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# Using GIS to Collaboratively Evaluate National Water Model FIM in Real-Time

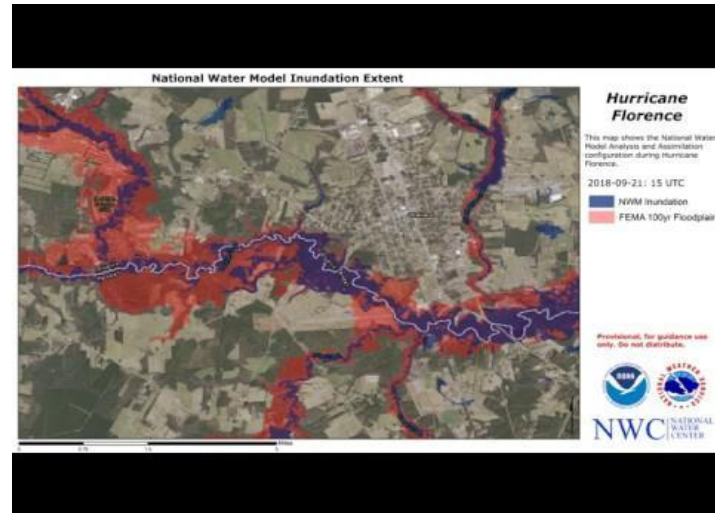
Monica Stone

Lead Geospatial Scientist | Water Prediction Operations Division, NOAA/NWS National Water Center



# Real-Time Flood Inundation Mapping (FIM)

- Critical need for real-time FIM at a continental scale
- National Water Center is leading a multi-agency effort to provide a contiguous best-available dataset



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# National Water Model FIM

- NOAA/NWS National Water Model released in 2016
  - ◆ Hydrologic modeling framework providing observed and forecast streamflow for over 3.4 million waterway miles in the ConUS, Hawaii, and Puerto Rico/U.S. Virgin Islands
  - ◆ Compliments the ~4,000 official river forecast locations, providing valuable information to underserved locations
- Continental-scale FIM in real-time using NWM output
  - ◆ Hourly analysis
  - ◆ 18-hour maximum extent (updated hourly), forced by the HRRR
  - ◆ 3/5/10-day maximum extents (updated every 6 hours), forced by the GFS



## NWS River Forecast Center FIM

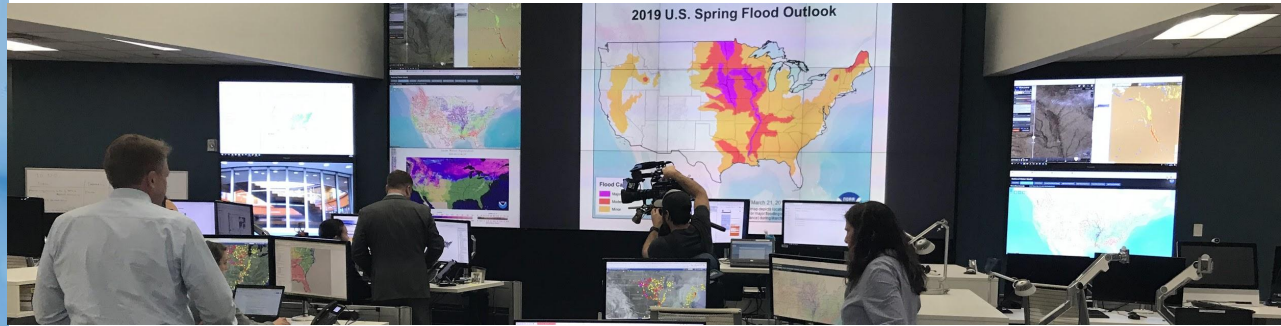
- Continental-scale FIM in real-time using the official RFC forecasts at gauged locations
  - ◆ 5-day maximum extent (updated hourly)
  - ◆ Only available downstream of gauged locations
- Utilizes the National Water Model physics to route flow between gauged locations



