

Middle Atlantic River Forecast Center Overview

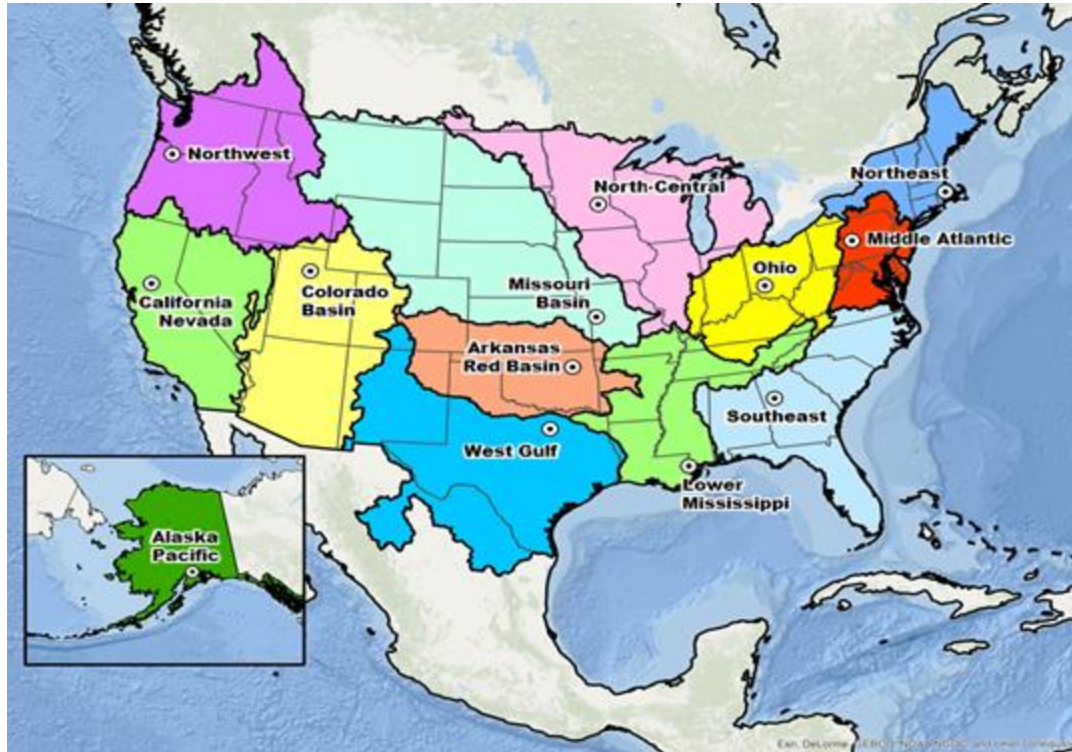
Alaina MacFarlane, Senior Hydrologist (MARFC)



