# How NWS Flood Inundation Mapping Performed during the April 2024 Ohio Valley Floods

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# What is FIM?

*Water on a Map* - translating streamflow analysis and forecasts into operational inundation maps to help communicate impacts.

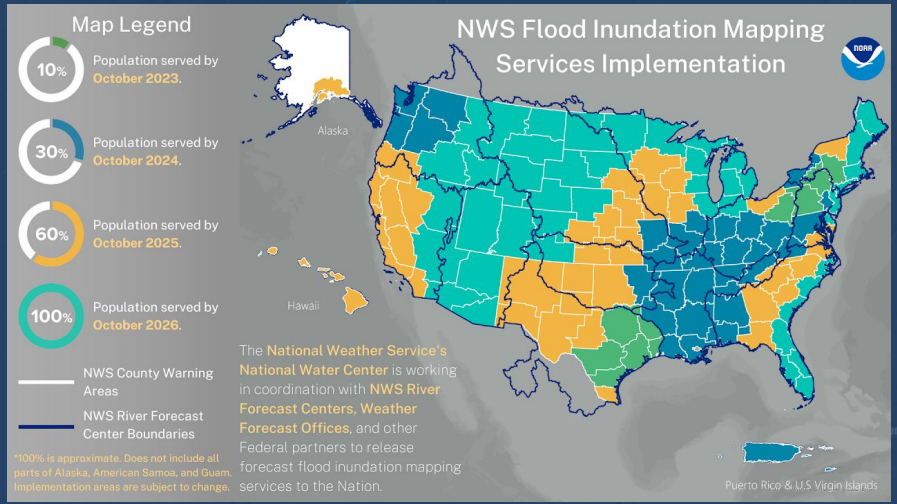
Neighborhood-level Flood Inundation Maps (extent maps)

FIM available to the public:

- NWM Latest Analysis
- RFC 5-Day Max Forecast
- NWM 5-Day Max Forecast
- Stage-Based CatFIM* (not available at all forecast point locations)

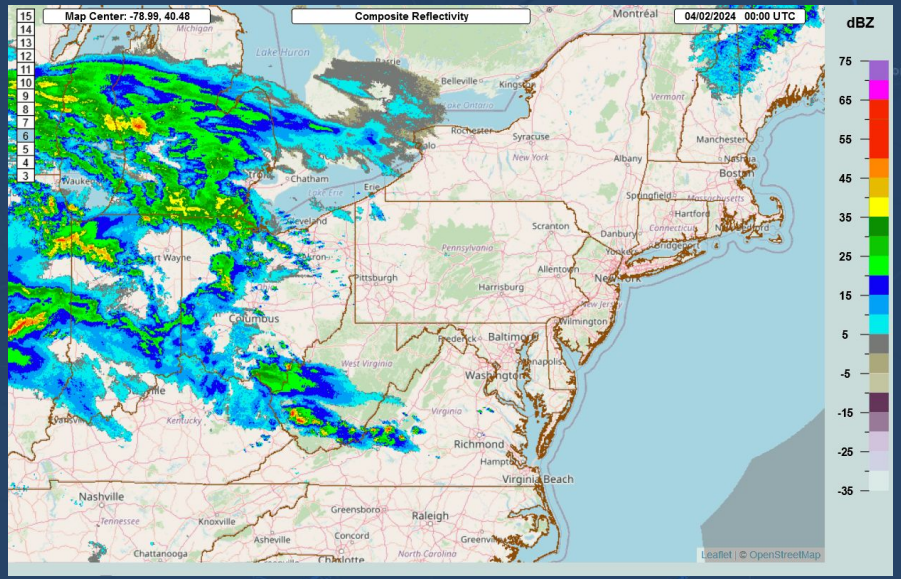
Partners were trained on FIM in the months leading up to these events.

