NATIONAL WEATHER SERVICE
PRODUCT/SERVICE DESCRIPTION DOCUMENT (PDD)
TYPE: Official Product
DATE:

Meteorological Model Ensemble River Forecasts

Part I – Mission Connection

1. Product/Service Description – The National Weather Service (NWS) Meteorological Model Ensemble River Forecasts web pages, graphics and text products are being produced by Eastern Region River Forecast Centers (RFCs) and the Southeast RFC to provide useful hydrologic information to users. The objective of this information is to provide short lead-time (<7 days) ensemble river forecasts using forcing fields provided by various meteorological ensemble systems.

   These ensemble river forecast are produced at the RFCs using a collection of software entitled Meteorological Model-based Ensemble Forecasting System (MMEFS). 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 members are processed through the Community Hydrologic Prediction System (CHPS) to generate an ensemble of river forecasts. These individual river forecasts are turned into probabilistic forecasts. *"R" software* is used to generate a suite of graphics to display this information (see Attachment 1 for some examples).

2. Purpose – The purpose of the ensemble river forecasts is to provide users with a short-term (<7 days) situational awareness by providing the probabilistic exceedence information relative to NWS flood categories and providing the ensemble river forecasts that in turn show a range of outcomes. These web pages complement information contained in the current short-term deterministic hydrologic forecasts and internal NWS WFO-requested *subjective* contingency forecasts. This service 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 service is the hydrologic community, including but not limited to the US Army Corps of Engineers (USACE), US Geologic Survey (USGS), NWS Weather Forecast Offices (WFOs) and the emergency management community. Additional users include 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.

4. Presentation Format – The ensemble river forecasts can be viewed at *http://www.erh.noaa.gov/mmefs/index.php*. The interface utilizes a Google map with an optional River Forecast Center (RFC) map overlay. The products are accessible by individual forecast points and by individual states. The information is selectable by "Ensemble/Model" type and the "Chance of Exceedence" for action, minor, moderate, and major flood stages is depicted for that "Ensemble/Model" type on the Google map.

   Alternatively, there is also a table view for each River Forecast Center at *http://www.erh.noaa.gov/mmefs/index_table.php*. Please see Attachment 1 for some examples.

Part II – Technical Description

1. Format and Science Basis –This service uses forcing parameters provided by various meteorological ensemble systems as input to the hydrologic model hosted by the RFC's Community Hydrologic Prediction System (CHPS). At this time, these products 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 software supporting these products is flexible enough to easily add other meteorological ensemble sources. Even though the system has been automated, the staff of each RFC monitors the output and provides status messages to users as needed.

   These ensemble river forecasts were developed for several reasons.

   - Hydrologic forecast uncertainty is closely linked to the uncertainties associated with precipitation and temperature forecasts used by hydrologic simulation models.
   - This service explicitly uses short-range meteorological model ensemble temperature and precipitation data, eliminating the need for historical precipitation and temperature data for its results.
   - This service provides a means to further users' understanding of the effects of model inputs used in hydrologic simulations.
   - These ensembles river forecasts are useful surrogates for multiple contingency runs that are typically used by river forecast centers to convey quantitative precipitation forecast (QPF) or quantitative temperature forecast (QTF) uncertainty for *worst case* scenarios.

2. Availability – The ensemble river forecast web pages are available 24-hours per day and 7-days a week and are monitored by Eastern Region RFCs and the Southeast RFC staff.

