# Using the Maryland Coastal Flood Explorer Scribe

The Maryland Coastal Flood Explorer is a tool to understand and visualize the impacts of sea level rise and flooding in Maryland. It offers interactive features that allow users to explore historical data and projected water levels, across Maryland's coastal zone. By leveraging tools, such as depth queries and customizable layers, users can gain valuable insights into their local flood risks and make informed decisions.

## **Getting Started**

1 <u>Navigate to https://mdfloodexplorer.org</u>	
MARYLAND COASTAL	
FLOOD EXPLORER Sea-level, High-tide, and Historic Flooding	
Q Search address, city, zip code	
Explore by Tide Stations	e e
GET STARTED	
-ද් Annapolis ද් Baltimore ද් Cambridge ද් Ocean City Inlet ද් Solomons Island ද් Tolchester Beach ද් Washington DC	





Or you can navigate by clicking the closest tide gauge.

MARYLAND COASTAL FLOOD EXPLORER Sea-level, High-tide, and Historic Flooding	
© Search address, city, zip code No results Explore by Tide Stations GET STARTED	
-এ Annapolis এ Baltimore এ Cambridge -এ Ocean City Inlet -এ Solomons Island -এ Tolchester Beach -এ Washington DC	

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This icon shows the location of the tide gauge. By clicking on it, you can pull up additional information such as the station information and historical water levels. Clicking the links here will take you to the NOAA webpage for this station.



## Using the slider bar

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**5** To visualize different sea level rise numbers, drag the slider up and down or directly click the year you'd like to visualize.





**6** Note the water level change. The darker the blue, the deeper the water.

7 The viewer also visualizes current minor, moderate, and major flood thresholds for each tide gauge and these flood thresholds with SLR added to them. This image shows moderate flooding under current tide levels (2005 baseline).



8 Choosing "2050 SLR + Moderate" will visualize 2050 slr projection for that location with a moderate high tide.







Tip! You can explore how one flooding event may have impacted water levels differently at different tide gauges. For example, Hurricane Isabel water levels were different than in Baltimore.

10 Click "Hurricane Isabel 2003" to show water levels. To see how levels may be different at a different station, click the arrow to navigate to the Baltimore tide gauge.



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As you can see along the slider, water levels in Baltimore (6.49 ft) were higher than Cambridge (4.14ft) during Isabel.



**12** To navigate back to Cambridge, simply drag across your screen.



**13** The explorer automatically switches the tide gauge based on where you are on the map. To use the Cambridge tide gauge, click "Apply Local Water Levels".



(i) Tip! A user can choose not to switch to the recommended tide gauge by clicking "Retain Local Water Levels". This can be useful if the site is right on the border between and the user feels a different gauge is more representative of the area they're working in.

**14** You can also navigate by putting an address in the search bar at the top of the screen.



**15** Back in Cambridge, click the graph icon next to the tide gauge to get a graph of SLR for that tide gauge area.



Tip! To see what tide gauges are assigned to each county, navigate to "Data Modeling" within the information tab."

**16** Click differnt years along the graph to get the projected SLR number.

Maryland Coastal Flood Ex Sea-level, High-tide, and Historic Flooding	
← Cambridge ~ > SLR Relative to 2005 Baseline       2070: 2.33 ft      2040    2060    2080    2100    2120	Cheptank River

## **Top Navigation Bar**

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Now we will explore the features of the navigation bar at the top right hand corner of the screen. Click this icon to pull up background on the explorer.



"Tool Navigation" provides a little more detail than this guide does on the individual features of the tool.

Maryland Coastal Flood Explorer	×
Tool Navigation    Using the Tool    Data Modeling    Flooding Scenarios    Feedback      Food Navigation      Slider      Drag the Sea-level Rise Slider up to select the desired sea-level rise, ranging from 0 to 8 feet, with half-foot increments. As the slider is adjusted, the map automatically updates to show which areas are likely to be inundated at that specific water level. For instance, setting the slider to 5 feet will highlight the regions likely affected by a 5-foot rise in sea-level, while a setting of 8 feet will show areas at risk of the highest permitted sea-level rise.	
Tide Gauge Selector The Tide Gauge Selector allows users to focus on specific areas for predicted sea level rise, accounting for variations in local conditions. In coastal Maryland, sea level rise is projected to occur at different rates due to factors like vertical land motion, which affects the region's response to rising waters. Localized projections, calculated by the <u>University of Maryland Center for Environmental Science</u> (UMCES), are based on data from seven tide gauges in or near Maryland, including Annapolis, Baltimore, Cambridge, Ocean City, Solomons Island, Tolchester Beach, and Washington, DC. The Maryland Coastal Flood Explorer uses these tide gauges to adjust flood projections. When searching for a	

"Using the Tool" will direct users to the DNR website where there's information on putting the tool into action such as "how to" videos and case studies.



20 "Data Modeling" provides more background on the modeling approach used to develop the layers and the geographic extent of the explorer.

