State of Maryland

Nuisance Flood Plan Development Guidance

2024 Update

Photo of Cambridge, MD from MyCoast MD

Wes Moore, Governor | Josh Kurtz, Secretary

State of Maryland

Nuisance Flood Plan Guidance Update

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Table of Contents

Table of Contents **2**
Glossary **3**
Introduction and Purpose **5**
Benefits of having a nuisance flood plan 7
Reflecting on the last five years 8
What are the new recommendations? 11
How to meet the NFP requirement? 11
Nuisance Flooding Plan Development Process **13**
Step 1: Determine your nuisance flooding planning team 13
Step 2: Evaluate and analyze existing plans 13
Step 3: Evaluate impacts to update thresholds as necessary 17
Step 4: Develop the plan with updated recommendations 23
Step 5: Submit the plan 25
Step 6: Implement the plan 26
Conclusion **27**
Related Documents **27**
Other Related Documents **27**
APPENDIX A: Frequently Asked Questions **28**
What is Nuisance Flooding? 28
Do I need a nuisance flood plan? 31
How do I predict tidal flooding? 37
APPENDIX B: Funding Opportunities **38**
APPENDIX C: Adaptation Resources **39**
APPENDIX D: Checklist **41**

Glossary

Adaptation: the process of adjusting to an actual or expected environmental change and its effects in a way that seeks to moderate harm or exploit beneficial opportunities

Coastal Zone: The Maryland coastal zone extends from three miles out in the Atlantic Ocean to the inland boundaries of the 16 counties and Baltimore City that border the Atlantic Ocean, Chesapeake Bay and the Potomac River up to the District of Columbia. This area encompasses two-thirds of the State's land area and is home to almost 70% of Maryland's residents.

El Niño: El Niño and La Niña are two opposing climate patterns, El Niño, sometimes considered a "warm-event" brings warmer waters that cause the Pacific jet stream to move south of its neutral position. With this shift, areas in the northern U.S. and Canada are dryer and warmer than usual. In the U.S. Gulf Coast and Southeast, these periods are wetter than usual and have increased flooding.

Flood Threshold: the values at which flooding occurs, often defined in terms of action, minor, moderate, and major

Green Infrastructure Plan: a plan that identifies a strategically planned network of natural and semi-natural areas with other environmental features, designed and managed to deliver a wide range of ecosystem services, while also enhancing biodiversity

Hazard Mitigation: in a planning context, any sustainable action to reduce or eliminate long-term risk to people and property from future disasters through actions to break the cycle of disaster damage, reconstruction and repeated damage

Hazard Mitigation Plan: prepared and adopted by communities with the primary purpose of identifying, assessing, and reducing the long-term risk to life and property from hazard events

High Tide Flooding: high tide flooding is the overflow or excess accumulation of water that covers typically dry coastal land and occurs during high tides

La Niña: La Niña has the opposite effect of El Niño, sometimes considered a "cold-event," with trade winds even stronger than usual, pushing more warm water toward Asia. Off the west coast of the Americas, upwelling increases, bringing cold, nutrient-rich water to the surface. These cold waters in the Pacific push the jet stream northward. This tends to lead to drought in the southern U.S. and heavy rains and flooding in the Pacific Northwest and Canada. During a La Niña year, winter temperatures are warmer than normal in the South and cooler than normal in the North. La Niña can also lead to a more severe hurricane season.

Nuisance Flooding (NF): high-tide flooding that causes public inconvenience

Nuisance Flood Plan (NFP): a five-year plan executed by jurisdictions to understand, plan, and implement programs to reduce flood risk and increase resilience to nuisance flooding

MDEM: Maryland Department of Emergency Management

MDNR: Maryland Department of Natural Resources

MDP: Maryland Department of Planning

MDE: Maryland Department of Environment

Mean Higher High Water (MHHW): The average of the higher high water height of each tidal day observed over the National Tidal Datum Epoch

Mean Lower Low Water (MLLW): The average of the lower low water height of each tidal day observed over the National Tidal Datum Epoch

NOAA: National Oceanic and Atmospheric Administration

NWS: National Weather Service

Resiliency: the ability to prepare for threats and hazards, adapt to changing conditions, and withstand and recover rapidly from adverse conditions and disruptions.

Tide Gauge: component of a modern water level monitoring station, is fitted with sensors that continuously record the height of the surrounding water level

Underserved and Overburdened Communities: used to describe the minority, low-income, tribal and indigenous populations or communities in the United States that potentially experience disproportionate environmental harms and risks due to exposures or cumulative impacts or greater vulnerability to environmental hazards

Introduction and Purpose

Maryland is known for its beautiful coast lines, vibrant communities, and delicious food. Maryland's coastal counties, jurisdictions that border the Chesapeake Bay and the Atlantic Coast, are home to nearly 70% of Maryland's residents, and are at an increasing risk of nuisance flooding due to high tides, sea level rise, land subsidence, and storm surge. Tropical storms, Nor'easters, high tide events, and unnamed storms continue to lead to detrimental flooding throughout the state. Climate change is leading to rising sea levels and high tides that have consequences for Maryland's coastal jurisdictions, economies, and natural resources. In 2024, many areas along Maryland's coast have already experienced more than 20 nuisance flood days, and by 2050, relative sea level rise is expected to be 1.6 feet.

A local jurisdiction shall:

1. update the plan every five years
2. publish the plan on the local jurisdiction's website
3. submit a copy of the plan to the Maryland Department of Planning (MDP)

To enhance the resilience of every coastal jurisdiction in Maryland and to prepare for the future of increased flooding, the State of Maryland requires that every coastal municipality and county that experiences nuisance flooding submit a nuisance flood plan (NFP) to be updated every five years. Pursuant to Maryland House Bill 1427 (2019), §3-1018(b) and (c), on or before Oct. 1, 2020, a local jurisdiction that experiences nuisance flooding (NF) shall develop a plan to address nuisance flooding. In addition, a local jurisdiction shall update the plan every five years; publish the plan on the local jurisdiction's website; and shall submit a copy of the plan to the Maryland Department of Planning (MDP). This legislation is an update to Senate Bill 1006 and House Bill 1350 (2018). The definition of nuisance flooding in accordance with §3-1001 of the Natural Resource Article is "high tide flooding that causes a public inconvenience." Jurisdictions set flood thresholds at which different decisions are made for activating alerts, watches and warnings, and taking action.

It has been nearly five years since the first nuisance flood plan guidance document was released to provide recommendations for meeting the requirements of the legislation. In that time, Maryland's local jurisdictions experienced unprecedented nuisance flooding, installed numerous nuisance flooding mitigation projects, and developed methods for analyzing and predicting nuisance flood risk. It is our hope that the second iteration of nuisance flood plans will build upon the 2019 documents by not only analyzing collected reports and updating nuisance flood thresholds, but also looking at the community impacts of flooding and how flooding may be minimized moving forward.

This document is an update to the 2019 Nuisance Flood Plan Guidance and incorporates input from reviewers from local and state governments. The guidance provided is advisory and nonmandatory, and is based on the assumption that jurisdictions have already completed a nuisance flood plan, or will in the future. Please see Appendix A to determine location requirements.

The purpose of the updated guidance document is to:

- Assist in the development of nuisance flood plans by providing a step by step approach
- Examine HMPs or other plans for addressing NF requirements
- Provide examples of various types of nuisance flood plans
- Analyze data collected to date and how it may be used to inform the next iteration
- Provide clear details on how to submit your plan and what is acceptable

While the process of developing a NFP may seem challenging, local jurisdictions are already responding to nuisance flood events. This guidance is meant to highlight existing plans, programs and reporting processes and help local jurisdictions navigate not only how they will meet the legislative requirement, but how they plan to address future events to bolster resilience to nuisance flooding and reduce impacts to a jurisdiction's valuable assets. Every coastal jurisdiction may have a different approach to planning, and this document can help create flexibility and accountability in responding to nuisance flooding.

The 2024 Nuisance Flood Plan Guidance suggests a six step process for approaching the 2025 update.

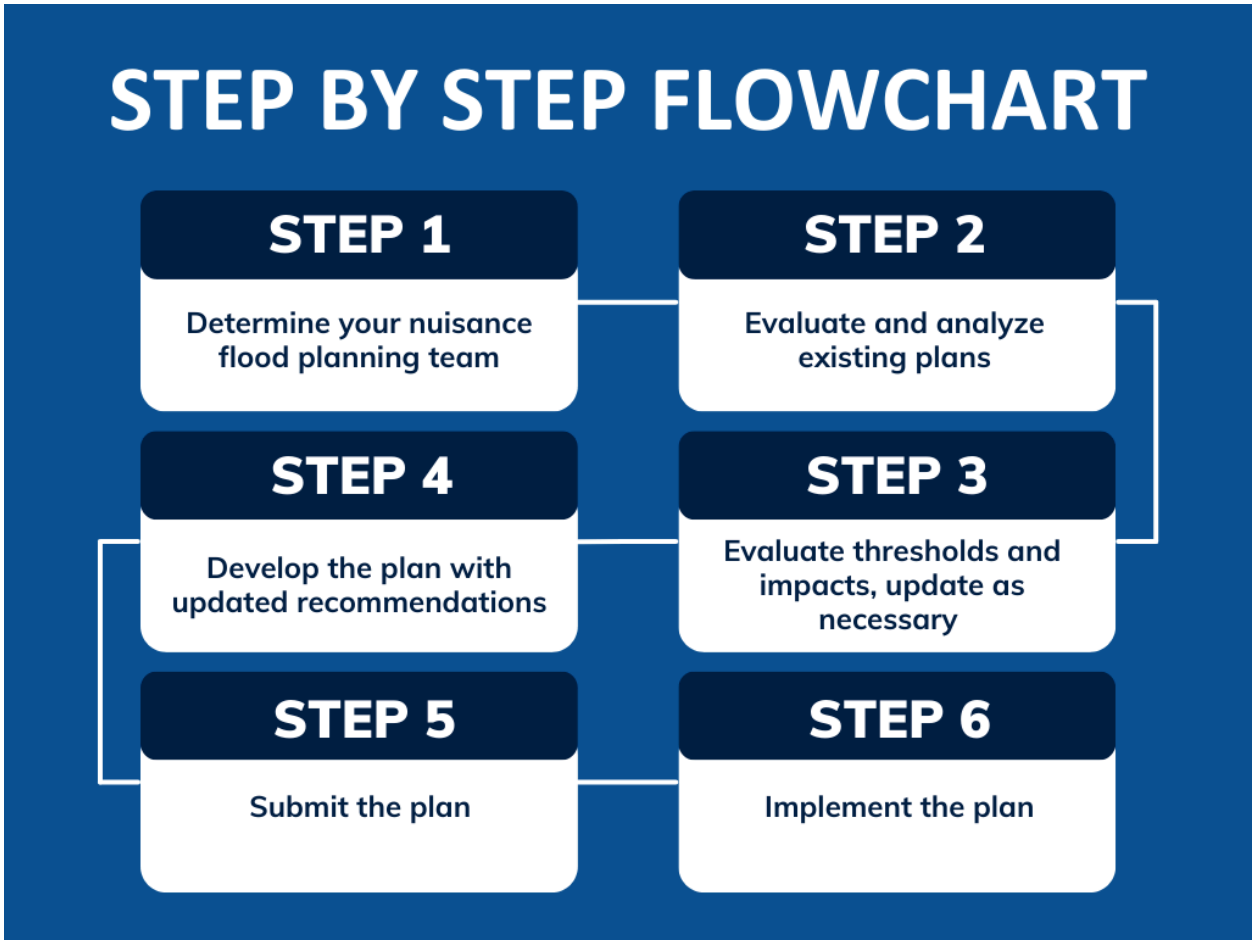


*Figure 1: S*teps to submitting a nuisance flood plan.

Benefits of having a nuisance flood plan

Jurisdictions that border either the Chesapeake Bay or the Atlantic Coast are at risk for an increasing risk of nuisance flooding due to high tides, sea level rise, land subsidence, and storm surge. It is recommended that all jurisdictions, including municipalities, within Maryland's Coastal Zone develop an NFP if they experience flooding that poses a risk to the community, whether it is considered nuisance flooding. For a list of counties and municipalities that are in Maryland's Coastal Zone or already have a nuisance flood plan, see Appendix A.

