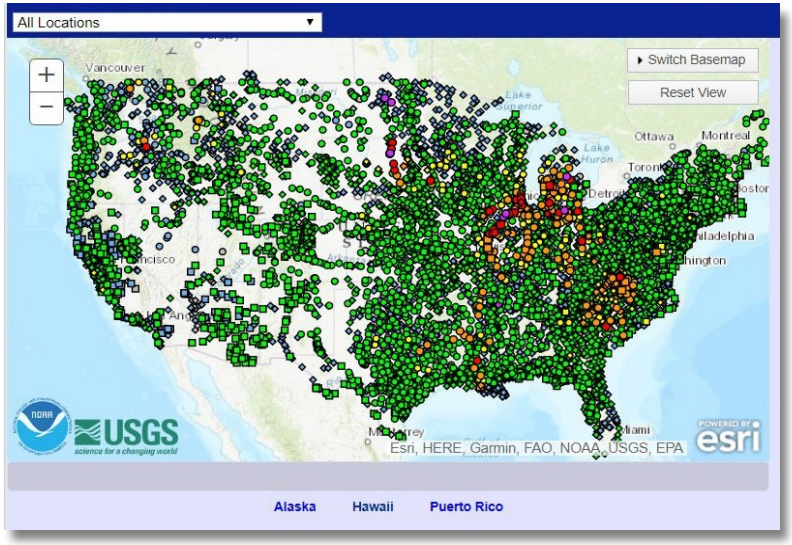
National Weather Service
Flood Inundation Mapping (FIM)

John Kirk

NOAA / NWS Middle Atlantic River Forecast Center

NOAA / NATIONAL WEATHER SERVICE
MIDDLE ATLANTIC RIVER FORECAST CENTER

Current Services

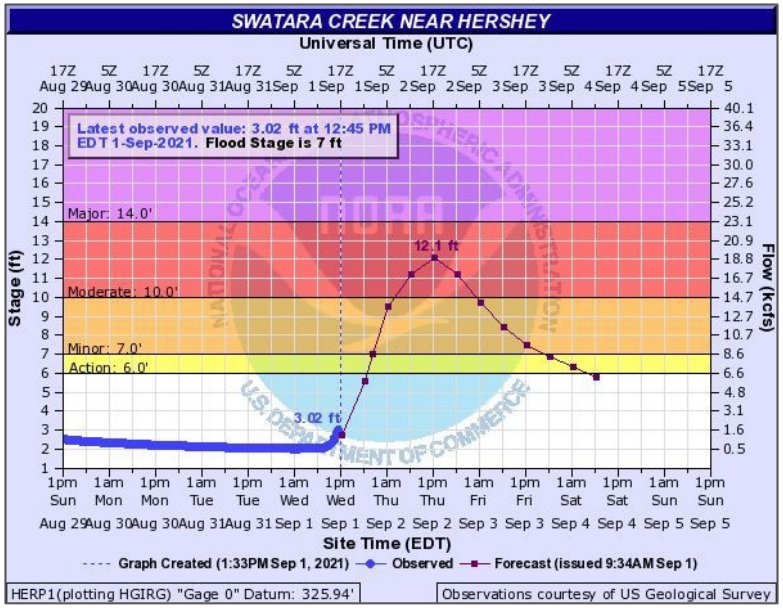


NWPS/AHPS Gages & Forecasts

National Water Model (NWM)

- NWS offers a variety of hydrologic services, including river forecasts
  - **NWPS:** ~3600 official river forecast locations available via National Water Prediction Service (successor to AHPS)
  - **NWM:** Modeled streamflow for 3,400,000 river miles via the National Water Model
- Opportunities to improve river forecast and flood impact communication to public and partners

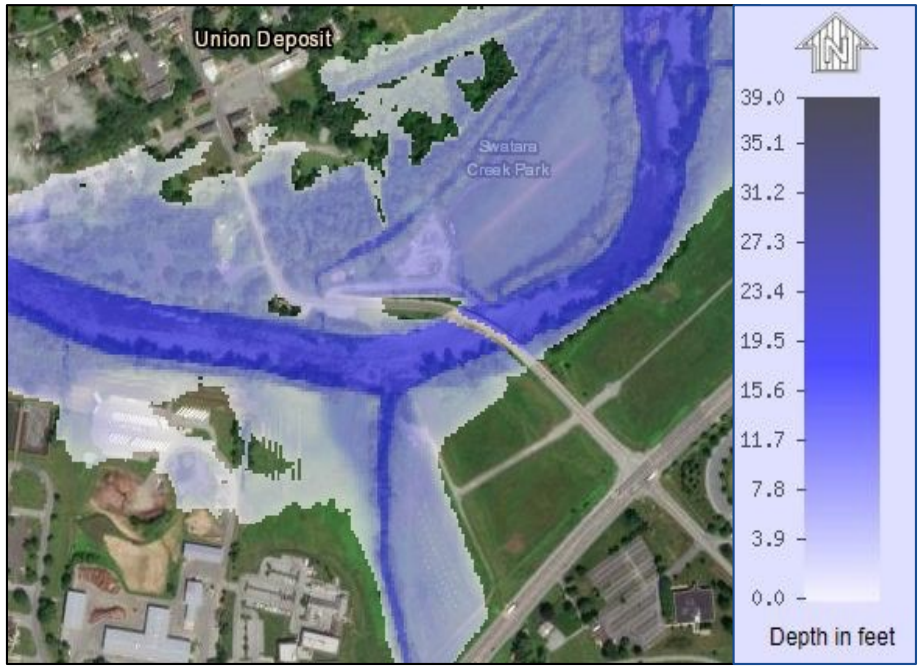
Current Services



"a picture is worth a thousand words"

