

# Tools and Products I - Federal Resources

**NOAA and USGS**

**Doug Marcy, David Wolcott, Laurie Hogan, Athena Clark**



Water Levels in the Southeast  
June 13-15, 2023

## National Weather Service Roles and Responsibilities

**Weather Forecast Offices** - Watches, Warning, Advisories for Coastal Flooding and other coastal forecasts (Rip Currents, Waves, etc), Flood Category Development, Coordination with Emergency Management, Data Ingest

- [Weather.gov](https://www.weather.gov), [weather.gov/erh/coastalflood](https://www.weather.gov/erh/coastalflood) (covers NC/SC coastline), [water.weather.gov](https://www.water.weather.gov) (*see me at breakout*)

**Regional HQ** - Policy, Training, Coordination with HQ, NOAA line offices, Modellers (NWS, NOS), Federal Agencies, Forecaster Tool Development

- Joint ER project with NOS - Potential Coastal Flood Extent Maps

**Headquarters** - National Level Policy, Service Transformation

**National Centers** - National Hurricane Center, National Water Center, Ocean Prediction Center, River Forecast Centers (riverine model guidance)



# Coastal Hazard Mapping (NWS Eastern Region)

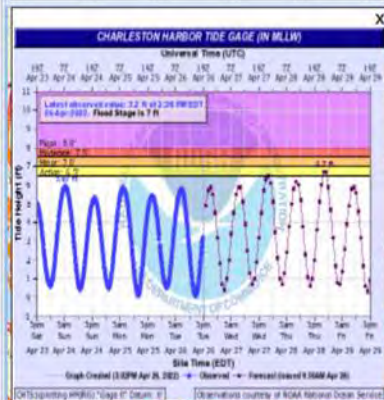


NATIONAL WEATHER SERVICE  
NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION

Local Forecast Offices A-K   Local Forecast Offices L-Z   River Forecast Centers   Center Weather Service Units   Regional HQ

Coastal Flood Threat Display   Selected View: Eastern Region Headquarters   Recorded Training   FAQs   Permalink

Coastal Hazard Map   Water Level Quicklook   Inundation and Impact Resources   Forecast Display



Coastal Hazard Overlays

Data Overlays

- Observed Wave Height
- Forecasts and Observations
  - Forecast and Observations available
  - Observations only
  - Forecast table only

Flood categories provided by NWS forecast tables below graphs - Select tide cycle in upper left.

- Major Flooding
- Hazardous Flooding
- Minor Flooding
- No Flooding
- No forecast this cycle

Forecast Overlays

- Wave Height (ft)
- Wind Speed (kts)
- Wind Gust (kts)

Experimental Potential Coastal Flood Extent Maps [\(How to use this information?\)](#)

- Low-lying Areas
- Minor Extent
- Moderate Extent
- Major Extent
- Major +1 Ft Extent
- Major +2 Ft Extent
- Major +3 Ft Extent

Opacity



[Product Description Document](#)

Provide feedback: [HERE](#)

[REST services](#)

**Note:**The potential coastal flood extent overlays illustrate the extent of potential stillwater flooding at a flood category threshold, not the depth. The layers do not account for the effects of wind, rainfall, wave action, erosion, subsidence, or future construction.

# Inundation and Impact Resources: FAQs / Disclaimer

weather.gov/bco/forecast?wfo=ERH&zoomLevel=12&centerLat=40.60704563563634&centerLng=-73.80152606806365#


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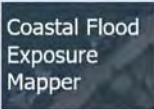
### Federal Inundation and Impact Resources




**FEMA Flood Maps**  
FEMA flood map service is the official public source for flood hazard information produced in support of the National Flood Insurance Program.



**NOAA Sea Level Rise Viewer**  
Provides depictions of sea level rise and potential coastal flooding impact areas.




**Coastal Flood Exposure Mapper**  
Helps to start your community discussions about hazard impacts with maps of your area that show people, places, and natural resources exposed to coastal flooding.



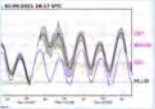
**NWS/OCM Minor, Moderate, Major Flood Threshold Maps**  
highlight flood-prone areas based on the NWS flood category thresholds

### Federal Coastal Flood Model Guidance

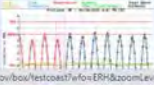
Note: Model guidance does not provide estimates of the entire water level at the coast. Actual water levels for a coastal flooding event may vary due to factors such as rainfall and wave action. Please see Coastal Hazard Map for official National Weather Service forecasts.



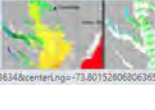
**ETSS Storm Surge Model**  
This product is experimental total water level model guidance for tide gauges. Water level guidance is for extra-tropical storms.



**PETSS Storm Surge Model**  
This product is experimental total water level probabilistic model guidance for tide gauges. Water level guidance is for extra-tropical storms.



**ESTOFS Storm Surge Model**  
This product is experimental total water level model guidance for tide gauges. Water level



**NOS Regional OFS Models**  
perform nowcast and short-term (0 hr - 48 hr.) forecast predictions of pertinent parameters (e.g., currents,

## FAQs:

### 1. To provide feedback on this website, you may send email to the following addresses:

Northern Maine - [canwebmaster@noaa.gov](mailto:canwebmaster@noaa.gov)  
 Southern Maine and New Hampshire - [gyx.webmaster@noaa.gov](mailto:gyx.webmaster@noaa.gov)  
 Massachusetts, Rhode Island - [box.webmaster@noaa.gov](mailto:box.webmaster@noaa.gov)  
 Connecticut, New York - [glx.webmaster@noaa.gov](mailto:glx.webmaster@noaa.gov)  
 New Jersey, Delaware - [nhl.webmaster@noaa.gov](mailto:nhl.webmaster@noaa.gov)  
 Eastern Chesapeake Coast, and Virginia - [als.webmaster@noaa.gov](mailto:als.webmaster@noaa.gov)  
 Western Chesapeake Coast, DC, and Virginia - [lwx.webmaster@noaa.gov](mailto:lwx.webmaster@noaa.gov)  
 Northern North Carolina Coastlines - [wxobs.nhxi@noaa.gov](mailto:wxobs.nhxi@noaa.gov)  
 Northern South Carolina and Southern North Carolina Coast - [fm.webmaster@noaa.gov](mailto:fm.webmaster@noaa.gov)  
 Northern Georgia and Southern South Carolina Coast - [mss.charleston@noaa.gov](mailto:mss.charleston@noaa.gov)

### 2. How are these forecasts made?

The forecaster uses computer model guidance, climatology, and bias calculations, along with their understanding of the complex interactions of tides, waves, weather, and water levels to make these forecasts.

### 3. Why are some locations always "grayed" out?

The colors indicate forecast flood categories for the chosen tide cycle (slider bar in upper left). The colors are dependent on the weather offices sending the "table" information below the hydrograph. For some locations the tables are not provided due to a variety of factors.

- Forecasting knowledge is still under development
- Occasionally, the forecast high tide time is already past the current time
- A few locations are considered "river forecasts" but are also tidal in nature, these locations will never have forecast tables

### 4. How were the Potential Coast Flood Extent Layers created?

The National Weather Forecast offices have created the impact-based flood categories for individual tide gauge locations in collaboration with local Emergency Managers and other local officials. The impact categories represent the threat to the community based on the flooding of roads, infrastructure, businesses and homes resulting in a threat to property and life. For the Potential Coast Flood Extent Layers, the NWS collaborated with the NOAA "Digital Coast" staff who are the agency experts in digital elevations and geospatial analysis methods. NOAA "Digital Coast" applied their methodologies of depicting inundation applying them to the NWS flood thresholds creating these potential flood impact layers.

