

NWS Hydrologic Forecasting Improvements Making Waves

From predicting the potential for Spring flooding in the United States to introducing advanced hydrologic forecasting tools in places like Iowa and Egypt, NOAA's National Weather Service (NWS) is demonstrating the value of more informative forecasts for protecting lives and property and contributing to the nation's economy.

Why are hydrologic forecasting efforts important? As forecasts improve, people have more time to take appropriate actions to protect themselves and their property. Three-quarters of all presidentially declared disasters are the result of flooding. In an average year, more than 130 people are killed by flooding and flash flooding and damages exceed \$3.5 billion.

Hydrology and the modernized NWS

"With much of the modernized Weather Service technology now in place, we're starting to reap the benefits of more and higher quality weather and climate data," said John Ingram, program manager for the NWS Advanced Hydrologic Prediction System (AHPS). The system represents a combination of software and hardware tools used for analyzing data and creating graphical displays of probability forecasts. AHPS builds upon NOAA's modern technologies, i.e., Doppler weather radars, geosynchronous satellites, supercomputers, automated weather observation stations and the new interactive weather computer and communications system workstations known as AWIPS.

"Within AHPS, we're coupling National Weather Service weather and climate forecasts with hydrologic numerical models to provide a suite of hydrologic forecast products from days to months into the future," Ingram said.

As new hydrologic forecasts evolve, users will begin to see existing short-term text-only forecasts for a few days supplemented by text and easier to understand graphical products for forecast periods out to several months in the future. "Graphical products

really present a better picture for emergency managers and other users to make informed decisions about pending floods or droughts," Ingram added.

Demonstrating AHPS in Des Moines

The NWS has been operating AHPS for the Des Moines River Basin, Iowa since March of 1997. Following the Great Flood of 1993 in the Midwest, the Des Moines basin was chosen as a first phase toward a national implementation of AHPS. Longer-range forecasts resulting from AHPS advanced modeling will help ecosystem managers, farmers, emergency managers, and many other water users prepare for the impact of events ranging from droughts to floods. Once it is eventually implemented across the nation, AHPS will include probability estimates of future precipitation as well as account for precipitation already on the ground to provide forecast enhancements especially important during critical flood situations.

The payoff of hydrologic forecasting

Better hydrologic forecast methods promise to contribute considerable value to the U.S. economy. In a study conducted at the onset of the NWS modernization, the Commerce Department's National Institute of Standards and Technology (NIST) found that a significant portion of the value realized from the modernization would come from advances in predicting the availability of water resources for the country.

Implementing better short- to long-term hydrologic forecasts resulting from the AHPS system will mean improvements in operating efficiency for dams, better water yields for crop irrigation and hydroelectric power, benefits for river navigation and commercial shipping. If implemented nationwide, these benefits to the economy could total more than \$600 million annually.

Proving the technology internationally

Several other nations are already sold on the capabilities of NWS hydrologic forecasting, said Curtis Barrett, project manager for the NWS Hydrologic Technology Transfer Center in Silver Spring, Md.

"For several years we've been sharing our latest river forecasting techniques with Egypt and China, helping those countries better manage their water resources and improve their ability to forecast floods and droughts," Barrett said. With funding from the U.S. Agency for International Development, a state-of-the-art system to monitor, forecast and simulate flows for the Nile at the High Aswan Dam promises to help Egypt make best use of its water resources and anticipate future availability of water based on the potential for droughts or floods.

Once the short- to long-range forecasts resulting from AHPS are available throughout the United States, this country will also be in a better position to make the best use of its water resources.

"Water users are raising the need for both short- to long-range forecasts which effectively couple weather, water and climate information," Ingram said.

The NWS FY2000 Budget Request includes \$2.2 million to begin National implementation of AHPS in the Upper Midwest (which includes Wisconsin, Minnesota, Michigan, Illinois, and portions of Iowa, Missouri, and North Dakota) and tributaries within the upper Ohio River basin (which includes Kentucky, West Virginia, Ohio, and western Pennsylvania).

Examples of AHPS forecasts for the Des Moines River basin are available on the web at <http://www.crh.noaa.gov/dmx/ahps>

Further information on AHPS may be obtained at: <http://www.nws.noaa.gov/oh/ahps> and by e-mail, AHPS@noaa.gov