by the Illinois River Association. (Please refer to the article entitled *Illinois River Recreation Forecast: An Experimental Product* on page 5 for more information and an example of this new product.)

Our goal is to serve you as best as we can. If you have any comments or suggestions, please email **SR-TUA.Webmaster@noaa.gov**.

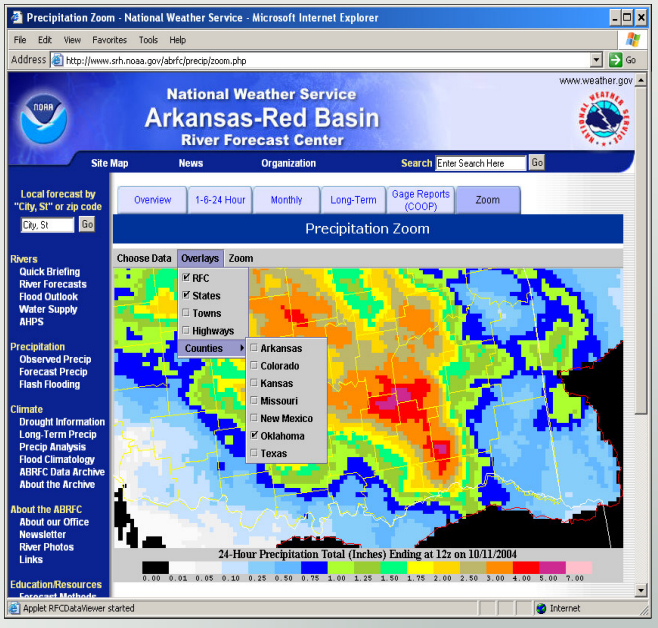


Figure 3: *"Precipitation Zoom" using the new Java-based tool. Users can zoom in to their area of interest, and choose which overlays to apply.*

Illinois River Recreation Forecast: *An Experimental Product*

By Diane Cooper

In August, ABRFC in cooperation with the Oklahoma Scenic River Commission (OSRC) began issuing the web-based Illinois River Recreation Forecast. (http://www.srh.noaa.gov/abrfc/recfcst) As an Oklahoma Scenic River, the Illinois River is very popular with canoeists and rafters. The forecast is derived from the flow information generated by the ABRFC river model and translated to a river floatability index value. The index is based on guidelines provided by the Illinois River Association.

The goal of the forecast is to better inform recreational interest groups of the expected river conditions to ensure a safe experience on the Illinois River. This product is also used by the OSRC as a tool in the decision process of when to halt the rental of canoes and rafts due to expected unsafe river levels. In addition, the OSRC attempts to warn campers of dangerously high water. The visual depiction of the correlated flow to index values helps these processes to be easier and more effective. It is also anticipated that several newspapers may offer this information in a weekly feature article to inform the public of desirable and undesirable days to enjoy the recreational opportunities on the Illinois River.

The forecast is divided into two sections of the river. The "Upper Reach" is upstream of Diamond Head Resort and the "Lower Reach" extends from Diamond Head Resort downstream into Tenkiller Ferry Lake. As the current and