Penn State Harrisburg Workshop 2025

MIDDLE ATLANTIC
RIVER FORECAST CENTER

NWS River Forecast Centers



122 Weather Forecast Offices

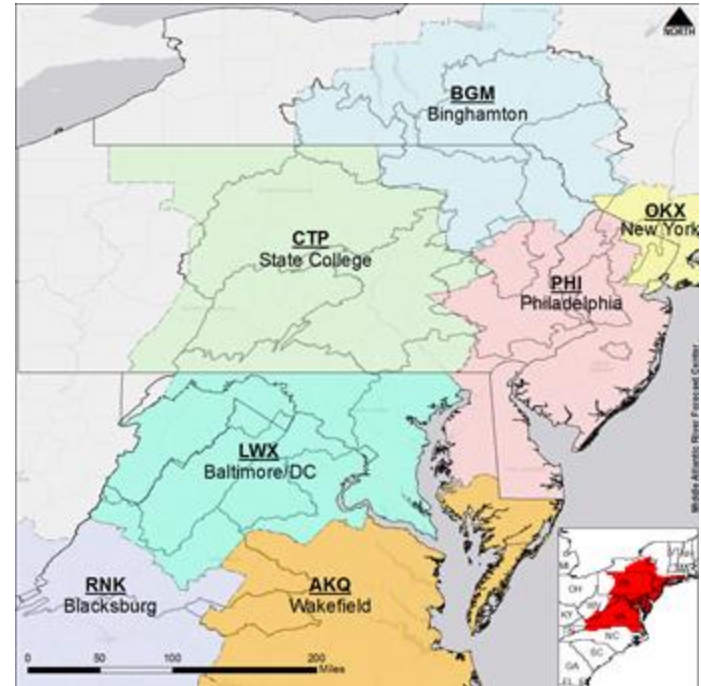
13 River Forecast Centers

MARFC Basins & WFOs

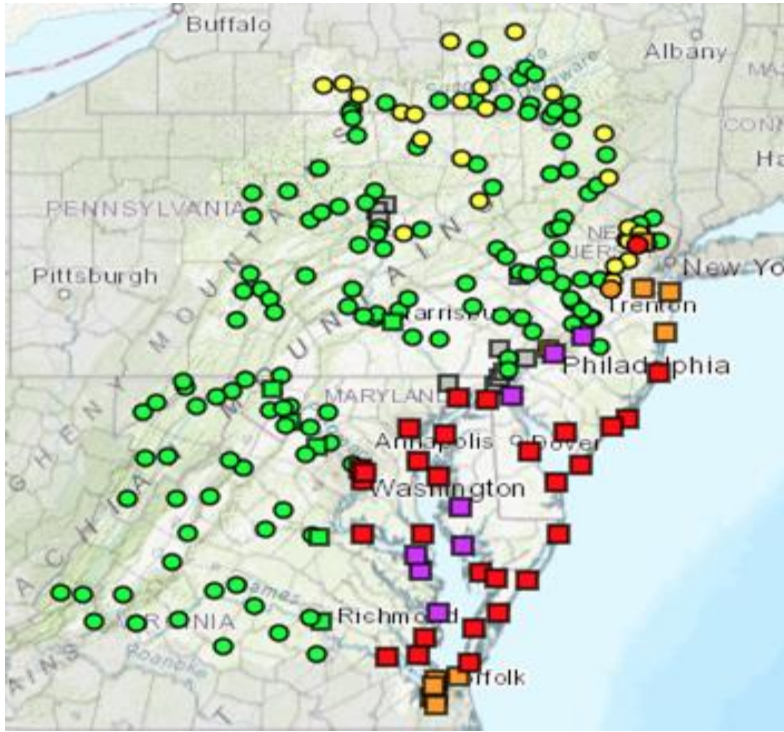
Mid-Atlantic River Basins



Mid-Atlantic WFOs



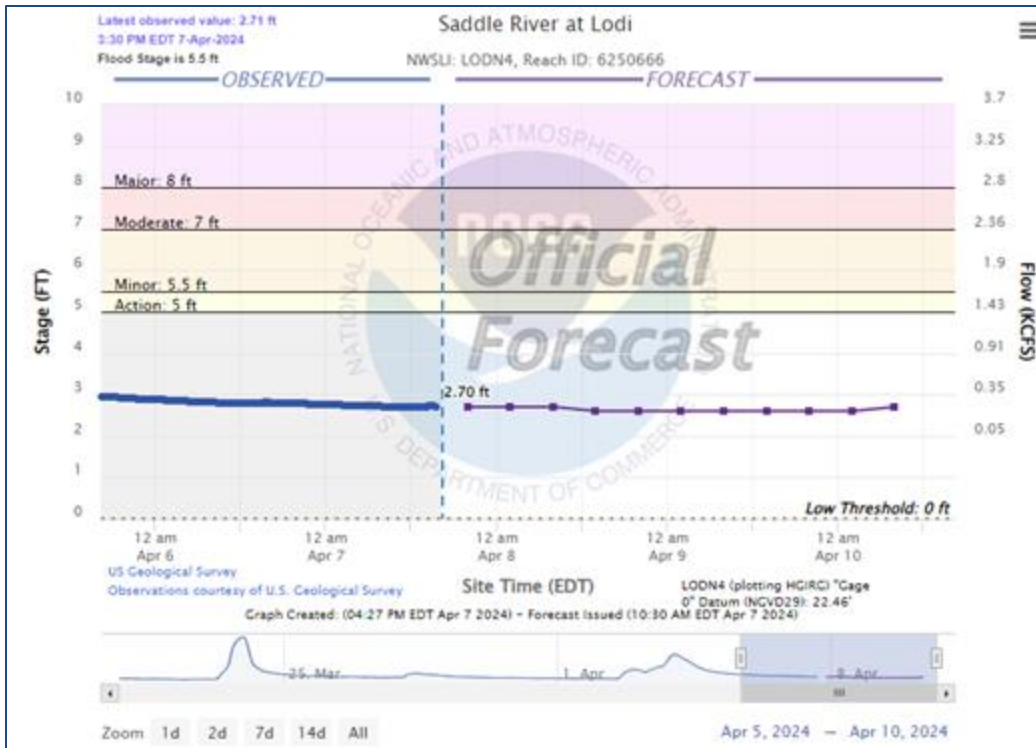
Forecast Operations



- 7 days/week and 365 days/year
