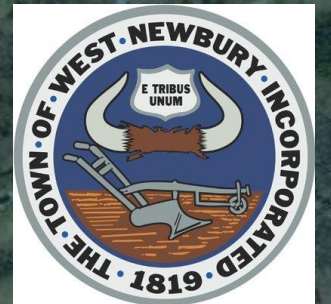


Planning Forward: Envisioning River Road under High Water Conditions



River Road Flood Vulnerability and Adaptation Study
Town of West Newbury, Massachusetts

Presentation Outline

1. Project Overview
2. Flood Risks from Study
3. Flooding Today
4. Adaptation Introduction



Project Goals and Methods

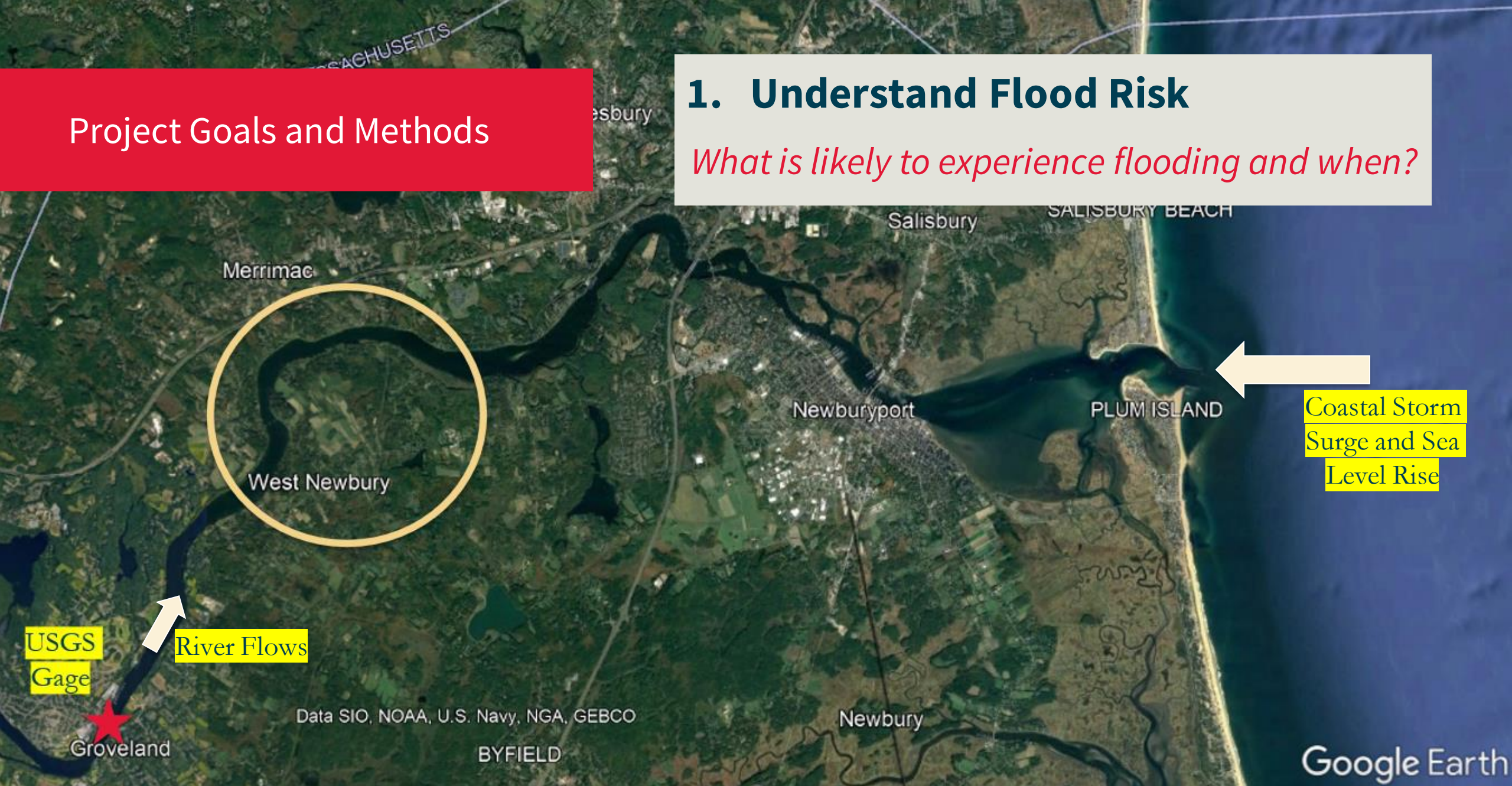
1. Understand flood risk near River Road
2. Identify areas of bank erosion
3. Evaluate culvert conditions and capacity
4. Introduce flood adaptation and bank stabilization options

