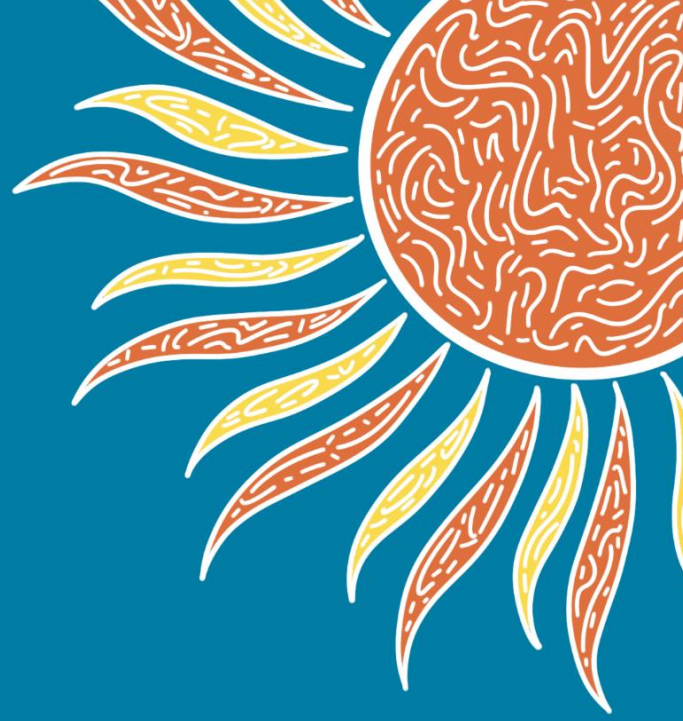


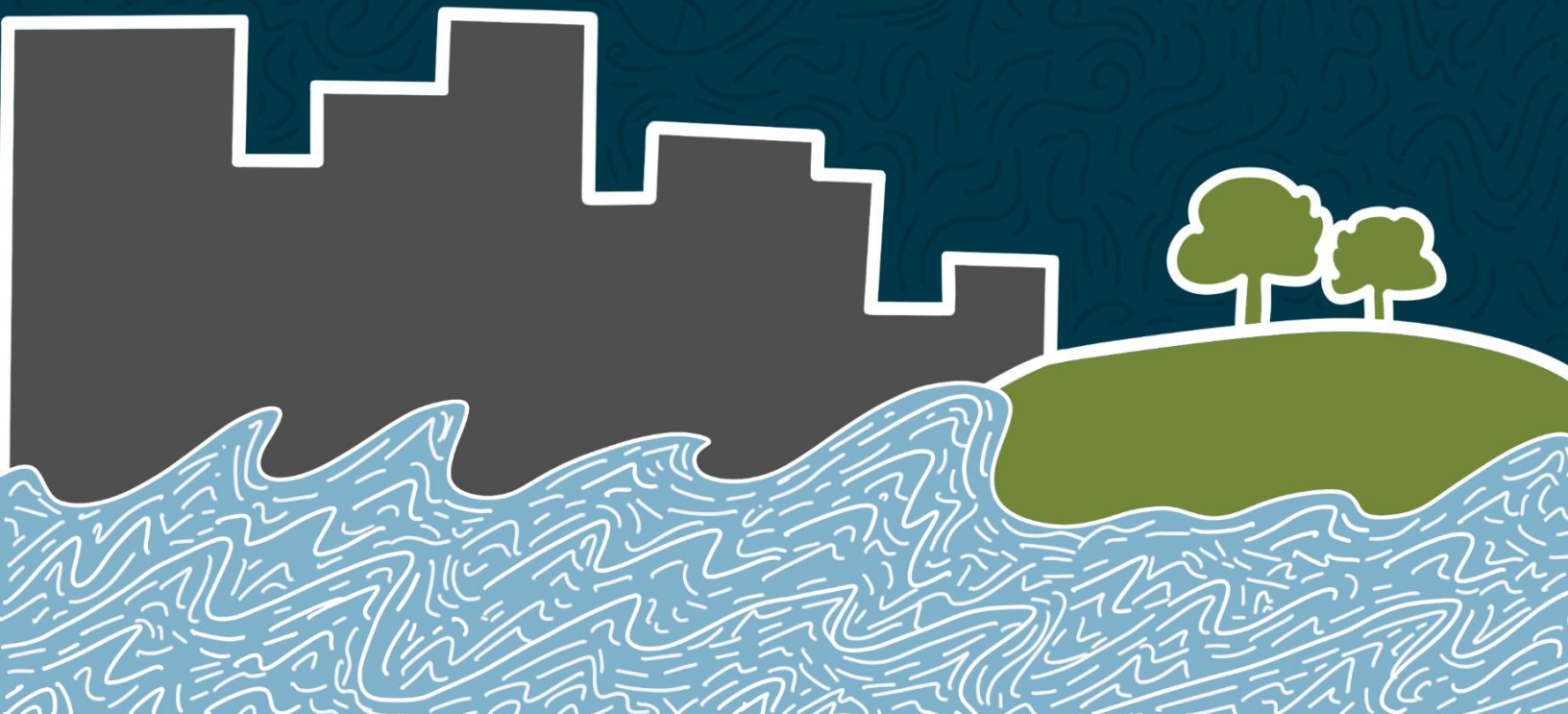


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Prince George's County & City of Laurel

# HAZARD MITIGATION PLAN 2023



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# Abbreviations

BRIC	Building Resilient Infrastructure and Communities
CDBG	Community Development Block Grant
COMAR	Code of Maryland Regulations
CRS	Community Rating System
EF	Enhanced Fujita
FEMA	Federal Emergency Management Agency
FHBM	Flood Hazard Boundary Map
FIRM	Flood Insurance Rate Map
FMA	Flood Mitigation Assistance
GIS	Geographic Information System
HMGP	Hazard Mitigation Grant Program
HMP	Hazard Mitigation Plan
HU	Housing Units
IA	Individual Assistance
IH	FEMA Individuals and Households Program
Hazus-MH	Hazus Multi-hazard
NCEI	National Centers for Environmental Information
NFIP	National Flood Insurance Program
NOAA	National Oceanic and Atmospheric Administration
PA	Public Assistance
RCP	Representative Concentration Pathway
STAPLEE	Social, Technical, Administrative, Political, Legal, Economic, and Environmental Criteria
SVI	Social Vulnerability Index
SWM	Stormwater Management

# Executive Summary

## A. Introduction

The Prince George's County and City of Laurel 2023 Hazard Mitigation Plan (HMP) is an update to the 2017 plan. Since the last version, the HMP has progressed to more thoroughly address the evolving risks posed by natural hazards. The purpose of the HMP is to prevent future loss and damage by assessing Prince George's County and the City of Laurel communities' vulnerabilities to natural hazards and preparing a long-term strategy that considers climate change to adequately address those hazards. The direct outcome of this plan will be the implementation of mitigation projects in the communities that need them most.

For more information on the HMP's purpose and planning context, refer to **Chapter 1**.

## B. Planning Process

The hazard mitigation planning process is collaborative—involving active participation from County and City officials, community residents, community stakeholders, state officials, and hazard mitigation experts. It involves the following five main steps:

1. Organize the planning process and resources,
2. Assess risks and vulnerabilities from natural hazards,
3. Assess community capabilities to implement hazard mitigation actions,
4. Develop a mitigation strategy, and
5. Adopt and implement the plan.

Prince George's County and the City of Laurel convened a joint Mitigation Advisory Committee to lead HMP development. The Committee formally met four times during the planning process and worked closely with Dewberry Engineers, Inc. to develop the 2023 HMP. The Mitigation Advisory Committee carried out the above steps from September 2022 through March 2023.

Public participation was sought throughout the process, including during the following engagement and input opportunities:

- **Virtual community hazard problem area mapping** (residents placed 'pins' on a map to identify locations of hazard problem areas with descriptions of the issues they've noticed);
- **Virtual public hazard mitigation survey**, which allowed residents to share their opinion of the hazards with the biggest impacts on the County and how they'd like to see the County and City address them;
- **Public meeting** to see an overview of the hazard risk assessment (step 2, above) results and provide feedback on the HMP's revised goal and what mitigation projects we should implement to address the risks and vulnerabilities;
- **Public draft HMP review survey** that gave the public a chance to review the updated draft HMP and provide feedback through a virtual survey;

- **Public meeting** to see an overview of the updated draft HMP and provide feedback; and
- **HMP adoption hearings** where the public could provide comments during the adoption processes for the County and City.

## B.1. Planning Committee Membership

The Mitigation Advisory Committee participated in the planning process (outlined in **Chapter 2**) through attendance at a series of meetings, review of materials, comments on draft documents, consideration of hazards and existing programs and policies, and identification of actions that will further reduce the impacts of hazards in Prince George's County and the City of Laurel.

The following agencies are designated members of the Mitigation Advisory Committee:

- Department of Environment (Dawn Hawkins-Nixon, Kelly Flint, Lilantha Tennekoon, Patrick Callahan, Jeffrey DeHan, Sudanshu Mishra, Joanna Smith)
- Office of Homeland Security (Ronald Gill, Meloyde Batten-Mickens, Joey Henderson, Ehsan Bahador, James Carter and Alexandra Harris)
- Police (Major Anthony Cline)
- Fire/Emergency Medical Services (Chief James McClelland)
- Public Works and Transportation (Erv Beckert and Mary Sherrill)
- Information Technology (Miles Roesner)
- Family Services (Cathy Stasny)
- Department of Permitting, Inspection, and Enforcement (Rey De Guzman, Behdad Kashanian)
- Department of Parks and Recreation (Wanda Ramos, Andree Checkley, Katina Shoulars)

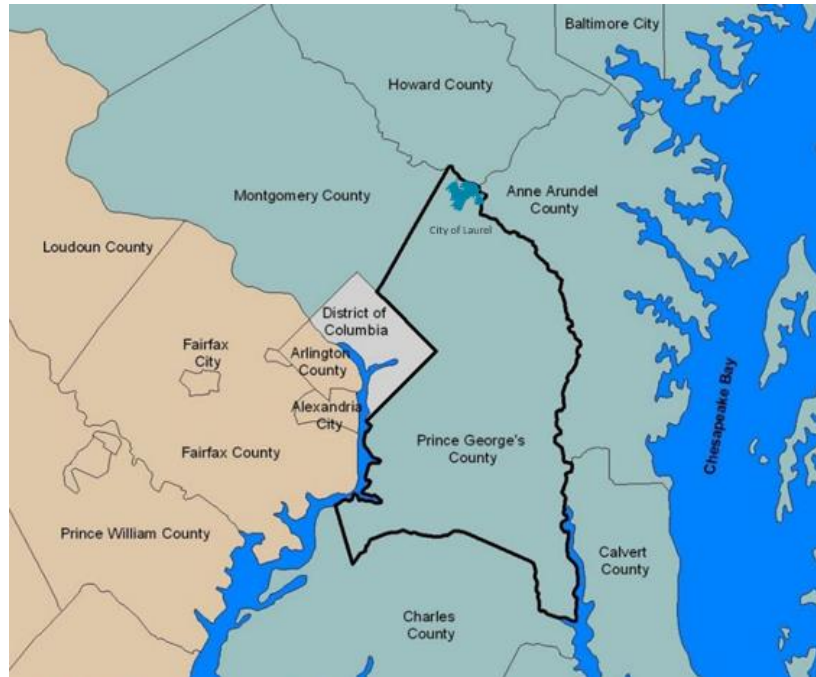
The following were notified when the planning process was initiated and were asked to review and comment on the HMP before it was finalized:

- The 25 incorporated municipalities located in Prince George's County that do not have separate land use authority and the City of Bowie, which retains some land use authority.
- Interested parties on Planning Board's public notification list of e-mails that is maintained by Maryland-National Capital Park and Planning Commission (civic associations, neighborhood associations, etc.)
- Dam Owners
- Utility companies (e.g., PEPCO, Baltimore Gas & Electric, WSSC Water)
- Adjacent counties (Montgomery, Howard, Charles, Calvert, Anne Arundel)
- Red Cross National Capital & Greater Chesapeake Region
- University of Maryland
- Maryland Department of Emergency Management
- Maryland Department of the Environment
- Natural Resources Conservation Service, Prince George's District Conservationist

For more information on the hazard mitigation planning process, refer to **Chapter 2**.

## C. Community Profile

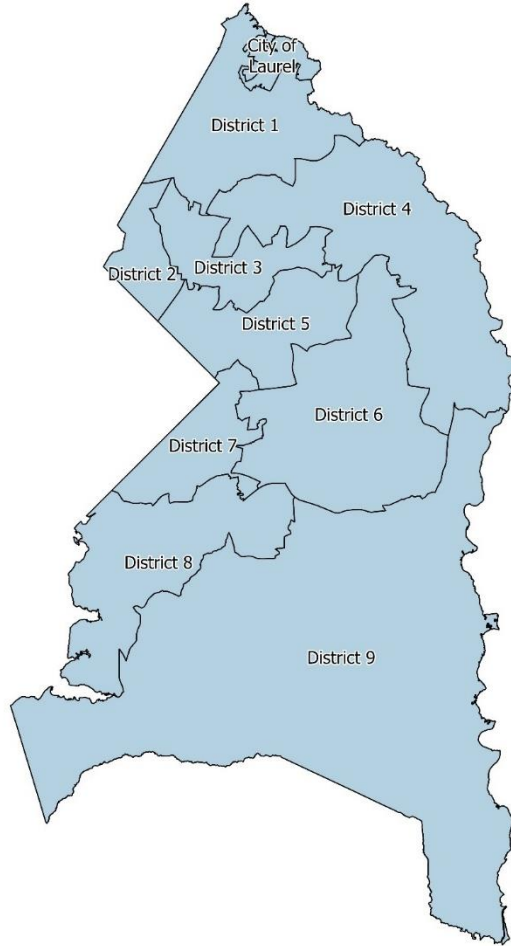
Prince George's County and the City of Laurel are part of the greater Washington-Baltimore metropolitan area (**Figure 1**). The County is bounded on the west by the District of Columbia and Fairfax County, Virginia. To the north are Montgomery and Howard Counties; on the east are Anne Arundel and Calvert Counties, and Charles County is to the south. The City is located midway between Baltimore and Washington, DC.



*Figure 1: Vicinity map of the County within the Washington-Baltimore area*

Although there are 27 separate incorporated municipalities within the boundaries of Prince George's County, only the Cities of Laurel and Bowie retain some degree of land use authority. Only the City of Laurel is recognized separately by FEMA and administers its own floodplain management ordinance, thus the City of Laurel participation has been incorporated into the plan as a separate entity in the planning process with specific community profile information detailed in **Chapter 3**.

For the purposes of planning, Prince George's County is divided into its 37 planning areas which were used during the 2017 plan update planning process.) These planning areas are geographically defined by natural or manmade boundaries and represent the smallest geographical area for which a master plan is prepared. Per the Mitigation Advisory Committee, the 2023 HMP was organized where appropriate into areas consistent with the nine County Council Districts and the City of Laurel as shown in **Figure 2**.



*Figure 2: Prince George's County Council District Map*

Prince George's County and the City of Laurel has many valued community assets, including housing, transportation networks, utility infrastructure, higher education institutions, natural resources, its economy, and its people. Of these assets, critical facilities, people, and future development are especially prominent throughout the HMP. Critical facilities and people are integral to allowing essential government and business operations to continue during and after a disaster. Considering future development within the County when addressing natural hazards is helpful in planning for a resilient future. The 2023 HMP update uses social vulnerability as a new lens to paint a more complete picture of the community and its assets.

For more information on Prince George's County and the City of Laurel, refer to **Chapter 3**.

## D. Risk Assessment

The hazard identification and risk assessment consists of three parts:

6. Identify which hazards could affect Prince George's County and the City of Laurel,
7. Profile hazard events and determine what areas and community assets are the most vulnerable to damage from these hazards, and

8. Estimate losses and prioritize the potential risks to the community.

The hazards are given priority levels as a part of the hazard profiling process. They are determined based on Mitigation Advisory Committee input, as well as the five criteria to assign a quantitative ranking. Each criterion identifies and categorizes the comparative probability and potential vulnerability for the identified hazards. The framing criteria/questions are:

1. **Occurrence Probability:** Has the hazard occurred in the area before, and if so, how often based on the historical record? Weighting factor: 0.15
2. **Impact:** What are the potential damages and community function disruptions when the hazard occurs? Weighting factor: 0.35
3. **Geographic Extent:** What percentage of the community is impacted by the hazard? Weighting factor: 0.20
4. **Warning Time:** How much time is the community given to prepare for an event? Weighting factor: 0.10
5. **Community Concern:** How much concern does the public have for each of the hazards? Weighting factor: 0.20

This methodology ranks the hazards comparatively for the County based on risk. However, it does not mean that low-scoring hazard will not occur or will not have an impact on the area. It provides an overview of which hazards may pose the greatest risk to Prince George's County and the City of Laurel.

## D.1. Hazard Risk Assessment

Each hazard from the 2017 plan was re-evaluated for the 2023 update. The 2023 HMP assigned hazard risk index values based on the five criteria listed above and categorized the hazards into High, Moderate, and Low rankings based on final index scores. Ultimately, the hazards listed in **Table 1** were identified as relevant to Prince George's County, incorporated into the risk assessment, and prioritized. Riverine flood, severe storm (flood-related), severe storm (wind-related), and high wind were the highest-ranked hazards in the County.

For more results from the hazard risk assessment, refer to **Chapter 4**.

Table 1. 2023 Hazard Risk Index Score Results & Overall Ranking

Hazard	Occurrence Probability	Impact	Geographic Extent	Warning Time	Community Concern	Hazard Risk Index Score & Overall Rank	State Ranking (5 = highest)	FEMA Ranking (5 = highest)
Riverine Flood	Highly Likely	Critical	Moderate	Limited	High	3.25 (High)	5	2
Severe Storm (Flood-Related)	Highly Likely	Critical	Moderate	Limited	High	3.25 (High)	5	N/A
Severe Storm (Wind-Related)	Highly Likely	Limited	Large	Limited	High	3.1 (High)	5	3
High Winds	Likely	Limited	Large	Limited	High	2.95 (High)	5	3
Tornado	Likely	Critical	Minor	No Notice	Moderate	2.9 (Moderate)	5	4
Extreme Heat	Highly Likely	Limited	Large	Extended	Moderate	2.8 (Moderate)	4	4
Winter Storm	Highly Likely	Minor	Large	Limited	Moderate	2.55 (Moderate)	5	4
Hurricane/ Tropical Storm	Somewhat Likely	Limited	Large	Limited	Low	2.4 (Moderate)	4	2
Dam and Levee Failure	Unlikely	Limited	Negligible	No Notice	Low	1.85 (Moderate)	4	N/A
Earthquake	Likely	Minor	Minor	No Notice	Negligible	1.8 (Moderate)	N/A	2
Extreme Cold	Somewhat Likely	Minor	Large	Extended	Negligible	1.75 (Moderate)	4	3
Sinkhole	Highly Likely	Minor	Negligible	Minimal	Negligible	1.65 (Low)	2	N/A
Wildfire	Highly Likely	Minor	Negligible	Limited	Negligible	1.55 (Low)	4	1
Landslide	Somewhat Likely	Minor	Negligible	No Notice	Negligible	1.45 (Low)	2	2
Drought	Somewhat Likely	Minor	Minor	Extended	Negligible	1.35 (Low)	4	2
Coastal Flood	Unlikely	Minor	Minor	Limited	Negligible	1.3 (Low)	5	2



## E. Capability Assessment

Prince George's County and the City of Laurel have a number of resources accessible for implementing hazard mitigation initiatives. These resources include both private and public assets at the local, state, and federal levels. The capability assessment evaluates the current capacity of the communities of Prince George's County and the City of Laurel to mitigate the adverse effects of the natural hazards identified in the hazard identification and risk assessment. By providing a summary of each jurisdiction's existing capabilities, the capability assessment serves as the foundation for designing an effective hazard mitigation strategy. Overall, the County proves to be capable of adequately carrying out mitigation and adaptation projects, but the City of Laurel may need support from the County to accomplish the same.

For more information on the hazard mitigation capabilities of the County and City, refer to **Chapter 5**.

## F. Mitigation Strategy

The Mitigation Advisory Committee used the results of the hazard identification and risk assessment and the capability assessment to develop goals and objectives for the County and City of Laurel. The committee members revised and streamlined the goals from the 2017 plan update into the following four goals:



Increase public education and awareness of natural hazard risks to people and private property, and promote current and new opportunities to participate in mitigation planning.



Prevent future climate-related damages and losses to communities, critical facilities, and natural resources through ordinances, policies, and plans aligned with regional and state resilience and equity goals.



Implement structural projects that mitigate the risks of natural hazards to people, infrastructure, and environmental assets while equitably distributing project benefits.



Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.

Each mitigation action for the County and City were developed based on past damages, existing risk and vulnerabilities, community input, and current capabilities. The STAPLEE criteria methodology was used to capture these values consistently. It allows for the Mitigation Advisory Committee to take social, technical, administrative, political, legal, economic, and environmental considerations into account when reviewing potential actions for inclusion in the mitigation strategy.

**Table 2** and **Table 3** in the following sections outline the mitigations actions for Prince George's County and the City of Laurel, respectively.

For more information on the mitigation strategy, refer to **Chapter 6**.

## F.1. Prince George's County Mitigation Actions

Some of the County's actions have been integrated and adapted from other County plans. They are signified by the color of the "Action Number" column accordingly:

- [Plan 2035 Prince George's Elements](#) integrated policies are shown in **orange**.
- [Climate Action Plan](#) Priority Recommendations are shown in **green**.

Table 2. Prince George's County 2023-2028 Mitigation Actions

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	<b>Prevention</b>							
PG-1	Partner with federal agencies, the state, and Non-governmental Organizations to utilize available technical assistance to translate identified risks into mitigation projects, especially for benefit cost analyses for the County and municipalities.	X			X	Office of Homeland Security	Ongoing	Medium
PG-2	Using the best available data, check the locations of HazMat sites, National Pollutant Discharge Elimination System sites, and other land uses; if found to be in flood hazard areas, communicate with the owner/handler of hazardous materials and known pollutants regarding risk and appropriate response and protection measures.			X	X	Department of Environment	Short-term	Medium
PG-3	Integrate mitigation plan requirements and actions into other appropriate planning mechanisms, such as comprehensive plans and capital improvement plans.				X	Maryland-National Capital Park and Planning Commission	Ongoing	High
PG-4	Collect flood depth information to support a grant to provide elevation certificates in areas newly included in the Special Flood Hazard Area or to those experiencing				X	Office of Homeland Security	Funding contingent	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	flooding issues to support Letter of Map Amendments (LOMA) or NFIP premium reductions.							
PG-5	Expand codes and standards enforcement, such as for existing land use regulations and policies.		X		X	Department of Permitting, Inspections and Enforcement	Ongoing	Medium
PG-6	Prohibit all waivers to allow development in floodplains.				X	Department of Permitting, Inspections and Enforcement	Ongoing	High
PG-7	Revise Prince George's County Code of Ordinances to incorporate and require climate-resilient design, nature-based infrastructure, and climate-resilient practices. Adopt and enforce policies to require green infrastructure practices for new and existing properties, especially native plantings, rain gardens, green corridors, runoff retention, and other nature-based ways to reduce and naturally filter runoff on private and public properties.	X			X	Maryland-National Capital Park and Planning Commission, Planning Department	Short-term	High
PG-8	Office of the County Executive must introduce and support a County Council resolution requiring the County to integrate extreme weather and energy-efficiency criteria into building codes.				X	Department of Permitting, Inspections, and Enforcement	Short-term	High
PG-9	Require County Stormwater Management (SWM) Standards to Incorporate Projected Climate Change Impacts by using approved downscaled and up-to-date climate impact information to reevaluate peak rainfall estimates and future design storm profiles. Evaluate SWM standards using this criterion at least every three (3) years. Require all upgrades of County storm drain systems and Capital Improvement Project roadway, bridge, culvert and	X			X	Department of Public Works and Transportation, Stormwater Management Division	Long-term	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	stormwater management repair or renovation projects to meet these updated climate-resilient design criteria.							
PG-10	Avoid Future Development in Flood Inundation Areas Below Existing High-hazard Potential Dams. Require that plan sets for subdivision proposals and permit applications to show the danger reach and inundation area and prohibit new construction in these areas.				X	Maryland-National Capital Park and Planning Commission, Planning Department	Ongoing	High
PG-11	Conduct Countywide Thermal Mapping of Tree Canopy Cover with Shade Study, and Aerial Utility Mapping exercises. Then conduct a neighborhood-level Heat Vulnerability Assessment. Address the identified gaps in the tree canopy through appropriate heat mitigation actions and projects.				X	Department of the Environment	Short-term	High
PG-12	Conduct a study on the feasibility of using climate-smart building materials in mitigation projects and normal County/City construction projects to mitigate impacts from extreme temperatures and rainfall. Examples include those listed on the Maryland Department of the Environment's <a href="#">"Alternative/Innovative Technology List of Approved Practices."</a> Once complete, develop a process that promotes the use of these materials wherever feasible.				X	Department of the Environment	Long-term	Medium
PG-13	Adopt the most recent published edition of the I-Codes (e.g., International Building Code, International Residential Code).				X	Department of Permitting, Inspections and Enforcement	Short-term	High
	<b>Property Protection</b>							

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
PG-14	Support mitigation projects that will result in the protection of public or private property from natural hazards. Eligible projects include but are not limited to: 1. acquisition of hazard-prone property or structures 2. Elevation of flood-prone structures 3. Minor structural flood control projects 4. Relocation of structures from hazard-prone areas 5. Retrofitting of existing buildings, facilities, and infrastructure 6. Retrofitting of existing buildings and facilities for shelters 7. Critical infrastructure protection measures 8. Stormwater management improvements 9. Advanced warning systems and hazard gauging systems (weather radios, reverse-911, stream gauges, I-flows) 10. Targeted hazard education 11. wastewater and water supply system hardening and mitigation	X		X	X	Office of Homeland Security	Ongoing	Medium
PG-15	Implement appropriate mitigation measures for hazard-vulnerable priority critical facilities	X			X	Department of Public Works and Transportation	Long-term	High
	<b>Natural Resource Protection</b>							
PG-16	Use the Watershed Implementation Plan to prioritize stabilization projects, especially if funding from outside resources is available for the mitigation of environmental impacts.	X			X	Department of the Environment	Ongoing	Medium
PG-17	Coordinate with Pepco, Baltimore Gas and Electric, and any other utility companies (as appropriate) to schedule and perform regular tree trimming to mitigate the risk of power outages during windstorms. Maintenance should be conducted to retain a healthy tree canopy, ensure trees' longevity, and decrease the risk of power outages. Prioritize socially vulnerable neighborhoods/ populations first and maintain old-growth trees with large canopies to encourage tree retention for extreme heat mitigation.	X			X	Department of Public Works and Transportation	Ongoing	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	Develop mutual aid with the City of Laurel to provide limited resources and personnel to assist in trimming and tree control as needed.							
PG-18	Implement proposed flood mitigation projects from the upcoming watershed study for the Collington Branch Stream. Develop a Memorandum of Agreement with the City of Laurel to inspect and clean the portion of the stream that runs through their jurisdiction.				X	Department of the Environment	Long-term	High
PG-19	Conduct a study to determine the feasibility of creating a stormwater park/greenway (or another watershed- or landscape-scale flood risk reduction project) that will improve natural floodplain functions in areas of high risk.				X	Maryland-National Capital Park and Planning Commission	Short-term	Medium
PG- 20	Develop a program to utilize vacant land (both publicly and privately owned) for stormwater management. Acquire land to serve the dual purpose of green infrastructure/ stormwater infiltration and recreational/open space.				X	Maryland-National Capital Park and Planning Commission, Planning Department	Ongoing	Medium
PG-21	Use conservation subdivisions (or other site planning and landscape conservation tools) when developing in Established Communities near Rural and Agricultural Areas to cluster development, transition density, and encourage the preservation of green infrastructure corridors, as defined by the County's Green Infrastructure Plan.	X			X	Maryland-National Capital Park and Planning Commission, Planning Department	Ongoing	Medium
PG-22	To preserve environmentally sensitive land and to encourage development in the Regional Transit Districts, evaluate a transfer of development rights program, density exchanges, or purchase of development rights program for the Rural and Agricultural Areas. Explore opportunities to transfer development rights within areas and to coordinate with the Watershed Implementation Plan and Maryland Accounting for Growth Policy				X	Department of the Environment	Ongoing	Low

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
PG-23	Align Economic Development Plans with the Climate Action Plan, preserving existing agricultural land and natural areas and promoting development in already-developed areas near high-capacity transit. Perform an economic development and climate adaptation analysis of existing agricultural land and natural areas that are crucial to climate resilience on a subwatershed basis. Identify areas of open space for preservation and optimum use for climate resilience.				X	Department of the Environment	Short-term	High
	<b>Structural Projects</b>							
PG-24	Create metrics to track routine stormwater maintenance and monitor how the work is increasing capacity and where additional capacity may be needed through retrofits.				X	Department of Public Works and Transportation	Ongoing	Medium
PG-25	Conduct a Countywide Flood Assessment (including pluvial mapping) to understand the impact of updated rainfall intensity estimates per the latest version of NOAA Atlas 14, recent elevation data, and stormwater controls. Identify priority areas for mitigation projects and update the stormwater ordinance as needed.				X	Department of the Environment	Ongoing	High
PG-26	Develop structural and action plans with inundation mapping for all High Hazard Potential Dams with poor conditions and no Emergency Action Plans. Develop structural and action plans for high-risk pump stations, levees, and other flood control infrastructure. Ensure a process for supporting affected "downflow" communities that a dam failure hazard would inundate.			X	X	Department of Public Works and Transportation	Long-term	High
PG-27	Implement stormwater management projects, such as drainage retrofits, to address pluvial/stormwater flooding in community-identified areas. Prioritize restoration projects from the Watershed Implementation Plan (WIP) that will	X			X	Department of Public Works and Transportation	Ongoing	High



Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	support the Plan 2035 future land use pattern. Downtowns should be given priority for stormwater retrofits, especially environmental site design practices. Land acquisition or ecological restoration activities should be targeted to stronghold watersheds.							
PG-28	To reduce system outages from natural hazards, perform energy grid modernization in socially vulnerable areas by adding a solar microgrid. Prioritize areas that are known to suffer multiple outages during the year.	X			X	Department of Public Works and Transportation	Ongoing	Low
PG-29	Evaluate new and existing government buildings, critical facilities, and infrastructure for solar energy generation potential and install solar panels and batteries if feasible.				X	Department of Public Works and Transportation	Ongoing	Low
	<b>Emergency Services</b>							
PG-30	Update Upper Marlboro Emergency Response Plan to address flooding, including evacuation, emergency response, mitigation, etc.			X	X	Office of Homeland Security	Short-term	Medium
PG-31	Update the County's disaster recovery plan to include a post-disaster strategic rebuilding decision framework that comprehensively integrates equity.				X	Office of Homeland Security	Short-term	Medium
PG-32	The Department of Family Services Agency on Aging will continue its outreach to seniors and other vulnerable populations about health and safety during periods of extreme heat and extreme cold. Information will be added to the Family Service's web page and frozen meal distribution with supplement provision of hot meals during severe weather periods from January through March.			X	X	Department of Family Services	Ongoing	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
PG-33	Develop a plan with the Department of Social Services, Department of Health, and Office of Sustainability to create Resilience Hubs in vulnerable communities to increase community capacity to prepare for, withstand, and respond to natural hazard impacts and emergency situations. These should also function as heating/cooling centers.	X			X	Department of Social Services; Department of Health; Office of Sustainability	Long-term	Low
PG-34	Assess Climate Projections and Consequences of Dam and Levee Failure. Analyze baseline conditions against local/regional climate projections to highlight future vulnerabilities and risk. Model hydrological loads to the consequences of failure under present and future conditions and jointly evaluate dams, levees, and interdependent components. Incorporate Findings in Emergency Action Plans.				X	Office of Homeland Security	Ongoing	High
	<b>Educations &amp; Awareness</b>							
PG-35	Continue annual flood risk awareness and mitigation mailing to all owners of high-risk properties in the Special Flood Hazard Area, including Repetitive Loss/Severe Repetitive Loss structures. Provide additional outreach in response to new/upcoming grant opportunities and funding.			X	X	Office of Homeland Security	Ongoing	High
PG-36	Work with County municipalities and/or develop public-private partnerships to provide hazard awareness messaging and information on hazard preparedness and mitigation in secondary languages for promotion using local newspapers, municipal websites, social media, etc.		X	X	X	Department of Community Relations	Ongoing	High
PG-37	Integrate hazard mitigation considerations in future updates of the Citizens' Preparedness Guide and Business Preparedness Guide, including mitigation projects they can implement and how they can get their project included in an upcoming grant application.			X	X	Office of Homeland Security	Ongoing	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
PG-38	Conduct outreach to homeowners located on Founders Terrace (and other high-priority streets/neighborhoods) on opportunities to get funding for potential flood mitigation projects for the streams that run behind their homes.			X	X	Department of Community Relations	Short-term	Medium
PG-39	Develop a County Hazard Mitigation Hub website similar to the public outreach website for <a href="#">Vision Zero</a> . This should be combined with the future Climate Resilience Website as described in Plan 2035 if possible. Coordinate with various county agencies, such as the Department of Environment (DoE), Office of Homeland Security, and Office of Information Technology (OIT).			X	X	Office of Homeland Security	Short-term	Medium
PG-40	Demonstrate County commitment to climate action through publicly transparent tracking, monitoring, evaluation, and reporting. Require the Maryland-National Capital Park and Planning Commission to create and establish a public Smart Growth Dashboard that tracks approved preliminary plans of subdivisions, approved site plans and development proposals. Integrate this into the hazard mitigation/climate action hub website (refer to Action PG-41).			X	X	Maryland-National Capital Park and Planning Commission	Ongoing	Medium
PG-41	Develop an action guide for socially vulnerable communities that provides step-by-step guidance on how they can get their home considered for inclusion in a mitigation project/grant application.			X	X	Office of Homeland Security	Short-term	Medium
PG-42	Send a digital copy of the 2023 HMP to all County and City staff, as well as all homeowner associations within the planning area.		X	X	X	Office of Homeland Security	Short-term	High
PG-43	Integrate conducting an annual/semi-annual comprehensive grant availability search and information dissemination into a County staff member's job description. This staff member should coordinate an annual workshop		X			Office of Homeland Security	Ongoing	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	with the County and its municipalities to discuss county-wide priorities and projects that should be submitted in grant applications.							

## F.2. City of Laurel Mitigation Actions

Table 3. City of Laurel 2023-2028 Mitigation Actions

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	<b>Prevention</b>							
L-1	Partner with federal agencies, the state, and non-governmental organizations to utilize available technical assistance to translate identified risks into mitigation projects, especially for benefit-cost analyses.		X		X	Office of Emergency Management	Ongoing	Medium
L-2	Integrate mitigation plan requirements and actions into other appropriate planning mechanisms, such as comprehensive plans and capital improvement plans.				X	Office of Emergency Management	Ongoing	High
L-3	Adopt the most recent published edition of the I-Codes (e.g., International Building Code, International Residential Code).				X	Department of the Fire Marshal and Permit Services	Short-term	High
	<b>Property Protection</b>							

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
L-4	Support mitigation projects that will result in the protection of public or private property from natural hazards. Eligible projects include but are not limited to: 1. acquisition of hazard-prone property or structures 2. Elevation of flood-prone structures 3. Minor structural flood control projects 4. Relocation of structures from hazard-prone areas 5. Retrofitting of existing buildings, facilities, and infrastructure 6. Retrofitting of existing buildings and facilities for shelters 7. Critical infrastructure protection measures 8. Stormwater management improvements 9. Advanced warning systems and hazard gauging systems (weather radios, reverse-911, stream gauges, I-flows) 10. Targeted hazard education 11. wastewater and water supply system hardening and mitigation	X			X	Department of Economic & Community Development	Ongoing	Medium
L-5	Promote the use of climate-smart building materials in mitigation projects and normal City construction projects to mitigate impacts from extreme temperatures and rainfall, such as those listed on the Maryland Department of the Environment's " <a href="#">Alternative/Innovative Technology List of Approved Practices.</a> "	X			X	Department of Economic & Community Development	Ongoing	Medium
	<b>Structural Projects</b>							
L-6	After flood events, the City will evaluate whether to pursue funding to implement flood mitigation projects.	X			X	Office of Emergency Management	Ongoing	High
L-7	Assess Climate Projections and Consequences of Dam and Levee Failure. Analyze baseline conditions against local/regional climate projections to highlight future vulnerabilities and risk. Model hydrological loads to the consequences of failure under present and future conditions and jointly evaluate dams, levees, and		X		X	Department of Public Works; Department of the Environment	Short-term	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	interdependent components. Incorporate Findings in Emergency Action Plans.							
L-8	To reduce system outages from natural hazards, perform energy grid modernization in socially vulnerable areas by adding a solar microgrid. Prioritize areas that are known to suffer multiple outages during the year.	X			X	Department of Public Works	Funding contingent	Medium
L-9	Evaluate new and existing government buildings, critical facilities, and infrastructure for solar energy generation potential and install solar panels and batteries if feasible.	X			X	Department of Public Works	Short-term	Low
L-10	Implement stormwater management projects, such as drainage retrofits, to address pluvial/stormwater flooding in community-identified areas.	X			X	Department of Public Works	Ongoing	High
	<b>Emergency Services</b>							
L-11	At the intersection of Van Dusen Road and Contee Road (Anderson's Corner), add a comprehensive recreational building, comprised of indoor recreational space, gymnasium(s), and meeting rooms. Unlike a typical community center, the City envisions more of a steel building structure with a hybrid use between drop-in programs for local residents and a larger multiuse footprint to host a wider range of recreational sports and activities. The City will conduct a feasibility study that includes considering stormwater runoff effects and the potential to use the facility as a hazard shelter and/or extreme temperature refuge.	X		X	X	Department of Economic & Community Development	Long-term	Medium
	<b>Educations &amp; Awareness</b>							

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
L-12	Work with City closed circuit television network to produce seasonal hazard awareness and topical mitigation programming.		X	X		Office of Emergency Management	Short-term	Low
L-13	Develop an action guide for socially vulnerable communities that provides step-by-step guidance on how to get their home considered for inclusion in a mitigation project/grant application.		X	X	X	Office of Emergency Management	Short-term	Medium
L-14	Send a digital copy of the 2023 HMP to all County and City staff.		X	X		Office of Emergency Management	Short-term	Medium

## G. Plan Implementation

The HMP identifies procedures for implementing and maintaining the HMP as a living document that continuously guides actions within Prince George's County and the City of Laurel. The County and City will submit a 5-year written update to the State and FEMA Region III, unless a disaster or other circumstances lead to a different time frame. In the interim, the HMP will be integrated into county plans, municipal plans, and other documents as applicable and the Committee will hold an annual meeting to evaluate and monitor progress.

Since feedback from residents, businesses, and other stakeholders is a critical part of hazard mitigation planning, public notice of the annual review will be given, and public participation will be actively invited. The County will post a link to the HMP on the Prince George's County Department of the Environment's website, the Office of Homeland Security's website, and the City of Laurel's website.

For more information on how the HMP will be implemented, refer to **Chapter 7**.



# Chapter 1. Introduction

*This chapter provides the purpose for the HMP's development and provides federal, state, and local context for the County and City's hazard mitigation planning process.*

## A. Purpose

The 2023 Prince George's County and City of Laurel Hazard Mitigation Plan (HMP) is an actionable, FEMA-approved plan. The purpose of the HMP is to identify natural hazard risk within the planning area, understand what matters most to residents, and develop a long-term strategy for protecting communities. The overall goal of mitigation planning is to break out of the cycle of sustaining disaster damage and rebuilding, only for the process to start again.

### **Hazard Mitigation**

The effort to reduce or eliminate risk to people, property, and the environment by lessening the impact of hazards.

The HMP represents the County and City's commitment to reducing risks from natural hazards. Local officials can refer to the plan in their day-to-day activities when making decisions regarding regulations, ordinances, permits, outreach, and funding for capital improvements and other community initiatives. Additionally, the HMP may help the State of Maryland prioritize future grant funding as it becomes available.

The Prince George's County and City of Laurel HMP will continue to be a useful tool for all community stakeholders by increasing public awareness about local hazard risks and providing information about options and resources available to reduce those risks. Educating the public about potential hazards will help the jurisdiction protect itself against the effects of future hazards and will enable informed decision-making regarding where to live, purchase property, or locate business.

## B. Planning Context

### B.1. Authority and Scope

On October 30, 2000, President Clinton signed into law the Disaster Mitigation Act of 2000 (DMA2K), which required state and local mitigation plans that would help to reduce loss of life and property, human suffering, economic disruption, and disaster assistance costs resulting from natural disasters.

The new law amended the Robert T. Stafford Disaster Relief and Emergency Assistance Act and added a new section to the law, Section 322, Mitigation Planning. Section 322 requires local governments to prepare and adopt jurisdiction-wide hazard mitigation plans for disasters declared after November 1, 2004, as a condition of receiving Hazard Mitigation Grant Program (HMGP) project grants and other non-disaster related mitigation grant assistance programs.

Local governments must review and, if necessary, update their mitigation plans every five years from the original date of the plans to continue Hazard Mitigation Assistance program eligibility. The requirements

for local mitigation plans are found in Section 44 Code of Federal Regulations Part 201.6. FEMA's "Local Mitigation Planning Policy Guide" issued on April 19, 2022 provides updated FEMA interpretation and explanation of local plan mitigation regulations and FEMA's expectations for mitigation plan updates.<sup>1</sup> In addition, FEMA uses the Local Mitigation Plan Review Tool (updated in 2022) to ensure that a plan meets FEMA's regulatory requirements.

## B.2. State-Level Hazard Mitigation and Climate Planning

The State of Maryland is working to both mitigate its carbon emissions and adapt to the effects of climate change that are already present or all but guaranteed in the future. On the mitigation front, the Maryland Department of the Environment's Climate Change Program oversees the [2030 Greenhouse Gas Emissions Reduction Act Plan](#) and its related greenhouse gas emissions inventory. The Plan, recognizing the 2020 achievement of a 20% reduction in statewide greenhouse gas emissions, will be updated in 2023 to establish a new 60% reduction goal by 2031 and net-zero emissions by 2045.<sup>2</sup> This represents one of, if not the most, ambitious climate change law adopted by any U.S. state.

Among other efforts, the Climate Change Program also supports the Maryland Commission on Climate Change. The Commission was established in 2015 and tasked with advising the government "on ways to mitigate the causes of, prepare for, and adapt to the consequences of climate change."<sup>3</sup> The Adaptation and Response (Resilience) working group – one of 8 Commission working groups – focuses on dealing with the impacts of climate change, and it has developed a framework for guiding and prioritizing resilience actions over the next ten years. The [Maryland Adaptation and Resilience Framework Recommendations](#) has three focus areas and goals, with one of them being "Local Government Action and State Service Delivery."

### Focus Area #2: Local Government Action & State Service Delivery

Goal: Build local government capacity to adapt to climate change; Collaborate between state and local governments to understand climate impacts and implement adaptation solutions; Co-create local adaptation solutions through supporting and engaging in regional partnerships; Conduct public educational outreach; Provide sufficient funding, tied to adaptation goals, to support local governments.

Under the local government action focus area, there are five service delivery goals, and each one has activities for the state and local governments. **Table 4** outlines the goals and associated local activities. The County and City, in addition to their locally-designed actions in **Chapter 6**, aim to carry out the Framework's activities whenever feasible.

*Table 4. Maryland Adaptation and Resilience Framework Recommendations service delivery goals and local government activities*

Activity	Details
<b>Goal 1: Capacity Building</b>	

<sup>1</sup> The Local Mitigation Planning and Policy Guide is effective on April 19, 2023, for all FEMA plan approvals.

<sup>2</sup> Maryland Department of the Environment. The 2030 Greenhouse Gas Emissions Reduction Act Plan. <https://mde.maryland.gov/programs/air/ClimateChange/Pages/Greenhouse-Gas-Emissions-Reduction-Act-%28GGRA%29-Plan.aspx>

<sup>3</sup> Maryland Commission on Climate Change. <https://mde.maryland.gov/programs/air/ClimateChange/MCCC/Pages/index.aspx>

Activity	Details
1.2.1	Participate in the small group discussions introduced in Activity 1.1.4 <sup>4</sup> to provide feedback and help improve the toolkit (the Adaptation and Response Working Group will provide a web-based toolkit of capacity-building tools, resources, grant opportunities, training, etc. to assist local partners).
1.2.2	Apply the toolkit resources to local projects.
1.2.3	Provide feedback on lessons learned during Activity 1.2.2 to share success stories, identify gaps, explain suggested improvements, etc.
<b>Goal 2: Collaborative Assessment, Planning and Action</b>	
2.2.1	Voluntarily expand use of existing tools and criteria (ex. Watershed Resources Registry, MD EJScreen, CS- Climate Ready Action Boundary, and Coast Smart criteria) when implementing all siting and design projects.
2.2.2	Voluntarily adopt higher regulatory standards to go beyond minimum NFIP requirements to ensure protection against worsening flooding forecasted due to climate change and that reflect the state of climate science. This applies to jurisdictions in both tidal and non-tidal areas.
2.2.3	Assign oversight of climate adaptation plan and strategy alignment and implementation as a permanent responsibility to a high-level managerial staff position. Where possible, establish a Sustainability Manager or Chief Resilience Officer position to carry out this work.
<b>Goal 3: Co-Creating Local Adaptation Solutions</b>	
<i>There is not a local strategy for this goal.</i>	
<b>Goal 4: Educational Outreach</b>	
4.2.1	Engage communities through listening sessions to learn about local climate impacts and resilience needs. This will help to honor community voices and experience and provide direction for the development of the outreach approach.
4.2.2	Maximize opportunities for parallel and complementary education efforts among regional groups, local governments, Non-governmental Organizations and state agencies (e.g., Maryland Flood Awareness Month).
4.2.3	Integrate public outreach campaigns with existing public engagement processes developed by local jurisdictions for climate change adaptation.
<b>Goal 5: Funding</b>	
5.2.1	Evaluate existing sources of funding that can support adaptation activities, including state and federal grant programs.
5.2.2	Identify projects that satisfy multiple programs' needs and leverage funds across those programs to implement them.
5.2.3	Consider pursuing innovative financing approaches, such as green banks, public-private partnerships, and resilience authorities, to support adaptation action.

<sup>4</sup> State agencies and environmental or land trust Non-governmental Organizations coordinate to convene small group discussions among and within local governments, including elected officials and staff, to assist in the use of the toolkit and identify improvements. Provide opportunities for local governments to network with experts for peer-learning among local governments both within and outside of Maryland.

### B.3. County-Level Hazard Mitigation and Climate Planning

Prince George's County has been taking action to respond to and reduce its contributions to climate change for over a decade. In 2008, the County Council established emissions reduction targets to reduce County emissions to 80% below 2008 levels by 2050. Since then, the County has implemented a number of initiatives to provide reliable and environmentally sound energy solutions to maximize energy savings.<sup>5</sup>

In 2020, the County Council unanimously passed a Council Resolution (CR-007-2020) mandating a Climate Action Commission to develop a Climate Action Plan for Prince George's County to prepare for and build resilience to regional climate change impacts, and to set and achieve climate stabilization goals.<sup>6</sup> The Climate Action Commission consists of sixteen commissioners representing public, private, and government interests. The overarching goal of the Commission is to provide actionable County strategies to both mitigate climate change through reduced greenhouse gas emissions and help protect the County's communities from the increasing likelihood of significant climate change impacts.

In January 2022, a draft Climate Action Plan was completed and presented to the public. The Plan aims to help the County reach its carbon emissions goal of a 50% reduction by 2030 (compared with 2005 levels). This goal aligns with the State of Maryland's projection for 50% emission reduction by 2030 through the implementation of the Maryland 2030 Greenhouse Gas Reduction Plan and the Metropolitan Washington Council of Government's goals for the region.

## C. Plan Organization

An executive summary is included in the beginning of the HMP to provide a high-level overview of the findings and chosen actions. The HMP itself contains the following seven chapters that cover the steps of the hazard mitigation planning process used in the plan:

- **Chapter 1. Introduction** provides the purpose for the HMP's development and provides federal, state, and local context for the County and City's hazard mitigation planning process.
- **Chapter 2. Planning Process** defines the processes followed throughout the update of this plan, including public participation and stakeholder engagement.
- **Chapter 3. Community Profile** contextualizes the HMP by providing background on Prince George's County and the City of Laurel.
- **Chapter 4. Risk Assessment** provides an overview of the natural hazards that have been identified as potentially affecting Prince George's County and the City of Laurel and an assessment of their risks to the planning area.
- **Chapter 5. Capability Assessment** evaluates Prince George's County and the City of Laurel's capabilities and resources available to implement the actions in the Mitigation Strategy.
- **Chapter 6. Mitigation Strategy** outlines the methodology of project selection and prioritization and provides an overview of the hazard mitigation goals, actions, and projects selected for the 2023-2028 planning horizon.

<sup>5</sup> DMV Climate Partners. Climate Initiatives: Prince George's County. <https://climatepartners.org/initiatives/local/prince-georges-county/>

<sup>6</sup> Prince George's County Council. Climate Action Commission. <https://pgccouncil.us/810/Climate-Action-Commission>

- **Chapter 7. Plan Implementation** describes the implementation plan, identifies available programs and resources to support implementation, and outlines procedures for maintaining the plan as a living document.

The **Appendices** contain supplemental reference materials as well as detailed calculations and methodologies used in the planning process as follows:

- **Appendix A – Mitigation Advisory Committee** includes Committee meeting materials and the Mitigation Strategy Feedback Survey results.
- **Appendix B – Outreach and Engagement** includes public outreach and engagement materials, including public meeting notes and Public Hazard Mitigation Survey results.
- **Appendix C – Hazard History** lists historical hazard events by date for each of the hazards in the Risk Assessment.
- **Appendix D – Critical Facility Hazard Analysis** lists critical facilities that fall into one or more hazard risk areas within the County and City.
- **Appendix E – 2017-2023 Mitigation Actions Status Report** discusses actions from the 2017 HMP Update and their status, including which actions were carried over into the 2023 HMP Update.
- **Appendix F – 2023-2028 Mitigation Action Plans** provides implementation action plans for each high priority mitigation action committed to by Prince George's County and the City of Laurel for the 2023 HMP.
- **Appendix G – Record of Changes** lists changes made to the 2017 HMP during the 2023 HMP update process .
- **Appendix H – Adoption Resolutions** includes sample and final HMP adoption resolutions for Prince George's County and the City of Laurel.
- **Appendix I – FEMA Requirements** includes the FEMA Local Plan Review Tool, FEMA approval letters, and the annual HMP progress report template.
- **Appendix J – Hazus Reports** provides the Hazus reports for riverine flood, coastal flood, hurricane wind, and earthquake used in the risk assessment.

## D. Acknowledgements

The 2023 HMP was supported by a Hazard Mitigation Assistance Building Resilient Infrastructure and Communities (BRIC) grant, which is administered by the Maryland Department of Emergency Management with funding from the Federal Emergency Management Agency. The project was facilitated by Dewberry Engineers, Inc.

## Chapter 2. Planning Process

*This chapter defines the process followed throughout the update of the HMP, including public participation and stakeholder engagement.*

### A. Planning Process

The Prince George's County Department of the Environment and the Office of Homeland Security in partnership with the City of Laurel's Office of Emergency Services led the development of their first regional hazard mitigation plan for the jurisdictions in 2005.

For the required 2023 update, the County and City continued a joint planning process in 2022, resulting in the 2023 Prince George's County & the City of Laurel HMP being approved by FEMA pending adoption by Prince George's County and the City of Laurel in March 2023. The combined effort leveraged the advantage of shared resources, including technical assistance provided by Dewberry Engineers, Inc. (Dewberry), and built on the success of similar multi-jurisdiction partnering agreements.

The Mitigation Advisory Committee ensured that potential stakeholders participated in the planning process, including reviewing the draft and final versions of the plan. Prince George's County received a Federal Emergency Management Agency (FEMA) Hazard Mitigation Assistance grant to support the 2023 plan update.

The 2023 plan update followed the traditional mitigation plan update process initiated with a Mitigation Advisory Committee HMP update kick-off meeting on September 16, 2022. The Hazard Identification Risk Assessment was refreshed using updated data sources during the Fall of 2022, including adding new components (climate projections, social vulnerability, and future development). The hazard identification and risk assessment results were presented to the Mitigation Advisory Committee at a meeting on November 16, 2022, where the plan's 2017 mitigation goal was reviewed and revised into four new goals. The **Community Profile**, **Mitigation Strategy** and **Plan Implementation** chapters were updated during the fall and winter of 2022.

The County leveraged community outreach events during November 2022 and January 2023 to seek input and feedback on the draft risk assessment, stakeholders' perceptions of hazard exposure and mitigation, and feedback on the draft 2023 HMP. Social media, newsletters, and community outreach listservs were used to reach the public. A sampling of outreach materials and messaging may be found in **Appendix B**.

### B. The Mitigation Advisory Committee

Prince George's County convened a Mitigation Advisory Committee comprising representatives from departments within Prince George's County and the City of Laurel, community stakeholders, state representatives, and a FEMA Region 3 representative. The Mitigation Advisory Committee worked with the Dewberry team to provide input at each key stage of the planning process, including reviewing the format and content of the previous plan and making decisions on what information to carry forward into the 2023 plan update. Mitigation Advisory Committee members responded to queries detailing plan implementation and mitigation capabilities; updated their 2017 plan actions; participated in Mitigation Advisory Committee meetings; participated in email correspondence, a feedback survey, and a virtual

meeting to create a comprehensive menu of 2023-2028 mitigation actions; reviewed document drafts; and supported outreach efforts.

**Appendix G** contains the record of changes that documents how each chapter in the 2017 plan was updated in the 2023 plan. Efforts to involve County and City departments and community organizations that might have a role in implementing the mitigation strategy included invitations to attend meetings and serve on the Mitigation Advisory Committee, access to draft updated plan chapters, e-mail updates, mitigation action development discussions, public outreach events and opportunities for input and comment on all draft deliverables. **Table 5** lists contributing Mitigation Advisory Committee members.

*Table 5: Mitigation Advisory Committee*

Name	Jurisdiction/Category	Department	Title
Ronald Gill	Prince George's County	Office of Homeland Security	Director, Office of Homeland Security
Meloyde Batten-Mickens	Prince George's County	Office of Homeland Security	Deputy Director
Joey Henderson	Prince George's County	Office of Homeland Security	Manager, Preparedness and Outreach
Alexandra Harris	Prince George's County	Office of Homeland Security	Emergency, Management Specialist
Ehsan Bahador	Prince George's County	Office of Homeland Security	Regional Planner
Dawn Hawkins-Nixon	Prince George's County	Department of the Environment	Associate Director
Lilantha Tennekoon	Prince George's County	Department of the Environment	Engineer, Sustainability Division – Flood Management
Patrick Callahan	Prince George's County	Department of the Environment	GIS Analyst
Jeffrey DeHan	Prince George's County	Department of the Environment	Associate Director, Stormwater Management
Frank L. Galosi	Prince George's County	Department of the Environment	Section Head, Stormwater Management Division
Sudanshu Mishra	Prince George's County	Department of the Environment	Assistant Associate Director, Stormwater Management Division
Joanna Smith	Prince George's County	Department of the Environment	Engineer

Name	Jurisdiction/ Category	Department	Title
Major Anthony Cline	Prince George's County	Police Department	Executive Officer, Bureau of Homeland Security and Intelligence
Chief James McClelland	Prince George's County	Fire/ Emergency Medical Services	Battalion Chief
Erv Beckert	Prince George's County	Department of Public Works and Transportation	Chief, Highway and Bridge Design Division
Mary Sherrill	Prince George's County	Department of Public Works and Transportation	Storm Drain Manager
Sangrea Watkins	Prince George's County	Economic Development Corporation	Special Assistant to President/CEO & Operations Manager
Rey De Guzman	Prince George's County	Department of Permitting, Inspection, and Enforcement	Floodplain Administrator
Behdad Kashanian	Prince George's County	Department of Permitting, Inspection, and Enforcement	Associated Director
Courtney Mariette	Prince George's County	Office of Community Relations	Associate Deputy Director
Mychael Dickerson	Prince George's County	Prince George's County Public Schools	Chief of Staff
Gary Cunningham	Prince George's County	Prince George's County Public Schools	Director of Safety and Security
Wanda Ramos	Prince George's County	Department of Parks and Recreation	Deputy Director, Maryland-National Capital Park and Planning Commission
Andree Checkley	Prince George's County	Department of Parks and Recreation	Planning Director
Katina Shoulars	Prince George's County	Department of Parks and Recreation	Division Chief, Countywide Planning
Cathy Stasny	Prince George's County	Department of Family Services, Area Agency on Aging	
James Carter	Prince George's County	Office of Homeland Security	Critical Infrastructure Protection



Name	Jurisdiction/ Category	Department	Title
Joanne Barr	City of Laurel	Administration	Deputy City Administrator
Robert Love	City of Laurel	Economic and Community Development	Economic and Community Development Director
Christina Cornwell	City of Laurel	Department of Community Resources and Emergency Management	Director/Emergency Manager
Carreen Koubek	City of Laurel	Office of the City Administrator	Special Assistant to the City Administrator
Miles Roesner	City of Laurel	Department of Information Technology	GIS Analyst
Jesse Delph	Maryland	Maryland Department of Emergency Management/ Hazard Mitigation Branch	Senior Hazard Mitigation Specialist
Caitlin Whiteleather	Maryland	Maryland Department of Emergency Management/ Hazard Mitigation Branch	State Hazard Mitigation Officer
Joshua Norris	Federal Emergency Management Agency (FEMA) Region III	Hazard Mitigation Branch	FEMA Region 3 Hazard Mitigation Planner and Reviewer for the State of Maryland
Kelly Flint	State of Maryland	Department of the Environment	Senior Engineer (Dam Safety Representative)
Stephanie Robinson	City of Bowie	Emergency Management	Emergency Management Specialist
Courtney Gosse	Red Cross National Capital & Greater Chesapeake Region	---	Disaster Program Manager
Erin Meyer	University of Maryland	Emergency Management and Business Continuity	Director

Name	Jurisdiction/ Category	Department	Title
John Bailey IV	Homeowner and Civic Association	Camps Springs Civic Association	---
Lakia Prue	Homeowner and Civic Association	Binkley Towns Homeowners Association	---
Cary Nelson	Homeowner and Civic Association	Brook Manor Civic Association	---
Dr. Toye Latimore	Homeowner and Civic Association	Founders Woods Homeowners Association	---
Sarah Cavitt	Homeowner and Civic Association	Indian Head Hwy Area Action Council	---
Charles Hawkins	Homeowner and Civic Association	Tantallon North Area Civic Association	---
Earle A. Gumbs	Homeowner and Civic Association	Hillcrest-Marlow Heights Civic Association	---
Regina Jeter	Homeowner and Civic Association	Apple Grove Squires Woods	---
Dennis Serette	Homeowner and Civic Association	Barnaby Manor Civic Association	---
Antewan Brown	Homeowner and Civic Association	Birchwood/Clearview Civic Association	---
Olaf "Pete" Pedersen III	Utilities	PEPCO	Manager of Emergency Preparedness
Ervin McDaniel III	Utilities	Baltimore Gas & Electric Company	External Affairs Manager
Michael Block	Utilities	Washington Suburban Sanitary Commission Water	CHHS Contractor/Consult
Sara Basehart	Community Groups	Independence Now	Executive Director

Name	Jurisdiction/ Category	Department	Title
Kim Finch	Prince George’s County	Planning Department Environment Section	Environmental Planner
Stephanie Dalke	University of Maryland	University of Maryland – Environmental Finance Center	Water Resources and Climate Adaption Program Manager
Brandy Espinola	University of Maryland	University of Maryland – Environmental Finance Center	Climate Resilience and Sustainability Program Manager

From September 2022 through January 2023, the Mitigation Advisory Committee held three meetings and supervised work on the 2023 HMP. Extensive coordination through email occurred between Prince George’s County Office of Homeland Security and Dewberry consultants. Additionally, coordination was conducted with the City of Laurel Office of Emergency Services staff. The Mitigation Advisory Committee members coordinated and consulted with other entities and stakeholders to identify and delineate natural hazards within the community and to assess the risks and vulnerability of public and private buildings, facilities, utilities, communications, transportation systems, and other vulnerable infrastructure. In addition, the Mitigation Advisory Committee members worked with the County Office of Homeland Security and the Dewberry consultants to review program capabilities, provide 2017 mitigation action status updates, and to update the 2023 mitigation strategy.

During the HMP update, most communication occurred through emails, meetings, and feedback surveys. The Mitigation Advisory Committee and Dewberry consultants mutually chose this strategy rather than in-person meetings to accommodate budgets, schedules, and safety concerns due to the COVID-19 pandemic. **Table 6** documents meeting dates and their purposes. Meeting materials are located in **Appendix A** and **Appendix B**. Participation in plan update activities is summarized in **Table 7**.

Table 6: Mitigation Advisory Committee Meetings

Date	Meeting	Summary
September 16, 2022	HMP Update Project Kick-off Meeting	During the Mitigation Advisory Committee Plan Update Kick-off Meeting, the planning process and schedule was presented. Committee members committed to the project and schedule. The list of hazards and rankings from the 2017 plan update were validated through a prioritization exercise. The previous plan structure and content was discussed; a decision was made to retain structure and general level of content. The update process and role of the Mitigation Advisory Committee members, project schedule, and desired plan outcomes were discussed.
November 16, 2022	Risk Assessment Results and Goals Update Workshop	The hazard identification and risk assessment results were presented with maps and data provided in a power point presentation. The 2017 plan goal was reviewed and revised into four new goals. Public outreach needs were discussed.

Date	Meeting	Summary
December 14, 2022	Mitigation Strategy Development Workshop	Reviewed the project status, mitigation goals, and action prioritization methodology. An Airtable database was used to discuss and make decisions on the actions for the updated Mitigation Strategy. Discussions were held throughout the presentation so Dewberry could gather feedback from the Mitigation Advisory Committee.
February 1, 2023	Plan Draft Review Meeting	An overview of the 2023 Draft Hazard Mitigation Plan was presented to the Committee. There was then a discussion with Committee members to answer questions and gather feedback on the Draft Plan. The meeting closed with a discussion on next steps in the planning process and an open forum for questions or comments from the Committee.

Table 7: Mitigation Advisory Committee Meeting Summary and Attendance

Member	Department	Kick-Off	Risk Assessment & Goal Workshop	Mitigation Strategy Workshop	Mitigation Action Feedback Survey	Public Meetings	Draft Plan Review Meeting
Ronald Gill	Office of Homeland Security	X		X			
Meloyde Batten-Mickens	Office of Homeland Security			X		X	X
Joey Henderson	Office of Homeland Security	X	X	X		X	X
Alexandra Harris	Office of Homeland Security	X					
Ehsan Bahador	Office of Homeland Security	X	X	X	X	X	X
Dawn Hawkins-Nixon	Dept. of Environment	X	X	X			X
Lilantha Tennekoon	Dept. of Environment	X		X	X		X
Patrick Callahan	Dept. of Environment		X	X	X		X
Jeffrey DeHan	Dept. of Environment		X				X

Member	Department	Kick-Off	Risk Assessment & Goal Workshop	Mitigation Strategy Workshop	Mitigation Action Feedback Survey	Public Meetings	Draft Plan Review Meeting
Sudanshu Mishra	Dept. of Environment		X	X			X
Frank L. Galosi	Dept. of Environment		X		X		X
Joanna Smith	Dept. of Environment		X	X			
Major Anthony Cline	Police Dept.		X	X	X		
Chief James McClelland	Fire/ Emergency Medical Services		X				
Erv Beckert	Dept. of Public Works and Transportation						
Mary Sherrill	Dept. of Public Works and Transportation		X	X			X
Sangrea Watkins	Economic Development Corporation						
Rey De Guzman	Dept. of Permitting, Inspections, and Enforcement		X	X			
Behdad Kashanian	Dept. of Permitting, Inspections, and Enforcement						

Member	Department	Kick-Off	Risk Assessment & Goal Workshop	Mitigation Strategy Workshop	Mitigation Action Feedback Survey	Public Meetings	Draft Plan Review Meeting
Courtney Mariette	Office of Community Relations						X
Mychael Dickerson	PG County Public Schools						
Gary Cunningham	PG County Public Schools			X			
Wanda Ramos	Dept. of Parks and Recreation		X				
Andree Checkley	Dept. of Parks and Recreation						
Katina Shoulars	Dept. of Parks and Recreation		X				
Cathy Stasny	Dept. of Family Services, Area Agency on Aging						
Joanne Barr	Administration		X				X
Robert Love	Economic and Community Development		X	X			X
James Carter	Homeland Security Critical Infrastructure		X	X			

Member	Department	Kick-Off	Risk Assessment & Goal Workshop	Mitigation Strategy Workshop	Mitigation Action Feedback Survey	Public Meetings	Draft Plan Review Meeting
Christina Cornwall	Dept. of Emergency Services	X		X	X	X	X
Miles Roesner	Dept. of Information Technology		X	X			
Jesse Delph	Maryland Department of Emergency Management (MDEM)						
Caitlin Whiteleather	Maryland Department of Emergency Management (MDEM)						
Joshua Norris	Federal Emergency Management Agency (FEMA) Region III						
Kelly Flint	Maryland Department of Environment		X	X			X
Stephanie Robinson	Emergency Management, City of Bowie		X	X	X	X	X
Courtney Gosse	American Red Cross					X	
Erin Meyer	University of Maryland			X			X
John Bailey IV	Camps Springs Civic Association						



Member	Department	Kick-Off	Risk Assessment & Goal Workshop	Mitigation Strategy Workshop	Mitigation Action Feedback Survey	Public Meetings	Draft Plan Review Meeting
Lakia Prue	Binkley Towns Homeowners Association						
Cary Nelson	Brook Manor Civic Association						
Dr. Toye Latimore	Founders Woods Homeowners Association	X	X		X	X	
Sarah Cavitt	Indian Head Hwy Area Action Council						
Charles Hawkins	Tantallon North Area Civic Association						
Earle A. Gumbs	Hillcrest-Marlow Heights Civic Association						
Regina Jeter	Apple Grove Squires Woods						
Dennis Serette	Barnaby Manor Civic Association						
Antewan Brown	Birchwood/Clearview Civic Association						
Olaf “Pete” Pedersen III	PEPCO		X				

Member	Department	Kick-Off	Risk Assessment & Goal Workshop	Mitigation Strategy Workshop	Mitigation Action Feedback Survey	Public Meetings	Draft Plan Review Meeting
Ervin McDaniel III	Baltimore Gas & Electric Company						
Michael Block	Washington Suburban Sanitary Commission Water		X				X
Sara Basehart	Independence Now						
Joanne Hall Barr	City of Laurel						X
Carreen Koubek	Office of City Administrator, City of Laurel		X				X
Kim Finch	Prince George's County Planning Department, Environmental Section		X	X			X
Stephanie Dalke	University of Maryland – Environmental Finance Center (EFC)						X
Brandy Espinola	University of Maryland – Environmental Finance Center (EFC)			X	X		
Brian K. Lee*	City of Laurel				X		X
Daniel L. Dornan*	Prince George's County				X		

Member	Department	Kick-Off	Risk Assessment & Goal Workshop	Mitigation Strategy Workshop	Mitigation Action Feedback Survey	Public Meetings	Draft Plan Review Meeting
Bill Bailey*	City of Laurel				X		

\* Not in the Mitigation Advisory Committee, but contributed their subject matter expertise to the planning process

## C. Public Participation and Stakeholder Engagement

### C.1. Public Participation

The public involvement element of the planning process involved a hazard mitigation survey, an online Story Map and community mapping opportunity, a hazard mitigation planning webpage, two virtual public meetings, and a draft review period. Further details on the virtual public meeting are shown in **Table 8**. The hazard mitigation survey was available online to the public from November 1, 2022 – January 3, 2023. The survey was promoted via social media (**Appendix B**) and shared through the following local community channels:

- County Department of the Environment Twitter account
- County Office of Emergency Management Facebook page
- NextDoor
- County Connect Prince George's Facebook page
- County Reddit page

External public participation was initiated in November 2022 by the Prince George's County Office of Homeland Security supplemented by efforts of the Prince George's County Department of the Environment.

Examples of community outreach and engagement include a public meeting held on November 6, 2022, to update the public on the 2023 hazard mitigation update process, share risk assessment results, field questions, and discuss their thoughts and concerns for their community.

Prince George's County citizens were notified of the plan revisions and asked to participate through posts on Facebook, Twitter, Reddit, and on the Emergency Management section of the county website. This method of soliciting public participation in the plan will be utilized during the next 5 years.

*Table 8: Public Meetings*

Date	Meeting	Summary
November 9, 2022	Public Meeting #1	During the first Public Meeting, an overview of the planning process, current progress, preliminary results from the risk assessment, and discussion of potential planning goals were all presented. The public also had an opportunity to give input and ask questions, and were provided with opportunities for further involvement.
February 2, 2023	Public Meeting #2	During the second Public Meeting, an overview of the 2023 Draft Hazard Mitigation Plan was presented. Additionally, there was a discussion to gather feedback from the public on the Draft Plan. The meeting closed with next steps in the planning process and an opportunity for the public to ask further questions.

## C.2. Public Survey Results

The public survey collected a total of 39 responses from Prince George's County residents, business owners, workers, and students, faculty, and staff of colleges and universities in the jurisdiction. The survey was conducted from September to December of 2022 and included several questions on hazard awareness, hazard mitigation techniques, and hazard mitigation preferences. Three quarters of the respondents to the survey were residents of Prince George's County. Aside from residents, other respondent types included people who work in the County or who represent a federal/state/private agency or organization with a vested interest in Prince George's County.

Over half of the survey respondents reported that they live in the Berwyn Heights community of the County. The community with the second highest number of respondents was Greenbelt. No respondents reported they live in the City of Laurel. The "Other" responses included two respondents from Fort Washington and one from Chapel Oaks. Survey respondents' reported communities are shown in **Figure 3**.

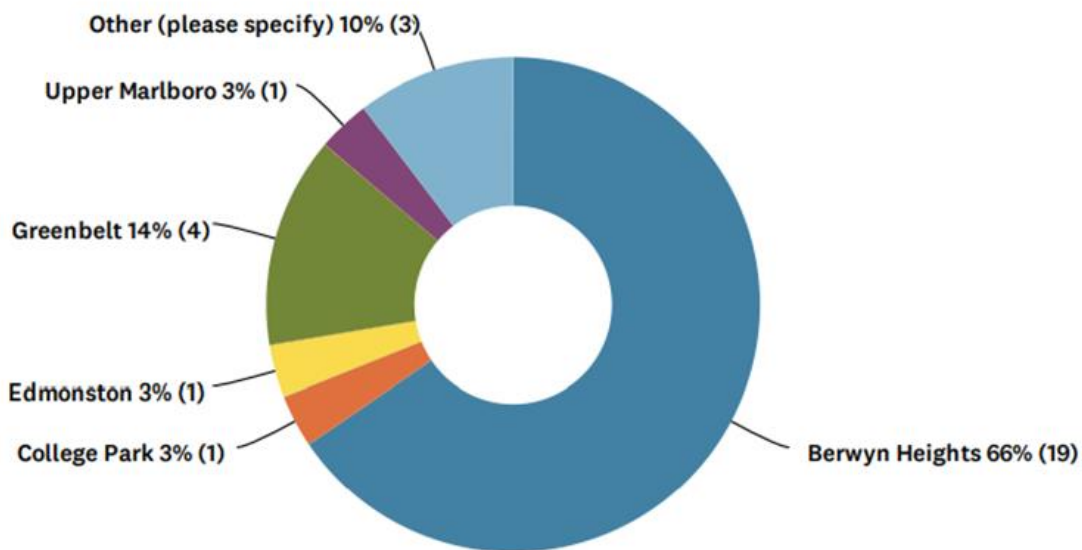


Figure 3: Public Survey Respondent's Communities

Prince George's County residents are concerned about flooding and flood-related and wind-related severe storms. In line with these concerns, more than half of respondents reported that their home, business, community, college or university, or organization had been previously affected by either a flood, high winds, or wind-related or flood-related severe storm. Additionally, more than half of respondents reported winter storm/blizzard ranked as a hazard that has had the biggest impact on the County, ranking high among the most impactful hazards. All responses to the hazard that has had the biggest impact on the County are shown in **Figure 4**.

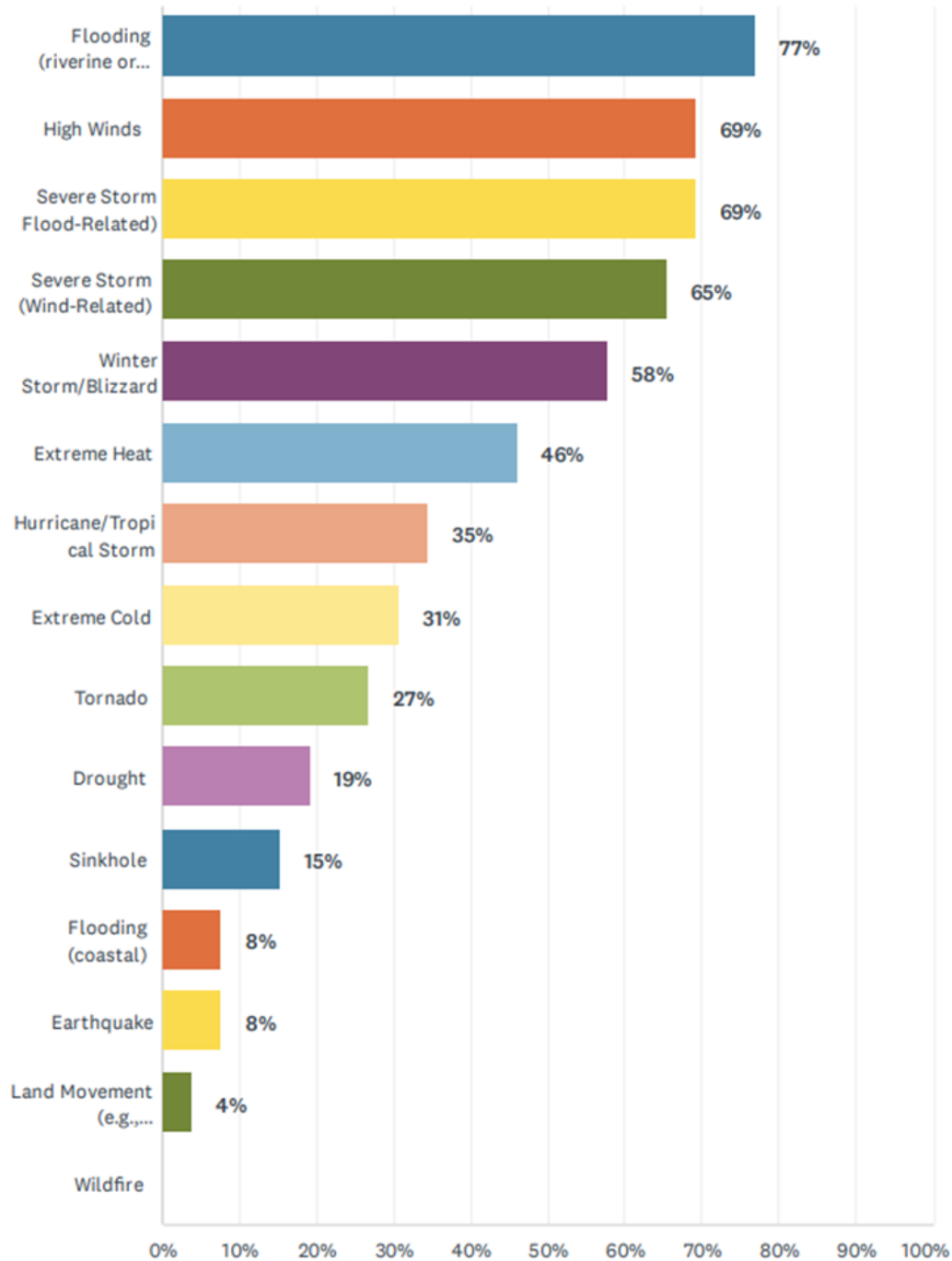


Figure 4: Hazards with the Largest Impact on the County

Although flooding is a top concern for County residents, 68% do not have flood insurance. Respondents reported multiple reasons for not having flood insurance, with the most common reasoning being that they are not required to, or they do not think they need it. Residents who cited “other” reasons reported that insurance does not offer flood insurance for their home. Survey respondents reported many occurrences of past home flood damage, with the majority of responses relating to flooding in the basement of residents’ homes. Additionally, respondents reported inadequate storm drainage worsening property damage due to flash flooding. However, perceptions of hazards do not appear to affect residents’ decisions to live in the area: more than half (64%) of respondents said they would repair or rebuild their property in the same location if a disaster substantially damaged their home.

Prior to taking the survey, only 33% of respondents knew that Prince George's County maintains a hazard mitigation plan. Similarly, only 44% of respondents are signed up for the Alert Prince George's emergency notification system, and 30% of respondents had never heard of Alert Prince George's before. Therefore, there is limited knowledge among the public of the County's hazard mitigation efforts.

Survey participants were asked what they believed the most important actions that Prince George's County could take to mitigate hazards and become more resilient over time. Residents could select multiple important actions. More than two-thirds of respondents cited localized flood-risk reduction projects, the most of any action. Other commonly cited actions included providing technical assistance to residents, businesses, jurisdictions, and organizations to help with hazard mitigation (63%), outreach and education to residents to help with hazard mitigation (59%), enact and enforce regulations, codes and ordinances, such as zoning regulations and building codes (56%), and implement a warning system to alert the public of impending hazards (56%). When asked to identify one mitigation action the County could take, many respondents provided open-ended answers related to flood and stormwater mitigation projects, public education and outreach to vulnerable populations about hazards, and taking action to reduce power outages due to tree damage.

Overall, the hazard mitigation survey illustrated Prince George's County residents' high concern for flooding, severe storms, and high winds. Only one third of survey respondents knew that the County maintains a hazard mitigation plan. This highlights the need for a strong hazard mitigation effort in Prince George's County that is responsive to the risks and vulnerabilities outlined later in this plan, as well as the concerns of residents, especially flood-risk reduction projects.

### C.3. Stakeholder Engagement

Internal stakeholder engagement began in September 2022 when the members of the 2017 Prince George's County and City of Laurel Mitigation Advisory Committee were notified that the plan would be updated, and the committee would be revitalized to reconvene at a project kick-off meeting on September 16, 2022. Additional invitations to serve on the Mitigation Advisory Committee were sent out to a wider group of people that included significantly more stakeholders from within the County and City, throughout the communities, and at the state/regional levels. The stakeholder groups invited to participate through either the Mitigation Advisory Committee or draft plan review opportunities include the following:

- The 25 incorporated municipalities located in Prince George's County that do not have separate land use authority and the City of Bowie, which retains some land use authority.
- Interested parties on Planning Board's public notification list of e-mails that is maintained by Maryland-National Capital Park and Planning Commission (civic associations, neighborhood associations, etc.)
- Dam Owners
- Utility companies (e.g., PEPCO, Baltimore Gas & Electric, WSSC Water)
- Emergency managers of adjacent counties (Montgomery, Howard, Charles, Calvert, Anne Arundel)
- Red Cross National Capital & Greater Chesapeake Region
- University of Maryland
- Maryland Department of Emergency Management
- Maryland Department of the Environment
- Natural Resources Conservation Service, Prince George's District Conservationist

Engagement of community stakeholders in the review of the 2023 HMP has been an ongoing effort. In addition to posting a digital version of the HMP on the Prince George's County website, stakeholders were encouraged to provide input through the community hazard mapping activity in the 2023 HMP virtual Story Map, Hazard Mitigation Survey, and Draft HMP Review Survey. Prince George's County Office of Homeland Security staff continue to use

an open floor (or unarranged times) during meetings and trainings to solicit feedback and discuss the 2023 HMP with community stakeholders.

June is Prince George's County Flood Awareness Month which has been used to introduce the public and stakeholders to the Hazard Mitigation Planning process and flood awareness through several intensive activities. Each owner of flood prone property depicted on the County's Flood Insurance Rate Maps as being within the Special Flood Hazard Area is sent a letter encouraging the purchase of flood insurance even if not lender required, mitigation options and sources of more information through the County's web-based Floodplain Lookup Tool and other programs. The City of Laurel Emergency Manager apprised internal City staff of plan update status at weekly department director meetings. City of Laurel homeowner's association have been briefed and linked to the draft plan are on the city's website encouraging citizen comment.

A summary of Prince George's County and City of Laurel outreach efforts, scanned materials, and screen captures of messaging are in **Appendix B**.

### **C.3.a. Dam Safety Coordination**

Dam owners and dam safety experts were both asked to provide input into the HMP as well as provide general feedback. A Dam Safety Representative was consulted from the outset of the planning process and was included on the Mitigation Advisory Committee. Emergency Action Plans, mapped inundation zones, location and size of the population at risk, and potential impacts to structures were all integrated into the plan. The Dam Safety Permits Division of the Stormwater, Dam Safety, and Flood Management Program within the Maryland Department of the Environment reviewed the draft Dam and Levee Failure section in Chapter 4, dam-related mitigation and adaptation actions, and appendices for accuracy and completeness.

While all dam owners were offered opportunities for involvement, four provided feedback on the draft HMP or participated in the Mitigation Advisory Committee. They included:

- Prince George's County Department of the Environment- Stormwater Management
- Prince George's County Department of the Environment- Flood Management
- City of Laurel Department of Emergency Services
- City of Bowie Emergency Management

The dam owners approved of the HMP and had no major concerns or comments; however, they did state interest in being included in any future planning or discussions regarding their affected dams

### **C.3.b. Virtual Story Map**

A virtual Story Map was created in ArcGIS Online and presented to the public to collect community hazard location information. The Story Map contains background information on the HMP update, as well as the purpose of Hazard Mitigation Plans. Additionally, there is a section of the Story Map that lists the identified hazards for Prince George's County and the City of Laurel that are discussed in the **Risk Assessment** chapter of this Plan. The public could identify community problem areas through a survey linked in the Story Map, shown in **Figure 5**.



Prince George's County Community Problem Areas

Help us identify hazard problem areas in Prince George's County! Hazard problem areas refer to locations that have known recurring issues with flooding, landslides or other related issues.

**Hazard Type\***

-Please select-

**Location Description**

1000

**Description of the Problem\***

1000

**Attach Photos and Videos (optional)**

1
Drop file here or select file (pdf, doc, docx, xls,.xlsx, pptx, ppt, txt. Number of files required: 3)

**Select Location**  
Specify the location for this entry by searching on the map.

Find address or place

Esri, USGS | M:NCPPC, VGIN, Esri, HERE, Garmin, FAO, NOAA, USGS, EPA, NPS | Powered by Esri

Figure 5: Community Problem Area Survey

Seven community problem areas were identified by members of the public through the survey. The location of the community problem areas identified through the survey are shown in **Figure 6**. A description of each identified problem area is shown in **Table 9**. Six out of the seven responses were for flooding hazards, and one response was a wind-related hazard.

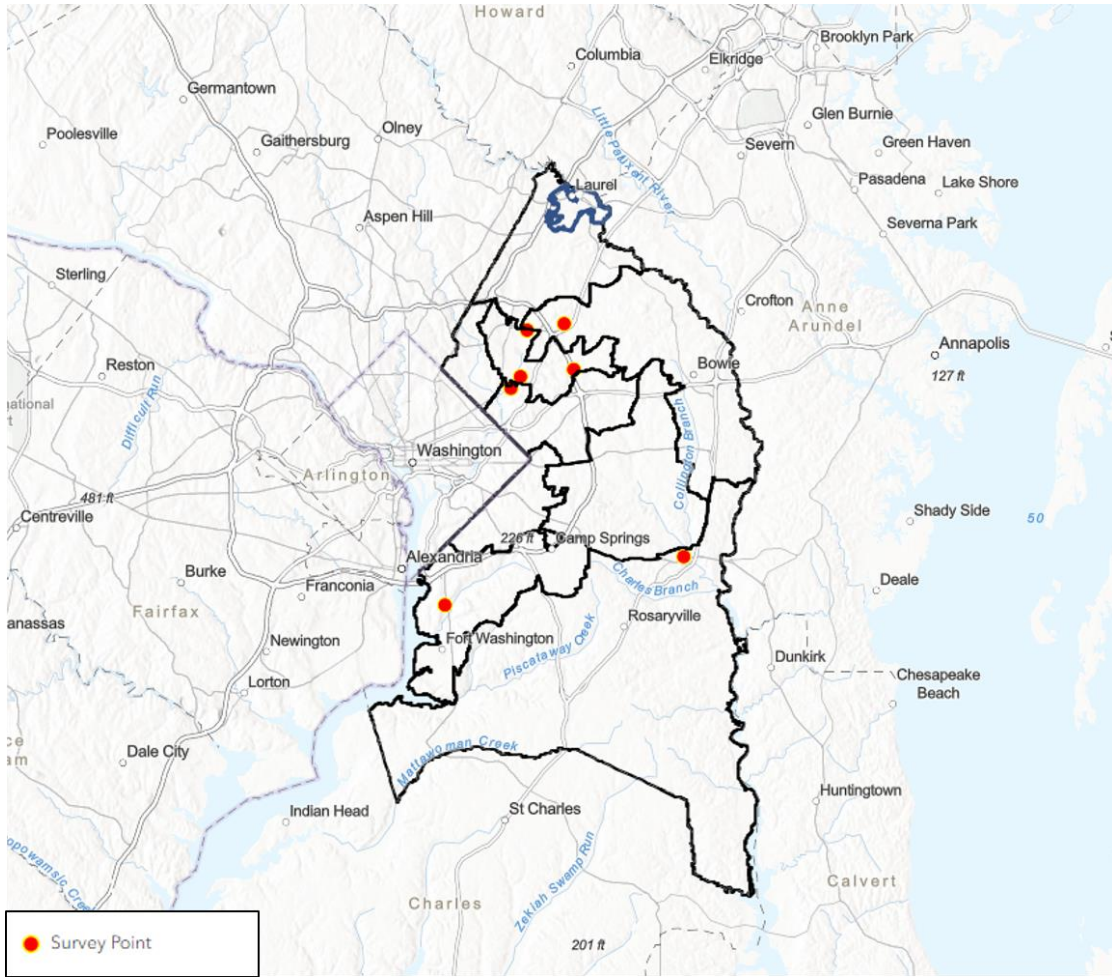


Figure 6: Community Problem Areas Map

Table 9: Identified Community Problem Areas

Hazard Type	Location Description	Description of the Problem
Flooding	n/a	Insufficient stormwater drainage leads to stormwater filling up a below-grade concrete walkway. During the flooding of August 10 <sup>th</sup> , the first floor of an apartment building was flooded here.
Severe Storm (Wind-Related)	Greenbelt Area	Recent windstorms, especially in 2022, caused power outages. Pepco tree trimming a few years ago reduced the problem, but work needs to continue to reduce vulnerability.
Flooding	Fort Washington, MD	Streams in the back of single family homes located on Founders Terrace.

Hazard Type	Location Description	Description of the Problem
Flooding	Parking lot for office building	During bad rain storms the parking lots in this area flood pretty bad.
Flooding	Town of Upper Marlboro, streets and surrounding areas along the Collington Branch.	During heavy rains select areas along the Collington Branch flood and roads need to be closed until the water recedes. The areas primarily affected by the water are 202 @ Marlboro Pike and up to Peerless Avenue. The other area is further downstream where the Collington Branch passes under Water Street between Judges Drive and Rt. 4. This is a well-known problem area and may already be part of a mitigation plan.
Flooding	Port towns including Bladensburg, Edmonston, Cottage City, Riverdale, College Park, and Hyattsville	Port towns including Bladensburg, Edmonston, Cottage City, College Park have always flash floods due to the old drainage system.
Flooding	8900 Block 59 <sup>th</sup> Avenue, Berwyn Heights, MD	More incidents of flooding from rain storms.

## D. Community Lifelines

Lifelines are systems, like roads and power, that allow critical government and essential business operations to continue. Lifelines are essential to human health and safety, and/or economic security. The framework of lifelines was to give common definitions and terminology when talking about various hazards or incidents and what may or has been affected, and to help formulate a response to an incident, as well as prompt mitigation before such an incident may occur. This framework allows emergency managers to:

- Characterize the incident and identify the root causes of priority issue areas.
- Distinguish the highest priorities and most complex issues from previous incident information.

A lifeline enables the continuing operation of critical government and business functions during a hazard or other incident and is essential to human health and safety, and/or economic security. Lifelines (**Figure 7**) include police and fire departments, hospitals, power plants, arterial roads, grocery stores, and the cellular towers that connect everything. These often-interconnected systems are, simply put, essential for communities to keep the “lights on.” Examples of this are:

- The most fundamental services in the community that, when stabilized, enable all other aspects of society to function.
- The integrated network of assets, services, and capabilities that are used day-to-day to support the recurring needs of the community.

- When disrupted, decisive intervention (e.g., rapid service re-establishment or employment of contingency response solutions) is required to stabilize the incident.



*Figure 7: FEMA Community Lifeline Categories*

## D.1. BRIC and Community Lifelines

Resilient lifelines help build resilient communities. The goals and objectives of FEMA's Strategic Plan promote using mitigation to reduce risk to lifelines before a disaster and to quickly stabilize a community after disaster by preventing cascading impacts. BRIC mitigation grants can go toward projects which mitigate these structures, facilities, and systems. Lifeline-focused mitigation projects could involve a wide variety of public, private, and non-profit organizations. Framing mitigation projects in the terms of which community lifelines are being improved gives a mitigation project a higher chance to be awarded a BRIC mitigation grant.

## Chapter 3. Community Profile

*This chapter contextualizes the HMP by providing background on Prince George's County and the City of Laurel.*

Prince George's County is part of the greater Washington-Baltimore metropolitan area. The county is approximately 499 square miles (mi<sup>2</sup>), 483 mi<sup>2</sup> comprised of land and 16 mi<sup>2</sup> of water. Prince George's County is surrounded by Anne Arundel County and the Patuxent River to the east, Calvert County to the southeast, Charles County to the south, Howard County to the north, and Montgomery County to the northwest in Maryland. Washington, D.C. and the Potomac River lie to the west. The county border with Fairfax County and Alexandria, Virginia is the Potomac River shoreline along the Virginia coast.

Although there are 27 separate incorporated municipalities within the boundaries of Prince George's County, only the Cities of Laurel and Bowie retain some degree of land use authority. Only the City of Laurel is recognized separately by FEMA and administers its own floodplain management ordinance, so the City of Laurel's participation has been incorporated into the plan as a separate entity in the planning process with specific community profile information detailed in **Chapter 3**.

### A. Physiography

Prince George's County lies in the Atlantic Coastal Plain, and its landscape is characterized by gently rolling hills and valleys, but can be locally quite rugged where short, high-gradient streams have incised steep ravine systems. Along its western border with Montgomery County, Adelphi, Calverton and West Laurel rise into the Piedmont, exceeding 300 feet mean sea level (MSL) in elevation. The Piedmont is characterized by deeply weathered, poorly exposed bedrock and a rolling topography. The Fall Line, which delineates the division between Coastal Plain and Piedmont, is the easternmost extent of rock-filled river rapids, the point at which east-flowing rivers cross from the hard, igneous, and metamorphic rocks of the Piedmont to the relatively soft, unconsolidated strata of the flat Coastal Plain. **Figure 8** shows the States of Maryland and Delaware divided into their respective physiographic provinces.

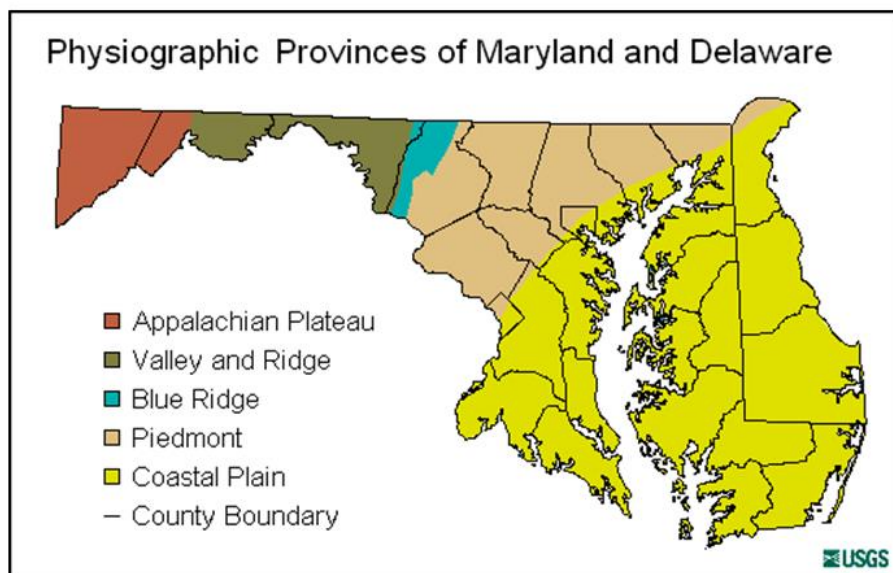


Figure 8: Physiographic Provinces of Maryland and Delaware

## B. Hydrology

Prince George's County lies within two watersheds: the Patuxent River and the Potomac River, both of which are a part of the greater Chesapeake Bay Watershed.

The Potomac River Watershed covers 14,670 square miles: Virginia (5,723 mi<sup>2</sup>) Maryland (3,818 mi<sup>2</sup>), West Virginia (3,490 mi<sup>2</sup>), Pennsylvania (1,570 mi<sup>2</sup>), and the District of Columbia (69 mi<sup>2</sup>). Based on information from the 2019 National Land Cover Database (NLCD) which is the most current land use database, the majority of the basin's land area is covered by forests (53.2% of the land area). Developed land makes up 14.7% of the basin's land area, while agriculture covers 25.2%. Water and wetlands make up 6% of the basin's land area. The Potomac's major tributaries include: the Anacostia River, Antietam Creek, the Cacapon River, Catocin Creek, Conococheague Creek, the Monocacy River, the North Branch, the South Branch, the Occoquan River, the Savage River, the Seneca Creek, and the Shenandoah River. The Potomac River watershed is mainly fed by the Anacostia River, Oxon Creek, Piscataway Creek, Mattawoman Creek, Zekiah Swamp, and the Potomac River in Prince George's County.

The Patuxent River Watershed is fed mainly by the Patuxent River, Rocky Gorge Reservoir, and Western Branch in Prince George's County. It covers 908 mi<sup>2</sup> that is mostly forested (43%) with only 10.7% of its acreage developed. The Patuxent River is the largest and longest river entirely within Maryland, and its watershed is the largest completely within the state.

Significant water bodies in Prince George's County include, but are not limited to:

- Bald Hill Branch
- Base Lake
- Bear Branch
- Beaverdam Creek
- Black Swamp Creek
- Carey Branch
- Cash Creek Lake
- Charles Branch
- Chews Lake
- Collington Lake
- Crow Branch
- Greenbelt Lake
- Henson Creek
- Horsepen Branch
- Indian Creek
- Lake Artemesia
- Lake Deborah
- Laurel Lake
- Northampton Lake
- Paint Branch
- Redington Lake
- Sligo Creek
- Walker Branch

## C. Climate

The eastern half of Maryland lies on the Atlantic Coastal Plain, with flat topography and sandy or muddy soil. This region has a humid subtropical climate, with hot, humid summers and a short, mild to cool winter. This humid subtropical climate is strongly influenced by the Chesapeake Bay and the Atlantic Ocean, both of which moderate the weather but do not prevent ice formation almost every winter on the

bay’s northern tributaries; summer calms can produce high temperatures of up to 107°F, with nearly 100% relative humidity. Average temperatures in eastern Maryland are 75°F in July and 35°F in January.

The Piedmont region has average seasonal snowfall totals generally exceeding 20 inches; temperatures below 10°F are less rare than in the Atlantic Coastal Plain. Land use and development trends in Prince George’s County is characterized by highly urbanized areas, high growth areas, and outlying more rural areas in the southern area of the county. Between 2002 and 2010, the County experienced a 7.7% increase in developed land and a 6.3% decrease in natural resource areas—agricultural, forest, and wetlands.

## D. Land-Use and Development Trends

The majority of residential growth between 1980 and 2010—measured by the number of issued building permits—occurred in County communities outside of the Capital Beltway (Route 95/495) and more isolated from transit stations. However, approximately 60% of nonresidential growth occurred outside of the Capital Beltway during this period. These trends are problematic because suburban development during the past three decades has not been compact and has, as a result, consumed a disproportionate amount of land and required an extensive new infrastructure investment. Between 2002 and 2011, suburban development outside of the Capital Beltway accounted for 73% of all growth and 59% of all consumed land, while more densely urban areas inside the Capital Beltway accounted for 25% of all growth and only 5% of all consumed land.<sup>7</sup> This is because areas inside of the Capital Beltway have been largely “built out” for several decades. Thus, the areas inside the Beltway are more prone to re-development.

Land use and development trends are documented by the United States Census Bureau and that agency’s American Community Survey. In addition, a George Mason University study also characterized county demographics. **Chapter 3.E** relies most strongly on Census Bureau data supplemented by the *Plan 2035 Prince George’s Approved General Plan*, May 6, 2014.

As of May 2014, the highest percentage of the county (282,589 acres) is devoted to single-family dwelling units (27%). Land dedicated to agricultural and natural resource activities accounts for 16.7% of the county, while parks and open space, institutional uses, and vacant property consumes approximately 20% of land area. Only 37 acres, or 0.013%, of county land is classified as mixed use. It is anticipated that mix use development will increase with new and re- development projects in the future. **Table 10** provides a comprehensive list and description for each of these land use categories as of May 2014.

Table 10: Existing Land Use for Prince Georges County (2014)

Land Use	Acres	Percent Land Area	Description
Agricultural–Natural Resources	47,134	16.68%	Agricultural or natural resources activities.
Residential–Single-Family	76,412	27.04%	Single-family detached units.
Residential–Attached	1,190	0.42%	Single-family attached units e.g. duplexes or

<sup>7</sup> Maryland Department of Planning 2010 Land Use/Land Cover Product Summary: <https://planning.maryland.gov/Pages/OurWork/landuse.aspx>

Land Use	Acres	Percent Land Area	Description
			triplexes.
Residential–Townhouse	4,878	1.73%	Single-family townhouse units.
Residential–Multifamily	5,431	1.92%	Multifamily units e.g. apartments or condos.
Commercial	5,832	2.06%	Commercial e.g. shopping, service, trade, or restaurants.
Office	3,446	1.22%	Offices.
Industrial	8,150	2.88%	Industrial, manufacturing, and storage.
Institutional	32,662	11.56%	Social, institutional, or public facilities.
Transportation and Utilities	7,186	2.54%	Transportation and utility-related.
Parks and Open Space	34,475	12.20%	Parks and open space.
Vacant	55,756	19.73%	Undeveloped land.
Mixed Use	37	0.01%	Single lot Mixed-use, typically housing office above retail or retail.
Total	282,589	100.00%	All land area in Prince George’s County

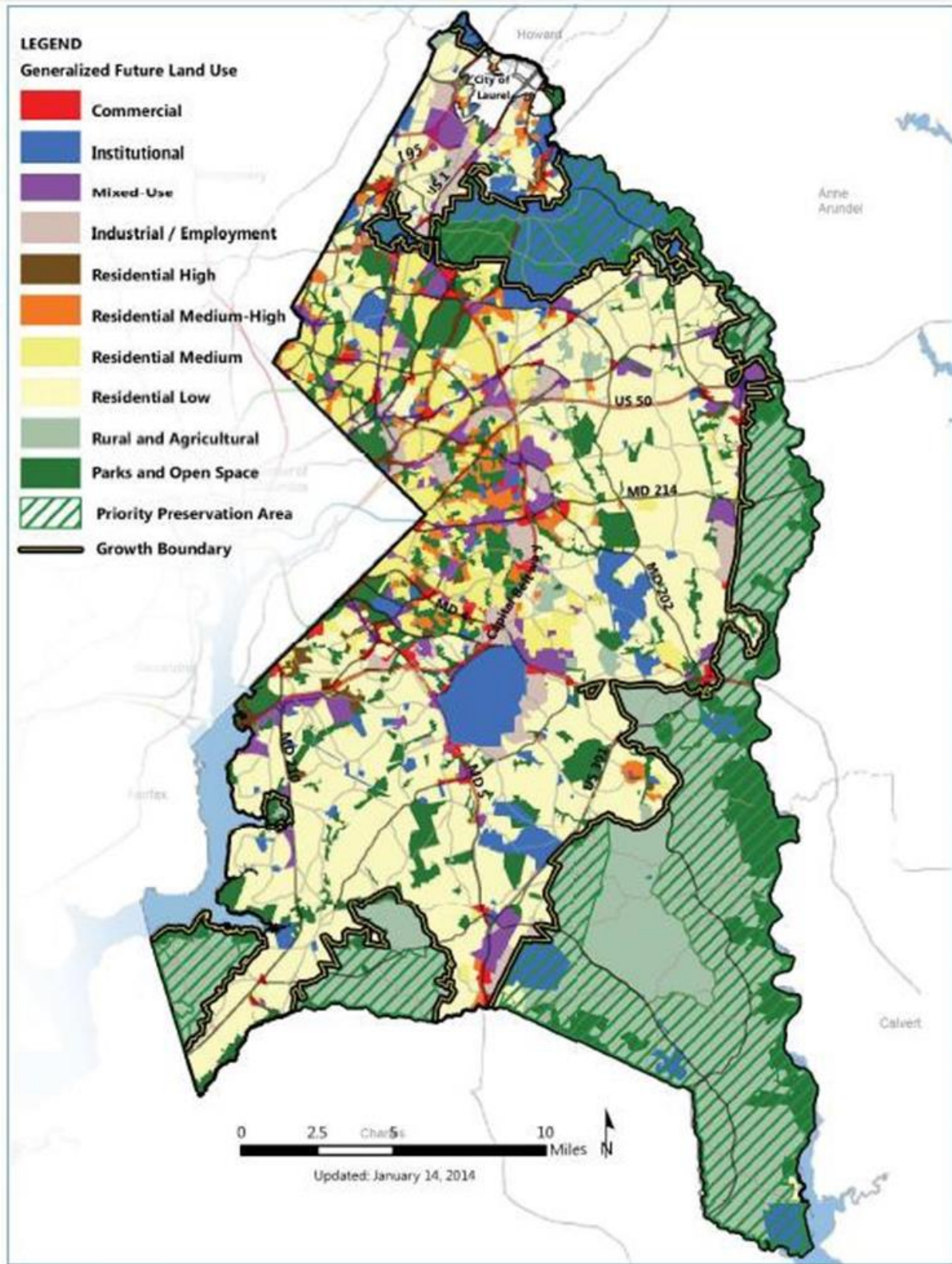
Development trends are a notable topic when considering hazard risk. New development in the County has occurred within the Beltway in support of the County’s priorities of community and transit-oriented development. Prince George’s County’s Redevelopment Authority reports recent development occurring in the Brentwood/Mt. Rainier neighborhood area. These recent developments are located outside of the Special Flood Hazard Area, decreasing the communities vulnerability to flood hazards.

Future Prince George’s County land use decisions are guided by *Plan 2035*, which prioritizes where future growth and development should be concentrated. Land use areas are characterized by three “tiers.” Generalized future land use in the County is shown in **Figure 9**. *Plan 2035* delineates Priority Preservation Areas and is committed to maximizing development in its mixed-use Regional Transit Districts, many centered proximate to the county’s 15 Metro Stations.<sup>8</sup> A 2011 study by the George Mason University Center for Regional Analysis (GMU) concluded that robust economic growth in the region cannot be guaranteed unless the housing preferences of the workforce have been met. The study recommended that most of the new housing be in compact developments with convenient access to jobs and transportation options to meet growing demand for mixed-use, walkable, transit accessible communities. The density of the Regional Transit Districts is often noticeably greater within a quarter mile of Metro and light rail stations. The County’s greatest opportunity to build a strong commercial tax base and generate the type and scale of economic development opportunities that will enhance its competitiveness within the region will rest on creating and enhancing these Districts shown in approved

<sup>8</sup> Metro Stations: <https://www.mncppc.org/1698/Metro-Stations>



sector and master plans. The County Department of Planning and the Maryland-National Capital Parks and Planning Commission continue to modify community plans and zoning to meet *Plan 2035's* vision.



Source: M-NCPPC, 2014

Figure 9: Future Land Use Map for Prince George's County

Plan 2035 notes that 90% of approved by unbuilt development is located outside of the Capital Beltway. Land use is characterized by three tiers, shown in **Table 11**.

Table 11: Prince George's County Growth and Consumption by Tier

Tier	Growth Rate	Total Land Consumption
Developed Tier	25%	5%
Developing Tier	73%	59%
Rural Tier	2%	36%

## E. Population

The United States Census Bureau's Population Estimates Program states Prince George's County, Maryland's population as 955,306 as of July 1, 2021. This is a -1.2% change from the April 1, 2020 U.S. Census count. Compared to the 2010 U.S. Census, the County has seen a population change of +12.0%. As of December 2020, the Maryland Department of Planning, Projections and State Data Center projects the population of Prince George's County to be about 983,870 by 2045, which would only be a 3.0% increase from the most recent 2021 estimate from the Census Bureau. This projection was created without 2020 Census data, so if the State's 2020 projection of 911,140 is adjusted to reflect the 2020 Census population (967,201) and the same annualized growth rates are then used on the new baseline, a new projection for the County's population in 2045 is 1,043,973.<sup>9</sup> Based on this cumulative information, the population of Prince George's County by 2045 is estimated to be about 7.9% higher than the most current (2021) estimate. **Table 12** shows the population projections for Prince George's County.

Table 12: Population Projections for Prince George's County and the City of Laurel

Statistic	City of Laurel	Prince George's County
Population, Census (April 1, 2010)	25,115	863,420
Population, Census (April 1, 2020)	30,060 (+19.7%)	967,201 (+12.0%)
Population Estimate (July 1, 2021)	29,490 (-1.8%)	955,306 (-1.2%)
<b>Projected Population (2045)</b>	<b>N/A</b>	<b>983,870 (+3.0%)</b>

Source: [United States Census Bureau QuickFacts](#); Maryland Department of Planning, [Projections and State Data Center](#), December 2020

### E.1. Race and Sex

According to 2021 US Census Bureau data, most of the population in Prince George's County was reported to be of a single race (92.5%). Of the total population reporting one race, 59.9% were Black or African American, 12.5% were White, and 3.8% were Asian. The Hispanic or Latino origin population was reported as 20.4%. **Table 13** shows County demographics.

<sup>9</sup> This methodology does not consider any changes in the projected growth rates that may result from incorporating the 2020 Census data into the State's projection methodology.

Table 13: Race Demographics for Prince George's County (2021)

Statistic	Percent	Population
White alone	12.5%	119,011
Black or African American alone	59.9%	572,018
American Indian and Alaska Native percent	0.5%	5,051
Asian alone	3.8%	36,355
Native Hawaiian and Other Pacific Islander alone	0.1%	571
Two or More Races	7.5%	72,039
Hispanic or Latino	20.4%	194,430
White alone, not Hispanic or Latino	11.6%	110,928

Source: US Census Bureau QuickFacts

In Prince George's County, there are more females than males. Females represent 51.7% of the population, or 494,106 people. Male persons make up the remaining 48.3% of the population, or 461,200 people. Table 14 shows the gender distribution for Prince George's County.

Table 14: Gender Distribution of Prince George's County (2021)

Statistic	Percent	Population
Female persons	51.7%	494,106
Male persons	48.3%	461,200

Source: US Census Bureau QuickFacts

## E.2. Language

About 23.4% of Prince George's County residents were foreign-born according to the 2021 U.S. Census bureau data. In addition, 28.2% of persons aged five or older do not speak English at home. These statistics indicate that there may be a significant portion of the community that may require special consideration when developing hazard reduction and outreach strategies for the community. **Table 15** shows the language statistics for Prince George's County.

Table 15: Language Demographics for Prince George's County (2021)

Statistic	Percent	Population
Foreign born persons	24.0%	228,914
Language other than English spoken at home, persons age 5+ years	28.2%	252,506

Source: US Census Bureau QuickFacts

### E.3. Age

The 2021 U.S. Census Bureau data shows that about 6.2% of the population in Prince George's County is under the age of five while approximately 22.1% is under the age of 18. Additionally, approximately 14.5% of the population is age 65 and above. These figures are similar to the Maryland state averages, with the exception of the 65 and over population, being 1.8% below the state average (16.3%). **Table 16** shows the age statistics for Prince George's County.

*Table 16: Age Demographics for Prince George's County (2021)*

Statistics	Percent	Population
Persons under 5 years	6.2%	59,229
Persons under 18 years	22.1%	210,912
Persons between 18 and 65 years	57.2%	546,563
Persons 65 years and over	14.5%	138,692

Source: US Census Bureau QuickFacts

### E.4. Education

Data from the 2021 census estimates shows that about 87.2% of residents in the region graduated from high school and 34.9% received a bachelor's degree or higher. These statistics, coupled with the population characteristics described in the previous paragraphs, are important to inform public outreach programs. The content and delivery of public outreach programs should be consistent with the audiences' needs and ability to understand complex information. **Table 17** summarizes education levels of Prince George's County.

*Table 17: Education Levels for Prince George's County (2017-2021)*

Statistic	Percent	Population
High school graduate or higher, persons age 25+ years	87.2%	794,000
Bachelor's degree or higher, persons age 25+ years	34.9%	317,782

Source: US Census Bureau QuickFacts

### E.5. Income

As of 2021, the average median household income in Prince George's County was approximately \$91,124, less than half a percent of the state average according to the 2021 U.S. Census. About 11.5% of residents within Prince George's County live below the poverty line. This rate is relatively close to that of the national rate of 11.6% in 2021 and the state rate of 10.3%. The income levels indicate that some residents in housing at risk may not have the resources available to them to undertake mitigation projects that require self-funding. **Table 18** shows the income data for Prince George's County and the State of Maryland.

Table 18: Income Statistics for Prince George's County and the State of Maryland (2017-2021)

Statistic	Prince George's County	State of Maryland
Median household income (2021 USD)	\$91,124	\$91,431
Per capita income in past 12 months (2021 USD)	\$40,643	\$45,915
Persons in poverty	11.5%	10.3%

Source: US Census Bureau QuickFacts

## E.6. [Housing](#)

As of 2021, there were 362,251 housing units in Prince George's County according to the U.S. Census. When considering mitigation options, special attention should be given to the difference in capabilities between owners and renters. Housing mitigation projects, except for acquisition/demolition or elevation of buildings in extremely high hazard landslide and flood areas. **Table 19** shows the housing statistics for Prince George's County.

Table 19: Housing Demographics for Prince George's County

Statistic	Amount
Housing units, 2021	362,351
Owner-occupied housing unit rate, 2017-2021	62,2%
Median value of owner-occupied housing units, 2017-2021	\$337,800
Median selected monthly owner costs -with a mortgage, 2017-2021	\$2,212
Median selected monthly owner costs -without a mortgage, 2017-2021	\$720
Median gross rent, 2017-2021	\$1,593
Building permits, 2021	2,459
Households, 2017-2021	337,366
Persons per household, 2017-2021	2.78

Source: US Census Bureau QuickFacts

## F. Business and Labor

The sectors with the most employees in Prince George's County are:

- Educational services
- Federal government
- Transportation and warehousing
- Retail trade
- Information

- Health care
- Accommodation and food services
- Finance and insurance
- Professional services

**Table 20** lists the establishments with the highest number of employees in Prince George’s County.

*Table 20: The Ten Largest Employers in Prince George's County, MD, 2020-2021*

Company	Product/Service	Number Employed
University of Maryland System	Higher education	20,250
Joint Base Andrews Naval Air Facility Washington	Military installation	17,500
U.S. Internal Revenue Service	Revenue collection & data processing	4,735
U.S. Census Bureau	Demographic research & analysis	4,605
Washington Metropolitan Area Transit Authority	Public Transportation	3,546
United Parcel Service (UPS)	Mail & package delivery services	3,000
NASA - Goddard Space Flight Center	Space research	3,000
Prince George's Community College	Higher education	2,045
MGM National Harbor	Hotels and Gaming	2,000
Gaylord National Resort Convention Center	Hotels and Conventions	2,000

Source: Maryland Department of Commerce Brief Economic Facts for Prince George’s County

Additional “important employers” as provided by Mitigation Advisory Committee members include the following: Giant Food, Version, Safeway, Walmart, Home Depot, McDonalds, Lowe’s, Capital One, and Dimension Healthcare System.

The highest paid professions in the county during 2015 average between \$75,000 and \$90,000 annually:

- Medical
- Architecture and Engineering
- Computer and Mathematical
- Legal
- Management
- Life, Physical, and Social Science

As of 2020, there were a total of 15,716 employer establishments and 11,615 firms in Prince George’s County, according to the U.S. Census. **Table 21** shows business and labor statistics for Prince George’s County. As of November 2022, the unemployment rate for Prince George’s County was 4.0%, lower than the Maryland State average of 4.3%.

Table 21: Business and Labor Statistics for Prince George's County

Employment	Prince George's County
Total employer establishments, 2020	15,716
Total employment, 2020	274,678
Total annual payroll, 2020 (\$1,000)	13,593,029
Total employment, percent change, 2019-2020	+0.4%
Total non-employer establishments, 2019	87,879
All firms, 2017	11,615
Men-owned firms, 2017	6,759
Women-owned firms, 2017	2,490
Minority-owned firms, 2017	4,885
Nonminority-owned firms, 2017	5,269
Veteran-owned firms, 2017	854
Nonveteran-owned firms, 2017	9,385

Source: US Census Bureau QuickFacts

## G. Future Growth and Development

Of the many priority policies presented in *Plan 2035*, one compelling strategy is “Policy 1: Direct a majority of projected new residential and employment growth to the Regional Transit District in accordance with the Growth Policy Map and the County’s Growth Policy Goals.” Table 22 aligns Growth Policy Map Areas with projected new dwelling units and new jobs from 2014 through the *Plan 2035* planning horizon of 2035.

Table 22: Plan2035 Growth Management Goals

Growth Policy Map Areas	Percentage of New Dwelling Units	Projected Dwelling Units	Percentage of New Jobs	Projected New Jobs
Regional Transit District	50%	31,500	50%	57,000
Local Centers	25%	15,750	20%	22,800
Local Transit, Neighborhood & Campus Centers	15%	9,450	15%	17,100
Town Centers	10%	6,300	5%	5,700
Employment Areas	4%	2,520	20%	22,800



Growth Policy Map Areas	Percentage of New Dwelling Units	Projected Dwelling Units	Percentage of New Jobs	Projected New Jobs
Established Communities	20%	12,600	9%	10,260
Future Water & Sewer Service Areas	0%	0	0%	0
Rural and Agricultural Areas	1%	630	1%	1,140
Total County Projected Growth	100%	63,000	100%	114,000

## H. Transportation

The County contains a large portion of the Capital Beltway (I-95/I-495). After a decades-long debate, construction began in late 2007 on an east-west toll freeway, the Intercounty Connector (ICC), which extends I-370 in Montgomery County to connect I-270 with I-95 and U.S. 1 in Laurel. The ICC was completed in 2012. Other interstates that service the county include I-95 and I-295. Interstate 95 is a north-south route, being the primary route along the East Coast extending from Maine to Florida. I-295 is an eight-mile spur route connecting I-95/I-495 and Maryland Route 210 near the Potomac River to Interstate 695 and Washington D.C. Route 295 in the Anacostia neighborhood of Washington, DC. Several large U.S. highways also service the region. They include: US 1, US 1 Alternate, US 50, and US 301. There is a total of 38 Maryland state roads that run through Prince George's County.

Fourteen Washington Metro subway system stations are in Prince George's County; four of them are line terminus stations: Greenbelt, New Carrollton, Largo Town Center and Branch Avenue. There has been much debate on the construction of the Purple Line, which will link highly developed areas of both Montgomery and Prince George's Counties. In 2016, the Maryland Transportation Authority selected the Purple Line Transit Partners, a consortium led by Fluor Enterprises, to design and build the Purple Line and to operate and maintain it for 36 years. Construction had been anticipated for late 2016, with service projected to begin in 2022, but a legal challenge had stalled work on the new line. New projections have the Purple Line completed by 2026.

The Maryland Area Rail Commuter Train service has two lines that traverse Prince George's County. The Camden Line runs between Baltimore Camden Station and Washington Union Station and has six Prince George's County stops: Riverdale Park, College Park, Greenbelt, Muirkirk, Laurel, and Laurel Racetrack. The Penn Line runs on the AMTRAK route between Baltimore Penn Station and Washington Union Station. It has three stops in the county: Bowie State, Seabrook, and New Carrollton.

The Washington Metropolitan Area Transit Authority operates Metrobus fixed-route bus service and Metrorail heavy-rail passenger service in and out of the County as well as the regional MetroAccess paratransit system for the handicapped. The Prince George's County Department of Public Works and Transportation also operates TheBus, a County-wide fixed- route bus system, and the Call-A-Bus service for passengers who do not have access to or have difficulty using fixed-route bus service. Call-A-Bus is a demand-response service which generally requires 14-days advance reservations. The County also offers a subsidized taxicab service for elderly and disabled residents called Call-A-Cab in which eligible customers who sign up for the service purchase coupons giving them a 50 percent discount with participating taxicab companies in Prince George's and Montgomery Counties.

The College Park Airport (est. 1909) is the world's oldest continuously operated airport and is home to the adjacent College Park Aviation Museum. Residents also use Ronald Reagan Washington National Airport in Arlington County, Virginia, Baltimore–Washington International Thurgood Marshall Airport near Baltimore, and Dulles International Airport in Dulles, Virginia.

The Central Maryland Regional Transit bus system served the greater Laurel Maryland area and parts of neighboring Ann Arundel, Howard and Prince George's County. It was funded as the Corridor Transportation Corporation in May 1987 by the Baltimore- Washington Corridor Chamber and began its transit operation as "Connect-a-Ride" two years later with nine buses serving five routes. The non-profit organization changed its status and name and rebranded its service in early 2013. During 2014, Howard County initiated its own Regional Transportation Agency of Central Maryland recruiting Anne Arundel County to join. Service through this system will serve citizen in the City of Laurel.

## I. Infrastructure

The Public Service Commission of Maryland regulates gas, electric, telephone, water, sewage disposal companies, and telecommunications companies. Infrastructure services are robust in the densely populated areas of the county and within the City of Laurel. Services like solid waste pick up are more limited in the more rural, southern areas of the county.

The following are the providers for the services mentioned:

- **Electric** – Prince George's County is served by five electricity providers: First Energy, Spark Energy, Baltimore Gas and Electric, PEPCO, and SMECO.
- **Natural Gas** – Natural gas is provided to the County by Washington Gas and Baltimore Gas and Electric.
- **Telephone** – Local telephone service is provided throughout Prince George's County by Verizon Communications Inc. and AT&T.
- **Public Water and Wastewater** – In the County, public water and wastewater treatment is provided by the Washington Suburban Sanitary Commission. The City of Bowie has its own water utility, providing water to 50% of Bowie residents. The City of Bowie also has its own waste water treatment plant.
- **Television** – Cable television service is provided within Prince George's County by Verizon FIOS, Comcast, and Xfinity along with satellite and internet providers.
- **Internet** – Internet is provided within Prince George's County by Verizon FIOS, Comcast, and Xfinity.

## J. City of Laurel

The City of Laurel features a landscape characterized by change since European settlement. Growth in the City and surrounding areas has rapidly filled in the space between Baltimore and Washington during the past three decades. Even with rapid growth, Laurel is a community with an identity and a particular sense of place. This identity provides a perspective of the past, to which Laurel today and Laurel in the future can relate. Laurel's history defines the character of the City; historic sites in the area provide the opportunity to maintain this character, so that the future as a place of community traces back to early colonial beginnings. Arrowheads, stone hatchets and other artifacts uncovered throughout the City of

Laurel point to Native American habitation long before the colonists. Human civilization occupied the upper reaches of the Patuxent River in and around the site of modern Laurel for more than 250 years.

Charles I of England granted Cecil Calvert the charter establishing the Maryland Colony in 1632. The charter conferred upon Calvert almost complete control over the colony subject to continued allegiance to the crown. In setting up his new colony, Calvert took for his model the existing social economic institutions of England, transferring from the Thames to the Potomac the seventeenth-century manorial system of England.

During World War I, Fort George G. Meade was established as a training camp at its present location. Other federal facilities seeking large tracts of land close to Washington also moved into the area, bringing jobs and business. The Department of Agriculture's Research Center at Beltsville was an important addition to the area's economic base. These new developments did much to break the sense of isolation brought on during the town's industrial decline earlier in the twentieth century.

In 1940 Laurel had a population of fewer than 3,000, but by 1950 the population had risen to nearly 4,500. Between 1950 and 1960 Laurel experienced rapid population growth, with the City's population reaching 8,500 by 1960. This increase was accounted for, in part, by the annexation of land, which extended Laurel's boundary south of Montrose Avenue. The decade of the 1960s brought a more moderate rate of growth, with Laurel's population reaching 10,525 by 1970. With additional annexations to the west and south, the City's population as of July 1, 2014 rose to 24,125. Now, the population of the City of Laurel is estimated at 30,060.<sup>10</sup>

During the 1960s the Laurel mill site and railroad station still delineated the western and eastern extent of the developed portion of Laurel. To the east, a belt of marshland and the Patuxent River defines the City. The City annexed western areas extending a portion of its western boundary to Interstate 95 during 1968. The annexation of property to the east, along MD 197 has evolved into an upper-income housing and office complex, reflecting the rising value Laurel's real estate. The outward expansion of the Washington urbanized area toward Laurel, and Laurel's increasing orientation to Washington has reinforced the southerly direction of growth in the area.

## J.1. Location

The City of Laurel is located between the Baltimore and Washington Metropolitan Areas. As these two metropolitan areas have continued to merge, their impact on the City of Laurel has dramatically increased. Located within the northwest corner of Prince George's County, Laurel is also heavily impacted by several other jurisdictions. To the north and northeast are Howard and Anne Arundel Counties respectively with Montgomery County located approximately a mile to the west. Forming a natural boundary to the north is the Patuxent River, which serves as the dividing line between the City of Laurel and the two adjoining counties. A map of the City is shown in **Figure 10**.

<sup>10</sup> United States Census Bureau QuickFacts.  
<https://www.census.gov/quickfacts/fact/table/laurelcitymaryland,princegeorgescountymaryland/PST045221>

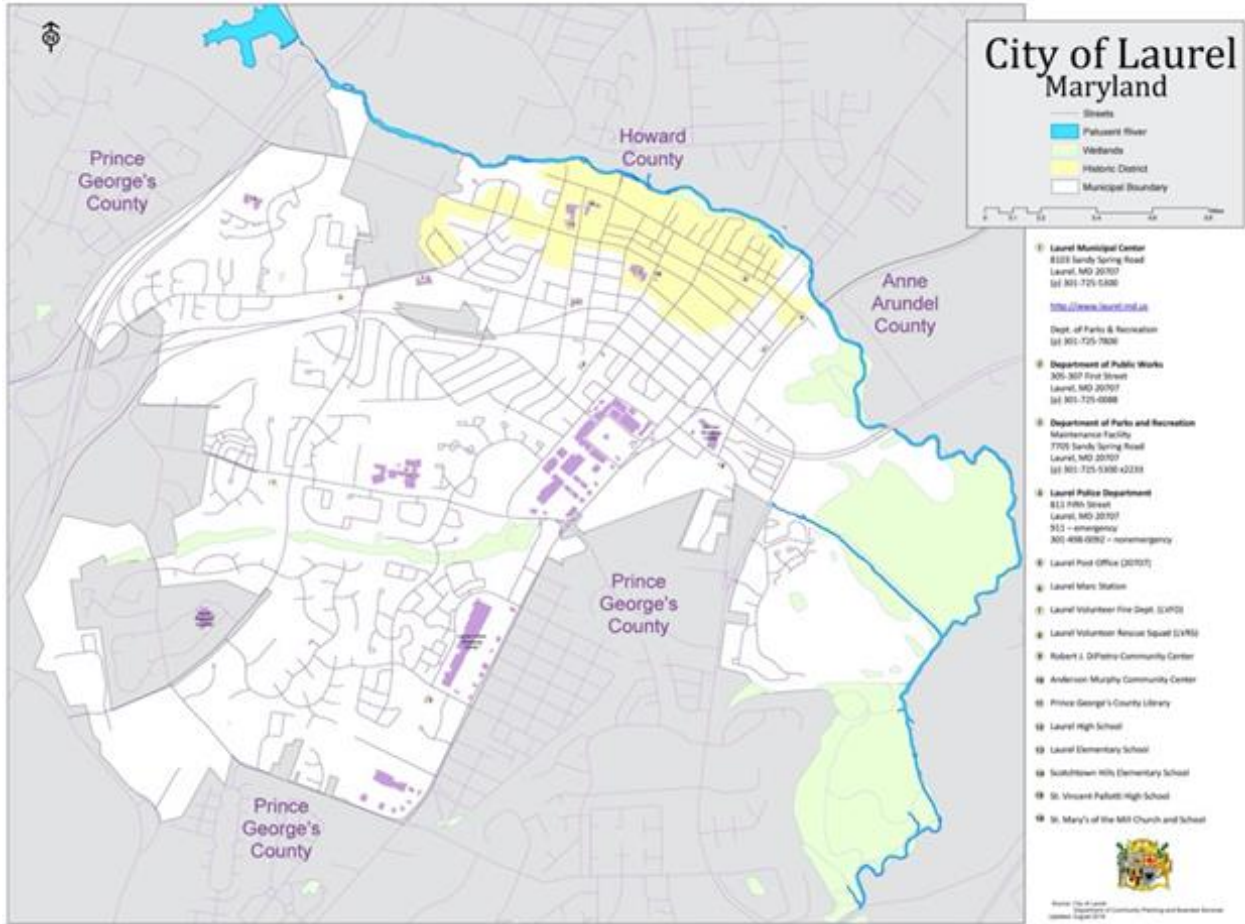


Figure 10. City of Laurel, Maryland

The Baltimore-Washington corridor has continued as the fastest growing region within the State of Maryland. The Baltimore Region consists of Anne Arundel, Baltimore, Carroll, Hartford and Howard Counties and Baltimore City. The Washington Suburban Region includes Frederick, Montgomery and Prince George's Counties. Due to its strategic location and the transportation network serving it, the areas surrounding the City of Laurel have witnessed dramatic growth rates. Since the 1974 Master Plan, the most significant of these growth areas has been in Columbia in Howard County and the US 29 corridor in Montgomery County. The Columbia 14,000-acre planned community located midway between Baltimore and Washington, DC, is approaching build-out and with a 2007 population of almost 100,000 with a planned population of 110,000. Due to development factors including the use of transfer development rights, much of Montgomery County's growth has occurred along US 29, which has been made more accessible to the City of Laurel by improvements to MD 198.

## J.2. Community Assets

The following community facilities/assets are vital to the continuity, sustainability, and resilience of the City of Laurel:

- City Hall Municipal Center** – This facility houses the main City government offices to include the Mayor, City Council, City Administrator, Deputy City Administrator, Emergency Manager, Budget, Finance and Human Resource Office, Fire Marshal & Permit Services Office, Public Information &

Communications Office, Economic & Community Development Office & Information Technology Office and the U.S. Passport Office is within this facility. The City's Emergency Operations Center (EOC) is located within this facility and this facility serves as a backup site for the Laurel Police Department's dispatchers/communications operations.

- **Laurel Police Department** – This facility houses the City's full-service Police Department with a wide variety of police functions, to include prisoner holding cells, dispatch communications office, administrative offices, patrol offices, investigation offices, and special operations offices. This building houses a conference hall which is open to the public and is used to host special events & functions. This facility is used as a storage site for the Laurel Police Department's vehicles, trucks, & specialty vehicles used for both normal & emergency operations. This facility houses several City Continuity of Operations Plan alternate work locations.
- **Laurel Volunteer Fire Department** – This facility is a two-level building with 4 drive-through bays that houses the entire volunteer fire department for the City of Laurel. The upper level of the building is dedicated to the operations branch of the department, while the lower level houses the administrative branch. The facility contains offices, a gym, a kitchen, meeting rooms and bunk rooms for male and female fire fighters.
- **Laurel Volunteer Rescue Squad** – This facility houses a private, nonprofit corporation that provides medical, rescue, and fire services to the Greater Laurel area. The facility houses state of the art heavy rescue equipment, a rescue engine, fire engine, water rescue team gear/equipment, two rescue boats, two Basic Life Support ambulances, and support vehicles. The Laurel Volunteer Rescue Squad utilizes this facility and the contained equipment to respond to over 7,000 calls for help annually.
- **Department of Public Works** – This facility consists of 3 major structures that houses the City's full-service Public Works Department (DPW). Additionally, this site is the storage facility for all the City's fleet of trucks. The City's Office of Emergency Management's emergency response trailers are stored at this facility. Building one houses the main full service DPW offices to include: administrative offices, transportation offices, DPW Emergency Operations Center, vehicle maintenance & repair operations, etc., building two is used to store equipment, materials, and supplies used by DPW to support a wide range of both normal & emergency operations, and building three is DPW's salt dome that stores road salt used during winter weather emergencies and events.
- **Department of Parks and Recreation Operations** – This facility consists of 2 major structures that houses both the City's full-service Parks & Recreation (P&R) operations division and a garage structure for the City's Mobile Command Unit (MCU) and its Rehab/Canteen Vehicle. Building one houses the main full-service P&R offices to include administrative offices, operational offices, emergency support functions office, equipment storage for both normal and emergency operations, etc. This building is used as one of P&R's designated Community Operations Plan sites and building two houses the City's Mobile Command Unit emergency vehicle and Rehab/Canteen emergency vehicle used for local, county and regional emergency incidents and special events.
- **Laurel Armory** – Anderson Murphy Community Center – This Parks & Recreation Department facility consists of a variety of both recreational and office spaces used to support both public and City employee recreational, health & wellness operations. This facility is used as one of the City's designated temporary emergency evacuation shelters during disasters or evacuation operations and this building is used as one of the P&R's designated Community Operations Plan sites. This

site is also the designated Community Operations Plan site for the City's Emergency Relocation Group for Community Operations Plan events.

- **Robert J. DiPietro Community Center** – This Parks & Recreation Department facility consists of a variety of both recreational and office spaces used to support both public and City employee recreational, health & wellness operations. This facility is used as one of the City's designated temporary emergency evacuation shelters during disasters or evacuation operations. This building is used as one of the Parks & Recreation's designated Community Operations Plan sites.
- **Public Schools** – Laurel Elementary School, Scotchtown Hills Elementary School and Laurel High School are all located within the boundaries of the City of Laurel.
- **Gude Mansion** – This historic house is the location of the Parks & Recreation administrative offices. This 3-story is responsible for receiving City business from the public as well as other City departments.

### J.3. Land Use and Development Trends

The City of Laurel of Laurel comprises a total of approximately 3,027 acres, or 4.73 square miles per the City of Laurel General Plan, September 26, 2016. This figure represents an increase of 267 acres since 2008 or a total increase of 9.8 percent in area. This increase was due to two Mixed-

Use Transportation annexations; Anderson's Corner, 45 acres and Strittmatter Land, LLC, 62.3 acres. These parcels were "vacant" prior to the annexation.

In 2015, residential land use made up 990 acres (33 percent) of the City's total area. Commercial acreage, which includes retail, office, and service delivery use totaled 433 acres (14 percent).

Public and Institutional land use, which includes active and passive parks and open space, churches, schools, public and quasi-public uses totaled 791 acres (26 percent) while Mixed Use Transportation (M-X-T) use totaled 87 acres (2.9 percent). Industrial land use totaled 154 acres (5 percent) and vacant land totaled 82 acres (2.7 percent). The remaining 490 acres (16 percent) is streets and public rights-of-way.

Nearly 100 percent of the City of Laurel's area is either developed, has received approval for its development, or is in some stage of development approval, as shown in **Table 23**. The City of Laurel land area has increased by 96.58 percent since 1974 through annexation. Since the 1974 General Plan, there has been a significant increase in developed land. This trend is indicative of the suburbanization of the area and the evolving role of the City of Laurel as a full-service core urban area. These figures also reflect land values within the City of Laurel, as well as its strategic location.

One land use type that has increased significantly in both percentage and acreage, is the Public and Institutional Classification. This category includes active and passive parks, open space, churches, schools, public and quasi-public uses. From 2005-2015, the total land devoted to these uses has increased from 475 acres to 791 acres, a 66.5 percent increase. New land development includes Greenview Drive Park, Bear Branch Stream Valley Park at the Greens of Patuxent, and the Stephen P. Turney Recreation Complex. Greenview Drive Park and the Greens of Patuxent are located in the Special Flood Hazard Area, increasing flood vulnerability for new developments in the City of Laurel. Since 2005, land that has been donated to the City of Laurel has been open space, conservation, and forested areas.

Land devoted to transportation, including streets and public rights-of-way, has increased concurrently with development. The 2015 acreage dedicated to transportation use was 490 acres compared to 411 acres in 2005, an 8.45 percent increase.

As land prices have risen, undeveloped land within the City of Laurel has become extremely scarce. There are a few infill lots scattered throughout the City. Residentially zoned land had previously provided the bulk of inventory of vacant land. The 2015 vacant land category includes annexed areas which are now within the City of Laurel since 2005. The City of Laurel's inventory of vacant land has dwindled to a very small proportion, 3 percent.

The analysis of land use presented in the City of Laurel General Plan provides a depiction of current and future trends. Due to robust commercial development and ease of access through various transportation modes, Laurel has become a central business and retail center for areas proximate to the City. Increased commercial office space has leveraged employment opportunities for City residents as well as nearby Prince George’s County, Montgomery County, Howard County and City of Baltimore residents. While the growth of Laurel area brings challenges, it has also provided a diverse complement of amenities such as increased public recreation and open space facilities and more diverse retail development. These trends will inform future land use decisions.

There is very little vacant land within the City, but vacant parcels appropriate for infill development are scattered throughout the City. Any sizeable development would require the assemblage of several parcels and the razing of existing structures. To facilitate redevelopment and to create additional economic development opportunities for property, the City Zoning Regulations were amended to create Revitalization Overlay Areas. Revitalization Overlay Areas offer flexibility by offering intensification or increased density of properties in Areas that are targeted for their potential economic development, for superior amenities, land uses, or achieving superior land design.

The Revitalization Overlay to be an alternative form of development designed to facilitate redevelopment and provide for specific land uses and configurations recommended for the continued development and economic health, well-being and stability of city neighborhoods.

The major focus of future growth in proximity to the City is expected to take place in Konterra. A project to build a new Konterra Town Center, a mixed-use shopping, entertainment, residential, and business district is planned to begin construction in the upcoming years. Although the project is in the planning stage, its ultimate build-out over a 20-year period is certain to influence a change in demographics for not only the City but also the region. Specific land use, population and employment projections were not available for the City.

Table 23. City of Laurel Land Use (2015)

Land Use	Total Acres		Percentage of City’s Total Acres	
	2005	2015	2005	2015
Single, two and three family	1,092	790	39%	26%
Multi-family	319	200	12%	7%
Total Residential	1,411	990	51%	33%
Commercial	327	433	12%	14%
Industrial	136	154	5%	5%
Public & Institutional	475	791	17%	26%
Transportation	411	490	15%	16%

Land Use	Total Acres		Percentage of City’s Total Acres	
	2005	2015	2005	2015
Mixed-use Transportation	0	87	0%	3%
Vacant	0	82	0%	3%
<b>Total</b>	<b>2,760</b>	<b>3,027</b>	<b>100%</b>	<b>100%</b>

Source: City of Laurel General Plan, August 2016

## J.4. Population

The population for the City of Laurel is 30,060 as of the 2020 US Census Bureau population estimates. This is a 16 percent increase since the 2010 Census. **Table 24** shows the Population breakdown for the City of Laurel. Projections are not available for the City through the US Census, the Maryland Department of Planning, or in the City of Laurel General Plan.

Table 24. City of Laurel Population

Statistic	Population
Population estimate base, 2020	30,060
Veterans, 2016-2020	1,216

Source: U.S. Census Bureau QuickFacts

### J.4.a. Race and Sex

According to the 2020 U.S. Census Bureau data, most of the population in the City of Laurel was reported to be of a single race (83.1 percent). Of the total population reported to be one race, 50.7 percent were Black or African American, 23.5 percent were White, and 8.3 percent were Asian. Only 18.8 percent of the population were reported to be of Hispanic or Latino in origin. **Table 25** shows the demographics for the City of Laurel.



Table 25. City of Laurel Race Demographics

Statistic	Percent of Population	Approximate Population
White alone, percent, 2020	23.5%	7,064
Black or African American alone, percent, 2020	50.7%	15,240
American Indian and Alaska Native alone, percent, 2020	0.6%	180
Asian alone, percent, 2020	8.3%	2,522
Native Hawaiian and Other Pacific Islander alone, percent, 2020	0.0%	0
Two or More Races, percent, 2020	6.6%	1,984
Hispanic or Latino, percent, 2020	18.8%	5,651
White alone, not Hispanic or Latino, percent, 2020	18.4%	5,531

Source: U.S. Census Bureau QuickFacts

According to the U.S. Census Bureau, there are more females than males in the City of Laurel. Female persons account for 52.8 percent of the population, equaling 15,872 persons. Male persons make up the remaining 47.2 percent of the population, equaling 14,188 persons. **Table 26** shows the gender demographics.

Table 26. City of Laurel Gender Distribution

Statistic	Percent of Population	Approximate Population
Female persons, percent, 2010	52.8%	15,872
Male persons, percent, 2010	47.2%	14,188

Source: U.S. Census Bureau QuickFacts

### J.4.b. Language

About 28.9 percent of residents in the City of Laurel were foreign-born according to the 2020 U.S. Census bureau data. Census data also reports that 34.3 percent of persons age five and older speak a language other than English at home. These statistics indicate there may be a significant portion of the community that would benefit from developing hazard reduction and outreach strategies in languages other than English. **Table 27** show the language demographics for the City.

Table 27. City of Laurel Language Demographics

Statistic	Percent of Population	Approximate Population
Foreign born persons, percent, 2016-2020	28.9%	8,687
Language other than English spoken at home, percent of persons age 5 years+, 2016-2020	34.3%	10,311

Source: U.S. Census Bureau QuickFacts

**J.4.c. Age**

The 2020 U.S. Census Bureau data shows that about 7.8 percent of the population in the City of Laurel is under the age of five while approximately 24.7 percent is under the age of 18. Additionally, approximately 10.7 percent of the population is age 65 and above. Population over 65 in the City of Laurel is 5.6 percent lower than Maryland state average of 16.3 percent. The five and under population in the City of Laurel is 2.0 percent greater than the Maryland state average of 5.8 percent. **Table 28** shows age statistics for the City of Laurel.

*Table 28. City of Laurel Age Demographics*

Statistic	Percent of Population	Approximate Population
Persons under 5 years, percent, 2020	7.8%	2,345
Persons under 18 years, percent, 2020	24.7%	7,425
Persons between 18 and 65 years, percent, 2020	64.6%	19,419
Persons 65 years and over, percent, 2020	10.7%	3,216

Source: U.S. Census Bureau QuickFacts

**J.4.d. Education**

Data from the 2020 Census estimates shows that about 88.6 percent of residents in the City graduated from high school and 43.8 percent hold bachelor’s degrees or higher. These numbers, coupled with the population characteristics described in the previous paragraphs, should be considered when creating public outreach programs. The content and delivery of public outreach programs should be consistent with the audiences’ education level. **Table 29** shows the education statistics for the City of Laurel.

*Table 29. City of Laurel Education Statistics*

Statistic	Percent of Population	Approximate Population
High school graduate or higher, percent of persons age 25 years+, 2016-2020	88.6%	26,633
Bachelor's degree or higher, percent of persons age 25 years+, 2016-2020	43.8%	13,166

Source: U.S. Census Bureau QuickFacts

These statistics are similar to the Maryland State percentages of 90.6 percent of persons graduated from high school and 40.9 percent holding bachelor’s degrees or higher.

**J.4.e. Income**

As of 2020, the average median household income in the City of Laurel was approximately \$80,255, which is approximately 7.8 percent less than the state average according to the 2020 U.S. Census estimates. About 9.7 percent of residents within the City of Laurel live below the poverty line. This rate is slightly below the state rate of 10.3 percent. These figures indicate that some families will not have available resources for property mitigation projects requiring self-funding. **Table 30** compares the income statistics for the City of Laurel and the State of Maryland.

Table 30. City of Laurel Income Statistics vs. State of Maryland

Statistic	City of Laurel	State of Maryland
Median household income (in 2015 dollars), 2011-2015	\$80,255	\$87,063
Per capita income in past 12 months (in 2020 dollars), 2016-2020	\$38,582	\$43,352
Persons in poverty, percent	9.7%	10.3%

Source: U.S. Census Bureau QuickFacts

#### J.4.f. Housing

According to the 2020 U.S. Census, there were 9,647 households in the City of Laurel. When considering mitigation options, special attention should be given to the difference in capabilities between owners and renters. **Table 31** shows the housing statistics for the City of Laurel.

Table 31. City of Laurel Housing Statistics

Statistic	Percent of Population
Owner-occupied housing unit rate, 2016-2020	43.7%
Median value of owner-occupied housing units, 2016-2020	\$281,500
Median selected monthly owner costs -with a mortgage, 2016-2020	\$1,976
Median selected monthly owner costs -without a mortgage, 2016-2020	\$677
Median gross rent, 2016-2020	\$1,611
Households, 2016-2020	9,647
Persons per household, 2016-2020	2.65
Living in same house 1 year ago, percent of persons age 1 year+, 2016-2020	78.9%

Source: U.S. Census Bureau QuickFacts

#### J.5. Business and Labor

The sectors with the most employees in the City of Laurel are:

- Retail trade
- Information
- Health care
- Accommodation and food services
- Finance and insurance
- Professional services
- Community services

**Table 32** lists the establishments with the top employers in the City of Laurel.

*Table 32. City of Laurel Top Employers (2017)*

Company	Product / Service	Total Employed
Booz Allen Hamilton	Management Consulting	825
Safeway	Groceries	716
Domino's	Restaurant	658
Marriott International, Inc.	Hotels & Motels	543
Johns Hopkins University	Medical services	497
Leidos	Research & analysis	471
Harris Teeter	Groceries	436
Y of Central Maryland	Community Services	406
CACI	Information	364
PETSMART	Retail Trade	348

Source: SimplyHired for Laurel, Maryland

As of 2017, there were a total of 760 firms in the City of Laurel, according to the U.S. Census. **Table 33** breaks down business and labor statistics for the City of Laurel. As of September 2022, the unemployment rate for the City of Laurel was 4.8 percent which is higher than the state average of 4.0 percent.

*Table 33. City of Laurel Business and Labor Statistics (2017)*

Company	Number
All firms	760
Men-owned firms	362
Women-owned firms	180
Minority-owned firms	208
Nonminority-owned firms	405
Veteran-owned firms	41
Nonveteran-owned firms	571

Source: U.S. Census Bureau QuickFacts

## J.6. Future Growth and Development

The City of Laurel's location in one of the region's fastest growing areas suggests that the City's population will continue to grow. However, without additional annexations, further growth will be limited to development in existing residential or open space areas and redevelopment.

Future population characteristics can be expected to follow general state and country-wide trends.. With the general decline in birth rates as well as the continued maturing of the population born during the 1950s and 1960s, it is expected that the average age of Laurel residents could rise. This trend creates implications for a variety of public services to support the elderly, including adequate and affordable housing and accessible public transportation.

Trends influencing household size will also continue as an important factor for future land use decisions in the City of Laurel. Census numbers for Prince George's County shows a continued drop in household size from 2.89 in 1980, 2.76 in 1990, 2.74 in 2000, but an increase to 2.78 in 2010, and 2.83 in 2020. Similarly, the City of Laurel household size was 2.4 in 1980, 2.25 in 1990, 2.22 in 2000, 2.37 in 2010, and an increase to 2.65 in 2020. Factors influencing household size include choices in lifestyle, housing preferences, the number of two-income families and the available housing stock. One factor that may partially offset the observed trend in drop in household size is the development of new housing. The declining average household size reflects regional and national trends, which are the result of an aging population and declining birth rates. However, with an increased amount of younger families moving into the City, there will be a corresponding increase in the City's population of 14 years old or younger within the next several years. As these families grow, it will be important to provide a sufficiently wide choice of housing options.

Additional population trends which may be expected to continue to grow in the future include population with more education experience and demand for professionals with higher education level. Other anticipated trends include an increase in the number of two-income families and a relative increase in household and per-capita income, which will be necessary to keep pace with the higher income housing being built within the City.

## J.7. Transportation

Laurel is traversed from north to south by U.S. Route 1 (US 1), which links Key West, Florida with the Canada–U.S. border in Maine. On the west, the city is bordered by Interstate 95, and beyond the eastern border lies the Baltimore-Washington Parkway. Crossing all of these highways is the east-west artery Route 198 (MD 198), which intersects with US 1 in the heart of Laurel. Other major state roads in Laurel are MD 216, which connects the city with southern Howard County, and MD 197, which runs from Laurel to Bowie. The eastern terminus of MD 200 (the Intercounty Connector) lies just south of the city limits and connects Laurel with Gaithersburg.

Two Maryland Area Rail Commuter train stations on the Camden Line to Baltimore and Washington, D.C. are located in Laurel: Laurel Station and Laurel Racetrack Station, the latter with minimal service. Laurel Station is a particularly notable example of the stations designed by E. Francis Baldwin for the Baltimore and Ohio Railroad.

The Washington Metropolitan Area Transit Authority Metrobus service provides four lines into Laurel, and local Connect-a-Ride and Howard Transit bus service is available. Several taxicab and shuttle services also support the region.

Suburban Airport, a general aviation airport, is located on Brock Bridge Road, nearby in Anne Arundel County border. This airport provides general aviation access for medivac helicopters, flight training, business travelers, and serves as a relief airport for light traffic into and out of the two major regional airports. Baltimore-Washington International Thurgood Marshall Airport is within 15 miles and Ronald Reagan Washington National Airport is within 25 miles of Laurel.

## J.8. Infrastructure

The Public Service Commission of Maryland regulates gas, electric, telephone, water, sewage disposal companies, and telecommunications companies.

The following is provider information for these services:

- **Natural Gas** – Natural gas is provided to the City of Laurel by Washington Gas and Baltimore Gas and Electric.
- **Telephone** – Local telephone service is provided throughout the City of Laurel by Verizon Communications Inc. and AT&T.
- **Public Water and Wastewater** – In the City, public water and wastewater treatment is provided by the Washington Suburban Sanitary Commission.
- **Television** – Cable television service is provided within the City of Laurel by Verizon FIOS, Comcast, and Xfinity along with satellite and internet providers.
- **Internet** – Internet is provided within the City of Laurel by Verizon FIOS, Comcast, and Xfinity.

## Chapter 4. Risk Assessment

*This chapter provides an overview of the natural hazards that have been identified as potentially affecting Prince George's County and the City of Laurel and an assessment of their risks to the planning area.*

### A. Introduction

The purpose of the hazard risk assessment is to provide a County-wide overview of how various hazards impact Prince George's County and the City of Laurel. The risk assessment uses an all-natural-hazards identification, classification, and vulnerability indexing process to ensure that the hazard analysis is comprehensive. The purpose of a risk assessment is to characterize hazards that threaten the County and City's people, property, environment, and critical infrastructure, thus enabling the Mitigation Advisory Committee to develop a comprehensive and effective Mitigation Strategy that is designed to reduce risks of identified hazards. While new hazards are unlikely to emerge, evaluation tools and processes will evolve, and hazard mitigation priorities will likely change in future risk assessment revisions.

**Risk**, for the purpose of hazard mitigation planning, is the potential for damage or loss created by the interaction of natural hazards with assets, such as buildings, infrastructure, or natural and cultural resources.<sup>11</sup>

A natural hazard is defined as an environmental phenomenon that has the potential to impact society and the human environment. It has the potential to cause harm to people, property and infrastructure damage, agricultural losses, damage to natural resources, business interruptions, or other types of harm or loss. In comparison, a manmade hazard includes any disastrous event caused directly and principally by one or more identifiable deliberate or negligent human actions. Technological hazards, a hazard originating from technological or industrial conditions, including accidents, dangerous procedures, or failures, are also considered a type of manmade hazard. Other than the consideration of dam- and levee-related hazards, this plan only addresses natural hazards.

Identifying the hazard risks to a community is critical when determining how to allocate finite resources to carry out appropriate mitigation actions. The risk assessment involves the following steps:

1. **Identify hazards** that can affect Prince George's County and the City of Laurel.
2. **Assess the risk** of each identified hazard with respect to:
  - a. Location: where it might affect the planning area,
  - b. Extent: its potential magnitude,
  - c. Previous occurrences: how often events have happened in the past,
  - d. Probability of future events: how likely they are to occur in the future,
  - e. Vulnerability: what parts of the community are most likely to be affected, and
  - f. Impacts: the potential consequences.

<sup>11</sup> FEMA Local Mitigation Planning Policy Guide (April 19, 2022)

With both this process and the organizational structure of Maryland's *2021 State Hazard Mitigation Plan* in mind, each hazard section is outlined according to the topics below.

### **Description**

General definitions and characteristics of hazards are included in the risk assessment to provide a common understanding as to what the event is and why it is of enough concern to make it a hazard in Prince George's County and the City of Laurel.

### **Location**

Hazards occurring in Prince George's County range from regional to localized with some specifically associated with the geologic attributes of a localized area. The geographic extent for each hazard is presented in the text and supported by tables or maps where available and appropriate.

### **Extent (Magnitude/Strength)**

Assessment of severity is expressed in terms of consequence of impacts, such as injuries and fatalities; damage to personal property, infrastructure, state or local critical assets, and the environment; negative effects on the economy; and the degree and extent to which the hazard affects the ability to provide essential services.

### **Previous Occurrences**

Every District in the County has experienced the adverse effects of hazards. Descriptions of previous occurrences, or known hazard incidents, are included to help frame the extent of the hazard's impact on areas of Prince George's County. In some cases, detailed accounts are provided for significant historic hazard events. Occurrences for every hazard from the 2017 Plan were reviewed and updated. Detailed historic events and associated deaths, injuries, and total damage by county are included for some hazards.

### **Probability of Future Events (Changing Climate Conditions)**

The likelihood of a hazard occurring again looks toward past frequency to assist in determining the probability of future occurrence. For some hazards, the future probability of events is further supported by assumptions that favorable environmental conditions resulting in a hazard event will continue to develop or persist.

FEMA now requires that states evaluate changes to climate conditions that may affect and influence their long-term vulnerability. These changes to climate conditions are described as "climate change" or "future conditions" throughout this Plan. The impact of climate change on location, extent, intensity, frequency, and duration is analyzed for each climate-related natural hazard.

### **Vulnerability and Impact**

Specific characteristics of local jurisdictions may make them more susceptible to damage from a given hazard. It is important to understand the hazards that can have the biggest impact on a jurisdiction and understand the components of vulnerability (people, property, economy, environment, critical infrastructure, etc.) and potential losses.



## A.1. Summary of Changes

This plan update refreshes and expands upon content from the 2017 Hazard Identification and Risk Assessment Section. As part of the update, the following changes were made to the risk assessment chapter:

- Changed the chapter title from “Hazard Identification, Risk Assessment, and Vulnerability Analysis” to “Risk Assessment.”
- The “Land Movement” section was renamed to “Landslide.”
- The “Dam Failure” and “Levee Failure” sections were combined into the “Dam and Levee Failure” section.
- The risk assessment elements from the City of Laurel Flood Addendum were incorporated into the “Riverine Flood” section.
- Incorporated climate impacts (climate model projections) on the future probability of hazards.
- Considered social vulnerability, future population (U.S. Census data modified with annualized growth rates), and future development (Prince George's County Plan 2035) in hazard exposure analyses.
- Completed FEMA Hazus-MH v5.1 (also referred to as “Hazus”) analyses for the flooding, coastal flooding, hurricane, and earthquake hazard sections. Hazus was not used in previous plans.
- Updated NCEI Historic Event tables for every hazard.
- Created new maps and analyses for dam and levee inundation zones.