- 7am - 10pm
- 24 hours during flooding
- ~175 daily forecast points

HAS - Hydrometeo Analysis & Support (1 person) 7am-3pm	Hydrologists - River Forecasting (2 people) 7am-3pm & 8am-4pm
Evening Shift - HAS + Hydro duties (1 person) 2pm-10pm	Overnight Shifts only during Flooding

How do we create a streamflow forecast?

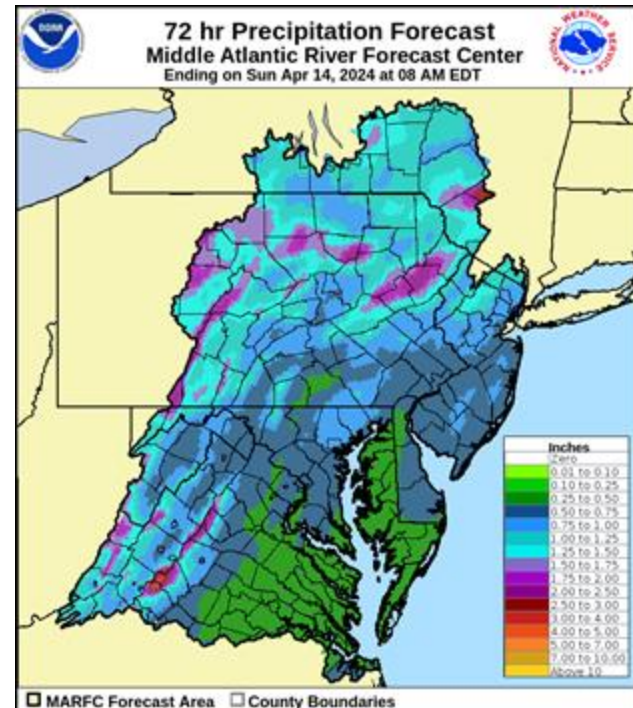


HAS Operations

Quantitative Precipitation Forecast (QPF)

