



Informational Brief
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NOAA NOS CO-OPS
(aka Tides and Currents)
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Disclaimer: The views expressed in this slide show and during this presentation are mine. They do not represent the views of NOAA or my office.



Station 8413320 Bar Harbor, ME

Station 9759110 Magueyes Island PR

NOAA National Ocean Service Center for Operational Oceanographic Products and Services (CO-OPS)

Observing System Programs

National Water Level Observation Network (NWLON)

Physical Oceanographic Real-Time System (PORTS)
(30 Year Anniversary)

National Current Observation Program (NCOP)
(Current Predictions webpage)



Station 9414304 SF Bay Bridge Air
Gap



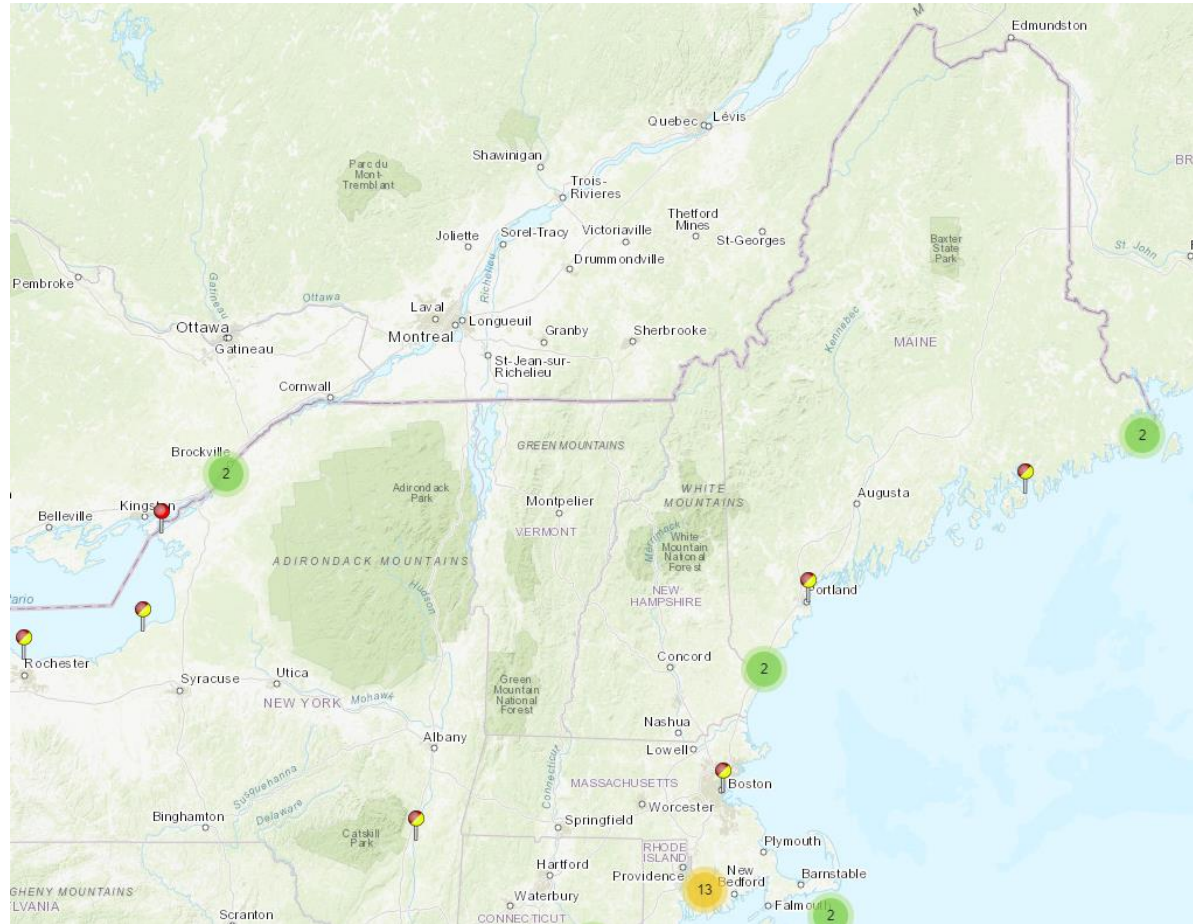
Sample CO-OPS Products:

[NOAA Tides and
Currents Webpage](#)

[Coastal Inundation
Dashboard](#)

[Sea Level Trends](#)

[Tsunami Stations](#)



