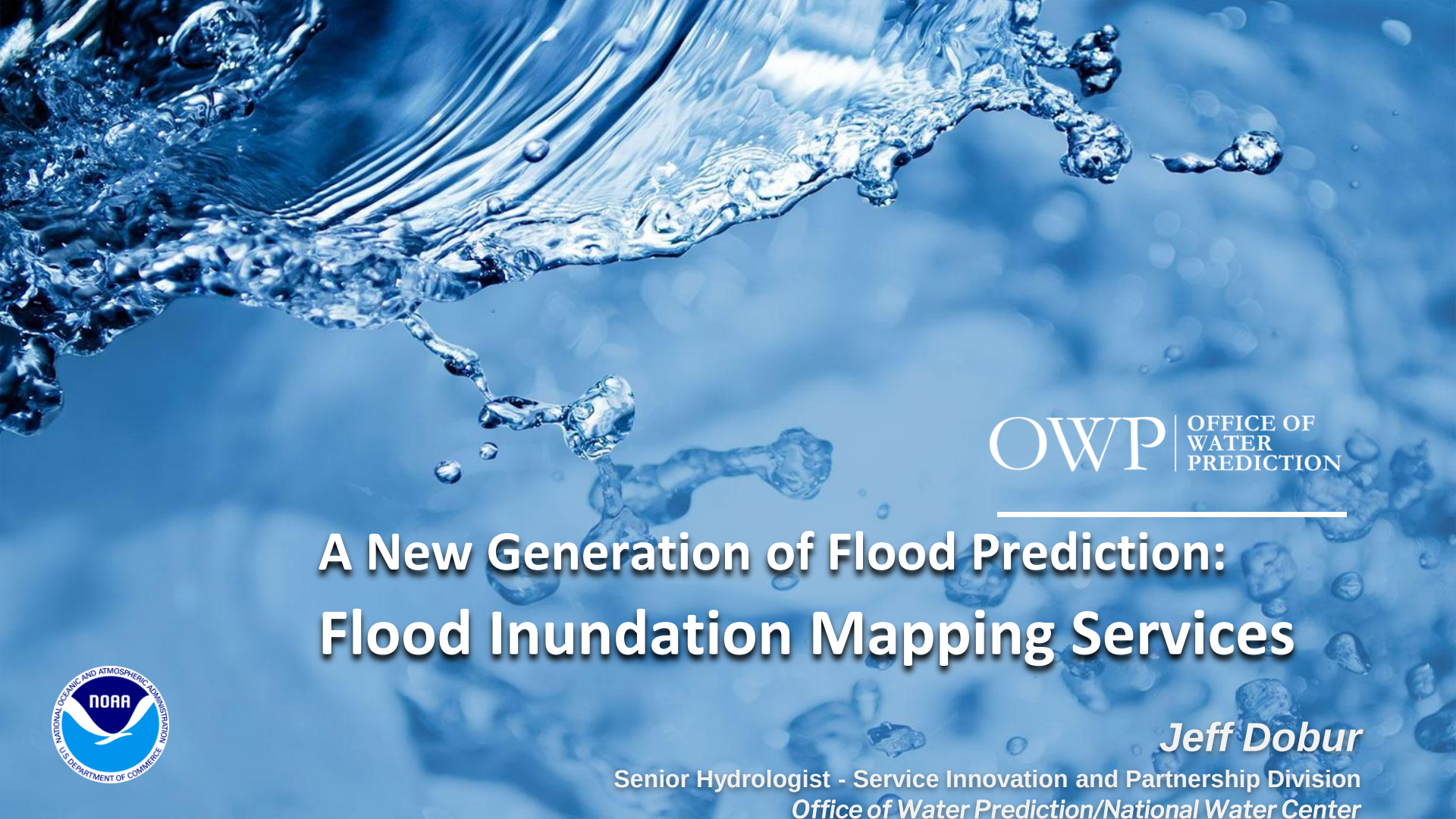


OWP | OFFICE OF WATER PREDICTION

A New Generation of Flood Prediction:
Flood Inundation Mapping Services

Jeff Dobur

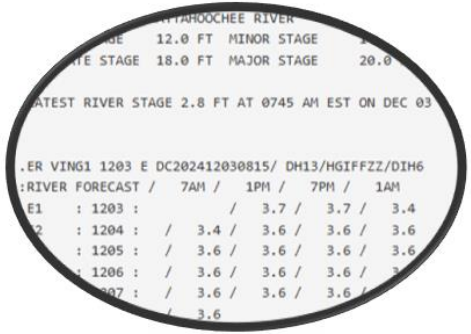
Senior Hydrologist - Service Innovation and Partnership Division

Office of Water Prediction/National Water Center

Where we have come from...

