# Flood Impacts using the NWS Flood Inundation Maps with Innovative Tools

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*David C. Smith PhD.*[1] *and Monica Stone*[1]

[1]National Water Center, Office of Water Prediction, National Weather Service, NOAA, Tuscaloosa, AL, USA

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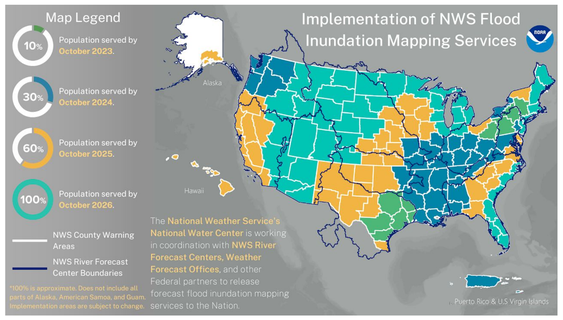
## Background




Experimental Flood Inundation Map (FIM) services are now available for 30% of the U.S. population including Puerto Rico and the U.S. Virgin Islands (http://water.noaa.gov/FIM). These services will be expanded to nearly 100% of the U.S. population in 2026 (see image above). These FIM services depict the extent of predicted inundation, as derived from River Forecast Center forecasts and the National Water Model (NWM).

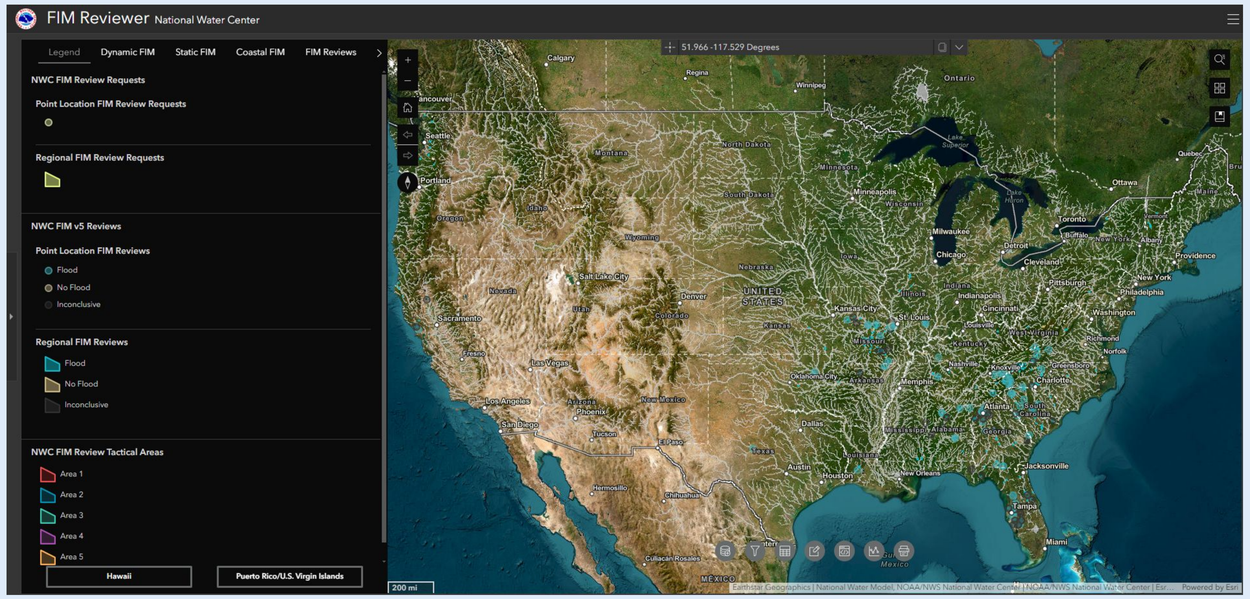
The expansive spatial and temporal resolution capabilities of the NWM is coupled with the high resolution National Hydrography Dataset (NHD) from the U.S. Geological Survey. This allows the National Weather Service (NWS) to provide real-time analyses and forecast FIM capabilities at the neighborhood-level for all communities across the U.S.

The NWM FIMs cover 3.6 million river miles (see image below) including Puerto Rico and the U.S. Virgin Islands, Hawaii, and portions of Alaska.