Emphasis on Community Engagement

Project Goals and Methods

1. Understand Flood Risk

What is likely to experience flooding and when?



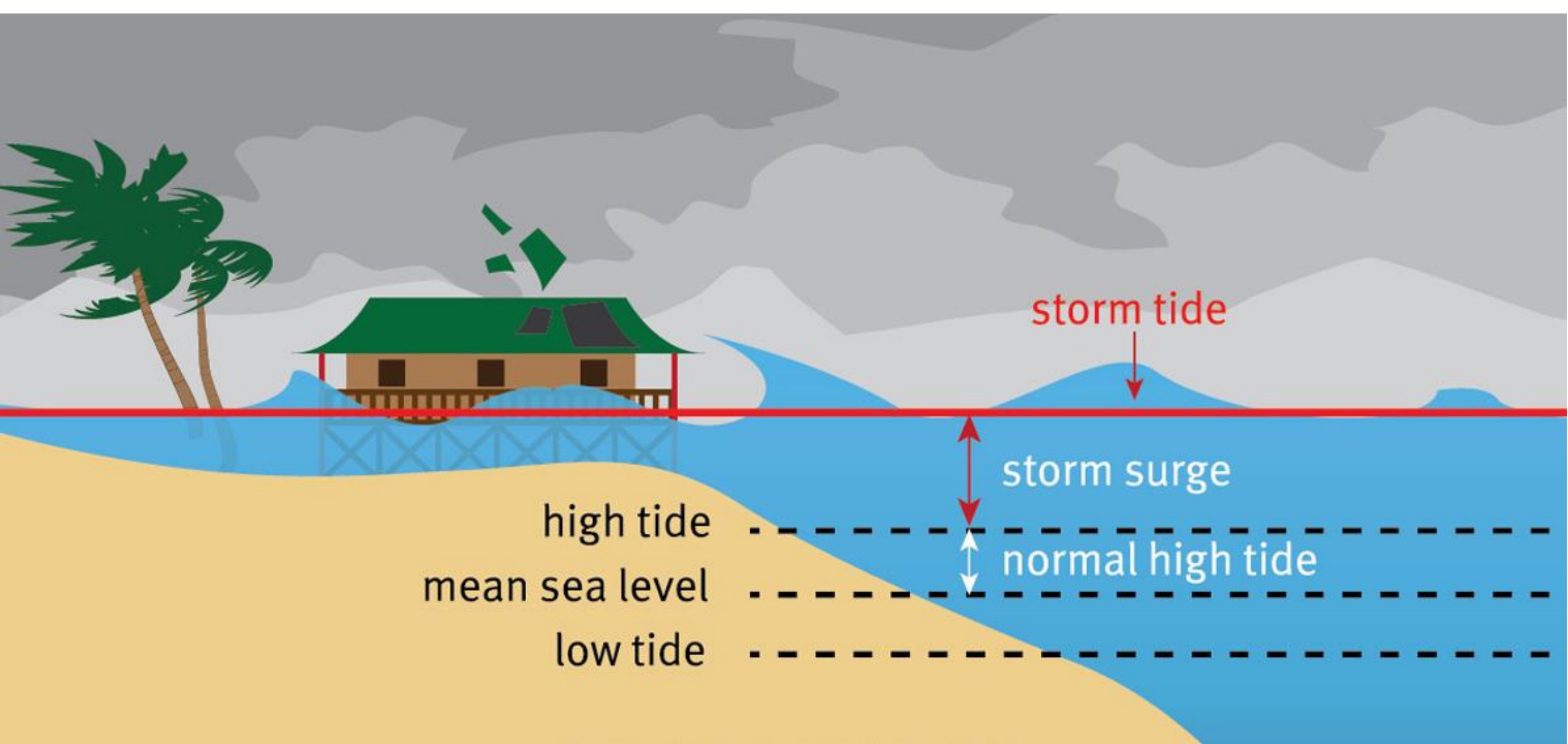
Project Goals and Methods

1. Understand Flood Risk During:

- 100-yr Coastal Storm Surge Events
- Mean Higher-High Water (Daily “High Tides”)

