

Overview of MARFC Probabilistic River Forecasts

November 2006

Ned Pryor

Joe Ostrowski

Short and Long Term AHPS Ensemble Products

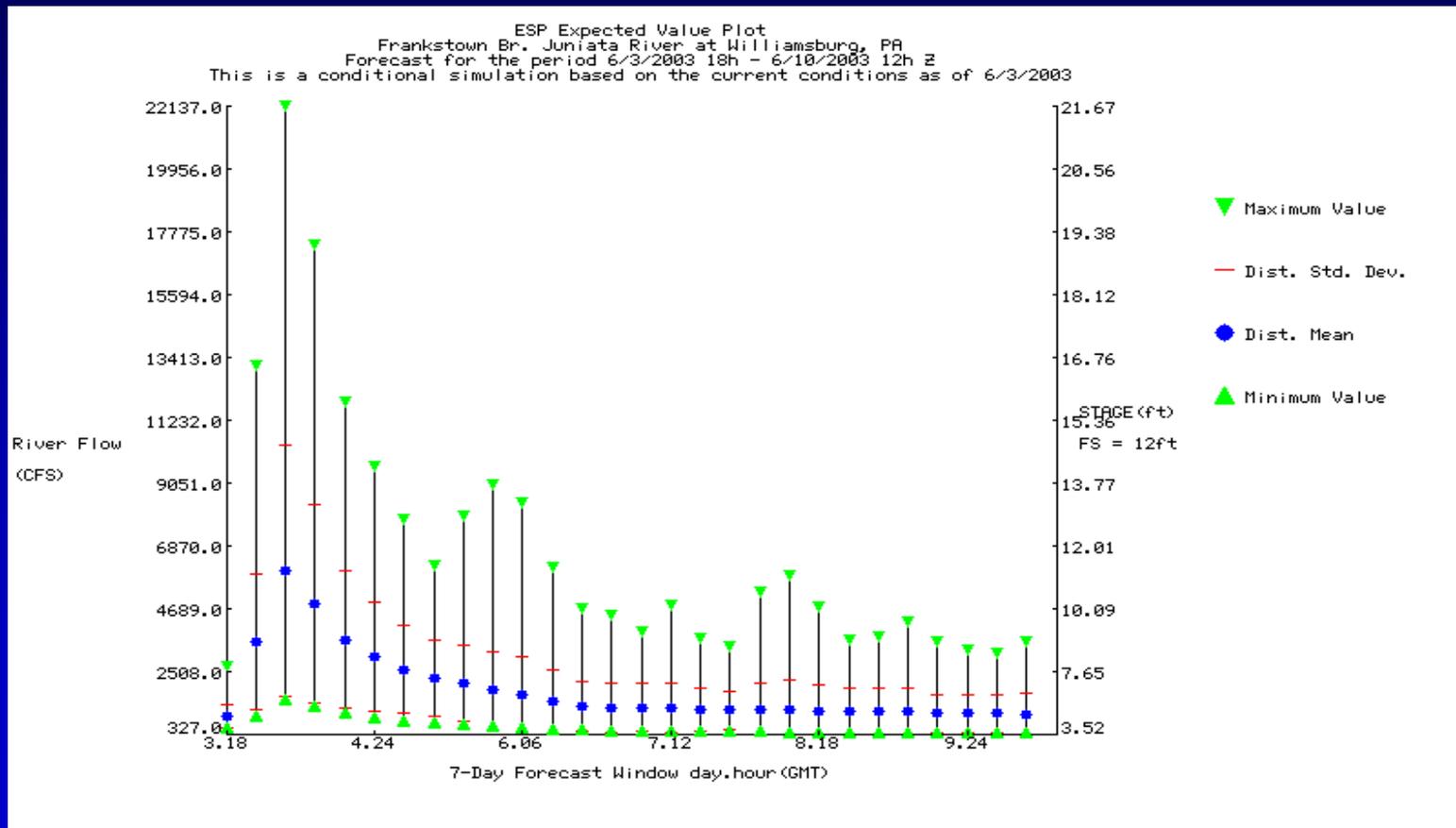
- 7-day probabilistic products
 - 18 test basins....issued daily
- 30-day AHPS products
 - 150 points...issued weekly
 - Conventional AHPS graphics
 - Inflows to reservoirs
 - Spring Flood Outlooks

Typical Product

- DAILY RIVER AND LAKE SUMMARY
- NATIONAL WEATHER SERVICE STATE COLLEGE PA
- 953 AM EST THU FEB 10 2005

•	: STATION	FLOOD	8AM	24-HR	7AM	7AM	
•	: ID	NAME	STAGE	STAGE	CHANGE	FORECAST	/COMMENTS
•	:					FRI	SAT
•	:						
•	:	WEST BRANCH SUSQUEHANNA RIVER					
	ROVP1:	RENOVO	16:	3.3/:	1.1:	5.0/	4.4/:
	LHVP1 :	LOCK HAVEN	21:	9.1/:	0.5:	10.2/	10.0/:
	WILP1 :	WILLIAMSPORT	20:	4.7/:	1.8:	7.5/	6.8/:
•	:						

7-Day Expected Value Plot



7-Day Probabilistic River Forecasts

- Current Basin Conditions
- Short term probabilistic precipitation and temperatures (PQPF/PQTF)
- 48-hour PQPF merged with 5 days of climo
- QPF scenarios based on comparison of historic forecast and observed MAPs
- 3 graphics generated daily for 18 basins in PA-Juniata (CTP) and Schuylkill (PHI) Basins

Operational Steps

- Automated process run off cron on Linux workstation
- Transfer mods from operational FGROUP to test FGROUP
- Save Carryover
- Determine and insert start/end dates in PQPF control file

Operational Steps (cont'd)

- Run fcst_ens_compu script to generate PQPF/PQTF time-series
- Run FSCT/ESP for the FGROU
- Generate 3 ESPADP graphics for each segment using ESPADP in batch mode
- Transfer graphics to ER AHPS server
- Archive

WFO CTP AHPS Page

National Weather Service Advanced Hydrologic Prediction Service - Microsoft Internet Explorer

Address: <http://ahps.erh.noaa.gov/cgi-bin/ahps.cgi?ctp>

Search

Local weather forecast by "City, ST"

National Conditions
 Rivers
 Satellite
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Local Conditions
 Warnings
 Weather Forecast
 Radar

What is AHPS?
 Facts
 Our Partners

How are we doing?
 Feedback

ALERT! A Urban And Small Stream Advisory is in effect for portions of the area. [View all valid statements/warnings](#) or choose a specific point or river to get the details for that location.