In addition, each hazard section was reformatted to improve clarity and increase alignment with Maryland's *2021 State Hazard Mitigation Plan* and the *FEMA Local Mitigation Planning Policy Guide* (April 19, 2022).

## A.2. Hazard Identification

Prince George's County and the City of Laurel are exposed to a wide array of hazards that can impact people, property, and the environment. The hazards included in the 2023 plan were identified through the evaluation of:

- Previous versions of the hazard mitigation plan,
- Maryland's *2021 State Hazard Mitigation Plan*,
- Presidentially declared disasters encompassing Prince George's County, and
- National Risk Index data for Prince George's County.

**Table 34** shows the identified hazards assessed in this plan (in alphabetical order) and the general descriptions and definitions of each.

Table 34. Descriptions of identified hazards

Hazard	Description
Coastal Flood	Coastal Flooding is when water inundates or covers normally dry coastal land as a result of high or rising tides or storm surges. <sup>12</sup>
Dam and Levee Failure	Dam and levee failure are characterized by a sudden, rapid, and uncontrolled release of water from the containment of a dam or levee, causing nearby land to flood. <sup>13</sup>
Drought	A Drought is a deficiency of precipitation over an extended period resulting in a water shortage. <sup>14</sup>
Earthquake	An Earthquake is a shaking of the earth's surface by energy waves emitted by slowly moving tectonic plates overcoming friction with one another underneath the earth's surface. <sup>15</sup>
Extreme Cold	Extreme cold is characterized by prolonged periods of unusually low temperatures, generally accompanied by high winds. <sup>16</sup>
Extreme Heat	Extreme heat is characterized by prolonged periods of unusually high temperatures, generally accompanied by high humidity. <sup>17</sup>
High Wind	High wind is sustained non-convective winds of 35 knots (40 mph) or greater lasting for 1 hour or longer or winds (sustained or gusts) of 50 knots (58 mph) for any duration (or otherwise locally/regionally defined), on a widespread or localized basis. <sup>18</sup>
Hurricane/Tropical Storm	A Hurricane is a tropical cyclone or localized, low-pressure weather system that has organized thunderstorms but no front (a boundary separating two air masses of different densities) and maximum sustained winds of at least 74 mph. <sup>19</sup>
Landslide	A Landslide is the movement of a mass of rock, debris, or earth down a slope. <sup>20</sup>

<sup>12</sup> FEMA National Risk Index. Coastal Flooding. <https://hazards.fema.gov/nri/coastal-flooding>

<sup>13</sup> FEMA. Guidance for Flood Risk Analysis and Mapping. Dams/Reservoirs and Non-Dam Features. November 2019. [https://www.fema.gov/sites/default/files/2020-02/Dams\\_Reservoirs\\_and\\_Non\\_Dam\\_Features\\_Guidance\\_Nov\\_2019.pdf](https://www.fema.gov/sites/default/files/2020-02/Dams_Reservoirs_and_Non_Dam_Features_Guidance_Nov_2019.pdf)

<sup>14</sup> FEMA National Risk Index. Drought. <https://hazards.fema.gov/nri/drought>

<sup>15</sup> FEMA National Risk Index. Earthquake. <https://hazards.fema.gov/nri/earthquake>

<sup>16</sup> CDC. Extreme Cold. <https://www.cdc.gov/disasters/winter/pdf/extreme-cold-guide.pdf>

<sup>17</sup> NWS. Heat. <https://www.weather.gov/bgm/heat>

<sup>18</sup> NOAA NHC. Glossary of NHC Terms.

<https://www.nhc.noaa.gov/aboutgloss.shtml#:~:text=High%20Wind%20Warning%3A,expected%20or%20observed%20over%20land>

<sup>19</sup> FEMA National Risk Index. Hurricane. <https://hazards.fema.gov/nri/hurricane>

<sup>20</sup> FEMA National Risk Index. Landslide. <https://hazards.fema.gov/nri/landslide>

Hazard	Description
Riverine Flood	Riverine Flooding is when streams and rivers exceed the capacity of their natural or constructed channels to accommodate water flow and water overflows the banks, spilling out into adjacent low-lying, dry land. <sup>21</sup>
Severe Storm (Flood-Related)	Flood-related severe storms can cause heavy rainfall over an area. Flash floods can be the product of heavy localized precipitation in a short time period. <sup>22</sup>
Severe Storm (Wind-Related)	Wind-related severe storms are associated with the presence of strong winds, hail, and lightning. Wind related to severe storms typically originates from thunderstorms. <sup>23</sup>
Sinkhole	A sinkhole is a depression in the ground that has no natural external surface drainage. <sup>24</sup>
Tornado	A Tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground and is visible only if it forms a condensation funnel made up of water droplets, dust, and debris. <sup>25</sup>
Wildfire	A Wildfire is an unplanned fire burning in natural or wildland areas such as forests, shrub lands, grasslands, or prairies. <sup>26</sup>
Winter Storm	Winter Weather consists of winter storm events in which the main types of precipitation are snow, sleet, or freezing rain. <sup>27</sup>

The following hazards are characterized as uniformly affecting the entire County, including the City of Laurel: severe storm, high winds, tornado, winter storm, earthquake, and drought. Wildfire occurrence is relatively minor in Laurel because there are no significant agricultural areas in or around the City, and forested and open areas largely are confined to the floodplain and open space along the Patuxent River on the east and Fairland Regional Park on the west side of the City.

<sup>21</sup> FEMA National Risk Index. Riverine Flooding. <https://hazards.fema.gov/nri/riverine-flooding>

<sup>22</sup> Storm Data Preparation, NOAA National Weather Service Instruction 10-1605, Operations and Services Performance, NWSPD 10-16. March 23, 2016. Available at: <https://www.ncdc.noaa.gov/stormevents/pd01016005curr.pdf>

<sup>23</sup> FEMA National Risk Index. Strong Wind. <https://hazards.fema.gov/nri/strong-wind>

<sup>24</sup> United States Geological Survey. What is a sinkhole? <https://www.usgs.gov/faqs/what-sinkhole>

<sup>25</sup> FEMA National Risk Index. Tornado. <https://hazards.fema.gov/nri/tornado>

<sup>26</sup> FEMA National Risk Index. Wildfire. <https://hazards.fema.gov/nri/wildfire>

<sup>27</sup> FEMA National Risk Index. Winter Weather. <https://hazards.fema.gov/nri/winter-weather>

### A.3. Risk Assessment

Once the hazards for Prince George’s County and the City of Laurel were identified for assessment, the location, extent, and previous events were analyzed to help determine the probability of future events, vulnerability, and potential impacts. Together, these help illustrate overall risk. The data and analyses used for the risk assessment are described below.

#### A.3.a. Hazard Data

The hazard assessment used several data sources, including:

- National Centers for Environmental Information Storm Events Database
- FEMA Presidential Disaster Declarations Summary Dataset
- CDC Social Vulnerability Index 2020 data
- FEMA Hazus-MH v5.1
- Climate Mapping for Resilience and Adaptation Assessment Tool
- Prince George’s County GIS Open Data Portal
- Dam and levee location and inundation zone GIS data
- County critical facilities GIS data

Select data sources are further described below.

##### A.3.a.1. Presidential Disaster Declarations

FEMA maintains the Disaster Declarations Summary dataset.<sup>28</sup> The first disaster declared in the dataset was in 1953, and it has been updated on a regular basis into 2022. Events are categorized as “major disaster,” “emergency,” and “fire management” assistance declarations per the Robert T. Stafford Disaster Recovery Act and related Department of Homeland Security regulations.<sup>29</sup> For an event to be declared a disaster by FEMA, the Governor of Maryland must first declare a state of emergency and then formally request from the President that the Federal government respond to the disaster because the impacted local governments and the State lack adequate resources to respond and recover. **Table 35** shows the FEMA Disaster Declarations Summary data for events declared for Prince George’s County, Maryland from 1953 to October 2022. Twelve Major Disaster Declarations were issued since 1971 and six Emergency Declarations were issued since 1993, totaling 18 declarations. These declarations are made at the county level, meaning the City of Laurel is included in these declarations.

Table 35. Declared Disasters for Prince George’s County, Maryland (1953-2022)

Disaster Number	Disaster Type	Incident Type (Named Storm)	Incident Begin Date	Program(s) Declared			
				IH	IA	PA	HMGP
3100	Emergency	Snow	13-Mar-1993	-	-	Yes	Yes

<sup>28</sup> OpenFEMA Dataset: Disaster Declarations Summaries - v2. <https://www.fema.gov/openfema-data-page/disaster-declarations-summaries-v2>

<sup>29</sup> The Individual and Households Program (IHP) provides assistance to individuals who experienced property loss or damage due to disasters, the Public Assistance Program (PA) supports the repair or replacement of damaged public infrastructure, the Hazard Mitigation Grant Program (HMGP) is available for eligible mitigation projects after the disaster, and HMGP Post Fire is available for eligible mitigation projects after a fire management assistance declaration.

Disaster Number	Disaster Type	Incident Type (Named Storm)	Incident Begin Date	Program(s) Declared			
				IH	IA	PA	HMGP
1016	Major Disaster	Snow	8-Feb-1994	-	-	Yes	Yes
1081	Major Disaster	Snow/Blizzard	6-Jan-1996	-	-	Yes	Yes
1324	Major Disaster	Severe/Winter Storm(s)	25-Jan-2000	-	-	Yes	Yes
3179	Emergency	Severe/Winter Storm(s)	14-Feb-2003	-	-	Yes	-
1492	Major Disaster	Hurricane/Flood (Isabel)	18-Sep-2003	Yes	Yes	Yes	Yes
3251	Emergency	Hurricane/Flood (Katrina)*	29-Aug-2005	-	-	Yes	-
1910	Major Disaster	Snow/Blizzard	5-Feb-2010	-	-	Yes	Yes
3335	Emergency	Hurricane/Flood (Lee)	26-Aug-2011	-	-	Yes	-
4038	Major Disaster	Flood (Lee)	6-Sep-2011	-	-	Yes	Yes
4091	Major Disaster	Hurricane/Flood (Sandy)	26-Oct-2012	Yes	-	Yes	Yes
3349	Emergency	Hurricane/Flood (Sandy)	26-Oct-2012	-	-	Yes	-

Disaster Number	Disaster Type	Incident Type (Named Storm)	Incident Begin Date	Program(s) Declared			
				IH	IA	PA	HMGP
4261	Major Disaster	Snow/Blizzard	22-Jan-2016	-	-	Yes	Yes
3430	Emergency	Biological	20-Jan-2020	-	-	Yes	-
4491	Major Disaster	Biological	20-Jan-2020	Yes	-	Yes	Yes

\*Emergency Declaration 3251 was intended to assist Hurricane Katrina evacuees.

**A.3.a.2. Building Data**

For flooding, earthquake, and hurricane hazards, replacement building values provided by FEMA Hazus were used in scenario (loss estimation) analyses for those hazards. A vulnerability analysis is meant to approximate damages based on exposure and hazard sensitivity. In the case of a real hazard event, the damages may be more or less than what is calculated in the vulnerability analysis sections. For hazard exposure analyses that did not use Hazus data, building footprints and property tax assessment data provided by the County were used to determine value.

**Exposure Analysis**

An exposure analysis is beneficial in understanding which and how many assets are exposed to hazards with defined hazard areas and the potential damages they may experience. It may result in an overestimate of risk as it does not take into account factors such as a building's elevation, building code adherence, or age, among other factors.

To assess Prince George's County's vulnerability, an inventory of its structures and critical facilities was completed. Critical facilities are those that warrant special attention in preparing for a disaster and that are vital in maintaining community function. Prince George's County has provided an inventory of critical facilities that include emergency services facilities, healthcare, water and wastewater services, and other critical facilities. **Table 36** below shows each critical facility type and general location. **Figure 11** shows the location of each critical facility located in Prince George's County and the City of Laurel.

Table 36. Number of Critical Facilities by Type in Prince George's County and the City of Laurel

Facility Type	Prince George's County Districts 1-9	City of Laurel
Commercial Facilities	109	6
Defense Industrial Base	1	--
Emergency Services	74	4
Government Facilities	377	9
Transportation	41	1
Energy	14	1
Water and Wastewater Systems	11	--
Healthcare and Public Health	23	1
Food and Agriculture	17	--
Chemical	11	--
Communications	3	2
Information Technology	2	--
Nuclear	2	--
<b>Total</b>	<b>685</b>	<b>24</b>

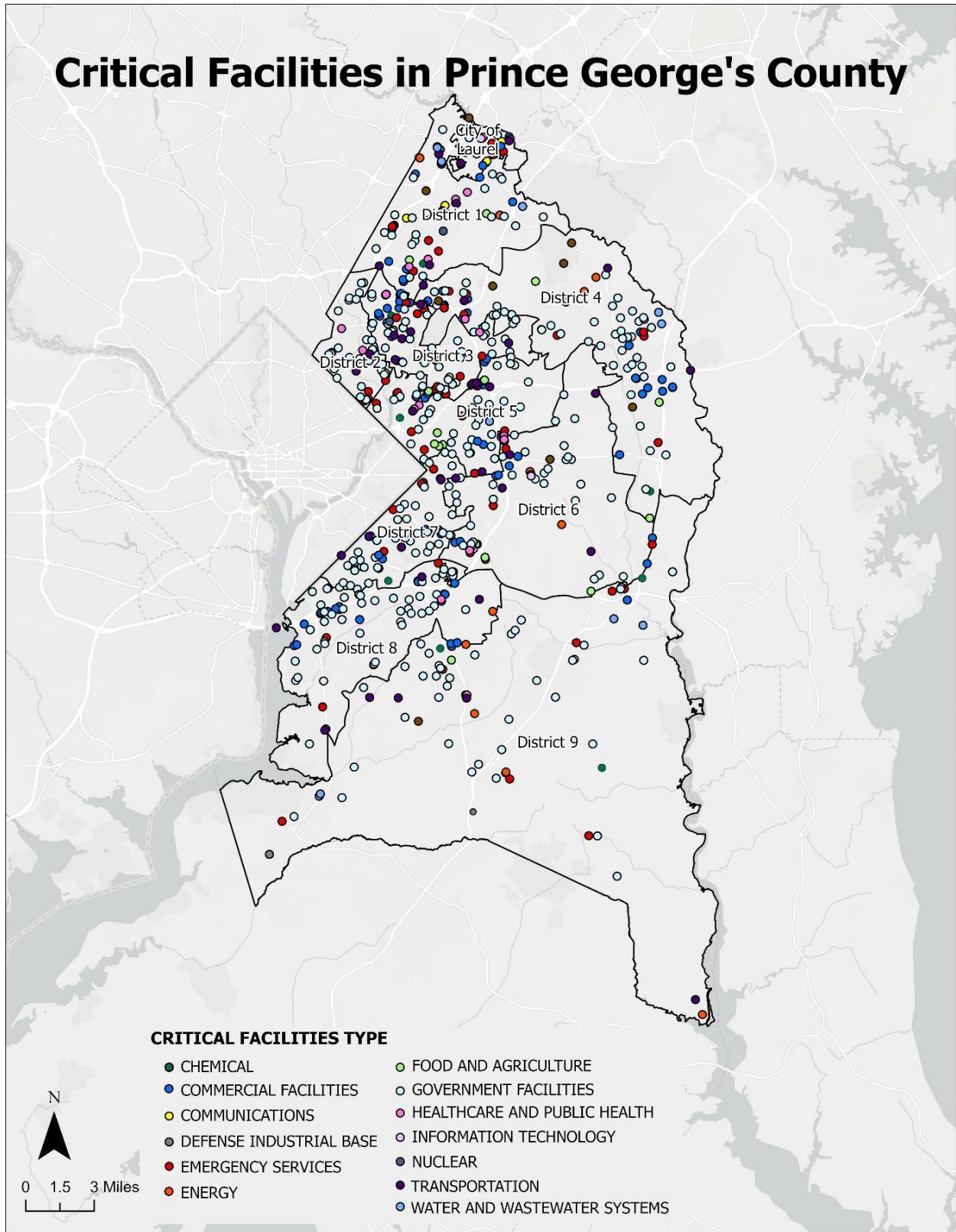


Figure 11. Critical Facilities Location by Type in Prince George's County



### A.3.a.3. Climate Data

The Risk Assessment considers the impact of climate change on the hazards outlined in the chapter. The *Fourth National Climate Assessment* (NCA4) published in 2018 summarizes the impacts of climate change on the United States, now and in the future. Key climate data from the NCA4 “Northeast” chapter is included in this section. Additionally, the Climate Mapping for Resilience and Adaptation tool and International Panel on Climate Change Sixth Assessment Report are used for climate-related hazard information and climate projections.

### A.3.a.4. Social Vulnerability Data

The Center for Disease Control's (CDC) Social Vulnerability Index as of October 2022 was used to determine areas of social vulnerability within Prince George's County and the City of Laurel. The Social Vulnerability Index uses U.S. Census data to determine vulnerability for four related themes, which when combined create an overall Social Vulnerability Index ranking.

## **A.3.b. Historical Analysis**

The [National Centers for Environmental Information \(NCEI\) Storm Events Database](#) was used to assess hazards affecting Prince George's County and the City of Laurel by annualizing hazard events, damage figures, injuries, and deaths. The data was pulled when events from January 1950 to August 2022 were available, but not all hazards have event data that was collected for the entire period of record. All NCEI monetary figures have been adjusted for inflation to 2022 US Dollars (USD).

Historical hazard event data allows for an estimation of future probability for those events. However, future event probability based on historical occurrences does not account for climate impacts, which can increase or decrease an event's probability. When climate projection data is available, climate impacts are accounted for in each hazard's profile.

### **Probability**

Probability is the likelihood that a hazard event will occur. Low probability was defined as less than 1.25 annualized events per year, while high probability was defined as greater than 4.5 annualized events per year. Medium probability is between low and high probability.

While NCEI data was used to perform historical analyses, it should be noted that only storm and other significant weather phenomenon occurrences that (1) had a sufficient intensity to cause loss of life, injuries, significant property damage, and/or disruption to commerce; (2) were unusual or noteworthy in the media; or (3) set records and occurred in conjunction with another event, are included in the database. This means that not all events that have affected Prince George's County may be captured in the data and associated analyses. Narrative descriptions of events are included in each hazard section and **Appendix C** to further capture historical conditions.

**Table 37** shows the hazards assessed in this plan and their associated hazard(s) from the NCEI database. Note that some hazards, such as severe storms and tropical storms, may be listed in more than one hazard-related category since they include flood- and wind-related hazard elements.

Table 37. Hazards identified in the 2023 HMP and their associated National Centers for Environmental Information hazards

Identified Hazard	Associated NCEI Database Hazard(s)
Riverine Flood	Flood
Coastal Flood	Coastal Flood
	Tropical Storm
Severe Storm (Flood-Related)	Flash Flood
	Heavy Rain
Dam and Levee Failure	--
Tornado	Tornado
Severe Storm (Wind-Related)	Thunderstorm Wind
	Lightning
	Hail
High Wind	High Wind
	Strong Wind
Hurricane/Tropical Storm (Wind-Related)	Hurricane
	Tropical Storm
Winter Storm	Blizzard
	Heavy Snow
	Winter Storm
	Winter Weather
	Ice Storm
Wildfire	Wildfire
Drought	Drought
Earthquake	--
Landslide	--
Sinkhole	--
Extreme Heat	Heat
	Excessive Heat

Identified Hazard	Associated NCEI Database Hazard(s)
Extreme Cold	Cold/Wind Chill
	Extreme Cold/Wind Chill

### A.3.c. Exposure Analysis

Maps are included throughout the chapter to illustrate hazard events that can be visualized spatially. Data for hurricane and tropical storm tracks were found on the National Oceanic and Atmospheric Administration International Best Track Archive for Climate Stewardship website and used to create historical path maps. FEMA Digital Flood Insurance Rate Map data was used to depict the Special Flood Hazard Area within the County. Wildfire location data and the Community Wildfire Protection Plan (CWPP) Area were provided by the Forest Service Research Data Archive and the Community Wildfire Protection Plan, respectively. Geologic data was acquired through the United States Geological Survey for earthquakes, Maryland Geological Survey and County 311 data for sinkholes, and Prince George's County for land movement.

Dam and levee inundation area shapefiles were obtained from Prince George's County, the City of Laurel, and the City of Bowie to map potential areas of concern. Associated dam inundation zone exposure values were calculated using building footprints and tax assessment structure value data acquired from the County's Open GIS platform.

The critical facilities exposure analysis was completed using the County's critical facilities GIS layer and spatial hazard extents, with a quarter of a mile buffer around the spatial hazard extent. Dam and levee failure, wildfire, sinkholes, and flooding extents were each intersected with the County's provided critical facilities layers to determine exposure. A full list of critical facilities and the spatial hazard areas they are exposed to can be found in **Appendix D**.

### A.3.d. Scenario (Loss Estimation) Analysis

FEMA Hazus software was used to determine the potential losses from future hazard events. Hazus is a computer modeling tool that enables the use of U.S. Census data to determine risk exposure from floods, coastal wind events, and earthquakes. The Hazus Flood Model was used to calculate physical damages and economic losses due to coastal and riverine flooding. Hazus utilized flood depth grids (developed by Dewberry) and functions that relate the depth and type of flooding to the degree of damage for various categories of buildings. The Hazus Hurricane Model was used to estimate physical and economic damage to buildings due to wind and windborne debris. Wind hazard data in Hazus are generated at the census tract level. The model considers peak gusts, terrain roughness, and tree coverage data for incoming hurricanes, historic storms, or probabilistic hazards. Finally, the Hazus Earthquake model was used to evaluate the probability of damage to buildings and infrastructure according to ground shaking data from the United States Geological Survey Shakemap website.

### A.3.e. Social Vulnerability Analysis

Prince George's County is made up of diverse communities with varying degrees of social vulnerability. FEMA defines social vulnerability as the potential for loss within an individual or social group, recognizing that some characteristics influence an individual's or group's ability to prepare, respond, cope or recover from an event. These characteristics can overlap within populations to create heightened vulnerability, which may be compounded by infrastructure deficiencies within communities and historic or existing discriminatory government policies.<sup>30</sup>

Social vulnerability can influence a community's ability to mitigate and recover from hazard events. The County is considering social vulnerability factors in the risk assessment chapter to identify communities that should be a priority for implementing mitigation projects and actions before a disaster. As seen in **Figure 12**, The Centers for Disease Control and the Agency for Toxic Substances and Disease Registry

<sup>30</sup> FEMA Local Mitigation Planning Policy Guide. [https://www.fema.gov/sites/default/files/documents/fema\\_local-mitigation-planning-policy-guide\\_042022.pdf](https://www.fema.gov/sites/default/files/documents/fema_local-mitigation-planning-policy-guide_042022.pdf)

created a Social Vulnerability Index using U.S. Census data to determine vulnerability on a census tract level. Each tract is ranked by 15 social factors that are grouped into four related themes, which when combined, create a census tract's overall Social Vulnerability Index ranking.

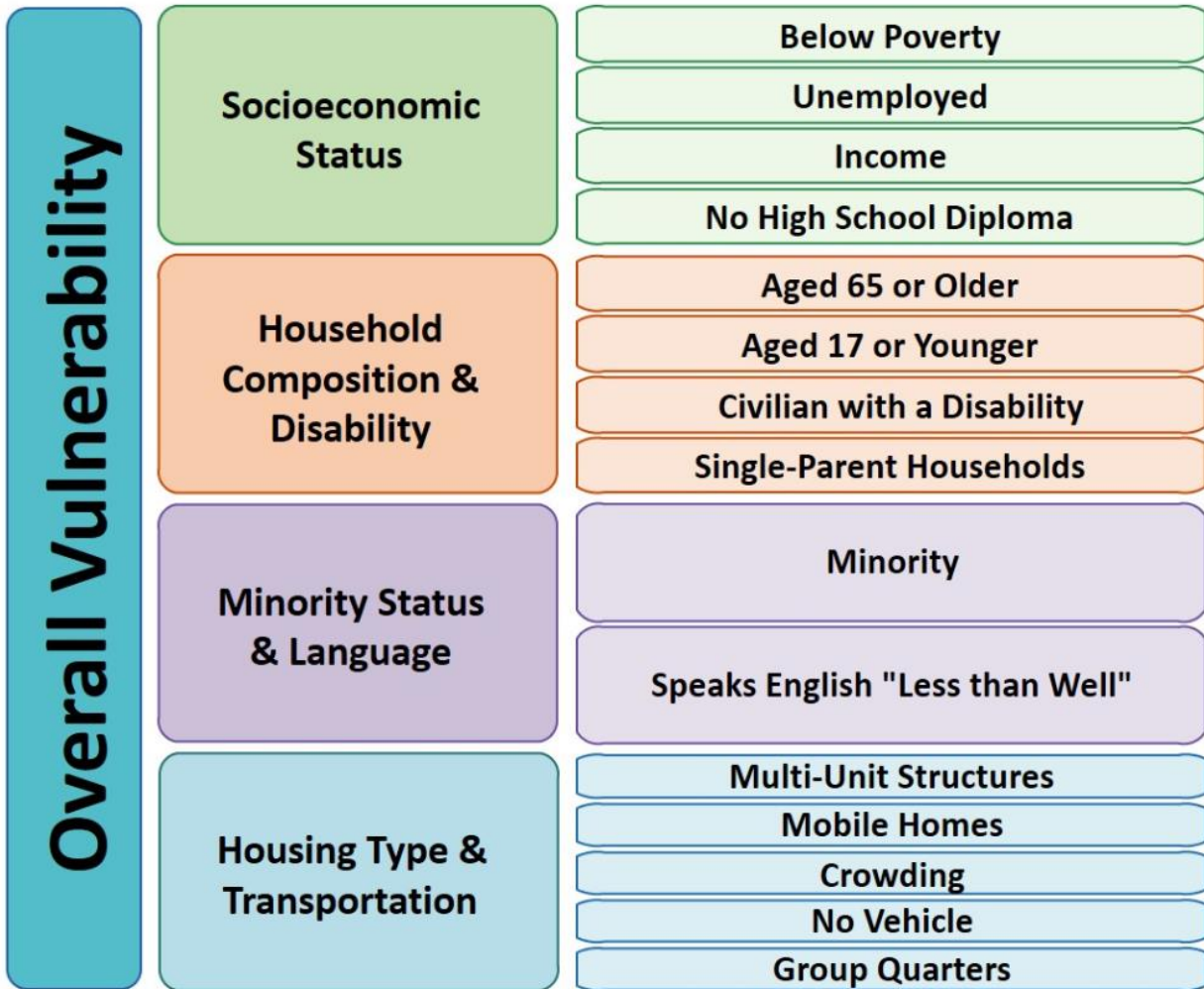


Figure 12. Variables used in Social Vulnerability Index scoring (source: [CDC/ATSDR](#))

According to 2020 Social Vulnerability Index data (as updated in October 2022), Prince George's County has an overall social vulnerability score of 0.81, which is considered a high level of vulnerability. The county has a higher level of social vulnerability than each of the counties it shares a border with, as shown in **Figure 13**. Within the County, census tracts with high social vulnerability scores of 0.75 or higher are located in Districts 1, 2, 3, 5, 6, 7, 8, and the City of Laurel, as shown in **Figure 14**. These areas with high social vulnerability may need support in preparing for hazards and responding to disasters.

Throughout the hazard sections in this chapter, Social Vulnerability Index scores are shown on maps alongside hazard areas to illustrate the overlap between exposure and vulnerability. This analysis helps determine areas that may have the highest overall risk of certain hazards.

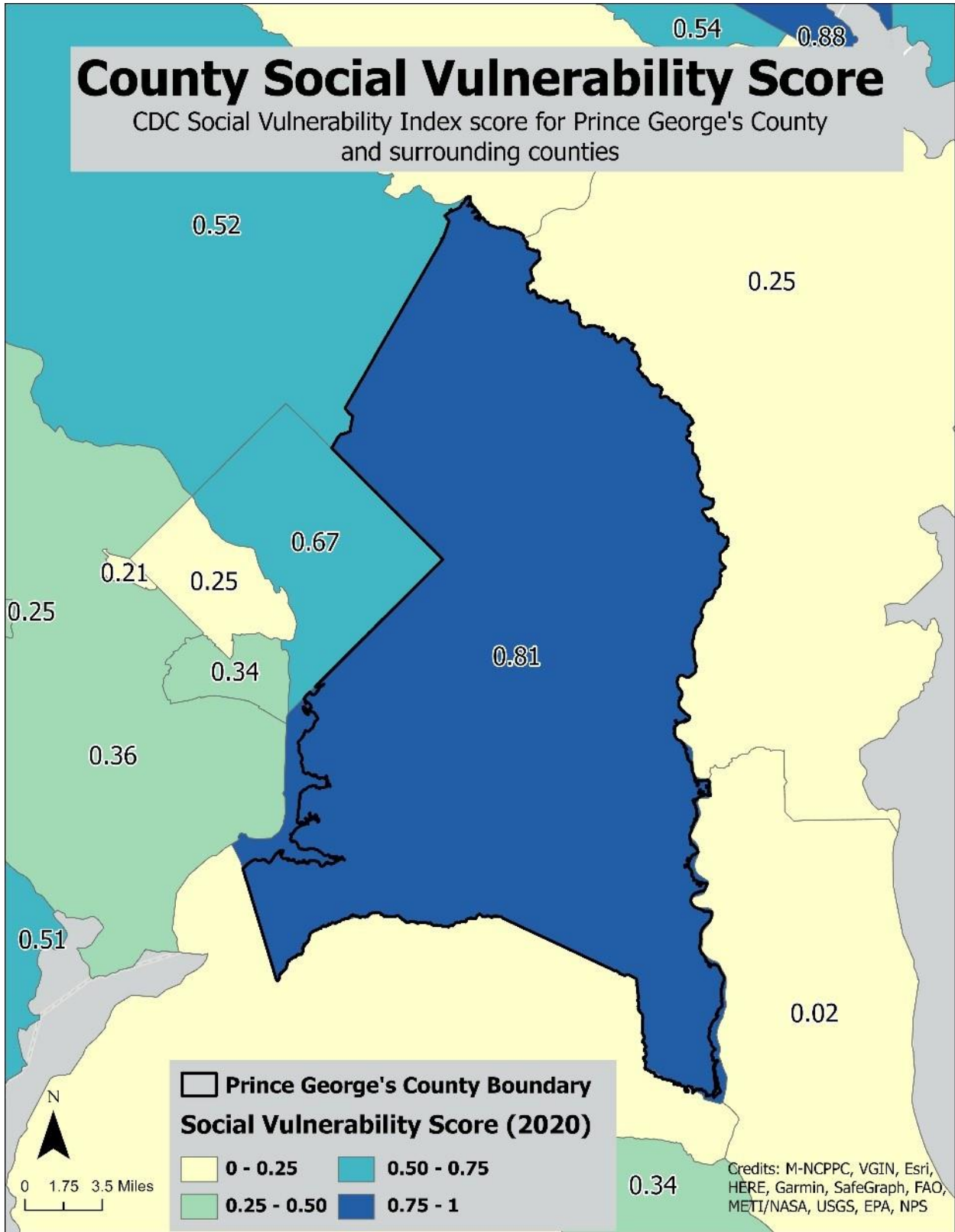


Figure 13. Social Vulnerability Score for Prince George's County and Surrounding Counties

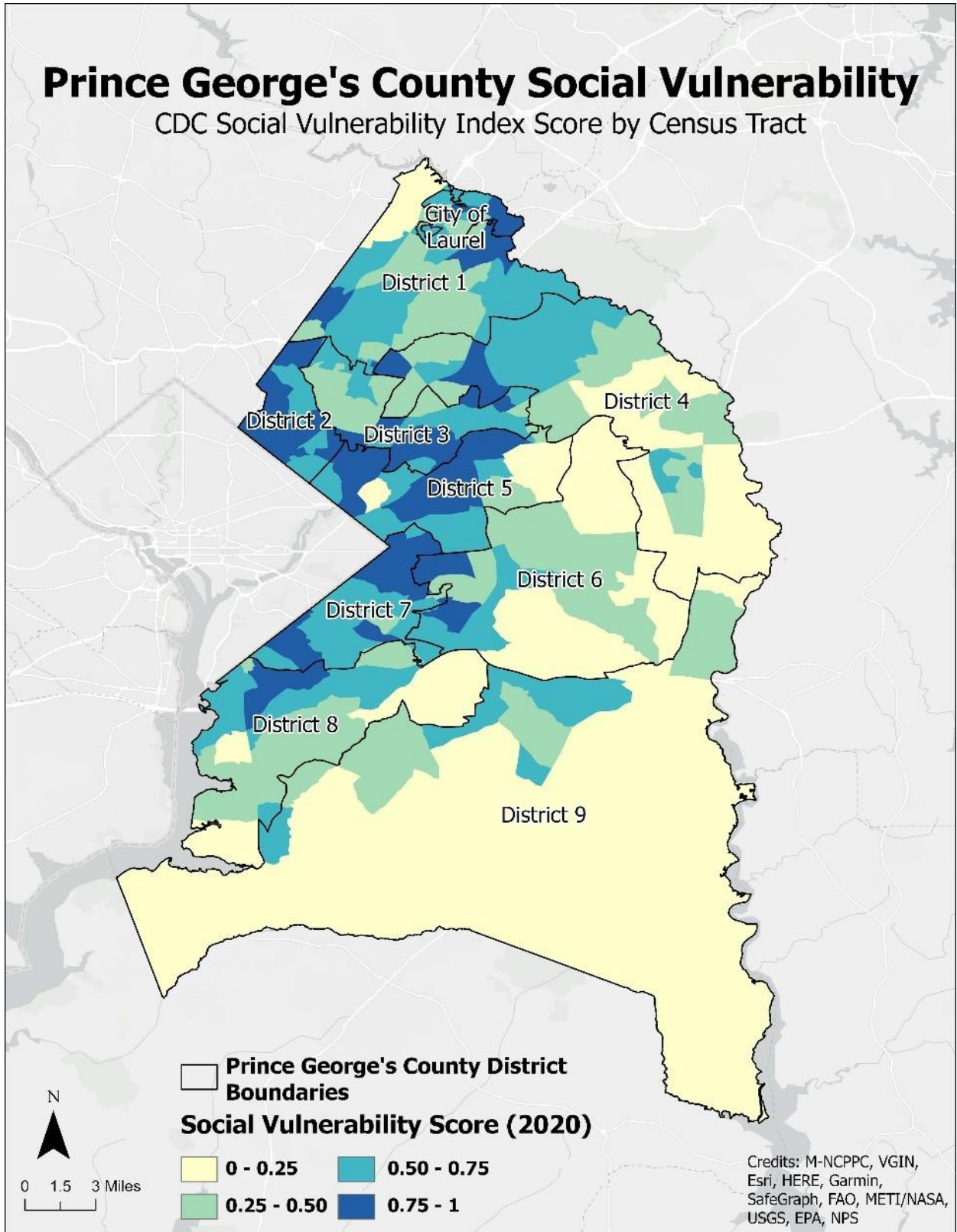


Figure 14. Social Vulnerability Score by Census Tract in Prince George's County

### A.3.f. Future Conditions Analysis: Climate

Our world is constantly changing, and our climate is no different. Planning for hazard mitigation involves looking at both historical observations and future projections. Together, they help paint a more complete picture of what actions our communities need to take to become more resilient.

The number of billion-dollar weather and climate disasters is increasing in the United States.<sup>31</sup> This trend reflects the compounded effects of a changing climate along with vulnerable communities and infrastructure exposed to hazards. Understanding the current and future risks face is fundamental to building community resilience in Prince George's County.

Every natural hazard is not directly affected by a changing climate—only those that are sensitive to changes in temperature, precipitation, sea level rise, and storm frequency/intensity. The climate-related hazards most notable for Prince George's County are riverine flood, severe storm, tornado, hurricane/tropical storm, winter storm, high wind, extreme heat, dam and levee failure, extreme cold, drought, coastal flood, and wildfire.

#### Regional and Local Climate Change Trends and Projections

Prince George's County is *already* facing climate change impacts through extreme weather events, including long periods of extreme heat, devastating flooding, and a series of severe storms. The sections below discuss the climate projections for Prince George's County and the surrounding region.

#### A.3.f.1. Changes in Temperature

On average, the climate is warming at a rapid rate, causing record-breaking temperatures and heat waves. Temperatures in Maryland have risen about 2.5°F since the beginning of the 20th century, and temperatures are projected to continue increasing.<sup>32</sup> This rise in temperature is leading to an increase in the number of extreme heat days in the state. **In 2021, Prince George's County had 21 extreme heat days between May and September, the highest number of recorded extreme heat days in the past 5 years.**<sup>33</sup> Unfortunately, this trend (**Figure 15**) is expected to continue.

<sup>31</sup> NOAA National Centers for Environmental Information (NCEI) U.S. Billion-Dollar Weather and Climate Disasters (2022). <https://www.ncei.noaa.gov/access/billions/>

<sup>32</sup> NOAA/NESDIS Maryland and the District of Columbia State Climate Summary (2022). <https://statesummaries.ncics.org/chapter/md/>

<sup>33</sup> Centers for Disease Control (CDC) National Environmental Public Health Tracking Network (2022). <https://ephtracking.cdc.gov/DataExplorer/#/>



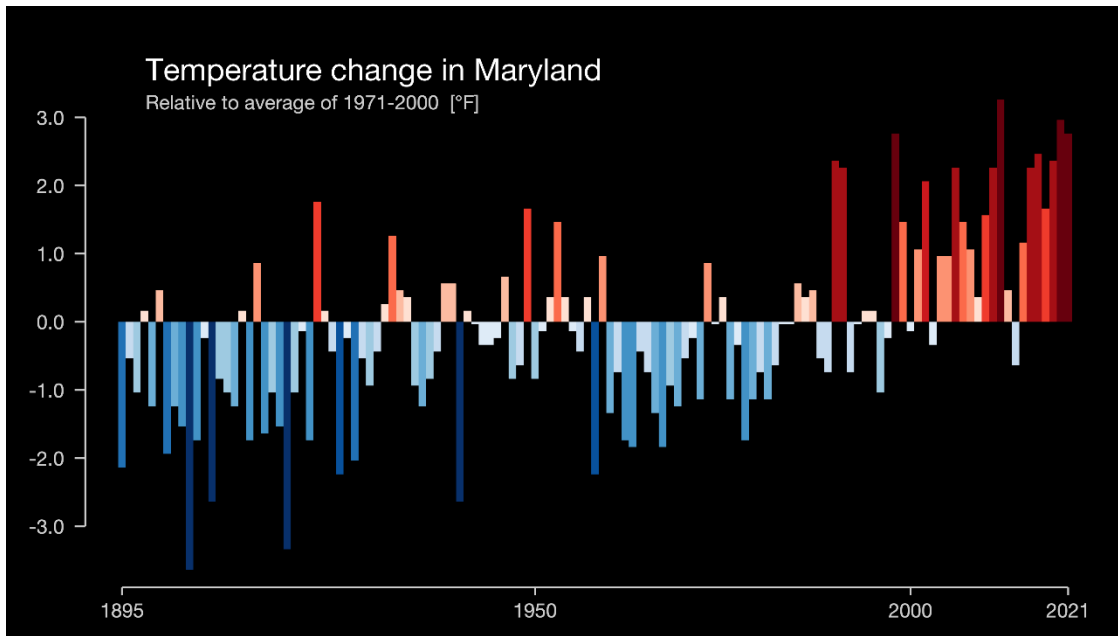


Figure 15. Historic temperature change in Maryland relative to average temperature of 1971-2000<sup>34</sup>

Climate projections from the Climate Mapping for Resilience and Adaptation Assessment Tool show a significant increase in extreme heat days through the end of the early century and into the mid and late centuries.<sup>35</sup> Annual days with temperatures above 90°F are projected to continue to rise, reaching 51.7 days under a lower emissions scenario (RCP 4.5), and 54.1 days under a higher emissions scenario (RCP 8.5) by 2044.

### Representative Concentration Pathway

The Representative Concentration Pathways (RCPs) describe four different 21<sup>st</sup> century pathways of greenhouse gas emissions and atmospheric concentrations, air pollutant emissions, and land use.<sup>36</sup> Basically, they provide a way to envision and plan around four different climate futures. They have an outlook to the year 2100. Projections are described based on two different RCPs (RCP 4.5 and RCP 8.5) to address uncertainty in what our future emissions, and therefore climate, will look like. We are currently tracking within 1% of actual emission with the higher emission scenario (RCP 8.5) based on historical emissions and anticipated outcomes of current global climate policies.<sup>37</sup> **In short, unless drastic action is taken, the climate projections under RCP 8.5 may be more realistic, especially when planning for climate risks and impacts to 2050.**

Figure 16 shows the projected annual days with a maximum temperature of more than 90°F.

<sup>34</sup> University of Reading. Show Your Stripes (2021). <https://showyourstripes.info/c/northamerica/usa/maryland>

<sup>35</sup> Climate Mapping for Resilience and Adaptation Assessment Tool (2022). <https://livingatlas.arcgis.com/assessment-tool/search>

<sup>36</sup> International Panel on Climate Change. AR5 Synthesis Report: Climate Change 2014. (2014). [https://ar5-syr.ipcc.ch/topic\\_futurechanges.php](https://ar5-syr.ipcc.ch/topic_futurechanges.php)

<sup>37</sup> Christopher R. Schwalm, Spencer Glendon, Philip B. Duffy. RCP8.5 tracks cumulative CO2 emissions. Proceedings of the National Academy of Sciences, 2020; 202007117 DOI: 10.1073/pnas.2007117117

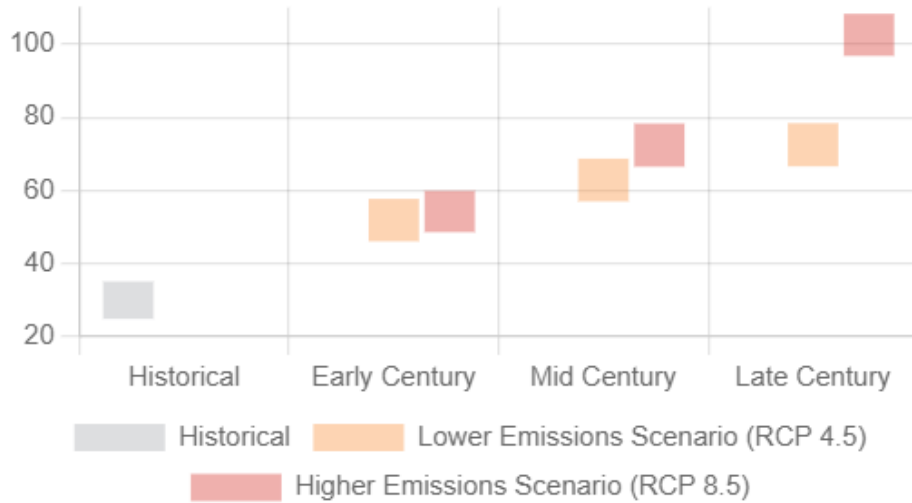


Figure 16. Projected annual days with a maximum temperature of greater than 90°F in Prince George's County (Source: Climate Mapping for Resilience and Adaptation Assessment Tool).

These extreme heat days are especially dangerous for heat-sensitive residents such as outdoor workers, the elderly, residents with respiratory illnesses, and households without air conditioning. Urban heat island areas within the County, such as heavily developed areas with less tree canopy cover and green space, will feel the impacts of extreme heat days more severely. Additionally, when periods of extreme heat coincide with dry conditions, the County could expect to experience more droughts and brushfires. The effects of these natural hazards are intensified due to climate change and can cause strains on the water supply and water quality, increased roadside erosion, heat strokes, and increased food costs. **The average rise in annual temperatures will also result in milder winters with fewer extreme cold days, with the projected days with a maximum temperature below 32°F to decrease to near 0 by 2044** according to the climate models used in the Fourth National Climate Assessment. A winter warming trend has been observed in Maryland with a below average number of very cold nights since the mid-1990s (Figure 17). Warmer temperatures in winter months will also result in greater amounts of moisture in the atmosphere leading to an intensification of winter storm events such as nor'easters and snowstorms.

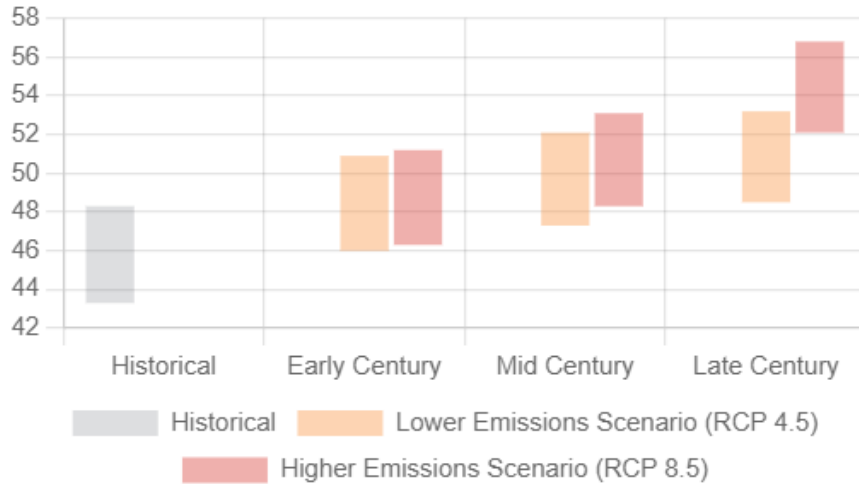


Figure 17. Projected average daily minimum temperature °F in Prince George's County (Source: Climate Mapping for Resilience and Adaptation Assessment Tool)

**A.3.f.2. Changes in Precipitation**

Climate change is causing an increase in annual precipitation amounts and annual precipitation events, which will increase flooding potential in Prince George's County. **Average annual total precipitation in Prince George's County is projected to continue to increase in upcoming years (Figure 18)**, aligning with the general precipitation trends in Maryland and the Northeast region.

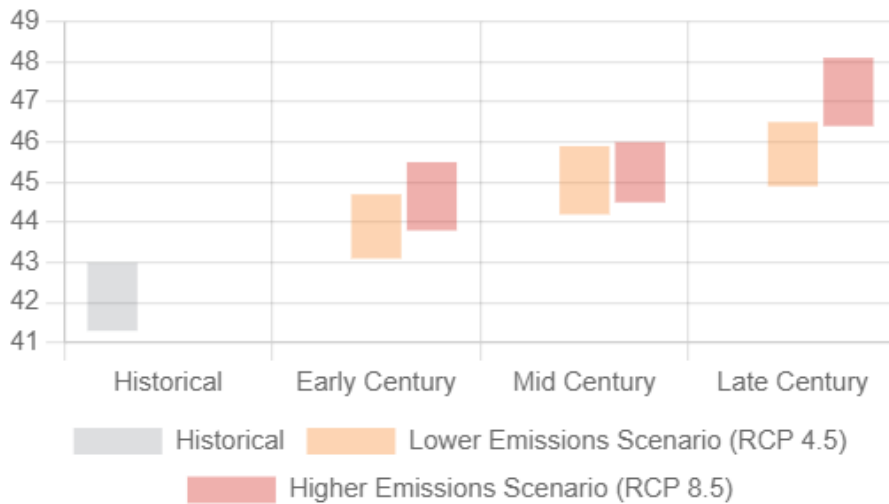


Figure 18. Projected average annual total precipitation in Prince George's County (Source: Climate Mapping for Resilience and Adaptation Assessment Tool)

**The Northeast region has experienced a greater recent increase in extreme precipitation than any other region in the United States, with a 70% increase in the amount of precipitation falling in very heavy events.**<sup>38</sup> Illustrating this point, there is projected to be a decrease in the total “wet” days, but an

<sup>38</sup> U.S. Global Change Research Program. Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II (2018). <https://nca2018.globalchange.gov/chapter/18/>

increase of 1.4 inches of annual precipitation by 2044 in the County.<sup>39</sup> **Figure 19** shows that expected increase in heavy precipitation days per year.

**Annual days that exceed 99th percentile precipitation**

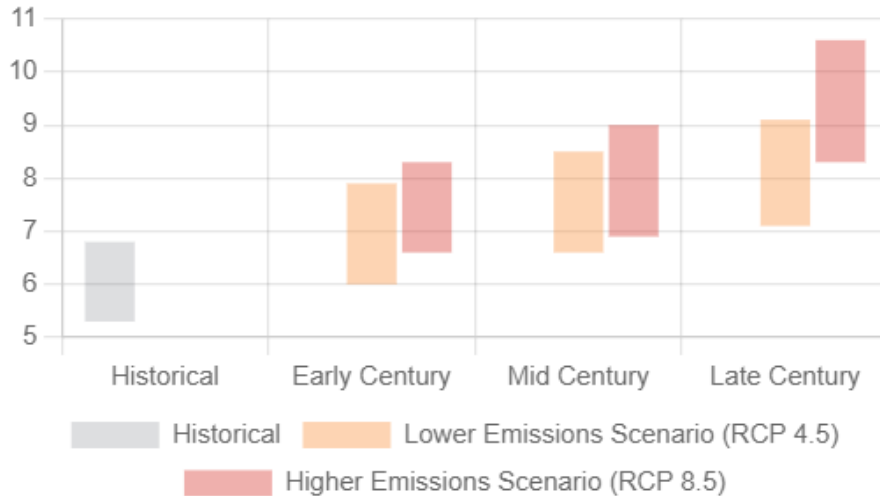


Figure 19. Projected annual days that exceed the 99th percentile precipitation in Prince George's County (Source: Climate Mapping for Resilience and Adaptation Assessment Tool)

Flash floods and riverine flooding are intensified by higher volume precipitation events. This overall increase in precipitation amounts in the Northeast region will impact Prince George's County by causing more frequent incidents of flooding to infrastructure and housing, crop destruction, and health concerns from standing water. Additionally, increased volume of precipitation will cause flooding in low-lying areas and urbanized areas with more impervious surfaces and can overwhelm the County's stormwater systems. From 2018-2021, there were 4,362 water-related complaints to the County's 311 hotline, including flooded basements, backyards, and neighborhood streets. With the amount of precipitation and flooding expected to increase in the coming years due to climate change, more County residents will be exposed to flooding and at risk of flood-related damage and hazards.

**A.3.f.3. Sea Level Rise**

Global rise in sea level is caused, in part, by a warming ocean and melting glaciers and ice sheets. **The climate models used in the Fourth National Climate Assessment project that within the next twenty years, 0.2% of the County will be impacted by global sea level rise regardless of the greenhouse gas emissions scenario (Figure 20).** By late century, 0.9% of the County is projected to be impacted by global sea level rise as shown in **Figure 21**. Prince George's County is located between the Potomac River and the Patuxent River, which are both tidally influenced by the Atlantic Ocean. This location places the County at risk for coastal flooding from sea level rise and storm surge, as well as tidal flooding during high tide. Sea level rise increases the water level for storm surges and high tides, which can make coastal floods more severe and more frequent.

<sup>39</sup> Climate Mapping for Resilience and Adaptation Assessment Tool (2022). <https://livingatlas.arcgis.com/assessment-tool/search>

**Percent of selected county impacted by global sea level rise**

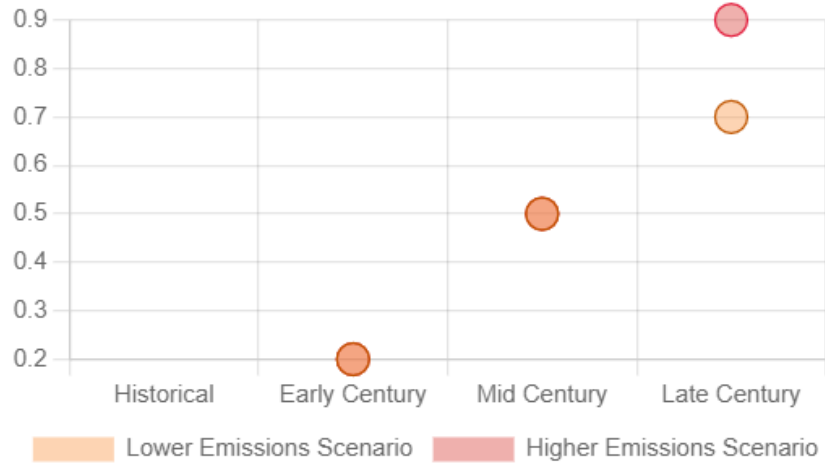


Figure 20. Projected percent of Prince George's County impacted by global sea level rise (Source: Climate Mapping for Resilience and Adaptation Assessment Tool)

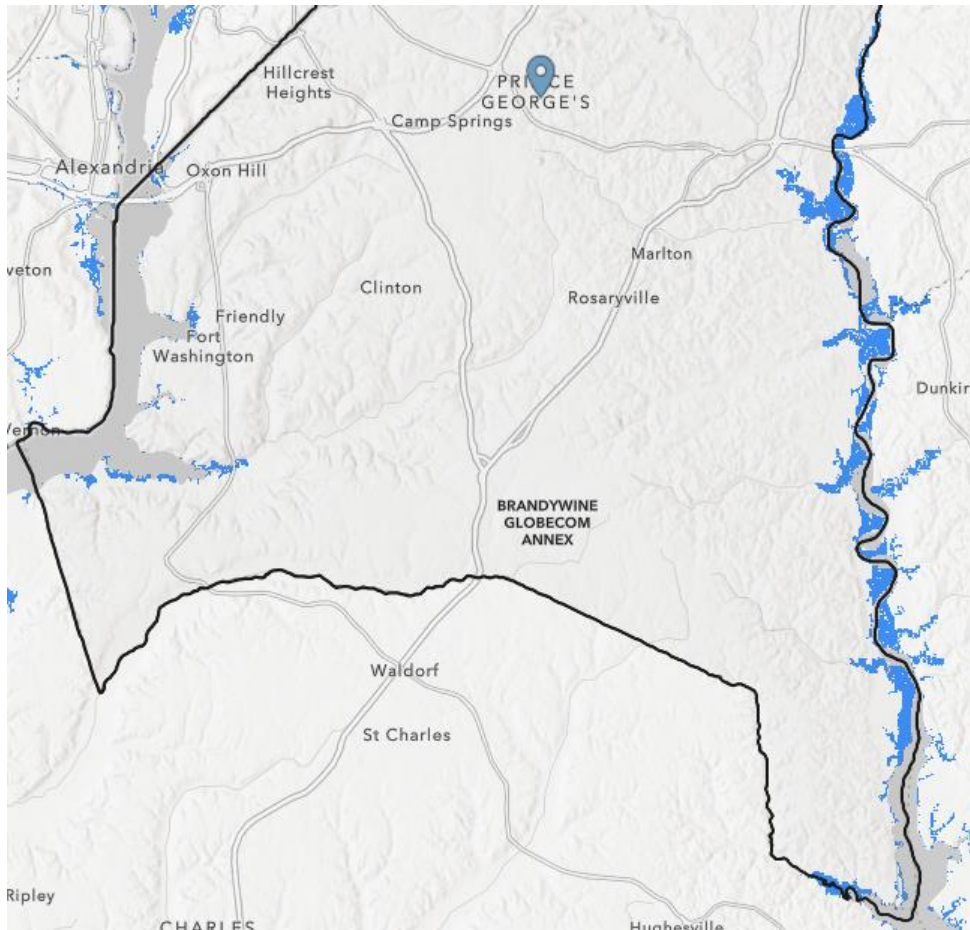


Figure 21. Areas projected to experience coastal flooding due to sea level rise by late century (2070-2099) (Source: Climate Mapping for Resilience and Adaptation Assessment Tool)

#### A.3.f.4. Changes in Severe Storms

The International Panel on Climate Change reports that it is very likely that ocean surface temperature will increase in the Atlantic Ocean. This would provide more energy for Atlantic storms to strengthen, which could lead to an increased frequency of thunderstorms, tornadoes, hurricanes, and nor'easters. Sea surface temperatures in the tropical Atlantic, known as the Main Development Region for tropical systems have risen 1.85°F in the last century, and the likelihood of tropical cyclones reaching Category 3 status has increased since 1979.<sup>40</sup> **Climate change is projected to magnify the impact of hurricanes and tropical storms through increasing both precipitation amounts and extreme wind speeds.**

**Additionally, due to weakening winds coming from inland areas toward the Atlantic, the speed of land falling storms may slow, which would allow hurricanes to rapidly intensify—especially within the 24 hours before landfall—and stall, dropping more rain on a limited area.** Prince George's County may also see the coastal region at severe risk from tropical storms expand northward to include it.<sup>41</sup> Overall, severe storms can bring heavy rain and lightning, leading to flooding and power outages. Severe wind events can also cause power outages and dangerous conditions due to downed power lines, trees, and road obstructions due to wind-blown debris.

#### A.3.f.5. Conclusion

The outlook illustrated above is alarming, but there are actions we can begin today that will help mitigate the risks we face. Research shows that every \$1 invested in climate hazard mitigation can save up to \$13 in post-disaster recovery costs.<sup>42</sup> Less recovery costs mean that people and infrastructure suffered less damage during hazard events—an outcome that is better for everyone. Our current and future risks are highlighted below so we can integrate them into the Risk Assessment and mitigate them through the projects and actions outlined in the Mitigation Strategy.

#### **Climate Projections Summary for Prince George's County**

- Increase in the number of annual extreme heat days
- Milder winters, with fewer extreme cold days
- Increased risk of extreme heat and dry conditions overlapping, leading to an increased risk of droughts and wildfires
- Increased average total annual precipitation
- More extreme precipitation events, with more rain falling in shorter amounts of time, which can lead to more flash floods, riverine flooding, and pluvial flooding
- 0.2% of the County's land is expected to be impacted by sea level rise within the next 20 years
- Intensified winter storm events
- Stronger hurricanes that bring more rain, stronger winds, intensify quickly, and move slower over land

#### **A.3.g. Future Conditions Analysis: Development**

In 2014, Prince George's County published and adopted the Plan Prince George's 2035 Approved General Plan (Plan 2035), a comprehensive 20-year general plan for the county. This plan articulates a

<sup>40</sup> NOAA National Centers for Environmental Information (NCEI) Climate at a Glance (2022).

[https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/global/time-series/atlanticMdr/land\\_ocean/6/11/1880-2019?trend=true&trend\\_base=10&begtrendyear=1880&endtrendyear=2020](https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/global/time-series/atlanticMdr/land_ocean/6/11/1880-2019?trend=true&trend_base=10&begtrendyear=1880&endtrendyear=2020)

<sup>41</sup> International Panel on Climate Change. Sixth Assessment Report. *Climate Change 2022: Impacts, Adaptation and Vulnerability*. Chapter 14. Page 1938. 2022.

<sup>42</sup> National Institute of Building Sciences (NIBS) Mitigation Saves (2020). [http://2021.nibs.org/files/pdfs/ms\\_v4\\_overview.pdf](http://2021.nibs.org/files/pdfs/ms_v4_overview.pdf)

vision for making Prince George's County a competitive force in the regional economy, a leader in sustainable growth, a community of strong neighborhoods and municipalities, and a place where residents are healthy and engaged. The plan includes a Growth Policy Map (**Figure 22**), which reflects the Plan 2035 vision to concentrate future growth to promote sustainable development and minimize development impacts to the County's natural resources. The Growth Policy Map visually communicates where the County should grow and outlines which parts of the county will not experience substantial change.<sup>43</sup> It is important to view these planned growth areas from the County's Growth Policy Map in the context of hazard risk.

#### *A.3.g.1. Proposed Future Development*

The Growth Policy Map, shown in **Figure 22** designates areas of proposed growth as well as areas of restricted growth. Growth areas include Regional Transit Districts, Local Centers, Employment Areas, Established Communities, Future Water and Sewer Service Areas, and Rural and Agricultural Areas. The Growth Boundary designates the areas that are eligible to receive public water and service, which impacts where the County can grow. Rural and Agricultural Areas are not eligible for public water and sewer service, and therefore are recommended to be protected without any development. The Regional Transit Districts shown on the Growth Policy Map are recommended as locations for the majority of future residential and commercial development in Prince George's County. Local Centers and Employment Areas also are designated as ideal locations for future residential and commercial development, respectively. The Established Community and Future Water and Sewer Service Areas on the Growth Policy Map are areas where the Plan recommends only context-sensitive development or near-term development that is being deferred until residential capacity is required.

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<sup>43</sup> Plan Prince George's 2035 Approved General Plan. The Maryland-National Capital Park and Planning Commission. 2014.

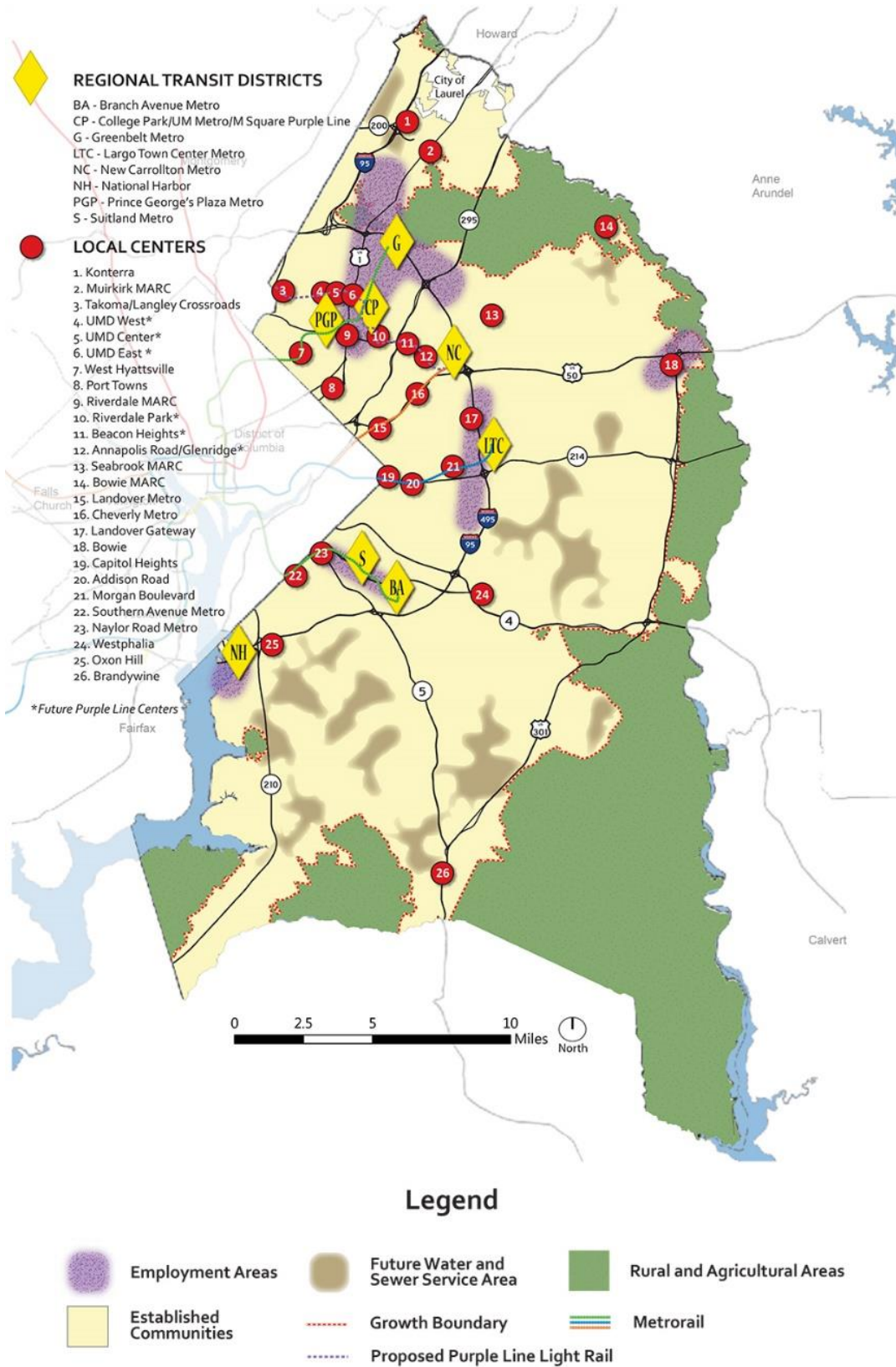


Figure 22. Plan 2035 Growth Policy Map



**A.3.g.2. Hazard Risk to Future Development**

As development increases, risk and exposure to hazards increases. To mitigate the effects of hazards, future land use planning must consider the locations and impacts of hazard events. Select hazards in this chapter include future development maps that depict the future development areas of Regional Transit Districts, Local Centers, and Employment Areas outlined in the Plan 2035 Growth Policy Map overlaid with various hazard risk areas.

Overall, as future planning and development occurs throughout Prince George’s County, it is useful to identify areas that are at risk from hazards. Areas such as Local Centers, Employment Areas, and Regional Transit Districts are all described in the County’s Plan 2035 as areas that will experience growth in development in the upcoming years, so there will be increased potential consequences of natural hazards. Identifying areas at risk of hazards can be used to help identify development projects that should be considered for additional hazard mitigation actions.

**A.3.h. Future Conditions Analysis: Population**

The United States Census Bureau's Population Estimates Program states Prince George’s County, Maryland’s population as 955,306 as of July 1, 2021. This is a -1.2% change from the April 1, 2020 U.S. Census count. Population clusters are located around the Town of Bowie, the City of Laurel, and the combined metro area of Hyattsville, College Park, and Greenbelt. Compared to the 2010 U.S. Census, the County has seen a population change of +12.0%. As of December 2020, the Maryland Department of Planning, Projections and State Data Center projects the population of Prince George’s County to be about 983,870 by 2045, which would only be a 3.0% increase from the most recent 2021 estimate from the Census Bureau. This projection was created without 2020 Census data, so if the State’s 2020 projection of 911,140 is adjusted to reflect the 2020 Census population (967,201) and the same annualized growth rates are then used on the new baseline, a new projection for the County’s population in 2045 is 1,043,973.<sup>44</sup>

**Based on this cumulative information, the population of Prince George’s County by 2045 is estimated to be about 7.9% higher than the most current (2021) estimate.** It is assumed that most of this change will occur in and around the development areas highlighted in A.3.g.1 Proposed Future Development. The City of Laurel has seen a similar population trend, as shown in **Table 38**.

*Table 38. Population Changes in Prince George’s County and the City of Laurel since 2010*

	City of Laurel	Prince George’s County
<b>Population, Census (April 1, 2010)</b>	25,115	863,420
<b>Population, Census (April 1, 2020)</b>	30,060 (+19.7%)	967,201 (+12.0%)
<b>Population Estimate (July 1, 2021)<sup>45</sup></b>	29,490 (-1.8%)	955,306 (-1.2%)
<b>Projected Population (2045)<sup>46</sup></b>	<b>N/A</b>	<b>983,870 (+3.0%)</b>

<sup>44</sup> It should be noted that this methodology does not take into account any changes in the projected growth rates that may result from incorporating the 2020 Census data into the State’s projection methodology.

<sup>45</sup> United States Census Bureau QuickFacts.

<https://www.census.gov/quickfacts/fact/table/laurelcitymaryland.princegeorgescountymaryland/PST045221>

<sup>46</sup> Maryland Department of Planning, Projections and State Data Center, December 2020.

<https://planning.maryland.gov/MSDC/Documents/popproj/TotalPopProj.pdf>

## B. Riverine Flood

### B.1. Description

Flooding is the most frequent and costly natural hazard in the United States, causing more than 10,000 deaths since 1900. Nearly 90 percent of Presidential Disaster Declarations result from natural events where flooding was a major component. Floods generally result from excessive precipitation and are classified in two categories: general floods due to precipitation within a watershed for an extended time period which includes storm-induced wave or tidal action; and flash floods, the product of heavy precipitation in short duration impacting a localized area. The severity of a flood event is typically determined by a combination of several major factors, to include stream and river basin topography and physiography; precipitation and weather patterns; recent soil moisture conditions; and the degree of vegetative clearing and impervious surface.

Riverine flooding occurs when streams and rivers exceed the capacity of their natural or constructed channels to accommodate water flow and water overflows the banks, spilling out into adjacent low-lying, dry land. Heavy rain and large amounts of snow melt can cause riverine flooding. Riverine flooding is a longer-term event and can last days or weeks. Riverine floods are defined in terms of their extent (including the horizontal area affected and the vertical depth of floodwaters) and the related probability of occurrence.

Periodic flooding of lands adjacent to rivers, streams and shorelines (floodplains) is a natural and inevitable occurrence that can be expected to take place based upon established recurrence intervals. The recurrence interval of a flood is defined as the average time interval, in years, expected between a flood event of a particular magnitude and an equal or larger flood. Flood magnitude increases with increasing recurrence interval.

Floodplains are designated by the frequency of floods that are large enough to cover them. For example, the 10-year floodplain will be impacted by a flood with a 10% probability of occurring at any time; the 100-year floodplain represents the area inundated by a 1% probability flood. Flood frequencies, such as the 1% probability (100-year) flood, are determined by plotting a graph of the size of all known floods for an area and determining how often floods of a particular size occur. Flood frequencies are used to characterize flood modeling by FEMA and its floodplain management regulations, stormwater management design requirements, and local floodplain management building standards.

#### **FEMA Flood Insurance Rate Maps**

FEMA-published Flood Insurance Rate Maps (FIRMs) are one way that communities can see which areas have the highest risk of riverine and coastal flooding. Areas with a 1% or higher chance of experiencing a flood each year is considered to have a high risk. Those areas have at least a one-in-four chance of flooding during a 30-year mortgage.

Flash flooding that is not associated with an overflowing body of water (also known as pluvial flooding) from extreme rainfall is assessed in **Section C**. Coastal flooding is assessed in **Section Q**.

## B.2. Location and Extent

Prince George's County is bordered by the Patuxent River to the east and the Potomac River to the west. The City of Laurel is in the northeast section of the County and borders the Patuxent River. Most tributaries, branches, and creeks in the area flow into either of these two rivers. The effective FEMA Flood Insurance Rate Maps for the County were updated September 16, 2016. They show one-percent annual chance floodplains associated with the rivers and streams in the Potomac and Patuxent watersheds. The Flood Insurance Rate Map identifies high flood hazard risk areas as part of the one-percent annual chance (100 year) floodplain, moderate risk areas as part of the 0.2-percent annual chance (500 year) floodplain, or minimal risk areas outside the 500-year floodplain. Approximately 10.7% of the land in Prince George's County (including the City of Laurel) is located within the 100-year floodplain. Depth of flooding varies across the County based on location in the flood zone. The average Base Flood Elevation of the 100-year floodplain in Prince George's County is 9.3 feet. Velocity of flood waters can be determined using local flood gauges. **Figure 23** shows the 100-year floodplain within Prince George's County and **Figure 24** similarly shows the 100-year floodplain in the City of Laurel.

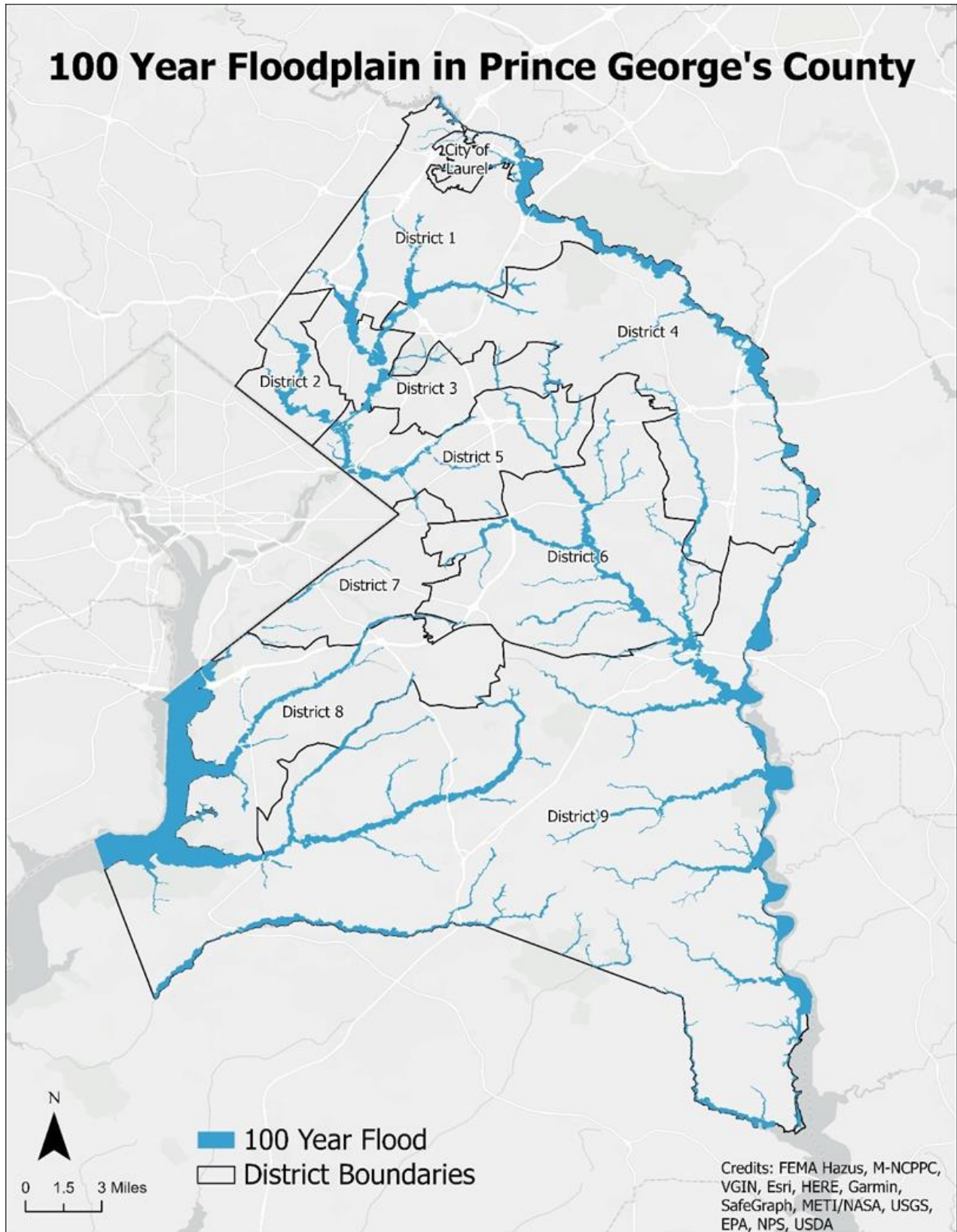


Figure 23: 100-Year Floodplain; Prince George's County, Maryland

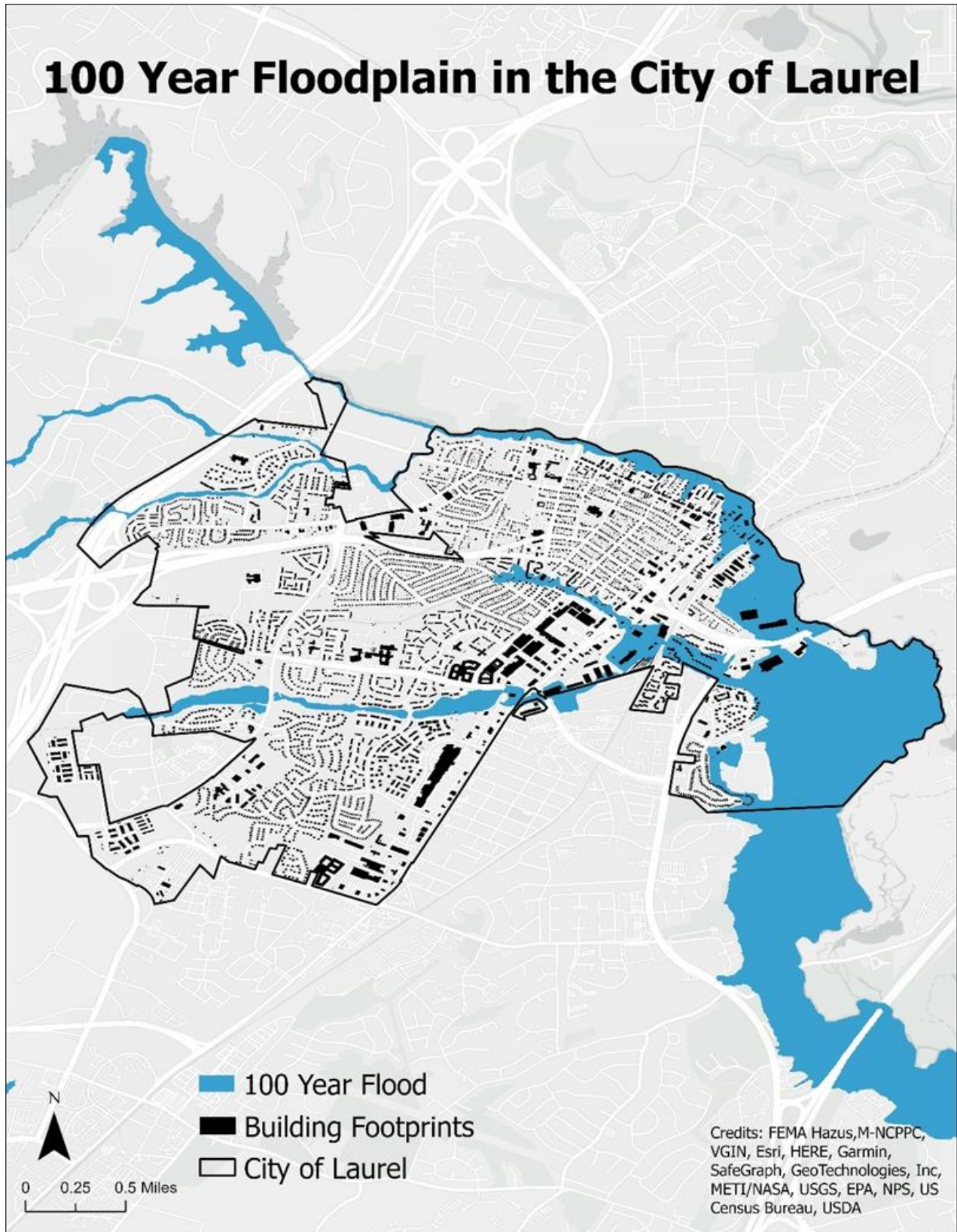


Figure 24: 100-Year Floodplain; City of Laurel, Maryland

In addition to the 100-year floodplain, riverine flood extent in Prince George's County is represented by the Riverine Climate Ready Action Boundary Inundated Zone. This zone was created by the Maryland Department of Planning in 2021 and expands the FEMA floodplain by vertically adding 3 feet of water on top of the Special Flood Hazard Area elevations and pushing this volume of water out horizontally. **Figure 25** and **Figure 26** show Riverine Climate Ready Action Boundary extent in Prince George's County and the City of Laurel.

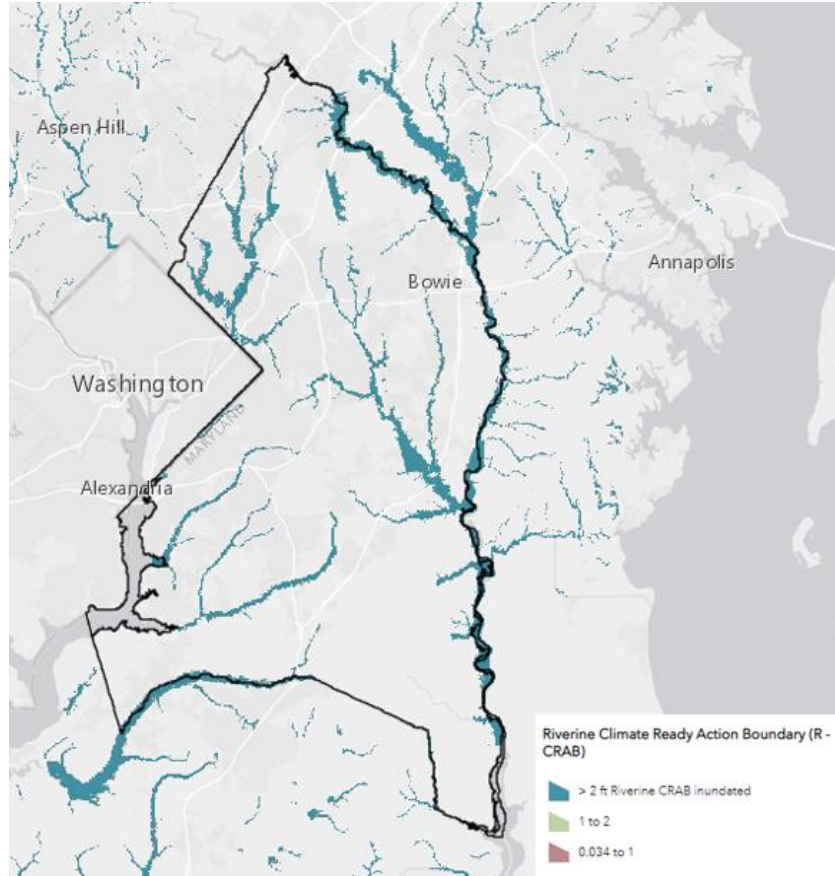
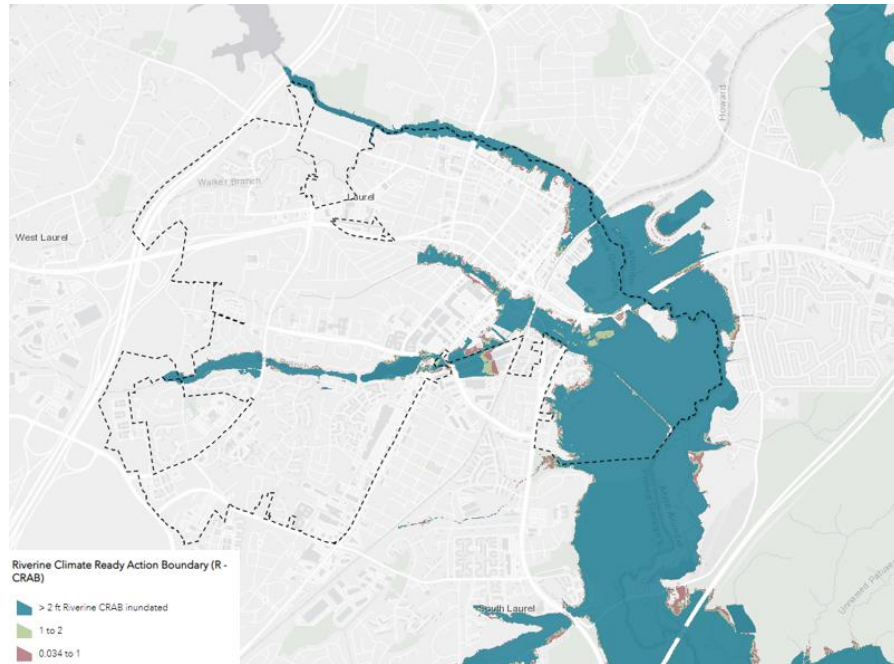


Figure 25: Riverine Climate Ready Action Boundary, Prince George's County



*Figure 26: Riverine Climate Ready Action Boundary, City of Laurel*

Several factors contribute to the relative severity of a flood. Development, or the presence of people and property in the hazard areas, is a critical factor in determining a flood's relative severity. Additional factors that contribute to flood severity range from specific characteristics of the floodplain to characteristics of the structures located within the floodplain. The following is a brief discussion of some of these factors and how they may relate to the area.

- **Flood depth:** The greater the depth of flooding, the higher the potential for significant damage.
- **Flood duration:** The longer duration of time that floodwaters are in contact with building components, such as structural members, interior finishes, and mechanical equipment, the greater the potential for damage. Floodwater may linger because of the low relief of the area, but the degree varies.
- **Velocity:** Flowing water exerts force on the structural members of a building, increasing the likelihood of significant damage. A one-foot depth of water, flowing at a velocity of five feet per second or greater, can knock an adult over and cause significant scour around structures and roadways.
- **Elevation:** The lowest possible point where floodwaters may enter a structure is the most significant factor contributing to its vulnerability to damage due to flooding.
- **Construction type:** Certain types of construction are more resistant to the effects of floodwater than others. Masonry buildings, constructed of brick or concrete blocks, are typically the most resistant to flood damage simply because masonry materials can be in contact with limited depths of water without sustaining significant damage. Wood frame structures are more susceptible to flood damage because the construction materials used are easily damaged when inundated with water.

### **B.2.a. City of Laurel**

A major natural feature within the City is the Patuxent River, which runs along the northern City boundary. Three major tributaries, Walker, Crow and Bear Branches connect to the River. Walker Branch traverses the northwest portion of the City and drains into the Patuxent River west of Main Street. Bear Branch originates west of Sweitzer Lane and feeds into Laurel Lakes, and eventually into Crow's Branch within the Greens of Patuxent. A large portion of those areas immediately adjacent to the tributaries is a steep slope. Water flowing through the Patuxent River is impounded between Brighton Dam in Montgomery County and the T. Howard Duckett Dam just west of Interstate 95. Drinking water for the City is pumped from the Rocky Gorge Reservoir to the Patuxent Water Filtration Plant.

A drainage basin for the area extends along a ridgeline west of the City and runs easterly to the Patuxent River near the Baltimore-Washington Parkway. The system includes direct drainage into the Patuxent River as well as into the three major tributaries. Natural drainage for the City is generally poor, due to the relative flatness of the topography.

In 1980 the Maryland General Assembly enacted the Patuxent River Watershed Act. The purpose of this Act was to create a coordinated land management strategy for controlling non-point pollution within the Patuxent River Watershed. The State and all seven counties within the watershed subsequently adopted a policy plan.

As part of this effort, the City is a member of Prince George's County's Patuxent River Watershed Advisory Committee. As Laurel becomes progressively more developed and as more of the ground surface is covered with impervious materials, the amount of storm water runoff is continually increasing. Without effective countermeasures, increased pollution to the river occurs. Consequences of this pollution include silt build-up in riverbeds, brownish water from sediment runoff and debris and litter being washed into the water and along the banks.

In conjunction with this effort, the City has implemented a Patuxent River Primary Management Area, in the form of an open-space (R-OS) zoning category. The purpose of this zone is to implement the water quality and environmental protection goals of the Patuxent Policy Plan and Addendum, and other established natural resource programs, and policies for streams and their streamside environments within the City's Patuxent River Watershed. As part of this zone, minimum setbacks from the river or tributaries are enforced. The desired effect of this effort is to improve water quality through prevention of non-point source sedimentation and pollution. Mandatory increased vegetative cover will also serve to reduce both the velocity and quantity of storm water runoff, slowing the process of erosion and sedimentation.

The City is involved in three other facets of the Patuxent Policy Plan and Addendum:

1. A program undertaken to retrofit several existing storm drainage facilities, which drain into the Patuxent. These infiltration devices help mitigate the pollution impact from urban water runoff.
2. On a larger scale, the Laurel Lakes Planned Development was constructed so as to use the lake system as a regional storm water management system. Benefits of this system include storm water control and improved water quality, in addition to aesthetic and recreational considerations.
3. An ongoing program involves the Department of Parks and Recreation's Riverfront Park. Acquisition of lands adjacent to the River is continuing through the subdivision dedication process for the creation of a largely undisturbed passive park.



### B.3. Previous Occurrences

Prince George’s County and the City of Laurel have experienced many flood events that have caused damage since the 2017 Hazard Mitigation Plan. **Table 39** summarizes several notable flood events that have occurred.<sup>47</sup> Many of these flood instances are related to remnants of tropical storms and hurricanes that have also affected many other areas of the United States.

*Table 39: Notable Historic Flood Events in Prince George's County and the City of Laurel*

Event Date	Description
September 2018	The remnants of Hurricane Florence slowly tracked through the area with thunderstorms and rain showers, leading to instances of flooding.
October 2018	As Hurricane Michael passed south of the County, heavy rain caused flooding.
August 2020	Tropical Storm Isaias passed through Prince George’s County, bringing flooding rain. Heavy rain also led to incidents of flash flooding.
September 2020	Flash flooding due to heavy rainfall flooded U.S. Route 50 in Prince George’s County with up to five feet of water.
August 2021	Thunderstorms produced isolated instances of flash flooding in Prince George’s County.
July 2022	A cold front dropped down from the north, causing showers and thunderstorms to develop. This led to instances of flooding and flash flooding.
August 2022	Thunderstorms caused heavy rainfall, and with a slow storm motion this led to instances of flooding and flash flooding. Multiple 911 calls were received for water rescues.

According to the NOAA NCEI Storm Events Database, there have been 99 reported flood events in Prince George’s County since 1950. According to the data shown in **Table 40**, total damage since 1950 was divided by the number years in the Period of Record, to determine that there was an average of \$3,125 in annual damages (all property damage with no reported agricultural damage) due to flooding in the County. There were no deaths, and no injuries reported to the database during this period. Historical flood events can be found in **Appendix C**.

*Table 40: NCEI Historic Flood Event Data*

Event Type	Number of Events	Period of Record	Total Annual Damage	Annualized Deaths	Annualized Injuries	Annualized Events
Flood	99	1950-2022	\$3,125	0.0	0.0	1.4

<sup>47</sup> NOAA NCEI Storm Events Database. <https://www.ncdc.noaa.gov/stormevents/>

### B.3.a. Historic Summary of Insured Flood Losses

The National Flood Insurance Program (NFIP) enables property owners in participating communities to purchase Federally backed insurance for flood losses. For a community to participate in the NFIP they must adopt floodplain management regulations that reduce future flood damages, adopt the FEMA Flood Insurance Rate Maps and Flood Insurance Study for the jurisdiction and manage a floodplain management program which enforces Federal, State and local floodplain regulations affecting development in the designated Special Flood Hazard Area (1-percent annual chance floodplains depicted on the Flood Insurance Rate Maps). Flood insurance backed by the Federal government is designed to provide an alternative to disaster assistance so that the high costs associated with repairing damage to buildings and their contents caused by floods is reduced. Flood insurance is available to property owners and contents coverage is available to renters in communities in good standing with FEMA in terms of their local floodplain management ordinance.

In addition to providing flood insurance and reducing flood damages through floodplain management regulations, the NFIP identifies and maps the nation's floodplains. Mapping flood hazards creates broad-based awareness of the flood hazards and provides the data needed for insurers to actuarially rate structures for flood insurance coverage.

Communities that participate in the NFIP are required to adopt and enforce local floodplain management regulations that meet or exceed the minimum Federal NFIP floodplain management regulations. These regulations apply to all types of floodplain development and ensure that development activities will not cause an increase in future flood damages. Buildings are required to be reasonably safe from flooding which usually requires the finished floor elevation to be elevated at or above the corresponding Base Flood Elevation. The Base Flood Elevation is determined based on modeling and mapping identified within a community's Flood Insurance Study. The Flood Insurance Study and its corresponding Flood Insurance Rate Maps provide information on areas of flood risk per the NFIP standards.

The maps identify areas that have a 1-percent annual chance of flooding as well as those areas with a 0.2 percent-annual chance of flooding. When new structures are built, they are required to adhere to regulations and flood risk information provided by the NFIP. If a structure is within the regulated floodplain (Special Flood Hazard Area)backed by a federally insured mortgage, flood insurance coverage is mandatory. The requirement for high-risk structures to be insured through the NFIP or another flood hazard specific insurance policy is how the government minimizes flood recovery costs to the public.

Participation in the NFIP is shown in **Table 41**, which includes the dates the Flood Hazard Boundary Maps (FHBM) were issued, when the first Flood Insurance Rate Maps (FIRMs) became effective, the date of the current FIRMs used for insurance purposes, and the date the community entered the NFIP.

*Table 41: FEMA NFIP Participation Dates<sup>48</sup>*

Jurisdiction	Community Number	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date
City of Laurel	240053	9 Aug 1974	1 Nov 1978	16 Sep 2016
Prince George's County	245208	N/A	4 Aug 1972	16 Sep 2016

<sup>48</sup> FEMA. Community Status Book Report. Maryland. <https://www.fema.gov/cis/MD.pdf>

**Table 42** shows that the City of Laurel and Prince George's County have a combined total of 2,402 policies and their associated insurance value and premiums as of December 2, 2022.

*Table 42: NFIP Policies in Force (as of 12/2/2022)*

Jurisdiction	Policies in Force	Total Coverage	Total Premiums
City of Laurel	108	\$31,425,000	\$53,657
Prince George's County	2,294	\$657,655,800	\$1,523,128
<b>Total</b>	<b>2,402</b>	<b>\$689,080,800</b>	<b>\$1,576,785</b>

**Table 43** summarizes the NFIP policy and claim statistics for the County and City. Losses (claims) include any flood damage where water crossed a property line. It should be emphasized that these values include only those losses to structures that were insured through the NFIP policies, and for losses where insurance claims were filed and received. It is likely that many additional instances of flood losses in Prince George's County and the City of Laurel were either uninsured, denied claims payment, or not reported.

*Table 43: NFIP Claims (as of 12/2/2022) Since 1978*

Jurisdiction	Number of Losses	Substantial Damage Paid Losses	Total Payments
City of Laurel	21	0	\$101,216
Prince George's County	1,072	6	\$7,325,288
<b>Total</b>	<b>1,093</b>	<b>6</b>	<b>\$7,426,504</b>

### B.3.b. NFIP Repetitive Loss Structures

A Repetitive Loss structure is defined under both the NFIP and Flood Mitigation Assistance. The HMP primarily focuses on the NFIP definition, which identifies a Repetitive Loss structure as a structure that meets one of the two following qualifiers:

4. Two or more claims of more than \$1,000 paid by the NFIP within any rolling 10-year period, since 1978; or
5. Two or more claims (building payments only) that, on average, equal or exceed 25 percent of the market value of the property.<sup>49</sup>

Similarly, Severe Repetitive Loss refers to a structure that meets one of the two following qualifiers:

<sup>49</sup> This definition is based on the definitions for Repetitive Loss used by the NFIP program. See 44 C.F.R. § 209.2 and pt. 61, Appendices A(1)-A(3); see FEMA, National Flood Insurance Program, Flood Insurance Manual, Appendix A, pg. 11-12, and Appendix E, pg. 5 (Apr. 2021); and see FEMA, National Flood Insurance Program, Community Rating System Coordinator's Manual, pg. 120-7 (2017).

1. Received four or more separate claim payments of more than \$5,000 each (including building and contents payments); or
2. Received two or more separate claim payments (building payments only) where the total of the payments exceeds the current value of the property.<sup>50</sup>

The identification of Repetitive Loss properties is an important element to conducting a local flood risk assessment, as the inherent characteristics of properties with multiple flood losses strongly suggest that they will be threatened by continual losses. Nationwide, repetitive loss structures constitute 2% of all NFIP insured structures but are responsible for 40% of all NFIP claims. Therefore, mitigation for Repetitive Loss properties is a high priority for FEMA, and the areas in which these properties are located typically represent the most flood prone areas of a community. A primary goal of FEMA is to reduce the numbers of structures that meet these criteria, whether through elevation, acquisition, relocation, or a flood control project that lessens the potential for continual losses.

According to FEMA, there are currently 82 Repetitive Loss properties that have not been mitigated within Prince George's County (one of which is in the City of Laurel) accounting for 179 losses. This is an increase of 40 Repetitive Loss structures and 87 losses as compared with the statistics from the last plan update in 2017. The majority of these Repetitive Loss properties are residential. The causes of flooding for these properties include drainage issues, riverine flooding, groundwater intrusion, stormwater intrusion, and coastal flooding. The two main causes of repetitive loss in the County are riverine flooding and drainage issues. The addresses of the properties are maintained by FEMA, Maryland Department of Emergency Management, and the Prince George's County Department of Environment, and they are deliberately not included in this plan as required by the Privacy Act. **Figure 27** shows the general locations of Repetitive Loss structures in Prince George's County and their proximity to the FEMA Special Flood Hazard Area. Due to map scale limitations, some points on the map represent clusters of repetitive loss properties located in close proximity, such as being located in the same neighborhood.

More than \$3 million has been paid in claims, with an average claim of \$17,546. Only one Repetitive Loss structure was identified in the 2010 Plan and 42 were identified in the 2017 Plan. **Table 44** shows the total number of properties, total number of losses experienced, and losses paid for Prince George's County and the City of Laurel by building type.

A Severe Repetitive Loss property has one of the following: (1) at least four NFIP claims payments of more than \$5,000 each, with the cumulative amount of such claims payments exceeding \$20,000; or (2) at least two separate claims payments with the cumulative amount exceeding the market value of the building. **There are no Severe Repetitive Loss properties within Prince George's County or in the City of Laurel.**

*Table 44. NFIP Repetitive Loss/Severe Repetitive Loss Overview*

Jurisdiction / Building Type	# of RL	RL Losses	# Mitigated	Building Payments	Contents Payments	Total Payments
Prince George's County	81	176	0	\$2,617,397	\$517,125	\$3,134,522
2-4 Family	3	9	0	\$66,459	\$321	\$66,780

<sup>50</sup> This definition is based on the definitions for SRL used by the NFIP program. See 42 U.S.C. § 4014(h); see FEMA, National Flood Insurance Program, Flood Insurance Manual, Appendix I, pg. 1, and Appendix L, pg. 8 (Apr. 2021); and see FEMA, National Flood Insurance Program, Community Rating System Coordinator's Manual, pg. 120-8 (2017).

Jurisdiction / Building Type	# of RL	RL Losses	# Mitigated	Building Payments	Contents Payments	Total Payments
Business, Non-Residential	2	4	0	\$520,779	\$169,441	\$690,219
Other Residential	1	2	0	\$212,295	\$0	\$212,295
Other Non-Residential	3	7	0	\$118,810	\$208,607	\$327,417
Single-Family	72	154	0	\$1,699,054	\$138,757	\$1,837,811
<b>City of Laurel</b>	<b>1</b>	<b>1</b>	<b>0</b>	<b>\$1,345</b>	<b>\$0</b>	<b>\$1,345</b>
Single Family	1	1	0	\$1,345	\$0	\$1,345
<b>GRAND TOTAL</b>	<b>82</b>	<b>179</b>	<b>0</b>	<b>\$2,618,742</b>	<b>\$521,945</b>	<b>\$3,140,687</b>

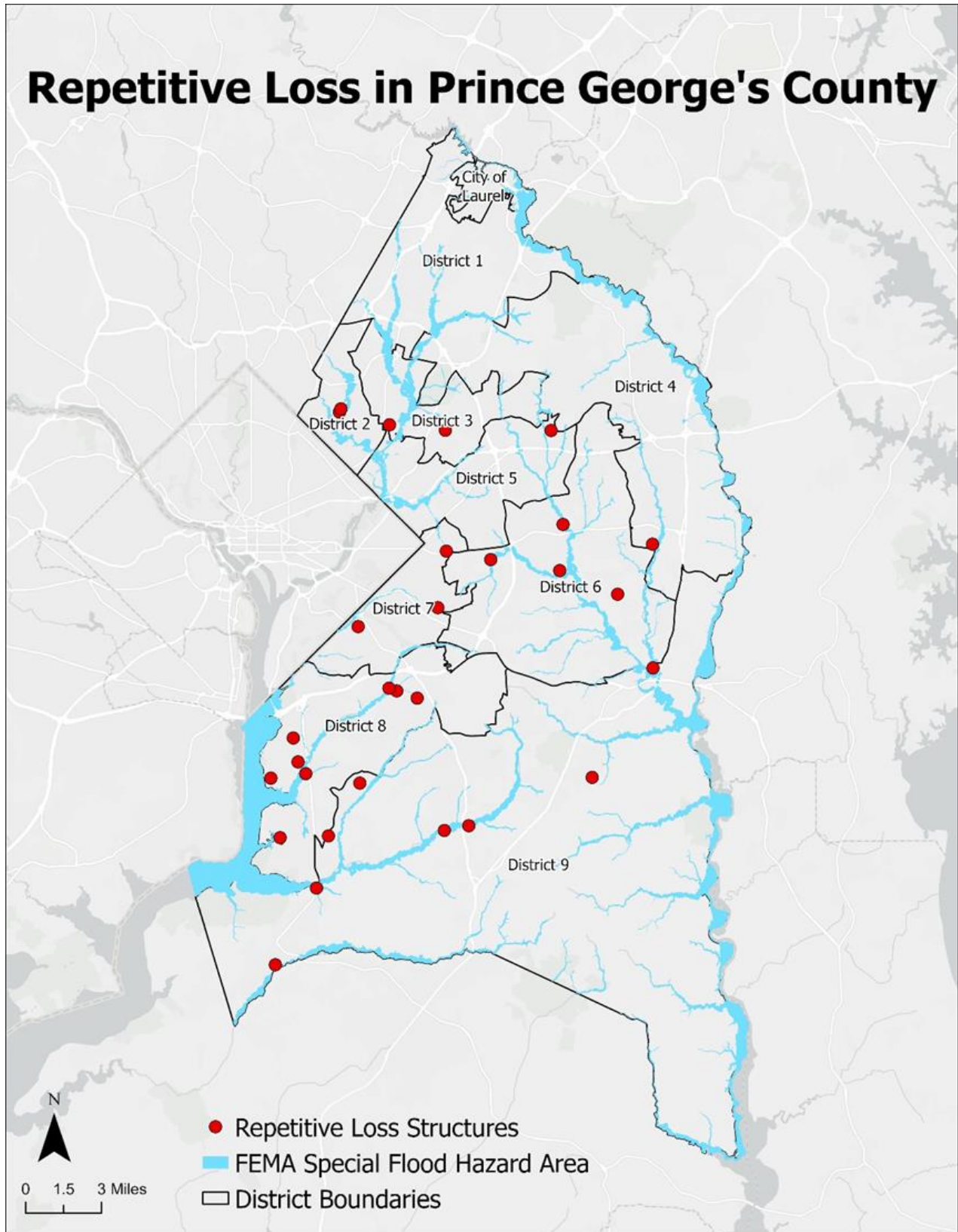


Figure 27: Repetitive Loss Structures in Prince George's County

### B.3.c. Community Rating System

The NFIP Community Rating System (CRS) is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risks. There are ten CRS classes: Class 1 requires the most credit points and gives the largest flood insurance premium reduction; Class 10 does not receive a premium reduction. These discounts are applied per each CRS community and apply to all flood insurance policyholders. For CRS participating communities, flood insurance premium rates are discounted in increments of 5%; i.e., a Class 1 community receives a 45% premium discount, while a Class 9 community receives a 5% discount.<sup>51</sup>

Prince George’s County currently participates in the CRS program. Prince George’s first entered the CRS on October 1, 1991 and the current effective date for the program is October 1, 2001. Participation in this program allows residents within the Special Flood Hazard Area to receive a discount on their flood insurance premiums for policies purchased under the NFIP. Residents within the non- Special Flood Hazard Area also receive a discount on their policies. The County’s current class is ranked as 5, which gives a 25% premium discount to properties in the Special Flood Hazard Area, or regulated floodplain, and 10% premium discount for non- Special Flood Hazard Area properties. The City of Laurel entered the CRS on April 1, 2022, and the current effective date for the program is April 1, 2022. The City’s class is ranked as 7, which gives a 15% premium discount to properties in the Special Flood Hazard Area, or regulated floodplain, and 5% premium discount for non- Special Flood Hazard Area properties.<sup>52</sup> Each community’s current CRS status is shown in **Table 45**.

Table 45. FEMA CRS Status<sup>53</sup>

Jurisdiction	CRS Entry Date	Current Effective Date	Current Class	Discount Within Special Flood Hazard Area	Discount Outside of Special Flood Hazard Area
City of Laurel	1 April 2022	1 April 2022	7	15%	5%
Prince George’s County	1 Oct 1991	1 Oct 2001	5	25%	10%

### B.4. Probability of Future Events

All of Prince George’s County and the City of Laurel is vulnerable to some degree of flooding. Based on historical flood event data, flood events can be expected to occur frequently in Prince George’s County and the City of Laurel. The probability of future flood events based on the magnitude and according to best available data is illustrated by flood zones shown in **Figure 28** and **Figure 29**. Each of the FEMA Flood Zones represents the probability of a flood event occurring in that area. It is also highly likely that Southern Prince George’s County may be subject to coastal flooding associated with possible sea level rise due to climate change. In addition to sea level rise, precipitation events are expected to increase in intensity with seasonal variations due to climate change. With the Northeast Region experiencing a 70% increase in the amount of precipitation falling in very heavy precipitation events, Prince George’s County

<sup>51</sup> FEMA Community Rating System <https://www.fema.gov/national-flood-insurance-program-community-rating-system>

<sup>52</sup> FEMA. N.d. “Community Status Book Report- Maryland”.

<sup>53</sup> FEMA. Community Status Book Report. Maryland. <https://www.fema.gov/cis/MD.pdf>

can be expected to experience a similar increase in amount of precipitation.<sup>54</sup> Changes in precipitation patterns in Maryland are likely to intensify floods and bring more short duration high-intensity rain events in spring and summer than historically experienced. According to the FEMA Climate Mapping for Resilience and Adaptation tool, the County is projected to experience an increase of 1.4 inches of annual precipitation by 2044.<sup>55</sup> In addition, precipitation is expected to increase during the winter months. However, due to warming air temperatures, this is expected to fall more frequently as rain or freezing rain versus snow. Increased precipitation will increase the probability of rain-induced flooding (i.e., pluvial) and riverine flooding events in low-lying areas and in areas with impervious surfaces that do not have adequate mitigation measures in place.

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<sup>54</sup> U.S. Global Change Research Program. Impacts, Risks, and Adaptation in the United States: Fourth National Climate Assessment, Volume II (2018). <https://nca2018.globalchange.gov/chapter/18/>

<sup>55</sup> Climate Mapping for Resilience and Adaptation Assessment Tool (2022). <https://livingatlas.arcgis.com/assessment-tool/search>



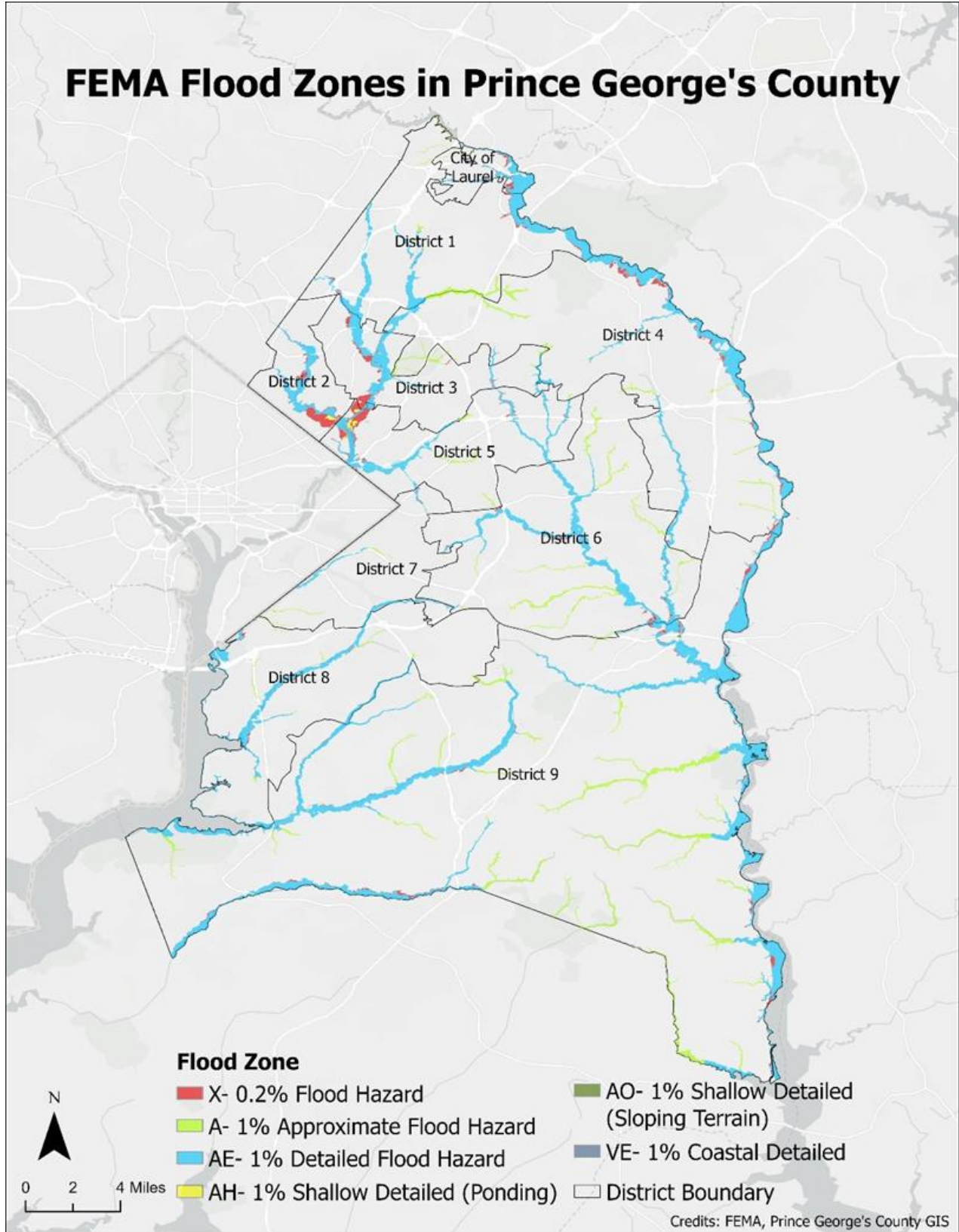


Figure 28: FEMA Flood Zones in Prince George's County

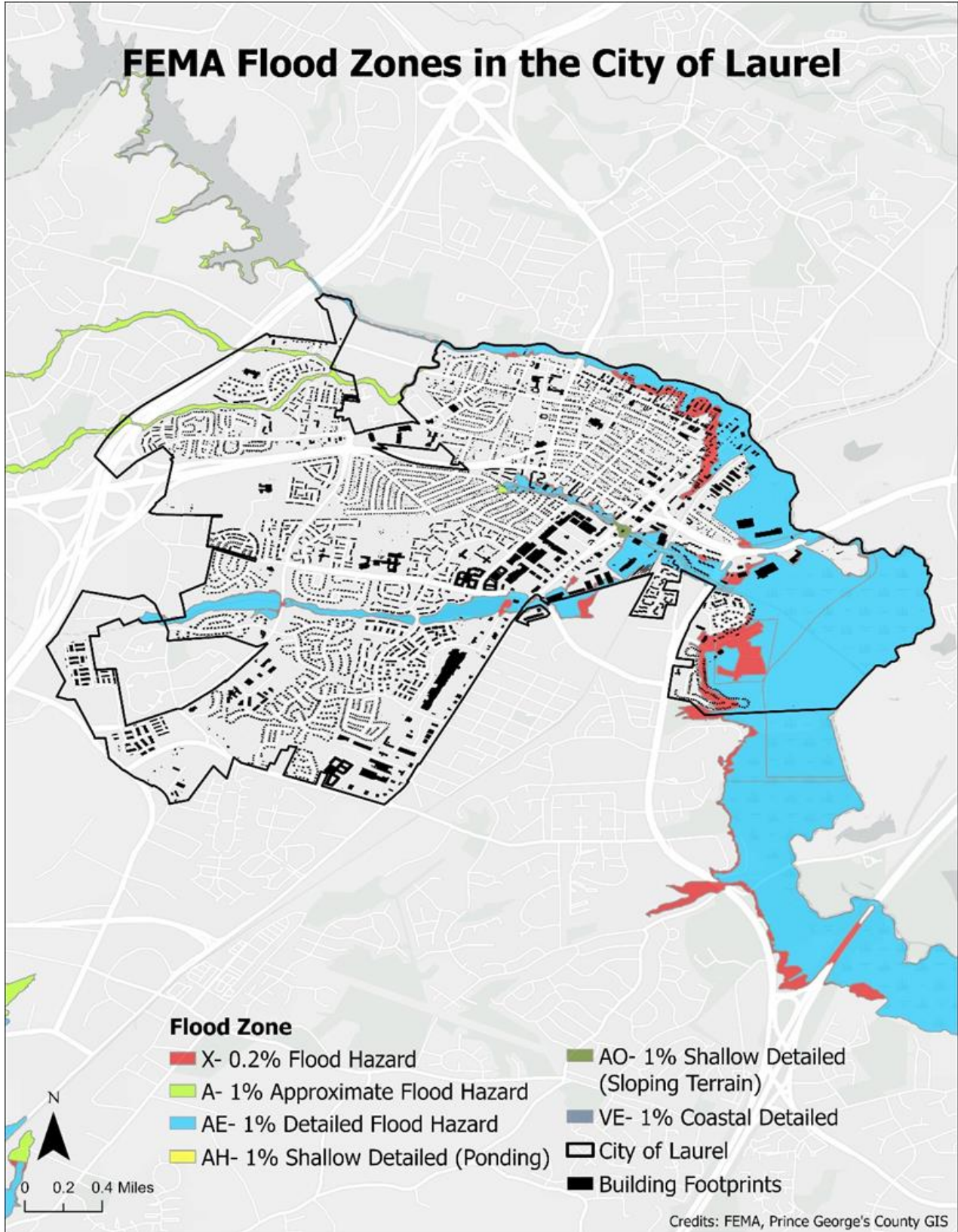


Figure 29: FEMA Flood Zones in the City of Laurel

## B.5. Vulnerability and Risk Assessment

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for flooding, including a statewide Hazus analysis. These scores and ranks are shown in **Table 46**, which shows the State’s ranking for flood vulnerability in Prince George’s County (including the City of Laurel) as high. The State’s ranking for coastal flood is shown in **Table 119** in **Section Q**.

*Table 46. 2021 State of Maryland Flood Hazard Ranking and Risk for Prince George’s County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	2
Deaths	4
Property Damage	3
Crop Damage	1
Geographic Extent	1
Events	2
Local Plan Ranking (2017)	4
<b>Overall Weighted Risk Rating<sup>56</sup></b>	<b>25</b>
<b>Overall Ranking</b>	<b>High</b>

Historic flood damages include foundation and wall damage to structures, contents damage, loss of utilities, infrastructure damage to roads, and shore erosion. Damages from storm water runoff events also include wall damage due to “wicking”, mildew damage, damage to contents, minor foundation damage, damage to water distribution systems, and potable water contamination. Public related costs include debris clearance; equipment, material and labor expenses related to emergency response and recovery; and building or facility repair or replacement (County parks, utilities, communications, buildings, vehicles, etc.).

Flooding can also impact the County’s economy and major employers. Flood damage to businesses can lead to loss of inventory, lack of communication with customers, and may force a business to completely shut down operations. Employers may be disrupted regardless of their location within the floodplain when customers and clients cannot reach their location due to flood damage to roads. The County economy may be impacted by lack of purchases being made during a flood event. Agricultural exports may also be impacted by flooding due to loss of crops. As with flooded roads, public expenditures on flood recovery, repairs to damaged public property affect all residents of the city, not just those in the floodplain.

<sup>56</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5),

### B.5.a. Assets Exposed

Exposure analysis shows the total value of buildings in a mapped floodplain. It is not an estimation of loss from a particular event. Using County-provided parcel data, an exposure analysis was performed to see the value at risk if flooding were to occur across the entire county. This parcel data was used in conjunction with the FEMA flood hazard areas to assign parcels to a specific flood zone. Results of the exposure analysis are shown in **Table 47**. Overall, 9.7% of the total properties in Prince George's County and the City of Laurel are exposed to flooding in the 1% or 0.2% chance floodplains. Of properties within Laurel, 2.6% are exposed to the 100-year and 500-year flood scenarios.

Table 47: Building Value Exposure in FEMA Floodplains

Jurisdiction	Total Value	Building Value Exposure in Floodplain			% Value Exposed
		AE - 1%	X - 0.2%	Grand Total	
Prince George's County	\$82,364,235,096	\$4,908,200,664	\$2,576,953,262	\$7,485,153,926	9.10%
City of Laurel	\$2,749,392,079	\$410,752,492	\$313,248,832	\$724,001,324	2.60%
<b>Total</b>	<b>\$84,828,483,354</b>	<b>\$5,318,953,156</b>	<b>\$2,890,202,094</b>	<b>\$8,209,155,250</b>	<b>9.70%</b>

### B.5.b. Critical Facilities Exposed

Critical facilities are essential to fulfilling important public safety, emergency response, and disaster recovery functions. Flooding impacts to critical facilities could severely impact vital functions in a community, putting citizens at risk. Some facilities such as hospitals also house large numbers of people who would have trouble if required to evacuate before or during a severe flood.

An exposure analysis was performed to determine critical facilities located within the 0.2-percent and 1-percent annual chance FEMA floodplain. Results of this exposure analysis are shown in **Table 48**. Twenty-five total critical facilities are located in either the 0.2-percent or 1-percent annual chance floodplain. Six of the total critical facilities in the 0.2-percent or 1-percent annual chance floodplain are located in the City of Laurel. **Appendix D** contains the full, structure-by-structure critical facility hazard analysis.

Table 48: Critical Facilities in FEMA Floodplains

Jurisdiction	All Facilities	Critical Facilities in Floodplain	
		AE- 1%	X- 0.2%
Prince George's County	685	8	11
City of Laurel	24	3	3
<b>Total</b>	<b>709</b>	<b>11</b>	<b>14</b>

### B.5.c. Loss Estimation

Riverine flooding loss estimates for each jurisdiction were derived using the FEMA Hazus-MH v5.1 Flood Module for riverine hazards. Flood hazard is defined by a relationship between depth of flooding and the

annual chance of inundation to that depth. Annualization is the mathematical method of converting individual losses to a weighted average that may be experienced in any given year. Annualized loss is the preferred measure with which to express potential risk for hazard mitigation planning as it is useful for creating a common denominator by which different types of hazards may be compared. Annualized losses compared across a region may indicate targeted areas for prioritization of hazard mitigation actions. Areas with significant annualized losses may be subject to not only local flooding (nuisance flooding) but also frequent storm event flooding.

Riverine flood exposure is shown in **Table 49**. Riverine flood losses calculated in the Hazus Flood Module for the City of Laurel and Prince George's County are shown in **Table 50** and **Table 51**, respectively. The Hazus results show that loss to residential structures makes up approximately 75% of the total losses due to flooding. Since residential structures were shown to have the highest damage, homeowners should be educated on flood risks to homes and proper clean up following flood events. Annual total flood loss by census tract for Prince George's County and the City of Laurel is shown in **Figure 30** and **Figure 31**. Census tracts with total loss over \$100,000,000 are located in Districts 2, 3, 9, and the City of Laurel. Due to population growth and increased development, all estimates of the numbers of vulnerable structures and losses may under-estimate risk at the present time. Flood damage due to flash flooding (stormwater or pluvial flooding) is not accurately reflected in the Hazus results.

Table 49: Riverine Flood Exposure (based on Hazus-MH v5.1)

Municipality	Residential	Commercial	Industrial	Other	Total Exposure
City of Laurel	\$3,973,423,000	\$1,268,890,000	\$134,076,000	\$151,776,000	<b>\$5,528,165,000</b>
Prince George's County	\$130,144,361,000	\$26,242,415,000	\$5,564,076,000	\$7,454,437,000	<b>\$169,405,289,000</b>
<b>Total Exposure</b>	<b>\$134,117,784,000</b>	<b>\$27,511,305,000</b>	<b>\$5,698,152,000</b>	<b>\$7,606,213,000</b>	<b>\$174,933,454,000</b>

Table 50: City of Laurel Riverine Flood Losses (based on Hazus-MH v5.1)

City of Laurel	100-Year Riverine Flood Losses				
	Residential	Commercial	Industrial	Other	Total
<b>Total Exposure</b>					
City of Laurel	\$3,973,423,000	\$1,268,890,000	\$134,076,000	\$151,776,000	\$5,528,165,000
<b>Direct Losses</b>					
Building	\$86,152,000	\$65,358,000	\$5,733,000	\$3,088,000	\$160,331,000
Contents	\$41,332,000	\$79,086,000	\$8,887,000	\$3,566,000	\$132,871,000

City of Laurel	100-Year Riverine Flood Losses				
	Residential	Commercial	Industrial	Other	Total
Inventory	\$0	\$1,598,000	\$1,070,000	\$33,000	\$2,701,000
Subtotal	\$127,484,000	\$146,042,000	\$15,690,000	\$6,687,000	\$295,903,000
<b>Business Interruption</b>					
Income	\$859,000	\$50,428,000	\$318,000	\$1,107,000	\$52,712,000
Relocation	\$9,000,000	\$16,431,000	\$224,000	\$601,000	\$26,256,000
Rental Income	\$7,416,000	\$12,255,000	\$38,000	\$48,000	\$19,757,000
Wage	\$2,013,000	\$48,478,000	\$290,000	\$4,509,000	\$55,290,000
Subtotal	\$19,288,000	\$127,592,000	\$870,000	\$6,265,000	\$154,015,000
<b>TOTAL</b>	<b>\$146,772,000</b>	<b>\$273,634,000</b>	<b>\$16,560,000</b>	<b>\$12,952,000</b>	<b>\$449,918,000</b>

Table 51: Prince George's County Riverine Flood Losses (based on Hazus-MH v5.1)

Prince George's County	100-Year Riverine Flood Losses				
	Residential	Commercial	Industrial	Other	Total
<b>Total Exposure</b>					
Prince George's County	\$130,144,361,000	\$26,242,415,000	\$5,564,076,000	\$7,454,437,000	\$169,405,289,000
<b>Direct Losses</b>					
Building	\$834,296,000	\$323,906,000	\$73,819,000	\$72,724,000	\$1,304,745,000
Contents	\$392,305,000	\$408,446,000	\$125,548,000	\$93,673,000	\$1,019,972,000
Inventory	\$0	\$10,790,000	\$19,217,000	\$298,000	\$30,305,000

Prince George's County	100-Year Riverine Flood Losses				
	Residential	Commercial	Industrial	Other	Total
Subtotal	\$1,226,601,000	\$743,142,000	\$218,584,000	\$166,695,000	\$2,355,022,000
<b>Business Interruption</b>					
Income	\$2,398,000	\$232,281,000	\$2,882,000	\$28,440,000	\$266,001,000
Relocation	\$111,416,000	\$76,858,000	\$2,826,000	\$17,990,000	\$209,090,000
Rental Income	\$57,472,000	\$57,232,000	\$543,000	\$3,069,000	\$118,316,000
Wage	\$5,694,000	\$260,289,000	\$4,002,000	\$269,408,000	\$539,393,000
Subtotal	\$176,980,000	\$626,660,000	\$10,253,000	\$318,907,000	\$1,132,800,000
<b>TOTAL</b>	<b>\$1,403,581,000</b>	<b>\$1,369,802,000</b>	<b>\$228,837,000</b>	<b>\$485,602,000</b>	<b>\$3,487,822,000</b>

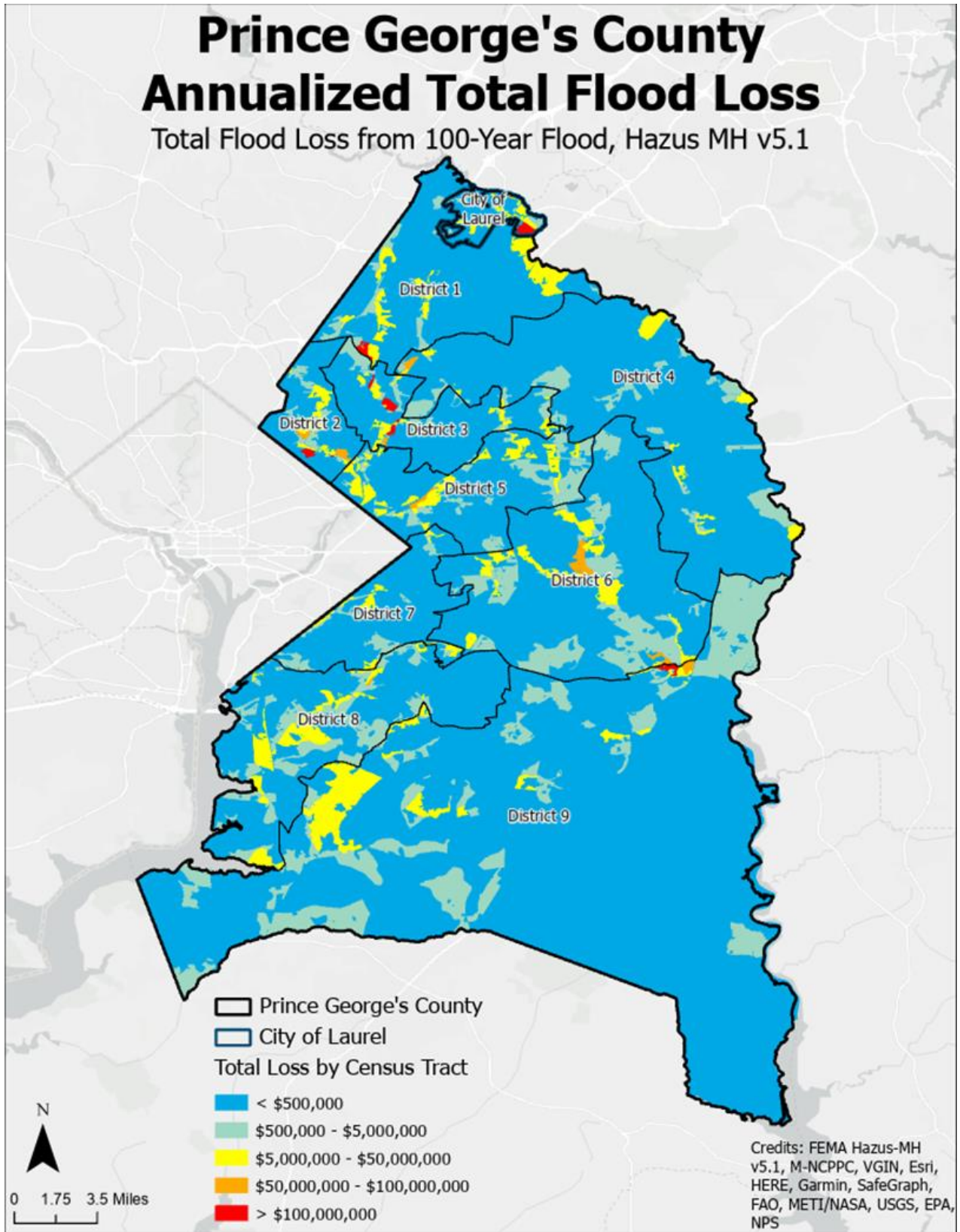


Figure 30: Annualized Total Flood Loss by Census Tract in Prince George's County



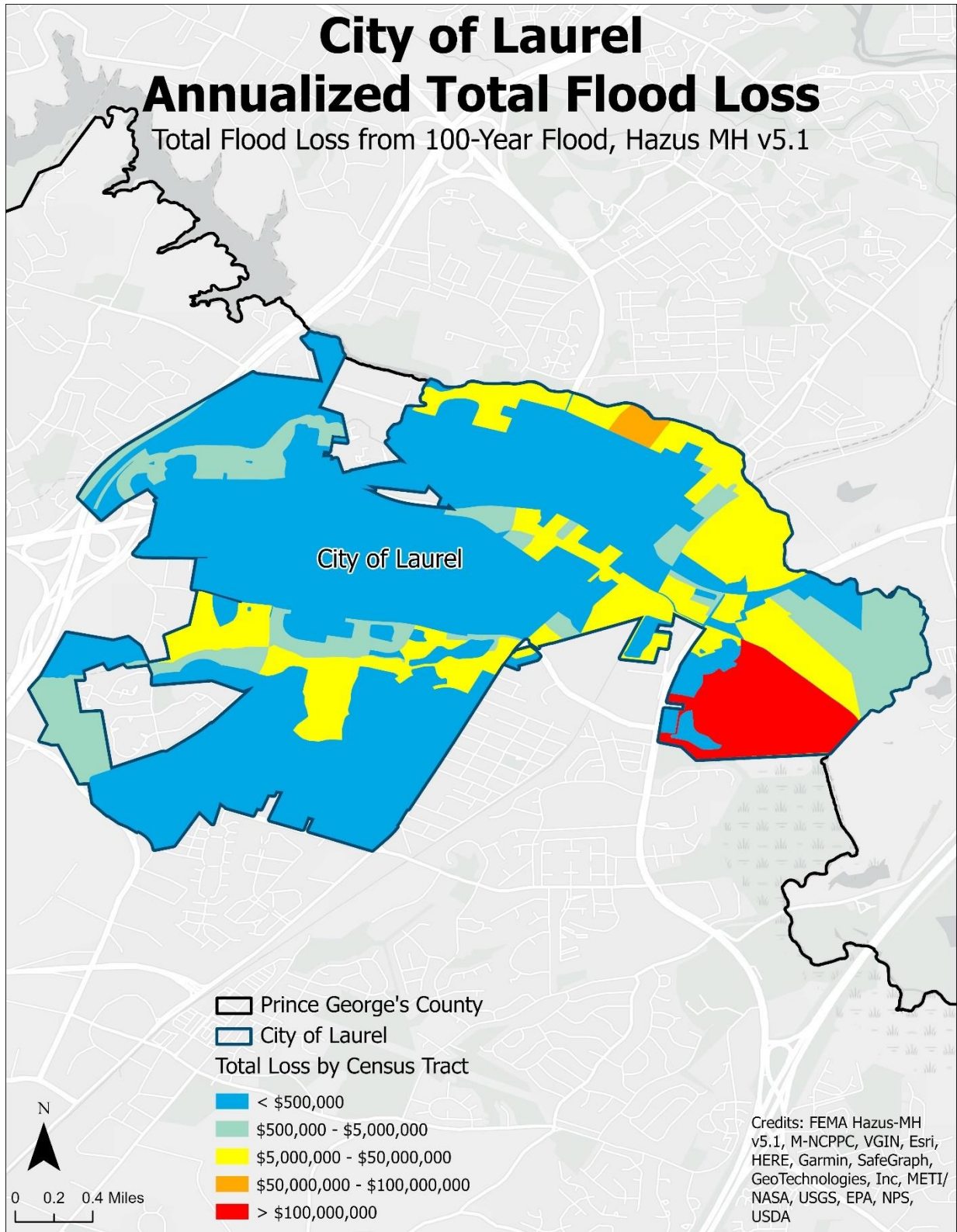


Figure 31: City of Laurel Annualized Total Flood Loss by Census Tract

### B.5.d. City of Laurel Critical Facilities Flood Vulnerability Assessment

Outside of this 2023 hazard mitigation planning effort, the City of Laurel staff also performed a more detailed risk assessment from flooding by analyzing the vulnerability of critical facilities within the City. Of the data gathered about these facilities, the factors directly affecting the facility's susceptibility to damage and/or loss from flooding are the building's construction date and flood zone. Critical facilities constructed prior to 1976 were built before the first Flood Insurance Rate Map (pre- Flood Insurance Rate Map) and therefore were not designed with flood protection in mind. This leaves those structures more vulnerable to future flooding than those constructed post- Flood Insurance Rate Map which increases the risk of future damage. The designated flood zone in which each facility lies also greatly affects the likelihood that flooding will occur at that location. **Table 52** below summarizes the flood event vulnerability of critical facilities in the City of Laurel, in order of greatest risk.

The following definitions were used to assign a level of exposure and vulnerability to the critical facilities listed in **Table 52** below.

- **Zone Exposure:**
  - 1 = Structures located in an effective "X" zone
  - 2 = Structures located in an effective "AE" zone
- **Pre/Post- Flood Insurance Rate Map Vulnerability:**
  - 1 = Structures built after 1975 and located in an effective "X" zone
  - 2 = Structures built after 1975 and located in an effective "AE" zone; or structures built prior to 1976 and located in an effective "X" zone

Those levels were combined to assign an overall **flood risk** to each critical facility as described below:

- **Low (1-2):** These structures were built after the development of community Flood Insurance Rate Maps and were therefore designed with flood protection in mind. They are also located in an effected "X" zone which further reduces the likelihood of future damage/loss.
- **Moderate (3-4):** These structures are at an increased level of risk due to their combined Zone and Pre/Post Firm Risk. Those built post- Flood Insurance Rate Map are located in an effective "AE" zone which puts them at a higher risk, and those located in an effective "X" zone were built pre- Flood Insurance Rate Map and are at an equally elevated risk.
- **High (5-6):** These structures are the most vulnerable of those inventoried and carry the greatest damage/loss risk from future flood events. They are all located within an effective "AE" zone which in itself poses a larger flood threat. Structures given a "High" level of risk were constructed pre- Flood Insurance Rate Map and are located in an effective "AE" zone.

#### Critical Facility Flood Risk

Of the 11 public facilities assessed, **7 have a moderate to high risk for a future 100-year flood event** as assessed through comparison with the 2016 Flood Insurance Rate Map data and structure construction date.

Table 52: City of Laurel Critical Facilities Flood Vulnerability Assessment

Name of Facility	Purpose	Address	Year Built	Effective Zone	Zone Exposure	Pre/Post FIRM Vulnerability	Flood Risk
Laurel Volunteer Rescue Squad	P	14910 Bowie Rd.	1952	AE-EL 142	2	3	High
Laurel Police Department	P	811 Fifth St.	1988	AE-EL 165	2	2	Moderate
City Hall Municipal Center	A	8103 Sandy Spring Rd.	1945	X	1	2	Moderate
Department of Parks and Recreation Operations	A, P	7705 Sandy Spring Rd.	1962	X	1	2	Moderate
Laurel Armory-Anderson Murphy Community Center	R	422 Montgomery St.	1927	X	1	2	Moderate
Laurel Elementary School	E	516 Montgomery St.	1973	X	1	2	Moderate
Laurel High School	E	800 Cherry Ln.	1965	X	1	2	Moderate
Laurel Volunteer Fire Department	P	7411 Cherry Ln.	1990	X	1	1	Low
Department of Public Works	P	305-307 First St.	1988	X	1	1	Low
Robert J. DiPietro Community Center	R	7901 Cypress St.	1993	X	1	1	Low
Scotchtown Hills Elementary School	E	15950 Dorset Rd.	1980	X	1	1	Low
Parks & Recreation Administrative Offices	A	13910 Laurel Lakes	1799	X	1	3	Low

A= Administration      P= Public Safety      R= Recreation      E= Education

**B.5.e. Population Exposed**

People that live within or near floodplains are more likely to experience flooding compared to those that do not. Using population data from the 2020 American Community Survey, census tracts in Prince George’s County were overlaid with the effective FEMA Special Flood Hazard Areas to identify areas where residents may be exposed to flooding. Census tracts identify total population, but do not indicate whether within these boundaries that residents live. **Figure 32** shows population in Prince George’s County by census tract and FEMA Flood Zones. Every District and the City of Laurel have populous areas near or within a flood zone. As development occurs, floodplain ordinances will be essential to ensure that future development and residents within flood zones are able to withstand future flood events.

Flooding creates many risks to human population. Flooding can cause fatalities and serious injuries when people do not evacuate areas that are flooded and enter floodwaters or when people are not careful in the dangerous environment after the flood has passed. Prince George’s County has an alert system called Alert Prince George’s in place to protect its population that provides accurate and timely

information before, during, and after an emergency or disaster.<sup>57</sup> This alert system can provide flood warnings to allow for residents to prepare for a flood event and evacuate if necessary. The State of Maryland has an evacuation zone tool called “Know Your Zone” for residents living in a hurricane evacuation zone. These zones are primarily in coastal areas and are typically used for hurricanes or tropical storms which cause flooding events.<sup>58</sup> The County also provides an Emergency Preparedness Guide on their Office of Homeland Security website that has information on what to do before, during, and after a flood.<sup>59</sup>

In addition to direct risks to human life, there may be further impacts to public health due to flooding. Critical services such as may be forced to close due to flood damage, and floodwater is often contaminated with sewage which can lead to illness and affect drinking water. If untreated sewage enters drinking water systems, widespread gastrointestinal illness could occur. Flooding creates damp environments for mold to grow. Unless the mold is removed quickly, its presence can lead to respiratory illnesses. This is especially true for the elderly and people with disabilities. In addition to the more visible damage to property and infrastructure, flood disasters can disrupt vital health services like dialysis and breathing machines if power outages occur due to flooding.<sup>60</sup> Hazard impacts are also known to cause inequitable impacts on vulnerable populations. For example, low income persons may have a harder time recovering from direct flood impacts, and those reliant on public transportation may face hardships due to access or delays.

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<sup>57</sup> Prince George's County. Alert Prince George's. <https://www.princegeorgescountymd.gov/794/Alert-Prince-Georges>

<sup>58</sup> State of Maryland. Know Your Zone. <https://mdem.maryland.gov/Pages/know-your-zone-md.aspx>

<sup>59</sup> Prince George's County. Emergency Management Guide.

<https://www.princegeorgescountymd.gov/DocumentCenter/View/11637/Full-Emergency-Preparedness-Guide-PDF>

<sup>60</sup> FEMA. Guide to Expanding Mitigation; Making the Connection to Public Health.

[https://www.fema.gov/sites/default/files/documents/fema\\_mitigation-guide\\_public-health.pdf](https://www.fema.gov/sites/default/files/documents/fema_mitigation-guide_public-health.pdf)

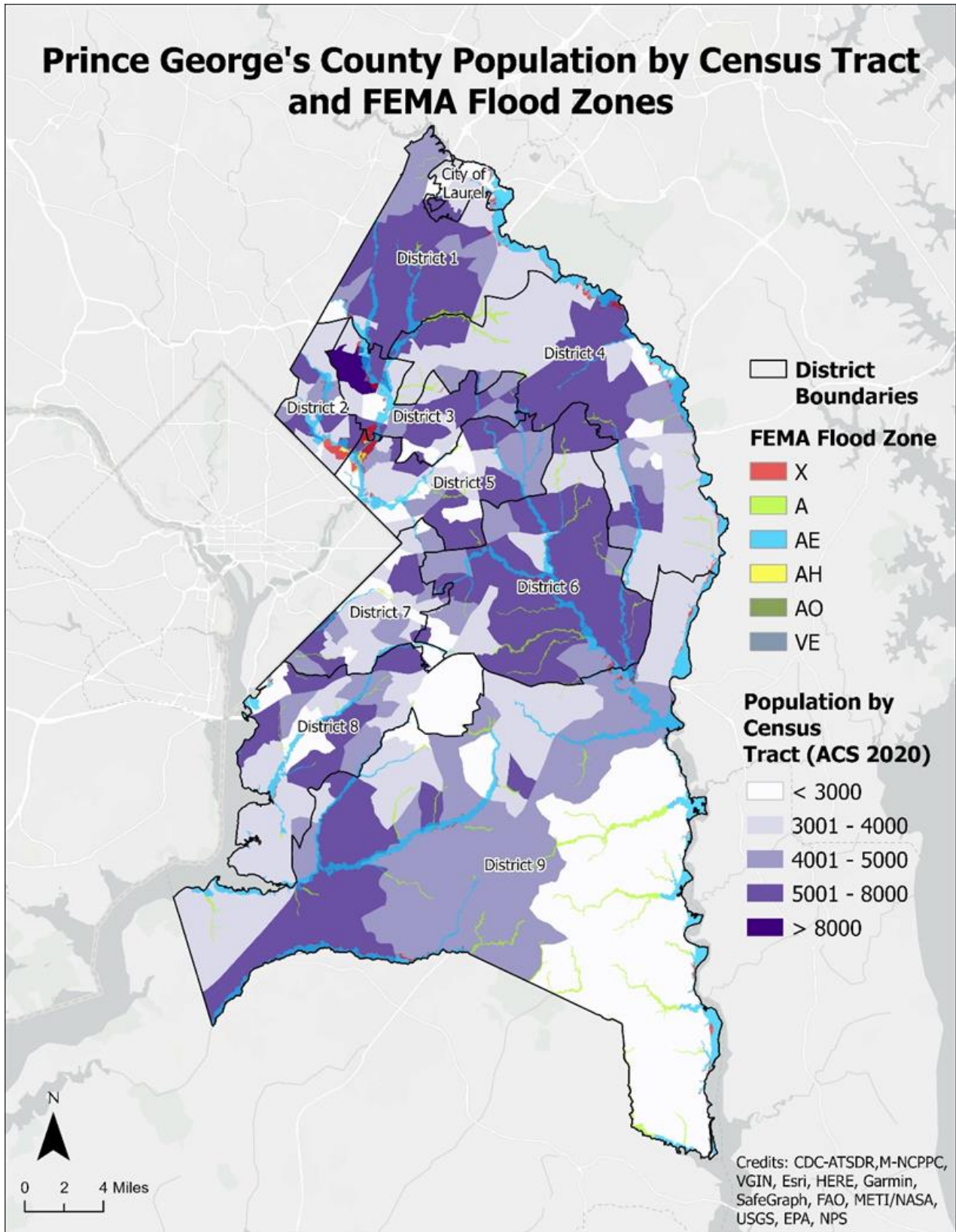


Figure 32: Prince George's County Population by Census Tract and FEMA Flood Zones

### **B.5.f. Future Development**

Development located within the FEMA Special Flood Hazard Area faces increased risk. Development located within this area has an increased risk of flooding, which can impact homes, businesses, and transportation in the area. Additionally, developed areas have more impervious surfaces where water cannot be absorbed into the ground and must be managed through stormwater and drainage systems. Pluvial flood events can be intensified in developed areas with low stormwater and drainage system capacity where water accumulates and floods streets, homes, and businesses.

**Figure 33** shows the FEMA Special Flood Hazard Area in Prince George's County and the future growth areas from the Growth Policy Map. There is overlap between Local Centers, Employment Areas, and Regional Transit Districts and the Special Flood Hazard Area. Future development in those areas should take potential flooding impacts into consideration and consider mitigation actions.

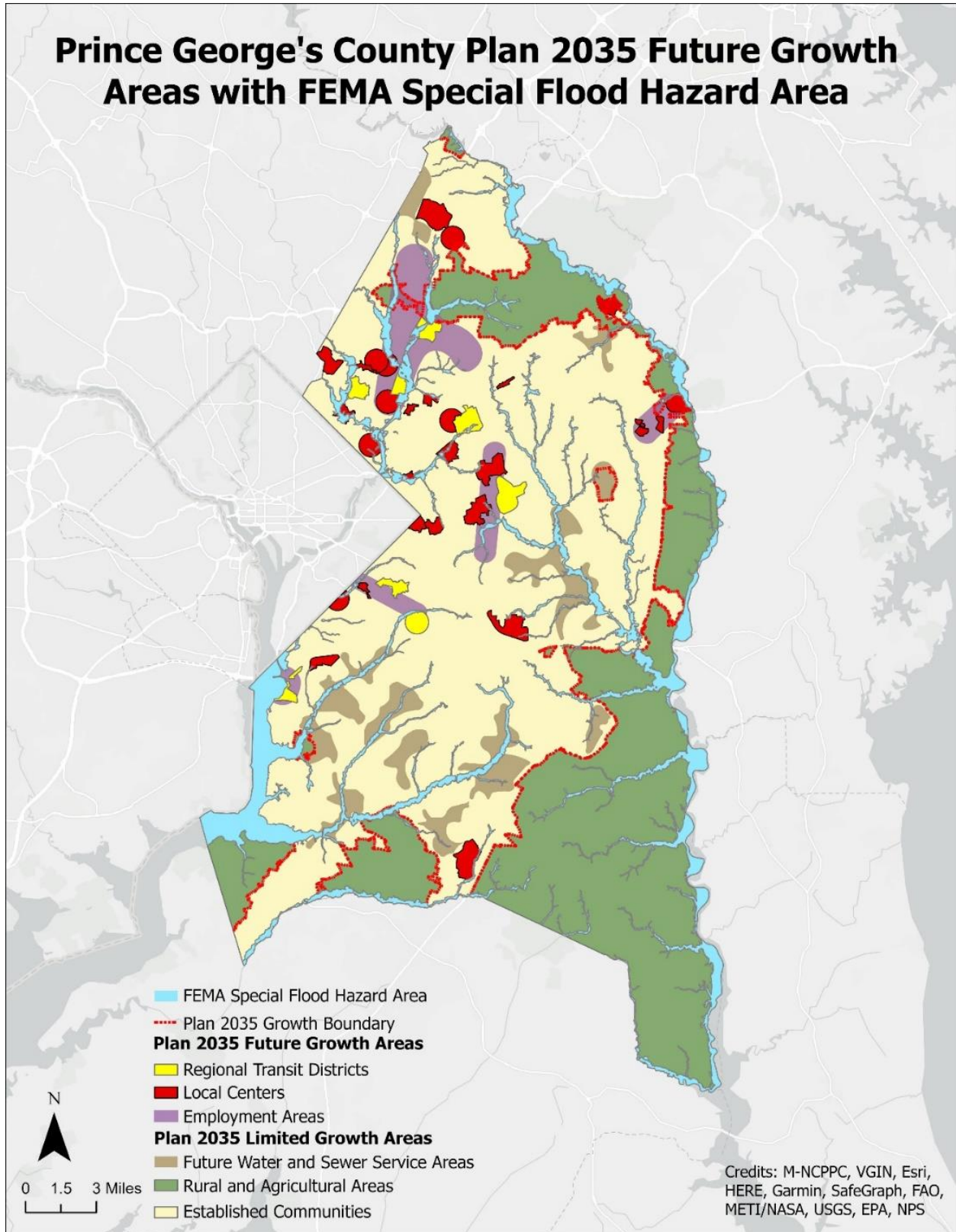


Figure 33. Prince George's County Plan 2035 Future Growth Areas with FEMA Special Flood Hazard Area

### B.5.g. Social Vulnerability

Flood risk is higher for socially vulnerable populations. Property values within floodplains are lower, and many floodplain areas have been developed for multi-family housing and single-family low-income neighborhoods.<sup>61</sup> Therefore, socially vulnerable populations are more likely to live in floodplains and have reduced capacity to respond to and recover from flood events. **Figure 34** shows social vulnerability by census tract in Prince George’s County using the CDC Social Vulnerability Index 2020 data. Residents living in areas with high social vulnerability in flood zones may be at higher risk for flood impacts such as damage to homes, power outages, and death or injuries due to flooding.

### B.6. Consequence Analysis

A consequence analysis (refer to **Table 53**) has been done to better understand the range of impacts that a riverine flood event can have on several features of the planning area and the population within it.

*Table 53. Riverine Flood Consequence Analysis*

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	Flooding can cause injury or loss of life. Flood conditions necessitate warnings, such as flash flood warnings, road closure warnings, and flood advisories to allow residents to remain safe during hazardous floods. Evacuations may also be necessary during large-scale flood events.
<b>Public Health</b>	Floodwaters often contain contaminants such as bacteria and chemical hazards. Flooding can also result in sewer overflows, resulting in sewage in floodwaters. Individuals traversing floodwaters or children playing in floodwaters are at risk of contracting diseases, injuries, and infections. Structures exposed to flooding may develop mold or wood rot. People with asthma, allergies, or breathing conditions may be at a higher risk to mold.
<b>Critical Facilities and Infrastructure</b>	Critical facilities, such as hospitals may flood and lose power during flood events, forcing them to operate on backup generators. Infrastructure may experience impacts in the form of damage from flooding, debris blockages, temporary closure of transportation routes, and the potential inability of the stormwater system to handle floodwater in a severe event.
<b>Economy</b>	A major flood event would be costly for local governments in terms of emergency response, delivery of services, disaster cleanup, and future mitigation projects. Some of the costs could be recouped through federal grant reimbursements, but local governments would still feel the fiscal impact of a major event.
<b>Buildings</b>	Home and landowners within the FEMA 100-year flood zone are most at risk to impacts from a flood event. They may experience damage to or loss of property depending upon the severity of flooding in the area. Structures that are impacted by flooding may have structural damage, damaged electrical systems and gas tanks, or develop mold or wood rot.

<sup>61</sup> Lee D, Jung J. 2014. The growth of low-income population in floodplains: a case study of Austin. <https://doi.org/10.1007/s12205-014-0205-z>



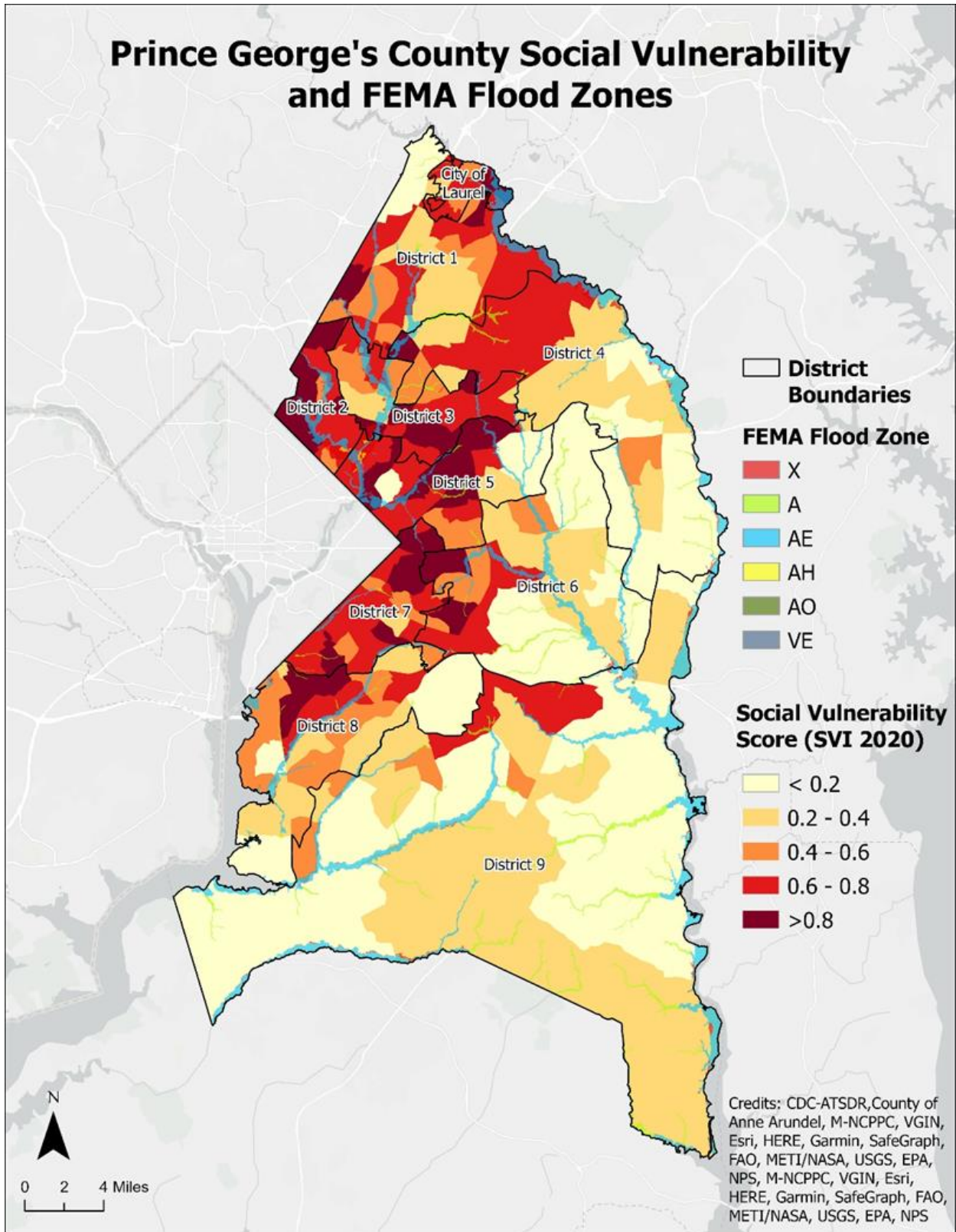


Figure 34: Prince George's County Social Vulnerability and FEMA Flood Zones

## C. Severe Storm (Flood-Related)

### C.1. Description

Severe storms are formed when warm, moist air pushes upwards into the atmosphere, cools, and forms into cumulonimbus clouds. As the air continues to cool, it starts to form water droplets or ice, and as these droplets or ice start to fall, they may collide and combine repeatedly into larger forms before reaching the Earth's surface. Severe storms can form in any geographic region and are sometimes the cause of other natural phenomena.

Flood-related severe storms can cause heavy rainfall over an area, causing urban (pluvial) flooding. Urban flooding occurs when heavy rainfall creates a surface water flood event independent of an overflowing water body. Prince George's County defines urban flooding as "...the inundation of property in a built environment, particularly in more densely populated areas, caused by rain falling on increased amounts of impervious surfaces and overwhelming the capacity of drainage systems."<sup>62</sup> The Maryland Department of the Environment is working to more consistently define flooding events, such as urban flooding, as used in statutes.