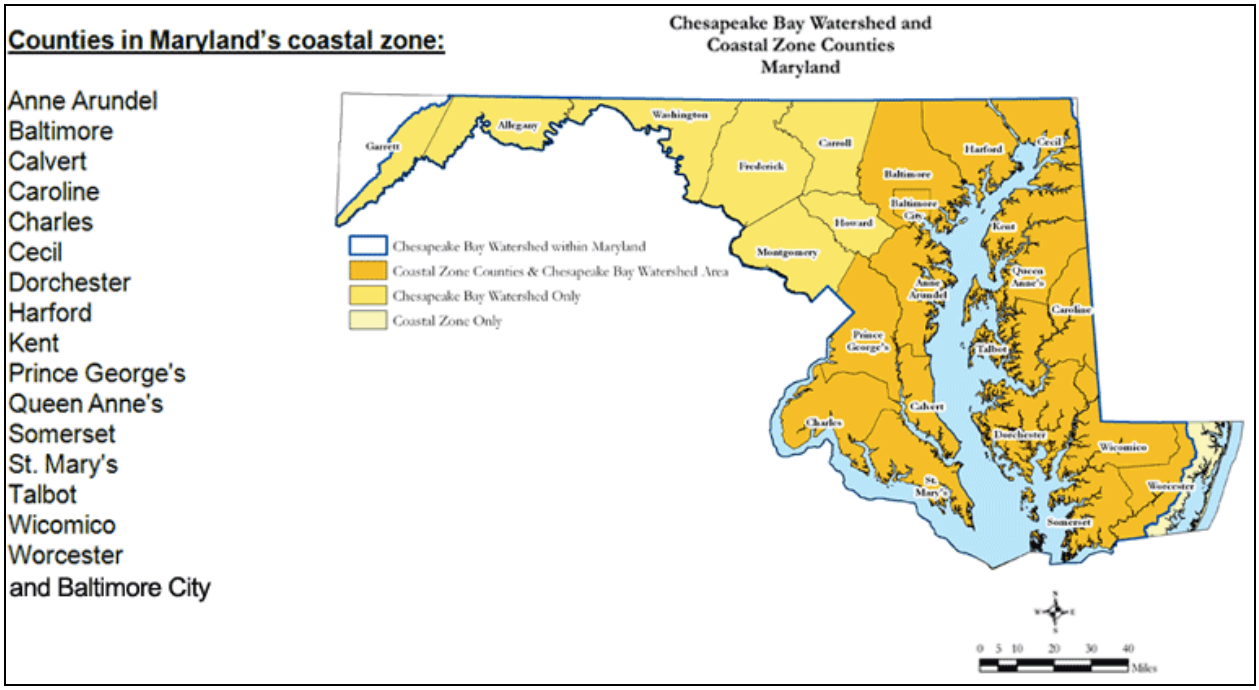


Figure 2: A map of counties in Maryland's Coastal Zone.

Local governments, non-governmental organizations (NGOs), state agencies and consultants can use this guidance document to determine how to meet the legislation requirements. It is essential that the State of Maryland provides a cohesive and comprehensive approach to flood planning, to ensure that our local jurisdictions have the best chance of identifying, adapting to and mitigating flooding impacts. Maryland's unique ecosystems and culturally significant communities offer opportunities to get creative about nuisance flood planning, and following the guidance recommendations can move communities beyond the minimum requirements and facilitate long-term planning to get ahead of the impacts of nuisance flooding.

Additionally, having a nuisance flood plan can help local jurisdictions think about:

- Establishing or updating emergency alert notifications
- Identification and implementation of nuisance flood reduction projects

- Policies and procedures are in place to respond to nuisance flood events
- Linkages to hazard mitigation plans and flood mitigation plans
- Nuisance flood documentation required for grant applications
- Participation in the Community Rating System

Reflecting on the last five years

In 2019, the State released a guidance document to assist Coastal Zone jurisdictions in the creation of a nuisance flood plan following the legislation update. The guidance required an:

- Inventory of known flood hazard areas where tidal nuisance flooding occurs
- Identification of flood thresholds/water levels/conditions that lead to tidal nuisance flooding
- A mechanism to document tidal nuisance flood events and response activities from 2020-2025

Since the guidance was released in 2019, Maryland's Coastal Zone has experienced multiple unprecedented nuisance flood events that were consequential for local jurisdictions. Some notable events that have occurred include:

- August 4th, 2020 – Tropical Storm Isaias on August 4th
    - Declared Disaster, Estimated cost: $13,988,797.94
- September 1-2, 2021 – Remnants of Hurricane Ida
    - Undeclared Disaster
- October 28-30, 2021 – Coastal Flooding Event
    - Undeclared Disaster
- December 2022 – Wind Event
    - Undeclared Disaster
- August 2023 – Wind Event, NWS
    - Undeclared Disaster
- January 9-10, 2024 – January Storm Event
    - Undeclared Disaster

With the exceptions of Tropical Storm Isaias and Hurricane Ida, most events have been unnamed wind, coastal flooding, or rain events. An analysis using the National Oceanic Atmospheric Administration's (NOAA) Coastal Inundation Dashboard using minor flooding thresholds shows that the number of winter coastal flooding days has already surpassed the number of flood events experienced in previous years (*Figure 3 on next page)*.

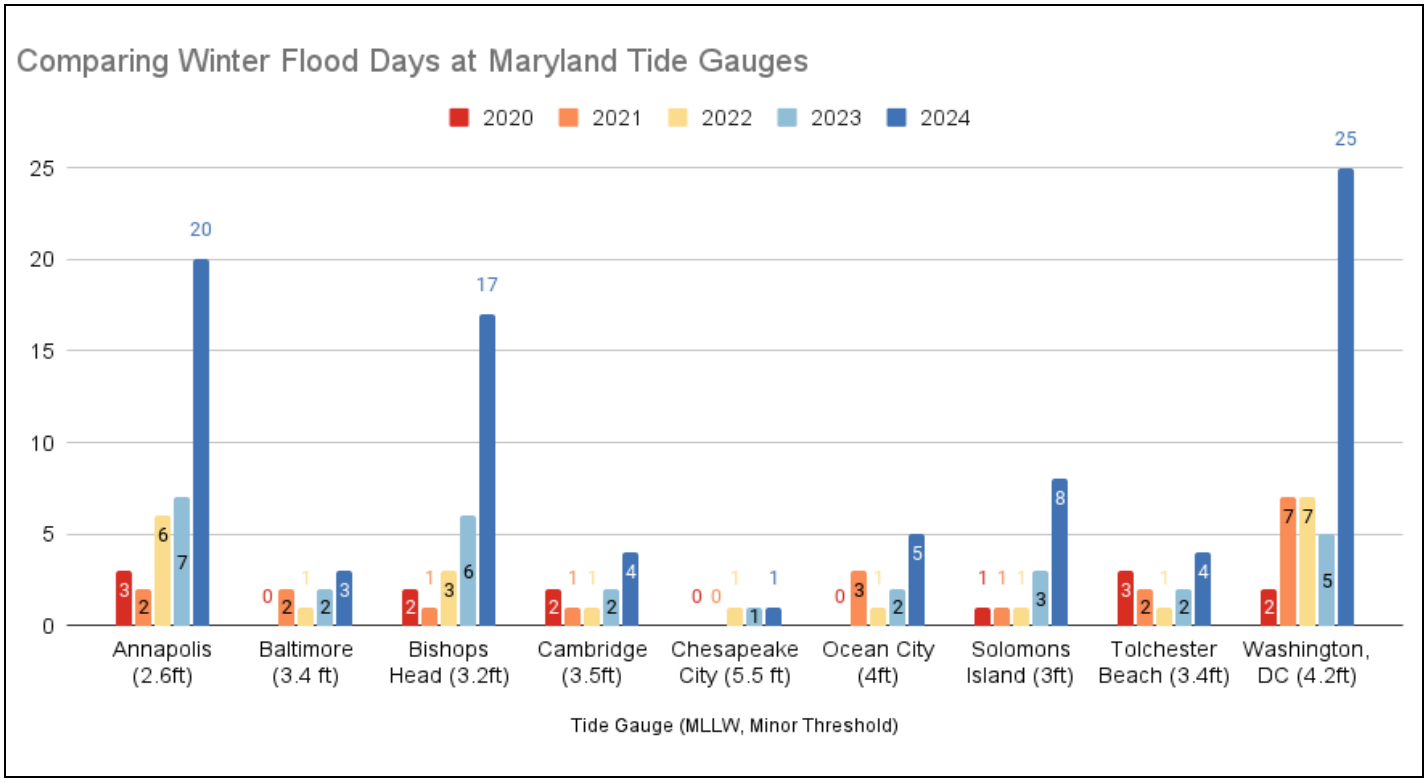


Figure 3: Coastal Flood Days at Maryland and D.C. Tide Gauges analyzed using NOAA's Coastal Inundation Dashboard and MLWW Minor Flood Thresholds.

Increasing nuisance flood days can be attributed to a number of factors including: wind, moon phases, precipitation, El Niño/La Niña, and sea level rise. Due to the variety of factors that influence flooding, it is important to plan for a wide range of scenarios to facilitate comprehensive community resilience. To document flooding over the last five years, Coastal Zone jurisdictions have been using a variety of different tools and documentation methods (see Step 2). One newer tool is MyCoast Maryland, which connects photos of flooding to tidal, precipitation and riverine data to understand the conditions that lead to the flooding. MyCoast MD photos can be submitted by anyone from anywhere in Maryland, which increases available data for analysis. MyCoast MD photos and other documentation tools can be used to show the impacts of the coastal flooding days, and often can expand upon our existing knowledge of a range of flood issues. Since 2020, 1396 reports of flooding have been documented by users across the state on MyCoast MD.

While the increase in flood reports and flood events are not unique to Maryland's Coastal Zone, two Maryland cities are in the top ten locations of frequent nuisance flooding in the U.S. according to NOAA (*Figure 4*).

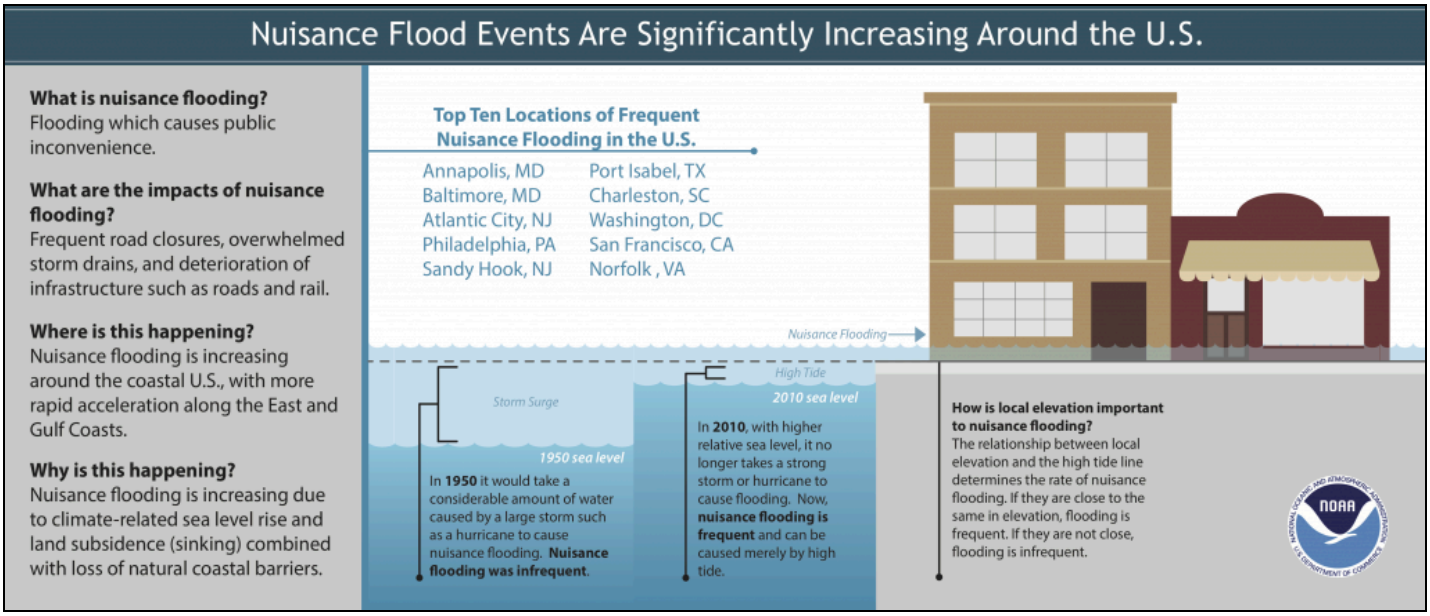


Figure 4: Shows nuisance flooding leading to impacts on infrastructure, NOAA Infographic. See Appendix A for a larger version of this image.

In recognition of the unprecedented flood events in the last five years, we felt it necessary to provide an updated nuisance flood plan guidance that incorporates new recommendations, tools, and actions to best support jurisdictions in their nuisance flood mitigation and adaptation. The following pages detail recommendations and updates to make when writing the 2025-2030 NFPs.

Figure 5: An employee measures the high water line on a building in downtown Annapolis after the January 9 flooding. Photo by Dylan Taillie.

What are the new recommendations?

The 2024 update encourages Coastal Zone jurisdictions to further expand upon the 2019 recommendations. To prepare for the next round of nuisance flood plans, jurisdictions that previously submitted nuisance flood plans were contacted to provide input for the new recommendations.

