Making FIMs Work for Multiple Users: Understanding the Value and Function of Flood Inundation Mapping to Support Decision Support

Principal and Co-Investigators:
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The Nurture Nature Center
518 Northampton St, Easton, PA 18042
610-253-4432

Researchers at the Nurture Nature Center (NNC) study the communication, utility, and design of National Weather Service forecast products. Our goal is to understand and improve the information you need to protect yourself when severe weather is possible. To do this, we need the help of volunteers who are willing to take part in research.

This material is based upon work supported by the National Oceanic and Atmospheric Administration FY2023 Weather Program Office Research Programs under grant number NA23OAR4590359.
Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of NOAA.

Agenda

- Consent form
- Pre-session Survey
- Scenario
- Post-session Survey

Trinity/San Jacinto River Briefing

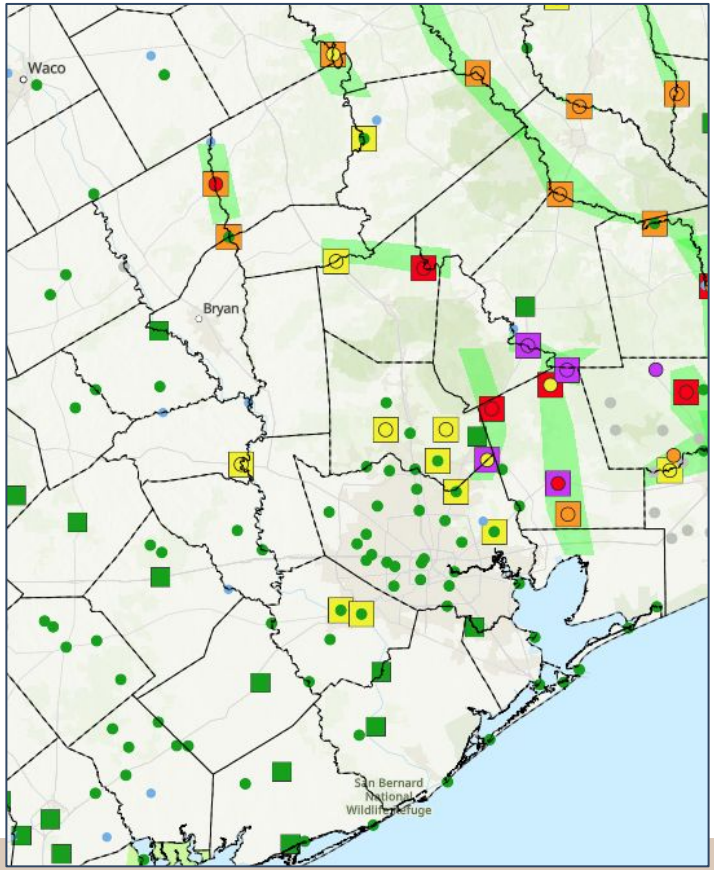
3:00 PM CDT
Tuesday, April 30th, 2024

Prepared by:
Katie Landry-Guyton (HGX) and Will Maddux (WGRFC)

Situation Overview

Current River Observations and Forecasts

Houston/Galveston
WEATHER FORECAST OFFICE



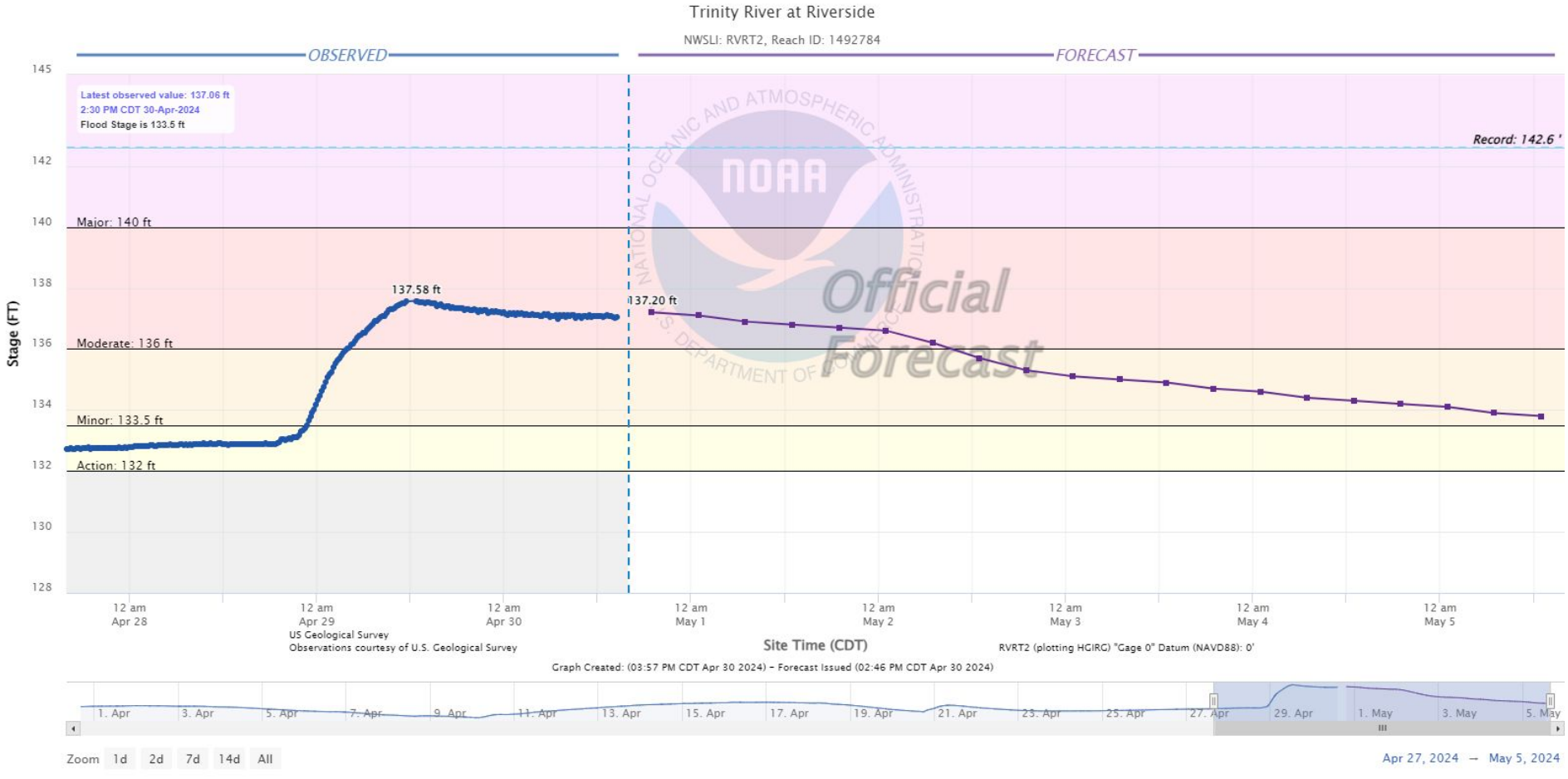
Trinity River is experiencing action to major river flooding. Lake Livingston has decreased their releases from 98,400 cfs to 94,300 cfs.

East Fork San Jacinto River is experiencing action to major river flooding.

CATEGORIES	OBSERVATION	FORECAST
Major Flood	3	4
Moderate Flood	5	8
Minor Flood	21	22
Action	27	24
No Flood	264	63
Flood Category Not Defined	139	0
No Forecast Available	0	0
Low Water Threshold	0	0
Data Not Current	32	0
Out of Service	4	0

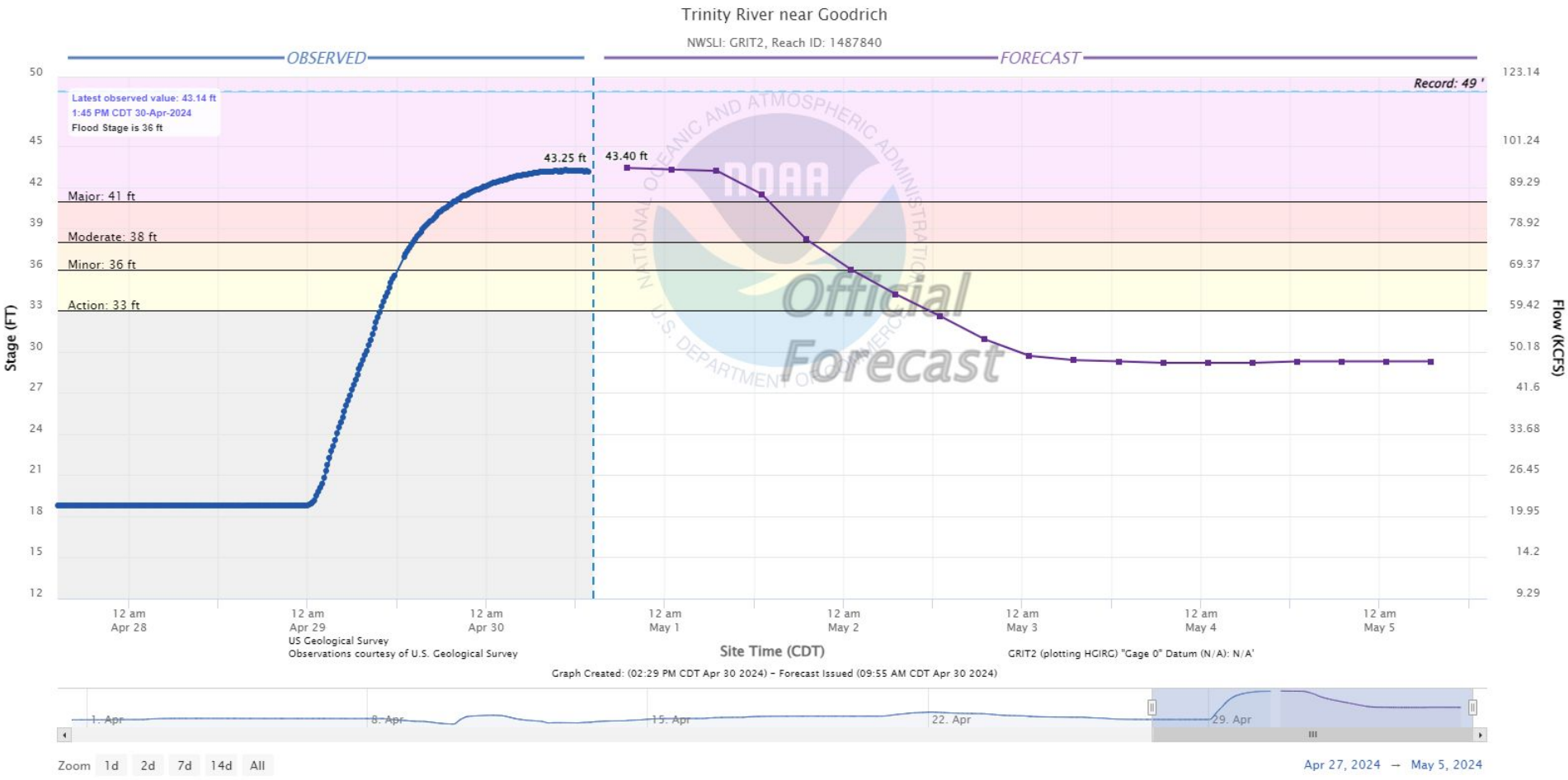
Trinity River at Riverside

Houston/Galveston



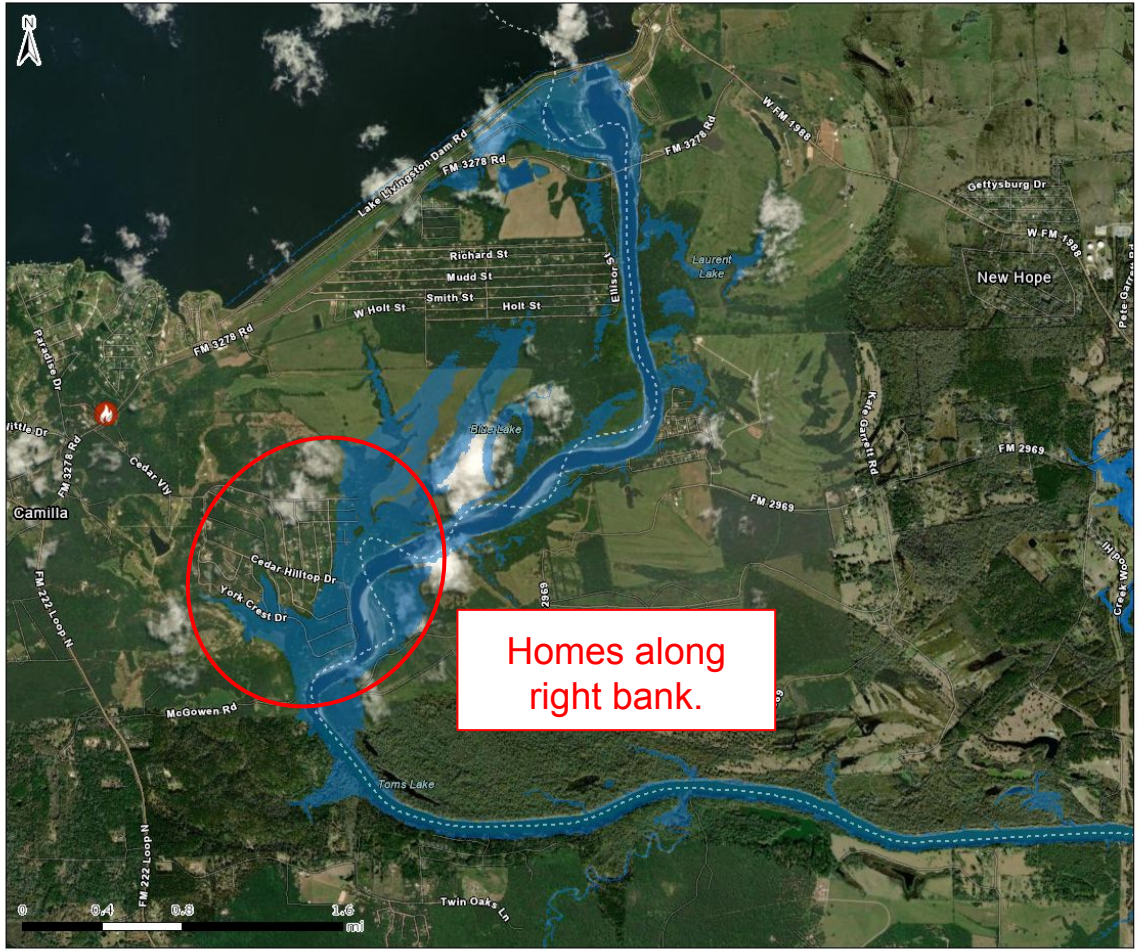
Trinity River at Goodrich

Houston/Galveston



RFC FIM_04292024_GRIT2_Upstream

Potential road and structures *threatened*.



Homes along right bank.

*AHPS Observed River Stages
- Major Flooding
- Moderate Flooding
- Minor Flooding
- Near Flood
- No Flooding
- Flood Category Not Defined
- At or Below Low Water Threshold
- Observations Are Not Current
- Out of Service

*Critical Infrastructure
- SCHOOLS
- FIRE/EMS
- NURSING HOME
- POLICE
- HOSPITALS
- COLLEGES

***RFC Max Stage Forecast**

Record Forecasts
- Increasing
- Constant
- Decreasing

Max Status - Forecast Trend
- Major (Increasing)
- Major (Constant)
- Major (Decreasing)
- Moderate (Increasing)
- Moderate (Constant)
- Moderate (Decreasing)
- Minor (Increasing)
- Minor (Constant)
- Minor (Decreasing)
- Action (Increasing)
- Action (Constant)
- Action (Decreasing)

NWM Inundation Extent Analysis

Estimated Impacted Buildings (FEMA USA Structures)
- Agriculture
- Assembly
- Commercial
- Education
- Government
- Industrial
- Residential
- Utility and Misc
- Other
- Inundation Extent

RFC 5-Day Max Downstream Inundation Extent Forecast

5 Days - Estimated Impacted Buildings (FEMA USA Structures)
- Agriculture
- Assembly
- Commercial
- Education
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- Other
- 5 Days - Inundation Extent

Experimental visualization, for guidance use only. Does not take into account coastal flooding or storm surge. May not reflect the official forecast or account for local levees. Visit water.weather.gov for the official forecast.

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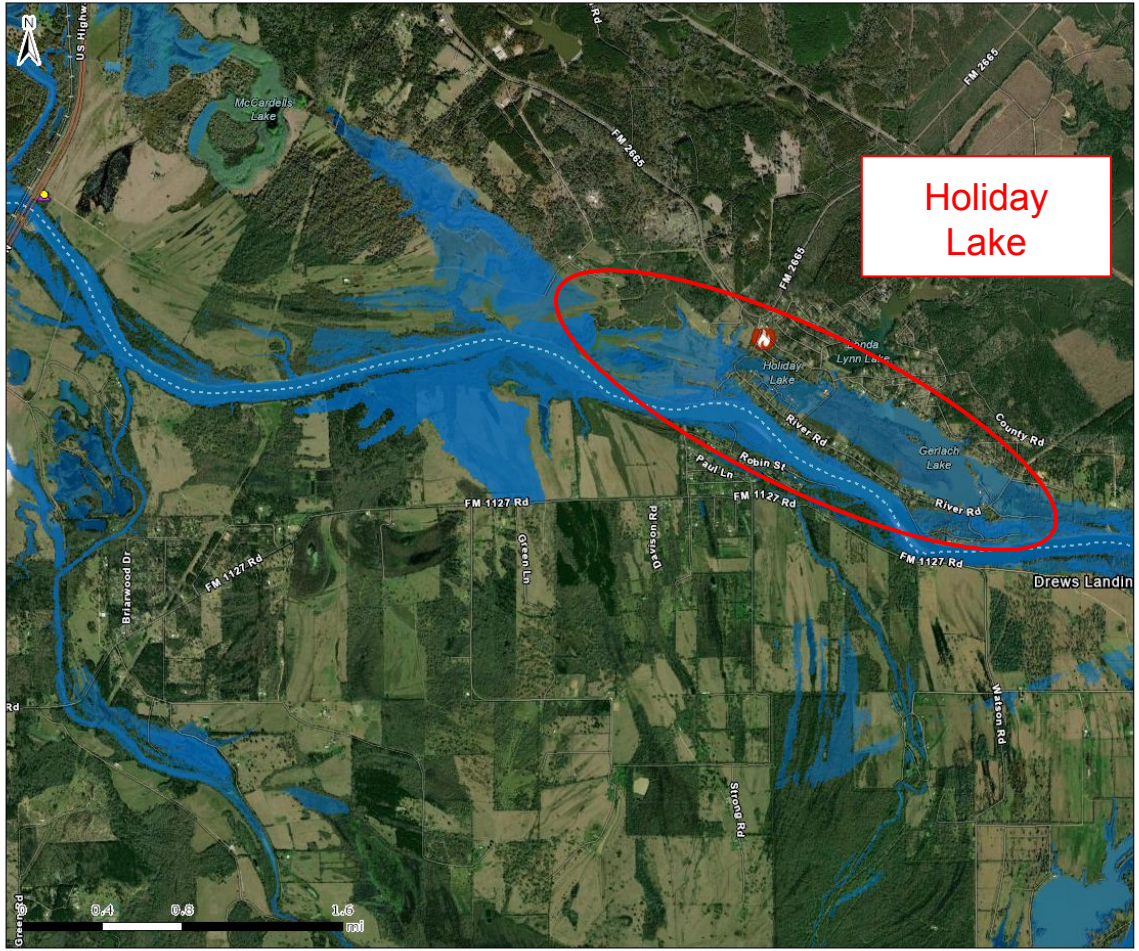
RFC FIM_04292024_GRIT2

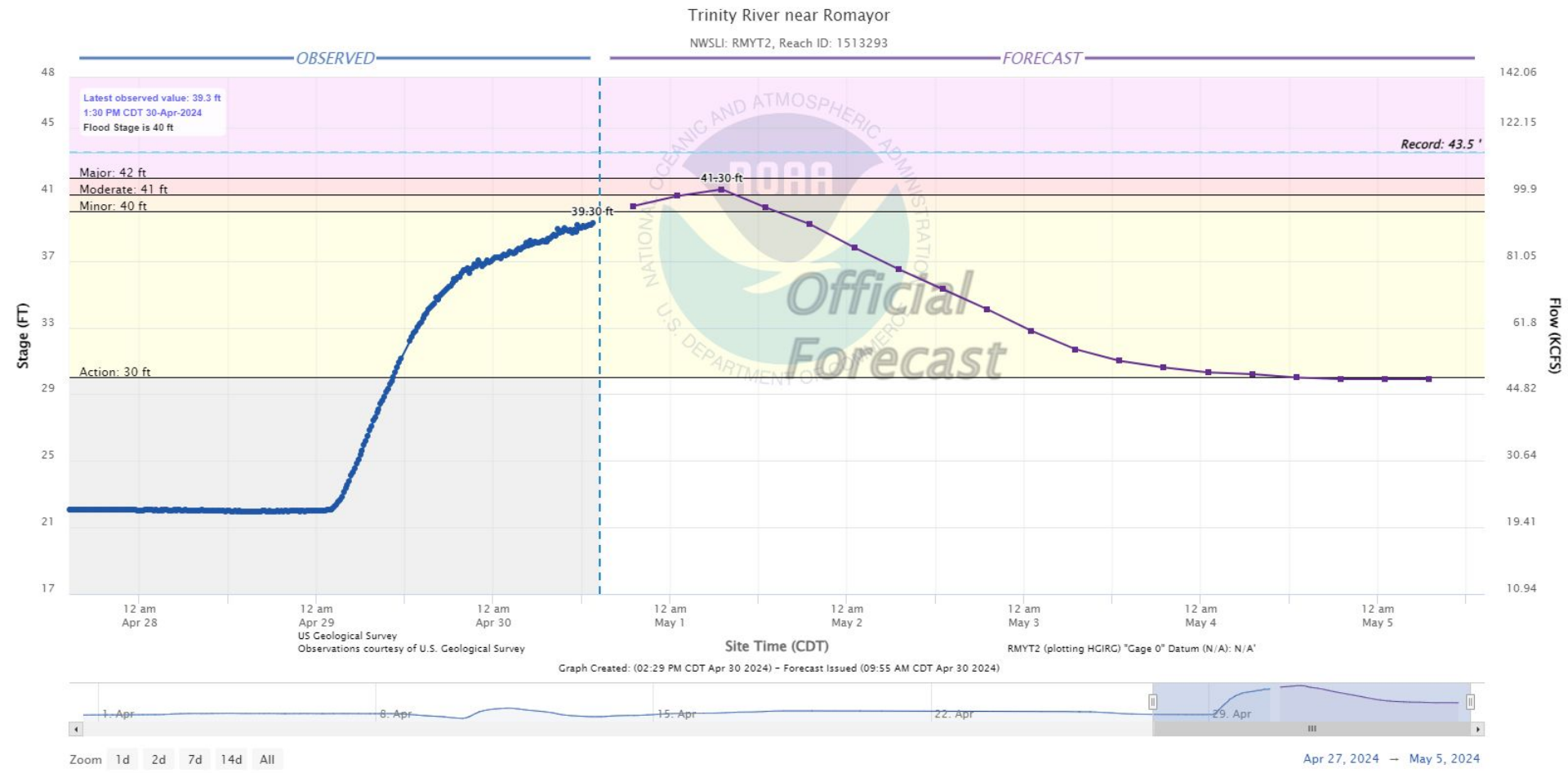
Potential road and structures *threatened*.