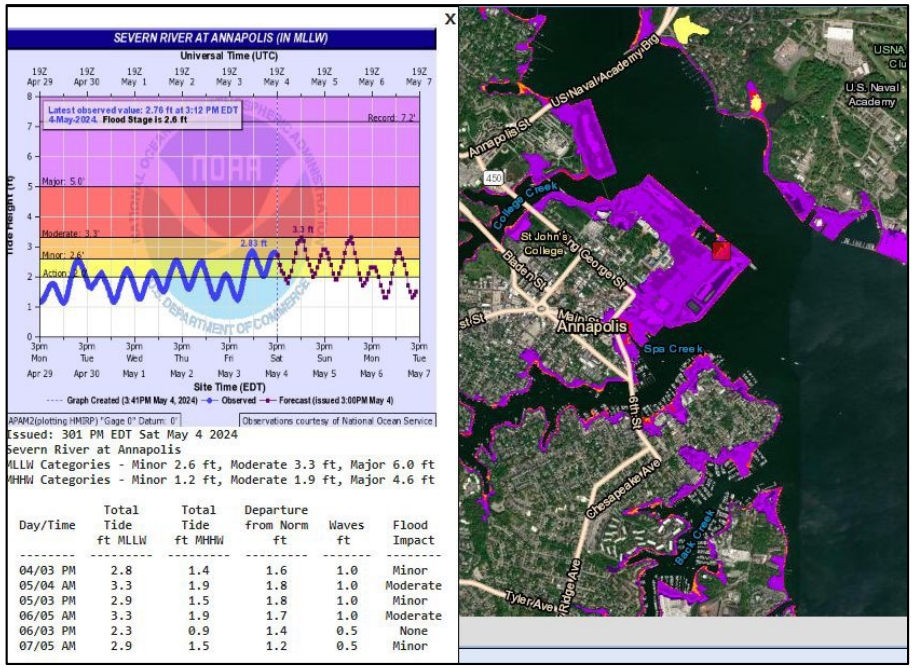
Some Existing NOAA/NWS Flood Map Resources

"Partner FIM"
(available at select locations on NWPS)



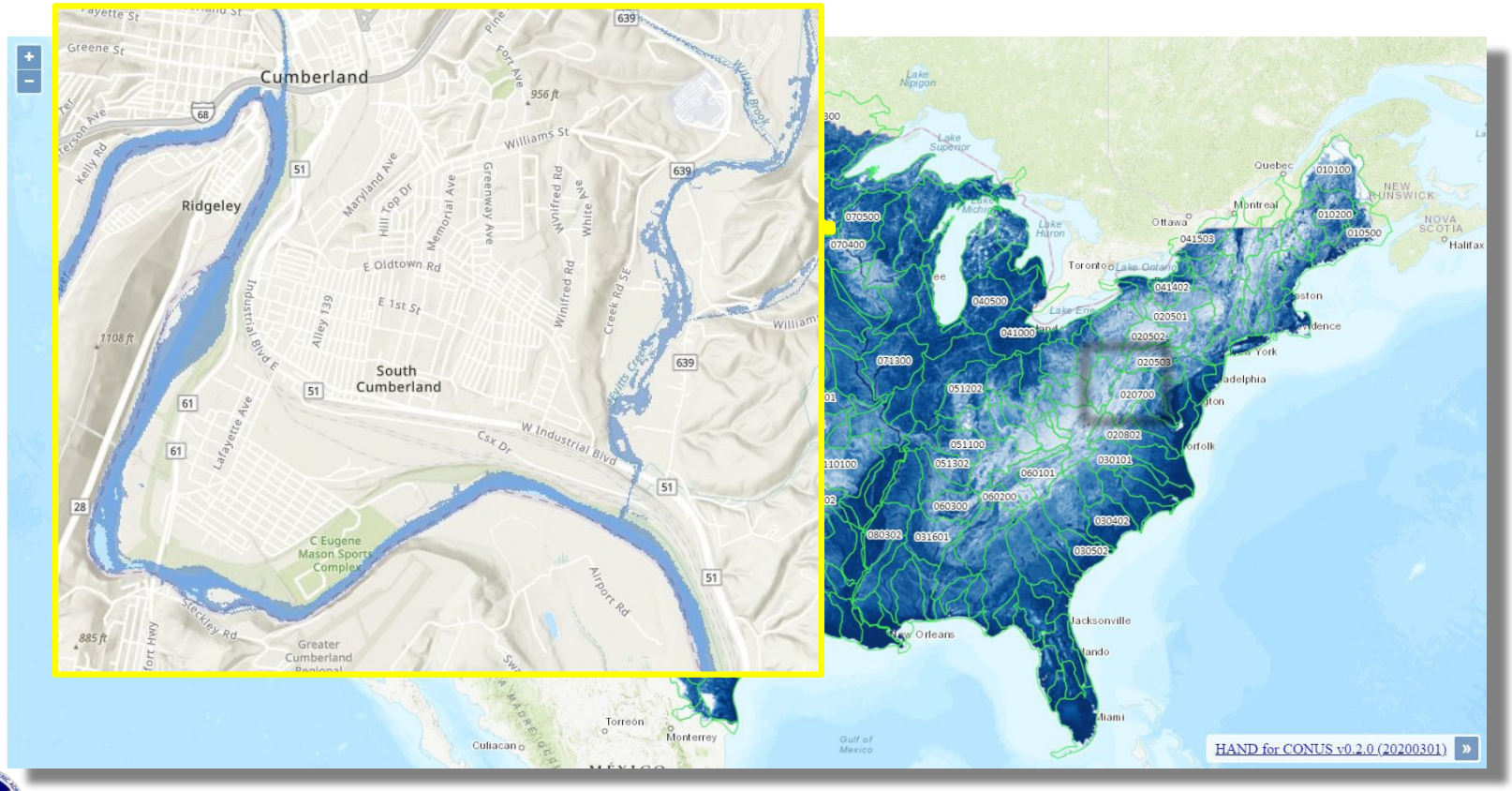
https://water.noaa.gov/about/partner-fim-locations