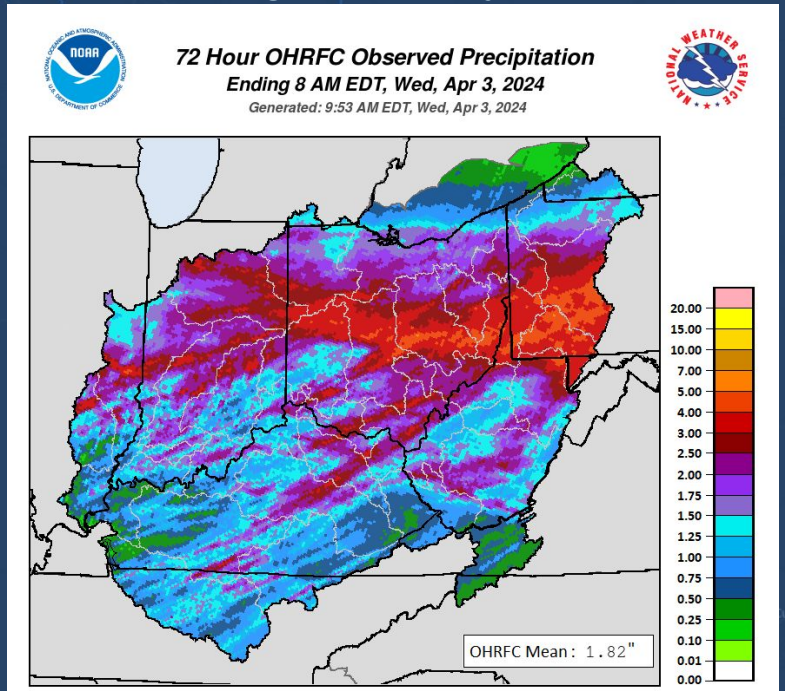
- Hourly webinars and face-to face meetings



# The Event

- Several rounds of rainfall along a nearly stationary boundary
- Ensembles began hinting to the possibility of river flooding a few days prior.
  - IDSS emails began on March 29th.

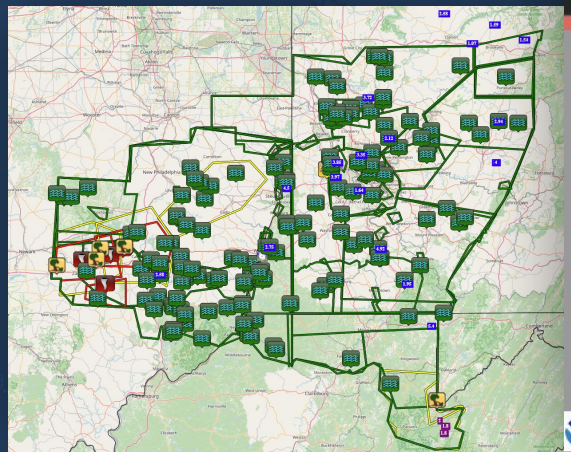


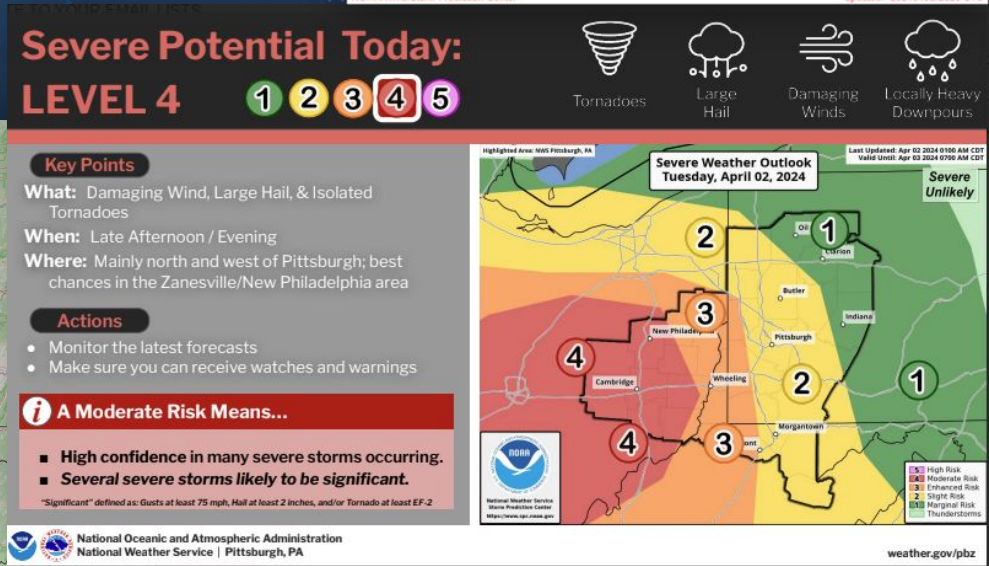



# Workload

- Moderate Risk of Severe on Tuesday April 2nd
- Flash Flooding/Landslides
- IDSS Webinars and Briefings
- Phone Calls
- Verification