Holiday Lake

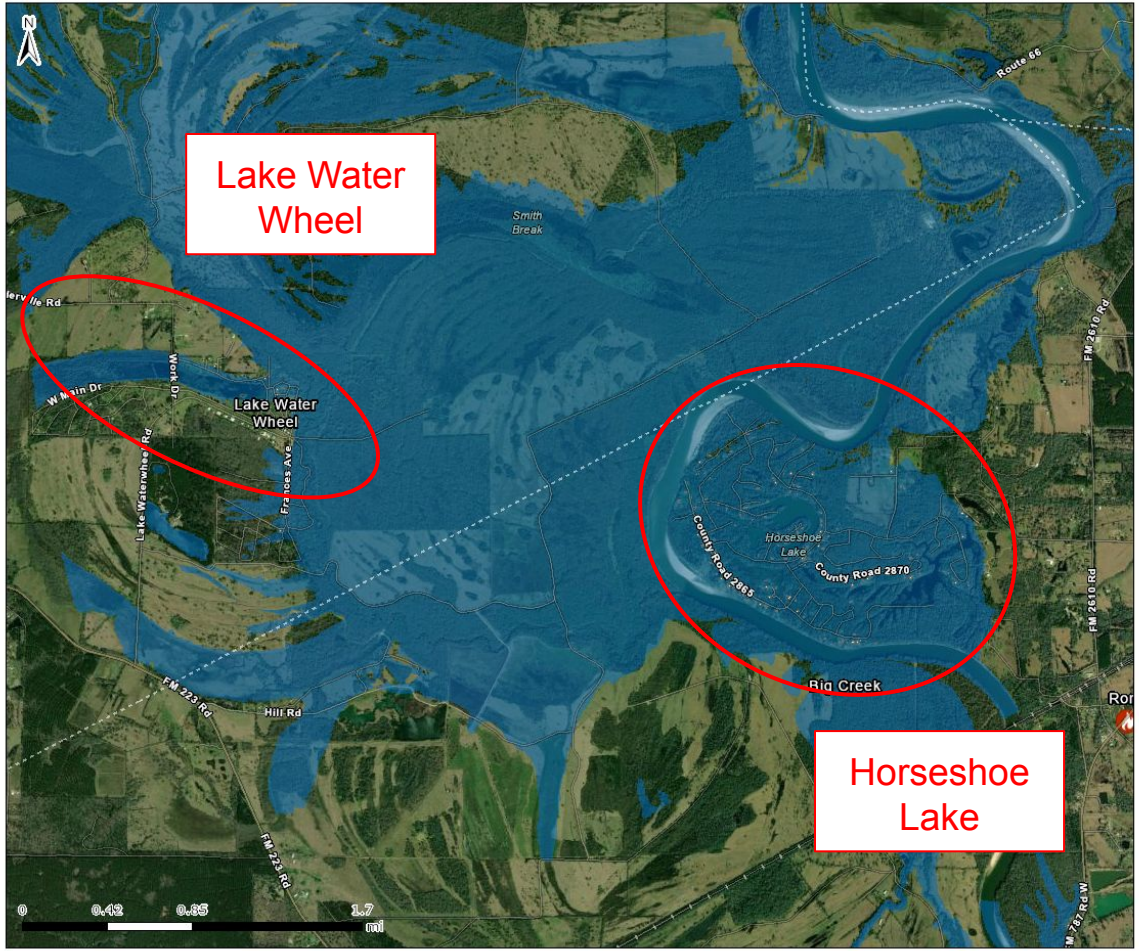
Trinity River at Romayor

Houston/Galveston



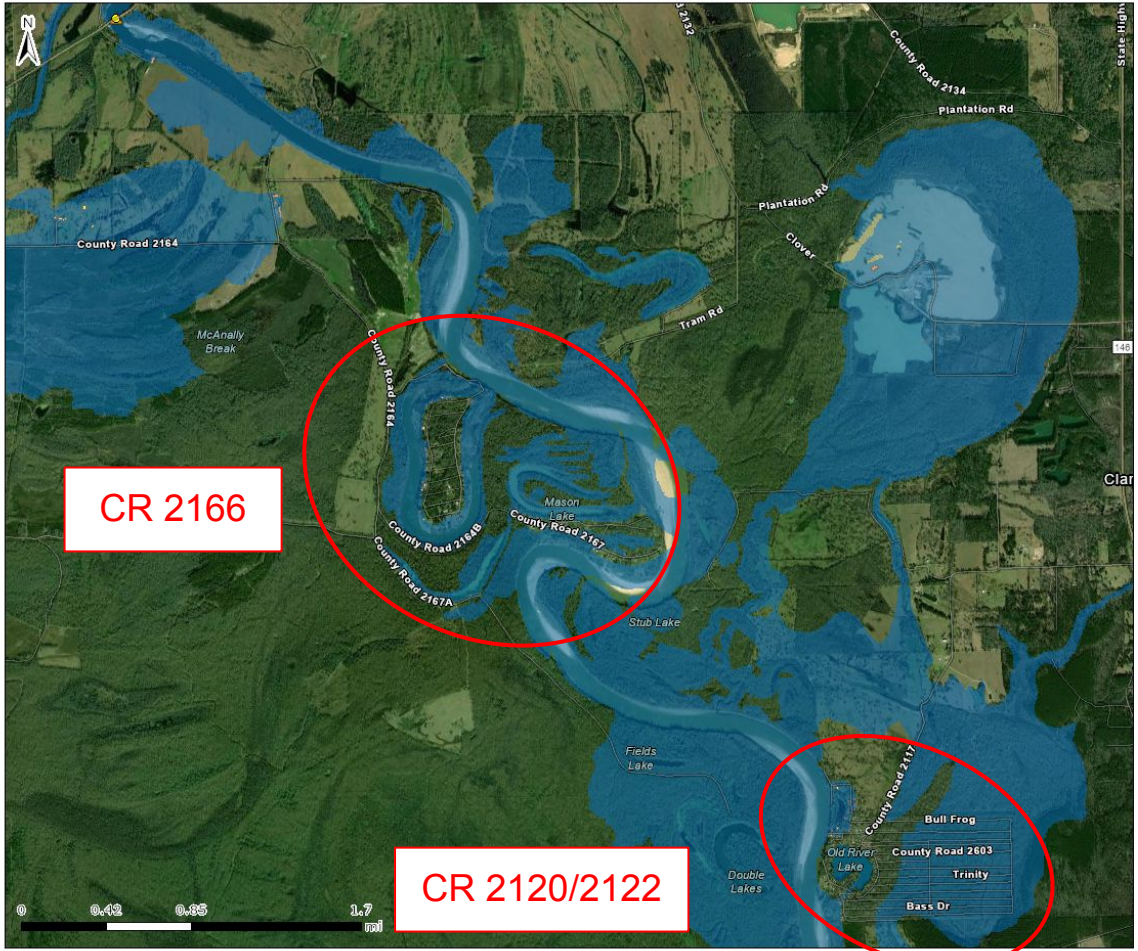
RFC FIM_04292024_RMYT2

Potential road and structures *threatened*.



RFC FIM_04292024_RMYT2_Downstream

Potential road and structures *threatened*.



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5 Days - Estimated Impacted Buildings (FEMA USA Structures)
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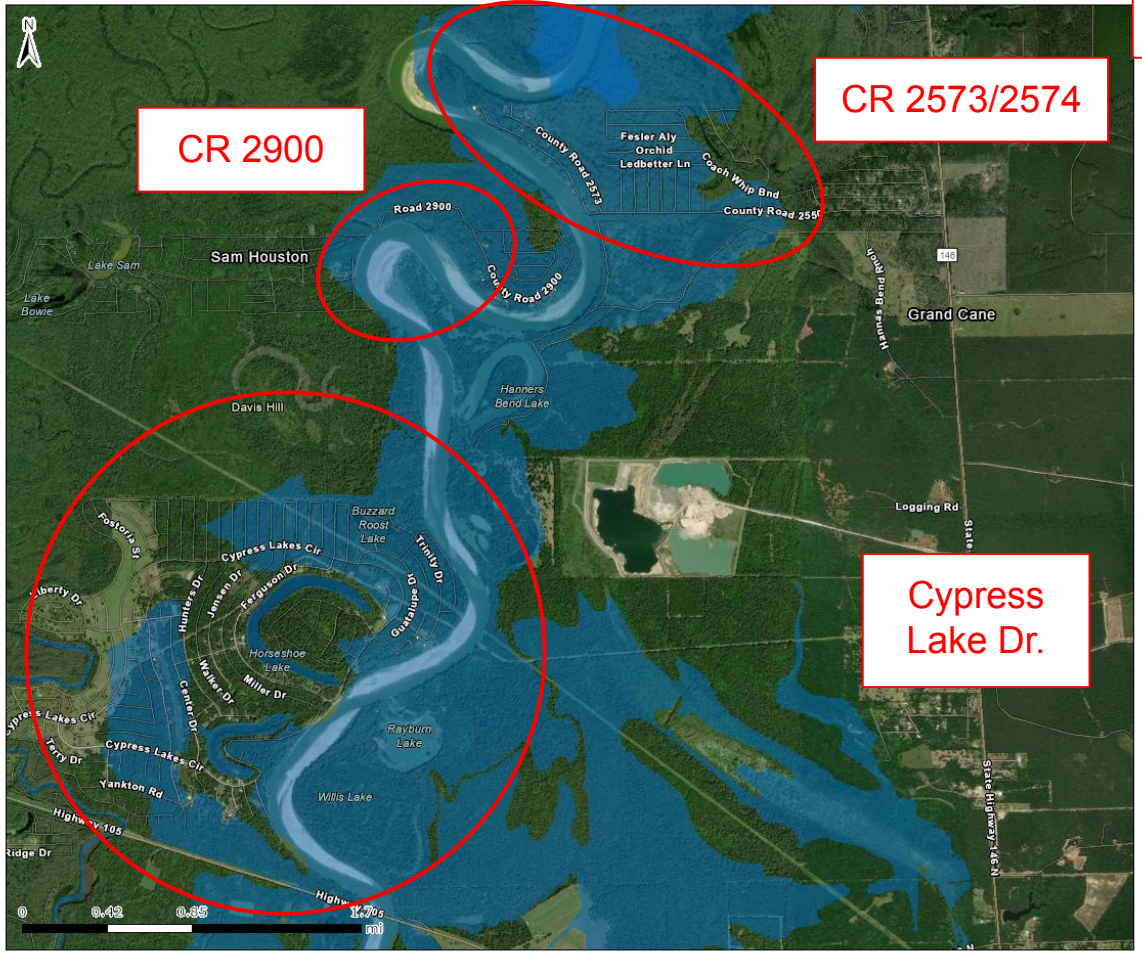
RFC FIM_04292024_RMYT2_Downstream2

Potential road and structures *threatened*.



Minor Flooding
Near Flood
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NWM Inundation Extent Analysis

Estimated Impacted Buildings (FEMA USA Structures)
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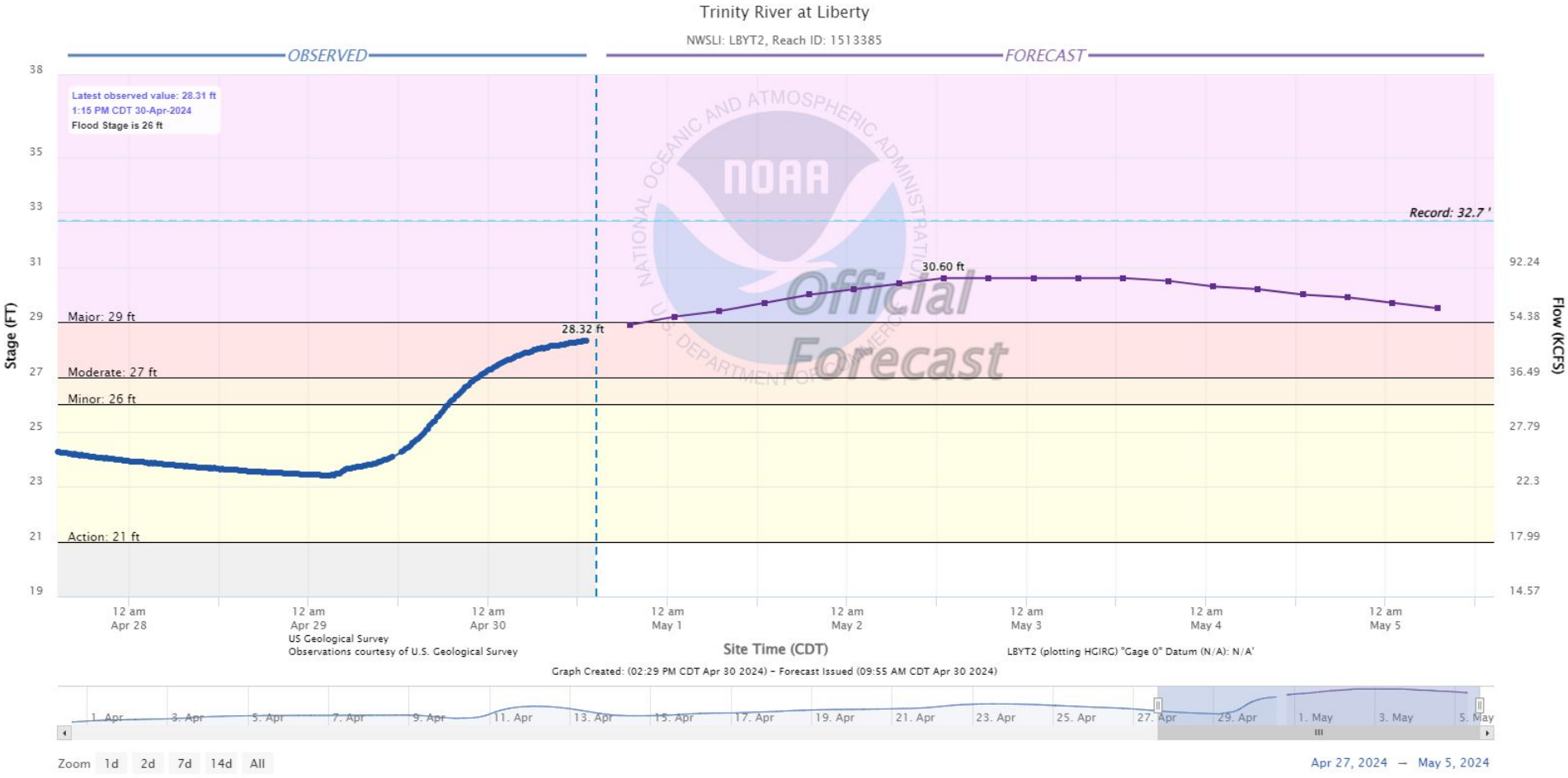
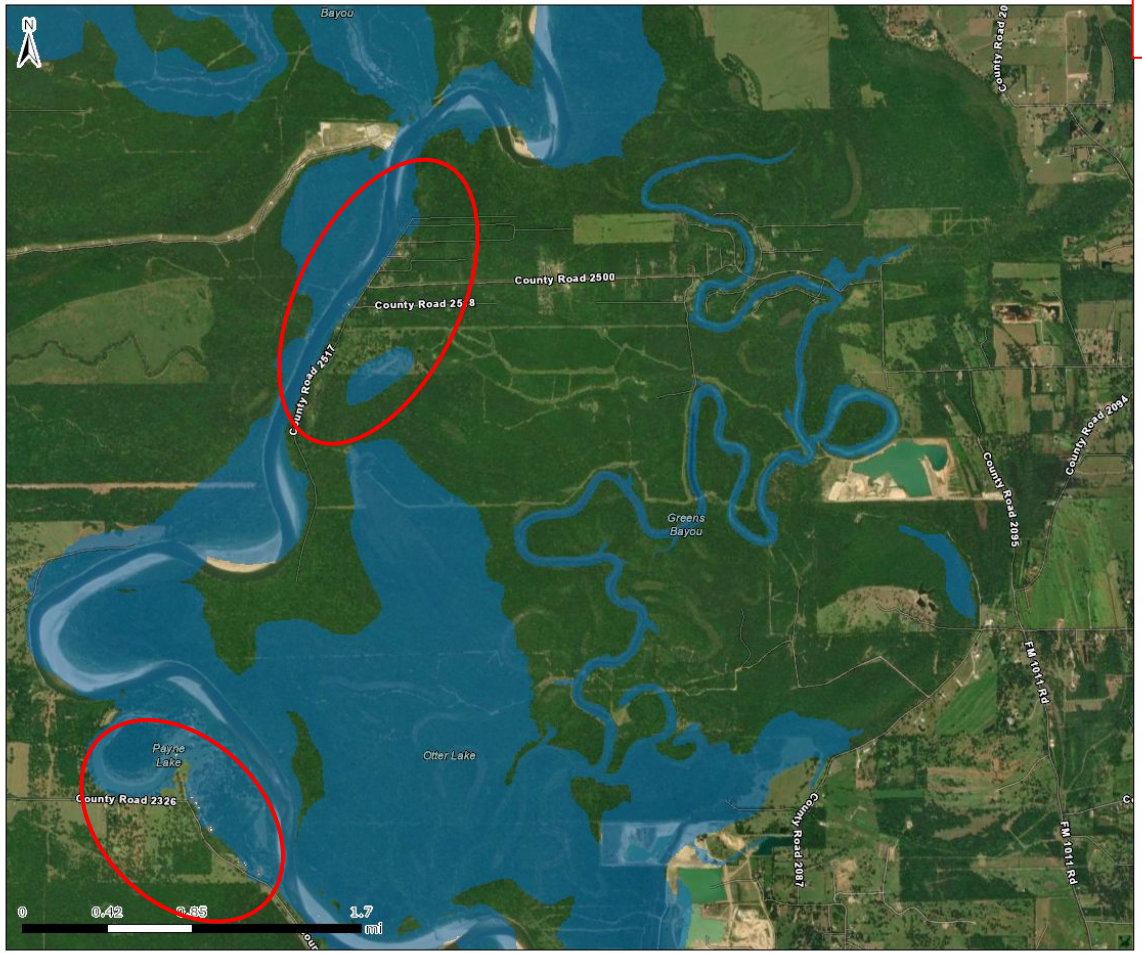
Trinity River at Liberty

Houston/Galveston



RFC FIM_04292024_LBYT2_Upstream2

Potential road and structures *threatened*.



Minor Flooding
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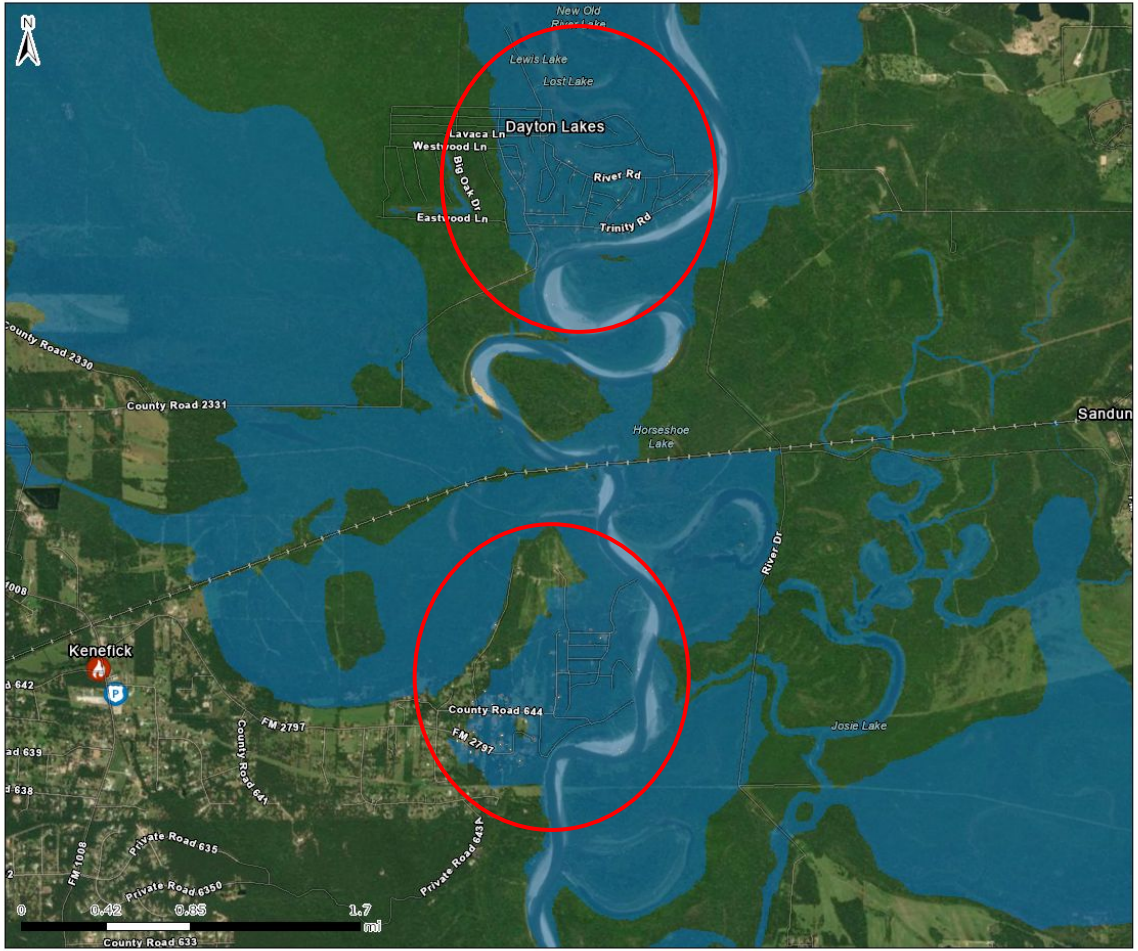
RFC FIM_04292024_LBYT2_Upstream

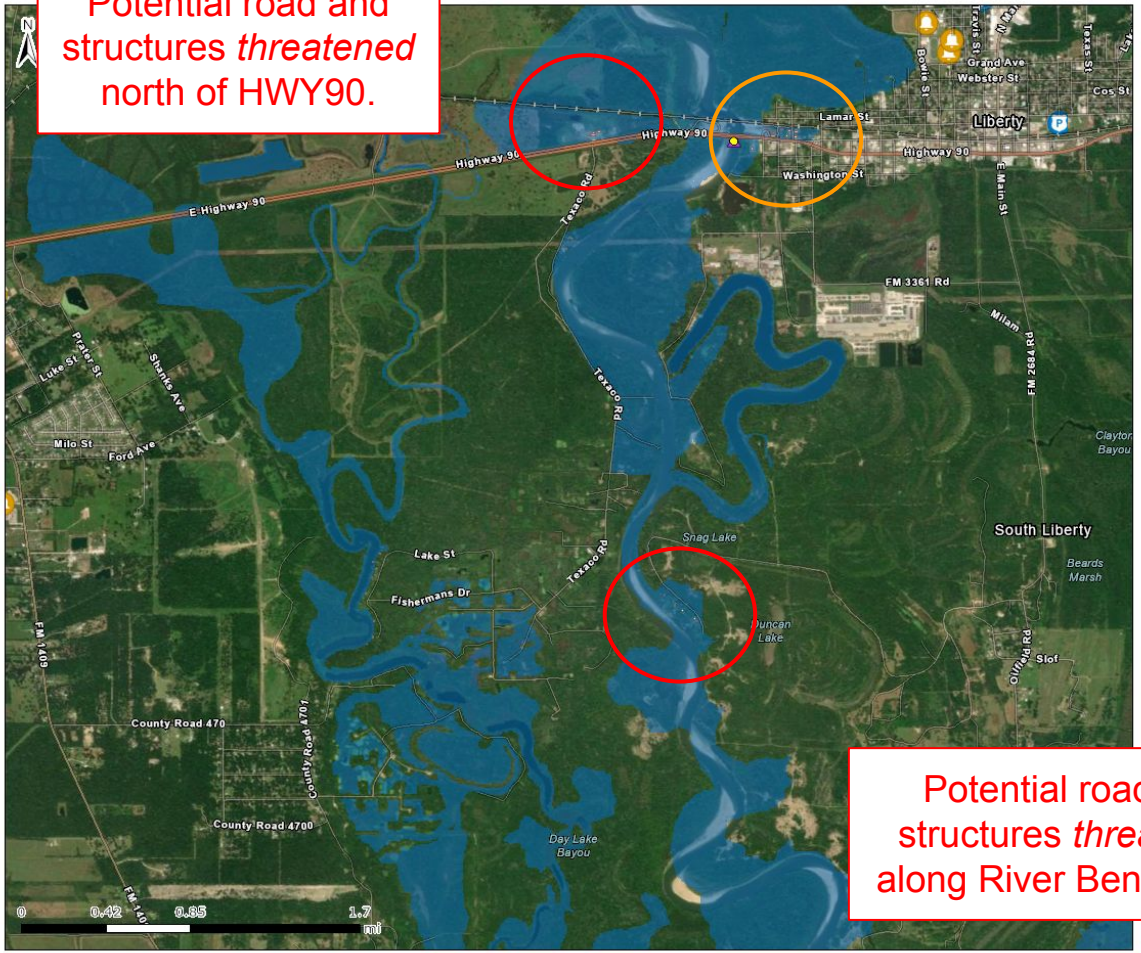
Potential road and structures *threatened*.



RFC FIM_04292024_LBYT2

Potential road and structures *threatened* north of HWY90.

Levee protected area.



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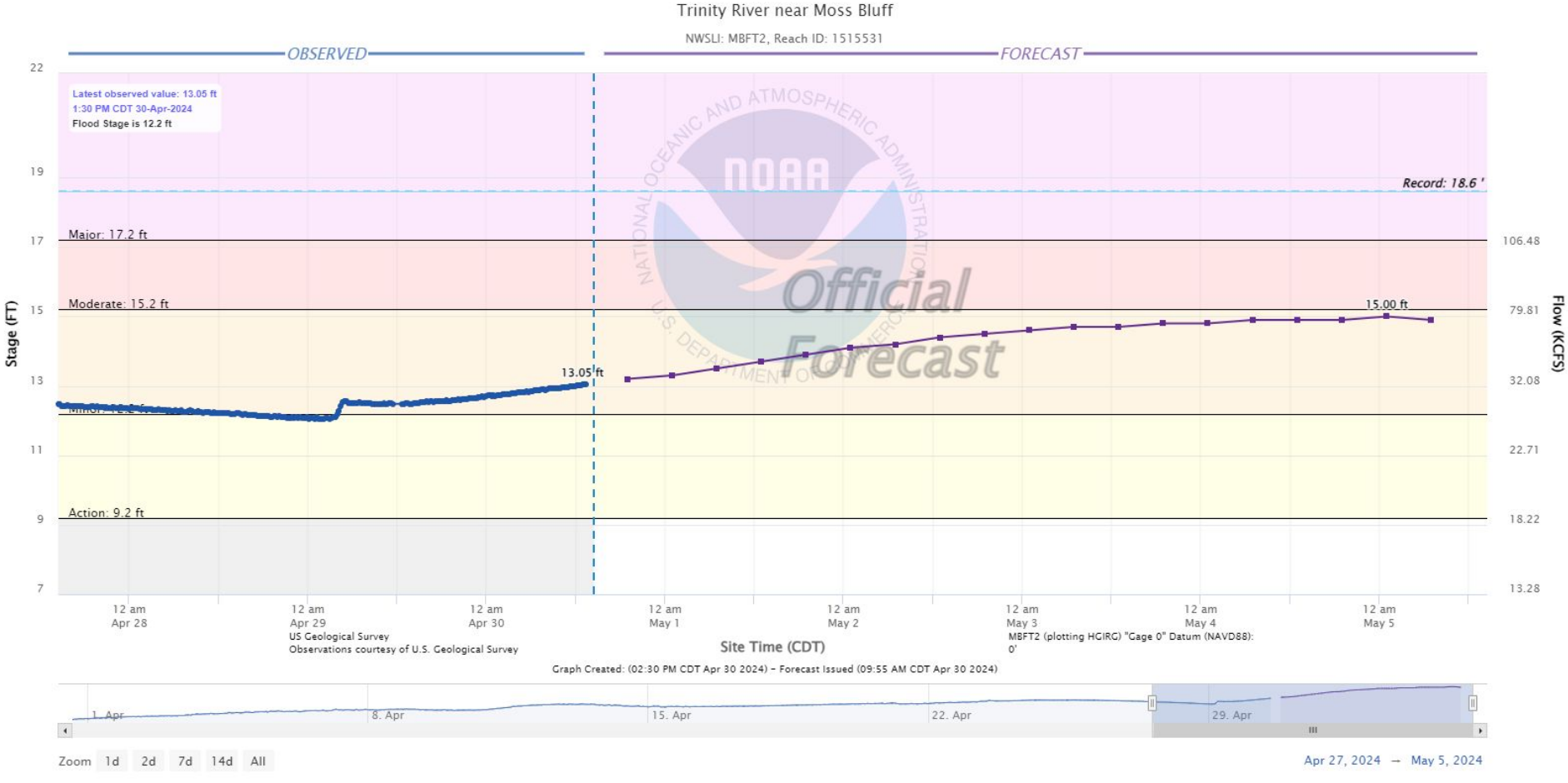
Potential road and structures *threatened* along River Bend Road.