Coastal FIM

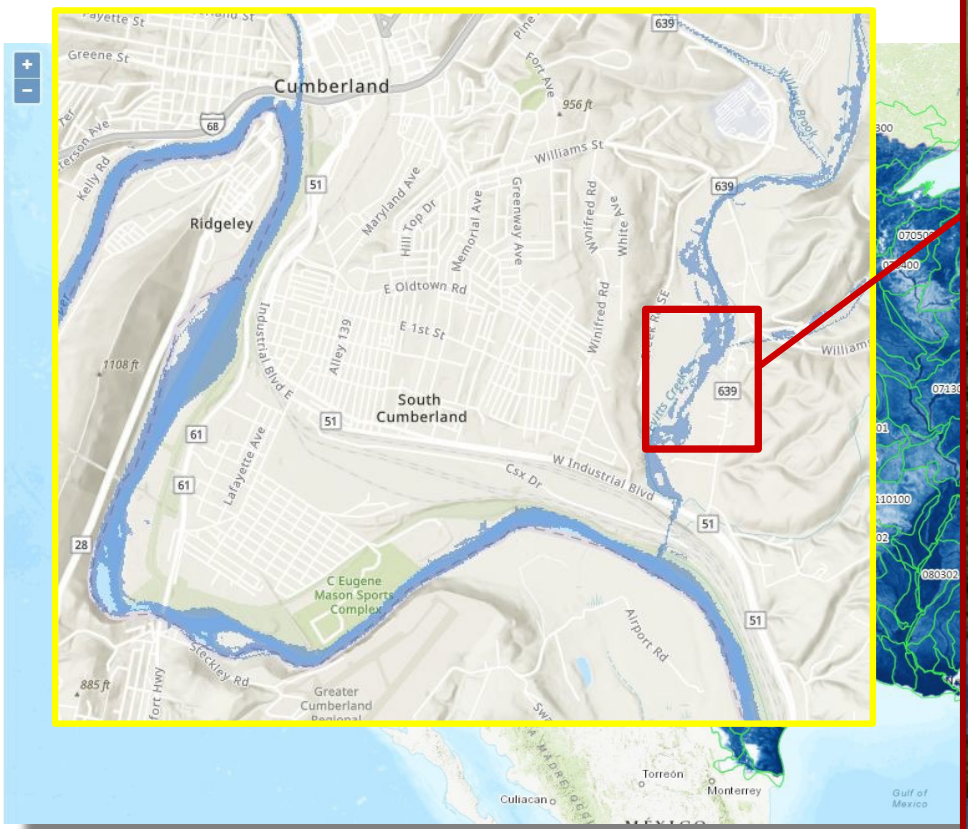


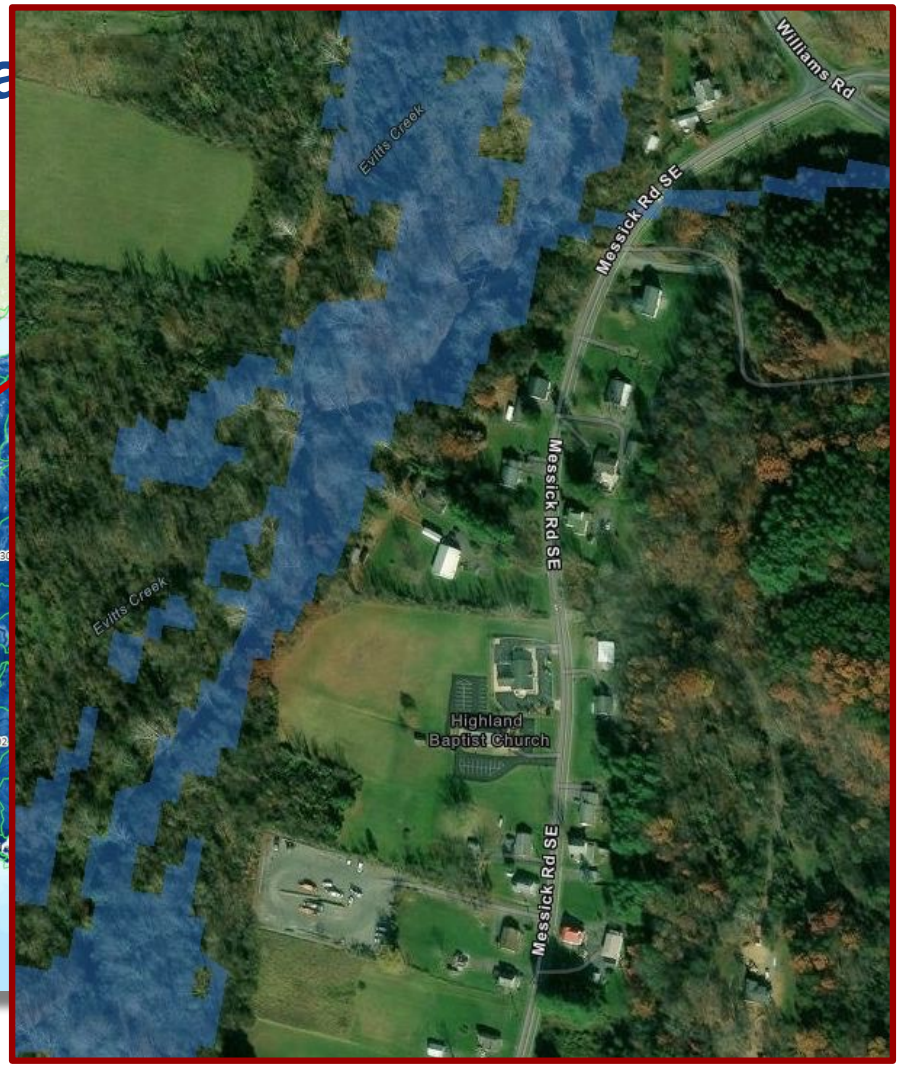
https://www.weather.gov/erh/coastalflood

New NWS Flood Inundation Mapping (“FIM”)



New NWS Flood Inundation Ma



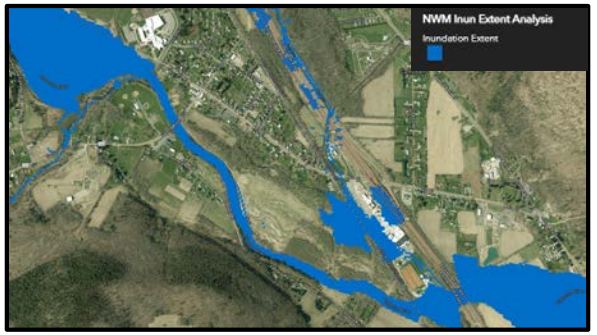


“New” NWS FIM Types

- Each of the new NWS FIM types uses the **Height Above Nearest Drainage (HAND) method** to