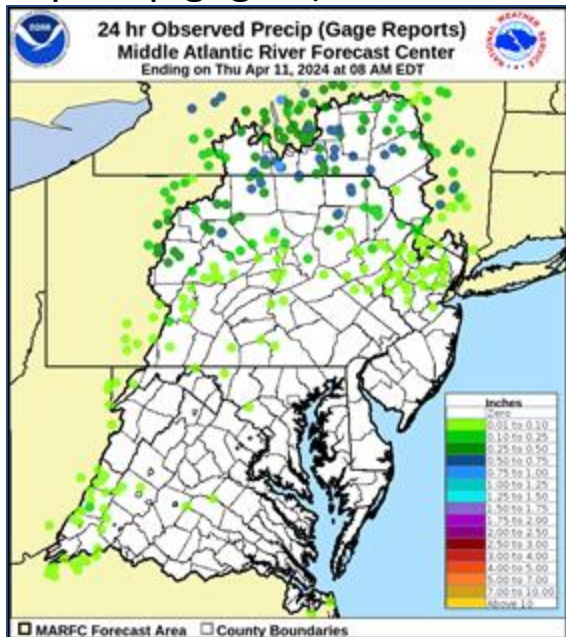
- 72 hours of QPF
- Initialize with Weather Prediction Center (WPC)
- Adjust based on model data and radar
- Collaborate with WFOs and neighboring RFCs prior to issuing

QPF is routinely issued at 12z, 18z, and 0z.



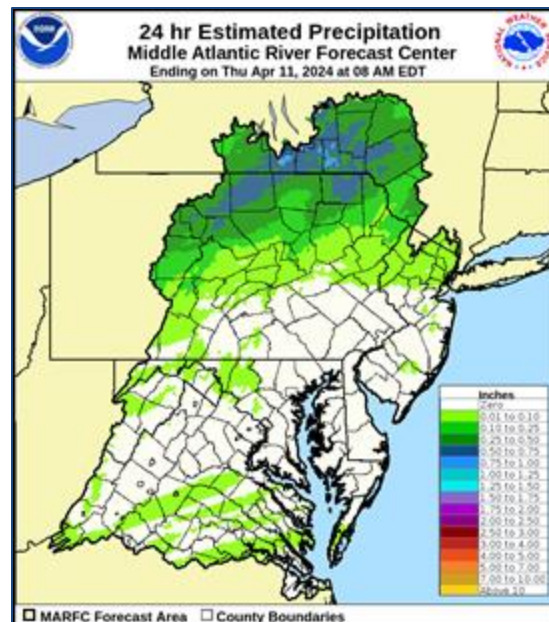
HAS Operations

QC precip gages (6hr and 24hr)



Gage Data: 3,400 gages
(~ 2,600 report every day)

QC hourly multisensor precip grids (hourly)



Multisensor (Radar + Gages) Precipitation
Estimate (MRMS)

Forecasting Streamflow

Input

Output

Dissemination

- Observed precipitation
- Observed temperature
- Forecast precipitation
- Forecast temperature
- Observed river stages
- Projected reservoir releases

Simulated river stage

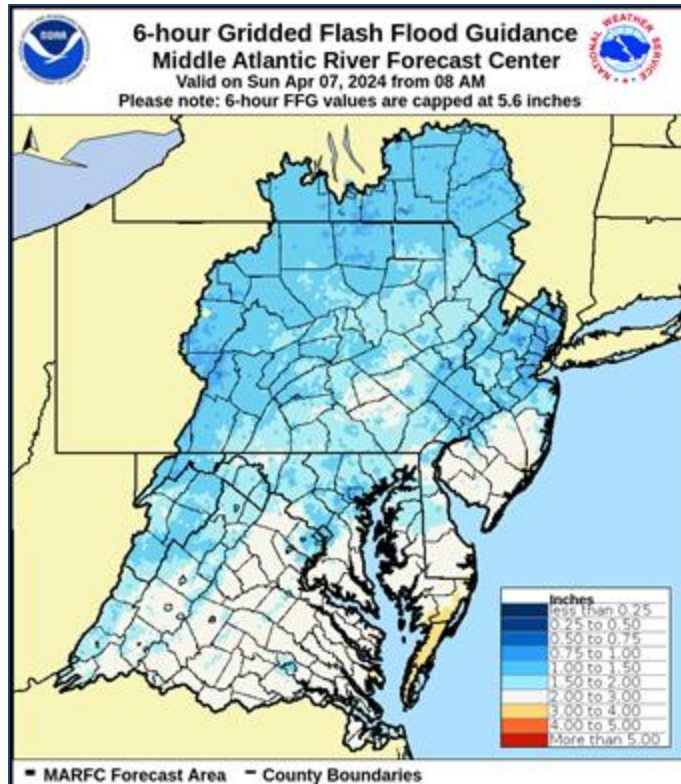
- River stage forecasts (RVFs) are sent to WFOs
- WFOs share the forecasts with the public and issue any warnings as necessary



