Building the Future of National Weather Service Flood Services

Derek Giardino
Geo-Intelligence Program Lead
Service Development Division
May 29th, 2026

Who are you?

Not Fernando Salas

Masters in C.E. Water Resources from UCF
Undergrad in Meteorology from NIU

From Chicago…ok from the suburbs of Chicago

Chicago Bears fan, anything from Chicago really and inversely anything not Wisconsin

Celebrated my 3rd anniversary last week to my wife I met at Crossfit

Working at OWP since 2023, before which I was an operational forecaster for West Gulf River Forecast Center for 14 years

Deployed on site for July 4th Flooding, Texas State Operations Center Hurricane Harvey, Florida State Operations Center for Hurricane Dorian and Ian, FEMA Region 6 for flood response in 2015

Team Lead for the Department of Commerce Agency Priority Goal of Test Capability of Providing Flood Inundation Mapping to Texas

Reorganization

The Way it is Today

Chief Scientist
Fred Ogden

Geo-Intelligence
Division
Fernando Salas

FIM Project
Derek Giardino

HydroVIS
Derek/Shawn/Nick

FIM Development
Carson Pruitt

Hydrofabric
Riley McDermott

Reorganization

The Way it is Monday

Chief Scientist
Fred Ogden

Service Development Division
Fernando Salas

Geo-Intelligence Program
Derek Giardino

Analysis and Prediction Program
Brian Cosgrove (Deputy Director)

HydroVIS
Derek/Shawn /Nick

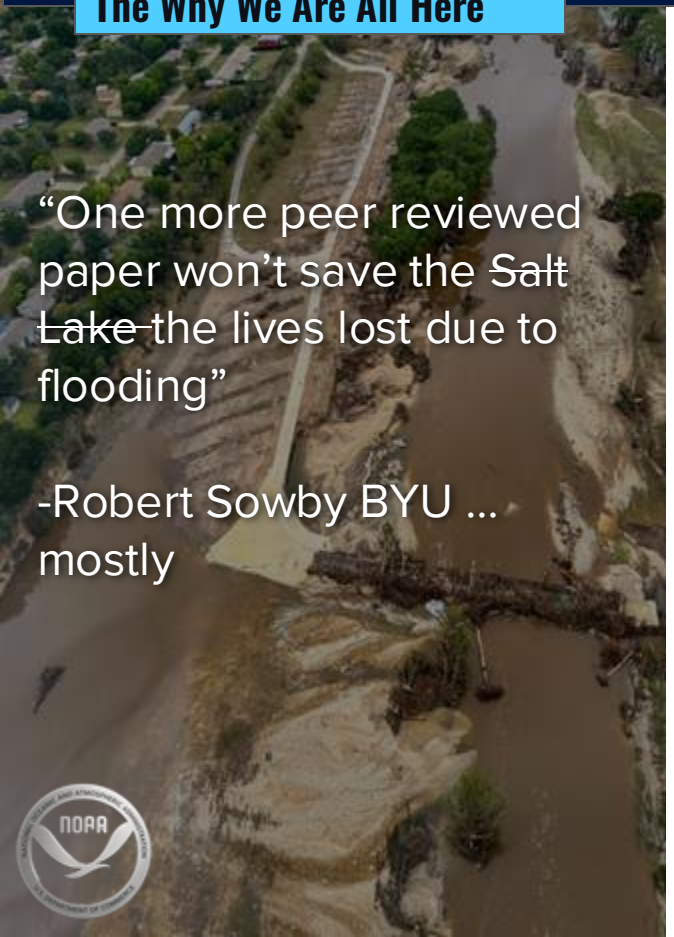
FIM Development
Carson Pruitt

Hydrofabric
Riley McDermott

National Water Model Development

The Mission

The Why We Are All Here



"One more peer reviewed paper won't save the ~~Salt Lake~~ the lives lost due to flooding"

-Robert Sowby BYU … mostly

National Weather Service

Protect life and property

CIROH Mission

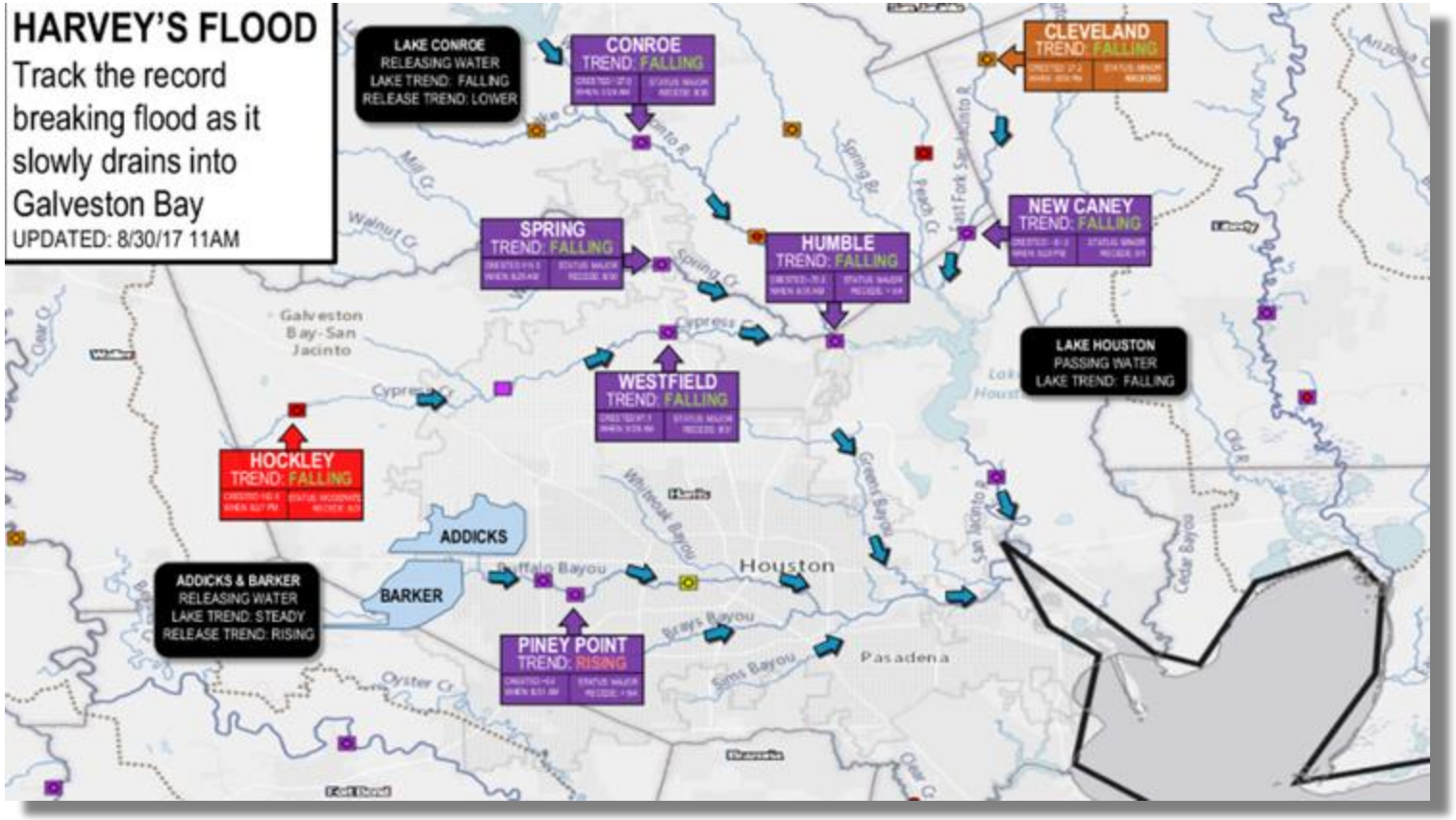
To innovate research that enhances our understanding of how coupled atmosphere-oceanland-biosphere components interact hydrologically and transform this new knowledge into **operational research products benefitting society**.