One type of pluvial flooding is flash flooding. Flash floods can be the product of heavy localized precipitation in a short time period. Flash floods consist of a rapid rise of water along a water channel or low-lying urban area and are usually a result of an unusually large amount of rain and/or high velocity of water flow (particularly in hilly areas) within a very short period of time. Flash floods can occur with limited warning.

Common causes of pluvial flooding include overflowing drainage or stormwater systems or when ground is oversaturated and cannot absorb excess water, causing surface water to flood an area. Areas with high amounts of impervious surfaces, such as urban areas can experience intensified pluvial flooding events due to a lack of ability for water to absorb into the ground.

### C.2. Location and Extent

A number of factors contribute to the extent (strength and magnitude) of a flood and the relative vulnerabilities of certain areas. Development, or the presence of people and property in the hazardous areas, is a critical factor in determining vulnerability to flooding. Additional factors that contribute to flood extent include:

- Flood depth: The greater the depth of flooding, the higher the potential for significant damages.
- Flood duration: The longer duration of time that floodwaters are in contact with building components, such as structural members, interior finishes, and mechanical equipment, the greater the potential for damage. Floodwaters may linger because of the low relief of the area, but the degree varies.
- Velocity: Flowing water exerts force on the structural members of a building, increasing the likelihood of significant damage. A one-foot depth of water, flowing at a velocity of five feet per second or greater, can knock an adult over and cause significant scour around structures and roadways.

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<sup>62</sup> Drainage and Flooding in Prince George's County. Presentation by Prince George's County DPIE, DPW and DER. (2021)

- **Elevation:** The lowest possible point where floodwaters may enter a structure is the most significant factor contributing to its vulnerability to damage due to flooding. Data on the specific elevations of structures in Frederick County has not been compiled for use in this analysis.
- **Construction type:** Certain types of construction are more resistant to the effects of floodwaters than others. Masonry buildings, constructed of brick or concrete blocks, are typically the most resistant to flood damages simply because masonry materials can be in contact with limited depths of water without sustaining significant damage. Wood frame structures are more susceptible to flood damage because the construction materials used are easily damaged when inundated with water.

Rainfall associated with flash flooding is intense and the waters are fast moving, so it is not as easy to predict when a flash flood will occur or how severe it will be. Specific extent of flash flooding is difficult to determine in advance because local terrain, soil conditions, and construction play a role in how much stormwater can percolate into the soil, be accommodated by waterways, or cause flash flooding. Depth and velocity of flash flooding is difficult to determine, but local stream gauges could be used to mark velocity of floodwaters. To help alleviate the difficulty around predicting urban flooding issues, the Maryland Department of the Environment is working with local jurisdictions, the Maryland Departments of Emergency Management, Planning, Natural Resources, the Department of Transportation, and other state agencies to collect flood event data and identify locations where flooding has occurred after January 1, 2000.<sup>63</sup> The result of this work will be more comprehensive information on urban flooding locations, including within Prince George’s County. Without specific information, all areas in the County and City of Laurel should be considered at risk to storm-related flooding.

### C.3. Previous Occurrences

According to the NCEI, there have been 108 flash flood events and 102 heavy rain events recorded in the database. These records range from 1950 to 2022. Some events were associated with massive tropical weather systems, but most were associated with storms occurring from April through August. Additionally, it should be noted that some NCEI heavy rain events occurred on the same day or within a few days of NCEI flash flood events. The NCEI database reports \$55,695 in annual damages (all property damage) for flash flood and heavy rain occurrences and 2.9 annualized events. **Table 54** summarizes these results by hazard event type.

*Table 54: NCEI Historic Flash Flood and Heavy Rain Data*

Event Type	Number of Events	Period of Record	Total Annualized Damage	Annualized Deaths	Annualized Injuries	Annualized Events
Flash Flood	108	1950-2022	\$55,653	0	1.5	1.5
Heavy Rain	102	1950-2022	\$42	0	0.0	1.4
<b>Total</b>	<b>210</b>	<b>1950-2022</b>	<b>\$55,695</b>	<b>0</b>	<b>1.5</b>	<b>2.9</b>

<sup>63</sup> Maryland Department of the Environment. Advancing Stormwater Resiliency in Maryland (A-StoRM): Maryland’s Stormwater Management Climate Change Action Plan. 2021. <https://mde.maryland.gov/Documents/A-StoRMreport.pdf>

## C.4. Probability of Future Events

The probability of future occurrences of severe storm events impacting Prince George’s County and the City of Laurel is high. It is extremely difficult to determine the probability of future occurrence in a specific area within the county with any degree of accuracy. All areas within Prince George’s County are at risk of heavy rain and flash floods, especially the heavily urbanized areas with high amounts of impervious surfaces in the northern part of the County, Upper Marlboro, and in the City of Laurel. Based on past occurrences, Prince George’s County and the City of Laurel have a high probability of future severe storm occurrence, averaging approximately 3 events annually.

According to the *Fourth National Climate Assessment* (NCA4), climate change will impact general flood hazards. NCA4 projects continued increases in the frequency and intensity of heavy precipitation in many regions of the United States, including the northeast. The strongest hurricanes are expected to “become both more frequent and more intense,” and result in more rainfall.<sup>64</sup>

## C.5. Vulnerability and Risk Assessment

Severe storm events have a high correlation with riverine flooding. Vulnerability to severe storm flooding events is similar to vulnerability to riverine flooding, presented in **Chapter 4.B.5**. In the future, as precipitation patterns change, flood risks will intensify in areas adjacent to water bodies and, more specifically, flash flooding risks will elevate in more developed areas, where there are more impervious and paved surfaces. If development and population growth encroach into flood-prone areas, Prince George’s County and the City of Laurel’s vulnerability to flooding will increase.

The topography and elevation of an area, development and extent of impervious surfaces, and precipitation movement and patterns correlate to the vulnerability of the region to severe storm flooding events. With flash flooding comes flooded roads, homes, and structures which can lead to safety hazards—an in extreme cases, loss of life. Consistent rainfall and flash flooding can wash out roads and cause erosion, which can lead to landslides and agricultural damages. Lastly, flash floods have been and will continue to be a significant threat to the economic and social well-being of the more developed areas of Prince George’s County and the City of Laurel. In particular, the towns that have concentrated structures, assets, and populations are vulnerable to flood damages. Flash floods can affect the economy and commerce of the county through flooded roads and economic losses for local businesses.<sup>65</sup>

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for thunderstorm. These scores and ranks are shown in **Table 55**, which shows the State’s ranking for thunderstorm vulnerability in Prince George’s County (including the City of Laurel) as high. The State’s ranking for riverine flood is shown in **Table 46** in **Section B**.

*Table 55. 2021 State of Maryland Thunderstorm Hazard Ranking and Risk for Prince George’s County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3

<sup>64</sup> The Fourth National Climate Assessment. Volume II, Impacts, Risks, and Adaptation in the United States. U.S. Global Change Research Program, 2018.; Revised February 2020. Available at: [https://nca2018.globalchange.gov/downloads/NCA4\\_2018\\_FullReport.pdf](https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf).

<sup>65</sup> 2021 Draft Maryland Hazard Mitigation Plan

Risk Factors	Rank
Injuries	2
Deaths	4
Property Damage	2
Crop Damage	1
Geographic Extent	3
Events	3
Local Plan Ranking (2017)	4
<b>Overall Weighted Risk Rating<sup>66</sup></b>	<b>26</b>
<b>Overall Ranking</b>	<b>High</b>

### C.6. Consequence Analysis

A consequence analysis (refer to **Table 56**) has been done to better understand the range of impacts that a severe storm flood event can have on several features of the planning area and the population within it.

Table 56. Severe Storm (Flood-Related) Consequence Analysis

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	Severe storm events with flooding can cause injury or loss of life. Flood conditions necessitate warnings, such as flash flood warnings, road closure warnings, and flood advisories to allow residents to remain safe during hazardous floods. Evacuations may also be necessary during large-scale severe storm events.
<b>Public Health</b>	Floodwaters associated with severe storms often contain contaminants such as bacteria and chemical hazards. Flash flooding can also result in sewer overflows, resulting in sewage in floodwaters. Individuals traversing floodwaters or children playing in floodwaters are at risk of contracting diseases, injuries, and infections. Structures exposed to flooding may develop mold or wood rot. People with asthma, allergies, or breathing conditions may be at a higher risk to mold.
<b>Critical Facilities and Infrastructure</b>	Severe storms can cause flash flooding that can damage electrical systems to critical facilities. Infrastructure may experience impacts in the form of damage from flooding, debris blockages, temporary closure of transportation routes, and the potential inability of the stormwater system to handle floodwater in a severe event.
<b>Economy</b>	Flash floods can affect the economy and commerce of the county through flooded roads and economic losses for local businesses. Additionally, flash flooding can cause erosion, impacting agricultural productivity.

<sup>66</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

Community Feature	Impacts
<b>Buildings</b>	Towns with concentrated structures, assets, are more vulnerable to flood damages. Flash flooding can impact buildings in urban areas and rural areas. Homeowners may experience damage to or loss of property depending upon the severity of flooding in the area. Structures that are impacted by flooding may have structural damage, damaged electrical systems and gas tanks, or develop mold or wood rot.

## D. Severe Storm (Wind-Related)

### D.1. Description

Wind-related severe storms are associated with the presence of strong winds, hail, and lightning. Wind related to severe storms typically originates from thunderstorms. Thunderstorms are caused when air masses of varying temperatures and moisture content meet. It is also possible to experience storms without precipitation, which can increase wildfire risk during periods of dry weather or drought. Thunderstorms can form in any geographic region and are sometimes the cause of other natural phenomena such as downburst winds, heavy rain, flash floods, large hailstones, tornadoes, and waterspouts.

A severe thunderstorm includes damaging winds of 58 mph (50 knots) or greater and hail one inch or larger in diameter. High winds have been further broken down into three categories by the National Weather Service Storm Events database: High wind, strong wind, and thunderstorm wind.

A “high wind” is a sustained non-convective winds of 35 knots (40 mph) or greater lasting for one hour or longer or winds (sustained or gusts) of 50 knots (58 mph) for any duration (or otherwise locally/regionally defined), on a widespread or localized basis. In some mountainous areas, the above numerical values are 43 knots (50 mph) and 65 knots (75 mph), respectively.<sup>67</sup>

A “strong wind” is a non-convective wind gusting less than 50 knots (58 mph), or sustained winds less than 35 knots (40 mph) resulting in a fatality, injury, or damage.<sup>68</sup>

A “thunderstorm wind” is a wind arising from convection (occurring within 30 minutes of lightning being observed or detected) with speeds of at least 50 knots (58 mph), or winds of any speed (non-severe thunderstorm winds below 50 knots) producing a fatality, injury, or damage. Events with maximum sustained winds or wind gusts less than 50 knots (58 mph) should be entered as a Storm Data event only if they result in fatalities, injuries, or serious property damage.

Hail is precipitation in the form of ice that occurs in thunderstorms between currents of rising air (updrafts) and currents of descending air (downdrafts). These storms typically occur in late spring through early summer. As defined by the National Weather Service, thunderstorms must feature hail that is 1 inch in diameter (quarter-size) or larger to be classified as “severe.” **Figure 35** shows how hail is formed in the atmosphere. The Tornado and Storm Research Organization Hailstorm Intensity Scale, shown in **Table 57** ranks intensity or damage potential related to hail size (distribution and maximum), texture, numbers, fall speed, speed of storm translation, and strength of the accompanying wind. Evidence indicates that maximum hailstone size is the most important parameter relating to structural damage, especially towards the more severe end of the scale. It must be noted that hailstone shapes are also an important feature, especially as the “effective” diameter of non-spheroidal specimens should ideally be an average of the coordinates. Spiked or jagged hail can also increase some aspects of damage.

*Table 57: Tornado and Storm Research Organization Hailstorm Intensity Scale*

Scale	Intensity Category	Typical Hail Diameter (mm)*	Typical Damage Impacts
H0	Hard hail	5	No damage

<sup>67</sup> High Winds are addressed under the “High Winds” section

<sup>68</sup> Strong Winds are addressed under the “High Winds” section

Scale	Intensity Category	Typical Hail Diameter (mm)*	Typical Damage Impacts
H1	Potentially damaging	5-15	Slight general damage to plants, crops
H2	Significant	10-20	Significant damage to fruit, crops, vegetation
H3	Severe	20-30	Severe damage to fruit and crops, damage to glass and plastic structures, paint and wood scored
H4	Severe	25-40	Widespread glass damage, vehicle bodywork damage
H5	Destructive	30-50	Wholesale destruction of glass, damage to tiled roofs, significant risk of injuries
H6	Destructive	40-60	Bodywork of grounded aircraft dented; brick walls pitted
H7	Destructive	50-75	Severe roof damage, risk of serious injuries
H8	Destructive	60-90	Severe damage to aircraft bodywork
H9	Super Hailstorms	75-100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open
H10	Super Hailstorms	>100	Extensive structural damage. Risk of severe or even fatal injuries to persons caught in the open

\*Approximate range (typical maximum size in bold), since other factors (e.g. number and density of hailstones, hail fall speed and surface wind speeds) affect severity.

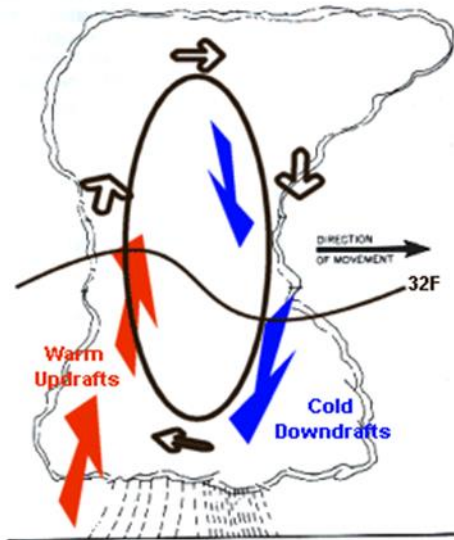


Figure 35: Formation of Hail (Source: NOAA)



Lightning is generated by the buildup of charged ions in a thundercloud. When this buildup intersects with the best conducting object or surface on the ground, the result is a discharge of a lightning bolt. A bolt of lightning can reach temperatures approaching 50,000 degrees Fahrenheit. Lightning rapidly heats the sky as it flashes, but the surrounding air cools following the bolt. This rapid heating and cooling of the surrounding air cause thunder.

## D.2. Location and Extent

All of Prince George's County and the City of Laurel could be impacted by a thunderstorm event that causes high wind, lightning, and hail. All structures and assets in Prince George's County and the City of Laurel should be considered vulnerable to these hazards. While impacts may vary based on location and severity and asset characteristics, the potential impacts in each jurisdiction are the same.

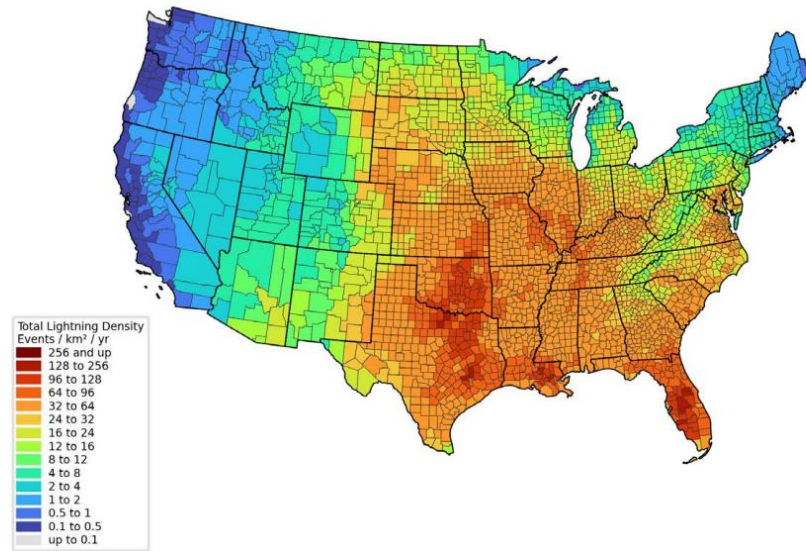
Using the National Weather Service definition for a severe thunderstorm, dime-sized hail is considered a minimum hazard, and quarter-sized hail is considered a major hazard. Quarter-sized hail can cause significant damage to property such as automobiles, aircraft, and roofs as well as agricultural crops and livestock. Damage to shingled roofs may go undetected until leaks and cracks start forming. Damage to metal roofs is more noticeable due to dents and damage to exterior finishes. Automobiles may be dented or have their windshields and windows shattered. Although rare, large hailstones may even cause injury or death. The amount of cover available during a hailstorm can greatly affect the risk to human health during these events.

Lightning occurs randomly, therefore it is impossible to predict where and with what frequency it will strike. It is assumed the city is uniformly exposed to lightning. Lightning flash data compiled by Vaisala, Inc. with data from 2015 through 2020 shows total lightning density per county, shown in **Figure 36**.<sup>69</sup> Prince George's County had a total lightning density of 32 to 64 events/km<sup>2</sup>/year.

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<sup>69</sup> Vaisala, Inc. Total lightning statistics. <https://www.vaisala.com/sites/default/files/documents/WEA-MET-2021-Annual-Lightning-Report-B212465EN-A.pdf>

## Total lightning density 2015–2020 per county



VAISALA

2021 ANNUAL LIGHTNING REPORT

© Vaisala 2022

Figure 36: Vaisala, Inc. Total Lightning density 2015-2020

While there is no established index for lightning, a lightning strike is considered to be of minimum severity when it has limited impacts on infrastructure (e.g., only hitting tree limbs, if anything other than the ground) and major severity when it causes extensive damage (e.g. loss of life, fire, structural damage). The potential damages resulting from lightning strikes are primarily loss of life, business interruption, fire, and minor structural damage. A false sense of security often leads people to believe that they are safe from a lightning strike because it may not appear to be near their location. However, lightning can strike 10 miles away from a rain column, which puts people outside of the storm cloud at risk.

Using the National Weather Service high wind categories listed above, sustained non-convective winds of 40 mph or greater lasting for one hour or longer or winds (sustained or gusts) of 58 mph for any duration, on a widespread or localized basis, are considered a minimum severity event. A major severity event would be wind events of greater than 58 mph or wind events resulting in death, injury, or significant damage.

### D.3. Previous Occurrences

When using the combined NCEI thunderstorm wind, lightning, and hail events, there are a total of 619 events recorded in Prince George's County. Since 1950, there have been 501 thunderstorm wind events, 13 lightning events, and 105 hail events recorded in the database. Annualized deaths, injuries, damages, and number of events are summarized in **Table 58**.

Table 58: NCEI Historic Hail, Lightning, and Thunderstorm Wind Event Data

Event Type	Number of Events	Period of Record	Total Annualized Damage	Annualized Deaths	Annualized Injuries	Annualized Events
Thunderstorm Wind	501	1950-2022	\$72,982	0.00	0.11	6.96
Lightning	13	1950-2022	\$9,652	0.01	0.07	0.18
Hail	105	1950-2022	\$166	0.00	0.00	1.46
<b>Total</b>	<b>619</b>	<b>1950-2022</b>	<b>\$82,800</b>	<b>0.01</b>	<b>0.18</b>	<b>8.60</b>

#### D.4. Probability of Future Events

Based on the NCEI database, Prince George’s County and the City of Laurel have a high probability of experiencing these types of hazards. Severe thunderstorm wind events occur seven to nine times annually (9.20 annual occurrences), hail events occur once or twice each year (1.20 annual occurrences), and a damaging lightning strike is a rare occurrence.

As ocean surface temperature increases in the Atlantic Ocean due to climate change, there will be more energy for Atlantic storms to strengthen, which could lead to an increased frequency of thunderstorms and other severe storms in Prince George’s County. Additionally, as the temperature and amount of moisture in the air increases due to climate change, there is a higher risk of severe thunderstorms occurring.

#### D.5. Vulnerability and Risk Assessment

The primary hazard caused by thunderstorm winds is the transport of debris, which can cause casualties and property loss or even the dislodging of mobile homes from their foundation. Lightning can also cause fires, hailstorms can cause damage to structures and cars, and can put people’s lives at risk. Additionally, high winds may also cause damage to poles and lines carrying electric, telephone, and cable television service.

All of the County’s population is vulnerable to severe storms. The number of people affected by storms and to what degree will depend on the type of storm that occurs, as well as its severity and tenure. Residents that live in remote areas with limited road or transportation access may be temporarily isolated if roads become impassable due to debris or fallen trees or extended power outages occur.

Because all areas of Prince George’s County and the City of Laurel are susceptible severe storm events, it can be assumed that all structures are exposed and potentially vulnerable. Taller structures are the most exposed to lightning, while structures that are not surrounded by others are more likely to be damaged by wind. All structures are in danger of hail damage. Older structures built before 1940 are often more susceptible to all types of damage related to severe storms. Older critical facilities are vulnerable to wind damage due to the age of construction and poor condition due to age and lack of maintenance, especially in the more rural and isolated areas of the County. It is important to identify specific critical facilities and assets that are most vulnerable to severe weather. Evaluation criteria include

the age of the building (and what building codes may have been in effect at the time of construction), type of construction, and condition of the structure (i.e., how well the structure has been maintained).

**Figure 37** shows buildings constructed before 2002 (the first year that the Building Codes from 2000 were required in the County) and are broken up into three date categories and levels of possible vulnerabilities:

- 1600 to 1899 (Dark Orange): Highly Vulnerable
- 1900-1949 (Light Orange): Moderately Vulnerable
- 1950-2002 (Light Yellow): Slightly Vulnerable

Buildings that are shown in dark orange suggest that they may be more susceptible to wind damage than buildings in yellow; However, all buildings shown could be susceptible to damage. There is a possibility that these buildings may have been renovated to improve structural integrity for protecting against wind damage. Nonetheless, this map is intended to give an overview of areas that are of higher risk. The trend shown in the map is that most highly vulnerable buildings are in the Eastern part of the county.

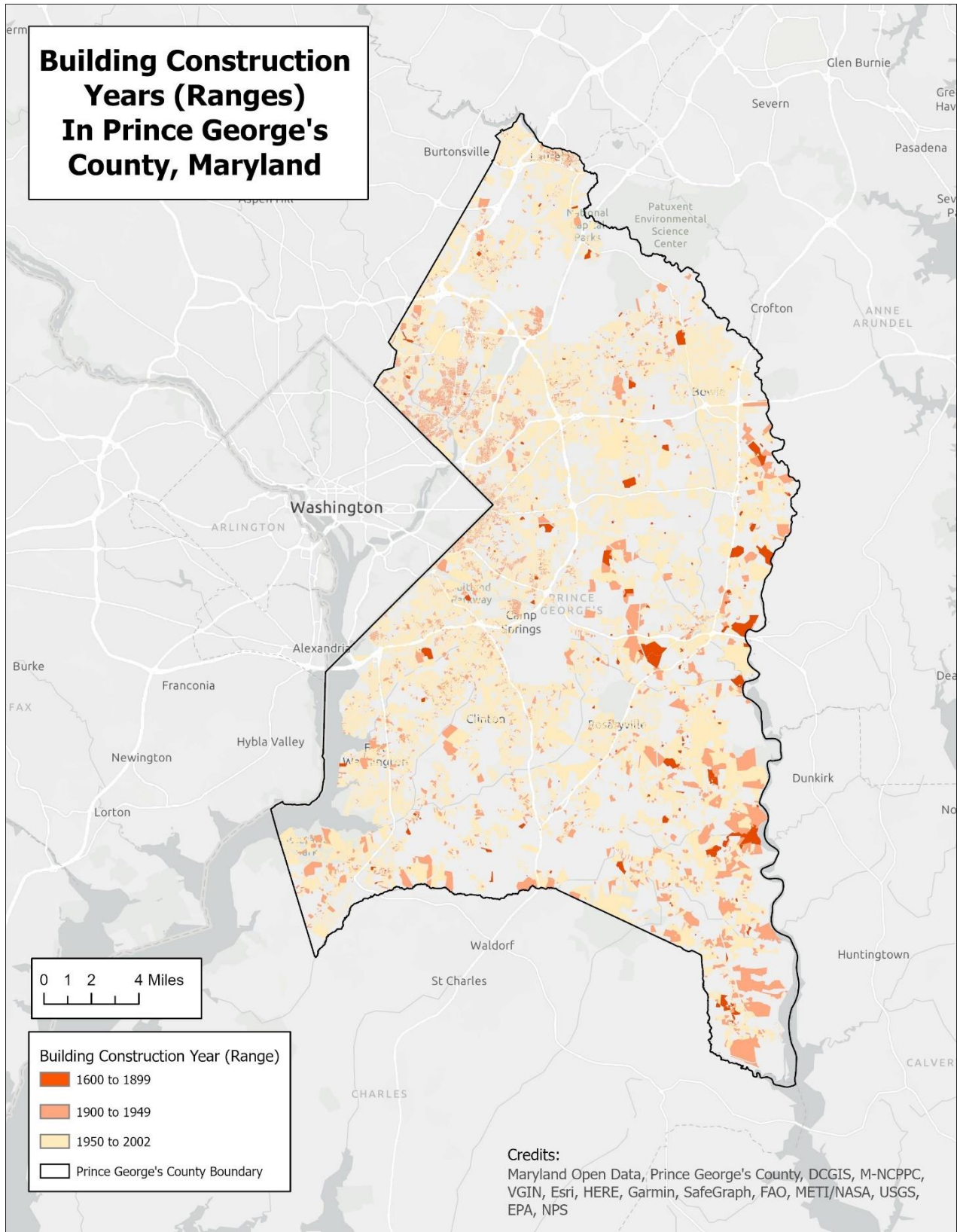


Figure 37: Buildings Constructed before 2002 in Prince George's County

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for wind. These scores and ranks are shown in **Table 59**, which shows the State’s ranking for wind vulnerability in Prince George’s County (including the City of Laurel) as high.

*Table 59. 2021 State of Maryland Wind Hazard Ranking and Risk for Prince George’s County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	2
Deaths	4
Property Damage	3
Crop Damage	1
Geographic Extent	2
Events	4
Local Plan Ranking (2017)	4
<b>Overall Weighted Risk Rating<sup>70</sup></b>	<b>26.5</b>
<b>Overall Ranking</b>	<b>High</b>

## D.6. Consequence Analysis

A consequence analysis (refer to **Table 60**) has been done to better understand the range of impacts that a severe storm wind event can have on several features of the planning area and the population within it.

*Table 60. Severe Storm (Wind-Related) Consequence Analysis*

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	Home and landowners throughout the state are at risk to impacts from a wind-related severe storm event in the form of lightning and hail. Lightning is very dangerous, even when observed at several miles away. As such, members of the public should seek shelter immediately. In addition, hail poses the threat of personal injury, particularly for hail stones of larger sizes.
<b>Public Health</b>	Lightning can put people’s lives at risk due to fires or electrocution. Hail can also endanger the public when hail size is large enough to cause injury if hit. Residents in the County that live in remote areas with limited road or transportation access may be temporarily isolated and cut off from critical facilities if roads become impassable due to debris or fallen trees or extended power outages occur, putting their health at risk in case of an emergency.

<sup>70</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

Community Feature	Impacts
<b>Critical Facilities and Infrastructure</b>	Infrastructure may experience impacts in the form of fire caused by lightning strikes, roof and crop damage from hail, and interruptions to above-ground power and communication systems.
<b>Economy</b>	A major storm event would be costly for state and local governments because of the potential for damages associated with property, debris generation, and loss of power. Delivery of services may also be slowed or halted in affected areas as a result of momentary losses in power and communications.
<b>Buildings</b>	Home and landowners throughout the state may experience damage to property depending upon the amount of lightning strikes and severity of hail in the area.

## E. High Wind

### E.1. Description

High wind events occur when there is a large difference in air pressure between two locations. NCEI defines high wind events as:

*Sustained non-convective winds of 35 knots (40 mph) or greater lasting for 1 hour or longer or winds (sustained or gusts) of 50 knots (58 mph) for any duration (or otherwise locally/regionally defined), on a widespread or localized basis. In some mountainous areas, the above numerical values are 43 knots (50 mph) and 65 knots (75 mph), respectively.*

In addition to high winds, the NCEI dataset includes strong wind events as defined below:

*Non-convective winds gusting less than 50 knots (58 mph), or sustained winds less than 35 knots (40 mph) resulting in a fatality, injury, or damage.*

This sub-set of wind type does not include wind during severe storm events, winter storms and blizzards, or tropical/sub-tropical cyclones. Those wind effects are described in sections addressing those specific hazards.

### E.2. Location and Extent

High wind events can occur anywhere throughout Prince George's County and the City of Laurel, though the impacts will vary depending on infrastructure characteristics. Sometimes these high wind events originate from microbursts. Microbursts (also known as downbursts) are powerful downdrafts associated with heavy precipitation events such as thunderstorms, rain showers, and particularly hailstorms. In some cases, dry microbursts can be triggered by virga (rain that evaporates before it reaches the ground). According to the National Oceanic and Atmospheric Administration (NOAA), microbursts occur when the weight of heavy precipitation or hail accelerates downward winds to very high velocities as it falls from the upper levels of the atmosphere. Approximately five percent of all thunderstorms are estimated to produce a microburst. These microbursts can result in significant wind damage similar to a weak tornado. Although microbursts are more common in the western United States, they also occur in the eastern United States, including Maryland.

Downdrafts associated with microbursts are typically only a few hundred to a few thousand feet across. When the downdraft reaches the ground, it spreads out horizontally and may form one or more horizontal vortex rings around the downdraft. Microburst events typically last 15 to 20 minutes.

According to NOAA, a derecho is a widespread, long-lived windstorm that is associated with a band of rapidly moving showers or thunderstorms. A typical derecho consists of numerous microbursts, downbursts, and downburst clusters. If the wind damage swath extends more than 240 miles (about 400 kilometers) and includes wind gusts of at least 58 mph (93 km/h) or greater along most of its length, then the event may be classified as a derecho. Derechos can occur anywhere in Prince George's County and the City of Laurel.



### E.3. Previous Occurrences

Since 1950, there have been 15 high wind and 24 strong wind events recorded by the NCEI database in Prince George’s County. **Table 61** shows the combined annualized NCEI data that was recorded from these 39 wind events. 11 of these 39 wind events occurred within the last ten years. The most damaging high wind event occurred on February 12, 2017 when low pressure rapidly intensified as it moved up the New England coast. A strong pressure gradient between the low and high pressure over the Midwest caused high winds. Estimated wind gusts of 63 mph caused damage. The highest wind gust was measured at 72 mph at Andrews Air Force Base. The one strong wind event took place on October 11, 2018 after Hurricane Michael. A record of the 11 events that occurred within the last ten years and their subsequent damages, deaths, and injuries can be found in **Appendix C**. Most of the damage was to residential properties for both high and strong wind events. Only one event in the past 10 years affected crops in the County (\$3,000 of damage).<sup>71</sup>

Table 61: NCEI Historic High Wind and Strong Wind Event Data

Event Type	Number of Events	Period of Record	Total Annualized Damage	Annualized Deaths	Annualized Injuries	Annualized Events
High Wind	15	1950-2022	\$46,041	0.00	0.07	0.21
Strong Wind	24	1950-2022	\$2,161	0.01	0.00	0.10
<b>Total</b>	<b>39</b>	<b>1950-2022</b>	<b>\$48,202</b>	<b>0.01</b>	<b>0.07</b>	<b>0.31</b>

### E.4. Probability of Future Events

High wind events are considered medium probability and random events that can occur at any time of year, so all areas within Prince George’s County and the City of Laurel are equally at risk. The NCEI Storm Events data were annualized by taking the total number of damaging wind events (high and strong winds) and dividing them by the length of the record, as seen in **Table 61**. The annualized values should only be used as an estimate of what can be expected in any year. Using historic records, it can be estimated that Prince George’s County and/or the City of Laurel will experience at least one event every three to four years.

As stated in the 2021 HMP, “Wind events happen frequently, occur year-round and stem from multiple hazard types. Therefore, the probability of a wind event each year is highly likely. While some hazard events, such as hurricanes, are expected to become more frequent and intense, the future probability of wind events is unclear. According to the *Fourth National Climate Assessment*, “projections of future changes in severe thunderstorms, tornadoes, hail, and strong wind events are uncertain.” The difficulty

<sup>71</sup> NOAA Storm Events Database. [https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+High+Wind&beginDate\\_mm=01&beginDate\\_dd=01&beginDate\\_yyyy=2012&endDate\\_mm=07&endDate\\_dd=31&endDate\\_yyyy=2022&county=PRINCE%20GEORGE%2527S%3A33&haifilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitButton=Search&statefips=24%2CMARYLAND](https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28Z%29+High+Wind&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=2012&endDate_mm=07&endDate_dd=31&endDate_yyyy=2022&county=PRINCE%20GEORGE%2527S%3A33&haifilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitButton=Search&statefips=24%2CMARYLAND)

projecting future events can be attributed, in part, to a need for further research and lack of historical data.<sup>72</sup>

### E.5. Vulnerability and Risk Assessment

The impact of high winds can be measured in financial terms, as well by fatalities and injuries. As shown in **Table 61**, damages from these events can be approximated at \$48,202 for property and minimal crop damages annually. Injuries and fatalities are unlikely, with one death occurring in the County in the past 20 years of high or strong wind events recorded in the NCEI Storm Events database.

High wind events can also impact buildings and infrastructure in the County. Severe wind can blow shingles, siding, awnings, and other features off buildings. Falling trees and tree limbs can damage structures. Objects picked up by wind can be hurled through the air, damaging structures and breaking windows when contact is made. In some cases, structures can be blown off foundations. Additionally, utility poles and above ground power lines can be knocked down by severe winds, impacting populations who rely on those power lines. Populations at risk include people over 65, persons in poverty, and non-native English speakers that have lower capacity to adapt to loss of power or damage to their homes. The homeless population in the County may also be more vulnerable due to a lack of adequate shelter during high or strong wind events. Finally, transportation in the County may be affected by high or strong winds. These events could cause delays or closures of bridges in the county.<sup>73</sup>

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for wind. These scores and ranks are shown in **Table 62**, which shows the State’s ranking for wind vulnerability in Prince George’s County (including the City of Laurel) as high.

*Table 62. 2021 State of Maryland Wind Hazard Ranking and Risk for Prince George’s County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	2
Deaths	4
Property Damage	3
Crop Damage	1
Geographic Extent	2
Events	4
Local Plan Ranking (2017)	4

<sup>72</sup> The Fourth National Climate Assessment. Volume II, Impacts, Risks, and Adaptation in the United States. U.S. Global Change Research Program, 2018.; Revised February 2020. Available at: [https://nca2018.globalchange.gov/downloads/NCA4\\_2018\\_FullReport.pdf](https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf).

<sup>73</sup> Maryland Transportation Authority Wind Warnings and Restrictions: [https://mdta.maryland.gov/Emergency/Emergency\\_Info.html](https://mdta.maryland.gov/Emergency/Emergency_Info.html)

Risk Factors	Rank
Overall Weighted Risk Rating <sup>74</sup>	26.5
Overall Ranking	High

## E.6. Consequence Analysis

A consequence analysis (refer to **Table 63**) has been done to better understand the range of impacts that a high wind event can have on several features of the planning area and the population within it.

Table 63. High Wind Consequence Analysis

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	Impacts to the public include potential for injury or loss of life, and destruction of property due to high winds. Populations at risk include people over 65, non-native English speakers, and low-income households that have lower capacity to adapt to loss of power or damage to their homes. The homeless population in the County may also be more vulnerable due to a lack of adequate shelter during high or strong wind events.
<b>Public Health</b>	There are limited impacts of high wind on public health. Indirect impacts include power outages, which can lead to electrocution, fires and burns and carbon monoxide poisoning from gasoline powered electrical generators.
<b>Critical Facilities and Infrastructure</b>	High wind events can impact critical facilities and infrastructure in the County. Falling trees and tree limbs can damage critical facilities or block roadways. Transportation in the County may be affected by high or strong winds. These events could cause delays or closures of bridges in the county
<b>Economy</b>	A major wind event would be costly for local governments because of the potential for damages associated with property, debris generation, 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.
<b>Buildings</b>	High wind events can impact buildings in the County. Severe wind can blow shingles, siding, awnings, and other features off buildings. Falling trees and tree limbs can damage structures.

<sup>74</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

## F. Tornado

### F.1. Description

A tornado is a narrow, violently rotating column of air that extends from the base of a thunderstorm to the ground and is visible only if it forms a condensation funnel made up of water droplets, dust, and debris. Data from the NOAA website indicates the path of a tornado is generally less than half of a mile wide, but the path length can vary from a few hundred yards to dozens of miles. A tornado moves at speeds from 30 to 125 mph, but can generate winds exceeding 300 mph.<sup>75</sup>

Tornado season typically occurs from March through August; however, tornadoes can happen in any month. In the United States, tornadoes have been classified on the Fujita Scale, assigning numeric scores from zero to five (or higher) based on the severity of observed damages. The traditional Fujita (F) scale, introduced in 1971, was used to rate the intensity of tornadoes thereafter and previously documented tornadoes. Starting in February of 2007, an “enhanced” Fujita (EF) scale was implemented, with somewhat lower wind speeds at the higher F-numbers, and more thoroughly refined structural damage indicator definitions.

**Table 64** shows the Enhanced Fujita Tornado Damage Scale with corresponding wind speeds, typical damages, and relative frequency.

*Table 64: Enhanced Fujita Tornado Damage Scale*

Enhanced Fujita Scale (EF)	Wind Speeds (mph)	Typical Damage	Frequency
EF0	65 – 85	<b>Light:</b> Chimneys are damaged, tree branches are broken, shallow-rooted trees are toppled.	29%
EF1	86 – 110	<b>Moderate:</b> Roof surfaces are peeled off, windows are broken, some tree trunks are snapped, unanchored mobile homes are overturned, attached garages may be destroyed.	40%
EF2	111 – 135	<b>Considerable:</b> Roof structures are damaged, mobile homes are destroyed, debris becomes airborne, (missiles are generated), large trees are snapped or uprooted.	24%
EF3	136 – 165	<b>Severe:</b> Roofs and some walls are torn from structures, some small buildings are destroyed, nonreinforced masonry buildings are destroyed, most trees in forest are uprooted.	6%
EF4	166 – 200	<b>Devastating:</b> Well-constructed houses are destroyed, some structures are lifted from foundations and blown some distance, cars are blown some distance, large debris becomes airborne.	2%

<sup>75</sup> NOAA Tornado Definition. <https://www.weather.gov/phi/TornadoDefinition>

Enhanced Fujita Scale (EF)	Wind Speeds (mph)	Typical Damage	Frequency
EF5	Over 200	<b>Incredible:</b> Strong frame houses are lifted from foundations, reinforced concrete structures are damaged, automobile-sized missiles become airborne, trees are completely debarked.	Less than 1%

Source: NOAA National Weather Service. The Enhanced Fujita Scale. <https://www.weather.gov/oun/efscale>

In 2021, there were there were 1,376 tornadoes in the United States, compared with 1,075 in 2020, according to preliminary data from the National Oceanic and Atmospheric Administration (NOAA). Tornadoes killed over 100 people in 2021, including about 90 in the December 10 series of tornadoes. In 2020, 76 people perished in tornadoes.<sup>76</sup> Tornadoes have the potential to create total destruction of structures—especially mobile homes, businesses, and cars—causing many deaths, extensive tree damage along roadways (which may inhibit or block access), extensive damage to electric and telephone lines, utility line breaks, and damaged or destroyed radio and television towers.

## F.2. Location and Extent

A tornado is a hazard event that threatens all of Prince George’s County and the City of Laurel. Prince George’s County has experienced tornadoes ranging from EF0 (minimum severity) to EF3. However stronger tornadoes, up to strongest classification of an EF5, are possible as shown in **Table 64** above. A tornado with a classification of EF1 or above could cause moderate damage at a minimum, resulting in overturned automobiles and uprooted trees.

**Figure 38** summarizes tornado activity in the United States based on the number of recorded tornadoes per 1,000 square miles. Prince George’s County and the City of Laurel are in a zone where they may experience one to five tornados every 1,000 square miles per year.

<sup>76</sup> Insurance Information Institute: <https://www.iii.org/fact-statistic/facts-statistics-tornadoes-and-thunderstorms>

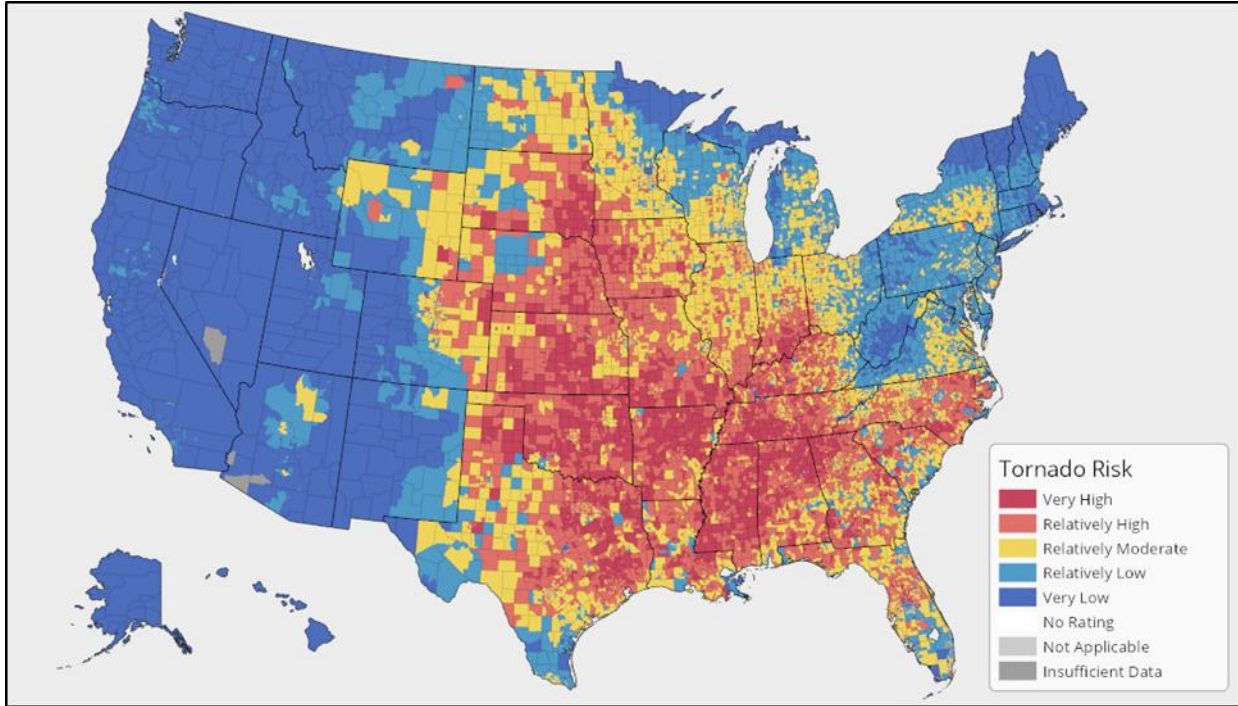


Figure 38: Tornado Activity in the United States<sup>77</sup>

Buildings must be designed to withstand both external and internal wind pressures on the structural framing and exterior elements. The level to which these structures are designed, as expected, directly correlates with the building's ability to resist damage due to high winds. The community's building code dictates the design wind speed to which a structure must be designed; both Prince George's County and the City of Laurel have adopted the 2018 International Building Code.<sup>78</sup> For some building types, the structures constructed after the adoption of the updated building code are likely to be the most resistant to damage from extreme wind.

Tornado damage to a given structure depends on several factors, including the condition of the exposed structures, their design and construction, and the quality of the building materials and connections. The 2015 International Building Code references the American Society of Civil Engineers Standard 7-10, which requires most residential structures to be constructed to withstand a design wind speed of 115 mph (three-second peak gust). However, most structures within the County, including the City of Laurel, were built prior to the adoption of the current building code and current standards. Older buildings, certain construction materials and techniques, manufactured housing, and poorly designed buildings are more vulnerable to tornadoes. When homes are destroyed by tornadoes, residents are impacted by the requirement to rebuild to current standards, which may come at a higher cost. Destruction of commercial buildings and infrastructure could cause employers to move their facilities and operations elsewhere, resulting in a loss of jobs and employees relocating to other areas outside of the County. Major damage to an employer could force temporary or permanent relocation outside of Prince George's County or the City of Laurel negatively impacting employees and tax revenues.

<sup>77</sup> FEMA National Risk Index – Tornadoes: <https://hazards.fema.gov/nri/tornado>

<sup>78</sup> 2015 International Building Code and Subtitle 4 Prince George's County Building Code. <http://www.princegeorgescountymd.gov/1436/Building-Codes-Bulletins>

Buildings must be designed to withstand both external and internal wind pressures on the structural framing and exterior elements. The level to which these structures are designed, as expected, directly correlates with its ability to resist damages due to high winds. The community’s building code dictates the design wind speed to which a structure must be designed. For some building types, the structures constructed subsequent to the adoption of the building code are the most likely to be the most resistant to damages from wind.

Vulnerability to tornadoes is dependent on the geographic extent and magnitude of the event. Damages from lower-intensity tornadoes (EF0) can range from chimney damage to uprooted shallow trees. A significant tornado (EF2) would cause considerable damage to the roofs of frame houses, complete destruction of mobile homes, and large trees and utility lines snapping. A devastating tornado (EF4) would result in well-constructed houses being leveled, weak foundations being blown down, and cars being thrown.

### F.3. Previous Occurrences

Since 1950, there have been 26 recorded tornadoes in the planning area, ranging in intensity from EF0 to EF3.<sup>79</sup> On July 1, 2013 a weak tornado touched down in Prince George’s County in an area south of Clinton and west of Brandywine and reached a maximum speed of 60 mph. This tornado earned an EF-0 ranking, traveled 2.3 miles, and was about 75-yards wide.<sup>80</sup> More recently, an EF-1 tornado touched down in Bowie on July 5, 2022. This tornado’s peak winds were measured at 90 mph and was measured to be 125 yards wide. This 2022 tornado traveled 1 mile before dissipating.<sup>81</sup>

**Table 65** describes tornado events, intensity rating, deaths, injuries, and damages within the past ten years from the NCEI Storm Events Database. **Table 66** summarizes all the annualized NCEI historic data for tornadoes since 1950 in Prince George’s County. Previous occurrences, including the most recent July 2022 tornado in Bowie, may be found in **Appendix C**. There are two reported deaths and 60 reported injuries due to tornadoes in Prince George’s County between 1950-2022 recorded in the NCEI database. Both of these deaths and 55 of the total injuries occurred during a tornado in September 2001, which also caused \$100 million in damages. As illustrated in the table, most tornadoes occur in the spring, and tornado outbreaks can occur which spawn several tornadoes in the same day.

Table 65: NCEI Recent Tornado History 2012-2022

Fujita Scale	Date	Community Affected	Deaths	Injuries	Total Property Damages	Total Damages
EF1	05 Jul 2022	Bowie	0	0	\$250,000	\$250,000
EF0	29 Sep 2015	Laurel	0	0	\$0	\$0
EF0	01 Jul 2013	Crestview Manor	0	0	\$500	\$100,000

<sup>79</sup> NWS/NOAA Storm Events Database:

[https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Tornado&beginDate\\_mm=01&beginDate\\_dd=01&beginDate\\_yyyy=1950&endDate\\_mm=07&endDate\\_dd=31&endDate\\_yyyy=2022&county=PRINCE%20BGEORGE%2527S%3A33&hifilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitButton=Search&statefips=24%2CMARYLAND](https://www.ncdc.noaa.gov/stormevents/listevents.jsp?eventType=%28C%29+Tornado&beginDate_mm=01&beginDate_dd=01&beginDate_yyyy=1950&endDate_mm=07&endDate_dd=31&endDate_yyyy=2022&county=PRINCE%20BGEORGE%2527S%3A33&hifilter=0.00&tornfilter=0&windfilter=000&sort=DT&submitButton=Search&statefips=24%2CMARYLAND)

<sup>80</sup> WTOP News: <https://wtop.com/news/2013/07/weak-tornado-confirmed-in-prince-georges-co/>

<sup>81</sup> Washington Post: <https://www.washingtonpost.com/weather/2022/07/06/bowie-tornado-formation-prince-georges/>

Fujita Scale	Date	Community Affected	Deaths	Injuries	Total Property Damages	Total Damages
EF0	19 Apr 2013	Westphalia	0	0	\$25,000	\$30,000
EF0	01 Jun 2012	Buena Vista	0	0	\$2,000	\$2,000

Table 66: NCEI Historic Tornado Event Data

Event Type	Number of Events	Period of Record	Total Annualized Damage	Annualized Deaths	Annualized Injuries	Annualized Events
Tornado	26	1950-2022	\$1,548,020	0.03	0.83	0.36

#### F.4. Probability of Future Events

Based on the NCEI historic records of tornado activity in Prince George’s County, it is estimated that the County will experience about one tornado event approximately every three or four years.

Climate change may affect the possibility of future tornadoes, but a lack of reliable historical data tracking affects the measurement of this possibility. According to the US Fourth National Climate Assessment, tornadoes are exhibiting changes that may be linked to climate change, but scientific understanding is not yet detailed enough to confidently project the direction and magnitude of future change.<sup>82</sup> There is a need for further research into the effect of climate change on tornado probability.

#### F.5. Vulnerability and Risk Assessment

A tornado manifests as a high-impact, low-probability hazard whose effect is dependent on its intensity and the type of development in its path. Tornado vulnerability is based on building construction standards, the availability of shelters or safe rooms, and advanced warning capabilities. Even well-constructed buildings are vulnerable to the effects of a stronger (generally EF2 or higher) tornado. Identifying assets within the County and City exposed to tornado events is virtually impossible since tornadoes are so unpredictable. It can be assumed that every structure has an equal chance of exposure to a tornado event. Therefore, all of the assets of Prince George’s County and the City of Laurel are included in the current and future tornado hazard area.

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for tornado. These scores and ranks are shown in **Table 67**, which shows the State’s ranking for tornado vulnerability in Prince George’s County (including the City of Laurel) as high.

<sup>82</sup> US Global Change Research Program’s Fourth National Climate Assessment: [https://nca2018.globalchange.gov/downloads/NCA4\\_2018\\_FullReport.pdf](https://nca2018.globalchange.gov/downloads/NCA4_2018_FullReport.pdf)



Table 67. 2021 State of Maryland Tornado Hazard Ranking and Risk for Prince George’s County

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	2
Deaths	4
Property Damage	4
Crop Damage	1
Geographic Extent	4
Events	2
Local Plan Ranking (2017)	5
<b>Overall Weighted Risk Rating<sup>83</sup></b>	<b>30</b>
<b>Overall Ranking</b>	<b>High</b>

The Federal Emergency Management Agency’s (FEMA) National Risk Index rates the risk level of a location for different types of disasters. This index breaks the rating down into three components: expected annual loss, social vulnerability, and community resilience. For a tornado disaster, FEMA’s risk assessment for the County is rated as “relatively moderate.” **Figure 39** shows the County’s tornado Risk Index rating and the surrounding County’s ratings. The breakdown of this risk for Prince George’s County is as follows:

- Expected Annual Loss: Relatively Moderate
- Social Vulnerability: Relatively Low
- Community Resilience: Relatively Moderate

Prince George’s County’s risk level is relatively high when compared to both the state and national levels.<sup>84</sup> According to the Nation Risk Index, 81.7% of U.S. counties have a lower Risk Index and 83.3% of counties in Maryland have a lower Risk Index for tornadoes than Prince George’s County.

<sup>83</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

<sup>84</sup> FEMA National Risk Index. <https://hazards.fema.gov/nri/map>

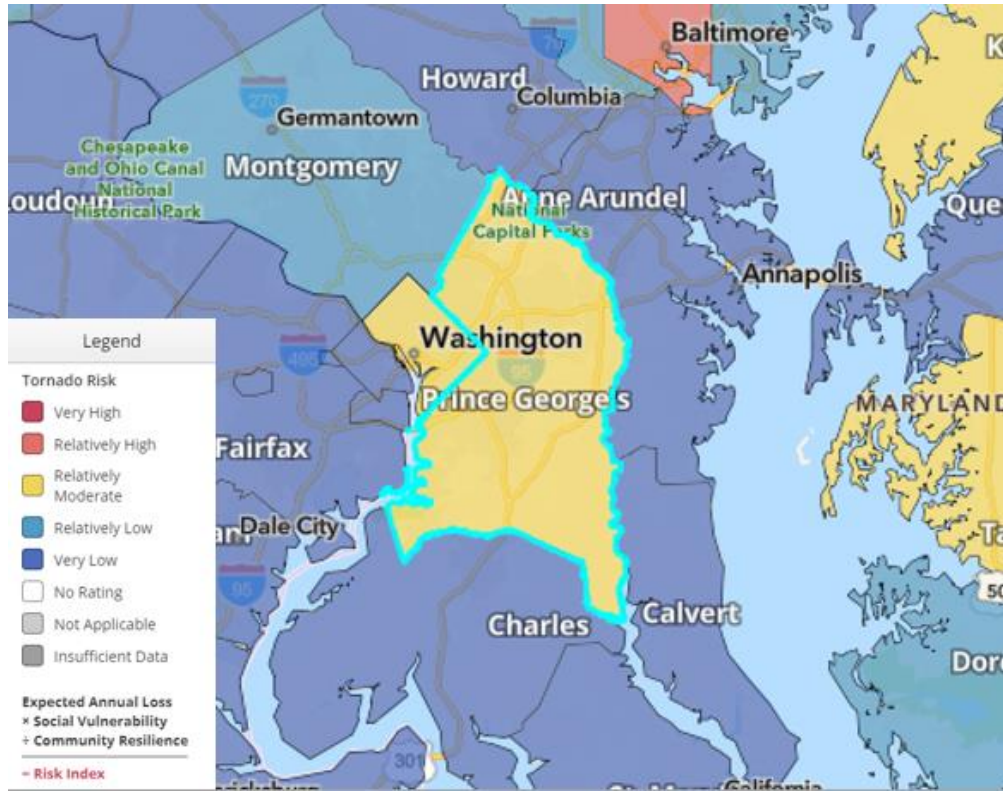


Figure 39: FEMA National Risk Index for Tornadoes in Prince George's County

A generalized loss estimate for the County was derived from NCEI Storm Events data. The data were annualized by taking the total number of damaging tornado events and dividing it by the length of the record (2012 to 2022 - 10 years). The annualized values should only be utilized as an estimate of what can be expected each year since they are averaged from historical occurrences. As shown in **Table 66**, above, the NCEI data illustrates that, on average, \$38,200 could be lost in annual damages (nearly all of it property damage).

As evidenced in the loss figures, tornadoes have the potential to be very destructive. The NCEI estimates are believed to be an underrepresentation of the actual losses experienced, as numerous losses from events are not reported or are difficult to quantify. In this way, the NCEI database, and any similar databases, are incomplete.

Often tornadoes come with little to no warning; Therefore, most of the affected population should shelter-in-place when possible. The Maryland state government website recommends seeking shelter in a nearby sturdy building (preferably in a basement) or storm shelter if a person is in a mobile home or outdoors. If a person is in a building with multiple floors, then they should go to the lowest floor or basement.<sup>85</sup>

## F.6. Consequence Analysis

A consequence analysis (refer to **Table 68**) has been done to better understand the range of impacts that a tornado event can have on several features of the planning area and the population within it.

<sup>85</sup> Maryland State Government. <https://mdem.maryland.gov/Pages/resources-Tornadoes.aspx>

Table 68. Tornado Consequence Analysis

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	Tornadoes can have severe impacts on life safety. Tornadoes can occur without warning, and reaction time may be short. Injuries or loss of life can result when people out in the open are in or near a tornado's path; exposed individuals can be picked by tornado winds or struck by debris. People inside structures that are impacted by tornadoes may suffer injuries or death if trapped in a collapsed building or struck by flying or falling objects. If possible, residents should evacuate prior to a tornado.
<b>Public Health</b>	Public health issues from tornadoes can include water contamination, as well as potential for fire and gas leaks. Damages to certain exposed infrastructure, such as pipelines or septic tanks, can result in hazardous materials spills and leaks.
<b>Critical Facilities and Infrastructure</b>	All critical facilities and infrastructure in the County is considered at-risk to tornadoes. Above-ground infrastructure in the path of a tornado can suffer extensive damage and/or complete destruction. When roads close, other transportation routes must be determined.
<b>Economy</b>	A major tornado event would be costly for local governments because of the potential for damages associated with property, debris generation, 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.
<b>Buildings</b>	Home and landowners throughout the state may experience varying levels of damage to property depending upon the severity of winds in the area. Infrastructure may experience impacts in the form of blowing debris, and interruptions to above ground power and communication systems.

## G. Extreme Heat

### G.1. Description

Prolonged periods of unusually high temperatures, generally accompanied by high humidity, characterize the hazard of extreme heat in the Mid-Atlantic region. The “heat index” is a measure of the combined effects of temperature and relative humidity to produce the perceived temperature. For example, a temperature of 100°F “feels like” 109°F when the relative humidity is 40%. The National Weather Service heat index chart is shown in **Figure 40**, and indicates the potential for heat-related disorders under prolonged exposure and/or strenuous physical activity.

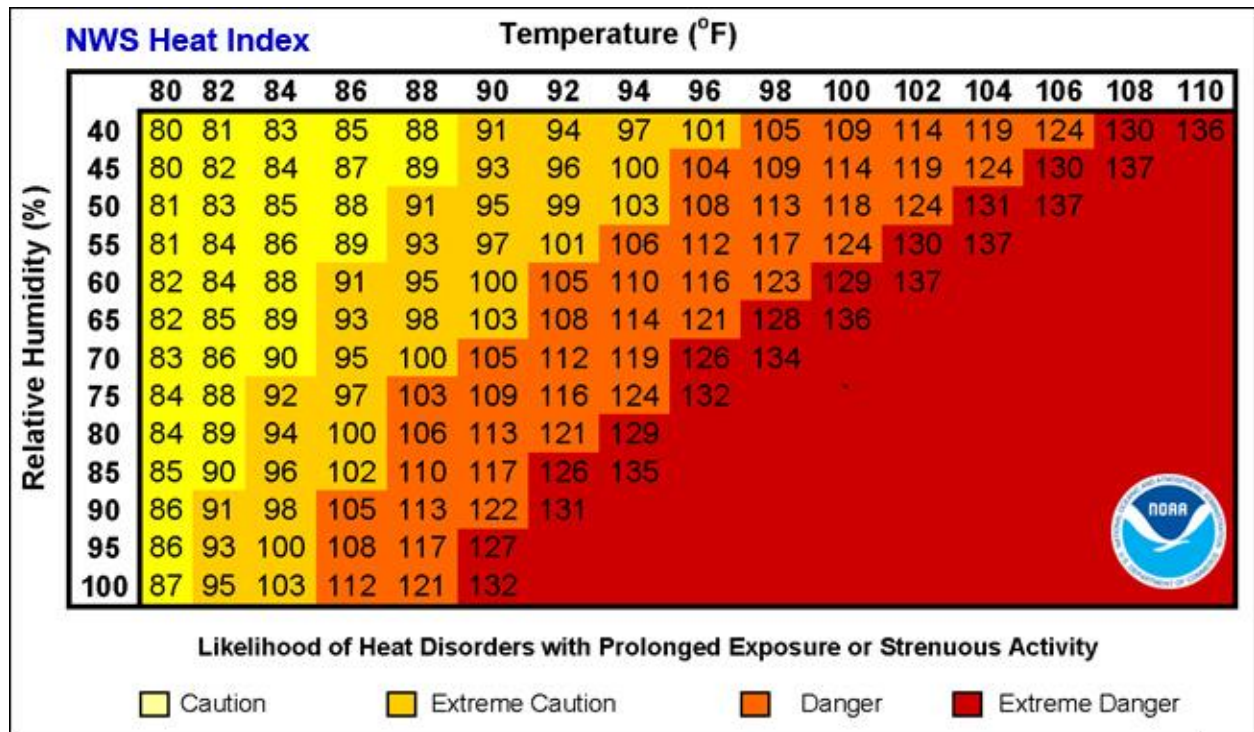


Figure 40: National Weather Service Heat Index Chart

### G.2. Location and Extent

Although extreme heat events will impact the entire county, the impact of extreme heat is most prevalent in urban areas, where the urban heat-island effect prevents densely developed areas from releasing the heat that is built up during the day. Secondary impacts of extreme heat are a severe strain on the electrical power system and potential brownouts or blackouts.

Extreme heat combined with high relative humidity slows evaporation, limiting the body’s ability to cool itself efficiently. Overexposure may result in heat exhaustion or stroke, which could lead to death. The

Centers for Disease Control and Prevention state that excessive heat exposure caused 15,707 deaths in the United States between 1999 and 2020.<sup>86</sup>

For excessive heat, the National Weather Service uses heat index thresholds as criteria for the issuance of heat advisories and excessive heat warnings. National Weather Service heat advisory bulletins inform citizens of forecasted extreme heat conditions. The bulletins are based on projected or observed heat index values and include:

- Excessive Heat Outlook: there is a potential for an excessive heat event within three to seven days.
- Excessive Heat Watch: conditions are favorable for an excessive heat event within 12 to 48 hours, but some uncertainty exists regarding occurrence and timing.
- Excessive Heat Warning/Advisory: an excessive heat event is expected within 36 hours.<sup>87</sup>

These products are usually issued when confidence is high that the event will occur. A warning implies that conditions could pose a threat to life or property, while an advisory is issued for less serious conditions that may cause discomfort or inconvenience but could still lead to threat to life and property if caution is not taken. The record heat temperature in Maryland was 109 degrees Fahrenheit in 1936, and higher is possible in Prince George's County.<sup>88</sup>

Urban areas with less tree canopy cover and high amounts of heat absorbing surfaces such as pavement and buildings are more likely to experience higher temperatures during heat events. These urban areas can become heat islands, with higher daytime temperature, reduced nighttime cooling, and higher air-pollution levels. Heat islands can also exacerbate the impact of naturally occurring heat waves, which are periods of abnormally hot, and often humid, weather. Sensitive populations are particularly at risk during these events. Urban heat island severity in the City of Laurel is shown in **Figure 41**. Severity is measured on a scale of 1 to 5, with 1 being a relatively mild heat area (slightly above the mean for the city), and 5 being a severe heat area (significantly above the mean for the city).

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<sup>86</sup> National Center for Environmental Health, Centers for Disease Control. QuickStats: Deaths Involving Exposure to Excessive Heat, by Sex — National Vital Statistics System, United States, 1999–2020 (cdc.gov)

<sup>87</sup> National Weather Service. Heat Watch vs. Warning. <https://www.weather.gov/safety/heat-ww>

<sup>88</sup> NCEI. State Climate Extremes Committee. Records. <https://www.ncei.noaa.gov/access/monitoring/scec/records>

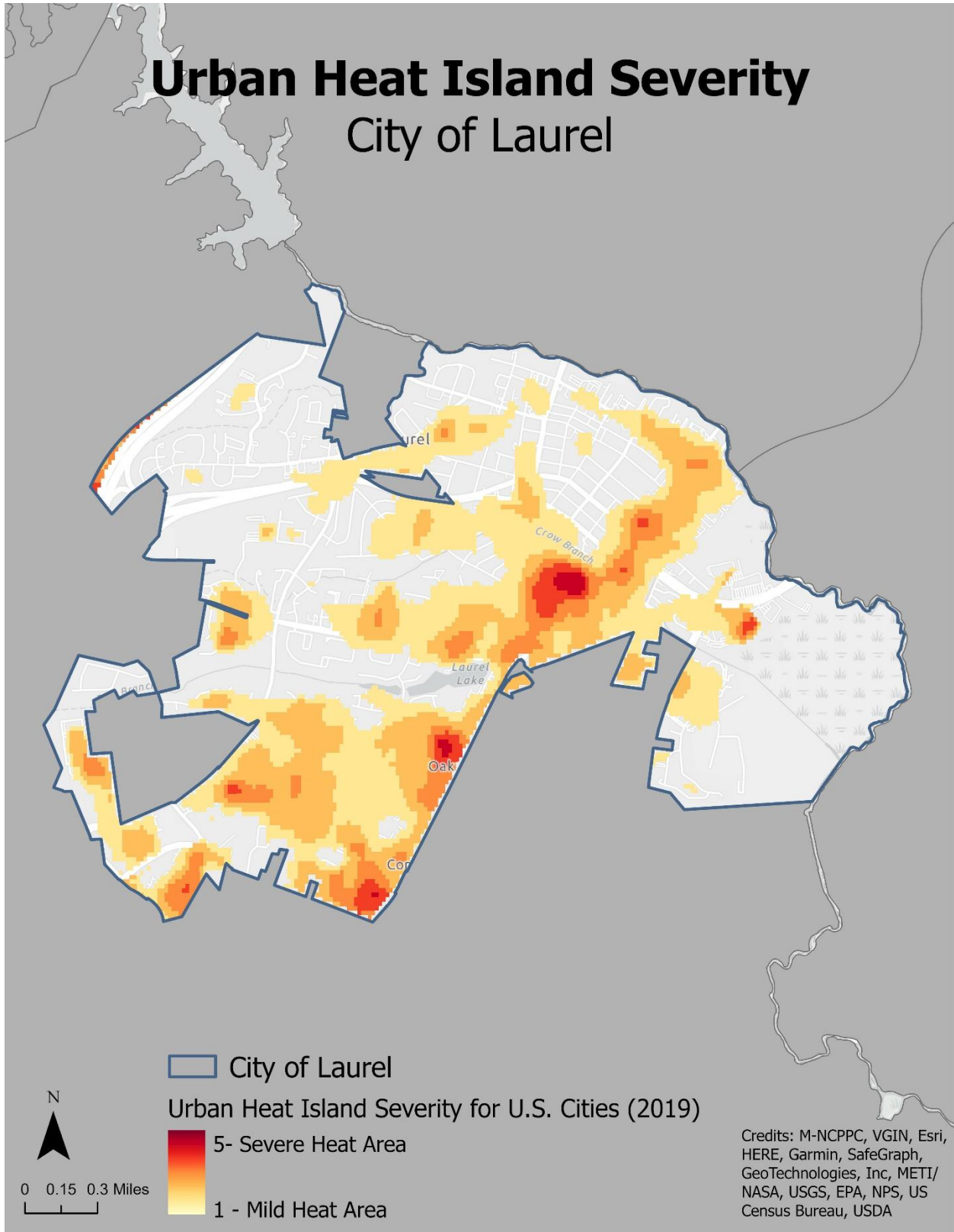


Figure 41: Urban Heat Island Severity in the City of Laurel

### G.3. Previous Occurrences

According to National Centers for Environmental Information (NCEI) data on “heat” and “excessive heat” events, there are a total of 68 extreme heat events that have been recorded in Prince George’s County between 1950 and 2022, including 59 heat events and nine excessive heat events. An “excessive heat” event results from a combination of high temperatures (well above normal) and high humidity. An “excessive heat” event occurs and is reported in the NCEI Storm Events Database whenever heat index values meet or exceed locally or regionally established excessive heat warning thresholds. A “heat” event is defined as period of heat resulting from the combination of high temperatures (above normal) and relative humidity. A “heat” event occurs and is reported in the NCEI Storm Events Database whenever heat index values meet or exceed locally or regionally established advisory thresholds.<sup>89</sup> The total annualized damages, deaths, injuries, and the number of events are summarized in **Table 69**.

*Table 69: NCEI Historic Heat and Excessive Heat Event Data*

Event Type	Number of Events	Period of Record	Total Annualized Damage	Annualized Deaths	Annualized Injuries	Annualized Events
Heat	59	1950-2022	\$0	0.14	0.56	0.82
Excessive Heat	9	1950-2022	\$0	0.03	0.00	0.10
<b>Total</b>	<b>68</b>	<b>1950-2022</b>	<b>\$0</b>	<b>0.17</b>	<b>0.56</b>	<b>0.92</b>

A closer review of the NCEI Storm Events Database reveals four notable periods of extreme heat within the last twenty years:

- In July 2010, a ridge of high pressure aloft along with a southwest flow around surface high pressure resulted in hot and humid conditions during the Fourth of July through the 8th. Temperatures on the 6th and 7th of July soared past 100 degrees. Prince George’s County authorities reported that twenty-eight people were taken to the hospital due to heat-related illnesses from July 4th through July 8th.
- In July 2011, a strong upper-level high pressure build-up over Prince George’s County led to heat indices as high as 120 degrees. Hot and humid conditions led to numerous reports of heat-related illnesses in the region. Heat indices up to 118 degrees were reported at Andrews Air Force Base. Unfortunately, one fatality was reported due to the high heat in the County.
- In July 2018, a southerly flow caused hot and humid conditions over a two-day period. The Maryland Department of Health reported two fatalities in Prince George’s County due to the heat over a two-day period when heat indices were close to 100 degrees.
- In July 2020, the County had the hottest summer on record, with 26 straight days of 90-degree heat or higher.

<sup>89</sup> National Weather Service. Storm Data Preparation (2021). NWSI 10-1605, Storm Data Preparation (noaa.gov)

## G.4. Probability of Future Events

Based on the NCEI historic records of heat-related events in Prince George's County, it is estimated that that county will experience about three extreme heat or excessive heat events annually. According to climate projections from Climate Mapping for Resilience and Adaptation Assessment Tool, there will be a significant increase in extreme heat days in Prince George's County and the City of Laurel through the end of this century due to climate change, increasing by 21 days from early century to late century under the lower emissions scenario and 48 days under the higher emissions scenario.<sup>90</sup> As extreme heat days increase, the frequency of extreme heat events will also increase, putting County residents at a higher risk of heat-related death and illnesses.

## G.5. Vulnerability and Risk Assessment

Extreme heat has social, economic, and environmental impacts. People, especially the elderly, outdoor laborers, children, and individuals in poor physical health, are more vulnerable to heat-related illnesses (e.g., heat exhaustion) and death (heat stroke). The most at-risk districts which contain the largest population of elderly residents are Districts 1, 5, 6, and 8. These districts, therefore, have a greater vulnerability to heat as well; this can be seen in **Figure 42**. Prolonged periods of extreme heat would lead to agricultural/horticultural losses. NCEI's online data indicate 12 deaths and 40 injuries attributed to extreme heat in Prince George's County between 1997 and 2022.

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<sup>90</sup> Climate Mapping for Resilience and Adaptation Assessment Tool (2022)



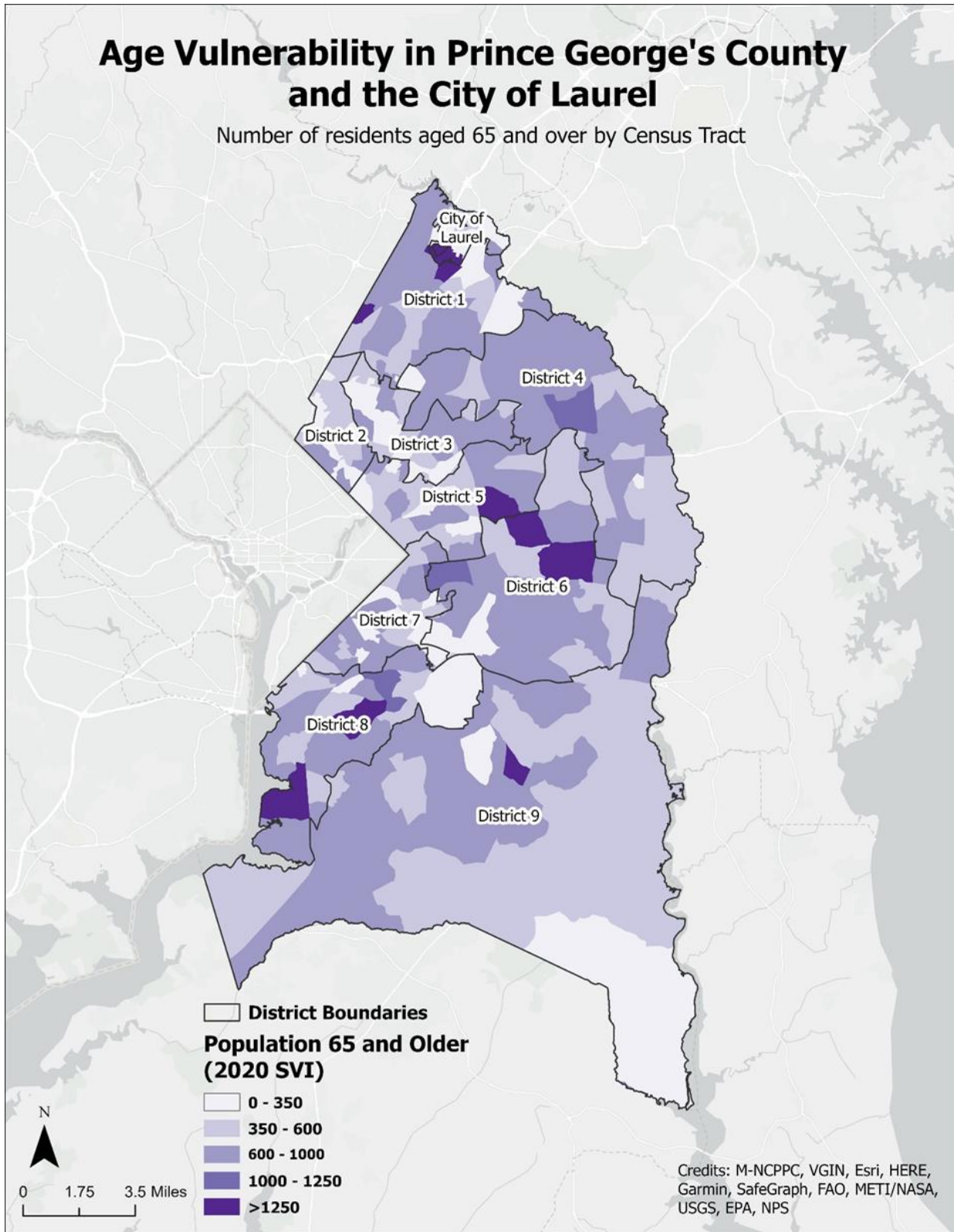


Figure 42: Age Vulnerability in Prince George's County and the City of Laurel

The relative vulnerability of different planning areas may be derived by combining a measure of the population of seniors with estimated agricultural losses. The results indicate the following planning areas have relatively higher vulnerability to extreme heat: Langley Park; Greenbelt; Bladensburg- New Carrollton; Bowie; Landover; Largo-Lottsford; Suitland-District Heights; The Heights; and Henson Creek.

Environmental impacts of extreme heat include damage to crops, impacts to wildlife, and increased propensity towards drought. Extreme heat events can also impact the economy through loss of crops and business disruption from direct and cascading high temperature impacts. Heat waves and extreme heat events also often lead to poor air quality. The extreme heat and stagnant air during a heat wave increases the amount of ozone pollution and particulate pollution in the air. Poor air quality can lead to health problems, including difficulty breathing and chest pain.

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for extreme temperature (heat and cold are considered together by the State). These scores and ranks are shown in **Table 70**, which shows the State’s ranking for extreme temperature vulnerability in Prince George’s County (including the City of Laurel) as medium-high.

*Table 70. 2021 State of Maryland Extreme Temperature Hazard Ranking and Risk for Prince George’s County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	1
Deaths	1
Property Damage	1
Crop Damage	1
Geographic Extent	3
Events	2
Local Plan Ranking (2017)	3
<b>Overall Weighted Risk Rating<sup>91</sup></b>	<b>18.5</b>
<b>Overall Ranking</b>	<b>Medium-High</b>

### G.5.a. Population Exposure

All of Prince George’s County and the City of Laurel are vulnerable to extreme heat. Residents with respiratory illnesses or other underlying health conditions, children, and the elderly are all more vulnerable to extreme heat than others. Outdoor workers in the County are also more vulnerable to extreme heat and have a higher chance of suffering heat-related illnesses on extreme heat days.

<sup>91</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

Residents that live in structures with limited air conditioning or ventilation may also be at higher risk during extreme heat events, especially when an event lasts for several days.

Populations living in areas with low tree cover are also more vulnerable to the impacts of extreme heat. In cities in America, trees have historically been planted along race and class lines. A Tree Equity Score can be used as a metric to help cities assess how well they are delivering equitable tree canopy cover to all residents. The score combines measures of tree canopy cover need and priority for trees in urban neighborhoods (defined as Census Block Groups). It is derived from tree canopy cover, climate, demographic and socioeconomic data. **Figure 43** shows tree equity score by municipality in Prince George's County and the City of Laurel. The majority of the County has a high Tree Equity Score, which indicates that there is no gap in the tree canopy in those areas, and people living in those areas would be less likely to experience extreme heat impacts that may arise due to lack of tree canopy cover.

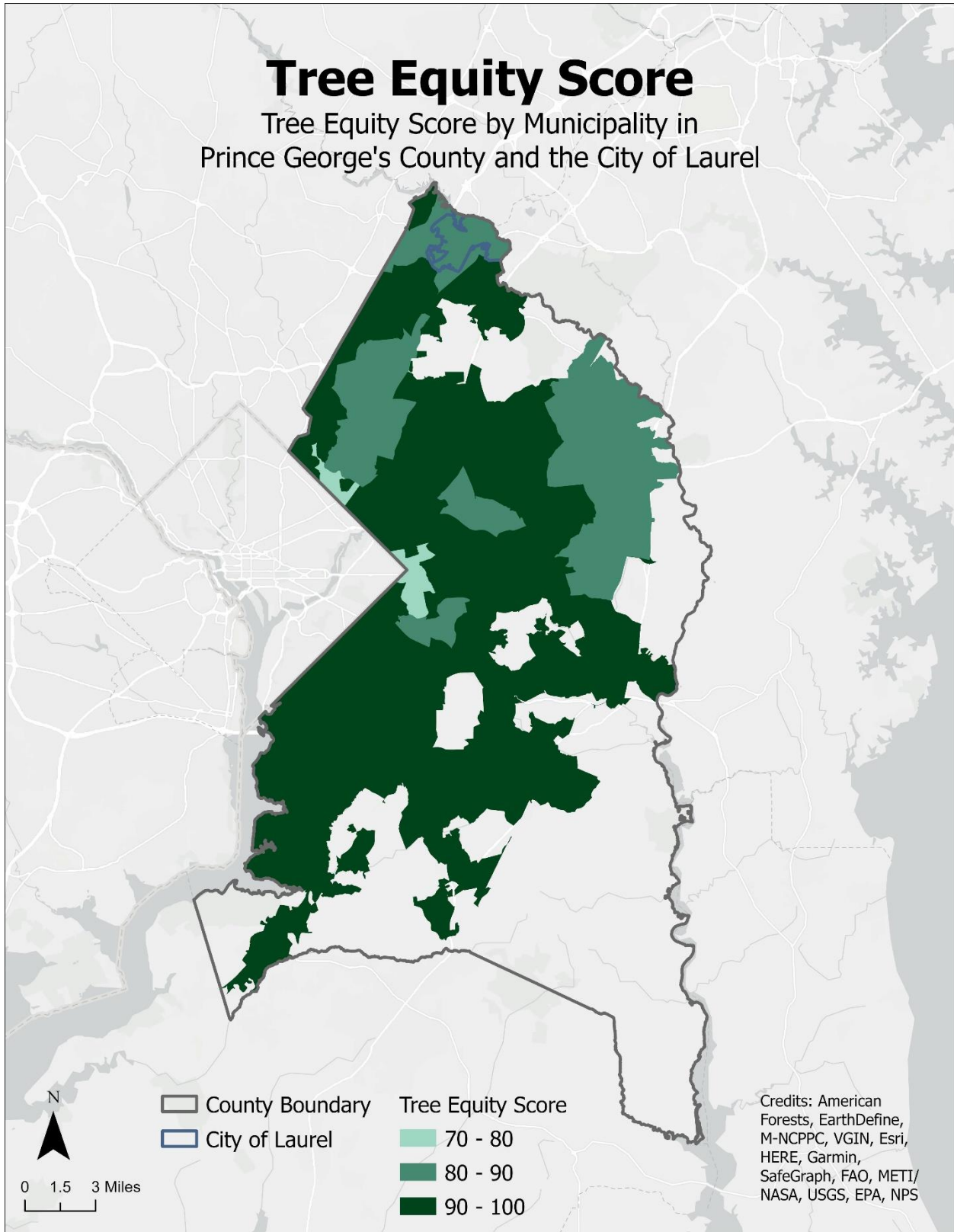
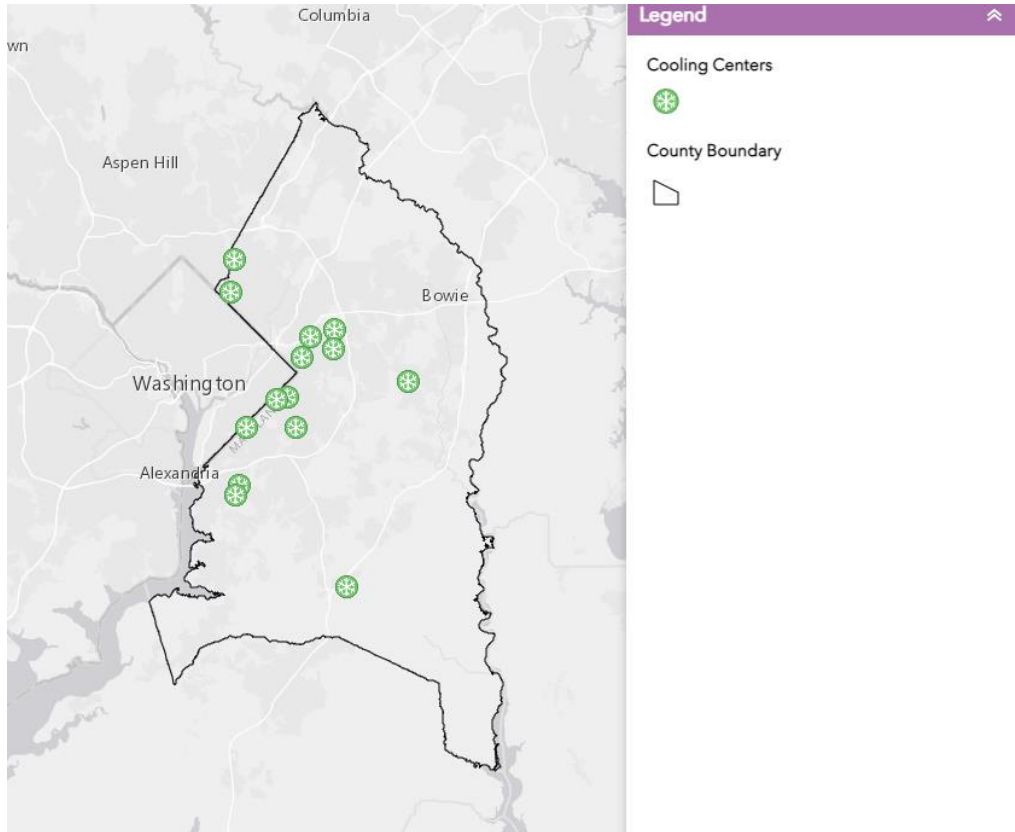


Figure 43: Prince George's County Tree Equity Score

The County offers cooling stations for vulnerable residents who may not have air conditioning or are sensitive to heat on days when temperatures reach 90 degrees or higher. These cooling stations are primarily located at parks throughout the County, and can be located on an online map viewer tool, shown in **Figure 44**. Residents can also call 3-1-1 to learn more about cooling center hours of operation and location.



*Figure 44: Cooling Centers in Prince George's County*

### **G.5.b. Future Development**

As future development occurs, residents that live in developed and urban areas with low tree canopy cover and high amounts of heat-absorbing surfaces, such as pavement, are more likely to be affected by extreme heat. These developed areas can become urban heat islands, which have higher average temperatures than areas with more tree cover and less heat-absorbing surfaces. Heat-absorbing surfaces such as roadways and railroads can also be impacted by extreme heat events, such as when asphalt surfaces soften or buckle or rails deform.

As seen in **Figure 45**, tree canopy cover is less dense in the more populated areas of the County, including Districts 1, 2, 3, 4, 5, 7, and the City of Laurel. There is an additional large gap in the tree canopy cover at Andrews Airforce Base, as expected. These areas with low tree canopy cover and high development are at an increased risk of extreme heat impacts.

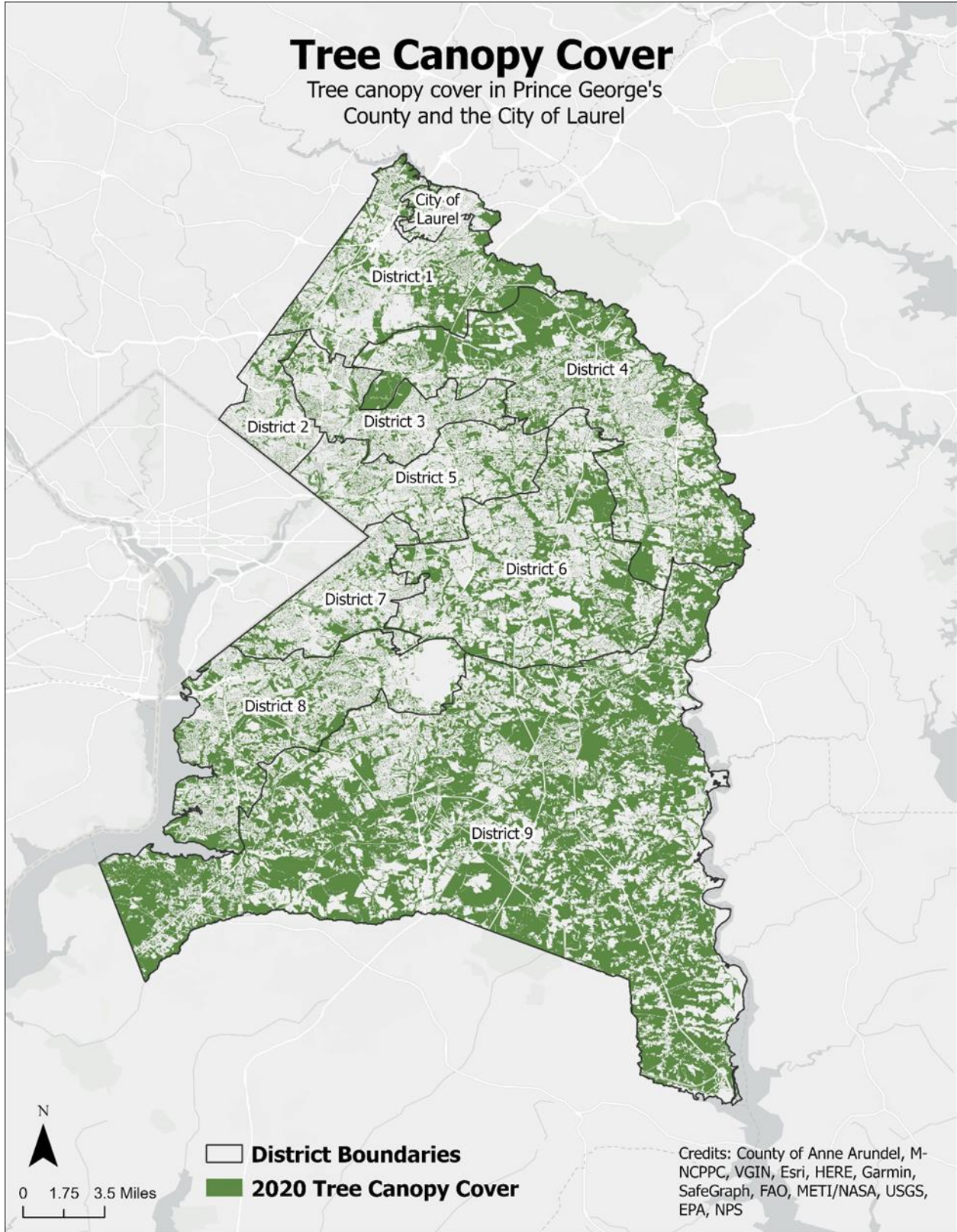


Figure 45: Tree Canopy Cover in Prince George's County and the City of Laurel

## G.6. Consequence Analysis

A consequence analysis (refer to **Table 71**) has been done to better understand the range of impacts that an extreme heat event can have on several features of the planning area and the population within it.

*Table 71. Extreme Heat Consequence Analysis*

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	All of Prince George's County and the City of Laurel are vulnerable to extreme heat. Urban areas are exposed more acutely to the dangers of extreme heat due to the urban heat island effect.
<b>Public Health</b>	Residents with respiratory illnesses or other underlying health conditions, children, and the elderly are all more vulnerable to extreme heat than others. Additionally, extreme heat negatively impacts air quality by increasing the amount of ground-level ozone (or smog). Worsened air quality can aggravate existing respiratory illnesses, and long-term exposure can result in decreased lung function.
<b>Critical Facilities and Infrastructure</b>	Critical facilities may be impacted by extreme heat if the structure collapses or buckles. Infrastructure may be impacted when asphalt surfaces soften or buckle, or rails deform due to the heat. Additionally, power consumption for air-conditioned environments may increase, stressing utility infrastructure, and resulting in blackouts.
<b>Economy</b>	Extreme heat can lead to decreased agricultural productivity. Indirect losses due to business interruption in the case of a power outage or road buckling during an extreme heat event. Increasing temperatures will increase the demand for electricity, increasing electricity costs.
<b>Buildings</b>	Extreme heat events generally have limited impact on buildings. However, in some rare cases extreme heat can cause structures to collapse or buckle.

## H. Winter Storm

### H.1. Description

Winter storms come in many forms and can include heavy snow, freezing rain, and/or high winds. Snow typically maintains its crystalline structure from the clouds where it forms until it reaches the ground surface. Freezing rain may have started in the clouds as either rain or snow but reaches the surface as a liquid that freezes on contact with power lines, tree limbs, vehicles, buildings, and the ground when temperatures are below freezing. Freezing rain can accumulate on these surfaces resulting in an ice coating. Sleet reaches the surface in the form of clear pellets of ice that bounce upon contact. Winter winds can produce extremely low temperatures and create snow drifts which can impact mobility in the region.

The severity of a winter storm is often relative to the conditions that the area of focus is accustomed to. There are some standardized tools that can be used to provide estimates on expected storm impacts, such as the National Weather Service's Winter Storm Severity Index. The Winter Storm Severity Index shows extent by communicating how disruptive a storm will be to a community based on the significance of impacts.<sup>92</sup> The relative conditions of the area are considered, such as population, location, and storm characteristics. **Table 72** shows the Winter Storm Severity Index.

*Table 72: NOAA Winter Storm Severity Index*

Impact Level	Potential Impacts
No Impacts	Impacts not expected.
Limited Impacts	Rarely a direct threat to life and property. Typically results in little inconveniences.
Minor Impacts	Rarely a direct threat to life and property. Typically results in an inconvenience to daily life.
Moderate Impacts	Often threatening to life and property, some damage unavoidable. Typically results in disruptions to daily life.
Major Impacts	Extensive property damage likely, lifesaving actions needed. Will likely result in major disruptions to daily life.
Extreme Impacts	Extensive and widespread severe property damage, lifesaving actions will be needed. Results in extreme disruptions to daily life.

<sup>92</sup> NOAA. Winter Storm Severity Index. <https://www.wpc.ncep.noaa.gov/wwd/wssi/wssi.php>



## H.2. Location and Extent

Winter storms affect the entirety of Prince George’s County including the City of Laurel. While the probability of a winter storm occurring is roughly the same in all parts of the region, the risk of damage will vary depending on infrastructure and population density. During and following winter storm events, there is a high probability for traffic accidents and traffic jams due to snow and ice. Roads may become impassable, inhibiting the ability of emergency equipment to reach trouble spots and the accessibility of medical and shelter facilities.

## H.3. Previous Occurrences

Between 1950 and 2022, the NCEI database has recorded a total of 132 events that involve blizzard, heavy snow, winter storm, winter weather, and ice storm in Prince George’s County.<sup>93</sup> There have been 3 blizzard events, 10 heavy snow events, 31 winter storm events, 84 winter weather events, and 4 ice storms. Annualized damages, deaths, injuries, and number of events are summarized in **Table 73**.

*Table 73: NCEI Historic Winter Weather Event Data*

Event Type	Number of Events	Period of Record	Total Annualized Damage	Annualized Deaths	Annualized Injuries	Annualized Events
Blizzard	3	1950-2022	\$417	0.01	0.00	0.04
Heavy Snow	10	1950-2022	\$278	0.00	0.00	0.14
Winter Storm	31	1950-2022	\$13,958	0.00	0.13	0.43
Winter Weather	84	1950-2022	\$0	0.00	0.00	1.17
Ice Storm	4	1950-2022	\$486	0.00	0.00	0.06
<b>Total</b>	<b>132</b>	<b>1950-2022</b>	<b>\$15,139</b>	<b>0.01</b>	<b>0.13</b>	<b>1.84</b>

Based on data from the National Centers for Environmental Information, the total average annual snowfall within Prince George’s County between 2006 and 2020 was 15.2 inches.<sup>94</sup>

<sup>93</sup> For this section the following NCEI database event types were used to generalize the winter storms section: blizzard, heavy snow, winter storm, winter weather, and ice storm.

<sup>94</sup> National Centers for Environmental Information. U.S. Climate Normals 2020: U.S. Monthly Climate Normals (2006-2020) - Beltsville, MD. National Centers for Environmental Information (NCEI). Retrieved October 31, 2022, from <https://www.ncei.noaa.gov/access/search/data-search/normals-monthly-2006-2020?bbox=40.386%2C-77.727%2C37.250%2C-74.591&pageNum=1>

However, as shown during the blizzard of 1996 and other events, winter storms producing higher snowfall amounts are possible. Over the past three decades, areas of Prince George's County have recorded 24-hour snowfall totals as high as 22 inches.<sup>95</sup>

#### H.4. Probability of Future Events

Based on the NCEI database, Prince George's County and the City of Laurel have a high probability of experiencing all types of winter weather events. NCEI winter weather events occur about four times annually (4.7 annual occurrences), winter storm events occur once or twice each year (1 annual occurrences), heavy snow events rarely occur (0 annual occurrences), and blizzards and ice storms happen about once every three to five years (0.3 and 0.2 annual occurrences, respectively).

According to the *Fourth National Climate Assessment* (NCA4) chapter on the Northeast, “winters have warmed three times faster than summers” in recent years and this trend is expected to continue, likely resulting in a shorter and less pronounced cold season with fewer frost days and a longer transition out of winter into the growing season. Moreover, the NCA4 projects a shorter snow season, fewer days below freezing, and more winter precipitation falling as rain rather than snow. Despite these trends, the future probability of winter weather events remains highly likely.<sup>96</sup>

#### H.5. Vulnerability and Risk Assessment

The entire county can be impacted by winter storm events. Severe winter storms can cause loss of utilities, increases in traffic accidents, and impassable roads. Snow and ice can be extremely hazardous to drivers because visibility is reduced, and surface accumulation reduces traction and strains power lines, roofs, and other structures. Populations without access to shelter or heat may be more vulnerable to the impacts of winter storm events. Severe winter storms have been and will continue to be a significant threat to the economic and social well-being of Prince George's County and the City of Laurel. Disruptions of emergency and other essential services and critical facilities are the main threats to people and property.

Vulnerability to the effects of winter storms on buildings depends on the age of the building (and the building codes in effect at the time of construction), type of construction, and condition of the structure (i.e., how well it has been maintained, materials used, etc.). The impacts of winter storms are usually minimal in terms of property damage and long-term effects. The most notable impact from winter storms is damage to power distribution networks and utilities and the impacts on transportation, debris removal and utility restoration. Severe winter storms have the potential to inhibit community services. Government costs for these events include overtime personnel wages and equipment, or contractors for road clearing. Private-sector losses are attributed to time lost when employees are unable to travel. Homes and businesses suffer damage when electric service is interrupted for long periods of time. After several severe winter storms during the plan update period the Potomac Electric Power Company (PEPCO) reorganized its response structure to improve power restoration after severe events.

Health threats can become severe when frozen precipitation makes roadways and walkways very slippery, prolonged power outages occur, and fuel supplies are jeopardized. Occasionally, buildings may be damaged when snow loads exceed the design capacity of their roofs or trees fall due to excessive ice

<sup>95</sup> National Oceanic and Atmospheric Administration. (2022, March 3). NOWData - NOAA Online Weather Data. Climate. Retrieved October 31, 2022, from <https://www.weather.gov/wrh/climate?wfo=lx>

<sup>96</sup> Fourth National Climate Assessment, Volume II, Impacts, Risks, and Adaptation in the United States, Chapter 18: “Northeast.” U.S. Global Change Research Program. 2018; revised February 2020. Available at: <https://nca2018.globalchange.gov/chapter/18/>

accumulation on branches. The water content of snow can vary significantly from one storm to another and can drastically impact the degree to which damage might occur. In snow events that occur at temperatures at or even above freezing, the water content of the snowfall is generally higher. Higher water content translates into a heavier, “wet” snowfall that more readily adheres to power lines and trees, increasing the risk of their failure. Roof collapse is also more of a concern with wetter, heavier snowfall.

Clearing of roadways and sidewalks is usually easier with drier, more powdery snow which is also less likely to accumulate on power lines and trees. This type of snow generally occurs in temperatures below freezing, as water content decreases with temperature. The primary impact of excessive cold is an increased risk for frostbite, and potentially death, as a result of over-exposure to extreme cold. Secondary effects of extreme/excessive cold include frozen water pipes in homes and businesses.

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for winter storm. These scores and ranks are shown in **Table 74**, which shows the State’s ranking for winter storm vulnerability in Prince George’s County (including the City of Laurel) as high.

*Table 74. 2021 State of Maryland Winter Storm Hazard Ranking and Risk for Prince George’s County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	2
Deaths	4
Property Damage	2
Crop Damage	2
Geographic Extent	4
Events	4
Local Plan Ranking (2017)	4
<b>Overall Weighted Risk Rating<sup>97</sup></b>	<b>29.5</b>
<b>Overall Ranking</b>	<b>High</b>

## H.6. Consequence Analysis

A consequence analysis (refer to **Table 75**) has been done to better understand the range of impacts that a winter storm event can have on several features of the planning area and the population within it.

<sup>97</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

Table 75. Winter Storm Consequence Analysis

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	The primary life safety impact of excessive cold is an increased risk for frostbite, and potentially death, as a result of over-exposure to extreme cold. Health hazards related to walking and snow removal, including falling on ice or slippery surfaces, are frequent and can be life-threatening.
<b>Public Health</b>	Power outages and road closures due to winter weather can result in limited access to food, basic supplies, and an adequate heat source. Health threats can become severe when frozen precipitation makes roadways and walkways very slippery, prolonged power outages occur, and fuel supplies are jeopardized.
<b>Critical Facilities and Infrastructure</b>	Winter storms can cause damage to power distribution networks and utilities and the impacts on transportation, debris removal and utility restoration. If critical facilities lose power, they may become inoperable.
<b>Economy</b>	Government costs for these events include overtime personnel wages and equipment, or contractors for road clearing. Private-sector losses are attributed to time lost when employees are unable to travel.
<b>Buildings</b>	Vulnerability to the effects of winter storms on buildings depends on the age of the building (and the building codes in effect at the time of construction), type of construction, and condition of the structure (i.e., how well it has been maintained, materials used, etc.). Occasionally, buildings may be damaged when snow loads exceed the design capacity of their roofs or trees fall due to excessive ice accumulation on branches.

## I. Hurricane/Tropical Storm

### I.1. Description

Hurricanes and tropical storms are two types of tropical cyclones. A tropical cyclone is a rotating, organized system of clouds and thunderstorms that originates over tropical or sub-tropical waters and has a closed low-level circulation. Hurricanes and tropical storms are differentiated by wind speed. Tropical storms refer to tropical cyclones that have maximum sustained surface wind speeds of 39 to 73 miles per hour. Hurricanes are those tropical storms with maximum sustained surface wind speeds exceeding 74 miles per hour. Hurricanes specifically refer to tropical cyclones that form in the North Atlantic and central and eastern North Pacific.<sup>98</sup> The Atlantic hurricane season begins June 1 and ends November 30 each year. Most hurricanes occur between mid-August and late September.

Hurricanes and tropical storms bring high winds, heavy rainfall, and storm surge, which can last for several days. These storms have the potential to cause significant damage, with most damages resulting from extreme winds and prolonged intense rainfall.

### I.2. Location and Extent

The entire planning area of Prince George's County and the City of Laurel are at risk to tropical storm and hurricane impacts. Coastal areas are more likely to be affected by tropical storms and hurricanes (especially winds and coastal flooding), meaning coastal areas of the county may experience more severe impacts from these hazards. However, inland areas can also be affected by intense precipitation caused by these storms or the remnants of the storm event. Prolonged rainfall can also cause flash flooding and riverine flooding, which has previously affected Prince George's County and the City of Laurel.

The Maryland Department of Emergency Management's Know Your Zone tool identifies areas where residents may need to evacuate in an emergency or shelter at home, depending on where they live or the severity of a hurricane or tropical storm.<sup>99</sup> Prince George's County has both A and B Evacuation Zones within the County. Residents living within those zones are at a higher risk of impact from hurricanes.

Hurricane extent is measured on the Saffir-Simpson Hurricane Wind Scale. It categorizes a hurricane on a scale of 1 to 5 based on its sustained wind speed, which provides an estimate for potential for property damage. **Table 76** is adapted from the National Hurricane Center and Central Pacific Hurricane Center of NOAA and displays the Saffir-Simpson Hurricane Wind Scale categories and associated types of damage due to the hurricane winds.<sup>100</sup>

<sup>98</sup> NOAA. n.d. "Glossary of National Hurricane Center Terms: Tropical Cyclones." <https://www.nhc.noaa.gov/aboutgloss.shtml>

<sup>99</sup> Maryland Department of Emergency Management. n.d. "Know Your Zone".

<https://maryland.maps.arcgis.com/apps/InformationLookup/index.html?appid=abef1ee97e254dd7a8b55cc179e29d6c>

<sup>100</sup> Saffir-Simpson Hurricane Wind Scale. n.d. "NOAA National Hurricane Center and Central Pacific Hurricane Center." <https://www.nhc.noaa.gov/aboutsshws.php>

Table 76: Saffir-Simpson Hurricane Wind Scale

Category	Sustained Winds	Types of Damage Due to Hurricane Winds
1	74-95 mph	<b>Very dangerous winds will produce some damage:</b> 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 mph	<b>Extremely dangerous winds will cause extensive damage:</b> 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 mph	<b>Devastating damage will occur:</b> 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 mph	<b>Catastrophic damage will occur:</b> 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.
5	157 mph or higher	<b>Catastrophic damage will occur:</b> 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.

Many tropical depressions and hurricanes degrade in the Mid-Atlantic and manifest as Nor’easters over Prince George’s County and the City of Laurel. A Nor’easter is a storm along the East Coast of North America, so called because the winds over the coastal area are typically from the northeast. These storms may occur at any time of year but are most frequent and most violent between September and April.<sup>101</sup> Nor’easters are large-scale cyclones that cause hurricane force winds. Nor’easters can cause extensive damage from high winds and excessive precipitation or snow.

### I.3. Previous Occurrences

In the NCEI database, there are four tropical storm and hurricane events with recorded dates and damages since 1950. Each of these events caused significant damages affecting property. Hurricane Isabel in 2003 caused crop damages as well. **Table 77** summarizes these events and their total damages in current dollars (nearly all property damages) while **Table 78** shows the combined annualized NCEI data that was recorded from those three events. There were no deaths or injuries reported directly in this database. Additionally, one hurricane is recorded outside the NCEI database as a presidentially declared disaster. Hurricane Sandy in October 2012 impacted the County with strong winds and heavy rainfall.

<sup>101</sup> NOAA National Weather Service. What is a Nor’easter? What is a Nor’easter? (weather.gov)

Table 77: Historical Tropical Storm Event Damages

Date	Name	Current Total Damages
16 Sep 1999	Hurricane Floyd	\$173,290
18 Sep 2003	Hurricane Isabel	\$3,999,420
27 Aug 2011	Hurricane Irene	\$1,984,750
Oct 2012	Hurricane Sandy	---
04 Aug 2020	Tropical Storm Isaias	\$1,875,000

Table 78: NCEI Tropical Storm Annualized Event Damages

Event Type	Number of Events	Period of Record	Total Annualized Damage	Annualized Deaths	Annualized Injuries	Annualized Events
Tropical Storms	4	1950-2022	\$60,694	0.00	0.00	0.06

Prince George’s County (along with the rest of Maryland) has an extensive history of exposure and damage from Nor’easters and hurricanes. **Figure 46** shows tropical storm and hurricane tracks that have affected Maryland since 1980.<sup>102</sup> Most of the storms were tropical storms or tropical depressions as they passed through or near the State. Note that some of the larger hurricanes that have affected Prince George’s County may not be shown on this map for the sake of clarity, as the extent of their influence was larger than 200 miles outside of the State.

<sup>102</sup> 21 NCAR UCAR. Climate Data Guide. <https://climatedataguide.ucar.edu/climate-data/ibtracs-tropical-cyclone-best-track-data>

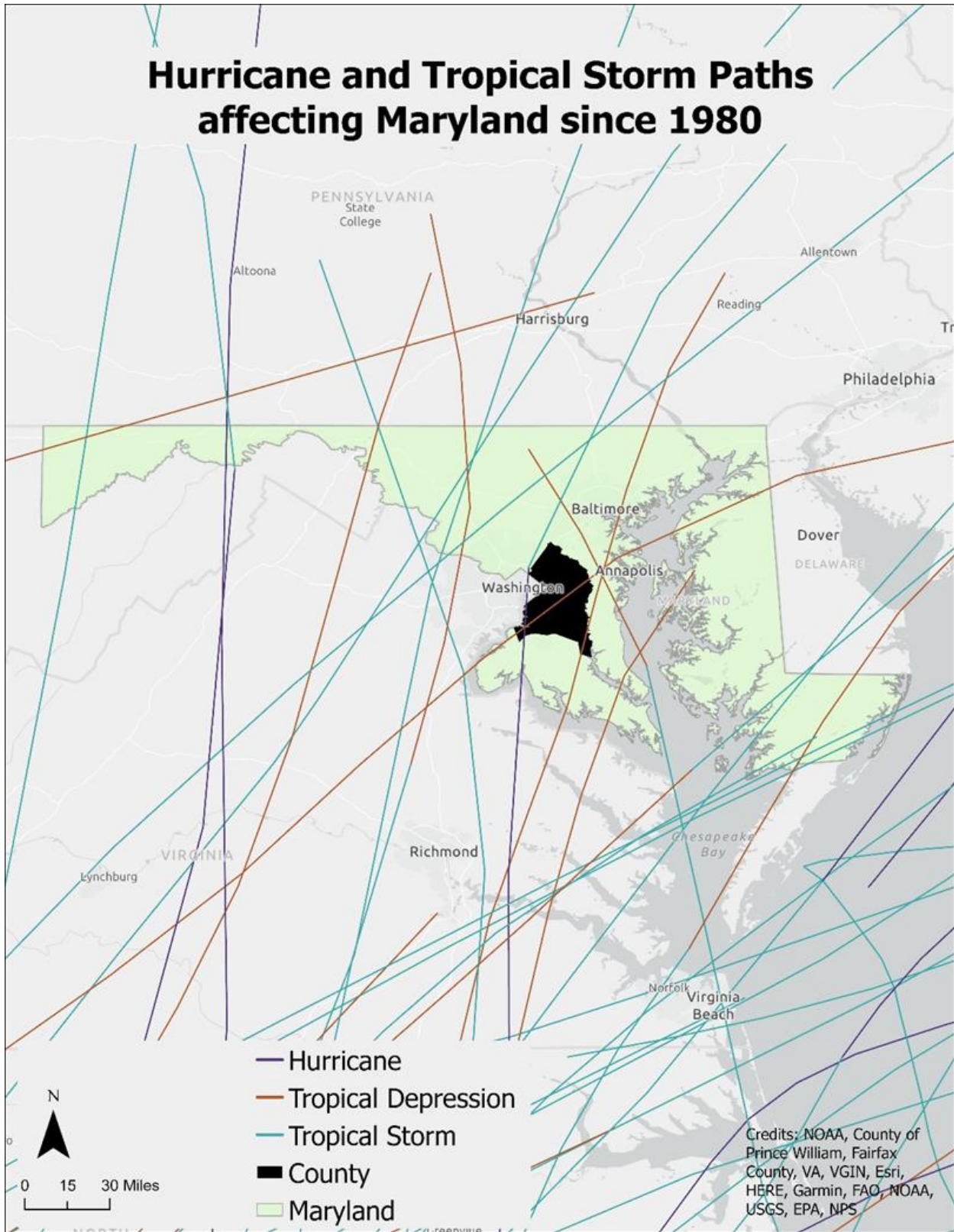


Figure 46: Historic Hurricane and Tropical Storm Paths affecting Maryland since 1980



## I.4. Probability of Future Events

Based on the NCEI database, Prince George’s County and the City of Laurel have a low probability to experience these destructive types of hazards. As shown in **Table 78**, hurricanes and tropical storms destructively affect Prince George’s County and the City of Laurel about once every 20 years (0.06 annual occurrences), even though the Atlantic hurricane season occurs every year between June and November.

Although the probability of hurricanes impacting Prince George’s County and the City of Laurel have historically been low, there is an increased probability of hurricanes and tropical storms occurring in the future due to climate change. Climate change is projected to magnify the impact of hurricanes and tropical storms through increasing both precipitation amounts and extreme wind speeds. Sea surface temperatures in the tropical Atlantic, known as the Main Development Region for tropical systems have risen 1.85°F in the last century, and the likelihood of tropical cyclones reaching Category 3 status has increased since 1979.<sup>103</sup> Therefore, the County and the City may be more likely to experience a hurricane or tropical storm as sea surface temperatures warm.

## I.5. Vulnerability and Risk Assessment

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for coastal hazards (hurricane and tropical storms are one of several coastal hazards considered jointly by the State). These scores and ranks are shown in **Table 79**, which shows the State’s ranking for coastal hazard vulnerability in Prince George’s County (including the City of Laurel) as high. The State’s ranking for wind is shown in **Table 59** in **Section D**.

*Table 79. 2021 State of Maryland Coastal Hazard Ranking and Risk for Prince George’s County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	2
Deaths	4
Property Damage	3
Crop Damage	1
Geographic Extent	1
Events	2
Local Plan Ranking (2017)	4

<sup>103</sup> NOAA National Centers for Environmental Information (NCEI) Climate at a Glance (2022). [https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/global/time-series/atlanticMdr/land\\_ocean/6/11/1880-2019?trend=true&trend\\_base=10&begtrendyear=1880&endtrendyear=2020](https://www.ncei.noaa.gov/access/monitoring/climate-at-a-glance/global/time-series/atlanticMdr/land_ocean/6/11/1880-2019?trend=true&trend_base=10&begtrendyear=1880&endtrendyear=2020)

<b>Overall Weighted Risk Rating<sup>104</sup></b>	<b>23</b>
<b>Overall Ranking</b>	<b>High</b>

### I.5.a. Loss Estimate

FEMA's Hazus-MH Hurricane Model v5.1 was used to determine the potential losses from a hurricane that made landfall on the East Coast for Prince George's County and the City of Laurel. As summarized in **Table 80**, nearly all building related economic loss from a hurricane in Prince George's County is expected to be a minor loss. As shown in **Table 81**, building loss would account for the majority of economic loss following a hurricane, followed by content loss. **Table 82** shows other impacts of hurricanes, such as debris generated, people displaced, and individuals seeking shelter. According to Hazus v5.1, only during the 1,000-year hurricane wind event would we expect any households to be displaced.<sup>105</sup> These two households are located in the unincorporated areas of the County.

Table 80: Hurricane Building Related Economic Loss by Damage Level (from Hazus-MH v5.1)

Jurisdiction	Return Period	Minor	Moderate	Severe	Destruction	Total
City of Laurel	10-year	\$0	\$0	\$0	\$0	\$0
	20-year	\$0	\$0	\$0	\$0	\$0
	50-year	\$11,800	\$100	\$0	\$0	\$11,900
	100-year	\$19,600	\$400	\$0	\$0	\$20,000
	200-year	\$92,300	\$6,100	\$0	\$0	\$98,400
	500-year	\$363,200	\$34,800	\$100	\$0	\$398,100
	1,000-year	\$500,300	\$50,500	\$200	\$0	\$551,000
Prince George's County	10-year	\$0	\$0	\$0	\$0	\$0
	20-year	\$0	\$0	\$0	\$0	\$0
	50-year	\$255,400	\$800	\$0	\$0	\$256,200
	100-year	\$586,500	\$8,300	\$100	\$0	\$594,900
	200-year	\$2,361,300	\$96,200	\$200	\$0	\$2,457,800
	500-year	\$13,736,300	\$950,700	\$4,300	\$1,000	\$14,692,300
	1,000-year	\$30,403,600	\$2,947,700	\$23,100	\$21,300	\$33,395,700
<b>Total</b>	10-year	\$0	\$0	\$0	\$0	\$0
	20-year	\$0	\$0	\$0	\$0	\$0
	50-year	\$267,200	\$900	\$0	\$0	\$268,100
	100-year	\$606,100	\$8,700	\$100	\$0	\$614,900
	200-year	\$2,453,600	\$102,300	\$200	\$0	\$2,556,200
	500-year	\$14,099,500	\$985,500	\$4,400	\$1,000	\$15,090,400

<sup>104</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

<sup>105</sup> The "households displaced" and "individuals seeking temporary shelter" Hazus v5.1 estimates in Table 82 may be higher than shown. Hazus v6.0 has since made changes to the sheltering algorithm which often resulted in very conservative estimates.

Jurisdiction	Return Period	Minor	Moderate	Severe	Destruction	Total
	1,000-year	\$30,903,900	\$2,998,200	\$23,300	\$21,300	\$33,946,700

Table 81: Hurricane Building Related Economic Loss by Type of Loss (from Hazus-MH v5.1)

Municipality	Return Period	Building Loss	Content Loss	Inventory Loss	Other Loss	Total Loss
City of Laurel	10-year	\$0	\$0	\$0	\$0	\$0
	20-year	\$0	\$0	\$0	\$0	\$0
	50-year	\$5,100	\$50,400	\$0	\$100	\$55,700
	100-year	\$1,432,400	\$206,900	\$0	\$1,200	\$1,640,500
	200-year	\$6,458,400	\$770,400	\$0	\$83,400	\$7,312,200
	500-year	\$16,437,800	\$1,841,700	\$200	\$929,100	\$19,208,800
	1,000-year	\$20,310,100	\$2,337,400	\$800	\$1,302,900	\$23,951,200
Prince George's County	10-year	\$0	\$0	\$0	\$0	\$0
	20-year	\$0	\$0	\$0	\$0	\$0
	50-year	\$5,462,100	\$3,335,200	\$0	\$1,200	\$8,798,500
	100-year	\$69,406,200	\$13,043,700	\$0	\$48,200	\$82,498,100
	200-year	\$216,153,200	\$36,505,300	\$0	\$735,500	\$253,394,000
	500-year	\$629,343,900	\$100,034,900	\$71,700	\$31,125,300	\$760,575,700
	1,000-year	\$1,050,214,600	\$169,899,300	\$453,200	\$57,533,500	\$1,278,100,600
Total	10-year	\$0	\$0	\$0	\$0	\$0
	20-year	\$0	\$0	\$0	\$0	\$0
	50-year	\$5,467,200	\$3,385,600	\$0	\$1,300	\$8,854,200
	100-year	\$70,838,600	\$13,250,600	\$0	\$49,400	\$84,138,600
	200-year	\$222,611,600	\$37,275,700	\$0	\$818,900	\$260,706,200
	500-year	\$645,781,700	\$101,876,600	\$71,900	\$32,054,400	\$779,784,500
	1,000-year	\$1,070,524,700	\$172,236,700	\$454,000	\$58,836,400	\$1,302,051,800

Table 82: Hurricane Other Impacts (from Hazus-MH v5.1)

Municipality	Return Period	Debris Generated (Tons)	Households Displaced	Individuals Seeking Temporary Shelter
City of Laurel	10-year	0	0	0
	20-year	0	0	0
	50-year	0	0	0
	100-year	100	0	0
	200-year	600	0	0

Municipality	Return Period	Debris Generated (Tons)	Households Displaced	Individuals Seeking Temporary Shelter
	500-year	1,500	0	0
	1,000-year	1,900	0	0
Prince George's County	10-year	0	0	0
	20-year	0	0	0
	50-year	2,300	0	0
	100-year	15,400	0	0
	200-year	30,200	0	0
	500-year	126,500	0	0
	1,000-year	194,500	2	2
<b>Total</b>	10-year	0	0	0
	20-year	0	0	0
	50-year	2,300	0	0
	100-year	15,500	0	0
	200-year	30,800	0	0
	500-year	128,000	0	0
	1,000-year	196,400	2	2

Annualized hurricane loss by census tract, as determined by Hazus is shown in **Figure 47** and **Figure 48**. Districts 1, 5, 6, 8, and 9 all have census tracts that would have over \$15,000 annualized loss due to hurricane according to the Hazus Hurricane Model. These areas are more vulnerable to hurricanes than areas of the County that are expected to have less economic loss due to a hurricane.

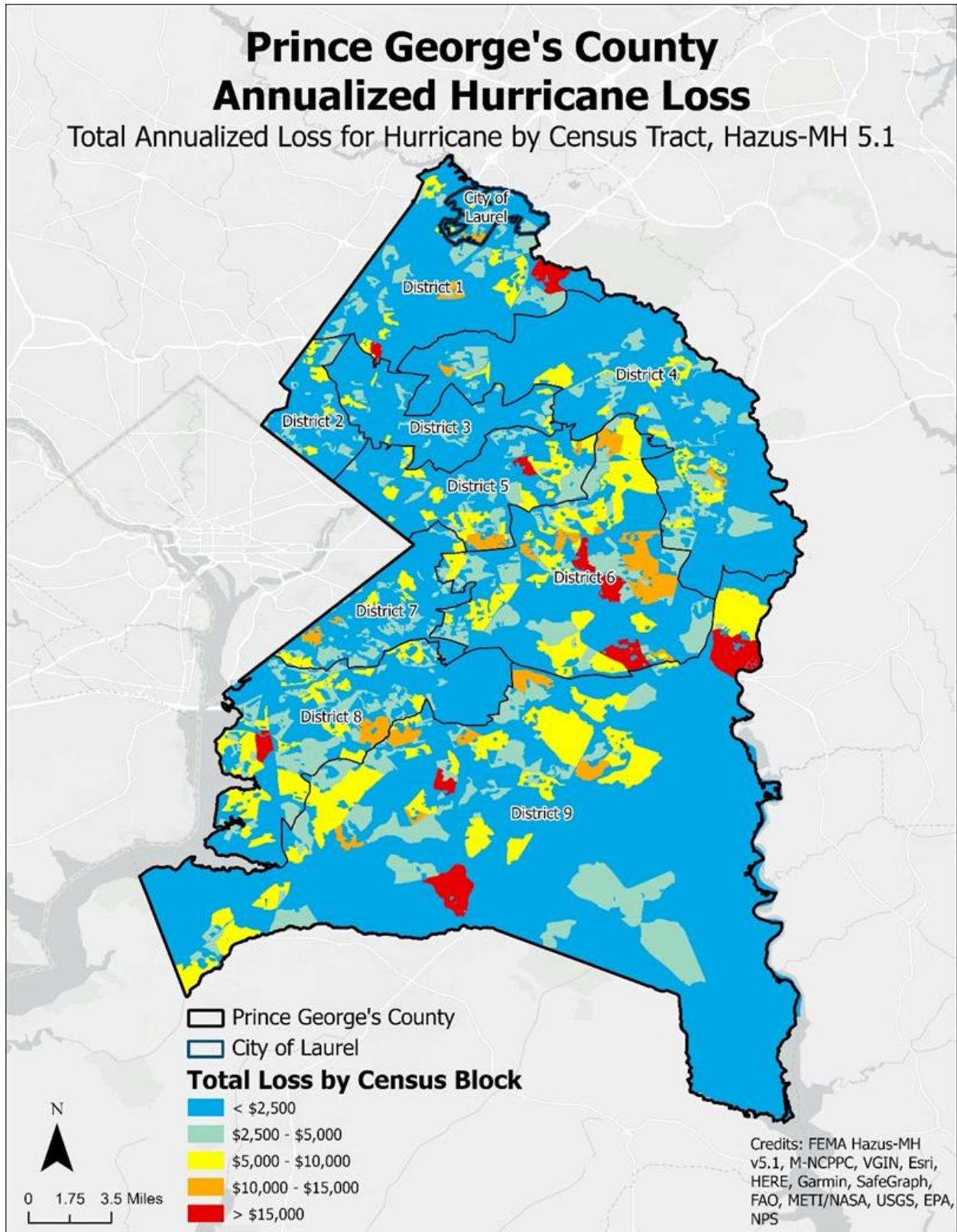


Figure 47: Hurricane Annualized Loss by Census Tract in Prince George's County

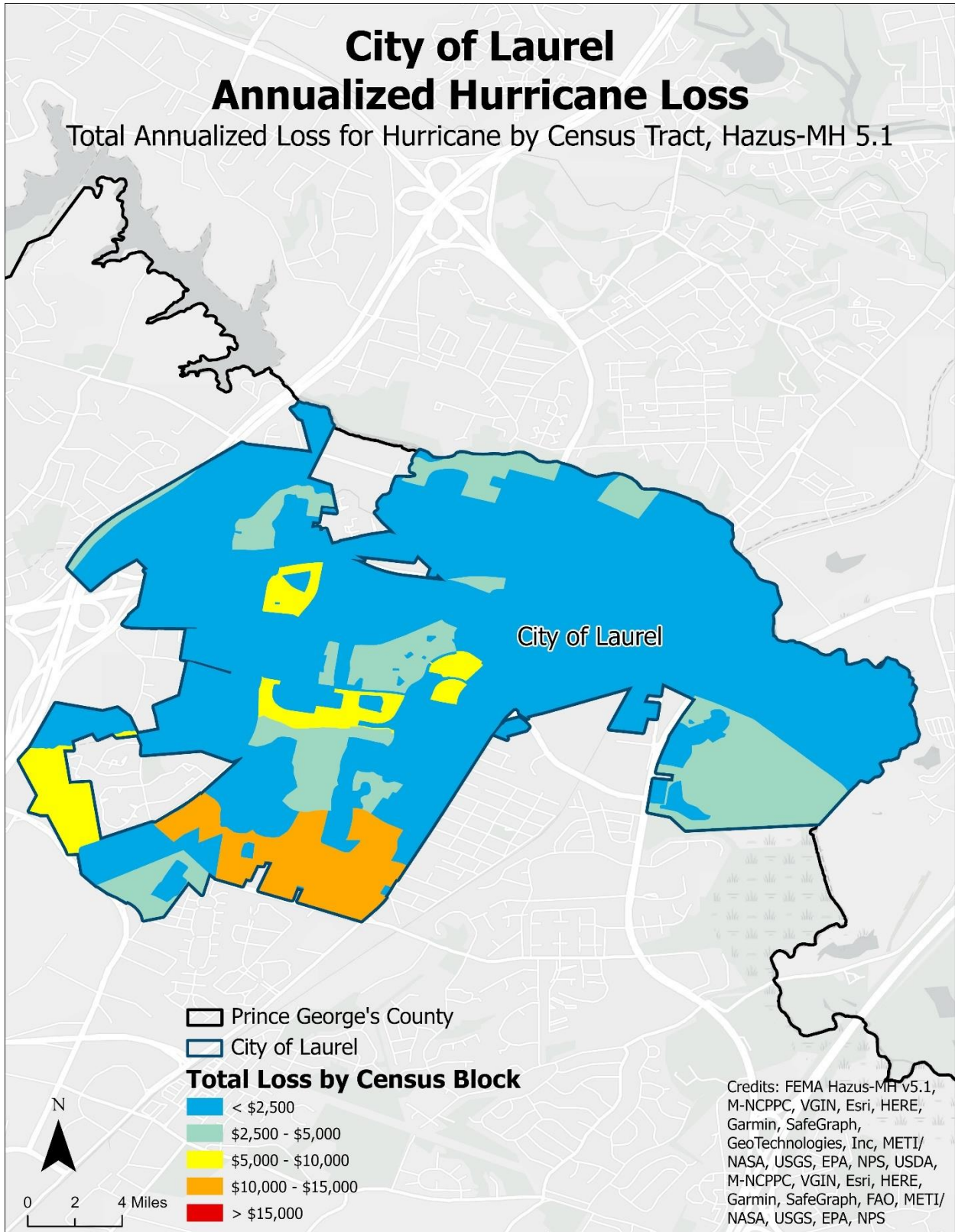


Figure 48: City of Laurel Hurricane Annualized Loss by Census Tract

### I.5.b. Population Exposed

The number of people affected by hurricanes and tropical storms depends on the scale and duration of a particular event. Residents living within hurricane evacuation zones have more exposure to hurricanes and tropical storms than those living further inland in the County. Hurricane evacuation zones A and B are located in Districts 8 and 9, along the Potomac and Patuxent Rivers. Powerful hurricanes may require local or regional evacuations if buildings are not expected to withstand the high winds. Residents living in urban areas with significant impervious surfaces may witness pluvial flooding and even ponding of water, which can last several days after a storm.

Hurricanes and tropical storms have primary impacts to population through high winds that stir up airborne debris and downed trees, both of which can lead to significant building damage and power outages. Residents living in mobile homes may be especially vulnerable to damage from high winds, if the home is improperly installed or anchored. Extreme wind events can also blow over tractor trailers on the highway and make driving difficult. Wind-caused flying debris, broken tree limbs or branches, and falling objects can also cause serious injuries and death.

### I.5.c. Social Vulnerability

The potential for prolonged power outages due to hurricanes and tropical storms raises risks to public health. Tropical storms and hurricanes typically occur during the summer months when humidity and heat levels are highest. Socially vulnerable populations, such as lower-income households, the elderly, children under the age of four, and people with disabilities are at a higher risk of heat-related illnesses and may be impacted by a loss of power during summer months due to a hurricane or tropical storm. Additionally, socially vulnerable populations may have decreased ability to cope with loss of perishable food, lack of water, or the need to find temporary shelter.

## I.6. Consequence Analysis

A consequence analysis (refer to **Table 83**) has been done to better understand the range of impacts that a hurricane or tropical storm event can have on several features of the planning area and the population within it.

*Table 83. Hurricane/Tropical Storm Consequence Analysis*

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	The number of people affected by hurricanes and tropical storms depends on the scale and duration of an event. Residents living within hurricane evacuation zones have more exposure to hurricanes and tropical storms than those living further inland in the County. Powerful hurricanes may require local or regional evacuations if buildings are not expected to withstand the high winds.
<b>Public Health</b>	The potential for prolonged power outages due to hurricanes and tropical storms raises risks to public health. Tropical storms and hurricanes typically occur during the summer months when humidity and heat levels are highest. Socially vulnerable populations, such as lower-income households, the elderly, children under the age of four, and people with disabilities are at a higher risk of heat-related illnesses and may be impacted by a loss of power during summer months due to a hurricane or tropical storm.

Community Feature	Impacts
<b>Critical Facilities and Infrastructure</b>	Hurricanes and tropical storms can cause flooding or wind damage to critical facilities and infrastructure. Wind-caused flying debris, broken tree limbs or branches, and falling objects can cause structural damage and power loss to critical facilities and impact infrastructure such as bridges and utilities.
<b>Economy</b>	Economic impacts resulting from hurricanes include supply chain disruption from flooded roads and economic losses for local businesses that have incurred storm or flood damage.
<b>Buildings</b>	Hurricanes and tropical storms can have high winds that stir up airborne debris and downed trees, both of which can lead to significant building damage and power outages.



## J. Dam and Levee Failure

### J.1. Description

#### J.1.a. Dam Failure

Dams serve as barriers to hold back water and can be used to regulate water supply, control floods, provide hydroelectric power, or create recreational opportunities. Dams can cause serious harm when they fail, putting lives and properties at risk. Dam failure is characterized by a sudden, rapid, and uncontrolled release of water. Dams can fail for several reasons, including overtopping due to floods that exceed the capacity of the dam, aging of the dam, inadequate maintenance, or a deliberate act of sabotage. Due to the risk posed by a dam failure, it is important to evaluate dam inundation zones by calculating the flood hazard exposure.

#### J.1.b. Levee Failure

FEMA defines a levee as “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 risk from temporary flooding.” Levees are typically built parallel to a waterway, most often a river, to reduce the risk of flooding on the landward side.<sup>106</sup>

Levee failure occurs when the levee fails or is breached, causing the water previously contained in the levee to flood nearby land. Man-made levees can fail in several ways, including breaching, foundation failure due to erosion or a subsurface failure of the levee, or overtopping, which can lead to erosion of the levee and cause breaching.

### J.2. Location

#### J.2.a. Dams

Prince George's County has 47 dams within its jurisdiction. Of these 47 dams, 19 are classified as high-hazard potential, 16 are significant-hazard, and 14 are low-hazard dams. The County owns four high-hazard potential dams within the County, and is responsible for the routine monitoring, inspection, and maintenance of the dams. These four County-owned high-hazard potential dams include: Laurel Lakes, Indian Creek #2, Indian Creek #3, and Lake Arbor dams. Each of the high hazard dams has an Emergency Action Plan to reduce the risk of human life loss and minimize property damage during an unusual or emergency event. The County provided a list of 15 of the high-hazard potential and significant-hazard potential dams that are owned by the County, and the other 32 dams were found on the National Inventory of Dams.<sup>107</sup> Out of the 15 high-hazard potential dams, only 5 have inundation zone mapping completed. **Figure 49** shows the dams by hazard potential. **Table 84** details information for all the dams in Prince George's County and the City of Laurel.

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<sup>106</sup> FEMA. N.d. What is a Levee Fact Sheet. [https://www.fema.gov/sites/default/files/2020-08/fema\\_what-is-a-levee\\_fact-sheet\\_0512.pdf](https://www.fema.gov/sites/default/files/2020-08/fema_what-is-a-levee_fact-sheet_0512.pdf)

<sup>107</sup> National Inventory of Dams (NID). 2022. <https://nid.sec.usace.army.mil/#/>

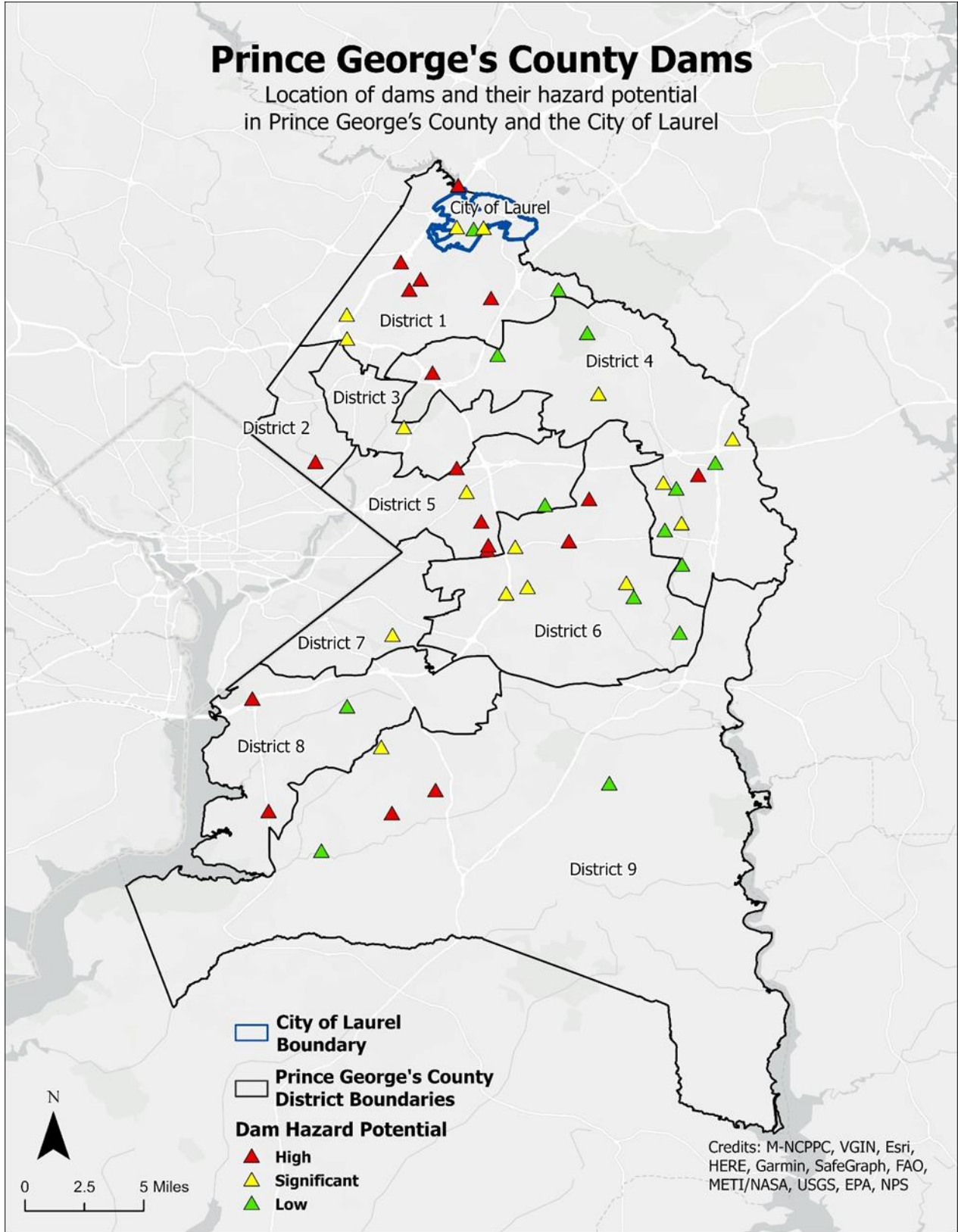


Figure 49: Location of Dams and their Hazard Potential in Prince George's County and the City of Laurel

Table 84: Dams located in in Prince George's County and City of Laurel

Dam	National Inventory of Dams Number	River	Owner Type	Owner Name	Primary Purpose	Height	Year Built	Hazard Potential	Condition Assessment	EAP*	EAP Approval Date
T. Howard Duckett Dam	MD00020	Patuxent River	Regional	Washington Suburban Sanitary Commission	Water Supply, Recreation	139 ft	1953	High	Fair	Yes	5/01/21
Aragona Village	MD00623	Tributary to Broad Creek	County	Prince George's County Department of the Environment	Flood Risk Reduction	15.4 ft	1995	High	Fair	Yes	12/02/21
Prince George Country Club Dam	MD00272	Northeast Branch	Private	Woodmore Country Club	Recreation, Irrigation	19 ft	1982	High	Poor	Yes	4/21/22
FedEx Field Pond No. 1	MD00329	Southwest Branch	Private	WFI Stadium, Inc.	Flood Risk Reduction	35 ft	1997	High	Fair	Yes	5/01/21
New Bald Eagle Road SWM	MD00591	Oxon Creek	State	Maryland DOT State Highway Administration	Flood Risk Reduction	43.5 ft	2006	High	Poor	Yes	5/01/21
Contee Main Settling Pond	MD00081	Indian Creek	Private	Laurel Sand and Gravel, Inc.	Tailings	41 ft	1973	High	Unsatisfactory	Yes	4/29/20
Lake Arbor (Lake Arbor Way)	MD00082	Western Branch	County	Prince George's County	Recreation	38 ft	1971	High	Fair	Yes	5/27/20

Dam	National Inventory of Dams Number	River	Owner Type	Owner Name	Primary Purpose	Height	Year Built	Hazard Potential	Condition Assessment	EAP*	EAP Approval Date
Cosca Regional Park Dam	MD00064	Butler Branch	Local Gov.	Maryland-National Capital Park and Planning Commission-Cosca Park	Recreation, Fire Protection, Stock, or Small Fishpond	28 ft	1970	High	Fair	Yes	5/05/21
Indian Creek Site 3	MD00265	Indian Creek	County	Prince George's County	Flood Risk Reduction	28 ft	1983	High	Fair	Yes	5/27/20
Summerfield SWM Pond No. 1 (Chatsfield Way)	MD00324	Southwest Branch	County	Prince George's County	Flood Risk Reduction	23 ft	1994	High	Poor	Yes	7/29/20
Indian Creek Site 2	MD00260	Indian Creek	County	Prince George's County	Flood Risk Reduction	22 ft	1983	High	Fair	Yes	5/27/20
Greenbelt Dam	MD00008	Indian Creek	City	City of Greenbelt	Recreation	22 ft	1936	High	Satisfactory	Yes	6/25/21
Hanson Oaks SWM	MD00622	Beaverdam Creek	County	Prince George's County	Flood Risk Reduction	20 ft	1900	High	Poor	No	--
Cash Lake Dam	MD00013	Patuxent River	Federal	US Fish & Wildlife Service	Fish and Wildlife Pond	20 ft	1939	High	Fair	Yes	12/11/20

Dam	National Inventory of Dams Number	River	Owner Type	Owner Name	Primary Purpose	Height	Year Built	Hazard Potential	Condition Assessment	EAP*	EAP Approval Date
Bowie Town Center Lake	MD00490	Mill Branch	City	City of Bowie	Flood Risk Reduction & Recreation	20 ft	1990	High	Fair	Yes	4/30/21
Ashcroft Drive-Woodbridge Pond	MD00614	Beaverdam Creek	County	Prince George's County	Flood Risk Reduction	20 ft	--	High	Poor	Yes	5/27/21
Summerfield SWM Pond No. 2	MD00625	Southwest Branch	County	Prince George's County	--	15 ft	--	High	Poor	No	3/11/22
Allison Street Levee	MD00583	Northwest Branch	County	Prince George's County	Flood Risk Reduction	15 ft	1988	High	Fair	Yes	5/01/13
Summit Creek- Mount Auburn Dr.	MD00617	Piscataway Creek	Private	Summit Creek Homes Association	Flood Risk Reduction	15 ft	2000	High	Poor	No	--
UMSTC Lower Dam	MD00348	Patuxent River	City	City of Bowie	Flood Risk Reduction	38 ft	2001	Significant	Fair	Yes	5/01/21
Northridge SWM Pond	MD00515	Horsepen Branch	City	City of Bowie	Flood Risk Reduction	28 ft	1989	Significant	Satisfactory	Yes	4/29/21
Frost Pond	MD00584	Beaverdam Creek	County	Prince George's County	Flood Risk Reduction	27 ft	1988	Significant	Fair	No	--

Dam	National Inventory of Dams Number	River	Owner Type	Owner Name	Primary Purpose	Height	Year Built	Hazard Potential	Condition Assessment	EAP*	EAP Approval Date
Lake Largo Town Center Dam (Kings Way)	MD00373	Southwest Branch	County	Prince George's County	Recreation	26.7 ft	1973	Significant	Poor	Yes	11/23/20
Van Dusen Road	MD00615	Bear Branch	County	Prince George's County	Stormwater Management	23 ft	1988	Significant	Fair	Yes	3/11/22
Laurel Lakes No. 1 (Lower)	MD00232	Bear Branch	County	Prince George's County	Recreation	21 ft	1986	Significant	Satisfactory	Yes	11/23/20
Collington Facility 9 Dam	MD00511	Collington Branch	County	Prince George's County	Flood Risk Reduction	20.8 ft	1990	Significant	Satisfactory	No	--
Madison Hill SWM Pond 1 (Silk Tree Drive)	MD00327	Brier Ditch, Northeast Branch	County	Prince George's County	Irrigation, Recreation	18 ft	1994	Significant	Satisfactory	No	--
Tinkers Creek Regional SWM Pond No. 8	MD00498	Tinkers Creek	County	Prince George's County DER	Flood Risk Reduction	17.5 ft	1991	Significant	Satisfactory	Yes	5/31/20
Perrywood	MD00605	Collington Branch	Private	Perrywood Manor HOA, Inc.	--	16.3 ft	1984	Significant	Fair	No	--
Ritchie Hill SWM Pond	MD00402	Ritchie Branch	State	MD DOT State Highway Administration	--	15 ft	2008	Significant	Satisfactory	Yes	5/01/21

Dam	National Inventory of Dams Number	River	Owner Type	Owner Name	Primary Purpose	Height	Year Built	Hazard Potential	Condition Assessment	EAP*	EAP Approval Date
Hensen Creek Flood Control Dam #17	MD00575	Henson Creek	Local Gov.	Maryland-National Capital Park and Planning Commission – Prince George's County Parks	Flood Risk Reduction	22 ft	1992	Significant	Unsatisfactory	Yes	5/27/21
Tall Oaks Crossing	MD00381	Collington Branch	City	City of Bowie	Recreation	14 ft	1985	Significant	Not Rated	Yes	5/13/20
Cherry Hill Park Dam	MD00430	Paint Branch	Private	Cherry Hill Campcity, Inc.	Flood Risk Reduction	13 ft	1986	Significant	Satisfactory	Yes	4/14/21
Heritage Glen Dam	MD00377	Southwest Branch	County	Prince George's County	Flood Risk Reduction	12 ft	2004	Significant	Satisfactory	Yes	5/19/20
Cherryvale Neighborhood Park Pond	MD00487	Paint Branch	County	Maryland-National Capital Park and Planning Commission - Prince George's County Parks	Fish and Wildlife Pond	10 ft	1960	Significant	Unsatisfactory	Yes	5/11/20
Beechtree Dam	MD00361	East Branch, Collington Branch	Private	Lake Presidential Golf Club	Irrigation, Recreation	50 ft	2002	Low	Fair	N/A	--
Parker Farms Dam	MD00302	Piscataway Creek	Private	Parker Farms	Recreation	32 ft	1978	Low	Not Rated	N/A	--

Dam	National Inventory of Dams Number	River	Owner Type	Owner Name	Primary Purpose	Height	Year Built	Hazard Potential	Condition Assessment	EAP*	EAP Approval Date
Bowie Gateway SWM Pond Dam	MD00436	Green Branch	City	City of Bowie	--	28 ft	1992	Low	Not Rated	N/A	--
Stonegate SWM Dam	MD00512	Hensen Creek	County	Prince George's County DER	Flood Risk Reduction	25 ft	2003	Low	Satisfactory	N/A	--
Collington Life Care Center Lake	MD00491	Patuxent River West Branch	Private	Collington Kendal	Flood Risk Reduction	25 ft	1986	Low	Not Rated	N/A	--
Marlton South SWM Dam	MD00352	Southwest Branch	County	Prince George's County	Recreation	24 ft	2000	Low	Fair	N/A	--
Snowden Pond	MD00418	Patuxent	Federal	US Fish and Wildlife Service	Fish and Wildlife Pond	21 ft	1947	Low	Unsatisfactory	N/A	--
Perrywood (Waterfowl Way)	MD00604	Collington Branch	Private	Perrywood Community Association	--	18.8 ft	2003	Low	Not Rated	N/A	--
Soil Conservation Service Lake	MD00111	Beck Branch	Federal	United States Department of Agriculture Natural Resources Conservation Science	Water Supply	17 ft	1939	Low	Not Rated	N/A	--



Dam	National Inventory of Dams Number	River	Owner Type	Owner Name	Primary Purpose	Height	Year Built	Hazard Potential	Condition Assessment	EAP*	EAP Approval Date
Collington Facility 14 SWM Dam	MD00527	Western Branch-Patuxent River	County	Prince George's County	Flood Risk Reduction	16 ft	1992	Low	Satisfactory	N/A	--
Allen Pond	MD00129	Collington Branch	City	City of Bowie	Recreation	16 ft	1972	Low	Not Rated	N/A	--
Karington SWM Dam	MD00528	Collington Branch-Western Branch	Private	Tom Milbourne	Flood Risk Reduction	15 ft	2007	Low	Not Rated	N/A	--
Laurel Lakes No 2	MD00231	Bear Branch	County	Prince George's County	Flood Risk Reduction	14 ft	1986	Low	Not Rated	N/A	--
Redington Lake Dam	MD00112	Patuxent	Federal	US Fish and Wildlife Service	Fish and Wildlife Pond	13 ft	1940	Low	Poor	N/A	--

\* EAP = Emergency Action Plan

Eleven dams in Prince George's County have inundation zone GIS maps available, as shown in **Figure 50**. There is one large dam in Prince George's County located on the Patuxent River; the Duckett Dam, if breached, would have a significant impact on the northeast section of the County and specifically the City of Laurel. Inundation mapping has been completed for the Duckett Dam, as well as ten smaller dams: Laurel Lakes 1, Tinker Creek, Indian Creek 2, Indian Creek 3, Lake Arbor, Heritage Glen, Bowie Town Center, Tall Oaks Crossing, Northridge, Melford Center Lower, and Largo Town Center Dams. For each dam, the downstream inundation zones were analyzed and mapped to show potential flood exposure due to dam failure or breach.

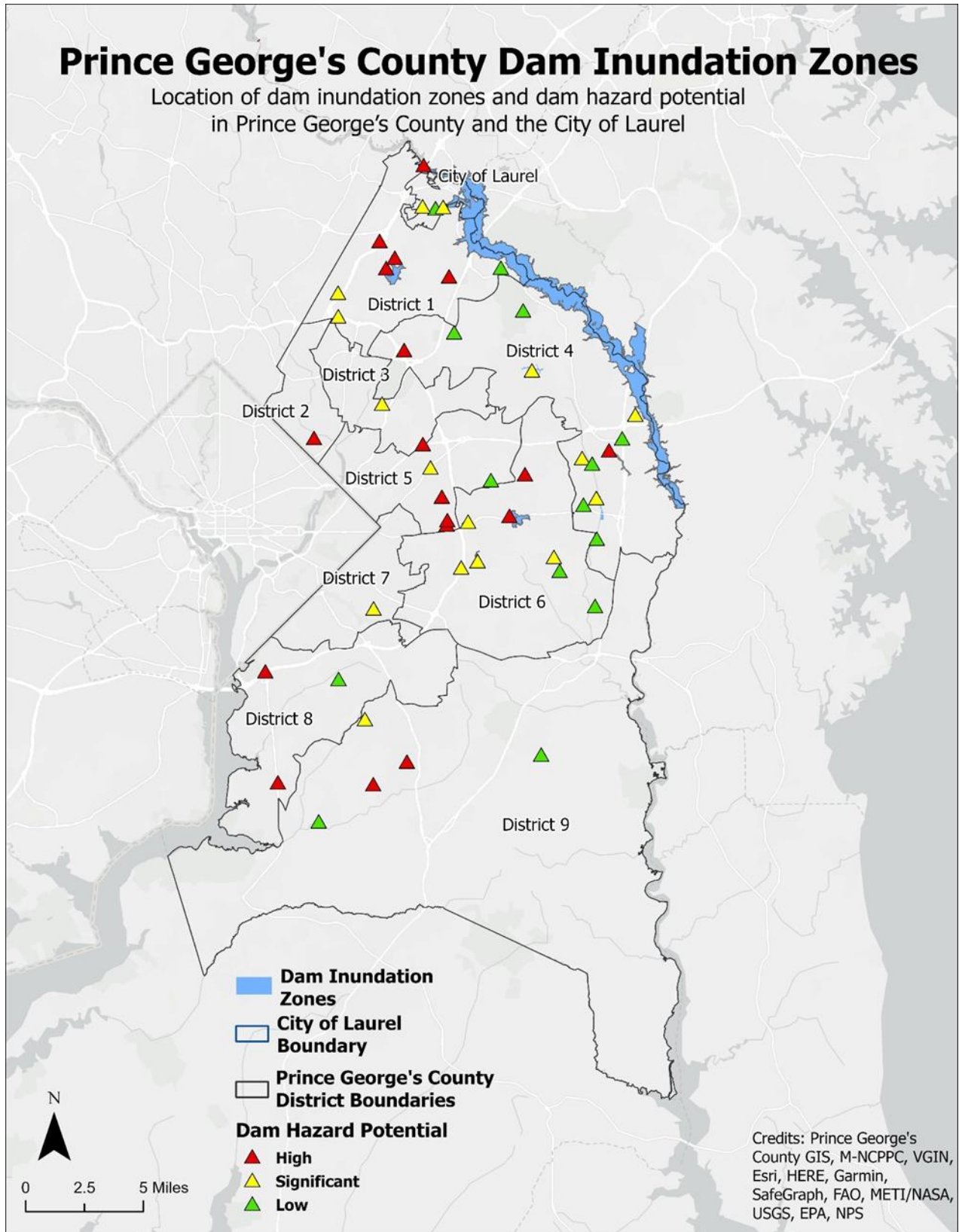


Figure 50: Location of Dam Inundation Zones in Prince George's County

### **J.2.b. Levees**

There are eight levee systems in Prince George's County. The Allison Street Levee System and the Brentwood Levee are located in District 2. The Bladensburg Levee and the Colmar Manor Levee are located in District 5. The Riverdale-Hyattsville Levee System spans across a portion of both District 3 and 5. A map of levees located in Districts 2, 3, and 5 is shown in **Figure 51**. The Collington Branch Upper Marlboro Levee is located in District 6, and the Western Branch Upper Marlboro Levee is located in District 9. **Figure 52** shows a map of the two Upper Marlboro Levees. The Forest Heights Levee is located in District 8, as shown in **Figure 53**.