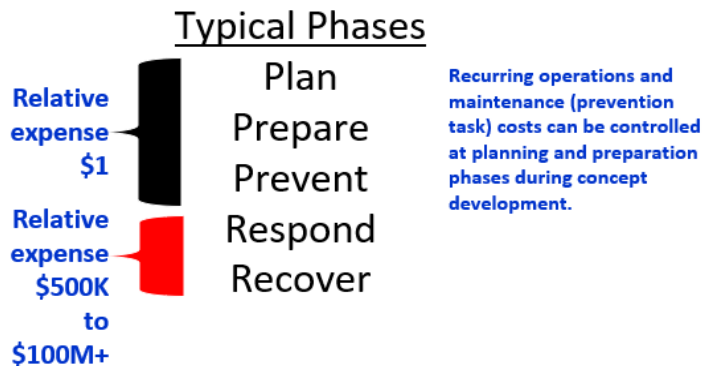
[National Tidal Datum Epoch just completed \(2002-2020\)](#) and [V DATUM Video](#)

An Engineering Method

Sustainability, Resilience, Survivability, & Total Cost of Ownership (beginning to end and restart)

Requirements determination starts at planning phase.

Focus
Analyze
Develop
Execute



- ❖ Define end goals
- ❖ Detailed Reconnaissance
- ❖ Review Local & Historical Resources, State & Local Codes & Waterfront knowledge
- ❖ ASCE/FEMA/USACE Pubs
- ❖ Coast Pilots
- ❖ Old and New charts
- ❖ Existing & Future Site Conditions (Civil, Bureaucratic, & Environmental)
- ❖ Total Life Cost
- ❖ Minimize O&M Costs
- ❖ Smallest payload
- ❖ MOUSE MOSS (Simple, Safe, Secure, Efficiency of Effort)
- ❖ Define & Plan for End of Service Life

Resources

ASCE/SEI *Minimum Design Loads and Associated Criteria for Buildings and Other Structures* ([ASCE/SEI 7-22](#))

[Applied Technology Council Hazards Design Loads GIS Tool](#)

[Maine Coastal Resilience](#) (southern), [Coastal Program](#), [DEP](#), [Coastal Program Strategic Outlook \(2021-2025\)](#), [Emergency Mgmt Agency](#), [climate plan](#) & [data](#)

[USACE Coastal Engineering Manual](#)

[FEMA Coastal Construction Manual](#)

ESRI GIS Web Tools

[FEMA Coastal Flood Risk](#), [Rockland FIRM](#), [Camden FIRM](#), & [Maine Floodplain Mapping Resources](#)