Updated 12:30 PM EDT Aug 27 2003

Click on a point or river on the map or select from the menus below.

- Tioga River -
- Cowanesque River -
- West Branch Susquehanna
- First Fork Sinnemahoning C
- Sinnemahoning Creek -
- Kettle Creek -
- Bald Eagle Creek -
- Pine Creek -
- Loyalsock Creek -
- Frankstown Branch Juniata f
- Little Juniata River -
- Juniata River -
- Raystown Branch Juniata Ri
- Aughwick Creek -
- Susquehanna River -
- Penns Creek -
- Sherman Creek -
- Conodoguinet Creek -
- Yellow Breeches Creek -
- Swatara Creek -
- Conestoga River -
- Conewannan Creek -

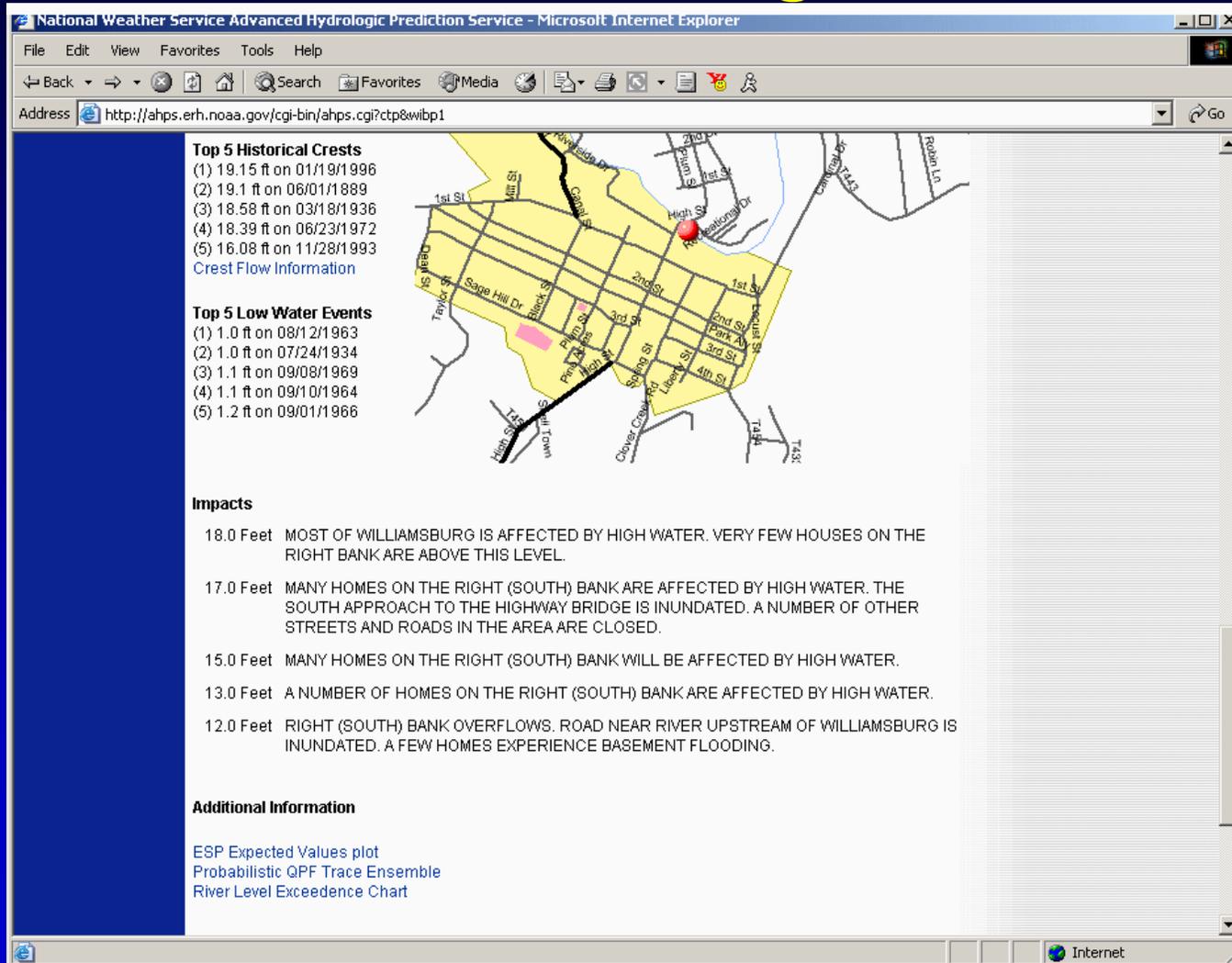
Map Legend

- or ■ at or above Flood Stage
- or □ high water, below Flood Stage
- or ■ below Flood Stage
- ⊙ or ⊠ observation more than 12 hours old
- ⊙ or ⊠ neighboring area point
- A square indicates that hydrograph information is available
- A circle indicates that both probability and hydrograph information are available

