

**Product/Service Description Document**  
**Experimental Hydrologic Short-Term**  
**Meteorological Model-based Ensemble Forecasting System (MMEFS)**

**Part I – Mission Connection**

1. Product/Service Description – The National Weather Service (NWS) experimental hydrologic short-term Meteorological Model-based Ensemble Forecasting System (MMEFS) webpage and text products are being produced by Eastern Region River Forecast Centers (RFCs) and the Southeast RFC to provide hydrologic contingency and planning forecasts to users. These users include the NWS Weather Forecast Offices (WFOs), emergency managers, the United States Army Corp of Engineers (USACE), and the United States Geological Survey (USGS).

The MMEFS uses the temperature and precipitation output from the National Centers for Environmental Prediction (NCEP) Global Ensemble Forecast System (GEFS), the Short Range Ensemble Forecasts (SREF), and the North American Ensemble Forecast System (NAEFS). These ensemble member outputs and the current SAC-SMA hydrologic model states are run through the Ensemble Streamflow Prediction (ESP) system to generate a number of possible river forecast outcomes. These outcomes are turned into short-term probabilistic contingency forecasts. This experimental system compliments the deterministic operational forecasts and allows users to plan for and consider different hydrologic scenarios.

2. Purpose – The purpose of the MMEFS web pages is to provide users with a short-term situational awareness through the display of short-range hydrologic ensemble forecasts. The MMEFS web pages compliment information contained in the current short-term deterministic hydrologic forecasts and current *subjective* contingency forecasts. This webpage and products will support the NOAA mission goals of serving society’s need for weather and water information and supporting the nation’s commerce, economy, and planning for the protection of life and property.
3. Audience – The target audience for this experimental product is the hydrologic community, including but not limited to the USACE, USGS, NWS WFOs and the emergency management community. Additionally, water reservoir managers (e.g. water supply managers for the large cities in the northeast or the power companies of the southeastern states), recreational interests, and the general public are among the intended audience for this experimental product.
4. Presentation Format – The MMEFS web pages can be viewed at <http://www.erh.noaa.gov/mmeefs/index.php>. The MMEFS webpage has an overview page which is sorted by River Forecast Center (RFC) and allows for the selection of both graphic and text products for the Advanced Hydrologic Prediction Service (AHPS) river forecast points. The MMEFS information is selectable by “Ensemble” type and a map showing the “Chance of Exceedence” of action, minor, moderate, and major flood stages is provided.

The MMEFS products are also accessible by individual forecast points, by river basins, and by WFO Hydrologic Service Areas (HSA).

5. Feedback – Feedback is a critical part of this project. Comments are welcome on both the service and the science of these products. Comments can be emailed to [ahps.webmaster@noaa.gov](mailto:ahps.webmaster@noaa.gov).

Comments may also be provided to:

NOAA/NWS/Eastern Region Headquarters  
Attn: Laurie Hogan  
630 Johnson Ave, Suite 202  
Bohemia, NY 11716  
631-244-0114

The public can complete a survey on this experimental product at:  
<http://www.weather.gov/survey/nws-survey.php?code=srhe>

The feedback period for this experimental service will extend from January 1, 2011 through June 30, 2011.