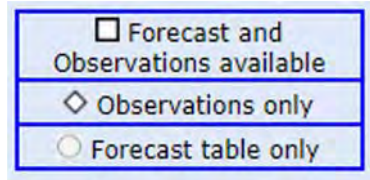
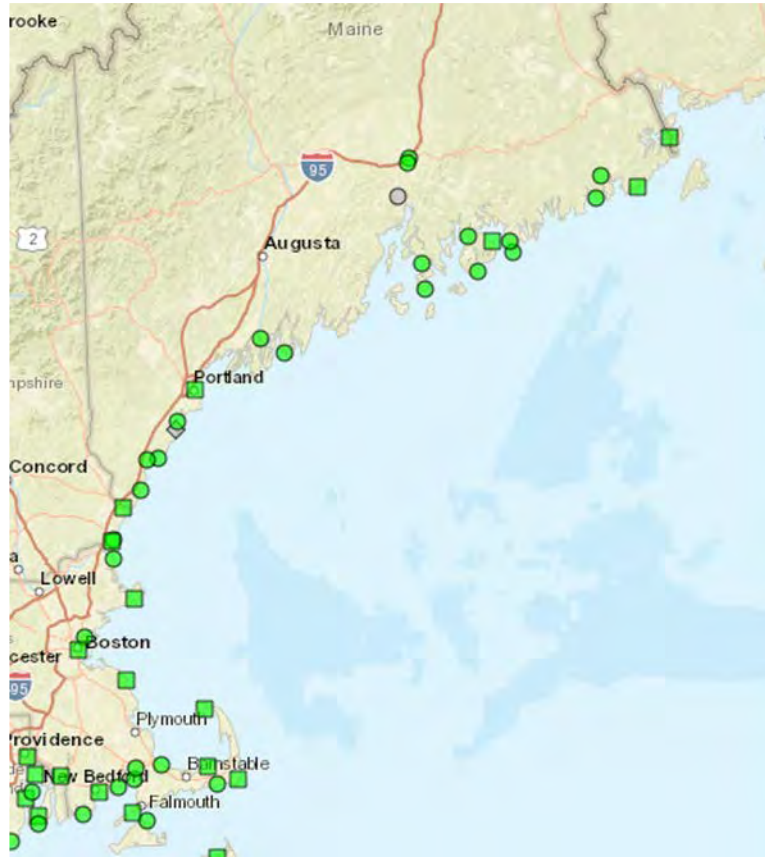
These flood category- based layers can be used in conjunction with NWS forecasts (either from coastal flood warnings and/or tide gauge forecasts from this web page). Note: The flood category thresholds and extent layers are representative of expected average of conditions based on the water level only. Other factors such as waves, winds, rainfall, and winterice conditions can create inland extents of flooding beyond what are depicted in these layers. The layers do not depict water depth.

**NOTE: For landfalling and near-shore tropical, subtropical, post-tropical systems occurring in the Atlantic Basin, use of these layers is not appropriate. Please refer to the [www.hurricanes.gov](http://www.hurricanes.gov) website throughout the tropical season, as well as the Potential Storm Surge Flooding Map and Peak Storm Surge Forecast graphic from NOAA's National Hurricane Center (NHC).**

**Note: The NWS has worked with local officials to determine flood thresholds along the east coast. These "Potential Coastal Flood Extent" overlays display potential flooding at the various thresholds. They can be used for scenario planning and risk assessment. The layers do not account for the effects of wind, rainfall, wave action, erosion, subsidence, or future construction and therefore are not an official forecast product.**

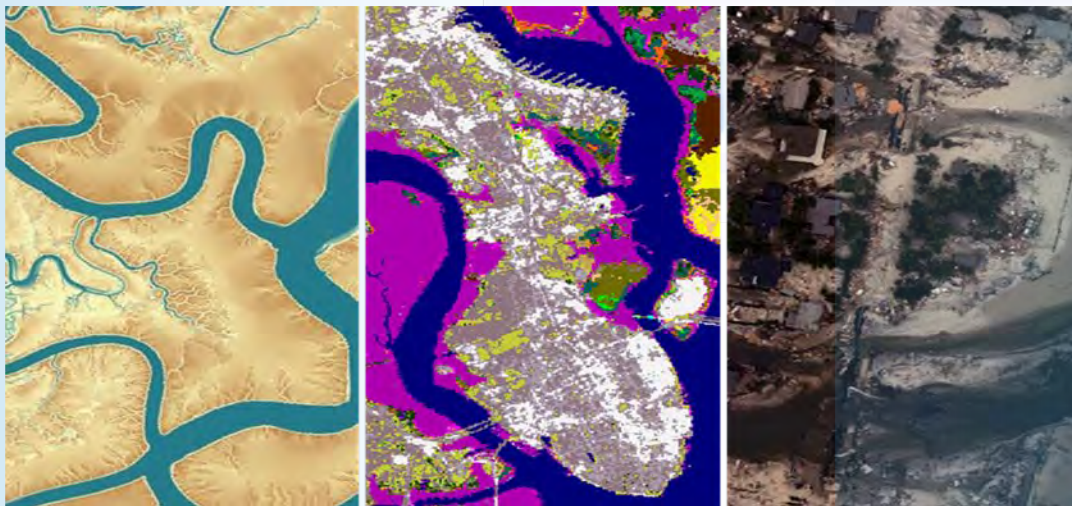


# Consideration for New Coastal Gauge Locations?



Contact Laurie Hogan Details:  
[laurie.hogan@noaa.gov](mailto:laurie.hogan@noaa.gov)

# Digital Coast DATA

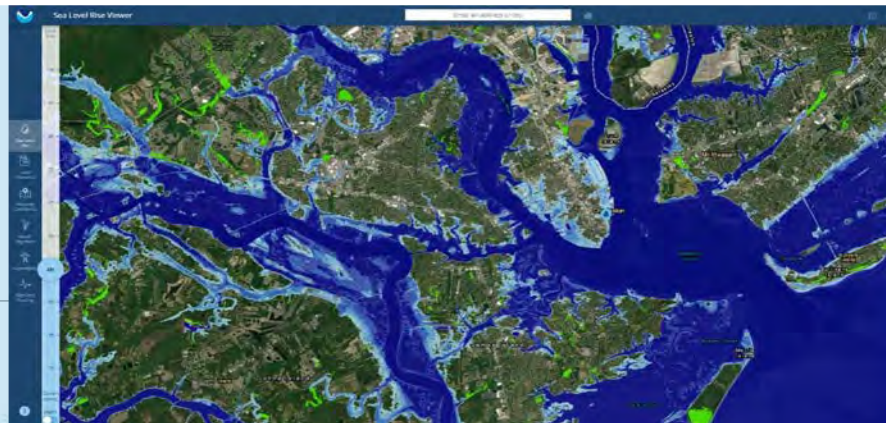


- 16 trillion lidar points, elevation data, land cover data, and 94 TB orthoimagery
- 200+ web mapping services
- National-level coastal data sets

## Digital Coast Tools

# Sea Level Rise Viewer

- Local sea level rise projections
- Data that integrates
  - Marsh migration
  - High-tide flooding
  - Socioeconomic impacts
  - Mapping confidence
  - Impact Visualizations

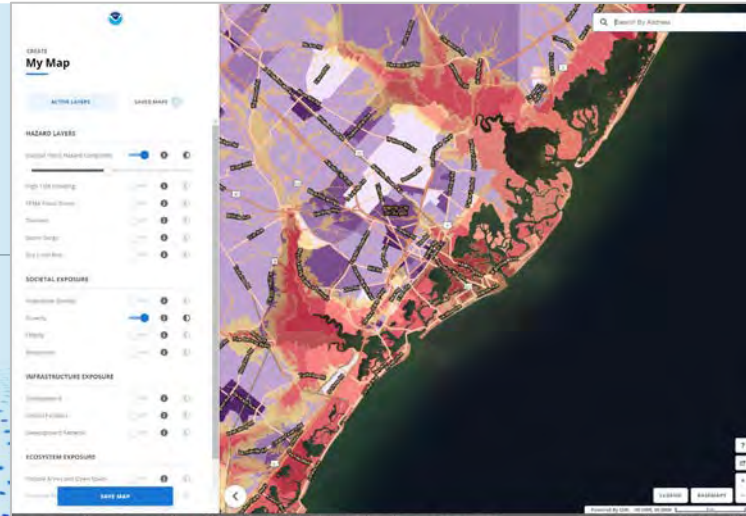


**All data publicly available for download**  
[coast.noaa.gov/slr](https://coast.noaa.gov/slr)

## Digital Coast Tools

# Coastal Flood Exposure Mapper

- Maps show people, places, and natural resources exposed to coastal flooding
- Community-based approach for assessing coastal hazard risks and vulnerabilities