Additional MARFC Products



Flash Flood Guidance



The amount of rainfall required in 1 hour, 3 hours, or 6 hours for a small stream to overflow its natural bank.

Gridded product is issued every 6 hours.

Headwater Guidance

```
000
FOU571 KRHA 071950
FFHNJ1
HEADWATER STATEMENT FOR NEW JERSEY STREAMS
MIDDLE ATLANTIC RIVER FORECAST CENTER
NATIONAL WEATHER SERVICE STATE COLLEGE PA
332 PM EDT SUN APR 7 2024

APPROXIMATE 1/3/6/12-HR BASIN AVERAGED RAINFALL (INCHES)
REQUIRED TO CAUSE MINOR, MODERATE, AND MAJOR FLOODING AT
THE INDICATED HEADWATER LOCATIONS.

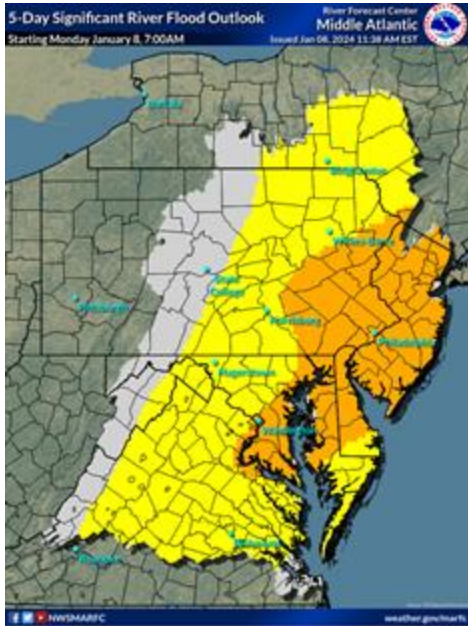
. B RHA 240407 Z DH18/DC2404071932/DUE/PPHCF/PPTCF/PPQCF/PPKCF
:
: IDENT 1HR 3HR 6HR 12HR HEADWATER NAME STREAM
: =====
:
: NWS BROOKHAVEN SERVICE AREA...
: Ramapo River...
MAWH4 1.5/ 1.8/ 1.9/ 1.9 :Mahwah (8ft) Ramapo River
:MAWH4ad 2.2/ 2.5/ 2.7/ 2.8 Mahwah (9) Ramapo River
:MAWH4mj 4.9/ 5.7/ 6.3/ 6.5 Mahwah (12) Ramapo River
: Hohokus Brook...
HOHH4 0.7/ 0.8/ 1.1/ 1.7 :Ho-Ho-Kus (3ft) Hohokus Brook
: Saddle River...
LOOH4 0.9/ 1.0/ 1.4/ 1.5 :Lodi (5.5ft) Saddle River
:LOOH4ad 1.2/ 1.4/ 2.0/ 2.1 Lodi (7) Saddle River
:LOOH4mj 1.4/ 1.7/ 2.4/ 2.6 Lodi (8) Saddle River
: Rahway River...
SPGH4 1.0/ 1.0/ 1.0/ 1.3 :Springfield (5.5ft) Rahway River
:
: NWS MT. HOLLY SERVICE AREA...
: PASSAIC BASIN...
: Passaic River...
CAMH4 0.5/ 0.6/ 0.8/ 1.0 :Chatham (6ft) Passaic River
:CAMH4ad 2.2/ 2.4/ 3.3/ 4.3 Chatham (7.2) Passaic River
:CAMH4mj 3.7/ 4.1/ 5.8/ 7.5 Chatham (8.2) Passaic River
: Rockaway River...
BOTN4 4.4/ 4.9/ 4.9/ 4.9 :Boonton Adv. (5ft) Rockaway River
```

The amount of rainfall required in 1 hour, 3 hours, 6 hours or 12 hours for a headwater stream to reach minor, moderate, or major flood stage.