## **Part II – Technical Description**

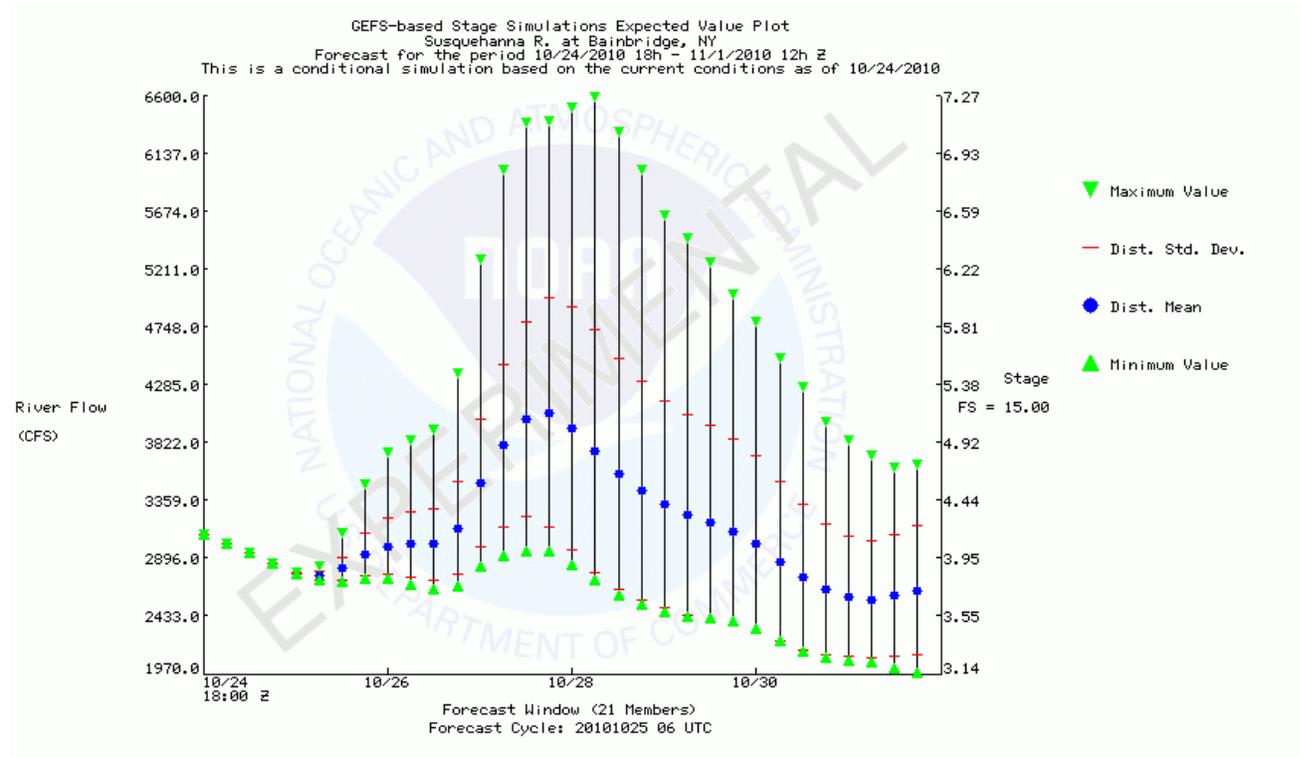
1. Format and Science Basis – The short-term hydrologic ensembles are provided by a system named the Meteorological Model-based Ensemble Forecast System (MMEFS). The objective of MMEFS is to produce short lead-time (< 10 days) hydrologic ensemble forecasts using forcing parameters provided by various meteorological ensemble systems as input to and processed by either the NWS River Forecast System (NWSRFS) Ensemble Streamflow Prediction (ESP) system or the Community Hydrologic Prediction System (CHPS). At this time, hydrologic ensemble forecasts from MMEFS are generated for river forecast locations in the Northeast, Ohio River Valley, Mid-Atlantic and Southeast U.S using model outputs from the National Centers for Environmental Prediction (NCEP) 12-member Global Ensemble Forecast System (GEFS) as provided via AWIPS to the RFC, the 21-member Short Range Ensemble Forecast (SREF) system and the 42-member the North American Ensemble Forecast System (NAEFS) produced at NCEP. The design of MMEFS is flexible enough to easily add other meteorological ensemble sources.

MMEFS was developed for several reasons:

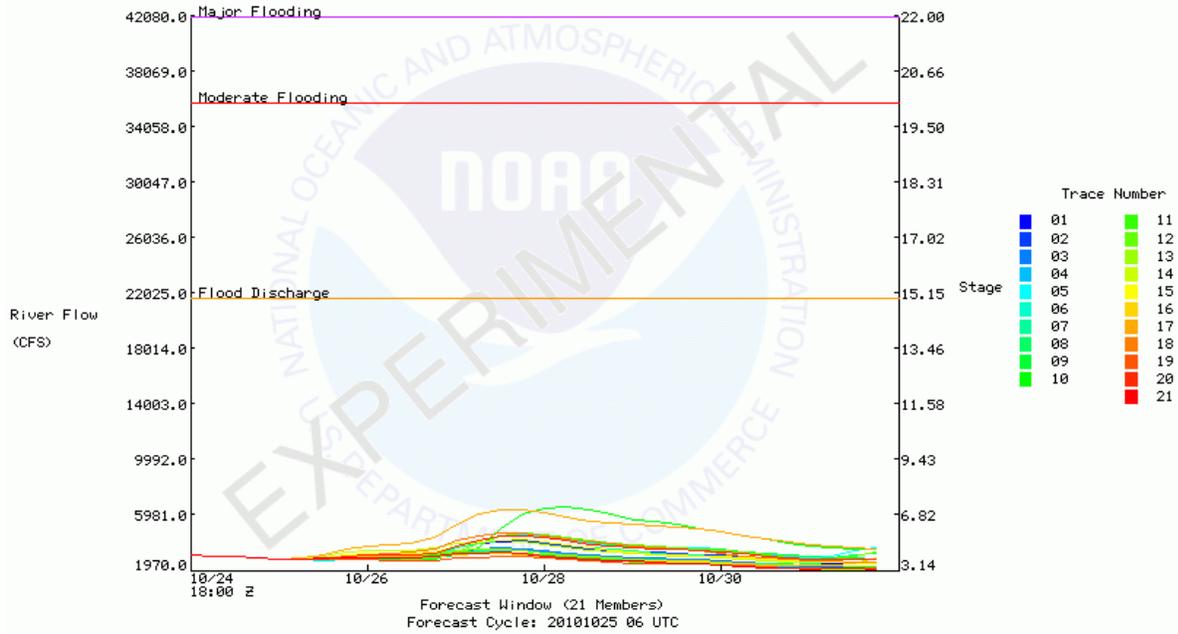
- Hydrologic forecast uncertainty is closely linked to the uncertainties associated with precipitation and temperature forecasts. MMEFS provides a range of hydrologic model simulations based on the differing meteorological numerical weather prediction (NWP) model forecasts used as inputs.
- MMEFS provides a means to further users' understanding of the effects of model inputs used in hydrologic models.

- For some weather/hydrologic scenarios, the hydrologic ensembles are useful surrogates for multiple contingency runs that are typically used by the RFCs to convey quantitative precipitation forecast (QPF) or quantitative temperature forecast (QTF) uncertainty.
2. Availability – The MMEFS web pages are available 24-hours per day and 7-days a week and are monitored by Eastern Region RFC and the Southeast RFC staff.
  3. Additional Information - [A “Help” page](#) that describes the ensemble process and the site navigation is available on the MMEFS web site.

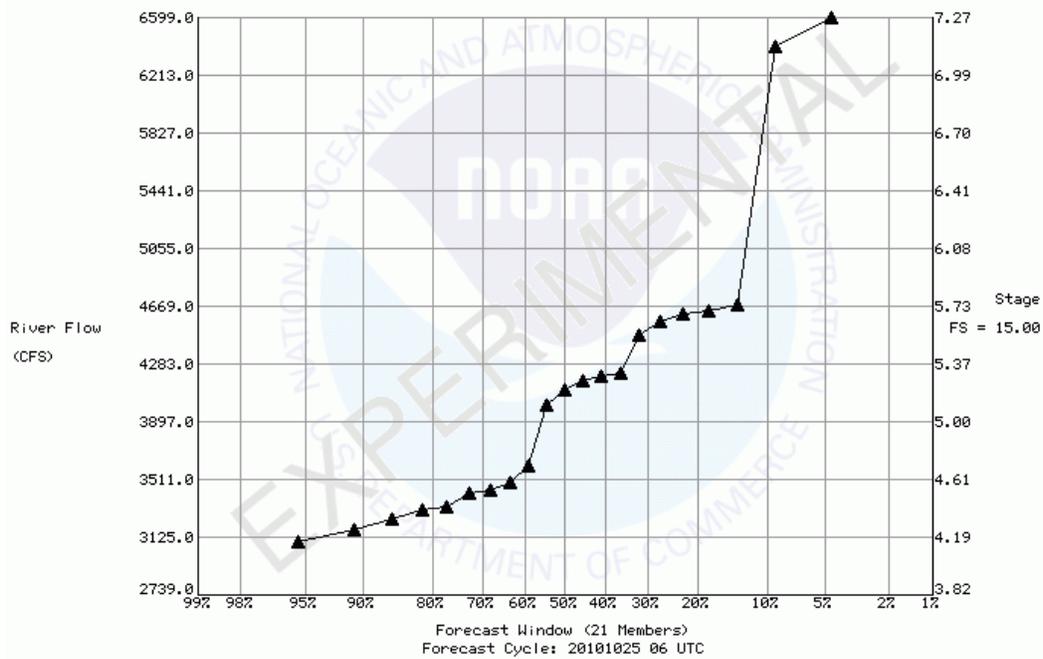
Examples of some of the MMEFS graphics and the associated “ PITESGBGM” text product are provided below.



