High Tide Flooding Recorded by the Hampton NH Tide Gauge 2013-2020

**BY KIRSTEN HOWARD & TIFFANY CHIN** RESILIENCE PROGRAM COORDINATOR | NH COASTAL PROGRAM 2022 NH CLIMATE SUMMIT



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#### WHY SUMMARIZE THIS DATA?

- To understand the frequency of high tide flooding in Hampton, NH
- To inform floodplain management decisions and planning for future sea level rise and tide conditions in the Town of Hampton and the surrounding region
- To inform water level monitoring needs

Report link: https://www.des.nh.gov/sites/ g/files/ehbemt341/files/docu ments/r-wd-21-15.pdf



Credit: David Murray, 2019



## THE HAMPTON HARBOR TIDE GAUGE

- tide gauge measures water levels at 6-minute intervals at 1/16<sup>th</sup> of an inch accuracy
- installed December 2012, by the Piscataqua Region Estuaries Partnership, NERACOOS (Charybdis Group)
- collecting data on a near-continuous basis since February 2013
- occasional short gaps in the data and two longer (> 1 month) gaps in 2016



Photo: Francesco Peri



# THE HAMPTON HARBOR COMMUNITY

- Barrier island village district, approximately 2,685 permanent residents and heavy seasonal population
- High tide flooding typically occurs in the low-lying areas west of Route 1A adjacent to the marshes of the Hampton-Seabrook Estuary
- Hampton buildings comprise approximately 24 percent of all National Flood Insurance Program policies in the State of New Hampshire
- Town has strengthened floodplain regulations, implemented a parking program for residents when tides are over 10 feet MLLW or during storm surges
- Under a scenario of 1.7 feet sea level rise, 3.4 miles of roadways in Hampton would be impacted by flooding. This increases to 13.2 miles under a 4 feet SLR scenario



Map of Hampton Beach depicting the current extent of inundation at Mean Higher High Water (MHHW) and the increase in flood extent under different sea level rise (SLR) scenarios.



## WATER LEVEL REFERENCES FOR HAMPTON HARBOR



At the Action stage (10 feet MLLW) road inundation and property flooding occurs in Hampton's most low-lying neighborhoods.

Flood categories for Hampton, NH, referenced to Mean Lower Low Water (National Weather Service Advanced Hydrologic Prediction Service, figure: Rayann Dionne)



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Photo Credit: Kirsten Howard

#### WHAT THE DATA TELLS US

- •At least one high tide over 10 feet MLLW was recorded on 30% to 40% of **days** each year between 2013 and 2020.
- •In 2020, there were 166 high tides over 10 feet MLLW.
- •High tide flooding occurs approximately three times more frequently on an annual basis than the NOAA tide charts predict, in part due to the influence of weather and storm surges.



## SEASONAL OBSERVATIONS

- •Flood stage high tides (10-10.99) persist throughout the year
- •Fewer high tides over 10 feet in winter, but more instances of severe flooding (Nor'easters)
- •High tides did not reach the Moderate or Major flood stage (greater than 11.99 feet) in the summer or fall of any year



## WHAT WE CAN EXPECT WITH SEA LEVEL RISE

#### Between 2013 and 2020:

• 24% of all high tides recorded reached or exceeded 10 feet MLLW.

#### Under a 1-foot sea level rise scenario, we estimate:

•65% of high tides would exceed 10 feet MLLW.

#### Under a 2-foot sea level rise scenario, we estimate:

- •95% of high tides could exceed 10 feet MLLW.
- The average number of days per year with a Major flood (over 13 feet) would increase to 27 days. Only one Major flood was recorded during the entire time series of 2013-2020.



Credit: Gabby Bradt, 2020





# WHAT THIS MEANS FOR OUR COMMUNITIES

•Residents, local decision-makers and emergency management officials should refer to the Hampton Harbor tide gauge <u>3-</u> <u>day forecast and real-time information</u> in addition to the more commonly used <u>NOAA</u> <u>tide prediction tables</u>

•There is a critical need for advanced planning and action to mitigate sea-level rise and increasing flooding in Hampton and coastal New Hampshire



Credit: Kirsten Howard, home elevation in the Hampton Harbor neighborhood in fall 2021



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Credit: Marie Sapienza, 2020





Thank you! Contact: Kirsten Howard, <u>Kirsten.B.Howard@des.nh.gov</u>, 603-559-0020