

**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 are run through the NWS River Forecast System (NWSRFS) Ensemble Streamflow Prediction (ESP) system or the Community Hydrologic Prediction System (CHPS) to generate a number of possible river forecast outcomes. These outcomes are turned into short-term probabilistic contingency forecasts. “R” software is used to generate a suite of graphics to display this information (see Attachment 1 for some examples). This experimental system complements 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 complement 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/mmefs/index.php>. The MMEFS webpage has a Google map overview page which has an optional River Forecast Center (RFC) map overlay. The MMEFS products are also accessible by individual forecast points and by individual states.

The MMEFS information is selectable by “Ensemble” type and the Google map shows the “Chance of Exceedence” of action, minor, moderate, and major flood stages using color coding consistent with the operational AHPS pages. Please see Attachment 1 for some examples.

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

<http://www.weather.gov/survey/nws-survey.php?code=srhe>

The feedback period for this experimental service will extend from September 15, 2011 through September 15, 2012.

## **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) 21-member [Global Ensemble Forecast System](#) (GEFS), 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.

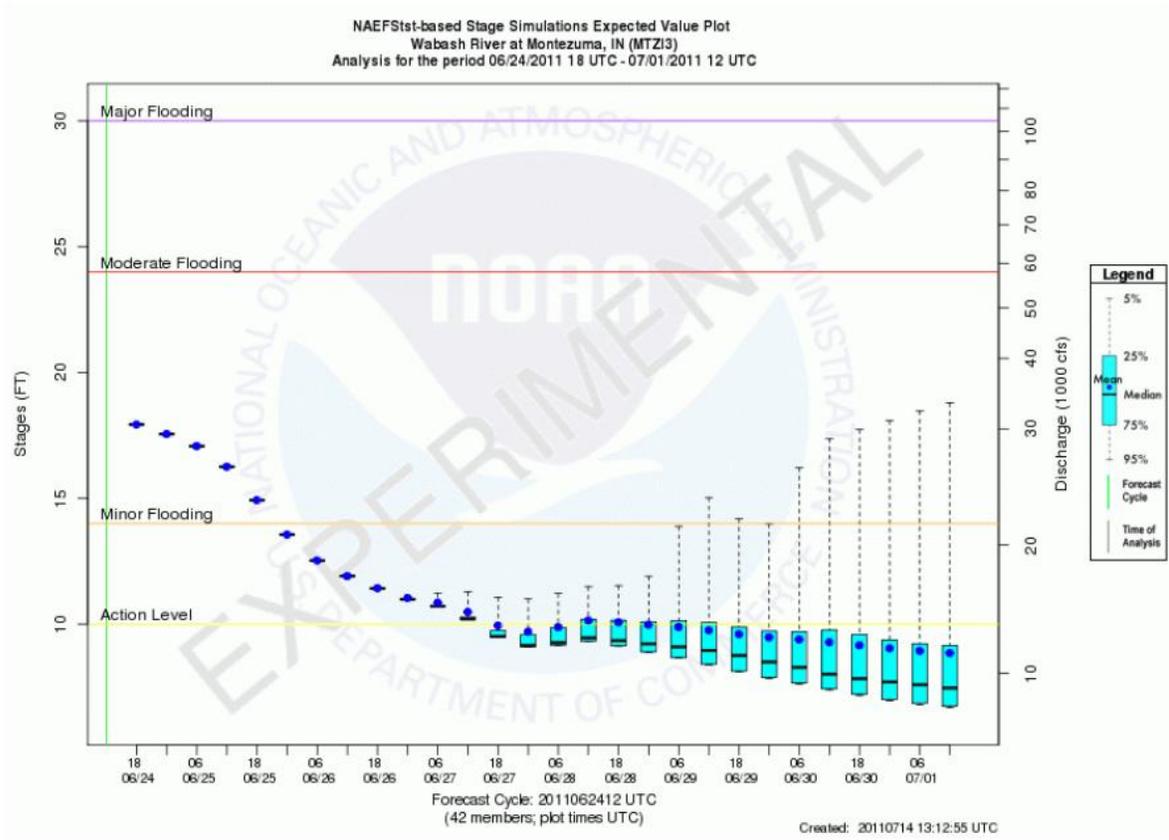
MMEFS was developed for several reasons:

- 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.

