Washington County Council of Governments

Helping communities plan for their future in Washington County, Maine

UMM GIS SERVICE CENTER

Instructions for using the

Storm Surge Scenarios

(http://gro-wa.org/washington-county-climate-change-response)

Overview of the Storm Surge Scenarios

The storm surge scenarios were created as part of the Climate Vulnerability Assessments prepared in 2014 for coastal communities in Washington County, Maine. The maps provide interested parties with storm surge scenarios for hurricane categories 1-4 at both mean and high tide. In addition, the scenarios show the impacts of storm surges on local infrastructure, which includes flooded and cut-off roads, flooded buildings and tax parcels in the flooding zone.

Storm surge scenarios show the estimated predicted depth of water for hurricane storm surge inundation for the coast of Washington County, Maine, based on the US National Weather Service's Sea, Lake, and Overland Surges from Hurricanes (SLOSH) Model. The estimates are based on a single storm scenario with the eye of the storm centered on Penobscot Bay. For further information about the National Weather Service's SLOSH Model program visit http://www.nhc.noaa.gov/surge/slosh.php.

The purpose of the storm surge maps is to assist with emergency and municipal planning, both long term and during real storm events. Depth estimates are in feet and are based upon predicted surge relative to LiDAR (light detection and ranging) elevation measurements provided by the Maine Office of GIS. Depths are estimates only. Actual storm surge inundation may vary very widely. Actual inundation may be more or less than estimates, depending on the storm's track, wind direction, the shape of bays and inlets, and other factors. The model includes no estimate of the likelihood or expected frequency of any given storm scenario.

The storm surge scenarios were prepared by Amy Dowley with contributions from Jake Rottersman, Chris Federico, and Thomas Cochran at the UMM GIS Laboratory and Service Center. This work is part of the GROWashington-Aroostook regional planning process that focuses on job creation, modern infrastructure, and healthy, affordable communities in the counties of Aroostook and Washington in northeastern Maine. More information on this regional planning project is available at http://www.gro-wa.org.

Maintenance of the digital information and training on how to use the online GIS tools is part of the on-going partnership between the Washington County Council of Governments and the University of Maine at Machias GIS Laboratory and Service Center.

Any questions, issues, or errors that arise while using the online mapping tools, please alert the UMM GIS Laboratory and Service Center via email at giscenter@maine.edu. We will respond as promptly as possible in order to provide the best service to our local communities.

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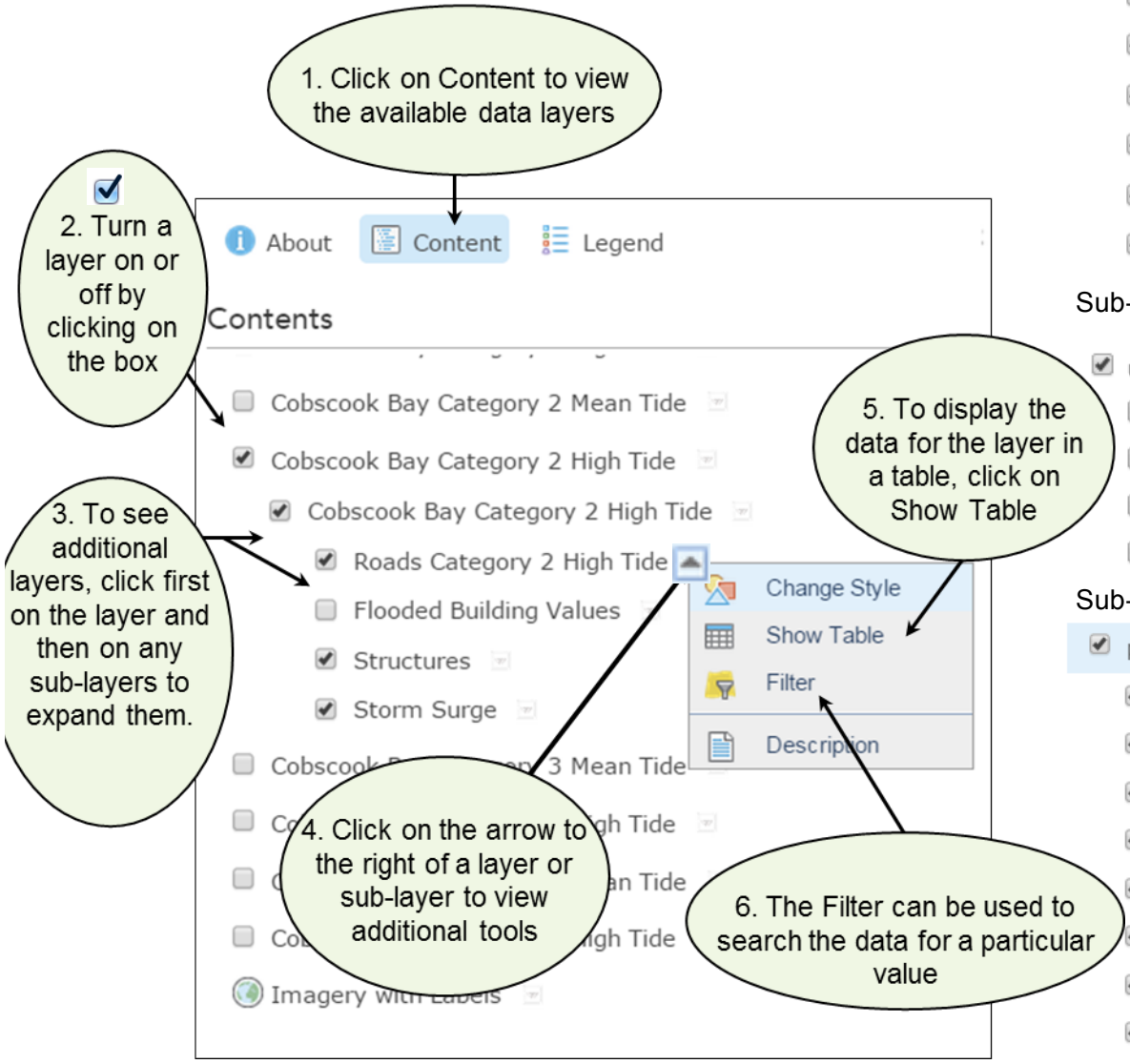
Access the mapping resource

