County Commissioners of Charles County

Resolution 2024-16 Adoption of Charles County 2024 Hazard Mitigation Plan

WHEREAS, Charles County, Maryland is vulnerable to natural and mad-made hazards which may result in loss of life and property, economic hardship, and threats to public health and safety; and

WHEREAS, Section 322 of the Disaster Mitigation Act of 2000 (DMA 2000) requires state and local governments to develop and submit for approval to the President a mitigation plan that outlines processes for identifying their respective natural hazards, risks, and vulnerabilities; and

WHEREAS, Charles County acknowledges the requirements of Section 322 of DMA 2000 to have an approved Hazard Mitigation Plan as a prerequisite to receiving post-disaster Hazard Mitigation Grant Program funds; and

WHEREAS, the Charles County 2024 Hazard Mitigation Plan has been developed by the Charles County Department of Emergency Services in cooperation with other county departments, the Charles County Resiliency Authority, response partners, local municipal officials, and the citizens of Charles County; and

WHEREAS, a robust public involvement process consistent with the requirements of DMA 2000 was conducted to develop the Charles County 2024 Hazard Mitigation Plan; and

WHEREAS, the Charles County 2024 Hazard Mitigation Plan recommends mitigation activities that will reduce losses to life and property affected by both natural and man-made hazards that face the County and its municipal governments.

NOW THEREFORE, by the County Commissioners of Charles County Maryland, be it RESOLVED that:

1. The Charles County 2024 Hazard Mitigation Plan is hereby adopted as the official Hazard Mitigation Plan of the County, and

2. The respective officials and agencies identified in the mitigation strategy of the Charles County 2024 Hazard Mitigation Plan are hereby directed to implement the recommended activities assigned to them.

ADOPTED, this 10th day of December, 2024

COUNTY COMMISSIONERS OF
CHARLES COUNTY, MARYLAND

Reuben B. Collins, II, Esq., *President*

Ralph E. Patterson, II, M.A., *Vice President*

Gilbert O. Bowling, III

Thomasina O. Coates, M.S.

Amanda M. Stewart, Ed.D.

ATTEST:

Carol A. DeSoto, Clerk to the Commissioners

2024



CHARLES COUNTY, MD

HAZARD MITIGATION PLAN UPDATE

200 BALTIMORE STREET
LA PLATA, MD 20646

DEPARTMENT OF EMERGENCY SERVICES

Charles County Government

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This plan was developed through the Charles County Hazard Planning Committee (HMPC) that included representatives from the following Departments and Partners:

Charles County Department of Emergency Services

Charles County Sheriff's Office

Charles County Department of Planning and Growth Management

Charles County Public Facilities

Charles County Resilience Authority

Charles County Department of Public Works

Charles County Department of Parks, Recreation, and Tourism

Charles County Soil Conservation District

Charles County Volunteer Fire and EMS

Charles County Department of Health

Charles County Equity Officer

Town of Indian Head

Town of La Plata

College of Southern Maryland

Port Tobacco River Conservancy

Maryland State Highway Administration La Plata Shop

Maryland Department of Emergency Management

EXECUTIVE SUMMARY

Charles County has been and will continue to be committed to a long-term strategy for reducing the risks of hazards.

Hazard mitigation is commonly defined as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects. A hazard mitigation plan states the aspirations and specific courses of action that a community intends to follow to reduce vulnerability and exposure to future hazard events.

The intention of this Hazard Mitigation Plan (HMP) update is to serve as a blueprint for coordinating and implementing hazard mitigation policies, programs, and projects. It provides a list of mitigation goals, objectives, and related actions that may assist Charles County in reducing risk and preventing loss from future natural hazard events. The impacts of hazards can be lessened and sometimes avoided altogether if appropriate actions are taken before hazardous events occur. By avoiding unnecessary exposure to known hazard risks, communities will save lives and preserve property and minimize the social, economic, and environmental disruptions that commonly follow hazard events. The negative impacts of natural hazards may be reduced for Charles County through identifying vulnerable areas and implementing measures aimed at minimizing exposure to them.

Communities face significant challenges during the post-disaster period in balancing the driving need for rapid recovery by implementing long-term hazard mitigation. The necessity to meet basic needs and resettle displaced populations immediately following a disaster often overshadows the more abstract, longer-term sustainability considerations. Once full-scale reconstruction is initiated, it is difficult to modify projects in progress to meet sustainability objectives. This trend highlights the need for pre-disaster mitigation planning that incorporates principles of sustainable development within the context of reconstruction, so that communities can more easily rebuild in a manner that will make them less vulnerable to future hazard events while improving the quality of life.

This update serves as a multi-jurisdictional hazard mitigation plan that represents a combined county and local commitment to reduce risks from natural hazards. The intent of this update is to produce a document that local officials can refer to in their day-to-day activities and in decisions regarding land use and planning decisions, regulation and ordinance creation and enforcement, granting permits, capital improvement investments, disaster planning and other community initiatives. Additionally, the update to this hazard mitigation plan serves as the basis for States to prioritize future grant funding as it becomes available.

The 2023 Plan Update will continue to be a useful tool for all community stakeholders by increasing public awareness about local hazards and risks and by providing information about options and resources available to reduce those risks. Educating the public about potential hazards will help each jurisdiction protect itself against the effects of future hazards and will enable informed decision-making regarding where to live, purchase property, or locate business. The 2023 Plan Update was developed by members

of a Hazard Mitigation Planning Committee (HMPC) that consisted of county agencies, regional partners, and the following local jurisdictions:

- Town of LaPlata
- Town of Indian Head
- Port Tobacco Village

Hazards were ranked by the HMPC and reevaluated during the planning process to determine the hazards with the largest impact on the County and its communities. The following table summarizes the results of the hazard identification, which are explained in Sections 3 and 4 of this plan.

Prioritization of Hazards	
HAZARD	**RANK**
Extreme Weather	3.4
Flood	3.3
Temperature Extremes	3.0
Public Health Emergency	3.0
Hurricane, Tropical Storm, and Nor'easter	2.6
Utility Interruption	2.4
Civil Disturbance and Criminal Activity	2.4
Environmental Hazards – Hazardous Materials	2.3
Transportation Accidents	2.2
Severe Winter Storms	2.1
Erosion	2.1
Building and Structure Collapse	2.0
Dam Failure	2.0
Earth Disturbance	1.9
Drought	1.9
Environmental Hazards - Nuclear Events	1.7
Wildfire	1.4

The plan update is organized as follows, with detailed table and figure lists provided, by chapters, in the Table of Contents.

Chapter 1 Planning Process: This chapter summarizes the planning history behind the Disaster Mitigation Act of 2000, its regulatory requirements, the planning process used by Charles County during the plan update, and a description of stakeholder involvement and outreach.

Chapter 2 Community Profile: This chapter provides a physical and demographic profile of the county, examining characteristics such as geography, hydrography, development, people, and land uses.

Chapter 3 Hazard Identification & Risk Assessment / Chapter 4 Hazard Profiles: These chapters evaluate the natural hazards likely to affect or impact the County, quantifying whom, what, where, and how the area might be affected by natural hazards.

Chapter 5 Historic and Cultural Resources Vulnerability Assessment - The chapter aims to integrate historic preservation planning considerations into the hazard mitigation planning process by evaluating the vulnerability of existing resources and recommend mitigation actions.

Chapter 6 Capability Assessment: This chapter describes available programs and resources that can support plan implementation.

Chapter 7 Mitigation Strategy: This chapter includes a range of updated mitigation actions, and projects to support achievement of the plan's goals and objectives.

Chapter 8 Plan Execution and Maintenance: This chapter describes how the plan will be monitored, evaluated, and updated, including a process for continuing stakeholder involvement after the plan is completed.

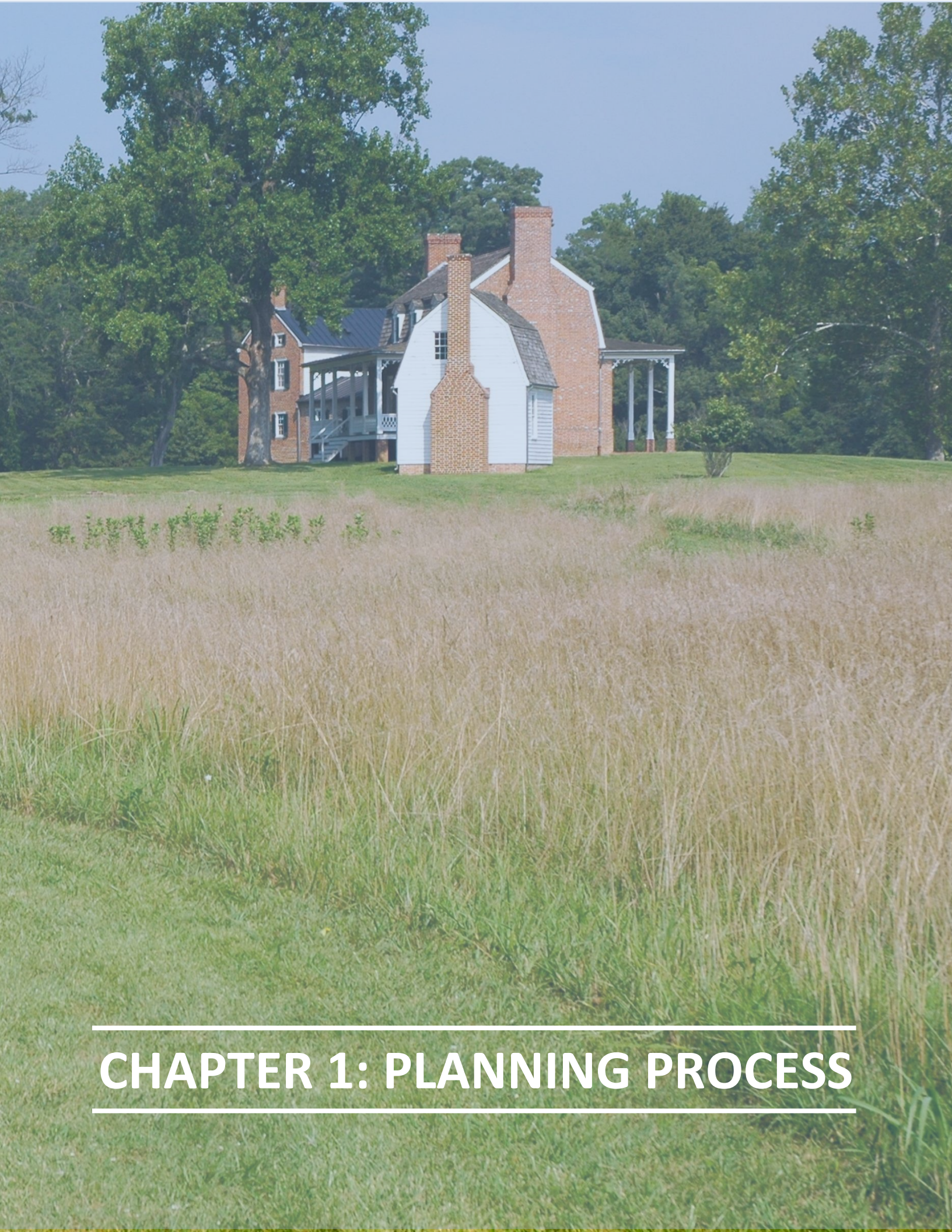
References include a list of the reports and data used to develop this plan.

Appendices are included at the end of the plan and contain supplemental reference materials and more detailed calculations and methodologies used in the planning process.

It is imperative that local decision makers become and stay involved in this planning process to provide new ideas and insight for future updates to the HMP for Charles County. Now that a mitigation strategy has been updated, it will remain a challenge and a goal for Charles County to provide necessary updates as mitigation techniques are implemented. It remains imperative that all local agencies, units of government, non-profit organizations, businesses and industries, and private citizens continue their involvement and dedication to hazard mitigation.

It is our long-term goal that the Hazard Mitigation Plan and the strategies identified will be fully integrated into daily decisions and routines of government and business. This will continue to require dedication and hard work, and this Plan update will continue to lay the building blocks to further strengthen the sustainability and resiliency of Charles County.

The HMPC members used the results of the Hazard Identification and Risk Assessment (HIRA) and the Capability Assessment to develop goals and form updated strategies, actions, and projects for the county and its independent jurisdictions.



CHAPTER 1: PLANNING PROCESS

1.0 PLANNING PROCESS

This section of the Hazard Mitigation Plan (HMP) describes the mitigation planning process undertaken by Charles County, the Charles County Hazard Mitigation Planning Committee (HMPC), and participating municipalities in the preparation of this HMP Update. This chapter consists of the following subsections:

- Multi-Jurisdictional Planning and Participation
- Background
- Purpose
- Scope
- Authority and Reference
- Overview of Hazard Mitigation Planning
- Local Methodology and Update Process
- The Planning Team
- Planning Meetings and Documentation
- Public and Stakeholder Participation
- Multi-Jurisdictional Planning and Participation

1.1 Background

Across the United States, natural and human-caused disasters have led to increasing levels of death, injury, property damage, and interruption of business and government services. The time, money, and effort needed to recover from these disaster events exhausts resources and diverts attention from important public programs and private agendas. Since 1962, there have been 35 Presidential Disaster Declarations and Emergency Declarations in Maryland, 23 of which have affected Charles County (FEMA, 2018). The emergency management community, citizens, elected officials, and other stakeholders in Charles County recognize the impacts disasters can have on their communities and support proactive efforts needed to reduce the potential effects of natural and human-caused hazards.

Presidential Disaster and Emergency Declarations

Maryland: 37

Charles County: 25*

**A full list of these declarations is provided in Section 3.2*

Emergency management is the discipline of identifying, managing, and avoiding risks. It seeks to promote safer, more resilient communities and involves:

- Planning and preparing for a disaster before it occurs
- Supporting those affected by the disaster
- Rebuilding after the natural or human-made disaster event
- Taking actions to reduce or minimize long-term risk

Emergency management is a dynamic process in which individuals, groups, and communities attempt to manage hazards to avoid or reduce the potential impacts of disasters.

There are four phases of emergency management:

- **Preparedness:** Planning, preparations, and other activities undertaken to facilitate response operations as well as save lives and property. Preparedness activities take place before an emergency occurs.
- **Response:** Actions that provide emergency assistance, save lives, minimize property damage, and speed up recovery. Response takes place during and immediately after a disaster event.
- **Recovery:** Actions taken to return to a normal or improved condition following an emergency or disaster event. Recovery occurs after a disaster.
- **Mitigation:** Any sustained action to reduce or eliminate long-term risk to life and property resulting from natural and human-made hazards and their impacts. Mitigation occurs before and after a hazard event and creates successive benefits over time.

> ***Hazard Mitigation:*** *Any sustained action to reduce or eliminate long-term risk to life and property resulting from natural and human-made hazards and their impacts.*

Pre-disaster mitigation actions are taken before a hazard event occurs. These actions are essential to breaking the disaster cycle of damage, reconstruction and repeated damage. A core assumption of hazard mitigation is that pre-disaster investments will significantly reduce the demand for post-disaster assistance by lessening the need for emergency response, repair, recovery and reconstruction. Furthermore, mitigation measures enable local residents, businesses, and industries to reestablish themselves in the wake of a disaster, which helps get the community economy back on track sooner and with fewer interruptions. With careful selection, successful mitigation actions are cost-effective means of reducing risk of loss over the long-term.

Hazard mitigation planning is a process of identifying policies, capabilities, activities, and tools necessary to implement successful and sustainable mitigation actions. Why undertake mitigation planning? Mitigation planning offers many benefits, including:

- Saving lives and preserving property
- Reducing insurance costs
- Promoting quick and effective recovery following disasters
- Reducing future vulnerability through wise development and post-disaster recovery and reconstruction
- Enhancing coordination within and across participating jurisdictions
- Expediting the receipt of pre-disaster and post-disaster grant funding
- Demonstrating a firm commitment to improving community health and safety

The benefits of mitigation planning go beyond reducing hazard vulnerability. Measures such as the acquisition or regulation of land in known hazard areas can help achieve multiple community goals, such as preserving open space, improving water quality, maintaining environmental health, and enhancing recreational opportunities. Thus, it is vitally important that any local mitigation planning process be integrated with other concurrent local planning efforts, and any proposed mitigation strategies must

consider other existing community goals or initiatives that will help complement or hinder their future implementation. Charles County and its participating jurisdictions have embraced this approach of identifying multiple opportunities to link the HMP with preexisting programs, policies, plans and initiatives. More information on this topic can be found in Chapter 5: Capability Assessment.

During the last two decades, the approach to the emergency management cycle has evolved considerably. A renewed emphasis has been placed on planning for disasters before they occur as a complement to effective response and recovery. As a result, hazard mitigation has gained increasing prominence as a critical part of emergency management. By taking sustained action to reduce or eliminate long-term risk to human life and property from hazards, risks can be proactively mitigated in a systematic manner, rather than reacted to after they occur.

This 2023 HMP Update is the result of continuing work by the citizens of Charles County to update the pre-disaster multi-hazard mitigation plan that will not only continue to guide the County towards greater disaster resistance, but will also respect the character, needs, and capabilities of the community.

1.2 Purpose

Charles County developed its previous HMPs in 2006, 2012, and 2018 which provided momentum for making homes, businesses, and communities as safe as possible against the impacts of floods, tornadoes, wildfires, and other natural hazards. Charles County remains dedicated in continuing the work started in 2006 and is updating the HMP in 2023 in order to:

- Provide a blueprint to protect life and property from the impacts of a future disaster by reducing the potential for future damages and economic losses.
- Qualify the County for additional grant funding, in both pre-disaster and post-disaster environments.
- Improve community resiliency and provide quick recovery and redevelopment following future disasters.
- Demonstrate a firm local commitment to hazard mitigation principles.
- Comply with state and federal legislative requirements tied to local hazard mitigation planning.

1.3 Scope

This HMP Update has been prepared to meet requirements set forth by the Federal Emergency Management Agency (FEMA) and the Maryland Department of Emergency Management (MDEM) in order for Charles County to maintain eligibility for funding and technical assistance from state and federal hazard mitigation programs. The HMP will continue to be updated and maintained to continually address natural and human-made hazards determined to be of high and moderate risk as defined by the updated results of the local Hazard Identification and Risk Assessment. Other natural and human-made hazards will continue to be evaluated during future updates to the HMP to determine if they warrant additional attention, including the development of specific mitigation measures intended to reduce their impact. This HMP will be updated, and FEMA approved within a five-year cycle. The HMP will be subject to reviews and potential updates annually and updating the plan after significant disasters.

1.4 Authority and Reference

This HMP will be adopted by Charles County in accordance with the authority granted to counties by the State of Maryland.

This HMP was updated in accordance with current state and federal rules and regulations governing local hazard mitigation plans. Authority for this plan originates from the following federal sources:

- Robert T. Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C., Section 322, as amended.
- Code of Federal Regulations (CFR), Title 44, Parts 201 Mitigation Planning and 206 Hazard Mitigation Grant Program;
- Disaster Mitigation Act of 2000, Public Law 106-390, as amended.
- National Flood Insurance Act of 1968, as amended, 42 U.S.C. 4001 et seq.
- National Dam Safety Program Act (Pub. L. 92-367), as amended.
- Local Mitigation Planning Policy Guide FP 206-21-0002

Robert T. Stafford Disaster Relief and Emergency Assistance Act is the statutory authority for most

Disaster Mitigation Act of 2000 established mitigation planning requirements as a condition of mitigation grant assistance.

The HMP shall be monitored and updated on a routine basis to maintain compliance with the legislation and guidance above, as well as the following state rules and regulations:

- Maryland Department of Emergency Management (MDEM), established in the Maryland Code. The Emergency Management Policy was updated in 1991 through Executive Order 01.01.1991.02. State of Maryland Emergency Management Policy.

The following MDEM reference document was also used to prepare this document:

- State of Maryland 2021 Hazard Mitigation Plan.

1.5 Overview of Hazard Mitigation Planning

Local hazard mitigation planning is the process of organizing community resources, identifying and assessing hazard risks, and determining how to best minimize or manage those risks. This process results in a HMP that identifies specific mitigation actions, each designed to achieve short-term planning objectives and realize a long-term community vision. To ensure the functionality of each mitigation action, responsibility is assigned to a specific individual, department, or agency along with a schedule for its implementation. Plan maintenance procedures are established to implement, evaluate and enhance the HMP as necessary. Developing clear plan maintenance procedures and implementation schedule ensures that Charles County's HMP remains a current, dynamic, and effective planning document over time.

1.6 Local Methodology and Update Summary

This HMP contains a narrative description of the process followed to prepare the plan. All municipalities were notified in August 2023 of the mitigation planning requirement, the HMPC, and 2023 HMP Update planning process. Additionally, county departments, state, and regional organizations were invited to HMPC meetings. The HMP Update process was conducted over five months, from August 2023 to January 2024. Throughout the planning update process, the Charles County HMPC reviewed and analyzed each section of the plan.

The planning process used for the 2023 HMP Update was based on Section 322 of the Disaster Mitigation Act of 2000 and supporting guidance developed by FEMA. The planning process followed these steps:

- Conduct an Internal Pre-Kickoff Meeting with Charles County Emergency Management staff Maryland Environmental Services (MES) staff, Smith Planning and Design (SPD) staff and Michael Baker International (MBI) staff.
- Conduct a Kick-Off Meeting with the HMPC
- Develop and implement Public Outreach Strategy
- Conduct a Risk Assessment Meeting with the HMPC
- Review and update the Hazard Identification and Risk Assessment
- Conduct a Mitigation Solutions Meeting with the HMPC
- Update the Capability Assessment to assess existing capabilities and mechanisms for the County and each municipality to carry out the Mitigation Strategy
- Update the Mitigation Strategy
- Update the Plan Maintenance procedures
- Complete a draft plan for review by Charles County
- Provide final draft to MDEM for review
- Provide final draft to FEMA for review
- Present HMP to Charles County for adoption
- Present HMP to municipalities for adoption

In accordance with the Disaster Mitigation Act of 2000, the Charles County 2023 HMP Update details the following topics:

- Planning Process
- Hazard Identification and Risk Assessment
- Capabilities Assessment
- Mitigation Strategy (Goals, Objectives, and Actions)

- Plan Review, Evaluation, and Implementation
- Plan Adoption

Each of the planning steps described above resulted in key products and outcomes that collectively make up the Charles County HMP. These work elements are further discussed below for introductory purposes.

Charles County 2023 HMP Outline

1. Planning Process
2. Community Profile
3. Hazard Identification and Risk Assessment
4. Hazard Profiles
5. Historic and Cultural Resources Vulnerability Assessment
6. Capability Assessment
7. Mitigation Strategy
8. Plan Execution and Maintenance

Chapter 2 - Community Profile: This chapter describes the general makeup of Charles County and its municipalities, including prevalent geographic, demographic, economic, and development characteristics. This baseline information provides a snapshot of the Countywide planning area and thereby assists participating officials in recognizing those social, environmental, and economic factors that ultimately play a role in determining community vulnerability to natural and human-made hazards.

Chapter 3 – Hazard Identification and Risk Assessment / Chapter 4 Hazard Profiles: These chapters contain a summary of the hazard identification and update process, individual hazard profiles for ten natural hazards and seven human-made hazards, and a vulnerability assessment. Together, these elements serve to identify, analyze, and assess Charles County's overall risk. This chapter builds on available historical data from previous occurrences, updates information and analysis contained in the hazard-by-hazard profiles and culminates in a hazard risk priority or ranking based on conclusions about the frequency of occurrence, potential impact, spatial extent, warning time, and duration of each hazard. FEMA's Hazus loss estimation methodology was also used in evaluating known flood risks according to their relative long-term cost, measured in expected damages. The Hazard Identification and Risk Assessment is designed to assist communities in seeking the most appropriate mitigation actions to pursue and implement by focusing their efforts on those hazards of greatest concern and those structures or planning areas facing the greatest risks.

Chapter 5 – Historic and Cultural Resources Vulnerability Assessment: This chapter focuses on assessing the vulnerability of the County's historic and cultural resources to natural and human-made hazard events. This includes an assessment of the risk and vulnerability of historic and cultural sites, districts, and other resources throughout Charles County. This assessment identifies high priority sites and areas for mitigation activity and areas for further study. The assessment also includes recommendations incorporated in Chapter 6 Mitigation Strategy.

Chapter 6 – Capability Assessment: This chapter includes an evaluation and update of the County and its jurisdiction regarding their planning, regulatory, administration, technical, financial, educational, and outreach capabilities. This includes an assessment of governmental structure, political framework, legal jurisdiction, fiscal status, policies and programs, regulations and ordinances, and resource availability. These factors are evaluated with respect to their strengths and weaknesses in preparing for, responding to, and mitigating the profiled hazards' effects. This exercise plays a key role in the hazard mitigation planning process by helping to determine the feasibility and relative appropriateness of various hazard mitigation action items that may be identified as part of the hazard mitigation strategy. This chapter also contains a section focused on plan integration, which assesses ways that Charles County currently integrates hazard mitigation with other community planning initiatives and examines additional opportunities for further integration. Combined with the risk assessment, the capability assessment informs the update of a meaningful and feasible Mitigation Strategy.

Chapter 7 – Mitigation Strategy: This chapter consists of broad goal statements as well as specific mitigation actions for each jurisdiction participating in the planning process. This updated strategy provides the foundation for the detailed Mitigation Action Plan that links jurisdictionally specific mitigation actions to locally assigned implementation mechanisms and target completion dates. Together, these sections are designed to make the HMP more strategic and functional through the identification of both long-term goals and near-term actions that will guide day-to-day decision-making and project implementation.

In addition to the identification and prioritization of possible mitigation projects, emphasis is placed on the use of program and policy alternatives to help make Charles County and participating municipalities less vulnerable to the damaging forces of nature while improving the economic, social, and environmental health of the community. The concept of multi-objective planning is emphasized throughout this HMP Update, identifying ways to link hazard mitigation policies and programs with complementary community goals that may be related to housing, economic development, community revitalization, recreational opportunities, transportation improvements, environmental quality, land development, and public health and safety. This HMP Update should be a proactive document that represents a concerted effort to make Charles County and participating jurisdictions more livable communities.

Chapter 8 – Plan Execution and Maintenance: This chapter includes the measures Charles County and participating jurisdictions will take to ensure the HMP's continuous long-term implementation. The procedures also include the way the HMP will be regularly monitored, reported upon, evaluated, and updated to remain a current and meaningful planning document.

The HMPC reviewed the current plan, identified additional information that needed to be included in the HMP Update and incorporated it as required by state and federal guidelines. The HMPC was also tasked with collecting all accurate data from plan participants and provided outreach to the public and business stakeholders to ensure that everyone's information is included in this HMP Update.

1.7 The Planning Team

The participants listed in Table 1.7-1 represent the HMPC members responsible for updating this HMP.

Table 1.7-1: 2023 HMPC Members

NAME	ORGANIZATION	HMPC KICKOFF MEETING 8/24/2023	MIDPOINT MEETING 10/19/2023	MITIGATION WORKSHOP(S) 12/14/2023
Michelle Lilly	Charles County Department of Emergency Services	X	X	X
Gary Lewis	Charles County Department of Emergency Services	X	X	X
Kelly Wilson	Charles County Department of Emergency Services		X	X
Nick Ellis	Charles County Department of Emergency Services	X	X	X
Agnes Adjei	Charles County Department of Planning & Growth Management	X	X	
Joel Binkley	Charles County Department of Planning & Growth Management	X		X
Beth Groth	Charles County Department of Planning & Growth Management	X	X	X
Lynn Knaggs	Charles County Department of Planning & Growth Management	X		X
Kelly Palmer	Charles County Department of Planning & Growth Management	X		X
Cathy Thompson	Charles County Department of Planning & Growth Management			X
Karen Wiggin	Charles County Department of Planning & Growth Management	X	X	
Stephen Staples	Charles County Public Facilities			
Stacy Schafer	Charles County Resilience Authority			X
Jeffery Clements	911/ Public Safety Communications	X		
Mary Lilly	Charles County Dept. of Health	X	X	X
Kelli Beavers	Charles County Parks, Recreation & Tourism			X
Sam Drury	Charles County Parks, Recreation & Tourism	X		X
Jason Stoddard	Charles County Public Schools			
LT John Dodge	Charles County Sheriff's Office	X		X
Luis Dieguez	Charles County Soil Conservation District	X	X	X
Renesha Miles	Charles County Office of Diversity Equity & Inclusion	X	X	

Table 1.7-1: 2023 HMPC Members

NAME	ORGANIZATION	HMPC KICKOFF MEETING 8/24/2023	MIDPOINT MEETING 10/19/2023	MITIGATION WORKSHOP(S) 12/14/2023
Patrick Goode	Charles County USDA Farm Services Agency			
Denise Mohun-Hintze	College of Southern Maryland	X	X	
John Dulina	Maryland Department of Emergency Management			
Ashley Farmer	State Highway Administration – La Plata Shop	X		X
Michelle Miner	Town of La Plata	X		X
Ryan Hicks	Town of Indian Head	X		X
Tina Wilson	Port Tobacco River Conservancy		X	X
Suzanne Wisnieski	US Department of Agriculture	X		
Mark Kaufman	Volunteer Fire	X	X	X
Michael Gimmel	Volunteer Fire Special Ops Chief	X		
Michell Lewis	Volunteer EMS			
Michael Manen	Maryland Environmental Service	X		
Doug Adams	Maryland Environmental Service		X	X
Kayla Rhue	Maryland Environmental Service			X
Mark James	Michael Baker International	X	X	X
Monica Perez Morales	Michael Baker International			X
Virginia Smith	Smith Planning & Design	X	X	X
Michele King	Smith Planning & Design	X		X

Note: The Town of Port Tobacco Village is included under the Charles County Hazard Mitigation Plan, as they do not have Land Use Authority.

A well-rounded community-based planning team contributed heavily to the development of this HMP Update. The Charles County Department of Emergency Services spearheaded the update process, with the support of the HMPC. Charles County engaged past HMPC members, county and local government officials, state agencies, stakeholders, and the public in local meetings and planning workshops to discuss and complete tasks associated with preparing the HMP Update. As part of the plan update, the Charles County Office of Diversity Equity & Inclusion was invited to participate. This Office was approved by Resolution 2021-24 Commitment to Diversity, Equity, and Inclusion in December 2021. This Office works directly with under-served populations.

FEMA's *Guide to Expanding Mitigation* highlights how local governments can partner with communities to strive for equity in hazard mitigation, including the planning and project development process. The guide recommends taking a "Whole Community" approach and involving historically underserved populations in the planning and decision-making processes, and also recommends the inclusion of those

with access and functional needs, businesses, faith-based and community organizations, nonprofit groups, schools, academia, media outlets, and all levels of government, including state, local, tribal, territorial, and federal partners that have a shared responsibility in emergency preparedness and mitigation.

When incorporating equity and inclusion approaches it is optimal to work with leaders of the groups that you are seeking to better include. Particularly with a highly structured planning process like the HMP it is important that Charles County seeks to *increase* inclusion or *incorporate more* equitable approaches.

Many planning processes traditionally have used a set of engagement methods, including English-language surveys, workshops, and presentations. These forms of engagement are often hard to access for the general public and especially so for socially vulnerable communities. Using an equity lens can be difficult to identify ways to operationalize equity into a structured public planning process. Table 1.7-2 provides detailed examples of equity considerations and recommended actions that Charles County has taken to incorporate equity into the HMP process.

Table 1.7-2 Examples of How To Use An Equity Lens In Hazard Mitigation Planning

Framework	Equity Consideration	Recommended Action
Decision-Making and Solutions	• Who sits at the decision-making table? • Are there systematic barriers to participation in the planning process? • How will community and stakeholders be involved, and mutual communication be established? • Scan for gaps – are needs of key socially vulnerable groups addressed?	• Establish equity principles and objectives to guide the HMP process. • Include community-based leaders on the HMPC including in plan development and review to identify gaps and opportunities for action. • Establish partnerships with community-based organizations to inform process, identify actions, and foster mutual communication. • Plan for integrating community feedback into plan update.
Accountability, Communication and Community Engagement	• How to include and deliver outcomes for those underrepresented in decision making or most affected by inequities? • How will we be accountable to the community from planning process throughout implementation?	• Implement specific engagement for hard to reach, socially vulnerable and traditionally underserved populations. • Implement mechanisms to report back to community members about how their input was addressed.
Understanding Data: Hazard Analysis & Risk Assessment	• How does inequity increase the impact of the hazard or climate impact? • How will race, ethnicity, gender identity, income, languages spoken, disability, age, or medically sensitive people be affected by a disaster or climate impact? Are any of these	• Engage with stakeholders to Identify socially vulnerable neighborhoods and population groups and assure that locally relevant hazards, risks and social vulnerability are included in the analysis. • Analyze social vulnerability, hazards, and climate data together. • Consider race, ethnicity, gender identity, income, languages spoken,

Table 1.7-2 Examples of How To Use An Equity Lens In Hazard Mitigation Planning		
Framework	**Equity Consideration**	**Recommended Action**
	groups concentrated in high-risk areas? • Did we miss anything because we are not familiar with day-to-day life or what it is like to experience a disaster in a socially vulnerable community?	disability, age, medically sensitive people, especially regarding the individual or group's ability to prepare for, survive and recover from a disaster or climate impact. • Assess long-standing and multi-generational inequities, e.g. redlining, underinvestment, hazardous waste sites. • Consider ways to measure cost of risks and hazards beyond property value, which undervalues the impact of asset loss to socially vulnerable communities.
Burdens and Benefits	• Would low-income households or communities of color experience a disproportionate burden? Will affluent communities receive disproportionate benefits? • Have historical inequities led to more substantial infrastructure needs in some communities? • Will the proposed measures result in displacement of vulnerable community members?	• Evaluate past mitigation measures and adjust or add to them to be more equitable and address gaps and new risks affecting vulnerable populations. • Incorporate previously developed community solutions when possible. • Update approach to hazards which have increased in severity and are hitting socially vulnerable community members hard. • Identify physical barriers and old/lack-of infrastructure in vulnerable and underserved communities. • Involve community-based organizations in evaluation of benefits and burdens.
Next Steps	• How can barriers to inclusion be addressed so the process can be more thorough and inclusive now and in the future?	• Leverage existing and build new relationships with community leaders and stakeholders to support equity and inclusion efforts. • Act responsively when equity considerations are identified.

1.8 Planning Meetings and Documentation

Below is a summary of the key meetings and workshops conducted by the Charles County HMPC during the plan update process. Invitations, agendas, sign-in sheets, and minutes for these meetings are included in Appendix C.

Internal Kick-Off Meeting

The Internal Kick-Off Meeting held on August 7, 2023, served as a project coordination meeting with representatives from Charles County, MES, MBI, and SPD. This meeting's intent was to discuss the planning process, project schedule, dates for upcoming meetings, and data needs and requirements.

Charles County staff compiled a list of HMPC members and provided it to the consultant to send out upcoming plan invitation emails.

Given the short timeline the planning team agreed to meet on a bi-weekly basis to provide updates, discuss data challenges, public outreach efforts, and set action items. The planning team also agreed to establish monthly HMPC meetings. HMPC meetings will be held at the College of Maryland, 8730 Mitchell Road, LaPlata, MD 20646.

Charles County 2023 HMP Update Timeline

- **August 7, 2023:** Internal Kick-Off Meeting
- **August 24, 2023:** Kick-Off Meeting
- **October 19, 2023:** Midpoint Meeting
- **December 12, 2023:** Public Open House
- **December 14, 2023:** Mitigation Workshops
- **April 2, 2024:** Submission to MDEM/FEMA

- Project Kickoff Meeting (virtual) - 1 hour
- Midpoint Meeting - 2 hours
- Mitigation Strategy Development - 4 hours

Plan milestones and deliverables were scheduled in line with the HMPC meetings. The consultant developed a task tracker that kept the plan on schedule and was used to provide County staff updates.

The Charles County website was used to post plan updates, and public surveys with linked notifications sent to HMPC members to disseminate to their networks. Plan format including colors, design and GIS map templates were also agreed on during this meeting.

HMPC Kick-Off Meeting

The HMPC Kick-Off Meeting was held virtually on August 24, 2023, from 10AM to 11AM. The meeting's intent was to provide an overview of the plan, discuss the 2023 condensed planning process, FEMA's new local planning requirements, and review the 2018 Plan. Invitations were sent to county agencies, municipal officials and stakeholders listed in Table 1.7-1. The agenda for the meeting is presented below in Table 1.8-1.

Table 1.8-1: 2023 Hazard Mitigation Planning Committee Agenda Items		**Kick-Off Meeting August 24, 2023, 10:00 – 11:00AM**
DATE	**ATTENDANCE**	**AGENDA**
August 24	28	Welcome and Introductions Project Overview HMPC Member, Municipal and Public Participation Hazard Updates Data Collection and Next Steps

The Charles County Director of Emergency Services welcomed everyone to the meeting, briefly introduced the project and turned the meeting over to the Consultant. A brief review of the definition of mitigation and the importance of mitigation planning was covered. The group went over the different parts that integrate the hazard mitigation plan. During this initial introduction, expectations, and the importance of

committee member participation throughout the plan update process were stressed. A tentative schedule for the plan update with meeting dates, agenda items, and expected progress was presented to the HMPC.

The HMPC reviewed hazards profiled in the 2018 HMP and completed a hazard risk evaluation exercise that determined if the County saw an increase or decrease in hazard impacts over the past five years. An overview of the capability assessment and mitigation strategy components of the HMP was also provided. This data provided officials with a more thorough understanding of the hazard risks in their communities, along with the varied levels of local capabilities available to address them.

Midpoint Meeting

The Midpoint meeting was held on October 19, 2023, at the College of Southern Maryland in La Plata. This meeting's purpose was to provide updated hazard risk assessment results, preliminary results from the public survey, and to conduct a capability assessment work session with meeting participants. Invitations were sent to county agencies, municipal officials and stakeholders listed in Table 1.7-11. Agenda for the meeting is presented in Table 1.8-2. Meeting participants reviewed and discussed results of the hazard risk assessment update, the greatest change was Erosion which went from Low to Medium, while the other hazards had minor variations in their risk factor numbers. High risk hazards included: Extreme Weather, Flood, Temperature Extremes, and Public Health Emergencies. HMPC members were also given the results of, and an opportunity to comment on the survey's status. Originally the survey was scheduled to close on November 15, 2023, however HMPC members expressed their desire to increase public participation in the survey, therefore, an additional two weeks was allotted. Additionally, HMPC members will post and repost the public survey social media with survey link, as appropriate. Finally, the work session held during this meeting afforded HMPC members an opportunity to discuss current capabilities and answer discussion questions aimed at identifying gaps or opportunities for expansion. Identified gaps and opportunities for expansion of current capabilities were incorporated into new mitigation actions for this plan update.

Table 1.8-2: 2023 Hazard Mitigation Planning Committee Agenda Items		**Midpoint Meeting October 19, 2023, 2:00 – 4:00PM**
DATE	**ATTENDANCE**	**AGENDA**
October 19	14	Introductions and Brief HMP Overview Project Update Hazard Identification Risk Assessment Update Capacity Assessment Work Session Next Steps

Renesha Miles, Charles County Office of Diversity Equity & Inclusion along with Mary Lilly Charles County Department of Health worked together to provide additional information on social equity integration into the Charles County Hazard Mitigation Plan Update. Equity is intersectional, individuals belong to more than one group and, therefore, may have overlapping health and social inequities, as well as overlapping strengths and assets. Examples of equity considerations and capabilities discussed during the Mid-Point meeting included:

- Mobile health screenings to provide treatment to those without transportation.
- Free health seminars targeted toward the health issues of minority groups.

Charles County uses the Medical Assistance Transportation Grant Program to assist community members who have no other means of transportation available and is only provided to Medicaid covered, medically necessary services by the least expensive method suitable to the recipient's needs.

Note: With a median household income of $103,678, Charles County is the 39th-wealthiest county in the United States as of 2020, and the highest-income county in the United States with a Black-majority population. However, 3.7% of Charles County families live in poverty, compared to the State of Maryland, with 9.6% of the population living below the poverty line.

Mitigation Workshops

A series of four virtual Mitigation Workshops were held on December 14, 2023. Meetings were topic specific, were scheduled for 1.5 hours and scheduled every second hour starting at 8:30AM and ending at 4:00PM. Members of the HMPC were split into four topical groups:

- Local Planning and Regulations
- Structure and Infrastructure
- Natural Systems Protection
- Public Education and Emergency Services

Table 1.8-3: 2023 Hazard Mitigation Planning Committee Agenda Items		**Mitigation Workshop (Virtual) December 14, 2023 8:30–10:00AM / 10:30-12PM / 12:30-2:00PM / 2:30-4:00**
DATE	**ATTENDANCE**	**AGENDA**
December 14	26	Welcome & Introductions Where are we? New Mitigation Actions - Activity Next Steps

Note: Participants signed up for a minimum of one topical workshop, however they were encouraged to participate in all the workshops offered.

Invitations were sent to county agencies, municipal officials and stakeholders listed in Table 1.7-1. The agenda for the meeting is presented in Table 1.8-3. Prior to the mitigation strategy workshops HMPC members were tasked with providing information on the status of mitigation actions (e.g., Completed, Canceled, Delayed, or Ongoing), a Mitigation Status Report was completed and is included in Appendix F of this plan update.

Seventy-four mitigation actions were discussed during the Mitigation Workshops held on December 14, 2023. Mitigation action included those carried over from the 2018 plan and new mitigation actions developed during this plan update process. Committee members had the opportunity to review each action and determine if it should be included in the plan update. In addition, tweaks were made to action

items, as necessary based on participant feedback. All new mitigation actions included in this plan were either proposed by committee members or were identified from risk and vulnerability assessments conducted within the hazard profiles.

Each group reported their top action items. A total of sixty-nine new action items were developed during the workshop. Action items identified as resonating the most with workshop participants, meaning they had a high likelihood of completion, and they should be completed during this next planning cycle were identified during each of the four workshops. Results of the Mitigation Workshop are included in Chapter 5: Mitigation Strategy, along with the results from the online mitigation prioritization survey completed by HMPC members. The survey was the final step in the mitigation strategies update process. Results of this survey indicated four (4) "high" priority mitigation actions. High priority mitigation actions include the following:

- Mitigation Action Item #5
- Mitigation Action Item #11
- Mitigation Action Item #50
- Mitigation Action Item #66

1.9 Public and Stakeholder Participation

A vital component of Charles County's community-based mitigation planning process involves public, stakeholder, and jurisdiction participation. Individual citizen involvement provides the HMPC with a greater understanding of local concerns and ensures a higher degree of mitigation success by developing community "buy-in" from those directly affected by the planning decisions of public officials. Additional opportunities to engage in the plan update process were offered this go-round.

Public input was sought using the following methods:

(1) online public survey

(2) press release and social media post about the plan update and ways to engage

(3) advertised open public meetings

(4) the posting of all development materials and a draft of the Charles County Hazard Mitigation Plan 2023 Update on the Charles County Emergency Services website.







Public messaging for this plan update was completed in cooperation with Doria Fleisher, Community Engagement Coordinator. In addition, the public meeting held on December 12, 2023, included the Charles County Citizen's Academy.

Each municipality was given multiple opportunities to participate in the HMP Update process through invitations to meetings, review of risk assessment results and mitigation actions, and an opportunity to comment on the draft of the HMP. The tools listed below were distributed at meetings or in meeting follow-up emails to solicit data, information, and comments from all municipalities in Charles County and other HMPC members and stakeholders. These resources were also posted to the project website.

- **Evaluation of Identified Hazards and Risk Worksheet:** Allows communities to provide information on the status of hazards in their community and nominate new hazards for inclusion in the 2023 HMP Update.
- **Capability Assessment Survey:** Collects information on local planning, regulatory, administrative, technical, fiscal, political, and resiliency capabilities to inform the Countywide and local mitigation strategies.
- **Mitigation Action Review Worksheet:** Allows County departments and local municipalities that submitted hazard mitigation projects for the 2018 Plan to re-evaluate them to determine if they are still viable or if they have been completed or discontinued.
- **Mitigation Action Worksheet:** Allows County departments and local municipalities to propose mitigation actions for the HMP and include information about each action such as a lead agency/department, implementation schedule, priority, estimated cost, and potential funding source(s).

In addition to the County and its jurisdictions, representatives from the Port Tobacco River Conservancy, College of Southern Maryland, and various state agencies participated in the planning process.

On December 12, 2023, a public form was held with Charles County Government Citizens Academy. The meeting was held at the Waldorf Senior & Recreation Center, located at 90 Post Office Road in Waldorf between 6PM and 8PM. Doria Fleisher, the Community Engagement Coordinator was contacted two weeks prior to coordinate this meeting with a group of 15 volunteer citizens. The Charles County Government Citizens Academy program is designed to help promote a better understanding of Charles County Government. Participants in the academy are tasked with examining issues and providing

suggestions to problems that impact government operations. The outcomes and suggestions of the academy are shared with Charles County Government leadership.

Participants reviewed each hazard and completed a hazard risk evaluation exercise that determined if the County saw an increase or decrease in hazard impacts over the past five years. Participants agreed that there was an overall increase in magnitude or occurrence of impacts in all but dam failure, hurricane, tropical storm, nor'easter, severe winter storm, wildfire, building and structure collapse, and nuclear events. Dam failure, hurricane, tropical storm, nor'easter, wildfire, building and structure collapse, and nuclear events saw no change in the last 5 years and severe winter storm saw a decrease in the past 5 years. Participants were then asked to develop mitigation actions for priority hazards. The following list are relevant mitigation actions that were recommended by the Academy members and carried over into the plan:

Action 1: Work with county roads and SHA to install reflectors within the white lines along roadways. During rain and snowstorms lines are difficult to see.

Action 2: Evaluate areas and roadways for opportunities to install lighting.

Action 3: Evaluate areas for installation of cameras to discourage criminal activity.

Action 4: Promote tree planting at the neighborhood level. Distribute information on Maryland's 5 million trees initiative. (5MT). Consider social equity when prioritizing neighborhood outreach.

Action 5: Increase and/or enhance public education. The following ideas to educate the public about hazard mitigation were identified during the December 2023 public meeting:

- Increase public meetings held by DES.
- Prepare and provide hurricane preparedness information prior to June 1st.
- Include hazard mitigation information and promote the project website with the county's utility bills or property tax bills.
- Create "hazard of the month" context for inclusion in the Maryland Independent Paper, which is released on Fridays.
- Utilize videos on pumps at gas stations to increase hazard awareness.
- Develop public awareness campaign regarding extreme temperatures and how they affect residents.
- Prepare flyers for safety strategies during severe winter weather, including driver education classes and materials.
- Send news releases to local newspapers, radio, and TV stations with pre-disaster information while attempting to reach all areas of Charles County.
- Perform outreach activities to inform residents of their vulnerability to hazards and how to mitigate them. This may include newsletters, flyers on keeping drain ditches clear, participation in the NFIP, and safety tips.
- Promote Tornado safety public awareness and encourage the building of safe rooms during new construction.

Figure 1.9-1: Charles County Public Forum, Citizens Academy - December 12.



Maryland Association of Floodplain and Stormwater Managers – Annual Conference

Maryland Association of Floodplain and Stormwater Managers (MAFSM) provides educational opportunities and promotes public awareness of sound environmental solutions to floodplain and stormwater management. The 2023 MAFSM 19th annual conference drew over 200 attendees from local, state, and federal governments and the private sector from Maryland. The conference was held on November 8, 2023, at the Maritime Conference Center in Linthicum Heights, MD. This event increases awareness within the audience about issues pertaining to restoration and protection of the natural resources of the Chesapeake and/or Maryland's other watersheds.

Charles County was represented at the 2023 conference and presented on the steps taken from the 2018 plan update, five years ago. Details were provided on how the action items identified in the 2018 plan were integrated into the nuisance flood plan and further refined in 5 site specific flood studies that were identified as priority flood areas. The focus of the presentation was based on how to maintain a trusted relationship with a client from grant development to planning and design to project implementation.

1.10 Multi-Jurisdictional Planning and Participation

This HMP was developed using a multi-jurisdictional approach. Though county departments have resources such as technical expertise and data which local jurisdictions may lack; involvement from local municipalities is critical to the collection of local knowledge related to hazard events. Local municipalities also have the legal authority to enforce compliance with land use planning and development issues. The 2023 Charles County HMP includes the participation of County officials and the following municipalities:

- Town of Indian Head
- Town of La Plata
- Town of Port Tobacco Village

To satisfy multi-jurisdictional participation requirements, each of the local jurisdictions was asked to perform the following tasks:

1. Designate a representative to serve on the Charles County HMPC.
2. Actively participate in the HMP Update process.
3. Provide best available data as required to update to the local hazard, risk, and vulnerability assessment.
4. Determine capability and provide copies of any planning, mitigation, or hazard-related documents for review and incorporation into the Plan.
5. Support the updating of the current countywide mitigation strategy, including the update, evaluation of plan goals and the review and development of new hazard mitigation actions.
6. Review and provide timely comments on all draft components of the HMP Update
7. Adopt the 2023 Charles County Hazard Mitigation Plan Update, including the local mitigation action plan specific to their jurisdiction.

Through the completion of these tasks, the Towns of Indian Head, La Plata, and Port Tobacco Village participated with Charles County in the updating of this Plan. Further, through the preparation of their own local mitigation action plans, these communities were responsible for addressing their most significant hazard concerns. This component of the HMP provides the opportunity for the jurisdictions to monitor and update their own specific HMP implementation responsibilities without necessarily having to meet with the HMPC. It also enables the jurisdiction to be solely responsible and accountable for those actions that apply to their jurisdictions.

Table 1.10-1: Multi-Jurisdictional Participation

JURISDICTION	COUNTY HMP MEETINGS			WORKSHEETS AND EXERCISES			
	KICK-OFF	MIDPOINT	MITIGATION SOLUTIONS	Evaluation of Identified Hazards & Risks Worksheet	Capability Assessment Survey	Mitigation Action Review Worksheet	New Mitigation Action Worksheet
Charles County	X	X	X	X	X	X	X
Town of Indian Head	X		X	X	X	X	X
Town of La Plata	X		X	X	X	X	X
The Town of Port Tobacco Village is included under the Charles County Hazard Mitigation Plan, as they do not have Land Use Authority							

All jurisdictions participated in the Plan update by either attending meetings, completing forms, or providing timely comments on draft components of the HMP.

1.11 Limitations

Limitations identified during this plan update included staff shortages. These shortages led to longer turnaround times for receiving requested information and the completion of activities and surveys. Overall participation in this plan update process was high, as evidenced by the quality of information included herein.

The Town of Port Tobacco Village was unable to send a representative to serve on the Hazard Mitigation Planning Committee. The village does not have land use authority. The population of Port Tobacco is twenty-five people and is included under the Charles County.

1.12 Data Sources

Throughout the HMP Update Process, existing plans, studies, reports, and technical information were reviewed and incorporated when applicable. Key data incorporated into the 2023 HMP Update included updated GIS data from Maryland's Mapping and GIS Data Portal (MD iMap), current parcel and critical facilities GIS data from Charles County, updated population and demographic information from the U.S. Census Bureau, the effective Flood Insurance Rate Map (FIRM) database and Flood Risk Database from FEMA, historic hazard event data from the National Oceanic and Atmospheric Administration's Storm Events Database, historic property GIS data from Maryland Historical Trust and the National Park Service, Maryland Department of Natural Resources Sea Level Rise Vulnerability GIS data, and more. Also, the State of Maryland 2020 Hazard Mitigation Plan and Charles County's Comprehensive Plan, Emergency Operations Plan, Flood Risk Report, and Flood Insurance Study were reviewed and referenced throughout the planning process. Plans, studies, and data specific to La Plata, Indian Head, and Port Tobacco were also reviewed and incorporated when applicable. A full list of reference material used during the planning process can be found in Appendix B – Bibliography.

1.13 Critical Facilities

FEMA generally defines a critical facility as follows: Facilities and infrastructure that are critical to the health and welfare of the population and that are especially important following hazard events. Critical facilities include, but are not limited to shelters, police and fire stations, and hospitals.

It is important to note, Charles County has included facilities that they deem either critical or especially important to the health and welfare of their citizens and visitors. These facilities are included in their Critical Infrastructure Database which is updated periodically. This database has been used during this planning process, and is included in Appendix H.

Facility types included in the critical facilities database are:

- Airport
- Bank
- Fire/EMS
- Government Facility
- Group Home

- Healthcare
- Post Office
- Public Safety
- Pump Station
- School
- Sheriff
- SMECO Property
- Tower Site
- Water Tower
- Well
- Park
- Homeless Camp
- Church
- Day Care



CHAPTER 2: COMMUNITY PROFILE

2.0 COMMUNITY PROFILE

The purpose of the Community Profile is to describe the characteristics of Charles County and its jurisdictions in order to better understand the context for the hazards assessed in this HMP, local community capabilities, vulnerable assets, and the mitigation strategy. Community characteristics highlighted in this section include basic information about Charles County's history, geography, population, demographics, economy, and development patterns. The Community Profile is divided into the following subsections:

- Geography and Environment
- Population and Demographics
- Jurisdictional Profiles
- Land Use and Development Trends

Charles County was founded in 1658 and named after Charles Calvert, early Governor of the colony of Maryland. The County is located in Southern Maryland, and surrounded by Prince George's County, Calvert County, St. Mary's County, and the Potomac River. Charles County forms a portion of the Washington Metropolitan Area, also known as the National Capital Region.

Charles County Facts

Founded: 1658
Total Area: 643 square miles
Land Area: 458 square miles
Population (2022): 170,102
Population Change (2010-2022): 16.1%
Households: 63,763
County Seat: Town of La Plata
Largest Community: Town of La Plata
Watersheds (HUC8): Lower Potomac, Patuxent, Middle Potomac-Anacostia-Occoquan

Sources: U.S. Census Bureau 2010, and 2022; USGS, 2013

The county is comprised of the Towns of La Plata, Indian Head, and Port Tobacco, and encompasses roughly 643 square miles. Additional areas with high population concentrations within Charles County include the communities of Bel Alton, Benedict, Bryans Road, Bryantown, Charlotte Hall, Cobb Island, Dentsville, Faulkner, Hughesville, Ironsides, Issue, Marbury, Marshall Hall, Mount Victoria, Nanjemoy, Newburg, Pisgah, Pomfret, Rison, Rock Point, St. Charles, Swan Point, Waldorf, Welcome, and White Plains.

The County is particularly known for its fervent cultural and historical heritage, the beautiful shorelines of the Potomac and Wicomico River, and its rural aesthetic. The landscape of Charles County is made up of compact rural settlements, spread across a vast region of farmland, streams, shorelines, and an extensive amount of undisturbed natural ecosystems.

The business base in Charles County presents a desirable location for industry and commerce. Consisting of eight industrial parks, with no inventory or manufacturing equipment tax. The economy contains a high amount of retail trade communications, utilities services, and local and federal government agencies. The

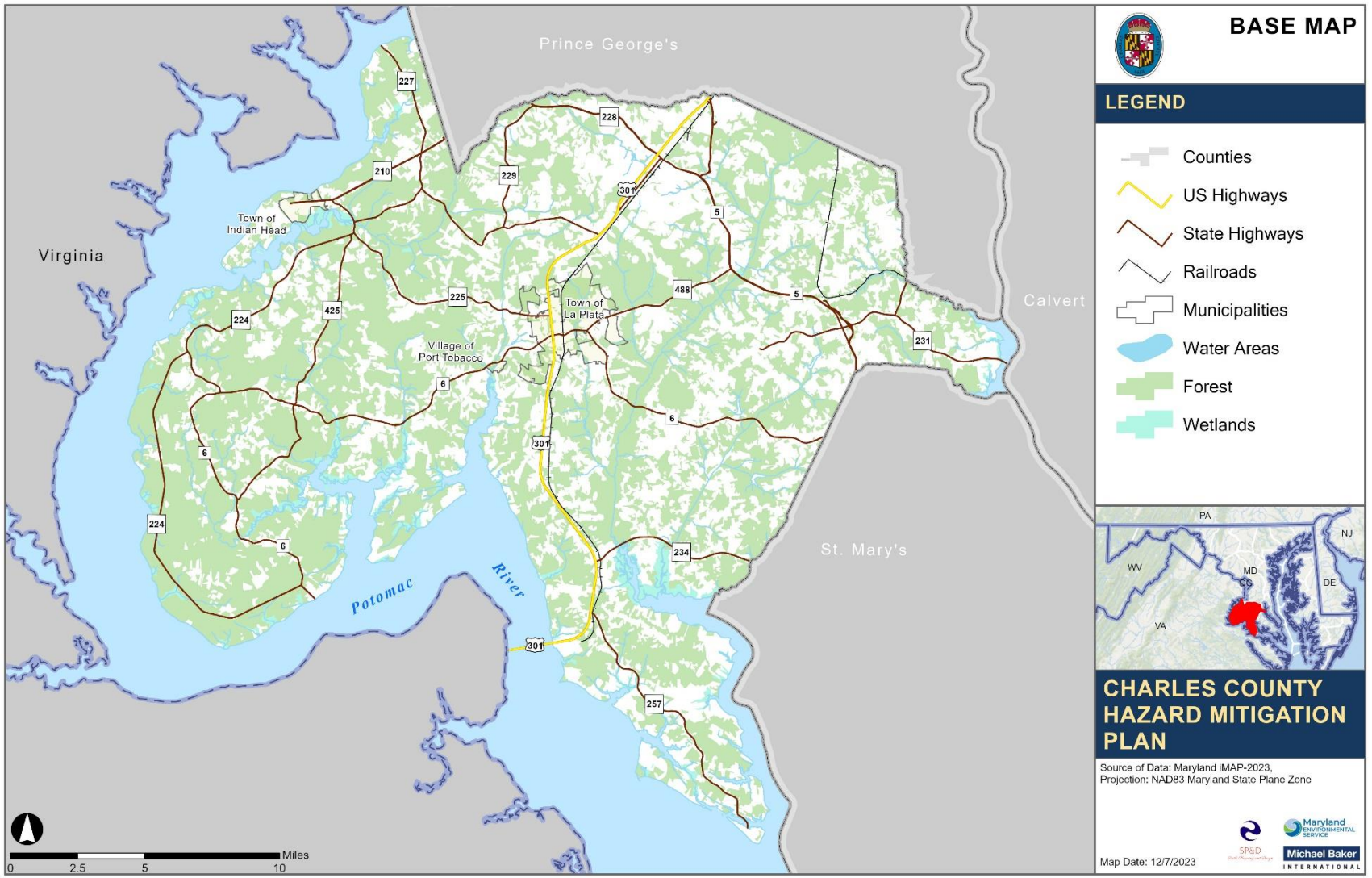
Naval Surface Warfare Center, College of Southern Maryland, Charles County Board of Education, Southern Maryland Oil Company, University of Maryland, and Charles Regional Medical Center are among the largest employers in the region.

2.1 Geography and Environment

While the total area of Charles County consists of 643 square miles, 458 of which are land, the remaining 185 square miles consists of water. As shown in Map 2.1-1. the three jurisdictions incorporated in Charles County include the Towns of La Plata, Indian Head, and Port Tobacco. The Town of La Plata is comprised of roughly 7.5 square miles, while the Town of Indian Head is made up of 1.23 square miles. The Village of Port Tobacco has the smallest land area, occupying only 0.16 square miles. The natural landscape of Charles County produces some of its most precious environmental assets. These include a vast shoreline, broad estuaries, heavily forested areas, scenic views of the Potomac and Wicomico Rivers, and rural terrain. Charles County's features create a setting of distinguished beauty that attracts many people, which accompanies population growth and development. With increased development, special considerations must be taken for the protection and preservation of wetlands, water quality, shorelines, floodplains, wildlife habitats, forests, upland natural areas, and moderate topographic slopes.

The geologic formations of Charles County and surrounding Maryland were formed during the tertiary period, resulting in landscapes comprised of sand, clay, silt, greensand, and diatomaceous earth. The rivers, streams, marshland, shoreline, and forests which make up Charles County's natural resources also support a wide range of plant and wildlife communities. Mineral resources of Charles County, sand and gravel, are used to aggregate materials for the construction industry (Maryland Geological Survey, 2018). Clay, for example, is often used in brick and ceramics production, while other resources include iron ore deposits and ground water (Maryland Geological Survey, 2018). These same environments contribute to the County's overall quality of life, rural character, and unique aesthetic, while providing a foundation for its built environment. In return, natural resource lands also support opportunities to maintain clean water and air quality, promote eco-tourism, and enhance property values in developed areas.

Map 2.1-1: Charles County Base Map



2.2 Population and Demographics

In 2022, the estimated population in Charles County was 170,102. The Town of La Plata was the most populated municipality in the County, with 10,676 residents (U.S. Census Bureau, 2022). As shown in Table 2.2-1, Charles County's population increased by 16.1 percent since 2010. Similarly, the populations of the La Plata and Indian Head increased by 22 percent and 4.7 percent respectively. Port Tobacco's population increased during this timeframe from 13 to 21 residents.

Table 2.2-1: Population Change in Charles County (U.S. Census, 2010 and 2022)

MUNICIPALITY	2010 POPULATION	2022 POPULATION	PERCENT CHANGE (%)
Charles County	146,551	170,102	16.1%
La Plata, Town of	8,753	10,676	22%
Indian Head, Town of	3,844	4025	4.7%
Port Tobacco, Village of	13	21*	61.5%

** Estimated provided by the Village of Port Tobacco*

The unincorporated communities of Waldorf and St. Charles are among the County's major population centers. Significant growth occurred in this area between 2010 and 2022, as the County's population increased by 16 percent during this timeframe. Charles County was also one of the fastest growing counties in the state between 2010 and 2020. Total employment in Charles County (jobs located in Charles County) increased by approximately 3,277 or 5.53 percent between 2010 and 2020 and is projected to increase by 17,683 or 28 percent by 2050 (NAICS Employment History and Projections, 2022).

Charles County has a relatively low population density, with approximately 371 people per square mile countywide. As shown in Table 2.2-2, La Plata and Indian Head are significantly more densely populated than the County as a whole. These more densely populated areas are potentially more vulnerable to the impacts of hazards due to the concentration of life, property, and other assets.

Table 2.2-2: Population and Housing Density in Charles County (U.S. Census, 2016)

MUNICIPALITY	POPULATION DENSITY (POPULATION PER SQ. MILE)	TOTAL HOUSING UNITS
Charles County	371.56	63,763
La Plata, Town of	1,336.8	3,778
Indian Head, Town of	3,365.4	1,499
Port Tobacco, Village of	114.6	7

As shown in Table 2.2, there are 59,205 households in Charles County. The racial makeup of the County is 32.9 percent White, 53.3 percent Black or African American, 7.5 percent Hispanic or Latino, 3.5 percent Asian, and less than 1 percent from other races or ethnicities (U.S. Census, 2022). The median age for the County is 38.3 years old with 13.9 percent age 65 or older. The median household income in the County is $116,882, and the percent of population below the poverty level is 6.7 percent, compared to 9.6 percent statewide (U.S. Census, 2022).

There are about 63,763 housing units in Charles County, 62,712 of which are occupied. An estimated 1,051 housing units are vacant, making up roughly 1.6 percent of all housing units in the County (U.S. Census, 2022). Approximately 67.9 percent of all housing units in the County are single unit detached structures, and the median value for owner occupied housing is $399,500. This is consistent with the median value of $380,500 for Maryland as a whole (U.S. Census, 2022). As shown in Table 2.2-3, most homes in Charles County were built between 1980 and 2009.

Table 2.2-3: Housing Units Constructed by Year in Charles County (U.S. Census, 2022)

YEAR BUILT	HOUSING UNITS	PERCENT OF TOTAL HOUSING UNITS
Built 2020 or later	1,538	2.4%
Built 2010 to 2019	8,471	13.3%
Built 2000 to 2009	10,575	16.6%
Built 1990 to 1999	12,258	19.2%
Built 1980 to 1989	12,273	19.2%
Built 1970 to 1979	9,499	14.9%
Built 1960 to 1969	4,403	6.9%
Built 1950 to 1959	2,820	4.4%
Built 1940 to 1949	1,188	1.9%
Built 1939 or earlier	738	1.2%
Total	**63,763**	**100%**

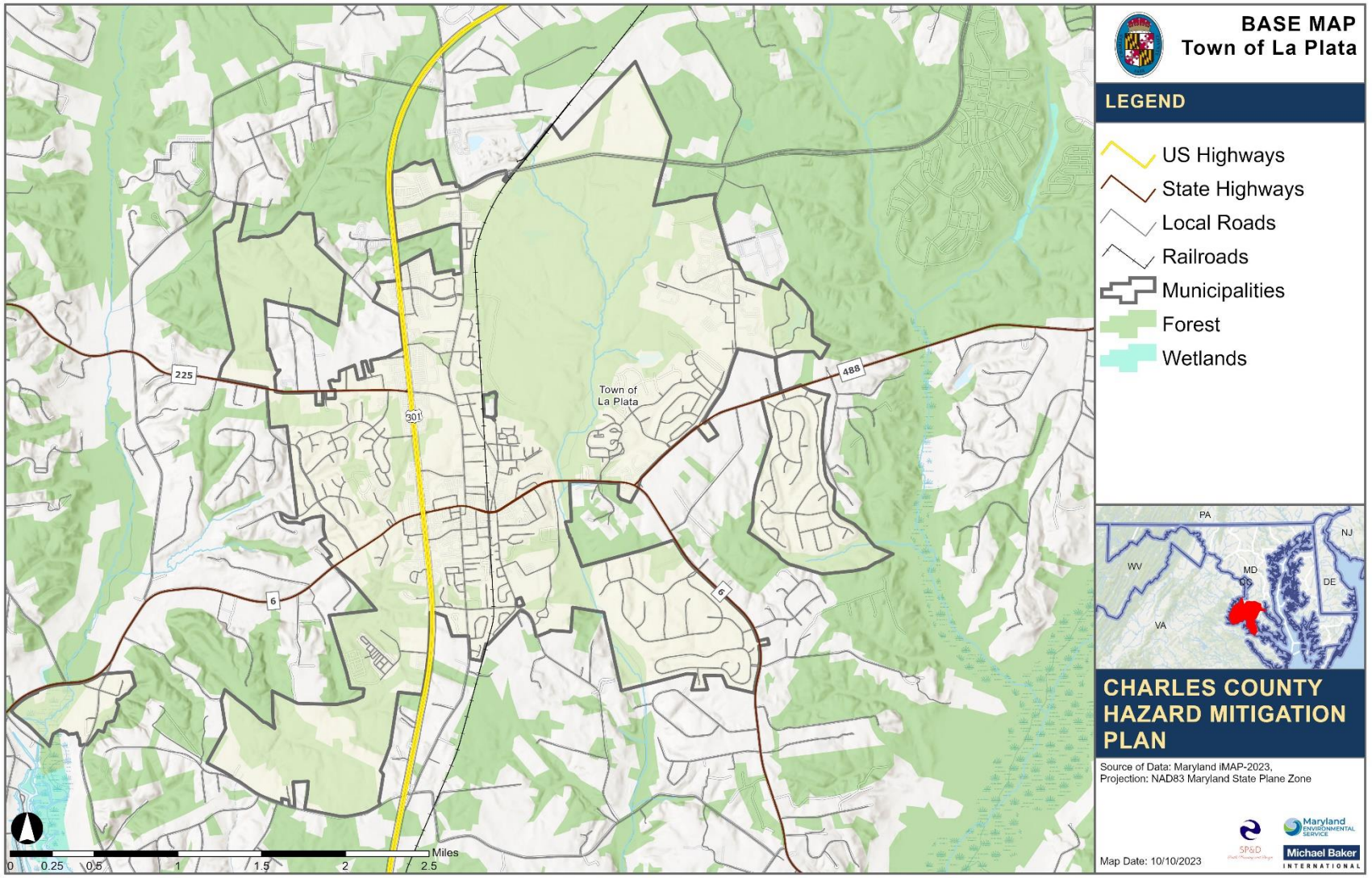
2.3 Jurisdictional Profiles

The following are brief overviews for each jurisdiction participating in the HMP Update.

Town of La Plata

The Town of La Plata is in central Charles County and serves as the County seat. La Plata is also the most populated jurisdiction in the County with 10,676 residents as of 2022. It is also home to the College of Southern Maryland and hundreds of small businesses that serve the region (U.S. Census, 2022). As shown in Map 2.3-1, Route 301 crosses the community from north to south, while state highways including Routes 225, 6, and 488 also transect La Plata. The Town of La Plata was originally founded in the 1870's as the Pennsylvania Railroad was granted a right-of-way to build its tracks and station, and the community was incorporated on April 4, 1888.

Map 2.3-1: Town of La Plata Base Map



Town of Indian Head

The Town of Indian Head is in the western portion of Charles County on a peninsula between the Potomac River and the Mattawoman Creek (see Map 2.3-2). This land that was once part of the territory of the Algonquin Indians. The Naval Station at Indian Head was established in 1890 when Ensign Dashiele came from the Annapolis area searching for a new location to build a proving ground for the testing of guns, munitions, and armor plate for Navy ships. During World War I & II the naval facilities were expanded. The Town of Indian Head was incorporated in 1920 and currently encompasses 1.5 square miles with a population of 4,025 (U.S Census, 2022).

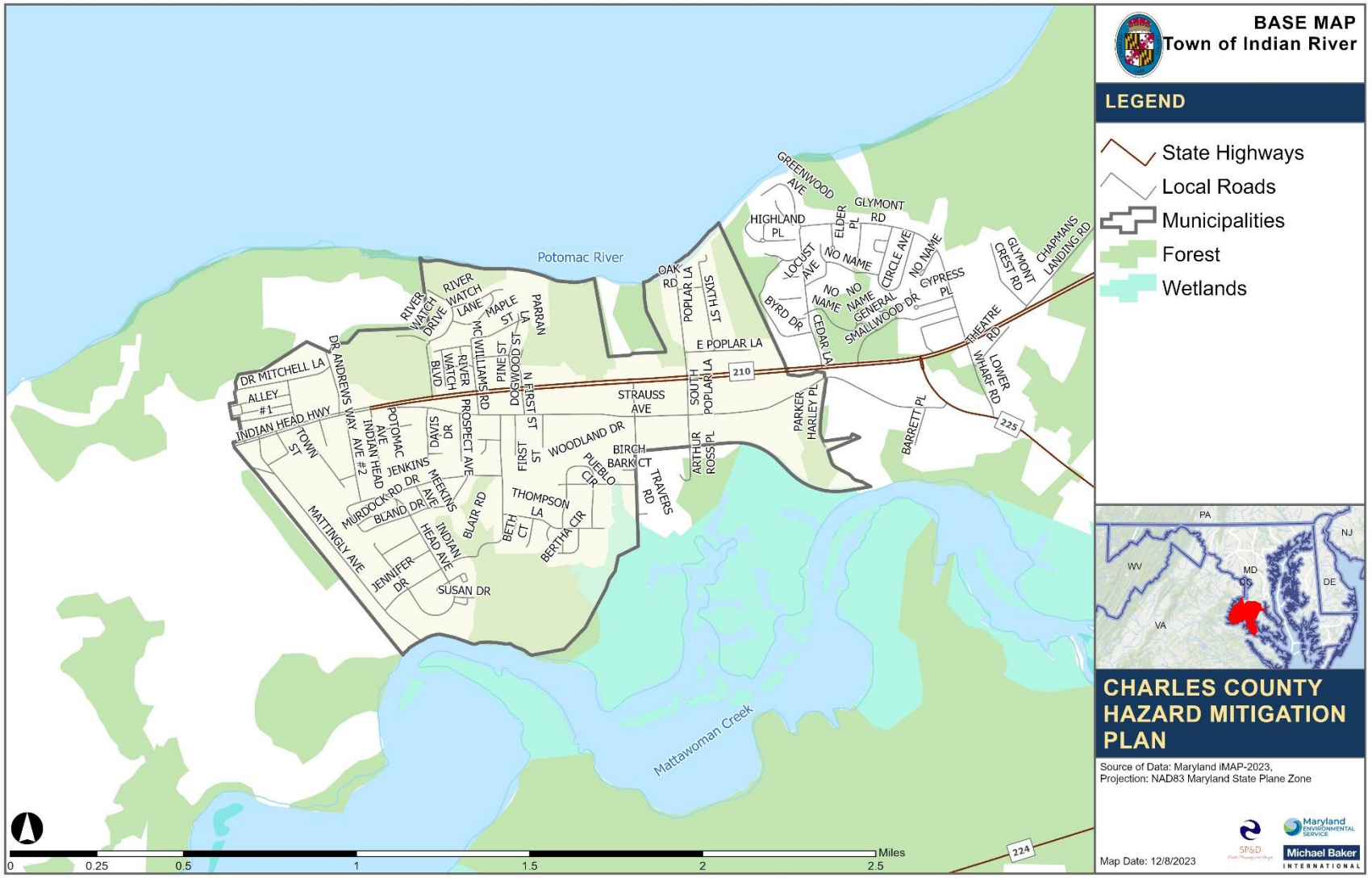
Town of Port Tobacco Village

Port Tobacco is centrally located in Charles County near the Port Tobacco River, which flows into the Potomac River. As shown in Map 2.3-3, the community is at the crossroads of Route 6 and Chapel Point Road. The Town of Port Tobacco was the original seat of Charles County and was officially incorporated in 1888. The population of the community was 21 as of 2022, making Port Tobacco the smallest incorporated community in Maryland. The Town Council is comprised of five elected members. Port Tobacco was historically the territory of Algonquian-speaking peoples, especially the Potopaco and the more dominant Piscataway.

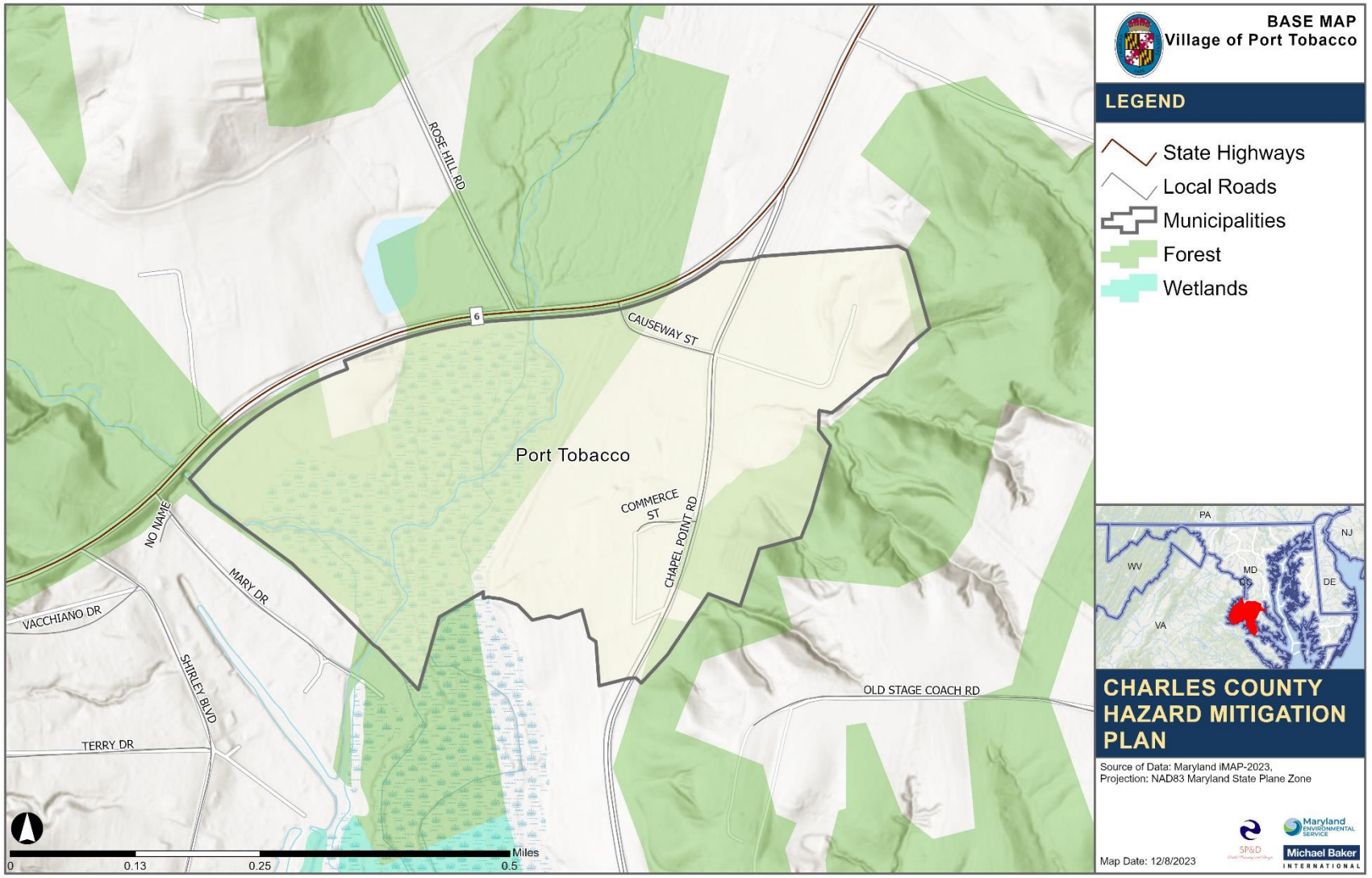
Figure 2.3-1: Port Tobacco Courthouse and Museum



Map 2.3-2: Town of Indian Head Base Map



Map 2.3-3: Village of Port Tobacco Base Map



2.4 Land Use and Development Trends

Charles County has transformed drastically over the past four decades due to rapid growth and urbanization. The outward expansion of the Washington D.C. suburbs has transformed portions of Charles County, especially the northern sections of the County. New residents are attracted by Charles County's lower taxes and housing costs, rural character, and relative freedom from the congestion in counties closer to Washington. This immigration has also brought increased traffic volumes on county roadways. As the County has grown, so have the demands for services. These challenges have attracted the attention of county officials and citizens, leading to the need for more nuanced methods of growth management in Charles County's future land use development plan. Charles County is in a transitional growth stage as some areas of the County are evolving from rural to more suburban communities. The development trends associated with this transition have been imposing economic and fiscal costs to the County.

Many of the County's existing settlements were built prior to when land use and growth management standards were established. As a result, preserving open space, vistas, or scenic views and maintaining the County's historic and rural character are challenges that face the County. Figure 2.4-1 illustrates existing land use patterns in Charles County. Most of the County consists of open space and residential development, while most of the County's commercial development is concentrated in La Plata, Indian Head, Waldorf, and along Route 301. Map 2.4-2 shows subdivision activity in Charles County, which also depicts heavier concentrations of development in the northern portions of the County and near existing infrastructure, particularly in and around Waldorf and La Plata.

The Charles County 2016 Comprehensive Plan will guide and manage future development and land uses in the County over the next decade. The goals and objectives of the plan strive to maintain planned land use patterns that offer opportunities to enrich quality of life while advancing economic growth and development. Future growth will be concentrated in areas of the County already equipped with public water and sewage treatment, and roughly 75% of future residential growth will be directed towards the Towns of Indian Head and La Plata. The growth of commercial and business areas will also remain within already established districts, including in La Plata and Indian Head, to prevent sprawl along the County's major roadways. The goals and objectives of Charles County's land use plan will also attempt to protect the County's natural resources and unique character while providing proper services to rural areas. To enhance public access to transportation, the highest development densities will be planned along the Route 301 transit corridor. Map 2.4-3 depicts the County's land use plan, which influences zoning and development regulations and ultimately the relationship between existing patterns of development and the location, dispersal, and range of future development. As shown in the map and as described above, target areas for growth are largely concentrated along Route 301 and near existing development, while much of the County is in conversation districts (agricultural, rural, and rural residential).

Projections from the Comprehensive Plan for 2040 aim to provide adequate land area needed to house roughly 37,000 new residents. The county aims to manage the amount and rate of development as needed to maintain consistency with its ability to provide necessary public services and facilities in a timely and cost-effective manner.

The following table summarizes these development trends for the County and two. It utilizes the definition of "changes in development" from the FEMA's Local Mitigation Planning Police Guide (2022c) and provides space for descriptions to briefly explain the reasoning for identified increases and decreases. The key for the table is as follows.

- Changes have resulted in an Increase in vulnerability for the jurisdiction (>)
- Changes have resulted in No Change in vulnerability for the jurisdiction (I)

There were no instances of a recognized decrease in vulnerability. The policy guide definitions appear in the table as follows.

Recent Development: For example, construction completed since the last plan was approved.

Potential Development: For example, development planned or under consideration by the jurisdiction.

General Trends: Conditions that may affect the risks and vulnerabilities of the jurisdictions (for example, climate change, declining populations or projected increases in population, or foreclosures).

Social Vulnerability: Shifts in the needs of underserved communities or gaps in social equity. This can also include changes in local policies, standards, codes, regulations, land use regulations, and other conditions.

Table 2.2-4 Summary of Development Trend Implications for Risk and Vulnerability

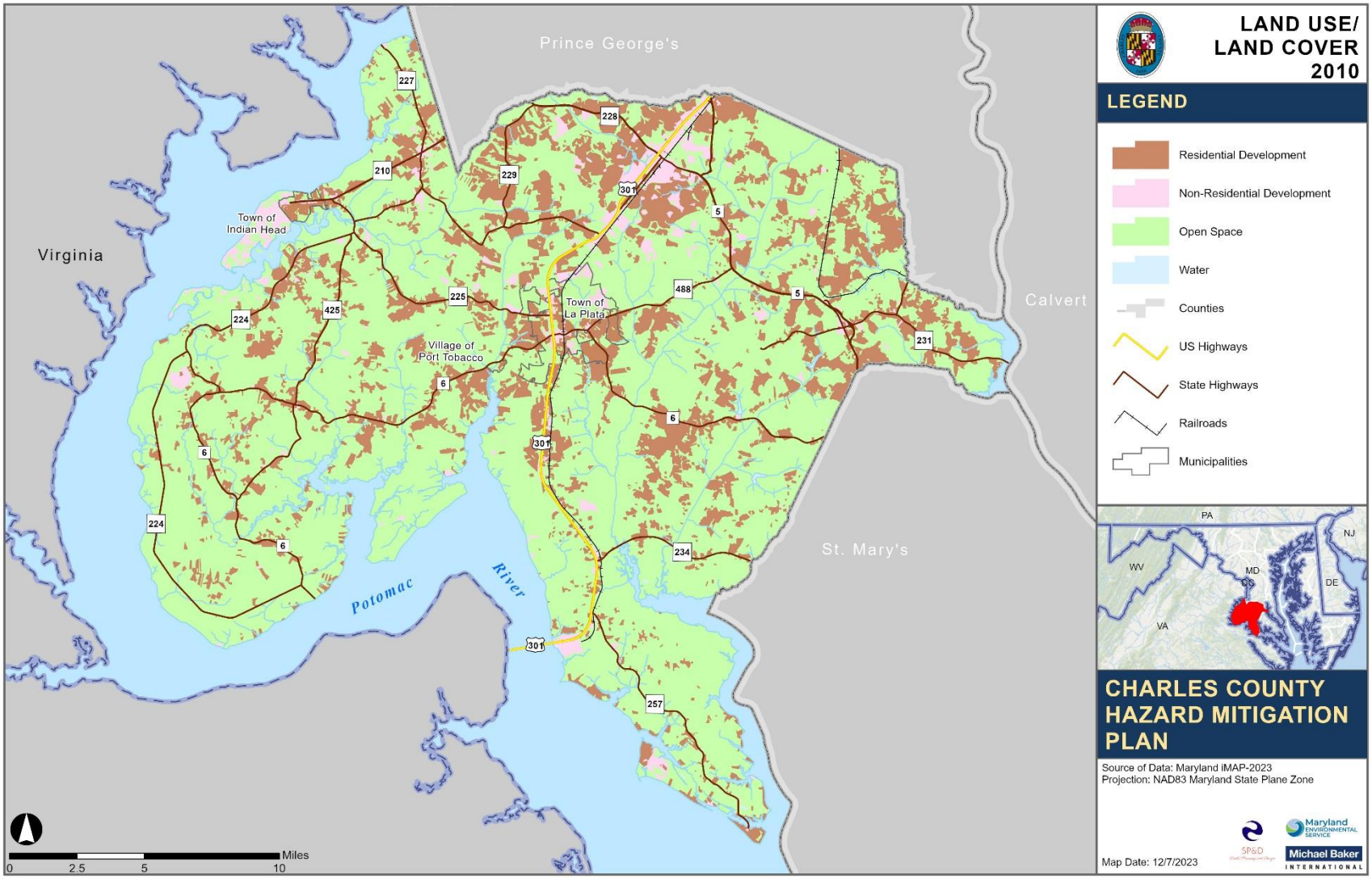
DEVELOPMENT CHANGE	COUNTY	TOWN OF INDIAN HEAD	TOWN OF LA PLATA
EARTH DISTURBANCE (EARTHQUAKE, LANDSLIDE, SUBSIDENCE)			
Recent Development Potential Development General Trends Social Vulnerability	Development trends have not caused increases or decreases in vulnerability to Earth Disturbance for the County or jurisdictions		
Erosion			
Recent Development	>	>	NA
Potential Development	>	>	NA
General Trends	>	>	NA
Social Vulnerability	>	>	NA
Drought			
Recent Development Potential Development General Trends Social Vulnerability	Development trends have not caused increases or decreases in vulnerability to drought for the County or jurisdictions		
Extreme Weather (Thunderstorm, Lightning, Tornado, Wind, Hail)			
Recent Development Potential Development General Trends Social Vulnerability	Development trends have not caused increases or decreases in vulnerability to the Public Health Emergencies for the County or jurisdictions.		

Table 2.2-4 Summary of Development Trend Implications for Risk and Vulnerability

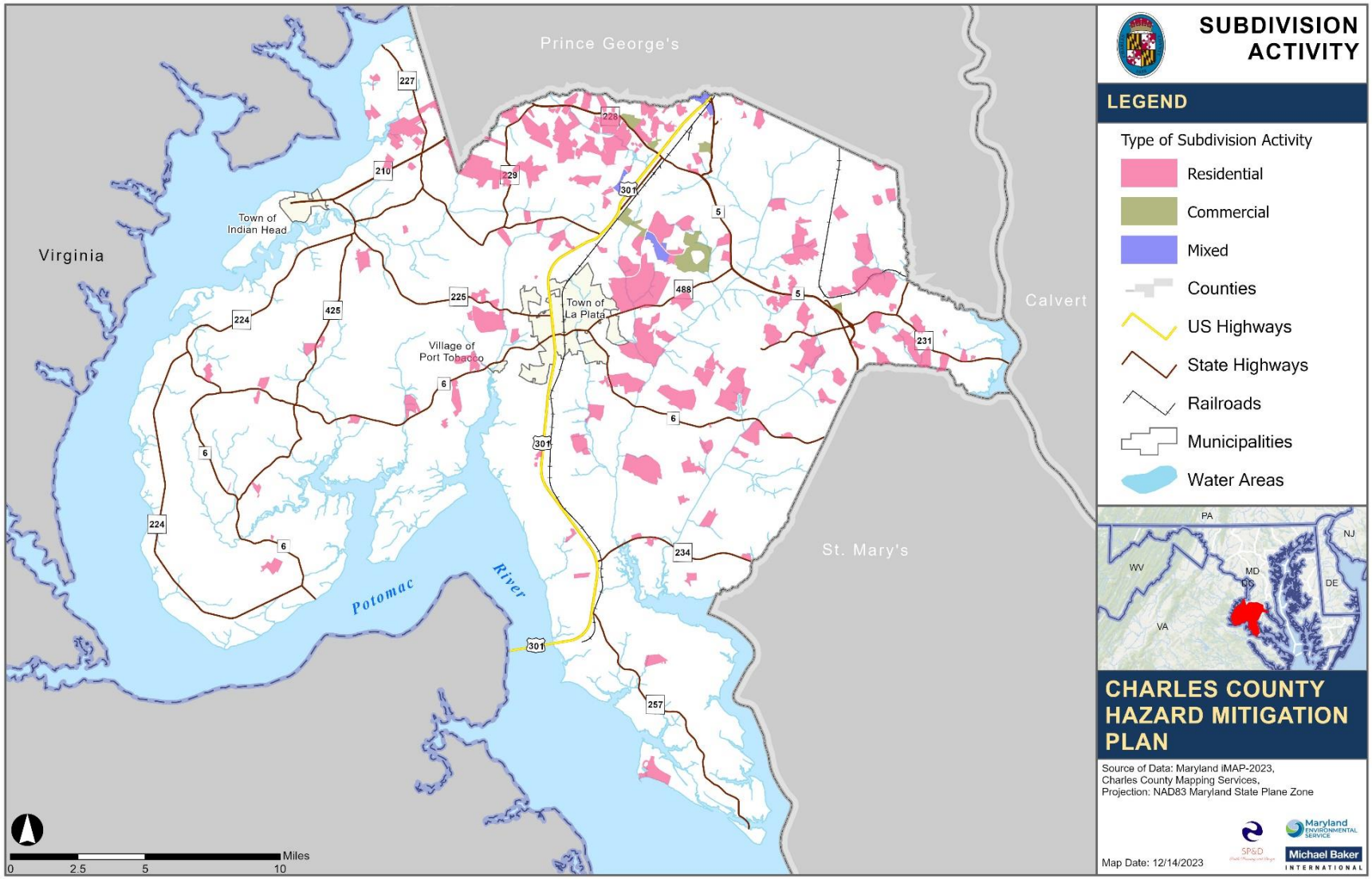
DEVELOPMENT CHANGE	COUNTY	TOWN OF INDIAN HEAD	TOWN OF LA PLATA
Flooding			
Recent Development	>	>	>
Potential Development	>	>	>
General Trends	>	>	>
Social Vulnerability	>	>	>
Hurricane, Tropical Storm, Nor'easter			
Recent Development	>	>	>
Potential Development	>	>	>
General Trends	>	>	>
Social Vulnerability	>	>	>
Severe Winter Storms			
Recent Development Potential Development General Trends Social Vulnerability	Development trends have not caused increases or decreases in vulnerability to the Severe Winter Weather for the County or jurisdictions.		
Temperature Extremes			
Recent Development	I	I	I
Potential Development	>	>	>
General Trends	>	>	>
Social Vulnerability	>	>	>
Wildfire			
Recent Development	I	I	I
Potential Development	I	I	I
General Trends	I	I	I
Social Vulnerability	>	>	>
Building and Structure Collapse			
Recent Development Potential Development General Trends Social Vulnerability	Development trends have not caused increases or decreases in vulnerability to the Public Health Emergencies for the County or jurisdictions.		
Civil Disturbance and Criminal Activity			
Recent Development	I	I	I
Potential Development	I	I	I
General Trends	>	>	>
Social Vulnerability	>	>	>
Dam Failure			
Recent Development Potential Development General Trends Social Vulnerability	Development trends have not caused increases or decreases in vulnerability to dam failure for the County or jurisdictions		
Environmental Hazards (Hazardous Materials & Pipeline)			
Recent Development			

Table 2.2-4 Summary of Development Trend Implications for Risk and Vulnerability			
DEVELOPMENT CHANGE	**COUNTY**	**TOWN OF INDIAN HEAD**	**TOWN OF LA PLATA**
Potential Development General Trends Social Vulnerability	Development trends have not caused increases or decreases in vulnerability to the Public Health Emergencies for the County or jurisdictions.		
Nuclear Events			
Recent Development	>	>	>
Potential Development	>	>	>
General Trends	>	>	>
Social Vulnerability	>	>	>
Public Health Emergencies			
Recent Development Potential Development General Trends Social Vulnerability	Development trends have not caused increases or decreases in vulnerability to the Public Health Emergencies for the County or jurisdictions.		
Transportation Accidents			
Recent Development Potential Development General Trends Social Vulnerability	Development trends have not caused increases or decreases in vulnerability to the Public Health Emergencies for the County or jurisdictions.		
Utility Interruption			
Recent Development Potential Development General Trends Social Vulnerability	Development trends have not caused increases or decreases in vulnerability to the Public Health Emergencies for the County or jurisdictions.		
Tornado			
Recent Development	>	>	>
Potential Development	>	>	>
General Trends	>	>	>
Social Vulnerability	>	>	>

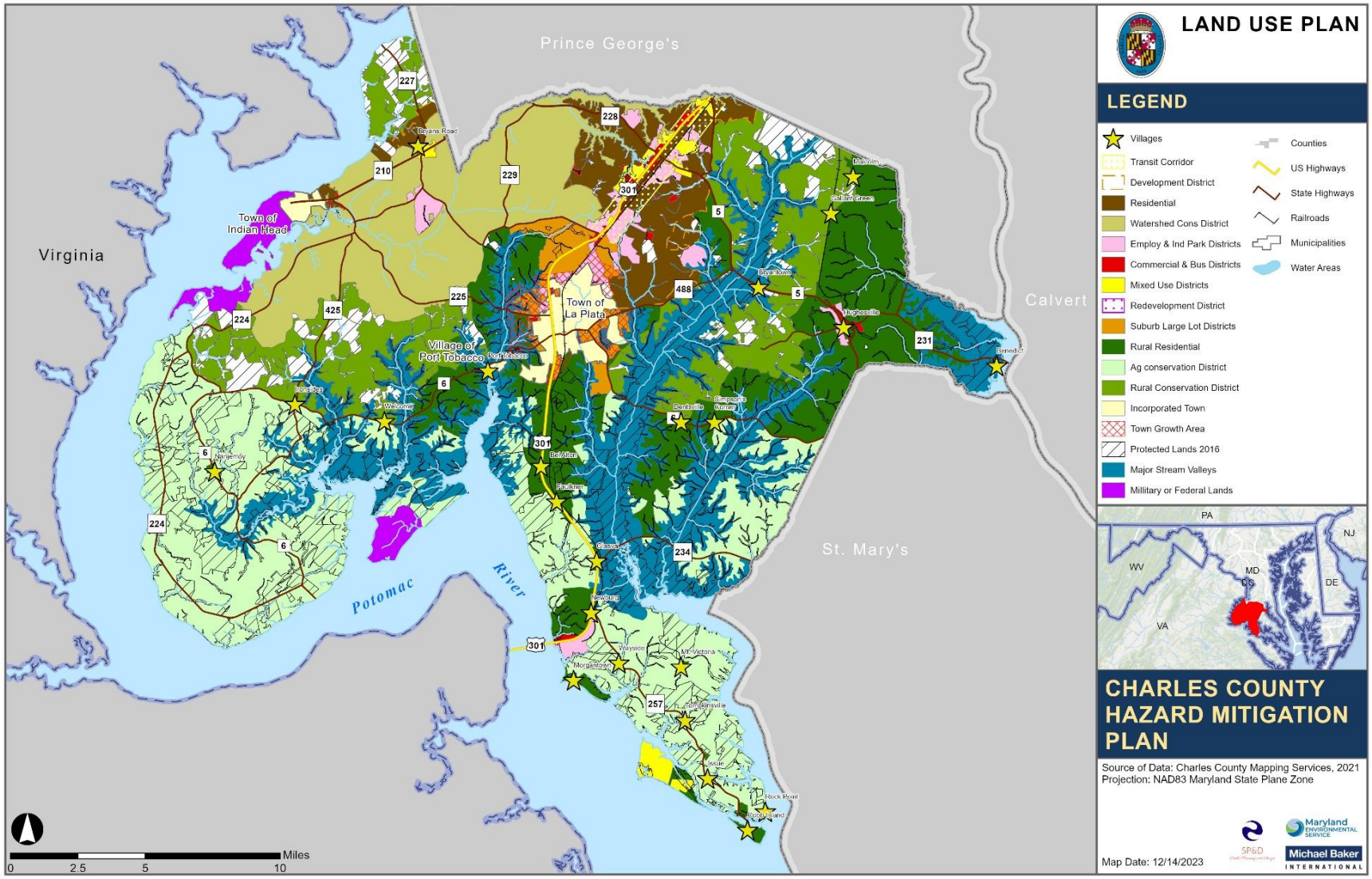
Map 2.4-1: Charles County Land Use/Land Cover Map



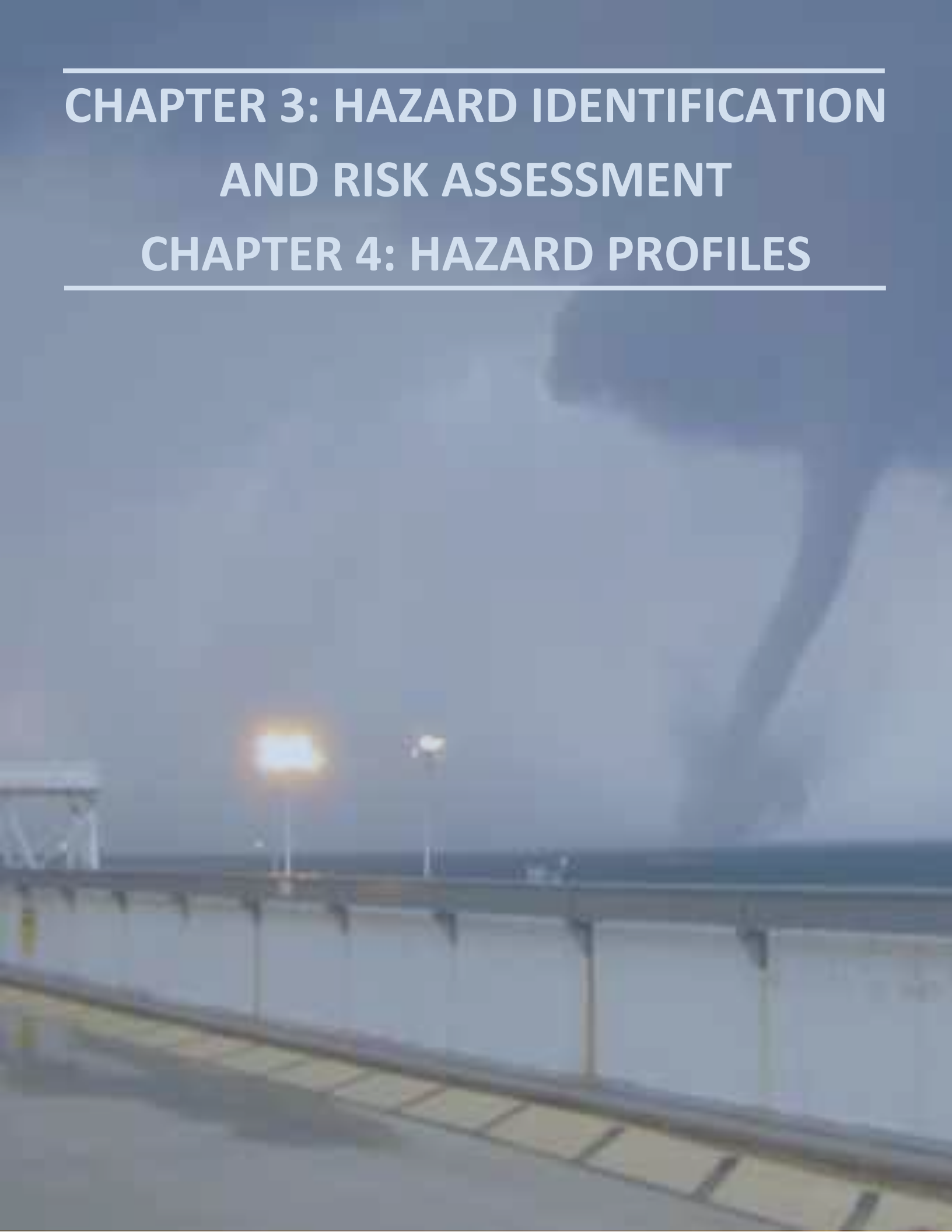
Map 2.4-2: Charles County Subdivision Activity



Map 2.4-3: Charles County Land Use Plan Map



CHAPTER 3: HAZARD IDENTIFICATION AND RISK ASSESSMENT
CHAPTER 4: HAZARD PROFILES



3.0 HAZARD IDENTIFICATION AND RISK ASSESSMENT

This section of the HMP describes the Hazard Identification and Risk Assessment (HIRA) summary undertaken by Charles County and participating municipalities in the preparation of this HMP Update. This section consists of the following subsections:

- Update Process Summary
- Hazard Identification
- Hazard Profiles
  - Dam Failure
  - Drought
  - Earth Disturbance
  - Erosion
  - Extreme Weather
  - Flood
  - Hurricane, Tropical Storm, Nor'easter
  - Public Health Emergency
  - Severe Winter Storms
  - Temperature Extremes
  - Wildfire
  - Building and Structure Collapse
  - Civil Disturbance and Criminal Activity
  - Environmental Hazards (Hazardous Materials & Pipeline)
  - Environmental Hazards (Nuclear Events)
  - Transportation Accidents
  - Utility Interruption

A key step in preventing disaster losses in Charles County is developing a comprehensive understanding of the hazards that pose risks to its communities. The following terms can be found throughout this section of the HMP.

Hazard:	Event or physical conditions that have the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, damage to the environment, interruption of business, and other types of harm or loss.
Risk:	Product of a hazard's likelihood of occurrence and its consequences to society.
Vulnerability:	Degree of susceptibility and resilience of the community and environment to hazards.

3.1 Update Process Summary

This risk assessment provides a factual basis for activities proposed by Charles County in its mitigation strategy. Hazards that may affect Charles County are identified and defined in terms of location and geographic extent, magnitude of impact, previous events, and likelihood of future occurrence. Wherever data could be validated, information from the previous plan has been incorporated and/or updated in the 2023 HMP. In addition, new data sources and analysis have been incorporated throughout the HIRA.

At the HMPC Kickoff Meeting, HMPC members discussed and evaluated each hazard and discussed whether they should be *continued*, *removed*, or *changed*. It was agreed that no change to the 2018 plan was needed other than moving Dam Failure and Public Health Emergencies into the natural hazard

category from the human-caused hazard category. HMPC members were also asked to comment on the severity of each hazard during the virtual kickoff meeting. Each hazard was presented in the chat section and committee members provided one of the following answers to rate the frequency of occurrence, magnitude, and geographic extent: (I) Increase, (D) Decrease, or (NC) No Change Table 3.1-1 documents the results of this analysis by the HMPC.

Table 3.1-1: 2023 Review of Hazards

2023 HAZARD	STATUS	COMMENT
Dam Failure	No Change	Moved from Human-Caused Hazards
Drought	No Change	
Earth Disturbance	No Change	
Erosion	Increase	
Extreme Weather	Increase	
Flood	Increase	
Hurricane, Tropical Storm, Nor'easter	No Change	
Public Health Emergency	Increase	Moved from Human-Caused Hazards
Severe Winter Storms	Decrease	
Temperature Extremes	Increase	
Wildfire	No Change	
Building and Structure Collapse	No Change	
Civil Disturbance and Criminal Activity	Increase	
Environmental Hazards (Hazardous Materials & Pipeline)	Increase	
Environmental Hazards (Nuclear Events)	No Change	
Transportation Accidents	Increase	
Utility Interruption	Increase	

After the HMPC agreed on the hazards for inclusion in the 2023 HMP, it developed hazard risk assessment profiles to define the characteristics of each hazard as it applies to Charles County. After identifying and profiling hazards, a vulnerability assessment was performed to identify the impact of natural or human-caused hazard events on people, buildings, infrastructure, and the community. Each natural and human-caused hazard is discussed in terms of its potential impact on individual communities in Charles County, including the types of structures and infrastructure that may be at risk. The assessment allows the County and its jurisdiction to focus mitigation efforts on areas most likely to be damaged or most likely to require early response to a hazard event. Depending upon data availability, assessment results may consist of an inventory of vulnerable structures and populations.

As part of the plan update, new hazard risk information was included in this chapter. FEMA's National Risk Inventory (NRI) information specific to Charles County was extrapolated and assessed for inclusion. The information included provides a national perspective on hazard risk and vulnerability. In addition, social vulnerability using the 16 variables included within the Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI) was added.

3.2 Hazard Identification

Table of Presidential Declarations

Under the Stafford Act, there are two forms of presidential action that authorize federal disaster assistance dollars. Presidential Emergency Declarations are intended to spur activities that will protect property and strengthen public safety to lessen impacts or avoid a catastrophic event. Presidential Disaster Declarations are made as a result of a disaster event and provide supplemental coordination and financial assistance beyond the ability of state and local governments (McCarthy, 2011). Because of the difference in these declarations, a single event may qualify for both kinds of declarations.

There is no financial threshold for an Emergency Declaration, but there are two thresholds for Presidential Disaster Declarations established under the Stafford Act: a state and a county threshold. These thresholds are based on a formula that uses the population of the jurisdiction (as recorded in the decennial Census) times a set per capita indicator. As of federal fiscal year 2022, these thresholds are $4.60 per capita for counties and $1.84 per capita for the state. With a 2020 population of 166,617, the Charles County threshold is $766,438. State and county thresholds must be simultaneously attained for a Presidential Disaster Declaration to be issued.

Table 3.2-1 identifies Presidential Disaster and Emergency Declarations that have affected Charles County from most to least recent.

Table 3.2-1: Presidential Disaster and Emergency Declarations Affecting Charles County

DISASTER NUMBER	DATE	DISASTER NAME
4491	January 20, 2020	Maryland Covid 19 Pandemic
3430*	January 20, 2020	Maryland Covid 19
2023 PLAN UPDATE		
4261	March 4, 2016	Severe Winter Storm and Snowstorm
4091	November 11, 2012	Hurricane Sandy
3349*	October 28, 2012	Hurricane Sandy
4075	August 2, 2012	Severe Storms and Straight-Line Winds
4038	October 5, 2011	Remnants of Tropical Storm Lee
4034	September 16, 2011	Hurricane Irene
3335*	August 27, 2011	Hurricane Irene
1910	May 6, 2010	Severe Winter Storms and Snowstorms
1875	February 19, 2010	Severe Winter Storm and Snowstorm
3251*	September 13, 2005	Hurricane Katrina Evacuation
1492	September 19, 2003	Hurricane Isabel
3179*	March 14, 2003	Snow
1409	May 1, 2002	Tornado
1324	April 10, 2000	Severe Winter Storm
1303	September 24, 1999	Hurricane Floyd
1081	January 11, 1996	Blizzard of 1996 (Severe Snowstorm)

Table 3.2-1: Presidential Disaster and Emergency Declarations Affecting Charles County		
DISASTER NUMBER	**DATE**	**DISASTER NAME**
1016	March 16, 1994	Severe Winter Weather and Ice Storms
3100*	March 16, 1993	Severe Snowfall & Winter Storm
524	January 26, 1977	Ice Conditions
489	October 4, 1975	Heavy Rains & Flooding
341	June 23, 1972	Tropical Storm Agnes
**Presidential Emergency Declarations*		

Since 1955, declarations have been issued for various hazard events including hurricanes or tropical storms, severe winter storms, tornadoes, and flooding. A unique Presidential Emergency Declaration was issued in September 2005. Through Emergency Declaration 3251, President George W. Bush declared that a state of emergency existed in the State of Maryland and ordered federal aid to supplement state and local response efforts to help people evacuated from their homes due to Hurricane Katrina. All counties in the state, including Charles County, were indirectly affected by Hurricane Katrina due to evacuee assistance.

Methodology

As part of the 2023 plan update Charles County utilized a risk factor (RF) tool to measure the degree of risk for identifying hazards in the County. The RF can also assist local community officials in ranking and prioritizing hazards that pose the most significant threat to a planning area based on a variety of factors deemed important by the HMPC and other stakeholders involved in the hazard mitigation planning process. The RF system relies mainly on historical data, local knowledge, consensus from the HMPC, and information collected through development of the hazard profiles included in Section 4. The RF approach produces numerical values that allow identified hazards to be ranked against one another; the higher the RF value, the greater the hazard risk.

RF values were obtained by assigning varying degrees of risk to five categories for each hazard profiled in the HMP update. Those categories include probability, impact, spatial extent, warning time, and duration. Each degree of risk was assigned a value ranging from one to four. The weighting factor agreed upon by the HMPC is shown in Table 3.2-2. To calculate the RF value for a given hazard, the assigned risk value for each category was multiplied by the weighting factor. The sum of all five categories equals the final RF value, as demonstrated in the following example equation:

Risk Factor Value = [(Probability x .30) + (Impact x .30) +
(Spatial Extent x .20) + (Warning Time x .10) + (Duration x .10)]

Table 3.2-2 summarizes each of the five categories used for calculating a RF for each hazard. According to the weighting scheme applied, the highest possible RF value is 4.0.

Table 3.2-2: Risk Factor Criteria

RISK ASSESSMENT CATEGORY	DEGREE OF RISK				WEIGHT VALUE
	LEVEL	CRITERIA		INDEX	
PROBABILITY *What is the likelihood of a hazard event occurring in a given year?*	Unlikely	Less than 1% annual probability		1	30%
	Possible	Between 1% and 49.9% annual probability		2	
	Likely	Between 50% and 90% annual probability		3	
	Highly Likely	Greater than 90% annual probability		4	
IMPACT *In terms of injuries, damage, or death, would you anticipate impacts to be minor, limited, critical, or catastrophic when a significant hazard event occurs?*	Minor	Very few injuries, if any. Only minor property damage and minimal disruption on quality of life. Temporary shutdown of critical facilities.		1	30%
	Limited	Minor Injuries Only. More than 10% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one. Day.		2	
	Critical	Multiple deaths and injuries possible. More than 25% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for more than one week.		3	
	Catastrophic	High number of deaths and injuries possible. More than 50% of property in affected area damaged or destroyed. Complete shutdown of critical facilities for 30 days or more.		4	
SPATIAL EXTENT *How large of an area could be impacted by a hazard event? Are impacts localized or regional?*	Negligible	Less than 1% of area affected		1	20%
	Small	Between 1% and 10.9% of area affected		2	
	Moderate	Between 11% and 25% of area affected		3	
	Large	Greater than 25% of area affected		4	
WARNING TIME *Is there usually some lead time associated with the hazard event? Have warning measures been implemented?*	More than 24 hours	Self-defined	*Note: Levels of warning time and criteria that define them may be adjusted based on hazard addressed.*	1	10%
	12 to 24 hours	Self-defined		2	
	6 to 12 hours	Self-defined		3	
	Less than 6 hours	Self-defined		4	
Duration *How long does the hazard event usually last?*	Less than 6 hours	Self-defined	*Note: Levels of duration time and criteria that define them may be adjusted based on hazard addressed.*	1	10%
	Less than 24 hours	Self-defined		2	
	Less than 1 week	Self-defined		3	
	More than 1 week	Self-defined		4	

Ranking Results

Using the methodology described above RF were calculated for each of the 17 potential hazards identified in the 2023 Plan Update. Hazards identified as *high* risk have risk factors greater than 3.0. Risk Factors ranging from 2.0 to 2.9 were deemed *moderate* risk hazards. Hazards with Risk Factors 1.9 and less are considered *low* risk. The 2023 plan update utilizes the results presented in Table 3.2-2 (changes in hazard) above and applies it to the risk factor. There are nine hazards that have seen an increase in frequency of occurrence, magnitude, and geographic extent include: erosion, extreme weather, flood, public health emergency, temperature extremes, civil disturbance and criminal activity, hazardous material, transportation accidents, and utility interruption. A severe snowstorm was the only hazard that saw a decrease in frequency of occurrence, magnitude, and geographic extent. Adjustments to the risk factor were made by increasing or decreasing the probability criteria by a score of one. In all but 4 cases the probability criteria were already 4 so there was no change to the overall risk factor. Hazard that saw an increase from 3 to 4 included erosion, flood, and civil disturbance, this equated to an overall adjustment of 0.3 to 0.4 increase in risk factor, for instance flood went from a risk factor of 3.0 to 3.3. In all but one case the hazard stayed within the same low, medium high category. Erosion went from a low to a medium category.

Table 3.2-3: Countywide Ranking of Hazard Types Based On Risk Factor (RF) Methodology.

HAZARD NATURAL (N) or MAN-MADE (M)	RISK ASSESSMENT CATEGORY					RISK FACTOR
	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
Extreme Weather (N)	4	3	4	4	1	3.4
Flood (N)	4	3	3	4	2	3.3
Temperature Extremes (N)	4	2	4	1	3	3.0
Public Health Emergency (N)	4	3	2	1	4	3.0
Hurricane, Tropical Storm, and Nor'easter (N)	2	3	4	1	2	2.6
Utility Interruption (M)	4	1	2	3	2	2.4
Civil Disturbance and Criminal Activity (M)	4	2	1	3	1	2.4
Environmental Hazards – Hazardous Materials (M)	4	1	1	4	2	2.3
Transportation Accidents (M)	4	2	1	1	1	2.2
Severe Winter Storms (N)	2	1	4	1	3	2.1
Erosion (N)	4	1	1	1	3	2.1
Building and Structure Collapse (M)	2	2	1	3	3	2.0
Dam Failure (N)	1	2	2	4	3	2.0
Earth Disturbance (N)	2	1	3	3	1	1.9
Drought (N)	1	1	4	1	4	1.9
Environmental Hazards - Nuclear Events (M)	1	2	1	2	4	1.7
Wildfire (N)	1	1	1	4	2	1.4

Based on these results, Charles County has four high risk hazards, nine moderate risk hazards, and four low risk hazards for a total of 17 hazards. The natural hazard with the highest risk potential is extreme weather, which has a value of 3.4.

A risk assessment result for the entire county does not mean that each municipality is at the same amount of risk to each hazard. During the update process, the jurisdictions within Charles County were provided the opportunity to provide any information on hazards that affect the County. Using the RF methodology, jurisdictions were also able to indicate if their risk was less than, greater than or equal to the County's Risk Factor for each hazard. The results of each jurisdictions Risk Factor review are provided in the table below, which indicates whether a community's risk is greater than (>), less than (<), or equal to (=) the risk factor assigned to Chares County as a whole. This table was developed based on municipal input from the Evaluation of Identified Hazards and Risk exercise that was conducted during the HMPC Kickoff Meeting.

Table 3.2-4: Jurisdictional Risk Evaluation

Municipality	Extreme Weather (N)	Flood (N)	Temperature Extremes (N)	Public Health Emergency (M)	Hurricane, Tropical Storm, and Nor'easter (N)	Utility Interruption (M)	Civil Disturbance and Criminal Activity (M)	Environmental Hazards: Hazardous Materials (M)	Transportation Accidents (M)	Severe Winter Storms (N)	Erosion (N)	Building and Structure Collapse (M)	Dam Failure (M)	Earth Disturbance (N)	Drought (N)	Environmental Hazards Nuclear Events (M)	Wildfire (N)
County Rank	3.4	3.3	3.0	3.0	2.6	2.4	2.4	2.3	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.7	1.4
Town of Indian Head	>	=	>	>	=	>	>	>	>	=	>	=	=	=	<	=	=
Town of La Plata	>	<	>	>	=	>	>	>	>	<	>	=	=	>	<	=	=
Town of Port Tobacco	>	=	>	>	=	=	>	>	>	<	>	=	=	=	>	=	=

3.3 National Risk Perspective

FEMA's National Risk Index (NRI) defines risk as the potential for negative impacts as a result of a natural hazards. The NRI provides risk index scores for natural hazards for counties and census tracts across the United States. Risk index scores are calculated utilizing the following components and formula:

Expected Annual Loss	X	Social Vulnerability	÷	Community Resilience	=	Risk Index
Is a natural hazards component that represents the average economic loss in dollars resulting from natural hazards each year.		Is a consequence enhancing risk component and community risk factor that represents the susceptibility of social groups to the adverse impacts of natural hazards.		Is a consequence reduction risk component and community risk factor that represents the ability of a community to prepare for anticipated natural hazards, adapt to changing conditions, and withstand and recover rapidly from disruptions.		Represents the potential for negative impacts resulting from natural hazards.

More information regarding the method used to calculate risk index scores can be found at *https://hazards.fema.gov/nri/determining-risk*.

According to the NRI, the overall risk index rating for Charles County is considered to be "relatively low" (risk index score = 73.2 out of 100) compared to other counties. Other highlights for the County include:

- Expected Annual Loss: Relatively Low (75.6 out of 100)
- Social Vulnerability: Very Low (19.7 out of 100)
- Community Resilience: Very High (86.6 out of 100)

The NRI includes a risk index rating for the following comparable natural hazards included within this plan:

- Drought (Relatively Low)
- Landslide/Earth Disturbance (Relatively Moderate)
- Riverine Flooding (Very Low)
- Hurricane (Relatively Moderate)
- Winter Weather (Relatively Moderate)
- Wildfire (Very Low)
- Severe Weather
  - Lightning (Relatively High)
  - Hail (Relatively Low)
  - Strong Wind/High Wind (Relatively Moderate)

National Risk Index – Scoring

Score: A community's score describes its relative position among all other communities at the same level for a given component. All scores are constrained to range of 0 (lowest possible value) to 100 (highest possible value).

Ratings: For every score there is a qualitative rating that describes the nature of a community's score in comparison to all other communities at the same level, ranging from "Very Low" to "Very High." Because all ratings are relative, there are no specific numeric values that determine the rating.

Social Vulnerability

The NRI includes social vulnerability as a component of the overall risk index. For purposes of the NRI, social vulnerability is defined as the susceptibility of social groups to the adverse impacts of natural hazards, including disproportionate death, injury, loss, or disruption of livelihood.

Social vulnerability to natural hazards is determined at the census tract level for Charles County via the NRI. The NRI utilizes the 16 variables included within the Centers for Disease Control and Prevention (CDC) Social Vulnerability Index (SVI). These variables make up the following larger groups: socioeconomic status, household characteristics, racial and ethnic minority status, and housing type & transportation.

The index concludes that Charles County has a "very low" susceptibility to the adverse impacts of natural hazards when compared to other counties in the United States. The highest areas of social vulnerability within the County include the tract between St Charles and La Plata, along U.S. Route 301. Figure 3.3-1 shows social vulnerability mapped for each census tract within the County. Darker blue areas indicate the census tracts with the highest level of social vulnerability.

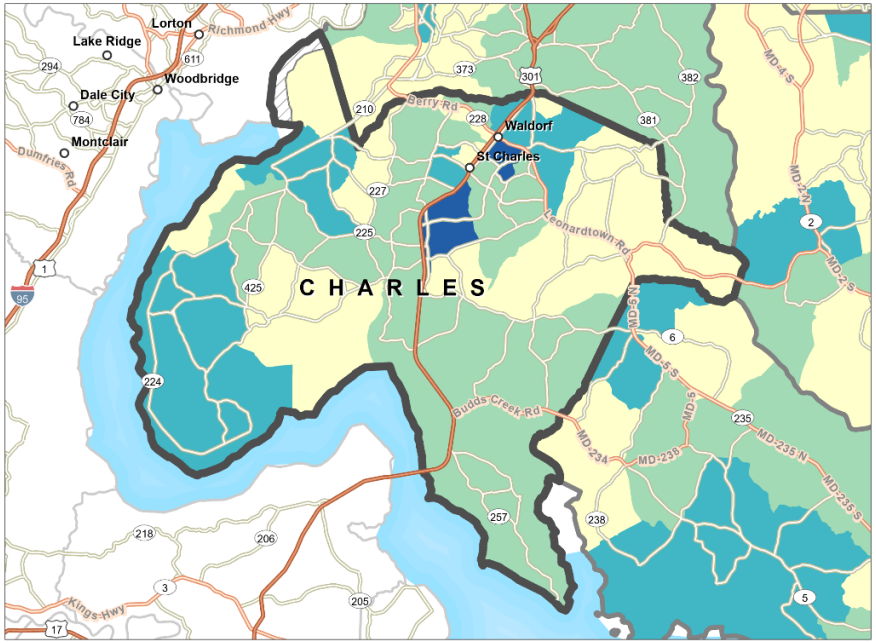
Figure 3.3-1: Charles County Social Vulnerability Index 2020

CDC/ATSDR Social Vulnerability Index 2020

CHARLES COUNTY, MARYLAND

CDC/ATSDR SVI 2020 – CHARLES COUNTY, MARYLAND

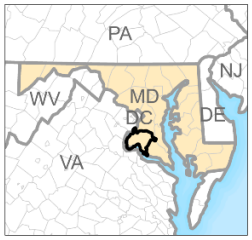
Overall Social Vulnerability[1]



Highest (Top 4th) | Vulnerability (SVI 2020)[2] | Lowest (Bottom 4th)

Data Unavailable[3]

0 1.5 3 6 9 Miles



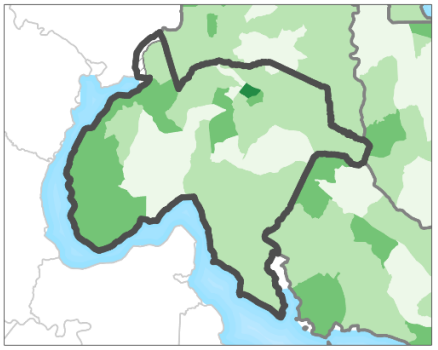
Social vulnerability refers to a community's capacity to prepare for and respond to the stress of hazardous events ranging from natural disasters, such as tornadoes or disease outbreaks, to human-caused threats, such as toxic chemical spills. The **CDC/ATSDR Social Vulnerability Index (CDC/ATSDR SVI 2020)**[4] **County Map** depicts the social vulnerability of communities, at census tract level, within a specified county. CDC/ATSDR SVI 2020 groups **sixteen census-derived factors** into **four themes** that summarize the extent to which the area is socially vulnerable to disaster. The factors include economic data as well as data regarding education, family characteristics, housing, language ability, ethnicity, and vehicle access. Overall Social Vulnerability combines all the variables to provide a comprehensive assessment.

ATSDR Agency for Toxic Substances and Disease Registry

GRASP Geospatial Research, Analysis, and Services Program

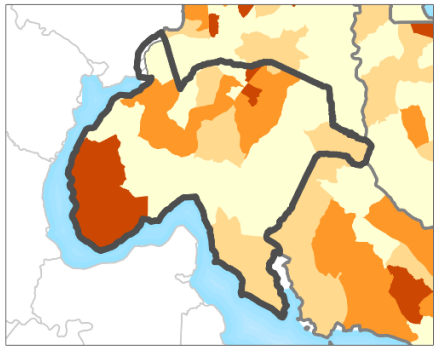
CDC/ATSDR SVI Themes

Socioeconomic Status[5]



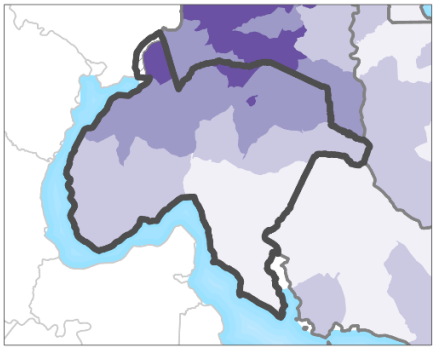
Highest (Top 4th) | Vulnerability (SVI 2020)[2] | Lowest (Bottom 4th)

Household Characteristics[6]



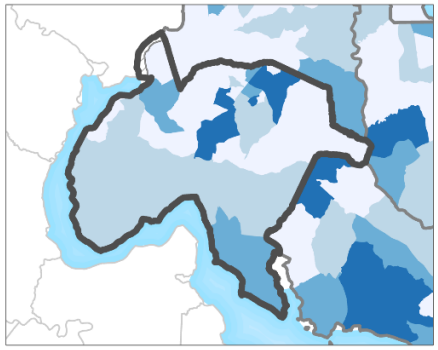
Highest (Top 4th) | Vulnerability (SVI 2020)[2] | Lowest (Bottom 4th)

Racial and Ethnic Minority Status[7]



Highest (Top 4th) | Vulnerability (SVI 2020)[2] | Lowest (Bottom 4th)

Housing Type/Transportation[8]



Highest (Top 4th) | Vulnerability (SVI 2020)[2] | Lowest (Bottom 4th)

Data Sources: [2]CDC/ATSDR/GRASP, U.S. Census Bureau, Esri® StreetMapTM Premium.
Notes: [1]Overall Social Vulnerability: All 16 variables. [2]Census tracts with 0 population. [4]The CDC/ATSDR SVI combines percentile rankings of US Census American Community Survey (ACS) 2016-2020 variables, for the state, at the census tract level. [5]Socioeconomic Status: Below 150% Poverty, Unemployed, Housing Costs Burden, No High School Diploma, No Health Insurance. [6]Household Characteristics: Aged 65 and Older, Aged 17 and Younger, Civilian with a Disability, Single-Parent Household, English Language Proficiency. [7]Race/Ethnicity: Hispanic or Latino (of any race); Black and African American, Not Hispanic or Latino; American Indian and Alaska Native, Not Hispanic or Latino; Asian, Not Hispanic or Latino; Native Hawaiian and Other Pacific Islander, Not Hispanic or Latino; Two or More Races, Not Hispanic or Latino; Other Races, Not Hispanic or Latino. [8]Housing Type/Transportation: Multi-Unit Structures, Mobile Homes, Crowding, No Vehicle, Group Quarters.
Projection: NAD 1983 StatePlane Maryland FIPS 1900.
References: Flanagan, B.E., et al., A Social Vulnerability Index for Disaster Management. *Journal of Homeland Security and Emergency Management*, 2011. 8(1).
CDC/ATSDR SVI web page: https://www.atsdr.cdc.gov/placeandhealth/svi/index.html.

4.0 HAZARD PROFILES

4.1 Earth Disturbance (Earthquake, Landslide, Subsidence)

Table 4.1-1: Earth Disturbance Ranking

HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING (PRIORITY)
Natural	2	1	3	3	1	**1.9**
LOW RISK (Less than 2.0)						

Earthquake - An earthquake is the motion or trembling of the ground produced by sudden displacement of massive rocks called plates, usually within the upper 10-20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. The impact of earthquakes can extend up to hundreds of thousands of square miles. Earthquakes are also known to cause fatal loss and injury, including substantial property damage of tens of billions of dollars, while disrupting the social and economic functioning of the affected area. Most property damage and earthquake-related deaths are caused by the failure and collapse of structures due to the ground shaking, which is dependent upon amplitude and duration of the earthquake (FEMA). There are many faults hidden underground that are large enough to generate damaging earthquakes but are also too small to extend from earthquake depths all the way up to ground level where they can be identified as faults. Accordingly, the best guide for earthquake hazards is often the earthquakes themselves. Future earthquakes are most likely to occur in the same general regions that have experienced past occurrences.

Landslide - A landslide is the downward and outward movement of earth materials reacting under the force of gravity. As such, “landslide” can be used to describe several different types of events displaying different movement characteristics and involving different materials. Rockslides, rock falls, mudflows, mudslides, debris flows, and debris avalanches are all types of landslide events involving different materials moving differently. Landslides typically occur when some factor (e.g., increased water content or change in load) causes the force of gravity to outweigh the forces working to hold material in place, resulting in the downslope movement of the subject material. Several natural and human factors may contribute to or influence landslides. These factors include topography, geology, precipitation, steepness of cut and fill slopes, and cut-slope stability.

Mudslides, also referred to as mudflows, lahars, or debris avalanches, are quick moving rivers of earth, rock, and other debris flooded with water. Mudslides develop when water rapidly accumulates in the ground, typically from heavy rainfall or rapid snowmelt, creating a river of “slurry” or mud. A slurry can travel several miles from its original location and increase in volume as it carries materials such as trees and cars. Slurries are especially dangerous due to their fast movement down slopes, and little warning when at avalanche speeds. Once the mudslide reaches flatter ground, the mudflow will spread out over a broad area where it can gather in thick deposits. In the United States alone, landslides have been known to cause up to $3.5 billion in damages, and nearly 25 to 50 deaths annually (USGS, 2004).

Subsidence - Subsidence is defined as the downward movement of surface material with little or no horizontal movement. Subsidence can occur naturally due to the physical and chemical weathering of certain types of bedrock or can be human-induced due to underground mining or excessive pumping of groundwater. Regardless of the reason for occurrence, the overall effect of a subsidence event is the same. That is, the development and eventual failure of a sinkhole, which can cause significant structural damage if buildings and/or infrastructure are present.

A sinkhole is a circular depression, typically funnel-shaped, caused by the undermining or collapse of the land's surface. Sinkholes often are a result of groundwater enlarging cavities in underlying karst or soluble bedrock. Karst is a type of topography formed from the dissolution of soluble carbonate rock, such as limestone, dolomite, gypsum and is characterized by sinkholes, caves, and open-channel groundwater flow.

While, sinkholes may be depressions formed in karst areas, not every depression or hole naturally occurring in the ground is a sinkhole. Depressions may also be a result of decayed tree stumps, stormwater runoff, leaking underground pipes, or dilapidated underground structures, such as septic tanks (Maryland Geologic Survey, 2016). Genuine sinkholes do not form in areas of hard crystalline rock-like structures, which are present in central and western Maryland. Neither do they form in the unconsolidated sediments of Maryland's Coastal Plain, the area approximately east of I-95 (Maryland Geologic Survey, 2016).

The three general types of sinkholes are: subsidence, solution, and collapse. Collapse sinkholes are most common in areas where the overburden (the sediments and water contained in the unsaturated zone, surficial aquifer system, and the confining layer above an aquifer) is thick, but the confining layer is breached or absent. Collapse sinkholes can form with little warning and leave behind a deep, steep sided hole. Subsidence sinkholes form gradually where the overburden is thin and only a veneer of sediments is overlying the limestone. Solution sinkholes form where no overburden is present, and the limestone is exposed at land surface.

Location, Extent, and Range of Magnitude

Earthquake - Regardless of the source of the earthquake, the associated energy travels in waves radiating outward from the point of release. When these waves travel along the surface, the ground shakes and rolls, fractures form, and water waves may be generated. Earthquakes generally last a matter of seconds, but the waves may travel for long distances and cause damage well after the initial shaking at the point of origin has subsided.

Breaks in the crust associated with seismic activity are known as "faults" and are classified as either active or inactive. Faults may be expressed on the surface by sharp cliffs or scarps or may be buried below surface deposits.

"Foreshocks," minor releases of pressure or slippage, may occur months or minutes before the actual onset of the earthquake. "Aftershocks," which range from minor to major, may occur for months after the main earthquake. In some cases, strong aftershocks may cause significant additional damage,

especially if the initial earthquake impacted emergency management and response functions or weakened structures.

Factors Contributing to Damage

The damage associated with each earthquake is subject to four primary variables:

- The nature of the seismic activity
- The composition of the underlying geology and soils
- The level and quality of development of the area struck by the earthquake
- The time of day

Seismic Activity: The properties of earthquakes vary greatly from event to event. Some seismic activity is localized (a small point of energy release), while other activity is widespread (e.g., a major fault letting lose all at once). Earthquakes can be very brief (only a few seconds) or last for a minute or more. The depth of release and type of seismic waves generated also play roles in the nature and location of damage; shallow quakes will hit the area close to the epicenter harder but tend to be felt across a smaller region than deep earthquakes.

Geology and Soils: The surface geology and soils of an area influence the propagation (conduction) of seismic waves and how strongly the energy is felt. Generally, stable areas (e.g., solid bedrock) experience less destructive shaking than unstable areas (e.g., fill soils). The location of a community or even individual buildings plays a strong role in the nature and extent of damage from an event**.**

Development: An earthquake in a densely populated area which results in many deaths and considerable damage may have the same magnitude as a shock in a remote area that has no direct impact. Large magnitude earthquakes that occur beneath the oceans may not even be felt by humans.

Time of Day: The time of day of an event controls the distribution of the population of an affected area. During the weekdays more of the population will be affected because communities will transition between work, school, or home. The relative seismic vulnerability of each location can strongly influence the loss of life and injury resulting from an event.

Types of Damage

While damage can occur by movement at the fault, most damage from earthquake events is the result of shaking. Shaking also produces several phenomena that can generate additional damage:

- Ground displacement
- Landslides and avalanches
- Liquefaction and subsidence
- Seiches

Shaking: In minor events, objects fall from shelves and dishes are rattled. In major events, large structures may be torn apart by the forces of the seismic waves. Structural damage is generally limited

to older structures that are poorly maintained, constructed, or designed in all but the largest quakes. Un-reinforced masonry buildings and wood frame homes that are not anchored to their foundations are typical victims.

Loose or poorly secured objects also pose a significant hazard when they are loosened or dropped by shaking. These "non-structural falling hazard" objects include bookcases, heavy wall hangings, and building facades. Home water heaters pose a special risk due to their tendency to start fires when they topple over and rupture gas lines. Crumbling chimneys may also be responsible for injuries and property damage.

Dam and bridge failures are significant risks during stronger earthquake events, and due to the consequences of such failures, may result in considerable property damage and loss of life. In areas of severe seismic shaking hazard, Intensity VII or higher can be experienced even on solid bedrock. In these areas, older buildings especially are at significant risk.

Ground Displacement: Often, the most dramatic evidence of an earthquake results from displacement of the ground along a fault line.

Landslides: Even small earthquake events can cause landslides. Rock falls are common as unstable material on steep slopes is shaken loose, but significant landslides or even debris flows can be generated if conditions are ripe. Roads may be blocked by landslide activity, hampering response and recovery operations.

Liquefaction and Subsidence: Soils may liquefy and/or subside when impacted by the seismic waves. Fill and previously saturated soils are especially at risk. The failure of the soils can lead to possibly widespread structural damage. The oscillation and failure of the soils may result in increased water flow and/or failure of wells as the subsurface flows are disrupted and sometimes permanently altered. Increased flows may be dramatic, resulting in geyser-like waterspouts and/or flash floods. Similarly, septic systems may be damaged creating both inconvenience and health concerns.

Seiches: Seismic waves may rock an enclosed body of water (e.g., lake or reservoir), creating an oscillating wave referred to as a "seiche." Although, these are not a common cause of damage, seiches in past Idaho earthquakes generated forceful waves along the state's large lakes, like those of a tsunami (tidal wave). A seiche would be a hazard to shoreline development, fragile ecosystems, and pose a significant threat to dam-created reservoirs. A seiche could either overtop or damage a dam leading to downstream flash flooding.

Although, no earthquake incidents have been recorded in Charles County since 1960, the closest earthquake event occurred in Prince George's County. The earthquake in Prince George's County occurred on May 23, 1986, and was a 2.5 on the Richter Scale.

Earthquake magnitude is often measured using the Richter Scale, an open-ended logarithmic scale that describes the energy release of an earthquake. Table 4.1-2 summarizes Richter Scale magnitudes as they relate to the spatial extent of impacted areas.

Table 4.1-2 Richter Scale Magnitudes and Associated Earthquake Size Effects.	
RICHTER MAGNITUDES	**EARTHQUAKE EFFECTS**
Less than 3.5	Generally, not felt but recorded.
3.5-5.4	Often felt, but rarely causes damage.
5.4- 6.0	At most, slight damage to well-designed buildings; can cause major damage to poorly constructed buildings over small regions.
6.1-6.9	Can be destructive up to about 100 kilometers from epicenter.
7.0-7.9	Major earthquake; can cause serious damage over large areas.
8.0 or greater	Great earthquake; can cause serious damage in areas several hundred kilometers across.

The Richter scale does not give any indication of the impact or damage of an earthquake, although it can be inferred that higher magnitude events cause more damage. Instead, the impact of an earthquake event is measured in terms of earthquake intensity, usually measured using the Modified Mercalli Intensity Scale, shown in Table 4.1-3. Based on historical data of earthquakes with a recorded Intensity, little damage is expected from earthquake events. No injury or severe damage from earthquake events has been reported in Charles County.

Table 4.1-3 Modified Mercalli Intensity Scale with Associated Impacts.			
SCALE	**INTENSITY**	**DESCRIPTION OF EFFECTS**	**CORRESPONDING RICHTER SCALE MAGNITUDE**
I	Instrumental	Usually detected only on seismographs.	<4.2
II	Feeble	Felt only by a few persons at rest, especially on upper floors of buildings.	
III	Slight	Felt quite noticeably indoors, especially on upper floors. Most people do not recognize it as an earthquake (i.e., a truck rumbling).	
IV	Moderate	Can be felt by people walking; dishes, windows, and doors are disturbed.	
V	Slightly Strong	Sleepers are awoken; unstable objects are overturned.	<4.8
VI	Strong	Trees sway: suspended objects swing; objects fall off shelves; damage is slight.	<5.4

Table 4.1-3 Modified Mercalli Intensity Scale with Associated Impacts.			
SCALE	**INTENSITY**	**DESCRIPTION OF EFFECTS**	**CORRESPONDING RICHTER SCALE MAGNITUDE**
VII	**Very Strong**	Damage is negligible in buildings of good design and construction, slight to moderate in well-built ordinary structures, and considerable in poorly built or badly designed structures; some chimneys are broken. Historic structures could be damaged.	<6.1
VIII	**Destructive**	Damage is slight in specially designed structures; considerable in ordinary, substantial buildings. Moving cars become uncontrollable, masonry fractures, poorly constructed buildings damaged. Historic structures likely to be damaged or potentially destroyed.	<6.9
IX	**Ruinous**	Some houses collapse, ground cracks, pipes break open; damage is considerable in specially designed structures; buildings are shifted off foundations. Historic structures likely to be damaged or potentially destroyed.	
X	**Disastrous**	Some well-built wooden structures are destroyed; most masonry and frame structures are destroyed along with foundations. Ground cracks profusely; liquefaction and landslides widespread. Historic structures very likely to be damaged or potentially destroyed.	<7.3
XI	**Very Disastrous**	Most buildings and bridges collapse, roads, railways, pipes and cables destroyed. Historic structures very likely to be damaged or destroyed.	<8.1
XII	**Catastrophic**	Destruction: trees fall; lines of sight and level are distorted; ground rises and falls in waves; objects are thrown upward into the air.	>8.1

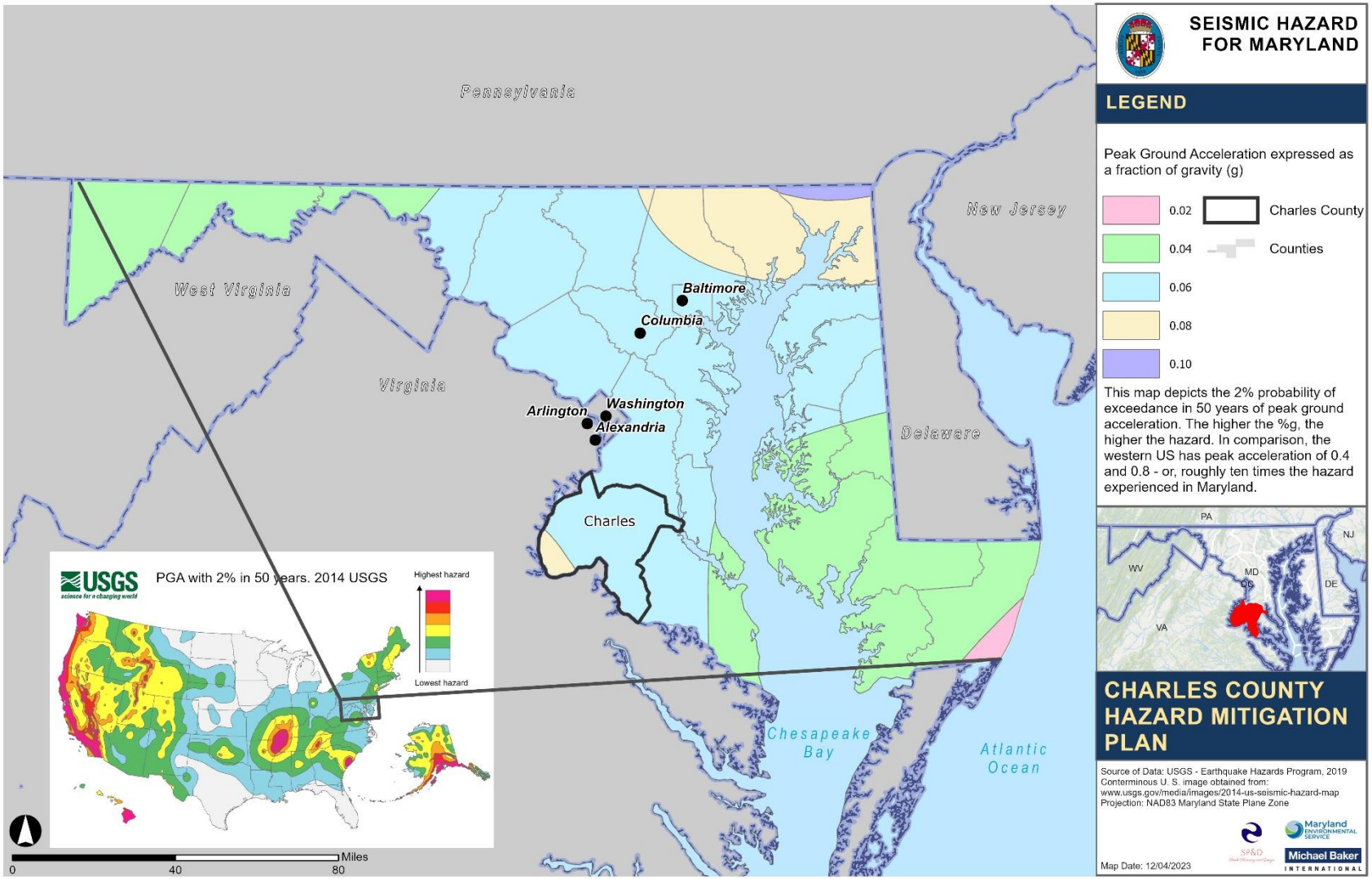
Since the worst earthquake recorded in Maryland had a magnitude of 3.7, a worst-case scenario for this hazard would be if an earthquake of similar magnitude occurred in Charles County or near the border in an adjacent county, causing mild damage in populated areas. Structural damage would not be expected in this scenario for most buildings, but blighted structures or those in a state of disrepair might experience further structural damage.

Environmental impacts of earthquakes can be numerous, widespread, and devastating, particularly if indirect impacts like economic impacts are considered. Earthquakes are known for causing induced

tsunamis, flooding, landslides, poor water quality, damage to vegetation, and breakage in sewage or toxic material containments.

Earthquake events in Maryland, including Charles County are mild. When events occur, they impact very small areas less than 100 kilometers in diameter. Map 4.1-1 shows the earthquake hazard in Maryland and Charles County, expressed as the two-percent probability of exceedance in 50 years of peak ground acceleration (g). This map was digitized from the 2014 National Seismic Hazard report. Charles County lies in the 0.06 zone, indicating that the hazard is minimal.

Map 4.1-1: Approximate USGS seismic hazard for Maryland and Charles County



Landslide - Rockfalls and other slope failure can occur in areas of Charles County with moderate to steep slopes. However, the elevation and land relief of Charles County is approximately 235 feet and has a relatively low slope gradient (Maryland Geological Survey, 2016). Map 4.1-2 depicts variances in slope grade for Charles County, gradients with higher percentages of slope change are more likely to have a landslide incidence (areas in red and orange represent have slopes of 15% of greater, indicating vulnerability to landslide events).

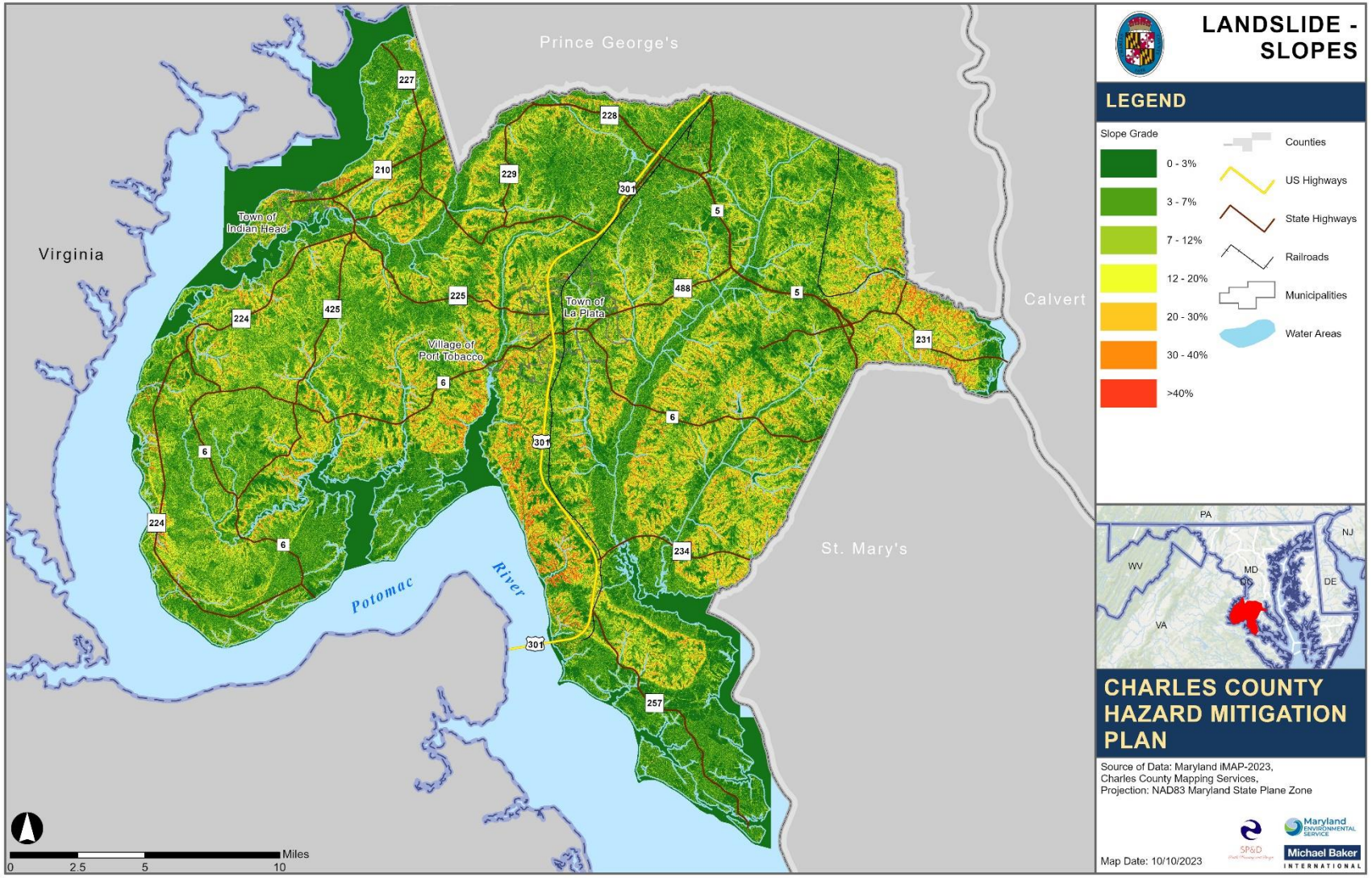
Many slope failures are associated with precipitation events – periods of sustained above-average precipitation, specific rainstorms, or snowmelt events. Areas experiencing erosion, decline in vegetation cover, and earthquakes are also susceptible to landslides. Human activities that contribute to slope failure include altering the natural slope gradient, increasing soil water content, and removing vegetation cover.

The Marlboro Clay formation is a geologic outcrop originally discovered in exposures near Upper Marlboro in Prince George's County and is of great significance due to its high rate of instability (Maryland Geologic Survey). The Marlboro Clay is a continuous layer throughout nearly the whole of Southern Maryland. Due to its natural thinness and readily covered slumping of overlying sediments, the Marlboro is poorly exposed. The narrow outcrop belt enters the area near Palmers Corner in Prince Georges County and drifts southwest for roughly 20 miles to the vicinity of Rison, an unincorporated community in Charles County. Deposits of the clay are present along the creeks of the Mattawoman and the Piscataway, Mason Springs, and the valleys of the Piscataway (Maryland Geologic Survey).

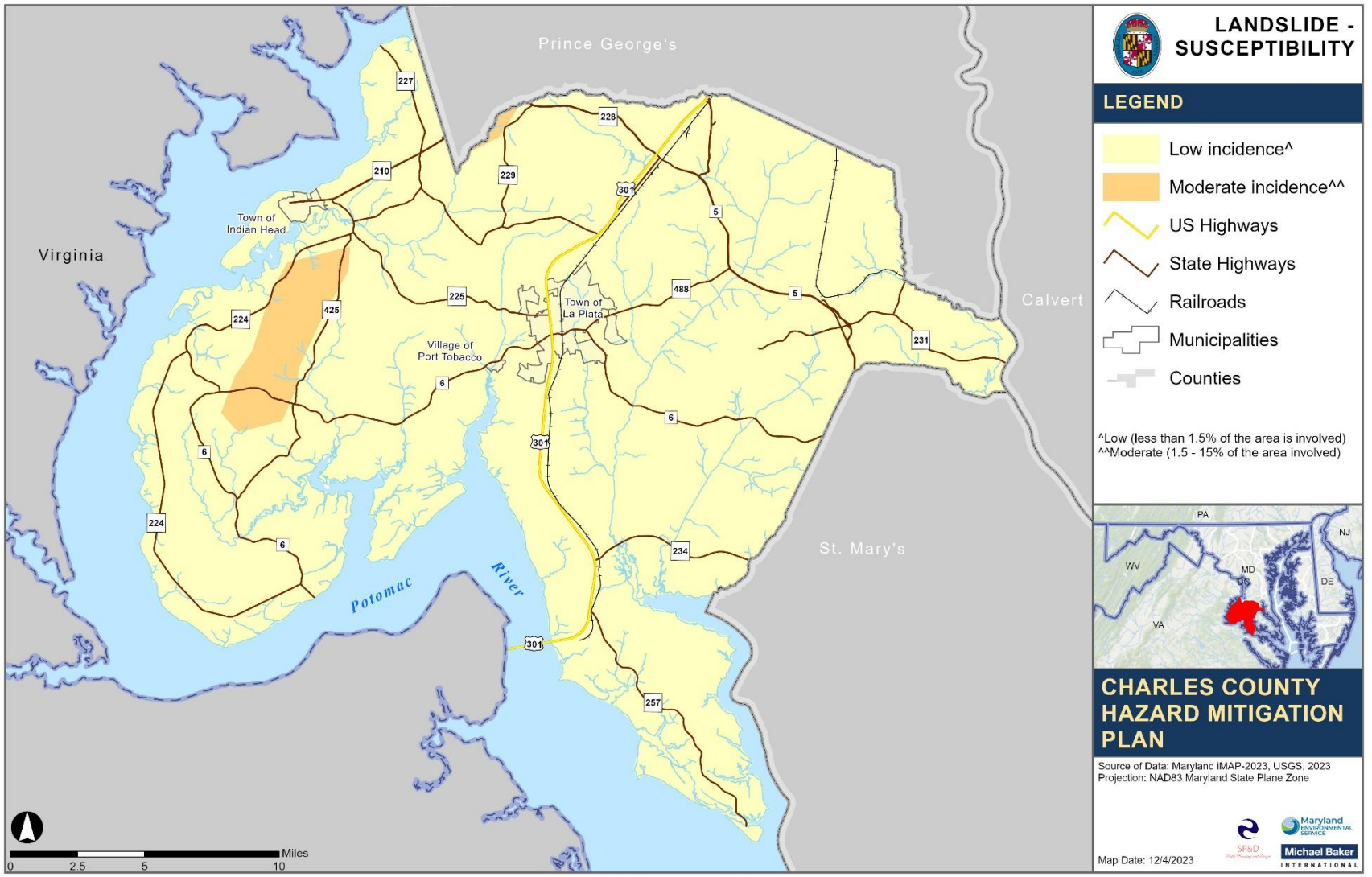
In Maryland's Coastal Plain province, the Marlboro Clay is one of the geologic formations highly susceptible to slope failure (Maryland Geologic Survey, 2016). Other formations highly susceptible to slope failure include clays of the Potomac and the St. Mary's Formation located southeast of Charles County. Both slumps and earthflows can occur in the Marlboro Clay. Slope failures are particularly numerous in southwestern and east-central Prince Georges County, adjacent to Charles County. As overlying permeable sediment becomes heavily saturated with infiltrating precipitation, the frictional resistance lowers along the contact with the low permeability Marlboro Clay producing a slide surface which could potentially lead to slope failure.

Map 4.1-3 shows a map of moderate and low areas of landslide susceptibility as defined by the USGS throughout Charles County. These areas were delineated based on where landslides have occurred in the past and where they may occur in the future. Moderate susceptibility is visible in the northwestern region of Charles County, just south of the Town of Indian Head, to the northwest of Bennsville, and along the border of Accokeek. The remaining jurisdictions are in areas of low landslide susceptibility.

Map 4.1-2: Steep slope locations in Charles County



Map 4.1-3: Landslide Susceptibility in Charles County

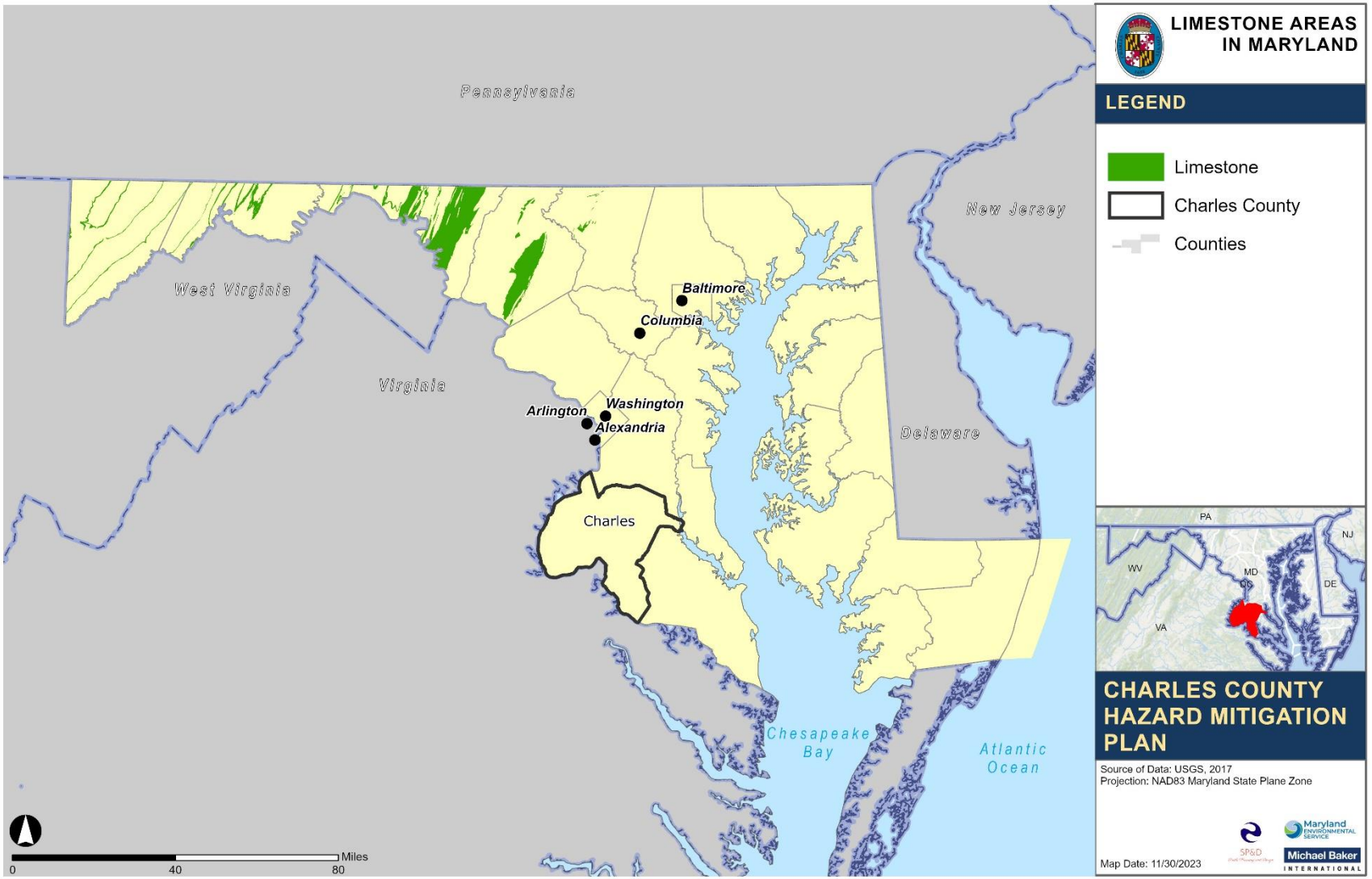


Subsidence - Subsidence is the gradual or sudden caving in or sinking of land. There are two common causes of subsidence in Maryland: mining activity and dissolution of carbonate rock such as limestone or dolomite. In some parts of Maryland, sinkholes are found in areas underlain by carbonate bedrock, however Charles County is not underlain by carbonate bedrock, but still has instances of subsidence related to possible mining activity and heavy rain. Map 4.1-4 depicts the location of limestone through Maryland. Mining also occurs throughout Charles County, but activities are predominantly limited to surface mining rather than underground mining.

The risk of subsidence incidents is not consistent throughout the state of Maryland and is more likely to occur in areas where karst or carbonate rock are more prominent. Karst topography in Maryland is present in Allegany, Baltimore, Washington, Carroll, and Frederick Counties. Despite the lack of karst topography in Charles County, subsidence incidents have occurred throughout the Charles County region. These incidences have resulted in minor sinkholes due to major flooding.

Sinkholes occur in many shapes, from steep-walled holes to bowl or cone shaped depressions. Sinkholes are dramatic because the land generally stays intact for a while until the underground spaces get too big. Sinkholes can vary in size, from a few feet to hundreds of acres, and from less than 1 to more than 100 feet deep. If there is not enough support for the land above the spaces, then a sudden collapse of the land surface can occur. Under natural conditions, sinkholes form slowly and expand gradually. However, human activities such as dredging, constructing reservoirs, diverting surface water, and pumping groundwater can accelerate the rate of sinkhole expansions, resulting in the abrupt formation of collapsed sinkholes.

Map 4.1-4: Limestone Areas Susceptible to Subsidence



Past Occurrence

Earthquake - Central Virginia, Southwestern Virginia, and the Atlantic seaboard north of Wilmington, Delaware has experienced significantly more seismic activity than Maryland (Maryland Geologic Survey, 2016). However, several earthquakes that have occurred in adjacent states have been felt in Maryland. This makes the likelihood of feeling an earthquake that occurred outside of Maryland more likely than one occurring within the state. On April 22, 1984, an earthquake of 4.1 on the Richter Scale, with an intensity of V to VI, occurred roughly 12 miles south of Lancaster, Pennsylvania (Maryland Geologic Survey). Effects could be felt throughout the northeastern region of Maryland. Impacts were mild, with an intensity of V effects, such as damaged windows, fallen hanging pictures, and shaking vehicles (Maryland Geologic Survey, 2016).

Based on available data, no earthquake epicenters have occurred south of Annapolis since April 25, 1758, and there are currently no known recordings of earthquakes in Charles County. However, in 2011 an earthquake epicenter with a magnitude of 5.8 occurred near Mineral, Virginia, roughly 80 miles from Charles County. Effects included slight damage, swaying trees, suspended objects swinging, and objects falling off shelves (Maryland Geologic Survey, 2016).

Map 4.1-5 shows this earthquake as well as all other recorded historic earthquake events in Charles between 1973 and 2017. This was the most current earthquake data available when updating this HMP. No damage in Charles County have been reported from any earthquake events, and most earthquakes in the region have occurred southwest of Charles County.

Map 4.1-5: Earthquake Events and Proximity to Charles County, Maryland (1973-2017)

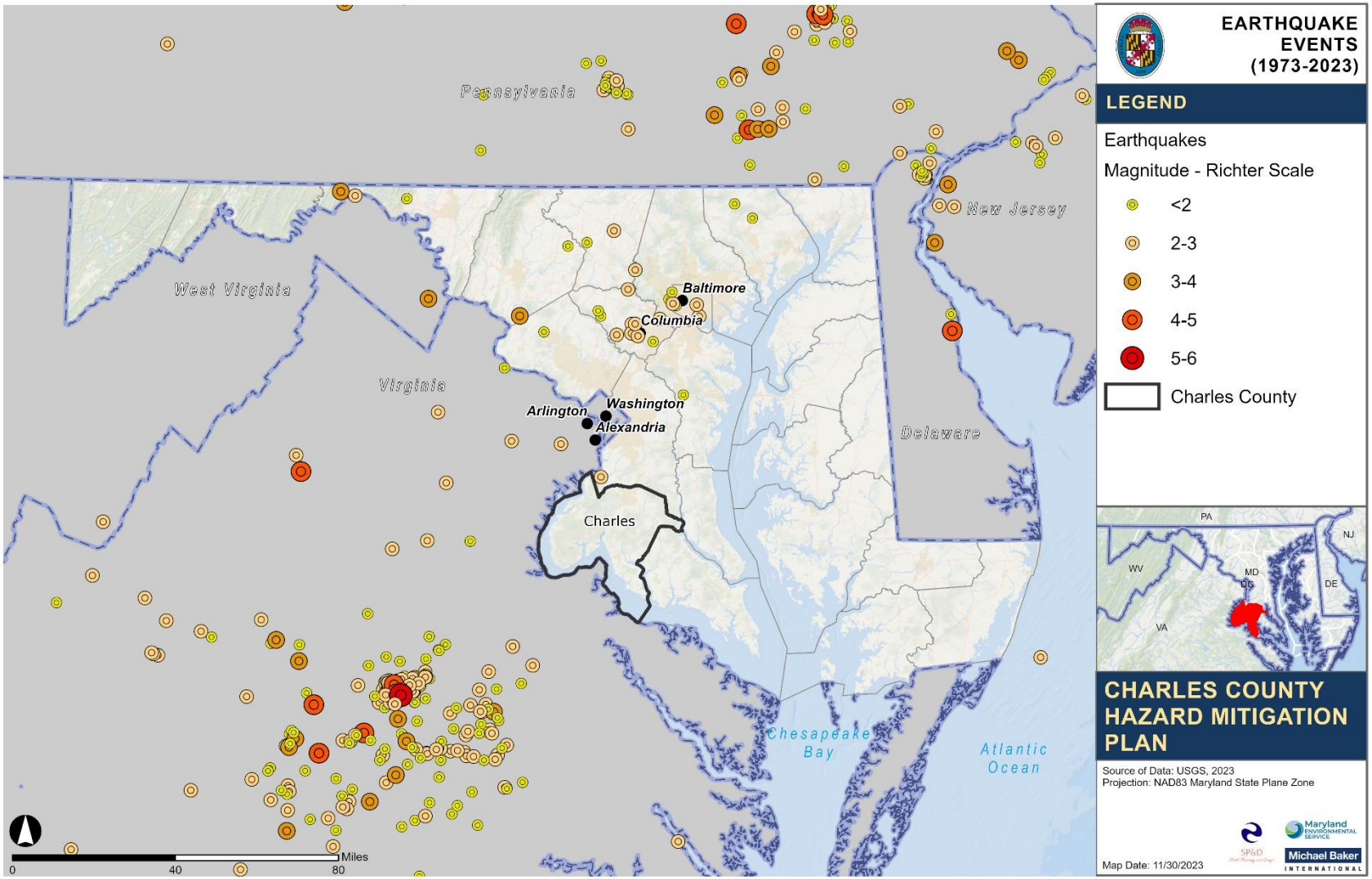


Table 4.1-4: Earthquake Chronology of Maryland, 1939-2023 (USGS, 2023)				
DATE	EPICENTER		GENERAL LOCATION	MAGNITUDE
11/26/1939	39.5	-76.6	Phoenix	(3.5, 3.7)
9/7/1962	39.7	-78.2	Hancock	-3.3
4/26/1978	39.7	-78.24	Hancock	3.1
5/23/1986	38.69	-77.04	Accoceek - Piscataway	2.5
1/13/1990	39.36	-76.8	Randallstown (V), Eldersburg (IV), Ellicott City (IV), Granite (IV), Owings Mills (III)	2.6 2.5
4/4/1990	39.35	-76.78	Granite - Randallstown - Baltimore	1.7
9/28/1991	39.36	-76.83	Granite - Randallstown	2.4
3/10/1993	39.2	-76.8	Columbia (IV) - Ellicott City (II) - Fulton (II)	2.5
3/12/1993	39.19	-76.87	Columbia - Allview Estates	2
3/15/1993	39.19	-76.87	Columbia - Allview Estates - Laurel	2.7
3/16/1993	39.19	-76.87	Columbia - Allview Estates	1.8
3/16/1993	39.19	-76.87	Columbia - Allview Estates	1.8
3/17/1993	39.19	-76.87	Columbia - Allview Estates	=/< 1.0
3/19/1993	39.19	-76.87	Columbia - Allview Estates	1
3/19/1993	39.19	-76.87	Columbia - Allview Estates	<1.0
3/21/1993	39.47	-76.3	Aberdeen - Bel Air	1.5
3/22/1993	39.19	-76.86	Columbia - Allview Estates	about 0.0
3/26/1993	39.28	-76.82	Ellicott City near jct US40 & 29	<1.5 (est.)
4/4/1993	39.19	-76.87	Columbia - Allview Estates	1.5
4/4/1993	39.19	-76.87	Columbia - Allview Estates	1.5
4/8/1993	39.19	-76.87	Columbia - Allview Estates	1-1.5
7/9/1993	39.19	-76.87	Columbia - Allview Estates	1.9
7/12/1993	39.19	-76.87	Columbia - Allview Estates	2.1
10/28/1993	39.25	-76.77	Ilchester - Ellicott City	2.1
10/28/1993	39.25	-76.77	Ilchester - Ellicott City	1.8
11/17/1993	39.19	-76.87	Columbia - Allview Estates	1.7 (est.)
11/27/1993	39.19	-76.87	Columbia - Allview Estates	<1.5 (est.)
11/27/1993	39.19	-76.87	Columbia - Allview Estates	about 1.5 (est.)
10/28/1994	39.1	-76.6	Glen Burnie - Pasadena -Gambrills - Millersville	2.7
8/2/1996	39.57	-76.08	Perryville	2.2
10/17/1996	39.7	-76.07	Rising Sun (epicenter may be in Pennsylvania)	2.2, 2.3
12/6/1996	39.19	-76.87	Columbia - Allview Estates	<1.5 (est.)
12/14/1996	39.19	-76.87	Columbia - Allview Estates	<1.5 (est.)

Table 4.1-4: Earthquake Chronology of Maryland, 1939-2023 (USGS, 2023)				
DATE	EPICENTER		GENERAL LOCATION	MAGNITUDE
12/16/1996	39.25	-76.77	Ilchester - Ellicott City	about 1 (est.)
12/22/1996	39.19	-76.87	Columbia - Allview Estates	2.0, 2.3
12/18/2001	38.19	-76.84	Columbia nr US29-Md32	1.5-2.0 (est.)
3/22/2002	38.19	-76.84	Columbia nr US29-Md32	1-2 (est.)
12/27/2008	40.114	-76.4	9 km (6 miles) W of Lancaster, PA.	3.4
7/1/2009	39.64	-75.48	Southwestern New Jersey	2.8
9/29/2009	39.607	-76.34	7 km (4 miles) NNE (15°) from Bel Air North, MD	1.6
7/16/2010	39.17	-77.25	Potomac-Shenandoah Region, MD	3.4
8/23/2011	37.936	-77.93	8 km (5 miles) SSW (195°) from Mineral, VA	5.8
10/30/2017	39.279	-77.051	Glenelg, Maryland	1.52
11/11/2017	39.261	-77.039	0.8 km (0.5 mi) ESE of Roxbury, Maryland	1.5
No Updates for 2023				

Landslide - Due to the large amounts of clay deposits and unstable ground for development, landslides occur more frequently throughout Southern Maryland. In recent years Maryland has experienced several costly landslides, including one on May 6, 2014, in the Fort Washington area of southwest Prince Georges County. Slope failure associated with heavy rain was responsible for the evacuation of 28 homes and a road collapse. Over the course of three days roughly 1,500 feet of hillside slid three feet toward a section of the street. The moving earth was also accompanied by several fallen trees and powerlines. The road cost roughly $15 million in repairs (WUSA9, 2014). Another landslide threatened at least five homes in 2011 near Indian Head (WUSA9, 2011a).

Landslide history is not documented as completely (if at all) as other hazards, primarily because landslides are not always seen. Beyond debris avalanches associated with significant rain and flooding activity, only minor landslides in the form of falling rock and/or mud slides have occurred in Charles County to date. Minor landslides typically are incidents that have been in remote locations and have resulted in damages isolated to those regions.

There is no central database of landslide events in Charles County, and it does not appear that records of major landslides for the County exist. However, since landslides often occur during periods of heavy rain or snowmelt, flooding, and coastal flooding it is possible to examine past occurrences of heavy rain, snow, or flood events. At least 55 of these events have been recorded by NOAA since 1950.

Subsidence - There is currently no known database for subsidence and sinkhole events occurring in Charles County, but a review of news stories includes some of the following occurrences:

- In the Town of La Plata, during September of 2011, residents reported seeing two sinkholes form along Route 301 after heavy rainfall (WUSA9, 2011b).

- On Friday, July 28, 2017, heavy rain caused a corrugated steel storm water drainpipe running under a Charles' County resident's property to collapse. Damages included a trench running that ran half the length of backyard engulfing two fallen trees (Maryland Independent, 2017).

Future Occurrence

Earthquake - The likelihood of a hazard event happening is usually expressed in terms of frequency. It is critically important to establish a probability of occurrence so that community officials can make informed decisions about the sustainability of future development and determine the feasibility of proposed mitigation projects. One way to define an earthquake's severity is to compare its acceleration to the normal acceleration due to gravity. Peak ground acceleration (PGA) measures the strength of ground movements in this manner. PGA represents the rate in change of motion of the earth's surface during an earthquake as a percent of the established rate of acceleration due to gravity. As shown in Map 4.1-1 Charles County has a very low PGA ratio of 0.06. In contrast, the western United States has a peak ground acceleration almost ten times that of Charles County.

Landslide - Landslides are typically triggered by periods of heavy rainfall or rapid snow thaw, and often worsen the effects of flooding. In areas burned by forest and brush fires, a lower threshold of precipitation may initiate landslides. Some landslides move slowly and cause damage gradually, whereas others move so rapidly that they can destroy property and take lives suddenly and unexpectedly.

Areas that are generally prone to landslide hazards include previous landslide areas, the bases of steep slopes, the bases of drainage channels, and developed hillsides where leach-field septic systems are used. Considering Charles County has had few reported landslides, the occurrences of future landslide activity are possible. Areas that are typically considered safe from landslides include areas that have not moved in the past, relatively flat-lying areas away from sudden changes in slope, and areas at the top or along ridges, set back from the tops of slopes.

Storm induced debris flows are landslides likely to cause death and injuries. As residential and recreational development increases on and near steep mountain slopes, the hazards from these rapid events will also increase.

Subsidence - Future occurrences of subsidence events are difficult to estimate given the limited reported past occurrences. However, subsidence events are likely to occur after heavy rain, heavy snow fall, hurricanes, and flooding. Although a sinkhole can form without warning, specific signs can signal potential development:

- Slumping or falling fence posts, trees, or foundations
- Sudden formation of small ponds
- Wilting vegetation
- Discolored well water
- Structural cracks in walls, floors

Due to the nature of geology in the region and the lack of karst or carbonate rock present in Charles County the likelihood of a hazard event due to subsidence is unlikely. However, the extraction of materials from an underground mine can cause the overlying earth to sink, which is called mine subsidence. The

extent of mine subsidence depends on the mining method, depth of mining, material extracted, and local geology. While no known mine subsidence events have been reported thus far, there is the potential for these events to occur in the future. However, most mining activity in Charles County occurs are surface mines rather than underground mines.