# Adapting Stormwater Management for Coastal Floods

The screenshot shows the NOAA website interface for 'Adapting Stormwater Management for Coastal Floods'. The page features a NOAA logo in the top left corner. The main heading is 'Adapting Stormwater Management for Coastal Floods'. Below the heading, there is a sub-heading: 'Communities can use this website to determine how the flooding of today and tomorrow can affect their stormwater systems, and generate reports that can be used to:'. This is followed by two bullet points: '• Display local information about the current and future flooding impacts' and '• Inform planning efforts'. Below this text is a four-step process: 1. UNDERSTAND (Learn more about coastal flooding and sea level rise), 2. ASSESS (Calculate current and future coastal flood frequency and impacts), 3. ANALYZE (Determine if, when, and how your stormwater system will be impacted), and 4. TAKE ACTION (Learn different ways to mitigate flooding issues). Each step has a corresponding icon and a button. On the right side of the page, there is a diagram illustrating coastal flooding. The diagram shows a cross-section of a coastal area with a house and a car. A 'Tidal Flap Valve' is shown in the ground. Three vertical lines indicate different elevation levels: 'Coastal Total Water Level' (the highest), 'Outfall Elevation' (the middle), and 'Lowest Coastal Facing Elevation' (the lowest). A 'Lowest Street Elevation' is also indicated, showing the ground level relative to the water level.

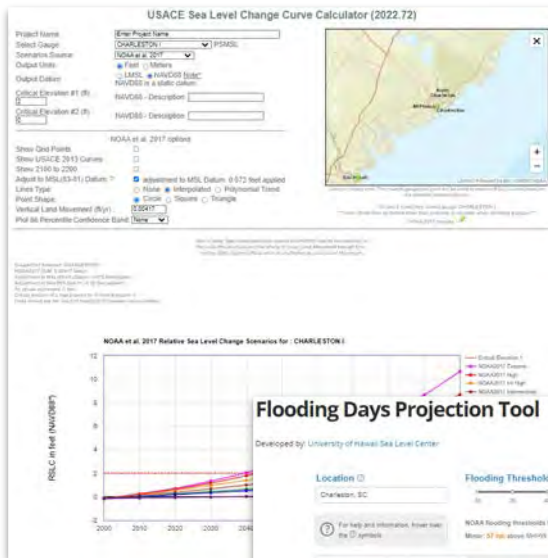
Provides information, tools, methods to examine:

- flooding from coastal inundation
- impacts on community-level stormwater issues
- when and where users might expect to see impacts
- what communities can do about it

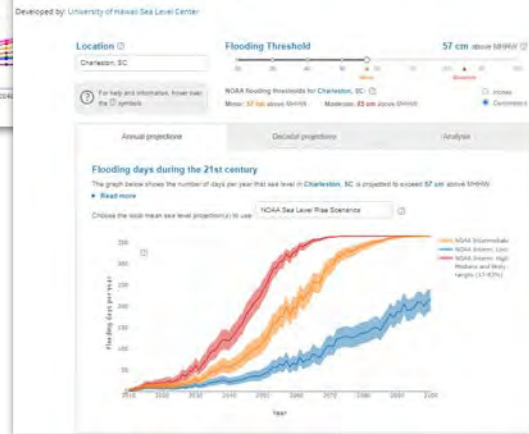
<https://coast.noaa.gov/stormwater-floods/>

# Water Level Calculator

- Scoping this year, development in '24 and '25
- Based on user needs assessments
- Interagency coordination
- Multiple authoritative sources
  - Historical Trends
  - Return Periods
  - Critical Thresholds
  - Probabilities
  - Uncertainty
  - Frequency/duration
  - Scenarios



## Flooding Days Projection Tool

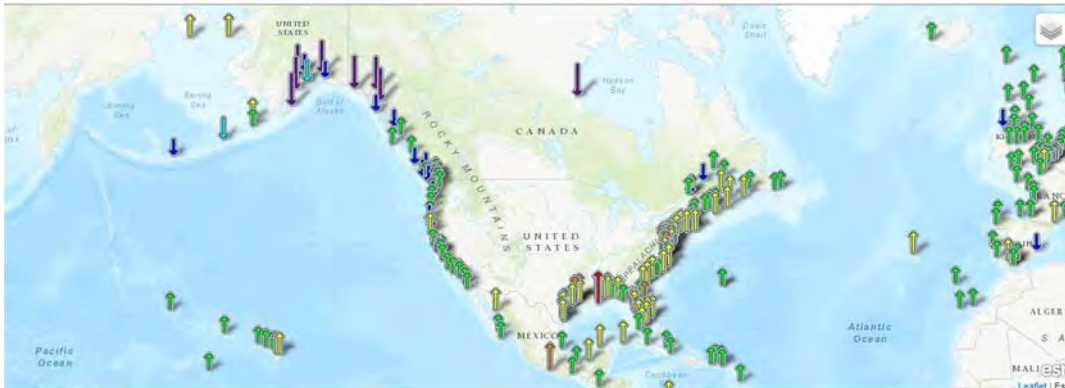


# Legacy climate products - Sea Level Trends

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CO-OPS publishes linear sea level trends at over 143 US locations (over 10,000 station years of data).

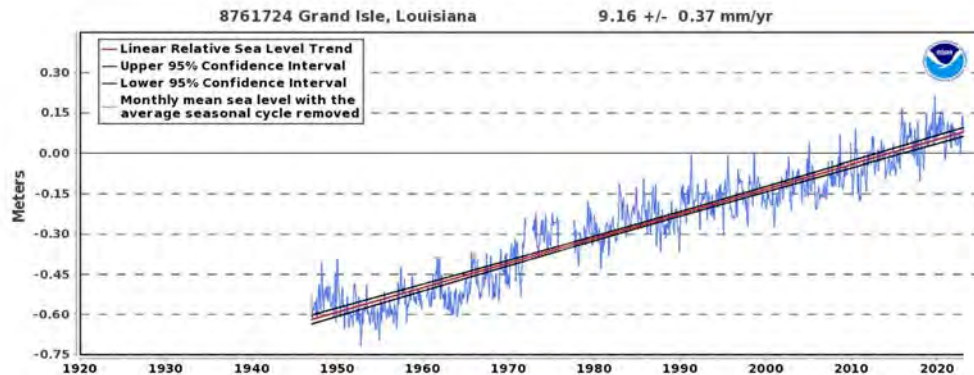
Approach: generally at least 30 years of data to get 95% CIs to within 1.5mm/yr using an AutoRegressiveIntegratedMovingAverage (ARIMA) method that solves for interannual variation, seasonal cycles and the trend at the same time.



This is an inherently backward-looking statistical product. It is not a projection and does not correct for changes in GHG emissions, ice melt, thermal expansion, vertical land motion, etc.

