

# Sea Levels & High Tide Flooding Past and Future

SciLine Media Briefing  
May 15, 2023

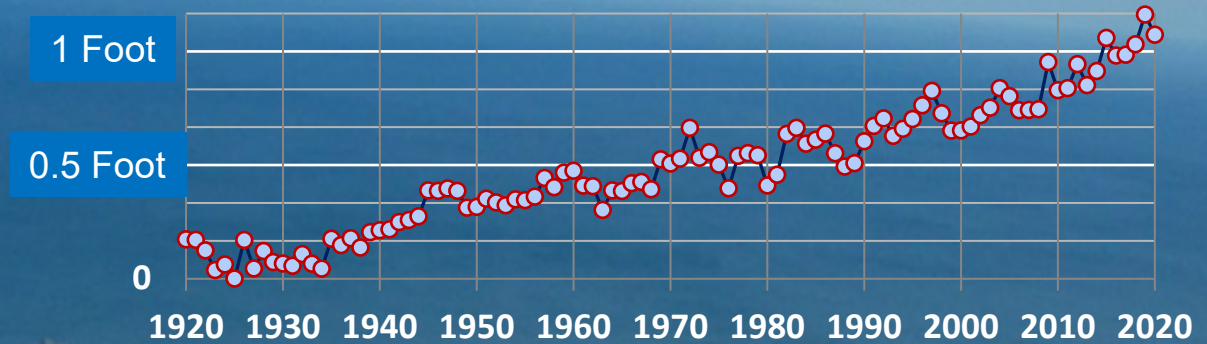
**William Sweet**  
National Oceanic and Atmospheric Administration



# Sea Level Rise

- About 1 foot of rise over the last 100 years along the US coastline
- The rate of rise has been accelerating over the last 50 years... **where is it headed?**

US Relative Sea Level Rise  
(average since 1920s)



# 2022 Interagency Sea Level Rise Report

- How much sea level rise should the U.S. expect by 2050?
- How much could sea levels rise by 2100 or 2150 (goalposts)?
- What is the risk of now and by 2050:
  - 2-foot (disruptive) flood
  - 3-foot (typically damaging) flood
  - 4-foot (often-destructive) flood

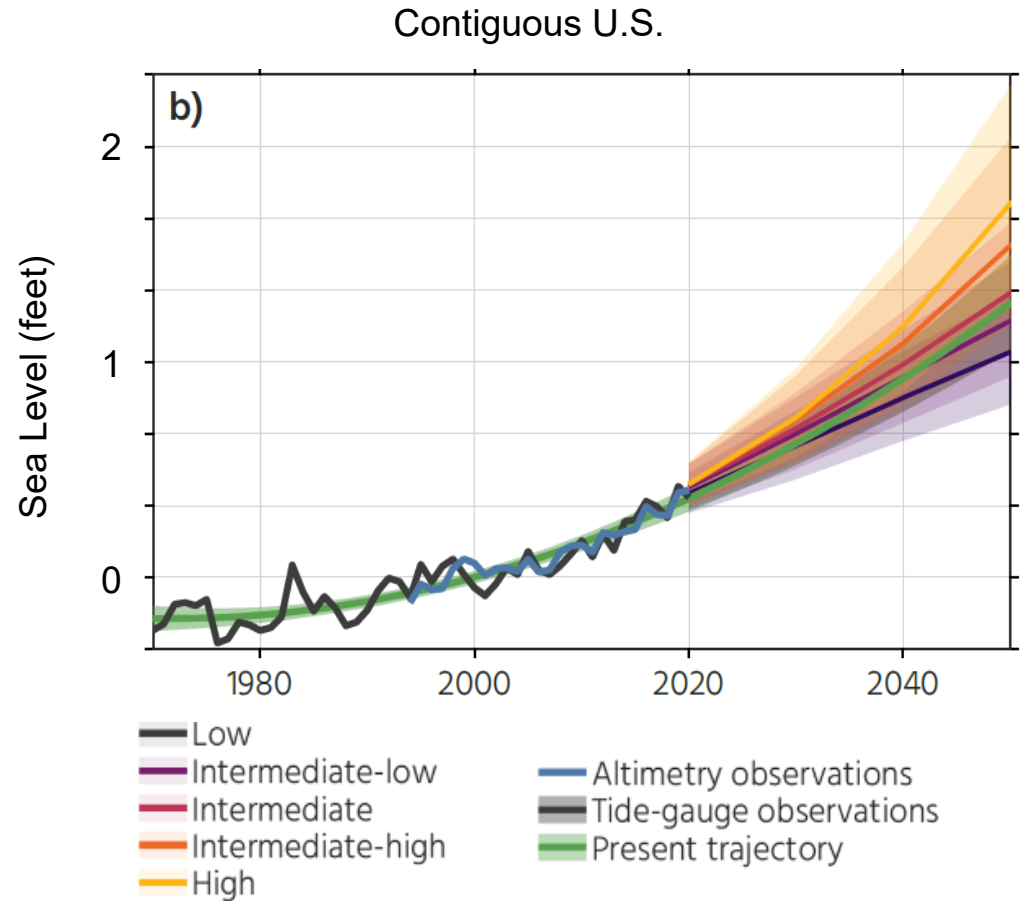
## Global and Regional Sea Level Rise Scenarios for the United States

