



# What Do We Want the Public to Know?

Flood risk communication AND education:  
From experienced officials to the general public - Who is your audience?

**Julie Dian-Reed**  
**National Weather Service, Wilmington OH**



# Role of NWS Beyond Warnings and Forecasts



- *"The National Weather Service (NWS) provides weather, water, and climate data, forecasts and warnings for the protection of life and property and enhancement of the national economy."*

- ***But...***

***What good is a forecast or warning if it's:***

- ***Not Received***
- ***Not Understood***



# Widespread or 'local', what should Ohioans know about floods?



- Ohio River Flood 2018

- Cincinnati, OH 2016 Flash Flood



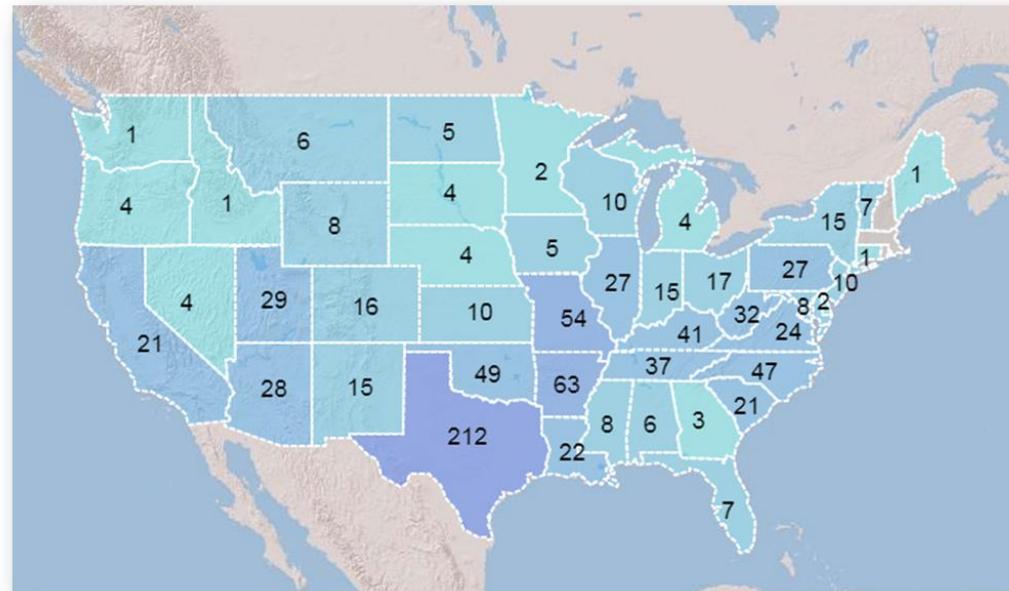


# Risk to life, Risk to property



- In “the weather business”, tornadoes often gain more attention than floods
- Even though, across the U.S., floods cause much more damage and greater loss of life

## 2010-2018 U.S. Flood Fatalities



Source: NOAA/National Weather Service



# Spreading the Word



- **Social Media presence:**
  - During Spring Awareness Campaigns
  - Immediately Prior or During Flooding
  - Partner with ODOT
    - Hit motorists!



**“Floods don’t affect me, I don’t live in a floodplain”**

**Do you commute through one?**

**Don’t get Caught...Be Flood Aware!**



**Don’t Risk a destroyed vehicle, OR your life!**

**#FloodAware Ohio**



# It's just "a little" water over the road... Do you know what that water is hiding? Don't get Caught...Be Flood Aware!

photo Courtesy (Hillsboro) Times-Gazette



Delhi, OH April 2017

Photo Courtesy: Aaron McKnight



**FloodAware Ohio**



June 24, 2016 10TV.com photo



# Additional Communication Challenges



- Are flood warnings and forecasts...
  - Reaching the 'right people'?
  - Understood?
- Do people understand that forecasts inherently **WILL CHANGE?**



# Clearly Communicating Flood Risk



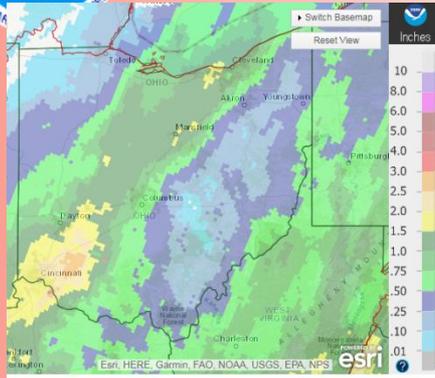
- “Sophisticated” Partners
  - Decision makers: Flood protection, sheltering, DOT, etc:
    - Emergency Management
    - Water Resource Managers
    - ODOT
    - City Planners
    - Utilities
- **Challenge:** During February 2018 Ohio River floods, confusion emerged over NWS graphics depicting river forecasts and river potential