OWP Mission

Collaboratively research, develop and deliver timely and consistent, state-of-the-science national hydrologic analyses, forecast information, data, guidance, and equitable decision-support services to **inform essential emergency management and water resources decisions** across all time scales.

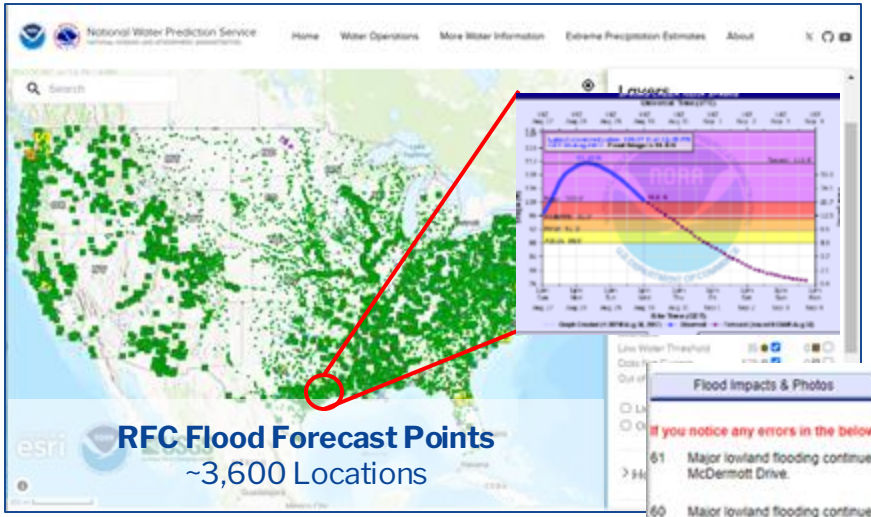
Hurricane Harvey

Not Even a Decade Ago



Hurricane Harvey

Impact Statements to Flood Mapping



National Water Prediction Service (NWPS)

"This is a tool we just can't afford to wait another 5 to 10 years to have..."

- Houston Office of Emergency Management Representative

Flood Impacts & Photos

61 Major lowland flooding continues as h... McDermott Drive.

60 Major lowland flooding continues as homes on McDermott Drive begin flooding.

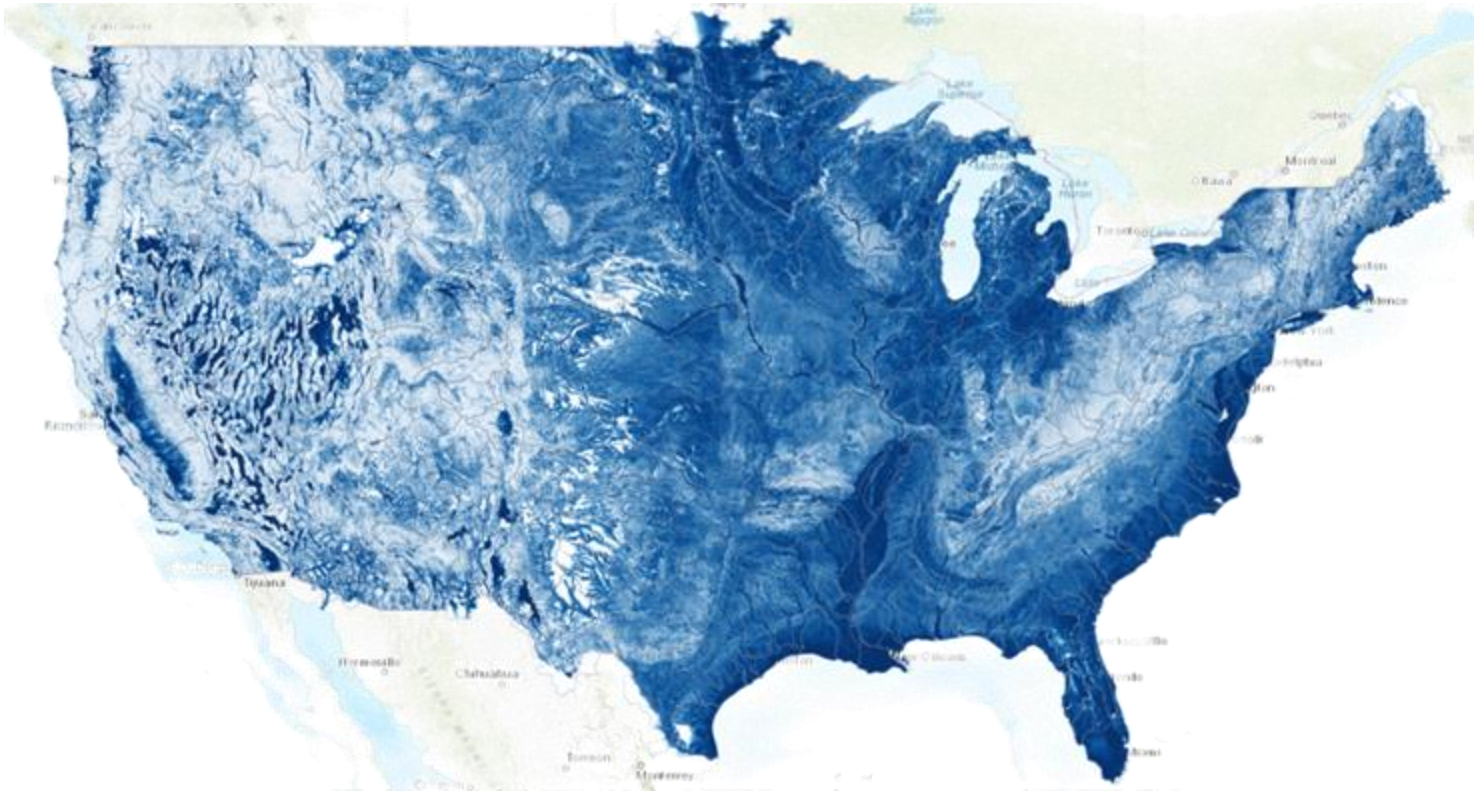
59.5 Major lowland flooding begins as home in Sequoia Estates subdivision begin flooding. Homestead Road south of the channel in innundated with one to two feet of water and water is several feet deep on the south bound feeder of U.S. Highway 59.

56.5 Moderate lowland flooding begins as streets in the Sequoia Estates subdivision and west of JFK Boulevard become innundated. The south bound feeder road of U.S Highway 59 is under close to one foot of water.

55 Minor lowland flooding begins as water escapes the north side of the upstream bank at U.S. Highway 59. Water is close to inundating the south bound feeder road south of the channel.