Text product is issued every 6 hours.



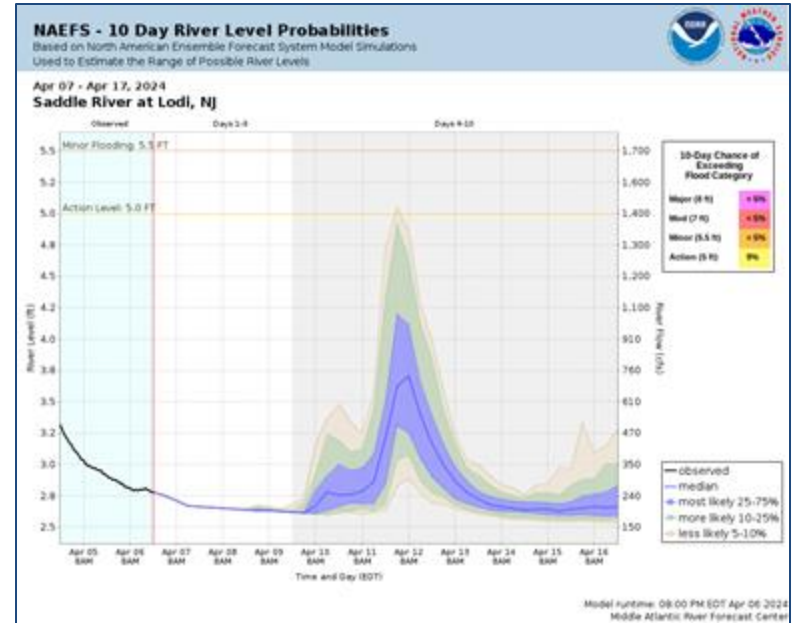
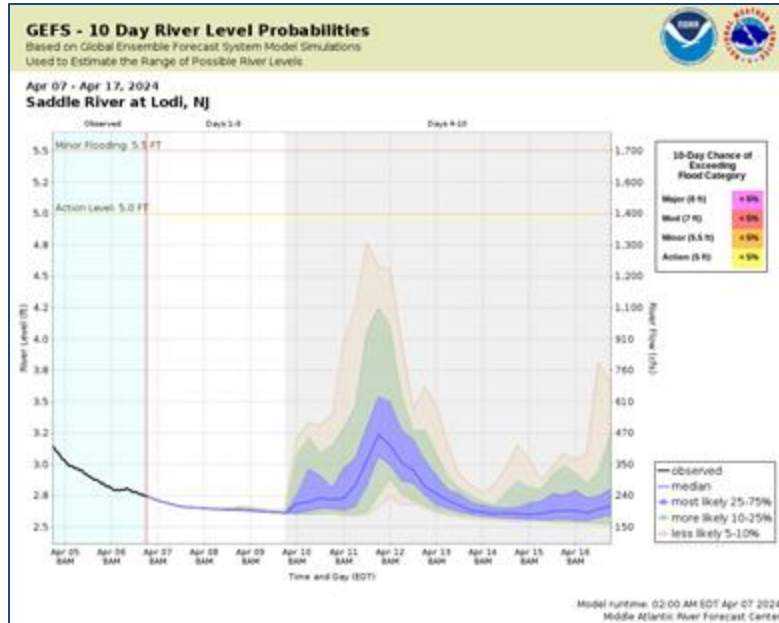
Significant Flood Outlook



The Significant Flood Outlook Product (FOP) is used to highlight the potential for moderate or major flooding over the next 5 days.