William V. Sweet/NOAA, Benjamin D. Hamlington/NASA JPL, Robert E. Kopp/Rutgers, Christopher P. Weaver/EPA, Patrick L. Barnard/USGS David Bekaert/NASA JPL, William Brooks/NOAA, Michael Craghan/EPA, Gregory Dusek/NOAA, Thomas Frederikse/NASA JPL, Gregory Garner/Rutgers, Ayesha S. Genz/Uni of Hawaii, John P. Krasting/NOAA, Eric Larour/NASA JPL, Doug Marcy/NOAA, John J. Marra/NOAA, Jayantha Obeysekera/Florida International, Mark Osler/NOAA, Matthew Pendleton/NOAA, Daniel Roman/NOAA, Lauren Schmied/FEMA, Will Veatch/U.S. Army Corps of Engineers, Kathleen D. White/U.S. Department of Defense, Casey Zuzak/FEMA



# U.S. sea levels predicted to be 10-12 in. higher in the next 30 years (2020-2050)

- Equals rise from the past 100 years
- Observations agree with models
- Fairly tight range of rise by 2050 giving greater confidence of rise



# High Tide Flooding and Public Communication

(Minor flooding is about 2', moderate is 3' and major is 4' above high tide)

## A need to graduate flood heights within FEMA's coastal floodplain

Minor is usually only disruptive



- **Shallow flooding** in the most vulnerable locations near the waterfront and shoreline resulting in a **low threat of property damage.**

Moderate is typically damaging



- **Widespread flooding** of vulnerable areas will result in an **elevated threat of property damage.**