3. Additional Information

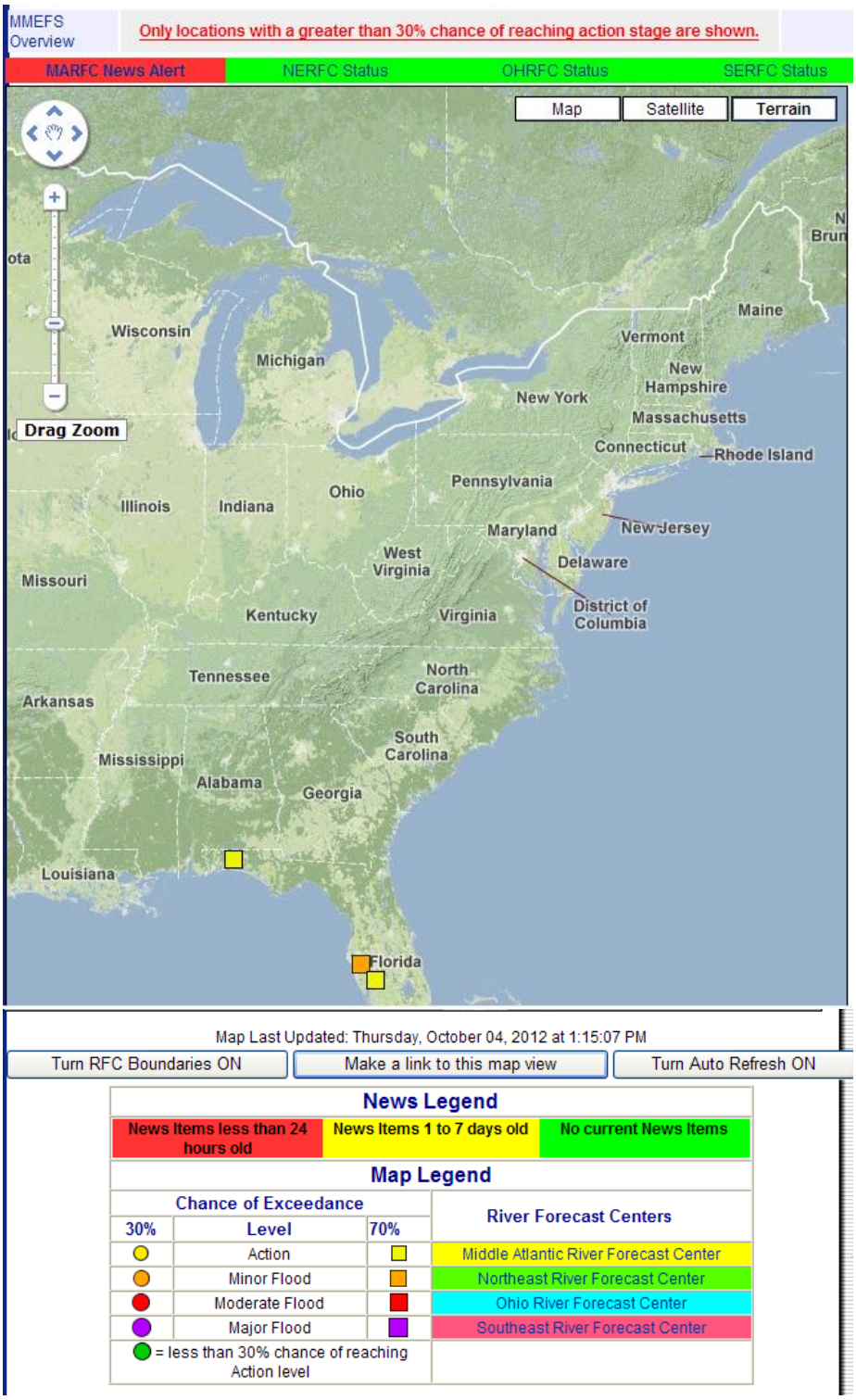
    a. A *Help Page* that describes the ensemble process and the site navigation is available on the ensemble river forecast web site.
    b. An online course, designed to help *understand numerical weather prediction (NWP) models*, which includes a section on ensembles, is available from UCAR's COMET. Another online course from COMET provides an *Introduction to NAEFS.*
    c. A slide presentation of an Introduction for Ensemble Streamflow Prediction, based on this *UCAR COMET distance learning module*, is *available*.