An updated nuisance flood plan could include:

1. **A description or summary of sources of flooding** (fluvial, pluvial, riverine), for example identification of areas where precipitation events cause flooding that impacts or exacerbates tidal nuisance flooding
2. An **analysis of the documented reports** (2020-2025) to date and determine if they were submitted from areas identified in the 2020 plan, or if they are in new areas
3. **Identification of vulnerable community resources**, critical facilities and jurisdiction-identified infrastructure impacted by flooding, i.e health centers, schools, fire departments, etc.
4. **Identification of underserved and overburdened communities** within or near areas that experience nuisance flooding or may be affected by the impacts of nuisance flooding
5. **Connections to or incorporation into existing plans**, such as hazard mitigation, comprehensive, green infrastructure plans, emergency evacuation plans (see Step 2)
6. **Prioritized flooding areas for action** or further study and identification of projects to mitigate or adapt to flooding within the next five years
7. **Process for communicating increasing flood risk**, especially to areas experiencing new or increased tidal flood events, or areas that may experience flooding in the future
8. **Evaluation of existing policies and ordinances** and whether they meet flood planning needs and whether they cover both inventoried and future flood areas
9. **Identification of potential funding sources** and partnerships for identified projects

How to meet the NFP requirement?

A nuisance flood plan should be adaptive and flexible and should pull together knowledge from various local jurisdiction departments and programs that may already be addressing flood impacts from planning to emergency management to public works. There is no one way for a local jurisdiction to meet the requirement and there may be existing planning documents or processes that fulfill the requirement (see Step 2, or the checklist in Appendix D).

Two options for submitting an NFP include:

- Creating a new or an updated nuisance flood plan for 2025-2030
- Submitting a related planning document that addresses the above recommendations, for example, a hazard mitigation plan
    - For all submissions, include a cover letter with a 1- to 2-page explanation on jurisdiction-based letterhead explaining:

- What is contained in the plan?
- How does the plan meet the requirements of the law?
- How was the plan adopted or approved?
- Where is the plan publicly available?

To submit a nuisance flood plan, local jurisdictions are required by statute, to post the plan on their website (provide website link) and send a copy (pdf), along with the letter, to the Maryland Department of Planning at Deborah Herr Cornwell (deborah.herrcornwell@maryland.gov). MDP and partner agencies will review the plan and respond back with questions and comments if there are any, and will confirm in writing that the plan has been received and approved.

There may be technical and financial assistance available to communities to meet this requirement through the Maryland Department of Natural Resources. For more information, please contact Sasha Land at sasha.land@maryland.gov or (410) 260-8718, or review the list of funding opportunities in Appendix B.

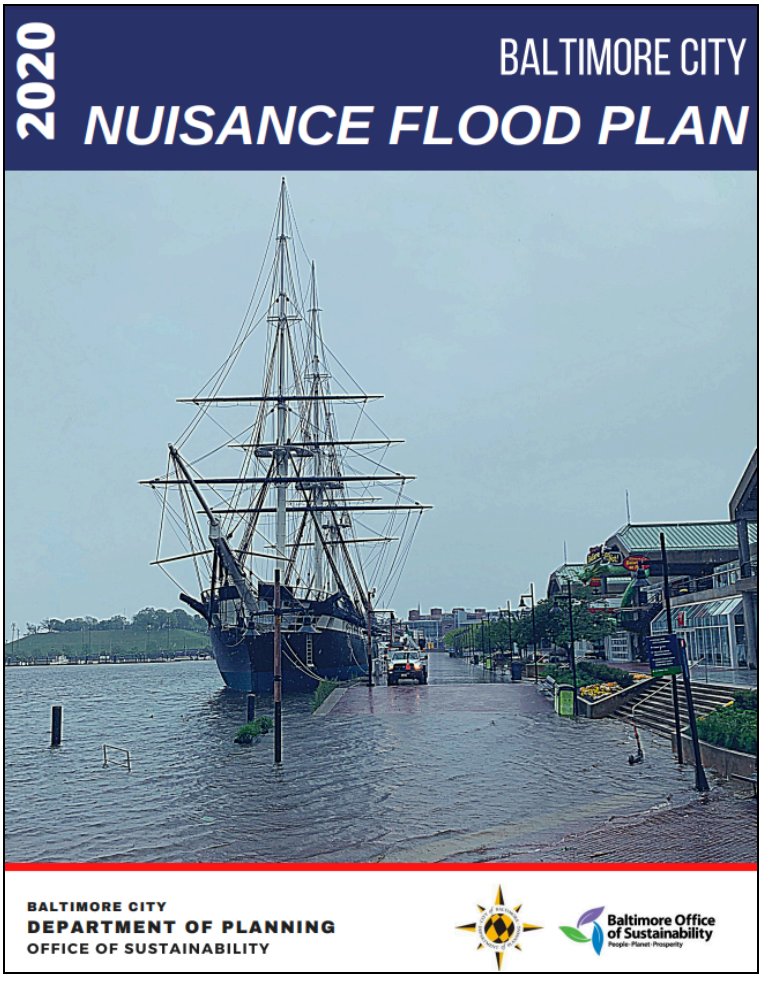


Figure 6: The cover of Baltimore City's 2020 Nuisance Flood Plan. NFPs can take on different forms, and may be incorporated into other existing plans, such as hazard mitigation or flood mitigation plans.

Nuisance Flooding Plan Development Process

Step 1: Determine your nuisance flooding planning team

Successful adaptation and long-term risk reduction to nuisance flooding depends on a jurisdiction's involvement of local leaders and decision makers to respond to the impacts. Jurisdictions in the Coastal Zone should consider if they will be able to meet the requirement on their own or if they should work with their affiliated county to fulfill the requirement, similar to Hazard Mitigation Plans. Step 1 involves identifying team players or departments that may have an interest or role in nuisance flood planning. If a jurisdiction is updating an existing nuisance flood plan, this step could start with a reconvening of the previous nuisance flood plan team and an evaluation of team membership. After getting together and discussing the different aspects of the nuisance flood plan requirements, decide who will take a lead role in writing or updating the nuisance flood plan. To ensure the plan accurately addresses the concerns of the community, consider creating a diverse nuisance flood planning workgroup that works within and across local jurisdictions and meets regularly. Your jurisdiction may have a pre-existing workgroup such as a hazard mitigation planning committee which can serve as a nuisance flooding planning committee. Potential representatives could include:

- Planning and Zoning
- Geographic Information Systems (GIS)
- Public Works
- Elected Officials
- Emergency Management
- County & Municipal Representatives
- Transportation
- Community Stakeholders
- Chamber of Commerce
- Water-Dependent Industry
- First Responders
- Nonprofits
- Parks and Recreation
- Stormwater Management

Step 2: Evaluate and analyze existing plans

Step 2 should focus on the existing nuisance flood plan and other related documents that have been produced since 2020. Once your team is assembled, review the nuisance flood plan legislation:

- Maryland House Bill 1427 (2019), §3-1018(b) and (c)
    - states on or before Oct. 1, 2020, a local jurisdiction that experiences nuisance flooding (NF) shall develop a plan to address nuisance flooding. In addition, a local jurisdiction shall update the plan every five years; publish the plan on the local jurisdiction's website; and shall submit a copy of the plan to the Maryland Department of Planning (MDP).
- HB 1427 (2019) is an update to Senate Bill 1006 and House Bill 1350 (2018)
- 2019 State of Maryland Nuisance Flood Plan Guidance Document

Next, review your *existing* nuisance flood plan or other relevant documents and answer the following questions using the plan:

- What are your current flood hazard areas? What are future flood hazard areas?
- Who and what are most affected by flooding?
- What are your identified flood thresholds at which nuisance flooding occurs?
    - Action, Minor, Moderate, Major?
    - Do you use Mean Lower Low Water (MLLW) or Mean Higher High Water (MHHW) tidal datums? Other?
    - What are the known flood hazard areas where tidal nuisance flooding occurs?
- How are you documenting nuisance/tidal flooding events and response activities?
    - Is this working for you?
    - Is this providing the data you need?

Keep these questions in mind as you start thinking about what's needed in your updated plan.

A. Locations Identified by County Roads Staff and NFP Workgroup Members

Location	Notes from County Roads and NFP workgroup members
Eastern Neck Road - ENI-NWR	regularly under water at significant tide - entrance bridge to Bogles Wharf Road
Bogles Wharf Road - ENI-NWR	regularly under water at significant tide - entire road can flood
Grays Inn Landing Road	whole length of road can flood. 3 homes along the water and a public landing will flood
Allen's Lane	Bay can come up the ditches (worse on Allen's Lane than Green Lane) - almost entire length of road can be impacted
Green Lane	Bay can come up the ditches - approximately 200' back from the Bay

Figure 7: Provides an example of a flood hazard area inventory from Kent County's Nuisance Flood Plan

Other existing plans and reporting processes (i.e., 911 calls, DPW road closures, etc) may also hold the answers to these questions, and meet the NFP requirement. If you do not currently have a nuisance flood plan, think about how the following plans could be used to meet the nuisance flood plan requirements for 2025. If you still cannot answer the above questions using the existing or comparable documents, please see Step 3 for identifying a flood threshold.

Flood Mitigation Plan (MDEM): If your jurisdiction has a flood mitigation plan, does it include any of the nine components listed on pages 7-8? If it does, how? If not, what information does it provide that could meet the NFP requirements?

Hazard Mitigation Plans (HMP, MDEM): your jurisdiction's HMP is a logical place where you might address nuisance flooding. Review your current hazard mitigation plan, and hazard profile for flooding. Does it include any of the components listed on page 6 of this document? If it does, how? If not, what information does it provide that could meet the NFP requirement? What could you incorporate into your HMP for it to meet the NFP requirements?

- Your county's hazard mitigation plan should include a methodology for assessing flood risk in your jurisdiction. This will include the frequency and severity of flooding as well as projected impacts. An HMP likely covers multiple types of flooding – for it to also cover your NFP, nuisance tidal flooding needs to be thoroughly analyzed. Your county's hazard mitigation plan should detail community assets that are impacted by various types of flooding. The nuisance flood plan can utilize these datasets to expand on the understanding of NF in your jurisdiction. Additionally, a nuisance flood plan can be added as an appendix or portion of the jurisdiction's HMP. Should your jurisdiction elect to meet the requirement through HMPs, key questions to consider might be: in the next required update to the hazard mitigation plan, how might you expand the flood hazard element to include nuisance flood events and how could you incorporate mitigation/adaptation strategies that address nuisance flood impacts?
    - Any Nuisance Flood Plan submitted as an element of a Hazard Mitigation plan is subject to review by MDEM and FEMA. Additionally, applicants seeking to satisfy NFP requirements within the jurisdiction's Hazard Mitigation Plan must notify MDEM of this intent to ensure proper review processes are adhered to.

Example of Incorporating NFP into a Hazard Mitigation Plan

In 2020 Queen Anne's County incorporated their nuisance flood plan into their hazard mitigation plan as "Appendix H." The plan states "A review of existing county floodplain management information and existing infrastructure was completed. In addition, the 2019 Multi-Jurisdictional Hazard Mitigation Plan was reviewed and integrated, as appropriate, into the plan development process. An additional data collection tool was used to inform this planning process the Fire, Rescue, and 9-1-1 Communications Survey Form." The plan builds upon the hazard mitigation plan following the guidance recommendations and can serve as an example of how to do a detailed site analysis.

You may find a link to the Queen Anne's County Nuisance Flood Plan here.

Stormwater Management Plans (MDE): possible stormwater management plans that reference nuisance flooding could include total maximum daily load (TMDL) implementation plans, watershed studies, National Pollutant Discharge Elimination System (NPDES) permit restoration or stormwater retrofit plans, and stormwater infrastructure improvement plans. If a jurisdiction has one of these plans, ask what are potential co-benefits? A nuisance flood plan could be used to meet some of the projects identified by one of these other plans.

Critical Area Program: Existing components of a jurisdiction's local Critical Area program may support efforts to reduce nuisance flooding or enhance climate resilience, and therefore may be appropriate to reference in the NFP. Local programs already include requirements related to stormwater management, planting shorelines, and use of fees-in-lieu. A local jurisdiction could reference nuisance flooding in these requirements or look at changes to the local Critical Area Program requirements to provide even greater benefits to address flood events. Suggested strategies include requiring enhanced stormwater management in certain development situations, using fees-in-lieu for mitigation projects that also address nuisance flooding, or adjusting local Critical Area program planting strategies to focus on resilience.

- In May 2024 legislative updates were made to the Critical Area Act, incorporating considerations for climate resiliency and equity and environmental justice into the Critical Area Law. Chapter 424 of the 2024 Laws of Maryland will require jurisdictions to update their local programs to identify areas vulnerable to climate change, incorporate mitigation and adaptation measures that address coastal impacts of climate change, and enhance the climate resilience of the Critical Area. Commission staff are in the process of developing guidance and establishing regulations that will assist local jurisdictions with those tasks. While specific measures may differ for each jurisdiction, the purpose of those measures will be to address sea level rise, saltwater intrusion, wetland migration, storm surge, precipitation-induced flooding, and nuisance flooding. Commission staff can work with interested jurisdictions to incorporate climate resiliency provisions into their Critical Area program. For more information, please contact the Critical Area Staff member for your jurisdiction. Contacts can be found through this link.
- In addition to incorporating measures for climate resilience, Chapter 424 of the 2024 Laws of Maryland requires local jurisdictions to identify underserved and overburdened communities within the Critical Area; provide measures to ensure equitable distribution of benefits and burdens of development, restoration, and mitigation; and ensure equity in the public participation process. The nuisance flood plan could also identify underserved and overburdened communities within vulnerable areas inside and outside the Critical Area.