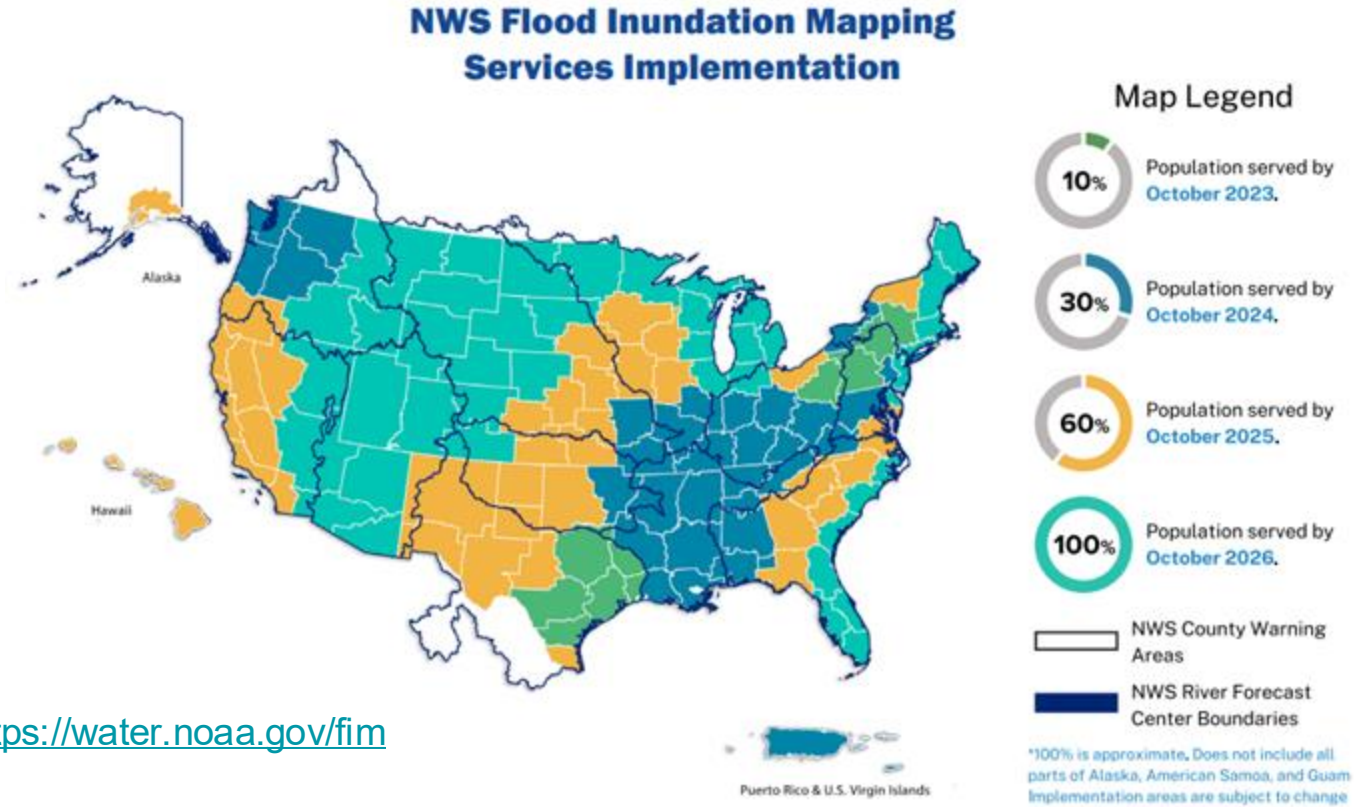
Continental Scale Flood Mapping

The Response to Flooding Like Harvey



Nationwide Flood Mapping Services

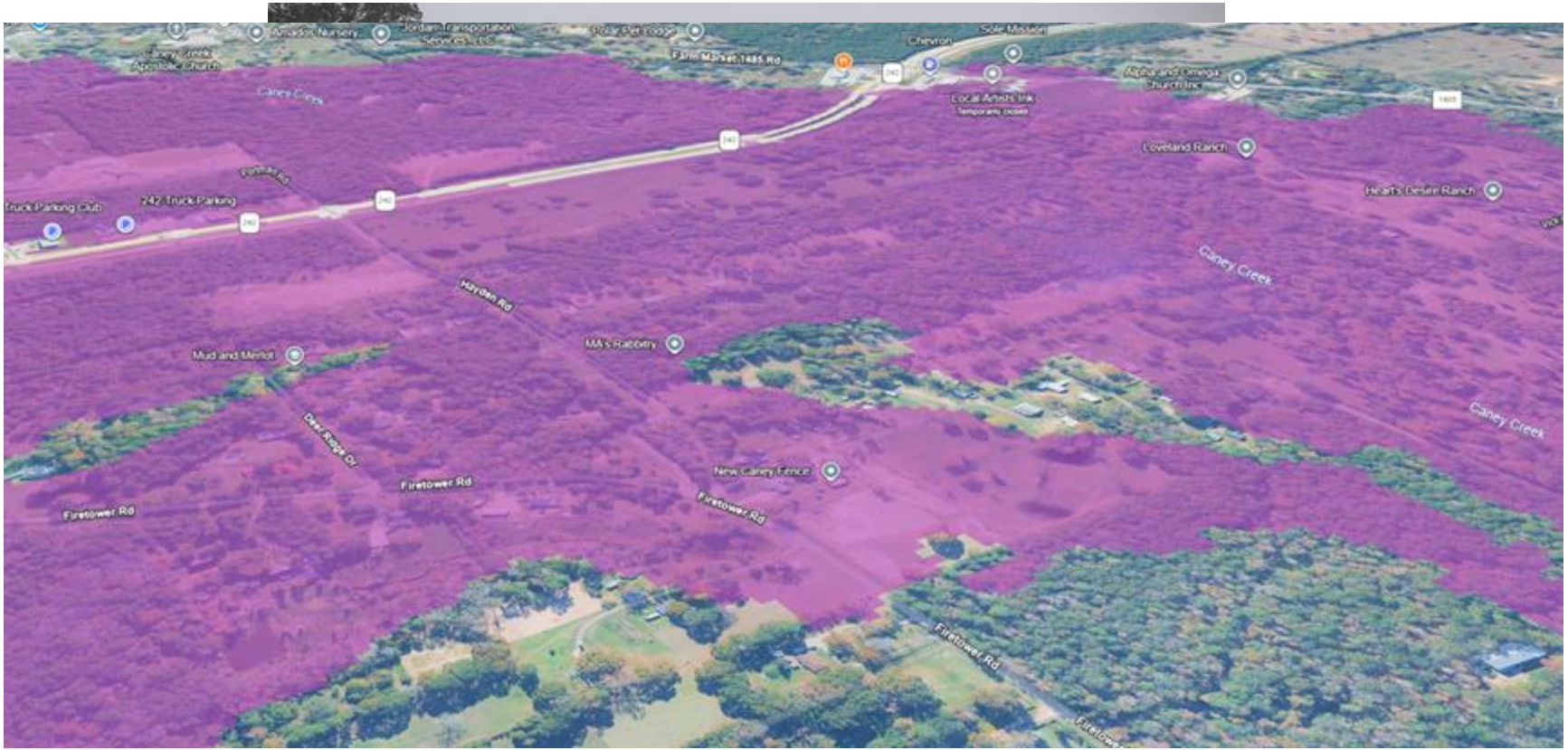
Full Release to 100% in 2026



Resources: https://water.noaa.gov/fim

Development Becomes Operations