Trinity River at Moss Bluff

Houston/Galveston



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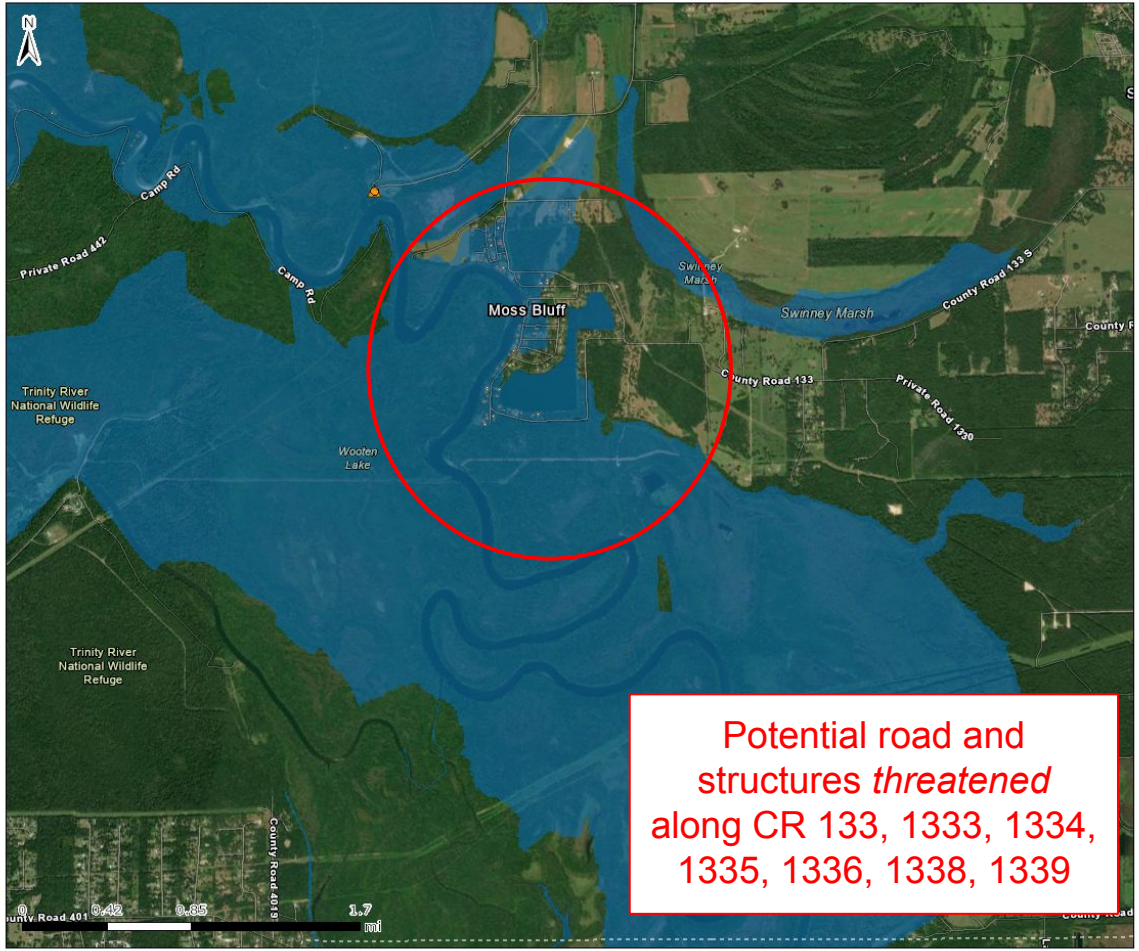
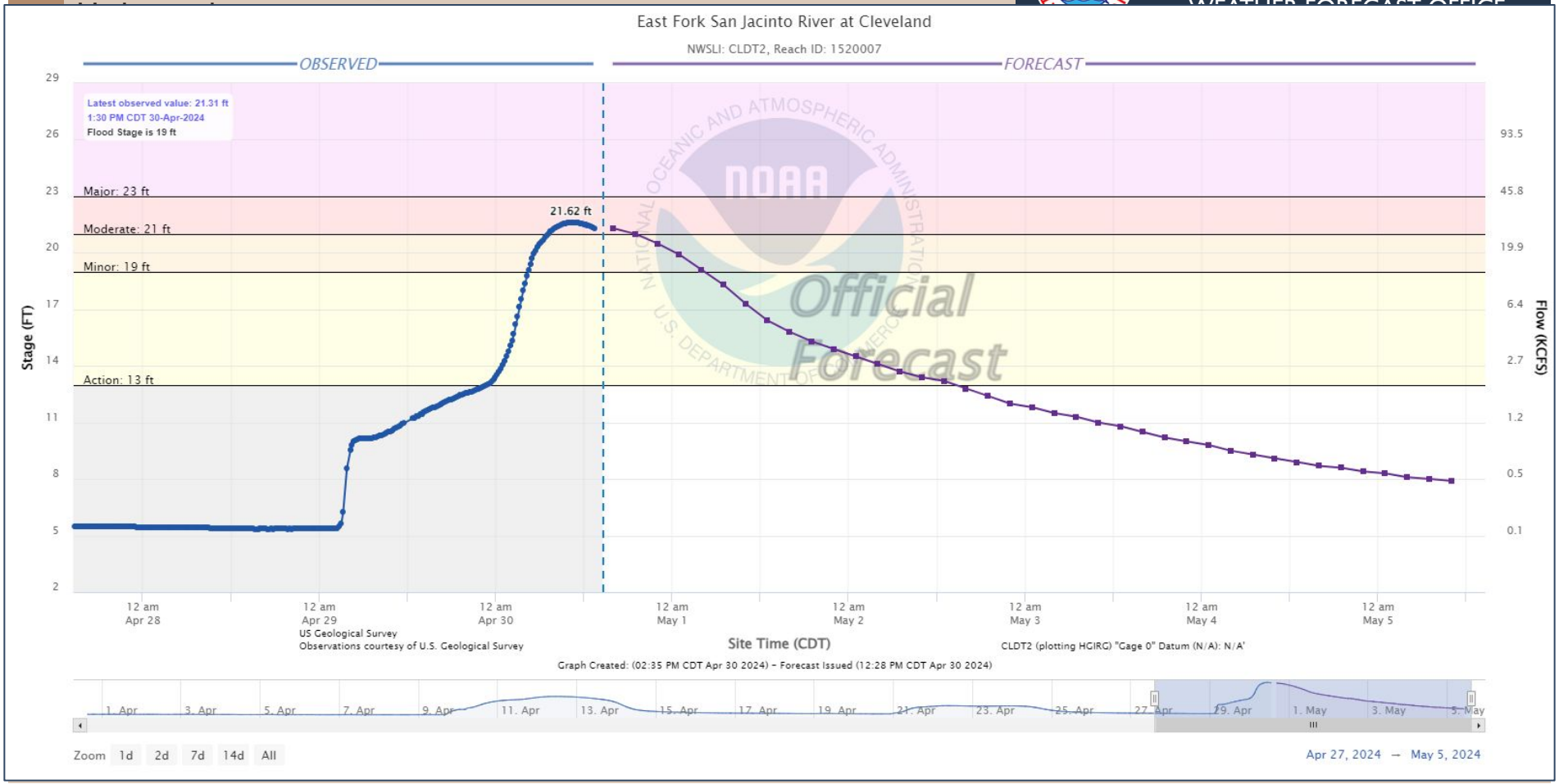


Potential road and structures *threatened* along CR 133, 1333, 1334, 1335, 1336, 1338, 1339

East Fork San Jacinto at Cleveland

Houston/Galveston



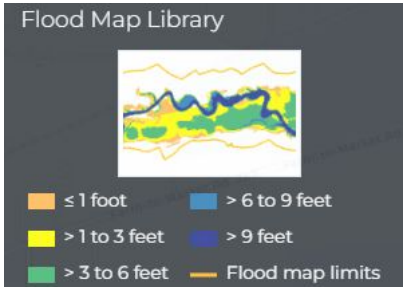
Potential road and structures *threatened*.

CR 1725 Inundated

RV Park Inundated

Ponding along I 69/US 59

INFRM FIM for 21.5 ft (Moderate Flood)



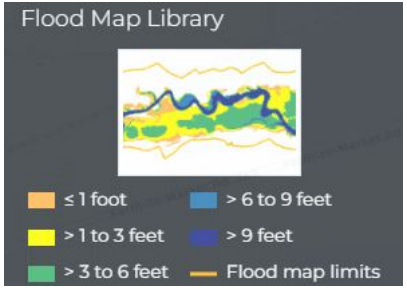
Impacts:

- CR 1725 inundated
- East Fork RV Resort inundated
- Ponding along I 69/US 59
- Santa Fe Railroad is NOT expected to flood

Potential road and structures *threatened*.

Ponding along I 69/US 59

INFRM FIM for 21.5 ft (Moderate Flood)

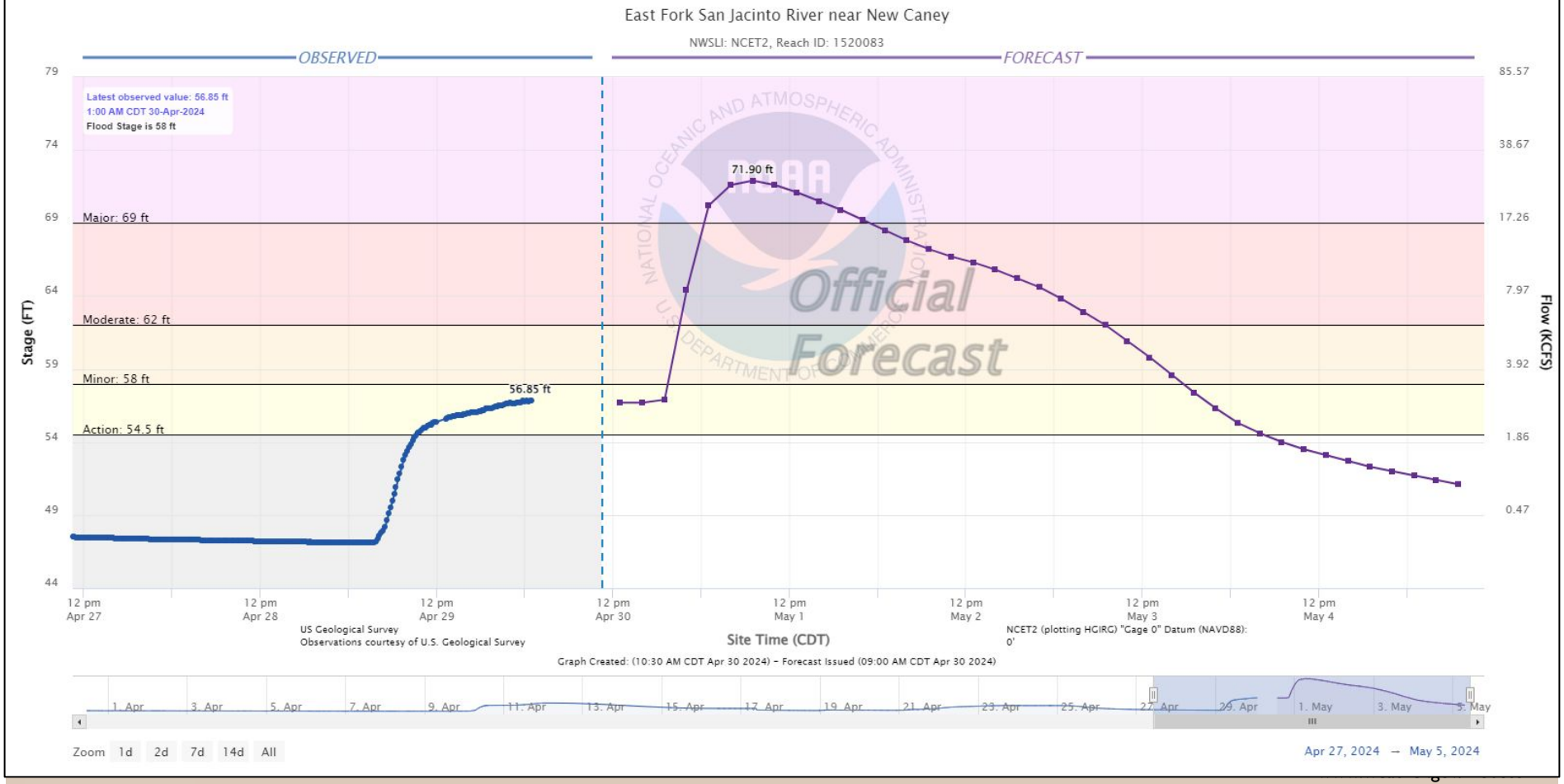


Impacts:

- Ponding along I 69/US 59

East Fork San Jacinto at New Caney

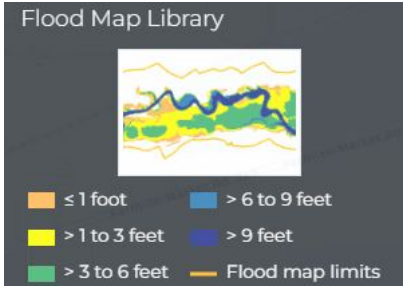
Houston/Galveston



Slab elevations of buildings right bank.

Potential road and structures *threatened*.

INFRM FIM for 72.0 ft (Major Flood Stage)



Impacts:

- FM 1485 inundated.
- Slab elevations of buildings on right bank are flooded.
- River Terrace is cut off.

Questions

Katie Landry-Guyton
katie.landry@noaa.gov

Helpful Resources:

National Water Prediction Service (NWPS)
InFRM Flood Decision Support Toolbox

Next Hydrograph Update: April 30th, 2024, 8:00 PM CDT

Flooding and Severe Weather Risk Update

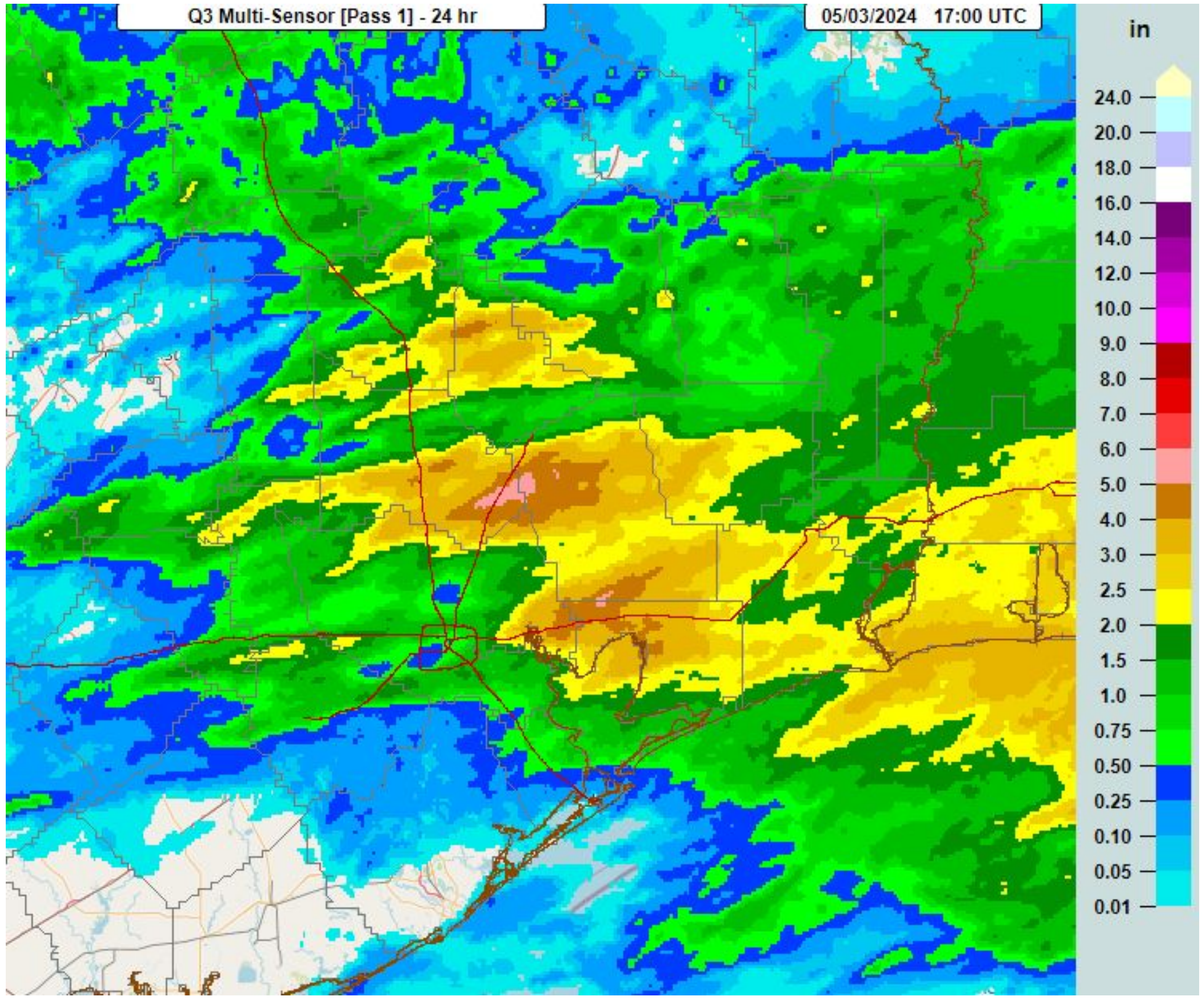
3 PM CDT
Friday, May 3, 2024

Katie Landry-Guyton
Senior Service Hydrologist

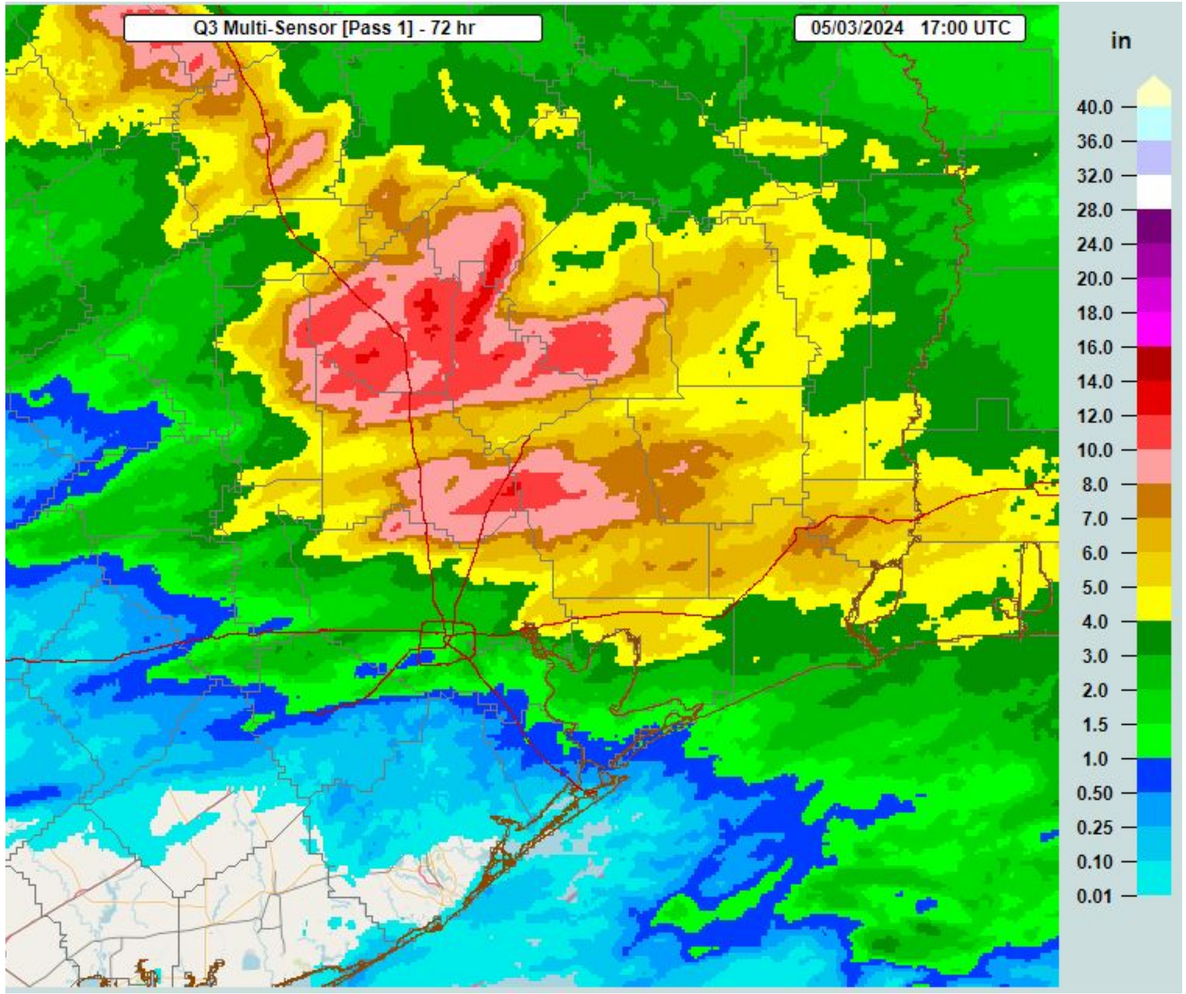
Tim Cady
Senior Meteorologist

Latest Rainfall Amounts

24 Hours

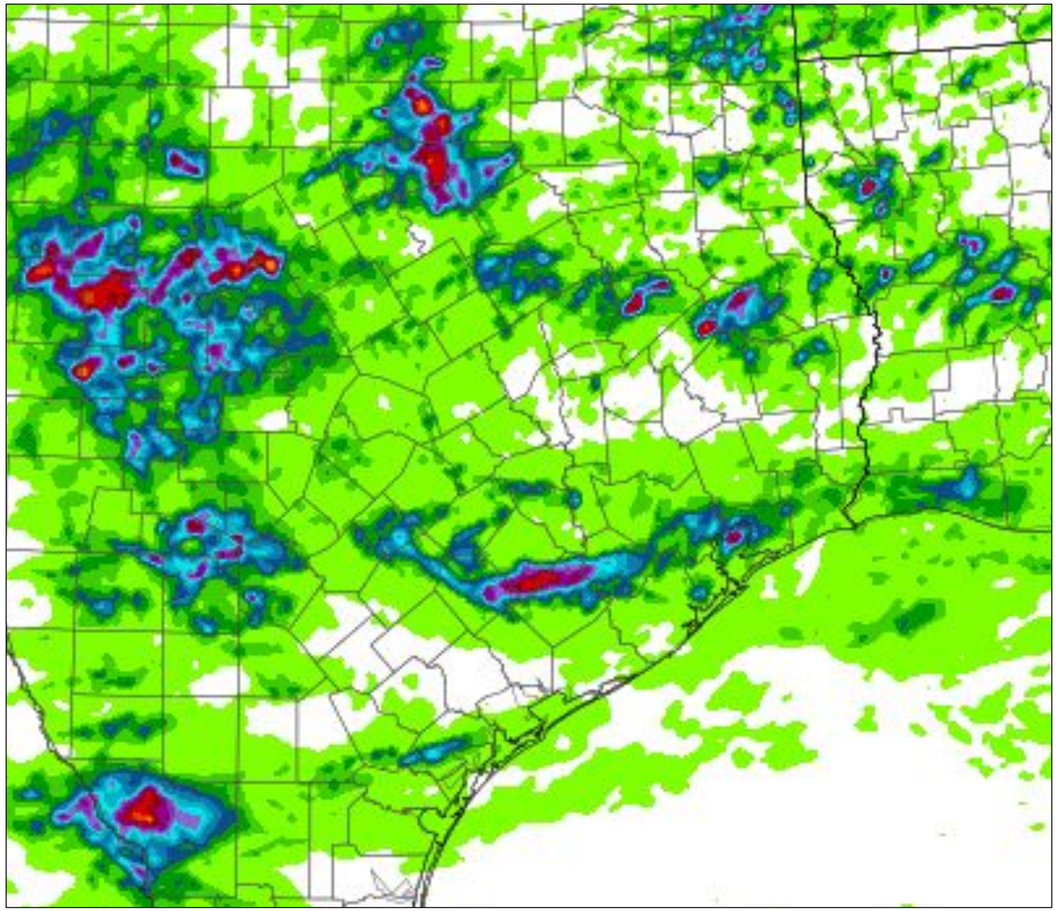


72 Hours



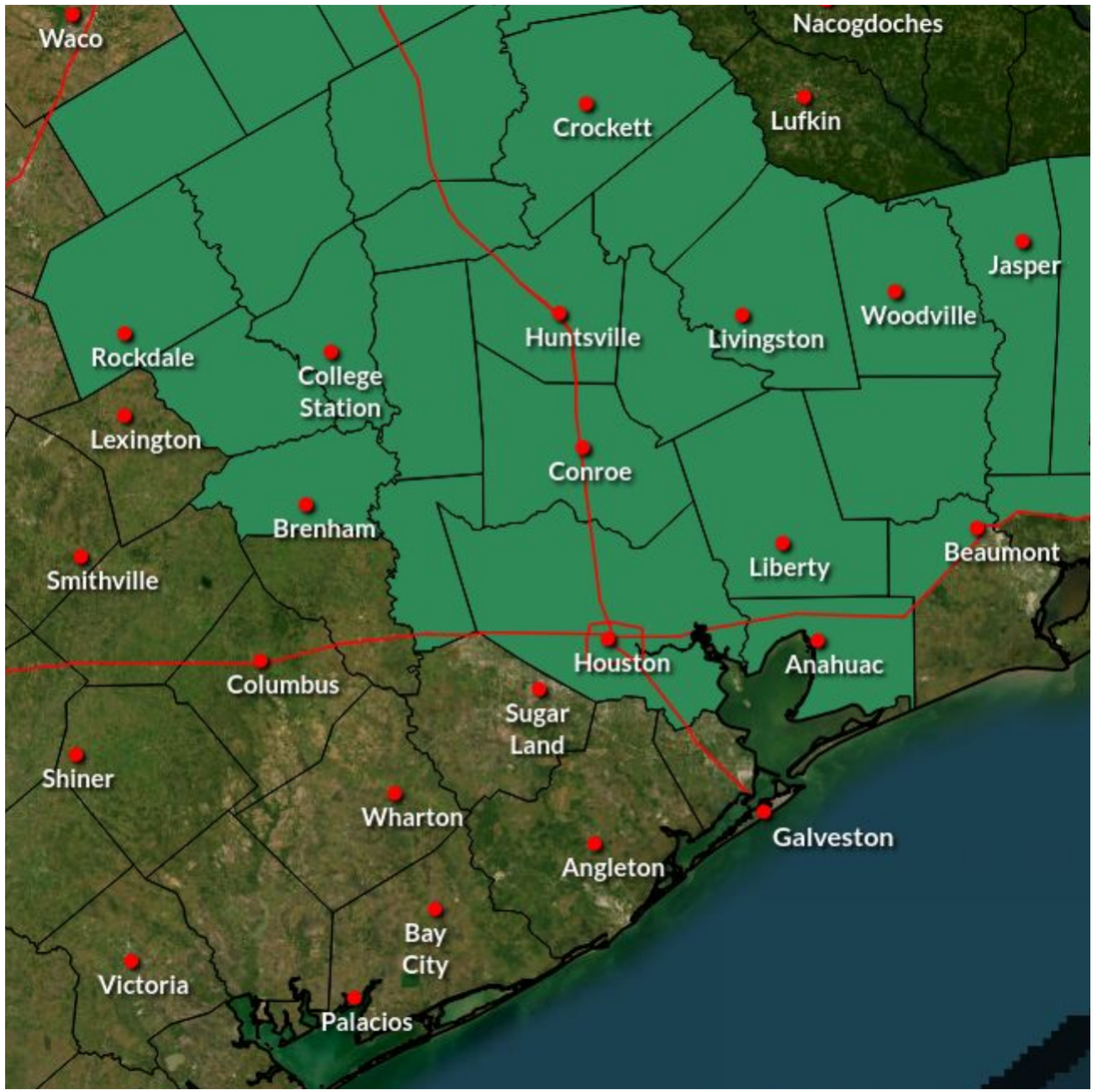
Tonight and Saturday Outlook

High resolution model data rainfall amounts (inches)

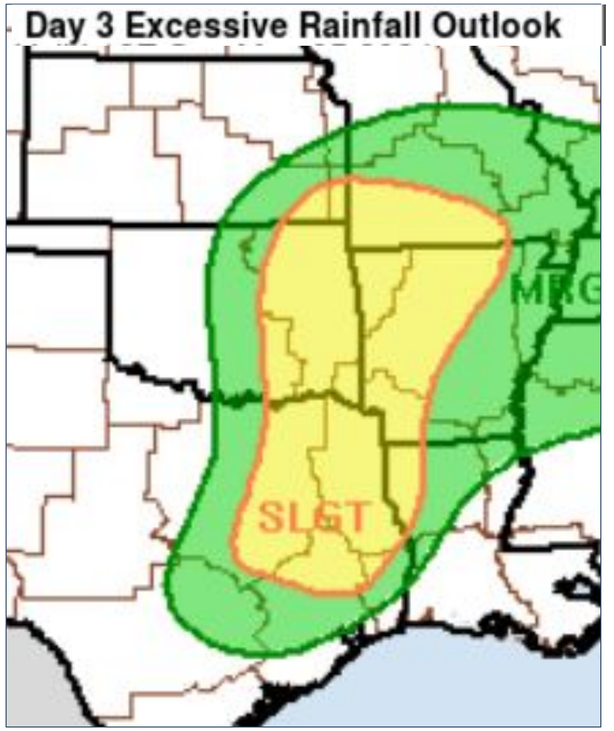


- Isolated showers and storms possible overnight into tomorrow.
  - Much less coverage than today.
- Locally, **an inch or two** of new rainfall possible in any thunderstorm activity.
- Saturday afternoon: could see isolated development across northern areas.