According to the US Environmental Protection Agency (EPA)'s What Climate Change Means for Maryland, temperatures will continue to increase as well as annual precipitation rates. Precipitation is expected to rise during winter and spring, while remaining relatively stable in summer and fall. Higher temperatures will cause snow to melt earlier in spring and boost evaporation, leading to drier soil in summer and fall. With increased rainfall intensity, the frequency and severity of landslides could increase due to soils being saturated causing slopes to be more prone to failure. In addition, with warmer temperatures altering snowmelt patterns, the increase in water runoff increases the chance of landslide and subsidence events occurring. Raising temperatures are also attributing to an increase in groundwater extraction, which can lead to subsidence. In Charles County, multiple types of clay soils are found, including Marlboro Clay and Aquasco soils. These soil types have an increase probability for subsidence during dry summer months or winters with increased precipitation.

Overall, the probability of an earth disturbance event (earthquake, landslide, or subsidence) impacting Charles County is considered *possible* (2 out of 4) as defined by the Risk Factor Methodology probability criteria.

Vulnerability Assessment

Earthquake

Based on past earthquake activity in proximity to Charles County, earthquake frequencies are relatively low. At the same time, earthquakes with low probability could result in high-consequence events. Although earthquakes may occur infrequently, they can have devastating impacts. Ground shaking can lead to the collapse of buildings and bridges; disrupt gas, lifelines, electric, and phone service. Deaths, injuries, and extensive property damage are possible vulnerabilities from this hazard. Some secondary hazards caused by earthquakes may include fire, hazardous material release, landslides, flash flooding, avalanches, tsunamis, and dam failure. Moderate and even very large earthquakes are inevitable, although very infrequent, in areas of normally low seismic activity. Consequently, buildings in these regions are seldom designed to deal with an earthquake threat; therefore, they are extremely vulnerable.

People

Most earthquake-related injuries and deaths are caused by the failure and collapse of structures due to ground shaking. The level of damage depends upon the amplitude and duration of the shaking, which are directly related to the earthquake size, distance from the fault, site, and regional geology. Earthquakes can have many impacts on people, including immediate and medium-term health impacts, and other effects:

- Immediate health impacts

These include injuries and deaths from building collapse, fires, and other secondary effects. Injuries can range from minor cuts and bruises to serious fractures, crush injuries, and burns. People can also be trapped without food, water, or oxygen, and even treatable injuries can become deadly if help doesn't arrive quickly. Inhaling dust, smoke, particulates, toxic gases, and asbestos can also lead to respiratory health issues.

- Medium-term health impacts

These include secondary infections of untreated wounds, increased risk of complications from chronic diseases. increased psychosocial needs, potential risk of communicable diseases, particularly in areas affected by overcrowding, increased morbidity, and risk of complications of chronic diseases due to interruption of treatment, potential environmental contamination by chemical/radiological agents following destruction of industrial infrastructure.

According to the CDC's Social Vulnerability Index, the most socially vulnerable census tracts in the County include La Plata and St. Charles. Of these census tracts, the most socially vulnerable groups are categorized by housing type and lack of transportation options. Socially vulnerable groups tend to have more exposure to hazards, therefore are disproportionately impacted. As with any hazard that had a potential to impact the county and its municipalities, considerations for socially vulnerable members of the community must be made. This is particularly true of public information announcements and disaster preparedness information. Public information as it relates to earth disturbances should be targeted at the most socially vulnerable groups found in La Plata and St. Charles. More information about social vulnerability is included in Section 3.3.

Structures & Systems

Earthquakes give little to no warning. They can have a large impact on an area. After-effects from an earthquake can include impacted lifelines such as roadways, downed power and communication lines, and damages to structures (especially poorly built, or those already in disrepair). Earthquakes are not a seasonal hazard, and thus can be experienced year-round. This can present its own set of issues.

As stated previously, the probability for a seismic event in Charles County is low. However, if for some reason an event was to occur with the County near the epicenter, there is no way to comprehend the amount of damage that could be sustained by the County. There is not one magnitude above which property damage can occur from an earthquake because there are other variables that play a role in the level of damage that an earthquake can cause. However, according to the U.S. Geological Survey (USGS), damage does not usually occur until the earthquake magnitude reaches somewhere above a 4 or 5.

Earthquakes can cause a variety of damages to structures and systems, including:

- Ground Shaking: The primary cause of building damage during earthquakes is ground shaking. As seismic waves travel through the ground, they can cause the structures and systems to sway and vibrate, putting stress on its structure.

- Liquefaction: In areas with loose soil or sand, earthquakes can cause liquefaction, where the soil loses its strength and turns into a liquid-like state. This phenomenon can result in sinking or tilting when liquefaction occurs.
- Tsunamis: Along the Atlantic coast, earthquakes can trigger tsunamis that can cause significant damage to structures and systems near the shore.
- Landslides: Strong earthquakes can also trigger landslides, which can destroy buildings located on steep terrain.
- Fires and Explosions: Earthquakes can damage gas lines, electrical lines, and other utility systems, which can lead to fires and explosions that can cause further damage to buildings.

Considering that there is no history of damage in the region due to earthquakes, damages are estimated to be limited to the more dilapidated structures and structures with unreinforced masonry. Therefore, structures identified as potentially at risk of damage due to an earthquake are older structures. In consideration of new structures, modern building codes and the low expected magnitude of earthquakes in the county, limited property damage is anticipated.

Historic Resources & Community Activities

Historic buildings are especially vulnerable considering the structures were not designed and constructed to absorb the swaying ground motions caused by earthquakes. Therefore, major structural damage, or outright collapse, can result. However, given the extremely low risk factor and associated impacts for Charles County, the likelihood of damages resulting from an earthquake are very low. This is also true for impacts from an earthquake to community events. While a slight disruption to events may occur as a result of an earthquake in the region, long term disruptions or event cancelations are not anticipated from this hazard, based on past occurrences.

Landslide - Landslides have the potential to damage or destroy homes and other structures, transportation routes, utilities, naturally occurring ecosystems, create travel delays, and impede on day-to-day life. However, death and injuries due to landslides are rare in Maryland but could potentially occur.

While most landslide susceptibility is relatively low throughout the County, the northwestern portion of the County and northwest Bennsville had moderate levels of landslide susceptibility. Additionally, developed areas of the County on or near steep slopes have increased vulnerability. For purposes of assessing landslide vulnerability in Charles County, structures and critical facilities were intersected with landslide prone areas, which were defined as areas with slope grades of 15% or greater. Based on this analysis, roughly 2.65% of critical facilities and 8.20% structures are in landslide areas (as seen in Table 4.1-5 below). Of the three incorporated jurisdictions in Charles County, the Town of La Plata has the greatest percentage of structures (11.73%) and critical facilities (6.1%) in landslide hazard areas. However, unincorporated areas of Charles County had the greatest number of structures (4,907) and critical facilities (12) in landslide areas throughout the entire County.

Table 4.1-6 shows a list of all critical facilities in areas with slopes of 15% or greater in Charles County. This indicates that in the event of a landslide, religious centers, health and childcare facilities, communication services, hydraulic services, and a police station could be at risk. Despite low probability of landslide

occurring in Charles County, a landslide event involving a critical facility listed below could lead to injury or loss of life, destroy natural ecosystems, damage structures, and impede mobility and emergency response functions.

Table 4.1-5: Structures and Critical Facilities Vulnerable to Landslide

MUNICIAPLITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN LANDSLIDE AREAS	PERCENT STRUCTURES IN LANDSLIDE AREAS	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN LANDSLIDE AREAS	PERCENT CRITICAL FACILITIES IN LANDSLIDE AREAS
Charles County Unincorporated Areas	61,656	4,907	7.96%	573	12	2.09%
Town of Indian Head	1,680	139	8.27%	23	1	4.35%
Town of La Plata	4,126	484	11.73%	82	5	6.10%
Village of Port Tobacco	11*	0	0.00%	0	0	0.00%
Total	**67,473**	**5,530**	**8.20%**	**678**	**18**	**2.65%**

** The Village of Port Tobacco noted that there are 22 structures in the jurisdiction; however, this analysis was conducted with GIS data which only included 11.*

Table 4.1-6: Structures and Critical Facilities Vulnerable to Landslide

NAME	TYPE	COMMUNITY
Good Samaritan Presbyterian Church	Churches	Charles County Unincorporated Areas
Indian Head Baptist Church	Churches	Town of Indian Head
Maryland Point Baptist Mission	Churches	Charles County Unincorporated Areas
Board of Education of Charles County MD	Communication Facilities	Charles County Unincorporated Areas
Jones Communications Of MD, Inc.	Communication Facilities	Charles County Unincorporated Areas
Potomac Electric Power Co.	Communication Facilities	Charles County Unincorporated Areas
Gilbert Run	Dams	Charles County Unincorporated Areas
Lake Jameson	Dams	Charles County Unincorporated Areas
Trinity Church	Dams	Charles County Unincorporated Areas
Claires Day Care	Day care centers	Town of La Plata
Southern MD Electric Coop Inc.	Electric substation	Charles County Unincorporated Areas
Assisted Living at Hawkins Gate	Nursing homes and long-term care facilities	Charles County Unincorporated Areas
CCSO Headquarters	Police Stations	Town of La Plata
Buckeye Circle Investments, LLC.	Pump Stations	Town of La Plata
Cliffton WWTP	Pump Stations	Charles County Unincorporated Areas
Haldane Pump Station	Pump Stations	Town of La Plata
Willowgate Pump Station	Pump Stations	Town of La Plata
Thomas Court Water Supply Co. Inc.	Wells	Charles County Unincorporated Areas

There are also 5 sites on the National Register of Historic Places and 63 sites on the Maryland Inventory of Historic Properties located in landslide hazard areas, which are discussed in more detail in Chapter 5.

Subsidence - Subsidence vulnerability is not consistent throughout Maryland, and risk is greater in areas with higher concentrations of karst or carbonate rock. While Charles County is not underlain with karst or carbonate rock, it has witnessed occurrences of minor sinkholes after heavy rain. Impacts of subsidence events can result in changes to elevation, and structural damage to storm drains, sanitary sewers, wells, roads, railroads, canals, levees, bridges, and public and private buildings.

Jurisdictional Differences

Earthquake - Charles County is located in a zone where earthquake vulnerability is expected to be relatively low; however, all jurisdictions in Charles County are considered equally susceptible to the impacts of an earthquake event.

Landslide - Based on the results of the vulnerability assessment, the Towns of La Plata and Indian Head, as well as certain portions of the unincorporated areas of Charles County are at a greater risk to landslide. Additionally, the northwestern section of the County near Indian Head may be more susceptible according to the USGS landslide susceptibility map. The Village of Port Tobacco has the lowest risk to landslide, with no structures or critical facilities located in areas with steep slopes.

Subsidence - All jurisdictions in Charles County have an equal risk to subsidence, although future mining activities could potentially increase risk in some areas.

Land Use and Development Trends

Earthquake - Considering the areas adjacent to Charles County have experienced low magnitude, low impact earthquakes, the likelihood of future damages due to earthquake events is low. Increased population and development may increase risk due to increased exposure of assets and populations to the hazard; however, continued enforcement of building and construction codes to mitigate earthquake vulnerabilities will continue to minimize risk.

Landslide - As residential and recreational development increases on and near susceptible coastal and geologic formations, landslide vulnerability is likely to increase. The risk of landslides can be reduced by avoiding construction on steep slopes and existing landslide hazard areas through land use controls, or by stabilizing slopes. Stability increases when groundwater is prevented from rising in the landslide mass by covering the landslide with an impermeable membrane, directing surface water away from the landslide, draining groundwater away from the landslide, and minimizing surface irrigation. Slope stability is also increased when a retaining structure and the weight of a soil/rock berm are placed at the toe of the landslide, or when mass is removed from the top of the slope.

Subsidence - Sinkhole formation is aggravated and accelerated by urbanization. Development increases water usage, alters drainage pathways, overloads the ground surface, and the redistribution soil. The formation of new sinkholes has been connected to land use practices, particularly from groundwater pumping, mining, construction, and development practices. Changes to natural water-drainage systems, and land surface changes are also correlated with sinkholes. For instance, when industrial runoff-storage ponds are formed, the weight of new material could trigger an underground collapse forming a sinkhole. Groundwater can also help keep surface soil in place, and groundwater pumping for irrigation and water supplies could disrupt balanced groundwater fluid pressures, resulting in a sinkhole.

4.2 Erosion

Table 4.2-1: Erosion Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Natural	4	1	1	1	3	**2.1**
MODERATE RISK (2.0 – 2.9)						

Location, Extent, and Range of Magnitude

Shoreline erosion is the process of the gradual wearing away of land masses and occurs along coasts and rivers and streams. Although flood-related erosion is covered by flood insurance, this peril is not covered per se under the National Flood Insurance Program (NFIP). The mapping and regulatory standards of the NFIP do not currently address erosion, but Community Rating System (CRS) credit is given to communities that include this hazard in their regulations, planning, public information, hazard disclosure, and flood warning programs.

According to the Maryland Department of Natural Resources (MD-DNR), erosion is a significant problem currently facing Maryland's diverse coastal environment. Approximately 31% of Maryland's coastline is currently experiencing erosion. Sea level rise is a causal force, which influences the on-going processes that drive erosion, in turn making coastal areas ever more vulnerable to both chronic erosion and episodic storm events (Nor'easters, tropical storms, hurricanes). Maryland is currently losing approximately 580 acres of land per year to shore erosion (MD-DNR 2012).

U.S. Army Corps of Engineers (USACE) found that 31% of tidal shorelines in Charles County are experiencing some erosion, with 7% experiencing significant erosion rates of two feet per year or more (USACE, 1990). Subsequent studies by the Maryland Geological Survey (MGS) estimated shoreline erosion by comparing recently mapped shorelines (1988-1995) to historical maps. These studies divided Maryland's shoreline into segments of 80 meters or more, generalized erosion rates into four categories, and assigned each shoreline segment to the most representative category. According to data made available through the Maryland Coastal Resiliency Assessment, the MGS found approximately 9% of the County's coastline to be subject to significant erosion rates of two feet per year or more (The Nature Conservancy, 2016). As shown in Map 4.2-1, the areas subject to significant erosion are concentrated near the Indian Head peninsula, the mouth of Nanjemoy Creek, and the mouth of Port Tobacco River.

The 2016 Maryland Coastal Resiliency Assessment used spatially explicit computer modeling informed by scientific literature and local expert opinion to spatially assess where natural habitats have the greatest potential to reduce risk for people. According to the report, the products of the Assessment include calculation of a Shoreline Hazard Index, which estimates the relative exposure to coastal hazards for the entire Maryland shoreline, delineation of Coastal Community Flood Risk Areas, selection of Priority Shoreline Areas for conservation and/or restoration, and the calculation of a Marsh Protection Potential Index.

The Maryland Shoreline Hazard Index was calculated from six (6) physical variables: geomorphology, elevation, relative sea level rise, wave power, storm surge height and erosion rates, and five natural feature types (forest, marsh, dune, oyster reef and underwater grasses). Each variable is ranked from very low hazard (rank=1) to very high hazard (rank=5), based on criteria shown in table, below, used within the within the InVEST coastal vulnerability model.

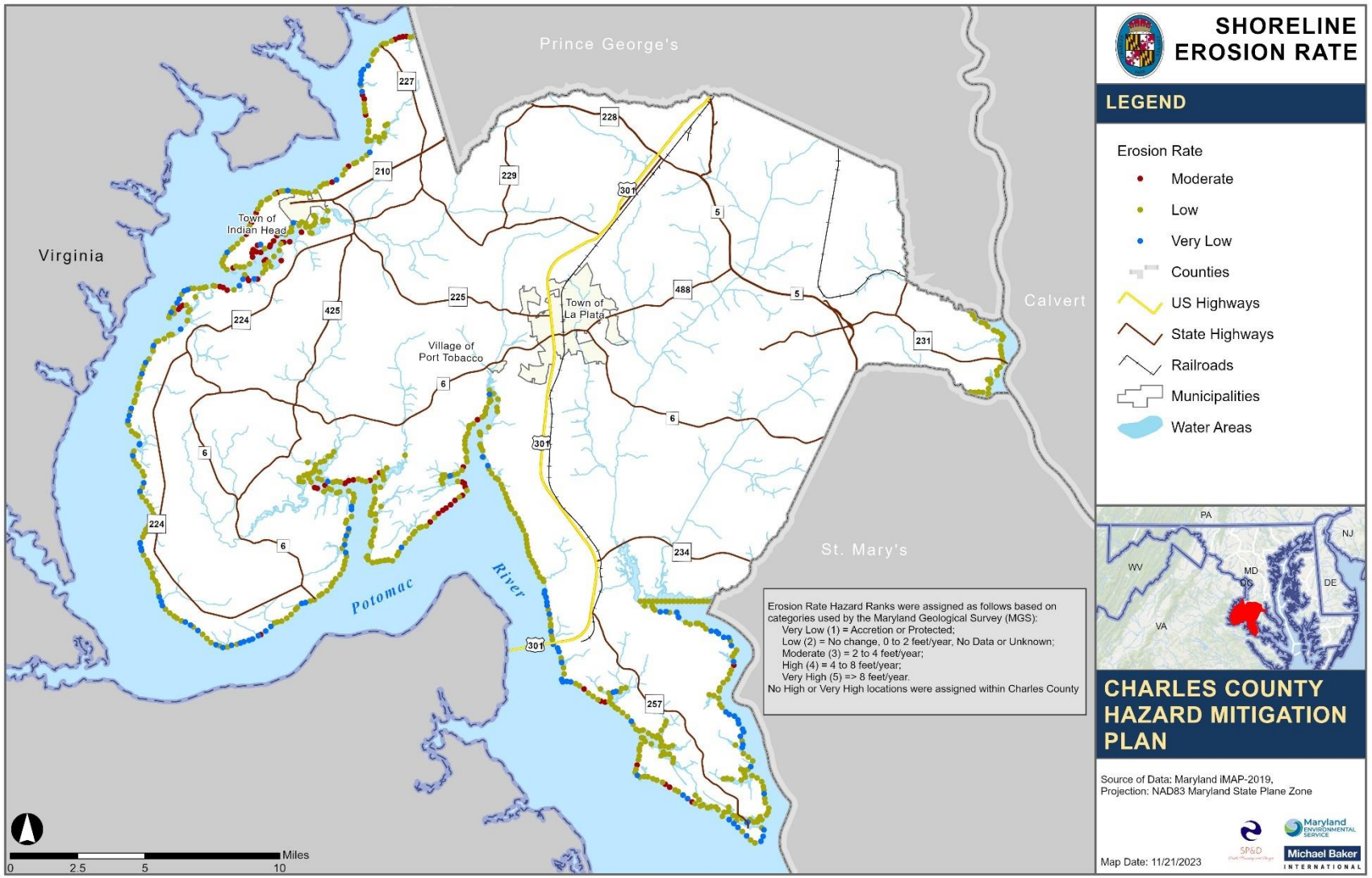
Table 4.2-2: Variables and Ranking System for InVEST Coastal Vulnerability Model

VARIABLE	VERY LOW HAZARD RANK (1)	LOW HAZARD RANK (2)	MODERATE HAZARD RANK (3)	HIGH HAZARD RANK (4)	VERY HIGH HAZARD RANK (5)
Geomorphology	Bulkhead	Riprap	Groin, jetty, breakwater, unconventional structure, living shoreline	Coarse-grained sand to gravel beaches	Other natural shoreline, dilapidated bulkhead
Elevation (m)	14.7 - 81.	6 5.9 - 14.7	2.3 - 5.9	0.5 - 2.3	0 - 0.5
Natural Habitats	Forest	Marsh	Dune	Oyster reef, Underwater grass (dense = 4, less dense = 4.5)	No habitat
Sea Level Rise (meters)	**None**	**1.32 -1.42**	**1.46 – 1.48**	**1.49 – 1.67**	**2.05 – 2.35**
Wave Power (kW/m)	**0 - 0.02**	**0.02 - 0.05**	**.05 - 0.16**	**00.16 - 0.78**	**Atlantic Shoreline**
Storm Surge Height (feet)	**0**	**0.1 - 2.2**	**2.3 - 3.5**	**3.6 - 4.6**	**4.7 - 8.9**
Erosion Rate (feet/year)	**Accretion or Protected**	**0 - 2, no change or unknown**	**2 - 4**	**4 - 8**	**>8**

Source: 2016 Maryland Coastal Resiliency Assessment Report

The analysis estimated the relative exposure of each 250-meter segment of the Maryland coastline to storm-induced erosion and flooding, and the relative effectiveness of existing natural habitats to buffer the shoreline from these hazards.

Map 4.2-1: Shoreline Erosion Rate (Maryland Coastal Resiliency Assessment, 2019)

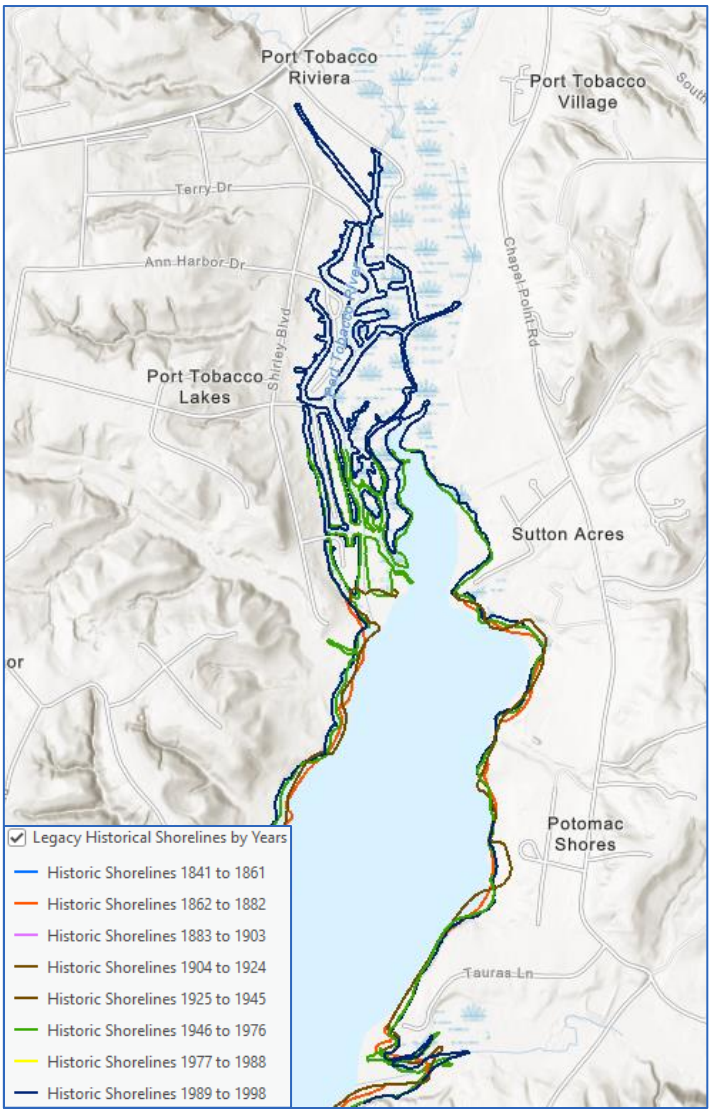


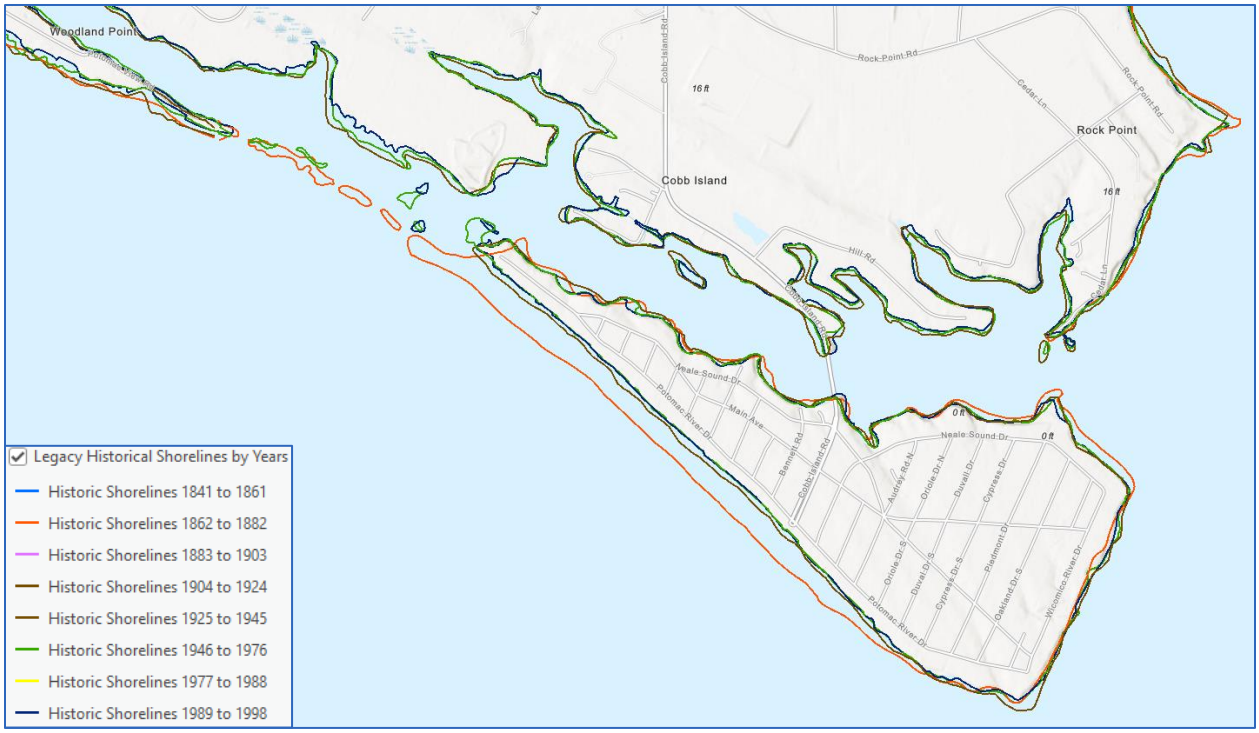
Past Occurrence

Shoreline erosion is a continuous process that is highly spatially variable and temporally episodic. The basic progression of erosion from wave action includes A) attack by waves, B) erosion of a bank and beach causing undercutting, C) slumping of the bank, and D) removal, transportation, and deposition of bank sediments along shorelines. The natural drivers of this process include weather, soil composition, topography, bathymetry (water depth), and fetch (the distance traveled by wind or waves across open water). Shoreline erosion tends to be greatest when storms amplify wind and wave action, and where soils are loose, slopes are steep, near-shore waters are deep, and fetch is large. In Charles County, the shoreline is highly vulnerable to nor'easters, tropical storms, and hurricanes, particularly when these storms last 24 to 48 hours and are accompanied by high winds and storm surges. Storms of this type can amplify several high tide cycles, inundating protective beaches and marshes and subjecting upland areas to the brunt of the destructive wave energy. The results can include damage to shoreline stabilization projects and severe erosion of land masses.

The Maryland Geological Survey (MGS) developed the Legacy Historical Shorelines by Years, which is a subset of the Maryland Historical Shorelines data set. Counties have digital shoreline vectors which are used to overlay orthophoto base map raster of the Maryland shoreline and show historical shoreline locations. This shoreline data set spans the time period 1932-1998. There is no data available from 1998-to present day for Charles County. The Legacy Shoreline layer will be replaced by the Limited ROC Shorelines by Decade as counties are updated over time.

An area in the county with extensive erosion is the headwaters of the Port Tobacco River near the Port Tobacco Village. As shown in the image to the right, from 1976 to 1998, the Port Tobacco River shoreline has receded significantly. Cobb Island Cobb, a small island located at the confluence of the Potomac and Wicomico Rivers, also has been impacted significantly by shoreline erosion. The image below illustrates the amount of land that has been eroded since 1882. As shown, several small islands of land have been eliminated over time.





Historic shoreline data for the remaining portions of the county is limited. Data for the Historic Shorelines 1946-1976 and Historic Shorelines 1989 to 1998 is available for all shorelines in the county, however not for the remaining shorelines.

The man-made drivers of shoreline erosion include land use and erosion control projects. Shoreline erosion tends to be greatest where upland areas generate significant runoff, and where adjacent shorelines are hardened with erosion control measures (such as revetments and bulkheads). Poorly designed erosion control measures accelerate shoreline erosion by reducing the supply of sediment to adjacent beaches, removing natural features that dampen wave action, or otherwise interrupting natural shoreline processes.

Future Occurrence

The risk of shoreline erosion is expected to increase in the future due to more intense weather events and rising sea levels driven by climate change. Both factors contribute to erosion by amplifying natural coastal processes. For example, as sea level rises, storm surges will extend further into the coastal zone, exposing upland areas to destructive wave energy with greater frequency. Areas with high erosion rates identified through the Coastal Resiliency Assessment's Maryland Shoreline Hazard Index should be monitored. The comfort station's foundation should be inspected to ensure it is an open foundation system that minimizes scour.

Tide gauge measurements in the Chesapeake Bay and Mid-Atlantic region show that sea level along Maryland's coastline has risen at an average rate of 3-4 mm per year, or approximately one foot per century. This rate is nearly double the global average and reflects both global sea level rise and local land subsidence. Research indicates that land subsidence in southern Maryland is the result of postglacial crustal movement, sediment loading, tectonic activity, and possibly groundwater withdrawals (Maryland

DNR, 2001; MGS, 2016). Future rates of sea level rise along Maryland's coastline are also expected to exceed the global average, resulting in a rise of 2-3 feet in the next 100 years (MGS, 2016). The potential of sea level rise to exacerbate erosion rates requires careful consideration of this factor in any shoreline erosion control plan.

Vulnerability Assessment

People

High shoreline erosion rates pose a significant threat to property owners, the public, and the County's natural resources - placing valuable land and assets at greater risk of storm damage. These assets include homes, businesses, historic and cultural sites, archaeological sites, recreational beaches, productive farmland, utilities, bridges, and roads. Shoreline erosion also contributes to the degradation of water quality and habitat. The nitrogen and phosphorus carried with eroded sediments can exacerbate summertime dead zones in the Chesapeake Bay and tidal Potomac, and the sediment itself can smother important aquatic resources and fill navigational channels used for commerce and recreation.

Many of our nation's coastal communities have limited economic resources and are disproportionately exposed to natural hazards. Historic inequalities in service provision have deprioritized coastal restoration and infrastructure upgrades in underserved communities. Therefore, underserved communities have had fewer opportunities to prepare for hazardous events. This underscores the need for equitable access to services supporting adaptation, emergency response, and recovery planning. While there are national tools that screen for vulnerable populations, they often do not provide place-based information at a scale or resolution meaningful for local action.

The Charles County Resilience Authority is a nonprofit organization that, as a government instrumentality, is operated for the public purpose of responding to the impacts of climate change in communities across Charles County. In review and prioritizing resilience-based projects the Authority prioritizes equity as impacts of climate change are not shared equally. All efforts are based on principles of diversity, equity, inclusivity, and justice. Using the results of the CDC Social Vulnerability Index presented in Chapter 3 there are no coastal communities in Charles County that have socially vulnerable populations.

Structures

For purposes of assessing vulnerability, the County focused on the direct loss of land and its potential impact on public and private structures, historic properties, and critical facilities. The land vulnerable to loss was estimated based on a shoreline change transect database produced by MGS. The database generalizes average annual erosion rates into five categories: accretion, 0-2 feet, 2-4 feet, 4-8 feet, and greater than 8 feet. To develop a conservative estimate of the land vulnerable to erosion, the highest average erosion rate in each category was assumed to prevail, and the average erosion rate was assumed to remain constant over the next 100 years. In 100 years' time, the shoreline was therefore estimated to retreat 200 feet for transects in the 0-2 feet per year category, 400 feet for transects in the 2-4 feet per year category, and 800 feet for the transects in the 4-8 feet per year and greater than 8 feet per year categories. Based on these assumptions, buffers were generated around the point at which each transect

intersects the current shoreline, and the structures within the buffer area were identified. Note that this is an order of magnitude estimate. Erosion rates are highly variable across space and time and are dependent on many localized shoreline characteristics.

Table 4.2-3 displays the number of public and private structures estimated to be vulnerable to erosion in the next 100 years, categorized by land use type. Overall, 2211 in Charles County were determined to be vulnerable to erosion over a span of about 100 years. Most are residential structures located in the County's unincorporated areas, and a smaller number are residential structures in Indian Head in residential use. Note that the commercial land use type includes commercial-residential uses and country clubs.

Table 4.2-3: Structures Vulnerable to Coastal Erosion

MUNICIPALITY	RESIDENTIAL	AGRICULTURAL	COMMERCIAL	INSTITUTIONAL	INDUSTRIAL	TOTAL
Charles County Unincorporated	1360	251	159	373	30	2173
Town of Indian Head	36	2	0	0	0	38
Total	**1396**	**253**	**159**	**373**	**30**	**2211**

Notes: Structures include only the primary structure(s) on each parcel; accessory structures such as sheds are excluded

In terms of critical facilities, the following facilities are to be vulnerable to erosion in the next 100 years:

- Playground/Park – 12361 Neale Sound Drive
- Southern Energy – 12620 Crain Highway
- MDTA – Fuel Dispensing Facility – 13010 Crain Highway
- MDTA – Dewatering Facility – 13014 Crain Highway
- MDTA – Equipment Storage – 13020 Crain Highway
- MDTA – Salt Dome – 13036 Crain Highway

Beyond property damage, coastal erosion can bring about a variety of other economic challenges. As climate change accelerates, this phenomenon—and the economic devastation it produces—may also increase.

Systems

The costs associated with shoreline erosion include the direct loss of land and its economic, cultural, and ecological values, as well as offsite impacts caused by increased sediment and nutrient loading to the Chesapeake Bay and its tributaries. Without appropriate mitigation measures, improvements such as houses, driveways, sewer pipes, or roads can be damaged or destroyed. This damage can lead to both public and private costs. Public costs may include lower tax revenue from reduced property values, capital budget expenses to repair or replace lost infrastructure, loss of historic properties or cultural sites, loss of recreational beaches, and the loss of productive farmland and forest that serve as the basis for a sustainable rural economy.

Coastal erosion and related processes can also disrupt shipping ports by making it more difficult for ships to reach ports and harbors, slowing down or otherwise altering the flow of goods. This has the potential to sharply impact trade in areas most heavily affected by erosion. Besides shipping, many other industries rely on coastal land and property. One of the most visible of these is tourism. Evidence has shown that tourists are less likely to return to areas suffering from continued erosion of beaches. Fishing, agriculture, and many other industries are also liable to be negatively impacted by erosion (U.S. Climate Resilience Toolkit).

Natural, Historic, and Cultural Resources

The number of properties on the Maryland Inventory of Historic Properties estimated to be vulnerable to erosion were assessed in Chapter 5 Historic and Cultural Resources Vulnerability Assessment. Overall, 119 of the 1,031 properties on the Maryland Inventory of Historic Properties were determined to be vulnerable to erosion over a span of about 100 years. More than half were near the communities of Indian Head and Newburg. Most of the properties near Indian Head were related to the historic Naval Ordnance Station. Twelve of the MIHP sites are potentially eligible for the National Register of Historic Places. Of the seven National Register Historic Places resources determined to be vulnerable to erosion, three were buildings (Marshall Hall, Mount Air, and Waverly), three were larger sites or districts (Piscataway Park, the Mallows Bay-Tidewater Historic and Archaeological District, and Mt. Aventine), and one was a historic skipjack (the Mary W. Somers).

Community Activities

Charles County features over 300 miles of shoreline, which residents and tourists enjoy. In the case of significant shoreline erosion, hiking, kayaking, fishing, and other outdoor shoreline or water activities are at risk of temporary or permanent disruptions.

Jurisdictional Differences

As shown in Table 4.2-1, Indian Head and the unincorporated areas of Charles County are more vulnerable to the impacts of erosion than Port Tobacco and La Plata.

Land Use and Development Trends

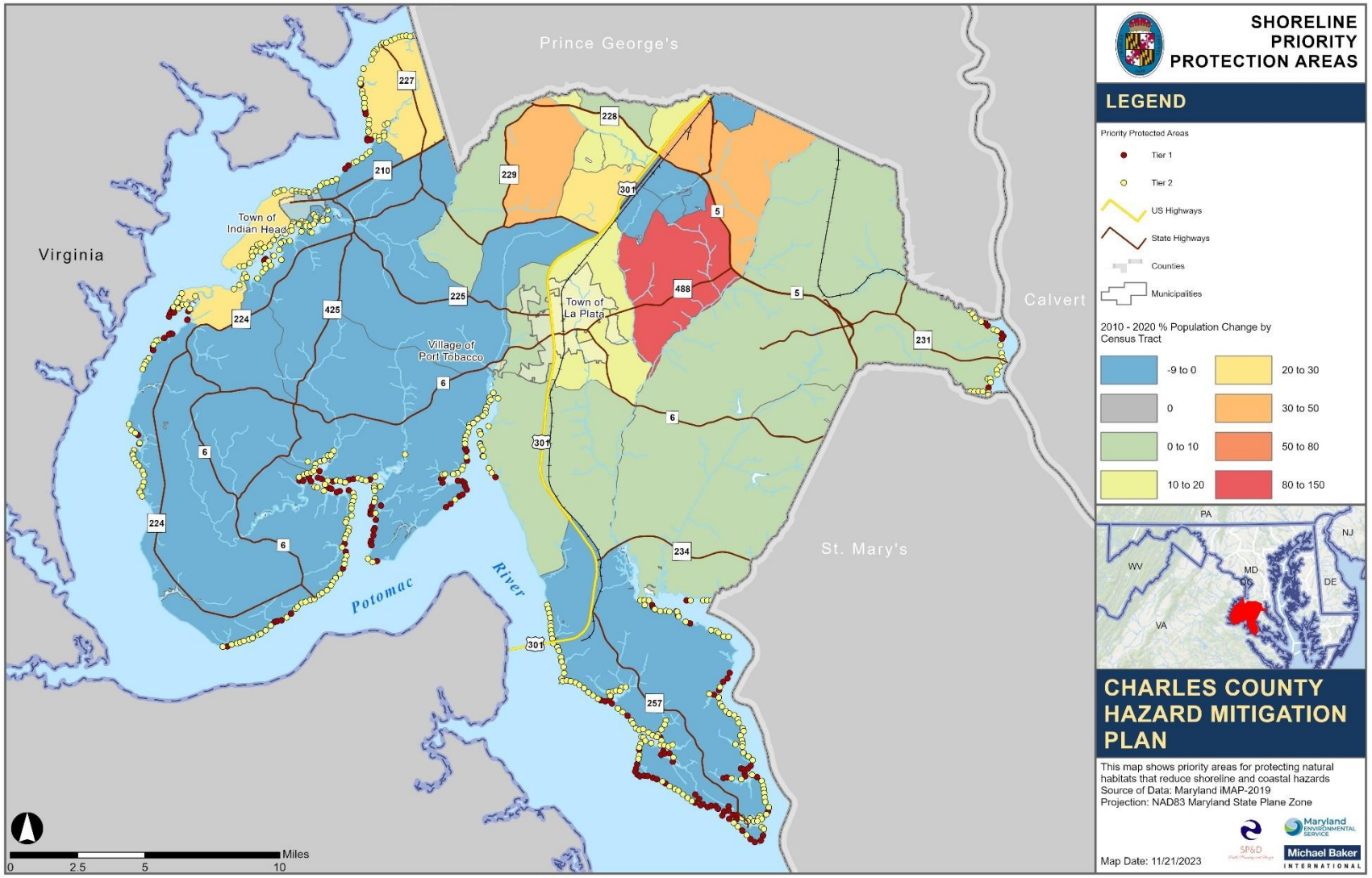
To determine how future development may affect vulnerability to coastal erosion, the County considered recent growth patterns and current land use regulations. First, the County compared the distribution of population growth between 2010 and 2020 to the distribution of Priority Shoreline Areas as determined by the Maryland Coastal Resiliency Assessment (The Nature Conservancy, 2019). Priority Shoreline Areas are coastal areas where natural habitats provide the greatest protection to nearby communities. Tier 1 areas provide the highest level of protection, and Tier 2 areas provide a more moderate level of protection. Land development that removes or degrades natural habitats in these areas could increase vulnerability to erosion. The three areas where recent development trends appear to pose the greatest threat to protective habitats are the shorelines along the Stump Neck Peninsula, the Bryans Road area, and the Cobb Neck peninsula.

The County reviewed existing land use regulations for development along the shoreline. Even in areas where new development occurs near protective natural habitats or vulnerable shorelines, existing land use regulations will likely protect new structures and infrastructure from the risk of erosion (See Map 4.2-2). The Chesapeake Bay Critical Area law requires Charles County to adopt and implement a Critical Area management ordinance for all land within 1,000 feet of tidal waters. The ordinance is intended to protect both water quality and wildlife habitat, and includes criteria addressing development density, water dependent uses, buffers from waterways, and protections for natural shorelines and wildlife habitats. In addition, Maryland's Living Shoreline Protection Act of 2008 includes provisions for existing development. Any improvements to protect private property from shoreline erosion are required to consist of marsh creation or other nonstructural shoreline stabilization measures that preserve the natural environment.

Charles County has been operating its municipal separate storm sewer system (MS4) under a National Pollutant Discharge Elimination System (NPDES) permit issued by the Maryland Department of the Environment (MDE) since 2014. The County's permit requires compliance with pollutant load limits from both the Chesapeake Bay Total Maximum Daily Load (TMDL) and local TMDLs and restoration of untreated impervious surfaces. The suite of allowable stormwater treatment options has also expanded beyond conventional stormwater best management practices (BMPs) to include alternatives such as street sweeping, catch basin cleaning, stream restoration, and tree planting. To address this requirement, Charles County has developed a 2017 Stormwater Restoration Plan that:

- Demonstrates ways to meet the Total Maximum Daily Load (TMDL) Stormwater Wasteload Allocations (SW-WLAs) approved by U.S. Environmental Protection Agency.
- Illustrates a strategy to provide additional stormwater runoff management on impervious acres equal to 20% of the impervious area for which runoff is not currently managed to the Maximum Extent Practicable (MEP).
- Educates and involves residents, businesses, and stakeholders in achieving measurable water quality improvements.
- Establishes a reporting framework for annual reporting under the County's MS4 permit.
- Provides an evaluation and adaptive management process for developing actions to be taken if permit requirements are not met.
- Identifies the funding needed to implement the Restoration Plan.

Map 4.2-2: Shoreline Priority Areas and Population Growth Rate



4.3 Drought

Table 4.3-1: Drought Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Natural	1	1	4	1	4	**1.9**
LOW RISK (Less than 2.0)						

Location, Extent, and Range of Magnitude

According to the United States Army Corps of Engineers (USACE), a drought is a period of time when natural or managed water systems do not provide enough water to meet established human and environmental uses because of natural shortfalls in precipitation or stream flow. Drought is a natural climatic condition, which occurs in virtually all climates, and is the consequence of a natural reduction in the amount of precipitation experienced over a long period of time, usually a season or more in length. High temperatures, prolonged winds, and low relative humidity can exacerbate the severity of drought. This profile focuses on two types of droughts: hydrologic and water management (as categorized by the World Meteorological Organization).

A **hydrologic drought** is defined in terms of reduction of stream flows, reduction in lake or reservoir storage, and lowering of groundwater levels. This results from a shift in normal weather patterns over an area causing the amount of precipitation to fall significantly below the long-term average.

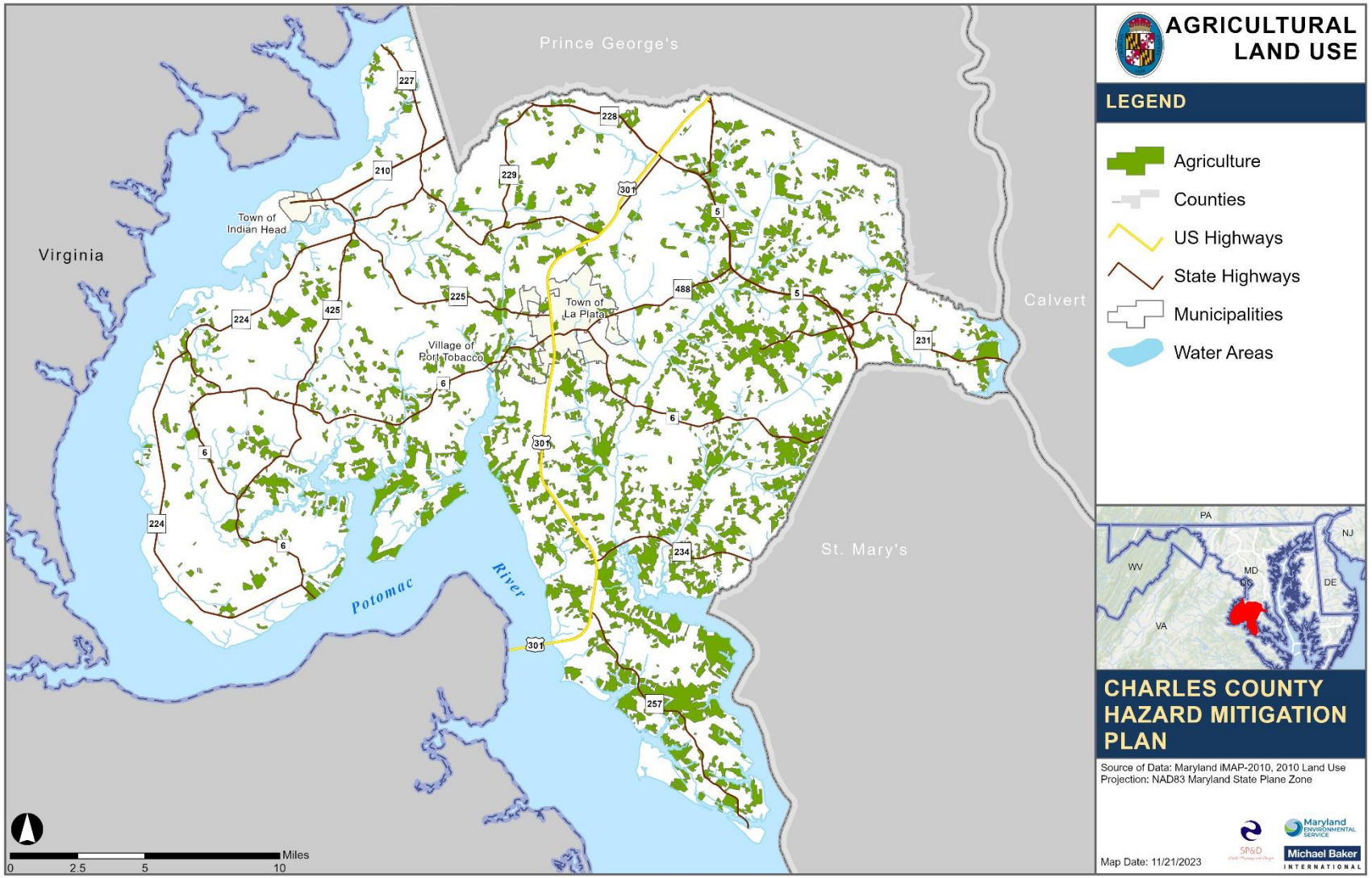
A **water management drought** is characterized as water deficiencies that exist due to failure of water management practices or facilities to bridge normal or abnormal dry periods and equalized water supply throughout the year.

A drought is a period of prolonged dryness that contributes to depletion of groundwater and surface-water yields. When droughts occur, they can have significant adverse consequences to:

- Public water supplies for human consumption
- Rural water supplies for livestock consumption and agricultural operations
- Water quality
- Natural soil water or irrigation water for agriculture
- Water for forests and for fighting forest fires
- Water for navigation and recreation.

Droughts are regional climatic events, so when these events occur in Charles County, impacts are felt across the entire county as well as areas outside county boundaries. The spatial extent for areas of impact can range from Southern Maryland to the entire mid-Atlantic region. Areas with extensive agricultural land uses can experience particularly significant impacts. As shown in Map 4.3-1, agricultural land uses are dispersed throughout the entirety of Charles County but are most heavily concentrated in the eastern and southeastern parts of the County.

Map 4.3-1: Charles County Agricultural Land Use



Droughts can have varying effects, depending on the month in which they occur, as well as the severity, duration, and location of the event. Even short-term droughts can be devastating, especially in conjunction with extreme temperatures.

There are three main measures of drought severity: The Standard Precipitation Index, the Palmer Drought Severity Index, and the United States Drought Monitor Drought Severity Classification. Table 4.3-2 shows the drought severity levels based on these indices and describes the possible impacts of each level.

The Standardized Precipitation Index (SPI) is based on the probability of an observed precipitation deficit occurring over a given prior time-period. The assessment periods considered range from 1 to 36 months. The variable time scale allows the SPI to describe drought conditions important for a range of meteorological, agricultural, and hydrological applications. For example, soil moisture conditions respond to precipitation deficits that occur on a relatively brief time scale, whereas groundwater, stream flow, and reservoir storage respond to precipitation deficits arising over many months.

The Palmer Drought Severity Index (PDSI) was developed by Wayne Palmer in the 1960s and uses temperature and rainfall information to determine dryness. It has become the semi-official drought index. The PDSI is most effective in determining long term drought (several months) and is not as helpful with short-term forecasts (a matter of weeks). It uses a 0 as normal, and drought is shown in terms of minus numbers. For example, minus 2 is moderate drought, minus 3 is severe drought, and minus 4 is extreme drought.

The United States Drought Monitor (USDM) Drought Severity Classification is based on local reports from expert observers, the impact that drought has on the area, and a composite of five drought indicators, including both the SPI and the PDSI.

Table 4.3-2: Drought Severity Classifications (National Drought Mitigation Center, 2023)

DROUGHT SEVERITY	RETURN PERIOD (YEARS)	DESCRIPTION OF POSSIBLE IMPACTS	DROUGHT MONITORING INDICES		
			Standardized Precipitation Index (SPI)	Palmer Drought Severity Index (PDSI)	USDM Drought Category
Abnormally Dry	3 to 4	Going into drought: short-term dryness slowing growth of crops or pastures; fire risk above average. Coming out of drought: some lingering water deficits; pastures or crops not fully recovered.	-0.5 to -0.7	-1.0 to -1.9	D0
Moderate Drought	5 to 9	Some damage to crops or pastures; fire risk high; streams, reservoirs, or wells low, some water shortages developing, or imminent, voluntary water use restrictions requested.	-0.8 to -1.2	-2.0 to -2.9	D1
Severe Drought	10 to 17	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.	-1.3 to -1.5	-3.0 to -3.9	D2

Table 4.3-2: Drought Severity Classifications (National Drought Mitigation Center, 2023)					
DROUGHT SEVERITY	RETURN PERIOD (YEARS)	DESCRIPTION OF POSSIBLE IMPACTS	DROUGHT MONITORING INDICES		
			Standardized Precipitation Index (SPI)	Palmer Drought Severity Index (PDSI)	USDM Drought Category
Extreme Drought	18 to 43	Major crop and pasture losses; extreme fire danger; widespread water shortages or restrictions.	-1.6 to -1.9	-4.0 to -4.9	D3
Exceptional Drought	44+	Exceptional and widespread crop and pasture losses; exceptional fire risk; shortages of water in reservoirs, streams, and wells creating water emergencies.	Less than -2.0	-5.0 or less	D4

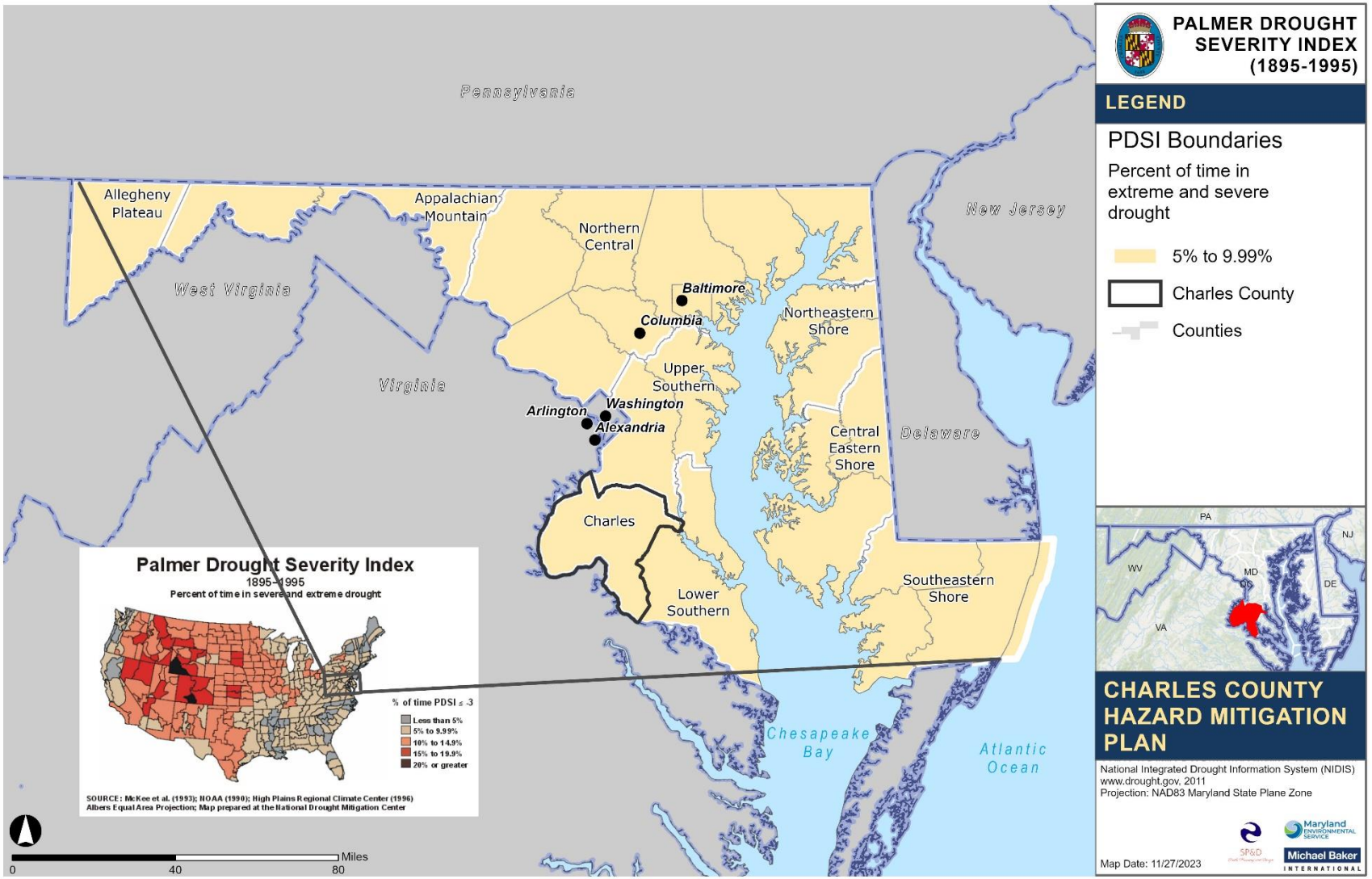
As shown in Map 4.3-2, Charles County and the entirety of Maryland are located in an area where severe and extreme drought occurs 5% to 9.9% of the time according to the PDSI based on data from 1895 to 1995. This was the most current data available at the time of the HMP Update.

Past Occurrence

According to the National Drought Mitigation Center, significant damages to agriculture have occurred since reporting began in 1986. The most notable events occurred in 1986, 1999, 2002 and 2007. These events are significant due to the persistent dry conditions, exceptional and widespread crop and pasture losses; increased fire risk; and water restrictions. Summarized in Table 4.3-1 are drought events that have occurred since 1986 in Charles County.

Table 4.3-3: Drought Events in Charles County since 1986 (National Drought Mitigation Center, 2023)			
DATE	TYPE	CATEGORY IMPACTED	DAMAGE
January – October 1986	Drought	Agriculture	Agriculture products
January – December 1988	Drought	Environmental	Chesapeake Bay Oyster Harvest
August 1991	Drought	Other	Farming
August – September 1997	Drought	Agriculture/Environmental	Farming
September 1998	Drought	Agriculture	Agriculture products
May – August 1999	Drought	Agriculture, Environmental, Water/Energy, Other	Water restriction, farming, agricultural products, crop loss, Sod farming,
March – September 2002	Drought	Agriculture, Fire, Other, Environmental	Farming, livestock, wildfires
September – October 2005	Drought	Agriculture, Fire, Environment	Agriculture products, farming
January – December 2007	Drought	Agriculture, Fire Environmental, Water/Energy, Other	Wildfires, agricultural products, livestock, farming
June – August 2010	Drought	Agriculture, Other, Fire	Agricultural products, farming, fire danger
No significant drought events have been recorded for Charles County since the previous plan.			

Map 4.3-2: Palmer Drought Severity Index, 1895-1995, Percent of time in Severe and Extreme Drought



According to the National Oceanic and Atmospheric Administration's (NOAA) Storm Events Database, there have been 12 reported drought events in Charles County since 1950.

Table 4.3-4: Drought Events in Charles County since 1950 (NOAA, 2023)

DATES	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
August 1998	0	0	$0	$0
October 1998	0	0	$0	$0
November 1998	0	0	$0	$1,670,000
December 1998	0	0	$0	$0
May 1999	0	0	$0	$0
June 1999	0	0	$0	$0
July 1999	0	0	$0	$0
August 1999	0	0	$0	$0
September 1999	0	0	$0	$0
July 2007	0	0	$0	$0
August 2007	0	0	$0	$0
October 2007	0	0	$0	$0
2023 PLAN UPDATE				
No significant drought events have been recorded for Charles County since the previous plan.				
Total	**0**	**0**	**$0**	**$1,670,000**

The drought that occurred in 1998 had the largest impact on Charles County, causing $1,670,000 in crop damage. After much of the state had experienced drought conditions for several months in a row, only 1.0 inch of rain fell in Charles County in November 1998. Water levels and reserves were greatly affected by the persistent drought. By November 20th, 80% of topsoil moisture across the state was rated short or very short. Statewide, this drought contributed $40 million in damage to the fall harvest. The lack of precipitation also had a negative impact on winter crops such as wheat, barley, and rye, and reports indicated that winter grain crops were only half as tall as they should have been at the end of the month. Some farmers even decided to not plant winter crops that year due to the lack of moisture. The drought also contributed to a six-fold increase in the amount of brush fires seen across the state in November 1998, with officials reporting 173 fires burning a total of 490 acres. From the beginning of August 1998 to the end of November 1998, the Forest Service recorded 303 fires statewide (NOAA, 2017).

Indemnity payments for losses suffered from drought are also an indicator of past drought events and their impacts, specifically to agriculture. Table 4.3-5 indicates that there was a total of over $5,000,000 in indemnity payments for losses suffered due to drought in Charles County between 1989 and 2014. The years with the greatest amount of indemnity payments were 2007, 2012, 2010, and 1999.

Future Occurrence

It is difficult to forecast the severity and frequency of future drought events in Charles County. Based on data from 1895 to 1995, Charles County has an annual probability of severe or extreme drought of 5% to 9.9% (see Map 4.3-2). This is equivalent to a PDSI value less than or equal to -3.

Therefore, the probability of drought impacting Charles County is considered *unlikely* (1.9 out of 4) as defined by the Risk Factor Methodology probability criteria.

However, rising temperatures due to climate change could negatively impact Charles County water resources by increasing the probability of drought events and severity. Currently, the County feels that water needs are being met even during times of drought. However, serious hydrological droughts or supply deficiencies could occur in the future, especially during periods of drought, as continued growth in population, increased demand for water from industry, and the effects of land development (which tends to reduce the water table) increase demand for water.

Vulnerability Assessment

There is no commonly accepted approach for assessing risk associated with droughts given the varying types and indices. Drought risk is based on a combination of the frequency, severity, and spatial extent (the physical nature of drought) and the degree to which a population or activity is vulnerable to the effects of drought. The degree of Charles County's vulnerability to drought depends on the environmental and social characteristics of the region and is measured by its ability to anticipate, cope with, resist, and recover from drought.

Table 4.3-5: Indemnity Payments for Losses Suffered to Drought in Charles County (USDA Risk Management Agency, 2023)

YEAR	INDEMNITY PAYMENTS
1989	$0
1990	$16,523
1991	$111,762
1992	$1,796
1993	$73,027
1994	$3,293
1995	$26,647
1996	$0
1997	$48,118
1998	$140,071
1999	$368,535
2000	$0
2001	$19,928
2002	$740,153
2003	$0
2004	$0
2005	$213,489
2006	$74,555
2007	$1,049,171
2008	$338,415
2009	$105,048
2010	$761,512
2011	$157,965
2012	$997,339
2013	$16,990
2014	$114,105
2015	Not Available
2016	Not Available
2017	Not Available
2018	$90,063
2019	$190,685
2020	$16,312
2021	$80,265
2022	$148,707
2023	$18,716
Total	**$5,923,190**

People

The entire population of Charles County is vulnerable to drought events. For those that rely on surface water, aquifers or private wells for potable water, a decline in surface water flows can be detrimental to the water supply.

Droughts can affect home and landowners in a local, regional, or statewide context. Typically, drought events take a long time to develop and may be either short-term or long-term events. Impacts to the public during a drought take the form of crop damage/failures, water rationing and other water source impacts, and wildfires.

Systems

The loss of crops or livestock due to drought can have far-reaching economic effects. Agriculture is the first resource to be impacted by a drought and is the asset that is most vulnerable to the impacts of this hazard in Charles County. According to the most recent Census of Agriculture, there were 385 farms in Charles County totaling 41,021 acres. The market value of products sold by these farms in 2017 was $14,065,000, with nearly 90% coming from crop sales (as opposed to livestock). Table 4.3-6 displays the top five agricultural commodity groups by sales in Charles County and illustrates that most of sales come from grains, oilseeds, dry beans, and dry peas (USDA, 2017).

Table 4.3-6: Top five agricultural commodity groups by sales in Charles County (USDA, 2017)

COMMODITY GROUP	VALUE OF SALES
Grains, oilseeds, dry beans, and dry peas	$8,292,000
Vegetables, melons, potatoes, and sweet potatoes	$2,065,000
Nursery, greenhouse, floriculture, and sod	$899,000
Other crops and hay	$843,000
Cattle and calves	$462,000

A major land drought event would draw upon state, county, and local resources. Some of the costs could be recouped through federal grant reimbursements, but local governments would still feel the fiscal impact of a major event.

Structures

Drought typically does not have a direct impact on critical facilities or structures; however, the indirect impacts of drought can. The combination of drought and lowering groundwater levels also has the potential to cut deeper stream channels, which creates higher stream banks and separates streams from their floodplains. This causes downcutting of stream banks, increased erosion, and higher sediment loads in affected streams. These impacts can result in the collapse of structures along streams, as the banks are undercut and eroded, as well as in the loss of agricultural land and archaeological sites. A worst-case scenario event as a result of a drought could involve mudslides due to heavy rains when a drought breaks, which could result in damage to structures (recent and historic) as well as archaeological sites.

Additionally, possible impacts to critical facilities include the loss of critical function due to low water supplies. Most of Maryland relies on ground water as its source of water, coming from confined and unconfined aquifers, and Southern Maryland relies exclusively on ground water. The locations of wells throughout Charles County are shown in Map 4.3-3. Severe droughts can negatively affect drinking water supplies, and if a public water system were affected and outside water was required to be shipped in, the losses could total into the millions of dollars. Private springs and wells could also potentially dry up, and possible losses to infrastructure include the loss of potable water. Should a drought affect the water available for public water systems or individual wells, the availability of clean drinking water could be compromised. This situation would require emergency actions and could possibly overwhelm local governments and financial resources.

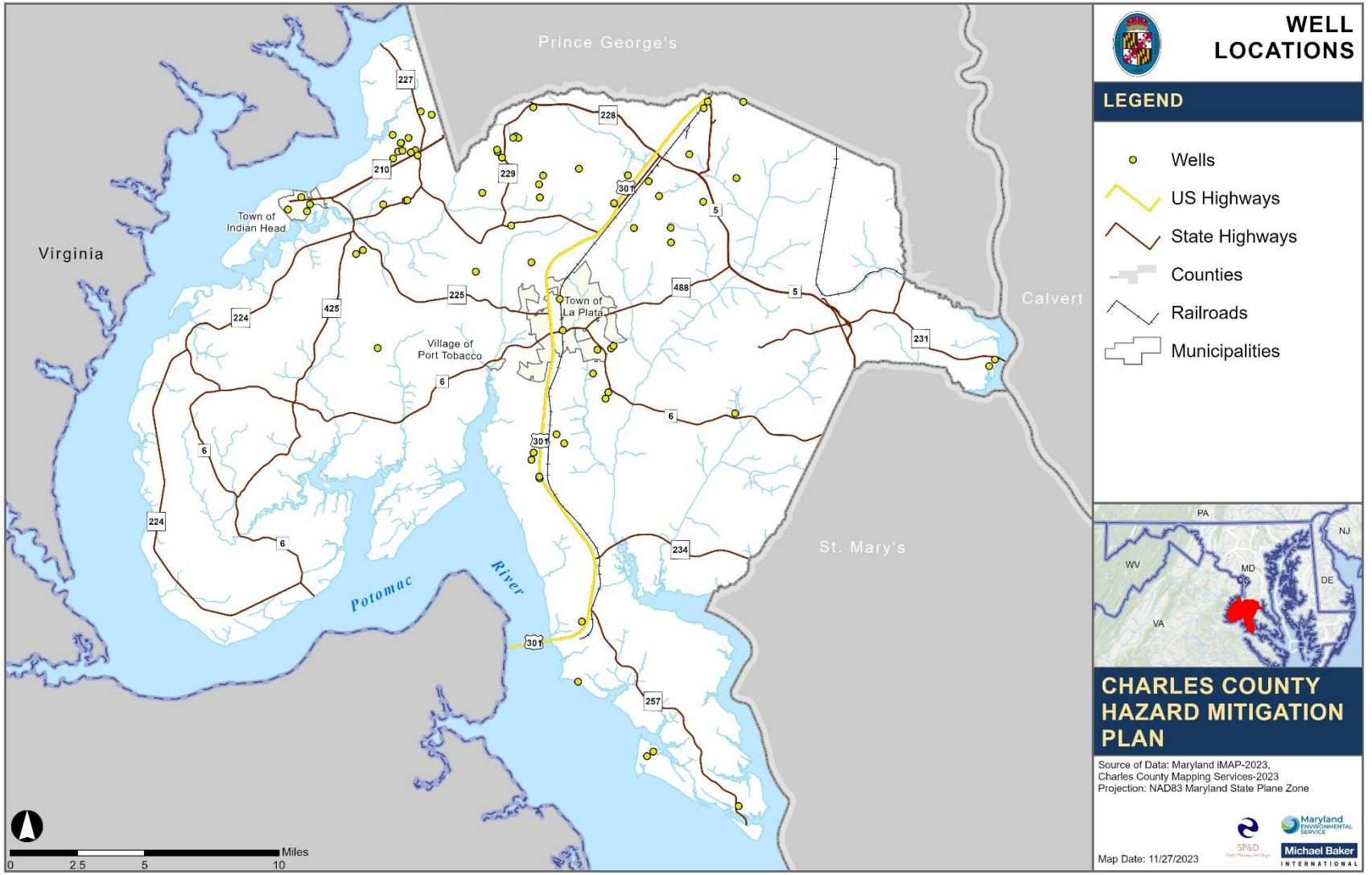
Natural, Historic and Cultural Resources

Environmental losses from drought are associated with damage to plants, animals, wildlife habitat, and air and water quality; forest and range fires; degradation of landscape quality; loss of biodiversity; and soil erosion. Some of the effects are short-term, and conditions quickly return to normal following the end of the drought. Other environmental effects linger for some time or may even become permanent. As most living beings are highly dependent on water, prolonged periods without it can have extremely detrimental effects on the health and condition of natural resources.

Community Activities

It is probable that the air and water quality of the region will considerably worsen during a drought. As a result, outdoor activities are at risk of cancellation. Hubs for outdoor and water recreation activities in the County will face risk of temporarily pausing operations.

Map 4.3-3: Well Locations within Charles County



Natural, Historic and Cultural Resources

Impacts to vegetation and wildlife can include death from dehydration as well as spread of invasive species or disease because of stressed conditions. However, drought is a natural part of the environment in Maryland and native species are likely to be adapted to surviving periodic drought conditions. It is unlikely that drought would jeopardize the existence of rare species or vegetative communities. Environmental impacts are more likely to occur at the interface of the human and natural world. Wind and water erosion can alter the visual landscape and dust can damage property. Water-based recreational resources can also be affected by drought conditions. Indirect impacts from drought arise from wildfire, which may have additional effects on the landscape and sensitive resources such as historic or archaeological sites.

Community Activities

During D2 droughts and above, it is probable that the air and water quality of Charles County will considerably worsen. As a result, outdoor activities are at risk of cancellation. Businesses and hubs for outdoor and water recreation activities in the County will face risk of temporarily pausing operations.

Jurisdictional Differences

Due to the regional nature of drought, all jurisdictions within Charles County are expected to be impacted equally by drought conditions. However, in the event of a drought, agricultural areas of the County may be the first areas to experience its impacts.

Land Use and Development Trends

Society's vulnerability to drought is affected by population growth and shifts, urbanization, demographic characteristics, technology, water use trends, government policy, social behavior, and environmental awareness. These factors are continually changing, and society's vulnerability to drought may rise or fall in response to these changes. For example, increasing and shifting populations increase pressure on the supply of water and other natural resources, since more people need more water.

According to the population estimates by the U.S. Census Bureau, Maryland's 2022 residential population was 6.165 million people, having grown 6.5% since the 2010 Census. Charles County's residential population has grown at a rate faster than that of the state as a whole (13% between 2010 and 2022). According to the Maryland Department of Planning, the population of Charles County is projected to grow to over 202,890 by 2040, which is over a 20% increase compared to the 2020 population of 162,950.

Future development's greatest impact on the drought hazard would possibly be to groundwater resources. New water and sewer systems or significant well and septic sites could use up more of the water available, particularly during periods of drought. Public water systems are monitored, but individual wells and septic systems are not as strictly regulated. Additionally, the effects of land development tend to reduce the water table. Therefore, future development could have an impact on drought vulnerabilities.

4.4 Extreme Weather (Thunderstorm, Lightning, Tornado, Wind, & Hail)

Table 4.4-1: Extreme Weather Ranking

HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Natural	4	3	4	4	1	**3.4**
HIGH RISK (3.0 or higher)						

Location, Extent, and Range of Magnitude

Extreme weather can occur during any season in Charles County. For the 2023 Charles County HMP, Extreme Weather is defined as thunderstorms, tornadoes, windstorms, lightning, and hailstorms. Several of these hazards were profiled separately during the 2018 HMP Update, while several were new for 2023. Thunderstorms that are associated with high winds, heavy precipitation, and lightning strikes can all be hazardous under the right conditions and locations. Strong winds and tornadoes can take down trees, damage structures, tip high profile vehicles, and create high velocity flying debris. Large hail can damage crops, dent vehicles, break windows, and injure or kill livestock, pets, and people. Dangerous and damaging factors of a severe storm include tornadoes, hail, lightning strikes, flash flooding, and winds associated with downbursts and microbursts. Reported severe weather events over the past 60 years provide an acceptable framework for determining the magnitude of such storms that can be expected and planned for accordingly.

Thunderstorms

Thunderstorms affect relatively small areas when compared with hurricanes and winter storms. Despite their relatively smaller size, all thunderstorms are dangerous. The typical thunderstorm is 15 miles in diameter and lasts an average of 30 minutes. Of the estimated 100,000 thunderstorms that occur each year in the United States, about 10 percent are classified as severe. The National Weather Service considers a thunderstorm severe if it produces hail at least 3/4 inch in diameter, winds of 58 MPH or stronger, or a tornado. Every thunderstorm needs three basic components: (1) moisture to form clouds and rain, (2) unstable air which is warm air that rises rapidly, and (3) lift, which is a cold or warm front capable of lifting air to help form thunderstorms.

Tornadoes

A tornado is a violently rotating funnel-shaped column of air that extends from a thunderstorm cloud towards the ground. Tornadoes can touch the ground with winds of over 300 mph. While relatively short-lived, tornadoes are intensely focused and are one of nature's most violent storms. Funnel clouds, also associated with tornadoes, are rapidly rotating columns of air that do not make complete contact with the ground.

Tornadoes usually form from one of three types of thunderstorms: 1) squall-lines, 2) multicells, and 3) supercells. Supercell thunderstorms are rotating storms containing what is known as a mesocyclone, or a

rotating updraft (column of air) from which tornadoes sometimes form. Supercell thunderstorms have a greater potential than other thunderstorms for producing severe weather, including tornadoes.

Tornadoes can range from just several yards to over two miles in width and have the potential to destroy nearly everything in their path. Although tornadoes normally travel on the ground for short distances, tornado tracks of 200 miles or more have been reported. Tornado paths average 4 miles in length but may reach up to 300 miles. Widths average 300 to 400 yards, but severe tornadoes have cut swaths a mile or more in width or have formed groups of two or three funnels traveling together. On the average, tornadoes move between 25 and 45 miles per hour, but speeds over land of up to 70 mph have been reported. Tornadoes rarely last more than a couple of minutes over a spot or more than 15 to 20 minutes in a 10-mile area, but their short periods of existence do not limit their potential devastation to an area. The destructive power of a tornado results primarily from its high wind velocities and sudden changes in pressure. Damages from tornadoes result from extreme wind pressure and windborne debris. Since tornadoes are generally associated with severe storm systems, they are often accompanied by hail, torrential rain, and intense lightning. Depending on their intensity, tornadoes can uproot trees, bring down power lines and destroy buildings. Flying debris is the main cause of serious injury and death.

Tornado movement is characterized in two ways: direction and speed of spinning winds, and forward movement of the tornado, also known as the storm track. The forward motion of the tornado path can be a few hundred yards or several hundred miles in length. The width of tornadoes can vary greatly, but generally range in size from less than 100 feet to over a mile in width. Some tornadoes never touch the ground and are short-lived, while others may touch the ground several times. Downbursts are characterized by straight-line winds. Downburst damage is often highly localized and resembles that of tornadoes. There are significant interactions between tornadoes and downbursts; a tornado's path can also be affected by downbursts. Because of this, the path of a tornado can be very unpredictable, including veering right, left or even taking a U-turn.

Previously, tornado damage was measured on the Fujita Scale, also called the FScale, named for Dr. Tetsuya Theodore Fujita. The operational Fujita scale ranges from an F0 to an F5. The strongest tornadoes observed to date have been F5 (winds between 261-318 mph). An Enhanced Fujita Scale (EF Scale) was developed and implemented operationally by the National Weather Service (NWS) in 2007. The EF Scale was developed to better align tornado wind speeds with associated damages. A description of this scale is shown in Table 4.4-2.

Table 4.4-2: Enhanced Fujita Scale (EF-Scale): Categories, Wind Speeds, and Associated Effects

EF-SCALE	WIND SPEED (mph)	DESCRIPTION OF EFFECTS	F-SCALE NUMBER
EF0	**65-85**	**Minor damage**: Peels surface off some roofs; some damage to gutters or siding; branches broken off trees; shallow-rooted trees pushed over. Confirmed tornadoes with no reported damage (i.e., those that remain in open fields) are always rated EF0.	F0-F1

Table 4.4-2: Enhanced Fujita Scale (EF-Scale): Categories, Wind Speeds, and Associated Effects			
EF-SCALE	**WIND SPEED (mph)**	**DESCRIPTION OF EFFECTS**	**F-SCALE NUMBER**
EF1	**86-110**	**Moderate damage**: Roofs severely stripped; mobile homes overturned or badly damaged; loss of exterior doors; windows and other glass broken.	F1
EF2	**111-135**	**Considerable damage**: Roofs torn off well-constructed houses; foundations of frame homes shifted; mobile homes destroyed; large trees snapped or uprooted; light-object missiles generated; cars lifted off ground.	F1-F2
EF3	**136-165**	**Severe damage**: Entire stories of well-constructed houses destroyed; severe damage to large buildings such as shopping malls; trains overturned; trees debarked; heavy cars lifted off the ground and thrown; structures with weak foundations blown away some distance.	F2-F3
EF4	**166-200**	**Devastating damage**: Well-constructed houses and whole frame houses completely leveled; cars thrown, and small missiles generated.	F3
EF5	**>200**	**Extreme damage**: Strong frame houses leveled off foundations and swept away; automobile-sized missiles fly through the air in excess of 100 m (300 ft.); steel reinforced concrete structure badly damaged; high-rise buildings have significant structural deformation.	F3-F6

Tornadoes and windstorms can occur throughout Charles County, though events are usually localized. However, severe thunderstorms may result in conditions favorable to the formation of numerous or long-lived tornadoes. Tornadoes can occur at any time during the day or night but are most frequent during late afternoon into early evening, the warmest hours of the day, and most likely to occur during the spring and early summer months of March through June.

Windstorms

Windstorms are violent gusts of air with typically little to no rain. Windstorms can also produce derechos (Spanish for “straight”), which are prolonged bursts of hurricane force winds occurring in a straight line. Straight-line winds and windstorms are experienced on a more region-wide scale. While such winds usually accompany tornadoes, straight-line winds are caused by the movement of air from areas of higher pressure to areas of lower pressure. Stronger winds are the result of greater differences in pressure. Windstorms are generally defined with sustained wind speeds of 40 mph or greater lasting for one hour or longer, or winds of 58 mph or greater for any duration of time.

A downburst is an area of strong, downward moving air associated with a downdraft from a thunderstorm. As the downdraft impacts the ground, the air is forced outwards in all directions while it also curls backwards. This results in incredible wind damage close to the surface of the ground, as well as horizontal rotation midway up between the ground and the base of the thundercloud. Downbursts may last anywhere from a few minutes in small-scale microbursts, to extended periods of up to 20 minutes in

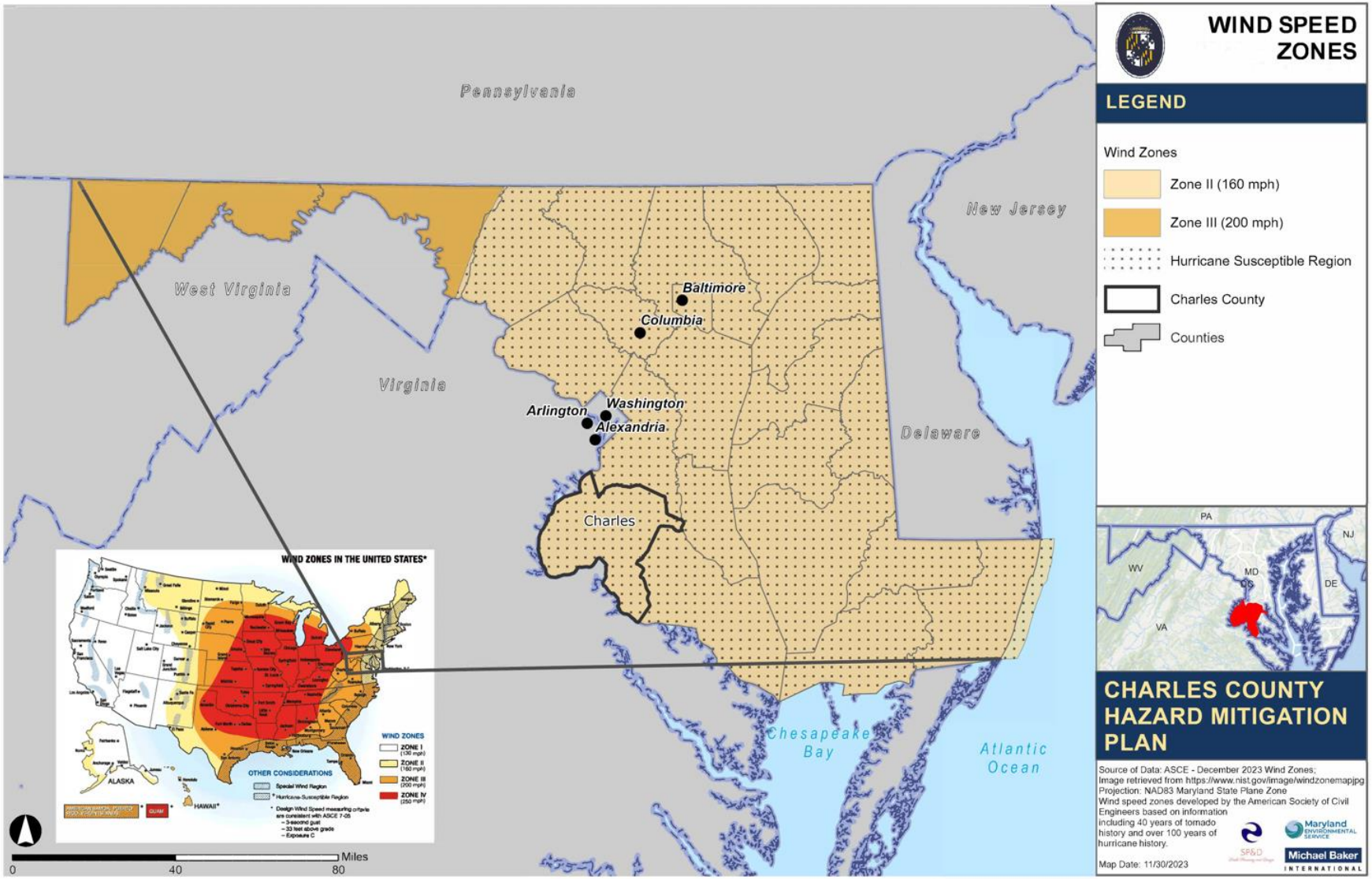
larger, longer macro-bursts. Wind speeds of downbursts can reach 150 mph and can result in damages comparable to a tornado. Often, downbursts can produce straight-line wind damage over an area as small as 1 mile to as large as 250 miles from the center of the downdraft. In fact, a downburst that spans a distance of less than 2.5 miles in diameter is considered a microburst.

Microbursts last for about five minutes and can cause wind speeds in excess of 160 mph. Because of their extremely fast winds, incredible wind shear and relatively small size, microbursts prove hazardous to aircrafts and have been the cause of tragic airplane crashes, including the 1985 Delta Airlines Flight 191 crash in Dallas-Fort Worth. Conversely, downbursts that span greater than 2.5 miles in radius are called macrobursts. Macrobursts can last nearly half an hour and produce wind speeds in excess of 130 mph. According to NOAA, macrobursts can produce wind damage comparable to an EF-3 tornado.

Not only are windstorms often a precursor to more serious storms, but they have also been known to cause flying debris, tree damage, power outages, damages to homes, structures, and crops. Inventory assets vulnerable to high winds are dependent on the age of the building, type, construction material used, and condition of the structure. Structures are susceptible to lateral loads, as the winds impact the flat surfaces of a building. In addition, uplift forces can impact structures, as the winds move not just in straight lines, but at angles as well.

FEMA places the Charles County region in Zone II (160 MPH) for structural wind design (Federal Emergency Management Agency, 1998), as displayed in Map 4.4-1 below. The county is also entirely located in the Hurricane Susceptible Region.

Map 4.4-1: Wind Speed Zones in Maryland



Lightning

Lightning is a discharge of electrical energy resulting from the build-up of positive and negative charges within a thunderstorm. The flash or "bolt" of light usually occurs within clouds or between clouds and the ground. A bolt of lightning can reach temperatures approaching 50,000°F.

Each year, lightning is responsible for the death of almost one hundred people, injuries to several hundred more, and millions of dollars in property damage in the United States (NOAA, 2023). In many cases, heart damage, inflated lungs, or brain damage have resulted from lightning strikes, leading to death. Loss of consciousness, amnesia, paralysis, and burns are reported by many who have survived. Deaths and injuries to livestock and other animals, thousands of forest and brush fires, as well as millions of dollars in damage to buildings, communications systems, power lines, and electrical systems have also been results of lightning.

Lightning events occur across the entirety of Maryland. Different areas experience varying event frequencies, but in all cases, lightning strikes occur primarily during the summer months. While the impact of flash events is highly localized, strong storms can result in numerous widespread events over a broad area. In addition, the impacts of an event can be serious or widespread if lightning strikes a particularly significant location, such as a power station or large public venue.

Lightning, although not considered severe by the National Weather Service's definition, can accompany heavy rain during thunderstorms. Lightning develops when ice particles in a cloud move around, colliding with other particles. These collisions cause a separation of electrical charges. Positively charged ice particles rise to the top of the cloud and negatively charged ones fall to the middle and lower sections of the cloud. The negative charges at the base of the cloud attract positive charges at the surface of the Earth. Invisible to the human eye, the negatively charged area of the cloud sends a charge called a stepped leader toward the ground. Once it gets close enough, a channel develops between the cloud and the ground. Lightning is the electrical transfer through this channel. The channel rapidly heats to 50,000 degrees Fahrenheit and contains approximately 100 million electrical volts. The rapid expansion of the heated air causes thunder.

Hail

Hail develops when a super cooled droplet collects a layer of ice and continues to grow, sustained by the updraft. Once the hail stone cannot be held up any longer by the updraft, it falls to the ground. Nationally, hailstorms cause nearly $1 billion in property and crop damage annually, as peak activity coincides with peak agricultural seasons. Severe hailstorms also cause considerable damage to buildings and automobiles, but rarely result in loss of life.

Large hail can damage structures, break windows, dent vehicles, ruin crops, and kill or injure people and livestock. Based on past occurrences, hail sizes greater than 1.75 inches in diameter are possible and should be accounted for in future planning activities.

Past Occurrence

There have been over five hundred recorded extreme weather that have either directly or indirectly impacted Charles County since 1960. Reported injuries, deaths, property damage, and crop damage have been significant. The following tables depict past storm occurrences using data gathered from The National Oceanic and Atmospheric Administration (NOAA).

Thunderstorms

Table 4.4-3 displays 89 recorded thunderstorm events with heavy rainfall, which took place within Charles County from 1950 until August 2023. Past occurrences of heavy winds associated with thunderstorms are highlighted in the discussion of past occurrences of windstorms. One event in 1997 caused $3,000 in property damage from heavy rain and gusty winds and caused power outages throughout the area.

Table 4.4-3: Thunderstorm (Heavy Rain) Events (NOAA, 2023)

YEAR OF EVENT	NUMBER OF EVENTS	NUMBER OF INJURIES	NUMBER OF DEATHS	CROP DAMAGE	PROPERTY DAMAGE
1950-2012	89	0	0	$0	$3,000
2013	0	0	0	$0	$0
2014	0	0	0	$0	$0
2015	0	0	0	$0	$0
2016	0	0	0	$0	$0
2017	0	0	0	$0	$0
2023 PLAN UPDATE					
2018	0	0	0	$0	$0
2019	0	0	0	$0	$0
2020	0	0	0	$0	$0
2021	0	0	0	$0	$0
2022	0	0	0	$0	$0
Total	**89**	**0**	**0**	**$0**	**$3,000**

**Past occurrences of thunderstorm wind events are discussed with past occurrences of windstorms.*

Tornado

Charles County reported a total of 26 tornado events, including tornado funnel cloud sightings from 1950 to 2017. Of these, the most devastating was one on April 28th, 2002. A destructive tornado crossed the County from just north of Rison, through La Plata, to Benedict before moving into Calvert County. This tornado left a 64-mile path of destruction ranging from F1 to F4 damages. The tornado first touched down on the eastern edge of General Smallwood State Park just north of Rison. The tornado (F4 strength), continued east into the downtown area where it crossed through the intersection of Routes 301 and 6. Damage was found on either side of Route 6, with the most severe devastation occurring on the south side of the highway. The downtown business district was nearly wiped out after 65 percent of the buildings were either heavily damaged or destroyed. The Civista Hospital on Charles Street, Town Hall and the police

station on Garrett Avenue, the Rescue Squad building on Calvert Street, Archbishop Neale School, and Blessed Lambs Pre-School on Route 6 were all damaged during the tornado event. The full length of the tornado reached 24 miles long, and resulted in three reported casualties, 122 injuries, and 115 million dollars' worth of property damages. An estimated 638 homes were damaged, 100 homes were destroyed, 143 businesses (mostly in the town center of La Plata) were damaged, and 49 businesses were destroyed (NOAA, 2017). A 51-year-old man was fatality injured when his home collapsed on Hawkins Gate Road, located 5 miles east of La Plata. The other two deaths which occurred were due to heart failure. Innumerable trees and agricultural buildings fell along the path of the storm as well. Figure 4.4-1 depicts damage from this event along Maple Avenue in La Plata.

Figure 4.4-1: Impacts of the 2002 tornado in La Plata (Charles County, 2002).



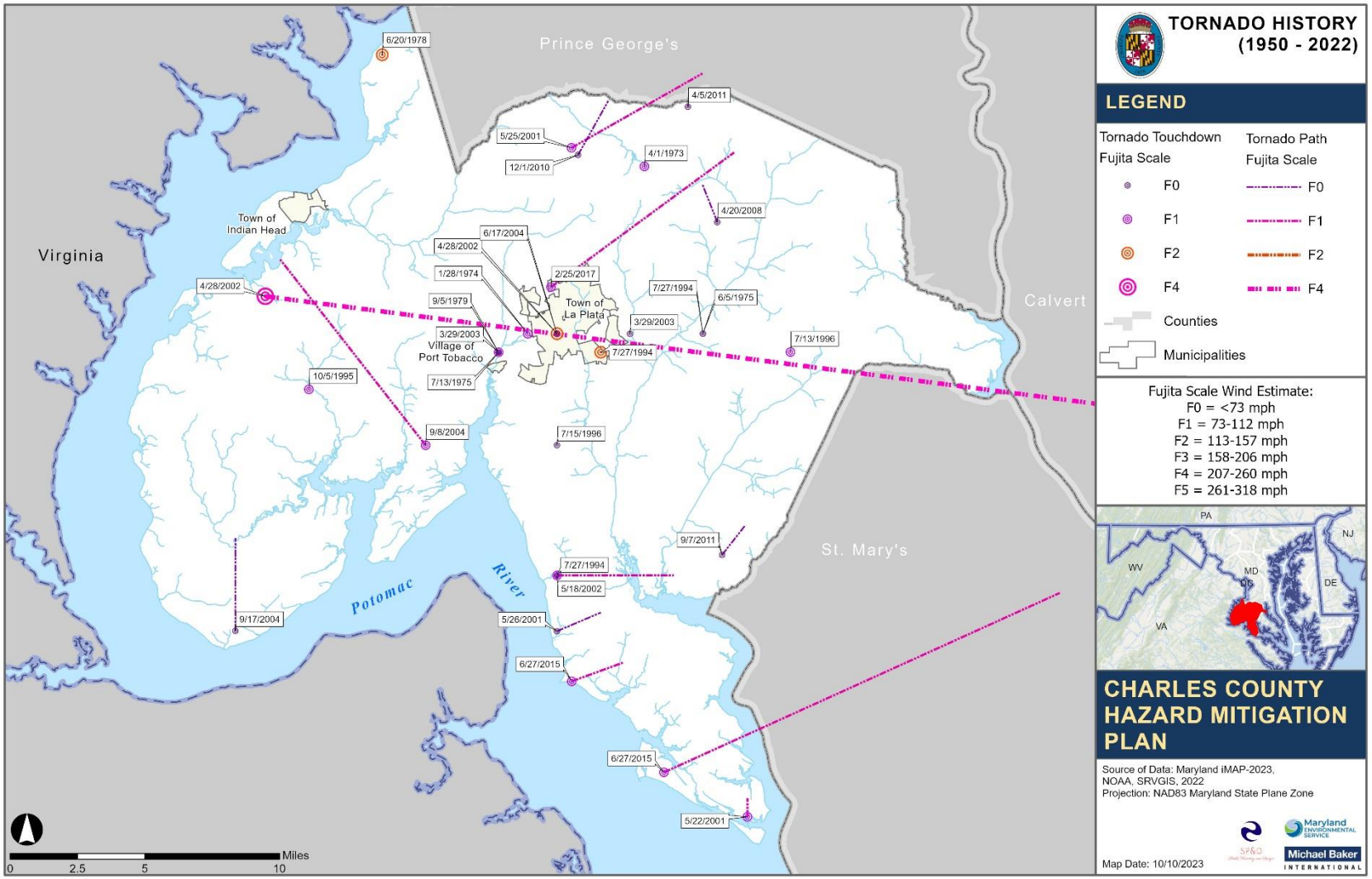
Figure 4.4-1: Impacts of the 2002 tornado in La Plata (Charles County, 2002).



Another notable storm occurred on November 11, 1995. An apparent microburst knocked down tens of trees along Chapel Point Road near State Route 6 in the Port Tobacco area just southwest of La Plata. Several large oaks were among them, and one caused $125,000 in damage to a home. Physicians Memorial Hospital in Waldorf reported four times the usual Saturday night "business"; however, whether any of the services were storm-related (to injury) was not determined.

Map 4.4-2 below depicts the paths of tornadoes that have occurred in Charles County from 1950 until 2017, notably the F4 tornado which took place on April 28th, in 2002.

Map 4.4-2: Tornado History of Charles County Since 1950



The following table displays tornado and funnel cloud events which have occurred in Charles County from 1950 until 2022. While 28 events were reported, there is also the possibility that other events occurred but went unreported. These 28 events caused an estimated $116,707,000 in property damages and $20,000 in crop damages.

Table 4.4-4: Tornado and Funnel Cloud Events (NOAA, 2023)

YEAR OF EVENT	NUMBER OF EVENTS	NUMBER OF INJURIES	NUMBER OF DEATHS	CROP DAMAGE	PROPERTY DAMAGE
1950-2012	24	122	1	$10,000	$116,204,000
2013	0	0	0	$0	$0
2014	0	0	0	$0	$0
2015	2	0	0	$0	$503,000
2016	0	0	0	$0	$0
2017	1	0	0	$0	$0
2023 PLAN UPDATE					
2018	0	0	0	$0	$0
2019	0	0	0	$0	$0
2020	0	0	0	$0	$0
2021	0	0	0	$0	$0
2022	1	0	0	$10,000	$0
Total	**28**	**122**	**1**	**$20,000**	**$116,707,000**

Windstorms

Table 4.4-5 below displays windstorm events which have occurred in Charles County from 1950 until August 2023. This list includes thunderstorm wind and high wind events reported in Charles County. There was a total of 408 reported occurrences of events meeting these criteria. These events caused several injuries, one death, and extensive property and crop damage.

Table 4.4-5: Windstorm Events (NOAA, 2023)

YEAR OF EVENT	NUMBER OF EVENTS	NUMBER OF INJURIES	NUMBER OF DEATHS	CROP DAMAGE	PROPERTY DAMAGE
1960-2012	227	1	1	$0	$2,042,290
2013	11	0	0	$6,000	$7,000
2014	17	0	0	$5,000	$10,000
2015	15	0	0	$0	$24,000
2016	16	1	0	$0	$4,000
2017	16	0	0	$0	$0
2023 PLAN UPDATE					
2018	19	0	0	$0	$0
2019	23	0	0	$0	$0

2020	19	0	0	$0	$195,250
2021	21	0	0	$0	$81,000
2022	21	0	0	$0	$49,000
2023	3	0	0	$0	$38,000
Total	**408**	**2**	**1**	**$11,000**	**$2,450,540**

A significant contribution to property damage, an estimated $125,000, occurred in La Plata on November 11th, 1995. The damage had occurred from an apparent microburst, which knocked down several oak trees along Chapel Point Road near State Route 6 in the Port Tobacco area just southwest of La Plata. One of the fallen trees resulted in $100,000 in damage to a home. Thunderstorm wind resulted in further property damage to the Naval Annex, which knocked down a six telephone poles along with a fallen tree limb which damaged a boat. Another significant windstorm event was the result of a nor'easter on April 16th, 2007, which left thousands of Maryland residents without power when high winds downed trees and power lines. An estimated $10,000 in property damages were recorded (NOAA, 2017). Additionally, Hurricane Sandy had significant wind impacts on Charles County. Heavy rain accompanied by high winds spread over coastal regions and most of Maryland. An estimated $969,190 in property damaged was the result of a windstorm event during Hurricane Sandy (NOAA, 2017). Damages included scattered trees, debris, and power outages.

Lightning

Table 4.4-6 below displays seven reported lightning events in Charles County between 1950 and 2017, causing an estimated total of $80,000 in property damages. The most notable of these events took place on June 24th, 1996, and resulted in $20,000 in property damages. It was reported that five homes were struck by lightning near the area of Cobb Island and the Governor Harry W. Nice Memorial Bridge. Noteworthy damages also occurred as a result of a lightning strike during a hurricane on July 10th, 2000, which caused $50,000 in property damages (NOAA, 2017). The strike started a fire at a home on Bryan's Road, which extensively damaged the structure. Wildfires caused by lightning can also potentially damage archaeological sites, as artifacts are frequently located on the surface of sites. Map 4.4-3 below displays a map of lighting events throughout the state of Maryland from 1996 until 2017. Charles County has relatively low number of reported lightning occurrences in comparison to counties such as Anne Arundel, Montgomery, and Frederick.

Table 4.4-6: Lightning Storm Events (NOAA, 2023)

YEAR OF EVENT	NUMBER OF EVENTS	NUMBER OF INJURIES	NUMBER OF DEATHS	CROP DAMAGE	PROPERTY DAMAGE
1960-2012	7	0	0	$0	$80,000
2013	0	0	0	$0	$0
2014	0	0	0	$0	$0
2015	0	0	0	$0	$0
2016	0	0	0	$0	$0
2017	0	0	0	$0	$0

2023 PLAN UPDATE					
2018	0	0	0	$0	$0
2019	0	0	0	$0	$0
2020	0	0	0	$0	$0
2021	0	0	0	$0	$0
2022	0	0	0	$0	$0
Total	**7**	**0**	**0**	**$0**	**$80,000**

Hail

The table below depicts 82 reported hailstorm events in Charles County from 1950 to 2017. Roughly $756,500 in property damages were reported, along with $50,000 in crop damage. On May 14th, 2010, a high pressure builds up occurred over the western Atlantic resulting in showers and thunderstorms. The combination of cold and moist warm air caused thunderstorms to become severe with large hail being the primary threat. Hail roughly 1.75 inches was reported near Waldorf. Hundreds of cars in the Waldorf area experienced significant damages, including broken wind shields and dents. Several homes were also reported as damaged. Another notable event occurred on September 21st, 1993, when hail .75 inches was produced during a thunderstorm and causing $50,000 in crop damages on several farms near the Town of La Plata. It was also noted by a member of the HMPC during the Risk Assessment Meeting that the Charles County Health Department experienced damage to air conditions units at the facility from hail.

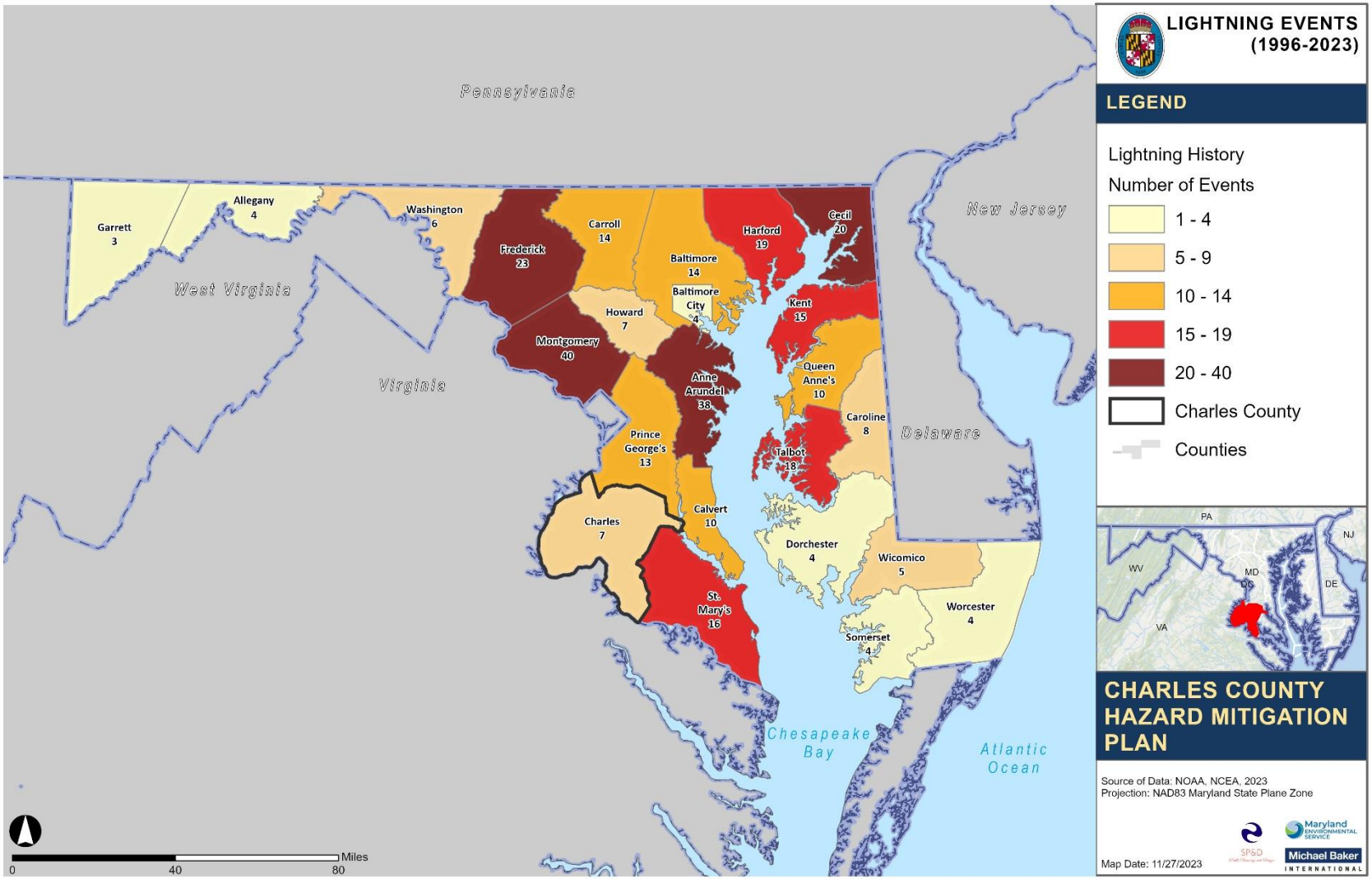
Table 4.4-7: Hailstorm Events (NOAA, 2023)

YEAR OF EVENT	NUMBER OF EVENTS	NUMBER OF INJURIES	NUMBER OF DEATHS	CROP DAMAGE	PROPERTY DAMAGE
1960-2012	70	0	0	$50,000	$756,500
2013	0	0	0	$0	$0
2014	0	0	0	$0	$0
2015	1	0	0	$0	$0
2016	9	0	0	$0	$0
2017	2	0	0	$0	$0
2023 PLAN UPDATE					
2018	1	0	0	$0	$0
2019	1	0	0	$0	$0
2020	2	0	0	$0	$0
2021	0	0	0	$0	$0
2022	1	0	0	$0	$0
2023	2	0	0	$0	$100,000
Total	**89**	**0**	**0**	**$50,000**	**$856,500**

Map 4.4-4 shows reported occurrences of hail ranging from .75 inches to 4.5 inches throughout Charles County from 1957 until August 2023. The majority of reported hail events occurred in the northeastern region of Charles County as shown in the map below; however, hailstorms may occur throughout the

County, and it is highly likely that all occurrences of hail that have impacted the County areas not depicted in Map 4.4-4.

Map 4.4-3 Lightning Events in Charles County Since 1996



Map 4.4.4: Hailstorm Events in Charles County Since 1957

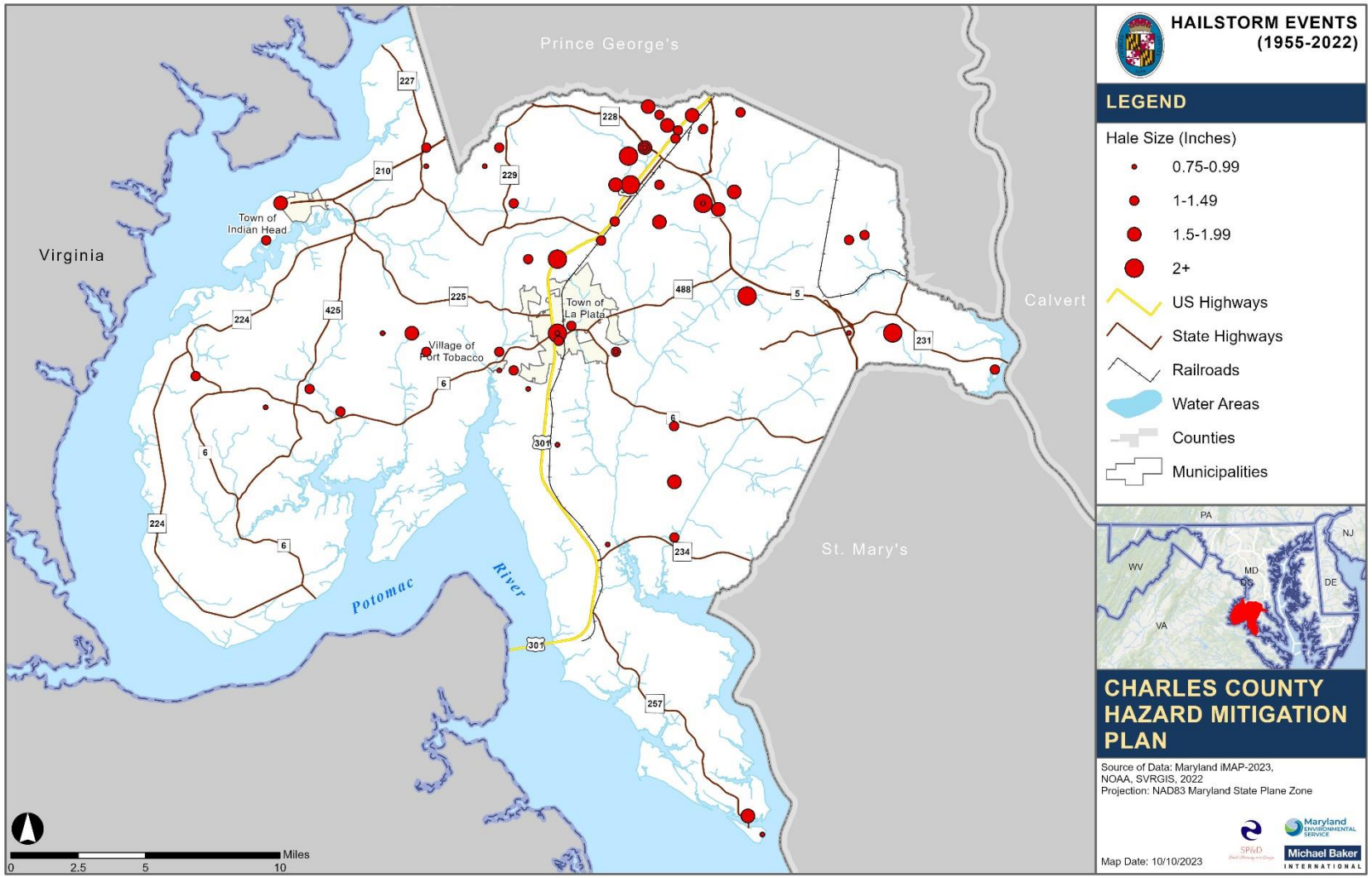


Table 4.4-8 below shows the total number of events for each type of extreme weather in Charles County since 1950. In total, there have been over 500 events, which have resulted in 2 deaths, 124 injuries, over $119 million in property damage, and an estimated $81,000 in crop damage.

Table 4.4-8: Extreme Weather Events in Charles County from 1950 to August 2023

EVENT TYPE	NUMBER OF EVENTS	INJURIES	DEATHS	CROP DAMAGE	PROPERTY DAMAGE
Heavy Rain	89	0	0	$0	$3,000
Tornado	28	122	1	$20,000	$116,707,000
Windstorms	408	2	1	$11,000	$2,450,540
Lightning	7	0	0	$0	$80,000
Hail	89	0	0	$50,000	$856,500
Total	**621**	**124**	**2**	**$81,000**	**$120,097,040**

Future Occurrence

Thunderstorm

Reported extreme weather events since 1950 provide an acceptable framework for determining the future occurrence in terms of frequency for such events. Each extreme weather hazard is also often accompanied by other risks. For example, thunderstorms are often accompanied by windstorms, flooding, hail, and lightning. Based on historical records, the interrelated nature of these events, and other indicators of weather systems, it can reasonably be assumed that this type of event is *highly likely* to occur (3.4 out of 4) as defined by the Risk Factor Methodology probability criteria. Additionally, the potential for these events to cause future damages to life and property is also relatively high.

Climate modeling predicts that conditions conducive to severe thunderstorms will arise more often as the Earth warms. Modeling suggests that weather conditions which lead to severe storms will arise 5% to 20% more often per one degree Celsius of global temperature change, primarily due to increased atmospheric instability. This increase in temperature also plays a role in the size of hailstones. With warmer temperatures, hailstones melt at higher altitudes, resulting in fewer small hailstones reaching the ground. However, rising temperatures also increase environmental instability, which results in more powerful updrafts within thunderstorm events. These updrafts elevate raindrops higher into the storm, allowing them to develop into larger hailstones. Climate change is anticipated to modify wind patterns, potentially resulting in stronger gusts during thunderstorms. In addition, as the climate continues to warm, the frequency of lightning strikes is projected to rise, with an estimated 12% increase for each 1°C rise in temperature.

Considering severe storms do not always arise even in the most favorable conditions, any associated increase in severe thunderstorms is expected to be smaller. Compared with other regions, the Northern Hemisphere is predicted to experience the largest increase in convective environments (Hermans, Gregory, Palmer, Ringer, Katsman, Slangen).

Given this information, the future annual average rate of thunderstorms can be estimated for Charles County given two possible scenarios considering a current incidence of 1.75 thunderstorm events annually. The most conservative scenario – a 5% increase in severe weather conditions – would mean the County would average approximately 1.84 thunderstorm events per year in the future. In the most extreme scenario – a 20% increase in severe weather conditions – the County would average approximately 2.1 thunderstorm events per year in the future.

Tornado

According to NOAA National Severe Storms Laboratory, Severe Weather 101: Tornado Forecasting, meteorologists at the NOAA Storm Prediction Center (SPC) issue daily forecasts, or convective outlooks, for organized severe thunderstorms over the U.S. based on current weather observations and forecast models. ***They also closely monitor areas they think are at a higher risk for tornadoes.*** *If conditions develop that are favorable for* ***tornadoes****, SPC forecasters issue a* ***severe thunderstorm or tornado watch*** *that typically lasts four to six hours.*

According to National Geographic's article, Tornadoes and Climate Change, three main components, warm, moist air, an unstable atmosphere, and wind shear, support the development of a supercell thunderstorm, which produces tornadoes. The article states that with climate change increasing global temperatures, the warmer atmosphere can retain more moisture, leading to greater atmospheric instability, which is crucial for supercell formation. Conversely, rising temperatures are expected to reduce wind shear, another essential factor. These opposing forces make it challenging to predict their overall impact on tornado formation. According to the Fifth National Climate Assessment, changes in smaller-scale, short-lived severe weather such as tornadoes and thunderstorms area more difficult to assess, and direct observations of those events and conditions associated with them are incomplete. Therefore, tornadoes may be showing changes that could be connected to climate change, however, the scientific understanding is not yet detailed enough to predict the direction and magnitude of these future changes.

In terms of number of past occurrences, Table 4.4-4: Tornado and Funnel Cloud Events (NOAA, 2023) listed a total of 28 tornadoes and funnel cloud events affecting Charles County from 1950-2023. Therefore, Charles County experiences an average of 0.39 tornado and/or funnel cloud events per year. Using these past events, the likelihood of future occurrences has a less than 1% annual probability indicating "not likely" or low probability, see Chapter 3 Hazard Identification and Risk Assessment, Table 3.2-2: Risk Factor Criteria. This is similar to the FEMA's National Risk Inventory which indicates Charles County's risk for tornado as "relatively low."

Vulnerability Assessment

The frequency of extreme weather events is expected to increase, which increases the County's vulnerability to this hazard. Additionally, vulnerability is higher in more densely developed areas. However, all assets located in Charles County can be considered at risk to extreme weather events. This

includes all the County's population, buildings, and infrastructure. Damages primarily occur as a result of extreme weather including tornadoes, high winds, lightning strikes, and hail.

Aged and dilapidated structures or structures not built to applicable building codes are more susceptible to damage. Mobile homes and campgrounds are especially susceptible to damage due to tornado or high wind. Past experiences with tornadoes in the region show that, while rare, death and injury are indeed possibilities. Vulnerability to the effects of a tornado or high wind is somewhat dependent upon the age of a structure because as building codes become more stringent, buildings are capable of enduring greater wind forces.

All County structures and infrastructure might be exposed to the effects of a tornado or other high winds. Depending upon the severity of a tornado, any existing structures might be damaged to some extent. Any future structures might be exposed to tornadoes or high winds as this hazard does not occur in specific locations. However, updated building codes including requirements for bracing and roof design, the most recent update was in 2022, will mitigate damages to structures, from the effects of tornado or other extreme weather events.

People

For the purpose of this plan, the entire population of Charles County is exposed to the extreme weather conditions. Residents may be displaced or require temporary and long-term housing and sheltering. In addition, damages can lead to severe injuries and loss of life. Impacts to the public include potential injury or loss of life, and destruction of property caused by tornadoes or high winds.

Socially vulnerable populations are most susceptible due to their physical and financial ability to react and respond during extreme weather events, specifically tornadoes. This population includes the elderly, young, and individuals with disabilities or access or functional needs who may be unable to evacuate in the event of an emergency. The elderly is considered most vulnerable because they require extra time and are more likely to seek or need medical attention that might not be readily available due to isolation during an extreme weather event, such as a tornado.

Vulnerable population also includes those who would not have adequate warning from an emergency warning system (e.g., television or radio); this would include residents and visitors. The population adversely affected by a tornado may also include those beyond the disaster area that rely on affected roads for transportation.

Economically disadvantaged people are at high risk for bracing tornadoes because of the potential inability to afford up-to-code homes and buildings that are deemed safe. They also may pose health issues, such as exposure to mold and other health issues cause by associated flooding. Extreme weather conditions can also cause respiratory illnesses or exacerbate their negative impacts on human health. In addition, high winds or tornadoes that are generated by extreme weather can knock down trees or structures, which can cause severe injury or death.

Structures

Designing structures that are resilient to extreme weather is a growing necessity. The most vulnerable structures during a tornado include manufactured housing, historic buildings, and general structure finishings. The increased frequency, intensity and impacts of extreme weather events requires structures to be designed for protection against physical damage and expense. In terms of tornadoes and high wind events, Charles County's current 2023 Building Code requires buildings, structures and parts thereof shall be designed to withstand the minimum wind loads of 115 mph.

Manufactured housing (i.e., mobiles homes or trailers) is particularly vulnerable to high winds and tornadoes. The U.S. Census Bureau defines manufactured homes as "movable dwellings, eight feet or wider and 40 feet or longer, design to be towed on its own chassis, with transportation gear integral to the unit when it leaves the factory, and without need of a permanent foundation (U.S. Census Bureau, 2021)." They can include multi-wide and expandable manufactured homes but exclude travel trailers, motor homes, and modular housing. Due to their lightweight and often unanchored design, manufactured housing is extremely vulnerable to high winds and will generally sustain the most damage.

The impacts of climate change can pose significant challenges to existing built infrastructure. Many of the County's structures, infrastructure, as well energy, water, and sanitation systems were not built to withstand the impending range of climate conditions and increased frequency of extreme weather events projected for the future.

The adoption, application, and enforcement of up-to-date model building codes is expected to reduce vulnerability, increase public safety, and afford at least minimal property protection from extreme weather events. However, codes are based on historical data and do not reflect future risks, including the impacts of climate change. Proactive zoning and land use policies that promote development in areas of relatively low vulnerability combined with good design choices can improve resilience.

Systems

The most common detrimental effects are interruptions in power supply and communications services due to downed wires and blocked roadways due to downed trees. Most severe power failures or outages are regional events. With the loss of power, electrical-powered equipment and systems will not be operational. This can cause food spoilage, loss of heat or air conditions, basement flooding (sump pump failure), lack of light, loss of water (well pump failure), lack of phone service, or lack of internet. While it is most often a short-term nuisance rather than a catastrophic hazard, utility interruptions can cause challenges for communications and response, particularly in more rural areas of the county. A worst-case scenario for utility interruption in the region would involve a power outage during a tornado or high wind event, which have the potential to cause power outages for prolonged periods of time.

Facilities with back-up generators are better equipped to handle a severe weather situation should the power go out. One of the greatest issues for critical facilities during tornados, major windstorms, or other extreme weather events is the inaccessibility of such facilities due to debris-covered roads, utility outages, or other debris-related issues. During periods of heavy winds or tornado event, roads can become

impassable, due to downed trees or power lines. Power and communication lines are susceptible to damage from falling limbs, as trees are rocked by strong winds. Possible losses to critical infrastructure include:

- Electric power disruption
- Communication disruption
- Road closures

Because power interruption can occur, backup power is recommended for critical facilities and infrastructure. Full functionality of critical facilities such as police, fire, and medical services is essential for response during and after a severe storm event.

Loss of service can impact residents and business operations alike. Interruptions in power utilities can affect populations such as the young and elderly, who are particularly vulnerable to temperature-related health impacts. Loss of power can impact other public utilities, including potable water, wastewater treatment, and communications. In addition to public water services, property owners with private wells might not have access to potable water due to pump failure until power is restored.

One of the dangers of tornadoes lies in their high capacity to cause secondary or cascading consequences, as intense winds can topple over trees, scatter debris, or damage home finishings. Moreover, these consequences can interrupt necessary utility connections, block roads or train tracks, and damage crops.

Natural, Historic, and Cultural Resources

Environmental resources, including environmentally sensitive areas (or habitats that are known to be essential for an endangered or threatened species), wetlands, parks, and reserves are vulnerable to extreme weather events, particularly tornadoes. Destroyed habitats could displace and kill organisms reliant on these habitats. The impacts of intense winds and precipitation on the environment typically take place over a larger area. Where these events occur, widespread, severe damage to plant species is likely. This includes uprooting or destruction of trees and an increased threat of wildfire in areas where dead trees are not removed.

There are 42 entries on the National Register of Historic Places (NRHP) in Charles County. These sites are particularly vulnerable to destruction, as they already require specialized care to stay in good condition for preservation.

At meetings of the Maryland Invasive Species Council, it was reported that studies indicate that about half of the trees falling over highways during an extreme weather event, such as a tornado or high wind event, can be prevented for about 10% of the effort to control them all. For example, it requires minimal effort to cut stump non-native invasive vine, such as oriental bittersweet, at ground level and apply glyphosate to the cut stump. It has been reported that fallen trees can impact electric power lines which can cause electric power outages and subsequent brush fires.

Community Activities

Potential economic impacts include loss of agriculture, business, and tourism. In addition, losses of buildings and infrastructure also take a toll on the economic condition of Charles County. Similarly, damages to buildings can displace people from their homes, threaten life safety and impact a community's economy and tax base. Tornadoes can also damage utilities and communication towers, which are costly because they need to be repaired almost immediately after damages occur, and these repairs can cost millions of dollars to fix for a singular event. Activities that have value to the community could potentially be impacted by tornadoes or other extreme weather events. When these activities are delayed or cancelled due to tornadoes or other extreme weather events, the economy of the community is affected.

Charles County offers a variety of outdoor community activities year-round. The Charles County Fair, the CornStalker Trail of Horror, the Annual Port Tobacco Market Day, the ArtsFest, the Sunflower Festival are all subject to delays or cancellation in the case of extreme weather events. Other signature Charles County events subject to delays or cancellation from extreme weather include the Annual Red, White, & Blue Crabs Celebration, the Scarecrow Festival, and the weekly Pop Up & Grow Vendor Market. These events were mentioned in town hall meetings and are therefore listed here, but all events that bring large gatherings could be affected by extreme weather, especially a tornado.

Jurisdictional Differences

Due to the regional nature of extreme weather, all jurisdictions within Charles County are vulnerable to the potential impacts of these events. However, population and building density has a correlation with hazard vulnerability and loss. In particular, the urban and suburban areas have higher population and structure densities, such as La Plata, Indian Head, and communities throughout unincorporated areas of the County may be more vulnerable to the impacts of a tornado or high wind event. Additionally, areas with taller buildings that can act as lightning rods have experienced greater vulnerability and loss during past lightning events. The environmental impacts most often associated with lightning strikes include damage or death to trees and ignition of wildfires. Jurisdictions that are heavily forested and that have, in the past, experienced wildfires that start because of a lightning strike are also vulnerable to losses due to lightning. Older homes that are in deteriorating condition and mobile homes are also more susceptible to tornadoes. Therefore, areas with heavier concentrations of these structures, such as mobile homes in Waldorf and Nanjemoy, are more vulnerable to the impacts of extreme weather.

Land Use and Development Trends

All future structures and infrastructure built in Charles County will likely be exposed to extreme weather events, particularly tornadoes and may experience damage. Since the previous statement is assumed to be uniform countywide, the location of development does not increase or reduce the risk necessarily. By adhering to building codes, Charles County and its jurisdictions can ensure that new development is built to current standards for wind resistance.

4.5 Flooding

Table 4.5-1: Flood Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Natural	4	3	3	4	2	**3.3**
HIGH RISK (3.0 or higher)						

Location, Extent, and Range of Magnitude

A flood is a natural event for rivers and streams and occurs when a normally dry area is inundated with water. Excess water from snowmelt or rainfall accumulates and overflows onto stream banks and adjacent floodplains. Flash floods, usually resulting from heavy rains or rapid snowmelt, can flood areas not typically subject to flooding, including urban areas. Extreme cold temperatures can cause streams and rivers to freeze, causing ice jams and creating flood conditions. Charles County contains a number of rivers, streams, and ditches that could potentially flood. Severe flooding would affect most Charles County waterways and, in turn, would impact properties that represent a variety of uses.

Floods are considered hazards when people and property are affected. Nationwide, hundreds of floods occur each year, making it one of the most common hazards in all 50 states and U.S. territories. In Maryland, flooding occurs commonly and can occur during any season of the year from a variety of sources. Most injuries and deaths from flooding happen when people are swept away by flood currents and most property damage results from inundation by sediment-filled water. Fast-moving water can wash buildings off their foundations and sweep vehicles downstream. Pipelines, bridges, and other infrastructure can be damaged when high water combines with flood debris. Basement flooding can cause extensive damage. Flooding can cause extensive damage to crop lands and bring about the loss of livestock. Several factors determine the severity of floods, including rainfall intensity and duration, topography, and ground cover.



Photo Source: Department of Emergency Services

Riverine flooding originates from a body of water, typically a river, creek, or stream, as water levels rise onto normally dry land. Water from snowmelt, rainfall, freezing streams, ice flows, or a combination thereof, causes the river or stream to overflow its banks into adjacent floodplains. Winter flooding usually occurs when ice in the rivers creates dams or streams freeze from the bottom up during extreme cold spells. Spring flooding is usually the direct result of melting winter snowpacks, heavy spring rains, or a combination of the two.

Flash floods can occur anywhere when a large volume of water flows or melts over a short time period, usually from slow moving thunderstorms or rapid snowmelt. Because of the localized nature of flash floods, clear definitions of hazard areas do not exist. These types of floods often occur rapidly with significant impacts. Rapidly moving water, only a few inches deep, can lift people off their feet, and only a depth of a foot or two is needed to sweep cars away. Most flood

deaths result from flash floods. The table below shows the different causes associated with flooding and flash flooding.

Table 4.5-2: Causes of Flooding and Flash Flooding	
CAUSES OF FLOODING	**CAUSES OF FLASH FLOODING**
Low lying topography, relatively undisturbed	Hilly/mountainous areas
High season water tables	High velocity flows
Poor drainage	Short warning times
Excess paved surfaces	Steep slopes
Constructions-filling	Narrow stream valleys
Obstructions-bridges	Parking lots and other impervious surfaces
Soil characteristics	Improper drainage

Urban flooding is the result of development and the ground's decreased ability to absorb excess water without adequate drainage systems in place. Typically, this type of flooding occurs when land uses change from fields or woodlands to roads and parking lots. Urbanization can increase runoff two to six times more than natural terrain (NOAA NWS, 1992). The flooding of developed areas may occur when the amount of water generated from rainfall and runoff exceeds a storm water system's capability to remove it. The Charles County Nuisance and Urban Flooding Plan, developed by the Charles County Resilience Authority, includes more information about urban flooding and has been included as Appendix F.



Photo Source: Department of Emergency Services

Ice Jams are stationary accumulations of ice that restrict flow. Ice jams can cause considerable increases in upstream water levels, while at the same time, downstream water levels may drop. Types of ice jams include freeze up jams, breakup jams, or combinations of both. When an ice jam releases, the effects downstream can be similar to that of a flash flood or dam failure. Ice jam flooding generally occurs in the late winter or spring.

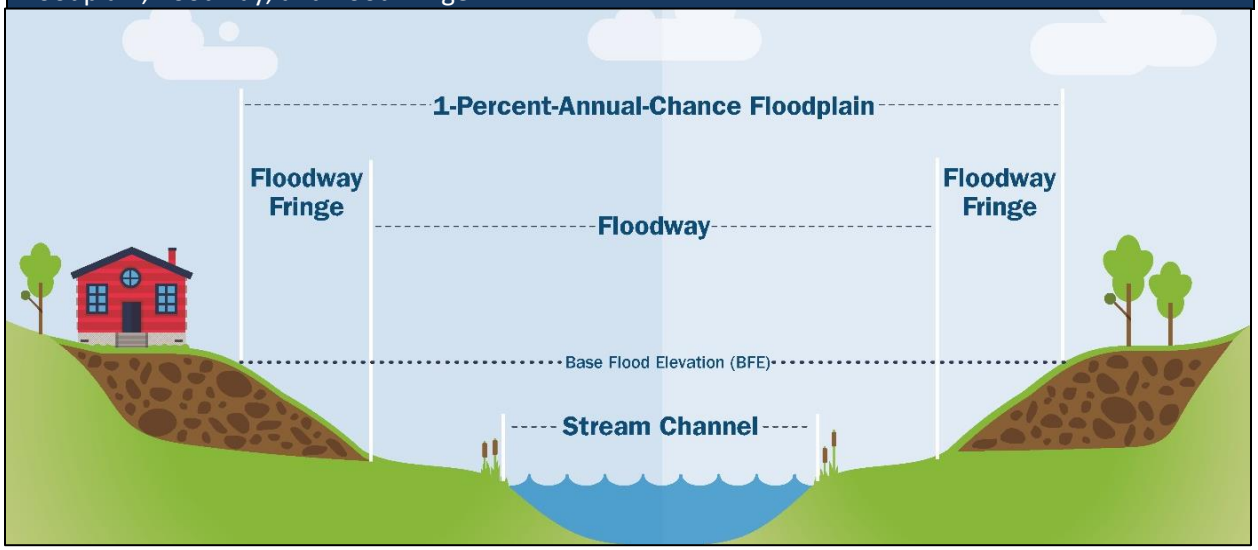
Flooding is normally the result of a larger event such as a thunderstorm, rapid snowmelt, and/or ice jam. Flooding can be as frequent as the occurrence of a spring rain or summer thunderstorm. The amount of precipitation produced by storm events determines the type of flooding. Flash floods, which typically occur more frequently than general floods, occur along small streams and creeks of the type that are widely present throughout southern Maryland.

Table 4.5-3: List of Flood Sources in Charles County (FEMA, 2015)	
FLOOD SOURCES	**FLOOD SOURCES**
Clark Run	Murphy Run
Jordan Swamp	Piney Branch
Kerrick Swamp	Piney Branch Tributaries

Table 4.5-3: List of Flood Sources in Charles County (FEMA, 2015)	
FLOOD SOURCES	**FLOOD SOURCES**
Mattawoman Creek	Potomac River
Old Womans Run	Patuxent River Tributaries
Patuxent River	Wicomico River
Zekiah Swamp Run	Creek Oaks Rim
Beaver Dam	Oden Run
Bowman Creek	Old Womans Run
Budds Creek	Piney Branch and Tributaries
Burgess Creek	Pomonkey Creek
Denton Run	Popes Creek
Devils Nest	Port Tobacco Creek and Tributaries
Ditchley Prong	Reeder Run and Tributaries
Gilbert Creek	Ross Branch
Gilbert Swamp Run	Smoots Pond Run
Hancock Run	Run Spring Hill Branch
Hells Bottom Run	St. Stephan Run
Hill Top Fork	Swanson Creek and Tributaries
Hoghole Run	Tributaries to Jordan Swamp
Indian Branch	Run Tributaries to Kerrick Swamp
Jane Berrys Run	Tributaries to Mattawoman Creek
Kerrick Swamp	Tributaries to Mill Dam Run
Lancaster Run	Tributaries to Piney Branch
Little Creek	Tributaries to Zekiah Swamp Run
Maddox Branch	Trinity Church Run and Tributary
Marbury Run	Wards Run and Tributaries
Mill Dam Run	Wills Branch Creek
Mill Run	Wheatley Run
Mill Swamp	

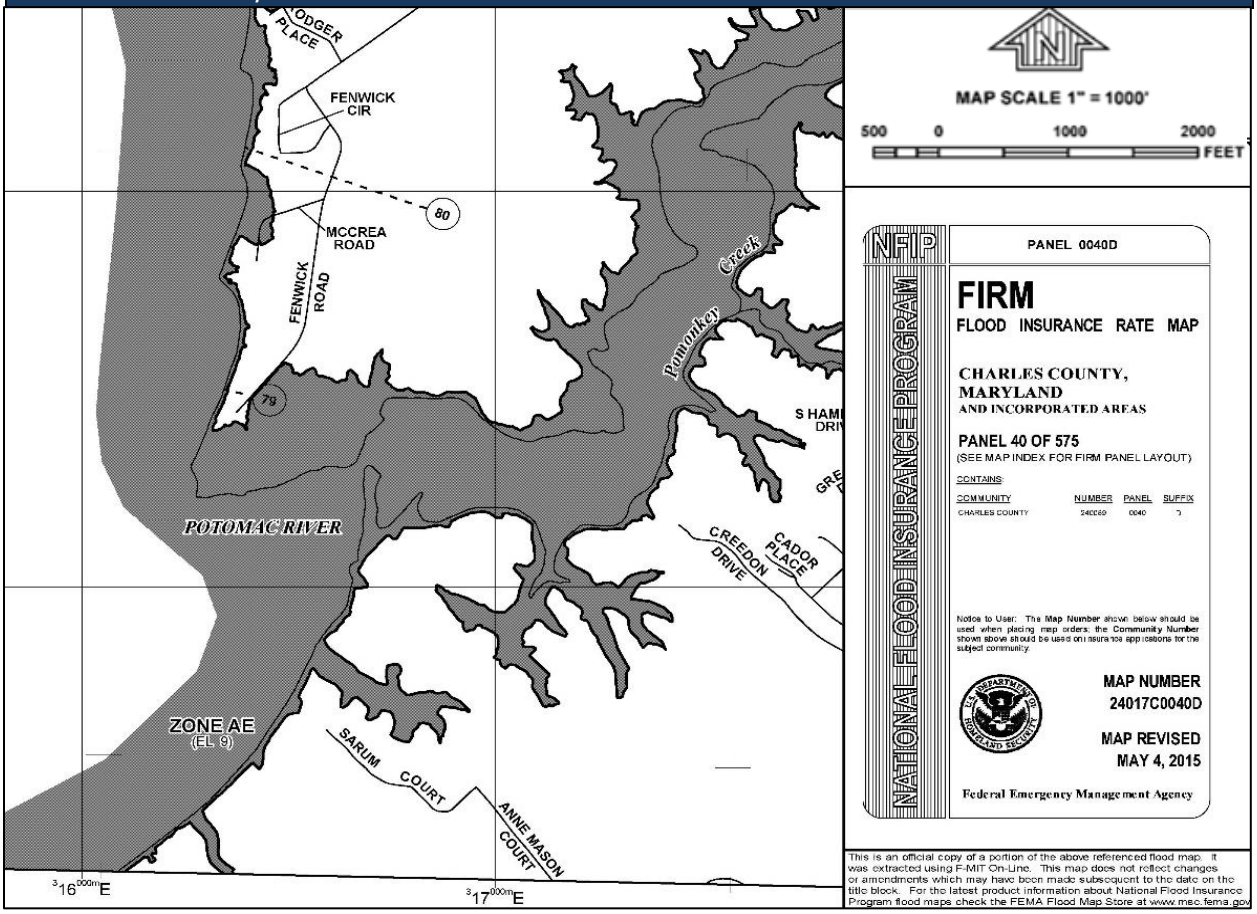
Floodplains are lowlands, adjacent to rivers, streams, and creeks that are subject to recurring floods. The size of the floodplain is described by the recurrence interval of a given flood. Flood recurrence intervals are explained in more detail in Section below however, when assessing the potential spatial extent of flooding, it is important to know that a floodplain associated with a flood that has a 10% chance of occurring in a given year is smaller than the floodplain associated with a flood that has a 0.2%-annual-chance of occurring. Flood Insurance Rate Maps (FIRMs) identify the 1%-annual-chance flood, which is used to delineate the Special Flood Hazard Area (SFHA) and identify Base Flood Elevations (BFEs). Figure 4.5-1 illustrates these terms. The SFHA serves as the primary regulatory boundary used by FEMA, the State of Maryland, and Charles County local governments.

Figure 4.5-1: Diagram identifying Special Flood Hazard Area, including the 1%-annual-chance (100-Year) floodplain, floodway, and flood fringe.



Countywide FIRMs were published for Charles County on September 4, 2013, and May 4, 2015. All communities within Charles County are now shown on a single set of countywide FIRMs. Previous FIRMs and Flood Boundary and Floodway Maps (FBFM) were digitized to produce a FIRM that is compatible with geographic information systems. An example of the mapping products published is shown in Figure 4.5-2. FIRMs for the entire county can be obtained from the FEMA Map Service Center. These maps can be used to identify the expected spatial extent of flooding from a 1%- and 0.2%-annual-chance event.

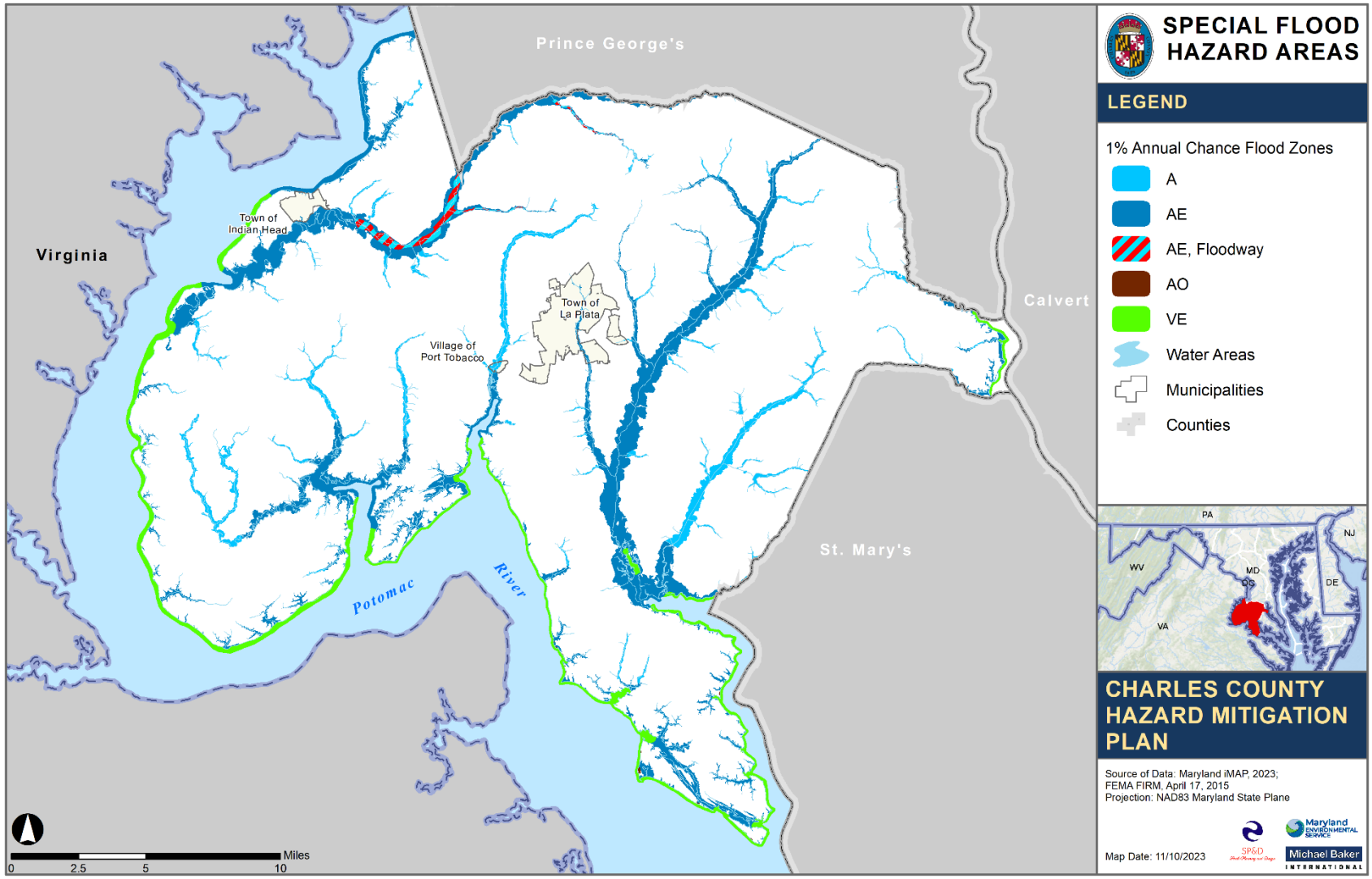
Figure 4.5-2: FIRM Panel 24017C0040D, May 4, 2015, showing flood hazard areas along the Potomac River and Pomonkey Creek



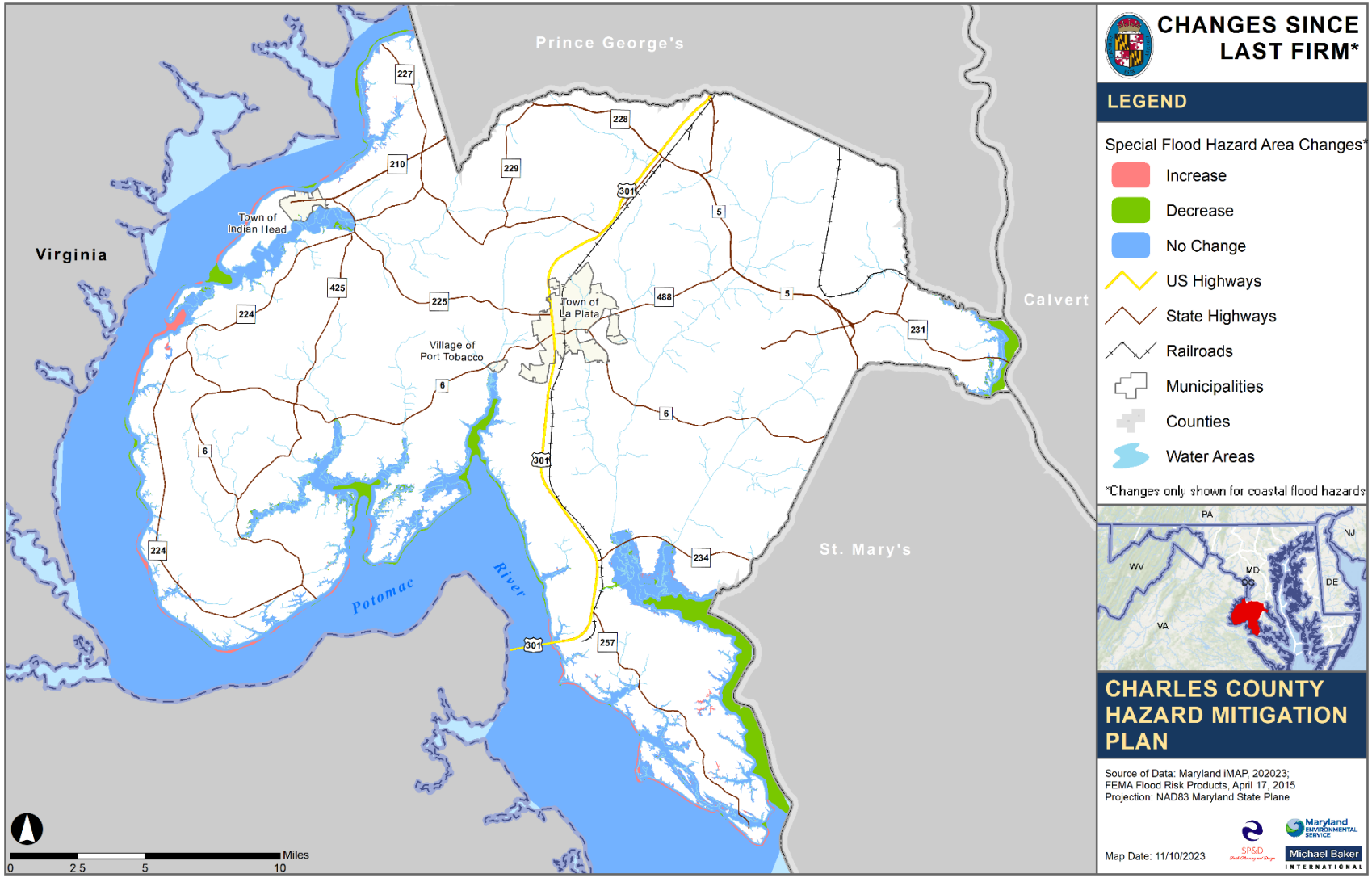
Map 4.5-3 shows the flood zones in Charles County. The location of approximate and detailed (including Base Flood Elevations) Special Flood Hazard Areas (1% annual chance zones) are shown. FEMA defines Flood Zone A as the areas of approximate 1% annual chance zones, since Base Flood Elevation data is not known for the area, and Zone AE shows areas in the 1% annual chance zones determined by Base Flood Elevation details. VE zones shown on the map are coastal high hazards areas, where the computed wave heights for the 1%-annual-chance-flood are three feet or greater. Map 4.5-4 shows changes since the last FIRM for coastal areas. As shown in the map, the SFHA increased in several areas along the Potomac River but decreased in other locations, such as along other parts of the Potomac River as well as the Wicomico River, Nanjemoy Creek, and the Patuxent River.

Charles County is also located in the Lower Potomac, the Patuxent, and the Middle Potomac-Anacostia-Occoquan Watersheds (see Map 4.5-5).

Map 4.5-3: Flood Zones in Charles County



Map 4.5-4: Changes Since Last FIRM



Map 4.5-5: Charles County Watersheds

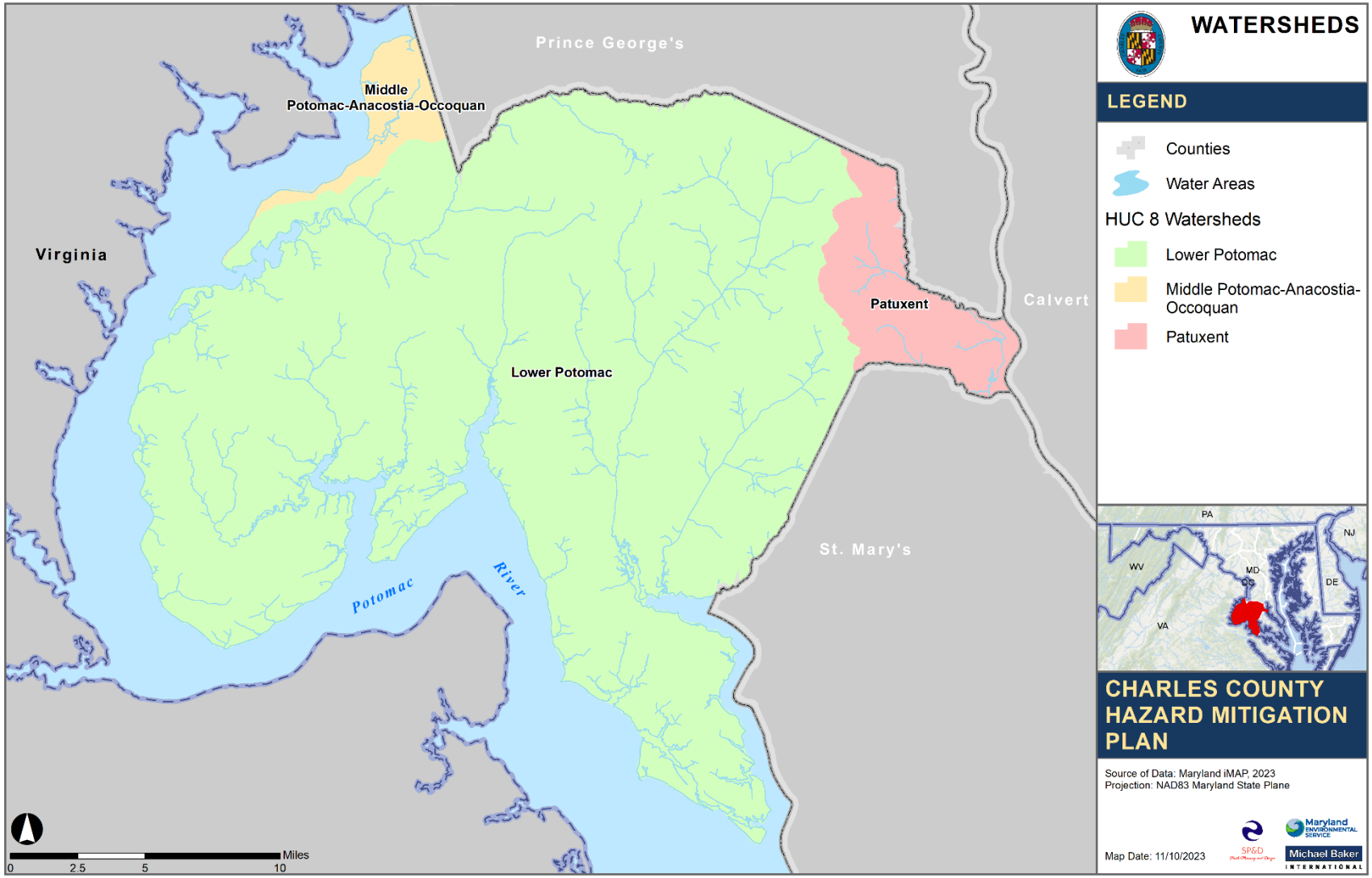


Table 4.5-4 below indicates municipal participation in the NFIP. The Village of Port Tobacco currently does not participate in the NFIP.

Table 4.5-4: Charles County NFIP Participation (FEMA, 2018)

MUNICIPALITY	CID	NFIP ENTRY DATE	CURRENT EFFECTIVE MAP
Charles County Unincorporated	240089	6/5/1985	5/4/2015
Town of La Plata	240092	4/17/1985	5/4/2015
Town of Indian Head	240091	10/15/1985	5/4/2015

Floods are considered hazards when people and property are affected. Injuries and deaths can occur when people are swept away by flood currents or bacteria and disease are spread by moving or stagnant floodwaters. Most property damage results from inundation by sediment-filled water. A large amount of rainfall over a short time span can result in flash flood conditions. Small amounts of rain can result in floods in locations where the soil is frozen or saturated from a previous wet period or if the rain is concentrated in an area of impermeable surfaces such as large parking lots, paved roadways, or other impervious developed areas.

Several factors determine the severity of floods, including rainfall intensity and duration, topography, ground cover and rate of snowmelt. Water runoff is greater in areas with steep slopes and little or no vegetative ground cover. Charles County features areas with sloping terrain, which can contribute to more severe floods as runoff reaches receiving water bodies more rapidly over steep terrain. Also, urbanization typically results in the replacement of vegetative ground cover with asphalt and concrete, increasing the volume of surface runoff and stormwater, particularly in areas with poorly planned stormwater drainage systems.

In Maryland, there are seasonal differences in how floods are caused. In the winter and early spring (February to April), major flooding has occurred as a result of heavy rainfall on dense snowpack throughout contributing watersheds, although the snowpack is generally moderate during most winters. Summer floods have occurred from intense rainfall on previously saturated soils. Summer thunderstorms deposit large quantities of rainfall over a short period of time that can result in flash flood events. In addition, as detailed in Section 4.4, Charles County occasionally experiences intense rainfall from tropical storms in late summer and early fall.

Floods are naturally occurring events that benefit riparian systems, which have not been disrupted by human actions. Such benefits include groundwater recharge and the introduction of nutrient rich sediment improving soil fertility. However, the destruction of riparian buffers, changes to land-use and land cover throughout a watershed, and introduction of chemical or biological contaminants which often accompany human presence cause environmental harm when floods occur. Hazardous material facilities are potential sources of contamination during flood events. Other environmental impacts of flooding include water-borne diseases, suffocation of tree species non-tolerant to excess water, heavy siltation, damage, or loss of crops and drowning of both humans and animals.

Past Occurrence

The severity of flooding in Charles County is determined by several local factors, including river basin topography, precipitation patterns, recent soil moisture conditions, and groundcover/vegetative state. Charles County and its municipalities have many streams and small tributaries that are highly susceptible to flooding. The properties in and near the identified floodplains of Charles County are subject to flooding events on an almost annual basis. Floodplain management, flood control structures, hazard mitigation, and flood relief funds are strategies that have reduced Charles County's annual flood damages.

Charles County has a long history of flooding events. Small, localized flooding events occur annually with minimal property damage. According to NOAA's NCEI Storm Events Database, Charles County has been impacted by 59 floods, flash floods, and coastal flood events since 1950 (See Table 4.5-5). Twenty-eight of these events have occurred since the previous HMP update. Additionally, several Presidential Disaster and Emergency Declarations affecting Charles County have been in response to hazard events related to flooding events or other storm events with flood impacts (see Table 3.2).

Table 4.5-5: Flood, Flash Flood, and Coastal Flood Events, 1950-2022 (NOAA, 2023)

YEAR OF EVENT	NUMBER OF EVENTS	NUMBER OF INJURIES	NUMBER OF DEATHS	CROP DAMAGE	PROPERTY DAMAGE
1950-2017	31	0	0	$0	$475,000
2018	6	0	0	$0	$0
2019	2	0	0	$0	$50,000
2020	12	0	0	$0	$10,000
2021	7	0	0	$0	$5,000
2022	1	0	0	$0	$0
Total	**59**	**0**	**0**	**$0**	**$540,000**

According to the NOAA, the greatest impact on Charles County was a result of coastal flooding event that occurred on February 4, 1998. A powerful nor'easter, carrying copious moisture from the Gulf of Mexico and Caribbean region dumped between 2 and 4 inches of rain across much of Maryland between the foothills and the Chesapeake Bay. Rainfall totals, ranging from 3 to 5 inches, fell in lower southern Maryland, causing widespread flooding of low-lying areas and small streams and creeks. The nor'easter, which arrived on the heels of another just a week earlier, caused tides of 3 to 4 feet above normal from the Calvert County-Anne Arundel County line south to Point Lookout in extreme southeastern St. Mary's County; and along the lower tidal Potomac River along the Charles and St Mary's shoreline, including Cobb Island and St George Island. Inland flooding was less extensive in Charles and Calvert Counties, but a problem, nonetheless. In Charles County, 25 roads were closed at the peak of the flooding, and numerous vehicles were reportedly stranded. Hydrologic observers recorded up to 4.5 inches of rain.

In Charles County alone, eighty trees and large limbs were reported down, thirty on Cobb Island. Other road closures in St. Mary's, Calvert, Anne Arundel, and southeastern Prince George's County were due to fallen trees or limbs. The combination of BG&E, PEPCO, and SMECO reported nearly 15,000 customers without power at the height of the storm. Four thousand customers were affected in St. Mary's County, 5,000 in Anne Arundel, 1,793 in Calvert, and 1,550 in southeastern Prince George's and Charles Counties.

Another significant event associated with flash flooding occurred on August 25, 1999. Flash flooding was reported in various parts of the County that resulted in property damage of approximately $200,000. Rainfall totals in Charles County ranged from around 2 inches on the west side of Waldorf to 5.7 inches about 5 miles east of town. Several portions of Acton Lane near Mattawoman Creek were closed due to high water. The Lynnbrook subdivision in Waldorf had several homes surrounded and flooded by water, and some residents had to be rescued by firefighters. Over $100,000 damage was reported in the neighborhood. Hamilton Drive reportedly had water flowing over it like a waterfall.

A recent flash flood event in 2019 impacted St. Charles and caused an estimated $50,000 in property damage to the planned community. The event, caused by heavy precipitation, primarily impacted properties in Wakefield Circle area. Water was reported to be just above the bottom of vehicle doors. Montgomery County, Washington DC, and northern Virginia were also impacted.

The NFIP also identifies properties that frequently experience flooding. Floods are the most common and costly natural catastrophe. In terms of economic disruption, property damage, and loss of life, floods are "nature's number-one disaster." For that reason, flood insurance is almost never available under industry-standard homeowner's and renter's policies. The best way for citizens to protect their property against loss to flood is to purchase flood insurance through the NFIP. Congress established the NFIP in 1968 to help control the growing cost of federal disaster relief. The NFIP is administered by FEMA. The NFIP offers federally backed flood insurance in communities that adopt and enforce effective floodplain management ordinances to reduce future flood losses. Information on NFIP premiums and coverage, prior claims, and substantial damage claims provide additional information on past flood occurrences. Table 4.5-6 shows this information for each community in Charles County.

Table 4.5-6: Charles County NFIP Insurance Policies (Current as of 11/1/2023)

MUNICIPALITY	NUMBER OF POLICIES	AMOUNT OF COVERAGE
Charles County Unincorporated	457	$138,916,000
Town of La Plata	13	$3,257,000
Town of Indian Head	3	$1,050,00

The FEMA NFIP defines a **repetitive loss property** as:

- Properties are those for which two or more losses of at least $1,000 each have been paid under the National Flood Insurance Program (NFIP) within any 10-year period since 1978.

The FEMA NFIP defines **severe repetitive loss properties** as:

- A property that has at least four NFIP claim payments (including building and contents) over $5,000 each, and the cumulative amount of such claims payments exceeds $20,000; or,
- A property for which at least two separate claims payments (building payments only) have been made with the cumulative amount of the building portion of such claims exceeding the market value of the building.

The 2023 Hazard Mitigation Assistance Program and Policy Guide (page 304) defines repetitive loss and severe repetitive loss properties differently, and these definitions are as follows:

A **repetitive loss property** is a structure covered by a contract for flood insurance made available under the NFIP that:

a) Has incurred flood-related damage on 2 occasions, in which the cost of the repair, on the average, equaled or exceeded 25 percent of the market value of the structure at the time of each such flood event and
b) At the time of the second incidence of flood-related damage, the contract for flood insurance contains increased cost of compliance coverage.

A **severe repetitive loss property** is a structure that:

a) Is covered under a contract for flood insurance made available under the NFIP.
b) Has incurred flood related damage –
    i. For which 4 or more separate claims payments (includes building and contents) have been made under flood insurance coverage with the amount of each such claim exceeding $5,000, and with the cumulative amount of such claim's payments exceeding $20,000 or
    ii. For which at least 2 separate claims payments (includes only building) have been made under such coverage, with the cumulative amount of such claims exceeding the market value of the insured structure.

As of November 2023, there were 33 repetitive loss properties in Charles County. All the properties were located in unincorporated areas of the County except for one located in La Plata. The repetitive loss property in La Plata is located at Redwood Circle. Most of these properties were single-family residential (27), while the remaining six properties were other-nonresidential (6) or business-nonresidential (2). Of these 33 properties, 6 are considered severe repetitive loss properties. Most of the severe repetitive loss properties (5) were single family residential, while 1 was a non-residential structure. Less than half of the repetitive loss properties were NFIP insured (14 total), and only 1 property was considered to be "mitigated."

Note: The County is currently in the process of having the "mitigated" property removed from the repetitive loss listing and has completed and submitted the NFIP Repetitive Loss (RL) Update Worksheet (AW-501). This update is requested as there is no structure located on the property.

Table 4.5-7 shows the number of repetitive loss properties and losses by jurisdiction and structure type.

Table 4.5-7: Charles County Repetitive Loss Properties and Losses by Structure Type (MDEM, 2023).

JURISDICTION	RESIDENTIAL: SINGLE FAMILY		BUSINESS NON-RESIDENTIAL:		OTHER NON-RESIDENTIAL:		TOTAL	
	PROPER-TIES	LOSSES	PROPER-TIES	LOSSES	PROPER-TIES	LOSSES	PROPER-TIES	LOSSES
Charles County Unincorporated	26	69	2	5	4	11	32	85
Town of La Plata	1	2	0	0	0	0	1	2
Town of Indian Head	0	0	0	0	0	0	0	0
Total	**27**	**71**	**2**	**5**	**4**	**11**	**33**	**87**

Future Occurrence

In Charles County, flooding occurs commonly and can take place during any season of the year. Every two to three years, serious flooding occurs along one or more of Maryland's major rivers or streams and it is not unusual for such events to happen several years in succession. Floods are described in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and related probability of occurrence. Historical records are used to determine the probability of occurrence (percent chance) for a flood of specific extent to occur.

The frequency of flooding, flash flooding, and heavy rain events are likely to increase due to climate change. Areas that currently experience regular flooding due to proximity to rivers and/or steep slopes are likely to see conditions change or worsen, and some areas that historically flood very little or not at all are likely to start flooding with greater frequency due to the increased amount and intensity of storm events. According to a 2021 study published in Nature "when it comes to riverine flooding, climate change is likely exacerbating the frequency and intensity of extreme flood events but decreasing the number of moderate floods." Flash flooding will continue to increase as there are more extreme precipitation events. Warmer temperatures increase evaporation, putting more moisture into the atmosphere that then gets released as rain or snowfall.

As climate change progresses, both the frequency and severity of flood events are anticipated to rise. The increased occurrence and intensity of rainfall contribute to more severe flooding incidents. Heavy downpours can quickly result in flash floods, causing rivers to overflow their banks. NOAA Atlas 14 Point Precipitation Frequency Estimates for the La Plata 1 W Station (Site ID: 18-5080), the Precipitation Frequency (PF) is projected to increase at each average recurrence interval (years) for each duration. For example, the five (5) minute duration at Year 1 is 0.364 inches and is projected to increase to 0.437 inches in Year 2. The PF doubles by Year 50 with a projected 0.712 inches. Reviewing the durations for each interval, projects continue to increase for the La Plata Station.

The NFIP recognizes the 1%-annual-chance flood, also known as the base flood, as the standard for identifying properties subject to federal flood insurance purchase requirements. A 1%-annual-chance flood is a flood, which has a 1% chance of occurring over a given year. The FIRMs published on September 4, 2013, and May 4, 2015, can be used to identify areas subject to the 1%- and 0.2%-annual-chance flooding. Areas subject to 2%- and 10%-annual-chance events are not shown on maps; however, water surface elevations associated with these events are included in the flood source profiles contained in the Flood Insurance Study Report. The probability of future flooding in Charles County can be considered *likely* (3 out of 4) according to the Risk Factor Methodology.

Table 4.5-8 shows a range of flood recurrence intervals and associated probabilities of occurrence.

Table 4.5-8: Recurrence Intervals and Associated Probabilities of Occurrence (FEMA, 2001).

RECURRENCE INTERVAL	CHANCE OF OCCURRENCE IN ANY GIVEN YEAR (%)
10-year	10
50-year	2
100-year	1
500-year	0.2

The 3rd National Risk Assessment: Infrastructure on the Brink quantifies risk as "the unique level of flooding for each infrastructure type relative to operational thresholds, as established by the federal government and other authoritative bodies." Operational flood risk at the local level denotes when a facility is flooded to the point where it can no longer function as intended or becomes unsafe. At a high level, the assessment finds the following true today and likely in the coming decades:

- Risk to residential properties is expected to increase by 10% over the next 30 years, with 12.4 million properties at risk today (14%) and 13.6 million at risk of flooding in 2051 (16%).
- Additionally, 2.0 million miles of road (25%) are at risk today and that is expected to increase to 2.2 million miles of road (26%) over the next 30 years (a 3% increase over the next 30 years).
- Commercial properties are expected to see a 7% increase in risk of flooding from 2021 to 2051, with 918,540 at risk today (20%) and 984,591 at risk of flooding in 30 years (21%).
- Currently, 35,776 critical infrastructure facilities are at risk today (25%), increasing to 37,786 facilities by 2051 (26% and a 6% increase in risk).
- Compounding that risk, 71,717 pieces of social infrastructure facilities are at risk today (17%), increasing to 77,843 by 2051 (19% and an increase of 9% over that time).

In Maryland, there are 112,187 residential properties, 11,990 miles of roads, 8,445 commercial properties, 379 infrastructure facilities, and 826 social facilities with operational flood risk today. According to riskfactor.com, in Charles County, there are 5,420 properties that have greater than a 26% chance of being severely affected by flooding over the next 30 years. This represents 12% of all properties in the County.

In addition to damage to properties, flooding can also cut off access to utilities, emergency services, transportation, and may impact the overall economic well-being of an area. Overall, Charles County has

a “moderate” risk of flooding over the next 30 years, which means flooding is likely to impact day-to-day life within the community. This is based on the level of risk the properties face rather than the proportion of properties with risk.

Vulnerability Assessment

Charles County is vulnerable to flooding that could cause loss of lives, property damage, and road closures.

People

While the entire population of Charles County may be indirectly impacted by flooding (e.g., traffic delays or detours), residents living near flood prone areas or within the SFHA are most likely to experience direct impacts from flooding. Residents may be displaced or require temporary and long-term housing and sheltering. In addition, damage caused by a flood can lead to severe injuries and loss of life. Impacts to the public include potential injury or loss of life, health issues, and destruction of property due to flooding.

Socially vulnerable populations are more susceptible to flood impacts due to their physical and financial ability to react before and after a hazard event. Vulnerable populations include the elderly, young, and individuals with disabilities or access or functional needs who may be unable to evacuate in the event of an emergency. The elderly are considered most vulnerable because they require extra time and are more likely to seek or need medical attention that might not be readily available due to isolation during a storm event. According to the CDC’s Social Vulnerability Index, the most socially vulnerable census tracts in the County include La Plata and St. Charles. Of these census tracts, the most socially vulnerable groups are categorized by housing type and lack of transportation options. More information about social vulnerability is included in Section 3.3.

Systems

Impacts to systems in the event of a flood include, but are not limited to:

- Temporarily submerged roads and bridges
- Repetitively submerged infrastructure experiences damage over time, which can create closures in the long term
- Emergency communication breakdowns
- Contamination of well water
- Emergency responders may be cut off from communities and people due to roadway inundation
- Public perception and faith in first responders can be negatively impacted due to slow responses caused by flooding

Critical facilities were assessed during this plan update to determine which, if any, are in a flood hazard area. Communication Systems, specifically tower sites, were assessed for flood vulnerability in this section. Results from the assessment indicated that there are no communication systems vulnerable to flooding within the County or its municipalities.

As discussed in the next section, two (2) pump stations are within the 1%-annual-chance flood zone. If either pump station was inundated due to flooding, its failure could cause untreated sewerage to back up into the community, causing public safety health risks and environmental damage.

Structures

For the purpose of assessing vulnerability, the following structural assessment focused on community assets that are located in the 1%-annual-chance floodplain. While greater and smaller floods are possible, information about the extent and depths for this floodplain is available for all jurisdictions countywide, thus providing a consistent basis for analysis.

Table 4.5-10 displays the number of structures, critical facilities, and populations intersecting the SFHA along with the total number of structures, critical facilities, and population in each community. The numbers of vulnerable structures and critical facilities were calculated by overlaying the building footprints with the SFHA as shown in the FIRM data. Similarly, the estimated population in the SFHA was calculated by overlaying the centroids of Census blocks with the SFHA; while clearly an estimate, using the block centroid helps to minimize overestimation of flood-prone populations. The results of this analysis are also shown on the map in Map 4.5-6.

Plan Update

For the flood vulnerability analysis, Maryland's MdProperty View parcel data was utilized, which contains parcel data that is current as of early June 2020. Building footprints, provided by Charles County, were also used in conjunction with parcels data to determine structures at-risk to 1%-annual-chance flood.

Source: Maryland Department of Planning Charles County 2017/18 Edition & Charles County 2023 Building Footprints

Overall, only an estimated 0.74% of the structures and 0.86% of the total population of Charles County are located in the 1%-annual-chance flood zone and are most at risk from the impacts of flooding. All of these structures are located in unincorporated areas of Charles County. As shown in Table 4.5-10, the majority of structures located in the SFHA were residential (297), followed by commercial land use types (93). There were also three (3) critical facilities located in the SFHA, all of which were located in unincorporated areas of the County. However, all of these critical facilities also had water-related uses, including pump stations and wells (see Table 4.5-9).

Table 4.5-9: Critical Facilities Located in the SFHA

CF NAME	CF TYPE	COMMUNITY
Rt 5 Pump Station	Pump Stations	Charles County Unincorporated Areas
Cobb Island Pump Station	Pump Stations	Charles County Unincorporated Areas
Well Lot	Wells	Charles County Unincorporated Areas

In summary, the vast majority of structures, populations, and critical facilities are located outside of the SFHA. This can be attributed to Charles County's aggressive floodplain management practices and smart siting of critical facilities and infrastructure.

Table 4.5-10: Community Flood Vulnerability

MUNICIPALITY	TOTAL STRUCTURES* IN SFHA	PERCENT STRUCTURES IN SFHA	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN SFHA	PERCENT CRITICAL FACILITIES IN SFHA	TOTAL ESTIMATED 2020 POPULATION	POPULATION IN SFHA	PERCENT POPULATION IN SFHA
Charles County Unincorporated Areas	500**	0.81%	573	3	0.52%	150,376	1,400	0.93%
Town of Indian Head	0	0.00%	23	0	0.00%	3,892	0	0.00%
Town of La Plata	0	0.00%	82	0	0.00%	10,143	0	0.00%
Village of Port Tobacco	0	0.00%	0	0	0.00%	25	7	28.00%
Total	**500**	**0.74%**	**678**	**3**	**0.44%**	**164,436**	**1,407**	**0.86%**

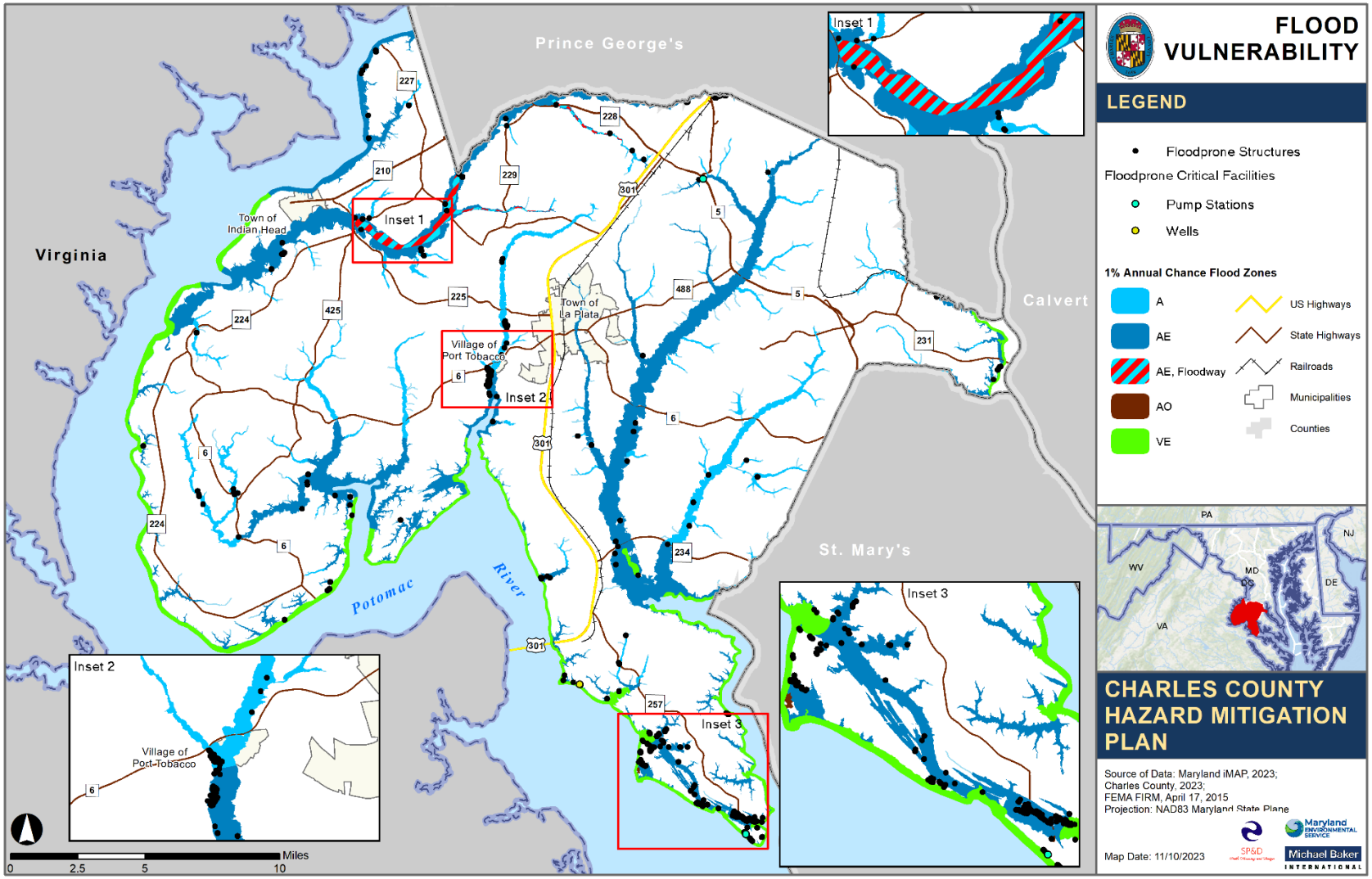
*Notes: * Structures include only the primary structure(s) on each parcel; accessory structures are excluded.*
*** 2023 Update: The total amount of structures in the SFHA (500) has increased from 2018 (450) due to the identification and subsequent inclusion of structures at the Goose Bay Marina and Campground.*

Table 4.5-11: Structures Vulnerable to Flooding (in SFHA) by Municipality and Land Use Type

MUNICIPALITY	AGRICULTURE	COMMERCIAL	EXEMPT	TOWN HOUSE	APARTMENT	COMMERCIAL CONDO	RESIDENTIAL	TOTAL STRUCTURES IN SFHA
Charles County Unincorporated Areas	16	28	4	17	1	65	297	426*
Town of Indian Head	0	0	0	0	0	0	0	0
Town of La Plata	0	0	0	0	0	0	0	0
Village of Port Tobacco	0	0	0	0	0	0	0	0
Total	**16**	**28**	**4**	**17**	**1**	**65**	**297**	**426***

* Note: This total does not include those parcels with multiple structures in the SFHA.