- Possible: 30% or greater
- Likely: 50% or greater

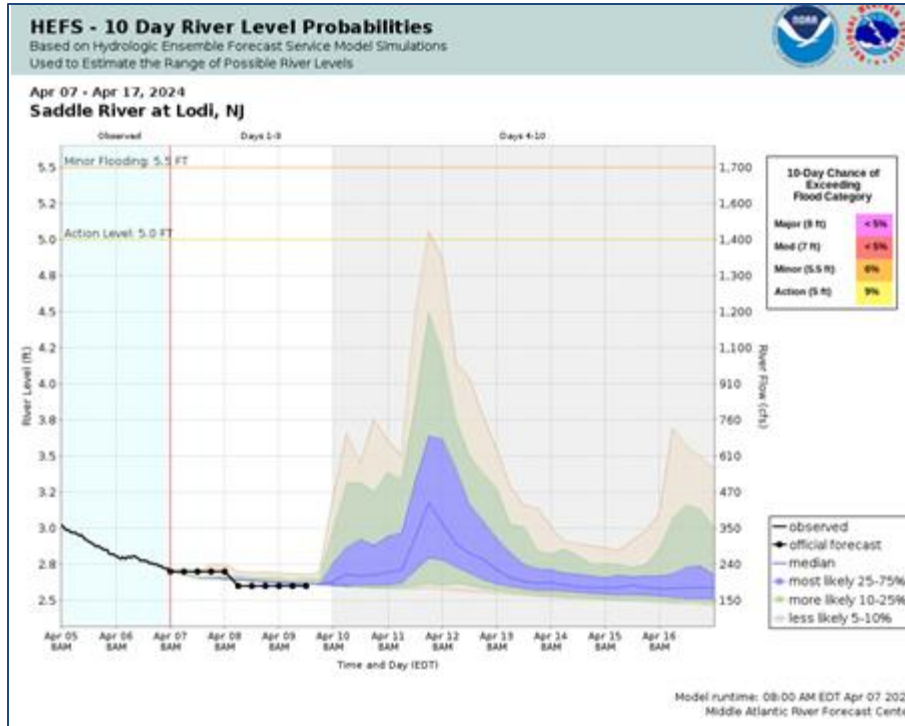
Multi-Model Ensemble Forecasts System (MMEFS)



- Uses raw ensemble precip & temp data from NAEFS and GEFS
- Each model runs twice a day



Hydrologic Ensemble Forecasts Service (HEFS)



- Uses a preprocessor to generate precipitation and temperature forcings based on GEFS mean
- Runs once a day

<https://www.weather.gov/erh/mmefs>



MARFC's Partners and Impact-Based Decision Support Services (IDSS)



MARFC's Core Partners



FEMA




**US Army Corps
of Engineers®**



plus WFOs, National Centers, and the Public

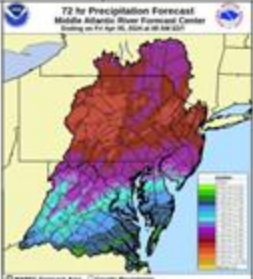


Briefings


Heavy Rain and River Flooding this Week  Middle Atlantic River Forecast Center

OVERVIEW: Multiple rounds of rainfall through Wednesday night will increase flood potential. The highest chance for river flooding is across the Susquehanna, Delaware, Passaic and Raritan basins.

Affected Rivers	Given the current rainfall forecast, the rivers most at risk for flooding are the Susquehanna, Delaware, Passaic and Raritan in New Jersey, Potomac and southeast Pennsylvania tributaries. Given the widespread rainfall, the flood potential has increased across much of the area.
Timing	Multiple periods of heavy rain are expected to move through the region today through Wednesday night. River flooding is expected to extend into Thursday.
Hazards & Impacts	Minor flooding is likely for the above mentioned areas. The chances of Moderate flooding have increased since yesterday, especially for the Susquehanna.
Confidence	High confidence in widespread heavy rainfall through Wednesday. Less confidence in total rainfall amounts and placement. High confidence for widespread minor river flooding.