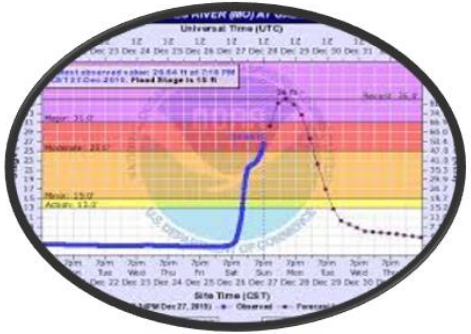
History of NWS Water Forecast Services

1980s -1990s



Text Forecasts

1990s – 2000s



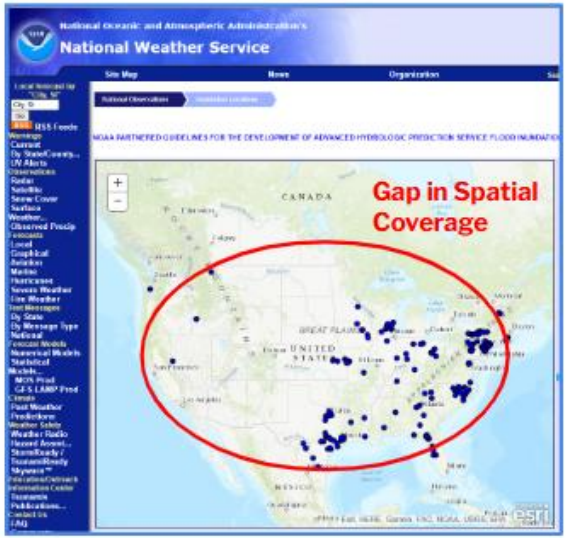
Graphical Forecasts and Maps

2000s-2010s

Flood Mapping

Limited

Where we have come from…



AHPS Inundation Libraries
~200 Locations

“Can you show me a map where it is going to flood?”

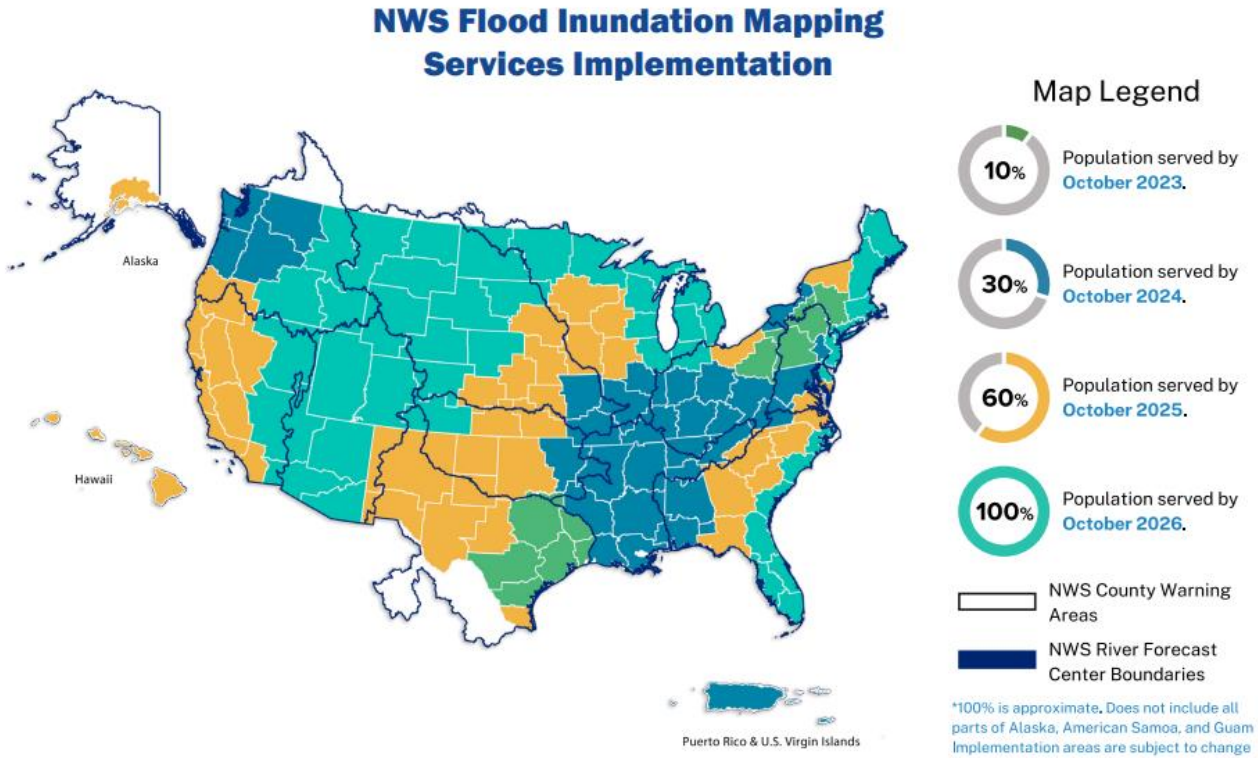
“I understand what the forecast height is but what does that mean as far as what will be impacted?”

- Water Decision Makers from past to now

Where we are going…

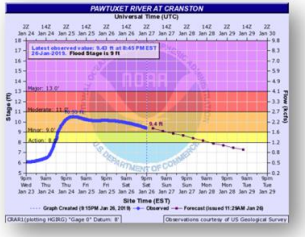
Flood Inundation Mapping Services across the Nation…over 3 million river miles…from summit to sea.

Where we are going...