depict river flood inundation **(flood extent only, for now)**
  - Based on **live forecast and observed data**
  - Only available when **flood conditions are possible or are occurring**.

RFC FIM
(River Forecast Center)

NWM FIM
(National Water Model)

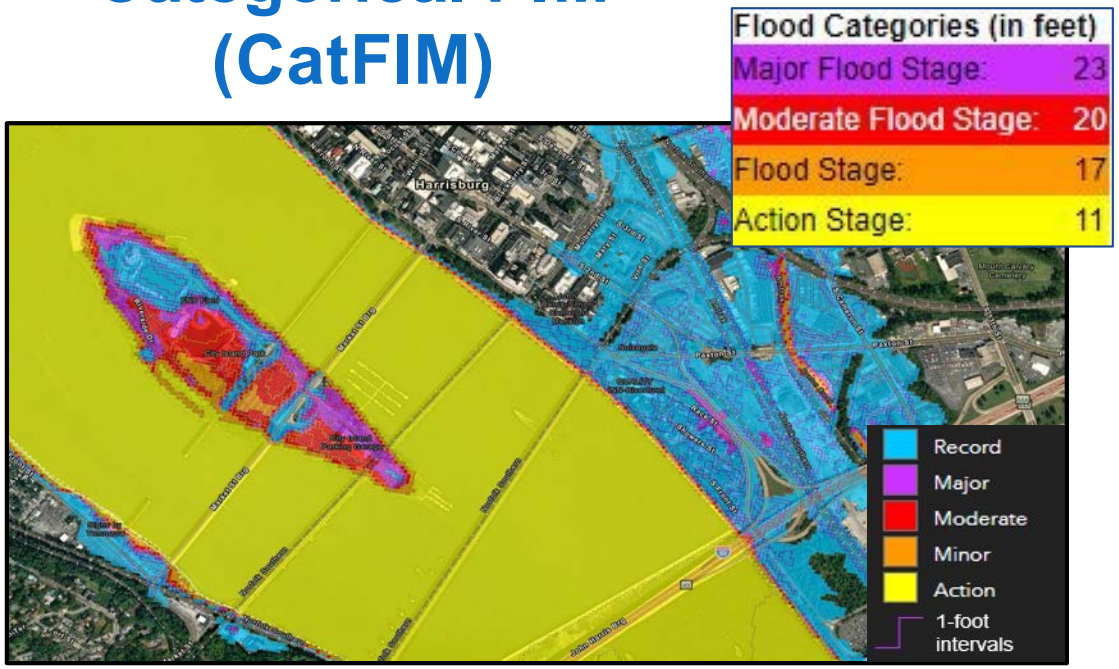


NWM
Latest Analysis FIM
(aka “AnA = Analysis and Assimilation”)