# Ohio River Forecast Center (OHRFC)



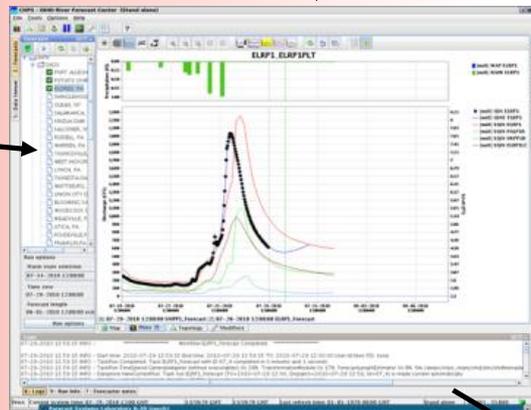
## River Forecast Process



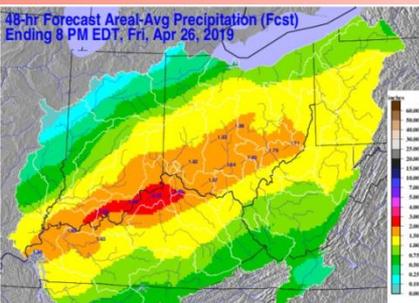
Observed Rainfall



Observed Snow Estimates



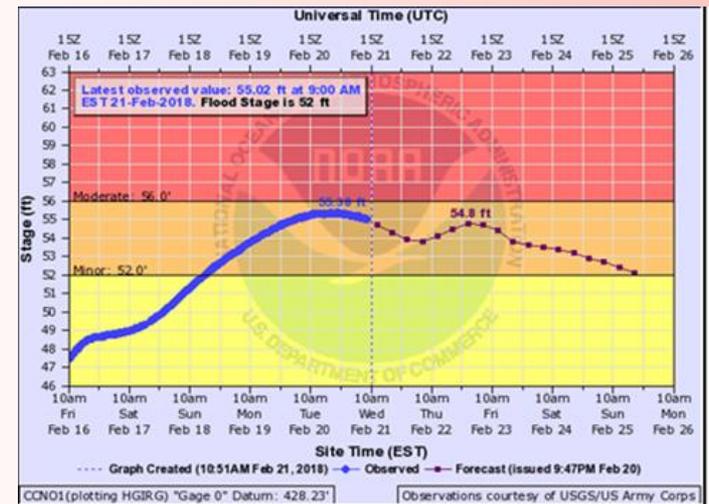
River Forecast Model



RFC Rainfall Forecast

## NWS Official River Forecast

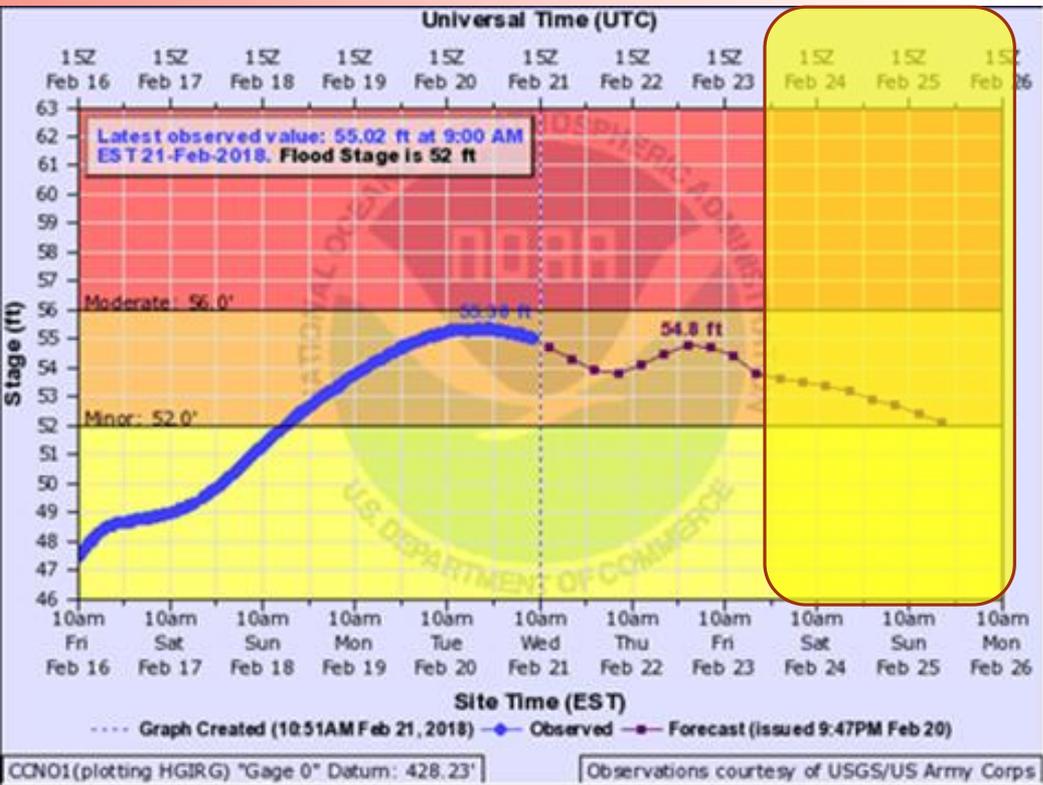
- Rain gage/radar rainfall estimates are **quality controlled**.
- Snow water estimates (when relevant)
- **48-72 hour** rainfall forecasts (**human QC'd**)
- **Human Adjusted** river model simulations