For Three Timeframes:

- Near-Term (2030ish) – *1.2 ft sea level rise*
- Medium-Term (2050ish) – *2.4 ft sea level rise*
- Long-Term (2070ish) – *4.2 ft sea level rise*



Source: Rosenstiel Hurricane Hub

Project Goals and Methods

Massachusetts Coastal Flood Risk Model (MC-FRM)

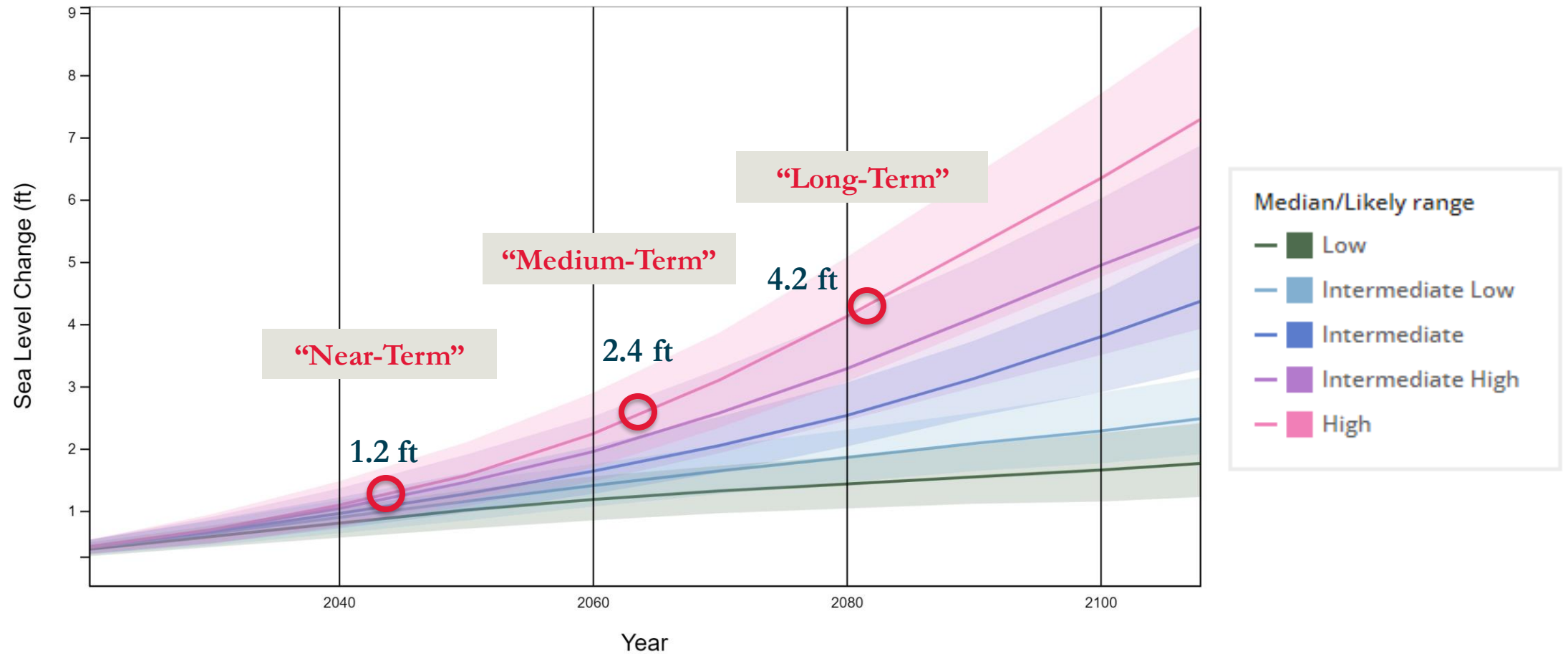
MC-FRM provides flood extents and elevations for:

- 1% annual chance coastal events, i.e., “100-year storms”
- Sea Level Rise
- 3 Timeframes



Project Goals and Methods

NOAA 2022 Sea Level Rise Projections *Boston*



Project Findings: Flooding in 2030


Road overtopping
during coastal
storm surge events

LEGEND:

 IMPACTED ROADS

 ROADS

 2030 MHHW (SLR ONLY)
INUNDATION EXTENT

 2030 100-YR COASTAL EVENT
INUNDATION EXTENT

Project Findings: Flooding in 2050

Road overtopping
during coastal
storm surge events

LEGEND:

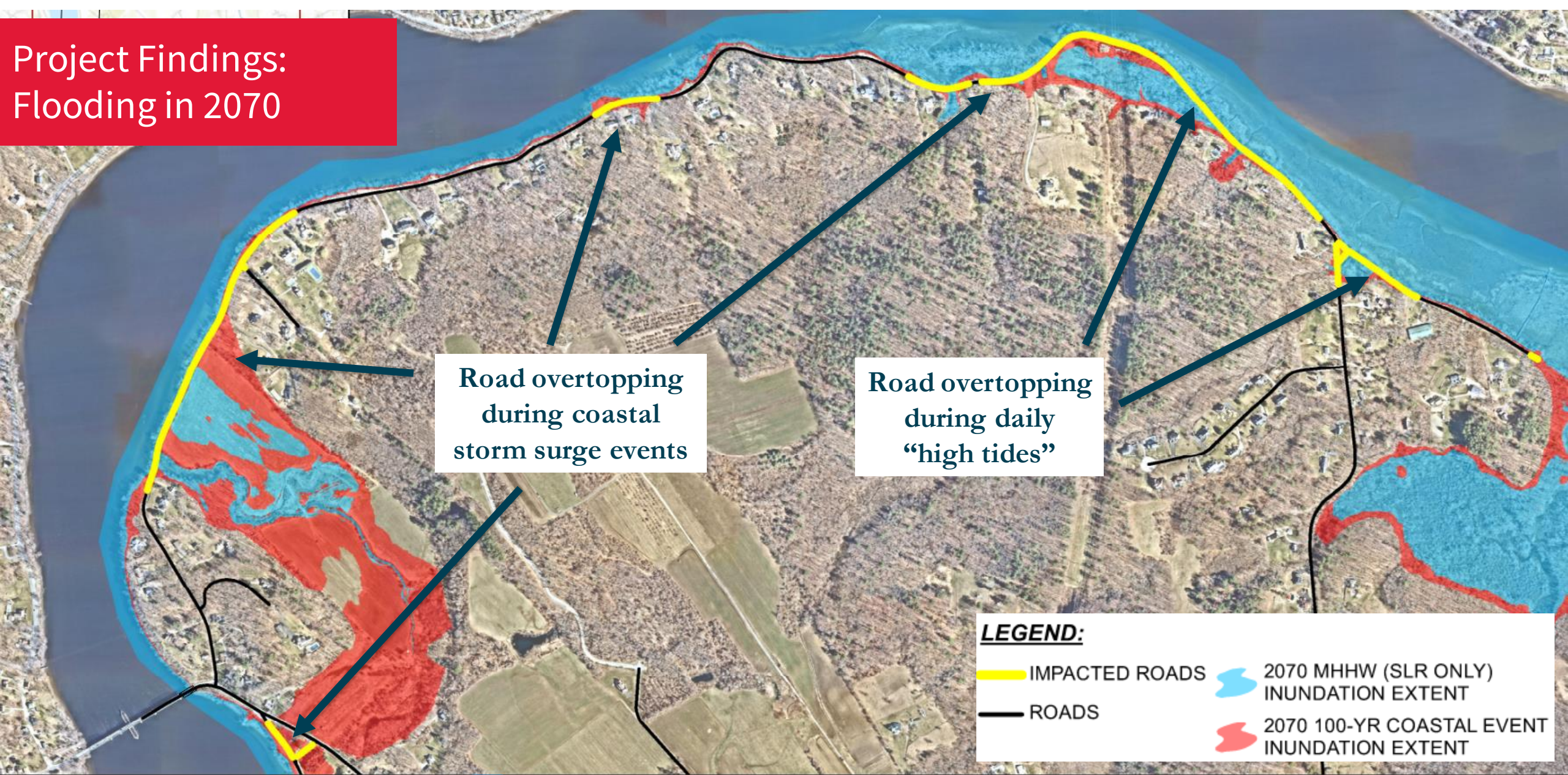
IMPACTED ROADS

ROADS