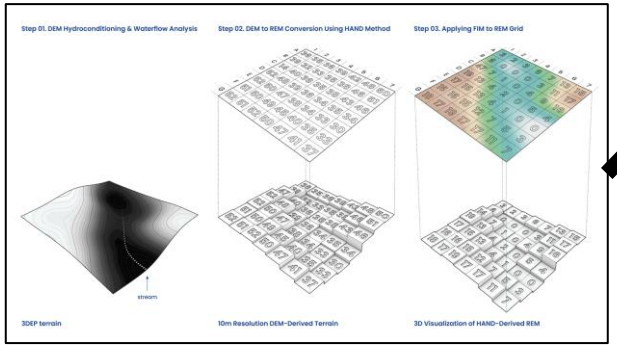
How…

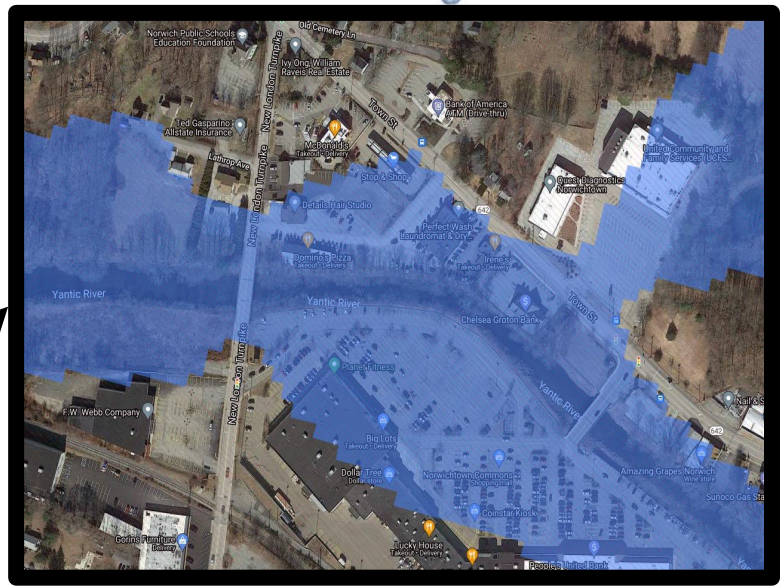
National Water Model Guidance
Completely automated process with no forecaster engagement – but provides complimentary guidance on ~3.4 million stream miles nationwide, including Puerto Rico and the Virgin Islands, Hawaii, and by the fall - portions of Alaska



River Center Forecasts
Forecasters heavily engaged in the forecast production

The HAND Methodology





Services...

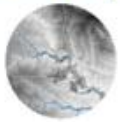
National Water Model Guidance

Completely automated process with no forecaster engagement – but provides complimentary guidance on ~3.4 million stream miles nationwide, including Puerto Rico and the Virgin Islands, Hawaii, and by the fall - portions of Alaska

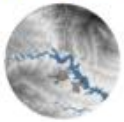
River Center Forecasts

Forecasters heavily engaged in the forecast production

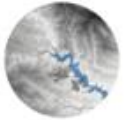
NWM Latest Analysis FIM



NWM 5-Day Max FIM



RFC 5-Day Max FIM



NBM

Dynamic FIM Services

Flood Inundation Mapping

on the National Water Prediction Service (NWPS)

National Water Model Dynamic FIM Services

water.noaa.gov

NWM Latest Analysis FIM

- FIM available if greater than “high water” return period (roughly 1.6 - 2 year return period)
- Assimilates to USGS Gages and routes downstream where available
- For other locations in NWM uses MRMS observed rainfall to generate flows
- NO QPF or forecast flows
- Run every hour

Flood Inundation Mapping

on the National Water Prediction Service (NWPS)

National Water Model Dynamic FIM Services

water.noaa.gov

NWM Max FIM

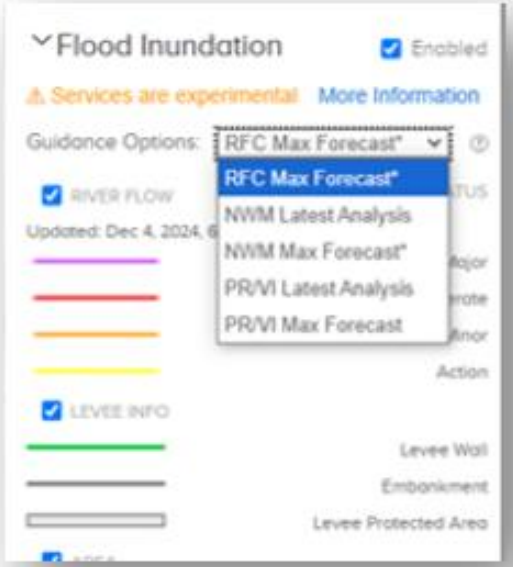
- FIM available if greater than “high water” return period (roughly 1.6 - 2 year return period)
- Utilizes the National Water Model Forecast Flows
- Map represents the maximum flow over the next 5 days
- Produced from the NBM QPF (public) and the GFS (internal only)
- Run every 6 hours - available about 6 ½ hours after model runtime

Flood Inundation Mapping

on the National Water Prediction Service (NWPS)