Figure 51: Allison Levee System, Brentwood Levee, Riverdale-Hyattsville Levee, Bladensburg Levee, Colmar Manor Levees and Extents

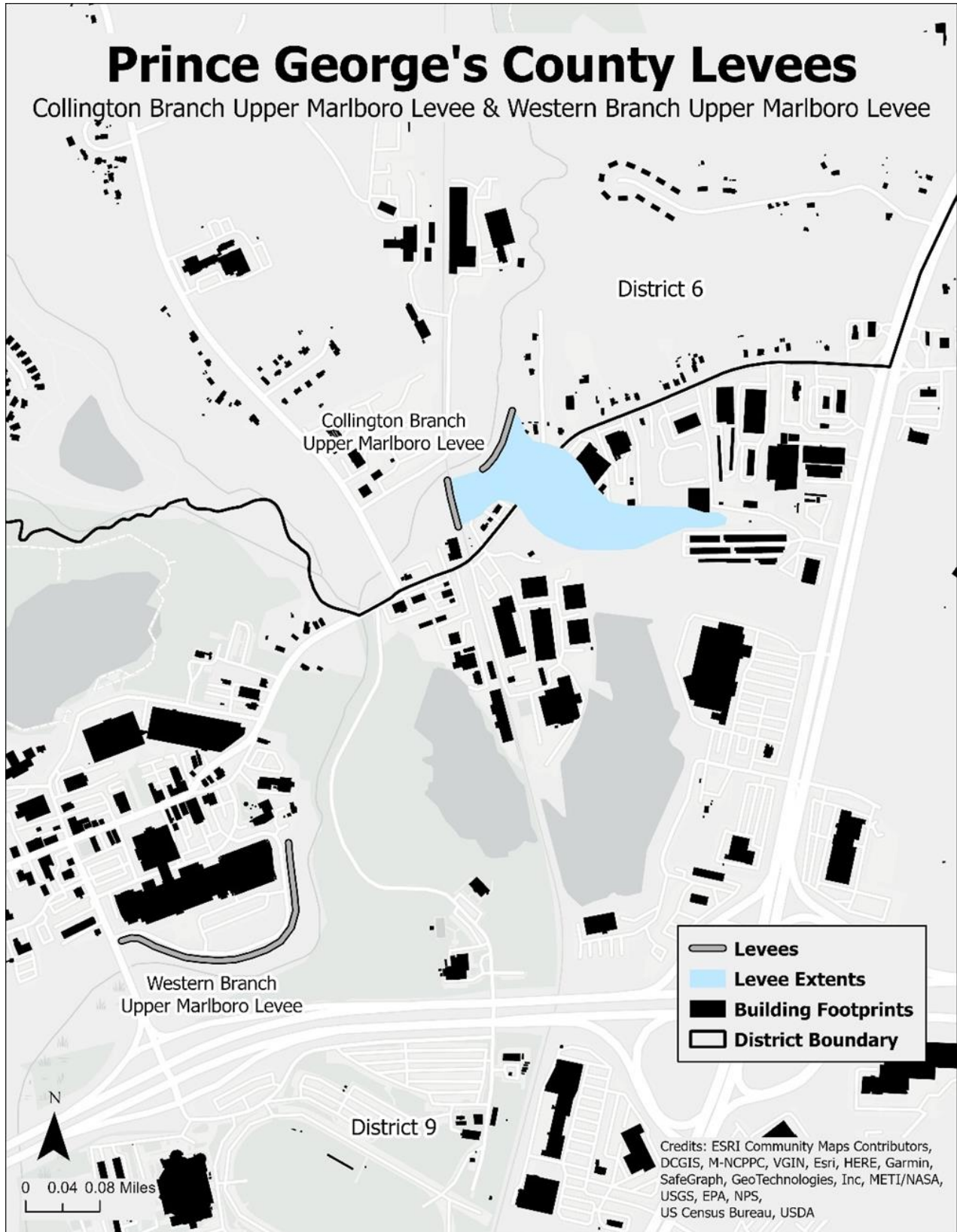


Figure 52: Upper Marlboro Levees and Extents

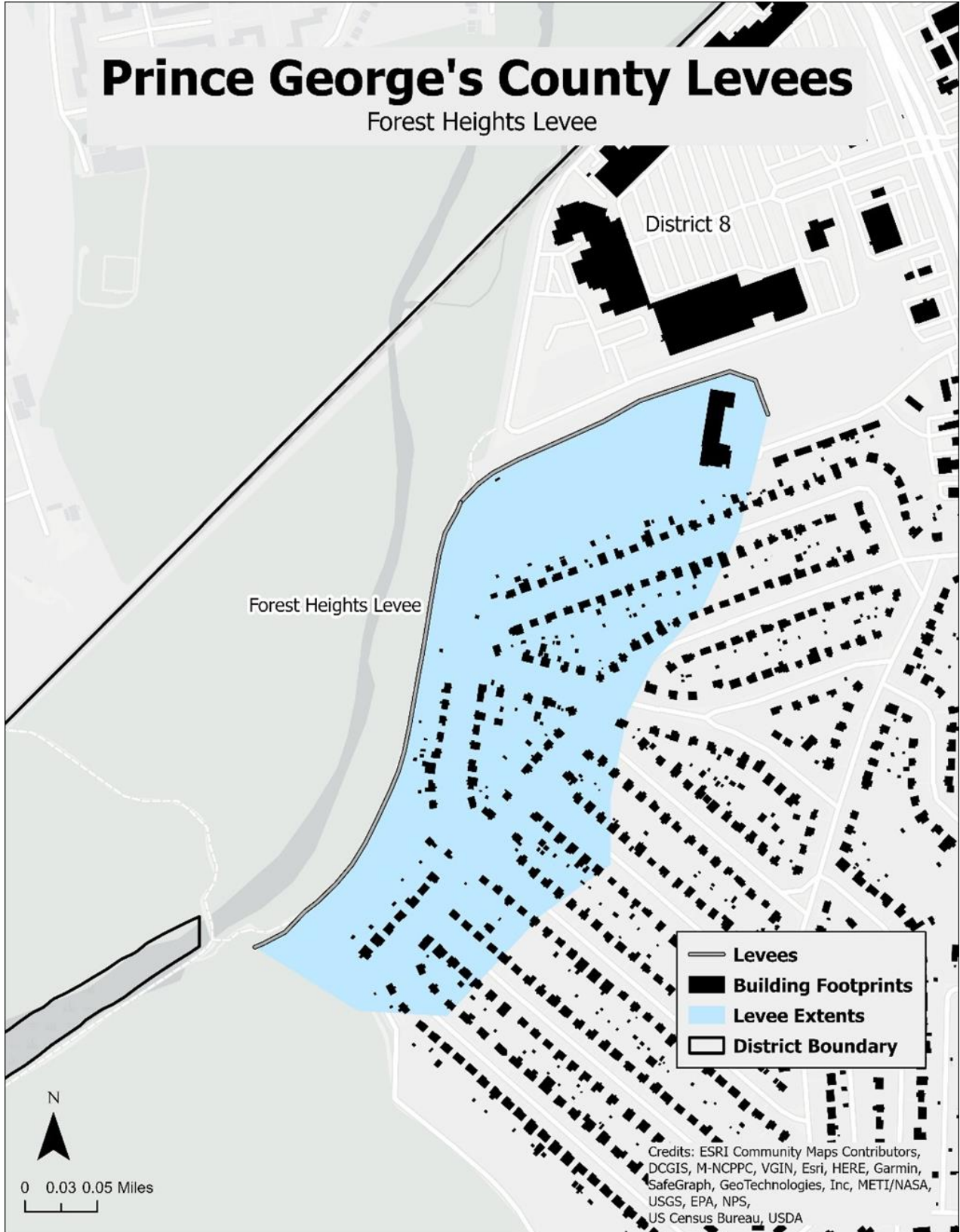


Figure 53: Forest Heights Levee and Extent

The Allison Street Levees, Bladensburg, Colmar Manor, and Riverdale-Hyattsville levees along the Anacostia River were designed by the U.S. Army Corps of Engineers, which started construction in 1954. In 1959, the levees were turned over to the Washington Suburban Sanitary Commission for maintenance. Subsequently, the maintenance responsibilities were assumed by Prince George’s County. The Prince George’s County Department of Public Works and Transportation (DPW&T) partners with U.S. Army Corps of Engineers to conduct annual inspections. Routine maintenance includes cutting, mowing, trimming and repair annually.

During the mid-1990s, the Prince George’s County Department of Environmental Resources prepared a watershed study that examined anticipated flood discharges and flood levels. Due to decades of upland development that changed rainfall-runoff patterns, the 100-year flood was determined to be larger than the design flood used by U.S. Army Corps of Engineers to design the levees. Therefore, the County expressed concern that the levees no longer provided the intended level of protection. A study determined that in some places, levee height is lower than required by current standards. Three areas could be affected by levee overtopping which puts more than 2,100 structures at risk to flooding.

In 2009, U.S. Army Corps of Engineers and the County held discussions regarding a plan to remove trees that had not previously been identified as problematic and to address vegetation and high grass that obstruct the identification of potential erosion and burrowing animals that may weaken the levees.

### J.3. Extent

#### J.3.a. Dam Hazard Classification

The extent or magnitude of a dam failure event can be measured in terms of the classification of the dam. In the County, there are 19 high-hazard potential, 16 significant-hazard potential, and 14 low-hazard potential dams. The hazard potential classification system should be utilized with the understanding that the failure of any dam could represent a danger to downstream property or life. As described in **Table 85**, dams in Maryland are classified by the State into three hazard categories, which align with the FEMA classification and the National Inventory of Dams hazard classification.

*Table 85: Maryland Dam Hazard Classification*

Hazard Classification	Description
High Hazard	Failure would likely result in loss of human life, extensive property damage to homes and other structures, or cause flooding of major highways such as State roads or interstates
Significant Hazard	Failure could possibly result in loss of life or increase flood risks to roads and buildings, with no more than 2 houses impacted and less than six lives in jeopardy
Low Hazard	Failure is unlikely to result in loss of life and only minor increases to existing flood levels at roads and buildings is expected.

Source: Maryland Department of Environment. <https://mde.maryland.gov/programs/water/DamSafety/Documents/FactSheet-HazardClassificationOfDams.pdf>



### *J.3.a.1. Dam Failure Risk*

The hazard classifications are based on overall risk. There are three major flood risks that can be applied to any dam, including incremental risk, non-breach risk, and residual risk:<sup>108</sup>

- **Incremental risk** refers to the risk to the pool area and downstream floodplain occupants attributed to a dam breach both prior to and following overtopping, or if a dam component malfunctions. The consequences due to incremental risk are typically due to downstream inundation, but if there is a loss of the pool, there can be consequences upstream of the dam as well.
- **Non-breach risk** refers to the risk to the pool area and the downstream affected floodplains even if the dam functions as intended. This is due to 'normal' dam operation of the dam or 'overtopping of dams without breach' scenarios.
- **Residual risk** refers to the risk in the pool area and downstream of the dam and the landside area behind a levee at any point in time.

Additional risks that may lead to dam failure include landslides into reservoirs, which causes surges that may cause overtopping, as well as earthquakes, which may cause longitudinal cracks at the top of embankments, weakening entire structures. High winds can also cause significant wave action and result in erosion to the dam structure. These environmental risks can have cascading impacts that may affect up and downstream flooding if they cause dam failure. As demonstrated by Maryland's classification of dams, vulnerabilities from high-hazard potential dams can include loss of human life, property damage to homes and other structures, flooding of major highways, and increased flood risk, among others, depending on what is located downstream of the dam. Depending on the use of the dam, a dam failure or incident could also impact the water supply. Storms, landslides, earthquakes, and other natural hazards may have cascading impacts that may affect up and downstream flooding potential of high-hazard potential dams.

### *J.3.a.2. Levee Failure Risk*

Levee system failure or overtopping can cause severe flooding and high-water velocities. A failure of a levee system could be devastating to the communities that are protected by the system. A levee failure caused by structural failure can be sudden, and perhaps with little to no warning. If a levee failure is caused by overtopping, the community protected by the levee may or may not be able to recognize the impending failure and evacuate. If a levee failure occurs suddenly, evacuation may not be possible.

Levee failure risk may also be affected by the impacts of climate change. One major concern is the impact of rising sea level on levee systems. As sea levels rise, there may be additional pressure put on tidal levee systems, thus increasing the potential for failure. Additionally, as intensity and frequency of storms and extreme precipitation events increase due to climate change, levee structural integrity will be tested, and levee systems may have to retain more water, which could lead to failure.

## **J.3.b. Dam Condition Assessment**

In addition to hazard classifications, dams are also assigned a condition assessment by the National Inventory of Dams. Condition assessments describe the condition of the dam at the time of inspection. Condition assessments are subjective, as they are assigned by individual inspectors. **Table 86** shows a description of each of the National Inventory of Dams condition assessments.

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<sup>108</sup> United States Bureau of Reclamation. Best Practices and Risk Methodology: Chapter A-9 Risk Guidelines Presentation. 2019. <https://www.usbr.gov/damsafety/risk/BestPractices/Chapters/A9-GovernanceAndGuidance.pdf>

Table 86: Dam Condition Assessment Classification

Condition Assessment	Description
Satisfactory	No existing or potential dam safety deficiencies are recognized. Acceptable performance is expected under all loading conditions (static, hydrologic, seismic) in accordance with the applicable regulatory criteria or tolerable risk guidelines.
Fair	No existing dam safety deficiencies are recognized for normal loading conditions. Rare or extreme hydrologic and/or seismic events may result in a dam safety deficiency. Risk may be in the range to take further action.
Poor	A dam safety deficiency is recognized for loading conditions which may realistically occur. Remedial action is necessary. “Poor” may also be used when uncertainties exist as to critical analysis parameters which identify a potential dam safety deficiency. Further investigations and studies are necessary.

Danger reach is an additional measure of dam failure extent. This refers to the area below a dam that would be flooded as a result of dam failure. Maps of the danger reach, referred to as “inundation maps,” are prepared by an engineer based on hydrologic and hydraulic analyses and topography of the affected area. Danger reach inundation maps serve as the basis of Emergency Action Plans (EAPs).<sup>109</sup> Emergency Action Plans are written documents that identify incidents that can lead to potential emergency conditions at a dam, identifies the areas that can be affected by the loss of reservoir, and specifies pre-planned actions to be followed to minimize property damage, potential loss of infrastructure and water resource, and potential loss of life because of failure or mis-operation of a dam.<sup>110</sup>

#### J.4. Previous Occurrences

As of November 2022, there have been no major dam or levee failures in Prince George’s County.

#### J.5. Probability of Future Events

While there have been no historical dam or levee failures in Prince George’s County, any single dam or levee breach event in the future may lead to catastrophic and expensive consequences. Without a historical basis, quantifying the probability of future dam failure is not currently possible. However, as climate change increases the frequency of severe storms and amount of extreme rainfall, there is an increasing risk of floodwaters overtopping dams. An increased risk of overtopping increases all types of risk associated with dam failures. High hazard potential dams are especially at risk of failure that causes severe damages to people and property.

<sup>109</sup> Maryland Department of the Environment. Maryland’s Dam Safety Program.

<https://mde.maryland.gov/programs/Water/DamSafety/Documents/FactSheetHazardClassificationofDams.pdf>

<sup>110</sup> Association of State Dam Safety Officials. Emergency Action Planning. <https://damsafety.org/dam-owners/emergency-action-planning>

## J.6. Vulnerability and Risk Assessment

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for dam failure (the State includes levees under “dam failure”). These scores and ranks are shown in **Table 87**, which shows the State’s ranking for dam failure vulnerability in Prince George’s County (including the City of Laurel) as medium-high.

*Table 87. 2021 State of Maryland Dam Failure Hazard Ranking and Risk for Prince George’s County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	1
Deaths	1
Property Damage	1
Crop Damage	1
Geographic Extent	3
Events	2
Local Plan Ranking (2017)	3
<b>Overall Weighted Risk Rating<sup>111</sup></b>	<b>18.5</b>
<b>Overall Ranking</b>	<b>Medium-High</b>

### J.6.a. Infrastructure Exposed to Dam Failure

In total, \$1,411,313,712 in property value is exposed between the eleven dam inundation areas that were provided by the County. Property exposure was determined by intersecting a County-provided property value GIS layer with each dam’s inundation zone GIS layer. **Figure 54** through **Figure 64** below show each dam’s inundation zone and the building footprints exposed. **Table 88** shows exposed property values for properties within each of the inundation zones.

The Duckett Dam poses the highest risk of exposure, both in terms of buildings in the inundation zone and property exposure. Almost \$700 Million is exposed, with the inundation zone containing 964 buildings, and spanning across parts of the City of Laurel, District 1, and District 4. The Largo Town Center Dam has the least amount of buildings in its inundation zone, but has the third least amount of property exposure, with \$44,463,996 exposed.

<sup>111</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

Table 88: Property Exposure by Dam

Dam	Hazard Potential	Buildings in Inundation Zone	Property Exposure
Duckett Dam	High	964	\$692,272,613
Tinker Creek Dam	Significant	10	\$669,767
Heritage Glen Dam	Significant	17	\$6,005,665
Indian Creek 2 & 3	High	182	\$151,537,770
Lake Arbor Dam	High	126	\$50,393,250
Largo Town Center Dam	Significant	3	\$44,463,996
Laurel Lakes No 1 Dam	Significant	103	\$327,589,022
Bowie Town Center Dam	High	37	\$105,287,663
Northridge Dam	Significant	6	\$10,292,166
Tall Oaks Crossing Dam	Significant	9	\$6,067,400
Melford Center Lower Dam	Significant	0	\$16,734,400
<b>Total</b>	--	<b>1457</b>	<b>\$1,411,313,712</b>

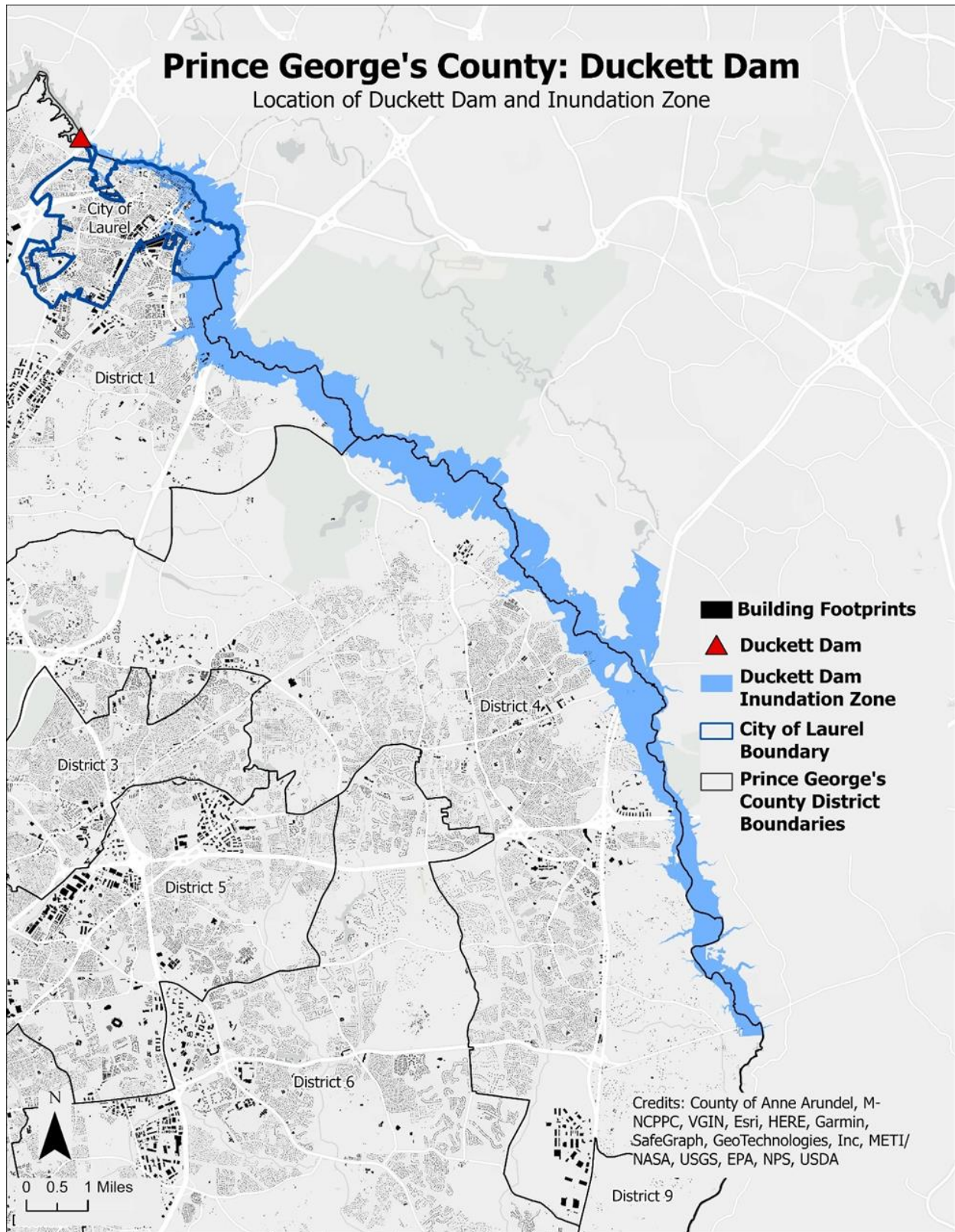


Figure 54: Duckett Dam Location and Inundation Zone



Figure 55: Largo Town Center Dam Location and Inundation Zone

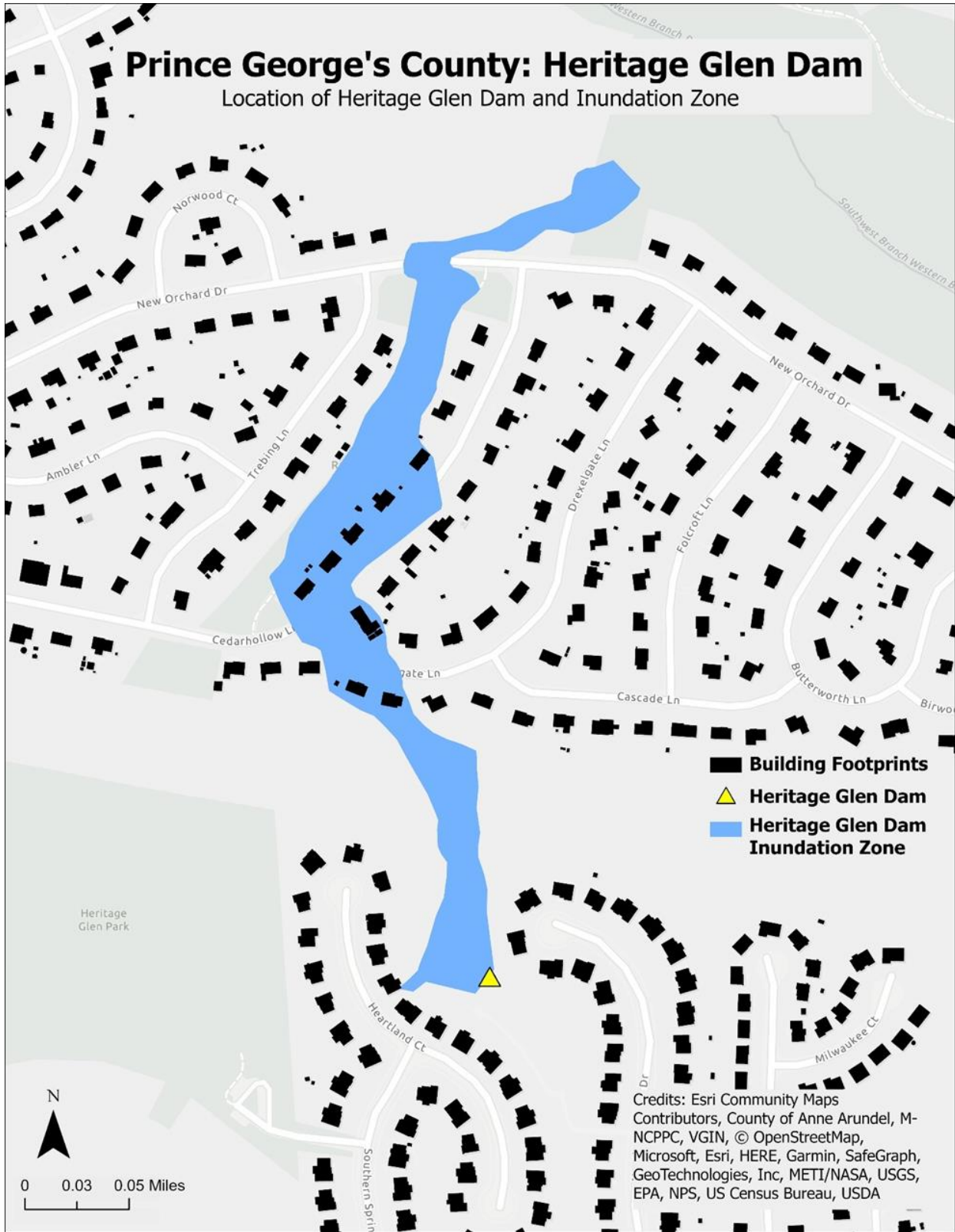


Figure 56: Heritage Glen Dam Location and Inundation Zone

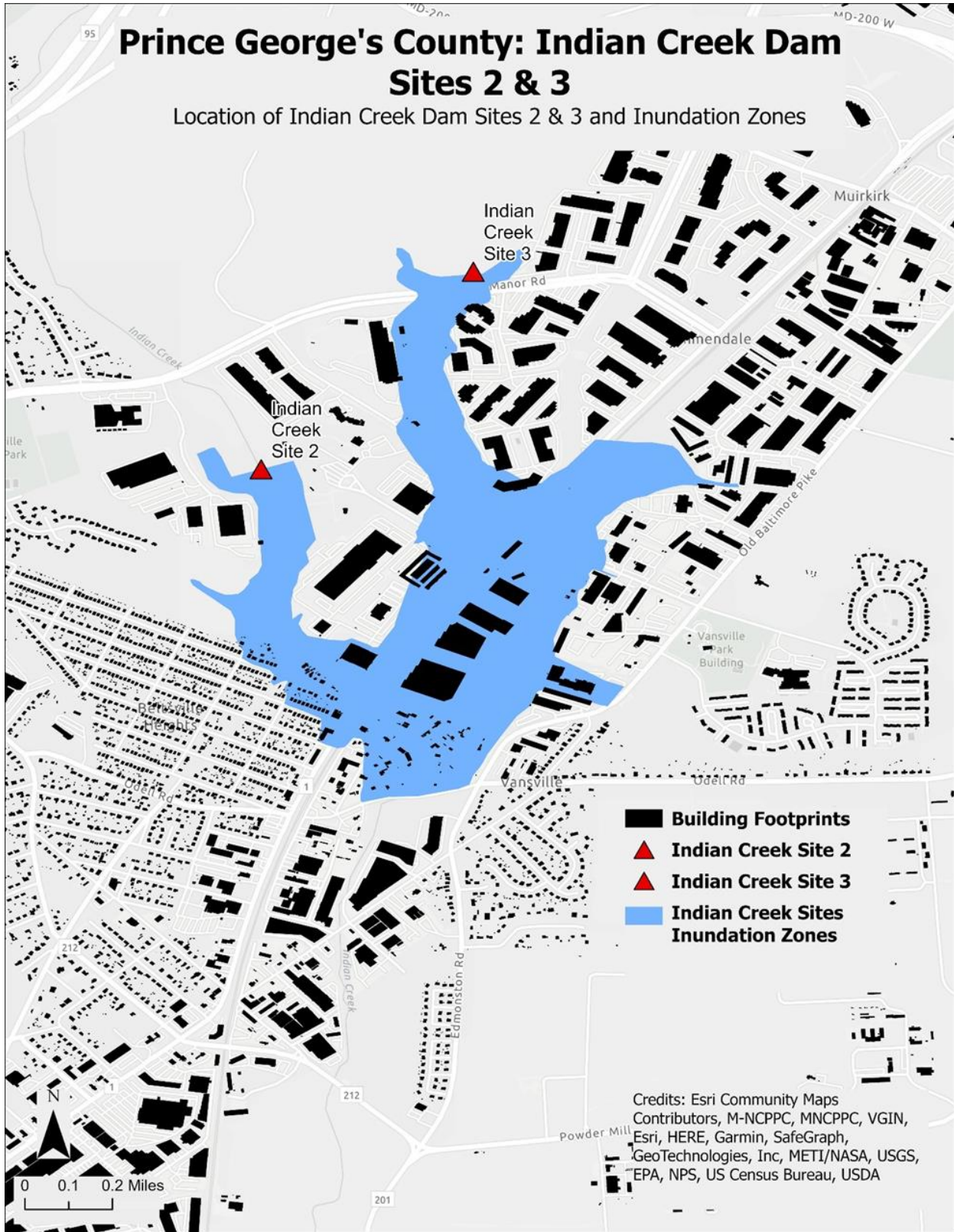


Figure 57: Indian Creek Dam Sites 2 & 3 Locations and Inundation Zone



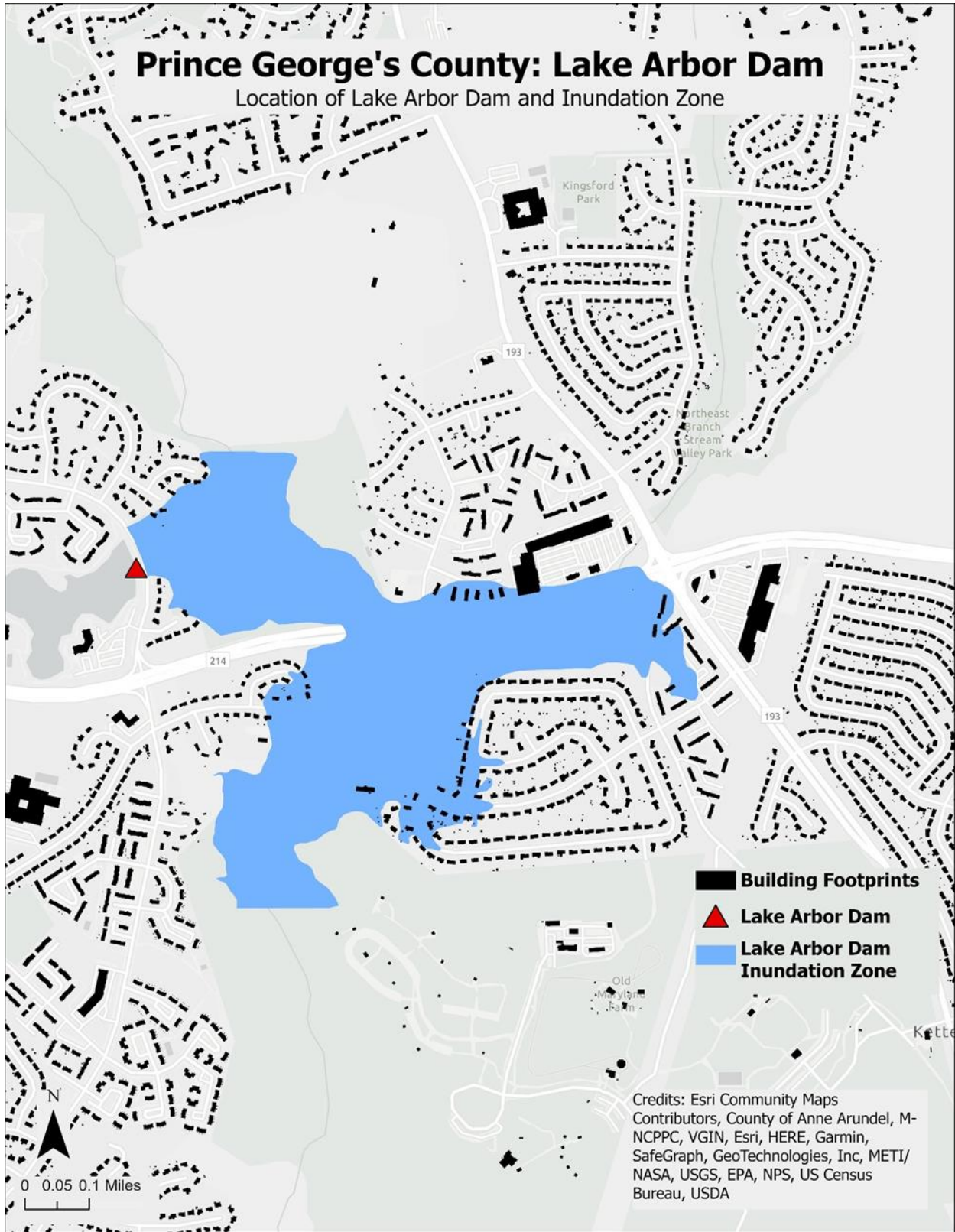


Figure 58: Lake Arbor Dam Location and Inundation Zone

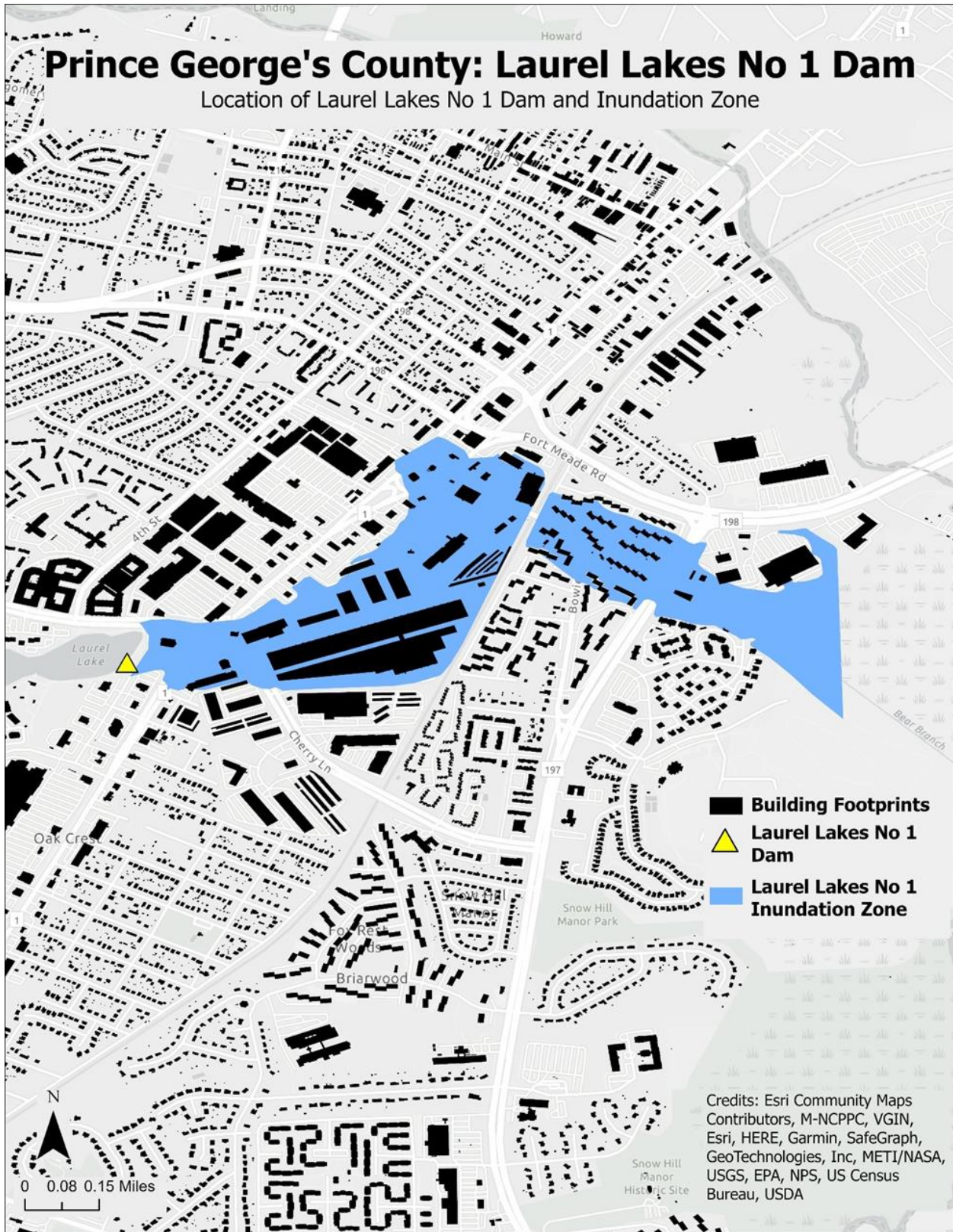


Figure 59: Laurel Lakes Dam No 1 Location and Inundation Zone



Figure 60: Tinker Creek Dam Location and Inundation Zone



Figure 61: Bowie Town Center Dam and Inundation Zone



Figure 62: Northridge Dam Location and Inundation Zone



Figure 63: Tall Oaks Crossing Dam Location and Inundation Zone

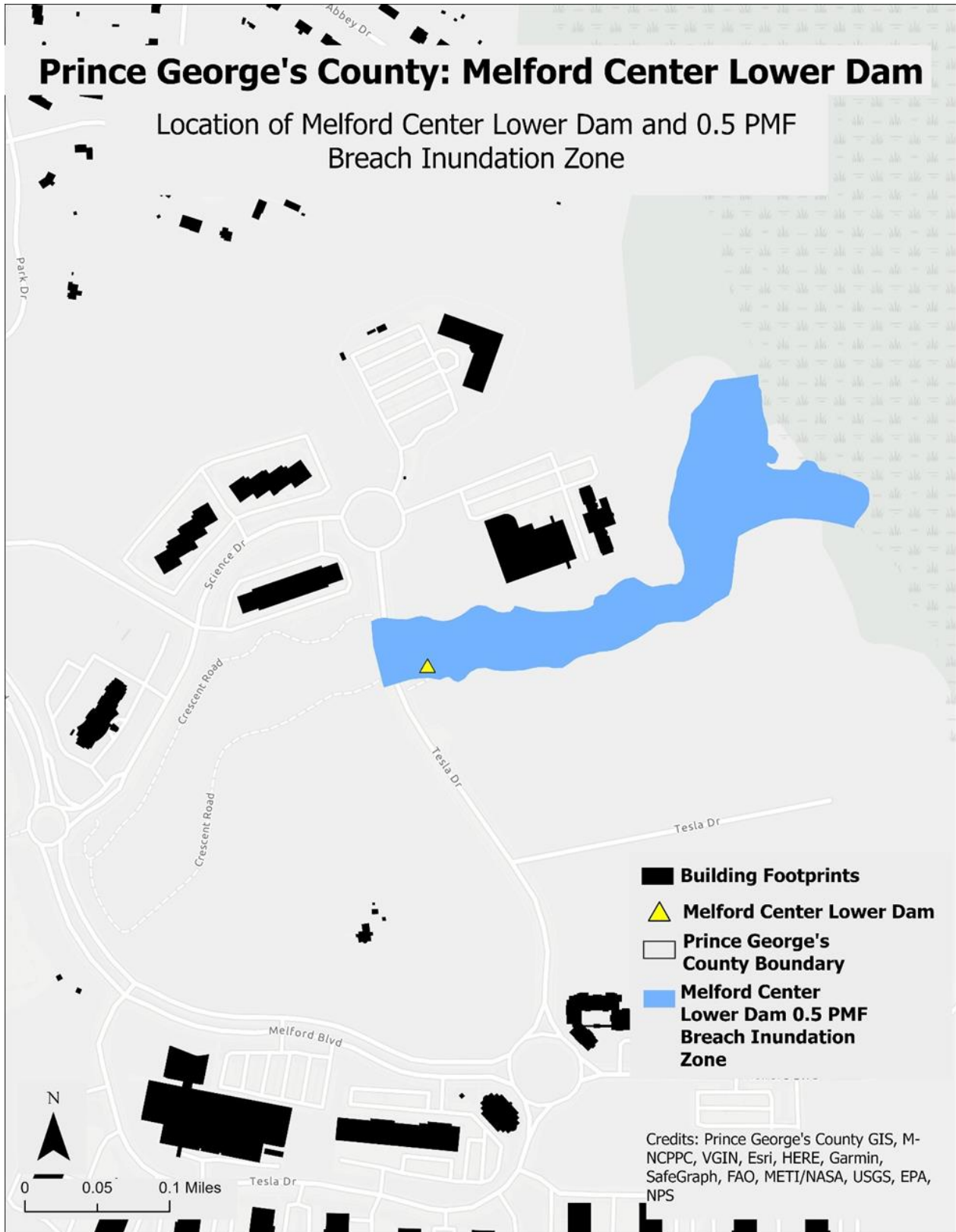


Figure 64: Melford Center Lower Dam Location and 0.5 Probable Maximum Flood Break Inundation Zone

### *J.6.a.1. Large Dams – Duckett*

The Duckett Dam is a large, high-hazard potential dam located on the Patuxent River. An analysis was completed using inundation zone GIS data for the Duckett Dam to evaluate property exposure in the case of a dam break. This inundation zone layer depicts a “sunny day” scenario, where the Duckett Dam fails, the reservoir is full, and there is no inclement weather to add additional water to the event. The inundation zone from the dam was intersected with a property value GIS map layer to determine the exposure during the “sunny day” dam failure scenario. This dam failure scenario put \$692,272,613 in property value at risk. A breach of a dam of this size would cause extensive property damage to properties within the inundation zone and put residents in the inundation zone at risk.

### *J.6.a.2. Small Dams*

Each of the small dams were analyzed for their possible property exposure. Property values were intersected with each dam inundation zone layer to determine property exposure. Laurel Lakes No 1 Dam had the highest exposed property value, with \$327,589,022 of exposed property at risk in its inundation zone. Indian Creek Dam Sites 2 & 3 had the second highest exposed property value, with \$151,537,770. Bowie Town Center Dam has \$105,287,663 in exposed property. Lake Arbor Dam had \$50,393,250 in exposed property value. Largo Town Center Dam had \$44,463,996 of exposure for the property in its inundation zone. Melford Center Lower Dam had \$16,734,400 and Northridge Dam had \$10,292,166 in exposed property. Tall Oaks Crossing Dam had \$6,067,400 in exposed property. Heritage Glen Dam had an exposed property value of \$6,005,665. Tinker Creek Dam had the lowest exposed property value, with \$669,767.



*J.6.a.3. Properties Exposed to Dam Failure*

Each of the dams were analyzed to determine the impact on the number and types of properties located in each inundation zone. Number and type of exposed properties located within the dam inundation zones are shown in **Table 89**.

*Table 89: Types of Properties Exposed to Dam Failure*

Dam	Residential-Single Family	Residential-Townhouse	Residential-Multi-Family	Residential-Attached	Commercial	Parks & Open Space	Institutional	Office	Industrial	Church	Vacant
Duckett Dam	360	119	34	15	78	71	37	36	24	8	411
Tinker Creek Dam	6	0	0	0	0	2	2	0	0	0	2
Heritage Glen Dam	24	0	0	0	0	5	0	0	0	0	1
Indian Creek 2 & 3	39	0	0	0	7	2	9	8	58	0	1
Lake Arbor Dam	73	31	0	0	1	5	3	0	0	1	0
Largo Town Center Dam	0	0	4	0	2	1	0	1	0	0	3
Laurel Lakes No 1 Dam	1	1	7	0	22	0	3	0	11	0	24
Bowie Town Center Dam	14	65	9	0	5	8	6	0	0	0	7

Dam	Residential-Single Family	Residential-Townhouse	Residential-Multi-Family	Residential-Attached	Commercial	Parks & Open Space	Institutional	Office	Industrial	Church	Vacant
<b>Northridge Dam</b>	25	0	0	0	0	11	0	0	0	0	6
<b>Tall Oaks Crossing Dam</b>	24	1	0	0	1	12	0	0	0	0	2
<b>Melford Center Lower Dam</b>	0	0	0	0	0	2	0	0	1	0	4

**J.6.a.4. Critical Facilities Exposed to Dam Failure**

Only 14 of the 708 critical asset facilities in Prince George's County and the City of Laurel are within the County's provided dam inundation zones. Seven of those 12 facilities fall within the Duckett Dam inundation zone, three are within the Laurel Lakes No 1 Dam inundation zone, two are within the Bowie Town Center Dam inundation zone, one is in the Lake Arbor Dam inundation zone, and one is within the Largo Town Center Dam inundation zone. **Table 90** and **Table 91** show the critical facilities located within inundation zones by dam inundation zone, as well as by type of critical facility. Critical facilities exposure was determined by intersecting the County's critical facilities points GIS layer with each Dam Inundation Zone GIS layers. **Appendix D** contains the full, structure-by-structure critical facility hazard analysis.

*Table 90: Prince George's County Critical Facilities Located in Dam Inundation Zones*

Dam	Critical Facilities in Inundation Zone
Duckett Dam	7
Tinker Creek Dam	0
Heritage Glen Dam	0
Indian Creek 2 & 3	0
Lake Arbor Dam	1
Largo Town Center Dam	1
Laurel Lakes No 1 Dam	3
Bowie Town Center Dam	2
Northridge Dam	0
Tall Oaks Crossing Dam	0
Melford Center Lower Dam	0
<b>Total</b>	<b>14</b>

*Table 91: Prince George's County Critical Facilities Located in Dam Inundation Zones*

Critical Facility Type	Facilities in Inundation Zone	Facilities Outside Inundation Zone	Percent in Inundation Zone
Commercial Facilities	5	110	4.50%
Emergency Services	2	76	2.60%
Government Facilities	2	382	0.50%
Transportation	2	40	5%

Critical Facility Type	Facilities in Inundation Zone	Facilities Outside Inundation Zone	Percent in Inundation Zone
Energy	1	14	7.10%
Water and Wastewater Systems	1	10	10%
Healthcare and Public Health	0	24	0%
Food and Agriculture	1	16	6.30%
Chemical	0	11	0%
Communications	0	5	0%
Information Technology	0	3	0%
Nuclear	0	2	0%
Defense Industrial Base	0	1	0%
<b>Total</b>	<b>14</b>	<b>694</b>	<b>2.02%</b>

**J.6.b. Infrastructure Exposed to Levee Failure**

The exposure values were approximated for this analysis using the same building footprints and property values as the dam failure exposure assessment. Property exposure and buildings in inundation extent were determined by intersecting a property value GIS layer and building footprint GIS layers with levee inundation extent GIS layers. **Table 92** summarizes the total building exposure in Prince George’s County to potential levee failure within each levee’s inundation extent. The total property exposure for the County is approximately \$644 million. The Brentwood Levee has the highest exposure risk, with approximately \$212 Million in property exposure, with 1074 buildings in the levee inundation area.

*Table 92: Summary of Individual Levee Risk Exposure*

Levee	District	Buildings in Inundation Zone	Property Exposure
Allison Street Levee System	District 2	362	\$109,339,700
Bladensburg Levee	District 5	486	\$118,512,532
Brentwood Levee	District 2	1074	\$212,527,000
Upper Marlboro Levees (Collington Branch and Western Branch)	District 9	14	\$9,189,432
Colmar Manor Levee	District 5	349	\$45,487,938
Forest Heights Levee	District 8	209	\$22,817,500
Riverdale-Hyattsville Levee	Districts 3 & 5	834	\$125,749,000

Levee	District	Buildings in Inundation Zone	Property Exposure
Total	--	3328	\$643,623,102

**J.6.c. Population Exposed to Dam Failure**

Only four districts and the City of Laurel are affected by dam inundation zones, as seen in **Figure 65**. Although these are the only districts with pre-existing inundation zone maps, each of the nine districts and the City of Laurel have at least one dam within its boundaries. Mapping of the remaining high hazard dams in the county without existing inundation maps would support additional analysis of population exposure to dam failure in the County.

According to 2020 census-tract CDC Social Vulnerability Data, the Duckett Dam and Indian Creek 2 & 3 Dams have the only dam inundation zones that impacts populations with a Social Vulnerability Index score of 0.6 or higher. **Figure 66** shows a map of social vulnerability in the County and dam inundation areas.

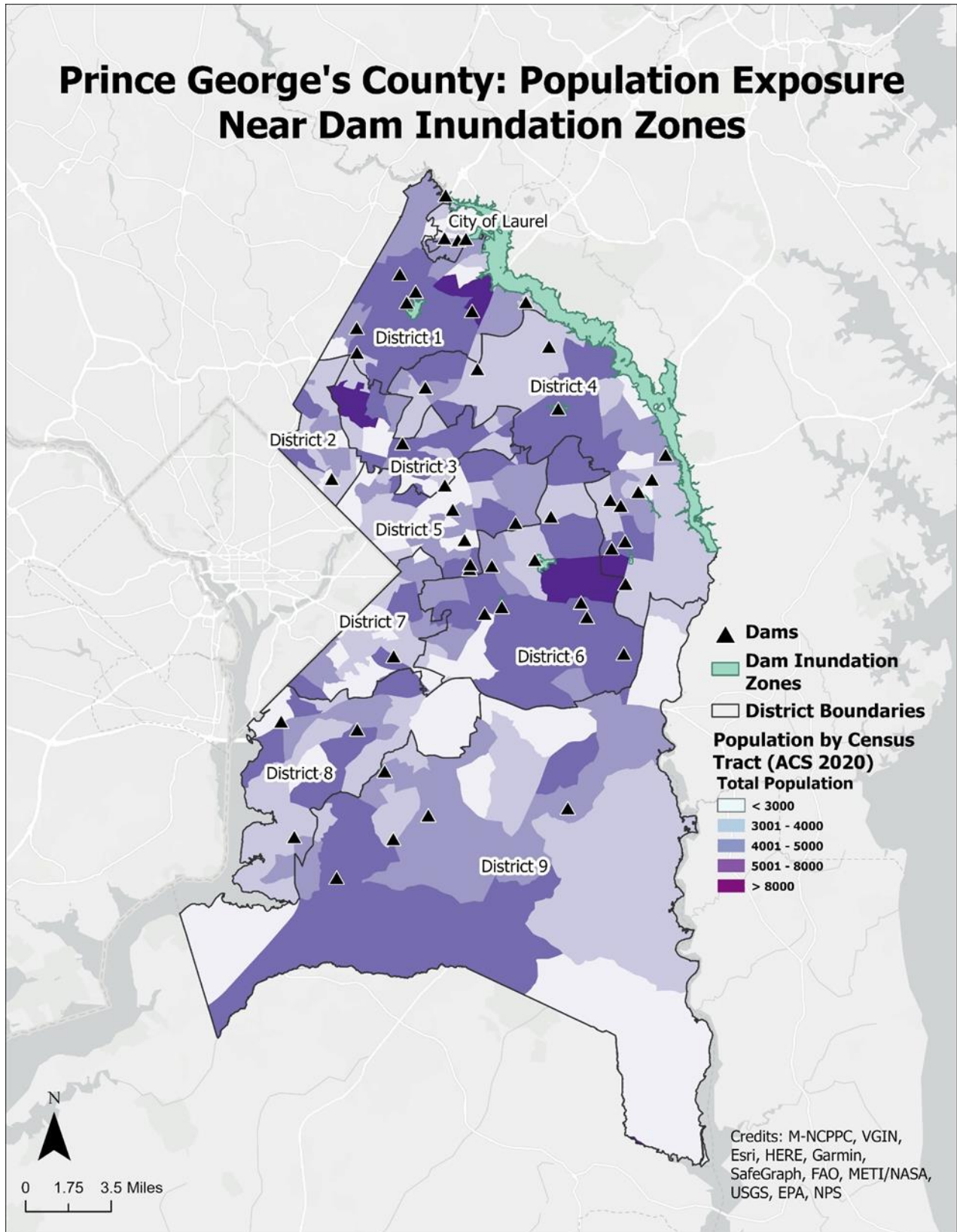


Figure 65: Prince George's County Population and Dam Inundation Zones

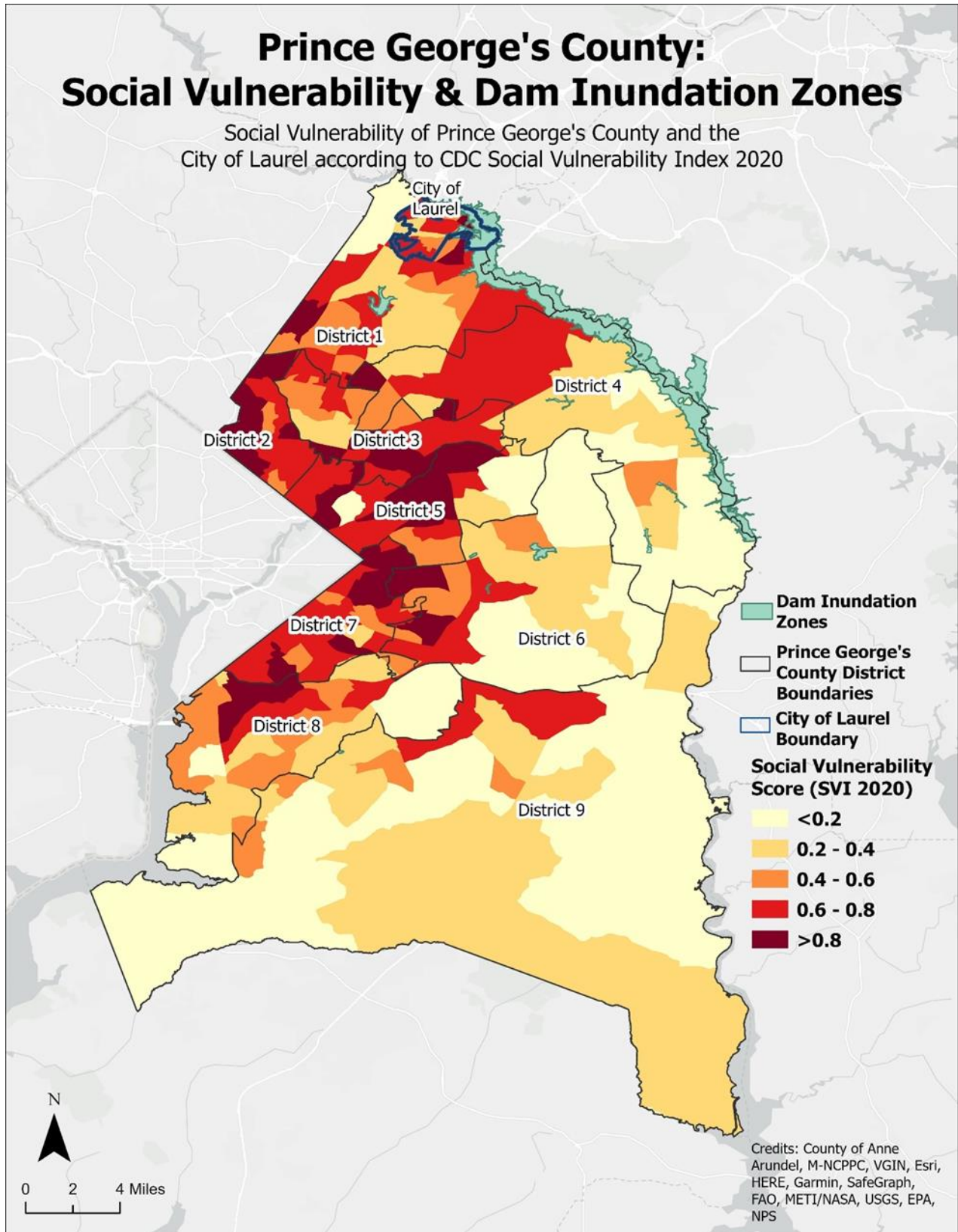


Figure 66: Prince George's County Social Vulnerability and Dam Inundation Zones

#### **J.6.d. Future Development**

An increase in development increases the potential for risk associated with dam and levee failure in Prince George's County and the City of Laurel. Downstream development increases the potential consequences of a dam or levee's failure due to an increased number of structures and population in the inundation zone. There will be increased economic, social, and environmental impacts as development increases downstream from dams. Additionally, more dams will be re-classified as significant-hazard potential and high-hazard potential, which will increase the need for Emergency Action Plans and planning to avoid disruption to essential facilities as well as prevent loss of life.

To reduce the vulnerability from high-hazard potential dams and the potential consequences associated with dam failure incidents, Prince George's County and the City of Laurel should reduce the number of high-hazard potential dams. Future development should include projects to build community resilience to dam-related flooding from existing high-hazard potential dams, such as flood-proofing or acquiring structures downstream of dams.

As shown in **Figure 67**, there is overlap between dam and levee inundation zones and Local Centers and Employment Areas, which means an increase in exposure and, therefore, an increase in risk to those developed areas in the case of dam or levee failure.



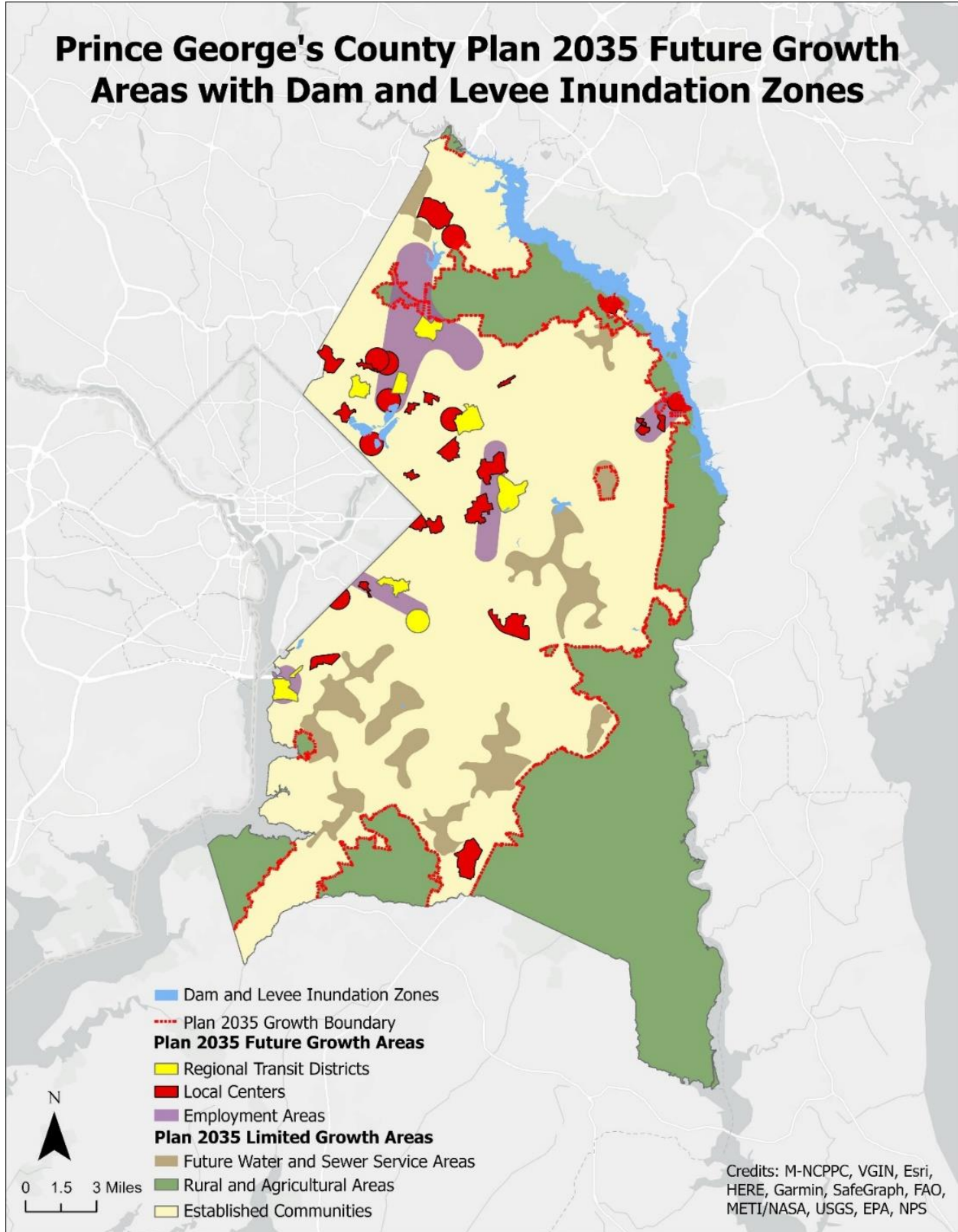


Figure 67. Prince George's County Plan 2035 Future Growth Areas with Dam and Levee Inundation Zones

## J.7. Consequence Analysis

Dam failure incidents can have significant economic, environmental, and social impacts on an area. Direct economic impacts can occur following a dam failure event through closure of businesses and need to repair or rebuild infrastructure and structures. Indirect economic impacts include loss of employment due to flooded businesses, and lower property tax revenues for impacted properties. Environmental impacts of dam failure include pollution of groundwater and surface water, as well as soil pollution. Dam failure can also degrade environmentally sensitive areas through flooding. Social impacts include changes to quality of life for populations living in dam inundation zones, as well as loss of services from critical facilities within inundation zones, including medical and transportation facilities.

Additionally, there are multiple FEMA Community Lifelines that are vulnerable to dam failure. FEMA's Community Lifelines have been developed to reframe incident information, communicate incident impacts, and organize response efforts across a community. The FEMA Community Lifelines at risk in the case of dam failure include the Food, Water, and Shelter Lifeline, and the Transportation Lifeline.

A consequence analysis (refer to **Table 93**) has been done to better understand the range of impacts that a dam or levee failure event can have on several features of the planning area and the population within it.

*Table 93. Dam or Levee Failure Consequence Analysis*

<b>Community Feature</b>	<b>Impacts</b>
<b>Life Safety (Warning and Evacuation)</b>	All populations within dam inundation areas are considered at-risk to dam failure. Dam failure can result in injuries and loss of life, and evacuations may be necessary to protect life safety.
<b>Public Health</b>	Dam failure can have negative impacts on public health. Impacts are similar to the public health issues associated with flooding (see <b>section B.6</b> ). Additionally, having water and wastewater treatment facilities within dam inundation areas increases vulnerability to sewage spills and water contamination.
<b>Critical Facilities and Infrastructure</b>	Dam failure can cause loss of services from critical facilities within inundation zones, including medical and transportation facilities. Infrastructure can also be impacted by dam failure by washed-out or flooded roads.
<b>Economy</b>	Direct economic impacts can occur following a dam failure event through closure of businesses and need to repair or rebuild infrastructure and structures. Indirect economic impacts include loss of employment due to flooded businesses, and lower property tax revenues for impacted properties.
<b>Buildings</b>	All buildings located in dam inundation areas are at risk from dam failure. Dam failure may cause flooding to structures, and lead to flood damages such as structural degradation or mold.

## K. Earthquake

### K.1. Description

The earth's surface is covered by solid rock that is approximately 50 miles thick, referred to as the lithosphere. The lithosphere is made up of the Earth's crust, which ranges in size from about 22 miles thick for continents to about five miles thick for the oceans, and the upper mantle which is composed of solidified magma. This lithosphere "floats" above a thick layer of molten rock known as the lower mantle. The lithosphere is divided into large and small sections that geologists call plates. Earthquakes occur when those geologic plates slide against or move under each other, resulting from the sudden release of energy that creates seismic waves. Most movements between plates are extremely small, generating tiny earthquakes that cannot be sensed by people. Other, less frequent movements between plates can be quite large, generating powerful earthquakes that can shake the ground surface and cause widespread damage.

In its most general sense, the term "earthquake" is used to describe any seismic event — whether natural or caused by humans — that generates seismic waves. Earthquakes are caused mostly by rupture of geological faults, but also by other events such as volcanic activity, landslides, mine blasts, "fracking" supporting the oil and natural gas industries and nuclear tests. An earthquake's point of initial rupture is called its focus or hypocenter. The epicenter is the point at ground level directly above the hypocenter.

Most earthquakes occur at weak points in the earth's crust along surfaces where two or more geologic plates meet, called faults. Large faults within the Earth's crust result from the action of plate tectonic forces, with the largest forming the boundaries between the plates. The location of faults can provide an indication of where future earthquakes are likely to occur. Some of the more active earthquake faults in the United States include the San Andreas Fault in California and the New Madrid Fault in the Midwest.

The potential effects of an earthquake are dependent on the magnitude of the event, the distance from the epicenter, and the local geology. At the Earth's surface, earthquakes manifest themselves by shaking and sometimes displacement of the ground. Typical impacts of a major earthquake include damages to buildings, transportation networks, and utility systems due to earthquake ground shaking and displacements. Intensities are generally greater on soft soils such as Marlboro Clays than solid rock. Seismic shaking of some poorly compacted alluvial soil can lead to liquefaction; which occurs when soil is shaken to the point where it can no longer support the weight of any object that is located on it. Other geologic impacts of strong earthquakes may include landslides, fissuring and slumping at the ground surface. When the epicenter of a large earthquake is located offshore near a subduction zone (where one geologic plate moves under another), the seabed may be displaced sufficiently to cause a tsunami. Tsunami waves can travel across the ocean at very high speeds, depending on the location and source of the seismic event.

### K.2. Location and Extent

Earthquakes in the United States occur most frequently along the West Coast, where several geologic plate boundaries converge. Earthquakes also occur along the East Coast of the United States, but the

mechanisms causing these earthquakes are not well understood, as these earthquakes occur within the plate rather than at plate boundaries.<sup>112</sup>

All of Prince George's County and the City of Laurel is at risk for earthquakes. The mid-Atlantic and central Appalachian region, including Maryland, is characterized by a moderate amount of low-level earthquake activity, but their cause or causes are not well-known. In Maryland, there are numerous faults, but none are known or suspected to be active. Because of the relatively low seismic energy release, this region has received relatively little attention from earthquake seismologists. Earthquakes can range in size and impact, and are most commonly measured by magnitude, intensity, and peak ground acceleration:

- **Magnitude** is a measure of the strength of an earthquake or energy released by it. Magnitude is measured by a device known as a seismograph. The scale used to measure earthquake magnitude was originally defined by Charles Richter in the 1930s, and is commonly referred to as the Richter Scale, which assigns a magnitude number to quantify the strength of an earthquake. Since January 2002, the Moment Magnitude Scale has been used by seismologists in the United States Geological Survey to calculate and report magnitudes for all modern large earthquakes. The Moment Magnitude Scale was developed in the 1970s and measures the size of earthquakes in terms of its energy released.
- **Intensity** is a measure of the effects of an earthquake at a particular place on people, structures, or the land itself. Earthquake intensity is most commonly measured in the United States using the Modified Mercalli Intensity (MMI) scale. The intensity at a point depends not only upon the strength of the earthquake, but also upon the distance from the earthquake to the point and the local geology at that point.
- **Peak Ground Acceleration (PGA)** is another common measure of earthquake shaking along the earth's surface. PGA expresses acceleration along the earth's surface as a percentage of g, the acceleration due to gravity (32.2 ft. / s<sup>2</sup>).

The most common form of scale is the Modified Mercalli Intensity Scale. This scale is summarized in **Table 94**.<sup>113</sup>

*Table 94: Modified Mercalli Intensity Scale for Earthquakes*

Scale	Intensity	Earthquake Effects	Corresponding Richter Scale Magnitude
I	Instrumental	Detected only on seismographs	< 4.2
II	Feeble	Felt by a few	
III	Slight	Felt by several; like a truck rumbling by	< 4.8
IV	Moderate	Felt by many	

<sup>112</sup> United States Geological Survey. The Science of Earthquakes. <https://www.usgs.gov/programs/earthquake-hazards/science-earthquakes#:~:text=An%20earthquake%20is%20what%20happens,the%20fault%20or%20fault%20plane>.

<sup>113</sup> United States Geological Survey. Modified Mercalli Intensity Scale. <https://www.usgs.gov/media/images/modified-mercalli-intensity-scale>

Scale	Intensity	Earthquake Effects	Corresponding Richter Scale Magnitude
V	Slightly Strong	Felt by nearly all. Trees and bushes shaken noticeably	
VI	Strong	Trees sway; suspended objects swing; objects fall off shelves	< 5.4
VII	Very Strong	People move unsteadily; walls crack; plaster falls	< 6.1
VIII	Destructive	Moving cars uncontrollable; masonry fractures; poorly constructed buildings damaged	< 6.9
IX	Ruinous	Some houses collapse; ground cracks; pipes break open	
X	Disastrous	Ground cracks profusely; many buildings destroyed; liquefaction and landslides widespread	< 7.3
XI	Very Disastrous	Most buildings and bridges collapse; roads, railways, pipes and cables destroyed; general triggering of other hazards	< 8.1
XII	Catastrophic	Total destruction; trees fall; ground rises and falls in waves	> 8.1

### K.3. Previous Occurrences

Between 1950 and 2022, Prince George’s County has not experienced an earthquake that had its epicenter within the County. However, recently the County has felt the effects of nearby earthquakes. On August 4, 2021, the U.S. Geological Survey reported that a magnitude 2.1 earthquake was centered in Clarksville, Maryland, at 2:11 a.m. with a depth of about 1.8 miles. This earthquake was felt in Prince George’s County as well as Howard, Montgomery, Carroll, and The District.<sup>114</sup> Similarly, the region felt the August 23, 2011 5.8 magnitude earthquake that occurred in Louisa County, Virginia – which affected many structures and buildings in the Northern Virginia, Washington D.C., and Maryland.<sup>115</sup> Following the 2011 earthquake, nearly 200 public schools in Prince George’s County were shut for inspections, officials said 32 would remain closed until later in the week because of safety concerns.

There have been 175 Earthquakes of various sizes that have affected Prince George’s County and the City of Laurel since 1900. This indicates about 0.7 annualized events. Although no earthquakes have originated in the County area, earthquakes can travel very far depending on their size. Many of the earthquakes felt in Prince George’s County have originated from the Virginia Seismic Zone. **Figure 68** illustrates earthquake epicenters near Prince George’s County since 1758.

<sup>114</sup> WTOP “Small earthquake shakes Central Maryland: Did you feel it?”: <https://wtop.com/maryland/2021/08/earthquake-hits-the-dc-region-overnight/>

<sup>115</sup> Washington Post “Region tallies earthquake damage, mostly uninsured”: [https://www.washingtonpost.com/local/region-tallies-earthquake-damage-mostly-uninsured/2011/08/24/gIQAfDxScJ\\_story.html](https://www.washingtonpost.com/local/region-tallies-earthquake-damage-mostly-uninsured/2011/08/24/gIQAfDxScJ_story.html)

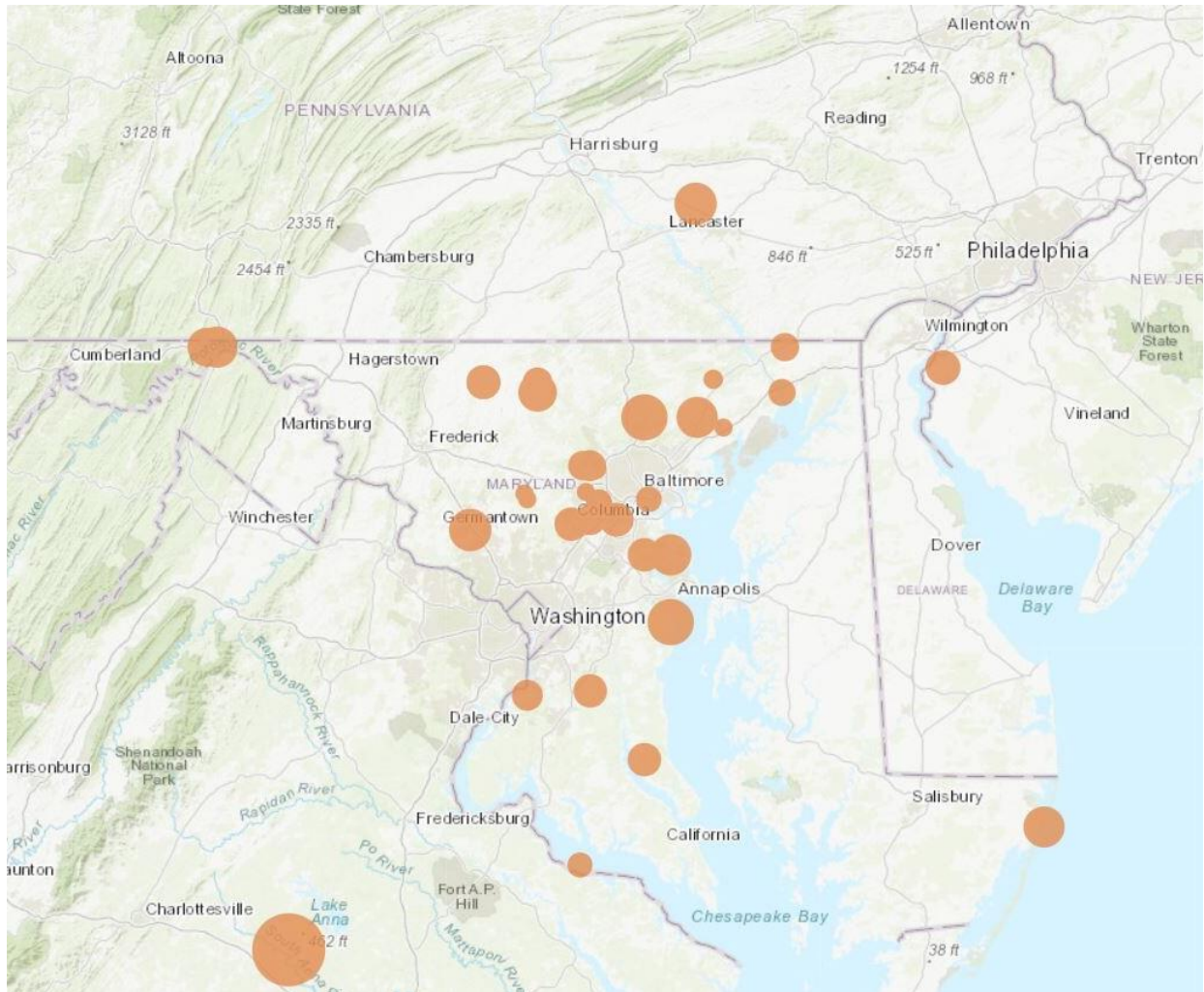


Figure 68. Approximate epicenters of Maryland earthquakes since 1758 <sup>116</sup>

#### K.4. Probability of Future Events

Earthquakes are high-impact, low-probability events. Earthquakes and tsunamis are not considered as significant hazards in Prince George’s County and the City of Laurel, and the probability of such events occurring within Prince George’s County and the City of Laurel appears to be extremely low. However, the County could be indirectly affected by earthquakes occurring outside the County.

There is limited knowledge on the connection between climate change and earthquake probability. As research emerges on the link between climate and seismic activity, earthquake probability in the County should be re-evaluated.

#### K.5. Vulnerability and Risk Assessment

Although earthquakes may occur infrequently, they can have devastating impacts that affect entire communities and regions. The destructiveness of an earthquake depends on several factors, including

<sup>116</sup> Maryland Geological Survey. [http://www.mgs.md.gov/geology/geohazards/earthquakes\\_and\\_maryland.html](http://www.mgs.md.gov/geology/geohazards/earthquakes_and_maryland.html)

the magnitude of the tremor, direction of the fault, distance from the epicenter, regional geology, and the design characteristics of buildings and infrastructure. Moderate and even very large earthquakes are inevitable; consequently, buildings in these regions are seldom designed to deal with an earthquake threat; therefore, they are extremely vulnerable.

Earthquake intensity is generally greater on soft soils than solid rock. Liquefaction can occur when loose sand and silt that is saturated with water behaves like a liquid when shaken by an earthquake to the point where it can no longer support the weight of any object that is located on it.<sup>117</sup> Areas that contain alluvial soils are more at risk of liquefaction occurring in the event of an earthquake. Other effects of a strong earthquake include landslides, fissuring and slumping at the ground surface, and even tsunamis. When the epicenter of a large earthquake is located offshore, the seabed may be displaced sufficiently to cause a tsunami. Tsunami waves can travel across the ocean at very high speeds, depending on the location and source of the seismic event.

**Figure 69** and **Figure 70** depict relative damage and probabilistic risk of earthquakes, respectively. According to the figures below, Prince George's County is located in an area of minor relative risk of earthquake damage, and low probabilistic risk. Additionally, the County's critical facilities exposure to earthquake risk is shown in **Appendix D**.

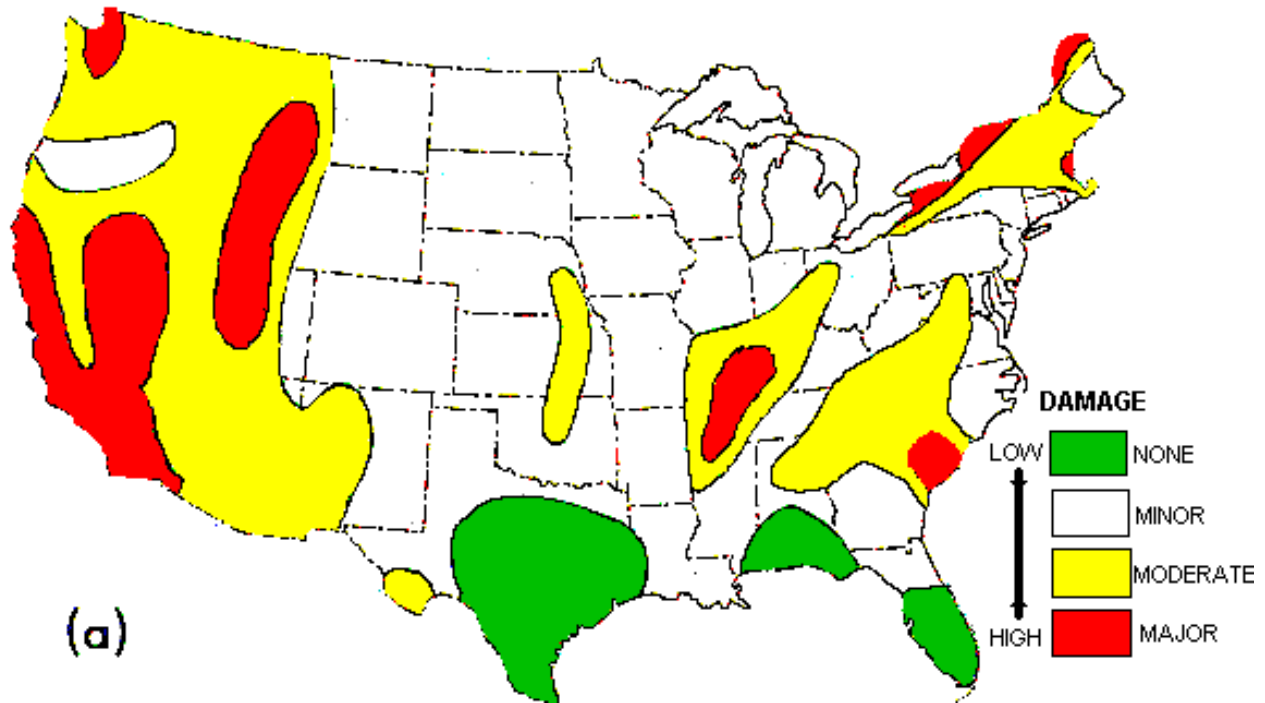


Figure 69. Relative risk of earthquake damage, based to a large extent on known earthquake history<sup>118</sup>

<sup>117</sup> United States Geological Survey. "About Liquefaction" <https://geomaps.wr.usgs.gov/sfgeo/liquefaction/aboutlig.html>

<sup>118</sup> Algermissen, S. T., 1969, Seismic risk studies in the United States: Proc., 4th World Conference on Earthquake Engineering, Santiago, Chile, v. 2, p. 14-27.

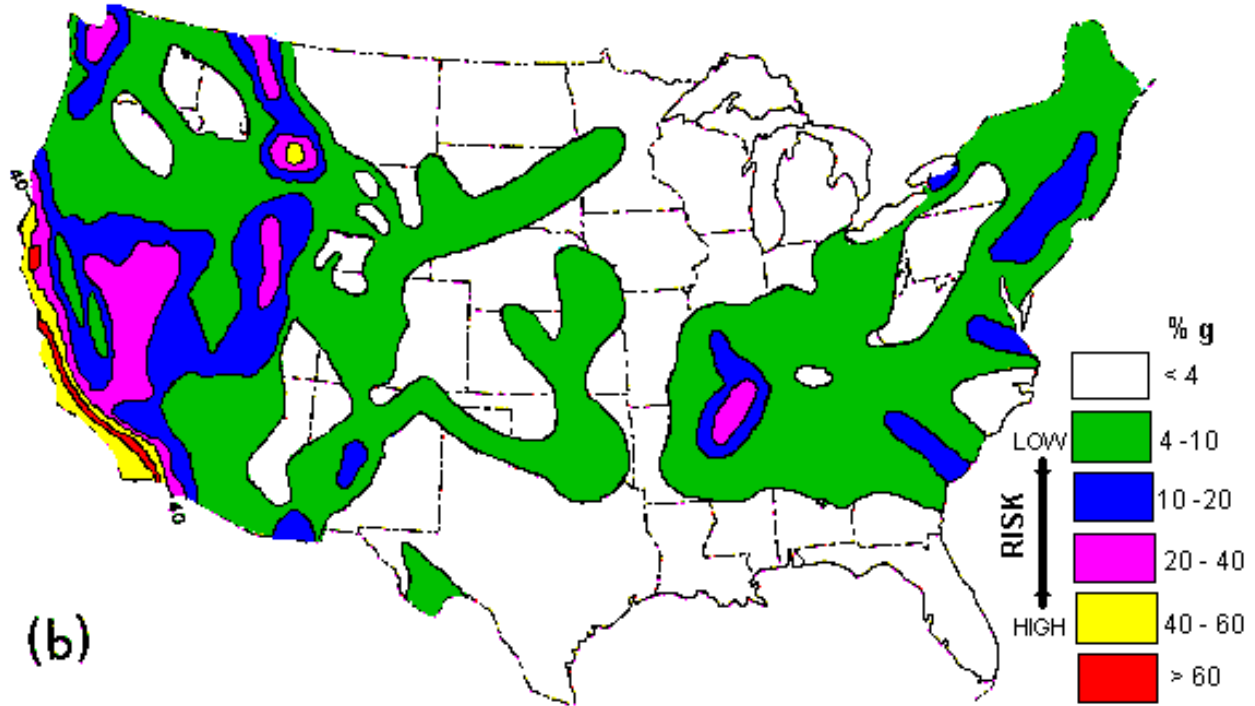


Figure 70. Probabilistic earthquake risk map showing maximum horizontal ground acceleration with a 90-percent probability of not being exceeded in 50 years <sup>119</sup>

### K.5.a. Loss Estimate

The Hazus Earthquake Loss Estimation Methodology provides government officials with decision support software for estimating potential losses from earthquake events. This loss estimation capability enables users to anticipate the consequences of earthquakes and develop plans and strategies for reducing risk. Hazus was used to generate an estimate of the consequences of a probabilistic scenario earthquake event for Prince George's County. The resulting “loss estimate” generally describes the scale and extent of damage and disruption that may result from the modeled earthquake event.

Loss estimates created using FEMA's Hazus-MH v5.1 shows annualized losses for the region at \$805,900, as shown in **Table 95**. **Table 96** shows annualized loss based on general building occupancy. The residential building stock accounts for about 68% of the total annualized loss, followed by commercial with 24% of the total loss. A comparison between the total exposure for the planning area against the estimated annualized losses indicates that, on an annual basis, less than 1% of assets exposed are vulnerable to earthquakes.

Table 95: Total Annualized Loss (from Hazus-MH v5.1)

Jurisdiction	Building	Contents	Inventory	Other	Total Loss	Total Exposure
City of Laurel	\$11,700	\$2,400	\$0	\$5,400	\$19,600	\$5,528,165,000

<sup>119</sup> Algermissen, S. T., Perkins, D. M., Thenhaus, P. C., Hanson, S. L. and Bender, B. L., 1982, Probabilistic estimates of maximum acceleration and velocity in rock in the contiguous United States: U. S. Geol. Survey Open-File Report 82-1033, 99 p.



Jurisdiction	Building	Contents	Inventory	Other	Total Loss	Total Exposure
Prince George's County	\$503,400	\$99,100	\$1,500	\$182,400	\$786,400	\$169,405,289,000
<b>Total</b>	<b>\$515,000</b>	<b>\$101,500</b>	<b>\$1,500</b>	<b>\$187,800</b>	<b>\$805,900</b>	<b>\$174,933,454,000</b>

Table 96: General Occupancy Related Annualized Loss (from Hazus-MH v5.1)

Jurisdiction	Residential	Commercial	Industrial	Other	Total Loss	Total Exposure
City of Laurel	\$11,600	\$7,000	\$400	\$600	\$19,600	\$5,528,165,000
Prince George's County	\$537,600	\$186,600	\$23,200	\$38,900	\$786,400	\$169,405,289,000
<b>Total</b>	<b>\$549,100</b>	<b>\$193,600</b>	<b>\$23,600</b>	<b>\$39,500</b>	<b>\$805,900</b>	<b>\$174,933,454,000</b>

Lastly, older buildings in the County and City of Laurel may be affected more by an earthquake than newer buildings. As mentioned in the **Severe Storm (Wind-Related)** section, **Figure 71** shows buildings constructed before 2002 (the first year that the Building Codes from 2000 were required in the County) and are broken up into three date categories and levels of possible vulnerabilities:

- 1600 to 1899 (Dark Orange): Highly Vulnerable
- 1900-1949 (Light Orange): Moderately Vulnerable
- 1950-2002 (Light Yellow): Slightly Vulnerable

Buildings that are shown in dark orange suggest that they may be more susceptible to earthquake damage than buildings in yellow. Older structures built before 1940 are often more susceptible to damage. Older critical facilities are vulnerable to damage due to the age of construction and poor condition due to age and lack of maintenance, especially in the more rural and isolated areas of the County. It is important to identify specific critical facilities and assets that are most vulnerable to severe weather. Evaluation criteria include the age of the building (and what building codes may have been in effect at the time of construction), type of construction, and condition of the structure (i.e., how well the structure has been maintained).

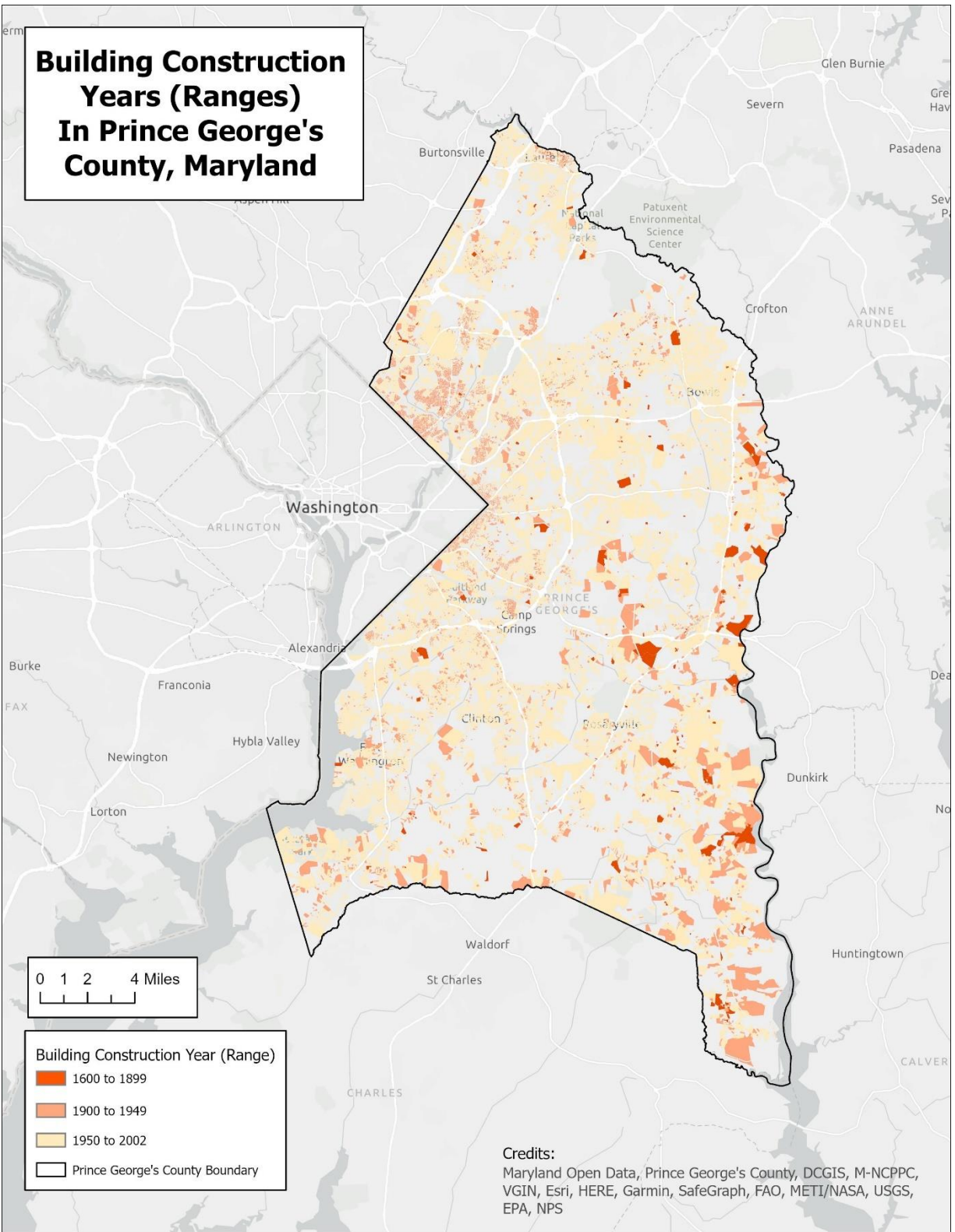


Figure 71: Building Construction Years in Prince George's County

**K.6. Consequence Analysis**

A consequence analysis (refer to **Table 97**) has been done to better understand the range of impacts that an earthquake event can have on several features of the planning area and the population within it.

*Table 97. Earthquake Consequence Analysis*

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	While a devastating earthquake in the County is unlikely, injuries are possible if earthquake shaking causes items to fall off shelves or walls. Damages to structures or infrastructure could have impacts on the life safety of the population. Evacuations are unlikely for an earthquake event, but individuals should take cover under a heavy, sturdy object in the event of an earthquake.
<b>Public Health</b>	Earthquakes that are strong enough to damage infrastructure may have public health impacts, such as contaminated water supply, fires from natural gas leaks, or prolonged power outages (which can especially impact public health when combined with extreme temperatures).
<b>Critical Facilities and Infrastructure</b>	In the event of an earthquake, there is potential for damages to critical facilities due to structural damage, fallen shelves, and loss of water or power due to ruptured pipes and power lines. Additionally, there is potential for damage to the city's infrastructure, including all pipes, roads, bridges, railroads, dams, and utility poles. During earthquakes, underground infrastructure, such as water and sewer systems and natural gas pipelines, is especially vulnerable.
<b>Economy</b>	The economic impact of an earthquake in the County would likely be limited to losses from damaged building contents (e.g., goods falling off shelves).
<b>Buildings</b>	There is potential for damages to structures during an earthquake due to structural damage, fallen shelves, and loss of water or power due to ruptured pipes and power lines. Fires caused by ruptured pipes or downed power lines have the potential to cause structure fires.

## L. Extreme Cold

### L.1. Description

Extreme cold is characterized by prolonged periods of unusually low temperatures, generally accompanied by high winds. The term “extreme cold” can be subjective depending on the focus-region, because regions that are relatively unaccustomed to winter weather, near freezing temperatures are considered “extreme cold,” while areas accustomed to winter weather may consider “extreme cold” to be temperatures freezing or below. According to the CDC, as temperatures drop below normal and as wind speed increases, heat can leave the body more rapidly, which can lead to serious health problems. Extreme cold is a dangerous situation that can bring on health emergencies in susceptible people, such as those without shelter or who are stranded, or who live in a home that is poorly insulated or without heat.<sup>120</sup>

Wind chill is defined by the National Weather Service as the rate of heat loss on the human body resulting from the combined effect of low temperature and wind. As winds increase, heat is carried away from the body at a faster rate, driving down both the skin temperature and eventually the internal body temperature. Animals are also affected by wind chill; however, cars, plants and other objects are not.<sup>121</sup>

While not as prevalent as extreme heat events, extreme cold events - prolonged periods of unusually low temperatures, generally accompanied by high winds – can and do occur in the Mid-Atlantic region. The “wind chill” is a measure of the combined effects of air temperature and wind speed to produce the perceived temperature. For example, a temperature of 20°F “feels like” 4°F when the wind speed is 20 mph. The National Weather Service Wind Chill chart is shown in **Figure 72**, and indicates the length of time for frostbite to develop on exposed skin.

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<sup>120</sup> Centers for Disease Control: Extreme Cold - <https://www.cdc.gov/disasters/winter/pdf/extreme-cold-guide.pdf>

<sup>121</sup> National Weather Service: Extreme Cold - <https://www.weather.gov/dlh/extremecold>

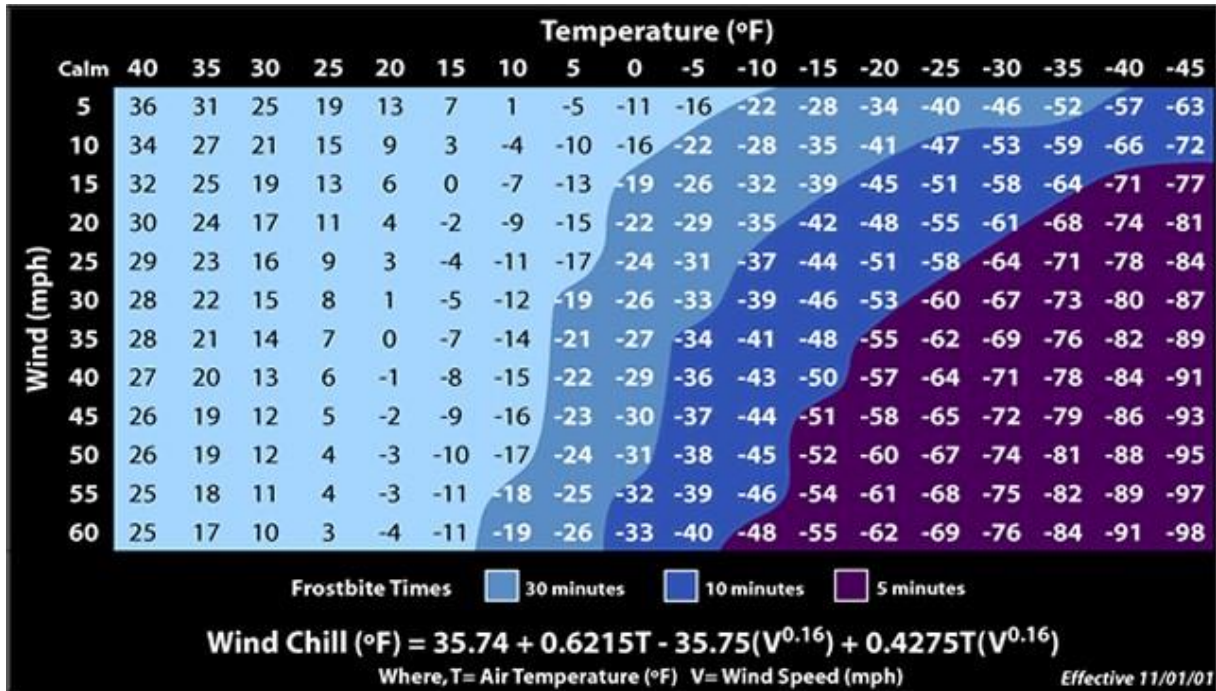


Figure 72: National Weather Service Wind Chill Chart

## L.2. Location and Extent

As with extreme heat, extreme cold can occur anywhere in the county. However, the impact of extreme cold is most prevalent in urban areas, where there is usually a larger proportion of vulnerable populations, such as homeless individuals and people who rely upon public transportation. Secondary impacts of extreme cold may include the freezing and bursting of frozen pipes and severe strain on electrical and fuel systems with potential electrical or fuel service interruptions.

The lowest recorded temperature in the Prince George's County area was negative 5 degrees Fahrenheit at Reagan National Airport in nearby Washington, DC. Colder temperatures are also possible in the County.

Extreme cold combined limits the body's ability to warm itself efficiently. Overexposure may result in frostbite and hypothermia, which could lead to death. The Centers for Disease Control and Prevention state that excessive cold exposure caused 16,911 deaths in the United States between 1999 and 2011.<sup>122</sup> According to the Environmental Protection Agency, between 1979 and 2016, the death rate as a direct result of exposure to cold (the underlying cause of death) generally ranged from 1 to 2.5 deaths per million people, with year-to-year fluctuations. Overall, a total of more than 19,000 Americans has died from cold-related causes since 1979, according to death certificates.<sup>123</sup>

<sup>122</sup> Centers for Disease Control and Prevention. QuickStats. Number of Hypothermia-Related Deaths, by Sex – National Vital Statistics System, United States, 1999-2011. Retrieved from <https://www.cdc.gov/mmwr/preview/mmwrhtml/mm6151a6.htm>

<sup>123</sup> Environmental Protection Agency Climate Change Indicators: Cold-Related Deaths. <https://www.epa.gov/climate-indicators/climate-change-indicators-cold-related-deaths>

### L.3. Previous Occurrences

There are a total of twelve cold/wind chill and extreme cold/wind chill events reported in the NCEI Storm Events Database between 1950 and 2022. Total annualized damages, deaths, injuries, and the number of events are summarized in **Table 98**. Total damage from cold/wind chill was \$2,500 of crop damage from one event.

*Table 98: NCEI Historic Cold/Wind Chill and Extreme Cold/Wind Chill Event Data*

Event Type	Number of Events	Period of Record	Total Annualized Damage	Annualized Deaths	Annualized Injuries	Annualized Events
Cold/Wind Chill	7	1950-2022	\$34.70	0	0	0.1
Extreme Cold/Wind Chill	5	1950-2022	\$0	0	0	0.0
<b>Total</b>	<b>12</b>	<b>1950-2022</b>	<b>\$34.70</b>	<b>0</b>	<b>0</b>	<b>0.1</b>

A closer review of the NCEI data does not reveal any notable periods of extreme cold or wind chill within the last ten years, and three periods of cold/wind chill within the last ten years.

### L.4. Probability of Future Events

Based on the NCEI historic records of extreme temperature-related events in Prince George’s County, it is estimated that the county will experience extreme cold events about once every ten years.

According to the Environmental Protection Agency, unusually cold winter temperatures have become less common across the contiguous 48 states in recent decades, particularly very cold nights. Extreme cold waves are likely to continue to decrease as winter temperatures increase in the future. This winter warming is expected to reduce the number of direct cold-related deaths, but the decrease is projected to be smaller than increases in heat-related deaths in most regions.<sup>124</sup>

### L.5. Vulnerability and Risk Assessment

Extreme cold has social, economic, and environmental impacts. People, especially the elderly, outdoor laborers, children, and individuals that are homeless or in poor physical health, are vulnerable to cold-related illnesses (e.g., frostbite) and death (extreme hypothermia). Periods of extreme cold, especially in the early spring or fall months, can lead to agricultural and horticultural losses. Although the NCEI database does not indicate any deaths or injuries attributed to extreme cold between 2002 and 2022, the Maryland Health Department (MHD) reported that during the 2019-2020 winter season, there were 50 cold-related deaths statewide, including some in Prince George’s County.<sup>125</sup> According to MHD, 57 cold-related deaths occurred in Maryland during the 2020-2021 reporting period. Twenty-two (22) of those

<sup>124</sup> EPA Climate Change Indicators: Cold-Related Deaths. <https://www.epa.gov/climate-indicators/climate-change-indicators-cold-related-deaths>

<sup>125</sup> Maryland Department of Health. Maryland Department of Health reports first cold-related illness death of the 2020-2021 winter weather season. <https://health.maryland.gov/newsroom/Pages/Maryland-Department-of-Health-reports-first-cold-related-illness-death-of-the-2020-2021-winter-weather-season.aspx>

deaths were suspected or presumed homeless individuals, and four (4) deaths for which it could not be determined whether the individuals were suspected or presumed homeless.<sup>126</sup>

Although most of the hypothermia-related deaths in Maryland occurred in Baltimore and northern areas of the state, a few of these deaths were reported in Prince George’s County. The most at-risk districts which contain the largest population of elderly residents are Districts 1, 3, 4, and 6. This population group has a greater vulnerability to extreme cold; **Figure 42** in **Section G.5.a** illustrates where these populations are concentrated.

According to the Environmental Protection Agency, outdoor occupational groups that work during winter months (such as agricultural workers or utility workers) face higher risks of exposure to cold. Other groups that are vulnerable to cold include older adults, infants, people with pre-existing medical conditions, homeless people, and those with inadequate winter clothing or home heating.<sup>127</sup>

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for extreme temperature (heat and cold are considered together by the State). These scores and ranks are shown in **Table 99**, which shows the State’s ranking for extreme temperature vulnerability in Prince George’s County (including the City of Laurel) as medium-high.

*Table 99. 2021 State of Maryland Extreme Temperature Hazard Ranking and Risk for Prince George’s County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	1
Deaths	1
Property Damage	1
Crop Damage	1
Geographic Extent	3
Events	2
Local Plan Ranking (2017)	3
<b>Overall Weighted Risk Rating<sup>128</sup></b>	<b>18.5</b>
<b>Overall Ranking</b>	<b>Medium-High</b>

<sup>126</sup> Maryland Department of Health. 2020-2021 Cold-related Illness Surveillance Summary Report. [https://health.maryland.gov/preparedness/SiteAssets/Reports\\_ColdArchive/NewForm/2020-2021%20Summary%20Cold%20Report\\_FINAL%20\(1\).pdf](https://health.maryland.gov/preparedness/SiteAssets/Reports_ColdArchive/NewForm/2020-2021%20Summary%20Cold%20Report_FINAL%20(1).pdf)

<sup>127</sup> EPA Climate Change Indicators: Cold-Related Deaths: <https://www.epa.gov/climate-indicators/climate-change-indicators-cold-related-deaths>

<sup>128</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

## L.6. Consequence Analysis

A consequence analysis (refer to **Table 100**) has been done to better understand the range of impacts that an extreme cold event can have on several features of the planning area and the population within it.

*Table 100. Extreme Cold Consequence Analysis*

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	Extreme cold can occur anywhere in the County. However, the impact of extreme cold is most prevalent in urban areas, where there is usually a larger proportion of vulnerable populations, such as homeless individuals and people who rely upon public transportation. Early warning of extreme cold event is helpful to allow for preparation for the event, including finding shelter and remaining indoors.
<b>Public Health</b>	People, especially the elderly, outdoor laborers, children, and individuals that are homeless or in poor physical health, are vulnerable to cold-related illnesses (e.g., frostbite) and death (extreme hypothermia).
<b>Critical Facilities and Infrastructure</b>	Critical facilities may be impacted by bursting pipes due to extreme cold. Infrastructure such as utilities and bridges may freeze due to extreme weather.
<b>Economy</b>	Extreme cold events may impact agricultural productivity. Indirect impacts due to loss of agricultural productivity may include higher food prices in the County.
<b>Buildings</b>	Extreme cold may cause pipes to crack or burst, causing water damage to buildings. Cold weather can also weaken concrete and create cracks in drywall joint compound and paint.



## M. Sinkhole

### M.1. Description

A sinkhole is a circular depression, typically funnel-shaped, that has no natural external surface drainage—when it rains, all of the water stays inside the sinkhole and typically drains into the subsurface. Sinkholes are most often found in karst areas. Karst is a type of topography formed on carbonate rock, such as limestone or dolomite, and is characterized by sinkholes, caves, and open-channel groundwater flow. Sinkholes are common where the rock below the land surface is limestone, carbonate rock, salt beds, or rocks that can naturally be dissolved by groundwater circulating through them. As the rock dissolves, spaces and caverns develop underground.

Sinkholes are dramatic because the land usually stays intact for a time until the underground spaces get too big. If there is not enough support for the land above the spaces, then a sudden collapse of the land surface can occur. These collapses can be small, or they can be huge and can occur where a house or road is located. Typically, sinkholes form so slowly that little change is noticeable, but they can form suddenly when a collapse occurs. Such a collapse can have a dramatic effect, especially in an urban setting.

Sinkholes can vary from a few feet to hundreds of acres wide and from less than 1 to more than 100 feet deep. Some are shaped like shallow bowls or saucers whereas others have vertical walls; some hold water and form natural ponds. Depressions that form on karst areas may be sinkholes, however, every depression or hole in the ground isn't necessarily a sinkhole. Depressions in the land may also be a result of rotted tree stumps, collapsed underground structures such as old septic tanks, stormwater runoff, and leaking underground pipes. The most damage from sinkholes tends to occur in Florida, Texas, Alabama, Missouri, Kentucky, Tennessee, and Pennsylvania.

### M.2. Location and Extent

In Maryland, karst areas occur in Baltimore, Carroll, Washington, and Frederick Counties, with less extensive areas in Allegany County. True sinkholes do not form in areas underlain by hard, crystalline rock present in central and western Maryland, nor in the unconsolidated sediments of Maryland's Coastal Plain (areas approximately east of I-95). Therefore, sinkholes are not a common hazard within Prince George's County and the City of Laurel. **Figure 73** shows the geology of Maryland. Prince George's County is mainly composed of the Quaternary, Tertiary, and Cretaceous sediments of sand, silt, gravel, and clay. There are no karst areas within the County, making the probability of a sinkhole forming inside its bounds extremely low.

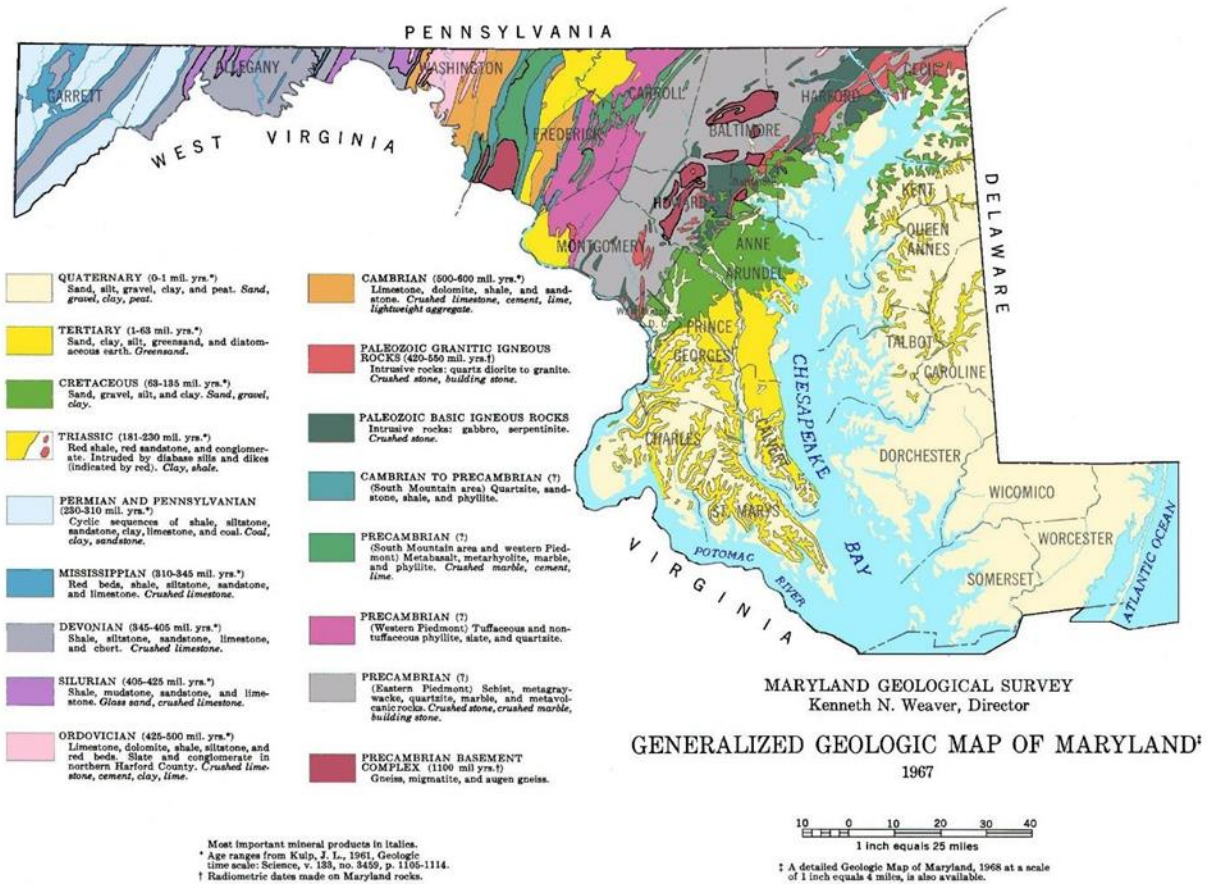


Figure 73: Generalized Geologic Map of Maryland<sup>129</sup>

The areas in Maryland that are most associated with collapse sinkholes are the Hagerstown Valley, the Frederick Valley, and the Wakefield Valley. To a lesser degree, sinkholes are found in Green Spring Valley, Worthington Valley, and Long Green Valley. None of these valleys are located in Prince George's County, where there are no karst areas. Overall, while not common, the entire planning area is at risk of sinkholes.

In general, sinkholes can range from a few feet across and less than a foot deep to hundreds of acres in width and a hundred feet deep. The severity of a sinkhole will depend on its size, how quickly it forms, and its proximity to existing development. A sinkhole that occurs gradually over time may be able to be addressed before damage occurs, whereas one that forms quickly may lead to property damage or service disruptions, if roads or utilities are affected. Sinkholes that occur in more developed areas will likely experience more significant damage due to the concentration of buildings, infrastructure, and people. However, even sinkholes that form gradually can incur significant damage if no interventions occur, such as the collapse of a roadway or building foundations. In a location with minimal (if any) sinkholes such as Prince George's County, they are expected to be small and not very deep when they do occur.

<sup>129</sup> Maryland Geologic Survey. 1967.

### M.3. Previous Occurrences

A significant sinkhole incident occurred on May 11-12, 2008 (**Figure 74**) after 12 hours of continuous and relatively uniformly distributed rainfall, averaging about 0.25 inches of rain per hour. The area behind five homes on the south side of Yorkville Road was affected, resulting in the formation of a sinkhole approximately 500 feet long, 100 feet wide and 10 feet deep. In 2009, the Department of Environmental Resources received a FEMA Hazard Mitigation Assistance grant to acquire the properties, demolish the homes, stabilize the site, and retain the land as open space. The removal of the structures is expected to save \$ 1,779,680 over the 100 years following the acquisitions.

Between August 2016 and July 2022, there were 765 drainage complaints related to sinkholes on private properties and 1,998 on public right-of-way land in Prince George's County and the City of Laurel. **Table 101** summarizes the number of sinkhole complaints that occurred by private properties and public right-of-way land in each District. The complaints considered duplicates or found to have incomplete information are not included in this summary. **Figure 75** shows the extent of sinkhole-related complaints within the County. As of July 2022, about 70% of the total complaints were closed by the Department of Public Works & Transportation and about 19% were closed by the Department of Environment.



Figure 74. May 2008 sinkhole event

Table 101: Number of Sinkhole Complaints from August 2016 to July 2022 in Prince George's County

Political Area	Type	Total Complaints
City of Laurel	Private Property	4
	Public Right-of-Way	8
District 1	Private Property	41
	Public Right-of-Way	135
District 2	Private Property	14
	Public Right-of-Way	64
District 3	Private Property	61
	Public Right-of-Way	181
District 4	Private Property	45
	Public Right-of-Way	146
District 5	Private Property	68

Political Area	Type	Total Complaints
	Public Right-of-Way	239
District 6	Private Property	109
	Public Right-of-Way	314
District 7	Private Property	99
	Public Right-of-Way	175
District 8	Private Property	168
	Public Right-of-Way	322
District 9	Private Property	156
	Public Right-of-Way	414
<b>Total</b>		<b>2,763</b>

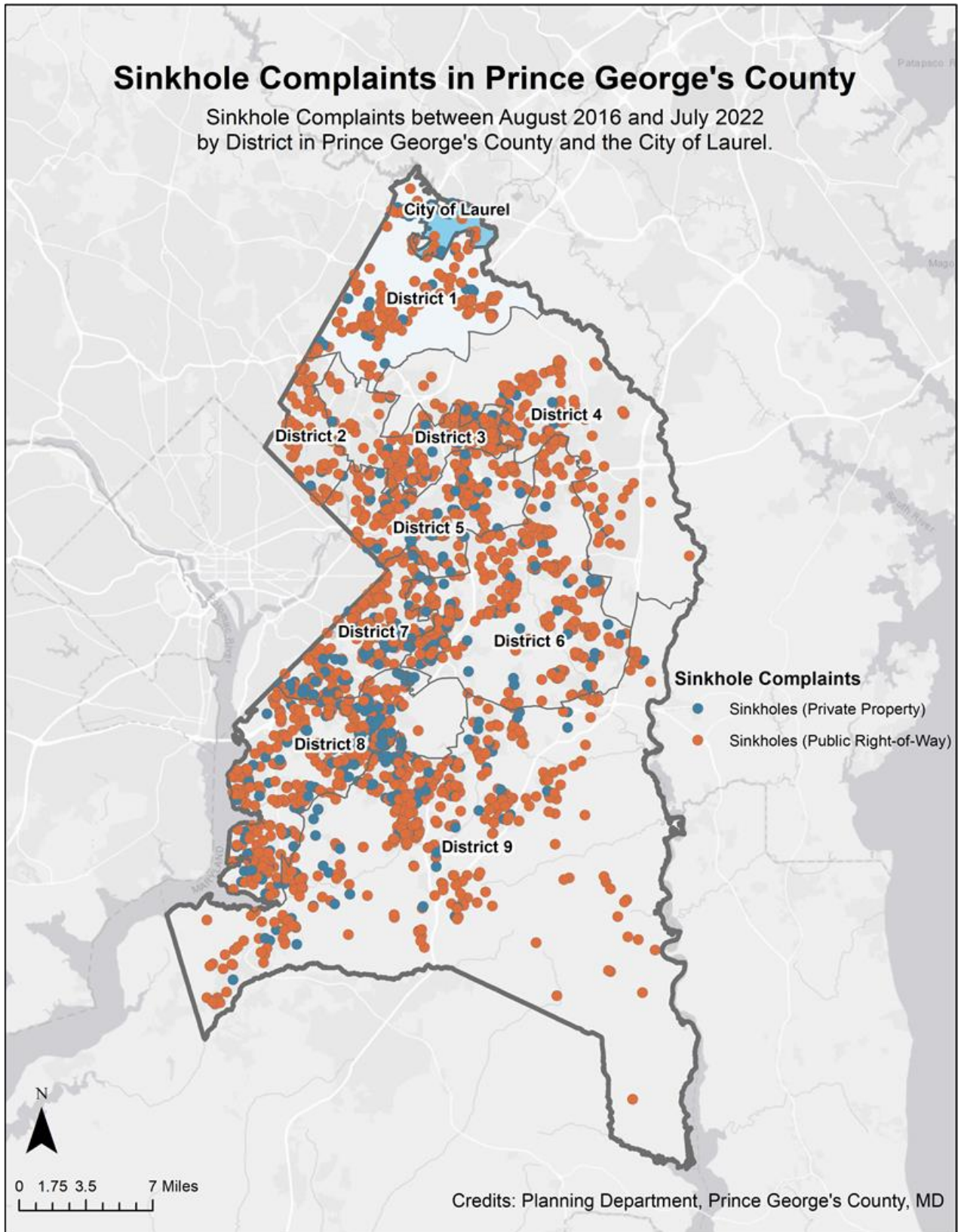


Figure 75: Sinkhole Complaints in Prince George's County (August 2016-July 2022)

## M.4. Probability of Future Events

Since only one NCEI record for sinkholes occurring within Prince George’s County could be found, it is posited that the vast majority of sinkholes that do occur within Prince George’s County or the City of Laurel are minor events or not “true” sinkholes, such as potholes, which are caused by a failure of paving materials. There are no karst areas within the County, making the probability of a sinkhole forming inside its bounds extremely low.

Most research points to sinkhole development being heavily dependent on geology, but the role of climate change should also be considered. A case study was done in Florida that showed a correlation between climate change and an increase in sinkholes.<sup>130</sup> Sinkhole collapse phases were linked and followed shortly after periods of drought. As drought likelihood and intensity is expected to increase in Prince George’s County, especially during the summer and fall, future occurrences may be higher than historical projections suggest.

Because sinkholes are not a significant risk in the region, a full calculation of probability was not performed for this analysis. Sinkholes are high-impact, low-probability events. With the few historic significant incidents throughout the region and limited data, the probability is low. The complaints received regarding possible sinkholes in the county are summarized in **Table 102**.

*Table 102: Sinkhole Complaints in Prince George's County*

Number of Complaints	Period of Record	Annualized Events
2,763	2016-2022	460.5

## M.5. Vulnerability and Risk Assessment

Sinkholes can cause structures to collapse, cars to be damaged, and can cause injuries or death when occurring in a populated area. As population grows in Prince George’s County and the City of Laurel, growth will continue to increase demands on groundwater supplies, elevating the risk for more land subsidence in areas already experiencing sinkholes, urban areas, as well as new subsidence in other areas. In the past, major subsidence areas have been in agricultural settings where groundwater has been pumped for irrigation.

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for soil movement (sinkhole is considered jointly with landslides and coastal erosion by the State). These scores and ranks are shown in **Table 103**, which shows the State’s ranking for soil movement vulnerability in Prince George’s County (including the City of Laurel) as medium-low.

*Table 103. 2021 State of Maryland Soil Movement Ranking and Risk for Prince George’s County*

Risk Factors	Rank
Population Vulnerability	4

<sup>130</sup> Global warming causes an increase in sinkhole collapse – Case study in Florida, USA. <https://nhess.copernicus.org/preprints/nhess-2018-18/nhess-2018-18-SC1-supplement.pdf>

Population Density	3
Injuries	1
Deaths	1
Property Damage	1
Crop Damage	1
Geographic Extent	1
Events	1
Local Plan Ranking (2017)	2
<b>Overall Weighted Risk Rating<sup>131</sup></b>	<b>13</b>
<b>Overall Ranking</b>	<b>Medium-Low</b>

## M.6. Consequence Analysis

A consequence analysis (refer to **Table 104**) has been done to better understand the range of impacts that a sinkhole event can have on several features of the planning area and the population within it.

Table 104. Sinkhole Consequence Analysis

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	All of the County is at risk of sinkholes. Sinkholes can cause structures to collapse, cars to be damaged, and can cause injuries or death when occurring in a populated area.
<b>Public Health</b>	A person can be harmed when stepping into an existing sinkhole or when the ground beneath gives way during a sinkhole's collapse. Additionally, sinkholes can cause decreased water quality by draining unfiltered water from streams, lakes, and wetlands directly into aquifers.
<b>Critical Facilities and Infrastructure</b>	Critical facilities located in or adjacent to a sinkhole area can be severely damaged or destroyed. There may also be damage to underground and above-ground utilities, and damage to transportation infrastructure, including roads, bridges, and railroad tracks due to sinkholes.
<b>Economy</b>	Sinkholes can impact local economies by decreasing agricultural productivity if they are located in agricultural areas. Additionally, they can cause damage to roadways or County owned structures, creating potentially large economic burden on local and County governments to repair.
<b>Buildings</b>	The amount of structural damage depends on the type of construction, the structure location and orientation with respect to the sinkhole location, and the characteristics of the sinkhole event.

<sup>131</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

## N. Wildfire

### N.1. Description

A wildfire is an undesirable fire occurring in a natural area, such as forest, grassland, or prairie, which may spread to more developed areas. Wildfires can start from natural causes, such as lightning, but most are caused by humans, either accidentally or intentionally.<sup>132</sup>

Wildfires pose a great threat to life and property, particularly when they move from forest or brushy areas into more developed or inhabited areas. Since 1983, more than five million acres are burned annually in the U.S. as a result of wildfires, causing millions of dollars in damage. Each year, more than 70,000 wildfires occur in the U.S., almost 86% of which are started by humans; the remaining 14% are caused by lightning.<sup>133</sup> Weather is one of the most significant factors in determining the severity of wildfires.

The 2021 International Wildland-Urban Interface Code defined wildfires as uncontrolled fires spreading through vegetative fuels, exposing and possibly consuming structures.<sup>134</sup> Wildfires may create additional environmental concerns well after they are extinguished, such as increased erosion and water quality concerns via stormwater runoff. Three main factors influence wildfire behavior: topography, fuel, and weather.

Other natural hazards can contribute to the potential for wildfires or influence wildfire behavior. For example, high winds can down power lines, earthquakes can rupture gas lines, and lightning can spark fires. Lightning is a major cause of both structural fires and wildfires. Drought conditions increase wildfire potential by decreasing fuel moisture. Warm winters, hot, dry summers, severe drought, insect and disease infestations, years of fire suppression, and growth in the wildland-urban interface (WUI) continue to increase wildfire risk and the potential for catastrophic wildland fires. Forest insect epidemics and forest parasites contribute to wildfire potential by increasing fuel loading.

#### Wildland Urban Interface

The wildland-urban interface is the area of transition between human development and natural lands with vegetation. There is a greater risk of wildfire within the wildland-urban interface than outside of it. The **interface wildland-urban interface** describes areas where significant development (urban or suburban) runs right up to the natural vegetated areas. A clear line of demarcation can be seen between the two land uses. The **intermix wildland-urban interface** features development that is scattered throughout natural vegetated lands, which is often seen in rural or exurban areas.

Protecting the wildland-urban interface is the nation's fastest-growing firefighting expense. On average over the five years leading up to 2020, more than 80 percent of federal spending in the United States was used to suppress wildfires in the wildland-urban interface originated in the Forest Services, according to the Congressional Budget Office.<sup>135</sup> Protecting life and property in these areas is costly because fire managers must take an aggressive stand on the ground and from the air.

<sup>132</sup> Federal Emergency Management Agency. (n.d.). Wildfire | What. Protective Actions Research. Retrieved October 24, 2022, from <https://community.fema.gov/ProtectiveActions/s/article/Wildfire-What>

<sup>133</sup> National Interagency Fire Center. (n.d.). Statistics. National Interagency Fire Center. Retrieved October 24, 2022, from <https://www.nifc.gov/fire-information/statistics>

<sup>134</sup> International Code Council, Inc. (2020). Section 202 Definitions. In 2021 IWUIC: International Wildland-Urban Interface code.

<sup>135</sup> Congressional Budget Office. (2022, June). Wildfires. Congressional Budget Office. Retrieved October 25, 2022, from [https://www.cbo.gov/publication/58212#\\_idTextAnchor023](https://www.cbo.gov/publication/58212#_idTextAnchor023)



## N.2. Location and Extent

Forested lands and any nearby developed areas (the wildland-urban interface) are most at risk of fires. Areas in the wildland-urban interface (either interface or intermix) are illustrated in **Figure 76**.

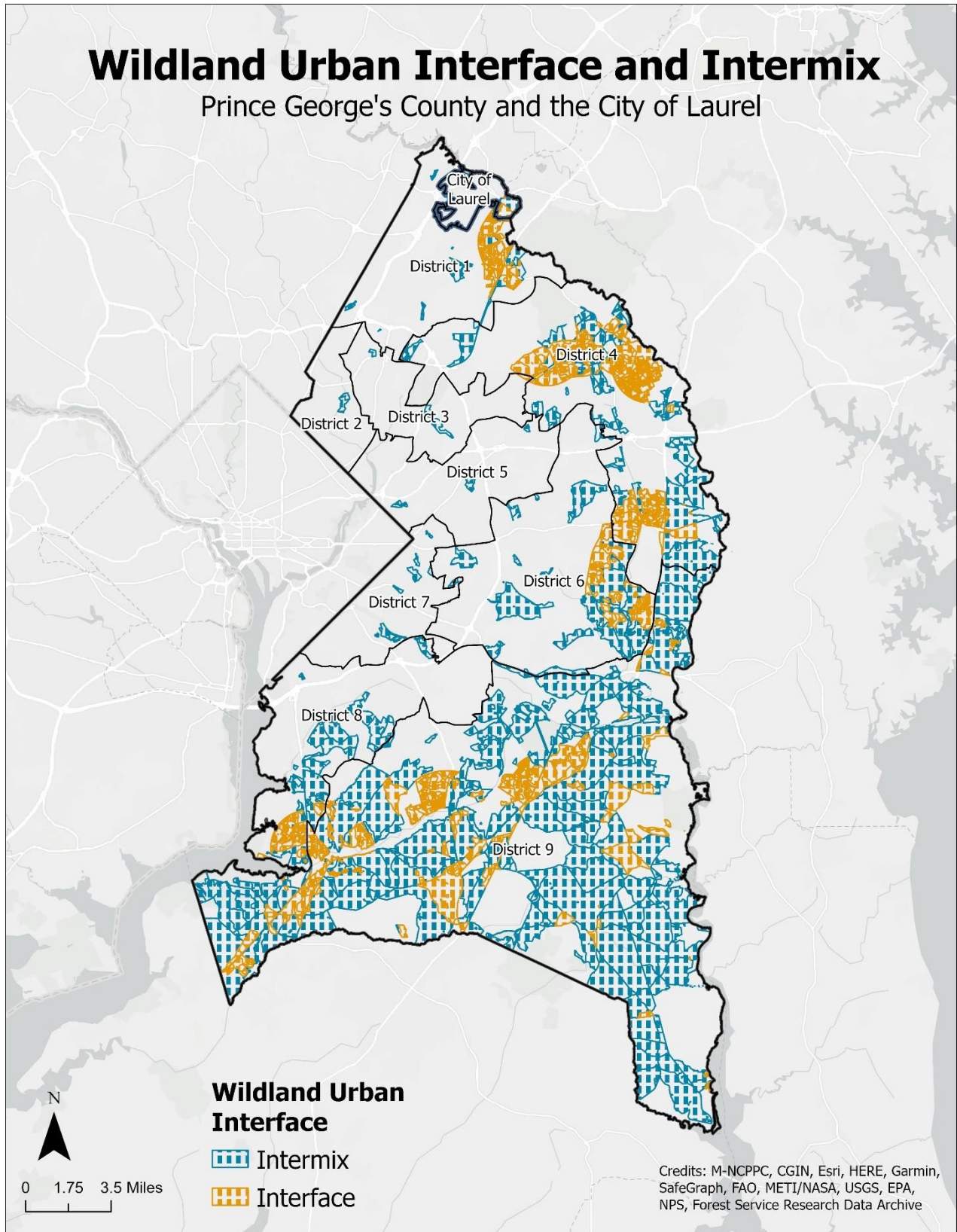


Figure 76: Wildland Urban Interface and Intermix in Prince George's County and the City of Laurel

The extent of a wildfire can be measured by its size, which is typically expressed in acres. The National Wildfire Coordinating Group has the following size classes for fires:

- Class A: one-fourth acre or less
- Class B: more than one-fourth acre, but less than 10 acres
- Class C: 10 acres or more, but less than 100 acres
- Class D: 100 acres or more, but less than 300 acres
- Class E: 300 acres or more, but less than 1,000 acres
- Class F: 1,000 acres or more, but less than 5,000 acres
- Class G: 5,000 acres or more

The wildfire’s severity is often of greater significance in wildfire classification than extent, however. Wildfire severity is a function of wildfire intensity (how hot the fire was, often measured by flame height) and its spread rate (the speed the fire travels).<sup>136</sup> It is typically expressed as low, moderate, or high, as shown in **Table 105**, and is measured by the condition of the vegetation and land after the wildfire is extinguished.

Table 105. Wildfire Severity Classification Levels<sup>137</sup>

	Low	Moderate	High
<b>Surface Litter</b>	scorched, charred, blackened but with definable plant parts; 40 to 85 percent litter cover remains.	partially consumed; less than 40 percent litter cover remaining, much covered with black char.	no surface litter remains.
<b>Small Woody Debris</b>	surfaces are burned with some unburned areas.	surfaces are charred; some woody debris partially to wholly consumed.	small woody debris is fully consumed.
<b>Large Wood Debris</b>	surfaces blackened with unburned areas.	surfaces are all blackened; char goes into wood.	only large, deeply charred logs are left.
<b>Stumps</b>	stumps are intact but blackened.	stumps are burned deep enough to form charcoal.	stumps are gone; holes in ground where stumps and root systems were.
<b>Mineral Bare Soil and Ash</b>	exposed soils unchanged or blackened, with isolated areas that are gray to orange where downed logs burned.	black, gray, and/or orange soil dominates area, with little to no unburned areas; gray ash is present in	black, gray and orange soil dominates area; gray ash layers may be deep and extensive.

<sup>136</sup> Ota Lutz. NASA Jet Propulsion Laboratory, California Institute of Technology. *The Science of Wildfires*. September 14, 2020. <https://www.jpl.nasa.gov/edu/news/2016/8/22/back-to-school-burn-the-science-of-wildfires/>

<sup>137</sup> Barkley, Y., University of Idaho Extension. *How to Determine Burn Severity After a Wildfire*. August 27, 2019. <https://surviving-wildfire.extension.org/how-to-determine-burn-severity-after-a-wildfire/>

	Low	Moderate	High
		patches covering <20 percent of area.	
<b>Summary</b>	<b>Less than 25% tree mortality, limited effects on soils</b>	<b>25–75% tree mortality, moderate effects on soils</b>	<b>Greater than 75% tree mortality, extensive mineral soil exposure</b>

The National Fire Danger Rating System assesses existing and expected conditions of identified factors that contribute to how dangerous a fire may become (its potential extent and severity). The National Fire Danger Rating System rates fire potential using color-coded levels as outlined in **Table 106**.

Table 106. National Fire Danger Rating System Levels<sup>138</sup>

Rating	Description
<b>Low</b>	When the fire danger is "low" it means that fuels do not ignite easily from small embers, but a more intense heat source, such as lightning, may start fires in duff or dry rotten wood. Fires in open, dry grasslands may burn easily a few hours after a rain, but most wood fires will spread slowly, creeping or smoldering. Control of fires is generally easy.
<b>Moderate</b>	When the fire danger is "moderate" it means that fires can start from most accidental causes, but the number of fire starts is usually pretty low. If a fire does start in an open, dry grassland, it will burn and spread quickly on windy days. Most wood fires will spread slowly to moderately. Average fire intensity will be moderate except in heavy concentrations of fuel, which may burn hot. Fires are still not likely to become serious and are often easy to control.
<b>High</b>	When the fire danger is "high", fires can start easily from most causes and small fuels (such as grasses and needles) will ignite readily. Unattended campfires and brush fires are likely to escape. Fires will spread easily, with some areas of high-intensity burning on slopes or concentrated fuels. Fires can become serious and difficult to control unless they are put out while they are still small.
<b>Very High</b>	When the fire danger is "very high", fires will start easily from most causes. The fires will spread rapidly and have a quick increase in intensity, right after ignition. Small fires can quickly become large fires and exhibit extreme fire intensity, such as long-distance spotting and fire whirls. These fires can be difficult to control and will often become much larger and longer-lasting fires.
<b>Extreme</b>	When the fire danger is "extreme", fires of all types start quickly and burn intensely. All fires are potentially serious and can spread very quickly with intense burning. Small fires become big fires much faster than at the "very high" level. Spot fires are probable, with long-distance spotting likely. These fires are very difficult to fight and may become very dangerous and often last for several days.

<sup>138</sup> U.S. Forest Service. National Fire Danger Rating System. <https://www.fs.usda.gov/detail/cibola/landmanagement/resourcemanagement/?cid=stelprdb5368839>

Potential impacts from wildfires include the damage and destruction of land, property, and structures as well as injuries and loss of life. Although rare, deaths and injuries usually occur at the beginning stages of wildfires when sudden flare-ups occur from high wind conditions. In most situations, people can evacuate the area and avoid injury. Financial losses relate to wildfires include destroyed or damaged houses, barns, private facilities, vehicles, and equipment; loss of commercial timber supplies; and local- and state-costs for response and recovery.

### N.3. Previous Occurrences

From 1992 to 2018, there were 88 wildfires of various sizes in Prince George's County.<sup>139</sup> Sizes can range from less than a quarter of an acre (Class A) to larger than 5,000 acres (Class G). **Table 107** summarizes the number of wildfires that occurred by Class in each District according to a spatial database of U.S. wildfires from the Forest Service Research Archive. District 4 and District 9 had the highest number of wildfires in the County, making up 77% of all recorded wildfires. **Figure 77** shows wildfire extent within the County, as well as specific areas of the community that participate in a Community Wildfire Protection Plan (CWPP) to fight against the wildfire danger.

*Table 107: Number of Wildfires from 1992 to 2018 in Prince George's County*

Political Area	Fire Size Code	Fire Description	Total Fires
City of Laurel	--	--	--
District 1	A	0.25 Acres or less	1
	B	0.26 to 9.9 Acres	3
	C	10.0 to 99.9 Acres	1
District 2	B	0.26 to 9.9 Acres	1
District 3	B	0.26 to 9.9 Acres	4
District 4	A	0.25 Acres or less	6
	B	0.26 to 9.9 Acres	15
District 5	B	0.26 to 9.9 Acres	1
District 6	A	0.25 Acres or less	1
	B	0.26 to 9.9 Acres	1
District 7	A	0.25 Acres or less	1
	B	0.26 to 9.9 Acres	1
District 8	B	0.26 to 9.9 Acres	2
	C	10.0 to 99.9 Acres	1

<sup>139</sup> Short, Karen C. 2021. Spatial wildfire occurrence data for the United States, 1992-2018 [FPA\_FOD\_20210617]. 5th Edition. Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2013-0009.5>

Political Area	Fire Size Code	Fire Description	Total Fires
District 9	A	0.25 Acres or less	13
	B	0.26 to 9.9 Acres	29
	C	10.0 to 99.9 Acres	3
	E	300 to 999 Acres	2
<b>Total</b>			<b>88</b>

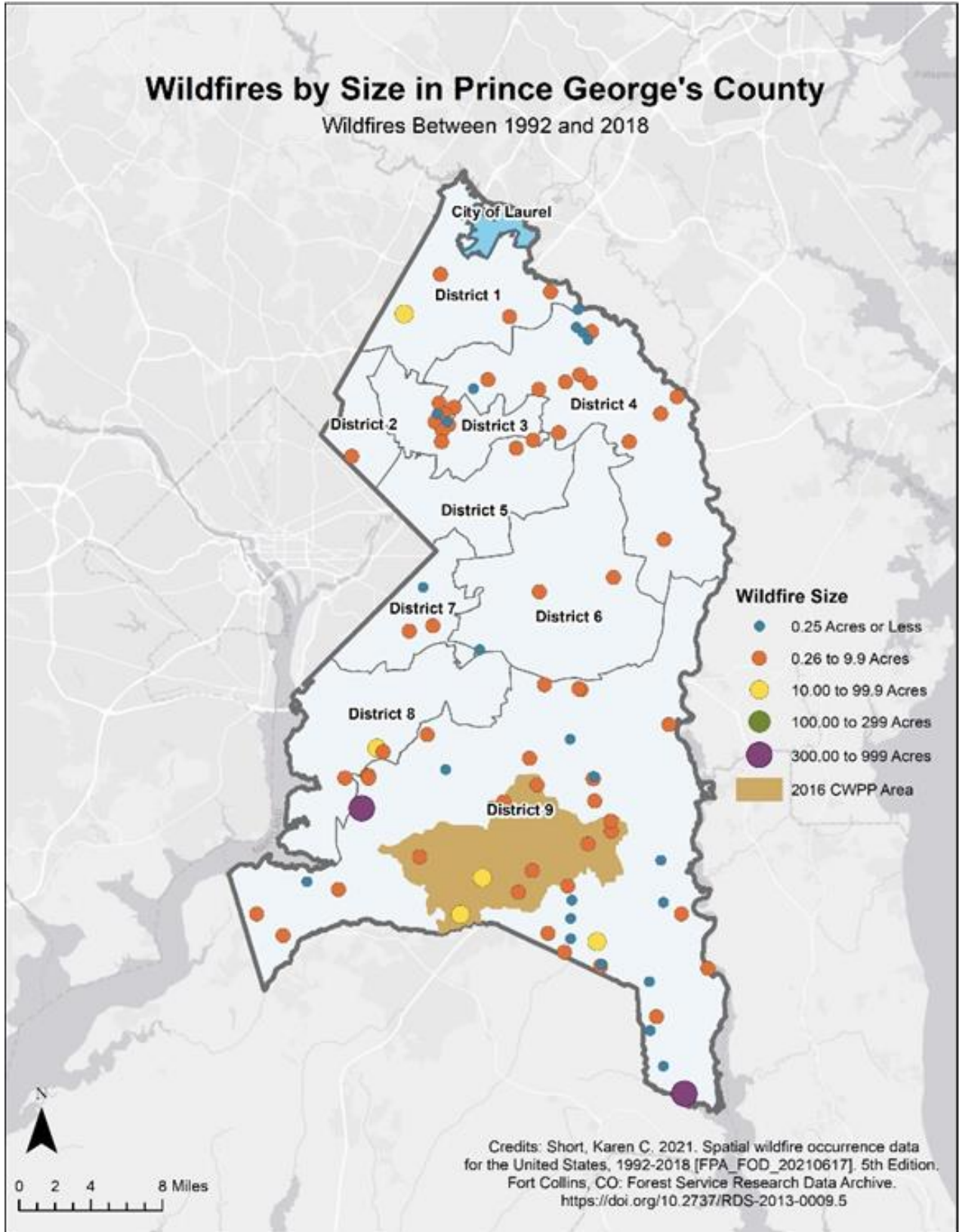


Figure 77: Wildfires (1992-2018) and CWPP in Prince George's County

## N.4. Probability of Future Events

Wildfires can occur at any time of day and during any month of the year, but in Maryland, wildfire season peaks in the spring due to the combination of low humidity, high winds, and dried forest fuels. Wildfire season length and peak months may vary from year to year. The primary factors that influence how many fires occur and how many acres they burn include land use, vegetation, the amount of combustible materials present, and weather conditions, such as wind, low humidity, and lack of precipitation. Generally, fires are more likely when vegetation is dry from a winter with little precipitation and/or a spring and summer with sparse rainfall.

Based on previous occurrences of wildfires in the County, approximately three wildfires a year are expected for the County. Districts 4 and 9 will also be more likely to experience wildfires based on historical wildfire occurrences. Additionally, increased risk of extreme heat and dry conditions due to climate change may lead to an increased risk of wildfires in the County. Wildfires may become larger in extent and fire seasons may become longer and more active as climate change creates warmer, drier conditions.

## N.5. Vulnerability and Risk Assessment

The most exposed property in the County is located where residential developments meet or intermingle with wildland vegetation, also known as the wildland-urban interface zone. This is where wildfire poses the biggest risk to human lives and structures.

Wildfires are a source for the fine particulate matter (PM2.5). PM2.5 are inhalable air pollutants which have an air quality standard set by the Environmental Protection Agency. According to the Environmental Protection Agency, populations exposed to PM2.5 may experience lung and heart problems such as aggravated asthma and increased respiratory symptoms.<sup>140</sup> The County participates in Clean Air Partners and receives daily forecasts of regional air quality and helps notify citizens and employees about air quality.<sup>141</sup> Buildings without fire suppression systems (e.g. sprinkler systems) or proximity to hydrants are more vulnerable to building fires.

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for wildfire. These scores and ranks are shown in **Table 108**, which shows the State's ranking for wildfire vulnerability in Prince George's County (including the City of Laurel) as medium-low.

*Table 108. 2021 State of Maryland Wildfire Ranking and Risk for Prince George's County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	1
Deaths	1

<sup>140</sup> United States Environmental Protection Agency. Health and Environmental Effects of Particulate Matter (PM). August 30, 2022. Retrieved from <https://www.epa.gov/pm-pollution/health-and-environmental-effects-particulate-matter-pm>

<sup>141</sup> Prince George's County, Maryland. Forecasts. Prince George's County, MD. Retrieved from <https://www.princegeorgescountymd.gov/348/Forecasts>



Property Damage	1
Crop Damage	1
Geographic Extent	3
Events	4
Local Plan Ranking (2017)	3
<b>Overall Weighted Risk Rating<sup>142</sup></b>	<b>20.5</b>
<b>Overall Ranking</b>	<b>Medium-High</b>

### N.5.a. Structures Exposed

Maryland’s Firewise program aims to reduce the threat of fires in the wildland-urban interface.<sup>143</sup> The program helps property owners learn how to best maintain their properties so they can reduce the risk to wildfires in their area. A portion of District 9 participates in the program. To evaluate the extent of the structures in the County exposed to wildfire, the wildland urban interface and intermix spatial areas were intersected with estimated building values obtained from the Planning Department of Prince George’s County. The district’s estimated structure value in the wildland-urban interface is summarized in **Table 109**. Additionally, **Appendix D** contains the full, structure-by-structure critical facility hazard analysis for wildfire risk.

Table 109: Building Counts and Values within Prince George’s County

Political Area	Total Buildings	Buildings in Interface	Buildings in Intermix	Total Value of Building (\$)	Value of Buildings in Interface (\$)	Value of Buildings in Intermix (\$)
City of Laurel	7,799	177	7	2,279,302,391	78,515,998	9,136,733
District 1	29,454	4,034	1,181	7,571,367,384	1,204,917,071	354,520,398
District 2	25,488	0	160	6,287,717,200	0	171,177,800
District 3	35,330	21	444	8,653,637,886	41,380,168	71,636,470
District 4	48,895	17,049	4,894	11,026,994,203	3,318,828,479	1,148,384,272
District 5	39,990	0	324	9,137,384,403	0	38,979,231

<sup>142</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

<sup>143</sup> Maryland Department of Natural Resources. (n.d.). Firewise Maryland Services. Firewise Living in Maryland. Retrieved October 25, 2022, from <https://dnr.maryland.gov/forests/pages/fire/firewise.aspx>

Political Area	Total Buildings	Buildings in <u>Interface</u>	Buildings in <u>Intermix</u>	Total Value of Building (\$)	Value of Buildings in <u>Interface</u> (\$)	Value of Buildings in <u>Intermix</u> (\$)
District 6	46,820	3,372	4,421	12,077,619,462	1,165,789,743	1,366,075,783
District 7	35,846	0	324	6,627,181,202	0	111,093,494
District 8	47,139	3,392	4,469	10,438,996,832	573,172,000	766,397,103
District 9	73,254	23,425	25,513	10,728,282,391	3,465,146,525	3,804,839,201
<b>Total</b>	<b>390,015</b>	<b>51,470</b>	<b>41,521</b>	<b>84,828,483,354</b>	<b>9,847,749,984</b>	<b>7,842,240,485</b>

### N.5.b. Population Exposed

People that live in either the wildland-urban interface or intermix areas are more likely to be affected by wildfires compared to those who do not. As of 2020, 36.9% of 358,183 housing units (HUs) in Prince George's County and the City of Laurel, and 23.6% of 10,211 housing units in the City of Laurel are directly exposed to wildfire risk, as summarized in **Table 110**.<sup>144</sup> Direct exposure refers to homes directly exposed to wildfire from adjacent vegetation. Indirect exposure refers to home exposed to wildfire from indirect sources such as embers or home-to-home ignition, and not exposed refers to homes distant from direct and indirect ignition sources.

Table 110: Wildfire Risk to Housing Units (HUs) in Prince George's County

Area	Total HUs	% HUs Directly Exposed	% HUs Indirectly Exposed	% HUs Not Exposed	HUs Exposed	% Exposed HUs Directly Exposed	% Exposed HUs Indirectly Exposed
City of Laurel	10,211	23.6%	74.2%	2.2%	9,987	24.2%	75.8%
Prince George's County*	358,183	36.9%	35.1%	28.0%	257,883	51.3%	48.7%

\*The calculations for Prince George's County includes the data for the City of Laurel.

Using population data from the 2020 American Community Survey, Prince George's County population by census tract was overlaid with the 2020 wildland-urban interface spatial extent.<sup>145</sup> **Figure 78** shows wildland-urban interface extent and total population within the County. Census tracts illustrate overall total population, but do not indicate where within census boundaries people live. This analysis considers only

<sup>144</sup> Scott, Joe H.; Gilbertson-Day, Julie W.; Moran, Christopher; Dillon, Gregory K.; Short, Karen C.; Vogler, Kevin C. 2020. Wildfire Risk to Communities: Spatial datasets of landscape-wide wildfire risk components for the United States. Fort Collins, CO: Forest Service Research Data Archive. Updated 25 November 2020. <https://doi.org/10.2737/RDS-2020-0016>

<sup>145</sup> Radeloff, Volker C.; Helmers, David P.; Mockrin, Miranda H.; Carlson, Amanda R.; Hawbaker, Todd J.; Martinuzzi, Sebastián. 2022. The 1990-2020 wildland-urban interface of the conterminous United States - geospatial data. 3rd Edition. Fort Collins, CO: Forest Service Research Data Archive. <https://doi.org/10.2737/RDS-2015-0012-3>

overall tract population as an indicator of exposure. There are 141 out of 255 census tracts in Prince George's County that intersect a wildland-urban interface area, making up 391,680 acres of land. Therefore, a majority of the County's census tracts contain or are adjacent to a wildland-urban interface area. This indicates high exposure to areas more likely to experience a wildfire for many residents of Prince George's County. Only by analyzing the tracts where the population exceeded 5,109, there were a total of 9,486 acres of land (about 3% of Prince George's County) located in the wildland-urban interface. Using the same tracts, a total of 27,656 acres of land (about 7% of Prince George's County) were in the wildland-urban interface intermix.

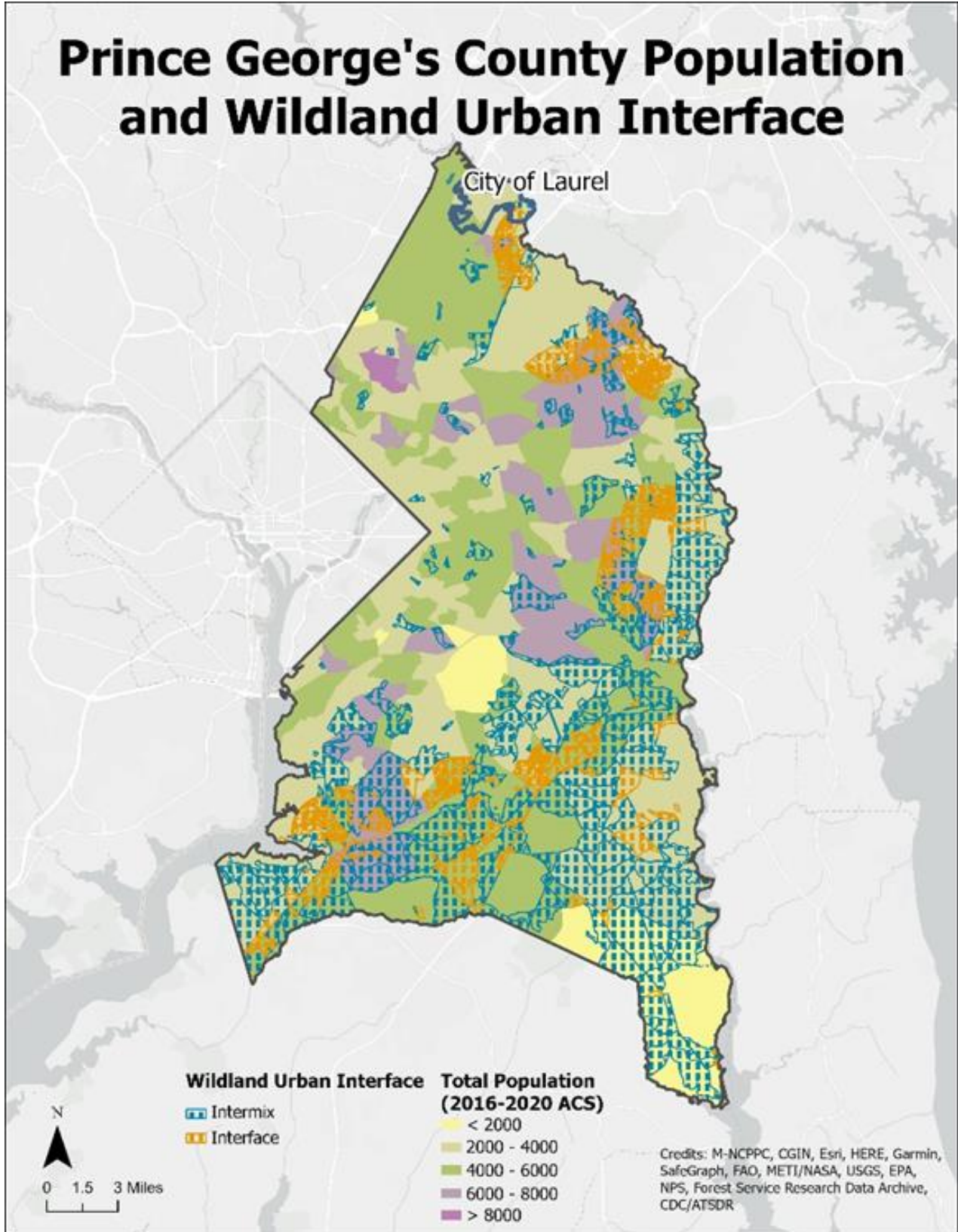


Figure 78: Total Population and Wildland-Urban Interface in Prince George's County

### **N.5.c. Social Vulnerability**

Wildfires disproportionately affect socially vulnerable households and communities. Communities with high social vulnerability scores in wildfire-prone areas such as the Wildland Urban Interface or Intermix are less likely to have adaptive capacity for collaborative investment in fuels management and preventative activities. Lower income residents are less likely to be able to afford the expense of clearing vegetative fuels, fire-proofing their homes, or rebuilding after a fire.<sup>146</sup> **Figure 79** shows 2020 CDC Social Vulnerability Score by Census tract for Prince George's County overlaid with the Wildland Urban Interface and Intermix areas in the County. Twenty-four of the 74 census tracts in Prince George's County with high social vulnerability (scores greater than 0.75) intersect Wildland Urban Interface or Intermix areas. Therefore, approximately one quarter of the high vulnerability census tracts in the County are at an increased risk of wildfire.

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<sup>146</sup> Coughlan, M., Ellison, A., Cavanaugh, A. Social Vulnerability and Wildfire in the Wildland-Urban Interface. [https://ewp.uoregon.edu/sites/ewp.uoregon.edu/files/WP\\_96.pdf](https://ewp.uoregon.edu/sites/ewp.uoregon.edu/files/WP_96.pdf)

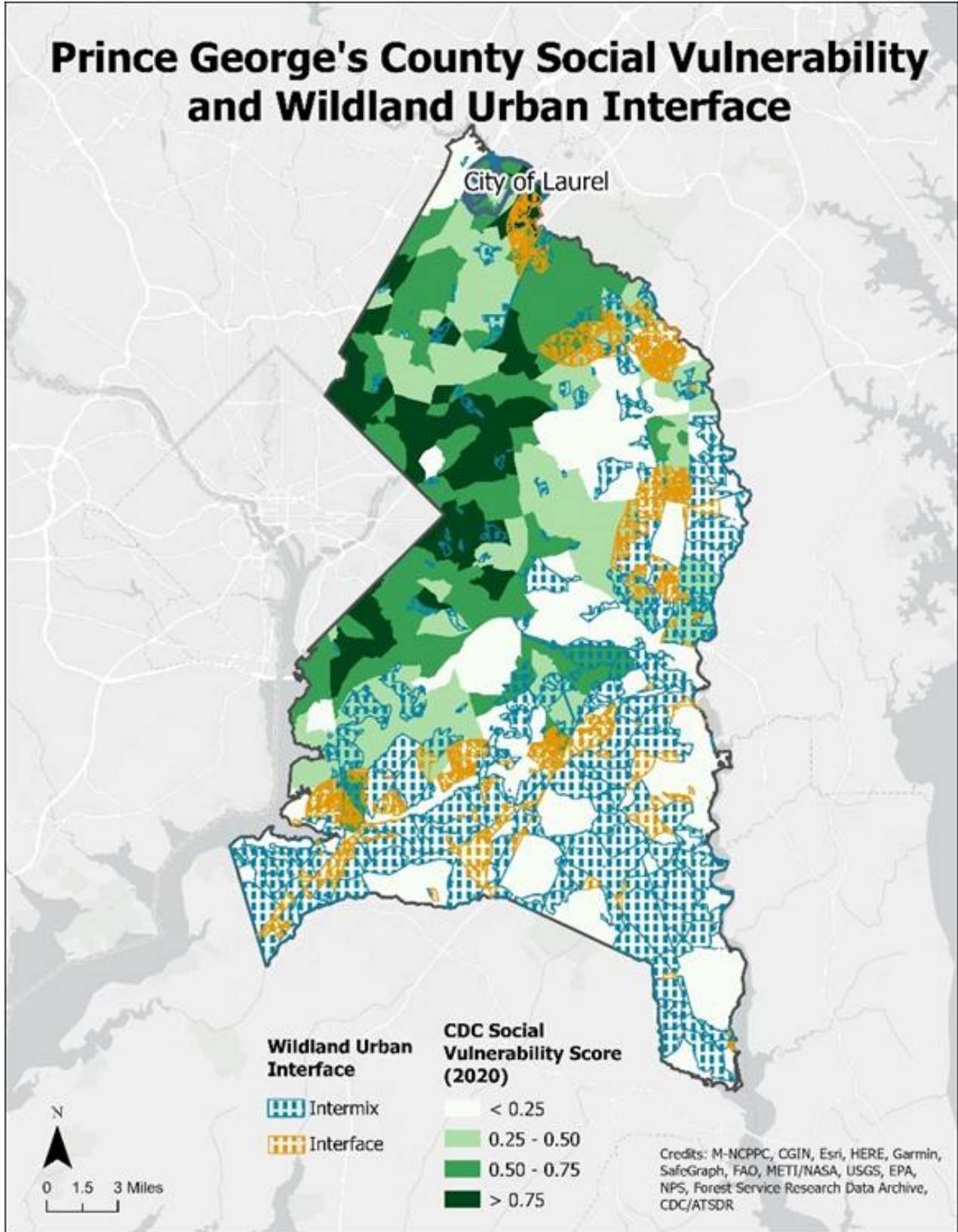


Figure 79: Social Vulnerability Score and Wildland-Urban Interface in Prince George's County

#### **N.5.d. Future Development**

There is an increased risk from wildfires in areas with increased development that are exposed to wildfire hazard areas. **Figure 80** shows the Wildland Urban Interface and Intermix overlapped with the Growth Policy Map. The Wildland Urban Interface and Intermix are zones of transition where structures and human development meet with undeveloped wildland or vegetative fuels. The Interface area is where urban sprawl presses up against natural areas, and the Intermix area is an area undergoing transition from forest and agricultural uses to urban land uses. The future growth areas in the county overlap with Wildland Urban Intermix Areas, putting those areas at higher risk of wildfire damage.

More specifically, fire departments and fire protection play critical roles in reducing the risk of wildfire and being prepared to respond in the event of a wildfire occurring, according to the United States Department of Agriculture Forest Service.<sup>147</sup> As of October 2021, the Planning Department of Prince George's County has listed 49 existing, 3 planned, and 34 proposed fire stations. **Figure 81** show the fire stations overlaid with the 2020 wildland-urban interface spatial extent. Of those fire stations, there are 5 existing and 7 proposed fire stations located within the wildland-urban interface intermix and there are 4 existing and 4 proposed fire stations located within the wildland-urban interface.

