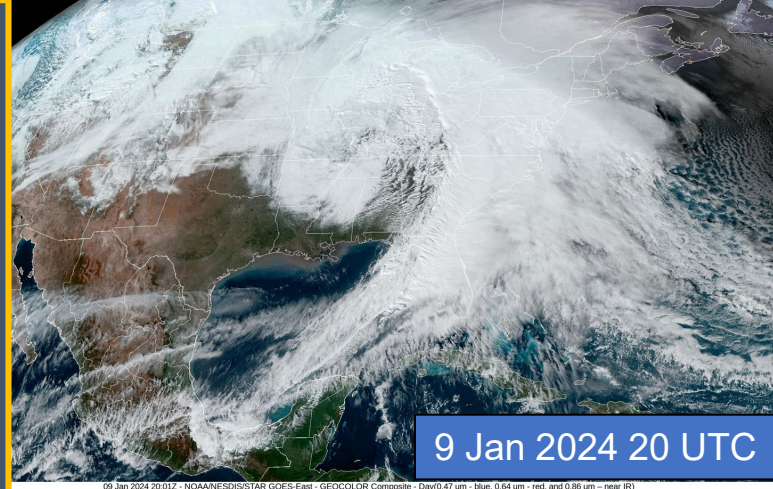


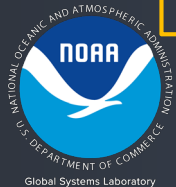
# From Prototype to Operational Decision Support Services Five Years of Coastal Total Water Level Forecasting in Eastern Region of the National Weather Service



9 Jan 2024 20 UTC

09 Jan 2024 20:01Z - NOAA/NESDIS/STAR GOES-East - GEOCOLOR Composite - Day(0.47 um - blue, 0.64 um - red, and 0.86 um - near IR)

Laurie G. Hogan, Hydrologic Services Division, NWS ER HQ  
*And a group of excellent folks in ER and beyond*



*For the AMS 2024*



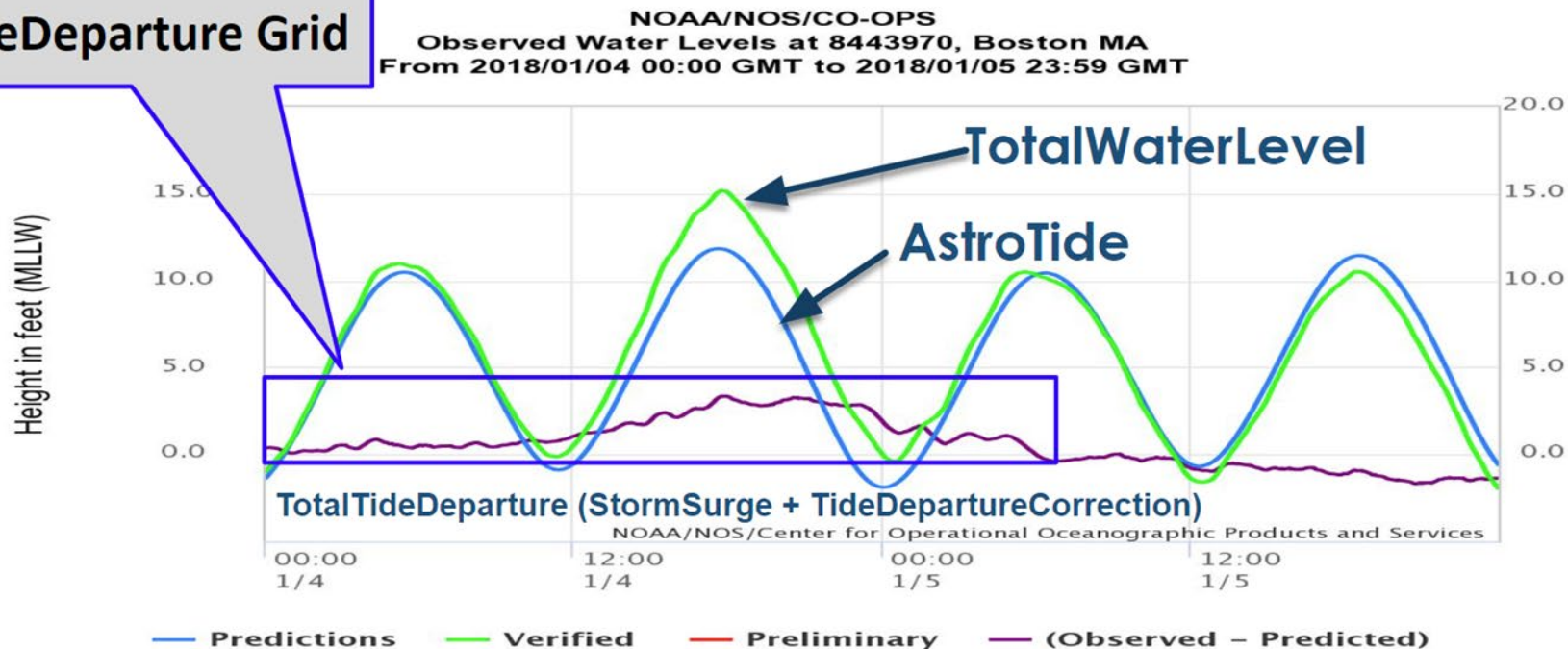
# What Is Total Water Level (TWL)?