River Forecast Center Dynamic FIM Services

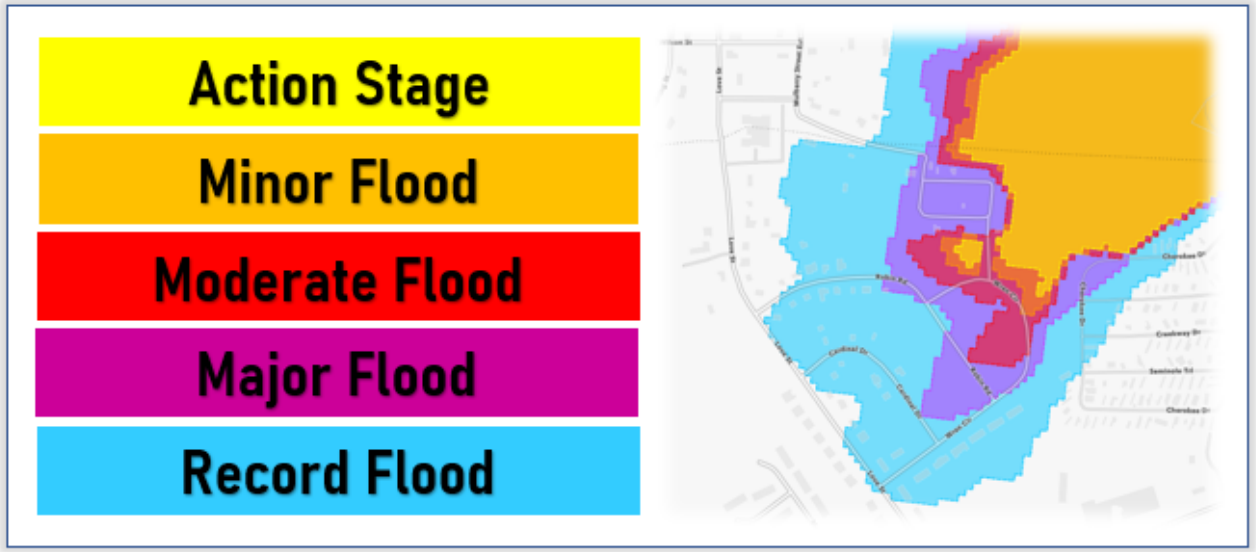
water.noaa.gov



- FIM available if Action stage or greater at site
- Replaces the National Water Model Flow with RFC Forecast Flow
- Map represents the maximum extent over next 5 days
- Maximum Latency would be 45 minutes from RFC Forecast Issuance
- Shows FIM downstream of forecast gage

Services...

Flood Inundation Maps for NWS Flood Categories at Forecast Locations

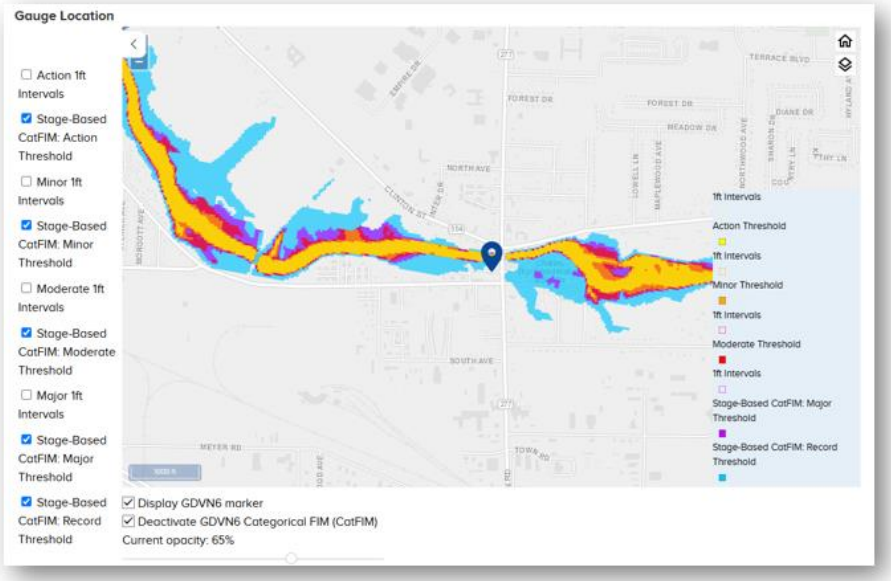


Static FIM Services

Flood Inundation Mapping

on the National Water Prediction Service (NWPS)

Static FIM Services



water.noaa.gov

- Available at select River Forecast Center forecast locations
- Roughly extends 5 miles upstream and downstream from gage site

Flood Inundation Mapping
as a Decision Support Service

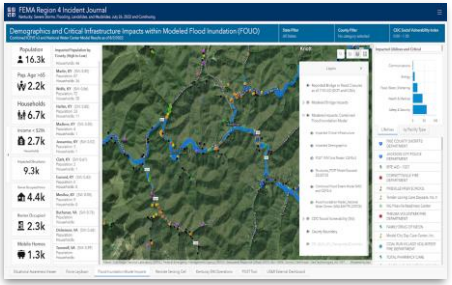
Value of FIM Services - at the Neighborhood Level

Aerial view of Montpelier, VT taken with University of Vermont Spatial Analysis Center Drone. Photo was taken on July 11, 2023 during the height of the major flood event. Photo credit: USDA Forest Service and University of Vermont.