Saturday Night/Sunday - Flood Watch In Effect

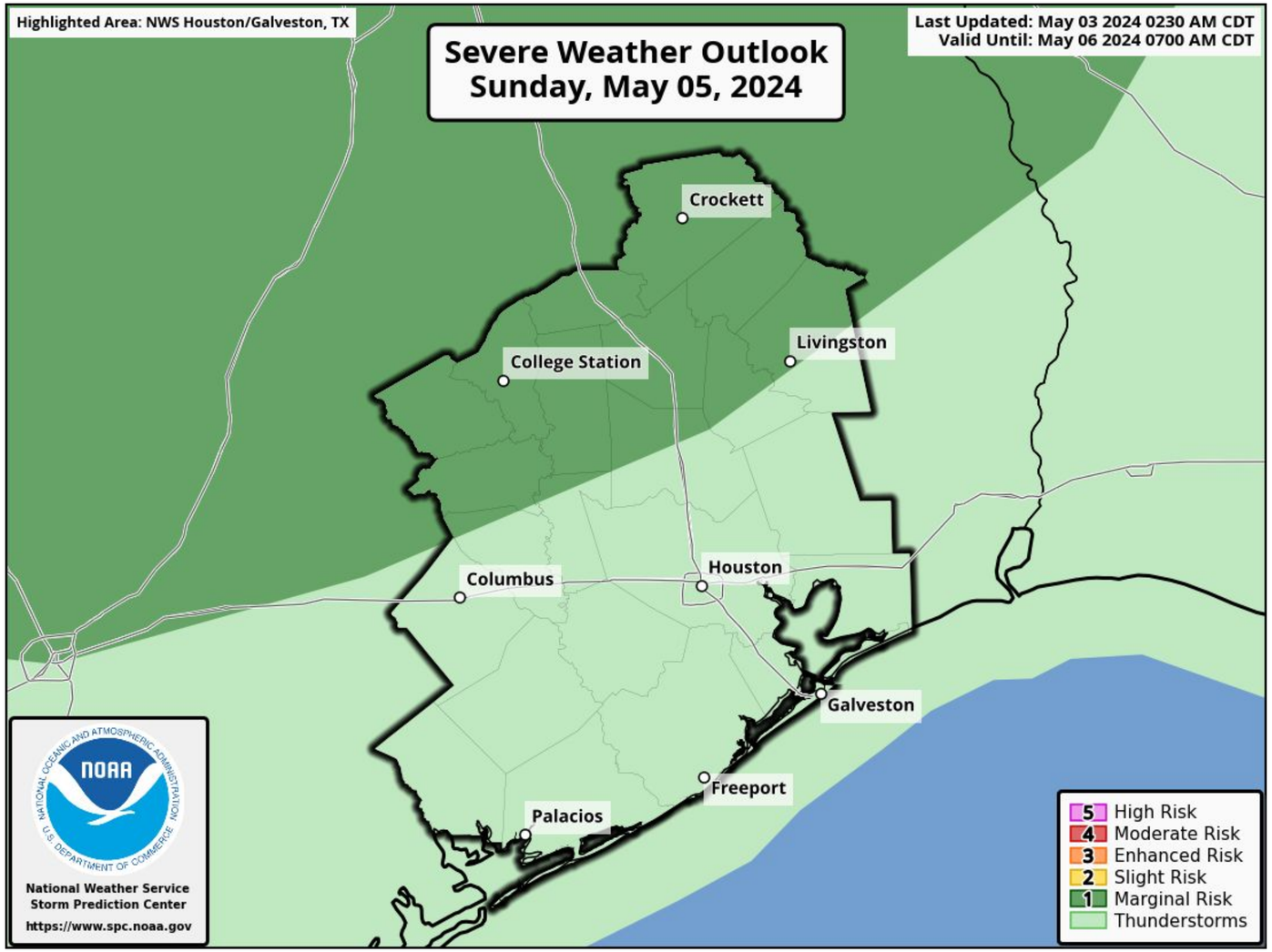


- The **Flood Watch** is has been extended until 1 PM Sunday.
- We expect another line of storms to move into the area from the northwest late Sat - early Sunday.
- **1-3” of new rainfall (locally higher)** possible.
- **Slight Risk of Excessive Rainfall** (northern areas)



The weather pattern changes early next week: drier and it gets hot by mid week.

Severe Weather Risk



- **A few isolated strong/severe storms** can't be ruled out between late Saturday and early Sunday**.**
- Greatest risk for severe weather is across our northern counties.
- Main threat is wind gusts, but hail and isolated tornadoes can't be ruled out completely.

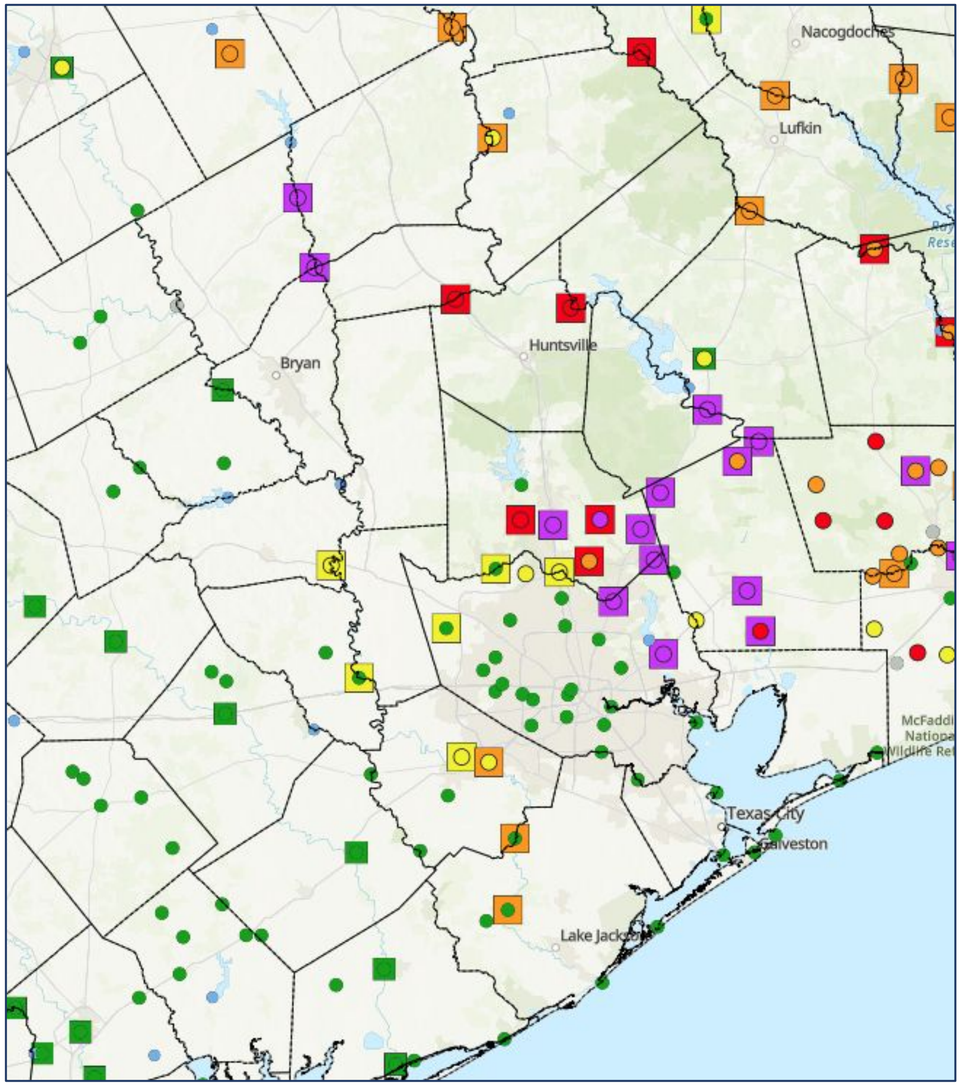
River Flooding Outlook

Katie Landry-Guyton
Senior Service Hydrologist

Situation Overview

Current River Observations and Forecasts

Houston/Galveston
WEATHER FORECAST OFFICE



Trinity River is experiencing Action to Major river flooding. Lake Livingston is holding their releases at 124,000 cfs.

San Jacinto River is experiencing Minor to Major river flooding. Lake Conroe has decreased their releases to 34,673 cfs.

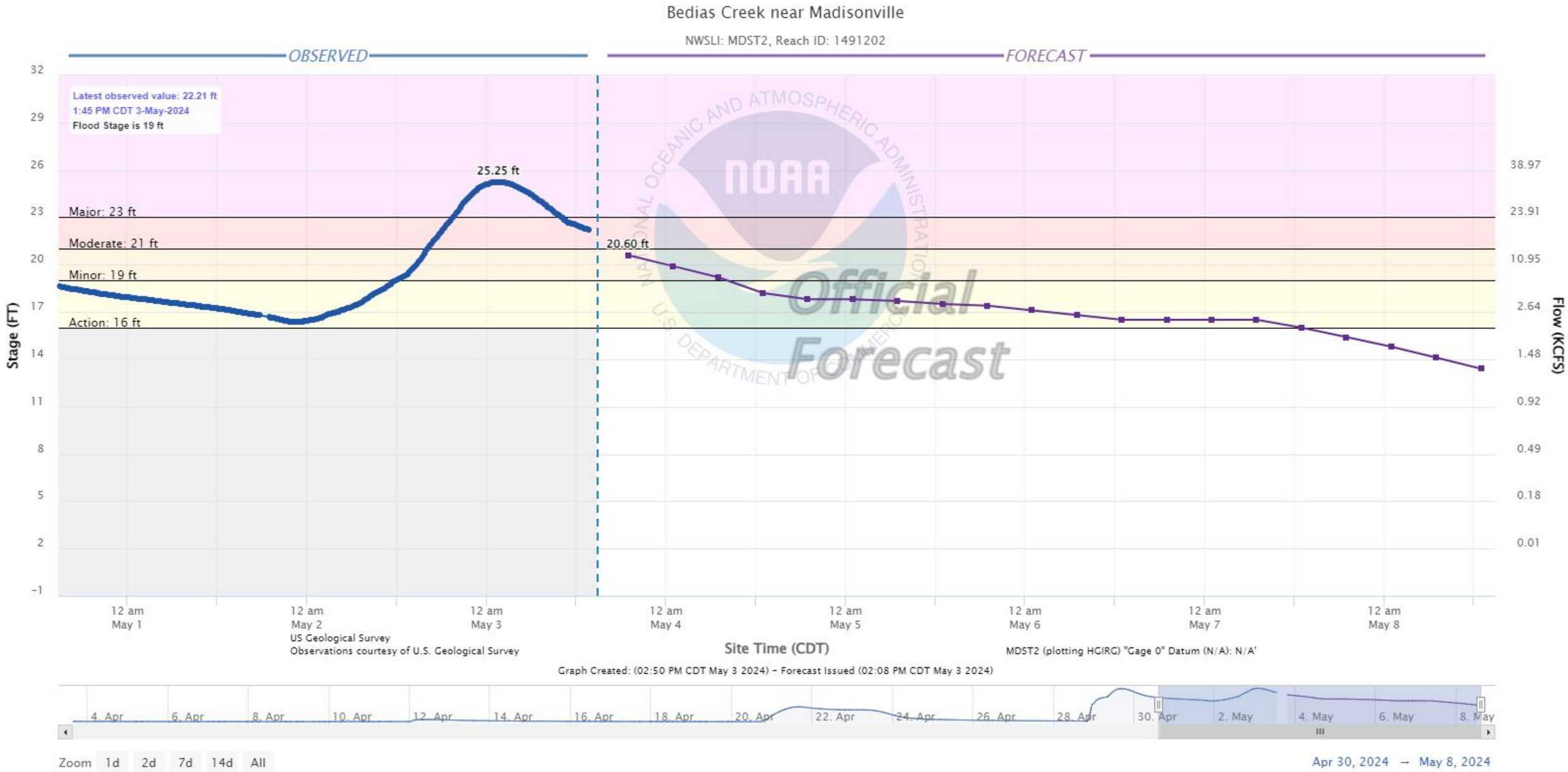
CATEGORIES	OBSERVATION	FORECAST
Major Flood	14	15
Moderate Flood	12	9
Minor Flood	34	20
Action	22	16
No Flood	199	46
Flood Category Not Defined	86	0
No Forecast Available	0	0
Low Water Threshold	0	0
Data Not Current	11	0
Out of Service	4	0

Navasota River forecast to reach Record Flood.

Brazos River is experiencing Action stage with Minor river flooding forecast.

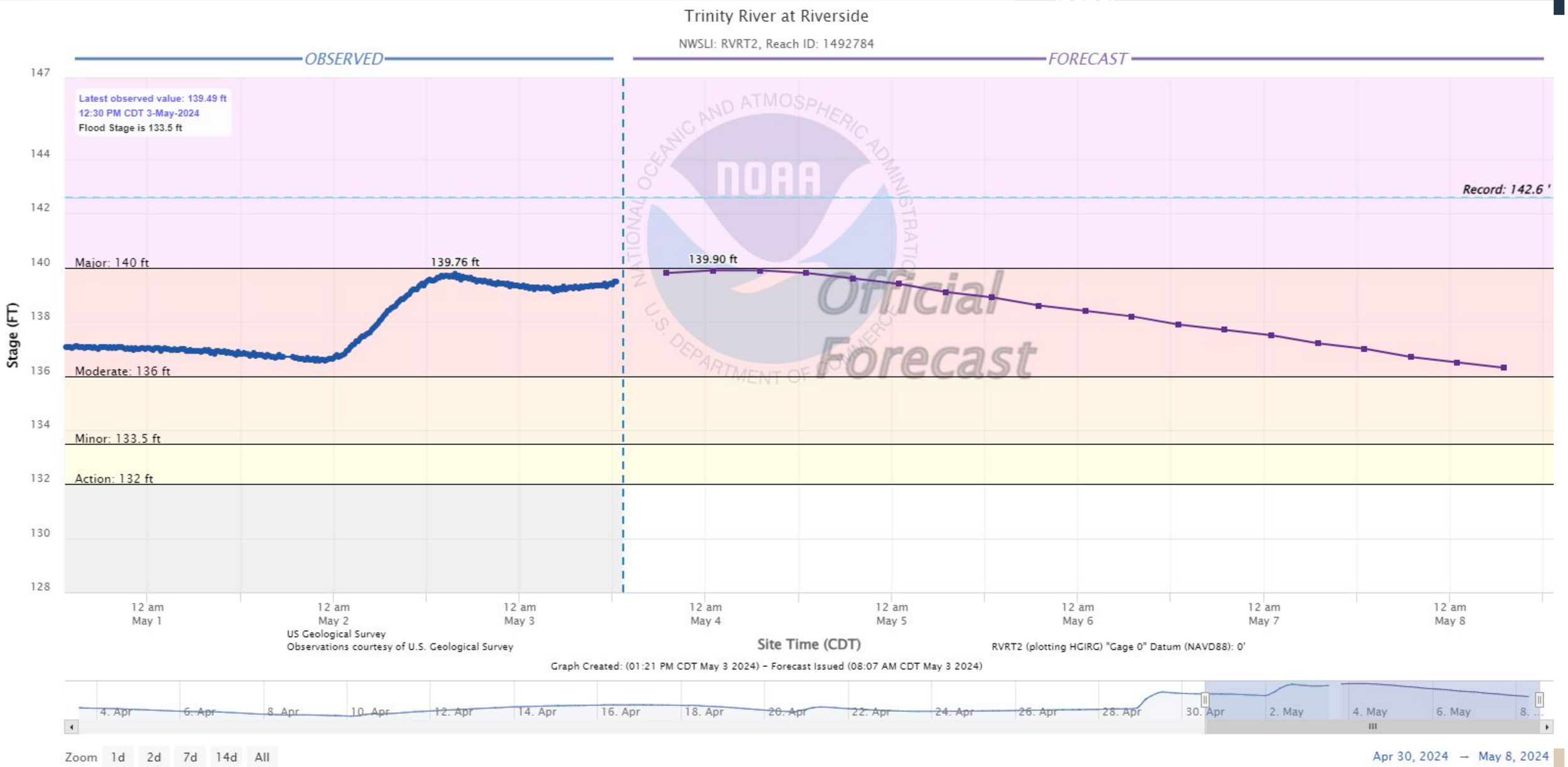
Bedias Creek at Madisonville

Houston/Galveston
WEATHER FORECAST OFFICE



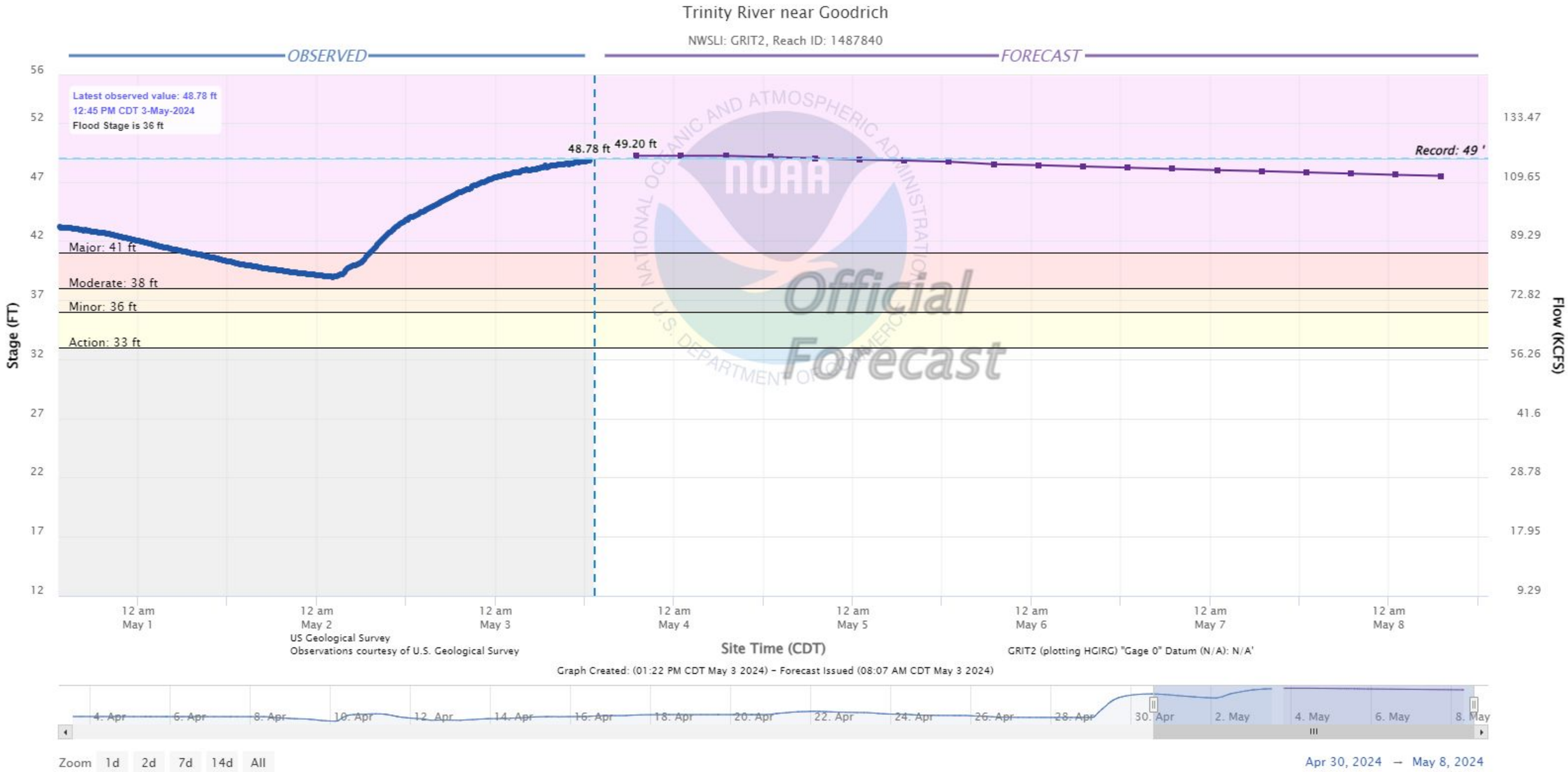
Trinity River at Riverside

Houston/Galveston
WEATHER FORECAST OFFICE

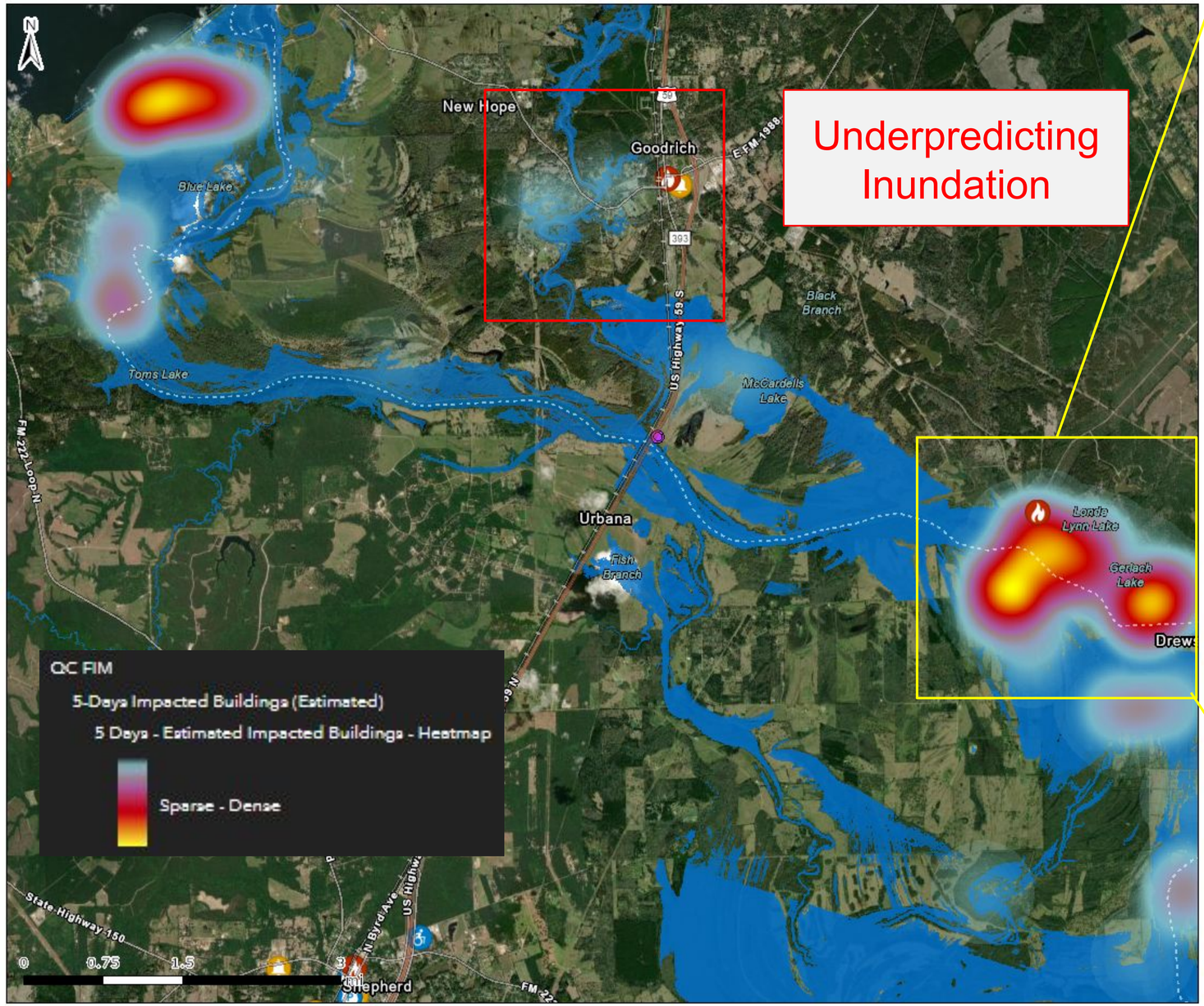


Trinity River at Goodrich

Houston/Galveston
WEATHER FORECAST OFFICE



NWS FIM_Trinity River_Goodrich_05032024



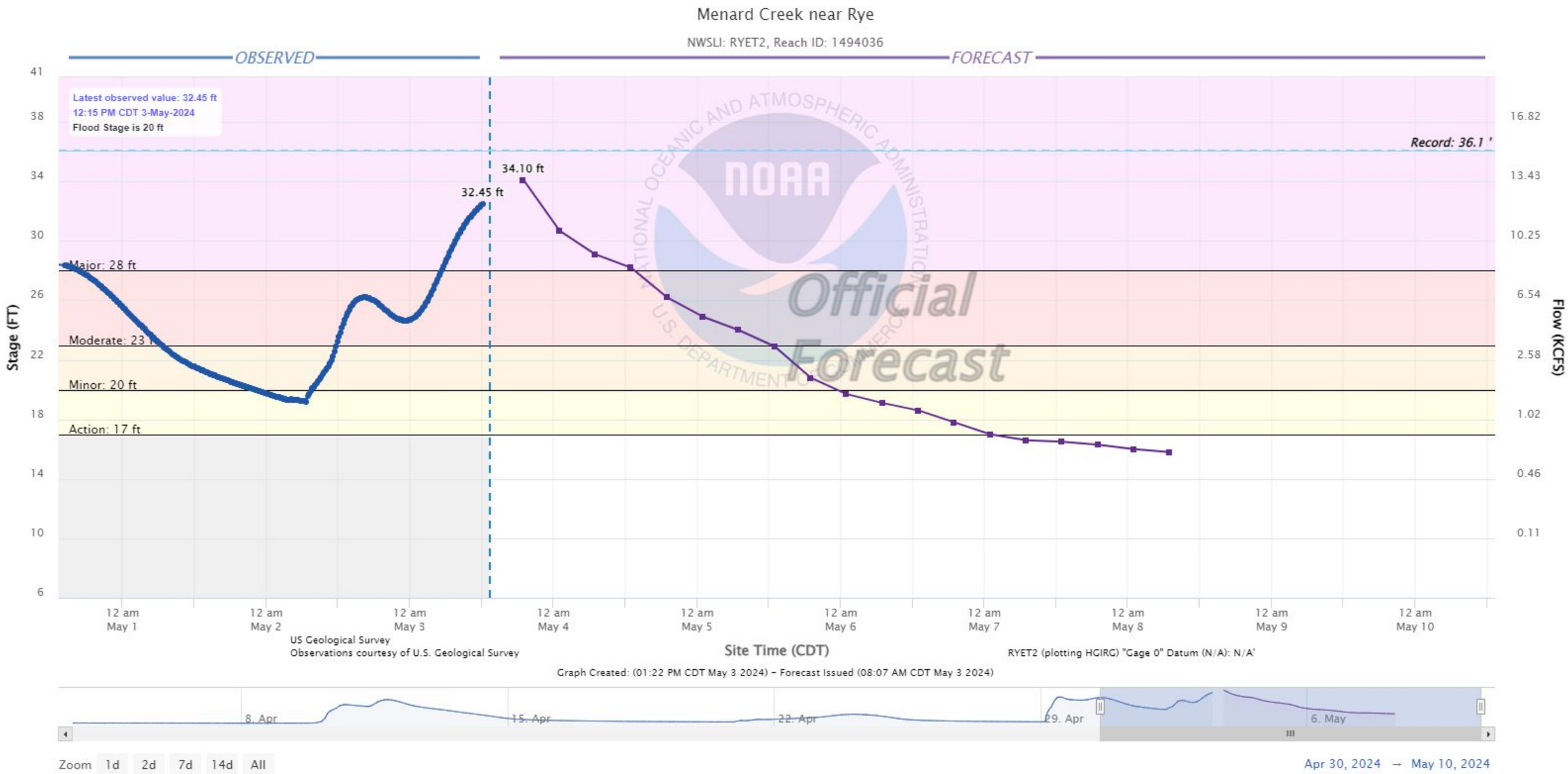
Underpredicting Inundation

Experimental visualization, for guidance use only. Does not take into account coastal flooding or storm surge. May not reflect the official forecast or account for local levees. Visit water.weather.gov for the official forecast.