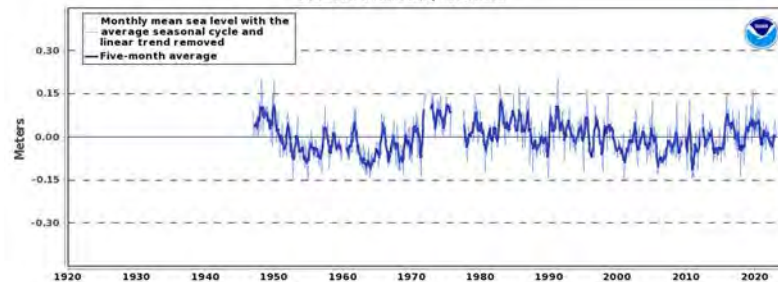
# Legacy products - Sea Level trends

Relative Sea Level Trend  
8761724 Grand Isle, Louisiana

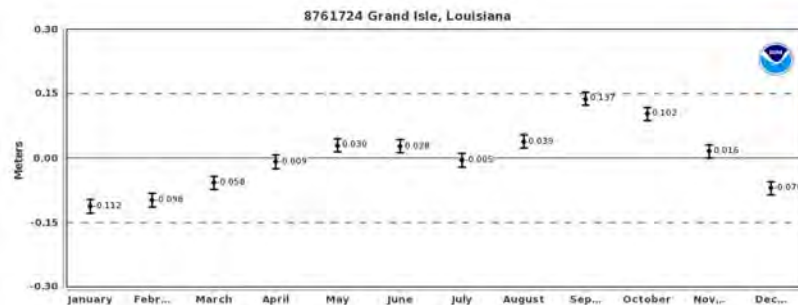


- Linear trends in mm/yr with 95% CI values
- Interannual variation with the trend removed
- Contributing average seasonal cycle by month

Interannual Variation  
8761724 Grand Isle, Louisiana



Average Seasonal Cycle  
8761724 Grand Isle, Louisiana



# Legacy product - Extreme Water Levels (EWL)

## Extreme Water Levels

East Coast West Coast Gulf Coast Alaska Hawaii



Please click on an arrow to access information about that station.

### 1% Annual Exceedance Probability Level

0.0-0.6 (0-2) 0.6-1.2 (2-4) 1.2-1.8 (4-6) 1.8-2.4 (6-8) 2.4-3.0 (8-10) >3.0 (>10)

Meters (feet) above Mean Higher High Water

Based on stations with at least 30 years of data

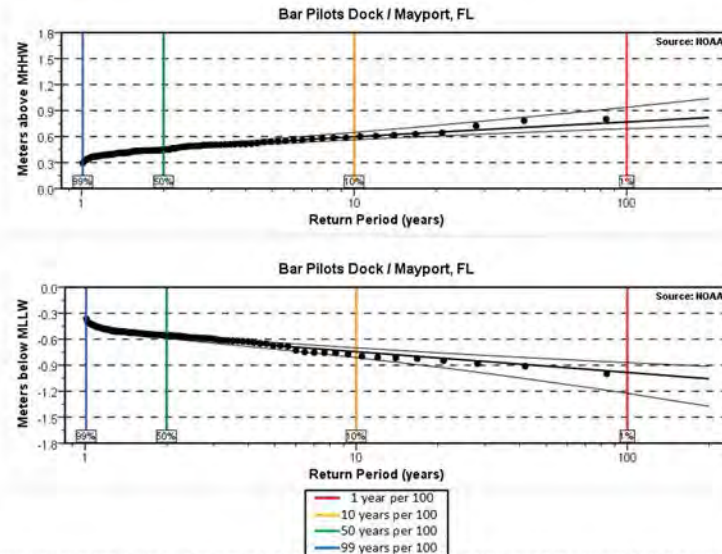
Block max Generalized Extreme Value approach using annual maximum water levels.

Highlights the 1%, 10%, 50%, 99% exceedance probabilities

# Legacy Products - EWL

## Annual Exceedance Probability Curves 8720218 Mayport (Bar Pilots Dock), FL

The annual exceedance probability curves with 95% confidence intervals shown below indicate the highest and lowest water levels as a function of return period in years. The dots indicate the annual highest or lowest water levels after the Mean Sea Level trend was removed, which were used to calculate the curves. The levels are in meters relative to the Mean Higher High Water (MHHW) or Mean Lower Low Water (MLLW) datums established by CO-OPS (1 foot = 0.3 meters). The horizontal position of the rightmost dot indicates the number of years of data used in the calculation.



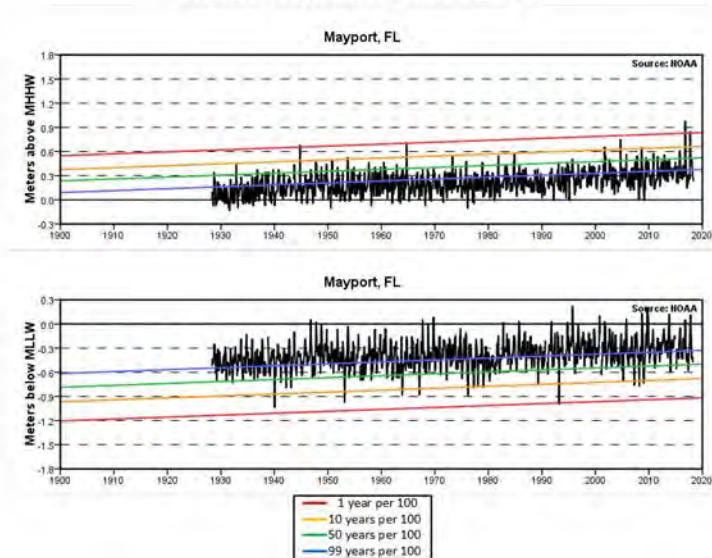
The 1% annual exceedance probability levels are 0.77 meters (2.53 feet) above Mean Higher High Water and 0.98 meters (3.22 feet) below Mean Lower Low Water.

Return interval  
(relative to MHHW)  
vs return period

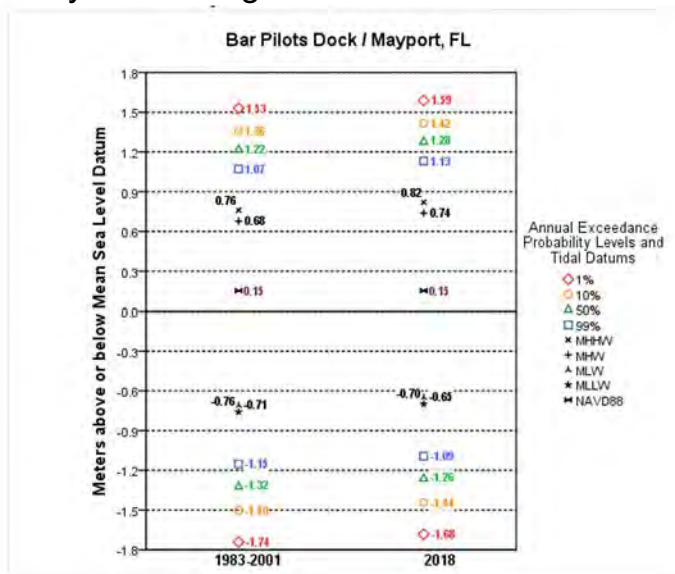
Both extreme high  
waters and extreme  
low waters.

# Legacy Products - Extreme Water Levels

Extreme Water Levels  
8720218 Mayport (Bar Pilots Dock), FL



The extreme levels follow sea level trends. This product will be updated to incorporate the interagency sea level report projections so that a user can see what the 1% storm levels would look like at some future year utilizing a scenario.



# Interagency Sea Level Rise Report

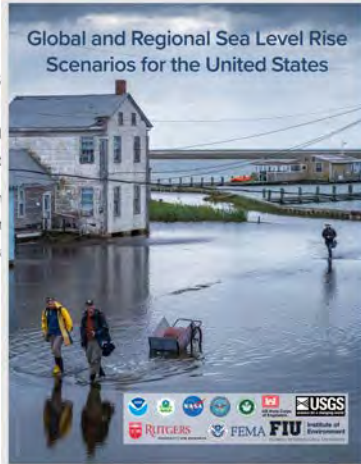
## 2022 Sea Level Rise Technical Report

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



- Establishes sea level projections at stations around the country based on different scenarios of driving processes (ice melt, vertical land motion, thermal expansion, etc. )
- Gridded projections available via CO-OPS API
- Will be incorporated into legacy products that are impacted by sea level change