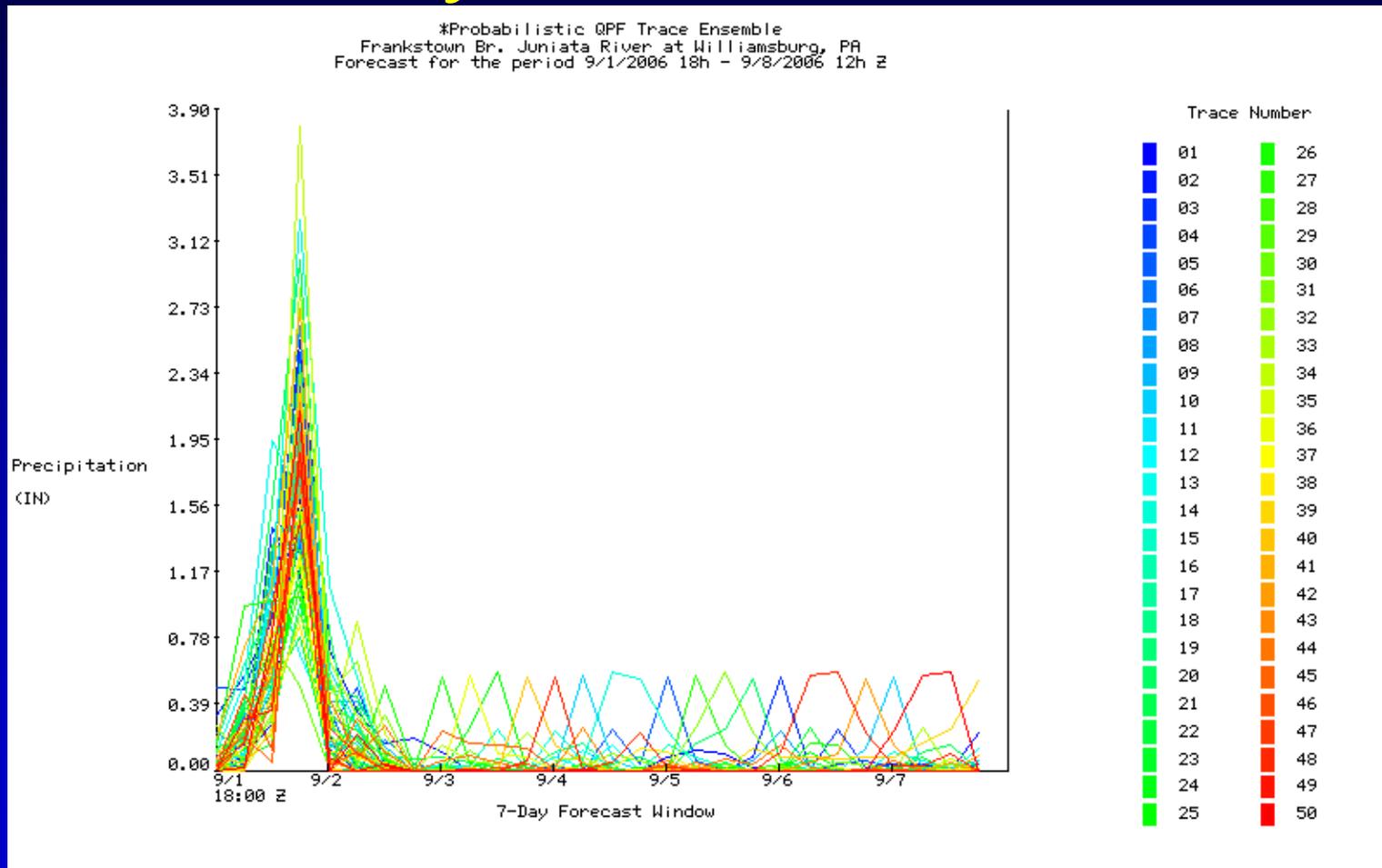
EXPAND VIEW

Internet

Frankstown Br. Juniata River at Williamsburg, PA



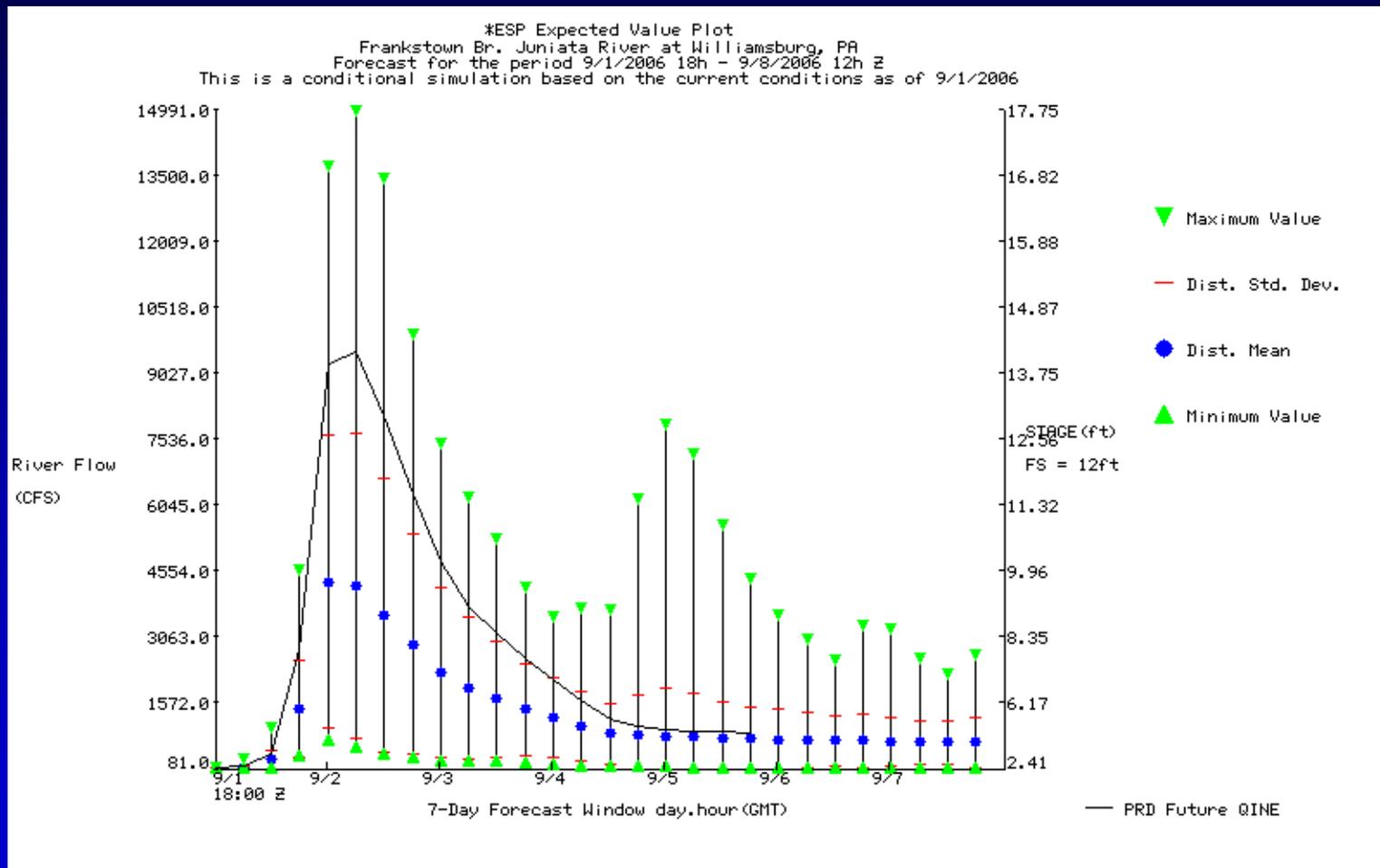
7-Day PQPF Traces



November 2006

NWS/NOAA

7-Day Expected Value Plot



MARFC GUIDANCE

RIVER STAGE FORECAST
MIDDLE ATLANTIC RIVER FORECAST CENTER
STATE COLLEGE, PA
1052 AM EDT FRI SEP 1 2006