*TWL - Water depth that produces flooding/inundation/impacts at the coast*



# What Is Being Forecast and How?

WFOs forecast the  
TotalTideDeparture Grid





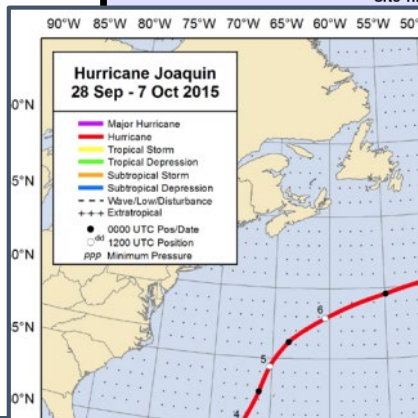
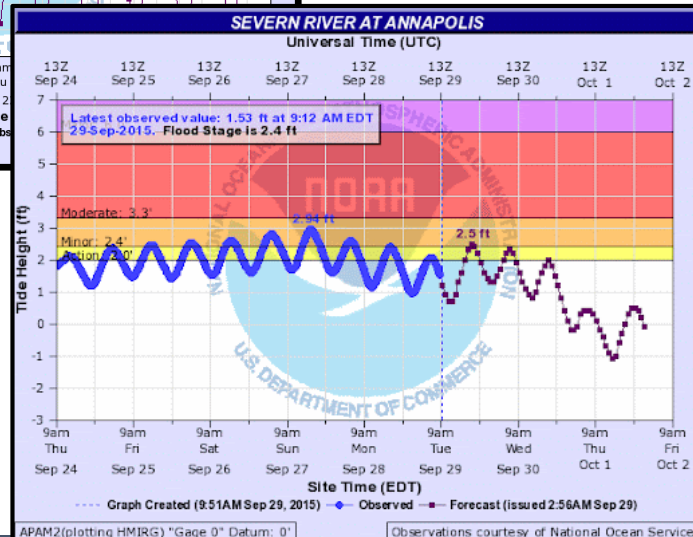
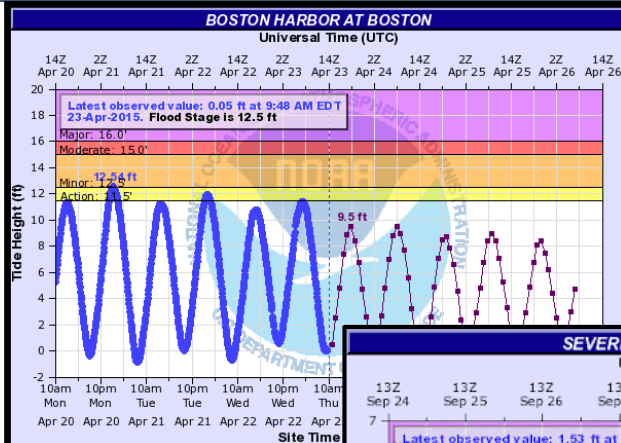
# ProtoType to Official Forecasts