2050 MHHW (SLR ONLY)
INUNDATION EXTENT

2050 100-YR COASTAL EVENT
INUNDATION EXTENT

Project Findings: Flooding in 2070



Flooding in 2024... *so far*

But what has been happening this year??

January 2024:

- Coastal Storm Surge
- Higher Relative Sea Levels

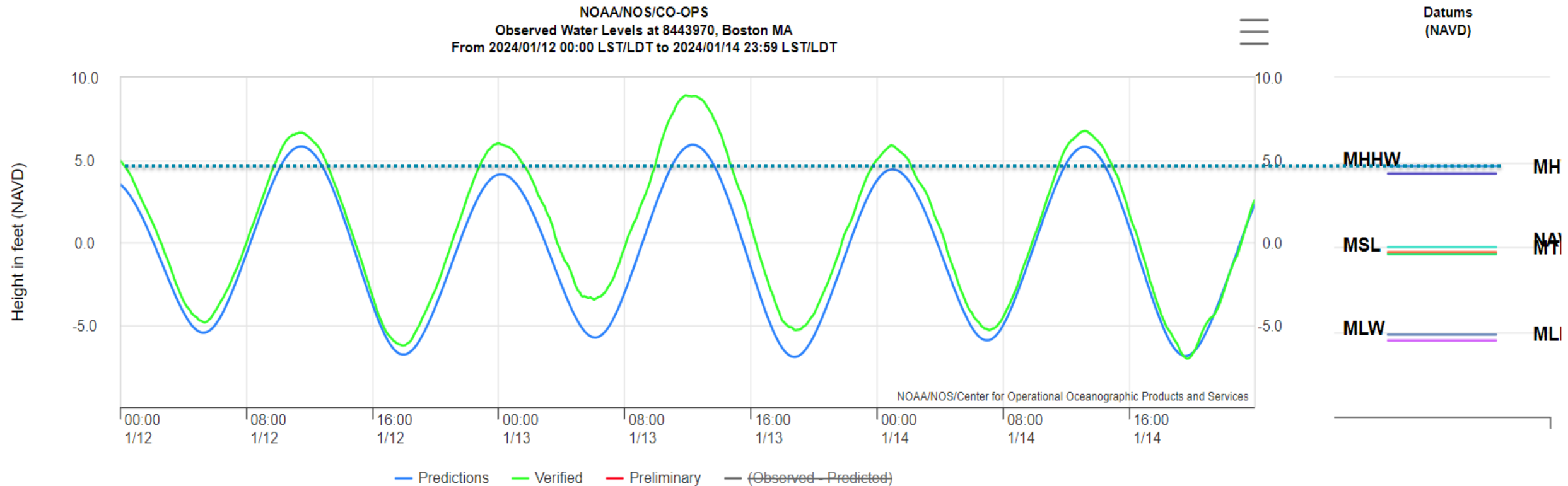


River Road – January 13th, 2024

Flooding in 2024... *so far*

January 2024: Coastal Storm Surge

- 4.1 ft above MHHW (“High Tide”)
- 0.5 ft below 100-yr surge



Flooding in 2024... *so far*

But what has been happening this year??