***And now…FIM!***



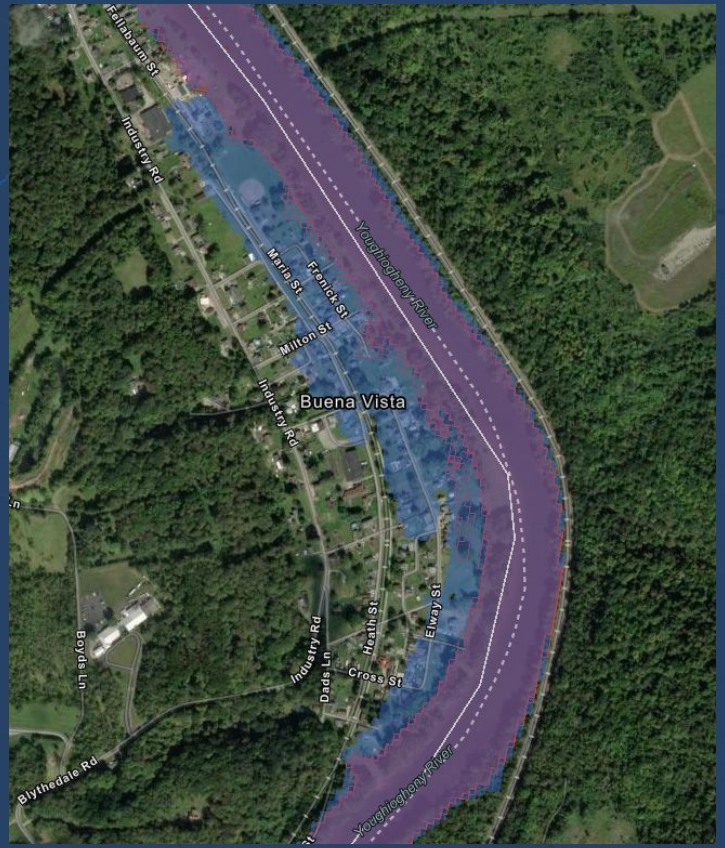
# Partner FIM Requests

| | | |
|---|---|---|
| Allegheny County, PA | Highlight mainstem rivers and other points of interest across county | Email: Multi-page slide deck |
| Harrison County, OH | Wanted to know whether water treatment plant would be affected | Email: screengrab of NWM FIM and NWM forecast hydrograph |
| Marshall County, WV | Wanted to discuss current and forecast flood conditions | Webinar |
| Jefferson County, PA | Concerned about levee impacts in Punxsutawney PA | Email: screengrab of FIM |
| Columbiana County, OH | Concerned about stages at Wellsville and East Liverpool Ohio | Webinar |
| WV Region II | Wanted to highlight flood threat for northern WV | Webinar |

# Partner FIM Requests - Allegheny County PA

***I know you are probably going to get swamped with these, but when you have time, can you please do a map for Allegheny County. if you could please do it for all of the rivers, including the Youghiogheny.***

- Used a combination of RFC FIM and stage-based CatFIM to show a range of possibilities.