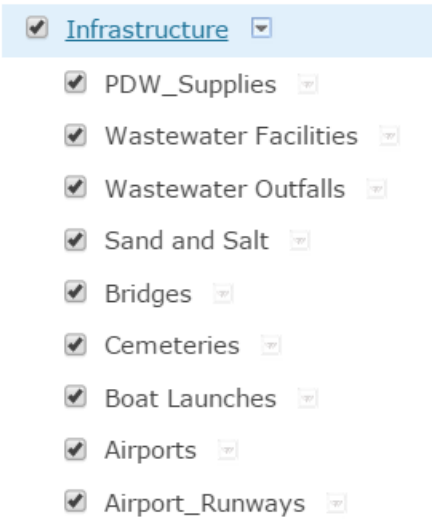
Navigate to http://gro-wa.org/washington-county-climate-change-response.htm#WashCoScenarios
Click on the blue-linked text identifying that the Second are a set of links that provide access to the on-line GIS mapping tools.
Click the blue linked title indicating the bay of your choice. Then choose to view the scenarios in the first list that are based on current sea levels or elect the scenarios from the second list that are based on 3 feet of sea level rise.

You will be directed to a map that by default is at full extent showing the entire bay with an aerial base map. Hone into your area of interest by using the zoom tools or double click on the map to focus the viewer screen.

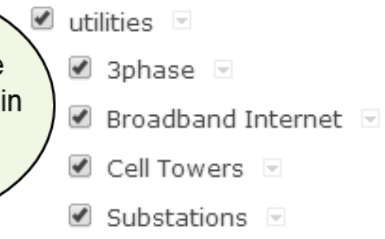
Viewing the content of the map



Sub-layers under Infrastructure:

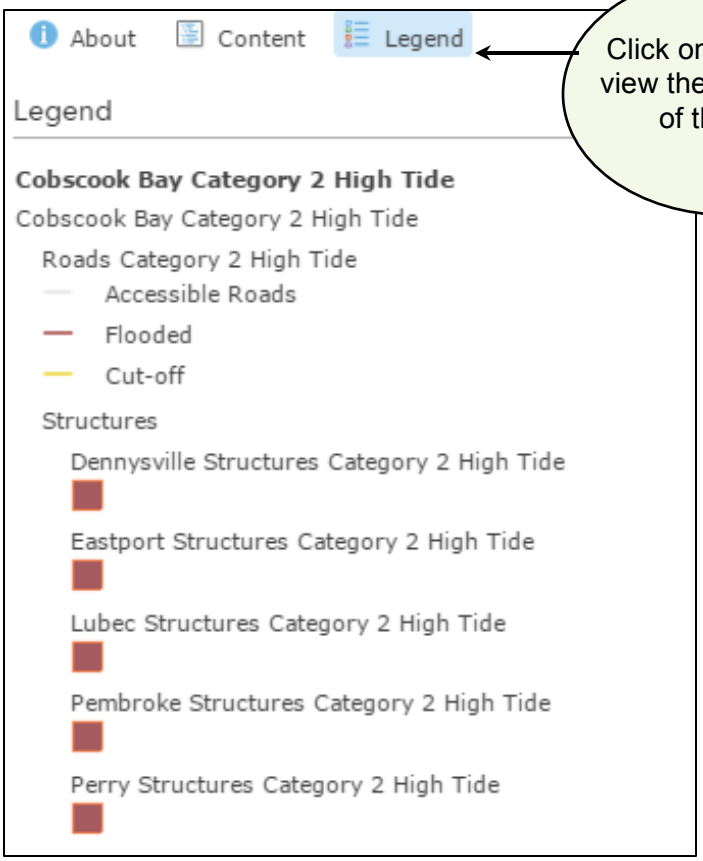


Sub-layers under Utilities:



Sub-layers under Public Services:

Viewing the map legend



Note: The layers must be turned on in the Content window in order for them to display in the Legend

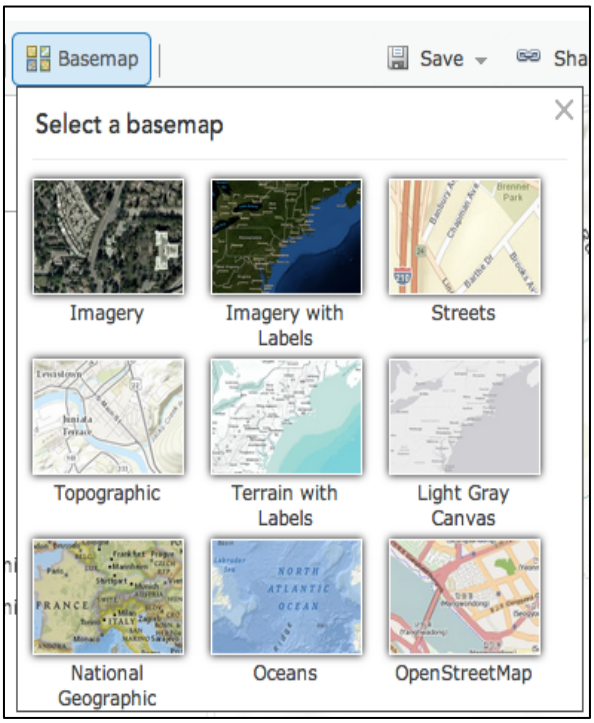
Changing the base map

Click on the base-map icon in the toolbar.