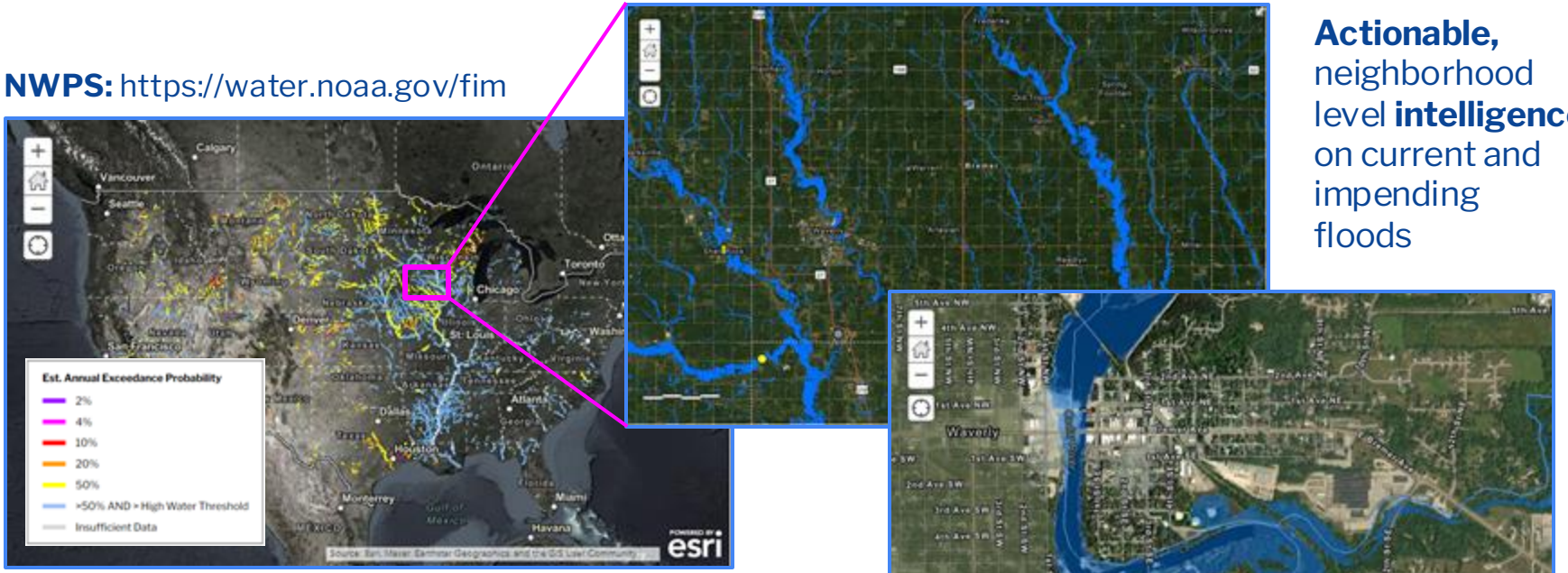
4 Years From Hydrograph to Flood Maps



Goal Was A Common Operating Picture

NWM to FIM to Response

NWPS: https://water.noaa.gov/fim



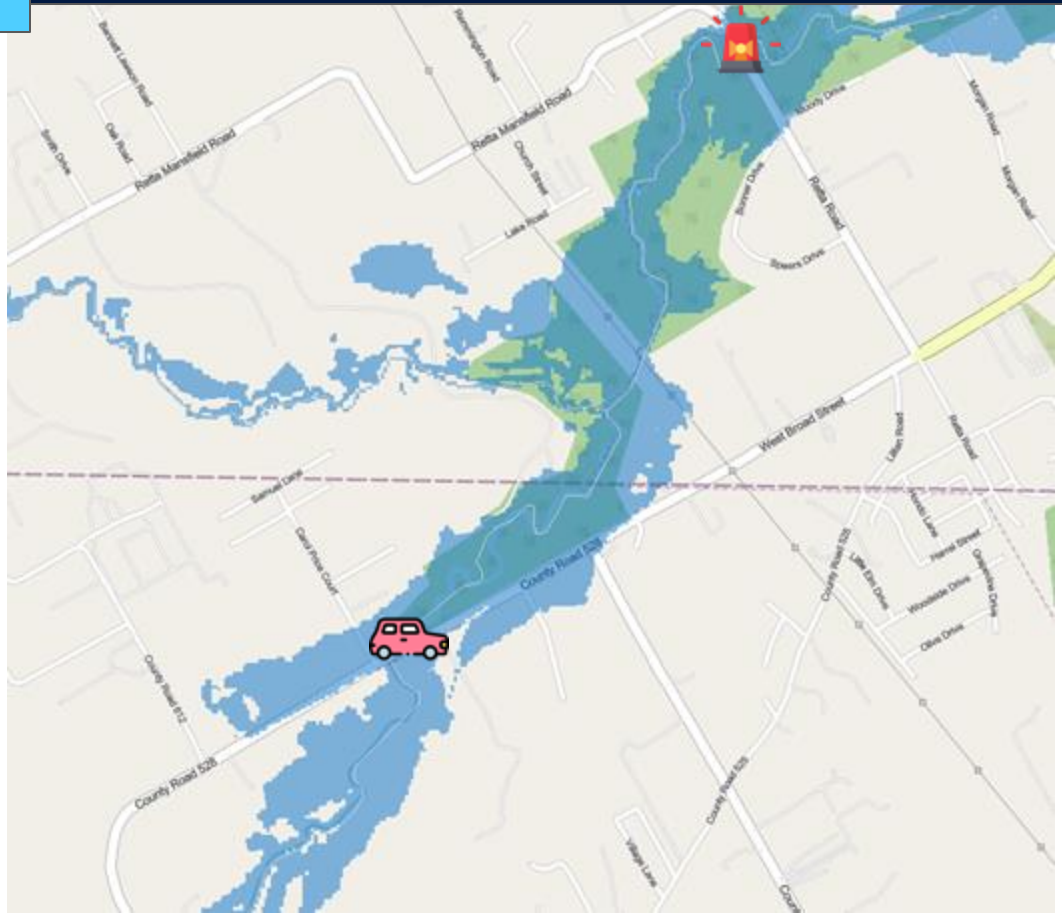
National Water Model
5-Day High Flow Magnitude Forecast