Example of Coastal Resiliency in Local Critical Area Program

In 2017 the Town of Oxford updated its local Critical Area Program to address nuisance flooding by adding provisions that require stormwater management for projects less than 5,000 sq. ft.; require replacement of tree removal in urban areas; and require the planting of select native species that are more robust and resilient to saltwater and poor soils for select projects along the shoreline. The purpose of these provisions was to encourage stormwater retention on-site and protect the shoreline in an effort to minimize nuisance flooding in the town.

For more information on this case study and other strategies to address nuisance flooding and coastal resiliency, please refer to the Critical Area Commission's 2016 Critical Area Coastal Resilience Planning Guide.

Green Infrastructure Plan: Does your jurisdiction have a Green Infrastructure Plan? Are there elements of that plan that identify areas of nuisance flooding and use a green infrastructure approach to address tidal flood impacts? Does it include any of the recommended components listed on page 7-8? If so, how? If not, what information does it provide that could meet the NFP requirements?

Example of a Green Infrastructure Plan that Incorporates Flooding:
The Talbot County Green Infrastructure Plan Update completed in 2021 identified sea level rise and flooding as risks to green infrastructure. See step 4 for an example of flood assessments and maps that could be incorporated into a nuisance flood plan.

The Talbot County Green Infrastructure Plan Update can be accessed at this link.

Comprehensive Plan (MDP): Does your comprehensive plan address any of the critical components listed on pages 7-8 of this document? If so, identify where it is included. If not, this information could be included in one or more of the comprehensive plan elements – Development Regulations, Sensitive Areas, Transportation, Water Resources, Community Facilities, Goals & Objectives, Land Use, Municipal Growth and/or Fisheries. While the NFP components may not fit within one element, the NFP would likely be considered in many of the comprehensive plan elements. Any local nuisance flood plans proposed as comprehensive plan amendments or functional plans must be submitted to Planning for 60-day interagency review under State law [Section 3-203(c)], Land Use Article.

Reminder: If existing plans are used to satisfy the submission of nuisance flood plan, each jurisdiction is responsible for documenting how the varying plans will support each other in the 1-2 page explanation provided to MDP.

Step 3: Evaluate impacts to update thresholds as necessary

In Step 3, look at your answers to the questions you asked in Step 2. What work is already occurring? Where are there gaps? How is existing data being used? How is flooding in your community changing over time? This section will help you approach understanding the current flood impacts to identify future planning goals, and help identify high priority projects and risk areas.

Reviewing Documented Tidal Nuisance Flood Events

Documenting flooding is important for numerous reasons. Reports of flooding can be used to determine impacts to public safety, assess frequency and duration of flood events, identify project opportunities, and more. There are a wide variety of tools used to document flooding throughout the state. In this step, review your documentation requirements.

The 2019 NFP Guidance suggested that documentation of flood events include:

- Date
- Time
- Type of event (high tide, storm, hurricane, etc.)
- Extent of flooding
- Damage information
- Estimated cost of damage
- Impacts to access

For 2025 this is expanded to include: recent weather (wind, rain), tidal stage, and precise coordinates.

Developing a flood documentation database can help standardize data and ensure continuity across the years. Having one platform for flood documentation, or one person who manages the data can facilitate this. Different spreadsheets and databases can be used, and Geographic Information System (GIS) software can be a valuable tool in comparing documented flooding locations to sea level rise and high tide flooding data. According to a survey of flood planners, the most common tools in Maryland for documenting flooding include: MyCoast, 911, email, 311, and jurisdiction-created nuisance flood logs.

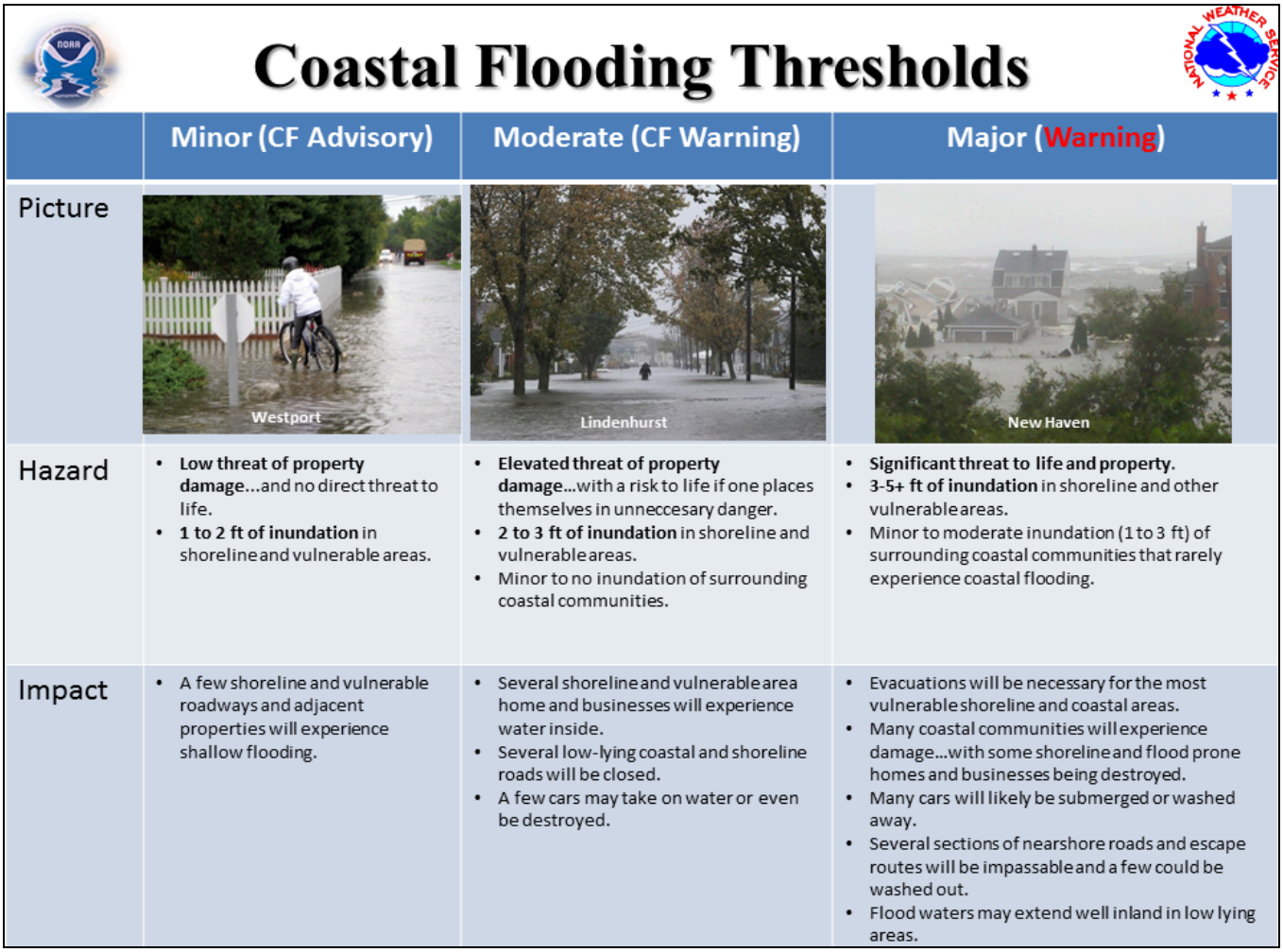
Table 1: Compares different flood documentation tools that jurisdictions use.

Tool	**When to use**
MyCoast MD	Non-emergency: use to capture a photo of tidal, precipitation, or riverine flooding
Email	Non-emergency: use for asking questions, sharing videos
Flood Log	Non-emergency: use for internal documentation
311	Action required: use when there is action to be taken, for example closing a road
911	Emergency: call 911 when there is imminent threat to life as a result of flooding

Ask yourself: are we receiving the right information? Are flood events being accurately captured? Is the data sufficient to inform decision making? Were there new flood areas documented that were not included in the first nuisance flood plan? Who is submitting the reports? Are you reaching the intended audience? Does everyone know about the tools? What is the extent of the flooding? Is there mitigation that needs to occur? Adaptation? What is an acceptable amount of flooding?

Reviewing Flood Thresholds

Floods are determined when certain flood thresholds are exceeded. In 2019, the original guidance document recommended that the nuisance flood plans identify flood thresholds. Documented reports of flooding can help visualize flooding at certain thresholds and ground-truth predictions. Use documented reports to evaluate your flood thresholds and whether they should be updated. If you don't have a flood threshold identified, you should identify the nearest tide gauge (or most representative tide gauge) and view the existing action, minor, moderate, and major flood stages.



Coastal Flooding Thresholds

	Minor (CF Advisory)	Moderate (CF Warning)	Major (Warning)
Picture	Westport	Lindenhurst	New Haven
Hazard	• **Low threat of property damage**...and no direct threat to life. • **1 to 2 ft of inundation** in shoreline and vulnerable areas.	• **Elevated threat of property damage**...with a risk to life if one places themselves in unneccesary danger. • **2 to 3 ft of inundation** in shoreline and vulnerable areas. • Minor to no inundation of surrounding coastal communities.	• **Significant threat to life and property.** • **3-5+ ft of inundation** in shoreline and other vulnerable areas. • Minor to moderate inundation (1 to 3 ft) of surrounding coastal communities that rarely experience coastal flooding.
Impact	• A few shoreline and vulnerable roadways and adjacent properties will experience shallow flooding.	• Several shoreline and vulnerable area home and businesses will experience water inside. • Several low-lying coastal and shoreline roads will be closed. • A few cars may take on water or even be destroyed.	• Evacuations will be necessary for the most vulnerable shoreline and coastal areas. • Many coastal communities will experience damage...with some shoreline and flood prone homes and businesses being destroyed. • Many cars will likely be submerged or washed away. • Several sections of nearshore roads and escape routes will be impassable and a few could be washed out. • Flood waters may extend well inland in low lying areas.

Figure 8. Example of different flood thresholds from NWS.

If flood thresholds are still representative of the flooding you are experiencing, the amount of flood days you've experienced should match the recorded number of flood days at your selected tide gauge. If you feel like you have been experiencing more flood days than you have set or received alerts for, your flood thresholds may be too high. For example, if your flood threshold is 2.6ft, and you received 6 alerts for coastal flooding, but actually experienced 10 nuisance flood days, 2.0ft might be more representative. Consider what factors might be influencing the increase in the extent of flooding to assist in planning. One way to analyze if the flood thresholds you selected are still representative of nuisance flooding is by visualizing the number of coastal flood days that met a certain threshold through the NOAA Coastal Inundation Dashboard – follow the steps here, which are also summarized below.

1. Identify your county or jurisdiction's flood threshold in your NFP
    a. If you do not have an identified flood threshold, consider the following two options:
        i. NOAA Coastal Inundation Dashboard: Zoom into Maryland and select your most-representative tide gauge. Click on it to view the minor, moderate, and major flood thresholds
        ii. National Water Prediction Service: Zoom into Maryland and select your most-representative tide gauge. Click on full information on the right side of the screen and scroll down to "Vertical Datum Table" to see current flood thresholds (Annapolis Example). Review the action, minor, moderate, and major levels.

Selecting a tide gauge: you may choose to select the tide gauge that best represents or is the closest to your jurisdiction. In some instances, a further tide gauge may be more representative of the project area. For example, Hoopers Island in Dorchester County is closest to the Solomons Island tide gauge, but would be better represented by the Cambridge tide gauge because it is on the same side of the Bay.

2. Determine which flood threshold you are most interested in – you could conduct this analysis for all thresholds, or start with the action level to determine how many action-flood days you've experienced in the last five years.
3. Go to the NOAA Coastal Inundation Dashboard
4. Locate the tide gauge of interest and click on it
5. In the bottom left corner of the pop up click "Inundation History Page"
6. Click "Historical Flood Days"
7. Scroll down and click "recompute using user-specific elevation"
8. Input the threshold you've identified
9. Click "Update"
10. Review the generated chart and consider the following questions to update your flood threshold.

The NOAA Coastal Inundation Dashboard will allow you to understand how many flood days your county or jurisdiction has experienced in a certain year or season by providing an updated chart using your selected tide gauge. Ask yourself:

- Are there more or less days than expected? Do the predicted days match the number of reports you have received?
    - If there are more days than expected – is it possible that local reports of flooding were not submitted for a particular day? Is it possible that the flooding was not considered severe enough to warrant a response?
    - If there are fewer days than expected – do your reports of flooding show that there were more flood events than were registered? Does the flood threshold need to be lowered to account for increasing frequency of flooding? For example, if your threshold for minor flooding is 2 ft, and the coastal inundation dashboard suggests that there have been ten flood days, but you have 15 days of flood reports, consider adjusting the threshold to a lower inundation (i.e. 1.6 ft) to adjust to what your jurisdiction considers as flooding.
- Are the coastal flood thresholds representative of nuisance flooding in your jurisdiction? Does nuisance flooding occur below the current thresholds?
- How do you communicate flood risk? When a flood threshold is reached, what should residents know? Does your jurisdiction distinguish between nuisance flooding and the National Weather Service's (NWS) coastal flood alerts? How has your community response evolved over the last five years? What should you do moving forward?
- Is the method of flood documentation still satisfactory?
- What data is missing?
- Should the NWS coastal impact statements and/or flood stages be updated? This can be done by contacting your local NWS representative.

