

### **NATIONAL WEATHER SERVICE** Building a Weather-Ready Nation

### A Summary of Flood Inundation Mapping Efforts at the Central Pennsylvania National Weather Service Forecast Office

### **AMS Annual Conference**

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# **Topics Covered**

- Background
- The State College Approach
  - Implementation Plan
  - Outreach
  - Staff training
- Lessons learned
  - · What flooding events could and should look like



# **FIM Background**

- Flood Inundation Mapping
  - Transformational service
  - Putting a picture to the flood
  - The EM community has asked for this for years
- Many challenges to overcome
  - How well does FIM perform?
  - Training staff/partners/public
  - How is it used on the operations floor during a big flood event
  - How will EMs/Partners/Public use this?



# **The State College Approach**

- Implementation Plan
  - Organized plan of attack
  - Contents
    - Background
    - Personnel
    - Training
    - FIM Reviews
    - Outreach Plan
    - Forecast Operations
    - Important Links and Documents





# **The State College Approach - Outreach**

- FIM Timing was favorable Coming out of the Pandemic
  We hadn't had face-to-face communication with our
  - We hadn't had face-to-face communication with our partners in at least two years
  - Introducing FIM services gave us a great opportunity to visit with our partners
- In person meetings with each county Emergency Services (33 Counties)
- Met with Partners State and User Groups
  - PA Emergency Management Agency (PEMA)
  - Susquehanna River Basin Commission
  - PA Silver Jackets
  - PA Spatial Data Access Office (PASDA)
  - Media Workshop



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# **The State College Approach - Outreach**





Name: Harrisburg 50-Year Flood Map

Description: This map zooms in on areas of Harrisburg, PA to show potential flooding at roughly the 50-year flood event. The National Water Model (NWM) AEP (annual exceedance probability) maps were based on the 40-year NWM v2.1 reanalysis simulation, utilizing a flow frequency analysis method described in Bulletin 17C guidelines developed by the United States Geological Survey (USGS). The "High water" conditions depicted in the maps are approximated regionally with an AEP that aligns with the "Action" flood threshold of the NWS forecas points within each region. Regions are defined by McCabe and Wolock (2016) based on a spatial analysis of variability in wa year runoff efficiency across HUC8 units. These NOAA AEP inundation maps represent a model simulation and do not h any regulatory authority. See FEMA fact sheet on flood insurance HERE (https://www.fema.gov/flood-insurance/rules legislation) Page 1 of 9











### **The State College Approach - Outreach**







# The State College Approach - Training

- FIM is a big change for the NWS field offices hydrologic program
  Especially during flash flood events smaller tributaries ٠

  - Extra work load
  - Leaving comfort zone using something new and untested to help make warning decisions
- OWP training assigned to each meteorologist
  Good starting point to introduce the subject, but much more was needed
- One-on-One training with each staff member
  - SOO or SSH facilitate, but the meteorologist works through the • scenario
  - Trained on flood event from TS Ida
- Encourage staff to become familiar with the FIM tools
  - Like anything else with flood monitoring, learn how to use the • tools you need



## **The State College Approach - Training**

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#### NWS CTP FIM Training

michael.jurewicz@noaa.gov	Switch account	

\* Indicates required question

Email \*

Record michael.jurewicz@noaa.gov as the email to be included with my response

If this is your first time every using the WaterView application, follow <u>these</u> instructions before returning to this training.

Open up the <u>WaterView</u> application and login using NOAA credentials (It may require 2 logins).

Your answer

Click the "Add Data" button highlighted in yellow below:







Your answer

Using the Search location feature, type in New Hope, PA (NHPP1)

Change your map background to imagery hybrid



### **Lessons Learned**

- State College has been using FIM in operations since September 2023
- Early lessons have been learned during flood events
  - Let the meteorology drive product issuances
  - If the meteorological threat and/or observed rainfall justifies flood related products, that is what will trigger us to start observing the FIM hourly analysis and near-term trends
- NWS Chat 2.0 / Slack is a good way to communicate flood risk real time with EM partners
  - FIM graphics is a natural fit for this platform
- Encourage staff to look at FIM products regularly



## **Lessons Learned - FIM In Practice**





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### **Lessons Learned - FIM In Practice**



NWS - State College - Michael Dangelo 9:01 PM

Here's a look at some Flood Inundation Mapping output for now (01Z) in Montour and northern Columbia County. We'd love to know how this compares to reality. Any folks out there who have local knowledge of the area, please let us know if it seems accurate or at least reasonable.

FIM\_Columbia\_Montour\_09092023.PNG -



#### NWS - State College - Michael Dangelo 9:09 PM

Here's a zoom into Buckhorn and, in particular, the Hemlock Creek and Frozen Run. The red and purple lines along the creeks (see legend) mean that this level of water/flow only has about a 2-4% chance of occurring in any year. The larger blue area spread out from the creek center/normal channel is meant to be an approximation of the areal extent of the water.

FIM\_Columbia\_Montour\_09092023\_2.PNG ·





NWS - State College - Michael Dangelo 9:18 PM

Here's a shot near Rohrsburg where the Little Green Creek joins the Green Creek. The model is expecting that the water may be encroaching on some buildings in town. It'd be great to hear what the real conditions may be like there now. (edited) FIM\_Columbia\_Montour\_09092023\_3.PNG •





# **Other FIM Verification Efforts**

- After a significant heavy rainfall event on 17-18 December, CTP and RHA combined to gather reports and/or footage of inundation in specific locations
   Comparison to NWM output
- Inter-agency proposal to use USGS high water marks, in concert with other verification data (like drone footage)



# **In Summary**

- NWS State College is using FIM products to visually show the risk of flooding
- Partner outreach necessary before showing FIM products
- Individual Staff Training
- FIM supplements "core" hydrologic products
- NWS Chat 2.0 is an effective conduit for communicating to EM partners



# **Questions / Comments?**

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