## Prototype Weather Forecast Offices

- Boston/Taunton/Norton
- Wakefield VA
- Baltimore/Washington DC

## October 2017

- All ER Coastal WFOs producing daily forecasts (hydrographs) continually.
- TWL Support Team
  - Team of field/regional experts



# 2018-2020: Early Lessons Learned

```
////////////////////  
HOURLY TWL VERIFICATION DATA  
////////////////////
```

TIDE

2020-04-12-0400Z

	CHTS1	FPKG1
Observed	7.1	8.9
Anomaly	+0.7	+0.9

=====

TWL Forecast Verification

=====

2020-04-11-2335Z	0.0	-0.1
2020-04-11-2313Z	0.0	-0.1
2020-04-11-1316Z	+0.2	0.0
2020-04-11-0924Z	0.0	0.0
2020-04-11-0920Z	0.0	0.0
2020-04-11-0150Z	0.0	0.0

Model Verification

=====

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ETSS

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2020-04-12 00Z	-0.8	-1.0
2020-04-11 18Z	-0.9	-1.0
2020-04-11 12Z	-0.9	-1.0
2020-04-11 06Z	-0.9	-1.0
2020-04-11 00Z	-0.9	-1.0
2020-04-10 18Z	-0.9	-1.0

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EST0FS

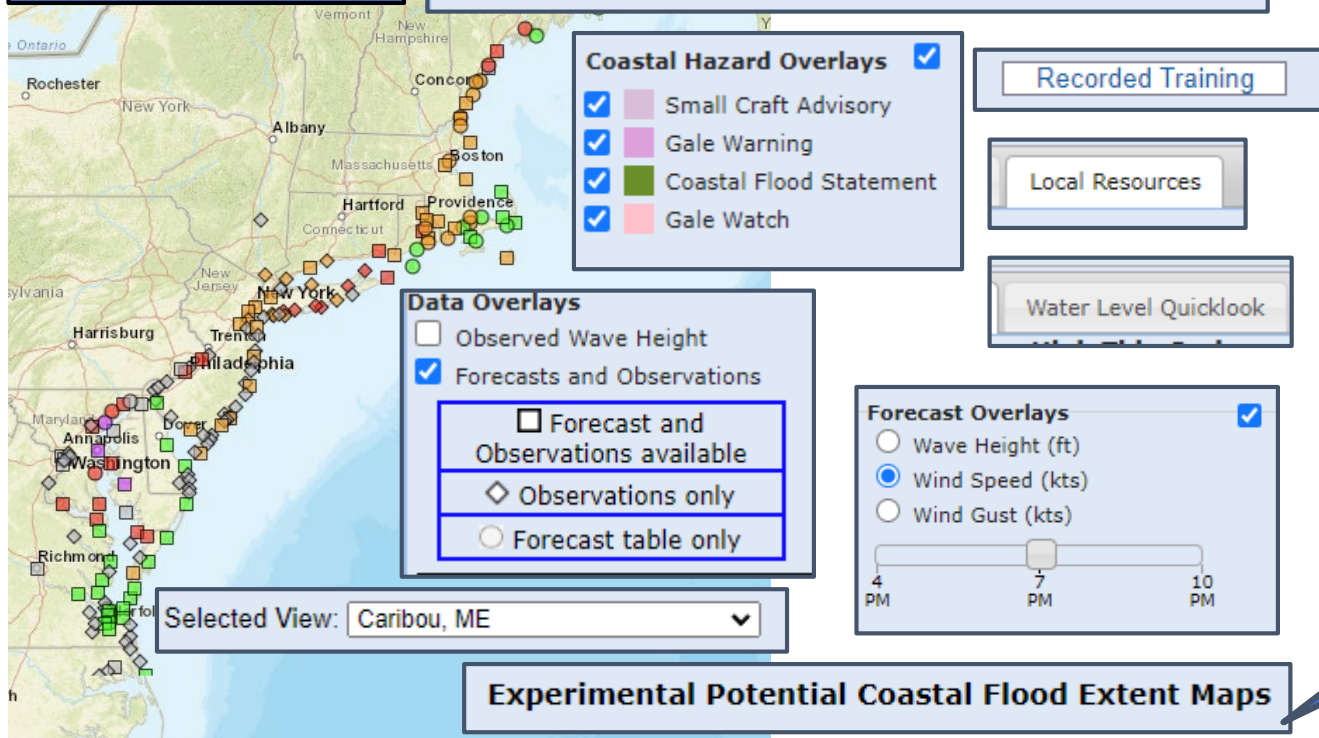
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2020-04-11 18Z	-1.3	-1.3
2020-04-11 12Z	-1.2	-1.3
2020-04-11 06Z	-1.3	-1.3
2020-04-11 00Z	-1.3	-1.3
2020-04-10 18Z	-1.3	-1.4
2020-04-10 12Z	-1.4	-1.4