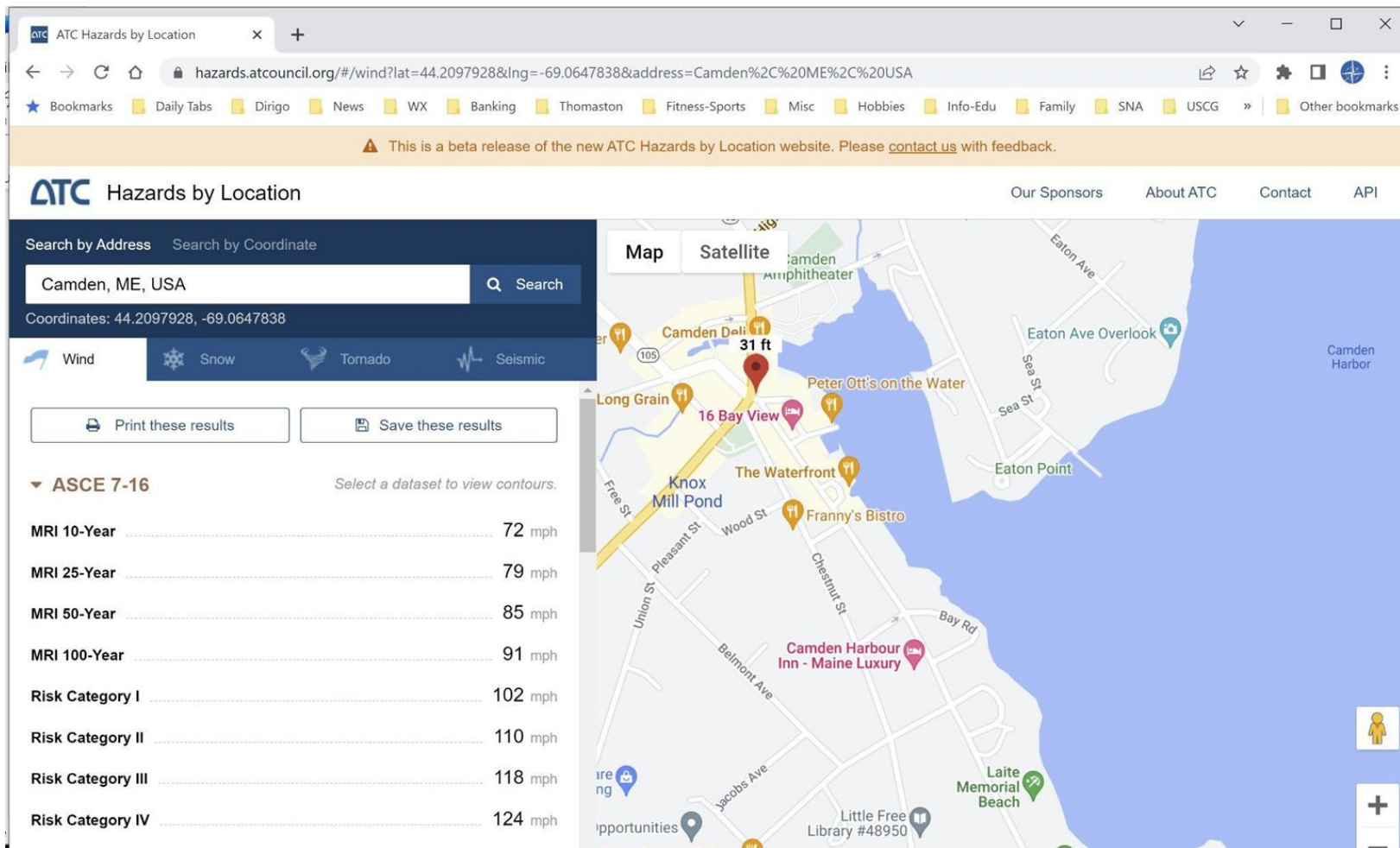
NGS Rockland ME CORS Site ID [MERO](#)

Local USACE District Command for list of coastal and navigation works underway.

[HURREVAC Climate Resilience Tool](#)

Town of Camden ME Flood Information Rate Map (FIRM)



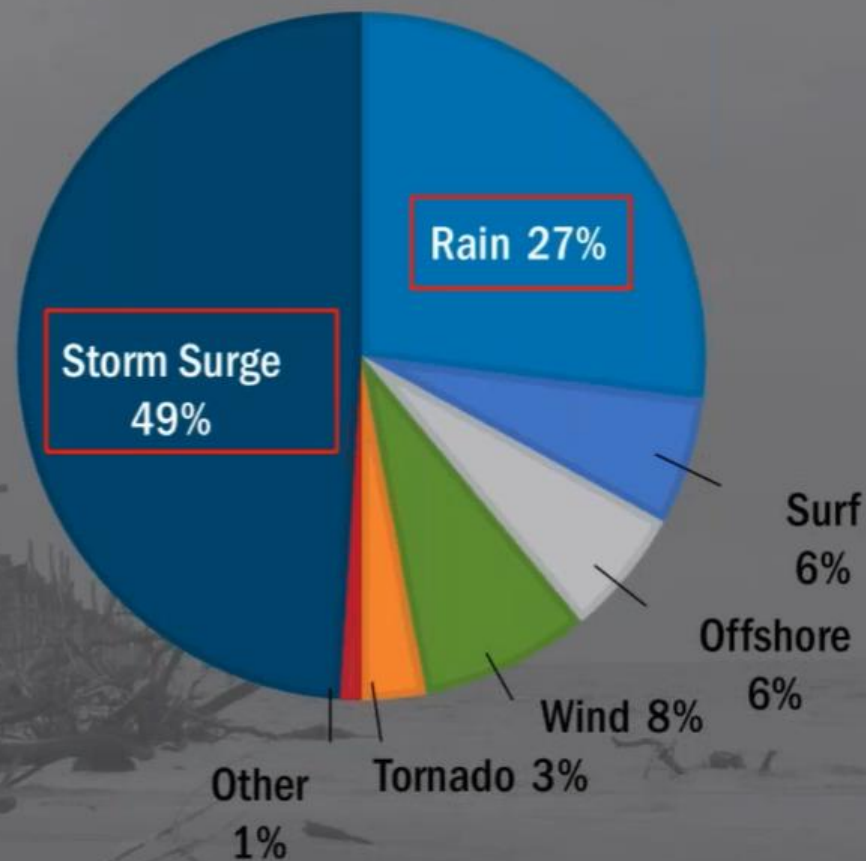


Risk categories explained in ASCE Pub 7 and [here](#).