Map 4.5-6: Structures and Critical Facilities Located in the SFHA



Coastal areas of Charles County may be prone to more significant flooding than areas further inland. Map 4.5-7 shows coastal flood depths for the 1%-annual-chance-flood event. As shown in the map, coastal areas along the Potomac and much of the County's coastline have the potential to experience flood depths of over 9 feet during a 1%-annual-chance-flood event. Please note that this map only depicts flood depths for coastal areas.

Similarly, Map 4.5-8 depicts the potential sea level rise impacts on Charles County and shows that some areas have the potential to experience 5-to-10-foot inundation. Sea level rise impacts are projected to have the greatest impacts to areas surrounding Mattawoman Creek, Nanjemoy Creek, Potomac River, and Wicomico River.

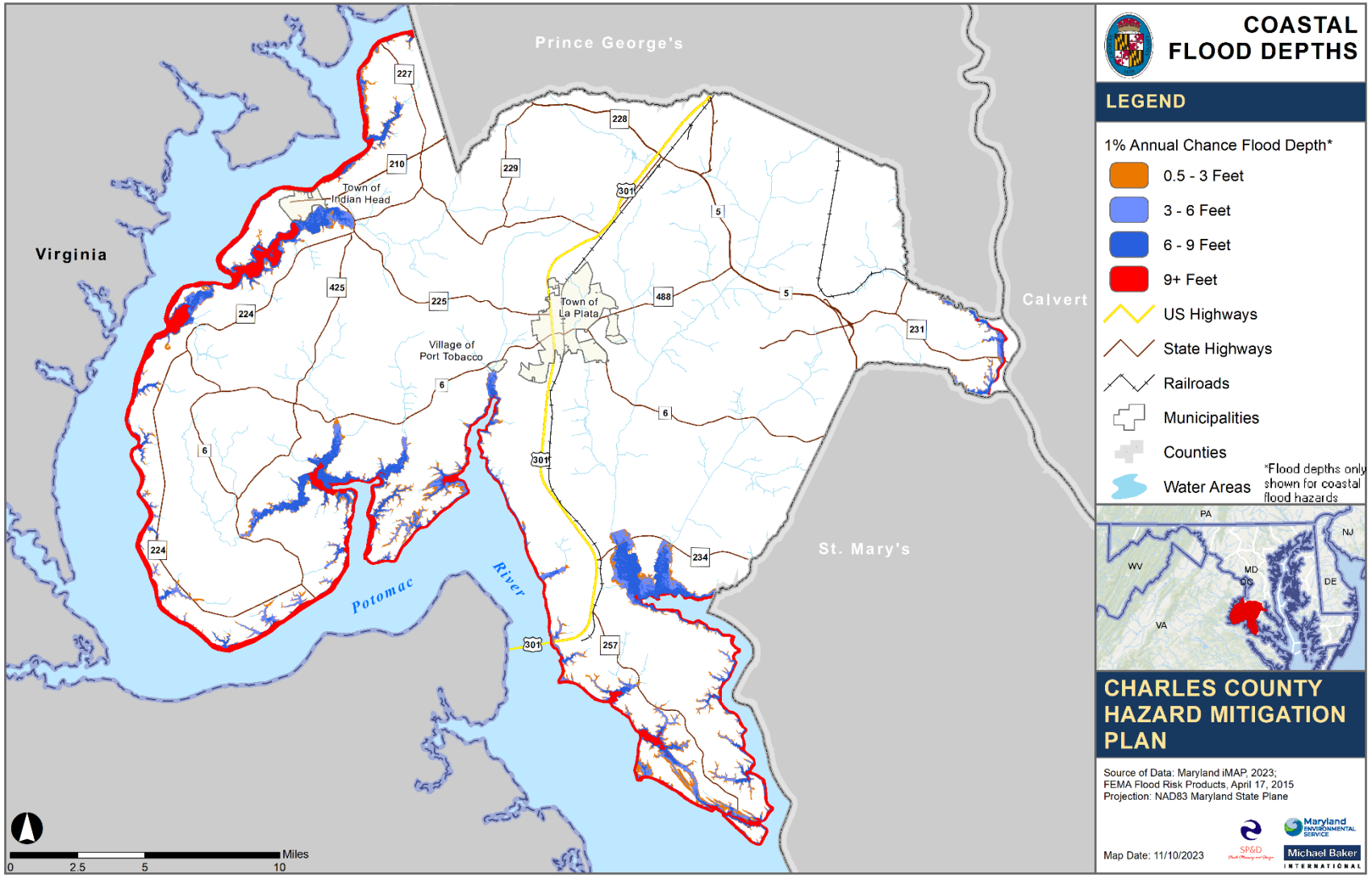
Charles County also determined the types and numbers of potential assets exposed to flooding using a loss estimation model called Hazus, which was developed by FEMA and is a nationally applicable standardized methodology that estimates potential losses from earthquakes, hurricanes, floods, and tsunamis. Hazus uses state-of-the-art GIS software to map and display hazard data and the results of damage and economic loss estimates for buildings and infrastructure. It also allows users to estimate the impacts of earthquakes, hurricanes, floods, and tsunamis on populations. Estimating losses is essential to decision-making at all levels of government and provides a basis for developing mitigation plans and policies, emergency preparedness, and response and recovery planning.

The potential predictive loss estimate data for the 2023 HMP Update was completed using an advanced Level 2 Hazus analysis for floods. As opposed to basic analysis using only default data, this advanced analysis incorporates specific data for inclusion in the hazard models. In addition, the new version of Hazus, 6.0, was utilized. The enhanced data and newer datasets used included:

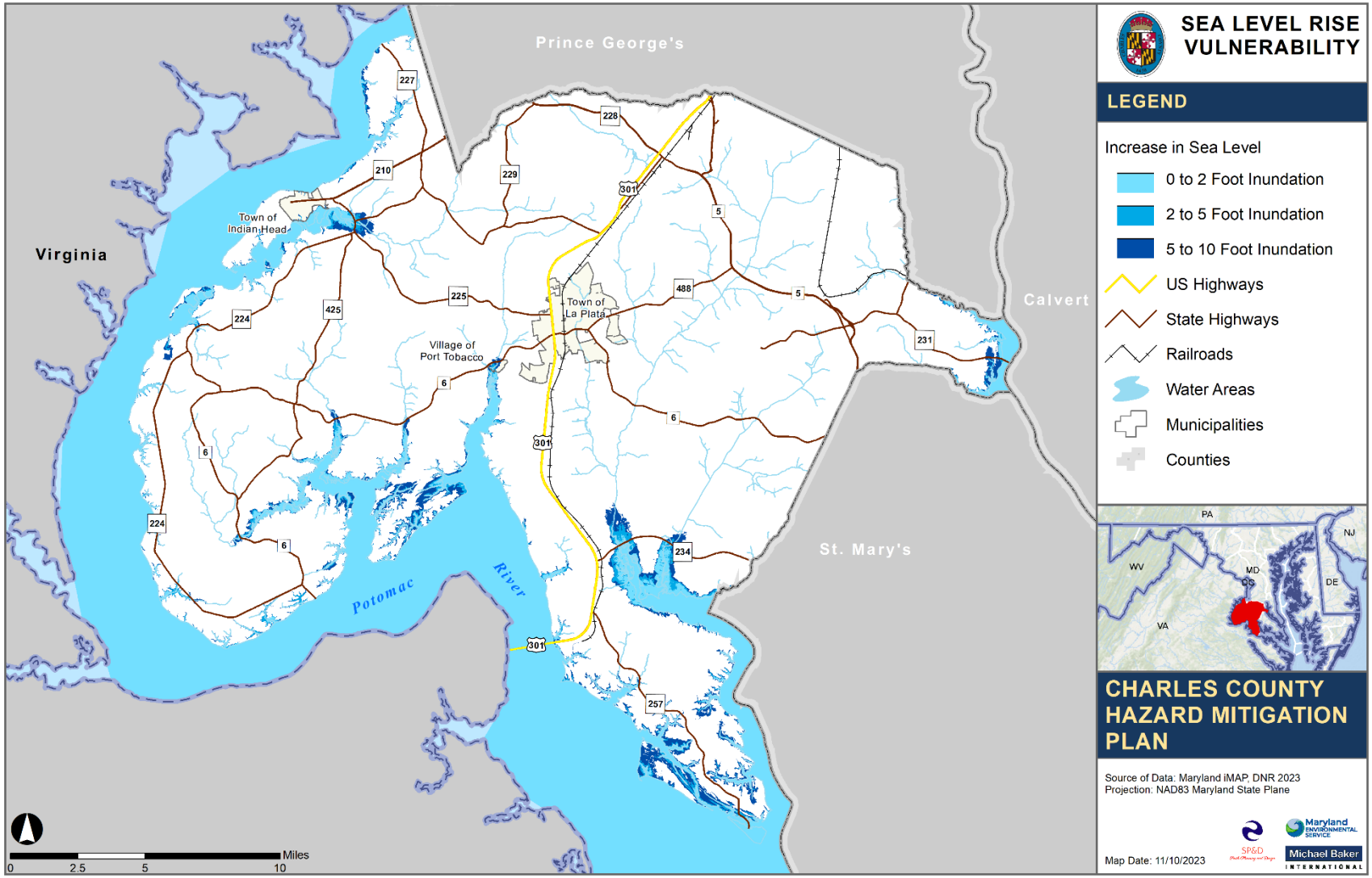
- Updated demographic data from the 2020 Census
- Dasymetric Census blocks to better attribute areas of population geographically within the block
- A user-delineated 100-year depth grid derived for Charles County from the effective FIRM data.

Using these datasets in Hazus Version 6.0, total economic losses from a coastal only 1%-annual-chance flood in Charles County are estimated at $47.03 million. The total building-related losses were $24.09 million dollars. 49% of the estimated losses were related to the business interruption of the region. Residential occupancies make up 54.94 percent of the total estimated building-related losses. According to the model, no critical facilities would be damaged by the flooding. Map 4.5-9 shows the distribution of building-related losses by census block across Charles County.

Map 4.5-7: Charles County Coastal Flood Depths



Map 4.5-8: Charles County Sea Level Rise Vulnerability



Map 4.5-9: Charles County Hazus Losses

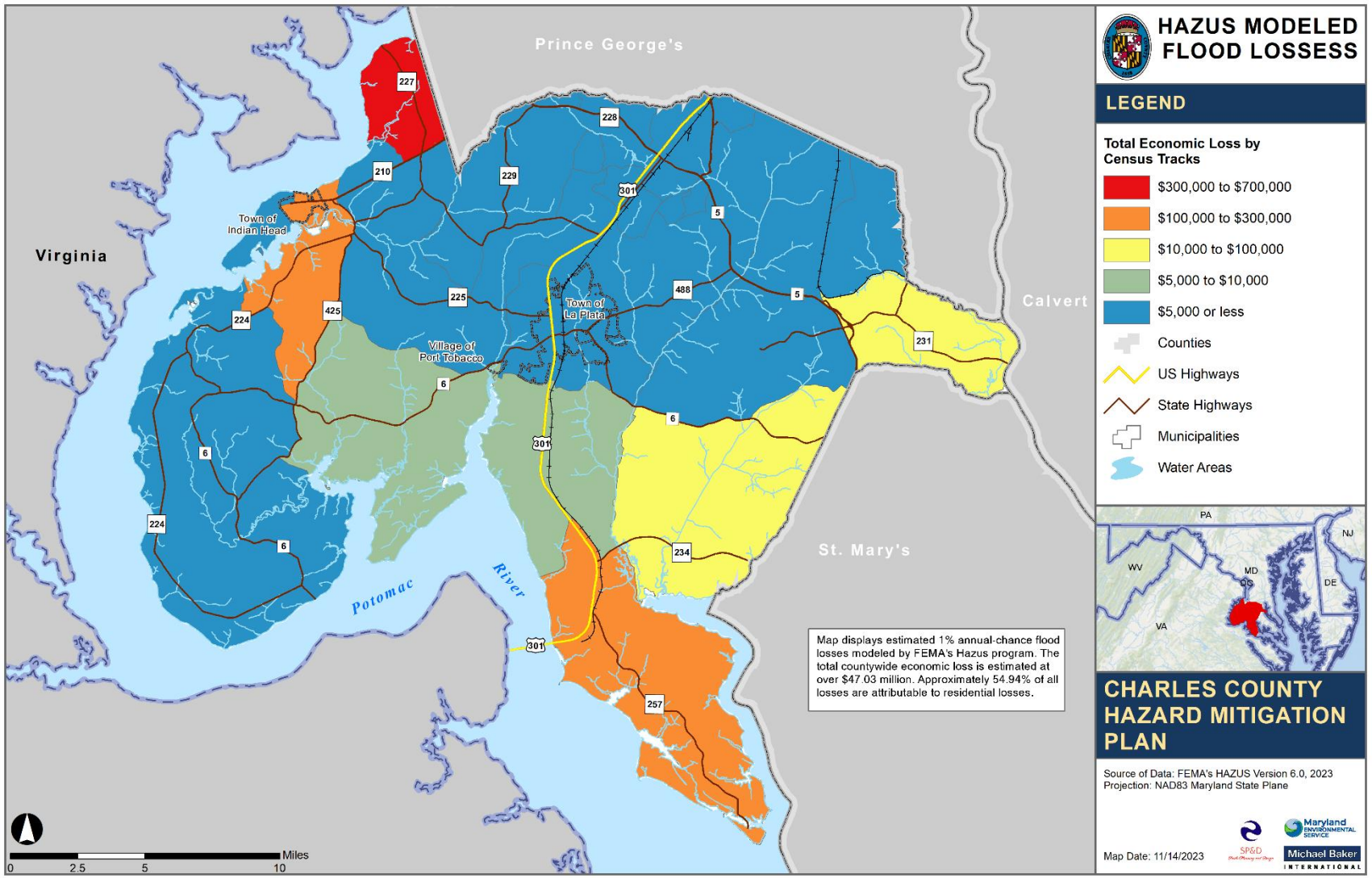


Table 4.5-12 summarizes total replacement value of buildings in the region by occupancy type and the estimate replacement value, while Table 4.5-13 estimates the expected damage by general occupancy for the flood scenario. Hazus analysis completed for the 2023 plan is included in both tables for comparison. Exposure values for the overall study region have increased since the previous analysis, especially with the education occupancy. However, exposure values flood scenarios decreased significantly compared to the 2018 Hazus analysis.

Table 4.5-12: Building Exposure by Occupancy Type for the Study Region

OCCUPANCY	2018 HAZUS ANALYSIS		2023 HAZUS ANALYSIS	
	EXPOSURE ($1,000)	PERCENT OF TOTAL	EXPOSURE ($1,000)	PERCENT OF TOTAL
Residential	$17,919,835	87.2%	$20,961,117	75.5%
Commercial	$1,840,063	9.0%	$3,940,237	14.2%
Industrial	$313,755	1.5%	$628,575	2.3%
Agricultural	$56,267	0.3%	$24,948	0.1%
Religion	$180,668	0.9%	$362,587	1.3%
Government	$125,664	0.6%	$232,857	0.8%
Education	$121,540	0.6%	$1,601,899	5.8%
Total	**$20,557,792**	**100.0%**	**$27,752,220**	**100%**

Table 4.5-13: Building Exposure by Occupancy Type for the Flood Scenario

OCCUPANCY	2018 HAZUS ANALYSIS		2023 HAZUS ANALYSIS	
	EXPOSURE ($1,000)	PERCENT OF TOTAL	EXPOSURE ($1,000)	PERCENT OF TOTAL
Residential	$6,019,871	87.5%	$1,165,621	84.3%
Commercial	$587,901	8.5%	$157,865	11.4%
Industrial	$101,578	1.5%	$27,503	2.0%
Agricultural	$38,011	0.6%	$1,017	0.1%
Religion	$51,932	0.8%	$25,217	1.8%
Government	$26,539	0.4%	$25,850	0.4%
Education	$53,808	0.8%	$0	0.0%
Total	**$6,879,640**	**100%**	**$1,383,073**	**100%**

Note: *Nationwide Structure Inventory (NSI 2022) from the U.S. Army Corps of Engineers (USACE) served as the primary data source for the general building stock updates. NSI 2022 is more complete and vastly improves non-residential buildings data when compared to the previously used Hazus general building stock datasets. In addition, attributes for foundation type and number of stories, from Lightbox Parcel data in NSI 2022, greatly improve replacement cost valuation over previous regionally estimated Census methods. (Hazus 6.0 Baseline Data Updates, 2022).*

Hazus also estimates that 1,180 tons of debris would be generated by the flood scenario, which would require 48 truckloads (25 tons per truck) to remove the debris generated. Additionally, it is estimated that 109 people would be seeking short-term shelter, and 125 households would be displaced as a result of the flood event.

For more details on the Hazus methodology used and additional results reports, see Appendix E – Hazus Results Report.

Natural, Historic and Cultural Resources

The primary impact to the natural environment from flooding is sedimentation and erosion. Flood waters can carry sediment to new areas and clog riverbeds which can worsen downstream flood issues. In Charles County, the shoreline is highly vulnerable to nor'easters, tropical storms and hurricanes, particularly when these storms last 24 to 48 hours and are accompanied by high winds and storm surges. According to data made available through the Maryland Coastal Resiliency Assessment, approximately 9% of the County's coastline is subject to significant erosion rates of two feet per year or more. The areas subject to significant erosion are concentrated near the Indian Head peninsula, the mouth of Nanjemoy Creek, and the mouth of Port Tobacco River.

Flooding also impacts wildfire by causing destruction of habitat, displacement, injury, or death. Additionally, flood waters can carry pollutants such as pesticides, industrial chemicals, and other debris, all of which are harmful to humans. Similarly, floods are known to be one of the leasing causes of weather-related infectious disease outbreaks. Flooding events help spread waterborne diseases such as hepatitis A and cholera.

For information regarding historic and cultural resource vulnerability in Charles County, please refer to Chapter 5.

Community Activities

Charles County offers a variety of outdoor community activities year-round. The Charles County Fair, the CornStalker Trail of Horror, the Annual Port Tobacco Market Day, the ArtsFest, and the Sunflower Festival are all subject to delays or cancellation in the case of flooding. Other signature Charles County events subject to delays or cancellation from flooding include the Annual Red, White, & Blue Crabs Celebration, the Scarecrow Festival, and the weekly Pop Up & Grow Vendor Market. In addition to these events, all large gatherings can be vulnerable to cancellation in the case of flooding.

Locations in and around the SFHA are most likely to be disrupted or canceled in the event of a flood event. Parks are commonly utilized to hold outdoor events and recreation of all types, therefore those within the SFHA are more at risk. These parks include, but are not limited to, Gilbert Run Park, Port Tobacco River Park, and Southern Park.

Jurisdictional Differences

As shown in Tables 4.5-10 and 4.5-11, the unincorporated areas of Charles County are at the highest risk to flooding. For areas with higher populations, significant flooding will have a greater impact because there is a greater exposure of people and property to floodwater. Also, higher magnitude flooding in the County produces a greater need for evacuation and emergency response. Bennsville, Waldorf, and Issue, all of which are in the unincorporated areas of Charles County, are at a greater risk to experiencing potential losses from flooding as shown by results of the Hazus analysis.

Land Use and Development Trends

Charles County updated their FIRMs in 2013 and 2015 and subsequently adopted an updated floodplain ordinance. Therefore, it is unlikely that new development would occur in areas prone to flooding without careful consideration of flood hazards during the development review process. However, as the County's population continues to grow, flood impacts could potentially be more widespread. In communities with higher populations, significant flood or flash flood events will have a higher impact because there is a greater exposure of people and property to floodwaters. Also, higher magnitude flooding in the County produces a greater need for evacuation and emergency response.

While flooding remains a likely occurrence throughout the identified flood hazard areas of Charles County, smaller floods caused by heavy rains and inadequate drainage capacity will be more frequent, but not as costly as the large-scale floods which may occur at much less frequent intervals. While the potential for flood is always present, Charles County current policies and regulations for development will help reduce the potential for future damages due to floods.

4.6 Hurricane, Tropical Storm, Nor'easter

Table 4.6-1: Hurricane, Tropical Storm, Nor'easter Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Natural	2	3	4	1	2	**2.6**
MODERATE RISK (2.0 – 2.9)						

Location, Extent, and Range of Magnitude

Coastal hazards take many forms, ranging from storm systems like hurricanes, tropical storms, and Nor 'easters that can cause storm surge inundation and heavy precipitation that may lead to flash flooding and exacerbation of shoreline erosion. These events may also contribute to longer term hazards such as sea level rise.

Tropical cyclones, a general term for tropical storms and hurricanes, are low pressure systems that usually form over the tropics. These storms are referred to as cyclones due to their rotation. Tropical cyclones are among the most powerful and destructive meteorological systems on earth. Their destructive phenomena include very high winds, heavy rain, lightning, tornadoes, and storm surge. As tropical storms move inland, they can cause severe flooding, downed trees and power lines, and structural damage.

There are three categories of tropical cyclones:

1. **Tropical Depression:** maximum sustained surface wind speed is less than 39 mph.
2. **Tropical Storm:** maximum sustained surface wind speed from 39-73 mph.
3. **Hurricane:** maximum sustained surface wind speed exceeds 73 mph.

Once a tropical cyclone no longer has tropical characteristics it is then classified as an extratropical system. Most Atlantic tropical cyclones begin as atmospheric, as easterly waves propagate off the coast of Africa and cross the tropical North Atlantic and Caribbean Sea. When a storm starts to move toward the north, it begins to leave the area where the easterly trade winds prevail and enters the temperate latitudes where the westerly winds dominate. This produces the eastward curving pattern of most tropical storms that pass through the Mid-Atlantic region. When the westerly steering winds are strong, it is easier to predict where a hurricane will go. When the steering winds become weak, the storm follows an erratic path that makes forecasting very difficult.

Tropical storms and hurricanes are accompanied by a storm surge, an abnormal local rise in sea level. The storm surge is caused by the difference in wind and barometric pressure between a tropical system and the environment outside the system. The result is that water is pushed onto a coastline. The height of the surge is measured as the deviation from mean sea level and can reach over 25 feet in extreme circumstances. The most devastating storm surges occur just to the right of the eye of a land falling hurricane. For coastal areas, the storm surge is typically the most dangerous and damaging aspect of the storm.

Howling winds associated with Nor'easters also have the potential to produce significant storm surge, similar to that of a Category One hurricane. In addition, these types of storms can also produce wind gusts to near hurricane force as well as flooding rain and crippling snowfall. The Sea, Lake, and Overland Surges from Hurricanes (SLOSH) model is used to evaluate the potential impact of storm surge. Emergency managers use data from SLOSH to identify at-risk populations and determine evacuation areas. Storm surges also affect tidal rivers and creeks, potentially increasing evacuation areas, Map 4.6-1.

Hurricanes are categorized according to the Saffir/Simpson scale with ratings determined by wind speed and central barometric pressure. Hurricane categories range from One through Five, with Category Five being the strongest (winds greater than 155 mph). A hurricane watch is issued when hurricane conditions could occur within the next 36 hours. A hurricane warning indicates that sustained winds of at least 74 mph are expected within 24 hours or less. The National Weather Service (NWS) National Hurricane Center defines June 1 through November 30 as the Atlantic hurricane season. September is typically the most active month for tropical cyclones in Maryland.

The Saffir/Simpson scale, shown in Table 4.6-2, was developed in 1971 by Herbert Saffir and Dr. Robert Simpson to classify hurricanes. The scale rates the intensity of hurricanes based on wind speed and barometric pressure measurements. The scale gives an indication of the potential flooding and wind damages associated with each hurricane category. While major hurricanes comprise only 20% of all tropical cyclones making landfall, they account for over 70% of the damage in the United States.

Table 4.6-2: Saffir-Simpson Scale Categories with Associated Wind speeds and Damages (NHC, 2012)

STORM CATEGORY	WIND SPEED (MPH)	DESCRIPTION OF DAMAGE
1	74-95	**Very dangerous winds will produce some damage:** Well-constructed frame homes could have damage to roof, shingles, vinyl siding, and gutters. Large branches of trees will snap, and shallowly rooted trees may be toppled. Extensive damage to power lines and poles likely will result in power outages that could last a few to several days.
2	96-110	**Extremely dangerous winds will cause extensive damage:** Well-constructed frame homes could sustain major roof and siding damage. Many shallowly rooted trees will be snapped or uprooted and block numerous roads. Near-total power loss is expected with outages that could last from several days to weeks.
3	111-129	**Devastating damage will occur:** Well-built framed homes may incur major damage or removal of roof decking and gable ends. Many trees will be snapped or uprooted, blocking numerous roads. Electricity and water will be unavailable for several days to weeks after the storm passes.
4	130-156	**Catastrophic damage will occur:** Well-built framed homes can sustain severe damage with loss of most of the roof structure and/or some exterior walls. Most trees will be snapped or uprooted, and power poles downed. Fallen trees and power poles will isolate residential areas. Power outages will last weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

Table 4.6-2: Saffir-Simpson Scale Categories with Associated Wind speeds and Damages (NHC, 2012)		
STORM CATEGORY	**WIND SPEED (MPH)**	**DESCRIPTION OF DAMAGE**
5	> 157	**Catastrophic damage will occur:** A high percentage of framed homes will be destroyed, with total roof failure and wall collapse. Fallen trees and power poles will isolate residential areas. Power outages will last for weeks to possibly months. Most of the area will be uninhabitable for weeks or months.

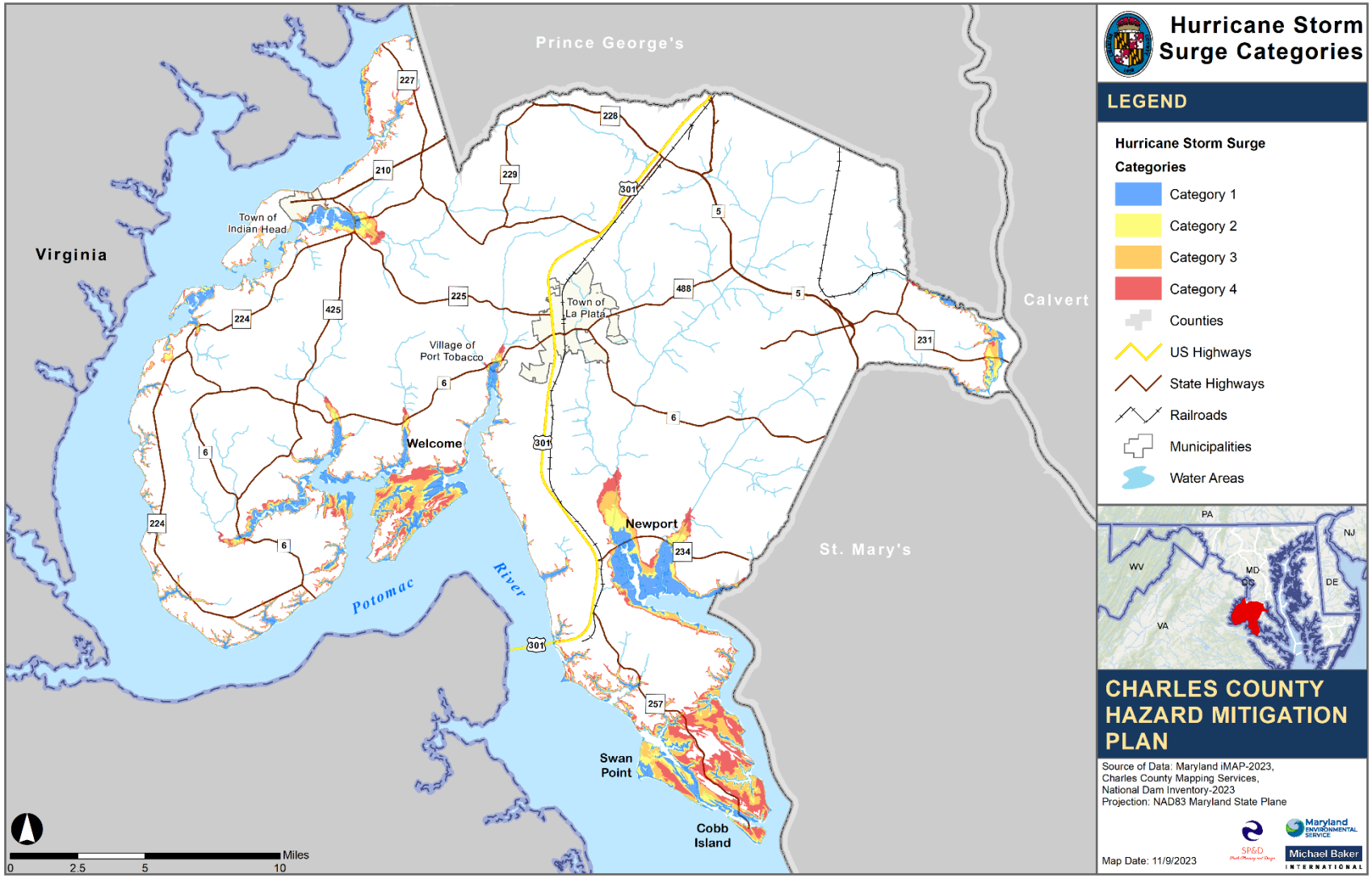
All of Charles County could be affected by a hurricane or a tropical storm. Since these events can disrupt power and inundate roads, tropical storms can cause havoc on the entire community. The county's proximity to the Chesapeake Bay exposes it to significant storm surge with considerable potential for flooding.

Map 4.6-2 depicts the wind zone for Charles County. The wind zones were established by the American Society of Civil Engineers based on information which includes 40 years of tornado history and over 100 years of hurricane history. Charles County falls into within Zone II. Shelters and critical facilities should be able to withstand a 3-second gust of up to 160 mph, regardless of whether the gust is the result of a tornado, coastal storm, or windstorm event. Therefore, these structures should be able to withstand the wind speeds experienced in a Category 5 event.

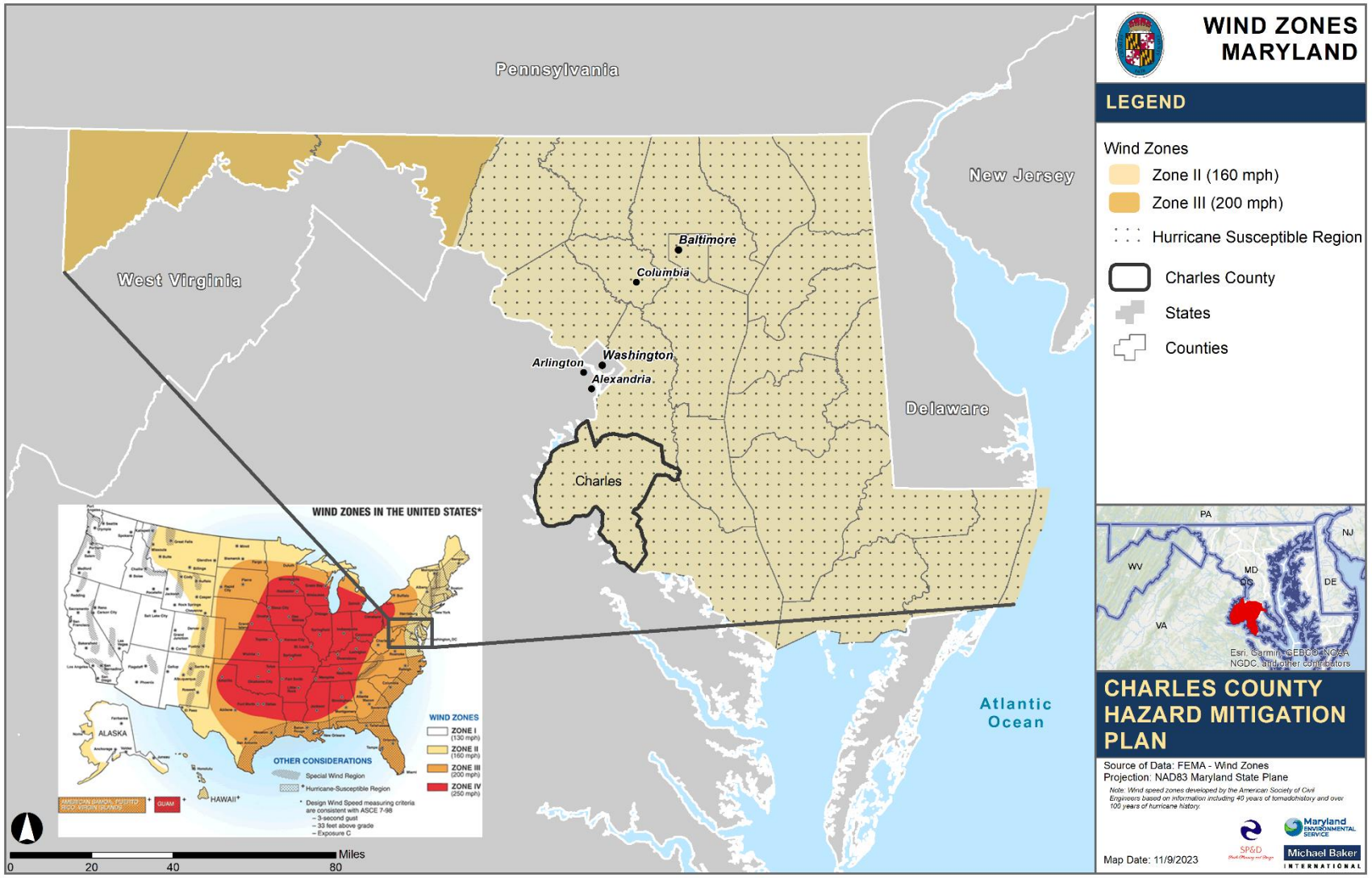
According to the NOAA, a Nor'easter is a cyclonic storm that moves along the east coast of North America. It is called "nor'easter" because the winds over coastal areas blow from a northeasterly direction. Nor'easters may occur any time of the year but are most frequent and strongest between September and April. These storms usually develop between Georgia and New Jersey within 100 miles of the coastline and generally move north or northeastward. Nor'easters typically become most intense near New England and the Canadian Maritime Provinces. In addition to heavy snow and rain, Nor'easters can bring gale force winds greater than 58 miles per hour. These storms can produce rough seas, coastal flooding, and beach erosion.

The East Coast of North America provides an ideal breeding ground for Nor'easters. During winter, the polar jet stream transports cold Arctic air southward across the plains of Canada and the U.S., and eastward toward the Atlantic Ocean, as warm air from the Gulf of Mexico and the Atlantic tries to move northward. The warm waters of the Gulf Stream help keep the coastal waters relatively mild during the winter, which in turn helps warm the cold winter air over the water. This difference in temperature between the warm air over the water and cold Arctic air over the land is the area where Nor'easters are born.

Map 4.6-1: Hurricane Storm Surge Categories – Charles County



Map 4.6-2: Wind Zones and Hurricane Susceptible Region in Maryland



Past Occurrence

Since 1950, there have been only 4 tropical storms that have affected Charles County. Table 4.6-3 gives a brief synopsis of those three events, according to the NOAA's Storm Events.

Table 4.6-3: Hurricane and Tropical Storm Events in Charles County since 1950 (NOAA, 2023)

DATES	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
9/16/1999	0	0	$25,000	$0
9/18/2003	0	41	$5,700,000	$10,000
8/11/2011	0	0	$1,300,000	$0
2023 PLAN UPDATE				
08/04/2020	0	0	$0	$0
Total	**0**	**41**	**$7,025,000**	**$10,000**

On September 16, 1999, Hurricane Floyd hit Maryland and resulted in property damage of approximately $200 million, roughly $25,000 of which occurred in Charles County. Hurricane Floyd made landfall just east of Cape Fear, North Carolina, in the early morning hours of the 16th and moved north-northeast across extreme southeast Virginia to near Ocean City, Maryland. A total of 5 to 8 inches fell across Baltimore, Prince George's, and Charles Counties. The amount of damage that Anne Arundel, Calvert, Charles, Harford, and St. Mary's Counties received from the storm qualified them for FEMA disaster assistance. Tidal flooding was reported along the Chesapeake Bay. In Charles County, over 20 roads were closed by flooding. Several trees and power lines were downed, resulting in 5,000 power outages.

On September 18, 2003, Charles County was struck by Hurricane Isabel. Initially Isabel was identified as a Category 2 hurricane that turned into a tropical storm by the time it struck Charles County. In Benedict, historic buildings along the Patuxent River sustained flooding from the storm surge, including some of the same houses severely damaged during the La Plata tornado in 2002. Cobb Island, a waterfront community, was hit by storm surge. This event caused approximately $5,700,000 in property damage and $10,000 in crop damage throughout the County.

On August 11, 2011, Charles County and many other counties in Maryland were hit by Hurricane Irene. Maximum sustained winds were about 80 mph when Hurricane Irene first made landfall near Ocean City, indicating that it was a Category One hurricane at landfall. The hurricane produced tropical storm conditions for Charles County and the rest of the state. There was no reported crop damage, but over $1 million in property damage was recorded.

On August 4, 2020, Tropical Storm Isaias moved up the east coast, passing through southern Maryland, spawning several tornadoes as well as flooding rain and tropical storm force winds. Sustained winds of 39 mph were reported at the Quantico Marine Corps Airfield, with a peak wind gust of 56 mph.

Although NOAA's Storm Events database only lists these four events for Charles County, the County may have been impacted by other hurricane and tropical storm events that have affected the State of Maryland. These additional events are listed below:

August 27, 1667 - Unnamed Hurricane: A strong hurricane ripped through the Mid-Atlantic region, causing 1667 to be known as "the Year of the Hurricane". A government report noted, "A mighty wind...destroyed four-fifths of (our) tobacco and corn and blew down in two hours fifteen thousand houses in Virginia and Maryland." Several separate accounts of the storm describe the great devastation. This was known as a benchmark storm for many generations.

October 15, 1954 - Hurricane Hazel: Hurricane Hazel made landfall as a Category 4 hurricane near the North Carolina-South Carolina border on October 15. Hurricane-force gusts swept the eastern half of Maryland, while heavy rains pounded the west. Washington National Airport reported a record sustained wind of 78 mph with gusts up to 98 mph. Gusts near 100 mph were commonplace throughout the Chesapeake Bay region and on the Eastern Shore. Severe flooding occurred along the bay and its tidal tributaries, and flash flooding plagued western Maryland, where 3-6 inches of rain fell. Generally, less than 2 inches of rain fell in the eastern half of the state.

August 12 and 18, 1955 - Hurricanes Connie and Diane: Hurricanes Connie and Diane both passed over Maryland as tropical storms within several days of each other, on August 12 and 18, respectively. The rains from Connie set the stage for the devastating floods caused by Diane, which poured 10-20 inches of rain on the already-soaked region. Major flooding occurred in central Maryland, particularly along the Potomac River. Strong gales from Connie sunk the tour schooner Levin J. Marvel, about 20 miles south of its home port of Annapolis, and fourteen passengers drowned.

June 21-23, 1972 - Hurricane Agnes: Hurricane Agnes moved through the Atlantic past Maryland as a tropical storm on June 21-23. Widespread and in some places record flooding wrought one of the state's most destructive natural disasters. In the tributaries on the north side of the Potomac River, from the Conococheague Creek at Fairview, Maryland down to Rock Creek at Washington, DC, floods in excess of the 100-year frequency level were observed. Many roads were closed, particularly in central Maryland, and thousands of evacuations occurred. The event proved to be an ecological calamity for the Chesapeake Bay. The damage in Maryland was in excess of $1.1 million, and there were 19 deaths.

July 13, 1996 - Hurricane Bertha: Hurricane Bertha moved across the Lower Maryland Eastern Shore on July 13th. The highest sustained wind speed recorded was 23 mph at Salisbury, with gusts up to 63 mph at Ocean City. One confirmed tornado was spawned by the hurricane near Madison in Dorchester County. Numerous trees and power lines were blown down and resulted in scattered property damage and power outages. Rainfall amounts generally ranged from to 5.0 inches and caused some street flooding. Property damages of $100,000 and crop damages of $15,000 occurred.

September 6, 1996 - Tropical Storm Fran: Spiral bands associated with Hurricane Fran affected the Lower Maryland Eastern Shore during Friday, September 6th. The highest sustained wind speed recorded was 22 mph at Salisbury with gusts of 35 mph. A storm surge of 4 to 6 feet inundated portions of the communities of Taylors Island, Hoopers Island, and Madison in Dorchester County along the Chesapeake Bay. Many roads were flooded with some homes receiving water damage at the time of high tide. Dorchester, Wicomico, Somerset, and Worcester counties were affected, and property damages reached $1 million. Storm winds channeled water up the Chesapeake Bay and its main tributaries, which became

a small-scale storm surge, causing $1.6 million in property damages and $5,000 in crop damages in central Maryland.

October 8, 1996 - Tropical Storm Josephine: Remnants of Tropical Storm Josephine moved quickly up the East Coast during Tuesday, October 8th, affecting the Lower Maryland Eastern Shore. The storm produced 1.5 to 3.5 inches of rain resulting in flooding of several roads. The storm caused $100,000 in damages.

September 16, 1999 - Hurricane Floyd: Hurricane Floyd moved north-northeast across extreme southeast Virginia and reached Maryland near Ocean City by evening on the 16th. Hurricane Floyd was a Category 1 hurricane as it crossed the Wakefield WFO County warning area. The storm surge caused tides two to three feet above normal throughout central Maryland. Tropical storm force wind gusts occurred in the northwest quadrant of the storm over portions of the Lower Maryland Eastern Shore. Property damages of over $1 million and crop damages of $575,000 occurred.

September 18, 2003 - Hurricane Isabel: Hurricane Isabel had been downgraded to a tropical storm by the time it reached Maryland, but it still caused significant damage in the state. Isabel's eye tracked well west of the bay, but the storm's 40 to 50 mph sustained winds pushed a bulge of water northward up the bay and its tributaries producing a record storm surge. The Maryland western shore counties of the Chesapeake Bay and along the tidal tributaries of the Potomac, Patuxent, Patapsco, and other smaller rivers experienced a storm surge that reached 5 to 9 feet above normal tides. Over 2000 people were evacuated from their homes. Many buildings were destroyed, and the Lower Maryland East Shore suffered the worst power outages in history. The storm caused one fatality, 200 injuries, $530 million in property damages, and $190,000 in crop damages. Counties affected included Anne Arundel, Calvert, Charles, Harford, Baltimore, Prince George's, and St. Mary's.

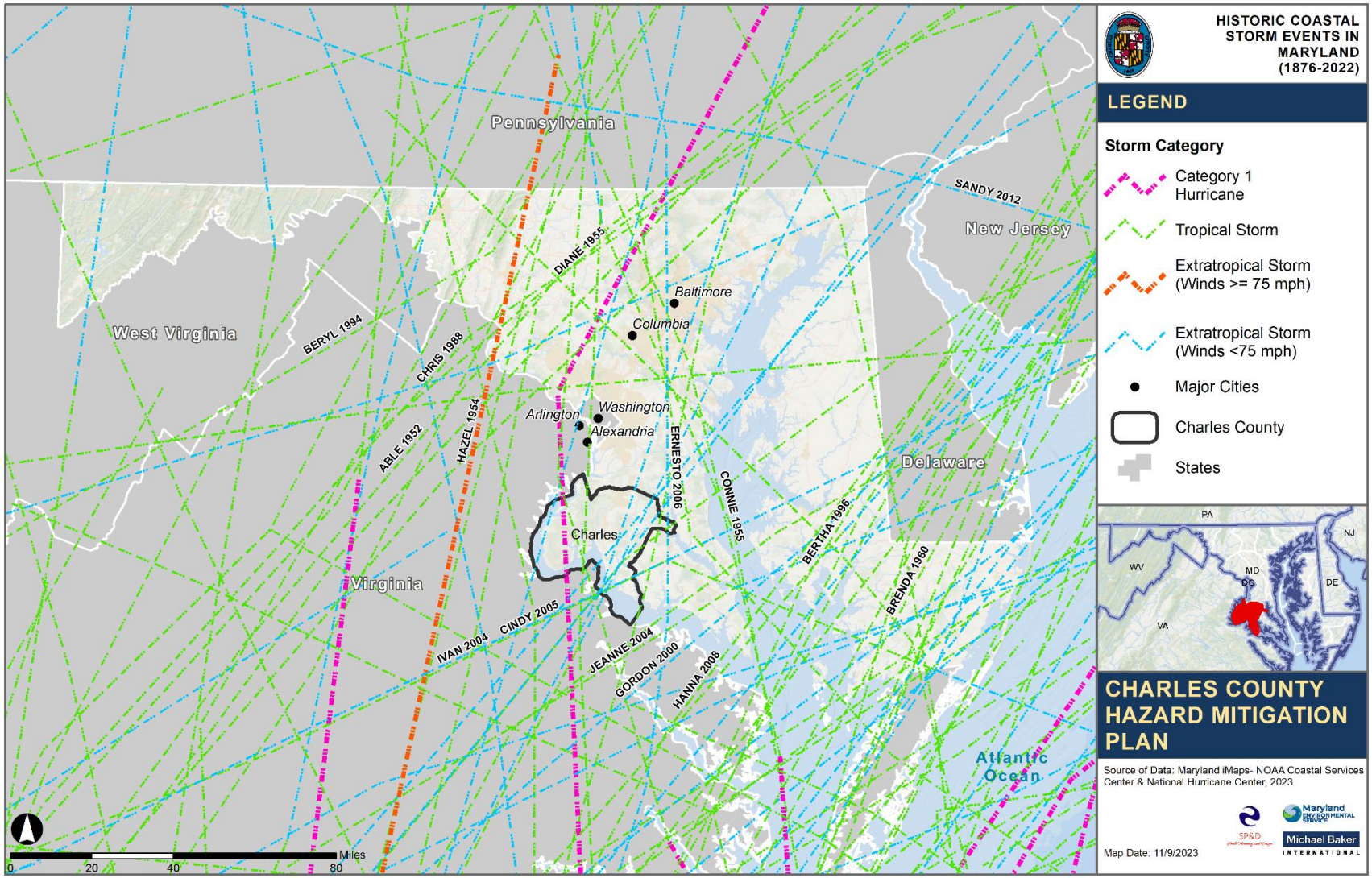
September 1, 2006 - Tropical Storm Ernesto: Moderate coastal flooding occurred due to the storm surge from the remnants of Tropical Storm Ernesto. The tide crest at Annapolis was 3.56 MLLW late Friday. In Charles County, mandatory evacuations were ordered due to the flooding, with many roads flooded. Property damage reached $50,000.

September 6, 2008 - Tropical Storm Hanna: Tropical Storm Hanna brought heavy rain, strong winds and some tidal flooding to the Eastern Shore during the day and into the evening of the 6th. Maximum sustained winds reached 50 mph. Tree damage was sustained throughout much of the state, and many roads were closed due to trees down.

September 6-9, 2011 – Tropical Storm Lee: On September 1st, 2011, Tropical Storm Lee developed in the northern Gulf of Mexico and made landfall in Louisiana on September 4th. The storm moved northeast towards the Tennessee Valley before coming extratropical. On Wednesday morning, September 7th, a torrential rainband set up above Charles County, stretching all the way to Baltimore. Rain accumulation reached 2 to 3 inches per hour, resulting in numerous home evacuations, rescues, road closures, flooding, and property damage. A Disaster Declaration was declared on October 5, 2011, for the entire State. Central Charles County and Ellicott City in Howard County were hit particularly hard (NOAA NWS, 2011). The County experienced $1,270,422.02 in reimbursable damages, including over $1 million in Public Assistance (FEMA, 2018).

September 2, 2016 - Tropical Storm Hermine: Tropical Storm Hermine affected the Southern Coast and Lower Maryland Eastern Shore areas. The affected counties were Dorchester, Wicomico, Somerset, and inland portions of Worchester as well as Maryland's Beaches. Tropical Hermine produced wind gusts, minor coastal flooding, and heavy rainfall for nearly three days. Map 4.6-3 shows hurricane tracks that have crossed Charles County and the rest of Maryland.

Map 4.6-3: Hurricane Tracks across Maryland



Future Occurrence

Although hurricanes and tropical storms can cause flood events consistent with 100- and 500- year levels, their probability of occurrence is measured relative to wind speed. Table 4.6-4 shows the probability of winds that reach the strength of tropical storms and hurricane conditions in Charles County and surrounding areas based on a statistical sample region of more than 30,000 square miles over a period of 46 years.

Table 4.6-4: Annual Probability of Tropical Storm and Hurricane Strength Wind Speeds for Charles County (ASCE, 2003)

WIND SPEED (MPH)	CORRESPONDING SAFFIR-SIMPSON TROPICAL STORM/HURRICANE CATEGORIES	ANNUAL PROBABILITY OF OCCURENCE
45 - 77	Tropical Storms and Category 1 Hurricanes	91.59%
78 - 118	Category 1 to 2 Hurricanes	8.32%
119 - 138	Category 3 to 4 Hurricanes	0.0766%
139 - 163	Category 4 to 5 Hurricanes	0.0086%
164-194	Category 5 Hurricanes	0.00054%
195 +	Category 5 Hurricanes	0.00001%

Table 4.6-4 includes wind speeds for all types of storms and is not specific to cyclonic winds. In Charles County and surrounding areas, the annual probability for winds that equal the strength of tropical storms (over 39 mph) is over 90 percent. The probability for winds at category 1 or 2 hurricane strength (78-118 mph) is greater than 8% in any given year. Combing this information with that in Table 4.6-1, these wind speeds correspond to minimal or moderate expected damages. The annual probability of winds exceeding 118 mph is less than 0.1 %.

Based on the frequency of historic occurrences as well as rising sea levels, the future probability of increased coastal hazard events in the Charles County is likely. Additionally, according to the Fourth National Climate Assessment (NCA4), climate change will impact and exacerbate coastal hazards.

NCA4 projects various major trends over the next 25 to 100 years relevant to coastal hazard impacts and future event probability. The strongest hurricanes are expected to “become both more frequent and more intense,” and result in more rainfall. Additionally, coastal hazard events interacting with sea level rise amplify many hazard impacts.

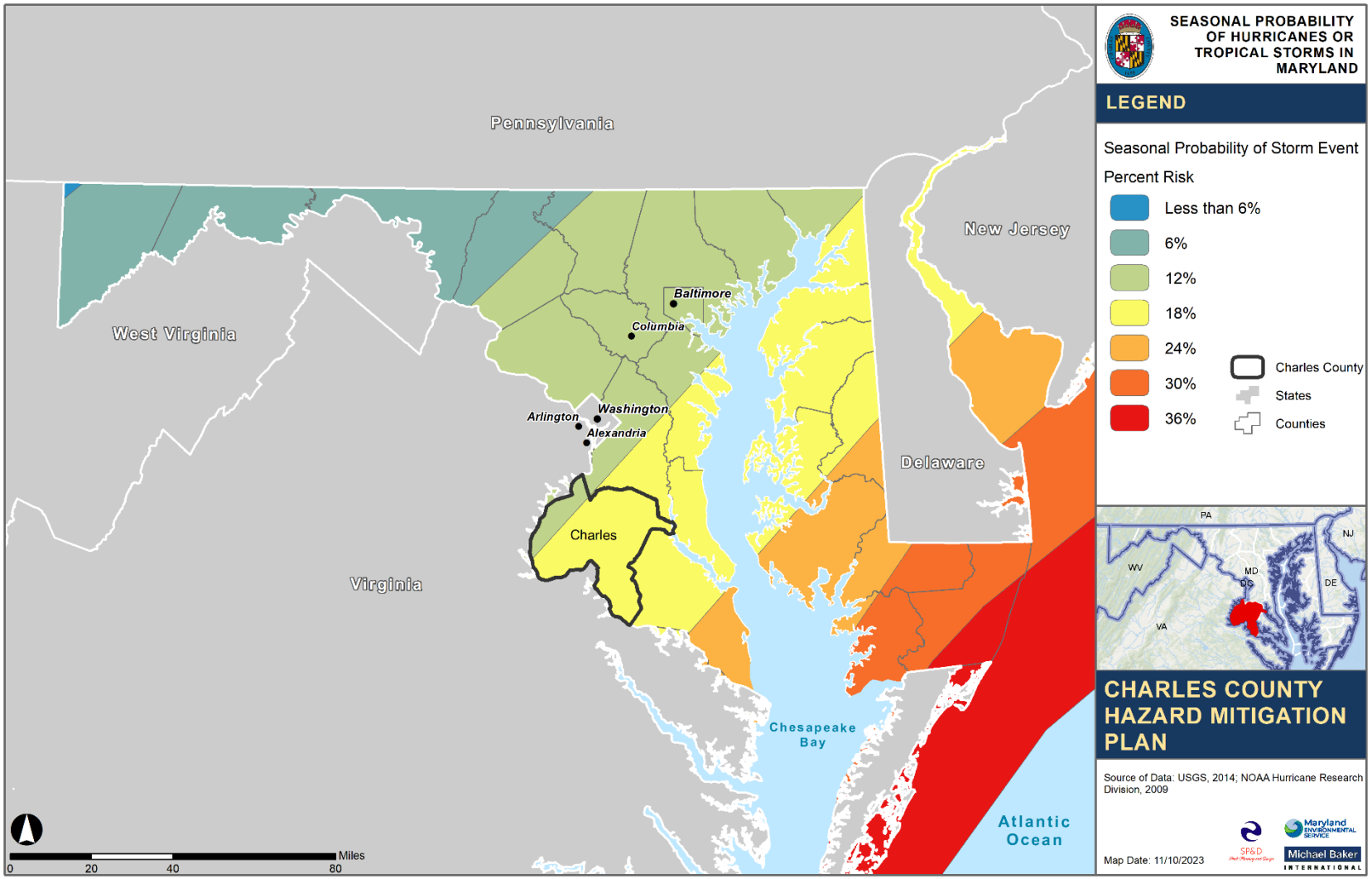
According to Sea-level Rise Projections for Maryland 2018, in the Northeast region of the United States, sea level rise is anticipated to exceed global mean sea rise with an increase of 1.2 feet by 2050 (Central Estimate, 50% probability SLR meets or exceeds) or up to 1.6 feet by 2050 (Likely Range, 67% probability SLR is between 0.8 and 1.6 feet). The most extreme sea level rise scenario within the 2018 report estimates 6.9 feet of sea level rise by 2100 under the “growing” emissions pathway. By 2150, under the same pathway, the highest estimate is 12.4 feet of sea level rise (Jay et al., 2018).

Storm surges are higher as a result of sea level rise. Coastal flooding is also exacerbated, among other phenomena such as shoreline erosion. According to the 2021 State Hazard Mitigation Plan, as sea levels

rise due to changing climate conditions, the impacts on tidal levels can be noted. Nuisance flooding is expected to increase through 2022, and by 2050, on a national scale, nuisance flooding is expected to occur about 45-70 days/year on average according to NOAA's State of High Tide Flooding and Annual Outlook.

The map included as Map 4.6-4 shows the chances of a tropical storm or hurricane affecting a given area of Maryland during the entire Atlantic hurricane season spanning from June to November. Note that this figure does not provide information on the probability of various storm intensities. However, based on historical data, this map reveals there is between a 12% to an 18% chance of Charles County experiencing a tropical storm or hurricane event between June and November of any given year, depending on the location within the County. The probability of future Hurricane, Tropical Storms, and Nor'easters impacting the County can be considered *possible* (2 of 4) according to the Risk Factor Methodology.

Map 4.6-4: Seasonal Probability of Hurricanes or Tropical Storms Affecting Charles County



Vulnerability Assessment

A vulnerability assessment for hurricanes and tropical storms focuses on the impacts of flooding and severe wind. Charles County is vulnerable to the impact of flooding and severe wind caused by these events. Historic data indicates that while storm tracks occasionally track over Charles County, impacts from associated rain can be felt in low-lying communities that face similar vulnerability from flooding events. A detailed assessment of Charles County's flood-related vulnerability is addressed in Section 4.5, while its vulnerability to wind damage is addressed in Section 4.4.

Category 1 Hurricanes and/or tropical storms are the most likely hurricane storm category to impact Maryland. These storms tend to lose their intensity as they travel from their point of origin up the Atlantic coastline. More often than not these storm events are downgraded to a Tropical Storm or Depression by the time they reach Maryland. Therefore, the hurricane Category 1 storm surge inundation area was intersected with critical facilities and building footprints to determine vulnerability.

People

Impacts to the public include potential for injury or loss of life, and destruction and/or loss of land and property due to flood and high winds. Storm surge and inland flooding have historically been the number one and two causes of loss of life during hurricanes. Flooding caused by storm surge can contaminate water with harmful bacteria and viruses that cause foodborne and waterborne illnesses.

Health Impacts of Extreme Weather

Although everyone is vulnerable to health impacts associated with extreme weather events, some populations may be more vulnerable than others. Children, pregnant woman, older adults, people with outdoor jobs, and persons with disabilities or with preexisting health conditions may be disproportionately impacted. Additionally, individuals affected by poverty, communities that live near contaminated waste sites or industrial areas, and rural areas with limited health systems may be more impacted by extreme weather events.

Source: NIEHS – Health Impacts of Extreme Weather

1 The Maryland Department of Emergency Management encourages all Marylanders to:

"Be Prepared: Know Your Zone, Have a Plan, Stay Informed and Have a Kit Systems"

"The Know Your Zone program allows local emergency officials to order evacuations by letter zones (A, B, and C) to provide information more easily to those in the area. To determine if you live, work, or visit an evacuation zone in Maryland, please go to KnowYourZoneMD.com and click on the "Find Your Zone" link.

Type in the address of the property you are interested in and you will find out if the location is in an evacuation zone.

Please note that the zones are for evacuations from storm surge or tidal flooding along the Chesapeake Bay, its tributaries, the coastal bay, and ocean on the Eastern Shore. The zones do NOT apply to inland and flash floods."

Systems

A major nor'easter event would be costly for state and local governments because of the potential for damage from flooding and high winds. Some of the costs could be recouped through federal grant reimbursements, but local governments would still feel the fiscal impact of a major event.

Utilizing the Category 1 hurricane storm surge inundation area, one (1) pump station and one (1) well was located within the inundation area. The Cobb Island pump station and the well lot located on Southview Road could potentially be impacted by storm surge. If the pump station was inundated due to storm surge, its failure could cause untreated sewerage to back up into the community, causing public safety health risks and environmental damage. Storm surge inundation could potentially cause damage to the well's casing and/or the associated plumbing. If storm surge water inundated impacts the well casing, water quality could be affected. The impact on water quality may have long-term implications for public health. The risk at these facilities from future storms is increased due to sea level rise and increased storm surge.

Structures

Home and landowners within coastal regions may experience damage to or loss of property depending upon the severity of flooding and winds in the area. Infrastructure may experience impacts in the form of damage to roads and bridges, temporary closure of transportation routes, and the potential inability of the stormwater system to handle floodwaters in a severe event.

The vulnerability analysis with building footprints and the Category 1 hurricane storm surge inundation area indicated that 141 mobile homes are vulnerable. Manufactured homes historically have been some of the most vulnerable structures to hurricanes. Mobile homes are particularly vulnerable to hurricane-force wind damage, and residents of these communities tend to be less economically resilient than the general population. Therefore, further analysis should be conducted to determine mitigation measures. FEMA's Protecting Manufactured Homes from Floods and Other Hazards should be referred to when considering proper mitigation measures.

Natural, Historic and Cultural Resources

Shoreline erosion would be the major impact to the coastal environment during a nor'easter. In addition, potential impacts from storm surge include damage to or complete destruction of historic structures and places. A complete vulnerability analysis for cultural and historic resources was conducted and is included in Chapter 5 Cultural and Historical Resources Vulnerability Assessment.

Community Activities

Reviewing community calendar events for Charles County and its municipalities, events occurring during hurricane season, June through November, have the potential to be impacted. Annuals events occurring hurricane season for Charles County and its municipalities include but are not limited to: the Charles County Fair, Cornstalkers, Vampire Manor, Market Day, the Sunflower Festival, Artsfest, the La Plata Summer Concert Series, Vikingscon – La Plata, and Veterans Day Ceremony – Indian Head. Moreover, all events from June through November can be affected by hurricanes if they occur.

Jurisdictional Differences

All of Charles County could be affected by a hurricane or a tropical storm. Since these events can disrupt power and inundate roads, tropical storms can cause havoc on the entire community. The county's proximity to the Chesapeake Bay exposes it to significant storm surge with considerable potential for flooding. More densely populated communities that are near flood prone watercourses such as Indian Head, Port Tobacco, and unincorporated areas of the County are particularly vulnerable. Additionally, as shown in Map 4.6-3, the northwestern section of the County is less likely to be impacted by hurricane or tropical storm events based on the seasonal probability of a storm event.

Land Use and Development Trends

The type and age of development play a role in vulnerability to hurricanes and tropical storms. In general, concrete, brick, and steel-framed structures tend to fare better than older, wood-framed structures or manufactured homes. As Charles County continues to grow and develop, it is therefore important to ensure that all development is built to code to withstand impacts from flooding and severe wind associate with hurricanes.

4.7 Severe Winter Storms

Table 4.7-1: Severe Winter Storm Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Natural	2	1	4	1	3	**2.1**
MODERATE RISK (2.0 – 2.9)						

Location, Extent, and Range of Magnitude

Charles County has been impacted by varying degrees of winter weather over the last century; however, the occurrence of severe winter weather in the County is relatively infrequent, even during winter months. Severe winter weather can cause hazardous driving conditions, communication and electrical power failure, community isolation, and can adversely affect business continuity. This type of severe weather may include one or more of the following winter factors:

Blizzards: As defined by the NWS, blizzards are a combination of sustained winds or frequent gusts of 35 mph or greater and visibilities of less than a quarter mile from falling or blowing snow for 3 hours or more. A blizzard, by definition, does not indicate heavy amounts of snow, although they can happen together. The falling or blowing of snow usually creates large drifts from the strong winds. The reduced visibilities make travel, even on foot, particularly treacherous. The strong winds may also support dangerous wind chills. Ground blizzards can develop when strong winds lift snow off the ground and severely reduce visibilities.

Heavy snow: Heavy snow may fall in large quantities during winter storms. Six inches or more in 12 hours or eight inches or more in 24 hours constitutes conditions that may significantly hamper travel or create hazardous conditions. The NWS issues warnings for such events. Smaller amounts can also make travel hazardous, but in most cases, only results in minor inconveniences. Heavy wet snow, before the leaves fall from the trees in the fall or after the trees have leafed out in the spring, may cause problems with broken tree branches and power outages.

Ice storms: Ice storms develop when a layer of warm (above freezing), moist air aloft coincides with a shallow cold (below freezing) pool of air at the surface. As snow falls into the warm layer of air, it melts to rain, and then freezes on contact when hitting the frozen ground or cold objects at the surface, creating a smooth layer of ice. This phenomenon is called freezing rain. Similarly, sleet occurs when the rain in the warm layer subsequently freezes into pellets while falling through a cold layer of air at or near the Earth's surface. Extended periods of freezing rain can lead to accumulations of ice on roadways, walkways, power lines, trees, and buildings. Almost any accumulation can make driving and walking hazardous. Thick accumulations can bring down trees and power lines.

Extreme Cold: In extended periods, although infrequent, could occur throughout the winter months in Charles County. Heating systems compensate for the cold outside. Most people limit their time outside during extreme cold conditions, but common complaints usually include pipes freezing and cars refusing to start. When cold temperatures and wind combine, dangerous wind chills can develop.

Wind Chill is how cold it "feels" and is based on the rate of heat loss on exposed skin from wind and cold. As the wind increases, it draws heat from the body, driving down skin temperature, and eventually, internal body temperature. Therefore, the wind makes it feel much colder than the actual temperature. For example, if the temperature is 0°F and the wind is blowing at 15 mph, the wind chill is -19°F. At this wind chill, exposed skin can freeze in 30 minutes. Wind chill does not affect inanimate objects.

Severe winter weather can result in the closing of primary and secondary roads, particularly in rural locations, loss of utility services, and depletion of oil heating supplies. Environmental impacts often include damage to shrubbery and trees due to heavy snow loading, ice build-up, and/or high winds which can break limbs or even bring down large trees. Gradual melting of snow and ice provides excellent groundwater recharge; however, high temperatures following a heavy snowfall can cause rapid surface water runoff and severe flash flooding.

The State of Maryland does have an extensive history of severe winter weather. Maryland's greatest winter storms are the Nor'easters. For nor'easters to occur in Maryland, an arctic air mass would be in place. While high pressure builds over New England, cold arctic air flows south from the high-pressure area. The dense cold air is unable to move west over the Appalachian Mountains; therefore, it funnels south down the valleys and along the Coastal Plain. Winds around the Nor'easter's center can become intense. The strong northeast winds that rack the East Coast and inland areas give the storm its name. The wind builds large waves that batter the coastline and sometimes pile water inland, causing major coastal flooding and severe beach erosion. Unlike hurricanes, which usually come and go within one tide cycle, a Nor'easter can linger through several tides, each one piling more and more water on shore and into the bays while dragging more sand away from the beaches.

Past Occurrence

Table 4.7-2 below represents past reported events of blizzards, heavy snow, winter storms, and winter weather in Charles County from 1950 until August 2023. While table 4.7-3 depicts past reported events of frost/freeze, ice storms, and sleet from 1950 until August 2023. Data for both tables was gathered from the NOAA's Storm Events Database and may not represent all events of severe winter storms in Charles County.

The most damaging severe winter storm event in Charles County took place on February 4-7 and February 9-11, 2010, and resulted in a total of $5,000 in damages. According to NOAA, a total of 24 inches of snow fell Northeast of Bryantown, causing fallen trees and subsequent power outages.

Of the many winter storms to affect Charles County, February 13, 2003, was the most devastating and could be considered a worst-case scenario event statewide. Resulting in the injury of 10 people and over $5.2 million in property damage throughout the Maryland, this complex storm system produced copious amounts of wintry precipitation west of the Chesapeake Bay. After the precipitation came to an end, record-breaking snow and sleet accumulations were reported. Across the extreme southern part of Maryland, accumulations of mainly sleet ranged from 7 to 12 inches. As a general rule, 1 inch of sleet accumulation is equivalent to 3 inches of snow. Therefore, areas that received mainly sleet during this massive winter storm received accumulations around two-thirds less precipitation than areas that had

only snow, even though they were impacted by the same storm system. This massive storm took a heavy toll on residents, structures, transportation systems, emergency responders, businesses, livestock, and travelers. A state of emergency was declared by the governor of Maryland and people across the State were ordered to stay off the roads during the height of the storm between the morning of the 16th and the morning of the 17th. In Charles County, the roof of an educational building in Doncaster caved in. Other buildings across the County that sustained structural damage included an auto shop, warehouse, garage, and two stores.

In 2016, a blizzard impacted Charles County. Snowfall totaled up to 13 inches near Hughesville and 23.5 inches near Waldorf. Gusty winds and low visibility also accompanied the storm, although no damages were reported according to NOAA.

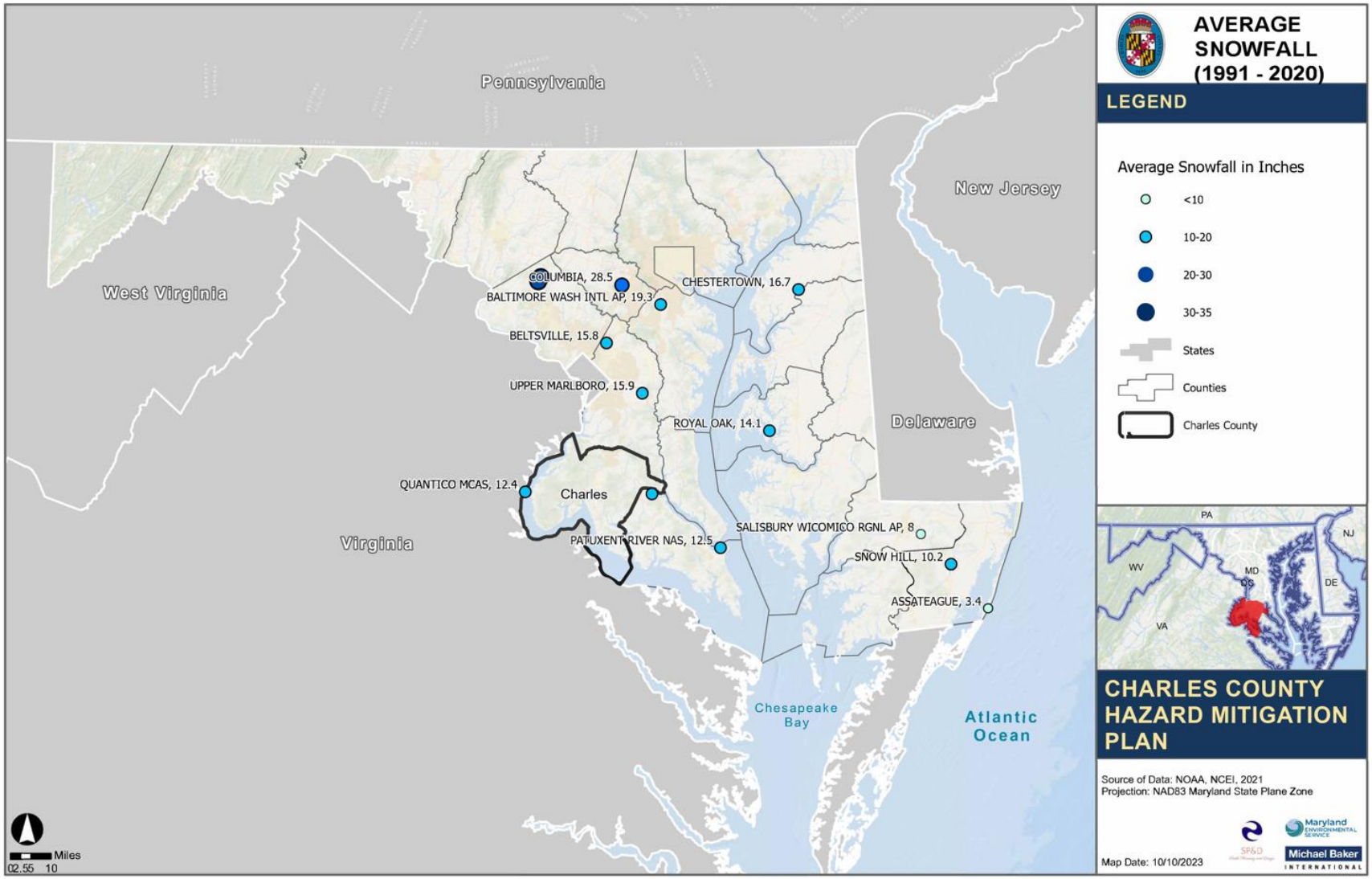
More recently, a winter storm accumulated up to 14 inches of snow in Charles County on January 3, 2022. The consequences of the snowstorm lasted several days, as some residents in the county were left without power. In total, around 70,000 residents in Maryland lost power, including an estimated 10,000-15,000 residents from Charles County. At the time, the Washington Post called the event "the biggest snowstorm in three years" (Samenow, 2022).

Table 4.7-2: Snowstorm Occurrences in Charles County: Blizzards, Heavy Snow, Winter Storm, Winter Weather (NOAA, 2023)

YEAR OF EVENT	NUMBER EVENTS	NUMBER OF INJURIES	NUMBER OF DEATHS	CROP DAMAGE	PROPERTY DAMAGE
1960-2012	69	0	0	$0	$5,000
2013	8	0	0	$0	$0
2014	0	0	0	$0	$0
2015	0	0	0	$0	$0
2016	6	0	0	$0	$0
2017	3	0	0	$0	$0
2023 PLAN UPDATE					
2018	4	0	0	$0	$0
2019	2	0	0	$0	$0
2020	0	0	0	$0	$0
2021	3	0	0	$0	$0
2022	3	0	0	$0	$0
Total:	**98**	**0**	**0**	**$0**	**$5,000**

Table 4.7-3: Ice storm Occurrences in Charles County: Frost/Freeze, Ice Storm, Sleet (NOAA, 2023)					
YEAR OF EVENT	NUMBER EVENTS	NUMBER OF INJURIES	NUMBER OF DEATHS	CROP DAMAGE	PROPERTY DAMAGE
1960-2012	10	0	0	$0	$0
2013	2	0	0	$0	$0
2014	2	0	0	$0	$0
2015	1	0	0	$0	$0
2016	4	0	0	$0	$0
2017	0	0	0	$0	$0
2023 PLAN UPDATE					
2018	1	0	0	$0	$0
2019	1	0	0	$0	$0
2020	1	0	0	$0	$0
2021	2	0	0	$0	$0
2022	0	0	0	$0	$0
Total:	**24**	**0**	**0**	**$0**	**$0**

Map 4.7-1: Severe Winter Storms



Future Occurrence

The probability of the County and its municipalities experiencing a severe winter storm can be difficult to quantify but based on historical record of 86 snowstorm events and 19 ice storm events since 1950, it can reasonably be assumed that the probability of future winter storm events is *likely* (3 out of 4) according to the Risk Factor Methodology.

Vulnerability Assessment

All assets located in Charles County can be considered at risk to severe winter storms. This includes 100 percent of the County's population, structures, critical facilities, and infrastructure. Damages can primarily occur as a result of cold temperatures, heavy snow or ice, and sometimes strong winds. Due to their regular occurrence, these storms are considered hazards only when they result in damage to specific structures or cause disruption to traffic, communications, electric power, or other utilities.

Since winter storms have become a regular occurrence in Charles County, as well as other counties throughout Maryland, strategies have been developed to respond to these events. Snow removal and utility repair equipment is present to respond to typical events. The use of auxiliary heat and electricity supplies such as wood burning stoves, kerosene heaters, and gasoline power generators reduces the vulnerability of specific structures. Locations lacking adequate equipment to protect against cold temperatures or significant snow and ice are more vulnerable to winter storm events. Even for communities that are prepared to respond to winter storms, severe events involving snow accumulations that exceed six or more inches in a twelve-hour period can cause a large number of traffic accidents, interrupt power supply and communications, and cause the failure of inadequately designed and/or maintained roof systems.

People

Winter storms can cause frostbite or loss of life for people without heating or adequate shelters. In addition, dangerous road conditions can lead to accidents, injuries, or loss of life.

Home and landowners throughout the state may also experience varying levels of damage to property depending upon snow and ice loads, though damage is usually minimal.

Systems

Some rural areas of the County may be more susceptible to isolation due to the potential loss of telephone communications and road closings. Power failures and interruption of water supplies are not uncommon from ice storms as well as heavy snow or blizzard conditions. Particular areas of vulnerability include low-income and elderly populations, mobile homes, and infrastructure such as roadways and utilities that can be damaged by such storms. Additionally, low-lying areas of the County can be impacted by flooding related to rapid snow melt.

A major winter weather event would be costly for state and local governments because of the potential for damages associated with property (during severe storms), storm cleanup, and loss of power. Some of

the costs could be recouped through federal grant reimbursements, but local governments would still feel the fiscal impact of a major event.

Structures

A winter storm can adversely affect roadways, utilities, business activities, and cause freezing conditions. They can result in the closing of secondary roads, particularly in rural locations, loss of utility services, and depletion of oil heating supplies. Most structures, including the County's critical facilities, should be able to provide adequate protection. However, if there is a heavy snowfall or a significant accumulation over time, the weight of the snow may cause building damage or even collapse. Those facilities with back-up generators are better equipped to handle a severe weather situation should the power go out.

Natural, Historic, and Cultural Resources

Environmental impacts of winter storms often include damage to shrubbery and trees due to heavy snow loading, ice build-up and/or high winds which can break limbs or even bring down large trees. An indirect effect of winter storms is the treatment of roadway surfaces with salt, chemicals, and other de-icing materials which can impair adjacent surface and ground waters. This is particularly a concern in highly urban areas. Additionally, rapid snowmelt may also lead to flash flood events, which causes further environmental impacts.

Community Activities

The Charles County Fair Board and Christmas Market Committee plan the Kris Kringle Christmas Market event each December. Activities typically include fireworks, music, and food and craft vendors. Because the weekend-long event features several outdoor activities, it is vulnerable alongside other large gatherings to postponement or cancellation if a severe winter storm affects the area.

Jurisdictional Differences

While all areas of the County are equally likely to be impacted by a severe winter storm, population and building density has a correlation with vulnerability and potential losses due to this hazard event. Therefore, more developed and populated sections of the County are more vulnerable to the potential impacts of severe winter storms.

Land Use and Development Trends

As the population of Charles County continues to grow, new development can increase vulnerability by increasing the number of assets exposed to the potential impacts of winter storms event. As discussed, all buildings are vulnerable to widespread utility disruptions, including loss of heat and electricity, as well as structure collapse or damage from downed trees.

4.8 Temperature Extremes

Table 4.8-1: Temperature Extremes Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Natural	4	2	4	1	3	**3.0**
HIGH RISK (3.0 or higher)						

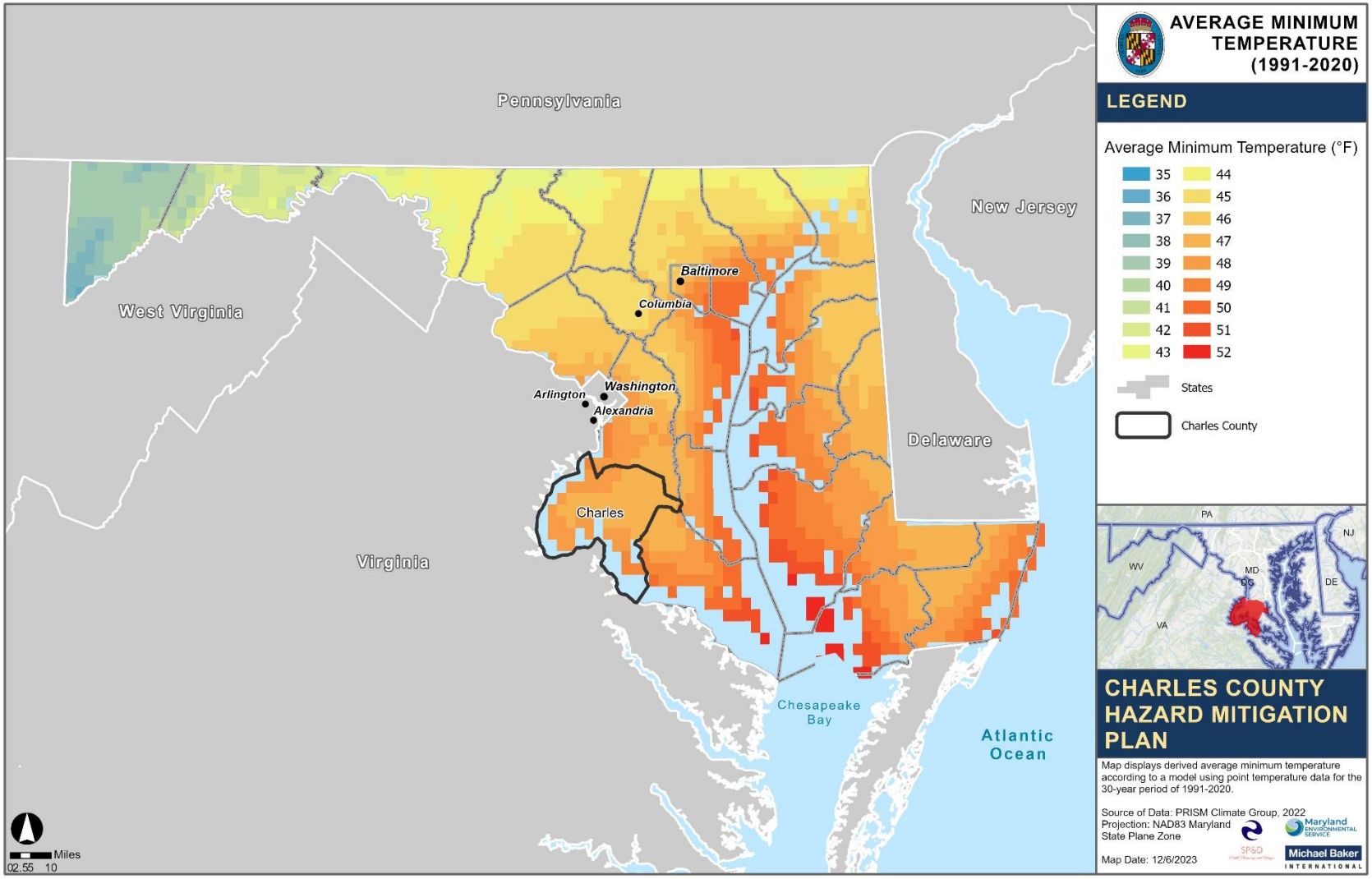
Location, Extent, and Range of Magnitude

Temperature extremes can occur at almost any time of the year but are most prevalent in the summer and winter. Extreme temperatures can be dangerous due to their effects on individuals who are exposed to them. Extreme heat is usually defined through a combination of temperature and humidity. Extreme heat can also be described as temperatures that hover 10°F or more above the average high temperature for a region during the summer months. Extreme cold is based on the temperature with wind chill. Extreme cold temperatures drop well below what is considered normal for an area during the winter months and may accompany winter storm events. Combined with increases in wind speed, such temperatures in Maryland can be life threatening to those exposed for extended periods of time. The recorded extreme heat events have occurred from June through September. Recorded extreme cold events in Maryland have occurred from December through April. Extreme temperatures can be dangerous to both people and crops.

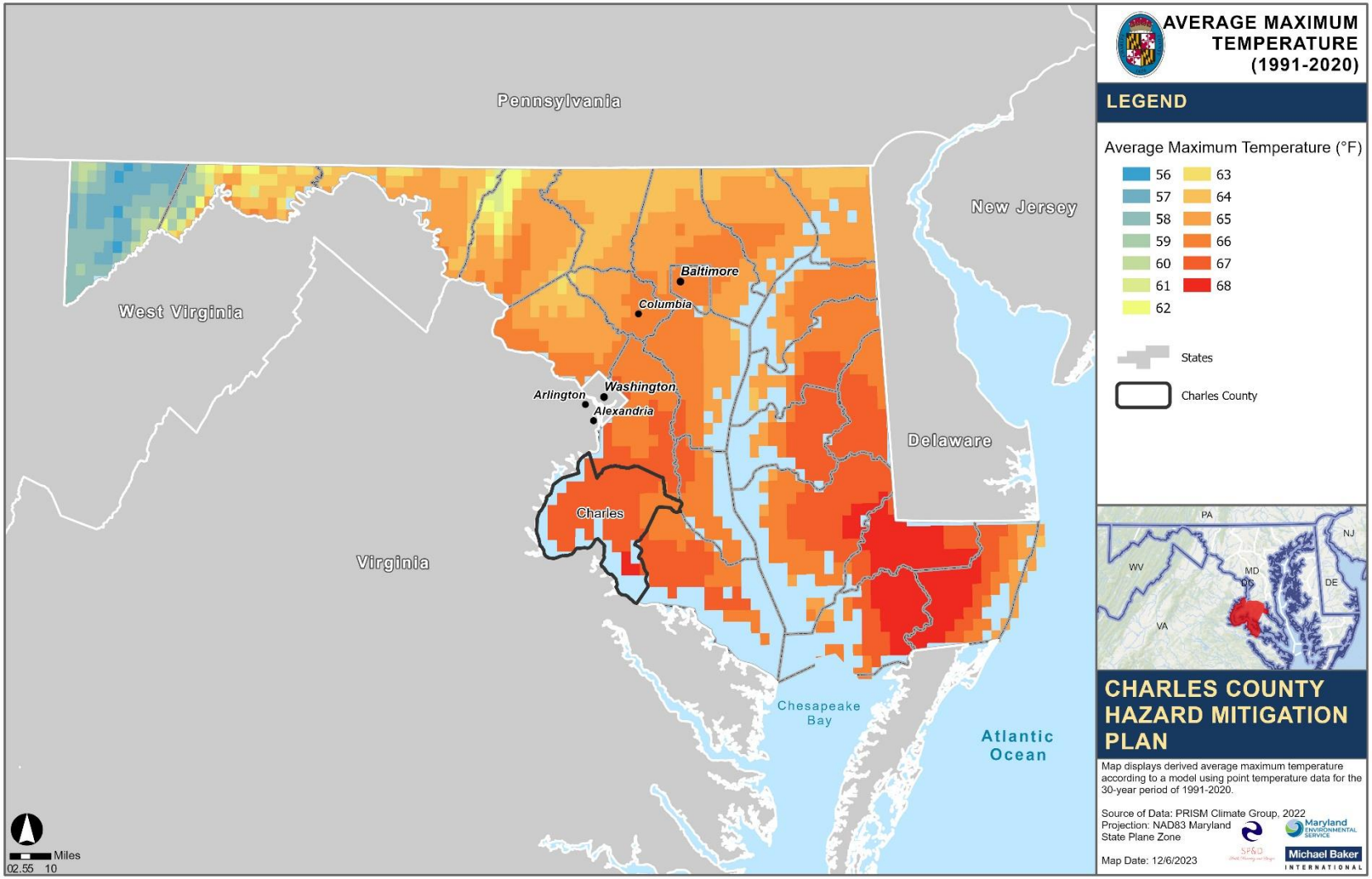
Charles County is subject to extreme temperatures in the summer and winter seasons. Areas most susceptible to extreme heat include more urban environments tend to retain the heat well into the night, leaving little opportunity for dwellings to cool. Demographics also are a consideration, as large populations of elderly, children, or poor residents represent those most vulnerable to temperature extremes.

Map 4.8-1 and Map 4.8-2 show annual mean maximum and minimum temperatures throughout Maryland and highlight Charles County. These maps present the year-round average minimum temperature (46-48°F) and average maximum temperature (66-68°F). Elevation and topography account for local differences seen on the maps. However, during the summer, the average high temperature is 86°F and the average low is 66.5° F in Charles County. In winter, the average high in Charles County is 47.5°F and the average low is 29.0°F (NOAA-NCEI, 2023).

Map 4.8-1: Average Minimum Temperatures for Charles County from 1991 - 2020



Map 4.8-2: Average Maximum Temperatures for Charles County from 1991 - 2020



The following impacts can be observed following extreme temperature events:

Health Impacts*:* The health impacts of extreme cold are greater in terms of mortality in humans, but often after more prolonged exposure rather than a cold snap. Extreme heat waves, however, can prove deadlier over a shorter duration. At greatest risk of death in heat waves are the urban-dwelling elderly without access to an air-conditioned environment for at least part of the day.

Transportation*:* Cold weather can impact automotive engines, possibly stranding motorists, and stress metal bridge structures. Highway and railroad tracks can become distorted in high heat. Disruptions to the transportation network and accidents due to extreme temperatures represent an additional risk.

Agriculture: Absolute temperature and duration of extreme cold can have devastating effects on trees and winter crops. Livestock is especially vulnerable to heat and crop yields can be impacted by heat waves that occur during key development stages.

Energy: Energy consumption rise significantly during extreme cold weather, and any fuel shortages or utility failures that prevent the heating of a dwelling can place residents in extreme danger. Extreme heat can also cause utility interruptions, as sagging transmission lines can short out.

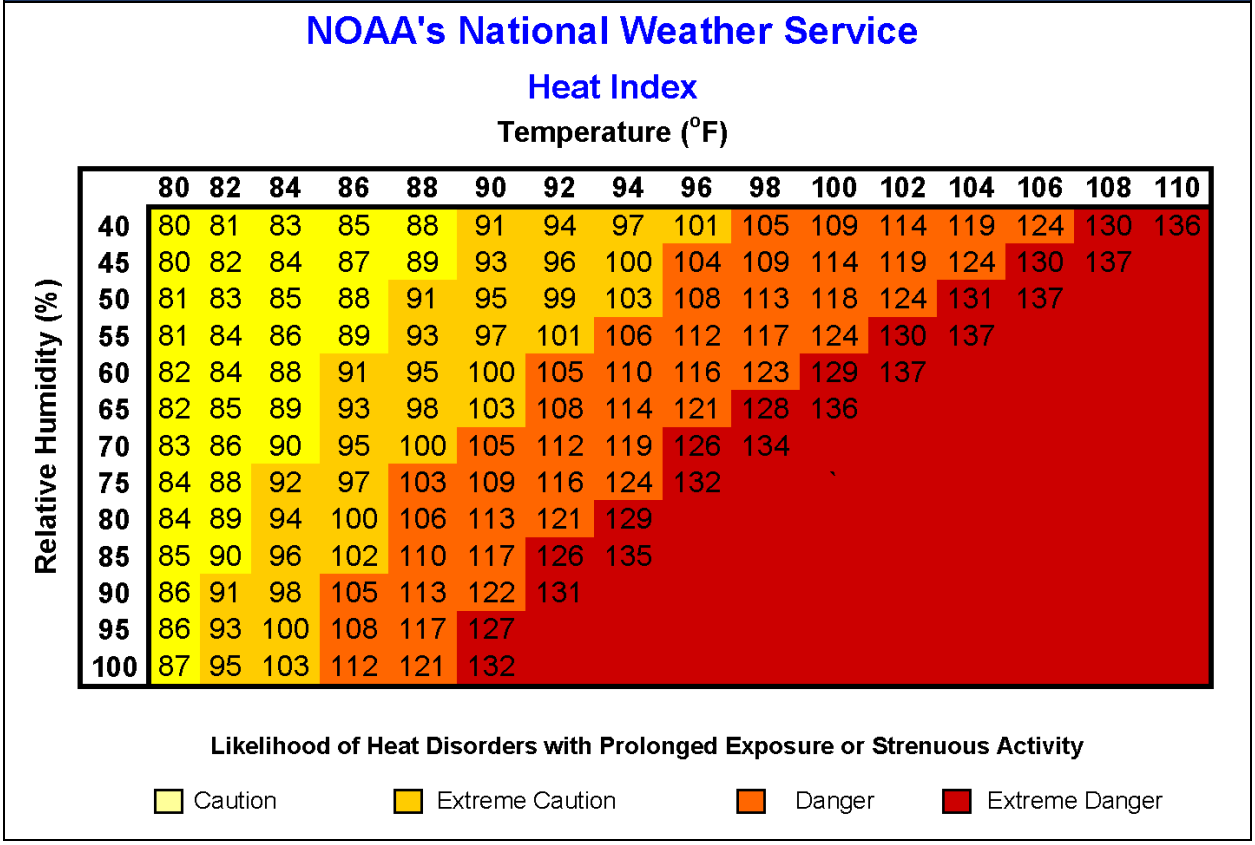
Extreme Heat: Extreme heat is the number one weather-related killer in the United States. It causes more fatalities each year than floods, lightning, tornadoes, and hurricanes combined. Heat disorders generally related to a reduction or collapse of the body's ability to shed heat by circulatory changes and sweating or a chemical (salt) imbalance caused by too much sweating. When the body heats too quickly to cool itself safely, or when too much fluid is lost through dehydration or sweating, the body temperature rises, and heat-related illnesses may develop.

Extreme temperatures can result in elevated utility costs to consumers and can cause human risks. Extremely high temperatures cause heat stress which can be divided into four categories (see Table 4.8-1). Each category is defined by apparent temperature which is associated with a heat index value that captures the combined effects of dry air temperature and relative humidity on humans and animals. Major human risks for these temperatures include heat cramps, heat syncope, heat exhaustion, heatstroke, and death. Note that while the temperatures in the table serve as a guide for various danger categories, the impacts of high temperatures will vary from person to person based on individual age, health, and other factors.

Table 4.8-2: Four Categories of Heat Stress (NOAA NWS, 2010)		
DANGER CATEGORY	**HEAT DISORDERS**	**APPARENT TEMPERATURE (°F)**
I (Caution)	Fatigue possible with prolonged exposure and physical activity.	80 to 90
II (Extreme Caution)	Sunstroke, heat cramps, and heat exhaustion possible with prolonged exposure and physical activity.	90 to 105
III (Danger)	Sunstroke, heat cramps, or heat exhaustion likely; heat stroke possible with prolonged exposure and physical activity.	105 to 130
IV (Extreme Danger)	Heatstroke or sunstroke imminent.	>130

Temperature advisories, watches and warnings are issued by the National Weather Service relating the above impacts to the range of temperatures typically experienced in Maryland. Exact thresholds vary across the State including Charles County, but in general Heat Advisories are issued when the heat index will be equal to or greater than 100°F, but less than 105°F, Excessive Heat Warnings are issued when heat indices will attain or exceed 105°F, and Excessive Heat Watches, are issued when there is a possibility that excessive heat warning criteria may be experienced within twelve to forty-eight hours (NOAA NWS, 2010).

Figure 4.8-1: National Weather Service Heat Index



Extreme Cold is also responsible for many fatalities each year. Threats, such as hypothermia and frostbite, can lead to loss of fingers and toes or cause permanent kidney, pancreas, and liver injury, or even death. Major winter storms can last for several days and are often accompanied by high winds, freezing rain or sleet, heavy snowfall and cold temperatures. Fifty percent of cold-related injuries happen to people over sixty years of age. More than 75% happen to males, and almost 20% occur within the home.

The dangers associated with extreme cold include frostbite and hypothermia. Frostbite is damage to body tissue caused by that tissue being frozen. Frostbite causes a loss of feeling in extremities, such as fingers, toes, ear lobes, or the tip of the nose. Hypothermia, or low body temperature can lead to uncontrollable shivering, memory loss, disorientation, slurred speech, drowsiness, and apparent exhaustion. Table 4.8-3 shows the NOAA's National Weather Service cold threat levels and their descriptions.

Table 4.8-3: Temperature and Associated Threat Level (NOAA NWS, n.d.)

EXCESSIVE COLD THREAT LEVEL	THREAT-LEVEL DESCRIPTION
Extreme	**"An Extreme Threat to Life and Property from Excessive Cold."** A very hard freeze with temperatures below 24 degrees (F)...OR...areas to widespread measurable freezing/frozen precipitation (not a trace) with coverage more than 25% within a defined area...OR...lowest wind chills below 10 degrees (F) with at least 10 mph wind.
High	**"A High Threat to Life and Property from Excessive Cold."** A hard freeze with temperatures between 24 - 27 degrees (F)...OR...patchy measurable freezing/frozen precipitation (not a trace) with coverage less than 25% within a defined area...OR...lowest wind chills 10 - 14 degrees (F) with at least 10 mph wind.
Moderate	**"A Moderate Threat to Life and Property from Excessive Cold."** A significant freeze with temperatures between 28 - 32 degrees (F)...OR...lowest wind chills 15 - 19 degrees (F) with at least 10 mph wind...OR...widespread frost with coverage more than 55% within a defined area.
Low	**"A Low Threat to Life and Property from Excessive Cold."** Near freezing with temperatures between 33 - 35 degrees (F)...OR...lowest wind chills 20 - 24 degrees (F) with at least 10 mph wind...OR...areas of frost with coverage 25 - 54% within a defined area.
Very Low	**"A Very Low Threat to Life and Property from Excessive Cold."** Lowest wind chills 25 - 34 degrees (F) with at least 10 mph wind...OR...patchy frost with coverage less than 25% within a defined area.
Non-Threatening	**"No Discernable Threat to Life and Property from Excessive Cold."** Cold season weather conditions are non-threatening.

Past Occurrence

According to NOAA, Charles County has been exposed to 83 occurrences of temperature extremes since 1950. Out of these occurrences, 10 were for extreme cold temperatures—five Cold/Wind Chill events and five Extreme Cold/Wind Chill. 65 are classified as Heat events and eight as Excessive Heat. These events are shown in Table 8-4.

The most significant extreme heat event occurred on July 14, 1995. A 38-hour period of extremely hot and humid weather in mid-July took its toll on humans and animals alike. The heat was caused by strengthening of the Bermuda high, extending from the surface to the upper levels of the atmosphere. The most life-threatening period of the heat wave occurred during the afternoon of July 15, when temperatures ranged from 98 to 103, but heat indices were between 115 and 129. For the entire period, heat indices were at or above 90 at most locations. On the evening of the 15th, indices exceeded 100 until around 2am, when outflow from a strong thunderstorm cooled and dried the surface, dropping temperatures and heat indices to the low to mid 70s. In the Baltimore area, there were a reported six deaths from the excessive heat. The Medical Examiner's office reported two other deaths in the state during the same period.

The most significant extreme cold event occurred in March 1998. A series of cold fronts ushered in only the second arctic air mass of the Winter of 1997-1998. The unseasonably frigid air, arriving on the heels of a mild and wet February, may have caused some damage to peach crops in Maryland orchards, especially on the coastal plain. The combination of mild and moist conditions earlier in the winter not only led to accelerated bud growth but may have decreased the resistance of fruit trees to the hard freeze. In addition to the possible peach damage, early blooming plums and some apricots sustained moderate to heavy damage. The coldest morning, March 13, produced temperatures as low as the low to mid-teens across the northern tier of the state. Minimum temperatures on Marth 11 and 12 averaged in the upper teens to lower 20s; daytime maxima held in the 30s on the 11th and 12th, with some areas (mainly higher terrain over far northern and western sections) failing to rise above freezing for the first time since January 1.

More recently, in July 2020, Charles County experienced a multi-day high-temperature and high humidity event with heat indices between 100 and 110 degrees.

Table 4.8-4: Previous temperature extremes impacting Charles County from 1950 to July 2023 (NOAA, 2023).						
DATE	EVENT	TEMPERATURE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
5/18/1996	Heat	Mid to upper 90s° F	0	0	$0	$0
7/13/1997	Heat	Upper 90s° F	0	0	$0	$0
8/16/1997	Heat	Low 100s° F (heat index of 105 – 110)	0	0	$0	$0
1/6/1998	Heat	Upper 50s° F	0	0	$0	$0
3/11/1998	Cold/Wind Chill	Low to mid 10s° F (with wind chill)	0	0	$0	$2,500
3/27/1998	Heat	Mid to upper 80s° F	0	0	$0	$0
7/20/1998	Heat	Mid to upper 90s° F (heat index of 100 – 105)	0	0	$0	$0
6/7/1999	Heat	Upper 90s° F to lower 100s° F (heat index 100 – 110)	0	0	$0	$0
7/4/1999	Heat	Upper 90s° F to lower 100s° F (heat index 100 – 115)	0	0	$0	$0
1/2/2000	Excessive Heat	Mid 60s to lower 70s° F	0	0	$0	$0
1/21/2000	Extreme Cold/Wind Chill	-25° F (with wind chill)	0	0	$0	$0
1/22/2000	Extreme Cold/Wind Chill	0° F (with wind chill)	0	0	$0	$0
1/27/2000	Extreme Cold/Wind Chill	0° F (with wind chill)	0	0	$0	$0
3/8/2000	Heat	Low to mid 80s° F	0	0	$0	$0
5/6/2000	Heat	Upper 80s° F to mid 90s° F (heat index of 89 – 97)	0	0	$0	$0
6/10/2000	Heat	Upper 80s° F to mid 90s° F (heat index 95 – 105)	0	0	$0	$0
6/25/2000	Heat	Upper 80s° F to mid 90s° F (heat index 95 – 105)	0	0	$0	$0
12/22/2000	Extreme Cold/Wind Chill	-20° F (with wind chill)	0	0	$0	$0
4/19/2001	Extreme Cold/Wind Chill	20° F (with wind chill)	0	0	$0	$0
6/12/2001	Heat	Low 90s° F (heat index 100)	0	0	$0	$0
6/27/2001	Heat	Low 90s° F (heat index 100)	0	0	$0	$0

Table 4.8-4: Previous temperature extremes impacting Charles County from 1950 to July 2023 (NOAA, 2023).						
DATE	EVENT	TEMPERATURE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
8/6/2001	Heat	High 90s° F (heat index 98 – 112)	0	0	$0	$0
7/2/2002	Heat	Mid 90s° F (heat index 100 – 110)	0	0	$0	$0
7/22/2002	Heat	Mid 90s° F (heat index 98 – 105)	0	0	$0	$0
7/28/2002	Heat	Mid 90s° F (heat index 100 – 110)	0	0	$0	$0
8/1/2002	Heat	High 90s° F (heat index 98 – 110)	0	0	$0	$0
8/12/2002	Heat	High 90s° F (heat index 95 – 100)	0	0	$0	$0
8/22/2002	Heat	Mid 90s° F (heat index 95 – 105)	0	0	$0	$0
12/7/2002	Cold/Wind Chill	6° F (with wind chill)	0	0	$0	$0
7/17/2006	Heat	(heat index 100 – 105)	0	0	$0	$0
7/18/2006	Heat	(heat index 100 – 105)	0	0	$0	$0
8/1/2006	Heat	(heat index 105 – 115)	0	0	$0	$0
6/1/2011	Heat	(heat index > 100)	0	0	$0	$0
6/9/2011	Heat	(heat index > 100)	0	0	$0	$0
7/21/2011	Excessive Heat	(heat index 115)	0	0	$0	$0
7/22/2011	Excessive Heat	Low 100s° F (heat index > 115)	0	0	$0	$0
7/29/2011	Heat	(heat index > 105)	0	0	$0	$0
5/28/2012	Heat	(heat index > 100)	0	0	$0	$0
6/20/2012	Heat	(heat index > 100)	0	0	$0	$0
6/21/2012	Heat	(heat index > 100)	0	0	$0	$0
6/29/2012	Excessive Heat	(heat index > 110)	0	0	$0	$0
7/5/2012	Heat	(heat index > 100)	0	0	$0	$0
7/7/2012	Excessive Heat	(heat index > 110)	0	0	$0	$0
7/8/2012	Excessive Heat	(heat index > 110)	0	0	$0	$0
7/18/2012	Heat	(heat index > 100)	0	0	$0	$0
7/26/2012	Heat	(heat index > 100)	0	0	$0	$0
7/18/2013	Heat	(heat index > 105)	0	0	$0	$0
7/19/2013	Heat	(heat index > 105)	0	0	$0	$0

Table 4.8-4: Previous temperature extremes impacting Charles County from 1950 to July 2023 (NOAA, 2023).						
DATE	**EVENT**	**TEMPERATURE**	**DEATHS**	**INJURIES**	**PROPERTY DAMAGE**	**CROP DAMAGE**
7/23/2016	Heat	(heat index > 100)	0	0	$0	$0
7/25/2016	Heat	(heat index > 100)	0	0	$0	$0
8/12/2016	Heat	(heat index > 100)	0	0	$0	$0
8/13/2016	Heat	(heat index > 100)	0	0	$0	$0
8/16/2016	Heat	(heat index > 100)	0	0	$0	$0
7/13/2017	Heat	(heat index > 100)	0	0	$0	$0
7/14/2017	Heat	(heat index > 100)	0	0	$0	$0
7/20/2017	Heat	(heat index > 100)	0	0	$0	$0
7/21/2017	Heat	(heat index > 100)	0	0	$0	$0
8/18/2017	Heat	(heat index > 100)	0	0	$0	$0
2023 PLAN UPDATE						
1/5/2018	Cold/Wind Chill	Arctic air and gusty winds	0	0	$0	$0
7/2/2018	Heat	Hot and humid conditions	0	0	$0	$0
7/3/2018	Heat	Hot and humid conditions	0	0	$0	$0
8/28/2018	Heat	Hot and humid conditions	0	0	$0	$0
8/29/2018	Heat	Hot and humid conditions	0	0	$0	$0
9/4/2018	Heat	Hot and humid conditions	0	0	$0	$0
1/21/2019	Cold/Wind Chill	Strong wind chills	0	0	$0	$0
7/16/2019	Heat	(heat index > 105)	0	0	$0	$0
7/17/2019	Heat	(heat index > 105)	0	0	$0	$0
7/19/2019	Heat	Mid to High 90s° F	0	0	$0	$0
7/20/2019	Excessive Heat	High 90s° F to Low 100s° F	0	0	$0	$0
7/21/2019	Excessive Heat	Mid to High 90s° F	0	0	$0	$0
8/19/2019	Heat	(heat index > 105)	0	0	$0	$0
7/17/2020	Heat	(heat index 100-110)	0	0	$0	$0
7/19/2020	Heat	(heat index 100-110)	0	0	$0	$0
7/20/2020	Heat	(heat index 100-110)	0	0	$0	$0

Table 4.8-4: Previous temperature extremes impacting Charles County from 1950 to July 2023 (NOAA, 2023).

DATE	EVENT	TEMPERATURE	DEATHS	INJURIES	PROPERTY DAMAGE	CROP DAMAGE
7/21/2020	Heat	(heat index 100-110)	0	0	$0	$0
7/22/2020	Heat	(heat index 100-110)	0	0	$0	$0
7/23/2020	Heat	(heat index 100-110)	0	0	$0	$0
7/28/2020	Heat	(heat index 100-110)	0	0	$0	$0
7/17/2021	Heat	(heat index 105-110)	0	0	$0	$0
8/11/2021	Heat	Heat and Humidity	0	0	$0	$0
8/12/2021	Heat	Heat and Humidity	0	0	$0	$0
8/13/2021	Heat	Heat and Humidity	0	0	$0	$0
12/23/2022	Cold/Wind Chill	Negative Degree Wind Chills	0	0	$0	$0
07/28/2023	Excessive Heat	Heat and Humidity	0	0	$0	$0
07/29/2023	Excessive Heat	Heat and Humidity	0	0	$0	$0
Total			**0**	**0**	**$0**	**$2,500**

Future Occurrence

Based on historical occurrences of extreme temperature events, the probability that Charles County will face an extreme temperature event in the future is *highly likely* (4 out of 4) as defined by the Risk Factor Methodology probability criteria. Based on location and geography, it is more likely that extreme heat events will impact the County than extreme cold events.

Vulnerability Assessment

The potential for extreme heat and cold always exists in and around the summer and winter months. Meteorologists and weather forecasters can normally predict the temperature with excellent accuracy. Adhering to extreme temperature warnings can significantly reduce the risk of temperature related deaths.

People

Extreme heat and cold primarily impact people rather than buildings or critical facilities. Those hardest hit by both heat and cold waves are adults 65 years of age or older, many who are already physically vulnerable. Excessive heat exposure also affects people with certain pre-existing medical conditions, including cardiovascular disease, respiratory illnesses, and obesity. Small children are also more susceptible to temperature extremes.

Home and landowners across the state are also at risk to the impacts from an extreme temperature event. Impacts to the public include potential for injury or loss of life, and destruction and/or loss of land and property due to extreme temperatures.

For an extreme temperature event, as with all disaster events, responders face the risk of personal injury while performing necessary job functions.

Structures

Buildings or infrastructure of significant age may be more susceptible to temperature extremes. For example, burst pipes could damage buildings and necessitate repairs during extreme cold events, and HVAC or air-conditions systems could overheat or be damaged during an extreme heat event. Additionally, power outages during extreme heat or cold events could have significant consequences to people that occupy buildings. However, the primary impacts of extreme temperatures are on people rather than buildings. Nonetheless, facilities need to be maintained to ensure that they operate in appropriate conditions for people.

Infrastructure may also experience impacts in the form of damage to roads and bridges and temporary closure of mass transit in the event of cascading impacts, such as power outages.

Systems

An extreme temperature event could be costly for state and local governments, depending on the length and geographic extent of the temperatures because of the potential for crop loss and business disruption

from the direct and cascading temperature impacts. Some of the costs could be recouped through federal grant reimbursements, but local governments would still feel the fiscal impact of a major event.

Transportation systems including roadways, runways, and railways may begin to buckle during excessive heat events. In addition, power lines become less efficient from overheating effects like drooping and load shedding capacity can be overwhelmed as transformers degrade or become damaged.

Extreme cold events with ice can increase road closures and significant car crash situations. Ice and freezing temperature can also cause:

- Frozen electrical equipment such as transformers, renewables like windmills and solar panels, and fuel pipelines can result in an inability to meet energy demands. In addition, power plants in warmer places often have pipes and equipment exposed to the air, which means cold temperatures can cause more damage.

Natural, Historic and Cultural Resources

Loss of crops, impacts to wildlife, and increased propensity towards drought (for high temperatures) would be the major impact to the environment during extreme temperature events.

Community Activities

Each summer the Charles County Arts Alliance hosts an ArtsFest event, which features outdoor performances, food trucks, and art for purchase by local artists. Charles County also hosts the Red, White, and Blue Crab Celebration on the Fourth of July. Other summer events, such as baseball games at Regency Stadium and the La Plata Summer Concert Series are also vulnerable to be affected by extreme heat. If an excessive heat event occurs at the same time as these events, participants and visitors are at risk of experiencing the negative effects of high temperature exposure.

Jurisdictional Differences

The entirety of Charles County and its jurisdictions are considered vulnerable to the effects of extreme temperatures, but as discussed, these vulnerabilities are extremely individualized among the general population and will continue to be extremely difficult to address from a county-wide or even local emergency response level. As of 2022, the US Census estimates that 52.3% of the population of Port Tobacco was age 65 or older, while 15.3% of La Plata's population and 8.5% of Indian Head's population were in this age group. Countywide, 13.9% of the population was estimated to be age 65 or older in 2022 (U.S. Census, 2016). Based on this data, the populations of Port Tobacco and La Plata are more vulnerable to the impacts of extreme heat and cold than the population of the County as a whole, while residents of Indian Heat are slightly less vulnerable.

Additionally, as shown in Figures 4.8-1 and 4.8-2, the northern part of the County annually experiences cooler temperatures on average, while the southern part of the County is typically warmer. This makes the northern part of Charles County slightly more vulnerable to the impacts of extreme cold and less vulnerable to the impacts of extreme heat than areas in the southern part of the County, while

communities in the southern portion of the County are slightly more vulnerable to extreme heat and less vulnerable to extreme cold events.

Land Use and Development Trends

All future structures and infrastructure built in Charles County will likely be exposed to extreme temperature events; however, people are more vulnerable to these events than structures or infrastructure. As a result, the location of development will not increase or reduce risk to this hazard but changing demographics and population characteristics as a result of new development have the potential to impact the County's vulnerability to extreme temperatures.

4.9 Wildfire

Table 4.9-1: Wildfire Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Natural	1	1	1	4	2	**1.4**
LOW RISK (Less than 2.0)						

Location, Extent, and Range of Magnitude

Wildfires can occur during anytime of the year; however, wildfires are likely to ensue during the spring and fall. This is due to the increase of fallen leaves from deciduous trees, along with the combination of sunlight and wind, which promotes drying. The relative humidity combined with a breeze creates the conditions for wildfires to spread rapidly. Fires can be rated based on their ability to ignite. The five fuel types, which makeup Maryland's land cover are listed below (Maryland Department of Natural Resources):

- **Deciduous Hardwood Forest:** Deciduous forests makeup a large percentage of Charles County's vegetation. Depending on the amount hardwood debris accumulated from dried leaves and plants, can determine fire intensity and rate of spread. Fires fueled by hardwood litter will typically burn the surface leaves and debris, with flames ranging from 1-4 feet. In areas of dense dried shrubs, fire intensity is likely to increase substantially and smolder for long periods of time.
- **Tall Grass:** Tall grass makes up a small percentage of Charles's County's land cover, and typically grows in fields or plains. When cured and dried in abundance, tall grass burns hot and fast. Under the influence of a strong wind, and flames ranging 12-18 feet, fires can spread at a very fast rate.
- **Evergreen Litter:** Evergreen trees can be found in the lower southwestern portion of the County, near Nanjemoy, Doncaster State Forest, and Smallwood State Park. Evergreens are also grown in abundance in the northeastern and southeastern areas of Charles County, around Mt. Victoria. The buildup of dried pine needles can easily ignite and spread, and flames from evergreen debris can range from 1 to 6 feet.
- **Evergreen Overstory:** In stands of densely packed evergreens and pines, surface fires can spread upwards towards the tree canopy. This could eventually result in crown fires, which spread from treetop to treetop, resulting in the torching of trees.
- **Marsh:** Although marshes are surrounded by water, they have a large quantity of fine fuels, which can burn rapidly. Flame lengths of marsh fires can reach 20 feet or more. Marshes are present along low-lying wetlands in Charles County, including parts of Mattawoman Creek and Nanjemoy Creek.

The leading cause of wildfires in Maryland is due to human activity, which accounts for 96% of all wildfires. Improper debris and outdoor burning ignite an average of 35% of the fires each year. The second leading cause of wildfires in Maryland is arson, which accounts for 30% of ignitions. Other sources of wildfire ignitions include smoking, campfires, poorly discarded ashes, railroads, equipment use, downed power

lines, and fireworks. Lightning is however, the only natural cause of all wildfires, and accounts for 4% of wildfire ignitions in Maryland (Maryland Department of Natural Resources, 2023).

Most wildfires in Maryland are surface fires, which burn fallen debris along the "duff" layer. The duff layer is comprised of decomposed leaves, needles, twigs, and other organic material. During dry periods, fires can burn underground in this duff layer, for weeks, or even months, and cause severe issues (Maryland Department of Natural Resources). Fire intensity is typically higher in areas of dense vegetative fuels, such as grasses, evergreens, and shrubs. Maryland rarely experiences wildfires that burn in the tree canopy, known as crown fires. However, crown fires can still occur during very dry and windy seasons, along dense stands of evergreen trees. Fuels, weather, and topography are the three factors that control wildfire behavior.

Wildfires are dependent upon the quantity and quality of available fuels. Fuel quantity is the mass per unit area. Fuel quality is determined by several factors, including fuel density, chemistry, and arrangement. Arrangement influences the availability of oxygen. Another important aspect of fuel quality is the total surface exposed to heat and air. Fuels with large area-to-volume ratios, such as grasses, leaves, bark, and twigs, are easily ignited when dry.

Climatic and meteorological conditions that influence wildfires include solar insulation, atmospheric humidity, and precipitation, all of which determine the moisture content of wood and leaf litter. Dry spells, heat, low humidity, and wind increase the susceptibility of vegetation to fire. Various natural and human agents can be responsible for igniting wildfires. Natural agents include lightning, sparks generated by rocks rolling down a slope, friction produced by branches rubbing together in the wind, and spontaneous combustion.

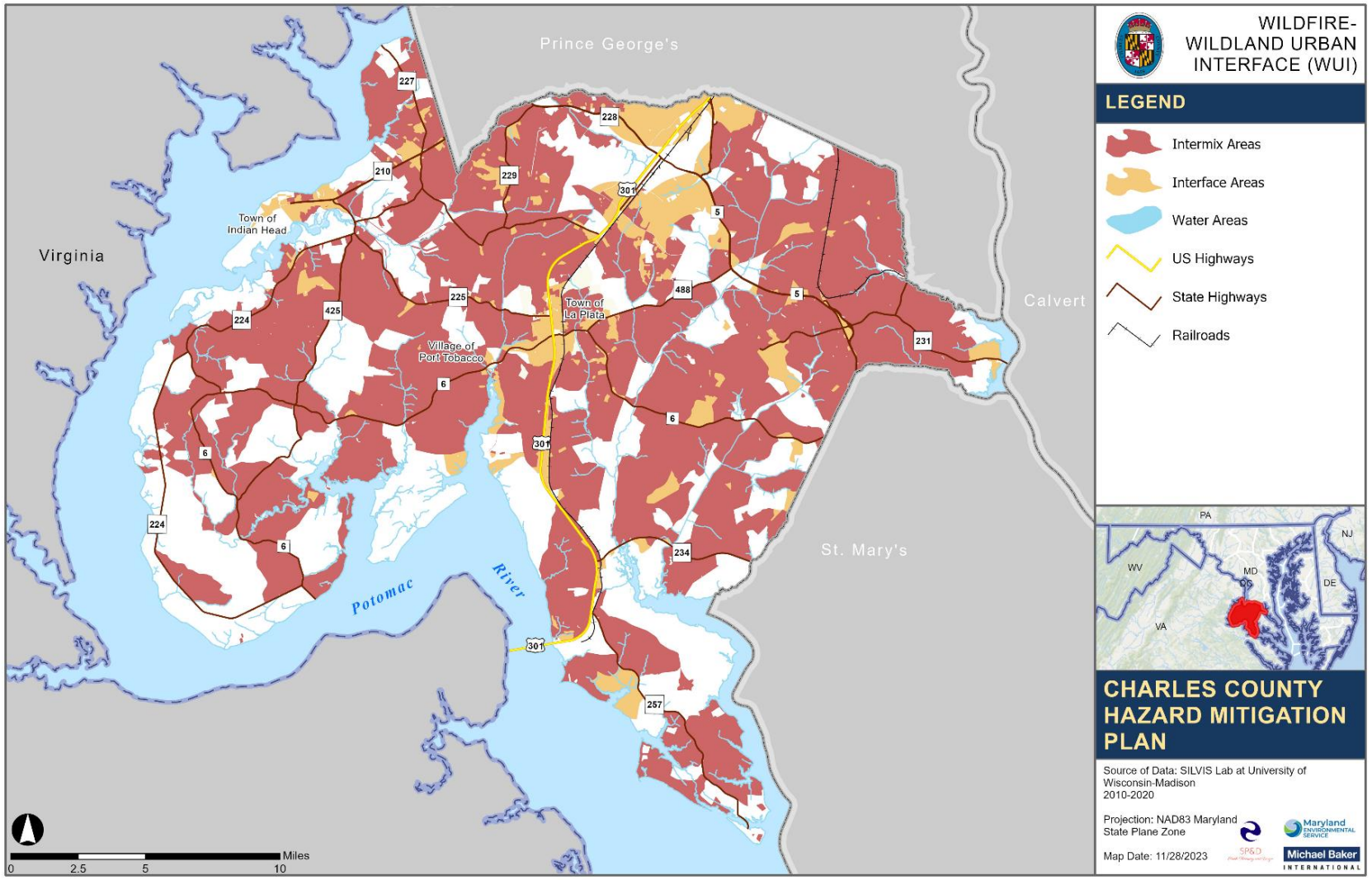
Wildfire events can range from small fires that can be managed by local firefighters to large fires impacting many acres of land. Large events may require evacuation from one or more communities and necessitate regional or national firefighting support. The impact of a severe wildfire can be devastating. While some fires are not human-caused and are part of natural succession processes, a wildfire can kill people, livestock, fish, and wildlife. They often destroy property, valuable timber, forage, and recreational and scenic values.

Vegetation loss is often an environmental concern with wildfires, but it typically is not a serious impact since natural re-growth occurs with time. The most significant environmental impact of vegetation loss is the potential for severe erosion, silting of stream beds and reservoirs, and flooding due to ground-cover loss following a fire event. Wildfires can also have a positive environmental impact in that they burn dead trees, leaves, and grasses to allow more open space for new and different types of vegetation to grow and receive sunlight. Another positive effect of a wildfire is that it stimulates the growth of new shoots on trees and shrubs, and a fire's heat can open pinecones and other seed pods.

Areas at the greatest risk to wildfire events are those where structures and other human development meet undeveloped wildland. This area is referred to as the Wildland-Urban Interface (WUI), which is characterized by an environment where fire can readily move between structural and vegetation fuels. Map 4.9-1 depicts WUI areas and intermix areas. Intermix areas are defined as those where housing and

vegetation intermingle, whereas WUI areas are characterized by development in the vicinity continuous wildland vegetation. Much of Charles County is located in both intermix and interface areas.

Map 4.9-1: Wildland Urban Interface and Intermix Areas in Charles County



Past Occurrence

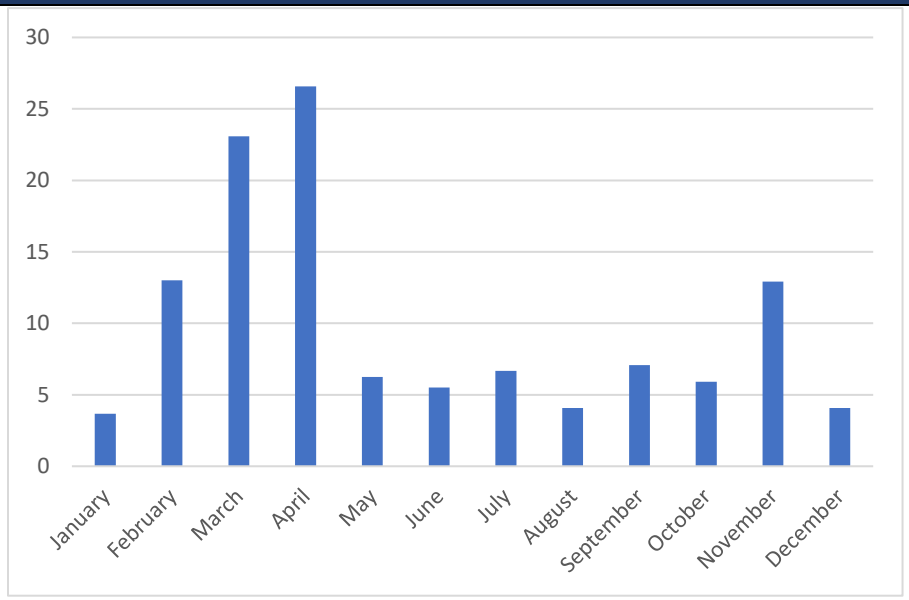
On average, the Maryland Forest Service (MFS) responds to 123 wildfires a year (Maryland Department of Natural Resources). These same fires can burn more than 1,780 acres of forest, brush, and grasses. Although, some wildfires in Maryland can burn hundreds or even thousands of acres, a majority of them burn less than 10 acres. At the same time, these smaller wildfires still threaten nearby developments, wildlife, natural resources, and lives. Each year wildfires threaten hundreds of homes or structures, while dozens are either damaged or destroyed.

Table 4.9-2 Regional Wildfire Statistics for Southern Maryland 2011-2022 (DNR, 2011-2022)

YEAR	NUMBER OF FIRES	ACRES BURNED
2011	18	1,303.9
2012	45	49.5
2013	34	51.3
2014	19	10.3
2015	36	20.9
2023 PLAN UPDATE		
2016	28	57.3
2017	22	68.5
2018	9	56.2
2019	27	41.7
2020	15	66.6
2021	23	31.4
2022	38	78.9
Total	**314**	**1,836.5**

In 2022, 30 percent of wildfires in Maryland took place in the southern region, which includes Charles County. This amounted to 38 wildfire events burning 78.9 acres. During the five-year period highlighted in Table 4.9-2, 152 fires occurred in Southern Maryland, which burned over 1,400 acres. Most of this burning occurred in 2011 (Maryland Department of Natural Resources - Forest Service, 2022).

Figure 4.9-1: Average Number of Statewide Wildfires by Month 2011-2022 (DNR, 2022)



As shown in Figure 4.9-1, wildfire events have occurred most frequently throughout Maryland over the past five years in the months of April, March, February, and November. The greatest potential for wildfire events typically occurs in the spring and fall months. In the spring, bare trees allow sunlight to reach the forest floor, drying fallen leaves and other ground debris. Additionally, increasing daytime temperature, low relative humidity, and wind promotes the ignition and spread of fires. The springtime is also when the largest fires will occur. The fall months are typically a time of depleted soil moisture, low stream conditions, and reduced leaf canopies, which accounts for the increase in fires for the month of November. Wildfires that generally occur in the summer are most often associated with droughts. Land use, vegetation, amount of combustible materials present, and weather conditions such as wind, low humidity, and lack of precipitation are the chief factors determining the number of fires and acreage burned.

Future Occurrence

Previous events in Southern Maryland and the presence of WUI areas in Charles County suggest that wildfire has the potential to occur in the County. Weather conditions like drought can increase the likelihood of wildfires occurring. Many wildfires could also be caused by the result of human-caused ignitions. However, due to relatively few past wildfire occurrences and impacts in Charles County, the probability of a wildfire occurring in Charles County is considered *unlikely* (1 of 4) as defined by the Risk Factor Methodology probability criteria.

Vulnerability Assessment

People

Impacts to the public include destruction of property, injuries related to burns and smoke inhalation, and road closures. Wildfires also impact communities by spreading pollution and creating health problems by reducing air quality from the spread of ash and smoke.

Structures

Table 4.9-3 depicts the number of structures, critical facilities, and populations that intersect the WUI areas depicted in Map 4.9-1. This analysis only focused on WUI areas and not intermix areas due to the higher risk associated with WUI areas. As shown in the table, nearly 30% of structures in the County are located in WUI areas, including more than half of all structures in Indian Head and La Plata. Additionally, 25% of all critical facilities in Charles County, and 34% of the population are located in these areas. Critical facilities that intersect the WUI are shown in by type in Table 4.9-4, while specific critical facilities related to emergency response operations and government and school operations are shown in Table 4.9-5.

Systems

The impacts on continuity of operations would be limited, unless a facility is directly within the path of destruction of a wildfire. Delivery of services may be slowed or halted in affected areas as a result of blocked roadways, and/or momentary losses in power and communications caused by destroyed infrastructure.

Fires can extensively impact the economy of an affected area, especially the logging, recreation, and tourism industries, upon which many counties depend. Major direct costs associated with forest fires or wildfires include the salvage and removal of downed timber and debris and the restoration of the burned area. If burned-out woodlands and grasslands are not replanted quickly to prevent widespread soil erosion, then landslides, mudflows, and floods could result, compounding the damage.

In the past wildfires and brush fires in Maryland have forced school closings, disrupted telephone services by burning fiber optic cables, damaged railroads and other infrastructure, and adversely affected tourism, outdoor recreation, and hunting. The likelihood of one of those fires attaining significant size and intensity is unpredictable and highly dependent on environmental conditions and firefighting response. Weather conditions, particularly drought events, increase the likelihood of wildfires occurring. Yet, it is equally important to note that 96 percent of wildfires are human caused, making their occurrence harder to foresee.

Natural, Historic, and Cultural Resources

Forty-one places in Charles County are listed on the National Register of Historic Places. Therefore, the structural integrity of these cultural and historically significant places is highly vulnerable to destruction by wildfire.

Community Activities

As illustrated in Tables 4.9-3 and 4.9-4, the Town of Indian Head and La Plata are highly vulnerable to wildfires. Some activities during the spring and fall, or peak wildfire season in Maryland, include the CornStalker's Trail of Terror, the Annual Port Tobacco Market Day, and the Scarecrow Festival. Furthermore, all outdoor activities during peak wildfire season can be subject to postponement or cancellation if a wildfire in the area occurs.

Table 4.9-3: Structures, Critical Facilities, and Populations Vulnerable to Wildfires (WUI areas)

MUNICIPALITY	TOTAL STRUCTURES	TOTAL STRUCTURES IN WUI AREA	PERCENT STRUCTURES IN A WUI AREA	TOTAL CRTICAL FACILITIES	CRITICAL FACILITIES IN WUI AREA	PERCENT CRITICAL FACILITIES IN WUI AREA	TOTAL ESTIMATED 2020 POPULATION	POPULATION IN WUI AREA	PERCENT POPULATION IN WUI AREA
Charles County Unincorporated Areas	99,592	29,592	29.71%	664	304	45.78%	171,257	72,089	42.09%
Town of Indian Head	1,850	1,617	87.41%	30	25	83.33%	4,331	3,739	86.33%
Town of La Plata	4,649	3,569	76.77%	132	88	66.67%	12,407	8,865	71.45%
The Village of Port Tobacco	28	0	0%	0	0	0.00%	854	119	13.93%
Total	**106,091**	**34,778**	**32.78%**	**826**	**132**	**23.04%**	**188,849**	**84,812**	**44.91%**

Table 4.9-4: Critical Facilities Vulnerable to Wildfires (WUI areas) By Type

MUNICIPALITY	AIRPORTS	AMBULANCE/EMS STATIONS	CHURCHES	COMMUNICATION FACILITIES	DAY CARE CENTERS	ELECTRIC SUBSTATION	FIRE / AMBULANCE EMS STATIONS	GOVERNMENT BUILDINGS	NURSING HOMES AND LONG-TERM CARE FACILITIES	POLICE STATIONS	PUMP STATIONS	SCHOOLS	WELLS	GRAND TOTAL
Charles County Unincorporated Areas	1	1	53	12	14	4	8	0	2	1	16	10	27	149
Town of Indian Head	0	0	11	1	1	1	1	1	0	0	0	1	2	19
Town of La Plata	0	0	4	4	4	0	2	1	6	4	11	2	3	41
The Village of Port Tobacco	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Total	**1**	**1**	**68**	**17**	**19**	**5**	**11**	**2**	**8**	**5**	**27**	**13**	**32**	**209**

Table 4.9-5: Emergency Response, Government, and School Facilities Vulnerable to Wildfire		
NAME	TYPE	COMMUNITY
Benedict Vol Fire Dept. Inc	Ambulance/EMS Stations	Charles County Unincorporated Areas
Bryans Rd Vol Fire Dept.	Ambulance/EMS Stations	Charles County Unincorporated Areas
Charles County Rescue Squad, Inc	Ambulance/EMS Stations	Town of La Plata
Charles County Mobile Intensive Care	Ambulance/EMS Stations	Charles County Unincorporated Areas
Hughesville Vol F D & RS Inc	Ambulance/EMS Stations	Charles County Unincorporated Areas
Indian Head Vol Fire Dept.	Ambulance/EMS Stations	Town of Indian Head
Potomac Heights. Vol Fire Dept.	Ambulance/EMS Stations	Charles County Unincorporated Areas
Waldorf Vol Fire Dept. Inc	Ambulance/EMS Stations	Charles County Unincorporated Areas
Benedict Vol Fire Dept. Inc	Fire Stations	Charles County Unincorporated Areas
Bryans Rd Vol Fire Dept.	Fire Stations	Charles County Unincorporated Areas
Hughesville Vol F D & RS Inc	Fire Stations	Charles County Unincorporated Areas
Indian Head Vol Fire Dept.	Fire Stations	Town of Indian Head
La Plata Volunteer Fire Dept. Inc	Fire Stations	Town of La Plata
Nanjemoy Volunteer Fire Dept. Inc	Fire Stations	Charles County Unincorporated Areas
Potomac Heights. Vol Fire Dept.	Fire Stations	Charles County Unincorporated Areas
Waldorf Vol Fire Dept. Inc	Fire Stations	Charles County Unincorporated Areas
Bel Alton Vol Fire Dept Inc	Fire Stations	Charles County Unincorporated Areas
Board Town Comm. of Indian Head	Government Buildings	Town of Indian Head
Charles County Commissioners	Government Buildings	Town of La Plata
La Plata Town Hall	Government Buildings	Town of La Plata
Dept of Natural Resources	Government Buildings	Charles County Unincorporated Areas
Sheriff's Office - District II	Police Stations	Charles County Unincorporated Areas
Archbishop Neale School	Schools	Town of La Plata
Arthur Middleton Elementary	Schools	Charles County Unincorporated Areas
Dr. Gustavus Brown School	Schools	Charles County Unincorporated Areas
Jennifer Elementary	Schools	Charles County Unincorporated Areas
Milton Somers Middle School	Schools	Town of La Plata
Stoddert Middle School	Schools	Charles County Unincorporated Areas
Thomas Stone High School	Schools	Charles County Unincorporated Areas
Eva Turner Elementary	Schools	Charles County Unincorporated Areas
General Smallwood Middle School	Schools	Town of La Plata
Dr. Mudd Elementary School	Schools	Charles County Unincorporated Areas
Ryceville Amish Parochial School	Schools	Charles County Unincorporated Areas
Indian Head Elementary	Schools	Town of Indian Head
Mary Burgess Neal Elementary School	Schools	Charles County Unincorporated Areas

Jurisdictional Differences

As highlighted in Table 4.9-3, the Town of Indian Head is at the highest risk to wildfire events, followed by La Plata. Both of these communities are at a higher risk than the unincorporated areas of Charles County and the Village of Port Tobacco; however, WUI areas and intermix areas existing throughout much of the County.

Land Use and Development Trends

As human development continues to increase in Charles County, so will the number of WUIs and intermix areas. The potential for property damage and other wildfire impacts will increase each year as more properties are developed and more people move to these areas. However, encouraging principles of defensible space in new and existing development in these areas could help reduce the potential for wildfires to spread to structures.

4.10 Building and Structure Collapse

Table 4.10-1: Building and Structure Collapse Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Human-Made	2	2	1	3	3	**2.0**
LOW RISK (Less than 2.0)						

Location, Extent, and Range of Magnitude

Buildings and other engineered structures, including bridges, may collapse if their structural integrity is compromised, especially due to effects from other natural or human-made hazards. Older buildings or structures, structures that are not built to standard codes, or structures that have been weakened are more susceptible to be affected by these hazards.

Adherence to modern building codes can lower a building's risk to collapse. Building codes – developed by the International Code Council in partnership with FEMA and other federal, state, local, and private authorities – specify the minimum legal design and construction requirements for structural integrity, construction materials, and fire protection (FEMA, 2014). Most buildings constructed after 1981 in Charles County were built under modern building codes as adopted in the Energy Conservation Building Standards Act, which established the Maryland Building Performance Standards. Throughout the County, approximately 71% of structures were built after 1980, which indicates that a significant portion were constructed prior to when these standards were in place (U.S. Census, 2022).

Bridges serve to connect both large and small roadways and communities throughout the County. Whether they span another roadway or a body of water, bridges are a crucial part of every transportation system. However, many of Maryland's bridge structures are aging and in need of repair. Inspection and maintenance are necessary to observe and mitigate the extent of disrepair, especially on older structures.

There are different effects of a collapse, depending on the type and cause of the collapse and the type of structure that collapses. A building collapsing in on itself will likely result in debris field which is dense but has a small footprint. However, if a building collapses in an outward direction, the debris field will be more widely scattered (University of Michigan, 2011). Both of these types of collapses can cause injury to and endanger the lives of those inside or near to the structure and can result in damages to nearby property, especially if the collapse causes a large amount of debris near a populated area. Though occupied buildings are less likely to collapse since they would generally be maintained, more risk of death or injury would be likely with the sudden collapse of an occupied building.

Disrepair can critically affect the integrity of the bridge structure. The level of disrepair depends on how much of the structure is damaged and how critical that portion of the structure is to the safety of drivers. Some structures only need deck replacement or a new superstructure, while others have substructure problems and should be entirely replaced. As of June 27, 2023, 252 of the state's 5,473 bridges were classified as structurally deficient. Seven of these are located in Charles County (National Bridge Inventory,

2023). A list of these bridges is shown in Table 4.10-2. This is an increase of two bridges since the last plan. However, four bridges that were listed as structurally deficient in the last plan are no longer listed as such.

Table 4.10-2: Structurally Deficient Bridges in Charles County (National Bridge Inventory, 2023)

INSPECTION DATE	ROAD	FEATURE CROSSED	YEAR BUILT	AVERAGE DAILY TRAFFIC	STRUCTURALLY DEFICIENT FEATURE
10/2022	MD 225	Mattawoman Creek	1951	8,750	Culvert Deterioration
9/2021	Poplar Hill Road	Zekiah Swamp	1969	4,300	Substructure Deterioration
8/2021	Truman Manor Lane	Swanson Creek	1992	1,100	Culvert Deterioration
8/2021	Celestial Lane	Swanson Creek	1992	1,100	Culvert Deterioration
9/2022	Stines Store Road	Gilbert Swamp Run	1933	125	Superstructure Deterioration
9/2022	Bryantown Road	Mill Dam Run	1933	1,396	Superstructure Deterioration
9/2022	Trinity Church Road	Gilbert Swamp Run	1927	600	Deck Deterioration, Superstructure Deterioration
9/2022	Davis Road	Piney Branch	2000	100	Channel Deterioration

The 82-year-old Governor Harry W. Nice Memorial Bridge was also a potential risk for Charles County. The 1.7-mile bridge spanned the Potomac River to connect the community of Newburg in Charles County with Dahlgren, Virginia. It was determined that the current bridge would require a major rehabilitation project and as a result, it was announced in 2016 that the bridge would be replaced. Construction of the new bridge began in 2020 and was opened to the public in October 2022 (MDTA, 2022).

A worst-case scenario for a bridge structure collapse is for a high traffic bridge to collapse during rush hour causing many injuries and several deaths. A worst-case scenario for a building collapse would be for a building with multiple people in it to collapse in a denser area causing injuries and possible death to those in the building as well as around the area.

Past Occurrence

A notable collapse occurred in 2010 in Waldorf as the result of a fire. One commercial building and all of its contents were lost, and damage was estimated at $650,000 (The Bay Net, 2010). There have been no reported occurrences of bridge collapses in Charles County.

Future Occurrence

Structures and buildings can collapse due to deterioration of bridge critical load bearing members and building structural integrity, but external occurrences can also impact bridges and buildings. There have not been many notable issues with building structural integrity in Charles County, but without proper maintenance and code enforcement this risk can grow. The County has a significant number of older structures, and approximately 1,051 vacant housing units, there is an increased risk of building collapse. The number of these has decreased since the last plan, but the risk is still present. Additionally, other hazard events such as fires, winter storms, and tropical storms could create conditions that would cause buildings or structures to collapse. The future occurrence of building and structure collapse can be considered *possible* (2 out of 4) as defined by the Risk Factor methodology probability criteria.

Vulnerability Assessment

People

The effects of building and structure collapse on the population depend on different factors, most importantly their proximity to the actual collapse. If people are inside a building or on a bridge when it collapses, there may be catastrophic impacts. Generally, people located in older, deteriorated buildings or traveling across structurally deficient bridges are more at risk.

Structures

The most vulnerable areas of the County are those with the highest concentration of deteriorating structures. The age of the building stock in an area also influences vulnerability to structure collapse. Structures can either collapse into themselves or in an outward direction depending on the cause of the collapse. Since the HMPC determined that Charles County is not at great risk to earth disturbance hazards, the greatest risk for collapse is from cascading effects on structures, especially those with lower pre-existing structural integrity, by construction activities, from heavy snowfall during winter storms, from an imbalance of water forces on either side of a structural wall, and from high winds during storms. As discussed, seven bridges throughout Charles County are structurally deficient. Structurally deficient bridges are often still safe for vehicles to cross over but will need work in the near future. All of these bridges are located in unincorporated areas of the County.

Systems

The collapse of bridges may impact various systems throughout the County, especially those that rely on transportation. The supply chain may be interrupted or delayed due to bridges collapsing, especially railroad bridges that carry freight.

Natural, Historic, and Cultural Resources

Since the age of the building or structure influences its vulnerability to collapse, historic structures are more typically more vulnerable to this hazard. This highlights the importance of maintaining historic structures. Cultural resources may not be particularly vulnerable to building and structure collapse,

depending on the resource itself. Natural resources are not directly vulnerable to building and structure collapse, but the cascading impacts from collapse could lead to some contamination and the destruction of habitat.

Community Activities

Community activities are not particularly vulnerable to building and structure collapse unless the location of the activity was impacted.

Jurisdictional Differences

Unincorporated areas of Charles County and Port Tobacco Village face the greatest risks to structure collapse, as all structurally deficient bridges are in these areas. Areas with a large portion of structures built prior to 1980 may also be at higher risk. These include the Town of Port Tobacco Village (100% of structures built prior to 1980) and the communities of Nanjemoy (56.9%), Thompkinville (56.3%), Pomonkey (55.5%), Bryantown (51.9%), and Marbury (50.2%). These communities are all located in the unincorporated areas of Charles County; however, over 30% of structures in the Town of La Plata were built prior to 1980, which indicates that this jurisdiction may be at a higher risk to building and structure collapse as well (U.S. Census, 2022).

Land Use and Development Trends

Continuing to adhere to building codes and development regulations and maintaining aging infrastructure will reduce the risk of building and structure collapse in the future; however, older buildings or structures, structures that were not built to standard codes, or structures that have been weakened will remain more susceptible to this hazard. Because the impacts of building or structure collapse are highly localized, new development in areas with older structures or infrastructure is unlikely to increase risk.

4.11 Dam Failure

Table 4.11-1: Dam Failure Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Natural	1	2	2	4	3	**2.0**
MODERATE RISK (2.0 – 2.9)						

Location, Extent, and Range of Magnitude

Worldwide interest in dam and levee safety has risen significantly in recent years. Aging infrastructure, new hydrologic information, and population growth in floodplain areas downstream from dams and near levees has resulted in an increased emphasis on safety, operations, and maintenance.

Approximately 92,000 dams are listed in the National Inventory of Dams (NID), though tens of thousands more dams exist under state regulation throughout the country but are below threshold sizes to be included in the NID. Other owners include state and local authorities, public utilities, and federal agencies. The Code of Maryland Regulations (COMAR) defines a dam as any obstruction, wall, or embankment built to store or divert water, along with its abutments and appurtenant works. Dams provide benefits such as flood protection, power generation, drinking water, irrigation, and recreation. Failure of these structures results in an uncontrolled release of impounded water. While failures are relatively rare, immense damage and loss of life is possible in downstream communities when such events occur. Aging infrastructure, hydrologic, hydraulic, and geologic characteristics, population growth, and design and maintenance practices should be considered when assessing dam failure hazards.

A levee is a man-made structure, usually an earthen embankment, designed and constructed in accordance with sound engineering practices to contain, control, or divert the flow of water so as to reduce to the risk from temporary flooding (FEMA, 2016). Breaches of these structures occur when they are overtopped or physically incapable of containing the pressure exerted by the floodwaters. If a levee breaks, many properties may be quickly submerged in floodwater and residents may become trapped by this rapidly rising water. The failure of dams and levees has the potential to place large numbers of people and great amounts of property in harm's way. Because there are no levees in Charles County, this profile focused on dams.

Dam failures most often occur during or after a massive rainfall, flooding, or spring thaws, sometimes with little to no warning. Depending on the size of the water body where the dam is constructed, water contributions may come from distant upstream locations.

Dam failures can pose a serious threat to communities located downstream from major dams. The impact of a dam failure is dependent on dam and reservoir characteristics and the amount and distance of population, or assets located downstream. Catastrophic failures are characterized by the sudden, rapid, and uncontrolled release of impounded water or any other fluid or semi-fluid from a dammed impoundment or water body. Maryland uses three categories to classify dams: High, Significant, and Low hazards.

- **High Hazard Dam** failure is likely to result in the loss of human lives, extensive property damage, and will cause flooding on state roads or highways. In Maryland high hazard dams are referred to as "Category I", and "Class C" ponds by the US Natural Resources Conservation Service (NRCS).
- **Significant Hazard Dam** failure could also result in the loss of lives, increase flood risks to roads and other major infrastructures. However, no more than 2 homes may be impacted, and less than six lives may be in jeopardy in order for a dam hazard to be significant. These forms of dam hazards are also referred to as "Category II" dams by the Code of Maryland Regulations (COMAR).
- **Low Hazard Dam** failure is likely to result in the loss of life; only minor damage to roadways and homes is expected. Low hazard dams are referred to as "Category III" by COMAR.

According to MDE Dam Safety Program's webmap, as of June 2024, Maryland has a total of 558 dams. The number of dams in each category are as follows:

- 108 High Hazard Dams
- 135 Significant Dams
- 315 Low Hazard Dams

Danger Reach is the area below a dam, which would flood as a result of dam failure. In the case of a "Danger Reach" the depth and width of flooding from a dam failure far exceeds the normal floodplain. Other dam failure types include the "Sunny Day" scenario, which dams fail on a sunny day, not during a storm. "Brim-Up" is another failure scenario, in which a reservoir is filled to the top of a dam, possibly as a result of a failed spillway, or during a Probable Maximum Flood (Maryland Department of Environment, 2017).

The environmental impacts of dam failures can be devastating. Depending on the size of the event and number or type of structures located in the inundation area, water contamination from hazardous material facilities could occur. Water velocities could result in total destruction of trees and other vegetation. Soil loss from erosion and scouring would be significantly greater because of a large amount of fast-moving water affecting a small, localized area, which would likely change the ecosystem. Additionally, if the dam's purpose is to hold a water supply, downstream communities will lose access to potable water. In addition, all of the environmental impacts expected during a flood are possible during a dam failure.

Emergency Action Plan (EAP) is a formal document that describes procedures to minimize the risk of loss of life and property damage when potential emergency conditions threaten a Hazard Potential Category high or significant dam. Individuals and agencies are responsible for the execution of EAPS involving the dam owners, local government, emergency response agencies, and Maryland's Dam Safety Program. The dam owner is responsible for the safe operation, maintenance, and inspection of the dam and must prepare an EAP to conform to the law and guidelines established by Maryland's Department of the Environmental Dam Safety Program. The owner submits the EAP for review and approval by Maryland Department of Environment (MDE). Every EAP is tailored to site specific conditions, as well as the requirements of the owner, agency or organization that operates or regulates use of the dam, and to the emergency response organizations that will respond to the emergency. Charles County developed the Gilbert Run Watershed – Dams Hazard Specific Plan (HSP) for the two significant hazard dams and one

high hazard dam shown in Table 4.11-2 and identified on Map 4.11-1. This plan was most recently revised and updated in April 2023.

Table 4.11-2: High Hazard and Significant Dams in Charles County (MD Dam Safety)

NAME	OWNER	NID ID	YEAR COMPLETED	SERVICE LIFE	DESIGN HAZARD POTENTIAL	STATE REG. AGENCY	DAM HEIGHT
Gilbert Run Dam No. 1 (Trinity Church)	Privately Owned/ County Operated	MD00037	1964	50 yrs.	Significant	MDE Dam Safety	40 ft.
Gilbert Run Dam No. 2 (Wheatley)	Charles County	MD00060	1968	50 yrs.	Significant	MDE Dam Safety	39 ft.
Gilbert Run Dam No. 3 (Jameson)	Privately Owned/ County Operated	MD00038	1964	50 yrs.	High	MDE Dam Safety	37 ft.
Westlake Village Lake 3	Privately Owned	MD00254	1984	--	Low	MDE Dam Safety	11 ft.
Mc Allister Pond No. 1	Privately Owned	MD00171	1967	--	Low	MDE Dam Safety	22 ft.
Indian Head Riverview SWM Pond	Town of Indian Head	MD00546	1990	--	Low	MDE Dam Safety	21 ft.
Green Tree Reservoirs	MD DNR	MD00239	1950	--	Low	MDE Dam Safety	5 ft.
Myrtle Grove Lake	MD DNR	MD00183	1965	--	Low	MDE Dam Safety	14 ft.

The worst-case scenario for dam failure in Charles County would occur at the dam with the highest hazard potential, which is the Jameson Dam. This is one of the three dams located along the Gilbert Run Watershed. The other two major dams in Charles County, both classified as significant, are Wheatley and Trinity Church dams. A dam failure or breach causes flooding in landward areas adjacent to the structure could be devastating depending on the level of flooding for which the structure is designed and the amount of landward development present. If an abrupt failure occurs, the rushing waters of a flood wave could result in catastrophic losses. All three dams are located in the eastern portion of Charles County.

Although Wheatley Dam is currently registered at a Significant Hazard Level, a re-evaluation by a dam retrofitting contractor recommends a change to a High Hazard Level. MDE has been informed and is considering the recommendation.

Figure 4.11-1: Jameson Dam (Google Streetview, 2014)



Map 4.11-1: High Hazard and Significant Hazard Dams in Charles County



Past Occurrence

The worst dam failure in all of the U.S. is the Johnstown Flood of 1889 in Pennsylvania. The notorious Johnstown Flood is one of America's most well-known disasters. The disaster occurred when an unusually large amount of rain fell over western Pennsylvania in May of 1889. Consequently, the earthen South Fork Dam breached on May 31, 1889, and released 20 million tons of water into the Conemaugh River Valley in Cambria County. As the water rushed through the valley it swept away part of the community of South Fork and the communities of Mineral Point, Woodvale, Franklin, East Conemaugh, and finally, Johnstown. The dam had been known to be leaking and gave way when it was overtopped by floodwaters. The narrow valley and the dense build-up along the Conemaugh floodplain downstream from the dam aggravated the flood catastrophe. When the flood was over, 16,000 people were homeless and 2,209 were dead.

No documentation could be found for dam failure in Charles County. However, the National Performance of Dams Program, which maintains a database of failures for all dams listed in the National Inventory of Dams, lists 34 dam-related incidents in the entire state of Maryland. These incidents are shown in Table 4.11-3 although most were relatively minor and caused little damage.

Table 4.11-3: Past Dam Incidents in Maryland (NPDP, 2023)

DAM NAME	INCIDENT DATE	INCIDENT TYPE	DAM TYPE
Camp Ritchie	1/1/1929	Piping	Earth
Stubbs	10/1/1929	Not Known	Earth
Big Millpond (Route 50)	2/25/1979	Undermining	---
Black Rock Estates Pond	4/21/1992	Inflow Flood - Hydrologic Event	---
Annapolis Mall SWM Pond	3/4/1993	Inflow Flood-Hydrologic Event	Earth
Conowingo	1/20/1996	Inflow Flood-Hydrologic Event	Concrete Gravity
Herrington Creek Dam	6/12/1996	Concrete Deterioration	Earth
St. Mary's River Watershed Site #1	2/4/1998	Inflow Flood-Hydrologic Event	Earth
Columbia LNG Secondary Dam	3/21/1998	Concrete Deterioration	Earth
Rolling Green Community Pond	2/11/1999	Piping	---
Lake Jenkins	5/7/1999	Inflow Flood-Hydrologic Event	Arch Masonry
Lake Lanahan	5/7/1999	Inflow Flood-Hydrologic Event	Earth
Frazers Dam	9/15/1999	Inflow Flood-Hydrologic Event	Earth
Nagels Mill Pond	9/15/1999	Piping	Earth
Redskins Stadium SWM Pond	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Teels Lake Dam (2 events)	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Coulbourn Mill Dam	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Lake Bonnie	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Mill Creek Dam	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Owings Farm Pond	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Scull Farm Pond	9/16/1999	Inflow Flood-Hydrologic Event	Earth

DAM NAME	INCIDENT DATE	INCIDENT TYPE	DAM TYPE
St. Paul's Millpond	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Big Millpond (Route 50)	9/16/1999	Inflow Flood-Hydrologic Event	---
Cabin Creek Mill Dam	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Stubbs	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Jones Lake Dam	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Tuckahoe State Park Dam	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Riley Mill Pond	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Foreman Branch Dam	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Sassafras Mill Dam	9/16/1999	Inflow Flood-Hydrologic Event	Earth
Pecks Branch Dam (Ashburton)	2/29/2000	Piping	Earth
Owings Farm Pond	9/16/2001	Inflow Flood-Hydrologic Event	Earth
Conowingo	1/4/2010	Gate Operations	---
2023 PLAN UPDATE			
No dam failures have been recorded for Maryland since the previous plan.			

Future Occurrence

Provided that adequate engineering and maintenance measures are in place, high hazard dam failures are unlikely in Charles County. According to Risk Factor criteria, the probability of a dam failure occurring is unlikely (1 out of 4). The presence of structural integrity and inspection programs significantly reduces the potential for major dam failure events to occur, however all three dams identified on Table 4.11-1 are fifty years old, service life. Because of their age and possible future climate-influenced storms, the dams need retrofitting work. For example, encroaching trees need to be removed from spillway areas and groin areas. Jameson Dam, a privately owned dam, needs to have a new trash rack and ladder installed on the riser. Wheatley Dam's crest needs to be raised to increase reservoir capacity.

The construction, operation, maintenance, modification, and abandonment of dams is regulated and monitored by the Maryland Department of Environment Dam Safety. Dams are evaluated based on categories such as slope stability, undermining seepage, and spillway adequacy. The presence of structural integrity and inspection programs significantly reduces the potential for major dam failure events to occur.

Dam Emergency Action Plans (EAP) drafted in accordance with the Federal Guidelines for Dam Safety identify the risk related information include the inundation area and the time lapse between failure and flooding reaching specific destinations downstream. Charles County has the potential to be affected by dam failure, and therefore it is essential to have emergency planning procedures. The EAP for the three dams is annually reviewed and updated as needed, and every five years, a practice scenario is conducted in conjunction with Emergency Services.

Vulnerability Assessment

The primary hazard surrounding dam failure is the swift, unpredictable flooding of those areas immediately downstream. While general inundation areas can be determined, it is often impossible to know exactly how and where water held back by a dam will flow during a rapid failure of the dam. Generally, there are three (3) types of dam failures: hydraulic, seepage, and structural.

- Hydraulic Failure: Hydraulic failures result from the uncontrolled flow of water over the dam, around and adjacent to the dam, and the erosive action of water on the dam and its foundation. Earthen dams are particularly vulnerable to hydraulic failure since earth erodes at relatively small velocities.
- Seepage Failure: All dams exhibit some seepage that must be controlled in velocity and amount. Seepage occurs both through the dam and the foundation. If uncontrolled, seepage can erode material from the foundation of an earthen dam to form a conduit through which water can pass. This passing of water often leads to a complete failure of the structure, known as piping.
- Structural Failure: Structural failures involve the rupture of the dam and/or its foundation. This is particularly a hazard for large dams and for dams built of low strength materials.

Dam failures generally result from a complex interrelationship of several failure modes. Uncontrolled seepage may weaken the soil and lead to a structural failure. Structural failure may shorten the seepage path and lead to a piping failure. Surface erosion may lead to structural or piping failures.

When assessing the impacts of dam failure, it's crucial to consider cascading hazards and effects. The term "hazard creep" or "risk creep" refers to the increased anticipated consequences of a failure due to infrastructure development around a dam, both upstream and downstream, which raises the risk to people and property. Dam failure can be a cascading result of other events like hurricanes, tropical storms, regional floods, or earthquakes. It can also trigger cascading impacts both downstream and upstream. For instance, overtopping or structural failure of a dam can lead to significant flooding and inundation downstream, potentially increasing erosion and causing sinkholes. Upstream impacts might occur from heavy rainfall events causing the dam to reach capacity, leading to flooding of structures or infrastructure, erosion along the dam's structure, and the formation of sinkholes.

Other hazards that can affect dams include drought and wildfire. Droughts can lower water levels both upstream and downstream of a dam, potentially leading to erosion of the dam's structure and reservoir. Additionally, if the dam supports agricultural activities, drought conditions could result in crop and product losses. Wildfires can damage the surfaces of dams and spillways, as well as nearby facilities and equipment, particularly in embankment dams. After a wildfire, the risk of erosion and flash flooding increases.

Maryland Dam Safety requires that each dam be evaluated for its hazard potential downstream. Hazard potential is not related to the structural integrity of a dam, but strictly to the potential for downstream flooding. While the probability of a dam failure occurrence is unlikely, the potential hazard is high for the Jameson Dam and significant for Wheatley and Trinity Church.

Charles County's *Gilbert Run Watershed – Dams Hazard Specific Plan (HSP)* details the inundation area, which is the geographic area downstream of the dam that would be flooded by a breach of the dam or other large discharge. Figures 4.11-2 through 4.11-4 depict the inundation areas for the high and significant hazard dams in Charles County.

The vulnerability assessment is further developed to include specific information related to people, structures, systems, Historic Resources, and Community Activities. The entirety of the dam hazard profile was reviewed by the Hazard Mitigation Planning Committee and culminated in the development of a dam hazard mitigation goal, associated objective, and several mitigation actions to reduce long-term vulnerabilities from HHPDs included below. Two mitigation actions identified include notification, warning, and ongoing long-term outreach as property owners change overtime. The other mitigation action is specific to dams that will need evaluation and monitoring as they are either significant or high hazard potential dams and have exceeded their 50-year. service life. All of these action prompts the building of partnerships with dam owners which may result in rehabilitation projects as the age of the dams continue to advance.

Goal 4: Reduce the potential impacts of natural and man-made disaster on public and private property.

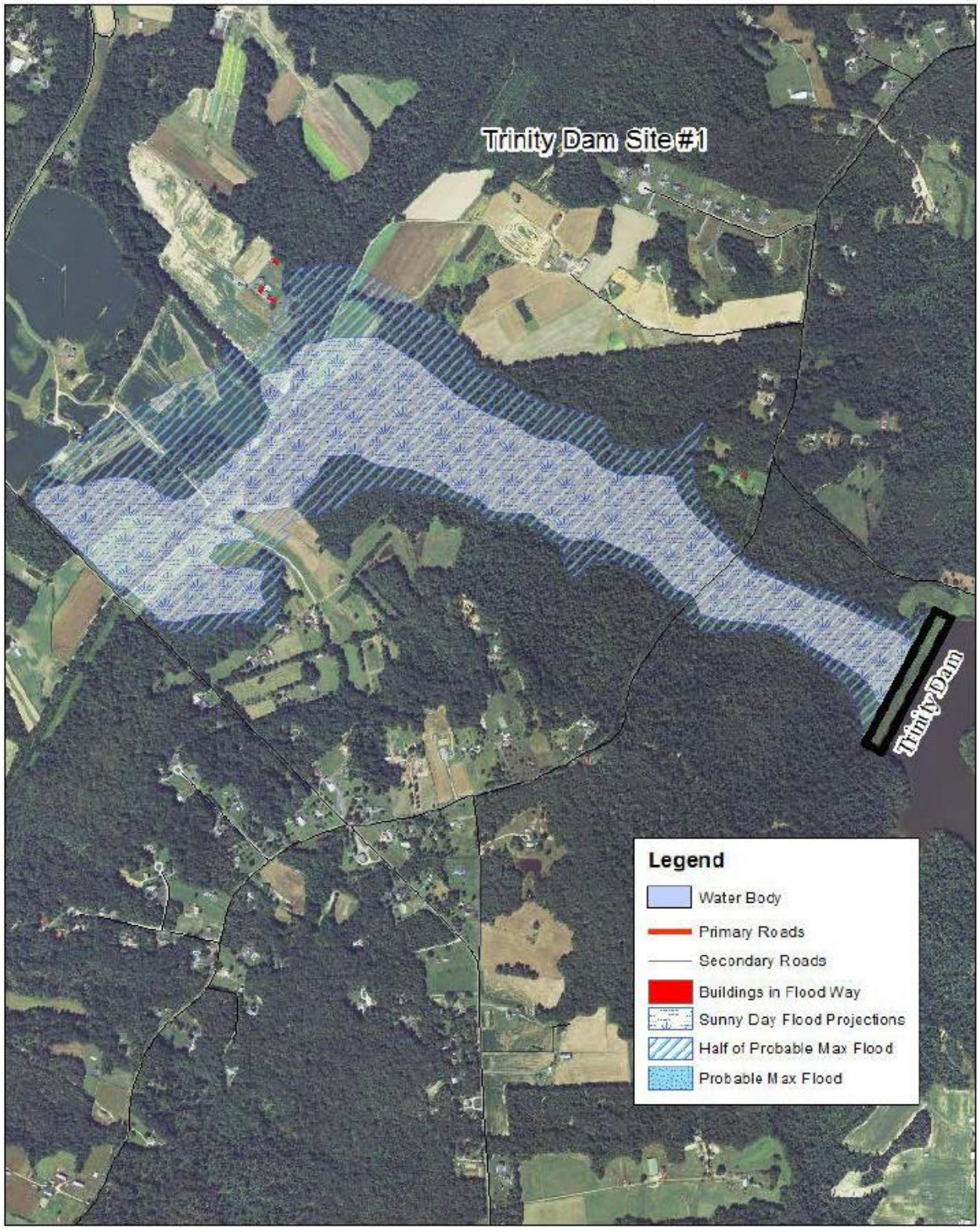
Objective 4D: Reduce the vulnerability of life, property, and infrastructure within the County to High Hazard Dams.

Mitigation Action #40: Add signage to the following roadways indicating they are within the inundation areas for the high and significant hazard dams: DuBois Road, Route 232, Route 6, and Oaks Road.

Mitigation Action #41: Work with private property dam owners to identify rehabilitation/improvement projects and potential funding opportunities. Specifically, the 3 Gilbert Run Dams (2) significant and (1) high hazard were all constructed in the 1960's with a service life of 50 years, which has been exceeded.

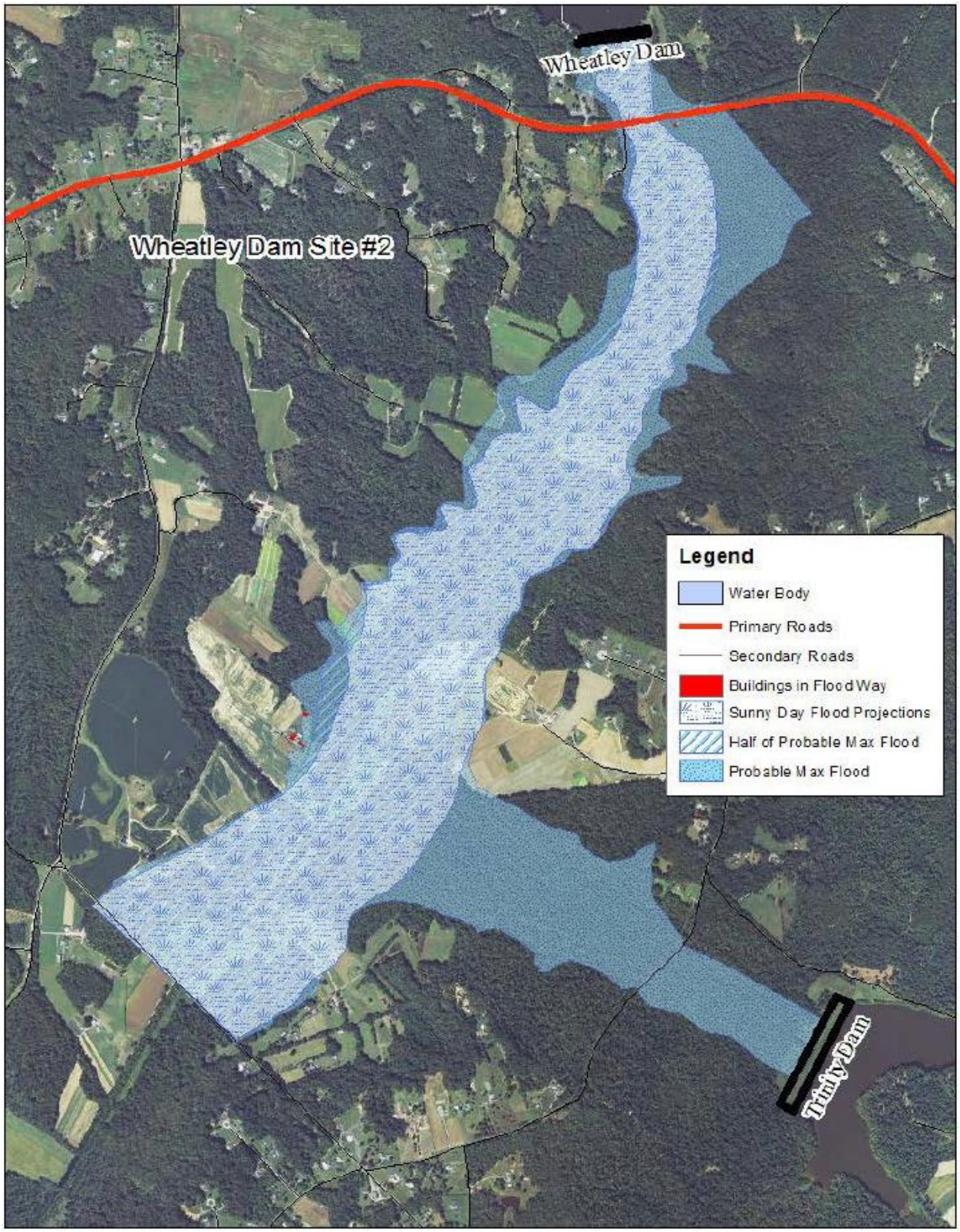
Mitigation Action #69: Target the seven (7) homes that are within all the dam inundation areas to advise homeowners of risks to life, health, and safety.

Figure 4.11-2: Dam Failure Inundation Area – Trinity Dam



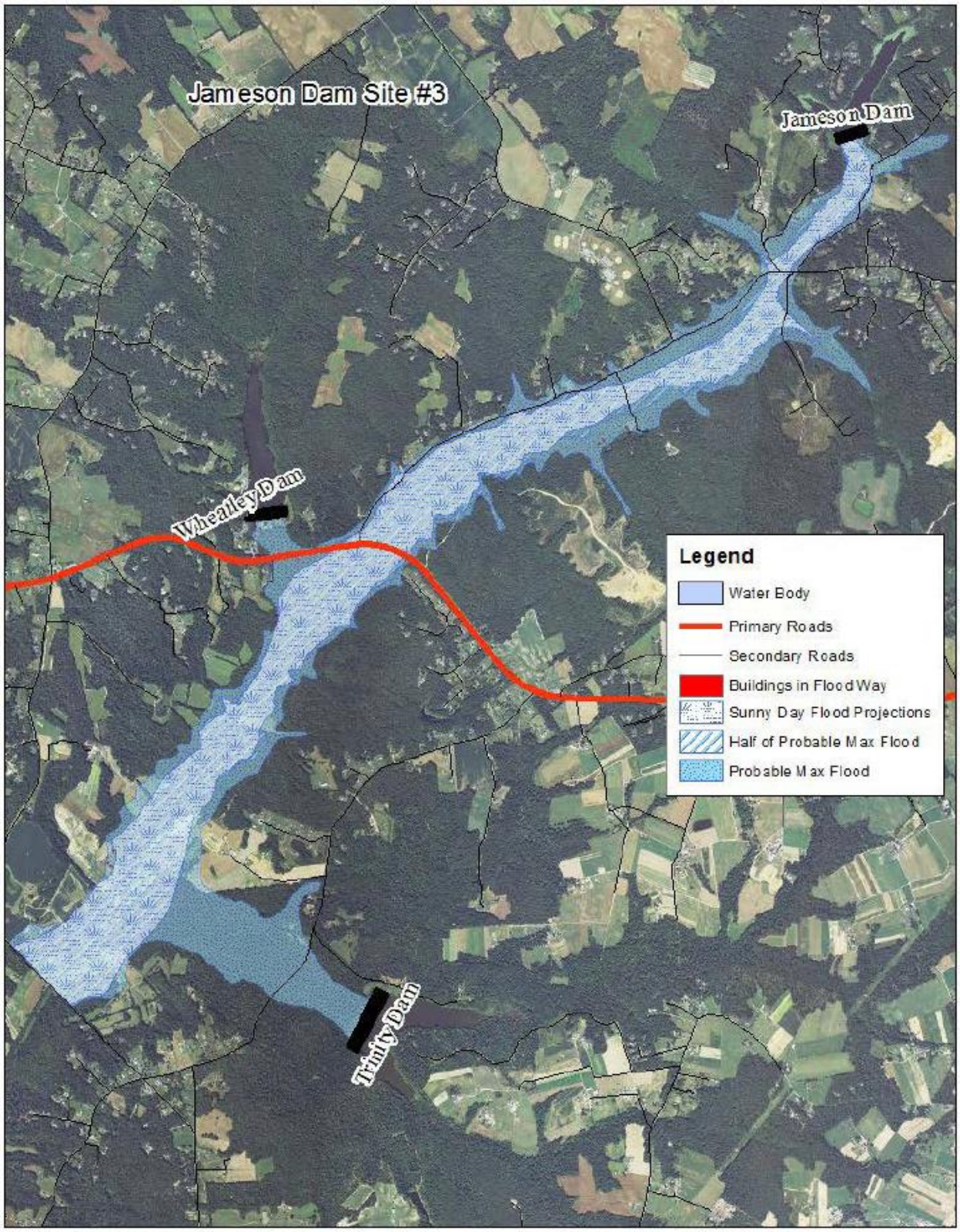
Source: Charles County's Gilbert Run Watershed – Dams Hazard Specific Plan (HSP), April 2023.

Figure 4.11-3: Dam Failure Inundation Area – Wheatley Dam



Source: Charles County's Gilbert Run Watershed – Dams Hazard Specific Plan (HSP), April 2023.

Figure 4.11-4: Dam Failure Inundation Area – Jameson Dam



*Source: Charles County's Gilbert Run Watershed – Dams Hazard Specific Plan (HSP)**, April 2023.***

People

Dam failures themselves do not pose a threat to public health; it is the cascading effects that occur after a failure that are more concerning. When a dam fails, it causes flooding downstream that can cause death, injury, and illnesses relating to water-borne diseases and standing water. As a result of flooding, people might have to evacuate and be displaced from their homes. According to the Dams Hazard Specific Plan (HSP), a total of seven (7) homes are within all the dam inundation areas. The 2020 U.S. Census indicated that the persons per household between 2011-2021 is 2.81. Using the census data and homes within the inundation area, approximately 20 people are at risk of dam failure. This number does not consider at risk people on impacted roads.

In terms of environmental damage, dam failure can cause significant environmental damage. The sudden release of water can alter landscapes, erode soil, destroy habitats and lead to the loss of wildlife. If the water in the dam was contaminated, contaminants could spread downstream. This could affect water quality and potentially cause health hazards.

From an economic standpoint, the economic cost of a dam failure can be significant. Depending on the location of the dam failure, recovery cost may not only impact the immediate area but also adjacent jurisdictions. Recovery cost could include repair for flooded structures, improvement to impaired roads and infrastructure, and so on. Damaged or destroyed businesses could lead to long-term closures and temporary or permanent loss of jobs. Another economic impact is the cost of dam rehabilitation or repair. If the dam failure occurred in a farming community, agricultural lands could be damaged if inundated, which leads to loss of function and/or inventory to agricultural businesses.

Structures

There have been no losses of life or property in Charles County due to a dam failure. However, this does not mean that there will never be any losses due to this type of event. If the worst-case scenario for dam failure in Charles County, the following structures could be impacted.

Table 4.11-4: Homes in All Dam Failure Inundation Areas

STREET NAME	CITY	DEPTH OF POTENTIAL FLOODING	COMMENTS
Carrico Mill Road	Hughesville	6 ft	No comments.
Enchanted Place	Charlotte Hall	1-2 ft	
Oaks Road	Charlotte Hall	1-2 ft	
Oaks Road	Hughesville	1-2 ft	
Keech Road	Charlotte Hall	1-2 ft	
Vom Hainberg Place	Charlotte Hall	3 ft	No road access.
Beech Hill Place	Charlotte Hall	6 ft	Barn used for business.
Old Farm Place	Charlotte Hall	6 ft	Flood near but not in home.
Dubois Road	Charlotte Hall	3 ft	Flood near but not in home.
Bowling Drive	Charlotte Hall	6 ft	
Bowling Drive	Charlotte Hall	3-6 ft	No road Access.

Newport Church Road	Charlotte Hall	6 ft	

Source: Charles County's Gilbert Run Watershed – Dams Hazard Specific Plan (HSP), April 2023.

Systems

In the event of a dam failure at one of the high and significant dam sites, the following risks to roads and highways were projected for each dam based on the following scenarios: Sunny Day Failures, 50% Probable Max Flooding (PMF) (due to piping failure), and a Probable Maximum Flood (Gilbert Run Watershed – Dams HSP, April 2023).

In the event of a Sunny Day failure of the Trinity Church Dam, DuBois Road and Route 232 could be inundated. In this scenario the water depth could reach a maximum of 5.6 feet on DuBois Road, and 3.0 feet on Route 232. During a 50% Probable Max Flood (piping failure) scenario, the water depth on DuBois Road could reach 11.8 feet, while Route 232 could reach 7.6 feet deep.

In a Sunny Day failure scenario for the Wheatley Run Dam, Route 6 could reach water depths of 8.91 feet, while Route 232 would only reach 2.8 feet. In the instance of a 50% PMF, Route 6 could reach 11.7 feet in water, Route 232 could reach 6.35 feet, and DuBois Road could reach 2.7 feet.