- Forecast stages are sent to the local NWS Weather Forecast Office (WFO) for final review before dissemination on the web.



River gages owned/operated by USGS/USACE



# Tell me...what's in YOUR forecast?



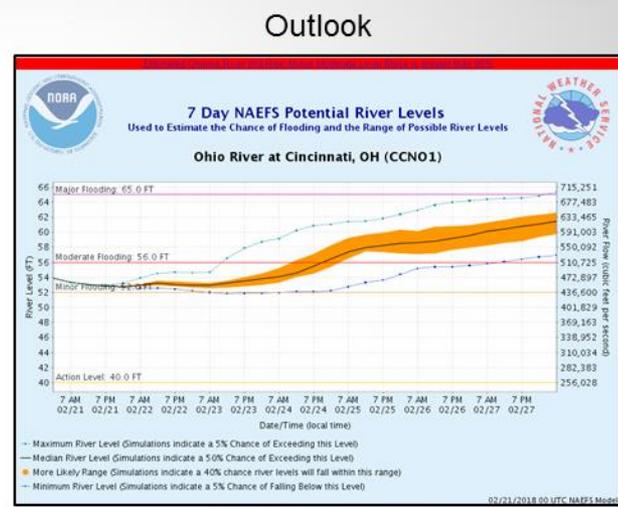
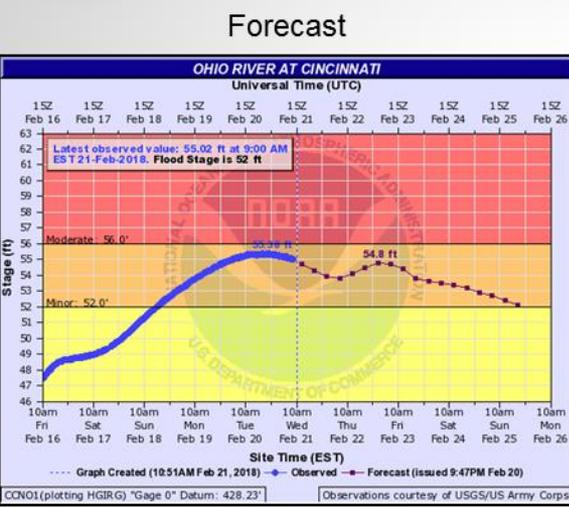
- Official forecast graph
  - Combined with impact statements/severity categories for local/county/state decision makers
- Greatest uncertainty is exact location/amount of rain!
- Rainfall in this timeframe NOT included in river forecast!!
  - Though sometimes 3 days is included