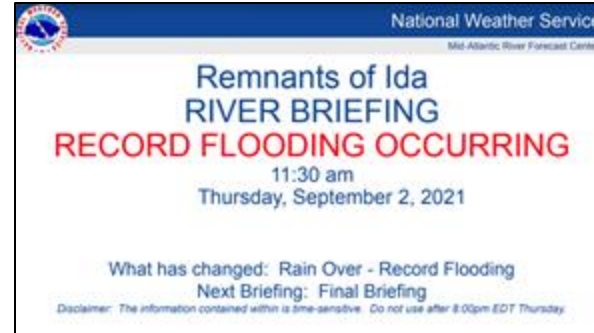
72 hr Precipitation Forecast
Middle Atlantic River Forecast Center
Issued on 04/02/2024 12:15 PM



MARFC River Forecasts
Issued on 04/02/2024 12:15 PM

Issued: 04/02/2024 12:15 PM www.weather.gov/marfc

- One-pager or full briefing
- Generally sent out around 12pm
- Coordinate with affected WFO/RFCs and NWC



National Weather Service
Mid-Atlantic River Forecast Center

**Remnants of Ida
RIVER BRIEFING
RECORD FLOODING OCCURRING**
11:30 am
Thursday, September 2, 2021

What has changed: Rain Over - Record Flooding
Next Briefing: Final Briefing

Disclaimer: The information contained within is time-sensitive. Do not use after 8:00pm EDT Thursday

- Host and participate in partner conference calls
- Extra posts to social media

Flood Inundation Maps (FIM)





River Flood Impacts - Williamsburg, PA

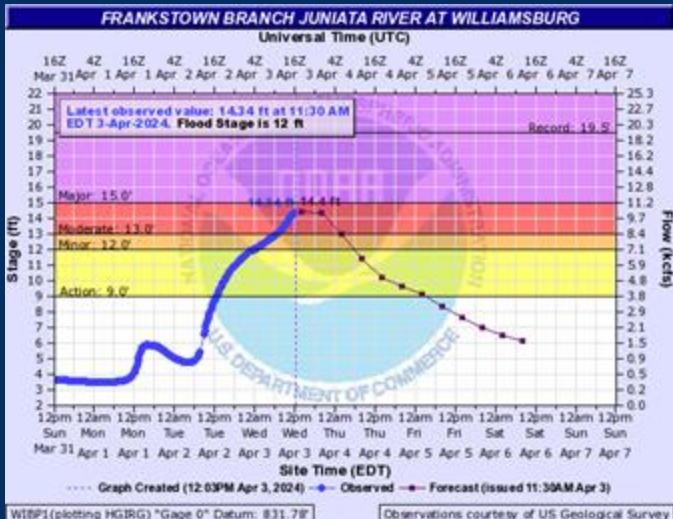
Frankstown Branch Juniata River at Williamsburg, PA

Inundation Level Shown: 15.0 ft. (Major Flood)

Forecast Crest Height: 14.4 ft. (Moderate Flood)

FIM Source: NWS - Categorical FIM (CatFIM)

FIM Creation Time: 12:15 PM Apr 3, 2024



Thank you!

In the Forecast: Heavy Rainfall - Flooding

Excessive Rainfall - through Sunday 7 AM



Forecast Rainfall - through Sunday 7 AM



NWS BALTIMORE/WASHINGTON

IN COORDINATION WITH NWS RIVER FORECAST CENTERS

River Stage Information

Conococheague Creek - Fairview, MD

March 9, 2024
10:35 AM



Forecast Impacts

10 ft ... Wishard Road and Kemp Mill Road are both flooded.

Flood Levels

Major Flood: 15.0 ft
Moderate Flood: 12.0 ft
Minor Flood: 10.0 ft
Action Stage: 8.0 ft

NWS Baltimore/Washington

In coordination with Mid Atlantic River Forecast Center

alaina.macfarlane@noaa.gov