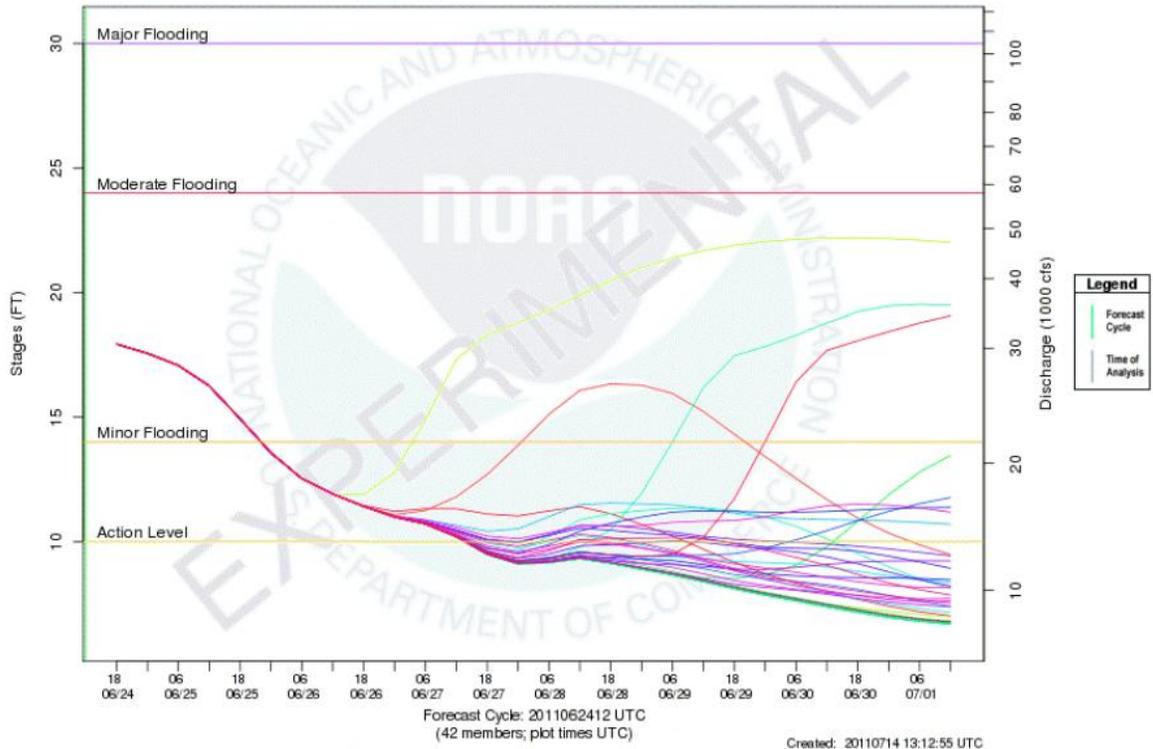
- For some weather/hydrologic scenarios, the hydrologic ensembles are useful surrogates for multiple contingency runs that are typically used by the RFCs to convey quantitative precipitation forecast (QPF) or quantitative temperature forecast (QTF) uncertainty.
2. Availability – The MMEFS web pages are 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.

**Attachment 1.**

*Some examples the MMEFS graphics produced by OHRFC are provided below. Additionally, an example of an MMEFS-related contingency table produced by MARFC is provided below.*