# Communicating River Uncertainty



## Forecast vs. Outlook What's the difference?



Outlooks use multiple “what if” scenarios for a solution

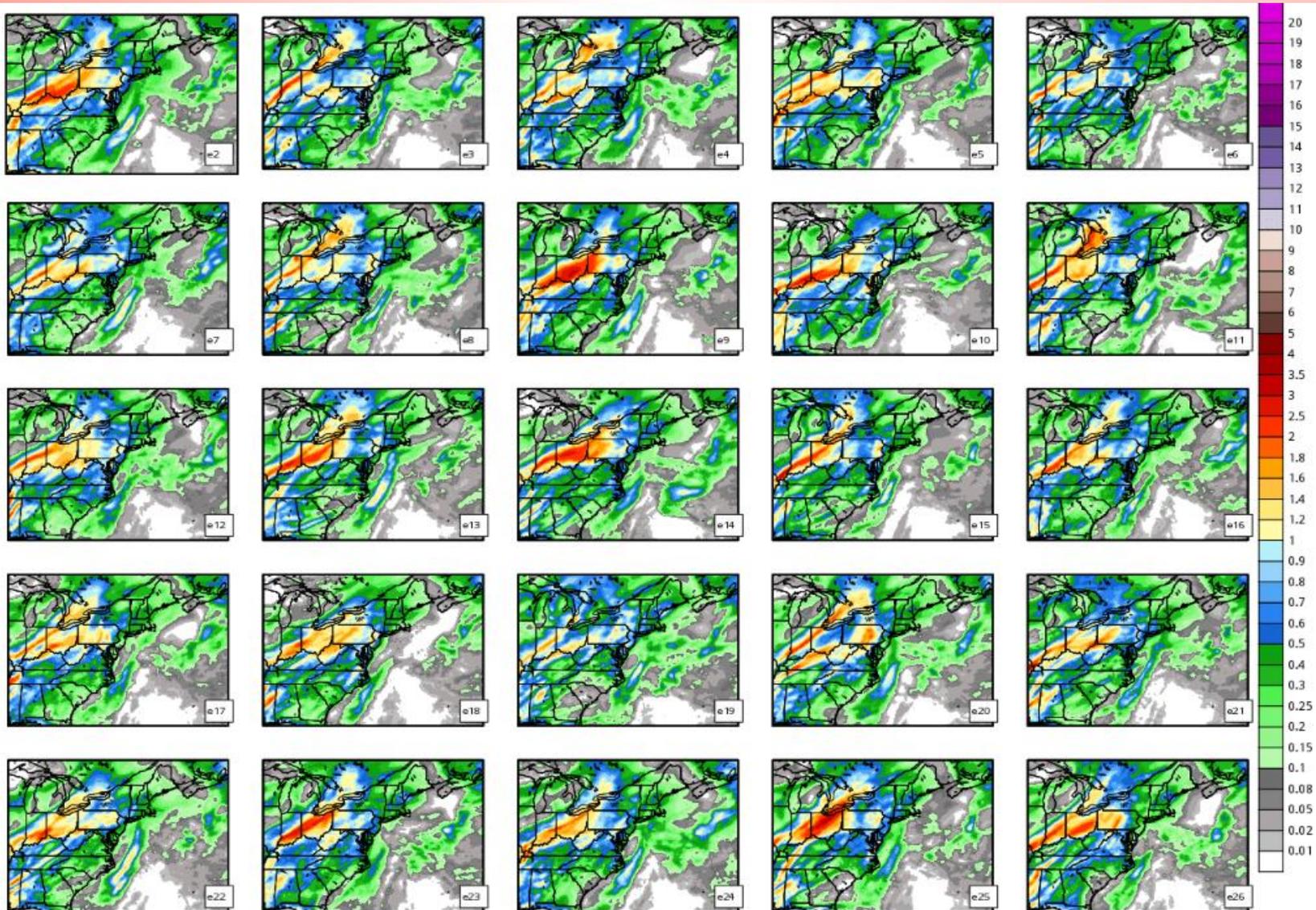
Forecasts give one solution based on many inputs and have human interaction.