:Williamsburg – Frankstown Branch Juniata River
FLOOD STAGE 12.0

.A :CREST: WIBP1 0902 E DC0609011052/DH20/HGIFFX 14.3

.E WIBP1 0901 E DC0609011052/DH14/HGIF/DIH6

:QPF FCST 8AM 2PM 8PM 2AM

.E1 :0901: : :/ 2.6/ 2.8/ 3.9

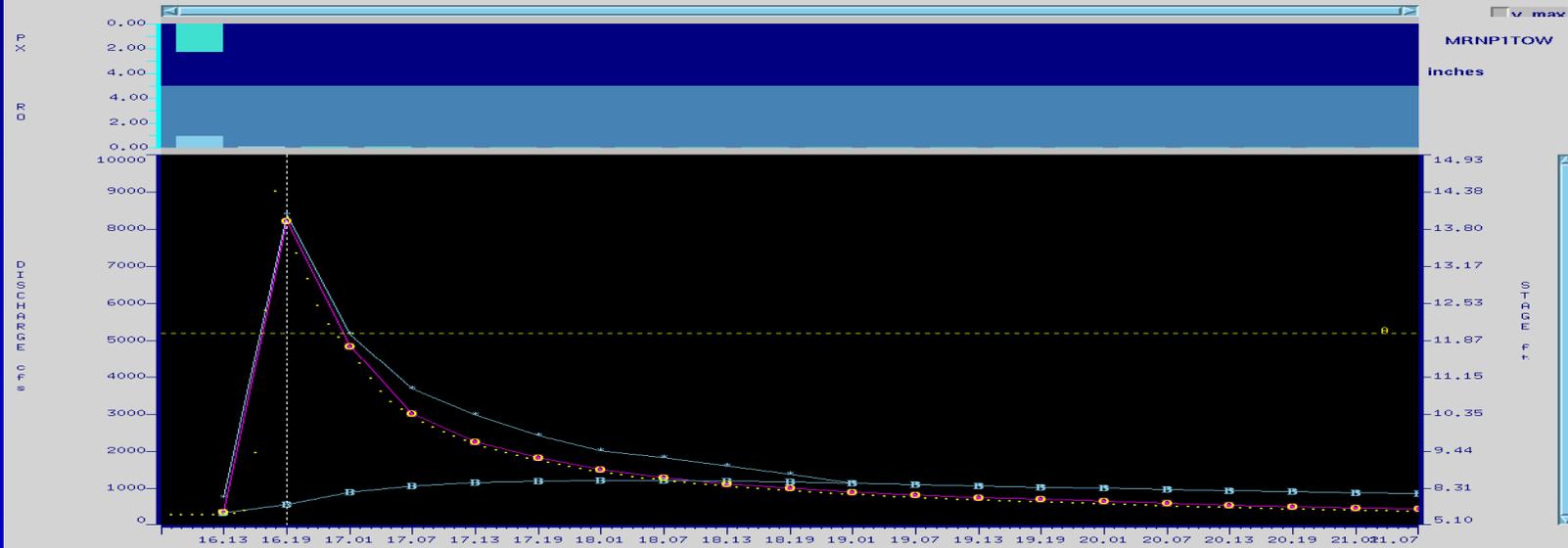
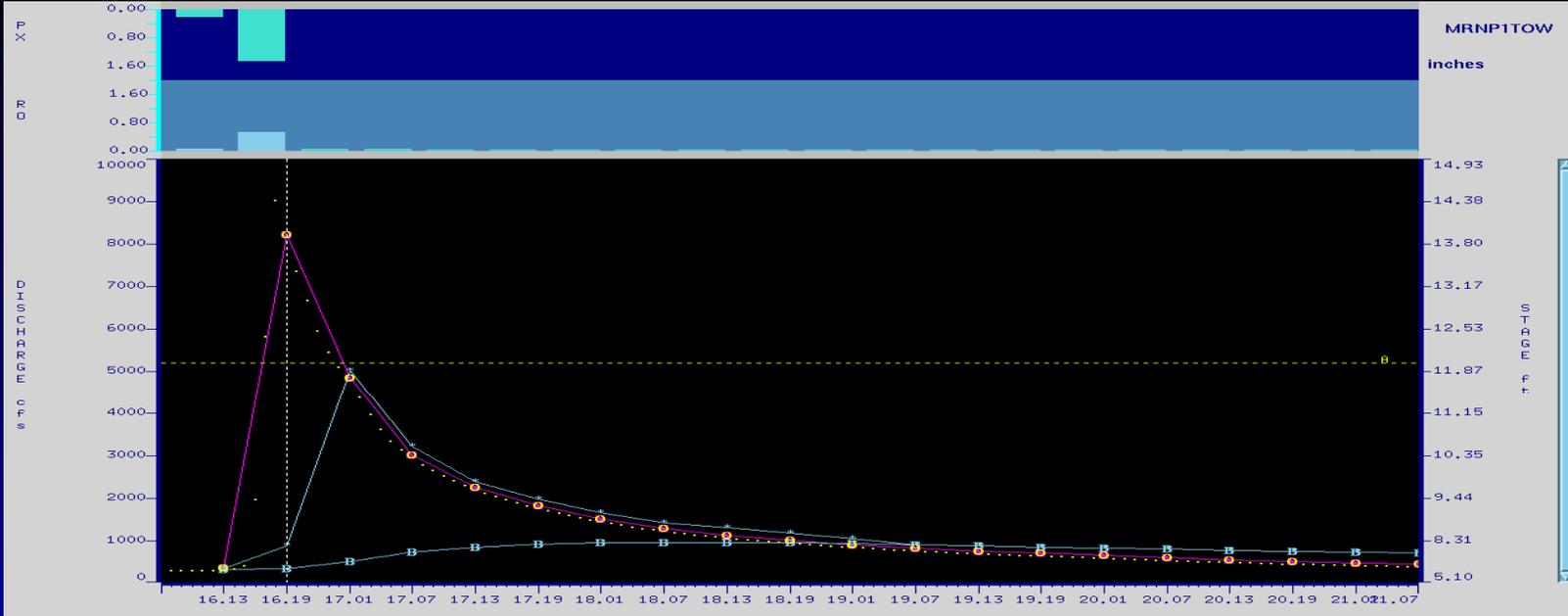
.E2 :0902:/ 8.0/ 14.0/ 14.3/ 13.1