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<sup>147</sup> United States Department of Agriculture Forest Service. Fire Adapted Communities. Retrieved from <https://www.fs.usda.gov/managing-land/fire/fac>

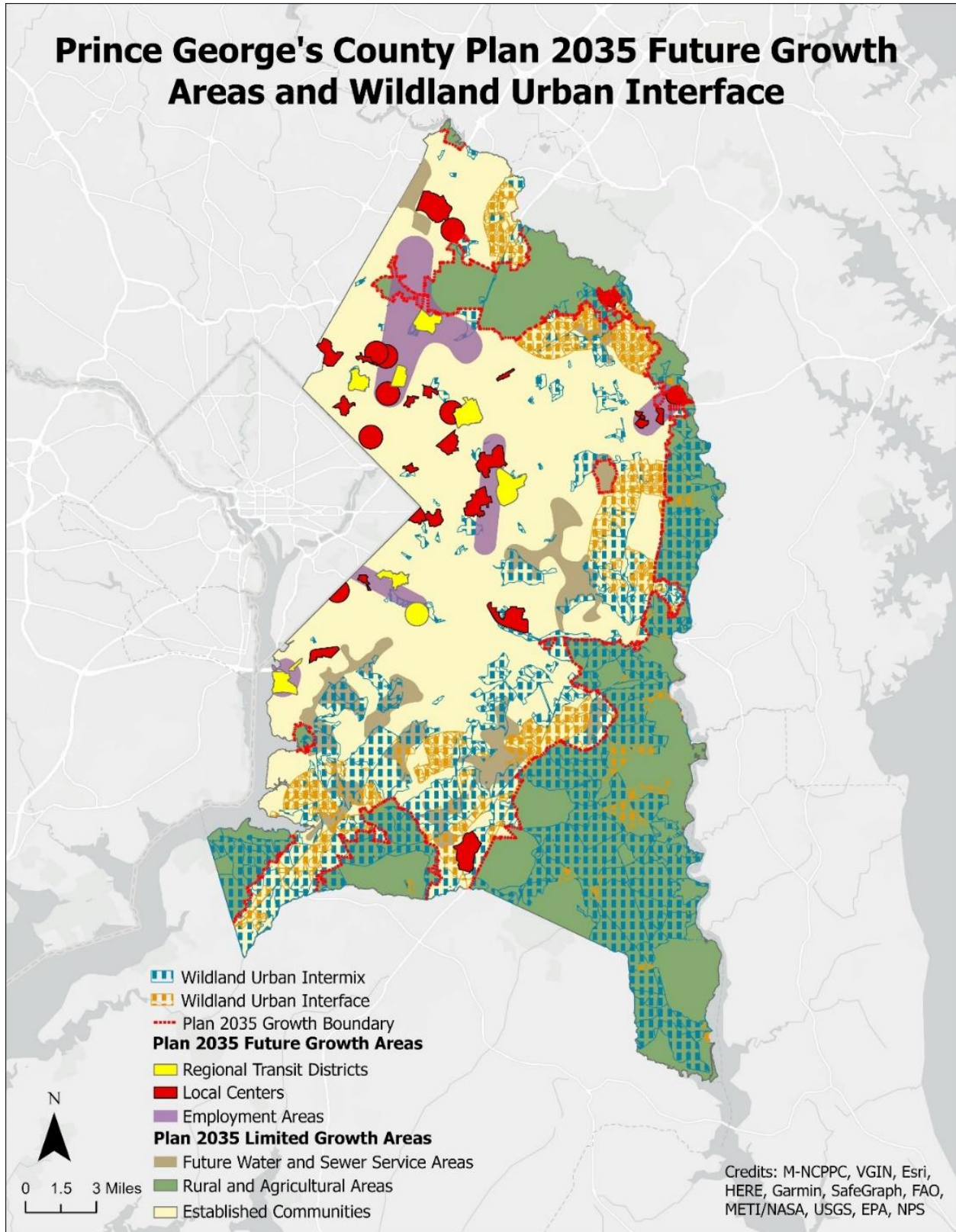


Figure 80. Prince George's County Plan 2035 Future Growth Areas and Wildland Urban Interface



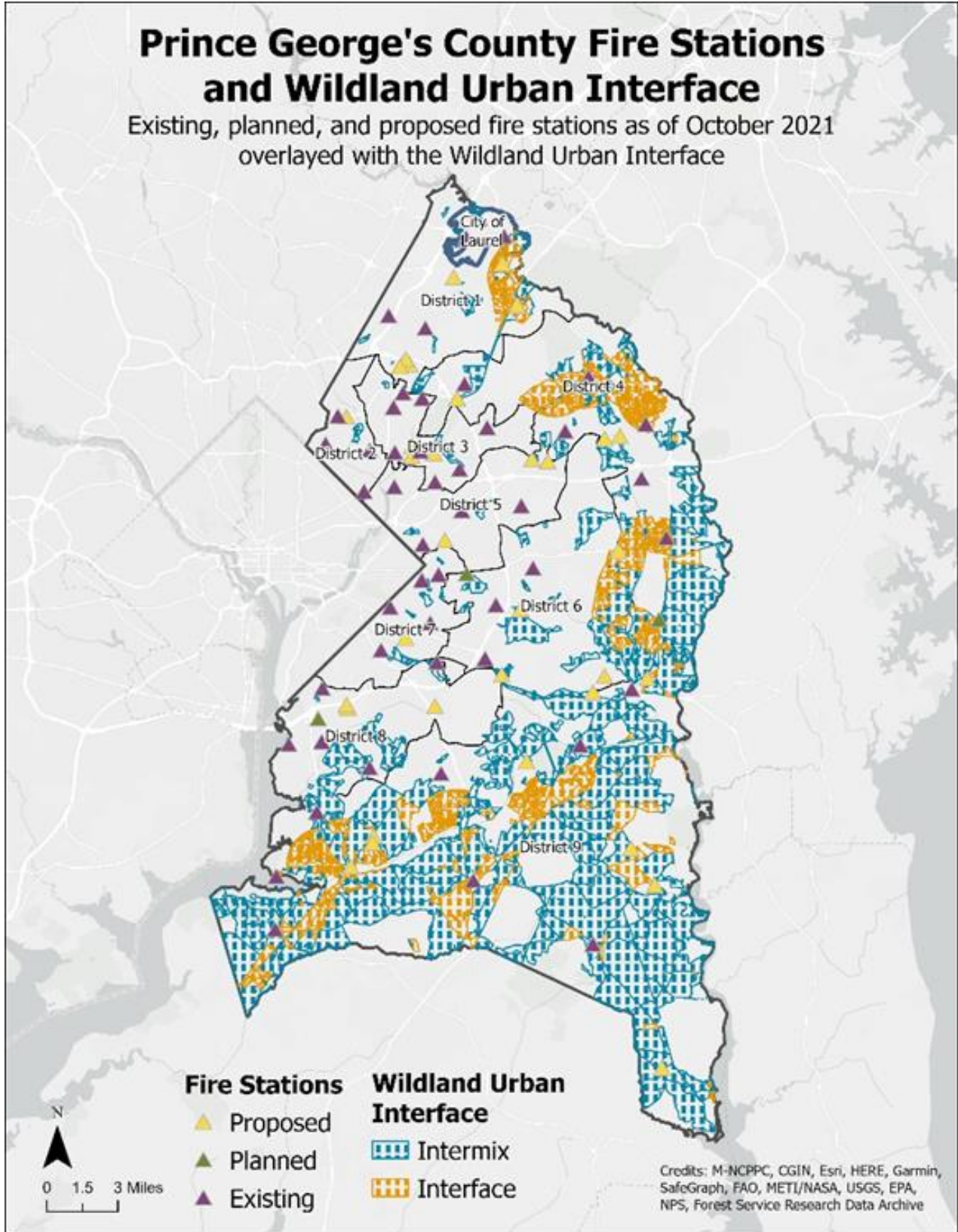


Figure 81: Fire Stations and Wildland-Urban Interface in Prince George's County

## N.6. Consequence Analysis

A consequence analysis (refer to **Table 111**) has been done to better understand the range of impacts that a wildfire event can have on several features of the planning area and the population within it.

*Table 111. Wildfire Consequence Analysis*

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	Wildfires present a serious hazard to life safety. People trapped in structures on fire may sustain injuries due to smoke inhalation or burns. Fatalities can occur during wildfire events. Evacuation is necessary for large wildfires due to their potential wide extent.
<b>Public Health</b>	Wildfires can result in reduced air quality due to smoke. County residents who have asthma or breathing problems may be more vulnerable to the impacts of decreased air quality.
<b>Critical Facilities and Infrastructure</b>	Critical facilities impacted by wildfires may become inoperable. Additionally, wildfires burning adjacent to infrastructure such as utilities and bridges may damage structural integrity.
<b>Economy</b>	A major wildfire event would be costly for local governments because of the potential for damages associated with property, infrastructure, and impacts to health and air quality. Some of the costs could be recouped through federal grant reimbursements, but local governments would still feel the fiscal impact of a major event .
<b>Buildings</b>	Wildfires can cause significant damage to structures, ranging from smoke and fire damage to the total loss of one or multiple structures. Structures located in the wildland-urban interface, wooden buildings or densely developed areas may be at a higher risk, as fire may spread more quickly.

Wildfires can have disastrous consequences, causing damage to residences and commercial buildings as well as to timber, grasslands, and natural resources.

Timber loss and environmental damage frequently result from wildfires. Wildfire poses a significant threat to nearby buildings and populations. Forest damage from thunderstorms may block interior access roads and fire breaks, pull down overhead power lines, or damage pavement and underground utilities, thereby creating heavy fire load and making suppression and response more difficult.

Economic consequences of wildfire include the cost of suppression, reduced property values, lost sales and business revenues, reduced tourism, and increased water treatment costs. Resources threatened include communities, homes, gas transmission lines, electrical facilities and lines, timber, watershed and recreation areas, and wildlife.

## O. Landslide

### O.1. Description

Landslides, also known as mass movements, are defined as the downward movement of soil, rock, and organic materials caused by gravity.<sup>148</sup> They can be a powerful, destructive force that erodes steep slopes, topples or destroys buildings, and damages roadways and other infrastructure.

Most landslides have multiple causes. They occur when the forces acting down the slope (e.g., gravity) overcome the strength of the geological materials of the slope. Therefore, they can be triggered by anything that increases the effects of down-slope forces or decrease the strength of the slope material. Landslide triggers can be natural, human-caused, or a combination of both.

Landslide events may be triggered by various natural processes such as rainfall, snowmelt, changes in water level, flood-induced erosion along the sides of slopes, excess groundwater buildup and seepage, earthquakes, and volcanic activity. Certain soil types can cause mass movements when they undergo changes in water content, such as during heavy rains or a drought. Expansive soils are soils that undergo large volume changes when moisture is added or removed, and they typically include organic soils and highly plastic clays. Pockets of potentially expansive soil formations – Marlboro Clays – are known to cause problems for building foundations and roadbeds when they are altered or cut. Marlboro Clay formations have low permeability and may have high shrink-swell (volume change) potential.

Nonetheless, many landslides are triggered by disturbance by human activities such as the removal of vegetation from slopes or hillside construction of buildings, roadways, and other infrastructure. According to the National Research Council, the primary causes of landslides are related to resource development and land use practices, including underground mining of coal or other minerals, withdrawal of petroleum or groundwater, and drainage of expansive soils. This is because these resources are partially responsible for holding the ground up. When they are removed, the rock collapses on itself. However, this is not immediately noticeable as it tends to occur over wider areas like a valley or an agricultural area as opposed to one spot like a sinkhole.

### O.2. Location and Extent

Landslides can occur anywhere land on a slope becomes unstable. It is more likely on slopes that are overly steep, have loose debris such as rocks, or contain excess weight from rain or snow accumulation. Prince George's County lies primarily within the Atlantic Coastal Plain physiographic region, which ranges from nearly level to gently rolling topography. Most of the County's topography is relatively flat; less than 11 percent of the total land area has steep slopes (between 15 and 25% grade) and only 5 percent has severe slopes (greater than 25% grade). According to the Maryland Greenways Commission, a small section of the County is considered part of the Piedmont Plateau and is somewhat hillier. Landslides and slope failures are limited to small, isolated areas mostly in the western and southeastern parts of the County.

Few areas within the County have soil types that undergo large volume changes when moisture is added or removed, such as Marlboro Clays. **Figure 82** shows the location of Marlboro Clay in Prince George's

<sup>148</sup> United States, Department of the Interior, Geological Survey, Landslide Program and National Landslide Information Center, and Geological Survey of Canada, Landslides and Geotechnics Section, *The Landslide Handbook—A Guide to Understanding Landslides*, United States Geological Survey circular 1325, (Reston, VA: U.S. Geological Survey, 2001), 4, accessed February 10, 2015, <http://pubs.usgs.gov/circ/1325/>.

County, which may be more susceptible to land movement and landslides when intense precipitation occurs. The southwestern and central-eastern areas of Prince George's have the greatest risk of landslides within the County. However, this does not necessarily mean their risk is high. The United States Geological Survey U.S. Landslide Inventory contains historical landslide data. Based on the prevalence of data it contains for a certain area, the risk of landslides can be assumed with a reasonable assumption of uncertainty. The U.S. Landslide Inventory contains only one landslide event within the County – a small mudslide in the Fort Washington neighborhood of Piscataway Hills. Therefore, landslide risk may be relatively low throughout the County, but may be highest in the southwestern portion, which is also where Marlboro Clay is found.

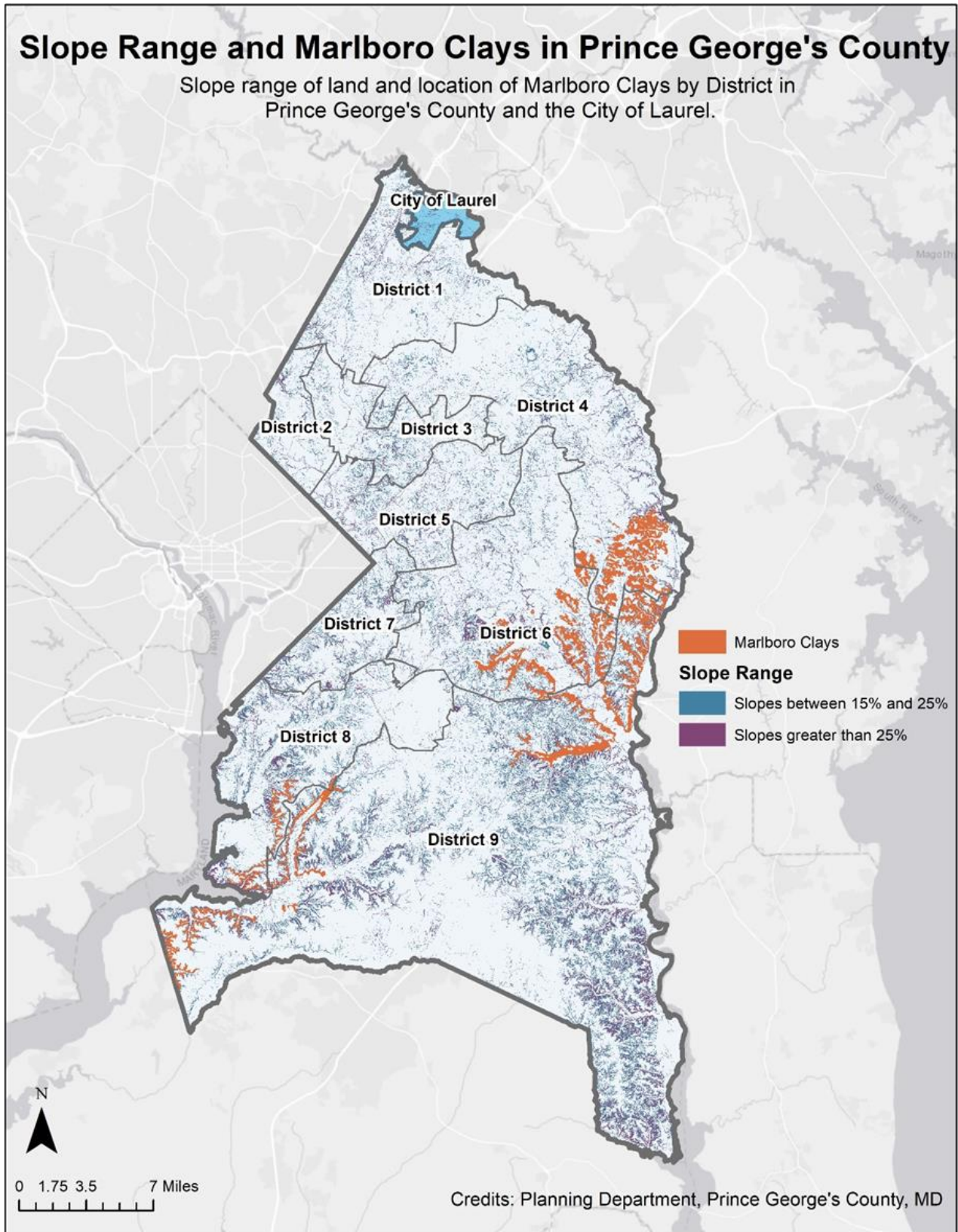


Figure 82: Marlboro Clay Areas within Prince George's County

Attributes that can contribute to a landslide's severity include movement mechanism, material type, velocity, moisture content, magnitude of range, geometry, and physical setting. Since there are many factors, classification systems have been created that focus on the three main variables: movement, material type, and velocity. The remaining attributes can be largely conveyed based on the three main variables.

Landslides may be classified into names based on the mode of slope movement (slides, flows, lateral spreads, falls, and topples) and the type of geologic material (rocks, earth, or debris/mud). **Table 112** provides a classification matrix for mass movement.

Table 112. Mass movement classification<sup>149</sup>

	Rock	Earth	Debris/Mud
Slides	Rock slump, rock block slide, rock slide	Earth slump, Earth block slide, Earth slide	Debris/mud slump, debris/mud block slide, debris/mud slide
Flows	Rock flow, rock avalanche	Earth flow	Debris/mud flow, debris avalanche
Lateral Spreads	Rock spread	Earth spread	Debris spread
Falls	Rockfall	Earthfall	Debris fall
Topples	Rock topple	Earth topple	Debris topple

A landslide's classification can communicate severity based on the attributes associated with specific names. For example, the velocity description can be communicated through the mode of movement as follows:

- Slides: extremely slow to extremely rapid
- Flows: extremely slow to extremely rapid
- Lateral spreads: extremely slow to extremely rapid
- Falls: very to extremely rapid
- Topples: extremely slow to extremely rapid

**Table 113** details the velocity (meters/second) associated with each velocity description.

Table 113. Landslide Velocity Scale<sup>150</sup>

Velocity Class	Description	Velocity (m/sec)	Typical Velocity
7	Extremely rapid	5	5 m/sec
6	Very rapid	0.05	3 m/min
5	Rapid	5x10 <sup>-4</sup>	1.8 m/hr
4	Moderate	5x10 <sup>-6</sup>	13 m/month

<sup>149</sup> Hungr O, Evans SG, Bovis M, and Hutchinson JN (2001) Review of the classification of landslides of the flow type. Environmental and Engineering Geoscience VII, 221-238.

<sup>150</sup> Cruden, David M., and David J. Varnes. "Landslides: investigation and mitigation. Chapter 3-Landslide types and processes." Transportation research board special report 247 (1996).

Velocity Class	Description	Velocity (m/sec)	Typical Velocity
3	Slow	$5 \times 10^{-8}$	1.6 m/year
2	Very slow	$5 \times 10^{-10}$	16 mm/year
1	Extremely slow	N/A	N/A

### O.3. Previous Occurrences

Currently, landslides are not known to be a significant widespread hazard in Prince George’s County or the City of Laurel. The State of Maryland does not have the geologic conditions or the types of topography that are conducive to large-scale landslides, and the County does not have a history of mining or other man-made activities that contribute to landslides. However, while it is unlikely that landslides will become a significant hazard in the near future, there have been localized problems.

A review of landslide data, including the United States Geological Survey U.S. Landslide Inventory, and news articles found references to the following two landslide events related to Marlboro Clay soils:

1. A 1975 landslide damaged or destroyed 25 homes and caused approximately \$500,000 worth of damage.
2. In May 2014, heavy rains triggered a small landslide in the Piscataway Hills community of Fort Washington (**Figure 83**). Despite its small geographic size, the mudslide impacted 28 homes, damaged local roads and water lines supported by Marlboro clay soils, and required approximately \$15 million in hillside restoration and infrastructure repairs. This landslide remains the costliest natural disaster in Prince George’s County history. A total of 7 properties were acquired through a FEMA Hazard Mitigation Assistance grant in 2014 after the event. The removal of the structures is expected to save \$3,623,545.

In addition to these events, landslides have damaged or threatened other homes in Prince George’s County. Seven properties were acquired through a FEMA Hazard Mitigation Assistance grant in 2005. The removal of the structures is expected to save \$1,659,140 over the 100 years following the acquisitions.



*Figure 83. May 2014 Landslide in the Piscataway Hills community of Fort Washington*

#### O.4. Probability of Future Occurrences

Due to the localized variability of the hazard, probabilistic landslide data are limited and not available without a local study of specific hazard areas and conditions. Based on the two previous occurrences since 1975, there is a very low probability of future landslide events occurring in the County (a 4% annualized chance).

Landslides have greater probability of occurring after periods of severe rainfall. When considering future conditions for Prince George's County, the average annual total precipitation — based on the higher greenhouse gas emissions scenario of RCP 8.5 — is expected to slightly increase over the next 20 years from 42.2 inches to 44.6 inches according to the Climate Mapping for Resilience and Adaptation Tool. The projected increase in the number of severe storms will likely result in more frequent heavy rains and flooding that can increase the risk of landslides, so the 4% annualized chance may increase through mid-century.

#### O.5. Vulnerability and Risk Assessment

Landslides can cause significant damage and destruction of roadways, buildings, utility lines, and other infrastructure. Although landslide damages are usually confined to a small area, the secondary impacts of a landslide can sever key roads or utility lines and may be felt over a much wider area. Damaged pavements can cause the departments of transportation to allocate funds for repairs. Populations that are directly affected by landslides may experience injury or illness such as water-borne diseases and



electrocution due to broken power, water, gas, or sewage pipes. Individuals may also experience injury or lacerations from falling debris.<sup>151</sup>

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for soil movement (landslide is considered jointly with sinkholes and coastal erosion by the State). These scores and ranks are shown in **Table 114**, which shows the State's ranking for soil movement vulnerability in Prince George's County (including the City of Laurel) as medium-low.

*Table 114. 2021 State of Maryland Soil Movement Ranking and Risk for Prince George's County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	1
Deaths	1
Property Damage	1
Crop Damage	1
Geographic Extent	1
Events	1
Local Plan Ranking (2017)	2
<b>Overall Weighted Risk Rating<sup>152</sup></b>	<b>13</b>
<b>Overall Ranking</b>	<b>Medium-Low</b>

## O.6. Consequence Analysis

A consequence analysis (refer to **Table 115**) has been done to better understand the range of impacts that a landslide event can have on several features of the planning area and the population within it.

*Table 115. Landslide Consequence Analysis*

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	Landowners across the County are at risk to impacts from a landslide event. Impacts to the public include potential for injury or loss of life, and destruction and/or loss of land and property due to emergencies from soil movement. Evacuations may be difficult due to the localized variability of the hazard.
<b>Public Health</b>	Populations that are directly affected by landslides may experience injury or illness such as water-borne diseases and electrocution due to broken power,

<sup>151</sup> World Health Organization. Landslides. World Health Organization. Retrieved November 2, 2022, from [https://www.who.int/health-topics/landslides#tab=tab\\_2](https://www.who.int/health-topics/landslides#tab=tab_2)

<sup>152</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

Community Feature	Impacts
	water, gas, or sewage pipes. Individuals may also experience injury or lacerations from falling debris.
<b>Critical Facilities and Infrastructure</b>	Critical facilities located in the area of a landslide may be forced to close due to structural damage or loss of power. Infrastructure may experience impacts in the form of damage to roads and bridges, temporary closure of transportation routes, the potential inability of the stormwater system to handle floodwaters, and loss of power.
<b>Economy</b>	A landslide event would typically be more localized and costly for local governments because of the potential for damages from flooding. Some of the costs could be recouped through federal grant reimbursements, but local governments would still feel the fiscal impact of a major event.
<b>Buildings</b>	Home and landowners within earth movement zones may experience damage to or loss of property depending upon the severity of movement in the area.

## P. Drought

### P.1. Description

A drought is a deficiency of precipitation over an extended period resulting in a water shortage. Drought occurs when water systems cannot provide the minimum necessary water to sustain plant, animal, or economic systems due to shortfalls in precipitation, soil moisture, or runoff. A drought can be characterized in several different ways depending on its impact. The most common form of drought is agricultural drought. Agricultural droughts are characterized by unusually dry conditions during the growing season. A meteorological drought is an extended period of time (six or more months) with precipitation of less than 75% of the normal precipitation. Hydrological drought refers to deficiencies in surface and subsurface water supplies. It is measured as streamflow, snowpack, lake, reservoir, and groundwater levels. Socioeconomic drought occurs when physical water shortages start to affect the health, well-being, and quality of life of the people, or when the drought starts to affect the supply and demand of an economic product.

The severity of droughts often depends on the community's reliance on a specific water source. The probability of drought is difficult to predict because of the variables involved in determining the cause, severity, and length of a drought event

### P.2. Location and Extent

All of Prince George's County, including the City of Laurel, is at risk of experiencing periods of reduced rainfall, which can lead to drought. High summer temperatures can exacerbate the severity of a drought. When soils are wet, a significant portion of the sun's energy goes toward the evaporation of the ground moisture. However, when drought conditions eliminate soil moisture, the sun's energy heats the ground surface, and temperatures can soar, which further dries the soil.<sup>153</sup>

Drought can cause many problems, including diminished water supply and water quality, undernourishment of livestock and wildlife, crop damage, and increased wildfire risk. Secondary impacts from droughts pose risks to farmers due to potential reduction in income, while food prices and lumber prices can increase.

The extent of drought can depend on the duration, intensity, geographic extent, and the regional water supply demands made by human activities and vegetation. The intensity of the impact from drought could be minor to major in a localized area or cause damage across a region, affecting human health and the economy. Generally, impacts of drought evolve gradually, and regions of maximum intensity change with time. The severity of a drought is determined by extent as well as intensity and duration. The frequency of a drought is determined by analyzing the intensity for a given duration, which allows determination of the probability or percent chance of a more severe event occurring in a given mean return period. **Table 116** summarizes the drought severity and its possible impacts on a community or region. The most severe drought classification, an Exceptional Drought, has occurred is possible in the planning area.

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<sup>153</sup> The impact of extreme heat is more thoroughly addressed under the "Extreme Heat" section

Table 116: Drought Severity Classification and Possible Impacts<sup>154</sup>

Category	Description	Possible Impacts
D0	Abnormally dry	Going into a drought: short-term dryness slows planting, growth of crops or pastures; fire risk above average. Coming out of a drought: some lingering water deficits; pastures or crops not fully recovered.
D1	Moderate drought	Some damage to crops, pastures; fire risk high; streams, reservoirs, or wells low; some water shortages develop or are imminent; voluntary water use restrictions requested.
D2	Severe drought	Crop or pasture losses likely; fire risk very high; water shortages common; water restrictions imposed.
D3	Extreme drought	Major crop/pasture losses; extreme fire danger; widespread water shortages or restrictions.
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies.

### P.3. Previous Occurrences

Drought events in Prince George's County since 2000 have been categorized using the U.S. Drought Monitor Changes and are shown in **Figure 84**.<sup>155</sup> Between 2002 and 2003, there were record dates of droughts categorized as D3 and D4. On August 27, 2002, it was recorded that 100% of the county was experiencing a drought of category D3 and 57.31% of the county was categorized as D4. Most recently, on October 15, 2019, 100% of the county was experiencing a drought of category D2.

<sup>154</sup> U.S. Drought Monitor. <https://droughtmonitor.unl.edu/About/AbouttheData/DroughtClassification.aspx>

<sup>155</sup> National Drought Mitigation Center. Time Series. Time Series | U.S. Drought Monitor. Retrieved from <https://droughtmonitor.unl.edu/DmData/TimeSeries.aspx>

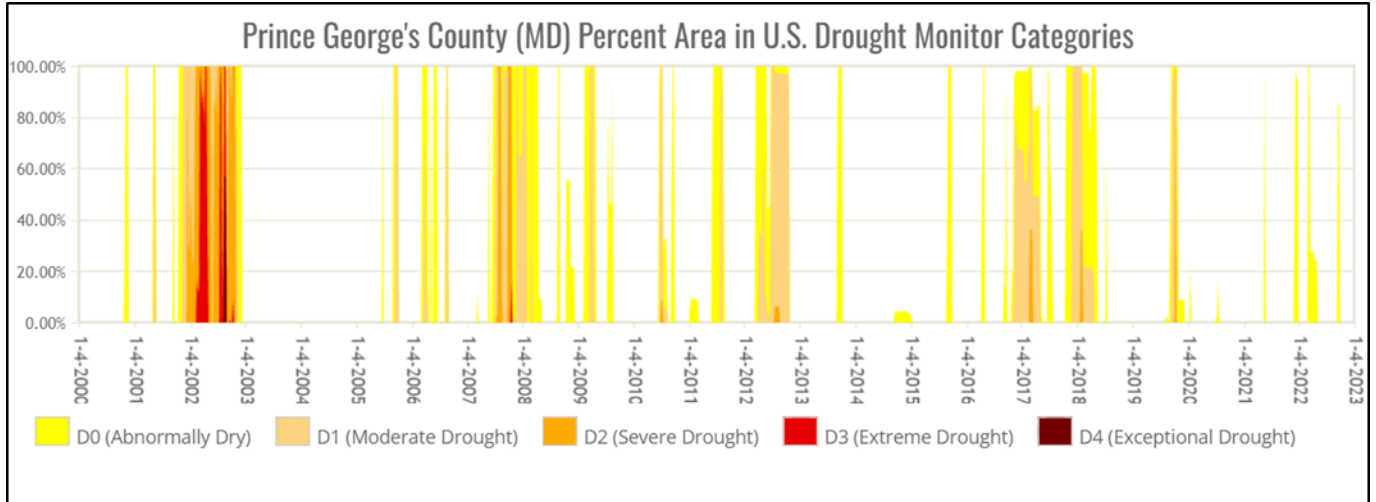


Figure 84: Prince George's County Percentage Area in U.S. Drought Monitor Changes Categories

### P.4. Probability of Future Events

When considering future conditions for Prince George's County and the City of Laurel, the expected number of events and agricultural losses each year due to drought are relatively low. According to the Climate Mapping for Resilience and Adaptation tool, the average number of annual dry days for the County, based on higher greenhouse gas emissions, will slightly increase from 150.3 days to 151.9 days in approximately 20 years while the average number of annual days with maximum temperatures of more than 90°F will increase from 29.2 days to 54.1 days.<sup>156</sup>

### P.5. Vulnerability and Risk Assessment

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for drought. These scores and ranks are shown in **Table 117**, which shows the State's ranking for drought vulnerability in Prince George's County (including the City of Laurel) as medium-high.

Table 117. 2021 State of Maryland Drought Hazard Ranking and Risk for Prince George's County

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	1
Deaths	4
Property Damage	1
Crop Damage	3

<sup>156</sup> U.S. Climate Resilience Toolkit. Climate Mapping for Resilience and Adaptation. Retrieved October 26, 2022, from <https://resilience.climate.gov/>

Geographic Extent	1
Events	2
Local Plan Ranking (2017)	2
<b>Overall Weighted Risk Rating<sup>157</sup></b>	<b>19</b>
<b>Overall Ranking</b>	<b>Medium-High</b>

## P.6. Consequence Analysis

A consequence analysis (refer to **Table 118**) has been done to better understand the range of impacts that a drought event can have on several features of the planning area and the population within it.

*Table 118. Drought Consequence Analysis*

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	As drought is a slow developing hazard, it is unlikely to have significant impacts on life safety and is not expected to result in warnings or evacuation. Drought occurrences may result in water use restrictions. If drought is due to extreme heat the elderly, small children, the chronically ill, livestock, and pets may be at risk of impacts due to extreme heat.
<b>Public Health</b>	Drought has the potential to impact public health by reducing the quality and quantity of available drinking water. Low water flow due to drought can result in decreased sewage flows and subsequent increases in contaminants in the water supply.
<b>Critical Facilities and Infrastructure</b>	Drought is expected to have minimal impacts on critical facilities infrastructure. If water use is limited, critical facilities may lose water. Green infrastructure, such as green stormwater infrastructure, may incur minor damages during drought occurrences if plants cannot resist drought.
<b>Economy</b>	Drought can have economic impacts on the County, including loss of agricultural yield and death of livestock due to lack of water access. Regional drought conditions could lead to increased food prices in the County.
<b>Buildings</b>	Drought has minimal impacts on structures although it could have impacts on the functionality of the building if water supply is disrupted. In addition, structural issues could occur in the event that drought impacts building foundations or footings.

If a significant drought event were to occur, it could bring economic, social, and environmental impacts to the study area. Commonly, one of the most significant drought-related economic effects on a community is due to agricultural impact. Other economic effects could be felt by businesses that rely on adequate water levels for their day-to-day business, such as carwashes and laundromats. The elderly, small children, the chronically ill, livestock, and pets are most vulnerable to extreme heat.

<sup>157</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

Droughts can also create conditions that enable the occurrence of other natural hazard events such as wildfires or wind erosion. The likelihood of flash flooding increases if a period of severe drought is followed by a period of extreme precipitation. Low-flow conditions also decrease the quantity and pressure of water available to fight fires, while dry conditions increase the likelihood that fires will occur.

Low water flow can result in decreased sewage flows and subsequent increases in contaminants in the water supply. A decrease in the availability of water also decreases the drinking water supply and the food supply as food sources become scarcer. This disruption can work its way up the food chain within a habitat. Loss of biodiversity and increases in mortality can lead to increases in disease and endangered species.

Environmental drought impacts include those on both human and animal habitats and hydrologic units. During periods of drought, the amount of available water decreases in lakes, streams, aquifers, soil, wetlands, springs, and other surface and subsurface water sources. This decrease in water availability can affect water quality such as oxygen levels, bacteria, turbidity, temperature increase, and pH changes. Changes in any of these levels can have a significant effect on the aquatic habitat of numerous plants and animals found throughout the study area. The depletion of groundwater can cause subsidence and affect infrastructure such as roads, buildings, and water pipes, and can lead to the formation of sinkholes. The impact on pavement can lead to the departments of transportation to allocate resources for repair.<sup>158</sup>

Identifying the first stages of drought and conserving water can aid in mitigating drought. Mitigation management for drought is a proactive process, but most of the process is initiated at the state level. The Maryland Department of the Environment uses four indicators of water sufficiency: precipitation levels, stream flows, groundwater levels, and reservoir storage. For a region to be placed in the “Watch,” “Warning,” or “Emergency” stage, two or more indicators must be in a “Watch” category or higher level.

Maryland is divided into six drought regions for drought monitoring and response.<sup>159</sup> Parts of Prince George's County are serviced by the Southern Region, except for areas served by Washington Suburban Sanitary Commission Service Area, including the City of Laurel. The regions for drought monitoring and response are shown in **Figure 85**.

<sup>158</sup> National Integrated Drought Information System. Navigation and Transportation. Drought.gov. Retrieved November 2, 2022, from <https://www.drought.gov/sectors/navigation-and-transportation#key-issues>

<sup>159</sup> Maryland Department of the Environment. Drought Information and Indicators. Maryland Department of the Environment. Retrieved from <https://mde.maryland.gov/programs/water/droughtinformation/Pages/droughtinfoandindicators.aspx>

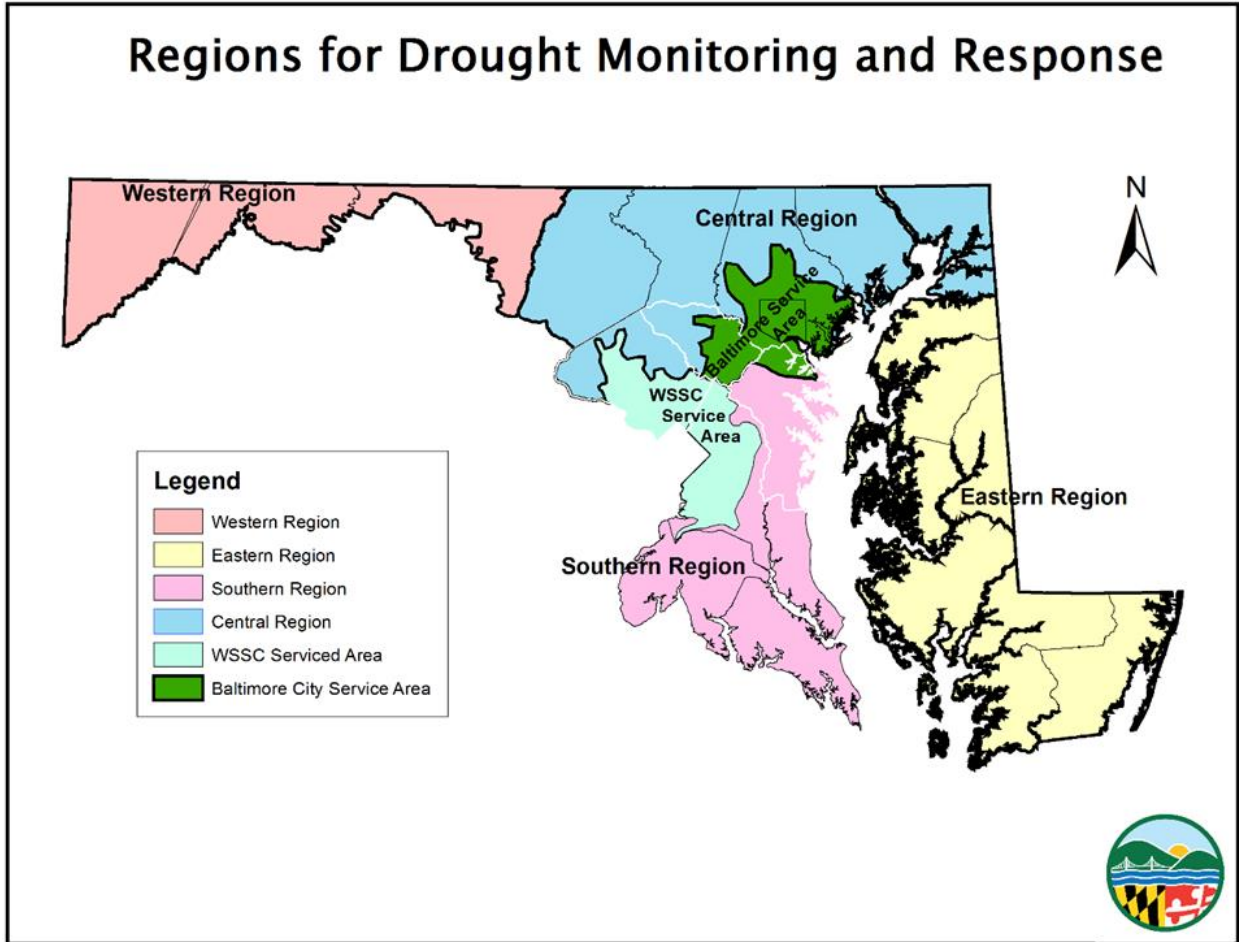


Figure 85: Maryland Regions for Drought Monitoring and Response



## Q. Coastal Flood

### Q.1. Description

Coastal Flooding is when water inundates or covers normally dry coastal land as a result of high or rising tides or storm surges. Coastal flooding occurs along the coasts of oceans, bays, estuaries, coastal rivers, and large lakes. Coastal flooding can be caused by storm surge, nuisance flooding, and sea level rise.

#### **Types of Coastal Flooding**

Storm surge: abnormal rise of seawater that is above the predicted astronomical tides and is generated by a storm's winds pushing water toward land. Storm surge can cause minor to major impacts to coastal infrastructure and buildings, including complete destruction.

Nuisance flooding: temporary minor inundation of low-lying coastal areas that happens during exceptional high tides. Nuisance flooding (also referred to as sunny day or tidal flooding) can cause minor impacts to coastal infrastructure and buildings. Once nuisance flooding reaches a level of moderate to major damage, it becomes classified as flooding from sea level rise.

Sea level rise: the permanent inundation of low-lying coastal areas as the increasing elevation of the oceans exceeds the land's elevation. Sea level rise can cause complete destruction of coastal communities over time as land is lost. It also worsens storm surge and nuisance flooding severity over time.

In Maryland, the major causes of coastal flooding include hurricanes and tropical storms, severe storms, and Nor'easters. Coastal flooding can cause coastal erosion; loss or submergence of wetlands and other coastal ecosystems; saltwater intrusion; high water tables; loss of coastal recreation areas, beaches, protective sand dunes, parks, and open space; and loss of coastal structures.

### Q.2. Location and Extent

Storm surge extent is measured by inundation height above the ground (e.g., greater than 3 feet above ground). NOAA, the National Weather Service, and the National Hurricane Center host interactive [National Storm Surge Hazard Maps](#) that compute and display storm surge vulnerability in the United States under scenarios from a Category 1 to a Category 5 hurricane. Storm surge can cause minor to major impacts to coastal infrastructure and buildings, including complete destruction, especially if they coincide with the normal high tide to create a storm tide (the sum of storm surge and astronomical tide). Storm surges produced by storms depend on the storm's intensity, forward speed, and timing (relative to high tide and lunar cycles). Wind-generated storms can even cause flooding, coastal erosion, and structural damage upstream of typical coastal regions. Areas that are not typically susceptible to storm surge can experience damage to structures or infrastructure.

Nuisance flooding can cause minor impacts to coastal infrastructure and buildings. Once nuisance flooding reaches a level of moderate to major damage, it becomes classified as flooding from sea level rise. Sea level rise can cause complete destruction of coastal communities over time as land is lost. It also worsens storm surge and nuisance flooding severity over time. Coastal flooding extent is measured with river/stream gages to determine the water's height above normal water levels. For storm surge,

nuisance, and sea level rise flooding, topographical features (particularly elevation), ocean levels, astronomical tide levels, and the storm surge height will determine how far inland coastal flooding extends.<sup>160</sup>

Overall, several factors contribute to the relative severity of a coastal flood. Development, or the presence of people and property in the hazard areas, is a critical factor in determining a flood's relative severity. Additional factors that contribute to flood severity range from topography to characteristics of the structures located within the low-lying coastal area. The following is a brief discussion of some of these factors and how they may relate to the area.

- **Flood depth:** The greater the depth of flooding, the higher the potential for significant damage.
- **Flood duration:** The longer duration of time that floodwaters are in contact with building components, such as structural members, interior finishes, and mechanical equipment, the greater the potential for damage. Floodwater may linger because of the low relief of the area, but the degree varies. Seawater can be especially harmful to buildings and contents because of the high salinity levels.
- **Velocity:** Flowing water exerts force on the structural members of a building, increasing the likelihood of significant damage. A one-foot depth of water, flowing at a velocity of five feet per second or greater, can knock an adult over and cause significant scour around structures and roadways.
- **Elevation:** The lowest possible point where floodwaters may enter a structure is the most significant factor contributing to its vulnerability to damage due to flooding.
- **Construction type:** Certain types of construction are more resistant to the effects of floodwater than others. Masonry buildings, constructed of brick or concrete blocks, are typically the most resistant to flood damage simply because masonry materials can be in contact with limited depths of water without sustaining significant damage. Wood frame structures are more susceptible to flood damage because the construction materials used are easily damaged when inundated with water.

FEMA flood maps identify the Coastal High Hazard Area as Zone V or VE. These parts of the coastal Special Flood Hazard Area show locations where waves and fast-moving water can cause extensive damage during the base flood event. In V zones, wave heights are larger than 3 feet during the 1% annual chance flood. For comparison, Zone A areas are determined to have wave heights of between 1.5 and 3 feet during the 1% annual chance flood. "Zone VE" means that a detailed study has been done for the area, and Base Flood Elevations have been calculated. Structures in areas mapped as Zone V and Zone VE are subject to stricter building requirements because of the higher risk of damage from strong waves. In Prince George's County, there are only four VE zone areas, totaling 0.734 square miles (0.148% of the County's area). Depth of flooding varies across the County based on location in the flood zone. The average Base Flood Elevation of the Coastal High Hazard Area floodplain in Prince George's County is 8.3 feet. The velocity of coastal flooding can be difficult to determine. Shown in **Figure 86**, these zones are all located in District 9 along the Patuxent River. Coastal flooding does not occur in the City of Laurel.

<sup>160</sup> Storm Data Preparation, NOAA National Weather Service Instruction 10-1605. Operations and Services Performance, NWSPD 10-16. July 26, 2021. Available at: <https://www.nws.noaa.gov/directives/sym/pd01016005curr.pdf>.

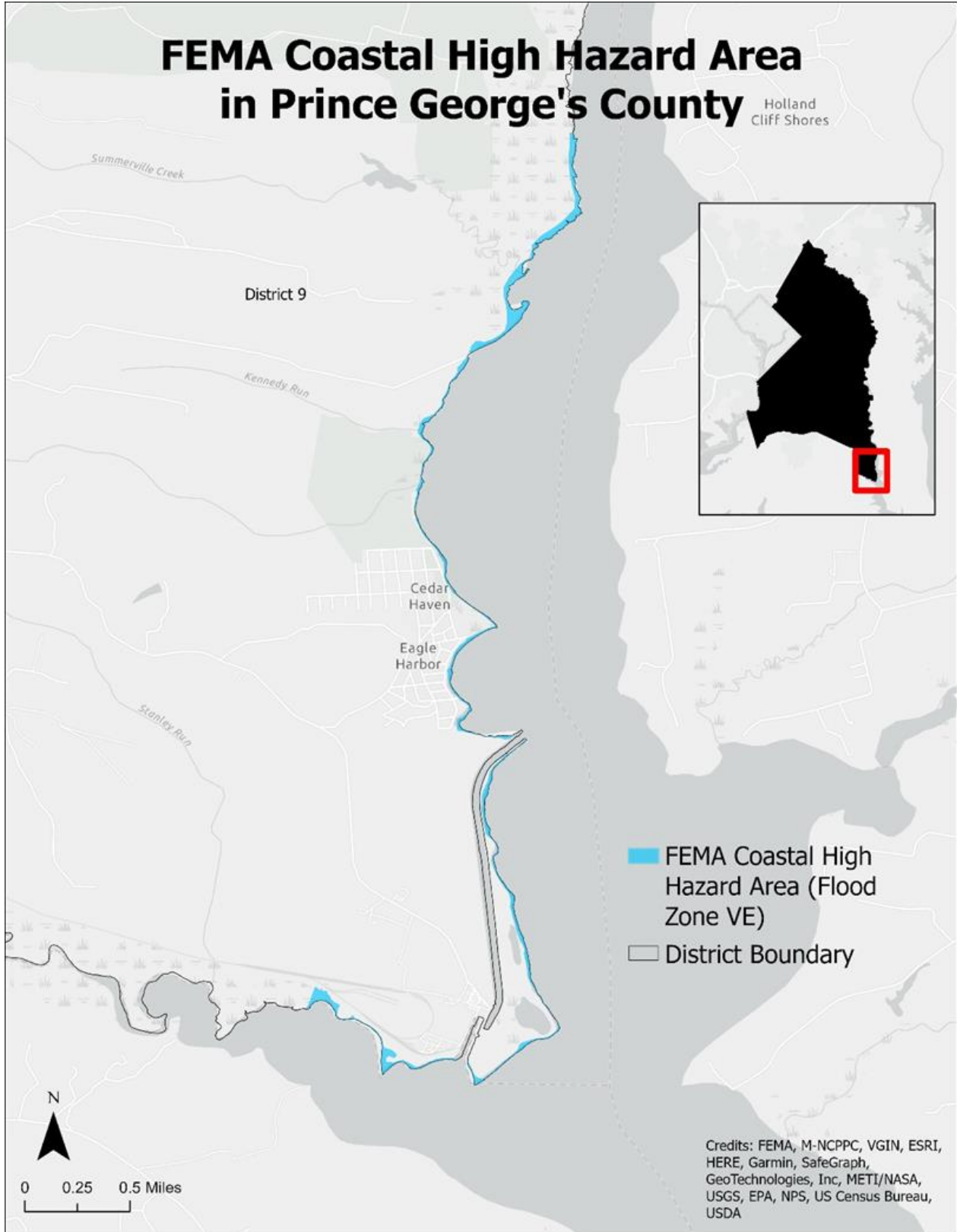


Figure 86: FEMA Coastal High Hazard Area in Prince George's County

Considering climate impacts on coastal flooding, the Maryland Department of Planning created a Coastal Climate Ready Action Boundary Inundated Zone GIS layer to reflect a three-foot rise in the base flood elevations. This layer shows the extent and depth of flood waters for coastal areas in the state above the existing ground elevation given 3-feet of sea level rise. By vertically adding 3 feet of water on top of the FEMA Special Flood Hazard Area elevations and pushing this volume of water out horizontally, the application delineates four areas of flood depths: >3 feet, 2-3 feet, 1-2 feet, and 0-1 foot.

This layer can be used to support climate resilient planning and development in coastal areas as it can show the potential location of coastal flooding impacts as the climate changes. In Prince George's County, the Coastal Climate Ready Action Boundary is located along the eastern portion of District 9 along the Patuxent River, and the western edge of District 8 and 9 along the Potomac River. **Figure 87** shows the extent of the Climate Ready Action Boundary in Prince George's County District 9 and **Figure 88** shows the extent in Districts 8 and 9.

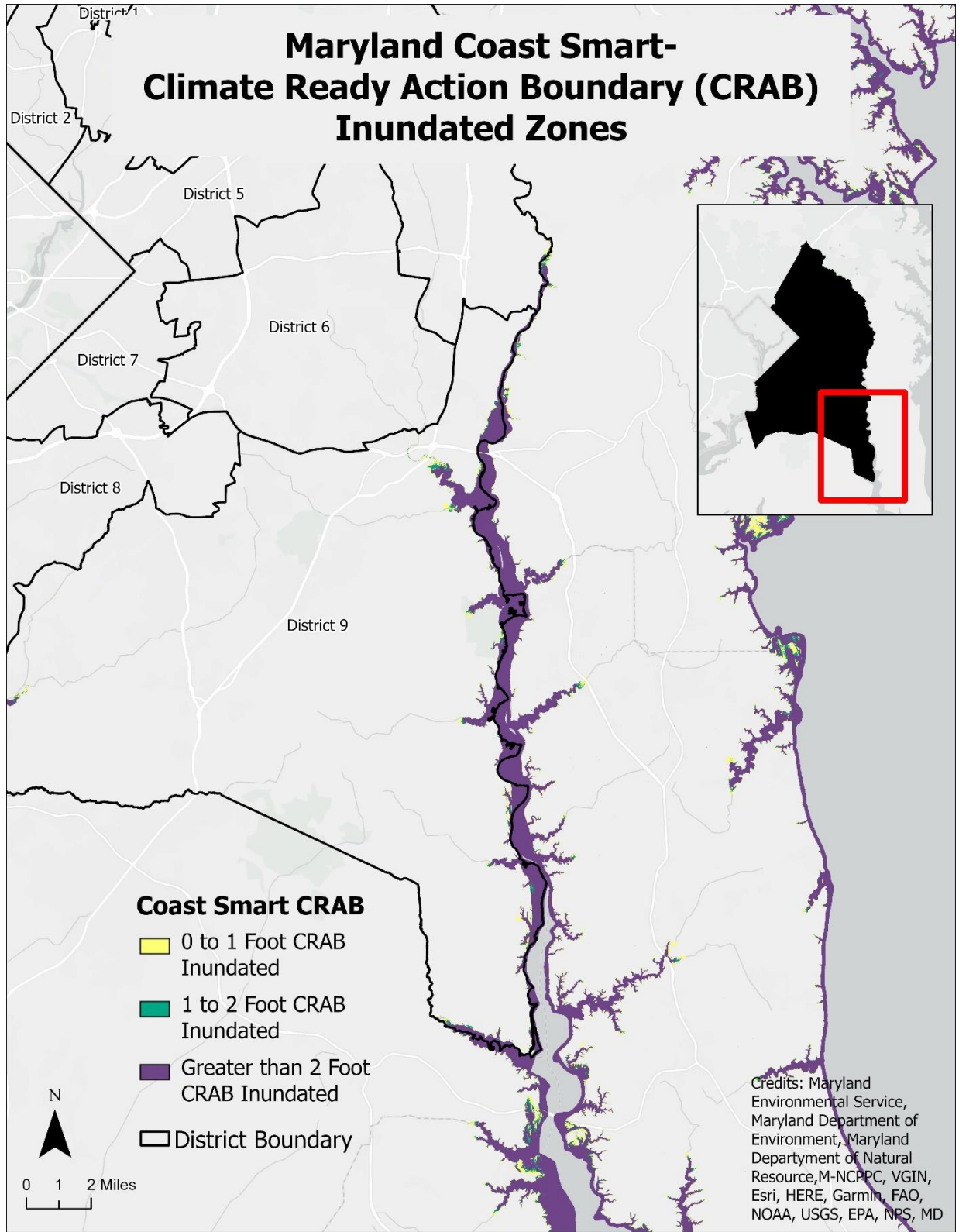


Figure 87: Climate Ready Action Boundary Areas Prince George's County District 9

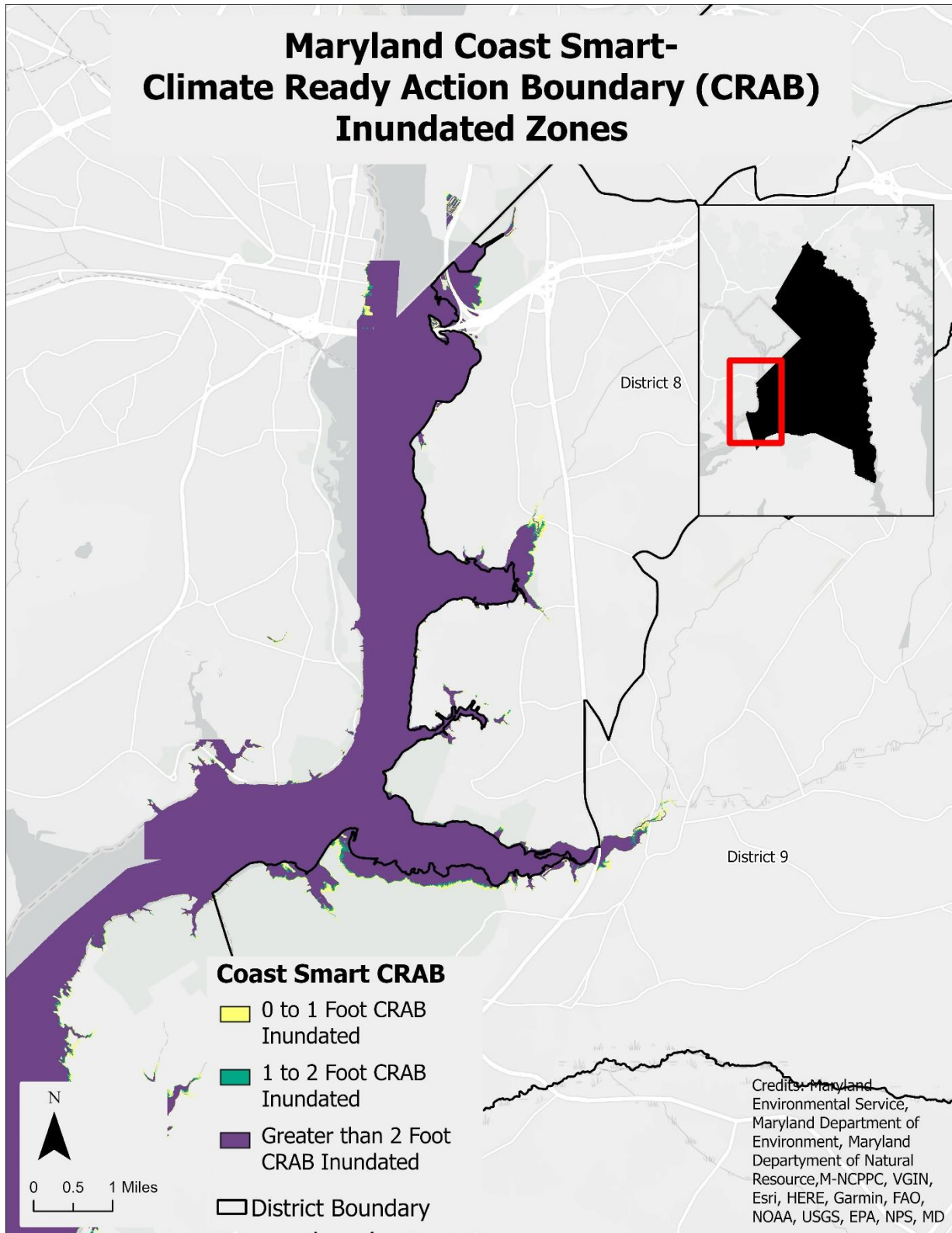


Figure 88: Climate Ready Action Boundary Areas Prince George's County Districts 8 & 9

### Q.3. Previous Occurrences

According to the NCEI Storm Events Database, there have been no records of coastal flooding or storm surge flooding in Prince George's County since 1950. There have been coastal flood watches announcements for Prince George's County, most recently in October 2021. During this storm event, storm surge flooding and coastal flooding of two to three feet above ground level were expected in the County.<sup>161</sup> Prior to this event, news records show that Hurricane Isabel in 2003 caused storm surge flooding in Maryland, impacting Prince George's County.<sup>162</sup>

### Q.4. Probability of Future Events

Due to the lack of records on coastal flooding in Prince George's County, it is difficult to determine the probability of future events. However, as sea levels rise due to climate change, the probability of coastal flooding will increase for the County. According to the Maryland 2018 Sea Level Rise Projections, the Likely range (66% probability) of the relative rise of mean sea level expected in Maryland between 2000 and 2050 is 0.8 to 1.6 feet.<sup>163</sup> The rise in sea level could lead to more frequent, and more destructive coastal flooding events. Additionally, parts of the County in the FEMA VE zone are at a higher risk to coastal flooding due to the 1 percent annual chance flood event, with additional hazards associated with storm-induced velocity wave action. These parts of the County have a higher probability of experiencing coastal flooding events, and the extent of this Zone may increase with sea level rise, putting more of the County at risk of coastal flood events.

### Q.5. Vulnerability and Risk Assessment

According to a 2015 Flood Risk Report for Prince George's County, seven percent of the County land area is considered coastal land.<sup>164</sup> This land area is located in the southern portion of Prince George's County, along the Potomac River and Patuxent Rivers. The Potomac River and the Patuxent River border Districts 8 and 9, the two most southern districts in the County. Coastal Flood extents for the Patuxent River in District 9, shown in **Figure 89**, were derived using the FEMA Hazus-MH v5.1 Flood Module for coastal hazards.

Communities located near, or within the 100-year coastal floodplain are vulnerable to coastal flooding. The impacts of coastal flooding can be short-or long-term and are most intensely experienced within local communities. To assist Maryland's coastal communities, the Coast Smart Communities program was established. Coast Smart addresses short- and long-term coastal hazards, such as coastal flooding, storm surge, and sea level rise by connecting local government staff and partners to essential information, tools, people, and trainings.<sup>165</sup>

The southern part of the County may be at risk for increased storm surge impacts within the Potomac and Patuxent River floodplains as sea level rises due to climate change. The Fourth National Climate Assessment projects sea level rise in the Northeast region of the United States to exceed global mean sea level rise with an average increase by 2 feet ("Intermediate-Low" sea level rise scenario) and 4.5 feet

<sup>161</sup> Path. Coastal Flood Warning Issues in Prince George's County: NWS. October 28, 2021.

<https://patch.com/maryland/bowie/coastal-flood-warning-issued-prince-georges-county-nws>

<sup>162</sup> National Weather Service. Hurricane Isabel, September 18, 2003. <https://www.weather.gov/mhx/Isabel>

<sup>163</sup> University of Maryland Center for Environmental Science. Sea-level Rise: Projections for Maryland 2018. 2018.

<https://mde.maryland.gov/programs/Air/ClimateChange/MCCC/Documents/Sea-LevelRiseProjectionsMaryland2018.pdf>

<sup>164</sup> FEMA RiskMap. Flood Risk Report- Prince George's County, Maryland Coastal Study. 12/17/2015.

[https://map1.msc.fema.gov/data/FRP/FRR\\_24033C\\_Coastal\\_20151217.pdf?LOC=482b36a091bd403c3dc3e36ec8741232](https://map1.msc.fema.gov/data/FRP/FRR_24033C_Coastal_20151217.pdf?LOC=482b36a091bd403c3dc3e36ec8741232)

<sup>165</sup> Maryland Department of Natural Resources. CoastSmart. <https://dnr.maryland.gov/ccs/coastsmart/Pages/default.aspx>

("Intermediate" sea level rise scenario). The most extreme sea level rise scenario estimates 11 feet of sea level rise by 2100.<sup>166</sup> Storm surges and coastal flooding are exacerbated by sea level rise, creating

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<sup>166</sup> Fourth National Climate Assessment. Volume II, Impacts, Risks, and Adaptation in the United States, Chapter 18: "Northeast." U.S. Global Change Research Program. 2018; revised February 2020. <https://nca2018.globalchange.gov/chapter/18/>



greater impact of coastal flooding on Prince George's County.

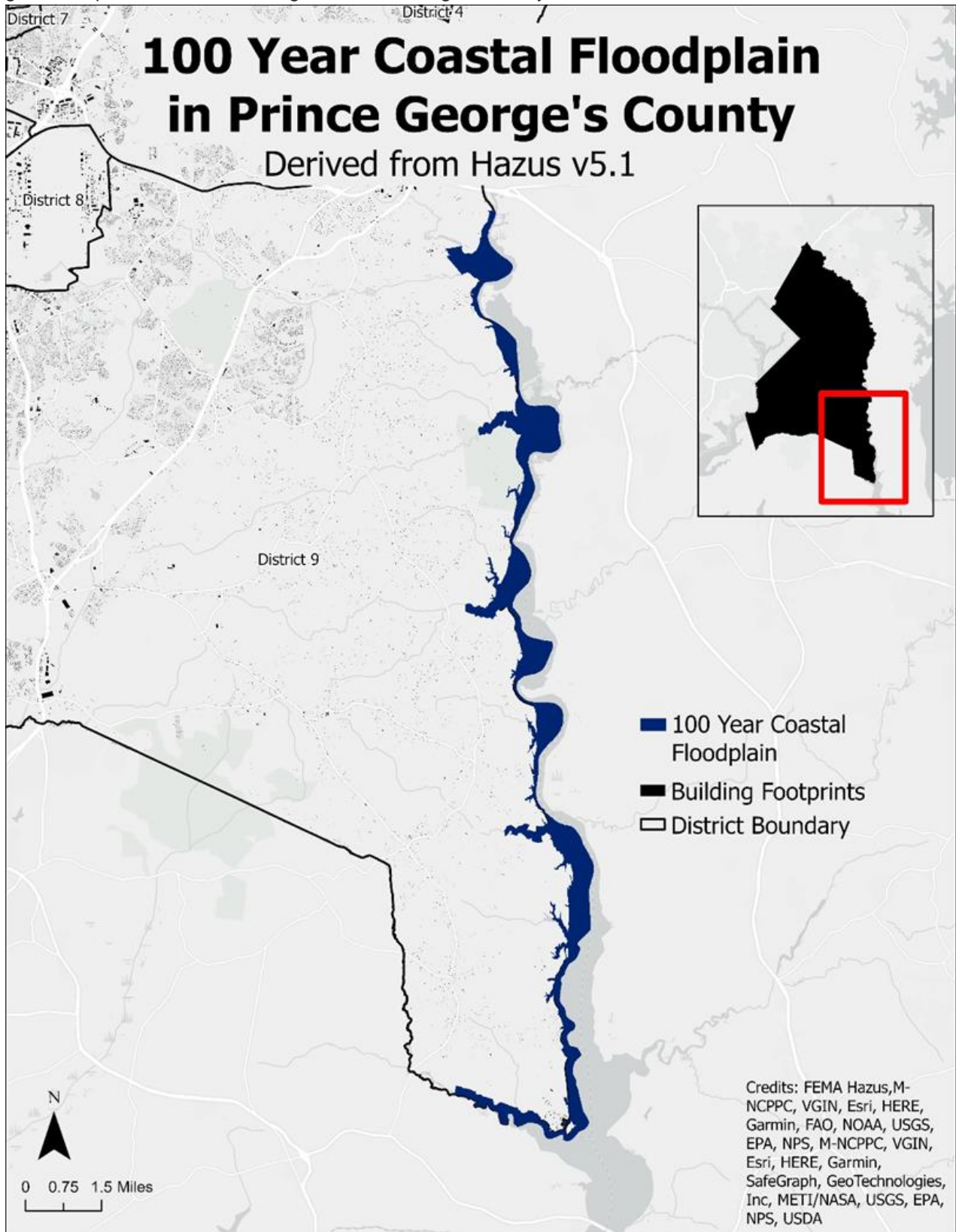


Figure 89: 100-Year Coastal Floodplain in Prince George's County

The State of Maryland 2021 Draft Hazard Mitigation Plan ranked the County on several factors for coastal hazards (coastal flood is one of several coastal hazards considered jointly by the State). These scores and ranks are shown in **Table 119**, which shows the State’s ranking for coastal hazard vulnerability in Prince George’s County (including the City of Laurel) as high.

*Table 119. 2021 State of Maryland Coastal Hazard Ranking and Risk for Prince George’s County*

Risk Factors	Rank
Population Vulnerability	4
Population Density	3
Injuries	2
Deaths	4
Property Damage	3
Crop Damage	1
Geographic Extent	1
Events	2
Local Plan Ranking (2017)	4
<b>Overall Weighted Risk Rating<sup>167</sup></b>	<b>23</b>
<b>Overall Ranking</b>	<b>High</b>

**Q.5.a. Loss Estimation**

Coastal flooding loss estimates for Prince George’s County were derived using the FEMA Hazus-MH v5.1 Flood Module for coastal hazards. Flood hazard is defined by a relationship between depth of flooding and the annual chance of inundation to that depth. Annualization is the mathematical method of converting individual losses to a weighted average that may be experienced in any given year. Annualized loss is the preferred measure with which to express potential risk for hazard mitigation planning as it is useful for creating a common denominator by which different types of hazards may be compared. Annualized losses compared across a region, may indicate targeted areas for prioritization of hazard mitigation actions.

The annualized results for Prince George’s County are summarized in **Table 120**. Due to population growth and increased development, all estimates of the numbers of vulnerable structures and losses may under-estimate risk at the present time. As shown in **Table 120**, approximately 80% of all exposure and 97% of all losses due to coastal flooding would be to residential structures.

Coastal flooding also has impacts to business interruption, with most losses due to relocation following a flood event. Coastal flooding can also cause damage to businesses due to loss of inventory, lack of communication with customers, and may force a business to completely shut down operations. Employers may be disrupted regardless of their location within the floodplain when customers and clients

<sup>167</sup> Risk = (Population Vulnerability\*0.5) + (Population Density\*0.5) + (Geographic Extent\*1.5) + (Events\*1.0) + (Property Damage\*1.0) + (Crop Damage\*1.0) + (Deaths\*1.0) + (Injuries\*1.0) + (Local Plan Risk Assessment\*1.5)

cannot reach their location due to flood damage to roads. The County economy may be impacted by lack of purchases being made during a flood event. Agricultural exports may also be impacted by coastal flooding due to loss of crops.

Table 120: Prince George's County 100-Year Coastal Annualized Flood Losses (from Hazus-MH v5.1)

Prince George's County	100-Year Coastal Flood Losses (in whole dollars)				
	Residential	Commercial	Industrial	Other	Total
<b>Total Exposure</b>					
Prince George's County	\$130,144,361,000	\$26,242,415,000	\$5,564,076,000	\$7,454,437,000	\$169,405,289,000
<b>Direct Losses</b>					
Building	\$840,000	\$4,000	\$1,000	\$2,000	\$847,000
Contents	\$505,000	\$9,000	\$1,000	\$12,000	\$527,000
Inventory	\$0	\$0	\$0	\$0	\$0
<b>Subtotal</b>	<b>\$1,345,000</b>	<b>\$13,000</b>	<b>\$2,000</b>	<b>\$14,000</b>	<b>\$1,374,000</b>
<b>Business Interruption Losses</b>					
Income	\$20,000	\$9,000	\$0	\$1,000	\$30,000
Relocation	\$136,000	\$0	\$0	\$0	\$136,000
Rental Income	\$53,000	\$0	\$0	\$0	\$53,000
Wage	\$47,000	\$2,000	\$0	\$5,000	\$54,000
<b>Subtotal</b>	<b>\$256,000</b>	<b>\$11,000</b>	<b>\$0</b>	<b>\$6,000</b>	<b>\$273,000</b>
<b>TOTAL</b>	<b>\$1,601,000</b>	<b>\$24,000</b>	<b>\$2,000</b>	<b>\$20,000</b>	<b>\$1,647,000</b>

## Q.6. Consequence Analysis

A consequence analysis (refer to **Table 121**) has been done to better understand the range of impacts that a coastal flood event can have on several features of the planning area and the population within it.

Table 121. Coastal Flood Consequence Analysis

Community Feature	Impacts
<b>Life Safety (Warning and Evacuation)</b>	Communities located near, or within the 100-year coastal floodplain are vulnerable to coastal flooding. The impacts of coastal flooding can be short-or long-term and are most intensely experienced within local communities. Coastal flooding can cause injury or loss of life. Flood conditions necessitate warnings and evacuations may also be necessary during large-scale flood events.
<b>Public Health</b>	Floodwaters often contain contaminants such as bacteria and chemical hazards. Individuals traversing floodwaters or children playing in floodwaters are at risk of contracting diseases, injuries, and infections. Structures exposed to flooding may develop mold or wood rot. People with asthma, allergies, or breathing conditions may be at a higher risk to mold.
<b>Critical Facilities and Infrastructure</b>	Critical facilities, such as hospitals may flood and lose power during coastal flood events, forcing them to operate on backup generators. Coastal floods can also destroy critical facilities. Infrastructure may experience impacts in the form of damage from flooding, debris blockages, temporary closure of transportation routes, and the potential inability of the stormwater system to handle floodwater in a severe event.
<b>Economy</b>	A major coastal flood event would be costly for local governments in terms of emergency response, delivery of services, disaster cleanup, and future mitigation projects. Coastal flood events can also cause displacement of populations, impacting the local economy.
<b>Buildings</b>	Home and landowners within the FEMA 100-year coastal flood zone are most at risk to impacts from a coastal flood event. They may experience damage to or loss of property depending upon the severity of flooding in the area. Structures that are impacted by flooding may have structural damage, damaged electrical systems and gas tanks, or develop mold or wood rot.

## R. Risk Assessment Summary

Prince George's County and the City of Laurel have opted to aggregate the findings from the risk assessment through a Hazard Risk Index. The risk factors considered were probability of occurrence, impact, geographic extent, warning time, and community concern. Each hazard's risk factors were assigned a value from 1 to 4 based on the criteria shown in **Table 122**, with a higher value indicating increased risk. A weighting factor was then applied. Finally, the risk factor's weighted index values were added together to calculate the hazard's final Hazard Risk Index score, as show in the following equation:

$$HRI\ Score = (probability\ value \times 0.20) + (impact\ value \times 0.35) + (geographic\ extent\ value \times 0.20) + (warning\ time\ value \times 0.10) + (community\ concern\ value \times 0.15)$$

The Hazard Risk Index scores were then used to rank each hazard as high, moderate, or low. The Mitigation Advisory Committee reviewed and confirmed the final rankings. The Hazard Risk Index scores and overall hazard rankings are shown in **Table 123**.

Table 122. Hazard Risk Index Scoring Criteria

Hazard Risk Index Factor	Level	Criteria	Index Value	Weighting Factor
<b>Occurrence Probability</b>	Unlikely	Less than 1% annual probability	1	0.15
	Somewhat Likely	Between 1% and 10% annual probability	2	
	Likely	Between 10% and 90% annual probability	3	
	Highly Likely	90%+ annual probability	4	
<b>Impact*</b>	Minor	Minor property damages and minimal community function disruption	1	0.35
	Limited	Minor injuries are possible and more than 10% of buildings damaged	2	
	Critical	Multiple deaths/injuries possible and more than 25% of buildings damaged	3	
	Catastrophic	High number of deaths/injuries possible and more than 50% of buildings damaged	4	
<b>Geographic Extent*</b>	Negligible	Less than 5% of community	1	0.20
	Minor	5% to 50% of community	2	
	Moderate	25% to 50% of community	3	
	Large	More than 50% of community	4	
<b>Warning Time</b>	Extended	More than 24 hours	1	0.10
	Limited	12 to 24 hours	2	
	Minimal	6 to 12 hours	3	
	No Notice	Less than 6 hours	4	

Hazard Risk Index Factor	Level	Criteria	Index Value	Weighting Factor
Community Concern**	Negligible	Less than 5% reported concern	1	0.20
	Low	5% to 25% reported concern	2	
	Moderate	25 to 50% reported concern	3	
	High	More than 75% reported concern	4	

\* Both impact and geographic extent include vulnerability (concerning people and infrastructure) considerations.

\*\* Community concern comprises the opinions of the Mitigation Advisory Committee and the public's concern for each hazard as provided by the online public hazard mitigation survey.

This methodology ranks the hazards comparatively for the County based on risk. However, it does not mean that low-scoring hazard will not occur or will not have an impact on the area. It provides an overview of which hazards may pose the greatest risk to Prince George's County and the City of Laurel. A summary of the index is found in **Table 123** with the state and FEMA rankings provided for comparison.

The State of Maryland and FEMA hazard rankings are provided in the results table for comparison, and they are described as follows:

- **State Ranking:** In the 2021 State of Maryland Hazard Mitigation Plan, a score from high (5) to low (1) was awarded based on the hazard's overall ranking for each county. Some hazards have been grouped together, so they will share the same score.
- **FEMA Ranking:** The FEMA National Risk Index for Prince George's County provides risk scores for each hazard from 0 to 100. The scores are then classified from very high (5) to very low (1). The scores are calculated using an equation that combines scores for expected annual loss from hazard events, social vulnerability and community resilience (risk index = expected annual loss × social vulnerability ÷ community resilience).

Table 123. 2023 Hazard Risk Index Score Results & Overall Ranking

Hazard	Occurrence Probability	Impact	Geographic Extent	Warning Time	Community Concern	Hazard Risk Index Score & Overall Rank	State Ranking (5 = highest)	FEMA Ranking (5 = highest)
Riverine Flood	Highly Likely	Critical	Moderate	Limited	High	3.25 (High)	5	2
Severe Storm (Flood-Related)	Highly Likely	Critical	Moderate	Limited	High	3.25 (High)	5	N/A
Severe Storm (Wind-Related)	Highly Likely	Limited	Large	Limited	High	3.1 (High)	5	3
High Winds	Likely	Limited	Large	Limited	High	2.95 (High)	5	3
Tornado	Likely	Critical	Minor	No Notice	Moderate	2.9 (Moderate)	5	4
Extreme Heat	Highly Likely	Limited	Large	Extended	Moderate	2.8 (Moderate)	4	4
Winter Storm	Highly Likely	Minor	Large	Limited	Moderate	2.55 (Moderate)	5	4
Hurricane/ Tropical Storm	Somewhat Likely	Limited	Large	Limited	Low	2.4 (Moderate)	4	2
Dam and Levee Failure	Unlikely	Limited	Negligible	No Notice	Low	1.85 (Moderate)	4	N/A
Earthquake	Likely	Minor	Minor	No Notice	Negligible	1.8 (Moderate)	N/A	2
Extreme Cold	Somewhat Likely	Minor	Large	Extended	Negligible	1.75 (Moderate)	4	3
Sinkhole	Highly Likely	Minor	Negligible	Minimal	Negligible	1.65 (Low)	2	N/A
Wildfire	Highly Likely	Minor	Negligible	Limited	Negligible	1.55 (Low)	4	1
Landslide	Somewhat Likely	Minor	Negligible	No Notice	Negligible	1.45 (Low)	2	2
Drought	Somewhat Likely	Minor	Minor	Extended	Negligible	1.35 (Low)	4	2
Coastal Flood	Unlikely	Minor	Minor	Limited	Negligible	1.3 (Low)	5	2

## Chapter 5. Capability Assessment

*This chapter evaluates Prince George's County and the City of Laurel's capabilities and resources available to implement the actions in the Mitigation Strategy.*

### A. Prince George's County Capability Assessment

#### A.1. County Government Structure and Capabilities

Prince George's County is one of eleven charter counties in Maryland. Since 1970, it has had an elected executive and an elected council. A charter county has been granted express powers rule by the Maryland General Assembly. According to the Maryland Association of Counties ([www.mdcounties.org](http://www.mdcounties.org)), charter counties provide services and facilities for its citizens that are grouped by the general nature of those services and facilities:

- **General Government** – includes executive and legislative control, judicial support, election supervision, financial administration (budgeting and accounting), legal (counsel and prosecution), personnel administration, planning and zoning, general services, and alcoholic beverage control.
- **Public Safety** – includes law enforcement, fire protection, corrections, building inspection, animal control, homeland security, emergency management and traffic engineering.
- **Public Works** – includes road construction and maintenance, sewer, water, storm drains, and solid waste collection and disposal (in Prince George's County, sewer and water services are provided by the Washington Suburban Sanitary Commission).
- **Health** – includes support of the state-required and regulated county health department.
- **Education (Kindergarten through 12th grade)** – includes support of the state-required county board of education that operates under state law.
- **Community Colleges** – includes support of the county or regional board of trustees of a community college that operates under state law.
- **Libraries** – includes support of the county board of library trustees that operates under state law.
- **Recreation and Parks** – includes recreation activities and facilities, and park and open space maintenance and development (The Maryland-National Capital Park and Planning Commission has responsibility for parks and recreation in Prince George's County).
- **Development** – includes such things as urban and rural development and redevelopment, housing, economic development, and economic opportunity programs.
- **Debt Service** – includes the annual principal and interest payments on debt issued for the development of public capital facilities (i.e., roads, schools, libraries, parks, etc.).

Prince George's County administers its services and facilities through numerous departments and agencies. The primary agencies that have direct or indirect roles related to mitigation of natural hazards and which are summarized in this chapter include:

- Office of Homeland Security
- Department of Environment
- Department of Public Works & Transportation;



- Department of Housing & Community Development;
- Office of Central Services;
- Permitting, Inspections and Enforcement;
- Prince George's County Public Schools;
- Fire/Emergency Medical Services; and
- Department of Family Services.

Two other organizations that have roles related to mitigation of natural hazards are summarized in this chapter: The Maryland-National Capital Park & Planning Commission and the Washington Suburban Sanitary Commission.

### A.1.a. Planning and Development Processes

Prince George's County is characterized by highly urbanized areas, high growth areas, and outlying rural areas. The comprehensive and long-term planning, zoning, and development review and approval processes are complex and involve several agencies, notably the Department of the Environment and The Maryland-National Capital Park & Planning Commission. Site-specific characteristics are considered, including the presence of mapped flood hazards, wetlands, unstable soils, and steep slopes during development review. This section presents brief overviews of key documents and highlights how natural hazards are addressed in the overall process.

The 27 municipalities in Prince George's County participate in planning and regulating development. As shown in **Table 124**, the County and The Maryland-National Capital Park & Planning Commission perform these functions for the cities, with the exception of the City of Laurel.

Table 124: Development Authorities in Municipalities

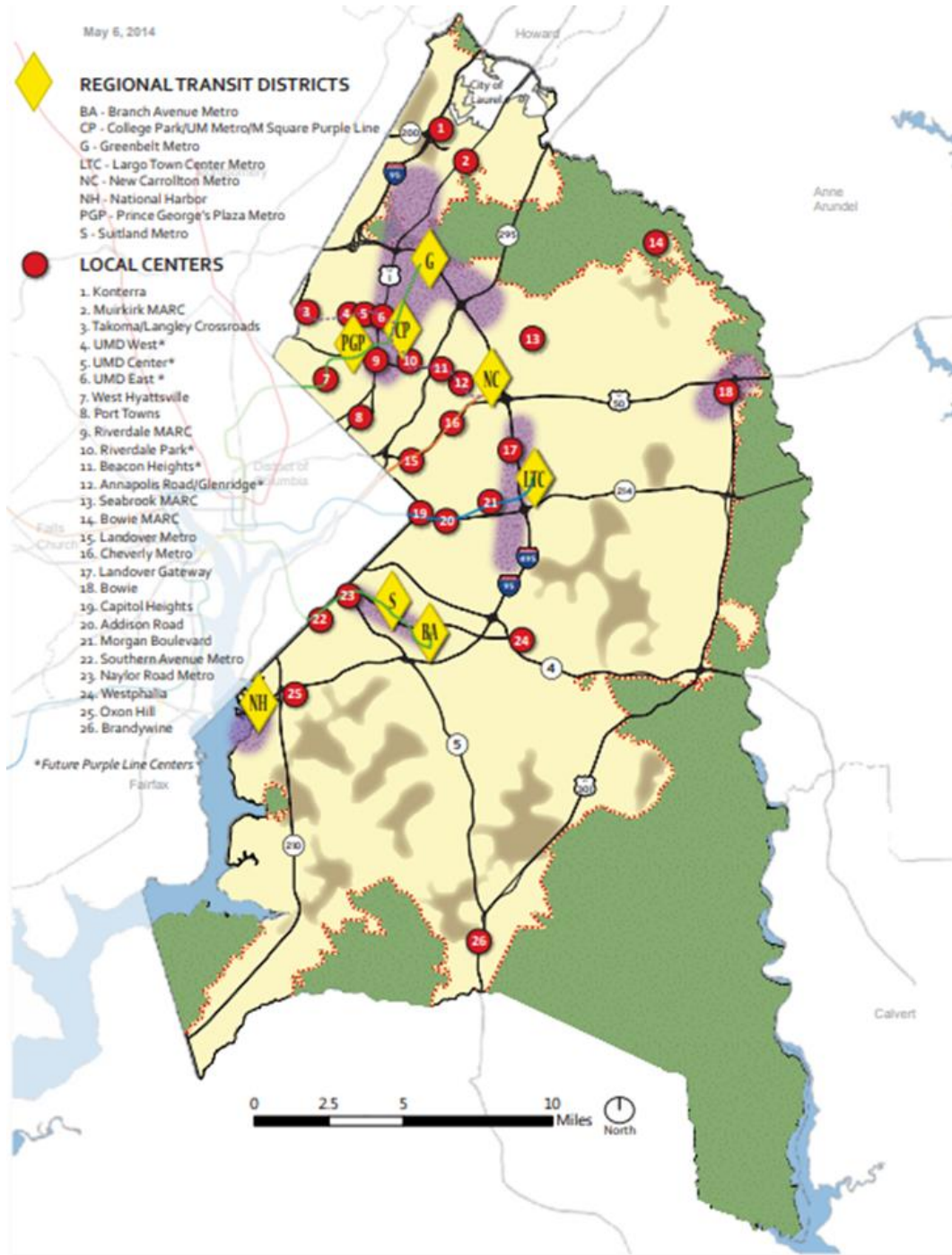
Municipality	NFIP ID#	Planning	Zoning	Building Code	Floodplain Ordinance	Schools	Fire, Emergency Medical Services, Police
Laurel	240053	Yes	Yes	Yes	Yes	✓	Yes
Bowie	✓	✓	✓	Yes (also requires County permit)	✓	✓	✓
Berwyn Heights, Bladensburg, Brentwood, Capital Heights, Cheverly, College Park, Colmar Manor, Cottage City, District Heights, Eagle Harbor, Edmondston, Fairmount Heights, Forest Heights, Glenarden, Greenbelt, Hyattsville, Landover Hills, Morningside, Mount Rainier, New Carrollton, North	✓	✓	✓	✓	✓	✓	✓

Municipality	NFIP ID#	Planning	Zoning	Building Code	Floodplain Ordinance	Schools	Fire, Emergency Medical Services, Police
Brentwood, Riverdale Park, Seat Pleasant, University Park, Upper Marlboro							

✓ Means the function is included in the County's process, the municipality thus does not have separate authority, ordinances, or services.

### A.1.b. Approved General Plan

*Plan 2035, Prince George's County Approved General Plan* (May 6, 2014) makes comprehensive recommendations for guiding future development. The plan's vision emphasizes Accessibility, Sustainability, Prosperity and Livability. It redefines policies and objectives by re-characterizing the 2002 General Plan Policy Areas. The Developed Tier and Developing Tier were re-characterized into 2035 Policy Areas: Established Communities, Future Water and Sewer Service Areas and Employment Areas. The 2002 General Rural Tier Policy Area was converted to 2035 Agricultural/Rural Areas and the Growth Boundary Area. These new area classifications are visually communicated through the Growth Policy Map, indicating where the County will experience development or will remain undeveloped in the upcoming years. **Figure 90** shows the Plan 2035 Growth Policy Map.



**Legend**








- |   |   |   |
|---|---|---|
|  Employment Areas        |  Future Water and Sewer Service Area |  Rural and Agricultural Areas |
|  Established Communities |  Growth Boundary                     |  Metrorail                    |
|   |  Proposed Purple Line Light Rail     |   |

Figure 90: Prince George's County Plan 2035 Growth Policy Map

In the Plan, undeveloped flood hazard areas are included among environmentally sensitive areas. The County's goal is to preserve 80% of its remaining undeveloped land, or approximately 46,220 acres. The plan emphasizes protection of sensitive areas through methods such as property acquisitions, conservation programs, and development of enhanced or additional regulations and policies. By protecting undeveloped flood hazard areas, these spaces can provide ecosystem services such as flood control. The Plan also outlines policies related to assessing decisions for potential impacts of climate change, including flooding and sea level rise. The County aims to prioritize flood adaptation upgrades to at-risk areas and reduce development in flood-prone areas. Prince George's County is widely recognized for its progressive approach to guiding development away from flood-prone areas.

### **A.1.c. Zoning and Planning**

The primary elements of the zoning and planning processes are highlighted below. Extensive materials, both printed matter and webpages, are issued by Department of Environment and The Maryland-National Capital Parks and Planning Commission to explain and guide citizens and developers through the processes. The County continues to coordinate the Floodplain Ordinance and Building Code whenever either is updated.

#### *A.1.c.1. The Zoning Ordinance*

The ordinance establishes several zones which permit residential, commercial, industrial or agricultural uses, or a mixture of those uses. Each zone has specific requirements and limitations. The Chesapeake Bay Critical Area Overlay Zones, required by the State, apply to tidal waters, tidal wetlands, and all land within 1,000 feet of the mean high tide line. Woodland conservation requirements are addressed through the review and approval of tree conservation plans, as detailed in the Woodland Conservation Technical Manual. Landscape provisions are also included in the Zoning Ordinance and details and requirements can be found in the Landscape Manual. Variances may be sought to obtain relief from the strict application of the Zoning Ordinance, such as to allow variances to setback or building height limitations. The ordinance was revised since the 2017 hazard mitigation plan update and the floodplain management ordinance was revised and adopted following provision of new FEMA Flood Insurance Rate Maps (September 16, 2016).

The Zoning Ordinance contains one specific provision related to floodplains:

- *Sec. 27-124.01 One hundred (100) year floodplain.* This section defines the floodplain as that which is delineated by the County's watershed management studies approved by the County Stormwater Management Task Force. At a minimum, floodplain limits are those which are delineated or revised by the Federal Emergency Management Agency. Where no studies are available or where the Department of the Environment has determined existing studies to be inapplicable, new studies shall be required and performed to the satisfaction of the Department of the Environment, taking into consideration future land use based on zoning. Watercourses having less than 50 acres of upstream watershed may be excluded.

#### *A.1.c.2. Planning Process*

Through several types of plans, the County provides guidance for future physical development. The responsibility for the General Plan and other plans rests with the Maryland-National Capital Park and Planning Commission Area master plans address the adequacy of public facilities and development proposals are analyzed for impacts on schools, police, fire, rescue, libraries, health, parks and trails. They also are used as the basis for decisions on zoning changes, special exceptions and subdivision applications.

### A.1.c.3. Subdivision Review

Subdivision Regulations control subdivision of land for the purposes of sale or development. Each subdivision proposal is supported by a preliminary plan that depicts such features as lot lines, streets, drainage patterns, stormwater management facilities, topography, building restriction lines, easements and environmental features such as floodplains, wetlands, woodlands, steep slopes and unstable soils. After receiving preliminary plan approval most plans are recorded in the County land records office. This legally recorded document, known as a record plat, depicts lot lines, easements, building setbacks, public right-of-ways and any other encumbrances that restrict the physical development of the land. The Maryland-National Capital Park and Planning Commission administers the review process.

### A.1.c.4. Additional Plans and Reviews

Environmental features and constraints are among many aspects that are reviewed and considered. Detailed site plans show additional detail, including location of buildings, open spaces, landscaping, grading and other physical features. Detailed plans are required for stormwater management, tree conservation, sediment and erosion control, and utilities.

### A.1.c.5. Floodplain Ordinance

The Prince George's County Floodplain Ordinance (Division 4 of Subtitle 32, Water Resources Protection in the County Code, meets and exceeds the minimum requirements of the NFIP.

### A.1.c.6. Building Permit, Use and Occupancy

The Prince George's County Building Code enforces provisions supporting protection from potential impacts from natural hazards. Building permits are required for new construction and certain work on existing buildings and a robust inspection program enforces the code.

### A.1.c.7. Trees and Vegetation

The Prince George's County Tree Canopy Coverage Ordinance (Division 3 of Subtitle 25, Trees and Vegetation) establishes procedures, standards, and requirements to preserve, maintain, enhance, and restore tree canopy coverage on developed and developing sites for the benefit of County residents and future generations. Tree canopy requirements shall be met unless a waiver has been granted.

## A.2. The Capital Improvement Plan

The Capital Improvement Program is the County's six-year financial plan for constructing and renovating permanent facilities such as schools, libraries, fire stations and roads. Capital projects often take two to three years to complete. The Capital Improvement Program provides a detailed, year-by-year schedule of all planned expenditures and financing requirements for each construction project. Eligible capital improvement projects address frequent home flooding (water entering the habitable structure area), and alleviate severe road flooding that does not fall under jurisdiction of the county Department of Public Works and Transportation. Also included are flood control system certification, municipal participation, storm drain acceptance and flood warning systems projects. When possible, water quality enhancement features are incorporated in capital improvement projects. Property owners directly benefiting from capital improvement projects must pay for and provide the county with a right of way.

Projects that specifically address flood hazards, whether as a primary purpose or adjunct component, include:

- **COE County Restoration.** This program is a partnership with the U.S. Army Corps of Engineers and will involve the design and construction of environmental enhancement and flood control projects in the Anacostia and Patuxent River watersheds. Numerous projects are in the planning and design phase, including levee improvements, water quality measures, wetland creation, and reforestation and fish blockage removal. In Fiscal Year 2023, construction and certification support will continue on the Allison Street Levee.
- **County Revitalization and Restoration.** This project provides funding for infrastructure improvements and reconstruction in areas targeted for revitalization. Improvements will include the installation of traffic signals, intersection modifications, drainage structures, street lighting, landscaping, water quality and quantity measures, bicycle lanes, sidewalks and other amenities necessary to improve or expand existing roadway infrastructure while enhancing the appearance of the community.
- **Green Street Improvements.** This project provides funding for improvements along major roadways and at key intersections to improve appearance, safety and functionality while addressing environmental issues. This will improve water quality and related environmental conditions in the immediate vicinity of the projects undertaken.
- **Stormwater Management Restoration.** The County's stormwater management infrastructure is aging and in need of extensive and expensive repairs. The project determines the condition of the storm drain system, which will provide a basis for a large-scale repair of storm drain infrastructure throughout the County. Ponds identified as deficient will be corrected, constructed and landscaped. Several countywide initiatives are also funded here, including tree plantings for water quality and a comprehensive street tree inventory.
- **Endangered Structure Acquisition Program.** This project provides for the acquisition of residential properties within the 100-year floodplain and properties vulnerable to unforeseen natural conditions such as a slope failure or stream erosion. This project will mitigate severe economic impacts associated with flooding events to commercial, industrial and residential properties. Acquisition of the most severely flood-prone properties will have a positive impact. Properties which are acquired are then evaluated for opportunities to implement wetland banking, stream restoration, flood mitigation, reforestation and/or green space opportunities.
- **Flood Protection and Drainage Improvement.** This program consists of flood protection and drainage relief projects that will address surface run-off causing home flooding, alleviate road flooding and correct residential yard drainage deficiencies. It will also provide flood mitigation and drainage improvement to residential structures which cannot be corrected through the County's Department of Public Works and Transportation maintenance program.

### A.3. Ordinances and Regulations

#### **A.3.a. Subdivision Regulations**

The Prince George's County regulations pertaining to the subdivision of land are found in Subtitle 24. The broad purposes are to provide for the public health, safety, and general welfare, including wise use and management of natural resources and provision of open space. A stated objective is that "Significant natural features which are impossible or difficult to reproduce, such as waterways, streams, hills, wooded lands, and specimen trees, should be preserved to the degree practicable." Some highlights pertaining to natural hazards:

- Stormwater management must be addressed in all subdivision proposals (minor subdivisions are four or fewer single-family residential lots; major subdivisions are all others).
- Preliminary plans for subdivision must show flood hazard areas, forest stands, perennial streams, non-tidal wetlands, and soil types (including highly erodible soils).
- Minimum lot areas are specified, generally exclusive of any land within the 100-year floodplain.
- For residential subdivisions, a 25-foot setback from the floodplain shall be established as a building restriction line.
- Proposals for most residential subdivisions are required to plat and convey to the County or a municipality suitable and adequate land for active or passive recreation; land shown for preservation as part of a stream valley park on an official master plan may be substituted under certain conditions.
- Developers are encouraged to dedicate floodplain areas for public purpose, otherwise such areas are subject to a floodplain easement.
- The area in the floodplain easement may be used for utility lines and /or storm drainage facilities, open-type fencing, or passive recreation, provided that no structures are built that would interfere with the flood conveyance capacity.
- A 50-foot perennial stream buffer is required.
- The minimum 50-foot perennial stream buffer may be extended to include the floodplain, adjacent slopes of 25% or greater, and highly erodible soils on slopes of 15% or greater and additional area deemed necessary to protect the stream or floodplain.
- The subdivision of land found to be unsafe for development, which may be due to natural conditions such as, but not confined to, flooding, erosive stream action, high water table, unstable soils or severe slopes, or to man-made conditions such as unstable fills or slopes may be restricted or prohibited.

### **A.3.b. Stormwater & Wetlands Regulations**

The Prince George's County regulations pertaining to stormwater management are found in Subtitle 32, Water Resources Protection and Grading Code Division 3, Stormwater Management. The purpose of the requirements is to protect, maintain, and enhance the public health, safety, and general welfare by establishing minimum requirements and procedures to control the adverse results of increased stormwater runoff associated with land development. Proper management of stormwater runoff minimizes damage to public and private property, reduces the effects of development on land and stream channel erosion, assists attainment and maintenance of water quality standards, reduces local flooding, and maintains, as nearly as possible, predevelopment runoff characteristics of the area.

The County's Stormwater Management ordinance sets the standards for stormwater management design plans, as well as establishes requirements for inspection, maintenance, and enforcement of stormwater management plans.

The County emphasizes the use of non-structural stormwater best management practices when a development is proposed. Stormwater best practices used and promoted in the County emphasize "No Adverse Impact" structures such as bio-retention facilities, underground infiltration, on-site ponds, and off-site regional facilities. Protection of existing wetlands and replacement of impacted wetlands are controlled through permitting related to grading and construction activities. County stormwater management regulations include several provisions for the safe conveyance of excess stormwater and floodwaters and to increase groundwater recharge. Stormwater management plans are also required for all redevelopment plans in the County.

The County includes a Nontidal Wetlands Protection Ordinance in Subtitle 32, Division 5 of its code of ordinances. This ordinance outlines Prince George's County's comprehensive program for the protection, conservation and regulation of nontidal wetlands. The goal of this program is to ensure no net loss of nontidal wetland acreage and function and to strive for a net resource gain in the County.

Development proposals that include wetland impacts are subject to the requirements of the Maryland Department of the Environment and the U.S. Army Corps of Engineers.

### **A.3.c. Floodplain Ordinance**

The revised Floodplain Ordinance (Division 4 of Subtitle 32 Water Resources Protection and Grading Code) was adopted September 16, 2016 to protect life and health and to minimize public and private property damage by controlling development within the floodplain.

Due to the County's restrictive approach to floodplain development, proposals for new development in the regulated floodplain are not common. Substantial improvements and additions to existing buildings are subject to ordinance provisions. The following highlights the areas in which the ordinance exceeds minimum requirements:

- New development of substantial improvement is required to be 2 feet above the Base Flood Elevation.
- The 1%-annual chance floodplain is based upon ultimate conditions hydrology or full build out of the watershed based upon current zoning or land use proposed in an approved Master Plan.
- The lowest floor of any new building or substantial improvement/additions to existing buildings are to be elevated one or more feet above the elevation of the 1%-annual chance floodplain.
- Activities proposed for the mapped floodplain must be evaluated using engineering methodologies to determine the impact on flood elevations; compensatory storage that offsets any impacts is required.
- For any new buildings or substantially improved buildings or additions, enclosures below the lowest floor are not allowed.

### **A.3.d. County Building Code**

Prince George's County stays current with the Maryland Building Performance Standards (which are based on the current Editions of the *International Building Code*, the *International Mechanical Code*, the *International Energy Code*, the *International Existing Building Code*, and the *International Residential Code*). By amendment, the County embodies in the building code, certain additional regulations for grading, drainage, surface structures, erosion control, and stormwater management. The codes apply to new construction and work on existing structures.

According to FEMA's National Building Code Adoption Tracking Portal, Prince George's County uses up to date hazard building codes that protect against five hazards; flood, seismic, tornado, hurricane wind, and damaging wind. The County uses 2018 International Building Codes (IBC). The County is also anticipated to adopt the 2021 IBC in 2024.<sup>168</sup> Additionally, the County's building codes have been rated as "Resistant," with 100-percent of the county being required to adhere to a hazard-resistant building code, according to FEMA's Climate Mapping for Resilience and Adaptation's statement of hazard resistance code adoption status.<sup>169</sup>

<sup>168</sup> FEMA. National Building Code Adoption Tracking Portal.

<https://stantec.maps.arcgis.com/apps/MapSeries/index.html?appid=a053ac48343c4217ab4184bc8759c350>

<sup>169</sup> FEMA. Climate Mapping for Resilience and Adaptation v 1.0.4. <https://livingatlas.arcgis.com/assessment-tool/explore/details>



Prince George's County has adopted amendments to the Building Code that are specific to wind damage, damage due to heavy winter storms fires, and drainage, outlined in the following codes:

- *Subtitle 4, Building, Division 1 Building Code:*
  - *Sec. 4-144. Fire and Smoke Protection Features, Section 704, Fire-Resistance Rating of Structural Members; Sec. 4-145. Exterior Walls, Section 705, Combustible Materials on the Exterior Side of Exterior Walls; Sec.4-149. Fire and Smoke Protection Features, Section 705, Exterior Walls; Sec. 4-151. - Fire and Smoke Protection Features, Section 708, Fire Partitions.* Each of these sections contains fire resistance guidelines to protect structures from fires.
  - *Sec. 4-187. Structural Design; Snow Loads; Section 1608.1, General.* References American Society of Civil Engineers 7 for design snow loads; but design roof load shall not be less than that determined by Sec. 1607 of the Code, and in no case less than thirty (30) pounds per square foot snow load, plus the drift.
  - *Sec. 4-188. Dampproofing and Waterproofing. Section 1805.4.3.8, Site Grading* The ground immediately adjacent to the foundation shall be sloped away from the building at a slope of not less than one unit vertical in twelve (12) units horizontal (1:12) for a minimum distance of 5 feet (914 mm) measured perpendicular to the face of the wall or an approved alternate method of diverting water away from the foundation shall be used. Consideration shall be given to the possible additional settlement of the backfill when establishing the final ground level adjacent to the foundation.

The residential building code applicable to one and two-family dwellings identifies the wind speed, flood loads, and snow load for prescriptive designs. It also addresses unstable soils, giving the building code office the authority to require additional measures. The County adopted modifications to the residential code that are comparable to the adopted modifications to the building code.

- In addition to the Building Code, *Subtitle 32. Water Resources Protection and Grading Code. Division 2* contains guidance on protecting structures from geologic hazards and drainage:
  - *Sec. 32-133. Denial of Permit (c) Geological Hazard.* “If, in the opinion of the Director or Permitting, Inspections and Enforcement, the land area for which grading is proposed is subject to geological hazard to the extent that no reasonable amount of corrective work can eliminate or sufficiently reduce settlement, slope instability, or any other hazard to persons or property, the grading permit shall be denied.”
  - *Sec. 32-162. On-site Drainage (a) (6).* “In order for drainage to discharge into natural watercourses such natural ground shall be protected from erosion by an adequate amount of riprap or by other measures. Flows exceeding three (3) cubic feet per second will not be permitted in open facilities such as swales and ditches, but shall be conveyed in enclosed storm drain systems.”
  - *Sec. 32-162. On-Site Drainage (a)(7).* “Overflows [of drainage] from the one hundred (100) year storm shall be traced through the site and intervening area to their locations of discharge into a natural stream and, at critical locations, their hydraulic gradient determined to ascertain that the proposed construction does not flood or damage existing and proposed buildings or structures along the trace.”

## A.4. Department of the Environment

The mission of the Department of Environment is to protect and enhance the natural and built environments of Prince George's County by enforcing Federal, State and County laws to create a healthy, safe and aesthetically pleasing environment for all residents and businesses of the County. Its programs, which are some of the most progressive in the Nation, work hand in hand with the County Executive's Livable Communities Initiative to provide healthy, safe, and clean communities for the citizens and residents of Prince George's County. Descriptions of the department's functional groups and initiatives that address natural hazards are briefly described below.

**Environmental Services.** Prince George's Environmental Services group is responsible for environmental stewardship of the County and administers programs for stormwater management, floodplain management and damage assessment, allocation of water and sewer service, reforestation of designated areas, capital projects construction, and the restoration of degraded streams and ponds. Prince George's County is recognized as a national model for ecosystem management and restoration. Special programs focus on the quality of streams, others on industrial and residential pollution prevention, the revitalization of older communities, the restoration of the Anacostia River and its tributaries, the preservation and replacement of trees, and the protection of the Chesapeake Bay.

The Group is involved with a number of programs associated with land development and revitalization, working closely with the Office of Engineering in the Department of Public Works and Transportation to ensure development projects will meet environmental concerns and the required codes, but at the same time, making sure this process is fairly and practically applied.

The Environmental Services Group is charged with monitoring the County's activities that are related to its continued compliance with and participation in the NFIP and the NFIP's CRS. For summary information on the NFIP and CRS, please refer to Chapter 4.B.3.b and Chapter 4.B.3.c, respectively.

**Permits and Review Group.** The Permits and Review Group provides technical support to review and approve plans for construction, including fire and life safety. The County code requires that an owner or authorized agent obtain a permit to erect, construct, enlarge, alter, move, improve, connect, demolish, use and/or occupy, or raze any building. Other types of projects which require permits include grading, stormwater, installation or construction of chimneys, billboards, carports, chairlifts, escalators, swimming pools, wood burning stoves, certain fences, antennas, and installation or renovation of certain electrical devices and wiring.

**Licenses and Inspection Group.** The Licenses and Inspections Group (LIG) provides regulation of construction, development, and grading activity in the County and incorporated municipalities (except the City of Laurel), through inspection and enforcement. Codes enforced include building, electrical, fire, mechanical, energy, accessibility, grading, stormwater management, zoning, and other applicable State and County codes for construction and development projects. Except for work of a minor nature, commercial projects are required to be certified by third party inspection agents under the Third-Party Inspection Program. The Group's Commercial Construction/Life Safety Team oversees the Third-Party Inspection Program.

**Permit and Inspection Activity and Staff Qualifications.** The Office of Engineering and the Licenses and Inspection Group are staffed by professionals who meet or exceed State requirements for certification in their trade/specialty, either through the model code organization or the Maryland Department of Housing & Community Development. Most staff members maintain multiple certifications. To maintain qualifications, staff members attend training offered by the International Code Council, the Maryland Department of Housing & Community Development, and commercial providers.

**Countywide Flood Reduction Program.** Prince George's County has a strong record of dealing with flooding since 1972's Tropical Storm Agnes brought the potential for significant impacts to the attention of elected officials and policymakers. The County joined the National Flood Insurance Program (NFIP) that year, and soon thereafter established a task force to analyze the risks and data on flood control projects, to review flood emergency procedures, and to recommend actions to address flooding. A comprehensive watershed-based stormwater management plan approach has evolved during the past 45 years which is nationally recognized as an innovative and practical way to meet regulatory requirements, enhance clean water and protect riverine and wetland systems in a highly urban and suburban environment.

**Sustainability Division.** The Sustainability Division (SD) is responsible for the planning, development and implementation of environmental programs that protect communities and enhance the quality of life in Prince George's county.

The Sustainability Division leads floodplain studies, including 100-year floodplain studies for county stream reaches. **Chapter 4** of the 2023 HMP summarizes the results of the risk assessment for flood hazards, which indicates that 9.7% of the total properties in Prince George's County and the City of Laurel are exposed to flooding in the 1% or 0.2% chance floodplain, with a grand total of approximately \$8 billion value exposed to flooding. Most buildings have not experienced flooding in at least the last 35 years (period for which the County has records). Many of the areas where flood-prone development exists are targeted for urban revitalization, especially inside the Beltway along the Anacostia River, Oxon Run, and Beaverdam Creek.

**Comprehensive Watershed Management Plans.** The Department of Environment has the responsibility to conduct watershed studies and develop management plans. The purposes of the plans include determination of potential flooding based on planned future development, consideration of mitigation alternatives to control flooding and minimize damage, and identification of stormwater management strategies to alleviate water quality impacts and stream channel erosion associated with development.

Flood hazard mitigation alternatives considered for identified problem areas range from nonstructural (buyout, site modification, elevation) to structural (levees/floodwalls, channel improvements, bridge/culvert improvements, retention/detention structures). Pre-determined criteria are used to evaluate and rank alternatives. Selected projects have been implemented using a mix of County and State funds.

**Climate Action Commission.** The Climate Action Commission was created in the Spring of 2020 to develop a Climate Action Plan for Prince George's County. The Climate Action Plan (CAP) aims to help the County reach its carbon emissions goal of a 50% reduction by 2030 (compared with 2005 levels). The goal aligns with the State's projection for 50% emission reduction by 2030 through the implementation of the Maryland 2030 Greenhouse Gas Reduction Plan and the Metropolitan Washington Council of Government's goals for the region. In January 2022, Prince George's County DoE submitted the official Climate Action Plan to the County Council and in July 2022, the Plan was adopted by the County.

## [A.5. Floodplain Management](#)

### **A.5.a. Continued Compliance with the NFIP**

Although the County's Floodplain Ordinance is the foundation for its participation in the NFIP, all of its programs and initiatives related to reducing flood hazards are evidence of the commitment to comply with and exceed the requirements of the federal program. **Table 125** shows community participation in the NFIP as of December 12, 2022.

Prince George's Floodplain Administrator and the County's Planning and Zoning Division of the Community Development and Code Compliance Department administer the County's floodplain

management ordinance, and therefore are responsible for enforcing the substantial damage provisions in the ordinance after a hazard event. This includes ensuring that repair or improvement to substantially damaged structures in any flood hazard area does not happen without a permit obtained from the County.

**Substantial Damage**

Damage of any origin sustained by a building or structure whereby the cost of restoring the building or structure to its condition before damage would equal or exceeds fifty percent (50%) of the market value of the building or structure before the damage occurred.

*Table 125: Community Participation in the NFIP as of December 12, 2022*

CID	Community Name	Initial FHBM Identified	Initial FIRM Identified	Current Effective Map Date	Reg-Emer Date
245208A	Prince George’s County	N/A	08/04/72	09/16/16	08/04/72
240053A	City of Laurel	08/09/74	11/01/78	09/16/16	11/01/78

Source: FEMA Community Status Book Report, Maryland, December 12, 2022

The Maryland Department of the Environment’s Community Assistance Program conducts periodic Community Assistance Visits to review community performance. The report of the February 22, 2017 visit indicated that the program was in good standing and complimented the County on its commitment to strong floodplain management, which is also evidenced in its CRS rating of 5. The Community Assistance Visit report also praises the County’s floodplain management ordinance, which contains numerous higher regulatory standards including prohibiting new buildings in the regulatory floodplain, the FEMA or County floodplain, whichever is more restrictive.

Program administration highlights include:

- Maintain Elevation Certificates on all new and substantially improved buildings, in computer format, and make copies available;
- Provide Flood Insurance Rate Map information and information on the purchase of flood insurance to inquirers; inform lenders, insurance agents, and real estate offices about the service;
- Maintain current Flood Insurance Rate Maps and copies of past effective maps;
- Conduct an annual outreach to floodplain residents;
- Require hazard disclosure as part of real estate transactions;
- Maintain materials on drainage problems and flood protection in the public libraries and provide assistance to inquirers and property owners;
- Develop new flood hazard data as part of the development review process and maintain and update changes to the flood hazard maps;
- Preserve open space in the floodplain (over 13,400 acres in stream valley parks) and maintain lots where buildings were acquired as open space;
- Encourage property owners to retrofit flood-prone buildings; and
- Review stormwater management proposals; maintain stormwater management and drainage systems and implement capital projects for drainage and flood control.

### A.5.b. NFIP Community Rating System

The NFIP's CRS is designed to recognize and encourage community floodplain management activities that exceed the minimum NFIP standards. NFIP flood insurance premium rates are adjusted to reflect the reduced flood risk resulting from community activities that meet the three goals of the CRS: (1) reduce flood losses; (2) facilitate accurate insurance rating; and (3) promote awareness of flood insurance.

Prince George's County is rated as a Class 5 community, which translates to a 25% reduction in flood insurance rates for local residents and businesses located in mapped special flood hazard areas (and a 10% discount outside of mapped Special Flood Hazard Areas). The Class 5 rating places Prince George's County in the top 3% of over 1,000 communities nationwide that participate in the CRS.

In April 2022, The City of Laurel joined the CRS program. The City is classified as a Class 7 community, receiving a 15% premium discount for properties within the Special Flood Hazard Area and 5% discount outside the Special Flood Hazard Area.

### A.5.c. Community Assistance Visits

The NFIP offers a Community Assistance Program that offers a Community Assistance Visit to a community by a FEMA staff member or staff of a state agency on behalf of FEMA. This visit provides technical assistance to the community and assures that the community is adequately enforcing its floodplain management regulations.

Community Assistance Visits typically consist of a tour of the floodplain, an inspection of community permit files, and meetings with local appointed and elected officials. If any administrative problems or potential violations are identified during a Community Assistance Visit the community will be notified and given the opportunity to correct those administrative procedures and remedy the violations to the maximum extent possible within established deadlines. FEMA or the state will work with the community to help them bring their program into compliance with NFIP requirements.

Communities that have participated in a Community Assistance Visit and the date of their most recent visits are shown in **Table 126**.

*Table 126. Community Assistance Visits*

Community Name	Community Assistance Visit Date
Prince George's County	February 22, 2017
City of Laurel	June 3, 2021

### A.5.d. Public Information and Outreach

Prince George's County has a robust initiative to inform its citizens about flood hazards and related matters, including:

- Every June is declared "Flood Awareness Month" by the County Executive.
- The Department sponsors a booth with flood information at various fairs.
- The webpage has numerous pages with flood hazard information, including links to related sites.
- A telephone number is dedicated for citizens to use for questions about flooding and stormwater concerns.

- A direct mailing about flood hazards and mitigation measures is sent each June to about 3,700 owners of properties that are impacted by mapped flood hazard areas.
- A direct mailing consisting of a letter and brochures about the NFIP goes to the 300 insurance agents, mortgage lenders, and real estate agents that do business in the County.
- GIS-based flood maps are used to respond to inquiries from homeowners, insurance companies, and lending institutions, about the location of properties and buildings with respect to the mapped floodplain.

#### **A.5.e. Flood Warning Activities**

Prince George's County recognizes that with approximately 3,800 buildings located in mapped Special Flood Hazard Areas scattered throughout the County, many are not subject to frequent or deep flooding and many will remain subject to some degree of flooding. In addition to the weather monitoring and notification activities of the Office of Homeland Security and Washington Suburban Sanitary Commission, DER has identified and implemented automated flood warning systems in three areas. Automated flood warning systems rely on a network of rain and stream gauges, and computer models, to monitor and predict conditions conducive to flooding.

#### **A.5.f. Flood-Prone Structures and Elevation Certificates**

Elevation certificates are prepared by surveyors and document the ground elevation, floor elevation, and other building characteristics. The County has approximately 760 certificates on file electronically and available to the public. Property owners may use certificates for flood insurance rating purposes and the County uses the detailed information to evaluate mitigation options. As funding permits, the County may collect additional elevation certificates.

#### **A.5.g. Residential Mitigation Activities**

The County's damage reduction program places considerable emphasis on mitigation of flood damage to residential properties. This emphasis is reflected in the criteria used to prioritize use of mitigation funds for acquisition and site modifications (floodwalls and grading). Interest in this program is typically generated after floods that cause damage. Since the mid-1980s, the County has accomplished numerous residential mitigation projects, such as the acquisition of flood-prone homes. Using combinations of County, State and federal funds, 75 homes have been acquired and the land dedicated to open space. During 2004, a FEMA grant was awarded to support acquisition of two homes. Since the 2010 hazard mitigation plan update, FEMA Hazard Mitigation Assistance program funds were used to acquire and demolish seven residential structures at high hazard due to the Piscataway Slope Failure which has been exacerbated during periods of heavy rain. The project cost was

\$2,689,500 and since the property lots are in perpetual greenspace easement there will be no further development on this high-risk site. Residential Floodproofing. Using County funds, measures to protect 62 homes have been constructed, primarily using site grading and flood walls around entrances.

### **[A.6. The Maryland-National Capital Park & Planning Commission \(Planning\)](#)**

The Maryland-National Capital Park and Planning Commission is a bi-county agency, created by the General Assembly of Maryland in 1927. The Commission's geographic authority extends to the great majority of Montgomery and Prince George's Counties. It has three major functions:

- The preparation, adoption, and, from time to time, amendment or extension of the General Plan for the physical development of The Maryland-Washington Regional District;
- The acquisition, development, operation, and maintenance of a public park system; and
- In Prince George's County only, the operation of the entire County public recreation program.

The Maryland-National Capital Park and Planning Commission's Planning Department is managed to help preserve and protect the County's resources by providing planning services and growth management guidance, and by facilitating effective intergovernmental and citizen involvement through education and technical assistance.

To fulfill its responsibilities, the Planning Department undertakes a wide range of planning activities and is responsible for certain reviews of development proposals. Because those activities are so extensive, **Section A.6.a** summarizes only the responsibilities of the two key offices involved in development review, and the role of the environmental planning and special project's sections in long-range planning. **Section A.7.b** highlights how natural hazards are recognized and addressed. **Section C** summarizes elements of the General Plan and the Green Infrastructure Plan that touch on natural hazards.

### **A.6.a. Development Review**

The Maryland-National Capital Park and Planning Commission's Planning Department has a significant role in the review of development proposals for compliance with certain requirements contained in the Zoning Ordinance and the Subdivision Ordinance). The divisions within the department that are mainly responsible for these reviews are the Development Review Division and the Countywide Planning Division.

The Development Review Division is responsible for assisting customers to comply with the Zoning Ordinance and Subdivision Regulations through a managed review process. While development is viewed as the economic engine of the County, protecting the integrity of neighborhoods is equally important. The Development Review Division encourages growth in a way that is sensitive to the needs and values of neighborhoods. The Development Review Division consists of five sections:

- **Zoning:** Processes zoning map amendments, special exceptions, variances, special permits, certification of nonconforming uses, departures from parking and loading schedules, parking lot and loading area design, landscaping, and sign standards. The Subdivision Section processes preliminary plans and final plats of subdivision; reservation and vacation plats; and premise addressing.
- **Urban Design Review:** Processes comprehensive and specific design plans, conceptual and detailed site plans, and applications for alternative compliance from the Landscape Manual.
- **Permit Review:** Reviews site plans submitted with grading, building, signs, and use permits for conformance with the requirements of the Zoning Ordinance. Review comments are provided to the applicant and the County Department of Environmental Resources, which is the agency responsible for the acceptance, processing, and issuance of permit applications.
- **Planning Information Services:** Provides assistance with planning and zoning information research for specific properties, within Prince George's County. Also provides Zoning Certification and general information requests.
- **Applications:** Provides assistance to citizens seeking information on pending development applications and to those filing zoning, subdivision, and urban design applications. This work unit assigns application numbers, reviews applications for completeness, advises applicants on

advanced notification and sign posting requirements, and maintains and facilitates access to the official application files.

The Countywide Planning Division consists of four sections that work together on countywide issues providing planning services and technical support to the Planning Department and other County, State and regional agencies: Environmental Planning, Historic Preservation, Special Projects and Research, and Transportation Planning. The sections that have a role in addressing hazards are:

- The Environmental Planning Section prepares an overall review of environmental conditions affecting the site, using information as submitted in the natural resource inventory (NRI), the tree conservation plans, and in-house GIS databases and aerial photographs.
- The Special Projects Section of the Countywide Planning Division provides environmental support for the long-range plans of the Community Planning Divisions.

## A.7. The Maryland-National Capital Park & Planning Commission (Parks)

The Maryland-National Capital Park and Planning Commission, Department of Parks & Recreation is charged with managing the public park and recreation system within Prince George's County. With more than 27,000 acres of parkland, the Commission strives to provide a balance between natural, undeveloped open space and land that is developed with recreational facilities and trails. The Maryland-National Capital Park and Planning Commission's improved properties include athletic fields and tennis courts, playgrounds, fitness trails, golf courses, outdoor pools, a trap and skeet range, an equestrian center, several lakes, ice rinks, an airport and miles of paved surface trails. Buildings include community center facilities, nature centers, many historic structures, house museums and sites, cultural arts facilities, Recreations Centers, multi-generation centers, a baseball stadium and the aviation museum in College Park.

### **A.7.a. Land Acquisition, Park Planning and Development**

The M-NCPCC Park Planning & Development Division (PP&D) within the Department of Parks and Recreation provides the planning, engineering, design, landscape plan development, and construction management functions involved in bringing new parks and recreation facilities to the public. Each year, the Division acquires about 100 to 300 acres of land through the Maryland-National Capital Park and Planning Commission capital improvement funding, grants, mandatory dedication (subdivisions), and surplus property programs. Design, engineering, and management of park construction oversight is the responsibility of the professional in-house staff comprised of planners, landscape architects, engineers, surveyors, architects and construction inspectors.

### **A.7.b. Existing Facilities and Weather-Related Hazards**

The Maryland-National Capital Park and Planning Commission monitors weather conditions and receives severe weather alerts from the Office of Homeland Security and the National Weather Service and the decisions of County Government regarding closures and delays are followed, except that programs for school children follow the notifications issued by the Prince George's County Public School System. Employees and constituents are advised to listen to local broadcasts for closures.

The Department of Parks and Recreation has a diverse force of maintenance personnel and equipment that allows it to deal with the effects of natural hazard events:



- For previous events, existing resources have been adequate to handle disaster recovery work. Maryland-National Capital Park and Planning Commission facilities have not experienced severe damage since Hurricane Agnes in 1972.
- Snow removal on Maryland-National Capital Park and Planning Commission's properties is a seasonal function. Additionally, the Maryland-National Capital Park and Planning Commission is part of the County's snow emergency plan and crews are designated to support snow removal on public streets. Priority is given to office buildings, community centers, and all operating and programmed facilities. Athletic fields, playgrounds, community and neighborhood parks are plowed after the programmed facilities are deemed accessible. Removal of tree debris from high winds or heavy snows is managed by in-house forces, either by chipping and spreading or disposal at the landfill. Sites are prioritized based on impacts. Area Operations staff are equipped with chain saws and tree removal gear and generally handle smaller, less complex tree and debris removals. Priority is given to blocked building entrances, sidewalks, access roads, and parking lots, followed by trails and woodland areas.
- Maintenance personnel are mobilized when major events are predicted. They are responsible for checking roof drains, securing buildings, and, if flooding is predicted, pulling docks at the Waterfront Park and Patuxent River sites.
- Mobilization of forces for preemptive maintenance is based on the predicted severity of an event, using up-to-date weather information.

## A.8. Department of Public Works & Transportation

The Prince George's County Department of Public Works and Transportation administers a comprehensive transportation system that includes local public transit services. The Department has the following duties:

- Designs, constructs and maintains county's transportation infrastructure inclusive of roads, bridges, sidewalks, curbs, gutters, and roadside drainage.
- Plans, installs and maintains streetlights, roadway regulatory signs, pavement markings and traffic management devices.
- Landscapes and maintains grassy areas and trees in public rights-of-way including litter collection, debris removal, mowing, tree trimming and emergency tree removal.
- Reviews and issues permits for site development projects that include site grading, construction of roadway infrastructure, stormwater management facilities, street lighting and landscaping, as well as inspects and approves all construction before release of permit to ensure compliance to the County Code.
- Maintains flood control facilities, including pumping stations and the storm drainage network.
- Administers the county's Capital Improvement Project Program regarding transportation infrastructure.
- Coordinates with the Maryland State Highway Administration (SHA) on the planning, design, construction and operation of state highways within the county.
- Oversees the county's public transportation system (TheBus, Call-A-Bus and Call-A-Cab) and coordinates regional public transit services (rail and bus) with the Washington Metropolitan Area Transit Authority.

- Administers and enforces the county's Critical Area, Sediment and Erosion Control and Stormwater Management programs.
- Coordinates with Maryland National Capital Park and Planning Commission on the planning and design of site development projects in the county.
- Evaluates and test construction materials used on Capital Improvement Projects and permitted construction sites.
- Coordinates with local Soil Conservation District on site grading when applicable.

### **A.8.a. Requirements for Roads and Drainage**

The Office of Engineering issues permits for site grading, stormwater management, roadway construction, utility construction within the rights-of-way or for construction within the Critical Area to those planning to develop a property or to perform work within the public right-of-way or on private property that will impact on the public road rights-of-way and/or the Chesapeake Bay area or its tributaries.

Requirements imposed through the permit process are intended to ensure that adequate and safe transportation infrastructure is constructed, effective sediment and erosion control is maintained, and requisite stormwater management design requirements are met. The Office of Engineering inspects all permitted construction projects throughout the construction period to ensure county code compliance.

The following detail additional hazard-related road and drainage requirements:

- **Flood-Resistance Requirements for Roads and Bridges:** In addition to meeting County requirements, road and bridge construction that impacts flood hazard areas or non-tidal wetlands must also be approved by the Maryland Department of the Environment. Bridges and culverts are expected to be stable during passage of the discharge equal to the 100-year flood. Design standards also include provisions for evaluating the potential for scour and providing appropriate protection against scour of abutments, piers, wing walls, and culvert inlets and outlets.
- **Unstable Soil Requirements:** Due to pothole and road damage from freezing and thawing cycles in areas with poor drainage (including Marlboro and Christiana clays), the Department determined it appropriate to mitigate damage by requiring deeper excavation, increased base thickness and additional underdrainage. Design requirements are found in the American Association of State Highway and Transportation Officials and State Highway Administration manuals and apply to roads improved by the county and those built by private developers.
- **Snow Load Requirements:** The American Association of State Highway and Transportation Officials bridge design criteria include accounting for anticipated snow load.

### **A.8.b. Road and Drainage Maintenance**

Prince George's County maintains more than 1,820 miles of roadways ranging from low-volume rural and secondary roads to high-volume primary collector and arterial roadways. The Office of Project Management is responsible for inspection and improvement of bridges and drainage channels. The inspection reports help identify required maintenance work and are used to prioritize projects.

The Office of Highway Maintenance provides roadway infrastructure, litter control, and stormwater management to all users in the County in order to ensure a safe and aesthetically pleasing transportation system. The work is undertaken by several specialized crews with a total of more than 140 crew members. Office of Highway Management is charged with roadway patching and surfacing; bridge maintenance; pipe repair and replacement; ditch and channel maintenance and inlet and drainage pipe cleaning; driveway aprons; sidewalk, curb and gutter maintenance; and stormwater management facility

maintenance. Additional responsibilities include snow and ice removal, maintaining street trees, and maintenance of various flood control facilities.

The inspection program is an important aspect of maintenance of the system. More than 2,400 service requests are received from County residents annually. Inspectors respond within three working days, unless an emergency is reported, in which case the response is immediate. After high water events, an inspection is performed to determine if maintenance and repairs are warranted. A 24-hour emergency on-call program covers emergency service requests, and flood control and pumping station responses.

### **A.8.c. Flood Control Facility Maintenance**

In the 1940s, the U.S. Army Corps of Engineers constructed the Anacostia Flood Control Project which includes more than three miles of levees (combined length along both sides of the Anacostia River). To manage drainage on the landward side of the levees, the Corps installed four pumping stations (Bladensburg, Colmar Manor, North Brentwood, and Edmonston). The Department operates and maintains pumping stations. Signals are transmitted when the pumps turn on automatically based on water levels. The Corps and the Department conduct an annual inspection of the levees, floodway channel and pumping stations. The Department is responsible for maintenance, including mowing, vegetation control, debris removal, and stabilization of erosion. The pumping stations receive quarterly and annual maintenance and testing of the electrical and mechanical equipment.

The U.S. Army Corps of Engineers constructed two other Flood Control Projects. The Upper Marlboro Flood Control project completed in 1964, which included approximately 1,950 linear feet of levee, 3,000 linear feet of channel improvements, 1,413 linear feet of new channels, and 4,430 linear feet of floodway clearing. The Forest Heights Flood Control project completed in 1964 included 4,160 linear feet of channel improvements, 2,250 linear feet of levee, and two drop structures. As with the Anacostia Project, the Corps and the Department conduct an annual inspection of the levee systems.

In addition to maintaining the Anacostia Flood Control Project, the County manages, and maintains several non-federal flood control projects:

- Sligo Creek Flood Control levee: built by the Washington Suburban Sanitary Commission in 1973.
- Northeast Branch Flood and Erosion Control Channelization (above East-West Highway): built by the Washington Suburban Sanitary Commission in 1976.
- Henson Creek Flood Control Levee and Channelization near Morningside: built by the Washington Suburban Sanitary Commission in 1972.
- Oxon Run Flood Control Levee near Green Valley Drive: built by the Washington Suburban Sanitary Commission in 1982.
- Oxon Run Tributary Floodwall: built by the County to protect homes and a school (completed 2004).
- Northeast Branch Flood Control Levee near Allison Street: built by the Washington Suburban Sanitary Commission.

### **A.8.d. Department of Public Works and Transportation Public Information**

The Department's webpage provides topical information to the public, which includes, but is not limited to: snow and ice conditions, traffic management, planned and ongoing Capital Improvement Program road improvements, street repairs, traffic signals, signs and markings, street light repair and installation, storm drainage and other services such as litter and debris removal. The site includes contact numbers for customer service requests, as well as a state-of-the-art traffic center information, and press releases

concerning emergency conditions, road closings, and outreach activities are posted. A section of the website is devoted to Frequently Asked Questions which features a specific section about storm drainage.

#### **A.8.e. Department of Public Works and Transportation and Natural Hazards**

Weather is an important influence on the County's road system and stormwater management facilities in terms of the physical infrastructure and how the County prepares for and responds to events. Weather is monitored through the local news media and the National Weather Service. Four weather-related conditions are influential to hazards: snow/ice; heavy rain/flooding; extreme heat; and coastal erosion.

### **A.9. Washington Suburban Sanitary Commission**

The Washington Suburban Sanitary Commission, a bi-county water and sewer agency, was established on May 1, 1918 to serve Montgomery County and Prince George's County. It is the eighth largest water and wastewater utilities in the country.

#### **A.9.a. Dam and Reservoir Operations**

Washington Suburban Sanitary Commission maintains its three dam reservoirs to comply with all federal and/or State requirements concerning the safety of the dam structures. The dams are periodically inspected and maintenance is performed regularly to assure safe functioning.

The T. Howard Duckett Dam located on the Patuxent River is rated as a "high hazard" dam because of the possible adverse incremental consequences that could result from the release of water due to failure of the dam or rainfall-runoff that exceeds design events in the watershed above the dam. Dams rated as "high hazard" are required by the Maryland Department of Natural Resources Dam Safety Division to be capable of safely passing the Probable Maximum Flood. At the time it was constructed in 1954 the Duckett Dam could pass the Probable Maximum Flood. Since that time the Probable Maximum Flood has been increased to 32 inches of rain in a 72-hour period. The statistical probability of such a storm is once every 10,000 years. The average annual rainfall in Central Maryland is 42 inches. The change to a more stringent requirement has resulted in Duckett Dam being deemed inadequate to safely pass this theoretical storm, mainly due to potential erosion of earth slopes and foundations. Due only to the dam's inability to safely pass such a storm, Maryland Department of Natural Resources characterized the dam as "unsafe" (such designation does not imply any imminent threat). Washington Suburban Sanitary Commission responded with a downstream slab scour protection project to allow the dam to safely pass the Probable Maximum Flood, which will remove the "unsafe" label from the dam. Construction was completed during 2012. An Emergency Response Plan, approved by the Maryland Department of the Environment, is coordinated with downstream jurisdictions.

The reservoirs are managed to optimize water supplies, not as a flood control system. Washington Suburban Sanitary Commission's operating protocols specifically address monitoring of weather conditions and management of water levels to minimize flood impacts when feasible. Water level is typically maintained with 3 feet of freeboard (corresponds to runoff from about 1 inch of rainfall in watershed). Water may be released from the reservoir if major runoff events are forecast. Under some release scenarios flooding occurs in the City of Laurel and other downstream areas in the County. Washington Suburban Sanitary Commission notifies city and county officials in advance of any releases that could cause flooding.

### **A.9.b. Construction of Water Supply & Sewer Lines**

Washington Suburban Sanitary Commission constructs about eighty miles of new (or replacement) water supply lines and eighty miles of new (or replacement) sewer lines annually. Developers install water and sewer lines to Washington Suburban Sanitary Commission specifications; Washington Suburban Sanitary Commission takes ownership if inspections during construction indicate compliance with Washington Suburban Sanitary Commission requirements. Construction in the waters of the State, including installation of utility lines under streams and floodplains, as well as activities that impact non-tidal wetlands, is required to satisfy State regulatory requirements administered by the Maryland Department of the Environment. Washington Suburban Sanitary Commission administers the delegated State sediment control program for all utility construction in Montgomery and Prince George's Counties.

### **A.9.c. Water Supply Adequacy and Drought Plans**

Washington Suburban Sanitary Commission has determined that water supplies on the Potomac River are "more than adequate" to meet current and future water needs (until 2030) of its service area (includes portions of Prince George's County and Montgomery County). Washington Suburban Sanitary Commission works with the Interstate Commission on the Potomac River Basin (ICPRB) Co-Op, a regional cooperative with the U.S. Army Corps of Engineers and Fairfax Water, monitoring all municipal and utility requests to withdraw additional waters from the Potomac River. The Interstate Commission on the Potomac River Basin prepares demand forecasts every five years to monitor the Washington metropolitan area's water needs with available flows.

In 2018, Washington Suburban Sanitary Commission participated in a drought exercise hosted by the Interstate Commission on the Potomac River Basin to test the mechanisms in the Potomac River Low Flow Allocation Agreement for allocating water during an extreme drought, and to explore the interactions between multiple drought management plans that encompass the Potomac River and the Washington Metropolitan Area. This exercise helped to address education and coordination needs, created momentum toward further improvement and preparation, and identified areas for improvement in drought response in the region.<sup>170</sup>

### **A.9.d. Washington Suburban Sanitary Commission and Natural Hazards**

The two filtration plants on high ground to distribute water are not subject to flooding, although large flooding events could damage water intake structures (Hurricane Agnes runoff raised the Patuxent River level downstream of the T. Howard Duckett Dam almost to the top of the Rocky Gorge raw water pumping station). Although the wastewater treatment plants are located in low areas to facilitate gravity flow, only small portions of the properties of the three plants located in Prince George's County are located within mapped flood hazard areas. The majority of critical plant infrastructure is above the 100-year flood elevation.

More than fifty sewage pumping stations are located throughout the bi-county region; several may be located within the mapped 100-year flood hazard area, but critical operating equipment is set on floors above the flood elevation in accordance with state design guidelines. None has been damaged by flooding. Nearly all pumping stations have dual feed power supply or emergency generators as back up during power failures, which can occur during storm events.

Urban streams experience erosion and course changes, which occasionally expose water and sewer lines and manholes; infrastructure protection measures for stream crossings are undertaken in compliance with State permit requirements. Some projects to stabilize erosion and restore streams have

<sup>170</sup> Policy Works LLC. 2018 Washington Metropolitan Area Drought Exercise. [https://www.potomacriver.org/wp-content/uploads/2019/03/DREX-Report\\_v4-for-distribution.pdf](https://www.potomacriver.org/wp-content/uploads/2019/03/DREX-Report_v4-for-distribution.pdf)

been undertaken, typically in association with major sewer construction projects that are aligned along watercourses.

## A.10. Department of Housing & Community Development

The Department of Housing and Community Development and the Housing Authority expands access to a broad range of quality housing by creating safe, well planned, attractive residential communities and enabling families to become self-sufficient and communities to become stable. Individuals and families with housing or community improvement needs are served. Special emphasis is given to low- and moderate-income people who live or work in the County. Department of Housing and Community Development carries out its mission through aggressive grant leveraging, creative financing, innovative planning, and productive partnerships with public, private and community-based organizations.

The Department's work is accomplished by two divisions and through two quasi-independent authorities:

- **Community Planning and Development Division:** Oversees and manages the Department of Housing and Urban Development planning and reporting documents and is responsible for coordinating and preparing the County's 5-year Consolidated Plans and Annual Action Plans for Housing and Community Development, and the Consolidated Annual Performance and Evaluation Reports. The Division is also responsible for oversight and management of the Federal programs: Community Development Block Grant (CDBG), Home Investment Partnerships Program (HOME), and Emergency Solutions Grants (ESG) funds, including the American Dream Down Payment Initiative (ADDI), CDBG Recovery (CDBG-R) and Homelessness Prevention and Rapid Re-housing Program (HPRP).
- **Rental Assistance Division:** Enables low-income families to rent from any landlord with Section 8 rental assistance.

## A.11. Homeland Security

The Prince George's County Office of Homeland Security develops and maintains comprehensive emergency management programs through planning with federal, State, local officials, and the private sector, to develop a coordinated safety and preparedness strategy. The objective of this office is to protect life, property, and the environment from the effects of natural and man-made disasters, including terrorist acts.

The Office of Homeland Security responds to natural hazard events by providing shelter for displaced persons and facilitates rapid restoration of normal conditions. The Office of Homeland Security also coordinates volunteer programs to assist staff with its responsibilities during emergency incidents and disasters. The Office of Homeland Security provides the following services:

- Provides effective and orderly governmental control and coordination of the County's emergency response to reduce the impact such events may have on Prince George's County residents.
- Prepares and maintains the County's comprehensive Emergency Response Plan providing emergency management planning for the entire County.
- Provides Prince George's County residents, businesses, and non-profit organizations with emergency preparedness education and training necessary to reduce loss of life, minimize property damage, and protect the environment from emergencies and disasters regardless of cause.

- Serves as the liaison and coordinator of State/Federal financial assistance for municipalities and County residents following County declared disasters.
- Staffs and operates the Emergency Operations Center, which is the County's command post during serious incidents and severe weather occurrences.
- Serves as the liaison to the Maryland Department of Emergency Management and other local emergency management agencies and organizations.
- Coordinates the activities of volunteer, public and private agencies in all phases of emergency management (Preparedness, Response, Recovery, and Mitigation).
- Develops plans and exercises, and coordinates emergency management training for Prince George's County.
- Assures timely and adequate public warning of potential or imminent disaster events and provides disaster-related safety information to the public and media.
- Assists Municipalities, County, State, and Federal officials and their respective constituents with disaster preparedness, response, mitigation, and recovery programs.
- Provides the public and media organizations with accurate and timely information regarding emergency management programs and issues in Prince George's County.

The Office of Homeland Security routinely monitors weather conditions and forecasts reported by the National Weather Service and commercial television. When conditions warrant, the National Weather Service directly contacts the County and conference calls are conducted with neighboring counties and the State.

The Office of Homeland Security features a Preparedness Center on their website. This site has general preparedness resources, emergency preparedness guides, and information about natural hazards that impact the County. One of the preparedness resources is a Family Preparedness Guide, which has been published in both English and Spanish.

The County's Emergency Operations Center has cooling centers located throughout the County. These centers offer a cooling area with seating any time temperatures reach 90 degrees or higher. Residents can locate these centers on the map, shown in **Figure 91** or learn more information about cooling centers by calling 3-1-1.

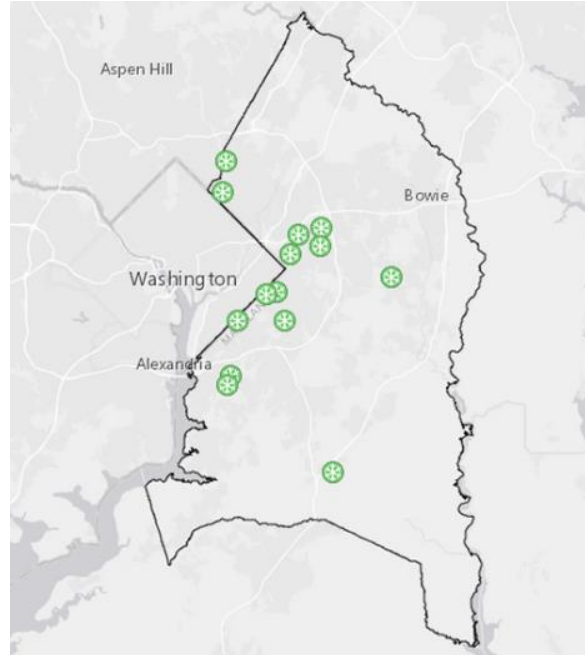


Figure 91: Cooling Centers in Prince George's County

## A.12. Office of Central Services

The Office of Central Services administers centralized support services for the County, including facilities operation and management, contract administration and procurement, fleet management, real estate, construction, and administrative services.

The Facilities Operation & Management Division is responsible for the maintenance of county-owned and leased facilities. The Division oversees the operation of more than 100 County occupied buildings, including fire and police stations, County and State Court Houses, a child day care center, and the County's Correctional Facility. Facilities Operation & Management is also responsible for the overall management direction of the County's vertical construction program.

All work on County buildings, including construction of new buildings, work inside existing buildings, and additions to existing buildings, must comply with the Prince George's County Building Code and all other County requirements. Building permits are obtained and DER conducts inspections during construction.

The County is self-insured. During the past five years, county-owned buildings have not sustained significant damage due to lightning, wind, rain, snow/ice, or hail. County-owned buildings did sustain damage after Tropical Depression Lee in 2011 which resulted in construction of a floodwall to protect the County Administration Building in Upper Marlboro.

### A.12.a. Prince George's County Public Schools

As outlined in the Quality Schools Program Strategic Plan, the School System faces opportunities and challenges as it pursues its mission to serve the education needs of the

County's citizens. The Prince George's County Public Schools functions as an agency of the State Department of Education. The operating budget is funded by the Prince George's County Government; the capital budget is funded by both State and County funds.



The Prince George's County Public Schools owns its inventory of buildings. The Department of Planning and Architectural Services is responsible for the capital improvement program, including acquisition of land for new facilities, planning renovations and additions to existing facilities, and disposal of surplus property. The Prince George's County Public Schools is self-insured for property damage.

### **A.12.b. Fire/Emergency Medical Services**

The Fire/Emergency Medical Services Department is responsible for fire suppression, emergency medical services, fire prevention, fire and rescue communications, research, training and the coordination of the volunteer fire companies. In addition to responding to structural fires, the Department is responsible for coordinating the County's response to hazardous materials incidents and wildfires, as follows:

- **Hazardous Materials:** The Fire/EMA Department maintains the County's hazardous materials response plan and coordinates the Local Emergency Preparedness Committee, a federally mandated organization that operates under "community right to know" rules established by the federal government, primarily focusing on public awareness and hazardous materials. A database of the physical locations of certain hazardous materials as reported in the Tier II reports required by the U.S. Environmental Protection Agency is maintained. Hazardous materials incidents are largely associated with transportation of materials.
- **Forest & Brush Fire:** At the state level, response to forest and brush fires is coordinated by the Maryland Forest Service, which also operates the Statewide Fire Monitoring System to collect fire weather data and determine fire danger ratings. Some department personnel are trained in wildland fire suppression.

## **A.13. Department of Family Services**

The Department of Family Services ensures the development and provision of a comprehensive, responsible and effective community-based human service delivery system that enhances the quality of life for individuals and families of Prince George's County.

The Department's has seven Family Services Committees that are directly involved with citizens, many with special needs and vulnerabilities. Each of the committees has an affiliated agency which ensures that goals and objectives that are set by committees are met to support the County's vulnerable citizens. The seven committees are:

- Aging Advisory Committee
- Commission for Children, Youth and Families
- Commission for Individuals with Disabilities
- Commission for Veterans
- Commission for Women
- Social Services Board
- Commission on Fathers Men and Boys

The Department of Family Services activates outreach to its constituencies when extreme heat or prolonged cold spells may threaten health and safety.

## B. City of Laurel Capability Assessment

The City of Laurel uses Maryland city management programs, policies and procedures outlined in a series of City Council Ordinances.

### B.1. City Government Overview

The City of Laurel, Maryland is governed by a Mayor and City Council form of government in accordance with its Charter, adopted on April 4, 1870. The elected officials consist of the Mayor, serving a four-year term, and five Council members who serve two-year terms. The Mayor and City Council provide community leadership, develop policies to guide the City in delivering services and achieving community goals, and encourage citizen awareness and involvement:

- **Office of the Mayor:** The Mayor is the Chief Executive of the City with all the powers necessary to secure the enforcement of all ordinances and resolutions passed by the City Council. As the leading elected official of the City, the Mayor is empowered to approve or veto legislation, prepare the annual budget, and directly supervise the administration of the City. The Mayor has authority to declare emergencies and has broad emergency powers during a declared emergency.
- **City Council:** The City Council, as the legislative body of the City of Laurel, appropriates funds, considers and enacts resolutions, and adopts regulations and ordinances for the protection of rights and privileges, peace and good government, and safety and health of all citizens.

The key elements of the City's organization engaged in planning for, responding to and mitigating natural hazard events as well as regulating land development are:

- **City Administrator:** The City Administrator carries out the charges of the Mayor and City Council through day-to-day management, support, and oversight of all City departments and functions.
- **Police Department.** The Laurel Police Department is a full-service law enforcement agency. In addition to its law enforcement responsibilities, the department works with the Emergency Manager to alert citizens to pending flooding. Police officers have the authority to provide control during situations that may create threats to life and property.
- **Economic and Community Development:** The Department of Economic and Community Development maintains and oversees the built environment within the City of Laurel. The department is responsible for zoning compliance, subdivisions, development and historic preservation review, economic development, affordable housing and implementation of the City's Master Plan. These activities are intended to improve the quality of life in the City. The City's zoning authority is independent of Prince George's County. Article IV, Division 1 of the City's Unified Land Development Code outlines the Floodplain Management Regulations.
- **Public Works:** Public Works provides engineering planning, design, and construction administration for street rehabilitation and construction projects on City property. Technical support is provided to other City departments. It conducts engineering review of plats and plans for subdivisions and site plans for single lot developments. To assure compliance with City requirements, subdivision improvements are inspected during construction. The department maintains record drawings of construction improvements and topographic maps, develops and implements the Capital Improvement Program (CIP).

- **Budget and Personnel Services:** The Department administers all of the financial activities of the City government, administration of all employee benefits and advises and assesses the City management staff in all other personnel matters.
- **Parks and Recreation:** Parks and Recreation maintains the City's 21 park and recreation facilities and approximately 288 acres of parkland and associated equipment. It is responsible for developing and implementing recreational programs. During times of emergency the department is responsible for opening shelters and procuring food. The City's two shelters have been certified by the American Red Cross (and both are outside the mapped floodplain).
- **Emergency Management:** The Emergency Manager (EM) is the City's designated official responsible for managing the Emergency Operations Center (EOC) during activations to support the Incident Commander responding to and mitigating all hazard emergency incidents. The EM is responsible to identify, develop, and implement rules, regulations, and policies regarding the preparedness, mitigation, response, and recovery from disasters within the City boundaries. During normal operations the EM works for the Emergency Services Director and coordinates closely with the City Administrator. However, during emergency activations the EM works directly for the Mayor and coordinates with the Emergency Services Director and the City Administrator to ensure the management of resources during these incidents. Additionally, the EM is the City's designated Floodplain Manager who works closely with and coordinates with the Department of Economic & Community Development on all floodplain issues within the City of Laurel.
- **Emergency Services Department:** The Department of Emergency Services (ES) reports to the City Administrator's Office and the Deputy City Administrator is the Director of Emergency Services. The department coordinates activities associated with the Laurel Police Department and the two fire service departments within the City (Laurel Volunteer Fire Department & Laurel Volunteer Rescue Squad) regarding providing emergency services to the citizens of Laurel. The Emergency Services Department provides guidance and leadership to the Emergency Operations Center's Policy Room during emergency activations and major incidents within the City. Additionally, the Emergency Services Department coordinates the activities of the Emergency Manager and all associated programs within the emergency management field.

## B.2. City of Laurel Master Plan

The City of Laurel strives to maintain a high quality of life for its citizens through the regulation of land uses and the protection of natural resources. The City approved a Comprehensive Master Plan in 1961 and subsequent Master Plans in 1974, 1989, 1997, and 2008, amended September 28, 2009 by City Ordinance Number 1647. The most recent City Master Plan was adopted by City Council through Ordinance Number 1873 on September 26, 2016. The Master Plan is kept on file and available for inspection at the office of the clerk to the city council and is available online.

## B.3. Development Controls

The Unified Land Development Code was adopted on September 26, 2016 with the Master Plan through Ordinance Number 1877. Various governmental functions related to land use, development and re-development are administered through this code and amendments, as outlined in the sections below.

### **B.3.a. Sectional Map Amendment**

The City has adopted the Sectional Map Amendment which coordinated the City Zoning Map with the proposed Land Use Categories approved in the Master Plan Comprehensive Land Use Plan Map. The Sectional Map Amendment was enacted to bring zoning in compliance with the Master Plan. Approval of any future Zoning Map amendments will be predicated upon findings as stipulated in Land Use, Division I. Single- Jurisdiction Planning and Zoning, Maryland Land Use Code Annotated (2014) as may be amended.

### **B.3.b. Comprehensive Land Use Map**

As in the previous master plans, a study area outside the City's corporate limits is considered. General land use proposals are made for those areas surrounding the City which are integral to the functioning of the City. Development on the boundaries of the City has and will continue to have an impact on the City in terms of the quality of life and the ability to deliver services to City residents. Land use recommendations are made in anticipation of future development.

### **B.3.c. Zoning Regulations**

The City Zoning Regulations, contained within the Unified Land Development Code, chapter 20 of the Laurel City Code, is a major tool which implements the goals and objectives of the Master Plan. Within the Code are the specific regulations that detail permitted uses and the location of buildings in relation to the land. The City of Laurel pursuant to the authority vested in it by Title I – V inclusive, of Article 66(B), as amended, of the annotated Code of Maryland (1957 Edition) adopted City Ordinance Number 427 on January 9, 1961 creating and establishing regulations dividing the City into districts or zones for zoning purposes.

The City of Laurel Land Development Code provides for twenty-three individual zoning districts organized into five general zoning classifications: residential, commercial, office, industrial and planned development. The Code also provides for revitalization, neo-traditional, mixed use, transit-oriented and arts & entertainment overlay areas to supplement the “by right” development options available within the five zoning classifications.

### **B.3.d. Subdivision Regulations**

Subdivision regulations provide for orderly growth and well- planned development by setting standards for the uniform control of development which involves the subdivision of land into more than one parcel. Subdivision regulations should encourage a desirable relationship of subdivision design to the general physical characteristics of an area and also encourage preservation of natural attributes to foster compatibility of development with the natural character of the land. Subdivision regulations should also provide standards for density, open space, suitable building space, and vehicular and pedestrian traffic. Requirements for the provision of potable water, sanitary sewer, stormwater drainage, and other utility systems are established within these regulations. Other factors, such as the limitations on development created by steep slopes, soils type(s), and flood plains are also contained in the Subdivision Regulations.

The City of Laurel pursuant to the authority and provisions of Titles I – IV, inclusive, of Article 66(B) of the Annotated Code of Maryland (1968 Edition, as amended) and pursuant to the authority and provisions of the Charter of the Mayor and City Council of Laurel adopted City Ordinance Number 476 on April 14, 1969 establishing subdivision regulations governing procedures for approving preliminary plans and final plats, design standards for streets, alleys, easements, blocks, lots, public sites and open spaces, required improvements of paving, stormwater drainage, potable water supply, and sanitary sewers. These regulations have been updated frequently; most recently through the On December 23, 1974 the Mayor

and City Council adopted City Ordinance Number 525, a comprehensive amendment to the City Subdivision Regulations. The Regulations have been amended, as necessary, to comply with State regulations and subsequently adopted Master Plans.

### **B.3.e. Historic Districts**

On November 10, 1975 the Mayor and City Council adopted City Ordinance Number 535 creating the City of Laurel Historic District Commission. In May 1978 Historic Districts Number 1, 2 and 3 officially recognized in order to safeguard the heritage and atmosphere of the older sections of the City. Historic District Number 4 was established in May 1979, District 5 in May 1980, District 6 in July 1981 and District 7 in September 1983. In accordance with the powers afforded under Article 66(B) of the Annotated Code of Maryland, the Historic District Commission, through the Building Permits process, oversees all construction, improvements, and requested demolitions within the seven (7) Historic Districts. Decisions made by the Commission are based on a Historic District Design Guidelines meant to ensure the retention of Laurel's historic structures. As a part of this program the City also offers a tax credit program to encourage public participation.

### **B.3.f. Housing-Property Maintenance Code**

A property maintenance code governs the maintenance of existing residential structures and all existing premises and constitute minimum requirements and standards for premises, structures, equipment and facilities for light, ventilation, space, heating, sanitation, protection from the elements, life safety, safety from fire and other hazards, and for safe and sanitary maintenance.

In September 1977, the Mayor and City Council adopted a Housing-Property Maintenance Code for single-family and multi-family dwellings within the City that established minimum standards governing the condition and maintenance of dwellings, multi-family dwellings and dwelling units. The City of Laurel adopted the Prince George's County Housing Code in August 1983 and made a concentrated effort of enforcement through a residential rental licensing process.

The rental licensing program is a program that sets minimum property maintenance standards that must be met by all rental property owners. This includes multi-family, single-family detached, townhouse, duplex, condominium, apartment units above or below businesses and individual rooms rented out. All rental units are re-inspected every three (3) years. This program is effective in maintaining a higher level of quality and safety among rental dwellings.

The Mayor and City Council subsequently adopted the Building Officials and Code Administrators International, Inc. 1990 Edition of the National Property Maintenance Code in November 1993, the 1998 Edition in February 1999, the 2006 Edition in April 2009. The International Code Council (ICC) 2012 Edition of the International Property Maintenance Code was adopted in July 2012, the 2015 Edition in April 2015, and the 2018 Edition in 2021.

### **B.3.g. Building Code**

A Building Code regulates the construction of buildings and structures. The purpose of the Code is to establish the minimum requirements to safeguard the public health, safety and general welfare through structural strength, stability, sanitation, adequate light and ventilation, energy conservation, and safety to life and property from fire and other hazards.

The Mayor and City Council of Laurel adopted a Building Code in July 1954 to regulate the design, construction, alteration, repair, equipment use, location, occupancy, maintenance, demolition and removal of buildings and structures. The City has over time amended and reorganized the provisions of the Building Code to keep-up-to-date with the latest edition of the International Building Code. The Mayor

and City Council adopted the International Code Council International Building Code, 2018 Edition in July 2021. The building codes include provisions to ensure that buildings are designed and constructed to resist certain environmental loads. The minimum design must account for loads associated with a basic wind speed (3-second gust) of 115 miles per hour. The minimum snow load for roof design is 30 pounds per square foot.

### **B.3.h. Floodplain Management**

Tropical Storm Agnes in June 1972 generated the flood of record in Laurel where Washington Suburban Sanitary Commission measured high water marks that indicated the recurrence interval of the event was slightly greater than the 1 percent-annual-chance flood (100 years). This event continues to influence the City's approach to floodplain management and public safety 45 years later.