Recent flooding has brought attention to difficulties in understanding the difference between the river forecast and river potential

- 2-3 days of forecast rainfall
- Official river forecasts produced by hydrologists
- Manual changes at flood control dams are included
- Most likely outcome
- Updated forecasts found at [www.weather.gov/ohrfc](http://www.weather.gov/ohrfc)
- 7-days of rainfall “what-if” scenarios (up to 42 outcomes)
- Computer-based outlooks (no hydrologist adjustments)
- Manual changes at flood control dams NOT included.
- Many possible risk-based outcomes
- Updated outlooks found at [www.weather.gov/erh/mmefts](http://www.weather.gov/erh/mmefts)

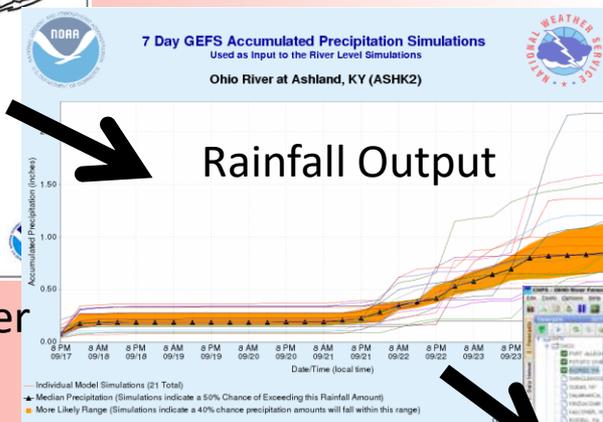
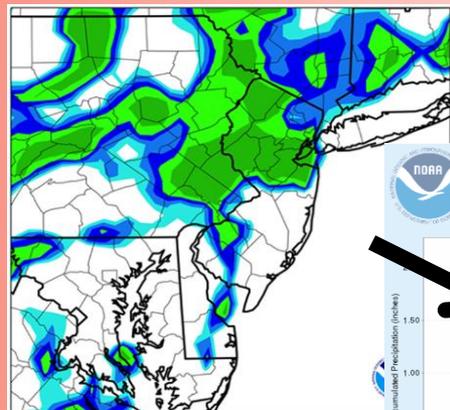


# Which Rainfall Forecast will occur?

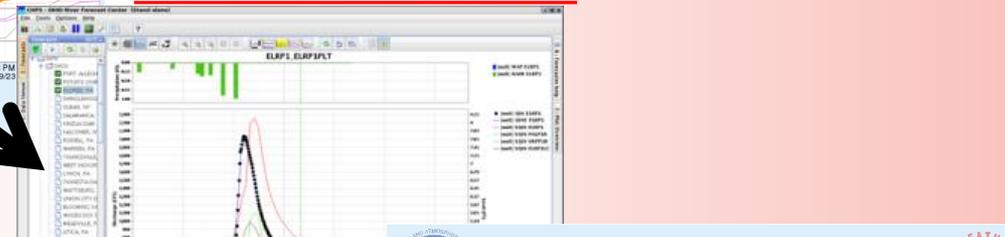




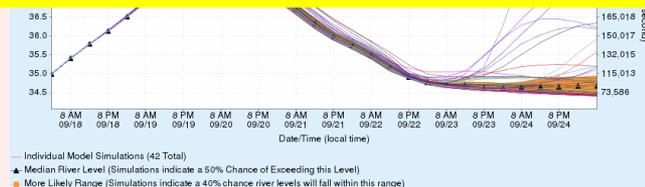
# Ensemble Potential Process



River Model  
**No Human Interaction**



**Preferred Ensemble**  
(but even this 42 member solution has its weaknesses)



Ensemble Weather Forecasts

- Canadian+American Ensembles (NAEFS) 42 solutions/7 days
- American Global Ensemble (GEFS) 21 solutions/7 days
- Short Range American Ensemble (SREF) 21 solutions/3 days

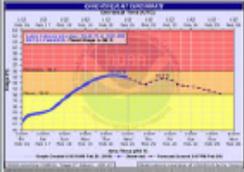


# Which Forecast Do I Use?



Question: Why are the “Potential River Levels” different from the official forecast?