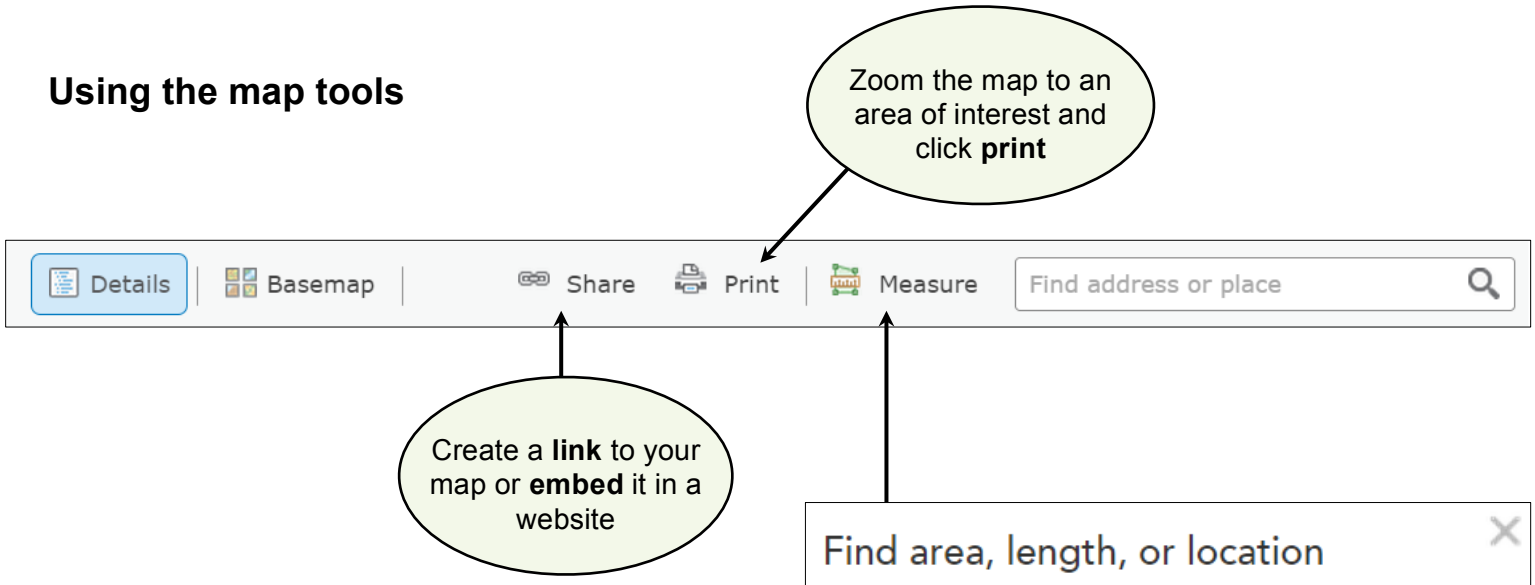
Choose a base-map from the options displayed.

The map will display the selected base map.

There is minimal difference between the base maps called Imagery and Imagery with Labels. The labels refer to labeled features on the landscape.



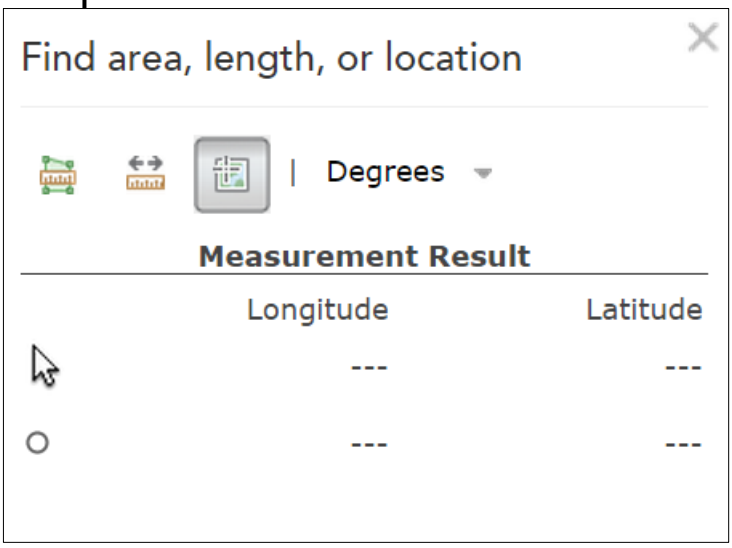
Using the map tools



To measure area, click on the tool, then click on the map to draw a shape, then double-click.

To measure length, click on the tool, then click 2 or more points on the map.

To find the coordinates of a location, click on the tool, then on the map.

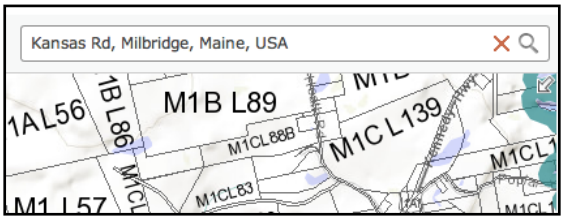


The location tool stores coordinates for one location at a time with stored values displayed on the lower line with the hollow point. The tool continues to retrieve coordinates for the places you scroll over with the mouse cursor on the viewer screen and these values are displayed on the top line of results.

To locate an address, click inside the search box. →

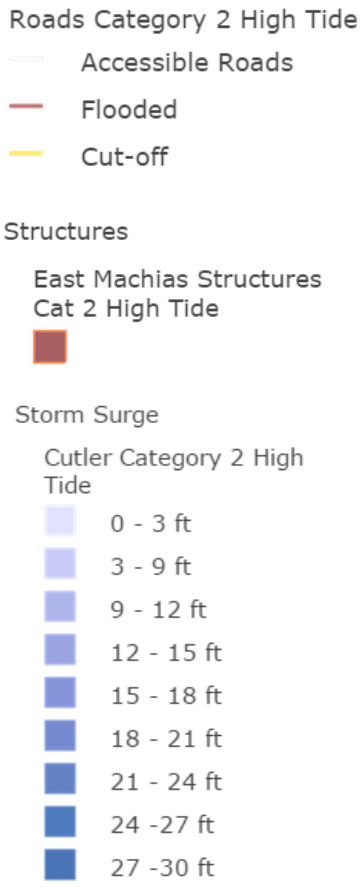
Enter an address. Be sure to include the town and state so that your search does not lead you outside Maine or the country.

The map will zoom to this location. If there are parcels displayed nearby (the Parcels with Labels layer must be on), click inside a parcel for the pop-up information to be displayed.



Exploring a hurricane scenario

What information is included in the storm surge scenarios map?