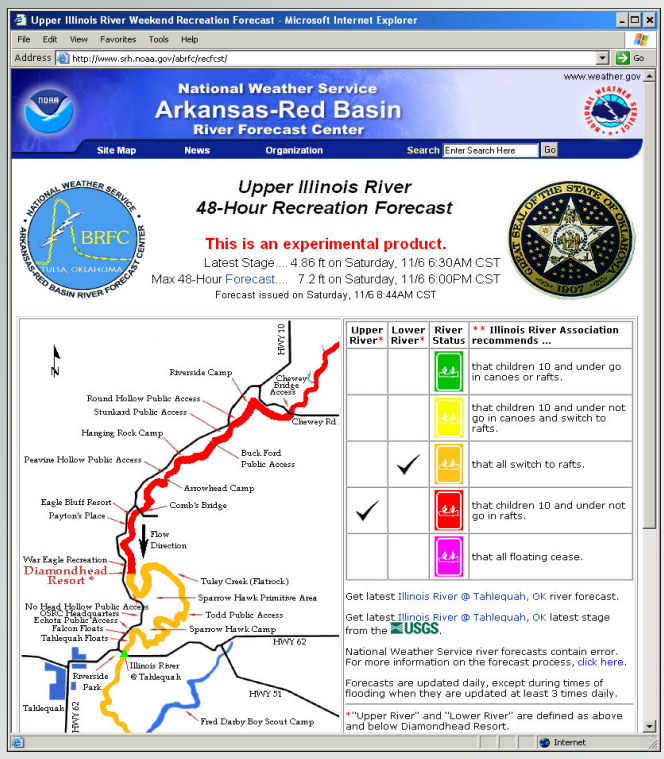


Figure 1: *Illinois River Recreation Forecast from November 6, 2004. Based on the conditions that day, the Illinois River Association guidelines recommended all floaters switch to rafts, and that children 10 and under not float the River above Diamondhead Resort.*

(Continued on page 7)

Hydrologic Distributed Modeling Project (HDMS)

ABRFC River Modeling Research

By Diane Cooper

For the past several years, ABRFC has teamed with NWS OHD (Office of Hydrology Development Lab) to test and calibrate a Hydrologic Distributed Model. This model has a finer resolution and time step than the current operational NWSRFS lumped model. The potential benefits of the HDMS model over the NWSRFS model are that the HDMS model runs on an hourly time step (rather than the current model at a 6 hour time step), it maintains the 4X4 km gridded precipitation inputs (rather than creating a basin averaged rainfall amount from the gridded precipitation), and it routes water from grid cell-to-grid cell (rather than using Unit Hydrograph Theory.) With the grid-to-grid routing technique, finer rivers and streams within the main basin can be resolved. Similar to the NWSRFS model, the HDMS model uses the Sacramento Soil Moisture Accounting Scheme (SAC-SMA) for the soil emulation process. However, as with the precipitation, the NWSRFS model has one value for each parameter on a basin scale, whereas the HDMS model can maintain a value per 4X4 km grid cell. This allows for finer resolution in indicating differences in soils and their localized responses, as well as the variation in soil moisture levels through time.

Recent statistical analysis of the calibrated HDMS model for the period of 1997 through mid 2004 at Corbin, KS (CBNK1) shows a 2.9% improvement of the overall flow when compared to the NWSRFS model. It also shows an improvement for the higher flow events, which are typically under simulated. In addition, the time to crest error shows a decrease. For example, in 2003, the NWSRFS model showed an average error of 10.1 hours, with most crests simulated too early. The HDMS model indicated an average error of 6.6 hours with most simulated events occurring too late.

Figure 1 shows a comparison of the flow output of the HDMS model and NWSRFS model to the observed flow. While, in this plot, the HDMS flow simulation does not show a perfect result, it does show improvement over the NWSRFS model, especially in the timing of the crest. However, the potential exists for improvement and additional functionalities such as forecaster interaction for real-time forecasting, incorporation of computed potential evaporation, and a variety of overlay options are identified for future upgrades.