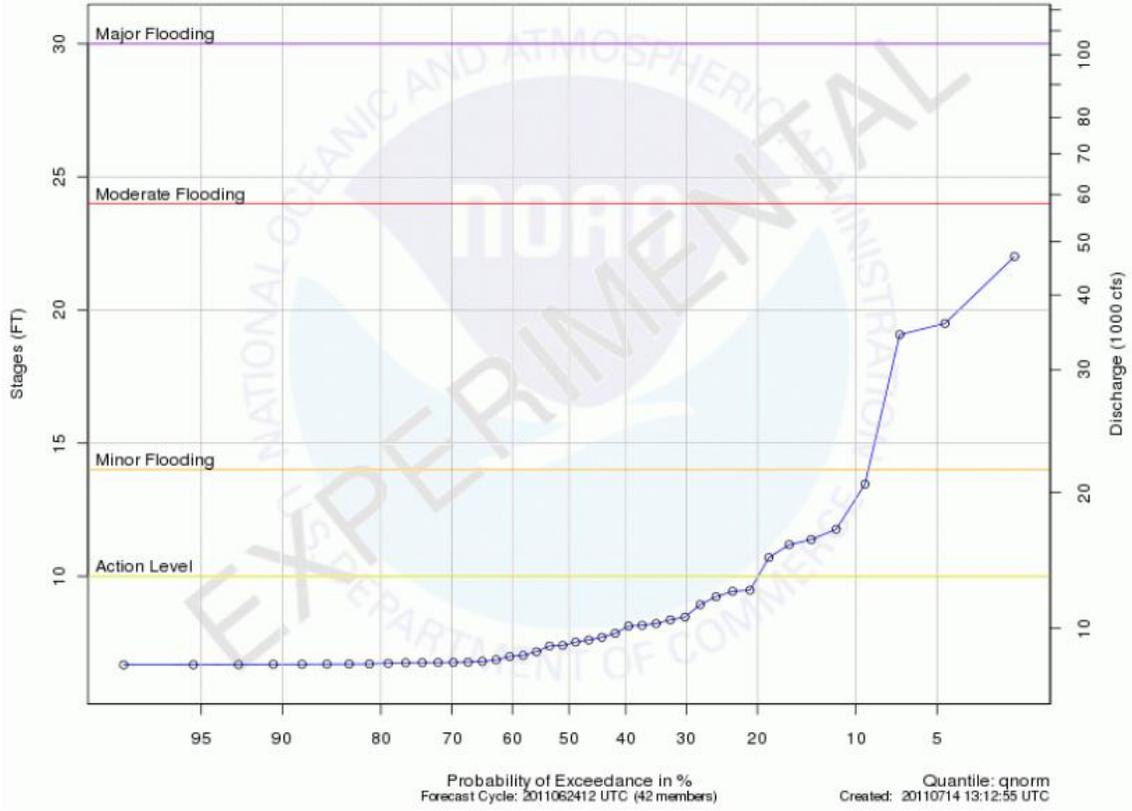


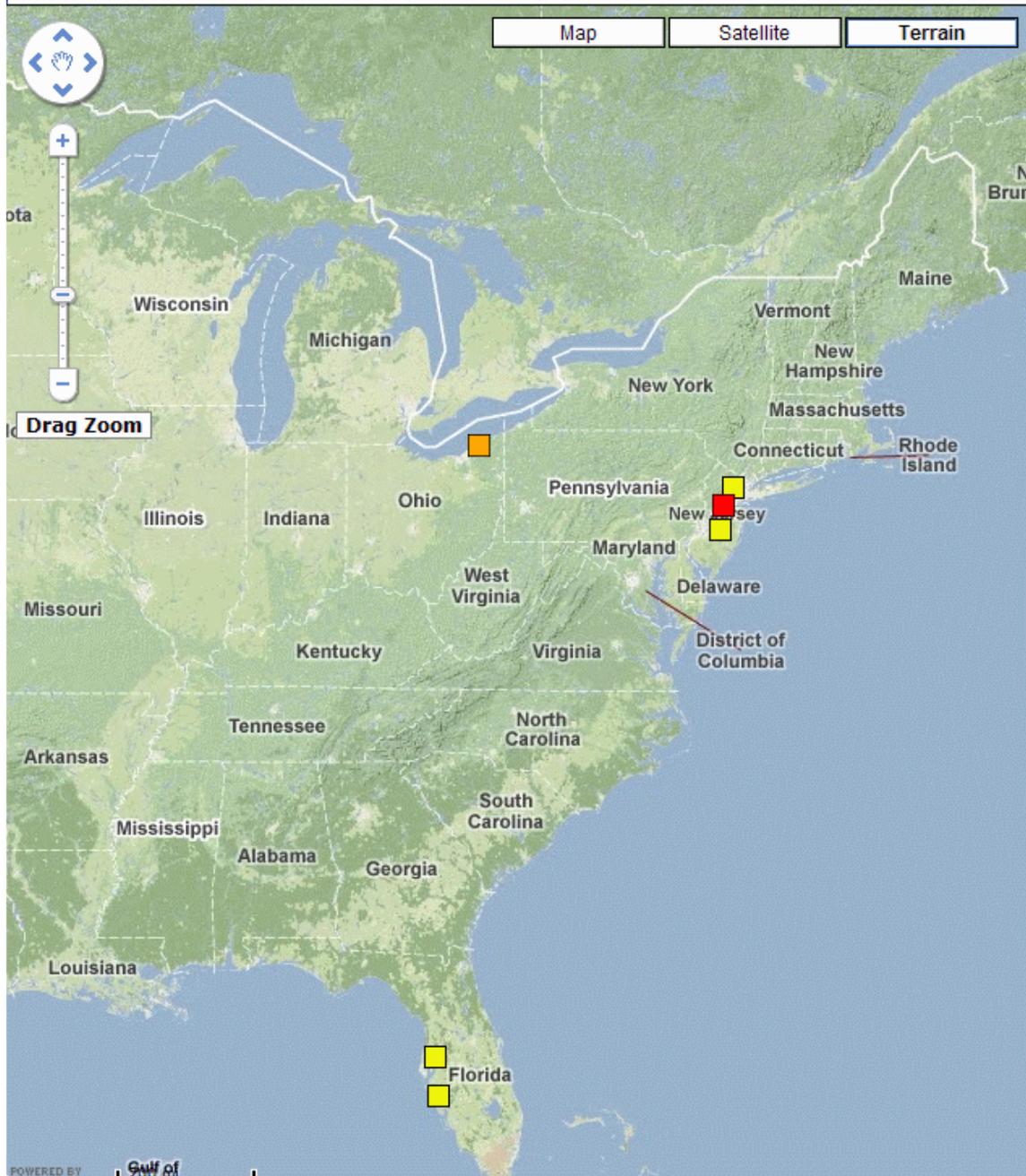
NAEFStst-based Stage Simulations Traces  
Wabash River at Montezuma, IN (MTZ13)  
Analysis for the period 06/24/2011 18 UTC - 07/01/2011 12 UTC