Actionable, neighborhood level **intelligence** on current and impending floods

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

Meet Lucas Warren

May 4th 2024

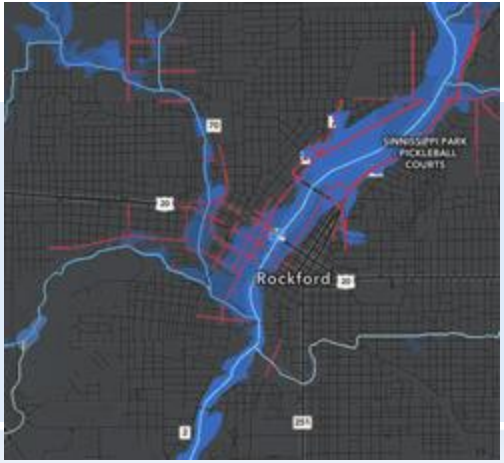


Turning Maps into a Life Saving Capability

A Map Doesn't Save a Life

Buildings Footprints

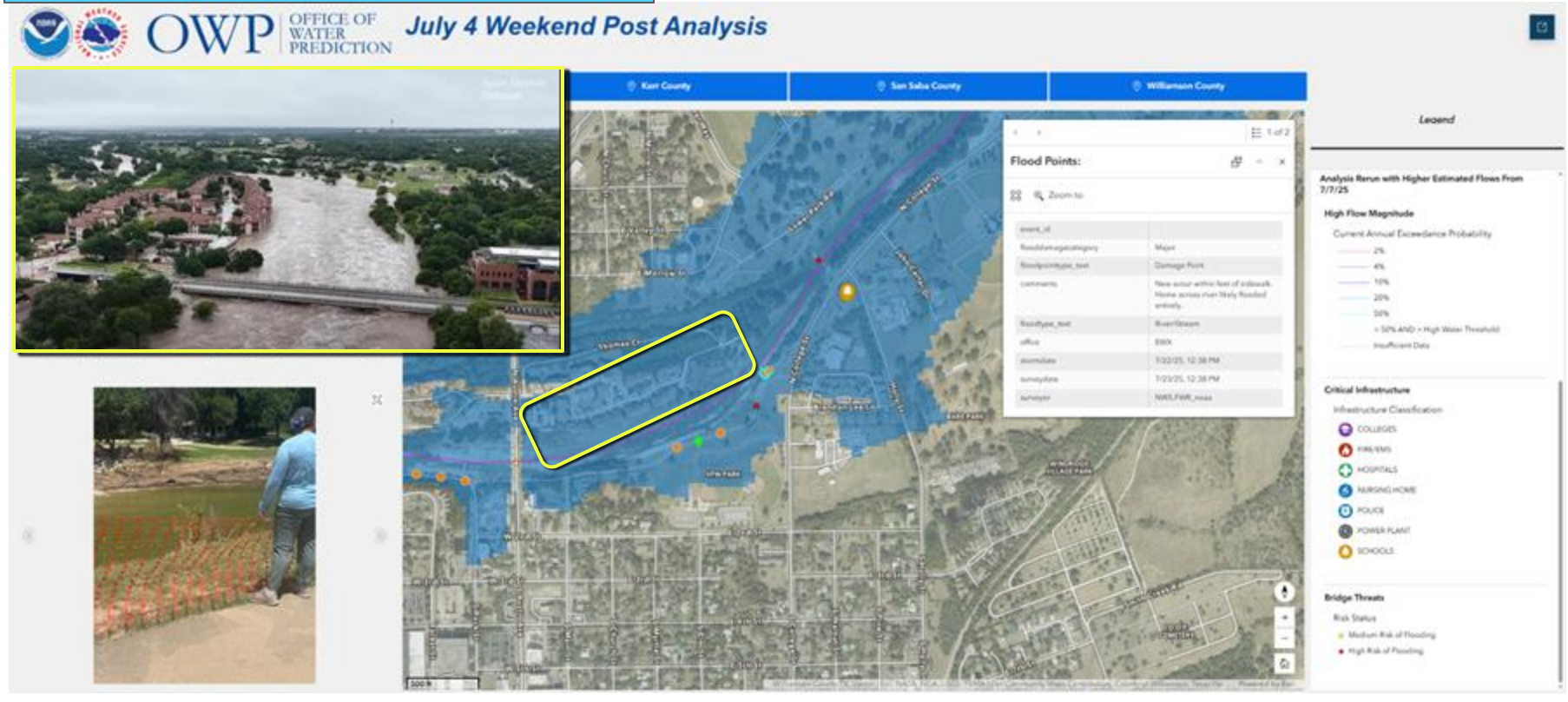
Bridges



Roads

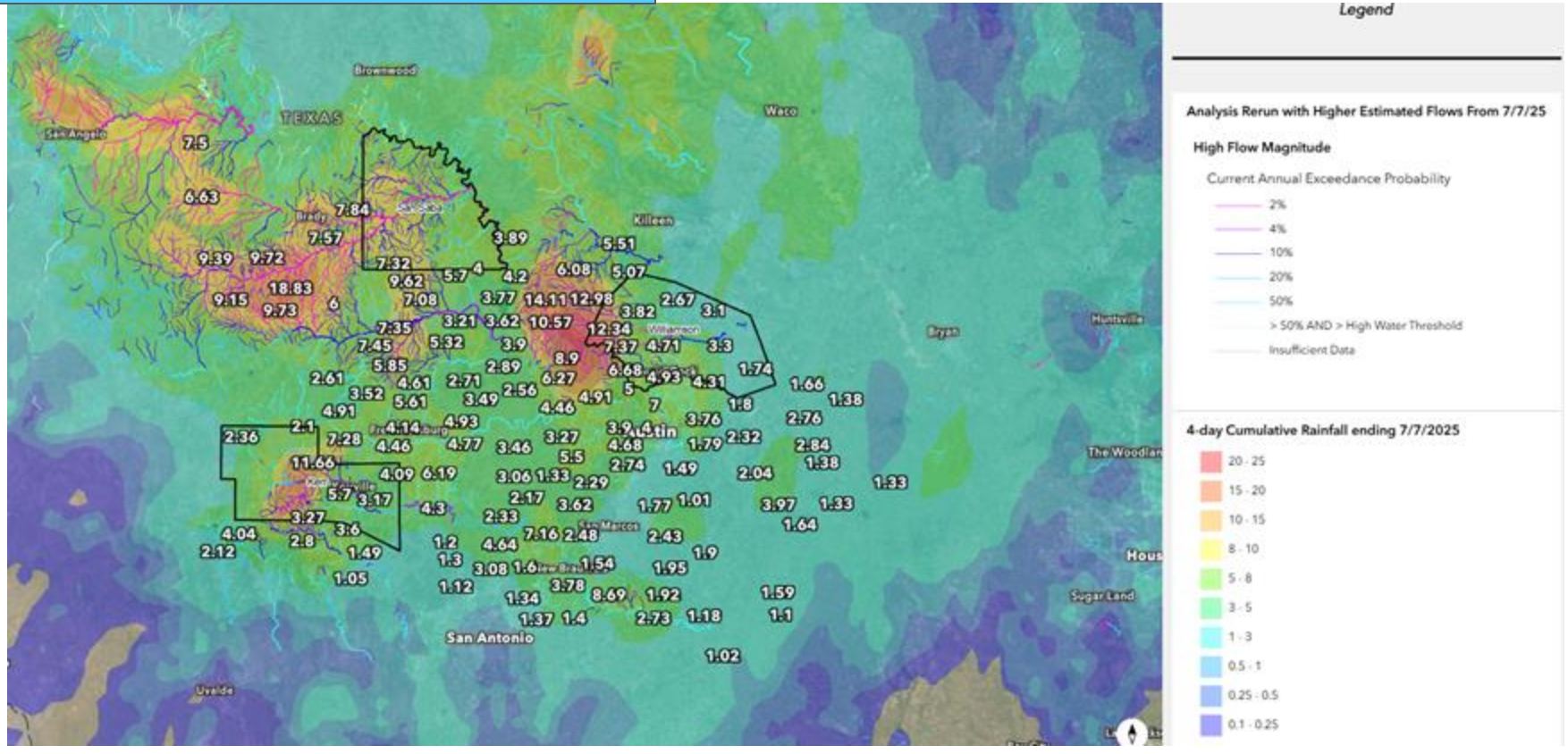
Georgetown Texas

Actionable Information



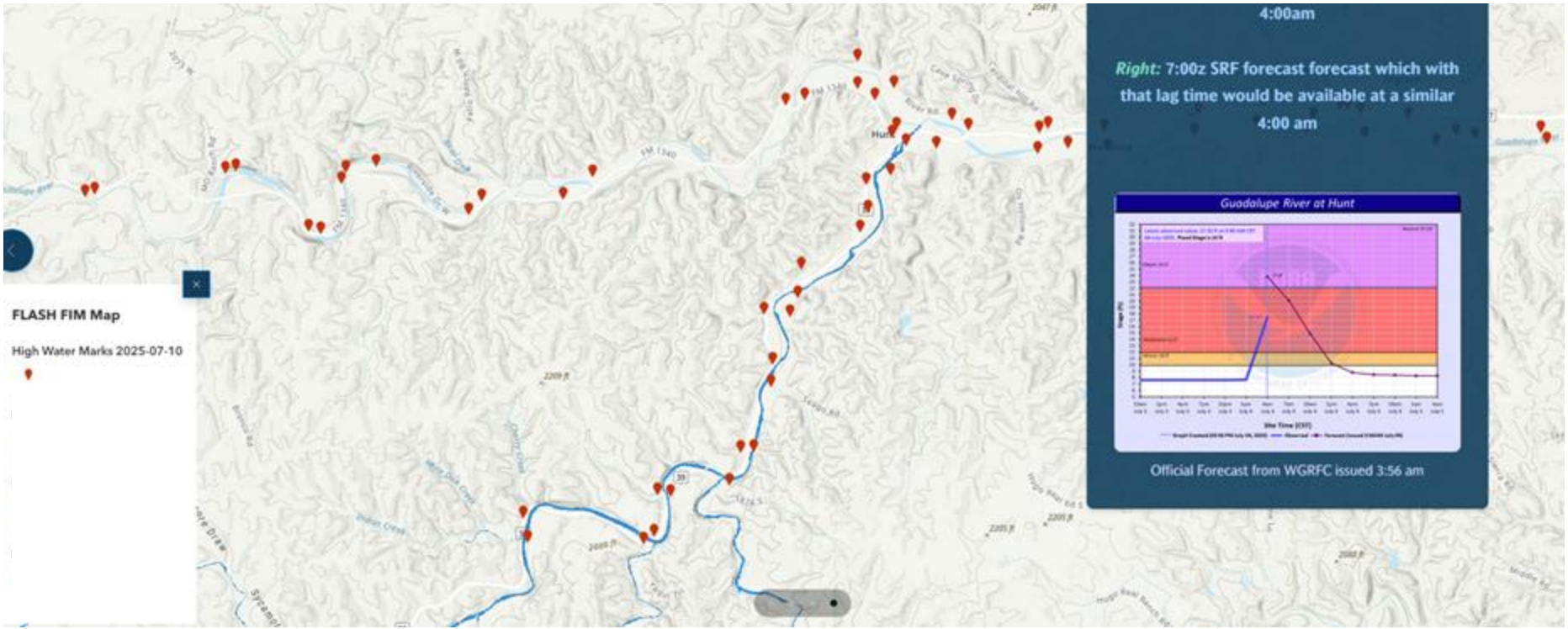
Fourth Of July Flooding 2025

Work Still to Do



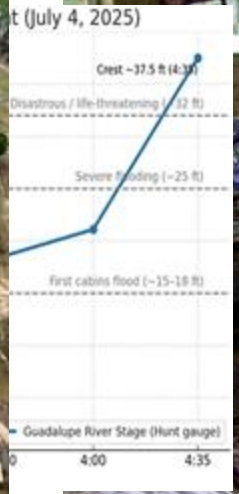
Fourth of July Flooding 2025