Example: Using MyCoast MD to Evaluate Number of Flood Days

One way to review the established thresholds is by using reports of flooding to match what the tide gauges registered to what was experienced in real time. MyCoast Maryland is one example of how the number of reports received during a certain time period can indicate the extent and frequency of flooding. For example, as of May 6, 2024, MyCoast MD had received reports of flooding on 21 different days from Deal Island residents. Using the flood thresholds identified for the nearest tide gauge, Bishops Head, it was determined that as of May 6, 2024, Bishops Head had registered 21 different flood days. In this situation the days of reports and the number of flood days matched. On the contrary, Anne Arundel County has 27 different days of reported flooding on MyCoast MD, but only 20 registered high tide flooding days according to the Coastal Inundation Dashboard.

View this scribe to learn how to access MyCoast MD data.

Ask yourself: Are the flood days different because some reports are of precipitation based flooding and

not tidal flooding? Are the flood thresholds too high, and thus not registering as flood days? Are the flood thresholds too low and capturing flooding that is not nuisance flooding? What are people reporting as flooding? What impacts are you seeing on the ground?

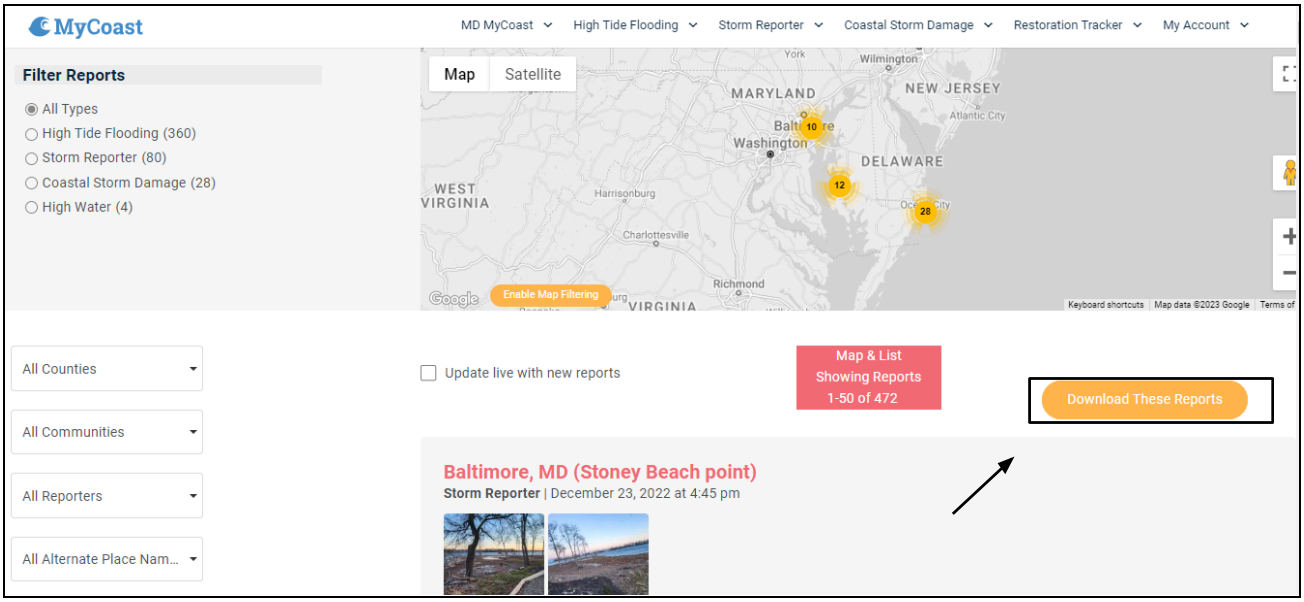


Figure 9: shows the button for downloading reports on MyCoast. Go to MD MyCoast, "Search Reports."

Identifying High Risk Areas to High Tide Flooding

Existing reports and tidal data, such as roadway inundation and flood exposure maps, can help inform decision making. Please review the tools in the appendix to determine high priority areas based on current and future flooding. Note that MyCoast Reports can be pulled into any mapping application and can be used to analyze where existing flooding is occurring. See Appendix A for tools and tips.

Ask yourself: is flooding occurring beyond our known flood hazard areas? Have we received reports from new areas? How many reports of flooding are we getting from each area? Do the tidal layers and sea level rise layers expand beyond our known hazard areas? Where is flooding likely to occur in the future?

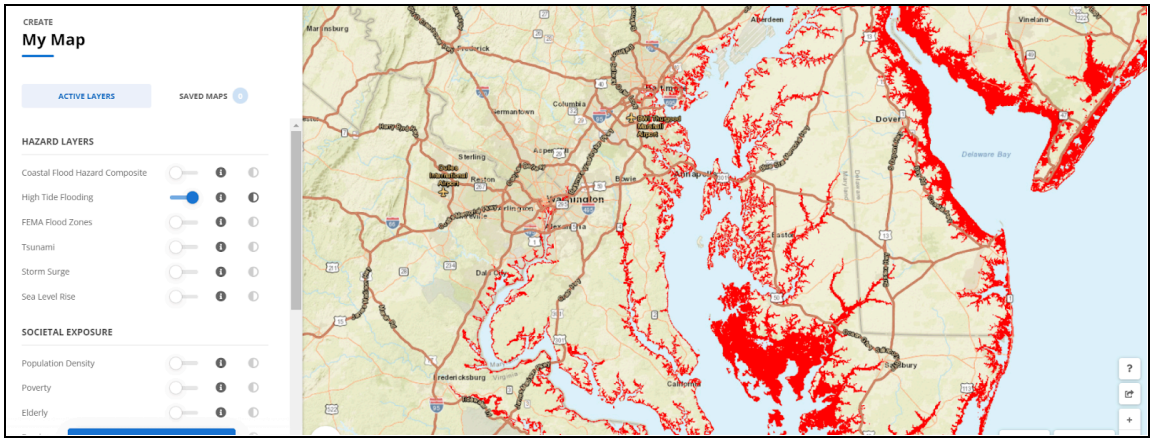


Figure 10: A screenshot from NOAA's Coastal Flood Exposure Mapper showing high tide flooding.

Step 4: Develop the plan with updated recommendations

In Step 4, it's time to move beyond 2020-2025 and look towards the future – how is your county or jurisdiction going to approach flooding in the next five years? What are your short term and long term priorities? Use the existing documents and your answers to the previous questions to update your nuisance flood plan with the following recommendations:

Evaluating Risks and Opportunities

1. **A description or summary of sources of flooding** (fluvial, pluvial, riverine)
    a. This could include an identification of areas where precipitation events are causing flooding that impacts or exacerbates tidal flooding. One way to do this is through qualitative analysis and review of documented flood events – what were the conditions that lead to the flooding? Were there high winds? High tide? Full moon? Did it rain during a high tide?
    b. What happens when the river is bankfull? Does this lead to nuisance flooding?
2. An **analysis of the documented reports** (2020-2025) to date and determine if they were submitted from areas identified in the 2020 plan, or if they are in new areas (see Step 3)
3. **Identification of vulnerable community resources**, critical facilities and jurisdiction-identified infrastructure impacted by flooding, i.e health centers, schools, fire departments, etc.
    a. Your county's Hazard Mitigation Plan could be a good place to start when researching vulnerable community resources. The State Hazard Mitigation Plan also provides an analysis of vulnerable infrastructure in the state.
    b. The NOAA Coastal Flood Exposure Mapper has layers for social vulnerability and infrastructure exposure.
    c. The MDOT Climate Change Vulnerability Viewer has layers that can be turned on for: airports, hospitals, wastewater treatment plants, and historic properties. This is in addition to its tools and layers that show flood inundation depth grids, roadway inundation, and the Coast Smart Climate Ready Action Boundary (CRAB).
    d. This could include a map, a list, a table, etc.
4. **Identification of underserved and overburdened communities** within or near areas that experience nuisance flooding or may be affected by the impacts of nuisance flooding
    a. The following tools can be used as means of identifying environmental justice communities, in addition to internally reflecting on what areas have received more funding or projects than others.
        i. Maryland Park Equity Mapper
        ii. Maryland Environmental Justice Screen
        iii. Maryland Climate Equity Mapper
        iv. MDE EJ Screening Tool

v. Climate and Economic Justice Screening Tool
vi. This could include a map, priority list, a table, etc.

5. **Connections to or incorporation into existing plans**, such as hazard mitigation, comprehensive, green infrastructure plans, emergency evacuation plans (see Step 2)

Taking Action

6. **Prioritized flooding areas for action** or further study and identification of projects to mitigate or adapt to flooding within the next five years
    a. Prioritization can be based on a number of factors. Projects could be prioritized by cost, where many smaller projects could be completed over time, or one large project could be completed. It's important to do research on partner organizations because there could be opportunities to work with local organizations to collaborate on projects, reducing the cost to your organization. Additionally, it's important to remember that some recommendations could include policy changes, which take time to implement. Planning for the long term may be more costly in the short-term, but beneficial overall.
    b. This video from the U.S. Climate Resilience Toolkit provides recommendations to aid in the prioritization of projects.
    c. This could include a map, a list, a table comparing options, a matrix, etc.
7. **Process for communicating increasing flood risk**, especially to areas experiencing new or increased tidal flood events, or areas that may experience flooding in the future
    a. Compare previously identified flood risk areas to flood maps for the next ten, twenty, and thirty years. Are they different? Are there areas you want to prioritize? How is increasing risk being communicated to communities that may not have previously experienced flooding? What resources are being shared?
8. **Evaluation of existing policies and ordinances** and whether they meet flood planning needs and whether they cover both inventoried and future flood areas
    a. This section could include an identification of policies to prevent or minimize future flooding, for example, setbacks, building codes, ties into the Critical Area Program. Are building codes being mapped to floodplain ordinances? Are you regulating to higher standards than the national flood insurance program (NFIP)?
9. **Identification of potential funding sources** and partnerships for identified projects (see Appendix B).

A checklist to guide development of the plan has been included in Appendix D.

Step 5: Submit the plan

If you are required to submit a nuisance flood plan, a plan must be submitted to the Maryland Department of Planning (MDP) every five years. Submit plans to MDP at deborah.herrcornwell@maryland.gov.

Submit:

- A nuisance flood plan for 2025-2030, either a new plan or an updated plan; or
- A related planning document that includes the above recommendations, for example a hazard mitigation plan

Communicate the contents of the plan and the intended next steps within your jurisdiction (related departments, constituents, etc). Make sure that there are clear roles and responsibilities for how tidal nuisance flood events and adaptation actions will be documented and implemented over the next five years. Since the NFP requirements can be satisfied in a variety of ways, the public participation and formal adoption process will depend upon the type of planning document your jurisdiction creates. See Table 2 to ensure that you are meeting the requirements of the submission.

- Include with your submission, a 1- to 2-page explanation on jurisdiction-based letterhead explaining:
    - What is contained in the plan?
    - How does the plan meet the requirements of the law?
    - How was the plan adopted or approved?
    - Where is the plan publicly available?

Table 2: NFP requirements and checkboxes to be used to aid in the submission process.

What to submit to MDP	Plan addresses nuisance flooding	Link to plan is posted on website	Plan is adopted or approved	Submission includes a cover letter and link
A new plan or an updated nuisance flood plan that reviews the previous plan (2020) and expands upon the data and decision making	☐	☐	☐	☐
Adopted as an addendum to or chapter of hazard mitigation plan, comprehensive plan, or other related plan	☐	☐	☐	☐
Letter of explanation of how existing plans meet the requirement	☐	☐	☐	☐

Nuisance Flood plans are intended to be updated every five years. This timeline may not match the timeline of existing plans, so it is important to be aware of the different timelines and requirements, especially if your jurisdiction decides to combine plans. The following table (*Table 3 on next page)* provides an overview of when nuisance flood plans are meant to be submitted over the next ten years, in addition to what the requirements are.

Table 3: Serves as an approximate schedule for when counties and jurisdictions are expected to submit their nuisance flood plans.

Phase	Date	Requirements
First Phase (complete)	October 2020	Nuisance flood plan, link to plan, memo
Second Phase	October 2025	Submit to MDP: Nuisance flood plan or other plan that incorporates nuisance flooding and meets the requirements, link to website with the posted plan, cover memo and if applicable 1-2 page explanation of how your jurisdiction is meeting the mandate.
Third Phase	October 2030	Submit to MDP: Nuisance flood plan or other plan that incorporates nuisance flooding and meets the requirements, link to website with the posted plan, cover memo and if applicable 1-2 page explanation of how your jurisdiction is meeting the mandate.

