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### Water Predictions for Life Decisions

Cheat. Youghiogheny. New River. Snake. Colorado. Yuba. Salmon. Names engraved on the minds of white water enthusiasts and kayakers evoking thoughts of thrilling adventure and excitement.

Riding the swirling waters or navigating around a standing wave are exciting ways to enjoy the great outdoors. Swollen rivers from rain, melting snow or scheduled dam releases provides exciting white water rides. Increased river heights produce a faster, more powerful flow. The character of a river changes depending on the height of the river and the shape of the channel. Deep water moves at a different rate of speed than shallow water.

For the white water enthusiast, the big question is, how much water will there be? How much water will there be in the next hour, the next day, the next weekend, the next month? Where is the water coming from? Where will it go? Is a drought looming ahead or are we primed for a flood? How certain is the National Weather Service (NWS) prediction? The Advanced Hydrologic Prediction Services (AHPS) can answer many of these questions.

AHPS is the next generation of hydrologic forecasting. It is revolutionizing many of the ways the NWS does hydrologic business. AHPS is a comprehensive hydrologic forecasting infrastructure sharing resources with many government and private-sector agencies. AHPS relies on a vast streamgaging network, including those of the U.S. Geological Survey, to receive the latest river conditions. The NWS takes advantage of NOAA's Doppler weather radar, satellites, and highly evolved observation, processing, and communication systems to produce the most advanced hydrologic forecasts to date. AHPS provides more river and flood information than previously available, giving a heads-up to recreational users allowing them to prepare more efficiently for floods, flash floods and droughts and every hydrologic condition in between.

*"To the people of the world, it sounds like witchcraft,"* says John Ingram, program manager for AHPS at the NWS Office of Hydrologic Development *"But we are going to be providing forecasts days, weeks, months, even a season into the future."*

AHPS results in one critical benefit; better and more timely river and flood information, which is the single most important factor of critical decisions affecting our economy and our safety. AHPS provides those who use, or live near, rivers the information needed to make wiser decisions. It allows the outdoor enthusiast to take better advantage of a river's flow for maximum enjoyment or avoid danger when a river is expected to be perilously high. This kind of pin point river forecasting is no longer wishful thinking. It is happening now. AHPS is being implemented in phases in the Ohio River Valley and north central United States where many are already reaping benefits.

Flooding returned to the upper Midwest in the Spring of 2001 as rainfall combined with melting snow forced rivers out of their banks. While there were damages and evacuations, unlike the

Great Flood of 1993, this time, citizens were better prepared because of AHPS. *“In many communities, water levels have risen well above flood stage and were headed for the record levels that proved disastrous in 1993. But officials said river towns have had more time to prepare this year.”* National Public Radio, 4/19/01.

The amount of water in a river changes with the weather. Hydrologic prediction determines how much water will be delivered and where it will go. This allows for the prediction of floods and droughts, but also for wise management of water resources for recreation.

Perhaps one of the best examples of partnerships and timely reservoir releases for the white water community is with the USACE in Huntington, WV. Congressional authorization has been granted to the USACE to release water from the Summersville Lake, located in central West Virginia, for white water usage based on water availability. Annual planning meetings are held between the USACE and the white water community to discuss future requirements and needs.

Reservoir and dam operators are challenged with the difficult task of knowing when to release or retain water. Augmenting river flow is driven by seasonal weather and river quality conditions. Striking a proper balance to satisfy the eco-system for fish and wildlife, hydro-electric power requirements, transportation, irrigation and recreational usage is no easy task. *“There is a thin line for error,”* said Timothy Curran, a U.S. Army Corps of Engineer (USACE) hydraulic engineer located in Huntington, WV.

Today’s NWS river forecasts predict the changing river levels over multiple states, with forecasts of up to three days. AHPS long-range forecasts will provide users like the USACE, and other water management agencies, new tools to optimize better reservoir releases and aid in more equitable releases of dam-controlled rivers days and even months in advance.

AHPS provides a range of information for planning white water events. AHPS allows for more detailed short-term warnings of smaller river basins to mitigate flash flood hazards. AHPS also provides a better handle on knowing what the river conditions will be like days or weeks in advance to plan for an optimum weekend river run. The result will allow white water events directors to keep abreast of short-range and long-range river conditions for current and upcoming festivals, races and white water rodeos.

*“We have an opportunity now to show how well AHPS works with other new technologies being incorporated into our forecast and warning programs. We’re very excited about the benefits all these technologies bring to our jobs of watching [and predicting] the weather,”* said Brenda Brock, Meteorologist-in-Charge, NWS Forecast Office in Des Moines.

A key feature of AHPS is probabilistic forecasting. Each day, the American public makes life decisions based on the local weather forecast. The chance of rain in a weather forecast, expressed in percentages, provides a confidence factor to the public which is used for daily planning. Soon, river heights and crests will be forecasted the same way. Known as probabilistic forecasting, river forecasts will provide the white water enthusiast a confidence factor. They will be able to look at the forecast, determine the probability a river will reach a certain level at a specific location and make life decisions accordingly.

And there is more. To integrate technology, the NWS is transitioning from text to a web base format. The most visible difference of an AHPS forecast is the way information is presented. In place of black-and-white text-only products, AHPS information is presented graphically, using an array of colors, fonts and styles.

*“It’s a lot easier to look at a picture sometimes and get the data off it, rather than trying to sift through all the text and the acronyms and everything else...You can look at a picture and figure out what the timing is and what the crest level is, and then go...”* (Robert Goldhammer, Emergency Manager, Polk County, Iowa).

Easy to understand and accessible via the Internet, AHPS products are beneficial not only to the local emergency officials but to river enthusiasts and the general public. Maps and other information will be produced in common GIS format and distributed through the Internet and other modern forms of communication. One to five day graphical forecasts of river heights will be employed nationwide by 2003. AHPS will become fully functional in the rest of the country as additional resources become available.

Mark Twain said, *“The face of the river, in time, became a wonderful book . . .And it was not a book to be read once and thrown aside, for it had a new story to tell every day.”* The NWS is writing new chapters in the way its prepares and disseminates hydrologic predictions.

River recreationists desiring to learn more about AHPS, should visit the NWS at their web site: [www.nws.noaa.gov/water](http://www.nws.noaa.gov/water). The NWS wants to be customer driven. To voice your comments and suggestions about AHPS send an email to: [hsd.ahps@noaa.gov](mailto:hsd.ahps@noaa.gov).

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