The most significant natural hazard that impacts Laurel is flooding, particularly flooding of the Patuxent River, which is shown in the 100-year floodplain in **Figure 92**. A large water supply dam that is owned and operated by the Washington Suburban Sanitary Commission is located immediately upstream of I-95 above the City. Three Patuxent tributaries flow through the City: Walker, Crow and Bear Branches.

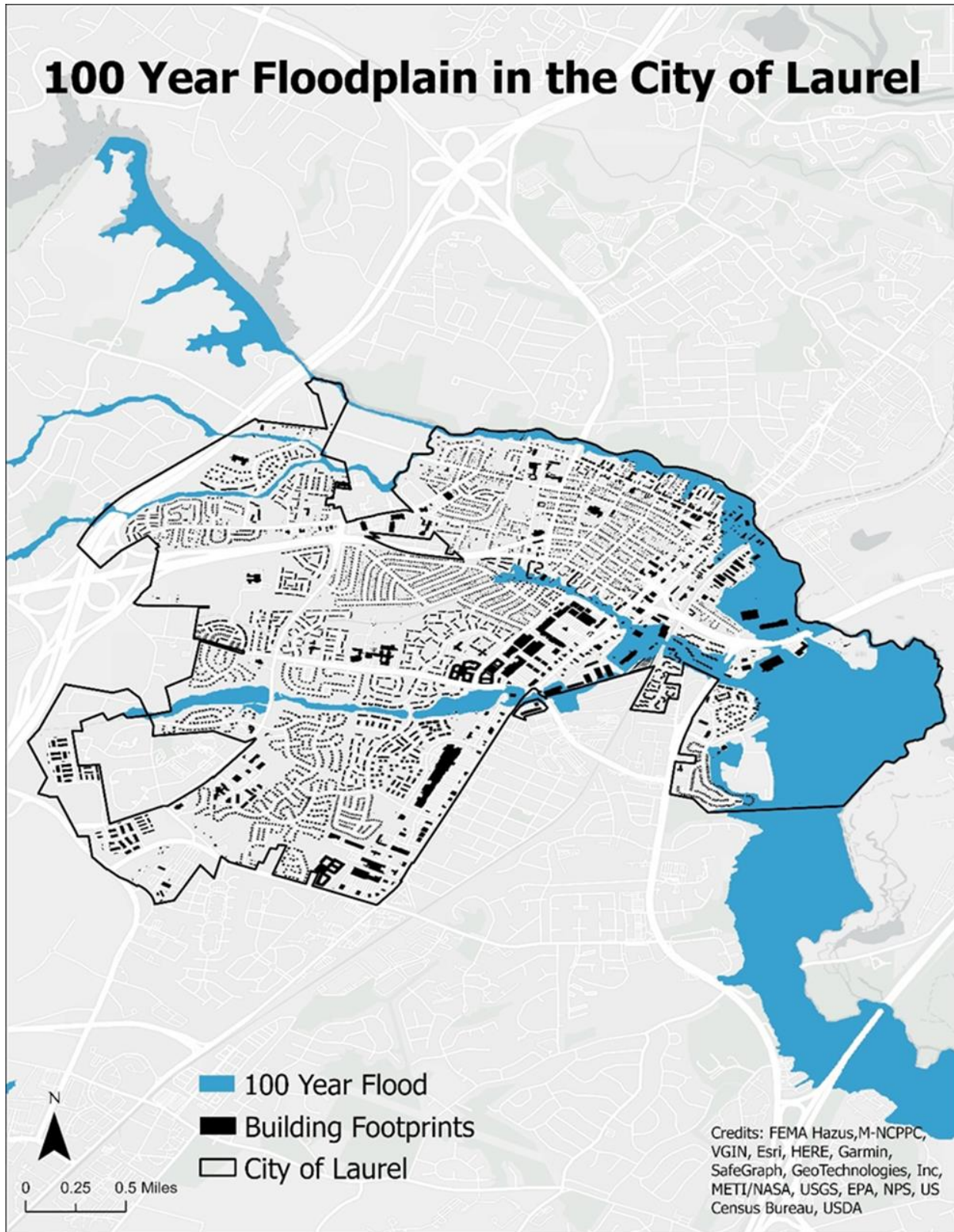


Figure 92. City of Laurel 100-Year Floodplain

Laurel has two distinct types of flood risk. The more probable risk is riverine flooding due to prolonged rainfall that causes waterways to overflow their banks and which may prompt Washington Suburban Sanitary Commission to open floodgates. Although failure of the dam is extremely unlikely, the consequences associated with dam breach have been examined. Due to the City's proximity to the dam, City officials are in regular communications with Washington Suburban Sanitary Commission and participate in periodic exercises of the emergency plan and notification procedures.

### ***B.3.h.1. National Flood Insurance Program***

The City of Laurel does not have any properties that are designated by FEMA as "repetitive loss properties" (insured by the NFIP and have received two or more flood insurance claims of at least \$1,000) or "severe repetitive loss properties" but continues to monitor property status annually. The City adopted new flood insurance rate maps, the Special Flood Hazard Area and a new, updated floodplain management ordinance, which is Article IV of the Unified Land Development Guide on September 16, 2016 through City Ordinance 1868. As with all city ordinances, the Floodplain Management Ordinance is accessible online.

The City of Laurel entered the CRS on April 1, 2022, and the current effective date for the program is April 1, 2022. The NFIP CRS is a voluntary incentive program that recognizes and encourages community floodplain management activities that exceed the minimum NFIP requirements. As a result, flood insurance premium rates are discounted to reflect the reduced flood risks. The City's class is ranked as 7, which gives a 15% premium discount to properties in the Special Flood Hazard Area, or regulated floodplain, and 5% premium discount for non-Special Flood Hazard Area properties.<sup>171</sup>

### ***B.3.h.2. Ordinances and Regulations***

The City of Laurel administers regulations and ordinances to regulate flood hazard areas to minimize exposure of people and property. Administration of the floodplain management ordinance is the joint responsibility of the City's Floodplain Manager (Director of Economic and Community Development) with assistance from the Emergency Manager. They are, therefore, also responsible for enforcing the substantial damage provisions in the ordinance after a hazard event. This includes ensuring that repair or improvement to substantially damaged structures in any flood hazard area does not happen without a permit obtained from the City.

#### **Substantial Damage**

Damage of any origin sustained by a building or structure whereby the cost of restoring the building or structure to its before damaged condition would equal or exceed fifty (50) percent of the market value of the building or structure before the damage occurred. Also used as "substantially damaged" structures.

The current Flood Insurance Rate Map (Panel #240053 0001E, revised 9/16/16) is used as the minimum flood hazard area within which development must conform to floodplain management regulations in the City of Laurel. If a floodplain has not been delineated, the City can require applicants to provide a survey that evaluates and defines the flood hazard area. All proposals for work in flood hazard areas are subject to the requirements of the Maryland Department of the Environment. The City requires applicants to obtain all State permits prior to issuing the local permit.

<sup>171</sup> FEMA. n.d. "Community Status Book Report- Maryland"



The City's standard procedure for determining the extent of the mapped flood hazard area through ground-truthing is to measure off of the centerline of the waterway shown on the flood hazard map and apply that distance to the applicant's site plan. In areas where Base Flood Elevations are shown, there is no cross check with the topography and the flood zone is superimposed on the site plan. For individual building permits issued for single lot development, the City requires owners to submit an Elevation Certificate to document compliance before the Use and Occupancy Permits are issued.

The Subdivision Regulations of the City of Laurel outline the requirements for the design, review and approval of subdivisions. The City expressly restricts the subdivision for development of any real property which lies within the fifty-year floodplain of any streams or drainage courses. Preliminary plans (plat plans) are required to show waterways, drainage structures, and flood elevations and boundaries of flood-prone areas (including floodways). Where a proposed subdivision includes a floodplain area and the area is to be left in open space, the area is placed in a floodplain easement or made available for public park or recreation uses. Areas under a floodplain easement may be used for utility lines or storm drainage facilities.

In approved subdivisions that include floodplain areas, development permits are not issued for any type of new construction within the area delineated as floodplain. Platted lots may include flood hazard areas (or other areas deemed to be "unsafe land") provided proposed building sites meet zoning setbacks, 100-foot setback from the edge of a watercourse shown on the flood insurance rate map plus an additional 25-foot setback from the floodplain. If the proposal includes fills or other structure elevating techniques, levees, channel modifications, or other methods to overcome flood or erosion-related hazards, they must be designed in compliance with the City's flood hazard prevention requirements.

Applicants for work on existing buildings are required to submit the value of work proposed. For work on floodplain buildings, that value is compared to the assessed value as a screening for whether the proposed work constitutes a substantial improvement (50 percent or more of market value). Every application for renovation, improvement, or repair of existing buildings is checked to determine if the building is located in the mapped flood hazard areas. The City's Floodplain Manager or an authorized designee must review and sign-off on any permits for work on existing flood-prone buildings.

For the rehabilitation of structures within the floodplain, the City requires mitigation efforts where possible. Most structures already in the floodplain are slab-on-grade. Elevation Certificates are required before any permits are issued to insure that, in as much as possible, that floor elevation changes are such that the grade of the finished first floor is above the floodplain elevation and that all electrical outlets are at least 1.5 feet above the flood elevation.

The Maryland Department of the Environment periodically conducts a compliance audit of the City's floodplain permitting and review activities. The City has consistently been found in compliance since 1978 (confirmed by the most recent visit was December 21, 2010), when the City began participation in the NFIP. The most recent Community Assistance Visits for the City of Laurel in November 2020 and June 2021 found Laurel's administration of their floodplain management program to be in good standing.

#### **B.4. Fiscal Programming**

The Capital Improvement Program is a fiscal plan, or a schedule, for financing public improvements over a period of time. The schedule balances the City's need for public improvement with its ability to finance improvements. It spreads the improvements over a six (6) year period in order to stabilize expenditures and to avoid sharp fluctuations in ad valorem tax rates. With capital programming it is possible to reconcile major improvements with financial resources.

The Capital Improvement Program is developed using the general guidelines outlined in the Master Plan. These guidelines for growth and development help City officials to anticipate the need for public improvements by approximating the period by which facilities must be in place and by determining the type of facility needed. The plan, in delineating future development and population levels which are based on phasing considerations, presents the factors which influence the demand or need for future public facilities and other capital expenditures and the general framework required for capital expenditure.

The City Capital Improvement Program is updated annually to provide a continuous plan for the scheduling of major capital expenditures and for formulating the annual City budget.

Annual revisions include the addition of a capital budget to fund projects in the next fiscal year. As the Capital Improvement Program is updated, proposed improvements are reviewed against Master Plan goals and objectives to insure consistency. The budget proposed for Fiscal Year 2023 is \$11,942,563 in new project funding; and \$14,183,286 requested for reauthorization. The Capital Improvements Program budget for Fiscal Year 2023 includes \$2,052,741 for hazard mitigation.

## B.5. Code Adoption

On July 26, 2021, The City approved Ordinance 18-46, which officially adopted the following Codes:

- The International Building Code, 2018 Edition. (Ref: COMAR 05.02.07)
- State of Maryland Fire Prevention Code, 2018 Edition.
- The International Residential Code for One and Two-Family Dwellings, 2018 Edition. (Ref. COMAR 05.02.07)
- The International Mechanical Code, 2018 Edition. (Ref: COMAR 05.02.07)
- The International Existing Building Code, 2018 Edition. (Ref: COMAR 05.16)
- The Maryland Accessibility Code.(Ref: COMAR 05.02.02)
- The International Energy Conservation Code, 2018 Edition (hereinafter referred to as the "Energy Code"). (Ref. COMAR 05.02.07)
- International Swimming Pool and Spa Code, 2018 Edition.
- The National Electrical Code, 2017 Edition. (Ref: COMAR 05.02.07)
- National Fire Protection Association, NFPA Codes, 2018 Edition.
- The International Property Maintenance Code (IPMC), 2018 Edition. (Ref: COMAR 05.02.01)
- The National Electrical Code, 2017 Edition. (Ref: COMAR 05.02.07)

## B.6. Communicating with Citizens

The City of Laurel actively communicates with its residents using a variety of media, each of which can be used to convey information about preparing for and responding to natural hazards:

- The monthly newsletter, MayorGram, is posted on the City's web page, emailed to all residents and businesses that sign up for it, and is available in hardcopy at all City facilities. The newsletter reports on City activities and progress on various initiatives, and informs readers about upcoming activities and events. It is available to convey information important to the residents relating to hazard and how to mitigate the effects. Content related to flooding and flood safety has been addressed.

- Several documents related to preparing for disasters and emergencies can be downloaded from City's web page, including brochures specific to tornadoes, winter storms, heat waves, and hurricanes (also in Spanish).
- The City's regulations are accessible through the web page and public access to GIS maps is provided through the Prince George's County's and the Maryland-National Capital Parks and Planning Commission's online applications and web viewers.
- The Streets & Drainage page on the County's web site includes answers to typical questions posed by citizens.
- The local government public access video channel is accessible to residents who subscribe to cable and internet providers and through the City's streaming video link ([www.laurel.md.us/streaming](http://www.laurel.md.us/streaming)). Mayor and City Council meetings, other public meetings and critical watches, warnings and mitigation efforts are shown on this channel.
- After major flooding, the City posts information on the public access video channel, including information about the City's post-disaster permitting requirements.
- Local AM/FM radio station broadcasts emergency information on an as-needed basis (AM 600, 630, 980, 1090, 1500 and FM 88.1, 95.5, 103.5).
- Door hangers, email, telephonic messages and targeted direct mailings have been used after floods to inform people of their post-flood responsibilities; the contact/ mailing list is considered to be comprehensive, including addresses in the floodplain and other homes that have flooded.
- City Emergency Response staff offer briefings to residential associations and business groups to improve awareness of natural and man-made hazards.

## B.7. Natural Resources

The City of Laurel values its open space and encourages protection of trees and wetlands in its development processes. Activities proposed within wetland areas must be approved by the Maryland Department of the Environment under state statute and by the U.S. Army Corps of Engineers under the authority of Section 404 of the Clean Water Act.

The following describe the City's ordinances related to open space and forest conservation:

- **Open Space** – Open Space is addressed in the City's Subdivision Ordinance (Sections 15-7 and 15-8). The City may require up to 10 percent of gross area or water frontage for park, school or recreational purposes. The location of set-aside areas are to be approved by the Parks and Recreation Director using a ratio of one acre of park for every 100 dwelling units. Areas must be appropriate in area, shape and terrain for intended park uses. City may elect to accept a fee as alternate to dedication, in whole or in part, to maximize accessible locations.
- **Forest Conservation (Ordinance No. 1079)** – In 1992, the Mayor and City Council adopted the Forest Conservation ordinance to comply with State requirements. Applications for subdivisions and plan approvals, site plan approvals, development plan approvals, grading permits or sediment control permits for an area of land of forty thousand (40,000) square feet or greater shall submit a forest stand delineation and a forest conservation plan. Methods to protect delineated forest stands and trees during construction shall be accomplished using methods approved by the department, as provided in the Forest Conservation Technical Manual. The City submits Forest Stand Delineations and Forest Conservation Plans to the Maryland Department of Natural Resources for review of all development proposals.

## B.8. Ongoing & Previous Mitigation Initiatives

This section highlights Laurel's activities and programs that reduce the impact of natural hazards.

**Section C** summarizes measures described in other sections for reference.

- **Revised Flood Insurance Rate Maps.** Engineering studies to revise the floodplain maps resulted in revised Flood Insurance Rate Maps which were reviewed during a lengthy public review process during 2015 and 2016. The maps were formally adopted by the City Council on September 16, 2016. The revised maps show somewhat higher flood elevations than shown on the previous Flood Insurance Rate Map.
- **Property Mitigation.** Flood prone properties are identified during the hazard mitigation planning cycle. Three properties were identified last time: one has been acquired and demolished and mitigation solutions are being sought for the others. As mentioned previously, priority mitigation projects have been identified by the City's consultant and a pathway for funding is being explored.
- **Stormwater Management.** Working with The Maryland Department of Environmental Resources and Prince George's County Department of Environment the City will attempt to alleviate several concerns relating to stormwater runoff that affects several residential areas that are outside of the floodplain as shown on the FEMA map. Stormwater management for the City is administered through the Prince George's County Department of Environment.
- **Drainage Maintenance.** Prince George's County is responsible for public drainage infrastructure in the City. However, due to its proximity to the Patuxent River, the City recognizes the critical importance of adequate drainage and biannual inspections of storm drains and cleans inlets to reduce blockage.
- **Insurance for Public Buildings.** The City maintains property insurance coverage on its buildings to cover damage due to structural fire, wind and lightning and flood. Three NFIP flood insurance policies are in effect for buildings that form the Laurel Municipal Swimming Pool which is in the floodplain of the Patuxent River.

## C. Summary of Existing Mitigation Activities

**Table 127** highlights measures and programs in Prince George’s County and the City of Laurel governments that reduce the impact of natural hazards.

*Table 127. Summary of County and City activities that reduce hazard impacts*

Hazard	Activities
<b>Prince George’s County</b>	
<b>Flood</b>	<ul style="list-style-type: none"> <li>• Department of Environment provides online/handout information to inquirers; site-specific flood hazard information, advice on flood insurance and measures to minimize damage</li> <li>• Department booth at festivals includes flood mitigation and safety materials</li> <li>• June is Flood Hazard Awareness Month</li> <li>• Master Plan sets forth policies to preserve environmental features (Maryland-National Capital Park and Planning Commission; Department of Environment)</li> <li>• Zoning Ordinance includes Chesapeake Bay Critical Area Overlay Zone (Maryland-National Capital Park and Planning Commission; Department of Environment)</li> <li>• Green Infrastructure Plan calls for conservation of natural areas, including flood hazard areas (Maryland-National Capital Park and Planning Commission; Department of Environment)</li> <li>• Developers required to delineate flood hazard areas and wetlands as part of subdivision review layouts and building permits (Maryland-National Capital Park and Planning Commission; Department of Environment)</li> <li>• Flood hazard area protection and damage-resistant measures imposed through subdivision regulations and floodplain management code requirements (Maryland-National Capital Park and Planning Commission; Department of Environment)</li> <li>• County participates in the NFIP’s CRS (Department of Environment)</li> <li>• Management of increased stormwater runoff required as part of new development (Department of Environment; Department of Public Works and Transportation)</li> <li>• Department of Environment identifies, designs and implements structural and nonstructural projects to reduce flood damage</li> <li>• Department of Environment and Office of Homeland Security operate flood-threat recognition and warning capabilities</li> <li>• Department of Public Works and Transportation and State standards minimize flood risks and damage for roads, bridges and culverts</li> <li>• Department of Public Works and Transportation operates flood control pump stations</li> <li>• Department of Public Works and Transportation inspects drainage ways, maintains channels and levees</li> <li>• County and U.S. Army Corps of Engineers in discussions regarding maintenance and upgrades of the Anacostia River levees</li> <li>• Washington Suburban Sanitary Commission monitors weather and predicted storm activity to manage reservoirs</li> <li>• The Maryland-National Capital Park and Planning Commission acquires and maintains open space, including active recreational areas and passive open space</li> </ul>

Hazard	Activities
	<ul style="list-style-type: none"> <li>• Prince George's County Public Schools avoids selecting new school sites that are affected by mapped flood hazard areas</li> <li>• Flood warning system notification lists updated with flood-prone properties based on revised flood maps. General flood warnings delivered to the public through traditional and social media platforms such as the Office of Homeland Security website, Twitter, and Facebook.</li> </ul>
<b>Winter Storm</b>	<ul style="list-style-type: none"> <li>• Department of Environment enforces the State building code with criteria for design snow load for buildings and structures</li> <li>• Department of Public Works and Transportation requires bridge designs to account for snow load</li> <li>• Department of Public Works and Transportation has snow removal plans and capacity</li> <li>• Department of Public Works and Transportation has brochures and online content related to snow emergencies and snow removal (in English and Spanish)</li> <li>• Several agencies monitor weather and developing conditions (Office of Homeland Security Department; Department of Public Works and Transportation; Department of Environment, Schools)</li> <li>• Family Services does outreach to elderly</li> </ul>
<b>High Winds/ Tornado</b>	<ul style="list-style-type: none"> <li>• The State building code is enforced with criteria for design wind load for buildings and structures</li> <li>• Several agencies monitor weather and developing conditions (Office of Homeland Security; Department of Public Works and Transportation; Department of Environment, Schools)</li> <li>• Office of Homeland Security coordinates with other agencies to operate Alert Prince George's system for citizen notification;</li> <li>• Housing Authority retrofit public housing facility with code-compliant window assemblies</li> </ul>
<b>Severe Storm</b>	<ul style="list-style-type: none"> <li>• The State building code is enforced with criteria for wind design load and lightning protection for buildings and structures</li> <li>• Several agencies monitor weather and developing conditions (Office of Homeland Security; Department of Public Works and Transportation; Department of Environment; Schools)</li> <li>• Office of Homeland Security coordinates with other agencies to operate Alert Prince George's system for citizen notification; recovery presentations online/cable</li> </ul>
<b>Drought</b>	<ul style="list-style-type: none"> <li>• Washington Suburban Sanitary Commission manages reservoirs for water supply</li> <li>• Metropolitan Washington Council of Governments Water Supply and Drought Awareness Response Plan</li> <li>• County and City participate in regional planning initiatives (Washington Suburban Sanitary Commission, Washington COG)</li> <li>• The Maryland-National Capital Park and Planning Commission complies with water restrictions, focusing limited water supplies on unique horticultural resources, including champion and historic trees and irreplaceable resources</li> </ul>
<b>Wildfire</b>	<ul style="list-style-type: none"> <li>• Fire/ Emergency Medical Services coordinates with Department of Natural Resources for wildland fire response</li> <li>• Fire/ Emergency Medical Services has some personnel trained in wildland fire suppression</li> </ul>

Hazard	Activities
<b>Dam Failure</b>	<ul style="list-style-type: none"> <li>• Washington Suburban Sanitary Commission periodically inspects dams and performs regular maintenance to assure safe functioning</li> <li>• Washington Suburban Sanitary Commission's Emergency Response Plan for Rocky Gorge Dam (Duckett) is approved by the Maryland Department of the Environment and is coordinated with downstream jurisdictions</li> <li>• Washington Suburban Sanitary Commission notifies the City of Laurel in advance of releases that may cause flooding</li> </ul>
<b>Extreme Heat</b>	<ul style="list-style-type: none"> <li>• Family Services does outreach to elderly residents</li> <li>• Department of Public Works and Transportation's road and bridge standards for expansion joint and improvements in joint materials minimize damage due to extreme heat</li> </ul>
<b>Landslide</b>	<ul style="list-style-type: none"> <li>• Department of Public Works and Transportation requires roads to have deeper excavation, increased base thickness and additional underdrainage in areas with poor drainage (Marlboro and Christiana Clays)</li> <li>• Preliminary plans for subdivisions must depict steep slopes and unstable soils (Maryland-National Capital Park and Planning Commission)</li> <li>• Subdivision of land may be restricted or prohibited if found to be unsafe for development, which may be due to natural conditions such as, but not confined to unstable soils or severe slopes (Maryland-National Capital Park and Planning Commission)</li> <li>• Department of Environment enforces the State building code with addresses unstable soils, giving the code office authority to require special measures</li> <li>• Grading permits may be denied no reasonable corrective work will eliminate or reduce settlement, slope instability or geological hazards to persons or property (Maryland-National Capital Park and Planning Commission; Department of Environment)</li> </ul>
<b>City of Laurel</b>	
<b>Flood</b>	<ul style="list-style-type: none"> <li>• Enforcement of floodplain management requirements.</li> <li>• The Department of Public Works is authorized to close roads when flooding is imminent.</li> <li>• City newsletter, webpage, direct mailing, door hangers, email, telephonic message, public access video and radio used for public information and alerts.</li> <li>• Laurel identifies drainage problems and implements improvements.</li> <li>• Laurel has acquired flood hazard areas along Bear Branch Creek, Crow Branch Creek and the Patuxent River (Riverfront Park) and maintains as open space and passive recreation areas.</li> <li>• Economic and Community Development along with the Emergency Manager use the revised FIRMs to promote flood awareness and to pursue funds to mitigate impacts to residential and commercial properties.</li> </ul>
<b>Streambank Erosion</b>	<ul style="list-style-type: none"> <li>• Laurel addresses riverbank erosion through the purchase of flood hazard areas along Patuxent River (Riverfront Park) and subdivision regulations that require setback.</li> </ul>
<b>Winter Storm</b>	<ul style="list-style-type: none"> <li>• Economic and Community Development enforces the building codes criteria for design snow loads for buildings and structures.</li> </ul>

Hazard	Activities
	<ul style="list-style-type: none"> <li>• City newsletter, webpage, direct mailing, door hangers, email, telephonic message, public access video and radio used for public information and alerts</li> <li>• Office of Homeland Security develops and disseminates outreach materials for residents, businesses, and visitors.</li> <li>• Office of Homeland Security monitors weather and developing conditions.</li> </ul>
<b>High Wind/ Tornado</b>	<ul style="list-style-type: none"> <li>• Economic and Community Development enforces the building codes, with criteria for design wind loads for buildings and structures.</li> <li>• Office of Homeland Security monitors weather and developing conditions.</li> <li>• Office of Homeland Security coordinates with other agencies and the County to operate</li> <li>• Alert Prince George’s for citizen notifications.</li> </ul>
<b>Severe Storm</b>	<ul style="list-style-type: none"> <li>• Economic and Community Development enforces building codes with criteria for design wind loads for buildings and structures</li> <li>• Economic and Community Development enforces the building code with lightning protection requirements for nonresidential buildings.</li> <li>• Office of Homeland Security monitors weather and developing conditions.</li> <li>• City newsletter, webpage, direct mailing, door hangers, email, telephonic message, public access television and radio used for public information and alerts.</li> <li>• Office of Homeland Security coordinates with other agencies to operate Alert Prince George’s for citizen notifications.</li> </ul>
<b>Drought</b>	<ul style="list-style-type: none"> <li>• Washington Suburban Sanitary Commission manages reservoirs for potable water supply.</li> <li>• Laurel participates in regional drought planning initiatives (Washington Suburban Sanitary Commission, Washington COG).</li> </ul>
<b>Dam Failure</b>	<ul style="list-style-type: none"> <li>• City has regular communication with Washington Suburban Sanitary Commission regarding the upstream dam and receives advance notices of releases that may cause flooding</li> </ul>
<b>Extreme Heat</b>	<ul style="list-style-type: none"> <li>• City newsletter, webpage, direct mailing, door hangers, email, telephonic message, public access video and radio used for public information and alerts</li> <li>• Office of Homeland Security develops and disseminates outreach materials for residents, businesses, and visitors.</li> </ul>

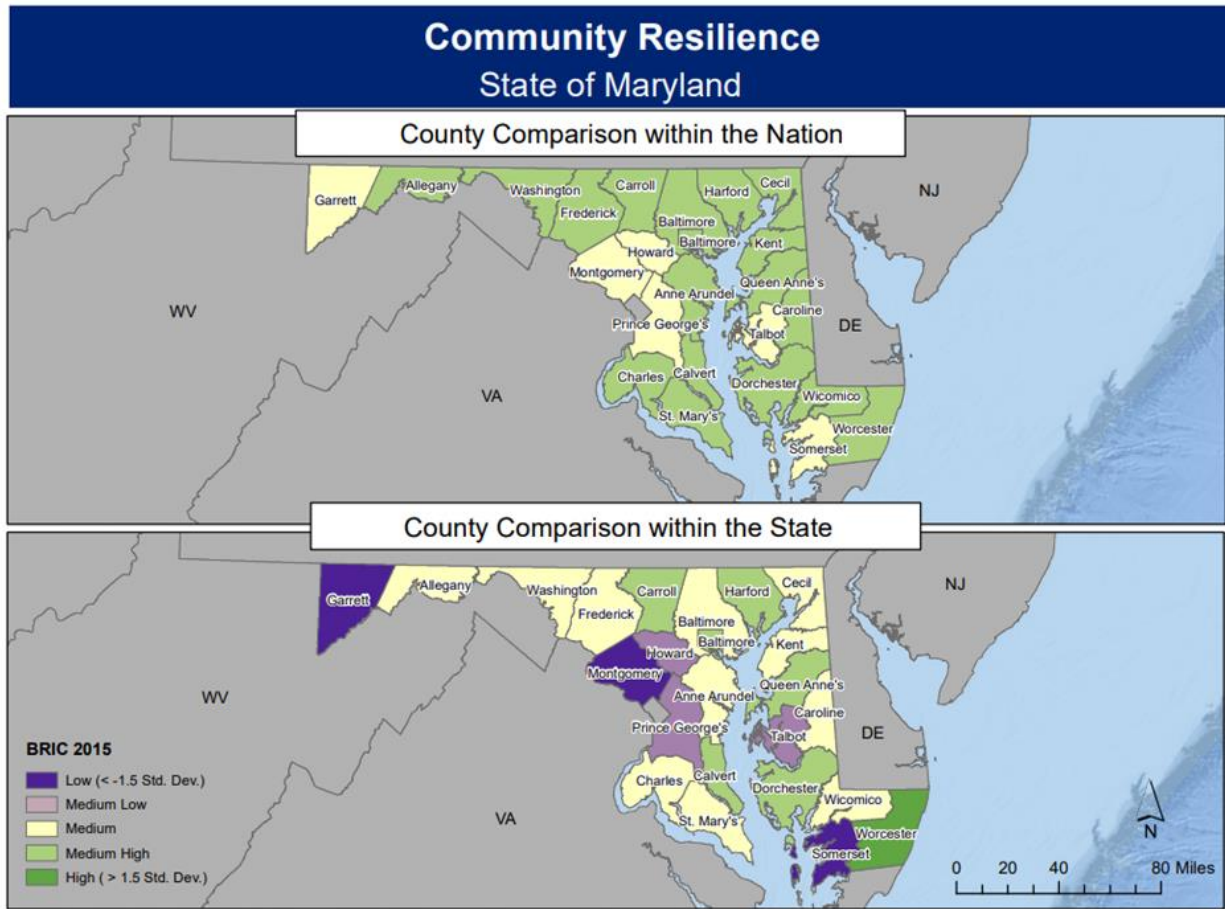
### C.1. Potential Areas of Improvement

Prince George’s County and the City of Laurel could improve existing mitigation capabilities by applying for grants to fund mitigation projects. The City of Laurel would benefit from dedicated staff to collaborate with the County on grant applications and mitigation action implementation. Additionally, building capacity to complete benefit-cost analyses and apply for technical assistance or project scoping assistance would allow the County and the City to expand their capabilities to achieve mitigation. National Risk Index Community Resilience Indicator Score

The County’s overall resilience to natural hazards can also be expressed through a FEMA National Risk Index Community Resilience indicator score. Prince George’s County has a relatively moderate ability to prepare for natural anticipated natural hazards, adapt to changing conditions, and withstand and recover



rapidly from disruptions when compared to the rest of the U.S. according to the National Risk Index.<sup>172</sup> Community resilience score is measured using the Baseline Resilience Indicators for Communities (HVRI BRIC) published by the University of South Carolina's Hazards and Vulnerability Research Institute (HVRI). The BRIC index uses 49 variables arrayed in the six broad capitals (or categories) of community resilience. The six capitals include: human well-being/cultural/social; economic/financial; infrastructure/built environment/housing; institutional/governance; community capacity; environmental/natural.<sup>173</sup> According to the BRIC scoring, Prince George's County has a medium low community resilience score when compared to other counties in the state, but a medium community resilience score when compared to the counties in the nation. BRIC community resilience scores for the state of Maryland, including Prince George's County is shown in **Figure 93**. Continuing to build resilience capabilities within the County will improve the community resilience score moving forward.



Baseline Resilience Indicators for Communities (BRIC) 2015



Figure 93: BRIC Community Resilience, State of Maryland

<sup>172</sup> FEMA National Risk Index. Community Resilience. Map | National Risk Index (fema.gov)

<sup>173</sup> University of South Carolina. BRIC- Baseline Resilience Indicators for Communities. [https://www.sc.edu/study/colleges\\_schools/artsandsciences/centers\\_and\\_institutes/hvri/data\\_and\\_resources/bric/](https://www.sc.edu/study/colleges_schools/artsandsciences/centers_and_institutes/hvri/data_and_resources/bric/)

## D. Plan Assessment

A review of County (**Table 128**) and City (**Table 129**) enabling statutes, ordinances, planning documents, and building codes revealed that some aspects of existing efforts strongly support mitigation capabilities.

*Table 128. Prince George's County Plan Assessment*

Plan Name	Description	Mitigation Integration Options
Plan Prince George's 2035 Approved General Plan (2014)	Plan Prince George's 2035 includes comprehensive recommendations for guiding future development within Prince George's County. The Plan updates a 2002 Prince George's County Approved General Plan by establishing new land use patterns and development centers.	The Plan briefly mentions mitigation on page 141 in Climate Change Policy 4. The Plan suggests including more detailed hazard information related to climate adaptation and mitigation strategies when updating the County's Hazard Mitigation Plan. Consider adding a description of hazards and their priority in upcoming County plans.
Climate Action Plan (2022)	The plan summarizes the climate threats in the County as we understand them, as well as progress to date in advancing climate action, particularly in reducing greenhouse gas emissions. Building on this information, it presents strategies to achieve a carbon-free, resilient Prince George's County.	The plan discusses climate hazards and trends in Prince George's County, as well as mitigation actions for climate-driven hazards.
Priority Preservation Area Functional Master Plan (2012)	The plan contains recommendations for agricultural land preservation; seeking funds for agricultural preservation; minimization of development and barriers to farming in the priority preservation area; valuation of farm and forest land for environmental and economic value; and reclaiming land for agricultural enterprises and agricultural support services. This plan recommends an approach to sustaining farm and forest operations that clarifies the county's intent to prioritize agricultural land preservation and provides a framework in the implementation table for accomplishing the policies and strategies outlined, partnering with the appropriate federal, state, local, and nonprofit agencies.	The Plan contains action steps to preserve farmland and forestland, which when protected can mitigate the impacts of flooding. In future preservation plans, consider adding a section outlining hazard impacts on preserved lands.

<p>Formula 2040 (2013)</p>	<p>This Plan establishes a framework that will assure the department can meet future parks and recreation programmatic and facility needs. Through the Plan, the County establishes a framework that will assure that we can meet future parks and recreation programmatic and facility needs.</p>	<p>The Plan provides goals and action strategies to preserve open spaces. As part of the development of the next Plan, meet with the Plan developers to discuss the impacts of hazards on the parks system.</p>
<p>Green Infrastructure Master Plan (2005)</p>	<p>The plan identifies a contiguous network of environmentally sensitive areas throughout the county and sets forth a goal, objectives, policies, and strategies to preserve, protect, and enhance these elements by the year 2025. The plan supports the desired development pattern in the General Plan. This is the first comprehensive functional master plan ever developed for environmental ecosystems in Prince George's County.</p>	<p>The plan includes maps of regulated areas within the 100-year floodplain and identifies gaps in protected areas throughout the County. Future updates to the plan should incorporate coastal flooding risks as well as riverine flooding risks to the sensitive and important environmental features throughout the county.</p>
<p>Land Preservation Parks and Recreation Plan (2022- Draft)</p>	<p>The Land Preservation Parks and Recreation Plan (LPPRP) provides goals, objectives, and policy guidelines for the delivery of parkland, open space, and recreation opportunities in Prince George's County. The LPPRP specifies standards to help identify the need for parkland and recreation facilities in an ongoing effort to provide equitable opportunity and benefit to county patrons.</p>	<p>The Plan includes references to the County floodplain ordinance as well as the HMP as a guide for future growth.</p>
<p>Prince George's County, Maryland-Phase II Watershed Implementation Plan (2012)</p>	<p>The goal for this Plan is to develop reduction strategies to meet nutrient and sediment allocations at the County scale.</p>	<p>In the next Plan, include strategies for mitigating the risk of flooding on the septic and stormwater system, particularly drainage improvements intended to handle heavy downpours during storms.</p>
<p>Approved Historic Sites and Districts Plan (2010)</p>	<p>This Plan sets countywide preservation policy and provides citizens, nonprofit organizations, the private sector, and government agencies with guidance on historic preservation.</p>	<p>In the next Plan, include a goal to mitigate the impact of hazards on historic sites and resources. Also consider adding a section that discusses historical sites in hazard prone areas, the potential impacts of different hazards, and potential mitigation options.</p>

<p>Prince George's County Master Plan of Transportation 2035 (2022)</p>	<p>Master Plan of Transportation 2035 (MPOT 2035) supports Plan Prince George's 2035, the County's approved general plan, by setting a guiding vision, supporting goals, and measurable actions to achieve a more equitable transportation system for all people who travel in the County, regardless of which travel mode they choose</p>	<p>The Plan mentions preparing a hazard mitigation plan with a focus on improving roads to withstand flooding. In future plans, consider including a section on roads/transportation infrastructure in the County that are currently vulnerable to flooding and other hazards.</p>
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Table 129. City of Laurel Plan Assessment

Plan Name	Description	Mitigation Integration Options
<p>City of Laurel Master Plan (2016)</p>	<p>This document amends the 2007 Master Plan and the 2009 Update. While recent growth and development have brought a large degree of amenities and benefits to the City, they have also brought some associated problems, which must be addressed. This plan identifies a number of these issues and opportunities and recommends a structure for providing for orderly and balanced growth.</p>	<p>The Plan creates policies for limiting riverine flooding in the Patuxent River Watershed, as well as limiting dam-related flooding through the management of the Duckett Dam in coordination with the Washington Suburban Sanitary Commission. In future plans, consider including a description of all hazards that may impact the City, and their priority in upcoming plans.</p>
<p>Berwin Heights-Sustainable Community Action Plan (2017)</p>	<p>This Plan discusses strengths and weaknesses in the Town relating to environment, economy, transportation, housing, quality of life, and local planning and land use in the community sectors. It also outlines desired outcomes, strategies and action items, and implementation partners for each of the sectors going forward.</p>	<p>Consider incorporating mitigation strategies in the “Strategies and Action Items” section of future plans.</p>
<p>City of Bowie 2022-2025 Climate Action Plan Implementation Plan</p>	<p>This plan outlines the action areas and implementation steps the City will take to reduce greenhouse gas emissions.</p>	<p>The Plan discusses expanding urban tree canopy, which is a mitigation strategy for extreme heat. Consider adding a section to discuss mitigation actions for other climate-related hazards.</p>

<p>City of Bowie Sustainability Plan</p>	<p>The Sustainability Plan builds upon the Climate Action Plan and all the other sustainability work that has come before it. The plan has three themes inspired by the City's motto: Growth, Unity, and Progress. Under each theme are topics, under each topic are goals, and for each goal strategies and actions have been identified.</p>	<p>The Plan includes strategies focused on emergency response to hazards, including flooding and storms.</p>
<p>City of Bowie Emergency Operations Plan (2016)</p>	<p>The City of Bowie Emergency Operations Plan (EOP) is a multi-discipline, all hazards plan that establishes a single, comprehensive framework for the management of major emergencies and disasters within the City.</p>	<p>This Plan describes hazard mitigation and the process for receiving Hazard Mitigation Assistance. Consider describing the potential hazards that may require assistance to mitigate in future plans.</p>
<p>Green Infrastructure Stormwater Management Climate Adaptation Plan: Dueling Creek Watershed- City of Mount Rainier, Maryland (2021)</p>	<p>The purpose of this Plan was to increase awareness on climate change issues and identify how green infrastructure can be used in the City to help mitigate the effects of increasing frequency, intensity, and duration of rainfall on localized flooding and other changes to local climate such as changing weather patterns and increasing temperatures.</p>	<p>The Plan discusses and maps areas in the City that may be at higher risk of pluvial flooding, as well as coastal flooding due to sea level rise. The Plan also describes the impacts of climate change on flooding and recommends mitigation actions to reduce vulnerability to flooding in the City.</p>

## Chapter 6. Mitigation Strategy

*This chapter outlines the methodology of mitigation project selection and prioritization and provides an overview of the hazard mitigation goals, actions, and projects selected for the 2023-2028 planning horizon.*

### A. Introduction

Both Prince George's County and the City of Laurel have plans which outline a vision for the future of their communities and are consistent with hazard mitigation planning. In May 2014, Prince George's County approved the Plan 2035, Prince George's County General Plan, which includes county goals and strategies to guide future land use, growth and development, and environmental protection and preservation of important lands. The City of Laurel's General Plan was approved in September 2016 but did not include growth and development projections. The vision statements of the general plans promote community well-being and sustainability, which enables cross-cutting interfaces with the Hazard Mitigation Plan. The hazard mitigation strategy contained within this HMP sets the stage for long-term disaster resistance by identifying actions that will, over time, reduce the risk of people and property to hazards. In addition, the HMP enables continued eligibility for certain mitigation grant funds.

The mitigation strategy is a culmination of several elements that ultimately result in a path to resilience via an action plan. It includes:

- Revising the 2017 Hazard Mitigation Plan's goal;
- Evaluating a wide array of potential actions based on the results of the risk assessment and capabilities assessment;
- Selecting and prioritizing mitigation actions; and
- Developing mitigation action plans for Prince George's County and the City of Laurel.

#### A.1. Existing Authorities, Policies, Programs, and Resources for Mitigation

Relevant authorities, policies, programs, and resources available to support Prince George's County's and the City of Laurel's hazard mitigation activities are outlined in the **Capability Assessment** chapter. Both jurisdictions have experienced program administrators and staff who can work with the Mitigation Advisory Committee to advance the mitigation strategy and further facilitate a holistic, integrated program to reduce hazard risk and increase the resilience of the County and City's growing and diverse communities.

### B. Mitigation Goals

When a community decides that certain risks are unacceptable and mitigation actions may be achievable, the development of goals and actions takes place. Goals are long-term, general statements.

The Mitigation Advisory Committee reviewed and revised the mitigation goal in the 2017 HMP on two different occasions: during the Mitigation Advisory Committee kick-off on September 19, 2022, and during the risk assessment results meeting on November 16, 2022. The committee discussed the County's and City's desire to expand from one goal to four to highlight specific needs while maintaining a broad enough

scope to represent the varied needs and wants of diverse communities. The final goals for the updated HMP were shared during a meeting to review and revise the mitigation strategy on December 14, 2022. The revised goals apply to both Prince George's County and the City of Laurel:



Increase public education and awareness of natural hazard risks to people and private property, and promote current and new opportunities to participate in mitigation planning.



Prevent future climate-related damages and losses to communities, critical facilities, and natural resources through ordinances, policies, and plans aligned with regional and state resilience and equity goals.



Implement structural projects that mitigate the risks of natural hazards to people, infrastructure, and environmental assets while equitably distributing project benefits.



Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.

## C. Mitigation Action Selection

The 2017 mitigation actions were reviewed during the December 14, 2022, Mitigation Advisory Committee meeting. The conversation centered on the Committee's suggestion to move away from including actions that are considered a capability of the County or City and towards including more innovative actions and projects. Staff from designated lead agencies updated the status of each action and determined which should be continued and if modifications were required. The status of each action from the previous plan is outlined in **Appendix E**.

Once the determinations were made for the 2017 actions, a wide range of new actions was identified and discussed by the Mitigation Advisory Committee during the December 14th meeting, as well as through a mitigation strategy survey distributed shortly after the meeting. An overview of the actions considered and how the final selected actions were prioritized is described in the sections below.

### C.1. Actions Considered

The Mitigation Advisory Committee systematically reviewed different activities that could prevent or reduce the impacts of the hazards discussed in **Chapter 4**. This was done to ensure that all possible measures were explored, not just traditional approaches. **Table 130** lists the categories of mitigation and emergency management activities along with some activities that could be considered under each.

Table 130. Mitigation Action Categories and Types

Action Category	Action Types
<b>Prevention</b>	Planning and zoning; Building codes; Open space preservation; Floodplain regulations; Stormwater management regulations; Drainage system maintenance; Capital improvements programming; Shoreline/riverine setbacks
<b>Property Protection</b>	Acquisition/Demolition/Relocation; Building elevation; Critical facilities protection; Retrofitting (i.e., wind-proofing, floodproofing, seismic design); Safe rooms, shutters, shatter-resistant glass; Insurance
<b>Natural Resource Protection</b>	Land acquisition; Floodplain protection; Watershed management; Riparian buffers; Forest and vegetation management; Erosion and sediment control; Wetland preservation and restoration; Habitat preservation; Slope stabilization; Historic property
<b>Structural Projects</b>	Reservoirs; Dams/levees/dikes/floodwalls/seawalls; Diversions/detention/retention; Channel modification; Beach nourishment; Storm sewers
<b>Emergency Services</b>	Warning systems; Evacuation planning and management; Emergency response training and exercises; Sandbagging for flood protection; Installing temporary shutters for wind protection
<b>Education and Awareness</b>	Outreach projects; Speak series/demonstration events; Hazard mapping Real estate disclosure; Library materials; School children educational programs; Hazard expositions

The above categories served as a framework for the types of mitigation actions considered by the Mitigation Advisory Committee. New potential actions were created based on the vulnerabilities identified in the risk assessment, the results of the capability assessment, and the relevant strategies found in other planning documents, such as Plan Prince George's 2035, the Prince George's County Climate Action Plan, and the Maryland Climate Adaptation and Resilience Framework Recommendations.

Actions that were considered and reviewed by the Mitigation Advisory Committee are shown in **Table 131**, along with the pros and cons of each action in the context of the County and City and their hazard conditions. For additional context, a discussion of current regulatory and preventative standards and programs can be found in **Chapter 5**.

Table 131. Review of Possible Mitigation Activities

Potential Action	Pros	Cons
<b>Prevention</b>		
Perform regular tree trimming	County & City: <ul style="list-style-type: none"> <li>• Can prevent power outages during storms and</li> </ul>	County & City: <ul style="list-style-type: none"> <li>• Jurisdiction/ responsibility would need to be clarified</li> </ul>



Potential Action	Pros	Cons
	<p>keep people connected for emergency services</p> <ul style="list-style-type: none"> <li>• Can prevent damage to property and injuries to people during severe weather</li> <li>• Can improve long-term health and stability of tree</li> </ul>	<p>and coordinated with PEPCO/utility providers</p>
<p>Conduct a watershed study</p>	<p>County:</p> <ul style="list-style-type: none"> <li>• Provide detailed information to identify flood risk areas for mitigation measures and long-term management plans</li> <li>• Can be used to identify mitigation measures that reduce flood risk</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• A countywide study can be time consuming and costly</li> <li>• Securing funding may be challenging or strain workforce capacity</li> <li>• Other measures like improved land use planning, structural flood protection, and emergency preparedness plans are still needed</li> </ul>
<p>Develop a Comprehensive Reforestation Plan to find and address gaps in the existing tree canopy.</p>	<p>County:</p> <ul style="list-style-type: none"> <li>• Help identify and prioritize gaps in tree canopy or areas key for preservation for heat mitigation and air quality</li> <li>• Help research species that are native and improve chances of survival</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• Some stakeholders may resist provisions that require protection of trees on private property</li> <li>• Limited monitoring and enforcement</li> </ul>
<p><b>Property Protection</b></p>		
<p>Prohibit all waivers to allow development in floodplains.</p>	<p>County &amp; City:</p> <ul style="list-style-type: none"> <li>• Reduce risk of damage to structures and loss of life during flood events</li> <li>• Preserve natural floodplains with important ecological benefits</li> <li>• May reduce future financial burden on taxpayers</li> </ul>	<p>City &amp; County:</p> <ul style="list-style-type: none"> <li>• Limits availability of land for future growth</li> <li>• Some stakeholders may resist the potential loss of value from affected properties</li> </ul>

Potential Action	Pros	Cons
<p>Create metrics to track routine stormwater maintenance and monitor how the work is increasing capacity and where additional capacity may be needed through retrofits.</p>	<p>County:</p> <ul style="list-style-type: none"> <li>• Ensure maintenance is consistent and effective</li> <li>• Identify gaps that may need retrofits</li> <li>• Reduces risk of flooding</li> <li>• Can identify potential cost savings</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• Challenges in enforcing compliance</li> <li>• Implementation of new technology costs</li> </ul>
<p>Use conservation subdivisions in areas adjacent to Rural and Agricultural Areas to transition density and to encourage preservation of green infrastructure corridors as defined by the County's Green Infrastructure Plan.</p>	<p>County:</p> <ul style="list-style-type: none"> <li>• Can preserve character</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• May be more expensive and difficult to attract development</li> </ul>
<p>Perform energy grid modernization in socially vulnerable areas by adding a solar microgrid to reduce system outages from natural hazards. Additionally, evaluate new and existing government buildings, critical facilities, and infrastructure for solar potential.</p>	<p>County &amp; City:</p> <ul style="list-style-type: none"> <li>• Reduces risk of system outages</li> <li>• Reduces reliance on fossil fuels</li> <li>• Solar can be less expensive in the long-term</li> </ul>	<p>County &amp; City:</p> <ul style="list-style-type: none"> <li>• Actual energy grid modernization can be costly to install new technologies</li> </ul>
<p>Office of the County Executive must introduce and support a County Council resolution requiring the County to integrate extreme weather and energy-efficiency criteria into building codes.</p>	<p>County:</p> <ul style="list-style-type: none"> <li>• Can help future property protection of buildings</li> <li>• Can reduce greenhouse gas emissions</li> <li>• May reduce need for costly repairs</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• Challenges with compliance</li> <li>• Stakeholder resistance to perceived potential additional burdens</li> <li>• Potential increase in construction cost and challenges incentivizing development</li> </ul>
<p>Adopt and Enforce Policies to Require Green Infrastructure Practices for New and Existing Properties, especially native plantings, rain gardens, green corridors, runoff retention, and other nature-based ways to reduce and naturally filter runoff on private and public properties. Insert specific enforceable language in guiding</p>	<p>County:</p> <ul style="list-style-type: none"> <li>• Improve water quality and risk of flooding</li> <li>• Aesthetic benefits</li> <li>• Ecological benefits to wildlife habitats</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• Enforcing compliance</li> <li>• Potential stakeholder resistance</li> </ul>

Potential Action	Pros	Cons
County documents related to proposed and existing development.		
<b>Natural Resource Protection</b>		
To preserve environmentally sensitive land and to encourage development in the Regional Transit Districts, evaluate a transfer of development rights program, density exchanges, or purchase of development rights program for the Rural and Agricultural Areas. Explore opportunities to transfer development rights within areas and to coordinate with the Watershed Implementation Plan and Maryland Accounting for Growth Policy	<p>County:</p> <ul style="list-style-type: none"> <li>• Can preserve environmentally important areas and encourage development in optimized areas</li> <li>• Balance demand with natural resource protection for environmental and public health benefits</li> <li>• Reduce need for infrastructure in rural and agricultural areas</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• Evaluating the cost of this program might be challenging</li> </ul>
<b>Structural Projects</b>		
Conduct a study to determine the feasibility of creating a stormwater park/greenway (or another watershed- or landscape-scale flood risk reduction project) that will improve natural floodplain functions in areas of high risk.	<p>County:</p> <ul style="list-style-type: none"> <li>• Reduce risk of flooding in high risk areas</li> <li>• Ecological and aesthetic benefits</li> <li>• Identify potential costs and viability</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• Land acquisition</li> <li>• Cost</li> </ul>
Develop structural and action plans with inundation mapping for all High Hazard Potential Dams with poor conditions and no Emergency Action Plans. Develop structural and action plans for high-risk pump stations, levees, and other flood control infrastructure.	<p>County:</p> <ul style="list-style-type: none"> <li>• Identify potential impacts of dam failure</li> <li>• Improve safety and reliability</li> <li>• Can identify emergency actions in hazard events</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• May require acquisition of new technology or data</li> <li>• Cost of study and subsequent cost of repairs to infrastructure</li> </ul>
Implement stormwater management projects, such as drainage retrofits, to address pluvial/stormwater flooding in community-identified areas.	<p>County &amp; City:</p> <ul style="list-style-type: none"> <li>• Improve public safety and water quality</li> <li>• Reduce property damage and pollution</li> </ul>	<p>County &amp; City</p> <ul style="list-style-type: none"> <li>• May involve installation of new infrastructure</li> <li>• Cost of compliance</li> </ul>

Potential Action	Pros	Cons
<b>Emergency Services</b>		
Develop a plan with the Department of Social Services, Department of Health, and Office of Sustainability to create Resilience Hubs in vulnerable communities to increase community capacity to prepare for, withstand, and respond to natural hazard impacts and emergency situations. These should also function as heating/cooling centers.	<p>County:</p> <ul style="list-style-type: none"> <li>• Ensure a central location to prepare, withstand, and respond to events</li> <li>• Increases community capacity and public safety</li> <li>• Improve quality of life and support vulnerable populations</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• May require costly acquisition of new facilities or retrofitting</li> <li>• Operating may be challenging</li> </ul>
Continue to Support Regional Drought Response and Planning. Continue the County's commitment and participation with the Metropolitan Washington Council of Governments and Washington Suburban Sanitary Commission when drought awareness responses are activated.	<p>County &amp; City:</p> <ul style="list-style-type: none"> <li>• Mitigate negative impacts of drought</li> <li>• Protect natural resources</li> </ul>	<p>County &amp; City:</p> <ul style="list-style-type: none"> <li>• Navigating potential coordination between jurisdictions and stakeholders with potential conflicting priorities</li> </ul>
<b>Education and Awareness</b>		
Conduct outreach to homeowners on mitigation projects for flooding from streams near homes	<p>County:</p> <ul style="list-style-type: none"> <li>• Engage residents</li> <li>• Identify and prioritize needs of homeowners</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• Specialized materials can be difficult to coordinate</li> <li>• Homeowners may resist additional burden</li> </ul>
Develop a County Hazard Mitigation Hub website	<p>County:</p> <ul style="list-style-type: none"> <li>• Provide a center for digital information</li> <li>• Fast and accessible for preparation and response to disasters</li> <li>• Could serve as a platform for engagement and feedback</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• Technical expertise</li> </ul>
"Demonstrate County commitment to climate action through publicly transparent tracking, monitoring, evaluation, and reporting. Require Maryland-	<p>County:</p> <ul style="list-style-type: none"> <li>• Increasing accountability and trust with stakeholders</li> </ul>	<p>County:</p> <ul style="list-style-type: none"> <li>• Technical expertise</li> </ul>

Potential Action	Pros	Cons
National Capital Park and Planning Commission to create and establish a public Smart Growth Dashboard that tracks approved preliminary plans of subdivisions, approved site plans and development proposals."	<ul style="list-style-type: none"> <li>Identify areas of need for resources</li> <li>Improve efficiency of permitting processes</li> </ul>	

## C.2. Action Prioritization

The STAPLEE (Social, Technical, Administrative, Political, Legal, Economic, and Environmental) criteria (**Table 132**) were used to prioritize the mitigation actions as high, medium, or low for the County and City<sup>174</sup>. This methodology requires that social, technical, administrative, political, legal, economic, and environmental considerations be taken into account when reviewing potential actions for the area’s jurisdictions to undertake. The Economic criterion includes a benefit-cost review. This process was used to help ensure that the most equitable and feasible actions would be implemented based on the jurisdictions’ risks and capabilities.

Table 132. STAPLEE Project Evaluation Criteria

Category	Example Questions
<b>Social</b>	<ul style="list-style-type: none"> <li>Is the proposed action socially acceptable to the community(s)?</li> <li>Are there equity issues involved that would mean that one segment of a community is treated unfairly?</li> <li>Will the action cause social disruption?</li> </ul>
<b>Technical</b>	<ul style="list-style-type: none"> <li>Will the proposed action work?</li> <li>Will it create more problems than it solves?</li> <li>Does it solve a problem or only a symptom?</li> <li>Is it the most useful action in light of other community(s) goals?</li> </ul>
<b>Administrative</b>	<ul style="list-style-type: none"> <li>Can the community(s) implement the action?</li> <li>Is there someone to coordinate and lead the effort?</li> <li>Is there sufficient funding, staff, and technical support available?</li> <li>Are there ongoing administrative requirements that need to be met?</li> </ul>
<b>Political</b>	<ul style="list-style-type: none"> <li>Is the action politically acceptable?</li> <li>Is there public support both to implement and to maintain the project?</li> </ul>
<b>Legal</b>	<ul style="list-style-type: none"> <li>Is the community(s) authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?</li> <li>Are there legal side effects? Could the activity be construed as a taking?</li> <li>Is the proposed action allowed by a comprehensive plan, or must a comprehensive plan be amended to allow the proposed action?</li> <li>Will the community(s) be liable for action or lack of action?</li> <li>Will the activity be challenged?</li> </ul>

<sup>174</sup> This same prioritization criteria was applied for HHPD actions. Specific HHPDs will be matched to projects being implemented based on their assigned condition severity and the risk they pose to the community based on inundation data.

Category	Example Questions
<b>Economic</b>	<ul style="list-style-type: none"> <li>• What are the costs and benefits of this action (i.e., cost-benefit review)?</li> <li>• Do the benefits exceed the costs?</li> <li>• Are initial, maintenance, and administrative costs taken into account?</li> <li>• Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private)?</li> <li>• How will this action affect the fiscal capability of the community(s)?</li> <li>• What burden will this action place on the tax base or local economy?</li> <li>• What are the budget and revenue effects of this activity?</li> <li>• Does the action contribute to other community goals, such as capital improvements or economic development?</li> <li>• What benefits will the action provide?</li> </ul>
<b>Environmental</b>	<ul style="list-style-type: none"> <li>• How will the action affect the environment?</li> <li>• Will the action need environmental regulatory approvals?</li> <li>• Will it meet local and state regulatory requirements?</li> <li>• Are endangered or threatened species likely to be affected?</li> </ul>

The above STAPLEE categories and relevant questions were discussed when selecting and prioritizing actions, although a detailed written analysis was not conducted. For measures such as education and outreach that do not result in a quantifiable reduction of damages, the relationship between the probable future benefits and the cost of each measure was factored in. Generally, each jurisdiction’s representatives evaluated the actions for inclusion in the plan with the following framework:

- **Time** – Can the strategy be implemented quickly?
- **Ease to implement** – How easy is the strategy to implement? Will it require many financial or staff resources? Are there programs to secure the additional resources needed to implement?
- **Effectiveness** – Will the strategy be highly effective in reducing risk? Are other strategies more effective?
- **Lifespan** – How long will the effects of the strategy be in place?
- **Hazard(s) Mitigated** – Does the strategy address a high-priority hazard, or does it address multiple hazards?
- **Equity** – Does the strategy have disproportionate negative impacts on vulnerable communities?

High priority was placed on the actions that are considered consistent with current County and City plans, technically feasible, likely to have high political and social acceptance, and can be achieved using existing resources or are eligible for grants. Projects for which federal mitigation grant funds are sought must be eligible activities according to the most recent policy and guidance and illustrate a cost-to-benefit ratio greater than or equal to one.

While considering STAPLEE Project Evaluation Criteria, there may be cases where Prince George’s County has prioritized a mitigation action but does not feel it can move it forward due to insufficient staff capacity or technical skills. In this case, it may be appropriate to consider technical assistance options. As detailed in **Chapter 7.B.1**, technical assistance is direct support to a community that builds resilience community capacity and capabilities in ways that meet their unique needs. This is typically done by federal, regional, or state agency staff or their contract support working with local communities directly.

## D. 2023-2028 Mitigation Actions

All 2023-2028 mitigation actions are outlined in this section. The descriptions and/or definitions for the elements that accompany each action are described in **Table 133**. **Table 134** contains Prince George's County's actions and **Table 135** contains the City of Laurel's actions. The key details included are meant to add relevant context and encourage implementation and accountability. For detailed actions plans of the "high priority" actions, refer to **Appendix F**.

Table 133. Action Input Descriptions

Action Detail	Input Description
Category of mitigation action	Prevention, property protection, natural resource protection, structural projects, emergency services, or education and awareness
Action number	Jurisdiction abbreviation - # (e.g., PG-1)
Applicable goal(s)	<ul style="list-style-type: none"> <li>• <u>Goal 1</u>: Implement structural projects that mitigate the risks of natural hazards to people, infrastructure, and environmental assets while equitably distributing project benefits.</li> <li>• <u>Goal 2</u>: Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.</li> <li>• <u>Goal 3</u>: Increase public education and awareness of natural hazard risks to people and private property, and promote current and new opportunities to participate in mitigation planning.</li> <li>• <u>Goal 4</u>: Prevent future climate-related damages and losses to communities, critical facilities, and natural resources through ordinances, policies, and plans aligned with regional and state resilience and equity goals.</li> </ul>
Action lead	The department or office responsible for ensuring the action is implemented
Timeframe for implementation	<ul style="list-style-type: none"> <li>• <u>Short-term</u>: less than three years</li> <li>• <u>Long-term</u>: more than three years</li> <li>• <u>Ongoing</u>: continuous with no designated end date</li> <li>• <u>Funding contingent</u>: timeline is dependent on funding from a source outside of the jurisdiction</li> </ul>
Priority level for implementation	High, medium, or low

### D.1. Prince George’s County Mitigation Actions

Some of the County’s actions have been integrated and adapted from other County plans. They are signified by the color of the “Action Number” column accordingly:

- [Plan 2035 Prince George’s Elements](#) integrated policies are shown in **orange**.
- [Climate Action Plan](#) Priority Recommendations are shown in **green**.

Table 134. Prince George’s County 2023-2028 Mitigation Actions

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	<b>Prevention</b>							
PG-1	Partner with federal agencies, the state, and Non-governmental Organizations to utilize available technical assistance to translate identified risks into mitigation projects, especially for benefit cost analyses for the County and municipalities.	X			X	Office of Homeland Security	Ongoing	Medium
PG-2	Using the best available data, check the locations of HazMat sites, National Pollutant Discharge Elimination System sites, and other land uses; if found to be in flood hazard areas, communicate with the owner/handler of hazardous materials and known pollutants regarding risk and appropriate response and protection measures.			X	X	Department of Environment	Short-term	Medium
PG-3	Integrate mitigation plan requirements and actions into other appropriate planning mechanisms, such as comprehensive plans and capital improvement plans.				X	Maryland-National Capital Park and Planning Commission	Ongoing	High
PG-4	Collect flood depth information to support a grant to provide elevation certificates in areas newly included in the Special Flood Hazard Area or to those experiencing				X	Office of Homeland Security	Funding contingent	Medium



Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	flooding issues to support Letter of Map Amendments (LOMA) or NFIP premium reductions.							
PG-5	Expand codes and standards enforcement, such as for existing land use regulations and policies.		X		X	Department of Permitting, Inspections and Enforcement	Ongoing	Medium
PG-6	Prohibit all waivers to allow development in floodplains.				X	Department of Permitting, Inspections and Enforcement	Ongoing	High
PG-7	Revise Prince George's County Code of Ordinances to incorporate and require climate-resilient design, nature-based infrastructure, and climate-resilient practices. Adopt and enforce policies to require green infrastructure practices for new and existing properties, especially native plantings, rain gardens, green corridors, runoff retention, and other nature-based ways to reduce and naturally filter runoff on private and public properties.	X			X	Maryland-National Capital Park and Planning Commission, Planning Department	Short-term	High
PG-8	Office of the County Executive must introduce and support a County Council resolution requiring the County to integrate extreme weather and energy-efficiency criteria into building codes.				X	Department of Permitting, Inspections, and Enforcement	Short-term	High
PG-9	Require County Stormwater Management (SWM) Standards to Incorporate Projected Climate Change Impacts by using approved downscaled and up-to-date climate impact information to reevaluate peak rainfall estimates and future design storm profiles. Evaluate SWM standards using this criterion at least every three (3) years.	X			X	Department of Public Works and Transportation, Stormwater Management Division	Long-term	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	Require all upgrades of County storm drain systems and Capital Improvement Project roadway, bridge, culvert and stormwater management repair or renovation projects to meet these updated climate-resilient design criteria.							
PG-10	Avoid Future Development in Flood Inundation Areas Below Existing High-hazard Potential Dams. Require that plan sets for subdivision proposals and permit applications to show the danger reach and inundation area and prohibit new construction in these areas.				X	Maryland-National Capital Park and Planning Commission, Planning Department	Ongoing	High
PG-11	Conduct Countywide Thermal Mapping of Tree Canopy Cover with Shade Study, and Aerial Utility Mapping exercises. Then conduct a neighborhood-level Heat Vulnerability Assessment. Address the identified gaps in the tree canopy through appropriate heat mitigation actions and projects.				X	Department of the Environment	Short-term	High
PG-12	Conduct a study on the feasibility of using climate-smart building materials in mitigation projects and normal County/City construction projects to mitigate impacts from extreme temperatures and rainfall. Examples include those listed on the Maryland Department of the Environment's <a href="#">"Alternative/Innovative Technology List of Approved Practices."</a> Once complete, develop a process that promotes the use of these materials wherever feasible.				X	Department of the Environment	Long-term	Medium
PG-13	Adopt the most recent published edition of the I-Codes (e.g., International Building Code, International Residential Code).				X	Department of Permitting, Inspections and Enforcement	Short-term	High
	<b>Property Protection</b>							

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
PG-14	Support mitigation projects that will result in the protection of public or private property from natural hazards. Eligible projects include but are not limited to: 1. acquisition of hazard-prone property or structures 2. Elevation of flood-prone structures 3. Minor structural flood control projects 4. Relocation of structures from hazard-prone areas 5. Retrofitting of existing buildings, facilities, and infrastructure 6. Retrofitting of existing buildings and facilities for shelters 7. Critical infrastructure protection measures 8. Stormwater management improvements 9. Advanced warning systems and hazard gauging systems (weather radios, reverse-911, stream gauges, I-flows) 10. Targeted hazard education 11. wastewater and water supply system hardening and mitigation	X		X	X	Office of Homeland Security	Ongoing	Medium
PG-15	Implement appropriate mitigation measures for hazard-vulnerable priority critical facilities	X			X	Department of Public Works and Transportation	Long-term	High
	<b>Natural Resource Protection</b>							
PG-16	Use the Watershed Implementation Plan to prioritize stabilization projects, especially if funding from outside resources is available for the mitigation of environmental impacts.	X			X	Department of the Environment	Ongoing	Medium
PG-17	Coordinate with Pepco, Baltimore Gas and Electric, and any other utility companies (as appropriate) to schedule and perform regular tree trimming to mitigate the risk of power outages during windstorms. Maintenance should be conducted to retain a healthy tree canopy, ensure trees' longevity, and decrease the risk of power outages. Prioritize socially vulnerable neighborhoods/ populations	X			X	Department of Public Works and Transportation	Ongoing	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	first and maintain old-growth trees with large canopies to encourage tree retention for extreme heat mitigation. Develop mutual aid with the City of Laurel to provide limited resources and personnel to assist in trimming and tree control as needed.							
PG-18	Implement proposed flood mitigation projects from the upcoming watershed study for the Collington Branch Stream. Develop a Memorandum of Agreement with the City of Laurel to inspect and clean the portion of the stream that runs through their jurisdiction.				X	Department of the Environment	Long-term	High
PG-19	Conduct a study to determine the feasibility of creating a stormwater park/greenway (or another watershed- or landscape-scale flood risk reduction project) that will improve natural floodplain functions in areas of high risk.				X	Maryland-National Capital Park and Planning Commission	Short-term	Medium
PG-20	Develop a program to utilize vacant land (both publicly and privately owned) for stormwater management. Acquire land to serve the dual purpose of green infrastructure/ stormwater infiltration and recreational/open space.				X	Maryland-National Capital Park and Planning Commission, Planning Department	Ongoing	Medium
PG-21	Use conservation subdivisions (or other site planning and landscape conservation tools) when developing in Established Communities near Rural and Agricultural Areas to cluster development, transition density, and encourage the preservation of green infrastructure corridors, as defined by the County's Green Infrastructure Plan.	X			X	Maryland-National Capital Park and Planning Commission, Planning Department	Ongoing	Medium
PG-22	To preserve environmentally sensitive land and to encourage development in the Regional Transit Districts, evaluate a transfer of development rights program, density exchanges, or purchase of development rights program for the Rural and Agricultural Areas. Explore opportunities to				X	Department of the Environment	Ongoing	Low

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	transfer development rights within areas and to coordinate with the Watershed Implementation Plan and Maryland Accounting for Growth Policy							
PG-23	Align Economic Development Plans with the Climate Action Plan, preserving existing agricultural land and natural areas and promoting development in already-developed areas near high-capacity transit. Perform an economic development and climate adaptation analysis of existing agricultural land and natural areas that are crucial to climate resilience on a subwatershed basis. Identify areas of open space for preservation and optimum use for climate resilience.				X	Department of the Environment	Short-term	High
	<b>Structural Projects</b>							
PG-24	Create metrics to track routine stormwater maintenance and monitor how the work is increasing capacity and where additional capacity may be needed through retrofits.				X	Department of Public Works and Transportation	Ongoing	Medium
PG-25	Conduct a Countywide Flood Assessment (including pluvial mapping) to understand the impact of updated rainfall intensity estimates per the latest version of NOAA Atlas 14, recent elevation data, and stormwater controls. Identify priority areas for mitigation projects and update the stormwater ordinance as needed.				X	Department of the Environment	Ongoing	High
PG-26	Develop structural and action plans with inundation mapping for all High Hazard Potential Dams with poor conditions and no Emergency Action Plans. Develop structural and action plans for high-risk pump stations, levees, and other flood control infrastructure. Ensure a			X	X	Department of Public Works and Transportation	Long-term	High

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	process for supporting affected "downflow" communities that a dam failure hazard would inundate.							
PG-27	Implement stormwater management projects, such as drainage retrofits, to address pluvial/stormwater flooding in community-identified areas. Prioritize restoration projects from the Watershed Implementation Plan (WIP) that will support the Plan 2035 future land use pattern. Downtowns should be given priority for stormwater retrofits, especially environmental site design practices. Land acquisition or ecological restoration activities should be targeted to stronghold watersheds.	X			X	Department of Public Works and Transportation	Ongoing	High
PG-28	To reduce system outages from natural hazards, perform energy grid modernization in socially vulnerable areas by adding a solar microgrid. Prioritize areas that are known to suffer multiple outages during the year.	X			X	Department of Public Works and Transportation	Ongoing	Low
PG-29	Evaluate new and existing government buildings, critical facilities, and infrastructure for solar energy generation potential and install solar panels and batteries if feasible.				X	Department of Public Works and Transportation	Ongoing	Low
	<b>Emergency Services</b>							
PG-30	Update Upper Marlboro Emergency Response Plan to address flooding, including evacuation, emergency response, mitigation, etc.			X	X	Office of Homeland Security	Short-term	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
PG-31	Update the County's disaster recovery plan to include a post-disaster strategic rebuilding decision framework that comprehensively integrates equity.				X	Office of Homeland Security	Short-term	Medium
PG-32	The Department of Family Services Agency on Aging will continue its outreach to seniors and other vulnerable populations about health and safety during periods of extreme heat and extreme cold. Information will be added to the Family Service's web page and frozen meal distribution with supplement provision of hot meals during severe weather periods from January through March.			X	X	Department of Family Services	Ongoing	Medium
PG-33	Develop a plan with the Department of Social Services, Department of Health, and Office of Sustainability to create Resilience Hubs in vulnerable communities to increase community capacity to prepare for, withstand, and respond to natural hazard impacts and emergency situations. These should also function as heating/cooling centers.	X			X	Department of Social Services; Department of Health; Office of Sustainability	Long-term	Low
PG-34	Assess Climate Projections and Consequences of Dam and Levee Failure. Analyze baseline conditions against local/regional climate projections to highlight future vulnerabilities and risk. Model hydrological loads to the consequences of failure under present and future conditions and jointly evaluate dams, levees, and interdependent components. Incorporate Findings in Emergency Action Plans.				X	Office of Homeland Security	Ongoing	High
	<b>Educations &amp; Awareness</b>							

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
PG-35	Continue annual flood risk awareness and mitigation mailing to all owners of high-risk properties in the Special Flood Hazard Area, including Repetitive Loss/Severe Repetitive Loss structures. Provide additional outreach in response to new/upcoming grant opportunities and funding.			X	X	Office of Homeland Security	Ongoing	High
PG-36	Work with County municipalities and/or develop public-private partnerships to provide hazard awareness messaging and information on hazard preparedness and mitigation in secondary languages for promotion using local newspapers, municipal websites, social media, etc.		X	X	X	Department of Community Relations	Ongoing	High
PG-37	Integrate hazard mitigation considerations in future updates of the Citizens' Preparedness Guide and Business Preparedness Guide, including mitigation projects they can implement and how they can get their project included in an upcoming grant application.			X	X	Office of Homeland Security	Ongoing	Medium
PG-38	Conduct outreach to homeowners located on Founders Terrace (and other high-priority streets/neighborhoods) on opportunities to get funding for potential flood mitigation projects for the streams that run behind their homes.			X	X	Department of Community Relations	Short-term	Medium
PG-39	Develop a County Hazard Mitigation Hub website similar to the public outreach website for <a href="#">Vision Zero</a> . This should be combined with the future Climate Resilience Website as described in Plan 2035 if possible. Coordinate with various county agencies, such as the Department of Environment (DoE), Office of Homeland Security, and Office of Information Technology (OIT).			X	X	Office of Homeland Security	Short-term	Medium



Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
PG-40	Demonstrate County commitment to climate action through publicly transparent tracking, monitoring, evaluation, and reporting. Require the Maryland-National Capital Park and Planning Commission to create and establish a public Smart Growth Dashboard that tracks approved preliminary plans of subdivisions, approved site plans and development proposals. Integrate this into the hazard mitigation/climate action hub website (refer to Action PG-41).			X	X	Maryland-National Capital Park and Planning Commission	Ongoing	Medium
PG-41	Develop an action guide for socially vulnerable communities that provides step-by-step guidance on how they can get their home considered for inclusion in a mitigation project/grant application.			X	X	Office of Homeland Security	Short-term	Medium
PG-42	Send a digital copy of the 2023 HMP to all County and City staff, as well as all homeowner associations within the planning area.		X	X	X	Office of Homeland Security	Short-term	High
PG-43	Integrate conducting an annual/semi-annual comprehensive grant availability search and information dissemination into a County staff member's job description. This staff member should coordinate an annual workshop with the County and its municipalities to discuss county-wide priorities and projects that should be submitted in grant applications.		X			Office of Homeland Security	Ongoing	Medium

## D.2. City of Laurel Mitigation Actions

Table 135. City of Laurel 2023-2028 Mitigation Actions

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	<b>Prevention</b>							
L-1	Partner with federal agencies, the state, and non-governmental organizations to utilize available technical assistance to translate identified risks into mitigation projects, especially for benefit-cost analyses.		X		X	Office of Emergency Management	Ongoing	Medium
L-2	Integrate mitigation plan requirements and actions into other appropriate planning mechanisms, such as comprehensive plans and capital improvement plans.				X	Office of Emergency Management	Ongoing	High
L-3	Adopt the most recent published edition of the I-Codes (e.g., International Building Code, International Residential Code).				X	Department of the Fire Marshal and Permit Services	Short-term	High
	<b>Property Protection</b>							
L-4	Support mitigation projects that will result in the protection of public or private property from natural hazards. Eligible projects include but are not limited to: 1. acquisition of hazard-prone property or structures 2. Elevation of flood-prone structures 3. Minor structural flood control projects 4. Relocation of structures from hazard-prone areas 5. Retrofitting of existing buildings, facilities, and infrastructure 6. Retrofitting of existing buildings and facilities for shelters 7. Critical infrastructure protection measures 8. Stormwater management improvements 9. Advanced warning systems and hazard gauging systems (weather radios, reverse-911,	X			X	Department of Economic & Community Development	Ongoing	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
	stream gauges, I-flows) 10. Targeted hazard education 11. wastewater and water supply system hardening and mitigation							
L-5	Promote the use of climate-smart building materials in mitigation projects and normal City construction projects to mitigate impacts from extreme temperatures and rainfall, such as those listed on the Maryland Department of the Environment's " <a href="#">Alternative/Innovative Technology List of Approved Practices</a> ."	X			X	Department of Economic & Community Development	Ongoing	Medium
	<b>Structural Projects</b>							
L-6	After flood events, the City will evaluate whether to pursue funding to implement flood mitigation projects.	X			X	Office of Emergency Management	Ongoing	High
L-7	Assess Climate Projections and Consequences of Dam and Levee Failure. Analyze baseline conditions against local/regional climate projections to highlight future vulnerabilities and risk. Model hydrological loads to the consequences of failure under present and future conditions and jointly evaluate dams, levees, and interdependent components. Incorporate Findings in Emergency Action Plans.		X		X	Department of Public Works; Department of the Environment	Short-term	Medium
L-8	To reduce system outages from natural hazards, perform energy grid modernization in socially vulnerable areas by adding a solar microgrid. Prioritize areas that are known to suffer multiple outages during the year.	X			X	Department of Public Works	Funding contingent	Medium

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
L-9	Evaluate new and existing government buildings, critical facilities, and infrastructure for solar energy generation potential and install solar panels and batteries if feasible.	X			X	Department of Public Works	Short-term	Low
L-10	Implement stormwater management projects, such as drainage retrofits, to address pluvial/stormwater flooding in community-identified areas.	X			X	Department of Public Works	Ongoing	High
	<b>Emergency Services</b>							
L-11	At the intersection of Van Dusen Road and Contee Road (Anderson's Corner), add a comprehensive recreational building, comprised of indoor recreational space, gymnasium(s), and meeting rooms. Unlike a typical community center, the City envisions more of a steel building structure with a hybrid use between drop-in programs for local residents and a larger multiuse footprint to host a wider range of recreational sports and activities. The City will conduct a feasibility study that includes considering stormwater runoff effects and the potential to use the facility as a hazard shelter and/or extreme temperature refuge.	X		X	X	Department of Economic & Community Development	Long-term	Medium
	<b>Educations &amp; Awareness</b>							
L-12	Work with City closed circuit television network to produce seasonal hazard awareness and topical mitigation programming.		X	X		Office of Emergency Management	Short-term	Low

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
L-13	Develop an action guide for socially vulnerable communities that provides step-by-step guidance on how to get their home considered for inclusion in a mitigation project/grant application.		X	X	X	Office of Emergency Management	Short-term	Medium
L-14	Send a digital copy of the 2023 HMP to all County and City staff.		X	X		Office of Emergency Management	Short-term	Medium

### D.3. Hazard Mitigation Grant Program Mitigation Projects

In addition to the mitigation actions, Prince George's County and the City of Laurel have submitted projects under FEMA Hazard Mitigation Grant Program (HMGP) funding. These projects align with the mitigation goals outlined in **Chapter 6.B** of this Plan. The projects and their descriptions are shown below:

- HMGP-4491-DR-MD-0009: Prince George's County Preparation of Flood Warning System SOP. 5% initiative project. The purpose of the proposed activity is to develop a standard operating procedure (SOP) for Prince George's County's two flood warning systems which enable the County to monitor real-time flood conditions and provide information to relevant authorities and impacted communities.
- HMGP-4491-DR-MD-0012: City of Laurel, Prince George's County Emergency Back-Up Generators for Critical Facilities 6. Regular project. Upsizing of 5 and obtaining 1 generator at 6 critical facilities. Buildings include: City/Municipal Hall, Laurel Police Department, Park and Recreation Maintenance Facility, Laurel Armory Facility, City Services Building, and Public Works Facility.
- HMGP-4491-DR-MD-0017: Prince George's County Town of Eagle Harbor Shoreline Restoration - Phased. Regular project. The living shoreline component of this Project will prevent shoreline erosion, increase resilience against storms, improve water quality, and protect properties and infrastructure along the shoreline.
- HMGP-4491-DR-MD-0016: Prince George's Residential Flood Mitigation 75th Ave (phased project).
- HMGP-4491-DR-MD-0018: Fort Washington Neighborhood Flood Risk Mitigation Project (Phased project).

## E. Mitigation Actions Summary

After all the final decisions were made, the mitigation strategy included 57 total actions —43 for Prince George’s County and 14 for the City of Laurel. However, the City of Laurel may choose to participate in the County’s actions as feasible when true County-wide mitigation is needed. **Table 136** and **Table 137** below provide further summary information on the mitigation strategy.

*Table 136: Summary of final determinations for the 2017-2023 mitigation actions*

Determination	Number of Actions	Actions Included
In Progress - Carried Over	9	PG-1; PG-3; PG-14; PG-15; PG-30; PG-35 L-4; L-6; L-12
Not Started – Carried Over	8	PG-2; PG-4; PG-31; PG-32; PG-36; PG-37 L-1; L-2
Not Started - Removed	4	n/a
Completed - Removed	11	n/a

**Table 137** lists the hazards covered in the 2023 HMP and the mitigation actions applicable to each. The objective was to have at least one action for each hazard.

*Table 137: Action Applicability by Hazard*

Hazard	# PG Actions	# Laurel Actions	Applicable Actions
Riverine Flood	31	8	PG-1; PG-2; PG-3; PG-4; PG-5; PG-6; PG-8; PG-9; PG-13; PG-14; PG-15; PG-16; PG-18; PG-19; PG-20; PG-22; PG-23; PG-25; PG-27; PG-30; PG-31; PG-33; PG-35; PG-36; PG-37; PG-38; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-6; L-12; L-13; L-14
Severe Storm (Flood-Related)	26	11	PG-1; PG-3; PG-5; PG-6; PG-8; PG-9; PG-12; PG-13; PG-14; PG-15; PG-20; PG-21; PG-22; PG-23; PG-24; PG-25; PG-27; PG-31; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-5; L-6; L-10; L-11; L-12; L-13; L-14
Tornado	20	9	PG-1; PG-3; PG-5; PG-8; PG-13; PG-14; PG-15; PG-22; PG-23; PG-28; PG-29; PG-31; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-8; L-9; L-12; L-13; L-14

Hazard	# PG Actions	# Laurel Actions	Applicable Actions
Severe Storm (Wind-Related)	21	9	PG-1; PG-3; PG-5; PG-8; PG-13; PG-14; PG-15; PG-17; PG-22; PG-23; PG-28; PG-29; PG-31; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-8; L-9; L-12; L-13; L-14
Hurricane/Tropical Storm	20	7	PG-1; PG-3; PG-5; PG-8; PG-13; PG-14; PG-15; PG-22; PG-23; PG-28; PG-29; PG-31; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-12; L-13; L-14
Winter Storm	20	9	PG-1; PG-3; PG-5; PG-8; PG-13; PG-14; PG-15; PG-22; PG-23; PG-28; PG-29; PG-31; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-8; L-9; L-12; L-13; L-14
High Wind	21	9	PG-1; PG-3; PG-5; PG-8; PG-13; PG-14; PG-15; PG-17; PG-22; PG-23; PG-28; PG-29; PG-31; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-8; L-9; L-12; L-13; L-14
Extreme Heat	22	9	PG-1; PG-3; PG-5; PG-8; PG-11; PG-12; PG-13; PG-14; PG-15; PG-17; PG-22; PG-23; PG-31; PG-32; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-5; L-11; L-12; L-13; L-14
Dam and Levee Failure	21	8	PG-1; PG-3; PG-5; PG-8; PG-10; PG-13; PG-14; PG-15; PG-22; PG-23; PG-26; PG-31; PG-33; PG-34; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-7; L-12; L-13; L-14
Earthquake	18	7	PG-1; PG-3; PG-5; PG-8; PG-13; PG-14; PG-15; PG-22; PG-23; PG-31; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-12; L-13; L-14
Extreme Cold	20	9	PG-1; PG-3; PG-5; PG-8; PG-12; PG-13; PG-14; PG-15; PG-22; PG-23; PG-31; PG-32; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-5; L-11; L-12; L-13; L-14
Drought	18	7	PG-1; PG-3; PG-5; PG-8; PG-13; PG-14; PG-15; PG-22; PG-23; PG-31; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-12; L-13; L-14

Hazard	# PG Actions	# Laurel Actions	Applicable Actions
Coastal Flood	20	8	PG-1; PG-2; PG-3; PG-5; PG-8; PG-13; PG-14; PG-15; PG-22; PG-23; PG-31; PG-33; PG-35; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-6; L-12; L-13; L-14
Landslide	18	7	PG-1; PG-3; PG-5; PG-8; PG-13; PG-14; PG-15; PG-22; PG-23; PG-31; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-12; L-13; L-14
Wildfire	18	7	PG-1; PG-3; PG-5; PG-8; PG-13; PG-14; PG-15; PG-22; PG-23; PG-31; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-12; L-13; L-14
Sinkhole	18	7	PG-1; PG-3; PG-5; PG-8; PG-13; PG-14; PG-15; PG-22; PG-23; PG-31; PG-33; PG-36; PG-37; PG-39; PG-40; PG-41; PG-42; PG-43  L-1; L-2; L-3; L-4; L-12; L-13; L-14



# Chapter 7. Plan Implementation

*This chapter describes the implementation plan, identifies available programs and resources to support implementation, and outlines procedures for maintaining the plan as a living document.*

## A. Distribution

After the update's adoption, the 2023 HMP will be posted on the Prince George's County Department of the Environment's website, the Office of Homeland Security's website, and the City of Laurel's website. Notices of its availability will be distributed to the following groups:

- Federal and state agencies that were notified and invited to participate in plan development;
- Mitigation Advisory Committee;
- Adjacent counties and the District of Columbia;
- Citizens who attended public meetings or participated in surveys and provided contact information; and
- Organizations, agencies, and elected officials who received notices of public meetings.

## B. Implementation and Maintenance

Both Prince George's County and the City of Laurel have programs and activities that reduce the impacts of hazards and emergencies. **Chapter 5** describes the general County and City capabilities and ongoing activities that reduce the impacts of hazards, in part, through the implementation of the actions in the HMP.

Implementing the actions outlined in **Chapter 5** will involve adequate planning, finding projects, and integrating actions throughout the County's and City's various other efforts. These can be aided by finding technical assistance, securing funding, and integrating hazard mitigation into other planning mechanisms. The sections below explore these topics in more detail.

### B.1. Technical Assistance

In cases where Prince George's County or the City of Laurel has prioritized a mitigation action, but does not feel it can move it forward due to insufficient staff capacity or technical skills, technical assistance provided by FEMA or other state or federal agencies may help.

Technical assistance is direct support to a community that builds the community's resilience capacity and capabilities in ways that meets their unique needs. This is typically done by federal, regional, or state agency staff or their contract support working with local communities directly. While the types of support vary by program, themes often include increasing understanding of risk and mitigation, inspiring communities to action, and helping prepare for project funding or implementation.

#### **Factors of a Successful Technical Assistance Project**

- Existing community support and ownership.

- Helps position the community to action, including applying for funding or passing a policy or ordinance.
- Integration with other resilience efforts.
- Community is disadvantaged or lower capacity.
- Project helps overcome challenges and addresses risk.

Better understanding community interests and needs, followed by tailored support to fill those gaps, is key to supporting low-capacity communities and equity. Technical assistance programs acknowledge there is no one-size-fits-all solution to supporting communities and that risk information alone is often not enough to support implementation of mitigation actions.

**Table 138** outlines sources of potential technical assistance funding or non-financial technical support available to the County.

*Table 138. Sources of Technical Assistance*

Name	Overview	Contact
<b>FEMA Mitigation Planning Technical Assistance</b>	<p>FEMA’s Risk Mitigation Action Planning (MAP) Program identifies flood risk to promote informed planning and development practices. Risk information is primarily conducted on a county or tribal basis and includes both regulatory flood risk maps and nonregulatory risk information. Under FEMA Risk MAP program, agency staff or their contractors can provide technical assistance tailored to a community’s need, such as increasing understanding of risk and mitigation or helping prepare for project funding or implementation. This may include a project alternatives analysis or exploring project costs and benefits.</p> <p>For more information refer to the <a href="#">Incorporating Mitigation Planning Technical Assistance into Risk MAP Projects Guidance</a> and the <a href="#">FEMA Region 3 Hazard Mitigation Planning</a> webpage.</p>	<p>Primary point of contact at Maryland Department of Emergency Management or FEMA Region 3</p>
<b>FEMA Building Resilient Infrastructure and Communities (BRIC) Direct Technical Assistance</b>	<p>Building Resilient Infrastructure and Communities (BRIC) Direct Technical Assistance (DTA) gives full support to communities that may not have the resources to begin climate resilience planning and project solution design on their own. Through process-oriented, hands-on support, BRIC DTA will work to enhance a community’s capacity to design holistic, equitable climate adaptation solutions that advance numerous community-driven objectives.</p> <p>For more information, refer to the <a href="#">BRIC Direct Technical Assistance</a> webpage.</p>	<p>Communities can send a request through an online submission form found <a href="#">here</a>.</p>

<p><b>FEMA Dam Safety Collaborative Technical Assistance</b></p>	<p>FEMA offers a Collaborative Technical Assistance (CTA) series to help communities at risk of dam-related flooding to better understand their risk landscape and the potential consequences of dam-related emergencies. The CTA will include planning for emergencies related to operational discharges or dam-related infrastructure failure. Participants will engage in a facilitated planning process with community stakeholders to build relationships, develop plans, and collaborate with whole community partners to achieve the goal of increased preparedness to dam-related hazards.</p> <p>For more information, refer to the <a href="#">Dam Safety Collaborative Technical Assistance</a> webpage.</p>	<p>Preston Wilson at <a href="mailto:Preston.Wilson@fema.dhs.gov">Preston.Wilson@fema.dhs.gov</a> or Alesia Za Gara at <a href="mailto:alesia.zagara@associates.fema.dhs.gov">alesia.zagara@associates.fema.dhs.gov</a>.</p>
<p><b>U.S. Army Corps of Engineers Floodplain Management Services Program (FPMS)</b></p>	<p>FPMS activities cover the full range of information, technical services, and planning guidance and assistance on floods and floodplain issues within the broad umbrella of floodplain management. Technical services and planning guidance under the FPMS Program are provided to State, regional, and local governments without charge, within program funding limits.</p> <p>For more information regarding FPMS, refer to the <a href="#">Serving Local Communities Through Technical Service Programs</a> webpage.</p>	<p>Stacey Underwood at 410-962-4977 or <a href="mailto:Stacey.M.Underwood@usace.army.mil">Stacey.M.Underwood@usace.army.mil</a></p>
<p><b>U.S. Army Corps of Engineers Continuing Authorities Program</b></p>	<p>The Continuing Authorities Program solves water-resource, flood-risk mitigation and environmental restoration problems in partnership with local sponsors without the need to obtain specific Congressional authorization. This program decreases the amount of time required to budget, develop and approve a potential project for construction. Continuous Authorities Program allows the Corps to plan and implement projects that are smaller, less complex and less costly.</p> <p>For more information, refer to the <a href="#">Continuing Authorities Program</a> webpage. Requests for assistance from a state or local government agency should be in the form of a letter describing the location and nature of the problem and requesting assistance under the program.</p>	<p>Anastasiya Kononova, Continuous Authorities Program Manager, at 410-962-2558.</p>
<p><b>U.S. Army Corps of Engineers National Hurricane Program</b></p>	<p>The U.S. Army Corps of Engineers and FEMA work with the National Oceanic and Atmospheric Administration (NOAA) to conduct hurricane evacuation studies with the goal of helping local communities understand their evacuation timeline.</p> <p>For more information, refer to the appropriate fiscal year's <a href="#">National Hurricane Program Fact Sheet</a>.</p>	<p>Tom Laczo at 410-962-6773, or <a href="mailto:Thomas.D.Laczo@usace.army.mil">Thomas.D.Laczo@usace.army.mil</a></p>

<p><b>Environmental Protection Agency Technical Assistance Services for Communities (TASC) Program</b></p>	<p>Provides independent assistance to help communities better understand the science, regulations and policies of environmental issues and Environmental Protection Agency actions. The TASC program benefits communities by explaining technical findings and answering community questions, helping them understand complex environmental issues, and supporting their active roles in protecting healthy communities and advancing environmental protection. The services are determined on a project-specific basis and provided at no cost to communities.</p> <p>For more information, refer to the <a href="#">Technical Assistance Services for Communities Program</a> webpage.</p>	<p>Contact the appropriate <a href="#">Environmental Protection Agency Regional TASC Coordinator</a></p>
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Visit the following link to download a list of service providers for technical assistance created for the Chesapeake Bay Stewardship Fund through the National Fish and Wildlife Foundation:  
<https://www.nfwf.org/sites/default/files/2022-02/2022-Chesapeake-Bay-Watershed-Technical-Assistance-Providers-List-updated.xlsx>.

### B.1.a. Technical Assistance Case Studies

#### Training: Data Modernization and Resilience Meeting

- Assistance need: Allegan County, Michigan and its multiple townships were going through the FEMA map update process which resulted in new mapping for most of the county as it was previously unmapped. There were local concerns about what this would mean as far as duties at the local level (many townships felt understaffed and thought this additional duty would overwhelm them) and were concerned that mapping flood risk would dampen the local real estate market.
- About the assistance: Due to the number of newly mapped communities, it was decided to develop an NFIP 101 session as part of the technical assistance and outreach to help the communities understand what was involved in the program. FEMA delivered a presentation on the NFIP which was followed by the State of Michigan speaking on the technical assistance they provide in joining the program and then their regionally based officials that can assist with more difficult issues as they arise. In addition, two local officials representing communities already participating in the NFIP spoke about their experience. One assured the others that the job duties were not overwhelming and where to go for help on the more challenging issues. Another representative talked about how the flood maps help inform sensible local development decisions. Later in the follow-up meetings, state mitigation staff were there to talk about potential projects and planning grants.
- Results: The initial meeting helped ease the minds of many of the community officials in the unmapped areas. The tone of the process changed from skepticism to many of the officials embracing it and participating throughout the length of the process including the three meetings.

One community applied to join the NFIP by the 3rd meeting and a local tribe, Gun Lake, applied for a planning grant.

### **Risk and Priority Assessment & Funding Opportunities and Best Practices**

- Assistance need: In 2016, Hurricane Matthew - a major flooding in eastern North Carolina - dumped a large amount of rainfall shortly on top of a large rainfall event that occurred the week before. The most severe flooding experienced took place in Fayetteville (Cumberland County) and Lumberton (Robeson County). The State (North Carolina) and the affected communities sought assistance to organize post-Matthew resilient redevelopment planning and grant identification in the area.
- About the assistance: Assistance included multiple engagements with key officials and the general public as well as identification and basic scoping of mitigation project ideas that could be funded with post-disaster funding. In each county, the planning team led a series of six meetings (three with local officials and three with the public) to determine major impacts from the storm, identify any unmet needs that still existed several months after the event, and develop a set of mitigation projects. During these meetings, planners used an online ArcGIS portal to identify specific locations where impacts had occurred and to discuss details of what occurred during the storm. These high impact areas became the basis to propose potential projects.
- Results: The resulting plans mobilized the communities to prioritize their greatest mitigation needs and provided the needed elements to begin preparation of mitigation grant applications, several of which were submitted to FEMA and later Department of Housing and Urban Development.

## **B.2. Funding Opportunities**

In the same manner of outlining lead agencies of parallel efforts for future mitigation projects, **Table 139** outlines notable sources of potential funding. Additional funding opportunities in the state of Maryland may be found on the [Maryland Department of Natural Resources](#) webpage, and the [Georgetown Climate Center Adaptation Clearing House](#) may list more opportunities in Maryland and nationwide.

Common federal sources of grants and loans include FEMA, the U.S. Department of Housing and Urban Development, the National Parks Service (NPS), the U.S. Department of Agriculture, the U.S. Environmental Protection Agency, the U.S. Economic Development Administration (EDA), and the U.S. Fish and Wildlife Service (FWS).

Table 139. Sources of Potential Funding

Name	Source	Funding Type	Maximum Funding	Local Cost Share	URL
<b>Hazard Mitigation Grant Program (HMGP)</b>	FEMA	Grant	---	25%	<a href="#">Webpage</a>
<b>Building Resilient Infrastructure and Communities (BRIC)</b>	FEMA	Grant	\$2 million (state set-aside) or \$50 million (national competition)	25%	<a href="#">Webpage</a>
<b>Flood Mitigation Assistance (FMA) Program</b>	FEMA	Grant	\$25,000 (planning); \$50,000 technical assistance; \$900,000 project scoping; \$300,000 capability and capacity building; \$50 million localized projects; N/A individual projects	25%	<a href="#">Webpage</a>
<b>Pre-Disaster Mitigation (PDM) Grant Program</b>	FEMA	Grant (via congressional appropriation)	---	25%	<a href="#">Webpage</a>
<b>Public Assistance - Mitigation</b>	FEMA	Grant	---	25%	<a href="#">Webpage</a>
<b>Safeguarding Tomorrow Revolving Loan Fund (RLF) Program</b>	FEMA (provided to states)	Loan	---	Eligible as local cost share match for other Hazard Mitigation	<a href="#">Webpage</a>

Name	Source	Funding Type	Maximum Funding	Local Cost Share	URL
				Assistance grant	
<b>Community Development Block Grants (CDBG) - Disaster Recovery</b>	Department of Housing and Urban Development	Grant	---	None	<a href="#">Webpage</a>
<b>Community Development Block Grants (CDBG) - Mitigation</b>	Department of Housing and Urban Development	Grant	---	None	<a href="#">Webpage</a>
<b>Regional Conservation Partnership Program (RCPP)</b>	United States Department of Agriculture	Grant	\$10 million	None, but encouraged	<a href="#">Webpage</a>
<b>Emergency Watershed Protection Program</b>	United States Department of Agriculture	Grant	< \$5 million	Varies	<a href="#">Webpage</a>
<b>National Coastal Resilience Fund</b>	National Fish and Wildlife Foundation & NOAA	Grant	None	None, but encouraged	<a href="#">Webpage</a>
<b>Interagency Nonstructural Flood Risk Management Projects</b>	U.S. Army Corps of Engineers	Technical Assistance	---	Yes	<a href="#">Webpage</a>
<b>Environmental Quality Incentives Program (EQIP) - Wildfire and Hurricane Mitigation</b>	United States Department of Agriculture	Incentive	\$3 million	25%	<a href="#">Webpage</a>
<b>Building Blocks for Sustainable Communities</b>	Environmental Protection Agency	Technical Assistance	---	None	<a href="#">Webpage</a>
<b>Greening America's Communities Program</b>	Environmental Protection Agency	Technical Assistance	---	None	<a href="#">Webpage</a>

Name	Source	Funding Type	Maximum Funding	Local Cost Share	URL
<b>Superfund Redevelopment Initiative (SRI)</b>	Environmental Protection Agency	Technical Assistance	---	None, but encouraged	<a href="#">Webpage</a>
<b>Urban Waters Small Grants Program (UWSG)</b>	Environmental Protection Agency	Grant	\$60,000	None	<a href="#">Webpage</a>
<b>Urban and Community Forestry (UCF) Program</b>	United States Department of Agriculture	Grant	Varies	Yes	<a href="#">Webpage</a>
<b>Resilient Maryland Program</b>	Maryland Energy Administration	Grant	Varies	---	<a href="#">Webpage</a>
<b>Chesapeake and Coastal Grants Gateway</b>	Maryland Department of Natural Resources	Grant	Varies	---	<a href="#">Webpage</a>

### B.3. Utilizing Social Vulnerability Scores

CDC Social Vulnerability Index scores can be used by Prince George’s County and the City of Laurel to identify potential mitigation project locations. Social Vulnerability scores by census tract are based on percentiles. Percentile ranking values range from 0 to 1, with higher percentile scores indicate greater social vulnerability.

Socially vulnerable populations often face disproportionate adverse effects of natural disasters without equitable opportunities to prepare for them; therefore, they would benefit greatly from mitigation projects. Knowledge of social vulnerability scores throughout the County and City is essential when applying for grant programs that provide funding for mitigation projects located in areas with high social vulnerability.

For the most recent census-tract level SVI scores, refer to the CDC’s [Social Vulnerability Index Interactive Map](#). The official 2020 CDC Social Vulnerability Index map is provided in **Figure 94**.

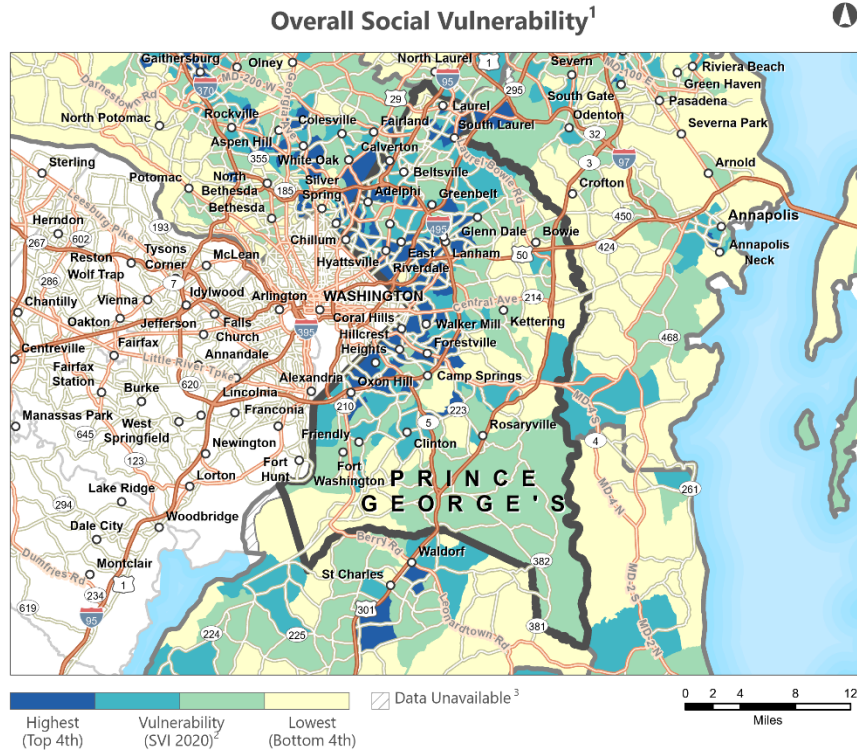


CDC/ATSDR Social Vulnerability Index 2020

PRINCE GEORGE'S COUNTY, MARYLAND



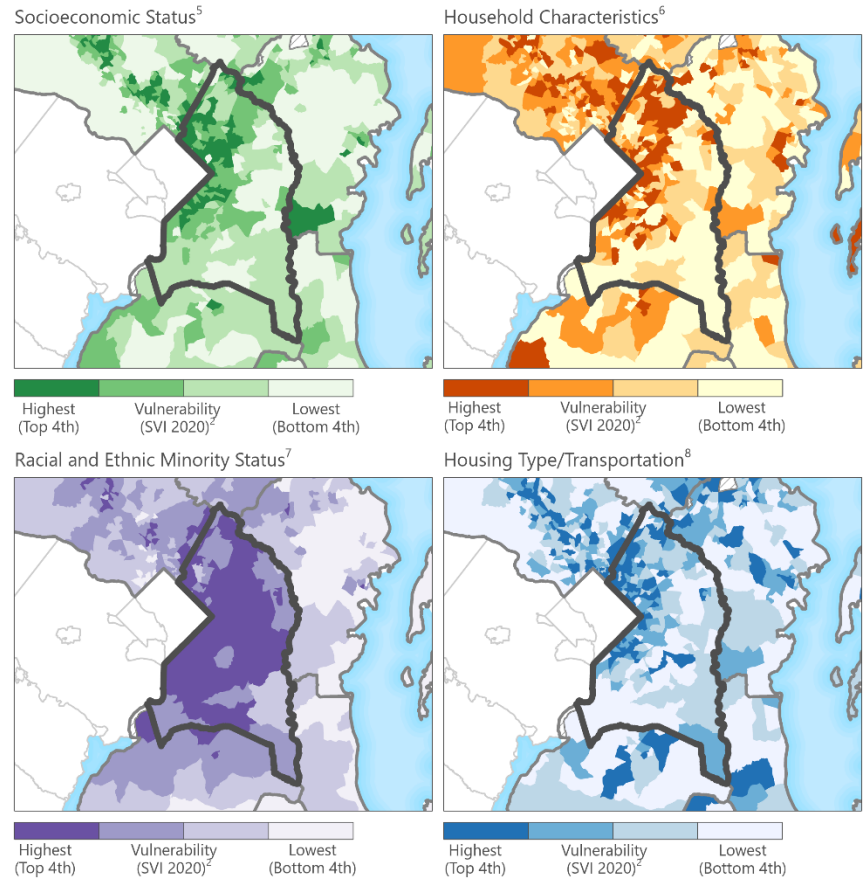
CDC/ATSDR SVI 2020 – PRINCE GEORGE'S COUNTY, MARYLAND



Overall Social Vulnerability<sup>1</sup>



CDC/ATSDR SVI Themes



Socioeconomic Status<sup>5</sup>

Household Characteristics<sup>6</sup>

Racial and Ethnic Minority Status<sup>7</sup>

Housing Type/Transportation<sup>8</sup>

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)<sup>1</sup> 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.



**Data Sources:** <sup>1</sup>CDC/ATSDR/GRASP, U.S. Census Bureau, Esri® StreetMap™ Premium.  
**Notes:** <sup>1</sup>Overall Social Vulnerability: All 16 variables. <sup>2</sup>Census tracts with 0 population. <sup>3</sup>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. <sup>4</sup>Socioeconomic Status: Below 150% Poverty, Unemployed, Housing Costs Burden, No High School Diploma, No Health Insurance. <sup>5</sup>Household Characteristics: Aged 65 and Older, Aged 17 and Younger, Civilian with a Disability, Single-Parent Household, English Language Proficiency. <sup>6</sup>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. <sup>7</sup>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>.

Figure 94. 2020 CDC Social Vulnerability Index Map for Prince George's County

## B.4. Incorporating Mitigation Plan Requirements into Other Local Planning Mechanisms

**Chapter 5** describes how Prince George's County and the City of Laurel address hazards as part of their current planning mechanisms and processes, including land development, infrastructure design, and public outreach. The development of the 2023 HMP did not reveal any significant gaps in how hazards are addressed in existing planning mechanisms or processes, however, there are opportunities to explore integrating this process within the community, with other parallel programs and initiatives in the County or City, or in tandem with efforts in cities or at the regional, State, and National level as they become available.

The following list identifies lead agencies that are likely to undertake complementary and parallel efforts to future mitigation projects:

- Prince George's County Department of the Environment: This department is responsible for protecting and improving the environment in Prince George's County. It works on a variety of issues related to environmental, hazard, and climate change planning, including air quality, water quality, hazardous waste, and sustainability.
- Maryland Department of the Environment: The Maryland Department of the Environment is the state agency responsible for protecting and improving the environment in Maryland. It works on a variety of issues related to environmental, hazard, and climate change planning, including air quality, water quality, hazardous waste, and sustainability.
- Maryland Department of Emergency Management: The Maryland Department of Emergency Management is responsible for coordinating the state's response to disasters and emergencies. It works on a variety of issues related to hazard and emergency management, including emergency preparedness, response, and recovery.
- Prince George's County Office of Homeland Security: The Prince George's County Office of Homeland Security is responsible for coordinating the county's response to disasters and emergencies. It works on a variety of issues related to hazard and emergency management, including emergency preparedness, response, and recovery.
- Maryland-National Capital Park and Planning Commission: A bi-county agency that is responsible for planning and developing parks, recreation, and open space in Montgomery and Prince George's Counties in Maryland. Efforts to protect and preserve the natural and cultural resources in the region include the Maryland-National Capital Park and Planning Commission 's Department of Parks and Recreation has a Division of Natural and Historical Resources that is responsible for managing and protecting the natural and cultural resources within the park system. This division works on a variety of environmental planning and resource management activities, including land acquisition, restoration, and preservation of natural areas, as well as the management of historic sites and resources.

Broadly speaking, this recommendation simply aims for the Mitigation Action Committee to explore new ways to continue building relationships and operational capacity between organizations with similar goals to improve our communities' relationships with the natural environment.

## C. Monitoring and Reporting Progress

The Prince George's County Department of Environment and the Office of Homeland Security will coordinate an annual meeting of the Mitigation Advisory Committee and assemble an annual report to the Maryland Department of Emergency Management and FEMA Region 3 detailing annual progress on mitigation actions (refer to **Appendix I** for an annual progress report template) as well as outreach activities. The Prince George's County Office of Homeland Security Regional Planner will lead in compiling the annual report and the City of Laurel's Department of Emergency Services Emergency Manager will work with County officials to support its development. In each jurisdiction, the lead agencies will be contacted and asked to report on the status of implementation, including obstacles to progress and recommended solutions. All 27 incorporated municipalities within Prince George's County will be invited and encouraged to attend the annual meeting. To monitor progress, the Department of Environment may convene a meeting of the appropriate agencies to discuss and determine progress, and to identify obstacles to progress, if any.

The Plan will be evaluated for effectiveness by the Mitigation Advisory Committee during each annual meeting. To evaluate effectiveness of the Plan, the Committee members will determine mitigation actions that have been successfully implemented and identify additional support if needed to advance near-term actions. Additionally, the Committee will update the public on action status and document hazard occurrences and impacts. Finally, the Committee will identify new or additional vulnerabilities that may impact the County and City, to be addressed in the future update of the Plan.

In addition to the scheduled reports, the Office of Homeland Security, the Department of Environment, and the City of Laurel Emergency Manager will convene meetings after damage-causing natural hazard events to review the effects of such events. Based on those effects, adjustments to the mitigation actions and priorities may be made or additional event-specific actions may be identified. Such revisions shall be documented as outlined in **Section D**, below.

## D. Evaluations, Revisions, and Updates

Revisions that warrant changing the text of the HMP or incorporating new information may be prompted by a number of circumstances, including the identification of new mitigation actions, the completion of several mitigation actions, a significant change in hazard risk, or to satisfy requirements to qualify for specific funding. Minor revisions may be handled by addenda.

A major comprehensive review and revision of the HMP will be considered over a five-year cycle. The HMP was first adopted in 2005 and the first updated plan was in 2010. The County and City adopted the 2023 update on October 12, 2023 following Maryland Department of Emergency Management and FEMA conditional approval. The Mitigation Advisory Committee will be re-convened by the Prince George's County Office of Homeland Security Regional Planner and City of Laurel Department of Emergency Services Emergency Manager to conduct the comprehensive evaluation and update during the next cycle. At that time, natural hazard events that have occurred will be incorporated and the risk assessment will be updated if such events indicate new or altered exposures. Particular attention will be given to progress made on the mitigation actions. Actions that have not been completed and new actions that have been identified will be re-prioritized and examined in terms of feasibility, staff resources, County and City goals, and budget limitations.

The Mitigation Advisory Committee will involve the public in the plan maintenance process and during the major comprehensive review of the HMP utilizing at least the same level of effort as described in this

update. The public will be notified when the revision process is started and provided the opportunity to review and comment on changes to the HMP and the proposed mitigation actions. It is expected that a combination of virtually-distributed information, draft documents posted on the website, and/or public County and City Council meetings may be used.

## E. Future Improvements

The Hazard Mitigation Process is designed to be steps to continuous improvement and refinement. In order to support this effort, recommendations made during this review that were not able to be implemented due to time and budget constraints were compiled, and a review of other recently published and comparable hazard mitigation plans was conducted. The resulting recommendations for the next comprehensive update of the 2023 HMP are described below.

- Integrating the Risk Assessment's mapping into the Hazard Risk Index: The Hazard Risk Index used in the summary section of the Risk Assessment provides a way to compare and rank hazards by their overall impact on the planning area. This could be taken a step further by integrating GIS analyses into the index scores of spatial hazards so they can be automatically computed not only for the planning area as a whole, but smaller communities. This can allow for more targeted mitigation actions to be linked to specific areas, since hazard impacts can vary greatly across the planning area.
- Priority Project Sheets: A priority project sheet can be developed for the top 5 or so actions as identified by the Mitigation Advisory Committee and/or the public. These sheets would be based on the funding application requirements for the action's most likely funding opportunity. This would allow for a head start on the future application which may increase project implementation.
- Neighborhood Focus Groups: Hazard risk, vulnerability, and priorities can vary greatly between neighborhoods and communities throughout the planning area. To help integrate these differences into the overall Mitigation Strategy, focus groups can be used to gather valuable feedback from priority neighborhoods or populations. This would also help develop a more detailed, intersectional social vulnerability analysis to assess the County's current abilities to ensure that projects have distributional equity.
- State Integration: Further integrating with the State of Maryland's identified priorities and related frameworks.
- Risk Hot-Spot Mapping: Combine all spatial assessments to identify and more granularly map "hot spots" of overlapping hazard risk, social vulnerability, and future development.
- Standalone Executive Summary: Public feedback highlighted the desire for a standalone executive summary that provides the most important information for the average County or City resident in a more manageable package. While the current executive summary gives a high-level overview, a more thorough versions could be developed, or perhaps tailored versions for the City of Laurel and Prince George's County.

## F. Public and Stakeholder Involvement

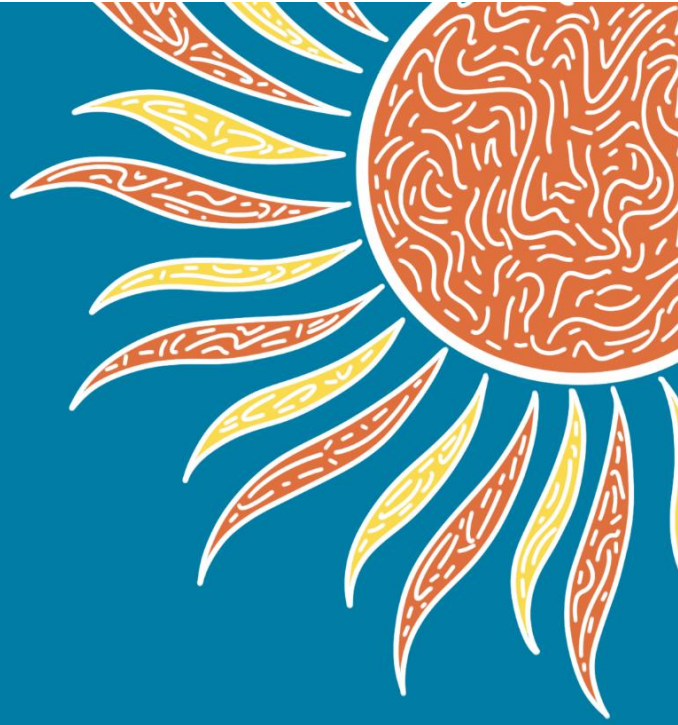
Feedback from residents, businesses, and other stakeholders is a critical part of hazard mitigation planning. The input from the Prince George's County and the City of Laurel public was a highly valuable part of the 2023 HMP update, and it will continue to be sought as the planning process continues and

evolves. Public and stakeholder involvement helps guide mitigation actions and projects through prioritizing what the public values and needs.

Public notice of the annual review will be given, and public participation will be actively invited. At a minimum, notification will be through web postings and press releases to local media outlets, primarily newspapers. In addition, an annual event will be held to publicize progress on implementing the mitigation plan. This event could be timed to coincide with the anniversary of a significant event or annual awareness event. The County will also post a link to the mitigation plan on the Office of Homeland Security's website. It is recommended that the County's website serve as a means of communication by providing information about mitigation initiatives and updates to the projects and the HMP itself.

As resources become available, social media should be utilized to publicize public hazard mitigation planning meetings and news. Specifically, community Facebook groups and the Prince George's County Subreddit can be utilized as they are already-existing community networks that allow for greater exposure to those who do not typically see notices about hazard mitigation planning. Feedback can and should be solicited from these groups as a way to bolster knowledge of hazard issues using local knowledge.

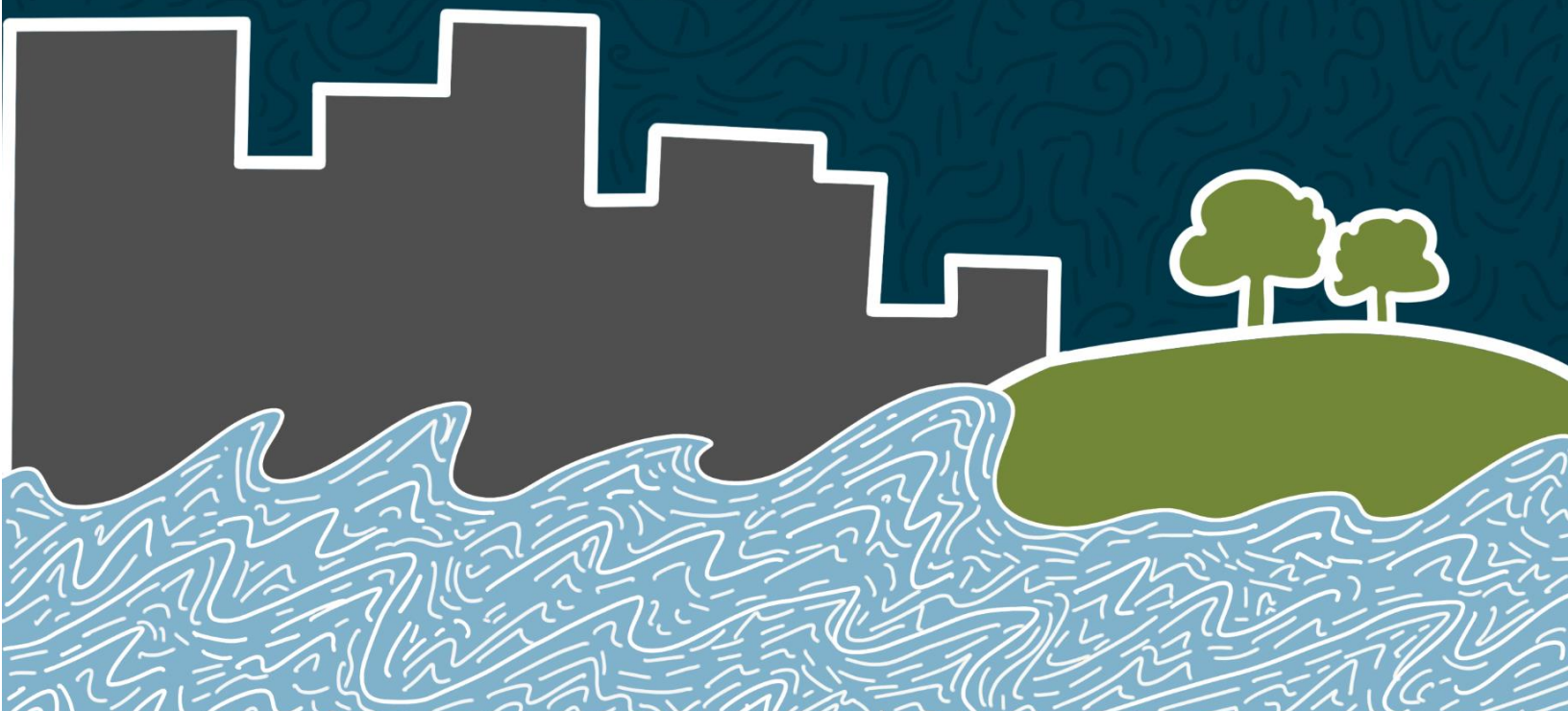
Additionally, as described in the future improvements section, outreach can be conducted to further involve community groups (e.g., church groups, schools, volunteer organizations) in the planning process. Emergency management professionals can also be contacted to determine areas for collaborations and identify specific mitigation projects that can be collaboratively implemented to address hazards that effect both jurisdictions.



Prince George's County & City of Laurel

# HAZARD MITIGATION PLAN 2023

## APPENDICES



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# Appendix A. Mitigation Advisory Committee

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  - a. Presentation
  - b. Agenda
  - c. Notes
  - d. Attendance
2. Risk Assessment Results Meeting
  - a. Presentation
  - b. Agenda
  - c. Notes
  - d. Attendance
3. Mitigation Strategy Workshop
  - a. Presentation
  - b. Agenda
  - c. Notes
  - d. Attendance
4. Mitigation Strategy Feedback Survey
  - a. Prince George's County Survey
  - b. City of Laurel Survey
5. Plan Review Meeting
  - a. Presentation
  - b. Agenda
  - c. Notes
  - d. Attendance

## A. Kick-Off Meeting

### A.1. Presentation



# Prince George's County Hazard Mitigation Plan 2023 Update

Mitigation Advisory Committee Kick-Off

September 16, 2022 | Microsoft Teams (Virtual)

# AGENDA

- Introduction
- Local Hazard Mitigation Plan Update Overview
- Discussion: Current Plan Status
- Next Steps

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Mitigation Advisory Committee Kick-Off September 16, 2022



## Introductions

### The Decision Makers

- **Mitigation Advisory Committee (MAC)**
- Maryland Department of Emergency Management (MDEM)
- FEMA Region III

### Dewberry Team

- Scott Choquette, Project Manager
- Jade Payne, Deputy Project Manager
- Hanna Rush, Mitigation Planner and HIRA Lead
- Jesse Nelson, Mitigation Planner
- Jillian Browning, Hazus Lead
- Other SMEs as-needed

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Mitigation Advisory Committee Kick-Off September 16, 2022





## Why have a hazard mitigation plan?

- Reduces or eliminates the need to respond (Lessens resource burden)
- Creates resiliency and sustainability
- Promotes Data sharing between different levels of government and academia
- Supports decision-making
- Disaster Mitigation Act of 2000
  - Certain FEMA Public Assistance (State Plans)
  - FEMA's Hazard Mitigation Assistance Programs

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Mitigation Advisory Committee Kick-Off September 16, 2022



## Hazard Mitigation Grants

- Local communities must have a FEMA-approved Hazard Mitigation Plan in place to receive Federal grant funds for hazard mitigation projects, such as:
  - BRIC (Building Resilient Infrastructure and Communities)
  - HMGP (Hazard Mitigation Grant Program)
  - HMGP Post Fire
  - FMA (Flood Mitigation Assistance)
- Other (non-FEMA) funding sources




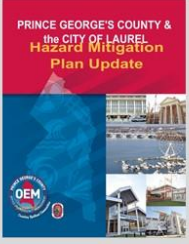
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Mitigation Advisory Committee Kick-Off September 16, 2022



# Prince George's Planning Context




Dewberry will:	2017 HM Plan	You will:
<ul style="list-style-type: none"><li>Facilitate the process</li><li>Provide technical expertise and consultation</li><li>Do the heavy lifting</li></ul>		<ul style="list-style-type: none"><li>Participate and provide hazard information in a timely manner</li><li>Make final decisions</li><li>Provide local context</li></ul>

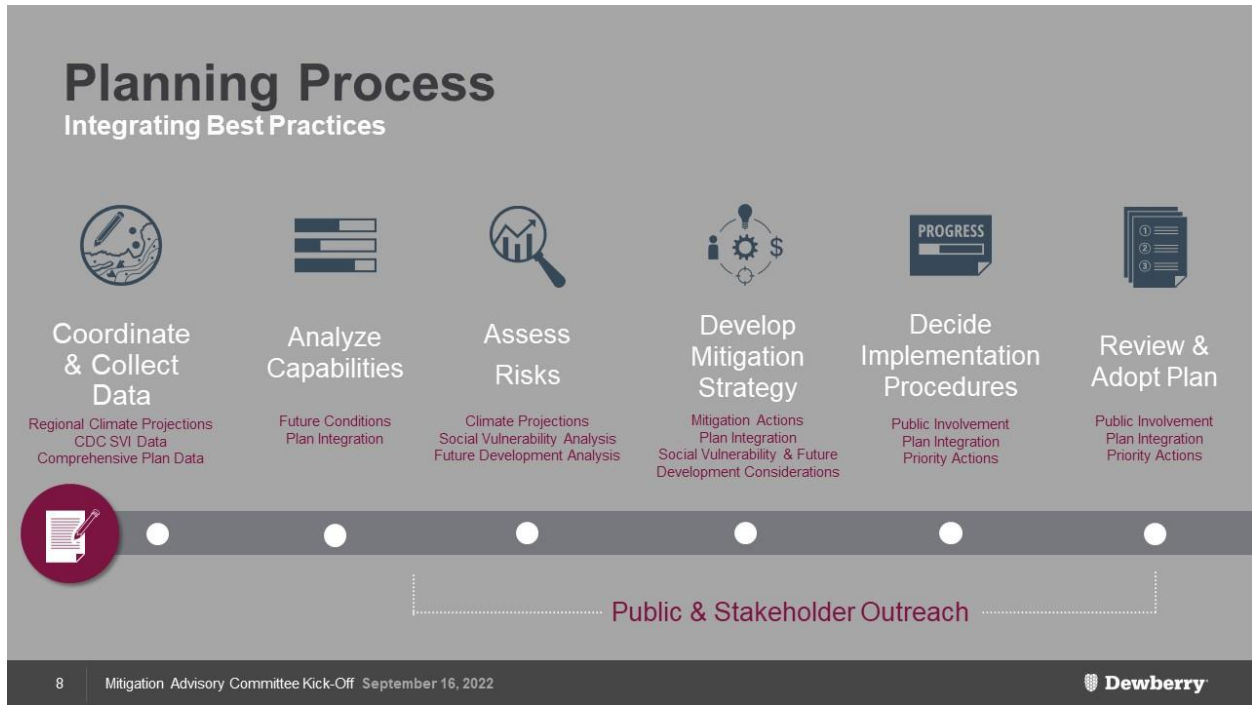
6 | Mitigation Advisory Committee Kick-Off September 16, 2022 

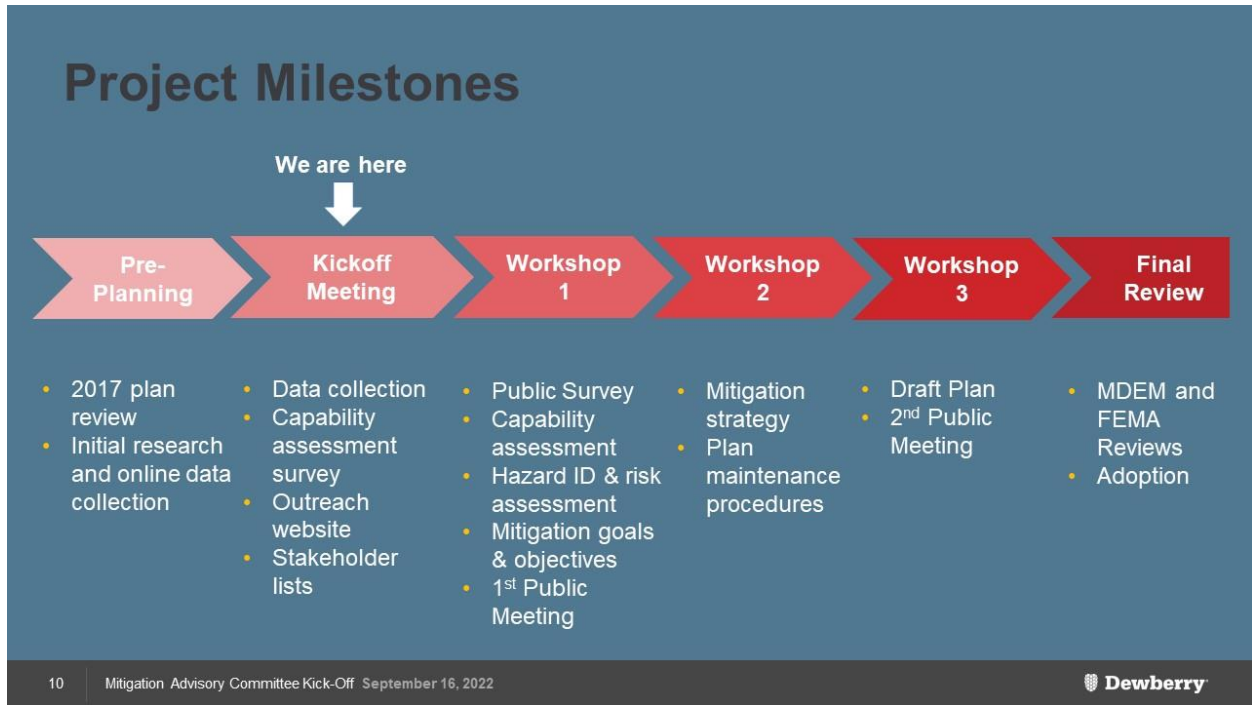
# Hazard Mitigation Plan Update

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## Overview

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## Plan Update Requirements

### Per 2022 FEMA Local Mitigation Planning Policy Guide

- **Reflect changes in development:**
  - Increases or decreases in hazard vulnerability, changes in social vulnerability, changes in capabilities
  - New construction, planned development
  - Climate change, population changes, policy/regulatory changes
- **Reflect changes in priorities and progress in local mitigation efforts:**
  - Written narrative for PG County and the City of Laurel
  - Status of all hazard mitigation actions in the previous plan
  - Description of how mitigation plan was integrated into other planning mechanisms

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## Right-Sizing the Update Scope

### Per 2022 FEMA Local Mitigation Planning Policy Guide

- The participants choose the scope
- “Where hazard risk has not significantly changed, a jurisdiction may simply use the update process to **review, fill in gaps and verify existing information**. The updated plan must document that the information was reviewed and remains accurate.”
- “The **update may be small if relatively little has changed**, or it may be large if more engagement is needed to bring together partners and stakeholders due to changes in demographics, development, and disaster frequency and intensity.”

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## Improvements to the Plan

- **Hazus** Loss Estimation
- Expanding stakeholder and public **outreach**
- Address **future conditions** (i.e., climate change land use change, population change)
- Integrate equity and **social vulnerability**
- Include **Community Lifelines**
- Emphasizing **building codes and land use and development ordinances**
- Align with NFIP, **CRS**, and Risk MAP (flood risk mapping)
- Meet high **hazard potential dam grant program requirements** (include all dam risks)
- **Plan integration** (e.g., Prince George's PLAN 2035, 2021 MD State HMP)

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# Current Plan Status & Updates

Discussion

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## HIRA Components



Hazard Ranking



Hazard Profiles



Climate Change  
Impacts



Hazard History (Locations,  
Extents, Occurrences)



Vulnerability, Exposure,  
and Loss Estimations



Probability of Future  
Events



Potential Impacts




State HMP Integration


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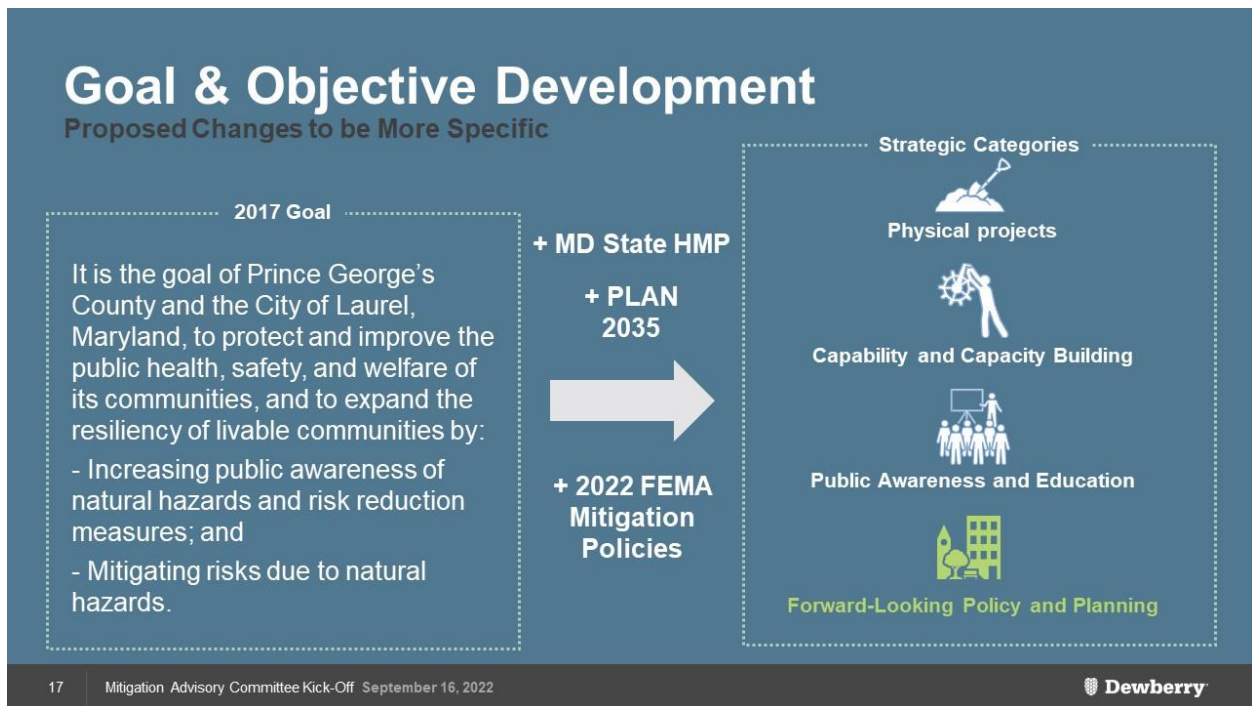
Mitigation Advisory Committee Kick-Off September 16, 2022



Hazard Type	2017 Ranking	2023 Consideration Level
Riverine Flooding	High	<b>Changes?</b>
Coastal Flooding	Medium-Low	
Severe Storms (Flood-Related)	High	
Flood Risk – Dam Failures	Medium	
Flood Risk – Levee Failures	Medium	
Tornadoes	High	
Severe Storms (Wind-Related)	Medium-High	
High Winds	Medium-High	
Hurricanes/Tropical Storms (Wind-Related)	Medium-High	
Winter Storms/Blizzards	Medium-High	
Wildfire	Low	
Drought	Medium-Low	
Earthquakes	Medium	
Land Movement/Landslides	Medium-Low	
Sinkholes	Low	
Extreme Heat	Medium	
Extreme Cold	Medium-Low	



**Hazard Ranking Priority** 



## Mitigation Strategy

What do you want to focus on?



- Emphasize future conditions in the STAPLE/E action prioritization method
  - Climate projections, social vulnerability, community lifelines and future development
- Integrate actions from other related State, Regional, County, and City plans or reports
- Start thinking about what projects and actions you want to see happen over the next 5 years.

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## Discussion: Developments Since 2017

- What **hazard events** have you experienced?
- What **mitigation projects** have you completed?
- What are your **current priorities**?
- What about the 2017 plan would you like to see **changed**?
- How can we **make the plan more useful**?
- How can we make going from **actions in the plan to implementing projects** easier/more likely?



Discussion

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# Next Steps

## Schedule & Action Items

20 Mitigation Advisory Committee Kick-Off September 16, 2022



	Sep	Oct	Nov	Dec	Jan '23	Feb	March
<b>HM Plan Milestone:</b>	Kick-Off	Outreach Begins	HIRA & Strategy Workshops	Draft Plan	MDEM Review	FEMA Review	Adoption
Review 2017 HMP	█						
Data Collection	█						
HIRA	█	█	█				
Capability Assessment		█	█				
Revise Goals + Objectives			█				
Mitigation Strategy Development			█	█			
Public Engagement		█	█	█			
HMP Writing / Revising		█	█	█	█	█	
MDEM Review / Approval					█		
FEMA Review / Approval					█	█	
Plan Adoption, Approval Letters, Plan Distribution							█

## Project Schedule



## What We Need From You:

1. Contact List (suggested stakeholder list already sent)
2. Requested Data for HIRA (list already sent)
3. Comments received from FEMA Region 3 in 2017 (FEMA review tool) (*new request*)
4. Capability Assessment Worksheet – County and City each get one (*coming soon*)
5. Mitigation Strategy Status Update (*coming soon*)

Please email to Jade Payne ([jjpayne@dewberry.com](mailto:jjpayne@dewberry.com))

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## Questions?



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## A.2. Agenda



### Meeting Agenda

**Title:** Prince George's County Hazard Mitigation Plan Update Kick-Off      **Location:** Microsoft Teams (Virtual)

**Date:** Friday, September 16<sup>th</sup>, 2022      **Time:** 12:00 – 1:00 pm ET

**Purpose:** The 2023 update of the Prince George's County, MD Hazard Mitigation Plan is underway. Dewberry will provide an overview of the planning process and the input that will be needed from the County and the City of Laurel to update the plan.

#### Agenda Items

Topic	Presenter	Time
<b>Introduction:</b> <ul style="list-style-type: none"> <li>- Roles</li> <li>- Purpose</li> <li>- Expectations for Mitigation Advisory Committee</li> </ul>	Scott Choquette, Dewberry	12:00 – 12:05 pm
<b>Local Hazard Mitigation Plan Update Overview:</b> <ul style="list-style-type: none"> <li>- Planning Process</li> <li>- Milestones</li> <li>- Update Requirements</li> <li>- "Right-Sizing" the Update Scope</li> <li>- Improvements to the Plan</li> </ul>	Jade Payne, Dewberry	12:05 – 12:20 pm
<b>Current Plan Status Discussion:</b> <ul style="list-style-type: none"> <li>- Hazard Ranking</li> <li>- Recent Updates/Hazard Events</li> <li>- Mitigation Strategy Update</li> </ul>	Scott Choquette	12:20 – 12:40 pm
<b>Next Steps:</b> <ul style="list-style-type: none"> <li>- Project Schedule</li> <li>- Action Items</li> </ul>	Jade Payne	12:40 – 12:50 pm
Questions	All	12:50 – 1:00 pm

### A.3. Notes



## Meeting Notes

**Title:** Prince George's County Hazard Mitigation Plan Update Kick-Off      **Location:** Microsoft Teams (Virtual)

**Date:** Friday, September 16<sup>th</sup>, 2022      **Time:** 12:00 – 1:10 pm ET

**Purpose:** The 2023 update of the Prince George's County, MD Hazard Mitigation Plan is underway. Dewberry will provide an overview of the planning process and the input that will be needed from the County and the City of Laurel to update the plan.

- Attendees:**
1. Scott Choquette, Dewberry (Presenter)
  2. Jade Payne, Dewberry (Presenter)
  3. Ehsan Bahador, Prince George's County
  4. Joey Henderson, Prince George's County
  5. Dawn Hawkins-Nixon, Prince George's County
  6. Ronald E. Gill, Prince George's County
  7. Lilantha Tennekoon, Prince George's County
  8. Tiatte M. Day, Prince George's County
  9. Christina Cornwell, City of Laurel
  10. Alexandra D. Harris, Prince George's County

### Meeting Summary

Scott Choquette (Project Manager, Dewberry) and Jade Payne (Deputy Project Manager, Dewberry) met with the Prince George's County Mitigation Advisory Committee (MAC) on September 16, 2022 to provide an overview of the mitigation plan update process. A PowerPoint presentation was used to review the project purpose, schedule, public outreach plan, and the planned updates to each section. Discussions were held throughout the presentation so Dewberry could gather feedback from the MAC on how the plan update should proceed. Discussion and presentation topics are grouped below with input and questions from the MAC.

### Meeting Notes

<b>Introduction</b>
No Comments
<b>Local Hazard Mitigation Plan Update Overview</b>
No Comments

- Lilantha: MDE alerted the County that we should designate more of our dams as HHPD or significant dams. We have 35 high-hazard/significant dams in the county. Many are owned by the County, Laurel has one, and a few others are city/municipal managed. The new tally is 35. The MDE website has the spreadsheets, but we can also provide them.
- Ron: Dawn – can we talk about the climate change task force soon?
  - Dawn: Sure.
- Christina (City of Laurel): CRS progress – we are now officially a part of it. We may have done some floodproofing to city facilities, but I have to double-check. We should have recommendations from USACE on a regional project (technical study) that gives recs for regional projects. Within that, USACE did a flood study that we have as well. We have an EAP for our HHPD. We had an inspection done and a tabletop exercise. There may be a few questions that I have later on since I wasn't involved last time. Drought response/planning was supposed to happen with WSSE and the County—not sure if that happened. After this plan was approved, the city did a flood addendum that was submitted and approved. That was supposed to be adopted by the county but I don't think it was.

#### Action Items: Data Request Questions

- Ehsan: Regarding critical facilities – much of that information is considered sensitive data from the county (e.g., federal facilities)
  - Ron: I'm fine with providing addresses and types of facilities (hospitals, police departments, etc.) since that can be found online anyway.
- Ehsan: Regarding population projections, that information can come from the census.
- Ehsan: What do you mean by 'future development'?
  - Scott: An area of redevelopment or planned development/improvement

#### Next Steps: Action Items

1. Contact List (*suggested stakeholder list sent to County*)
2. Requested Data for HIRA (*list sent to County*)
3. Comments received from FEMA Region 3 in 2017 (FEMA Review Tool) (*action item from meeting*)
4. Provide flood addendum to 2017 plan (*action item from meeting*)
5. Provide updated dam spreadsheet (*action item from meeting*)
6. Christina (City of Laurel): Provide information on mitigation projects since 2017 (floodproofing city facilities) (*action item from meeting*)
7. Christina (City of Laurel): Provide any information you have on USACE technical studies and recommendations. (*action item from meeting*)
8. Capability Assessment Worksheet – County and City each get one (*coming soon*)
9. Mitigation Strategy Status Update (*coming soon*)

Please email to Jade Payne at [jpayne@dewberry.com](mailto:jpayne@dewberry.com)



**Current Plan Status Discussion – Hazard Ranking**

- Ehsan: The ratio of flash flooding has been increasing. We've seen changing rainfall patterns.
- Dawn: I agree about flash flooding as an emerging hazard. Is the mapping of pluvial flooding a requirement to consider it a hazard in the plan? If we know the general areas of the flooding often, can we use that?
  - Scott: Yes, we can use that anecdotal information in the plan. I would recommend including an action to create a "rain on grid" type model in the mitigation strategy. We will figure out some way to include it.
- Dawn: The County completed a climate action plan where extreme heat was included as an emerging/high hazard in the County. We could change it to "Medium-High"
  - Scott: We can do that, and we have seen communities include action around shade tree plantings, cooling centers, etc.
- Joey: Do we see more power outages from severe storms (wind-related)?
  - Dawn: We've had a couple in the summer associated with microbursts. It is becoming a little bit more common, but it is still medium-high ranking in my opinion.

**Current Plan Status Discussion – Mitigation Goal**

- Ehsan: We focus on all four categories already, but the main aspect of mitigation strategies should be the same.
  - Scott: We will take the first pass at the new goals and objectives and run it by you for review.

**Current Plan Status Discussion – Developments Since 2017**

- Dawn: We've created a Climate Action Plan.
- Dawn: Flooding – With the availability of federal funding to address infrastructure issues, the County has been able to put more of our CIP efforts toward addressing the small residential drainage issues. Our programming has been modified a little bit to reflect this and put more effort toward flood mitigation based on grant availability.
- Dawn: We are embarking more on efforts to reduce our GHG emissions. There is some overlap with flood mitigation efforts on natural resources side (e.g., green infrastructure). Some of our county-level priorities are moving in the direction of climate adaptation and incorporating flood mitigation.
- Ehsan: We have been encouraging more nature-based solutions based on FEMA priorities (combo of green/grey infrastructure). This would be more innovative mitigation actions. We integrated community lifelines and SVI for HMA applications to enhance equity with socially vulnerable populations. We have been focusing more on hazards that will be amplified or intensified by climate change.
- Ehsan: I would like to see the plan updated based on what the new policy from FEMA says. That would be the biggest change I'd want to see.
- Dawn: We should ensure that we are accounting for recommendations coming from other plans underway in the county. We have a climate implementation task force that will be working to identify priority projects/efforts for the county to invest in to reduce or carbon footprint. We are also embarking on watershed studies with USACE and a consultant to identify mitigation measures in specific watersheds to reduce flood risk. We should have some recommended projects from those in the next phase of the study.
  - Scott: Do you know the timeline for the studies or task force?
  - Dawn: The task force should have findings by the end of this fiscal year (June/July 2023). As for the watershed studies, the timeline is underway still.
  - Lilantha (leading studies): We are looking at 2 years for the bigger watersheds, but smaller ones maybe Oct 2023/end of fiscal year 2024.

## A.4. Attendance

### 1. Summary

Meeting title	Prince George's County HMP Update Kick-Off
Attended participants	10
Start time	9/16/22, 11:55:55 AM
End time	9/16/22, 1:09:48 PM
Meeting duration	1h 13m 53s
Average attendance time	1h 6m 43s

### 2. Participants

Name	First join	In-meeting duration	Email
Choquette, Scott	9/16/22, 11:56:08 AM	1h 13m 27s	[REDACTED]
Bahador, Ehsan	9/16/22, 11:57:10 AM	1h 12m 27s	[REDACTED]
Henderson, Joey L.	9/16/22, 11:59:10 AM	1h 10m 25s	[REDACTED]
Payne, Jade Hawkins-	9/16/22, 12:00:26 PM	1h 9m 22s	[REDACTED]
Nixon, Dawn Gill,	9/16/22, 12:01:13 PM	1h 8m 21s	[REDACTED]
Ronald E. Tennekoon,	9/16/22, 12:01:13 PM	1h 8m 22s	[REDACTED]
Lilantha Day, Tiatte M.	9/16/22, 12:02:11 PM	1h 6m 15s	[REDACTED]
Christina Cornwell	9/16/22, 12:05:16 PM	1h 4m 21s	[REDACTED]
Harris, Alexandra D.	9/16/22, 12:05:27 PM	1h 4m 4s	[REDACTED]
	9/16/22, 12:10:07 PM	50m 8s	[REDACTED]

## B. Risk Assessment Results Meeting

### B.1. Presentation



# Prince George's County Hazard Mitigation Plan 2023 Update

MAC: Risk Assessment Results & Discussion

November 16, 2022 | Microsoft Teams (Virtual)

## AGENDA

- Project Status
- Hazard Identification & Risk Assessment Results
- Discussion: Draft Mitigation Goals
- Brainstorm: Project & Project Locations Identification
- Next Steps

Prince George's County, MD

# Project Status

## Planning Process Updates & Milestones

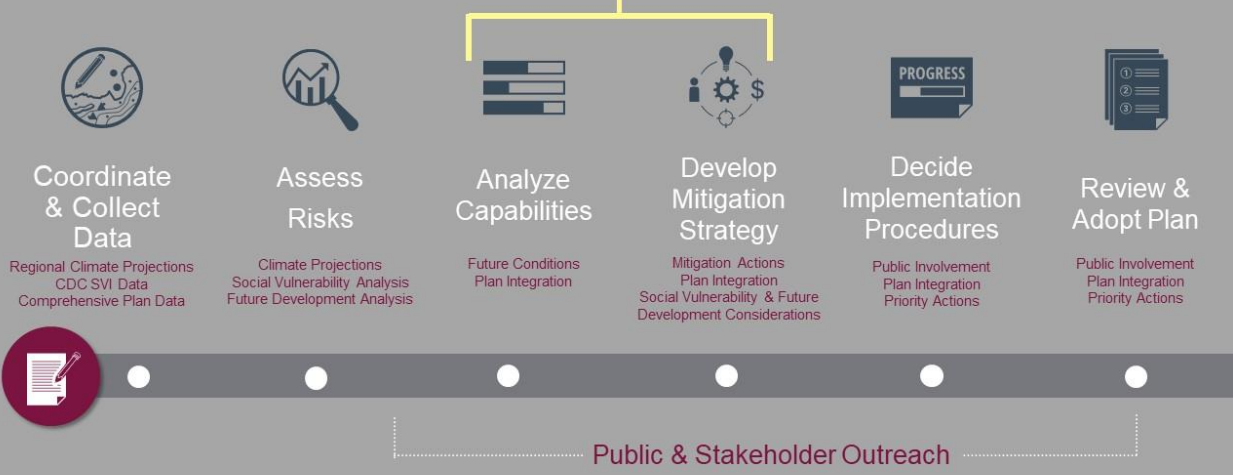
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# Planning Process

We Are Here!




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	Sep	Oct	Nov	Dec	Jan '23	Feb	March
HM Plan Milestone:	Kick-Off	Outreach Begins	Risk Assessment & Strategy Workshops		Draft Plan & MDEM Review	FEMA Review	Adoption
Review 2017 HMP							
Data Collection							
HIRA							
Capability Assessment							
Revise Goals + Objectives							
Mitigation Strategy Development							
Public Engagement							
HMP Writing / Revising							
MDEM Review / Approval							
FEMA Review / Approval							
Plan Adoption, Approval Letters, Plan Distribution							

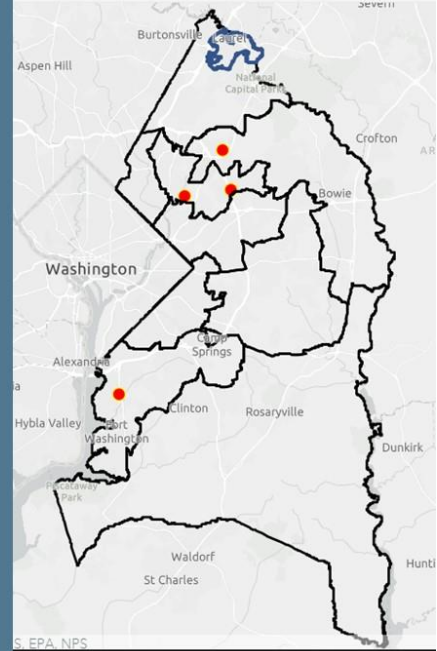
**Project Schedule** 

## Capability Assessment

- Currently underway!
- Most of the information remains consistent with the 2017 plan
- A **handout or survey** will be sent out to County & City representatives to fill in any remaining gaps once the initial review & update is complete

## Public Outreach Progress

- Public Meeting #1 Turnout:
  - 19 Attendees = 6 Stakeholders + 5 General Public + 8 MAC/County
- Public Survey: 14 responses
- Social Media Advertisements: 475+ views & interactions
- Community Hazard Mapping: 4 responses (see figure)



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## Hazard Identification & Risk Assessment (HIRA)

### Results Highlights

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## What will we cover today?

- **New components** will be reviewed: climate projections, social vulnerability, and future development
- The following slides will provide an **overview of the new/emerging risks** as compared to the 2017 results
- The full draft HIRA chapter will be circulated to the MAC for review in the next couple of weeks and then sent to MDEM for a preliminary review.