Given the scenario of a Sunny Day failure for Jameson Dam, Oaks Road could reach water depths of 15.4 feet, Route 6 (over Gilbert Run) could reach 23.75 feet, and Route 232 could reach 1.9 feet. In the case of a 50% PMF Oaks Road could reach 19.09 feet, Route 6 could reach 9.41 feet, Route 232 could reach 6.49 feet, and DuBois Road could reach 5.4 feet.

Natural, Historic and Cultural Resources

The National Register of Historic Places was used to assess the vulnerability of natural, historic, and cultural resources. For more complete information about the historical designations, refer to the Maryland's National Register Properties for Charles County. Historic structure locations were overlayed with dam locations or within the dam inundation areas. This assessment concluded no historic or culture structures are located in or around dams located in Charles County.

Community Activities

Activities that have value to the community could potentially be impacted by dam failures, however the identified dams are located in rural areas. Therefore, community activities would be unlikely to occur in these areas. Gilbert Run Dam 2 (Wheatley) is in the Gilbert Run Park, which is open between April 1st to September 30th. The park provided hiking and nature trails, picnic areas (grills and tables), picnic pavilions, playground areas, fishing piers and pedal boating, row boating and canoeing. A dam failure would cause the park to close temporary.

Jurisdictional Differences

All high and significant hazard dams in the County are located in the unincorporated areas, which puts these sections of Charles County at the highest risk. In particular, the communities of Hughesville and Charlotte Hall are at greater risk. The jurisdictions of La Plata, Indian Head, and Port Tobacco have a

significantly lower risk to being impacted by a dam failure event due to the location of the three Gilbert Run dams.

Land Use and Development Trends

The current land use of the surrounding area of Gilbert Run Watershed is listed as both a rural conservation district and a rural residential district. As a result, future land development in these areas is expectedly constricted. Limiting development in these areas is a safe form of land use and development planning, considering the developments surrounding Jameson Dam and the Gilbert Run Watershed are at higher risk for experiencing a dam failure incident. Currently there are an estimated 12 structures within the dam failure inundation area of the Gilbert Run Watershed. To avoid further increasing vulnerability to a dam failure event, land development and zoning regulations should continue to limit development in these areas.

4.12 Civil Disturbance and Criminal Activity

Table 4.12-1: Civil Disturbance and Criminal Activity Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Human-Made	4	2	1	3	1	2.4
MODERATE RISK (2.0 – 2.9)						

Location, Extent, and Range of Magnitude

Civil disturbance is a broad term that is typically used by law enforcement to describe one or more forms of disturbance caused by a group of people. Civil disturbances are typically a symptom of and a form of protest against major socio-political problems. Civil disturbance hazards include the following:

- ***Famine**:* Involves a widespread scarcity of food leading to malnutrition, increased mortality, and a period of psychosocial instability associated with the scarcity of food, such as riots, theft of food, and the fall of governments caused by political instability borne of an inability to deal with the crisis caused by famine.
- ***Economic Collapse or Recession**:* Very slow or negative growth.
- ***Misinformation**:* Erroneous information spread unintentionally.
- ***Civil Disturbance, Public Unrest, Mass Hysteria, and Riot**:* Group acts of violence against property and individuals, for example.
- ***Strike or Labor Dispute**:* Controversies related to the terms and conditions of employment, for example.

Typically, the severity of the action coincides with the level of public outrage. In addition to a form of protest against major socio-political problems, civil disturbances can also arise out of union protest, institutional population uprising, or from large celebrations that become disorderly.

The scale and scope of civil disturbance events varies widely. Most civil disturbance events, should they occur, may have diminished impacts as a result of response training. Additionally, having adequate law enforcement can minimize the chances of a small assembly of people turning into a significant disturbance. However, government facilities, landmarks, prisons, and universities are common sites where crowds and mobs may gather. Civil disturbances can take the form of small gatherings or large groups blocking or impeding access to a building or disrupting normal activities by generating noise and intimidating people. They can range from a peaceful sit-in to a full-scale riot, in which a mob burns or otherwise destroys property and terrorizes individuals. Even in its more passive forms, a group that blocks roadways, sidewalks, or buildings interferes with public order. There are two types of large gatherings typically associated with civil disturbances: a crowd and a mob. A crowd may be defined as a casual, temporary collection of people without a strong, cohesive relationship. Crowds can be classified into four categories:

- ***Casual Crowd:*** A casual crowd is merely a group of people who happen to be in the same place at the same time. Violent conduct does not occur.

- ***Cohesive Crowd:*** A cohesive crowd consists of members who are involved in some type of unified behavior. Members of this group are involved in some type of common activity, such as worshipping, dancing, or watching a sporting event. Although they may have intense internal discipline, they require substantial provocation to arouse to action.
- ***Expressive Crowd:*** An expressive crowd is one held together by a common commitment or purpose. Although they may not be formally organized, they are assembled as an expression of common sentiment or frustration. Members wish to be seen as a formidable influence. One of the best examples of this type is a group assembled to protest.
- ***Aggressive Crowd:*** An aggressive crowd is comprised of individuals who have assembled for a specific purpose. This crowd often has leaders who attempt to arouse the members or motivate them to action. Members are noisy and threatening and will taunt authorities. They may be more impulsive and emotional and require only minimal stimulation to arouse violence. Examples of this type of crowd could include demonstrators and strikers, though not all demonstrators and strikers are aggressive.

A mob can be defined as a large disorderly crowd or throng. Mobs are usually emotional, loud, tumultuous, violent, and lawless. Similar to crowds, mobs have different levels of commitment and can be classified into four categories (Alvarez & Bachman, 2007):

- ***Aggressive Mob:*** An aggressive mob is one that attacks, riots, and terrorizes. The object of violence may be a person, property, or both. An aggressive mob is distinguished from an aggressive crowd only by lawless activity. Examples of aggressive mobs are the inmate mobs in prisons and jails, mobs that act out their frustrations after political defeat, or violent mobs at political protests or rallies.
- ***Escape Mob:*** An escape mob is attempting to flee from something such as a fire, bomb, flood, or other catastrophe. Members of escape mobs are generally difficult to control and can be characterized by unreasonable terror.
- ***Acquisitive Mob:*** An acquisitive mob is one motivated by a desire to acquire something. Riots caused by other factors often turn into looting sprees. This mob exploits a lack of control by authorities in safeguarding property.
- ***Expressive Mob:*** An expressive mob is one that expresses fervor or revelry following some sporting event, religious activity, or celebration. Members experience a release of pent-up emotions in highly charged situations.

Seldom have civil disorder events been recorded in Charles County's recent history; however, criminal activity occurs much more frequently and is defined as an act committed in violation of the law. The following are categories of criminal activity used when describing various crimes throughout Charles County and neighboring areas (CrimeReports, 2017):

- **Assault:** An unlawful attack by one person upon another.
- **Assault with a Deadly Weapon:** An unlawful attack by one person upon another for the purpose of inflicting severe or aggravated bodily injury.
- **Arson:** Any willful or malicious burning or attempt to burn, with or without intent to defraud, a dwelling, house, public building, motor vehicle, aircraft, or personal property of another.

- **Homicide:** The willful killing of one human being by another.
- **Kidnapping:** The crime of unlawfully seizing and carrying away a person by force or seizing and detaining a person against his or her will with an intent to carry that person away at a later time.
- **Robbery:** The taking or attempting to take anything of value from the care, custody, or control of a person by force, threat of violence, and/or by putting the victim in fear.
- **Other Sexual Offense:** Offenses that are sexual in nature and not immediately classified as a Sexual Offense or Sexual Assault.
- **Sexual Assault:** The carnal knowledge of an individual forcibly and against her or his will.
- **Sexual Offense:** This classification includes offenses against chastity, common decency, morals, and the like.
- **Breaking and Entering:** The unlawful entry of a structure to commit a felony or a theft.
- **Property Crime:** General crimes committed on residential or commercial property.
- **Theft:** The taking or attempting to take anything of value from the care, custody, or control of a person.
- **Disorder:** Any behavior that tends to disturb the public peace or decorum, scandalize the community, or shock the public sense of morality.
- **Drugs:** The violation of laws prohibiting the production, distribution, and/or use of certain controlled substances and the equipment or devices utilized in their preparation and/or use. The unlawful cultivation, manufacture, distribution, sale, purchase, use, possession, transportation, or importation of any controlled drug or narcotic substance.
- **Liquor:** Driving or operating a motor vehicle or common carrier while mentally or physically impaired as the result of consuming an alcoholic beverage or using a drug or narcotic.
- **Weapons Offense:** The violation of laws or ordinances prohibiting the manufacture, sale, purchase, transportation, possession, concealment, or use of firearms, cutting instruments, explosives, incendiary devices, or other deadly weapons.
- **Traffic Violation:** A violation of traffic law or code.

The worst-case scenario for Charles County would be an aggressive crowd or an expressive mob protesting on or within a major thoroughfare, most likely formed near a major educational institution or headquarters. This scenario would also involve property damage and possible injury. Civil disturbances also pose as major threats to mobility, local economies, educational systems, and are capable of damaging structures, including those which are of historical and archaeological origin.

Past Occurrences

Historically the Village of Port Tobacco in Charles County has had several riots, most notably the one which took place shortly after the Revolutionary War in 1786. Another significant historical riot in Charles County occurred in 1765. As a result of the Stamp Act crisis in 1765, the court of Port Tobacco closed its doors as a sign of the refusal to pay the newly instated stamp tax. Later in late 1774, just after the Continental Congress adopted a trade embargo to protest British imperial policies, a group of Charles County residents forced the court to adjourn. Again, in June of 1786 an angry riot began at the Port Tobacco courthouse in response to local merchants refusing to use British goods (Maryland Historical Magazine, 1990).

Despite Port Tobacco's rich history of civil disturbances, there has been few reported cases in Charles County in recent time. However, surrounding areas in Maryland, such as Baltimore, have had several destructive riots in 2015 and 2020. While these occurrences did not take place in Charles County, they may however have created a sudden fear for Charles County residents and limited their mobility.

The Charles County Sheriff's Department attempts to inform county citizens of crimes in their area by reporting incidences to CrimeReports.com. Crime statistics are also published in annual reports. In 2021, the Sheriff's Office of Charles County reported 3,628 arrests, the lowest number of all 14 years shown in Table 4.12-2 (Charles County Sheriff's Office, 2023). There was no annual report published in 2020, most likely due to the COVID-19 pandemic. The number of arrests per year was in a steady decline between 2014 and 2017, with a dramatic decrease between 2017 and 2018 that began another declining trend. The exact reason for this decline is not clear, as the number of service calls each year has stayed relatively stable. The annual reports from 2018 and beyond do acknowledge this success and cite technological advancements, maintaining strong relationships with the community, and strategic partnerships as achievements that have contributed. Charles County officials have also developed the Charles County Crime Solvers program.

Table 4.12-2: Arrests in Charles County (Charles County Sherriff's Office, 2023)

YEAR	ARRESTS
2009	11,454
2010	11,746
2011	11,658
2012	11,416
2013	11,029
2014	11,600
2015	10,655
2016	9,898
2017	9,325
2018	5,702
2023 PLAN UPDATE	
2019	5,508
2020	N/A
2021	3,628
2022	4,006
Total	**89,456**

While there are few reports of civil disturbances in Charles County, political protesting is a rare occurrence. Crime in Charles County varies widely, including incidences of assault, breaking and entering, property crime, robbery, sexual offenses, and theft. The majority of these crimes are concentrated in and around the city of Waldorf; however, fewer occurrences have taken place in the Town of La Plata, Indian

Head, and the Village of Port Tobacco. Beginning in 2017, the Charles County Sherriff's Office began publishing quarterly data reports on incidents to the CityProtect website. The data includes a myriad of incident categories, including the ones mentioned above and proactive policing, emergencies, fires, traffic violations, quality of life, and others. Table 4.12-3 below showcases the number of incidents reported for a handful of criminal activities between 2018 to September 2023. The two most common activities that the Sheriff's Office reported were theft and assault, both of which have steadily decreased over the years. This matches the trend of decreasing arrests.

Table 4.12-3: Reported Criminal Incidents in Charles County (Charles County Sherriff's Office, 2023)

ACTIVITY	2018	2019	2020	2021	2022	2023*	TOTAL
Assault	3,530	2,431	1,891	1,633	1,820	1,424	12,729
Breaking and Entering	677	585	353	276	283	194	2,368
Homicide	21	8	15	5	4	5	58
Property Crime	1,739	1,473	1,116	948	997	822	7,095
Robbery	222	120	99	109	132	101	783
Sexual Offense	822	879	620	684	798	504	4,307
Theft	5,485	3,955	3,144	2,863	3,204	2,284	20,935
Theft from Vehicle	1,383	963	959	762	690	570	5,327
Theft of Vehicle	665	502	486	398	430	419	2,900

*Only contains data through September 2023

Future Occurrence

The Charles County Detention Center also has the potential for large-scale civil disorder, though this has never occurred to date. The Detention Center is located in the Town of La Plata on Route 301. Opened in 1995, it is a secure facility for incarcerated adults and houses 203 cells. Additionally, the Charles County Detention Center has an annex house for inmates on work release. The Corrections Division is accountable for the safety and custody of inmates, while also providing a variety of programs to help inmates re-enter society as more productive citizens through the reduction of recidivism.

Minor civil disturbances will continue to occur in Charles County, but it is not possible to accurately predict the probability and triggers for a large-scale civil disturbance event over the long-term. Local law enforcement will continue to anticipate these types of events and be prepared to handle a crowd so that peaceful gatherings are prevented from turning into unruly public disturbances. Therefore, the probability of civil disturbance occurring in Charles County is considered possible, yet unlikely. However, the probability of criminal activity occurring in Charles County is very likely. Taken together, the probability of civil disturbance and criminal activity as a combined hazard is considered *highly likely* (4 out of 4) as defined by the Risk Factor Methodology probability criteria.

Vulnerability Assessment

People

The vulnerability of communities to civil disturbance is difficult to determine because the hazard is typically tied to the current political and economic climate.

Structures

Civil disturbance events may target specific structures, especially government buildings if the disturbance is political in nature. Structures may be the targets of various property crimes, including breaking and entering, arson, and vandalism. While fires may cause serious structural damage to buildings and potentially lead to condemnation and demolition, other property crimes have lower potential damages associated with them. Retail stores are vulnerable to damage associated with breaking and entering, as some participants in or around the disturbance move to looting.

Systems

In the case that a large civil disturbance event occurred, the County could incur losses related to work stoppages. This may disrupt important services throughout the County, including utility service, healthcare systems, and transportation systems. Demonstrations may occur on major highways or roads, disrupting their use.

Natural, Historic, and Cultural Resources

Typically, natural resources are not at risk to civil disturbance events. They may be at risk to property crimes such as arson, which could escalate into a wildfire that burns acres of land and vegetation. Historic or cultural resources are more vulnerable, as they may be the target or location of demonstrations and vandalism. This would be tied to the political and economic climate at the time, as statues of historical figures or representations of certain cultures or peoples may be linked.

Community Activities

Community activities may be impacted by civil disturbances as they may be seen as opportunities to demonstrate in front of an already gathered audience. Parades, sporting events, and other local events are typically staffed by law enforcement to deter any disturbance from escalating or crimes being committed.

Jurisdictional Differences

In general, only small and localized areas of Charles County are particularly vulnerable to civil disturbance events. Areas at higher risk include those near government facilities in La Plata, the Charles County Detention Center, the College of Southern Maryland, and other landmarks. On the other hand, all communities in Charles County are vulnerable on some level, directly or indirectly, to criminal activity. Historic records of crime indicate that the Waldorf area may be at a higher risk than other parts of the County. The continuation of programs such as CrimeReports and Crime Solvers can help citizens and local police work together towards deterring crime and increasing public safety.

Land Use and Development Trends

With increased development and population growth, the potential for civil disturbance and criminal activity could possibly increase. However, during the process of building and development, crime

prevention can be encouraged through environmental design principles (National Crime Prevention Council, 2003). Future designs could incorporate the following:

- More lighting systems in public places
- Increased pedestrian and bicycle traffic
- Utilization of vacant land
- Increased video surveillance systems
- Increased Red Light Traffic Cameras
- Increased security of homes and commercial space

With the expected growth and development of Charles County, proper precautions can be made to discourage the likelihood of civil disturbances and criminal activity, including the aforementioned environmental design principles.

4.13 Environmental Hazards (Hazardous Materials & Pipeline)

Table 4.13-1: Environmental Hazards Ranking (Hazardous Materials & Pipeline)						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Human-Made	4	1	1	4	2	**2.3**
MODERATE RISK (2.0 – 2.9)						

Location, Extent, and Range of Magnitude

This Environmental Hazards profile focuses on hazardous material releases and pipeline hazards. These events result from human activities and industries and can result in injury and death to humans and damage to property.

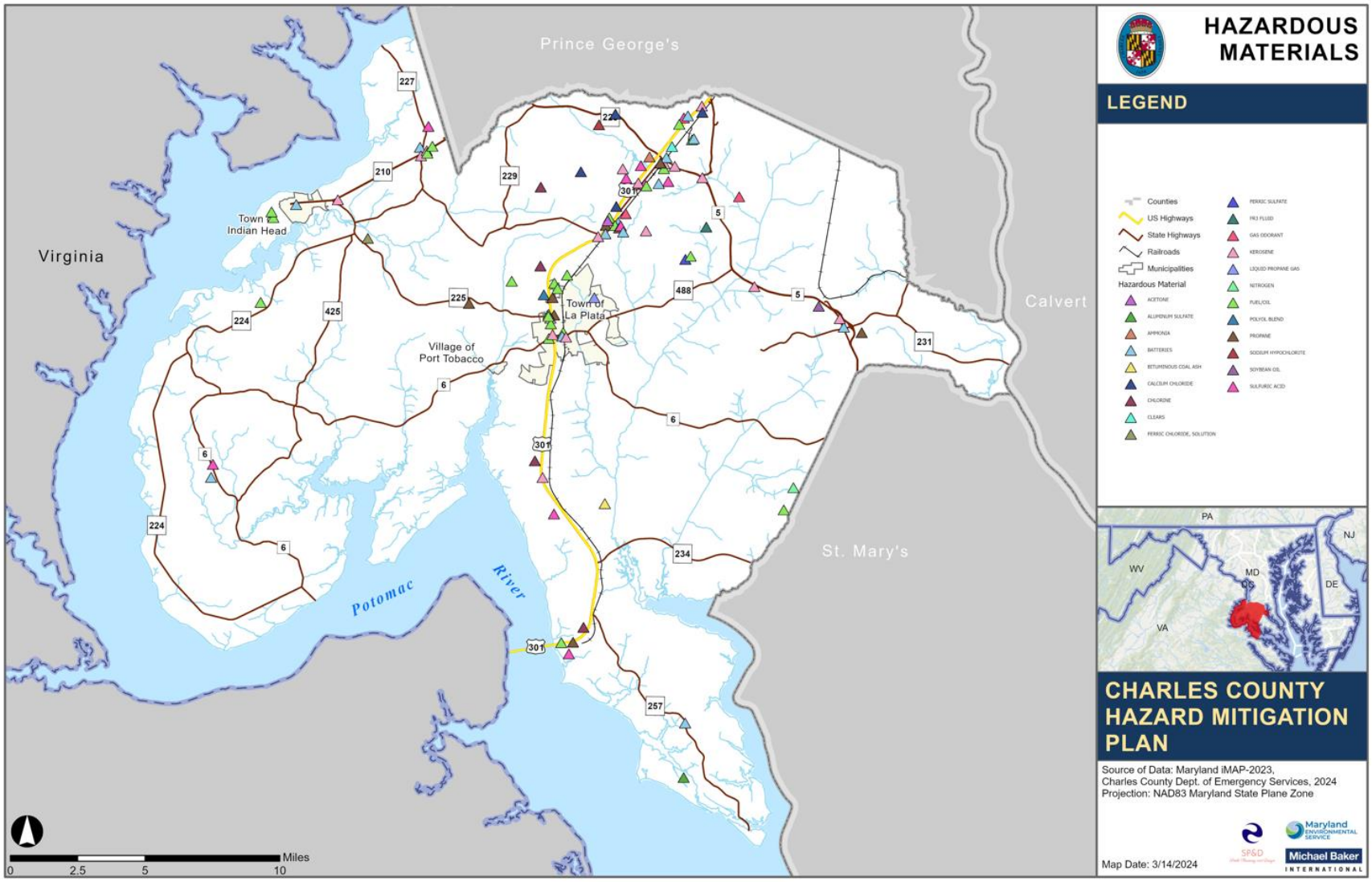
Hazardous Materials Release

A hazardous material release is the contamination of the environment (i.e., air, water, soil) by any material that because of its quantity, concentration, physical characteristics, or chemical characteristics threatens human, animal, or plant health, the environment, or property. Hazardous material spills are usually accidental events that arise from human activities such as the manufacture, transportation, storage, and use of hazardous materials. The consequences of such spills are usually unintended. An accidental or intentional release of hazardous materials could produce a health hazard to those in the area, downwind, and/or downstream with immediate, prolonged, and/or delayed effects. The spread of the material may additionally be defined by weather conditions and topography of the area. A hazardous materials release can come from a fixed facility or transportation. These events can also be intentional releases or acts of terrorism.

Fixed facilities housing hazardous substances in Charles County include water treatment plants, swimming pools, gas stations, and supply stores containing substances such as fuel, farm chemicals, propane, fuel oil, paint, and small amounts of chlorine. The locations of hazardous materials facilities throughout Charles County are shown in Map 4.13-1. Most of these sites are clustered near U.S. 301.

A hazardous material release may also occur due to a transportation accident. There are increasingly large numbers of chemicals, oils, radioactive materials, and other hazardous substances spilled as the result of highway, rail, and waterway accidents, storage tank leakage, pipeline break, and/or other accidents. On occasion, these events become a major disaster and force people to evacuate and/or lose their homes and businesses. The most likely locations for a transportation-related hazardous material release are along the highways running throughout the County. Gas, propane, and other hazardous materials are delivered throughout the County year-round. The need for gas, propane, fertilizers, and other toxic materials in daily life creates a larger risk for a hazardous materials release.

Map 4.13-1: Location of Hazardous Materials Facilities in Charles County



A hazardous materials release in Charles County may not only contaminate dirt or surface material but could potentially contaminate flowing water in ditches, rivers, or small streams. Other potential concerns for spills/leaks are icy road conditions during winter months, sabotage, and terrorism. Dispersion can take place rapidly when transported by water and wind. While often accidental, releases can occur as a result of human carelessness, intentional acts, or natural hazards. When caused by natural hazards, these incidents are known as secondary events. Hazardous materials can include toxic chemicals, radioactive materials, infectious substances, and hazardous wastes. Such releases can affect nearby populations and contaminate critical or sensitive environmental areas. The environmental impacts of hazardous material releases include:

- Hydrologic effects, including surface and groundwater contamination.
- Other effects on water quality such as changes in water temperature.
- Damage to streams, lakes, ponds, estuaries, and wetland ecosystems.
- Air quality effects, including pollutants, smoke, and dust.
- Loss of quality in landscape.
- Reduced soil quality.
- Damage to plant communities, including loss of biodiversity and damage to vegetation.
- Damage to animal species, including animal fatalities, degradation of wildlife and aquatic habitat, pollution of drinking water for wildlife, loss of biodiversity, and disease.

With a hazardous material release, whether accidental or intentional, there are several potentially exacerbating or mitigating circumstances that will affect its severity or impact. Mitigating conditions are precautionary measures taken in advance to reduce the impact of a release on the surrounding environment. Primary and secondary containment or shielding by sheltering-in-place protects people and property from the harmful effects of a hazardous material release. Exacerbating conditions, characteristics that can enhance or magnify the effects of a hazardous material release are included below.

- **Weather conditions:** Affects how the hazard occurs and develops.
- **Micro-meteorological effects of buildings and terrain:** Alters dispersion of hazardous materials.
- **Non-compliance with applicable codes (e.g., building or fire codes) and maintenance failures (e.g., fire protection and containment features):** Can substantially increase the damage to the facility itself and to surrounding buildings.

The severity of the incident is dependent not only on the circumstances described above, but also with the type of material released and the distance and related response time for emergency response teams. The areas within closest proximity to the releases are generally at greatest risk, yet depending on the agent, a release can travel great distances or remain present in the environment for a long period of time (e.g., centuries to millennia for radioactive materials), resulting in extensive impacts on people and the environment.

Charles County has created a Tactical Response Team (TRT) to respond to hazardous materials releases 24/7 in the County. The need for the team came after 9/11 when the County realized most of the first responders were volunteers and would be called back to their full-time jobs as firefighters in the

surrounding counties. The TRT is prepared to handle a myriad of hazardous materials releases at any time. The team responds to approximately 130 hazardous materials responses a year and utilizes National Capital Region FEMA training to respond to Chemical, Biological, Radiological, Nuclear, and enhanced (improvised) explosives threat (CBRN) events throughout the region.

A worst-case scenario event of a hazardous material release would be if a release occurred in a very populated area, such as La Plata or Waldorf. A hazardous material release would likely cause the evacuation of community residents, visitors, and employees.

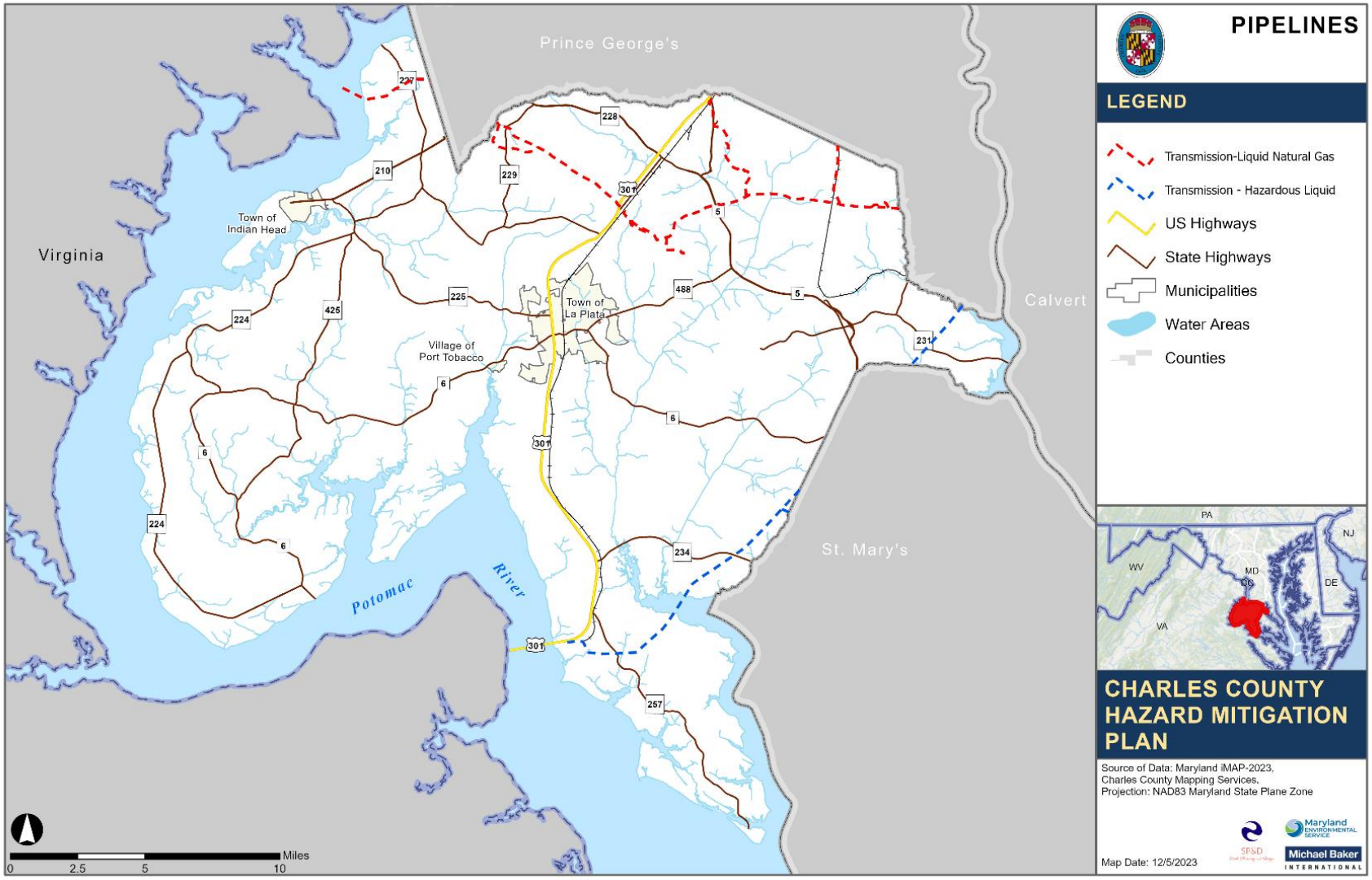
Pipeline Hazards

Transmission pipelines are often used as a preferred means to safely transport large quantities of energy products. In Charles County, there are several pipelines, including the CPV Maryland St. Charles Emergency Center (CPVSC) gas pipeline and the PSEG Keys Energy Center (PSEG) as pipeline. The CPVSC spans 1.5 miles, while the PSEG facilities pans 7.7 miles. Map 4.13-2 shows the locations of pipelines in Charles County.

Pipelines safety standards are established within the US Code of Federal Regulations (CFR), Title 49 "Transportation," Part 190-1999 with inspection and enforcement of these standards carried out by the Office of Pipeline Safety (OPS), within the US Department of Transportation, Pipeline and Hazardous Materials Safety Administration (PHMSA). PHMSA estimates that gas transmission pipelines run through roughly 90% of all counties in the United States. Transmission pipelines are mostly buried underground and operated remotely from centrally located control centers. According to PHMSA, the control centers allow for the efficient operation of either a single pipeline or a number of different pipeline systems from a single location. Pipeline control center operators can start and stop pumps, open and close valves, and control a number of other operational tasks from a single location (US DOT-PHMSA). Pipelines are considered a relatively safe means of transporting crude oil or petroleum across the country; however, there have been pipeline incidents with catastrophic results. Such incidents can negatively impact nearby urbanized populations and contaminate critical or sensitive environmental areas. The great risk that pipelines present to the public include potential impacts from the unintentional release of the hazardous liquid or gas transmission product transported through the pipelines.

Precautionary measures are taken in advance to reduce the impact of a pipeline incident on the surrounding environment. For instance, pipeline operators are required to perform periodic surveys throughout their system. Additionally, emergency response plans must be developed for these facilities. For example, both the CPVSC and PSEG pipelines have Emergency Response Plans that outline various types of emergency situations and appropriate response procedures. Even with precautionary measures, it is difficult to predict the true risk that transmission pipelines present to a community.

Map 4.13-2: Location of Pipelines in Charles County



A Dominion Compressor station, which was slated to be one of the largest such facilities in the country at the time, covering 50-acres, using around 230,000 gallons of water per day, and storing 13,000 gallons of ammonia on site, was proposed on existing property in the Bryans Road section of the County. However, continued opposition from environmental groups, Mt. Vernon officials, and residents, led to difficulties which caused Dominion to forgo the new station and continuing existing operations on the site, which houses a field office, a warehouse, and pipeline (Keene, 2018; Lagasse, 2018). Although pipelines can be a great economic benefit, the worst-case scenario for a transmission pipeline incident impacting a densely populated area could result in widespread injury, death, property damage, and environmental damage.

Past Occurrence

Hazardous Materials Releases

Since 2000, there have been 30 highway, railway, and aircraft-related hazardous material incidents in Charles County. Only two have occurred since the last plan update, and the majority have occurred in Waldorf and on a highway. The total reported damages are $131,672. Table 4.13-2 below contains details about each incident.

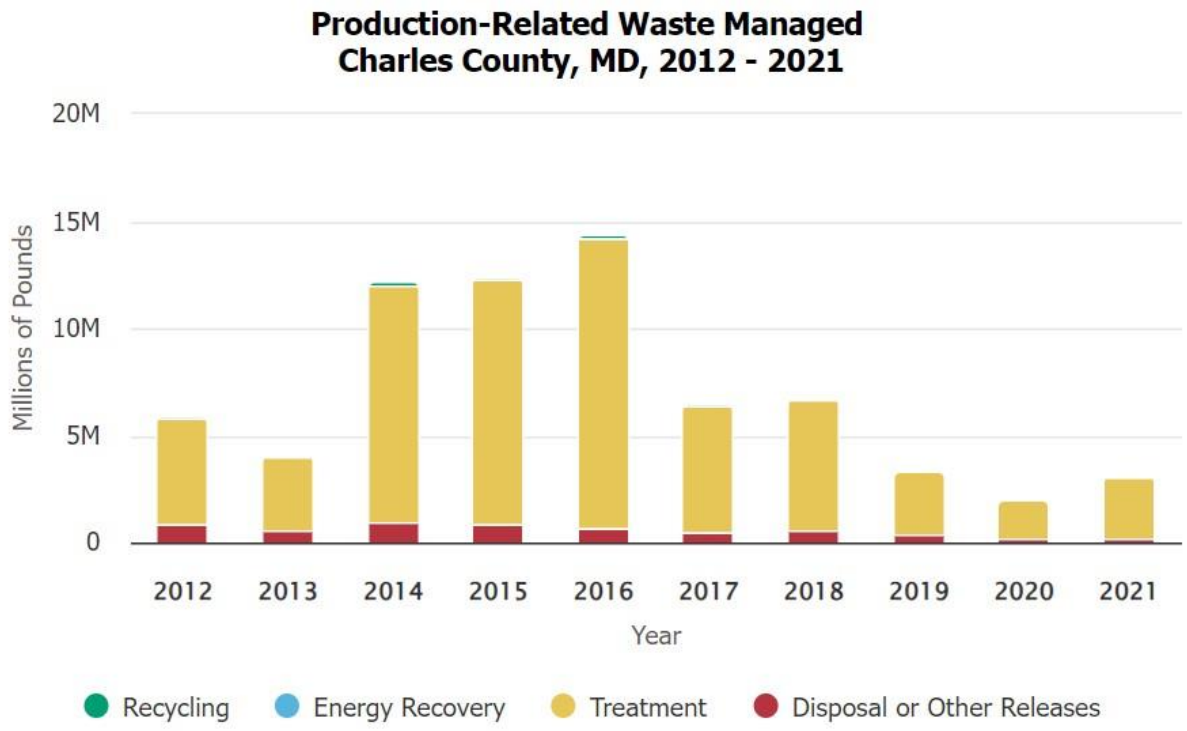
Table 4.13-2: Hazardous Material Incidents in Charles County since 2000 (PHMSA, 2023)

INCIDENT CITY	DATE OF INCIDENT	COMMODITY	TOTAL DAMAGES	MODE OF TRANSPORTATION
Bryantown	10/3/2000	Fuel Oil (No. 1, 2, 4, 5, Or 6)	$119,800.00	Highway
Indian Head	10/17/2000	Sulfuric Acid	$0.00	Highway
Waldorf	2/24/2001	Fuel Oil, No. 1, 2, 4, 5, Or 6	$26.00	Highway
Waldorf	6/18/2001	Fuel Oil, No. 1, 2, 4, 5, Or 6	$152.00	Highway
Waldorf	10/10/2001	Fuel Oil, No. 1, 2, 4, 5, Or 6	$20.00	Highway
Waldorf	11/2/2001	Fuel Oil, No. 1, 2, 4, 5, Or 6	$0.00	Highway
Waldorf	4/10/2002	Fuel Oil, No. 1, 2, 4, 5, Or 6	$26.00	Highway
Waldorf	4/11/2002	Hypochlorite Solutions	$0.00	Air
Waldorf	7/20/2002	Fuel Oil, No. 1, 2, 4, 5, Or 6	$20.00	Highway
Waldorf	11/19/2002	Fuel Oil, No. 1, 2, 4, 5, Or 6	$26.00	Highway
La Plata	5/30/2003	Bisulfites, Aqueous Solutions, N.O.S.	$0.00	Highway
Indian Head	6/12/2003	Sulfuric Acid	$0.00	Highway
La Plata	8/11/2003	Hypochlorite Solutions	$0.00	Highway
Waldorf	1/19/2004	Fuel Oil, No. 1, 2, 4, 5, Or 6	$1.00	Highway
Waldorf	3/24/2004	Paint Including Paint, Lacquer, Enamel, Stain, Shellac Solutions, Varnish, Polish, Liquid Filler and Liquid Lacquer Base	$60.00	Highway
Newburg	4/30/2004	Fuel Oil, No. 1, 2, 4, 5, Or 6	$4,010.00	Highway
Hughesville	8/9/2004	Fuel Oil, No. 1, 2, 4, 5, Or 6	$1.00	Highway
Indian Head	8/24/2004	Sulfuric Acid	$0.00	Highway

Table 4.13-2: Hazardous Material Incidents in Charles County since 2000 (PHMSA, 2023)				
INCIDENT CITY	**DATE OF INCIDENT**	**COMMODITY**	**TOTAL DAMAGES**	**MODE OF TRANSPORTATION**
Indian Head	12/30/2004	Sulfuric Acid	$0.00	Highway
Waldorf	10/12/2005	Isopropanol Or Isopropyl Alcohol	$0.00	Highway
Waldorf	3/9/2006	Paint Including Paint, Lacquer, Enamel, Stain, Shellac Solutions, Varnish, Polish, Liquid Filler and Liquid Lacquer Base	$0.00	Air
Waldorf	4/10/2008	Corrosive Liquid, Basic, Inorganic, N.O.S.	$0.00	Highway
Waldorf	2/2/2009	Smokeless Powder for Small Arms (100 Pounds or Less)	$0.00	Highway
Waldorf	2/9/2009	Gasoline Includes Gasoline Mixed with Ethyl Alcohol, With Not More Than 10% Alcohol	$0.00	Highway
Waldorf	2/25/2010	Diesel Fuel	$0.00	Highway
Waldorf	5/4/2011	Aerosols, Poison, Packing Group Iii (Each Not Exceeding 1 L Capacity)	$0.00	Air
Waldorf	3/22/2013	Fire Extinguishers Containing Compressed or Liquefied Gas	$0.00	Air
Waldorf	10/14/2015	Aerosols, Poison, Packing Group Iii (Each Not Exceeding 1 L Capacity)	$0.00	Highway
2023 Plan Update				
Waldorf	6/28/2018	Corrosive Liquid, Acidic, Inorganic, N.O.S.	$0.00	Highway
Waldorf	2/28/2020	Nitric Acid Other Than Red Fuming, with More Than 70 Percent Nitric Acid	$0.00	Highway

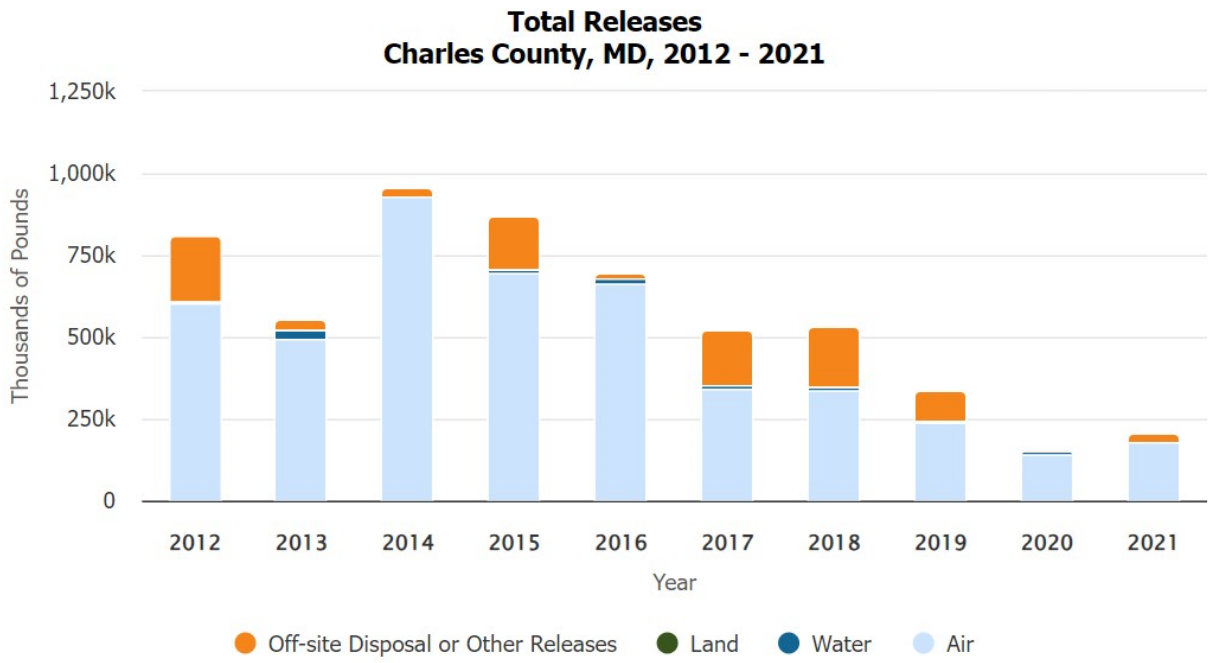
The US EPA's Toxic Release Inventory (TRI) program tracks hazardous materials release and disposal data for US counties and states. Since 1994, there have been no significant reported releases in Charles County. Additionally, Maryland ranks 31st nationwide based on total releases per square mile (EPA, 2016). However, the TRI does note many substances that have been safely disposed of in the County. Disposals include nitroglycerin, arsenic, chromium, manganese, mercury, nickel, nitric acid, sulfuric acid, and zinc. The TRI data does not provide data regarding the effect on the public of releases or disposals of hazardous materials; however, the US EPA TRI reports that there are five TRI sites in Charles County which produced 3.1 million pounds of production-related waste in 2021, the latest year data is available for. This is the second fewest amount of waste produced since 2012, with only 1.9 million pounds produced in 2020. Figure 4.13-1 showcases as the waste managed in the County between 2012 and 2021, most of which is treated.

Figure 4.13-1: Production-Related Waste Managed in Charles County 2012-2021 (EPA, 2023)



Of these 3.1 million pounds, 205,000 pounds were disposed of or released. 117,600 pounds, or around 86%, was released into the air, 24,300 pounds (12%) was disposed of off-site, and 4,000 pounds (2%) was released into local waterbodies. This was the second least amount of waste emitted into the air since 2012, third least disposed of off-site, and least released into waterbodies since 2012. Most of the releases are done by the Morgantown Generating Station, which released a total of 181,562 pounds in 2021 (EPA, 2023). Figure 4.13-2 below showcases the releases by year between 2012 and 2021.

Figure 4.13-2: Total Waste Released in Charles County 2012-2021 (EPA, 2023)



Pipeline Hazards

There have been only four reported pipeline incidents in Maryland, three of which occurred in the 1970s and 1980s. The most recent event occurred on April 7, 2000, at the Piney Point Oil Pipeline, which was owned by the Potomac Electric Power Company. A pipe failure was experienced at the Chalk Point Generating Station in southeastern Prince George's County on the morning of the 7th, but the release was not discovered until the late afternoon. As a result, approximately 140,400 gallons of fuel oil were released into the surrounding wetlands and Swanson Creek. There were no injuries as a result of this event, but clean-up and environmental response operations cost approximately $71 million (NTSB, 2000).

Future Occurrence

Hazardous material release and pipeline incidents are generally considered difficult to predict. An occurrence is largely dependent upon the accidental or intentional actions of a person or group. It is difficult to predict when and where environmental hazards will arise as they are often related to equipment or technology failure and human error. Adequate monitoring through the MDE will reduce the likelihood of potential impacts to the community and to the environment; however, it is still very likely that these events, particularly hazardous materials releases, will continue to occur. Based on historical data, hazardous materials releases occur hundreds of times annually throughout the state. Therefore, the probability of future environmental hazard events is considered *highly likely* (4 out of 4) as defined by the Risk Factor Methodology probability criteria.

Vulnerability Assessment

Hazardous Materials

People

Hazardous materials incidents can pose a series of threats to human safety and welfare. Depending upon the materials released, as well as atmospheric conditions, an incident has the potential to cause significant disruption to Charles County and its jurisdictions along with injury or even death to residents in the immediate area. At-risk populations, such as the young, elderly, and sick, may be more vulnerable to the adverse health impacts of releases. Table 4.13-3 below calculates the population within 1.25 miles of a TRI Facility.

Figure 4.13-3: Household Hazardous Waste Brochure



Workers should receive proper training in the use, safety, and regulations regarding hazardous materials. Workers and emergency response personnel should be trained in the techniques and safety measures for dealing with spills and incidents. The general public should be made aware of the hazards of household chemical products and of methods for properly disposing of these products. Charles County utilizes the Household Hazardous Waste Disposal Program to help. Informational and educational materials are available on the County's website as well as in the brochure shown in Figure 4.13-3.

Structures

Incidents often occur in conjunction with, or as a result of, natural hazards impacting facilities that house hazardous materials. Table 4.13-3 below lists the TRI Facilities within Charles County and Table 4.13-4 shows the number of critical facilities that are considered vulnerable. The impact on the structure itself will depend on the hazard and the materials it is housing. Numerous regulations and codes have been created to address containment, hazard communication, and controls. Hazardous materials are best managed through suitable containment. When properly contained, hazardous materials are unlikely to cause harm. The design of chemical containers for transportation and storage should be based on chemical and physical characteristics, the degree of hazard offered by the product, and to some extent on economic considerations. Most regulations and codes require containers to resist the most severe stresses that may reasonably be expected during normal handling, storage and use. Facilities are required to identify chemicals in buildings, tanks and other storage facilities using the (National Fire Protection

Association) NFPA 704 system. USDOT regulations impose certain controls on the types of chemicals that may be shipped together, how they must be loaded and secured on vehicles, levels of allowable radiation exposure and radiological contamination and, for certain high level radioactive shipments, highway routing. Codes and zoning requirement may address allowable locations for chemical storage and use.

Systems

The variety of potential hazardous materials releases means they can impact systems in different ways. A release into the public water supply could also impact wastewater systems. Incidents that occur along roadways could shut down access to critical parts of transportation systems for extended periods of time. Incidents at energy production sites could disrupt the availability and transmission of energy and electricity throughout the county. The systems that are impacted will depend on the nature of the incident, including the material involved and location.

Natural, Historic, and Cultural Resources

Natural resources are particularly at-risk from hazardous materials releases. Local waterways may become contaminated with harmful substances, leading to the destruction of plant life and health impacts on local wildlife. Entire habitats may be destroyed through contamination, forcing wildlife to migrate to a different area for either an extended period of time or permanently. A large-scale event could have disastrous ripple effects for not only the local ecosystem, but potentially at both the county and regional scale.

Historic and cultural resources are not particularly vulnerable to incidents. Historic structures may be more susceptible to contamination if they have not been well maintained over the years and have cracks in either the structure or foundation that allow harmful substances to enter.

Community Activities

An incident may disrupt community activities depending on its location and atmospheric conditions. If an incident occurs near congregations of people or atmospheric conditions are such that materials may be spread towards the location of an activity, it will create a disruption. Areas may be off-limits for days, weeks, or even longer if a release is large enough.

Pipeline Hazards

People

Pipeline incidents can pose a threat to human safety and welfare, depending upon the materials released and the location of the incident. The largest impact would come if an incident occurred near a source of local drinking water or agricultural operations. Table 4.13-4 below contains information on populations in the county that are considered vulnerable.

Structures

An incident may only impact structures depending on their proximity and the nature of the incident. If the incident is explosive in nature, nearby structures may be impacted. Jurisdictions may have development regulations in place that restrict development and certain land uses within a predetermined distance from pipelines. Table 4.13-4 below contains information on critical facilities in the county that are considered vulnerable.

Systems

Pipeline systems are now considered by the Department of Homeland Security to be critical infrastructure under the transportation systems sector (US-DHS, 2015). While the likelihood of an emergency at a transmission pipeline in Charles County is difficult to determine, the likelihood is expected to increase as the transportation and distribution of energy products continues to increase. An incident may cause delays in energy production and distribution.

Natural, Historic, and Cultural Resources

Natural resources are particularly at-risk from pipeline incidents and tend to be what is the most affected. Flooding and other hazards could potentially damage pipelines and increase the risk of a pipeline failure or release of materials. Local waterways may become contaminated with oil or natural gas, leading to the destruction of plant life and health impacts on local wildlife. Entire habitats may be destroyed through contamination, forcing wildlife to migrate to a different area for either an extended period of time or permanently. A large-scale event could have disastrous ripple effects for not only the local ecosystem, but potentially at both the county and regional scale.

Historic and cultural resources are not particularly vulnerable to pipeline incidents unless they are in close proximity.

Community Activities

An incident may disrupt community activities depending on its location. If an incident occurs near congregations of people or if the activity relies on an impacted waterbody, it will create a disruption. Areas may be off-limits for days, weeks, or even longer if a release is large enough.

Jurisdictional Differences

Jurisdictions that are home to one or more hazardous materials facilities should be considered vulnerable to hazardous materials releases from fixed facilities. Table 4.13-3 shows the number of TRI facilities in Charles County. Three are located in unincorporated areas, while the remaining two are located in the Towns of La Plata and Indian Head. The jurisdictions and areas of the County without TRI facilities have much lower relative vulnerability to hazardous materials incidents at fixed facilities.

Table 4.13-3: TRI Facilities in Charles County (EPA, 2021)		
TRI FACILITY	**LOCATION**	**INDUSTRY**
La Plata Ready Mix Concrete	La Plata	Nonmetallic Mineral Product
Morgantown Generating Station	Charles County Unincorporated (Newburg)	Electric Utilities
US Navy Naval Support Facility Indian Head	Indian Head	Other
Waldorf Marble Inc.	Charles County Unincorporated (White Plains)	Plastics and Rubber
Waldorf Plant	Charles County Unincorporated (Waldorf)	Nonmetallic Mineral Product

Critical facilities and populations located near TRI sites as shown in Table 4.13-4. Indian Head, La Plata, and unincorporated areas of the County all have critical facilities and populations located within 1.5 miles of a TRI facility. Indian Head is the jurisdiction most at risk to a hazardous materials release at a TRI facility, with 78% of critical facilities and over 50% of the jurisdiction's population located within 1.5 miles of the U.S. Navy Naval Support Facility. Overall, nearly 17% of critical facilities and 7.6% of the County's population are located near TRI facilities.

Table 4.13-4: Environmental Hazards (TRI Facility) Vulnerability in Charles County						
MUNICIPALITY	**TOTAL CRITICAL FACILITIES**	**CRITICAL FACILITIES WITHIN 1.5 MI OF TRI FACILITY**	**PERCENT CRITICAL FACILITIES WITHIN 1.5 MI OF TRI FACILITY**	**TOTAL ESTIMATED 2010 POPULATION**	**POPULATION WITHIN 1.5 MI OF TRI FACILITY**	**PERCENT POPULATION WITHIN 1.5 MI OF TRI FACILITY**
Charles County Unincorporated Areas	573	87	15.18%	134,384	8,539	6.35%
Town of Indian Head	23	18	78.26%	3,833	2,217	57.84%
Town of La Plata	82	10	12.20%	8,321	389	4.67%
Village of Port Tobacco	0	0	0.00%	13	0	0.00%
Total	**678**	**115**	**16.96%**	**146,551**	**11,145**	**7.60%**

All jurisdictions are also vulnerable to the impacts of hazardous materials releases during transportation. As shown in Table 4.13-5, over 35% of the County's population is located within 1.5 miles of major highways, including 100% of Port Tobaccos population and over 80% of the populations in both Indian Head and La Plata. Additionally, over 63% of critical facilities in the County are located in these areas and could be impacted by a release during transport.

Table 4.13-5: Hazard Materials Release (Transportation) Vulnerability in Charles County						
MUNICIPALITY	**TOTAL CRITICAL FACILITIES**	**CRITICAL FACILITIES WITHIN 1.5 MI OF HAZMAT RELEASE AREAS**	**PERCENT CRITICAL FACILITIES WITHIN 1.5 MI OF HAZMAT RELEASE AREAS**	**TOTAL ESTIMATED 2010 POPULATION**	**POPULATION WITHIN 1.5 MI OF HAZMAT RELEASE AREAS**	**PERCENT POPULATION WITHIN 1.5 MI OF HAZMAT RELEASE AREAS**
Charles County Unincorporated Areas	573	346	60.38%	134,384	41,205	30.66%
Town of Indian Head	23	20	86.96%	3,833	3,115	81.27%

Town of La Plata	82	66	80.49%	8,321	7,139	85.79%
Village of Port Tobacco	0	0	0.00%	13	13	100.00%
Total	**678**	**432**	**63.72%**	**146,551**	**51,472**	**35.12%**

As state highway and railway corridors cross through and around Charles County, all jurisdictions in the County could potentially be affected by a hazardous materials release. Additionally, populations and critical facilities in Indian Head, La Plata, and unincorporated areas of the County are located near TRI facilities and are therefore potentially more vulnerable to a hazardous materials release at a fixed facility. Previous occurrences of hazard material incidents suggest that the population of Waldorf may be at an increased risk. For pipeline emergencies, only unincorporated areas of the County are currently vulnerable, although future expansions of pipelines could cause other jurisdictions could become vulnerable to this hazard.

Pipeline Hazards

Table 4.13-6 below shows critical facilities and populations that may be vulnerable to a transmission pipeline incident. Vulnerability is defined as living or being located with 0.25 miles of transmission pipelines that traverse Charles County. Roughly 22.37% of Charles County's population lives within 0.25 miles of transmission pipelines and are potentially vulnerable to the impacts of a transmission pipeline incident. Only the unincorporated areas of the County are vulnerable to this hazard. Approximately 116 or 16.96% of all critical facilities in the County are also located within this area. Similarly, only critical facilities in the unincorporated areas of the County are vulnerable.

Table 4.13-6: Pipeline Emergency Vulnerability

MUNICIPALITY	TOTAL CRITICAL FACILITIES	CRITICAL FACILITIES IN PIPELINE AREA	PERCENT CRITICAL FACILITIES IN PIPELINE AREA	TOTAL ESTIMATED 2010 POPULATION	POPULATION IN PIPELINE AREA	PERCENT POPULATION IN PIPELINE AREA
Charles County Unincorporated Areas	573	115	20.07%	134,384	32,788	24.40%
Town of Indian Head	23	0	0.00%	3,833	0	0.00%
Town of La Plata	82	0	0.00%	8,321	0	0.00%
Village of Port Tobacco	0	0	0.00%	13	0	0.00%
Total	**678**	**115**	**16.96%**	**146,551**	**32,788**	**22.37%**

Land Use and Development Trends

Population impacts are often greater than the structural impacts during an environmental hazard event, and as a result, more densely populated areas of the County would be impacted more significantly during such an event. Development codes and zoning requirement may address allowable locations for chemical storage and use, although as the population increases, development will also continue to increase in nearby areas thereby exposing a greater number of individuals to the risk of a hazardous materials release. Zoning regulations can also be used to limit the extent of development and population densities near pipelines.

4.14 Nuclear Events

Table 4.14-1: Nuclear Events Hazard Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Human-Made	1	2	1	2	4	**1.7**
LOW RISK (Less than 2.0)						

Location, Extent, and Range of Magnitude

The State of Maryland's Radiological Incident Annex, dated July 2010, defines Fixed Nuclear Facilities (FNF) as sites where nuclear materials are employed in an operation (i.e., nuclear reactors) or in storage which could cause an emergency nuclear incident. An emergency nuclear incident always coincides with a **radiation incident,** which the Radiological Incident Annex defines as any event involving radiation exposure or radioactive contamination to the public (U.S. Nuclear Regulatory Commission, 2017).

The areas surrounding FNFs are known as ingestion zones, since those areas are most likely to absorb radiation if it were released from an FNF. **Ingestion zones** are defined as having a radius of about 50 miles for commercial nuclear reactors and a radius of about 5 miles for research reactors. Within ingestion zones, **plume zones** are designated as having a radius of about 10 miles for commercial nuclear reactors and about 1 mile for research reactors.

Radiation is defined generally as energy given off by matter in the form of rays or high-speed particles. While there are many non-hazardous forms of natural radiation that citizens encounter daily, some forms of radiation can be dangerous when uncontrolled. Radiation can be dangerous to humans when exposed to dosages of 200 rad or more. **Rads** are units of measurement for the amount of ionized radiation that enters the body. The US Nuclear Regulatory Commission requires the use of the units "curie", "rad" and "rem" as part of the Code of Federal Regulations 10 CFR 20.

The most common types of radiation are alpha, beta, and gamma rays—although other types do exist. **Alpha** particles are formed by two protons and two neutrons and are considerably larger than any other radiation particles (over 7,000 times larger than beta rays). Due to their mass, alpha particles have a relatively short range. In fact, human skin is able to keep alpha particles from entering the body in most cases. While humans that come into external contact with alpha particles are unlikely to face harm, the ingestion, inhalation, or absorption into the bloodstream of alpha particles can be very dangerous. When internalized, alpha particles damage cells and are known to cause cancer later in life.

Beta particles are extremely small and rapidly moving. Low mass and high speed make beta particles more of a threat to penetrate the human body and cause harm. In open air, beta particles can travel several feet but are easily stopped by solid materials. Exposure to beta particles externally will cause a burn on the skin similar to sunburn. When inhaled, ingested, or absorbed into the bloodstream, beta particles damage cells and result in radiation sickness and cancer later in life.

Gamma particles have no mass and no charge. Gamma rays consist of pure electromagnetic energy that move at the speed of light. Since they have no mass, in open air gamma rays can travel tens of miles before dispersing. Although they are generally classified as an external hazard; gamma-emitting radionuclides can also be inhaled, or ingested with water or food, and cause exposures to organs inside the body. In large exposures, radionuclides can cause radiation sickness and even immediate death. Table 4.14-2 below displays health effects in relation to time of radiation exposure.

Table 4.14-2: Health Effects with Exposure to Radiation

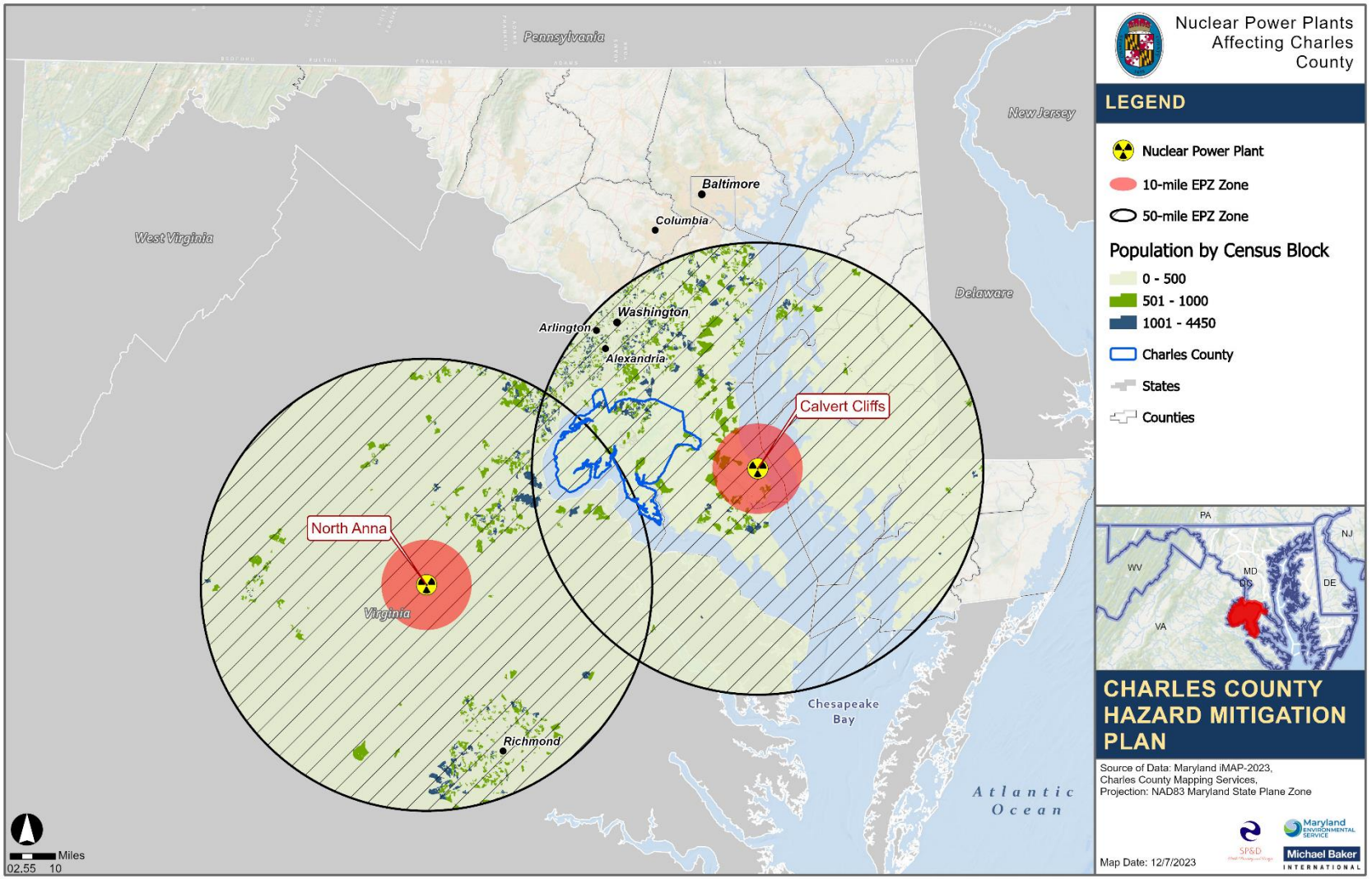
EXPOSURE (RADS)	HEALTH EFFECTS	TIME TO ONSET (WITHOUT TREATMENT)
5-10	Changes in blood chemistry	
50	Nausea	Hours
55	Fatigue	
70	Vomiting	
75	Hair loss	2-3 weeks
90	Diarrhea	
100	Hemorrhage	
400	Possible death	Within 2 months
1,000	Destruction of intestinal lining / Internal bleeding / Death	1-2 Weeks
2,000	Damage to central nervous system / Loss of consciousness / Death	Minutes-Hours

Given the instance of a nuclear incident there are three factors which can limit the amount of radiation one receives from an unshielded source: time, distance, and shielding.

- **Time:** While there is not a technically "safe" amount of radiation, limiting the amount of time an individual is exposed to radiation can decrease chances of ill effects. For instance, an individual having an x-ray taken is subjected to three to four times as much radiation as is naturally occurring; however, the x- ray is extraordinarily brief and unlikely to cause lasting effects.
- **Distance:** As mentioned in the descriptions of alpha, beta, and gamma particles, different types of radiation can travel different distances (alpha the shortest distance and gamma particles the furthest) before expending all their energy. Thus, increasing the distance between unshielded radiation and humans is a very effective method of prevention.
- **Shielding:** Depending on the thickness of the barrier, shielding exponentially blocks or reduces radiation pathways. For example, lead is commonly used to block or reduce radiation pathways due to its extreme density, which keeps particles from penetrating the shield (US EPA, 2017).

Charles County is located within 50 miles of two FNFs: the Calvert Cliffs Nuclear Power Plant in Maryland and the North Anna Power Station in Virginia. Considering both FNFs are active and contain radionuclides, Charles County is within the ingestion exposure zones for both facilities. Please refer to the Map 4.14-1 for the location of these facilities in relation to Charles County.

Map 4.14-1: Nuclear Power Plants Affecting Charles County



Although very rare, an accident at either FNF could result in dangerous levels of radiation that could affect the health and safety of the public located within the ingestion exposure zones. The risk of accidental release at each FNF is calculated by the US Nuclear Regulatory Commission (NRC) using the "probabilistic risk assessment "(PRA) method. Since both Calvert Cliffs and North Anna Nuclear Power Stations use pressurized water reactors (PWR), both facilities have similar risks of failure. The risk for PWR core damage is approximately 30% over 20 years. However, this number does not include containment failure, which is estimated by the NRC at 8% annually for PWR (US NRC, 2016).

Although currently unreleased, the NRC is developing a new risk modeling system for nuclear reactors called State-of-the-Art Reactor Consequence Analyses (SOARCA). SOARCA's objective is to develop updated and more realistic analyses of severe reactor accidents by including significant plant changes and updates (e.g., system improvements, training and emergency procedures, and offsite emergency response) that plant owners have made, which were not reflected in earlier assessments conducted by the U.S. Nuclear Regulatory Commission (NRC). These plant changes also include enhancements since the terrorist attacks on September 11, 2001. Additionally, seismic activity in the mid-Atlantic region has caused many FNF to revisit plans and training for FNF automatic shutdowns when earthquakes occur. While the likelihood of a release of radiation from a nuclear reactor is very low, the cascading damages and consequences of a release of radiation are extremely severe, especially regarding decontamination of persons, buildings, infrastructure, and roadways.

Nuclear accidents themselves are classified into three categories:

- **Critical accidents:** Involves loss of control of nuclear assemblies or power reactors.
- **Loss-of-coolant accidents:** Occurs whenever a reactor coolant system experiences a break or opening large enough so that the coolant inventory in the system cannot be maintained by the normally operating make-up system.
- **Loss-of-containment accidents:** Involves the release of radioactivity from materials, such as tritium, fission products, plutonium, and natural, depleted, or enriched uranium. Points of release have been containment vessels at fixed facilities or damaged packages during transportation accidents.

Nuclear facilities must notify the appropriate authorities in the event of an accident. The Nuclear Regulatory Commission uses four classification levels for nuclear incidents (Nuclear Regulatory Commission, 2008):

- **Unusual Event: Under this category, events are in process or have occurred which indicate potential degradation in the plant's safety.** No release of radioactive material requiring off-site response or monitoring is expected unless further degradation occurs.
- **Alert:** If an alert is declared, events are in process or have occurred which involve an actual or potential substantial degradation in the level of safety of the plant. Any releases of radioactive material from the plant are expected to be limited to a small fraction of the EPA Protective Action Guides (PAGs).
- **Site Area Emergency:** A site area emergency involves events in process, or which have occurred that result in actual or likely major failures of plant functions needed for protection of the public.

Any releases of radioactive material are not expected to exceed the EPA PAGs except near the site boundary.

- **General Emergency:** A general emergency involves actual or imminent substantial core damage or melting of reactor fuel with the potential for loss of containment integrity. Radioactive releases during a general emergency can reasonably be expected to exceed the EPA PAGs for more than the immediate site area.

Injured people will require some decontamination during medical treatment and is likely required prior to hospital admission. Thousands more will likely need superficial decontamination, and both short-term and long-term medical follow-ups to check for signs of cancer or other ailments associated with the unintended release of radiation.

Radioactive contamination will settle on streets, sidewalks, and building surfaces. Depending on the type of building materials, radiation might form a tight bond to stone and concrete that is resistant to simple rinsing. Personal items including clothing and jewelry will likely be contaminated and require forfeiture. While the exterior of vehicles may be decontaminated by simply rinsing with soap and water, the interior of vehicles will be much harder to clean and the cost of doing so may be prohibitively expensive.

Some demolition will likely be required, but most surfaces may be systematically decontaminated to low levels (a lengthy, costly process). It is most likely that decontamination will be focused primarily on critical infrastructures – such as major thoroughfares, public transportation, sewers, and water treatment facilities in order to restore basic functions as quickly as possible. Streets may need to be repaved or "capped" to trap radioactive contamination. Most sidewalks in the ingestion zone will need to be cleaned or capped. In addition, roofing materials will most likely need to be removed and/or resurfaced.

Contaminated exterior surfaces will need to be decontaminated with an assortment of chemical treatments (e.g., stripping, vacuum blasting, scabbling), and collected wastes will need to be hauled off for disposal. Contaminated building interiors will require removal of surface coatings, carpet, drapery, furniture, etc., and will need to be largely refurbished.

The waste caused by decontamination work is a concern. Workers can try to capture decontamination wastes for disposal, but much will escape into storm drains with each spring rain, causing sewers to become (further) contaminated. Some wastewater and sewage drains may be cleaned when "hot spots" of contamination are identified, but others may be left fairly contained if cleaning is not justified. It is also possible, though concentrations are low, river sediment remediation may be required.

Past Occurrence

The accident at the Three Mile Island Generating Station in March 1979 remains the nation's only nuclear incident at the General Emergency level and remains the worst nuclear incident on record in the nation. During this incident, equipment malfunctions, design-related problems, and worker errors led to a partial meltdown of the TMI Unit 2 reactor core at TMI.

Future Occurrence

Overall, the probability of a future nuclear incident event is unlikely (1 of 4) according to the Risk Factor Methodology. However, while the nuclear hazard is the most unlikely to be experienced, it is also the most severe. The Emergency Notification Network (ENN) will be used to provide warnings regarding a nuclear power plant emergency, and the Emergency Alert System (EAS) and the Citizen's Notification Service (CNS) will be used to notify the general public of emergency condition. The county Warning Point maintains a capability to use a wide variety of radio systems and networks to provide a county-wide emergency warning system including the 800 MHz, VHF and UHF radio systems, satellite communications, and amateur radio operator (MEMA, 2008).

Vulnerability Assessment

While a nuclear event is the most unlikely hazard to be experienced, it could also be the most severe hazard in terms of consequence, immediate damages, cascading damages, and long-term negative effects on citizens, government, critical infrastructure, housing, healthcare, political institutions, and the private sector. Developing a hazard mitigation plan, understanding nuclear/radiological risk, and identifying future opportunities for training, exercises, and familiarization with state and Federal response agencies is the industry best practice for preparing for the response to and recovery from nuclear hazards. While most hazards are handled entirely at the local level, the response to a hazard of this type is inherently massive and automatically triggers widespread responses from the State of Maryland and dozens of Federal agencies. In order to improve preparedness, continued coordination and future trainings with the aforementioned entities is crucial.

People

The effects and impacts of a nuclear/radiological threat depend on the type of radiation released, the duration of the release, the volume of the release, and the existing weather conditions, such as wind speed and direction. In populated areas, foot and vehicular traffic after deposition re-suspend and transfer contamination for hours afterward until the entire scene has been effectively controlled and cordoned, contributing to contamination spread beyond the expected ingestion zone. Individuals in the deposition zone will likely transfer contamination to their residences in their hair and clothing.

Charles County is located entirely within the 50-mile Ingestion Exposure Pathway for Calvert Cliffs Nuclear Power Plant and partially within the pathway for the North Anna Power Station. The worst-case radiological release event for Charles County would be a major release of radioactive material from the Calvert Cliffs Nuclear Power Plant. This event could generate a great deal of fear for residents of Charles County and the surrounding region.

Structures

A major release of radiation into either ingestion exposure pathways would result in potentially catastrophic damage. All buildings in the ingestion zone are at risk of contamination. Negative indoor building pressure draws radioactive aerosols into buildings via cracks around windows and doors. Exterior

air intake increases the contamination in the interior of larger buildings. As stated above, individuals will likely transfer contamination to their residences.

Systems

Sewage and water treatment facilities, along with other critical infrastructure will likely need to be decontaminated at costs that are unpredictably high. Roadways will likely need to be resurfaced or capped to prevent further contamination. Charles County's government vehicle fleet could be contaminated and require extensive and costly decontamination or replacement. The current healthcare system and number of hospital beds will be inadequate to sufficiently handle the number of patients, worried well, and family members, which would quickly stress and overwhelm current resources.

Natural, Historic, and Cultural Resources

Natural resources are very vulnerable to nuclear events as the risk for contamination is very high.

Community Activities

Specific impacts would depend on the extent and spread of the contamination, although it is likely that most incidents would suspend community activities in the short-term as more information is gathered.

Jurisdictional Differences

The entirety of Charles County falls within the 50-mile Ingestion Exposure Pathway for Calvert Cliffs Nuclear Power Plant, and the western portion of the County is also located within the pathway for the North Anna Power Station. While there is not a significant distinction in risk for any specific jurisdictions within Charles County since the severity of a radiation incident will be dictated by the weather (direction of wind, wind speed, humidity, etc.), the western portion of the County, including the Town of Indian Head, may be slightly more vulnerable because it is located in two Ingestion Exposure Pathways as opposed to just one. More densely populated areas will also pose challenges to wind/dispersal modeling due to complex urban wind patterns.

Land Use and Development Trends

In general, any new development and increases in population will increase the number of people and assets in Charles County that are at risk to a nuclear event; however, the specific location of future development and population growth centers will have little impact on vulnerability to this hazard since the entire county is at-risk.

4.15 Public Health Emergencies

Table 4.15-1: Public Health Emergencies Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Natural	4	3	2	1	4	3.0
HIGH RISK (3.0 or higher)						

Location, Extent, and Range of Magnitude

A public health emergency may be defined as an event, either natural or human-caused, that creates a significant health risk to the public. Public health emergencies can result from a number of causes, take many forms, and be spread by various means. Due to the nature of public health emergencies, impacts from such an event tend to be more widespread rather than confined to a specific location. A public health emergency can originate outside of Charles County, yet impact areas within the county.

Table 4.15-2: Public Health Emergencies that are Threats or Possible Threats	
AREAS OF CONCERN	EXAMPLE
Agro-terrorism	The deliberate introduction of an animal or plant disease with the goal of generating fear, causing economic losses, and/or undermining stability. Agro-terrorism can be considered a subcategory of bioterrorism and foodborne diseases.
Bioterrorism	The intentional or deliberate use of germs or biotoxins that cause disease or death in people, animals, or plants. Examples include Salmonella, and E. coli or other agents that cause anthrax, smallpox, or botulism.
Chemical terrorism	The deliberate use of manufactured chemicals, whether they were created intentionally as weapons or for industrial purposes, in order to cause illness or death. Examples include sarin and chlorine.
Chemical incidents and accidents	The non-deliberate exposure of humans to harmful chemical agents, with similar outcomes to chemical terrorism.
COVID-19 pandemic	In March 2020 the World Health Organization (WHO) officially declared the COVID-19 outbreak a pandemic. Coronavirus disease (COVID-19) is an infectious disease caused by the SARS-CoV-2 virus. Most people infected with the virus will experience mild to moderate respiratory illness and recover without requiring special treatment. However, some will become seriously ill and require medical attention. COVID-19 and influenza (flu) are both infectious respiratory diseases, and they share some similar symptoms. However, they are caused by different viruses, and there are some differences in who is most vulnerable to severe disease. The COVID-19 public health emergency declarations ended on May 11, 2023.
Foodborne diseases	Foodborne illness is caused by ingestion of harmful microbes or the toxins they produce. The Centers for Disease Control and Prevention (CDC) estimates there are approximately 76 million pathogen-induced cases of food-borne disease each year in the United States causing approximately 325,000 hospitalizations and 5,000 deaths. Examples include botulism, Salmonella, E. coli 0157:H7, shigella, and norovirus.
Generalized Infectious Disease Outbreaks	A sudden increase in occurrences of a disease when cases are in excess of normal expectancy that is not caused by another threat identified in this list.

Table 4.15-2: Public Health Emergencies that are Threats or Possible Threats	
AREAS OF CONCERN	**EXAMPLE**
Influenza pandemic	An epidemic of the flu virus that spreads worldwide and infects a large proportion of the human population. Influenza pandemics occur when a new strain of the flu virus is transmitted to humans from another animal species, like pigs, chickens, or ducks. Humans do not have natural immunity against these new strains. Historically, pandemic flu occurs two to three times every 100 years or so. During the 20th century the world experienced three pandemic flu events; 1918, 1957/58, and 1968. The severity of disease varied greatly among them. The H1N1 flu virus was the first pandemic flu of the 21st century.
Natural disasters	Although not classified public health emergencies themselves, damage from natural disasters can lead to contaminated water, shortages of food and water, loss of shelter, and the disruption of health care services, each of which have the ability to become public health emergencies within the affected community.
Opioids	A 70% jump in opioid related deaths from 2015 to 2016 elevated this crisis to a state of emergency in Maryland. While an addiction, illegal drug manufacturers/dealers can worsen the actual impact with tainted/deadly drugs.
Radiological threats	Intentional or accidental exposure to radiological material. Examples include radioactive materials dispersed through the use of explosives ("dirty bomb"), an accident at a nuclear power facility, the introduction of radioactive materials into a food or water supply, or the explosion of a nuclear device near a population center.
Vector-borne diseases	Disease spread by vectors, such as insects and ticks. Examples include West Nile virus, Dengue fever, Rocky Mountain spotted fever, malaria, and ZIKA virus. In 2015/2017, ZIKA virus, a virus carried by mosquitoes, spread to dozens of countries, infected thousands resulting in birth defects in some cases, and contributed to worldwide travel warnings that included several communities in both Florida and Texas.
Water-borne diseases	Diseases spread by contaminated drinking water or recreational water. According to the CDC, more than 1,000 persons become ill from contaminated drinking water and more than 2,500 persons become ill from recreational water disease outbreaks annually in the United States.
Zoonotic/Animal-borne diseases	Animal diseases that can spread to humans and, in some cases, become contagious from human to human.

In the event of a public health emergency, the mission of the Charles County Department of Health is to preserve life, minimize risk, investigate threats, maintain surveillance systems, coordinate medical and mental health care, communicate health-related information, provide essential public health functions, mobilize resources, collaborate and coordinate with stakeholder partners/agencies, distribute medical countermeasures, and maintain/create safe public environments and assist with recovery efforts.

Influenza Response Activities

Flu seasons occur each year with varying severity. Estimates of influenza-associated deaths range from a low of about 3,350 to a high of 48,614 people in the United States per year. Pandemics happen when new (novel) influenza A viruses emerge which are able to infect people easily and spread from person to person in an efficient and sustained way.

Table 4.15-3: Estimated Health Impact of Pandemic Influenza in Charles County (based on an estimated population of 170,102)			
CHARACTERISTICS	MODERATE SEVERITY	HIGH SEVERITY	VERY HIGH SEVERITY
	< 20% attack rate	30% attack rate	50% attack rate
Illness	34,020	51,031	68,041
Outpatient Care	17,010	25,515	34,020
Hospitalization	142	442	5,204
ICU Care	22	77	789
Ventilation	110	33	378
Deaths	8	108	994

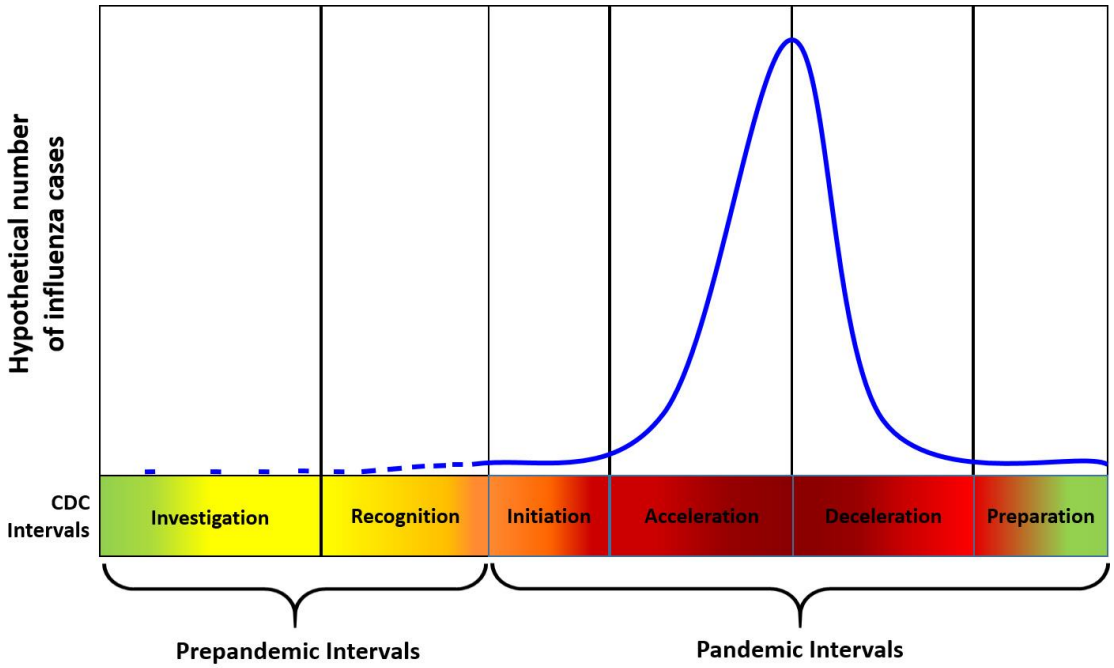
There are several characteristics of an influenza pandemic that differentiate it from other public health emergencies. First, it has the potential to suddenly cause illness in a very large number of people, who could overwhelm the health care system throughout the nation. A pandemic could also jeopardize essential community services by causing high levels of absenteeism in critical positions in every workforce. It is likely that vaccines against a new virus will not be available for six to eight months following the emergence of the virus. Basic services, such as health care, law enforcement, fire emergency response, communications, transportation, and utilities, could be disrupted during a pandemic. Finally, a pandemic could last for several weeks, if not months.

Year-round seasonal influenza activities provide the foundation for any influenza pandemic response. Surveillance and monitoring, research and development, delivery of Medical Countermeasures (for example, vaccines and therapeutics, diagnostics, and respiratory protective devices) and non-pharmaceutical interventions, health care system response, and public communication are integral to the objectives of the U.S. Department of Health and Human Services' (HHS) Pandemic Influenza Plan 2017 update.

HHS has developed three tools to assess the risk and potential public health impact posed by an emerging virus, estimate the possible progression of the event, and evaluate its severity and transmissibility to help guide different aspects of planning and response.

The Pandemic Intervals Framework (PIF) defines and describes six-time intervals of an influenza pandemic, including indicators signaling each interval and recommended interventions. These intervals provide a common method to describe pandemic activity which can inform public health actions. The duration of each pandemic interval might vary depending on the characteristics of the virus and the public health response.

Figure 4.15-1: Pandemic Intervals Framework



The Pandemic Severity Assessment Framework (PSAF) is a systematic framework for assessing the public health effects of an emerging pandemic. It helps to identify the type and timing of actions needed for effective intervention and guide the development of operational plans and guide response efforts. The Influenza Risk Assessment Tool (IRAT) assess the potential human pandemic risk of novel influenza A viruses to inform decisions regarding the development, manufacturing, use and stockpiling of diagnostics, vaccines, and therapeutics.

The Opioid Crisis

On March 1, 2017, Maryland Governor Larry Hogan declared a state of emergency in response to the opioid crisis in Maryland. Over the past several years Maryland and much of the country has seen an ever-increasing rise in the growth of opioid addiction and overdose deaths placing a severe strain on emergency services and public health.

Opioids are a class of medication that reduce pain by acting upon receptors in the brain and spinal cord (also known as analgesics). Opioids include heroin and prescription opioid drugs such as oxycodone, hydrocodone, hydromorphone, methadone, tramadol, and codeine, and prescribed and illicit fentanyl. Opioids are used in the medical treatment of severe, acute pain. Opioids are also highly addictive when used over a long period of time.

Heroin and fentanyl killed 1,468 Maryland residents in the first nine months of 2016, up 70% from the same period in 2015. The emergency declaration provides local agencies with the ability to access valuable resources in an effort to improve prevention, treatment, and recovery support services.

COVID-19

The U.S. Department of Health and Human Services declared the end of the COVID-19 Public Health Emergency (PHE) on May 11, 2023. Laboratories report results electronically to the health department through the National Electronic Data Surveillance System. Charles County residents with a positive result, meaning confirmation of SARS-CoV-2 infection from a PCR-RNA laboratory test, are included in the total case count. The total case count represents all confirmed cases of SARS-CoV-2 among Charles County residents since the pandemic began. The total number of COVID-19 cases in Charles County is 39,943 as of December 1, 2023.

Data Source: Maryland Department of Health Daily REDCap Report with all positive SARS-CoV-2 infections in Charles County.

Past Occurrence

Charles County has faced numerous public health emergencies in the past. In 2009, the County responded to the first pandemic of the 21st century, the H1N1 influenza virus. The first case of H1N1 reported in the County was in April of 2009. Data from the Charles County Department of Health indicated that two peak periods of influenza infection occurred in June and October 2009.

The Charles County Department of Health also provided a listing of other events that have had a public health impact in the County since 2011. Eleven events, ranging from small, localized disease outbreaks to global infectious disease outbreaks which affected the local population, livestock, schools, businesses, churches, and county fairs are summarized in the following table.

Table 4.15-4: Significant Public Health Events Since 2011 (Charles County Department of Health, 2023)

DATE	EVENT	IMPACT
5/3/2012	Tuberculosis (TB) Outbreak	Local/Regional: Locally this impacted 327 High School Students
7/15/2012	Rabies/Bats	Local: Multiunit apartment complex
8/30/2012	H3N2 Flu Variant - Pigs	MD/Regional: Affected swine entrants at the Charles County Fair
9/26/2014	Emerging Infectious Disease Outbreak - Ebola	National/Worldwide: Travel restrictions and heightened disease surveillance
2015-2016	Emerging Infectious Disease Outbreak-Zika	National/Worldwide: Travel precautions and local response teams.
11/11/2016	Tuberculosis (TB) Outbreak	Local/Regional: High school students and local community organization
3/2017	Opioid Crisis	Local/Regional/State:
8/2017	Disease Outbreak – Hepatitis A	Regional: Smoothie Franchise
9/17/2017	H3N2 Flu Variant-Pigs	Regional: 40 human cases and three county fairs impacted.
3/2020-5/11/2023	Pandemic - COVID-19	Local/Regional/State/National/Global: Closed local daycares/schools/businesses; travel restrictions; visitation restrictions (hospitals, long-term care facilities, etc.; dining restrictions; worshipping restrictions-many services offered via live feeds; supply chain disruptions; contact tracing and surveillance efforts
5/16/2022-10/23/2022	Mpox	Contact tracing and surveillance, vaccine efforts.

The Maryland Department of Health routinely collects statistics on reportable illnesses. Table 4.15-5 provides an example of cases of selected notifiable conditions that have reported incidence within the past five years. An increase in the incidence rates triggers a public health response.

Table 4.15-5: Cases of Selected Notifiable Conditions Reported in Charles County

CONDITION	2018	2019	2020	2021	2022	5-YEAR MEAN
Amebiasis	0	1	0	0	0	0.2
Anaplasmosis**	0	0	0	0	0	0
Animal Bites	235	258	170	213	295	234.2
Anthrax	0	0	0	0	0	0
Arboviral Infection (Other than Westnile)***	-	-	-	-	-	-
Babesiosis**	0	0	0	0	0	0
Botulism	0	1	0	0	0	0.2
Campylobacteriosis	10	8	15	19	9	12.2
Chancroid	0	0	0	-	0	0
Chikungunya****	0	0	0	0	0	0
Chlamydia*****	1,103	1,138	983		826	1012.5
Cholera	0	0	0	0	0	0
Coccidioidomycosis	0	1	0	0	0	0.2
Creutzfeldt-Jakob Disease	0	0	0	0	0	0
Cryptosporidiosis	1	2	1	0	2	1.2
Cyclosporiasis	0	0	0	1	0	0.2
Dengue Fever**	0	1	0	0	0	0.2
Diphtheria	0	0	0	0	0	0
Ehrlichiosis**	4	1	4	1	2	2.4
Encephalitis - non-Arboviral	1	0	0	0	0	0.2
Epsilon Toxin (C. perf.) Associated Illness	0	0	0	0	0	0
Giardiasis	4	5	2	3	4	3.6
Glanders	0	0	0	0	0	0
Gonorrhea*****	258	273	303	-	267	275.25
H. influenzae – Invasive Disease	7	1	1	3	4	3.2
Hantavirus Infection	0	0	0	0	0	0
Hantavirus Pulmonary Syndrome	0	0	0	0	0	0
Hemolytic Uremic Syndrome post-diarrheal	0	0	0	0	0	0
Hepatitis A (Acute-Symptomatic)	1	2	0	1	2	1.2
Hepatitis B – Perinatal	0	0	0	0	0	0
Hepatitis B (Acute-Symptomatic)	1	2	0	1	1	1
Hepatitis C – Perinatal****	0	0	0	0	0	0
Hepatitis C (Acute-Symptomatic)	1	1	1	0	0	0.6
Hepatitis D (Acute-Symptomatic)	0	0	0	0	0	0
Hepatitis E (Acute-Symptomatic)	0	0	0	0	0	0
Influenza Novel A Virus Infection	0	0	0	0	0	0
Isosporiasis	0	0	0	0	0	0
Kawasaki Syndrome	0	0	0	0	0	0
Legionellosis**	19	7	5	6	4	8.2
Leprosy (Hansen Disease)	0	0	0	0	0	0

Table 4.15-5: Cases of Selected Notifiable Conditions Reported in Charles County						
CONDITION	2018	2019	2020	2021	2022	5-YEAR MEAN
Leptospirosis	0	0	0	0	0	0
Listeriosis	1	2	0	0	0	0.6
Lyme Disease**	8	12	9	10	28	13.4
Malaria**	0	0	0	1	3	0.8
Measles (Rubeola)	0	0	0	0	0	0
Meningitis, Aseptic	7	9	2	4	4	5.2
Meningitis, Fungal****	1	1	0	2	0	0.8
Meningococcal Invasive	2	0	0	0	0	0.4
MERS-CoV, Mid East Resp Syndrome****	0	0	0	0	-	0
Microsporidiosis	0	0	2	0	0	0.4
Mumps (Infectious Parotitis)	0	0	0	0	0	0
Mycobacteriosis, Other than TB & Leprosy	17	20	11	8	14	14
Pertussis	1	0	2	1	2	1.2
Pertussis Vaccine Adverse Rxns	0	0	0	0	0	0
Plague	0	0	0	0	0	0
Pneumonia – Hospitalized Healthcare Worker	0	0	0	0	0	0
Poliomyelitis	0	0	0	0	0	0
Psittacosis	0	0	0	0	1	0.2
Q Fever	0	0	0	0	0	0
Rabies - Animal	6	7	6	4	3	5.2
Rabies - Human	0	0	0	0	0	0
Ricin Toxin Associated Illness	0	0	0	0	0	0
Rubella – Congenital Syndrome	0	0	0	0	0	0
Rubella (German Measles)	0	0	0	0	0	0
Salmonellosis - Other than Typhoid Fever**	17	20	23	11	18	17.8
Severe Acute Respiratory Syndrome (SARS)	0	0	0	0	0	0
Shiga toxin producing E. coli (STEC)**	1	0	1	2	3	1.4
Shigellosis**	4	4	2	4	4	3.6
Smallpox and Other Orthopox Viruses	0	0	0	0	0	0
Spotted Fever Rickettsiosis**	3	1	0	0	0	0.8
Staphylococcal Enterotoxin B Illness	0	0	0	0	0	0
Strep Group A – Invasive Disease	4	5	1	4	7	4.2
Strep Group B – Invasive Disease	20	10	13	25	20	17.6
Strep pneumoniae – Invasive (Drug Resistant)***	-	-	-	-	-	-
Strep pneumoniae – Invasive Disease**	11	5	7	2	10	7
Syphilis – Congenital	0	1	0	0	0	0.2
Syphilis Primary and Secondary	14	14	21	-	9	11.6
Tetanus	0	0	0	0	0	0
Trichinellosis**	0	0	0	0	0	0
Tuberculosis	4	8	1	6	2	4.2

Table 4.15-5: Cases of Selected Notifiable Conditions Reported in Charles County

CONDITION	2018	2019	2020	2021	2022	5-YEAR MEAN
Tularemia	0	0	0	0	0	0
Typhoid Fever (Acute)	0	0	0	0	0	0
Typhoid Fever – Carrier	0	0	0	0	0	0
Varicella (Chickenpox) – Deaths	0	0	0	0	0	0
Vibriosis (Non-Cholera)	1	4	1	5	2	2.6
Viral Hemorrhagic Fever	0	0	0	0	0	0
West Nile Virus	0	0	0	0	0	0
Yellow Fever	0	0	0	0	0	0
Yersiniosis**	0	0	1	1	2	0.8
Zika Virus Disease****	0	0	0	0	0	0
Zika Virus Infection****	0	0	0	0	0	0

Data sources: Maryland's NEDSS and PRISM databases. Data is current as of 2/16/2023. These are active databases and counts may vary slightly over time, as well as differ slightly from counts published by the Centers for Disease Control and Prevention (CDC). HIV/AIDS data are not included here but are available at https://health.maryland.gov/phpa/OIDEOR/CHSE/pages/statistics.aspx. COVID-19 data are available at https://coronavirus.maryland.gov/. Due to a Network Security Incident in December 2021, the Maryland Department of Health could not finalize the 2021 STI (Chancroid, Chlamydia, Gonorrhea, and all stages of Syphilis) reporting. Jurisdiction-level STI data is available but varies in completeness by condition and by county. It is not advised to use 2021 STI Data for local planning purposes. Contact sti.datarequest@maryland.gov for more information.
** The case status classifications (confirmed, probable or suspect) included in these totals are specific to the condition and depend in part on the CDC case definitions for surveillance, where those exist (see https://ndc.services.cdc.gov/). There may be additional "suspect" cases for the following conditions: anaplasmosis, babesiosis, Creutzfeldt-Jakob disease, dengue fever, ehrlichiosis, legionellosis, lyme disease, malaria, mumps, salmonellosis, Shiga toxin producing E. coli, shigellosis, spotted fever rickettsiosis, trichinellosis, invasive streptococcal pneumoniae, and yersiniosis.
*** The CDC discontinued the following conditions from the nationally notifiable conditions list (https://ndc.services.cdc.gov/) on the noted years: 2012: Strep pneumoniae - Invasive (Drug Resistant) 2014: Arboviral Infection
**** The CDC added the following conditions to the nationally notifiable conditions list (https://ndc.services.cdc.gov/) on the noted years: 2013: Meningitis, Fungal 2014: Chikungunya, MERS-CoV 2016: Zika Virus Disease, Zika Virus Infection 2018: Hepatitis C - Perinatal
***** Please note that 2022 Chlamydia and Gonorrhea cases include those with unknown jurisdiction: 317 and 71, respectively.

HIV/AIDS data are not included in Table 4.15-5; therefore, rates have been collected from the CDC. According to the CDC, an estimated 751 people aged 13 and older were diagnosed with HIV infection in Maryland during 2022. At the end 2022, there were 31,616 people aged 13 and older living with diagnosed HIV in Maryland. Maryland was ranked 12th among states and territories in adult/adolescent HIV diagnosis rates (per 100,000) in 2021.

Further information is available to the public on the Charles County Department of Health's website. The website provides health related topics in addition to information on how to prepare for and prevent various types of disasters, specifically heat, hurricanes, and flooding. The Department of Health's website also provides information on disaster mitigation, preparedness, response, and recovery, including:

- Developing a Disaster Plan
- Sheltering in Place
- Evacuation
- Emergency Response
- Maryland Response (Becoming a Volunteer)
    - Medical Reserve Corps Charles County Unit

Future Occurrence

All communities face a broad range of natural and manmade hazards that can threaten the public's health and safety. Public health departments across the country have been tasked with developing plans for coordinated response to these hazards. Public health emergencies are difficult to predict. A wide range of causes can result in varying levels of severity and the impact a particular hazard may have on a local population, thus making it difficult to establish a frequency of occurrence.

The following excerpt called "Infectious Disease In An Era of Global Change" from the publication Nature Reviews Biology shows the relationship between climate change and increase infectious diseases.

Infectious Disease In An Era of Global Change

"In recent decades, declines in mortality and morbidity, particularly childhood mortality, have been one of the great triumphs of public health. Greater access to care, such as therapeutics (including antibiotics), improved sanitation and the development of vaccines have been core drivers of this progress. Even as medical advances in the twenty-first century have spurred advances in population health, inequalities in access to these advances remain widespread between and within countries. Reducing inequities in access to health care and improving surveillance and monitoring for infectious diseases in low-income and middle-income countries, and in underserved populations within countries, should be a priority in tackling pathogen emergence and spread in the future. Climate change, rapid urbanization and changing land-use patterns will increase the risk of disease emergence in the coming decades. Climate change, in particular, may alter the range of global pathogens, allowing infections, particularly vector-borne infections, to expand into new locations. A continued uptick in global travel, trade and mobility will transport pathogens rapidly, following emergence. A changing world requires changing science to evaluate future risks from infectious disease. Future work needs to explicitly address concurrent changes: how shifting patterns of demographic, climatic and technological factors may collectively affect the risk of pathogen emergence, alterations to dynamics and global spread. At the same time, new technologies, including advances in data collection and surveillance, need to be harnessed."

Source: Nature Reviews Microbiology – Infectious Disease In An Era of Global Change. October 2021.

Vulnerability Assessment

The public health role of preparing for and responding to emergencies has expanded in the face of massive impacts from recent disasters and emerging infectious disease outbreaks. The Division of Preparedness and Response Services of The Charles County Department of Health was established in 2002 in response to the U.S. Centers for Disease Control and Prevention's (CDC) Public Health Emergency Preparedness (PHEP) grant requirements. The Public Health Preparedness program is structured around 15 capabilities, providing a template for effective response planning and mitigation strategies.

The Division of Preparedness and Response Services provides an important core public function and is committed to strengthening the jurisdictions' health security by preparing for, responding to, and recovering from public health emergencies, natural or man-made, and being part of a system for community resiliency.

The focal point of Public Health Preparedness revolves around planning for mass vaccination and pharmaceutical dispensing campaigns in the event of a large-scale public health emergency, such as an outbreak of a highly contagious disease. This type of planning requires a great deal of collaboration with local community stakeholders as well as numerous jurisdictional healthcare partners.

The Division of Preparedness and Response participates as a member of the Region V Emergency Preparedness Coalition, which is made up of representatives from hospitals, public health, and other healthcare agencies within Montgomery, Prince George's, Calvert, Charles, and St. Mary's counties. The Division also represents the county as a member of the National Capital Region Council of Governments Public Health Emergency Planners sub-committee. These and other local planning groups work to continuously improve health and medical system emergency preparedness through planning, training, drills and exercises, and policy development.

The assessment and prioritization of health hazards is an ongoing process. Changes in population, demographic, environmental and disease specific risk factors, as well as improvements in planning, training, exercising and mitigation-based activities conducted by the department alter the risk relationship.

People

Public health emergencies may result in loss of life, long-term or chronic health issues, and mental health issues. Epidemics or other large-scale public health emergencies may result in a strain on available resources. Limited resources affecting nationwide availability, as was recently demonstrated by the COVID-19 Pandemic, result in widespread devasting impacts. Impacts include but are not limited to the health and safety of first responders and medical personnel, and the services they provide. In addition, business may be impacted by closures, loss of employees and customers due to illness, and supply chain disruptions.

Structures

The maintenance of public facilities and office spaces in terms of cleanliness is important to stop the spread of disease. These facilities and areas should be sanitized periodically, however the increased cost associated with sanitization procedures proves challenging.

Systems

Potential delay or failure of services due to insufficient staffing and resources cause significant issues. This can include school/daycare closures; impacts on hospitals and healthcare services; food service can be cancelled if there is a lack of power, inability to keep food at safe temperatures; and so much more would be impacted if roads were impassable and supply chain demand could not be met. The COVID-19 pandemic was the most recent and widespread example of disruption to normal life.

Natural, Historic and Cultural Resources

Shoreline/water quality is monitored/measured for safety levels and continued use. If adversely affected, swimming, fishing, and other water related events could be prohibited for a period of time.

Extreme heat can also become a public health event and can trigger outings and/or events to be cancelled throughout the county.

Community Activities

Loss of confidence in government and the public health system could become apparent if suggested solutions are slow to work; if cancellations in community activities are necessary; if information is not effectively communicated/understood by county residents and the messaging is not consistent/uniform from the stakeholder partners in a public health emergency.

Jurisdictional Differences

All areas in Charles County are considered vulnerable to public health emergencies, with the likely greatest impact in terms of population affected and disruption of economic activity occurring in more densely populated communities such as the towns of La Plata and Indian Head. The College of Southern Maryland in La Plata may also be at a higher risk due to the high concentration of students.

Land Use and Development Trends

Because proximity is a major factor in how diseases and illnesses spread, changes in population, demographics, and density may influence the impact of an outbreak, epidemic, or pandemic. Any significant development in Charles County could potentially impact how susceptible the County is to a widespread disease or public health emergency.

4.16 Transportation Accidents

Table 4.16-1: Transportation Accidents Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Human-Made	4	2	1	1	1	**2.2**
MODERATE RISK (2.0 – 2.9)						

Location, Extent, and Range of Magnitude

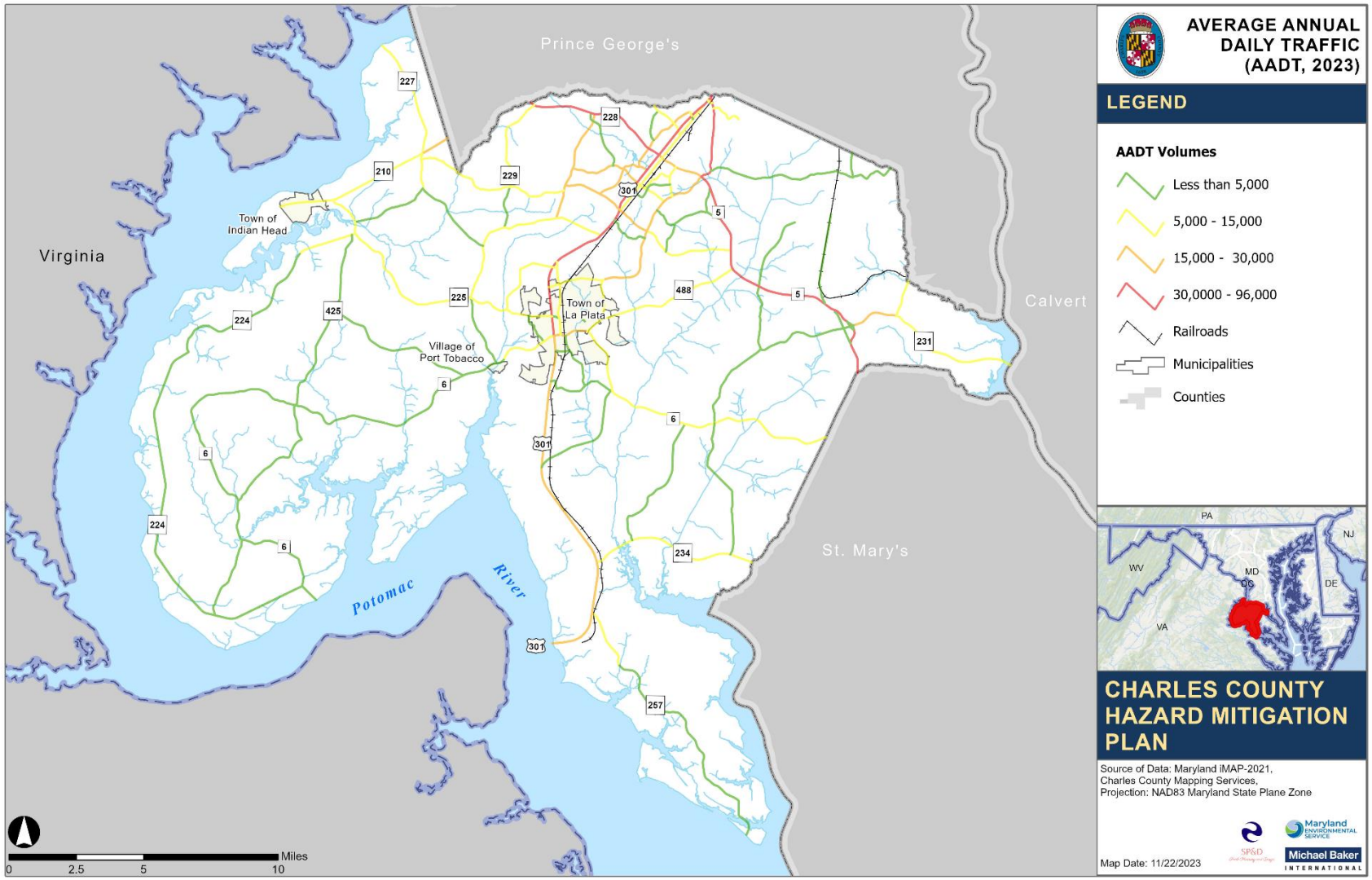
For the purposes of this plan, transportation accidents are defined as incidents involving highway, air, and rail travel. According to the Maryland Department of Transportation's State Highway Administration, there is a total of 1,050.7 linear miles of highway, including 48.2 miles of local municipal roadways within Charles County, 799.9 miles of County highway, and 200 miles of state highway (SHA, 2023). There are no U.S. interstate highways that pass-through Charles County, but U.S. Route 301 does run from the northeast part of the County, through the Town of La Plata, and across the Potomac River into Virginia. Charles County is crossed by several major road networks, and transportation accidents involving those networks can have impacts on secondary roads.

Map 4.16-1 shows the road network in Charles County and the average annual daily traffic on those roads from 2021. The most heavily traveled roads are US Highway 301, State Highway 228, and State Highway 5. Major transportation corridors are more vulnerable to transportation accidents, especially in areas where the daily traffic counts are greatest.

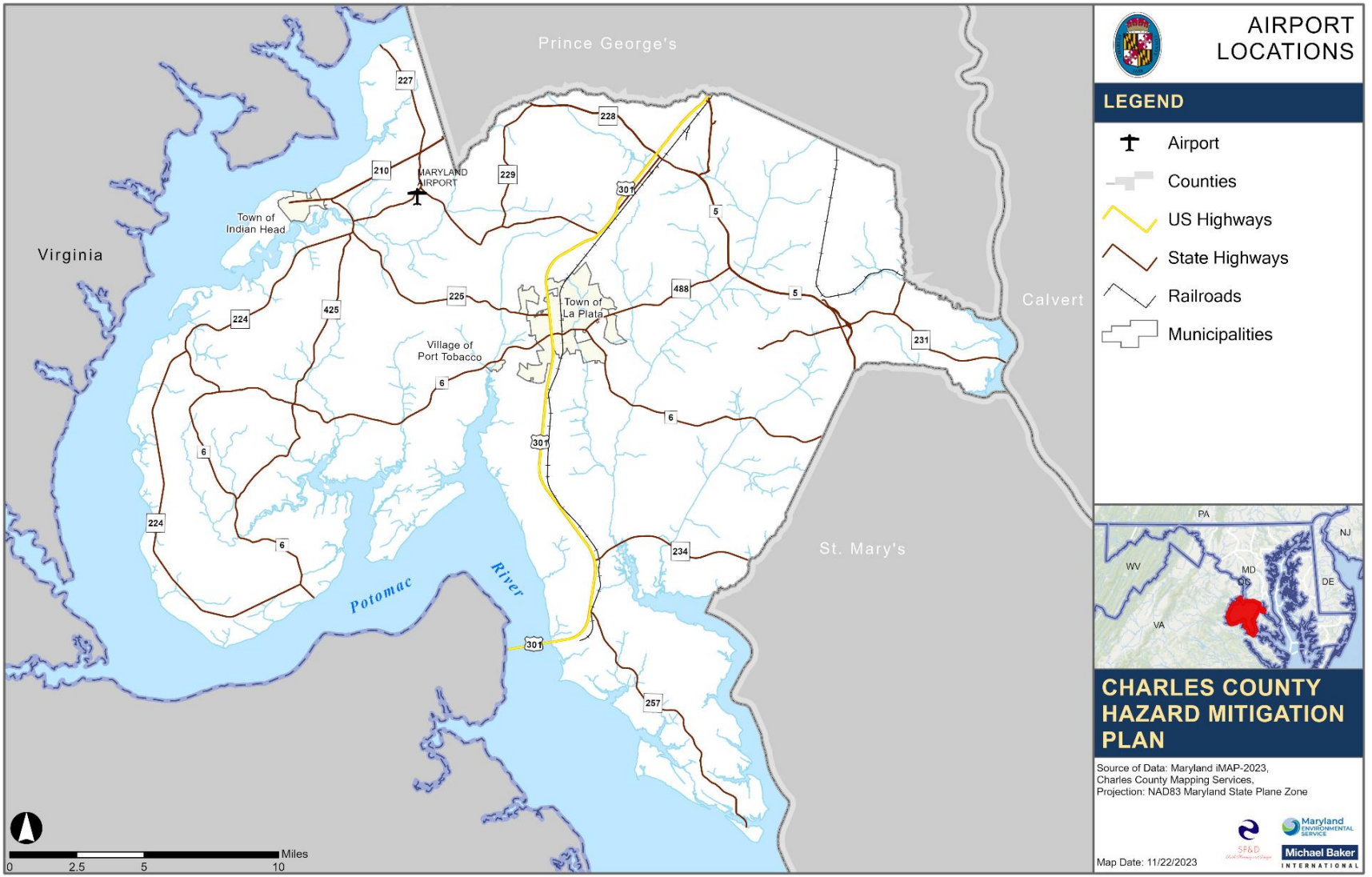
At a minimum, transportation accidents can result in damage to the vehicles and minor injuries to passengers and drivers. At worst, significant transportation accidents can result in death or serious injury or extensive property loss or damage coupled with business interruptions and hours of congestion. Road and railway accidents in particular have the potential to result in hazardous materials releases if the vehicle involved in an accident is hauling hazardous materials. The expected impacts of transportation accidents are amplified by the fact that there is often little warning of accidents.

In addition, there are several other important components to the County transportation infrastructure, as shown in Map 4.16-2. These include an airport and a railroad line. Accidents involved aircrafts or railroads could also have significant impacts on Charles County. Additionally, aircrafts traveling to nearby airports shown in Map 4.16-3 could cause significant damage to structures, populations, infrastructure, and the environment if one were to crash in Charles County.

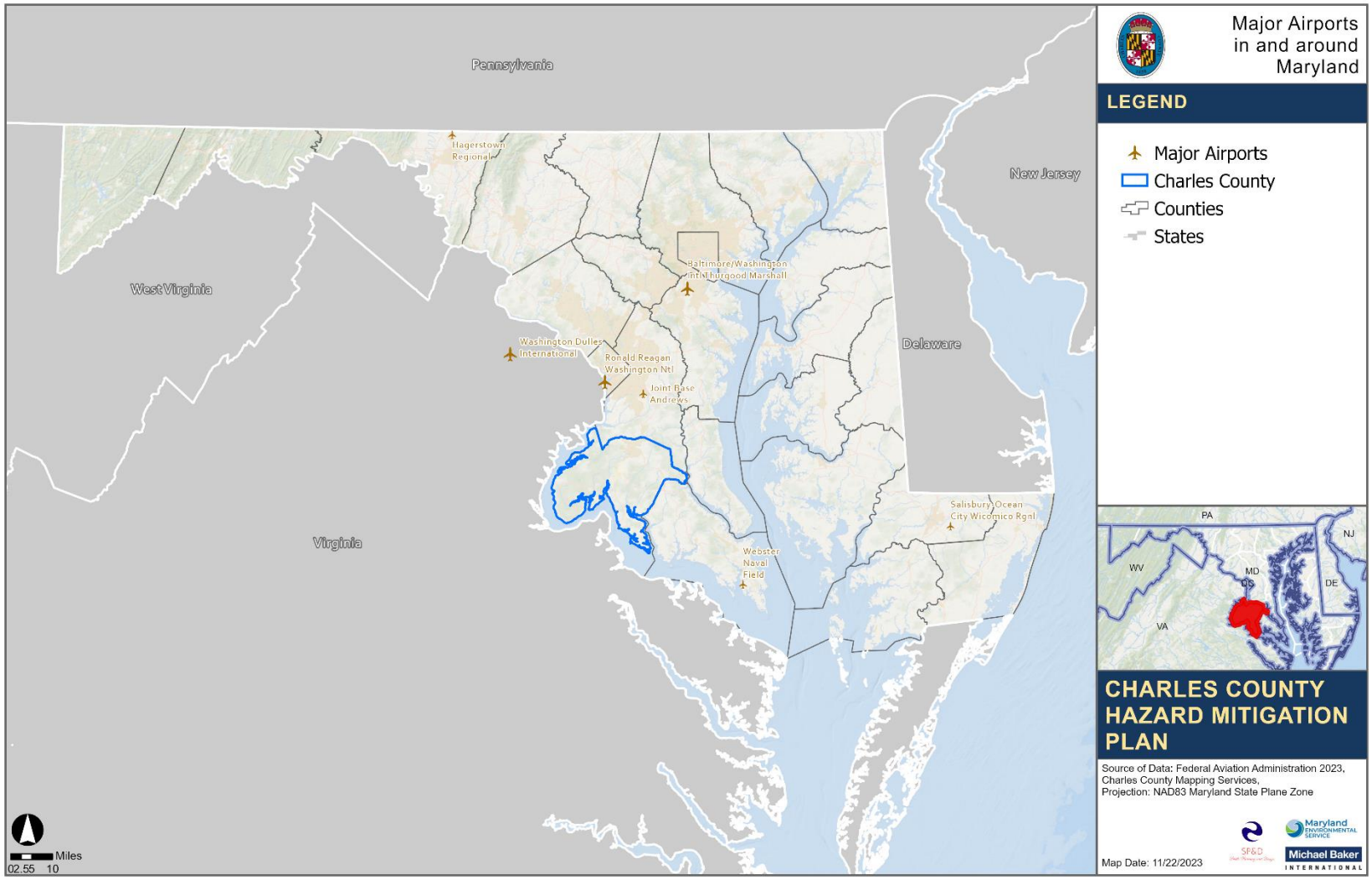
Map 4.16-1: Charles County Average Annual Daily Traffic Volumes



Map 4.16-2: Charles County Airport Locations, Highways, and Railroads



Map 4.16-3: Major Airports in and around Maryland



The worst-case scenario for a transportation accident impacting Charles County would be a road accident which results in a hazardous material spill leading to immediate health hazard, or an accident involving an aircraft crash landing in a populated section of the County.

Past Occurrence

The most common transportation accidents in Charles County are highway accidents involving motor vehicles. The County's most serious road transportation concerns involve the U.S. Highway 301, State Highway 228, and State Highway 5 since these routes have the highest annual average traffic counts in the County. Additionally, there is a temporal aspect to highway transportation accidents; in the spring and early summer, when construction and narrowed lanes are commonplace, the incidence of large-scale transportation accidents increases. On a smaller timeframe, rush hour periods will see much higher volume of traffic than other times of the day depending on the location.

Maryland Department of Transportation statistics for reportable vehicle accidents in Charles County from 2012 to 2022 are shown in Table 4.16-2. This was the most current data available during the HMP update process. There has been a notable rise in the total number of crashes and crashes that resulted in death from 2012 to 2022, but the number of crashes that have resulted in injury is fairly stable beyond a heightened period from 2015 to 2018. A report that included crash information for 2017 was not found. However, the State's Fatal Crash Dashboard did include data for 2017, which shows it had the most crashes that resulted in death of any year in the sample.

Table 4.16-2: Charles County Vehicle Crash Statistics 2012-2023 (MDOT, 2023)

YEAR	TOTAL CRASHES	TOTAL CRASHES THAT RESULTED IN INJURY	TOTAL CRASHES THAT RESULTED IN DEATH
2012	2,336	820	14
2013	2,396	826	14
2014	2,481	815	7
2015	2,637	868	14
2016	2,974	960	26
2017	N/A	N/A	28
2023 PLAN UPDATE			
2018	3,070	874	18
2019	2,914	845	18
2020	2,482	697	25
2021	2,893	780	17
2022	2,881	801	23
Total	**12,824**	**4,289**	**75**

There are no recorded past occurrences accidents involving rail or air traffic that have impacted Charles County.

Future Occurrence

Charles County's population has grown by over 7% from 2016 to 2021, which suggests that traffic volumes have risen accordingly. New residents have limited knowledge of detour routes and alternate routes around accidents, contributing to the possibility of accident-related congestion. The continued or elevated numbers of tractor-trailers on the County's road system could also contribute to incidences of transportation accidents. While air and rail-related transportation accidents are not as likely to impact the County because of their lower frequency, it is possible that highway accidents may increase slightly without proper mitigation strategies in place.

Overall, the probability of future transportation accidents in Charles County can be considered *highly likely* (4 out of 4) according to the Risk Factor Methodology.

Vulnerability Assessment

People

People are very vulnerable to transportation accidents, as evidenced by Table 4.16-2 above. Drivers, pedestrians, and bicyclists are all susceptible to injury and death from transportation accidents. Between 2018 and 2022, the 25–29-year-old age group had the largest share of drivers and injuries. Both this cohort and drivers aged 30-34 experienced 37 deaths in this time frame. Men accounted for 77.5% of all driver fatalities since 2018. The most affected passengers were slightly younger, as those aged 20-24 accounted for the most injuries and deaths. The numbers for injuries and deaths for non-motorists are spread fairly evenly across age groups, but men were more likely to be fatally injured (MDOT, 2023).

Structures

Due to the widespread transportation network in Charles County, many structures are exposed to the threat of transportation accidents. Table 4.16-3 shows the structures in transportation accident hazard zones for highways, rail lines, and airport in Charles County. Table 4.16-4 shows the number of critical facilities within these hazard areas.

Systems

Transportation accidents can have significant impact on the transportation system. Highways may be shut down entirely, with usually one or more lanes impacted by a crash; this may impact shipping routes.

Natural, Historic, and Cultural Resources

Natural hazards may be impacted by the results of a transportation accident, but this is typically the result of a hazardous materials release and not the subject of this hazard profile. Trees and vegetation may be damaged by vehicles involved in crashes.

Historic and cultural resources are not particularly vulnerable to transportation accidents.

Community Activities

Community's activities are not particularly vulnerable to transportation accidents. Travel routes to activities may be impacted, but the activity itself tends not to be. One exception may be parades or processions that use county or local roads. If an accident were to occur at a certain location at a certain time, it may cause issues for activities such as those.

Jurisdictional Differences

A transportation-related incident can occur on any stretch of roadway in Charles County or its municipalities. However, severe accidents are more likely to occur on the County's highways, which experience heavier traffic volumes including heavy freight vehicles. The combination of high traffic volume, occasional severe winter weather, and large numbers of hazardous materials haulers increase the chances of traffic accidents occurring.

As shown in the tables below, the unincorporated areas of Charles County and the Town of La Plata are most vulnerable to the impacts of transportation accidents on major highways. There are 2,374 structures in the unincorporated areas of Charles County located within 0.25 miles of a major highway and 79 critical facilities within these areas, while there are 693 structures and 19 critical facilities in La Plata near major highways. Both the Town of La Plata and the unincorporated areas of the County are also at the greatest risk of being impacted by an accident involving an active rail line. Additionally, there are over 7,000 structures and 90 critical facilities within five miles of an airport in the unincorporated portions of the County, and there are 157 structures in Indian Head near airports, making these jurisdictions at a higher risk to aircraft-related incidents. The Village of Port Tobacco is at the lowest risk to all types of transportation accidents, with zero structures or critical facilities near major highways, active rail lines, or airports.

Table 4.16-3: Structures Vulnerable to Transportation Accidents in Charles County							
MUNICIAPLITY	Total Structures	Total Structures within 0.25 miles of Major Highway	Percent Structures within 0.25 miles of Major Highway	Total Structures within 0.25 miles of Active Rail Line	Percent Structures within 0.25 miles of Active Rail Line	Total Structures within 5 miles of Airport	Percent Structures within 5 miles of Airport
Charles County Unincorporated Areas	99,592	3,888	3.90%	5,281	5.30%	17,287	17.16%
Town of Indian Head	1,850	0	0.00%	0	0.00%	1,781	26.27%
Town of La Plata	4,649	742	15.96%	1,361	29.28%	0	0.00%
Village of Port Tobacco	28	0	0.00%	0	0.00%	0	0.00%
Total	**106,091**	**4,630**	**4.36%**	**6,642**	**6.26%**	**19,068**	**17.97%**

Table 4.16-4: Critical Facilities Vulnerable to Transportation Accidents in Charles County							
MUNICIAPLITY	Total Critical Facilities	Critical Facilities within 0.25 miles of Major Highway	Percent Critical Facilities within 0.25 miles of Major Highway	Critical Facilities within 0.25 miles of Active Rail Line	Percent Critical Facilities within 0.25 miles of Active Rail Line	Critical Facilities within 5 miles of Airport	Percent Critical Facilities within 5 miles of Airport
Charles County Unincorporated Areas	664	125	18.83%	101	15.21%	114	17.17%
Town of Indian Head	30	0	0.00%	0	0.00%	0	0.00%
Town of La Plata	132	35	26.52%	69	52.27%	0	0.00%
Village of Port Tobacco	0	0	0.00%	0	0.00%	0	0.00%
Total	**826**	**160**	**19.37%**	**170**	**20.58%**	**114**	13.80%

Land Use and Development Trends

As the population grows in Charles County, as will the transportation needs of the community. Therefore, maintaining and enhancing transportation infrastructure will be necessary to meet the demand. Already, some roads in the northern part of the County are heavily trafficked and will be at greater risk of experiencing accidents as the population grows. Similarly, as population grows, the number of housing units and other structures near major highways, active rail lines, and the airport will likely also rise and therefore increase vulnerability.

4.17 Utility Interruption

Table 4.17-1: Utility Interruption Hazard Ranking						
HAZARD TYPE	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	RF RATING
Human-Made	4	1	2	3	2	**2.4**
MODERATE RISK (2.0 – 2.9)						

Location, Extent, and Range of Magnitude

Utility interruptions in Charles County focus primarily on power failures, which are often a secondary impact of another hazard event. For example, severe thunderstorms or winter storms could bring down power lines and cause widespread disruptions in electricity service. Strong heat waves may also result in rolling blackouts where power may not be available for an extended period of time. Additionally, local outages may be caused by traffic accidents or wind damage. Utility interruptions and power failures can take place throughout the entirety of Charles County.

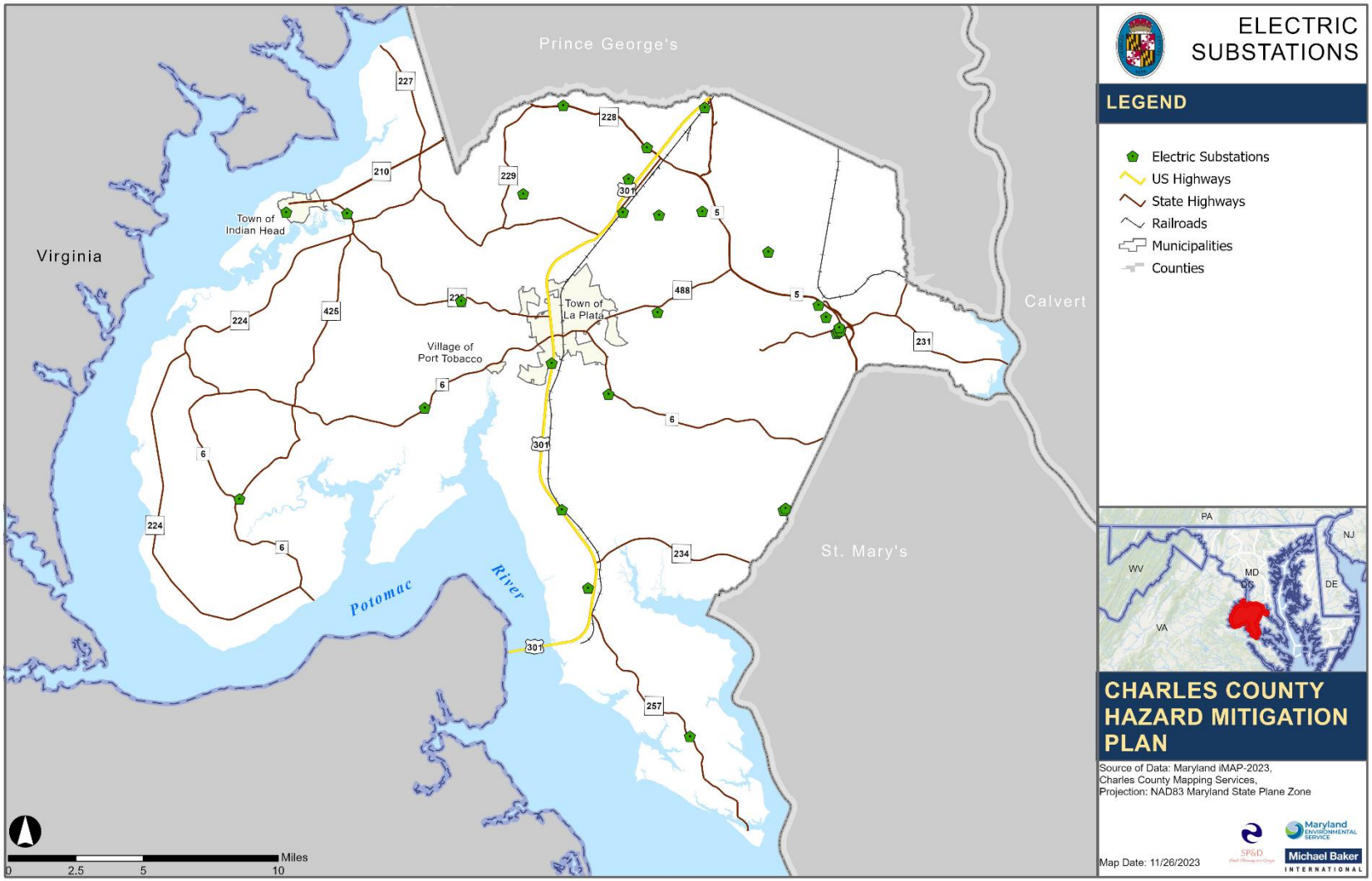
Most severe power failures or outages are regional events. With the loss of power, electrical-powered equipment and systems will not be operational. Examples may include:

- Lighting
- HVAC and ancillary support equipment
- Communication systems (public address systems, telephone, computer servers, and peripherals)
- Ventilation systems
- Fire and security systems
- Refrigerators
- Sterilizers
- Trash compactors
- Office equipment
- Medical equipment

This can cause food spoilage, loss of heat or air conditioning, basement flooding (sump pump failure), lack of light, loss of water (well pump failure), lack of phone service, or lack of internet service. However, this is most often a short-term nuisance rather than a catastrophic hazard. At a minimum, power outages can cause short term disruption in the orderly functioning of business, government, and private citizen functioning and activities. A worst-case scenario for utility interruption in Charles County would involve a power outage during the winter snow or ice storm. Downed trees and wires from the heavy ice formation could cause power outages throughout the entirety of the County for prolonged periods of time.

Map 4.17-1 depicts the location of electric substations in Charles County. If any of these facilities were damaged or impacted by a hazard event, there would be the potential for widespread power outages throughout the County.

Map 4.17-1: Electric Substations in Charles County



Past Occurrence

Utility interruptions are largely minor, routine events. In Charles County, minor power outages occur several times per year. They are most often associated with winter storms and thunderstorms with high winds. There is currently no complete or comprehensive inventory of past occurrences of utility interruptions for the County; however, there have been some significant occurrences in recent years. In April of 2015, an explosion at a transfer station in Charles County led to outages in the County and in Washington D.C., causing several Smithsonian museums, 14 Metro stations, traffic lights, and the State Department to lose power. The White House and U.S. Capitol were also impacted, but backup generators immediately switched on to restore power (Nuckols, 2015). In 2016, HMPC indicated that there was a large network outage that disrupted 60% of services. In January of 2022, a winter storm led to over a thousand outage incidents across Calvert, Charles, Prince George's, and St. Mary's Counties. Nanjemoy was particularly hard-hit, as many trees and their limbs buckled under the weight of heavy snow. It took several days for all the incidents to be resolved and power restored (South Maryland News Net, 2022). In June of 2023, severe weather led to downed trees and wires and the loss of power at the UM Charles Regional Medical Center. The backup generator failed, which led to transport units to divert to St. Mary's County or other nearby care facilities. The hospital went into code green (mini disaster), as they had to essentially suspend operations and was not able to receive any patients (South Maryland News Net, 2023). In July of 2023, violent thunderstorms swept through the area with strong winds leading to many downed trees and damaged power lines; 200,000 were left without power, including 7,000 in Charles County (Samenow, 2023).

Future Occurrence

Minor power failure (i.e., short outage events) may occur several times a year for any given area in Charles County, while major (i.e., widespread, long outage) events take place once every few years. Power failures are often occurrences during severe weather and therefore, should be expected during those events. Therefore, the future occurrence of utility interruptions in Charles County can be considered *highly likely* (4 out of 4) as defined by the Risk Factor methodology probability criteria. These interruptions should be anticipated, and first responders should be prepared during severe weather events.

Vulnerability Assessment

People

The public is at risk from the cascading impacts of utility interruptions. The severity of the impact will depend on multiple factors, particularly the cause of the interruption and the existing vulnerabilities of the population. For example, a utility interruption caused by or during a heat wave or winter storm would place vulnerable populations such as children and the elderly particularly at risk due to their sensitivity to extreme temperatures. The lack of cooling or heating will have a negative impact on all populations, but the vulnerabilities of those two populations place them at a higher risk. Sick populations who need medical care that requires electricity are highly vulnerable to utility interruptions as well.

Structures

Emergency medical facilities, including retirement homes and senior centers are particularly vulnerable to power outages. While back-up power generators are often used at these facilities, loss of electricity may result in hot or cold temperatures for which elderly populations are particularly vulnerable. There are currently 4 nursing homes and long-term care facilities in Charles County, and Appendix E provides details about these facilities and their locations.

Systems

Extreme weather events, transportation accidents, or nationwide shortages could cause significant energy shortage problems that impact a variety of systems. Communication systems may be inoperable due to a lack of power, causing issues for emergency response. As stated above, healthcare systems are also vulnerable to interruptions if back-up power generators are not sufficient, as was the case with UM Charles Regional Medical Center in 2023. This may cause a strain on other facilities in the county or region. Vulnerability may also depend on the utility provider.

Natural, Historic, and Cultural Resources

Natural resources are not particularly vulnerable to utility interruptions but may be at risk from the same hazard or hazards that caused an interruption, such as severe weather. There may be an increased usage of natural or cultural resources if a lack of power results in residents leaving their homes at a higher rate. Historic resources may be less vulnerable to utility interruptions if they do not rely on modern infrastructure at the same level of newer homes and structures, and they may even be better positioned to deal with utility interruptions in colder weather as they may employ alternative heating methods such as wood burning stoves or coal burners.

Community Activities

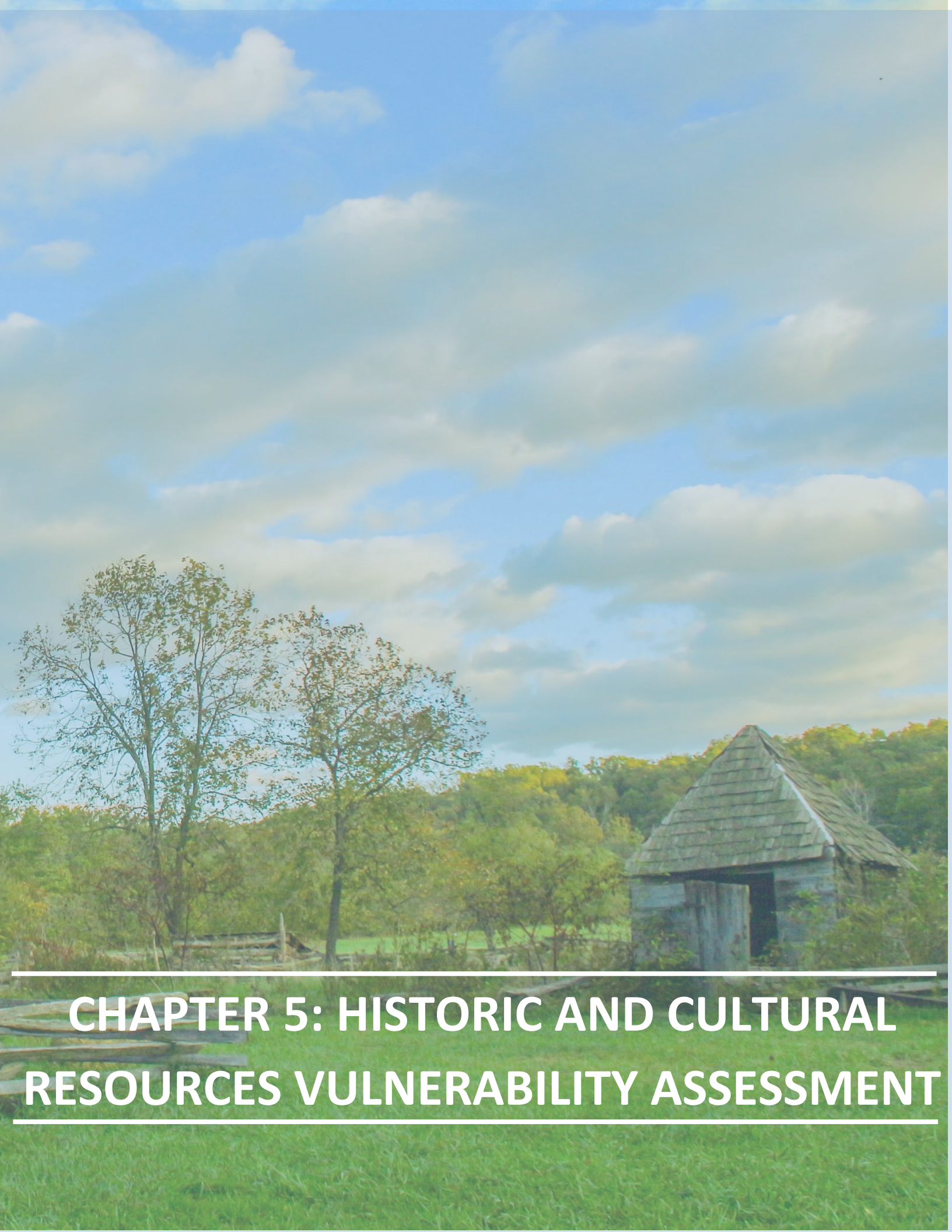
The impact on community activities will depend on the utility usage required for the activity. Community centers may be closed due to a lack of power.

Jurisdictional Differences

Due the unpredictable and often regional nature of utility interruptions, all jurisdictions in Charles County are considered to be at equal risk.

Land Use and Development Trends

All future structures and infrastructure built in Charles County will likely be exposed to the impacts of utility interruption. As a result, the location of development does not increase or reduce the risk necessarily. However, if utility lines are upgraded or buried in certain areas of the County, such as in areas with concentrations of new development, these areas could potentially be at a lower risk to experiencing power outages as a result of downed power lines.



CHAPTER 5: HISTORIC AND CULTURAL RESOURCES VULNERABILITY ASSESSMENT

5.0 Historic and Cultural Resources Vulnerability Assessment

5.1 Overview

Historic resources include landmark buildings, historic structures and sites, commercial and residential districts, historic rural resources, archaeological and cultural sites, and the historic environment in which they exist. Historic resources serve as visual reminders of a community's past, providing a link to its cultural heritage and a better understanding of the people and events that shaped the patterns of its development. Preservation of these important resources makes it possible for them to continue to play an integral, vital role in the community. Disaster events can have significant impacts on all life and property; however, the impacts can be particularly devastating on historic and cultural resources because many are irreplaceable. Therefore, it is essential to consider these resources in the mitigation planning process.

Currently Charles County contains 42 entries on the National Register of Historic Places (NRHP), including The County also contains two properties administered by the National Park Service: The Thomas Stone National Historic Site, Figure 5.1-1., also known as Habre de Venture, located on Rose Hill Road between MD 6 and MD 225 in Port Tobacco and Piscataway Park. Charles County also contains 1,031 sites on the Maryland Inventory of Historic Properties (MIHP), 114 of which are potentially eligible for inclusion on the NRHP. There are also 1,005 recorded archaeological sites in the County, although there are likely more sites not yet found. Like other valuable assets and critical facilities throughout the County, these historic and cultural resources are essential to protect, preserve, and consider when assessing risk and vulnerability.

Figure 5.1-1 Thomas Stone National Historic Site located in Port Tobacco



Charles County initially was defined as being a rural county. The County has continued to grow over the past twenty-five years as one of Washington, D.C.'s major bedroom communities. Charles County's growth rate can be attributed to several factors including its proximity to the Washington metropolitan area. Charles County's relatively low tax rate, lower housing costs and rural character add to its appeal as a popular market. Population growth has a direct correlation with the loss of historic properties. The 1990 Census reported 1,828 structures built between 1940 and 1949 and 1,930 structures built by 1939 or earlier. These numbers were significantly reduced according to 2021 American Community Survey (U.S. Census Bureau, 2021), which recorded 1,482 structures built between 1940 and 1949 and 1,917 built by 1939 or earlier, representing a loss of 359 structures. This is roughly equivalent to 1.5 historic structures lost per month. Since 1990, recent trends in the County’s land use

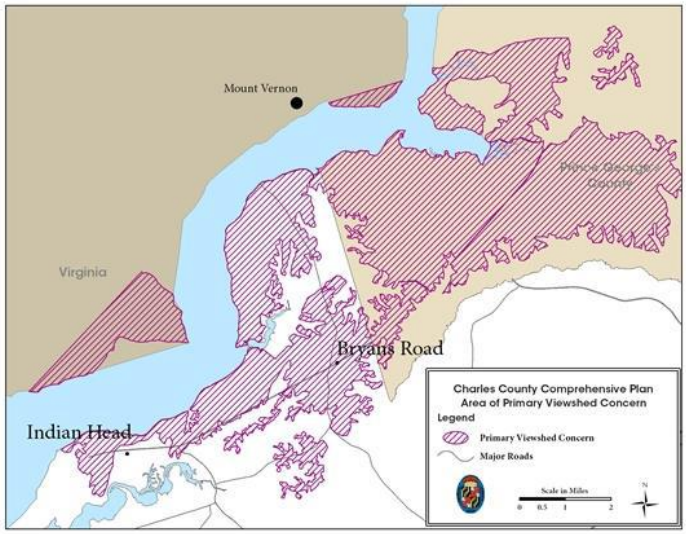
planning have begun to focus population growth and development within designated growth areas. These efforts may indirectly help to protect historic resources located outside designated growth areas. In addition, the County is committed to integrating historic preservation planning into its development review process to mitigate the negative impacts of development on historic and archaeological sites.

Depending on the number of historic resources within a community, it is unrealistic to assume that all the necessary mitigation activities can be done at once to protect these resources. The work must be done in a manner that retains the character-defining features of a historic property and can be costly. Therefore, it makes sense to set priorities in terms of which resources and mitigation projects should be the point of focus.

Charles County recognizes that the preservation and maintenance of archaeological sites and historic structures contribute to the cultural heritage of the County and are in the long-term best interest of the County. Areas of concern are:

- Architecture
- Archaeology
- Cemeteries
- Cultural Landscapes
- Living Traditions and Folklore
- History Museums and Collections
- Mount Vernon Viewshed

Figure 5.1-2 Mount Vernon Viewshed (Charles County, 2016)



The Mount Vernon Viewshed, which encompasses portions of Bryans Road, Marshall Hall and Piscataway Park, has been identified as an area of concern because future land development and loss of tree cover could potentially have adverse impacts on this historic landscape. Therefore, the County is undertaking measures, such as creating an overlay zone, to protect the view from Mount Vernon as George Washington would have seen it when he lived there. The viewshed is also referenced in the Charles County Comprehensive Plan, and the plan includes a goal in the community development chapter to "protect significant views and vistas from the adverse effects of development including the Mount Vernon Viewshed." The greatest threat to the viewshed is the loss of tree cover, which could happen because of erosion, wildfire, tornados, or other natural disasters. Erosion along the shoreline is currently occurring but will likely get worse and could greatly impact the view from Mount Vernon.

The chapter aims to integrate historic preservation planning considerations into the hazard mitigation planning process by:

- Evaluating existing resources and data and identifying gaps.

- Determining which historic properties and cultural resources are vulnerable to hazard events.
- Prioritizing historic and cultural resources for mitigation action.

Some historic and cultural resources also have unique vulnerabilities to hazard events. Depending on the resource, vulnerability to certain hazards may be greater and/or less than that of other assets in the County. For example, historic paper documents may not be impacted by an earthquake or severe winter storms, but historic properties have the potential to be more significantly impacted by these events than newer structures constructed to comply with modern building codes and development regulations. Similarly, flooding may have a more significant impact on a historic property than other properties, but there may be less of an impact on historic sites such as monuments or cemeteries.

5.2 Data Sources and Gap Analysis

The first step of assessing the vulnerability of historic and cultural resources in Charles County involved collecting existing data and resources and conducting a gap analysis. The following datasets were used to conduct this analysis and develop this chapter:

- **National Register of Historic Places (NRHP):** The NRHP is the National Park Service's list of the Nation's historic places worthy of preservation. It includes districts, sites, buildings, structures, and objectives significant to American historic, architecture, archaeology, engineering, and culture. There are over 90,000 sites on the list throughout the United States, with almost 1,600 in the State of Maryland. Charles County contains 42 listings on the National Register of Historic Places. This data was available in GIS format, which allowed the County to assess vulnerability of these sites to hazard events. Information about individual NRHP sites can be viewed on the NRHP database on the National Park Service's website. Photographs and registration forms for each site can be viewed and downloaded. Registration forms include a description of each site as well as information about a site's location, classification, function or use, and significance.
- **Maryland Inventory of Historic Properties (MIHP):** An inventory created by the Maryland Historical Trust (MHT) which contains historic districts, sites, buildings, structures, and objects of known or potential value to the history of the State of Maryland. The inventory contains data on over 13,000 archaeological sites and 41,000 historic and architectural resources. 1,031 historic and cultural resources are in Charles County and were evaluated in this plan; however, information about archaeological sites was not available for incorporation into this HMP Update due to the sensitivity of the information. This data was also available in GIS format. MHT maintains a similar searchable database for properties listed on the MIHP, although the level of information available for each site varies. For example, some include the MHT MIHP Properties Form, which includes information about the property, its location, classification, and significance, while others include NRHP nomination forms. Additionally, some files contain extensive photos of the property, while others do not contain any. Some entries only include brief descriptions of the site and a map depicting its location.
- **Historic Preservation Easements:** This dataset includes properties where owners have entered into an easement agreement with MHT to protect the historic character of their property. There are 17 of these easements in Charles County. This data was also available in GIS format.

- **County Cemetery Inventory:** Charles County maintains a list of cemeteries in the County and their property owners. This dataset contained 138 sites, 95 of which contain GPS coordinates. Since the previous HMP, three additional cemeteries were identified and added to the list and thirty additional sites were mapped, which allowed 95 of the cemeteries to be analyzed for their vulnerability to hazard events.
- **Recommended National Register Eligible Resources (RNRE):** Charles County maintains a list of sites that are recommended for inclusion on the NRHP. RNRE resources listed in this HMP have been evaluated by Charles County Department of Planning and Growth Management staff and are considered likely to meet NRHP criteria and/or are locally significant. However, these resources have not been formally evaluated or determined eligible for the NRHP by the Maryland Historical Trust. This list contains 113 sites that are currently on the MIHP. These sites were assessed with the MIHP properties, but these 113 sites are highlighted in the following analysis.

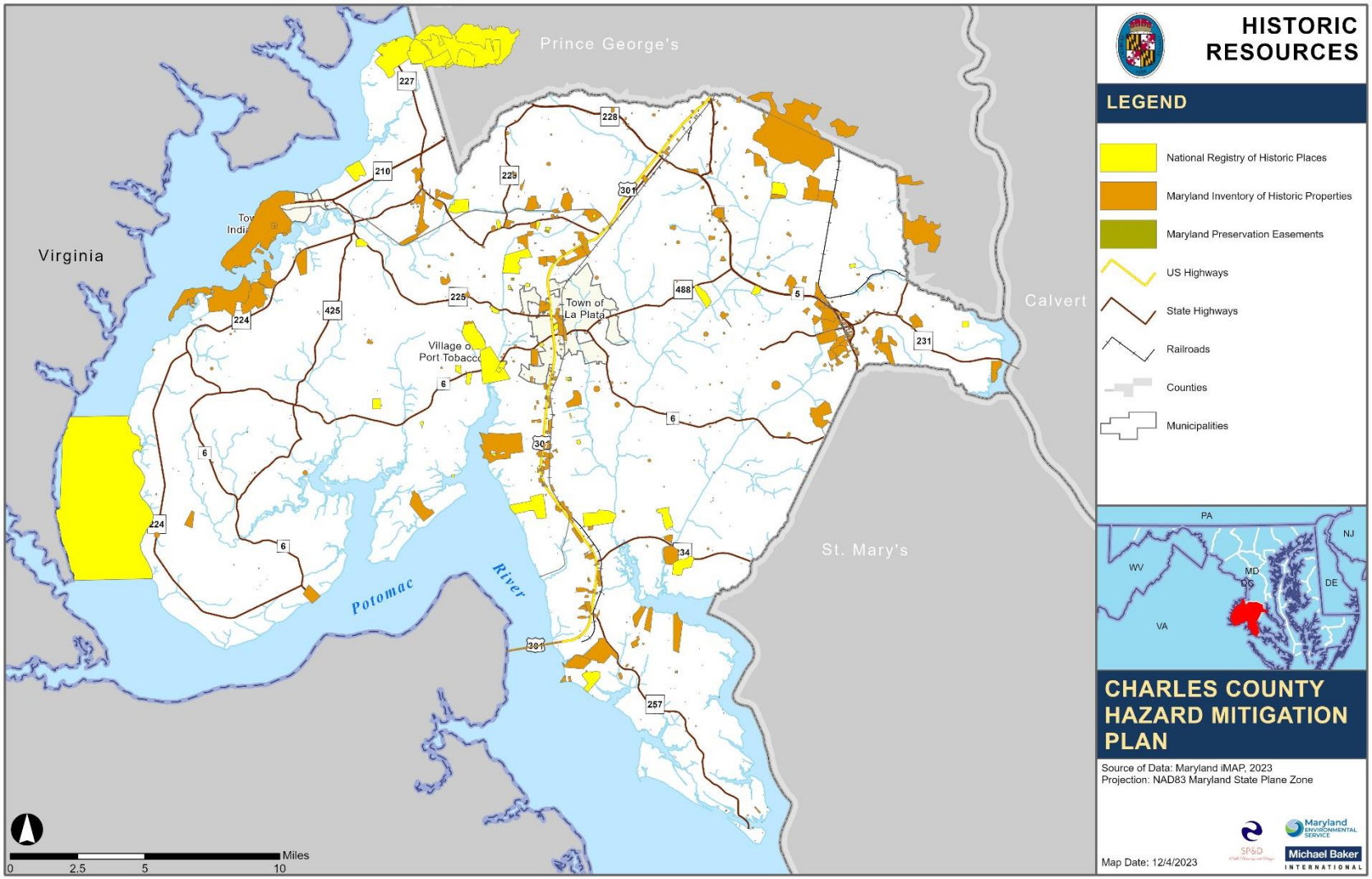
Resources identified in the National Register of Historic Places, Maryland Inventory of Historic Properties, and the Historic Preservation Easements dataset are shown in Map 5.2-1 and the 95 cemeteries for which GPS coordinates were available are shown in Map 5.2-2.

The NRHP and MIHP provided the most valuable information about historic properties in Charles County for vulnerability analysis. Coupled with the list of MIHP sites that are potentially eligible for the NRHP, these data sources helped provide a means to prioritize sites based on their historical significance. However, there remain gaps in data availability. The following recommendations were developed based on this analysis:

- Identify additional information about cemeteries throughout Charles County and obtain location information for the remaining 43 sites.
- Identify which cemeteries are adjacent to or associated with structures on either the National Register of Historic Places or Maryland Inventory of Historic Properties.
- Obtain archaeological site data and surveys from Maryland Historic Trust.
- Continue to survey properties for inclusion on the MIHP and evaluate for NRHP eligibility or local significance.
- Utilize predictive models and approaches outlined in the *Indigenous Cultural Landscapes Study for the Nanjemoy and Mattawoman Creek Watersheds* study to identify indigenous cultural landscapes of historic and cultural significance to the County and assess the vulnerability of these landscapes.

To be considered eligible for the National Register of Historic Places, property generally must be at least 50 years old. As shown in Table 5.2-1, the County contains many properties that were constructed more than 50 years ago. The largest concentrations of these properties are in Thompkinsville, Pomonkey, Nanjemoy, and Marbury. Charles County should also consider reviewing property records and surveying sites that aren't currently on the NRHP or MIHP to determine if they could potentially be eligible for either list.

Map 5.2-1: Historic Resources in Charles County



Map 5.2-2: Cemeteries in Charles County

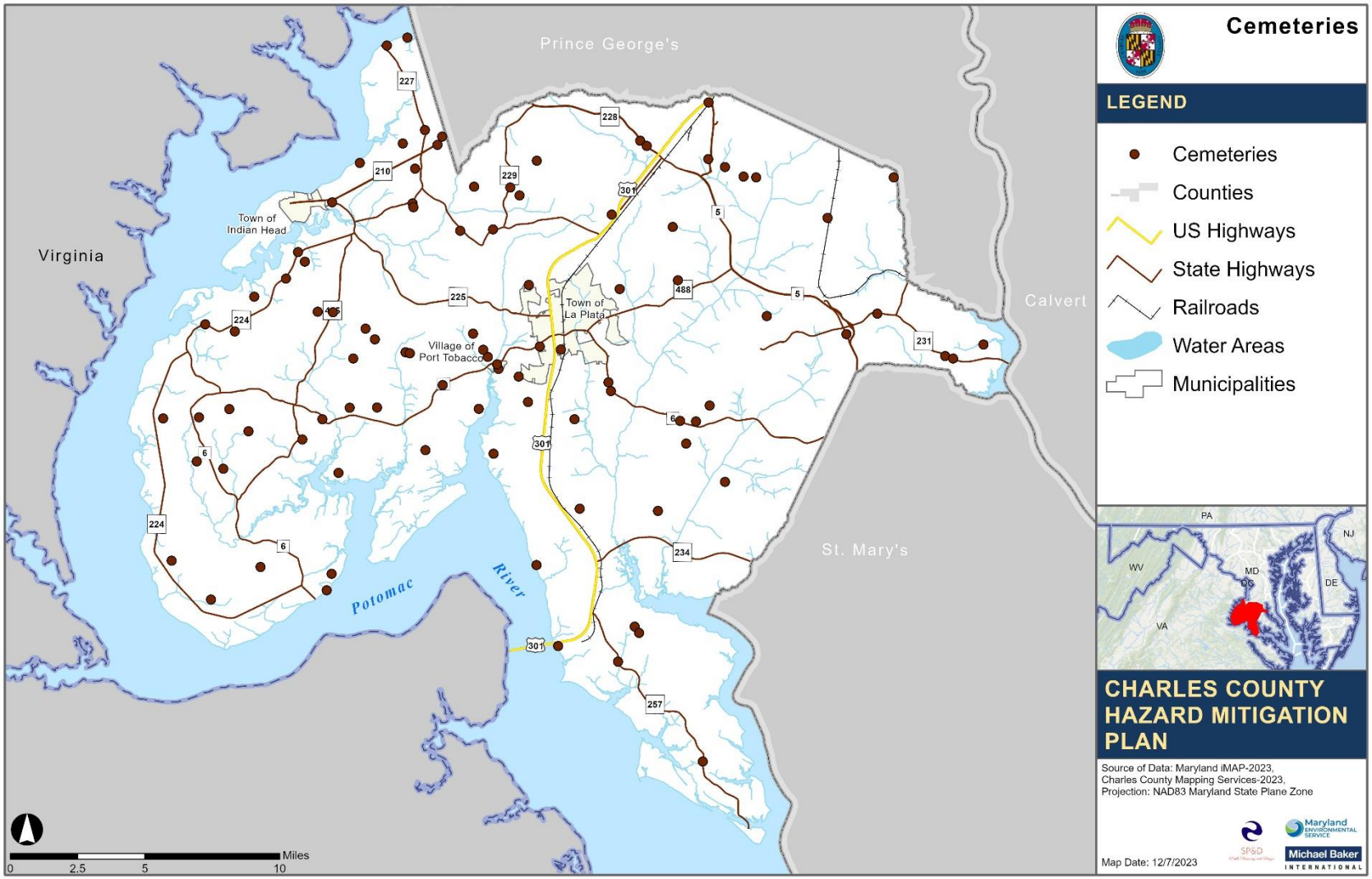


Table 5.2-1: Age of Structures by Area of Charles County

YEAR BUILT	LA PLATA	HILL TOP	NANJEMOY	ALLENS FRESH	THOMPKINS VILLE	WALDORF	POMONKEY	BRYANTOWN	HUGHES VILLE	MARBURY
Total Structures	5,905	755	1,231	2,230	2,281	33,117	6,051	6,090	2,339	1,719
Built 1960 to 1969	518	65	129	74	124	1,706	911	709	88	148
Built 1950 to 1959	340	35	100	61	215	646	852	143	27	165
Built 1940 to 1949	235	29	113	48	124	169	668	16	23	57
Built 1939 or earlier	**109**	**33**	**149**	**179**	**451**	**299**	**240**	**164**	**173**	**120**
Total Built Prior to 1969	**1,202**	**162**	**491**	**362**	**914**	**2,820**	**2,671**	**1,032**	**311**	**490**
% Built Prior to 1969	**20.36%**	**21.46%**	**39.89%**	**16.23%**	**40.07%**	**8.52%**	**44.14%**	**16.95%**	**13.30%**	**28.50%**

5.3 Vulnerability Assessment

The analysis of historical and cultural resource vulnerability focused on natural hazards that have geographically distinct vulnerabilities. For example, all structures, critical facilities, and population in the County are vulnerable to hazards such as severe winter storms, extreme temperatures, and extreme weather; however, the vulnerability of an asset varies significantly for other hazards depending on its geographic location. For example, structures in the Special Flood Hazard Area are much more vulnerable to flooding, whereas assets in the Wildland-Urban Interface are at a higher risk to wildfire. Since all historic and cultural resources can be considered vulnerable to many of the hazards that have regional or county-wide impacts, this analysis focused on assessing vulnerability to the following location-specific hazards to help identify the most at-risk historic and cultural resources in the County:

- Flood
- Erosion
- Earth Disturbance (Landslide)
- Wildfire

Flood Vulnerability

Table 5.2 displays the number of historic and cultural resources that intersect the Special Flood Hazard Area (SFHA) in each jurisdiction. They are categorized as follows:

- National Register of Historic Places
- Maryland Inventory of Historic Properties
- Recommended National Register Eligible Resources
- Properties with Historic Preservation Easements

The numbers of vulnerable addressable structures and critical facilities were calculated by overlaying the addressable structures with the SFHA as shown in the FIRM data. Select results of this analysis are also shown for each jurisdiction on the maps in Maps 5.3-1 through 5.3-3. These maps depict the SFHA as well as NRHP sites, MIHP sites, and properties with historic preservation easements.

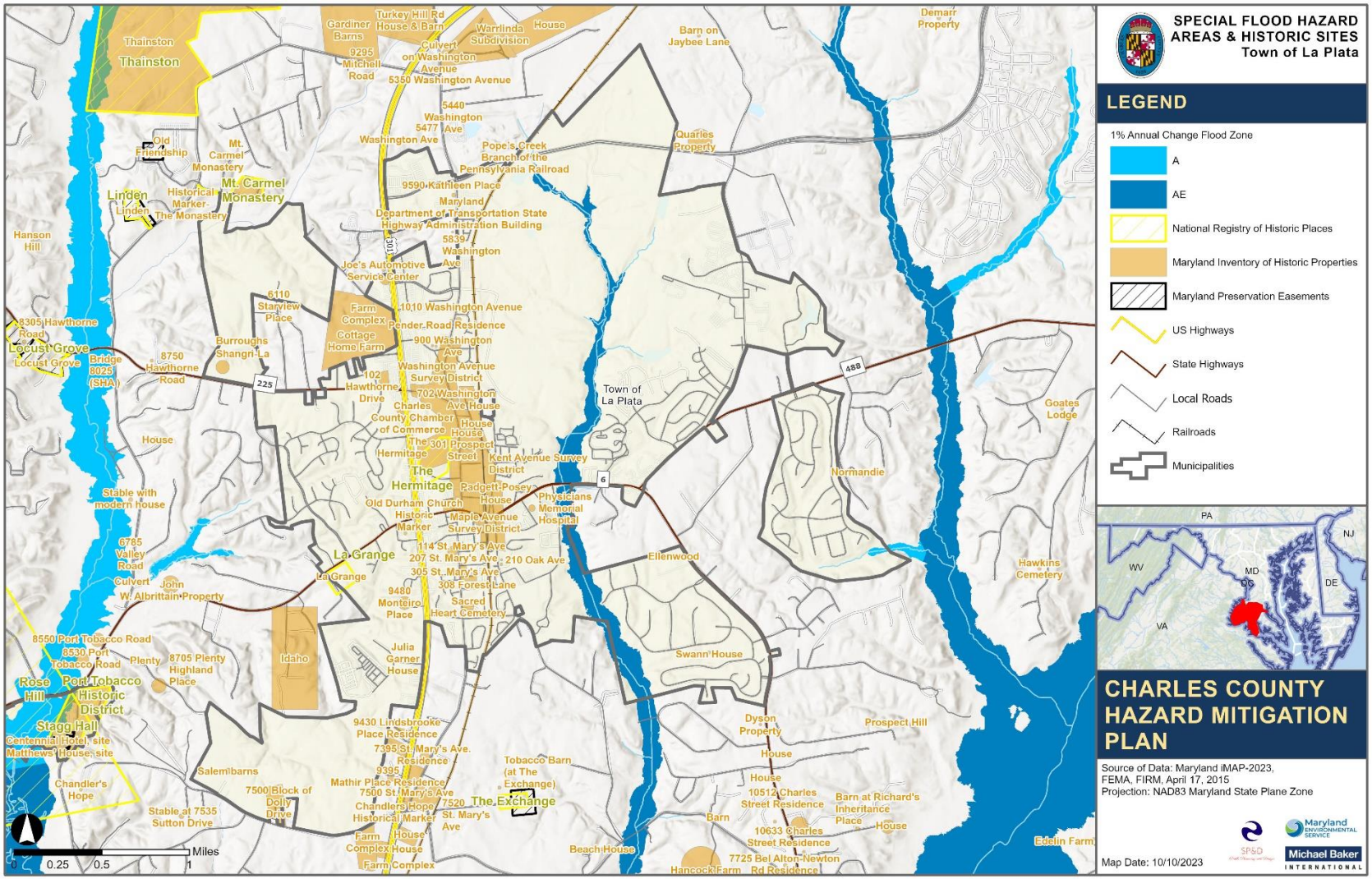
As shown in Table 5.3-1 17 National Register of Historic Places (40.48%) are in the SFHA. A list of these sites is shown in Table 5.3-2. While only 10.09% of sites on the Maryland Inventory of Historic Properties are in the SFHA, this amounts to 104 sites of historic importance. Additionally, six of those sites are potentially eligible for the National Register of Historic Places. None of the 17 properties with historic preservation easements are in the SFHA. While not shown in the table, there is one cemetery, Old Port Tobacco Parrish, located in the SFHA.

The vast majority of historic sites that are vulnerable to flooding are located in the unincorporated areas of Charles County, while several historic sites or districts in the SFHA are located in the Village of Port Tobacco. Only one of the historic sites in La Plata is in the SFHA, and the Town of Indian Head does not contain any historic sites on the lists mentioned above within its municipal boundaries, although several historic sites associated with the Naval Ordnance Station are located nearby.

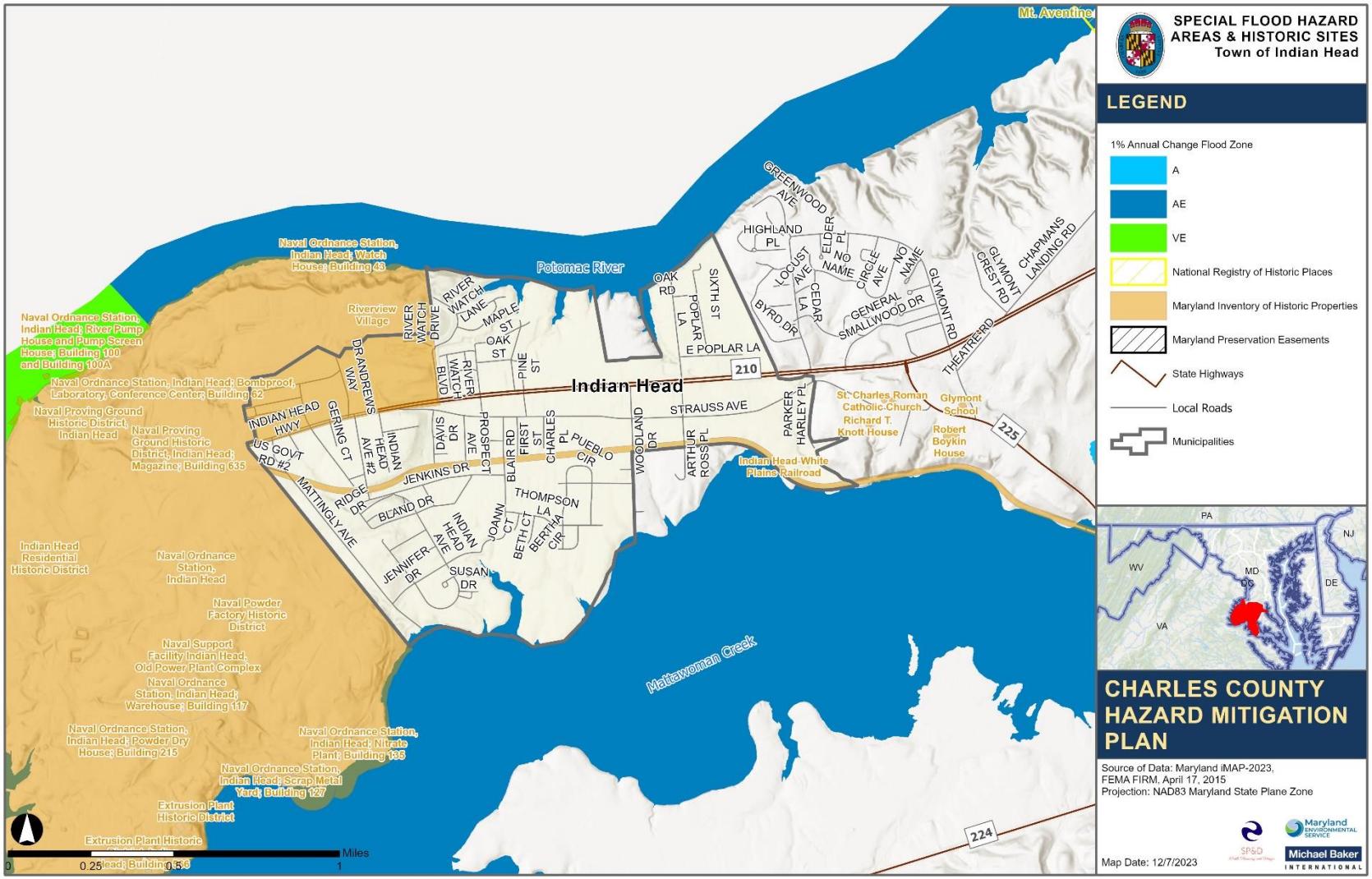
Table 5.3-1: Historic and Cultural Resource Flood Vulnerability

MUNICIPALITY	TOTAL NRHP SITES	TOTAL NRHP SITES IN SFHA	PERCENT NRHP SITES IN SFHA	TOTAL MIHP SITES	TOTAL MIHP SITES IN SFHA	PERCENT MIHP SITES IN SFHA	TOTAL RNRE SITES	TOTAL RNRE SITES IN SFHA	PERCENT RNRE SITES IN SFHA	TOTAL HISTORIC PRES. EASEMENTS	TOTAL HISTORIC PRES. EASEMENTS IN SFHA	PERCENT HISTORIC PRES. EASEMENTS IN SFHA
Charles County Unincorporated Areas	36	15	41.67%	901	93	10.65%	102	6	5.88%	14	0	0.00%
Town of Indian Head	0	0	0.00%	3	3	100.00%	0	0	0.00%	0	0	0.00%
Town of La Plata	3	0	0.00%	76	1	1.32%	10	0	0.00%	0	0	0.00%
Village of Port Tobacco	3	2	66.67%	51	4	7.84%	1	0	0.00%	3	0	0.00%
Total	**42**	**17**	**40.48%**	**1,031**	**104**	**10.09%**	**113**	**6**	**5.31%**	**17**	**0**	**0.00%**

Map 5.3-1: Historic and Cultural Resource Flood Vulnerability in the Town of La Plata



Map 5.3-2: Historic and Cultural Resource Flood Vulnerability in the Town of Indian Head



Map 5.3-3: Historic and Cultural Resource Flood Vulnerability in the Town of Port Tobacco Village

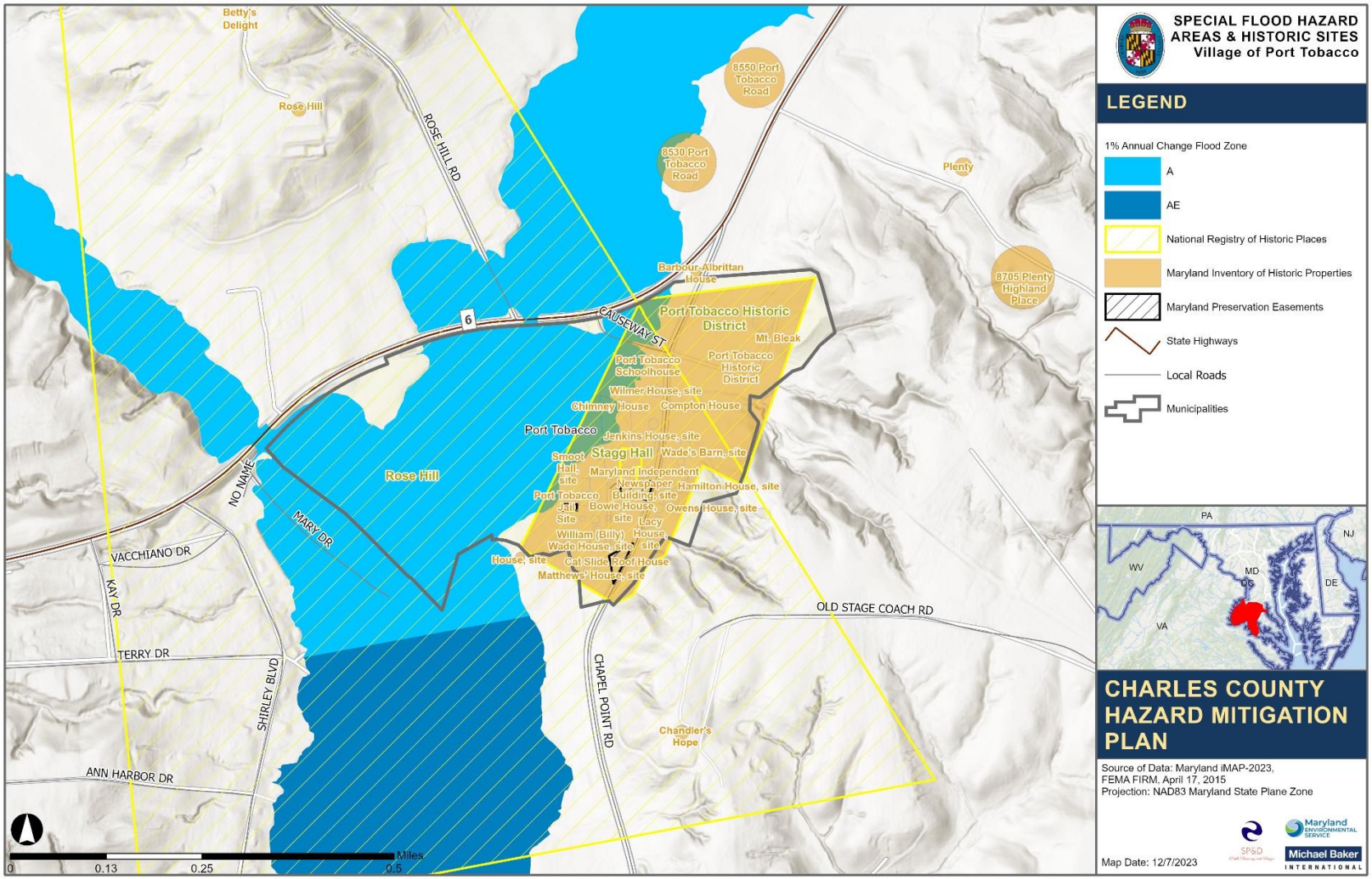


Table 5.3-2: National Register of Historic Places Located in the Special Flood Hazard Area		
NAME	**TYPE**	**JURISDICTION**
Moyaone Reserve Historic District	District	Charles County Unincorporated Areas
2023 PLAN UPDATE		
McPherson's Purchase	Building	Charles County Unincorporated Areas
Mount Air	Building	Charles County Unincorporated Areas
Rose Hill	Building	Village of Port Tobacco
Sarum	Building	Charles County Unincorporated Areas
St. Catharine	Building	Charles County Unincorporated Areas
The Lindens	Building	Charles County Unincorporated Areas
Waverley	Building	Charles County Unincorporated Areas
Thomas Stone NHS - Habre de Venture	Building, Site	Charles County Unincorporated Areas
Timber Neck	Building, Site	Charles County Unincorporated Areas
Bryantown Historic District	District	Charles County Unincorporated Areas
Mallows Bay-Tidewater Historic and Archaeological District	District	Charles County Unincorporated Areas
Mt. Aventine	District	Charles County Unincorporated Areas
Port Tobacco Historic District	District	Village of Port Tobacco
Thainston	District	Charles County Unincorporated Areas
Mary W. Somers (Skipjack)	Object	Charles County Unincorporated Areas
Piscataway Park	Site	Charles County Unincorporated Areas
Please note that a district may contain multiple resources, not just one building. Additionally, individual building listings may contain multiple resources. As a result, there may be several buildings or resources included in an individual listing.		

All six historic districts listed on the National Register of Historic Places in Charles County intersect the SFHA; however, districts are geographically larger than any sites or buildings, and the presence of a SFHA in a historic district may not pose a significant threat to people or property. Except for the historic *Mary W. Somers* skipjack, the remaining structures in the SFHA are all categorized as buildings, sites, or both. Table 5.3-3 shows the six Recommended National Register Eligible sites located in the SFHA, all of which are in the unincorporated areas of Charles County.

Table 5.3-3: Recommended National Register Eligible Sites Located in the Special Flood Hazard Area		
NAME	**MIHPNO**	**JURISDICTION**
Anthony's Pasture	CH-189	Charles County Unincorporated Areas
Christ Episcopal Church	CH-18	Charles County Unincorporated Areas
Governor Harry W. Nice Memorial Bridge	CH-376	Charles County Unincorporated Areas
Millbrook Farm Grist Mill	CH-193	Charles County Unincorporated Areas
Pasquahanza	CH-32	Charles County Unincorporated Areas
Plank Bridge Farm Corn Crib & Barn	CH-174	Charles County Unincorporated Areas

A full list of MIHP properties and their vulnerability to hazards discussed in this chapter can be found in Appendix D.