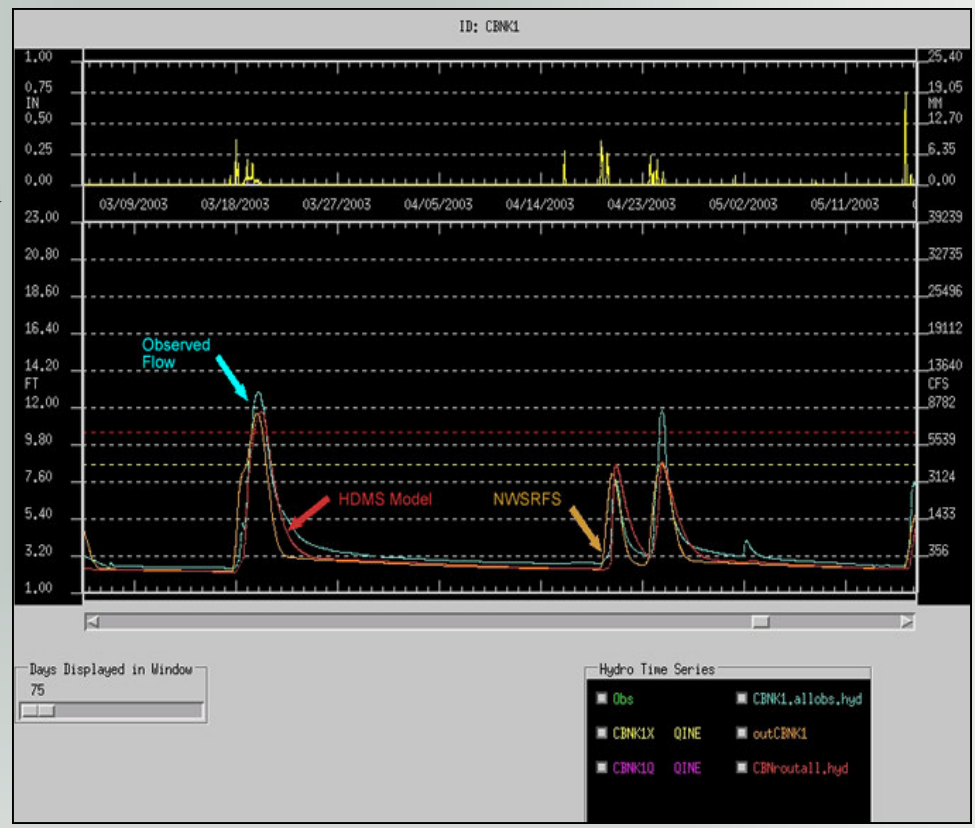


Figure 1: *A comparison of the HDMS Model flow (Red) to the NWSRFS Model flow (orange) and the Observed flow (aqua). (Note: the observed flow is courtesy of the USGS.) The plot along the top shows the hourly precipitation (yellow) . This time period in this graph is from 3/5/03 to 5/17/04.*

Illinois River Recreation Forecast (Continued)

(Continued from page 5)

or forecast flow level increases, the color code of the stream section changes to correlate to the recommendations from the Illinois River Association, located in the table in the upper right portion of the graphic. (A sample graphic is shown in **Figure 1**, on page 5)

Since this is an experimental product and not yet a permanent member of the suite of web-based products, user feedback is requested. Some comments received include: "This is a great tool, more people could definitely benefit from this site." (Tahlequah, OK) and "Appreciate the information." (Tulsa, OK). The feedback period continues through July 31, 2005. If you use this product or have a recommendation on how it could be improved, please complete the survey found on ABRFC's Recreation Forecast webpage (http://www.srh.weather.gov/abrfc/recfcst/cust_survey_recfcst.php) If you have other comments and ideas, you can send then via email to billy.olsen@noaa.gov or to

Arkansas-Red Basin River Forecast Center
10159 East 11th Street, Suite 300
Tulsa, OK 74128
Attn: Billy Olsen.

The Gage Publication Procedure is Changing

In an effort to reduce costs, this will be the last paper copy publication of *The Gage*. In the future, the newsletter will only be published in an electronic format and posted on the ABRFC website at www.srh.noaa.gov/abrfc. If you would like to receive an email notification of the newsletter postings, please sent your email address to diane.cooper@noaa.gov with "*subscribe newsletter*" in the subject portion of your message.

Acronyms in this Edition

* **ABRFC**– Arkansas Red Basin River Forecast Center
* **AWIPS**—Advanced Weather Interactive Processing System
* **COOP**— Cooperative Observer Program
* **CPC**—Climate Prediction Center
* **FFG**—Flash Flood Guidance
* **HCM**—Hydrologic Coordination Message
* **HDMS**—Hydrologic Distributed Modeling System
* **PDSI**—Palmer Drought Severity Index
* **PRISM**—Parameter-elevation Regressions on Independent Slopes Model
* **NWS**—National Weather Service
* **NWSRFS**—National Weather Service River Forecasting System.
* **OHD**—Office of Hydrology Development Lab
* **OSRC**—Oklahoma Scenic River commission
* **RFC**—River Forecast Center
* **RVF**—River Forecast Product
* **SAC– SMA**—Sacramento Soil Moisture Accounting Scheme
* **USGS**—United States Geological Survey.

National Weather Service — ABRFC
10159 E. 11th. St. Ste 300
Tulsa OK 74128

In This Issue