By statute, each jurisdiction will post the plan on their website and send a copy to Deborah Herr Cornwell (deborah.herrcornwell@maryland.gov) at the Maryland Department of Planning (MDP). Upon receipt, your jurisdiction will receive a letter of acknowledgement from MDP. The plan will then be shared with the Maryland Department of Natural Resources for review. MDP and partner agencies will review the plan and respond back with questions and comments if there are any, and will confirm in writing that the plan has been received and approved.

Step 6: Implement the plan

Once confirmation has been received, and the plan has been added to your jurisdiction's website, the next phase is implementation. It will be up to your county or jurisdiction to continue documenting flooding and analyzing findings to inform project adaptation and mitigation opportunities. The U.S. Climate Resilience Toolkit has a great page with resources and case studies for prioritizing and planning projects, in addition to taking action. Funding opportunities are identified in Appendix B.

Nature-based restoration techniques can enhance the ability of communities to respond to or recover from storms, flooding and other climate hazards by buffering people and infrastructure. Wetlands, dunes, living shorelines and other green-infrastructure practices can help communities adapt to changing conditions when used alongside other strategies. Use photo documentation as a mechanism of pre and post monitoring to inform adaptive management strategies. Examples located in Appendix C.

Conclusion

Planning for nuisance flooding is not just planning for tidal inundation, but it is understanding the confounding factors of precipitation, sea level rise, and wind and their associated impacts on our communities.

If you are interested in staying involved in flood planning in the state of Maryland, consider participating in these workgroups and opportunities:

Maryland Flood Awareness Month
Maryland Association of Floodplain and Stormwater Managers
Maryland CoastSmart Council
Maryland Commission on Climate Change: Adaptation and Resilience Working Group

Related Documents

1. 2019 Nuisance Flood Planning Guidance
2. Maryland House Bill 1427 (2019), §3-1018(b) and (c)
3. Senate Bill 1006 and House Bill 1350 (2018)
4. §3-1001 of the Natural Resource Article
5. Sea Level Rise Projections for Maryland 2023

Other Related Documents

1. Sea Level Rise Increases Frequency of High Tide Flooding
2. Local Mitigation Planning Guide
3. U.S. Climate Resilience Toolkit High Tide Flooding

For questions about nuisance flood planning, contact Sasha Land in DNR's Chesapeake and Coastal Service at sasha.land@maryland.gov , or call (410)-260-8718.

For questions about submitting nuisance flood plans, contact Debbie Herr Cornwell at deborah.herrcornwell@maryland.gov, or call (410)-767-4500.

APPENDIX A: Frequently Asked Questions

What is Nuisance Flooding?

Communities throughout the State of Maryland face increasing disturbances from episodic nuisance flooding. Nuisance flooding is defined in §3-1001 of the Natural Resource Article of the Maryland Annotated Code as "high-tide flooding that causes public inconvenience." Please note, the National Oceanic and Atmospheric Administration (NOAA) has shifted from this definition, instead referring to nuisance flooding as high tide flooding. High tide flooding and nuisance flooding may be used interchangeably throughout this document.

Nuisance flooding is defined in §3-1001 of the Natural Resource Article of the Maryland Annotated Code as "high-tide flooding that causes public inconvenience."

Figure A1: A photo of downtown Annapolis after the January 9 storm. This is a nuisance flood as it impacts access, drainage, and public safety. Photo from MyCoast MD.

The impacts of nuisance flooding may disrupt daily activities for several hours or days before abating. Roads may be temporarily closed due to high water, engineered and natural drainage systems may be overwhelmed, and open areas and buildings may be inundated for a period of time. In addition, precipitation may combine with tidal or wind-driven nuisance flooding, and further exacerbate the impacts and impair stormwater management infrastructure.

High tide flooding may be exacerbated by sea level rise, wind events, precipitation and storm events, and the astrological position of the sun and the moon. In Maryland, relative sea level rise is projected to increase by 1.6ft in 2050 (SLR Projections). As sea levels rise, coastal flooding, including high tide flooding and storm surge, will occur more frequently and impact areas further inland. As a changing climate drives sea levels higher and precipitation events to greater severity, these repeated "nuisance" impacts will become significant stressors on infrastructure, emergency services, public health, and community wellbeing as they become more chronic in nature. At the Baltimore tide gauge, high tide flooding is projected to occur at least 65 days per year in 2050 (NOAA Annual High Tide Flooding Outlook, NASA Flooding Analysis Tool). This prediction is similar across all the Maryland tide gauges. For more information on high tide flooding please see NOAA's "What is high tide flooding?" page.

The graphic below (*Figure A2*) depicts nuisance flooding and is for illustration purposes only. While the §3-1018 of the Natural Resource Article only requires jurisdictions to make a plan for tidal flood events, *Figure A2* depicts factors that can contribute to a nuisance flood event surface or stormwater (pluvial), riverine (fluvial), and tidal (oceanic).

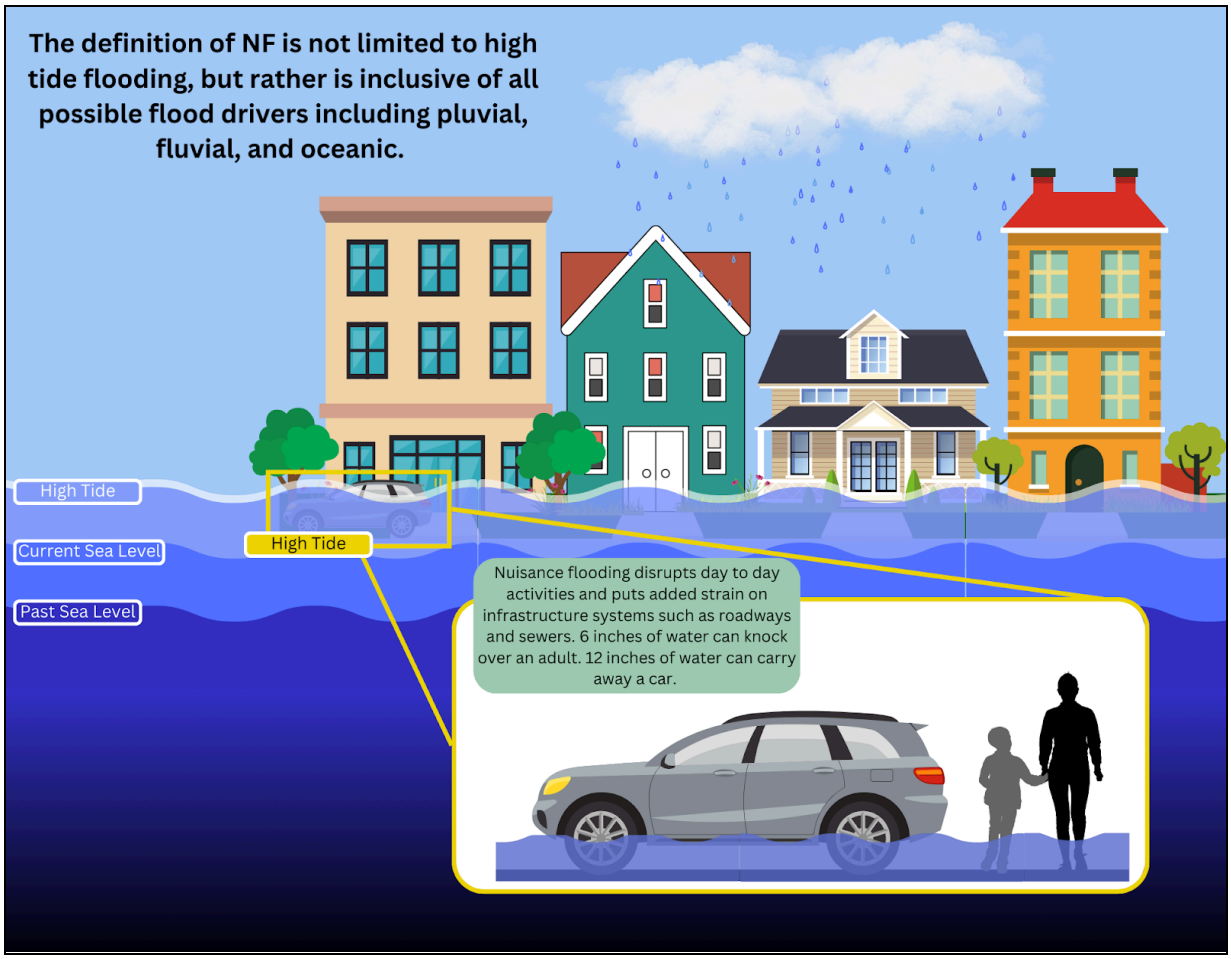


Figure A2: highlights how a high tide might impact a community. This is exacerbated by sea level rise.

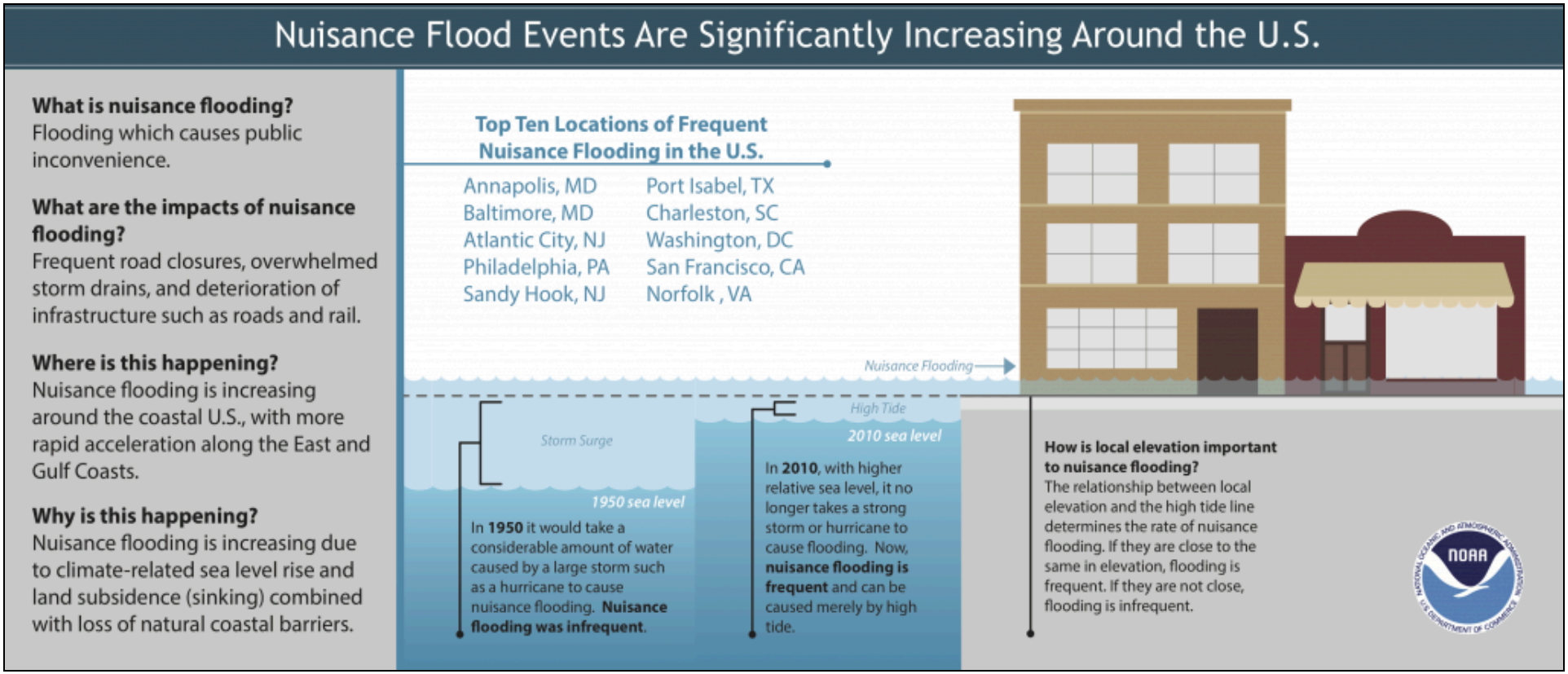


Figure A3: Shows nuisance flooding leading to impacts on infrastructure, NOAA Infographic.

Do I need a nuisance flood plan?

Nuisance flood plans have many benefits related to flood planning. They can identify projects for grant applications, facilitate community understanding, and lead towards short term adaptation and long term resilience. It is *required* that all jurisdictions, including municipalities, that experience nuisance tidal flooding develop a nuisance flood plan to be updated every five years. It is *recommended* that all counties, including municipalities, within Maryland's Coastal Zone develop a plan to respond to nuisance flooding even if they do not currently experience tidal flooding. A good first step would be to check if your county or municipality is located in Maryland's Coastal Zone (*Figure A4*).