https://nws.weather.gov/products/PDD/SDD_ExpNWCVisualizationServices_2022.pdf

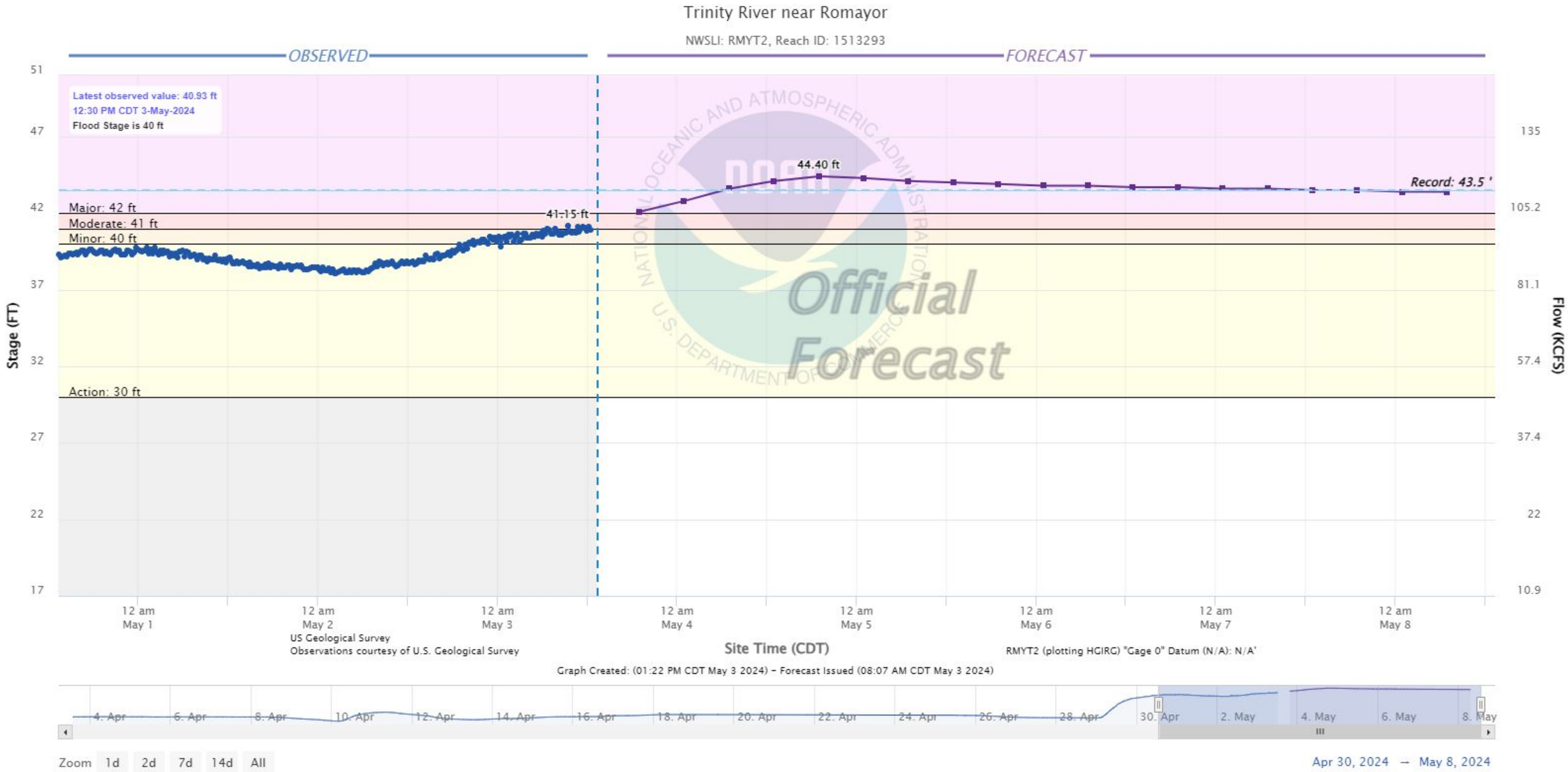
Menard Creek at Rye

Houston/Galveston
WEATHER FORECAST OFFICE



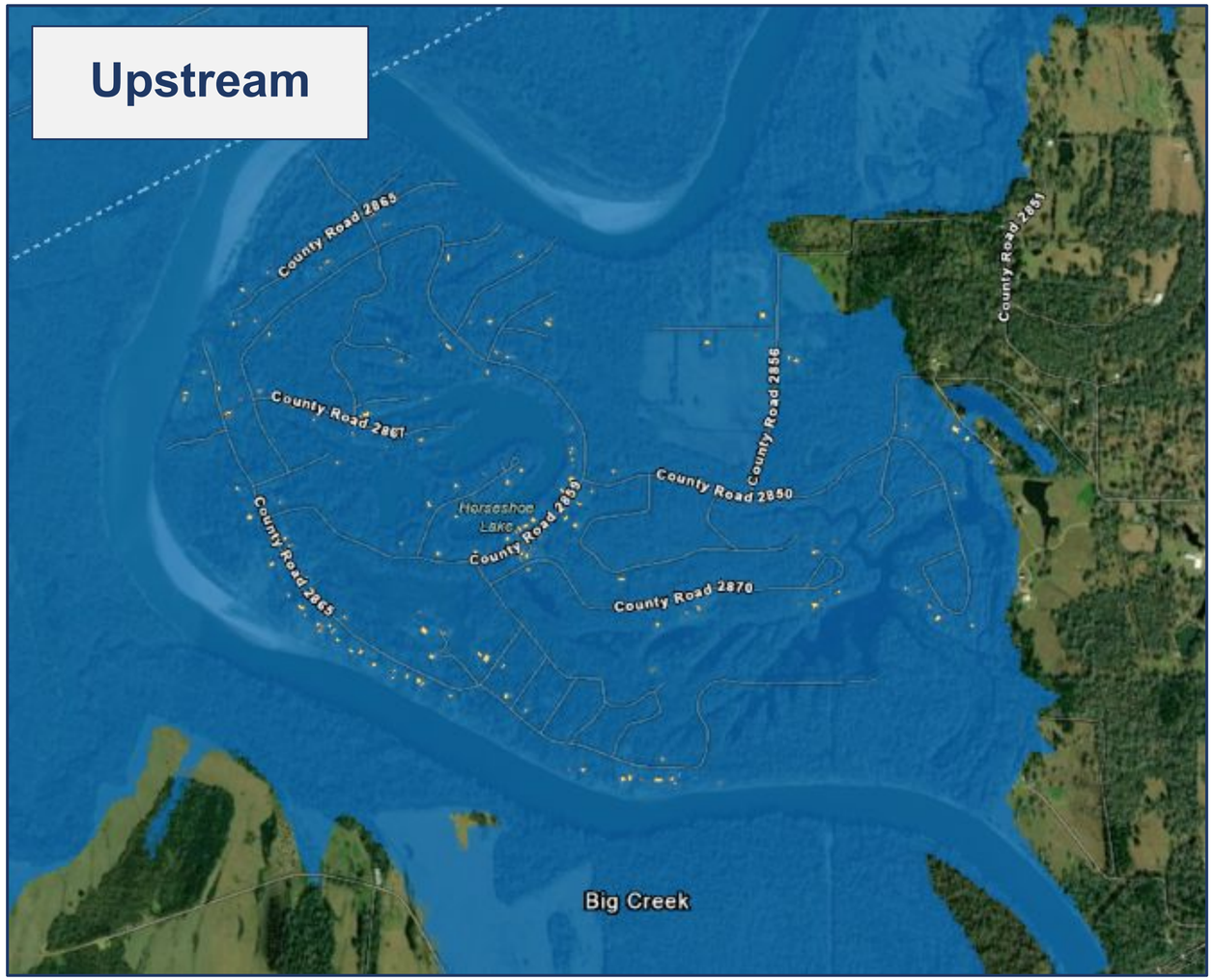
Trinity River at Romayor

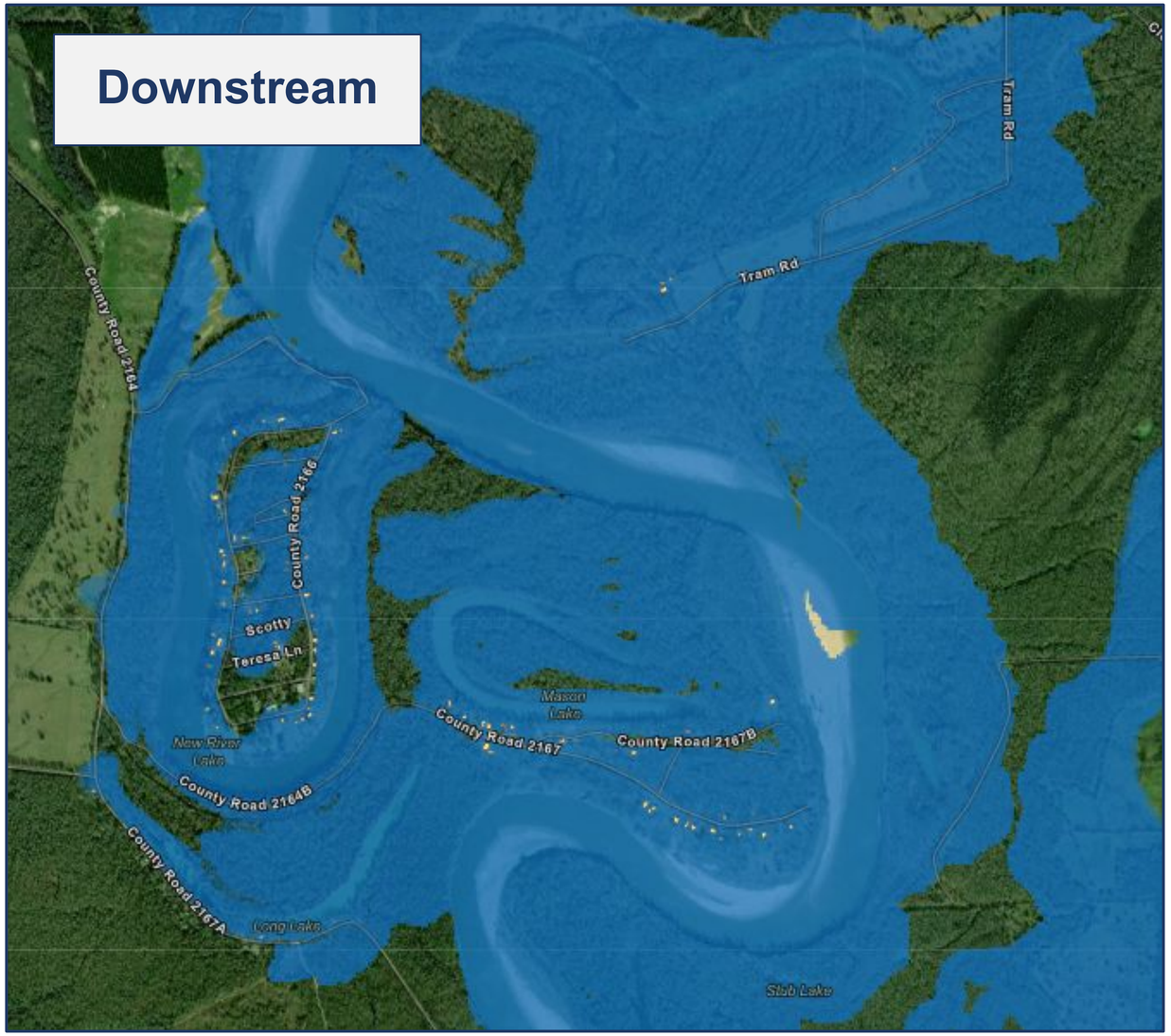
Houston/Galveston
WEATHER FORECAST OFFICE



Trinity River at Romayor

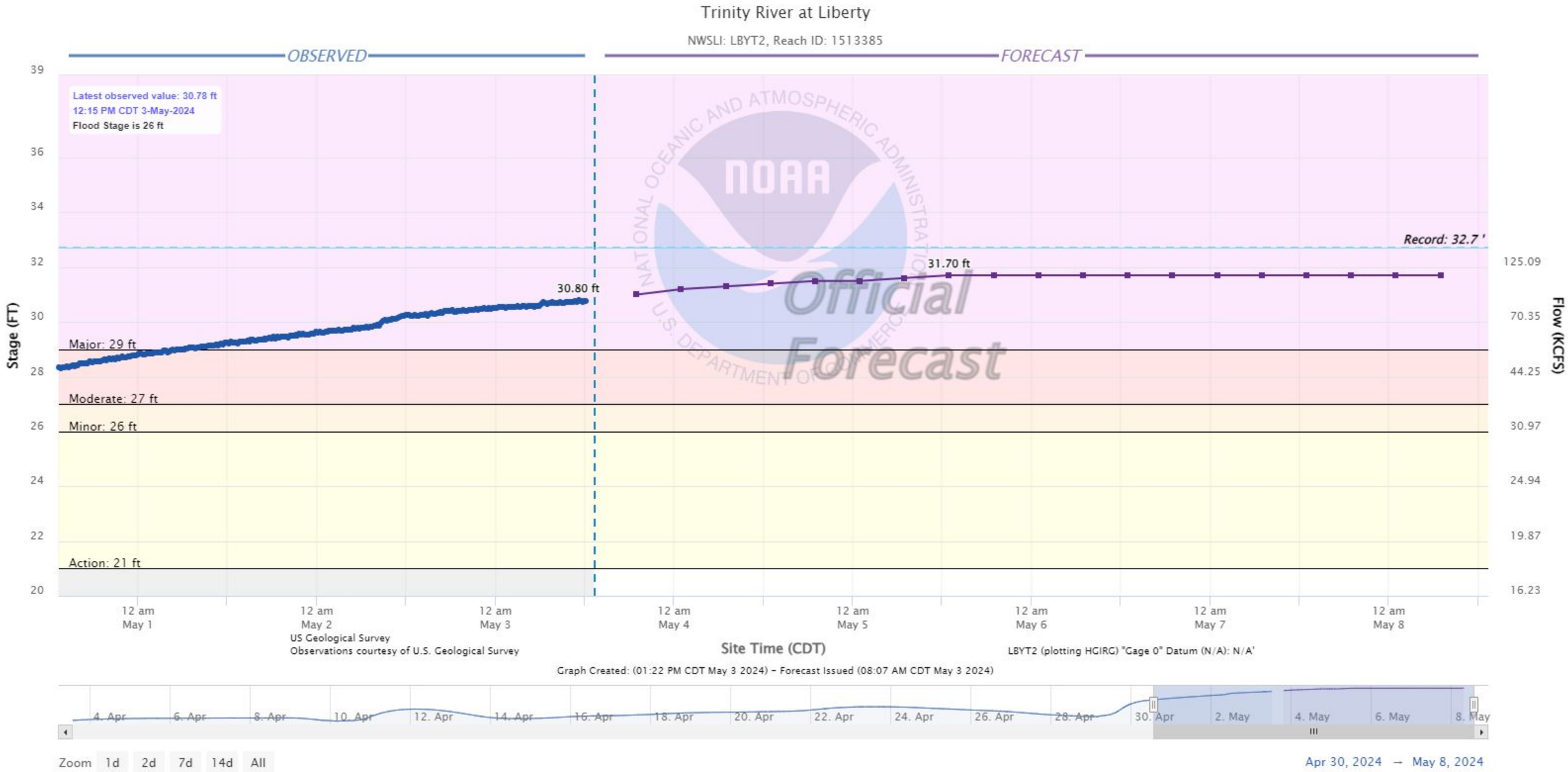
Houston/Galveston
WEATHER FORECAST OFFICE





Trinity River at Liberty

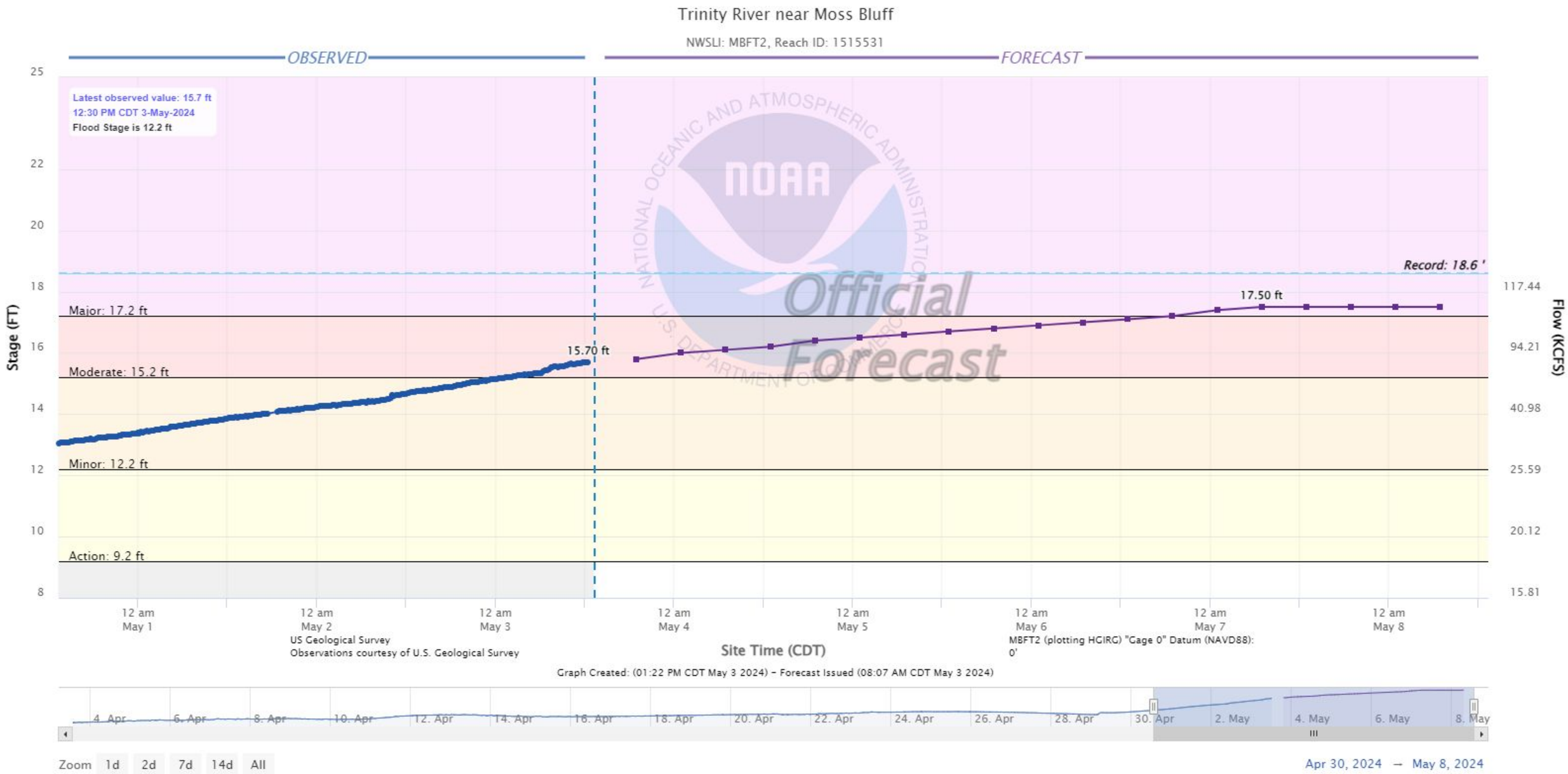
Houston/Galveston
WEATHER FORECAST OFFICE



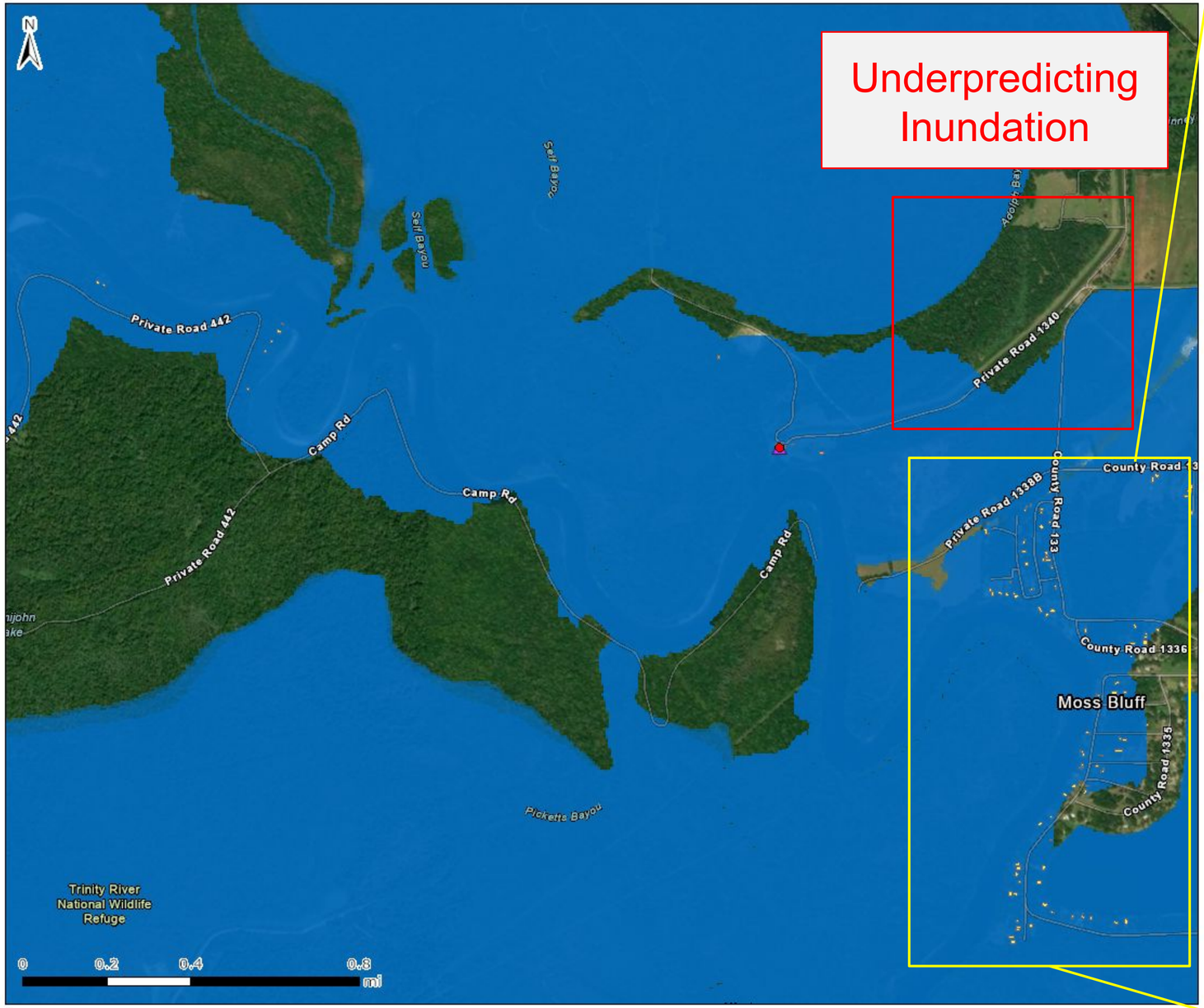
NOAA
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION
U.S. DEPARTMENT OF COMMERCE
Official Forecast