4. Contact – Comments on this product can be emailed to ahps.webmaster@noaa.gov.

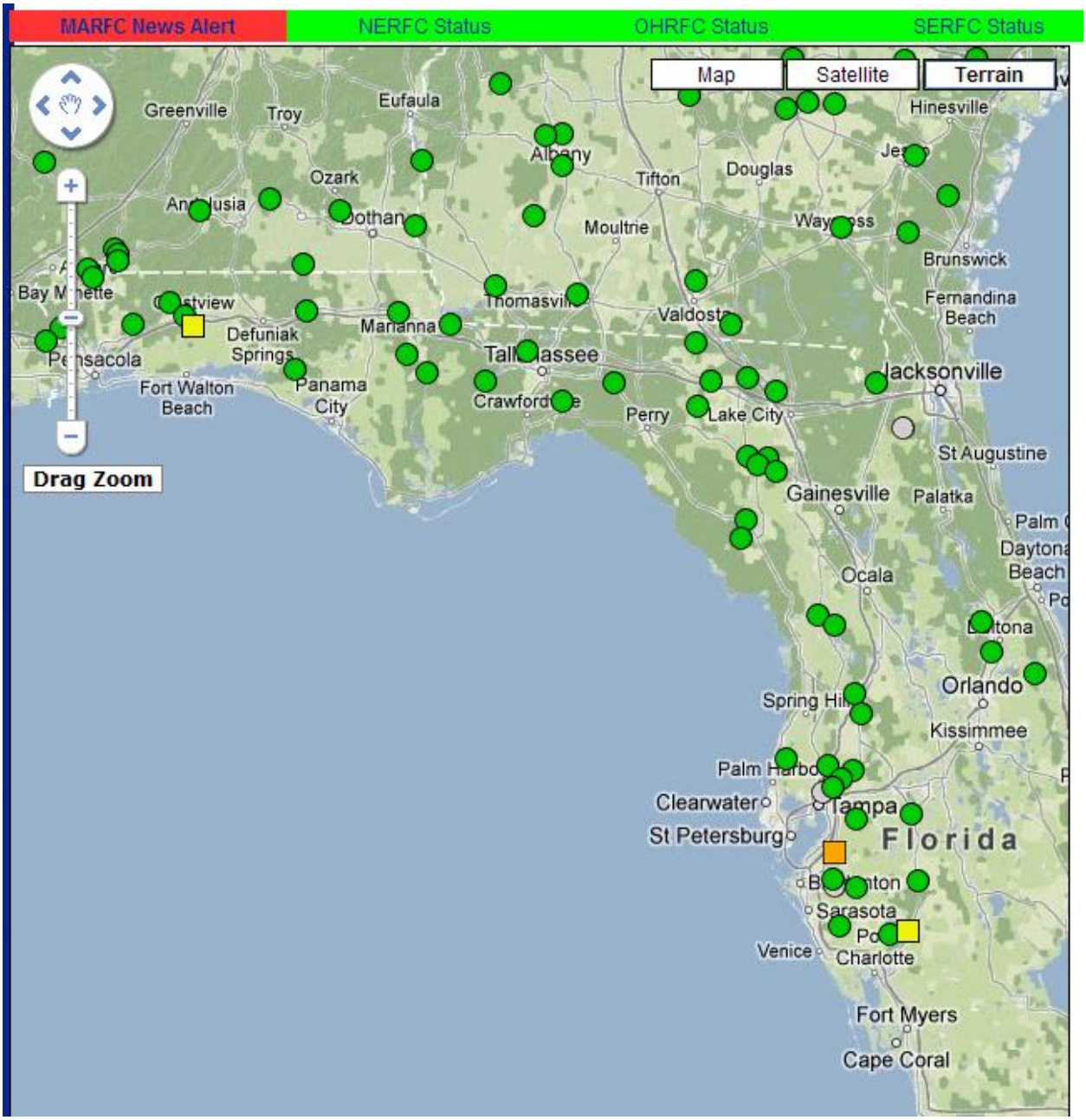
    Comments may also be provided to:

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

Attachment 1. Examples of various displays from the web pages for the Meteorological Model Ensemble River Forecasts.



This figure is an example of the Google map main page for this service.



This figure is an example of single state display capability from this service.

Meteorologic Model Ensemble River Forecasts

Please see the Product Description Document for detailed information about this service.

To return to the map view, please click here.

The following tables provide access to hydrologic information generated using various meteorological model ensemble forcings for the listed NWS River Forecast Centers.

Middle Atlantic River Forecast Center (MARFC) News!