March 2024:

- Coastal Storm Surge
- Higher Relative Sea Levels

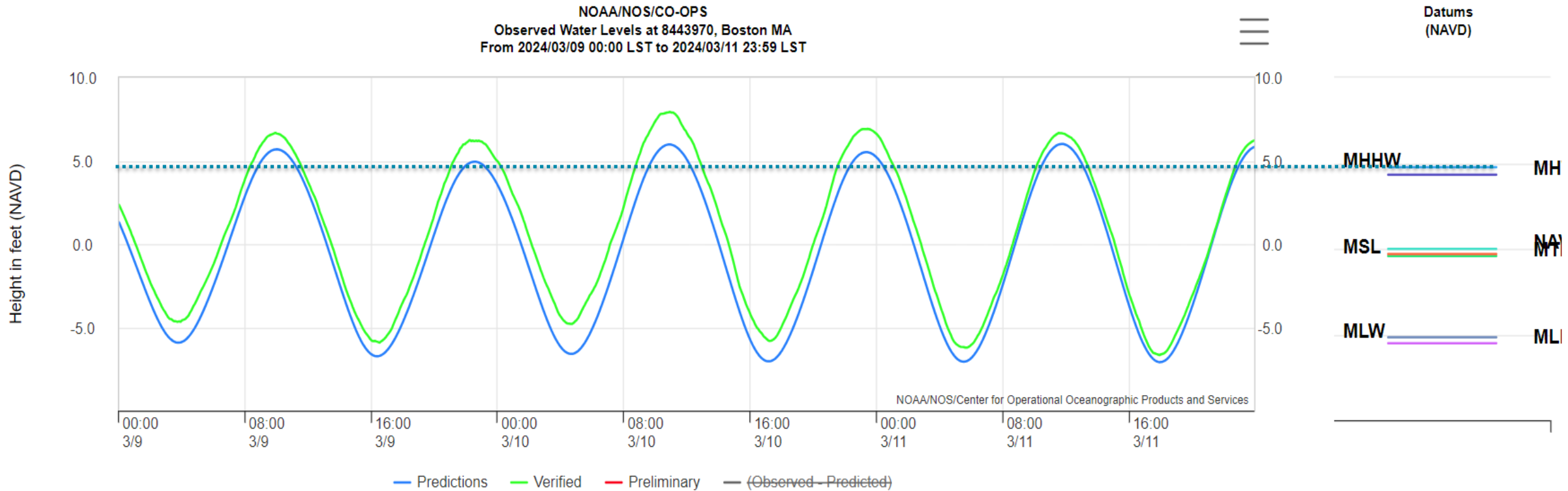


River Road - March 10th, 2024

Flooding in 2024... *so far*

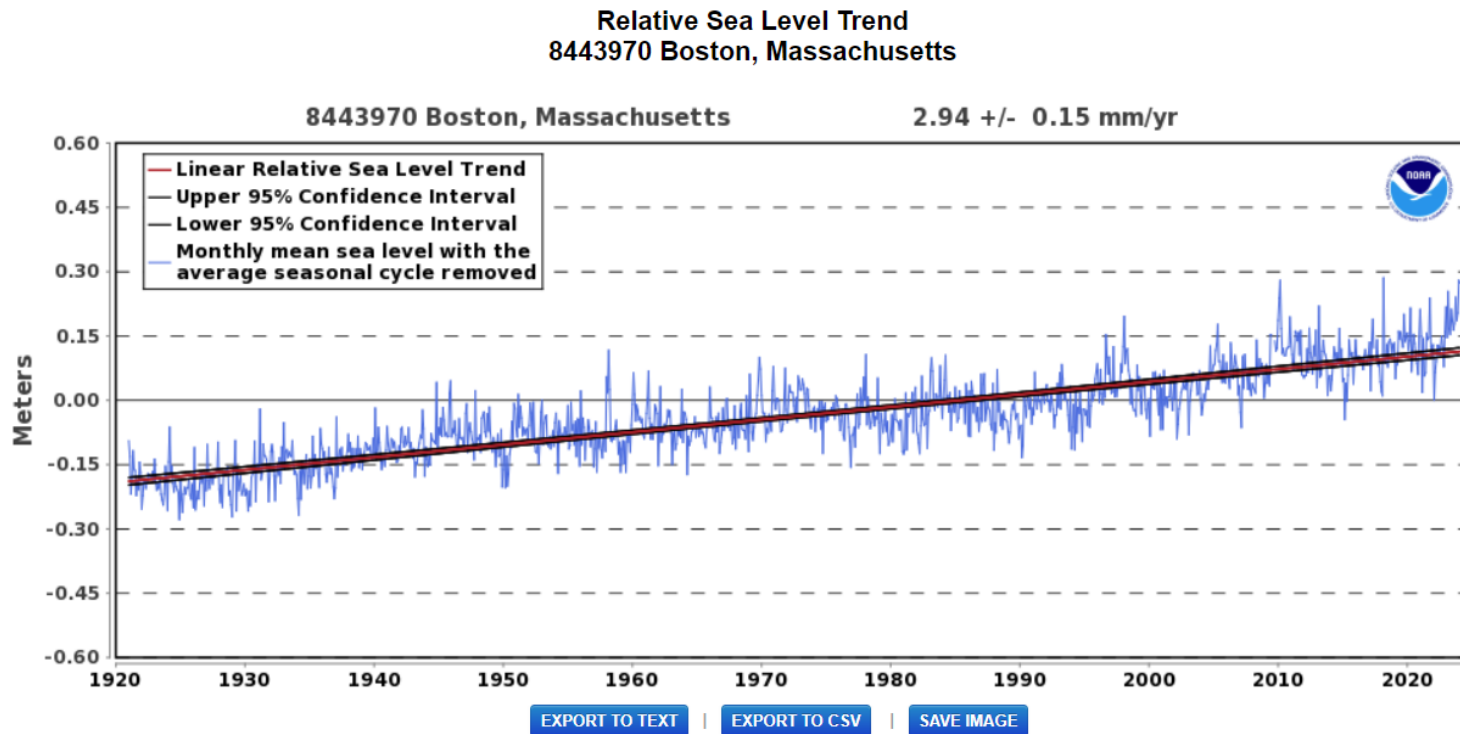
March 2024: Coastal Storm Surge

- 3.1 ft above MHHW (“High Tide”)
- 1.5 ft below 100-yr surge



Flooding in 2024... *so far*

Observed Higher Relative Sea Levels



The relative sea level trend is 2.94 millimeters/year with a 95% confidence interval