4:00am South Fork Guadalupe River



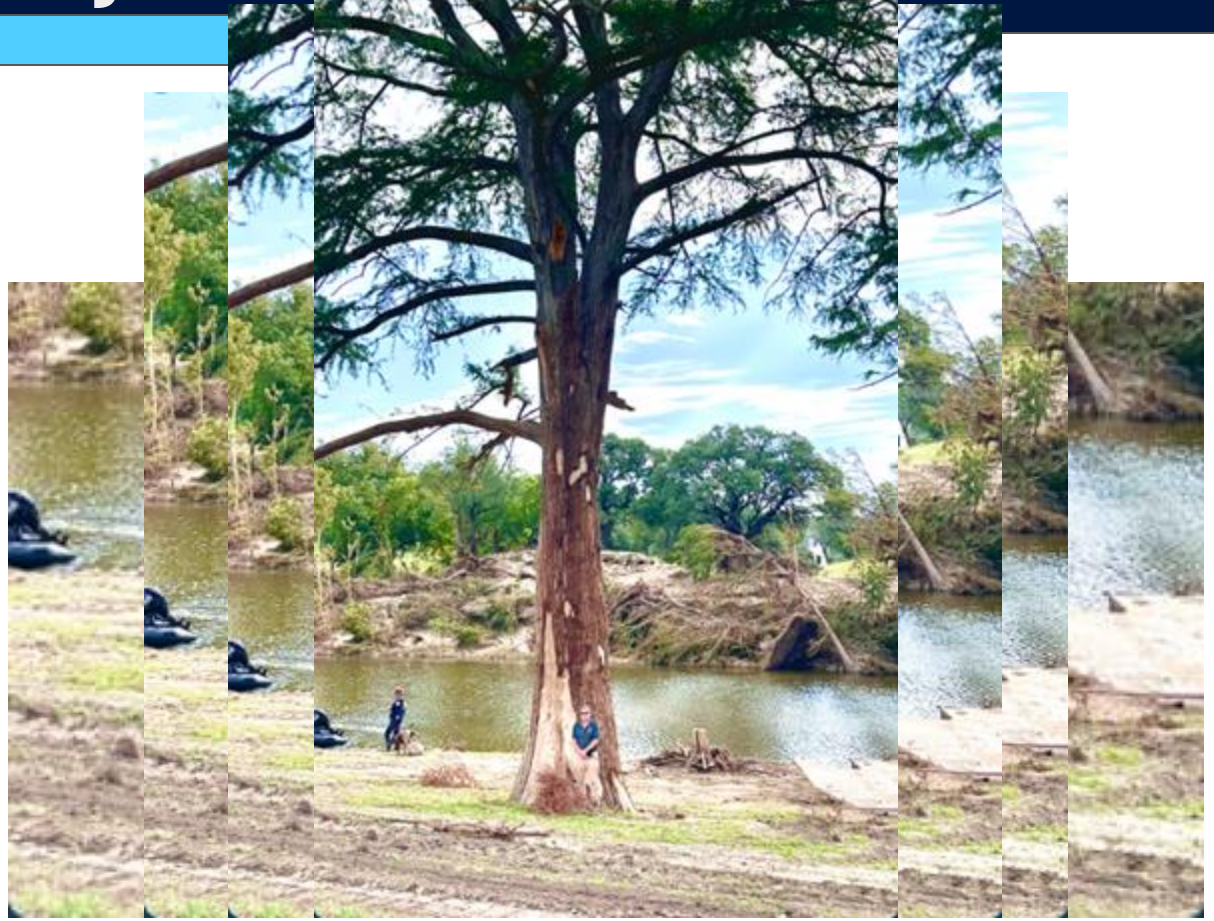
Fourth of July Flooding

4:00am South Fork Guadalupe River



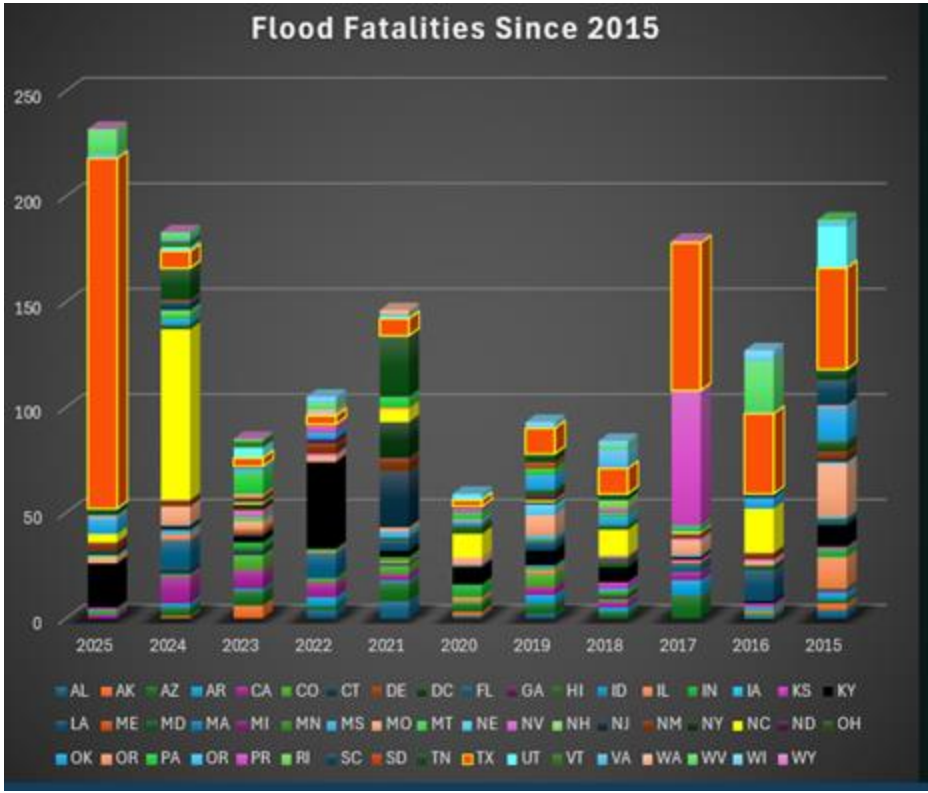
Fourth of July Floo

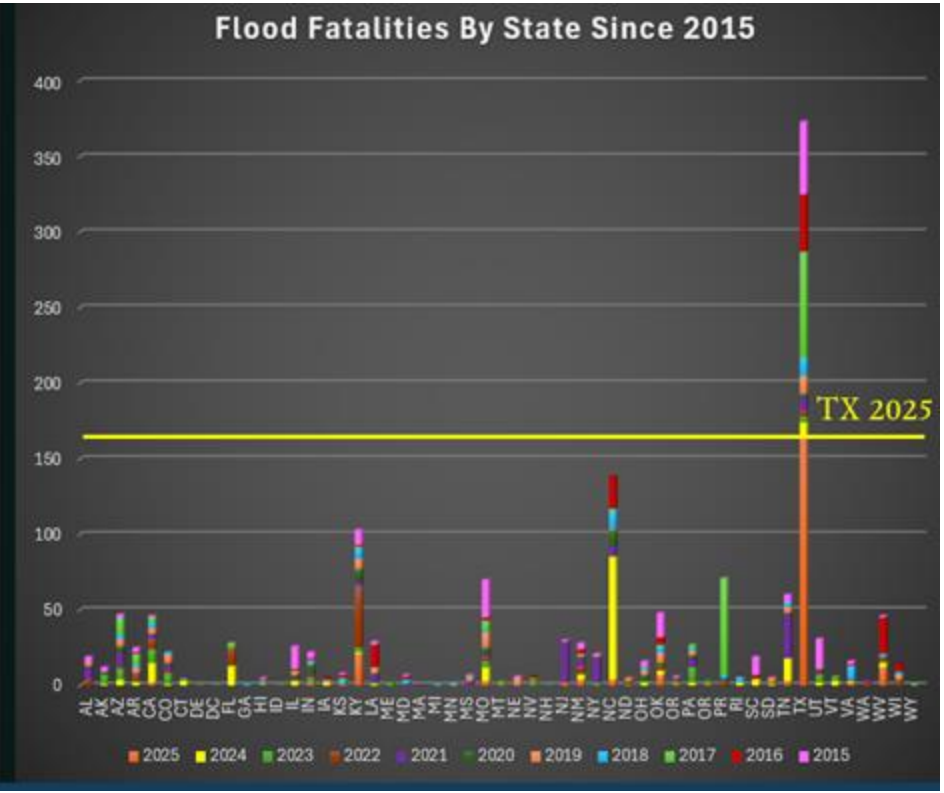
Wall of Water



Fourth of July Flooding in Context

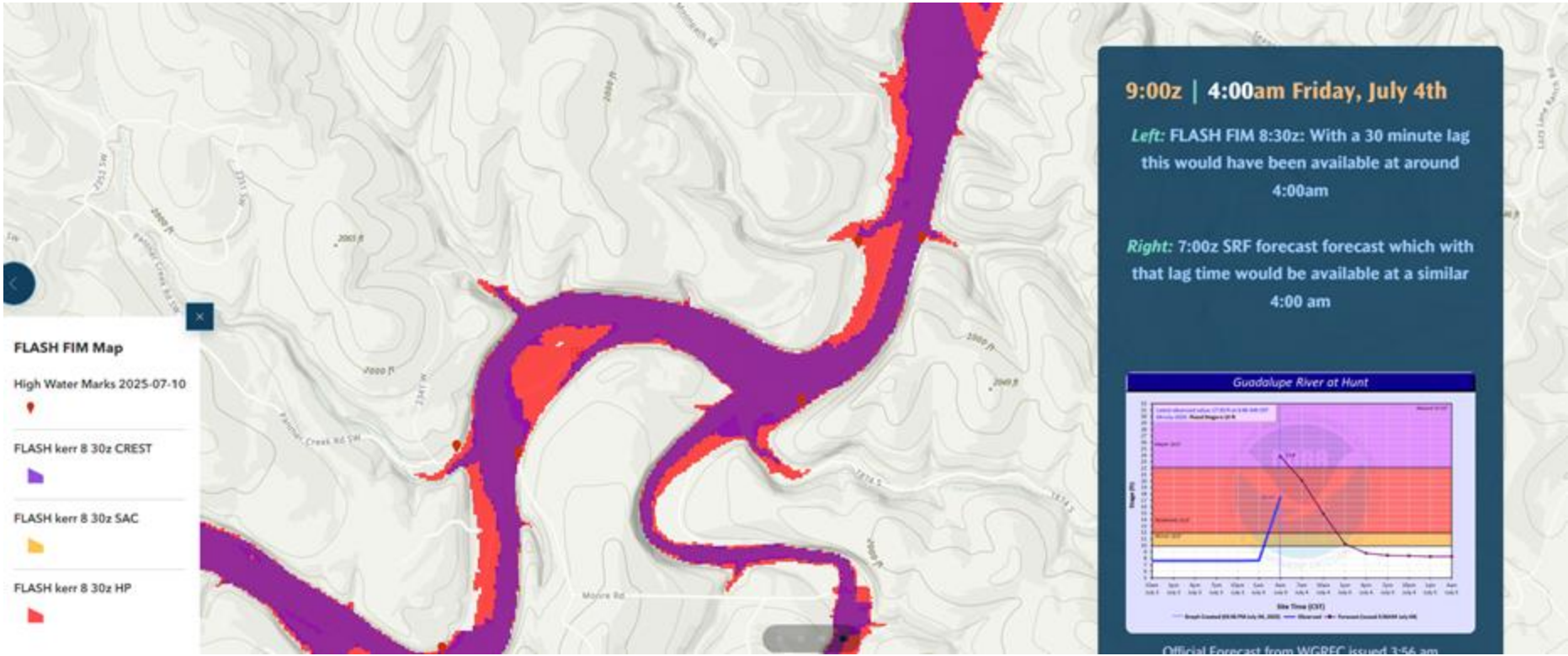
Flood Related Fatalaties Since 2015





FLASH FIM Capability

4:00am South Fork Guadalupe River



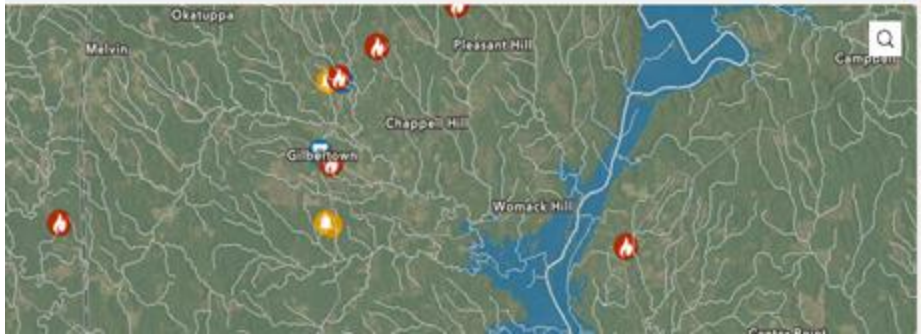
FLASH FIM in Testing for Operations

Forecasters Testing and Providing Feedback

Past 1 hour Accumulated Precipitation & NRP FIM

CREST FLASH Inundation Extent (EXPERIMENTAL)