Pick 1... Observed anomaly, TWL verification, and model bias

# March 2021 – Coastal Flood Webpage

January 9th, 2024



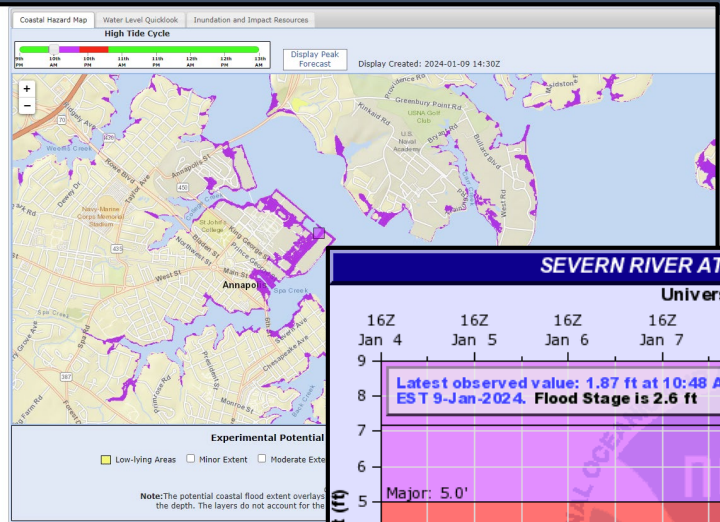
Scan to Visit the NWS Eastern Region Coastal Flood Map



**Added June 2022**

In collaboration with  
NOAA Digital Coast

# Authoritative Forecasts - Local Impacts



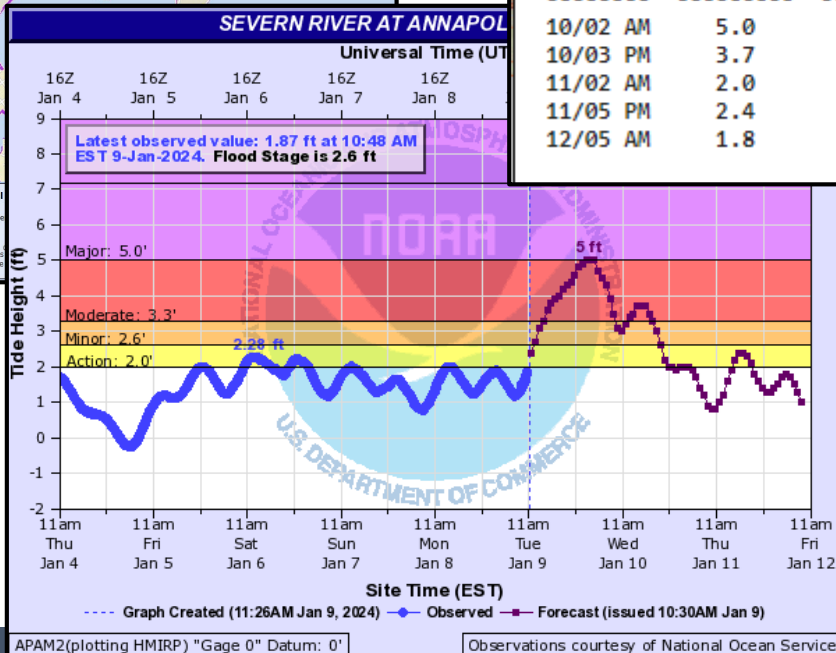
Issued: 1030 AM EST Tue Jan 9 2024

Severn River at Annapolis

MLLW Categories - Minor 2.6 ft, Moderate 3.3 ft, Major 6.0 ft

MHHW Categories - Minor 1.2 ft, Moderate 1.9 ft, Major 4.6 ft

Day/Time	Total Tide ft MLLW	Total Tide ft MHHW	Departure from Norm ft	Waves ft	Flood Impact
10/02 AM	5.0	3.6	4.6	3.0	Major
10/03 PM	3.7	2.3	2.9	1.0	Moderate
11/02 AM	2.0	0.6	1.7	0.5	None
11/05 PM	2.4	1.0	1.3	0.5	None
12/05 AM	1.8	0.4	1.3	0.5	None