Trinity River at Moss Bluff

Houston/Galveston
WEATHER FORECAST OFFICE

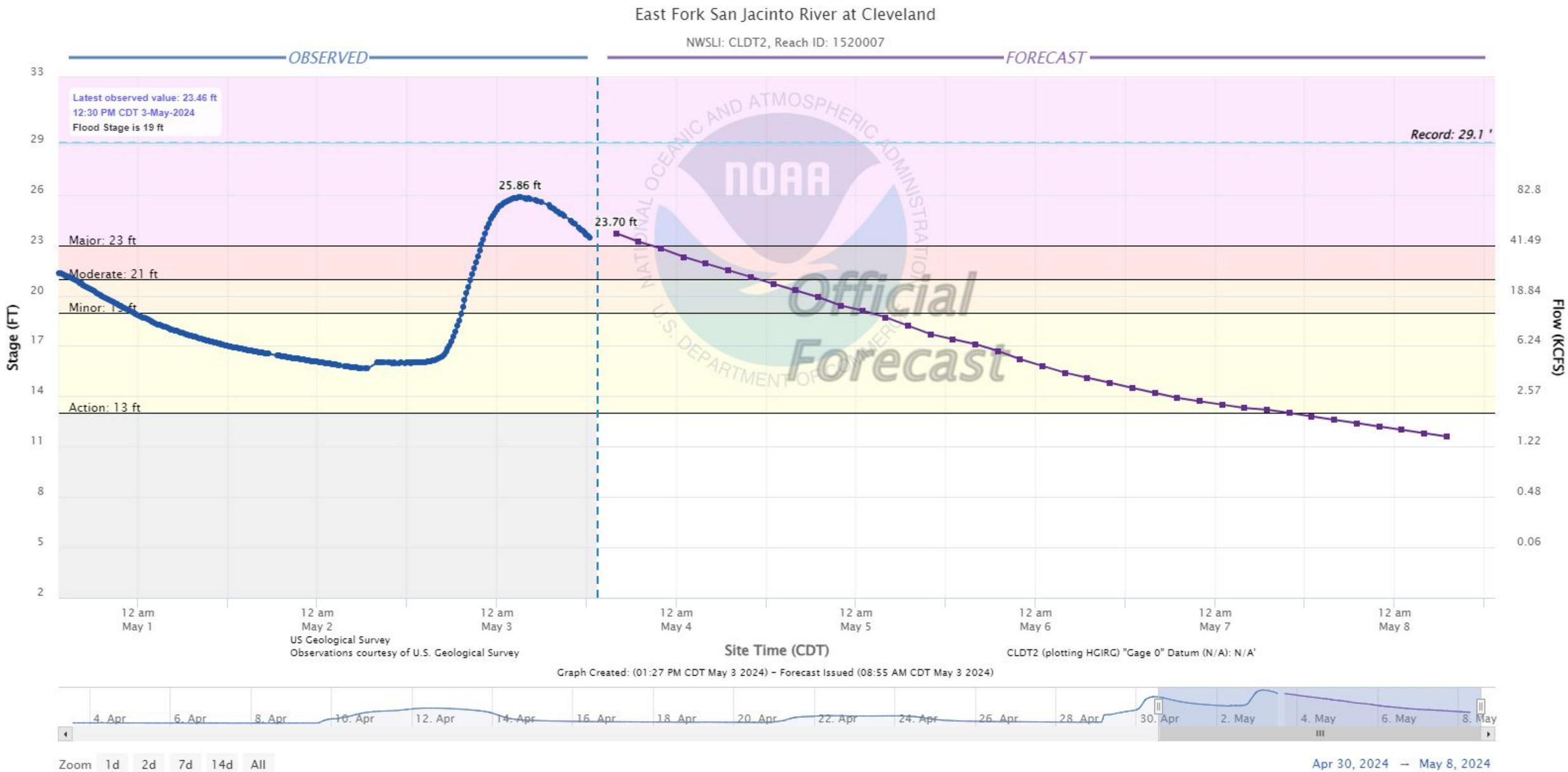


NWS FIM_Trinity River_Moss Bluff_05032024



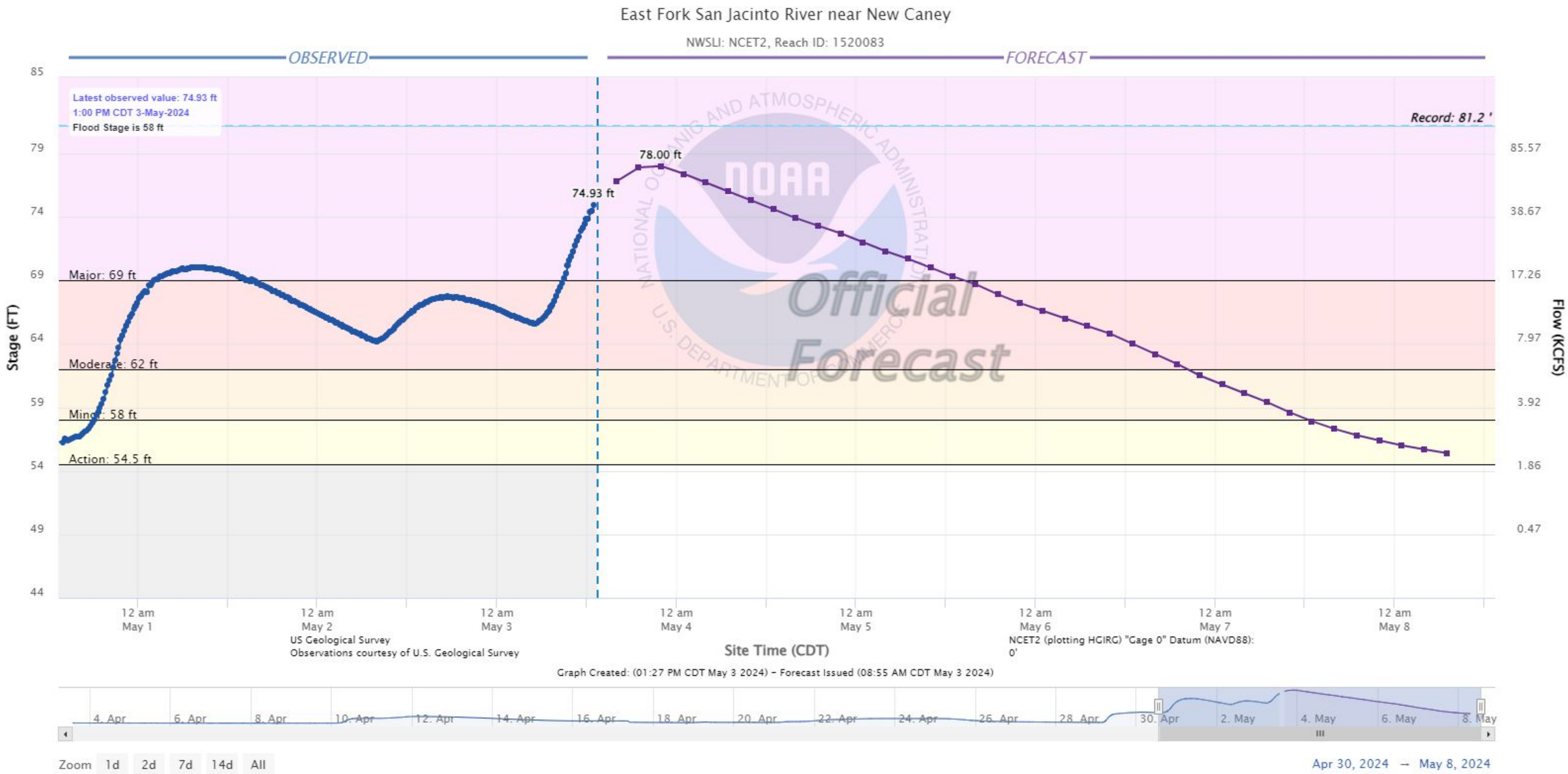
E.F. San Jacinto River at Cleveland

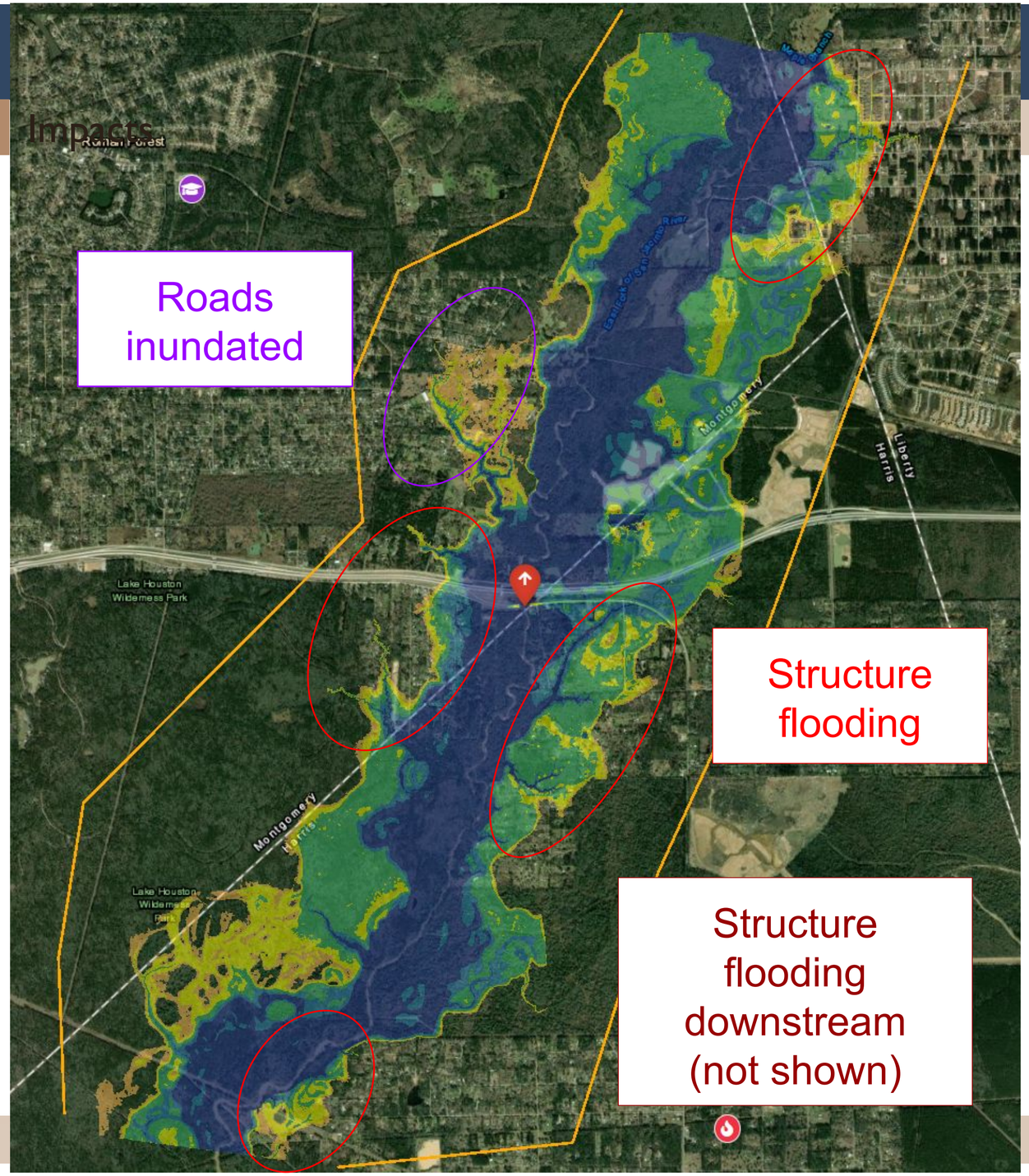
Houston/Galveston
WEATHER FORECAST OFFICE



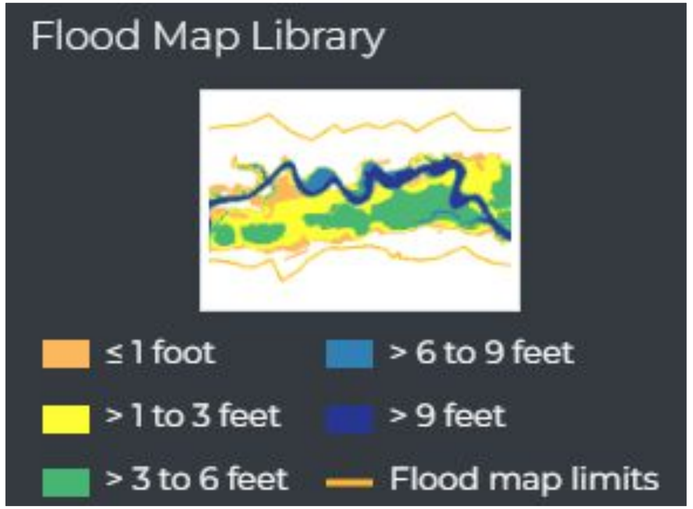
E.F. San Jacinto River near New Caney

Houston/Galveston
WEATHER FORECAST OFFICE





INFRM FIM for 78.0 ft (Major Flood Stage)

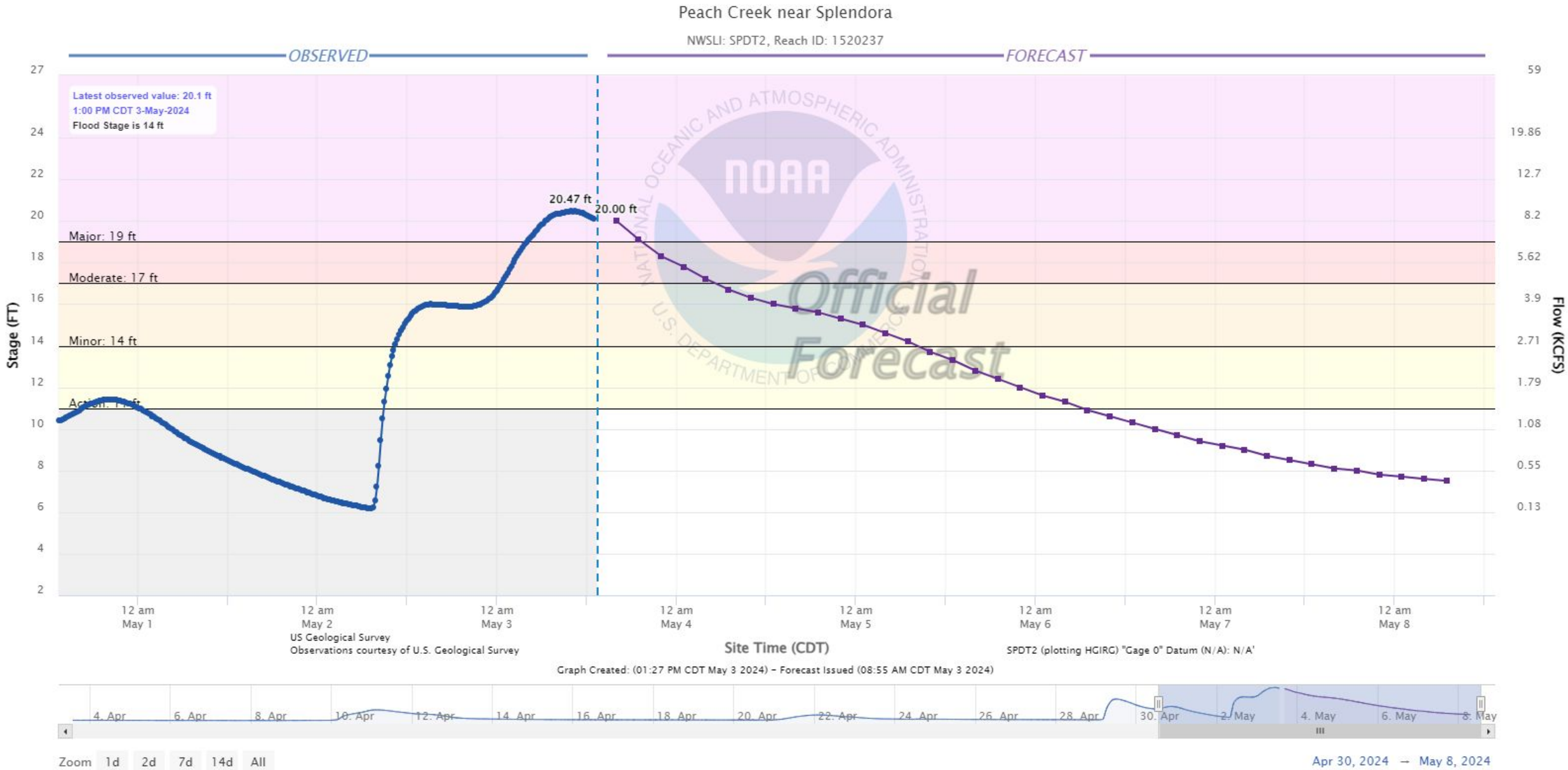


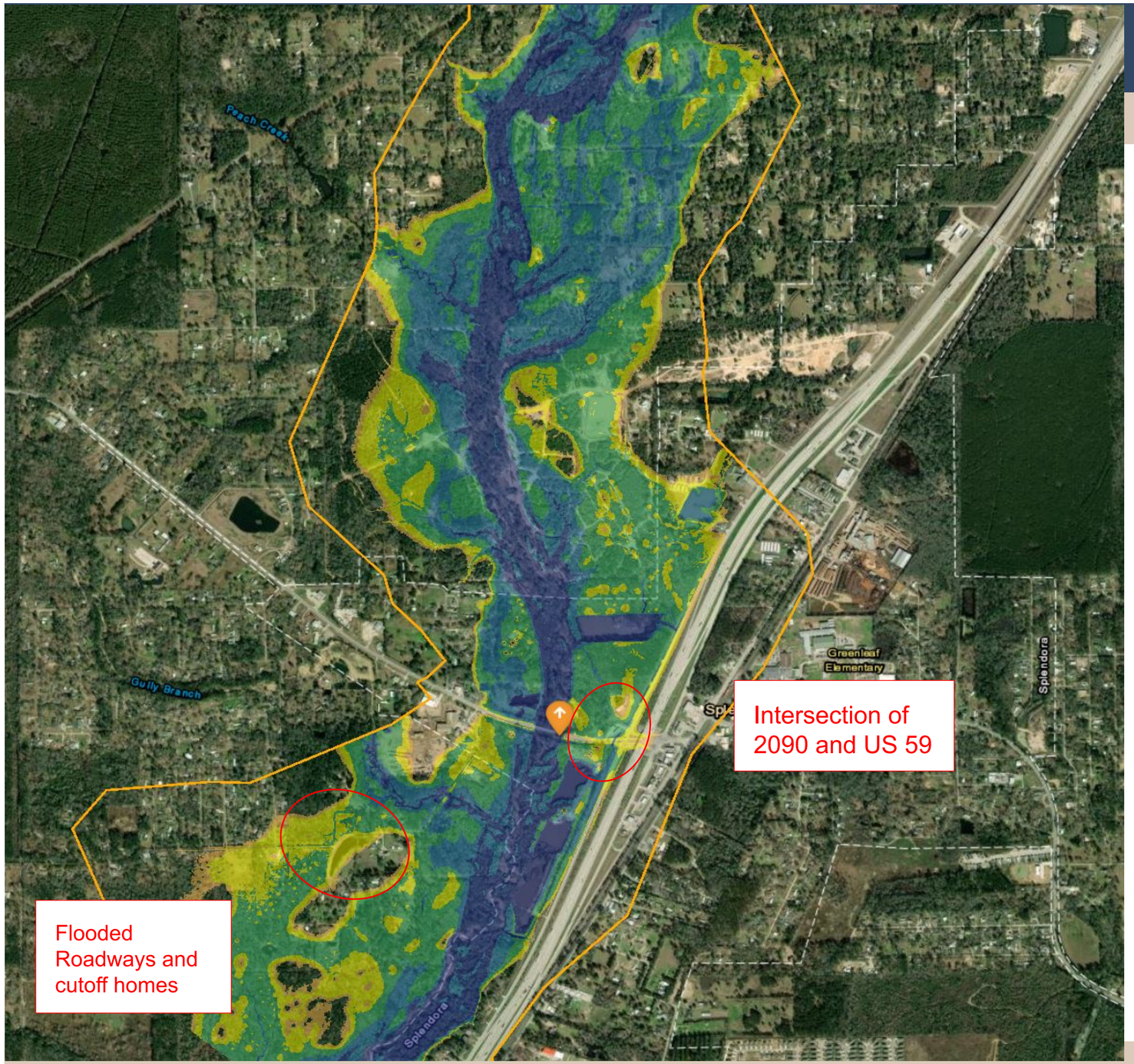
Impacts:

- FM 1485 impassable.
- Widespread flooding of homes on both the right and east banks
- Neighborhoods downstream cutoff with isolated structure flooding.

Peach Creek near Splendora

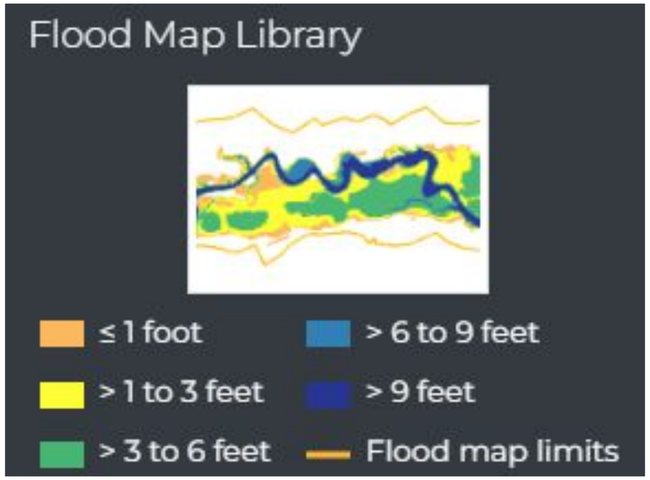
Houston/Galveston
WEATHER FORECAST OFFICE





Houston/Galveston
WEATHER FORECAST OFFICE

InFRM FIM for 20.5 ft (Major Flood Stage)

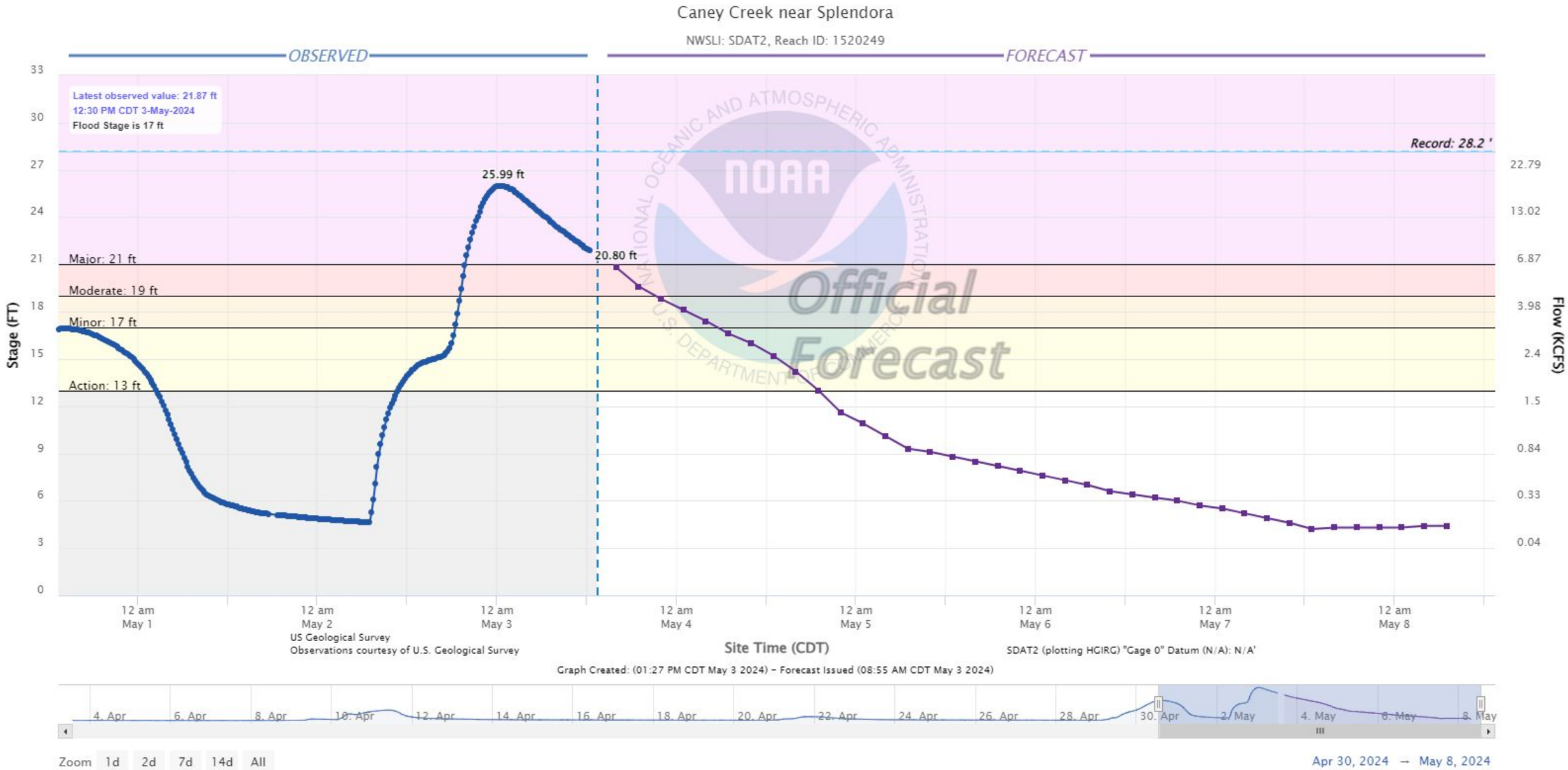


Impacts:

- Intersection of US 59 and FM 2090 begins to flood.
- Intersection of Green Forest and East Twelve Oaks takes on water and cuts off homes.
- Homes on Buck Road become threatened.