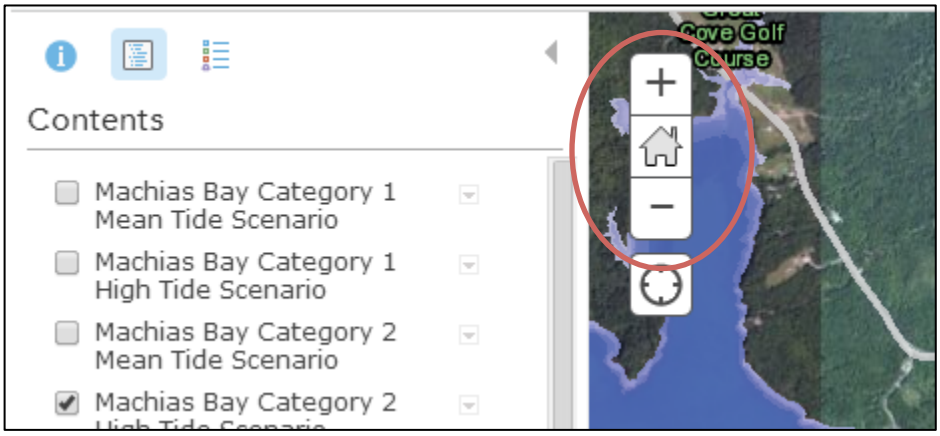
Roads- Display the roads are accessible, flooded, or cut-off for a given scenario.

Structures-Display the structures that are in the flood zone (determined using the most recent aerial photos).

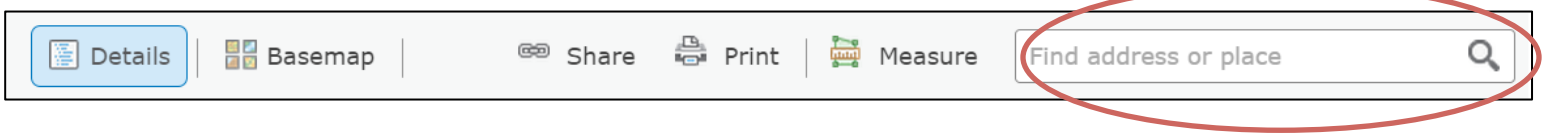
Storm Surge – Displays the water depth and flood extent for a given scenario. Depths are shown in ranges of 3 feet.

Find flooding impact in your town

To identify the flooding impact on a particular location you can pan the map screen and zoom in to a particular location.

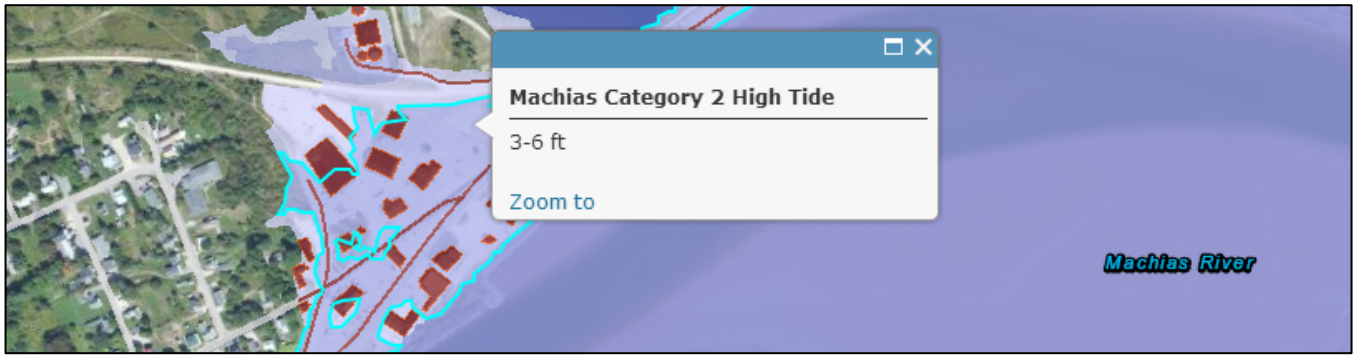


You can also navigate to a particular site by typing the name of the place or address into the dialogue box with the magnifying glass located at the upper right hand of your map viewer.

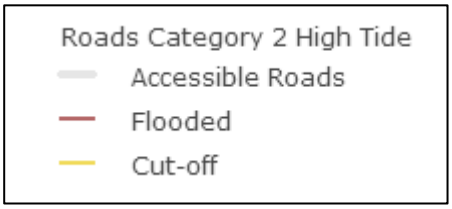


What is the depth of the flooding?

Select the storm surge layer in the map viewer by clicking on the flooded area of interest. A pop up window will appear identifying water depth for the storm category and tide condition.

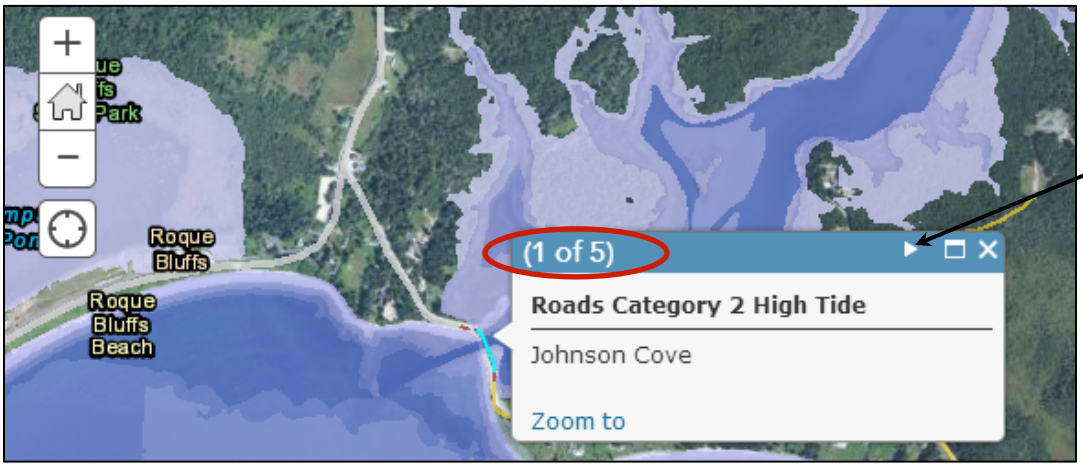


What roads are at risk?



You will notice that the roads layers are symbolized in three colors. Red lines indicate locations where the storm surge for a given scenario overtops and floods the roadway. Yellow lines denote road routes that are cut-off by flooded roads on all exit routes. Light grey lines are those not impacted by the modeled storm surge and therefore demonstrate access routes based on the given the storm scenario.