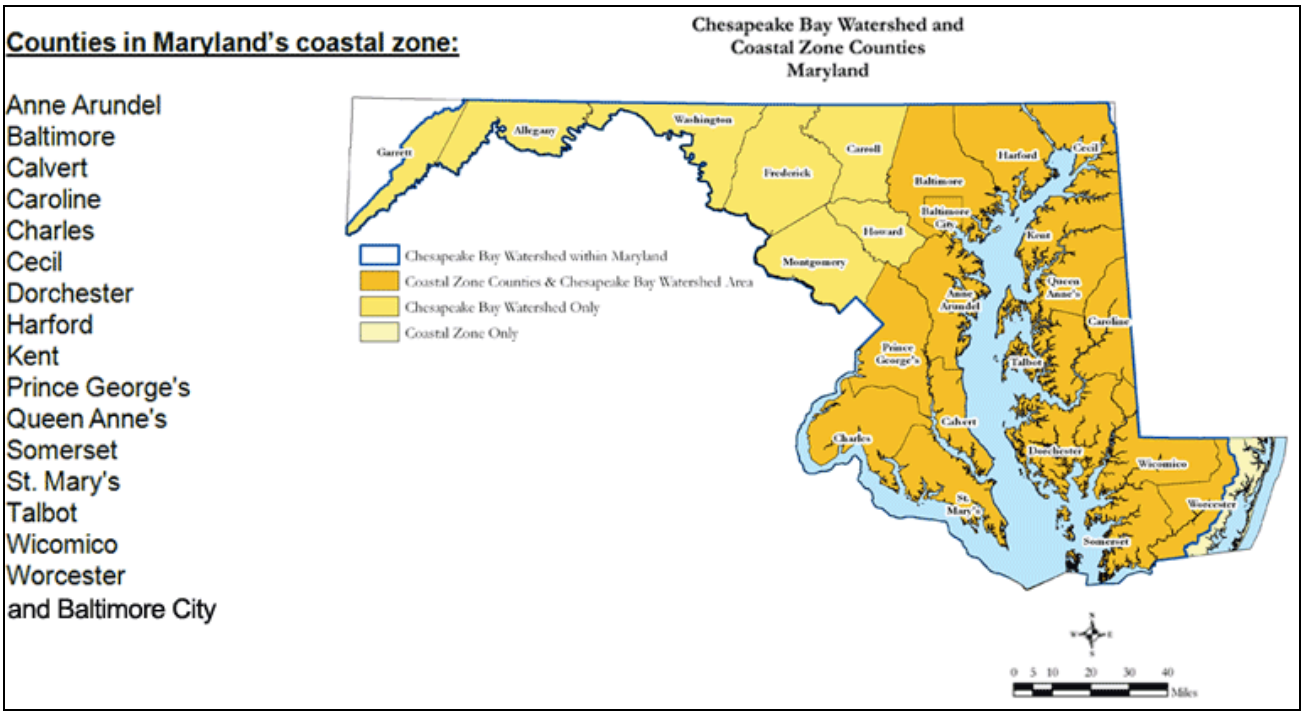


Figure A4: shows a map of Maryland's coastal zone.

If your county is located in the coastal zone, consider the following (*Figure A5*).

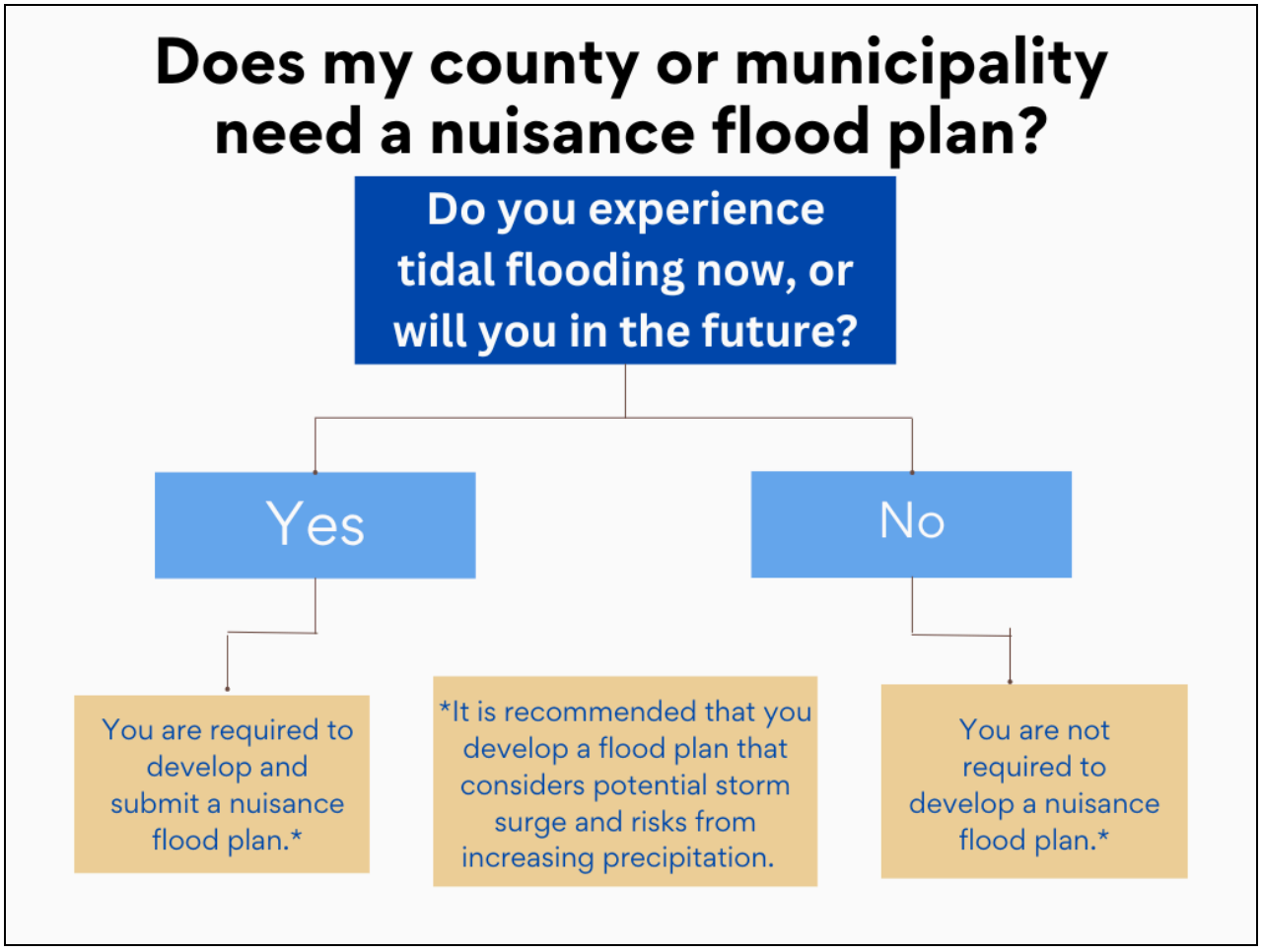


Figure A5: shows a flow chart of how to determine whether a nuisance flood plan is needed.

The following list shows which counties and jurisdictions reported experiencing nuisance tidal flooding in 2020. **If your county or municipality is not on this list, it does not mean that you do not experience nuisance flooding.** Please review the next section to determine if you experience nuisance flooding now or may in the future. If so, you need a nuisance flood plan.

Anne Arundel County
- Annapolis
- Highland Beach

Baltimore City

Baltimore County

Calvert County
- Chesapeake Beach
- North Beach

Caroline County
- Denton

Cecil County
- Charlestown
- Chesapeake City
- Elkton
- Perryville
- Port Deposit

Charles County
- Indian Head
- Port Tobacco

Dorchester County
- Cambridge
- Secretary

Harford County

Kent County
- Chestertown
- Millington
- Rock Hall

Prince George's County
- Bladensburg
- Colmar Manor
- Cottage City
- Eagle Harbor
- Edmonston
- Hyattsville

Queen Anne's County
- Centreville
- Millington
- Queenstown

St.Mary's County
- Leonardtown

Somerset County
- Crisfield
- Princess Anne

Talbot County
- Easton
- Oxford
- St. Michaels

Wicomico County
- Salisbury

Worcester County
- Ocean City
- Pocomoke City
- Snow Hill

How do I determine if my county or jurisdiction experiences nuisance flooding?

There are various tools that can be used to determine if your area currently experiences nuisance or high tide flooding, or might in the future.

1. NOAA has a high tide flooding layer that shows areas currently subject to tidal flooding. The layer can be accessed at the NOAA Sea Level Rise Viewer or the NOAA Coastal Flood Exposure Mapper.

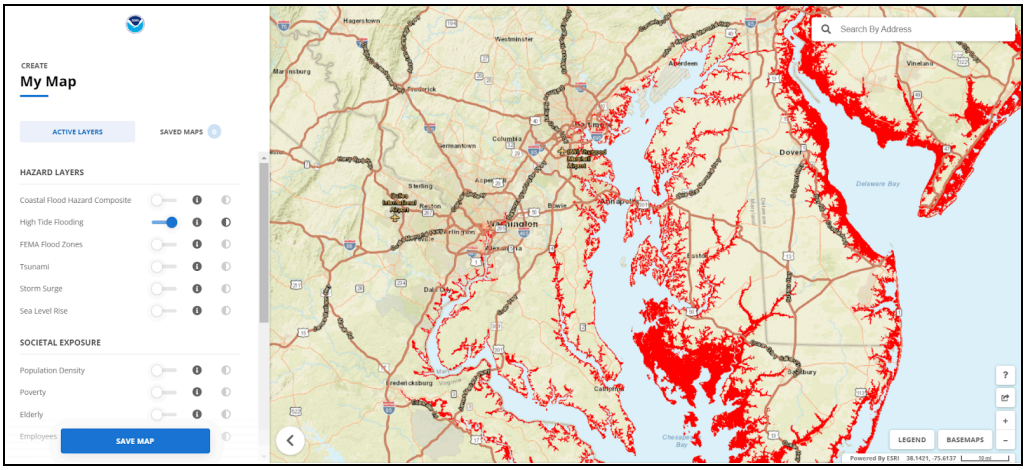


Figure A6: shows a map of high tide flooding in Maryland.

2. The NOAA Coastal Flood Exposure Mapper can be used to identify areas likely to flood during extreme high tides. The flood thresholds for this map are based on national flood thresholds from NOAA Technical Report NOS CO-OPS 086: Patterns and Projections of High Tide Flooding along the U.S. Coastline Using a Common Impact Threshold. In the report, NOAA recognizes high tide flooding as sunny day, nuisance and recurrent tidal flooding. To access the website, please visit: NOAA Coastal Flood Exposure Mapper. This viewer can from a landscape perspective show low-lying areas vulnerable to nuisance flooding. You can use this as a first step to identify trouble spots and then fill in with more specific community information.
3. The Maryland Department of Transportation's Climate Change Vulnerability Viewer (MDOT CCVV) has three nuisance tidal inundation scenarios: 2020, 2050, and 2100. MDOT uses sea-level projections to forecast areas of inundation for a given scenario. The layers were developed using the University of Maryland Center for Environmental Science (UMCES) sea level rise estimates. The layers can be found when clicking on the red circle with blue waves in it at the top right of the screen. When this layer is on, you can click on a point of interest and the map will provide the projected water depth. This is beneficial for a site specific analysis.
    a. The MDOT CCVV can also be used to determine which roadways will be flooded based on a specific likelihood of a storm event and indicates the depth of flooding associated with that event. Two types of data layers are provided: a) flooding depth on a roadway (Roadway Inundation) and b) depth of flooding over the land area (Flood Depth Grids).

To access the website: arcg.is/ymbaW

i. Open the website and in the top ribbon click on the book with a bookmark icon "Jurisdiction Bookmarks". Select your jurisdiction.

ii. Click on either flood depth grids or roadway inundation

iii. Click on the magnifying glass within the layer box (next to layer heading) and enter 2015, 2020, 2050, or 2100 to filter the list of data options based on year. This will minimize the amount of results making it easier to locate your specific dataset of interest.

b. This information can be used to identify the tidal nuisance flood threshold – e.g. 3.3' above 2015 Mean Sea Level, or 10% Annual Chance of Flooding above 2015 Mean Sea Level, or 2'+ depth of water on the roadway. A variety of other related data is available by clicking on the icon which is Roadway Inundation. Select the 2015 Mean Sea Level – 10% Annual Chance (10YR Storm) layer. This layer depicts the lowest level of flooding to road- ways that is likely occurring during a minor event. When available the 1YRr chance storm layer will more accurately show nuisance flooding. Click on any of the segments shown on the map to get a popup box showing the attribute values of that road segment and its predicted flooding.