Forecast Input	Official River Forecast  Most Useful Within 3 Days	Potential River Levels  Most Useful Beyond 3 Days
Forecast Rainfall	Includes 2-3 days (may not cover entire rainfall event); More spatial precision	Includes up to 7 days; Less spatial precision
Reservoir Operations/Releases	Uses real-time information from reservoir managers	Uses computer-only simulations
Observed Rainfall Quality Control	Uses real-time forecaster input	Uses computer estimates at model run time
River Forecast Model	Uses real-time forecaster modifications/corrections	No real-time forecaster modifications included
Uncertainties	Provides a single river forecast based on a single rainfall forecast; Does not show a range of possible outcomes	Greater forecast spread based on up to 40 computer-generated rainfall forecasts; Provides range of possible outcomes
Forecast Updates	As needed	Uses a preset schedule



# Future River Potential Graphics



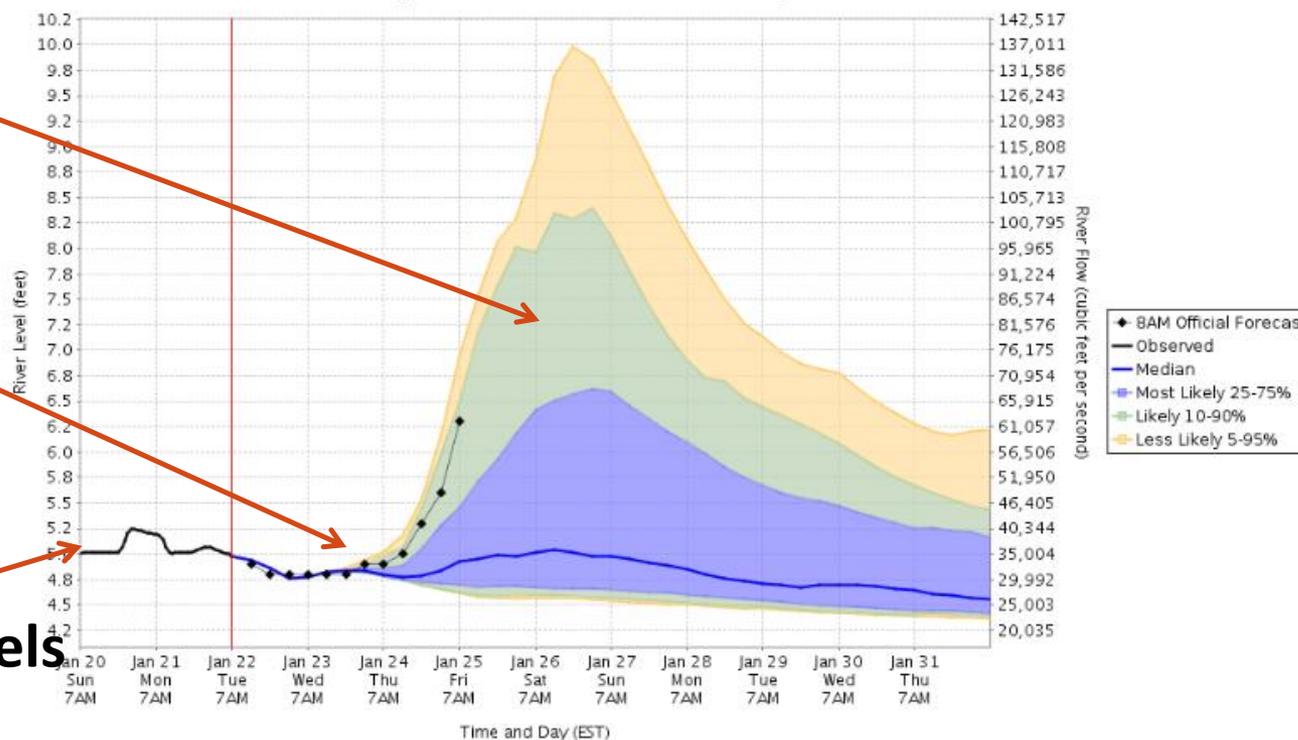
## 10 Day River Level Probabilities

Used to Estimate the Range of Possible River Levels  
[without ENSPOST (Experimental)]

Caution: Official forecast may be updated after this graph is generated.  
For the latest official forecast, go to <http://water.weather.gov/ahps>



### Susquehanna River at Harrisburg, PA (HARP1)



Range of Possibilities

“Official Forecast”  
(dots)

Observed River Levels  
(black line)

About this graph

Forecasts for the Susquehanna River at Harrisburg are issued routinely year-round.