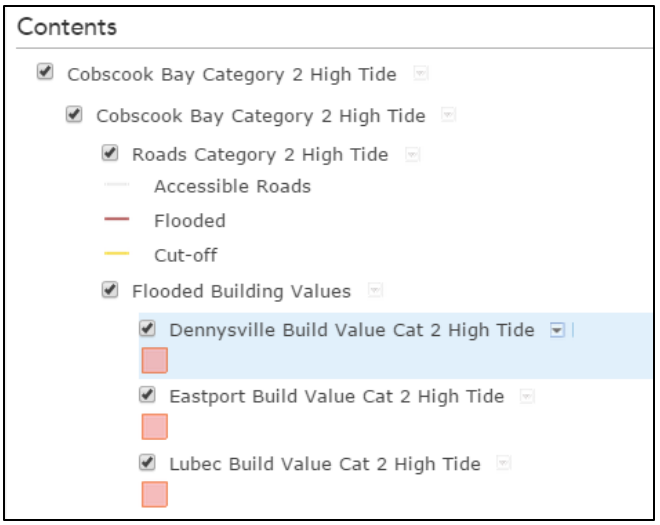
Identify the name of a particular road in the map by clicking on it with your mouse. A pop-up window will appear providing the street name for the selected road.



Click the forward and back buttons to retrieve the attribute data for each feature at the selected location

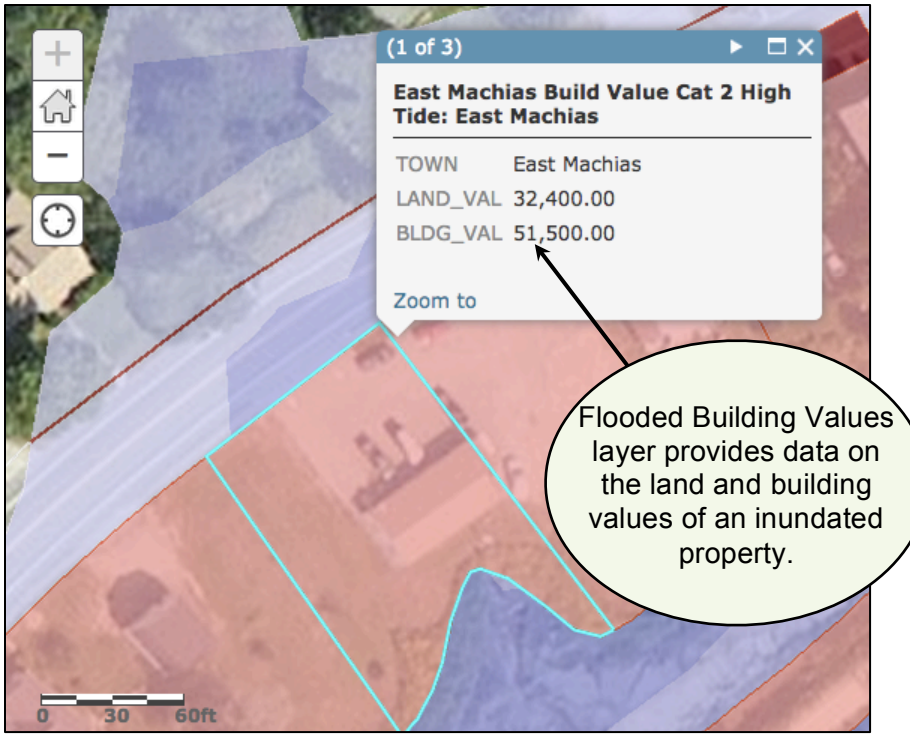
If the selected location retrieves values for multiple map features, the pop up will show the number of features along with a forward and back option to retrieve information for each of the separate items.

What are the land and building values of inundated parcels?



Notice that storm surge scenarios include flooded structures in dark red. Parcels that will be impacted by surge inundation are symbolized in pink and are included for those communities that have provided tax parcel data to the UMM GIS Service Center. If this data is not included for your town, contact town officials to request that the information be delivered to the GIS lab so that it can be included with the online service.

By default, the Flooded Building Values are not displayed on the map. To view the layer, navigate to the heading of the storm scenario listed under the map Contents, click the heading to reveal the storm surge subheading. Check the box next to Flooded Building Values to include these sub-layers on the map. Once the layer loads on the map, select a pink parcel in the map viewer. A pop up window will provide information about the economic value of the building and land.

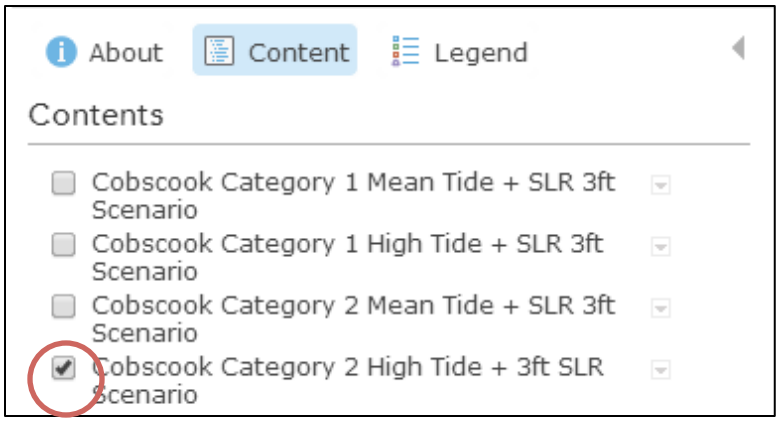


How do I investigate the impacts of different storm surge scenarios?

The default view is selected to show the most likely worst case storm scenario: a category 2 hurricane striking Washington County at high tide.

View a different scenario by first, un-selecting the current scenario. Now choose among the listed scenarios, listed by storm category and tide condition. Check the box next to the heading of the scenario you would like to view. If you want to go back to the original map, just close the browser tab with the map and reselect the map link on the GROWashington-Aroostook page.