FIM Impact-Based Decision Support Services

Increasing direct interaction with core partners based on various scenarios and needs

Public Services



NWPS, National Viewer, providing visualizations and FIM for the partners to ingest into their system (i.e. REST services via HydroVis).

Baseline IDSS

Providing graphics, email packages, webinars, NWSChat, etc. to all core partners to convey general impacts.

Most Common IDSS

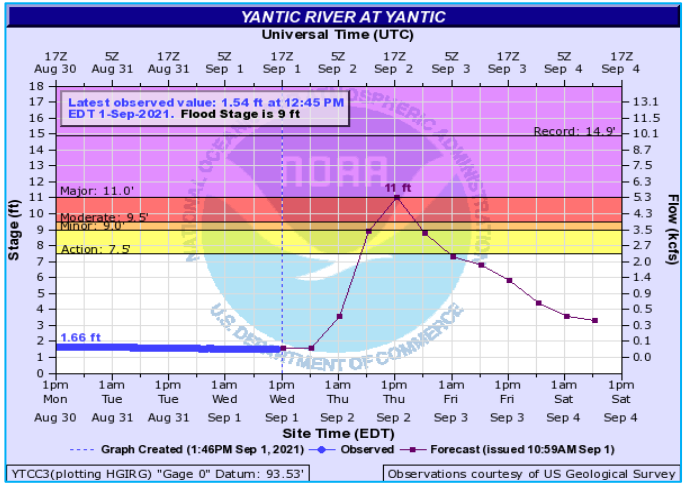
Targeted IDSS

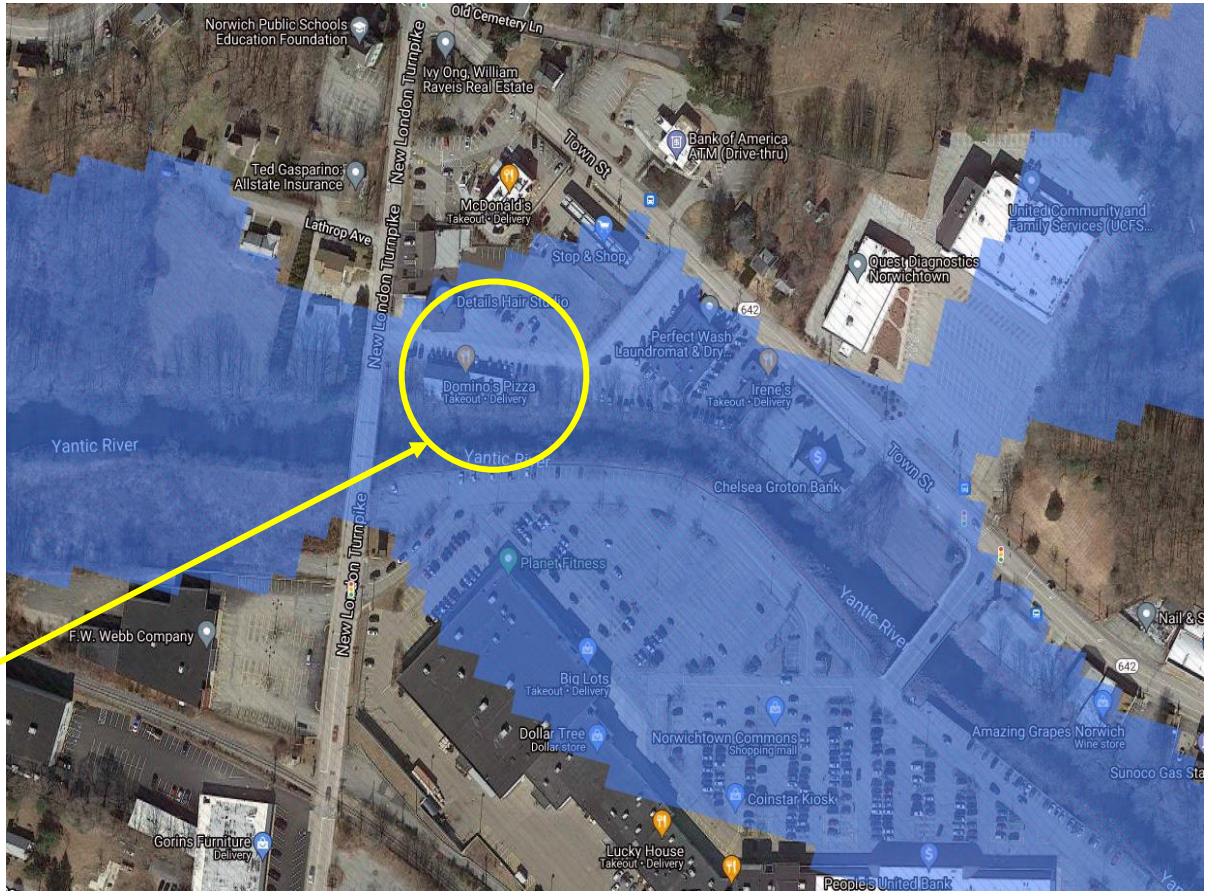
Providing targeted graphics, email packages, webinars, etc. to core partners to convey specific impacts based on their specific needs and thresholds.