## Challenge

The challenge with this vast coverage of National Weather Service (NWS) Flood Inundation Maps (FIM), is identifying potential flood impacts using the NWS FIM quickly and efficiently and communicating the impacts as the national center with the NWS local offices so they can help emergency managers make challenging life-saving decisions.

## Flood Impact Assessment Tool (FIAT)



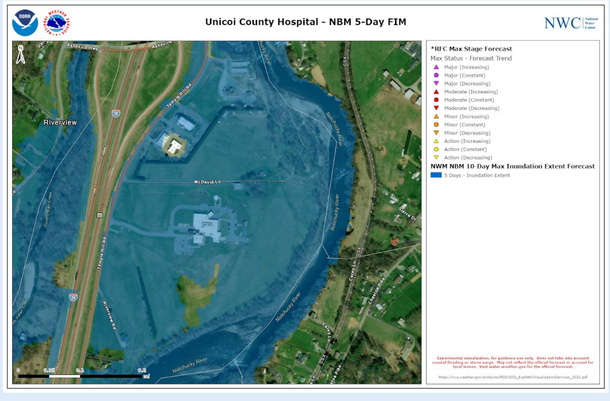

The prototype Flood Impact Assessment Tool (FIAT) Dashboard (see image above) helps address these challenges by bringing potential impacts front and center based on all available data by focusing on specific areas (see image above). This promotes the identification of specific flooding impacts which can be quickly communicated for Impact-Based Decisions Support Services (IDSS). National Water Center (NWC) personnel use FIAT to highlight areas using points or polygons with categories to streamline support to NWS local office personnel. These points and polygons can quickly be seen by local office personnel to use in support of emergency managers and the general public. The areas highlighted by FIAT will have the following categories:

**Flood** - If the forecast flow materializes, flooding or inundation of some extent at this location is LIKELY to occur based on all available data.

**No Flood** - If the forecast flow materializes, flooding or inundation of some extent at this location is NOT LIKELY to occur based on all available data suggesting an area is likely safe at the current forecast.

**Inconclusive** - There is not enough information to make the determination.

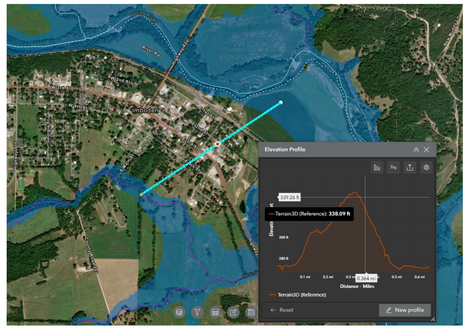
An example of this was the identification of flooding impacts to the Unicoi County Hospital in eastern Tennessee during Hurricane Helene. NWC personnel were able to identify the potential inundation of the hospital several hours before the flood waters began surrounding the building. This information was passed along to the local offices using the graphic below. The polygon highlighting the area was also available to local offices via the Flood Inundation Map (FIM) Dashboard.




## Additional Tools and Data

National Water Center (NWC) personnel incorporate many different prototype tools and datasets in conjunction with the Flood Impact Assessment Tool (FIAT). These tools help to identify and communicate the magnitude and timing of flooding impacts. Many of the tools are automated and programmatically calculate critical data regarding the Flood Inundation Maps.

- Timing of crests for determining the timing of impacts.
- Nearby critical infrastructure such as hospitals, nursing homes, and fire stations.
- Nearby levees or reservoirs.
- Overtopping of bridges.
- Heat map highlighting widespread inundation of structures.
- Historical flooding information.
- Remote sensing data.
- Digital Elevation Model Tools.




These tools are available in the NWC's Flood Inundation Map (FIM) Dashboard and support FIAT by increasing the overall number of datapoints to identify and communicate the timing and magnitude of potential flood impacts to National Weather Service (NWS) local office personnel.

## Summary

The National Weather Service's (NWS) Experimental Flood Inundation Map (FIM) services are now available for 30% of the U.S. population including Puerto Rico and the U.S. Virgin Islands. These services will be expanded to nearly 100% of the U.S. population in 2026. The National Water Center has developed and employed innovative new tools to promote quick and efficient identification of potential flood impacts using the NWS FIM and communicate those impacts to the NWS local offices so they can help emergency managers make challenging life-saving decisions.

**ACKNOWLEDGEMENTS:**

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NWS FIM

NWC OPS

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**CONTACT**

Website: *https://water.noaa.gov*
Email: *David.C.Smith@noaa.gov*

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