The S  
most  
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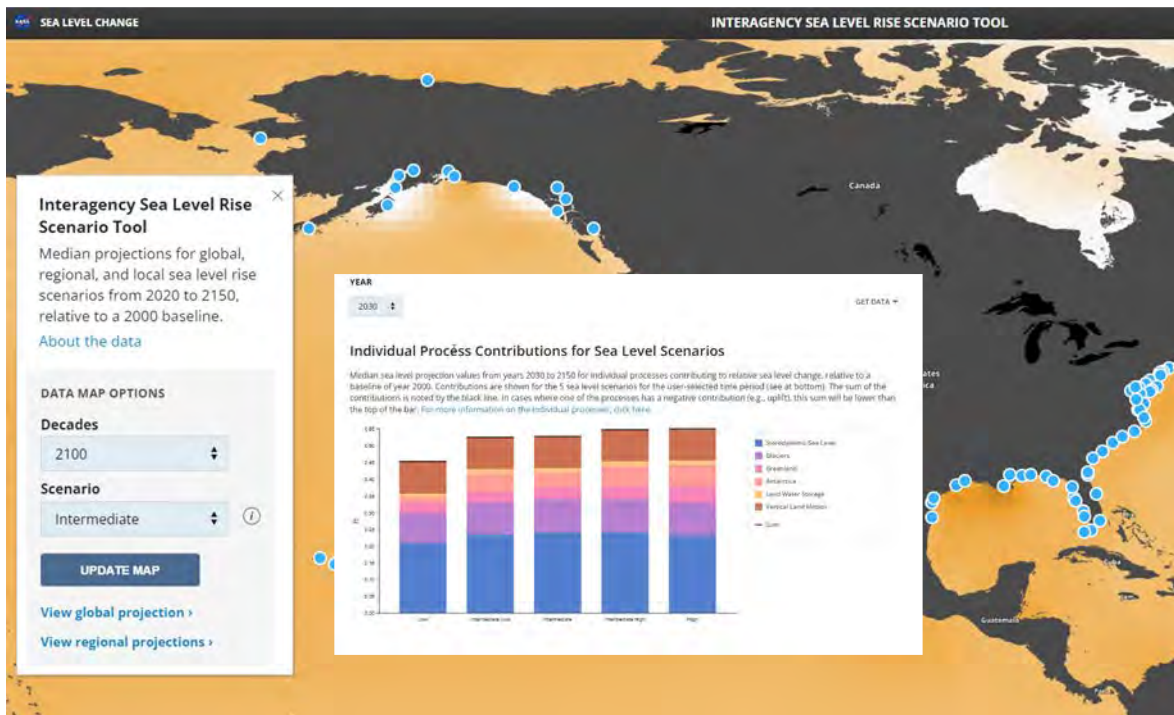
View the Full Sea Level Rise Technical Rep  
Frequently Asked Questions  
his Report  
nical report is the latest product of the Sea Level Rise a

## APPLICATION GUIDE for the 2022 Sea Level Rise Technical Report

This is a superb guide to understanding how to apply the information in the report



# Interagency Sea Level Scenario Tool

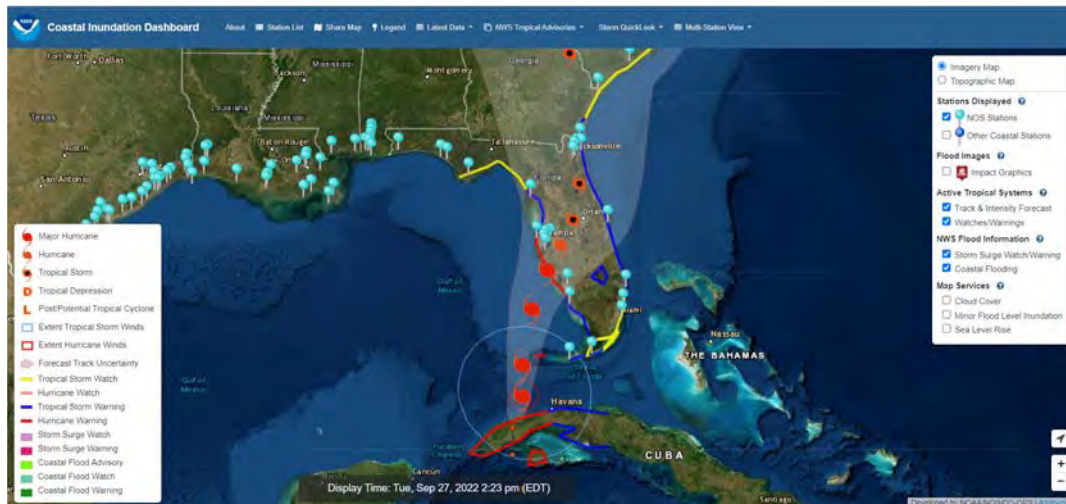


- Projections from on [2022 interagency task force report](#)
- Broken down by decade (2030 to 2100, 2150) and contributing processes
- Provides visual of the scenarios over time for each location



# Coastal Inundation Dashboard (CID)

- Interactive web-map application targeted towards coastal decision makers and planning community
- Real-time & historic flood information at NOS water level stations
  - Including Great Lakes
- Water level data at tidal stations shown relative to Mean Higher High Water (MHHW) tidal datum
  - Average daily highest tide

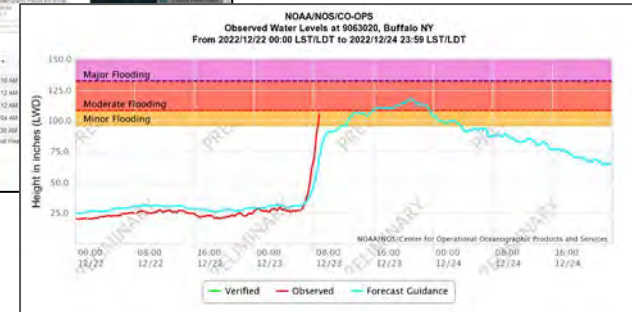
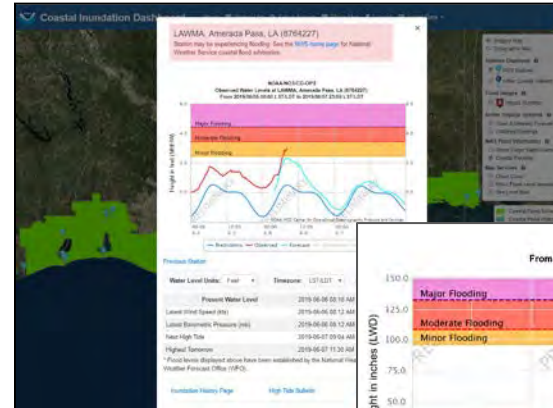


<https://tidesandcurrents.noaa.gov/inundationdb/>

# CID -Coastal Flood Impact Thresholds

- Established by local NWS Weather Forecast Offices (WFOs)
  - Takes into account local geography and flood mitigation
  - Provides a trigger point for NWS coastal flood advisory products
- Application compares observed water levels with station's minor flood threshold
  - Flood "alerts" are displayed as blinking station markers on the map and as messages within the station pop-up