Integrated IDSS

Providing onsite, integrated support within a core partner's operations with detailed impact informations tailored to the partner's needs and thresholds.

Value of FIM Services - Visualizations to depict impacts





Integrating FIM Services into our IDSS

Disclaimer: This experimental map represents the NWS's best approximation of inundation based upon modeled river discharge

Yantic River at Yantic, CT

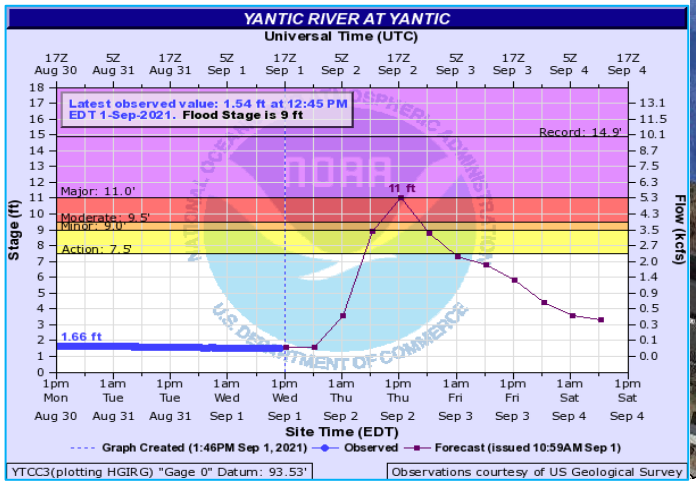
Forecast Crest Height: **11 Feet**

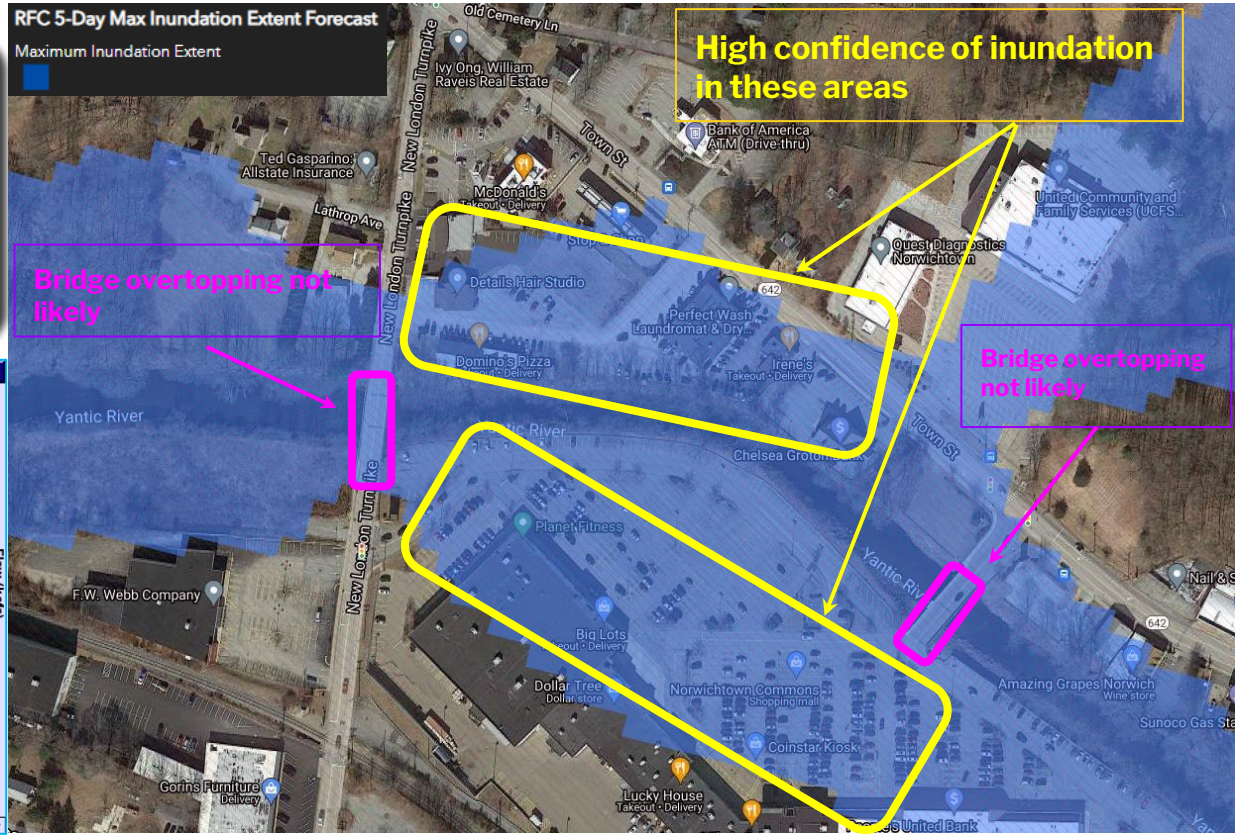
Map Height Shown: **11 Feet**

FIM Source: **RFC FIM 5 Day Max Extent**

FIM Type: **Dynamic (Depth NOT Included)**