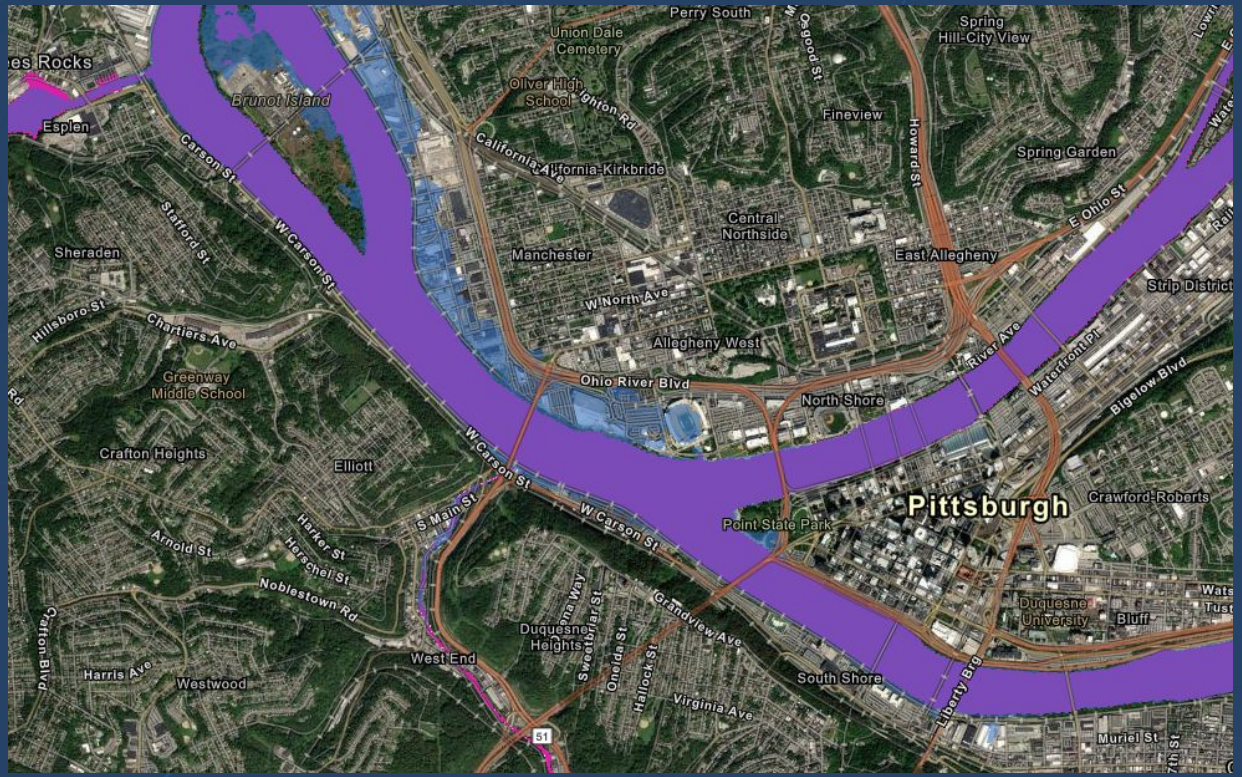


# Allegheny County - Pittsburgh Problem

RFC FIM was overdone…why?

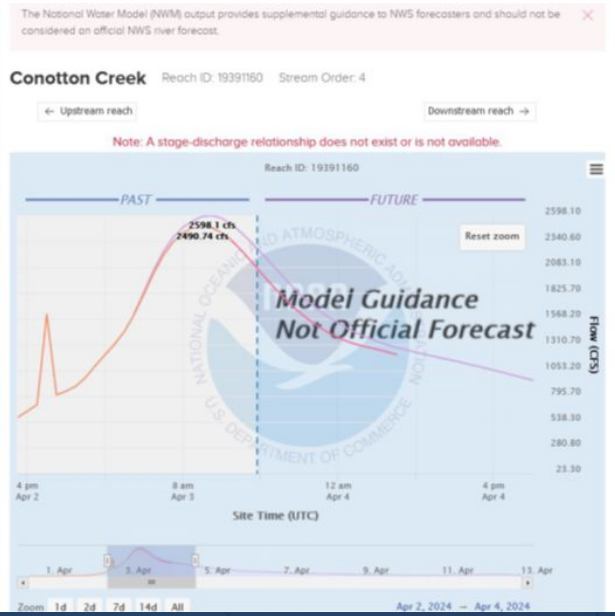
Could not use RFC FIM. But we needed to show the EM something…

Used Retrospective Probability FIM (internal)



