Low Flow Probabilistic Forecast

Part I - Mission Connection

a. **Product Description:** Currently the National Weather Service (NWS) River Forecast Centers (RFCs) and Weather Field Offices (WFOs) produce a wide variety of river forecasts, which indicate current and future river conditions. The experimental Low Flow Probabilistic Forecasts prepared by the North Central River Forecast Center (NCRFC) will be issued as Web page graphics. The graphics will be for the NCRFC's area of responsibility. They will be issued once a month (after the Climate Prediction Center (CPC) outlooks are released at mid-month). They will cover the three month period after the issuance (for example, graphics released around May 26 will cover June-August period).

b. **Purpose:** A wide variety of water users need more information than is currently conveyed with the existing AHPS set of products. They need the overall water outlook over an extended period, such as, how low can the river go, what will be the flow of water, etc. A general hydrologic outlook for a river basin can be produced which can be used by the water managers to aid in their decision making process.

c. **Audience:** This forecast graphic is targeted at partners and regional customers, such as, the US Army Corps of Engineers, the US Geological Survey, Federal Emergency Management Agency, state Emergency Managers (EMs), and river authorities with areas of responsibility over several states. Water resources managers and climatologists will find the low flow information useful for drought monitoring and climatological applications. Local EMs and the general public may also find this forecast useful.

d. **Presentation Format:** The Low Flow Probabilistic Forecast graphic is presented on a map with NCRFC's area of responsibility. Forecast points along the rivers are indicated by "clickable" dots. The graphic has stage/flow on the y-axes and probabilities on the x-axis and the period of validity is three months. The detailed explanation of this graphic is provided for the user(s) through a button ("About") on the page. The graphic is located at: http://www.crh.noaa.gov/ncrfc/ahps/ESPMAPS and at selected WFO web sites, such as, http://www.crh.noaa.gov/ahps/nonexceed.php?wfo=lsx&shef=lusm7

e. **Feedback Method:** Comments regarding this graphic are sought through the feedback link on the webpage or they may also be sent to:

North Central River Forecast Center
17733 Lake Drive West
Chanhassen, MN 55317
Attn: Dan Luna
daniel.luna@noaa.gov

An online survey is also available on this page.
Experimental Feedback Period: March 15, 2005 through May 15, 2005

Part II - Technical Description

a. **Format and Science Basis:** NCRFC runs the Ensemble Streamflow Prediction (ESP) component of the National Weather Service River Forecasting System to generate long term probabilities. The Conditional Simulation (CS) uses recorded historical climate data for the specified forecast period along with the basin's current conditions (soil moisture, snow cover, etc.), as input to the hydrologic model. The simulation also may include official meteorological and climate outlooks up to three months into the future. Individual simulated hydrographs (or traces) for each annual climate scenario. The CS nonexceedance probability curve is generated using the minimum stage or flow value from each year's conditional trace to determine the chances that the river will fall below a given level, such as minimum levels required for water supply or navigation. Each probability value on the x-axis has an associated flow or stage value on the y-axis. This information can be used to assess the likelihood of falling below levels of interest during the forecast period, based on current conditions. The conditional probability curve will change as initial basin conditions change or as the forecast period changes. The Historical Simulation (HS) uses the historical climate data as inputs to the hydrologic model, but is run continuously starting at the beginning of the period of record and sequentially through subsequent climate years, unlike the CS which reinitialized the model each year with the current basin conditions.

A comparison of the CS and HS can indicate dryer or wetter conditions than normal. For example, if the current conditions are drier than normal, then the associated stage or flow values for the conditional probability curve will be lower than the values associated with the same historical probabilities, and the conditional curve will plot below the historical curve.

b. **Product Availability:** The Low Flow graphics will be produced and sent to the web on a monthly basis, shortly after the middle of the month. The graphics are located at: http://www.crh.noaa.gov/ncrfc/ahps/ESPMAPS and at selected WFO web sites, such as, http://www.crh.noaa.gov/ahps/nonexceed.php?wfo=lsx&shef=lusm7

c. **Additional Information:** Contact Dan Luna (daniel.luna@noaa.gov) or John Halquist (john.halquist@noaa.gov) at NCRFC (phone 952-361-6650).