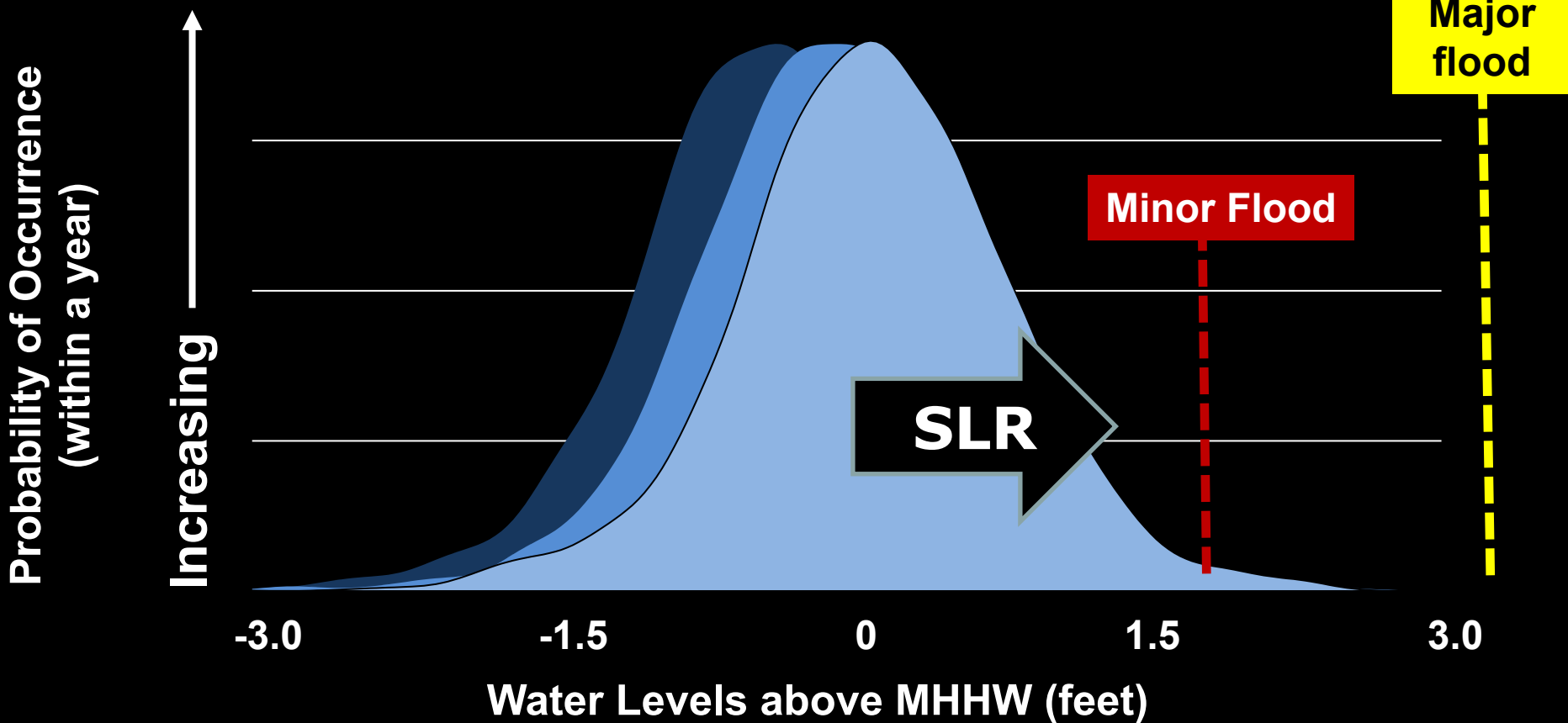
Major is often destructive



- **Severe flooding** will cause extensive inundation and flooding of numerous roads and buildings resulting in a **significant threat to property and life.**