of +/- 0.15 mm/yr based on monthly mean sea level data from 1921 to 2023 which is equivalent to a change of 0.96 feet in 100 years.

Variability in monthly mean sea levels across the years.

In 2024, January mean sea levels were highest on record (since 1912) in Portland, Maine.

Flooding in 2024... *so far*

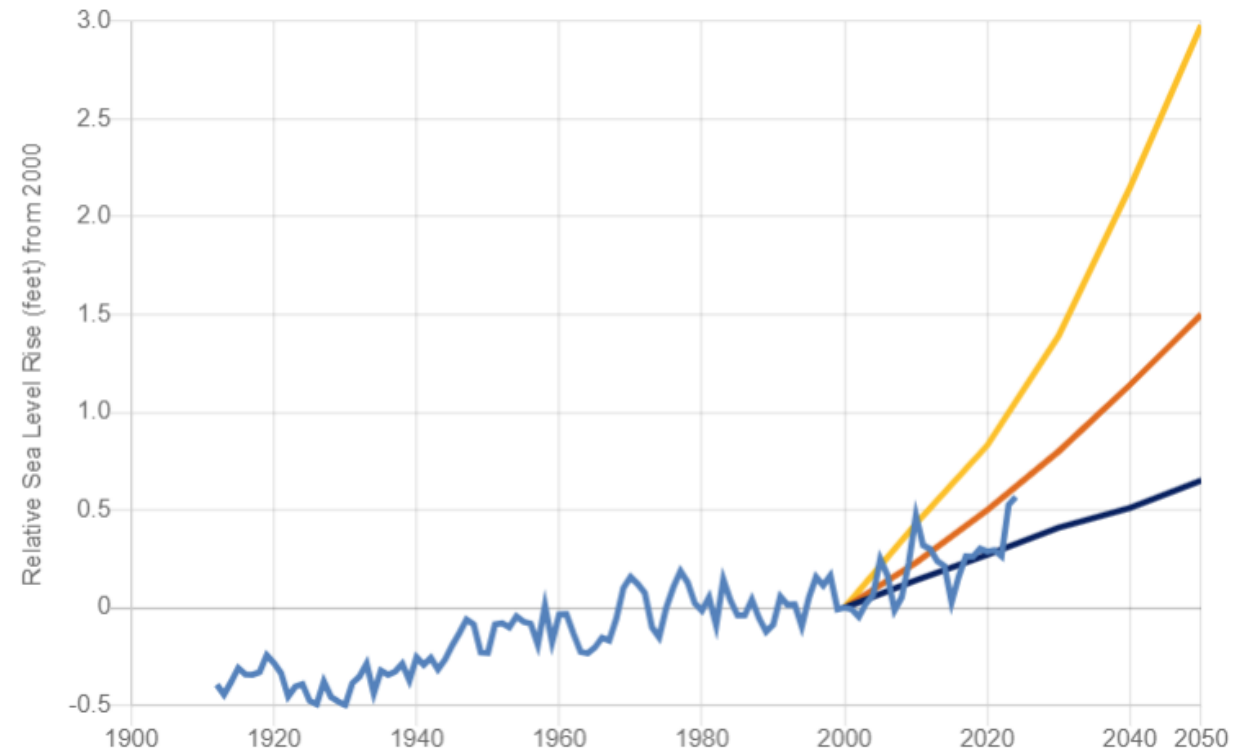
For a given year, mean sea levels can be higher than the predicted high or lower than the predicted low.