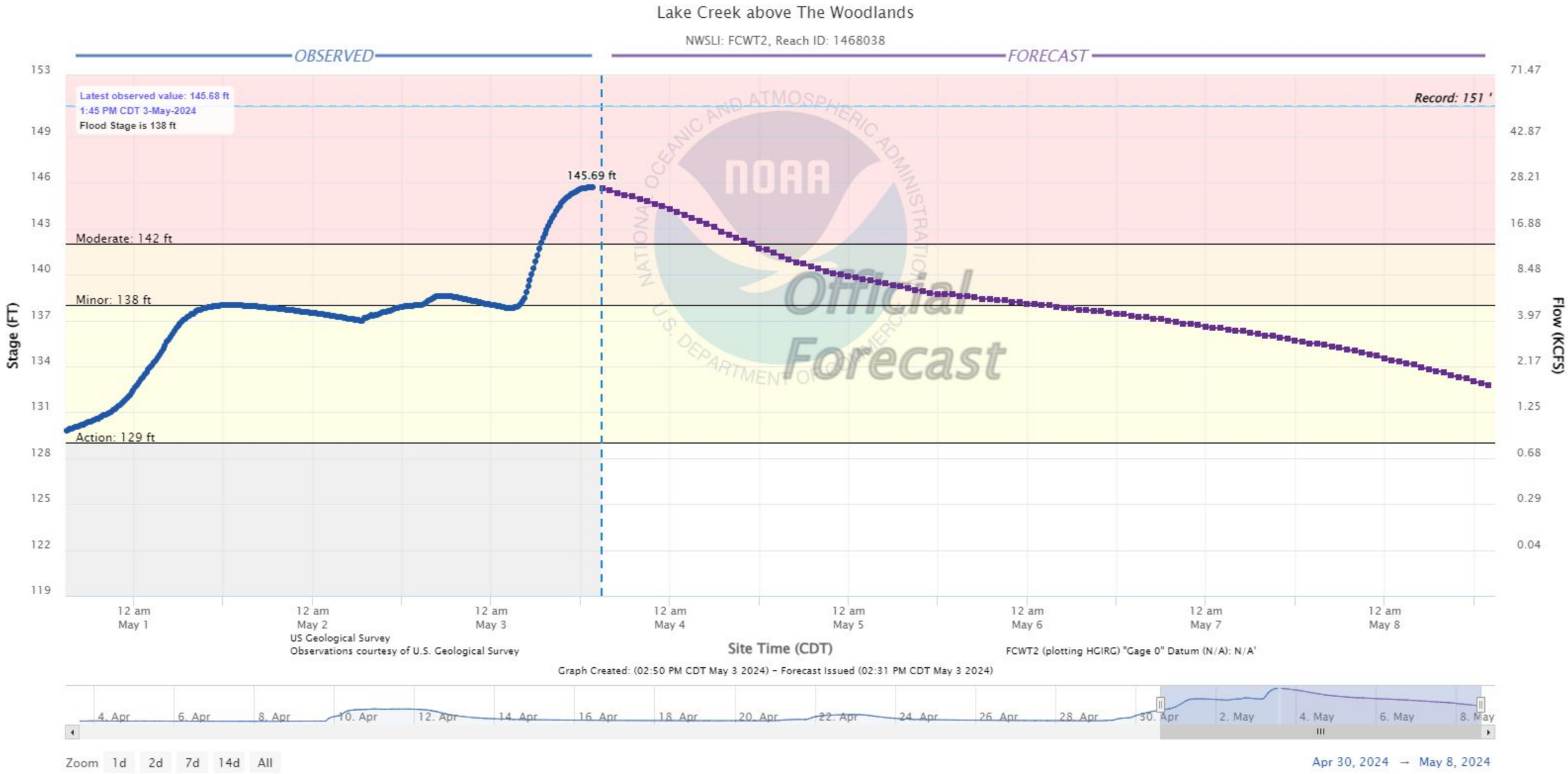
Caney Creek near Splendora

Houston/Galveston
WEATHER FORECAST OFFICE



Lake Creek above The Woodlands

Houston/Galveston
WEATHER FORECAST OFFICE

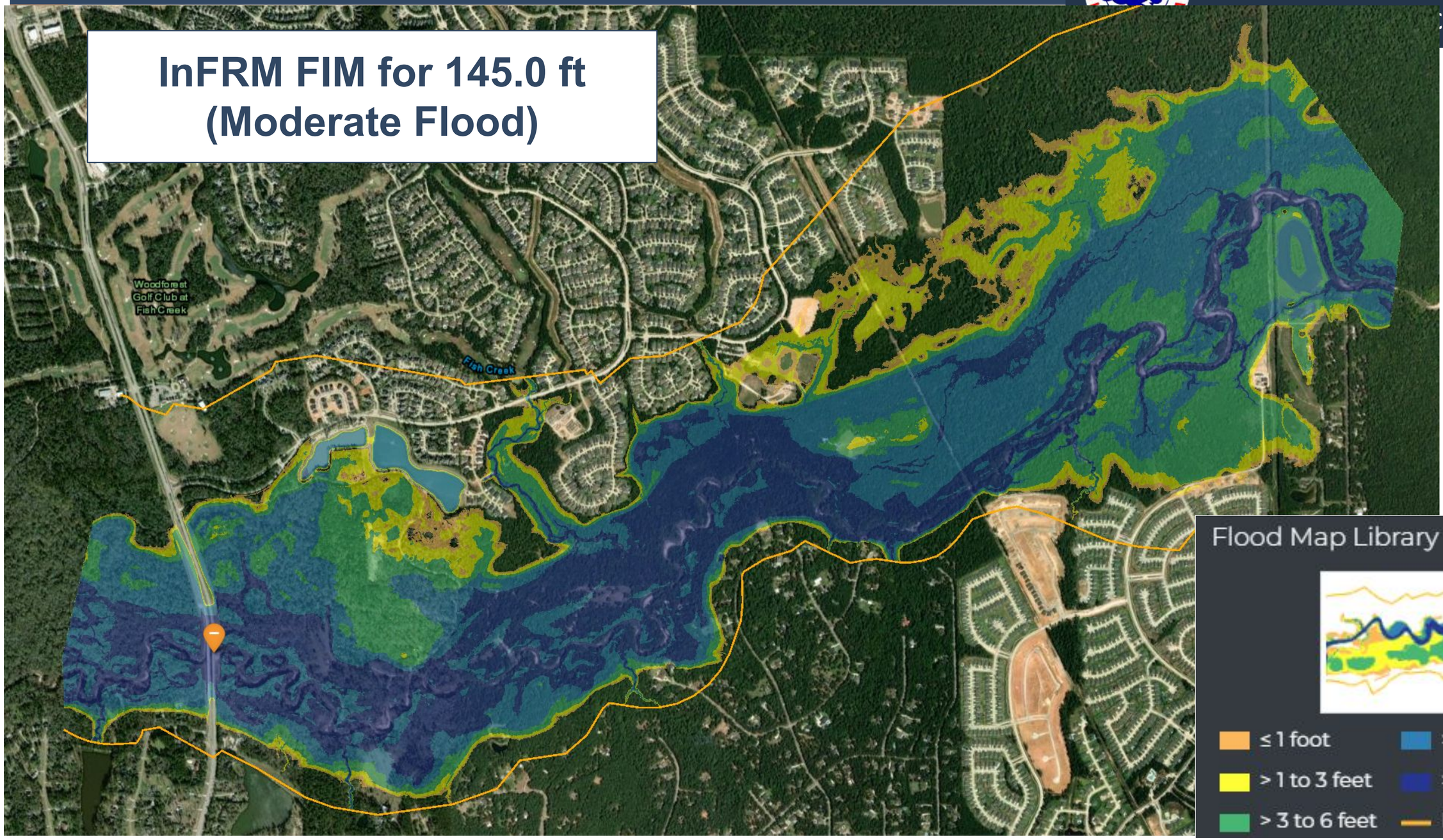


Lake Creek above The Woodlands

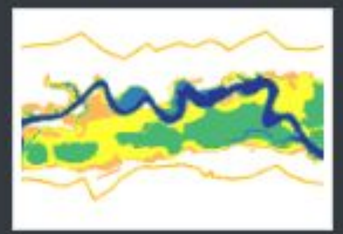
Houston/Galveston

AST OFFICE

InFRM FIM for 145.0 ft (Moderate Flood)



Flood Map Library



≤ 1 foot

> 1 to 3 feet

> 3 to 6 feet

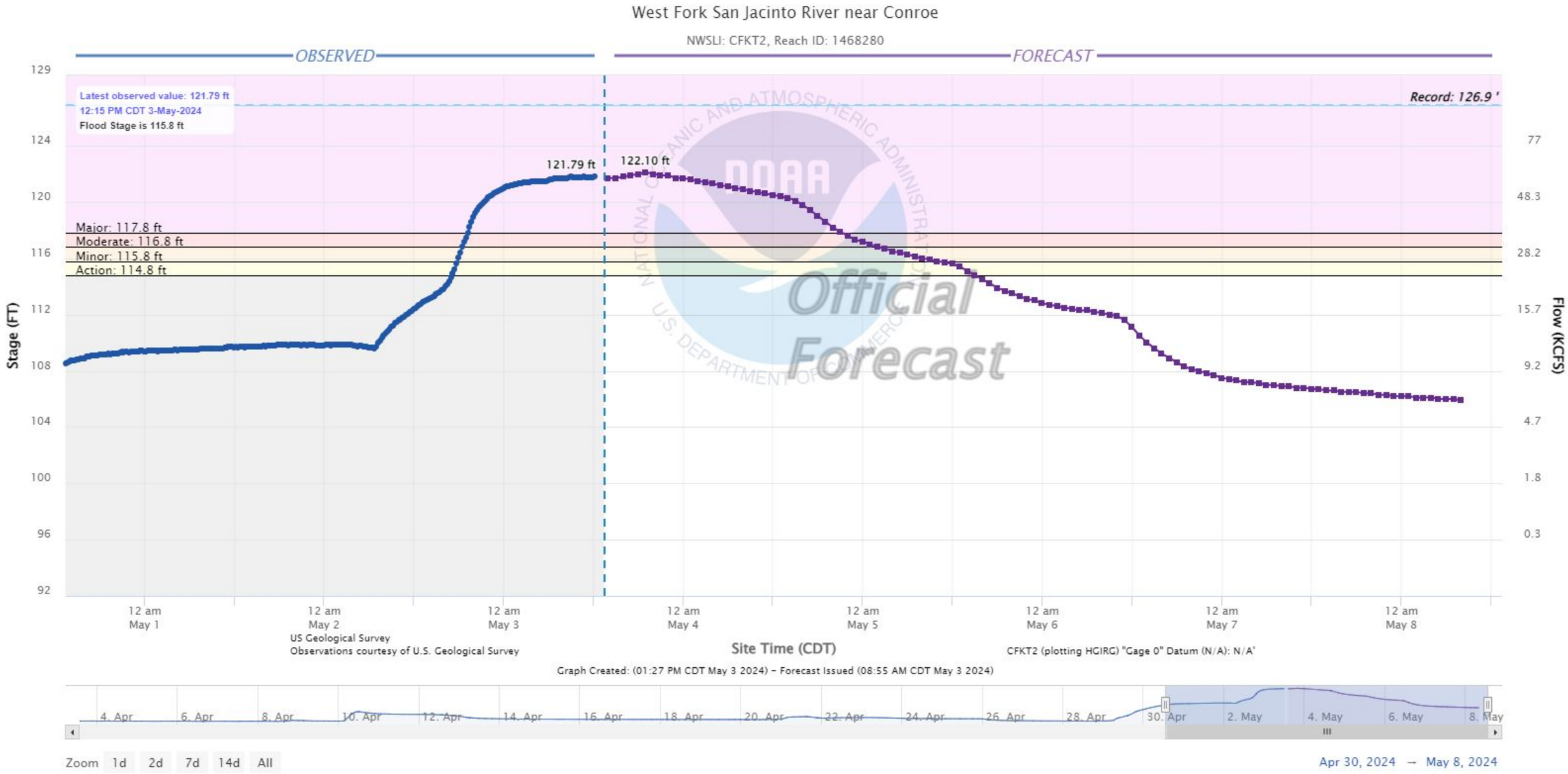
> 6 to 9 feet

> 9 feet

Flood map limits

W.F. San Jacinto River near Conroe

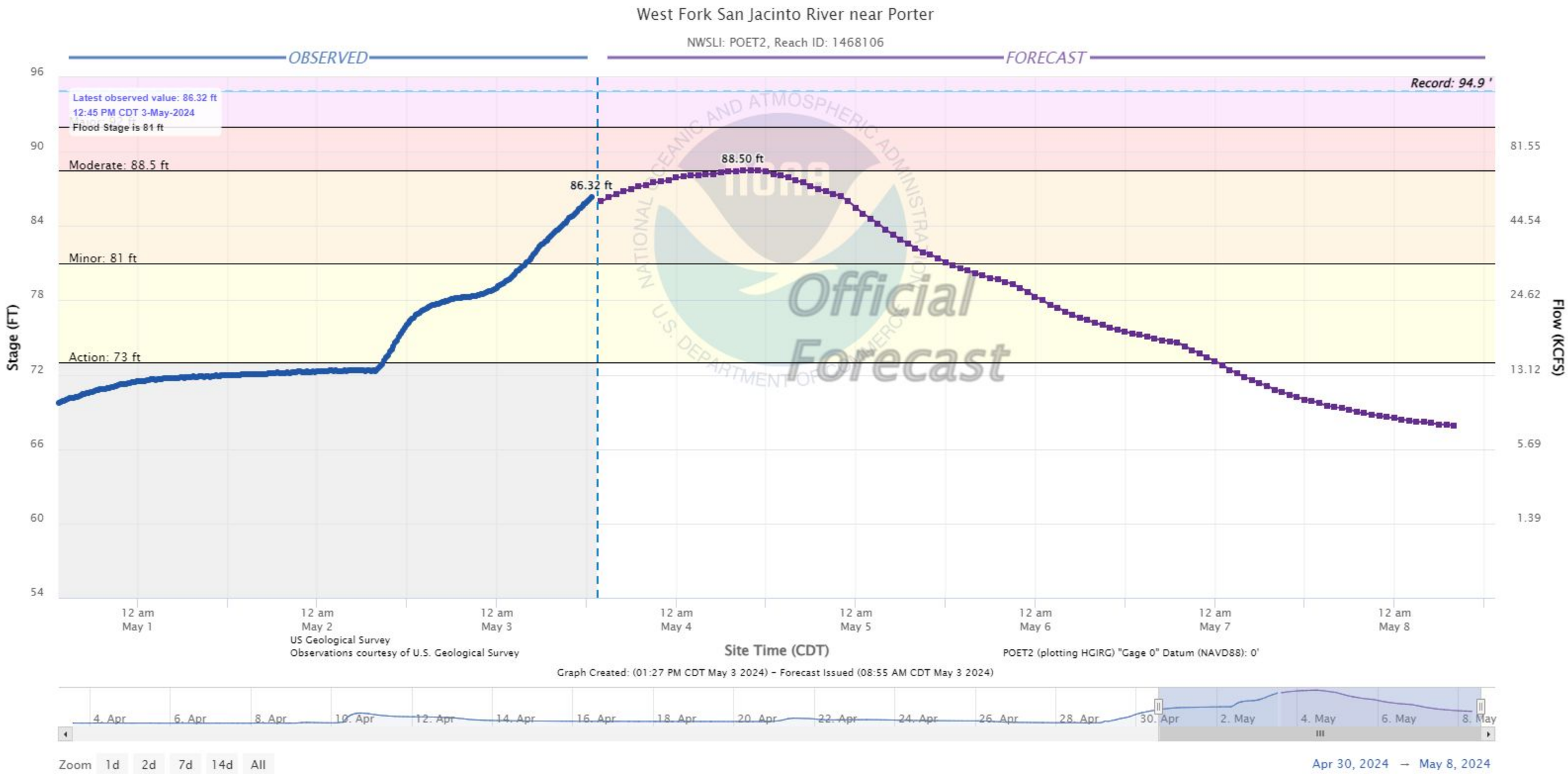
Houston/Galveston
WEATHER FORECAST OFFICE



Official Forecast

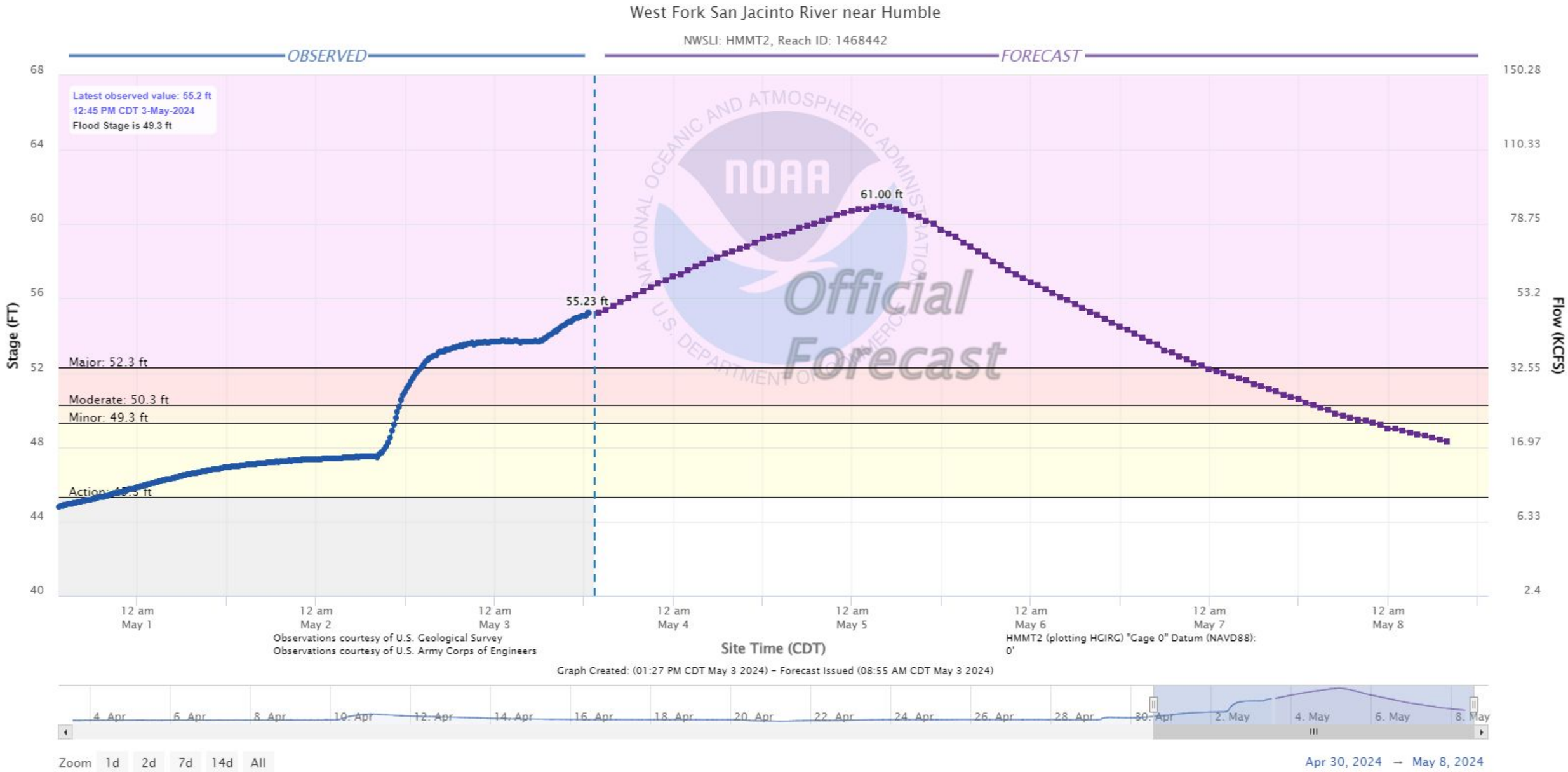
W.F. San Jacinto River near Porter

Houston/Galveston
WEATHER FORECAST OFFICE



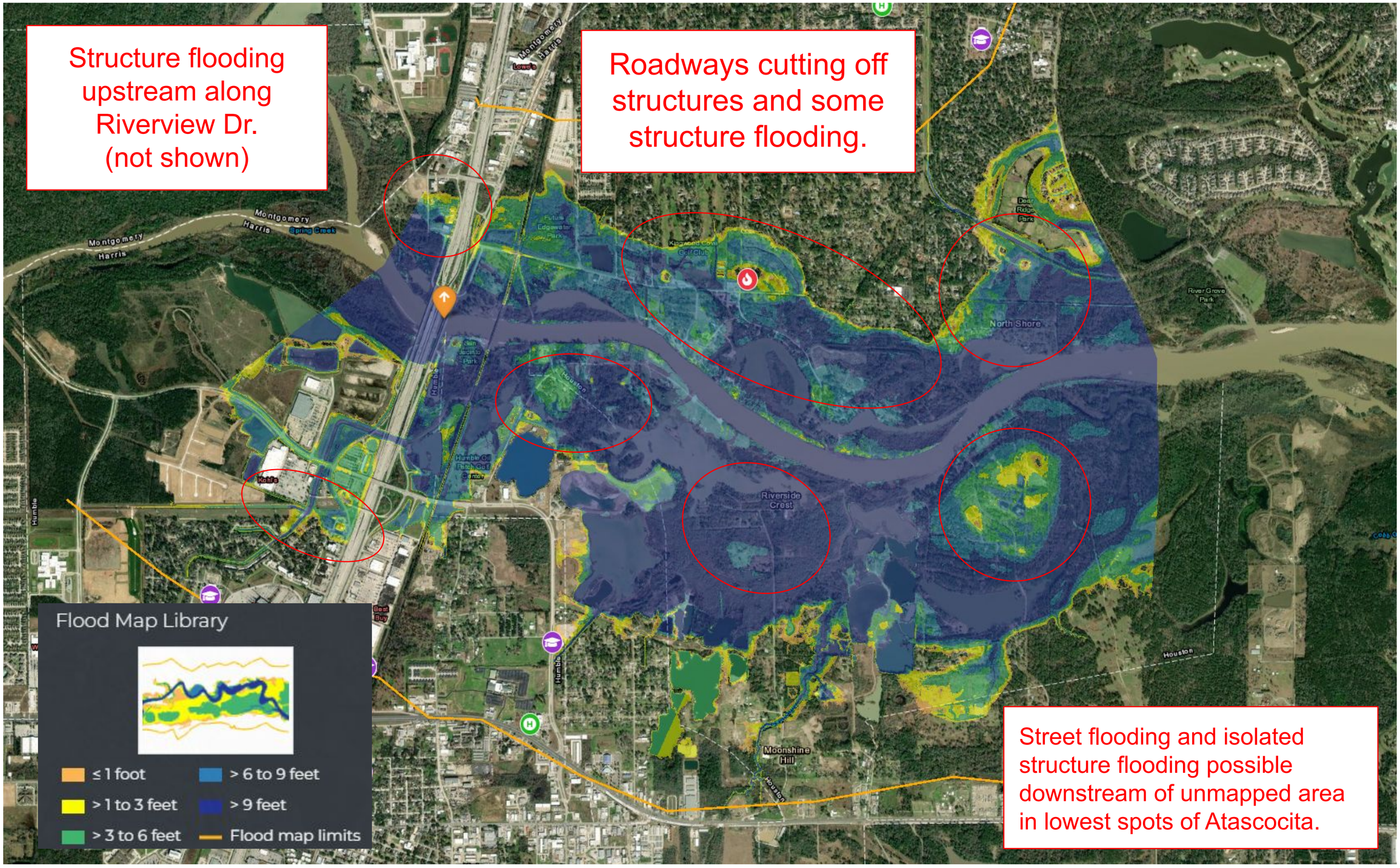
W.F. San Jacinto River near Humble

Houston/Galveston
WEATHER FORECAST OFFICE



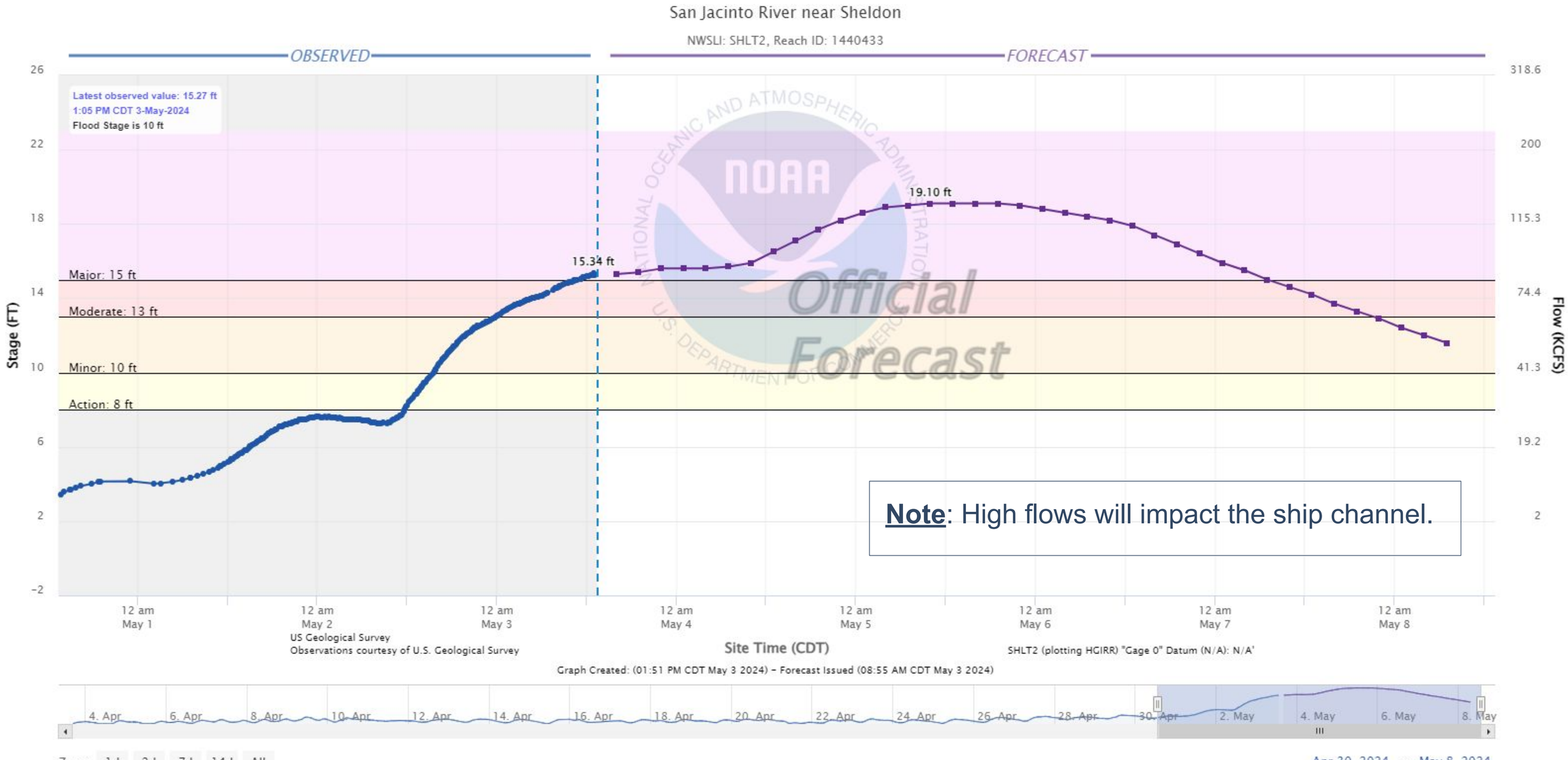
West Fork San Jacinto at Humble

Map showing impacts at 61.0 ft



San Jacinto River at Sheldon

Houston/Galveston
WEATHER FORECAST OFFICE

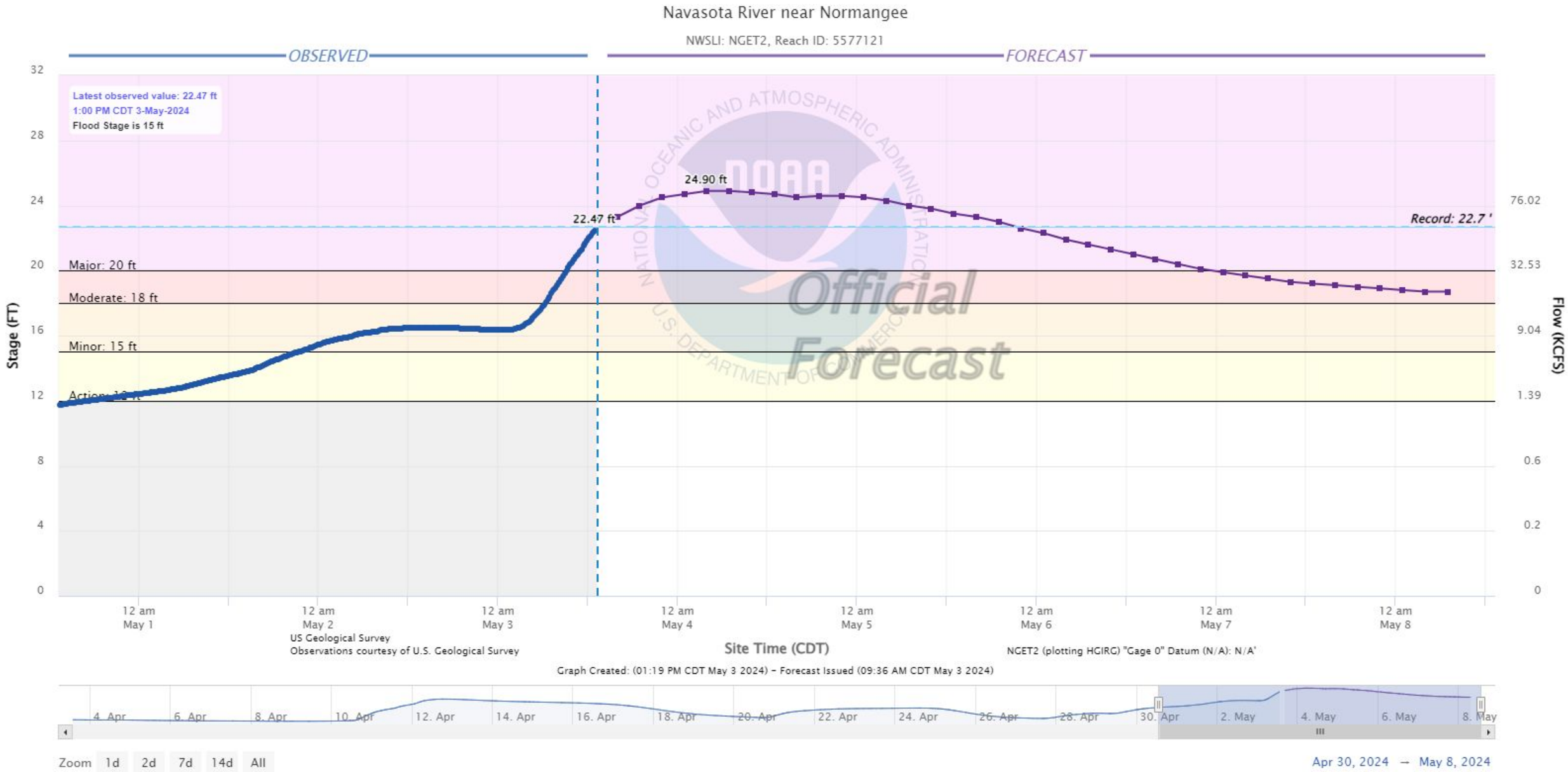


Official Forecast

Note: High flows will impact the ship channel.