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## Feedback & Validation

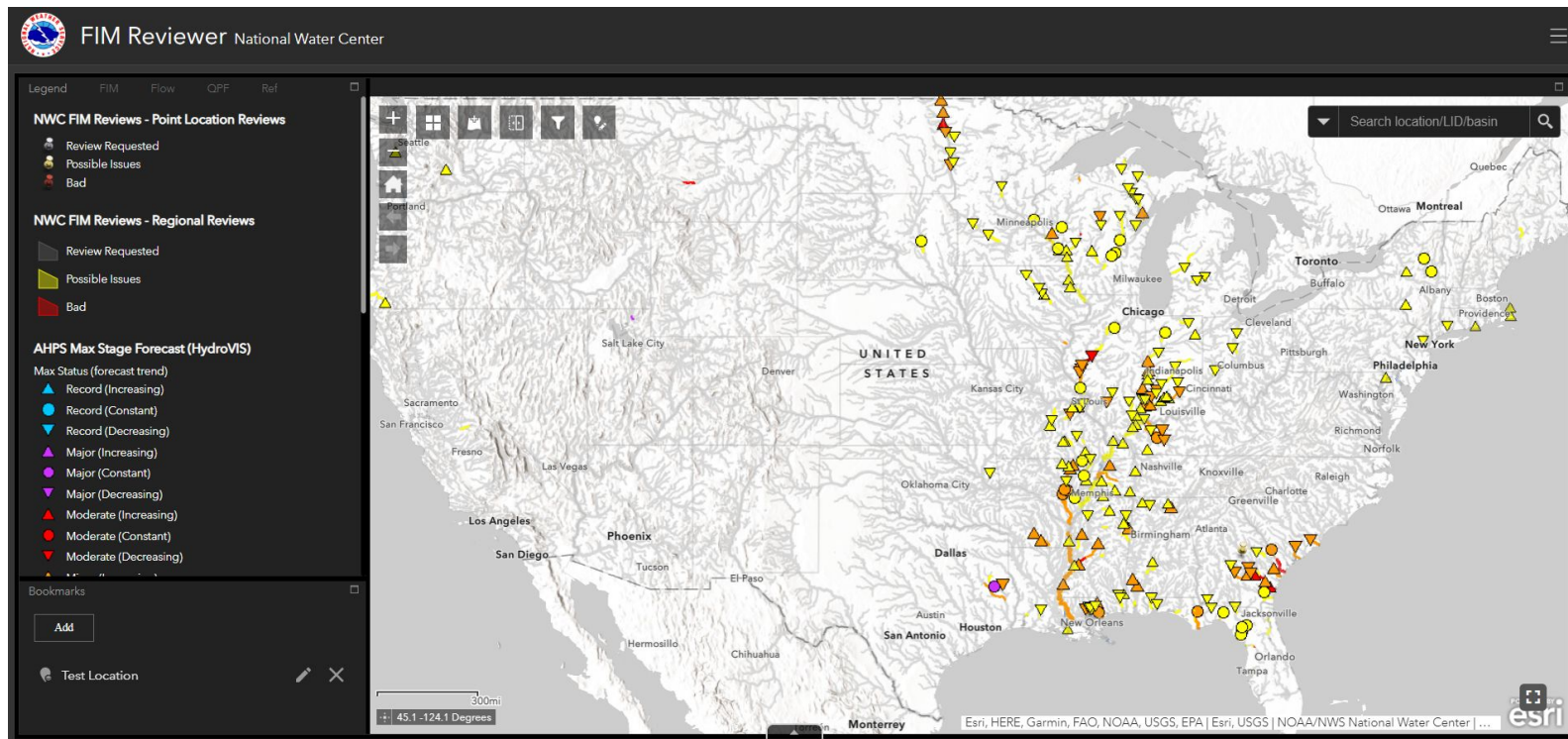
- Accurate feedback is needed on the extent and timing of inundation forecasts from these new data services
  - ◆ Feedback from local experts informs our continuous development efforts
  - ◆ Feedback can be used to aid the forecasting process



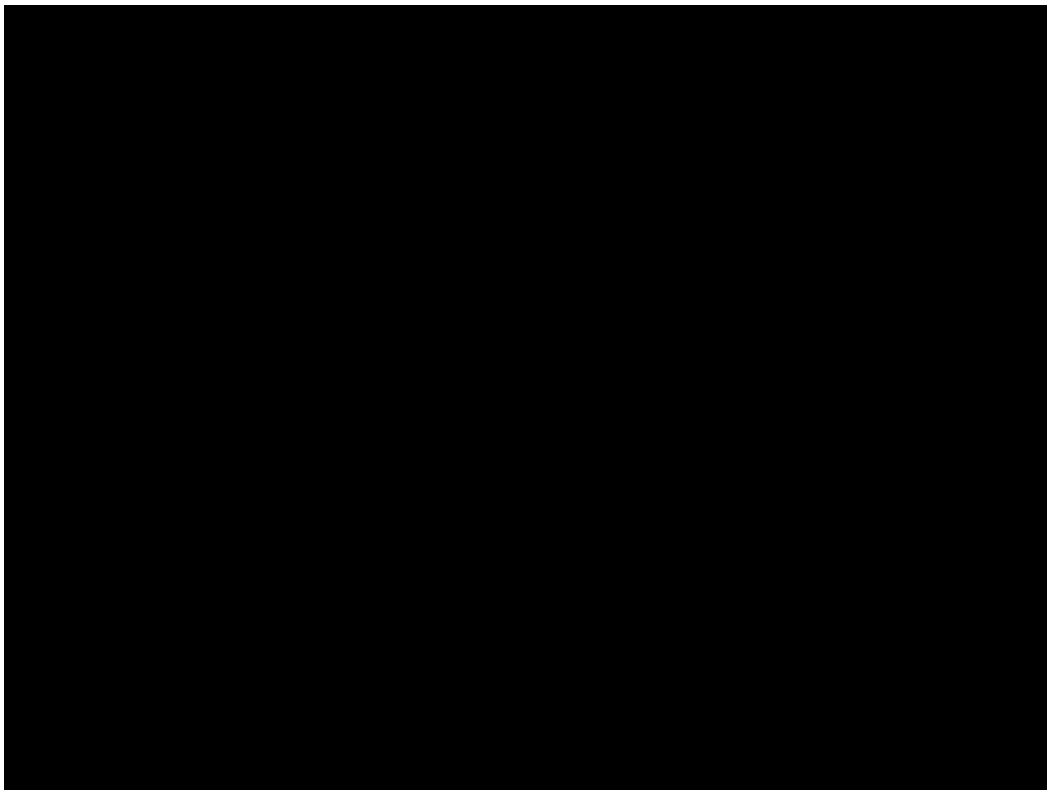
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# FIM Reviewer Web Application