GEFS-based Hydrograph Traces  
 Susquehanna R. at Bainbridge, NY  
 Forecast for the period 10/24/2010 18h - 11/1/2010 12h Z  
 This is a conditional simulation based on the current conditions as of 10/24/2010



GEFS-based Exceedance Probability  
 Susquehanna R. at Bainbridge, NY  
 Forecast for the period 10/24/2010 - 11/1/2010  
 This is a conditional simulation based on the current conditions as of 10/24/2010



ZCZC PITESGBGM  
 FGUS61 KRHA DDHHMM  
 ESGBGM  
 RIVER STAGE CONTINGENCY  
 NATIONAL WEATHER SERVICE  
 MID-ATLANTIC RIVER FORECAST CENTER...STATE COLLEGE, PA  
 :

... The following contingency table is based on GEFS Ensemble  
 ... Precipitation and Temperature. It displays the probability  
 ... of exceedance of threshold flood categories for HSA BGM  
 ... for the period 10/24/2010 - 10/31/2010

... GEFS Ensemble Run : 10 / 25 / 2010 06 Z

	ACTION		MINOR		MODERATE		MAJOR	
	Stg	Pct	Stg	Pct	Stg	Pct	Stg	Pct
BAIN6			15.0	<5%	20.0	<5%	22.0	<5%
BRGN6	12.0	<5%	13.0	<5%	17.0	<5%	19.0	<5%
BRYN6			17.0	<5%	22.0	<5%	26.0	<5%
CCRN6	9.0	<5%	12.0	<5%	13.0	<5%	14.8	<5%
CHEN6			12.0	<5%	15.0	<5%	19.0	<5%
CINN6			9.0	<5%				
CKFN6			10.0	<5%	16.0	<5%	18.0	<5%
CKLN6			12.0	<5%	14.0	<5%	20.0	<5%
CMGN6			16.0	<5%	20.0	<5%	24.0	<5%
CMPN6			8.0	<5%	10.0	<5%	11.0	<5%
CNNN6								
CNON6			10.0	<5%	12.6	<5%	20.3	<5%
CRNN6	21.0	<5%	29.0	<5%	30.0	<5%	36.0	<5%
CRTN6			8.0	<5%	10.0	<5%	12.5	<5%
FSHN6			13.0	<5%	16.0	<5%	18.0	<5%
GNEN6			13.0	<5%	17.0	<5%		
HLEN6			11.0	<5%	13.0	<5%	15.0	<5%
HVDN6			10.0	<5%	12.0	<5%	15.0	<5%
HWYP1			11.0	<5%	12.0	<5%	20.0	<5%
LDYN6			17.0	<5%	20.0	<5%	22.0	<5%
MHPP1	25.0	<5%	27.0	<5%	31.0	<5%	40.0	<5%
MONP1	12.0	<5%	15.5	<5%	17.0	<5%	18.5	<5%
MTGN4			25.0	<5%	28.0	<5%	33.0	<5%
MTMP1			18.0	<5%	24.0	<5%	27.0	<5%
NVRN6								
OFRP1	7.0	<5%	11.0	<5%	13.0	<5%	16.0	<5%
PEPN6								
RCKN6			11.0	<5%	12.0	<5%	13.0	<5%
SHBN6			8.5	<5%	9.0	<5%	10.6	<5%
TNKP1			11.0	<5%	14.0	<5%	17.0	<5%
TOWP1			16.0	<5%	18.0	<5%	25.1	<5%
UNDN6			11.0	<5%	13.0	<5%	14.5	<5%
VSTN6	16.0	<5%	18.0	<5%	21.0	<5%	27.0	<5%
WALN6			9.5	<5%	14.0	<5%	16.0	<5%
WBRP1	10.0	<5%	22.0	<5%	28.0	<5%	30.0	<5%
WCRN6			17.0	<5%	18.0	<5%	21.0	<5%
WVYN6	10.0	<5%	11.0	<5%	16.0	<5%	20.0	<5%