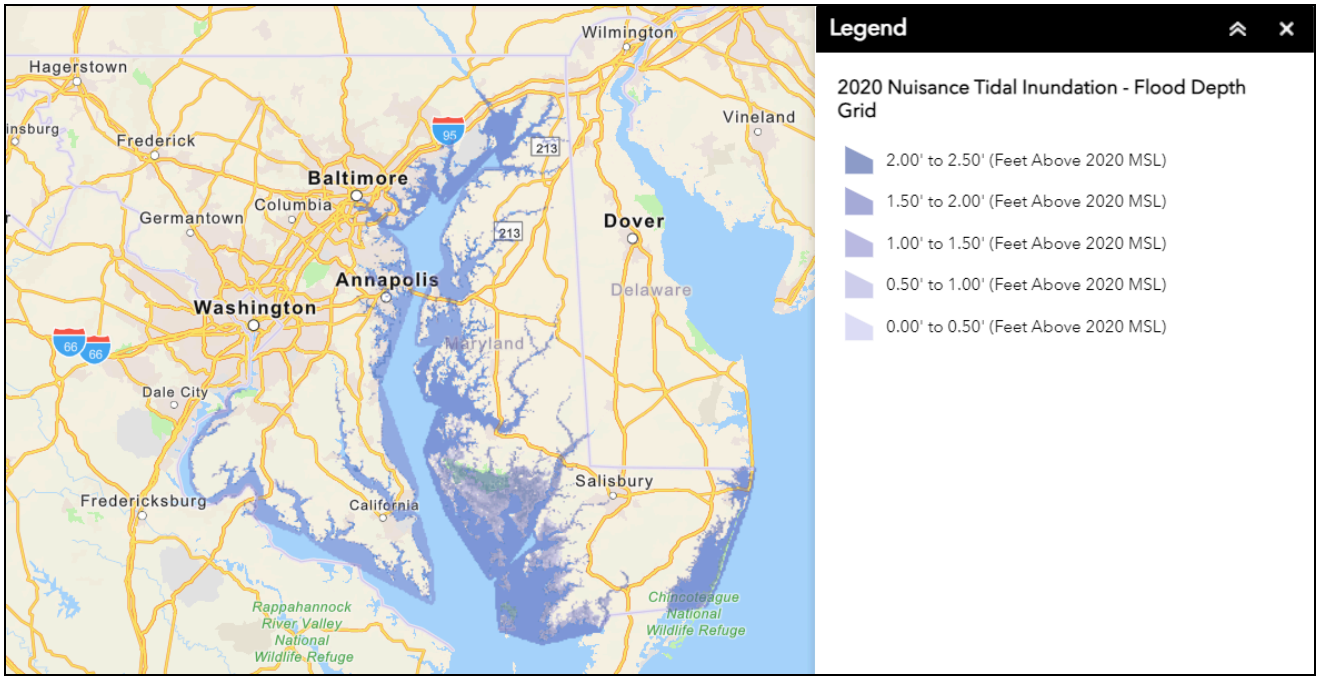


Figure A7: Shows a map of nuisance tidal inundation using the MDOT CCVV.

4. MyCoast Maryland serves as one potential flood documentation tool for the state of Maryland. Counties and municipalities can view reports of high tide flooding on the MyCoast MD website to help determine if tidal flooding has impacted your area. Click “Search Reports” under MD MyCoast at the website. To download the data, view this scribe. A GIS layer of all MyCoast reports is also available here.
5. The Maryland Department of the Environment provides the Digital Flood Insurance Rate Maps (DFIRMS) for residents, which can help determine current flood risk as well as future flood risk. This tool is beneficial for viewing site level flood data.
6. The FEMA Resilience Analysis and Planning Tool (RAPT) is a GIS planning tool used to inform strategies for emergency preparedness, response, and recovery. It provides infrastructure data points that can be used to help determine vulnerability of specific infrastructure.
7. Maryland’s Cultural Resource Information System, hosted by the Maryland Historical Trust, provides an online database of architectural and archaeological sites and standing structures. This website can be used to identify areas vulnerable to nuisance flooding by pulling in nuisance tidal data.
8. Emergency services reports and weather alerts, such as alerts set by the National Weather Service, can provide a history of whether coastal flooding has occurred in your area.
9. Public submissions can also be used to track or identify areas prone to flooding. Social media, emails, and phone calls can all be used to view flooded areas. Review documented reports from 2020-2025 to view areas of nuisance flooding.
10. Existing reports such as hazard mitigation plans, stormwater management plans, comprehensive plans, dam emergency action plans, dam repair plans, and dam failure inundation areas all can provide important context for determining whether your specific area is prone to flooding.

Table A1: Summarizes various tools used to determine nuisance flood locations.

Tool	Link	When to Use
NOAA Sea Level Rise Viewer	NOAA Sea Level Rise Viewer	Use for identifying general impacts of sea level rise and high tide flooding
NOAA Coastal Flood Exposure Mapper	NOAA Coastal Flood Exposure Mapper	Use to understand flood risk, assess social vulnerability
MDOT Climate Change Vulnerability Viewer	Climate Change Vulnerability Viewer (MDOT CCVV)	Use for site specific flood depth grids and predictions of nuisance tidal inundation
MyCoast Maryland	MyCoast MD	Use to view existing reports, check tides, groundtruth flood predictions, analyze data
Digital Flood Insurance Rate Maps	Digital Flood Insurance Rate Maps (DFIRMS)	Use to view site specific information about flood zones
Resilience and Analysis Planning Tool	Resilience Analysis and Planning Tool (RAPT)	Use to assess critical infrastructure located in the floodplain
MEDUSA, Maryland's Cultural Resource Information System	Maryland's Cultural Resource Information System	Use to identify architectural and archaeological sites in the floodplain

How do I predict tidal flooding?

Predicting tidal flooding on a short term basis is helpful for site visits, project implementation, budget development, and more. Tools that are useful for near-term tidal flooding include:

1. National Water Prediction Service (Coastal & Riverine Water levels): Click on the Regional map for the mid-Atlantic to show the flood status of riverine and coastal locations. Selecting a specific location will provide conditions for that gauge. The conditions are current and predicted. A user brochure of what data is available can be found here.
2. NOAA Inundation Dashboard: The dashboard provides real-time and historical inundation information at select National Ocean Service tide stations. For a full list of features, click on the link and then click the 'About?' link at the top of the map.
3. Chesapeake Bay Operational Forecast System: This generates water level, current, temperature, and salinity nowcast and forecast guidance four times per day.
4. NOAA also provides a monthly tidal flooding outlook and an annual tidal flooding outlook. The monthly tidal outlook can be used for seasonal predictions of when tides might be higher than usual, leading to increased instances of flooding. In the annual outlook, select a year to view predictions for, and then select your tide gauge of interest. There are two views: decadal or non-decadal. In the non-decadal view you can see observed flood days to date based on a certain sea level rise scenario. In the decadal view you can view predicted flood days.

APPENDIX B: Funding Opportunities

Table B1: Provides a summary of different grant opportunities available for flood planning and implementation. This is a non-comprehensive list.

Agency	Grant Opportunity	Timeline	Link
Maryland Department of Natural Resources	Grants Gateway - awards funds for resilience projects, stormwater management, nature based solution designs	Opens in July with applications due in December	Grants Gateway
Maryland Department of Emergency Management	Hazard Mitigation Grant Program (HMGP) - provides funding for eligible mitigation measures that reduce disaster losses	Funding is made available following authorization of a Presidential Major Disaster Declaration	Hazard Mitigation Grant Program (HMGP)
Maryland Department of Emergency Management	Building Resilient Infrastructure and Communities (BRIC)	Opens in October with applications due in February	Building Resilient Infrastructure and Communities
Maryland Department of Emergency Management	Flood Mitigation Assistance (FMA)	Opens in October with applications due in February	Flood Mitigation Assistance (FMA)
Maryland Department of the Environment*	Comprehensive Flood Management Grant Program	Opens in December and closes at the end of January	Comprehensive Flood Management Grant Program
Maryland Department of Transportation	PROTECT Program - provides funding to invest in projects that improve the resilience of surface transportation infrastructure	Typically opens in April and closes in August	PROTECT Program
Chesapeake Bay Trust	Watershed Assistance Grant Program - provides support for watershed restoration project designs and permitting, can be used for design of green Stormwater practices and shorelines	Opens in September and closes in December	Watershed Assistance Grant Program
Chesapeake Bay Program	Small Watershed Grant Projects - community-based projects to improve the condition of their local watershed while building stewardship among residents	Opens in February and closes in April	Small Watershed Grant Projects

*More water-related grants can be found at the Maryland Department of the Environment's website. The Maryland Environmental Service hosts a database of grants as well.

APPENDIX C: Adaptation Resources

There are many different approaches to responding to nuisance flooding. Adaptation is frequently recommended as a pathway for reducing flooding, as it recognizes that flooding is already occurring and identifies ways to respond to existing and future conditions. DNR is currently in the process of creating an adaptation guidebook for the state of Maryland, but recommends these resources in the meantime.

Natural Resources

When natural resources are impacted by nuisance flooding it leads to loss of habitat, habitat degradation, erosion, water contamination, and increased flooding. There are various adaptation strategies that can be used to reduce nuisance flooding including living shorelines, dune restoration, oyster reefs, vegetative buffers, floodplain reconnection, and reducing impervious surfaces.

- Maryland DNR's Forests for Flood Buffers identifies native trees that can be used as flood remediation
- The Backyard Buffer Program helps homeowners get started with streamside buffers
- This climate change planning website provides adaptation and resilience strategies with descriptions and visuals
- The Resiliency through Restoration program supports on-the-ground implementation of nature-based projects
- What is Green Infrastructure? This page on the Environmental Protection Agency's (EPA) website explains different types of green infrastructure and provides examples.
- The Green Book for the Buffer – An Illustrated Guidebook for Planting at the Shoreline
- Maryland DNR in partnership with the Maryland Environmental Trust also has a Coastal Resilience Easement program

Infrastructure

Infrastructure includes roads, buildings, critical facilities, water treatment systems, energy systems, bridges, means of transportation, and more. Solutions for responding to flood impacts on infrastructure may look different than solutions for protecting natural resources from flooding.

- Coast Smart Construction Program: Maryland Coast Smart regulations require State and local capital projects that contain a structure and whose total project cost is over $500,000 to identify projects located in flood zones identified by the Coast Smart - Climate Ready Action Boundary (CS-CRAB). If projects are located waterward of this layer, they must comply with the Coast Smart Construction Program's design criteria.
    - CRAB: Climate Ready Action Boundary takes the FEMA 100-year flood layer + 3 feet. The newly inundated area shows how 3 additional feet of water moves across new areas of the landscape horizontally based on the land elevation profile or Digital Elevation Model (DEM)
- The Critical Area Commission provides resources for buffers, stormwater management,

and shore erosion control

- Weather it together – Maryland Historical Trust's Flood Mitigation Guide
- Flood Insurance Page at the Maryland Insurance Administration

Community Resilience

Nuisance flooding can impact public safety, access to transportation, recreational opportunities, businesses, and overall community morale. Adapting to nuisance flooding needs to involve community members as valued decision makers – how is your jurisdiction providing educational resources on flooding? How does your jurisdiction respond during a flood? What resources and tools are available to residents?

- Coastal Training Program
- MyCoast MD
- Climate and Hazard Mitigation Planning (CHaMP) Tool
- Coastal Flooding, Climate Change, and Your Health: What You Can Do to Prepare

Other Related Resources

- For climate adaptation graphics click here.
- Maryland's Plan to Adapt to Saltwater Intrusion and Salinization can be found here. An update of this plan is expected in 2024.
- Chapter 8 of the Greenhouse Gas Reduction Plan for the State of Maryland details adaptation.
- A Sustainable Chesapeake written in 2010 provides a process for assessing and addressing the impacts of climate change in coastal areas.
- For more information and case studies on high tide flooding, click here.
- The Nature Conservancy provides case studies and other related resources for Maryland here.
- To read the Maryland Climate Change Adaptation and Resilience Framework recommendations, click here.

APPENDIX D: Checklist

- ☐ Does your submission include a cover letter?
- ☐ Does your cover letter explain the following?
  - ☐ Link to the plan?
  - ☐ What is contained in the plan?
  - ☐ How does the plan meet the requirements of the law?
  - ☐ How was the plan adopted or approved?
  - ☐ Where is the plan publicly available?
- ☐ Did you provide a nuisance flood plan or other related document that serves as a nuisance flood plan for the next five years?
- ☐ Does your plan include the following?
  - ☐ **A description or summary of sources of flooding** (fluvial, pluvial, riverine), for example identification of areas where precipitation events cause flooding that impacts or exacerbates tidal nuisance flooding
  - ☐ An **analysis of the documented reports** (2020-2025) to date and determine if they were submitted from areas identified in the 2020 plan, or if they are in new areas
  - ☐ **Identification of vulnerable community resources**, critical facilities and jurisdiction-identified infrastructure impacted by flooding, i.e health centers, schools, fire departments, etc.
  - ☐ **Identification of underserved and overburdened communities** within or near areas that experience nuisance flooding or may be affected by the impacts of nuisance flooding
  - ☐ **Connections to or incorporation into existing plans**, such as hazard mitigation, comprehensive, green infrastructure plans, emergency evacuation plans (see Step 2)
  - ☐ **Prioritized flooding areas for action** or further study and identification of projects to mitigate or adapt to flooding within the next five years
  - ☐ **Process for communicating increasing flood risk**, especially to areas experiencing new or increased tidal flood events, or areas that may experience flooding in the future
  - ☐ **Evaluation of existing policies and ordinances** and whether they meet flood planning needs and whether they cover both inventoried and future flood areas
  - ☐ **Identification of potential funding sources** and partnerships for identified projects
- ☐ Did you follow the six steps to updating your nuisance flood plan? See *Figure 1* and pages 13-27.
- ☐ Do you have a plan to communicate flood risk to your communities?