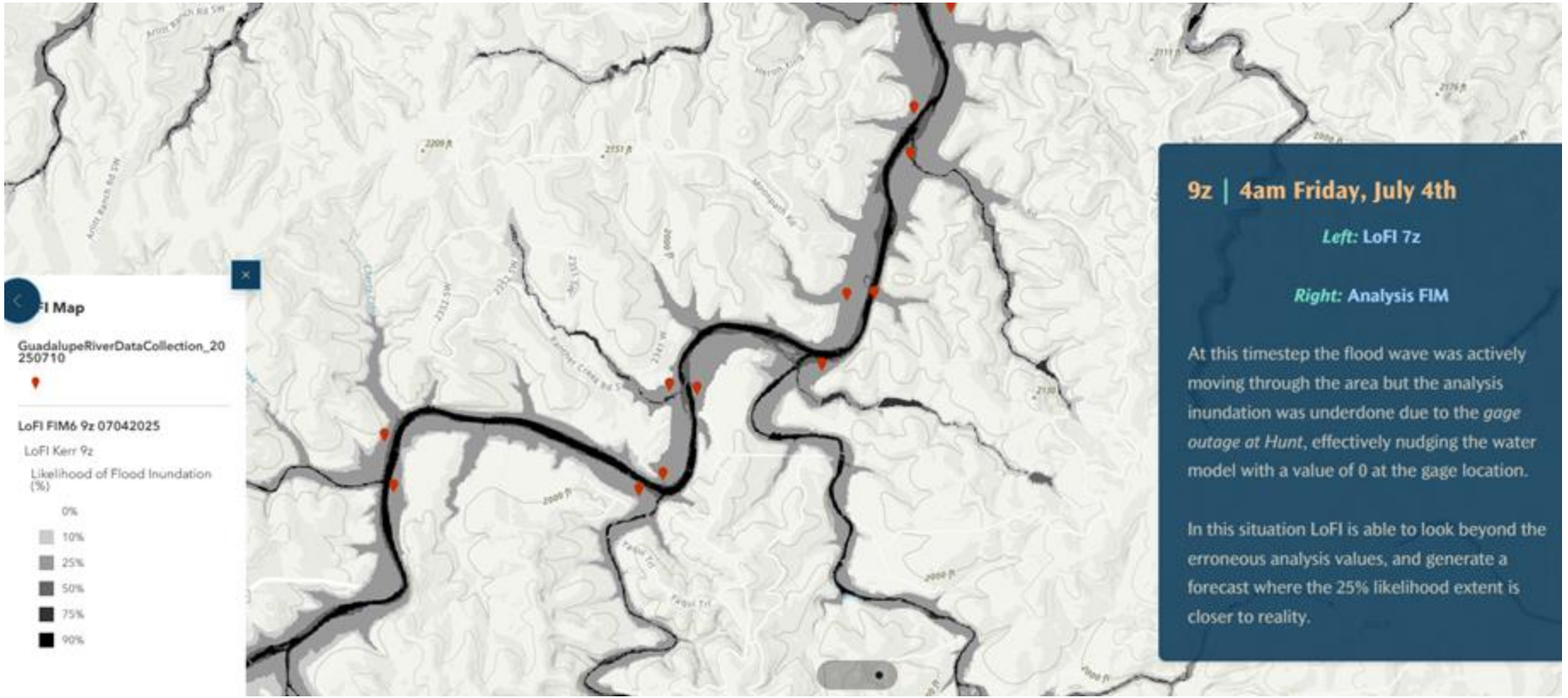
SAC-SMA FLASH Inundation Extent (EXPERIMENTAL)



Hydrophobic FLASH Inundation Extent (EXPERIMENTAL)

Likelihood FIM Capability

4:00am South Fork Guadalupe River



Likelihood FIM in Testing for Operations

Forecasters Testing and Providing Feedback

CIROH and the Future of FIM

This is the Only Team We Have

HydroFabric

- Continuous virtual/observed topobathy available at all NWM reaches
- Analyze the hydrofabric utilized by NWM against the hydrofabric that is utilized to generate FIM - is a single hydrofabric solution possible? If not how to optimize each for their specific purpose?

FIM Development

- Multi-model solutions to improve HAND capabilities in areas where HAND can not be improved thru parameter optimization
- Pluvial flash flood modeling/mapping that incorporates rain rate

HydroVIS

- All mapping will have the impacts embedded into their library, meaning that all impacts are sitting in our repo. What can you do with them?
- How to increase the understanding and utility of FIM to meet our end user requirements

Thank You!

Derek Giardino

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https://water.noaa.gov

NOAA

OWP | OFFICE OF WATER PREDICTION