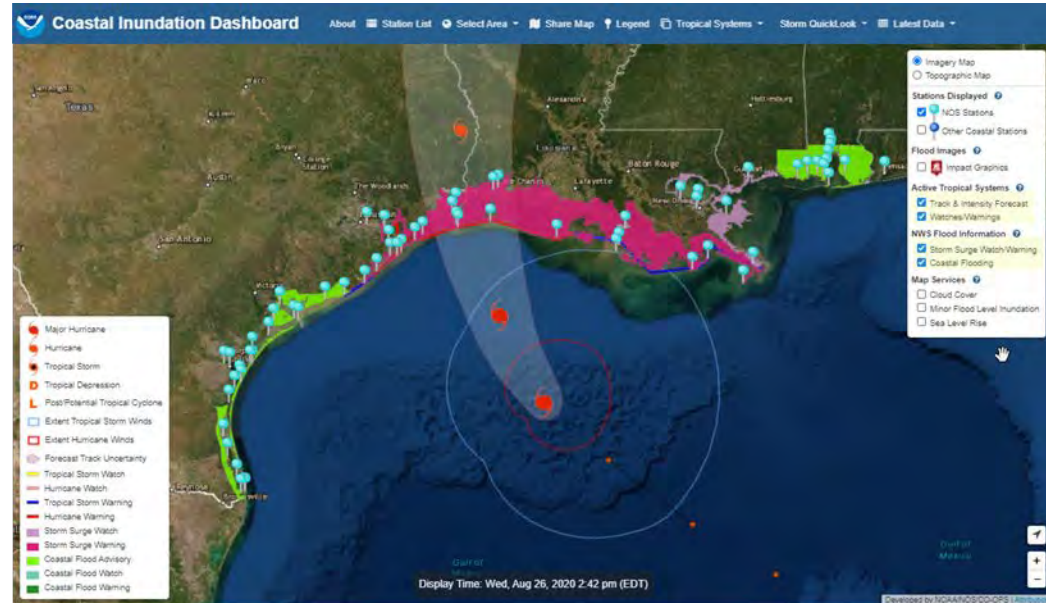
	Minor (CF Advisory)	Moderate (CF Warning)	Major (Warning)
<b>Picture</b>			
<b>Hazard</b>	<ul style="list-style-type: none"> <li>Low threat of property damage...and no direct threat to life.</li> <li>1 to 2 ft of inundation in shoreline and vulnerable areas.</li> </ul>	<ul style="list-style-type: none"> <li>Elevated threat of property damage...with a risk to life if one places themselves in unnecessary danger.</li> <li>2 to 3 ft of inundation in shoreline and vulnerable areas.</li> <li>Minor to moderate inundation (1 to 3 ft) of surrounding coastal communities that rarely experience coastal flooding.</li> </ul>	<ul style="list-style-type: none"> <li>Significant threat to life and property.</li> <li>3-5 ft of inundation in shoreline and other vulnerable areas.</li> <li>Minor to moderate inundation (1 to 3 ft) of surrounding coastal communities that rarely experience coastal flooding.</li> </ul>
<b>Impact</b>	<ul style="list-style-type: none"> <li>A few shoreline and vulnerable roadways and adjacent properties will experience shallow flooding.</li> </ul>	<ul style="list-style-type: none"> <li>Several shoreline and vulnerable areas home and businesses will experience water inside.</li> <li>Several low-lying coastal and shoreline roads will be closed.</li> <li>A few cars may take on water or even be destroyed.</li> </ul>	<ul style="list-style-type: none"> <li>Evacuations will be necessary for the most vulnerable shoreline and coastal areas.</li> <li>Many coastal communities will experience damage...with some shorelines and flood zones homes and businesses being destroyed.</li> <li>Many cars will likely be submerged or washed away.</li> <li>Several sections of beachside roads and escape routes will be impassable and a few could be washed out.</li> <li>Flood waters may extend well inland in low lying areas.</li> </ul>



# CID Map Features: NWS Tropical Cyclone & Coastal Flooding Products

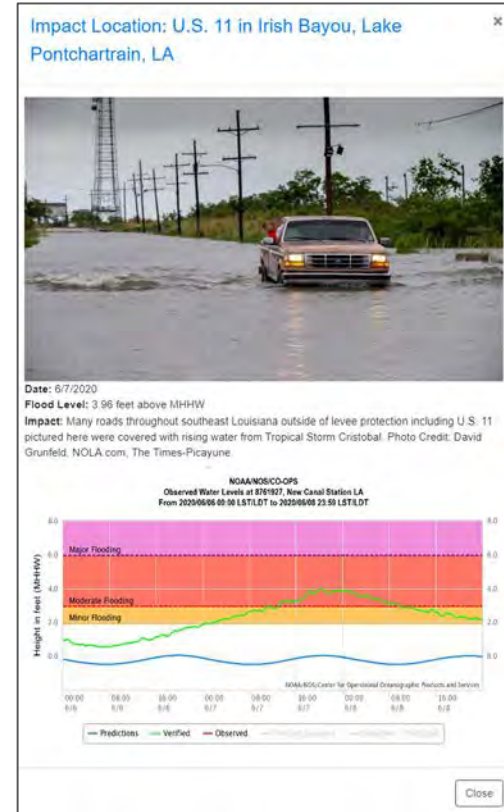
## Monitoring storm surge in real-time

- Latest National Hurricane Center (NHC) tropical cyclone forecast information
  - Forecast track and cone of uncertainty
  - Extent of tropical storm and hurricane force winds
  - Storm surge watch/warning
- Coastal flood watches, warnings and advisories issued from NWS WFOs
- Data updates on the fly from NOAA's nowCOAST



# CID Map Features: Impact Graphics

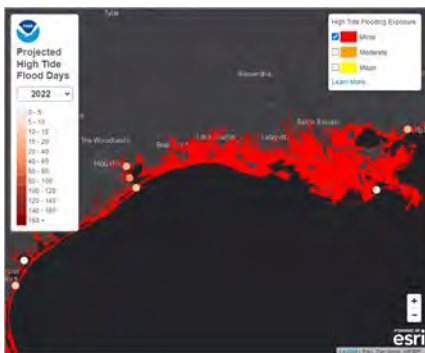
- Over 200 Images taken during past flood events along with associated water level measurements at the nearest water level station
  - Relates measured water levels with on-the-ground impacts
  - Please send photos!
- Potential future integration of webcams



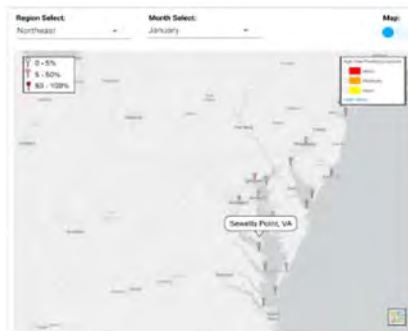
# A Spectrum of High Tide Flooding (HTF) Products

[Annual High Tide Flooding Outlook](#) -----> [Monthly High Tide Flooding Outlook](#) -----> [Coastal Inundation Dashboard](#)

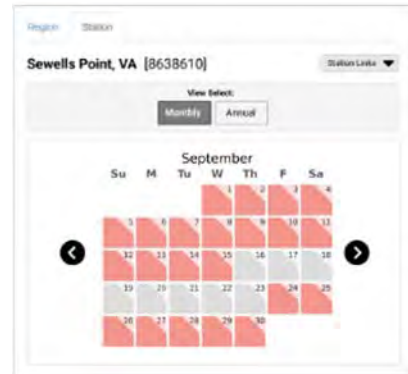
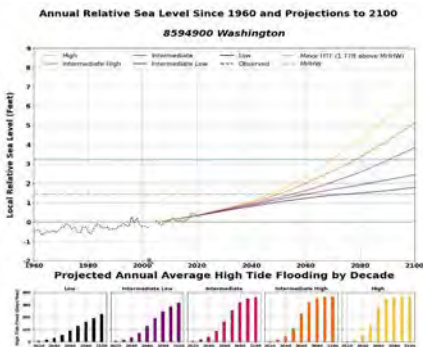
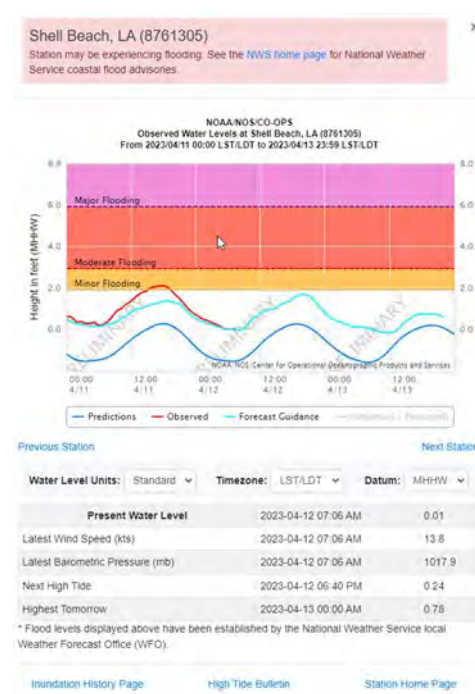
Annual & Decadal Projections