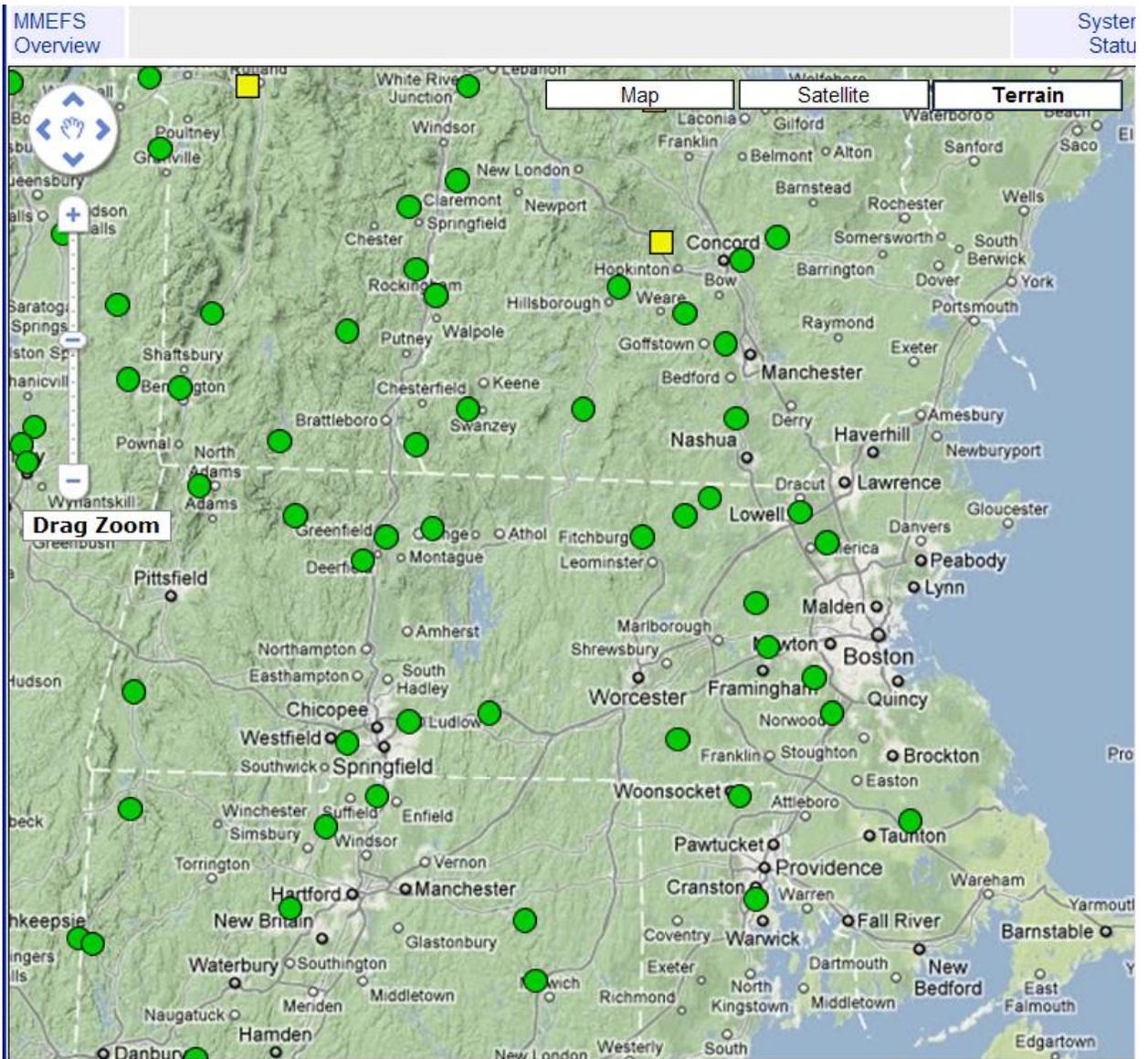
Created: 20110714 13:12:55 UTC

NAEFStst-based Stage Simulations Probability of Exceedance Plot  
Wabash River at Montezuma, IN (MTZ13)  
Analysis for the period NAUTC - 07/01/2011 12UTC





Example of Google map main page for MMEFS.



Example of single state display capability.