Erosion Vulnerability

To assess the vulnerability of historic and cultural resources to erosion, Charles County focused on the direct loss of land and its potential impact on these resources. The land vulnerable to loss was estimated based on a shoreline change transect database produced by Maryland Geological Survey (MGS). The database generalizes average annual erosion rates into five categories: accretion, 0-2 feet, 2-4 feet, 4-8 feet, and greater than 8 feet. To develop a conservative estimate of the land vulnerable to erosion, the highest average erosion rate in each category was assumed to prevail, and the average erosion rate was assumed to remain constant over the next 100 years. In 100 years', time, the shoreline was therefore estimated to retreat 200 feet for transects in the 0-2 feet per year category, 400 feet for transects in the 2-4 feet per year category, and 800 feet for the transects in the 4-8 feet per year and greater than 8 feet per year categories. Based on these assumptions, buffers were generated around the point at which each transect intersects the current shoreline, and the properties within the buffer area were identified. Note that this is an order of magnitude estimate. Erosion rates are highly variable across space and time and are dependent on many localized shoreline characteristics.

Table 5.3-4 displays the number of National Register of Historic Places, Maryland Inventory of Historic Properties site, and Recommended National Register Eligible sites estimated to be vulnerable to erosion. A total of seven National Register of Historic Places (19.44%) are in erosion hazard areas, while 119 Maryland Inventory of Historic Properties (12.76%) are in these areas. Of these 119 sites, 12 are potentially eligible for the National Register of Historic Places. National Register of Historic Places vulnerable to erosion are listed in Table 5.3-5 while a list of Recommended National Register Eligible sites can be found in Table 5.3-6. Additionally, while not shown in the table below, ten cemeteries are in an erosion-prone areas. A full list of MIHP sites vulnerable to erosion can be found in Appendix D.

Table 5.3-4: Historic and Cultural Resources Vulnerable to Erosion

MUNICIPALITY	TOTAL NRHP SITES	TOTAL NRHP IN EROSION HAZARD AREA	PERCENT NRHP SITES IN EROSION HAZARD AREA	TOTAL MIHP SITES	TOTAL MIHP SITES IN EROSION HAZARD AREA	PERCENT MIHP SITES IN EROSION HAZARD AREA	TOTAL RNRE SITES	TOTAL RNRE SITES IN EROSION HAZARD AREA	PERCENT RNRE SITES IN EROSION HAZARD AREA
Charles County Unincorporated Areas	36	7	19.44%	901	115	12.76%	102	12	11.76%
Town of Indian Head	0	0	0.00%	3	3	100.00%	0	0	0.00%
Town of La Plata	3	0	0.00%	76	1	1.32%	10	0	0.00%
Village of Port Tobacco	3	0	0.00%	51	0	0.00%	1	0	0.00%
Total	**42**	**7**	**16.67%**	**1,031**	**59**	**11.54%**	**113**	**12**	**10.62%**

Figure 5.3-1 depicts Mount Air, which is also vulnerable to flood and landslide.

Table 5.3-5: National Register of Historic Places Vulnerable to Coastal Erosion

NAME	TYPE	JURISDICTION
Waverley	Building	Charles County Unincorporated Areas
Mount Air	Building	Charles County Unincorporated Areas
Marshall Hall	Building	Charles County Unincorporated Areas
Mt. Aventine	District	Charles County Unincorporated Areas
Mallows Bay-Widewater Historic and Archaeological District	District	Charles County Unincorporated Areas
Mary W. Somers (Skipjack)	Object	Charles County Unincorporated Areas
Piscataway Park	Site	Charles County Unincorporated Areas
Please note that a district may contain multiple resources, not just one building. Additionally, individual building listings may contain multiple resources. As a result, there may be several buildings or resources included in an individual listing.		

Overall, 119 of the 1,031 properties on the Maryland Inventory of Historic Properties were determined to be vulnerable to erosion over a span of about 100 years. More than half were near the communities of Indian Head and Newburg. Most of the properties near Indian Head were related to the historic Naval Ordnance Station. Twelve of the MIHP sites are potentially eligible for the National Register of Historic Places and are shown in Table 5.3-6.

Figure 5.3-1: Image of Mount Air (NPS, 1978)



Table 5.3-6: Recommended National Register Eligible Sites Vulnerable to Coastal Erosion

NAME	MIHPNO	JURISDICTION
Anthony's Pasture	CH-189	Charles County Unincorporated Areas
Popes Creek Power Plant	CH-528	Charles County Unincorporated Areas
Rock Hall	CH-85	Charles County Unincorporated Areas
St. Francis Catholic Church	CH-663	Charles County Unincorporated Areas
Yatten	CH-38	Charles County Unincorporated Areas
2023 PLAN UPDATE		
Maiden Point Farm	CH-130	Charles County Unincorporated Areas
Hampton House	CH-144	Charles County Unincorporated Areas
Keechland	CH-158	Charles County Unincorporated Areas
Ravens Crest	CH-164	Charles County Unincorporated Areas
Pasquahanza	CH-32	Charles County Unincorporated Areas
Governor Harry W. Nice Memorial Bridge	CH-376	Charles County Unincorporated Areas
West Hatton	CH-39	Charles County Unincorporated Areas

Earth Disturbance (Landslide) Vulnerability

For purposes of assessing the vulnerability of historic and cultural resources to landslide, National Register of Historic Places, Maryland Inventory of Historic Properties, Recommended National Register Eligible sites, and Historic Preservation Easements were intersected with landslide prone areas, which were defined as areas with slope grades of 12% or greater. For historic sites or districts that were represented as polygons rather than points, a site was deemed vulnerable to landslide if more than 50% of the site were in an area with a slope grade of 12% or greater.

As shown in Table 5.3-7, approximately 12% of all NRHP sites are in landslide hazard areas, while only 6.01% of Maryland Inventory of Historic Properties and 8.85% of Recommended National Register Eligible sites are in these areas. Most of these sites are in the unincorporated areas of the County, while Port Tobacco and La Plata also include vulnerable sites. Four of 14 historic preservation easements are also located in landslide-prone areas, all of which are in Charles County's unincorporated areas. Additionally, ten cemeteries (Betty S. Delight - Ridgate Grave; Cooksey, Dent, Sanders Graves; Ellenborough - Edelen and Stone Grave; Fergusson Fuese Graves; Husick Cemetery; McDaniel Cemetery; Mulberry Grove - Hanson, Ferausson, Mitchell; St. John S. Baptist Church Cemetery (St. John's AME); St. Ignatius Catholic Church Cemetery; and Stoddert Cemetery) are on landslide-prone properties. Figures 5.3-2 depicts Maxwell Hall, National Register of Historic Places, vulnerable to landslides.

Figure 5.3-2: Image of Maxwell Hall (NPS, 1974)



Table 5.3-7: Historic and Cultural Resource Vulnerability to Landslide

MUNICIPALITY	TOTAL NRHP SITES	TOTAL NRHP IN LANDSLIDE AREA	PERCENT NRHP SITES IN LANDSLIDE AREA	TOTAL MIHP SITES	TOTAL MIHP SITES IN LANDSLIDE AREA	PERCENT MIHP SITES IN LANDSLIDE AREA	TOTAL RNRE SITES	TOTAL RNRE SITES IN LANDSLIDE AREA	PERCENT RNRE SITES IN LANDSLIDE AREA	TOTAL HISTORIC PRESERVATION EASEMENTS	TOTAL HISTORIC PRES EASEMENTS IN LANDSLIDE AREA	PERCENT HISTORIC PRES EASEMENTS IN LANDSLIDE AREA
Charles County Unincorporated Areas	36	5	13.89%	901	52	5.77%	102	10	9.80%	14	4	28.57%
Town of Indian Head	0	0	0.00%	3	0	0.00%	0	0	0.00%	0	0	0.00%
Town of La Plata	3	0	0.00%	76	1	1.32%	10	0	0.00%	0	0	0.00%
Village of Port Tobacco	3	0	0.00%	51	9	17.65%	1	0	0.00%	3	0	0.00%
Total	**42**	**5**	**11.90%**	**1,031**	**63**	**6.01%**	**113**	**10**	**8.85%**	**17**	**4**	**23.53%**

Table 5.3-8 lists National Register Historic Places vulnerable to landslide, of which all five are buildings.

Table 5.3-8: National Register of Historic Places Sites Vulnerable to Landslide

NAME	TYPE	JURISDICTION
Linden	Building	Charles County Unincorporated Areas
Locust Grove	Building	Charles County Unincorporated Areas
Maxwell Hall	Building	Charles County Unincorporated Areas
St. Thomas Manor	Building	Charles County Unincorporated Areas
Truman's Place	Building	Charles County Unincorporated Areas
Please note that a district may contain multiple resources, not just one building. Additionally, individual building listings may contain multiple resources. As a result, there may be several buildings or resources included in an individual listing.		

Maryland Inventory of Historic Properties in landslide hazard areas are shown in Table 5.3-9. All are in unincorporated areas of the County.

Table 5.3-9: Recommended National Register Eligible Sites Vulnerable to Landslide

NAME	MIHPNO	JURISDICTION
Edelin	CH-136	Charles County Unincorporated Areas
Eutah	CH-79	Charles County Unincorporated Areas
Goode Road Log House	CH-778	Charles County Unincorporated Areas
2023 PLAN UPDATE		
Edgehill Farm	CH-148	Charles County Unincorporated Areas
Loch Leven Cornhouse	CH-684	Charles County Unincorporated Areas
Millbrook Farm Grist Mill	CH-193	Charles County Unincorporated Areas
Mount Pleasant	CH-298	Charles County Unincorporated Areas
Plank Bridge Farm Corn Crib & Barn	CH-174	Charles County Unincorporated Areas
Prospect Hill	CH-74	Charles County Unincorporated Areas
Robert Bowling House	CH-120	Charles County Unincorporated Areas

Wildfire Vulnerability

For purposes of assessing the vulnerability of historic and cultural resources to wildfire, National Register Historic Places, Maryland Inventory Historic Places, Recommended National Register Eligible sites, and Historic Preservation Easements were intersected with Wildland-Urban Interface (WUI) areas. This analysis only focused on WUI areas and not intermix areas due to the higher risk associated with WUI areas. As shown in Table 5.11, approximately 30.95% of the National Register of Historic Places in the County are in WUI areas, including nine sites in the unincorporated areas of the County, one site in La Plata, and two sites in Port Tobacco. Additionally, 340 MIHP sites (33.56%) are in the WUI, including 73.68% of MIHP sites in the Town of La Plata. Of these 346 at-risk MIHP sites, 29 are potentially eligible for the NRHP. Additionally, five of 17 Historic Preservation Easements in Charles County are in the WUI.

Table 5.3-10 illustrates that 11 of 13 National Register Historic Places located in the Wildland-Urban Interface are buildings, while the remaining two resources are historic districts (Bryantown and Port

Tobacco). Additionally, Table 5.3-11 shows the 29 Recommended National Register Eligible Sites in the Wildland-Urban Interface Area.

Table 5.3-10: National Register of Historic Places Vulnerable in Wildland-Urban Interface Areas

NAME	TYPE	JURISDICTION
Acquinsicke	Building	Charles County Unincorporated Areas
Araby	Building	Charles County Unincorporated Areas
Oak Grove	Building	Charles County Unincorporated Areas
Rose Hill	Building	Village of Port Tobacco
Sarum	Building	Charles County Unincorporated Areas
Spye Park	Building	Charles County Unincorporated Areas
St. Thomas Manor	Building	Charles County Unincorporated Areas
Stagg Hall	Building	Village of Port Tobacco
The Hermitage	Building	Town of La Plata
The Lindens	Building	Charles County Unincorporated Areas
Waverley	Building	Charles County Unincorporated Areas
Bryantown Historic District	District	Charles County Unincorporated Areas
Port Tobacco Historic District	District	Village of Port Tobacco

Please note that a district may contain multiple resources, not just one building. Additionally, individual building listings may contain multiple resources. As a result, there may be several buildings or resources included in an individual listing.

Table 5.3-11: Recommended National Register Eligible Sites in Wildland-Urban Interface Areas

NAME	MIHPNO	JURISDICTION
Bel Alton Historic District	CH-560	Charles County Unincorporated Areas
Black Friars	CH-42	Charles County Unincorporated Areas
Carrico Building	CH-344	Town of La Plata
Cat Slide Roof House	CH-23	Village of Port Tobacco
Chillum	CH-354	Town of La Plata
Ellenwood	CH-33	Town of La Plata
Huckleberry Plains	CH-191	Charles County Unincorporated Areas
Idaho	CH-166	Charles County Unincorporated Areas
James L. Carrico House	CH-613	Charles County Unincorporated Areas
La Plata Historic District	CH-326	Town of La Plata
Maiden Point Farm	CH-130	Charles County Unincorporated Areas
Millbrook Farm	CH-192	Charles County Unincorporated Areas
Millbrook Farm Dairy	CH-192A	Charles County Unincorporated Areas
Millbrook Farm Smokehouse	CH-192B	Charles County Unincorporated Areas
Millbrook Farm Grist Mill	CH-193	Charles County Unincorporated Areas
Mt. Victoria	CH-35	Charles County Unincorporated Areas
Nanjemoy Store and Post Office, site	CH-194	Charles County Unincorporated Areas

Table 5.3-11: Recommended National Register Eligible Sites in Wildland-Urban Interface Areas		
NAME	MIHPNO	JURISDICTION
Old Brick Jail	CH-178	Town of La Plata
Old Pomonkey High School	CH-503	Charles County Unincorporated Areas
Physicians Memorial Hospital	CH-806	Town of La Plata
Quaker Cemetery	CH-457	Charles County Unincorporated Areas
Rose Hill	CH-1	Charles County Unincorporated Areas
St. Johns Chapel	CH-251	Charles County Unincorporated Areas
St. Joseph's Church	CH-68	Charles County Unincorporated Areas
St. Paul's Episcopal Church	CH-226	Charles County Unincorporated Areas
Sunnyside	CH-214	Charles County Unincorporated Areas
West Hatton	CH-39	Charles County Unincorporated Areas
Westwood Manor	CH-151	Charles County Unincorporated Areas
Wright House	CH-356	Charles County Unincorporated Areas

Vulnerability Summary

Tables 5.3-12 and 5.3-13 summarize vulnerable for all National Register Historic Places and Recommended National Register Eligible sites in Charles County. The tables show which hazards each resource is vulnerable to. In the following tables, a site's vulnerability to these hazards is noted with the following colors:

- Vulnerable to Flood - Blue
- Vulnerable to Erosion – Brown
- Vulnerable to Landslide – Green
- Vulnerable to Wildfire - Red

Each site was assigned a priority score based on the results of this analysis. If a site was vulnerable to erosion, landslide, or wildfire, it received one point for each of these hazards, whereas if a site was in the Special Flood Hazard Area it received two points since flood is a high-risk hazard for Charles County. For example, the Port Tobacco Historic District received a priority score of four, as this resource was vulnerable to flood (2), landslide (1), and wildfire (1).

As shown in Table 5.3-12, one resource on the National Register of Historic Places received a priority score of four, while only one Recommended National Register Eligible (RNRE) site received a score of four in Table 5.3-13. County-owned assets are identified with an asterisk.

A full list of MIHP sites and their vulnerability is available in Appendix D.

Table 5.3-12: National Register Historic Places Vulnerability Summary and Prioritization

NAME	TYPE	JURISDICTION	NRHP REFERENCE NUMBER	LISTED DATE	FLOOD (2)	EROSION (1)	LANDSLIDE (1)	WILDFIRE (1)	PRIORITY
Moyaone Reserve Historic District	District	Charles County	100005659	10/7/2020					2
2023 PLAN UPDATE									
Waverley	Building	Charles County	75000886	8/11/1975					4
Mallows Bay-Widewater Historic and Archaeological District	District	Charles County	15000173	4/24/2015					3
MARY W. SOMERS (skipjack)	Object	Charles County	76002173	10/8/1976					3
Mount Air	Building	Charles County	78001453	12/22/1978					3
Mt. Aventine	District	Charles County	94001328	4/18/1996					3
Piscataway Park	Site	Charles County	66000144	10/15/1966					3
Bryantown Historic District	District	Charles County	85000590	3/14/1985					3
Port Tobacco Historic District	District	Village of Port Tobacco	79003911	8/4/1989					3
Rose Hill	Building	Village of Port Tobacco	73000914	3/30/1973					3
Sarum	Building	Charles County	74000948	8/13/1974					3
The Lindens	Building	Charles County	90000607	4/23/1990					3
Habre de Venture (Thomas Stone National Historic Site)	Building, Site	Charles County	72001595	10/31/1972					2
McPherson's Purchase	Building	Charles County	85000019	1/3/1985					2
St. Catharine	Building	Charles County	74000950	10/1/1974					2
Thainston	District	Charles County	90000436	3/28/1990					2
Timber Neck	Building, Site	Charles County	79001123	9/6/1979					2
St. Thomas Manor	Building	Charles County	88002050	11/10/1988					2
Marshall Hall	Building	Charles County	76000152	5/12/1976					1
Linden	Building	Charles County	77000693	11/23/1977					1
Locust Grove	Building	Charles County	78001454	7/21/1978					1
Maxwell Hall*	Building	Charles County	74000949	7/30/1974					1
Truman's Place	Building	Charles County	87002264	1/20/1988					1

Table 5.3-12: National Register Historic Places Vulnerability Summary and Prioritization

NAME	TYPE	JURISDICTION	NRHP REFERENCE NUMBER	LISTED DATE	FLOOD (2)	EROSION (1)	LANDSLIDE (1)	WILDFIRE (1)	PRIORITY
Acquinsicke	Building	Charles County	92000070	2/20/1992					1
Araby	Building	Charles County	74000947	7/25/1974					1
Oak Grove	Building	Charles County	83003777	11/23/1983					1
Spye Park	Building	Charles County	90001523	10/4/1990					1
Stagg Hall*	Building	Village of Port Tobacco	88003061	12/29/1988					1
The Hermitage	Building	Town of La Plata	98000886	6/17/1998					1
Cedar Grove	Building	Charles County	79001124	3/2/1979					0
Ellerslie	Building	Charles County	79003264	9/24/1979					0
Green's Inheritance	Building	Charles County	77000692	12/16/1977					0
Johnsontown Tobacco Barn No. 2	Building	Charles County	11000947	12/27/2011					0
La Grange	Building	Town of La Plata	76000990	10/22/1976					0
Mt. Carmel Monastery	Site	Charles County	73000913	12/4/1973					0
Oakland	Building	Charles County	83002946	8/4/1983					0
Pleasant Hill	Building	Charles County	97001449	12/12/1997					0
Retreat	Building	Charles County	88000222	6/28/1988					0
Rich Hill*	Building	Charles County	75000885	11/12/1975					0
Rosemary Lawn	Building	Charles County	92000380	4/16/1992					0
St. Mary's Roman Catholic Church, Newport	Building	Charles County	91000603	5/30/1991					0
The Exchange	Building	Charles County	84001763	6/7/1984					0

** Denotes County-owned properties*

Table 5.3-13: Recommended National Register Eligible Sites Vulnerability Summary and Prioritization							
NAME	JURISDICATION	MIHPNO	FLOOD (2)	EROSION (1)	LANDSLIDE (1)	WILDFIRE (1)	PRIORITY
Millbrook Farm Grist Mill	Charles County	CH-193					4
Anthony's Pasture	Charles County	CH-189					3
Governor Harry W. Nice Memorial Bridge	Charles County	CH-376					3
Pasquahanza	Charles County	CH-32					3
Plank Bridge Farm Corn Crib & Barn	Charles County	CH-174					3
William and Mary Parish Christ Episcopal Church)	Charles County	CH-18					2
Maiden Point Farm	Charles County	CH-130					2
West Hatton	Charles County	CH-39					2
Hampton House	Charles County	CH-144					1
Keechland	Charles County	CH-158					1
Popes Creek Power Plant, Southern Maryland Tri-County Co-op Power Plant	Charles County	CH-528					1
Ravens Crest	Charles County	CH-164					1
Spearman Lancaster House	Charles County	CH-85					1
St. Francis Catholic Chapel	Charles County	CH-663					1
Yatten	Charles County	CH-38					1
Edelin Farm	Charles County	CH-136					1
Edgehill Farm	Charles County	CH-148					1
Eutah	Charles County	CH-79					1
Goode Road Log House, site	Charles County	CH-778					1
Loch Leven Cornhouse	Charles County	CH-684					1
Mount Pleasant	Charles County	CH-298					1
Prospect Hill	Charles County	CH-74					1
Robert Bowling House	Charles County	CH-120					1
Bel Alton Historic District	Charles County	CH-560					1
Black Friars	Charles County	CH-42					1

Table 5.3-13: Recommended National Register Eligible Sites Vulnerability Summary and Prioritization

NAME	JURISDICATION	MIHPNO	FLOOD (2)	EROSION (1)	LANDSLIDE (1)	WILDFIRE (1)	PRIORITY
Carrico Building	Town of La Plata	CH-344					1
Cat Slide Roof House	Village of Port Tobacco	CH-23					1
Chillum	Town of La Plata	CH-354					1
Ellenwood	Town of La Plata	CH-33					1
Huckleberry Plains	Charles County	CH-191					1
Idaho	Charles County	CH-166					1
James L. Carrico House	Charles County	CH-613					1
La Plata Historic District	Town of La Plata	CH-326					1
Millbrook Farm	Charles County	CH-192					1
Millbrook Farm Dairy	Charles County	CH-192B					1
Millbrook Farm Smokehouse	Charles County	CH-192A					1
Mt. Victoria	Charles County	CH-35					1
Nanjemoy Store and Post Office, site	Charles County	CH-194					1
Old Brick Jail (La Plata Jail)	Town of La Plata	CH-178					1
Old Pomonkey High School	Charles County	CH-503					1
Physicians Memorial Hospital	Town of La Plata	CH-806					1
Quaker Cemetery	Charles County	CH-457					1
Rose Hill	Charles County	CH-1					1
St. Johns Chapel	Charles County	CH-251					1
St. Joseph's Church	Charles County	CH-68					1
St. Paul's Episcopal Church	Charles County	CH-226					1
Sunnyside	Charles County	CH-214					1
Westwood Manor	Charles County	CH-151					1
Wigwam	Charles County	CH-797					1
Araby	Charles County	CH-11					0
Betty's Delight	Charles County	CH-153					0
Bowling Green	Charles County	CH-215					0

Table 5.3-13: Recommended National Register Eligible Sites Vulnerability Summary and Prioritization							
NAME	JURISDICATION	MIHPNO	FLOOD (2)	EROSION (1)	LANDSLIDE (1)	WILDFIRE (1)	PRIORITY
Brentfield	Charles County	CH-139					0
Brentland Road House	Charles County	CH-152					0
Brinkwood	Charles County	CH-213					0
Burlean Hall (Burlain's Hill) (Mount Pleasant)	Charles County	CH-298					0
Calvary United Methodist Church	Charles County	CH-622					0
Caroline Christ Farm	Charles County	CH-425					0
Chandler's Hope	Charles County	CH-124					0
Christ Episcopal Church	Town of La Plata	CH-62					0
Crain's Lot	Charles County	CH-36					0
Dent's Palace	Charles County	CH-40					0
Dudley & Lyon's Department Store	Charles County	CH-489					0
Ellenborough	Charles County	CH-138					0
Ellerslie	Charles County	CH-24					0
Emory Chapel (Methodist)	Charles County	CH-363					0
Equality	Charles County	CH-99					0
Eugene Chaney House	Charles County	CH-374					0
Friendship Farm	Charles County	CH-101					0
Gallant Green Store	Charles County	CH-602					0
George J. Turner House	Charles County	CH-656					0
Greenland, Hanson's Conclusion	Charles County	CH-603					0
Greenweich Boundary Markers	Charles County	CH-165					0
Gunston	Charles County	CH-28					0
Hall's Lot (Edelin Farm)	Charles County	CH-136					0
Hard Bargain	Charles County	CH-41					0
Herbert House	Charles County	CH-119					0
Hetty and Tom Wright House	Charles County	CH-763					0
Holly Hall	Charles County	CH-21					0

Table 5.3-13: Recommended National Register Eligible Sites Vulnerability Summary and Prioritization							
NAME	JURISDICATION	MIHPNO	FLOOD (2)	EROSION (1)	LANDSLIDE (1)	WILDFIRE (1)	PRIORITY
Holly Springs	Charles County	CH-109					0
Huckleberry	Charles County	CH-19					0
Jameson Tenant Farm	Charles County	CH-648					0
Jesse M. Herbert Property	Charles County	CH-469					0
Joseph C. Parks House	Charles County	CH-143					0
Joseph Gray House (SiClaire Manor)	Charles County	CH-757					0
La Plata Railroad Station	Town of La Plata	CH-351					0
Locust Grove	Charles County	CH-353					0
Marshall's Rest Property	Charles County	CH-140					0
Morris' Discovery (Wright House)	Charles County	CH-356					0
Mt. Aventine	Charles County	CH-75					0
Nanjemoy Baptist Church	Charles County	CH-355					0
Old Durham Church	Charles County	CH-63					0
Old Fields Chapel	Charles County	CH-112					0
Padgett-Posey House	Town of La Plata	CH-513					0
Page Schoolhouse Property (Winmkler's Shop Schoolhouse Spalding Property)	Charles County	CH-232					0
Pisgah United Methodist Church	Charles County	CH-505					0
Pleasant Grove Baptist Church	Charles County	CH-523					0
Pleasant Hill	Charles County	CH-301					0
Plenty	Charles County	CH-77					0
Preference (Mona Property)	Charles County	CH-73					0
Rowe House	Town of La Plata	CH-339					0
Sam Montgomery House	Charles County	CH-644					0
Shiloh Historic District	Charles County	CH-787					0
Simpson's Coal Black, Simpkin Coatback	Charles County	CH-657					0
Smallwood's Retreat	Charles County	CH-12					0
Society Hill	Charles County	CH-37					0

Table 5.3-13: Recommended National Register Eligible Sites Vulnerability Summary and Prioritization

NAME	JURISDICATION	MIHPNO	FLOOD (2)	EROSION (1)	LANDSLIDE (1)	WILDFIRE (1)	PRIORITY
St. Ignatius of Loyola Church, Hilltop	Charles County	CH-97					0
St. John AME Church	Charles County	CH-366					0
St. Matthew's Methodist Church	Charles County	CH-186					0
The Napping	Charles County	CH-108					0
The Retreat	Charles County	CH-10					0
Thomas Brown Log Dwelling	Charles County	CH-377					0
Trinity Episcopal Church	Charles County	CH-123					0
W.H. Winstead Co., Inc. Property	Charles County	CH-435					0
Western View	Charles County	CH-156					0
William G. Chappelear Property	Charles County	CH-445					0

Mitigation Solutions

Historic and cultural resources are invaluable and often irreplaceable assets, and it is essential to reduce the potential impact of hazards to these resources. However, maintaining the historic character of a structure and undertaking site-specific mitigation actions can be a challenge. For example, replacing windows, doors, roofs, or other aspects of a historic structure could compromise its historic integrity if not done properly. Similarly, elevating a structure could have similar impacts if not undertaken with care. For example, elevating a historic structure can have minimal impacts if the façade of a structure is not drastically altered, and landscaping around a property can also reduce the visual impact of an elevation. When undertaking mitigation actions to protect historic sites and properties, it is important to ensure projects are preservation sensitive. This is essential to maintain a site's integrity and eligibility for the National Register of Historic Places and the Maryland Inventory of Historic Properties, which provide access to certain funding opportunities and other benefits. Below are several strategies that can be considered when mitigating vulnerable historic properties, particularly the high-priority sites identified in Tables 5.13 and 5.14:

- Relocation of historic properties in flood prone areas
- Floodproofing and elevation-in-place
- Education and outreach to owners of historic properties
- Obtaining flood insurance
- Stormwater management projects on historic sites and in historic districts
- Preservation and restoration strategies
- Soil conservation and stabilization measures
- Water flow control and drainage programs
- Erosion control methods
- Erosion environmental impact assessments

Some specific actions that Charles County plans to undertake to build upon this analysis and reduce the vulnerability of its historic and cultural resources include the following. These actions are also incorporated in the Mitigation Strategy in Chapter 6. (The number in parenthesis refers to the Mitigation Action Plan items.)

1. **Create an Archaeological Context for Charles County (#67):** This context would be developed based on a literature review of academic and historical works, and on information found in the archaeological data from the Maryland Historical Trust. The Archaeological Context would be used to develop research questions and predict which sites that may answer those questions are located within high hazard areas. Finally, the County should conduct an Archaeological Survey of High Priority Sites in High Hazard Areas (#60). This project should be undertaken in phases beginning with context development.
2. **Create an Expedited Review Process to be utilized post-incident (#61):** An expedited historic property review process can include the identification of stabilization measures and minor repairs that can be completed without formal Historic Preservation Commission review. Similarly, Department of Planning and Growth Management staff can be authorized to approve certain

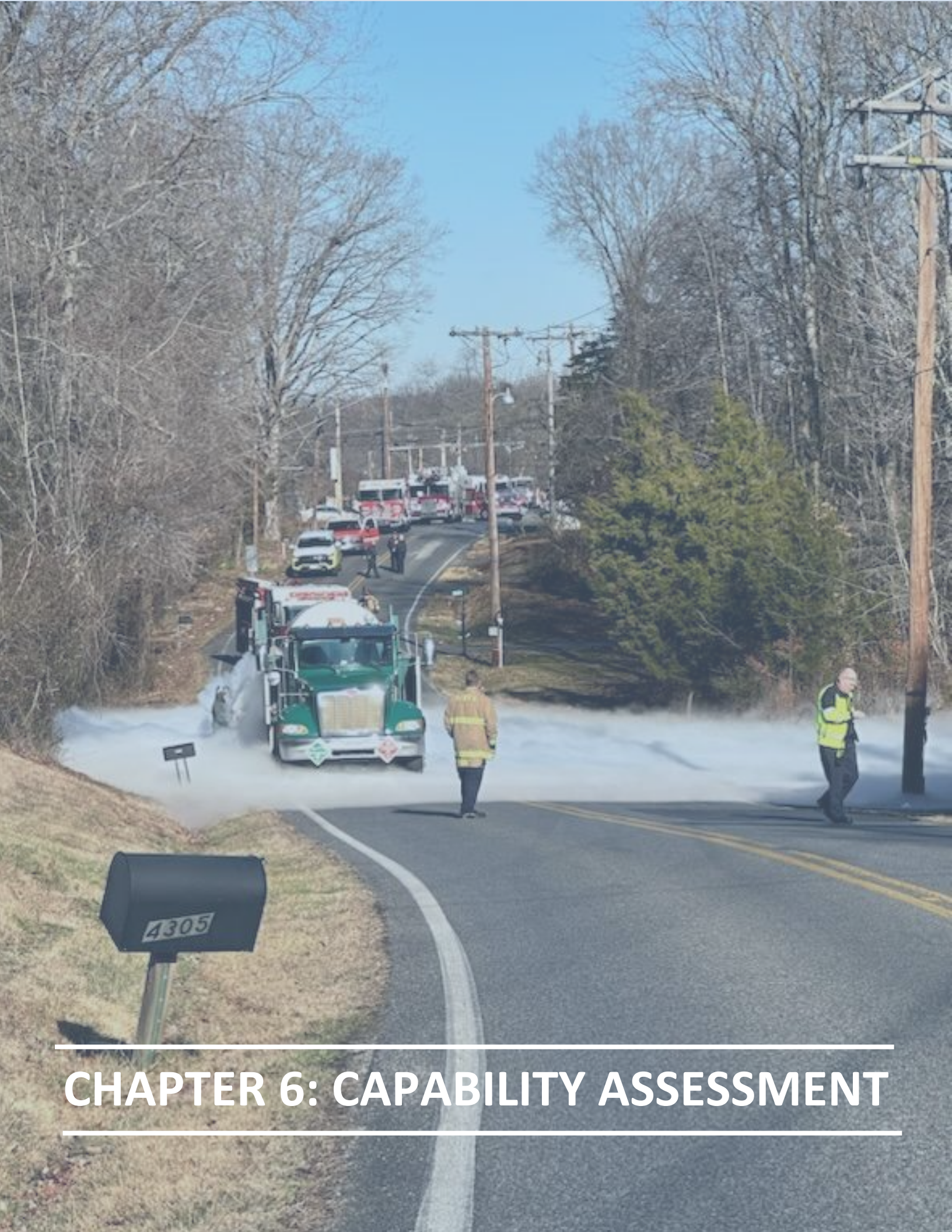
changes utilizing Site Design and Architectural Review (SDAR) Guidelines when applicable. Planning and Growth Management staff, with clear guidance, can expedite permits for proposed work without the need for a Historic Preservation Commission review meeting. This could expedite stabilization and provision of a weather-tight building enclosures and reduce the administrative burden on property owners during the recovery process.

3. **Include Historic Properties in the County's Debris Management Plan (#56):** One of the best tools for minimizing the loss of historic materials is to include a process to handle the salvage of these materials in the debris management plan. This can also be promoted as a sustainable alternative to disposal. To be effective, the plan should identify potential training opportunities for Department of Public Works personnel to learn how to sort debris and salvage historic materials and components rather than discard all debris in a landfill. Such training may be provided by the State of Maryland or FEMA. In the aftermath of a disaster, the salvaged items can be identified by property and made available to owners seeking to complete repairs.
4. **Establish a Demolition Delay Process to be utilized post-incident (#62):** One of the tools that can provide time for a careful evaluation of threatened buildings is a demolition delay ordinance. In some communities, demolition delay ordinances are passed to allow time for owners of otherwise unprotected historic buildings to re-consider their options. In the aftermath of a flood event, it can provide time for qualified architects, engineers, and contractors to assess and stabilize a building. To protect public safety, one of the key provisions of a demolition delay ordinance is identifying a process by which a building official can approve the immediate demolition of a building or structure that is so compromised that it poses an immediate hazard or threat. Additionally, Charles County may want to embrace the model developed by Ellicott City and Preservation Maryland in response to the major 2016 flood event. Following the flood, a temporary resource center was established to provide technical assistance and guidance for preservation and rebuilding using financial incentives, such as historic tax credits, loans, and other funding sources. Preservation assistance was provided to over 78,000 square feet within the historic district (Preservation Maryland, 2017).
5. **Develop outreach and education to assist non-profits with the development of disaster plans:** This would help protect irreplaceable museum collections that might be impacted by hazard events. Museums are the caretakers of valuable and irreparable cultural assets in the form of artifacts as well as archaeological and archival collections. Comprehensive disaster planning and the use of best practices by these organizations is essential to the survival of these cultural collections.
6. **Develop disaster plans for historic sites and resources owned by Charles County (#63):** Since Charles County owns several vulnerable, historic sites, it has the ability to undertake mitigation projects at these sites. Further assessing vulnerability and developing disaster plans for these resources will help the County determine how to best protect and preserve the historic assets under its jurisdiction.
7. **Targeted outreach to historic property owners (#64):** Conduct targeted outreach to owners of at-risk high-priority historic properties about conservation-sensitive mitigation techniques and emergency preparedness.

8. **Implement stormwater management and drainage improvements in flood-prone historic districts (#15):** While not all assets are owned by the County or other public entities, infrastructure in historic districts often is. Implementing stormwater management and drainage improvement projects nearby historic sites could help reduce the impact of flash flooding and potential losses. However, retrofitting projects should include an archaeological review.

Charles County will also consider undertaking the following steps to achieve long-term preservation goals:

- Make use of a broad range of preservation tools and strategies to permanently protect the County's most significant assets.
- Develop programs and strategies to educate the public about heritage resources and their preservation.
- Ensure that the historic preservation program has adequate resources to accomplish stated goals.
- Promote incentives to encourage heritage preservation programs and projects.
- Continue the survey and evaluation of all heritage resources including buildings, structures, archaeological sites, and historic landscapes, as well as living traditions and history museums.
- Promote heritage tourism initiatives throughout Charles County and the surrounding region.
- Continue to develop and implement preservation planning and review.
- Consider and minimize the impacts that elevation projects for non-historic properties have on historic structures and their setting.



CHAPTER 6: CAPABILITY ASSESSMENT

6.0 CAPABILITIES ASSESSMENT

This chapter identifies strengths and opportunities in Charles County's mitigation capabilities. Charles County has many existing programs, staff, and functions that can be adapted to mitigate hazards and reduce loss of life and property. These include programs related to emergency services, planning and growth management, public works, and parks and recreation, as well as functions related to program administration, technical analysis, financing, and outreach. Charles County also participates in many regional, state, and federal programs that can be coordinated with hazard mitigation goals. Together, these programs and capabilities can help Charles County build community resiliency through actions taken before, during, and after a hazard event. This chapter consists of the following subsections:

- Update Process Summary
- Capability Assessment Findings

6.1 Update Process Summary

A capability assessment work session was conducted at the October 19th mid-point meeting of the Hazard Mitigation Planning Committee (HMPC). Participants were asked a series of questions to further determine the current capabilities of Charles County as they relate to hazard mitigation. The FEMA Region III Hazard Mitigation Plan Guidance, Community Capability Assessment Worksheets, were used as reference. Information gathered both during the meeting and from inquiries conducted thereafter, updates have been made to this chapter. In addition, each municipality received a questionnaire for completion, which assisted in the update of municipal capabilities. Furthermore, the *2023 Mitigation Status Report*, completed by HMPC members, included completed and ongoing mitigation action from the 2018 Hazard Mitigation Plan, which further informed the update of capabilities included herein. The 2023 HMP update expands upon the capabilities assessment with new surveys of government officials and staff, provides a more thorough review of existing planning mechanisms, and summaries of the plans and programs adopted since 2018.

Capabilities are grouped into four categories:

- Planning and Regulatory
- Administrative and Technical
- Financial Capability
- Education and Outreach

The findings for each category are summarized below and are woven into the mitigation strategies presented in Chapter 7.

6.2 Capability Background

Local government services in Charles County are provided by the County, the Town of La Plata, and the Town of Indian Head. Port Tobacco Village has 25 residents (2021 Census) and does not provide local services. The Charles County government serves the County's unincorporated areas, while the town governments serve the incorporated municipalities.

6.3 Planning and Regulatory Capabilities

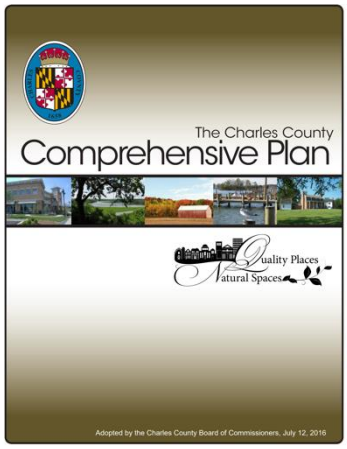
Charles County boasts a robust planning and regulatory framework that is highly conducive to comprehensive mitigation planning. First, the County has access to a wealth of planning and regulatory tools that can limit exposure to hazards and reduce the impact when disaster strikes. Second, the County features a highly centralized local government structure. In contrast to the scores of municipal governments that exercise planning and regulatory authority in most counties in the Northeast, only three local governments exercise this authority in Charles County. To identify the most promising opportunities for enhancing mitigation planning, this section provides a summary of the key planning and regulatory tools in place in Charles County, along with their relationship to hazard mitigation. Three program areas are addressed: emergency management, land use and development, and floodplain management.

Emergency Management

Hazard Mitigation Plan - HMPs describe in detail the hazards that may affect the community, the community's vulnerability to those hazards, and an action plan for how the community plans to minimize or eliminate that vulnerability. Charles County and its incorporated municipalities actively participated in the development of the initial Multi-Jurisdictional HMP and in the development of the 2023 plan update. This update refreshes the community's blueprint for how it intends to reduce the impact of hazards on people and property.

Emergency Operations Plan - Last updated in 2019, the Charles County Emergency Operations Plan defines which people and resources will be deployed in response to emergencies or disasters that impact the County. The plan is meant to facilitate mitigation and preparedness as well as response and recovery and represents a key opportunity for collaboration on hazard mitigation.

Continuity of Operations Plan - The Charles County Government Continuity of Operations Plan (COOP) was last updated in 2019 and provides the framework to restore essential functions if county operations were impacted by an emergency. Potential impacts considered include loss of access to facilities, loss of services due to reduced workforce, and loss of services due to equipment or system failure. The COOP planning process incorporated an all-hazards approach and represented another opportunity for integration with hazard mitigation.



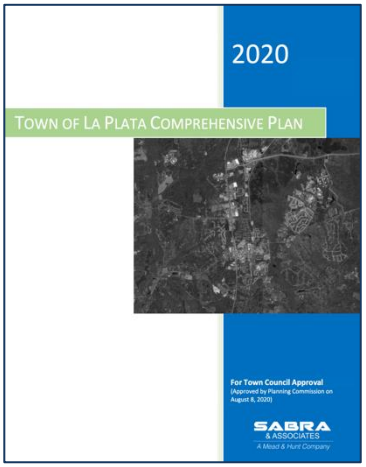
Land Use and Development

Comprehensive Plan - A community's comprehensive plan establishes the framework for future growth and serves as the official policy guide for decisions about how development will be managed, where and how it will occur, and what capital improvements and public services will support it. Charles County adopted a new comprehensive plan in 2016 that made significant changes to the previous plan. The 2016 Charles County Comprehensive Plan reduces the Development District by more than 30,000 acres, concentrates growth, enhances natural resource protections, promotes historic village revitalization efforts, and supports light rail transit for long term development. Each of these themes

intersects with and supports hazard mitigation. The Land Use Plan's emphasis on concentrating growth in existing developed areas and preserving natural resources can support decisions to limit new development in hazard-prone areas and to protect features that reduce hazard impacts. To implement these goals, the comprehensive plan sets ambitious quantitative targets. Chapter 3 of the plan calls for 75 percent of future residential growth to be directed to the sewer service areas and the Towns of Indian Head and La Plata, while Chapter 5 calls for fifty percent of the County to be protected as open space. The comprehensive plan supports these land use goals with complementary goals for economic development and infrastructure. For example, Chapter 7 calls for the County to support revitalization and redevelopment of its aging urban centers, while Chapter 8 designates the construction of a light rail line from the Branch Avenue Metro Station to Waldorf/White Plains as a long-term transportation priority. Both measures support long-term development patterns that preserve the flood mitigation functions of living shorelines and limit the amount of new development in harm's way. Figure 5.1 shows the land use plan map from the 2016 Comprehensive Plan. During this plan update process, HMPC members indicated that the next update of the Comprehensive Plan is slated for 2026. The Hazard Mitigation Plan and annual update reports will be reviewed and integrated into the next Comprehensive Plan update. Finally, the HMPC suggested that during the visioning process of the Comprehensive Plan update, expansion of the Vision to include resiliency will encourage sound policies addressing climate change and hazard risk.

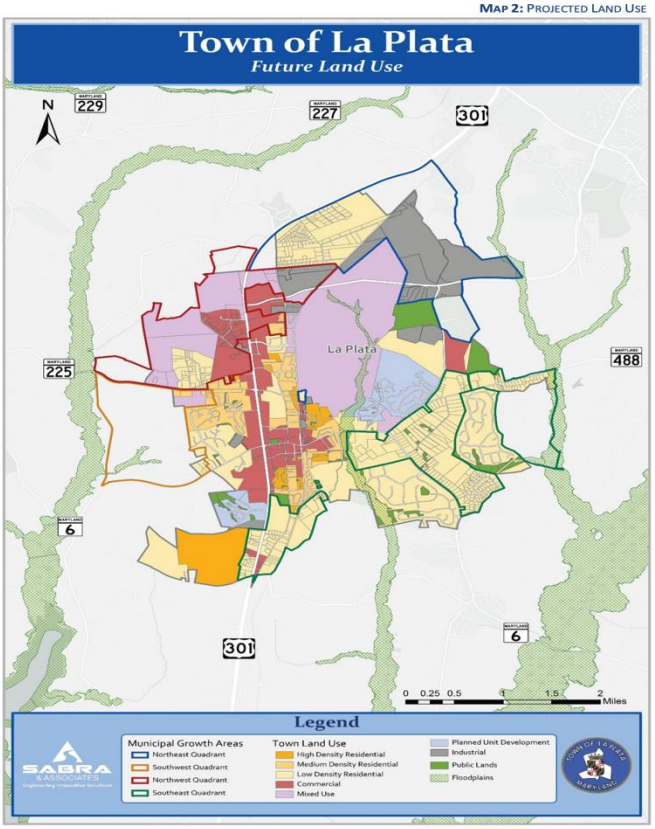
The La Plata 2020 Comprehensive Plan and Indian Head 2020 Comprehensive Plan both reflect the strength of interjurisdictional coordination in Maryland. The plans share many of the goals in the Charles County comprehensive plan but establish slightly different policies tailored to the distinct history and character of each town.

The Town of La Plata Comprehensive Plan, adopted on September 28, 2020 includes both an *Environmentally Sensitive Element* and a *Municipal Growth Element*. In terms of growth, the Future Land Use map shows projected municipal growth areas which are discussed in the Municipal Growth Element. Including all potential annexation areas, the total acreage of the town would be approximately 7,850 acres. Included in this acreage are floodplains; these areas comprise approximately 250 acres or 3 percent of the total acreage in Town. Included in the Municipal Growth Element is the "Protection of Sensitive Areas."

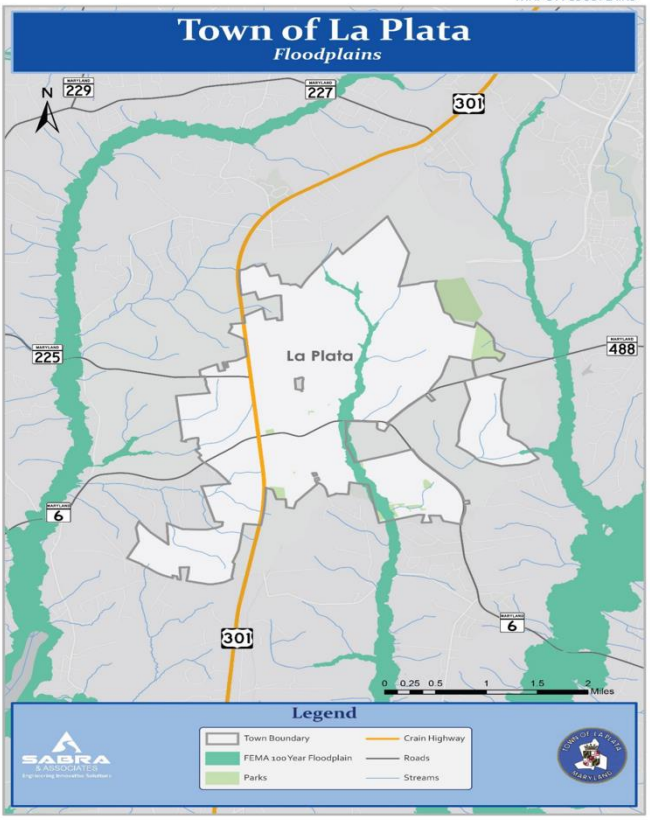


The proposed growth areas include some sensitive environmental areas. Growth areas 1, 2 and 3 are partially in state-designated Tier 2 watersheds that drain either west to the Port Tobacco River or east towards Zekiah Swamp Run. Jennie Run, which runs through growth area 1 is a designated Tier 2 stream. New development in the growth areas would be subject to the Town's sensitive area requirements for protection of sensitive areas such as floodplains, streams, steep slopes, and areas with erodible soils. New development affecting Tier 2 waters and needing certain State permits and approvals, would also be subject to Maryland's antidegradation regulations that are intended to maintain the condition of high-quality waters. Note: The Town of La Plata contains 100-year floodplains primarily associated with Clark Run and its tributaries, which run north and south approximately through the center of the Town. Additional floodplains are also in some locations of the potential municipal growth areas.

MAP 2: PROJECTED LAND USE



MAP 5: FLOODPLAINS

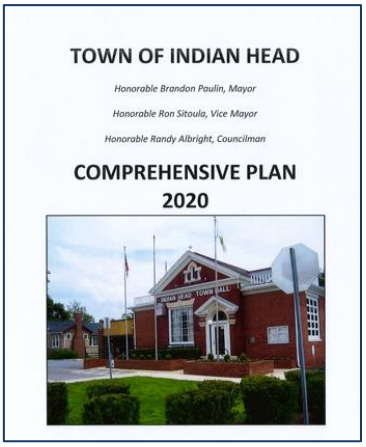


Source: 2020 Town of La Plata Comprehensive Plan; left image page 24, right image page 36.

Hazard mitigation related goals and actions to enhance current and future capabilities have been extrapolated and include, but are not limited to:

1. GOAL #6: Protect sensitive environmental areas through resource conservation and other natural resource management tools.
    a. Close gaps in the local greenway network through direct acquisition, easements and exactions during the development process. Make regular application for funding from DNR Program Open Space to secure priority greenway areas where new development is not planned.

2. GOAL #7: Require a high standard of environmental protection in new subdivisions through regulations that protect forest stands and mature trees, stream valleys, steep slopes and waterways.
    a. Develop and enact an ordinance which protects steep slopes from development.
    b. Create a greenways checklist to be used as part of the development review process to include existing and proposed conditions and a construction management plan that addresses riverbank stabilization and slope treatment; trail and pedestrian connections; greenway plantings; existing retention areas and mitigation measures.
    c. Prepare an environmental protection ordinance comprehensively integrates all existing and new development review requirements, including both high standards and flexibility for creative environmental protections.
3. GOAL #8: Meet or exceed regulatory goals for protecting the Port Tobacco River and Zekiah Swamp watersheds.
4. GOAL #12: Protect local watersheds by implementing protective development and stormwater management practices that minimize and mitigate the impact of additional runoff from new development.

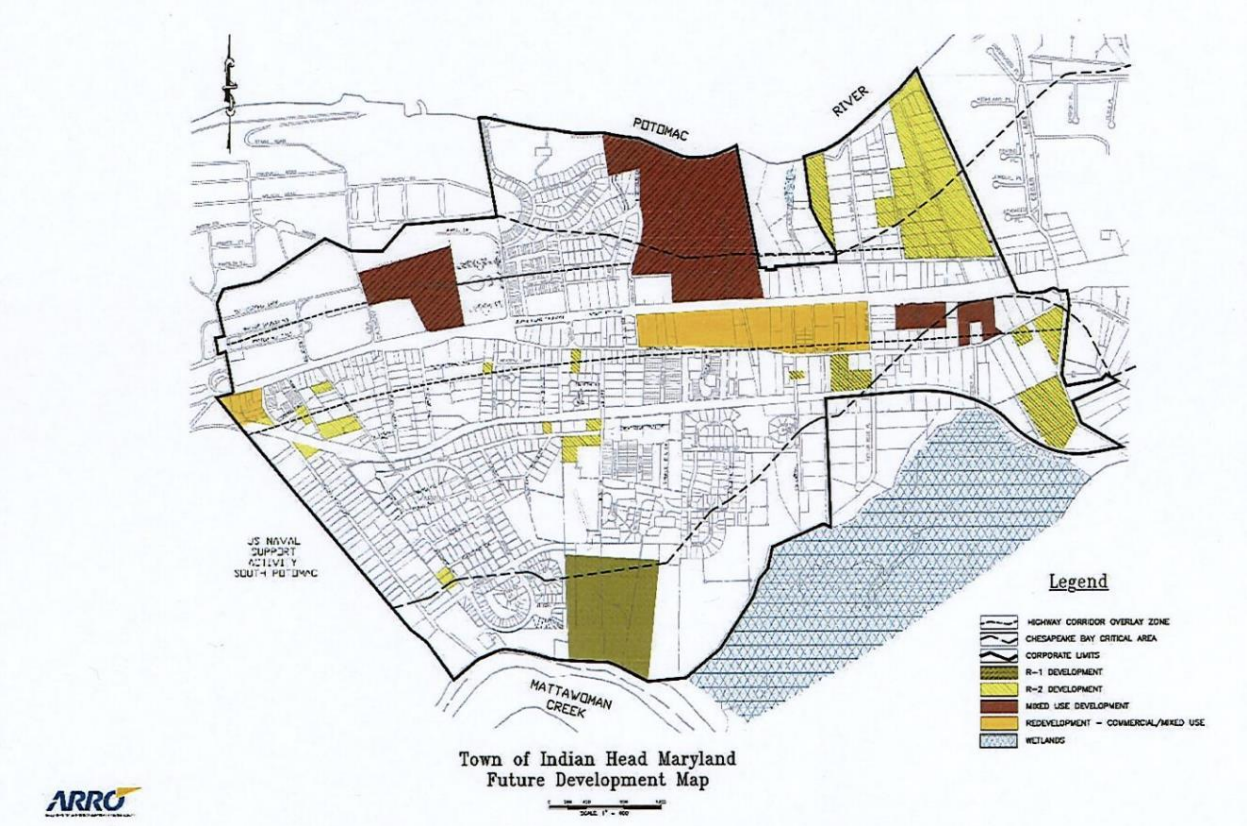


The Town of Indian Head Comprehensive Plan, prepared in 2020, and formally adopted by way of resolution on July 21, 2021, includes *Areas of Critical State Concern*, *Environmental Element and a Municipal Growth Element*. Hazard mitigation related goals, policies, and implementation strategies presented in the plan include, but are not limited to:

1. Policy EN. 1: Restrict the 100-year floodplain from further development. Implementation Strategies 1-3:
    a. New structures will not be permitted within the 100-year floodplain, except for water dependent facilities associated with commercial or industrial development.
    b. New development or substantial improvements to existing structures located in the 100-year floodplain shall not be permitted.
    c. New residential structures shall not be permitted within the 100-year floodplain.
2. Policy EN. 2: Development will be directed away from steep slopes.
    a. Implementation Strategy 4: Prohibit new development on steep slopes (greater than 25%) unless it can be demonstrated that the stability of the slope will be improved and that adverse environmental impacts will be mitigated.
3. Policy EN. 3: The natural ecosystem and functions of the stream and stream buffers are preserved and enhanced, and stormwater is managed to prevent degradation of streams.
4. Policy EN. 4: Implement provisions of the Chesapeake Bay Critical Area Overlay Zone ordinance through the permit review process to ensure future development is consistent with the requirements of the adopted Town Program.
    a. Implementation Strategy 3: Encourage protection of rapidly eroding shoreline (more than 2 feet per year) in order to reduce damage to real estate, to minimize suspended silt, and to reduce deposition of silts that fill channels.

b. Implementation Strategy 7: Maintain the 100-foot buffer landward from the mean high-water line of tidal waters and wetland.

The Municipal Growth Goal for the Town is to promote municipal growth through infill development and redevelopment while minimizing the impact of environmentally sensitive areas and the Town's infrastructure.



Source: 2020 Town of Indian Head Comprehensive Plan, page MG-29

Through the completion and adoption of the 2020 Town of Indian Head Comprehensive Plan, that includes hazard mitigation related goals, policies, and implementation strategies, the Town's capabilities have been enhanced since the previous planning cycle.

Zoning Ordinances

Charles County's zoning ordinance is the primary mechanism for implementing its comprehensive plan. Generally speaking, the ordinance establishes a series of zoning districts and defines the goals, permitted uses, and design standards for each district. Charles County's zoning ordinance has many provisions that support hazard mitigation, mostly by designating where residential, commercial, and industrial development is allowed and delineating where natural resources are protected. Maps from the 2016 Charles County Comprehensive Plan, Figure 6.3-1 Land Use and Figure 6.3-2 Generalized Zoning have been integrated into this plan. The zoning map for the portion of the County just north of La Plata and illustrates how base zones and overlay zones interact to protect sensitive natural resources. Overlay zones can be

placed over fixed zoning districts to apply addition provisions that are either more restrictive or expansive. The zoning map below shows some areas as dark green with crosshatch. This area is subject to the provisions of both the Rural Residential Zoning District, and the Resource Protection Overlay Zone. The Resource Protection Overlay Zone adds stream buffer requirements to preserve floodplains and another overlay zone protecting natural resources is the Critical Area Zone, which restricts development within 1,000 feet of tidal waters to protect water quality and wildlife habitat.

Subdivision Regulations

Charles County's subdivision regulations guide the division and development of the County's land through a series of requirements for the preparation, submission, and review of subdivision and land development plans. Unlike the zoning ordinance, the subdivision regulations apply throughout the County. The regulations are intended to provide adequate sites for development and public use, to maintain reasonable design standards, and to coordinate public improvements with private development interests.

Among the Charles County subdivision regulations supporting hazard mitigation are the general site design standards and the subdivision application criteria. General site design standards require a site design and environmental feature analysis and require that sensitive natural features be preserved as open space to the extent practicable. To implement this requirement, a list of criteria is provided for all subdivision application. At all stages of development (pre-application concept, minor subdivision plat, major subdivision preliminary plat, and major subdivision final plat), extensive environmental information must be included in the plans, including "all existing streams, water courses, flood plains, tidal and non-tidal wetlands, or other environmentally sensitive areas on and within 200' of site; and all required State and County buffers for the above features." The County issued a "Green Notice" to residents about newly updated versions of the Subdivision Regulations and Zoning Ordinance posted on the County website.

Figure 6.3-1: Land Use Plan Map (Charles County 2021)

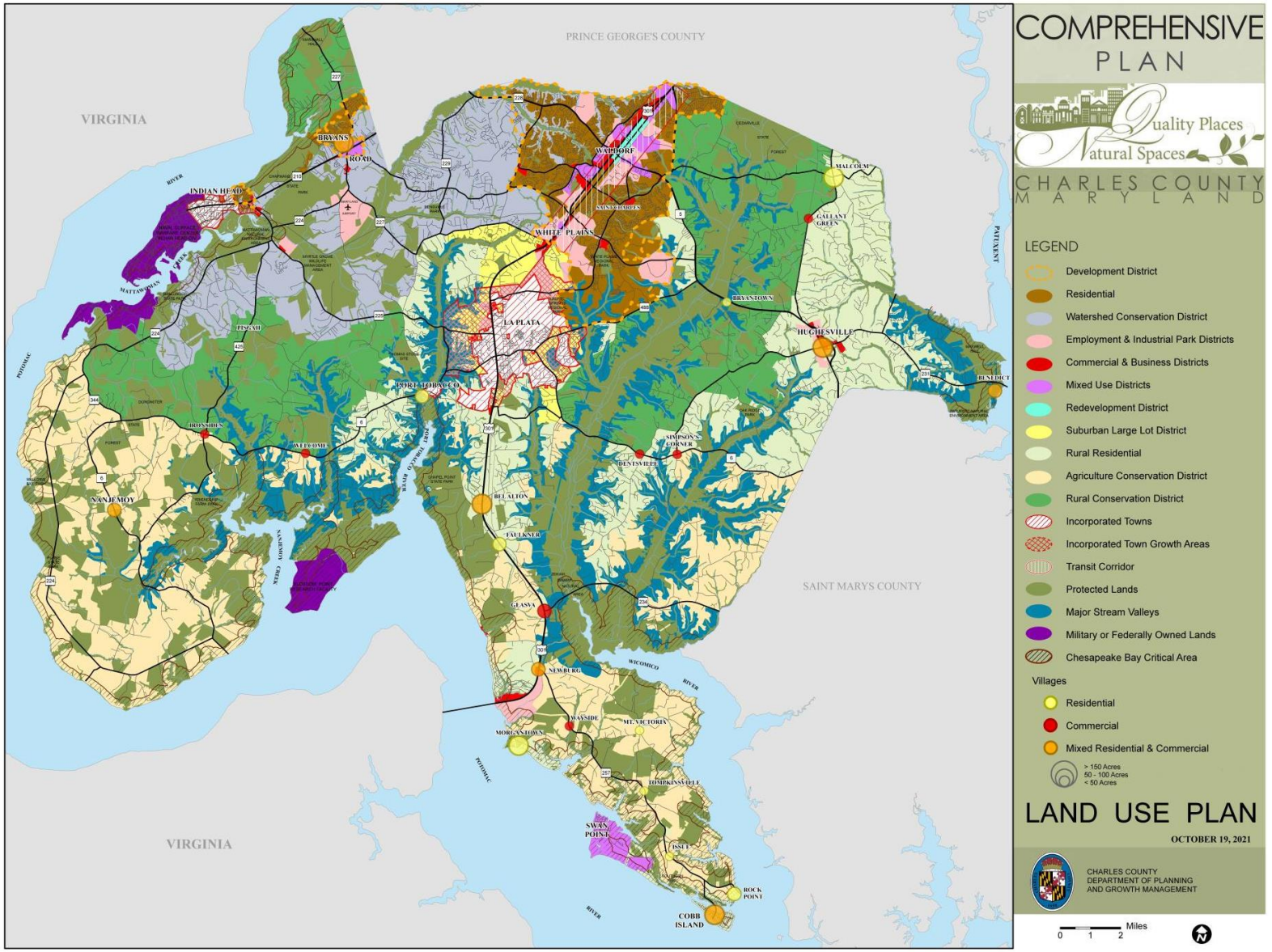
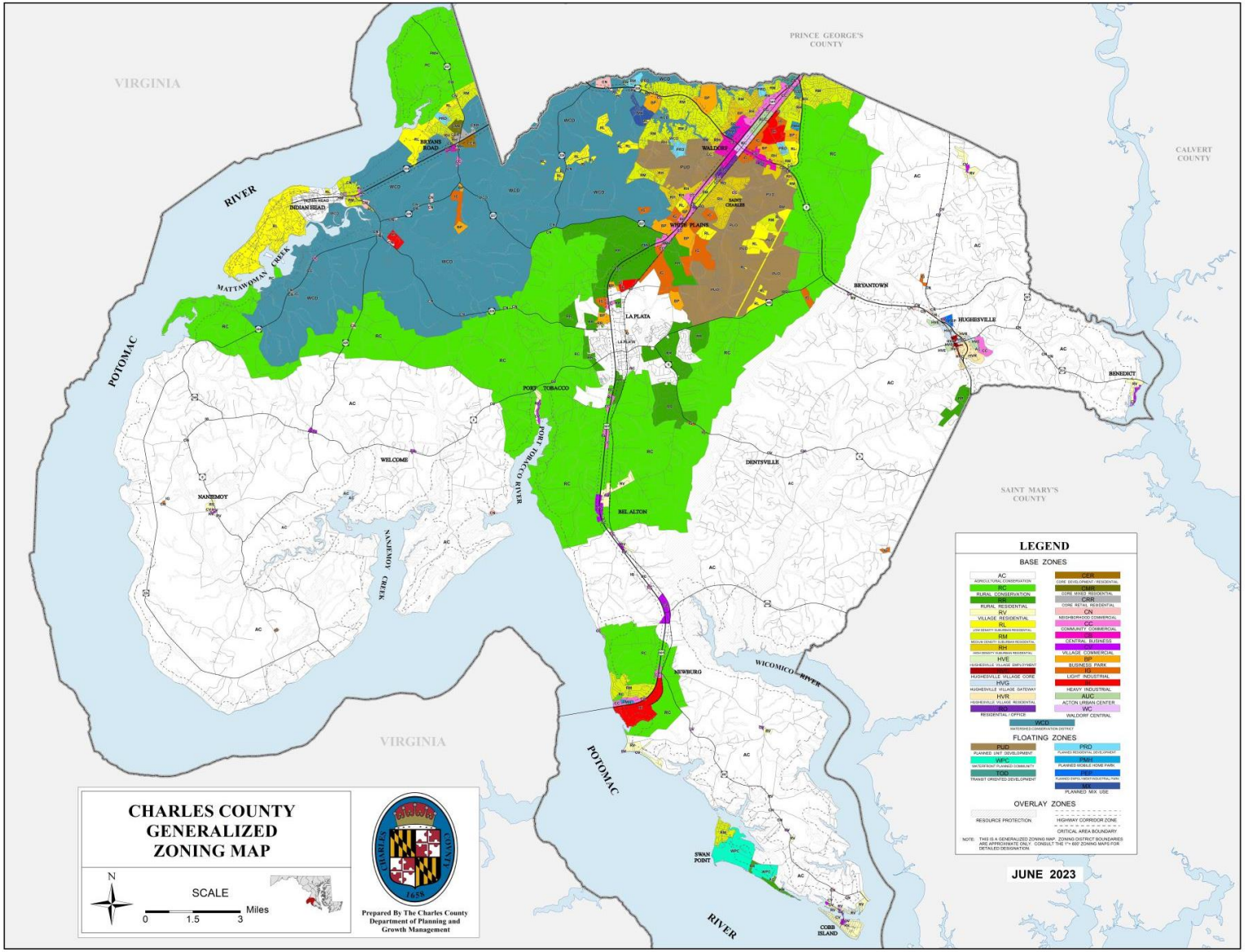


Figure 6.3-2: Generalized Zoning Map Charles County, June 2023 (Charles County 2024)



Building Codes

A community's building code establishes regulations for the design, construction, alteration, and maintenance of structures. These regulations ensure both that new construction uses sound methods and materials, and that existing buildings are kept in a state of good repair. The use of strong building codes supports hazard mitigation by limiting the loss of life and property when disaster strikes.

In Charles County, all three local jurisdictions have adopted model building codes maintained by the International Code Council. While Charles County has adopted the International Building Code 2018, International Residential Code 2018, and the 2015 International Existing Building Code, the Town of Indian Head and the Town of La Plata have both adopted the International Building Code 2018.

FEMA has developed recommendations for making building codes more hazard resistant, largely through FEMA's Mitigation Assessment Teams (MATs). For more than 30 years, MATs have been working with state and local officials to investigate the performance of buildings and infrastructure after disasters, down to the types of nails that are used to join wood framing members and the spacing of the nails. The investigations have shown that strengthening buildings reduces losses (FEMA). MAT reports develop recommendations for changes in construction methods based on field investigations and building science research. Priority recommendations are then adapted into building code amendment proposals.

FEMA's advocacy of building codes extends to code adoption by states and communities. For example, the Community Rating System, which is part of FEMA's National Flood Insurance Program (NFIP), is a voluntary incentive program that encourages community adoption of hazard-resistant building codes to exceed the minimum NFIP requirements. The incentive is that the community's flood insurance premiums are discounted.

Resilience Authority of Charles County

The Resilience Authority is a nonprofit organization that, as a government instrumentality, is operated for the public purpose of responding to the impacts of climate change in communities across Charles County and the State. After the Maryland General Assembly passed legislation in May of 2020 to authorize local governments to establish and fund a Resilience Authority under local law, the Charles County Commissioners created the Resilience Authority of Charles County in December of 2020, which is the first of its kind in Maryland.

The Authority is empowered to finance, manage, acquire, own, convey, and support resilience infrastructure projects and use innovative financing strategies, including those that leverage public and private investment. The Authority prioritizes equity by acknowledging impacts of climate change are not shared equally and all efforts are based on principles of diversity, equity, inclusivity, and justice.

The Resilience Authority has partnered with the University of Maryland's Center for Environmental Science to develop a coastal adaptation report card to assess the preparedness of Charles County communities for climate change and sea level rise events. This Report Card will inform the County

Government's Climate Action planning process, as well as the Resilience Authority's planning efforts and projects.

The Resilience Authority is responding to flooding hazards within Charles County. One such example identified as a priority in the County's Nuisance and Urban Flood Plan is a public parking lot that lacks functioning stormwater drainage in the commercial development area of Waldorf. The Resilience Authority is investigating grant funding for design engineering as the first step to replace the failing stormwater infrastructure with blended holistic green and gray infrastructure projects that provide multiple co-benefits.

Comprehensive Water and Sewer Plan

The 2023 Comprehensive Water and Sewer Plan designates where public water and sewer facilities are planned or available. The Comprehensive Water and Sewer Plan can be used as a tool to implement the County's growth management policies and can assure that the rate of growth does not outstrip the County's ability to provide essential public services.

The Comprehensive Water and Sewer Plan is another important County plan and is used as a guideline for water and sewer planning. The Water and Sewer Plan and the Zoning Ordinance work in conjunction to fulfill many of the goals and objectives of the Comprehensive Plan. The Water and Sewer Plan is particularly useful in relation to its policies on growth management and the provision of public facilities. The Water and Sewer Plan has a 25-year outlook and is updated every 3 years; however, the County amends the text and maps of the Water and Sewer Plan every year, or as is deemed appropriate.

Land Preservation, Parks, and Recreation Plan

The Land Preservation, Parks, and Recreation Plan (LPPRP) serves as an update and mechanism to analyze and track changes that have taken place in Charles County since the 2017 LPPRP plan. The plan serves two primary purposes: 1.) maintains county eligibility to participate in Maryland's Program Open Space matched grant funding that is used to supplement county funding for the improvement of parks and recreation assets. 2.) serves as a key document by providing key information, goals and achievable recommendations that will guide Charles County in the management and enhancement of its public parks, open spaces, and preserved lands for the next five years.

Goals of the 2022 LPPRP focus on improving the County's provision of public parks and recreation amenities and initiatives to preserve lands of high agricultural and natural resource value. Natural Resource Land Conservation and Agricultural Land Preservation Goals are identical to those of the County's current Comprehensive Plan. Goals for the Department of Recreation, Parks and Tourism were developed in response to needs identified through a level of service analysis.

Assessment and Shoreline Management Plan

The County recognized the need for a comprehensive shoreline assessment and management plan, including both public and private properties, for the purpose of identifying and prioritizing shorelines in need of restoration. The plan provides a basis for implementing the most effective shoreline restoration

projects and meeting the Chesapeake Bay Total Maximum Daily Load (TMDL) goals for nitrogen, phosphorus and sediment.

This assessment identifies eroding shore reaches that contribute significant sediment and nutrients into the tidal waters of the Chesapeake Bay and its tributaries and prioritized areas for restoration. The Plan put the natural process of shoreline erosion into perspective as to potential long-term impacts to upland banks, land loss, and the consequent input of sediments and nutrients into Chesapeake Bay. Priority for management strategy recommendations was given to eroding shorelines with high erosion rates and those with potential infrastructure impacts.

Watershed Assessments

Charles County Department of Planning and Growth Management initiated a series of watershed assessments in response to requirements set forth by the Maryland Department of the Environment (MDE) in the County's National Pollutant Discharge Elimination System (NPDES) Municipal Separate Storm Sewer System (MS4) permit (11-DP-3322 MD0068365), issued on December 26, 2014. The watershed assessments support the County's goals for healthy watersheds and natural resources, and also support progress towards satisfying several regulatory and permit requirements.

The assessment included field investigations and characterization of the stream and watershed conditions. This full-scale assessment was designed to catalog infrastructure, assess stream habitat for fish and aquatic insects, characterize stream channel stability and stream bank erosion, and assess water quality conditions of watershed streams.

Data were used to prioritize the watershed's individual stream reaches and sub watersheds for restoration and preservation measures to ultimately improve the conditions of the watershed. In addition to the stream assessments, indicators of watershed condition related to land use, stormwater best management practices (BMPs), and pollutant loading models were compiled in prioritization models that rank and prioritize the watersheds at the stream reach and sub watershed scales for restoration and preservation priorities.

Accounting for Ecosystem Services

This report recognizes that the natural resources of the county provide tremendous benefits to society that are not consistently accounted for in county government decision making. Leading the State of Maryland, the county has elected to consider new and innovative information for valuing the contributions of the environment, termed ecosystem services, with the goal of informing decision making in the county.

Ecosystem services can be broadly defined as any benefit that people receive from the environment. The ecosystem services considered in this report are those that have quantifiable monetary value. Monetary value is assessed by looking at how people pay for an ecosystem service in a market, or what they would have to pay to replace or conserve the service. By looking at multiple instances of economic preference the "social value" of ecosystem services can be estimated.

The values in this report are intended for evaluating tradeoffs and informing decision-making but do not indicate market value or compensatory value. While in some cases we consider market values as part of the value equation, the assessment broadly quantifies the many ways people value the natural environment, yielding a “social” or “public” value of ecosystem services in Charles County.

Health Department

In 1880, the General Assembly authorized the State Board of Health to organize local boards of health or advisory committees in every city, village, and legislative district (Chapter 438, Acts of 1880). Not until 1886, however, were County responsibilities assigned. In that year, the Board of County Commissioners was designated as the Charles County Board of Health (Chapter 22, Acts of 1886). In 1914, it was placed under control of the State Department of Health, which had organized in 1910 (Chapter 560, Acts of 1910; Chapter 742, Acts of 1914). Later, under provisions of the "County Health Law" of 1922, County health duties increased, opening the way for a full-time health officer in each county (Chapter 116, Acts of 1922).

Today, the Health Department, under the direction of the Health Officer, provides public health services and administers and enforces State and local health laws and regulations within Charles County. Programs meet the public health needs of the community and provide services not offered by the private sector (Code Health-General Article, secs. 3-101 through 3-202).

As part of the Emergency Operations Plan, Charles County last updated the Public Health Group Function Plan in 2018. In November 2022, the health department updated the Health Department Continuity of Operations Plan (COOP), which is not included in the countywide COOP. To ensure all relevant staff maintains Incident Command Systems (ICS) training, the Charles County Health Department follows the state’s training requirements, which will later include additional in-house training. In the future, the Charles County Health Department plans to create an exercise calendar that will further prepare employees for different response incidents; and will also include response partners as well.

Capital Improvement Program

Each year, the County reviews and adopts both the current year budget and a five-year Capital Improvement Program. Capital improvements are long-term investments, typically in physical infrastructure. Incorporating hazards planning and projects into the capital improvements planning process is one way of enhancing Charles County’s resilience to extreme weather and sea level rise.

Floodplain Management

In overseeing floodplain management, the Charles County Department of Planning and Growth Management has taken a unified, comprehensive approach which addresses natural floodplain functions and Federal and State programs associated with floodplain management. These programs are: the National Flood Insurance Program (NFIP), the Community Rating System (CRS), floodplain management ordinances, State Waterway Construction Permit Program for nontidal floodplains, the State’s Tidal and Nontidal Wetlands Permit Programs, U.S. Army Corps of Engineers’ Section 10 and 404 permit programs,

and the State's Coastal Zone Management Program. Below is a summary of several of the major tools and programs utilized by the County for floodplain management.

National Flood Insurance Program

Flooding is one of the most frequent natural hazards to impact Charles County, but also one of the most well-understood hazards with one of the most well-developed mitigation programs. Since 1968, the federal government has administered the NFIP to reduce the impact of flooding in the United States. This program makes more affordable flood insurance available to communities that adopt and enforce floodplain management regulations that meet NFIP requirements. The NFIP also helps communities understand flood risk by mapping flood hazard areas. Participation in the NFIP helps build a community's mitigation capability for flood hazards. Table 6.3-1 summarizes NFIP participation for each of Charles County and participating local jurisdictions. Please note that the Town of Port Tobacco Village does not participate in the NFIP.

Table 6.3-1: Charles County NFIP Participation – Data Updated 11/1/2023

MUNICIPALITY	NFIP ENTRY DATE	CURRENT EFFECTIVE MAP	NUMBER OF POLICIES	AMOUNT OF COVERAGE
Charles County Unincorporated	6/5/1985	5/4/2015	457	$138,916,000
Town of La Plata	4/17/1985	5/4/2015	13	$3,257,000
Town of Indian Head	10/15/1985	5/4/2015	3	$1,050,00

Charles County, La Plata, and Indian Head all participate in the NFIP and have adopted floodplain management ordinances as well as the most current FIRMs and FIS. Countywide FIRMs were published for Charles County on September 4, 2013, and May 4, 2015, for riverine and coastal areas respectively. These communities also support floodplain identification and mapping, enforce their floodplain ordinances, ensure floodplain mapping information is available to community members, and conduct outreach related to flood insurance.

Floodplain Identification and Mapping

Charles County and the jurisdictions provide up-to-date information, GIS datasets, and flood related data to FEMA as requested. Floodplain managers also share technical information with FEMA that could result in map revisions within six months of creating or identifying the new data, typically via email. Charles County and the jurisdictions support local floodplain determinations by researching and providing information about elevation certificates and using county topography data to review approximate elevations. The Charles County Department of Planning and Growth Management also maintains a record of approved Letters of Map Change.

Flood Risk Report

The Charles County Flood Risk Report (FRR) provides non-regulatory information to help local floodplain managers, planners, emergency managers, and others better understand their flood risk, take steps to

mitigate those risks, and communicate those risks to their citizens and local businesses. The FRR should be used in conjunction with other data sources to provide a comprehensive picture of flood risk within the project area.

Floodplain Management Ordinance and Enforcement

Charles County, La Plata, and Indian Head have all adopted updated floodplain management ordinances following FEMA publishing the May 4, 2015, FIRMs and FIS to meet the minimum requirements of the NFIP. Charles County and these communities have also gone beyond the minimum requirements, and the ordinances for all three jurisdictions regulate the BFE plus two feet of freeboard. Additionally, proposed subdivisions must demonstrate buildable area outside the SFHA. The county's floodplain management regulations are codified in Chapter 238 of its code of ordinances, and reference the building code, subdivision regulations, and zoning regulations. In addition to setting standards for development in the floodplain, the County's floodplain management ordinance establishes requirements for permit applications and designates a floodplain administrator to review these applications. The ordinances for the jurisdictions list similar requirements, and the ordinances for Indian Head, La Plata, and Charles County all regulate how permits are issued, the use of BFE and floodway data in reviewing subdivision proposals, identifying measures to keep new and substantially improved construction at or above the BFE, and maintaining elevation data for new or substantially improved structures. If there is a compliance issue, violation notices are posted, written notification with remedies are distributed, and court action is taken with fines if necessary. The ordinances are administered by the Charles County Department of Planning and Growth Management, La Plata Department of Planning, and Town of Indian Head Zoning Administrator.

Flood Insurance Outreach

As needed and when possible, Charles County and local staff explain to the public the importance of flood insurance, when it is required, why development is limited, and the benefits of participating in the NFIP. Mailings and public notices are also distributed to notify property owners about any changes to FIRMs that would impact insurance rates.

Community Rating System

Another federal program available to help build local mitigation capability for flood hazards is the Community Rating System (CRS). The CRS is a voluntary program available to NFIP-participating communities that aims to reduce flood damages to insurable property, strengthen and support the insurance aspects of the NFIP, and encourage a comprehensive approach to floodplain management. The CRS provides incentives in the form of insurance premium discounts for communities that exceed the minimum NFIP floodplain management requirements. While none of the jurisdictions in Charles County were participating in the CRS program as of November 2023, Charles County has taken steps to begin participating in the program. Participation in CRS represents a significant opportunity to enhance the County's mitigation capability for flood hazards.

Table 6.3-2: Summary of Planning Tools Adopted - Charles County & Municipalities														
Community	Hazard Mitigation Plan	Emergency Operations Plan	Evacuation Plan	Continuity of Operations Plan	Floodplain Management Ordinance	Zoning Regulations	Subdivision Regulations	Comprehensive Plan	Stormwater Management Plan	Natural Resource Protection Plan	Capital Improvement Plan	Firewise Community	Storm Ready	Building Code
Charles County	X	X	X	X	X	X	X	X	X	X	X		X	X
Town of La Plata	X	X		X	X	X	X	X	X				X	X
Town of Indian Head	X				X	X	X							X
Town of Port Tobacco Village	X	Port Tobacco Village has 25 residents (2021 Census) and does not provide local services. Does not exercise planning and zoning authority												

REGION 3 HAZARD MITIGATION PLAN GUIDANCE Checking In On The NFIP

As part of this plan update, community worksheets from the FEMA Region 3 Mitigation Plan Guidance: Checking In on the NFIP were completed. Questions and answers specific to floodplain mapping, floodplain management, and flood insurance are provided in the following tables. Following the completion of these worksheets and discussion, a new mitigation action was identified: Add additional floodplain management and permitting information to the County website, i.e., permit application, links to state and federal floodplain mapping and insurance programs.

Table 6.3-3: Floodplain Mapping & Identification Community Worksheet	
1. Who is your FPA or floodplain manager? Please provide office/agency name, position title, and contact information.	Mr. Ray Schumaker, Chief of Codes, Permits & Inspection Services, Dept. of Planning and Growth Management, & FPA Charles County, Maryland 200 Baltimore Street LaPlata, Maryland 20646 301-396-5842 ShumakeR@charlescountymd.gov
2. Where do you keep your FIRM and FIS report?	Hard copies of the FIRM, FIS, & LOMC's are available in the Charles County Office of Planning & Growth Management. Digital versions are available for review at www.mdfloodmaps.net & https://msc.fema.gov/portal/home
3. Has your community adopted the most recent FIRM? When was the adoption? Where is that information stored? Has your community updated the floodplain ordinance language to include the current FIRM	Charles County, Maryland has adopted the most recent FEMA FIRM, effective date of September 4, 2013. The Charles County Floodplain Management Ordinance language is in compliance with the current FIRM and FIS and is available online at the County's website; hard copies are available for review in the County's Department of Planning and Growth Management.

and FIS?	
4. Does your jurisdiction support requests for map updates?	Yes. Charles County reviews and may provide support for LOMC applications.
5. Is there a specific agency/department responsible for compiling these updates and tracking LOMCs?	Yes, Charles County tracks and compiles updates for LOMC's.
6. Do you collect updated technical or scientific data and modeling? How do you share this with FEMA?	Yes. Charles County collects and reviews technical and/or scientific modeling data when applicable. Copies are provided to FEMA during the LOMC process.
7. Does your jurisdiction provide assistance with local floodplain determinations? If yes, specify how.	Yes. Charles County may assist homeowners and potential applicants in determining if their property is located within or near the SFHA by providing mapping resources and information, both lateral and vertical determination information.
8. Do the people/agencies responsible for using these tools in your community have the access they need? Which tools does your community rely on?	Yes. Charles County utilizes multiple tools for NFIP information dissemination and education, including the County website, floodplain management personnel, and other tools such as www.mdfloodmaps.com, www.floodsmart.gov, & https://msc.fema.gov/portal/home
Floodplain management requires that you understand the mapping and data side when working with the public.	

Table 6.3-4: Floodplain Management Community Worksheet	
1. Does your jurisdiction issue permits for all proposed development in the SFHA? What office/position is responsible?	Yes. The Charles County Department of Planning and Growth Management, and the FPA are responsible for permit issuance within the SFHA.
2. Does your jurisdiction require BFE data for subdivision proposals and other development proposals larger than 5 lots or 5 acres? If so, what department or office is responsible?	Yes. Charles County requires BFE data for any development and subdivision proposals with at least 5 lots or at least 5 acres, whichever is the lesser, in SFHA's where base flood elevations are not shown on the FIRM; if H&H engineering analyses are submitted, they shall be performed in accordance with MDE & FEMA requirements & specifications. The Charles County Department of Planning & Growth Management is responsible.
3. How does your community identify substantially improved structures? When do they intervene?	The Charles County FPA requires documentation to be submitted regarding substantially improved structures, including market value, damage assessments, engineer certifications, etc. for compliance with floodplain management requirements.
4. Does your community have a coordinated process to determine substantial damage and to permit repair and improvement? Does the jurisdiction conduct substantial damage assessments in the SFHA? Does your community have a plan for who will conduct substantial damage assessments and a procedure for assessment?	Yes. The Charles County Floodplain Management Ordinance specifies that the FPA shall administer the requirements related to work on existing structures that are located within the SFHA and have been substantially damaged, and to notify owners of substantially damaged structures to obtain permits and prohibit non-compliant repair of damaged buildings. The FPA and/or authorized/designated County Representative conducts damage assessments.

5. Does your jurisdiction require Elevation Certificates for new or substantially improved structures? If yes, how is it documented and which office/agency/department is responsible?	Yes. Applicants for construction within the SFHA must submit an Elevation Certificate prepared by a licensed engineer or surveyor. Charles County reviews the applications and certificates.
6. How does the jurisdiction enforce the floodplain ordinance sections? How does the jurisdiction address SI/SD violations?	The Charles County FPA makes periodic inspections of properties, structures, and utilities for compliance with the ordinance and can issue violations, stop work orders, and penalties. The Charles County FPA and the code enforcement officer is responsible for enforcing violations.
7. Has your jurisdiction had a Community Assistance Visit? If so, were any corrective actions required?	Yes, Charles County had a Community Assistance Visit on January 28, 2019. Minor corrective actions were recommended regarding permit compliance and documentation, such as developing a checklist, and as-built elevation certificates.
8. Does your jurisdiction have or is considering higher ordinance standards than the NFIP? Please describe the higher standards and where they are documented.	All new or substantially improved structures shall have the lowest floor elevated to or above the flood protection elevation. The Charles County Flood Protection Elevation is the base flood elevation plus two (2) feet of freeboard. No additional regulations are planned at this time.
9. Are any local officials/departments in your community interested in additional training? What topics relate most to your community?	Yes, Charles County personnel are always interested in additional training in reviewing and administering the requirements of the NFIP.
Floodplain management reduces flood risk and protects floodplain health.	

Table 6.3-5: Floodplain Insurance Community Worksheet

1. How does the jurisdiction educate community members about the availability and value of flood insurance?	Charles County personnel and/or the FPA educates the community and property owners regarding the value of flood insurance through press releases, public service announcements, and/or direct contact with property owners within the SFHA.
2. Does the jurisdiction inform community property owners about changes to the FIRM that would impact their insurance rates?	Yes, Charles County and/or the FPA notifies property owners within the SFHA regarding changes to the FIRM through press releases, public service announcements, social media posts, and where applicable, direct correspondence.
3. How does the jurisdiction provide general assistance to community members regarding insurance issues?	The FPA and Charles County personnel are available to advise, assist and answer any questions of community members regarding the NFIP program and/or floodplain regulations.
4. Does the jurisdiction keep track of the number of residential and non-residential structures in the SFHA? How many structures are in the SFHA in your community?	Yes. A database of the number of residential and non-residential structures is maintained by the County. According to the FEMA CIS NFIP Insurance Report, there are 457 NFIP policies within the County.
5. Does the jurisdiction have any levees or levee systems in its jurisdiction?	No. Charles County does not have any levee systems within its jurisdiction according to the USACE national levee database.
6. Is the levee or levee system certified and accredited?	N/A

7. Is the levee or levee system a Provisionally Accredited Levee (PAL)?	N/A
8. Is the levee or levee system part of the USACE Rehabilitation and Inspection Program?	N/A
9. Does your community have any Major Dams or High Hazard Dams, and if so, have you applied for FEMA's High Hazard Potential Dam grant?	Yes. Charles County has one (1) high hazard dam, and two (2) significant hazard dams within its jurisdiction according to the USACE National Inventory of Dams. The County has not applied for FEMA's High Hazard Potential Dam grant.
Flood risk communication to the public is vital for a community to be truly resilient.	

6.4 Administrative and Technical

Administrative and technical capability refers to the community's personnel and the range of skills and tools they can mobilize to implement hazard mitigation actions. Common examples of personnel and skill sets needed for hazard mitigation include: planners with knowledge of land development and management practices; engineers and code inspectors trained in construction practices; planners, scientists, and engineers familiar with hazards in the community; emergency managers; floodplain managers; land surveyors; personnel skilled in geographic information systems; resource development staff or grant writers; and administrative staff to handle complex grant application processes.

Based on an assessment of local departments and personnel (see Table 6.4-1), Charles County and its municipalities were found to have administrative and technical staff needed to implement hazard mitigation activities. The county has key capabilities across all categories throughout its departments, while the capabilities of the jurisdictions are largely related to planning and grant writing. These communities also vary in staff size, resource availability, fiscal status, service provision, population, overall size, and vulnerability to the profiled hazards.

Table 6.4-1: Summary of Administrative and Technical Capabilities for Charles County

JURISDICTION	LAND USE/ DEVELOPMENT PLANNING	ENGINEERING	EMERGENCY MANAGER	FLOODPLAIN MANAGER	GIS	GRANT WRITING/FISCAL STAFF	PLANNING COMMISSION
Charles County Unincorporated	X	X	X	X	X	X	X
Town of Indian Head	X					X	X
Town of La Plata	X					X	X
Town of Port Tobacco Village	Port Tobacco Village has 25 residents (2021 Census) and does not provide local services. Does not exercise planning and zoning authority						

Charles County's local jurisdictions can also consult with state and federal agencies to supplement their administrative and technical capabilities. State agencies which can provide technical assistance for mitigation activities include, but are not limited to:

- Maryland Department of Emergency Management
- Maryland Department of Planning
- Maryland Department of Natural Resources
- Maryland Department of the Environment

Regional coordination and mutual aid for *Firefighting, Emergency Medical Services. Hazardous Materials, and Special Operations* is both provided and received by Charles County. Signed Memorandums of Understanding (MOU's) are in place with the following jurisdictions and entities:

- St. Mary's County, Maryland
- Prince George's County, Maryland
- King George County, Virginia
- Commandant Naval District Washington
- Calvert County, Maryland
- National Capital Region, Maryland
- Hughesville Volunteer Department
- Potomac Heights Volunteer Department
- Cobb Island Volunteer Department
- Waldorf Station 3 Volunteer Department
- Waldorf Station 12 Volunteer Department
- Tenth District Volunteer Department
- Charles County Mobile Intensive Care Unit
- Bryans Road Volunteer Department
- Newburg Volunteer Department

Federal agencies which can provide technical assistance for mitigation activities include, but are not limited to:

- Army Corp of Engineers
- Department of Housing and Urban Development (HUD)
- Department of Agriculture (DOA)
- Economic Development Administration
- Environmental Protect Agency (EPA)
- Federal Emergency Management Agency (FEMA)
- Small Business Administration

6.5 Financial

All mitigation actions share a common challenge: who will pay and with what money? Though some mitigation actions are less costly than others (for example, the staff time required to enforce codes will

likely cost less than the acquisition of flood-prone properties), all mitigation actions require some expenditure of limited resources.

To assess the financial capability of Charles County, the HMPC examined the diversity of the County's revenue sources and the favorability of the County's bond rating. Charles County's revenue includes property taxes and state grants. The county also receives a robust county revenue from service charges. These service charges are directed to Enterprise Funds that are separate from the General Fund and that support the services that consumers receive. Charles County's Enterprise Funds include the Water and Sewer Fund, Solid Waste Fund, Environmental Services Fund, Watershed Protection and Restoration Fund, and Inspection and Review Fund. Charles County's diverse revenue sources and separate Enterprise Funds give the County significant flexibility in financing mitigation projects.

The HMPC also considered the County's bond rating. Often, financing public infrastructure requires borrowing funds in the form of County Government bonds. Before bonds are issued, however, the County is required to obtain a rating from the national bond rating agencies. Financial ratings range from AAA, the highest rating, to C, the lowest rating. The higher the rating, the more confidence investors have in the County's ability to repay its bond issues, and the lower the interest rates will be. In September of 2023, Charles County announced that all three major national bond rating agencies: Fitch Ratings, S&P Global Ratings, and Moody's Investor's Service, have reaffirmed the county's AAA bond rating.



County Receives AAA Bond Rating for Seventh Straight Year

Post Date: 10/25/2023 2:50 PM

Charles County Government
NewsRelease

For Immediate Release
News Release # 2023-104

Charles County announces that all three major national bond rating agencies: Fitch Ratings, S&P Global Ratings, and Moody's Investor's Service, have reaffirmed the county's AAA bond rating. Bond rating experts met with county leaders to review the health and stability of the county based on budget management, external audits, financial management, and economic development. This allows the county to maintain low interest rates when repaying bonds.

"Retaining our AAA Bond Rating is a clear sign of the optimal future that lies ahead for Charles County. Having all three agencies once again confirm our status as a fiscally responsible and administratively sound county is also a clear reflection of the diligent work that our dedicated staff does on a daily basis," said Commissioner President Reuben B. Collins, II, Esq. Charles County is resilient and on behalf of myself and fellow Commissioners it is our responsibility to continue to set policies that are equitable and reflect the needs of the community.

S&P Global Ratings report stated that the County had "Positive operations in 2022, with anticipated use of reserves for one-time expenses in fiscal 2023, while also maintaining very strong reserves and liquidity." The S&P Global Ratings report also states, "Charles County has benefited from robust economic growth, which we expect will continue to provide strength for its main operating revenue (property and income taxes), and cover growing service demands related to climate change, demographics, and development trends, while management also actively, strategically spends down reserves."

Moody's evaluation cites, "The stable outlook reflects the expectation that the county's local economy will remain strong along with its finances despite planned draws through 2024. The draws are driven by planned one-time capital project funding with no structural changes that would indicate continued declines in reserves." The report also states, "Management's notable financial controls are a key strength to the county's credit profile. The fiscal 2024 General Fund budget is 3.3% greater than fiscal 2023." For the announcement, click here.

Fitch Ratings expects "Charles County to maintain a high level of financial flexibility throughout economic cycles, consistent with historical performance and supported by superior inherent budget flexibility in the form of an unlimited legal ability to raise revenues and solid expenditure flexibility. The 'AAA' rating also reflects solid revenue growth prospects from a growing property tax base and a low long-term liability burden." To view the announcement click here.

The county's $55 million consolidated public improvements bonds are scheduled for public sale on Tuesday, Nov. 14, to fund capital improvements. Significant projects to be financed by the Bonds include: additions and renovations to Board of Education facilities ($13,500,000); renovations and additions to College of Southern Maryland facilities ($200,000); Board of Education new school construction ($10,500,000); improvements to various general government facilities ($1,400,000); various park projects ($550,000); various road and bridge improvements ($4,550,000); various watershed protection and stream restoration projects ($300,000); and various water and sewer projects ($24,000,000).

Grant programs that have a nexus with hazard mitigation planning can also assist in offsetting the expenses of local mitigation actions. A detailed list of funding sources and programs can be in found in Appendix A.

6.6 Education and Outreach

Education and outreach activities can help implement mitigation activities and communicate hazard-related information. Examples include fire safety programs that fire departments deliver to students at local schools; participation in community programs such as Firewise Communities or StormReady Communities; and activities conducted as part of hazard awareness campaigns, such as Tornado or Flood Awareness Month. Some communities also have separate public information or communications offices to handle outreach initiatives.

Charles County's Department of Emergency Services offers several education and outreach programs. In 2017, the Department of Emergency Services published its Emergency Preparedness Guide to educate residents about disaster preparedness and provide tips and suggestions. This publication also describes

types of hazards and what to do before, during, and after a disaster event. To help residents prepare for storms, the Department of Emergency Services has met all the requirements of the National Weather Service's StormReady Program. These include establishing a 24-hour warning point and emergency operations center, developing a redundant communication system for receiving severe weather warnings and forecasts and alerting the public, creating a system that monitors weather conditions locally, promoting the importance of public readiness, and developing a formal hazardous weather plan that includes training severe weather spotters and holding emergency exercises. The Department also offers safety education and training through the Charles County Volunteer Fire & EMS program.

In addition to the planning mechanisms detailed above, the hazard warning and notification capabilities of Charles County are robust. The Charles County Citizen Notification System (CNS) - powered by EverBridge, is a free service that allows you to receive emergency, weather and community notifications via phone calls, email and more, for the locations you care about in Charles County. You can choose to receive notifications about events that may affect your home, your child's school, your parent's home, your workplace or other locations. Citizens are able to choose delivery methods, including home phone, cell phone, mobile app, text* and email. Text messaging is limited to emergency alerts only.

Hazard warning and notification mitigation action and projects are eligible under FEMA's HMA grant funding programs. Mitigation actions included in the *Charles County Nuisance Flood Plan* that would expand Charles County's hazard warning capabilities include additional signage to warn citizens and visitors alike of hazardous conditions. Additional roadway warning signs with remote capabilities and monitoring have been included in the Mitigation Strategies.



High Water Signage *Photo source right:* https://elteccorp.com/products/warning-systems/flood-warning-systems/.

Charles County has several platforms that could be adapted to communicate hazard-related information to the public. First, the County has a Public Information Office that provides vital information to the public during emergencies, responds to media inquiries, and coordinates news conferences. Second, for those interested in building or renovating a property, the County has a wealth of information on the web pages for the Department of Planning and Growth Management. These webpages include an interactive map that provides access to planning and regulatory information.

6.7 Local Jurisdiction Capabilities to Achieve Mitigation

The Town of La Plata: There are seven service departments within the Town Government that provide specialized services including: Finance, Human Resources, Legislative, Planning, Police, and Public Works. The Town of La Plata has the ability to expand on and improve on its administrative and technical, financial, and education and outreach capabilities.

The Town of Indian Head: The Town Council is assisted in carrying out responsibilities with the help of volunteers that make up the following commissions and committees: Board of Zoning Appeals, Board of Supervisors of Elections, Planning Commission, Ethics Commission, and Environmental Sustainability Committee. The Town of Indian Head has limited ability to expand on and improve on its administrative and technical, financial, and education and outreach capabilities.

6.8 Plan Integration

Charles County can enhance its mitigation capabilities by integrating hazard mitigation plans and other community plans. As FEMA emphasizes in its guide to Plan Integration, this process involves a two-way exchange of information. Plan integration involves the incorporation of community planning mechanisms into hazard mitigation plans, as well as the incorporation of hazard mitigation principles and practices into community plans.

Community planning mechanisms are primarily incorporated into this HMP update in two places: the Land Use and Development Trends section of each hazard profile, and the Mitigation Strategy chapter. For each hazard, the HMPC compared the Land Use Map included in the Charles County Comprehensive Plan to the distribution of hazard risk. The HMPC then identified any areas where future growth would be exposed to high hazard risk and recommended changes. The Mitigation Strategy chapter further incorporated community planning mechanisms by tailoring recommended strategies and actions to the County's existing planning framework. Specifically, the results of the planning and regulatory capability assessment were used to identify mitigation activities that build upon existing plans, policies, and ordinances.

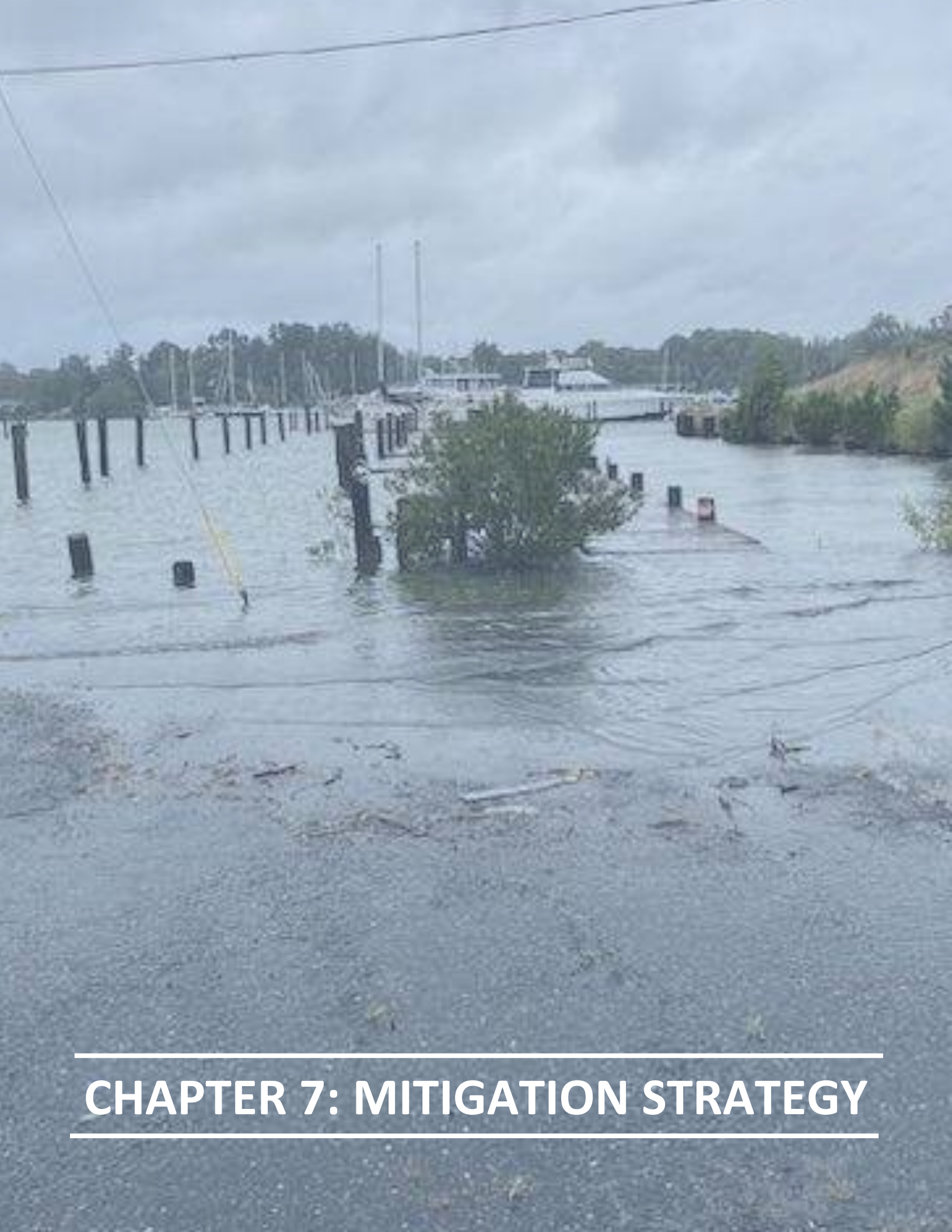
Charles County has a wealth of planning and regulatory tools that can reduce exposure and vulnerability to natural hazards. While this section provides a brief summary of these tools and their relationship to hazard mitigation, the information provided in Table 6.9-1 provides a detailed evaluation of several key tools and the extent to which they are integrated with hazard mitigation.

Table 6.8-1 Evaluation of Plan Integration In Charles County

KEY QUESTION	FINDING	SECTION/ REFERENCE	COMMENTS
COMPREHENSIVE PLAN			
Does the future land-use map clearly identify natural hazard areas?	In Part	Figure 3-1	The future land use map identifies the Chesapeake Bay Critical Area, Protected Lands, and Major Stream Valleys.
Do the land-use policies discourage development or redevelopment within natural hazard areas?	In Part	Chapters 3 and 5	The Land Use chapter includes the goal of protecting the County's natural resources, and the Natural Resources chapter includes the goal of preserving sensitive natural features. While there is significant overlap between sensitive natural features and natural hazard areas, they are not necessarily the same.

Table 6.8-1 Evaluation of Plan Integration In Charles County			
KEY QUESTION	**FINDING**	**SECTION/ REFERENCE**	**COMMENTS**
Does the plan provide adequate space for expected future growth in areas located outside natural hazard areas?	Yes	Chapter 3	The plan calls for growth to be concentrated in the sewer service areas and the Towns of Indian Head and La Plata.
Does the transportation plan limit access to hazard areas?	No	Chapter 8	The Transportation chapter does not explicitly address hazard areas.
Is transportation policy used to guide growth to safe locations?	No	Chapter 8	The Transportation chapter does not explicitly address hazard areas.
Are environmental systems that protect development from hazards identified and mapped?	No	Chapter 5	The Natural Resources chapter does not explicitly map protective environmental systems.
Do environmental policies maintain and restore protective ecosystems?	Yes	Chapter 5	The plan includes a series of policies and actions to protect floodplains, steep slopes, forest lands, shorelines, and Chesapeake Bay Critical Areas.
Do environmental policies provide incentives to development that is located outside protective ecosystems?	Yes	Chapters 3 and 5	Incentives are provided for preserving natural features through clustering and transfer of development rights.
Are the public safety goals and policies of the comprehensive plan related to those of the County Hazard Mitigation Plan?	In Part	Chapter 9	The County Hazard Mitigation Plan is described, but its goals and policies are not addressed.
Is public safety explicitly included in the plan's growth and development policies?	Yes	Chapters 3 and 10	The Land Use chapter and Community Development chapter both include policies emphasizing safety.
ZONING ORDINANCE			
Does the zoning ordinance conform to the comprehensive plan in terms of discouraging development or	Yes	Zoning Map, Article IX, Article XI	Although the zoning ordinance and map conforms to the comprehensive plan, the comprehensive plan does not explicitly identify natural hazard areas.

Table 6.8-1 Evaluation of Plan Integration In Charles County			
KEY QUESTION	**FINDING**	**SECTION/ REFERENCE**	**COMMENTS**
redevelopment within natural hazard areas?			
Does the ordinance contain natural hazard overlay zones that set conditions for land use within such zones?	In Part	Article IX, Article XI	The ordinance contains a Critical Area Overlay Zone and Resource Protection Overlay Zone to protect sensitive natural features. While there is significant overlap between sensitive natural features and natural hazard areas, they are not necessarily the same.
Does the ordinance prohibit development within, or filling of, wetlands, floodways, and floodplains?	Yes	Article XI, § 297-170	The zoning ordinance states that the land within this zone is to remain in an undisturbed natural state
SUBDIVISION REGULATIONS			
Do the subdivision regulations restrict the subdivision of land within or adjacent to natural hazard areas?	In Part	Article V, Section 44(b)(iii)	The subdivision regulations restrict the development of sensitive natural features. While there is significant overlap between sensitive natural features and natural hazard areas, they are not necessarily the same.
Do the regulations provide for conservation subdivisions or cluster subdivisions in order to conserve environmental resources?	Yes	Article V, Section 48	The subdivision regulations briefly address cluster subdivisions, but more detail is provided in Article XIV of the zoning regulations.



CHAPTER 7: MITIGATION STRATEGY

7.0 MITIGATION STRATEGY

This section of the Plan provides the "blueprint" for Charles County and participating municipalities to become less vulnerable to natural and human-caused hazards. It is based on the consensus of the Charles County HMPC along with the findings of the Hazard Identification and Risk Assessment (HIRA). This section consists of the following subsections:

- Update Process Summary
- Mitigation Goals and Objectives Review
- Mitigation Action Review & Status Update
- Mitigation Successes
- 2024-2029 Mitigation Goals & Objectives
- 2024-2029 Identification and Analysis of Mitigation Techniques
- 2024-2029 Mitigation Action Plan

The intent of the Mitigation Strategy is to provide Charles County and participating municipalities with the goals that will serve as the guiding principles for future mitigation policy and project administration, along with a list of proposed actions deemed necessary to meet those goals and reduce the impact of natural and human-made hazards. It is designed to be comprehensive and strategic in nature. The development of the strategy included a thorough review of natural and human-made hazards and identified policies and projects intended to not only reduce the future impacts of hazards, but also to help Charles County and participating municipalities achieve compatible economic, environmental, and social goals. The development of this section is also intended to be strategic, in that all policies and projects are linked to establish priorities assigned to specific departments or individuals responsible for their implementation and assigned target completion deadlines. Funding sources are identified that can be used to assist in project implementation.

- Mitigation goals are general guidelines that explain what the County wants to achieve. Goals are usually expressed as broad policy statements representing desired long-term results.
- Mitigation objectives describe strategies or implementation steps to attain the identified goals. Objectives are more specific statements than goals; the described steps are usually measurable and can have a defined completion date.
- Mitigation Actions provide more detailed descriptions of specific work tasks to help the County and its municipalities achieve prescribed goals and objectives.

7.1 Update Process Summary

The HMPC reviewed the goals, objectives, and actions identified in the 2018 HMP to assess their relevance based on the updated risk assessment and the progress made implementing the Mitigation Strategy over the past five years. This process included a full review of mitigation goals, objectives, and actions, as well as an identification of mitigation successes. After the HMPC completed the review of the Mitigation Strategy, they identified additional mitigation actions to meet the current goals and objectives. Updating

and developing new mitigation actions represent the key outcome of the mitigation planning process. The mitigation action plan includes a prioritized list of proposed hazard mitigation actions (policies and projects) for Charles County and its municipalities, including accompanying information such as those agencies or individuals assigned responsibility for their implementation, potential funding sources, and an estimated target date for completion. The action plans provide those individuals or agencies responsible for implementing mitigation actions with a clear roadmap that also serves as a valuable tool for monitoring progress over time.

Mitigation Goals and Objectives Review

Mitigation goals are general guidelines that explain what the County wants to achieve. Goals are usually expressed as broad policy statements representing desired long-term results. Mitigation objectives describe strategies or implementation steps to attain the identified goals. Objectives are more specific statements than goals; the described steps are usually measurable and can have a defined completion date.

The Charles County HMPC reviewed the 9 goals and 37 objectives in the 2018 HMP and determined that they remained relevant and reflected the overall purpose of the 2023 HMP; however, 2 new goals and 8 new objectives were added. The reviewed goals and objectives are shown in Table 7.1-1, while the full list of updated goals and objectives, including the additional goals and objectives added for 2023, is shown in Table 7.2-1.

Table 7.1-1: 2018 Goals and Objectives

Goal 1	**Protect existing natural resources and preserve environmentally sensitive areas where hazard potential is high.**
Objective 1A	Protect existing natural resources and open space, including parks and wetlands, within the floodplains.
Objective 1B	Restore degraded natural resources and open space to improve their flood control function.
Objective 1C	Preserve areas where natural hazard potential is high such as steeply sloping areas, sinkhole areas.
Goal 2	**Promote disaster-resistant future development.**
Objective 2A	Minimize future damage due to flooding by promoting resistant construction, retrofitting techniques and in the rural areas by erosion/sedimentation control practices.
Objective 2B	Regulate construction and development in the County to minimize increases in impervious surfaces to reduce runoff and flood risk.
Objective 2C	Ensure that new construction is resistant to natural hazards by adhering to floodplain regulations, building codes, and land use and development regulations.
Goal 3	**Attempt to reduce the current and future risk of flood damage.**
Objective 3A	Continue to participate in the National Flood Insurance Program.
Objective 3B	Reduce the vulnerability of County roads and other infrastructure to the impacts of flooding.
Objective 3C	Ensure regulations reduce the amount of future development in identified flood hazard areas.
Objective 3D	Evaluate and update existing floodplain ordinances to meet or exceed the NFIP standards and evaluate impacts of sea level rise.

Table 7.1-1: 2018 Goals and Objectives	
Objective 3E	Address stormwater issues in existing communities.
Goal 4	**Reduce the potential impacts of natural and man-made disaster on public and private property.**
Objective 4A	Address rural fire protection measures.
Objective 4B	Ensure adequate public safety infrastructure.
Objective 4C	Address problems regarding adequate water supply.
Objective 4D	Reduce the vulnerability of life, property, and infrastructure within the County to High Hazard Dams.
Objective 4E	Minimize the impact of winter weather on life, property, buildings, critical facilities, and infrastructure.
Objective 4F	Reduce vulnerability to environmental hazards by providing enhanced trainings, equipment, and plans for emergency response and mitigation.
Objective 4G	Continue to monitor low risk hazards based on Risk Factor (RF) Methodology and modify the plan if risk should change before the plan needs to be updated.
Objective 4H	Seek opportunities to protect critical communications infrastructure, such as by upgrading or burying powerlines where feasible.
Goal 5	**Protect public health, safety, and welfare by increasing public awareness of existing hazards (those identified in the 2018 HMP Update) and by fostering both individual and public responsibility in mitigation the potential impacts and risks of those hazards.**
Objective 5A	Develop and distribute public awareness materials about natural hazard risks, preparedness, and mitigation.
Objective 5B	Target owners of properties within identified hazard areas for additional outreach regarding mitigation and disaster preparedness.
Objective 5C	Coordinate with organizations that provide services to identified special populations.
Goal 6	**Identify high risk hazard areas and ultimately areas where hazards can be mitigated.**
Objective 6A	Direct Tier II facilities development away from high-risk infrastructure such as schools and community-based organizations.
Objective 6B	Collect all necessary data and develop commodity study.
Goal 7	**Provide adequate care during hazard events to prevent or reduce damage to lives and property.**
Objective 7A	Ensure evacuation information is readily available throughout the County.
Objective 7B	Ensure evacuation needs for special populations are met.
Objective 7C	Reduce impact of an outbreak by providing information and care regarding infectious diseases such as influenza.
Goal 8	**Improve communications, planning, and coordination throughout the County, including among county departments, jurisdictions, and both public and private stakeholders**
Objective 8A	Ensure all areas including rural portions of the County are in communication with the County at all times.
Objective 8B	Provide information to critical infrastructure, schools, and community-based organizations as soon as possible from the EOC.
Objective 8C	Provide adequate, safe, and efficient evacuation routes and shelters during hazard events.
Objective 8D	Implement effective emergency warning systems throughout the County.
Objective 8E	Ensure that local officials are well trained regarding natural hazard and appropriate prevention and mitigation activities and improve communications between the public and emergency management services.

Table 7.1-1: 2018 Goals and Objectives	
Objective 8F	Promote partnerships between various County departments and communities to continue to develop a County-wide approach to identifying and implementing mitigation actions.
Objective 8G	Seek opportunities to integrate hazard mitigation efforts with other planning initiatives throughout the County.
Goal 9	Protect and preserve the County's cultural, historic, and archaeological resources through mitigation planning and action.
Objective 9A	Identify high priority historic and cultural resources throughout the County.
Objective 9B	Implement policies and procedures to protect and preserve high priority historic, cultural, and archaeological resources.
Objective 9B	Educate the property owners, the public, and other stakeholders about mitigation techniques for historic properties.

Mitigation Action Review & Status Update

The purpose of hazard mitigation action items and associated projects is to reduce or eliminate long-term risk to people and property from hazards and their effects. In an effort to determine the status of the mitigation action items developed for the 2018-2023 Charles County Hazard Mitigation Plan, the Hazard Mitigation Planning Committee and representatives for the municipalities were asked to provide status updates. As a result, this mitigation status report was developed for this plan update. A progress status and additional details have been provided for each of the 2018 action items.

Table 7.1-2 lists the mitigation action items that were set forth in the 2018-2023 Charles County Hazard Mitigation Plan. The table provides the mitigation action item, community, hazard(s) addressed, lead agency or department and action status (Complete, Deferred, Canceled, Ongoing). In addition, status update details were provided in the "Status Update Notes" column. Action items ranked as a "High" priority in the 2018 Hazard Mitigation Plan are denoted with "High Priority."

A total of seventy (70) action items were evaluated as part of the plan update process; sixteen (16) of these action items were ranked as "high priority" in the previous plan. Members of the Hazard Mitigation Planning Committee (HMPC) provided important feedback regarding the progress of these action items. Based on this feedback, the following was determined: eight (8) mitigation actions are "completed," nine (9) mitigation action item was "deferred," and fifty (50) action items are "ongoing." No mitigation action items were canceled. The graph below further illustrates the present status of the 2018 mitigation actions based upon stakeholder feedback.

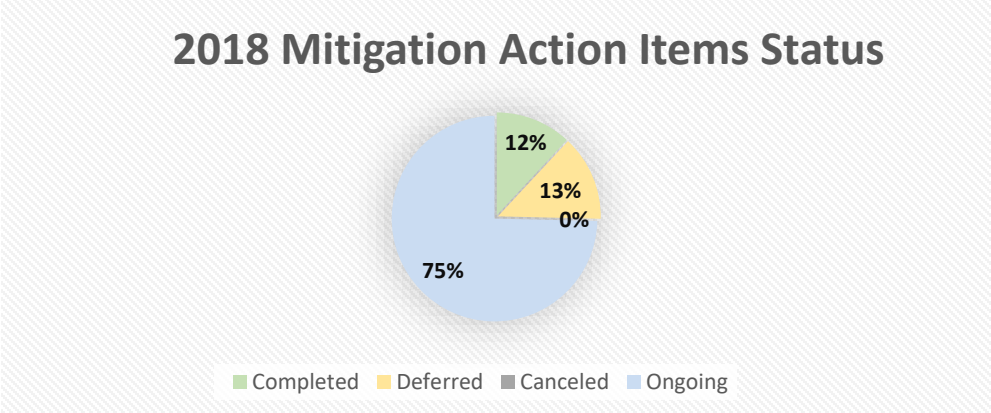


Table 7.1-2: Review of 2018 HMP Mitigation Action Plan

#	ACTION	COMMUNITY	HAZARD(S) ADDRESSED	LEAD AGENCY/ DEPARTMENT	STATUS	STATUS UPDATE NOTES
1	Install Uninterruptible Power Supplies on Critical Electronic Equipment in County Facilities To Prevent Outages During Thunder And Lightning Events. **High Priority**	Charles County	Extreme Weather	Emergency Services, Information Technology	Complete	Charles County issues laptops rather than ups equipment.
2	Encourage proper tree management for new power lines to reduce risks during high wind/severe winter weather. **High Priority**	Charles County	Extreme Weather, Severe Winter Storms	Emergency Services, SMECO	Ongoing	SMECO operates a tree management program.
3	Continue to support tree-trimming to prevent limb breakage and for safeguarding nearby utility lines during severe wind and winter events. **High Priority**	Charles County	Extreme Weather, Severe Winter Storms	Emergency Services, SMECO	Ongoing	SMECO operates a tree management program.
4	Install surge protectors on electronic equipment in County facilities to protect equipment during thunderstorm and lightning events. **High Priority**	Charles County	Extreme Weather	Emergency Services, Information Technology	Ongoing	Installation of surge protectors is an ongoing project.
5	Conduct engineering inspections of fire stations and schools to assess each facility's ability to sustain damage from flood and wind events. **High Priority**	Charles County	Flood, Extreme Weather	Charles County Public Schools, Volunteer Fire Department	Deferred	No public-school flood or wind risk reduction projects have been completed during this planning cycle.
6	Protect County buildings from hail damage by installing hail guards on roof-mounted HVAC equipment and installing hail-resistant roofing and siding when feasible on newly constructed facilities. **High Priority**	Charles County	Extreme Weather	Public Facilities	Complete	Hail guards were installed on all HVAC replacement units.
7	Promote Tornado safety public awareness and encourage the building of safe rooms during new construction.	Charles County	Extreme Weather	Emergency Services	Ongoing	Charles County DES continues public education of tornado safety through county social media accounts and printed materials.
8	Equip all County and public gathering places with lightning detectors.	Charles County	Extreme Weather	Emergency Services, Parks, Recreation and Tourism	Ongoing	Charles County high schools have installed lightning detection units from Earth Networks. RPT and DES met with Earth Networks and had an initial discussion on pricing and budget needs. Also, for recent comparison and consideration is PerryWeather APP.

#	ACTION	COMMUNITY	HAZARD(S) ADDRESSED	LEAD AGENCY/ DEPARTMENT	STATUS	STATUS UPDATE NOTES
9	Establish heating and cooling centers for vulnerable populations and link them to outreach projects that encourage at-risk populations to use the facilities.	Charles County	Temperature Extremes	Emergency Services	Ongoing	Heating and Cooling centers continue to be established when needed.
10	Develop public awareness campaign regarding extreme temperatures and how they affect residents.	Charles County	Temperature Extremes	Emergency Services	Ongoing	Public awareness campaigns continue on county social media and printed publications.
11	Continue to acquire, elevate or floodproof structures in identified repetitive loss areas throughout Charles County.	Charles County	Flood	Emergency Services, Public Facilities, Planning and Growth Management	Ongoing	The Planning Department does not acquire structures. We encourage property owners to elevate or flood proof their structures within our repetitive loss areas when they apply for permits.
12	Ensure that NFIP requirements are being met concerning repairs, renovations, and remodeling of structures located in the regulatory floodplain.	Charles County	Flood	Planning & Growth Management	Complete	All permits are reviewed for compliance with the NFIP and County Floodplain Regulations. This includes new construction and substantial improvements to existing structures. Existing structures are also evaluated to see if they are considered substantial improvements.
13	Address flooding that is caused by an obstructed drainage ditch that runs east to west through the center of the town.	Village of Port Tobacco	Flood		Cancelled	Status Not Provided
14	Take steps towards joining the community rating system.	Charles County	Flood	Planning & Growth Management	Ongoing	The Department is currently working with MDE & FEMA to resolve open items on the most recent CAV Report in an effort to join the CRS.
15	Implement stormwater management and drainage improvements in flood-prone historic districts.	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Flood	Planning and Growth Management	Ongoing	Continue to implement.
16	Inspection of critical facilities in the 100-year floodplain conducted by a certified floodplain manager.	Charles County, Town of La Plata	Flood	Emergency Services, Public Facilities, Planning and Growth Management, Town of La Plata	Ongoing	Develop inspection schedule.

#	ACTION	COMMUNITY	HAZARD(S) ADDRESSED	LEAD AGENCY/ DEPARTMENT	STATUS	STATUS UPDATE NOTES
17	Identify roadways/bridges that frequently flood and mitigate to ensure ingress and egress.	Charles County	Flood	SHA, County Roads	Complete	Egress during normal heavy rain events is not an issue as per SHA.
18	Increase awareness of homes that lie in the flood zone for prospective home buyers and residents by posting a link to the County's website that provides property-specific flood zone information.	Port Tobacco, Town of La Plata, Town of Indian Head	Flood	Planning and Growth Management, Floodplain Administrator	Ongoing	The Department is working on creating a floodplain website within the County website to provide information to all citizens about their flood risk.
19	Encourage immunization against diseases that can be easily communicable among residents of Charles County.	Charles County	Public Health Emergency	Health Department	Ongoing	The Charles County Department of Health continually educates residents and provides opportunities for immunization against communicable disease(s).
20	Establish areas where vaccines and other medications could be dispensed during a public health emergency.	Charles County	Public Health Emergency	Health Department	Ongoing	The Charles County Department of Health has four pre-identified POD location sites that can be used during a public health emergency. However, as experienced during the COVID-19 pandemic, it was necessary to adapt operations to alternative locations.
21	Incorporate inspection and management of hazardous trees into other maintenance processes. **High Priority**	Charles County	Utility Interruption	Public Works	Ongoing	Tree maintenance crews and contractors work year-round to manage tree growth and hazards.
22	Work with utility providers to ensure regular maintenance and upkeep of power lines and other utilities. **High Priority**	Charles County	Utility Interruption	Emergency Services, SMECO	Ongoing	Conducts regular maintenance.
23	Identify opportunities to upgrade or bury power lines.	Charles County	Utility Interruption	Emergency Services, SMECO	Ongoing	SMECO continues to monitor and upgrade when appropriate.
24	Prepare flyer for safety strategies during severe winter weather, including driver education classes and materials.	Charles County	Severe Winter Storms	Emergency Services, County Roads	Ongoing	Charles County continues public education through social media and printed materials. DPW has an emergency winter weather plan and SOP in place.
25	Review existing land use and development patterns near pipelines.	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Environmental Hazards	Planning and Growth Management, Emergency Services	Deferred	This will be evaluated during the Comprehensive Plan Update.

#	ACTION	COMMUNITY	HAZARD(S) ADDRESSED	LEAD AGENCY/ DEPARTMENT	STATUS	STATUS UPDATE NOTES
26	Review pathways for potential gas or hazardous liquid migration in the event of a pipeline release and encourage land use planning and zoning controls to decrease population density in high-risk areas.	Charles County	Environmental Hazards	Planning and Growth Management, Emergency Services	Ongoing	Schedule meeting to discuss.
27	Initiate a new commodity flow study.	Charles County	Environmental Hazards	Emergency Services	Ongoing	Brief commodity flow study conducted. Upgraded camera technology in process of procurement for constant monitoring to include annual commodity flow studies.
28	Purchase equipment necessary to sustain hazardous materials for emergency response teams.	Charles County	Environmental Hazards	Hazardous Materials Response Team (HMRT)	Ongoing	Constantly performing updates to current gear and equipment as well as purchasing new to meet the demand of today's Hazardous Materials responses. Received grant equipment and funs from HSGP and Securing the Cities (COG).
29	Evaluate Tier 2 facilities on an annual basis.	Charles County	Environmental Hazards	Hazardous Materials Response Team (HMRT)	Ongoing	With the addition of some full-time staffing, we have been able to successfully evaluate those that have reported and are in contact with staff. Currently 35/72 on file, the remaining have not accepted appointments.
30	Plan for and maintain adequate road and debris clearing capabilities.	Charles County	Transportation Accident	Public Works	Ongoing	County staff, equipment and contractors are in place to respond.
31	Implement traffic safety improvements at high-crash intersections and roadway segments.	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Transportation Accident	Planning and Growth Management	Ongoing	Prioritize intersections.
32	Develop Aircraft Emergency Disaster Plan.	Charles County	Transportation Accident	Emergency Services	Ongoing	Multi-Hazard Emergency Disaster Plan in review and evaluation process.
33	Continue Crime Solvers Program.	Charles County	Civil Disturbance and Criminal Activity	Sheriff's Office	Ongoing	This is a continuous program that the CCSO participates in.

#	ACTION	COMMUNITY	HAZARD(S) ADDRESSED	LEAD AGENCY/ DEPARTMENT	STATUS	STATUS UPDATE NOTES
34	Continue offering free home and business security surveys.	Charles County	Civil Disturbance and Criminal Activity	Sheriff's Office	Ongoing	CCSO continues to provide this service.
35	Continue publishing “Watch Works” newsletter.	Charles County	Civil Disturbance and Criminal Activity	Sheriff's Office	Ongoing	This is still disseminated by the CCSO, but it is now called the "Community Dispatch."
36	Encourage Crime Prevention Through Environmental Design (CPTED) principles.	Charles County	Civil Disturbance and Criminal Activity	Sheriff's Office	Ongoing	CCSO continues to provide this service.
37	Retrofit or rebuild high-priority structurally deficient bridges.	Charles County	Building and Structure Collapse	Public Works	Ongoing	
38	Review existing conditions of bridges to determine their susceptibility to collapse.	Charles County	Building and Structure Collapse	Public Works	Ongoing	All County owned bridges are inspected and rated every two years through the SHA.
39	Retrofit public buildings and critical facilities to withstand snow loads and prevent roof collapse.	Charles County	Building and Structure Collapse	Emergency Services	Ongoing	Charles County continually identifies buildings to retrofit with upgrades pending financial assistance.
40	Continue inspection, maintenance, and enforcement program to help ensure continued structural integrity of dams.	Charles County	Dam Failure	Emergency Services; Soil Conservation District	Complete	The SCD participates in the yearly inspections of the three large flood control dams in Charles County. As far as inspections of smaller dams, the SCD inspects these dams upon request or if needed as part of the SCD Small Pond Approval process. The SCD participates in the yearly inspections of the three large flood control dams in Charles County. As far as inspections of smaller dams, the SCD inspects these dams upon request or if needed as part of the SCD Small Pond Approval process.
41	Regulate development near steep slopes.	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Earth Disturbance	Planning and Growth Management	Complete	This is accomplished through the Critical Area Program within the Critical Area. Outside of the Critical Area it is reviewed by our Soil Conservation District.

#	ACTION	COMMUNITY	HAZARD(S) ADDRESSED	LEAD AGENCY/ DEPARTMENT	STATUS	STATUS UPDATE NOTES
42	Apply soil stabilization measures on steep, publicly owned slopes.	Charles County	Earth Disturbance	Planning and Growth Management	Ongoing	This would be handled by our local Soil Conservation District or Public Works Department, where appropriate or necessary.
43	Encourage structural designs that can resist loading associated with subsidence.	Charles County	Earth Disturbance	Planning and Growth Management	Deferred	This is not something that PGM is currently working on.
44	Identify ways to reduce vulnerability of historic properties to coastal erosion, particularly along the Potomac and Port Tobacco Rivers.	Charles County	Earth Disturbance	Emergency Services, Planning and Growth Management	Deferred	This is not something that PGM is currently working on.
45	Develop database to track landslide events.	Charles County	Earth Disturbance	Emergency Services, Soil Conservation District	Deferred	No database has been developed.
46	Monitor groundwater levels and areas where natural resources are removed underground.	Charles County	Earth Disturbance	Planning and Growth Management, Soil Conservation District	Ongoing	Charles County maintains an annual contract with the MD Dept of Natural Resources to monitor groundwater levels within the local aquifers.
47	Inform the public about defensible space and how to reduce their risk to fire.	Charles County	Wildfire	Emergency Services, Volunteer Fire Departments	Ongoing	Ongoing campaigns through the Fire Service.
48	Review Capital Improvement Plans to ensure that programmed infrastructure improvements are not in high hazard areas. **High Priority**	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	All Hazards	Emergency Services, Planning and Growth Management, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Ongoing	Indian Head: Complete. Plans are reviewed annually, all needs are evaluated, and plans are updated as necessary. A majority of Indian Head's infrastructure is outside of high hazard areas and new development within high hazard areas is not permitted. All of Indian Head's critical infrastructure and stations are outside of high hazard areas (ex. floodplain). PMG: Ongoing. La Plata: Ongoing.

#	ACTION	COMMUNITY	HAZARD(S) ADDRESSED	LEAD AGENCY/ DEPARTMENT	STATUS	STATUS UPDATE NOTES
49	Continue to conduct tests of its early warning/sirens bi-annually (early May and December). **High Priority**	Town of La Plata	All Hazards	Town of La Plata	Ongoing	Testing schedule.
50	Obtain grant funding for generators for critical facilities. **High Priority**	Charles County	All Hazards	Emergency Services	Ongoing	Grant funding for generators is an ongoing project.
51	During new construction or upgrades/retrofits to schools and emergency shelters, funding should be obtained to provide these facilities with emergency generators and intercoms. **High Priority**	Charles County	All Hazards	Emergency Services, Public Schools	Ongoing	Emergency Services collaborates with Public Schools in continual evaluation.
52	Review regulations to ensure adequate zoning regulations are in place to reduce future development in high-hazard areas and introduce new language to this effect in their zoning ordinances. **High Priority**	Charles County, Town of La Plata, Town of Indian Head	All Hazards	Planning and Growth Management, Town of La Plata, Town of Indian Head	Ongoing	Indian Head: Ordinances are reviewed annually, and zoning updates are implemented on a frequent and regular basis to ensure safety if the Town. PMG: Ongoing. Floodplain Management Ordinance will be reviewed to determine if any improvements are needed. La Plata: Ongoing.
53	Continue incorporating the HMP into future updates of the Charles County's Comprehensive Plan. **High Priority**	Charles County	All Hazards	Planning and Growth Management	Ongoing	This will be included/updated in our next Comp Plan update.
54	Introduce language in the comprehensive plan to plan for development while considering hazards and their impacts in highly developed areas. **High Priority**	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	All Hazards	Emergency Services, Planning and Growth Management, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Ongoing	Indian Head: Complete. Language addressing and regulating development in relation to hazards was included in the Town of Indian Head Comprehensive Plan 2020, enacted on September 27, 2021. PMG: Ongoing. This will be included/updated in our next Comp Plan update La Plata: Ongoing.
55	Work with the Town of Indian Head and Lackey High School to determine ways to provide alternative access during a hazard event.	Charles County, Town of Indian Head	All Hazards	Town of Indian Head, Emergency Services	Ongoing	Discussions with Lackey High School on alternative access during hazard events are ongoing.

#	ACTION	COMMUNITY	HAZARD(S) ADDRESSED	LEAD AGENCY/ DEPARTMENT	STATUS	STATUS UPDATE NOTES
56	Include Historic Properties in the County's Debris Management Plan.	Charles County	All Hazards	Planning and Growth Management, Emergency Services, Public Works	Deferred	Add information to the Comprehensive Plan Update. Information in Debris Management Plan, however it is not specific to historic properties
57	Send news releases to local newspapers, radio, and TV stations with pre-disaster information while attempting to reach all areas of Charles County.	Charles County	All Hazards	Emergency Services, Town of Indian Head, Town of La Plata	Ongoing	DES: Charles County utilizes CNS for public notifications, PIO for media notifications along with social media correspondence. Indian Head: Ongoing. Pre-disaster notification strategies such as dialer system alerts and press releases are currently practiced and will continue to be practiced. La Plata: Ongoing.
58	Continue to introduce environmental education programs in schools, park and recreation department, conservation associations, and youth organizations such as boy scouts/girl scouts, campfire girls, and summer camps.	Charles County, Town of Indian Head, Town of La Plata	All Hazards	Emergency Services, Town of Indian Head, Town of La Plata	Ongoing	RPT: Ongoing. This goal is ongoing with a variety of programs and camps offered through RPT. Summer of 2023 included "All About the Bay Camp", "Summer Adventure" "Explorer Week" Kayak & Fishing." Indian Head: Ongoing. Environmental education is a priority for the Town of Indian Head. A recently constructed boardwalk and living shoreline on the Potomac in Indian Head provides access to unique habitats and educational opportunities to the public. The Town regularly works with Eagle Scouts. Storm water educational materials are created and distributed to the public, businesses, schools, etc. La Plata: Ongoing.

#	ACTION	COMMUNITY	HAZARD(S) ADDRESSED	LEAD AGENCY/ DEPARTMENT	STATUS	STATUS UPDATE NOTES
59	Ensure access to special needs populations is provided.	Charles County	All Hazards	Emergency Services, Planning and Growth Management	Ongoing	DES: Charles County PGM and Emergency Services continues to address areas for special needs population access and roadway access for emergency vehicles. RPT: Ongoing. RPT recently hired a Therapeutic Recreation Specialist to offer additional recreational programming for special needs.
60	Conduct Archaeological Survey of High Priority Sites in High Hazard Areas.	Charles County	All Hazards	Planning and Growth Management	Deferred	Prioritize sites.
61	Create an Expedited Review Process for historic properties to be utilized post-incident	Charles County	All Hazards	Planning and Growth Management	Ongoing	This is something that PGM can work towards doing.
62	Establish a Demolition Delay Process for historic properties to be utilized post-incident.	Charles County	All Hazards	Planning and Growth Management, Emergency Services, Public Works	Deferred	This is not something PGM is currently working on but would be interested in assistance to develop a process.
63	Develop disaster plans for historic sites and resources owned by Charles County.	Charles County	All Hazards	Planning and Growth Management, Emergency Services		DES: Defer to PGM PMG: Deferred. PGM defers to EMS and Public Works Status Not Provided
64	Conduct targeted outreach to historic property owners about mitigation techniques and recovery.	Charles County	All Hazards	Emergency Services, Planning and Growth Management	Deferred	This is not something PGM is currently working on but would appreciate assistance in preparing a plan to implement this item.
65	Upgrade water suppression system.	Charles County	All Hazards	Public Works, Planning and Growth Management	Ongoing	All new construction requires to install an interior fire suppression system per the Building Code. The Capital Improvement Program continues to include public fire suppression systems (water system upgrades) to improve fire suppression, annually.

#	ACTION	COMMUNITY	HAZARD(S) ADDRESSED	LEAD AGENCY/ DEPARTMENT	STATUS	STATUS UPDATE NOTES
66	Perform outreach activities to inform residents of their vulnerability to hazards and how to mitigate. This may include newsletters, flyers on keeping drain ditches clear, participation in the NFIP, and safety tips.	Village of Port Tobacco	All Hazards	Village of Port Tobacco		Status Not Provided
67	Create an Archaeological Context for Charles County based on a literature review of academic and historical works, and on information found in the archaeological data at the Maryland Historical Trust.	Charles County	All Hazards	Planning and Growth Management	Complete	PGM has a record of the historical properties in the County.
68	Prioritize list of critical facilities that are vulnerable to natural and human-made hazards and develop potential mitigation solutions for high-priority critical facilities to reduce vulnerability. **High Priority**	Charles County, Town of Indian Head, Town of La Plata	All Hazards	Planning and Growth Management, Emergency Services	Complete	Completed and included with Charles County Climate Resilience Plan.
69	Prohibit future development in high hazard areas.	Charles County	All Hazards	Planning and Growth Management	Ongoing	Where there is an area outside of the Coastal High Hazard Area on a property, all new development must be located outside of the Coastal High Hazard Area.
70	Encourage low density development and open space areas.	Charles County	All Hazards	Planning and Growth Management	Ongoing	Consider during Comprehensive Plan Update.

Mitigation Successes

Since the 2018 HMP Update, Charles County and its jurisdictions completed several projects and had several mitigation successes. The mitigation actions identified as "completed" are listed below. Three (3) of the high priority mitigation actions were designated as "completed"; these mitigation actions are identified in red.

- **Action Item #1** – Install uninterruptible power supplies on critical electronic equipment in County facilities to prevent outages during thunder and lightning events.
- **Action Item #6** – Protect County buildings from hail damage by installing hail guards on roof-mounted HVAC equipment and installing hail-resistant roofing and siding when feasible on newly constructed facilities.
- **Action Item #12** – Ensure that NFIP requirements are being met concerning repairs, renovations, and remodeling of structures located in the regulatory floodplain.
- **Action Item #17** – Identify roadways/bridges that frequently flood and mitigate to ensure ingress and egress.
- **Action Item #40** – Continue inspection, maintenance, and enforcement program to help ensure continued structural integrity of dams.
- **Action Item #41** – Regulate development near steep slopes.
- **Action Item #67** – Create an Archaeological Context for Charles County based on a literature review of academic and historical works, and on information found in the archaeological data at the Maryland Historical Trust.
- **Action Item #68** – Prioritize list of critical facilities that are vulnerable to natural and human-made hazards and develop potential mitigation solutions for high-priority critical facilities to reduce vulnerability.

7.2 2024-2029 Mitigation Goals and Objectives

Based on the results of the review of current conditions and the mitigation goals and objectives established in 2018, the HMPC developed 2 new goals and 8 new objectives for inclusion in the 2023 HMP. This brings the total number of goals and objectives to 11 and 44 respectively. Table 7.2-1 details the mitigation goals and objectives that support the 2023 mitigation strategy. Goal 10 and 11 are new for the 2023 HMP and the additional objectives are highlighted in green below.

Table 7.2-1: 2023 Goals and Objectives

Goal 1	**Protect existing natural resources and preserve environmentally sensitive areas where hazard potential is high.**
Objective 1A	Protect existing natural resources and open space, including parks and wetlands, within the floodplains.
Objective 1B	Restore degraded natural resources and open space to improve their flood control function.

Table 7.2-1: 2023 Goals and Objectives	
Objective 1C	Preserve areas where natural hazard potential is high such as steeply sloping areas, highly erodible soils, and high-water table areas. Restore, if necessary, natural hazard areas via tree planting and other nature-based solutions.
Goal 2	**Promote disaster-resistant future development.**
Objective 2A	Minimize future damage due to flooding by promoting resistant construction, retrofitting techniques and in the rural areas by erosion/sedimentation control practices.
Objective 2B	Regulate construction and development in the County to minimize increases in impervious surfaces and minimize loss of existing tree cover to reduce runoff and flood risk.
Objective 2C	Ensure that new construction is resistant to natural hazards by adhering to floodplain regulations, building codes, and land use and development regulations.
Goal 3	**Attempt to reduce the current and future risk of flood damage.**
Objective 3A	Continue to participate in the National Flood Insurance Program.
Objective 3B	Reduce the vulnerability of County roads and other infrastructure to the impacts of flooding.
Objective 3C	Ensure regulations reduce the amount of future development in identified flood hazard areas.
Objective 3D	Evaluate and update existing floodplain ordinances to meet or exceed the NFIP standards and evaluate impacts of sea level rise.
Objective 3E	Address stormwater issues in existing communities.
Goal 4	**Reduce the potential impacts of natural and man-made disaster on public and private property.**
Objective 4A	Address rural fire protection measures.
Objective 4B	Ensure adequate public safety infrastructure.
Objective 4C	Address problems regarding adequate water supply.
Objective 4D	Reduce the vulnerability of life, property, and infrastructure within the County to High Hazard Dams.
Objective 4E	Minimize the impact of winter weather on life, property, buildings, critical facilities, and infrastructure.
Objective 4F	Reduce vulnerability to environmental hazards by providing enhanced trainings, equipment, and plans for emergency response and mitigation.
Objective 4G	Continue to monitor low risk hazards based on Risk Factor (RF) Methodology and modify the plan if risk should change before the plan needs to be updated.
Objective 4H	Seek opportunities to protect critical communications infrastructure, such as by upgrading or burying powerlines where feasible.
Goal 5	**Protect public health, safety, and welfare by increasing public awareness of existing hazards (those identified in the 2023 HMP Update) and by fostering both individual and public responsibility in mitigation the potential impacts and risks of those hazards.**
Objective 5A	Develop and distribute public awareness materials about natural hazard risks, preparedness, and mitigation.

Table 7.2-1: 2023 Goals and Objectives	
Objective 5B	Target owners of properties within identified hazard areas, as well as those affected by sink holes caused by deteriorating man-made infrastructure, for additional outreach regarding mitigation and disaster preparedness.
Goal 6	**Identify high risk hazard areas and ultimately areas where hazards can be mitigated.**
Objective 6A	Direct Tier II facilities development away from high-risk infrastructure such as schools and community-based organizations.
Objective 6B	Collect all necessary data and develop commodity study.
Goal 7	**Provide adequate care during hazard events to prevent or reduce damage to lives and property.**
Objective 7A	Ensure evacuation information is readily available throughout the County.
Objective 7B	Ensure evacuation needs for special populations are met.
Objective 7C	Reduce impact of an outbreak by providing information and care regarding infectious diseases such as influenza.
Goal 8	**Improve communications, planning, and coordination throughout the County, including among county departments, and both public and private stakeholders**
Objective 8A	Ensure all areas including rural portions of the County are in communication with the County at all times.
Objective 8B	Provide information to critical infrastructure, schools, and community-based organizations as soon as possible from the EOC.
Objective 8C	Provide adequate, safe, and efficient evacuation routes and shelters during hazard events. Consider siting of shelters to ensure easy accessibility for socially vulnerable populations.
Objective 8D	Implement effective emergency warning systems throughout the County.
Objective 8E	Ensure that local officials are well trained regarding natural hazard and appropriate prevention and mitigation activities and improve communications between the public and emergency management services.
Objective 8F	Promote partnerships between various County departments and communities to continue to develop a County-wide approach to identifying and implementing mitigation actions.
Objective 8G	Seek opportunities to integrate hazard mitigation efforts with other planning initiatives throughout the County.
Objective 8H	Enhance the capabilities to collect, analyze, update, and exchange data and information to support risk assessment and mitigation needs.
Objective 8I	Coordinate hazard mitigation efforts and capabilities with goals and objectives identified in the Charles County Climate Action Plan, as well as the Charles County Resilience Authority Resilience and Adaptation Report Card.
Goal 9	**Protect and preserve the County's cultural, historic, and archaeological resources through mitigation planning and action.**
Objective 9A	Identify high priority historic and cultural resources throughout the County.

Table 7.2-1: 2023 Goals and Objectives	
Objective 9B	Implement policies and procedures to protect and preserve high priority historic, cultural, and archaeological resources.
Objective 9B	Educate the property owners, the public, and other stakeholders about mitigation techniques for historic properties.
Goal 10	**Promote the development of policies, programs, initiatives, and projects that prioritize diversity, equity, and environmental justice.**
Objective 10A	Identify and reduce the health and safety impacts of hazards on vulnerable populations.
Objective 10B	Improve community engagement and outreach by organizations and agencies that provide services to vulnerable populations.
Objective 10C	Increase nature based mitigation and resilience solutions in areas where high hazard and high vulnerability overlap.
Goal 11	**Build and support municipal capacity and commitment to become less vulnerable and more resilient to hazards.**
Objective 11A	Increased awareness and knowledge of hazard mitigation principles and practice among local and municipal public officials.
Objective 11B	Aid municipal officials and municipalities obtain funding for mitigation planning and project activities.
Objective 11C	Coordinate hazard mitigation efforts with goals.

7.3 Identification and Analysis of Mitigation Techniques

The mitigation strategy in the updated HMP should include analysis of a comprehensive range of specific techniques or actions. Four categories of hazard mitigation techniques were utilized and include:

- **Local plans and regulations**: Government authorities, policies, or codes that influence the way land and buildings are developed and built. Examples include, but are not limited to comprehensive plans, subdivision regulations, building codes and enforcement, and NFIP and CRS.
- **Structure and infrastructure**: Modifying existing structures and infrastructure or constructing new structures to reduce hazard vulnerability. Examples include but are not limited to acquisition and elevation of structures in flood prone areas, utility undergrounding, structural retrofits, floodwalls and retaining walls, detention and retention structures, and culverts.
- **Natural systems protection**: Actions that minimize damage and losses and preserve or restore the functions of natural systems. Examples include but are not limited to sediment and erosion control, stream corridor restoration, forest management, conservation easements, and wetland restoration and preservation.
- **Public Education and Emergency Services**: Actions to inform and educate citizens, elected officials, and property owners about hazards and potential ways to mitigate the hazards and may also include participation in national programs. Examples include but are not limited to radio or television spots, websites with maps and information, provide information and training, NFIP outreach, StormReady, and Firewise Communities. Emergency services measures protect people

during and after a flood. Most counties and many cities have emergency management offices to coordinate warning, response, and recovery during a disaster.

Table 7.3-1 provides a matrix identifying the mitigation techniques used for the hazards identified in the risk assessment. The specific actions associated with these techniques are included in Table 7.4-1, 2024-2029 Mitigation Action Plan.

Table 7.3-1: Mitigation Techniques Used for All Hazards in Charles County				
HAZARD	**MITIGATION TECHNIQUE**			
(in order of RF Ranking)	**Local Plans and Regulations**	**Structure and Infrastructure Projects**	**Natural Systems Protection**	**Public Education and Emergency Services**
Extreme Weather (N)		X	X	X
Flood (N)	X	X	X	X
Temperature Extremes (N)				X
Public Health Emergency (N)	X			X
Hurricane, Tropical Storm, and Nor'easter (N)		X	X	X
Utility Interruption (M)		X		X
Civil Disturbance and Criminal Activity (M)		X		X
Environmental Hazards – Hazardous Materials (M)	X			X
Transportation Accidents (M)		X		
Severe Winter Storms (N)		X		X
Erosion (N)			X	
Building and Structure Collapse (M)		X		
Dam Failure (N)		X		X
Earth Disturbance (N)	X		X	
Drought (N)			X	X
Environmental Hazards - Nuclear Events (M)	X	X		X
Wildfire (N)			X	X

Note: Each mitigation technique has numerous mitigation actions items that apply to all hazards, including Local Plans and Regulations, Structure and Infrastructure Projects, and Public Education and Emergency Services.

7.4 2024-2029 Mitigation Action Plan

On December 14th, a virtual Mitigation Workshop was held to identify mitigation actions for inclusion in the 2024 Hazard Mitigation Plan (HMP). During the Workshop, HMPC members were divided into small groups based on the previously mentioned four (4) mitigation action categories. Each of the four (4) groups reviewed mitigation actions carried over from the 2018 HMP and new mitigation ideas developed for this update. Each group was relatively small, which enabled members to have discussions on various topics during this virtual setting. An excel spreadsheet was utilized to review 2018 action items and introduce potential 2024 mitigation ideas. Each group's answers and modifications were captured on the spreadsheet during the workshop.

The Mitigation workshop virtual meetings schedule on December 14, 2023, was:

- Local Planning and Regulations
  - 8:30 AM – 10:00 AM
- Structure and Infrastructure Projects
  - 10:30 AM - Noon
- Natural Systems Protection
  - 12:30 PM – 2:00 PM
- Public Education and Emergency Services
  - 2:30 PM – 4:00 PM

Results of the workshop were distributed to HMPC members for review and have been included in this section of the 2024 HMP, Table 7.4-1. Participants reviewed almost one hundred (100) mitigation actions for potential inclusion in the plan update. Participants reviewed each action and indicated if the proposed action item under review should or should not be included in the plan update. The review resulted in a total of thirty-three (33) new mitigation actions. While thirty-six (36) mitigation actions were carried over from the previous plan. A total of sixty-nine (69) mitigation actions were selected for inclusion in the plan and were categorized as follows:

- Local Planning and Regulations- 21 Action Items (8 new)
- Structure and Infrastructure Projects- 20 Action Items (9 new)
- Natural Systems Protection- 8 Action Items (8 new)
- Public Education and Emergency Services - 20 Action Items (8 new)

Table 6.4-1 was provided to all Hazard Mitigation Planning Committee (HMPC) members for final review. During the review process, direct coordination with several departments/agencies was necessary to ensure mitigation actions were accurate. The following departments and agencies were contacted via email.

- Department of Public Works – Action Items #3, #23, 27, 36, 41
- Department of Planning and Growth Management – Action Items #4, 24, 59
- Resilience Authority of Charles County – Action Item #24

- Charles County Capital Services – Action Items #29, 58
- Charles County Volunteer Fire Chief – Action Items #56, 57, 60
- Charles County Board of Education – Action Item # 57

Representatives from these departments/agencies provided review comments and modifications were made according to the respective mitigation action items listed above.

In addition to the selection of mitigation action for inclusion in the plan update, Mitigation Workshop participants were asked to identify mitigation actions that resonated the most with them and/or had a high likelihood of completion. While there were sixty-nine (69) total mitigation actions chosen for inclusion in the plan update, seventeen (17) of those were identified for further prioritization.

To further prioritize the seventeen (17) selected mitigation actions, an online survey was provided to all HMPC members and municipal representatives. The basis for this survey is the STAPLEE evaluation method, which uses standard criteria for evaluation: Social, Technical, Administrative, Political, Legal, Economic, and Environmental, however this evaluation was modified to a user-friendly online survey facilitating participation. The survey consisted of six (6) questions, which corresponded to a point system for prioritization purposes. Participants answered Yes/No/or Null to each question. These six (6) questions included the following:

1. Do you think there would be community acceptance/general support for this mitigation project?
2. Do you think implementation of this mitigation project will enhance the health and safety of the community?
3. Do you think the community will be able to sufficiently staff and/or provide technical support to implement this mitigation project?
4. Do you think the benefits of this mitigation project will exceed the likely costs?
5. Do you think the maintenance requirements for this option will be affordable and not provide an undue burden on the County?
6. Is this project consistent with environmental goals?

Charles County Mitigation Action Prioritization Survey

Thank you for participating in this survey. While 70 mitigation actions are included in the 2024 Charles County Hazard Mitigation Plan Update, 17 were identified for further prioritization during the mitigation workshops. These action items were selected during the workshop as resonating with participants and having a high likelihood of completion during the next planning cycle.

Mitigation actions are divided into the four (4) categories used during the workshops:

- Local Planning and Regulations
- Structure and Infrastructure Projects
- Natural Systems Protection
- Public Education and Emergency Services

Completion of this survey will assist in the final prioritization of the 17 mitigation actions. Please complete this survey to the best of your ability.

As a result of the prioritization survey, four (4) mitigation action items were rated as "high" priority, seven (7) action items were rated "medium," while the remaining six (6) mitigation action items were rated "low." Ratings for the mitigation action items are as follows:

- High **Mitigation Action Item #5** - Continue incorporating the HMP into future updates of the Charles County's Comprehensive Plan. Introduce language in the comprehensive plan to plan for development while considering hazards and their impacts in highly developed areas.
- High **Mitigation Action Item #11** - Add additional floodplain management and permitting information to the County website, i.e., permit application, links to state and federal floodplain mapping and insurance programs.
- High **Mitigation Action Item #50** - Encourage proper tree management for new power lines to reduce risks during high wind/severe winter weather. Also, continue to support tree-trimming to prevent limb breakage during these events.
- High **Mitigation Action Item #66** - Increase and/or enhance public education. The following ideas to educate the public about hazard mitigation were identified during the December 2023 public meeting:
    - Increase public meetings held by DES.
    - Prepare and provide hurricane preparedness information prior to June 1st.
    - Include hazard mitigation information and promote the project website with the county's utility bills or property tax bills.
    - Create "hazard of the month" context for inclusion in the Maryland Independent Paper, which is released on Fridays.
    - Utilize videos on pumps at gas stations to increase hazard awareness.
    - Develop public awareness campaign regarding extreme temperatures and how they affect residents.
    - Prepare flyers for safety strategies during severe winter weather, including driver education classes and materials.
    - Send news releases to local newspapers, radio, and TV stations with pre-disaster information while attempting to reach all areas of Charles County.
    - Perform outreach activities to inform residents of their vulnerability to hazards and how to mitigate them. This may include newsletters, flyers on keeping drain ditches clear, participation in the NFIP, and safety tips.
    - Promote Tornado safety public awareness and encourage the building of safe rooms during new construction.
- Medium **Mitigation Action Item #19** - Review regulations to ensure adequate zoning regulations are in place to reduce future development in high-hazard areas and introduce new language to this effect in their zoning ordinances. Charles county currently has a 2-foot freeboard requirement. Increase freeboard to 3 feet.
- Medium **Mitigation Action Item #32** - Plan for and maintain adequate road and debris clearing capabilities. Include information in the Debris Management Plan update.

- Medium **Mitigation Action Item #33** - Obtain and strategically deploy signage for community awareness during all-hazard events. This signage may include flood warning signs with or without flashing lights. Refer to the Nuisance Flood Plan.
- Medium **Mitigation Action Item #36 -** Work with county roads and SHA to install Reflective Pavement markers (RPM) along roadways. During rain and snowstorms lines are difficult to see, St. Charles Parkway is a prime example.
- Medium **Mitigation Action Item #46 -** Promote tree planting at the neighborhood level. Distribute information on Maryland's 5 million trees initiative. (5MT). Consider social equity when prioritizing neighborhood outreach.
- Medium **Mitigation Action Item #51 -** Establish heating and cooling centers for vulnerable populations and link them to outreach projects that encourage at-risk populations to use the facilities. Update and expand facility listing.
- Medium **Mitigation Action Item #64** - Public Information Campaign Pre & Post Disaster – black mold danger, impacts, and remediation.
- Low **Mitigation Action Item #21** - Explore the opportunity and language used to officially adopt the Coast Smart - Climate Ready Action Boundary (CS-CRAB) as a regulatory floodplain boundary. The CS-CRAB model is FEMA Base Flood Elevation (BFE)/1% annual chance floodplain with an additional 3 feet of water added to it. Structures in the coastal BFE plus three feet total 1,562, whereas coastal BFE structures total 689.
- Low **Mitigation Action Item #31** - Include Historic Properties in the County's Debris Management Plan. Ensure debris for historic properties could be preserved.
- Low **Mitigation Action Item #43** - Complete a Green Infrastructure Plan. Develop actions that mitigate flood risk by slowing and reducing stormwater discharges and highlight water quality improvements. In addition, urban heat islands form as cities replace natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. Trees, green roofs, and other green infrastructure features can cool urban areas by shading building surfaces, deflecting radiation from the sun, and releasing moisture into the atmosphere.
- Low **Mitigation Action Item #44 -** Create new and restore existing wetlands as a best management practice to increase resiliency by providing storm buffers, drought buffers and sea level rise buffers. Consider projects to create wetlands to increase floodplain holding capacity.
- Low **Mitigation Action Item #47 -** Establish a workgroup to develop recommendations regarding policies specific to development practices and general land clearing, such as retention of trees and native plantings. Review and strengthen existing codes and regulations.
- Low **Mitigation Action Item #61** - Evaluate and develop Tier II facilities and site plans on an annual basis. Tier II facilities are any regulated facility in the U.S. that stores or handles more than 10,000 pounds of hazardous chemicals and must submit an annual Tier II inventory report.

As previously discussed, Table 7.4-1, 2024-2029 Mitigation Action Plan provides the sixty-nine (69) mitigation action items identified for inclusion in this plan update. A total of thirty-three (33) mitigation actions are new, while thirty-six (36) mitigation actions have been carried over from the previous plan. Mitigation numbers in the first column that are highlighted in green are the new action items for the 2024 HMP Update. Mitigation actions denoted with an asterisk (*) are the seventeen (17) action items that resonated the most for each group.

Table 7.4-1 provides the action item number, the mitigation action, hazard(s) the action item addresses, the community the action item would help, the lead agency/department for the implementing the action item, the category the action item falls under, potential funding, and the implementation schedule, Note the implementation schedule is based on: Short Term (1 - 2 years to complete) and Long Term (3 – 5 years to complete).

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
1	Take steps towards joining the community rating system.	Flood	Charles County	Planning & Growth Management	Local Planning and Regulations	FEMA - CERC FEMA – Hazard Mitigation Assistance MDE - Comprehensive Flood Management Grant Program DNR – Grants Gateway	Short
2	Continue to acquire, elevate or floodproof structures in identified repetitive loss areas throughout Charles County. Form a workgroup to determine tasks and associated responsible entities, per task. Prioritize those properties within socially vulnerable Census Tracts.	Flood	Charles County	Emergency Services, Public Facilities, Planning and Growth Management	Local Planning and Regulations	FEMA – Hazard Mitigation Assistance HUD - Community Block Development Grant (CDBG)	Long
3	Evaluate the feasibility of mitigation measures for the critical facilities in the 100-year floodplain. There are two pump stations and one well within the 1% annual-chance floodplain.	Flood	Charles County	Public Works-Utilities, Planning and Growth Management, Floodplain Manager	Local Planning and Regulations, Structure and Infrastructure Projects	FEMA – Hazard Mitigation Assistance HUD - Community Block Development Grant (CDBG) USACE - Planning Assistance to States MDE - Comprehensive Flood Management Grant Program	Long
4	Monitor infrastructure (public & private) for impacts from subsidence and make recommendations to strengthen and mitigate issues as they are identified.	Earth Disturbance	Charles County	Planning and Growth Management	Local Planning and Regulations	FEMA – Hazard Mitigation Assistance	Long
*5	Continue incorporating the HMP into future updates of the Charles County's Comprehensive Plan. Introduce language in the comprehensive plan to plan for development while considering hazards and their impacts in highly developed areas. Integrate social equity throughout this planning process.	All Hazards	Charles County	Planning & Growth Management	Local Planning and Regulations	Annual Operating Budget	Long
6	Conduct archaeological assessment of high priority sites in high hazard areas.	All Hazards	Charles County	Planning and Growth Management	Local Planning and Regulations	MDE – Dams, FEMA HH Dams	Long

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
7	Create an Expedited Review Process for historic properties to be utilized post-incident. Evaluate for mitigation opportunities and convey to property owners for their consideration.	All Hazards	Charles County	Planning and Growth Management	Local Planning and Regulations	NPS – Competitive Grants Program MHT - Historic Preservation Non-Capital Grant Program Annual Operating Budget	Long
8	Establish a Demolition Delay Process for historic properties to be utilized post-incident.	Flood, Erosion, Landslide, Wildfire	Charles County, Town of Indian Head, Town of La Plata	Planning and Growth Management, Emergency Services, Public Works	Local Planning and Regulations	HUD - Community Block Development Grant (CDBG) NPS – Competitive Grants Program MHT - Historic Preservation Non-Capital Grant Program Annual Operating Budget	Long
9	Develop disaster facility plan(s) to preserve hazard prone historic resources owned by Charles County and municipalities.	Flood, Erosion, Landslide, Wildfire	Charles County, Town of Indian Head, Town of La Plata	Parks, Recreation & Tourism	Local Planning and Regulations	HUD - Community Block Development Grant (CDBG) NPS – Competitive Grants Program MHT - Historic Preservation Non-Capital Grant Program Annual Operating Budget	Long
10	Prohibit future development in high hazard areas, specifically in the 1% annual chance flood hazard area.	Flood	Charles County	Planning and Growth Management	Local Planning and Regulations	Annual Operating Budget	Long
*11	Add additional floodplain management and permitting information to the County website, i.e., permit application, links to state and federal floodplain mapping and insurance programs.	Flood	Charles County	Planning & Growth Management	Local Planning and Regulations	Annual Operating Budget	Short
12	Identify ways to reduce vulnerability of historic properties to coastal erosion, particularly along the Potomac and Port Tobacco Rivers.	Earth Disturbance	Charles County	Emergency Services, Planning and Growth Management	Local Planning and Regulations	FEMA – Hazard Mitigation Assistance NPS – Competitive Grants Program MHT - Historic Preservation Non-Capital Grant Program MDE - Comprehensive Flood Management Grant Program	Long

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
13	Apply soil stabilization measures on steep slopes with native plantings.	Earth Disturbance	Charles County	Planning and Growth Management	Local Planning and Regulations, Natural Systems Protection	FEMA – Hazard Mitigation Assistance Annual Operating Budget	Short
14	Address Goose Bay Marina & RV and Campground & Port Tobacco RV Resort- structures going from mobile to permanent with porches, skirting, and high occupancy rate.	Flood	Charles County	Planning and Growth Management	Local Planning and Regulations	FEMA - CERC MDE - Comprehensive Flood Management Grant Program	Long
15	Develop Incident Action Plans, based on high-risk hazards, to respond to threats to historic and cultural resources, e.g., sea level rise, storm surge, coastal erosion, riverine flooding, wildfire, dam failure, etc. Collaborate with municipalities in this planning process.	All Hazards	Charles County, Town of Indian Head, Town of La Plata	Recreation, Parks and Tourism, Emergency Services	Local Planning and Regulations	FEMA – Hazard Mitigation Assistance HUD - Community Block Development Grant (CDBG) NPS – Competitive Grants Program USACE – Planning Assistance to States MHT - Historic Preservation Non-Capital Grant Program MDE - Comprehensive Flood Management Grant Program DNR – Grants Gateway	Long
16	Promote FEMA Risk Rating 2.0 to the Public. Understand the community impact of Risk Rating 2.0 and share information with the public to encourage the purchase and/or retention of flood insurance. Should the County and or municipalities apply for CRS, this action qualifies for CRS credit, which in turn will lower the cost of flood insurance for policyholders.	Flood	Charles County, Town of Indian Head, Town of La Plata	Planning and Growth Management, Floodplain Manager	Local Planning and Regulations	FEMA - CERC MDE - Comprehensive Flood Management Grant Program	Short
17	Prioritize Severe Repetitive Loss Properties for mitigation. There are five residential and one commercial SRL properties.	Flood	Charles County	Emergency Services, Planning and Growth Management, Resilience Authority	Local Planning and Regulations	FEMA – Hazard Mitigation Assistance HUD - Community Block Development Grant (CDBG) MDE - Comprehensive Flood Management Grant Program	Long

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
18	Target flood insurance campaign to Repetitive Loss Properties, as only fourteen of the thirty-four properties are showing as having flood insurance in the FEMA NFIP database. Note: one RLP is within the Town of La Plata.	Flood	Charles County, Town of La Plata	Planning and Growth Management, Floodplain Manager	Local Planning and Regulations	FEMA - CERC MDE - Comprehensive Flood Management Grant Program	Short
*19	Review regulations to ensure adequate zoning regulations are in place to reduce future development in high-hazard areas and introduce new language to this effect in their zoning ordinances. Charles county currently has a 2-foot freeboard requirement. Increase freeboard to 3 feet.	Flood	Charles County	Planning and Growth Management, Floodplain Manager	Local Planning and Regulations	FEMA - CERC MDE - Comprehensive Flood Management Grant Program	Short
20	Develop and publish official Administrative Procedures for Substantial Improvement/ Substantial Damage (SI/SD), including standard worksheets, template letters, and homeowner/ contractor affidavits.	Flood	Charles County	Planning and Growth Management, Floodplain Manager	Local Planning and Regulations	FEMA - CERC MDE - Comprehensive Flood Management Grant Program	Short
*21	Explore the opportunity and language used to officially adopt the CRAB as a regulatory floodplain boundary. Structures in the coastal BFE plus three feet total 1,562, whereas coastal BFE structures total 689.	Sea Level Rise	Charles County, Town of La Plata, Town of Indian Head	Planning and Growth Management, Floodplain Mgr.	Local Planning and Regulations	FEMA - CERC MDE - Comprehensive Flood Management Grant Program	Long
22	Install surge protectors on electronic equipment in County facilities to protect equipment during thunderstorm and lightning events.	Extreme Weather	Charles County, Town of La Plata, Town of Indian Head	Emergency Services, Information Technology	Structure and Infrastructure Projects	FEMA – Homeland Security Grants	Long
23	Address flooding that is caused by an obstructed drainage ditch that runs east to west through the center of the town, Port Tobacco.	Flood	Village of Port Tobacco	Village of Port Tobacco, Parks Division	Structure and Infrastructure Projects	USACE - Continuing Authorities Program NRCS - Watershed and Flood Prevention Operations MDE - Comprehensive Flood Management Grant Program DNR – Grants Gateway	Long

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
24	Implement stormwater management and drainage improvements in flood-prone areas. *Note, for HMA higher eligibility, critical facilities and/or under would need to be within the flood prone area.*	Flood	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Planning & Growth Management, Resilience Authority	**Structure and Infrastructure Projects**	FEMA – Hazard Mitigation Assistance HUD - Community Block Development Grant (CDBG) USACE - Continuing Authorities Program NRCS - Watershed and Flood Prevention Operations MDE - Comprehensive Flood Management Grant Program DNR – Grants Gateway	Long
25	Work with utility providers to ensure regular maintenance and upkeep of power lines and other utilities.	Utility Interruption	Charles County	Emergency Services, SMECO	**Structure and Infrastructure Projects**	Annual Operating Budget	Long
26	Implement traffic safety improvements at high-crash intersections and roadway segments. Continue to review priority listing - La Plata.	Transportation Accident	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Planning and Growth Management, Maryland Department of Transportation	**Structure and Infrastructure Projects**	DOT – SMART Grants Program	Long
27	Review existing conditions of bridges to determine their susceptibility to collapse. Retrofit or rebuild high-priority structurally deficient bridges. All County bridges are inspected on a 2-year cycle. The bridge on Poplar Hill Road currently is deficient and replacement is scheduled for 2024.	Building and Structure Collapse	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Public Works, State Highway Administration	**Structure and Infrastructure Projects**	DOT - Bridge Investment Program	Short
28	Retrofit public buildings and critical facilities to withstand snow loads and prevent roof collapse.	Building and Structure Collapse	Charles County	Public Works	**Structure and Infrastructure Projects**	FEMA – Hazard Mitigation Assistance HUD - Community Block Development Grant (CDBG)	Long
29	Review Capital Improvement Plans to ensure that programmed infrastructure improvements are not in high hazard areas and/or look for mitigation opportunities that may be completed in tandem with necessary infrastructure improvements.	All Hazards	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Emergency Services, Planning and Growth Management, Town of La Plata, Town of	**Structure and Infrastructure Projects**	Annual Operating Budget	Short

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
	Include line items within capital improvement projects indicating if the project includes a hazard mitigation component.			Indian Head, Village of Port Tobacco			
30	Obtain grant funding for generators for critical facilities. Facilities in need of generators include volunteer stations and schools, notably Henry Lackey High School, Thomas Stone High School, and Piccowaxen Middle School.	All Hazards	Charles County, Town of La Plata, Town of Indian Head	Public Works, Emergency Services	**Structure and Infrastructure Projects**	FEMA – Hazard Mitigation Assistance FEMA - Homeland Security Grants USACE - Continuing Authorities Program	Long
*31	Include Historic Properties in the County's Debris Management Plan. Ensure debris from historic properties could be preserved.	All Hazards	Charles County	Planning and Growth Management, Emergency Services, Public Works	**Structure and Infrastructure Projects**	Annual Operating Budget	Short
*32	Plan for and maintain adequate road and debris clearing capabilities. Include information in the Debris Management Plan update.	Transportation Accident	Charles County, Town of La Plata, Town of Indian Head	Public Works	**Structure and Infrastructure Projects**	Annual Operating Budget	Short
*33	Obtain and strategically deploy signage for community awareness during all-hazard events. This signage may include flood warning signs with or without flashing lights. Refer to the Nuisance Flood Plan.	Flood, Extreme Weather	Charles County, Town of Indian Head, Town of La Plata	Public Works - County Roads, Emergency Services	**Structure and Infrastructure Projects**	FEMA – Hazard Mitigation Assistance MDE - Comprehensive Flood Management Grant Program	Short
34	Include Hazus data for 1% annual chance flood event in Debris Management Plan Update. Hazus data: 1,180 debris projected to be generated, equating to 48 truckloads (25 tons per truck.)	Flood	Charles County, Town of Indian Head, Town of La Plata	Public Works - County Roads, Emergency Services	**Structure and Infrastructure Projects**	Annual Operating Budget	Short
35	Apply for FEMA Flood Mitigation Assistance funding to support CRS activities and/or development a Flood Mitigation Plan with mitigation project concept designs.	Flood	Charles County, Town of Indian Head, Town of La Plata	Planning and Growth Management	**Structure and Infrastructure Projects**	FEMA – Flood Mitigation Assistance (FMA)	Short
*36	Work with county roads and SHA to install Reflective Pavement markers (RPM) along roadways. During rain and snowstorms lines are difficult to see, St. Charles Parkway is a prime example.	Transportation Accident	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Public Works - County Roads, State Highway Administration	**Structure and Infrastructure Projects**	DOT – SMART Grants Program	Short

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
37	Evaluate areas and roadways for opportunities to install lighting.	Civil Disturbance and Criminal Activity	Charles County, Town of Indian Head, Town of La Plata	Public Works - County Roads, SHA	Structure and Infrastructure Projects	DOT – SMART Grants Program	Short
38	Evaluate areas for installation of cameras to discourage criminal activity. Prioritize those neighborhoods within socially vulnerable Census Tracts.	Civil Disturbance and Criminal Activity	Charles County, Town of Indian Head, Town of La Plata	Sheriff's Office	Structure and Infrastructure Projects	FEMA – Homeland Security Grants HUD - Community Block Development Grant (CDBG)	Short
39	Develop concept designs and apply for grant funding to address nuisance and urban flood issues identified and prioritized in the Nuisance Flood Plan.	Flood	Charles County, Town of Indian Head, Town of La Plata	Emergency Services, Public Works- County Roads	Structure and Infrastructure Projects	FEMA – Hazard Mitigation Assistance HUD - Community Block Development Grant (CDBG) MDE - Comprehensive Flood Management Grant Program DNR – Grants Gateway	Long
40	Add signage to the following roadways indicating they are within the inundation areas for the high and significant hazard dams: DuBois Road, Route 232, Route 6, and Oaks Road.	Dam Failure	Charles County	Public Works- County Roads, Department of Emergency Services	Structure and Infrastructure Projects	FEMA HH Dams MDE – Dams,	Short
41	Work with private property dam owners to identify rehabilitation/improvement projects and potential funding opportunities.	Dam Failure	Charles County	Public Works, Department of Emergency Services, Recreation, Parks & Tourism	Structure and Infrastructure Projects	FEMA HH Dams MDE Dams, Annual Operating Budget	Long
42	Conduct watershed assessments to include new Atlas 14 precipitation table- rainfall intensity.	Flood	Charles County	Resilience Authority, Planning and Growth Management	Natural Systems Protection	FEMA – Hazard Mitigation Assistance MDE - Comprehensive Flood Management Grant Program DNR – Grants Gateway	Short

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
43*	Complete a Green Infrastructure Plan. Develop actions that mitigate flood risk by slowing and reducing stormwater discharges and highlight water quality improvements. In addition, urban heat islands form as cities replace natural land cover with dense concentrations of pavement, buildings, and other surfaces that absorb and retain heat. Trees, green roofs, and other green infrastructure features can cool urban areas by shading building surfaces, deflecting radiation from the sun, and releasing moisture into the atmosphere. Integrate social equity throughout this planning process.	Flood	Charles County	Resilience Authority, Planning and Growth Management	Natural Systems Protection	HUD - Community Block Development Grant (CDBG) EPA - Section 319 USACE – Planning Assistance to States UWSG - Nonpoint Source Program 12 and the Urban Waters Small Grants Program National Estuary Program Grants MDE - Comprehensive Flood Management Grant Program DNR – Grants Gateway	Short
44*	Create new and restore existing wetlands as a best management practice to increase resiliency by providing storm buffers, drought buffers and sea level rise buffers. Consider projects to create wetlands to increase floodplain holding capacity.	Flood & Sea Level Rise	Charles County, Town of La Plata, Town of Indian Head	Resilience Authority, Planning and Growth Management, Public Works	Natural Systems Protection	FEMA – Hazard Mitigation Assistance HUD - Community Block Development Grant (CDBG) EPA - Section 319 UWSG - Nonpoint Source Program 12 and the Urban Waters Small Grants Program National Estuary Program Grants MDE - Comprehensive Flood Management Grant Program DNR – Grants Gateway	Long
45	Include green infrastructure design into mitigation efforts to improve drainage and water retention. Also, incorporate green infrastructure such as open space and tree plantings in community designs to improve public health and expand recreational space.	Flood, Sea Level Rise, & Extreme Heat	Charles County, Town of La Plata, Town of Indian Head	Resilience Authority, Planning and Growth Management, Recreation, Parks & Tourism	Natural Systems Protection	FEMA – Hazard Mitigation Assistance HUD - Community Block Development Grant (CDBG) EPA - Section 319 UWSG - Nonpoint Source Program 12 and the Urban	Long

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
						Waters Small Grants Program National Estuary Program Grants MDE - Comprehensive Flood Management Grant Program DNR – Grants Gateway	
46*	Promote tree planting at the neighborhood level. Distribute information on Maryland's 5 million trees initiative. (5MT). Consider social equity when prioritizing neighborhood outreach. Prioritize those properties within socially vulnerable Census Tracts.	Erosion, Flood	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Resilience Authority, Planning and Growth Management	Natural Systems Protection	Maryland's 5 million trees initiative. (5MT)	Long
47*	Establish a workgroup to develop recommendations regarding policies specific to development practices and general land clearing, such as retention of trees and native plantings. Review and strengthen existing codes and regulations.	Erosion, Flood	Charles County, Town of Indian Head, Town of La Plata	Resilience Authority, Planning and Growth Management	Natural Systems Protection	DNR - Maryland Urban and Community Forestry Committee (MUCFC) Grants program Annual Operating Budget	Long
48	Evaluate existing stormwater practices to determine retrofit projects.	Flood	Charles County	Resilience Authority, Planning and Growth Management, Public Works-Roads	Natural Systems Protection	FEMA – Hazard Mitigation Assistance HUD - Community Block Development Grant (CDBG) MDE - Comprehensive Flood Management Grant Program DNR – Grants Gateway	Long
49	Working in coordination, the County and the Resilience Authority use prior studies and plans to inform and catalyze the design, permitting, and implementation of stormwater solutions that are prioritized by level of hazard and equity. The stormwater solutions should, wherever possible, include green infrastructure with multiple co-benefits to the community such as improvements in air quality, carbon sequestration, neighborhood	Erosion, Flood	Charles County	Resilience Authority, Planning and Growth Management, Public Works-Roads	Natural Systems Protection	FEMA – Hazard Mitigation Assistance USACE – Planning Assistance to States HUD - Community Block Development Grant (CDBG) MDE - Comprehensive Flood Management Grant Program DNR – Grants Gateway	Long

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
	beautification, and reduction in heat island effects.						
*50	Encourage proper tree management for new power lines to reduce risks during tornado, high wind or severe winter weather. Also, continue to support tree-trimming to prevent limb breakage during these events.	Extreme Weather, Tornadoes Severe Winter Storms	Charles County, Town of Indian Head, Town of La Plata, Village of Port Tobacco	Emergency Services, SMECO	Public Education & Emergency Services	Annual Operating Budget	Long
*51	Establish heating and cooling centers for vulnerable populations and link them to outreach projects that encourage at-risk populations to use the facilities. Update and expand facility listing. Prioritize neighborhoods within socially vulnerable Census Tracts to ensure easy accessibility to these centers.	Temperature Extremes	Charles County, Town of Indian Head, Town of La Plata, Village of Port Tobacco	Emergency Services	Public Education & Emergency Services	Annual Operating Budget	Long
52	Identify opportunities to upgrade or bury power lines.	Utility Interruption	Charles County, Town of Indian Head, Town of La Plata	Emergency Services, SMECO	Public Education & Emergency Services	HUD - Community Block Development Grant (CDBG)	Long
53	Increase awareness of available immunizations against diseases that can be easily communicable among residents of Charles County. Increase outreach efforts to vulnerable populations for awareness.	Public Health Emergency	Charles County, Town of Indian Head, Town of La Plata	Health Department	Public Education & Emergency Services	CDC Grants Annual Operating Budget	Short
54	In addition to pre- established areas where vaccines and other medications are dispensed during a public health emergency, identify alternate locations, as a contingency.	Public Health Emergency	Charles County, Town of Indian Head, Town of La Plata	Health Department	Public Education & Emergency Services	CDC Grants Annual Operating Budget	Short
55	Purchase equipment necessary to sustain hazardous materials response for emergency services.	Environmental Hazards	Charles County	Hazardous Materials Response Team (HMRT)	Public Education & Emergency Services	FEMA - Homeland Security Grants DOT - Hazardous Materials Emergency Planning (HMEP) Grant Program	Long
56	Inform the public about defensible space and how to reduce their risk of fire. Prioritize socially vulnerable Census Tracts that are within the wildfire/urban interface area, see Map 4.9-1.	Wildfire	Charles County, Town of Indian Head, Town of La Plata, Village of Port Tobacco	Emergency Services, Volunteer Fire Departments	Public Education & Emergency Services	Annual Operating Budget	Short

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
57	Work with Lackey High School to determine ways to provide alternative access during a hazard event.	Flood	Charles County, Town of Indian Head	Town of Indian Head, Emergency Services, SHA	Public Education & Emergency Services	Annual Operating Budget	Short
58	Continue to introduce environmental education programs in schools, park and recreation departments, conservation associations, and youth organizations.	All Hazards	Charles County, Town of Indian Head, Town of La Plata	Emergency Services, Town of Indian Head, Town of La Plata	Public Education & Emergency Services	Annual Operating Budget	Short
59	Conduct targeted outreach to historic property owners about mitigation techniques and recovery.	Flood, Erosion, Landslide, Wildfire	Charles County	Emergency Services, Planning and Growth Management	Public Education & Emergency Services	MHT - Historic Preservation Non-Capital Grant Program Annual Operating Budget	Long
60	Upgrade, maintain and add rural water access points for fire suppression.	Wildfire, Extreme Weather, Building and Structure Collapse	Charles County, Town of Indian Head, Town of La Plata	Public Works, Planning and Growth Management, Volunteer Fire Departments	Public Education & Emergency Services	Annual Operating Budget	Long
*61	Evaluate and develop Tier 2 facilities and site plans on an annual basis.	Environmental Hazards	Charles County	Hazardous Materials Response Team (HMRT)	Public Education & Emergency Services	FEMA - Homeland Security Grants Annual Operating Budget	Long
62	Include Hazus data for 1% annual chance flood event for shelter needs, an estimated 109 people will seek short-term shelter, while 125 households would be displaced. Include in EOP Update, the shelter operations plan.	Flood	Charles County, Town of Indian Head, Town of La Plata	Emergency Services	Public Education & Emergency Services	Annual Operating Budget	Short
63	Develop Post-Disaster Redevelopment Plan to guide decision making process after a major disaster. Prioritize socially vulnerable Census Tracts for targeted actions.	All Hazards	Charles County, Town of Indian Head, Town of La Plata	Emergency Services, Economic Development Department, Public Works, Planning and Growth Management	Public Education & Emergency Services	HUD - Community Block Development Grant (CDBG) Annual Operating Budget	Short
*64	Public Information Campaign Pre & Post Disaster – black mold danger, impacts, and remediation.	Flood, Public Health Emergencies	Charles County, Town of Indian Head, Town of La Plata	Emergency Services, Health Department	Public Education & Emergency Services	FEMA – CERC HUD - Community Block Development Grant (CDBG)	Short

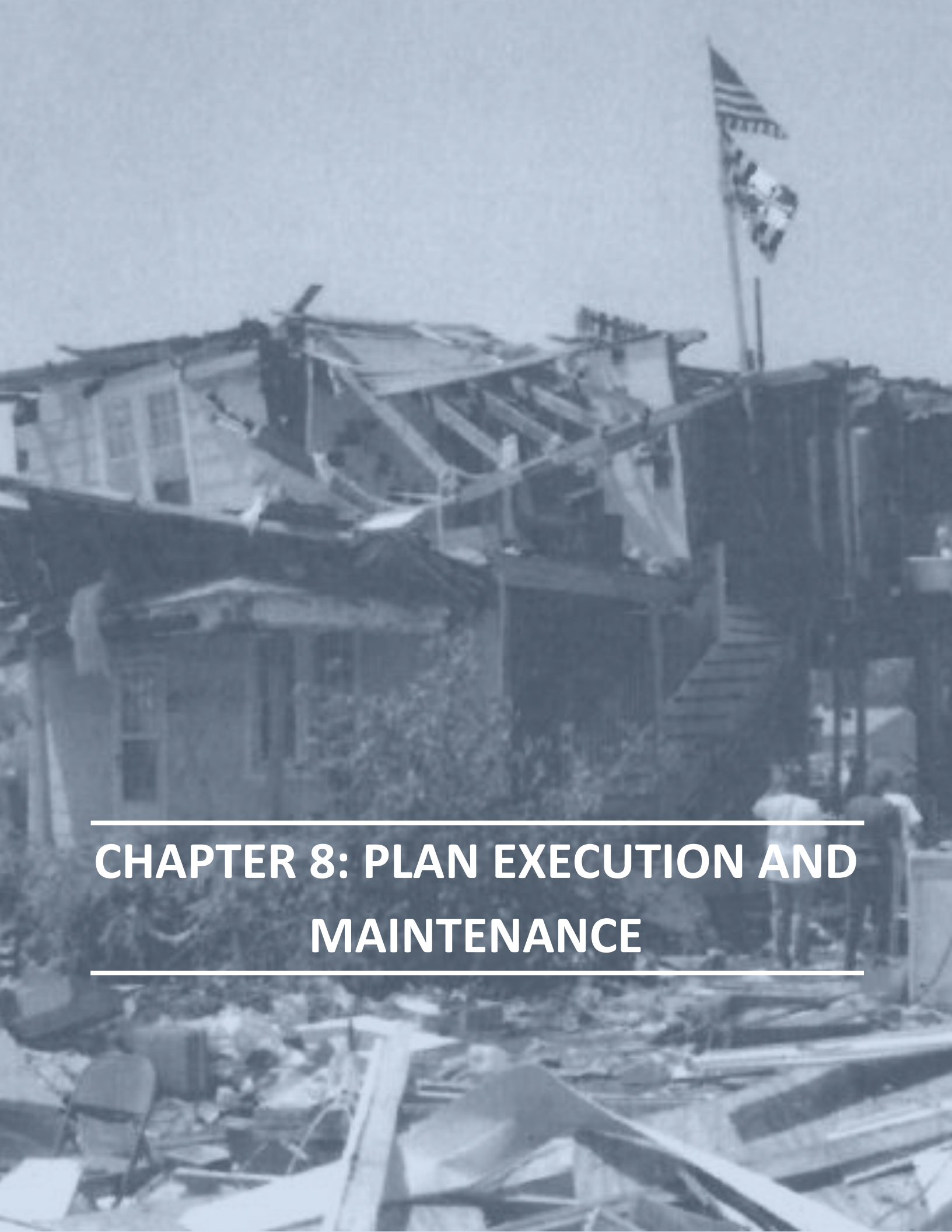
Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
						MDE - Comprehensive Flood Management Grant Program	
65	Disseminate generator safety tips such as those provided by the American Red Cross at: https://www.redcross.org/get-help/how-to-preparefor-emergencies/types-of-emergencies/poweroutage/safe-generator-use.html	Flooding, Hurricane, Tropical Storm, Nor'easter, Severe Winter Storms, Tornadoes, and Extreme Weather	Charles County, Town of Indian Head, Town of La Plata	Emergency Services	Public Education & Emergency Services	Annual Operating Budget	Short
*66	Increase and/or enhance public education. The following ideas to educate the public about hazard mitigation were identified during the December 2023 public meeting: - Increase public meetings held by DES. - Prepare and provide hurricane preparedness information prior to June 1st. - Include hazard mitigation information and promote the project website with the counties utility bills or property tax bills. - Create "hazard of the month" context for inclusion in the Maryland Independent Paper, which is released on Fridays. - Utilize videos on pumps at gas stations to increase hazard awareness. - Develop public awareness campaign regarding extreme temperatures and how they affect residents. - Prepare flyers for safety strategies during severe winter weather, including driver education classes and materials. - Send news releases to local newspapers, radio, and TV stations with pre-disaster information while attempting to reach all areas of Charles County.	All Hazards	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Emergency Services, Volunteer Fire & EMS Association Support	Public Education & Emergency Services	FEMA - CERC MDE - Comprehensive Flood Management Grant Program Annual Operating Budget	Short

Table 7.4-1: Charles County 2023-2029 Mitigation Action Plan

Number	Action	Hazard(s) Addressed	Community	Lead Agency/ Department	Category	Potential Funding	Implementation Schedule
	- Perform outreach activities to inform residents of their vulnerability to hazards and how to mitigate them. This may include newsletters, flyers on keeping drain ditches clear, participation in the NFIP, and safety tips. - Promote Tornado safety public awareness and encourage the building of safe rooms during new construction.						
67	Evaluate the expansion of cameras to discourage criminal activity. Update and maintain current cameras. Prioritize those neighborhoods within socially vulnerable Census Tracts.	Criminal Activity	Charles County, Town of Indian Head, Town of La Plata	Sheriff's Office	Public Education & Emergency Services	FEMA – Homeland Security Grants Annual Operating Budget	Long
68	Install emergency sirens with lightning detectors at parks and recreation facilities.	Extreme Weather (Tornado Specific)	Charles County, Town of Indian Head, Town of La Plata	Emergency Services, Recreation, Parks & Tourism	Public Education & Emergency Services	FEMA – Homeland Security Grants	Long
69	Target the seven (7) homes that are within all the dam inundation areas to advise homeowners of risks to life, health, and safety.	Dam Failure	Charles County	Emergency Services	Public Education & Emergency Services	FEMA - CERC FEMA - HH Dams MDE - Dams	Short

Actions highlighted in green are new for the 2024 HMP Update. Actions with an asterisk (*) denote groups top action items.