System		Last Updated	Fcst Cycle	Analysis Period	Fcst Hours	Members
GEFS	●	20121004-00:39 UTC	2012/10/03 18 UTC	10/04/2012 - 10/11/2012	168	21
GEFStst	●	20121004-01:47 UTC	2012/10/03 18 UTC	10/04/2012 - 10/11/2012	168	21
NAEFS	●	20121003-23:18 UTC	2012/10/03 12 UTC	10/04/2012 - 10/10/2012	168	42
SREF	●	20121004-09:32 UTC	2012/10/04 03 UTC	10/04/2012 - 10/08/2012	87	21
SREFtst	●	20121004-09:01 UTC	2012/10/04 03 UTC	10/04/2012 - 10/08/2012	87	21

Any questions? Contact MARFC

Northeast River Forecast Center (NERFC) News

System		Last Updated	Fcst Cycle	Analysis Period	Fcst Hours	Members
GEFS	●	20121004-00:26 UTC	2012/10/03 18 UTC	10/04/2012 - 10/11/2012	168	21
NAEFS	●	20121004-09:40 UTC	2012/10/04 00 UTC	10/04/2012 - 10/11/2012	168	42
SREF	●	20121004-08:28 UTC	2012/10/04 03 UTC	10/04/2012 - 10/08/2012	87	21

Any questions? Contact NERFC

Ohio River Forecast Center (OHRFC) News

System		Last Updated	Fcst Cycle	Analysis Period	Fcst Hours	Members
GEFS	●	20121004-11:59 UTC	2012/10/04 06 UTC	10/04/2012 - 10/11/2012	168	21
GEFSA	●	20120623-18:29 UTC	2012/06/23 12 UTC	06/24/2012 - 06/30/2012	168	12
NAEFS	●	20121004-09:16 UTC	2012/10/04 00 UTC	10/04/2012 - 10/11/2012	168	42
SREF	●	20121004-14:00 UTC	2012/10/04 09 UTC	10/04/2012 - 10/08/2012	87	21

Any questions? Contact OHRFC

Southeast River Forecast Center (SERFC) News

System		Last Updated	Fcst Cycle	Analysis Period	Fcst Hours	Members
GEFS	■	20121004-16:52 UTC	2012/10/04 06 UTC	10/04/2012 - 10/11/2012	168	21
NAEFS	■	20121004-09:58 UTC	2012/10/04 00 UTC	10/04/2012 - 10/11/2012	168	42
SREF	□	20121003-17:28 UTC	2012/10/03 09 UTC	10/03/2012 - 10/07/2012	87	21

Any questions? Contact SERFC

The information contained within this service does not represent official NWS hydrologic forecasts.
For the official NWS hydrologic forecasts, please click on the name of the RFC in the header line of each table above or visit the NWS Advanced Hydrologic Prediction Service web site (AHPS).

Help on the ensemble process and site navigation can be found **here**.

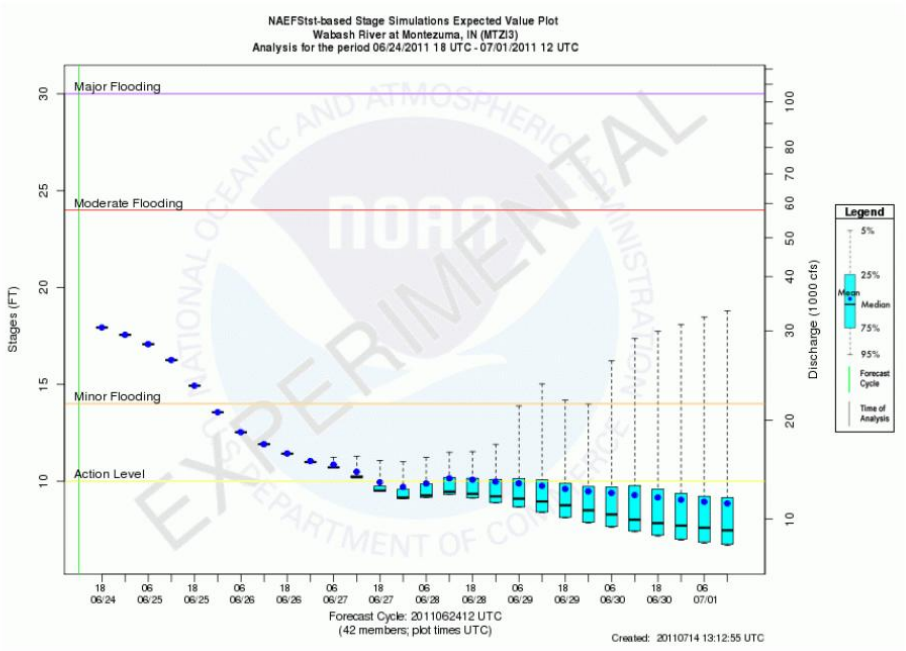
Page last refreshed: 2012-10-04 17:39 UTC

This figure is an example of tabular view capability from this service.