US Tropical Cyclone Fatalities

(from 1963 to 2012)

References:
[Hurricane Readiness for Coastal Communities FEMA L0311 \(Slide 48/95\)](#)
[National Hurricane Preparedness Website](#)

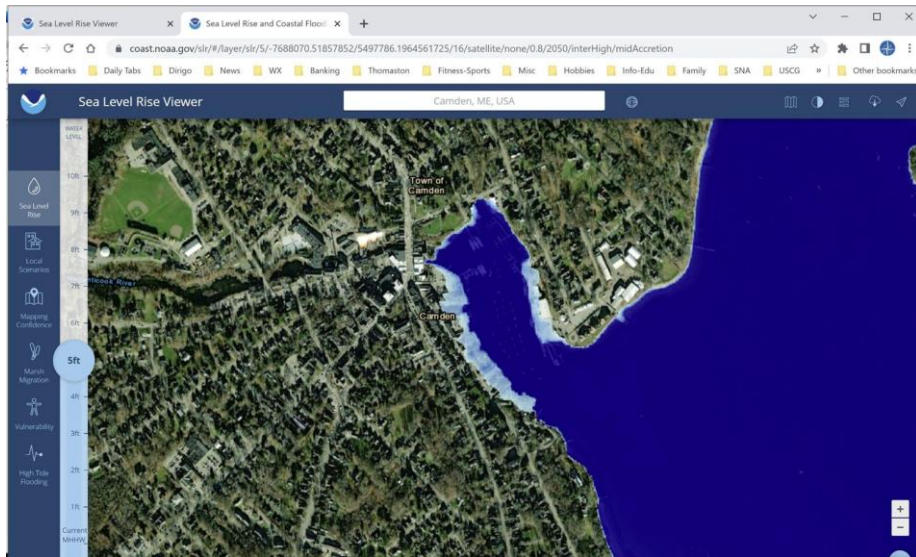




Factors Affecting Storm Surge

- **Intensity**
Stronger storm = More storm surge
- **Size (Radius of Maximum Winds)**
Larger = More storm surge
- **Forward Speed**
Slower storm = Storm surge farther inland
- **Width and Slope of Shelf (Bathymetry)**
Gradual sloping shelf = More storm surge
- **Angle of Approach**
Alters focus of storm surge

Sea Level Changes



Relative Sea Level Trends

NOAA Office of Coastal
Management (OCM) Digital
Coast

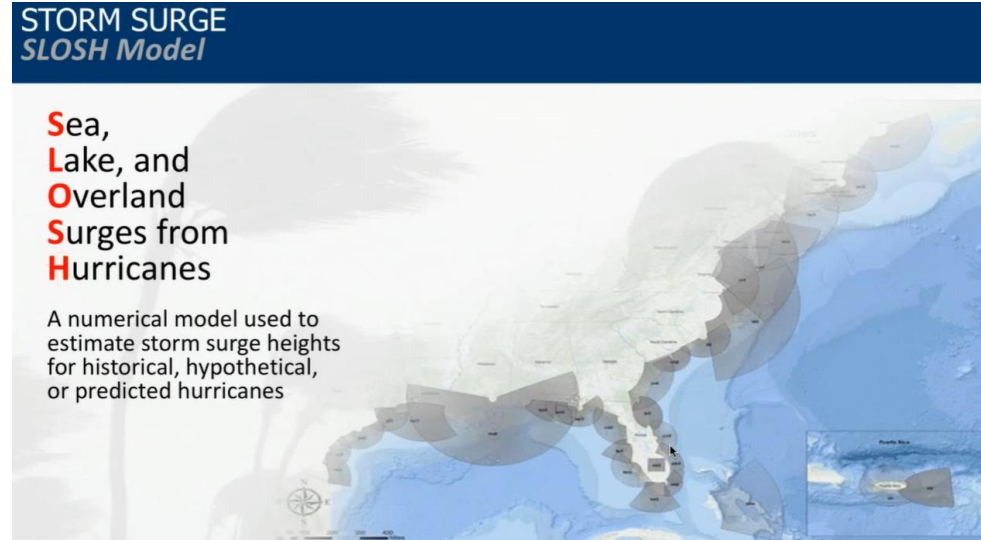
Sea Level Rise Viewer

Storm Specific Surge Modeling

Overview (Storm surge vs Storm Tide)

National Storm Surge Risk Maps - Version 2

MOMS (maximum of maximum) and MEOWS (**Maximum Envelope of Water (MEOW)**)



Open Forum Discussion

Disclaimer:

This presentation and any related discussions are for general information only. Detailed coastal engineering and coastal analysis specific to a site is required.

