

NWS Flood Prediction: Current and Future Services



2017 AMS Washington Forum
May 2, 2017

Mary Mullusky
Analyze, Forecast, and Support Office
NOAA / National Weather Service
Phone: 301-427-9372
Email: Mary.Mullusky@noaa.gov

NWS Water Prediction Services



Mission and Socioeconomic Impacts

NOAA NWS Mission

- "NOAA's NWS provides weather, water, and climate data, forecasts and warnings for the protection of life and property and the enhancement of the national economy."

Socioeconomic Impacts:

On average, over the past 30 years in the U.S., flooding has claimed near 90 lives and caused damages in excess of \$8 billion annually

- Floods occur in all 50 of the United States
- Threat all months of the year
- More than half of all flood-related deaths result from motorists



Photo credit: FEMA

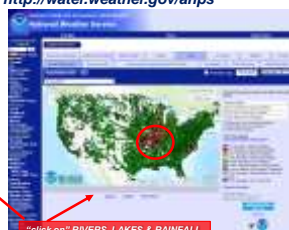
NWS Water Prediction Services



Watches, Warnings and Advisories plus AHPS information

<http://weather.gov/>

<http://water.weather.gov/ahps>



"click on" RIVERS, LAKES & RAINFALL for current river conditions

NWS Water Prediction Services



AHPS Information



NWS Water Prediction Services



AHPS Probabilistic Information

"click on" Probability tab to view probabilistic forecasts



Enhancing Current Forecasting Services



Improving Communications: Hazard Simplification

Proposal

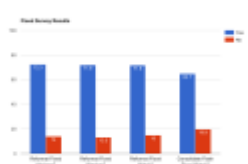
- Consolidate Flash Flood Watch into Flood Watch
- Reformat all Flood Advisory, Watches, and Warning Products into a simple "What", "Where", "When", and "Actions" format

Collecting Feedback through May 31 at

<http://www.nws.noaa.gov/os/notification/pns17hazsimp.htm>

Proposed Implementation Plan

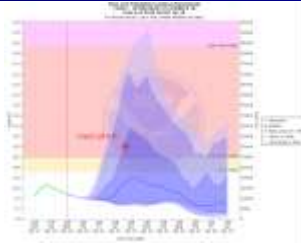
- Fall 2017: Consolidate and reformat Flash Flood Watch into Flood Watch; Reformat flood advisory, watch, and warning for river locations
- Spring 2018: Reformat flood advisories, flood warnings and flash flood warnings



Enhancing Current Forecasting Services

Hydrologic Ensemble Forecast Service (HEFS) Probabilistic information to support risk-based decisions

- Incorporates both atmospheric and hydrologic uncertainties
- 123 locations have experimental product for short-range river forecasts
- Testing and evaluation ongoing; collecting feedback via web
- New river service locations will expand throughout 2017



Enhancing Current Forecasting Services

When viewing forecast at a point, "click on" Inundation Mapping tab to view flood inundation maps

- Provide spatial extent and depth of flood waters
- Display inundation maps for levels from minor flooding through flood of record
- Better mitigate impacts of flooding and build more resilient communities
- Libraries include NWS flood severity categories and regulatory FEMA flood frequency maps

Implementation Status:

- ✓ 154 Flood Inundation Map Libraries
- ✓ Continued Partnership with FEMA, USACE, USGS, States, & Others



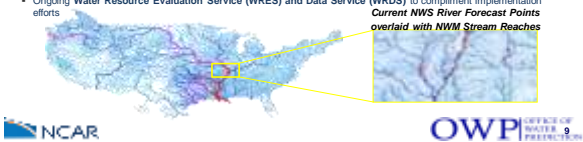
8

New Forecasting Services: National Water Model

Initial Operating Capability – v1.0 implemented in Aug. 2016

- Spatially continuous estimates of major water cycle components (snowpack, soil moisture, channel flow, major reservoir inflows, flood inundation)
- Operational forecast **streamflow guidance** for currently underserved locations: 3,600 forecast points -> 2.7 million (NHDPPlus river reaches)
- Implement an **Earth system modeling architecture** that permits rapid model evolution of new data, science and technology (i.e. WRF-Hydro)
- Ongoing **Water Resource Evaluation Service (WRES)** and **Data Service (WRDS)** to compliment implementation efforts

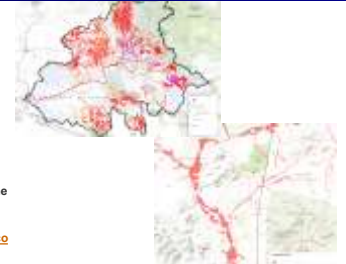
Current NWS River Forecast Points overlaid with NWM Stream Reaches



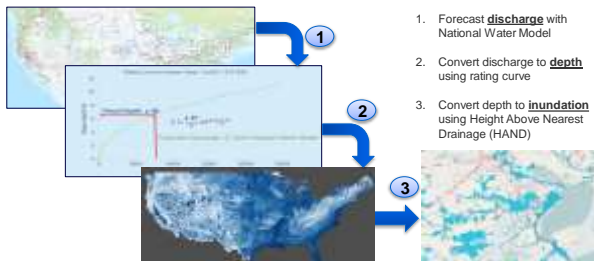
National Water Model

Initial Experimental Output

- **Hydrologic Output**
 - River channel discharge and velocity at 2.7 million river reaches
 - Reservoir inflow, outflow, elevation
 - Surface water depth and subsurface flow (250m CONUS+ grid)
- **Land Surface Output**
 - 1km CONUS+ grid
 - Soil and snow pack states
 - Energy and water fluxes
- **Direct-output and derived products** (e.g. streamflow anomalies and real-time inundation maps)
- Available at water.noaa.gov and nomads.ncep.noaa.gov/pub/data/hcfc/co/m/nwm



Prototype Continental-Scale Inundation Mapping



11

Questions?

Mary Multusky
Analyze, Forecast, and Support Office
NOAA / National Weather Service
Phone: 301-427-9372
Email: Mary.Multusky@noaa.gov