FIM Creation Time: **Sept 1st, 1 pm**





Record Flooding Forecast in Asheville, NC

Friday, September 27, 2024
12:45 AM EDT

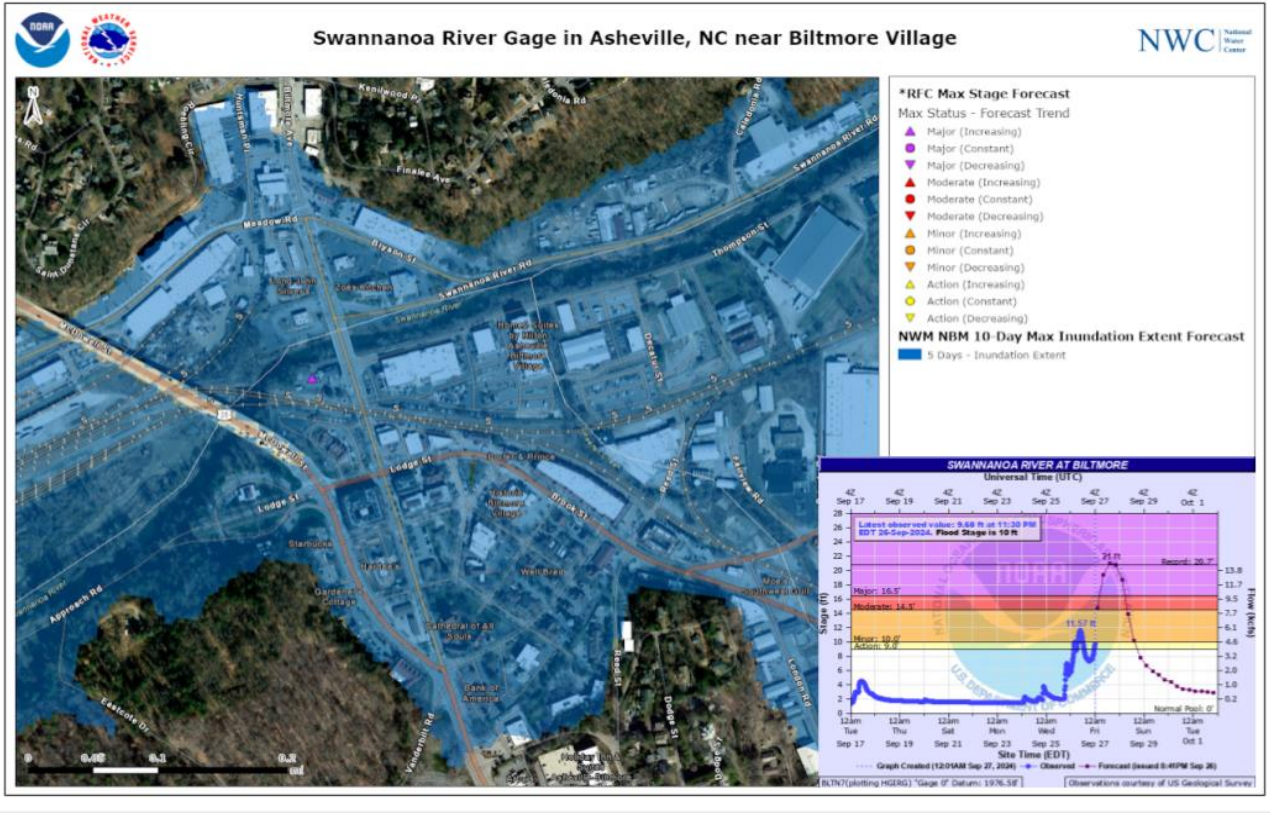
Life Threatening Flooding Possible

Key Messages

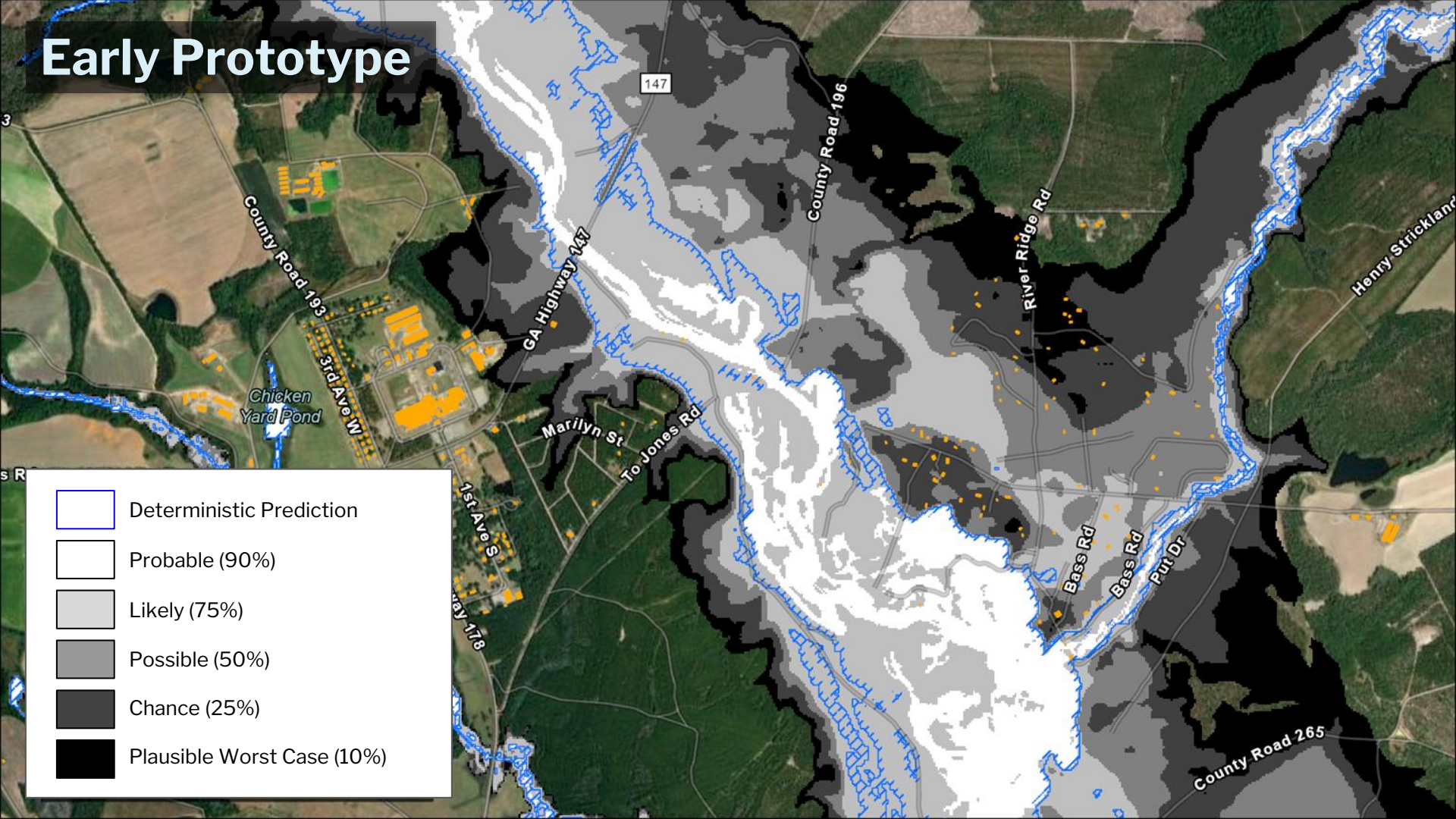
- Record flooding is forecast along the Swannanoa River
- Life threatening flooding may be possible
- Flood inundation mapping suggests widespread flooding in the Biltmore Village area of Asheville (shown in blue in the image on the right)
- To escape rising water, take the shortest path to higher ground.

Timing

- Flooding is ongoing and expected to crest Friday evening at record stage