CHAPTER 8: PLAN EXECUTION AND MAINTENANCE

8.0 PLAN EXECUTION AND MAINTENANCE

8.1 Monitoring, Evaluating, and Updating the Plan

Monitoring, evaluating, and updating this HMP is critical to maintaining its value and success in Charles County's hazard mitigation efforts. Ensuring effective implementation of mitigation activities paves the way for continued momentum in the planning process and gives direction for the future. This section explains who will be responsible for maintenance activities and what those responsibilities entail. It also provides a methodology and schedule of maintenance activities including a description of how the public will be involved on a continued basis. The HMPC decided to keep the methodology and schedule similar to what was outlined in the 2018 HMP, but to put more emphasis on integrating the mitigation actions identified in the Mitigation Strategy into the other ongoing planning efforts to ensure implementation and tracking of actions throughout the five-year plan maintenance process.

Once adopted, the plan faces the truest test of its worth: implementation. While this plan contains many worthwhile actions, the County will need to decide which action(s) to undertake first. Two factors will help with making that decision: the priority assigned the actions in the planning process and funding availability. Low or no-cost actions most easily demonstrate progress toward successful plan implementation.

An important implementation mechanism that is highly effective and low-cost is incorporation of the hazard mitigation plan recommendations and their underlying principles into other plans and mechanisms. The County already implements policies and programs to reduce losses to life and property from hazards. This plan builds upon the momentum developed through previous and related planning efforts and mitigation programs and recommends implementing actions, where possible, through these other program mechanisms. HMPC members involved in these other planning mechanisms will be responsible for integrating the findings and recommendations of this plan with these other plans, programs, as appropriate. Implementation, incorporation into existing planning mechanisms will be done through the routine actions of:

- Monitoring other planning/program agendas
- Attending other planning/program meetings
- Participating in other planning processes
- Monitoring community budget meetings for other community program opportunities

The successful implementation of this mitigation strategy will require constant and vigilant review of existing plans and programs for coordination and multi-objective opportunities that promote a safe, sustainable community.

Mitigation is most successful when it is incorporated into the day-to-day functions and priorities of government and development. Implementation will be accomplished by adhering to the schedules identified for each action and through constant, pervasive, and energetic efforts to network and highlight

the multi-objective, win-win benefits to each program. This effort is achieved through the routine actions of monitoring agendas, attending meetings, and promoting a safe, sustainable community. Simultaneous to these efforts, it is important to maintain a constant monitoring of funding opportunities that can be leveraged to implement some of the more costly recommended actions.

This will include creating and maintaining a bank of ideas on how to meet local match or participation requirements. When funding does become available, the County will be in a position to capitalize on the opportunity. Funding opportunities to be monitored include special pre- and post-disaster funds, state and federal earmarked funds, benefit assessments, and other grant programs, including those that can serve or support multi-objective applications.

The Charles County Department of Emergency Services is designated to lead plan maintenance processes of monitoring, evaluation and updating with support and representation from all participating municipalities. The Department of Emergency Services will coordinate maintenance efforts, but the input needed for effective periodic evaluations will come from community representatives, local emergency management coordinators and planners, the general public, and other important stakeholders. In addition, the Department of Emergency Services will serve in an advisory capacity to the Charles County Board of Commissioners and other Departments within the County.

Each jurisdiction will designate a community representative to monitor implementation of mitigation activities and hazard events within their respective communities. This individual will be asked to work with the Charles County Mitigation Planning Committee to provide updates on applicable mitigation actions and feedback on changing hazard vulnerabilities within their community. In addition, the jurisdictional monitor will be responsible for reviewing the planning and land use regulatory element of the community's capability assessment to identify potential opportunities for incorporating appropriate elements of this HMP into local planning mechanisms and will also identify locally generated plans, information, reports. The Town of Indian Head will integrate the results of the County's HMP into the following public documents: Comprehensive Plan, 2005 Plan for Future Downtown, Subdivision Ordinance, Town of Indian Head Design Manual, and the Urban Land Institute Study - ULI Report. The Town of La Plata will integrate the results of the County's HMP into the following public documents: 2020 Comprehensive Plan, 2011 Comprehensive Parks & Recreation Master Plan (CPRMP), Vision Plan for Greater La Plata & Downtown Plan, 2023 Urban Tree Canopy Plan, and Zoning and Subdivision Ordinance.

Similarly, the Charles County Department of Planning and Growth Management will lead the effort to integrate mitigation goals, objectives, and actions into County comprehensive planning efforts. While the Comprehensive Plan will not include detailed information from the risk assessment and mitigation strategy, the HMP will continue to be referenced to ensure this information is addressed in comprehensive planning process. The Department of Planning and Growth Management will also take the lead with several actions related to further evaluating historic and cultural resources. The Department of Planning and Growth Management will report to the HMPC the progress of these actions and will identify if there are changes that need to be made to the risk assessment or the mitigation strategy based on information developed during the comprehensive planning process.

The Resilience Authority of Charles County will undertake and support resilience infrastructure projects, that mitigate the effects of climate change by offering a range of financing structures, forms, and techniques and leverages public and private investment and stimulates demand for resilience infrastructure projects throughout Charles County. The Resilience Authority can work in partnership with Charles County to accelerate infrastructure financing, reduce the cost of implementation, and mitigate and manage the risks of climate change.

The Department of Emergency Services will oversee the progress made on the implementation of action items identified and modify actions, as needed, to reflect changing conditions. The Charles County Department of Emergency Services will meet annually to evaluate the plan and discuss specific coordination efforts that may be needed with participating jurisdictions and other stakeholders. The annual evaluation may include the participation of individual municipal monitors, or at least will include reports prepared by them.

The annual evaluations of the 2023 HMP will not only include an investigation of whether mitigation actions were completed, but also an assessment of how effective those actions were in mitigating potential losses. A review of the qualitative and quantitative benefits (or avoided losses) of mitigation activities will support this assessment. Results of the evaluation will then be compared to the goals and objectives established in the plan and decisions will be made regarding whether actions should be discontinued or modified in any way in light of new developments in the community. Progress will be documented by the HMPC for use in the next HMP update and submitted to the Charles County Department of Emergency Services.

This Plan will be updated by the approved five-year anniversary date, as required by the Disaster Mitigation Act of 2000, or following a disaster event. Future plan updates will account for any new hazard vulnerabilities, special circumstances, or new information that becomes available. During the five-year review process, the following questions will be considered as criteria for assessing the effectiveness of the Charles County Hazard Mitigation Plan.

- Has the nature or magnitude of hazards affecting the County changed?
- Are there new hazards that have the potential to impact the County?
- Do the identified goals and actions address current and expected conditions?
- Have mitigation actions been implemented or completed?
- Has the implementation of identified mitigation actions resulted in expected outcomes?
- Are current resources adequate to implement the plan?
- Should additional local resources be committed to address identified hazards?

Issues that arise during monitoring and evaluation which require changes to the local hazard, risk and vulnerability summary, mitigation strategy, and other components of the plan will be incorporated during future updates.

The following steps describe how the HMPC will monitor the progress of mitigation plan implementation annually and/or following a Federally Declared Disaster or significant hazard event.

Step 1: The Charles County OEM HMP Coordinator/Designee – Initiate monitoring process

- Notify the HMPC representatives to facilitate an annual or post-disaster review.
    - Disseminate the Mitigation Action Form for mitigation action updates to the HMPC, along with the current list of mitigation actions in the Plan.
    - Disseminate the Mitigation Action Form for mitigation action updates to stakeholders with potential new mitigation actions.

Step 2: Charles County OEM HMP Coordinator/Designee and HMPC – Collect and assess the status of current actions and identify new actions

- Assess progress for current actions, including implemented and funded actions and any new opportunities for mitigation actions.
- Have any mitigation actions been completed?
- Are different or additional resources now available?
- Are mitigation actions being implemented and monitored?

Step 3: Charles County OEM HMP Coordinator/Designee and HMPC – Assess new opportunities for mitigation.

- Has a major disaster occurred that presents opportunities for mitigation?
- Is there a new initiative, agency priority, existing planning mechanism, or information that is not represented in current actions?

Step 4: Charles County OEM HMP Coordinator/Designee – Prepare and disseminate the status report to HMPC and stakeholders, including elected officials.

- The status report may include:
    - Status of current and implemented actions.
    - Proposed new actions.
    - Potential funding sources.
    - New opportunities for mitigation, including actions in development, new programs, etc.

Any interested party wishing for an update of the HMP sooner than the 5-year update will submit such a request to the Charles County Department of Emergency Services for consideration through the Director. The request shall be accompanied by a detailed rationale. The Charles County Department of Emergency Services will evaluate all such requests and determine whether the update request should be acted upon. If the decision is in the affirmative, an assignment will be made for an individual to author the update. The draft updated section along with a detailed rationale will be submitted to the Charles County HMPC. The committee will circulate the draft updated section to every jurisdiction participating in the plan for comment and after an appropriate period of time, the committee shall decide to update the plan at least partially based on the feedback received from the other jurisdiction. County and municipal adoptions will then occur.

8.2 Continued Public Involvement

Continued public involvement is imperative to the overall success of the plan's implementation. The update process provides an opportunity to solicit participation from new and existing stakeholders and to publicize success stories from the plan implementation and seek additional public comment. The plan maintenance and update process will include continued public and stakeholder involvement and input through attendance at designated committee meetings, web postings, press releases to local media, and through public hearings.

As was done during development of the previous HMP Updates, the HMPC will involve the public during annual meetings or periodic evaluations of the HMP by providing an opportunity to submit comments. The public will have access to the current HMP through their local municipal office or on the Charles County Department of Emergency Services. Information on upcoming events related to this Plan or solicitation for comments will be announced via newsletters, newspapers, mailings, and the County website which can be accessed at: www.charlescountymd.gov/es/em/emergency-management. The public is encouraged to submit comments on the HMP at any time. The HMPC will incorporate all relevant comments during the next update of the Charles County HMP.

Appendix A: Mitigation Funding Sources

The following is a list of Federal and State Grants that may assist in implementing local Hazard Mitigation Plans.

Disclaimer: This information is subject to change at any time, contact the federal or state agency for current grant status.

Database last updated February 2023

Table A-1: Potential Funding Sources

Grant Program Name	Address and Telephone Contact Information	Eligible Activities	Federal, State and Local Cost Share Requirements	Other Program Characteristics	Grant Application Due Date
Federal Emergency Management Agency, Hazard Mitigation Grant Program (HMGP)	Maryland Department of Emergency Management 5401 Rue Saint Lo Drive Reisterstown, MD 21136	All Hazards Mitigation Planning. Acquisition, relocation, elevation and flood-proofing of flood-prone insured properties, flood mitigation planning, wind retrofit, stormwater improvements, education and awareness.	Federal - 75% Non-Federal - 25%	Local governments must follow the NFIP when a proposed project is located within the 100-year floodplain, also known as the Special Flood Hazard Area (SFHA). Projects must be cost effective, environmentally sound and solve problems. Repetitive loss properties are a high priority.	After a Presidential Disaster Declaration
Federal Emergency Management Agency, Building Resilient Infrastructure and Communities (BRIC)	Maryland Department of Emergency Management 5401 Rue Saint Lo Drive Reisterstown, MD 21136	BRIC funds may be used for: Capability and Capacity Building (C&CB) Activities, Mitigation Projects, and Management Costs.	Federal - 75% Non-Federal - 25% Economically Disadvantaged Rural Communities (EDRC) are eligible for an increase in funding up to 90% federal cost share/10% non-federal cost share. FEMA provides 100% federal cost share funding for management costs.	Projects must: Be cost-effective, Reduce or eliminate risk and damage from future natural hazards, Meet either of the two latest published editions of relevant consensus-based codes, specifications, and standards, Align with the applicable hazard mitigation plan, Meet all environmental and historic preservation (EHP) requirements.	Annual- Spring/Summer
Federal Emergency Management Agency, Flood Mitigation Assistance Program (FMA)	Maryland Department of Emergency Management 5401 Rue Saint Lo Drive Reisterstown, MD 21136	Assist States and communities to implement measures that reduce or eliminate the long- term risk of flood damage to buildings, manufactured homes, and other structures insured under the National Flood Insurance Program.	RL: Federal - 90% Non-Federal - 10% SRL: Federal - 100% Non-Federal - 0%	Available once a Flood Mitigation Plan has been developed and approved by FEMA.	Annual- Spring/Summer
National Flood Insurance Program (NFIP)	Maryland Department of Emergency Management 5401 Rue Saint Lo Drive Reisterstown, MD 21136	Provides financial protection by enabling persons to purchase insurance against floods, mudslide or flood related erosion.	Varies	Includes Federally backed insurance against flooding, available to individuals and businesses that participate in the NFIP.	Anytime
Increased Cost of Compliance	Maryland Department of Emergency Management 5401 Rue Saint Lo Drive Reisterstown, MD 21136	ICC coverage provides payment to help cover the cost of mitigation activities that will reduce the risk of future flood damage to a building. If a Flood Insurance Policy Holder suffers a flood loss and is declared to be substantially or repetitively damaged, ICC will pay up to 30,000 to bring the building into compliance with State or community floodplain management laws or ordinances. Usually this means elevating or relocating the building so that it is above the base flood elevation (BFE).	Varies	Once the local jurisdiction determines the building is substantially or repetitively damaged, the policy holder can contact an insurance agent to file an ICC claim. When applicable, based on provisions in the 2015 HMA Guidance, up to $30,000 of ICC funding can be used towards the non-federal share for a Hazard Mitigation Assistance (HMA) project.	Anytime

Table A-1: Potential Funding Sources

Grant Program Name	Address and Telephone Contact Information	Eligible Activities	Federal, State and Local Cost Share Requirements	Other Program Characteristics	Grant Application Due Date
U.S. Economic Development Administration, Economic Adjustment Program	U.S. Department of Commerce Economic Development Administration Curtis Center, 601 Walnut Street, Ste 140 South Philadelphia, PA 19106-3323 215-597-4603	Improvements and reconstruction of public facilities after a disaster or industry closing. Research studies designed to facilitate economic development.	Federal - 50%-70% Local- 30%-50%	Documenting economic distress, job impact and proposing a project that is consistent with a Comprehensive Economic Development Strategy are important funding selection criteria.	Anytime
U.S Economic Development Administration, Public Works and Development Facilities	U.S. Department of Commerce Economic Development Administration Curtis Center, 601 Walnut Street, Ste 140 South Philadelphia, PA 19106-3323 215-597-4603	Water and sewer, Industrial access roads, rail spurs, port improvements technological and related infrastructure	Federal - 50%-70% Local- 30%-50%	Documenting economic distress, job impact and projects that is consistency with a Comprehensive Economic Development Strategy are important funding selection criteria.	Quarterly Basis
Small Business Administration (SBA) Pre-disaster Mitigation Loan Program	James Rivera, Office of Disaster Assistance, Small Business Administration, 409 3rd Street, SW, STE 6050 Washington, DC 20416 202-205-6734	Activities done for the purpose of protecting real and personal property against disaster related damage.	No information	The mitigation measures must protect property or contents from damage that may be caused by future disasters and must conform to the priorities and goals of the state or local government's mitigation plan.	
Community Development Block Grants / States Program	U.S Department of Housing and Urban Development, Office of Block Grant Assistance, 451 7th Street SW., Washington, DC 20410-7000 202- 708-1112	Used for long-term recovery needs, such as: rehabilitation residential and commercial building; homeownership assistance, including down-payment assistance and interest rate subsidies; building new replacement housing; code enforcement; acquiring, construction, or reconstructing public facilities.	No information	Citizen participation procedures must be followed. At least 70 percent of funds must be used for activities that principally benefit persons of low and moderate income. Formula grants to States for non-entitlement communities.	After a Presidential Disaster Declaration
Fire Suppression Assistance Program	Infrastructure Division, Response and Recovery Directorate, FEMA, 500 C Street SW., Washington DC 20024 202-646-2500	Provides real-time assistance for the suppression of any fire on public (non- Federal) or privately owned forest or grassland that threatens to become a major disaster.	Federal - 70% Local - 30%	The State must first meet annual floor cost (if percent of average fiscal year fire costs) on a single declared fire. After the State's out-of- pocket expenses exceed twice the average fiscal year costs, funds are made available for 100 percent of all costs for each declared fire.	Funds from President's Disaster Relief Fund for use in a designated emergency or major disaster area.
Historic Preservation: Repair and Restoration of Disaster- Damaged Historic Properties	Infrastructure Division, Response and Recovery Directorate, FEMA, 500 C Street SW., Washington DC 20024 202-646-4621	To evaluate the effects of repairs to, restoration of, or mitigation hazards to disaster-damaged historic structures working in concert with the requirements of the Stafford Act.	Federal - 75% Local - 25%	Eligible to State and local governments, and any political subdivision of a State. Also, eligible are private non-profit organizations that operate educational, utility, emergency, or medical facilities.	After a Presidential Disaster Declaration
Transportation: Emergency Relief Program	Federal Transit Authority, FHWA, DOT, 1200 New	Provides aid for the repair of Federal-aid roads and roads on Federal lands.	Federal - 100%	Application is submitted by the State department of transportation for damages to Federal-aid highway	After serious damage to Federal-aid roads or roads on Federal lands caused

Table A-1: Potential Funding Sources

Grant Program Name	Address and Telephone Contact Information	Eligible Activities	Federal, State and Local Cost Share Requirements	Other Program Characteristics	Grant Application Due Date
	Jersey Avenue Washington, DC 20590 202-366-4043			routes, and by the applicable Federal agency for damages to roads on Federal lands.	by a natural disaster or by catastrophic failure.
Animals: Emergency Haying and Grazing	Emergency and Non-insured Assistance Programs, FSA, USDA, 1400 Independence Ave, SW, Washington, DC 20013 202-720-4053	To help livestock producers in approved counties when the growth and yield of hay and pasture have been substantially reduced because of a widespread natural disaster.	No information	Assistance is provided by the Secretary of Agriculture to harvest hay or graze cropland, or other commercial use of forage devoted to the Conservation Reserve Program (CRP0 in response to a drought or other similar emergency.	Anytime
Emergency Watershed Protection Program	Natural Resources Conservation Service 1400 Independence Avenue, SW Washington, DC 20250	Implementing emergency recovery measures for runoff retardation and erosion prevention to relieve imminent hazards to life and property created by a natural disaster that causes a sudden impairment of a watershed.	Federal - 75% Local - 25%	It cannot fund operation and maintenance work or repair private or public transportation facilities or utilities. The work cannot adversely affect downstream water rights and funds cannot be used to install measures not essential to the reduction of hazards.	TBD
Watershed Protection and Flood Prevention Program	Natural Resources Conservation Service 1400 Independence Avenue, SW Washington, DC 20250	To provide technical and financial assistance in carrying out works of improvement to protect, develop, and utilize the land and water resources in watersheds.	Varies due to project type.	Watershed area must not exceed 250,000 acres. Capacity of a single structure is limited to 25,000 acre-feet of total capacity and 12,500 acre- feet of floodwater detention capacity.	TBD
Watershed Surveys and Planning	Natural Resources Conservation Service 1400 Independence Avenue, SW Washington, DC 20250	To provide planning assistance to Federal, State, and local agencies for the development of coordinated water and related programs in watersheds and river basins. Emphasis is on flood damage reduction, erosion control, water conservation, preservation of wetlands and water quality improvements.	No information	These watershed plans form the basis for installing needed works of improvement and include estimated benefits and costs, cost- sharing, operation and maintenance arrangements, and other information necessary to justify the need for Federal assistance in carrying out the plan.	Anytime
Emergency Advance Measures for Flood Prevention	USACE 441 G Street, NW, Washington DC 20314 202-761-0011	To perform activities prior to flooding or flood fight that would assist in protecting against loss of life and damages to property due to flooding.	No information	There must be an immediate threat of unusual flooding present before advance measures can be considered. Any work performed under this program will be temporary in nature and must have a favorable benefit cost ratio.	Governor of State must request assistance
Emergency Streambank and Shoreline Protection	USACE 441 G Street, NW, Washington DC 20314 202-761-0011	Authorizes the construction of emergency streambank protection measures to prevent damage to highways, bridge approaches, municipal water supply systems, sewage disposal plants, and other essential public works facilities endangered by floods or storms due to bank erosion.	No information	Churches, hospitals, schools, and other non- profit service facilities may also be protected under this program. This authority does not apply to privately-owned property or structures.	TBD

Table A-1: Potential Funding Sources

Grant Program Name	Address and Telephone Contact Information	Eligible Activities	Federal, State and Local Cost Share Requirements	Other Program Characteristics	Grant Application Due Date
Small Flood Control Projects	USACE 441 G Street, NW, Washington DC 20314 202-761-0011	Authorizes the construction of small flood control projects that have not already been specifically authorized by Congress.	No information	There are two general categories of projects: structural and nonstructural. Structural projects may include levees, floodwalls, diversion channels, pumping plants, and bridge modifications. Nonstructural projects have little or no effect on water surface elevations, and may include flood proofing, the relocation of structures, and flood warning systems.	TBD
Flood: Emergency Advance Measures for Flood Prevention	USACE 441 G Street, NW, Washington DC 20314 202-761-0011	To mitigate, before an event, the potential loss of life and damages to property due to floods.	No information	Assistance may consist of temporary levees, channel cleaning, preparation for abnormal snowpacks, etc.	Governor of State must request assistance
Continuing Authorities Program (CAP)	USACE 441 G Street, NW, Washington DC 20314 202-761-0011	Initiates a short reconnaissance effort to determine Federal interest in proceeding. If there is interest, a feasibility study is performed.	Federal - 65% Local - 35%	A local sponsor must identify the problem and request assistance. Small flood control projects are also available.	Anytime
Hazardous Materials: State Access to the Oil Spill Liability Trust Fund	Director, USCG National Pollution Funds Center, U.S. Coast Guard Stop 7605. 2703 Martin Luther King Jr. Avenue, SE Washington, DC 20593-7605 202-795-6000	To encourage greater State participation in response to actual or threatened discharges of oil.	No information	Eligible to States and U.S. Trust Territories and possessions.	Anytime
Emergency Management Assistance (EMA)	Maryland Emergency Management Agency 5401 Rue Saint Lo Drive Reisterstown, MD 21136	Funds may be used for salaries, travel expenses, and other administrative cost essential to the day-to-day operations of State and Local emergency management agencies. Program also includes management processes that ensure coordinated planning, accountability for progress, and trained qualified staffing.	Federal - 50%	EMA funded activities may include specific mitigation management efforts not otherwise eligible for Federal funding. Management Assistance program funds may not be used for construction, repairs, equipment, materials or physical operations required for damage mitigation projects for public or private buildings, roads, bridges, or other facilities.	Anytime
Maryland Program Open Space	Department of Natural Resources 580 Taylor Ave. Annapolis, MD 21401 410-260-8445	Local provides financial and technical assistance to local subdivisions for the planning, acquisition, and/or development of recreation land or open space areas.	A local governing body may use up to $25,000 annually from its 100% (Acquisition) money to fund planning projects that update the Local Land Preservation and Recreation Plans.	Acquires outdoor recreation and open space areas for public use Administers funds made available to local communities for open and recreational space by the Outdoor Recreation Land Loan of 1969 and from the Land and Water Conservation Fund of the National Park Service, U.S. Department of the Interior.	July 1st
Maryland Recreational Trails Program	Maryland Scenic Byways/Recreational Trails Program* Office of Planning & Preliminary Engineering State Highway	Maintenance and restoration of existing recreational trail; Development and rehabilitation of trailside facilities and trail linkages; Purchase and lease of trail construction equipment; Construction of new trails;	Administered by the State Highway Administration (SHA), this program matches federal funds with local funds or in-kind contributions to implement trail	Projects must meet state and federal environmental regulatory requirements (NEPA, MEPA, Section 106, Section 4(f)). SHA will aid the project sponsor to acquire these approvals.	July 1st

Table A-1: Potential Funding Sources

Grant Program Name	Address and Telephone Contact Information	Eligible Activities	Federal, State and Local Cost Share Requirements	Other Program Characteristics	Grant Application Due Date
	Administration 707 N Calvert Street Baltimore, MD 21201 (p) 410.545.8637 (f) 410.209-5012 tmaxwell@sha.state.md.us	Acquisition of easements or property for recreational trails or recreational trail corridors; and Implementation of interpretive/educational programs to promote intrinsic qualities, safety, and environmental protection, as those objectives relate to the use of recreational trails.	projects. Projects can be sponsored by a county or municipal government, a private non-profit agency, a community group or an individual (non-governmental agencies must secure an appropriate government agency as a co-sponsor). Federal funds administered by the State Highway Administration are available for up to 80% of the project cost, matched by at least 20% funding from the project sponsor. Matching funds must be committed and documented in the local jurisdiction's budget. A Memorandum of Understanding outlining funding and project implementation responsibilities will be prepared by SHA and signed by all parties before the project funds are released.		
CoastSmart Communities Grant Program	Maryland Department of Natural Resources Chesapeake and Coastal Service (p) 410.260.8718 (f) 410.260.8739 sasha.land@maryland.gov	Municipalities and counties in the coastal zone are eligible to apply for and receive funds: Anne Arundel, Baltimore, Calvert, Caroline, Cecil, Charles, Dorchester, Harford, Kent, Prince George's, Queen Anne's, St. Mary's, Somerset, Talbot, Wicomico, and Worcester counties and Baltimore City. Funding for a one- year project that contributes to understanding, planning for, or implementing planning and outreach measures to address coastal hazard issues.	Up to $75,000 annually	Track A can fund flood vulnerability and risk assessments, updates to planning documents (e.g. hazard mitigation plans, zoning ordinances, building codes, floodplain ordinances, comprehensive plans), education and outreach campaigns and materials, applications to FEMA's Community Rating System in concert with other task outcomes, support for adopting an updated plan and integrating the plan into day-to-day existing planning processes that reduce overall flood risk due to tidal events or stormwater and rain events.	TBD

Table A-1: Potential Funding Sources

Grant Program Name	Address and Telephone Contact Information	Eligible Activities	Federal, State and Local Cost Share Requirements	Other Program Characteristics	Grant Application Due Date
Green Infrastructure Resiliency Grant Program	Maryland Department of Natural Resources Chesapeake and Coastal Service (p) 410.260.8799 (f) 410.260.8739 (e) megan.granato@maryland.gov	Municipalities and counties within the Maryland portion of the Chesapeake Bay watershed are eligible to apply for and receive funds. Please note that projects proposed in Cecil, Garrett and Worcester counties must be located within the portions of those counties that are within the watershed to be eligible. Funding for one year for Phase 1 and Phase 2 projects and up to 2 years for Phase 3 projects that will assess stormwater management needs associated with localized flooding and design or construct targeted green infrastructure practices to address those needs.	Up to $100,000 per project	Track B can fund watershed assessments that focus on determining local flood risks and how green infrastructure can be used to address those risks, site or watershed-level green infrastructure implementation plans, and green infrastructure project designs. This track can also fund construction of green infrastructure projects. To apply for construction funding, all applicable permit preapplication meetings must be complete.	TBD
Maryland Community Parks and Playgrounds Program	Department of Natural Resources 580 Taylor Ave. Annapolis, MD 21401 410-260-8445	1. Development of new parks 2. Rehabilitation of existing parks 3. Expansion or improvement of existing parks 4. Purchase and installation of playground equipment 5. Development of environmentally oriented parks and recreation projects 6. Development of new trails or extension of existing trails 7. Creation of access points to water recreation resources 8. Acquisition of land to create new parks.	The source of funds for this program is primarily State General Obligation Bonds, which may be authorized on an annual basis. The Community Parks and Playgrounds Program provides funding to incorporated municipalities and Baltimore City. Grants may be for up to 100% of the project cost and are selected on a competitive basis. Each applicant will be limited to one (1) Grant Proposal List submission package, which may contain several prioritized projects, per award cycle.	The Department of Natural Resources works to provide opportunities for Marylanders, especially our children, to experience nature. The DNR has developed a web site www.dnr.state.md.us/cin/NPS/index.asp that provides information about Nature Play Spaces. Nature Play Spaces are one of the many types of public recreation projects eligible for consideration for Community Parks and Playgrounds grant funding. While land acquisition costs may be considered for project funding, the highest priority will be placed on capital costs associated with park development and improvement.	TBD

Appendix B – Bibliography

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Appendix C – Participation

Appendix C Table of Contents

C-1 Internal Planning Team Kickoff Meeting – September 8, 2023

Invitations
Agenda / Meeting Checklist / Schedule
Minutes

C-2 HMPC Kickoff Meeting - August 24, 2023

Invitations
Agenda
PowerPoint Presentation
Minutes
Follow-up Coordination Mitigation Action Plan Worksheets

C-3 HMPC Midpoint Meeting – October 19, 2023

Invitations
PowerPoint Presentation
Capabilities Worksheets / NFIP Community Questionnaire
Minutes

C-4 HMPC Mitigation Workshop - December 14, 2023

Invitations
Teaming Correspondence
PowerPoint Presentation

C-5 HMPC / Public Meeting – December 12, 2023

Coordination Emails
PowerPoint
Presentations Photos
Sign-in Sheet

C-6 Public Survey Results

C-7 Press Release - September 13, 2023

C-1 Internal Planning Team Kickoff Meeting

September 8, 2023

EXTERNAL: Charles County HMP Update Internal Kickoff

KR

Kayla Rhue <krhue@menv.com>

Required Michael Manen; Michelle L. Lilly; Gary Lewis; James, Mark; Virginia Smith; Doug Adams; grothb

Accepted on 8/4/2023 5:08 PM.

Monday, August 7, 2023 10:00 AM-11:00 AM Microsoft Teams Meeting

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Microsoft Teams meeting

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Learn More | Meeting options

Internal Planning Team Kick Off Meeting - Agenda

Aug 7, 20223

1. **Team Introductions**
   - Maryland Environmental Services
   - Michael Baker International
   - Smith Planning and Design
   - Charles County

2. **Scope Review**
   - Planning Process
   - Community Profile
   - Hazard Identification & Risk Assessment
   - Historic and Cultural Resources Vulnerability Assessment
   - Capability Assessment
   - Mitigation Strategy
   - Plan Execution & Maintenance
   - Adoption

3. **Planning Team Members & Meeting Schedule**

4. **Project Milestones and Deliverables**

5. **State and FEMA Involvement**

   State

   a. Catlin Whiteleather caitlin.whiteleather@maryland.gov

   FEMA

   b. Matt McCullough matthew.mccullough@fema.dhs.gov

6. **Committee Members & Meeting Schedule**

7. **Meeting Location Venues**

8. **Major Planning Changes**
   a. Local, County, and State Changes
   b. FEMA Guidance

9. **County Website – Plan Updates**
   https://www.charlescountymd.gov/services/emergency-services

10. **Plan Format and Design**

11. **Data Request**
    a. GIS Data
    b. Planning / Policy Documents

12. **Risk Assessment – 2018 Hazards**
    - Drought
    - Earth Disturbance
    - Erosion
    - Extreme Weather
    - Flood
    - Hurricane, Tropical Storm, Nor'easter
    - Severe Winter Storms
    - Temperature Extremes
    - Wildfire
    - Building and Structure Collapse
    - Civil Disturbance and Criminal Activity
    - Dam Failure
    - Environmental Hazards
    - Nuclear Events
    - Public Health Emergencies
    - Transportation Accidents
    - Utility Interruption

13. **Plan Integration**

    County Planning Documents

    a. Comprehensive Plan
    b. Emergency Operations Plan
    c. Stormwater Plan
    d. Greenways, Open Space, etc.

14. **Next Steps**

Local Plan Update Kickoff Meeting – INTERNAL Checklist

☐	**Present suggested HMP update schedule and make adjustments as needed.**
☐	**Schedule five meetings: Input – Output Meetings, Cultural & Historical Steering Committee Meeting, and Commissioners Presentation.** ***(Date, time and venue)*****. Take into consideration other local existing meeting dates and plan accordingly.**
☐	**Determine desired format for other meetings and outreach opportunities both to public and municipalities (teleconferences, office hours, etc).**
☐	**Discuss big picture planning changes that will impact timeline.**
☐	**Discuss location and function of website for planning purposes** ***(calendar, announcements, useful links, draft plan review, etc.).***
☐	**Request contact information for community POCs.**
☐	**Request county/agency logo.**
☐	**Obtain GIS POC information and request county official provide GIS POC with advanced notice of upcoming information requests.**
☐	**Request other important county planning documents:** ○ Comprehensive Plan ○ Hazard Vulnerability Analysis ○ Emergency Operations Plan ○ Greenways, Stormwater, Land Use, etc.
☐	**Brainstorm potential stakeholders:** ○ Conservation District ○ County Forester ○ Watershed Associations ○ National and State Park/Forest ○ County Extension Agent ○ State NFIP Coordinator ○ Adjacent County Representatives (Required) ○ Red Cross
☐	**Send follow up email with list of action items after Internal Kickoff Teleconference.**

Charles County Hazard Mitigation 2023 Plan Update Schedule

Task	Months				
	August	September	October	November	December
A – Community Profile	■				
B - Planning Process	■	■	■	■	■
HMP Committee Meeting/Conference Calls	●	●	●		
Virtual Topical Meetings – As Applicable			●		
C - Hazard and Risk Assessment	■	■	■		
D - Cultural, Historical & Archaeological Analysis		■	■		
E – Capability Assessment & Mitigation Strategy				■	
F - Draft and Final Plans			■	■	■
G - Plan Implementation					■
H – Plan Execution & Maintenance					■

Internal Planning Team Kick Off Meeting - Notes

Aug 7, 2023 – 10AM to 11AM

Attendees:

- **Charles County** - Michelle Lilly / Gary Lewis / Beth Groth
- **MES** - Michael Manen / Kayla Rhue
- **MBI & SPD** - Mark James / Virginia Smith / Michele King / Eric Messick

Scope Review

- All attendees had an opportunity to review and approve the scope of work. The MOA was signed by MDEM. The fully executed contract between MES and MBI was received on June 27, 2023.
- MES will adjust MBI SOW to account for plan MDEM/FEMA review period past the December 2023 plan update develop. Suggest another 6 months for plan review, adjustments to the plan, and closeout.

Planning Team Members & Meeting Schedule

- Charles County has a running list with previous Hazard Mitigation Planning Committee (HMPC) members' names and contact information. Contacts will be referenced as there has been turn around since the last update (2022).
- Additional committee members should include Stacy Schaefer of the Resiliency Authority and other agencies that were not included in the 2018 update to address regional perspectives.
- Other Key members include the County Equity Officer and the Regional MDP contact Sarah Diehl
  Email: sarah.diehl@maryland.gov / 410-767-4547
- The 2023 Plan will not include a Historic & Cultural Resources Committee but will maintain relevant analysis and material.
- Plan Update Development & Plan Review Timeframe: August – December 10, 2023, for the plan update development with additional 30-day MDEM review and 45-day FEMA review.
  - County is going to approach the State / FEMA for an extension given the 6-month turnaround of the MOA.
  - Due to the quick turnaround of this plan update, monthly committee meetings will be scheduled (third or fourth Thursday) with internal planning team calls held on a biweekly basis.

Grants Eligibility Note: The link below summarizes hazard mitigation plan requirements for local officials that are applying to FEMA for assistance, either directly or through a state as sub-applicants. Hazard mitigation plans need to be updated and re-submitted for FEMA approval every five years to maintain eligibility.
https://www.fema.gov/emergency-managers/risk-management/hazard-mitigation-planning/requirements

State and FEMA Involvement

- We suggest when contacting the MDEM for an extension to the plan expiration, also request that FEMA participate in HMPC meetings and concurrent plan review with MDEM.
- Note: State Hazard Mitigation Officer is Caitlin Whiteleather caitlin.whiteleather@maryland.gov and FEMA Reviewer for Maryland is typically Joshua Norris.

Meeting Location Venues

- CSM College of Southern Maryland – Recommended using the same location that was used for the previous plan update, if available.
  Requirement: College Staff members must participate in meetings.
- The County will approach CSM for scheduling two HMPC meetings, September and October; 3rd or 4th Thursday of each month, with September meeting timeframe of 1:00 and 3:00 and the October meeting timeframe of 1:00-4:00. Note: the October HMPC meeting will be a 3-hr. mitigation workshop.
- Velocity Center – Back up meeting location https://www.csmd.edu/about/locations/velocity-center/index.html

Plan Integration Opportunities

- Draft 2022 Water and Sewer Comprehensive Plan and an update to the 2016 Comprehensive Plan that is currently being updated.

County Website

- Plan update material and meeting schedule will be posted to the County's website. https://www.charlescountymd.gov/services/emergency-services
- Draft chapters as they are developed will be posted for public review and comment monthly. Comments received will be integrated into the final draft plan prior to MDEM and FEMA review.
- Concurrent local review with MDEM and FEMA- Final cohesive Draft Plan will be posted for public review and comment in December 2023.

Plan Format and Design

- For consistency purposes the 2018 plan formatting will be used for the 2023 plan update. Current material will be reviewed for relevance and application. Additional data and graphics will be added throughout the plan update.

Data Request

- MBI will review previous data requests used for the Climate Action Plan for duplication and then submit additional GIS Data requests to both Michelle and Beth.
- Critical Infrastructure database is requested at this time from the Emergency Services Department.

Risk Assessment – 2018 Hazards

- Include Dam Failure and Public Heath Emergencies under Natural Hazards and complete Human Made Hazards on separate schedule and included as an Appendix.

Next Steps

- The HMPC Kickoff Meeting will be virtual and occur on August 24 or 31 pending potential conflicts in County staff schedule.

C-2 HMPC Kickoff Meeting

August 24, 2023

James, Mark

To: Kayla Rhue; Michael Manen; Doug Adams; Virginia Smith; Michelle L. Lilly; Gary Lewis; milesr@charlescountymd.gov; stapless@charlescounty.org; Kelly Palmer; Karen D. Wiggen; grothb; ThompsCa@charlescountymd.gov; adjeia@charlescountymd.gov; Ryan@townofindianhead.org; MMiner@townoflaplata.org; clementj@charlescountymd.gov; chieffire@ccvfireems.org; michael.gimmel@ccvfireemd.org; mlewis@ccvfireems.org; demohun-hintze@csmd.edu; dodgej@ccso.us; beaversk@charlescountymd.gov; afarmer@mdot.maryland.gov; Patrick.Goode@md.usda.gov; luis.dieguez@charlesscd.com; jsimpson@porttobacconiver.org; john.dulina@maryland.gov; drurys@charlescountymd.gov; jstoddard@ccboe.com; ellisn@charlescountymd.gov

Subject: RE: EXTERNAL: Charles County Hazard Mitigation Plan Committee Kickoff

EXTERNAL EMAIL

Good afternoon,

My name is Kayla Rhue, I am the Assistant Section Chief of Engineering within Maryland Environmental Service's Technical and Environmental Services Division. MES in collaboration with Michael Baker and Smith Planning and Design are pleased to support Charles County with their Hazard Mitigation Plan Update.

You have been selected by the Charles County Emergency Services to participate as a hazard mitigation committee member for the duration of the plan update. This process will take approximately 5 months and involve monthly meetings. The kick-off meeting has been scheduled for August 24, 2023, from 10:00 - 11:00 AM. This meeting will be virtual. An agenda will be distributed prior to the meeting.

Please RSVP if you are unable to attend, a summary of information will be forwarded after the meeting. If you have any questions in the meantime, feel free to email me. We look forward to meeting you.

Thank you

Microsoft Teams meeting

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Meeting ID: 273 014 070 839
Passcode: WMMKxB
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Phone Conference ID: 998 265 195#

Kick-Off Meeting

August 24, 2023

1:00 PM

Agenda

1. Welcome and Introductions
2. Project Overview
3. 2023 Planning Process
4. Risk Assessment Overview and Hazard Review
5. Capability Assessment and Mitigation Strategy Overview

   Exercise #2: Capability Assessment Survey
6. Next Steps and Action Items

Resources & Contact Information

Charles County Hazard Mitigation Plan Update Project Website:
www.charlescountymdhmpu.com

Submit forms to Mark James:

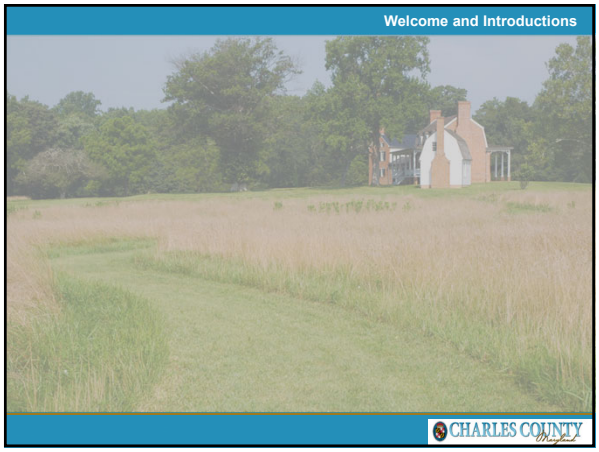
Email: mark.james@mbakerintl.com



1

- Welcome and Introductions
- Project Overview
- HMPC Member, Municipal, & Public Participation
- Hazard Updates
- Data Collection Efforts & Next Steps

2



3

- All attendees are currently muted to reduce background noise.
- Submit your questions at any time during the presentation by:
  - Using the Zoom "Chat"
- We will be recording this meeting to share with anyone unable to attend.

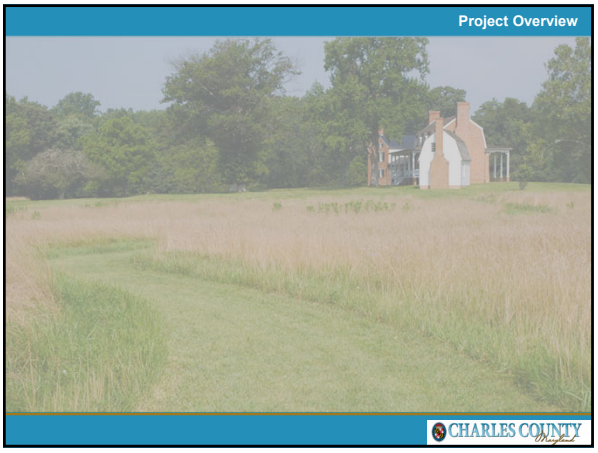


4

Participants, please let us know you are here!

- Please submit your name and municipality or organization by:
  1. Using the "Chat" **or**
  2. Emailing mark.james@mbakerintl.com

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- Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to life and property resulting from natural and human-made hazards.

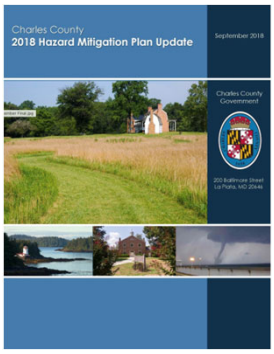


7

- A Hazard Mitigation Plan (HMP) is a community-driven, living document that communities use to reduce their vulnerability to hazards.
- Counties must have a plan to maintain access to mitigation grants. These grants can augment local mitigation activities already being accomplished and can leverage other funding sources.
- New Local Mitigation Planning Policy Guide Effective April 19, 2023, will be used for this plan update.



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- Planning Process.
- Hazard Identification and Risk Assessment.
- Mitigation Strategy.
- Plan Maintenance.
- Plan Adoption.
- High Hazard Potential Dams (required for HHPD Grant Program).
- MDEM focus Extreme Heat & Wildfire
- Climate Change
- Social Vulnerability & Equity

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HMPC Member, Municipal, & Public Participation



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What does it mean to be a member of the Hazard Mitigation Planning Committee (HMPC)?

- **Meetings**
  - Kick-Off: Thursday, August 24, 2023 – Activity #1
  - Mid-Point Meeting: TBD (2 Hours)
  - Mitigation Workshop: TBD (3-4 Hours)
- **Survey(s) and fillable forms**
  - Hazard Updates
  - Mitigation Action Status
  - Capabilities
  - Mitigation Action Ideas
  - Project Development & Prioritization
- **Assist with public outreach efforts**
- **Plan review and comments**

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Municipal Participation

The 2018 Charles County HMP included the following municipalities:

- Town of Indian Head
- Town of La Plata
- Town of Port Tobacco Village

*We must document municipal participation throughout the plan development process.

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Public Participation

- Online engagement
  - Public Survey
  - Plan Updates & Materials
  - Press Release
- HMPC Mid-Point Meeting- Public Invited

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Hazard Updates



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Hazard Update Process

- Hazard & Risk Evaluation
  - Increase (I)
  - Decrease (D)
  - No Change (NC)



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Hazard Update Process

- Describe update process
- Identify hazards and evaluate/update risk- Activity #1
- Profile hazards
- Assess vulnerability: Mid-Point Meeting



Photo of Mallows Bay Park, MD

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Hazard Update Process

Identified Hazards (2018 HMP)	How has the frequency of occurrence, magnitude of impact, and/or geographic extent changed in your community? NC=No Change I=Increase D=Decrease	Additional Comments (Explanation for marked I or D)
Natural		
Dam Failure		
Drought		
Earth Disturbance		
Erosion		
Extreme Weather		
Flood		
Hurricane, Tropical Storm, Nor'Easter		
Public Health Emergencies		
Sever Winter Storm		
Temperature Extremes		
Wildfire		
Human-Made		
Civil Disturbance & Criminal Activity		
Environmental Hazards		
Nuclear Events		
Transportation Accidents		
Utility Interruption		

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Hazard Update Process

- Full hazard profile includes:
  - Location and extent
  - Range of magnitude
  - Past occurrence
  - Future occurrence
  - Vulnerability assessment
    - People
    - Structures
    - Systems
    - Natural, Historic and Cultural Resources
    - Community Activities

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Data Collection- Trends, Capabilities, & Gaps

- How has the nature of hazard risk changed in the last five years? Is there new development?
- Capabilities & Gap Assessment- Next Step
  - Planning and Regulatory, Administrative and Technical, Financial, and Education and Outreach
  - Are the current resources/capabilities to implement mitigation actions sufficient?
  - Are the fiscal, administrative, political, public support, capability, etc. sufficient?

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Data Collection- Floodplain Coordinator

- Flood Insurance Policies & Claims
- Repetitive & Severe Repetitive Loss Properties
- NFIP Questionnaire

* Municipalities- conduct floodplain management activities or County?



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Next Step - Plan Integration



- Government authorities, policies, or codes that influence the way land and buildings are developed and built such as:
  - Comprehensive Plans- County & Municipal
  - Subdivision Regulations
  - Building Codes and Enforcement
  - Capital Improvement Programs
  - Stormwater Management Plans
  - Emergency Operations Plans
  - Hurricane Evacuation Plans

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Next Step - Mitigation Status Assessment

- Fillable Form will be distributed to collect status updates.

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Schedule and Meetings

Task	Dates
Kick Off Meeting	August 24, 2023
Mid-Point Meeting	September-October 2023
Mitigation Workshop	October- November 2023
Plan Writing	August-December 2023
Plan Review & Approval Process	

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Thank You!

Michelle Lilly
Director, Charles County Department of Emergency Services
lillym@charlescountymd.gov
(301) 609-3429

Mark James, CFM
Michael Baker International
mark.james@mbakerintl.com
(443) 938-0479

Virginia Smith, AICP
Smith Planning and Design
vsmith@smithp-d.com
(301) 724-7611



Hazard Mitigation Committee Kick-Off Meeting

August 24, 2023, 10:00 AM – 11:00 AM

Virtual

Link to Recording:

Charles County Hazard Mitigation Plan Committee Kickoff-20230824_100346-Meeting Recording.mp4 (sharepoint.com)

Attendees

Charles County Hazard Mitigation Planning Committee (HMPC) Members

Michelle Lilly, Emergency Services
Gary Lewis, Emergency Services
Jeffrey Clements, 9-1-1/Public Safety Communications
Ashley Farmer, MDOT (SHA)
Joel Binkley, Planning & Growth Management
Mark Kaufmann, County Fire Chief, CCVFA
Lynn Knaggs, Planning & Growth Management
Luis Dieguez, Charles Soil Conservation District
Lt John Dodge, Sheriff's Office
Agnes Adjei, Charles County Government
Ryan Hicks, Town of Indian Head
Michelle Miner, Town of La Plata
Sam Drury, Recreation, Parks, & Tourism
Mary Lilly, Department of Health, Emergency Preparedness & Response
Suzanne Wisnieski, FPAC-FSA, MD, USDA (FSA)
Kelly Palmer, Charles County Government
Denise Mohun-Hintze, College of Southern Maryland
Renesha Miles, Charles County Government, DEI Office
Beth Groth, Planning & Growth Management
Karen Wiggen, Planning & Growth Management
Tina Wilson, Citizen
Nick Ellis, Emergency Services
Michael Gimmel Jr., Charles County Volunteer Fire and EMS Association

Maryland Environmental Services

Michael Manen
Doug Adams

Michael Baker

Mark James

Smith Planning

Virginia Smith
Michele King

Welcome and Introductions

Michelle Lilly, Director of Charles County Emergency Services welcomed committee members to the meeting. She explained that in order for the community to maintain eligibility for FEMA grant funding, updates to the hazard mitigation plan are necessary every five years. Mark James provided a brief background and called for introductions of presenters verbally and attendees via chat. Mark went over the meeting agenda which include a virtual exercise to gather feedback from attendees on the changes in hazard and risks since the last plan update in 2018.

Project Overview

What is a Hazard Mitigation Plan and why do it? The Plan is a community-driven, living document that communities use to reduce their vulnerability to hazards. Counties must have a plan to maintain access to mitigation grants. These grants can augment local mitigation activities already being accomplished and can leverage other funding sources (state grants and other federal issued grants).

New hazard mitigation planning guidance went into effect this year. The new guidance mandates that all communities must participate throughout the planning process, not just review, and adopt the plan. Major changes are the inclusion of

and focus on social equity and climate change in this plan. It was partially addressed in the 2018 plan, but more analysis will be required. Also, we will be expanding on the capability assessment and plan integration portions of the plan.

Existing Plan Components will be maintained with some adjustments to the 2018 Plan format. These components include:

I. Planning Process.
II. Hazard Identification and Risk Assessment.
III. Mitigation Strategy.
IV. Plan Maintenance.
V. Plan Adoption.

Additions and/or expansion of the following items will be completed during the Plan update:

- ✓ High Hazard Potential Dams that must be included to apply for HHPD grant program – covered in the 2018 Plan.
- ✓ New State requirement to address extreme heat and wildfire – covered in the 2018 Plan.
- ✓ Climate change and social vulnerability result of the new FEMA guidance.

The Plan requires about a month of review by the State and then the federal government takes 45 days for their review. We anticipate having the plan done by December. The current 2018 Plan will lapse in December, limiting the County and communities from applying to HMA funding programs. However, with the assistance of the HMPC, the plan update process timeframe required for this update will be adhered to, and the time period that the plan is expired will be minimized to the greatest extent feasible.

HMPC Member, Municipal, and Public Participation

Hazard Mitigation Planning Committee (HMPC)– The committee consists of State Agency Officials, Municipal & County Officials, Non-Government Stakeholders. Committee members are responsible for guiding the direction of the plan. This will be done by using exercises and workshops that are coordinated throughout the planning process. The committee will also be responsible for reviewing the plan in working draft sections and a draft copy of the plan in December.

There will be a total of 5 surveys distributed to committee members during the course of the plan update process. The first on is today that will provide information on updates to hazards. Additional surveys will be issued prior to meeting and the results will be provided as part of the meeting summary. Additional surveys include:

I. Mitigation Action Status
II. Capabilities
III. Mitigation Action Ideas
IV. Project Development and Prioritization

Sub-Committee Opportunities may present themselves based on needs and interest levels. Regular scheduled committee meetings will be held monthly. The draft schedule follows:

- ✓ Kick-Off: August 24th - 1 hour
- ✓ Midpoint Meeting: late September early October- 2 hours
- ✓ Mitigation Strategy Workshop: November – 3 to 4 hours

The contractor stressed the importance of plan committee members to attend meetings, each month, provide local information, input on the plan, review the plan and develop mitigation actions.

Municipal participation - will include updates from the three municipalities that participated in the 2018 Plan:

- ✓ Town of Indian Head
- ✓ Town of La Plata

- ✓ Town of Port Tobacco Village

The contractor added that over the last year FEMA Region 3 has required this guidance to be used prior to it being effective. Municipalities cannot just sign off and adopt the plan at the end. Municipalities who wish to adopt the County Plan must participate throughout the plan update process and we must document participation. Municipalities will also have to identify mitigation action items for each hazard. The County and municipalities must show that they have thought through this process. Another new change in the guidance: If you identify a hazard within the mitigation plan, you have to have at least one mitigation action item.

Public and Stakeholder Participation - The public will be given opportunity to comment on the plan and provide input via an online survey. Press releases will be provided, and the public will be welcomed to the midpoint meeting. Plan material will also be posted to the County's website to review.

Virginia Smith explained Exercise #1: Risk Evaluation and Identification and Mark James screenshared the exercise form, while HMPC members provided answers in the chat. The purpose of the exercise was to evaluate previously profiled hazards and to identify any new hazards that may exist.

- Part 1: Note any changes in frequency, magnitude or geographic extent.
- Part 2: Evaluate list of hazards NOT profiled in existing HMP.

Hazard Updates

The contractor explained Exercise #1: Hazard Update Process. The purpose of the exercise is to gather information used to determine if there have been changes in the hazards over the past 5 years. This data was collected virtually. Each hazard was presented in the chat section and committee members provided one of the following answers to rate the frequency of occurrence, magnitude, and geographic extent: (I) Increase, (D) Decrease, or (NC) No Change

Natural Hazards	
Dam Failure	NC
Drought	NC
Earth Disturbance	NC
Erosion	I
Extreme Weather	I
Flood	I
Hurricane, Tropical Storm Nor'Easter	NC
Public Health	I
Severe Winter Storm	D
Temperature Extremes	I
Wildfire	NC
Human Made Hazards	
Building and Structure Collapse	NC
Civil Disturbance Criminal Activity	I
Environmental Hazards	I
Nuclear Events	NC
Transportation Accident	I
Utility Interruption	I

Data Collection and Next Steps

Questions for review and to consider for next meeting:

- How has the nature of hazard risk changed in the last five years? Is there new development?
- Are the current resources to implement mitigation actions sufficient?
- Are the fiscal, administrative, political, public support, capability, sufficient?
- Overall, what are the biggest obstacles to completing mitigation actions?

During the next meeting a capabilities survey will be issued to committee members prior to the meeting. This survey will review the planning, regulatory, administrative, technical/financial, and education/outreach capabilities that the County and municipalities have in place. We will determine if there are gaps and determine if resources are sufficient to implement mitigation actions.

Flood insurance data collection has also been requested from FEMA Region 3. The contractor will set up separate meeting with county / municipal floodplain managers to review and confirm NFIP policies and claims.

Information and updates will be posted on County website.

Task	Dates
Full Project Timeline	August 2023 – December2023
Kick Off Meeting	August 24, 2023 (TODAY)
Mid-Point Meeting	September/October – 2hrs
Mitigation Strategy	November – 4hr Workshop
Deliver to MDEM/FEMA for Review	December
Distribute to Municipalities for Adoption	March

Michelle Lilly gave final words. Will be in contact for next meeting in September/October.

Resources & Contact Information

Charles County Hazard Mitigation Plan Update Project Website:

https://www.charlescountymd.gov/services/emergency-services/emergency-preparedness

Michelle Lilly, Director - Lillym@charlescountymd.gov

Gary Lewis, lewisg@charlescountymd.gov

Mark James - mark.james@mbakerintl.com

Virginia Smith - vsmith@smithp-d.com

James, Mark

From: Virginia Smith <vsmith@smithp-d.com>
Sent: Tuesday, September 12, 2023 12:10 PM
To: milesr@charlescountymd.gov; stapless@charlescounty.org; Kelly Palmer; Karen D. Wiggen; grothb; ThompsCa@charlescountymd.gov; adjeia@charlescountymd.gov; Ryan@townofindianhead.org; MMiner@townoflaplata.org; clementj@charlescountymd.gov; chieffire@ccvfireems.org; michael.gimmel@ccvfireemd.org; mlewis@ccvfireems.org; demohun-hintze@csmd.edu; dodgej@ccso.us; beaversk@charlescountymd.gov; afarmer@mdot.maryland.gov; Patrick.Goode@md.usda.gov; luis.dieguez@charlesscd.com; jsimpson@porttobacconiver.org; john.dulina@maryland.gov; milesr@charlescountymd.gov; drurys@charlescountymd.gov; jstoddard@ccboe.com; ellisn@charlescountymd.gov
Cc: Michelle L. Lilly; Gary Lewis; James, Mark; Kayla Rhue; Michele King
Subject: EXTERNAL: Hazard Mitigation Plan Update
Attachments: Charles County 2018 Mitigation Action Status Update Form.pdf

EXTERNAL EMAIL

Good Afternoon,

As discussed during our kick-off meeting, feedback is required to obtain status updates for the action items included in the 2018 Hazard Mitigation Plan (HMP). Updating mitigation action items identified in the 2018 HMP is an important component to determining the progress that has been made within the last 5 years and developing an approvable plan. As such, we have attached a fillable PDF form to make gathering your input as easy as possible.

There are a total of 70 mitigation action items that require updates, however you are only requested to provide input on items where their department, agency, or organization was listed as a "responsible entity." To make this easy for everyone, we have included a table within the fillable PDF that correlates "responsible entity" with action items. *Note: you may also provide updates on action items other than those identified for your* department, agency, or organization.

Responsible Entity	Mitigation Action #
Emergency Services	1 ,2, 3, 4, 7, 8, 9, 10, 11, 16, 22, 23, 24, 25, 26, 27, 32, 39, 40, 44, 45, 47, 48, 50, 51, 54, 55, 56, 57,58, 59, 62, 63, 64, 68
Information Technology	1, 4
SMECO	2,3, 22, 23
Volunteer Fire Department	5, 29, 47
Parks, Recreation and Tourism	8
Planning and Growth Management	11, 12, 14, 15, 16, 18, 25, 26, 36, 41, 42, 43, 44, 46, 48, 52, 53, 54, 56, 59, 60, 61, 62, 63, 64, 65,67, 68, 69, 70
Village of Port Tobacco	13,48, 54, 66
Town of La Plata	16, 48, 49, 52, 54, 57, 58
SHA	17
Public Works - Roads	17, 24
Public Works	21, 30, 31, 37, 38, 51, 56, 62, 65
Health Department	19, 20
County Floodplain Administrator	18
Tactical Response Team (TRT)	28, 29
Sheriff's Office	33, 34, 35, 36
Soil Conservation District	45, 46
Town of Indian Head	48, 52, 54, 55 ,57, 58
Public Schools	5
Public Works - Facilities	6, 11, 16

Further instructions are included within the attached fillable PDF form. We respectfully request that you complete and return the Mitigation Action Items Update Form by **COB September 22, 2023.**

The information gathered from Hazard Mitigation Planning Committee (HMPC) members via this process will be

incorporated into the Plan Update and will help inform new mitigation projects.

Please let us know if you have any questions, thank you.

Virginia Smith, AICP
76 Baltimore Street
Cumberland, MD 21502
http://smithp-d.com
Office: 301.724.7611
Mobile: 301.707.1173
vsmith@smithp-d.com

Please complete the fillable sections for each of the seventy (70) mitigation action items contained herein, that your department, agency, or organization was listed as a responsible entity. We are requesting updates on a total of seventy (70) mitigation action items. Each of the action items includes pertinent project information as well as the following items we are seeking feedback on: (1) Project Status, and (2) Status details.

The table starting on page 2 lists each mitigation action item in the order they are found within the 2018 Hazard Mitigation Plan. For your convenience, the table below has been included which directs you to those mitigation action items that your department, agency, or organization was listed as a responsible entity. This table provides which mitigation action items (by number) that you should provide feedback for based upon your organization.

Note: You may also provide information for mitigation projects for which you are not listed as a responsible entity, but for which you have specific knowledge. If you are not listed as a responsible entity, but you have information on a mitigation action item, please provide this information.

Responsible Entity	Mitigation Action #
Emergency Services	1 ,2, 3, 4, 7, 8, 9, 10, 11, 16, 22, 23, 24, 25, 26, 27, 32, 39, 40, 44, 45, 47, 48, 50, 51, 54, 55, 56, 57,58, 59, 62, 63, 64, 68
Information Technology	1, 4
SMECO	2,3, 22, 23
Volunteer Fire Department	5, 29, 47
Parks, Recreation and Tourism	8
Planning and Growth Management	11, 12, 14, 15, 16, 18, 25, 26, 36, 41, 42, 43, 44, 46, 48, 52, 53, 54, 56, 59, 60, 61, 62, 63, 64, 65,67, 68, 69, 70
Village of Port Tobacco	13,48, 54, 66
Town of La Plata	16, 48, 49, 52, 54, 57, 58
SHA	17
Public Works - Roads	17, 24
Public Works	21, 30, 31, 37, 38, 51, 56, 62, 65
Health Department	19, 20
County Floodplain Administrator	18
Tactical Response Team (TRT)	28, 29
Sheriff's Office	33, 34, 35, 36
Soil Conservation District	45, 46
Town of Indian Head	48, 52, 54, 55 ,57, 58
Public Schools	5
Public Works - Facilities	6, 11, 16

Charles County 2018 Mitigation Action Plan (Sorted by Hazard)				
Number	**Mitigation Action**	**Community**	**Hazard(s) Addressed**	**Lead Agency/ Department**
1	Install uninterruptible power supplies on critical electronic equipment in County facilities to prevent outages during thunder and lightning events.	Charles County	Extreme Weather	Emergency Services, Information Technology
◯ **Complete**	◯ **Deferred**	◯ **Canceled**	◯ **Ongoing**	
2023 Status Update:				
2	Encourage proper tree management for new power lines to reduce risks during high wind/severe winter weather.	Charles County	Extreme Weather, Severe Winter Storms	Emergency Services, SMECO
◯ **Complete**	◯ **Deferred**	◯ **Canceled**	◯ **Ongoing**	
2023 Status Update:				
3	Continue to support tree-trimming to prevent limb breakage and for safeguarding nearby utility lines during severe wind and winter events.	Charles County	Extreme Weather, Severe Winter Storms	Emergency Services, SMECO
◯ **Complete**	◯ **Deferred**	◯ **Canceled**	◯ **Ongoing**	
2023 Status Update:				
4	Install surge protectors on electronic equipment in County facilities to protect equipment during thunderstorm and lightning events.	Charles County	Extreme Weather	Emergency Services, Information Technology
◯ **Complete**	◯ **Deferred**	◯ **Canceled**	◯ **Ongoing**	
2023 Status Update:				
5	Conduct engineering inspections of fire stations and schools to assess each facility's ability to sustain damage from flood and wind events.	Charles County	Flood, Extreme Weather	Charles County Public Schools, Volunteer Fire Department
◯ **Complete**	◯ **Deferred**	◯ **Canceled**	◯ **Ongoing**	
2023 Status Update:				
6	Protect County buildings from hail damage by installing hail guards on roof-mounted HVAC equipment and installing hail-resistant roofing and siding when feasible on newly constructed facilities	Charles County	Extreme Weather	Public Facilities
◯ **Complete**	◯ **Deferred**	◯ **Canceled**	◯ **Ongoing**	
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
7	Promote Tornado safety public awareness and encourage the building of safe rooms during new construction.	Charles County	Extreme Weather	Emergency Services
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
8	Equip all County and public gathering places with lightning detectors.	Charles County	Extreme Weather	Emergency Services, Parks, Recreation and Tourism
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
9	Establish heating and cooling centers for vulnerable populations and link them to outreach projects that encourage at-risk populations to use the facilities.	Charles County	Temperature Extremes	Emergency Services
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
10	Develop public awareness campaign regarding extreme temperatures and how they affect residents.	Charles County	Temperature Extremes	Emergency Services
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
11	Continue to acquire, elevate or floodproof structures in identified repetitive loss areas throughout Charles County.	Charles County	Flood	Emergency Services, Public Facilities, Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
12	Ensure that NFIP requirements are being met concerning repairs, renovations, and remodeling of structures located in the regulatory floodplain.	Charles County	Flood	Planning & Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
13	Address flooding that is caused by an obstructed drainage ditch that runs east to west through the center of the town.	Village of Port Tobacco	Flood	Village of Port Tobacco
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
14	Take steps towards joining the community rating system.	Charles County	Flood	Planning & Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
15	Implement stormwater management and drainage improvements in flood-prone historic districts.	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Flood	Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
16	Inspection of critical facilities in the 100-year floodplain conducted by a certified floodplain manager.	Charles County, Town of La Plata	Flood	Emergency Services, Public Facilities, Planning and Growth Management, Town of La Plata
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
17	Identify roadways/bridges that frequently flood and mitigate to ensure ingress and egress.	Charles County	Flood	SHA, County Roads
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
18	Increase awareness of homes that lie in the flood zone for prospective home buyers and residents by posting a link to the County's website that provides property-specific flood zone information.	Port Tobacco, Town of La Plata, Town of Indian Head	Flood	Planning and Growth Management, Floodplain Administrator
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
19	Encourage immunization against diseases that can be easily communicable among residents of Charles County.	Charles County	Public Health Emergency	Health Department
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
20	Establish areas where vaccines and other medications could be dispensed during a public health emergency.	Charles County	Public Health Emergency	Health Department
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
21	Incorporate inspection and management of hazardous trees into other maintenance processes.	Charles County	Utility Interruption	Public Works
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
22	Work with utility providers to ensure regular maintenance and upkeep of power lines and other utilities.	Charles County	Utility Interruption	Emergency Services, SMECO
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
23	Identify opportunities to upgrade or bury power lines.	Charles County	Utility Interruption	Emergency Services, SMECO
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
24	Prepare flyer for safety strategies during severe winter weather, including driver education classes and materials.	Charles County	Severe Winter Storms	Emergency Services, County Roads
	◯ Complete ◯ Deferred ◯ Canceled ◯ Ongoing			
2023 Status Update:				
25	Review existing land use and development patterns near pipelines.	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Environmental Hazards	Planning and Growth Management, Emergency Services
	◯ Complete ◯ Deferred ◯ Canceled ◯ Ongoing			
2023 Status Update:				
26	Review pathways for potential gas or hazardous liquid migration in the event of a pipeline release and encourage land use planning and zoning controls to decrease population density in high-risk areas.	Charles County	Environmental Hazards	Planning and Growth Management, Emergency Services
	◯ Complete ◯ Deferred ◯ Canceled ◯ Ongoing			
2023 Status Update:				
27	Initiate a new commodity flow study.	Charles County	Environmental Hazards	Emergency Services
	◯ Complete ◯ Deferred ◯ Canceled ◯ Ongoing			
2023 Status Update:				
28	Evaluate Tier 2 facilities on an annual basis.	Charles County	Environmental Hazards	Tactical Response Team (TRT)
	◯ Complete ◯ Deferred ◯ Canceled ◯ Ongoing			
2023 Status Update:				
29	Purchase equipment necessary to sustain hazardous materials for emergency response teams.	Charles County	Environmental Hazards, Nuclear Events	Tactical Response Team (TRT), Volunteer Fire Departments
	◯ Complete ◯ Deferred ◯ Canceled ◯ Ongoing			
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
30	Plan for and maintain adequate road and debris clearing capabilities.	Charles County	Transportation Accident	Public Works
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
31	Implement traffic safety improvements at high-crash intersections and roadway segments.	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Transportation Accident	Public Works
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
32	Develop Aircraft Emergency Disaster Plan.	Charles County	Transportation Accident	Emergency Services
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
33	Continue Crime Solvers Program.	Charles County	Civil Disturbance and Criminal Activity	Sheriff's Office
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
34	Continue offering free home and business security surveys.	Charles County	Civil Disturbance and Criminal Activity	Sheriff's Office
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
35	Continue publishing “Watch Works” newsletter.	Charles County	Civil Disturbance and Criminal Activity	Sheriff's Office
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
36	Encourage Crime Prevention Through Environmental Design (CPTED) principles.	Charles County	Civil Disturbance and Criminal Activity	Sheriff's Office, Planning and Growth Management
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
37	Retrofit or rebuild high-priority structurally deficient bridges.	Charles County	Building and Structure Collapse	Public Works
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
38	Review existing conditions of bridges to determine their susceptibility to collapse.	Charles County	Building and Structure Collapse	Public Works
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
39	Retrofit public buildings and critical facilities to withstand snow loads and prevent roof collapse.	Charles County	Building and Structure Collapse	Emergency Services
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
40	Continue inspection, maintenance, and enforcement program to help ensure continued structural integrity of dams.	Charles County	Dam Failure	Emergency Services
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
41	Regulate development near steep slopes.	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	Earth Disturbance	Planning and Growth Management
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
42	Apply soil stabilization measures on steep, publicly owned slopes.	Charles County	Earth Disturbance	Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
43	Encourage structural designs that can resist loading associated with subsidence.	Charles County	Earth Disturbance	Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
44	Identify ways to reduce vulnerability of historic properties to coastal erosion, particularly along the Potomac and Port Tobacco Rivers.	Charles County	Earth Disturbance	Emergency Services, Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
45	Develop database to track landslide events.	Charles County	Earth Disturbance	Emergency Services, Soil Conservation District
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
46	Monitor groundwater levels and areas where natural resources are removed underground.	Charles County	Earth Disturbance	Planning and Growth Management, Soil Conservation District
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
47	Inform the public about defensible space and how to reduce their risk to fire.	Charles County	Wildfire	Emergency Services, Volunteer Fire Departments
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
48	Review Capital Improvement Plans to ensure that programmed infrastructure improvements are not in high hazard areas.	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	All Hazards	Emergency Services, Planning and Growth Management, Town of La Plata, Town of Indian Head, Village of Port Tobacco
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
49	Continue to conduct tests of its early warning/sirens bi-annually (early May and December).	Town of La Plata	All Hazards	Town of La Plata
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
50	Obtain grant funding for generators for critical facilities.	Charles County	All Hazards	Emergency Services
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
51	During new construction or upgrades/retrofits to schools and emergency shelters, funding should be obtained to provide these facilities with emergency generators and intercoms.	Charles County	All Hazards	Emergency Services, Public Schools
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				
52	Review regulations to ensure adequate zoning regulations are in place to reduce future development in high-hazard areas and introduce new language to this effect in their zoning ordinances.	Charles County, Town of La Plata, Town of Indian Head	All Hazards	Planning and Growth Management, Town of La Plata, Town of Indian Head
○ Complete	○ Deferred	○ Canceled	○ Ongoing	
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
53	Continue incorporating the HMP into future updates of the Charles County's Comprehensive Plan.	Charles County	All Hazards	Planning & Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
54	Introduce language in the comprehensive plan to plan for development while considering hazards and their impacts in highly developed areas.	Charles County, Town of La Plata, Town of Indian Head, Village of Port Tobacco	All Hazards	Emergency Services, Planning and Growth Management, Town of La Plata, Town of Indian Head, Village of Port Tobacco
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
55	Work with the Town of Indian Head and Lackey High School to determine ways to provide alternative access during a hazard event.	Charles County, Town of Indian Head	All Hazards	Town of Indian Head, Emergency Services
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
56	Include Historic Properties in the County's Debris Management Plan.	Charles County	All Hazards	Planning and Growth Management, Emergency Services, Public Works
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
57	Send news releases to local newspapers, radio, and TV stations with pre-disaster information while attempting to reach all areas of Charles County.	Charles County	All Hazards	Emergency Services, Town of Indian Head, Town of La Plata
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
58	Continue to introduce environmental education programs in schools, park and recreation department, conservation associations, and youth organizations such as boy scouts/girl scouts, campfire girls, and summer camps.	Charles County, Town of Indian Head, Town of La Plata	All Hazards	Emergency Services, Town of Indian Head, Town of La Plata
◯ Complete	◯ Deferred	◯ Canceled		◯ Ongoing
2023 Status Update:				
59	Ensure access to special needs populations is provided.	Charles County	All Hazards	Emergency Services, Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled		◯ Ongoing
2023 Status Update:				
60	Conduct Archaeological Survey of High Priority Sites in High Hazard Areas.	Charles County	All Hazards	Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled		◯ Ongoing
2023 Status Update:				
61	Create an Expedited Review Process for historic properties to be utilized post-incident	Charles County	All Hazards	Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled		◯ Ongoing
2023 Status Update:				
62	Establish a Demolition Delay Process for historic properties to be utilized post-incident.	Charles County	All Hazards	Planning and Growth Management, Emergency Services, Public Works
◯ Complete	◯ Deferred	◯ Canceled		◯ Ongoing
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
63	Develop disaster plans for historic sites and resources owned by Charles County.	Charles County	All Hazards	Planning and Growth Management, Emergency Services
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
64	Conduct targeted outreach to historic property owners about mitigation techniques and recovery.	Charles County	All Hazards	Emergency Services, Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
65	Upgrade water suppression system	Charles County	All Hazards	Public Works, Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
66	Perform outreach activities to inform residents of their vulnerability to hazards and how to mitigate. This may include newsletters, flyers on keeping drain ditches clear, participation in the NFIP, and safety tips.	Village of Port Tobacco	All Hazards	Village of Port Tobacco
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
67	Create an Archaeological Context for Charles County based on a literature review of academic and historical works, and on information found in the archaeological data at the Maryland Historical Trust.	Charles County	All Hazards	Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				

Number	Mitigation Action	Community	Hazard(s) Addressed	Lead Agency/ Department
68	Prioritize list of critical facilities that are vulnerable to natural and human-made hazards and develop potential mitigation solutions for high-priority critical facilities to reduce vulnerability.	Charles County, Town of Indian Head, Town of La Plata	All Hazards	Planning and Growth Management, Emergency Services
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
69	Prohibit future development in high hazard areas.	Charles County	All Hazards	Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				
70	Encourage low density development and open space areas.	Charles County	All Hazards	Planning and Growth Management
◯ Complete	◯ Deferred	◯ Canceled	◯ Ongoing	
2023 Status Update:				

C-3 HMPC Midpoint Meeting

October 19, 2023

To: Virginia Smith; adjeia@charlescountymd.gov; beaversk@charlescountymd.gov; BinkleyJ@charlescountymd.gov; luis.dieguez@charlesscd.com; dodgej@ccso.us; drurys@charlescountymd.gov; john.dulina@maryland.gov; ellisn@charlescountymd.gov; afarmer@mdot.maryland.gov; michael.gimmel@ccvfireems.org; Patrick.Goode@md.usda.gov; grothb; Ryan@townofindianhead.org; chieffire@ccvfireems.org; knaggsl@charlescountymd.gov; Gary Lewis; mlewis@ccvfireems.org; mary.lilly@maryland.gov; Michelle L. Lilly; milesr@charlescountymd.gov; MMiner@townoflaplata.org; demohun-hintze@csmd.edu; Kelly Palmer; schaefes@resilientcharlescountymd.com; stapless@charlescounty.org; jstoddard@ccboe.com; ThompsCa@charlescountymd.gov; Karen D. Wiggen; WilsonK@charlescountymd.gov; gabby77@aol.com; Kayla Rhue

Subject: RE: EXTERNAL: Charles County Hazard Mitigation Update Meeting Reminder

EXTERNAL EMAIL

We hope you are able to join us at the hazard mitigation planning meeting tomorrow! A calendar invite was sent previously.

Hazard Mitigation Planning Committee (HMPC) Meeting
Date: Thursday, October 19, 2023
Time: 2-4:00 PM
Location: College of Southern Maryland; Room CE 101

Agenda Topics:

- Introductions & Brief HMP Overview
- Project Update
  - Public Outreach
  - Mitigation Status Report
  - Draft Plan Update Hazard Profiles
- Hazard Identification Risk Assessment (HIRA) Update
- **Capability Assessment Work Session**
  - Planning, Regulatory, Technical, Administration & Finance
  - Public Heath
  - Public Safety
  - NFIP Questionnaire
- Next Steps

SP&D
Smith Planning and Design

Virginia Smith, AICP
76 Baltimore Street
Cumberland, MD 21502
http://smithp-d.com
Office: 301.724.7611
Mobile: 301.707.1173
vsmith@smithp-d.com

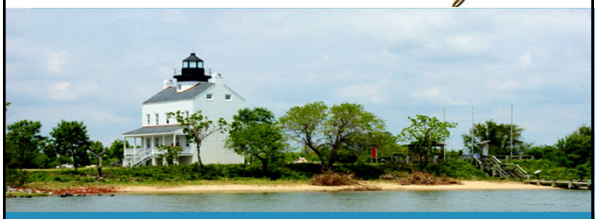
- Public Heath
- Public Safety
- NFIP Questionnaire

- Next Steps

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CHARLES COUNTY Maryland



2023 Hazard Mitigation Plan Update
Charles County, Maryland

Mid-Point Meeting- October 19, 2023

Michael Baker INTERNATIONAL

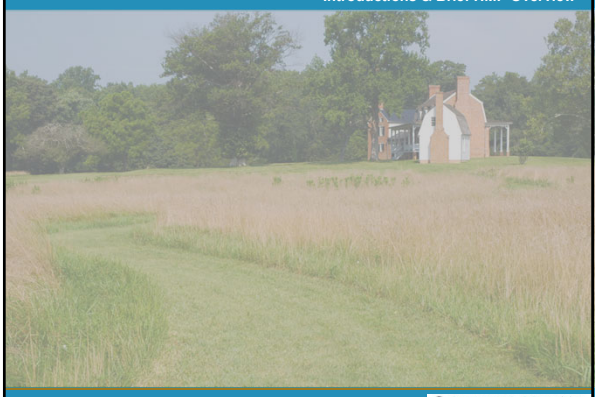
SP&D

1

- Introductions & Brief HMP Overview
- Project Update
  - Public Outreach
  - Mitigation Status Report
  - Draft Plan Update Hazard Profiles
- Hazard Identification Risk Assessment (HIRA) Update
- Capability Assessment Work Session
- Next Steps

2

Introductions & Brief HMP Overview



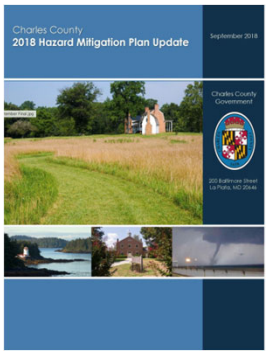
3

- A Hazard Mitigation Plan (HMP) is a community-driven, living document that communities use to reduce their vulnerability to hazards.
- Counties must have a plan to maintain access to mitigation grants. These grants can augment local mitigation activities already being accomplished and can leverage other funding sources.
- New Local Mitigation Planning Policy Guide Effective April 19, 2023, will be used for this plan update.



4

Plan Components



- Public Outreach
- Hazard Identification and Risk Assessment
- Capability Assessment
- Mitigation Strategy
- Plan Maintenance
- Plan Adoption

✓ High Hazard Potential Dams (required for HHPD Grant Program).
✓ MDEM focus Extreme Heat & Wildfire
✓ Climate Change
✓ Social Vulnerability & Equity

5

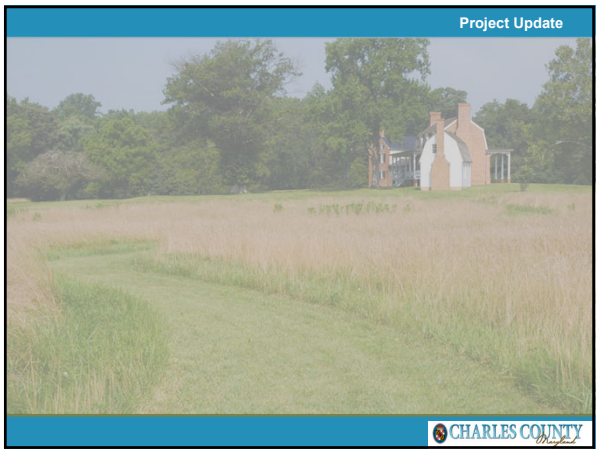
Municipal Participation

The 2018 Charles County HMP included the following municipalities:

- Town of Indian Head
- Town of La Plata
- Town of Port Tobacco Village

*We must document municipal participation throughout the plan development process.

6



7

Public Outreach

- Press Release
- Social Media Post
- Online Public Survey





Note: HMP Plan Update content uploaded on DES webpage. New content uploaded periodically.

8

Charles County Hazard Mitigation Plan Public Survey

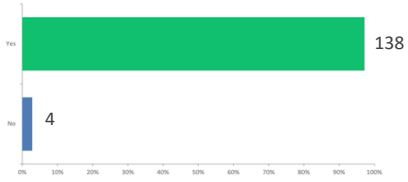
Wednesday, October 18, 2023

Total responses: 142

Powered by SurveyMonkey

Q1: Are you a resident of Charles County?

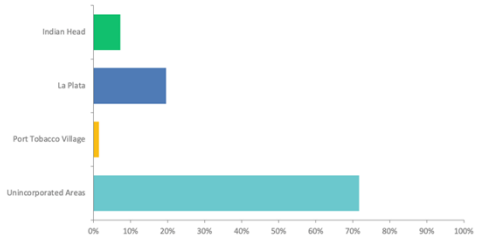
Answered: 142 Skipped: 0



9

Q2: Please provide the community where you currently live.

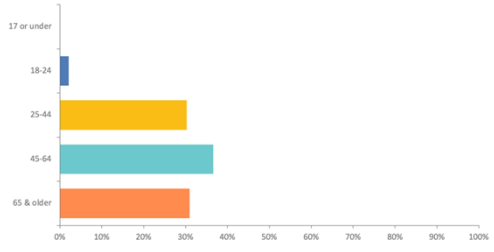
Answered: 138 Skipped: 4



10

Q3: Which age group are you in?

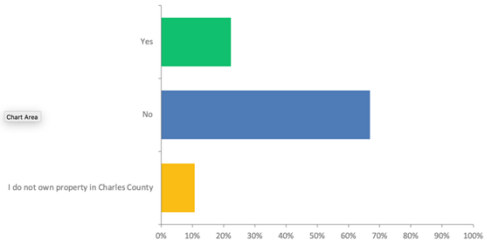
Answered: 142 Skipped: 0



11

Q7: If you own your home or commercial property, do you have flood insurance?

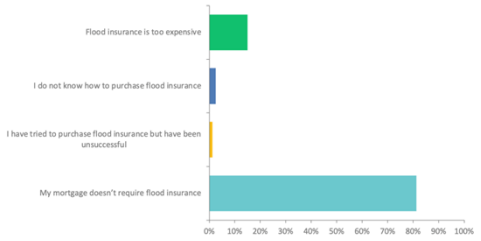
Answered: 121 Skipped: 21



12

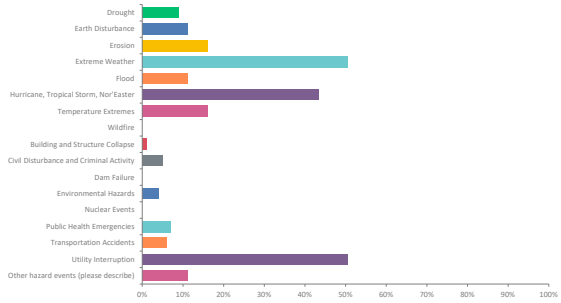
Q8: If "No", what is the primary reason why you do not carry flood insurance?

Answered: 80 Skipped: 62



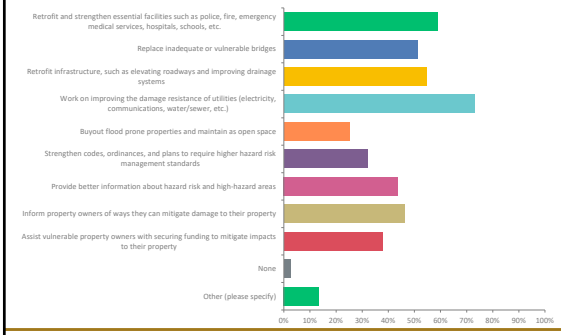
13

Q10: If your residence or commercial property has experienced damage from a hazard event, which of the following types of events have you experienced at your property?



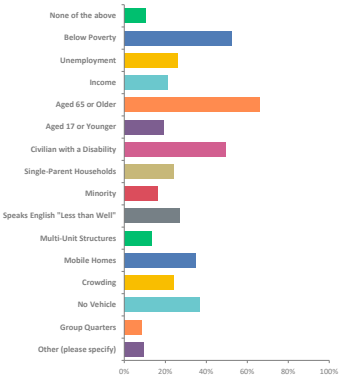
14

Q12: Which of the following mitigation project types do you believe should be focused on to reduce disruptions of services and strengthen the community (check all that apply)?



15

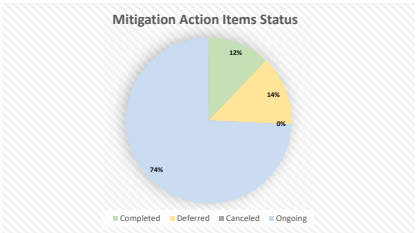
Q15: In terms of social vulnerability, do you feel that a specific group, or groups, in Charles County are particularly at risk for, or could be harmed by, any of the hazards listed in Question 14? This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk. Note: CDC 15 Social Factors below.



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Mitigation Status Report

HANDOUT



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Mitigation Status Report

Complete actions are listed below. High priority mitigation actions are identified in red.

- **Action Item #1** – Install uninterruptible power supplies on critical electronic equipment in County facilities to prevent outages during thunder and lightning events.
- **Action Item #6** – Protect County buildings from hail damage by installing hail guards on roof-mounted HVAC equipment and installing hail-resistant roofing and siding when feasible on newly constructed facilities.
- **Action Item #12** – Ensure that NFIP requirements are being met concerning repairs, renovations, and remodeling of structures located in the regulatory floodplain.
- **Action Item #17** – Identify roadways/bridges that frequently flood and mitigate to ensure ingress and egress.
- **Action Item #40** – Continue inspection, maintenance, and enforcement program to help ensure continued structural integrity of dams.
- **Action Item #41** – Regulate development near steep slopes.
- **Action Item #67** – Create an Archaeological Context for Charles County based on a literature review of academic and historical works, and on information found in the archaeological data at the Maryland Historical Trust.
- **Action Item #68** – Prioritize list of critical facilities that are vulnerable to natural and human-made hazards and develop potential mitigation solutions for high-priority critical facilities to reduce vulnerability.

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Hazard Mitigation Planning Committee (HMPC)

- **Meetings**
  - Kick-Off: Thursday, August 24, 2023
  - Mid-Point Meeting: October 19, 2023
  - Mitigation Workshop: TBD (3-4 Hours)
- **Survey(s) and fillable forms**
  - Hazard Updates- Changes in last five years.
  - Mitigation Action Status
  - Capabilities – Mid- Point Meeting Work Session
  - Mitigation Action Ideas
  - Project Development & Prioritization
- **Assist with public outreach efforts**
- **Plan review and comments**

19

Hazard identification Risk Assessment (HIRA)



20

Hazard Update Results

- Hazard & Risk Evaluation
  - Increase (I)
  - Decrease (D)
  - No Change (NC)



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Hazard Update Process

2023 HAZARD	STATUS	COMMENT
Dam Failure	No Change	Moved from Human-Caused Hazards
Drought	No Change	
Earth Disturbance	No Change	
Erosion	Increase	
Extreme Weather	Increase	
Flood	Increase	
Hurricane, Tropical Storm, Nor'easter	No Change	
Public Health Emergency	Increase	Moved from Human-Caused Hazards
Severe Winter Storms	Decrease	
Temperature Extremes	Increase	
Wildfire	No Change	
Building and Structure Collapse	No Change	
Civil Disturbance and Criminal Activity	Increase	
Environmental Hazards (Hazardous Materials & Pipeline)	Increase	
Environmental Hazards (Nuclear Events)	No Change	
Transportation Accidents	Increase	
Utility Interruption	Increase	

22

Presidential Disaster & Emergency Declarations

DISASTER NUMBER	DATE	DISASTER NAME
4491	January 20, 2020	Maryland Covid 19 Pandemic
3430*	January 20, 2020	Maryland Covid 19
4261	March 4, 2016	Severe Winter Storm and Snowstorm
4091	November 11, 2012	Hurricane Sandy
3349*	October 28, 2012	Hurricane Sandy
4075	August 2, 2012	Severe Storms and Straight-Line Winds
4038	October 5, 2011	Remnants of Tropical Storm Lee
4034	September 16, 2011	Hurricane Irene
3335*	August 27, 2011	Hurricane Irene
1910	May 6, 2010	Severe Winter Storms and Snowstorms
1875	February 19, 2010	Severe Winter Storm and Snowstorm
3251*	September 13, 2005	Hurricane Katrina Evacuation
1492	September 19, 2003	Hurricane Isabel
3179*	March 14, 2003	Snow
1409	May 1, 2002	Tornado
1324	April 10, 2000	Severe Winter Storm
1303	September 24, 1999	Hurricane Floyd
1081	January 11, 1996	Blizzard of 1996 (Severe Snowstorm)
1016	March 16, 1994	Severe Winter Weather and Ice Storms
3100*	March 16, 1993	Severe Snowfall & Winter Storm
524	January 26, 1977	Ice Conditions
489	October 4, 1975	Heavy Rains & Flooding
341	June 23, 1972	Tropical Storm Agnes

Presidential Emergency Declarations

23

HIRA Table- Updated

Changes to HIRA

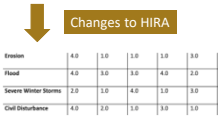


Table 3.4: Countywide ranking of hazard types based on Risk Factor (RF) methodology.

HAZARD NATURAL (N) or MAN-MADE (M)	RISK ASSESSMENT CATEGORY					RISK FACTOR
	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
Extreme Weather (N)	4	3	4	4	1	3.4
Flood (N)	4	3	3	4	2	3.3
Temperature Extremes (N)	4	2	4	1	3	3.0
Public Health Emergency (N)	4	3	2	1	4	3.0
Hurricane, Tropical Storm, and Nor'easter (N)	2	3	4	1	2	2.6
Utility Interruption (M)	4	1	2	3	2	2.4
Civil Disturbance and Criminal Activity (M)	4	2	1	3	1	2.4
Environmental Hazards – Hazardous Materials (M)	4	1	1	4	2	2.3
Transportation Accidents (M)	4	2	1	1	1	2.2
Severe Winter Storms (N)	2	1	4	1	3	2.1
Erosion (N)	4	1	1	1	3	2.1
Building and Structure Collapse (M)	2	2	1	3	3	2.0
Dam Failure (N)	1	2	2	4	3	2.0
Earth Disturbance (N)	2	1	3	3	1	1.9
Drought (N)	1	1	4	1	4	1.9
Environmental Hazards - Nuclear Events (M)	1	2	1	2	4	1.7
Wildfire (N)	1	1	1	4	2	1.4

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Municipal Table

Table 3.5: Jurisdictional Risk Evaluation

Municipality	Extreme Weather (N)	Flood (N)	Temperature Extremes (N)	Public Health Emergency (M)	Hurricane, Tropical Storm, and Nor'easter (N)	Utility Interruption (M)	Civil Disturbance and Criminal Activity (M)	Environmental Hazards: Hazardous Materials (M)	Transportation Accidents (M)	Severe Winter Storms (N)	Erosion (N)	Building and Structure Collapse (M)	Dam Failure (M)	Earth Disturbance (N)	Drought (N)	Environmental Hazards: Nuclear Events (M)	Wildfire (N)
County Rank	3.4	3.3	3.0	3.0	2.6	2.4	2.4	2.3	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.7	1.4
Town of Indian Head	>	=	>	>	=	>	>	>	>	=	>	=	=	=	<	=	=
Town of La Plata	>	<	>	>	=	>	>	>	>	<	>	=	=	>	<	=	=
Town of Port Tobacco	>	=	>	>	=	=	>	>	>	<	>	=	=	=	>	=	=

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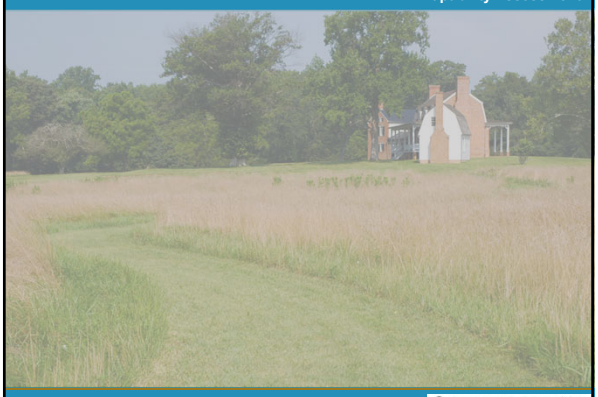
Hazard Update Process

- Full hazard profile includes:
  - Location and extent
  - Range of magnitude
  - Past occurrence
  - Future occurrence
  - Vulnerability assessment
    - People
    - Structures
    - Systems
    - Natural, Historic and Cultural Resources
    - Community Activities

Draft Chapters Updated:
- Hazard Identification & Risk Assessment
- Erosion
- Drought
- Extreme Weather
- Severe Winter Storm
- Temperature Extremes
- Dam Failure
- Plan Execution & Maintenance

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Capability Assessment



27

Work Session- Capabilities & Gap Assessment

- Are the current resources/capabilities to implement mitigation actions sufficient?
- Groups-
  - Planning and Regulatory, Administrative and Technical, Financial, and Education and Outreach (County & Municipalities)
  - Public Health
  - Public Safety

HANDOUTS

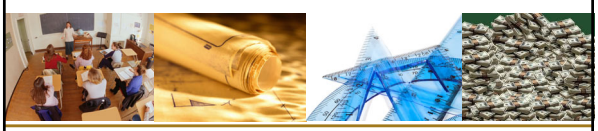
28

Data Collection- Floodplain Coordinator

HANDOUT

- Flood Insurance Policies & Claims
- Repetitive & Severe Repetitive Loss Properties
- NFIP Questionnaire

* Municipalities- conduct floodplain management activities or County?



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Next Steps



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Schedule and Meetings

Task	Dates
Kick Off Meeting	August 24, 2023
Mid-Point Meeting	October 19, 2023
Mitigation Workshop	**November 2023**
Plan Writing	August-December 2023
Plan Review & Approval Process	

31

Thank You!

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32

Administrative and Technical Capabilities Instructions: Please review and modify. As applicable.

Table 5.4: Summary of administrative and technical capabilities for Charles County							
JURISDICTION	LAND USE/ DEVELOPMENT PLANNING	ENGINEERING	EMERGENCY MANAGER	FLOODPLAIN MANAGER	GIS	GRANT WRITING/FISCAL STAFF	PLANNING COMMISSION
Charles County Unincorporated	X	X	X	X	X	X	X
Town of Indian Head	X					X	X
Town of La Plata	X					X	X
Town of Port Tobacco Village							

Jurisdiction:

1. Does the jurisdiction have in-house civil engineering capabilities?
   - Does the board / commission / department address hazard impacts? If so, how? For example, is the risk assessment of the approved Hazard Mitigation Plan (HMP) consulted when this board, commission or department considers projects or activities? If so, what is the process for review?

   - Are staffing numbers and training adequate to carry out the mission of the department?

   - Does the department identify projects that could be included in the mitigation strategy?

   - Can the department be engaged to implement mitigation actions?

   - How can the department be further engaged to reduce risk?

2. Does the jurisdiction have in-house department responsible for evaluating private properties and public grounds against local codes?
    - Does the department address hazard impacts? If so, how? For example, is the risk assessment of the approved Hazard Mitigation Plan (HMP) consulted when this board, commission or department considers projects or activities? If so, what is the process for review?

    - Are staffing numbers and training adequate to carry out the mission of the department?

    - Does the department identify projects that could be included in the mitigation strategy?

    - Can the department be engaged to implement mitigation actions?

    - How can the department be further engaged to reduce risk?

3. Does the jurisdiction have in-house or contracted staff familiar with and capable of successfully handling FEMA Hazard Mitigation Assistance (HMA) grant program requirements consistent with the Code of Federal Regulations, as well as non-FEMA funding sources?

Planning and Regulatory Instructions: Please review and modify, as applicable. In addition, please answer the questions below that table.

Summary of planning tools adopted - Charles County & Municipalities															
Community	**Hazard Mitigation Plan**	**Emergency Operations Plan**	**Evacuation Plan**	**Continuity of Operations Plan**	**Floodplain Management Ordinance**	**Zoning Regulations**	**Subdivision Regulations**	**Comprehensive Plan**	**Stormwater Management Plan**	**Natural Resource Protection Plan**	**Capital Improvement Plan**	**Firewise Community**	**Storm Ready**	**Building Code**	**Climate Adaptation Plan**
Charles County	X	X	X	X	X	X	X	X	X	X	X		X	X	
Town of La Plata	X	X		X	X	X	X	X	X				X	X	
Town of Indian Head	X				X	X	X							X	
Town of Port Tobacco Village	X														

Jurisdiction completed for: _____

1. What is the relationship between the Comprehensive/Master Plan and the Charles County Hazard Mitigation Plan?
    - Does the plan/policy address hazard impacts? If so, how? For example, does the plan/policy include limitations to building in areas of risk, noted by the hazard mitigation plan? If so, what are those restrictions?
    - Does the plan/policy identify projects that could be included in the mitigation strategy?
    - Can the plan/policy be used to implement mitigation actions?
    - How can the plan/policy be expanded and improved to reduce risk?

2. What year do you anticipate the next update of the Comprehensive/Master Plan to occur?

3. What information from the Charles County Hazard Mitigation Plan Update do you plan to integrate into the next update of the Comprehensive/Master Plan? Is the plan effectively reducing or eliminating development in known hazard areas, i.e., is the rate of development in the Special Flood Hazard Area lower, the same, or higher? Does the plan include recommendations or cross reference relevant mitigation actions from the current approved HMP?

4. When is the next scheduled update of the Emergency Operations Plan?

5. What is the relationship between the Emergency Operations Plan and the Charles County Hazard Mitigation Plan?
    - Does the plan/policy address hazard impacts? If so, how? For example, does the plan/policy include limitations to building in areas of risk, noted by the hazard mitigation plan? If so, what are those restrictions?
    - Does the plan/policy identify projects that could be included in the mitigation strategy?
    - Can the plan/policy be used to implement mitigation actions?
    - How can the plan/policy be expanded and improved to reduce risk?

6. Does the EOP address all hazards identified in the HMP?

7. How often will the Climate Change Adaptation Plan be updated?

8. What is the relationship between the Climate Change Adaptation Plan and the Charles County Hazard Mitigation Plan?
    - Does the plan/policy address hazard impacts? If so, how? For example, does the plan/policy include limitations to building in areas of risk, noted by the hazard mitigation plan? If so, what are those restrictions?

- Does the plan/policy identify projects that could be included in the mitigation strategy?

- Can the plan/policy be used to implement mitigation actions?

- How can the plan/policy be expanded and improved to reduce risk?

9. Is the jurisdiction certified by NWS as Storm Ready? If so, how long has the community been certified? Have surveys been conducted to determine the effectiveness of the program? If so, what were the results?

Financial capabilities include access to or eligibility to use funding resources for hazard mitigation.

Jurisdiction completed for: _____

1. Does the jurisdiction Have a Capital Improvement Program/Plan? *(A short-range plan, usually 4 to 10 years, which identifies capital projects and equipment purchases, provides a planning schedule, and identifies options for financing the plan)*

If yes, please answer the following:

- Has the funding resource been used in the past for hazard mitigation? If so, for what type of activities?

- Could the resource be used to fund future mitigation actions?

- How can the funding resource be further leveraged to reduce risk?

2. Does the jurisdiction use grant programs administered by Federal agencies other than FEMA with potential to fund mitigation actions? For example, the U.S. Department of Housing and Urban Development Community Development Block Grants, U.S. Department of Energy, and the U.S. Department of Transportation, etc.

3. Does the jurisdiction have a fee levied by the jurisdiction, in addition to cost of service provided, for use in funding related capital programs, such as non-Federal shares for mitigation actions?

Charles County, Maryland NFIP Community Questionnaire

Floodplain Identification & Mapping

1. Who is your FPA or floodplain manager? Please provide office/agency name, position title, and contact information.	Mr. Ray Schumaker, Chief of Codes, Permits & Inspection Services, Dept. of Planning and Growth Management, & FPA Charles County, Maryland 200 Baltimore Street LaPlata, Maryland 20646 301-396-5842 ShumakeR@charlescountymd.gov
2. Where do you keep your FIRM and FIS report?	Hard copies of the FIRM, FIS, & LOMC's are available in the Charles County Office of Planning & Growth Management. Digital versions are available for review at www.mdfloodmaps.net & https://msc.fema.gov/portal/home
3. Has your community adopted the most recent FIRM? When was the adoption? Where is that information stored? Has your community updated the floodplain ordinance language to include the current FIRM and FIS?	Charles County, Maryland has adopted the most recent FEMA FIRM, effective date of September 4, 2013. The Charles County Floodplain Management Ordinance language is in compliance with the current FIRM and FIS, and is available online at the County's website; hard copies are available for review in the County's Department of Planning and Growth Management.
4. Does your jurisdiction support requests for map updates?	Yes. Charles County reviews and may provide support for LOMC applications.
5. Is there a specific agency/department responsible for compiling these updates and tracking LOMCs?	Yes, Charles County tracks and compiles updates for LOMC's.
6. Do you collect updated technical or scientific data and modeling? How do you share this with FEMA?	Yes. Charles County collects and reviews technical and/or scientific modeling data when applicable. Copies are provided to FEMA during the LOMC process.
7. Does your jurisdiction provide assistance with local floodplain determinations? If yes, specify how.	Yes. Charles County may assist homeowners and potential applicants in determining if their property is located within or near the SFHA by providing mapping resources and information, both lateral and vertical determination information.
8. Do the people/agencies responsible for using these tools in your community have the access they need? Which tools does your community rely on?	Yes. Charles County utilizes multiple tools for NFIP information dissemination and education, including the County website, floodplain management personnel, and other tools such as www.mdfloodmaps.com, www.floodsmart.gov, & https://msc.fema.gov/portal/home

Floodplain management requires that you understand the mapping and data side when working with the public.

Floodplain Management

1. Does your jurisdiction issue permits for all proposed development in the SFHA? What office/position is responsible?	Yes. The Charles County Department of Planning and Growth Management, and the FPA are responsible for permit issuance within the SFHA.
2. Does your jurisdiction require BFE data for subdivision proposals and other development proposals larger than 50 lots or 5 acres? If so, what department or office is responsible?	Yes. Charles County requires BFE data for any development and subdivision proposals with at least 5 lots or at least 5 acres, whichever is the lesser, in SFHA's where base flood elevations are not shown on the FIRM; if H&H engineering analyses are submitted, they shall be performed in accordance with MDE & FEMA requirements & specifications. The Charles County Department of Planning & Growth Management is responsible.
3. How does your community identify substantially improved structures? When do they intervene?	The Charles County FPA requires documentation to be submitted regarding substantially improved structures, including market value, damage assessments, engineer certifications, etc. for compliance with floodplain management requirements.
4. Does your community have a coordinated process to determine substantial damage and to permit repair and improvement? Does the jurisdiction conduct substantial damage assessments in the SFHA? Does your community have a plan for who will conduct substantial damage assessments and a procedure for assessment?	Yes. The Charles County Floodplain Management Ordinance specifies that the FPA shall administer the requirements related to work on existing structures that are located within the SFHA and have been substantially damaged, and to notify owners of substantially damaged structures to obtain permits and prohibit non-compliant repair of damaged buildings. The FPA and/or authorized/designated County Representative conducts damage assessments.
5. Does your jurisdiction require Elevation Certificates for new or substantially improved structures? If yes, how is it documented and which office/agency/department is responsible?	Yes. Applicants for construction within the SFHA must submit an Elevation Certificate prepared by a licensed engineer or surveyor. Charles County reviews the applications and certificates.
6. How does the jurisdiction enforce the floodplain ordinance sections? How does the jurisdiction address SI/SD violations?	The Charles County FPA makes periodic inspections of properties, structures, and utilities for compliance with the ordinance and can issue violations, stop work orders, and penalties. The Charles County FPA and the code enforcement officer is responsible for enforcing violations.
7. Has your jurisdiction had a Community Assistance Visit? If so, were any corrective actions required?	Yes, Charles County had a Community Assistance Visit on January 28, 2019. Minor corrective actions were recommended regarding permit compliance and documentation, such as developing a checklist, and as-built elevation certificates.
8. Does your jurisdiction have or is considering higher ordinance standards than the NFIP? Please describe the higher standards and where they are documented.	All new or substantially improved structures shall have the lowest floor elevated to or above the flood protection elevation. The Charles County Flood Protection Elevation is the base flood elevation plus two (2) feet of freeboard. No additional regulations are planned at this time.
9. Are any local officials/departments in your community interested in additional training? What topics relate most to your community?	Yes, Charles County personnel are always interested in additional training in reviewing and administering the requirements of the NFIP.

Floodplain management reduces flood risk and protects floodplain health.

Flood Insurance

1. How does the jurisdiction educate community members about the availability and value of flood insurance?	Charles County personnel and/or the FPA educates the community and property owners regarding the value of flood insurance through press releases, public service announcements, and/or direct contact with property owners within the SFHA.
2. Does the jurisdiction inform community property owners about changes to the FIRM that would impact their insurance rates?	Yes, Charles County and/or the FPA notifies property owners within the SFHA regarding changes to the FIRM through press releases, public service announcements, social media posts, and where applicable, direct correspondence.
3. How does the jurisdiction provide general assistance to community members regarding insurance issues?	The FPA and Charles County personnel are available to advise, assist and answer any questions of community members regarding the NFIP program and/or floodplain regulations.
4. Does the jurisdiction keep track of the number of residential and non-residential structures in the SFHA? How many structures are in the SFHA in your community?	Yes. A database of the number of residential and non-residential structures is maintained by the County. According to the FEMA CIS NFIP Insurance Report, there are 457 NFIP policies within the County.
5. Does the jurisdiction have any levees or levee systems in its jurisdiction?	No. Charles County does not have any levee systems within its jurisdiction according to the USACE national levee database.
6. Is the levee or levee system certified and accredited?	N/A
7. Is the levee or levee system a Provisionally Accredited Levee (PAL)?	N/A
8. Is the levee or levee system part of the USACE Rehabilitation and Inspection Program?	N/A
9. Does your community have any Major Dams or High Hazard Dams, and if so, have you applied for FEMA's High Hazard Potential Dam grant?	Yes. Charles County has one (1) high hazard dam, and two (2) significant hazard dams within its jurisdiction according to the USACE National Inventory of Dams. The County has not applied for FEMA's High Hazard Potential Dam grant.
Flood risk communication to the public is vital for a community to be truly resilient.	

NEXT STEPS

- What are your short- and long-term action items?
    - Add additional floodplain management and permitting information to the County website, i.e. permit application, links to state and federal floodplain mapping and insurance programs.
    -

Hazard Mitigation Committee Mid-Point Meeting

October 19, 2023, 2:00 PM – 4:00 PM

In-person

Attendees

Charles County Hazard Mitigation Planning Committee (HMPC) Members:

Michelle Lilly, Emergency Services
Gary Lewis, Emergency Services
Mark Kaufmann, County Fire Chief, CCVFA
Luis Dieguez, Charles Soil Conservation District
Agnes Adjei, Planning & Growth Management
Mary Lilly, Department of Health, Emergency Preparedness & Response
Kelly Wilson, Emergency Services
Renesha Miles, Charles County Government, DEI Office
Beth Groth, Planning & Growth Management
Karen Wiggin, Planning & Growth Management
Tina Wilson, Citizen, Port Tobacco Conservancy
Nick Ellis, Emergency Services
Mark James, Michael Baker
Virginia Smith, SP&D
Doug Adams, MES

Introductions & Brief HMP Overview

Michelle Lilly, Director of Charles County Emergency Services welcomed committee members to the meeting. She explained that in order for the community to maintain eligibility for FEMA grant funding, updates to the hazard mitigation plan are necessary every five years. Mark James provided a brief background and called for introductions of meeting participants. Mark went over the meeting agenda which included an exercise to gather feedback on current capabilities and potential gaps that may exist. Capability gaps or ideas for enhancement identified will be further discussed at the final HMPC meeting, the Mitigation Workshop.

Project Overview

What is a Hazard Mitigation Plan and why do it? The Plan is a community-driven, living document that communities use to reduce their vulnerability to hazards. Counties must have a plan to maintain access to mitigation grants. These grants can augment local mitigation activities already being accomplished and can leverage other funding sources (state grants and other federal issued grants).

New hazard mitigation planning guidance went into effect this year (April 19, 2023). The new guidance mandates that all communities must participate throughout the planning process, not just review, and adopt the plan. Major changes are the inclusion of and focus on social equity and climate change in this plan. It was partially addressed in the 2018 plan, but more analysis will be required. Also, we will be expanding on the capability assessment and plan integration portions of the plan.

Existing Plan Components will be maintained with some adjustments to the 2018 Plan format. These components include:

I. Public Outreach
II. Hazard Identification and Risk Assessment

III. Capability Assessment
IV. Mitigation Strategy
V. Plan Maintenance
VI. Plan Adoption

Additions and/or expansion of the following items will be completed during the Plan update:

- ✓ High Hazard Potential Dams that must be included to apply for HHPD grant program – covered in the 2018 Plan.
- ✓ New State requirement to address extreme heat and wildfire – covered in the 2018 Plan.
- ✓ Climate change and social equity – result of the new FEMA guidance.

The Plan requires about a month of review by the State and then the federal government takes 45 days for their review. We anticipate having the plan done by December. The current 2018 Plan will lapse in December, limiting the County and communities from applying to HMA funding programs. However, with the assistance of the HMPC, the plan update process timeframe required for this update will be adhered to, and the time period that the plan is expired will be minimized to the greatest extent feasible.

Municipal Participation

The 2018 Charles County HMP included the following municipalities:

- ✓ Town of Indian Head
- ✓ Town of La Plata
- ✓ Village of Port Tobacco

We must document municipal participation throughout the plan development process.

Project Updates

Project updates were presented for Public Outreach, Survey Results, Mitigation Status Report, and Hazard Update Results (including the update process and updated HIRA table).

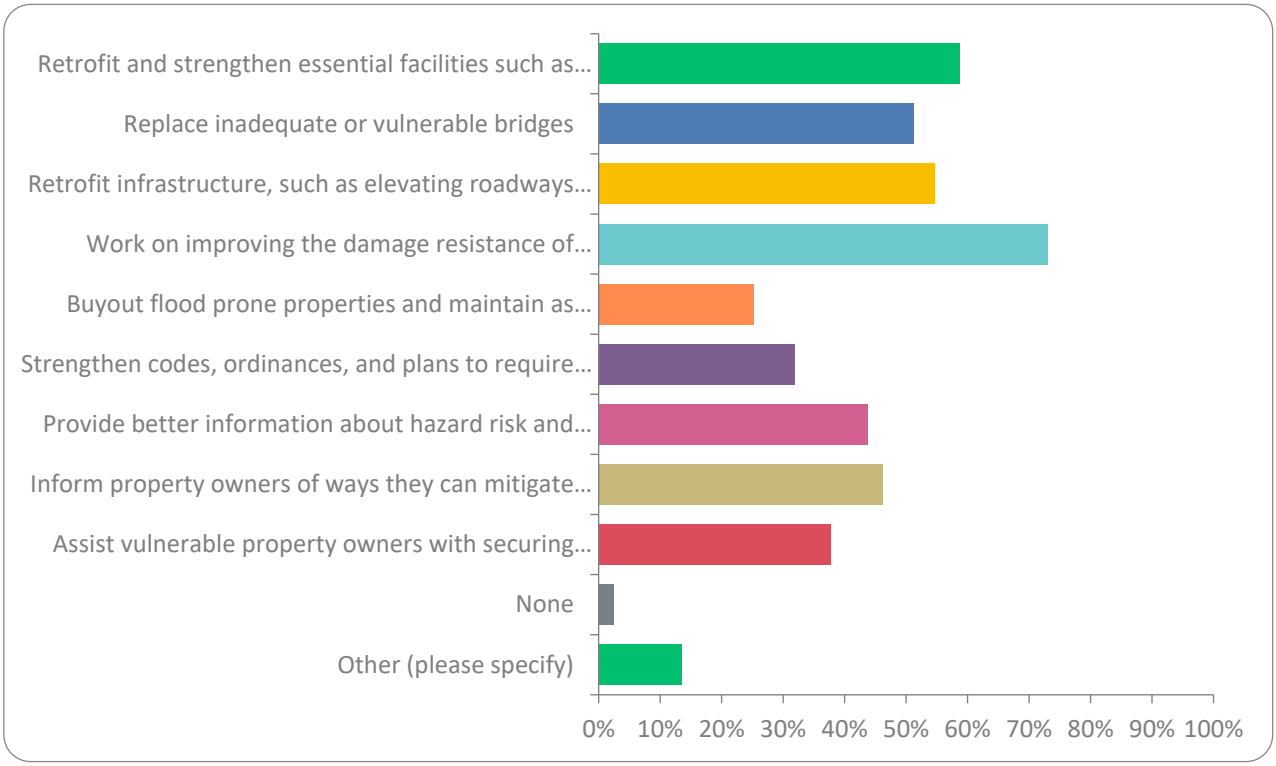
Public outreach efforts include:



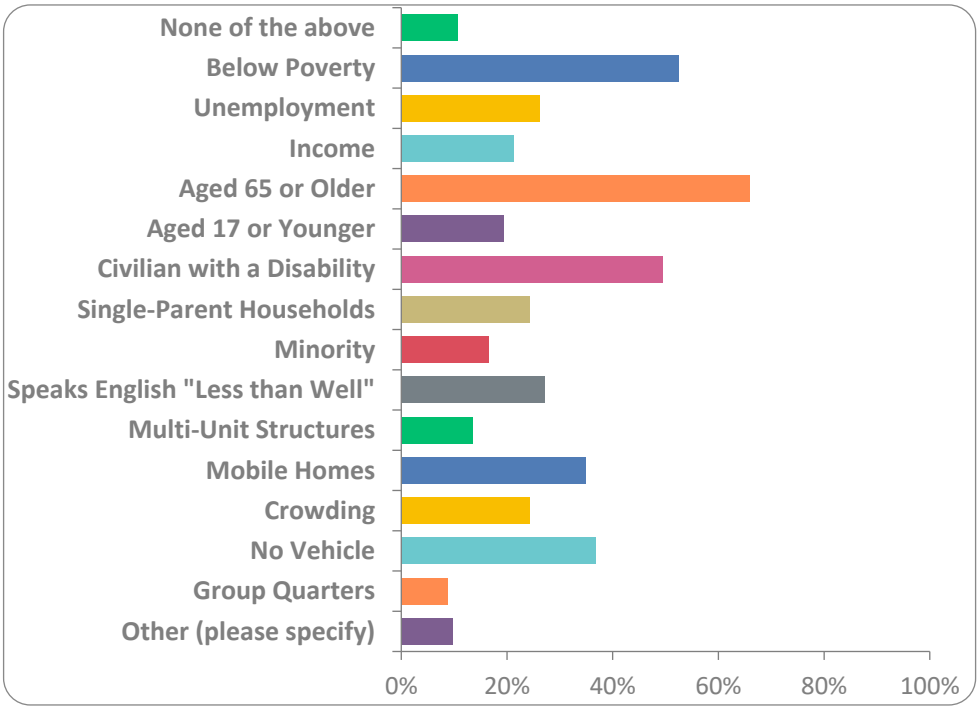
- ✓ Press Release (September 2023)
- ✓ Social Media Post
- ✓ DES webpage updates (new content uploaded periodically)
- ✓ Online Public Survey, QR Code to share:

Preliminary public survey results were presented at the meeting. As of October 18, 2023, 142 members of the public have taken the online survey. Highlighted results from the survey include:

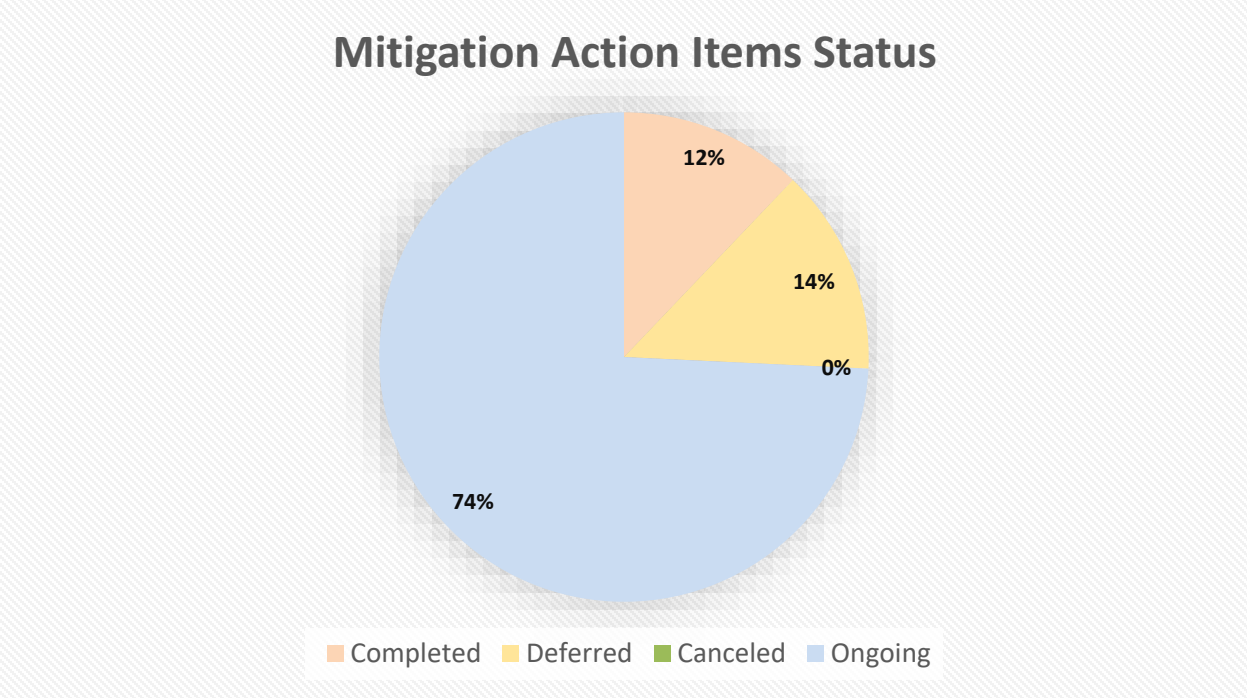
Q12: Which of the following mitigation project types do you believe should be focused on to reduce disruptions of services and strengthen the community (check all that apply)?



Q15: In terms of social vulnerability, do you feel that a specific group, or groups, in Charles County are particularly at risk for, or could be harmed by, any of the hazards listed in Question 14? This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk. Note: CDC 15 Social Factors below.



Results of the **Mitigation Status Report** were provided as a handout. The report indicates the following (pie chart):



Action items completed in the previous 5 year planning cycle are shown below; high priority action items are in red.

- **Action Item #1** – Install uninterruptible power supplies on critical electronic equipment in County facilities to prevent outages during thunder and lightning events.
- **Action Item #6** – Protect County buildings from hail damage by installing hail guards on roof-mounted HVAC equipment and installing hail-resistant roofing and siding when feasible on newly constructed facilities.
- **Action Item #12** – Ensure that NFIP requirements are being met concerning repairs, renovations, and remodeling of structures located in the regulatory floodplain.
- **Action Item #17** – Identify roadways/bridges that frequently flood and mitigate to ensure ingress and egress.
- **Action Item #40** – Continue inspection, maintenance, and enforcement program to help ensure continued structural integrity of dams.
- **Action Item #41** – Regulate development near steep slopes.
- **Action Item #67** – Create an Archaeological Context for Charles County based on a literature review of academic and historical works, and on information found in the archaeological data at the Maryland Historical Trust.
- **Action Item #68** – Prioritize list of critical facilities that are vulnerable to natural and human-made hazards and develop potential mitigation solutions for high-priority critical facilities to reduce vulnerability.

Note: *The completed Mitigation Status Report has been included alongside these meeting notes.*

Results of the **Hazard Identification and Risk Assessment** (competed during the kick-off meeting) are available.

It was agreed that no change to the 2018 plan was needed other than moving Dam Failure and Public Health Emergencies into the natural hazard category from the human-caused hazard category.

HMPC members were also asked to comment on the severity of each hazard during the virtual kickoff meeting. Each hazard was presented in the chat section and committee members provided one of the following answers to rate the frequency of occurrence, magnitude, and geographic extent: (I) Increase, (D) Decrease, or (NC) No Change.

2023 HAZARD	STATUS	COMMENT
Dam Failure	No Change	Moved from Human-Caused Hazards
Drought	No Change	
Earth Disturbance	No Change	
Erosion	Increase	
Extreme Weather	Increase	
Flood	Increase	
Hurricane, Tropical Storm, Nor'easter	No Change	
Public Health Emergency	Increase	Moved from Human-Caused Hazards
Severe Winter Storms	Decrease	
Temperature Extremes	Increase	
Wildfire	No Change	
Building and Structure Collapse	No Change	
Civil Disturbance and Criminal Activity	Increase	
Environmental Hazards (Hazardous Materials & Pipeline)	Increase	
Environmental Hazards (Nuclear Events)	No Change	
Transportation Accidents	Increase	
Utility Interruption	Increase	

Utilizing the HMPC's perspective of hazard risk, the HIRA ranking for each hazard identified in the plan was updated for the County and its municipalities, as shown on the next page. The largest change was Erosion went from Low to Medium, while the other hazards had minor variations in their risk factor numbers. High risk hazards include: Extreme Weather, Flood, Temperature Extremes, and Public Health Emergencies.

Table 3.4: Countywide ranking of hazard types based on Risk Factor (RF) methodology.

HAZARD NATURAL (N) or MAN-MADE (M)	RISK ASSESSMENT CATEGORY					RISK FACTOR
	PROBABILITY	IMPACT	SPATIAL EXTENT	WARNING TIME	DURATION	
Extreme Weather (N)	4	3	4	4	1	3.4
Flood (N)	4	3	3	4	2	3.3
Temperature Extremes (N)	4	2	4	1	3	3.0
Public Health Emergency (N)	4	3	2	1	4	3.0
Hurricane, Tropical Storm, and Nor'easter (N)	2	3	4	1	2	2.6
Utility Interruption (M)	4	1	2	3	2	2.4
Civil Disturbance and Criminal Activity (M)	4	2	1	3	1	2.4
Environmental Hazards – Hazardous Materials (M)	4	1	1	4	2	2.3
Transportation Accidents (M)	4	2	1	1	1	2.2
Severe Winter Storms (N)	2	1	4	1	3	2.1
Erosion (N)	4	1	1	1	3	2.1
Building and Structure Collapse (M)	2	2	1	3	3	2.0
Dam Failure (N)	1	2	2	4	3	2.0
Earth Disturbance (N)	2	1	3	3	1	1.9
Drought (N)	1	1	4	1	4	1.9
Environmental Hazards - Nuclear Events (M)	1	2	1	2	4	1.7
Wildfire (N)	1	1	1	4	2	1.4

Table 3.5: Jurisdictional Risk Evaluation

Municipality	Extreme Weather (N)	Flood (N)	Temperature Extremes (N)	Public Health Emergency (M)	Hurricane, Tropical Storm, and Nor'easter (N)	Utility Interruption (M)	Civil Disturbance and Criminal Activity (M)	Environmental Hazards Hazardous Materials (M)	Transportation Accidents (M)	Severe Winter Storms (N)	Erosion (N)	Building and Structure Collapse (M)	Dam Failure (M)	Earth Disturbance (N)	Drought (N)	Environmental Hazards Nuclear Events (M)	Wildfire (N)
County Rank	3.4	3.3	3.0	3.0	2.6	2.4	2.4	2.3	2.2	2.1	2.1	2.0	2.0	1.9	1.9	1.7	1.4
Town of Indian Head	>	=	>	>	=	>	>	>	>	=	>	=	=	=	<	=	=
Town of La Plata	>	<	>	>	=	>	>	>	>	<	>	=	=	>	<	=	=
Town of Port Tobacco	>	=	>	>	=	=	>	>	>	<	>	=	=	=	>	=	=

Draft chapters that have received an update as of the mid-point meeting include - Hazard Identification and Risk Assessment, Erosion, Drought, Extreme Weather, Severe Winter Storm, Temperatures Extremes, Dam Failure, and Plan Execution & Maintenance.

Hazard profiles include:

- Location and extent
- Range of magnitude
- Past occurrence
- Future occurrence
- Vulnerability assessment
  - People
  - Structures
  - Systems
  - Natural, Historic and Cultural Resources
  - Community Activities

Capability Assessment Work Session

A work session was held to provide an opportunity for HMPC members to identify capabilities and gaps as it relates to hazard mitigation. The identification of capability gaps and/or ideas for capability enhancements are incorporated into new mitigation strategies.

Question: Are existing resources/capabilities enough to efficiently implement mitigation actions? Are there opportunities to add to or enhance existing capabilities as they relate to hazard mitigation?

Attendees were placed in one of the following groups:

- Planning and Regulatory, Administrative and Technical, and Financial and Education and Outreach (County & Municipalities)
- Public Health & Equity
- Public Safety

Each group was provided discussion questions. Finding from this work session included, but are not limited to:

- Integration of Climate Action Plan, currently under development, in both the Hazard Mitigation Plan and the update of the Comprehensive Plan projected in 2026. Expanded the Vision statement in the Comprehensive Plan to promote enhanced policies specific to climate change.
- Potential need for additional planning and code enforcement personnel as more policies are enacted.
- The Health Department is working on an update to their Continuity of Operations Plan (COOP).
- Incident Command Staff (ICS) training is mandatory for staff, however DES and the Health Department may identify additional training needs, such as Incident Management Team, position specific training and EOC/IMT Integration.

FEMA required element of Hazard Mitigation Plan Updates:

- Does the plan describe how the existing capabilities of each participant are available to support the mitigation strategy? Does this include a discussion of the existing building codes and land use and development ordinances or regulations?
- Does the plan describe how jurisdictions integrated the mitigation plan, when appropriate, into other planning mechanisms?
- Does the plan describe each participant's ability to expand and improve the identified capabilities to achieve mitigation?

- The Health Department is in the preliminary phase of exercise planning that includes multiple disciplines and organizations.
- The Health Department is in the process of completing a COVID-19 After Action Report and Improvement Plan (AAR/IP). Items identified in the improvement plan will be reviewed for potential integration into the hazard mitigation plan, as public health action items,
- In terms of notification and warning, DES indicated that Charles County uses Everbridge which provides instant notification with multilingual capabilities. There are currently 20,872 registered users in Everbridge and 70,000 including the 9-1-1 database.

Follow-up will be conducted as well as additional discussion on potential gaps and new mitigation ideas will occur at the upcoming Mitigation Workshop.

Ongoing Data Collection efforts

- ✓ Flood Insurance Policies and Claims
- ✓ Repetitive and Severe Repetitive Loss Properties
- ✓ NFIP Questionnaire- the pre-populated draft questionnaire was provided to Planning & Growth Management for review and comment.

Next Steps

Task	Dates
Kick Off Meeting	August 24, 2023
Mid-Point Meeting	October 19, 2023
Mitigation Workshop	**TBD**
Plan Writing	August-December 2023
Plan Review & Approval Process	

Resources & Contact Information

Charles County Hazard Mitigation Plan Update Project Website:
2023 Hazard Mitigation Plan Update Process | Charles County, MD (charlescountymd.gov)

Michelle Lilly, Director - Lillym@charlescountymd.gov
Gary Lewis, lewisg@charlescountymd.gov
Mark James - mark.james@mbakerintl.com
Virginia Smith - vsmith@smithp-d.com

C-4 HMPC Mitigation Workshop

December 14, 2023

James, Mark

From: Virginia Smith <vsmith@smithp-d.com>
Sent: Tuesday, November 21, 2023 11:04 AM
To: Michelle L. Lilly; Gary Lewis; schaefes@resilientcharlescountymd.com; stapless@charlescounty.org; Kelly Palmer; Karen D. Wiggen; GrothB@charlescountymd.gov; ThompsCa@charlescountymd.gov; adjeia@charlescountymd.gov; Ryan@townofindianhead.org; MMiner@townoflaplata.org; WilsonK@charlescountymd.gov; chieffire@ccvfireems.org; michael.gimmel@ccvfireems.org; mlewis@ccvfireems.org; demohun-hintze@csmd.edu; dodgej@ccso.us; beaversk@charlescountymd.gov; afarmer@mdot.maryland.gov; Suzanne.Wisnieski@usda.gov; luis.dieguez@charlesscd.com; mary.lilly@maryland.gov; gabby77@aol.com; john.dulina@maryland.gov; milesr@charlescountymd.gov; drurys@charlescountymd.gov; jstoddard@ccboe.com; ellisn@charlescountymd.gov; knaggsl@charlescountymd.gov; BinkleyJ@charlescountymd.gov
Cc: James, Mark; Kayla Rhue; Michele King
Subject: EXTERNAL: Charles County Hazard Mitigation Plan - Virtual Mitigation Workshop
Attachments: Mitigation Workshop- Group Reference Sheet.pdf

EXTERNAL EMAIL

Good Morning,

The mitigation workshop will be held virtually, as requested. The mitigation workshop will be conducted using four topical groups that will review, modify, and discuss new mitigation action items for inclusion in the plan update. To that end, we have scheduled four time slots for each of the topical groups on December 14th. We have assigned each Hazard Mitigation Planning Committee (HMPC) member to one of the four groups/time slots based on their area of expertise and an even distribution of groups. Please plan to attend your designated group's timeslot, however you are not limited to that one group. If you would like to attend more than one group meeting, please let us know.

I have included the attached reference sheet which provides information on the four topical groups.

HMPC members have been selected for participation in one of the four groups as follows:

1. **Local Planning and Regulations**
   Date: December 14, 2023
   Time: 8:30- 10:00 AM
   WebEx Meeting Link:
   https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=m4e45137fead40a8163e01327ca4a1b2e
   Gary Lewis
   Kelly Palmer
   Karen Wiggin
   Cathy Thompson
   Lynn Knaggs
   Joel Binkley

2. **Structure and Infrastructure Projects**
   Date: December 14, 2023
   Time: 10:30 AM - Noon

WebEx Meeting Link:
https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=mf53f2a5fce31bf40480904e414303e67
Michelle Lily
Stephen Staples
Agnes Adjei
Ryan Hicks
Michelle Miner
Ashley Farmer
John Dulina

3. **Natural Systems Protection**
   Date: December 14, 2023
   Time: 12:30 PM – 2:00 PM
   WebEx Meeting Link:
   https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=ma614b28ad9eb0dab582091b594b7ab9e
   Stacey Schafer
   Beth Groth
   Kelli Beavers
   Suzanne Curtis Wisnieski
   Luis Dieguez
   Tina Wilson
   Sam Drury

4. **Public Education and Emergency Services**
   Date: December 14, 2023
   Time: 2:30 PM – 4:00 PM
   WebEx Meeting Link:
   https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=m67378973030927b200d4cc1dd09a0cba
   Kelly Wilson
   Mary Lily
   Mark Kaufman
   Michael Gimmel
   Mitchell Lewis
   Denise Mohun-Hintze
   Lt. Dodge
   Renesha Miles
   Jason Stoddard
   Nik Ellis

Calendar invites along with read ahead materials will be distributed, as well. We look forward to meeting with you at the Mitigation Workshop group meetings!

Virginia Smith, AICP

Mitigation Workshop – Please select one or more groups.

HMPC members have been assigned to one group, at a minimum, however more than one group may be chosen, at the discretion of each HMPC member.

The four groups included:

1. **Local Planning and Regulations**
2. **Structure and Infrastructure Projects**
3. **Natural Systems Protection**
4. **Public Education and Emergency Services**

Descriptions along with examples of mitigation actions for each group are summarized below for reference purposes.

(1) Local Planning and Regulations

This group will discuss preventive measures that are designed to keep the problem(s) associated various hazards from occurring or getting worse. This includes mitigation actions that ensure that future development does not increase damage. Typically, mitigation actions under this group are administered by building, zoning, planning and/or code enforcement offices. Examples include:

- Planning and zoning.
- Open space preservation.
- Floodplain development regulations.
- Building codes.
- Stormwater management.
- Drainage system maintenance.

* Adoption and enforcement of regulatory tools, including ordinances, regulations, and building codes, to guide and inform land use, development, and redevelopment decisions in areas affected by hazards.

(2) Structure and Infrastructure Projects

This group will discuss protection measures that are used to modify buildings and infrastructure or structural flood control projects. Your community may find some of these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Whereas mitigation actions associated with structural, or infrastructure projects may prove very expensive, however hazard mitigation grant opportunities are available.

These measures include:

- Acquisition.
- Relocation.
- Building elevation.
- Floodproofing.
- Sewer backup protection.

- Drainage systems.
- Reservoirs.
- Levees/floodwalls/seawalls.
- Channel modifications.
- Enlarging culverts or bridge openings.
- Diversions.
- Storm sewers.

* Acquisition or elevation of flood-damaged homes or businesses retrofit public buildings, schools, and critical facilities to withstand extreme wind events or ground shaking from earthquakes.

(3) Natural Systems Protection.
Water quality and natural habitats may be improved, and flood losses reduced, by preserving or restoring natural areas or the natural functions of floodplain and watershed areas.

- Preventing erosion with proper bank stabilization, sloping or grading techniques, planting vegetation on slopes, terracing hillsides, or installing riprap boulders or geotextile fabric.
- Stabilizing cliffs with terracing or plantings of grasses or other plants to hold soil together.
- Planting mature trees in the coastal riparian zone to assist in dissipation of the wind force in the breaking wave zone.
- Using a hybrid of hard/soft engineering techniques (i.e., combine low-profile rock, rubble, oyster reefs, or wood structures with vegetative planting or other soft stabilization techniques).
- Implementing marine riparian habitat reinstatement or revegetation.
- Using a rock splash pad to direct runoff and minimize the potential for erosion.
- Using bioengineered bank stabilization techniques.
- Using vegetative management, such as vegetative buffers, around streams and water sources.
- Protecting and preserving wetlands to help prevent flooding in other areas.
- Establishing and managing riparian buffers along river and streams.
- Retaining natural vegetative beds in stormwater channels.
- Retaining thick vegetative cover on public lands flanking rivers.

* Creating a buffer area by protecting natural resources, such as floodplains, wetlands, or sensitive habitats. Additional benefits to the community may include improved water quality and recreational opportunities.

(4) Public Education and Emergency Services.
Public information activities advise property owners, potential property owners and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of floodplains. Emergency services measures

protect people during and after a flood. Most counties and many cities have emergency management offices to coordinate warning, response, and recovery during a disaster. Examples of public outreach and emergency services mitigation actions can include:

- Map information.
- Outreach projects.
- Real estate disclosure.
- Insurance.
- Disaster preparedness.
- Hazard warning and notification.
- Technical assistance.
- Environmental education.
- Critical facilities protection.
- Health and safety maintenance.

* Implement outreach programs to educate property owners and the public about risk and about mitigation measures to protect homes and businesses.

James, Mark

Subject:	FW: EXTERNAL: Virtual HMP Mitigation Workshop - Public Education and Emergency Services
Location:	Virtual
Start:	Thu 12/14/2023 2:30 PM
End:	Thu 12/14/2023 4:00 PM
Show Time As:	Tentative
Recurrence:	(none)
Meeting Status:	Not yet responded
Organizer:	Virginia Smith

-----Original Appointment-----
From: Virginia Smith <vsmith@smithp-d.com>
Sent: Tuesday, November 21, 2023 1:33 PM
To: Virginia Smith; Gary Lewis; Michelle L. Lilly; James, Mark; WilsonK@charlescountymd.gov; mary.lilly@maryland.gov; Mark Kaufmann Jr. (Fire Chief); Michael Gimmel; Mitchell, Joyce; demohun-hintze@csmd.edu; dodgej@ccso.us; Renesha Miles; jstoddard@ccboe.com; Nicholas Ellis
Cc: Doug Adams; Kayla Rhue
Subject: EXTERNAL: Virtual HMP Mitigation Workshop - Public Education and Emergency Services
When: Thursday, December 14, 2023 2:30 PM-4:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: Virtual

EXTERNAL EMAIL

For those of you who have not accepted this calendar invite, please accept if you are planning on attending the meeting. We look forward to meeting with you. Thanks!

The mitigation workshop will be held virtually, as requested. The mitigation workshop will be conducted using four topical groups that will review, modify, and discuss new mitigation action items for inclusion in the plan update. To that end, we have scheduled four time slots for each of the topical groups on December 14th. We have assigned each Hazard Mitigation Planning Committee (HMPC) member to one of the four groups/time slots based on their area of expertise and an even distribution of groups. Please plan to attend your designated group's timeslot, however you are not limited to that one group. If you would like to attend more than one group meeting, please let us know.

HMPC members have been selected for participation in one of the four groups.

4. **Public Education and Emergency Services**
   Date: December 14, 2023
   Time: 2:30 PM – 4:00 PM

WebEx Meeting
Link: https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=m67378973030927b200d4cc1dd09a0cba
Kelly Wilson
Mary Lily
Mark Kaufman
Michael Gimmel
Mitchell Lewis
Denise Mohun-Hintze
Lt. Dodge
Renesha Miles
Jason Stoddard
Nik Ellis

James, Mark

Subject: FW: EXTERNAL: Virtual HMP Mitigation Workshop - Structure and Infrastructure Group
Location: WebEx Meeting Link: https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=mf53f2a5fce31bf40480904e414303e67

Start: Thu 12/14/2023 10:30 AM
End: Thu 12/14/2023 12:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Virginia Smith

-----Original Appointment-----
From: Virginia Smith <vsmith@smithp-d.com>
Sent: Tuesday, November 21, 2023 1:25 PM
To: Virginia Smith; Michelle L. Lilly; Gary Lewis; James, Mark; stapless@charlescounty.org; Agnes Adjei; Ryan@townofindianhead.org; Miner, Michelle (mminer@townoflaplata.org); afarmer@mdot.maryland.gov; mark.hubbard@maryland.gov
Cc: Stephen T. Staples; Doug Adams; Kayla Rhue; Michele King
Subject: EXTERNAL: Virtual HMP Mitigation Workshop - Structure and Infrastructure Group
When: Thursday, December 14, 2023 10:30 AM-12:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: WebEx Meeting Link: https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=mf53f2a5fce31bf40480904e414303e67

EXTERNAL EMAIL

Please accept this calendar invite if you are planning on attending the meeting. At this point, we only have a few responses for this group session. We look forward to meeting with you. Thanks!

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HMPC members have been selected for participation in one of the four groups.

2. **Structure and Infrastructure Projects**
   Date: December 14, 2023
   Time: 10:30 AM - Noon

WebEx Meeting
Link: https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=mf53f2a5fce31bf40480904e414303e67

Michelle Lily
Stephen Staples
Agnes Adjei
Ryan Hicks
Michelle Miner
Ashley Farmer
Mark Hubbard

James, Mark

Subject:	FW: EXTERNAL: HMP Virtual Mitigation Workshop - Local Planning and Regulations Group
Location:	WebEx Meeting Link: https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=m4e45137fead40a8163e01327ca4a1b2e
Start:	Thu 12/14/2023 8:30 AM
End:	Thu 12/14/2023 10:00 AM
Show Time As:	Tentative
Recurrence:	(none)
Meeting Status:	Not yet responded
Organizer:	Virginia Smith

-----Original Appointment-----
From: Virginia Smith <vsmith@smithp-d.com>
Sent: Tuesday, November 21, 2023 1:20 PM
To: Virginia Smith; Gary Lewis; Kelly Palmer; Cathy Thompson; Joel Binkley; Karen D. Wiggen; knaggsl@charlescountymd.gov; Michelle L. Lilly; James, Mark
Cc: Doug Adams; Kayla Rhue; Michele King
Subject: EXTERNAL: HMP Virtual Mitigation Workshop - Local Planning and Regulations Group
When: Thursday, December 14, 2023 8:30 AM-10:00 AM (UTC-05:00) Eastern Time (US & Canada).
Where: WebEx Meeting Link: https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=m4e45137fead40a8163e01327ca4a1b2e

EXTERNAL EMAIL

Meeting link:
https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=m4e45137fead40a8163e01327ca4a1b2e

Meeting number:
2630 357 3510

Meeting password:
nwVDf9ipq34

Host key:
921265

Join from a video or application
Dial 26303573510@webex.com

You can also dial 173.243.2.68 and enter your meeting number.

Meeting password for video system
69833947

Join by phone
+1-408-418-9388 Toll
Access Code: 26303573510

https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/globalcallin.php?MTID=mf1b851fb2df2d0088bcc28a99cc63d46
https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/globalcallin.php?MTID=mf1b851fb2df2d0088bcc28a99cc63d46

Meeting password for audio
69833947

Please accept this calendar invite if you are planning on attending the meeting. We look forward to meeting with you. Thanks!

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1. **Local Planning and Regulations**
   Date: December 14, 2023
   Time: 8:30- 10:00 AM
   WebEx Meeting
   Link: https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=m4e45137fead40a8163e01327ca4a1b2e
   Gary Lewis
   Kelly Palmer
   Karen Wiggin
   Cathy Thompson
   Lynn Knaggs
   Joel Binkley

James, Mark

Subject: FW: EXTERNAL: Virtual HMP Mitigation Workshop - Natural Systems Protection Group
Location: WebEx Meeting Link: https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=ma614b28ad9eb0dab582091b594b7ab9e

Start: Thu 12/14/2023 12:30 PM
End: Thu 12/14/2023 2:00 PM
Show Time As: Tentative

Recurrence: (none)

Meeting Status: Not yet responded

Organizer: Virginia Smith

-----Original Appointment-----
From: Virginia Smith <vsmith@smithp-d.com>
Sent: Tuesday, November 21, 2023 1:28 PM
To: Virginia Smith; Gary Lewis; Michelle L. Lilly; James, Mark
Cc: Stacy Schaefer; Beth A. Groth; Kelli Beavers; luis.dieguez@charlesscd.com; gabby77@aol.com; Sam J. Drury; Michele King; Doug Adams; Kayla Rhue
Subject: EXTERNAL: Virtual HMP Mitigation Workshop - Natural Systems Protection Group
When: Thursday, December 14, 2023 12:30 PM-2:00 PM (UTC-05:00) Eastern Time (US & Canada).
Where: WebEx Meeting Link: https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=ma614b28ad9eb0dab582091b594b7ab9e

EXTERNAL EMAIL

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The mitigation workshop will be held virtually, as requested. The mitigation workshop will be conducted using four topical groups that will review, modify, and discuss new mitigation action items for inclusion in the plan update. To that end, we have scheduled four time slots for each of the topical groups on December 14th. We have assigned each Hazard Mitigation Planning Committee (HMPC) member to one of the four groups/time slots based on their area of expertise and an even distribution of groups. Please plan to attend your designated group's timeslot, however you are not limited to that one group. If you would like to attend more than one group meeting, please let us know.

HMPC members have been selected for participation in one of the four groups.

3. **Natural Systems Protection**
   Date: December 14, 2023
   Time: 12:30 PM – 2:00 PM

WebEx Meeting
Link: https://smithplanninganddesign.my.webex.com/smithplanninganddesign.my/j.php?MTID=ma614b28ad9eb0dab582091b594b7ab9e

Stacey Schafer
Beth Groth
Kelli Beavers
Suzanne Curtis Wisnieski
Luis Dieguez
Tina Wilson
Sam Drury

James, Mark

From: Virginia Smith <vsmith@smithp-d.com>
Sent: Tuesday, November 28, 2023 12:08 PM
To: Michelle L. Lilly; Gary Lewis; schaefes@resilientcharlescountymd.com; stapless@charlescounty.org; Kelly Palmer; Karen D. Wiggen; GrothB@charlescountymd.gov; ThompsCa@charlescountymd.gov; adjeia@charlescountymd.gov; Ryan@townofindianhead.org; MMiner@townoflaplata.org; WilsonK@charlescountymd.gov; chieffire@ccvfireems.org; michael.gimmel@ccvfireems.org; mlewis@ccvfireems.org; demohun-hintze@csmd.edu; dodgej@ccso.us; beaversk@charlescountymd.gov; afarmer@mdot.maryland.gov; Suzanne.Wisnieski@usda.gov; luis.dieguez@charlesscd.com; mary.lilly@maryland.gov; gabby77@aol.com; mark.hubbard@maryland.gov; milesr@charlescountymd.gov; drurys@charlescountymd.gov; jstoddard@ccboe.com; ellisn@charlescountymd.gov; knaggsl@charlescountymd.gov; BinkleyJ@charlescountymd.gov
Cc: James, Mark; Michele King; Michelle L. Lilly; Gary Lewis; Kayla Rhue; Doug Adams
Subject: EXTERNAL: Hazard Mitigation Plan - Mitigation Workshop & Working Draft
Attachments: Charles County HMPC Comment Form.pdf; 3.0 Hazard Identification and Risk Assessment.pdf; 4.03 Drought.pdf; 4.05 Flood.pdf; 4.06 Hurricane, Tropical Storm, Nor'easter.pdf; 4.10 Building and Structure Collapse.pdf; 4.12 Dam Failure.pdf; 4.13 Civil Disturbance and Criminal Activity.pdf; 4.15 Public Health Emergencies.pdf; 4.17 Utility Interruption.pdf; 6.0 - Capabilities Assessment.pdf

EXTERNAL EMAIL

Hazard Mitigation Planning Committee (HMPC),

Last week we distributed meeting invitations to the virtual mitigation workshop. The mitigation workshop will be conducted using four topical groups that will review, modify, and discuss new mitigation action items for inclusion in the plan update. To that end, we have scheduled four time slots for each of the topical groups on December 14th. We have assigned each Hazard Mitigation Planning Committee (HMPC) member to one of the four groups/time slots based on their area of expertise and an even distribution of groups. Please plan to attend your designated group's timeslot, however you are not limited to that one group. If you would like to attend more than one group meeting, please let us know. Also, if you did not receive a meeting invitation, please let us know.

In preparation for the December 14th virtual mitigation workshop(s), we have attached multiple working draft chapters and hazard specific profiles for your review. We will send the remaining working draft hazard profiles early next week. Keep in mind, you will have an opportunity to review and comment on the cohesive draft when completed, however we wanted to provide you with the working draft for review and reference, for those who prefer this option.

Also attached is a comment form. Please use this fillable form to submit any comments you have on the working draft to Mark James, at mark.james@mbakerintl.com.

We look forward to seeing you on December 14th. Thanks!

CHARLES COUNTY Maryland



2024 Hazard Mitigation Plan Update
Charles County, Maryland

Mitigation Workshop – December 14, 2023

Michael Baker INTERNATIONAL

1

- Welcome and Introductions
- Where are we?
- New Mitigation Actions – Group Activity
- Next Steps

2

- Submit your questions at any time during the presentation by:
  - Using the "Chat"
- We will be recording this meeting to ensure that we have captured the ideas discussed today accurately.
- This meeting includes group discussion and feedback. Each of the four topical meeting groups are relatively small to accommodate this format.







3

Welcome & Introductions

Participants, please let us know you are here!

- In addition, please submit your name and municipality or organization by:
  1. Using the "Chat" **or**
  2. Emailing mark.james@mbakerintl.com

4

Where are we?



5

- HMPC Meetings
  - Kick-Off: August 24th
  - Mid-Point Meeting: October 12th
  - **Mitigation Workshop: December 14th**
- Survey(s) and fillable forms (HMPC)
  - Hazard Updates
  - Mitigation Action Status
  - Capabilities
  - Mitigation Action Ideas
- Press Releases, Public Survey, & DES Website
- Public Meeting - December 12, 2023
- Hazard Profiles - Distributed
- HIRA - Distributed
- Capability Assessment - Distributed
- Mitigation Status Report – Distributed & Uploaded

6



7

Mitigation Workshop

- The Goal of the workshop is to identify mitigation actions for inclusion in the 2024 HMP.
- Each of the four topical groups will be reviewing mitigation actions carried over from the 2018 HMP and new mitigation ideas developed for this update.
- Each topical group is relatively small, which will enable us to have discussions on various topics during this virtual setting.
- We will be using an excel spreadsheet to introduce potential 2024 mitigation ideas. We will capture your group answers on the spreadsheet as we work through the workshop.
- Results of the workshop will be distributed to HMPC members and included in the Mitigation Strategies section of the 2024 HMP.

8

Topical Groups

- Local Planning and Regulations
  - 8:30 AM – 10:00 AM
- Structure and Infrastructure Projects
  - 10:30 AM - Noon
- Natural Systems Protection
  - 12:30 PM – 2:00 PM
- Public Education and Emergency Services
  - 2:30 PM – 4:00 PM

9

Local Planning and Regulations

This group will discuss preventive measures that are designed to keep the problem(s) associated various hazards from occurring or getting worse. This includes mitigation actions that ensure that future development does not increase damage. Typically, mitigation actions under this group are administered by building, zoning, planning and/or code enforcement offices.

Examples include:

- Planning and zoning.
- Open space preservation.
- Floodplain development regulations.

Building codes.

- Stormwater management.
- Drainage system maintenance.

*Adoption and enforcement of regulatory tools, including ordinances, regulations, and building codes, to guide and inform land use, development, and redevelopment decisions in areas affected by hazards.

10

Structure and Infrastructure Projects

This group will discuss protection measures that are used to modify buildings and infrastructure or structural flood control projects. Your community may find some of these to be inexpensive measures because often they are implemented by or cost-shared with property owners. Whereas mitigation actions associated with structural, or infrastructure projects may prove very expensive, however hazard mitigation grant opportunities are available.

* Acquisition or elevation of flood-damaged homes or businesses retrofit public buildings, schools, and critical facilities to withstand extreme wind events or ground shaking from earthquakes.

These measures include:

- Acquisition.
- Relocation.
- Building elevation.
- Floodproofing.
- Sewer backup protection.
- Drainage systems.
- Reservoirs.
- Levees/floodwalls/seawalls.
- Channel modifications.
- Enlarging culverts or bridge openings.
- Diversions.
- Storm sewers.

11

Natural Systems Protection

Water quality and natural habitats may be improved, and flood losses reduced, by preserving or restoring natural areas or the natural functions of floodplain and watershed areas.

- Preventing erosion with proper bank stabilization, sloping or grading techniques, planting vegetation on slopes, terracing hillsides, or installing riprap boulders or geotextile fabric.
- Stabilizing cliffs with terracing or plantings of grasses or other plants to hold soil together.
- Planting mature trees in the coastal riparian zone to assist in dissipation of the wind force in the breaking wave zone.
- Using a hybrid of hard/soft engineering techniques (i.e., combine low-profile rock, rubble, oyster reefs, or wood structures with vegetative planting or other soft stabilization techniques).
- Implementing marine riparian habitat reinstatement or revegetation.
- Using a rock splash pad to direct runoff and minimize the potential for erosion.
- Using bioengineered bank stabilization techniques.
- Using vegetative management, such as vegetative buffers, around streams and water sources.
- Protecting and preserving wetlands to help prevent flooding in other areas.
- Establishing and managing riparian buffers along river and streams.
- Retaining natural vegetative beds in stormwater channels.
- Retaining thick vegetative cover on public lands flanking rivers.

12

Public Education and Emergency Services

Public information activities advise property owners, potential property owners and visitors about the hazards, ways to protect people and property from the hazards, and the natural and beneficial functions of floodplains. Emergency services measures protect people during and after a flood. Most counties and many cities have emergency management offices to coordinate warning, response, and recovery during a disaster. Examples of public outreach and emergency services mitigation actions can include:

- Map information.
- Outreach projects.
- Real estate disclosure.
- Insurance.
- Disaster preparedness.
- Hazard warning and notification.
- Technical assistance.
- Environmental education.
- Critical facilities protection.
- Health and safety maintenance.

* Implement outreach programs to educate property owners and the public about risk and about mitigation measures to protect homes and businesses.

13

Schedule & Next Steps

Task	Dates
Kick Off Meeting	August 24, 2023
Mid-Point Meeting	September-October 2023
Mitigation Workshop	October- November 2023
Plan Writing	August-December 2023
Distribution of Mitigation Workshop Results	December 2023
Draft Plan & HMPC Review	January 2024
Plan Submittal MDEM & FEMA	February 2024
MDEM & FEMA Plan Review & Approval Process	

14

Thank You!

Michelle Lilly
Director, Charles County Department of Emergency Services
lillym@charlescountymd.gov
(301) 609-3429

Mark James, CFM
Michael Baker International
mark.james@mbakerintl.com
(443) 938-0479

Virginia Smith, AICP
Smith Planning and Design
vsmith@smithp-d.com
(301) 724-7611



15

C-5 HMPC / Public Meeting

December 12, 2023

From: Doria Fleisher <FleisheD@charlescountymd.gov>
Date: Monday, December 11, 2023 at 11:16 AM
To: Virginia Smith <vsmith@smithp-d.com>
Cc: Michelle L. Lilly <LillyM@charlescountymd.gov>, Gary Lewis <LewisG@charlescountymd.gov>
Subject: 12/12 Listening Session

The room has a hardwire for an HDMI plug in to a laptop, with projection on multiple screens. I can bring my laptop as a back up.
I'll plan on being at WSRC at 5:30pm. If you need anything before then, please feel free to call my cell phone at 240-427-7187.
See you tomorrow 😊

Hello, and thank you for RSVP'ing to join us for tomorrow's Department of Emergency Services Hazard Risk Reduction Listening Session!
A few reminders:

- The event is from 6:00-8:00pm, and dinner will be served.
- We are meeting at the Waldorf Senior & Recreation Center, located at 90 Post Office Rd., Waldorf, MD 20602.
- Attire is casual/business casual.

We do have additional spaces available if you would like to bring someone with you! Please just let me know by 12pm on Tuesday so we can order food accordingly.
If your ability to attend changes or you have any questions, please reply to this email or call/text me at 240-427-7187.
Thank you—I look forward to seeing you tomorrow!
doria

I would like to send out a confirmation/reminder to the 20 people RSVP'd for tomorrow's listening session. Is there any information you would like me to include?
Also, is there anything I can do to help prep/plan/facilitate, other than show up and support?
Thanks!
doria

This is perfect-thank you!
Discussion of hazard mitigation planning in Charles County, MD- What, When, Who, How, and So What.

- Hazard Perspective Over the Past Five Years - Activity
- Mitigation Actions Completed
- New Mitigation Ideas – Opportunity for Participants to Contribute to the Plan.

This is helpful, Ginny-thank you! I can certainly pull chunks from here.
Could you also please provide me with some bullet points of what you plan to address/discuss/share/ask for feedback on during the Dec. 12th session?
Thanks!
doria

The following information was pulled from the Draft Hazard Mitigation Plan - Executive Summary.
Hazard mitigation is commonly defined as sustained actions taken to reduce or eliminate long-term risk to people and property from hazards and their effects. A hazard mitigation plan states the aspirations

and specific courses of action that a community intends to follow to reduce vulnerability and exposure to future hazard events.

The intention of this Hazard Mitigation Plan (HMP) update is to serve as a blueprint for coordinating and implementing hazard mitigation policies, programs, and projects. It provides a list of mitigation goals, objectives, and related actions that may assist Charles County in reducing risk and preventing loss from future natural hazard events. The impacts of hazards can be lessened and sometimes avoided altogether if appropriate actions are taken before hazardous events occur. By avoiding unnecessary exposure to known hazard risks, communities will save lives and preserve property and minimize the social, economic, and environmental disruptions that commonly follow hazard events. Through the identification of vulnerable areas and the implementation of measures aimed at minimizing exposure, the negative impacts of natural hazards may be reduced for Charles County.

Communities face significant challenges during post-disaster period in balancing the driving need for rapid recovery with implementing long-term hazard mitigation. The necessity to meet basic needs and resettle displaced populations immediately following a disaster often overshadows the more abstract, longer-term sustainability considerations. Once full-scale reconstruction is initiated, it is difficult to modify projects in progress to meet sustainability objectives. This trend highlights the need for pre-disaster mitigation planning that incorporates principles of sustainable development within the context of reconstruction, so that communities can more easily rebuild in a manner that will make them less vulnerable to future hazard events while improving the quality of life.

This update serves as a multi-jurisdictional hazard mitigation plan that represents a combined county and local commitment to reduce risks from natural hazards. The intent of this update is to produce a document that local officials can refer to in their day-to-day activities and in decisions regarding land use and planning decisions, regulation and ordinance creation and enforcement, granting permits, capital improvement investments, disaster planning and other community initiatives. Additionally, the update to this hazard mitigation plan serves as the basis for States to prioritize future grant funding as it becomes available.

The 2023 Plan Update will continue to be a useful tool for all community stakeholders by increasing public awareness about local hazards and risks and by providing information about options and resources available to reduce those risks. Educating the public about potential hazards will help each jurisdiction protect itself against the effects of future hazards and will enable informed decision-making regarding where to live, purchase property, or locate business. The 2023 Plan Update was developed by members of a Hazard Mitigation Planning Committee (HMPC) that consisted of county agencies, regional partners, and the following local jurisdictions:

- Town of LaPlata
- Town of Indian Head
- Port Tobacco Village

In addition, hazards identified and profiled in the HMP include:

Extreme Weather
Flood
Temperature Extremes
Public Health Emergency

Hurricane, Tropical Storm, and Nor'easter
Utility Interruption
Civil Disturbance and Criminal Activity
Environmental Hazards – Hazardous Materials
Transportation Accidents
Severe Winter Storms
Erosion
Building and Structure Collapse
Dam Failure
Earth Disturbance
Drought
Environmental Hazards - Nuclear Events
Wildfire

Finally, an online public survey has been developed. Social media post screenshot below and jpeg attached. Please feel free to post, as appropriate. We plan to close the survey soon, however if students would like to participate, please encourage them to do so prior to the Christmas holiday. Also, HMP information is on the Charles County DES website. Thanks so much!