Maryland Coastal Flood Explorer				
Tool Navigation Using the Tool Data Modeling Flooding Scenarios Feedback				
Data Modeling Flood Water Depth The flood water data on the Maryland Coastal Flood Explorer show the water depth from 0 to 8 feet above				
Mean High Higher Water. The data in the Maryland Coastal Flood Explorer do not consider natural processes such as erosion, subsidence, or future construction. Water extent is as it would appear on a calm day with no wind-driven waves. The				
mapping may not accurately capture detailed hydrologic/hydraulic features such as canals, ditches, and stormwater infrastructure, resulting in inundated areas that are not connected to open water. A more detailed analysis may be required to determine an area's actual susceptibility to flooding. The data and information provided should be used only as a screening-level tool.				
Tide Stations				
Each tide station displayed in the Maryland Coastal Flood Viewer includes links to the tide station's home page and inundation history supported by the NOAA Center for Operation Oceanographic Products and Services (tidesandcurrents.noaa.gov).				

21 "Flooding Scenarios" provides more background on the data used to create the SLR projects, high tide flooding thresholds, and historic event thresholds.

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	🎉 Maryland Coastal Fl	lood Explorer			
Tool Navigation	Using the Tool Data Modeling	Flooding Scenarios	Feedback		
Flooding Scena	arios				
Sea Level Rise Pro	jections				
Coastal water levels in I	Maryland have been rising at an increasing	rate and are expected to c	ontinue into the		
future. The Maryland Co	ommission on Climate Change Act of 2015	requires the University of I	Maryland Center		
for Environmental Scier	nce (UMCES) to produce a report every five	e years with updated sea lev	el rise projections		
for Maryland to facilitat	te the use of the latest sea level rise science	e. In 2018 and 2023 UMCES	convened a		
group of sea level rise e	experts from the Mid-Atlantic region that p	produced reports with upda	ted projections for		
the state. The 2023 rep	ort, Sea-Level Rise Projections for Maryla	nd 2023, provides sea level	rise projections on		
the three most plausible	e scenarios: Increasing Emissions (SSP3-7.0	0) in which the rate of emiss	ions doubles by		
the end of the century,	Current Commitments (SSP2-4.5) in which	only the present national o	ommitments for		
emission reductions are	e met, and the Paris Agreement (SSP1-2.6)	in which emissions reach n	et-zero during the		
second half of this cent	ury and warming is kept below 2°C.				
The data presented in t	his tool use the Current Commitments (SS	P2-4.5) projections as it is t	he recommended		
scenario for planning p	urposes. The use of the UMCES sea level p	predictions automatically ide	entifies the tide		
gauges to be included i	in this project as Baltimore, Tolchester Bea	ch, Annapolis, Cambridge, S	Solomons Island,		
Washington, D.C, and C	Ocean City. The level of confidence for SSP	2-4.5 comes from Maryland	DNR's Guidance		
for Heine Mondand's 7	022 Cos Level Dice Drejections document	as the O'rd parcentile (may	lium tolorongo for		

22 "Feedback" tab provides an email address where you can share your feedback on the tool, how you're using it, and ask questions: mdfloodexplorer.dnr@maryland.gov



#### Made with Scribe - https://scribehow.com

**23** Moving across the navigation bar. This icon will bring up the legend. It can be clicked on or off at any time.



Finally, this icon is either a sun or moon. It allows the user to switch back and forth between light mode and dark mode according to personal preference.

1 Image Color mode

## **MD Flood Explorer Tools**

25 Now we will explore the features of the built in tools on the bottom right hand corner of the screen. This icon pulls up the depth query tool.



26 Click anywhere on the map to see the predicted depth in feet. The depth numbers will stay up on the screen until the user clicks the "x" in the corner of an individual point or the reset button on the depth query tool.



- Open Water

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- **27** Now, move the slider up or click "2070 SLR + Major" to see how the water levels at each point changes.

**28** All of the depth queries can be cleared at the same time by clicking this button.



**29** The measure tool allows you to draw a line for a distance measurement in feet or a polygon for an area measurement in acres. Simply click along to trace your line or polygon and then double click to create your endpoint and get the measurement.



**30** The water opacity tool pulls up a slider which will change the opacity of just the water layers.



**31** Reducing the opacity will allow for a better visual of the imagery beneath the water layers. In this case, showing that much of the flooding in this image will occur on marsh land and the edge of the agricultural fields.



**Additional Layers** 

**32** This icon will bring up the option to change the basemap below the imagery as well as toggle prepopulated layers on and off as well as add your own layers.



**33 Example:** To visualize flooding on roadways, selecting the "Streets" basemap may be useful. To return to the original background, simply click streets again to turn it off.



**34** The tool includes a curated selection of prepopulated layers including building footprints, MyCoast photos, parcel data, land use land cover data, and critical area boundaries.



**35** When these layers are added to the viewer, they will also appear in the legend.



**Example:** Add the MyCoast layer and notice that there are multiple different icons. These are further explained with the legend.



**37** The explorer has a limited collection of prepopulated layers. DNR has provided an additional suite of ArcGIS layers which may be helpful on their <u>website</u>. These can be added here.



**38 Example**: To add schools, copy the url for the service layer from the list provided on the DNR website. Then select "ArcGIS Feature Service" from the drop down menu and paste the URL in the box.



### 39 Click "Add"





Two purple school house icons show up.



41 Finally, a user may want to add their own data. To do that, go back to the Basemaps and Layers icon and then select "File."



42 From here you can upload files. Note the size limit. The explorer does not currently have a way to adjust symbology of files uploaded by the users.