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## Future Conditions: Climate Projections



### Temperature

Days above 90°F to **more than double** & days with max temp below 32°F to **decrease to near 0** by 2044



### Precipitation

Decrease in total "wet" days but **1.4" increase in annual precipitation** by 2044



### Sea Level Rise

**0.2% of county impacted** by global sea level rise by 2044



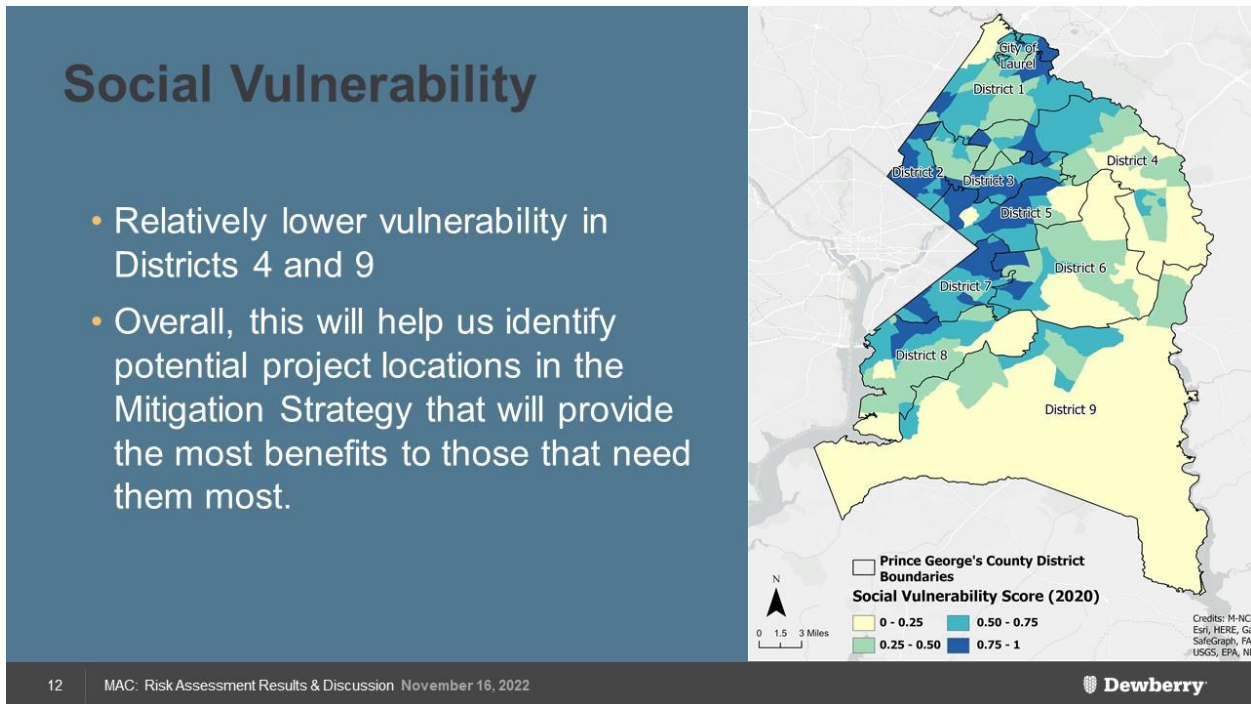
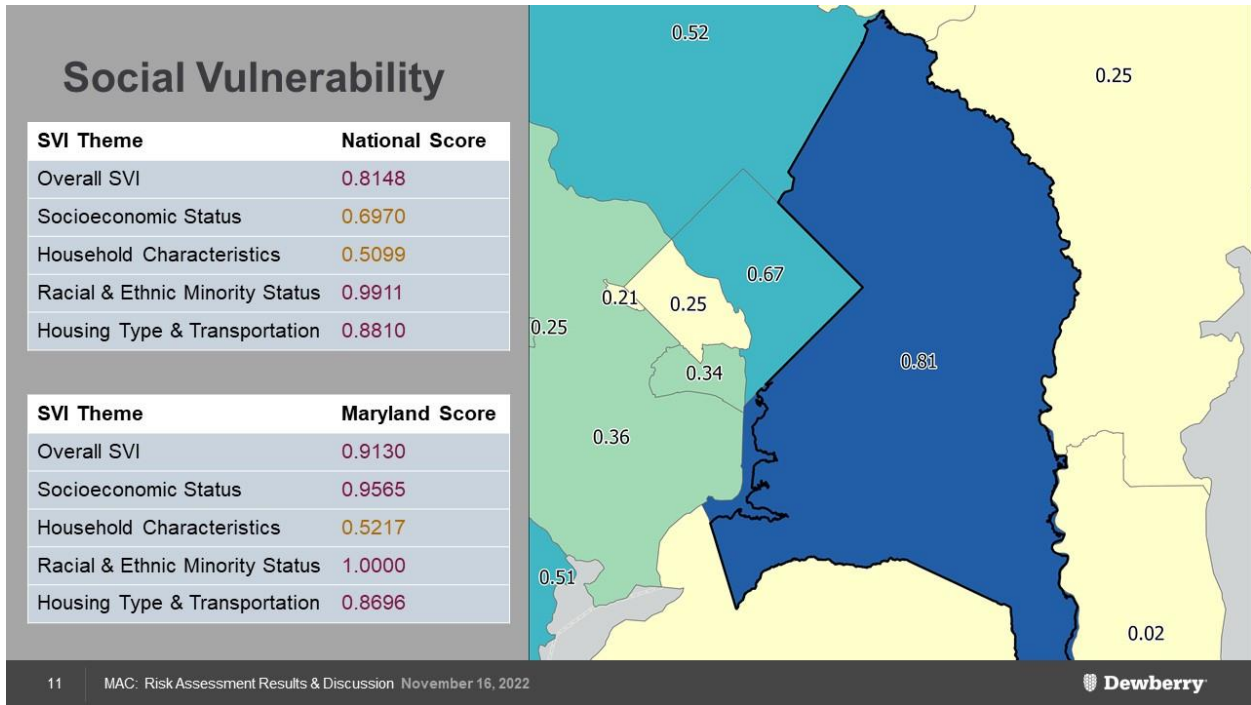
### Severe Storms

Hurricanes expected to bring **upwards of 25% more rainfall** & rapidly intensify

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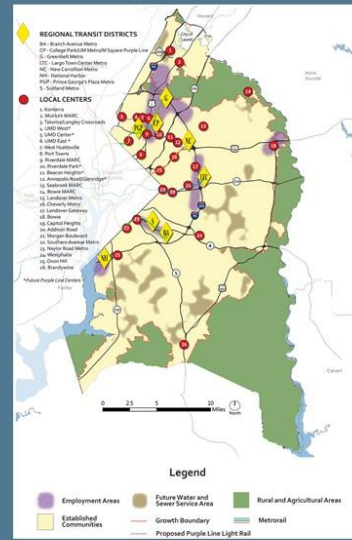




## Comprehensive Planning Integration

- Comprehensive planning data was incorporated
  - Environmental Features
  - Existing and Planned Transportation Investments
  - Existing Development Patterns
  - Projected Growth
- Overlaid with hazard areas to help identify areas of future risk due to increased exposure from future development

PG Plan 2035: Growth Policy Map



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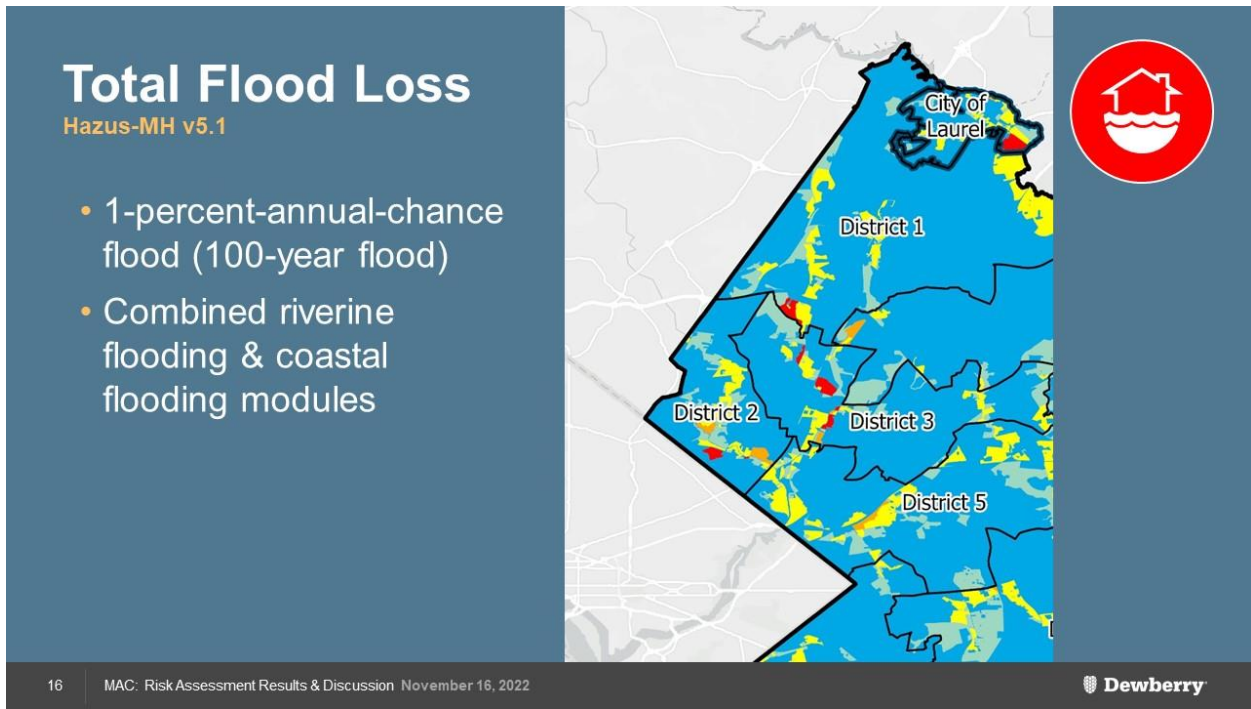
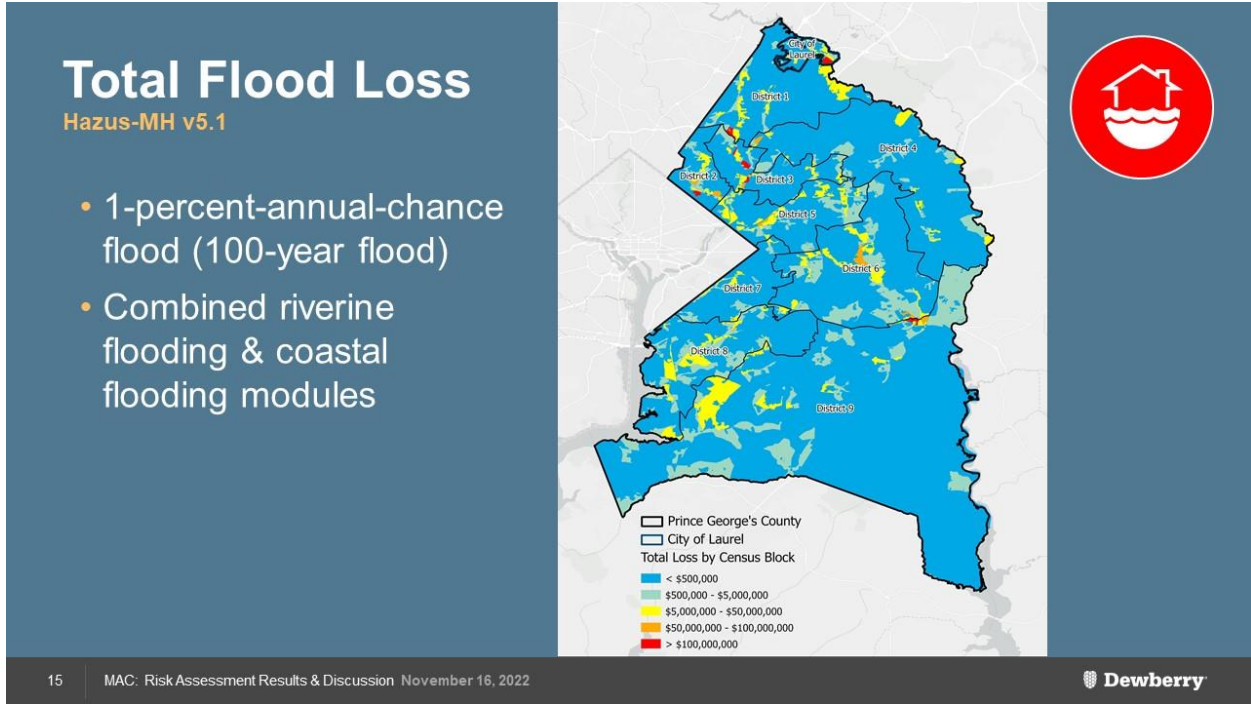
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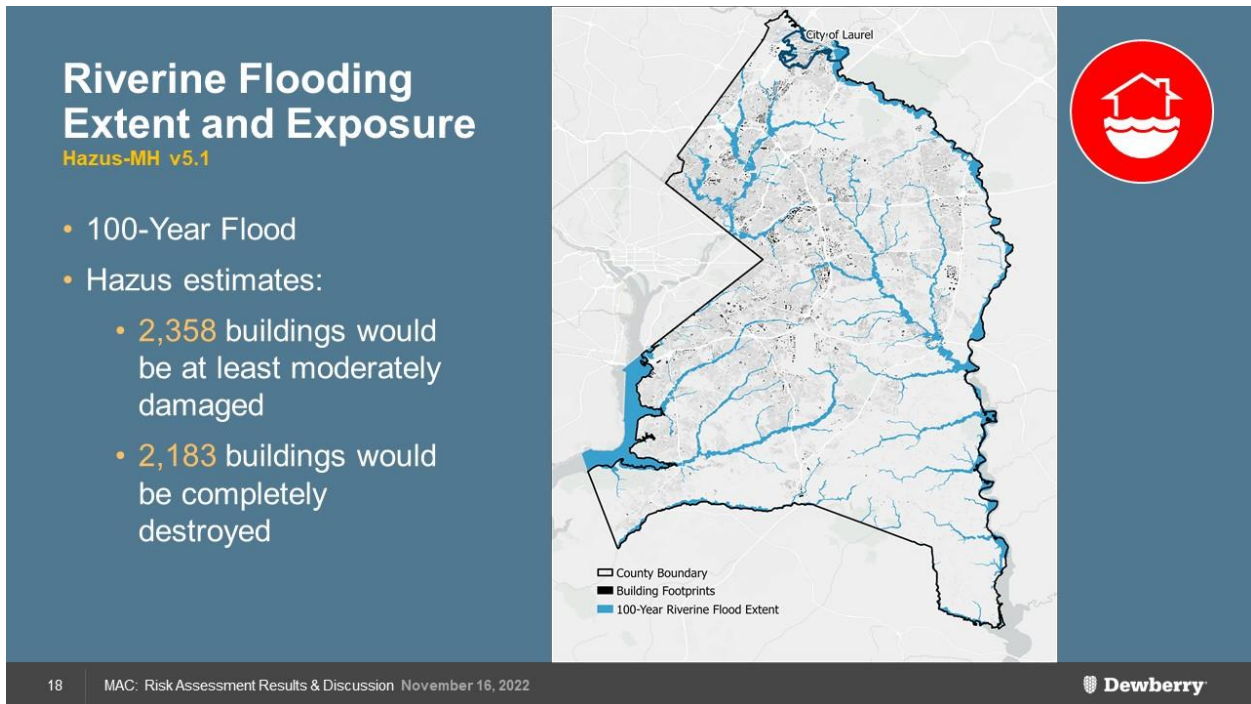
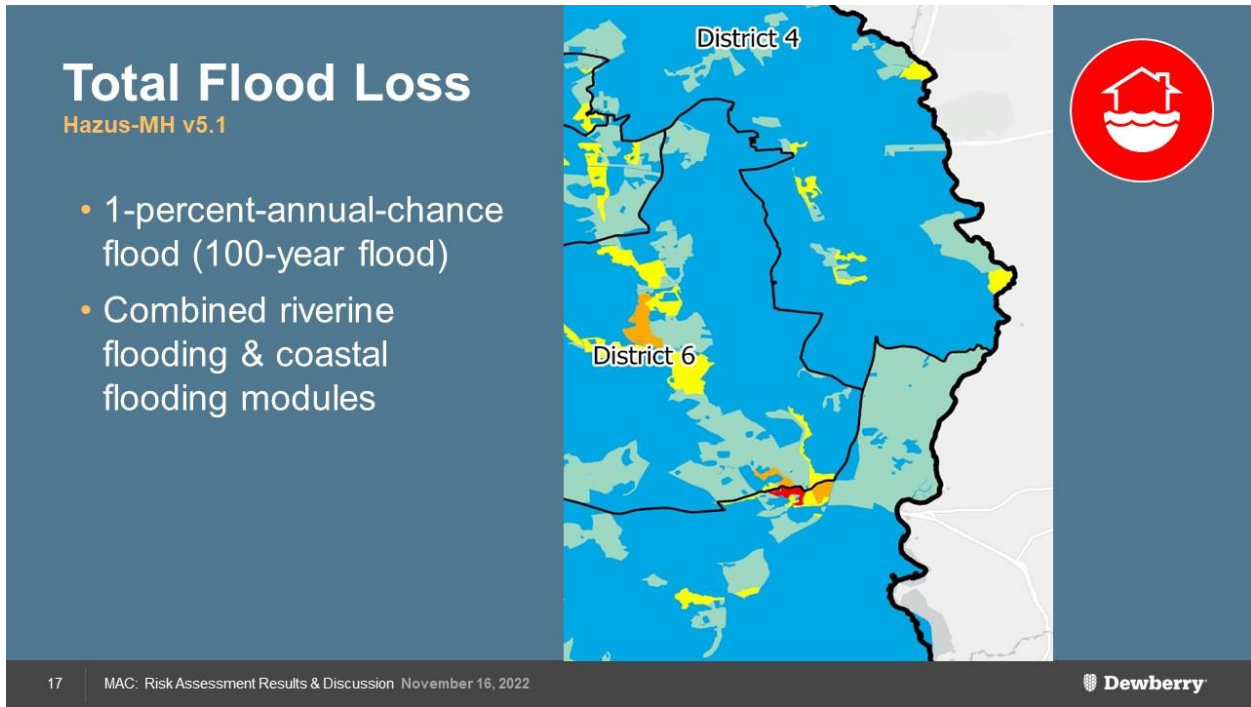


Hazard Type	2017 Ranking	2022 Ranking
Riverine Flooding	High	High
Severe Storm (Flood Related)	High	High
Tornado	High	High
Tropical Storm / Hurricane	Medium-High	Medium-High
Winter Storm	Medium-High	Medium-High
High Winds	Medium-High	Medium-High
Extreme Heat	Medium	Medium-High
Earthquake	Medium	Medium
Dam and Levee Failure	Medium	Medium
Extreme Cold	Medium-Low	Medium-Low
Drought	Medium-Low	Medium-Low
Coastal Flooding	Medium-Low	Medium-Low
Land Movement	Medium-Low	Medium-Low
Wildfire	Low	Low
Sinkholes	Low	Low

## Hazard Ranking Priority







# Riverine Flooding Losses

Hazus-MH v5.1



Prince George's County	100-Year Riverine Flood Losses (in whole dollars)				
	Residential	Commercial	Industrial	Other	Total
<b>Total Exposure</b>					
Prince George's County	\$130,144,361,000	\$26,242,415,000	\$5,564,076,000	\$7,454,437,000	\$169,405,289,000
<b>Direct Losses</b>					
Building	\$834,296,000	\$323,906,000	\$73,819,000	\$72,724,000	\$1,304,745,000
Contents	\$392,305,000	\$408,446,000	\$125,548,000	\$93,673,000	\$1,019,972,000
Inventory	\$0	\$10,790,000	\$19,217,000	\$298,000	\$30,305,000
<b>Subtotal</b>	<b>\$1,226,601,000</b>	<b>\$743,142,000</b>	<b>\$218,584,000</b>	<b>\$166,695,000</b>	<b>\$2,355,022,000</b>
<b>Business Interruption</b>					
Income	\$2,398,000	\$232,281,000	\$2,882,000	\$28,440,000	\$266,001,000
Relocation	\$111,416,000	\$76,858,000	\$2,826,000	\$17,990,000	\$209,090,000
Rental Income	\$57,472,000	\$57,232,000	\$543,000	\$3,069,000	\$118,316,000
Wage	\$5,694,000	\$260,289,000	\$4,002,000	\$269,408,000	\$539,393,000
<b>Subtotal</b>	<b>\$176,980,000</b>	<b>\$626,660,000</b>	<b>\$10,253,000</b>	<b>\$318,907,000</b>	<b>\$1,132,800,000</b>
<b>TOTAL</b>	<b>\$1,403,581,000</b>	<b>\$1,369,802,000</b>	<b>\$228,837,000</b>	<b>\$485,602,000</b>	<b>\$3,487,822,000</b>

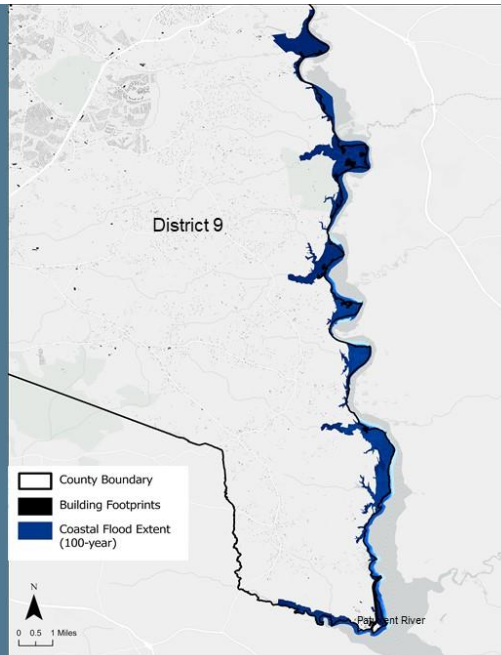
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# Coastal Flooding Extent and Exposure

Hazus-MH v5.1

- Southeast portion of the County affected (District 9)
- Along the Patuxent River
- Low development area



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# Coastal Flooding Losses

Hazus-MH v5.1



Prince George's County	100-Year Coastal Flood Losses (in whole dollars)				
	Residential	Commercial	Industrial	Other	Total
<b>Total Exposure</b>					
Prince George's County	\$130,144,361,000	\$26,242,415,000	\$5,564,076,000	\$7,454,437,000	\$169,405,289,000
<b>Direct Losses</b>					
Building	\$840,000	\$4,000	\$1,000	\$2,000	\$847,000
Contents	\$505,000	\$9,000	\$1,000	\$12,000	\$527,000
Inventory	\$0	\$0	\$0	\$0	\$0
Subtotal	\$1,345,000	\$13,000	\$2,000	\$14,000	\$1,374,000
<b>Business Interruption</b>					
Income	\$20,000	\$9,000	\$0	\$1,000	\$30,000
Relocation	\$136,000	\$0	\$0	\$0	\$136,000
Rental Income	\$53,000	\$0	\$0	\$0	\$53,000
Wage	\$47,000	\$2,000	\$0	\$5,000	\$54,000
Subtotal	\$256,000	\$11,000	\$0	\$6,000	\$273,000
<b>TOTAL</b>	<b>\$1,601,000</b>	<b>\$24,000</b>	<b>\$2,000</b>	<b>\$20,000</b>	<b>\$1,647,000</b>

# Severe Storm (Flood-Related): Events in NCEI Database (2012- October 2022)



Event Type	Number of Events	Current Total Annual Damages	Annualized Deaths	Annualized Injuries	Annualized Events
Flash Flood	21	\$139,000	0	0.30	2.10
Heavy Rain	0	\$0.00	0	0.00	0.00
<b>Total</b>	<b>21</b>	<b>\$139,000</b>	<b>0</b>	<b>0.30</b>	<b>2.10</b>

# Tornado

Annualized Losses, NCEI (1950-2022)



Fujita Scale	Date	Community Affected	Deaths	Injuries	Total Property Damages
EF	05 Jul 2022	Collington	0	0	\$250,000
EF0	29 Sep 2015	Laurel	0	0	\$0
EF0	01 Jul 2013	Crestview Manor	0	0	\$500
EF0	19 Apr 2013	Westphalia	0	0	\$25,000
EF0	01 Jun 2012	Buena Vista	0	0	\$2,000

- Total tornadoes (2012-2022): 5
- Annualized events: 0.5
- Total Annual Damages: \$38,200

# Hurricane: Annualized Loss/Exposure

Hazus  
-MH  
v5.1

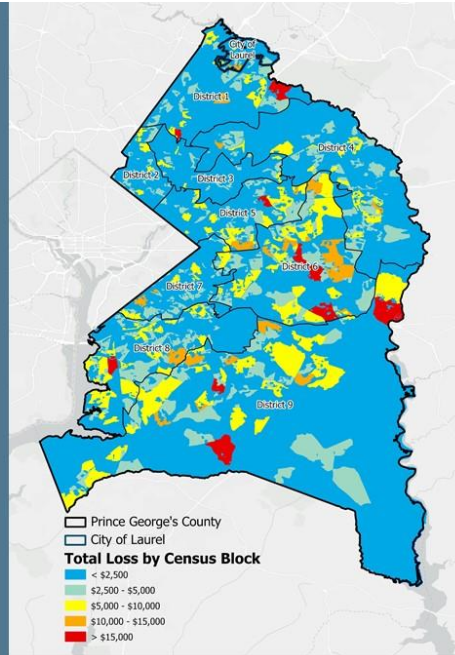


Building Related Economic Loss						
Municipality	Return Period	Building Loss	Content Loss	Inventory Loss	Other Loss	Total Loss
City of Laurel	10-year	\$0	\$0	\$0	\$0	\$0
	20-year	\$0	\$0	\$0	\$0	\$0
	50-year	\$5,141	\$50,404	\$0	\$142	\$55,687
	100-year	\$1,432,367	\$206,920	\$0	\$1,231	\$1,640,517
	200-year	\$6,458,414	\$770,401	\$0	\$83,391	\$7,312,206
	500-year	\$16,437,818	\$1,841,697	\$228	\$929,092	\$19,208,833
Joint Base Andrews	1,000-year	\$20,310,087	\$2,337,410	\$781	\$1,302,886	\$23,951,165
	10-year	\$0	\$0	\$0	\$0	\$0
	20-year	\$0	\$0	\$0	\$0	\$0
	50-year	\$32,442	\$4,621	\$0	\$40	\$37,103
	100-year	\$226,181	\$18,175	\$0	\$160	\$244,516
	200-year	\$746,942	\$56,061	\$0	\$9,623	\$812,626
Prince George's County	500-year	\$2,350,838	\$196,799	\$728	\$161,273	\$2,709,637
	1,000-year	\$3,798,750	\$385,439	\$3,082	\$325,410	\$4,512,681
	10-year	\$0	\$0	\$0	\$0	\$0
	20-year	\$0	\$0	\$0	\$0	\$0
	50-year	\$5,462,149	\$3,335,161	\$0	\$1,181	\$8,798,491
	100-year	\$69,406,206	\$13,043,695	\$8	\$48,202	\$82,498,111
Total	200-year	\$216,153,155	\$36,505,346	\$0	\$735,491	\$253,393,992
	500-year	\$629,343,871	\$100,034,917	\$71,658	\$31,125,278	\$760,575,723
	1,000-year	\$1,050,214,593	\$169,899,270	\$453,233	\$57,533,511	\$1,278,100,608
	10-year	\$0	\$0	\$0	\$0	\$0
	20-year	\$0	\$0	\$0	\$0	\$0

## Hurricane: Annualized Loss

Hazus-MH v5.1

- Total Annualized Loss for Hurricane Model
- Probabilistic scenario run to produce annualized loss



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## Winter Storm: Annualized Events & Damages

NCEI, since 2012



Event Type	Number of Events	Current Total Annual Damages	Annualized Deaths	Annualized Injuries	Annualized Events
Blizzard	1	\$0	0	0	0.3
Heavy Snow	0	\$0	0	0	0
Winter Storm	10	\$0	0	0	1
Winter Weather	47	\$0	0	0	4.7
Ice Storm	2	\$0	0	0	0.2
<b>Total</b>	<b>60</b>	<b>\$0</b>	<b>0</b>	<b>0</b>	<b>6.2</b>

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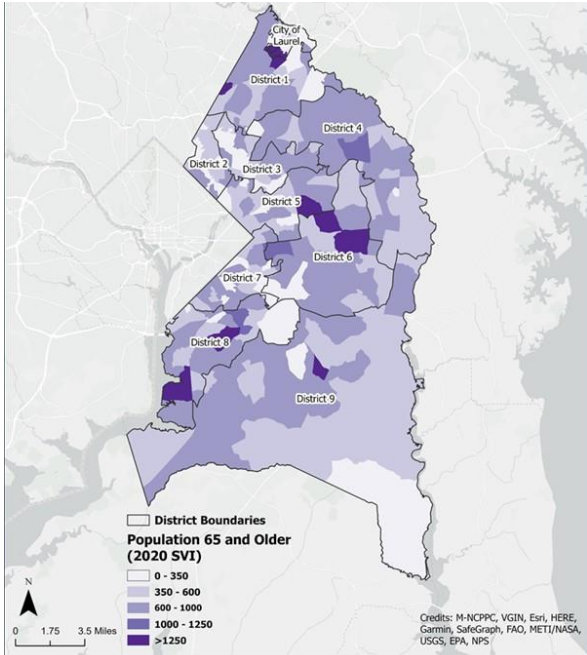
# High/Strong Winds: Historic Event Data

NCEI, since 2012



Event Type	Number of Events	Period of Record	Days with Event and Deaths	Annualized Cost of Damages	Days with Event and Injuries or Death	Annualized Injuries	Annualize Events
High Wind	10	2012-2022	0	\$313,300	4	0.40	1.00
Strong Wind	1	2012-2022	0	\$100	0	0.00	0.10
<b>All Wind Events</b>	<b>11</b>	<b>2012-2022</b>	<b>0</b>	<b>\$131,400</b>	<b>4</b>	<b>0.40</b>	<b>1.10</b>





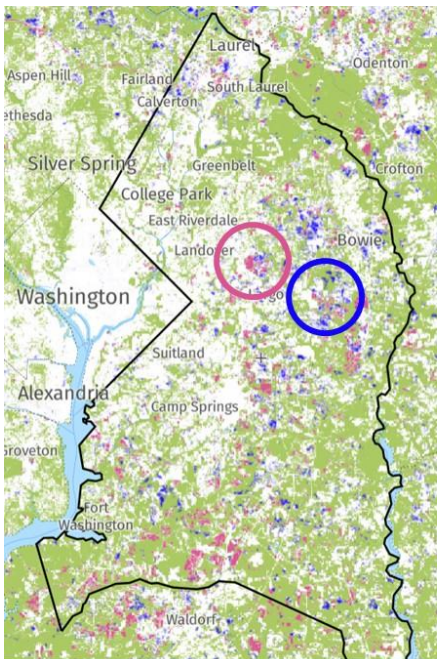
## Heat Vulnerability: 65+, children, single-parent household, disability



- The most at-risk districts which contain the largest population of senior citizens are Districts 1 (City of Laurel), 5, 6, and 8
- Annualized heat and excessive heat events have increased to 3.1

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## Heat Vulnerability: 65+, children, single-parent household, disability

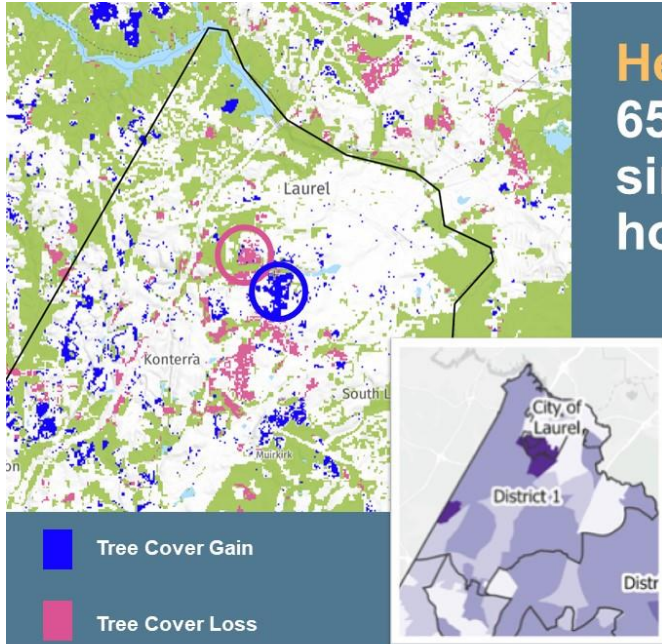


- Tree cover gain is partially in areas with the most vulnerable populations
- However, some of the cover loss is also in other areas with vulnerable populations

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## Heat Vulnerability:

**65+, children, single-parent household, disability**


- Tree **cover gain** is partially in areas with the most vulnerable populations
- However, some of the **cover loss** is also in other areas with vulnerable populations

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## Dam Exposure

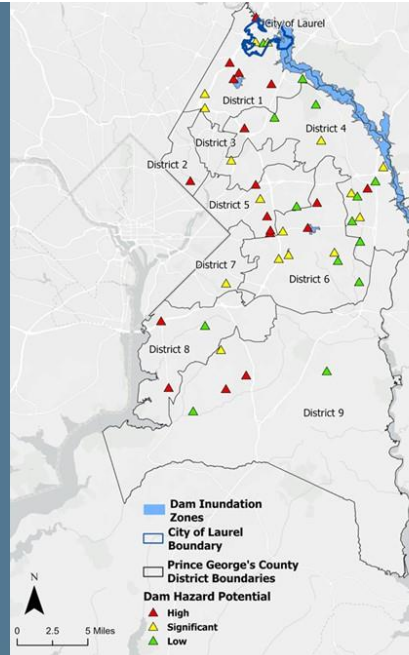
- Dam inundation zones mapped for **7 dams**

Dam	Hazard Potential	Buildings in Inundation Zone	Property Exposure
Duckett Dam	High	964	\$692,272,613
Tinkers Creek Dam	Significant	10	\$669,767
Heritage Glen Dam	Significant	17	\$6,005,665
Indian Creek 2 & 3	High	182	\$151,537,770
Lake Arbor Dam	High	126	\$50,393,250
Largo Town Center Dam	Significant	3	\$44,463,996
Laurel Lakes No 1 Dam	Significant	103	\$327,589,022
<b>Total</b>	<b>--</b>	<b>1405</b>	<b>\$1,272,932,083</b>

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## Dam Failure Inundation Map

- Mapped inundation zones located in the City of Laurel & Districts 1,4,6,9

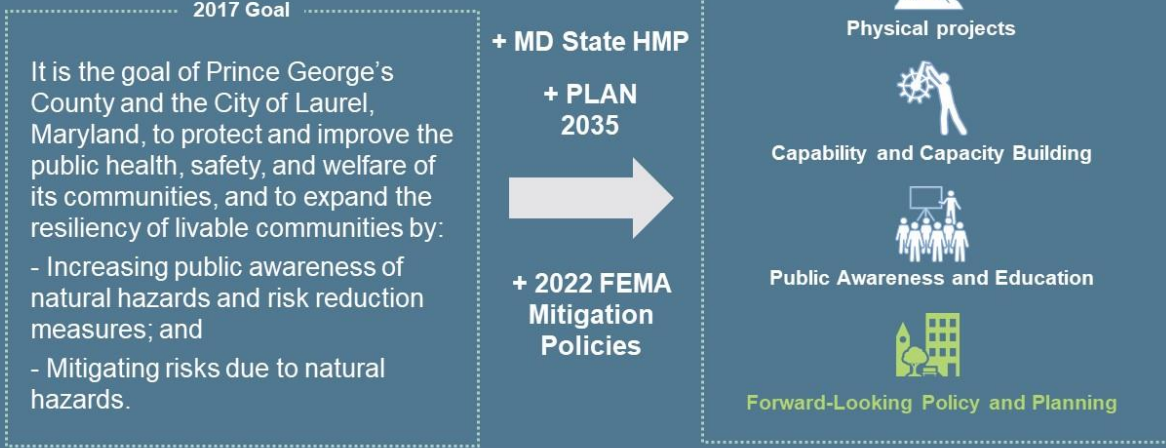


## Draft Mitigation Goals

### Discussion

# Goal & Objective Development

## Proposed Changes



# Potential Mitigation Goal Revisions



Implement projects that mitigate the risks of natural hazards to people, infrastructure, and environmental assets while equitably distributing project benefits.



Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.



Increase public awareness of natural hazard risks to people and property and promote current and new opportunities to participate in mitigation planning.



Prevent future climate-related damages and losses to communities, critical facilities, and natural resources through ordinances, policies, and plans that are aligned with regional and state resilience and equity goals.

## Potential Objectives?



Implement projects that mitigate the risks of natural hazards to people, infrastructure, and environmental assets while equitably distributing project benefits.

What are the County's and City's priorities?

- **Critical infrastructure?** What types?
- **Important environmental assets?**
- **Socially vulnerable neighborhoods?**

## Potential Objectives?



Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.

What are the County's and City's priorities?

- Are there departments or offices that should focus on hazard mitigation more?
- Who is responsible for carrying out mitigation activities and priorities year-round? Do they need additional help?
- Staff training?
- Capability/Capacity concerns around applying for mitigation grants?

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## Potential Objectives?

What are the County's and City's priorities?

- How is the public involved year-round? How do you want to improve this?
- Are there certain groups/communities that outreach should be increased?



Increase public awareness of natural hazard risks to people and property and promote current and new opportunities to participate in mitigation planning.

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## Potential Objectives?

### What are the County's and City's priorities?

- Are there specific goals/objectives from other **county/city/regional/state plans** you want to include?
- Are there **ordinances changes** that would be politically feasible? Adopting higher **building code standards**? Stricter **regulations in the floodplain**?
- Any **policy changes** we could focus on?



Prevent future climate-related damages and losses to communities, critical facilities, and natural resources through ordinances, policies, and plans that are aligned with regional and state resilience and equity goals.

## Project Identification

---

### Brainstorm

## Risk Assessment & Potential Projects Discussion

What does your **current project selection process** look like?

How can this process/plan be **more useful** to you when choosing and implementing projects?

Are there **mitigation projects or actions** you want to be included?

Do you know a **hazard problem area** you'd like addressed?



What can we include in the **risk assessment** to help identify projects and project locations?

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## Next Steps

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In the planning process

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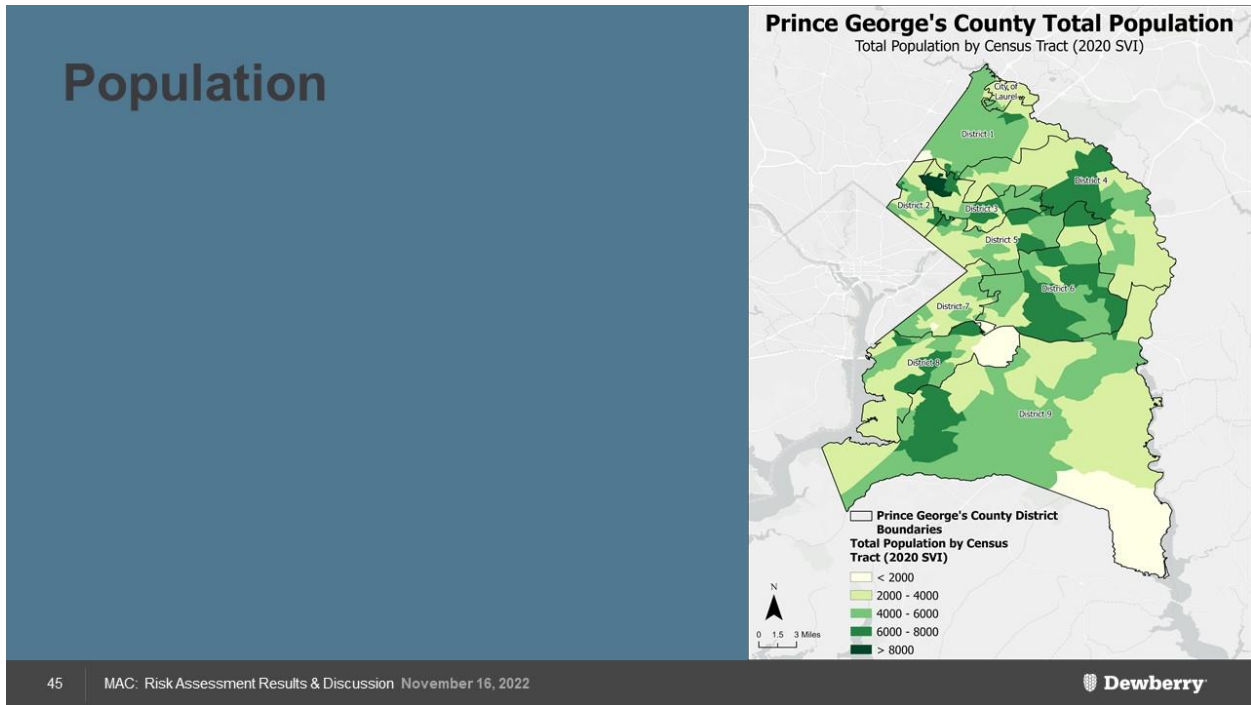
## How You Can Stay Involved:

1. Take the Hazard Mitigation Survey:  
<https://www.surveymonkey.com/r/Prince-Georges-HM-Survey-Social>
2. Tell us about hazard problem areas you know about:  
<https://bit.ly/HazardProblemAreas>
3. Review the draft HIRA sections once distributed
4. Provide input on draft goals and potential objectives you'd like to see (*you can send rough ideas*)
5. Provide mitigation projects and actions that would benefit the community (*ask others!*)



## HIRA Appendix

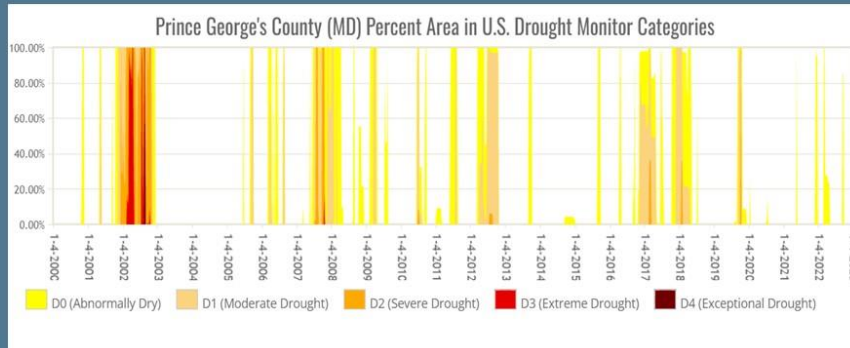
### Reference Maps & Tables



## Drought: Previous Occurrences



- October 15, 2019: 100% of the county experienced a D2 drought



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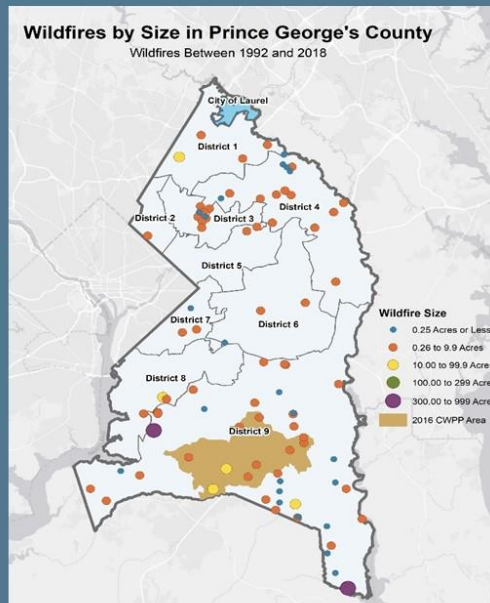
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## Wildfire: Events



	Total Events	Cumulative Damage	Total Years of Record
PG County	88	N/A	26
Annualized	3.4	N/A	---



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MAC: Risk Assessment Results & Discussion November 16, 2022



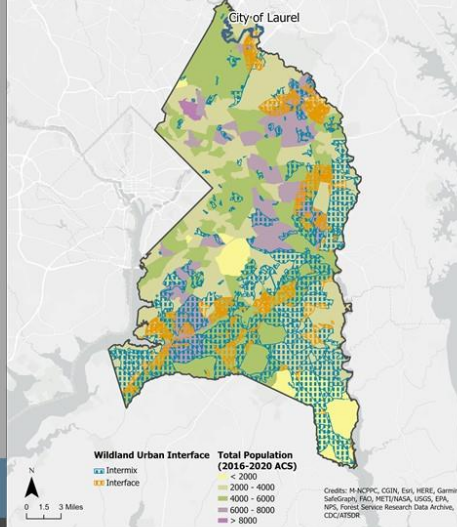
# Wildfire: Structures Exposed



- As of 2020, Prince George's County 36.9% of 358,183 housing units (HUs) are directly exposed to wildfire risk

Area	Total number of HUs	Fraction of Total HUs Directly Exposed	Fraction of Total HUs Indirectly Exposed	Fraction of Total HUs Not Exposed	Total number of exposed HUs	Fraction of Exposed HUs Directly Exposed	Fraction of Exposed HUs Indirectly Exposed
Prince George's County	358,183	36.9%	35.1%	28.0%	257,883	51.3%	48.7%
City of Laurel	10,211	23.6%	74.2%	2.2%	9,987	24.2%	75.8%

## Prince George's County Population and Wildland Urban Interface



## Wildfire Risk in Prince George's County

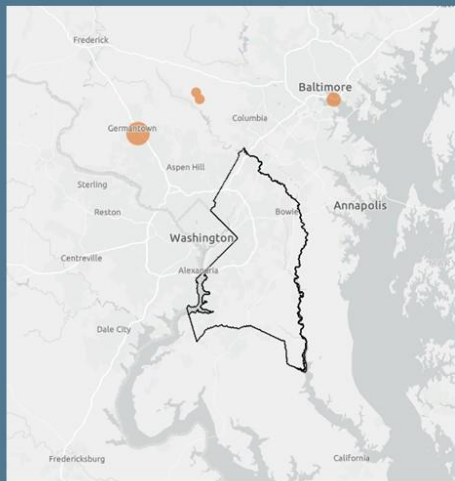
# Earthquake: Loss & Exposure

## Hazus-MH v5.1

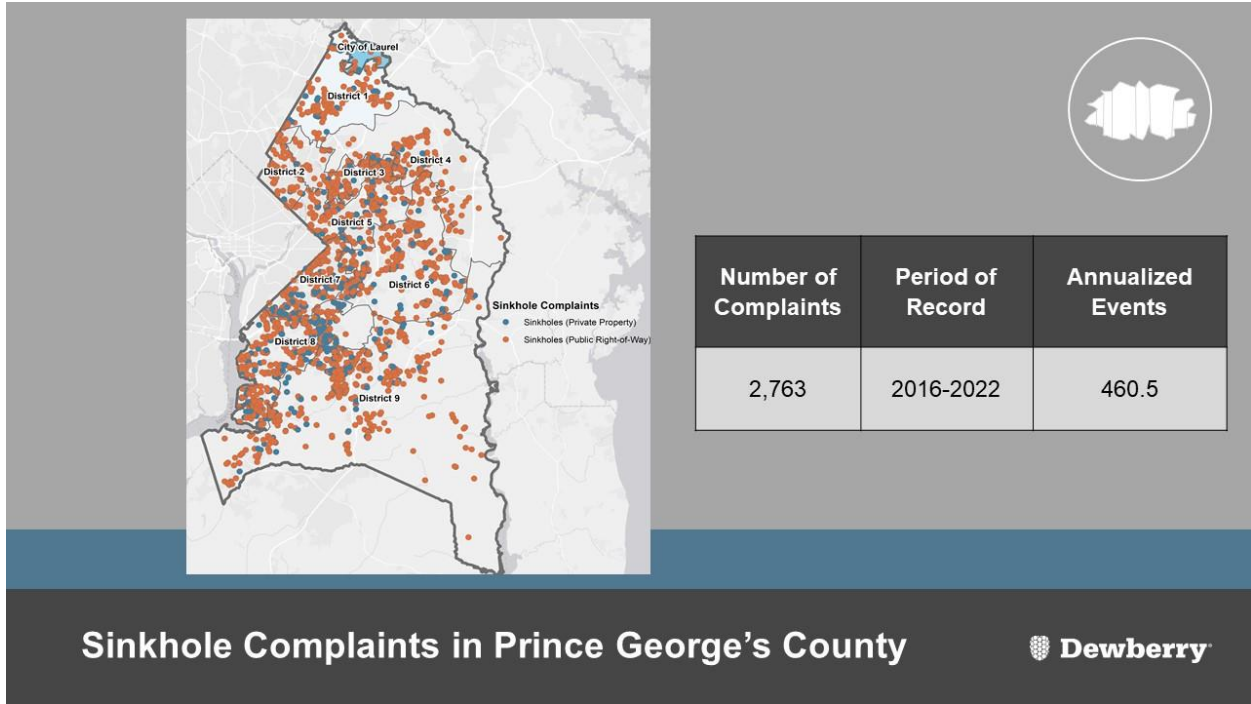


Jurisdiction	Building	Contents	Inventory	Other	Total Loss	Total Exposure
City of Laurel	\$11,676.46	\$2,435.77	\$31.16	\$5,419.10	\$19,562.50	\$5,528,165,000.00
Joint Base Andrews	\$3,203.14	\$703.16	\$11.03	\$1,482.25	\$5,399.58	\$710,416,000.00
Prince George's County	\$503,352.59	\$99,097.76	\$1,512.81	\$182,387.35	\$786,350.52	\$169,405,289,000.00
<b>Total</b>	<b>\$518,232.19</b>	<b>\$102,236.70</b>	<b>\$1,555.00</b>	<b>\$189,288.70</b>	<b>\$811,312.59</b>	<b>\$175,643,870,000.00</b>

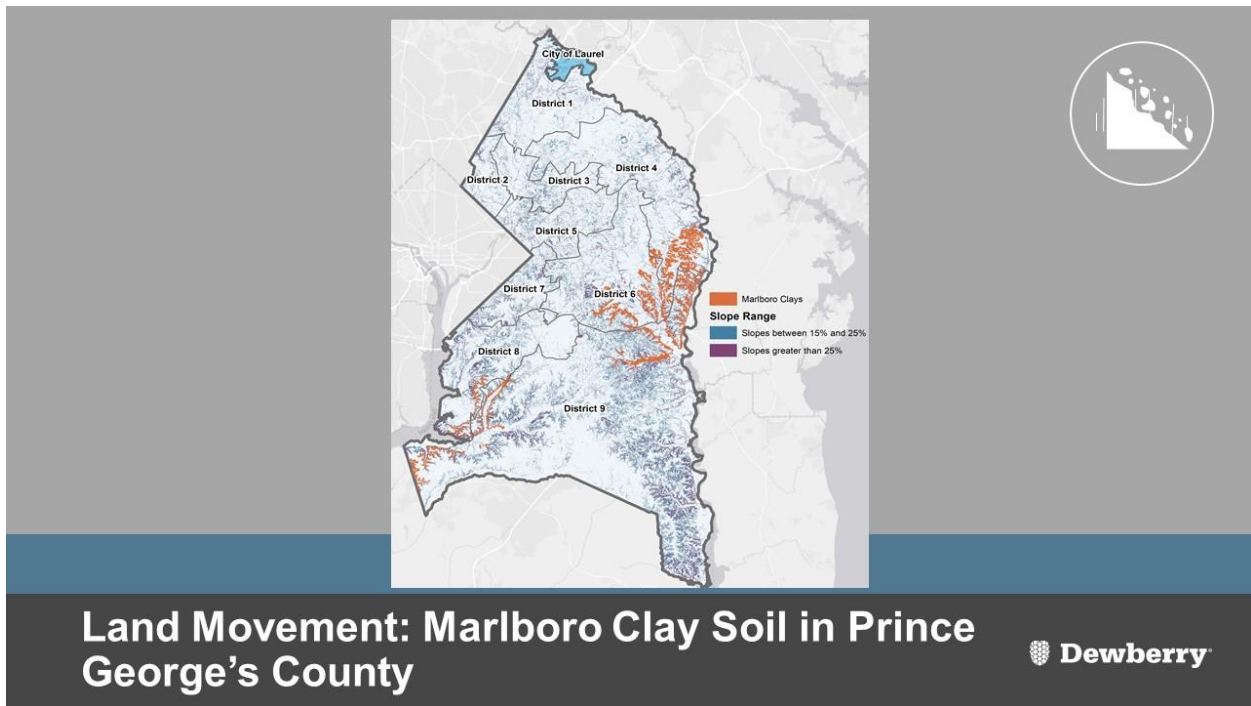
# Earthquakes in Maryland since 2000



- 10 earthquakes in Maryland since 2000
- None inside Prince George's County



**Sinkhole Complaints in Prince George's County**



**Land Movement: Marlboro Clay Soil in Prince George's County**



## Extreme Cold: Events (2012-2022)



Event Type	Number of Events	Current Total Annual Damage	Annualized Deaths	Annualized Injuries	Annualized Events
Cold/Wind Chill	3	\$0	0	0	0.30
Extreme Cold/Wind Chill	0	\$0	0	0	0.00
<b>All events</b>	<b>3</b>	<b>\$0</b>	<b>0</b>	<b>0</b>	<b>0.30</b>

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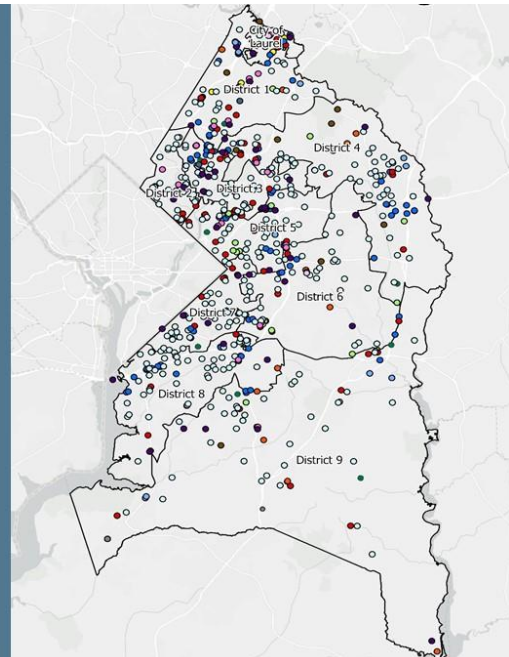


## Critical Facilities

### Changes reflected in the map:

- New critical facilities
- Moved critical facilities

CRITICAL FACILITIES TYPE	
● CHEMICAL	○ FOOD AND AGRICULTURE
● COMMERCIAL FACILITIES	○ GOVERNMENT FACILITIES
● COMMUNICATIONS	● HEALTHCARE AND PUBLIC HEALTH
● DEFENSE INDUSTRIAL BASE	○ INFORMATION TECHNOLOGY
● EMERGENCY SERVICES	● NUCLEAR
● ENERGY	● TRANSPORTATION
	● WATER AND WASTEWATER SYSTEMS



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MAC: Risk Assessment Results & Discussion November 16, 2022



## B.2. Agenda



# Mitigation Advisory Committee Meeting Agenda

**Title:** Mitigation Advisory Committee Meeting - HIRA Results      **Location:** [Microsoft Teams \(Virtual\)](#)  
 Meeting ID: 261 772 567 187 & Passcode: eRvdqH

**Date:** Wednesday, November 16<sup>th</sup>, 2022      **Time:** 3:00 – 4:30 pm ET

**Purpose:** Dewberry will provide a status update on the project's progress and public outreach efforts, followed by an overview of substantial changes in risk assessment results from the 2017 plan. There will be a discussion of proposed mitigation goals and objectives, as well as a brainstorming session for potential projects/actions and project locations. We will close with next steps and questions.

### Agenda Items

Topic	Presenter	Time
<b>Project Status</b> - Planning Process Milestones - Schedule - Capability Assessment - Public Outreach Progress	Jade Payne, Dewberry	3:00 – 3:15 pm
<b>Risk Assessment Results</b> - Climate Projections - Social Vulnerability - Future Development - Substantial Results Differences	Scott Choquette & Jade Payne, Dewberry	3:15 – 3:45 pm
<b>Draft Mitigation Goals Discussion</b> - Review & Revise Goals - Provide thoughts on objectives	Jade Payne, Dewberry	3:45 – 3:55 pm
<b>Potential Project Brainstorm</b> - Actions & Projects - Project Locations	Jade Payne & Scott Choquette, Dewberry	3:55 – 4:10 pm
<b>Next Steps</b> - Survey & Problem Area Identification - Review draft HIRA sections - Input on goals and objectives - Provide projects & actions	Jade Payne, Dewberry	4:10 – 4:15 pm
<b>Questions &amp; Comments</b>	Open Forum	4:15 – 4:30 pm



## B.3. Notes



# Mitigation Advisory Committee Meeting Notes

**Title:** Mitigation Advisory Committee Meeting - HIRA Results      **Location:** Microsoft Teams (Virtual)

**Date:** Wednesday, November 16<sup>th</sup>, 2022      **Time:** 3:00 – 4:30 pm ET

**Purpose:** Dewberry will provide a status update on the project's progress and public outreach efforts, followed by an overview of substantial changes in risk assessment results from the 2017 plan. There will be a discussion of proposed mitigation goals and objectives, as well as a brainstorming session for potential projects/actions and project locations. We will close with next steps and questions.

- Attendees:**
- |   |   |
|---|---|
| 1. Scott Choquette, Dewberry  | 16. Ehsan Bahador, OHS/OEM  |
| 2. Jade Payne, Dewberry   | 17. Frank L. Galosi, DOE  |
| 3. Jesse Nelson, Dewberry   | 18. Jeffrey M. DeHan, Stormwater Management, DOE  |
| 4. Hanna Rush, Dewberry   | 19. Sudhanshu Mishra, DOE   |
| 5. Joanne Hall Barr, City of Laurel                                     | 20. Dawn Hawkins-Nixon, DOE   |
| 6. James E. McClelland, Fire/EMS Services                               | 21. Kim Finch, Environmental Section, Planning Department   |
| 7. Robert Love, Economic and Commerce Department, City of Laurel        | 22. Reynaldo S. De Guzman, Floodplain Administrator, Department of Permitting, Inspections, and Enforcement |
| 8. Stephanie Robinson, Emergency Management, City of Bowie              | 23. Anthony J. Cline, Bureau of Homeland Security & Intelligence  |
| 9. Joey L. Henderson, OHS/OEM   | 24. Mary C. Sherrill, Department of Public Works and Transportation   |
| 10. Dr. Toye Lattimore, Founders Woods HOA                              | 25. Pete Pedersen, PEPCO  |
| 11. Carreen Koubek, Office of the City Administrator, City of Laurel    | 26. James A. Carter, OHS  |
| 12. Patrick T. Callahan, DOE  | 27. Katina Shoulars, Department of Parks and Recreation   |
| 13. Wanda Ramos, Maryland-National Capital Park and Planning Commission | 28. Joanna M. Smith, DOE  |
| 14. Kelly Flint, Dam Safety, MD DOE                                     | 29. Miles Roesner, Department of Information Technology   |
| 15. Michael Block, WSSC Water Representative                            |   |

### Meeting Summary

Scott Choquette (Project Manager, Dewberry) and Jade Payne (Deputy Project Manager, Dewberry) held a public meeting as representatives of the Prince George's County Office of Homeland Security/Office of Emergency Management on September 16, 2022. A PowerPoint presentation was used to review the project status and highlight key risk assessment results. Discussions were held to solicit MAC feedback on draft



mitigation goals, objectives, and potential mitigation projects. Discussion and presentation topics are grouped below with input and questions from the attendees.

### Meeting Notes

<b>Introduction</b>
No Comments
<b>Project Status</b>
No Comments
<b>Risk Assessment Results</b>
<ul style="list-style-type: none"> <li>• Ehsan - A couple questions about SVI – for District 9 and 4 during the SVI analysis, it was lower. Is this because of the population? No transportation to District 9. District 1,2,3 transportation an issue. What is the reason for the low SVI?             <ul style="list-style-type: none"> <li>○ Jade – population differences in the area leads to the difference. The makeup of the population and density created the different SVI scores. A more in depth look at the breakdown of the scores is necessary and really honing in on the census tracts, highlighting those that reach the bar of SVI that FEMA is looking for, and for those that don't reach that FEMA set bar, looking at the different themes and seeing what makes it not reach that bar.</li> </ul> </li> <li>• Ehsan - For the dams – they have high hazard dams. Are we considering these high hazard dams or just consider the 7 dams mentioned in the slides?             <ul style="list-style-type: none"> <li>○ Jade - Dam failure section itself has all of the dam data sent over. We have information for all of the dams and levees. It gets more into detail there, so we only presented on the failures.</li> </ul> </li> <li>• Ehsan - We missed the College Park tornadoe – was a EF3.             <ul style="list-style-type: none"> <li>○ Jade - We only included the tornadoes since 2012, cutoff date since there is a much more detailed list in the plan. It goes in the appendix since it is very lengthy.</li> </ul> </li> </ul>
<b>Draft Mitigation Goals Discussion</b>
<ul style="list-style-type: none"> <li>• Joey – knows the objective is fairly broad but would like to hear on if we should be more specific. If we are more specific, FEMA would hold us to that. Things are constantly changing, so our priorities outlined in the plan may change in 2 years.             <ul style="list-style-type: none"> <li>○ Jade – That's true. These goals we try to identify are the main areas we can focus on. We can get more specific for objectives, but very valuable to find out specificity</li> </ul> </li> <li>• Frank with DOE – It mentioned equitably aligning benefits. The part they work the most with is property owner buy in. Property rights. Property benefits, but don't want to be restricted with what they can do with the property. Flood benefits, but not with restrictions on the property. While reserving property rights is a critical component of every CIP they implement.</li> <li>• Frank - I would start with a basic awareness of all staff having an HMP             <ul style="list-style-type: none"> <li>○ Jade – Definitely agree, that is one of our questions in the Hazard Mitigation Survey. That is always one of the biggest things that stands out in any Hazard Mitigation</li> </ul> </li> <li>• Dawn – There is a huge need for awareness of the federal dollars coming down to state and local governments for specific types of hazard mitigation and climate resilience projects. Due to that abundance of dollars, it is very important to know which federal dollars apply to what.</li> </ul>



- Jade – Absolutely. Would this be addressed with more time spent on a section spelling out the projects and actions that align with different grant opportunities?
    - Dawn – That would be very helpful.
- Jade – When these notices of grant opportunities come out, are there internal notices sending this information around the county or city?
  - Dawn – Usually that comes from Joey.
  - Joey – OHS tries to push out that information to partnering agencies and the whole county. Some grants aren't from FEMA though and they don't have visibility on these. If it comes from Maryland DEP or others. They only know the grants coming from FEMA
- Dawn – by advancing heat to medium high hazard, other departments might be interested in grants that would be made available to address extreme heat
  - Joey – that gives a whole other line of grants. They might not directly tie into hazard mitigation, but there is a possibility.
  - Jade – if you emphasize co-benefits, that can help to create more funding. But it seems to be difficult to find visibility for breadth of funding availability. We will try and incorporate that into the Mitigation Strategy. A potential action to include will be tasking someone with the responsibility to go down list of grants to see what funding is available
- Ehsan – Regarding capability and capacity concerns. Most counties/municipalities need technical assistance. Most municipalities don't have capacity to do BCAs themselves, and don't have trained staff. Good to consider technical assistance.
  - Jade – is this just the jurisdictions in the county or county itself?
    - Ehsan – County itself too. County needs BCA applications, but they don't know how to do it properly. Need assistance.
- Kelly – just reading through HHPD (?) NOFO for 2022, you need a hazard mitigation plan to qualify. The hazard mitigation plan has to include risk to dams and comply with disaster mitigation plan.
  - Jade – One of goals was to meet HHPD requirements. This will be out for review soon, making sure we're hitting all of these points and making them eligible for grant.
- Joanne –in our community recognizing non-English speaking residents of the community making sure they are receiving this information.
  - Jade – does county and city have ongoing communication in other languages covering topics of hazard mitigation?
    - Joanne – They do, social media platform has increased, and local newspaper reaches out to people. Not sure if they are reaching those without English as their first language. Can't gauge with complete accuracy.
- Dawn – how does the public find out about Hazard mitigation plans? Is there validity to setting up a county webpage for hazard mitigation plan? People can go in there to find information. Create greater awareness. At this time, on DOEs webpage there is information on the Hazard mitigation plan. Homeland security webpage too. Not sure if there is one centric webpage.
  - Ehsan – No, there is not one centric webpage.
    - Jade – Yes, that is a good point. One centric would be good. Homeland Security page is only for 5-year build out process. Creating a more year-round information webpage would be a helpful tool to have.
- Stephanie – They have CAP for 2022-2025, specifically outlines resiliency. Implementing electrical grids and natural gas actions. They can send that. A hazard mitigation plan – stressing building codes to keep people out of flood plain should be very important.,
  - Joey – County does have a CAP
  - Jade – we have both of those and we have been reviewing it. Glad Stephanie mentioned grids. FEMA does provide funding for microgrids. If they want us to include information on that funding, we can include it.
    - Dawn/Stephanie – We would love to see that included.



- Patrick - Sorry, slow to get this out, but the County has a public outreach website for Vision Zero built in house using the Esri Hub site: <https://visionzero-princegeorges.hub.arcgis.com/>
  - Jade – thank you for sending. We will include this in the mitigation strategy.

**Potential Project Brainstorm**

- Ehsan – Generally, from a year ago, FEMA is emphasizing nature-based solutions. Long term strategies, instead of just looking at short term. This needs to be considered in our HMP since FEMA is shifting this way. HMP should justify projects based on that. We do have a couple nature-based solutions, but not too much. Sometimes the project depends on location of mitigation project, a combo of both would be perfect and not just one of them.
  - Jade – Especially with FEMA grants, including SVI requirements that can get a lot of points and nature-based solutions get points, stacking these all together will make it a lot more likely to get these grants.
- Jeffrey – As important to identify routine work or maintenance that helps to contribute to flood reduction. New projects are fantastic and can better existing conditions (infrastructure or dams, etc.). Stormwater management ponds, channels, rehabilitation or cleaning storm drains, there should be a way to integrate these existing routine work and maintenance and their effects with the new projects. Measurement and data are important. Performance metrics can help to quantify how their work is increasing capacity or increasing volume of control, mitigating CFS through flood area. Important to capture this information. Not sure it resonates with the HMP. HMP should have a metric in there that provides or drives this data capture and communication. Will lend to perception of what the government is doing.
  - Jade – Can incorporate it in there, whether or not they include it as an action. Useful to do it and can try and come up with ways that while they are performing actions and projects to keep the data in one place, to show that the county has been effective in the past.
- Dawn – Where would we fit in the need for resilience? With all of the various hazards the county is at risk for, there is some need for centers where communities can go to, to receive basic needs until their homes/utilities/service are restored, and until they can get other assistance with housing. How do we fit this need into the HMP?
  - Jade – Can definitely include this as an action in the mitigation strategy. Additionally helpful to identify areas of interest in the risk assessment that can help to determine what the needs are. Baltimore does this, so we can use their model or aspects of their model to form our own.
  - Jade – Are these resiliency hubs similar to Baltimore? Deal with natural hazards, but also in partnership with health dept and social services?
    - Dawn – Yeah.

**Next Steps**

No Comments

**Questions & Comments (Open Forum)**

No Comments

## B.4. Attendance

### 1. Summary

Meeting title	Mitigation Advisory Committee Meeting - HIRA Results
Attended participants	29
Start time	11/16/22, 2:45:21 PM
End time	11/16/22, 4:32:28 PM
Meeting duration	1h 47m 7s
Average attendance time	1h 26m 43s

### 2. Participants

Name	First join	In-meeting duration	Email
Joanne Hall Barr	11/16/22, 2:53:39 PM	1h 38m 29s	[REDACTED]
McClelland, James E.	11/16/22, 2:53:40 PM	1h 38m 31s	[REDACTED]
Choquette, Scott	11/16/22, 2:54:51 PM	54m 22s	[REDACTED]
Robert Love	11/16/22, 2:55:25 PM	1h 36m 39s	[REDACTED]
Stephanie Robinson	11/16/22, 2:55:44 PM	1h 36m 30s	[REDACTED]
Henderson, Joey L.	11/16/22, 2:56:12 PM	1h 36m 3s	[REDACTED]
[REDACTED]	11/16/22, 2:56:36 PM	1h 35m 30s	[REDACTED]
Nelson, Jesse	11/16/22, 2:56:40 PM	1h 35m 42s	[REDACTED]
Carreen Koubek	11/16/22, 2:57:04 PM	1h 35m 6s	[REDACTED]
Payne, Jade	11/16/22, 2:57:15 PM	1h 35m 2s	[REDACTED]
Callahan, Patrick T.	11/16/22, 2:57:50 PM	1h 34m 24s	[REDACTED]
Ramos, Wanda	11/16/22, 2:57:58 PM	1h 34m 19s	[REDACTED]
Kelly Flint (Guest)	11/16/22, 2:58:12 PM	1h 33m 57s	[REDACTED]
Block, Michael (Contractor)	11/16/22, 2:58:56 PM	1h 33m 16s	[REDACTED]
Bahador, Ehsan	11/16/22, 2:59:22 PM	1h 32m 56s	[REDACTED]
Galosi, Frank L.	11/16/22, 3:00:29 PM	1h 31m 37s	[REDACTED]
DeHan, Jeffrey M.	11/16/22, 3:00:50 PM	1h 31m 22s	[REDACTED]
Rush, Hanna R.	11/16/22, 3:00:55 PM	49m 50s	[REDACTED]
Mishra, Sudhanshu	11/16/22, 3:01:05 PM	1h 31m 3s	[REDACTED]
Hawkins-Nixon, Dawn	11/16/22, 3:01:36 PM	1h 30m 33s	[REDACTED]
Finch, Kim	11/16/22, 3:01:48 PM	1h 30m 39s	[REDACTED]
De Guzman, Reynaldo S.	11/16/22, 3:01:52 PM	1h 30m 13s	[REDACTED]
Cline, Anthony J.	11/16/22, 3:02:57 PM	1h 29m 15s	[REDACTED]
Sherrill, Mary C.	11/16/22, 3:03:31 PM	1h 28m 36s	[REDACTED]
[REDACTED]	11/16/22, 3:03:37 PM	1h 28m 17s	[REDACTED]
Carter, James A.	11/16/22, 3:03:52 PM	1h 28m 22s	[REDACTED]
Shoulars, Katina	11/16/22, 3:05:03 PM	1m 21s	[REDACTED]
Smith, Joanna M.	11/16/22, 3:05:23 PM	1h 26m 51s	[REDACTED]
Miles Roesner	11/16/22, 3:06:20 PM	1h 25m 51s	[REDACTED]

## C. Mitigation Strategy Workshop

### C.1. Presentation



# Prince George's County Hazard Mitigation Plan 2023 Update

MAC: Mitigation Strategy Development

December 14, 2022 | Microsoft Teams (Virtual)

## AGENDA

- Project Status
- Mitigation Goals
- Action Prioritization
- Survey Feedback
- Mitigation Strategy Update

Prince George's County, MD

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MAC: Mitigation Strategy Development December 14, 2022

 Dewberry

# Project Status

## Planning Process Updates & Milestones

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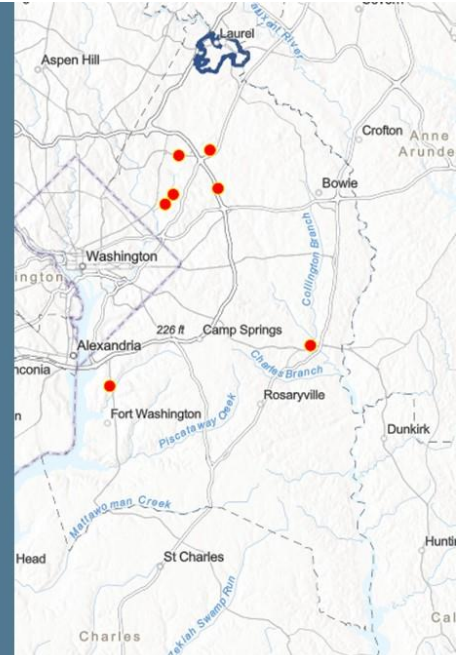
	Sep	Oct	Nov	Dec	Jan '23	Feb	March
HM Plan Milestone:	Kick-Off	Outreach Begins	Risk Assessment Workshop	Strategy Workshop	Draft Plan & MDEM Review	FEMA Review	Adoption
Review 2017 HMP							
Data Collection							
HIRA							
Capability Assessment							
Revise Goals + Objectives							
Mitigation Strategy Development							
Public Engagement							
HMP Writing / Revising							
MDEM Review / Approval							
FEMA Review / Approval							
Plan Adoption, Approval Letters, Plan Distribution							

## Project Schedule



## Public Outreach Progress

- Public Survey: **38 responses**
- Community Hazard Mapping: **7 responses** (see map)
- Social Media Advertisements: **500+ views & interactions**
- Survey will end **Friday, 12/23**



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## What is Technical Assistance and why is it important?

- Direct support to a community that builds community capacity and capabilities in ways that meet the unique needs of communities.
- Across FEMA and other federal agency partners, there are various technical assistance programs.
- Better understanding community interests and needs, followed by tailored support to fill those gaps, is a key way to support communities and equity.
- Acknowledges there are no one-size-fits-all solutions to supporting communities.

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## Examples

- More robust assessments of risks and priorities.
- Project alternatives analysis
- Assessment of benefits, including BCA support
- Tracking progress and assessing changing risk and priorities
- Training and outreach

### Themes of what's included



Increase understanding of risk and mitigation



Inspire communities to action



Help prepare for implementation, including alternatives analyses or BCAs.

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## Technical Assistance Integration

- 1-2 sentences added to existing Mitigation Strategy sections on how technical assistance can be considered:
  - Prioritization: Related to feasibility and community capacity
  - Implementation: Review opportunities for technical assistance and determine if needed
- New Section: Technical Assistance Overview
  - What it is
  - Examples
  - Existing federal and state opportunities
  - Process to access

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# Finalize Mitigation Goals

## Discussion

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## Final Mitigation Goals/Objectives



Implement projects that mitigate the risks of natural hazards to people, infrastructure, and environmental assets while equitably distributing project benefits.



Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.



Increase public awareness of natural hazard risks to people and property and promote current and new opportunities to participate in mitigation planning.



Prevent future climate-related damages and losses to communities, critical facilities, and natural resources through ordinances, policies, and plans that are aligned with regional and state resilience and equity goals.

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# Prioritize Actions

## STAPLE/E Criteria

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# STAPLE/E Prioritization

- **Social**

- Is the proposed action socially acceptable to the community(s)?
- Are there equity issues involved that would mean that one segment of a community is treated unfairly?
- Will the action cause social disruption?

- **Technical**

- Will the proposed action work?
- Will it create more problems than it solves?
- Does it solve a problem or only a symptom?
- Is it the most useful action in light of other community(s) goals?

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## STAPLE/E Prioritization

- **Administrative**

- Can the community(s) implement the action?
- Is there someone to coordinate and lead the effort?
- Is there sufficient funding, staff, and technical support available?
- Are there ongoing administrative requirements that need to be met?

- **Political**

- Is the action politically acceptable?
- Is there public support both to implement and to maintain the project?

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## STAPLE/E Prioritization

- **Legal**

- Is the community(s) authorized to implement the proposed action? Is there a clear legal basis or precedent for this activity?
- Are there legal side effects? Could the activity be construed as a taking?
- Is the proposed action allowed by a comprehensive plan, or must a comprehensive plan be amended to allow the proposed action?
- Will the community(s) be liable for action or lack of action?
- Will the activity be challenged?

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## STAPLE/E Prioritization

### • Economic

- What are the costs and benefits of this action?
- Do the benefits exceed the costs?
- Are initial, maintenance, and administrative costs taken into account?
- Has funding been secured for the proposed action? If not, what are the potential funding sources (public, non-profit, and private)?
- How will this action affect the fiscal capability of the community(s)?
- What burden will this action place on the tax base or local economy?
- What are the budget and revenue effects of this activity?
- Does the action contribute to other community goals, such as capital improvements or economic development?
- What benefits will the action provide?

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 Dewberry

## STAPLE/E Prioritization

### • Environmental

- How will the action affect the environment?
- Will the action need environmental regulatory approvals?
- Will it meet local and state regulatory requirements?
- Are endangered or threatened species likely to be affected?

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 Dewberry

# Survey Feedback

## Community Input

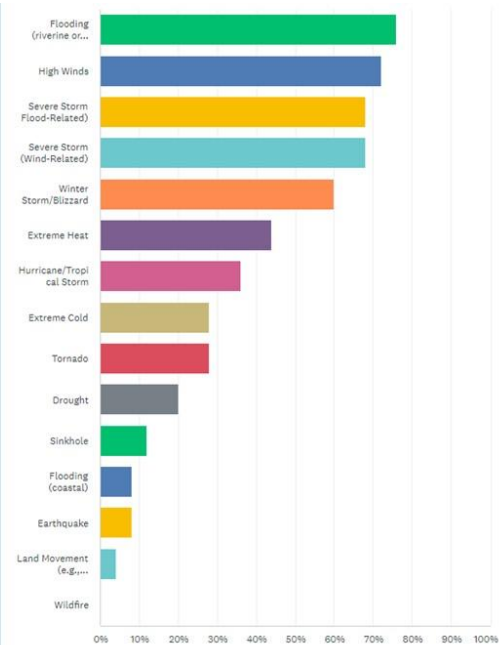
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## Community Feedback

- Question: Please select all hazards that have had the **biggest impact on Prince George's County** (i.e., your home, business, or neighborhood).



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## Community Feedback

- Top Projects:
  - Localized flood risk reduction
  - Technical assistance for property owners
  - Outreach and education
  - Ordinance updates

ANSWER CHOICES	RESPONSES
Conduct localized flood risk reduction projects, such as stormwater management projects or stabilizing roads/bridges	85% 22
Provide technical assistance to residents, businesses, jurisdictions, and organizations to help them preform hazard mitigation projects	62% 16
Provide outreach and education to residents, business, jurisdictions, and organizations to help them understand risks and mitigate hazards	58% 15
Enact and enforce regulations, codes and ordinances, such as zoning regulations and building codes	58% 15
Implement a warning system to alert the public of impending hazards	54% 14
Acquire/buyout properties to create open space and reduce flooding	50% 13
Floodproof buildings	42% 11
Demolish either an entire building or part of a building in order to rebuild it in a way that mitigates it from flooding	38% 10
Conduct non-localized flood risk reduction projects, such as rehabilitating dams and levees	38% 10
Stabilize the ground on slopes to prevent slope failures/landslides	35% 9
Retrofit buildings to reduce future damages from erosion, high winds, earthquakes, or snow.	35% 9
Purchase and install generators	35% 9
Elevate buildings to avoid potential floodwaters	15% 4
Construct safe rooms for hurricanes, tornadoes, etc.	12% 3
Perform wildfire mitigation projects, such as creating defensible space, retrofitting buildings with ignition-resistant building materials, or vegetation management	8% 2
Other (please specify)	Responses 4% 1

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MAC: Mitigation Strategy Development December 14, 2022



## Community Feedback

- “Review and **update stormwater systems** to meet current conditions” (4 similar stormwater responses)
- “Take care of some of the flooding areas that continue to recur. Someone needs to take responsibility and fix **issues between PEPCO and town.**”
- “Respond to residents’ needs and develop a **simple plan to help residents that are vulnerable.**”
- “**Flood mitigation projects along the Collington Branch** that flows through the Town of Upper Marlboro.”
- “Conduct **Risk Assessments on every community** in PG County”

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MAC: Mitigation Strategy Development December 14, 2022



## Community Feedback

- “Continue to trim trees around power lines to **avoid power outages.**”
- “Reduce development in floodplains and make significant strides on reducing the amount of impervious surfaces/**protect more open space within the county** to avoid sudden riverine flooding”
- “Consider an **open space ordinance**, similar to Montgomery County's farm preserve, to protect open space from development and encourage smarter, denser development.”

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MAC: Mitigation Strategy Development December 14, 2022



## Mitigation Strategy Update

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Airtable

22

MAC: Mitigation Strategy Development December 14, 2022





## C.2. Agenda



### Meeting Agenda

**Title:** Prince George's County Mitigation Advisory Committee: Mitigation Strategy Development      **Location:** Microsoft Teams (Virtual)

**Date:** Wednesday, December 14<sup>th</sup>, 2022      **Time:** 3:00 – 4:30 pm ET

**Purpose:** The 2023 update of the Prince George's County, MD Hazard Mitigation Plan is underway. Dewberry will provide an overview of the project status and the Committee will decide on actions to include in the Mitigation Strategy.

#### Agenda Items

Topic	Presenter	Time
Welcome and Introductions	Scott Choquette, Dewberry	3:00 – 3:05 pm
Project Status Update	Scott Choquette and Jade Payne, Dewberry	3:05 – 3:10 pm
Mitigation Goals Review	Jade Payne, Dewberry	3:10 – 3:15 pm
Action Prioritization	Scott Choquette, Dewberry	3:15 – 3:20 pm
Public Survey Feedback	Jade Payne, Dewberry	3:20 – 3:25 pm
Mitigation Strategy Update	Jade Payne, Dewberry	3:25 – 4:30 pm

### C.3. Notes



## Mitigation Advisory Committee Meeting Notes

**Title:** Prince George's County Mitigation Advisory Committee: Mitigation Strategy Development      **Location:** Microsoft Teams (Virtual)

**Date:** Wednesday, December 14<sup>th</sup>, 2022      **Time:** 3:00 – 4:30 pm ET

**Purpose:** The 2023 update of the Prince George's County, MD Hazard Mitigation Plan is underway. Dewberry will provide an overview of the project status, and the Committee will decide on actions to include in the Mitigation Strategy.

- Attendees:**
- |   |   |
|---|---|
| <ol style="list-style-type: none"> <li>1. Finch, Kim</li> <li>2. Stephanie Robinson</li> <li>3. Payne, Jade</li> <li>4. Kelly Flint</li> <li>5. Henderson, Joey L.</li> <li>6. Bahador, Ehsan</li> <li>7. Carter, James A.</li> <li>8. Callahan, Patrick T.</li> <li>9. Cline, Anthony J.</li> <li>10. Erin Meyer (UMD) (Guest)</li> <li>11. Quattrocchi, Dominic</li> <li>12. Choquette, Scott</li> <li>13. Wright, David A:(BGE)</li> <li>14. Christina Cornwell</li> </ol> | <ol style="list-style-type: none"> <li>15. Gill, Ronald E.</li> <li>16. Sherrill, Mary C.</li> <li>17. Rush, Hanna R.</li> <li>18. Tennekoon, Lilantha</li> <li>19. Robert Love</li> <li>20. Brandy Alexis Espinola</li> <li>21. Galosi, Frank L.</li> <li>22. Batten-Mickens, Meloyde R.</li> <li>23. Gary 2 Cunningham - Office of Safety and Security Services</li> <li>24. Smith, Joanna M.</li> <li>25. Mishra, Sudhanshu</li> <li>26. Miles Roesner</li> <li>27. Hawkins-Nixon, Dawn</li> <li>28. De Guzman, Reynaldo S.</li> </ol> |
|---|---|

### Meeting Summary

Scott Choquette (Project Manager, Dewberry) and Jade Payne (Deputy Project Manager, Dewberry) met with the Prince George's County Mitigation Advisory Committee (MAC) on December 14, 2022, to discuss the actions that would be included in the updated Hazard Mitigation Plan. A PowerPoint presentation was used to review the project status, mitigation goals, and action prioritization methodology. An Airtable database was used to discuss and make decisions on the actions for the updated Mitigation Strategy. Discussions were held throughout the presentation so Dewberry could gather feedback from the MAC. Discussion and presentation topics are grouped below with input and questions from the MAC.

### Meeting Notes

<b>Introduction</b>
<i>No Comments</i>



**Project Status**

- Scott explained that the HIRA section is in quality review now
- Now we are working on creating the mitigation strategies for the Plan
- Scott showed the results of the public outreach strategy – 7 people have designated community hazard areas, 38 responses to the Public survey
- Jade introduced Technical Assistance and its importance for the County or City
- Jade gave a brief overview of Technical Assistance, its capabilities for helping the County or City with project implementation, grant applications, etc.
- Jade gave examples of Technical Assistance, including BCAs, which was mentioned in the previous meeting
- Jade explained how Technical Assistance will be incorporated in the Mitigation Strategy sections

**Mitigation Goals Review**

- Jade presented the mitigation goals/objectives that were decided upon by the MAC at the previous meeting
- These goals incorporated feedback from the MAC meeting as well as feedback from individuals through email response

**Action Prioritization**

- Action prioritization is using the STAPLE/E Prioritization, which looks at a project through a variety of lenses including: social, technical, administrative, political, legal, economic, environmental
- Joey asked in terms of legal, do we keep into account new laws/policies that have come into effect?
- Scott responded yes, and that all projects will comply with current laws and policies

**Public Survey Feedback**

- Jade explained the feedback that has been received through the public survey
- Hazards that were the highest ranked as issues are: flooding, high winds, and severe storms
- Top projects from the survey were: localized flood risk reduction, technical assistance to property owners, outreach and education, and ordinance updates
- Jade showed comments from the survey. The majority of comments related to pluvial flooding and stormwater management, as well as incorporating more tree trimming to reduce damage from high winds and severe storms, expanding open space
- Joey asked if there were more comments from one area of the county?
- Jade replied there was a cluster around the Collington Branch area, but otherwise the respondents were spread throughout the County

**Mitigation Strategy Update**

- Jade presented the Airtable, which includes mitigation strategies and suggestions for updating the mitigation strategies
- Scott explained that FEMA is looking for more actionable, meaningful strategies as opposed to actions that the County routinely does (ex: strategies that begin with “continue....”), the actions that the County routinely does will be included in the Capability Assessment section of the plan
- Jade will consolidate any feedback and changes on the mitigation action strategies and send them to the MAC for review



- Scott explained that FEMA likes to see the updates on progress of mitigation action strategies from the previous hazard mitigation plan when creating new mitigation action strategies
- The group went through each mitigation action strategy and provided feedback on all strategies
- Dawn said on an annual basis, the County will be able to acknowledge where they have updated information from upcoming studies that may be more up to date than FEMA's information
- Dawn said since the 2017 plan, the County has added 2 new staff to the flood management group which has allowed for more capacity
- Dawn asked if the Elevation Certificates are being phased out with the new RiskRating2.0
- Scott replied they are not being totally phased out, but they will be slightly less important in setting premiums
- Frank asked if "natural hazards" could be expanded to include non-natural hazards that may occur in urban areas for Strategy 7; Ehsan agreed that we should make it more general wording, and include acquisition for all endangered structures as well as flood-prone structures as an eligible project
- Frank said he will talk with Dawn offline to see what tweaks can be made in the wording of Strategy 7
- Dawn said that we should keep Strategy 9 because the Upper Marlboro Emergency Response Plan because it hasn't been updated since 1999
- Frank said the MS4 Permit mandates water quality practices (Strategy 11), and he can provide specific verbiage if needed
- Frank said the MS4 Permit also requires watershed assessment plans (Strategy 12) so we should keep that action as well, but not use the M-NCPPC 2016 study should use
- The City of Laurel mitigation strategies will be reviewed at a later date with a representative from the City
- Dawn suggested it would be helpful to determine what Pepco is responsible for (tree trimming, etc.) and what the County is responsible for

**Questions & Comments (Open Forum)**

- Jade will be following up with the mitigation strategies list to allow for more feedback to finalize the actions
- Jade asked if there are any other projects that should be added to the list before it is sent out for more feedback.
- Frank suggested we have a meeting with the MNPPC group to discuss their plans and studies and incorporating those into the mitigation strategies

## C.4. Attendance

### 1. Summary

Meeting title	Mitigation Advisory Committee: Mitigation Strategy Development
Attended participants	28
Start time	12/14/22, 2:51:57 PM
End time	12/14/22, 4:32:01 PM
Meeting duration	1h 40m 5s
Average attendance time	1h 19m 34s

### 2. Participants

Name	First join	In-meeting duration	Email
Finch, Kim	12/14/22, 2:55:23 PM	1h 30m 52s	[REDACTED]
Stephanie Robinson	12/14/22, 2:57:08 PM	1h 34m 44s	[REDACTED]
Payne, Jade	12/14/22, 2:57:23 PM	1h 34m 31s	[REDACTED]
Kelly Flint	12/14/22, 2:57:29 PM	1h 34m 21s	[REDACTED]
Henderson, Joey L.	12/14/22, 2:57:29 PM	1h 34m 31s	[REDACTED]
Bahador, Ehsan	12/14/22, 2:57:29 PM	1h 34m 25s	[REDACTED]
Carter, James A.	12/14/22, 2:57:29 PM	1h 34m 29s	[REDACTED]
Callahan, Patrick T.	12/14/22, 2:57:40 PM	1h 34m 13s	[REDACTED]
Cline, Anthony J.	12/14/22, 2:57:46 PM	1h 34m 5s	[REDACTED]
Erin Meyer (UMD) (Guest)	12/14/22, 2:58:06 PM	1h 33m 44s	[REDACTED]
Quattrocchi, Dominic	12/14/22, 2:58:48 PM	1h 29m 26s	[REDACTED]
Choquette, Scott	12/14/22, 2:58:51 PM	1h 20m 52s	[REDACTED]
Wright, David A:(BGE)	12/14/22, 2:59:47 PM	1h 5m 44s	[REDACTED]
Gill, Ronald E.	12/14/22, 2:59:58 PM	55m 22s	[REDACTED]
Sherrill, Mary C.	12/14/22, 3:00:31 PM	1h 31m 21s	[REDACTED]
Rush, Hanna R.	12/14/22, 3:00:43 PM	1h 31m 10s	[REDACTED]
Tennekoon, Lilantha	12/14/22, 3:00:55 PM	1h 30m 57s	[REDACTED]
Robert Love	12/14/22, 3:01:20 PM	1h 17m 39s	[REDACTED]
Brandy Alexis Espinola	12/14/22, 3:01:33 PM	1h 30m 18s	[REDACTED]
Galosi, Frank L.	12/14/22, 3:03:31 PM	1h 28m 21s	[REDACTED]
Batten-Mickens, Meloyde R.	12/14/22, 3:04:23 PM	56m 37s	[REDACTED]
Gary 2 Cunningham - Office of S	12/14/22, 3:04:33 PM	1h 27m 28s	[REDACTED]
Smith, Joanna M.	12/14/22, 3:04:59 PM	53m 53s	[REDACTED]
Mishra, Sudhanshu	12/14/22, 3:05:07 PM	1h 26m 45s	[REDACTED]
Miles Roesner	12/14/22, 3:05:07 PM	23m 5s	[REDACTED]
Hawkins-Nixon, Dawn	12/14/22, 3:05:31 PM	1h 26m 21s	[REDACTED]
De Guzman, Reynaldo S.	12/14/22, 3:09:17 PM	51m 44s	[REDACTED]
Christina Cornwell	12/14/22, 3:30:21 PM	21m 2s	[REDACTED]

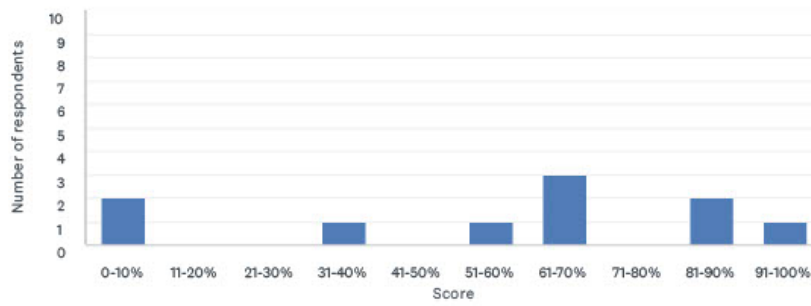
## D. Mitigation Strategy Feedback Survey

### D.1. Prince George's County Survey

Prince George's County: Mitigation Actions Feedback

#### Quiz Summary

AVERAGE SCORE  
56% • 55/99 PTS



#### STATISTICS

Lowest Score	Median	Highest Score
2%	68%	92%
Mean: 56%		
Standard Deviation: 32%		

#### Question Ranking

Prince George's County: Mitigation Actions Feedback

QUESTIONS (33)	DIFFICULTY	AVERAGE SCORE
Q1 Select all that apply:	1	54%
Q28 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	2	58%
Q13 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	2	58%
Q40 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	2	58%
Q43 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	2	58%
Q25 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	2	58%
Q54 Develop a program to utilize vacant land (both publicly and privately owned) for stormwater management. Acquire land to serve the dual purpose of green infrastructure/stormwater infiltration and recreational/open space.	7	62%
Q22 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	8	63%
Q10 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	8	63%
Q34 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	8	63%
Q57 To preserve environmentally sensitive land and to encourage development in the Regional Transit Districts, evaluate a transfer of development rights program, density exchanges, or purchase of development rights program for the Rural and Agricultural Areas. Explore opportunities to transfer development rights within areas and to coordinate with the Watershed Implementation Plan and Maryland Accounting for Growth Policy.	11	67%
Q19 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	12	71%
Q63 Office of the County Executive must introduce and support a County Council resolution requiring the County to integrate extreme weather and energy-efficiency criteria into building codes.	13	71%
Q68 Conduct Countywide Thermal Mapping of Tree Canopy Cover with Shade Study, and Aerial Utility Mapping exercises. Then conduct a neighborhood-level Heat Vulnerability Assessment.	13	71%
Q56 Use conservation subdivisions or other site planning and landscape conservation tools when developing in Established Communities near Rural and Agricultural Areas to cluster development and preserve land for resource protection or open space.	15	76%
Q55 Use conservation subdivisions in areas adjacent to Rural and Agricultural Areas to transition density and to encourage preservation of green infrastructure corridors as defined by the County's Green Infrastructure Plan.	15	76%
Q60 Adopt and Enforce Policies to Require Green Infrastructure Practices for New and Existing Properties, especially native plantings, rain gardens, green corridors, runoff retention, and other nature-based ways to reduce and naturally filter runoff on private and public properties. Insert specific enforceable language in guiding County documents related to proposed and existing development.	15	76%
Q4 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	18	79%
Q16 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	18	79%

Prince George's County: Mitigation Actions Feedback

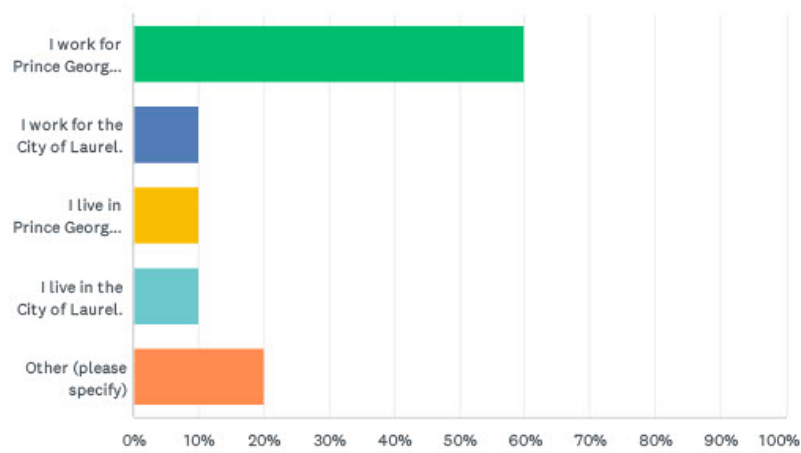
Q7 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	18	79%
Q66 Assess Climate Projections and Consequences of Dam and Levee Failure. Analyze baseline conditions against local/regional climate projections to highlight future vulnerabilities and risk. Model hydrological loads to the consequences of failure under present and future conditions and jointly evaluate dams, levees, and interdependent components. Incorporate Findings in Emergency Action Plans.	21	81%
Q61 Revise Prince George's County Code of Ordinance to Incorporate and Require Climate-resilient Practices.	21	81%
Q62 Update County's Stormwater Regulations to require climate resilient design and criteria.	21	81%
Q37 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	24	83%
Q58 Align Economic Development Plans with the Climate Action Plan, preserving existing agricultural land and natural areas and promoting development in already-developed areas near high-capacity transit. Perform an economic development and climate adaptation analysis of existing agricultural land and natural areas that are crucial to climate resilience on a subwatershed basis. Identify areas of open space for preservation and optimum use for climate resilience.	25	86%
Q67 Demonstrate County commitment to climate action through publicly transparent tracking, monitoring, evaluation, and reporting. Require M-NCPPC to create and establish a public Smart Growth Dashboard that tracks approved preliminary plans of subdivisions, approved site plans and development proposals.	25	86%
Q64 Require County Stormwater Management (SWM) Standards to Incorporate Projected Climate Change Impacts by using approved downscaled and up-to-date climate impact information to reevaluate peak rainfall estimates and future design storm profiles. Evaluate SWM standards using this criterion at least every three (3) years. Require all upgrades of County storm drain systems and CIP roadway, bridge, culvert and stormwater management repair or renovation projects to meet these updated climate-resilient design criteria.	25	86%
Q46 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	28	88%
Q65 Avoid Future Development in Flood Inundation Areas Below Existing High-hazard Dams. Require that plan sets for subdivision proposals and permit applications to show the danger reach and inundation area and prohibit new construction in these areas.	29	90%
Q59 The County shall prohibit all waivers to allow development in floodplains.	29	90%
Q31 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	29	90%
Q52 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	32	92%
Q49 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)	32	92%

**Q1 Select all that apply:**

Answered: 10 Skipped: 0



Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct	Average Score	Standard Deviation	Difficulty
0%	1.6/3.0 (54%)	0.74	1/33

ANSWER CHOICES	SCORE	RESPONSES	
✓ I work for Prince George's County.	2/3	60.00%	6
I work for the City of Laurel.	0/3	10.00%	1
✓ I live in Prince George's County.	1/3	10.00%	1
I live in the City of Laurel.	0/3	10.00%	1
Other (please specify)	--	20.00%	2
<b>Total Respondents: 10</b>			

#	OTHER (PLEASE SPECIFY)	DATE
1	I work for the City of Bowie	1/3/2023 10:16 AM
2	University of Maryland Environmental Finance Center	12/20/2022 2:07 PM

Q2 Name:

Answered: 10 Skipped: 0

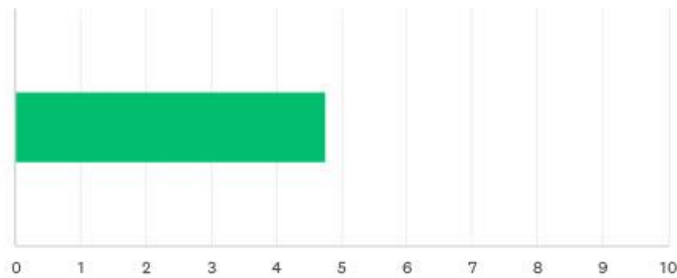
#	RESPONSES	DATE
1	Daniel L. Doman	1/4/2023 8:13 AM
2	Stephanie Robinson	1/3/2023 10:16 AM
3	Brian K Lee	12/27/2022 11:57 AM
4	Ehsan Bahador	12/23/2022 12:58 PM

Prince George's County: Mitigation Actions Feedback

5	Frank Galosi	12/22/2022 12:13 PM
6	Lilantha Tennekoon	12/21/2022 9:33 AM
7	Major Anthony Cline (PGPD)	12/20/2022 2:33 PM
8	Brandy Espinola	12/20/2022 2:07 PM
9	Patrick Callahan	12/20/2022 7:37 AM
10	Dr. Toye Y. Latimore	12/19/2022 9:12 PM

**Q3 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2



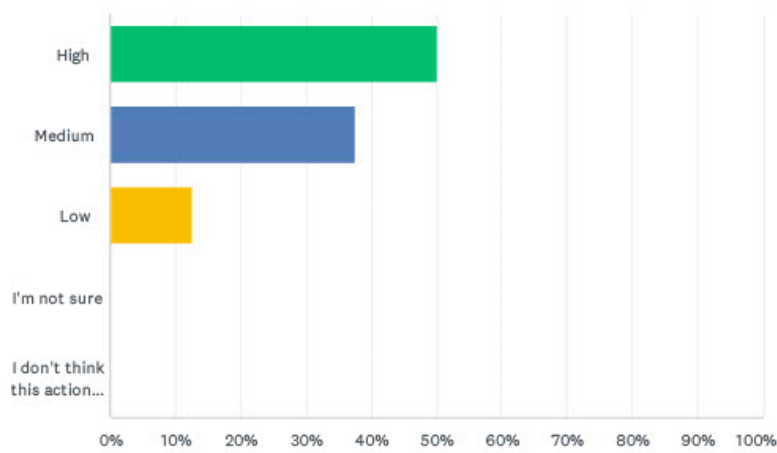
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	38	8
<b>Total Respondents: 8</b>			

#		DATE
1	4	1/4/2023 9:26 AM
2	5	1/3/2023 10:16 AM
3	5	12/30/2022 9:51 AM
4	6	12/27/2022 12:15 PM
5	4	12/23/2022 2:25 PM
6	3	12/22/2022 12:50 PM
7	5	12/20/2022 2:19 PM
8	6	12/19/2022 9:30 PM

**Q4 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 40%	Average Score 2.4/3.0 (79%)	Standard Deviation 0.74	Difficulty 18/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	50.00%	4
Medium	2/3	37.50%	3
Low	1/3	12.50%	1
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q5 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

Answered: 6 Skipped: 4

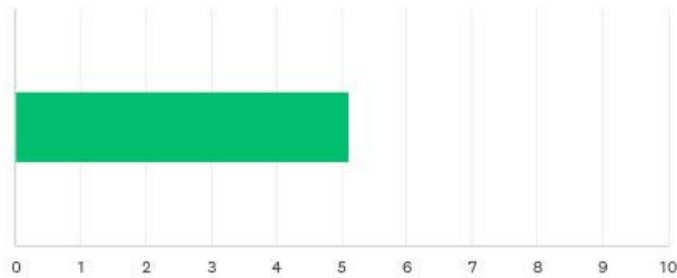
#	RESPONSES	DATE
1	Include other electricity providers serving portions of Prince George's County, such as SMECO and BGE if applicable.	1/4/2023 9:26 AM
2	May Baltimore Gas and Electric be included as well, as they serve a large percentage of the county	1/3/2023 10:16 AM
3	Suggest possibly changing the word "prevent". We will not outright eliminate power outages due to downed trees but will be lowering the risk through this measure	12/30/2022 9:51 AM
4	Develop mutual aid with the City of Laurel to provide limited resources and personnel to assist in trimming ang tree control as needed.	12/27/2022 12:15 PM

Prince George's County: Mitigation Actions Feedback

5	Department of Public Work and Transportation (DPW&T) is responsible for the debris removal after any incidents such as micro bursts. DPW&T should be engaged in this effort and coordinate with PEPCO.	12/23/2022 2:25 PM
6	Maybe a bit more explicit language to emphasize the need to conduct maintenance in such a way as to retain a healthy tree canopy and ensure the longevity of trees as opposed to a slash and dash approach.	12/20/2022 2:19 PM

**Q6 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2



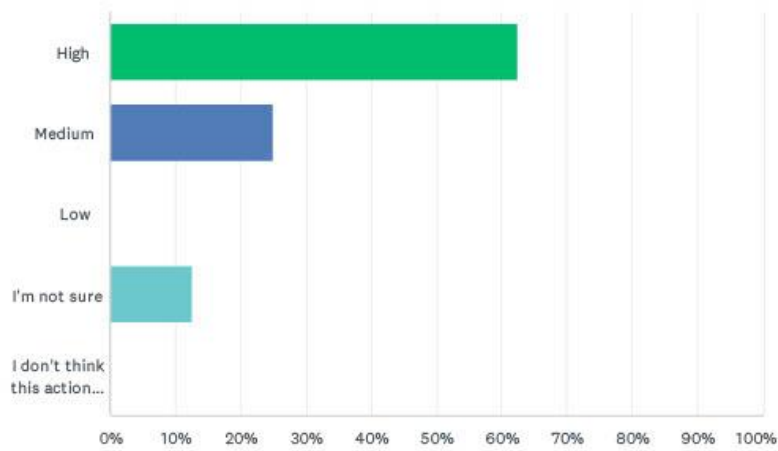
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	41	8
<b>Total Respondents: 8</b>			

#		DATE
1	5	1/4/2023 9:26 AM
2	5	1/3/2023 10:16 AM
3	6	12/30/2022 9:51 AM
4	6	12/27/2022 12:15 PM
5	4	12/23/2022 2:25 PM
6	4	12/22/2022 12:50 PM
7	5	12/20/2022 2:19 PM
8	6	12/19/2022 9:30 PM

**Q7 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 50%	Average Score 2.4/3.0 (79%)	Standard Deviation 1.06	Difficulty 18/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	62.50%	5
Medium	2/3	25.00%	2
Low	1/3	0.00%	0
I'm not sure	0/3	12.50%	1
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q8 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

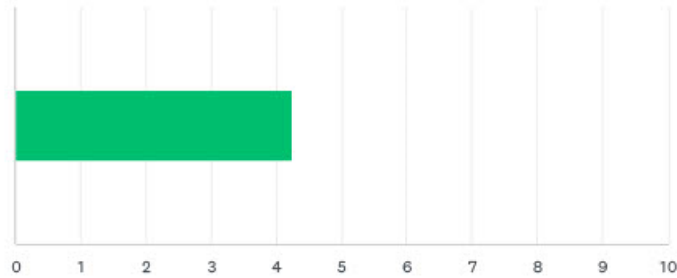
Answered: 4 Skipped: 6

#	RESPONSES	DATE
1	Implementing projects is what will directly help flood-impacted areas. Currently, a watershed study is being conducted (in 2023) in Collington Branch. An outcome of the study will be the proposal of specific flood mitigation projects	12/30/2022 9:51 AM
2	Develop MOA for the City of Laurel to inspect and clean the portion that runs through their jurisdiction.	12/27/2022 12:15 PM
3	It could be useful if the County wants to apply for a project scoping grant under BRIC/FMA.	12/23/2022 2:25 PM
4	USACE issued a report: Flood Risk Mgmt Study for Upper Marlboro, in 2021. this included FP modelling at the confl of Collington and Western Branch and Hydrology for Collington watershed.	12/22/2022 12:50 PM

Prince George's County: Mitigation Actions Feedback

**Q9 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2



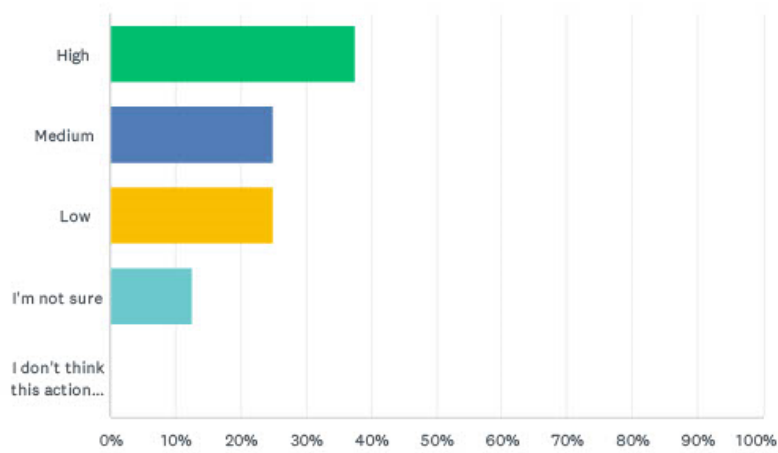
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	4	34	8
<b>Total Respondents: 8</b>			

#		DATE
1	4	1/4/2023 9:26 AM
2	5	1/3/2023 10:16 AM
3	3	12/30/2022 9:51 AM
4	3	12/27/2022 12:15 PM
5	5	12/23/2022 2:25 PM
6	3	12/22/2022 12:50 PM
7	5	12/20/2022 2:19 PM
8	6	12/19/2022 9:30 PM

**Q10 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 30%	Average Score 1.9/3.0 (63%)	Standard Deviation 1.13	Difficulty 8/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	37.50%	3
Medium	2/3	25.00%	2
Low	1/3	25.00%	2
I'm not sure	0/3	12.50%	1
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q11 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

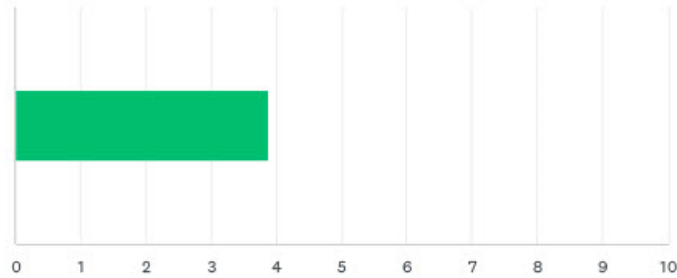
Answered: 4 Skipped: 6

#	RESPONSES	DATE
1	Any outreach should include funding options or other sources for completing recommended work, if available, including outreach on flood insurance.	1/3/2023 10:16 AM
2	County/consultant experts will ultimately decide on the best mitigation approach based on BCA, especially on large-scale projects that benefit neighborhoods.	12/30/2022 9:51 AM
3	I think it would be great to have it in the plan to display we consider a wide range of mitigation strategies such as public education.	12/23/2022 2:25 PM
4	This specific location could be part of a broader scope for the County to evaluate communities impacted by riverine flooding verses localized drainage.	12/22/2022 12:50 PM

Prince George's County: Mitigation Actions Feedback

**Q12 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	4	31	8
<b>Total Respondents: 8</b>			

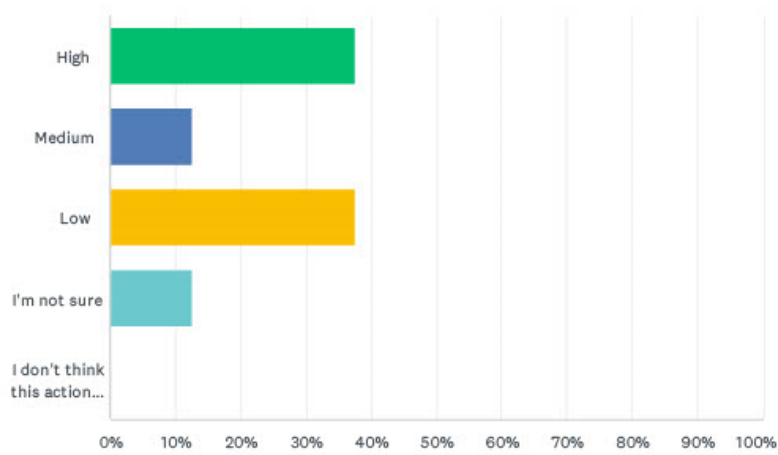
#		DATE
1	1	1/4/2023 9:26 AM
2	6	1/3/2023 10:16 AM
3	4	12/30/2022 9:51 AM
4	6	12/27/2022 12:15 PM
5	3	12/23/2022 2:25 PM
6	3	12/22/2022 12:50 PM
7	5	12/20/2022 2:19 PM
8	3	12/19/2022 9:30 PM

**Q13 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2



Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 30%	Average Score 1.8/3.0 (58%)	Standard Deviation 1.16	Difficulty 2/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	37.50%	3
Medium	2/3	12.50%	1
Low	1/3	37.50%	3
I'm not sure	0/3	12.50%	1
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q14 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

Answered: 5 Skipped: 5

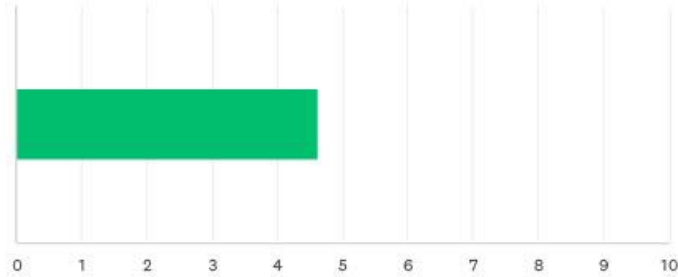
#	RESPONSES	DATE
1	Does the wording on this action include microgrids for government facilities such as shelters, EOCs and Fire/PD stations? What does it mean by 'solar potential'?	1/3/2023 10:16 AM
2	System outages occur in-frequently in a given area. If there are known locations that suffer multiple outages during a year, then that might be reasonable to target those areas.	12/30/2022 9:51 AM
3	Include City employees in any training offered; and have the City of Laurel as a partner in any grant applications.	12/27/2022 12:15 PM
4	since the socially vulnerable areas would not be able to fund these types of projects and the private sector owns the County energy grid, adding this action will not reduce the vulnerability of the energy grid in those areas.	12/23/2022 2:25 PM

Prince George's County: Mitigation Actions Feedback

5 I am confused as to why socially vulnerable grid modernization and government operations transition to renewable are the same action. These seem like two distinct actions. 12/20/2022 2:19 PM

**Q15 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2



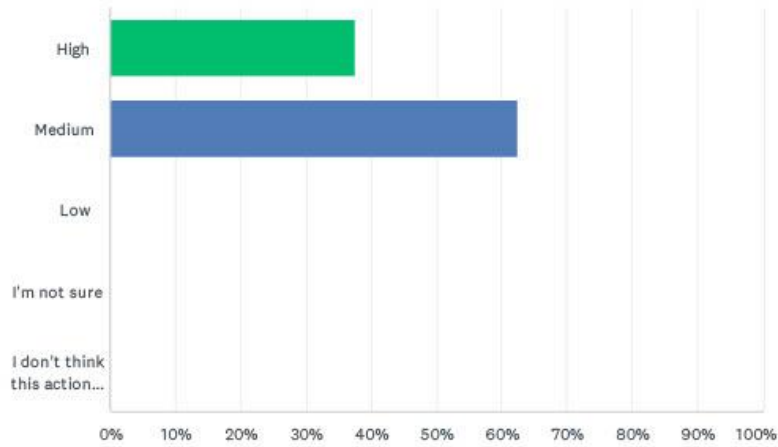
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
		5	37
<b>Total Respondents: 8</b>			<b>8</b>

#		DATE
1	4	1/4/2023 9:26 AM
2	4	1/3/2023 10:16 AM
3	5	12/30/2022 9:51 AM
4	6	12/27/2022 12:15 PM
5	5	12/23/2022 2:25 PM
6	3	12/22/2022 12:50 PM
7	6	12/20/2022 2:19 PM
8	4	12/19/2022 9:30 PM

**Q16 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 30%	Average Score 2.4/3.0 (79%)	Standard Deviation 0.52	Difficulty 18/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	37.50%	3
Medium	2/3	62.50%	5
Low	1/3	0.00%	0
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q17 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

Answered: 5 Skipped: 5

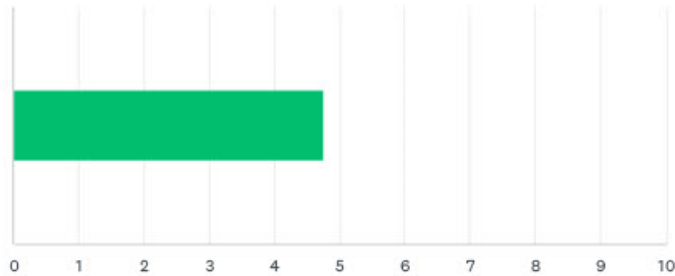
#	RESPONSES	DATE
1	Integrating plans across the different areas is an important item to look into.	12/30/2022 9:51 AM
2	Provide link in the website for citizens to click on the companion City plan.	12/27/2022 12:15 PM
3	It is a good suggestion and it needs collaboration among various county agencies such as Department of Environment (DoE), Office of Homeland Security (OHS), and Office of Information Technology (OIT).	12/23/2022 2:25 PM
4	this is not my area of influence, but for planning this seems to be an important topic to plan for - longer term.	12/22/2022 12:50 PM
5	The county should have a one stop shop for hazard mitigation and climate action, NOT two	12/20/2022 2:19 PM

Prince George's County: Mitigation Actions Feedback

seperate websites. streamline and coordinate so as to maximize reach and impact.

**Q18 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2



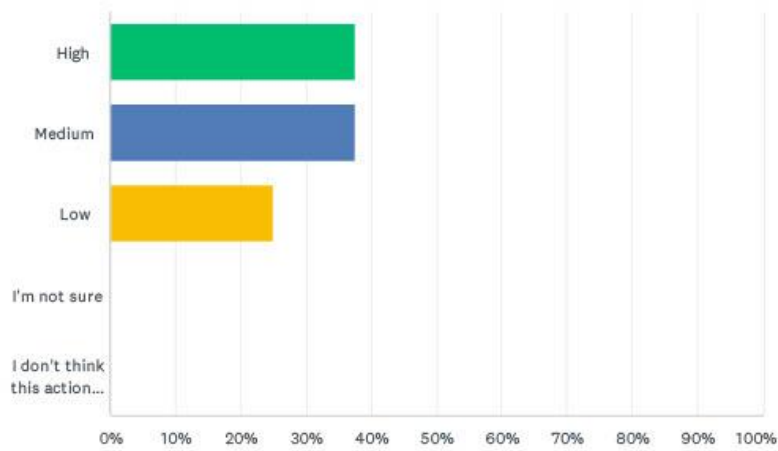
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	38	8
<b>Total Respondents: 8</b>			

#		DATE
1	4	1/4/2023 9:26 AM
2	6	1/3/2023 10:16 AM
3	6	12/30/2022 9:51 AM
4	4	12/27/2022 12:15 PM
5	6	12/23/2022 2:25 PM
6	4	12/22/2022 12:50 PM
7	5	12/20/2022 2:19 PM
8	3	12/19/2022 9:30 PM

**Q19 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 30%	Average Score 2.1/3.0 (71%)	Standard Deviation 0.83	Difficulty 12/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	37.50%	3
Medium	2/3	37.50%	3
Low	1/3	25.00%	2
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q20 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

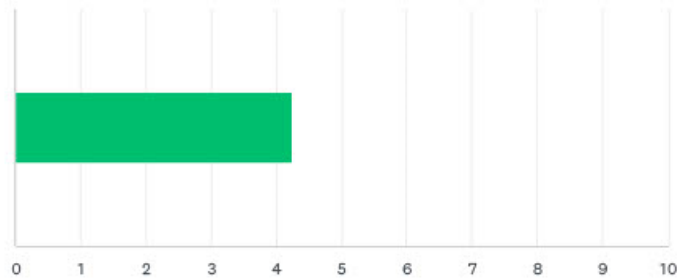
Answered: 3 Skipped: 7

#	RESPONSES	DATE
1	Such studies will show the County intends to take concrete action to mitigate flooding issues.	12/30/2022 9:51 AM
2	It would be useful for the grant applications and indicating the County approach towards the Nature-Based Solutions (NBS).	12/23/2022 2:25 PM
3	this is a significant balance btwn preserving natural features verses improved conveyance (infrastructure) verses property rights, liabilities and use ( ie MNCPPC) . it is a valid topic for planning purposes, but will be extremely challenging to develop a strategy that can be implemented.	12/22/2022 12:50 PM

Prince George's County: Mitigation Actions Feedback

**Q21 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2



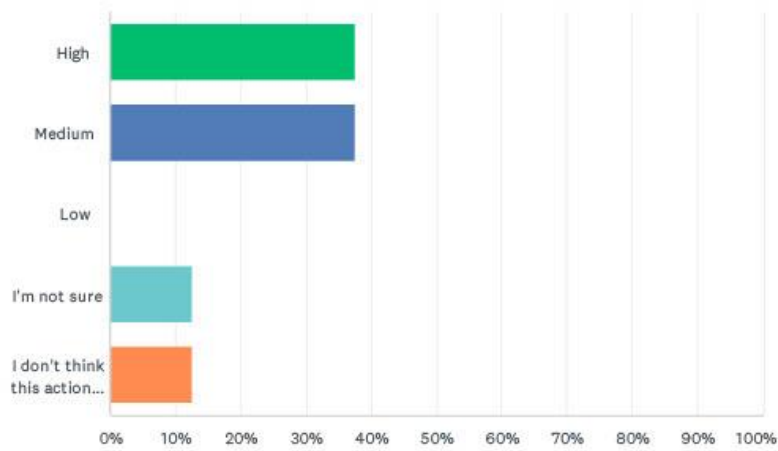
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	4	34	8
<b>Total Respondents: 8</b>			

#		DATE
1	5	1/4/2023 9:26 AM
2	5	1/3/2023 10:16 AM
3	3	12/30/2022 9:51 AM
4	4	12/27/2022 12:15 PM
5	4	12/23/2022 2:25 PM
6	2	12/22/2022 12:50 PM
7	5	12/20/2022 2:19 PM
8	6	12/19/2022 9:30 PM

**Q22 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 30%	Average Score 1.9/3.0 (63%)	Standard Deviation 1.25	Difficulty 8/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	37.50%	3
Medium	2/3	37.50%	3
Low	1/3	0.00%	0
I'm not sure	0/3	12.50%	1
I don't think this action should be in the plan	0/3	12.50%	1
<b>TOTAL</b>			<b>8</b>

**Q23 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

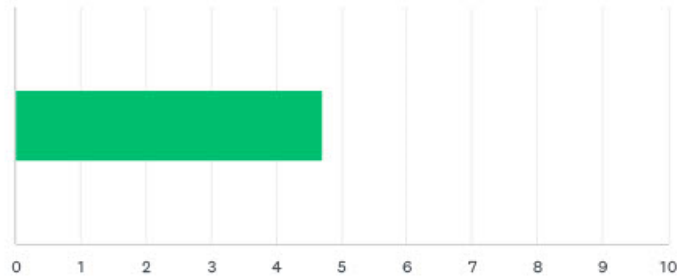
Answered: 3 Skipped: 7

#	RESPONSES	DATE
1	Not sure if such metrics can be created.	12/30/2022 9:51 AM
2	How will affected jurisdictions be able to add and manipulate the data as needed for their portion?	12/27/2022 12:15 PM
3	This is already being accomplished thru DPWT AND DOE programs, under requirements of MS4 PERMIT. Inspections of private facilities also being done.	12/22/2022 12:50 PM

Prince George's County: Mitigation Actions Feedback

**Q24 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 7 Skipped: 3



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	33	7
<b>Total Respondents: 7</b>			

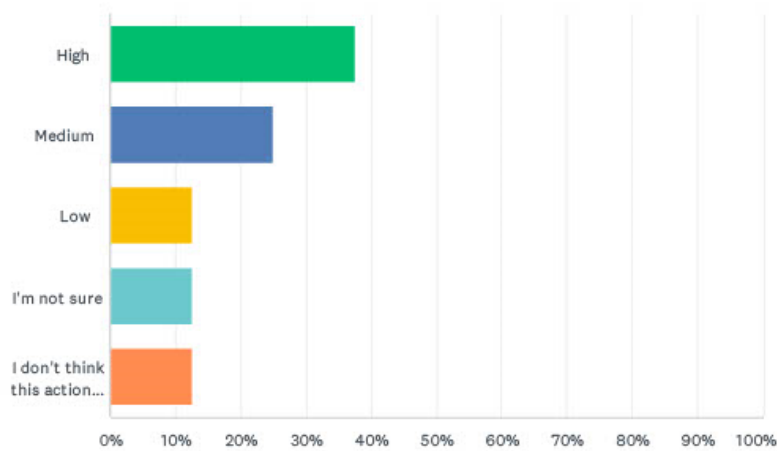
#		DATE
1	3	1/4/2023 9:26 AM
2	5	1/3/2023 10:16 AM
3	5	12/30/2022 9:51 AM
4	5	12/27/2022 12:15 PM
5	3	12/22/2022 12:50 PM
6	6	12/20/2022 2:19 PM
7	6	12/19/2022 9:30 PM

**Q25 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2



Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 30%	Average Score 1.8/3.0 (58%)	Standard Deviation 1.28	Difficulty 2/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	37.50%	3
Medium	2/3	25.00%	2
Low	1/3	12.50%	1
I'm not sure	0/3	12.50%	1
I don't think this action should be in the plan	0/3	12.50%	1
<b>TOTAL</b>			<b>8</b>

**Q26 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

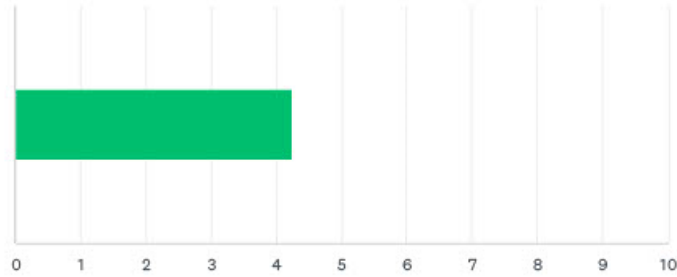
Answered: 1 Skipped: 9

#	RESPONSES	DATE
1	The concept of resiliency hubs is not clearly defined for the County agencies. There are challenges regarding the resiliency hubs management and on going discussions to use these hubs for the food resiliency or emergency activation. The Department of Social Services has established a new food resiliency office working with the County Executive food resiliency task force to distribute food among vulnerable population. I think it could be an action to be added in the next plan update and not now.	12/23/2022 2:25 PM

**Q27 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Prince George's County: Mitigation Actions Feedback

Answered: 8 Skipped: 2



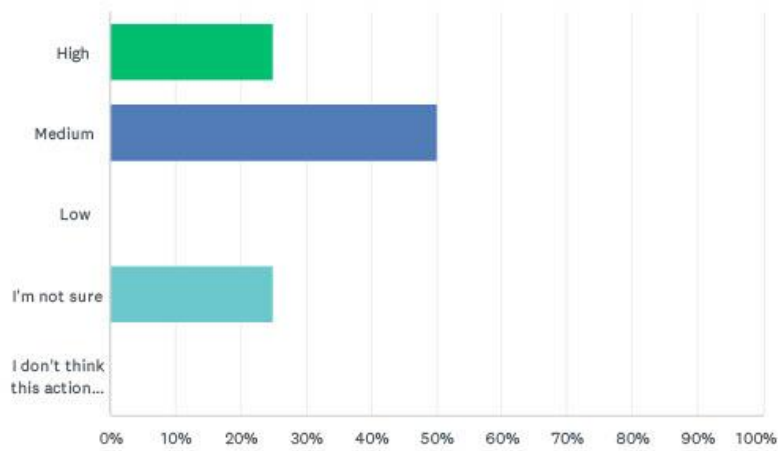
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	4	34	8
<b>Total Respondents: 8</b>			

#		DATE
1	5	1/4/2023 9:26 AM
2	5	1/3/2023 10:16 AM
3	6	12/30/2022 9:51 AM
4	4	12/27/2022 12:15 PM
5	3	12/23/2022 2:25 PM
6	3	12/22/2022 12:50 PM
7	4	12/20/2022 2:19 PM
8	4	12/19/2022 9:30 PM

**Q28 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 20%	Average Score 1.8/3.0 (58%)	Standard Deviation 1.16	Difficulty 2/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	25.00%	2
Medium	2/3	50.00%	4
Low	1/3	0.00%	0
I'm not sure	0/3	25.00%	2
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q29** Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.

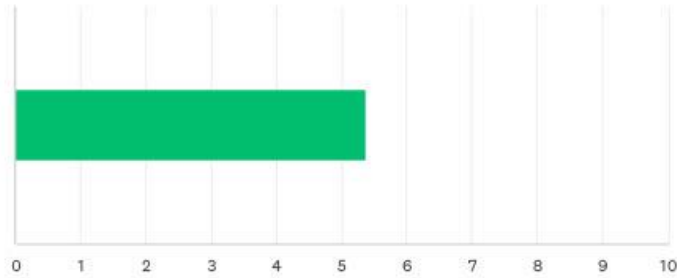
Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	I think that this is already covered in MNCPPC ORDINANCES and NRI evaluations.	12/22/2022 12:50 PM
2	Doesn't the county already have robust tree policies? The issue is enforcement of existing land use policies and plans. Investing in another plan/ study will not have an impact without stronger enforcement and accountability of existing regulations.	12/20/2022 2:19 PM

**Q30** What is your overall opinion of including this action in the plan (pending any minor text edits)?

Prince George's County: Mitigation Actions Feedback

Answered: 8 Skipped: 2



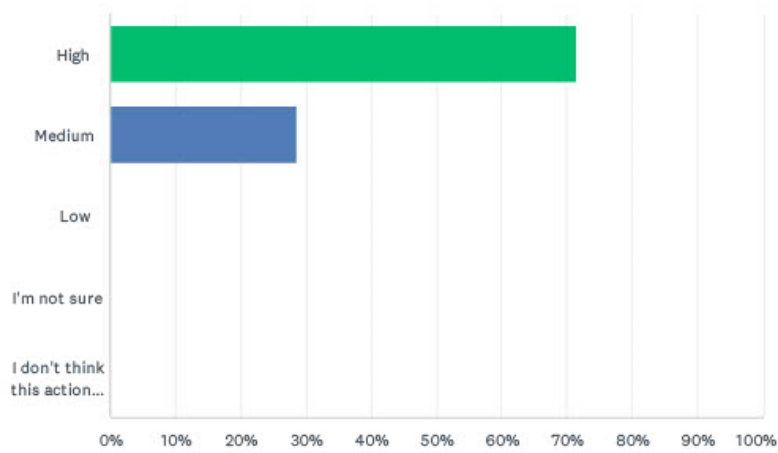
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	43	8
<b>Total Respondents: 8</b>			

#		DATE
1	6	1/4/2023 9:26 AM
2	5	1/3/2023 10:16 AM
3	4	12/30/2022 9:51 AM
4	6	12/27/2022 12:15 PM
5	6	12/23/2022 2:25 PM
6	6	12/22/2022 12:50 PM
7	5	12/20/2022 2:19 PM
8	5	12/19/2022 9:30 PM

**Q31 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 50%	Average Score 2.7/3.0 (90%)	Standard Deviation 0.49	Difficulty 29/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	71.43%	5
Medium	2/3	28.57%	2
Low	1/3	0.00%	0
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>7</b>

**Q32 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

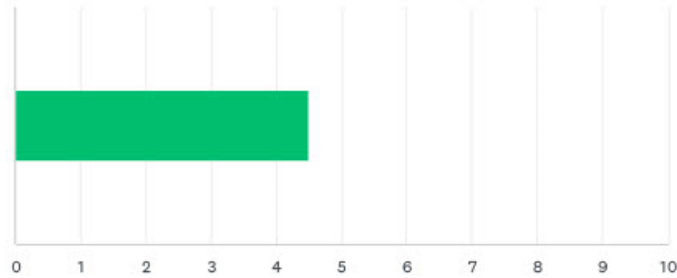
Answered: 3 Skipped: 7

#	RESPONSES	DATE
1	I don't understand "potential" in High Hazard Potential Dams. How is this defined? Suggest dropping it or defining the term.	12/30/2022 9:51 AM
2	must include P.G. County's vision for providing support to affected "down river/down flow communities that are directly in the path of/and would be affected by a dam mishap...	12/27/2022 12:15 PM
3	It should be added to the plan for the High Hazard Potential Dam (HHPD) and grant application.	12/23/2022 2:25 PM

Prince George's County: Mitigation Actions Feedback

**Q33 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2



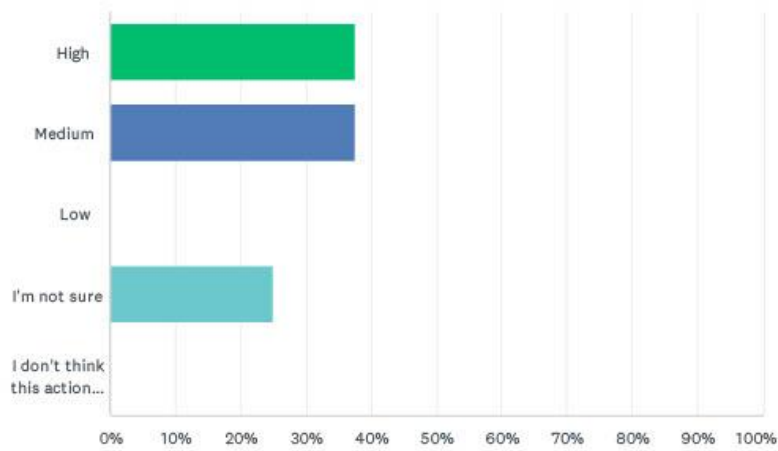
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	36	8
<b>Total Respondents: 8</b>			

#		DATE
1	3	1/4/2023 9:26 AM
2	5	1/3/2023 10:16 AM
3	3	12/30/2022 9:51 AM
4	5	12/27/2022 12:15 PM
5	6	12/23/2022 2:25 PM
6	3	12/22/2022 12:50 PM
7	6	12/20/2022 2:19 PM
8	5	12/19/2022 9:30 PM

**Q34 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 30%	Average Score 1.9/3.0 (63%)	Standard Deviation 1.25	Difficulty 8/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	37.50%	3
Medium	2/3	37.50%	3
Low	1/3	0.00%	0
I'm not sure	0/3	25.00%	2
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q35 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

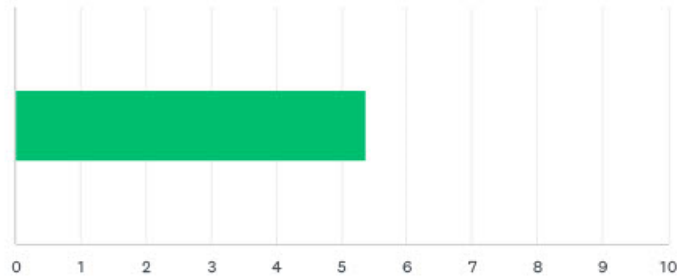
Answered: 3 Skipped: 7

#	RESPONSES	DATE
1	Should this include annual hazard mitigation outreach townhalls with residents?	1/3/2023 10:16 AM
2	It could be helpful to show that under served communities can apply for the HMA grants if they could have a joint application with the private sector or the County agencies.	12/23/2022 2:25 PM
3	suggest rewording .... action guide to identify County resources at OEM. OEM could decide how to release information on grant opportunities and requirements	12/22/2022 12:50 PM

Prince George's County: Mitigation Actions Feedback

**Q36 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	43	8
<b>Total Respondents: 8</b>			

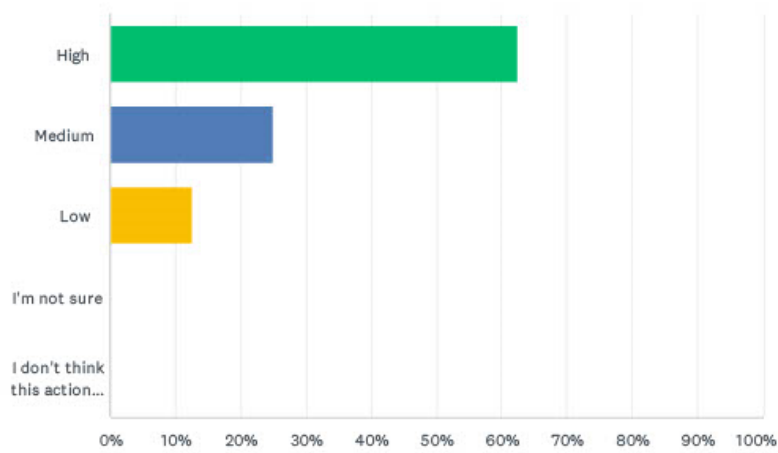
#		DATE
1	6	1/4/2023 9:26 AM
2	6	1/3/2023 10:16 AM
3	5	12/30/2022 9:51 AM
4	4	12/27/2022 12:15 PM
5	4	12/23/2022 2:25 PM
6	6	12/22/2022 12:50 PM
7	6	12/20/2022 2:19 PM
8	6	12/19/2022 9:30 PM

**Q37 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2



Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 50%	Average Score 2.5/3.0 (83%)	Standard Deviation 0.76	Difficulty 24/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	62.50%	5
Medium	2/3	25.00%	2
Low	1/3	12.50%	1
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q38 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

Answered: 6 Skipped: 4

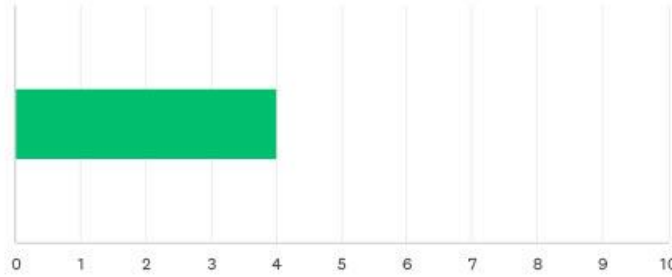
#	RESPONSES	DATE
1	Also send digital copies of the 2023 Hazard Mitigation Plan to all Homeowner Associations (HOAs) in the County.	1/4/2023 9:26 AM
2	Should be a requirement	1/3/2023 10:16 AM
3	Or provide the link to the document	12/30/2022 9:51 AM
4	since the plan will be in the Hazard Mitigation webpage, everyone will have access to it. I think sending a digital copy to the directors will be helpful.	12/23/2022 2:25 PM
5	send to County agencies, not staff. Agency should determine the logistics of engaging appropriate staff, divisions. operations, etc.	12/22/2022 12:50 PM

Prince George's County: Mitigation Actions Feedback

- 6 No one will read the entire plan. It also needs to include a well designed executive summary, infographic, summary, etc. that ties back to various county departments roles and responsibilities. 12/20/2022 2:19 PM

**Q39 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2



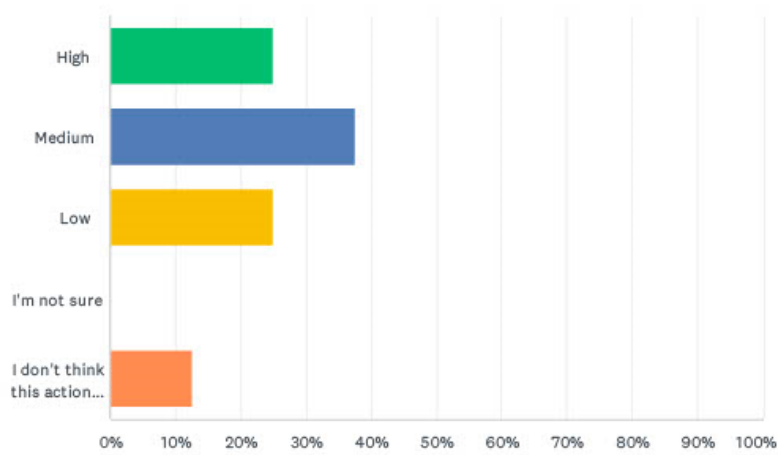
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	4	32	8
<b>Total Respondents: 8</b>			

#		DATE
1	5	1/4/2023 9:26 AM
2	6	1/3/2023 10:16 AM
3	4	12/30/2022 9:51 AM
4	3	12/27/2022 12:15 PM
5	5	12/23/2022 2:25 PM
6	0	12/22/2022 12:50 PM
7	6	12/20/2022 2:19 PM
8	3	12/19/2022 9:30 PM

**Q40 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 20%	Average Score 1.8/3.0 (58%)	Standard Deviation 1.04	Difficulty 2/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	25.00%	2
Medium	2/3	37.50%	3
Low	1/3	25.00%	2
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	12.50%	1
<b>TOTAL</b>			<b>8</b>

**Q41** Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.

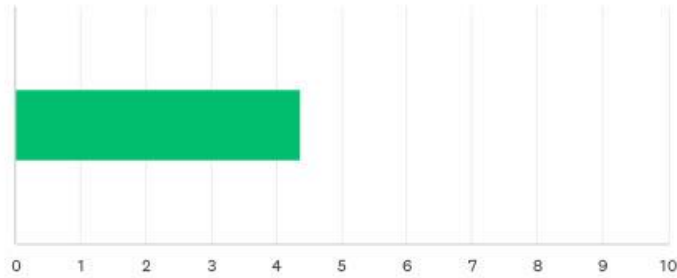
Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	Is it possible to consider an annual meeting/ workshop to discuss county-wide priorities and projects for grants with local municipalities, specifically those looking to submit grants?	1/3/2023 10:16 AM
2	It will improve the funding mechanism of mitigation projects through various funding options such as different grants.	12/23/2022 2:25 PM

**Q42** What is your overall opinion of including this action in the plan (pending any minor text edits)?

Prince George's County: Mitigation Actions Feedback

Answered: 8 Skipped: 2



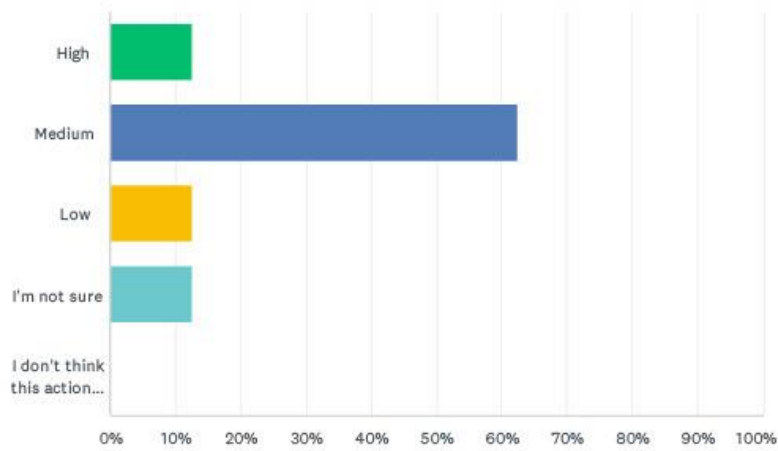
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	4	35	8
<b>Total Respondents: 8</b>			

#		DATE
1	4	1/4/2023 9:26 AM
2	5	1/3/2023 10:16 AM
3	5	12/30/2022 9:51 AM
4	4	12/27/2022 12:15 PM
5	4	12/23/2022 2:25 PM
6	3	12/22/2022 12:50 PM
7	6	12/20/2022 2:19 PM
8	4	12/19/2022 9:30 PM

**Q43 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 10%	Average Score 1.8/3.0 (58%)	Standard Deviation 0.89	Difficulty 2/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	12.50%	1
Medium	2/3	62.50%	5
Low	1/3	12.50%	1
I'm not sure	0/3	12.50%	1
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q44 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

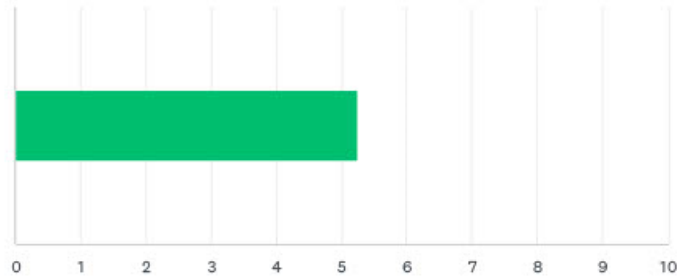
Answered: 3 Skipped: 7

#	RESPONSES	DATE
1	Make the same information available to City of Laurel counterparts.	12/27/2022 12:15 PM
2	Conducting a study of using climate-smart building materials would be a better wording. It will be useful if we could have an evidence based solution for promoting these type of materials.	12/23/2022 2:25 PM
3	What does it mean to promote? This should provide more details on what this action would entail and who will be taking it on.	12/20/2022 2:19 PM

Prince George's County: Mitigation Actions Feedback

**Q45 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2



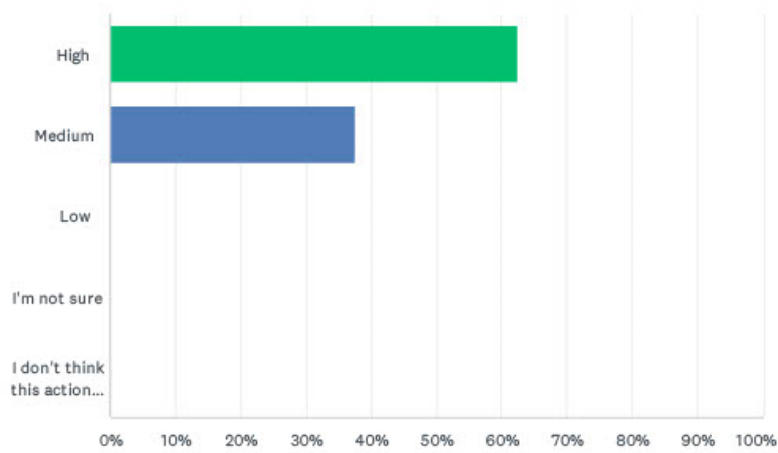
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	42	8
<b>Total Respondents: 8</b>			

#		DATE
1	6	1/4/2023 9:26 AM
2	6	1/3/2023 10:16 AM
3	4	12/30/2022 9:51 AM
4	4	12/27/2022 12:15 PM
5	6	12/23/2022 2:25 PM
6	5	12/22/2022 12:50 PM
7	6	12/20/2022 2:19 PM
8	5	12/19/2022 9:30 PM

**Q46 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 50%	Average Score 2.6/3.0 (88%)	Standard Deviation 0.52	Difficulty 28/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	62.50%	5
Medium	2/3	37.50%	3
Low	1/3	0.00%	0
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q47 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

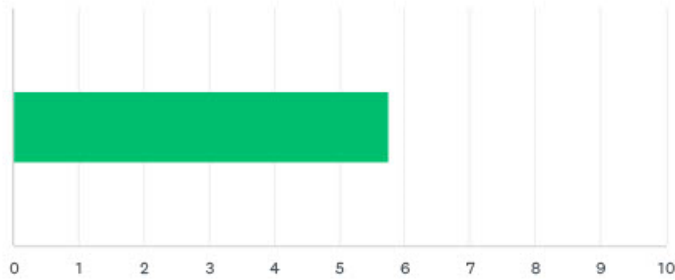
Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	Must thoroughly vet the most recent additions first before adopting, and if necessary only adopt certain chapters, if the rest don't meet the County's long term vision.	12/27/2022 12:15 PM
2	Department of Permitting, Inspections and Enforcement (DEPIE) should be the lead agency.	12/23/2022 2:25 PM

**Q48 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	6	46	8
<b>Total Respondents: 8</b>			

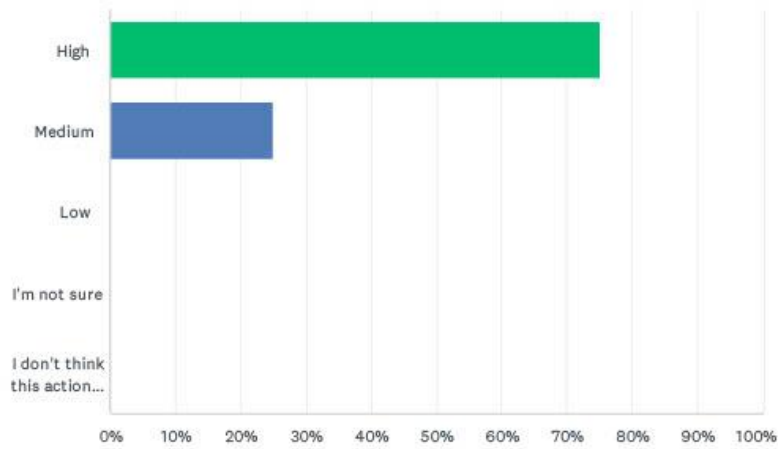
#		DATE
1	6	1/4/2023 9:26 AM
2	5	1/3/2023 10:16 AM
3	6	12/30/2022 9:51 AM
4	5	12/27/2022 12:15 PM
5	6	12/23/2022 2:25 PM
6	6	12/22/2022 12:50 PM
7	6	12/20/2022 2:19 PM
8	6	12/19/2022 9:30 PM

**Q49 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2



Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 60%	Average Score 2.8/3.0 (92%)	Standard Deviation 0.46	Difficulty 32/33
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	75.00%	6
Medium	2/3	25.00%	2
Low	1/3	0.00%	0
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q50 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

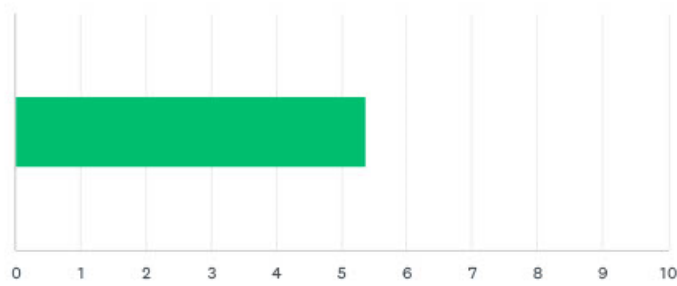
Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	Implement or scope? Is there an established list of current stormwater management projects?	1/3/2023 10:16 AM
2	this is already being performed thru various programs - DOE AND DPWT.	12/22/2022 12:50 PM

**Q51 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



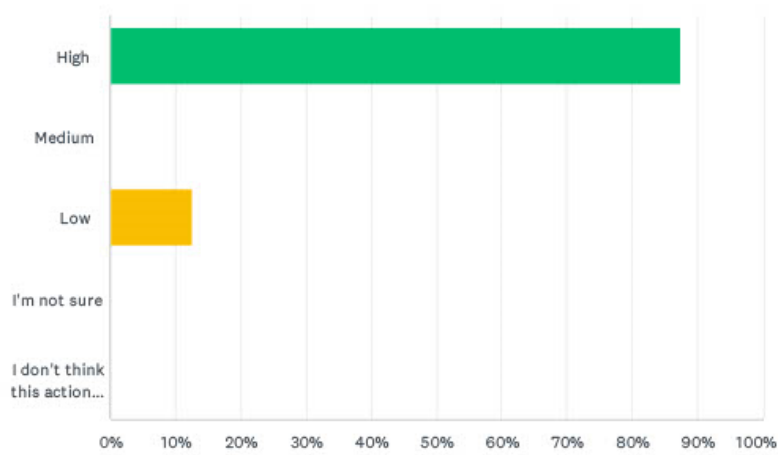
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	43	8
<b>Total Respondents: 8</b>			

#		DATE
1	6	1/4/2023 9:26 AM
2	6	1/3/2023 10:16 AM
3	4	12/30/2022 9:51 AM
4	5	12/27/2022 12:15 PM
5	6	12/23/2022 2:25 PM
6	5	12/22/2022 12:50 PM
7	5	12/20/2022 2:19 PM
8	6	12/19/2022 9:30 PM

**Q52 What priority ranking should this action be given in the plan? (Priority refers to how important it is for the County to accomplish/implement)**

Answered: 8 Skipped: 2

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct	Average Score	Standard Deviation	Difficulty
70%	2.8/3.0 (92%)	0.71	32/33

ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	87.50%	7
Medium	2/3	0.00%	0
Low	1/3	12.50%	1
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>8</b>

**Q53 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

Answered: 2 Skipped: 8

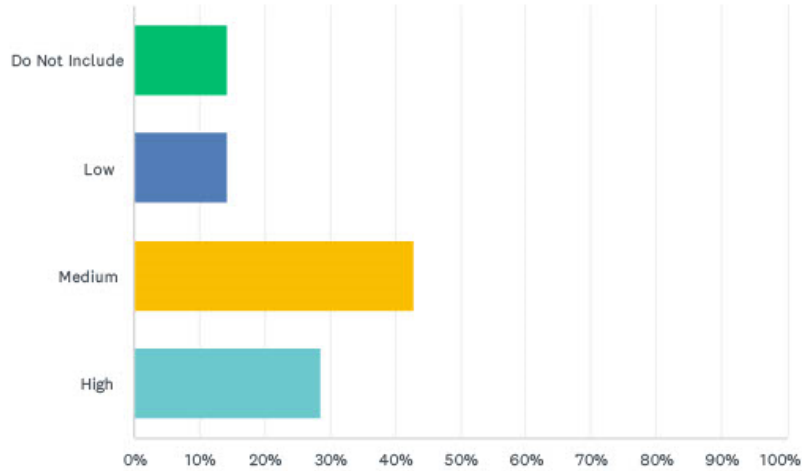
#	RESPONSES	DATE
1	Currently, several watershed scale studies are being conducted. In following years, other watersheds should be included	12/30/2022 9:51 AM
2	NEED TO BE IN SWM CODE.	12/22/2022 12:50 PM

**Q54 Develop a program to utilize vacant land (both publicly and privately owned) for stormwater management. Acquire land to serve the dual**

Prince George's County: Mitigation Actions Feedback

purpose of green infrastructure/stormwater infiltration and recreational/open space.

Answered: 7 Skipped: 3



QUIZ STATISTICS			
Percent Correct 20%	Average Score 1.9/3.0 (62%)	Standard Deviation 1.07	Difficulty 7/33

ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	14.29%	1
Low	1/3	14.29%	1
Medium	2/3	42.86%	3
✓ High	3/3	28.57%	2
<b>TOTAL</b>			<b>7</b>

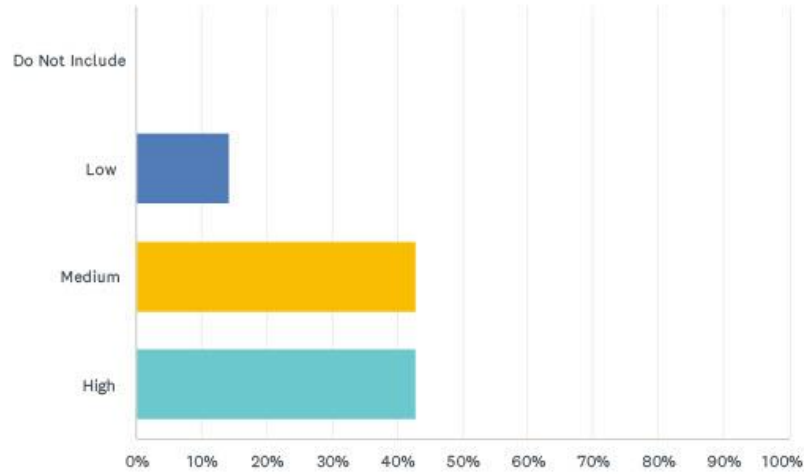
  

#	COMMENTS (IF ANY)	DATE
1	It is useful for the HMA grant applications.	12/23/2022 2:28 PM
2	Very DIFFICULT TO IMPLEMENT, LIMITED LAND OPPORTUNITIES, AND MANY OTHER OBSTACLES.	12/22/2022 12:56 PM

**Q55 Use conservation subdivisions in areas adjacent to Rural and Agricultural Areas to transition density and to encourage preservation of green infrastructure corridors as defined by the County's Green Infrastructure Plan.**

Prince George's County: Mitigation Actions Feedback

Answered: 7 Skipped: 3



**QUIZ STATISTICS**

Percent Correct 30%	Average Score 2.3/3.0 (76%)	Standard Deviation 0.76	Difficulty 15/33
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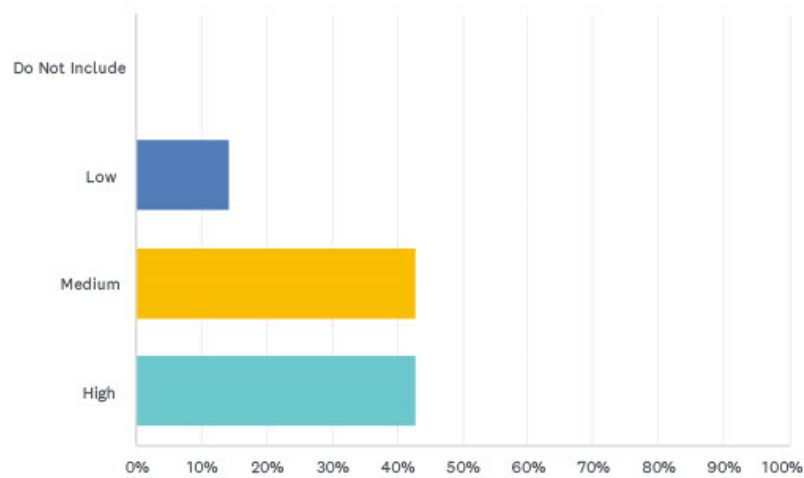
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	0.00%	0
Low	1/3	14.29%	1
Medium	2/3	42.86%	3
✓ High	3/3	42.86%	3
<b>TOTAL</b>			<b>7</b>

#	COMMENTS (IF ANY)	DATE
	There are no responses.	

**Q56 Use conservation subdivisions or other site planning and landscape conservation tools when developing in Established Communities near Rural and Agricultural Areas to cluster development and preserve land for resource protection or open space.**

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback

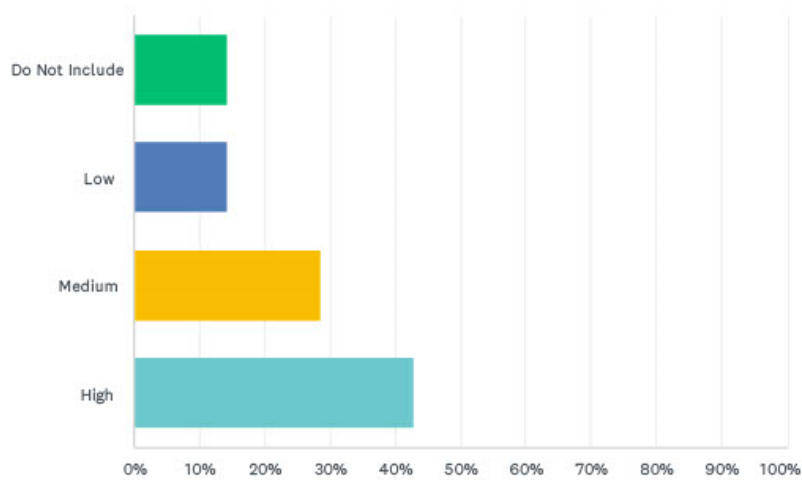


QUIZ STATISTICS			
Percent Correct 30%	Average Score 2.3/3.0 (76%)	Standard Deviation 0.76	Difficulty 15/33
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	0.00%	0
Low	1/3	14.29%	1
Medium	2/3	42.86%	3
✓ High	3/3	42.86%	3
<b>TOTAL</b>			<b>7</b>
#	COMMENTS (IF ANY)	DATE	
	There are no responses.		