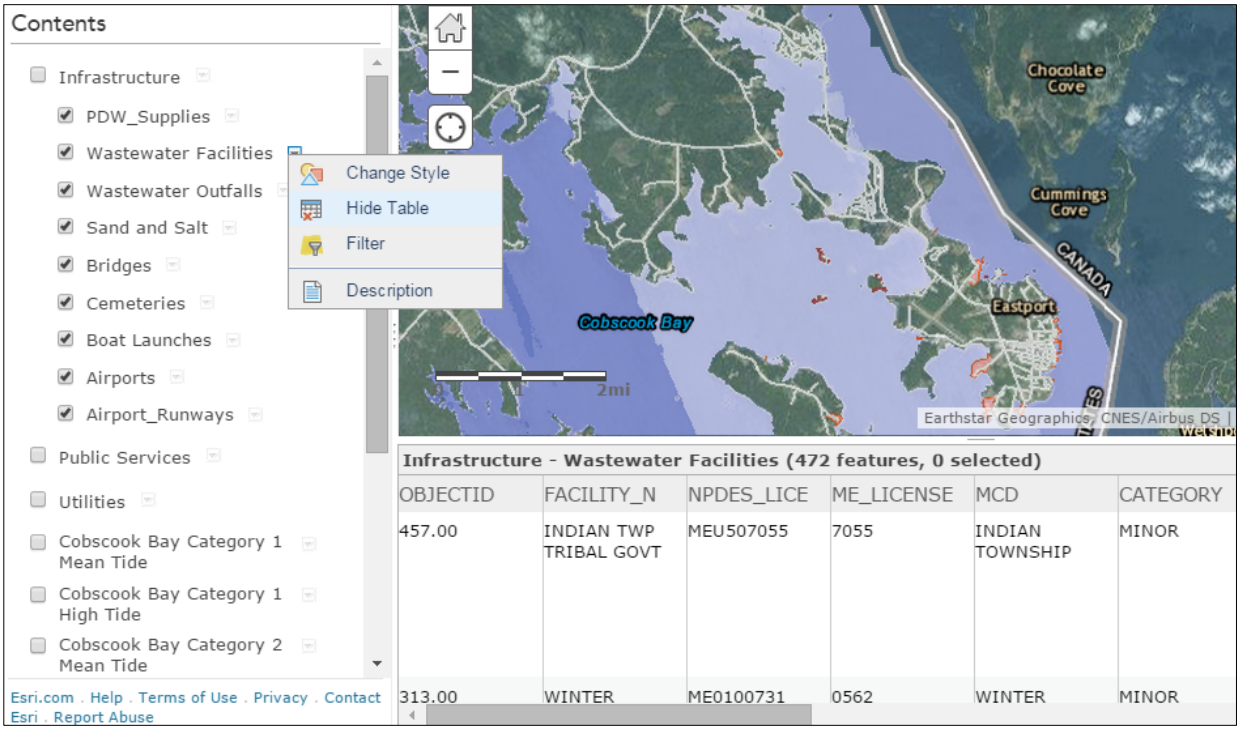
Tips*: If more than one scenario is being displayed, the scenarios at the top of the list will cover and hide the scenarios at the bottom.* ***To improve speed and functionality,*** *please limit the map display to one scenario "checked" on at a time.*



Retrieve data from the attribute table.

Attributes are information linked to the features of map layers. These data are stored together in an attribute table.

Click on the down button to the right of the layer you are interested in and select Table. An attribute table with the attribute fields and values for all features in the mapped layer will appear at the bottom of the map viewer screen.

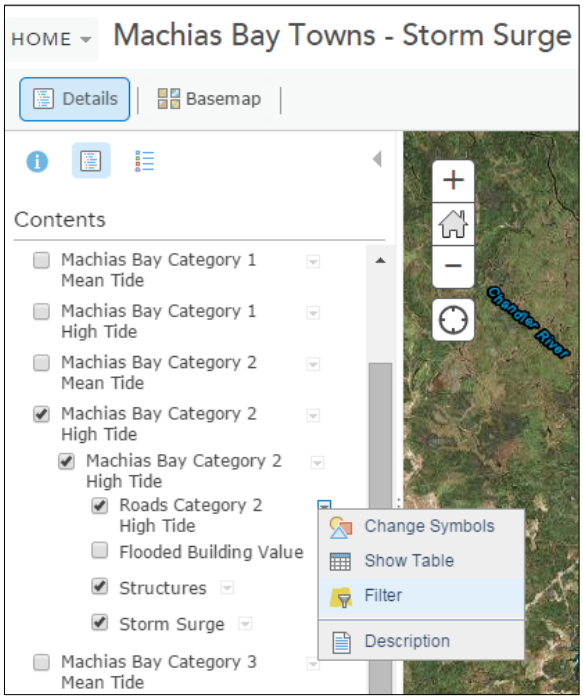


Ask questions of the map by applying a filter.

You can apply a filter to attribute data, limiting the visible records to show you only the values of interest. The filter is a useful tool that allows you to solve certain geographical questions that, for instance, support emergency preparedness and community planning efforts. Some examples follow:

What are the names of all the roads in Machias that are predicted to flood in a category 2 hurricane at high tide?

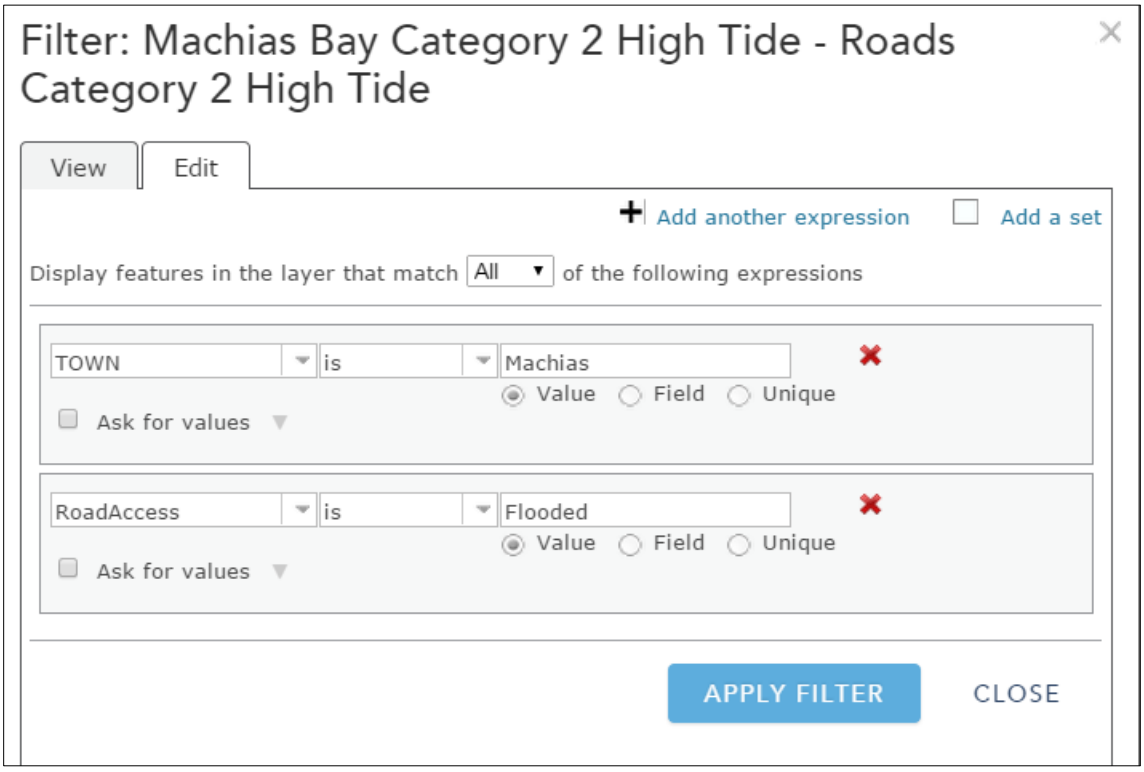
In the contents of the Machias Bay Towns- Storm Surge Scenarios map, find the map layers grouped under the heading Machias Bay Category 2 High Tide. Click Machias Bay Category 2 High Tide, then click on inset title that appears below - Machias Bay Category 2 High