## Sample User Feedback

“Saves me from having to visit multiple sources for the complete picture.”

“The inundation mapping piece is a home run.”

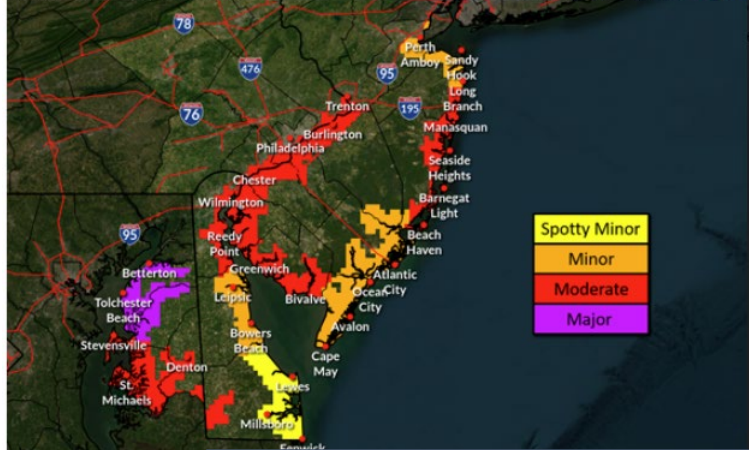
# 2024 -Impact-Based Decision Support Services

## Coastal Flood Threat

Valid Mon 8:00PM through Sat 2:00AM EST

Weather Forecast Office  
Mount Holly

Issued Jan 09, 2024 9:42 AM EST



- ✓ **Widespread moderate (2 to 2 ½ ft inundation above ground) coastal flooding** for vulnerable coastal communities along Jamaica Bay, southern and eastern coastal of Long Island, and southeastern coastal CT during the Saturday morning high tide.
- ✓ **Locally major (around 3 ft inundation above ground) coastal flooding is possible along the south shore bays and ocean front of Queens and Long Island.**
  - ✓ Elsewhere widespread minor to moderate coastal flooding, including up tidally affected rivers as well.

## Tidal Flooding Overview

January 9, 2024

9:00 AM



- Strong southeast winds will push water up the Chesapeake Bay and the northern shore of the Albemarle Sound. Peak winds from the southeast will occur from late this afternoon into early Wednesday morning. Winds decrease and shift from the west early Wednesday morning, but remain strong.
- Major tidal flooding is expected for the bay-side of the lower MD Eastern Shore. Widespread moderate tidal flooding farther south to Windmill Point and Bayford.
- 2 to 3 ft of inundation (or more) is possible. Water will likely close roads and threaten some homes and businesses in some areas in areas of Major to Moderate flooding.

[Coastal Flood Webpage](https://www.weather.gov/erh/coastalflood?wfo=akq)

<https://www.weather.gov/erh/coastalflood?wfo=akq>



National Oceanic and  
Atmospheric Administration  
U.S. Department of Commerce

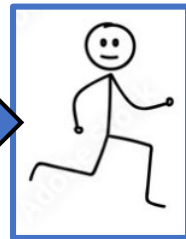
National Weather Service  
Wakefield, VA



# Future Work and Direction

- Continued collaborations with modelers
  - So extremely valuable!!
  - Incorporation of new models, new improvements
  - Challenging areas - back bays with shallow bathymetry
- Continued improvements to forecaster training
  - Training team developed curriculum
- Verification to support forecast improvements
  - NWS MDL leadership
- Improving Impact-Based Messaging

**Actionable**



# Thank You! / Questions?

laurie.hogan@noaa.gov

Scan to Visit the NWS Eastern  
Region Coastal Flood Map