Early Prototype



FIM Dissemination Endpoints

HydroVIS Enterprise GIS

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

ArcGIS REST Services Directory

Home > services

JSON | SOAP

Folder: /

Current Version: 10.81

View Footprints In: ArcGIS Online Map Viewer

Folders:

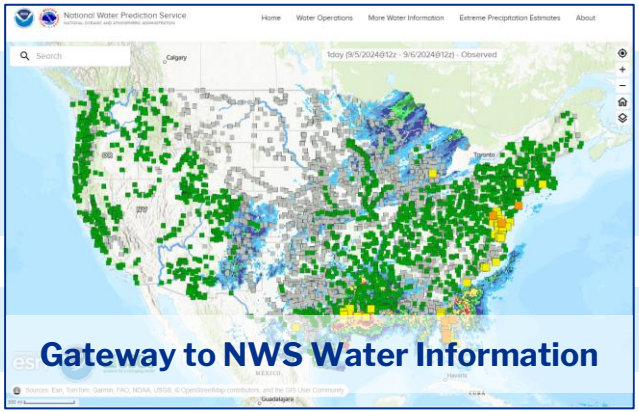
- fim_libs
- nwm
- owp
- para
- reference
- rfc
- Utilities

Services:

None

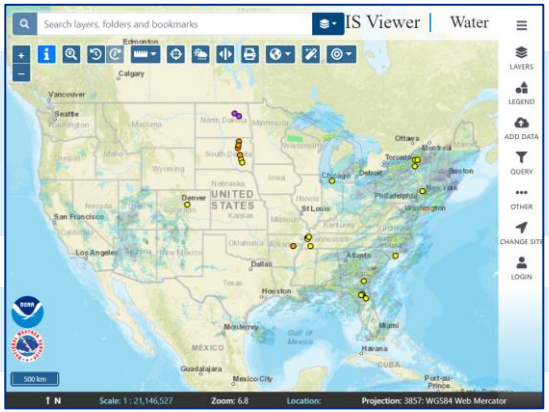
National Water Prediction Service

https://water.noaa.gov



NWS National GIS Viewer

https://viewer.weather.noaa.gov/water



Thank You!

jeffrey.dobur@noaa.gov

Office of Water Prediction
NOAA - NWS - National Water Center