Tide. Select the down button to the right of the Roads Category 2 High Tide and click on Filter.

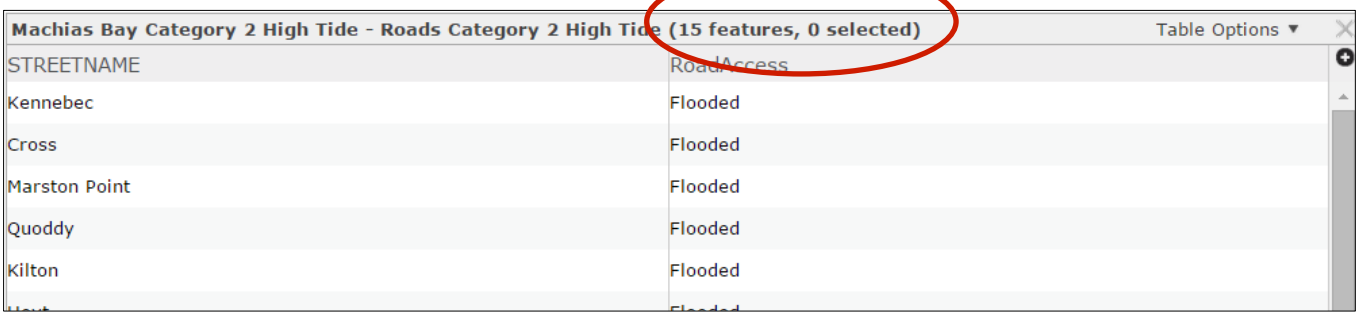
The filter tool allows you to “Display features in the layer that match the following expressions” Choose the field TOWN on the first pull down menu, the middle menu should be “is” and then in the text box to the right type in the value “Machias”. Underneath the text box where you’ve typed Machias, make sure that the button to the left of Value is selected.

Add another expression and choose the field RoadAccess on the drop down menu. Then enter the value “Flooded”.



Click Apply Filter and the table of attributes will show only the records that adhere to the user-generated filter. So by looking through the list of road names in the adjusted table, you can determine which roads are predicted to flood during a level 2 hurricane at high tide.

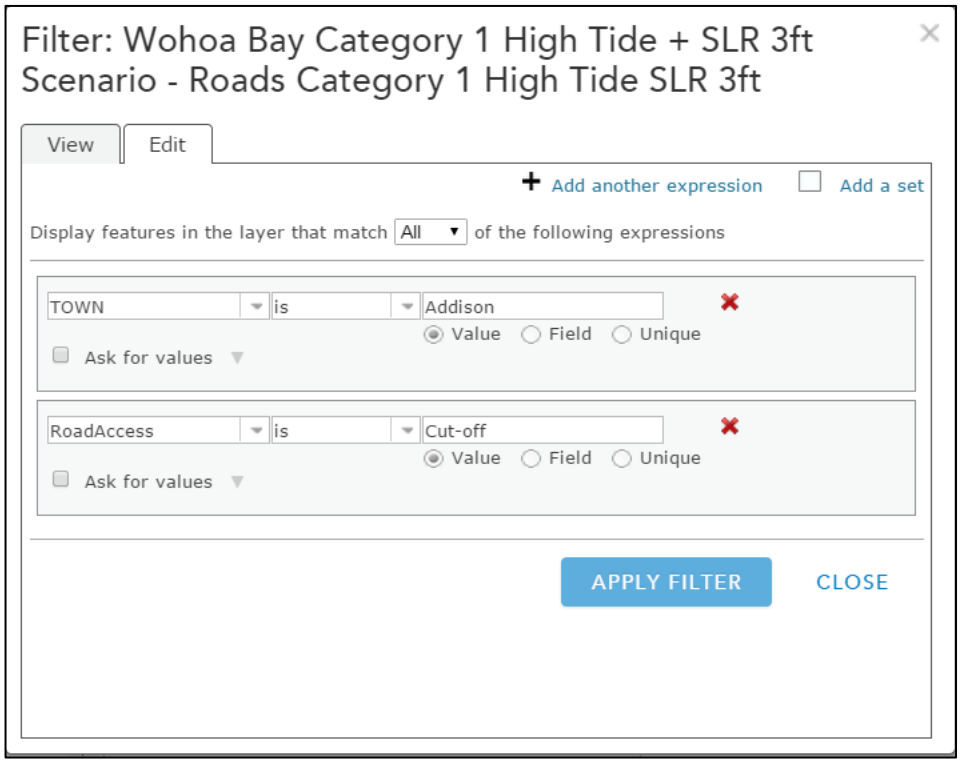
This filter retrieved 15 selected records.



How many roads are cut off in Addison in a category 1 hurricane at high tide accounting for sea level rise?

From the web page http://www.gro-wa.org/washington-county-climate-change-response.htm#WashCoScenarios choose the link for Wohoa Bay scenarios from the second set of links that include 3 feet of sea level rise.

