Visualizing Flooding to Support Long Term Sea Level Rise Planning

Using the Tool

The Maryland Flood Explorer is a valuable tool for visualizing flooding in a community from the municipal, county, or regional/watershed level. This tool, paired with the <u>Maryland Sea Level Rise Guidance document</u> can help local planners explore different flooding scenarios to understand which parts of their community are vulnerable and how that risk increases over time under different conditions. This can be used to prioritize areas for adaptation and mitigation projects, focus property owner educational efforts, and inform planning and zoning decisions. This tool can be used to support many state mandated planning efforts such as Nuisance Flood Plans (NFP), Hazard Mitigation Plans, and Comprehensive Plans.

Example Scenario

A small waterfront municipality on Maryland's Eastern Shore is working on its Nuisance Flood Plan. Through influxes in <u>MyCoast reports</u>, the town knows that there are three primary locations that experience nuisance flooding through a combination of MyCoast reports and ground truthing by the town's Department of Public Works. According to the <u>guidance</u>, some of the elements of the NFP include:

- 1. Identifying vulnerable community resources and critical facilities
- 2. Identifying underserved and overburdened communities within or near areas that experience nuisance flooding or may be affected by the impacts of nuisance flooding
- 3. Identify processes for communicating risks to communities experiencing new or increased tidal flooding events.

Tool in Action

- Open the <u>Maryland Flood Explorer</u> and enter the name of the town
- Click the **Basemaps & Layers** button and enable the following layer (which can be toggled on and off):
 - \circ $\;$ Under the Society tab, turn on Muni's to show the municipal boundaries
 - Under the Popular tab, turn on MyCoast reports

The screenshots below show the hotspots of MyCoast reports within the municipal boundaries. These can serve a good place to focus initial assessment of vulnerable communities for requirement #2.



- Moving the slider bar up and down, the vulnerable parts of the area are already apparent. The areas at risk increase substantially between a 2050 (1.57 ft) planning horizon and a 2100 (3.65 ft) planning horizon.
- In order to avoid overcrowding the view, it is recommended to turn layers off when not in use.

The screenshots below showcase the sections of this community that are vulnerable to flooding in 2050 and 2100. There are many considerations when setting planning horizons. The type of projects or planning effort, the tolerance to flooding, and the budget can all influence what planning horizon is appropriate. The Maryland SLR Guidance document is a useful tool for making those decisions. Utilizing the steps in the guidance document and these screenshots the planner may decide to focus shorter term nuisance flood planning goals using 2050, but that longer term visioning efforts will use 2100.



Visualizing current conditions:

- Presently, town planners know that many flooding reports already come from MyCoast on days when there are large tide events, thus town planners feel that the 2050 map of SLR may not show the full potential impacts of flooding for their community.
- In this community, it makes sense to use the visualizations that include the high tide flooding. On the slider bar, toggle on the "High Tide Flooding" which will visualize the combined impacts of sea level rise and tidal flooding.
 - Raise the slider to the "Current + Moderate" level to see which parts of the community are at risk with the current sea level and a moderate high tide event.
- Click the **Basemaps & Layers** button and enable the following layer (which can be toggled on and off):
 - **MyCoast** (Located under Add Layers, Popular) This layer shows where MyCoast reports have come in, and categorizes the report by type: High Tide Flooding, Storm Reporter, Coastal Storm Damage, High Water, and Restoration Tracker.



• From here it's possible to see where the MyCoast reports fall in connecting with the current projected flooding under moderate and high tide flooding and as well as how that is indicative of

projected future flooding as exemplified by the 2050 sea level rise projections plus moderate tidal flooding.

These screenshots can be used to identify specific streets and properties that should be listed in the updated nuisance flood plan. Additionally, the planner has chosen to include these screenshots to demonstrate the close connection between the MyCoast reports and the areas of current and projected flooding.

Identifying at risk critical facilities and community resources

To identify the critical facilities and community resources that are at risk in 2050, leave the slider at "2050 SLR + Moderate".

- Click on the **Basemaps & Layers** to import the relevant layers. Upload community-specific layers by choosing to "Upload by File." Layers can be uploaded from desktop files or online map services. There is a list of state-wide datasets provided on the Case Studies page.
 - Suggestion to add layers such as:
 - Hospitals, urgent care facilities, pharmacies, and public schools.
 - Helpful preloaded layers include
 - Parcels (Located under Add Layers, Popular) This shows the boundary for the parcel of interest
 - **Buildings** (Located under Add Layers, Popular) This shows the building footprints.



This screenshot displays the location of SNAP facilities (red dots), pharmacies (green dots), police stations (blue shield), and schools (purple schoolhouse). The layers used in this map are based on state-wide datasets. Community specific datasets may have additional details.

• Flooded roadways are an important potential risk to understand because they can hinder access for services such as mail delivery, school buses, and emergency services. *Something to consider*: This community is on a peninsula so certain critical facilities such as the hospital are located outside of the municipal limits. Understanding the broader context of flood risk is helpful for understanding over flood resilience of the community and can be used in community outreach about flood preparedness.

- Click the depth tool in the right hand corner of the screen. Then select roadways in communities potentially impacted by flooding.
- Now, move the slide up to visualize potential flooding under different tidal and sea level rise scenarios
 - \circ Note: Six inches of water on the roads is enough to reach the bottom of a standard sedan, making control of the vehicle difficult and potential stalling. A foot of water is enough to move a small car. Emergency vehicles use ~10 inches as the cut off for "safe" depth to drive through.



Three locations along roadways that are currently dry under moderate tide conditions were selected. Moving the slider up to 2050 SLR under minor and major flood conditions shows increasing locations where flooding on roadways is potentially an issue. The 0.8 ft of water on the main road off the peninsula in image three is right at the safe limit for emergency vehicles.

Identify processes for communicating risks to communities experiencing new or increased tidal flooding events.

• The third element of NFP is identifying communications strategies for conveying flood risk to communities about increased flood risk. Turning on the parcel data and exploring which neighborhoods are expected to experience flooding currently with major high tide events can be used to identify which parts of the community should be prioritized for flood preparedness outreach campaigns and where the town may want to prioritize adaptation and mitigation projects.



This map highlights priority regions for targeted flood mitigation messaging. These locations are also good locations to consider flood mitigation projects.

Identifying underserved or overburdened communities

- Click the **Basemaps & Layers** button and enable the following layers (which can be toggled on and off):
 - **SVI** (Located under Add Layers, Society) This shows the Social Vulnerability Index created by the CDC.
- The SVI layer can help to inform the second requirement for the NFP identified in this scenario. From the SVI layer, planners can see that the entire region falls within the same category. Click on the legend to see that this community is considered "medium" according to the index. After using the SVI layer, turn it off so that the viewer is not too crowded.



• If a community has additional layers developed specifically for their area, these can be added as files uploaded from the computer or as Map or Feature service layers.