Hi Ginny,
Per the email below from our community college, could you please provide some additional information that I can pass along?
Thanks!
doria

Hi Doria,
Could you provide us with some additional information on this event? Maybe what types of hazards will be discussed? We want to include this in our student newsletter and think just a little more information is needed to pique their interest if possible.
Thanks,
Lena

Hi Ange,
Our Department of Emergency Services is hosting a Hazard Risk Reduction Listening Session, and I wanted to make sure we tried to include some of our higher education faculty and students in the

discussion, especially those who may have an interest in emergency services, disaster preparedness, environmental and community resiliency, etc.
Could you please pass this information along to the CSM departments and request that they pass along to their students?
This event is being held on Tuesday, Dec. 12th from 6-8pm at the Waldorf Senior & Recreation Center (90 Post Office Rd., Waldorf MD). Dinner will be served!
A flyer is attached, and registration is at
https://www.surveymonkey.com/r/HazardRiskReductionListeningSession
Thanks for passing along this information!

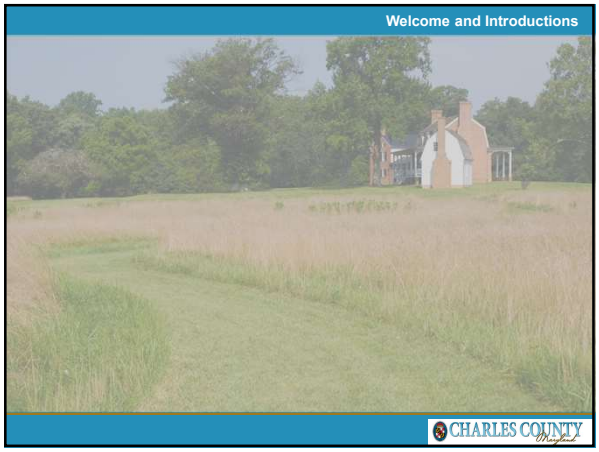
😊,
doria



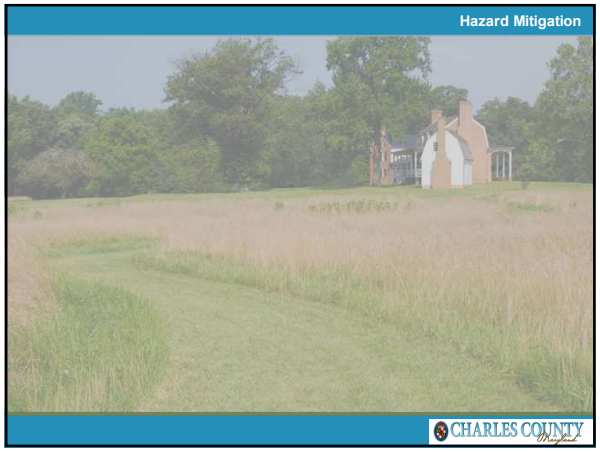
1

- Welcome and Introductions
- Hazard Mitigation Planning in Charles County, MD
  - What, When, Who, How, and So What
- Hazard Perspective - Activity
- Hazard Mitigation Actions Completed
- New Mitigation Ideas

2



3



4

What?

- Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to life and property resulting from natural and human-made hazards.



5

What?

- A Hazard Mitigation Plan (HMP) is a community-driven, living document that communities use to reduce their vulnerability to hazards.
- Counties must have a plan to maintain access to mitigation grants. These grants can augment local mitigation activities already being accomplished and can leverage other funding sources.



6

When?

- Charles County HMP must be updated every five years.
- Previous HMP was adopted in December of 2018.



7

Who?

- Lead- Department of Emergency Services
- Stakeholders
- Public
- Elected Officials



8

HMPC Member, Municipal, & Public Participation



9

How?

- **Meetings- Hazard Mitigation Planning Committee (HMPC)**
  - Kick-Off: Thursday, August 24, 2023
  - Mid-Point Meeting: October 12, 2023
  - Mitigation Workshop: December 14, 2023
- **Survey(s) and fillable forms (HMPC)**
  - Hazard Updates
  - Mitigation Action Status
  - Capabilities
  - Mitigation Action Ideas
- **Press Releases, Public Survey, & DES Website**
- **Public Meeting**
- **Plan review and comments**

10

So What?

- Additional hazard awareness and insight gained.
- Charles County remains eligible for grant funding.
- Plan is a roadmap for moving forward.
- New Mitigation Actions are identified, which may be developed into grant applications.
- Projects funded and undertaken.

11

Hazard Updates



12

Hazard Update Process

- Hazard & Risk Evaluation
  - Increase (I)
  - Decrease (D)
  - No Change (NC)



13

Hazard Update Process

Identified Hazards (2018 HMP)	How has the frequency of occurrence, magnitude of impact, and/or geographic extent changed in your community? NC=No Change I=Increase D=Decrease	Additional Comments (Explanation for marked I or D)
Natural		
Dam Failure		
Drought		
Earth Disturbance		
Erosion		
Extreme Weather		
Flood		
Hurricane, Tropical Storm, Nor'Easter		
Public Health Emergencies		
Severe Winter Storm		
Temperature Extremes		
Wildfire		
Human-Made		
Building and Structure Collapse		
Civil Disturbance & Criminal Activity		
Environmental Hazards		
Nuclear Events		
Transportation Accidents		
Utility Interruption		

14

The Hazard Mitigation Plan includes:

- Full hazard profile includes:
  - Location and extent
  - Range of magnitude
  - Past occurrence
  - Future occurrence
  - Vulnerability assessment
    - People
    - Structures
    - Systems
    - Natural, Historic and Cultural Resources
    - Community Activities

15

Mitigation Items Completed



16

Mitigation Action Completed

- Acquisition Demolition of a Severe Repetitive Loss
- Installation of uninterruptible power supplies on critical electronic equipment in County facilities to prevent outages during thunder and lightning events.
- Protected County buildings from hail damage by installing hail guards on roof-mounted HVAC equipment and installing hail-resistant roofing and siding when feasible on newly constructed facilities.
- Ensured that NFIP requirements are being met concerning repairs, renovations, and remodeling of structures located in the regulatory floodplain.
- Identified roadways/bridges that frequently flood and mitigate to ensure ingress and egress.
- Continual inspection, maintenance, and enforcement program to help ensure continued structural integrity of dams.
- Regulate development near steep slopes.
- Created Archaeological Context for Charles County based on a literature review of academic and historical works, and on information found in the archaeological data at the Maryland Historical Trust.
- Prioritized list of critical facilities that are vulnerable to hazards and develop potential mitigation solutions for high-priority critical facilities to reduce vulnerability.
- Completed Flood Studies- Zekiah Watershed & Mill Swamp

17

New Mitigation Action Ideas – Group Activity

- Opportunity to contribute to the Plan. What are your ideas to reduce or eliminate hazard risk?

18

Schedule

Task	Dates
Completed Draft Plan	December 2023
Draft Plan Review- HMPC & Upload to Website	January – February 2024
Agency Review – MDEM & FEMA	February - March 2024
Plan Adoption Process – County & Municipalities	

Thank You!

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CHARLES COUNTY


EXIT


CHARLES COUNTY


CHARLES COUNTY



Sign-in Sheet 12/12/2023

Hazardous Mitigation

12 DEC 2023

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C-6 Public Survey Results

Search Facebook

Charles County Government

Intro

Charles County Government Official Facebook Page.

Page · Government organization

PressRoom@CharlesCountyMD.gov

CharlesCountyMD.gov

Open now

Photos

See all photos



Charles County Government is with Charles County Department of Emergency Services.

November 13, 2023 ·

Have you taken the Hazard Mitigation Plan Survey yet? If not, don't delay, complete it today! The Hazard Mitigation Plan identifies potential hazards and lists future projects that may reduce or eliminate damage before a disaster strikes. The deadline to provide input is Thursday, Nov. 30, 2023. Please take the survey here: https://bit.ly/40ISHGy

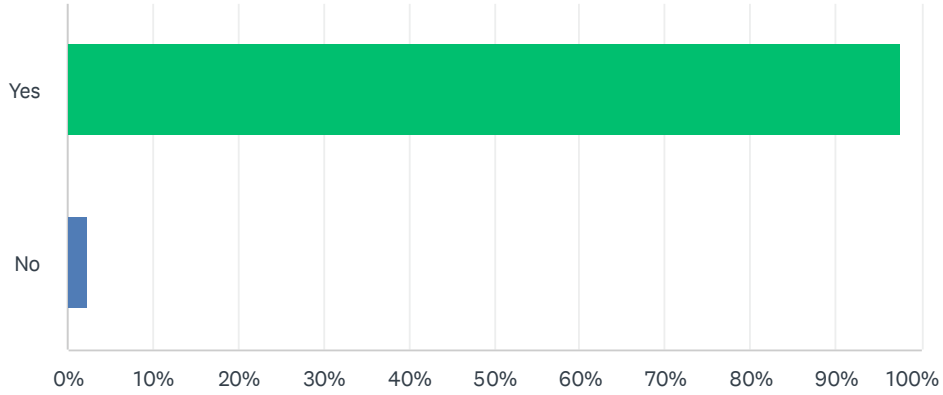


2

7 comments 4 shares

Q1 Are you a resident of Charles County?

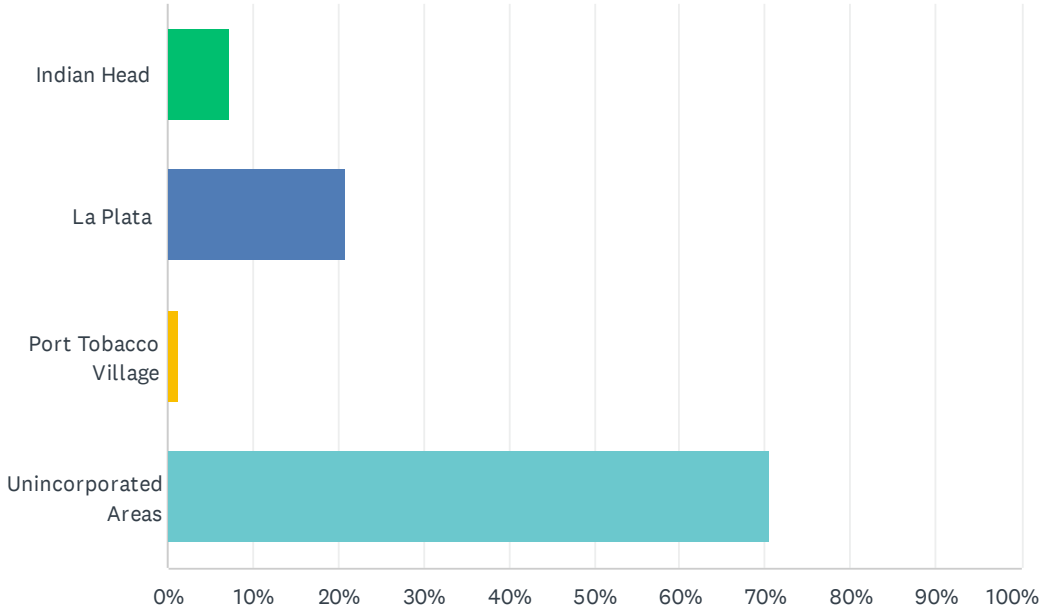
Answered: 257 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	97.67%	251
No	2.33%	6
TOTAL		257

Q2 Please provide the community where you currently live.

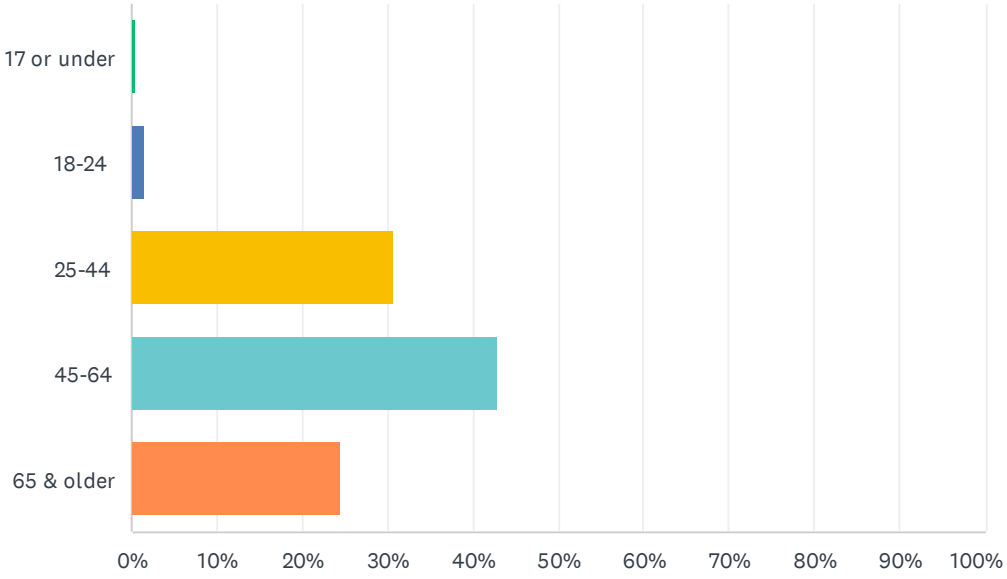
Answered: 248 Skipped: 10



ANSWER CHOICES	RESPONSES	
Indian Head	7.26%	18
La Plata	20.97%	52
Port Tobacco Village	1.21%	3
Unincorporated Areas	70.56%	175
TOTAL		248

Q3 Which age group are you in?

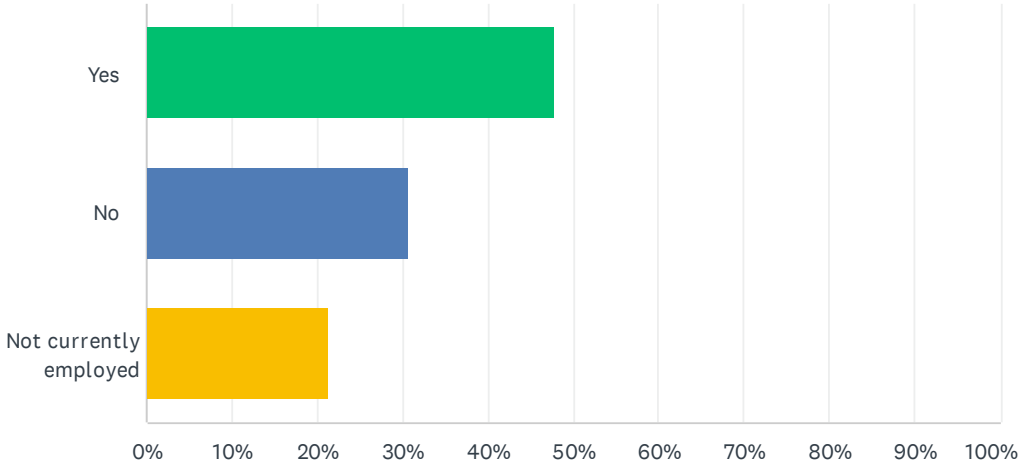
Answered: 257 Skipped: 1



ANSWER CHOICES	RESPONSES	
17 or under	0.39%	1
18-24	1.56%	4
25-44	30.74%	79
45-64	42.80%	110
65 & older	24.51%	63
TOTAL		257

Q4 Do you work in Charles County?

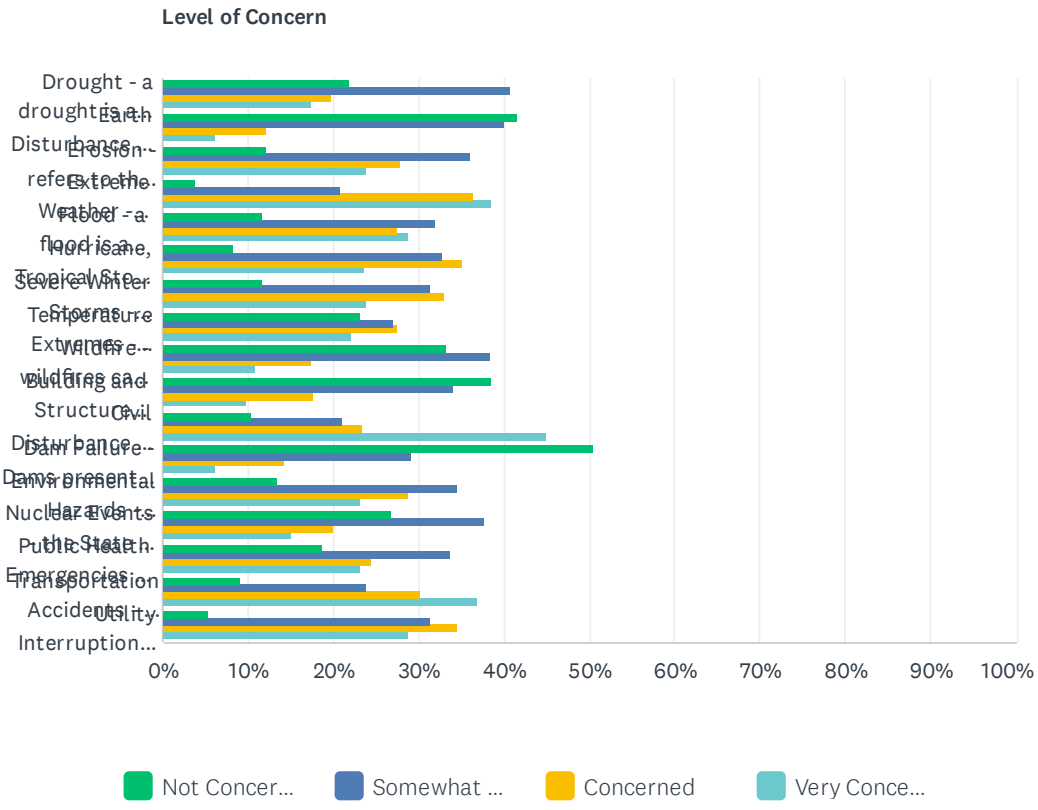
Answered: 257 Skipped: 1



ANSWER CHOICES	RESPONSES	
Yes	47.86%	123
No	30.74%	79
Not currently employed	21.40%	55
TOTAL		257

Q5 Please indicate your level of concern for each hazard using the drop down menu.

Answered: 232 Skipped: 26



Level of Concern	NOT CONCERNED	SOMEWHAT CONCERNED	CONCERNED	VERY CONCERNED	TOTAL
Drought - a drought is a period of time when natural or managed water systems do not provide enough water to meet established human and environmental uses because of natural shortfalls in precipitation or stream flow. Drought is a natural climatic condition, which occurs in virtually all climates, and is the consequence of a natural reduction in the amount of precipitation experienced over a long period of time, usually a season or more in length. High temperatures, prolonged winds, and low relative humidity can exacerbate the severity of drought.	21.93% 50	40.79% 93	19.74% 45	17.54% 40	228
Earth Disturbance - this hazard includes earthquake, landslide, and soil subsidence. An earthquake is the motion or trembling of the ground produced by sudden displacement of massive rocks called plates, usually within the upper 10-20 miles of the Earth's crust. Earthquakes result from crustal strain, volcanism, landslides, or the collapse of underground caverns. A landslide is the downward and outward movement of earth materials reacting under the force of gravity. As such, “landslide” can be used to describe a number of different types of events displaying different movement characteristics and involving different materials, such as: rockslides, rock falls, mudflows, mudslides, debris flows, and debris avalanches. Subsidence is defined as the downward movement of surface material with little or no horizontal movement.	41.48% 95	40.17% 92	12.23% 28	6.11% 14	229
Erosion - refers to the movement of soil particles by gravity, wind, water, and ice. In Charles County, shoreline erosion places land, property, infrastructure, and habitat at significant risk. The U.S. Army Corps of Engineers found that 31 percent of tidal shorelines in Charles County are experiencing some erosion, with about 9 percent experiencing significant erosion rates of two feet or more per year. Areas subject to significant erosion are concentrated near the Indian Head peninsula, the mouth of Nanjemoy Creek, and the mouth of Port Tobacco River.	12.17% 28	36.09% 83	27.83% 64	23.91% 55	230
Extreme Weather - extreme weather is defined as thunderstorms, tornadoes, wind storms, lightning, and hailstorms. Thunderstorms that are associated with high winds, heavy precipitation, and lightning strikes can all be hazardous under the right conditions and locations. Strong winds and tornadoes can take down trees, damage structures, tip high profile vehicles, and create high velocity flying debris. Large hail can damage crops, dent vehicles, break windows, and injure or kill livestock, pets, and people. Dangerous and damaging factors of a severe storms include tornadoes, hail, lightning strikes, flash flooding, and winds associated with downbursts and microbursts.	3.91% 9	20.87% 48	36.52% 84	38.70% 89	230
Flood - a flood is a natural event for rivers and streams and occurs when a normally dry area is inundated with water. Excess water from snowmelt or rainfall accumulates and overflows onto stream banks and adjacent floodplains. Flash floods, usually resulting from heavy rains or rapid snowmelt, can flood areas	11.79% 27	31.88% 73	27.51% 63	28.82% 66	229

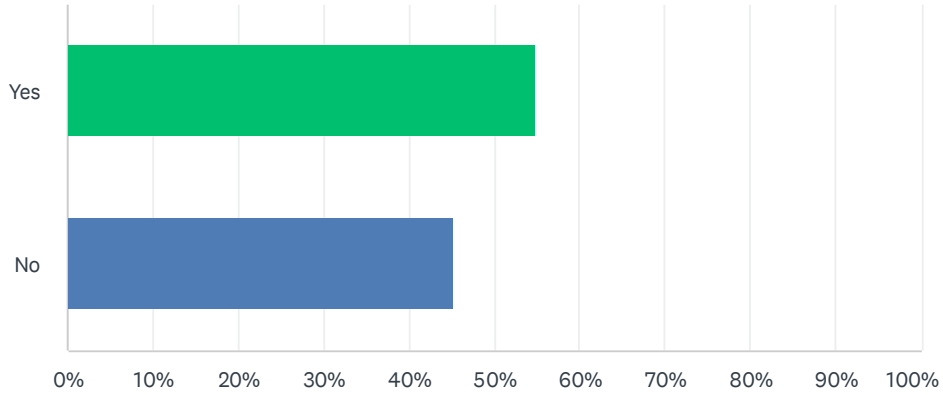
not typically subject to flooding, including urban areas. Extreme cold temperatures can cause streams and rivers to freeze, causing ice jams and creating flood conditions. Charles County contains a number of rivers, streams, and ditches that could potentially flood. Severe flooding would affect most Charles County waterways and, in turn, would impact properties that represent a variety of use.					
Hurricane, Tropical Storm, Nor'easter - coastal hazards take many forms, ranging from storm systems like hurricanes, tropical storms, and Nor'easters that can cause storm surge inundation and heavy precipitation that may lead to flash flooding and exacerbation of shoreline erosion. These events may also contribute to longer term hazards such as sea level rise. Tropical cyclones, a general term for tropical storms and hurricanes, are low pressure systems that usually form over the tropics. These storms are referred to as cyclones due to their rotation. Tropical cyclones are among the most powerful and destructive meteorological systems on earth.	8.33% 19	32.89% 75	35.09% 80	23.68% 54	228
Severe Winter Storms - Charles County has been impacted by varying degrees of winter weather over the last century; however; the occurrence of severe winter weather in the County is relatively infrequent, even during winter months. Severe winter weather can cause hazardous driving conditions, communication and electrical power failure, community isolation, and can adversely affect business continuity. This type of severe weather may include one or more of the following winter factors: blizzards, heavy snow, ice storms, and extreme cold.	11.74% 27	31.30% 72	33.04% 76	23.91% 55	230
Temperature Extremes - temperature extremes can occur at almost any time of the year, but are most prevalent in the summer and winter. Extreme temperatures can be dangerous due to their effects on individuals who are exposed to them. Extreme heat is usually defined through a combination of temperature and humidity. Extreme heat can also be described as temperatures that hover 10°F or more above the average high temperature for a region during the summer months. Extreme cold is based on the temperature with wind chill. Extreme cold temperatures drop well below what is considered normal for an area during the winter months and may accompany winter storm events.	23.14% 53	27.07% 62	27.51% 63	22.27% 51	229
Wildfire - wildfires can occur during anytime of the year; however, wildfires are likely to ensue during the spring and fall. This is due to the increase of fallen leaves from deciduous trees, along with the combination of sunlight and wind, which promotes drying. The relative humidity combined with a breeze creates the conditions for wildfires to spread rapidly. The leading cause of wildfires in Maryland is due to human activity, improper debris, or outdoor burning that ignites an average of 28% of the fires each year. The second leading cause of wildfires in Maryland is arson, which accounts for 23% of ignitions. Other sources of wildfire ignitions include smoking, campfires, poorly discarded ashes, railroads, equipment use, downed power lines, and fireworks.	33.19% 76	38.43% 88	17.47% 40	10.92% 25	229

Building and Structure Collapse - buildings and other engineered structures, including bridges, may collapse if their structural integrity is compromised, especially due to effects from other natural or human-made hazards. Older buildings or structures, structures that are not built to standard codes, or structures that have been weakened are more susceptible to be affected by these hazards.	38.50% 87	34.07% 77	17.70% 40	9.73% 22	226
Civil Disturbance and Criminal Activity - civil disturbance is a broad term that is typically used by law enforcement to describe one or more forms of disturbance caused by a group of people. Civil disturbances are typically a symptom of and a form of protest against major socio-political problems. Civil disturbance hazards include the following: famine, economic collapse or recession, misinformation, public unrest, mass hysteria, riot, and strikes or labor disputes.	10.39% 24	21.21% 49	23.38% 54	45.02% 104	231
Dam Failure - Dams present risks but they also provide many benefits, including irrigation, flood control, and recreation. Dams have been identified as a key resource of our national infrastructure that is vulnerable to terrorist attack. According to FEMA, dams can fail for several reasons, including: overtopping caused by floods, acts of sabotage, upstream dam failure (i.e., the failure of another nearby dam), structural failure of materials used in dam construction, or earthquakes. A total of six (6) dams are located within Charles County, one of which is classified as high hazard potential.	50.43% 116	29.13% 67	14.35% 33	6.09% 14	230
Environmental Hazards - includes hazardous material releases and pipeline hazards. These events result from human activities and industries and can result in injury and death to humans and damage to property. A hazardous material release is the contamination of the environment (i.e. air, water, soil) by any material that because of its quantity, concentration, physical characteristics, or chemical characteristics threatens human, animal, or plant health, the environment, or property.	13.54% 31	34.50% 79	28.82% 66	23.14% 53	229
Nuclear Events - the State of Maryland's Radiological Incident Annex defines Fixed Nuclear Facilities (FNF) as sites where nuclear materials are employed in an operation (i.e., nuclear reactors) or in storage which could cause an emergency nuclear incident. An emergency nuclear incident always coincides with a radiation incident, which the Radiological Incident Annex defines as any event involving radiation exposure or radioactive contamination to the public. The two nuclear power plants that could negatively impact Charles County are Calvert Cliffs and North Anna.	26.96% 62	37.83% 87	20.00% 46	15.22% 35	230
Public Health Emergencies - A public health emergency may be defined as an event, either natural or manmade, that creates a significant health risk to the public. Public health emergencies can result from a number of causes, take many forms, and be spread by various means. Due to the nature of public health emergencies, impacts from such an event tend to be more widespread rather than confined to a specific location. A public health emergency can originate	18.78% 43	33.62% 77	24.45% 56	23.14% 53	229

outside of Charles County, yet impact communities within the county.					
Transportation Accidents - for the purposes of the HMP, transportation accidents are defined as incidents involving highway, air, and rail travel. According to the Maryland Department of Transportation's State Highway Administration, there is a total of 1,019 linear miles of highway, including 46.8 miles of local municipal roadways within Charles County, 770.1 miles of County highway, and 202.1 miles of state highway. There are no U.S. interstate highways that pass through Charles County, but U.S. Route 301 does run from the northeast part of the County, through the Town of La Plata, and across the Potomac River into Virginia. Charles County is crossed by several major road networks, and transportation accidents involving those networks can have impacts on secondary roads.	9.09% 21	23.81% 55	30.30% 70	36.80% 85	231
Utility Interruptions - utility interruptions in Charles County focus primarily on power failures, which are often a secondary impact of another hazard event. For example, severe thunderstorms or winter storms could bring down power lines and cause widespread disruptions in electricity service. Strong heat waves may also result in rolling blackouts where power may not be available for an extended period of time. Additionally, local outages may be caused by traffic accidents or wind damage. Utility interruptions and power failures can take place throughout the entirety of Charles County.	5.24% 12	31.44% 72	34.50% 79	28.82% 66	229

Q6 When you moved into your residence or commercial property, did you consider the impact a natural or non-natural hazard event could have on your property?

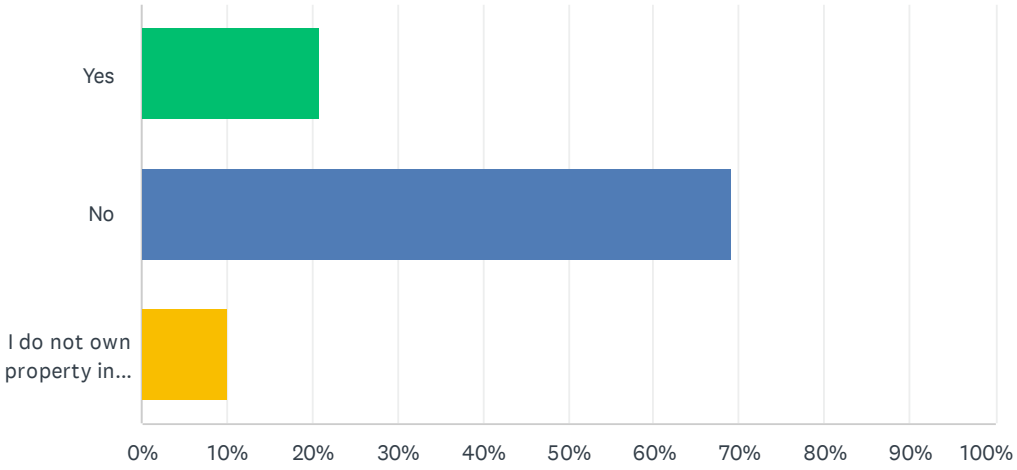
Answered: 219 Skipped: 39



ANSWER CHOICES	RESPONSES	
Yes	54.79%	120
No	45.21%	99
TOTAL		219

Q7 If you own your home or commercial property, do you have flood insurance?

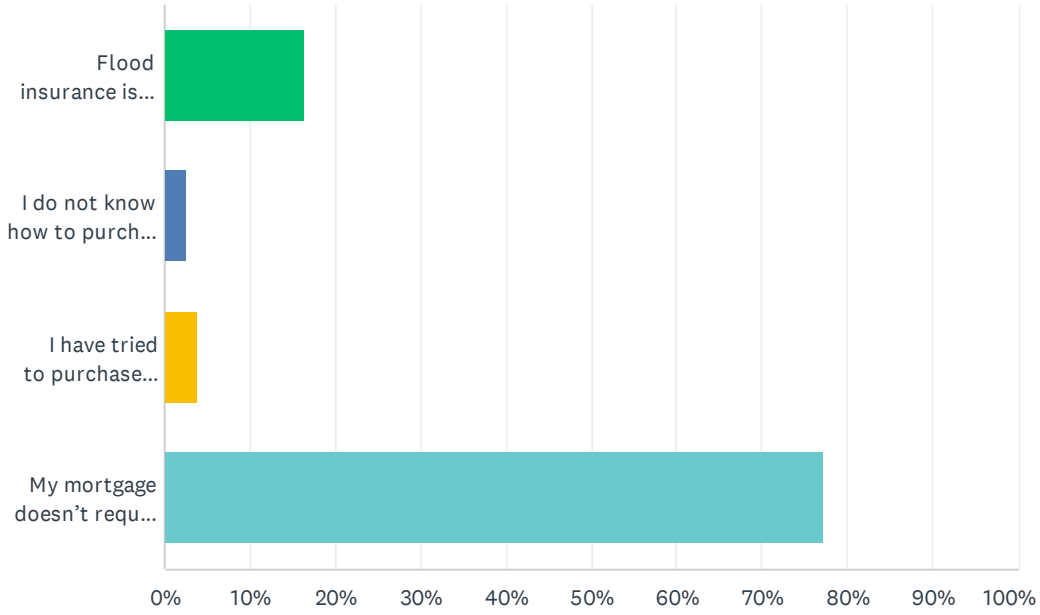
Answered: 220 Skipped: 38



ANSWER CHOICES	RESPONSES	
Yes	20.91%	46
No	69.09%	152
I do not own property in Charles County	10.00%	22
TOTAL		220

Q8 If “No”, what is the primary reason why you do not carry flood insurance?

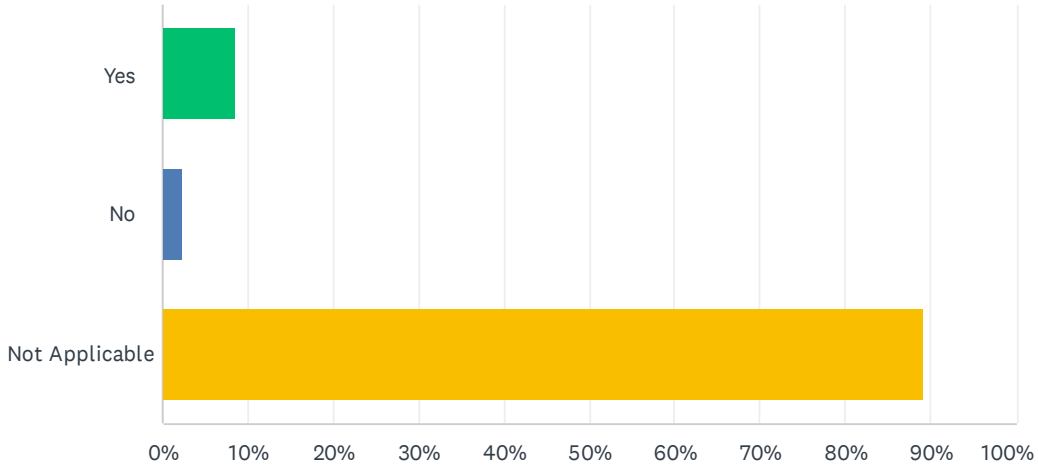
Answered: 153 Skipped: 105



ANSWER CHOICES	RESPONSES	
Flood insurance is too expensive	16.34%	25
I do not know how to purchase flood insurance	2.61%	4
I have tried to purchase flood insurance but have been unsuccessful	3.92%	6
My mortgage doesn’t require flood insurance	77.12%	118
TOTAL		153

Q9 If you rent your place of residence, do you have renter's content insurance?

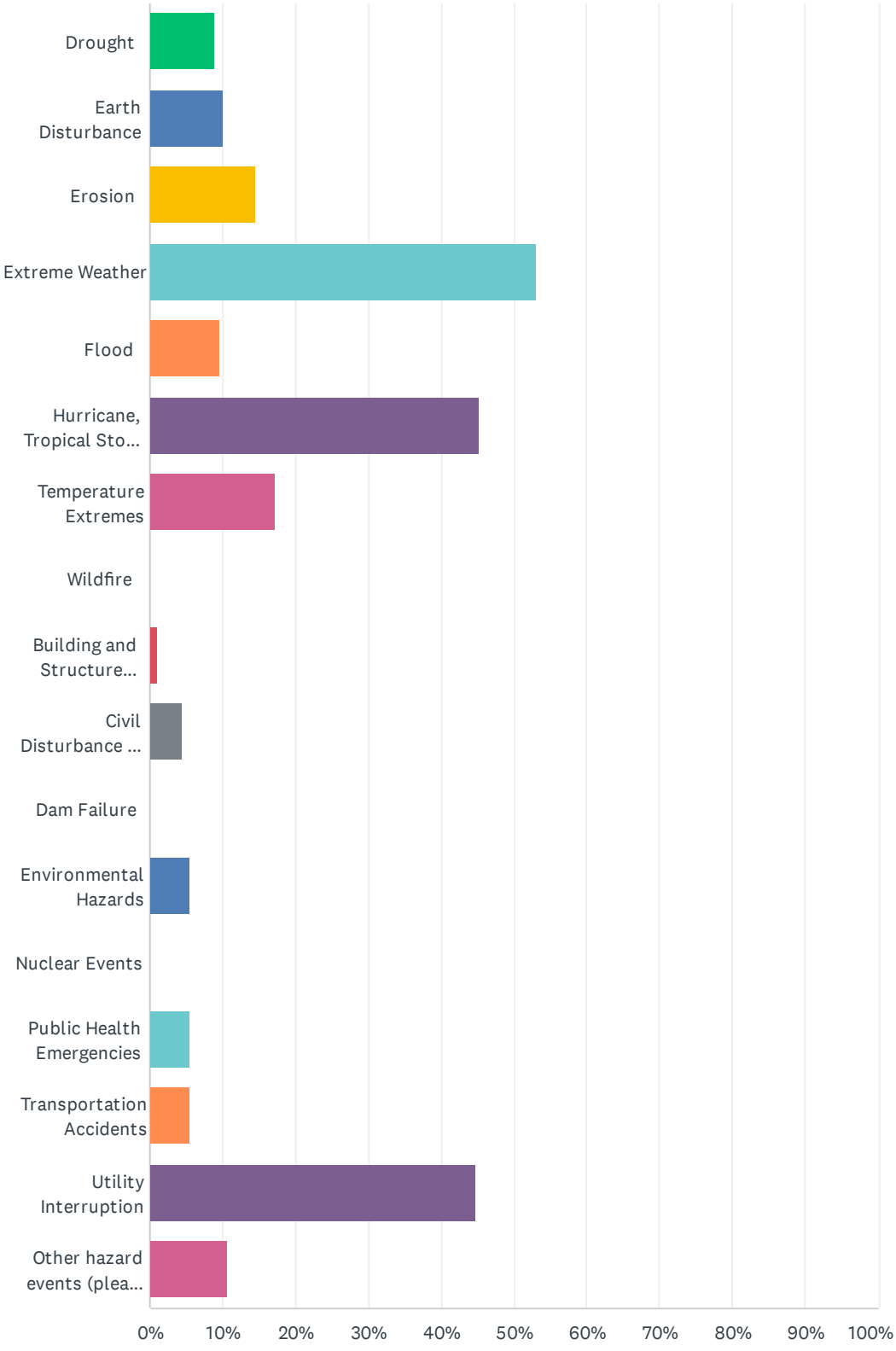
Answered: 212 Skipped: 46



ANSWER CHOICES	RESPONSES	
Yes	8.49%	18
No	2.36%	5
Not Applicable	89.15%	189
TOTAL		212

Q10 If your residence or commercial property has experienced damage from a hazard event, which of the following types of events have you experienced at your property?

Answered: 179 Skipped: 79


Drought
Earth Disturbance
Erosion
Extreme Weather
Flood
Hurricane, Tropical Sto...
Temperature Extremes
Wildfire
Building and Structure...
Civil Disturbance ...
Dam Failure
Environmental Hazards
Nuclear Events
Public Health Emergencies
Transportation Accidents
Utility Interruption
Other hazard events (plea...
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

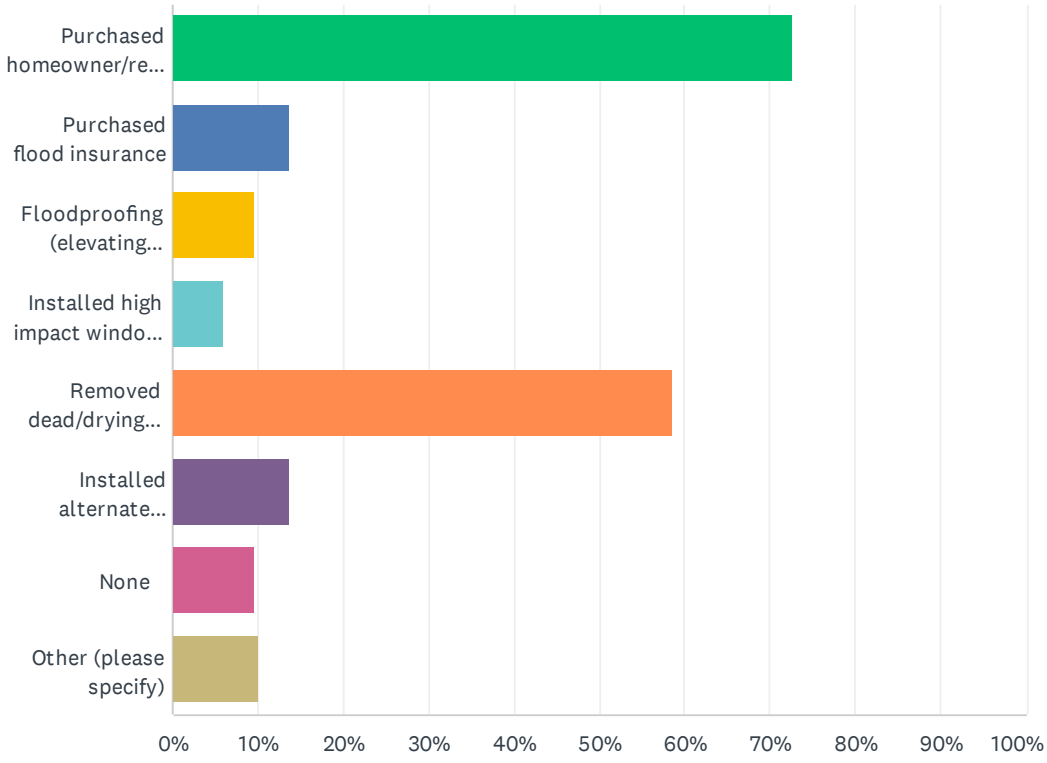
ANSWER CHOICES	RESPONSES	
Drought	8.94%	16
Earth Disturbance	10.06%	18
Erosion	14.53%	26
Extreme Weather	53.07%	95
Flood	9.50%	17
Hurricane, Tropical Storm, Nor'Easter	45.25%	81
Temperature Extremes	17.32%	31
Wildfire	0.00%	0
Building and Structure Collapse	1.12%	2
Civil Disturbance and Criminal Activity	4.47%	8
Dam Failure	0.00%	0
Environmental Hazards	5.59%	10
Nuclear Events	0.00%	0
Public Health Emergencies	5.59%	10
Transportation Accidents	5.59%	10
Utility Interruption	44.69%	80
Other hazard events (please describe)	10.61%	19
Total Respondents: 179		

#	OTHER HAZARD EVENTS (PLEASE DESCRIBE)	DATE
1	Suffered hail damage associated with the 2005 tornado and wind damage from 2013 derecho.	11/21/2023 3:19 PM
2	None	11/20/2023 1:25 PM
3	None	11/14/2023 5:40 PM
4	Hail damage. not sure that is extreme weather. happens often	11/13/2023 5:35 PM
5	Hail damage	11/6/2023 8:55 PM
6	Unlawful activity allowed	11/3/2023 4:59 PM
7	Tree falling on house.	10/31/2023 8:29 PM
8	Tornados were close...	10/27/2023 1:37 PM
9	deratio	10/12/2023 9:22 AM
10	Fast-moving water from adjoining properties flows downhill through our yard	10/10/2023 4:25 PM
11	None	10/9/2023 8:26 PM
12	Crime and Theft	10/9/2023 7:05 PM
13	Hail	10/9/2023 7:32 AM
14	Storm damage, tree fell on house	10/5/2023 1:15 PM
15	Microbursts create the most damage - Several ditches in neighborhood drain extremely slow	10/5/2023 10:06 AM

16	trees down	9/26/2023 9:40 AM
17	lightening strike	9/20/2023 3:31 PM
18	Trees down and on the roadway blocking roads	9/20/2023 1:36 AM
19	Loss of cell signal during a power outage	9/18/2023 4:57 PM

Q11 Have you taken any of the following actions to reduce the risk of hazards to your residence or commercial property?

Answered: 220 Skipped: 38



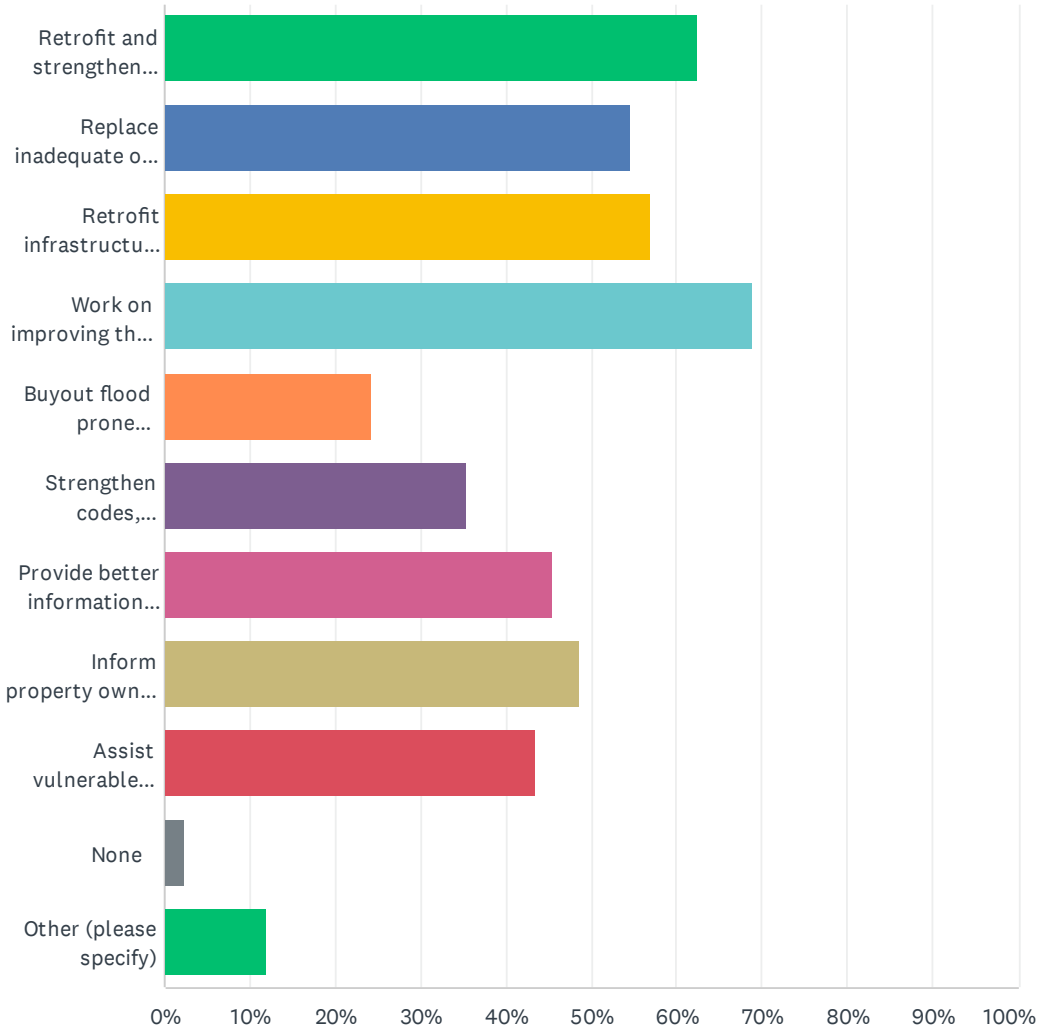
ANSWER CHOICES	RESPONSES	
Purchased homeowner/renter's insurance policies	72.73%	160
Purchased flood insurance	13.64%	30
Floodproofing (elevating furnace, water heaters, electric panels)	9.55%	21
Installed high impact windows or doors to withstand high winds	5.91%	13
Removed dead/drying trees and vegetation from around the home	58.64%	129
Installed alternate power/water supply	13.64%	30
None	9.55%	21
Other (please specify)	10.00%	22
Total Respondents: 220		

#	OTHER (PLEASE SPECIFY)	DATE
1	Large portable gasoline generator	11/21/2023 3:19 PM
2	Reinforced the footing foundations for the house.	11/21/2023 8:15 AM
3	purchased a back up generator, but not an automatic switchover unit	11/14/2023 10:59 AM

4	Planting native plants and shrubs to decrease land erosion from water	11/13/2023 5:47 PM
5	backup flooding cause of power outages. not looding from outside entry	11/13/2023 5:35 PM
6	Replaced roof shingles due to hail damage	11/13/2023 2:15 PM
7	Purchased a Generator, replaced roof & installed larger gutters	11/6/2023 8:55 PM
8	Encapsulated crawlspace.and installed sump which was not pumping into the main sewer line	11/6/2023 1:28 PM
9	added insulation	11/4/2023 11:33 PM
10	I have no control over my neighbors trees.	10/31/2023 8:29 PM
11	maintain very large stream buffer and have large wooded floodplain, far from structures	10/10/2023 4:25 PM
12	Setting up rain barrel system for irrigation	10/8/2023 10:06 AM
13	Generator	10/5/2023 10:42 AM
14	Replaced shingles. Higher quality resulted in minimal damage in recent hailstorm	10/5/2023 10:06 AM
15	Tried to get laws changed to prohibit the dumping of human waste on farmland	9/23/2023 3:20 PM
16	planning to install alternate power/water supply	9/20/2023 9:02 AM
17	Installed metal roof to withstand high winds	9/19/2023 10:31 PM
18	Have a gasoline powered generator (not whole house though)	9/19/2023 10:17 AM
19	None	9/19/2023 8:42 AM
20	N/A	9/19/2023 8:20 AM
21	The dead/dying trees left around my home are there because of the forestation guidelines according to what I was advised by the Windsor Manor Community.	9/18/2023 4:57 PM
22	Installed a gravity drain system in my basement.	9/18/2023 1:37 PM

Q12 Which of the following mitigation project types do you believe should be focused on to reduce disruptions of services and strengthen the community (check all that apply)?

Answered: 218 Skipped: 40



ANSWER CHOICES	RESPONSES	
Retrofit and strengthen essential facilities such as police, fire, emergency medical services, hospitals, schools, etc.	62.39%	136
Replace inadequate or vulnerable bridges	54.59%	119
Retrofit infrastructure, such as elevating roadways and improving drainage systems	56.88%	124
Work on improving the damage resistance of utilities (electricity, communications, water/sewer, etc.)	68.81%	150
Buyout flood prone properties and maintain as open space	24.31%	53
Strengthen codes, ordinances, and plans to require higher hazard risk management standards	35.32%	77
Provide better information about hazard risk and high-hazard areas	45.41%	99
Inform property owners of ways they can mitigate damage to their property	48.62%	106
Assist vulnerable property owners with securing funding to mitigate impacts to their property	43.58%	95
None	2.29%	5
Other (please specify)	11.93%	26
Total Respondents: 218		

#	OTHER (PLEASE SPECIFY)	DATE
1	Enforce no open burn laws where prohibited, i.e. St Charles neighborhoods	11/21/2023 3:19 PM
2	Stop the overdevelopment in the county	11/13/2023 5:47 PM
3	Build another hospital	11/13/2023 3:14 PM
4	Flooding on Mudd. There are 2 low bridges that flood every time it rains. Fix it.	11/8/2023 4:02 AM
5	Slow down building infrastructure that roadways and Emergency personal can not handle	11/7/2023 2:38 PM
6	There are many of us who would like to purchase flood insurance but have been told we are not in a flood area requiring mitigation...and then the water rises...	11/4/2023 11:33 PM
7	Instead of creating flood hazards by denuding and paving the county and then trying to figure out how to mitigate those hazards, STOP cutting down forests that provide free stormwater control, reduce drought, cool and clean our air, create wind breaks - ALL FOR FREE!!!!!	11/4/2023 8:44 PM
8	Stop narcissistic housing policies	11/3/2023 4:59 PM
9	Cut down and trim trees on roads before they fall and block the road.	10/31/2023 8:29 PM
10	Stop building and expanding housing	10/27/2023 12:26 AM
11	Rethink stormwater - natural stormwater solutions are more effective than culverts, which have been failing to handle the volume of water. Retention ponds can serve the people if they aren't simply fenced off, grassed, high-bank, holes in the ground. Consider creating wetlands instead - habitat and recreation.	10/10/2023 4:25 PM
12	I think the county should require owners or senior community rental properties to have generators in case.of power outages .	10/10/2023 4:24 PM
13	Crime and Policing	10/9/2023 7:05 PM
14	Consider dredging local waters that have been filling with soil from erosion	10/8/2023 5:14 PM
15	Storm water retention on neighborhood & individual property basis, solar roof requirements & changes to elec code.	10/8/2023 10:06 AM
16	Stop cutting down trees and building homes.	10/5/2023 11:32 AM
17	Create regulations on plumbing devices to reduce water usage. Pools should not be filled from well water. Funds set aside for WSSC integration. Educate on minimizing water usage	10/5/2023 10:06 AM

18	Fix traffic in Laplata!!!!!!	10/5/2023 9:10 AM
19	Don’t just allow unmitigated expansion of forested areas	9/25/2023 9:33 AM
20	Need large new hospital	9/21/2023 2:32 PM
21	Start or Sponsor a local CERT team or other volunteer organization to bring the community together and provide information and skills that can save lives and improve the community on all levels	9/20/2023 9:02 AM
22	Stop building houses everywhere.	9/20/2023 7:41 AM
23	I’ve asked to have preventative maintenance done on the roadway for over ten years still nothing done to western route 6. The bridge on Hawthorne rt 224 and Livingston rosdt	9/20/2023 1:36 AM
24	Move power lines underground.	9/19/2023 6:01 PM
25	Stop building	9/19/2023 11:51 AM
26	Hi	9/19/2023 9:37 AM

Q13 In the last 10 years, have you evacuated from your home or business as a result of a disaster (e.g., flooding or utility disruption)? If so, how long were you displaced? Did you go to a shelter?

Answered: 163 Skipped: 95

#	RESPONSES	DATE
1	No	12/20/2023 10:51 AM
2	No	11/27/2023 4:11 PM
3	Flooding. 2-3 weeks	11/23/2023 8:49 AM
4	Yes over night went to a hotel.	11/21/2023 10:34 PM
5	No	11/21/2023 12:48 PM
6	no thank God	11/21/2023 12:40 PM
7	No	11/21/2023 8:15 AM
8	No	11/21/2023 6:16 AM
9	4 days - no electricity	11/21/2023 5:53 AM
10	No	11/20/2023 10:34 PM
11	Ice storm 3 days	11/20/2023 10:01 PM
12	No	11/20/2023 8:38 PM
13	No	11/20/2023 8:08 PM
14	no	11/20/2023 7:39 PM
15	No	11/20/2023 3:51 PM
16	Yes, Burger King on Brian Rd., Watermain blockage had to close for two days.	11/20/2023 1:25 PM
17	In May, a small branch was on my power lines, I live 2 miles from SMECO--it took SMECO over 40 hours to come by and remove the 1' foot long branch off the lines and restore my electric. I had to deal without any electric-water due to this I am on a fixed income and couldn't afford a hotel.	11/20/2023 11:22 AM
18	No	11/14/2023 10:58 PM
19	No	11/14/2023 8:43 PM
20	No	11/14/2023 5:40 PM
21	No	11/14/2023 5:07 PM
22	Yes. When power was out due to a large snowstorm in January 2022 we went to my in laws house since we didn’t have any heat or electric for the night.	11/14/2023 2:52 PM
23	No	11/14/2023 9:24 AM
24	No	11/14/2023 7:27 AM
25	Extreme weather, only a few hours until the weather cleared up. No.	11/14/2023 5:09 AM
26	No	11/13/2023 9:36 PM
27	No	11/13/2023 9:22 PM
28	Na	11/13/2023 9:22 PM

29	No	11/13/2023 8:12 PM
30	No	11/13/2023 6:50 PM
31	Yes, one week due to power outage, had family with power to stay with until power was restored.	11/13/2023 5:47 PM
32	Yes, for a few days during a bad winter storm. We did not go to a shelter, we stayed in a hotel.	11/13/2023 5:41 PM
33	no	11/13/2023 5:35 PM
34	No	11/13/2023 5:09 PM
35	No	11/13/2023 3:14 PM
36	Yes, in July we were without power for almost 48 hours after a storm.	11/13/2023 2:54 PM
37	No	11/13/2023 2:38 PM
38	no	11/13/2023 2:09 PM
39	No	11/13/2023 1:25 PM
40	Power outage and stayed in camper	11/13/2023 12:38 PM
41	No	11/13/2023 12:18 PM
42	No	11/12/2023 7:25 PM
43	at previous property in Charles Cnty installed a back up generator.	11/10/2023 11:12 AM
44	no	11/9/2023 11:36 AM
45	Yes, had to go to a hotel for 4 days due to no electricity.	11/8/2023 4:02 AM
46	No	11/7/2023 2:38 PM
47	Lost power several times for extended periods of time. But I would not go to a shelter unless it was the absolute only option. I would go to a hotel, friend’s house, etc before I’d ever use a shelter.	11/6/2023 8:55 PM
48	No	11/6/2023 7:39 PM
49	No	11/6/2023 1:28 PM
50	No	11/6/2023 12:13 PM
51	no	11/5/2023 12:19 AM
52	no	11/4/2023 11:33 PM
53	Whenever the derecho hit. My family was out for 4 days. And shelter?!? That’s funny.	11/4/2023 11:24 PM
54	Yes, 5 days due to no power after a snow storm in 2022	11/4/2023 10:45 PM
55	No	11/4/2023 10:01 PM
56	No	11/4/2023 7:29 PM
57	No	11/4/2023 6:19 PM
58	No	11/4/2023 2:47 AM
59	No	11/3/2023 9:03 PM
60	We stayed through a dozen interruptions due to weather	11/3/2023 4:59 PM
61	no	11/3/2023 3:43 PM
62	No.	11/3/2023 12:22 PM
63	No	10/31/2023 8:29 PM
64	No	10/28/2023 11:19 PM
65	No, Not in the last 40 years…	10/27/2023 1:37 PM

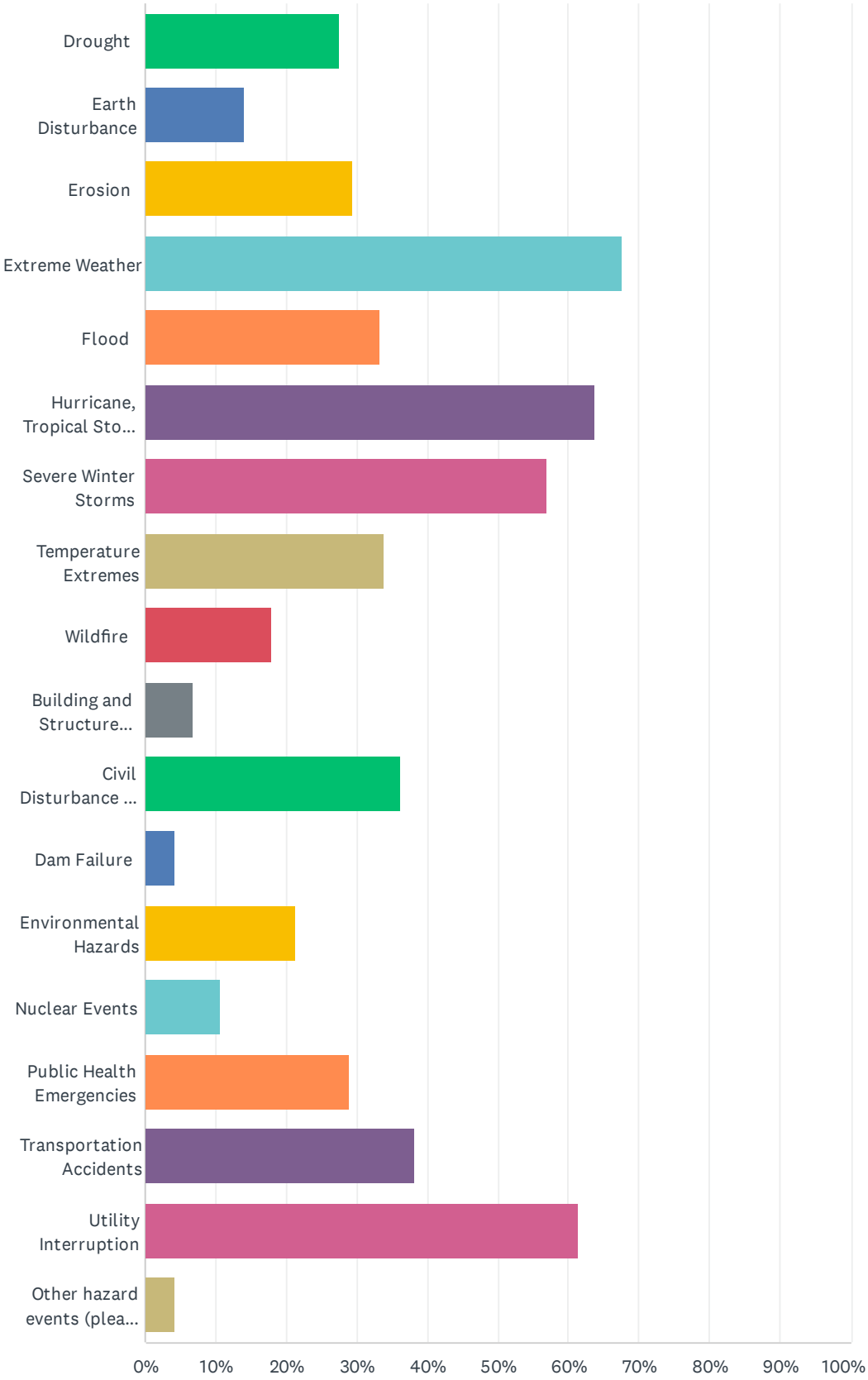
66	No	10/27/2023 10:48 AM
67	No	10/27/2023 9:55 AM
68	No	10/27/2023 1:41 AM
69	Yes, we went to a hotel that was paid for by home insurance	10/27/2023 12:26 AM
70	Yes, no power due to house fire, a week. Stayed at hotel.	10/26/2023 7:42 PM
71	No	10/26/2023 6:49 PM
72	No. N/A	10/26/2023 6:44 PM
73	no	10/24/2023 6:07 PM
74	Utility disruption - for 2 days. Went to a hotel.	10/23/2023 2:00 PM
75	No	10/21/2023 1:03 PM
76	No	10/19/2023 10:30 AM
77	n o	10/12/2023 9:22 AM
78	no	10/11/2023 10:27 AM
79	N/A	10/11/2023 9:50 AM
80	No	10/11/2023 9:44 AM
81	nO	10/10/2023 7:50 PM
82	Not really. We left for a few hours last year during the winter storm that knocked power out for over 24hrs (edge of Hughesville, near Benedict). No heat!	10/10/2023 4:25 PM
83	No	10/10/2023 4:24 PM
84	No	10/9/2023 8:26 PM
85	No	10/9/2023 7:05 PM
86	No	10/9/2023 7:32 AM
87	NA	10/8/2023 8:18 PM
88	No	10/8/2023 7:50 PM
89	No	10/8/2023 5:14 PM
90	no but we lost power for 3 days. SMECO services and infrastructures need to be improved.	10/8/2023 1:24 PM
91	No	10/8/2023 12:55 PM
92	no	10/8/2023 11:14 AM
93	no	10/8/2023 10:06 AM
94	no	10/7/2023 10:11 AM
95	N/A	10/7/2023 7:53 AM
96	No, but we have been without power for over 5 days.	10/7/2023 7:19 AM
97	No	10/6/2023 7:51 PM
98	3 days January 2022 electrical outage	10/6/2023 10:25 AM
99	Stayed in my camper	10/6/2023 9:24 AM
100	No	10/6/2023 6:46 AM
101	No	10/5/2023 6:02 PM
102	No	10/5/2023 5:47 PM

103	No	10/5/2023 3:55 PM
104	No	10/5/2023 3:05 PM
105	no	10/5/2023 1:26 PM
106	No	10/5/2023 12:26 PM
107	No	10/5/2023 11:17 AM
108	No	10/5/2023 11:15 AM
109	N/A	10/5/2023 10:42 AM
110	No	10/5/2023 10:22 AM
111	No	10/5/2023 10:06 AM
112	I have not but if concerning problems aren't taken care of it will happen	10/5/2023 10:01 AM
113	48 hours. No	10/5/2023 9:47 AM
114	Very bad winter storm left me without power or heat for several days.	10/5/2023 9:23 AM
115	No	10/5/2023 9:17 AM
116	Utility disruption, +3 days, family members home in unaffected area - no shelter.	10/2/2023 9:46 AM
117	Na	9/29/2023 7:55 AM
118	no	9/26/2023 7:21 PM
119	Yes. Flood/extreme weather. Displaced 1 day. Went to relative's home, did not go to shelter.	9/26/2023 11:44 AM
120	no. but almost did.	9/26/2023 9:40 AM
121	Utility 6 hours	9/25/2023 9:33 AM
122	No	9/23/2023 3:20 PM
123	No	9/23/2023 1:22 PM
124	No	9/22/2023 4:31 PM
125	utility disruption-had to stay at a family member's house for three days.	9/22/2023 8:15 AM
126	no, I never had to evacuate	9/22/2023 7:56 AM
127	NO	9/21/2023 5:32 AM
128	No	9/21/2023 12:45 AM
129	no	9/20/2023 3:31 PM
130	No	9/20/2023 10:06 AM
131	No	9/20/2023 9:02 AM
132	No	9/20/2023 7:41 AM
133	no	9/20/2023 6:33 AM
134	No	9/20/2023 5:28 AM
135	Earthquake left work to go home	9/20/2023 1:36 AM
136	No	9/19/2023 10:31 PM
137	No	9/19/2023 9:26 PM
138	N/A	9/19/2023 7:56 PM
139	no	9/19/2023 4:26 PM
140	No	9/19/2023 4:08 PM

141	no	9/19/2023 1:28 PM
142	No	9/19/2023 12:40 PM
143	Have not evacuated	9/19/2023 11:57 AM
144	Never	9/19/2023 10:17 AM
145	No	9/19/2023 9:40 AM
146	No	9/19/2023 8:42 AM
147	Yes, 24 hrs	9/19/2023 8:20 AM
148	Yes, utility disruption for more than 2 days, stayed in hotel.	9/19/2023 8:07 AM
149	No	9/19/2023 8:03 AM
150	No	9/18/2023 7:20 PM
151	No	9/18/2023 6:31 PM
152	No	9/18/2023 6:05 PM
153	Yes and no, I didn't go to a shelter.	9/18/2023 4:57 PM
154	24 hours. No shelter in place	9/18/2023 4:20 PM
155	no	9/18/2023 3:37 PM
156	No	9/18/2023 3:01 PM
157	No	9/18/2023 2:14 PM
158	no	9/18/2023 2:11 PM
159	No	9/18/2023 1:50 PM
160	No	9/18/2023 1:46 PM
161	No	9/18/2023 1:45 PM
162	Recently, the power was out for over 24 hours. Didn't have to evacuate.	9/18/2023 1:37 PM
163	No	9/18/2023 1:19 PM

Q14 Please indicate which hazard events you feel may particularly affect your community. (Please check all that apply)

Answered: 207 Skipped: 51

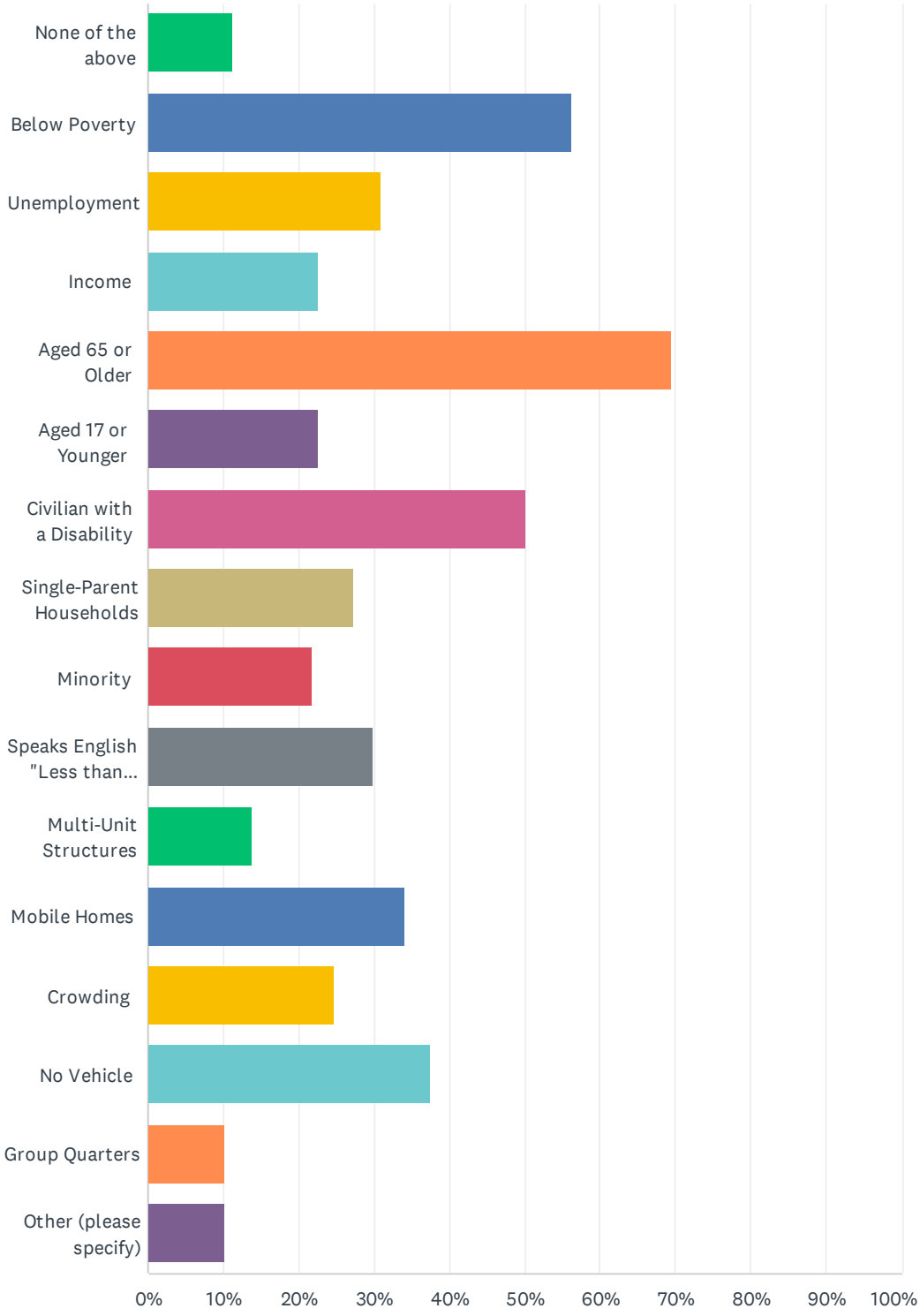

Drought
Earth Disturbance
Erosion
Extreme Weather
Flood
Hurricane, Tropical Sto...
Severe Winter Storms
Temperature Extremes
Wildfire
Building and Structure...
Civil Disturbance ...
Dam Failure
Environmental Hazards
Nuclear Events
Public Health Emergencies
Transportation Accidents
Utility Interruption
Other hazard events (plea...
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

ANSWER CHOICES	RESPONSES	
Drought	27.54%	57
Earth Disturbance	14.01%	29
Erosion	29.47%	61
Extreme Weather	67.63%	140
Flood	33.33%	69
Hurricane, Tropical Storm, Nor'Easter	63.77%	132
Severe Winter Storms	57.00%	118
Temperature Extremes	33.82%	70
Wildfire	17.87%	37
Building and Structure Collapse	6.76%	14
Civil Disturbance and Criminal Activity	36.23%	75
Dam Failure	4.35%	9
Environmental Hazards	21.26%	44
Nuclear Events	10.63%	22
Public Health Emergencies	28.99%	60
Transportation Accidents	38.16%	79
Utility Interruption	61.35%	127
Other hazard events (please describe)	4.35%	9
Total Respondents: 207		

#	OTHER HAZARD EVENTS (PLEASE DESCRIBE)	DATE
1	Agressive driving and road rage along Mattawoman Beantown Rd, St Charles Pkwy and Rosewick Rd corridor!	11/21/2023 3:34 PM
2	Evacuation-lack of info for driving on local roads and where to go	11/21/2023 6:19 AM
3	Drought includes the water table, especially in north Waldorf	11/13/2023 10:00 PM
4	Mass casualty incidents	11/13/2023 3:16 PM
5	Mold caused by extreme flooding	10/27/2023 12:28 AM
6	Earthquakes.	10/10/2023 4:33 PM
7	Gas line explosions	10/5/2023 11:26 AM
8	Overdeveloped land. We don’t have the water table to support all this growth. Wells are already running dry in spots	9/18/2023 9:05 PM
9	Tornado	9/18/2023 3:02 PM

Q15 In terms of social vulnerability, do you feel that a specific group, or groups, in Charles County are particularly at risk for, or could be harmed by, any of the hazards listed in Question 14? This question is not intended to be limited to certain groups - we are eager to learn of any and all types and sizes of groups you think might be at particular risk.Note: CDC 15 Social Factors below.

Answered: 194 Skipped: 64


None of the above
Below Poverty
Unemployment
Income
Aged 65 or Older
Aged 17 or Younger
Civilian with a Disability
Single-Parent Households
Minority
Speaks English "Less than...
Multi-Unit Structures
Mobile Homes
Crowding
No Vehicle
Group Quarters
Other (please specify)
0%
10%
20%
30%
40%
50%
60%
70%
80%
90%
100%

ANSWER CHOICES	RESPONSES	
None of the above	11.34%	22
Below Poverty	56.19%	109
Unemployment	30.93%	60
Income	22.68%	44
Aged 65 or Older	69.59%	135
Aged 17 or Younger	22.68%	44
Civilian with a Disability	50.00%	97
Single-Parent Households	27.32%	53
Minority	21.65%	42
Speaks English "Less than Well"	29.90%	58
Multi-Unit Structures	13.92%	27
Mobile Homes	34.02%	66
Crowding	24.74%	48
No Vehicle	37.63%	73
Group Quarters	10.31%	20
Other (please specify)	10.31%	20
Total Respondents: 194		

#	OTHER (PLEASE SPECIFY)	DATE
1	Rural	12/18/2023 4:11 PM
2	Minority in Charles County refers to Caucasians	11/21/2023 3:34 PM
3	Homeless	11/21/2023 2:15 PM
4	The racial tension in this county is out of control. I don’t feel safe shopping in the county at all.	11/20/2023 8:44 PM
5	homeless	11/14/2023 11:03 AM
6	Homeless	11/13/2023 9:24 PM
7	Those living in homeless tent camps in the County are the most vulnerable!	11/13/2023 5:55 PM
8	All groups can be affected depending on issue	11/13/2023 12:40 PM
9	non-gender-conforming people (trans, nonbinary)	11/9/2023 10:37 AM
10	A divisive question..... should not be on this survey....	10/27/2023 1:41 PM
11	Farmers/Producers, Watermen	10/10/2023 4:34 PM
12	Single living alone	10/5/2023 1:17 PM
13	Flood prone areas esp associated with low income	10/5/2023 10:12 AM
14	All are at risk	9/25/2023 9:37 AM
15	Homeless community	9/20/2023 9:15 AM
16	Near Major transit routes that are labelled "flood zone" or "high water warning" due to poor maintenance of storm drains	9/20/2023 9:11 AM

17	This is a stupid question!!! Everyone will be/is affected by the incidents in question14.	9/19/2023 12:45 PM
18	All	9/19/2023 11:53 AM
19	Homeless	9/18/2023 3:02 PM
20	homeless	9/18/2023 2:14 PM

Q16 Are you concerned with any other hazards not identified in this survey?

Answered: 95 Skipped: 163

#	RESPONSES	DATE
1	Air Pollution	12/20/2023 10:51 AM
2	No	11/23/2023 8:51 AM
3	Water quality! Although I read the public water testing results for Charles County, we have used Brita filtered water for at least 15 years as we can literally smell the amount of chlorine in our drinking water. The Brita reduces this odor and presumably the level of chlorine. Sentry Woods resident	11/21/2023 3:34 PM
4	No	11/21/2023 2:15 PM
5	Mosquitos and ants	11/21/2023 12:43 PM
6	Increasing congestion on our roads means it would be difficult to evacuate	11/21/2023 8:17 AM
7	The large amount of vehicle accidents seems out of control.	11/20/2023 8:44 PM
8	No	11/20/2023 8:10 PM
9	One of the most important is the lack of consequences for speeding, no blinkers or general disregard for common driving etiquette. The police do not police the town	11/20/2023 8:03 PM
10	No	11/20/2023 6:12 PM
11	No	11/20/2023 3:53 PM
12	No	11/20/2023 1:28 PM
13	No	11/14/2023 10:59 PM
14	None	11/14/2023 5:42 PM
15	gun violence/crime, car jacking, gang activity and drugs	11/14/2023 11:03 AM
16	No	11/14/2023 7:30 AM
17	No	11/14/2023 5:13 AM
18	Yes. The large number of houses being built. Over populating our county to where our hospital (we only have 1), emergency services, and schools cannot support.	11/13/2023 10:15 PM
19	Over building creates overcrowding, "too many rats in a cage" they will destroy each other. Too many homes, too much asphalt and concrete replacing green trees and plants. Lack of good medical care in this county.	11/13/2023 10:00 PM
20	No	11/13/2023 9:37 PM
21	No	11/13/2023 9:23 PM
22	Mosquito spraying should not be done, hazardous to humans and wildlife, train and finance citizens in the diy making of mosquito dunk buckets. Educate citizens on the use of native plants for erosion control and healthy ecosystems, require HO As and housing developers to ONLY use maryland native plants, shrubs and trees	11/13/2023 5:55 PM
23	No	11/13/2023 5:10 PM
24	Water quality	11/13/2023 2:55 PM
25	no	11/13/2023 2:11 PM
26	No	11/13/2023 1:26 PM

27	Tornadoes	11/13/2023 12:21 PM
28	No	11/12/2023 7:27 PM
29	no	11/9/2023 11:38 AM
30	Roads are on horrible shape. You plan on putting a huge park on Poplar hill, and there is no infrastructure to support it. The road is 2 lane. What are you thinking?	11/8/2023 4:05 AM
31	Over-population/rapid growth in our County. If we ever did have a mass-evacuation, there's no way our roads could handle it. Roads are in disrepair & insufficient for the number of residents we have now.	11/6/2023 9:04 PM
32	I am extremely concerned that our county can not handle a mass shouting. Our EMS, police, fire, are all spread to thin. There is more focus on building homes and clearing land but no consideration for the understaffed EMS units in the county.	11/6/2023 7:43 PM
33	No	11/6/2023 12:14 PM
34	no	11/5/2023 12:20 AM
35	No	11/4/2023 10:46 PM
36	No	11/4/2023 7:37 PM
37	No	11/4/2023 2:48 AM
38	No	11/3/2023 9:03 PM
39	Lack of lawful understanding of the ADA & Disability Accommodations, Effective Communication, & fact-based medical knowledge	11/3/2023 5:02 PM
40	pedestrian fatalities on 301 and other main routes with no clear walkways or protection from traffic	11/3/2023 4:01 PM
41	No	10/31/2023 8:32 PM
42	NO	10/27/2023 1:41 PM
43	No	10/27/2023 1:42 AM
44	No	10/26/2023 7:45 PM
45	No	10/26/2023 6:54 PM
46	Lack of engagement with Red Cross Disaster Cycle Services for Sound the Alarm program and sheltering services	10/26/2023 6:52 PM
47	Concerned with lack of sidewalks and the uptick of accidents involving pedestrians and bicycles.	10/23/2023 2:01 PM
48	aquifer - ground water management	10/11/2023 10:32 AM
49	Civil disturbances	10/10/2023 7:53 PM
50	No .	10/10/2023 4:33 PM
51	No	10/9/2023 8:27 PM
52	No	10/9/2023 7:35 AM
53	no	10/8/2023 1:28 PM
54	No	10/8/2023 12:58 PM
55	No	10/7/2023 7:57 AM
56	No	10/6/2023 10:26 AM
57	No	10/6/2023 9:27 AM
58	Running out of available water for county residents. Impact of over development	10/5/2023 1:29 PM
59	Over development of our county.	10/5/2023 12:31 PM

60	Gas lines explosions	10/5/2023 11:26 AM
61	Weapons. ‘Neighbors’ firing guns. Invasive trees, plants, insects. Lawn and outdoor insect chemicals present health hazard and kill off pollinators, beneficial insects	10/5/2023 10:12 AM
62	Increasing crime rates	10/5/2023 10:05 AM
63	Too much new construction, particularly in LaPlata	10/5/2023 9:11 AM
64	No	9/29/2023 7:56 AM
65	The over-development of our land, especially the impact of development in watershed areas is very detrimental to our environment.	9/26/2023 7:32 PM
66	No	9/26/2023 11:46 AM
67	terrorist event in DC. the traffic flow out of the area may exceed the flow rate of the Mac Middelton bridge which is the only out of the state when headed south.	9/26/2023 9:46 AM
68	Charles county fails to clean storm drains and creates street flooding.	9/25/2023 9:37 AM
69	No	9/23/2023 1:23 PM
70	No	9/22/2023 4:32 PM
71	Lack of personnel to respond to a large emergency i.e. hurricane, civil unrest, large forest fire, military attack.	9/21/2023 2:38 PM
72	TERRORIST ATTACKS	9/21/2023 5:40 AM
73	Attacks on Washington DC and military bases in our area.	9/20/2023 10:42 AM
74	No	9/20/2023 9:15 AM
75	Overdevelopment leading to a loss of wildlife, disturbance of the ecosystem, increased traffic, and degradation of air quality as well as quality of life for the community.	9/20/2023 9:11 AM
76	The amount of people being brought into Charles County with the rapid development is placing too much strain on our emergency services, hospital (there's only one in the county), over crowding schools, crowding our roads with more traffic then they can accommodate, and increasing crime in the area.	9/20/2023 7:45 AM
77	Population increase, overcrowding in general, deforestation, new home construction.	9/20/2023 5:35 AM
78	Our hospital is too small to accommodate the growing population and can’t handle the increase in demand day to day- any of these potential hazards actually happening would be crippling to our hospital resources.	9/19/2023 10:34 PM
79	no	9/19/2023 4:28 PM
80	Politicians	9/19/2023 1:30 PM
81	Aircraft incidents	9/19/2023 12:45 PM
82	No	9/19/2023 10:19 AM
83	Yes. Maintaining our Freedoms guaranteed in the United States Constitution.	9/19/2023 8:48 AM
84	No	9/19/2023 8:43 AM
85	Excessive sprawl and building.	9/19/2023 8:12 AM
86	I’m concerned with draconian health measures that don’t follow the science…like masks. There is no peer reviewed, bias free study that proves they worked	9/18/2023 9:05 PM
87	No	9/18/2023 7:21 PM
88	Crime.	9/18/2023 6:34 PM
89	No	9/18/2023 6:06 PM
90	No	9/18/2023 4:22 PM
91	Use of pesticides. Length of time EMS must wait in Emergency Room	9/18/2023 3:41 PM

92	County overgrowth with lack of infrastructure upgrades.	9/18/2023 3:30 PM
93	Future tornados - lost my business to the LaPlata Tornado	9/18/2023 3:02 PM
94	EMS, Fire and Police as well as all infrastructure not funded to keep up with the population growth.	9/18/2023 2:16 PM
95	No	9/18/2023 1:19 PM

Q17 In your opinion, what steps could be undertaken to reduce or eliminate the risk of future hazard damages?

Answered: 112 Skipped: 146

#	RESPONSES	DATE
1	Air purification companies	12/20/2023 10:51 AM
2	Awareness, less slab construction, stop the townhomes! Affordable, underground shelter construction for those of us living on a slab.	11/21/2023 3:34 PM
3	use of chemicals	11/21/2023 12:43 PM
4	Manage the development in the area to ensure that erosion is not exacerbated and that as the county continues to grow, roads are thought of first not as an afterthought.	11/21/2023 8:17 AM
5	More police officers are needed and allowing them to do their jobs. Protecting the innocent citizens. Change the laws to enforce consequences for repeat offenders.	11/20/2023 8:44 PM
6	Better paying jobs, lower taxes and lower home prices.	11/20/2023 8:10 PM
7	Below-ground electrical service, accessible public information, build another hospital/improve emergency services	11/20/2023 6:12 PM
8	Stop allowing more single and multi family homes to be built in the area.	11/20/2023 3:53 PM
9	You touch based on everything	11/20/2023 1:28 PM
10	stop building, fix the roads and sidewalks caving in because of old pipes or erosion.	11/20/2023 12:02 PM
11	SMECO could access the damage and then small things that happen take care of it, or contract out to remedy. I live near SMECO and I was one of the last to get my electric on. I saw them drive by, over and over. Very sad	11/20/2023 11:24 AM
12	Unknown at this time.	11/14/2023 10:59 PM
13	Additional stop lights.	11/14/2023 5:09 PM
14	more funding for police officers, training and prevention	11/14/2023 11:03 AM
15	Educate the community to be prepared for emergencies	11/14/2023 9:26 AM
16	Focus on issues.	11/14/2023 7:30 AM
17	I believe the intersection of Oak Ave & Charles St. needs a street light due to the speed and amount of traffic that passes through that area which includes emergency personnel. I believe that if there are shelters available in Charles county for extreme weather they should be communicated better. I also think police officers should patrol busy streets during times when school bus drop off and pick up is going on at busy traffic areas.	11/14/2023 5:13 AM
18	Moratorium on building, except for a quality hospital without long waits in ER, recruit for fire depts and medics so those will not be temporarily on shut down. Our health and safety basic needs first before more low quality thrown up homes on land that has not even settled before building.	11/13/2023 10:00 PM
19	Unknown	11/13/2023 9:37 PM
20	Awareness	11/13/2023 9:23 PM
21	Real consequences for crimes and evaluating the over use of PR for people who commit crimes. This just allow them to reoffend as they wait for a court date. Working with insurance company to give people reasonable rates for insurance.	11/13/2023 6:55 PM
22	Mosquito spraying should not be done, hazardous to humans and wildlife, train and finance citizens in the diy making of mosquito dunk buckets. Educate citizens on the use of native	11/13/2023 5:55 PM

	plants for erosion control and healthy ecosystems, require HO As and housing developers to ONLY use maryland native plants, shrubs and trees	
23	power outages.... need back and options to respond. work on replacement of weak failing infrastructure. restricting development in areas that are at risk or that their development cause risk to existing properties.	11/13/2023 5:41 PM
24	Not needed	11/13/2023 5:10 PM
25	Increase fire and EMS availability, build another hospital. Yours is over run daily	11/13/2023 3:16 PM
26	Upgrade power lines	11/13/2023 2:55 PM
27	na	11/13/2023 2:11 PM
28	Fix infrastructure	11/13/2023 1:26 PM
29	Stop the constant building and cutting down the trees	11/13/2023 12:21 PM
30	Proper drainage of rain water	11/12/2023 7:27 PM
31	proactively advocate at all political levels to align pollicies and practices that take the implications of climate change seriously.	11/10/2023 11:16 AM
32	Start preparing for rising tidal waters NOW	11/9/2023 11:38 AM
33	comprehensive risk mitigation in the county	11/9/2023 10:37 AM
34	Increase paid Fire & EMS; build a 2nd/better hospital with a real trauma center & mental health services; improve utility resiliency; trim trees & vines away from power lines; reduce growth (development) until infrastructure & services can catch up...	11/6/2023 9:04 PM
35	Knock down that useless unsafe Mall and build a trauma center!! Every neighbor being build should have to build and fund a new firehouse and funding to staff a paramedic EMS unit in that area !	11/6/2023 7:43 PM
36	Training and public information	11/6/2023 1:29 PM
37	na	11/5/2023 12:20 AM
38	enhanced information dissemination program; education on the nature and flow of water	11/4/2023 11:36 PM
39	Strengthen Charles County's GREEN infrastructure instead of destroying it and making citizens pay for feeble man made attempts to "mitigate" the damage.	11/4/2023 8:47 PM
40	More concern at the state government level rather than the current waste of tax money.	11/4/2023 7:37 PM
41	Modernize	11/3/2023 9:03 PM
42	The structure of Charles County Government needs exposed & Transparency - citizens don't know who makes decisions b/c secrecy is how they operate - or "good Ole boys" club, too	11/3/2023 5:02 PM
43	Diligence!!!!!!!	10/31/2023 8:32 PM
44	Floods from Rain are the most frequent event in the county. Flood mitigation in the flood prone areas.	10/27/2023 1:41 PM
45	A bigger better hospital that can handle the growth of our community	10/27/2023 10:50 AM
46	improve roads	10/27/2023 1:42 AM
47	Emergency evacuation plan, shelter plan, supplies stocks of food, water, medical supplies, generators fuel.	10/26/2023 7:45 PM
48	Expand infrastructure for emergency evacuation routes due to population growth	10/26/2023 6:54 PM
49	Increase staff within Emergency Management Department.	10/24/2023 6:08 PM
50	Living shoreline restoration and protection, more outreach about flood insurance and risk.	10/19/2023 10:35 AM
51	Education about what residents can do	10/11/2023 9:51 AM
52	Testing/ new protocols of safety for existing and new construction	10/11/2023 9:47 AM

53	Take into account more of the ecosystem services already being provided by a tract of land before zoning it one way or another. We lose a lot of healthy forests to development while unhealthy forests (overrun with invasives) are peppered throughout development areas. A more Integrated Land Use approach would make Charles County more resilient overall.	10/10/2023 4:34 PM
54	I don't have any .	10/10/2023 4:33 PM
55	better planning of new homes, perhaps not allowing as many to be built. somehow working with SMECO to improve their lines (bury maybe? not sure how to improve) and hire more people.	10/8/2023 1:28 PM
56	Put political people in office that are there for their constituents. Racial bias needs to be eradicated from Charles County.	10/8/2023 12:58 PM
57	Everywhere I look in this county I see things that can be done better or differently to minimize overpopulation, climate change, crime, small scale erosion that leads to large scale sedimentation in our rivers, power outages, waste disposal..... This is an inadequate forum for this conversation.	10/8/2023 10:16 AM
58	Keep streets and parking lots clean	10/8/2023 9:57 AM
59	I live at the corner of Barksdale Ave and Stone Drive I n Waldorf. Water stands there after a heavy rain. My neighbors told me there have been issues for a long time regarding water drainage in our Carrington neighborhood.	10/7/2023 7:57 AM
60	Stop allowing all the new building which is making more water from storms go into the small creeks. Water has no place to go anymore so it rises into our roads and yards causing flooding to our property	10/6/2023 9:27 AM
61	Fix roads where there is flooding and raise the bridge in area of flooding	10/5/2023 6:09 PM
62	Stop the destruction of Charles County's woodlands and forests. Stop clear cutting and building up in watershed zones. Have better arteries for residents to leave the county if needed to evacuate. The building of so many residences without proper emergency services and infrastructure is dangerous for Charles County. The clear cutting and off the charts building the County has permitted will be our demise. Charles County is hastening climate change, global warming, and the extinction of native species by selling out to developers.	10/5/2023 4:02 PM
63	Moratorium on development	10/5/2023 1:29 PM
64	Upgrade roads and utilities. Invest/expand Police/Fire/EMS personnel and equipment.	10/5/2023 12:31 PM
65	You have emergency notification on land lines, do you have emergency notification on cell phones?	10/5/2023 11:26 AM
66	Continue movement away from fossil fuel usage and reduce carbon emissions	10/5/2023 11:20 AM
67	SMECO deserves a rating of AAA+ for the improvement of keeping the electricity flowing when problems arise. Other infrastructure departments and offices have failed CC citizens with their lack of long grange planning, transportation/roads being the wose.	10/5/2023 11:01 AM
68	Proper, Advanced and adequate planning	10/5/2023 10:24 AM
69	Educate community. Regulations to minimize impact. Ie water shortages.	10/5/2023 10:12 AM
70	Surveys of water ways like creeks, and rivers. Mattawomen creek is overflowing and water is reaching to residents homes, seems like a clogged is happening and see an increased bibber population	10/5/2023 10:05 AM
71	Give community members resources to help them	10/5/2023 9:44 AM
72	Transportation route capacities have not kept up with development, so if an evacuation had to happen, it would be difficult. All significant or high hazard dams need to be under County control. Privately owned dams place others' properties and lives at risk.	10/5/2023 9:28 AM
73	Improve traffic patterns	10/5/2023 9:11 AM
74	Cut the red tape and archaic policy/regulations in the Critical Area to allow homeowners a better, modern, and (sometimes) less expensive, means to protect their property from erosion and sea level rise. Living shore line doesn't work for everyone and banks need to be graded and secured. Just "plant grass" is not a solution and neither are poor attitudes by County staff when it comes to Critical Area concerns and issues.	10/2/2023 9:58 AM

75	Stop building houses, the county is past population capacity and in the event of a countywide emergency I feel that the amount of people would severely limit the response of emergency officials.	9/29/2023 7:52 AM
76	The county should focus on assessing current structures, bridges, etc. to ensure safety standards are met and repaired. Traffic impact (backups and accidents) due to the increase in home building needs to be evaluated and addressed by increasing roadways or new roads. Current traffic getting in/out over the county lines is horrendous.	9/26/2023 7:32 PM
77	have an evacuation plan that covers the flow of PG residents DC residents and our own residents fleeing south.	9/26/2023 9:46 AM
78	Clean storm drains, improve utility lines for less interruptions, stop allowing development in forested areas for not necessary reason or actually spread developments elsewhere besides Waldorf and LaPlata	9/25/2023 9:37 AM
79	Pass laws prohibiting the release of human waste on Charles County farmland	9/23/2023 3:21 PM
80	education	9/22/2023 7:58 AM
81	Larger police , fire and volunteer personnel and hospital facilities in Charles County	9/21/2023 2:38 PM
82	Comprehensive planning, table top exercises & boots on the ground exercises to test plans.	9/21/2023 5:40 AM
83	All areas need tornado sirens.	9/21/2023 12:47 AM
84	Improve infrastructure	9/20/2023 9:15 AM
85	Stop overdeveloping and cramming more housing projects into areas where there are massive amounts of unsold houses and unprepared infrastructure (one lane roads, frequent power outages, etc.) Protect the natural resources that at-risk members of the community rely on (ie the natural spring on 488 that many use as a main source of potable water, walking and biking trails that many use to commute with no car, etc.) Boost support for affordable housing or shelters as well as food and medical supplies for the homeless population that is prominent in certain downtown areas of Waldorf Add community programs and projects that can provide resources, skills, and information to citizens to be prepared for the most likely emergencies	9/20/2023 9:11 AM
86	Place a moratorium on new home building and over development until our resources can accommodate the citizens who are already living here.	9/20/2023 7:45 AM
87	Prohibit new construction of neighborhoods, plant more trees.	9/20/2023 5:35 AM
88	Get our roads to 💯, trim the side of the road to stop tree falling during storms, make ditches tolow laying areas more able to keep runoff off roads. Educate on how to make your home safer by cutting fb dead trees getting a generator for power loss.	9/20/2023 1:41 AM
89	The hospital must expand capacity and urgent cares need to be open later to offset ER demand.	9/19/2023 10:34 PM
90	Raise awareness about resources in case of an emergency; in the instance that was a natural disaster I wouldn't have an idea where to go in order to receive assistance; I believe this is true for many people	9/19/2023 9:36 PM
91	Move utility lines underground.	9/19/2023 6:03 PM
92	fix roads and bridges stop building in charles county	9/19/2023 4:28 PM
93	education	9/19/2023 1:30 PM
94	N/A	9/19/2023 12:45 PM
95	Not sure	9/19/2023 10:19 AM
96	Actually educate the citizens on what they could do to reduce exposure to risks. Ensure that police/fire/ems/hospital facilities are updated and to code	9/19/2023 9:45 AM
97	Reduce monies spent on welfare and similar programs, invest in the infrastructure to put people back to work who are living on the taxpayer's dime.	9/19/2023 8:48 AM
98	None	9/19/2023 8:43 AM
99	Increase law enforcement and emergency services budget and staffing. Include additional	9/19/2023 8:12 AM

	training for DES and law enforcement. Restrict growth that is straining the resources and damaging infrastructure	
100	Fire the health department staff that used the pandemic to call health care racist and push a socialist Agenda.	9/18/2023 9:05 PM
101	Build resilient infrastructure and educate citizens on ways they can help.	9/18/2023 7:21 PM
102	Engage the public	9/18/2023 6:34 PM
103	Public education or increased awareness of what individuals can do for their property	9/18/2023 6:06 PM
104	To limit cutting down so many trees that also provide protection to residents and their homes from the elements of the earth.	9/18/2023 5:00 PM
105	Tree trimming. Expanding emergency services by providing more career personnel including firefighters	9/18/2023 4:22 PM
106	following the current ordinances. Homes built too close together that emergency vehicles can't get access. Apartments being built in area that already flood.	9/18/2023 4:11 PM
107	Better set up to receive patients in ER to free up EMS for next call. Offer monitoring for private wells to ck pesticide levels. Offer monitoring for radon levels.	9/18/2023 3:41 PM
108	Bury all utility lines to avoid outages, increase road infrastructure to match growing population, invest in hospital to meet demand.	9/18/2023 3:30 PM
109	Community Education is a major starting point because most residents do not realize we live within 50 miles of Calvert Cliffs Nuclear Power Plant, 10-20 Miles of Several military bases (Indian Head, Patuxent River, Dahlgren, Andrews, Bowling, etc. I have also noticed that we have had a lot more power outages in the last year than previous years.	9/18/2023 2:42 PM
110	Stop building	9/18/2023 1:47 PM
111	I live on Poorhouse Road where the power goes out occassionally. It's usually caused by a disruption to the sub-station that our lines feed off of. Don't know what could be done to help this though.	9/18/2023 1:44 PM
112	Climate change study	9/18/2023 1:19 PM

C-7 Press Release

September 13, 2023

NEWS RELEASE
CHARLES COUNTY, MARYLAND
SEPTEMBER 13, 2023

Charles County is seeking public input on its Hazard Mitigation Plan Update. The Hazard Mitigation Plan identifies potential hazards and lists future projects that may reduce or eliminate damage before a disaster strikes.

Mitigation not only saves lives, but also reduces disaster costs. Public-sector investment in mitigation since 1995 by FEMA, EDA, and HUD cost the country $27 billion but will ultimately save $160 billion, meaning $6 is saved for every $1 invested.

Input from residents, community members, business owners, and visitors will help ensure the success of the County's hazard mitigation plan and projects. There are a variety of ways community members and stakeholders can participate:

- ***Public Survey:*** *Take a survey* to provide feedback on concerns regarding local hazards and disaster risk. The survey takes around ten minutes to complete. Link: https://www.surveymonkey.com/r/K9VMPDJ
- ***Follow Us:*** Follow us on Facebook at https://www.facebook.com/CharlesCountyfor hazard mitigation updates and other emergency preparedness, response, and recovery information.
- ***Spread the Word:*** Tell your Charles County family, friends, and neighbors about the plan and how they can help!
- ***Reach Out:*** For questions regarding the plan, contact Gary Lewis, Department of Emergency Services at lewisg@charlescountymd.gov.

Learn more about the Charles County Hazard Mitigation Plan at https://www.charlescountymd.gov/services.

Appendix D – Maryland Inventory of Historic Properties

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-30		Waverley	Charles County	2	1		1	4
CH-193	Y	Millbrook Farm Grist Mill	Charles County	2		1	1	4
CH-189	Y	Anthony's Pasture	Charles County	2	1			3
CH-376	Y	Governor Harry W. Nice Memorial Bridge	Charles County	2	1			3
CH-368		*Mary K. Somers* (Skipjack)	Charles County	2	1			3
CH-32	Y	Pasquahanza	Charles County	2	1			3
CH-668		Piscataway Park	Charles County	2	1			3
CH-174	Y	Plank Bridge Farm Corn Crib and Barn	Town of La Plata	2		1		3
CH-369		Bryantown Historic District	Charles County	2			1	3
CH-372		Port Tobacco Historic District	Village of Port Tobacco	2			1	3
CH-1	Y	Rose Hill	Village of Port Tobacco	2			1	3
CH-15		Sarum	Charles County	2			1	3
CH-49		The Lindens	Town of La Plata	2			1	3
CH-18	Y	Christ Episcopal Church	Charles County	2				2
CH-5		Habre de Venture (Thomas Stone National Historic Site)	Village of Port Tobacco	2				2
CH-347		McPherson's Purchase	Charles County	2				2
CH-65		Mount Air	Charles County	2				2
CH-75	Y	Mount Aventine	Charles County	2				2
CH-751		St. Catherine's Catholic Church	Village of Port Tobacco	2				2
CH-51		Thainston	Town of La Plata	2				2
CH-297		Timber Neck Farm	Charles County	2				2
CH-381		Bridge 8018	Town of Indian Head		1	1		2
CH-67		Clifton No. 2	Charles County		1	1		2
CH-493-4		Extrusion Plant Historic District, Indian Head; Building 566	Town of Indian Head		1	1		2
CH-650		Juhle Property	Charles County		1	1		2
CH-157		Montross Farm, site	Charles County		1	1		2
CH-371-2		Naval Ordnance Station, Indian Head; Bombproof, Laboratory, Conference Center; Building 62	Town of Indian Head		1	1		2
CH-492-4		Naval Proving Ground Historic District, Indian Head; Magazine; Building 635	Town of Indian Head		1	1		2
CH-130	Y	Maiden Point Farm	Charles County		1		1	2
CH-39	Y	West Hatton	Charles County		1		1	2
CH-533		Acker House	Charles County		1			1
CH-336		Allen's Mill (Archeological Site)	Charles County		1			1
CH-535		Banks of the Dee	Charles County		1			1
CH-229		Benedict	Charles County		1			1

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-211		Benedict Hill House, site	Charles County		1			1
CH-690		Benedict Two-Room Schoolhouse	Charles County		1			1
CH-337		Brick House	Charles County		1			1
CT-1214		Bridge 4008 (SHA)	Charles County		1			1
CH-390		Bridge 8037, site	Charles County		1			1
CH-203		Burgess Farm	Charles County		1			1
CH-1017		Cedar Point Tobacco Barns	Charles County		1			1
CH-16		Chapel Point	Charles County		1			1
CH-375		Chapel Point State Park	Charles County		1			1
CH-782		Chicamuxen United Methodist Church	Town of Indian Head		1			1
CH-66		Clifton No. 1	Charles County		1			1
CH-618		Clubb House	Charles County		1			1
CH-709		Cobb Island Citizen's Association Hall	Charles County		1			1
CH-530		Cottage, site, Pine Grove Subdivision 99F Hill Road	Charles County		1			1
CH-617		Dwelling (site)	Charles County		1			1
CH-175		Edward Pye Grave	Town of Indian Head		1			1
CH-710		Elgin's Store	Charles County		1			1
CH-106		Elsemere	Charles County		1			1
CH-493		Extrusion Plant Historic District	Town of Indian Head		1			1
CH-493-1		Extrusion Plant Historic District, Indian Head; Building 526	Town of Indian Head		1			1
CH-493-2		Extrusion Plant Historic District, Indian Head; Building 544	Town of Indian Head		1			1
CH-493-3		Extrusion Plant Historic District, Indian Head; Building 559	Town of Indian Head		1			1
CH-493-5		Extrusion Plant Historic District, Indian Head; Building 572	Town of Indian Head		1			1
CH-493-6		Extrusion Plant Historic District, Indian Head; Building 581	Town of Indian Head		1			1
CH-493-8		Extrusion Plant Historic District, Indian Head; Building 588	Town of Indian Head		1			1
CH-493-12		Extrusion Plant Historic District, Indian Head; Chlorinator Equipment Buildings; Buildings 1478 and 1482	Town of Indian Head		1			1
CH-540		Fenwick Store and Post Office	Charles County		1			1

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-541		Fenwick/Brent Family Graveyard	Charles County		1			1
CH-504		Glymont School	Town of Indian Head		1			1
CH-732		Hammond Cottage	Charles County		1			1
CH-144	Y	Hampton House	Charles County		1			1
CH-672		Holt Property, Chicamuxen Wildlife Management Area	Charles County		1			1
CH-800		House at 13445 Furbush Road, site	Charles County		1			1
CH-770		House at Budds Ferry	Town of Indian Head		1			1
CH-734		House at Crab Landing	Charles County		1			1
CH-490		Indian Head Residential Historic District	Town of Indian Head		1			1
CH-815		Indian Head, Nitration House, Building 786	Town of Indian Head		1			1
CH-290		Indian Head-White Plains Railroad	Charles County		1			1
CH-158	Y	Keechland	Charles County		1			1
CH-181		Lee Graves at PEPCO Plant	Charles County		1			1
CH-55		Locust Grove	Charles County		1			1
CH-91		Locust Grove	Charles County		1			1
CH-204		Lower Cedar Point	Charles County		1			1
CH-725		Maiden Point Farm Tobacco Barn	Charles County		1			1
CH-54C		Marshall Cemetery	Charles County		1			1
CH-54		Marshall Hall	Charles County		1			1
CH-54A		Marshall Hall Office	Charles County		1			1
CH-54B		Marshall Hall Stable, site	Charles County		1			1
CH-773		Mattawoman Creek Foot Bridge (site)	Charles County		1			1
CH-526		Morris T. Wampler Hunting Lodge	Charles County		1			1
CH-371		Naval Ordnance Station, Indian Head	Town of Indian Head		1			1
CH-371-5		Naval Ordnance Station, Indian Head; Boiler House; Building 113	Town of Indian Head		1			1
CH-371-10		Naval Ordnance Station, Indian Head; Nitrate Plant; Building 135	Town of Indian Head		1			1
CH-371-12		Naval Ordnance Station, Indian Head; Powder Dry House; Building 215	Town of Indian Head		1			1
CH-371-4		Naval Ordnance Station, Indian Head; Powerhouse; Building 111	Town of Indian Head		1			1

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-371-3		Naval Ordnance Station, Indian Head; River Pump House and Pump Screen House; Building 100 and Building 100A	Town of Indian Head		1			1
CH-371-9		Naval Ordnance Station, Indian Head; Scrap Metal Yard; Building 127	Town of Indian Head		1			1
CH-371-7		Naval Ordnance Station, Indian Head; Warehouse; Building 117	Town of Indian Head		1			1
CH-371-8		Naval Ordnance Station, Indian Head; Warehouse; Building 120	Town of Indian Head		1			1
CH-371-1		Naval Ordnance Station, Indian Head; Watch House; Building 43	Town of Indian Head		1			1
CH-491		Naval Powder Factory Historic District	Town of Indian Head		1			1
CH-492		Naval Proving Ground Historic District, Indian Head	Town of Indian Head		1			1
CH-492-5		Naval Proving Ground Historic District, Indian Head; Breakwater Dock	Town of Indian Head		1			1
CH-492-2		Naval Proving Ground Historic District, Indian Head; Emergency Pump House; Building 254	Town of Indian Head		1			1
CH-1008		Naval Support Facility Indian Head, Building 2073	Town of Indian Head		1			1
CH-1009		Naval Support Facility Indian Head, Old Power Plant Complex	Charles County		1			1
CH-745		Neale-Shea House	Charles County		1			1
CH-1001		Old Cedar Point Subdivision	Charles County		1			1
CH-9		Old Friendship Barn Site	Charles County		1			1
CH-715		Persimmon Point Farm	Charles County		1			1
CH-703		Pine Grove	Charles County		1			1
CH-810		Pope's Creek Branch of the Pennsylvania Railroad	Charles County		1			1
CH-528	Y	Popes Creek Power Plant	Charles County		1			1
CH-721		Poppleton	Charles County		1			1
CH-376-1		Potomac River Bridge Administration Building	Charles County		1			1
CH-164	Y	Ravens Crest	Charles County		1			1
CH-319		Richard T. Knott House	Town of Indian Head		1			1

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-774		Riverside Historic District	Charles County		1			1
CH-811		Riverview Village	Town of Indian Head		1			1
CH-527		Robert & Mazel Killough Cottage, site	Charles County		1			1
CH-499		Robert Boykin House	Town of Indian Head		1			1
CH-85	Y	Rock Hall	Charles County		1			1
CH-789		Rock Point Oyster Packing House	Charles County		1			1
CH-661		Rock Point Road Foursquares	Charles County		1			1
CH-738		Rock Point Shucker's Houses	Charles County		1			1
CH-781		SHA Bridge No. 0802200	Charles County		1			1
CH-662		Shorter's Store, site	Charles County		1			1
CH-706		Smallwood State Park	Charles County		1			1
CH-25		St. Charles Roman Catholic Church, site	Town of Indian Head		1			1
CH-718		St. Clair Tobacco Farm	Charles County		1			1
CH-663	Y	St. Francis Catholic Chapel	Charles County		1			1
CH-704		Thomas Hotel	Charles County		1			1
CH-667		Upham Property No. 1, Smallwood State Park	Charles County		1			1
CH-724		Vickers House	Charles County		1			1
CH-621		Wakefield, Poppleton	Charles County		1			1
CH-739		Waverly Point Farmhouse	Charles County		1			1
CH-206		Wicomico Fields	Charles County		1			1
CH-543		Willard F. Miller Cottage	Charles County		1			1
CH-190		Wolleston Manor	Charles County		1			1
CH-38	Y	Yatten	Charles County		1			1
CH-950		10335 Carmel Drive	Charles County			1		1
CH-974		10975 Crain Highway	Charles County			1		1
CH-932		8305 Hawthorne Road	Town of La Plata			1		1
CH-994		9135 Cherry Lane	Town of La Plata			1		1
CH-993		9190 Cherry Lane	Town of La Plata			1		1
CH-827		9480 Monteiro Place	Town of La Plata			1		1
CH-647		Benedict Colored School	Charles County			1		1
CH-80		Blenheim, site	Charles County			1		1
CH-593		Brown House, site	Town of La Plata			1		1
CH-89		Charlestown Creek Site	Charles County			1		1
CH-693		D. Rose & J. Jones Ruin	Charles County			1		1
CH-334		Dearbought	Charles County			1		1
CH-682		Dent Family Cemetery	Charles County			1		1
CH-701		Dr. Thomas L. Higdon Farmhouse and Office	Charles County			1		1
CH-136	Y	Edelin Farm	Charles County			1		1
CH-148	Y	Edgehill Farm	Charles County			1		1
CH-34		Elmwood	Charles County			1		1
CH-79	Y	Eutah	Charles County			1		1
CH-90		Friendship	Charles County			1		1

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-477		Girl Scout Council Property	Charles County			1		1
CH-778	Y	Goode Road Log House	Charles County			1		1
CH-707		Goode Road Property	Charles County			1		1
CH-293		Hall's Lot	Charles County			1		1
CH-285		Hamilton House, site	Village of Port Tobacco			1		1
CH-308		Hart-Diggs House	Charles County			1		1
CH-450		Hugh D. & Mary T. Vazzana Property	Charles County			1		1
CH-284		Hutton-Jenkins House, site	Village of Port Tobacco			1		1
CH-117		Irvine House	Town of La Plata			1		1
CH-1016		John H. Robertson House	Charles County			1		1
CH-283		Lacy House, site	Village of Port Tobacco			1		1
CH-684	Y	Loch Leven Cornhouse	Charles County			1		1
CH-305		McDaniel House, site & Cemetery	Town of La Plata			1		1
CH-694		Michael J. H. Mudd Property, ruin	Charles County			1		1
CH-116		Mt. Bleak	Village of Port Tobacco			1		1
CH-173		Port Tobacco Times Building, site	Village of Port Tobacco			1		1
CH-74	Y	Prospect Hill	Town of La Plata			1		1
CH-120	Y	Robert Bowling House	Charles County			1		1
CH-288		Roberts House, site	Village of Port Tobacco			1		1
CH-286		Roberts Store, site	Village of Port Tobacco			1		1
CH-796		Round Hill Cemetery	Charles County			1		1
CH-691		Scout Camp Road Tenant House	Charles County			1		1
CH-1011		SHA Small Structure No. 08052X0	Charles County			1		1
CH-719		Simpson's Supply	Charles County			1		1
CH-542		Stony Hill Farm, site	Charles County			1		1
CH-129		Tenant House at St. Thomas Manor	Charles County			1		1
CH-419		Thomas Carrico Property	Charles County			1		1
CH-681		Thomas-Dudley Property	Charles County			1		1
CH-675		Trimac Property, Myrtle Grove Wildlife Management Area	Town of La Plata			1		1
CH-772		Tubman Cemetery	Town of La Plata			1		1
CH-287		Wade's Barn, site	Village of Port Tobacco			1		1
CH-230		Washington C. Page Property	Town of La Plata			1		1
CH-281		Welch House, site	Village of Port Tobacco			1		1
CH-151A		Westwood Manor Tenant House	Charles County			1		1
CH-53		Acquinsicke	Charles County				1	1
CH-11	Y	Araby	Charles County				1	1
CH-560	Y	Bel Alton Historic District	Charles County				1	1

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-42	Y	Black Friars	Charles County				1	1
CH-344	Y	Carrico Building	Town of La Plata				1	1
CH-23	Y	Cat Slide Roof House	Village of Port Tobacco				1	1
CH-354	Y	Chillum	Town of La Plata				1	1
CH-33	Y	Ellenwood	Town of La Plata				1	1
CH-191	Y	Huckleberry Plains	Charles County				1	1
CH-166	Y	Idaho	Town of La Plata				1	1
CH-613	Y	James L. Carrico House	Charles County				1	1
CH-326	Y	La Plata Historic District	Town of La Plata				1	1
CH-192	Y	Millbrook Farm	Charles County				1	1
CH-192B	Y	Millbrook Farm Dairy	Charles County				1	1
CH-192A	Y	Millbrook Farm Smokehouse	Charles County				1	1
CH-35	Y	Mt. Victoria	Charles County				1	1
CH-194	Y	Nanjemoy Store and Post Office, site	Charles County				1	1
CH-59		Oak Grove	Town of La Plata				1	1
CH-178	Y	Old Brick Jail	Town of La Plata				1	1
CH-503	Y	Old Pomonkey High School	Town of Indian Head				1	1
CH-806	Y	Physicians Memorial Hospital	Town of La Plata				1	1
CH-457	Y	Quaker Cemetery	Charles County				1	1
CH-304		Spye Park	Charles County				1	1
CH-251	Y	St. John's Chapel	Charles County				1	1
CH-68	Y	St. Joseph's Catholic Church	Charles County				1	1
CH-226	Y	St. Paul's Episcopal Church	Charles County				1	1
CH-6		St. Thomas Manor	Charles County				1	1
CH-13		Stagg Hall	Village of Port Tobacco				1	1
CH-214	Y	Sunnyside	Charles County				1	1
CH-47		The Hermitage	Town of La Plata				1	1
CH-151	Y	Westwood Manor	Charles County				1	1
CH-356	Y	Wright House	Charles County				1	1
CH-841		100 Winjon Place	Town of La Plata					0
CH-894		1001 Washington Avenue	Town of La Plata					0
CH-969		10010 Crain Highway	Charles County					0
CH-942		10015 Venus Road	Charles County					0
CH-912		10061 Lyle's Place	Charles County					0
CH-893		1008 Washington Avenue	Town of La Plata					0
CH-968		10085 Crain Highway	Charles County					0
CH-892		1010 Washington Avenue	Town of La Plata					0
CH-972		10155 Weedon Road	Charles County					0
CH-845		102 Hawthorne Drive	Town of La Plata					0
CH-949		10325 Carmel Drive, site	Charles County					0
CH-951		10345 Carmel Drive, site	Charles County					0
CH-973		10355 Branchville Road	Charles County					0
CH-954		10435 Glasva School Road, site	Charles County					0
CH-962		10470 Crain Highway	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-819		10512 Charles Street Residence	Town of La Plata					0
CH-820		10584 Charles Street Residence	Town of La Plata					0
CH-821		10633 Charles Street Residence	Town of La Plata					0
CH-823		10680 Charles Street	Town of La Plata					0
CH-824		10795 Charles Street	Town of La Plata					0
CH-642		10945 Berry Road	Charles County					0
CH-900		10955 Demarr Road	Charles County					0
CH-983		10985 Crain Highway	Charles County					0
CH-914		11026 Berry Road	Charles County					0
CH-852		112 St. Mary's Avenue	Town of La Plata					0
CH-958		11300 Crain Highway	Charles County					0
CH-853		114 St. Mary's Avenue	Town of La Plata					0
CH-948		11655 Crain Highway	Charles County					0
CH-952		11740 Edge Hill Road	Charles County					0
CH-854		118 St. Mary's Avenue	Town of La Plata					0
CH-957		11955 Edge Hill Road	Charles County					0
CH-953		11960 Edge Hill Road	Charles County					0
CH-947		12185 Crain Highway	Charles County					0
CH-917		12220 Gillespie Circle	Charles County					0
CH-945		12535 Crain Highway	Charles County					0
CH-941		12570 Crain Highway	Charles County					0
CH-671		14535 Charles Street	Charles County					0
CH-679		15355 Rock Point Road	Charles County					0
CH-856		200-300 Block of Prince George's Street	Town of La Plata					0
CH-855		207 St. Mary's Avenue	Town of La Plata					0
CH-637		208 St. Mary's Avenue	Town of La Plata					0
CH-860		210 Oak Avenue	Town of La Plata					0
CH-861		212 Oak Avenue	Town of La Plata					0
CH-916		2207 Old Washington Road, site	Charles County					0
CH-915		2215 Old Washington Road	Charles County					0
CH-918		2274 Old Washington Road, site	Charles County					0
CH-919		2282 Old Washington Road	Charles County					0
CH-927		2290 Mattawoman Beantown Road	Charles County					0
CH-922		2294 Old Washington Road, site	Charles County					0
CH-920		2298 Old Washington Road, site	Charles County					0
CH-582		2380 Old Washington Road	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-921		2500 Block of Old Washington Road, West Side	Charles County					0
CH-924		2525 Old Washington Road	Charles County					0
CH-923		2539 Old Washington Road	Charles County					0
CH-913		2620 Baden Place	Charles County					0
CH-641		2635 Baden Place	Charles County					0
CH-929		2635 Mattawoman Beantown Road	Charles County					0
CH-930		2711 Mattawoman Beantown Road	Charles County					0
CH-910		2760 Mill Hill Road	Charles County					0
CH-925		2915 Old Washington Road	Charles County					0
CH-874		301 Prospect Street	Town of La Plata					0
CH-846		304 Cecil Street	Town of La Plata					0
CH-875		305 Prospect Street	Town of La Plata					0
CH-857		305 St. Mary's Avenue	Town of La Plata					0
CH-859		308 Forest Lane	Town of La Plata					0
CH-926		3087 Old Washington Road	Charles County					0
CH-585		3340 St. Peter's Drive	Charles County					0
CH-879		3371 Mattawoman Beantown Road	Charles County					0
CH-396		3545 Bic Pic Place, site	Charles County					0
CH-905		3955 Annies Place	Charles County					0
CH-876		400 Prospect Street	Town of La Plata					0
CH-877		403 Prospect Street	Town of La Plata					0
CH-554		4050 Derrico Place Residence, site	Charles County					0
CH-881		4200-A Renner Road	Charles County					0
CH-880		4295 Renner Road	Charles County					0
CH-907		4310 Leonardtown Road	Charles County					0
CH-882		4385 Renner Road	Charles County					0
CH-862		4450 Middletown Road	Charles County					0
CH-863		4480 Crain Highway	Charles County					0
CH-864		4635 Crain Highway	Charles County					0
CH-908		4770 Leonardtown Road	Charles County					0
CH-909		4815 Leonardtown Road	Charles County					0
CH-865		4870 Crain Highway	Charles County					0
CH-883		4873 Piney Church Road	Charles County					0
CH-867		4900 Crain Highway	Charles County					0
CH-847		502 Kent Avenue	Town of La Plata					0
CH-848		504 Kent Avenue	Town of La Plata					0
CH-849		506 Kent Avenue	Town of La Plata					0
CH-868		5075 Crain Highway	Town of La Plata					0
CH-872		5350 Washington Avenue	Town of La Plata					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-884		5440 Washington Avenue	Town of La Plata					0
CH-885		5477 Washington Avenue	Town of La Plata					0
CH-889		5765 Washington Avenue	Town of La Plata					0
CH-891		5839 Washington Avenue	Town of La Plata					0
CH-702		5th District Polling House	Charles County					0
CH-897		6055 Starview Place	Town of La Plata					0
CH-898		6100 Starview Place	Town of La Plata					0
CH-899		6110 Starview Place	Town of La Plata					0
CH-935		6785 Valley Road	Town of La Plata					0
CH-842		702 Washington Avenue	Town of La Plata					0
CH-828		7375 Crain Highway Residence	Town of La Plata					0
CH-830		7395 St. Mary's Avenue Residence	Town of La Plata					0
CH-831		7430 Crain Highway Residence	Town of La Plata					0
CH-832		7480 Crain Highway Residence	Town of La Plata					0
CH-393		7495 Bensville Road	Charles County					0
CH-839		7500 Block of Dolly Drive	Town of La Plata					0
CH-834		7500 St. Mary's Avenue	Town of La Plata					0
CH-833		7520 St. Mary's Avenue	Town of La Plata					0
CH-836		7610 Crain Highway	Town of La Plata					0
CH-837		7665 Crain Highway	Town of La Plata					0
CH-825		7725 Bel Alton-Newton Road Residence	Town of La Plata					0
CH-817		7855 Crain Highway	Town of La Plata					0
CH-989		7875 Crain Highway	Town of La Plata					0
CH-990		7915 Crain Highway	Town of La Plata					0
CH-996		8050 Fairground Road	Town of La Plata					0
CH-998		8055 Waterford Place	Town of La Plata					0
CH-999		8055 Waterford Place, ruin	Town of La Plata					0
CH-991		8075 Crain Highway	Town of La Plata					0
CH-997		8230 Rosiers Place	Town of La Plata					0
CH-1000		8280 Crain Highway	Town of La Plata					0
CH-937		8530 Port Tobacco Road, site	Village of Port Tobacco					0
CH-936		8550 Port Tobacco Road	Village of Port Tobacco					0
CH-987		8600 Crain Highway	Charles County					0
CH-938		8705 Plenty Highland Place	Village of Port Tobacco					0
CH-933		8750 Hawthorne Road	Town of La Plata					0
CH-903		8840 Billingsley Road	Charles County					0
CH-985		8850 Fairground Road	Charles County					0
CH-984		8870 Fairground Road	Charles County					0
CH-986		8905 Fairground Road	Charles County					0
CH-904		8935 Billingsley Road, site	Charles County					0
CH-843		900 Washington Avenue	Town of La Plata					0
CH-844		902 Washington Avenue	Town of La Plata					0
CH-980		9203 Crain Highway	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-978		9230 Chapel Point Road	Charles County					0
CH-981		9260 Chapel Point Road	Charles County					0
CH-871		9295 Mitchell Road	Town of La Plata					0
CH-838		9325 Old Stagecoach Road	Town of La Plata					0
CH-960		9345 Irving Road	Charles County					0
CH-992		9350 Slidell Place	Town of La Plata					0
CH-818		9395 Mathir Place Residence	Town of La Plata					0
CH-961		9410 Irving Road	Charles County					0
CH-829		9430 Lindsbrooke Place Residence	Town of La Plata					0
CH-977		9555 Crain Highway, site	Charles County					0
CH-887		9570 Kathleen Place	Town of La Plata					0
CH-976		9585 Crain Highway	Charles County					0
CH-888		9590 Kathleen Place	Town of La Plata					0
CH-971		9603 Crain Highway	Charles County					0
CH-970		9605 Crain Highway	Charles County					0
CH-966		9609 Crain Highway	Charles County					0
CH-873		9620 Tony's Place	Town of La Plata					0
CH-963		9640 Crain Highway	Charles County					0
CH-964		9660 Crain Highway	Charles County					0
CH-466		A. Golden Jones Property	Charles County					0
CH-395A		Abandoned one-story frame dwelling, site	Charles County					0
CH-309		Alexandria Chapel	Town of Indian Head					0
CH-128		Alexandria Methodist Church Site and Cemetery	Charles County					0
CH-628		Alexius L. Middleton House	Charles County					0
CH-764		Alfred and Daisy Willett House	Charles County					0
CH-182		Alice V. Sideler House	Town of La Plata					0
CH-350		Alms House (Archeological Site)	Village of Port Tobacco					0
CH-442		Andrew E. Canter Property	Charles County					0
CH-627		Ann C. St. Clair House	Charles County					0
CH-692		Anne S. Mudd Property	Town of La Plata					0
CH-300		Apple Grove	Charles County					0
PG:87B-36		Aquasco Survey District	Charles County					0
CH-604		Aquilla Turner House	Charles County					0
CH-598		Armstrong House, site	Town of La Plata					0
CH-441		Ayres Property	Charles County					0
CH-443		Bailey Property	Charles County					0
CH-267		Bake Shop, site	Village of Port Tobacco					0
CH-256		Barber Shop, site	Village of Port Tobacco					0
CH-184		Barbour-Albrittan House	Village of Port Tobacco					0
CH-697		Barn	Town of La Plata					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-878		Barn and Outbuilding at 3327 Mattawoman Beantown Road	Charles County					0
CH-943		Barn at 10005 Venus Road	Charles County					0
CH-822		Barn at Richard's Inheritance Place	Town of La Plata					0
CH-902		Barn on Jaybee Lane	Charles County					0
CH-979		Barns on East Side of Twinberry Road, site	Charles County					0
CH-147		Beach House	Town of La Plata					0
CH-562		Bel Alton High School	Charles County					0
CH-566		Bel Alton Motel	Charles County					0
CH-760		Bel Alton Store and Post Office	Charles County					0
CH-476		Bell Property	Charles County					0
CH-121		Benedict Road House	Charles County					0
CH-436		Benjamin Adams Farm, site	Charles County					0
CH-459		Benjamin F. Bowling Property	Charles County					0
CH-507		Bernard W. Downs House	Charles County					0
CH-153	Y	Betty's Delight	Village of Port Tobacco					0
CH-446		Beuchert Property	Charles County					0
CH-243		Billingsley-Latimer Property	Charles County					0
CH-102		Blackburn House No. 1	Charles County					0
CH-103		Blackburn House No. 2	Charles County					0
CH-57		Bolton	Charles County					0
CH-255		Boswell House, site	Village of Port Tobacco					0
CH-270		Bowie House, site	Village of Port Tobacco					0
CH-271		Bowie Store, site	Village of Port Tobacco					0
CH-215	Y	Bowling Green	Charles County					0
CH-651		Bowling Tenant House	Charles County					0
CH-199		Bowman House	Charles County					0
CH-170		Brawner Hotel, site	Village of Port Tobacco					0
CH-111		Brawner House, site	Town of Indian Head					0
CH-139	Y	Brentfield	Charles County					0
CH-152	Y	Brentland Road House	Charles County					0
CH-44		Brick House Lot	Charles County					0
CH-388		Bridge	Charles County					0
PG:87B-37		Bridge 160060 (16060)	Charles County					0
CH-487		Bridge 8002	Charles County					0
CH-488		Bridge 8003 (Bridge 8003-2)	Charles County					0
CH-494		Bridge 8006	Charles County					0
CH-495		Bridge 8013	Charles County					0
CH-387		Bridge 8015	Charles County					0
CH-496		Bridge 8024	Town of La Plata					0
CH-382		Bridge 8025 (SHA)	Town of La Plata					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-383		Bridge 8028	Town of La Plata					0
CH-378		Bridge CH 0016	Charles County					0
CH-379		Bridge CH 0033	Charles County					0
CH-380		Bridge CH 0035	Charles County					0
CH-385		Bridge CH 10	Charles County					0
CH-386		Bridge CH 34, Dyson Bridge	Charles County					0
CH-384		Bridge CH 7	Charles County					0
CH-389		Bridge CH-009, Bel Alton-Newtown Road Bridge	Town of La Plata					0
PG:84-24		Bridge P-0410, site (P410)	Charles County					0
CH-451		Bridgett Property	Charles County					0
CH-314		Bridgett-Thomas Tenant House	Charles County					0
CH-213	Y	Brinkwood	Charles County					0
CH-699		Briscoe's Purchase, John Posey Farm	Charles County					0
CH-669		Broadview Farms	Charles County					0
CH-302		Bromont Cemetery, site	Charles County					0
CH-424		Brown Property	Charles County					0
CH-134		Bryantown House	Charles County					0
CH-45		Bryantown Tavern	Charles County					0
CH-278		Building, site	Village of Port Tobacco					0
CH-277		Building, site	Village of Port Tobacco					0
CH-131		Burdette's Rest	Charles County					0
CH-572		Burroughs Shangri-La	Town of La Plata					0
CH-1026		Butler Farmstead	Charles County					0
CH-315		Butler-Cooke Tenant House	Charles County					0
CH-688		Butler's Tavern	Charles County					0
CH-403		C. Posey Herbert Property	Charles County					0
CH-622	Y	Calvary United Methodist Church	Charles County					0
CH-645		Calverton Manor Tobacco Barn	Charles County					0
CH-631		Canter Property	Charles County					0
CH-425	Y	Caroline Christ Farm	Charles County					0
CH-595		Carroll House	Town of La Plata					0
CH-794		Carroll Property, site	Charles County					0
CH-326-3		Casey Jones Restaurant	Town of La Plata					0
CH-733		Catherine Dyson Farm	Charles County					0
CH-86		Causine Manor, site	Charles County					0
CH-113		Cedar Grove	Charles County					0
CH-600		Cedar Hill Farm	Charles County					0
CH-769		Cedarville State Forest	Charles County					0
PG:85B-14		Cedarville State Forest	Charles County					0
CH-639		Cemetery (c. 1825-1954)	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-262		Centennial Hotel, site	Village of Port Tobacco					0
CH-124	Y	Chandler's Hope	Village of Port Tobacco					0
CH-835		Chandlers Hope Historical Marker	Town of La Plata					0
CH-247		Charles A. Boswell House	Charles County					0
CH-180		Charles C. Wilcox House	Charles County					0
CH-454		Charles County Board of Education Property	Charles County					0
CH-850		Charles County Chamber of Commerce	Town of La Plata					0
CH-559		Charles County Fairgrounds	Town of La Plata					0
CH-514		Charles H. Cox House	Charles County					0
CH-235		Charles H. Stonestreet Property	Charles County					0
CH-735		Charles Sweetney House	Charles County					0
CH-64		Charleston	Charles County					0
CH-291		Cherry Hill	Charles County					0
CH-209		Cherry Hill, site	Charles County					0
CH-110		Chicamuxen School	Charles County					0
CH-14		Chimney House	Village of Port Tobacco					0
CH-289		Christ Church Cemetery	Village of Port Tobacco					0
CH-62	Y	Christ Episcopal Church, Port Tobacco Parish	Town of La Plata					0
CH-171		Christ Episcopal Church, site	Village of Port Tobacco					0
CH-611		Clarence V. Burch House	Charles County					0
CH-944		Clifton Historical Marker	Charles County					0
CH-210		Coates Retirment, site	Village of Port Tobacco					0
CH-326-2		Commercial Building	Town of La Plata					0
CH-115		Compton House	Village of Port Tobacco					0
CH-746		Conrad Posey Property	Charles County					0
CH-317		Cooksey Tenant House	Charles County					0
CH-658		Cooksey/Dent Cemetery	Charles County					0
CH-608		Cooksey's Store	Charles County					0
CH-246		Cornelius & Elizabeth Johnson House	Charles County					0
CH-687		Corner Tavern	Charles County					0
CH-537		Cottage Home Farm	Town of La Plata					0
CH-316		County School House, site	Charles County					0
CH-36	Y	Crain's Lot	Charles County					0
CH-589		Crawford House	Town of Indian Head					0
CH-538		Creason House	Charles County					0
CH-766		Creeds Mill Road House	Charles County					0
CH-665		Croggett Cemetery	Charles County					0
CH-346		Crouche's Gift	Town of Indian Head					0
CH-695		Culvert	Town of La Plata					0
CH-696		Culvert	Town of La Plata					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-636		Culvert on Washington Avenue	Town of La Plata					0
CH-635		Culvert on Washington Avenue	Town of La Plata					0
CH-470		Damba Property	Charles County					0
CH-783		Daniel Property	Charles County					0
CH-755		Dawson Property	Charles County					0
CH-761		De Lozier Property	Town of Indian Head					0
CH-762		Deakins Property	Charles County					0
CH-508		Delange Robinson House	Charles County					0
CH-242		DeLange Robinson Property	Charles County					0
CH-812		Demarr Property	Charles County					0
CH-437		Dent Property	Charles County					0
CH-418		Denton Higgs Property	Charles County					0
CH-163		Dent's Meadow	Charles County					0
CH-40	Y	Dent's Palace	Charles County					0
CH-238		Diane Shelton Property	Charles County					0
CH-197		Digges' Mill, site	Charles County					0
CH-698		Ditchley	Charles County					0
CH-358		Doncaster State Forest Farmhouse and Garage	Charles County					0
CH-149		Dr. Samuel A. Mudd House	Charles County					0
CH-60		Dr. Spalding's Office	Town of La Plata					0
CH-654		Dubois Road School	Charles County					0
CH-489	Y	Dudley and Lyon's Department Store	Charles County					0
CH-660		Dwelling	Charles County					0
CH-655		Dwelling	Charles County					0
CH-601		Dwelling	Charles County					0
CH-928		Dwelling at Substation & Mattawoman Beantown Rds	Charles County					0
CH-670		Dyson Property	Town of La Plata					0
CH-320		Dyson-Mahoney Tenant House	Charles County					0
CH-509		Earl & Consuelo Gates Property	Charles County					0
CH-29		Efton Hills	Charles County					0
CH-257		Elijah Well's Print Shop, site	Village of Port Tobacco					0
CH-754		Elinor and Lee Reich House	Town of La Plata					0
CH-449		Elisha Jones Property	Charles County					0
CH-485		Elizabeth Canter Property	Charles County					0
CH-138	Y	Ellenborough	Charles County					0
CH-24	Y	Ellerslie	Village of Port Tobacco					0
CH-482		Elrod Property	Charles County					0
CH-363	Y	Emory Chapel (Methodist)	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-840		End of Winjon Place	Town of La Plata					0
CH-303		Englewood	Town of La Plata					0
CH-413		Enoch & Lydia Jones Farm	Charles County					0
CH-1025		Epp Farm	Charles County					0
CH-99	Y	Equality	Charles County					0
CH-95		Ernest E. Lyon House	Charles County					0
CH-632		Ernest M. Jameson House	Charles County					0
CH-758		Ernest Skinner Property	Charles County					0
CH-374	Y	Eugene Chaney House	Charles County					0
CH-135		Evergreen	Charles County					0
CH-995		Fairground Road Survey District	Town of La Plata					0
CH-896		Farm Complex	Town of La Plata					0
CH-816		Farm Complex at 7710 Crain Highway	Town of La Plata					0
CH-956		Faulkner Road and Lomax Road Survey District	Charles County					0
CH-474		Ferguson Property	Charles County					0
CH-483		Ferris Property	Charles County					0
CH-1004		Forest Park Subdivision	Charles County					0
CH-401		Francis D. & Mary Jo Quade Property	Charles County					0
CH-510		Francis R. Cope Property	Charles County					0
CH-330		Frank & Nannie Thomas House	Charles County					0
CH-439		Frank Canter Property	Charles County					0
CH-532		Frank P. Reynolds House	Village of Port Tobacco					0
CH-484		Frank Schultz Tobacco Barn and Stripping House, site	Charles County					0
CH-465		Frederick T. Bowling Property	Charles County					0
CH-689		Freeman-Swann House, Swann Farm	Charles County					0
CH-101	Y	Friendship Farm	Charles County					0
CH-27		Friendship Farm	Village of Port Tobacco					0
CH-602	Y	Gallant Green Store	Charles County					0
CH-870		Gardiner Barns	Town of La Plata					0
CH-312		George Barbour House, site	Charles County					0
CH-98		George Butler House	Charles County					0
CH-468		George J. Chappelear Property, site	Charles County					0
CH-656	Y	George J. Turner House	Charles County					0
CH-231		George Lyon Property	Town of La Plata					0
CH-743		George M. Lloyd Farmhouse	Charles County					0
CH-408		George M. Sullivan Property	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-737		George Purcell House	Charles County					0
CH-588		George Shlagel Farm	Charles County					0
CH-486		Gerhard King Property	Charles County					0
CH-564		Glen Albin Farm	Town of La Plata					0
CH-352		Goates Lodge	Town of La Plata					0
CH-576		Gold Mine Saloon	Charles County					0
CH-241		Golden Meadows Dairy Farm	Charles County					0
CH-722		Goode Hope Baptist Church Site & Cemetery	Charles County					0
CH-700		Grabis-Keech House	Charles County					0
CH-335		Gray Family Cemetery	Charles County					0
CH-529		Greenland	Charles County					0
CH-61		Green's Inheritance	Charles County					0
CH-911		Greensward Turf Farm	Charles County					0
CH-107		Greenway	Charles County					0
CH-165	Y	Greenweich Boundary Markers	Charles County					0
CH-295		Greenwood, ruins	Charles County					0
CH-779		Grosstown Tobacco Barn	Charles County					0
CH-28	Y	Gunston	Charles County					0
CH-421		Guy Property	Charles County					0
CH-479		Gwynn Property, site	Charles County					0
CH-118		Hadlow	Charles County					0
CH-711		Hadlow Tobacco Barn No. 1	Charles County					0
CH-712		Hadlow Tobacco Barn No. 2	Charles County					0
CH-412		Hamer-George Property	Charles County					0
CH-430		Hamilton Property	Charles County					0
CH-808		Hamilton Tobacco Barn	Charles County					0
CH-826		Hancock Farm	Town of La Plata					0
CH-473		Haneef Property	Charles County					0
CH-534		Hannon's Hard Bargain	Charles County					0
CH-160		Hanson Hill	Charles County					0
CH-41	Y	Hard Bargain	Charles County					0
CH-531		Hardship, site (Boarman's Rest)	Town of La Plata					0
CH-545		Harford Street/East Hawthorne Drive Survey District	Town of La Plata					0
CH-179		Harris Graves	Charles County					0
CH-731		Harris Lot Dance Hall	Charles County					0
CH-705		Harris Lot House	Charles County					0
CH-318		Harrison & Janie Dent House	Charles County					0
CH-94		Harry C. Rees House	Charles County					0
CH-614		Harry R. Bowling House	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-405		Harry S. & Edith R. Chappelear Property	Charles County					0
CH-402		Harry S. Chappelear Property I	Charles County					0
CH-444		Harry S. Chappelear Property II	Charles County					0
CH-803		Harry Wheatley Farm	Town of La Plata					0
CH-132		Harwood	Village of Port Tobacco					0
CH-187		Hawkins Cemetery	Town of La Plata					0
CH-306		Hawkins' Log House	Charles County					0
CH-50		Hawthorne	Town of La Plata					0
CH-802		Hazzard's Addition	Charles County					0
CH-475		Henry A. Canter Property	Charles County					0
CH-615		Henry D. Middleton House	Charles County					0
CH-161		Henry H. Bowie House	Charles County					0
CH-630		Herber & Naomi Roberts House	Charles County					0
CH-119	Y	Herbert House	Charles County					0
CH-763	Y	Hetty and Tom Wright House	Charles County					0
CH-653		Hildabrand House	Charles County					0
CH-321		Hill House	Charles County					0
CH-931		Historical Marker- The Monastery	Town of La Plata					0
CH-340		Holly Cut	Charles County					0
CH-21	Y	Holly Hall	Charles County					0
CH-109	Y	Holly Springs	Charles County					0
CH-784		Home Place Property	Town of La Plata					0
CH-410		Hotel Charles Property	Charles County					0
CH-565		House	Charles County					0
CH-570		House	Charles County					0
CH-573		House	Town of La Plata					0
CH-557		House	Town of La Plata					0
CH-558		House	Town of La Plata					0
CH-574		House	Charles County					0
CH-395		House	Charles County					0
CH-394		House	Charles County					0
CH-578		House	Charles County					0
CH-579		House	Charles County					0
CH-556		House	Charles County					0
CH-212		House in Boarman's Manor	Charles County					0
CH-145		House near Ironsides	Charles County					0
CH-200		House near Longevity, site	Charles County					0
CH-96		House Near Ludlow's Ferry Site (or Laidlow's Ferry)	Charles County					0
CH-228		House near St. Paul's Church, ruins	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-866		House on west side of Crain Hwy, south of Promfret Rd, site	Charles County					0
CH-146		House, site	Town of La Plata					0
CH-260		House, site	Village of Port Tobacco					0
CH-429		Howard Property	Charles County					0
CH-1019		Howard W. Rye Farm	Charles County					0
CH-609		Howell's Run	Charles County					0
CH-19	Y	Huckleberry	Charles County					0
CH-1028		Huntt Family Cemetery	Charles County					0
CH-125		Hydramont	Charles County					0
CH-114		Ice Hill	Town of La Plata					0
CH-93		Irene Coulby House	Charles County					0
CH-415		Iserman Property, site	Charles County					0
CH-686		Issue Store and Post Office	Charles County					0
CH-409		J. Ollie Quade Property	Charles County					0
CH-716		J. Thomas Scott House	Charles County					0
CH-807		J. Warren Jameson Farm	Charles County					0
CH-741		James and Margaret Bowling Property	Charles County					0
CH-411		James G. & Mary S. Farrall Property	Charles County					0
CH-397		James L. & Gertrude A. Russell Property	Charles County					0
CH-480		James T. Lyon Property	Charles County					0
CH-70		Jameson House	Town of La Plata					0
CH-648	Y	Jameson Tenant Farm	Charles County					0
CH-683		Jameson-Moran House	Charles County					0
CH-322		Jameson-Tolson House	Charles County					0
CH-517		Jamieson House	Village of Port Tobacco					0
CH-307		Janifer House	Charles County					0
CH-367		Jenkins Farm Tobacco Barn	Charles County					0
CH-254		Jenkins House, site	Village of Port Tobacco					0
CH-472		Jennings Cross Property	Charles County					0
CH-452		Jennings Hamilton Property	Charles County					0
CH-236		Jeremiah T. Mudd Property	Charles County					0
CH-469	Y	Jesse M. Herbert Property	Charles County					0
CH-462		Jhaveri Property	Charles County					0
CH-886		Joe's Automotive Service Center	Town of La Plata					0
CH-422		John & Ethel Roberts Prop.	Charles County					0
CH-223		John B. McFerrin Memorial Methodist Episcopal Church and Parsonage	Town of La Plata					0
CH-447		John E. A. Nutwell Property	Charles County					0
CH-747		John Farr Farmhouse	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-652		John Grabis Property, site	Charles County					0
CH-359		John Grinder Farm	Charles County					0
CH-736		John Henry Kelly House	Charles County					0
CH-518		John Miller House	Town of La Plata					0
CH-511		John W. Albrittain Property	Town of La Plata					0
CH-427		Johnson Property	Charles County					0
CH-348		Johnsontown	Town of La Plata					0
CH-332		Johnsontown Barn	Town of La Plata					0
CH-742		Johnsontown Tobacco Barn No. 2	Town of La Plata					0
CH-629		Joseph & Nellie Lyon House	Town of Indian Head					0
CH-143	Y	Joseph C. Parks House	Charles County					0
CH-757	Y	Joseph Gray House-	Charles County					0
CH-791		Joseph H. Howard Property	Charles County					0
CH-141		Joseph H. Penn House	Charles County					0
CH-740		Joseph Hayden House, site	Charles County					0
CH-159		Joseph Smith House	Charles County					0
CH-84		Julia Garner House, site	Town of La Plata					0
CH-525		Kabin-on-a-Korner Tavern	Charles County					0
CH-417		Katherine Chappelear Property	Charles County					0
CH-550		Kent Avenue Survey District	Town of La Plata					0
CH-162		Key House	Village of Port Tobacco					0
CH-506		Knights of St. John Property, site	Town of La Plata					0
CH-3		La Grange	Town of La Plata					0
CH-351	Y	La Plata Railroad Station	Town of La Plata					0
CH-258		Lacey's Store, site	Village of Port Tobacco					0
CH-280		Lacy House, site	Village of Port Tobacco					0
CH-561		Lafayette Motel	Charles County					0
CH-901		Langley Farm	Charles County					0
CH-370		Laurel Branch (site)	Charles County					0
CH-240		Lemoine Wilkerson Property	Charles County					0
CH-520		Leo C. Bowie's General Store	Town of La Plata					0
CH-438		Lewis S. & Frances A. Jenkings Property	Charles County					0
CH-48		Linden	Town of La Plata					0
CH-788		Lizzie Smoot House, site	Charles County					0
CH-43		Loch Leven	Charles County					0
CH-185		Locust Grove	Town of La Plata					0
CH-353	Y	Locust Grove	Charles County					0
CH-605		Locust Grove	Charles County					0
CH-137		Locust Hill	Charles County					0
CH-71		Longevity	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-71A		Longevity Carriage House	Charles County					0
CH-338		Luckett's Hazard (Demolished)	Charles County					0
CH-407		Lucy C. Higdon Property	Charles County					0
CH-456		Lukenich Property	Charles County					0
CH-207		Mansion Hall, ruins	Charles County					0
CH-551		Maple Avenue Survey District	Town of La Plata					0
CH-771		Marbury Church of God Rectory	Charles County					0
CH-785		Marbury Historic District	Charles County					0
CH-406		Maria Steffers Property	Charles County					0
CH-433		Maria Wade Property	Charles County					0
CH-56		Market Overton	Charles County					0
CH-591		Marshall House	Town of La Plata					0
CH-140	Y	Marshall's Rest Property	Charles County					0
CH-414		Mary E. Bowling Farm	Charles County					0
CH-416		Mary E. Bowling Property	Charles County					0
CH-404		Mary I.H. Neave Property	Charles County					0
CH-432		Mary Shipley Ryan Property	Charles County					0
CH-597		Maryland Airport	Town of Indian Head					0
CH-633		Maryland Department of Transportation State Highway Administration Building	Town of La Plata					0
CH-275		Maryland Independent Newspaper Building, site	Village of Port Tobacco					0
CH-777		Maryland Point Mission, ruin	Charles County					0
CH-750		Maryland Tobacco Growers' Association Building	Charles County					0
CH-455		Matin Property	Charles County					0
CH-279		Matthews' House, site	Village of Port Tobacco					0
CH-196		Maxwell Hall	Charles County					0
CH-539		Medley Farmhouse, Part of Laurel Branch	Charles County					0
CH-610		Middleton Farm Tenant House	Charles County					0
CH-581		Midway RV Supply	Charles County					0
CH-463		Mileposts along the Southern Maryland Railroad (2)	Charles County					0
CH-58		Mill Hill Road House	Charles County					0
CH-798		Milstead House	Charles County					0
CH-464		Milstead Property	Charles County					0
CH-714		Milton Somers House	Town of La Plata					0
CH-342		Molly's Delight	Charles County					0
CH-453		Moran Property	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-220		Morgan House	Charles County					0
CH-723		Morgantown Road House	Charles County					0
CH-776		Mount Hope Baptist Church	Charles County					0
CH-298	Y	Mount Pleasant	Charles County					0
CH-208		Mount Pleasant	Charles County					0
CH-17		Mount Republican	Charles County					0
CH-52		Mt. Carmel Monastery	Town of La Plata					0
CH-82		Mt. Eagle	Charles County					0
CH-81		Mt. Tirzah	Charles County					0
CH-69		Mt. Zephyr	Town of La Plata					0
CH-83		Mulberry Grove	Village of Port Tobacco					0
CH-768		Murdock Property	Charles County					0
CH-596		Murray House	Town of La Plata					0
CH-355	Y	Nanjemoy Baptist Church	Charles County					0
CH-780		Nanjemoy High School	Charles County					0
CH-1006		Naval Research Laboratory - Pomonkey Nike Missile Battery W-54	Town of La Plata					0
CH-753		Nazarene Cemetery	Town of Indian Head					0
CH-571		Newburg Crossroads Survey District	Charles County					0
CH-218		Newport Hall	Charles County					0
CH-786		Newport Historic District	Charles County					0
CH-726		Newport Store	Charles County					0
CH-677		Nike Missile Battery Waldorf	Charles County					0
CH-516		Nordean Jackson House	Charles County					0
CH-198		Normandie, site	Town of La Plata					0
CH-201		Norris House	Charles County					0
CH-713		Norwood	Charles County					0
CH-553		Oak Avenue Survey District	Town of La Plata					0
CH-775		Oak Grove Baptist Church Site and Cemetery	Charles County					0
CH-678		Oak Ridge Park Barns	Charles County					0
CH-195		Oakland	Charles County					0
CH-664		Oakland Cemetery/Calvary United Methodist Church Cemetery	Charles County					0
CH-63	Y	Old Durham Church	Charles County					0
CH-851		Old Durham Church Historic Marker	Town of La Plata					0
CH-112	Y	Old Fields Chapel	Charles County					0
CH-8		Old Friendship	Town of La Plata					0
CH-221		Old House Near Allens Fresh	Charles County					0
CH-501		Old Mill Swamp Farm	Charles County					0
CH-500		Old Shiloh Church & Cemetery	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-391		Old Waldorf School	Charles County					0
CH-623		Old Waldorf Theater	Charles County					0
CH-584		Old Washington Road Survey District 3500-3600 Blocks	Charles County					0
CH-583		Old Washington Survey District 2900-3000 Blocks	Charles County					0
CH-607		Olivers Shop School	Charles County					0
CH-575		Ott's Market	Charles County					0
CH-906		Outbuildings at 12595 Poplar Hill Road	Charles County					0
CH-282		Owens House, site	Village of Port Tobacco					0
CH-519		Padgett House; Part of St. John's	Village of Port Tobacco					0
CH-513	Y	Padgett-Posey House	Town of La Plata					0
CH-244		Page Property	Charles County					0
CH-232	Y	Page Schoolhouse Property	Town of La Plata					0
CH-592		Parker House, site	Town of La Plata					0
CH-544		Parkway Motel, La Plata's Peddler's Paradise	Town of La Plata					0
CH-122		Patuxent City House	Charles County					0
CH-895		Pender Road Residence	Town of La Plata					0
CH-239		Philip A Sasscer Property	Charles County					0
CH-216		Phoenix Hall	Charles County					0
CH-467		Pilkerton Property, site	Charles County					0
CH-76		Piney Church, site	Town of La Plata					0
CH-521		Pisgah Gas Station and Garage	Town of La Plata					0
CH-505	Y	Pisgah United Methodist Church	Town of La Plata					0
CH-523	Y	Pleasant Grove Baptist Church and Cemetery	Town of Indian Head					0
CH-301	Y	Pleasant Hill	Charles County					0
CH-78		Pleasant Hill	Charles County					0
CH-77	Y	Plenty	Village of Port Tobacco					0
CH-100		Pomfret Colored School	Charles County					0
CH-150		Pomfret Road House, site	Charles County					0
CH-524		Pomonkey Elks Lodge	Town of Indian Head					0
CH-676		Pomonkey Nike Missile Site	Charles County					0
CH-1021		Pomonkey Survey District	Town of Indian Head					0
CH-248		Poplar Hill	Charles County					0
CH-169		Port Tobacco Courthouse	Village of Port Tobacco					0
CH-172		Port Tobacco Jail, site	Village of Port Tobacco					0
CH-126		Port Tobacco Schoolhouse	Village of Port Tobacco					0
CH-73	Y	Preference	Town of La Plata					0
CH-225		Prior's Cleave	Charles County					0
CH-814		Quarles Property	Town of La Plata					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-858		Queen Victoria Street	Town of La Plata					0
CH-268		Queensel House, site	Village of Port Tobacco					0
CH-428		Randall Property	Charles County					0
CH-458		Raymond & Martha Hitch Property	Charles County					0
CH-620		Reeves Chapel Site, Old St. Peter's Cemetery	Charles County					0
CH-612		Renner House	Charles County					0
CH-638		Restaurants	Town of La Plata					0
CH-177		Rich Hill	Charles County					0
CH-341		Richard Bland House	Charles County					0
CH-1024		Robertson Farm Log Tenant House	Charles County					0
CH-515		Roby House	Charles County					0
CH-105		Rosemary Lawn	Charles County					0
CH-310		Ross-Hancock House, ruins	Charles County					0
CH-339	Y	Rowe House	Town of La Plata					0
CH-799		Ruin north of Bryantown Road	Charles County					0
CH-400		S.M.D. Land, Inc. Property	Charles County					0
CH-552		Sacred Heart Catholic Church Parsonage	Town of La Plata					0
CH-634		Sacred Heart Cemetery	Town of La Plata					0
CH-939		Salem barns	Town of La Plata					0
CH-644	Y	Sam Montgomery House	Charles County					0
CH-155		Samuel Freeman House	Charles County					0
CH-522		Sandy Field Farmhouse	Town of Indian Head					0
CH-434		Sarah E. & George W. Cross Property	Charles County					0
CH-142		Sarah Gross House	Charles County					0
CH-448		Sarah V. & Stouten H. Canter Property	Charles County					0
CH-420		Sewell Property	Charles County					0
CH-364		Shiloh Cemetery	Charles County					0
CH-365		Shiloh Community United Methodist Church Property	Charles County					0
CH-787	Y	Shiloh Historic District	Charles County					0
CH-580		Shooters Bar & Grill	Charles County					0
CH-728		Simms' Store	Charles County					0
CH-626		Simms/Burch House	Charles County					0
CH-657	Y	Simpkin Coatback	Charles County					0
CH-1018		Simpson Tobacco Barn	Charles County					0
CH-720		Simpson's Supply Tobacco Barn	Charles County					0
CH-219		Sine House	Charles County					0
CH-311		Sinkfield Log House	Charles County					0
CH-1023		Skinner-Stromatt Family Cemetery	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-599		Slater House	Town of La Plata					0
CH-606		Sleepy Hollow	Charles County					0
CH-680		Small Structure 8026XO	Charles County					0
CH-801		Small Structure No. 08018X0	Charles County					0
CH-12	Y	Smallwood's Retreat	Charles County					0
CH-362		Smith's Chapel (Methodist)	Charles County					0
CH-659		Smoot Graves	Charles County					0
CH-259		Smoot Hall, site	Village of Port Tobacco					0
CH-790		Smoot Property	Charles County					0
CH-276		Smoot Warehouse, site	Village of Port Tobacco					0
CH-37	Y	Society Hill	Charles County					0
CH-955		South Faulkner Road Survey District	Charles County					0
CH-759		Southerland House and Store	Charles County					0
CH-756		Southerland-Washington House	Charles County					0
CH-577		Southern Maryland Crisis Pregnancy Center	Charles County					0
CH-563		Southern Maryland Oil Company Building	Charles County					0
CH-674		Southern Maryland Railroad	Charles County					0
CH-549		Southwinds Motel	Town of La Plata					0
CH-227		Sparks-Mudd Log House, ruin	Charles County					0
CH-748		Spring Hill	Town of La Plata					0
CH-183		Spring House or Well House	Village of Port Tobacco					0
CH-149A		St. Catharine Farm, Agricultural Buildings	Charles County					0
CH-97	Y	St. Ignatius of Loyola Church, Hill Top	Town of La Plata					0
CH-7		St. Ignatius Roman Catholic Church	Charles County					0
CH-7A		St. Ingnatius Church, Slave Quarters	Charles County					0
CH-217		St. John's	Town of La Plata					0
CH-366	Y	St. John's Chapel	Charles County					0
CH-250		St. John's Chapel Cemetery	Town of La Plata					0
CH-245		St. John's Farm	Charles County					0
CH-20		St. Mary's Roman Catholic Church	Charles County					0
CH-46		St. Mary's Roman Catholic Church and Cemetery	Charles County					0
CH-186	Y	St. Matthew's Methodist Church	Town of La Plata					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-940		Stable at 7535 Sutton Drive	Town of La Plata					0
CH-934		Stable with modern house	Town of La Plata					0
CH-471		Stanley Cross Property	Charles County					0
CH-619		Stardust Inn	Charles County					0
CH-154		Steepside	Charles County					0
CH-326-1		Steffens Building	Town of La Plata					0
CH-440		Stella Property	Charles County					0
CH-168		Stoddert Cemetery (at Southhampton)	Charles County					0
CH-26		Stone's Throw	Village of Port Tobacco					0
CH-269		Store, site	Village of Port Tobacco					0
CH-274		Store, site	Village of Port Tobacco					0
CH-273		Store, site	Village of Port Tobacco					0
CH-272		Store, site	Village of Port Tobacco					0
CH-398		Stratchko Property I	Charles County					0
CH-399		Stratchko Property II, site	Charles County					0
CH-127		Strawberry Hill, site	Charles County					0
CH-643		Structure 08033XO, Culvert	Charles County					0
CH-423		Sullivan Property	Charles County					0
CH-426		Susan J. Chappelear Property	Charles County					0
CH-333		Swann House	Town of La Plata					0
CH-261		Swann House, site	Village of Port Tobacco					0
CH-685		Swann Tenant House	Charles County					0
CH-793		Teagues Point Road Property, site	Charles County					0
CH-299		The Exchange	Town of La Plata					0
CH-548		The Maryland Army and National Guard Armory	Town of La Plata					0
CH-108	Y	The Napping	Charles County					0
CH-10	Y	The Retreat	Village of Port Tobacco					0
CH-377	Y	Thomas Brown Log Dwelling	Town of Indian Head					0
CH-730		Thomas Darnall Farm	Charles County					0
CH-478		Thomas Property, site	Charles County					0
CH-461		Thomas R. Bowling Property	Charles County					0
CH-502		Thompson Property	Charles County					0
CH-946		Three barns	Charles County					0
CH-625		Tippett House	Charles County					0
CH-357		Tobacco Barn (at The Exchange)	Town of La Plata					0
CH-555		Tomorrow's Heirlooms	Charles County					0
CH-87		Tompkinsville House	Charles County					0
CH-729		Tompkinsville Store and Post Office	Charles County					0
CH-123	Y	Trinity Episcopal Church	Charles County					0
CH-294		Trinity Lake House	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-22		Truman's Place	Charles County					0
CH-869		Turkey Hill Rd House & Barn	Town of La Plata					0
CH-765		Twiford's Store	Charles County					0
CH-167		Unidentified	Charles County					0
CH-266		Unidentified, site	Village of Port Tobacco					0
CH-392		Unoccupied house behind 7460 Bensville Road	Charles County					0
CH-590		Van Scoder House	Town of Indian Head					0
CH-594		Viars House	Town of La Plata					0
CH-222		Victorian House	Charles County					0
CH-176		Victorian Store Building	Charles County					0
CH-767		Vincent and Gertrude Simmons House	Charles County					0
CH-967		Virgo Road Property	Charles County					0
CH-813		Vliet Property	Town of La Plata					0
CH-435	Y	W.H. Winstead Co., Inc. Property	Charles County					0
CH-253		W.W. Padgett's Store, site	Village of Port Tobacco					0
CH-263		Wade House, site	Village of Port Tobacco					0
CH-1005		Wade Tobacco Barn	Village of Port Tobacco					0
CH-133		Wade's Store	Charles County					0
CH-264		Wade's Store, site	Village of Port Tobacco					0
CH-1003		Waldorf Motel and Restaurant complex	Charles County					0
CH-1029		Waldorf Nike Missile Battery Housing Complex	Charles County					0
CH-624		Waldorf Store and Post Office	Charles County					0
CH-805		Waldorf Tobacco Warehouse	Charles County					0
CH-345		Walker House	Town of La Plata					0
CH-673		Wallace Bowling Farm Property	Charles County					0
CH-431		Warriner Property	Charles County					0
CH-1002		Warrlinda Subdivision	Town of La Plata					0
CH-547		Washington Avenue Survey District	Town of La Plata					0
CH-188		Washington's Farm	Charles County					0
CH-717		Wathan House	Charles County					0
CH-749		Wathan-Stonestreet Property	Charles County					0
CH-809		Watson Road Property, ruin	Charles County					0
CH-752		Welcome Firetower	Charles County					0
CH-646		Wentworth	Charles County					0
CH-249		West House	Charles County					0
CH-156	Y	Western View	Town of La Plata					0
CH-965		Wheeler Property	Charles County					0

MIHPNO	National Register Eligible	Name	Jurisdiction	Flood (2)	Erosion (1)	Landslide (1)	Wildfire (1)	Priority
CH-959		Wheeler's Barbershop and Café	Charles County					0
CH-72		White Hall	Charles County					0
CH-567		White House Motel	Charles County					0
CH-616		White Marsh Farm	Charles County					0
CH-237		White Plains Livestock Farm	Charles County					0
CH-792		Wicomico Beach Road Tenant House	Charles County					0
CH-744		Wicomico Feed and Flour Mill	Charles County					0
CH-92		Wicomico Knolls, site	Charles County					0
CH-373		Widow's Pleasure	Charles County					0
CH-797	Y	Wigwam	Charles County					0
CH-649		Wilford Meadow Cottage	Charles County					0
CH-536		Willett Farmhouse, Part of Green's	Charles County					0
CH-265		William (Billy) Wade House, site	Village of Port Tobacco					0
CH-1007		William A. Roberts, Jr. Property	Charles County					0
CH-481		William E. Burch Property	Charles County					0
CH-445	Y	William G. Chappelear Property	Charles County					0
CH-727		William Hess House	Charles County					0
CH-233		William Marshall Property I	Charles County					0
CH-234		William Marshall Property II	Charles County					0
CH-331		William Ross House	Charles County					0
CH-666		William Woodburn House	Charles County					0
CH-546		Willing Helper's Society Hall	Town of La Plata					0
CH-252		Wilmer House, site	Village of Port Tobacco					0
CH-343		Wilton	Charles County					0
CH-292		Wiltshire Plains	Charles County					0
CH-568		Wise's Market and Service Station	Charles County					0
CH-804		Woodville Road House	Charles County					0
CH-975		Xtra Fuels	Charles County					0
PG:87A-24		Young House at Woodborough	Charles County					0
CH-460		Zantzinger Property	Charles County					0
CH-795		Zion Baptist Church and Cemetery	Charles County					0

Appendix E – HAZUS

Hazus: Flood Global Risk Report

Region Name: Flood_Charles

Flood Scenario: 1pct

Print Date: Thursday, November 16, 2023

Disclaimer:
Totals only reflect data for those census tracts/blocks included in the user's study region.

The estimates of social and economic impacts contained in this report were produced using Hazus loss estimation methodology software which is based on current scientific and engineering knowledge. There are uncertainties inherent in any loss estimation technique. Therefore, there may be significant differences between the modeled results contained in this report and the actual social and economic losses following a specific Flood. These results can be improved by using enhanced inventory data and flood hazard information.

FEMA

RiskMAP
Increasing Resilience Together

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General Description of the Region

Hazus is a regional multi-hazard loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences (NIBS). The primary purpose of Hazus is to provide a methodology and software application to develop multi-hazard losses at a regional scale. These loss estimates would be used primarily by local, state and regional officials to plan and stimulate efforts to reduce risks from multi-hazards and to prepare for emergency response and recovery.

The flood loss estimates provided in this report were based on a region that included 1 county(ies) from the following state(s):

- Maryland

Note:
Appendix A contains a complete listing of the counties contained in the region.

The geographical size of the region is approximately 44 square miles and contains 1,694 census blocks. The region contains over 59 thousand households and has a total population of 166,485 people. The distribution of population by State and County for the study region is provided in Appendix B.

There are an estimated 63,614 buildings in the region with a total building replacement value (excluding contents) of 27,752 million dollars. Approximately 92.00% of the buildings (and 75.53% of the building value) are associated with residential housing.

Building Inventory

General Building Stock

Hazus estimates that there are 63,614 buildings in the region which have an aggregate total replacement value of 27,752 million dollars. Table 1 and Table 2 present the relative distribution of the value with respect to the general occupancies by Study Region and Scenario respectively. Appendix B provides a general distribution of the building value by State and County.

Table 1
Building Exposure by Occupancy Type for the Study Region

Occupancy	Exposure ($1000)	Percent of Total
Residential	20,961,117	75.5%
Commercial	3,940,237	14.2%
Industrial	628,575	2.3%
Agricultural	24,948	0.1%
Religion	362,587	1.3%
Government	232,857	0.8%
Education	1,601,899	5.8%
Total	**27,752,220**	**100%**

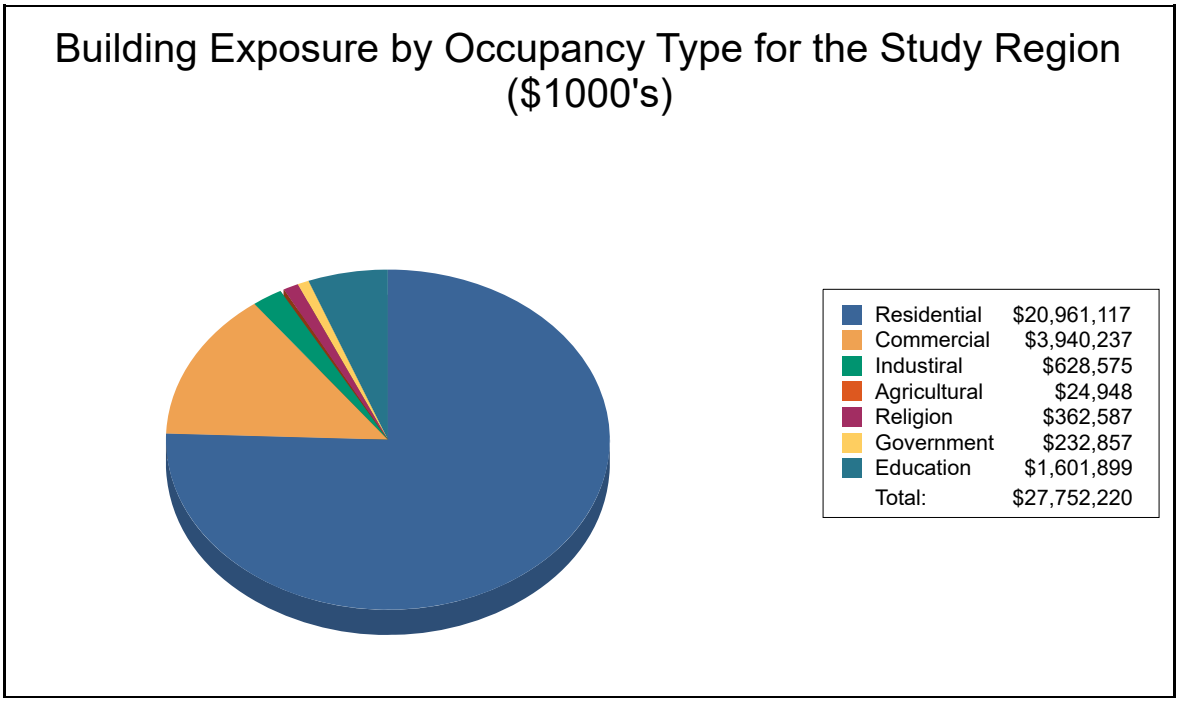
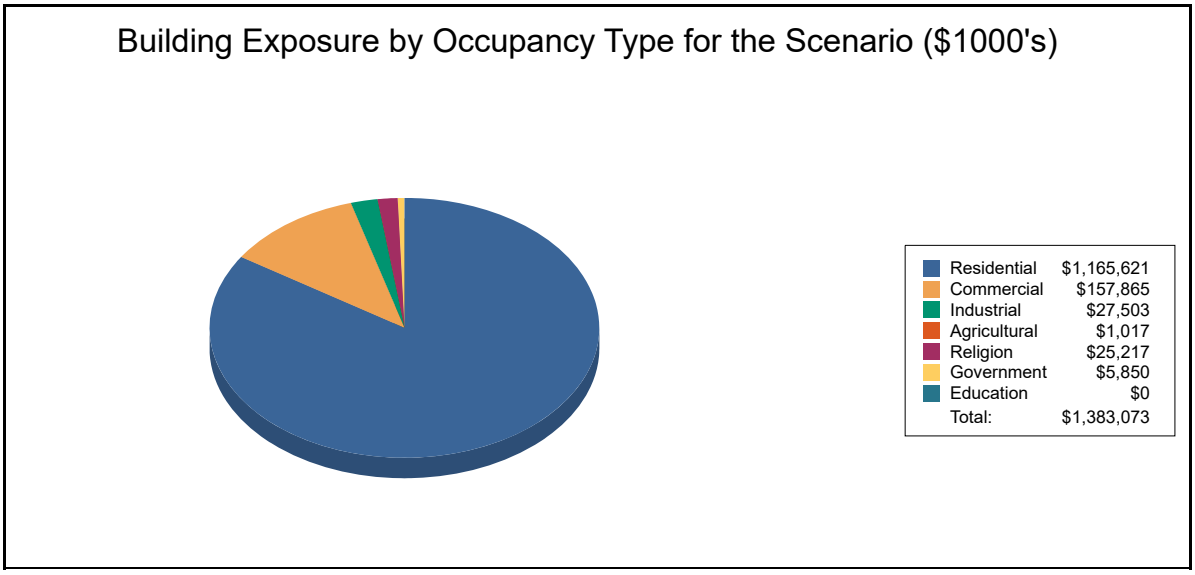


Table 2
Building Exposure by Occupancy Type for the Scenario

Occupancy	Exposure ($1000)	Percent of Total
Residential	1,165,621	84.3%
Commercial	157,865	11.4%
Industrial	27,503	2.0%
Agricultural	1,017	0.1%
Religion	25,217	1.8%
Government	5,850	0.4%
Education	0	0.0%
Total	**1,383,073**	**100%**



Essential Facility Inventory

For essential facilities, there are 1 hospitals in the region with a total bed capacity of 89 beds.
There are 55 schools, 14 fire stations, 8 police stations and 1 emergency operation center.

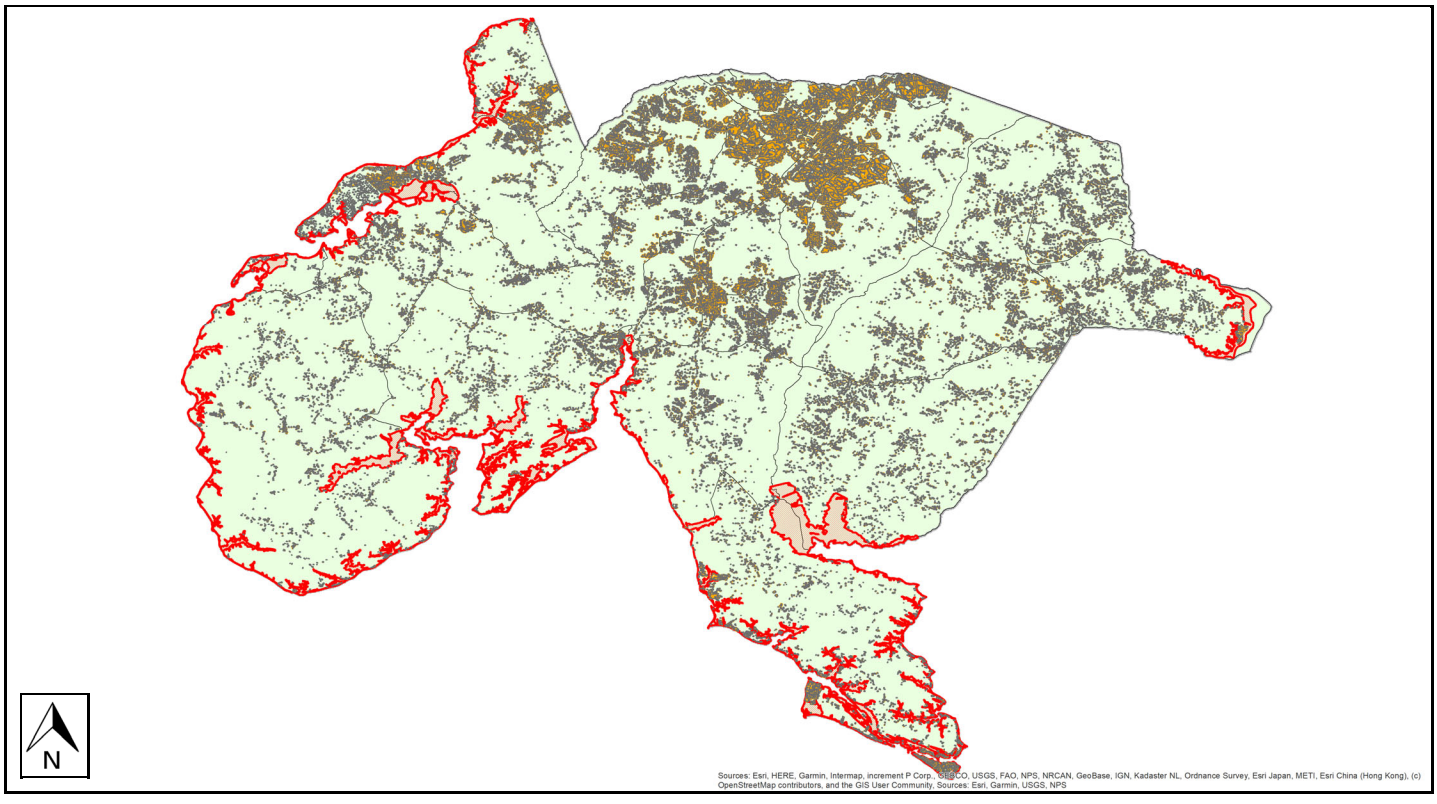
Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

Study Region Name:	Flood_Charles
Scenario Name:	1pct
Return Period Analyzed:	100
Analysis Options Analyzed:	No What-Ifs

Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



Building Damage

General Building Stock Damage

Hazus estimates that about 13 buildings will be at least moderately damaged. This is over 8% of the total number of buildings in the scenario. There are an estimated 5 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Flood Technical Manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 summarizes the expected damage by general building type.