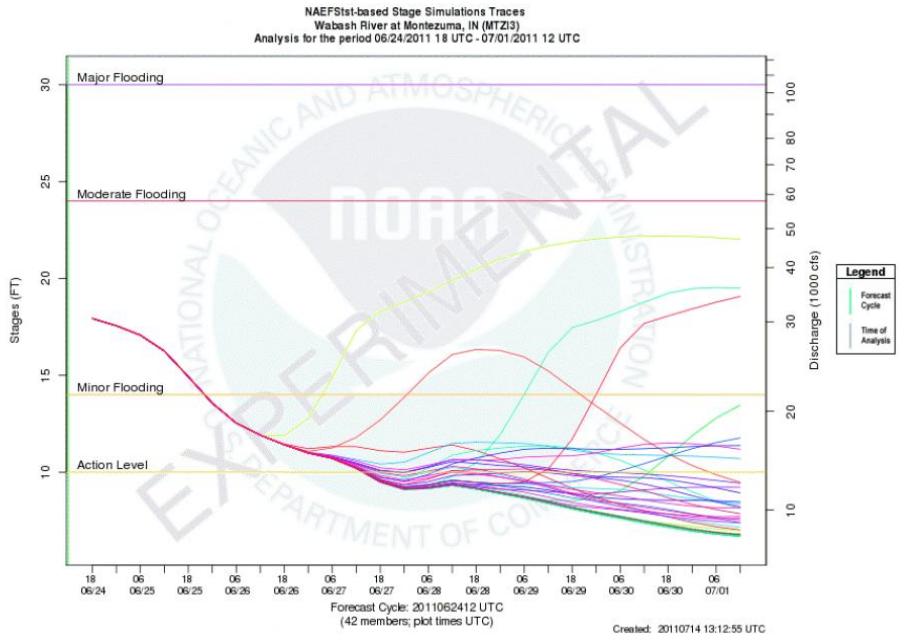
```
ZCZC CRWTIRCTP
FGUS61 KTIR DDHHMM
ESGCTP
RIVER STAGE CONTINGENCY
NATIONAL WEATHER SERVICE
Ohio River Forecast Center...,Wilmington OH
:
... The following contingency table is based on GEFS Ensemble
... Precipitation and Temperature. It displays the probability
... of exceedance of threshold flood categories for HSA ILX
... for the period 10/04/2012 - 10/11/2012


... GEFS Ensemble Run : 10 / 04 / 2012  06 Z

             ACTION        MINOR        MODERATE       MAJOR
LOCATION    STG  PCT      STG  PCT      STG  PCT      STG  PCT
-------------------------------------------------------------
CNFP1       7.0  <5%     12.0  <5%     14.0  <5%     17.0  <5%
ECMP1      22.0  <5%     25.0  <5%     27.0  <5%     28.0  <5%
ELRP1      17.0  <5%     23.0  <5%     25.0  <5%     27.0  <5%
FDLP1      15.0  <5%     19.0  <5%     22.0  <5%     25.0  <5%
JHNP1       5.0  <5%      7.0  <5%      9.0  <5%     10.0  <5%
JHSP1      23.0  <5%     28.0  <5%     30.0  <5%     34.0  <5%
RDYP1      11.0  <5%     16.0  <5%     18.0  <5%     20.0  <5%
RSSP1       7.0  <5%      9.0  <5%     10.0  <5%     10.5  <5%
WRRP1      12.0  <5%     14.0  <5%     15.0  <5%     17.0  <5%
```

This figure is an example of the text product capability from this service.

This figure is an example of the “R” graphic capability from this service.



This figure is an example of the "R" graphic capability from this service.



This figure is an example of the "R" graphic capability from this service.