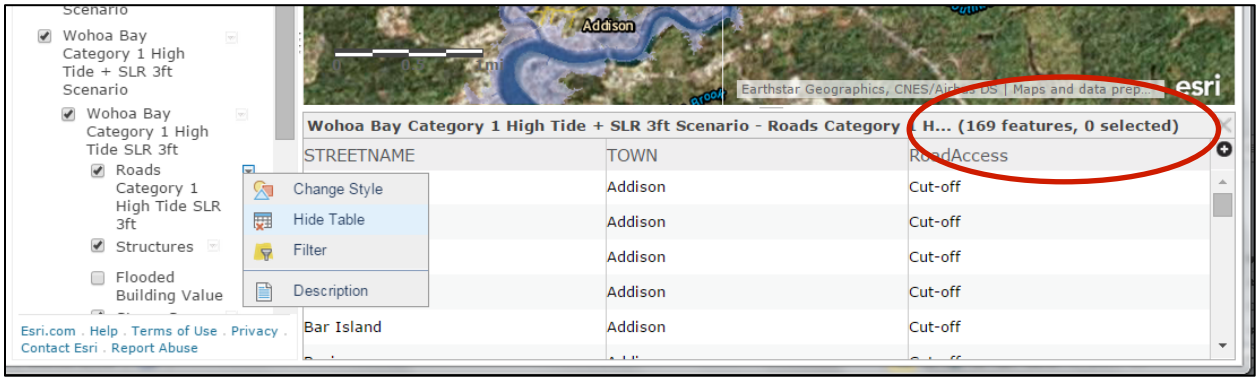
In the contents of the Wohoa Bay Towns- Storm Surge Scenarios map, find the map layers grouped under the heading Wohoa Bay Category 1 High Tide. Click Wohoa Bay Category 1 High Tide, then click on inset title that appears below - Wohoa Bay Category 1 High Tide. Select the down button to the right of the Roads Category 1 High Tide and click on Filter.



Choose the field TOWN on the first pull down menu, the middle menu should be “is” and then in the text box to the right type in the value “Addison”. Underneath the text box where you’ve typed Addison, make sure that the button to the left of Value is selected.

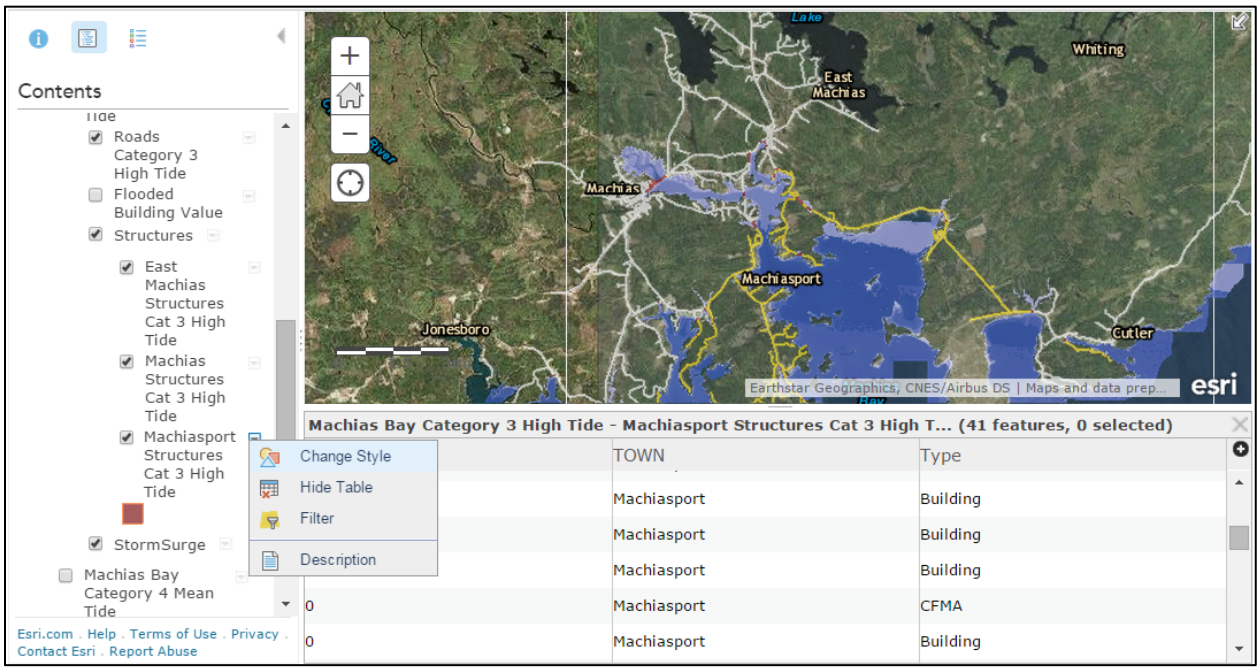
Add another expression and choose the field RoadAccess on the drop down menu. Then enter the value “Cut-off”.

Click Apply Filter. Now click the down button next to the Roads Category 1 High Tide layer heading and choose Show Table from the menu. The heading on the attribute table identifies that 169 records adhere to the filter, which are the road sections cut-off in a category I hurricane at high tide with sea level rise.



How many CFMA (Commerical Fisheries Marine Activities) structures are predicted to flood in a category 3 hurricane at high tide?

In the contents of the Machias Bay Towns- Storm Surge Scenarios map, find the map layers grouped under the heading Machias Bay Category 3 High Tide. Click Machias Bay Category 3 High Tide heading, then click on inset title that appears below - Machias Bay Category 3 High Tide. Click the Structures heading to show flooded structures layers listed by town. Select the down button to the right of the Machiasport Structures Cat 3 High Tide layer and click Show Table.



Structures are sorted by type as building, bridge, or CFMA (commercial fisheries marine activity). Click the down button to the right of the Machiasport Structures Cat 3 High Tide layer and select Filter.

Structures are already sorted into separate layers by town so only one filter for structure type is necessary. Choose the field Type on the first pull down menu, the middle menu should be “is” and then in the text box to the right type in the value “CFMA”. Underneath the text box where you’ve typed CFMA, make sure that the button to the left of Value is selected.

Click Apply Filter and the table of attributes will show only the records that adhere to the user-generated filter. Notice that only 4 records with the attribute type “CFMA” are displayed in the table out of the 41 that were originally displayed, so 4 CFMA structures are predicted to be impacted by a category 3 hurricane at high tide.