Total Economic Loss (1 dot = $300K) Overview Map



Table 3: Expected Building Damage by Occupancy

	1-10		11-20		21-30		31-40		41-50		>50	
Occupancy	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**	**Count**	**(%)**
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	0	0	0	0	0	0	0	0	0	0	0	0
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	0	0
Industrial	0	0	0	0	0	0	0	0	0	0	0	0
Religion	0	0	0	0	0	0	0	0	0	0	0	0
Residential	1	7	6	43	2	14	0	0	0	0	5	36
Total	**1**		**6**		**2**		**0**		**0**		**5**	

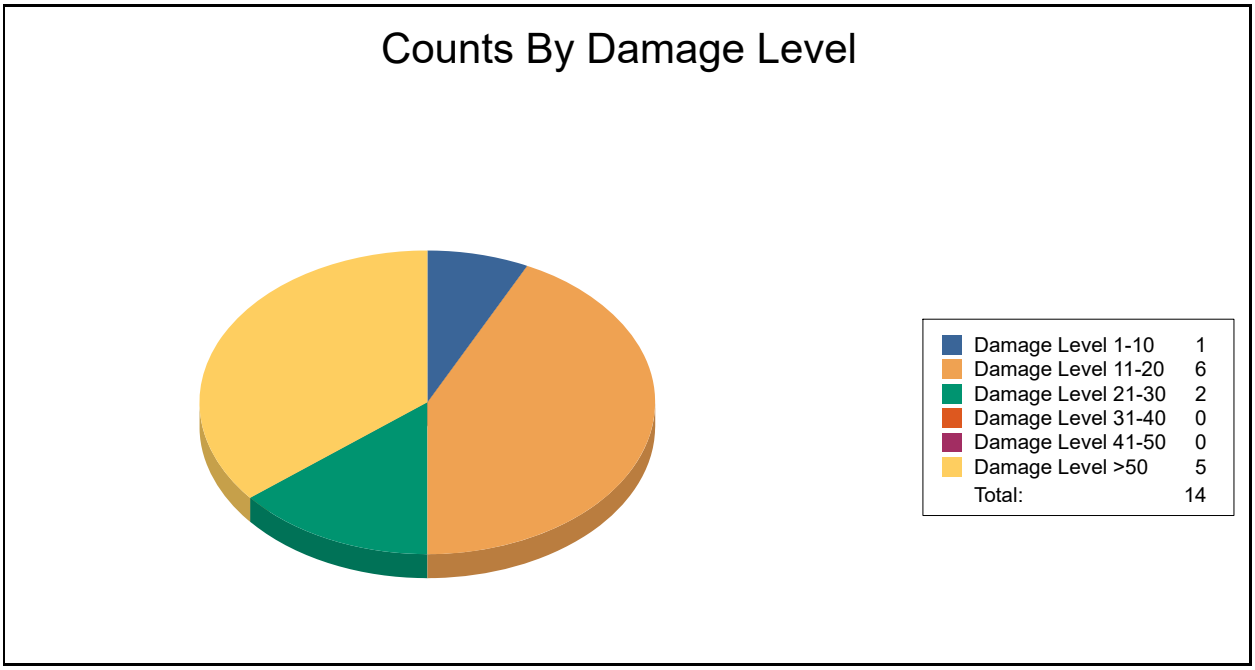




Table 4: Expected Building Damage by Building Type

Building Type	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	0	0	0	0	0	0	0	0	0	0	0	0
ManufHousing	0	0	0	0	0	0	0	0	0	0	0	0
Masonry	0	0	2	50	1	25	0	0	0	0	1	25
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	1	10	4	40	1	10	0	0	0	0	4	40

Essential Facility Damage

Before the flood analyzed in this scenario, the region had 89 hospital beds available for use. On the day of the scenario flood event, the model estimates that 89 hospital beds are available in the region.

Table 5: Expected Damage to Essential Facilities

		# Facilities		
Classification	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	1	0	0	0
Fire Stations	14	0	0	0
Hospitals	1	0	0	0
Police Stations	8	0	0	0
Schools	55	0	0	0

If this report displays all zeros or is blank, two possibilities can explain this.

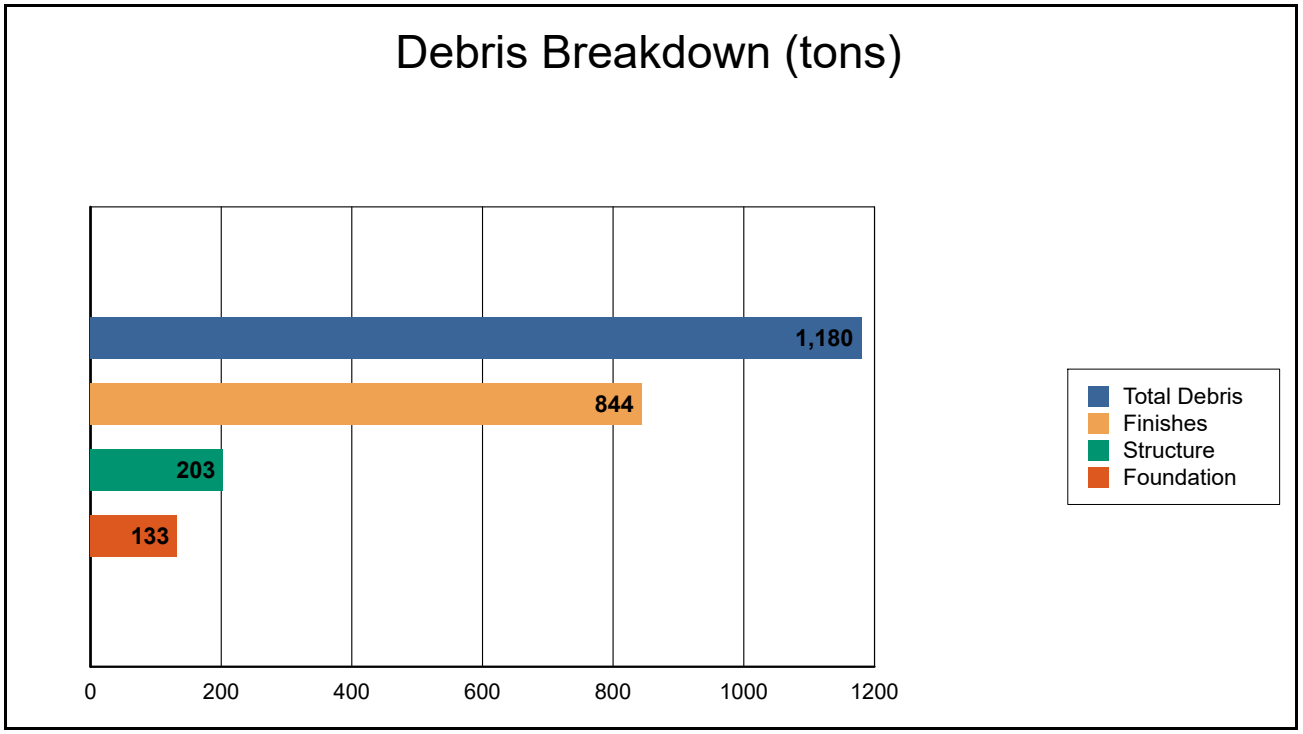
(1) None of your facilities were flooded. This can be checked by mapping the inventory data on the depth grid.

(2) The analysis was not run. This can be tested by checking the run box on the Analysis Menu and seeing if a message box asks you to replace the existing results.

Induced Flood Damage

Debris Generation

Hazus estimates the amount of debris that will be generated by the flood. The model breaks debris into three general categories: 1) Finishes (dry wall, insulation, etc.), 2) Structural (wood, brick, etc.) and 3) Foundations (concrete slab, concrete block, rebar, etc.). This distinction is made because of the different types of material handling equipment required to handle the debris.

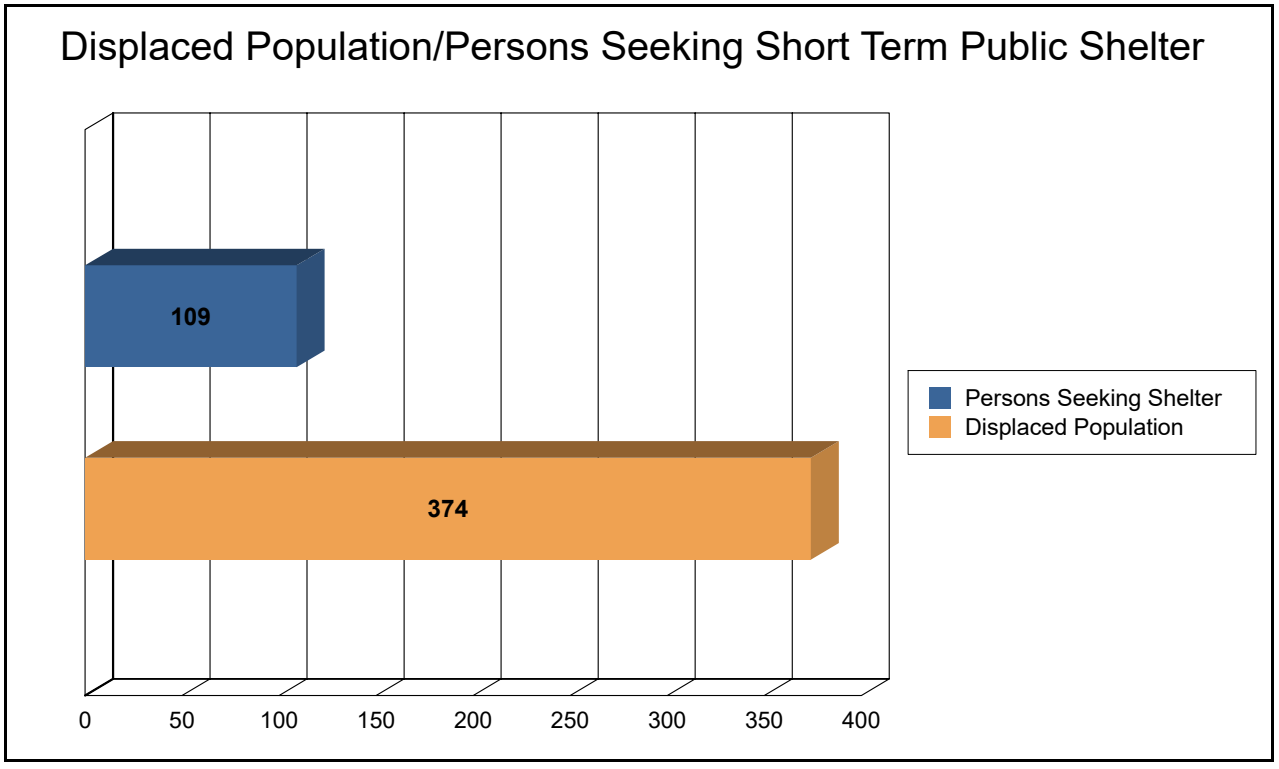


The model estimates that a total of 1,180 tons of debris will be generated. Of the total amount, Finishes comprises 71% of the total, Structure comprises 17% of the total, and Foundation comprises 11%. If the debris tonnage is converted into an estimated number of truckloads, it will require 48 truckloads (@25 tons/truck) to remove the debris generated by the flood.

Social Impact

Shelter Requirements

Hazus estimates the number of households that are expected to be displaced from their homes due to the flood and the associated potential evacuation. Hazus also estimates those displaced people that will require accommodations in temporary public shelters. The model estimates 125 households (or 374 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 109 people (out of a total population of 166,485) will seek temporary shelter in public shelters.



Economic Loss

The total economic loss estimated for the flood is 47.03 million dollars, which represents 3.40 % of the total replacement value of the scenario buildings.

Building-Related Losses

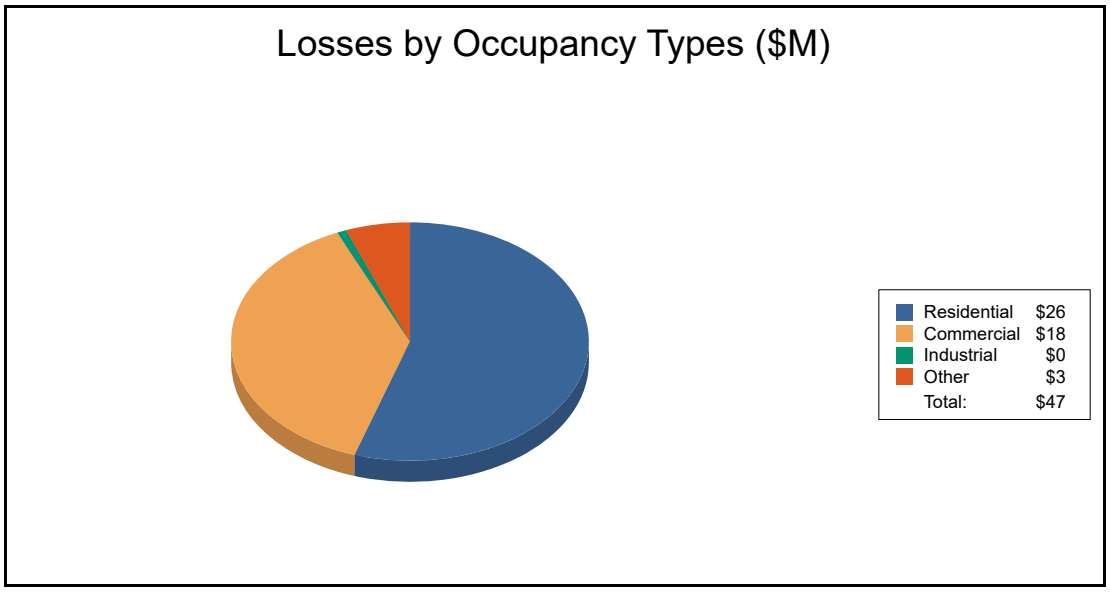
The building losses are broken into two categories: direct building losses and business interruption losses. The direct building losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the flood. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the flood.

The total building-related losses were 24.09 million dollars. 49% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 54.94% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.

Table 6: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
Building Loss						
	Building	12.51	0.90	0.09	0.02	13.52
	Content	7.66	2.37	0.17	0.14	10.33
	Inventory	0.00	0.20	0.03	0.01	0.23
	Subtotal	**20.17**	**3.46**	**0.29**	**0.17**	**24.09**
Business Interruption						
	Income	0.03	7.50	0.02	0.09	7.64
	Relocation	4.26	1.28	0.01	0.03	5.57
	Rental Income	1.31	0.98	0.00	0.00	2.29
	Wage	0.07	4.82	0.04	2.52	7.43
	Subtotal	**5.66**	**14.58**	**0.06**	**2.64**	**22.94**
ALL	**Total**	**25.84**	**18.04**	**0.35**	**2.81**	**47.03**





Appendix A: County Listing for the Region

Maryland

- Charles



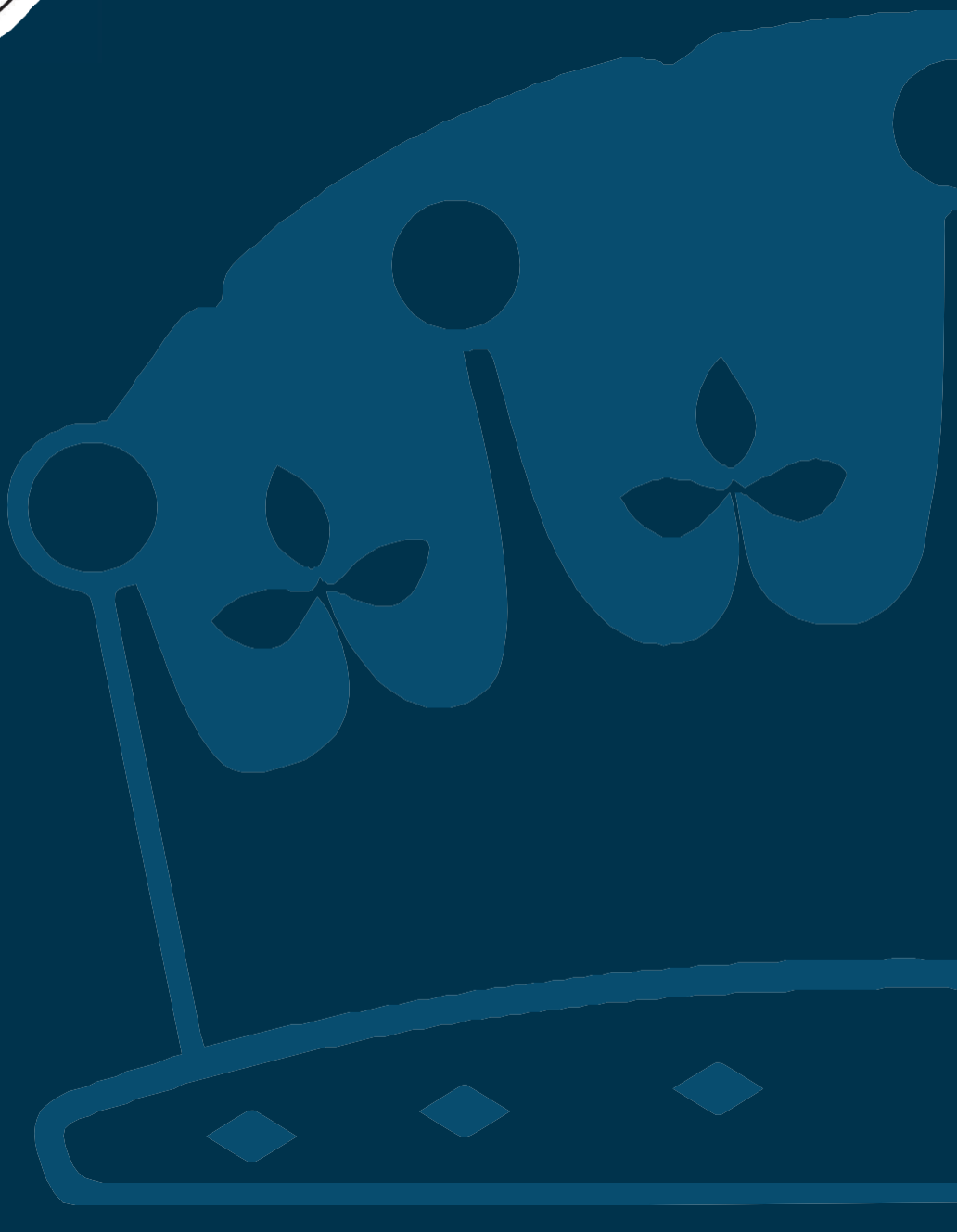
Appendix B: Regional Population and Building Value Data

		Building Value (thousands of dollars)		
	Population	Residential	Non-Residential	Total
Maryland				
Charles	166,485	20,961,117	6,791,103	27,752,220
Total	**166,485**	**20,961,117**	**6,791,103**	**27,752,220**
Total Study Region	**166,485**	**20,961,117**	**6,791,103**	**27,752,220**

Appendix F – 2024 Charles County Nuisance Flood Plan Update

CHARLES COUNTY NUISANCE FLOOD PLAN

10.2020 Updated
02.2024



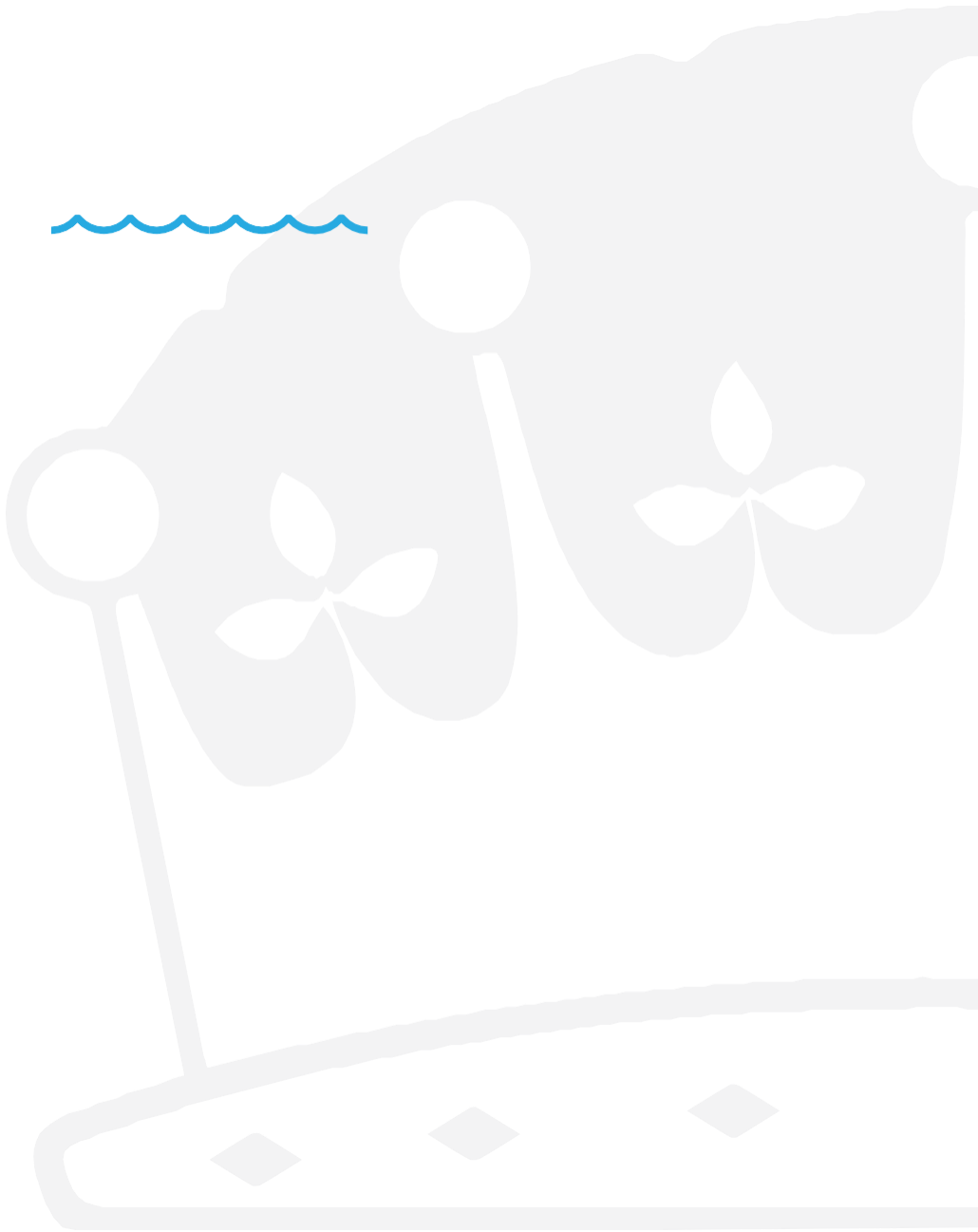


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Department of Planning & Growth Management
Department of Public Works
Maryland Emergency Management Agency
MD State Highway Administration
Charles County Volunteer Fire & EMS Associations
Port Tobacco River Conservancy
Town of La Plata
Town of Indian Head
Charles County Media Services
Charles County Sheriff's Office
College of Southern Maryland

Consultants

Maryland Environment Services
Michael Baker International
Smith Planning & Design

Update Summary

As part of the 2023 Charles County Hazard Mitigation Plan 2020 Nuisance Flood Plan was updated and amended. This document contains updates of efforts completed since the Nuisance Flood Plan was developed in 2020.

This document contains updates of efforts completed since the plan development in 2020.

The Charles County Resiliency Authority is a non-profit organization that was formed by the Maryland General Assembly and the Board of Charles County Commissioners in 2020. The purpose of the Resilience Authority is to respond to the impacts of climate change in communities across Charles County and the State. The following stormwater related flooding projects identified in the 2018 Nuisance and Urban Flood Plan are to be transferred from Charles County to the Resilience Authority of Charles County for analysis and completion:

4 - Bunty's Hill Road near Old Marshall Hall Road

5 - Rock Point Road in the area of Wayside Church

6 - Rock Point Road at Banks O'dee Road

7 - Pinewood Drive from Michael Road to Josephine Road

8 - Pinefield Road from Harwich Drive to Alfred Drive

10 - Old Washington Road_Pembrooke Square

11 - Action Lane near Crain Hwy_Right Lane next to bank

12 - Industrial Park Dr & Post Office Rd Intersection

13 - Garner Avenue between Fillmore Rd & Stone Ave

14 - Country Lane near Temi Drive Intersection

15 - Middletown Rd btw Blue Lake Place & Billingsley Rd

16 - Bunker Hill Road near Davis Road

17 - Turkey Hill Road

18 - Gallant Green Road_Unknown Cross Street

19 - Glen Albin Road Intersection with Oak Avenue

20 - Springhill Newton Road_Unknown Cross Street

22 - Pomfret Road at Hiker Biker Trail

23 - 3940 Dr. Samuel Mudd Road

24 - Popular Hill Road and St. Peters Church Road

27 - Rose Hill Road

28 - Bumpy Oak Road near Indian Head Rail Trail

29 - Crain Highway & Centennial Street Intersection

30 - Indian Head Highway (RT 210 N) at Lower Wharf Road

31 - Mt. Victoria Road near Black Friars

32 - Bel Alton Newtown Road & Oriole Lane Intersection

33 - Westdale Drive Townhomes

35 - Mill Creek Road after Benedict Avenue Intersection

36 - Dubois Road near AG Supply Place

37 - Billingsley Road at Duttons Bridge

38 - Mitchell Road near Hawthorne Road (RT 225)

40 - Port Tobacco Rd (MD 6) near Maryland Point Rd

41 - Chapel Point Road bt Causeway Street & Stagg Hall

42 - Cliffton Drive near Ingleside Drive

44 - Hancock Run Road near Bridge

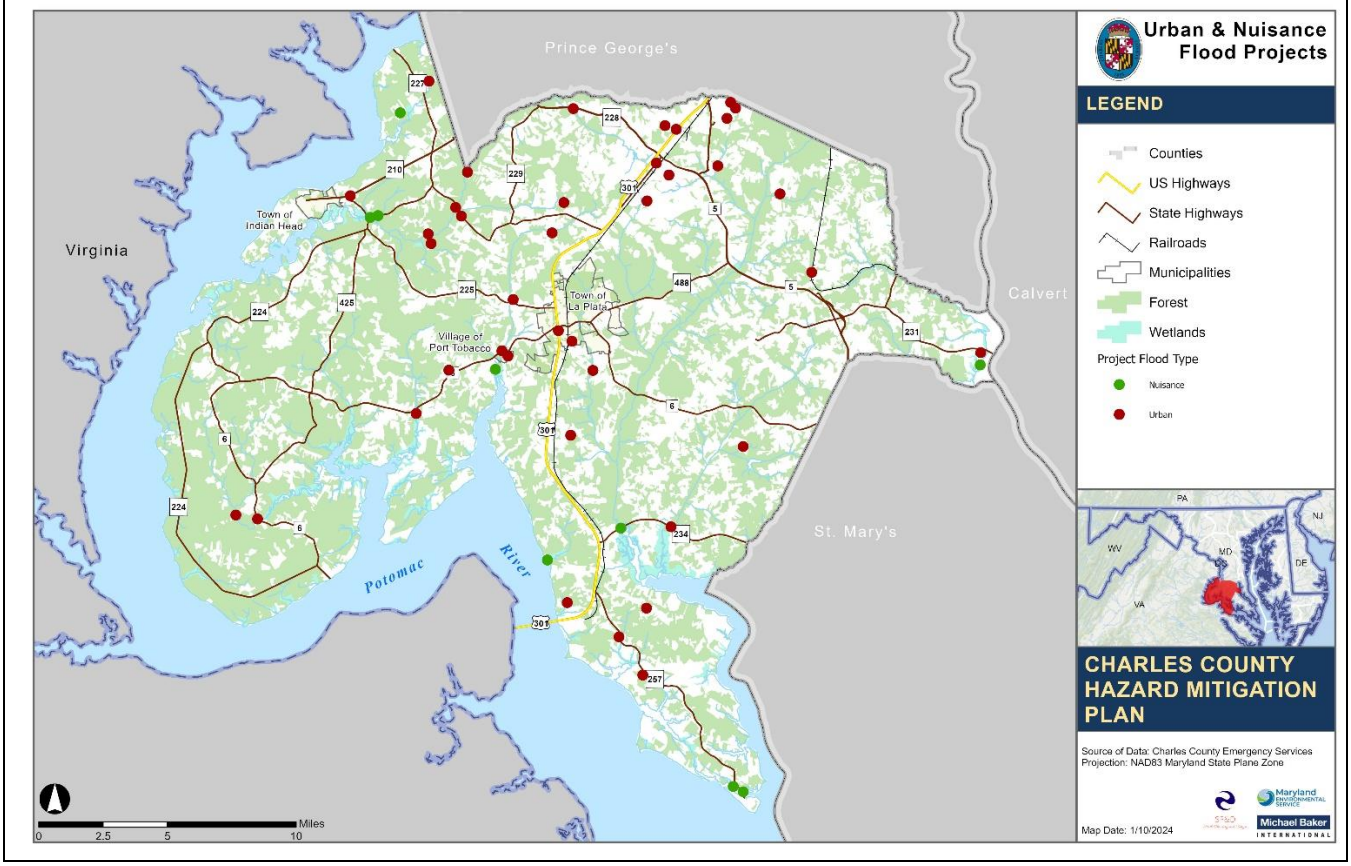
45 - Mill Swamp Road near Port Tobacco Road (RT 6)

46 - Burch Road near Port Tobacco Road (RT 6)

47 - Bumpy Oak Road bt Bridge & Rocky Creek Place

48 - Stine’s Store Road near Budds Creek Road (RT 234)

Map I: Urban & Nuisance Flood Projects



Since the *Nuisance and Urban Flood Plan* development in 2020, many steps have been taken toward mitigation of flood prone locations. Beginning in April of 2022, Charles County entered into agreements to begin analysis of three (3) areas within the Zekiah Watershed, that were identified in the *Charles County Urban and Nuisance Flood Plan.* This study analyzed the conditions causing the flooding utilizing existing U.S. Army Corps of Engineer's Hydrologic Engineering Center's River Analysis Systems (HEC-RAS) models, a SWMM model to analyze any storm sewer systems, to identify potential solutions(s) on a conceptual level to reduce or potentially eliminate flooding in the area. The study concentrated on addressing four (4) key objectives:

1. Analyze the cause(s) of flooding
2. Identify solutions that eliminate flooding, improve water quality, and account for future precipitation volumes.
3. Develop conceptual designs to guide implementation of solutions
4. Identify funding opportunities to implement solutions.

The assessments were completed in July of 2022. The following recommendations were proposed for the sites:

Old Washington Road and Pembrooke Square

- ✓ Drainage system improvements, revert impervious areas, and add Green Infrastructure and/or underground detention.

Industrial Park Drive and Post Office Road

- ✓ Drainage system improvements, replace 60” RCP with 58” x91’ elliptical reinforced concrete pipe and add green infrastructure.

Poplar Hill Road between St. Peters Church Road and Mattawoman Beantown Road

- ✓ Replace dual 60” corrugated metal pipe with dual 72” reinforced concrete pipe culverts, replace 22” high density polyethylene (HDPE) with 36” HDPE and stream restoration.

The Charles County Resilience Authority is in progress of identifying Department of Natural Resources grant funding opportunities to implement the above recommendations.

Beginning in April of 2023, Charles County entered into agreements to begin studying flood conditions along Fenwick Road and the Strawberry Hills community to identify potential solutions(s) on a conceptual level to reduce or potentially eliminate flooding in the area. The study concentrated on addressing four (4) key objectives:

1. Analyze the cause(s) of flooding
2. Identify solutions that eliminate flooding, improve water quality, and account for future precipitation volumes.
3. Develop conceptual designs to guide implementation of solutions
4. Identify funding opportunities to implement solutions.

The County will be completed with this initial phase of concept designs development by the end of calendar year 2024.

Introduction

The purpose of the nuisance flood plan is to identify sources of nuisance flooding, analyze flood hazards, and recommend actions to reduce flooding and increase community resiliency. While it was recommended that all jurisdictions within Maryland's Coastal Zone develop a Nuisance Flood Plan, Charles County recognizes both nuisance flooding within this document. It is crucial to address both nuisance flooding to increase resiliency, as both types of flooding affect the county.

Charles County Nuisance Problem Statement

Charles County, Maryland is experiencing flooding outside mapped floodplains with increasing frequency, including both nuisance flooding. Nuisance flooding is associated with high tides that flow back through the stormwater system, increasing/raising the level of groundwater, and overtopping the banks and edge of waterways. Nuisance flooding is an indicator of rising water levels in the Chesapeake Bay and its tributaries. Areas that were previously dry now flood during high tides because the water elevation is high enough to lap over the banks of waterways and to enter stormwater systems through outfalls that were previously high enough to prevent backflow, while allowing outflow. These challenges are compounded by what is becoming the new normal: an increase in the frequency and intensity of storms caused by higher global temperatures that increase evaporation in the ocean and atmosphere, creating more favorable conditions for heavier and more frequent precipitation. Increased runoff can contribute more nutrients, contaminants (e.g. oil, gasoline, antifreeze, among others) and sedimentation into the waterways and ultimately the Bay.

Nuisance Flooding Plan and Considerations

There is recognition by Maryland lawmakers, local and state governments, and citizens that tidally driven nuisance flood events are happening with more frequency. While nuisance flooding may not pose a serious threat or result in major damage, it interrupts and causes impacts to daily routines and can negatively impact commerce. 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 (Planning). This legislation is an update to Senate Bill 1006 and House Bill 1350 (2018). It is recommended that all jurisdictions, including municipalities, within Maryland's Coastal Zone develop a Nuisance Flood Plan even if they do not meet the requirements of the legislation. Charles County is located within the Maryland's Coastal Zone and is within the Chesapeake Bay Watershed Area.

Charles County, Maryland is experiencing flooding outside mapped floodplains with increasing frequency.

Nuisance Flooding



Nuisance flooding is associated with high tides that flow back through the stormwater system, increasing/raising the level of groundwater, and overtopping the banks and edge of waterways. Nuisance flooding is an indicator of rising water levels in the Chesapeake Bay and its tributaries. Areas that were previously dry now flood during high tides because the water elevation is high enough to lap over the banks of waterways and to enter stormwater systems through outfalls that were previously high enough to prevent backflow, while allowing outflow outside mapped floodplains with increasing frequency.

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."

Plan Purpose and Goals

The Plan will identify the sources and locations of nuisance flooding, provide an analysis of the hazard (e.g. frequency, duration, depth of flooding, and effects), and suggest recommended actions to reduce flooding and increase community resiliency. Developing the Plan will help make Charles County safer and more resistant to flood damage by nuisance flooding. The Plan will also fulfill the requirements set forth in Maryland House Bill 1427 (2019), §3-1018(b) and (c), which requires on or before October 1, 2020, that all local jurisdictions that experience nuisance flooding must develop a nuisance flood plan to address that flooding and update the plan every five years. To maintain the mandated update cycle, the Plan will be appended to become part of the County's 2023 Hazard Mitigation Plan Update, which must also be updated every five years.



Source:
https://dnr.maryland.gov/ccs/Documents/NuisanceFloodPlan.pdf

1. **To develop a Nuisance Flood Plan that will be adopted as a new Chapter into the Charles County Hazard Mitigation Plan.**

2. **To integrate the plan's mitigation actions into other County plans, programs, and land-use regulation to comprehensively address and resolve the issue.**

3. **To use a of variety of mitigation actions to address issues, including, but not limited to: education and outreach, watershed/stream restoration, green infrastructure solutions, best practices which may include both construction (capital) and ordinance/zoning-related (noncapital) projects.**

Nuisance Flood Plan and 2023 Charles County Hazard Mitigation Plan

As part of the *2023 Charles County Hazard Mitigation Plan*, various flood mitigation action items were identified for implementation over the next five-year planning cycle. Three such action items pertinent to the Nuisance Flood Plan are as flows:

- **Identify roadways/bridges that frequently flood and mitigate to ensure ingress and egress.**
- **Develop concept designs and apply for grant funding to address nuisance flood issues identified and prioritized in the Nuisance Flood Plan.**
- **Obtain and strategically deploy signage for community awareness during all-hazard events.**

The Nuisance Flood Plan is progress toward these 2023 hazard mitigation plan action items. In addition, the *Nuisance Flood Plan* has been adopted into the *Charles County Hazard Mitigation Plan*.

Nuisance Flooding Stakeholder Group

This group included representation from various sectors of the County government, municipalities, the business community, neighborhood associations, and other stakeholders identified by the County. The Stakeholder Group guided planning efforts and assisted with community support and outreach efforts. Participants included representatives from the following:

- Department of Emergency Services;
- Planning and Growth Management;
- Public Works includes Transportation, Capital Services, & Utilities;
- Elected Officials;
- County & Municipal Representatives;
- Transportation;
- Community Stakeholders;
- Port Tobacco Village
- Town of La Plata
- Town of Indian Head
- Port Tobacco River Conservancy
- College of Southern Maryland
- Maryland Emergency Management (MEMA)
- Maryland Department of Transportation (MDOT)
- Public Schools/Board of Education
- Soil Conservation
- Chamber of Commerce; and,
- Charles County Volunteer Fire.

The initial meeting of the Nuisance Flooding Stakeholder Group was held on 20 February 2020. Agenda items included:

- Project Scope, Schedule, & Expectations
- Climate Change Literature Review & Context
- Work Session Coastal Flooding & Sea Level Rise Group Work & Report Out
  - Site Specific Problem Statement & Description;
  - Preparedness;
  - Response; and,
  - Mitigation.
- Public Outreach Strategy

Additional information gathered during the initial stakeholder meeting, as well as modifications to previously collected data was collected. This information was then integrated into the plan document and the ArcGIS StoryMap.





Nuisance Flooding Public Outreach Efforts

Including the public is an important part of the planning process. A robust public engagement component was key to the success of this planning process. Outreach was woven throughout the planning process for developing the Charles County Nuisance Flood Plan.

Public outreach efforts focused on the following:

1. Informed the community about the Plan and provided an opportunity to gather information from the community about nuisance flooding,
2. Communicated flood risk and sought input on solutions members of the community wanted to see implemented to reduce flooding, and a final meeting
3. Communicate flood preparedness actions that individuals can take to reduce their flood hazard, the Plan mitigation strategy for carrying out the identified solutions and plan implementation.

The nuisance flood website was developed to communicate with the public and provide information on the planning process. In addition, social media outreach specific to the plan was conducted across all platforms. Analytics collected from the Charles County Media Services are shown below:

Facebook

- General Posts (5 Posts) > 10,718 Reach, 53 Reactions, 3 Comments, 22 Shares, 299 Post Clicks
- Aug. 14 Map Your Flood Video > People reached: 942, Reactions: 7, Shares: 8, Post Clicks: 20
- Aug. 19 Map Your Flood Video > People reached: 329, Comments: 1, Post Clicks: 4
- Aug. 20 Nuisance Flooding Video > People reached: 418, Share: 1, Post Clicks: 7
- Aug. 31 Nuisance Flooding Video > People Reached: 563, Post Clicks: 1

Twitter

- General Posts: (6 Posts) > 3681 Impressions, 57 Engagement (reactions, retweets etc.)
- Aug. 13 Map Your Flood Video > 311 Impressions, Detail expands: 11, Link Clicks: 1, Profile Clicks: 1
- Aug. 13 Nuisance Flooding Video > Impressions: 282, Detail expands: 3, Link Clicks: 2

NextDoor

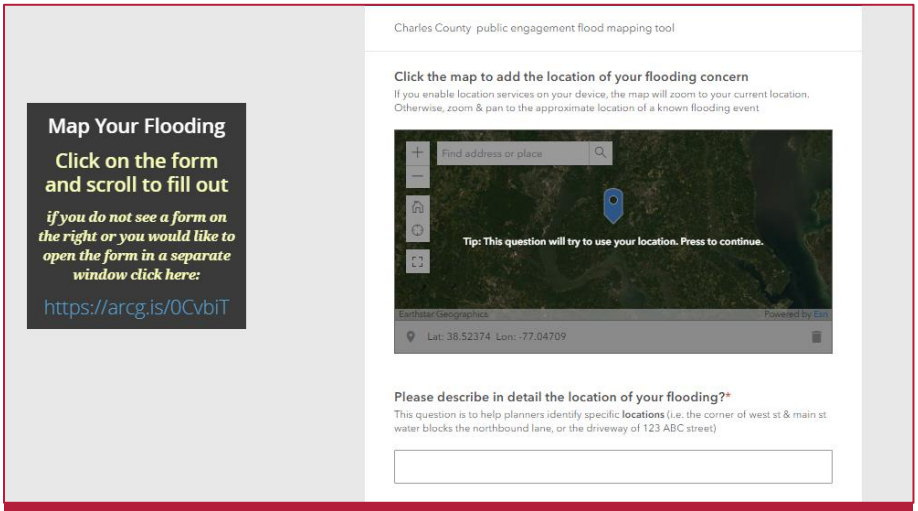
- 2 Posts, 5738 Impressions, 5 Reactions, 2 Comments

YouTube

- Map Your Flooding (:30s) 116 views / Avg.View 0:20 (68.6%)
- Nuisance Flooding (:40s) 34 views / Avg. View 0:21 (54.1%)

Nuisance Flooding ArcGIS StoryMap

As part of this planning initiative, an ArcGIS StoryMap was developed. An ArcGIS StoryMap is a web-based application that enables users to acquire information through stories with custom maps that inform and engage. Information on upcoming public events related to the Plan, was posted under **What's Happening Now** on the **Get Involved tab**. In addition to public events, the public was able to show the Team where they have experienced nuisance flooding using the map provided at **Map Your Flooding** (link) and adding a note describing the size, depth, duration, the weather, or any other flood characteristics that they thought were important for the Team to know.



Nuisance Flooding ArcGIS StoryMap
https://maryland.maps.arcgis.com/apps/Cascade/index.html?appid=7bb024fa03ff46a58e07323e16bdb7f1

Under the Department of Emergency Services' "Emergency Preparedness" webpage, the Nuisance Flooding ArcGIS StoryMap has been added. The public is encouraged to access the ArcGIS StoryMap to learn more about nuisance flooding in Charles County. In addition, the StoryMap provides an opportunity for the public to provide feedback and the ability to map their flood issues.

Nuisance Flooding Podcast



Charles County Government has introduced a series of podcasts, “Charles County Unscripted.” Podcast subscribers can tune in and listen to county stories, news, and information at home or on the go, on any mobile device. County staff interview a variety of guests who provide an inside look at the people, places, and events that shape Charles County Government and our community. One of the podcast programs, “Inside Your County Government,” explores the range of services the government provides. During the planning process, Michele Lily, Director of Emergency Services participated in the Nuisance Flood Podcast.

Description of Podcast

We talk with Michelle Lilly, Director of Emergency Services, about what nuisance flooding are and the department’s efforts to develop the County's Nuisance Flood Plan.

To participate in the comments and include a location in the County you see flood, please visit the Map Your Flooding Survey website or email Flooding@CharlesCountyMD.gov

For more information on the flood plan, visit the Nuisance Flooding Storymap webpage.

Additional County Climate Action & Resiliency Efforts

Charles County Government is working to reduce greenhouse gas emissions, transition to 100 percent renewable electricity, improve sustainability in county operations, and educate the county workforce on climate change mitigation and adaptation measures.

Charles County is one of three vanguard counties in the state working with the University of Maryland Center for Global Sustainability on a project called Resiliency Planning and Financing for Maryland Counties. The goal of the project is to develop Resilience Action Plans to establish planning and financing systems in pursuit of climate change resilience. The effort includes elements such as:

- The essential role of multi-community collaboration and coordination.
- Ensuring resilience efforts address needs of the most vulnerable populations.
- Integrating resilience planning into every aspect of local government operation.
- Approaching resiliency as a community asset rather than an obligation.
- Addressing the limitation of fiscal resources and understanding how to prioritize actions among multiple departments and stakeholders.
- Aligning priorities and resources with community goals to jumpstart the resiliency process.

County government planning efforts are underway for construction projects for solar arrays on county-owned land that will offset more than 100 percent of electricity needs for county buildings and facilities. The county has worked to reduce greenhouse gas emissions by utilizing appropriate landfill covers and upgrading the current passive collection system to one that actively captures emissions. Additionally, several measures have been instituted to increase the recycling rate to 46 percent, added to a 4 percent source-reduction-credit, equals a total-waste-diversion rate of 50 percent.

Shoreline restoration along the Potomac and Wicomico Rivers has also been prioritized with the completion of a scientific assessment that identified 153 sites along 27 miles of shoreline in most need of restoration for ecological services benefits, including storm surge buffering, carbon sequestration, wetlands restoration, and habitat creation.

Three high priority actions that can be cross referenced and integrated into the County's Nuisance Flood Plan include:

1. **Mitigate roads for current and future flood predictions**.

Strategy: Coordinate investments to mitigation roads for future climate conditions.
Performance measure: The number of roads that have been protected against future flooding events.
Performance target: Provide mitigation for one flooded road location per fiscal year. Possible actions include the following:

- Target coordination with the Maryland State Highways Administration to work collaboratively on a plan to harden roads to withstand flood events using the Nuisance Flood Plan as the guide to prioritizing actions.
- Prioritize drainage (stormwater management) projects through a planned analysis of Countywide projects & prioritization.
- Add flood gauges, for safety, to areas prone to flooding.
- Post-pandemic review remote teleworking policies.

2. **Maintain operation of County-owned roadways that are susceptible to sea level rise or flooding (nuisance or otherwise).**

Strategy: Fortify vulnerable roadways against flooding and sea level rise by raising the roadbed; improving drainage/stormwater management in the public right-of-way; and improving drainage/stormwater management in flood-prone areas.
Performance measure: A certain percentage of flood and sea level rise prone roads hardened and mitigated; a certain number of gallons of stormwater managed by new projects.
Performance target: Set target of 10% of flood and sea level rise prone roads fortified by 2030; 50% by 2040; 100% by 2050; and 50% of all stormwater managed on-site by 2030, 100% by 2050.

- Possible actions include the following:
- Identify sea level rise and flood prone roads.
- Develop priority list for road mitigation.
- Develop priority list for stormwater management improvements. This list should be available soon from work underway with the Maryland Environmental Service.
- Construct improvements beginning with the highest priority.

3. Improve SWM features (repair, maintain, and upgrade as needed).

Strategy: Improve SWM structure resiliency by prioritizing structures in flood prone areas and taking appropriate action to include upgrades, retrofits, and repairs.
Performance measure: Percent of SWM structures improved.
Performance target: 10% of prioritized SWM structures improved by 2030, 25% by 2040, 50% by 2050.
Possible actions include the following:

- Identify stormwater structures that require retrofit (per 2010 regulations) and develop a priority list.
- Research known areas of flooding and add to priority list for retrofit/upgrade/repair.
- Develop a public outreach plan to educate Homeowner Associations (HOAs) and stormwater structures owners about maintenance and repair procedures.
- Determine which stormwater feature projects could utilize watershed funding and benefit County's MS4 goals.

Identification of Nuisance Flood Areas

As an initial step in the data gathering process, flood event data was obtained from the National Center for Environmental Information (NCEI) and is included in Appendix 1. This data was reviewed to aid in the determination of nuisance flood locations. Additional information gathered by the Department of Emergency Services of known flood areas resulted in a listing of roadways and intersections. This listing was used to develop a flood location map. Staff from Department of Emergency Services and Department of Planning and Growth Management along with consultants working on the planning project conducted a tour of identified nuisance flood areas on January 23, 2020. Twenty-seven nuisance and urban flood locations were identified. Additional information gathered during the flood identification site visits included a description per site and a site photograph.

The initial meeting of the Nuisance Flooding Stakeholder Group was held on February 20, 2020. During the meeting, stakeholders reviewed preliminary information gathered by the core planning team, which included nuisance and urban flood locations sites 1 thru 27. In addition to reviewing and updating of the initial identified flood locations, the stakeholders in attendance identified twenty new flood locations, sites 28 thru 48, which have been added to Table 1 and depicted on Map 1. Furthermore, distinction was made between those sites identified as nuisance or tidally influenced flood and urban flooding. Nine of the forty-eight sites were considered nuisance flooding and are depicted on Map 2.

Site Example



Site #1: Fenwick Road in the area of New Place is a nuisance flood location and is impacted by the Pomonkey Creek.

TABLE 1. NUISANCE AND URBAN FLOOD LOCATIONS

MAPS 1 & 2



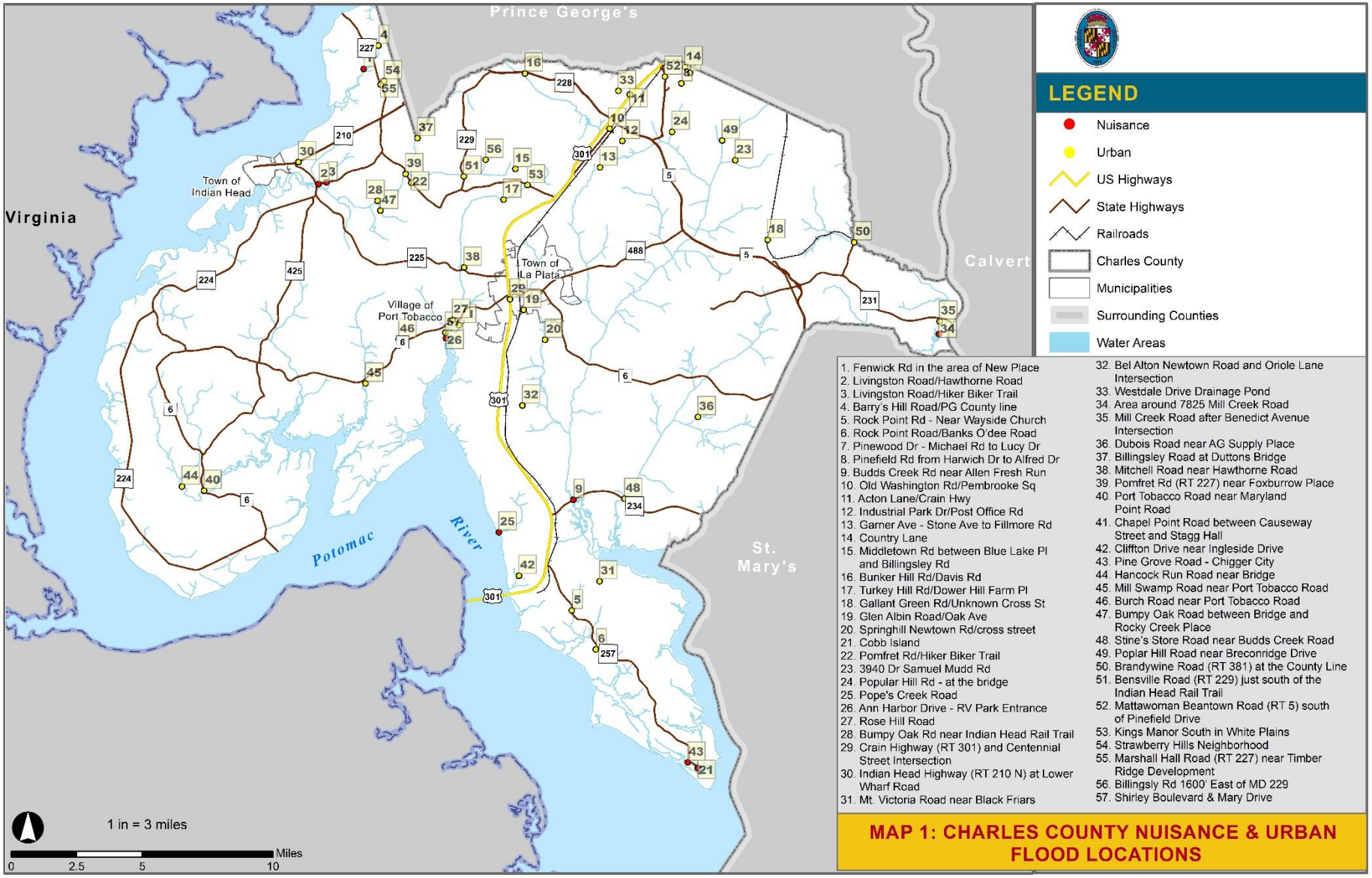
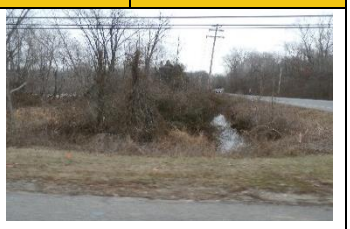
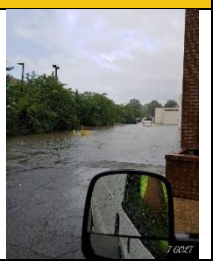
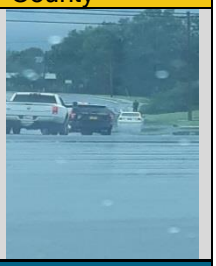
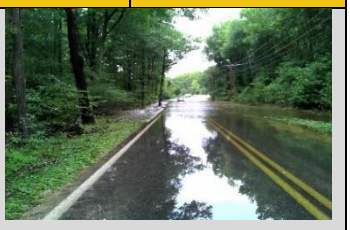
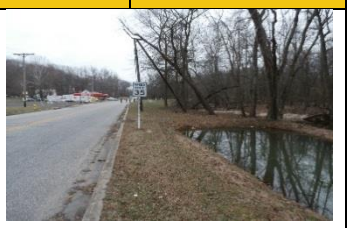
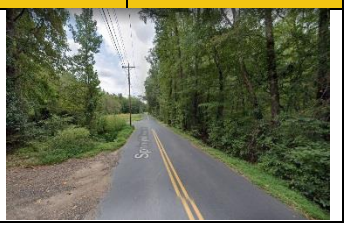

Prince George's
Virginia
Calvert
St. Mary's
Town of Indian Head
Town of La Plata
Village of Port Tobacco
Potomac River
1 in = 3 miles
Miles
0
2.5
5
10
LEGEND
Nuisance
Urban
US Highways
State Highways
Railroads
Charles County
Municipalities
Surrounding Counties
Water Areas
1. Fenwick Rd in the area of New Place
2. Livingston Road/Hawthorne Road
3. Livingston Road/Hiker Biker Trail
4. Barry's Hill Road/PG County line
5. Rock Point Rd - Near Wayside Church
6. Rock Point Road/Banks O'dee Road
7. Pinewood Dr - Michael Rd to Lucy Dr
8. Pinefield Rd from Harwich Dr to Alfred Dr
9. Budds Creek Rd near Allen Fresh Run
10. Old Washington Rd/Pembrooke Sq
11. Acton Lane/Crain Hwy
12. Industrial Park Dr/Post Office Rd
13. Garner Ave - Stone Ave to Fillmore Rd
14. Country Lane
15. Middletown Rd between Blue Lake Pl and Billingsley Rd
16. Bunker Hill Rd/Davis Rd
17. Turkey Hill Rd/Dower Hill Farm Pl
18. Gallant Green Rd/Unknown Cross St
19. Glen Albin Road/Oak Ave
20. Springhill Newtown Rd/cross street
21. Cobb Island
22. Pomfret Rd/Hiker Biker Trail
23. 3940 Dr Samuel Mudd Rd
24. Popular Hill Rd - at the bridge
25. Pope's Creek Road
26. Ann Harbor Drive - RV Park Entrance
27. Rose Hill Road
28. Bumpy Oak Rd near Indian Head Rail Trail
29. Crain Highway (RT 301) and Centennial Street Intersection
30. Indian Head Highway (RT 210 N) at Lower Wharf Road
31. Mt. Victoria Road near Black Friars
32. Bel Alton Newtown Road and Oriole Lane Intersection
33. Westdale Drive Drainage Pond
34. Area around 7825 Mill Creek Road
35. Mill Creek Road after Benedict Avenue Intersection
36. Dubois Road near AG Supply Place
37. Billingsley Road at Duttons Bridge
38. Mitchell Road near Hawthorne Road
39. Pomfret Rd (RT 227) near Foxburrow Place
40. Port Tobacco Road near Maryland Point Road
41. Chapel Point Road between Causeway Street and Stagg Hall
42. Cliffton Drive near Ingleside Drive
43. Pine Grove Road - Chigger City
44. Hancock Run Road near Bridge
45. Mill Swamp Road near Port Tobacco Road
46. Burch Road near Port Tobacco Road
47. Bumpy Oak Road between Bridge and Rocky Creek Place
48. Stine's Store Road near Budds Creek Road
49. Poplar Hill Road near Breconridge Drive
50. Brandywine Road (RT 381) at the County Line
51. Bensville Road (RT 229) just south of the Indian Head Rail Trail
52. Mattawoman Beantown Road (RT 5) south of Pinefield Drive
53. Kings Manor South in White Plains
54. Strawberry Hills Neighborhood
55. Marshall Hall Road (RT 227) near Timber Ridge Development
56. Billingsly Rd 1600' East of MD 229
57. Shirley Boulevard & Mary Drive
MAP 1: CHARLES COUNTY NUISANCE & URBAN FLOOD LOCATIONS

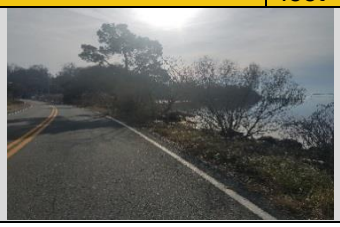
TABLE 1: NUISANCE AND URBAN FLOOD LOCATIONS				
Identifier	**Location Name**	**Source of Flooding**	**Water Level Mark**	**State/County/ Municipal**
1	**Fenwick Road in the area of New Place**	Nuisance - Pomonkey Creek	2 feet	County
	Description: Located in the northwestern portion of the county, Fenwick Road is in close proximity to Pomonkey Creek and. Mill Swamp is also adjacent to Fenwick Road. Several low points along the roadway allows water to overtop the roadway. Also, the road is at the same level as the creek. High tides heavy rains and flooding can render the road impassable. This area of the road that floods is in a "bowl" and the excessive water is partly is due to upstream developments and a limited outfall Flooding occurs along Fenwick Road between New Place and Ward Place. 			
2	**Livingston Road (RT 224) at Hawthorne Road (RT 225)**	Nuisance - Tributary #1 to Mattawoman Creek; storm surge, high tide and heavy rain events	1-2 feet	State
	Description: Due to a very low spot on Livingston Road (RT 224), water overtops the roadway frequently. A tributary to the Mattawoman Creek intersects at this site. A wetland is located along the road. Also, a culvert is located at the intersection of Livingston and Hawthorne Roads, which may be blocked by overgrown vegetation. Beaver dam issues are also exacerbating the flood issue. In the past, flooding has caused the entire roadway to close for 2 days.  			
3	**Livingston Road (RT 224) at Indian Head Rail Trail**	Nuisance - Tributary #2 to Mattawoman Creek	1-2 feet	State
	Description: The low area on Livingston Road floods during high tide. This low area is at the Indian Head Rail Trail. The trail floods causing water to flow across Livingston Road. A tributary to the Mattawoman Creek is near this area. Flooding in this area is also contributed to by the wetland that floods mentioned in Site #2. 			
Transferred to RA with continued projects and evaluations in progress 4	~~**Barry's Hill Road near Old Marshall Hall Road**~~	~~Urban - Mill Swamp~~	~~1-2 feet~~	~~County~~
	~~**Description:** Barry Hill Road is adjacent to Mill Swamp. The road elevation is nearly level with the water elevation on both sides of the road. Drainage north from Mill Swamp to the Potomac River may be limited by blocked culverts or poor conveyance. There are two access points into the area and signage indicating "Flood Area" is located along the side of the road. Flooding at this site is also contributed to by beavers located downstream on a private property.~~ 			
Transferred to RA with continued projects and evaluations in progress 5	~~**Rock Point Road (RT 257) in the area of Wayside Church**~~	~~Nuisance & Urban - Flash Flood; Piccowaxen Creek & Wicomico Creek~~	~~Less than 1 foot~~	~~State~~
	~~**Description:** Low section of the road allows overtopping during a heavy rain event. Ditchley Prong in close proximity to the area. Route 257 is located within the floodplain. During severe weather events, all of the road and structures are underwater. Complete destruction after an event.~~ 			

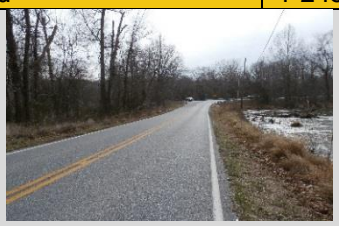
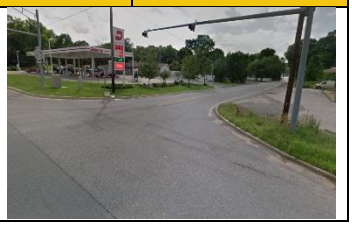
Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
Transferred to RA with continued projects and evaluations in progress 6	**Rock Point Road (RT 257) near Banks O'dee Road**	Nuisance & Urban - Flash Flood	2 - 2.5 feet	State
	Description: This poorly constructed, low-lying road that floods during heavy rain events resulting in road closure. Flooding occurs up to 500 yards north of the intersection on Route 257. There is poor drainage and agriculture runoff at this site exacerbating the flood conditions. Tide levels also affect this area. This site is one of the top 5 road issues in the county. 			
Transferred to RA with continued projects and evaluations in progress 7	**Pinewood Drive from Michael Road to Lucy Drive**	Urban	3 feet	County
	Description: This site is in a large housing development, Pinefield Neighborhood, that experiences stormwater issues during heavy rain events. Flood elevations increase closer to Pinewood Drive; up to 5 feet. 			
Transferred to RA with continued projects and evaluations in progress 8	**Pinefield Road from Harwich Drive to Alfred Drive**	Urban	1-2 feet average	County
	Description: Pinefield Road is in a large housing development and has been identified as a priority area for urban flooding. Stormwater issues causes flooding in this area during heavy rain events. Storm system collections denoted by catch basins are located on corners only resulting in a limited conveyance network. Flood depths are between 3-5 feet during a major storm event.  			
9	**Budds Creek Road (Rt 234) near Allens Fresh Run**	Nuisance - Allens Fresh Run – Tributary to Wicomico River	--	State
	Description: The Allen's Fresh Bridge on Budds Creek Road experiences tidal flooding. The Allens Fresh Run drains into the Wicomico River, which is in close proximity. After Hurricane Lee, mitigation projects included improvements to the bridge. Only an issue during a major tropical storm or hurricane event. 			
Transferred to RA with continued projects and evaluations in progress 10	**Old Washington Road and Pembrooke Square**	Urban - Tributary #1 to Piney Branch	Less than 1 foot	State
	Description: Old Washington Road and Pembrooke Square flood due to stormwater issues and impervious surface. A tributary to the Piney Branch may also be a possible flood source. Conveyance is poor across MD 925 Old Washington Rd and downstream that leads to backups and topping of swale. (Wetland-Piney Branch)  			

Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
Transferred to RA with continued projects and evaluations in progress 11	**Acton Lane near Crain Hwy**	Urban - Flash Flood Events	2 feet	County
	Description: Stormwater issues and a low section on Acton Lane results in flooding during a heavy rain event. Only the right lane next to the credit union floods with up to 2 feet of water. One lane road. 			

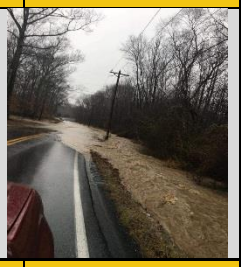
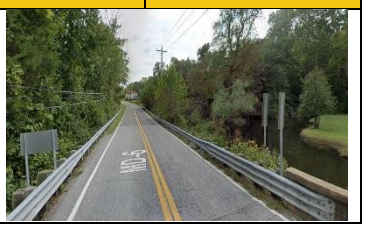
Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
Transferred to RA with continued projects and evaluations in progress 12	**Industrial Park Drive and Post Office Rd Intersection**	Urban	1-2 feet	County
	Description: Unnamed tributary enters a culvert north of Post Office Road and exits into channel north of the Southern MD Workforce Services property. Dense urban area associated with MD 301 up-stream leads to high volumes of runoff during rain events. Excessive flows will typically top the culvert on the north side of Post Office Drive and flood the intersection and then discharge into the channel on the south side. Also, a large controlled SWMP is located upstream. Note: This may be related to site #10, Piney Branch Wetland.  			
Transferred to RA with continued projects and evaluations in progress 13	**Garner Avenue between Stone Avenue to Fillmore Road**	Urban	Less than 1 foot	County
	Description: Garner Avenue is in the St. Charles Neighborhood. Stormwater issues cause flooding in the Carrington subdivision. All roads drain to channel located in residents' back yards. Box culverts are located along streets and at intersections that drain under the residential properties (front to back) to a drainage channel. Kerrick Swamp next to Fillmore Road. Drainage improvements were completed recently. 			
Transferred to RA with continued projects and evaluations in progress 14	**Country Lane near Temi Drive Intersection**	Urban - Tributary of Mattawoman Creek; Stream Flooding	3-4 feet	County
	Description: Country Lane is in the Pinefield Neighborhood and floods due to stormwater issues. System can't manage rainfall and gets overwhelmed due to lots of impervious surface. The bridge into the Pinefield neighborhood is stormwater issue as well. Pinefield Road and Orleans Lane to Alfred Lane had 3-4 feet of standing water from a rain event in July 2019. Stormwater or Sewer repairs currently in process. Drainage improvement projects have been developed. 			
Transferred to RA with continued projects and evaluations in progress 15	**Middletown Road between Blue Lake Place and Billingsley Road**	Urban	Less than 1 foot	County
	Description: Stormwater issues results in flooding along Middletown Road. There is a drainage ditch along the road, which overflows during heavy rain events. Most of Middletown Road and Turkey Hill Road are flooded routinely. It is common to have water on the road daily. Flooding occurs frequently near roundabout. Drainage improvements in process with installation of a roundabout. Issue near roundabout, SWM structures dead end and have nowhere to go. May need to partner with landowner to mitigate. 			

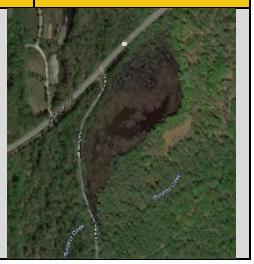
Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
Transferred to RA with continued projects and evaluations in progress 16	**Bunker Hill Road near Davis Road**	Urban - Piney Branch	Less than 1 foot	County
	Description: Davis Road is bridged over Piney Branch and then runs along Bunker Hill Road where a small stormwater management pond controls some of the road run off from the intersection of Bunkers Hill Road and Berry Road. Piney Branch crosses Berry Road, draining into the Mattawoman Creek. Combined drainage from roads and adjacent developments have led to an increase in flooding in this area. Minor improvements made with the addition of a small stormwater management pond. Mainly floods during a major storm event. During major storm events, bridge has been under 2 to 3 feet of water.  			
Transferred to RA with continued projects and evaluations in progress 17	**Turkey Hill Road**	Urban - Port Tobacco Creek	1-2 feet	County
	Description: Multiple areas along Turkey Hill Road are affected by flooding. A culvert is located right next to road; however, the road washes out during heavy rain events. Improvements have been completed and no new reports of flooding. 			
Transferred to RA with continued projects and evaluations in progress 18	**Gallant Green Road near Truman Manor Lane**	Urban - Swanson Creek	1 foot	County
	Description: Flooding occurs near Truman Manor Lane. One side of the road is impacted by flooding; however, water recedes quickly. Old pipes are rotting and decaying. 			
Transferred to RA with continued projects and evaluations in progress 19	**Glen Albin Road intersection with Oak Avenue**	Urban	1-2 feet	County
	Description: Water flows from Glen Oak Court and Oak Avenue into the intersection with Glen Albin Road. Stormwater issues cause flooding during heavy rain event. Issues began after new housing development was began. 			
Transferred to RA with continued projects and evaluations in progress 20	**Springhill Newtown Road intersection with Glen Albin**	Urban - Clark Run Tributary	3 feet	County
	Description: Flooding occurred near Ashely Ridge Place. An improvement project was completed 5 years ago. However, this area is still an issue. Road elevation is too low, and the bridge is not adequate. Newtown to Glen Albin -rushing water, major run-off and silt issues 			

Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
21	**Cobb Island (MD 254) at Bridge Approach**	Nuisance - Neale Sound	2 or more feet at approach to bridge	State
	Description: Flooding occurs at the approach to bridge. The Crab Houses located on both sides of the road are Repetitive Loss Properties. Flood events prevents residents from evacuating the Island. Island topography has many low-lying areas characterized with dips in roadway and drainage patterns leading to Potomac River through culverts.  			
Transferred to RA with continued projects and evaluations in progress 22	~~**Pomfret Road (RT 227) at Indian Head Rail Trail**~~	~~Urban~~	~~2 feet/4-5 feet~~	~~State~~
	~~**Description:** Stormwater issues at the intersection of Pomfret Road and the Indian Head Rail Trail cause flooding during heavy rain events. Flood water depths on the road are at 2 feet. However, flood depths on the shoulder are 4 to 5 feet due to a major drop off between the road and shoulder. This area is a low spot that all water drains to. Flood water comes from various directions to this area and water backs up to the Mattawoman Creek. Guardrail recommended. Erosion issues at this site.~~ 			
Transferred to RA with continued projects and evaluations in progress 23	~~**3940 Dr. Samuel Mudd Road**~~	~~Urban~~	~~1 foot~~	~~County~~
	~~**Description:** Drainage ditch alongside of Dr. Samuel Mudd Road and flows through a culvert at the driveway. Devils Nest crosses under a small bridge south location. Flooding is the result of stormwater issues.~~ ~~Over 200 feet of drainage pipe was recently replaced. Issue should be resolved.~~ 			
Transferred to RA with continued projects and evaluations in progress 24	~~**Poplar Hill Road between St. Peters Church Road and Mattawoman Beantown Road (at the bridge)**~~	~~Urban - Tributary #1 to Jordan Swamp~~	~~1-2 feet~~	~~County~~
	~~**Description:** Low section in the road with a culvert running under roadway. Stormwater issues cause roadway flooding.~~ 			
25	**Pope's Creek Road**	Nuisance - Potomac River	Less than 1 foot	County
	Description: Flooding occurs at the Pope's Creek Road bridge abutments. This area is not restricted when flooded, there are 2 access points into the area. Crab House is a Repetitive Loss Property. Signs of high tide and debris can be seen on the shoulder of the road.  			

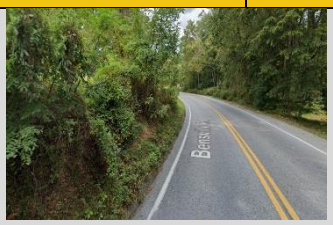
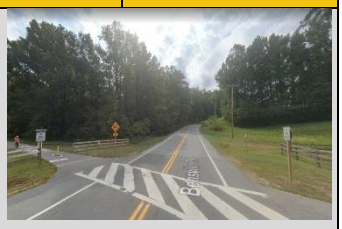
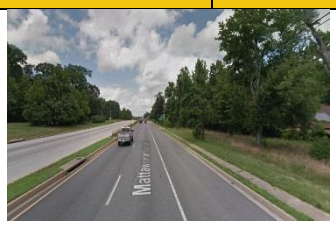
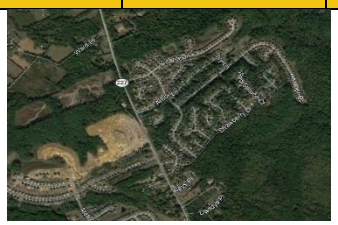
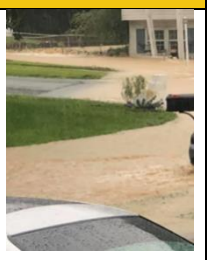
Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
26	**Ann Harbor Drive at RV Park Entrance**	Nuisance - Port Tobacco River	1-2 feet	Private
	Description: Properties are in violation of floodplain ordinance. Entire resort is under water during flood event with no evacuation plan (trailers are not relocated prior to event). Flooding occurs at the entrance of the RV Park. The canal area that drains to the Potomac River overtops the road during a high tide. 			
Transferred to RA with continued projects and evaluations in progress 27	~~**Rose Hill Road**~~	~~Urban - Wetland~~	~~1-2 feet~~	~~County~~
	~~**Description:** Rose Hill Road floods at intersection with Port Tobacco Road with 1-2 ft of water across road. Abandoned blocked culvert on West side of road that allows flow under Rose Hill Road into Port Tobacco Creek. Also, low sections of road are impacted by the adjacent wetland. Area is improving since the beavers have been removed.~~  			
Transferred to RA with continued projects and evaluations in progress 28	~~**Bumpy Oak Road near Indian Head Rail Trail**~~	~~Urban - Pond/Mattawoman Creek~~	~~1-2 feet~~	~~County~~
	~~A pond is located in the northeast corner of the Bumpy Oak Road and Indian Head Rail Trail intersection. Mattowoman Creek is in close proximity. The road elevation is only a few feet higher than the water surface elevation of the pond. Heavy rain events cause the pond to rise and overtop the road.~~ 			
Transferred to RA with continued projects and evaluations in progress 29	~~**Crain Highway (RT 301) and Centennial Street Intersection**~~	~~Urban~~	~~Less than 1 foot~~	~~State/Town~~
	~~Located in the Town of LaPlata, this area experiences flooding due to stormwater issues.~~ 			
Transferred to RA with continued projects and evaluations in progress 30	~~**Indian Head Highway (RT 210 N) at Lower Wharf Road**~~	~~Urban - Major Storm Events~~	~~1-2 feet~~	~~State/County~~
	~~Limited access school buses when flooded. Stormwater issues cause flooding in this area.~~ 			

Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
Transferred to RA with continued projects and evaluations in progress 31	~~Mt. Victoria Road near Black Friars~~	~~Urban~~	~~Less than 1 foot~~	~~County~~
	~~Limited access school buses when flooded. Wide area affected, approximately 10 to 15 feet.~~ 			
Transferred to RA with continued projects and evaluations in progress 32	~~Bel Alton Newtown Road and Oriole Lane Intersection~~	~~Urban~~	~~1-2 feet~~	~~County~~
	~~Limited access for school buses when flooded. Drainage pond located in the field along Bel Alton Newtown Road and across from Oriole Lane.~~ 			
Transferred to RA with continued projects and evaluations in progress 33	~~Westdale Drive Townhomes~~	~~Urban~~	~~Out of Banks: 4 feet~~	~~County~~
	~~A stream channel and drainage area behind the townhomes on Westdale Drive. Flooding of this channel is causing damage to the townhomes.~~  			
34	Area around 7825 Mill Creek Road	Nuisance - Patuxent River	2 foot	County
	Tidal flooding from the Patuxent River affects this area. This area of Benedict is surrounded by a cove of the east side and Patuxent River on the west. 			
Transferred to RA with continued projects and evaluations in progress 35	~~Mill Creek Road after Benedict Avenue Intersection~~	~~Urban~~	~~2 foot~~	~~County~~
	~~Flooding in 2 locations; before and after the firehouse.~~ 			

Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
Transferred to RA with continued projects and evaluations in progress 36	**Dubois Road near AG Supply Place**	Urban - Denton Run	2 feet	County
	Denton Run intersects with Dubois Road. During heavy rain events, flood waters overflow onto the roadway.			
Transferred to RA with continued projects and evaluations in progress 37	**Billingsley Road at Duttons Bridge**	Urban - Mattawoman Creek	3-5 feet	County
	Flood waters from the Mattawoman Creek overflow onto the roadway near the bidge.			
Transferred to RA with continued projects and evaluations in progress 38	**Mitchell Road near Hawthorne Road (RT 225)**	Urban	Less than 1 foot	County
	Only one side of the road is inundated.			
Transferred to RA with continued projects and evaluations in progress 39	**Pomfret Road (RT 227) near Foxburrow Place**	Urban - Mattawoman Creek	Less than 1 foot	State
	Flooding occurs near the bridge during storm events. The Mattawoman Creek traverses Pomfret Road at this site location.			
Transferred to RA with continued projects and evaluations in progress 40	**Port Tobacco Road (MD 6) near Maryland Point Road**	Urban - Nanjemoy Creek	2-2.5 feet	State
	Roadway flooding occurs near the bridge that crosses Nanjemoy Creek.			

Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
Transferred to RA with continued projects and evaluations in progress 41	~~Chapel Point Road between Causeway Street and Stagg Hall~~	~~Urban - Heavy Rain Events~~	~~Less than 1 foot~~	~~County~~
	~~Runoff issues cause roadway flooding during heavy rain events.~~			
Transferred to RA with continued projects and evaluations in progress 42	~~Clifton Drive near Ingleside Drive~~	~~Urban - Clifton Creek~~	~~Less than 1 foot~~	~~County~~
	~~The floodplain to Clifton Creek is adjacent to Clifton Drive on one side of the road, while a wetland is located on the other.~~			
43	Pine Grove Road - Chigger City	Nuisance - Neale Sound	Less than 1 foot	County
	Flooding in this area is a common nuisance since the road is within close proximity to the Neale Sound.			
Transferred to RA with continued projects and evaluations in progress 44	~~Hancock Run Road near Bridge~~	~~Urban - Beaverdam Creek~~	~~Less than 1 foot~~	~~County~~
	~~A beaver issue is causing Beaverdam Creek to flood the roadway during heavy rain events.~~			
Transferred to RA with continued projects and evaluations in progress 45	~~Mill Swamp Road near Port Tobacco Road (RT 6)~~	~~Urban - Mill Run & Burgess Creek~~	~~Less than 1 foot~~	~~County~~
	~~A large wetland is located adjacent to Mill Swamp Road. Burgess Creek traverses the road as well. Low road elevation allows water to overflow from the wetland during storm events.~~			

Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
Transferred to RA with continued projects and evaluations in progress 46	**Burch Road near Port Tobacco Road (RT 6)**	Urban - Wetland	Less than 1 foot	County
	A large wetland is located along both sides of Burch Road. 			
Transferred to RA with continued projects and evaluations in progress 47	**Bumpy Oak Road between Bridge and Rocky Creek Place**	Urban - Tributary No. 5 to Mattawoman Creek	Less than 1 foot	County
	Tributary Number 5 to Mattawoman Creek runs parallel with this section of road. 			
Transferred to RA with continued projects and evaluations in progress 48	**Stine's Store Road near Budds Creek Road (RT 234)**	Urban - Gilbert Swamp Run	Less than 1 foot	County
	Gilbert Swamp Run traverse Stine's Store Road and flows into Newport Run after the bridge. 			
Transferred to RA with continued projects and evaluations in progress 49	**Poplar Hill Road near Breconridge Drive**	Urban - Zekiah Swamp	Over 3 feet	County
	Description: Zekiah Swamp flows under the bridge located along Popular Hill Road. This site experienced extremely fast-moving water overtopping the roadway during a July 2020 heavy rain event. First time swift water has been seen at this location. Popular Hill bridge is currently under design for a rebuilt by the State. 			
Transferred to RA with continued projects and evaluations in progress 50	**Brandywine Road (RT 381) at the County Line**	Urban - Swanson Creek	Over 3 feet	State
	Description: During the July 2020 heavy rain event, flooding occurred on Brandywine Road near the county line. Extremely fast-moving water from both the County Line Creek and Swanson Creek overtopped the bridge. Measurements taken after the event determined the total flood water length, encompassing the bridge, was approximately 540'. First time swift water has been seen at this location and swift water rescues were necessary for past 2 events.  			

Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
Transferred to RA with continued projects and evaluations in progress 51	**Bensville Road (RT 229) just south of the Indian Head Rail Trail**	Urban - Heavy Rain Events	1-2 feet	State
	Description: This section of road is a steep hill, with a blind curve, leading to the Indian Head Rail Trail crossing. Due to the lack of a drainage system, the roadway floods during heavy rain events. Numerous wrecks with fatalities have occurred at this location due to the roadway conditions. Old Womans Run flows under the roadway just north of the trail crossing.  			
Transferred to RA with continued projects and evaluations in progress 52	**Mattawoman Beantown Road (RT 5) south of Pinefield Drive**	Urban - Heavy Rain Events	1-2 feet	State
	Description: Amongst these addresses: 2290, 2270, 2262, 2254, and 2246 Mattawoman Beantown Road, a deep ponding develops in the right lane of the road during heavy rains. This is partially due to the storm drainage collection boxes along Mattawoman Beantown Road, which are blocked with growth, debris, and trash. Public Works flushed the drainage system; however, system should be monitored.  			
Transferred to RA with continued projects and evaluations in progress 53	**Kings Manor South in White Plains**	Urban	Less than 1 foot	State/County
	Description: The neighborhood in Kings Manor South has dealt with flooding due to drainage issues reported by the public as “design flaws” that occurred in the development of the neighborhood. Some minor work has been completed to address the drainage problem, such as remodeling and modernizing the current drainage system. However, the issues with the drainage system persists resulting in flooding. Port Tobacco Creek and a tributary surround the neighborhood. 			
Transferred to RA with continued projects and evaluations in progress 54	**Strawberry Hills Neighborhood**	Urban	1-2 feet	County
	Description: Several locations within the Strawberry Hills Neighborhood have been impacted by flooding. These locations are as follows: 6808 Lantana Drive, 6908 Arbor Lane, 6858 Arbor Lane, and the intersection of Woodbury Drive and Heather Drive. The beginning section of Arbor Lane also experiences flooding during heavy rain events. Flooding at these locations is due to drainage system issues. In addition, flooding has occurred at the intersection of Woodbury Drive and Heather Drive and is due to drainage system maintenance issues.  			
Transferred to RA with continued projects and evaluations in progress 55	**Marshall Hall Road (RT 227) near Timber Ridge Development**	Urban - Heavy Rain Events	Less than 1 foot	State
	Description: The riprap and geotextile washed away along Marshall Hall Road during a heavy rain event, blocking culvert pipes causing the roadway to flood. The storm drain discharge at the Timber Ridge new construction site and Strawberry Hill subdivision is causing severe flooding, erosion and damage. Note, this is the first time this event has been reported, therefore should be monitored.  			

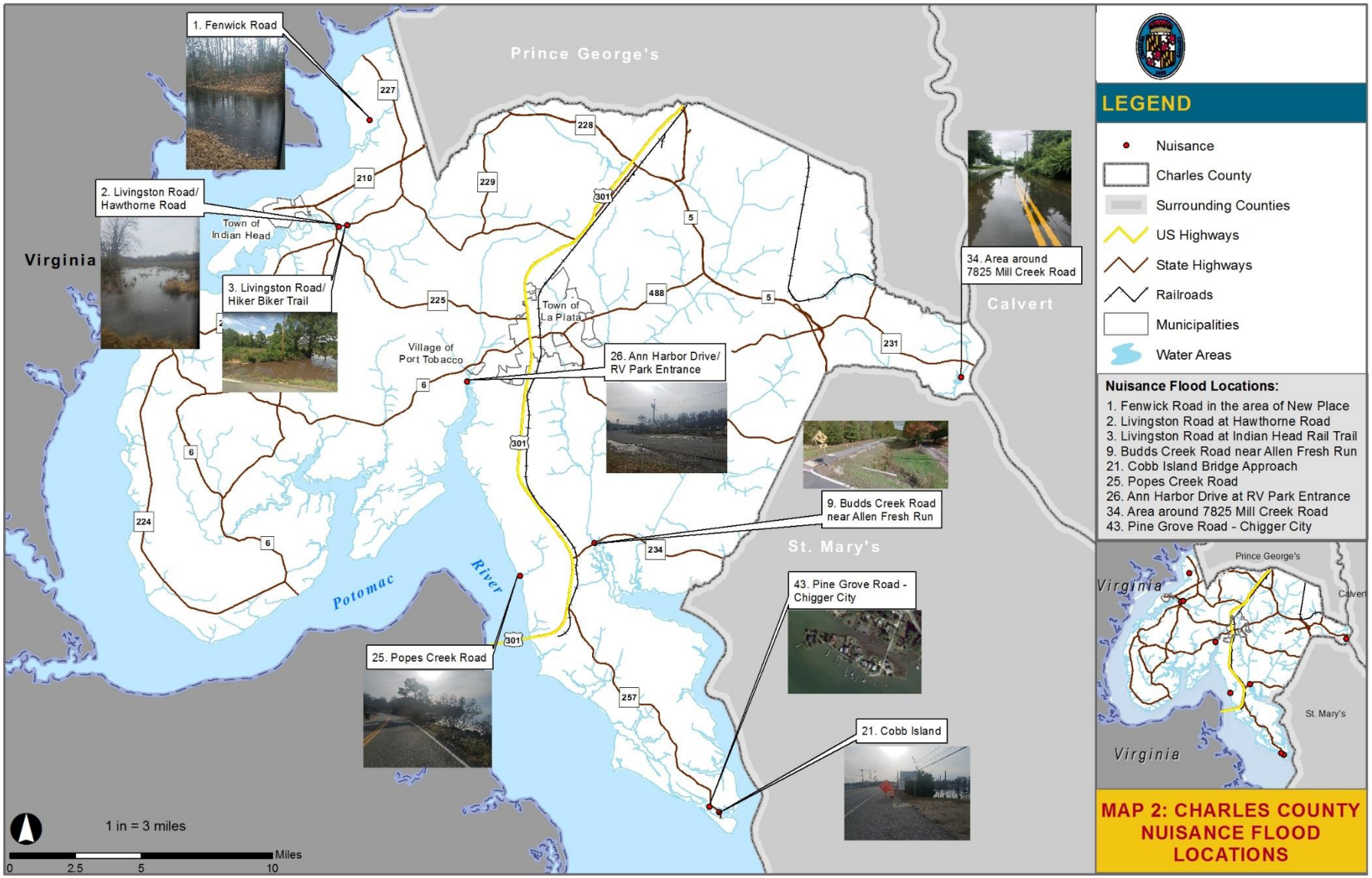
Identifier	Location Name	Source of Flooding	Water Level Mark	State/County/ Municipal
Transferred to RA with continued projects and evaluations in progress 56	**Billingsley Rd 1600' East of MD 229**	Urban	Less than 1 foot	County
	Description: Stream crossing flooding due to undersized pipe and need of road fill. A tributary to Pole Branch traverses the roadway at this site.			
Transferred to RA with continued projects and evaluations in progress 57	**Shirley Boulevard & Mary Drive**			County
	Description: Culvert under Shirley Boulevard. Canal located between Shirley Boulevard and Mary Drive. Tidal issues - Storm surge rises causing flooding			

Nuisance Flood Areas

Analysis of the forty-eight identified flood locations depicted and listed on Map 1 indicates that nine of these flood locations are tidally influenced and categorized as nuisance flood areas. These locations include:

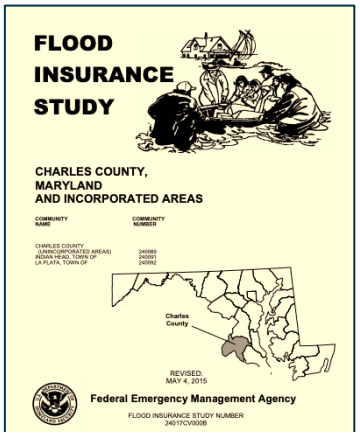
- Fenwick Road in the area of New Place;
- Livingston Road at Hawthorn Road;
- Livingston Road low area near the Indian Head Rail Trail;
- Allen's Fresh Bridge on Budds Creek Road;
- Cobb Island/MD 254 bridge approach;
- Pope's Creek Road bridge area; and,
- Ann Harbor Drive - RV Park Entrance;
- Area around 7825 Mill Creek Road; and,
- Pine Grove Road-Chigger City.

All nine-nuisance flood location are listed in Table 1 and depicted on Map 2.


1. Fenwick Road
2. Livingston Road/ Hawthorne Road
3. Livingston Road/ Hiker Biker Trail
25. Popes Creek Road
26. Ann Harbor Drive/ RV Park Entrance
9. Budds Creek Road near Allen Fresh Run
43. Pine Grove Road - Chigger City
21. Cobb Island
34. Area around 7825 Mill Creek Road
Prince George's
Virginia
Calvert
St. Mary's
Town of Indian Head
Town of La Plata
Village of Port Tobacco
Potomac River
1 in = 3 miles
Miles
0 2.5 5 10
LEGEND
Nuisance
Charles County
Surrounding Counties
US Highways
State Highways
Railroads
Municipalities
Water Areas
Nuisance Flood Locations:
1. Fenwick Road in the area of New Place
2. Livingston Road at Hawthorne Road
3. Livingston Road at Indian Head Rail Trail
9. Budds Creek Road near Allen Fresh Run
21. Cobb Island Bridge Approach
25. Popes Creek Road
26. Ann Harbor Drive at RV Park Entrance
34. Area around 7825 Mill Creek Road
43. Pine Grove Road - Chigger City
MAP 2: CHARLES COUNTY NUISANCE FLOOD LOCATIONS

Identification of Flood Thresholds, Water Levels, & Conditions

Flood Insurance Study (FIS)

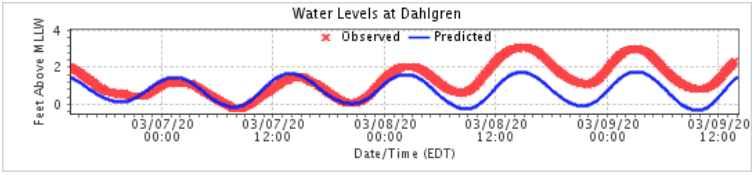


Source: FEMA MAP Service Center

According to the *Charles County Flood Insurance Study (FIS)* revised May 4, 2015, the principal flood problems of Charles County are coastal areas that are vulnerable to tidal flooding due to major storms such as hurricanes and nor'easters. Both of these storm types generate strong winds that can push large volumes of water inland. The severity of tidal flood damage depends on various factors, such as topography, the rate floodwater rises, depth and duration, wave action exposure, and quantity and type of structures or infrastructure within the floodplain. As such, the Potomac River, Patuxent River, and the Wicomico River are the primary sources of flooding in Charles County.

The timing of the maximum storm surge in conjunction with the normal tidal cycle can play an important role in the extent of tidal flooding. Mean tidal ranges within the Potomac and Patuxent Rivers are generally in the 1.5 feet range. Prolonged easterly or southeasterly winds typically increase tidal elevations while northwest winds typically lower tidal elevations. The storm surge in the Patuxent, Potomac, and Wicomico Rivers affects approximately 6, 115, and 21 miles respectively, of Charles County coastline. As previously mentioned, storm surges in combination with mean high or mean higher-high tides can result in more severe and extensive tidal flooding.

Tidal Gauge Data



The National Oceanic and Atmospheric Administration (NOAA) maintains and operates tidal gauge and meteorological stations throughout the region. The closest NOAA gage to Charles County is located at the Naval Surface Warfare Center (NSWC) at Dahlgren, Virginia. These gauges record a plethora of information such as tides/water levels, tide predictions, sea level trends, extreme water levels, and various other meteorological observations.

Tidal gauges can be useful to compare tidal fluctuations and peak events with the still-water floodwater elevations for calculated storm events as reported in the FIS. For example, according to the FIS, the Potomac River at the U.S. Route 301 Bridge has a 100-year (1% annual chance) flood elevation of 5.8 feet (NAVD88). Tide gauges use reference values called datums. In general, a datum is a base elevation used as a reference from which to determine heights or depths. A tidal datum is a standard elevation defined by a certain phase of the tide. The NAVD88 datum value at the Dahlgren gage is 1.02. This allows a comparison between the FIS and gauge data, given that the tidal gage is sufficiently close to flooding source location.

Tidal Gauge Data vs Flood Insurance Study Discussion

The maximum recorded tide at the Dahlgren gauge was 5.01 on September 18, 2018. Therefore, converting the gage datum to the flood elevation during that September flood would result in an elevation of 3.99 feet (NAVD88). According to the FIS, a 10-year (10% annual chance) tidal flood event at the U.S. 301 Bridge would be at an elevation of 4.1 feet. It would be reasonable to state that the September 18 tidal gauge measurement was approximately a 10-year flood event. Additionally, the table below illustrates the top ten highest and lowest recorded tidal events for the Dahlgren gauge provided in the NAVD88 datum over the last 5 years. Note that the top ten highest recorded gauge measurements are all within a span of 0.7 feet.

TABLE 3: HIGHEST AND LOWEST VALUES - DAHLGREN, VA - STATION ID: 8635027

Station:	8635027	Begin Date:	19800218
Name:	Dahlgren	End Date:	20200218
Product:	High/Low	Units:	Feet
Datum:	NAVD	Quality:	Verified

Rank	Highest	Highest Date	Zone	Lowest	Lowest Date	Zone
1	3.99	20180910 07:30	GMT	-4.42	20180105 04:36	GMT
2	3.84	20180909 19:18	GMT	-4.12	20180303 01:54	GMT
3	3.62	20191012 18:42	GMT	-3.74	20180302 16:06	GMT
4	3.47	20191012 06:24	GMT	-3.57	20180303 15:00	GMT
5	3.46	20180307 11:06	GMT	-3.45	20180303 15:00	GMT
6	3.44	20151004 00:06	GMT	-3.23	20170315 04:06	GMT
7	3.41	20151005 00:36	GMT	-3.22	20180104 17:54	GMT
8	3.36	20151004 12:18	GMT	-3.15	20180106 18:48	GMT
9	3.32	20180910 20:00	GMT	-3.10	20180107 18:36	GMT
10	3.29	20180911 08:30	GMT	-3.09	20190121 15:06	GMT

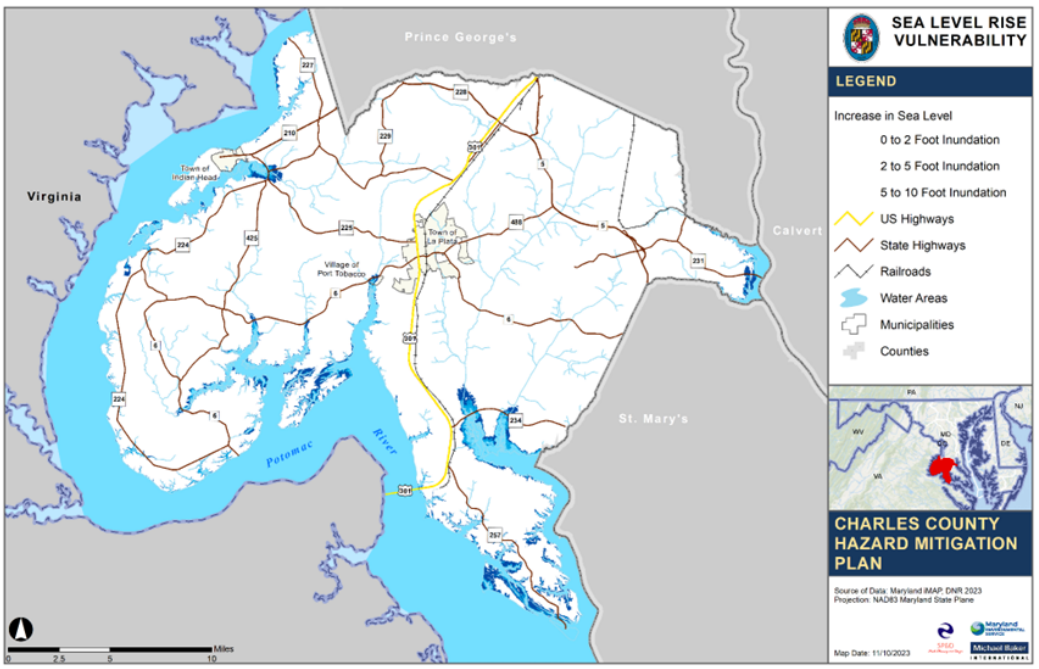
Source: https://tidesandcurrents.noaa.gov/stationhome.html?id=8635027 NOAA Tides & Currents-Dahlgren, VA - Station ID: 8635027

This exercise can be utilized to approximately correlate recorded tidal gauge data to known flood elevations for 10-, 50-, 100-, and 500-year storms as calculated within an FIS. However, the limitations of this technique must be taken into consideration. Specifically, the proximity of the tide gauge, or gauges, to the flood location is critical as mean ranges of tides vary from location to location even along the same river.

Sea Level Rise and Shoreline Erosion

Figure 3.3.5.8 from the 2023 Charles County Hazard Mitigation Plan Update, depicts the potential sea level rise impacts on Charles County, and shows that some areas have the potential to experience 5 to 10 foot inundation. Sea level rise impacts are projected to have the greatest impacts to areas surrounding the Mattawoman Creek, the Nanjemoy Creek, the Potomac River, and the Wicomico River.

Figure 3.3.5-8:

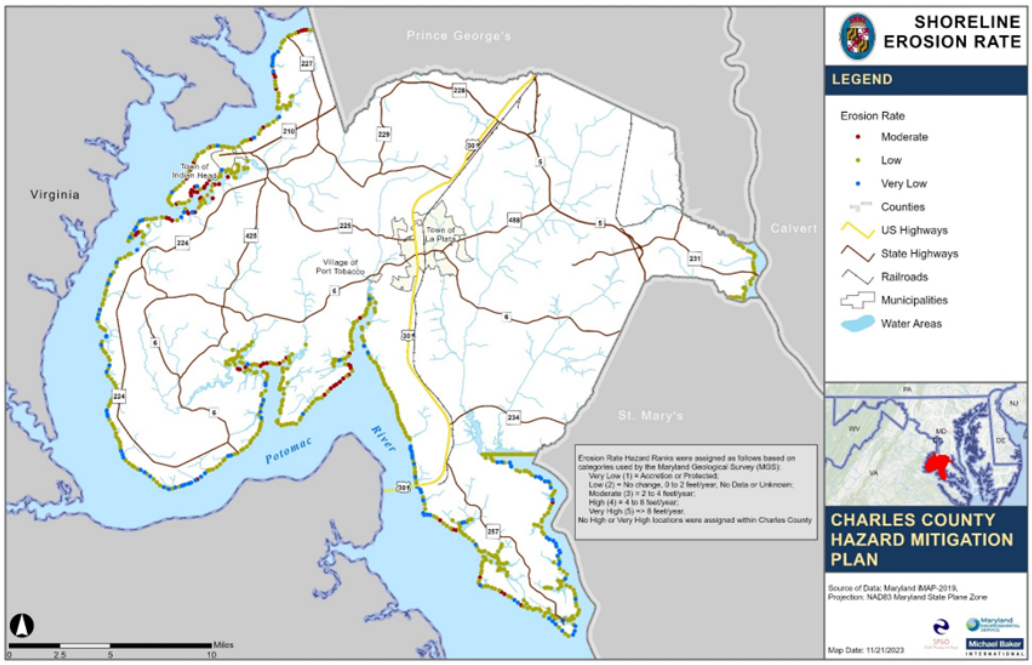


Source: 2023 Charles County Hazard Mitigation Plan Update

Additionally,tide gauge measurements in the Chesapeake Bay and Mid-Atlantic region show that sea level along Maryland's coastline has risen at an average rate of 3-4 mm per year, or approximately one foot per century. This rate is nearly double the global average, and reflects both global sea level rise and local land subsidence. Research indicates that land subsidence in southern Maryland is the result of postglacial crustal movement, sediment loading, tectonic activity, and possibly groundwater withdrawals (Maryland DNR, 2001; MGS, 2016). Future rates of sea level rise along Maryland's coastline are also expected to exceed the global average, resulting in a rise of 2-4.2 feet by 2100, if greenhouse emmission continue to increase (*2018 Sea Level Rise Projections for Maryland*). The potential of sea level rise to exacerbate erosion rates requires careful consideration of this factor in any shoreline erosion control plan.

Shoreline erosion is a continuous process that is highly spatially variable and temporally episodic. The basic progression of erosion from wave action includes: A) attack by waves, B) erosion of a bank and beach causing undercutting, C) slumping of the bank, and D) removal, transportation, and deposition of bank sediments along shorelines. The natural drivers of this process include weather, soil composition, topography, bathymetry (water depth), and fetch (the distance traveled by wind or waves across open water). Shoreline erosion tends to be greatest when storms amplify wind and wave action, and where soils are loose, slopes are steep, near-shore waters are deep, and fetch is large. In Charles County, the shoreline is highly vulnerable to nor'easters, tropical storms and hurricanes, particularly when these storms last 24 to 48 hours and are accompanied by high winds and storm surges. Storms of this type can amplify several high tide cycles, inundating protective beaches and marshes and subjecting upland areas to the brunt of the destructive wave energy. The results can include damage to shoreline stabilization projects and severe erosion of land masses.

Figure 3.3.3-1:



Source: 2023 Charles County Hazard Mitigation Plan Update

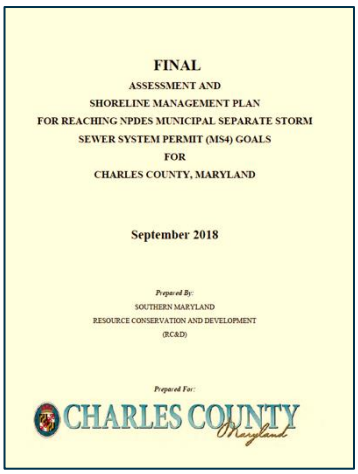
The U.S. Army Corps of Engineers (USACE) found that 31 percent of tidal shorelines in Charles County are experiencing some erosion, with 7 percent experiencing significant erosion rates of two feet per year or more (USACE, 1990). Subsequent studies by the Maryland Geological Survey (MGS) estimated shoreline erosion by comparing recently mapped shorelines (1988-1995) to historical maps. These studies divided Maryland's shoreline into segments of 80 meters or more, generalized erosion rates into four categories, and assigned each shoreline segment to the most representative category. According to data made available through the Maryland Coastal Resiliency Assessment, the MGS found approximately 9% of the County's coastline to be subject to significant erosion rates of two feet per year or more (The Nature Conservancy, 2016). As shown in Figure 3.3.3-1, the areas subject to significant erosion are concentrated near the Indian Head peninsula, the mouth of Nanjemoy Creek, and the mouth of Port Tobacco River.

The man-made drivers of shoreline erosion include land use and erosion control projects. Shoreline erosion tends to be greatest where upland areas generate significant runoff, and where adjacent shorelines are hardened with erosion control measures (such as revetments and bulkheads). Poorly designed erosion control measures accelerate shoreline erosion by reducing the supply of sediment to adjacent beaches, removing natural features that dampen wave action, or otherwise interrupting natural shoreline processes.

High shoreline erosion rates pose a significant threat to property owners, the public, and the County's natural resources - placing valuable land and assets at greater risk of storm damage. These assets include homes, businesses, historic and cultural sites, archaeological sites, recreational beaches, productive farmland, utilities, bridges, and roads. Shoreline erosion also contributes to the degradation of water quality and habitat. The nitrogen and phosphorus

carried with eroded sediments can exacerbate summertime dead zones in the Chesapeake Bay and tidal Potomac, and the sediment itself can smother important aquatic resources and fill navigational channels used for commerce and recreation.

Finally, the risk of shoreline erosion is expected to increase in the future due to more intense weather events and rising sea levels driven by climate change. Both factors contribute to erosion by amplifying natural coastal processes. For example, as sea level rises, storm surges will extend further into the coastal zone, exposing upland areas to destructive wave energy with greater frequency.



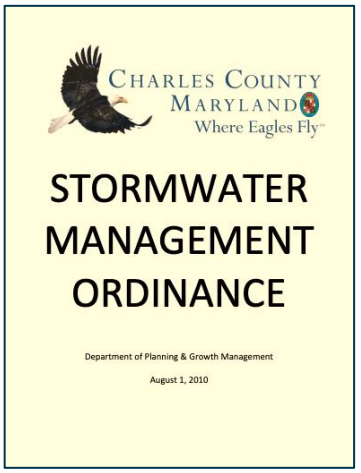
In September of 2018, the Final Assessment and Shoreline Management Plan for Reaching NPDES Municipal Separate Storm Sewer System Permit (MS4) Goals for Charles County, Maryland was completed. The plan reported that generally, the County's shorelines on the open Potomac River are subject to winddriven wave forces that caused shoreline erosion ranging from low to severe. Shorelines along the lateral waterbodies are somewhat less exposed to wave action, except shore reaches near their mouth. This Plan put the natural process of shoreline erosion into perspective as to potential long-term impacts to upland banks, land loss, and the consequent input of sediments and nutrients into the Chesapeake Bay. Priority was given to eroding shorelines with high erosion rates and those with potential infrastructure impacts. Eroding upland banks and shoreline morphology were addressed holistically in the context of the overall shoreline management plan.

This study yielded management strategy recommendations that addressed shoreline erosion on a reach basis. The impacts of "no action" at the shoreline were also considered. This plan employed the strategy of living shorelines as a best management practice for shore stabilization. Living shorelines are shore protection strategies that are relatively non-intrusive to natural surroundings yet effective within the context of long-term shoreline erosion control. They consist of a combination of stone structures, particularly sills and/or breakwaters along with sand nourishment which create a stable substrate for establishing wetland vegetation. This living shoreline approach utilizes stable marshes and beaches for shore protection, which are the preferred alternatives for shore protection, and can provide a platform for long-term coastal resiliency in the face of sea level rise.

Stormwater & Drainage Ordinances & Improvements Projects

Charles County adopted both the Stormwater Management Ordinance and the Storm Drainage Ordinance on August 1, 2010. In addition, to ordinances to control the adverse impacts associated with increased stormwater runoff, drainage improvement projects are undertaken each year by the County to mitigate existing stormwater related issues.

Stormwater Management Ordinance

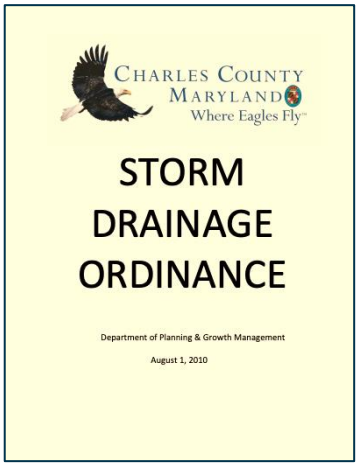


The purpose of the Charles County Stormwater Management Ordinance is to protect, maintain, and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse impacts associated with increased stormwater runoff.

The primary goals of the Charles County Stormwater Management Program are to maintain after development, as nearly as possible, the predevelopment runoff characteristics, and to reduce stream channel erosion, pollution, siltation and sedimentation, and local flooding by implementing Environmental Site Design (ESD) to the Maximum Extent Practicable (MEP) and, for water quality purposes only when necessary, using appropriate structural best management practices (BMPs).

The provisions of this Ordinance are adopted pursuant to the authority of the Environment Article, Title 4, Subtitle 2 of the Annotated Code of Maryland, 2009 Replacement Volume and Article 25 §3 of the Annotated Code of Maryland and apply to all new development or redevelopment of land, including but not limited to, residential, commercial, industrial, or institutional use. The application of this Ordinance and the provisions expressed herein shall be the minimum stormwater management requirements and shall not be deemed a limitation or repeal of any other powers granted by State law. The Department of Planning & Growth Management shall be responsible for the coordination and enforcement of the provisions of this Ordinance.

Storm Drainage Ordinance



This purpose of this ordinance is to protect the public health, safety and welfare on all existing properties by establishing minimum requirements and standards for adequate stormwater conveyance and drainage and providing for administration, enforcement, and penalties. Unless the particular activity is exempted by this regulation, a person may not construct a stormwater conveyance system consisting of pipes, inlets, gutters, ditches, swales, manholes, junction boxes, or perform any grading which would change the runoff characteristics from a property without first obtaining a permit from the Department of Planning & Growth Management. Prior to issuance of any permit, the County Engineer shall review and approve all information related to storm drainage as may be required of a developer under the terms of this ordinance.

Stormwater Management and Impervious Surface

Charles County's commitment to environmental stewardship is especially evident as related to stormwater management restoration. In 2014, the County was issued a five-year stormwater management discharge permit by the state with a due date of December 2019. The permit requires stormwater management restoration for 20-percent of the county's unmanaged impervious surface.

To begin the five-year permit period, all impervious surface in the County was mapped, and more than 7,000 acres were identified as needing stormwater management. Watershed assessments were completed for all 10 of the County's watersheds. These assessments measured water quality, evaluated stream valleys for erosion, surveyed hotspots for pollution, and identified stormwater restoration projects.

Staffing under the Watershed Restoration and Protection Program increased from 3.5 to 10.4 full-time equivalents during this five-year period and three consultant engineering firms were hired to assist in design and permitting of restoration projects.

Several permanent restoration projects have been completed. They include three step pool conveyances, three submerged gravel wetlands, five wet pond-constructed wetlands, 25 swales, a bioretention facility, a large underground storm filtering and storage facility, an outfall stabilization and two shoreline stabilizations. Several additional projects are currently under construction and in the design and permitting phases.

Nuisance Flood Response, Preparedness, & Mitigation

Following the identification of nuisance flood locations, stakeholders discussed each site and provided ideas on initiatives and projects for the following phases of Emergency Management: Preparedness, Response, and Mitigation.

Preparedness refers to measures taken to prepare **before** an emergency occurs and ensure that communities and services are capable of coping with disasters**.**

Examples: Community Awareness and Education; Proper Warning System; Mutual Aid; and, Mock Drill, Training Practice.

Response is defined as the actions taken to save lives and prevent further property damage **during** an emergency situation.

Examples: Evacuation; Sheltering; Road Barricades; and, Emergency Rescue.

Mitigation is the effort to reduce loss of life and property by minimizing or eliminating the impact of disasters. Mitigation activities take place **before** and **after** emergencies.

Examples: Flood Insurance; Stormwater Conveyance (culverts); Stormwater Upgrades (retention pond); and, Property Acquisition.

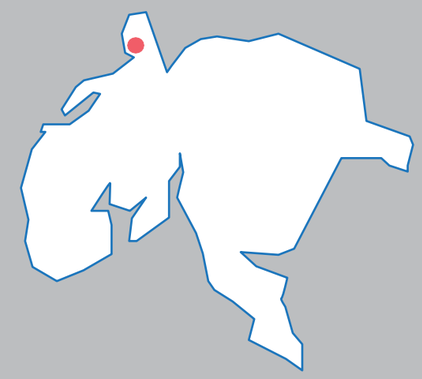
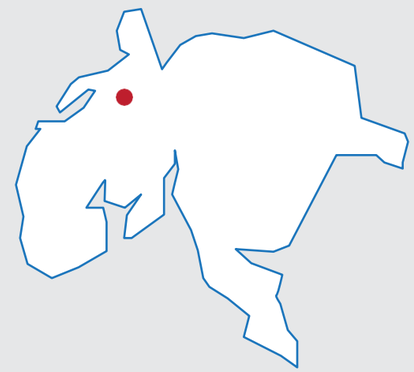
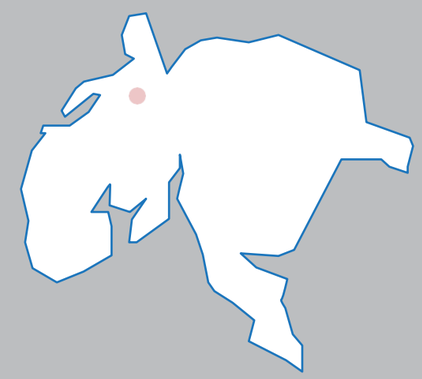
Each of the identified fifty-seven nuisance and urban flood location along with ideas on initiatives and projects have been included on Table 2. Finally, sites were reviewed and assigned a risk ranking of "**High**", "**Medium**", or "**Low**". Risk ranking criterial was based on the level of water observed and reported at each identified site and captured on Table 1.

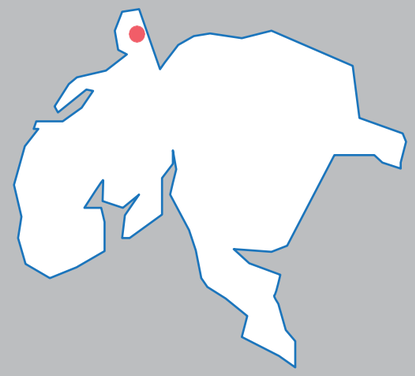
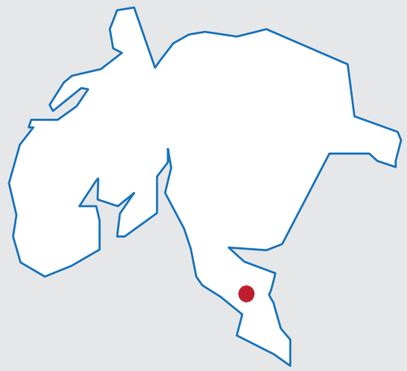
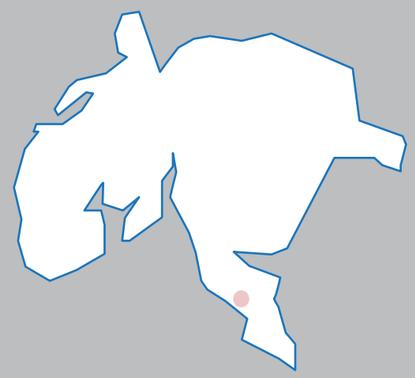
- Water Level reported as less than 1 foot of water or no information provided was assigned a risk ranking of "Low";
- Water Level reported as 1-2 feet of water was assigned a risk ranking of "Medium"; and,
- Water Level reported as 3 feet or more of water was assigned a risk ranking of "**High**".

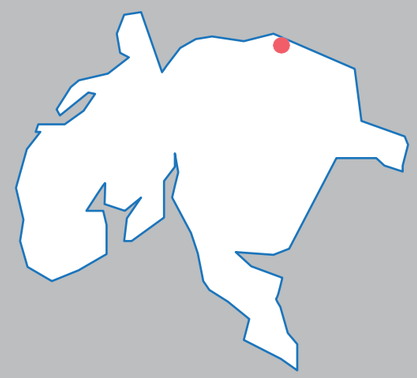
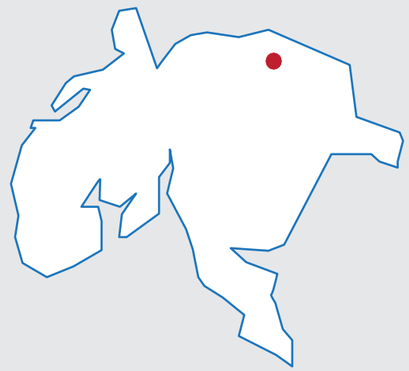
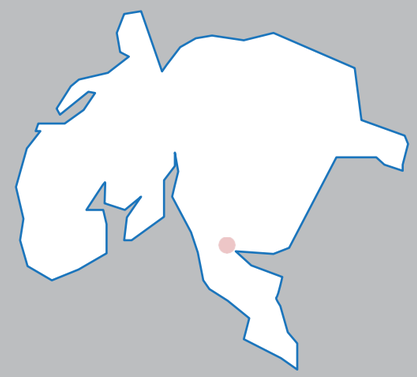
Using this assessment criteria six sites were labeled as "**High**" risk sites.

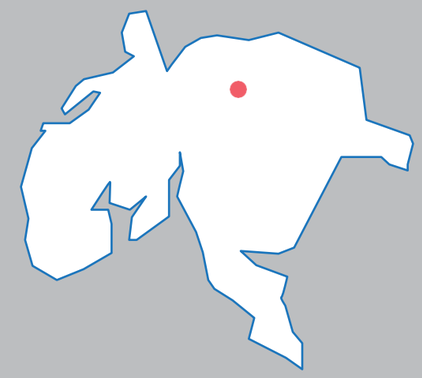
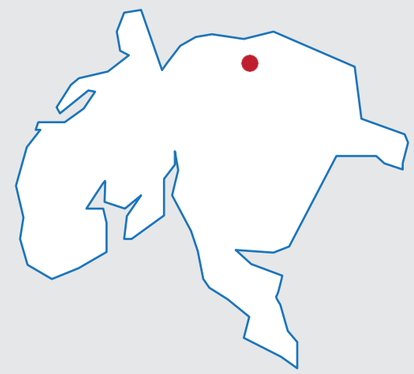
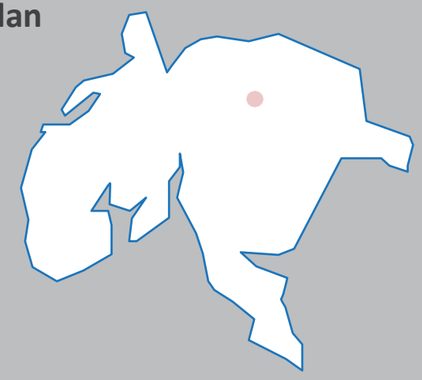
TABLE 2. NUISANCE AND URBAN FLOODING PREPAREDNESS, RESPONSE, & MITIGATION

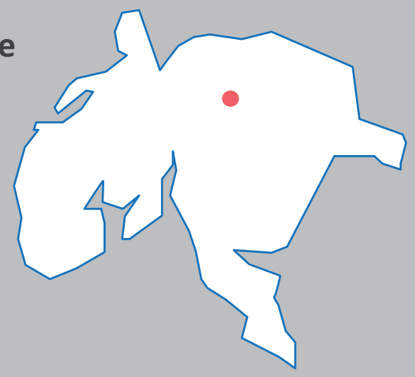
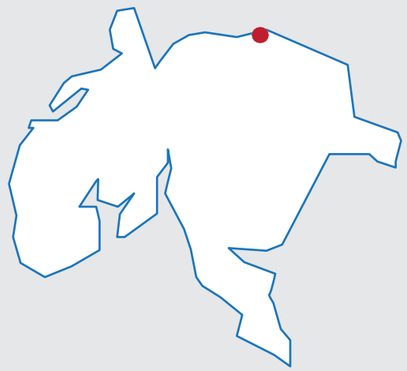
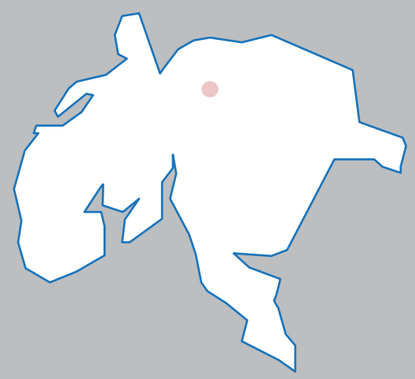


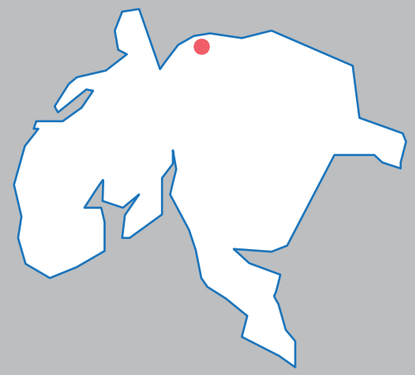
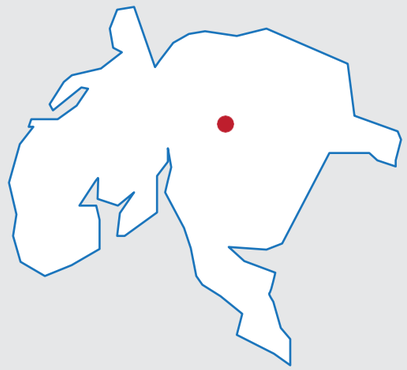
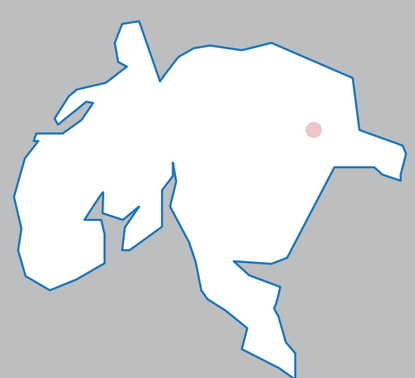
	HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
1 Fenwick Road in the area of New Place NUISANCE - Pomonkey Creek		ADD SIGNAGE SIGN TYPE: Warning and Mass Notification Use CAD and Notification EAS and IPAWS Use During Major Incidents	Current response is reactive barricade following notification Of water on roadway Note: Evacuation Resistant Community	Assessment of Location Existing Programs Prioritization	
2 Livingston Rd (RT 224) at Hawthorne Rd (RT 225) NUISANCE - Tributary #1 to Mattawoman Creek		ADD SIGNAGE SIGN TYPE: Measuring Quarterly Meeting Topic	Barricade Sign Priority	Protected property; possibly consider discussion with SHA & MDE Needs further evaluation	
3 Livingston Rd (RT 224) at Indian Head Rail Trail NUISANCE - Tributary #2 to Mattawoman Creek		ADD SIGNAGE SIGN TYPE: Measuring Quarterly Meeting Topic	Barricade Sign Priority	Protected property; possibly consider discussion with SHA & MDE Needs further evaluation	

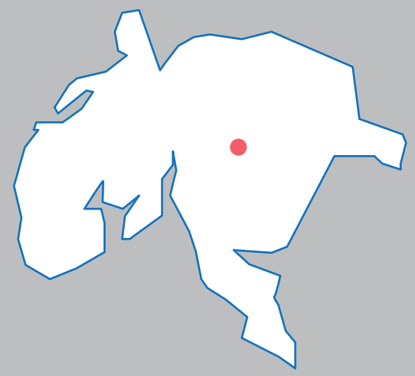
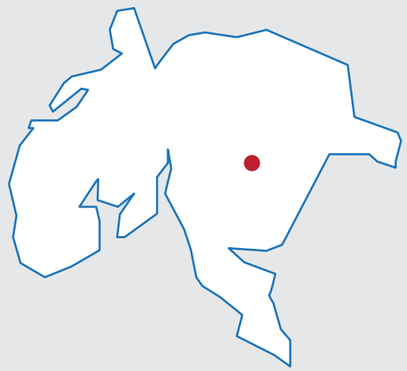
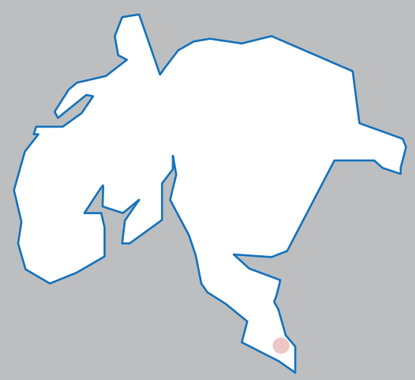
	HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
4 Barry's Hill Rd near Old Marshall Hall Rd URBAN - Mill Swamp		High Water Sign already installed at this location	*Transferred to RA with continued projects and evaluations in progress*	Clear Culverts	
5 Rock Point Rd (RT 257) in the area of Wayside Church NUISANCE & URBAN - Flash Flood; Piccowaxen Creek & Wicomico Creek		ADD SIGNAGE SIGN TYPE: Measuring	As Needed *Transferred to RA with continued projects and evaluations in progress*	Alternative Route, perhaps. Example: Improve Mt. Victoria	
6 Rock Point Rd (RT 257) near Banks O'dee Rd NUISANCE & URBAN – Flash Flood		ADD SIGNAGE SIGN TYPE: Flash Flood Sign	As Needed *Transferred to RA with continued projects and evaluations in progress*	Drainage correction Roadside ditches re-graded Culvert under roadway	

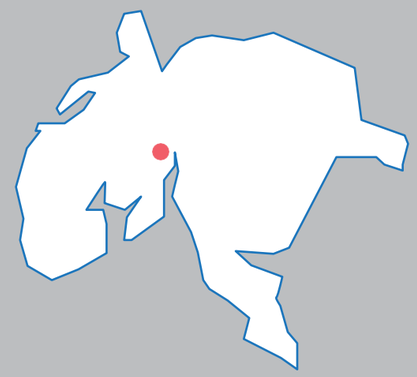
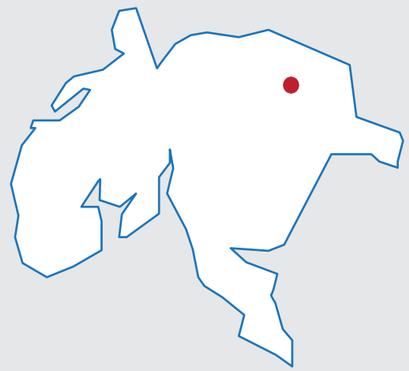
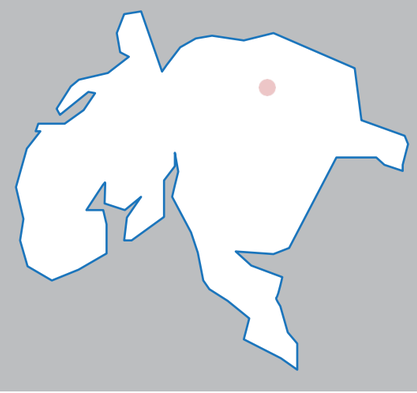
	HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
7 Pinewood Dr from Michael Rd to Lucy Dr URBAN		ADD SIGNAGE SIGN TYPE: Measuring signs placed strategically	Barricades have been used in the past. *Transferred to RA with continued projects and evaluations in progress*	Drainage improvements needed Some existing projects Private property issues	
8 Pinefield Rd from Harwich Dr to Alfred Dr URBAN		ADD SIGNAGE SIGN TYPE: Measuring	As Needed *Transferred to RA with continued projects and evaluations in progress*	Maybe a USDA Grant similar to Potomac Heights or Woodland Village	
9 Budds Creek Rd (Rt 234) near Allens Fresh Run NUISANCE - Allens Fresh Run - Tributary to Wicomico River				Bridge replacement project elevated the roadway.	

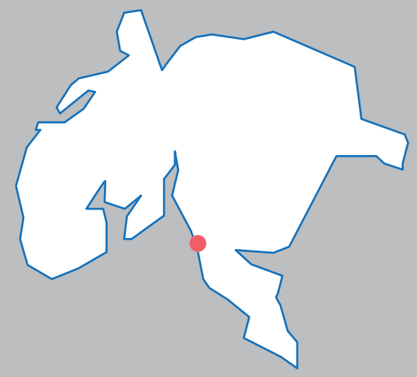
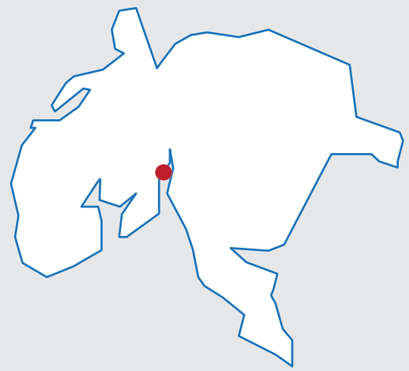
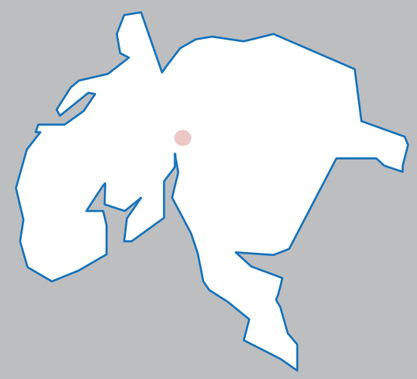
		HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
10	Old Washington Rd and Pembrooke Square URBAN - Tributary #1 to Piney Branch		ADD SIGNAGE SIGN TYPE: Flood Quarterly Meeting Topic	As Needed *Transferred to RA with continued projects and evaluations in progress*	Environmental restrictions are limited factors in this area in terms of projects Possibility of using stormwater as grey water and pumping to power plant	
11	Acton Lane near Crain Hwy URBAN - Flash Flood Events		Existing Drainage Issues	As Needed *Transferred to RA with continued projects and evaluations in progress*	Evaluate Drain System Drainage Improvement Plan	
12	Industrial Park Dr and Post Office Rd Intersection URBAN		ADD SIGNAGE SIGN TYPE: Flood	*Transferred to RA with continued projects and evaluations in progress*	Add to Drainage Improvement Plan Possibly enlarge culvert	

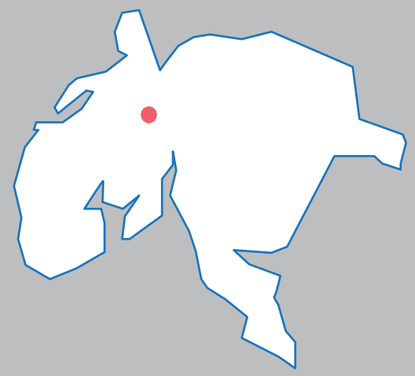
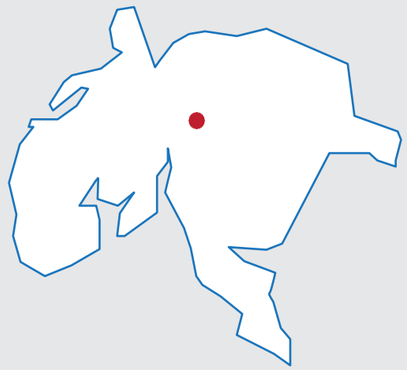
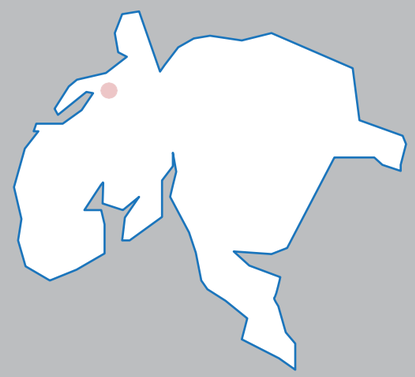
		HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
13	Garner Ave between Stone Ave to Fillmore Rd URBAN			*Transferred to RA with continued projects and evaluations in progress*	*Recent construction may have corrected issues. Waiting for large rain even. So far, no problems have been observed.	
14	Country Lane near Temi Dr Intersection URBAN - Tributary of Mattawoman Creek; Stream Flooding			*Transferred to RA with continued projects and evaluations in progress*	*Drainage improvement project completed	
15	Middletown Rd between Blue Lake Pl and Billingsley Rd URBAN		ADD SIGNAGE SIGN TYPE: Permanent Sign (High Water)	Temporary Signage Road Closures during event *Transferred to RA with continued projects and evaluations in progress*	Stormwater Study / Stormwater Management Structure	

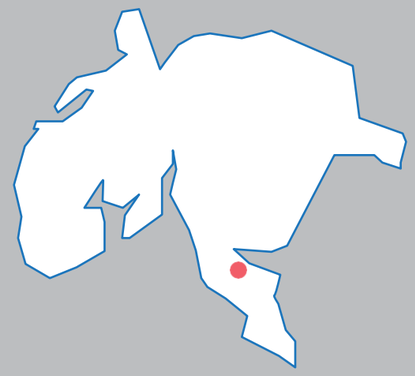
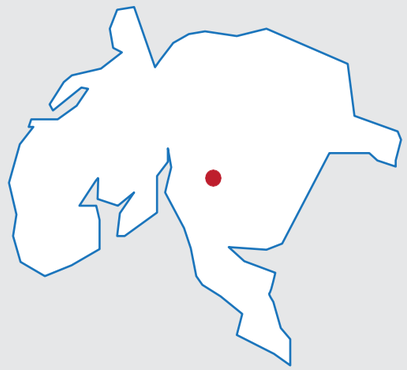
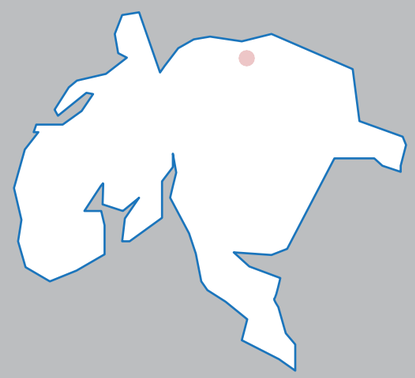
		HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
16	Bunker Hill Rd near Davis Rd URBAN - Piney Branch		Community outreach to HOA- discuss rain barrels, and rain gardens, etc.	Road Closure Signage *Transferred to RA with continued projects and evaluations in progress*	Advocate for developer to retrofit stormwater management for Scotland Heights	
17	Turkey Hill Rd URBAN - Port Tobacco Creek		ADD SIGNAGE SIGN TYPE: Permanent Sign (High Water - with lights)	As Needed *Transferred to RA with continued projects and evaluations in progress*	Series of culverts pipes have recently been replaced in this area.	
18	Gallant Green Rd near Truman Manor Lane URBAN - Swanson Creek		ADD SIGNAGE SIGN TYPE: Permanent Sign Swift Water Rescue Training and Equipment Emergency Notification Systems - public outreach initiatives	Add Vehicles with higher clearance to County vehicle fleet Request 9-1-1 / Code Red System *Transferred to RA with continued projects and evaluations in progress*	County Stormwater engineers should review site Replace pipes Elevate Roadway	

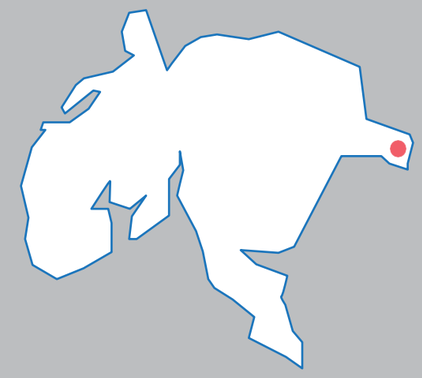
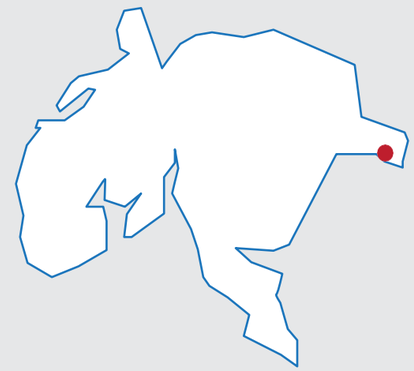
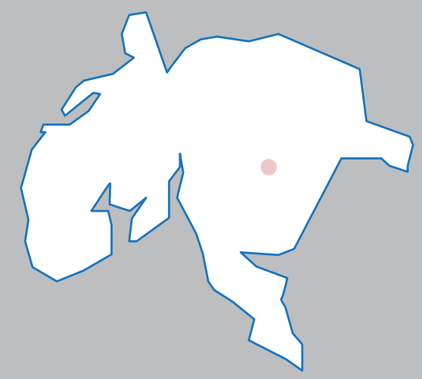
		HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
19	Glen Albin Rd intersection with Oak Avenue URBAN		*Transferred to RA with continued projects and evaluations in progress*		Town of La Plate to research any issues at this site.	
20	Springhill Newtown Rd intersection with Glen Albin URBAN - Clark Run Tributary		ADD SIGNAGE SIGN TYPE: Permanent Sign (Turn Around - Don't Drown) & High-Level Mark Sign Community Outreach including meetings	Road closure Barricades Emergency Rescue *Transferred to RA with continued projects and evaluations in progress*	Silt Fencing to hold back run-off Elevate the road and install drainage ditches	
21	Cobb Island (MD 254) at Bridge Approach NUISANCE - Neale Sound		ADD SIGNAGE SIGN TYPE: Permanent Sign High- Water Sign with lights; allow for remote operation and solar power Community outreach and prepare residents Meet with residents to discuss evacuation	As needed	Replace collapsed culvert pipe Explore flood buy-outs and the option to elevate structures	

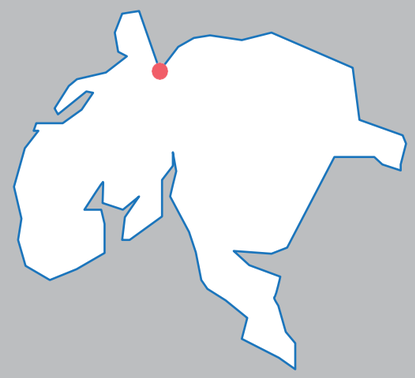
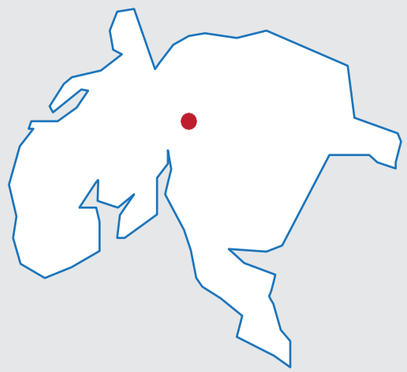
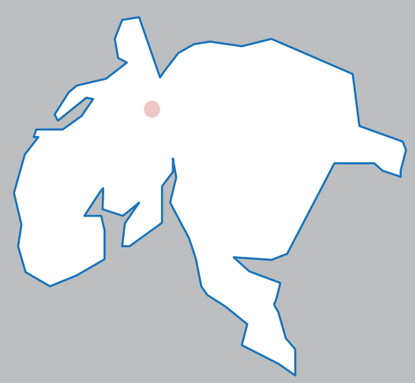
		HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
22	Pomfret Rd (RT 227) at Indian Head Rail Trail URBAN		ADD SIGNAGE SIGN TYPE: Permanent Sign with Lights	As Needed *Transferred to RA with continued projects and evaluations in progress*	Stormwater improvement & protect roadway edges / harden Increase vegetation along trail and roadway Watershed improvement at top or bottom of hill	
23	3940 Samuel Mudd Rd URBAN			*Transferred to RA with continued projects and evaluations in progress*	*Drainage pipe has recently been replaced. Public Works indicated that this should fix the issue; they will continue to monitor	
24	Poplar Hill Rd between St. Peters Church Rd and Mattawoman Beantown Rd (at the bridge) URBAN-Tributary #1 to Jordan Swamp			*Transferred to RA with continued projects and evaluations in progress*	Culvert replacement project Have County SWM engineer review to see if larger pipe is necessary	

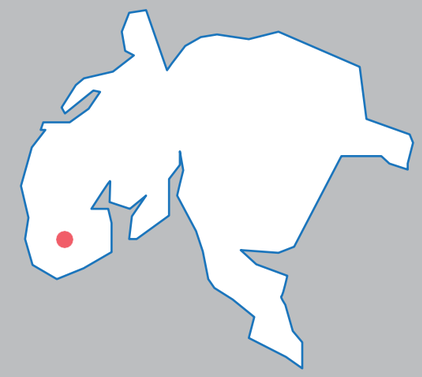
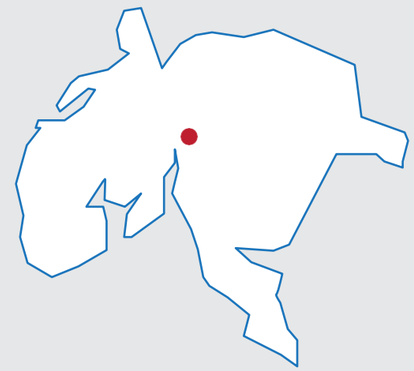
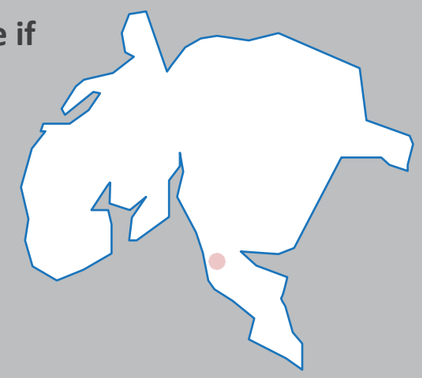
	HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
25 Pope's Creek Rd NUISANCE - Potomac River		ADD SIGNAGE SIGN TYPE: Permanent Sign (High Water - with lights); Powered remotely and by solar energy		Armor shoreline - revetment Elevate the road and parking lots, consider permeable pavement	
26 Ann Harbor Dr at RV Park Entrance NUISANCE - Port Tobacco River		ADD SIGNAGE SIGN TYPE: Permanent Sign (High Water) Community outreach and education Assist community in developing an evacuation plan	Implement Evacuation Plan	Series of culvert pipes have recently been replaced in this area	
27 Rose Hill Rd URBAN - Wetland		ADD SIGNAGE SIGN TYPE: Permanent Sign	*Transferred to RA with continued projects and evaluations in progress*	County stormwater engineers should review site in order to determine if larger pipe is needed to drain pond to Port Tobacco River Stream Maintenance Dam Removal	

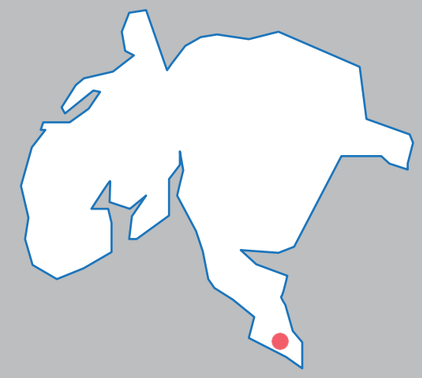
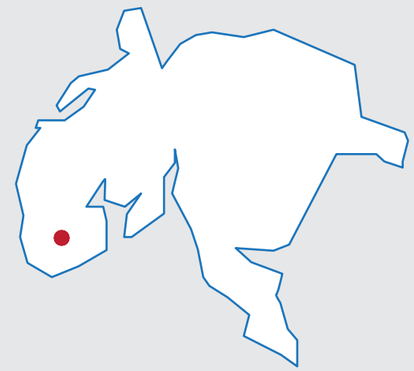
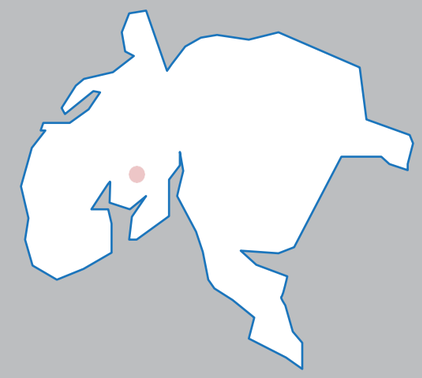
	HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
28 Bumpy Oak Rd near Indian Head Rail Trail URBAN - POND - Mattawoman Creek		Sign with Barricade	As Needed	Marsh / Wetland Issues	
			Transferred to RA with continued projects and evaluations in progress		
29 Crain Highway (RT 301) and Centennial St Intersection URBAN			*Transferred to RA with continued projects and evaluations in progress*	Stormwater Improvement	
30 Indian Head Highway (RT 210 N) at Lower Wharf Rd URBAN – Major Storm Event			*Transferred to RA with continued projects and evaluations in progress*	Beaver Removal Included in current Drainage Improvement Plan	

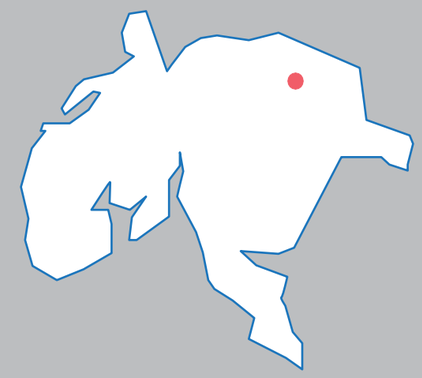
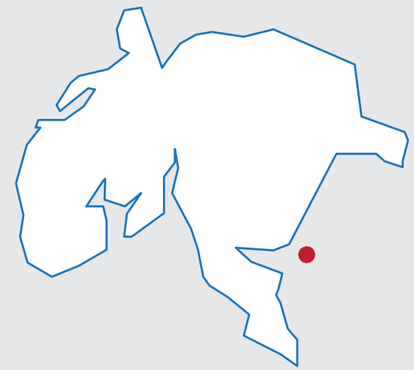
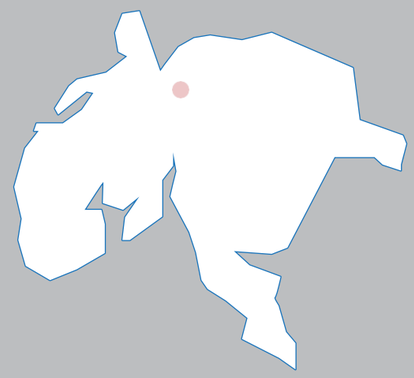
		PREPAREDNESS	RESPONSE	MITIGATION	
	HI / MD / LO				
31 Mt. Victoria Rd near Black Friars URBAN		ADD SIGNAGE SIGN TYPE: Flood Area Sign	*Transferred to RA with continued projects and evaluations in progress*	Stormwater evaluation Culvert may help Drainage Improvementplan	
32 Bel Alton Newtown Rd and Oriole Lane Intersection URBAN		ADD SIGNAGE SIGN TYPE: Permanent Sign with Lights	*Transferred to RA with continued projects and evaluations in progress*	Stormwater evaluation Culvert may help Consider site for inclusion in the Drainage Improvement Plan	
33 Westdale Dr Townhomes URBAN		Educate Homeowners/HOA	*Transferred to RA with continued projects and evaluations in progress*	Drainage Pond Needed Idea: Use as a template for additional drainage ponds that do not affect a road but impacts homes.	

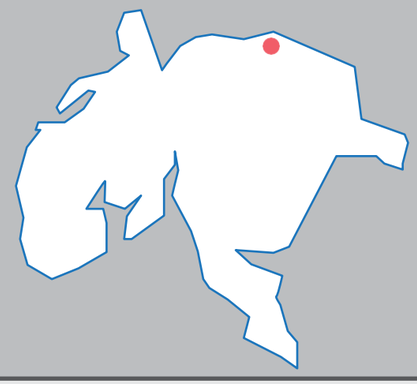
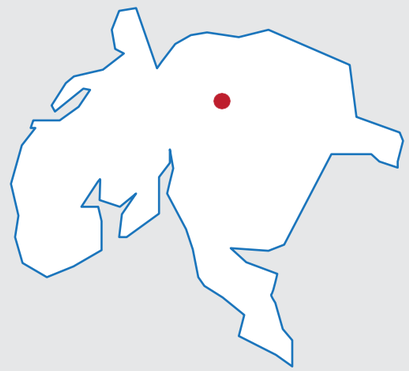
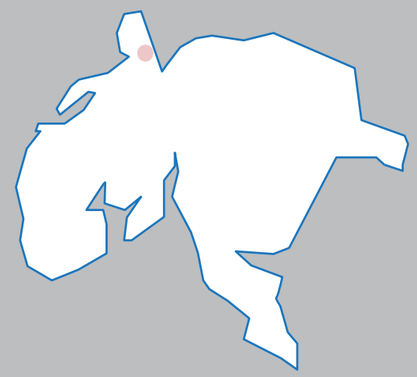
	HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
34 Area around 7825 Mill Creek Rd NUISANCE - Patuxent River		ADD SIGNAGE SIGN TYPE: Flood Area Sign with gauge and flashers			
35 Mill Creek Rd after Benedict Ave Intersection URBAN		ADD SIGNAGE SIGN TYPE: Flood area sign with gauge and flashers	*Transferred to RA with continued projects and evaluations in progress*		
36 Dubois Rd near AG Supply Place URBAN – Dention Run		ADD SIGNAGE SIGN TYPE: Measuring Sign	Response Barricades - fast moving water *Transferred to RA with continued projects and evaluations in progress*	Repairs may have been completed at this site, need to evaluate and confirm if work has been completed since 2015	

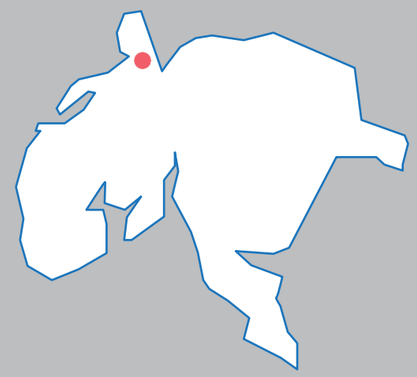
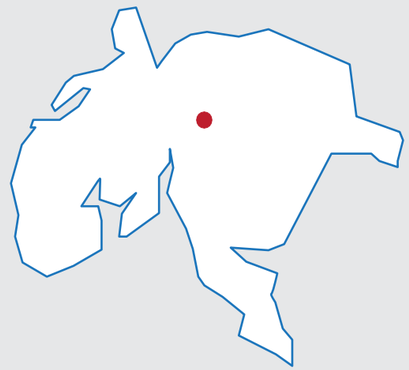
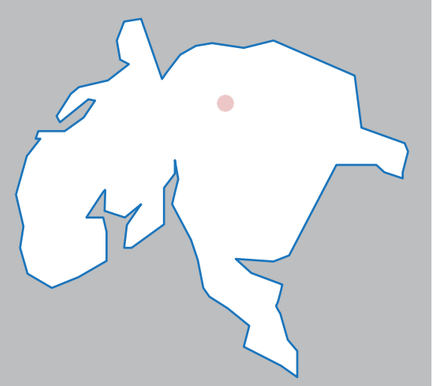
		HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
37	Billingsley Rd at Duttons Bridge URBAN - Mattawoman Creek		ADD SIGNAGE SIGN TYPE: Flood area sign with barricades	Rescue as Needed *Transferred to RA with continued projects and evaluations in progress*	Currently Being Evaluated Road and Drainage	
38	Mitchell Rd near Hawthorne Rd (RT 225) URBAN			*Transferred to RA with continued projects and evaluations in progress*	Installation of a culvert should fix this issue.	
39	Pomfret Rd (RT 227) near Foxburrow Pl URBAN - Mattawoman Creek		ADD SIGNAGE SIGN TYPE: Permanent Sign with lights Community outreach through social media Flyers to get community to sign-up for emergency notifications	Road Closure *Transferred to RA with continued projects and evaluations in progress*		

		HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
40	Port Tobacco Rd (MD 6) near Maryland Point Rd URBAN - Nanjemoy Creek		ADD SIGNAGE SIGN TYPE: Flood Area Sign Mailing to Property Owners	*Transferred to RA with continued projects and evaluations in progress*		
41	Chapel Point Rd between Causeway St and Stagg Hall URBAN - Heavy Rain Events		Property owner outreach	*Transferred to RA with continued projects and evaluations in progress*	Silt Fencing	
42	Clifton Dr near Ingleside Dr URBAN – Clifton Creek			*Transferred to RA with continued projects and evaluations in progress*	Review Clifton on the Potomac stormwater system to determine if retrofit project is needed.	

		PREPAREDNESS	RESPONSE	MITIGATION	
43	Pine Grove Rd - Chigger City NUISANCE - Neale Sound				
44	Hancock Run Rd near Bridge URBAN / BEAVER Beaverdam Creek		Road Closure *Transferred to RA with continued projects and evaluations in progress*	Beaver Issue Elevate Low Spots in Roadway	
45	Mill Swamp Rd near Port Tobacco Rd (RT 6) URBAN / BEAVER Mill Run & Burgess Creek		*Transferred to RA with continued projects and evaluations in progress*	Beaver issues Clean out pipes	

	HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
49 Popular Hill Rd near Breconridge Drive URBAN - Zekiah Swamp			*Transferred to RA with continued projects and evaluations in progress*	Complete reconstruction of the bridge; in design phase now	
50 Brandywine Rd (RT 381) at the County Line URBAN - Swanson Creek		ADD SIGNAGE SIGN TYPE: Measuring	*Transferred to RA with continued projects and evaluations in progress*		
51 Bensville Rd (RT 229) just south of Indian Head Rail Trail URBAN - Heavy Rain Events		ADD SIGNAGE SIGN TYPE: Flash Flood Sign	*Transferred to RA with continued projects and evaluations in progress*		

		HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
52	Mattawoman Beantown Rd (RT5) south Pinefield Dr URBAN			*Transferred to RA with continued projects and evaluations in progress*	Stormwater Maintenance	
53	Kings Manor South in White Plains URBAN			*Transferred to RA with continued projects and evaluations in progress*	Add to Drainage Improvement Plan	
54	Strawberry Hills Neighborhood URBAN			*Transferred to RA with continued projects and evaluations in progress*	Add to Drainage Improvement Plan	

		HI / MD / LO	PREPAREDNESS	RESPONSE	MITIGATION	
55	Marshall Hall Rd (RT 227) near Timber Ridge Development URBAN			*Transferred to RA with continued projects and evaluations in progress*	Install Plant Material Repair Culvert	
56	Billingsley Rd 1600’ east of MD 229 URBAN		ADD SIGNAGE SIGN TYPE: Warning System Signs	Traffic Warning Signs – Detour Signs *Transferred to RA with continued projects and evaluations in progress*	Investigate cause – calculate and resize culvert, may require property acquisition to clear the channel	
57	Shirley Blvd. & Mary Drive URBAN		ADD SIGNAGE SIGN TYPE: Warning System Signs	*Transferred to RA with continued projects and evaluations in progress*	Investigate downstream issues for the cause – calculate and resize culvert	

Drainage Improvement Plan & Project Prioritization Criteria

Quantitative metrics were scored based on results of the preliminary design and cost estimates (e.g. impervious area treated, pollutant removal). Other metrics were scored more qualitatively based on professional judgment and assessment of each project site (e.g. access constraints, public visibility/education/outreach).

Each project was assigned a score between 1 and 5 for each metric. Projects evaluated to have the most benefit received a score of 5, and those with the least benefit were given a score of 1. Constraints were evaluated in a similar fashion such that projects with more constraints were scored a 1, and those with the least were given a score of 5. The Department Public Works will continue to work on project criteria and prioritization and will include nuisance and urban flood site identified herein within their planning framework.

Implementation & Monitoring

Nuisance flood events and adaptation actions will be monitored, implemented, and documented. Table 2 within this plan will serve a guide for future actions over the course of over the next five years.

Continuous Communication with the Public

Charles County Nuisance Flooding ArcGIS StoryMap will continue to collect flood related information from the public. Additional information communicating flood hazards, ways to engage, and updates on implementation will be uploaded to the site.

In addition to the StoryMap, Maryland will be deploying the MyCoast application to document nuisance and precipitated-induced flooding, storm damage, and more. Coastal decision makers, emergency managers, and others use your reports to make better decisions. Charles County will promote the use of this application.

MyCoast

The National Oceanic and Atmospheric Administration (NOAA) and the National Weather Service (NWS) developed the MyCoast application, which is a social media application used to document nuisance flooding and flooding after storms. NOAA and NWS partner with State agencies to tailor the app to suit the needs of the partnering agency. In Maryland, the Department of Natural Resources (DNR) is the sponsoring partner.

Once the application is downloaded onto a mobile device, users can take photographs of nuisance flooding and submit them. These submissions are called “reports.” The MyCoast application captures the time and location of the photograph, in addition to the weather and tidal conditions. This data is recorded by the application and can be downloaded. Data obtained could assist decision makers on how to address nuisance flooding.

Data collected from the application is utilized to track the occurrence of nuisance flood events and support the development of mitigation actions for areas impacted by these events. The MyCoast report data can be used to:

- Confirm and identify new locations of flooding
- Define the hazard (depth, duration, area covered by flooding)
- Further refine the thresholds for when nuisance flooding will occur (in conjunction with tide data)
- Develop mitigation strategies to reduce flooding

APPENDIX 1

NCEI STORM EVENT DATA- CHARLES COUNTY ROADWAY FLOODING EVENTS



NCEI DATA Charles County – Roadway Flood Events			
Event Type	**Date**	**Location**	**Narrative/Road Name**
Coastal	2/4-2/5/1998	Cobb Island	Inland flooding was less extensive in Charles and Calvert Cos, but a problem, nonetheless. In Charles Co, 25 roads were closed at the peak of the flooding. Coastal flooding forced evacuations of Cobb Island; the island was cut off from the mainland at around 0700EST on the 5th, with conditions returning to normal by 1600EST.
Flash	8/25/1999	Countywide	• Several portions of Action Lane near the Mattawoman Creek were closed due to high water. • The Lynnbrook subdivision in Waldorf had several homes surrounded and flooded by water, and some residents had to be rescued by firefighters. • Hamilton Drive had water flowing over it like a waterfall. • Near the intersection of Acton Lane and Highway 301 in Waldorf, water became so deep a hotel had to be evacuated.
Flood	2/2-2/23/2003	La Plata	In Charles County, urban and small stream flooding was reported in La Plata and Bryans Road. • Newton Road, • Hancock Road, • and Bumpy Oak Road were closed by high water.
Flash Flood	6/7/2006	Countywide	• Middletown Road, • Billingsley Road, and • Turkey Hill Road in Waldorf and White Plains. • Bryans Road and Fenwick Road experienced flash flooding. • Bumpy Oak Road and Pomfret Road in Pomfret reported flash flooding.
Flood	11/16/2006	La Plata and Waldorf	Numerous roads were closed across Charles County, especially near La Plata, Port Tobacco, Bryans Road and Waldorf. • One roadway closed due to flooding include Billingsley Road between White Plains and Bryans Roads.
Flash Flood	8/22/2009	White Plains	Turkey Hill Road was closed due to water flowing over the roadway. Spotter in the area reported rainfall total of 3.74 inches.
Coastal Flood	11/13/2009	Cobb Island	Coastal flooding was responsible for road closures in Cobb Island.
Coastal Flood	9/30-10/1/2010		Several roads were closed due to tidal inundation. • Shirley Blvd. was closed at Port Tobacco Lakes. • Saunders Marine Place was closed in Charleston Creek. • Cobb Island Road was closed on Cobb island.

NCEI DATA Charles County – Roadway Flood Events			
Event Type	**Date**	**Location**	**Narrative/Road Name**
Flash Flood	7/13/2011	La Plata White Plains	• Saint Mary's Avenue was closed due to high water. A nearby rain gage measured 1.75 inches. • Washington Avenue was closed due to flash flooding. A nearby rain gage recorded 1.50 inches.
Flash Flood & Flood	9/7/2011	Mason Springs Mattawoman & Indian Head Tompkinsville Port Tobacco La Plata Bel Alton Indian Head	• Route 225 was flooded and closed near Route 224. A nearby rain gauge tallied 6.13 inches. • Numerous roadways were closed due to flash flooding in Waldorf and across Charles County. A spotter in Waldorf measured 8.71 inches of rain. • Route 257 was flooded and closed at Banks O Dee Road. A nearby spotter observed 4.52 inches of rain. • Route 301 was closed at Route 6 due to flash flooding. A nearby rain gauge tallied a storm total of 7.83 inches. • Port Tobacco Road was closed between Rose Hill and Valley Roads. • Route 301 was closed at Chapel Point Road due to flash flooding. A rain gauge in the area recorded 6.91 inches. • Route 227 West was closed at Ray Drive due to flash flooding. A nearby spotter reported 5.84 inches of rain.
Flash Flood	9/8/2011	Hill Top & Ironsides	Port Tobacco Road was closed at Wards Run due to flash flooding.
Flood	12/7-12/8/2011	Grayton	Route 6 was closed at Maryland Point Road due to flooding. A trained spotter near Bryans Road observed 4.31 inches.
Flood	12/8/2011	Pomfret	Route 227 was closed between Brierwood Road and Marshalls Corner Road due to high water. A rain gauge near Waldorf totaled 4.18 inches.
Flash	8/9/2013	Dubois	Dubois Road at AG Supply Place was closed due to high water.
Flood	5/1/2014	Pomonkey	Billingsley Road was flooded and closed just east of Mattawoman Creek.
Flash Flood	8/12/2014	Mattawoman & Waldorf	There was more than six inches of water flowing over Timberbrook Drive in Waldorf.
Flash Flood	6/27/2015	Newport	Bowling Drive was closed due to high water.
Coastal	10/4/2015		MD route 257/254 at Dyer Rd was closed during consecutive high tide cycles on the 4th.
Flash Flood	7/6/2017	Newton	There was high water flowing across the roadway near the intersection of Glen Albin Road and Spring Hill-Newtown Road.
Flash Flood	8/21/2017	Dentsville	Estevez Road flooded and closed due to torrential rainfall.

NCEI DATA Charles County – Roadway Flood Events			
Event Type	**Date**	**Location**	**Narrative/Road Name**
Flood	2/11/2018	Indian Head	The USGS stream gauge on Mattawoman Creek near Pomonkey exceeded flood stage between 256 PM on the 11th and 1030 AM on the 12th. Several roads, including Maryland Route 227, were flooded and closed while the gauge was over flood stage.
Flood	5/18/2018	Wayside Newtown Newport	• Mill Run Road reported flooded and closed at Mill Run near Route 257. • Shiloh Church Road reported flooded and closed near Ditchley Prong in the Newburg area. • Springhill Newtown Road reported flooded and closed in the vicinity of Clark Run south of La Plata. • Stines Store Road and Newport Church Road are both reported flooded and closed in the area of Murphy Run and Newport Run near Wicomico.
Flood	7/22/2018	Massawoman	Pinefield Road flooded and closed near Alfred Drive.
Flood	10/11/2018	St. Charles Waldorf Ironsides	Multiple vehicles were stranded in water at least knee high at the intersection of Hamlin and Garner and also at the intersection of Stone and Garner. • MD-925 was closed due to flooding near Terrace Drive. • MD-425 Ironsides Road was closed due to flooding near MD-6 Port Tobacco Road.
Flood	10/12/2018	Patuxent Indian Head	MD-381 Brandywine Road was closed due to flooding near MD-231 Prince Frederick Road. Mattawoman Creek was out of its banks. The creek passed flood stage of 7 feet at 5:42 AM EST and crested at 7.62 feet at 9:15 AM EST. At 7 feet, Pomfret Road at Livingston Road was closed due to high water.
Flash Flood	7/8/2019	St. Charles Indian Head	• Wakefield circle was flooded with water up over the bottom of vehicle doors. • The water level rose to the flood stage of 7 feet along the Mattowoman Creek at Pomonkey. The water level crested at 7.43 feet at 10:00 PM EST on the 8th. At 7 feet, Pomfret Road begins to flood.

Source: National Centers for Environmental Information (1980-September 30,2019)

Appendix G – 2018 Local Mitigation Plan Review Tool

LOCAL MITIGATION PLAN REVIEW TOOL

The *Local Mitigation Plan Review Tool* demonstrates how the Local Mitigation Plan meets the regulation in 44 CFR §201.6 and offers States and FEMA Mitigation Planners an opportunity to provide feedback to the community.

- The Regulation Checklist provides a summary of FEMA's evaluation of whether the Plan has addressed all requirements.
- The Plan Assessment identifies the plan's strengths as well as documents areas for future improvement.
- The Multi-jurisdiction Summary Sheet is an optional worksheet that can be used to document how each jurisdiction met the requirements of the each Element of the Plan (Planning Process; Hazard Identification and Risk Assessment; Mitigation Strategy; Plan Review, Evaluation, and Implementation; and Plan Adoption).

The FEMA Mitigation Planner must reference this *Local Mitigation Plan Review Guide* when completing the *Local Mitigation Plan Review Tool*.

Jurisdiction: **Charles County, MD**	**Title of Plan:** Charles County 2018 Hazard Mitigation Plan Update	**Date of Plan:**
Local Point of Contact:		**Address:**
Title:		
Agency:		
Phone Number:		**E-Mail:**

State Reviewer: **Jihane Ambroise**	**Title:** **State Hazard Mitigation Planner**	**Date:**

FEMA Reviewer: **Matt McCullough**	**Title:** Community Planner	**Date:**
Date Received in FEMA Region ***(insert #)***		
Plan Not Approved		
Plan Approvable Pending Adoption		
Plan Approved		

SECTION 1:
REGULATION CHECKLIST

INSTRUCTIONS: The Regulation Checklist must be completed by FEMA. The purpose of the Checklist is to identify the location of relevant or applicable content in the Plan by Element/sub-element and to determine if each requirement has been 'Met' or 'Not Met.' The 'Required Revisions' summary at the bottom of each Element must be completed by FEMA to provide a clear explanation of the revisions that are required for plan approval. Required revisions must be explained for each plan sub-element that is 'Not Met.' Sub-elements should be referenced in each summary by using the appropriate numbers (A1, B3, etc.), where applicable. Requirements for each Element and sub-element are described in detail in this *Plan Review Guide* in Section 4, Regulation Checklist.

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan** (section and/or page number)	**Met**	**Not Met**
ELEMENT A. PLANNING PROCESS			
A1. Does the Plan document the planning process, including how it was prepared and who was involved in the process for each jurisdiction? (Requirement §201.6(c)(1))	Chapter 1 & Appendix C	X	
A2. Does the Plan document an opportunity for neighboring communities, local and regional agencies involved in hazard mitigation activities, agencies that have the authority to regulate development as well as other interests to be involved in the planning process? (Requirement §201.6(b)(2))	Chapter 1 pg. 10-15 & Appendix C	X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))	Pg. 13-14 & Appendix C	X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))	Appendix B		X
A5. Is there discussion of how the community(ies) will continue public participation in the plan maintenance process? (Requirement §201.6(c)(4)(iii))	Pg. 289-291	X	
A6. Is there a description of the method and schedule for keeping the plan current (monitoring, evaluating and updating the mitigation plan within a 5-year cycle)? (Requirement §201.6(c)(4)(i))	Pg. 289-291	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	**Location in Plan (section and/or page number)**	**Met**	**Not Met**
ELEMENT A: REQUIRED REVISIONS **A4.) Required Revision:** Please provide a brief statement as to the incorporation and review of the listed reference materials. (Appendix B, etc…) Added new section (1.11 Data Sources) to Chapter 1: Planning Process on pg. 15. This paragraph references the materials listed in Appendix B and highlights several key data sources and studies reviewed and incorporated into the HMP Update.			
ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT			
B1. Does the Plan include a description of the type, location, and extent of all natural hazards that can affect each jurisdiction(s)? (Requirement §201.6(c)(2)(i))	Pg. 41-198	X	
B2. Does the Plan include information on previous occurrences of hazard events and on the probability of future hazard events for each jurisdiction? (Requirement §201.6(c)(2)(i))	Pg. 41-198	X	
B3. Is there a description of each identified hazard's impact on the community as well as an overall summary of the community's vulnerability for each jurisdiction? (Requirement §201.6(c)(2)(ii))	Pg. 41-198	x	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(ii))	Pg. 108-109		X
ELEMENT B: REQUIRED REVISIONS **B3.) Recommended Revision:** Appendix E- critical facilities have been noted, as well as the facility's exposure to each hazard type. For the next plan update, engage plan participants in a conversation that results in a prioritized list of the facilities that have been registered in Appendix E. Added new action (#68) to the mitigation action plan: "Prioritize list of critical facilities that are vulnerable to natural and human-made hazards and develop potential mitigation solutions for high-priority critical facilities to reduce vulnerability." See pgs. 283-284. **B4.) Required Revision:** Pg. 108-109- Please provide the structure types as well as the numbers for each participating community. IE- residential & commercial Revised Table 3.3.5.8 on pg. 109 to list RL properties and losses by type with data provided the State NFIP Coordinating Office. Accompanying description of the table was also revised to describe the new data.			
ELEMENT C. MITIGATION STRATEGY			
C1. Does the plan document each jurisdiction's existing authorities, policies, programs and resources and its ability to expand on and improve these existing policies and programs? (Requirement §201.6(c)(3))	Pg. 236-243	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6(c)(3)(ii))	Pg. 241-242		X
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6(c)(3)(i))	Pg. 266-268	X	
C4. Does the Plan identify and analyze a comprehensive range of specific mitigation actions and projects for each jurisdiction being considered to reduce the effects of hazards, with emphasis on new and existing buildings and infrastructure? (Requirement §201.6(c)(3)(ii))	Pg. 270- 287	X	
C5. Does the Plan contain an action plan that describes how the actions identified will be prioritized (including cost benefit review), implemented, and administered by each jurisdiction? (Requirement §201.6(c)(3)(iv)); (Requirement §201.6(c)(3)(iii))	Pg. 270-271	X	
C6. Does the Plan describe a process by which local governments will integrate the requirements of the mitigation plan into other planning mechanisms, such as comprehensive or capital improvement plans, when appropriate? (Requirement §201.6(c)(4)(ii))	Pg. 246-249	X	

ELEMENT C: REQUIRED REVISIONS

C2.) Required Revision:

Pg. 241-242- Please provide additional information as to the day-to-day operations of the local/county floodplain managers. This information should center on their enforcement of the floodplain ordinance, availability of floodplain mapping to community members, insurance outreach to community members, etc…..

Please see the attached NFIP Survey that could assist in gathering this information from the communities. Distributed survey and incorporated additional information about floodplain manager duties, specifically related to floodplain identification and mapping, floodplain management ordinance enforcement, and flood insurance outreach. This description is included in the Floodplain Management section of the Capability Assessment chapter (pgs. 242-244).

C4.) Recommended Revision:

Pg. 256- Action 2- Specific solutions for the prioritized critical facilities' risk, addressed earlier in the HIRA discussion (see Recommendation for B3.) could be developed and documented in the Mitigation Strategy section.

As described under B3, added new action (#68) to the mitigation action plan: "Prioritize list of critical facilities that are vulnerable to natural and human-made hazards and develop potential mitigation solutions for high-priority critical facilities to reduce vulnerability."

Pg. 262- Action 35 could be broken into 2 or 3 separate activities to make them more manageable.

Added "status update note" to table on page 264 indicating that this action was split into three separate actions. Actions appear in the mitigation action plan table as actions #59, #69, and #70 (pg. 282-283; 285-287).

ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION (applicable to plan updates only)			
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))	Pg. 20-29 & 41-198	X	

1. REGULATION CHECKLIST **Regulation** (44 CFR 201.6 Local Mitigation Plans)	Location in Plan (section and/or page number)	Met	Not Met
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))	Pg. 256-265	X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))	Pg. 252-255 & 266	X	
ELEMENT D: REQUIRED REVISIONS **D1.) Kudos:** Land Use and Develop Trends are addressed for each individual hazard. Very well done.			
ELEMENT E. PLAN ADOPTION			
E1. Does the Plan include documentation that the plan has been formally adopted by the governing body of the jurisdiction requesting approval? (Requirement §201.6(c)(5))	Pg. 14	N/A	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(c)(5))	Pg. 14	N/A	
ELEMENT E: REQUIRED REVISIONS			
ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)			
F1.			
F2.			
ELEMENT F: REQUIRED REVISIONS			