Navasota River near Normangee

Houston/Galveston
WEATHER FORECAST OFFICE

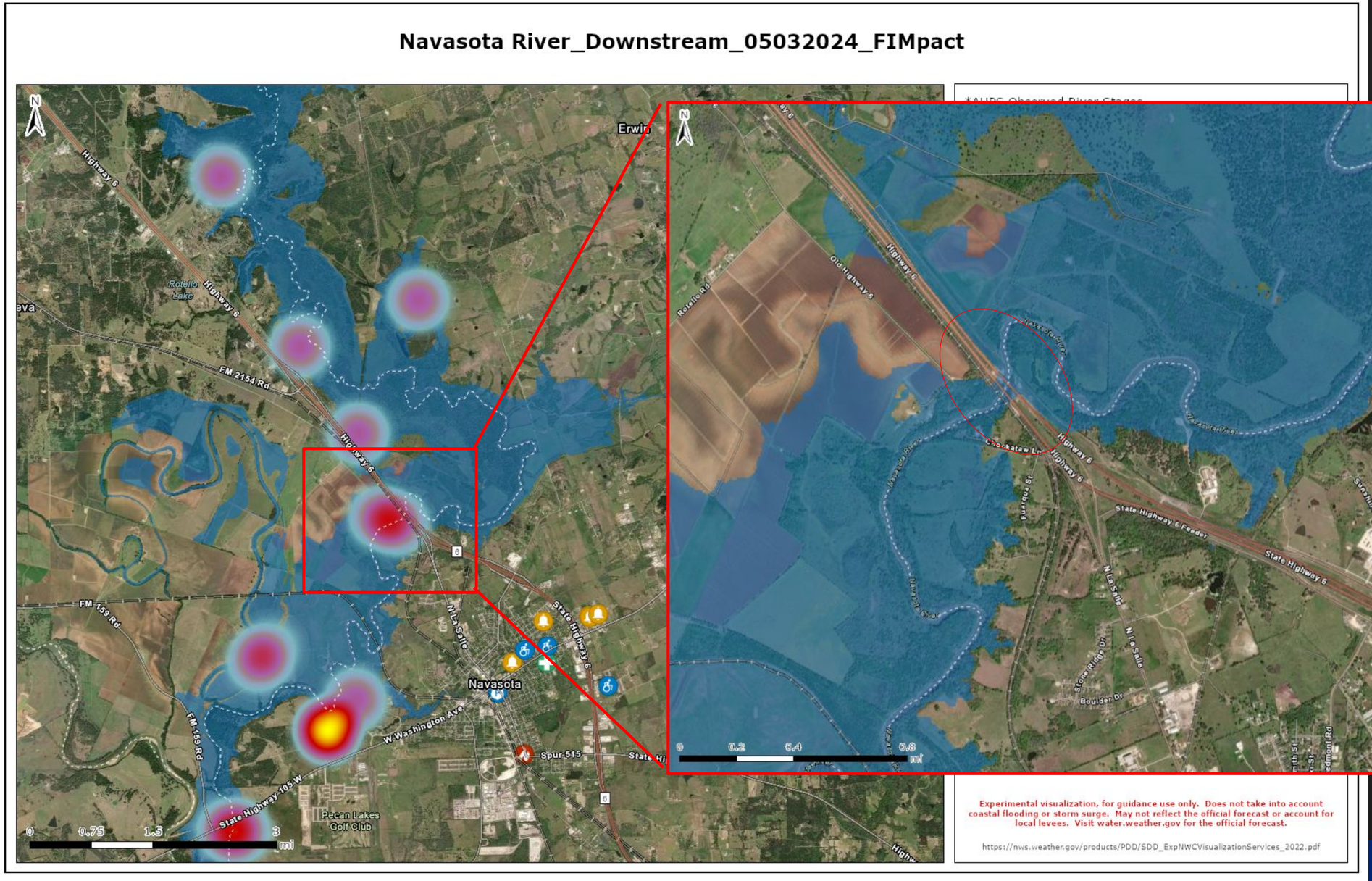


WGRFC Forecast Potential Flood Inundation

Impacted Area: *Robertson, Leon, Brazos, & Madison Counties*

West Gulf River Forecast Center

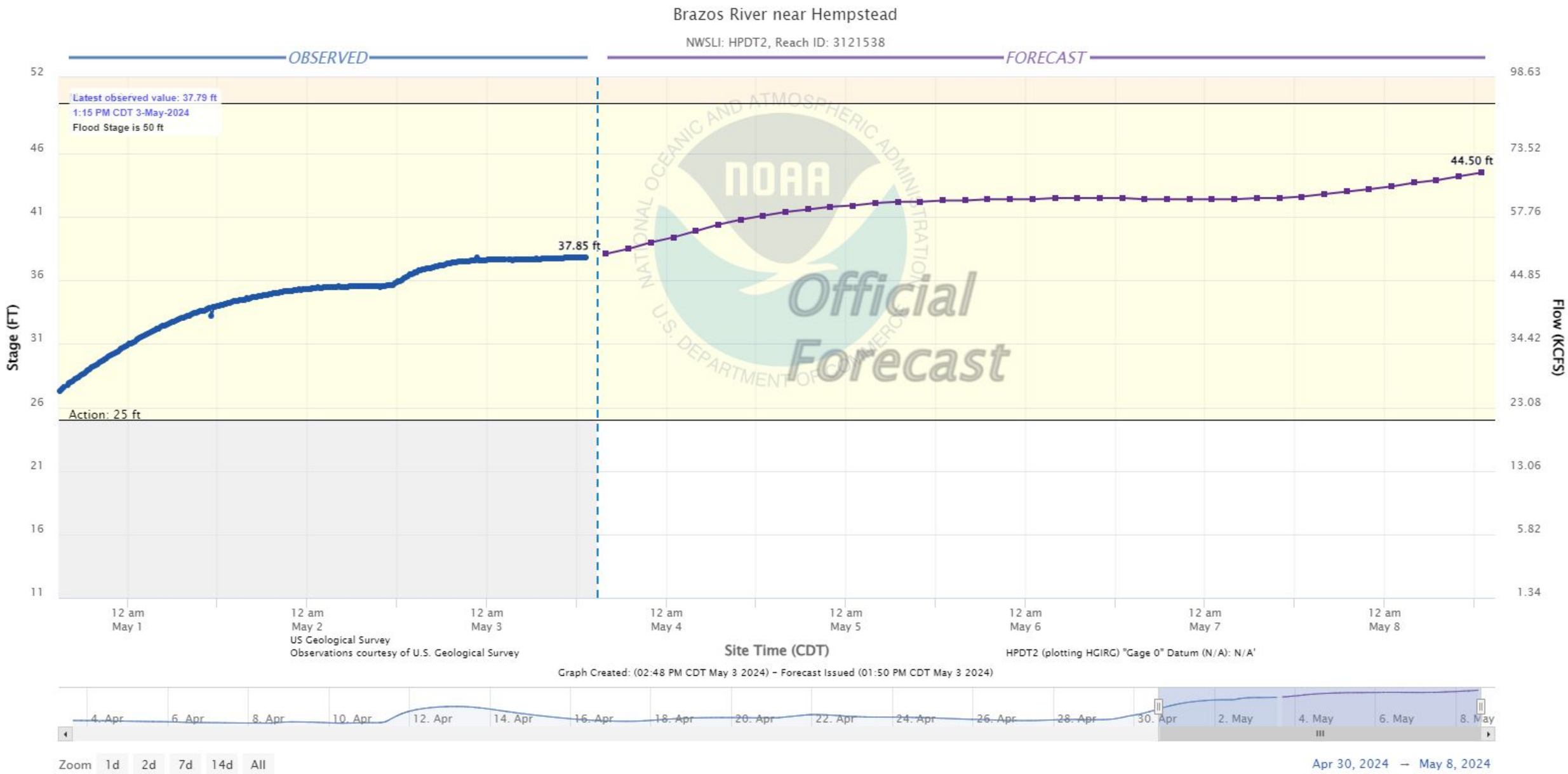
Thursday May 3, 2024



Based on current forecast, State Highway (SH) 6 is not expected to be inundated but it will be close. There is concern regarding debris impacting the bridge and the low spots along SH 6 are likely to inundated.

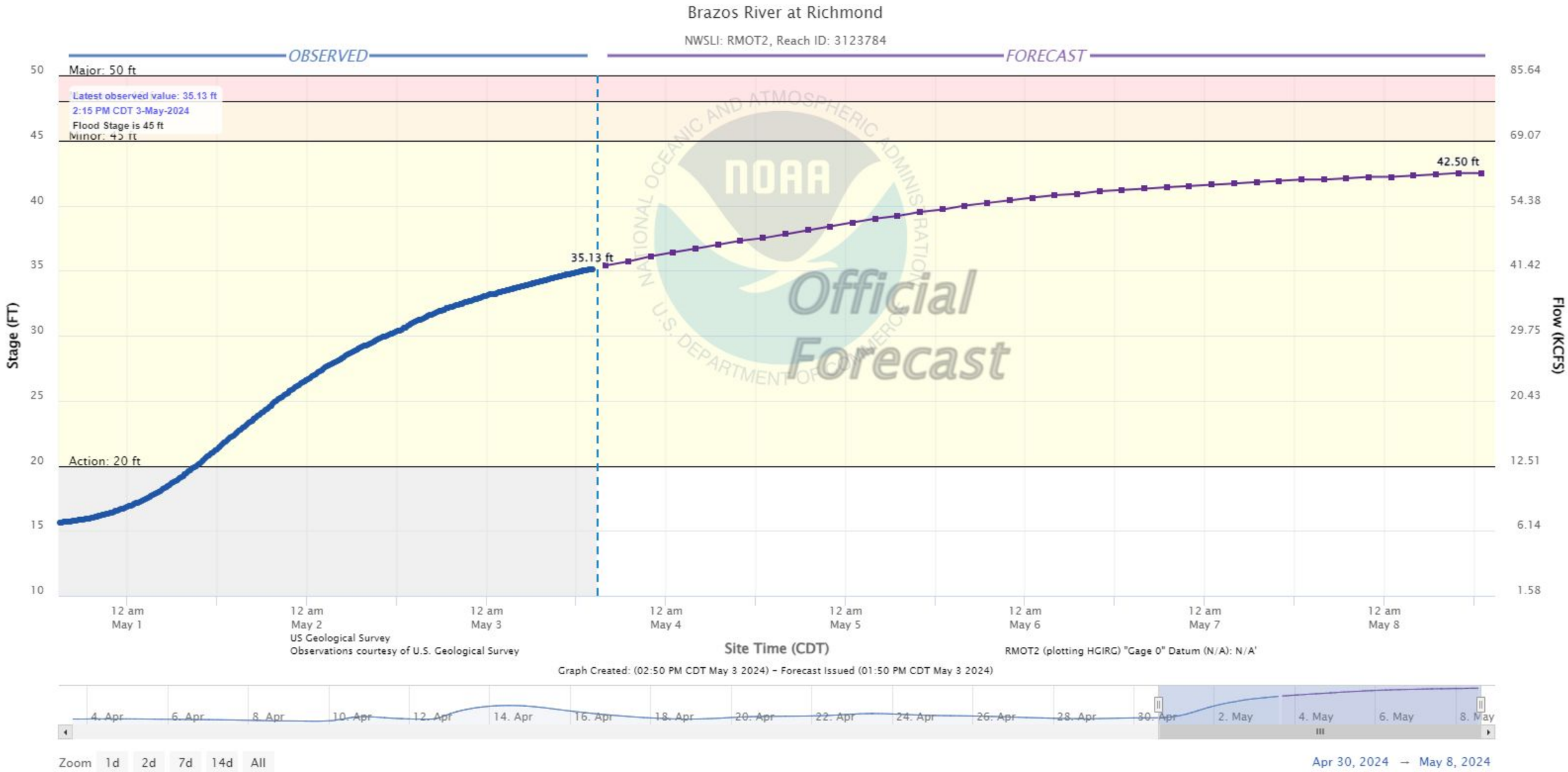
Brazos River at Hempstead

Houston/Galveston
WEATHER FORECAST OFFICE



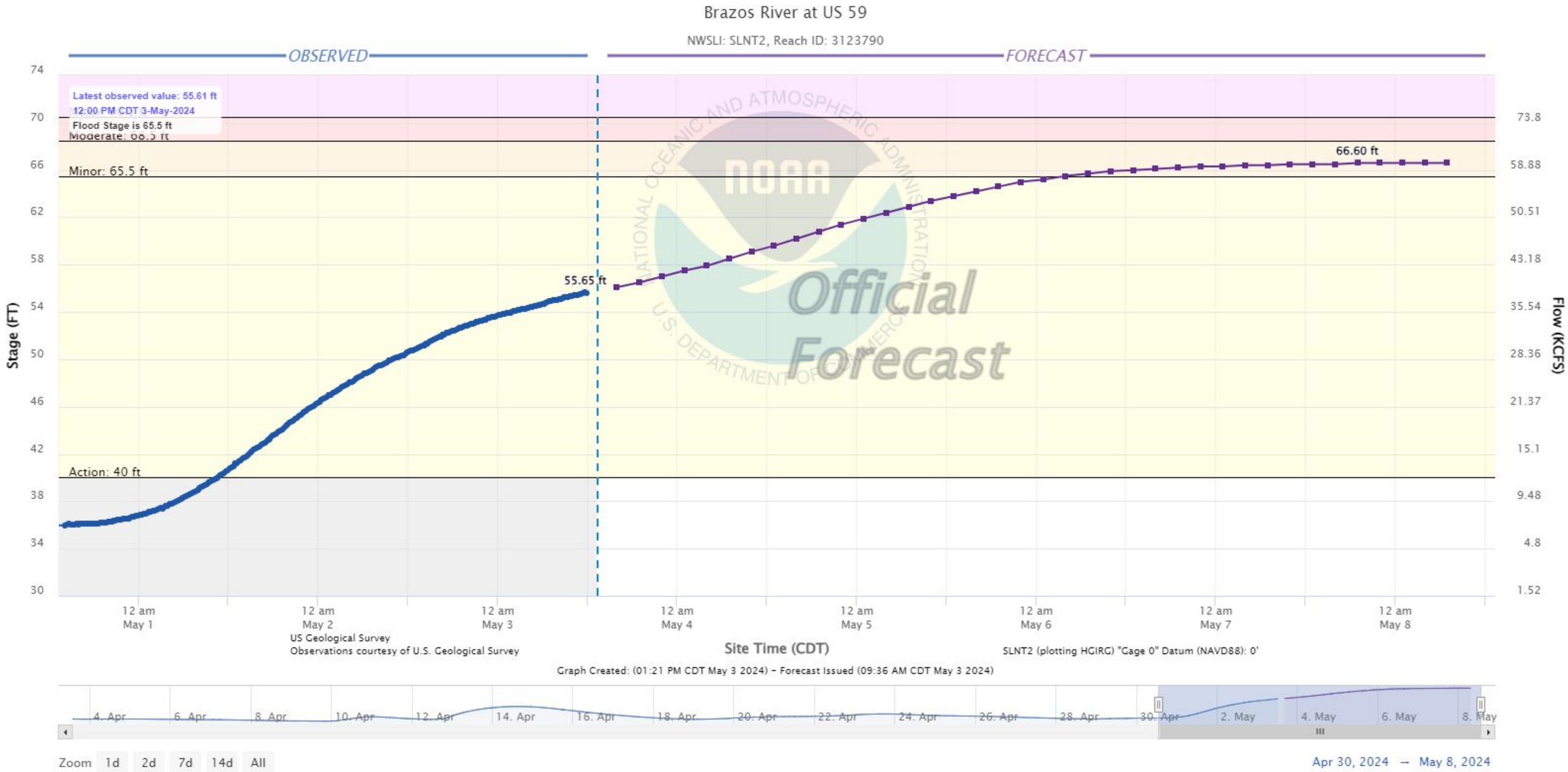
Brazos River at Richmond

Houston/Galveston
WEATHER FORECAST OFFICE



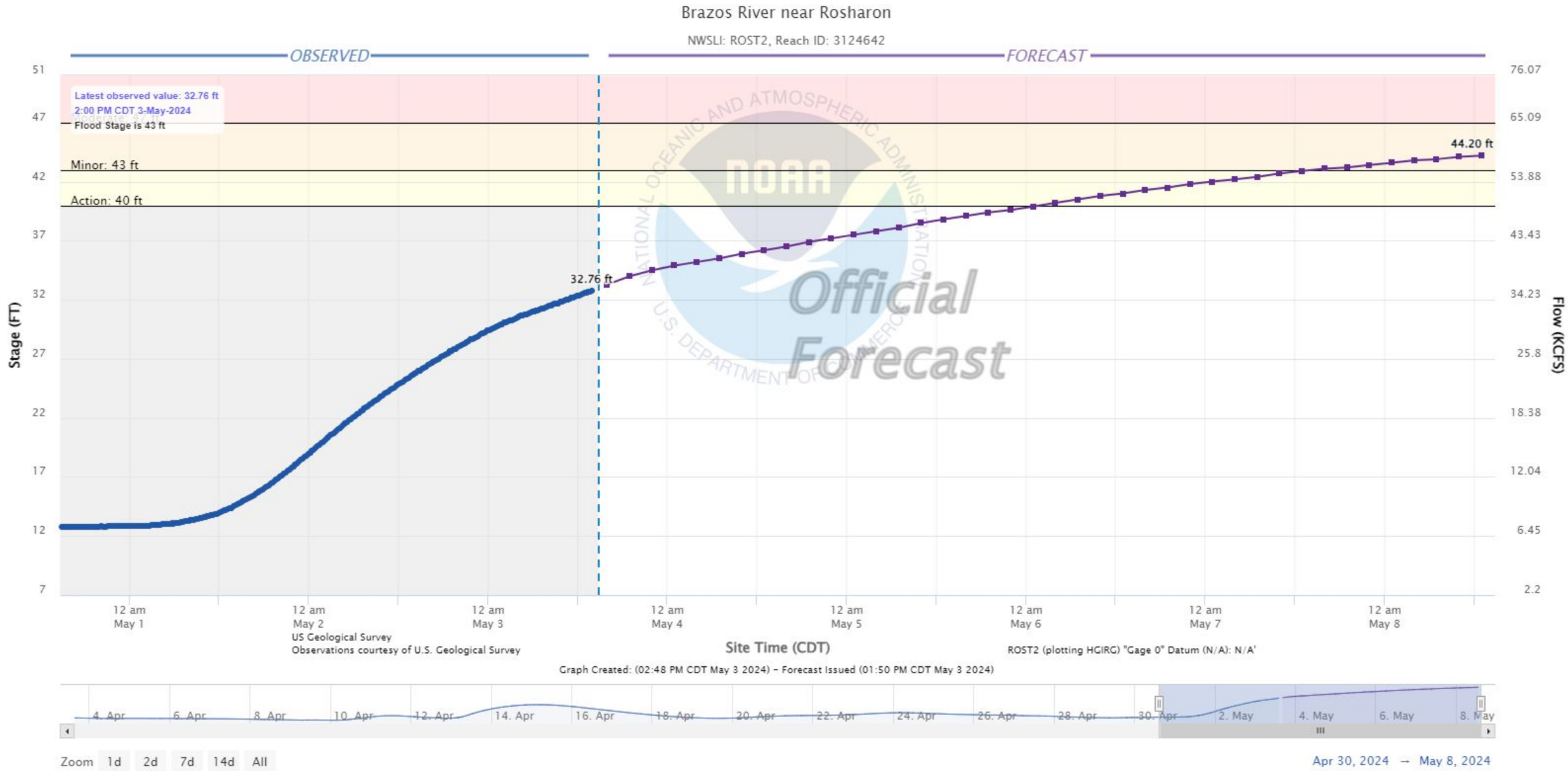
Brazos River at US 59

Houston/Galveston
WEATHER FORECAST OFFICE



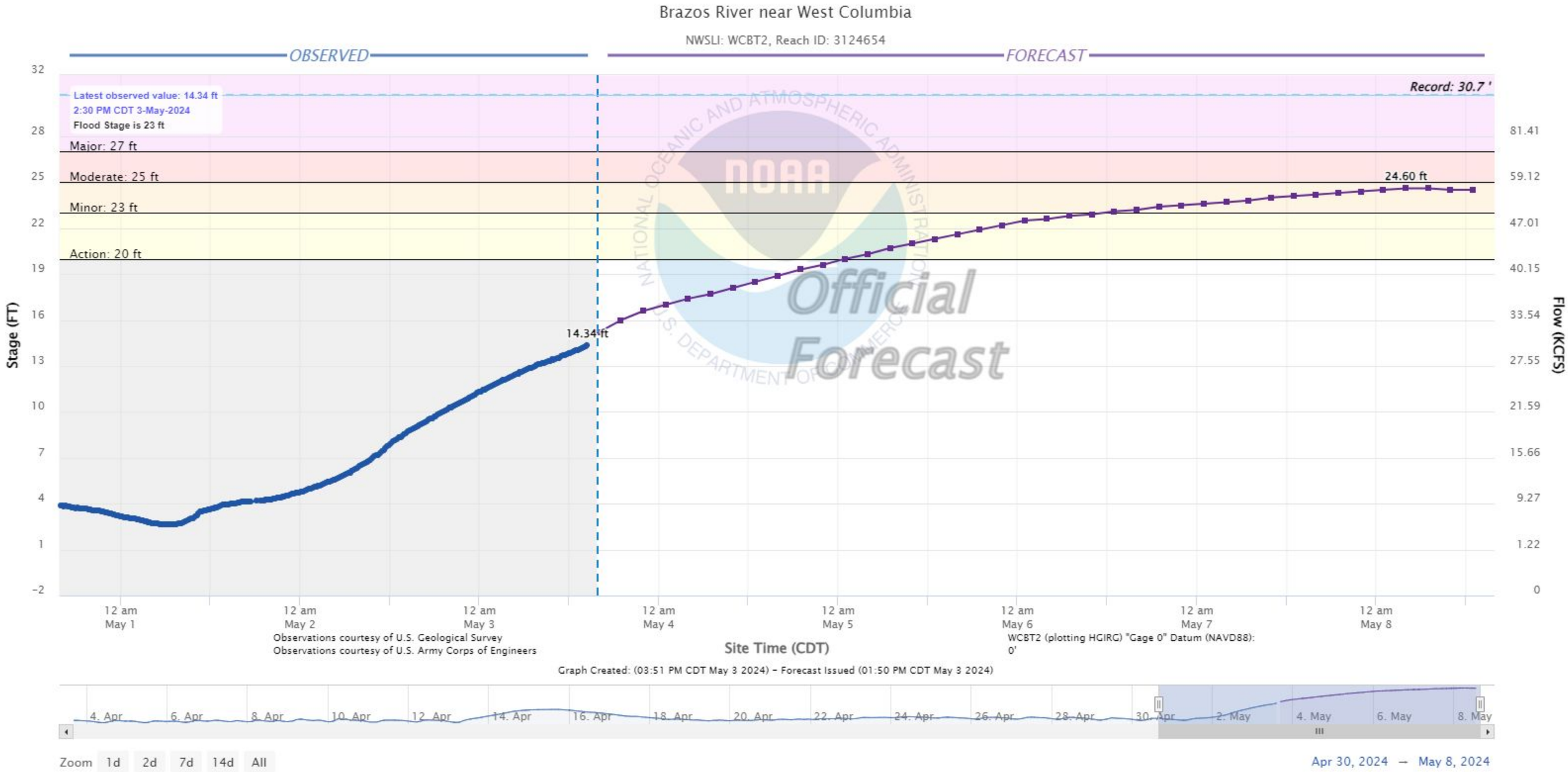
Brazos River at Rosharon

Houston/Galveston
WEATHER FORECAST OFFICE



Brazos River at West Columbia

Houston/Galveston



Questions/Contact Information

- Office email: **sr-hgx.nws@noaa.gov**
- **Questions/comments?**
- Inundation Mapping Resources:
  - National Water Prediction Service (NWPS)
  - InFRM Flood Decision Support Toolbox