The final costs of any project will depend on actual labor and material costs, competitive market conditions, final project costs, implementation schedule, and other variable factors. The recent increases in material, labor, and logistics pricing may have a significant impact that is not predictable, and careful review or consideration must be used in evaluation of material prices.

Because of this, project feasibility and funding needs must be carefully reviewed prior to making specific financial decisions to help ensure proper project evaluation and adequate funding. Viewers of this presentation must consider these points when making financial decisions or commitments.

Back up material:

1. NOAA Organization

2. Recently restored stations. These station were destroyed by Hurricanes Harvey, Irma, and Maria in Sep 2017

NOAA Line Offices

National Environmental Satellite, Data, and Information Service (NESDIS)

National Marine Fisheries Service (NMFS)

National Ocean Service (NOS)

National Weather Service (NWS)

Office of Marine and Aviation Operations (OMAO)

Office of Oceanic and Atmospheric Research (OAR)



Western Hemisphere

GOES GeoColor Imagery of the Western Hemisphere and Pacific Ocean collected over the last 24-hours.

Sea Level Trends

The sea level trends measured by tide gauges that are presented here are local relative sea level (RSL) trends as opposed to the global sea level trend. Tide gauge measurements are made with respect to a local fixed reference on land. RSL is a combination of the sea level rise and the local vertical land motion. The global sea level trend has been recorded by satellite altimeters since 1992 and the latest global trend can be obtained from NOAA's Laboratory for Satellite Altimetry, with maps of the regional variation in the trend. The University of Colorado's Sea Level Research Group compares global sea level rates calculated by different research organizations and discusses some of the issues involved.



The map above illustrates relative sea level trends, with arrows representing the direction and magnitude of change. Click on an arrow to access additional information about that station.

Changes In Atmospheric Thirst From 1980-2020, Measured In Terms of Reference Evapotranspiration (Mm)

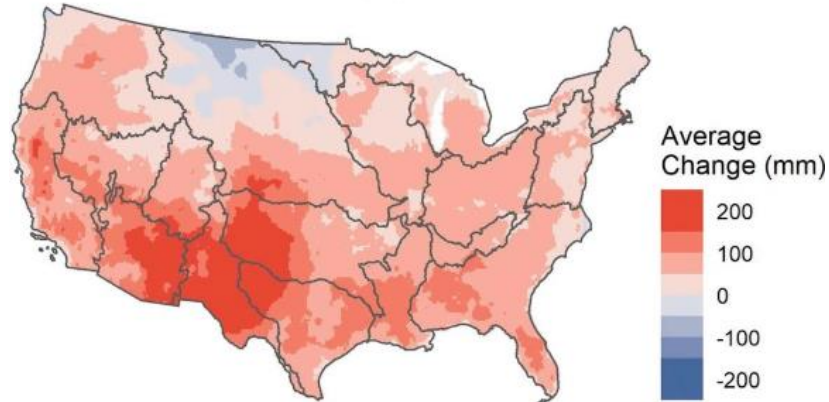


Figure 1. Changes in atmospheric thirst, measured in terms of reference evapotranspiration (mm), from 1980–2020. The largest changes are centered over the Rio Grande region of the southwestern U.S. Credit: Desert Research Institute.

Hurricanes Harvey, Maria, and Irma Recovery

Occurred between August and September 2017 causing \$2M in damage across 150 stations impacted..
National Hurricane Center websites: [Harvey](#), [Irma \(185 mph in PR\)](#), and [Maria \(175 mph in USVI\)](#).

Rockport, TX

Destroyed



Temporary



Rebuilt New



[New I-295 Jacksonville Ports](#)



Charlotte Amalie, St. Thomas, USVI

Destroyed (swept away)

Temporary at WICO

Rebuilt New at Cruise Ship Pier, WICO



(Port of) Mavaguez, PR (destroyed)

Site Destroyed

Temporary Station

Rebuilt New