.E3 :0903:/ 11.6

:Remarks CREST 13-15 FT SATURDAY EVENING

Other Uncertainties

- Rainfall Distribution
- Rainfall Intensity
- Snow conditions/melt
- Routings
- Rating Curves



11/2006 EST

Horizontal Scale: 1

Vertical Scale: 1

MRNP1TOW.QIN (C) MRNP1.QIN (C) MRNP1T.QIN (T)
 MRNP1TOW.QINE (Q) TOTL.FLOW.SQIN (C) BASEFLWG.SQIN (B)

undo time series change

Next Steps

Verification

- 5 years of archived forecasts
- Hindcasting
- Potential to expand forecasts to other areas

Customer Support

- Continue to solicit feedback from users
- Assist HSAs with explanation of product content and potential utility

Next Steps

SUNY Stony Brook Proposal to OHD
investigate meso scale WRF ensembles
as input to hydro models

Lessons Learned

- Short-term probabilistic software runs reliably without forecaster intervention
- 7-day PQPF forecasts are good contingency forecasts
- Help describe a range of outcomes that address “What if...” questions
- Need verification to confirm the validity of the products

Lessons Learned (con't)

- Wide range of potential river responses is not always pleasing...depicts the difficulty in forecasting precipitation
- Current technique does not address significant hydrologic modeling uncertainties
- Probabilistic forecasts seem most useful when there is time for deliberation

Lessons Learned (con't)

- Limited user feedback in part due to difficulty in finding products on web page
- Specifics of methodology are difficult to convey

Longer Term Probabilistic Forecasts

- Traditional 30-day ESP forecasts
- 150 basins
- 18 reservoir inflow forecasts
- Generated weekly
- “Basic” AHPS requirement
- Spring Flood Outlooks

MARFC Home Page

National Weather Service - Middle Atlantic River Forecast Center - Microsoft Internet Explorer

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Address <http://www.erh.noaa.gov/er/marfc/> Go

Forecast Products
AHPS
River Forecasts
Significant Flood Outlook
Spring Flood Outlook
Hydromet Discuss.
Flash Flood Guidance

Our Rivers
Current Stages
River Basins/
Forecast Points
Historic Floods
Flood Frequency
Climatology
What is Hydrology?

Maps
Current Radar
Departures
Forecasted Precip.
Observed Precip.
Avg. Precipitation
Snow Maps
Water
Temperatures
Multisensor Maps
Java/non-Java

Water Supply
Biweekly Statement
Drought Information

The MARFC
About Us
Vision & Mission

Contact Us
marfc.webmaster@noaa.gov

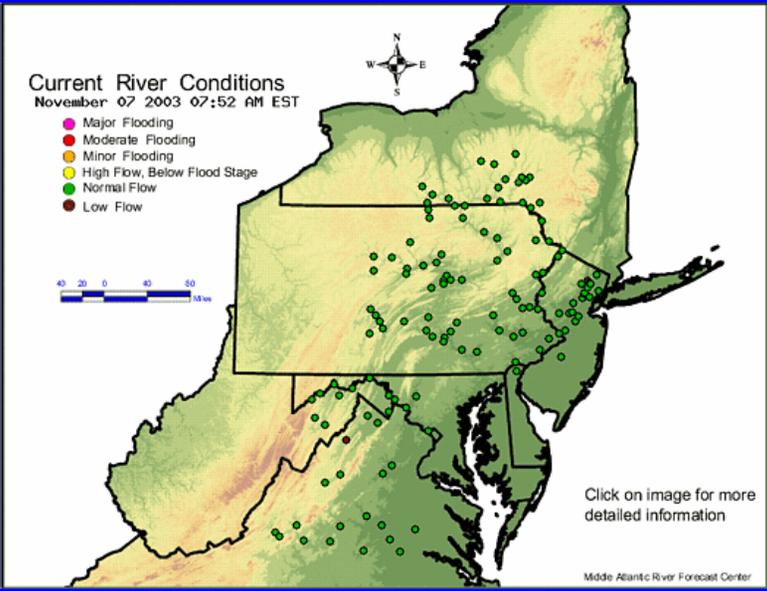
Winter is Coming!