For more info: NWS FIM Fact Sheet

“New” NWS FIM Types

Categorical FIM (CatFIM)



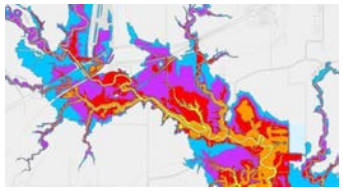
CatFIM Locations:
https://water.noaa.gov/about/cat-fim-locations

- **FIM extent** for each NWS **flood category** at streamgages
  - Minor Flood, Moderate, Major, etc.
- Also includes flood extents at **1-ft intervals** from Action Stage to 5 ft above Major Flood
- Static/Reference map used for **planning** and **“what-if” scenarios**; **not based on a current forecast**

NWS Flood Inundation Map (FIM) Types and Capabilities

Static Maps

Partner FIM (aka AHPS FIM) **-** High-resolution static maps. Shows both extent and depth of possible flooding at various crest heights. Only covers < 1,000 miles of rivers.

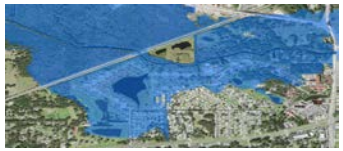


NWS Categorical FIM (CatFIM) - Static maps that cover ~30,000 miles of rivers. Shows likely spatial extent of flooding at various flood stage categories ("Major," "Moderate," "Minor," etc.).

Storm-Specific Forecast Maps

River Forecast Center FIM (RFC FIM) - Storm-specific forecast maps showing possible flood extent over the next 3-5 days based on the RFC forecast for the upstream gauge. Will cover ~110,000 river miles once fully implemented nationwide.

National Water Model FIM (NWM FIM) - Storm-specific forecast maps showing possible flood extent for all rivers and streams over the next 5 days based on NWM model guidance and antecedent conditions. Will cover ~3.4 million river miles once fully implemented nationwide.



National Water Model Latest Analysis FIM (AnA FIM) - NWM approximation of current flood extent based on latest rainfall observations and streamflow data. Will update every 1.5 hours. Will cover ~3.4 million river miles once fully implemented nationwide.

NWS FIM Use Before, During, and After a Flood Event

Forecasts & Data:

Day 4-7+ Pre-Flood or "Blue Sky" Planning	Days 1-3 Pre-Flood	Flood	Post-Flood
• Probabilistic forecasts • River ensembles (MMEFS & HEFS)	• NWS River Forecasts • NWM Guidance	• Current Conditions (Gage Observations) • NWS River Forecasts	• High Water Marks • Flood Photos/Videos • Damage Assessments

Flood Inundation Maps (FIM):

Day 4-7+ Pre-Flood or "Blue Sky" Planning	Days 1-3 Pre-Flood	Flood	Post-Flood
• Partner FIM • CatFIM • NWM FIM	• Partner FIM • CatFIM • RFC FIM • NWM FIM	• Partner FIM • CatFIM • RFC FIM • NWM FIM • Latest Analysis FIM	• Partner FIM • CatFIM • Latest Analysis FIM

NWS Flood Inundation Mapping Services Implementation

Map Legend

10% Population served by **October 2023**.

30% Population served by **October 2024**.