# Daily Highest Water Levels at NOAA Tide Gauge NYC

■ 1941-1950   ■ 1971-1980   ■ 2001-2010

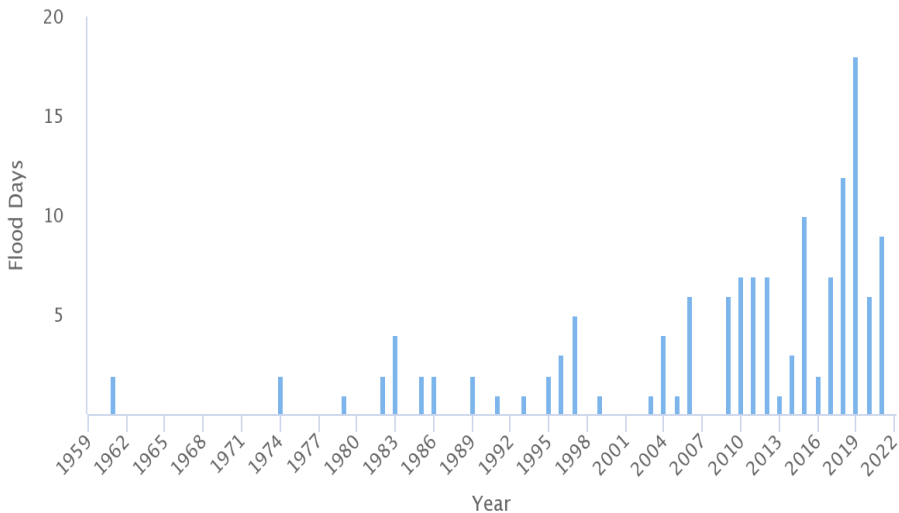


# High tide flooding from sea level rise is here and now

## NOAA Coastal Inundation Dashboard

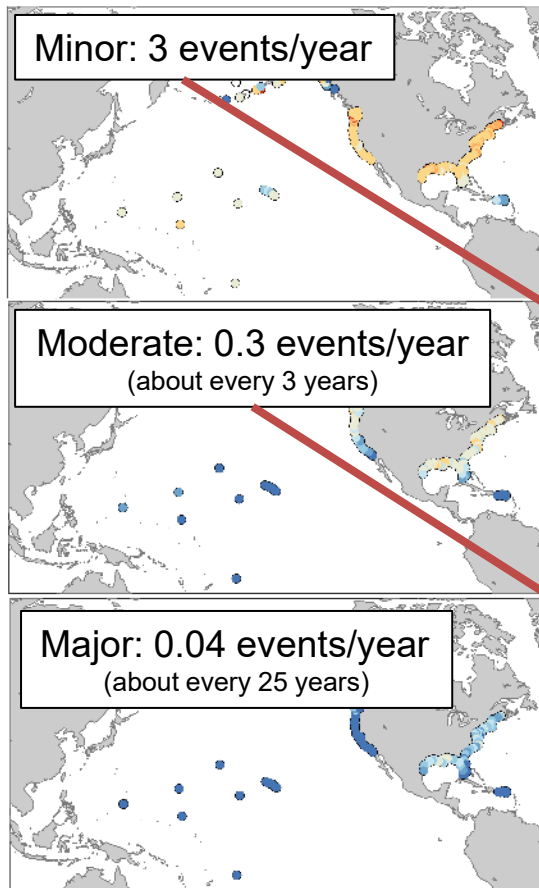
Minor: 2 feet above Average High Tide

1960-2021 Annual Flood Days 8575512, Annapolis MD

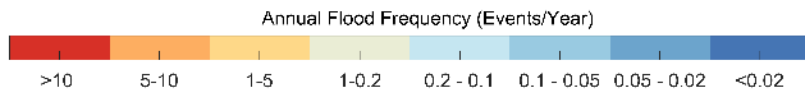
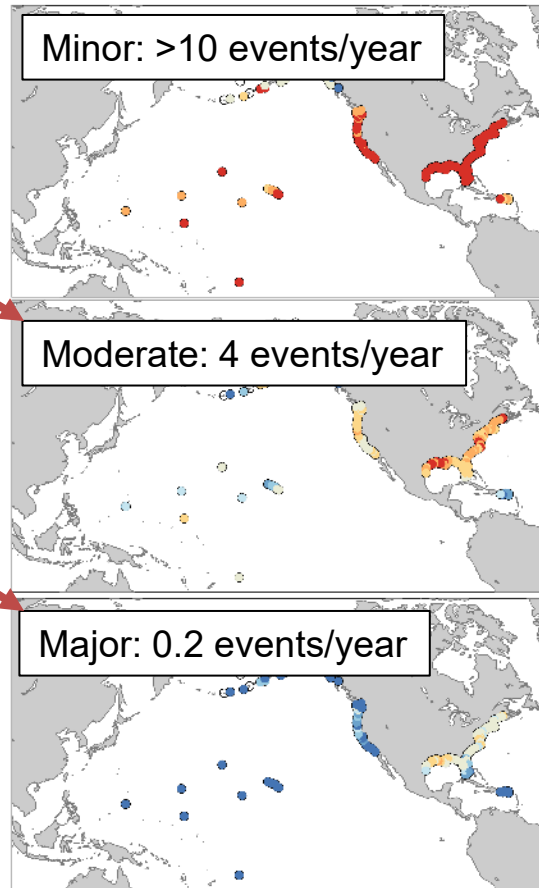