Learn how to protect your family, pets, and property from hazardous winter weather. Winter storms are deceptive killers, because most deaths related to the storm are caused by traffic accidents on icy roads or hypothermia from prolonged exposure to cold. Before winter sets in, take this opportunity to get ready for the upcoming winter season by preparing emergency survival kits for your home and car. Make sure your family has a disaster plan for handling severe winter weather. [Details...](#)

Information on damage caused by Hurricane Isabel can be found [here](#) and [here](#).

Current River Conditions
November 07 2003 07:52 AM EST

- Major Flooding
- Moderate Flooding
- Minor Flooding
- High Flow, Below Flood Stage
- Normal Flow
- Low Flow



Click on image for more detailed information

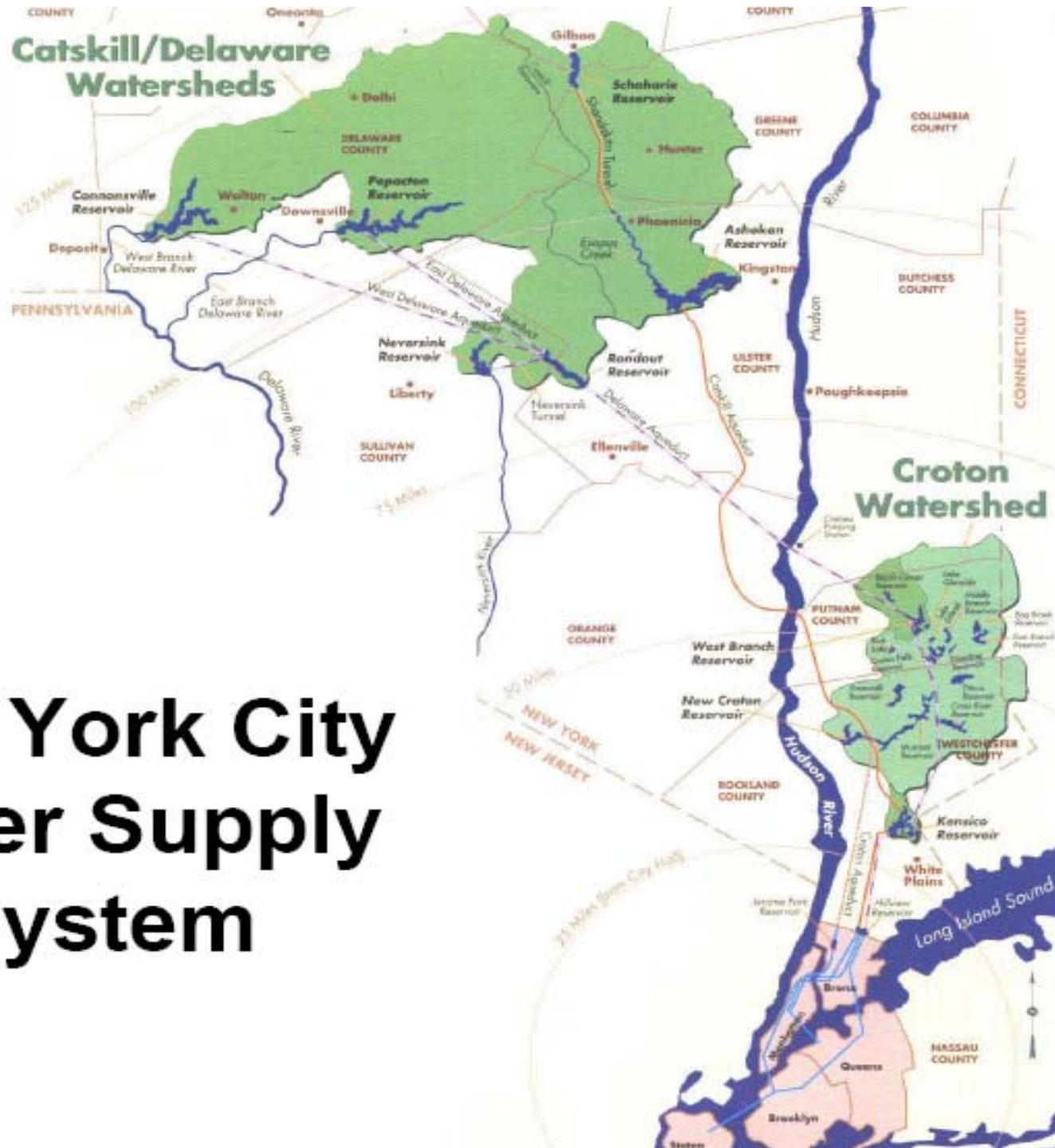
Middle Atlantic River Forecast Center

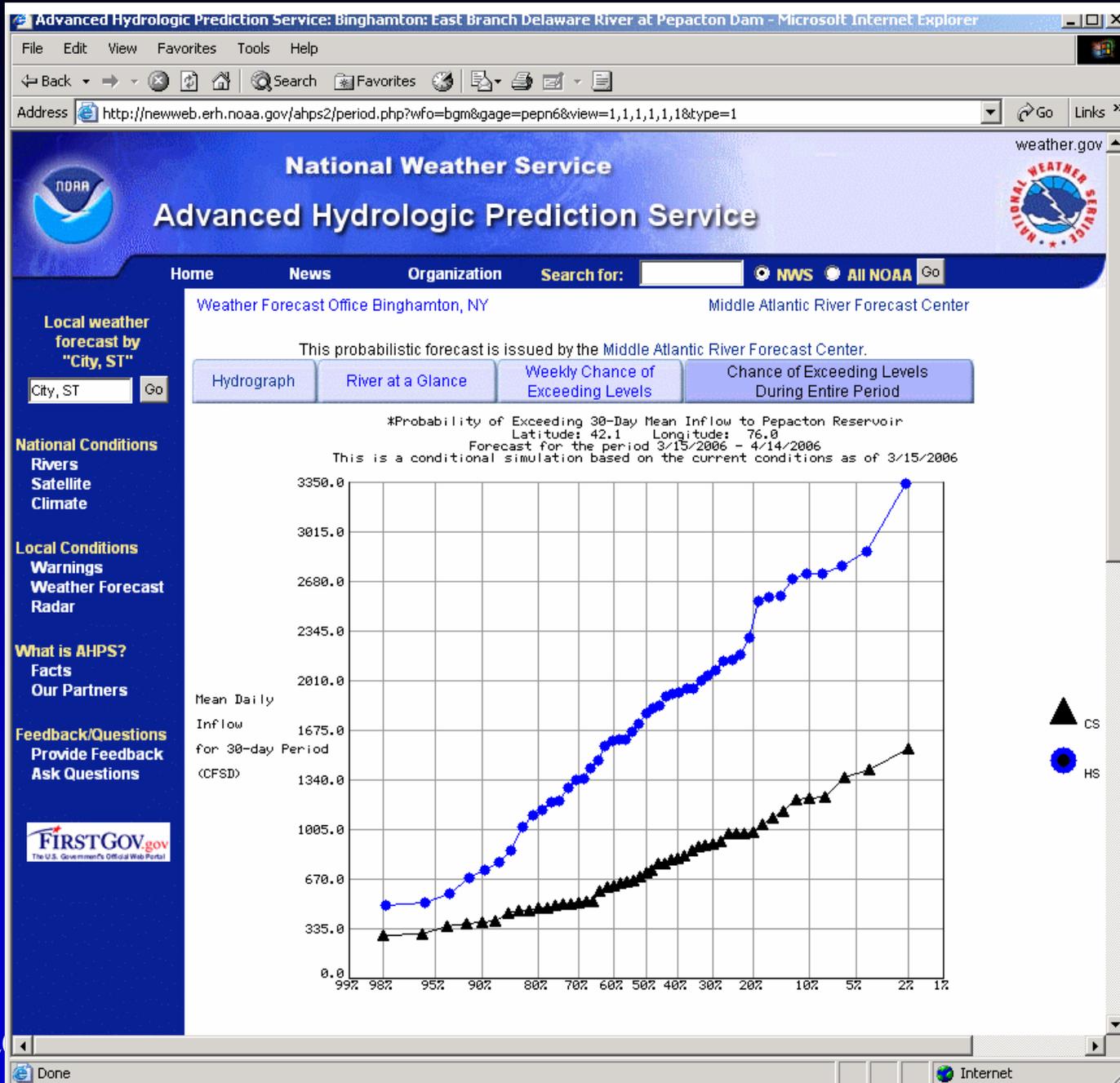
Internet

Inflows to Water Supply Reservoirs

- Most widely used product
- Inflows to COE multi-purpose reservoirs
- Inflows to 3 New York City water supply reservoirs
- NYC DEP uses product operationally