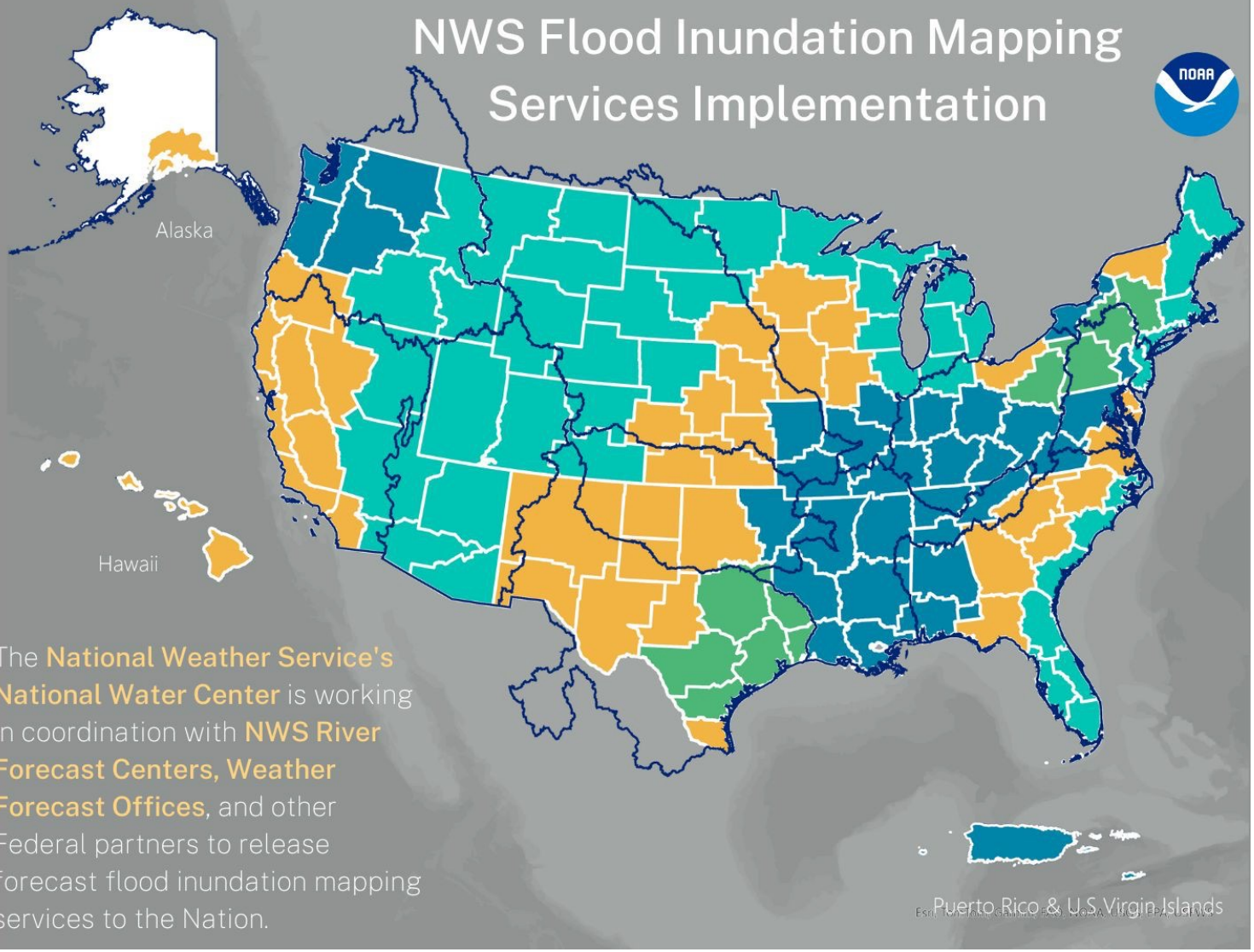
60% Population served by **October 2025**.

100% Population served by **October 2026**.

NWS County Warning Areas

NWS River Forecast Center Boundaries

*100% is approximate. Does not include all parts of Alaska, American Samoa, and Guam. Implementation areas are subject to change.



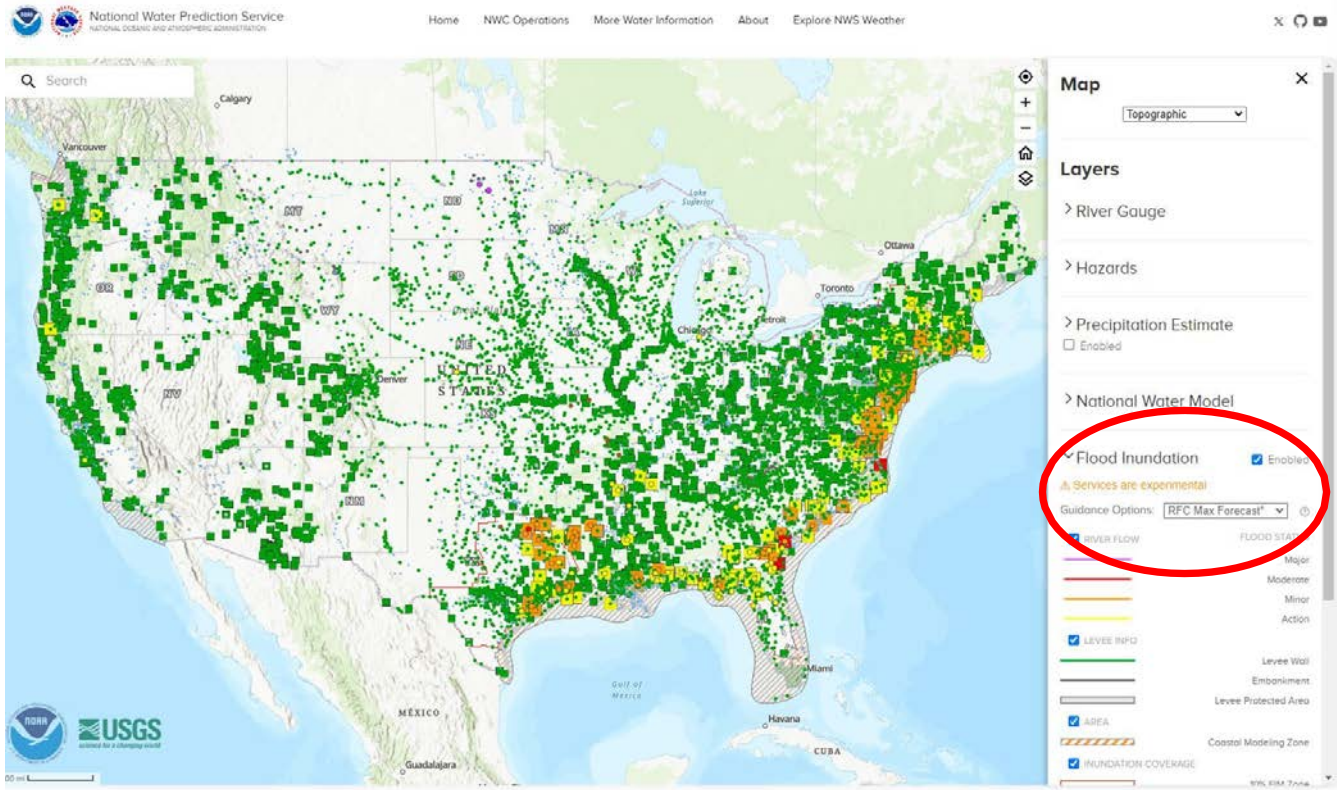
The **National Weather Service's National Water Center** is working in coordination with **NWS River Forecast Centers, Weather Forecast Offices**, and other Federal partners to release forecast flood inundation mapping services to the Nation.