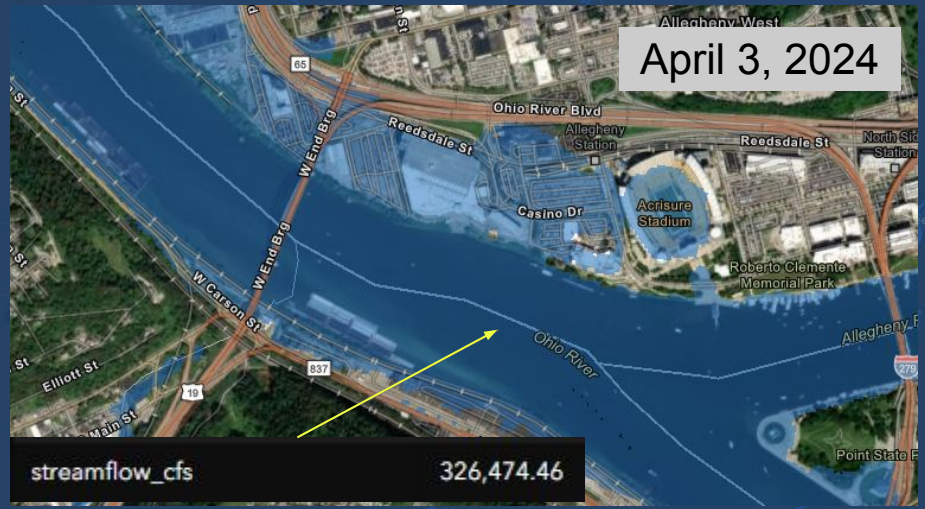
# Partner FIM Requests - Harrison County Ohio

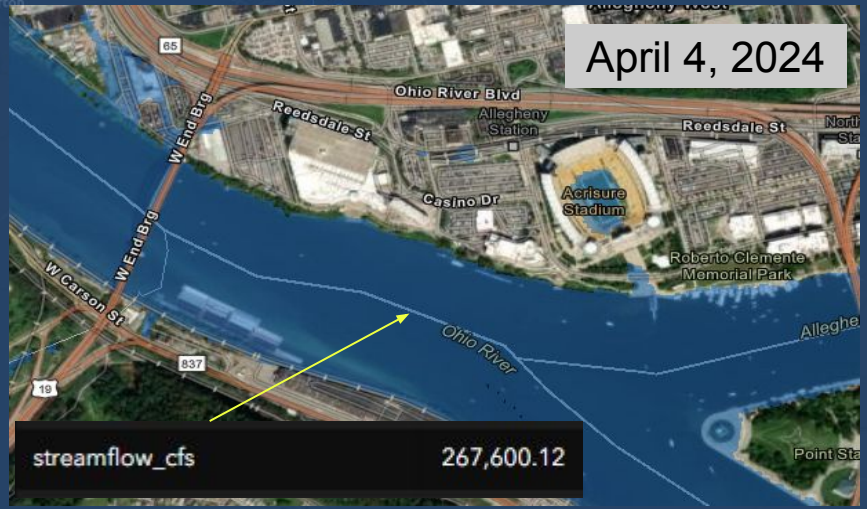
Unfortunately, we do not have a gage near that location. However, utilizing the National Water Model Forecast I can give you a rough estimate. It looks as if in the region around the water treatment plant, the Creek has crested. The Inundation does look like it is surrounding the water treatment plant. The bridges probably wouldn't be inundated, despite what it looks like in the image.



# RFC and NWC Collaboration

- Worked with FIM SMEs at OHRFC (Ryan F. and Brian A.) and Water Prediction Operations Division (WPOD) during the duration of the event.
  - Slack, Google Chat, Google Meet
- Kudos to NWC Geo-Intelligence Division (GID) for making changes on the fly!



# Our First Widespread FIM Event

NWPS was also used to give est. timing of crests for ungaged streams and used to determine whether to extend a flood warning

- Staff were trained in real-time with SOO and SSH

Hydrologist did most of the FIM reviews/requests

- Continued after the event
- Drone footage used to verify FIM in real-time
  - Shared in NWC FIM Slack Channel and added to FIM Reviewer

*Wheeling Island: FIM vs. aerial footage*

# PBZ Lessons Learned

## Staffing

- Widespread event requires additional staff dedicated to FIM analysis
- Issue: multi-hazard event made FIM staffing difficult
  - Draft a FIM IDSS/Staffing Plan!

## Ask for help

- WPOD/RFC will be doing FIM analysis
- Issue: WPOD may not have the understanding of the local area that the WFO has - ***communicate***.
  - Slack/Google Meets

# Takeaways

FIM Requests will come in many forms - email, webinar, etc.

- Draft ready-made template for use in events

Adjust staffing plans to incorporate FIM requests/analysis

- Depends on level of staff experience

Coordinate with RFC prior to the event

- Adequate time to staff up to meet FIM Demands

Consider use of other NWM products (hydrographs in NWPS)

- Can help tell the story

Continue verification post-event

- Also share the successes with partners to build confidence