New York City Water Supply System

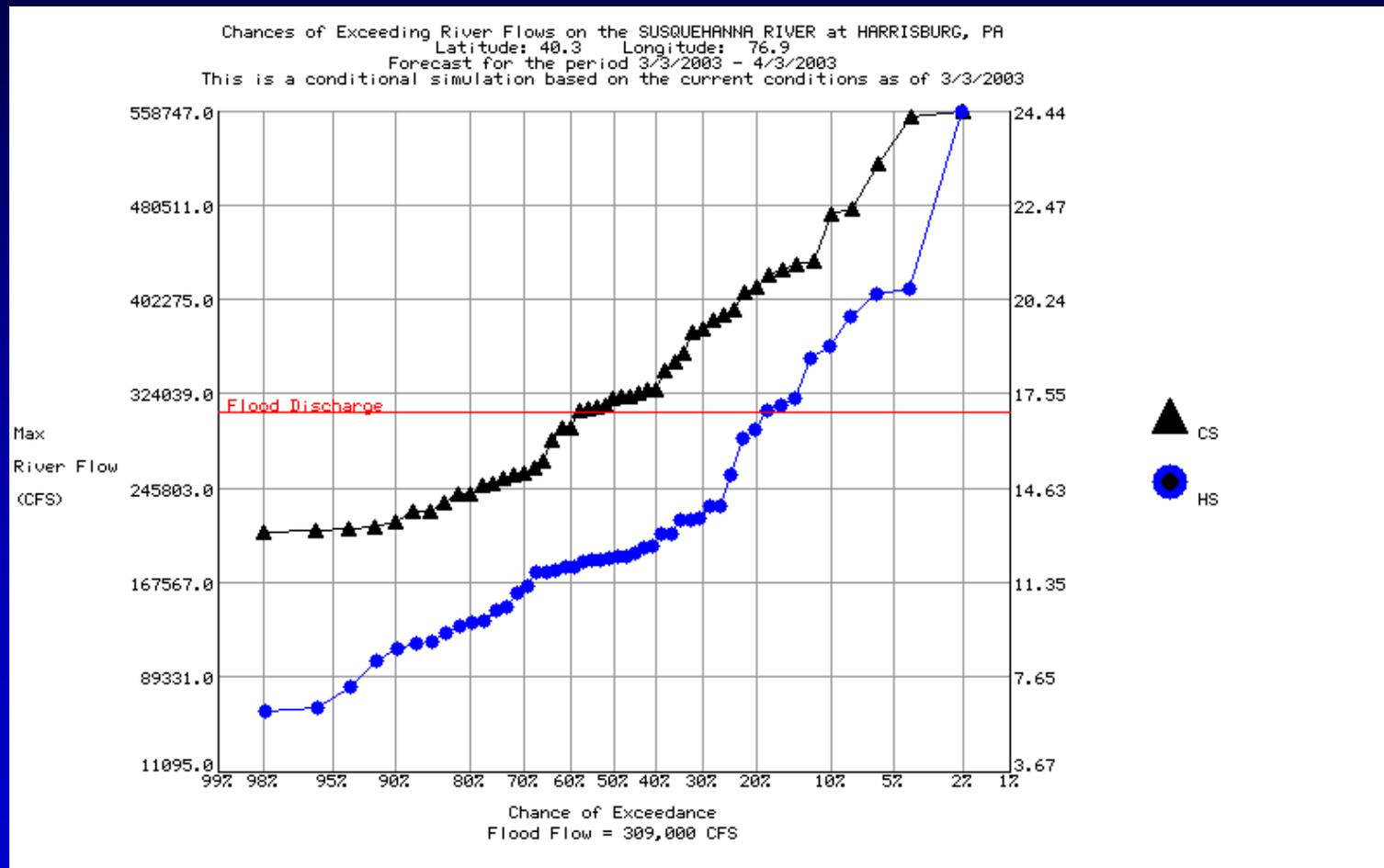




November 2

0AA

Spring Flood Potential Outlook



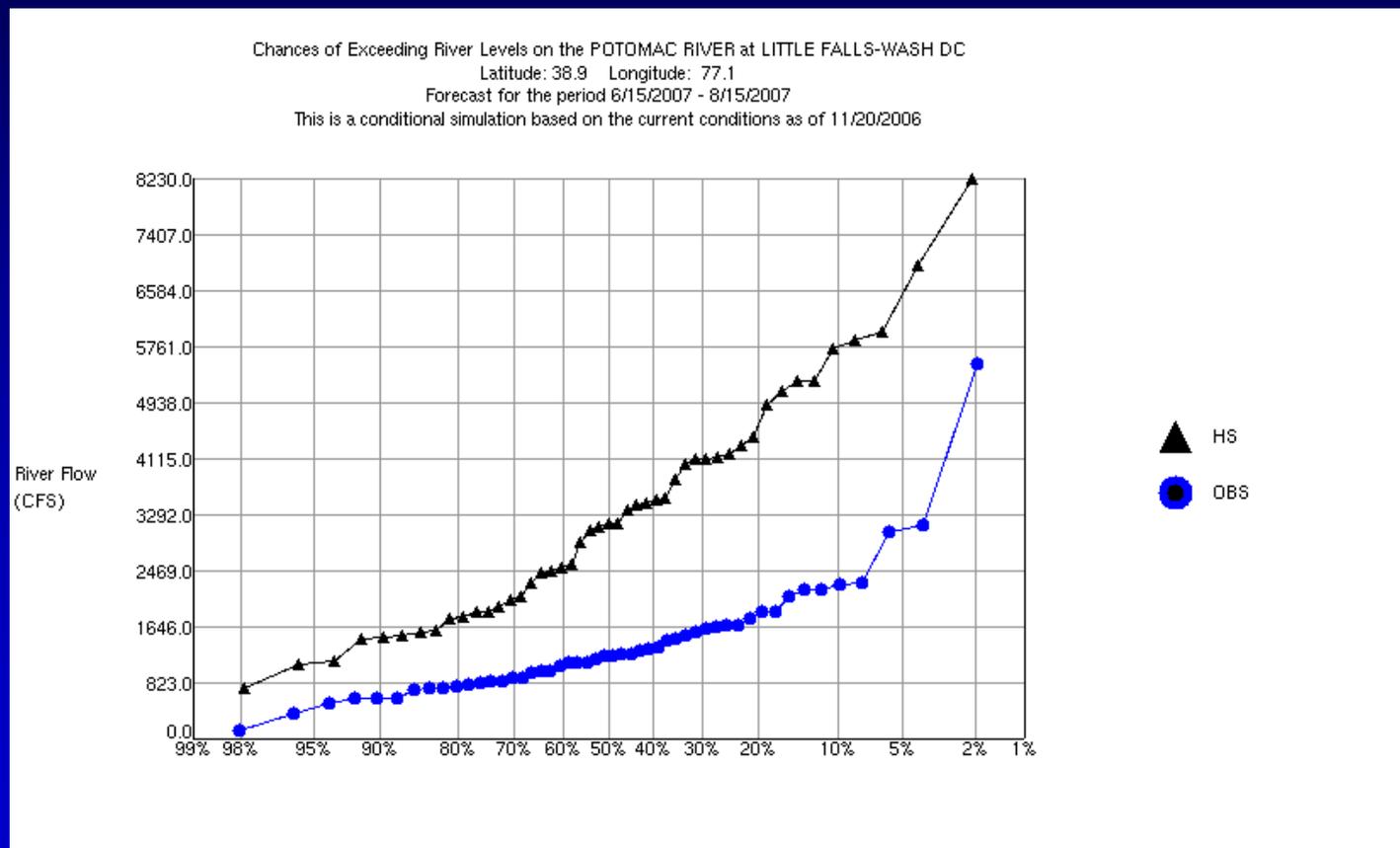
Low Flow Forecasting



November 2006

NWS/NOAA

Low Flow Simulations



Lessons Learned

- 30-day reservoir inflow product most widely used probabilistic product
- Low-flow products are frequently requested
- Error model post processing may be the tool for improved low flow forecasts