Where Can I Access NWS FIM?

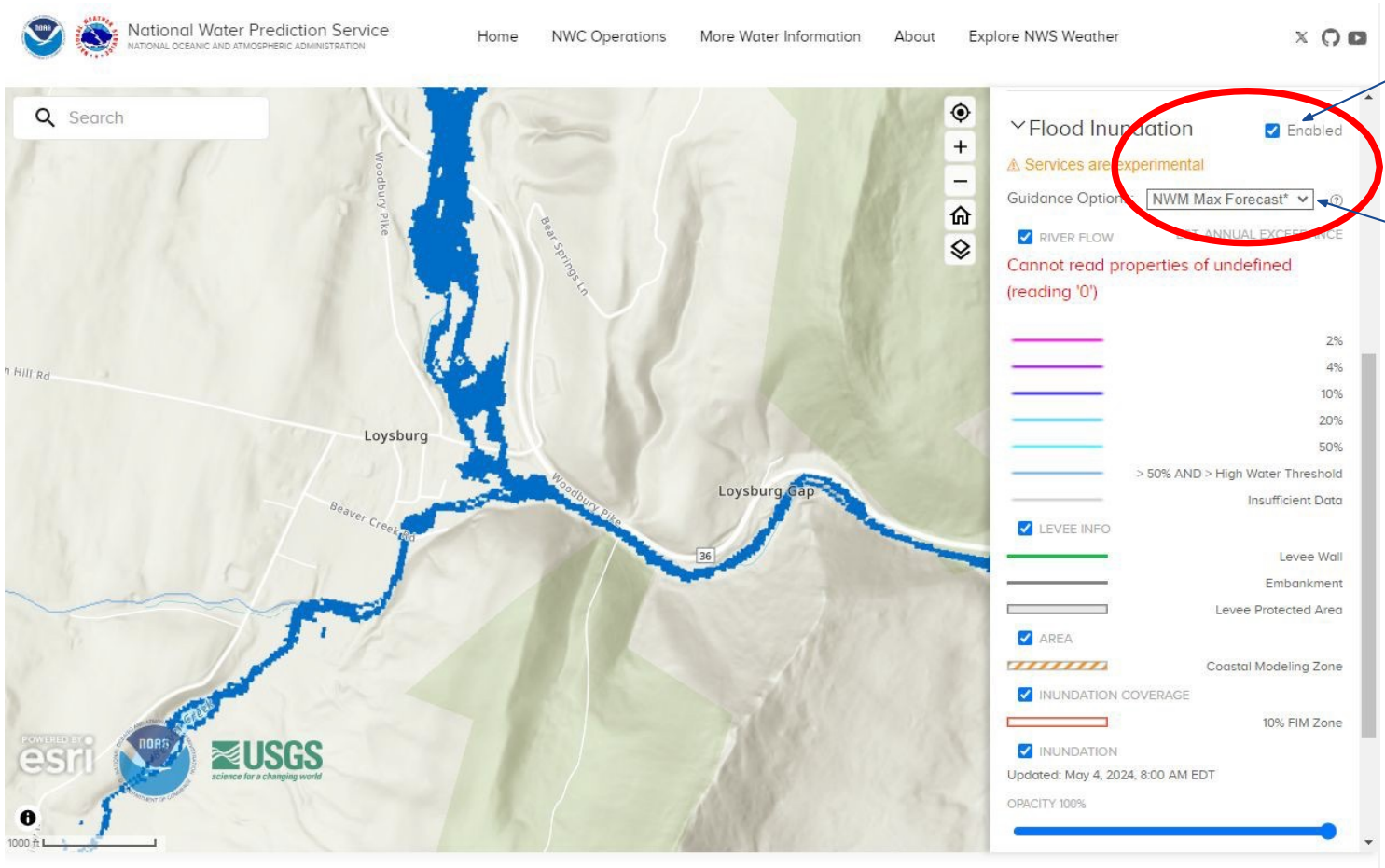
➢ *water.noaa.gov*

- **Forecast FIM**
  - Accessible from NWPS main page (Flood Inundation dropdown)
- **Static FIM**
  - Accessible from a gage page