Sub-seasonal Projections



Real Time Observations

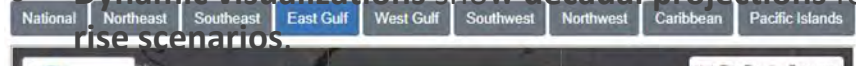


# HTF - Bringing Data to Life

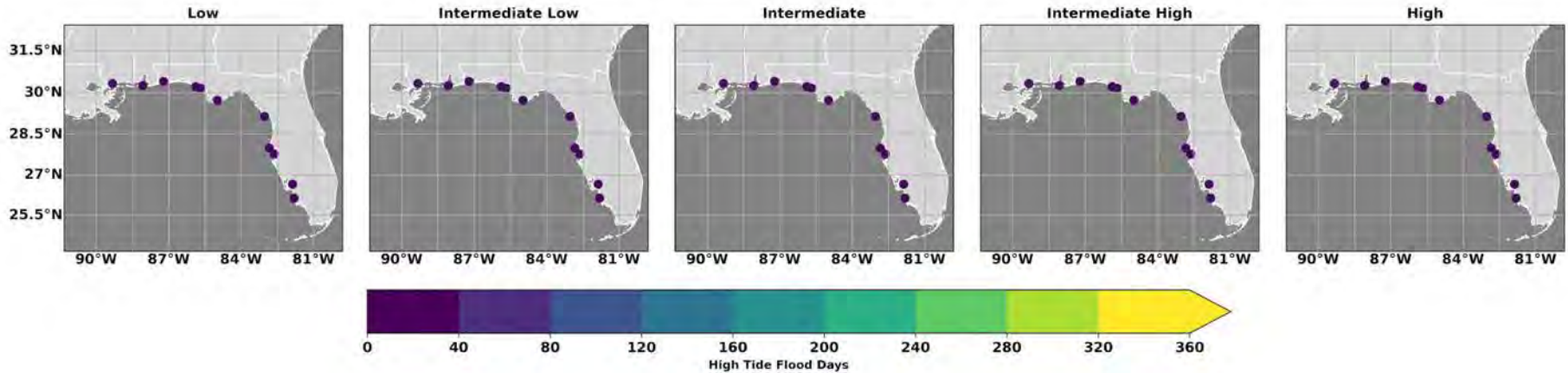
- Dense text become **organized attribute tables**.
- **Impact graphics** show the ways high tide flooding can impact regional landmarks.
- **Dynamic visualizations** show **decadal projections** for **regional high tide flooding based on updated sea level rise scenarios**.

## East Gulf State of High Tide Flooding & 2022 Outlook

This region of coastline is routinely impacted by severe weather that often contributes to flood events. Coupled with land subsidence and sea level rise, high tide flooding events are more frequent. This year's outlook predicts fewer flood events due to Earth's place at the furthest proximity from the moon in the Perigean cycle. Though this year's outlook is moderate, the eastern Gulf region has seen an almost 200% increase in high tide flooding events since



### Eastern Gulf Projected Decadal High Tide Flooding: 2020



# HTF - Seasonal Bulletin vs. Monthly Outlook

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	<b>Seasonal NOS High Tide Bulletin</b>	<b>HTF Monthly Outlook</b>
<b>Format</b>	Text	Geospatial + Calendar + Text
<b>Update frequency</b>	Quarterly	Monthly
<b>Timespan</b>	3 months	1 year
<b>Focus</b>	Regional	NOS HTF stations
<b>Delivery</b>	NOS news webpage	HTF webpage + Coastal Inundation Dashboard + APIs





# High Tide Flooding Monthly Outlook

Discover when and where you may experience above normal high tides in the next year.

Region Select: **Northeast** | Month Select: **March** | Map: **ON**

Map controls: +, -

Leaflet | Powered by Esri | Austin Community College, Baylor University, Boston College Campus GIS, CSU Mont...

Region: **Station**

## Bar Harbor [8413320]

Station Links

Calendar Toggle: **On/Off**

**March**

Su	M	Tu	W	Th	F	Sa
		1	2	3	4	5
6	7	8	9	10	11	12
13	14	15	16	17	18	19
20	21	22	23	24	25	26
27	28	29	30	31		

Navigation: < >


Monthly calendar grid showing high tide flooding outlook for the entire year (January to December).

# Handling data - Tidal Analysis Datum Calculator (TAD)

CO-OPS Tidal Analysis Datum Calculator

**Data and Resources**

- User Guide
- Technical Report
- CO-OPS Special Publication 1 - Tidal Datums and Their Applications
- CO-OPS Special Publication 2 - Tidal Datum Computation Handbook
- CO-OPS Special Publication 3 - Tidal Analysis and Predictions
- FAQs
- Datums Page and Associated Information



### Datum Calculator Input Parameters

**Select a Water Level Data File to Upload**

No file

— Supported file format is comma separated value (.csv) Layout of each line: datetime(mm/dd/yyyy HH:mm) water level  
— Any consistent time sampling (1-minute, 6-minute, 15-minute, etc.)

**Time Zone**  **Data Units**

— Time zone should be consistent with uploaded file

**Coordinates of Your Station**

Lat  Longitude

— Please enter the latitude (-90.0 to 90.0) & longitude (-180.0 to 180.0) in decimal degree above, and click Go to enable the Control Station dropdown  
— If you choose 'No Control Station', tidal datums are computed by arithmetic mean of your data  
— If you choose a control station, tidal datums are computed by simultaneously comparing to the control station

NOAA created an online user interface where non-NOAA data can be uploaded as .csv and tidal datums can be computed.

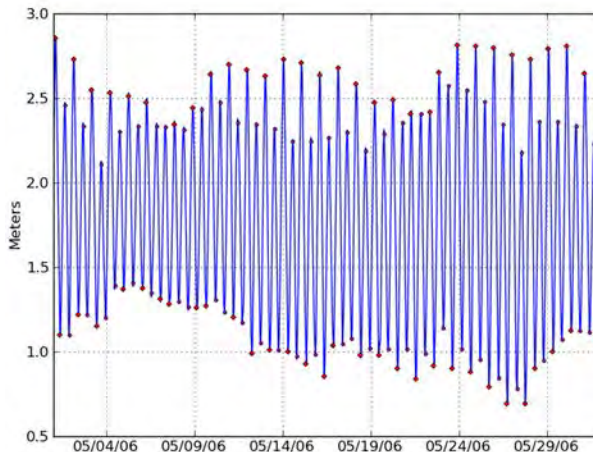
Note, this does not touch the CO-OPS database so any file with a consistent time series interval can be used.

This does not replace the work of producing “official” tidal datums that takes a long time and lots of human resources. It uses the same algorithmic approaches but makes some decisions based on the data file that would otherwise be made by a human.

# Handling data - Tidal Analysis Datum Calculator (TAD)

Users simply need to:

- Upload the csv file with water level data
- Specify units of the data
- Select time zone
- Specify lat/lon
- And choose a control station (if desired).



Outputs include images of the time series with the selected tides, csv of the tide picks, and an output log file that outlines the datum calculation method, control station datum information (if chosen) and the resulting datum plane, ratio, and range values.

```
2 Months of control station means retrieved.  
2 months in the analysis
```

```
Mean_Diff_MSL = -0.003  
Mean_Diff_MTL = 0.024  
Mean_Diff_DTL = 0.030  
Mean_Ratio_MN = 0.910  
Mean_Ratio_GT = 0.919  
Mean_Diff_MHHW = -0.041  
Mean_Diff_MHW = -0.045  
Mean_Diff_MLW = 0.093  
Mean_Diff_MLLW = 0.100
```

```
Corrected values for MN, GT, MTL, DTL  
1.449 1.615 1.719 1.751
```