Stage - Short-term Probabilistic Guidance (Experimental) ▼

[Return to Area Map](#)

Model runtime: 07:00 AM EST Jan 22 2019  
Middle Atlantic River Forecast Center



# Comments/Questions: Visit the NWS Booth!

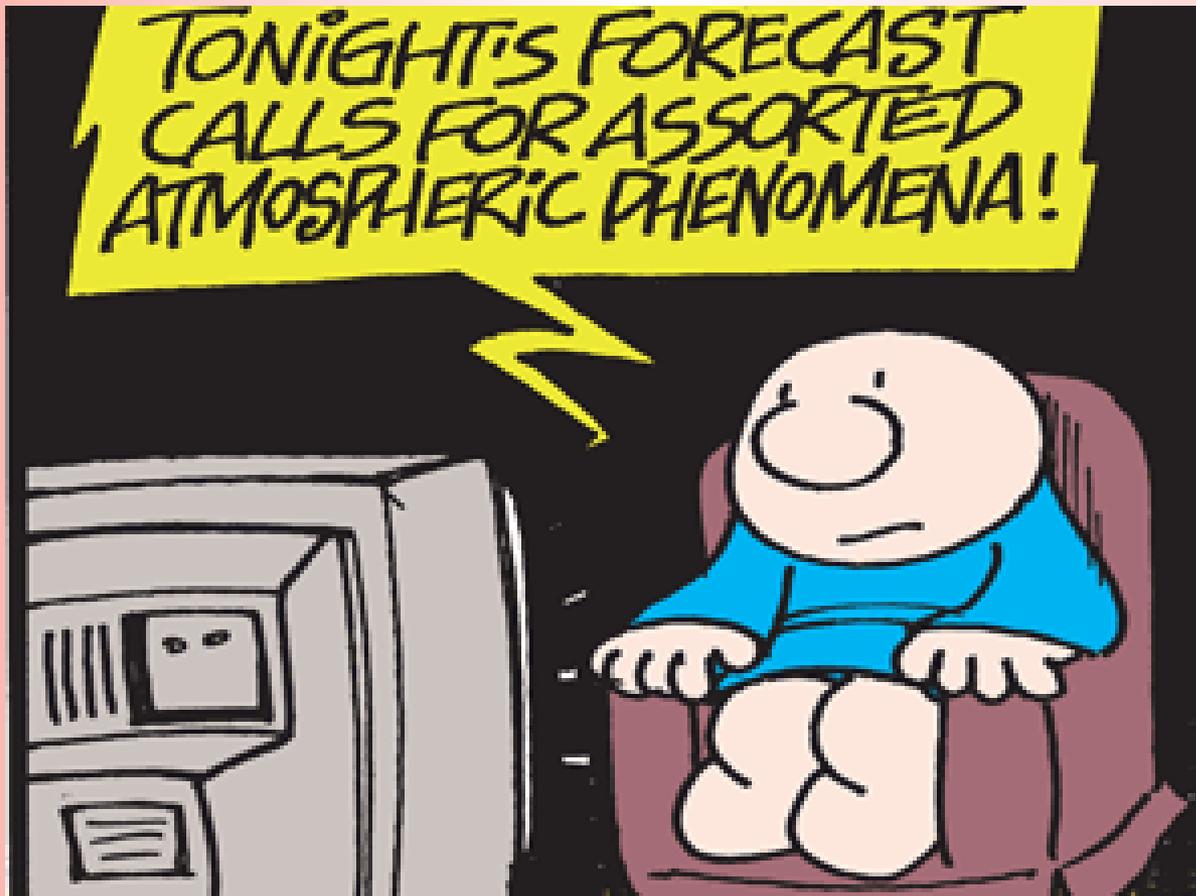


The screenshot shows the homepage of the Weather-Ready Nation website. At the top, there is a blue header with the 'WRN' logo, the text 'Weather-Ready Nation', and 'National Oceanic and Atmospheric Administration'. A search bar is located on the right. Below the header is a navigation menu with links for 'Weather Safety', 'Ambassadors', 'Education', 'News & Events', and 'About'. The main content area features a large image of a lightning bolt with the text 'Lightning: What You Need to Know When Thunder Roars, Go Indoors!' and a credit to 'Photo by Kevin Skow'. Below this is a row of four tiles: 'AMBASSADOR™ WRN WEATHER-READY NATION' with the text 'Become an Ambassador!'; 'Today's Forecast' with a map of the United States; and 'Today's Weather Safety' with four icons labeled 'Severe', 'Heat', 'Wildfire', and 'Floods'.

[weather.gov/wrn/](https://weather.gov/wrn/)



# Remember...



Even the best forecast is  
worthless unless it's clear...

**Thank you!**

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