NOAA/NOS/Center for Operational Oceanographic Products and Services

## High Tide Flooding in 2020



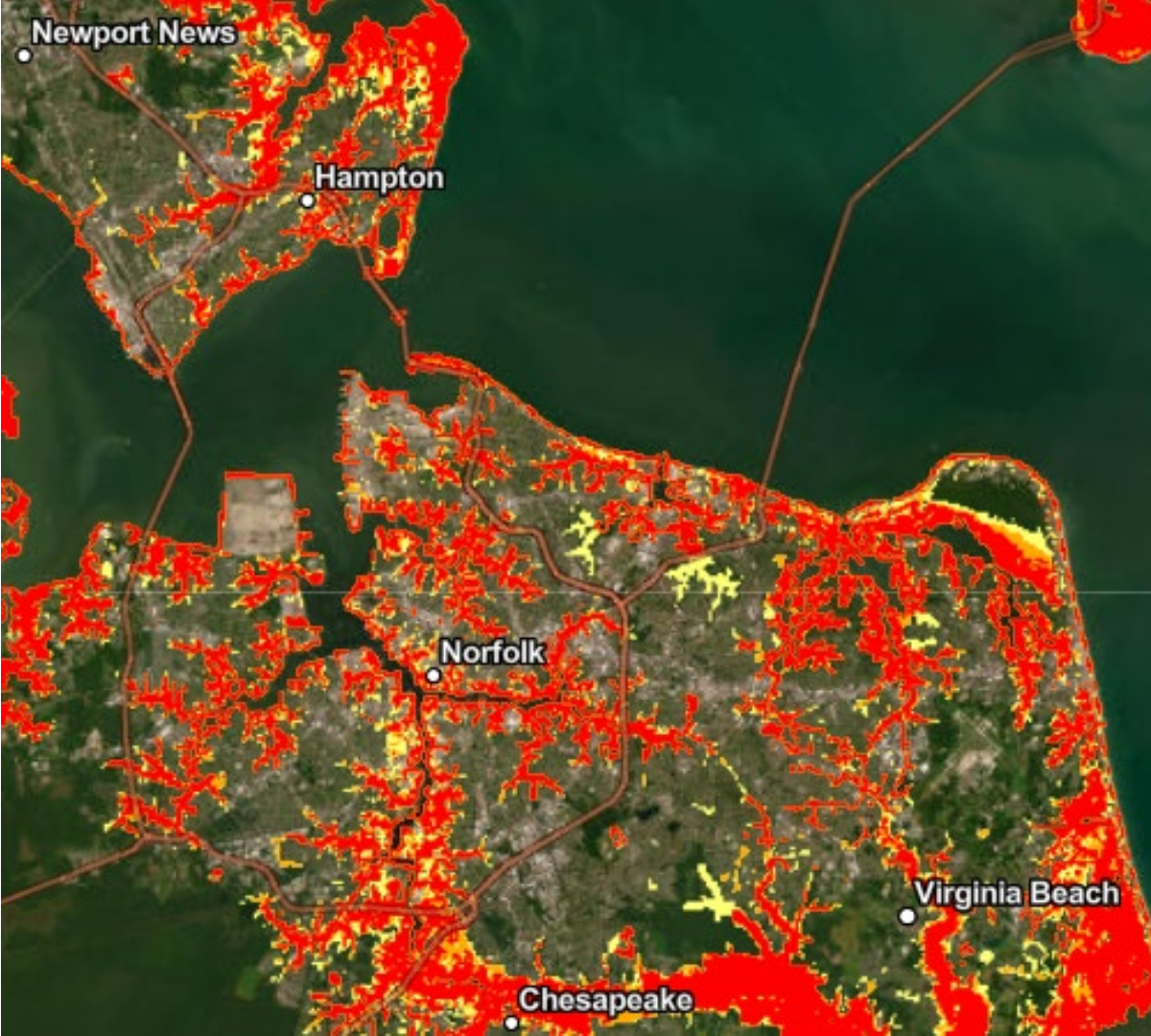
## High Tide Flooding by 2050



Considering the scenario aligned with the 'sea level rise trajectory':

In 2050, a flood regime shift:

- moderate flooding to occur more frequently than minor flooding occurs today.
- major flooding to occur slightly less than moderate flooding occurs today.



Annual Flood Frequencies in Norfolk region with 1 ft of SLR between 2020-2050:

In 2020:

- **Minor: 5 events/year**
- **Moderate: 1 event/year**
- **Major: 10-20% annual chance event**

By 2050:

- **Minor: 40-60 events/year**
- **Moderate: 5-10 events/year**
- **Major: 1 event/year**



“Moderate Level High Tide Flooding”  
in Norfolk, VA

Then (1990): Every 5 years

Now (2020): 1 event/year

Headlights (2050): 5-10 events/year

# Questions?

## William Sweet/NOAA

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**NOAA National Ocean Service**  
National Oceanic and Atmospheric Administration  
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## 2022 Sea Level Rise Technical Report

Updated projections available through 2150 for all U.S. coastal waters.

EARTHDATA

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## Interagency Sea Level Rise Scenario Tool

Interagency Sea Level Rise Scenario Tool

Provides projections for global, regional, and local sea level rise scenarios from 2020 to 2150, relative to a 2000 baseline. More

[View global projection](#)

[View regional projections](#)

DATA MAP OPTIONS

Details: 2150

Scenario: Intermediate

[UPDATE MAP](#)

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