National Water Prediction Service (NWPS)



Example of Forecast FIM on NWPS: *water.noaa.gov*



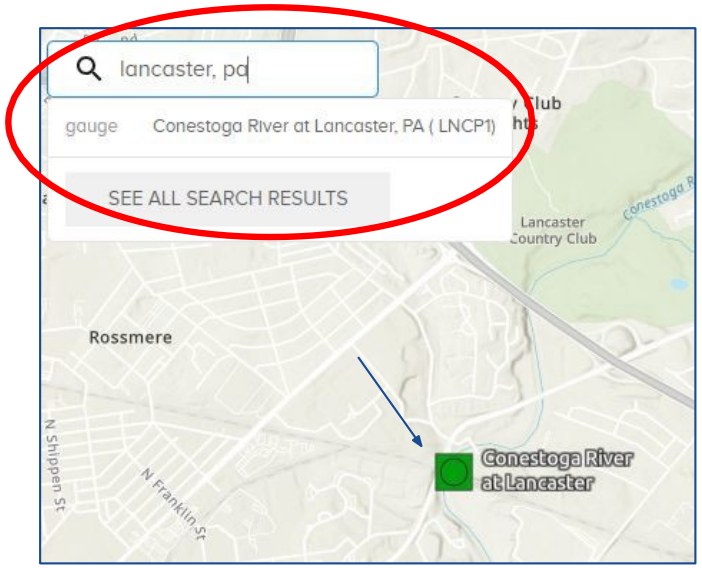
1. Click “Enable”

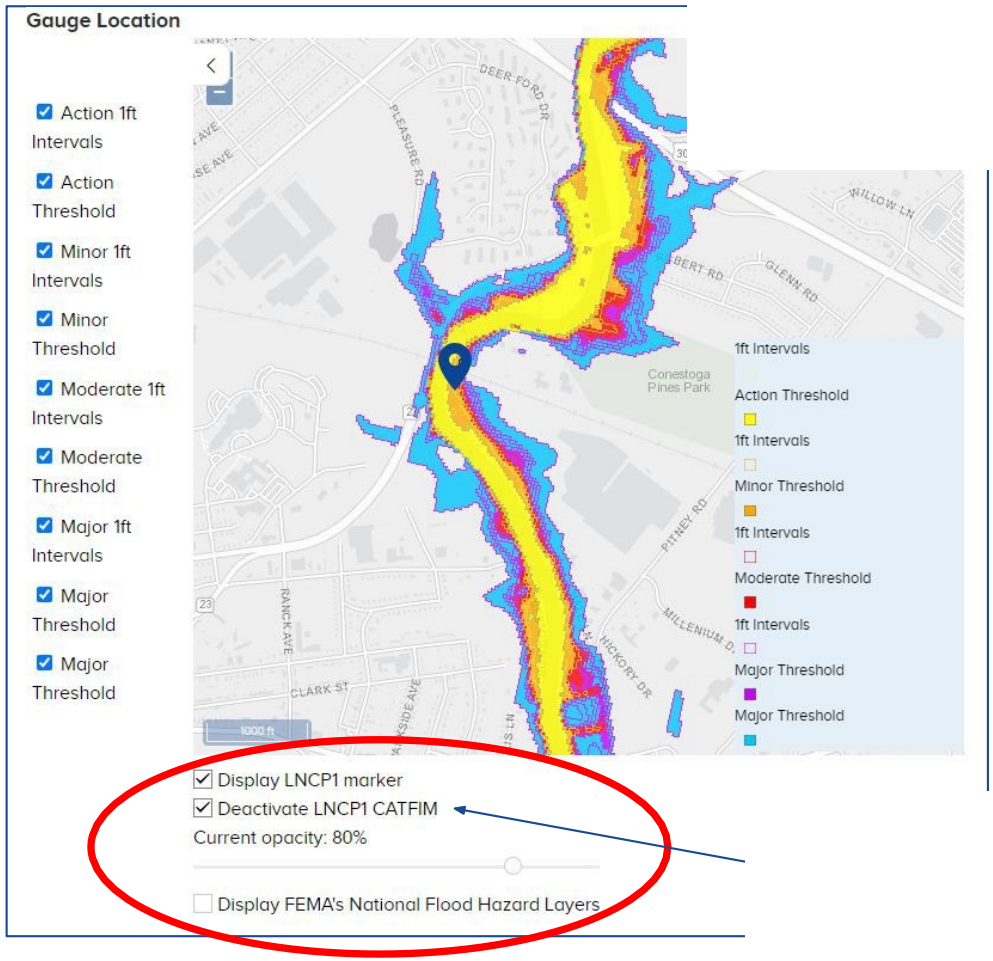
2. Choose a Forecast FIM type

3. Zoom into the map to see where FIM is available

Example of Static FIM on NWPS: *water.noaa.gov*

1. On NWPS main page, search or click on a streamgage to view the "gage page"





Import NWS FIM into Your GIS Dashboards & Environments

https://maps.water.noaa.gov/server/rest/services

Questions / Comments ?

John Kirk

Senior Hydrologist, NWS MARFC

johnathan.kirk@noaa.gov