Plan for variability!

Observed Higher Relative Sea Levels

Annual Sea Levels Referenced to 2000, NOAA Station 8418150, Portland undefined

— = Low — = Intermediate — = High Scenarios
— = Long Term Data



NOTE: The intermediate scenario is the "commit to manage" and the high scenario is the "plan to prepare" level in the Maine Won't Wait Climate Plan. Low, Intermediate, and High scenarios are based on Sweet et al., 2017.

Adaptation Introduction

(a) No response



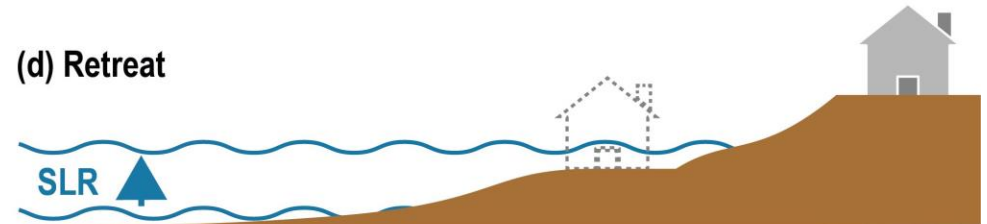
(b) Advance



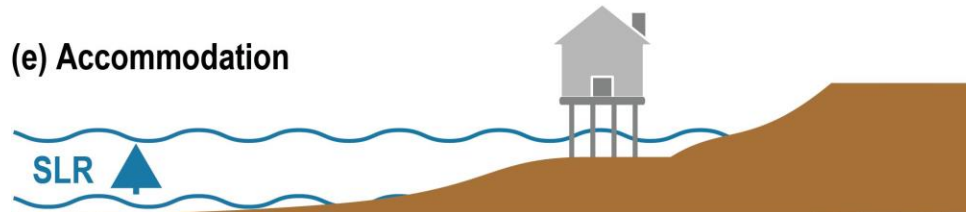
(c) Protection



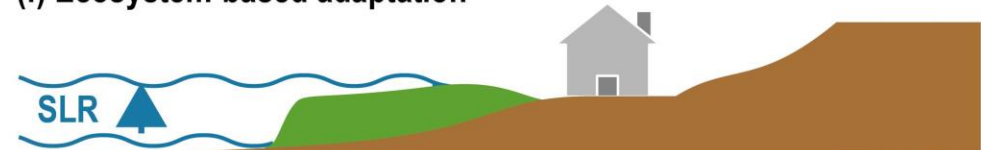
(d) Retreat



(e) Accommodation



(f) Ecosystem-based adaptation



From IPCC (2019) Chapter 4, Box 4.3, Fig. 1

Upcoming Community Events

- Kayak Tour – *June 12th (rain day June 13th)*
- Afternoon Community Site Visit - *June 20th*
- Evening Final Community Meeting - *June 20th*
- Project End - *June 30th*



Thank you!
Questions?



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