# Reviewing the NWC's FIM

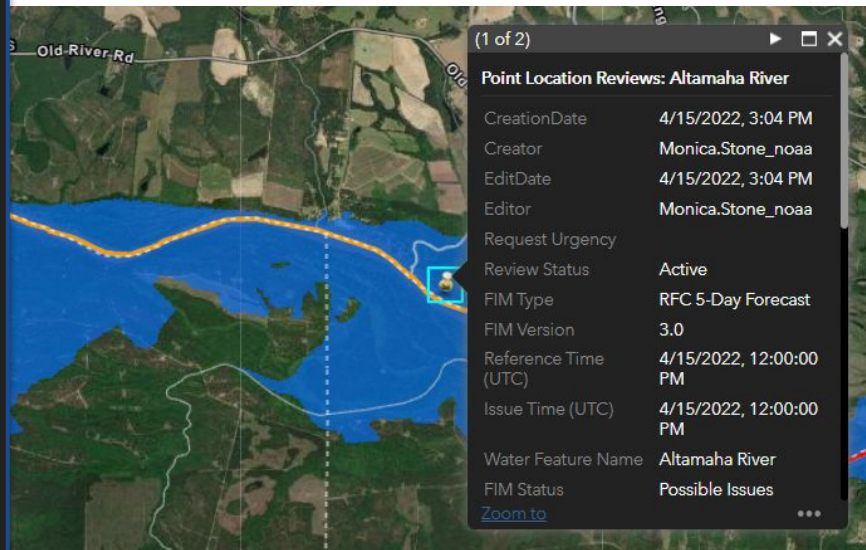


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## Accessing FIM Reviews

→ Active reviews can be queried and viewed immediately after submission

Point Location Reviews: Altamaha River	
CreationDate	4/15/2022, 3:04 PM
Creator	Monica.Stone_noaa
EditDate	4/15/2022, 3:04 PM
Editor	Monica.Stone_noaa
Request Urgency	
Review Status	Active
FIM Type	RFC 5-Day Forecast
FIM Version	3.0
Reference Time (UTC)	4/15/2022, 12:00:00 PM
Issue Time (UTC)	4/15/2022, 12:00:00 PM
Water Feature Name	Altamaha River
FIM Status	Possible Issues
FIM Behavior	Overpredicting
Nearest AHPS Gauge	CHRG1
Current Stage (ft)	10.50
Max Forecast Stage (ft)	11.09
Current Flow (cfs)	60,254.41
Max Forecast Streamflow (cfs)	63,672.52
Max Forecast Flood Status	minor
RFC QPF Duration (hr)	48
Review Comments	This is a sample review.
Developer Response	
Requested by Partner?	Yes
Plan to Share with Partner?	Yes



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# Monitoring Requested FIM Reviews

- NWS forecasters and other federal partners can request FIM reviews
  - ◆ Automated emails and dashboards alert the National Water Center to review requests



## Outstanding Point Location FIM Review Requests



Last update: 2 minutes ago

## Outstanding Regional FIM Review Requests



Last update: 2 minutes ago



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## Informing Future Development

- Feedback provides the NWC's FIM development team with a record of user observations on FIM forecast accuracy
- These observations expose source data issues and modeling errors, which are addressed through targeted calibration



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## Aiding the Forecasting Process

- Forecasters can view live inundation forecasts side-by-side with current and previous reviews
- FIM Reviewer allows forecasters to analyze FIM days in advance of a flood event



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**Monica Stone**

Lead Geospatial Scientist  
Water Prediction Operations Division  
NOAA/NWS National Water Center

[monica.stone@noaa.gov](mailto:monica.stone@noaa.gov)

<http://water.noaa.gov>