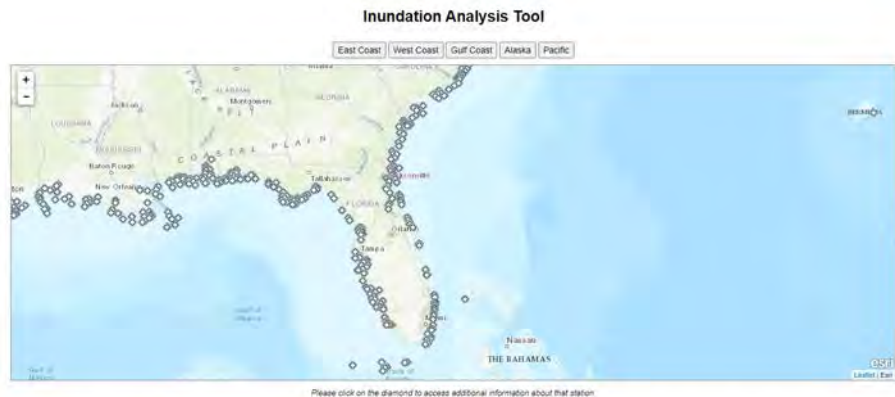
```
Corrected values for MHHW, MHW, MLW, MLLW  
2.559 2.446 0.992 0.943
```

```
Datums by Monthly Means Simultaneous Comparison (MWSC):  
HWL = 2.873 (2006/06/14 02:18)  
MHHW = 2.558  
MHW = 2.443  
DTL = 1.751  
MTL = 1.719  
MSL = 1.692  
MLW = 0.995  
MLLW = 0.943  
DHQ = 0.115  
DLQ = 0.051  
GT = 1.615  
MN = 1.449  
LWL = 0.692 (2006/05/26 17:42)
```

```
Meters
```

```
That is all.
```

# Handling data - Inundation Analysis Tool



Coastal storms and other meteorological phenomenon can have a significant impact on how high water levels rise and how often. The inundation analysis program is extremely beneficial in determining the frequency (or the occurrence of high waters for different elevations above a specified threshold) and duration (or the amount of time that the specified location is inundated by water) of observed high waters (tides). Statistical output from these analyses can be useful in planning marsh restoration activities. Additionally, the analyses have broader applications for the coastal engineering and mapping community, such as, ecosystem management and regional climate change. Since these statistical outputs are station specific, use for evaluating surrounding areas may be limited.

CO-OPS has an inundation analysis tool online but it is restricted to data with our database.

Users can choose stored datums or custom thresholds, dates, data products.

## Inundation Analysis Tool

872028 SouthBANK Riverwalk, St Johns River, FL

Please use the data inventory to find a period with hourly or six-minute data available.  
Data Inventory

Select a reference elevation and specify a date range for analysis.

You may select from an accepted list below or specify a different elevation.  
Most elevations on land are given relative to a specific datum such as NAVD83.

All analysis results are presently provided in meters relative to the requested threshold.

	Meters relative to MHW	Feet relative to MHW	Datum
<input type="radio"/> MHW	0.0	0.0	Mean High-High Water
<input type="radio"/> MHW	-0.02	-0.07	Mean High Water
<input type="radio"/> OTL	-0.207	-0.67	Mean Oceanic Tide Level
<input type="radio"/> MTL	-0.262	-0.86	Mean Tide Level
<input type="radio"/> MSL	-0.271	-0.89	Mean Sea Level
<input type="radio"/> MLW	-0.308	-1.00	Mean Low Water
<input type="radio"/> MLW	-0.398	-1.30	Mean Lower-Low Water
<input type="radio"/> NAVD83	-0.198	-0.65	North American Vertical Datum
<input type="radio"/> User-Specified Elevation			

Begin Date:

Mar 1 2023

End Date:

Apr 1 2023

Note: Date query is limited to a 10 year maximum and 1 month minimum date range when requesting an analysis of 6-minute data.

Choose type of data:

- 6-minute Height and High Water Analysis
- Hourly Height and High Water Analysis
- Hourly Height Analysis

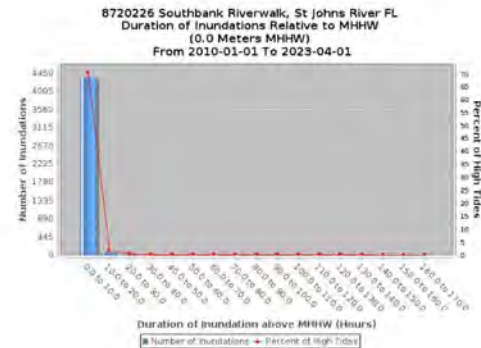
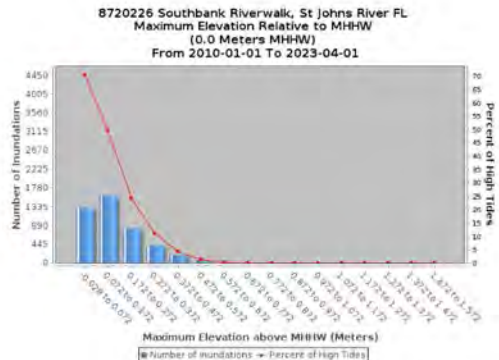
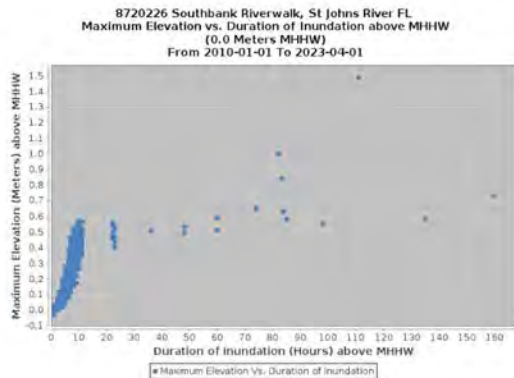
Submit Cancel

# Handling data - Inundation Analysis Tool

Outputs include plots and downloadable CSVs of:

- 1) Elevation vs Duration
- 2) Max elevation relative to chosen threshold
- 3) Duration relative to chosen threshold

**It should be noted that in FY25 we anticipate having a public-facing version of this tool, similar to TAD where users can upload their own data files and perform inundation analysis.**



# Handling data - VDatum

The screenshot shows the NOAA Online Vertical Datum Transformation tool interface. At the top, it features the NOAA logo and the text 'NATIONAL OCEANIC AND ATMOSPHERIC ADMINISTRATION' and 'INTEGRATING AMERICA'S ELEVATION DATA'. The main heading is 'ONLINE VERTICAL DATUM TRANSFORMATION'. Below this are navigation links: Home, About VDatum, Download, Docs & Support, and Contact Us.

The interface is divided into several sections:

- Regional Information:** A dropdown menu for 'Region' is set to 'Contiguous United States'.
- Horizontal Information:** This section is split into 'Source' and 'Target' columns. Both are set to 'NAD83(2011)'. The 'Coord. System' is 'Geographic (Longitude, Latitude)' and the 'Unit' is 'meter (m)'. There are also fields for 'Zone'.
- Vertical Information:** This section is also split into 'Source' and 'Target' columns. The 'Reference Frame' is 'MLLW' (Source) and 'NAVD 88' (Target). The 'Unit' is 'meter (m)'. There are radio buttons for 'Height' and 'Sounding', and a dropdown for 'GEOID model' set to 'GEOID18'.
- Point Conversion / ASCII File Conversion:** This section has 'Input' and 'Output' fields for Latitude, Longitude, and Height. There are buttons for 'Transform', 'Reset', and 'DMS'. Below these are buttons for 'Drive to on map' and 'Reset Map'.
- Map:** A map of the United States is shown at the bottom, with a legend for 'Vertical Uncertainty (+/-)'. The legend includes: Valid Tidal area (green), Non-Tidal area (yellow), Non-Valid area (red), CRD (blue), IGLD85 (purple), and SVU area (orange).

## NOAA's Vertical Datum Transformation tool

- Converts between geodetic, ellipsoidal, and tidal datums at any location with the domains (36 different vertical reference systems!) - think MSL/NAVD88/GRS80
- Domains currently covers CONUS, PR/VI, SEAK
- Spatially varying uncertainty covered in parts of NE, West Coast
- Based on ADCIRC circulation model+ topography of the sea surface (TSS) model+ relationships between tidal tidal datums
- Can be run locally by downloading all translation files or run online using the tool displayed here
- Both individual point information (lat/lon/elevation) and DEM files can be processed
- Note: will be an important tool with the new national vertical datum (NAPGD22) that will replace NAVD88

# Questions/Comments/Requests/Suggestions

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