**Q57** To preserve environmentally sensitive land and to encourage development in the Regional Transit Districts, evaluate a transfer of development rights program, density exchanges, or purchase of development rights program for the Rural and Agricultural Areas. Explore opportunities to transfer development rights within areas and to coordinate with the Watershed Implementation Plan and Maryland Accounting for Growth Policy.

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback

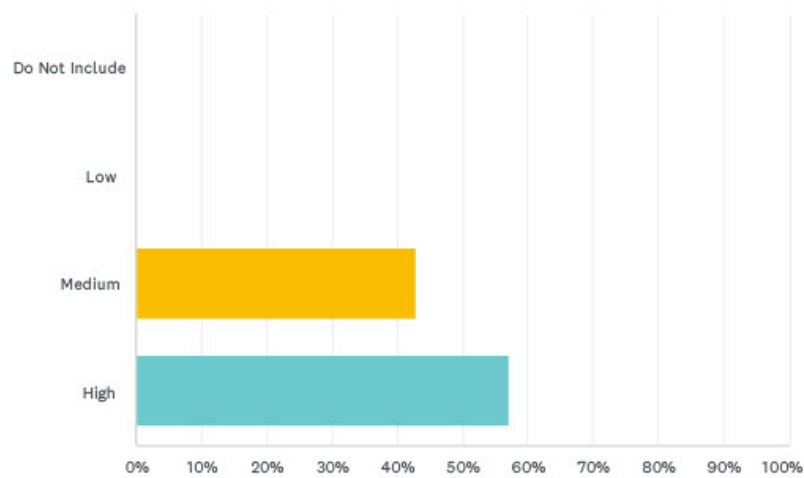


QUIZ STATISTICS			
Percent Correct 30%	Average Score 2.0/3.0 (67%)	Standard Deviation 1.15	Difficulty 11/33
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	14.29%	1
Low	1/3	14.29%	1
Medium	2/3	28.57%	2
✓ High	3/3	42.86%	3
<b>TOTAL</b>			<b>7</b>
#	COMMENTS (IF ANY)	DATE	
	There are no responses.		

Q58 Align Economic Development Plans with the Climate Action Plan, preserving existing agricultural land and natural areas and promoting development in already-developed areas near high-capacity transit. Perform an economic development and climate adaptation analysis of existing agricultural land and natural areas that are crucial to climate resilience on a subwatershed basis. Identify areas of open space for preservation and optimum use for climate resilience.

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback



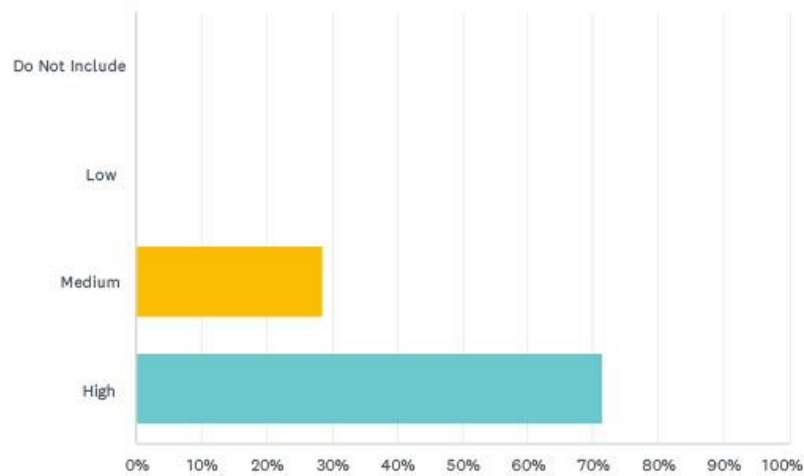
QUIZ STATISTICS			
Percent Correct 40%	Average Score 2.6/3.0 (86%)	Standard Deviation 0.53	Difficulty 25/33
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	0.00%	0
Low	1/3	0.00%	0
Medium	2/3	42.86%	3
✓ High	3/3	57.14%	4
<b>TOTAL</b>			<b>7</b>
#	COMMENTS (IF ANY)	DATE	
	There are no responses.		

**Q59 The County shall prohibit all waivers to allow development in floodplains.**

Answered: 7 Skipped: 3



Prince George's County: Mitigation Actions Feedback

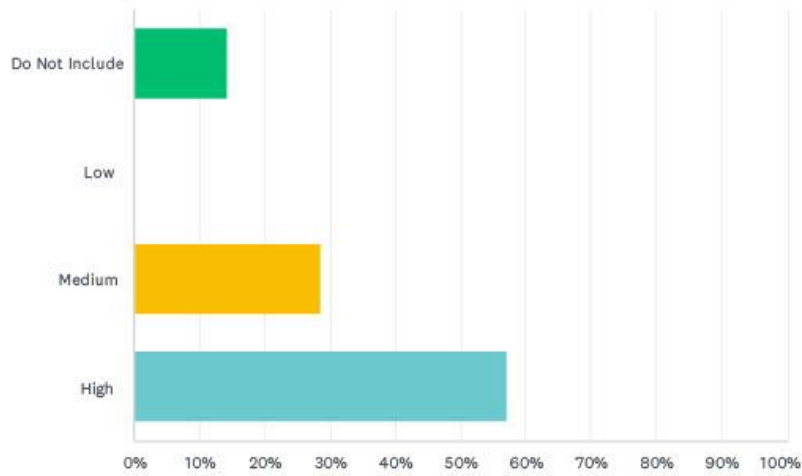


QUIZ STATISTICS			
Percent Correct 50%	Average Score 2.7/3.0 (90%)	Standard Deviation 0.49	Difficulty 29/33
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	0.00%	0
Low	1/3	0.00%	0
Medium	2/3	28.57%	2
✓ High	3/3	71.43%	5
<b>TOTAL</b>			<b>7</b>
#	COMMENTS (IF ANY)	DATE	
1	Absolutely, and work with local municipalities to ensure the same compliance	1/3/2023 10:16 AM	
2	We should limit these waivers for all but those that have a community benefit such as roads.	12/30/2022 9:57 AM	
3	Re: my earlier statement on enforcing existing regulations - eliminating waivers will be necessary to see improvements. Strongly support this.	12/20/2022 2:24 PM	

**Q60 Adopt and Enforce Policies to Require Green Infrastructure Practices for New and Existing Properties, especially native plantings, rain gardens, green corridors, runoff retention, and other nature-based ways to reduce and naturally filter runoff on private and public properties. Insert specific enforceable language in guiding County documents related to proposed and existing development.**

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 40%	Average Score 2.3/3.0 (76%)	Standard Deviation 1.11	Difficulty 15/33

ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	14.29%	1
Low	1/3	0.00%	0
Medium	2/3	28.57%	2
✓ High	3/3	57.14%	4
<b>TOTAL</b>			<b>7</b>

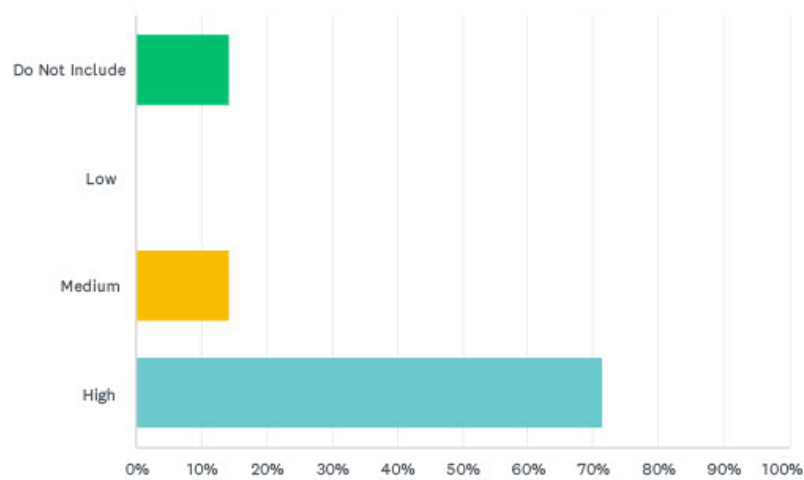
  

#	COMMENTS (IF ANY)	DATE
1	Overreach by County regarding private development.	1/4/2023 9:37 AM
2	fees and fines need to be set high enough to disincentivize noncompliance.	12/20/2022 2:24 PM

**Q61 Revise Prince George's County Code of Ordinance to Incorporate and Require Climate-resilient Practices.**

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback

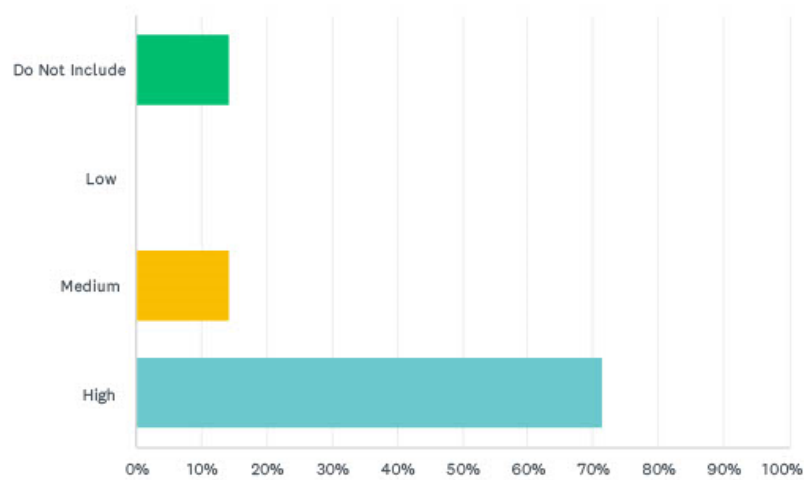


QUIZ STATISTICS			
Percent Correct 50%	Average Score 2.4/3.0 (81%)	Standard Deviation 1.13	Difficulty 21/33
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	14.29%	1
Low	1/3	0.00%	0
Medium	2/3	14.29%	1
✓ High	3/3	71.43%	5
<b>TOTAL</b>			<b>7</b>
#	COMMENTS (IF ANY)	DATE	
	There are no responses.		

**Q62 Update County's Stormwater Regulations to require climate resilient design and criteria.**

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback

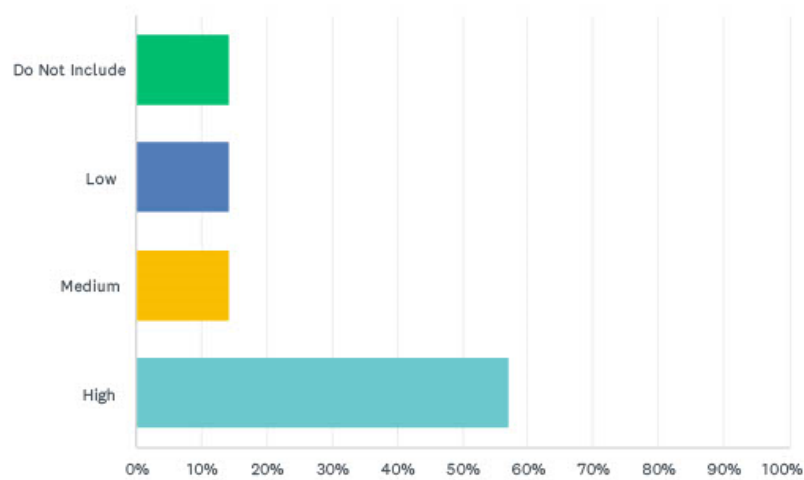


QUIZ STATISTICS			
Percent Correct 50%	Average Score 2.4/3.0 (81%)	Standard Deviation 1.13	Difficulty 21/33
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	14.29%	1
Low	1/3	0.00%	0
Medium	2/3	14.29%	1
✓ High	3/3	71.43%	5
<b>TOTAL</b>			<b>7</b>
#	COMMENTS (IF ANY)	DATE	
	There are no responses.		

**Q63 Office of the County Executive must introduce and support a County Council resolution requiring the County to integrate extreme weather and energy-efficiency criteria into building codes.**

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback

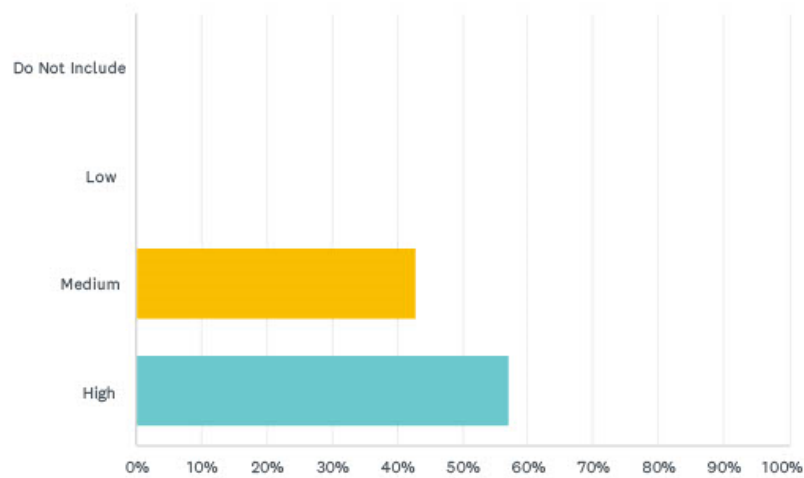


QUIZ STATISTICS			
Percent Correct 40%	Average Score 2.1/3.0 (71%)	Standard Deviation 1.21	Difficulty 13/33
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	14.29%	1
Low	1/3	14.29%	1
Medium	2/3	14.29%	1
✓ High	3/3	57.14%	4
<b>TOTAL</b>			<b>7</b>
#	COMMENTS (IF ANY)	DATE	
	There are no responses.		

**Q64 Require County Stormwater Management (SWM) Standards to Incorporate Projected Climate Change Impacts by using approved downscaled and up-to-date climate impact information to reevaluate peak rainfall estimates and future design storm profiles. Evaluate SWM standards using this criterion at least every three (3) years. Require all upgrades of County storm drain systems and CIP roadway, bridge, culvert and stormwater management repair or renovation projects to meet these updated climate-resilient design criteria.**

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback

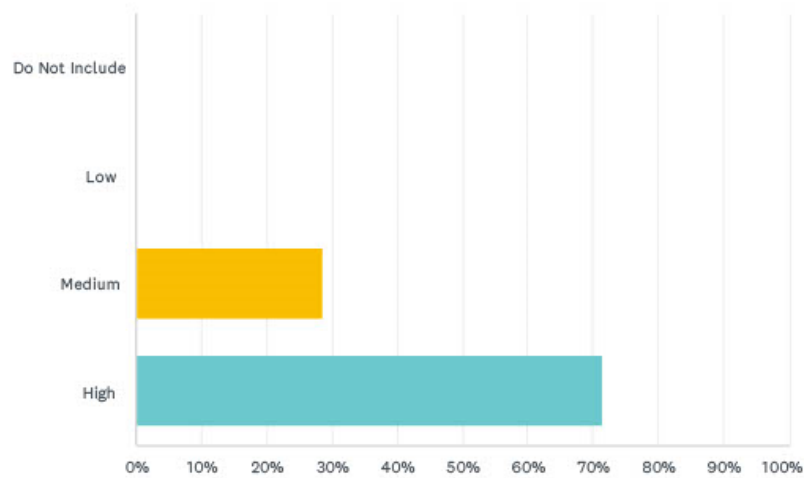


QUIZ STATISTICS			
Percent Correct 40%	Average Score 2.6/3.0 (86%)	Standard Deviation 0.53	Difficulty 25/33
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	0.00%	0
Low	1/3	0.00%	0
Medium	2/3	42.86%	3
✓ High	3/3	57.14%	4
<b>TOTAL</b>			<b>7</b>
#	COMMENTS (IF ANY)	DATE	
	There are no responses.		

**Q65 Avoid Future Development in Flood Inundation Areas Below Existing High-hazard Dams. Require that plan sets for subdivision proposals and permit applications to show the danger reach and inundation area and prohibit new construction in these areas.**

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback

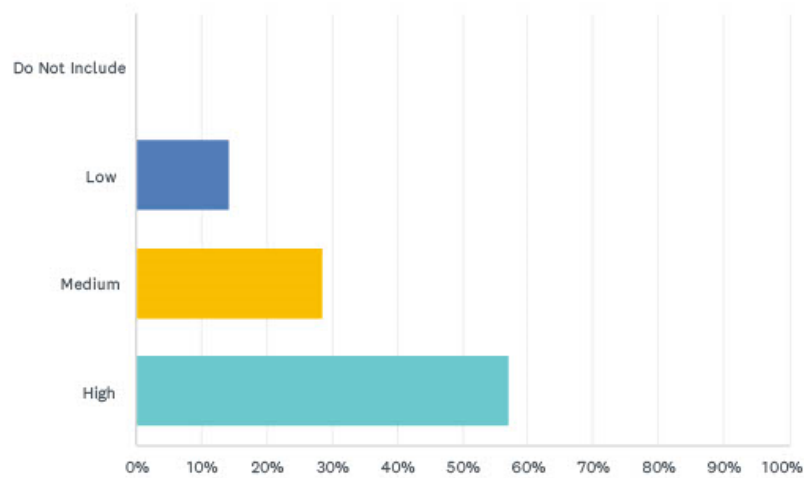


QUIZ STATISTICS			
Percent Correct 50%	Average Score 2.7/3.0 (90%)	Standard Deviation 0.49	Difficulty 29/33
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	0.00%	0
Low	1/3	0.00%	0
Medium	2/3	28.57%	2
✓ High	3/3	71.43%	5
<b>TOTAL</b>			<b>7</b>
#	COMMENTS (IF ANY)	DATE	
	There are no responses.		

**Q66 Assess Climate Projections and Consequences of Dam and Levee Failure. Analyze baseline conditions against local/regional climate projections to highlight future vulnerabilities and risk. Model hydrological loads to the consequences of failure under present and future conditions and jointly evaluate dams, levees, and interdependent components. Incorporate Findings in Emergency Action Plans.**

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback



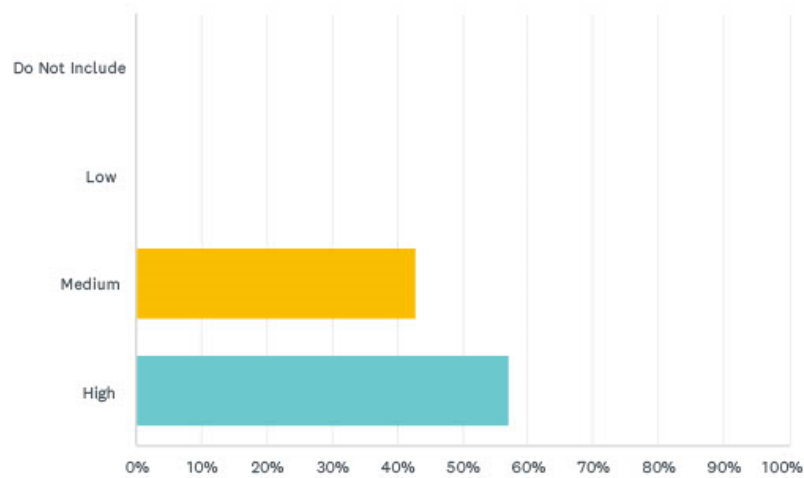
QUIZ STATISTICS			
Percent Correct 40%	Average Score 2.4/3.0 (81%)	Standard Deviation 0.79	Difficulty 21/33
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	0.00%	0
Low	1/3	14.29%	1
Medium	2/3	28.57%	2
✓ High	3/3	57.14%	4
<b>TOTAL</b>			<b>7</b>
#	COMMENTS (IF ANY)	DATE	
	There are no responses.		

**Q67 Demonstrate County commitment to climate action through publicly transparent tracking, monitoring, evaluation, and reporting. Require M-NCPPC to create and establish a public Smart Growth Dashboard that tracks approved preliminary plans of subdivisions, approved site plans and development proposals.**

Answered: 7 Skipped: 3



Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 40%	Average Score 2.6/3.0 (86%)	Standard Deviation 0.53	Difficulty 25/33

ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	0.00%	0
Low	1/3	0.00%	0
Medium	2/3	42.86%	3
✓ High	3/3	57.14%	4
<b>TOTAL</b>			<b>7</b>

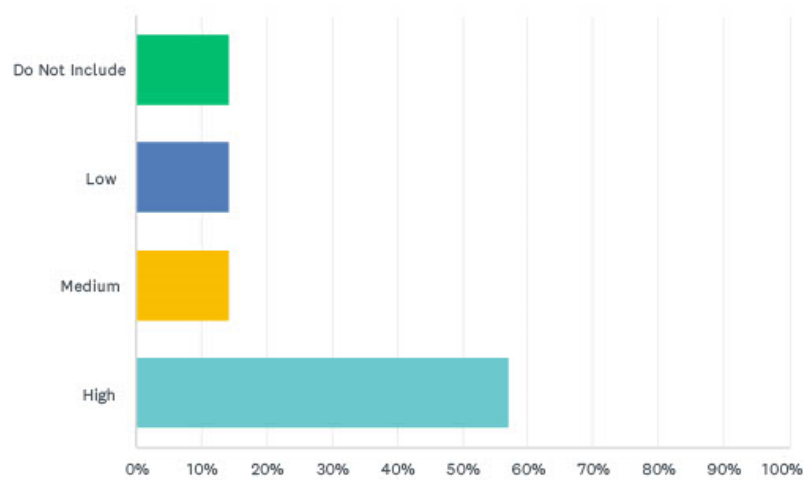
  

#	COMMENTS (IF ANY)	DATE
1	make sure that the one stop shop mitigation/climate action website connects with this dashboard.	12/20/2022 2:24 PM

**Q68 Conduct Countywide Thermal Mapping of Tree Canopy Cover with Shade Study, and Aerial Utility Mapping exercises. Then conduct a neighborhood-level Heat Vulnerability Assessment.**

Answered: 7 Skipped: 3

Prince George's County: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 40%	Average Score 2.1/3.0 (71%)	Standard Deviation 1.21	Difficulty 13/33
ANSWER CHOICES	SCORE	RESPONSES	
Do Not Include	0/3	14.29%	1
Low	1/3	14.29%	1
Medium	2/3	14.29%	1
✓ High	3/3	57.14%	4
<b>TOTAL</b>			<b>7</b>
#	COMMENTS (IF ANY)	DATE	
	There are no responses.		

**Q69 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q70 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

Prince George's County: Mitigation Actions Feedback

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q71 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q72 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q73 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q74 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q75 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

Prince George's County: Mitigation Actions Feedback

#	RESPONSES	DATE
1	Change priority to High	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q76 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q77 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q78 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q79 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q80 Do you have any final modifications to any of the above?**

Answered: 3 Skipped: 7

Prince George's County: Mitigation Actions Feedback

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM
3	reword- "watershed implementation plans"	12/22/2022 1:03 PM

**Q81 Do you have any final modifications to any of the above?**

Answered: 3 Skipped: 7

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM
3	project is substantially complete. County is engaged in accreditation work activities now, and target completion in FY24.	12/22/2022 1:03 PM

**Q82 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q83 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q84 Do you have any final modifications to any of the above?**

Answered: 3 Skipped: 7

#	RESPONSES	DATE
1	Make high priority	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM
3	<a href="https://www.princegeorgescountymd.gov/3182/Stay-Cool---Tips-to-Stay-Safe-in-the-Hea">https://www.princegeorgescountymd.gov/3182/Stay-Cool---Tips-to-Stay-Safe-in-the-Hea</a> <a href="https://www.princegeorgescountymd.gov/1723/Nutrition-Services">https://www.princegeorgescountymd.gov/1723/Nutrition-Services</a> Please see the above links for the current status.	12/23/2022 2:37 PM

Prince George's County: Mitigation Actions Feedback

**Q85 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q86 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q87 Do you have any final modifications to any of the above?**

Answered: 2 Skipped: 8

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM

**Q88 Do you have any final modifications to any of the above?**

Answered: 3 Skipped: 7

#	RESPONSES	DATE
1	no	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM
3	storm preparedness and extreme heat events? Also, not sure where to put this or if it is covered elsewhere, but does the Emergency Notification System cover extreme heat events? If not, should there be an action to expand it?	12/21/2022 1:28 PM

**Q89 Do you have any final modifications to any of the above?**

Answered: 3 Skipped: 7

#	RESPONSES	DATE
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Prince George's County: Mitigation Actions Feedback

1	Make high priority	1/4/2023 9:49 AM
2	No	1/3/2023 10:16 AM
3	The Office of Homeland Security/Emergency Management Division distributes preparedness guide regularly in various community events.	12/23/2022 2:37 PM

**Q90 Describe any final thoughts on mitigation actions in the updated Hazard Mitigation Plan:**

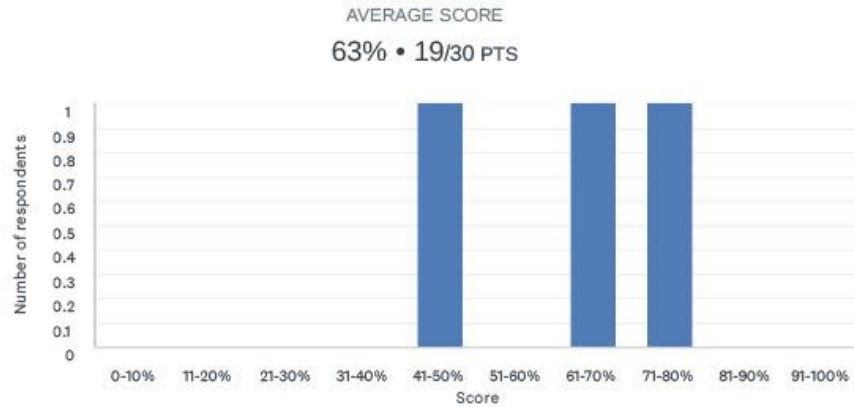
Answered: 1 Skipped: 9

#	RESPONSES	DATE
1	Keep up the good work in updating the Hazard Mitigation Plan.	1/4/2023 9:50 AM

## D.2. City of Laurel Survey

### City of Laurel: Mitigation Actions Feedback

#### Quiz Summary



#### STATISTICS

Lowest Score	Median	Highest Score
50%	63%	77%
Mean: 63%		
Standard Deviation: 13%		

#### Question Ranking

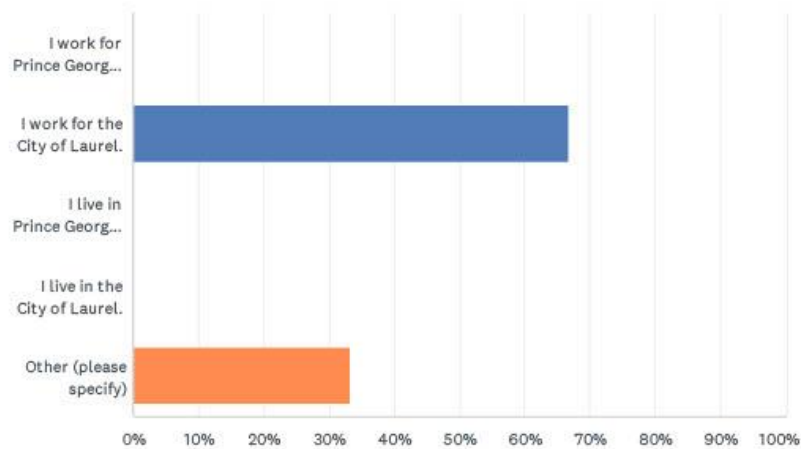
QUESTIONS (10)	DIFFICULTY	AVERAGE SCORE
Q30 What priority ranking should this action be given in the plan?	1	44%
Q15 What priority ranking should this action be given in the plan?	1	44%
Q21 What priority ranking should this action be given in the plan?	1	44%
Q24 What priority ranking should this action be given in the plan?	4	67%
Q33 What priority ranking should this action be given in the plan?	4	67%
Q18 What priority ranking should this action be given in the plan?	4	67%
Q1 Select all that apply:	4	67%
Q27 What priority ranking should this action be given in the plan?	8	78%
Q36 What priority ranking should this action be given in the plan?	9	89%
Q39 What priority ranking should this action be given in the plan?	9	89%

### Q1 Select all that apply:

Answered: 3 Skipped: 0



City of Laurel: Mitigation Actions Feedback



QUIZ STATISTICS

Percent Correct 0%	Average Score 2.0/3.0 (67%)	Standard Deviation 0.00	Difficulty 4/10
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ANSWER CHOICES	SCORE	RESPONSES
I work for Prince George's County.	0/3	0.00% 0
✓ I work for the City of Laurel.	2/3	66.67% 2
I live in Prince George's County.	0/3	0.00% 0
✓ I live in the City of Laurel.	1/3	0.00% 0
Other (please specify)	--	33.33% 1

Total Respondents: 3

#	OTHER (PLEASE SPECIFY)	DATE
1	University of Maryland Environmental Finance Center	12/21/2022 1:29 PM

Q2 Name:

Answered: 3 Skipped: 0

#	RESPONSES	DATE
1	<b>Bill Bailey</b> Bill Bailey	12/24/2022 3:59 PM
2	<b>Chrissy Cornwell</b> Chrissy Cornwell	12/24/2022 2:35 PM
3	<b>Brandy Espinola</b> Brandy Espinola	12/21/2022 1:29 PM

Q3 Do you have suggested modifications to any of the above?

City of Laurel: Mitigation Actions Feedback

Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	This action was impacted by COVID-19 and has not started.	12/24/2022 2:48 PM

**Q4 Do you have suggested modifications to any of the above?**

Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	The City has partnered with State, Federal, and local partners on various mitigation projects to include a study of the Patuxent River Watershed and flood gages. These projects are still on-going and were impacted by COVID-19.	12/24/2022 2:48 PM

**Q5 Do you have suggested modifications to any of the above?**

Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	The City is in the process of reviewing floodproofing recommendations from the Patuxent River Watershed study and installing flood gages. These projects were put on hold due to COVID-19.	12/24/2022 2:48 PM

**Q6 Do you have suggested modifications to any of the above?**

Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	I think we asked for this one to come out of the plan.	12/24/2022 2:48 PM

**Q7 Do you have suggested modifications to any of the above?**

Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	No action has been taken on this.	12/24/2022 2:48 PM

**Q8 Do you have suggested modifications to any of the above?**

Answered: 0 Skipped: 3

#	RESPONSES	DATE
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City of Laurel: Mitigation Actions Feedback

There are no responses.

**Q9 Do you have suggested modifications to any of the above?**

Answered: 0 Skipped: 3

#	RESPONSES	DATE
	There are no responses.	

**Q10 Do you have suggested modifications to any of the above?**

Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	This can be removed.	12/24/2022 2:48 PM

**Q11 Do you have suggested modifications to any of the above?**

Answered: 0 Skipped: 3

#	RESPONSES	DATE
	There are no responses.	

**Q12 Do you have suggested modifications to any of the above?**

Answered: 0 Skipped: 3

#	RESPONSES	DATE
	There are no responses.	

**Q13 Do you have suggested modifications to any of the above?**

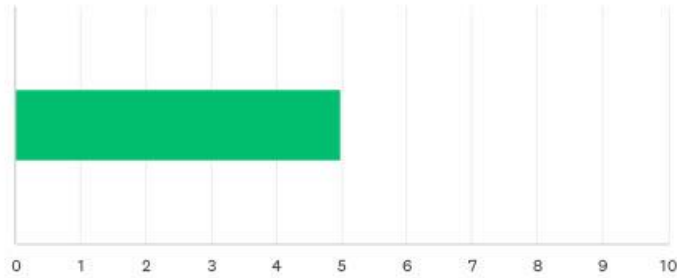
Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	The City is working on seasonal messaging for flood preparedness and expect to have information ready for Spring 2024.	12/24/2022 2:48 PM

**Q14 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

City of Laurel: Mitigation Actions Feedback

Answered: 2 Skipped: 1



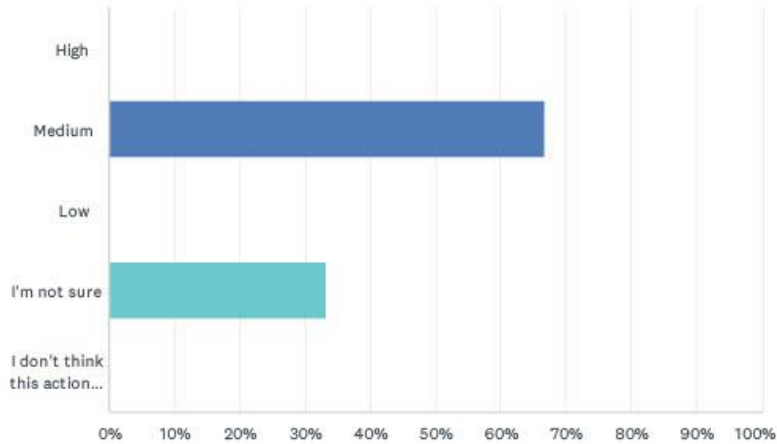
ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	10	2
<b>Total Respondents: 2</b>			

#		DATE
1	5	12/24/2022 4:07 PM
2	5	12/24/2022 2:54 PM

Q15 What priority ranking should this action be given in the plan?

Answered: 3 Skipped: 0



QUIZ STATISTICS			
Percent Correct	Average Score	Standard Deviation	Difficulty
0%	1.3/3.0 (44%)	1.15	1/10

City of Laurel: Mitigation Actions Feedback

ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	0.00%	0
Medium	2/3	66.67%	2
Low	1/3	0.00%	0
I'm not sure	0/3	33.33%	1
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>3</b>

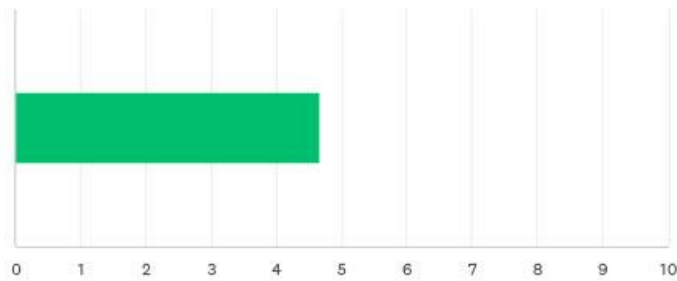
**Q16 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

Answered: 2 Skipped: 1

#	RESPONSES	DATE
1	N/A	12/24/2022 2:54 PM
2	I don't know enough about this proposed project. Is it being proposed for already disturbed land, in a floodplain, will it be used as a resilience hub? What is the explicit tie to hazard mitigation/ climate change? Depending on how this is planned - it could be definitely not or sure. Would need more context.	12/21/2022 1:39 PM

**Q17 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 3 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	14	3
<b>Total Respondents: 3</b>			

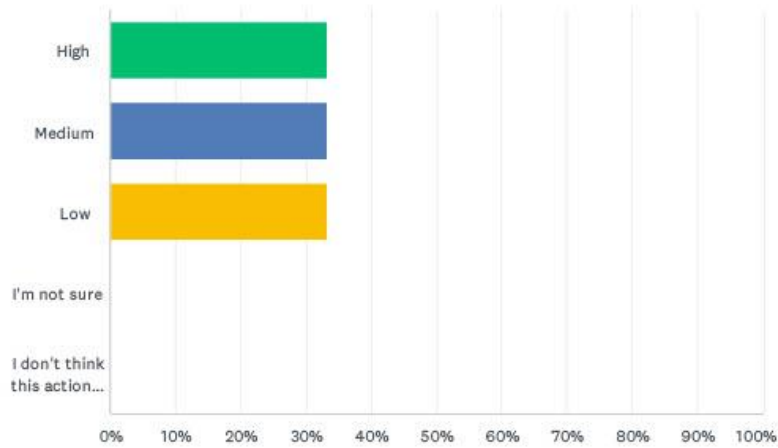
#		DATE
1	4	12/24/2022 4:07 PM

City of Laurel: Mitigation Actions Feedback

2	5	12/24/2022 2:54 PM
3	5	12/21/2022 1:39 PM

**Q18 What priority ranking should this action be given in the plan?**

Answered: 3 Skipped: 0



QUIZ STATISTICS			
Percent Correct 33%	Average Score 2.0/3.0 (67%)	Standard Deviation 1.00	Difficulty 4/10
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	33.33%	1
Medium	2/3	33.33%	1
Low	1/3	33.33%	1
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>3</b>

**Q19 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

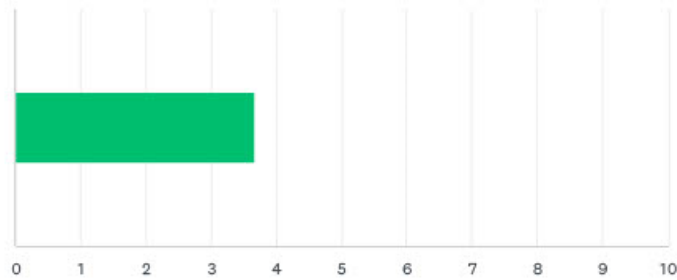
Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	N/A	12/24/2022 2:54 PM

City of Laurel: Mitigation Actions Feedback

**Q20 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 3 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	4	11	3
<b>Total Respondents: 3</b>			

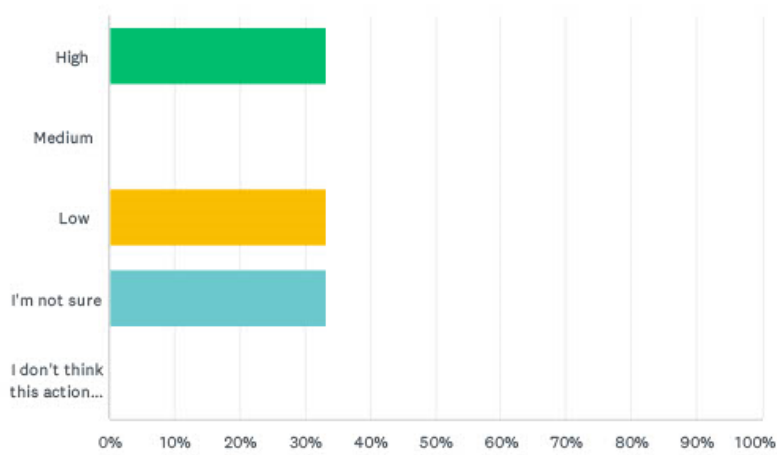
  

#		DATE
1	3	12/24/2022 4:07 PM
2	3	12/24/2022 2:54 PM
3	5	12/21/2022 1:39 PM

**Q21 What priority ranking should this action be given in the plan?**

Answered: 3 Skipped: 0

City of Laurel: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct 33%	Average Score 1.3/3.0 (44%)	Standard Deviation 1.53	Difficulty 1/10
ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	33.33%	1
Medium	2/3	0.00%	0
Low	1/3	33.33%	1
I'm not sure	0/3	33.33%	1
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>3</b>

**Q22 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

Answered: 1 Skipped: 2

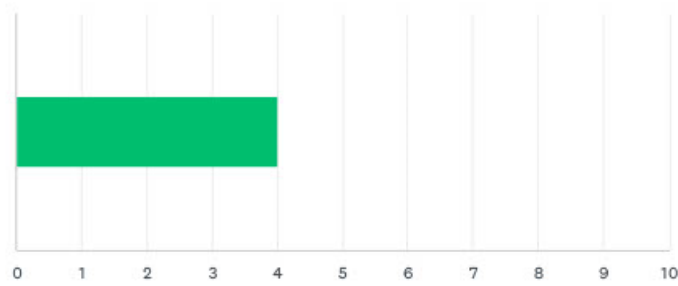
#	RESPONSES	DATE
1	It is a bit strange to combine the residential social grid modernization action with the government operations action. I support both.	12/21/2022 1:39 PM

**Q23 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 3 Skipped: 0



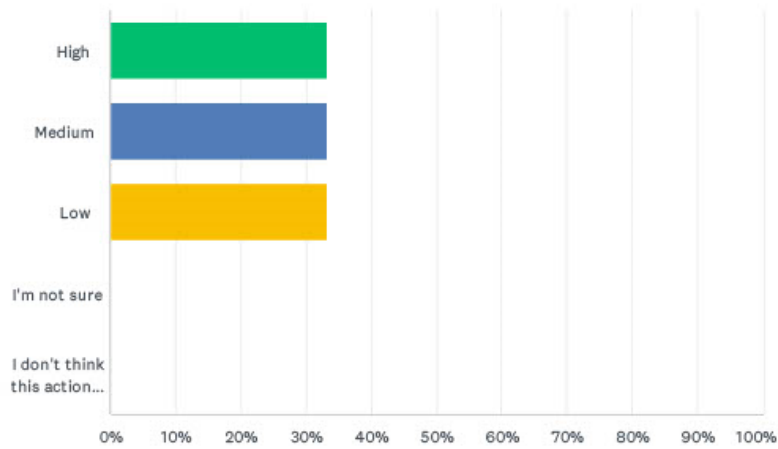
City of Laurel: Mitigation Actions Feedback



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	4	12	3
<b>Total Respondents: 3</b>			
#		DATE	
1	4	12/24/2022 4:07 PM	
2	3	12/24/2022 2:54 PM	
3	5	12/21/2022 1:39 PM	

Q24 What priority ranking should this action be given in the plan?

Answered: 3 Skipped: 0



QUIZ STATISTICS			
Percent Correct	Average Score	Standard Deviation	Difficulty
33%	2.0/3.0 (67%)	1.00	4/10

City of Laurel: Mitigation Actions Feedback

ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	33.33%	1
Medium	2/3	33.33%	1
Low	1/3	33.33%	1
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>3</b>

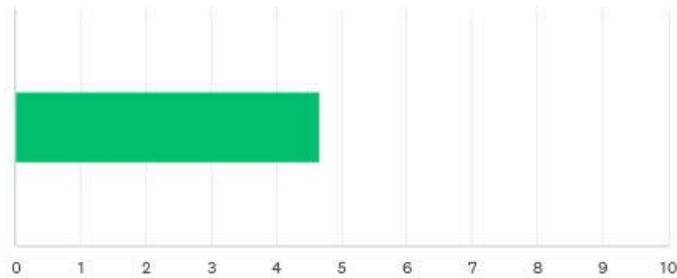
**Q25** Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.

Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	N/A	12/24/2022 2:54 PM

**Q26** What is your overall opinion of including this action in the plan (pending any minor text edits)?

Answered: 3 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	14	3
<b>Total Respondents: 3</b>			

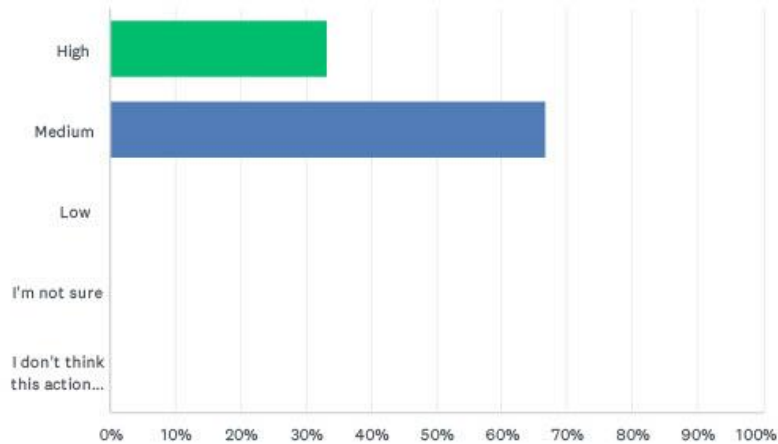
  

#	RESPONSES	DATE
1	4	12/24/2022 4:07 PM
2	5	12/24/2022 2:54 PM
3	5	12/21/2022 1:39 PM

City of Laurel: Mitigation Actions Feedback

**Q27 What priority ranking should this action be given in the plan?**

Answered: 3 Skipped: 0



QUIZ STATISTICS			
Percent Correct 33%	Average Score 2.3/3.0 (78%)	Standard Deviation 0.58	Difficulty 8/10

ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	33.33%	1
Medium	2/3	66.67%	2
Low	1/3	0.00%	0
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>3</b>

**Q28 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

Answered: 2 Skipped: 1

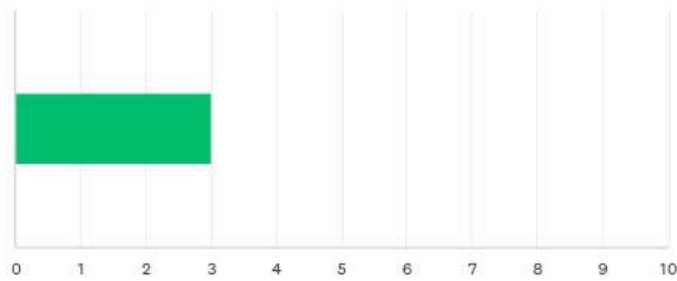
#	RESPONSES	DATE
1	N/A	12/24/2022 2:54 PM
2	needs an easy to navigate executive summary and or separte infographic/ memo so that city staff will actually be able to digest the pertinent information. this could piggy back off of the	12/21/2022 1:39 PM

City of Laurel: Mitigation Actions Feedback

County's effort so that they use the same template to reduce cost of development and increase alignment.

**Q29 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 3 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
		3	9
<b>Total Respondents: 3</b>			<b>3</b>

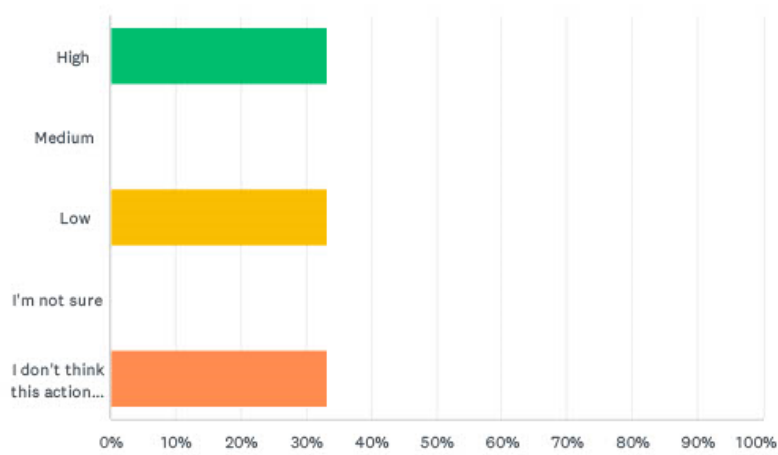
  

#		DATE
1	3	12/24/2022 4:07 PM
2	1	12/24/2022 2:54 PM
3	5	12/21/2022 1:39 PM

**Q30 What priority ranking should this action be given in the plan?**

Answered: 3 Skipped: 0

City of Laurel: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct	Average Score	Standard Deviation	Difficulty
33%	1.3/3.0 (44%)	1.53	1/10

ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	33.33%	1
Medium	2/3	0.00%	0
Low	1/3	33.33%	1
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	33.33%	1
<b>TOTAL</b>			<b>3</b>

**Q31 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

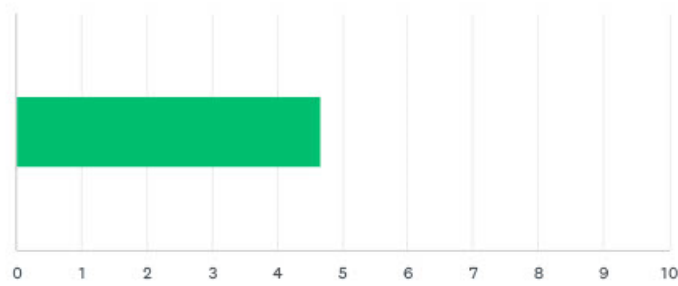
Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	I don't recall this being an action item.	12/24/2022 2:54 PM

**Q32 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 3 Skipped: 0

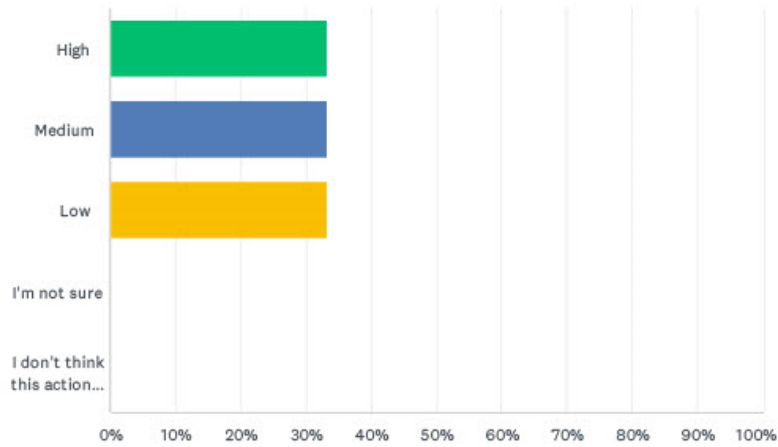
City of Laurel: Mitigation Actions Feedback



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	14	3
<b>Total Respondents: 3</b>			
#		DATE	
1	3	12/24/2022 4:07 PM	
2	5	12/24/2022 2:54 PM	
3	6	12/21/2022 1:39 PM	

Q33 What priority ranking should this action be given in the plan?

Answered: 3 Skipped: 0



QUIZ STATISTICS			
Percent Correct	Average Score	Standard Deviation	Difficulty
33%	2.0/3.0 (67%)	1.00	4/10

City of Laurel: Mitigation Actions Feedback

ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	33.33%	1
Medium	2/3	33.33%	1
Low	1/3	33.33%	1
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>3</b>

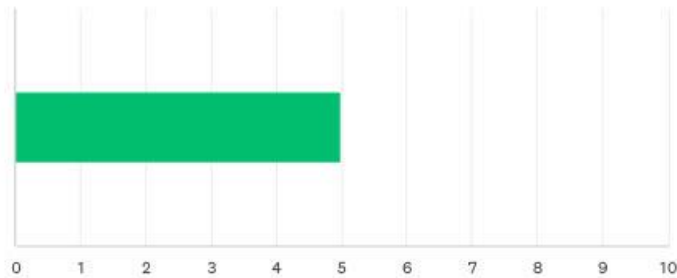
**Q34** Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.

Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	N/A	12/24/2022 2:54 PM

**Q35** What is your overall opinion of including this action in the plan (pending any minor text edits)?

Answered: 3 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	15	3
<b>Total Respondents: 3</b>			

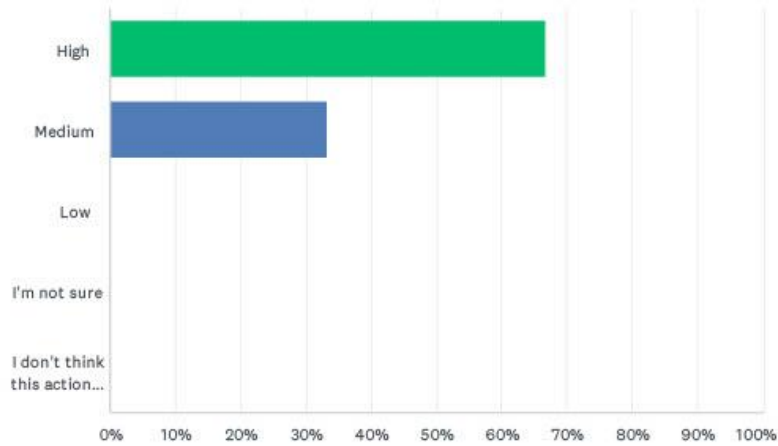
  

#	RESPONSES	DATE
1	4	12/24/2022 4:07 PM
2	5	12/24/2022 2:54 PM
3	6	12/21/2022 1:39 PM

City of Laurel: Mitigation Actions Feedback

**Q36 What priority ranking should this action be given in the plan?**

Answered: 3 Skipped: 0



QUIZ STATISTICS			
Percent Correct	Average Score	Standard Deviation	Difficulty
67%	2.7/3.0 (89%)	0.58	9/10

ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	66.67%	2
Medium	2/3	33.33%	1
Low	1/3	0.00%	0
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>3</b>

**Q37 Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.**

Answered: 1 Skipped: 2

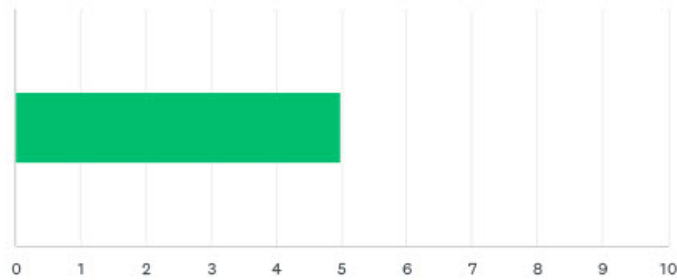
#	RESPONSES	DATE
1	N/A	12/24/2022 2:54 PM



City of Laurel: Mitigation Actions Feedback

**Q38 What is your overall opinion of including this action in the plan (pending any minor text edits)?**

Answered: 3 Skipped: 0



ANSWER CHOICES	AVERAGE NUMBER	TOTAL NUMBER	RESPONSES
	5	15	3
<b>Total Respondents: 3</b>			

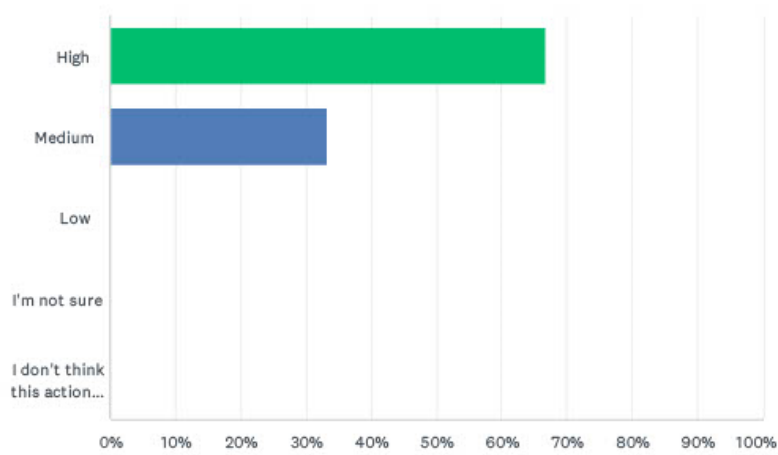
  

#		DATE
1	4	12/24/2022 4:07 PM
2	5	12/24/2022 2:54 PM
3	6	12/21/2022 1:39 PM

**Q39 What priority ranking should this action be given in the plan?**

Answered: 3 Skipped: 0

City of Laurel: Mitigation Actions Feedback



QUIZ STATISTICS			
Percent Correct	Average Score	Standard Deviation	Difficulty
67%	2.7/3.0 (89%)	0.58	9/10

ANSWER CHOICES	SCORE	RESPONSES	
✓ High	3/3	66.67%	2
Medium	2/3	33.33%	1
Low	1/3	0.00%	0
I'm not sure	0/3	0.00%	0
I don't think this action should be in the plan	0/3	0.00%	0
<b>TOTAL</b>			<b>3</b>

**Q40** Provide any recommendations for edits to the wording of the action, or any other thoughts or feedback on this mitigation action.

Answered: 1 Skipped: 2

#	RESPONSES	DATE
1	N/A	12/24/2022 2:54 PM

**Q41** Do you have any other mitigation actions the City should include in the updated Hazard Mitigation Plan?

Answered: 1 Skipped: 2

City of Laurel: Mitigation Actions Feedback

#	RESPONSES	DATE
1	N/A	12/24/2022 2:55 PM

**Q42 Describe any final thoughts on mitigation actions in the updated Hazard Mitigation Plan:**

Answered: 2 Skipped: 1

#	RESPONSES	DATE
1	N/A	12/24/2022 2:55 PM
2	enforcement of existing and future land use planning and development restrictions will be necessary to prevent maladaptive construction.	12/21/2022 1:39 PM

## E. Plan Review Meeting

### E.1. Presentation



# Prince George's County & City of Laurel Hazard Mitigation Plan - 2023 Update

MAC: Draft HMP Review

February 1, 2023 | Microsoft Teams (Virtual)

## AGENDA

- Project Status
- Draft Plan Review
- Next Steps
- Open Forum (Questions & Feedback)

Prince George's County, MD

2

MAC: Draft Hazard Mitigation Plan Review

 Dewberry

# Project Status

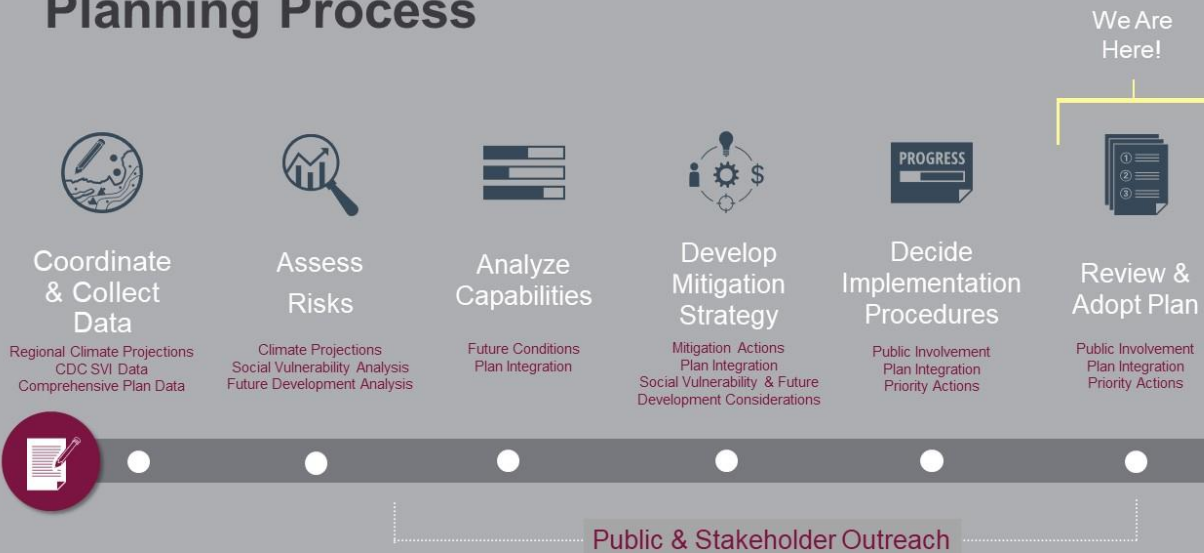
Planning Process Update & Draft Plan Feedback

3

MAC: Draft Hazard Mitigation Plan Review



## Planning Process



4

MAC: Draft Hazard Mitigation Plan Review



	Sep	Oct	Nov	Dec	Jan '23	Feb	March
<b>HM Plan Milestone:</b>	Kick-Off	Outreach Begins	Risk Assessment Workshop	Strategy Workshop	Draft Plan & MAC/Public Review	MDEM/FEMA Review	Adoption
Review 2017 HMP							
Data Collection							
HIRA							
Capability Assessment							
Revise Goals + Objectives							
Mitigation Strategy Development							
Public Engagement							
HMP Writing / Revising							
MDEM Review / Approval							
FEMA Review / Approval							
Plan Adoption, Approval Letters, Plan Distribution							

## Project Schedule

5

MAC: Draft Hazard Mitigation Plan Review



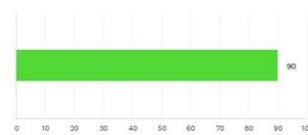
## Draft Plan Feedback Survey Results

- Responses from MAC Members & Prince George's County Residents
- Feedback included:
  - Suggestions for edits to abbreviations
  - Capability assessment information clarifications
  - Providing additional data from jurisdictional draft plans to be incorporated into the Plan
- Feedback survey will close on Sunday, 2/5

*"Excellent plan, I really appreciate the work and inclusion of Bowie data. Thank you!"*

*"I'm especially glad to see the robust risk assessment section supporting the revised hazard prioritization. This level of documentation is essential to conducting a comprehensive HIRA for our community"*

Q14 How well do you feel the 2023 draft plan will encourage worthwhile hazard mitigation activities in Prince George's County and the City of Laurel?



6

MAC: Draft Hazard Mitigation Plan Review



# Draft Plan Highlights

Updated Requirements & New Additions

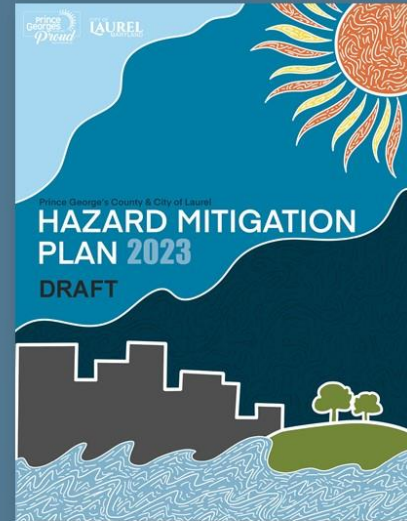
7

MAC: Draft Hazard Mitigation Plan Review



## New Plan Components

- One of the first plans to comply with the new **FEMA Mitigation Planning Policy Guide** (2022 release, effective April 2023)
- Compliant with **FEMA's High Hazard Potential Dam Grant Program**
- Creditable under **CRS Activity 510** (Floodplain Management Planning)



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MAC: Draft Hazard Mitigation Plan Review



# Hazard Risk Assessment Update

## Future Conditions - Population

- Used the Maryland Department of Planning, Projects, and State Data Center projects (pre-2020 Census)
- Adjusted projections based on 2020 Census counts using annualized growth rates

### A.3.h. Future Conditions Analysis: Population

The United States Census Bureau's Population Estimates Program states Prince George's County, Maryland's population as 955,306 as of July 1, 2021. This is a -1.2% change from the April 1, 2020 U.S. Census count. Population clusters are located around the Town of Bowie, the City of Laurel, and the combined metro area of Hyattsville, College Park, and Greenbelt. Compared to the 2010 U.S. Census, the County has seen a population change of +12.0%. As of December 2020, the Maryland Department of Planning, Projections and State Data Center projects the population of Prince George's County to be about 983,870 by 2045, which would only be a 3.0% increase from the most recent 2021 estimate from the Census Bureau. This projection was created without 2020 Census data, so if the State's 2020 projection of 911,140 is adjusted to reflect the 2020 Census population (967,201) and the same annualized growth rates are then used on the new baseline, a new projection for the County's population in 2045 is 1,043,973.<sup>44</sup>

Based on this cumulative information, the population of Prince George's County by 2045 is estimated to be about 7.9% higher than the most current (2021) estimate. It is assumed that most of this change will occur in and around the development areas highlighted in A.3.g.1 Proposed Future Development. The City of Laurel has seen a similar population trend, as shown in Table 35.

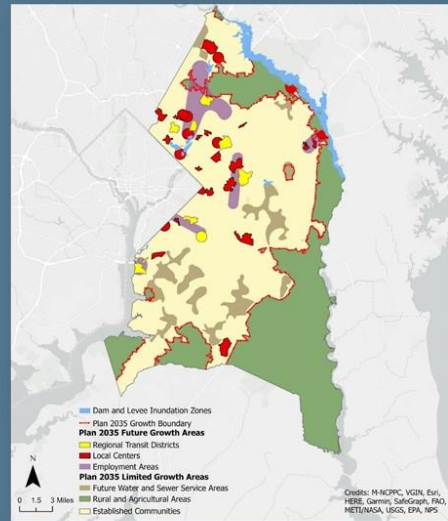
Table 35. Population Changes in Prince George's County and the City of Laurel since 2010

	City of Laurel	Prince George's County
Population, Census (April 1, 2010)	25,115	863,420
Population, Census (April 1, 2020)	30,060 (+19.7%)	967,201 (+12.0%)
Population Estimate (July 1, 2021) <sup>45</sup>	29,490 (-1.8%)	955,306 (-1.2%)
Projected Population (2045) <sup>46</sup>	N/A	983,870 (+3.0%)

# Hazard Risk Assessment Update

## Future Conditions - Development

- Prince George's County Plan 2035 Future Growth Areas Data
- Example: Future Growth Areas & Dam and Levee Inundation Zones (see image)
- Riverine Flood, Extreme Heat, Dam & Levee Failure, Wildfire,

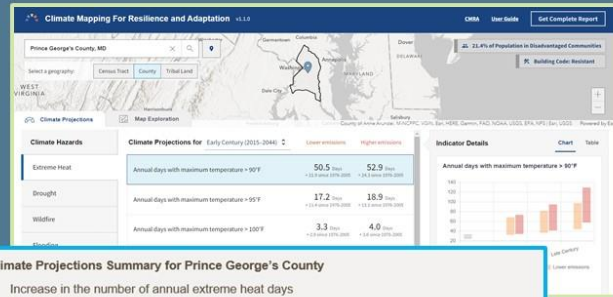




# Hazard Risk Assessment Update

## Future Conditions - Climate

- FEMA now requires that states evaluate changes to climate conditions that may affect and influence their long-term vulnerability
- FEMA Climate Mapping for Resilience and Adaptation Tool



- Climate Projections Summary for Prince George's County**
- Increase in the number of annual extreme heat days
  - Milder winters, with fewer extreme cold days
  - Increased risk of extreme heat and dry conditions overlapping, leading to an increased risk of droughts and wildfires
  - Increased average total annual precipitation
  - More extreme precipitation events, with more rain falling in shorter amounts of time, which can lead to more flash floods, riverine flooding, and pluvial flooding
  - 0.2% of the County's land is expected to be impacted by sea level rise within the next 20 years
  - Intensified winter storm events
  - Stronger hurricanes that bring more rain, stronger winds, intensify quickly, and move slower over land

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MAC: Draft Hazard Mitigation Plan Review

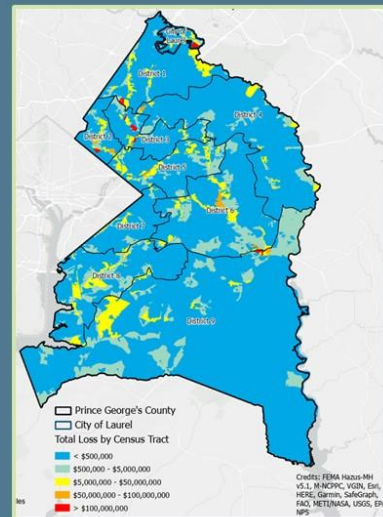


# Hazard Risk Assessment Update

## Hazus-MH v5.1 Loss Estimation

- Riverine & Coastal Flooding, Hurricane, Earthquake hazards
- Example: Total Flood Loss

Prince George's County	100-Year Riverine Flood Losses				Total
	Residential	Commercial	Industrial	Other	
<b>Total Exposure</b>					
Prince George's County	\$130,144,361,000	\$26,242,415,000	\$5,564,076,000	\$7,454,437,000	\$169,405,289,000
<b>Direct Losses</b>					
Building	\$834,296,000	\$323,906,000	\$73,819,000	\$72,724,000	\$1,304,745,000
Contents	\$392,305,000	\$408,448,000	\$126,548,000	\$93,673,000	\$1,019,972,000
Inventory	\$0	\$10,790,000	\$19,217,000	\$298,000	\$30,305,000
Subtotal	\$1,226,601,000	\$743,142,000	\$218,584,000	\$198,696,000	\$2,385,022,000
<b>Business Interruption</b>					
Income	\$2,396,000	\$232,281,000	\$2,882,000	\$28,440,000	\$286,001,000
Relocation	\$111,416,000	\$76,858,000	\$2,828,000	\$17,590,000	\$209,090,000
Rental Income	\$57,472,000	\$57,232,000	\$543,000	\$3,069,000	\$118,316,000
Wage	\$5,684,000	\$280,289,000	\$4,002,000	\$289,408,000	\$539,383,000
Subtotal	\$178,968,000	\$628,660,000	\$10,255,000	\$316,907,000	\$1,132,800,000
<b>TOTAL</b>	<b>\$1,403,581,000</b>	<b>\$1,369,802,000</b>	<b>\$228,837,000</b>	<b>\$485,602,000</b>	<b>\$3,487,822,000</b>



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MAC: Draft Hazard Mitigation Plan Review



# Hazard Risk Assessment Update

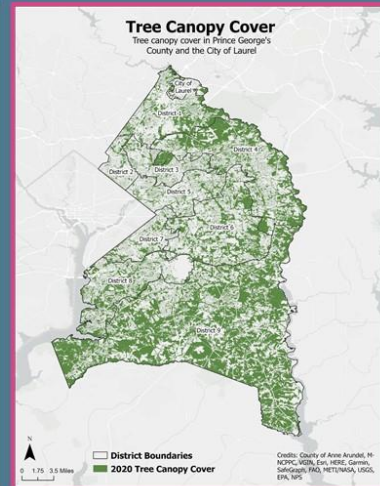
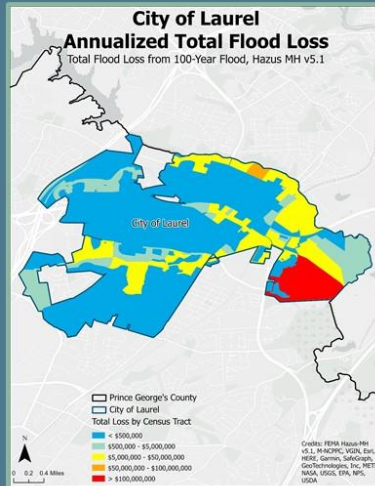
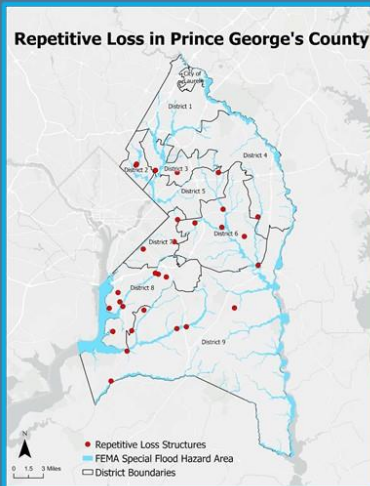
## Hazard Risk Index Score

$$\text{HRI Score} = (\text{probability value} \times 0.20) + (\text{impact value} \times 0.35) + (\text{geographic extent value} \times 0.20) + (\text{warning time value} \times 0.10) + (\text{community concern value} \times 0.15)$$

Hazard	Occurrence Probability	Impact	Geographic Extent	Warning Time	Community Concern	Hazard Risk Index Score & Overall Rank	State Ranking (5 = highest)	FEMA Ranking (5 = highest)
Riverine Flood	Highly Likely	Critical	Moderate	Limited	High	3.25 (High)	5	2
Severe Storm (Flood-Related)	Highly Likely	Critical	Moderate	Limited	High	3.25 (High)	5	N/A
Severe Storm (Wind-Related)	Highly Likely	Limited	Large	Limited	High	3.1 (High)	5	3
High Winds	Likely	Limited	Large	Limited	High	2.95 (High)	5	3
Tornado	Likely	Critical	Minor	No Notice	Moderate	2.9 (Moderate)	5	4
Extreme Heat	Highly Likely	Limited	Large	Extended	Moderate	2.8 (Moderate)	4	4
Winter Storm	Highly Likely	Minor	Large	Limited	Moderate	2.55 (Moderate)	5	4
Hurricane/Tropical Storm	Somewhat Likely	Limited	Large	Limited	Low	2.4 (Moderate)	4	2
Dam and Levee Failure	Unlikely	Limited	Negligible	No Notice	Low	1.85 (Moderate)	4	N/A
Earthquake	Likely	Minor	Minor	No Notice	Negligible	1.8 (Moderate)	N/A	2
Extreme Cold	Somewhat Likely	Minor	Large	Extended	Negligible	1.75 (Moderate)	4	3
Sinkhole	Highly Likely	Minor	Negligible	Minimal	Negligible	1.65 (Low)	2	N/A
Wildfire	Highly Likely	Minor	Negligible	Limited	Negligible	1.55 (Low)	4	1
Landslide	Somewhat Likely	Minor	Negligible	No Notice	Negligible	1.45 (Low)	2	2
Drought	Somewhat Likely	Minor	Minor	Extended	Negligible	1.35 (Low)	4	2
Coastal Flood	Unlikely	Minor	Minor	Limited	Negligible	1.3 (Low)	5	2

# Hazard Risk Assessment Update

## New Maps, Analyses & Data Integration



# Mitigation Strategy Update

## Updated Hazard Mitigation Goals & Actions

### D. 2023-2028 Mitigation Actions

All 2023-2028 mitigation actions are outlined in Table 131 and Table 132, along with key details to add relevant context and objectives to implementation and accountability. The descriptors and/or definitions for the elements that accompany each action are described in Table 133. Actions plans of the "high priority" actions, refer to **Appendix F**.

Table 130. Action Description Inputs

Action Detail	Input Description
Category of mitigation action	Prevention, property protection, natural resource protection, structural projects, emergency services, or other
Action number	Jurisdiction abbreviation - # (e.g., PG-1)
Applicable goal(s)	<ul style="list-style-type: none"> <li>Goal 1: Implement structural projects that mitigate the risks of natural hazards to people, infrastructure, and assets while equitably distributing project benefits.</li> <li>Goal 2: Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.</li> <li>Goal 3: Increase public education and awareness of natural hazard risks to people and private property, current and new opportunities to participate in mitigation planning.</li> <li>Goal 4: Prevent future climate-related damages and losses to communities, critical facilities, and natural resources, policies, and plans aligned with regional and state resilience and equity goals.</li> </ul>
Action lead	The department or office responsible for ensuring the action is implemented
Timeframe for implementation	<ul style="list-style-type: none"> <li>Short-term: less than three years</li> <li>Long-term: more than three years</li> <li>Ongoing: continuous with no designated end date</li> <li>Funding contingent: timeline is dependent on funding from a source outside of the jurisdiction</li> </ul>
Priority level for implementation	High, medium, or low

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
<b>Prevention</b>								
PG-1	Partner with federal agencies, the state, and Non-governmental Organizations to utilize available technical assistance to translate identified risks into mitigation projects, especially for benefit cost analyses for the County and municipalities.	X		X		Office of Emergency Management	Ongoing	Medium
PG-2	Using the best available data, check the locations of Hazardous sites, National Pollutant Discharge Elimination System sites, and other land uses; if found to be in flood hazard areas, communicate with the owner/handler of hazardous materials and known pollutants regarding risk and appropriate		X	X		Department of Environment	Short-term	Medium
PG-3	Integrate mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.							
PG-4	Collected flood data provide elevation Special Flood Hazard							

- Increase public education and awareness of natural hazard risks to people and private property, and promote current and new opportunities to participate in mitigation planning.
- Prevent future climate-related damages and losses to communities, critical facilities, and natural resources through ordinances, policies, and plans aligned with regional and state resilience and equity goals.
- Implement structural projects that mitigate the risks of natural hazards to people, infrastructure, and environmental assets while equitably distributing project benefits.
- Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.

# Implementation Plan Update

## Technical Assistance

Table 135. Sources of Technical Assistance

Name	Overview	Contact
<b>FEMA Mitigation Planning Technical Assistance</b>	FEMA's Risk Mitigation Action Planning (MAP) Program identifies flood risk to promote informed planning and development practices. Risk information is primarily conducted on a county or tribal basis and includes both regulatory flood risk maps and nonregulatory risk information. Under FEMA Risk MAP program, agency staff or their contractors can provide technical assistance tailored to a community's need, such as increasing understanding of risk and mitigation or helping prepare for project alternatives analysis or exploring project costs and benefits.  For more information refer to the <a href="#">Incorporating Mitigation Planning Technical Assistance into Risk MAP Projects</a> Guidance and the <a href="#">FEMA Region 3 Hazard Mitigation Planning</a> webpage.	Primary point of contact at Maryland Department of Emergency Management or FEMA Region 3
<b>FEMA Building Resilient Infrastructure and Communities (BRIC) Direct Technical Assistance</b>	Building Resilient Infrastructure and Communities (BRIC) Direct Technical Assistance (DTA) gives full support to communities that may not have the resources to begin climate resilience planning and project solution design on their own. Through process-oriented, hands-on support, BRIC DTA will work to enhance a community's capacity to design holistic, equitable climate adaptation solutions that advance numerous community-driven objectives.  For more information, refer to the <a href="#">BRIC Direct Technical Assistance</a> webpage.	Communities can send a request through an online submission form found <a href="#">here</a> .

### Risk and Priority Assessment & Funding Opportunities and Best Practices

- Assistance need:** In 2016, Hurricane Matthew - a major flooding in eastern North Carolina - dumped a large amount of rainfall shortly on top of a large rainfall event that occurred the week before. The most severe flooding experienced took place in Fayetteville (Cumberland County) and Lumberton (Robeson County). The State (North Carolina) and the affected communities sought assistance to organize post-Matthew resilient redevelopment planning and grant identification in the area.
- About the assistance:** Assistance included multiple engagements with key officials and the general public as well as identification and basic scoping of mitigation project ideas that could be funded with post-disaster funding. In each county, the planning team led a series of six meetings (three with local officials and three with the public) to determine major impacts from the storm, identify any unmet needs that still existed several months after the event, and develop a set of mitigation projects. During these meetings, planners used an online ArcGIS portal to identify specific locations where impacts had occurred and to discuss details of what occurred during the storm. These high impact areas became the basis to propose potential projects.
- Results:** The resulting plans mobilized the communities to prioritize their greatest mitigation needs and provided the needed elements to begin preparation of mitigation grant applications, several of which were submitted to FEMA and later Department of Housing and Urban Development.

### Risk and Priority Assessment & Funding Opportunities and Best Practices

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## Next Steps

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MAC: Draft Hazard Mitigation Plan Review



## Next Steps

1. Draft Plan Edits (MAC/Public Feedback) – **This Week**
2. MDEM & FEMA Plan Review – **February**
3. Adjudicate Comments & Prepare Final Plan – **February/March**
4. Prince George's County & City of Laurel Plan Adoption – **March**

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MAC: Draft Hazard Mitigation Plan Review



## Upcoming Engagement Opportunities

1. Last chance to **review the Draft Plan**:  
<https://www.surveymonkey.com/r/NBH-DW9K>
2. Spread the word about the **public meeting** tomorrow:  
<https://bit.ly/PublicHMP2>



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MAC: Draft Hazard Mitigation Plan Review

 Dewberry

## Open Forum: Questions & Feedback



22

MAC: Draft Hazard Mitigation Plan Review

 Dewberry

## E.2. [Agenda](#)



# Mitigation Advisory Committee Meeting Agenda

**Title:** Mitigation Advisory Committee Meeting: Draft Plan Review      **Location:** [Microsoft Teams \(Virtual\)](#)  
 Meeting ID: 226 267 219 73  
 Passcode: rXJdFH

**Date:** Wednesday, February 1<sup>st</sup>, 2023      **Time:** 2:00 – 3:00 pm ET

**Purpose:** Dewberry will provide an overview of the 2023 Draft Prince George's County and City of Laurel Hazard Mitigation Plan. There will be a discussion to answer questions and gather feedback on the Draft Plan. We will close with next steps.

### Agenda Items

Topic	Presenter	Time
<b>Project Status</b> - Schedule overview - Draft plan feedback received	Scott Choquette, Dewberry	2:00 – 2:10 pm
<b>Draft Plan Review</b> - New Plan highlights - Draft Plan Review Survey Results	Jade Payne, Dewberry	2:10 – 2:30 pm
<b>Next Steps</b> - MDEM Review - FEMA Review - Adoption by County & City	Scott Choquette, Dewberry	2:30 – 2:35 pm
<b>Questions &amp; Comments</b>	Open Forum	2:35 – 3:00 pm

### Action Items

1. Review the [draft plan](#) and [appendices](#), then provide feedback via the [brief online survey](#).
2. Spread the word about the [upcoming public meeting](#) on Thursday, February 2<sup>nd</sup>, to review the draft plan. The public can [review the draft plan](#) and provide feedback via the [online survey](#) as well.

### E.3. Notes



## Mitigation Advisory Committee Meeting Notes

<b>Title:</b>	Prince George's County Mitigation Advisory Committee: Prince George's County and City of Laurel Draft 2023 HMP Review	<b>Location:</b>	Microsoft Teams (Virtual)		
<b>Date:</b>	Wednesday, February 1 <sup>st</sup> , 2023	<b>Time:</b>	2:00 – 3:00 pm ET		
<b>Purpose:</b>	Dewberry will provide an overview of the 2023 Draft Hazard Mitigation Plan. There will be a discussion to gather feedback on the Draft Plan. The meeting will close with next steps and questions.				
<b>Attendees:</b>	<table border="0" style="width: 100%;"> <tr> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> <li>1. Brian Lee</li> <li>2. Stephanie Robinson</li> <li>3. Bahador, Ehsan</li> <li>4. Henderson, Joey L.</li> <li>5. Finch, Kim</li> <li>6. Perez Irizarry, Angel</li> <li>7. Payne, Jade</li> <li>8. Choquette, Scott</li> <li>9. Carreen Koubek</li> <li>10. Callahan, Patrick T.</li> <li>11. Mishra, Sudhanshu</li> <li>12. Mariette, Courtney E.</li> <li>13. Erin Meyer, UMD</li> </ol> </td> <td style="width: 50%; vertical-align: top;"> <ol style="list-style-type: none"> <li>14. Hawkins-Nixon, Dawn</li> <li>15. Rush, Hanna R.</li> <li>16. Stephanie Pendergrass Dalke</li> <li>17. DeHan, Jeffrey M.</li> <li>18. Batten-Mickens, Meloyde R.</li> <li>19. Sherrill, Mary C.</li> <li>20. Kelly Flint</li> <li>21. Robert Love</li> <li>22. Tennekoon, Lilantha</li> <li>23. Christina Cornwell</li> <li>24. Joanne Hall Barr</li> <li>25. Galosi, Frank L.</li> <li>26. Block, Michael (Contractor)</li> </ol> </td> </tr> </table>			<ol style="list-style-type: none"> <li>1. Brian Lee</li> <li>2. Stephanie Robinson</li> <li>3. Bahador, Ehsan</li> <li>4. Henderson, Joey L.</li> <li>5. Finch, Kim</li> <li>6. Perez Irizarry, Angel</li> <li>7. Payne, Jade</li> <li>8. Choquette, Scott</li> <li>9. Carreen Koubek</li> <li>10. Callahan, Patrick T.</li> <li>11. Mishra, Sudhanshu</li> <li>12. Mariette, Courtney E.</li> <li>13. Erin Meyer, UMD</li> </ol>	<ol style="list-style-type: none"> <li>14. Hawkins-Nixon, Dawn</li> <li>15. Rush, Hanna R.</li> <li>16. Stephanie Pendergrass Dalke</li> <li>17. DeHan, Jeffrey M.</li> <li>18. Batten-Mickens, Meloyde R.</li> <li>19. Sherrill, Mary C.</li> <li>20. Kelly Flint</li> <li>21. Robert Love</li> <li>22. Tennekoon, Lilantha</li> <li>23. Christina Cornwell</li> <li>24. Joanne Hall Barr</li> <li>25. Galosi, Frank L.</li> <li>26. Block, Michael (Contractor)</li> </ol>
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### Meeting Summary

Scott Choquette (Project Manager, Dewberry) and Jade Payne (Deputy Project Manager, Dewberry) met with the Prince George's County Mitigation Advisory Committee (MAC) on February 1, 2023, to review the 2023 Draft Hazard Mitigation Plan. A PowerPoint presentation was used to review the project status, review the Draft plan, and next steps for the project. Discussions were held throughout the presentation so Dewberry could gather feedback from the MAC. Discussion and presentation topics are grouped below with input and questions from the MAC.

### Meeting Notes

<b>Introduction</b>
<ul style="list-style-type: none"> <li>Scott introduced the meeting agenda</li> </ul>
<b>Project Status</b>





- Scott introduced the current step in the planning process and the project schedule
- Scott explained that the HIRA section is already under review by MDEM

#### Draft Plan Review

- Results from the Draft Plan Survey were shown to meeting attendees
- Jade presented the Draft Plan highlights, including compliance with new FEMA Mitigation Policy Planning Guide and FEMA High Hazard Dam potential
- Jade presented the updates to the HIRA section, including new future conditions section and population estimates for the future
- Brian Lee mentioned that some of the local jurisdictions may have different population counts than what is in the Plan currently (ex: City of Laurel should be over 31,000 people), and asked if we can incorporate these updated numbers into the Future Conditions Analysis section if he emails the data over
- Jade responded that we will incorporate these updated numbers once we receive that data from the City of Laurel
- Jade presented the addition of Hazus-MH v5.1 analysis in the HIRA section, as well as the new Hazard Risk Index Score
- Ehsan asked to clarify what “Severe storm (Flood-Related)” hazard section referred to. Jade clarified that it is flash flooding and pluvial flooding in this hazard section.
- Jade presented the updated Hazard Mitigation Goals and Actions, that were created with input from the MAC and the public
- Jade presented the new additions to the Plan Implementation chapter, including the new technical assistance and funding opportunities section, as well as the Annual Progress Report template
- Jade explained how the Plan is tailored to the FEMA HMP Program, with the incorporation of Social Vulnerability, Plan Integration, and FEMA Community Lifelines

#### Next Steps

- Scott explained the next steps for the Plan, with a timeline for the next steps
- Scott mentioned the public meeting that will be held on February 2, 2023 to review the Draft Plan

#### Questions/Comments

- Meloyde Batten-Mickens asked about the number of feedback forms that have been submitted on the Draft Plan Survey. Jade responded that we currently have less than 10 responses to the survey.
- Dawn said she would send out a request for responses to the Draft Plan Survey the afternoon of February 1, 2023 to try to get more responses.

## E.4. Attendance

### 1. Summary

	Mitigation Advisory Committee: Prince George's County and City of Laurel
Meeting title	Draft 2023 HMP Review
Attended	27
Start time	2/1/23, 1:55:27 PM
End time	2/1/23, 2:31:55 PM
Meeting duration	36m 28s
Average attendance time	29m 41s

### 2. Participants

Name	First join	In-meeting duration	Email
Brian Lee	2/1/23, 1:56:13 PM	35m 22s	[REDACTED]
Stephanie Robinson	2/1/23, 1:56:42 PM	34m 49s	[REDACTED]
Bahador, Ehsan	2/1/23, 1:57:08 PM	34m 23s	[REDACTED]
Henderson, Joey L.	2/1/23, 1:57:14 PM	34m 17s	[REDACTED]
Finch, Kim	2/1/23, 1:57:19 PM	34m 8s	[REDACTED]
Perez Irizarry, Angel	2/1/23, 1:57:22 PM	34m 13s	[REDACTED]
Payne, Jade	2/1/23, 1:58:00 PM	33m 32s	[REDACTED]
Choquette, Scott	2/1/23, 1:58:37 PM	32m 51s	[REDACTED]
Carreen Koubek	2/1/23, 1:58:55 PM	32m 30s	[REDACTED]
Callahan, Patrick T.	2/1/23, 1:59:02 PM	32m 32s	[REDACTED]
Mishra, Sudhanshu	2/1/23, 1:59:20 PM	32m 9s	[REDACTED]
Mariette, Courtney E.	2/1/23, 1:59:51 PM	32m 3s	[REDACTED]
Erin Meyer, UMD (Guest)	2/1/23, 2:00:00 PM	29m 40s	[REDACTED]
Hawkins-Nixon, Dawn	2/1/23, 2:00:28 PM	31m 6s	[REDACTED]
Rush, Hanna R.	2/1/23, 2:00:33 PM	30m 56s	[REDACTED]
Stephanie Pendergrass Dalke	2/1/23, 2:01:12 PM	30m 11s	[REDACTED]
DeHan, Jeffrey M.	2/1/23, 2:01:19 PM	30m 10s	[REDACTED]
Batten-Mickens, Meloyde R.	2/1/23, 2:02:25 PM	29m 5s	[REDACTED]
Sherrill, Mary C.	2/1/23, 2:02:28 PM	27m 14s	[REDACTED]
Kelly Flint	2/1/23, 2:02:33 PM	28m 53s	[REDACTED]
Robert Love	2/1/23, 2:03:25 PM	27m 58s	[REDACTED]
Tennekoon, Lilantha	2/1/23, 2:03:34 PM	28m 15s	[REDACTED]
Christina Cornwell	2/1/23, 2:04:25 PM	27m 3s	[REDACTED]
Joanne Hall Barr	2/1/23, 2:04:59 PM	26m 29s	[REDACTED]
Galosi, Frank L.	2/1/23, 2:09:07 PM	22m 35s	[REDACTED]
Block, Michael (Contractor)	2/1/23, 2:11:22 PM	20m 9s	[REDACTED]
[REDACTED]	2/1/23, 2:22:33 PM	8m 51s	[REDACTED]

## Appendix B. Outreach and Engagement

### Contents:

1. Public Meeting – Risk Assessment Results
  - a. Presentation
  - b. Agenda
  - c. Advertisements
  - d. Notes
  - e. Attendance
2. Public Hazard Mitigation Survey
3. Public Meeting – Draft Plan Review
  - a. Presentation
  - b. Agenda
  - c. Advertisements
  - d. Notes
  - e. Attendance
4. Public Draft Plan Review Survey
5. Online Outreach Materials
  - a. Video Meeting Statistics
  - b. StoryMap
  - c. Prince George's County Website
6. FEMA Region III- Local Hazard Mitigation Plan Engagement Strategy Worksheet

## A. Public Meeting – Risk Assessment Results

### A.1. Presentation



# Prince George's County Hazard Mitigation Plan 2023 Update

## Public Meeting #1

November 9, 2022 | Microsoft Teams (Virtual)

## AGENDA

- Hazard Mitigation Planning Overview
- Project Updates
- Hazard Identification & Risk Assessment
- Mitigation Goal Development
- Public Question & Discussion
- Next Steps

Prince George's County, MD

# Hazard Mitigation Planning

## Overview

3 Public Meeting #1 November 9, 2022

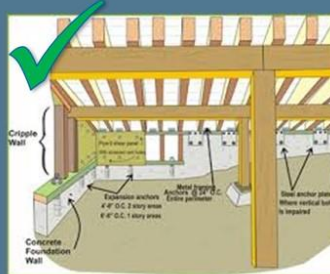


## What is hazard mitigation?

Any sustainable action that will **reduce or eliminate injury** to citizens, damages to structures and allow continuity of critical society functions



**Mitigation**  
Defensible Space for Wildfire Mitigation



**Mitigation**  
Earthquake Retrofit



**Preparedness & Response**  
purchase of a police command vehicle

4 Public Meeting #1 November 9, 2022





# Why have a hazard mitigation plan?

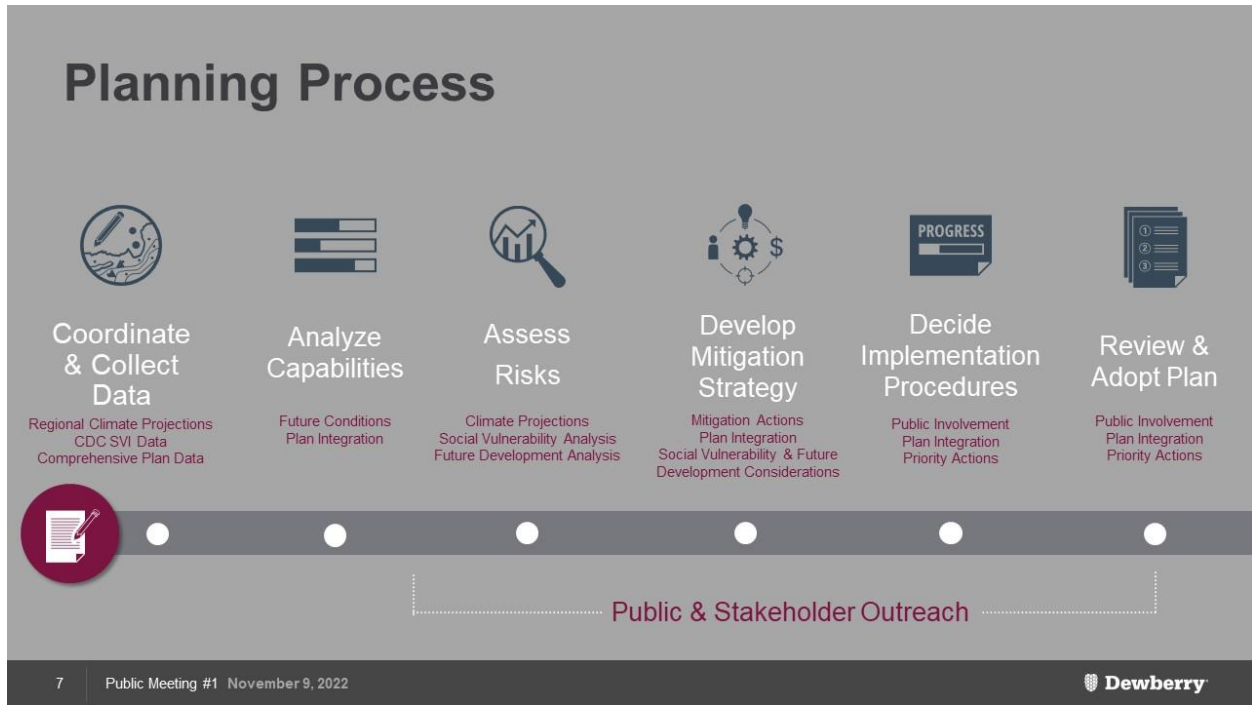
Prince George's County, MD

- Reduces or eliminates the need to respond (lessens resource burden)
- Increases resilience and promotes climate adaptation
- Promotes Data sharing between different levels of government and academia
- Supports decision-making
- Disaster Mitigation Act of 2000
  - Certain FEMA Public Assistance (State Plans)
  - FEMA's Hazard Mitigation Assistance Programs

## Hazard Mitigation Grants

- Local communities must have a FEMA-approved Hazard Mitigation Plan in place to receive Federal grant funds for hazard mitigation projects, such as:
  - **BRIC** (Building Resilient Infrastructure and Communities)
  - **HMGP** (Hazard Mitigation Grant Program)
  - **HMGP Post Fire**
  - **FMA** (Flood Mitigation Assistance)
- Other (non-FEMA) funding sources





## Plan Update Requirements

Per 2022 FEMA Local Mitigation Planning Policy Guide

- **Reflect changes in development:**
  - Increases or decreases in hazard vulnerability, changes in social vulnerability, changes in capabilities
  - New construction, planned development
  - Climate change, population changes, policy/regulatory changes
- **Reflect changes in priorities and progress in local mitigation efforts:**
  - Written narrative for PG County and the City of Laurel describing full planning process
  - Mitigation Strategy – goals, actions, and projects
  - Description of how mitigation plan was integrated into other planning mechanisms

8 | Public Meeting #1 November 9, 2022 | Dewberry

## Who is involved?

### Core Planning Groups

- Mitigation Advisory Committee (MAC)
- Maryland Department of Emergency Management (MDEM)
- FEMA Region III

### Critical Stakeholders

- Prince George's County public
- Community groups and organizations
- Critical infrastructure owners

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Public Meeting #1 November 9, 2022

 Dewberry

## Planning Process

---

Updates & Current Status

10

Public Meeting #1 November 9, 2022

 Dewberry



	Sep	Oct	Nov	Dec	Jan '23	Feb	March
<b>HM Plan Milestone:</b>	Kick-Off	Outreach Begins	Risk Assessment & Strategy Workshops		Draft Plan & MDEM Review	FEMA Review	Adoption
Review 2017 HMP							
Data Collection							
HIRA							
Capability Assessment							
Revise Goals + Objectives							
Mitigation Strategy Development							
Public Engagement							
HMP Writing / Revising							
MDEM Review / Approval							
FEMA Review / Approval							
Plan Adoption, Approval Letters, Plan Distribution							

**Project Schedule** 

# Hazard Identification & Risk Assessment

---

## Results Highlights

## HIRA Components



Hazard Ranking



Hazard Profiles



Climate Change Impacts



Hazard History (Locations, Extents, Occurrences)



Vulnerability, Exposure, and Loss Estimations



Probability of Future Events



Potential Impacts



State HMP Integration

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## Hazard Identification

### Prince George's County's Hazards



Flooding



Severe Winter Weather



Hurricane / Tropical Storm



Karst / Land Subsidence



Severe Weather



Extreme Heat



Wildfire



Drought



Tornado



Earthquake



Landslide



Dam/Levee Failure

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Public Meeting #1 November 9, 2022



Hazard Type	2017 Ranking	2022 Ranking
Riverine Flooding	High	High
Severe Storm (Flood Related)	High	High
Tornado	High	High
Tropical Storm / Hurricane	Medium-High	Medium-High
Severe Winter Weather	Medium-High	Medium-High
High Winds	Medium-High	Medium-High
Extreme Heat	Medium	Medium-High
Earthquake	Medium	Medium
Dam and Levee Failure	Medium	Medium
Extreme Cold	Medium-Low	Medium-Low
Drought	Medium-Low	Medium-Low
Coastal Flooding	Medium-Low	Medium-Low
Land Movement	Medium-Low	Medium-Low
Wildfire	Low	Low
Sinkholes	Low	Low

## Hazard Ranking Priority



## Federal Declarations

- 12 major disaster declarations for Prince George's County
  - 6 for flooding/severe storm
  - 5 for winter weather

### New Disaster Declarations Since Last Risk Assessment

Disaster Number	Incident Type	Incident Date	Program Declared			
			Individual Housing	Individual Assistance	Public Assistance	Hazard Mitigation Assistance
DR-4261	Severe winter storms and snowstorms	1/22/2016			X	X
EM-3430	Covid-19	1/20/2020		X	X	
DR-4491	Covid-19 Pandemic	1/20/2020		X	X	X

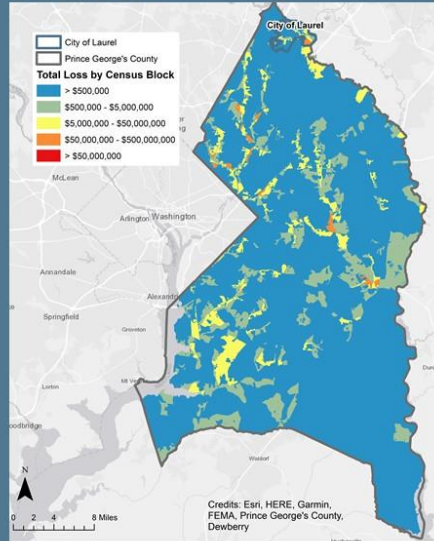


# Annualized Total Flood Loss

Hazus-MH v5.1



- Total Flood Loss
  - Combined Riverine and Coastal Flood Module
- 1-percent-annual-chance flood (100-year flood)



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# Riverine Flooding Losses

Hazus-MH v5.1



Prince George's County	100-Year Riverine Flood Losses (in whole dollars)				
	Residential	Commercial	Industrial	Other	Total
<b>Total Exposure</b>					
Prince George's County	\$130,144,361,000	\$26,242,415,000	\$5,564,076,000	\$7,454,437,000	\$169,405,289,000
<b>Direct Losses</b>					
Building	\$834,296,000	\$323,906,000	\$73,819,000	\$72,724,000	\$1,304,745,000
Contents	\$392,305,000	\$408,446,000	\$125,548,000	\$93,673,000	\$1,019,972,000
Inventory	\$0	\$10,790,000	\$19,217,000	\$298,000	\$30,305,000
Subtotal	\$1,226,601,000	\$743,142,000	\$218,584,000	\$166,695,000	\$2,355,022,000
<b>Business Interruption</b>					
Income	\$2,398,000	\$232,281,000	\$2,882,000	\$28,440,000	\$266,001,000
Relocation	\$111,416,000	\$76,858,000	\$2,826,000	\$17,990,000	\$209,090,000
Rental Income	\$57,472,000	\$57,232,000	\$543,000	\$3,069,000	\$118,316,000
Wage	\$5,694,000	\$260,289,000	\$4,002,000	\$269,408,000	\$539,393,000
Subtotal	\$176,980,000	\$626,660,000	\$10,253,000	\$318,907,000	\$1,132,800,000
<b>TOTAL</b>	<b>\$1,403,581,000</b>	<b>\$1,369,802,000</b>	<b>\$228,837,000</b>	<b>\$485,602,000</b>	<b>\$3,487,822,000</b>

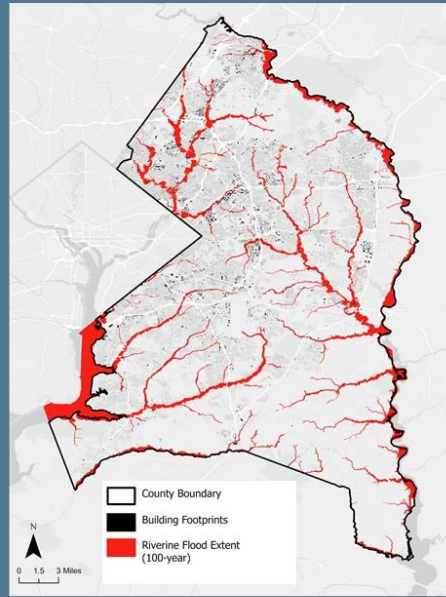
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## Riverine Flooding Extent and Exposure

Hazus-MH v5.1

- Hazus estimates:
  - 2,358 buildings will be at least moderately damaged
  - 2,183 buildings will be completely destroyed



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## Coastal Flooding Losses

Hazus-MH v5.1



Prince George's County	100-Year Coastal Flood Losses (in whole dollars)				
	Residential	Commercial	Industrial	Other	Total
<b>Total Exposure</b>					
Prince George's County	\$130,144,361,000	\$26,242,415,000	\$5,564,076,000	\$7,454,437,000	\$169,405,289,000
<b>Direct Losses</b>					
Building	\$840,000	\$4,000	\$1,000	\$2,000	\$847,000
Contents	\$505,000	\$9,000	\$1,000	\$12,000	\$527,000
Inventory	\$0	\$0	\$0	\$0	\$0
Subtotal	\$1,345,000	\$13,000	\$2,000	\$14,000	\$1,374,000
<b>Business Interruption</b>					
Income	\$20,000	\$9,000	\$0	\$1,000	\$30,000
Relocation	\$136,000	\$0	\$0	\$0	\$136,000
Rental Income	\$53,000	\$0	\$0	\$0	\$53,000
Wage	\$47,000	\$2,000	\$0	\$5,000	\$54,000
Subtotal	\$256,000	\$11,000	\$0	\$6,000	\$273,000
<b>TOTAL</b>	<b>\$1,601,000</b>	<b>\$24,000</b>	<b>\$2,000</b>	<b>\$20,000</b>	<b>\$1,647,000</b>

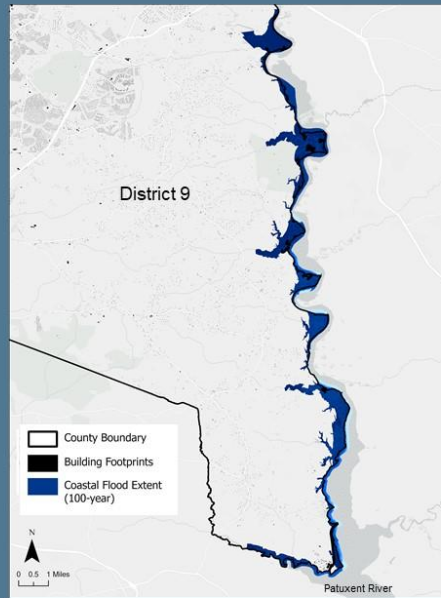
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## Coastal Flooding Extent and Exposure

Hazus-MH v5.1

- Southeast portion of the County affected (District 9)
- Along the Patuxent River



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## Tornado

Annualized Losses, NCEI (1950-2022)

Fujita Scale	Date	Community Affected	Deaths	Injuries	Total Property Damages
EF	05 Jul 2022	Collington	0	0	\$250,000
EF0	29 Sep 2015	Laurel	0	0	\$0
EF0	01 Jul 2013	Crestview Manor	0	0	\$500
EF0	19 Apr 2013	Westphalia	0	0	\$25,000
EF0	01 Jun 2012	Buena Vista	0	0	\$2,000

- Total tornadoes (2012-2022): 5
- Annualized events: 0.5
- Total Annual Damages: \$38,200



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# Annualized Loss/Exposure

Hazus-MH v5.1



Building Related Economic Loss						
Municipality	Return Period	Building Loss	Content Loss	Inventory Loss	Other Loss	Total Loss
City of Laurel	10-year	\$0	\$0	\$0	\$0	\$0
	20-year	\$0	\$0	\$0	\$0	\$0
	50-year	\$5,141	\$50,404	\$0	\$142	\$55,687
	100-year	\$1,432,367	\$206,920	\$0	\$1,231	\$1,640,517
	200-year	\$6,458,414	\$770,401	\$0	\$83,391	\$7,312,206
	500-year	\$16,437,818	\$1,841,697	\$228	\$929,092	\$19,208,833
Joint Base Andrews	10-year	\$20,310,087	\$2,337,410	\$781	\$1,302,888	\$23,951,165
	20-year	\$0	\$0	\$0	\$0	\$0
	50-year	\$0	\$0	\$0	\$0	\$0
	100-year	\$32,442	\$4,621	\$0	\$40	\$37,103
	200-year	\$226,181	\$18,179	\$0	\$160	\$244,519
	500-year	\$746,942	\$56,061	\$0	\$9,623	\$812,626
Prince George's County	10-year	\$2,350,838	\$196,799	\$728	\$161,273	\$2,709,637
	20-year	\$3,798,750	\$385,439	\$3,082	\$325,410	\$4,512,681
	50-year	\$0	\$0	\$0	\$0	\$0
	100-year	\$5,482,149	\$3,335,161	\$0	\$1,181	\$8,798,491
	200-year	\$69,406,206	\$13,043,695	\$8	\$48,202	\$82,498,111
	500-year	\$216,153,155	\$36,505,346	\$0	\$735,491	\$253,393,992
Total	10-year	\$629,343,871	\$100,034,917	\$71,658	\$31,125,278	\$760,575,723
	20-year	\$1,050,214,593	\$169,899,270	\$453,233	\$57,533,511	\$1,278,100,608
	50-year	\$0	\$0	\$0	\$0	\$0
	100-year	\$5,482,149	\$3,335,161	\$0	\$1,181	\$8,798,491
	200-year	\$69,406,206	\$13,043,695	\$8	\$48,202	\$82,498,111
	500-year	\$216,153,155	\$36,505,346	\$0	\$735,491	\$253,393,992

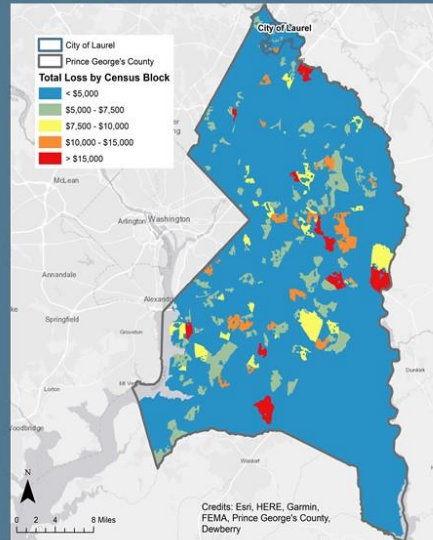


# Annualized Hurricane Loss

Hazus-MH v5.1



- Total Annualized Loss for Hurricane Model
- Probabilistic scenario run to produce annualized loss



**Age Vulnerability in Prince George's County and the City of Laurel**  
Number of residents aged 65 and over by Census Tract

**Population 65 and Older (2020 SVI)**

- 0 - 350
- 350 - 600
- 600 - 1000
- 1000 - 1250
- >1250

Credits: M-NCPPC, VGIN, Esri, HERE, Garmin, SafeGraph, FAO, METI/NASA, USGS, EPA, NPS

## Vulnerability:

# 65+, children, single-parent household, disability

- The most at-risk districts which contain the largest population of senior citizens are Districts 1, 5, 6, and 8

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## Dam Exposure

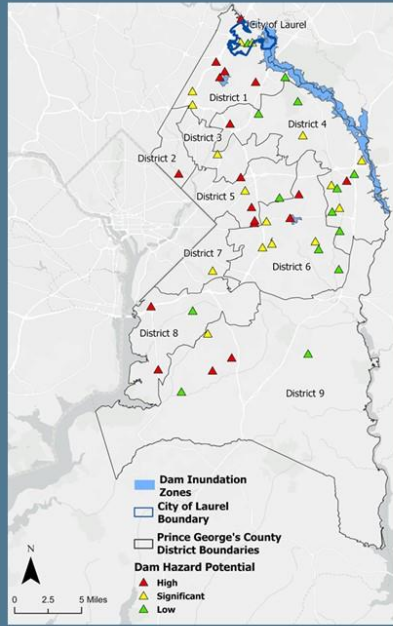
- Dam inundation zones mapped for 7 dams

Dam	Hazard Potential	Buildings in Inundation Zone	Property Exposure
Duckett Dam	High	964	\$692,272,613
Tinkers Creek Dam	Significant	10	\$669,767
Heritage Glen Dam	Significant	17	\$6,005,665
Indian Creek 2 & 3	High	182	\$151,537,770
Lake Arbor Dam	High	126	\$50,393,250
Largo Town Center Dam	Significant	3	\$44,463,996
Laurel Lakes No 1 Dam	Significant	103	\$327,589,022
<b>Total</b>	--	<b>1405</b>	<b>\$1,272,932,083</b>

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# Dam Inundation Map



- Inundation zones located in City of Laurel, Districts 1,4,6,9

## Mitigation Goals & Objectives

Review & Revise

# Goal & Objective Development

Proposed Changes to be More Specific

**2017 Goal**

It is the goal of Prince George's County and the City of Laurel, Maryland, to protect and improve the public health, safety, and welfare of its communities, and to expand the resiliency of livable communities by:

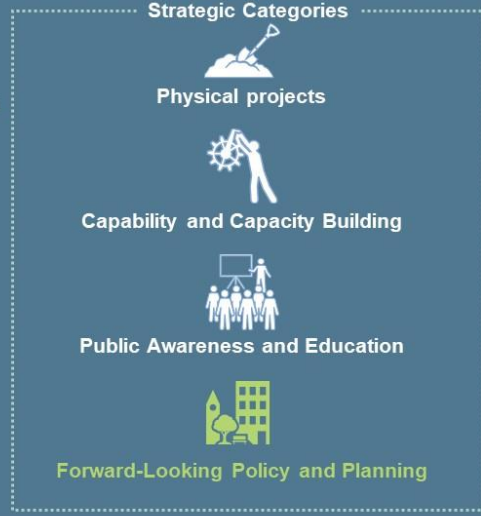
- Increasing public awareness of natural hazards and risk reduction measures; and
- Mitigating risks due to natural hazards.

+ MD State HMP

+ PLAN 2035



+ 2022 FEMA Mitigation Policies



# Potential Mitigation Goal Revisions



Implement projects that mitigate the risks of natural hazards to people, infrastructure, and environmental assets while equitably distributing project benefits.



Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.



Increase public awareness of natural hazard risks to people and property and promote current and new opportunities to participate in mitigation planning.



Prevent future climate-related damages and losses to communities, critical facilities, and natural resources through ordinances, policies, and plans that are aligned with regional and state resilience and equity goals.

## Public Questions & Comments

Are there **mitigation projects or actions** you want to be included?

How can this process/plan be **more useful** to you?

Do you know a **hazard problem area** you'd like addressed?



What **objectives** should be included in the plan?

Is there something specific you want to see in the **risk assessment**?

31

Public Meeting #1 November 9, 2022

 Dewberry

## Next Steps

---

Opportunities for Public Involvement

32

Public Meeting #1 November 9, 2022

 Dewberry

## How You Can Stay Involved:

1. Take the Hazard Mitigation Survey: <https://www.surveymonkey.com/r/Prince-Georges-HM-Survey-Social>
2. Tell us about hazard problem areas you know about: <https://bit.ly/HazardProblemAreas>
3. Check our webpage for future public meetings: <https://bit.ly/PGCountyHMP>



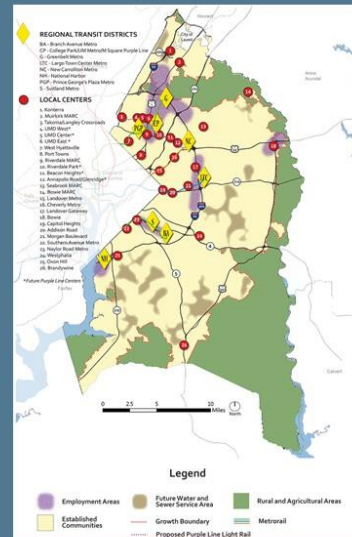
33 Public Meeting #1 November 9, 2022



## Comprehensive Planning Integration

- Comprehensive planning data was incorporated
  - Environmental Features
  - Existing and Planned Transportation Investments
  - Existing Development Patterns
  - Projected Growth
- Overlaid with hazard areas to help identify areas of future risk due to increased exposure from future development

PG Plan 2035: Growth Policy Map



34 Public Meeting #1 November 9, 2022



## A.2. Agenda



### Public Meeting Agenda

**Title:** Prince George's County Hazard Mitigation Plan Update – **Public Meeting #1**

**Location:** [Microsoft Teams \(Virtual\)](#)  
**Register Here:** <https://bit.ly/PublicHMP>

**Date:** Wednesday, November 9<sup>th</sup>, 2022      **Time:** 6:00 – 7:00 pm ET

**Purpose:** The 2023 update of the Prince George's County, MD Hazard Mitigation Plan is underway. Dewberry will provide an overview of the planning process, share current progress, provide preliminary results from the risk assessment, discuss potential changes to planning goals, hold an open forum for public questions and input, and share opportunities for further involvement.

#### Agenda Items

Topic	Presenter	Time
Welcome and Opening Remarks	Joey L. Henderson, Prince George's County Office of Homeland Security, Emergency Management Division	6:00 – 6:05 pm
Local Hazard Mitigation Plan Overview and Update: <ul style="list-style-type: none"> <li>- What is hazard mitigation?</li> <li>- What is the plan's purpose?</li> <li>- FEMA hazard mitigation grants</li> </ul>	Scott Choquette, Dewberry	6:05 – 6:10 pm
Project status update <ul style="list-style-type: none"> <li>- Milestones</li> <li>- New plan components</li> <li>- Public outreach opportunities</li> </ul>	Jade Payne, Dewberry	6:10 – 6:15 pm
Hazard identification and risk assessment <ul style="list-style-type: none"> <li>- Overview</li> <li>- Preliminary results</li> </ul>	Scott Choquette, Dewberry	6:15 – 6:30 pm
Mitigation goal development discussion	Jade Payne, Dewberry	6:30 – 6:35 pm
Open Discussion <ul style="list-style-type: none"> <li>- Questions, comments, and input from members of the public</li> </ul>	Scott Choquette, Dewberry	6:35 – 6:55 pm
Next Steps: <ul style="list-style-type: none"> <li>- Next Meeting</li> <li>- How to get involved</li> </ul>	Jade Payne, Dewberry	6:55 – 7:00 pm

### A.3. Advertisements

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- Page · Government organization
- 7915 Anchor St, Landover, MD, United States, Maryland
- (301) 324-4400
- OEMStaff@co.pg.md.us
- linktr.ee/PGOEM
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Prince George's County Office of Emergency Management is in Prince George's County, Maryland.  
November 4 at 8:29 AM

The Office of Homeland Security (OHS), in collaboration with the Department of Environment (DoE), will host a Virtual Public Forum for County residents on Wednesday, November 9th at 6pm. During this forum, we will report the results of the Hazard Identification and Risk Assessment (HIRA) and seek input from residents as we work to update the County's Hazard Mitigation Plan. To register visit, [bit.ly/PublicHMP](https://bit.ly/PublicHMP)

#CreatingResilientCommunities #PreparePrinceGeorges #HazardMitigation

**Prince George's County Office of Homeland Security Emergency Management Division hosts a VIRTUAL PUBLIC FORUM**

**Wednesday NOV. 9TH at 6PM**

**HAZARD MITIGATION PLAN**

Register at [bit.ly/PublicHMP](https://bit.ly/PublicHMP)

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The image shows a social media profile for 'pgcountyoem' (Prince George's County Office of Emergency Management). The profile includes a logo, a bio stating it is a government organization focused on preparedness and resilience, and a list of posts. One post is a flyer for a 'VIRTUAL PUBLIC FORUM' on Wednesday, Nov. 9th at 6PM, related to the Hazard Mitigation Plan. Below the profile is a tweet from 'PGC Dept. of the Environment' (@PGCSprout) dated 22h, which repeats the information about the virtual public forum. The tweet includes the same flyer image. A 'Sign in with Google' popup is visible on the right side of the tweet.

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- © 2022 Nextdoor

 Prince George's County Office of Homeland Security/Office of Emergency Management  
Emergency Preparedness Specialist Alexandra Harris • 4 days ago



Virtual Public Forum: Hazard Mitigation Plan. The Office of Homeland Security (OHS), in collaboration with the Department of Environment (DoE), will host a Virtual Public Forum for County residents on Wednesday, November 9th at 6pm.


During this forum, we will report the results of the Hazard Identification and Risk Assessment (HIRA) and seek input from residents as we work to update the County's Hazard Mitigation Plan.

To register visit, [bit.ly/PublicHMP](https://bit.ly/PublicHMP)

#CreatingResilientCommunities #PreparePrinceGeorges #HazardMitigation

Posted to Subscribers of Prince George's County Office of Homeland Security/Office of Emergency Management

 4 · 2,406 Impressions    Like    Comment    Share

 Add a comment...



colleg parkmd COLLEGE

Posts

Posted by u/WP-Hazard-Mitigation 6 days ago

**Hazard Mitigation Plan meeting for all county residents tomorrow (11/9) @ 6pm**

Event

PG county's office of homeland security/department of the environment is holding a public meeting on the natural hazard mitigation plan update on Wednesday (11/9) at 6pm.

The meeting is meant to share the results of the initial hazard risk assessment and provide a forum for the community to share about any issues with natural hazards they've noticed (like roads flooding, etc.).

Link for more information and to register for the meeting:  
<https://www.princegeorgescountymd.gov/2769/Hazard-Mitigation-Plan---Draft>

Prior registration is optional, so you can just join the meeting tomorrow at 6pm here:  
<https://bit.ly/3CD0AyZ>

Also, feel free to post any flooding (or other hazard) issues down below, and I can take note of them and make sure they're included in the plan update.

0 Comments Share Save ...

**Post Insights**  
Only you and mods of this community can see this

<b>169</b>	<b>100%</b>	<b>2</b>	<b>0</b>
Total Views	Upvote Rate	Community Karma	Total Shares



Jade Payne ▸ County Connect Prince George's

Just now · 🌐

Hey everyone, PG County is holding a virtual public meeting tomorrow @ 6 pm on natural hazards. If you know of any local problem areas (like streets/neighborhoods that flood) feel free to attend and share them!


You can register to attend here: <https://bit.ly/PublicHMP>




TOMORROW AT 6 PM

**PUBLIC MEETING: Prince George's County Hazard Mitigation Plan Update**

1 Going · 0 Interested

 **Jade Payne** ▸ DC, Maryland & Virginia Events  
2h · 🌐

Prince George's County, MD Residents:  
The County is hosting a VIRTUAL public forum so the community can share their concerns about flooding and other hazards. Is there a road that always floods? Has your house faced repeated flooding when it rains? WE WANT TO HEAR ABOUT IT!  
Join us tomorrow (Wednesday) at 6 pm to learn about the County's Hazard Mitigation Plan update and make your voice heard!  
For those attending and those that can't please share your thoughts with us through... [See more](#)



The graphic features a central circular collage divided into four quadrants: top-left shows a flooded road with a 'Flood' warning sign; top-right shows a fire; bottom-left shows a snow-covered road with a vehicle; bottom-right shows a 'TORNADO WATCH' sign. The text 'VIRTUAL PUBLIC FORUM' is at the top, 'Wednesday NOV. 9TH' is on the left, and 'at 6PM' is on the right.

**TOMORROW AT 6 PM**  
**PUBLIC MEETING: Prince George's County Hazard Mitigation Plan Update**  
1 Going · 0 Interested

The screenshot shows a Facebook event page. At the top, there is a navigation bar with icons for home, profile, video, marketplace, and a grid icon. The main header features a dark blue background with yellow text: "Prince George's County Office of Homeland Security Emergency Management Division hosts a VIRTUAL PUBLIC FORUM". Below this, a yellow banner contains the text "Wednesday NOV. 9TH at 6PM" and a circular graphic divided into four quadrants showing flood, fire, and other hazards. A calendar icon on the left shows the date "9". Below the banner, the event title is "PUBLIC MEETING: Prince George's County Hazard Mitigation Plan Update" with a "Go To Link" button. A message states "The Event Hasn't Started" with a note to check the event link. The page has tabs for "About" and "Discussion", and buttons for "Invite", "Edit", and a share icon. The "Details" section lists "1 hr", "1 person responded", "Event by Jade Payne", and "Public · Anyone on or off Facebook". It also includes links for a "Public Survey" and a "Public Meeting Link". The "Guests" section shows "1 GOING" and "0 INTERESTED". The "Share to Groups" section lists a group "DC, Maryland & Virginia Events" with 7K members and a "Share" button.

Prince George's County Office of Homeland Security  
Emergency Management Division  
hosts a  
**VIRTUAL PUBLIC FORUM**  
Wednesday NOV. 9TH at 6PM

9  
TOMORROW AT 6 PM – 7 PM  
**PUBLIC MEETING: Prince George's County Hazard Mitigation Plan Update**  
Online event [Go To Link](#)


**The Event Hasn't Started**  
Check the event link you provided to ensure the destination is correct.

[About](#) [Discussion](#) [Invite](#) [Edit](#) [Share](#) [...](#)


**Details**  
1 hr  
1 person responded  
Event by Jade Payne  
Public · Anyone on or off Facebook  
Public Survey (5 mins or less): <https://www.surveymonkey.com/.../Prince-Georges-HM-Survey...>  
Public Meeting Link: <https://bit.ly/3CDoAyZ>

**Guests** [See All](#)  
1 GOING 0 INTERESTED

**Share to Groups** [See all](#)  
DC, Maryland & Virginia Events  
Public group · 7K members [Share](#)







 r/PrinceGeorgesCountyMD


Posts

↑ Posted by u/AutoModerator 13 days ago 

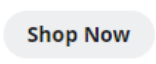
9 **Monthly Meetups/Events Thread**

↓ ↩

 7 Comments  Award  Share  Save  Hide  Report


 **u/velveeta** · Promoted

Edith once heard someone say youth was wasted on the young. Then she laughed. And laughed some more. Because Edith doesn't give a fork about age. Living well has no rules. So don't forget to treat yourself every day. That's La Dolce Velveeta.

velveeta.com 

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



 WP-Hazard-Mitigation · 6 days ago  
Hyattsville


Virtual Public Meeting for the Prince George's County Hazard Mitigation Plan Update:  
<https://bit.ly/PublicHMP>

Wednesday, November 9th, 6:00 - 7:00 pm

Come complain about flooding issues so we can do something about them!

Prior registration is not required, and you can join the meeting at 6pm tomorrow here:  
<https://bit.ly/3CDoAyZ>

↑ 1 ↓  Reply  Share  Save  Edit  Follow ...

 RamekinThief · 6 days ago  
Camp Springs

**r/PrinceGeorgesCountyMD**

**Posts**

Posted by u/WP-Hazard-Mitigation **Hyattsville** 6 days ago

**Hazard Mitigation Plan meeting for all county residents tomorrow (11/9) @ 6pm**

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0 Comments   Share   Save   ...

**Post Insights**  
Only you and mods of this community can see this

<b>167</b>  Total Views	<b>100%</b>  Upvote Rate	<b>4</b>  Community Karma	<b>0</b>  Total Shares
---	--	---	--

**r/HyattsvilleMD**

Posted by u/WP-Hazard-Mitigation 6 days ago

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PG county's office of homeland security/department of the environment is holding a public meeting on the natural hazard mitigation plan update on Wednesday (11/9) at 6pm.

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Only you and mods of this community can see this

<b>88</b> Total Views	<b>100%</b> Upvote Rate	<b>2</b> Community Karma	<b>0</b> Total Shares
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 PG County Office of Emergency Management  
@PGCountyOEM

On Wed, Nov 9th at 6pm, @PGCountyOEM and @PGCSprout will be hosting a Virtual Public Forum for County residents! During the forum we will report the results of the Hazard Identification and Risk Assessment (HIRA) and seek input from residents. To Register: [bit.ly/PublicHMP](https://bit.ly/PublicHMP)



8:00 AM · Nov 4, 2022 · Buffer

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**PRINCE GEORGE'S COUNTY  
OFFICE OF HOMELAND SECURITY**

**PRESS RELEASE**

**For Immediate Release:**

November 3, 2022

**For More Information:**

Alexandra D. Harris  
Emergency Management Specialist  
Prince George's County Office of Homeland Security  
301.324.4435  
[ADHarris@co.pg.md.us](mailto:ADHarris@co.pg.md.us)

**PRINCE GEORGE'S COUNTY SEEKING PUBLIC INPUT IN UPDATE TO HAZARD  
MITIGATION PLAN**

*County to Host Virtual Public Forum to Hear Resident Input*

**HYATTSVILLE, MD** – The Prince George's County Office of Homeland Security (OHS), in collaboration with the Department of Environment (DoE), has begun the process of updating the County's Hazard Mitigation Plan (HMP). The OHS will host a virtual public forum on Wednesday, November 9, 2022, at 6:00 PM to report the results of the Hazard Identification and Risk Assessment (HIRA) to County residents.

“Knowing and understanding the threats, risks, and hazards that effect Prince George's County allows for us to better plan for, respond to, and recover from emergencies and natural disasters,” said Office of Homeland Security Director Ronald E. Gill, Jr. “The County's Hazard Mitigation Plan is a key piece in our efforts to safely and effectively assist our residents during any emergency, and it is important for us to engage with the community throughout this process to ensure that our residents are informed.”

The Local Hazard Mitigation Policy 2022 guides the County's actions to reduce the risk from disasters over the next five years and beyond; and is meant to utilize new and existing plans, regulations, and environmental projects. The plan allows the County to be better prepared, resilient, and sustainable by identifying projects that will reduce the impacts of natural hazards. If the impacts from hazards can be prevented or reduced, lives can be saved, and recovery costs reduced.

The HMP also allows the County to apply for the Hazard Mitigation Grant Awards and receive funds from the Federal Emergency Management Agency (FEMA) to reduce the community's vulnerability to disasters. The funding is essential in helping the County become resilient and develop sustainability.

County residents are also encouraged to complete a survey on hazard mitigation project needs and plan priorities regarding the County's natural hazards. The survey takes no more than 10 minutes and can be completed [here](#).

Residents can join the public forum [here](#). For more information on Prince George's County Hazard Mitigation Plan update, visit the OHS website at [oem.mypgc.us](http://oem.mypgc.us).

###



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## A.4. Notes



### Public Meeting #1 Notes

<b>Title:</b>	Prince George's County Hazard Mitigation Plan - <b>Public Meeting #1</b>	<b>Location:</b>	Microsoft Teams (Virtual)
<b>Date:</b>	Wednesday, November 9 <sup>th</sup> , 2022	<b>Time:</b>	6:00 – 7:00 pm ET
<b>Purpose:</b>	The 2023 update of the Prince George's County, MD Hazard Mitigation Plan is underway. Dewberry will provide an overview of the planning process, share current progress, provide preliminary results from the risk assessment, discuss potential changes to planning goals, hold an open forum for public questions and input, and share opportunities for further involvement.		
<b>Attendees:</b>	Scott Choquette, Dewberry Mikaela Strech, Dewberry Ehsan Bahador, OHS/OEM Joey Henderson, OHS/OEM Mark Weissman, OHS/OEM Mark Grisar, Mt. Rainier CERT Anthony (Tony) Grimes, OHS Shelly Gooding, OHS/OEM Darrell Small, OHS/OEM David Lewis, OHS/OEM Ryan Chelton, Development Services, Town of Riverdale Park Stephanie Robinson, City of Bowie OEM Melvin Mason, Upper Marlboro CERT	Jaden N. Burnett, Landover OHS/OEM Noelle Burnett, Landover OHS/OEM Teresa Garcia, County Resident Alice Oshogbele, Sanitation Commissioner, Town of Eagle Harbor Joyce Prince, Public Safety Commissioner, Town of Eagle Harbor Mirna Lopez- Laurel resident and homeowner Alice E Teffian, Vice President, Eagle Harbor Citizens Association Eric L. Coates, REM Director of Health & Safety/Sr. Project Manager at McKissack Alonzo Joy, Upper Marlboro CERT	

#### Meeting Summary

Scott Choquette (Project Manager, Dewberry) held a public meeting as a representative of the Prince George's County Office of Homeland Security/Office of Emergency Management on September 9, 2022. A PowerPoint presentation was used to provide an overview of the mitigation plan update process, review the project status, and highlight key risk assessment results. Discussions were held to solicit public feedback on draft mitigation goals and potential mitigation projects. Opportunities to continue involvement in the planning process were provided at the end. Discussion and presentation topics are grouped below with input and questions from the attendees.

#### Meeting Notes

##### Welcome and Opening Remarks



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### Meeting Notes

#### Welcome and Opening Remarks



No Comments

**Project Status**

- Not about the plan getting funding, but about creating meaningful projects
- Keeping to schedule because we want to make sure to maximize opportunities to receive grant funding, which has strict timelines

**Risk Assessment Results**

- Mark Grisar: Extreme heat might be in the high category - anecdotally
- Scott: When you identify a vulnerability, you have to come up with strategies to address, so the higher the more strategies, but the difference between medium-high and high is more about the appetite of the county to address; federally, a lot of urgency to address it

**Draft Mitigation Goals Discussion**

No Comments

**Potential Project Brainstorm**

- Mark Grisar: conversation going on about when there's a great disaster, how do things get rebuilt - the way they were? The same place? Does that play into the planning? For example, coastal flooding.
  - Scott response: There's recovery of how to get things running. Then there's long-term recovery about rebuilding - most of the US we aren't good at this. We are starting to think about it. In terms of this plan, this is a conversation we should have
- Joey: a case-by-case basis, we've not had those issues in terms of flooding. In the past we've had ground movement - it wasn't feasible for the property owner to rebuild in the same areas
- Melvin Mason: has there been thought about boosting the involvement of organizations - like Community Emergency Response Team or [blank] - to provide more training?
- (Chat) Teresa Garcia: In 2018 the Little Patuxent River rose and the flood washed away parts of 198. I'm glad that these types of issues can be addressed so that they don't occur in the future

**Next Steps**

No Comments

**Questions & Comments (Open Forum)**

No Comments

## A.5. Attendance

### 1. Summary

Meeting title	Prince George's County Hazard Mitigation Plan - Public Meeting #1
Attended participants	23
Start time	11/9/22, 5:45:40 PM
End time	11/9/22, 7:00:50 PM
Meeting duration	1h 15m 10s
Average attendance time	48m 32s

### 2. Participants

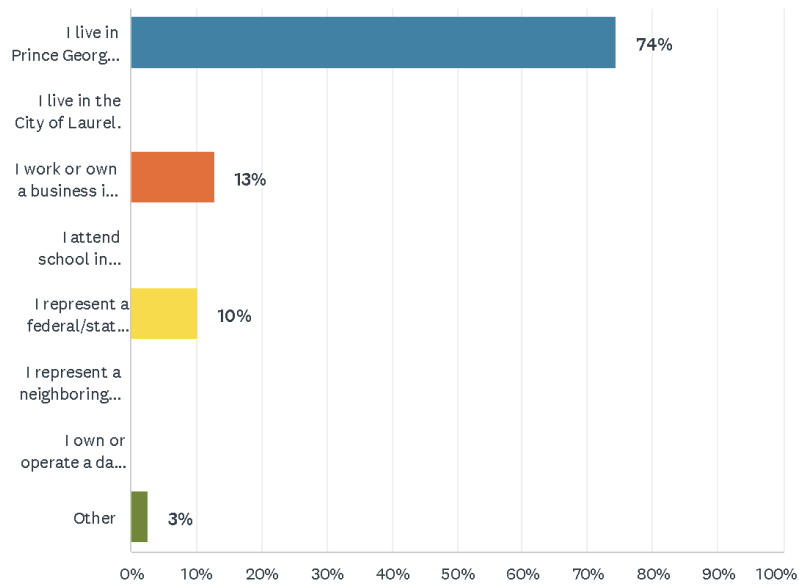
Name	First join	In-meeting duration	Email
Choquette, Scott	11/9/22, 5:55:24 PM	1h 5m 25s	[REDACTED]
Henderson, Joey L.	11/9/22, 5:55:26 PM	1h 3m 14s	[REDACTED]
Bahador, Ehsan	11/9/22, 5:55:26 PM	1h 4m 3s	[REDACTED]
Weissman, Mark J.	11/9/22, 5:55:26 PM	1h 3m 13s	[REDACTED]
mark grisar	11/9/22, 5:55:27 PM	1h 3m 26s	[REDACTED]
Grimes, Anthony V.	11/9/22, 5:57:22 PM	1h 1m 31s	[REDACTED]
Gooding, Shelly S.	11/9/22, 5:57:23 PM	1h 1m	[REDACTED]
Small, Darrell	11/9/22, 5:57:36 PM	1h 1m 23s	[REDACTED]
Lewis, David A.	11/9/22, 5:58:10 PM	1h 45s	[REDACTED]
Ryan Chelton	11/9/22, 5:59:05 PM	1h 19s	[REDACTED]
Strech, Mikaela	11/9/22, 5:59:09 PM	59m 50s	[REDACTED]
Stephanie Robinson	11/9/22, 6:00:07 PM	58m 55s	[REDACTED]
Mason, Melvin (NIH/CIT) [E	11/9/22, 6:00:49 PM	58m 35s	[REDACTED]
Burnett, Jaden N.	11/9/22, 6:01:47 PM	57m 2s	[REDACTED]
Noelle Burnett			
Teresa Garcia	11/9/22, 6:03:02 PM	56m 13s	
Alice Oshogbele	11/9/22, 6:03:38 PM	6m 47s	
Alice Oshogbele	11/9/22, 6:07:53 PM	41m 43s	
Mirna Lopez	11/9/22, 6:08:43 PM	50m 13s	
Alice E Teffian	11/9/22, 6:09:36 PM	37m 7s	
Eric L. Coates	11/9/22, 6:12:29 PM	4m 15s	[REDACTED]
Alonzo Joy	11/9/22, 6:26:20 PM	32m 9s	
Joyce Prince (call in for auc	11/9/22, 6:29:36 PM	9m 47s	
Joyce Prince	11/9/22, 6:39:43 PM	19m 10s	[REDACTED]

## B. Public Hazard Mitigation Survey

### Prince George's County Hazard Mitigation Survey

Q1 Which best describes you? (Note: Your answer will affect the questions you receive. Please take the survey more than once if you want to answer in different roles/capacities.)

Answered: 39 Skipped: 0



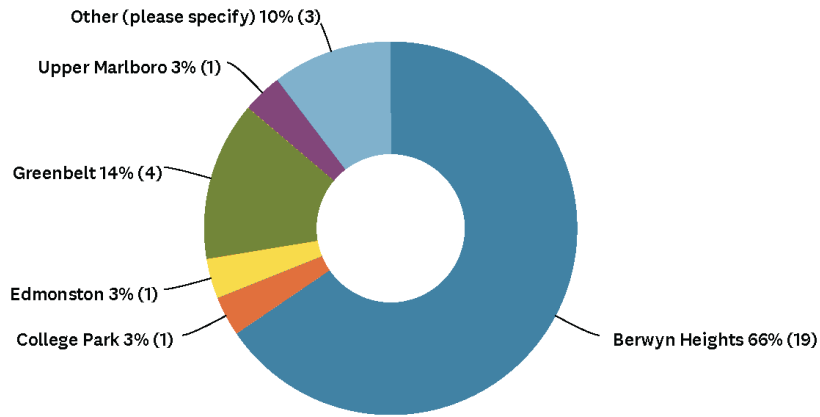
ANSWER CHOICES	RESPONSES	
I live in Prince George's County.	74%	29
I live in the City of Laurel.	0%	0
I work or own a business in Prince George's County, but I do not live in Prince George's County.	13%	5
I attend school in Prince George's County, but I do not live in Prince George's County.	0%	0
I represent a federal/state/private agency or organization with a vested interest in Prince George's County.	10%	4
I represent a neighboring jurisdiction to Prince George's County.	0%	0
I own or operate a dam or levee in or around Prince George's County.	0%	0
Other	3%	1
<b>TOTAL</b>		<b>39</b>

#	OTHER	DATE
1	I work in Prince George's County	11/18/2022 8:41 AM

Prince George's County Hazard Mitigation Survey

Q2 Which community do you live in?

Answered: 29 Skipped: 10





Prince George's County Hazard Mitigation Survey

ANSWER CHOICES		RESPONSES	
	Benwyn Heights	66%	19
	Bladensburg	0%	0
	Bowie	0%	0
	Brentwood	0%	0
	Capitol Heights	0%	0
	Cheverly	0%	0
	College Park	3%	1
	Colmar Manor	0%	0
	Cottage City	0%	0
	District Heights	0%	0
	Eagle Harbor	0%	0
	Edmonston	3%	1
	Fairmount Heights	0%	0
	Forest Heights	0%	0
	Glenarden	0%	0
	Greenbelt	14%	4
	Hyattsville	0%	0
	Landover Hills	0%	0
	Laurel	0%	0
	Morningside	0%	0
	Mount Rainier	0%	0
	New Carrollton	0%	0
	North Brentwood	0%	0
	Riverdale Park	0%	0
	Seat Pleasant	0%	0
	University Park	0%	0
	Upper Marlboro	3%	1
	Unincorporated Prince George's County	0%	0
	I do not live in Prince George's County	0%	0
	Other (please specify)	10%	3
TOTAL			29
#	OTHER (PLEASE SPECIFY)	DATE	

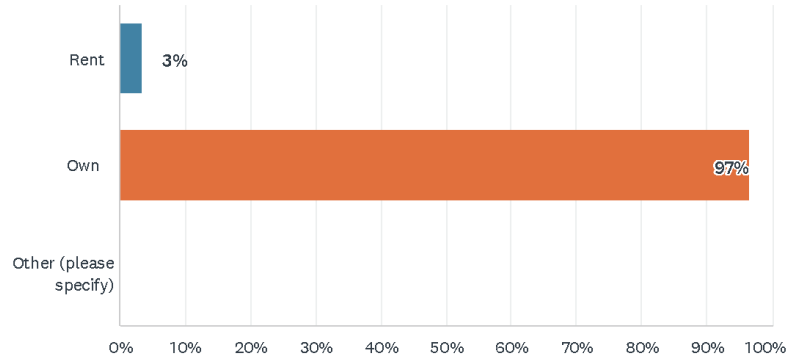
Prince George's County Hazard Mitigation Survey

1	Fort Washington	11/15/2022 10:35 AM
2	Fort Washington	11/14/2022 7:39 PM
3	Chapel Oaks	11/9/2022 7:34 PM

Prince George's County Hazard Mitigation Survey

Q3 Do you rent or own your residence?

Answered: 29 Skipped: 10



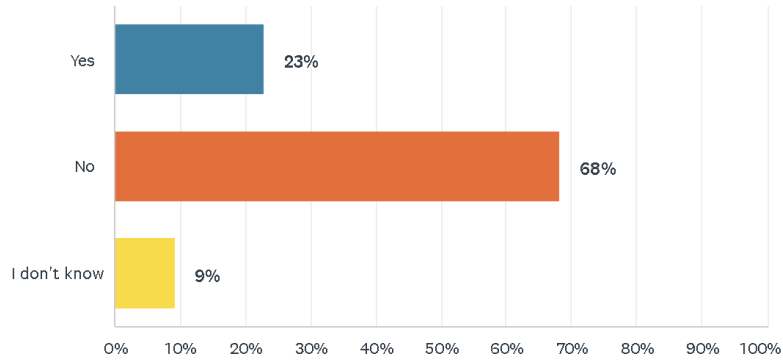
ANSWER CHOICES	RESPONSES	
Rent	3%	1
Own	97%	28
Other (please specify)	0%	0
<b>TOTAL</b>		<b>29</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Prince George's County Hazard Mitigation Survey

Q4 Do you have flood insurance (e.g., a National Flood Insurance Program policy)?

Answered: 22 Skipped: 17

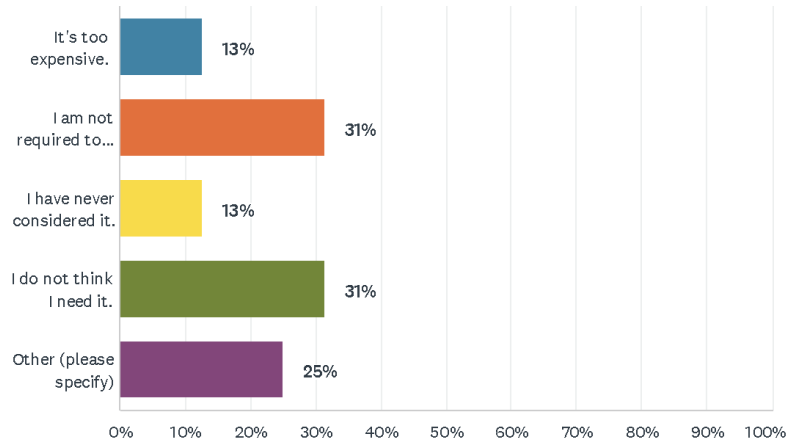


ANSWER CHOICES	RESPONSES	
Yes	23%	5
No	68%	15
I don't know	9%	2
TOTAL		22

Prince George's County Hazard Mitigation Survey

Q5 If you do not have flood insurance, please select the reasons that may apply:

Answered: 16 Skipped: 23



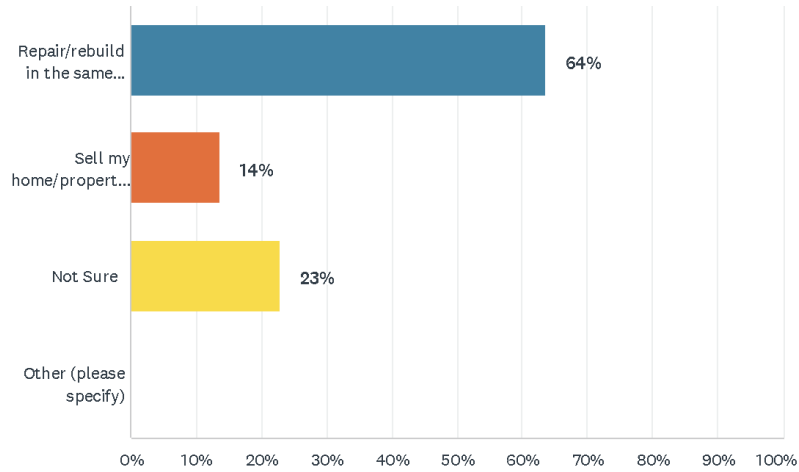
ANSWER CHOICES	RESPONSES
It's too expensive.	13% 2
I am not required to have it, so I choose not to.	31% 5
I have never considered it.	13% 2
I do not think I need it.	31% 5
Other (please specify)	25% 4
Total Respondents: 16	

#	OTHER (PLEASE SPECIFY)	DATE
1	It is not available from my home insurer!	11/25/2022 6:20 PM
2	Coverage covers the walls but not contents or AC unit, heat, water heater, etc.	11/22/2022 5:02 PM
3	House is located on the upper level	11/8/2022 6:13 PM
4	My insurance says it is not available for my home.	11/8/2022 4:35 PM

Prince George's County Hazard Mitigation Survey

Q6 If disaster substantially damaged your home, which of the following would be the most likely option you would pursue?

Answered: 22 Skipped: 17



ANSWER CHOICES	RESPONSES	
Repair/rebuild in the same location to at least current building code standards	64%	14
Sell my home/property and relocate	14%	3
Not Sure	23%	5
Other (please specify)	0%	0
<b>TOTAL</b>		<b>22</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Prince George's County Hazard Mitigation Survey

Q7 Please describe any past flood damage to your home. Feel free to include details such as damage estimates, date, frequency, duration, location (e.g., yard, road, building), and how deep the flooding was.

Answered: 20 Skipped: 19

#	RESPONSES	DATE
1	Water in the basement numerous times. Then \$13k of repair and water again when we had 4" of rain in an hour.	11/25/2022 6:20 PM
2	Water in basement up to 2 inches	11/24/2022 6:22 PM
3	None at this house, twice at last residence	11/24/2022 10:40 AM
4	Basement flooded several times. Also had hydrostatic pressure from oversaturation of the ground. A few years ago I had a sump pump installed.	11/23/2022 5:46 PM
5	Basement floor cracked open and flooded during heavy rains a couple of years ago. Water was less than a foot high. We did extensive work to basement to add sump pumps, etc. and all is ok now. We have replaced 3 sections of basement walls over time.	11/23/2022 7:24 AM
6	Flash flood in 2014 causing about \$30,000 in damage which was partially covered by insurance. Flooding during Hurricane Sandy as a result of loss of electricity. Flash flood again in July, 2022. Homes in my block are often flooded because of inadequate storm drainage.	11/22/2022 10:11 PM
7	Three flood incidents. 1. Around 2005 had water in basement from heavy snow followed by heavy rain. Yard also flooded. Had to replace carpet. 2. 2014 had 4 feet of water in basement from rain water and sewer backup. Yard was flooded. Sustained over \$40,000 worth of damage. Streets were flooded. Water comes up from the ground. Spent \$17,000 to get it back to where it was and this was with insurance. Town has a history of flooding and does nothing to solve the problem. There is a storm drain behind my yard that has not been checked in at least a decade. It is filled with debris and a recycling bucket. Town says it is the responsibility of the county. 3. Flooding on August 10, 2022. Heavy rain flooded streets, back yard and finished basement again. Had four inches of water, again a combination of rain water and sewer backup. Sustained \$28,000 worth of damage. Water flooded my car that was parked on the street. Had water in my wheel well and cup holder. Had to get a new car because of it. So far, we are out \$2500 and counting. Town has done nothing since 2014 to help mitigate flooding. Town says it is the counties fault.	11/22/2022 5:02 PM
8	2014 -basement flooded-2+ft. Approx. \$19,000.00, including remediation. Back yard flooded 2015- basement flooded 1.5 ft. Approx. \$15,000.00 including remediation.	11/22/2022 3:03 PM
9	Storm sewer backup flooded our basement in mid-1990. Ever since, we've experienced foundation seepage along the edges whenever we get more than 2 inches of rain at once or multiple days if rain that fill the water table. Now our basement floor has cracked and we get seepage from the middle of the floor too.	11/22/2022 2:18 PM
10	Before we waterproofed the basement, we would take on water during heavy rains. The worst occasion was during a heavy rain in January, when our sump pump failed and the drain backed up. The floor was under a couple of inches then. Before waterproofing, anything stored in the basement was either off the floor or in plastic bins, to minimize damage.	11/22/2022 1:36 PM
11	None	11/22/2022 1:29 PM
12	Basement flooded several times upon moving here because of the way my property is structured. Had to install piping around my entire exterior home to keep basement from flooding again.	11/14/2022 7:41 PM
13	None	11/9/2022 7:35 PM
14	Our house has flooded several times since 2017 due to storms. The house has a sump pump outside of the home that gets clogged and causes the house to flood	11/9/2022 6:36 AM

Prince George's County Hazard Mitigation Survey

15	Minor flooding of a shed that was built by a previous owner in a swale. Shed has since been demolished and swale replaced.	11/8/2022 8:17 PM
16	My neighbors at the bottom of the hill suffered major damages and flooding. 59th St, and Cunnigham St were severely damaged.	11/8/2022 6:13 PM
17	None	11/8/2022 4:35 PM
18	None	11/8/2022 4:17 PM
19	None to my knowledge.	11/8/2022 3:55 PM
20	Yard damage. Loss of tools and lawn furniture	11/8/2022 3:44 PM



Prince George's County Hazard Mitigation Survey

Q8 Are you interested in being contacted by Prince George's County or the City of Laurel staff to discuss potential hazard mitigation options for your home? If so, please provide your name and contact information below.

Answered: 10 Skipped: 29

ANSWER CHOICES	RESPONSES	
Name	100%	10
Email Address	100%	10
Phone Number	80%	8

#	NAME	DATE
1	Michael Bloom	11/25/2022 6:20 PM
2	Daniel "Buddy" Robson Jr.	11/22/2022 10:11 PM
3	Merrill and Helen Weinrich	11/22/2022 5:02 PM
4	Carmalita U Howard	11/22/2022 3:03 PM
5	Dr. Toye Latimore	11/14/2022 7:41 PM
6	Amanda Townsend	11/9/2022 6:36 AM
7	Gregoor Passchier	11/8/2022 8:17 PM
8	Shinita Hemby	11/8/2022 6:13 PM
9	Kathy Bartolomeo	11/8/2022 4:35 PM
10	James McCormack	11/8/2022 3:55 PM

#	EMAIL ADDRESS	DATE
1	[REDACTED]	11/25/2022 6:20 PM
2	[REDACTED]	11/22/2022 10:11 PM
3	[REDACTED]	11/22/2022 5:02 PM
4	[REDACTED]	11/22/2022 3:03 PM
5	[REDACTED]	11/14/2022 7:41 PM
6	[REDACTED]	11/9/2022 6:36 AM
7	[REDACTED]	11/8/2022 8:17 PM
8	[REDACTED]	11/8/2022 6:13 PM
9	[REDACTED]	11/8/2022 4:35 PM
10	[REDACTED]	11/8/2022 3:55 PM

#	PHONE NUMBER	DATE
1	[REDACTED]	11/25/2022 6:20 PM
2	[REDACTED]	11/22/2022 10:11 PM
3	[REDACTED]	11/22/2022 5:02 PM

Prince George's County Hazard Mitigation Survey

4	[REDACTED]	11/14/2022 7:41 PM
5	[REDACTED]	11/9/2022 6:36 AM
6	[REDACTED]	11/8/2022 8:17 PM
7	[REDACTED]	11/8/2022 6:13 PM
8	[REDACTED]	11/8/2022 4:35 PM

Prince George's County Hazard Mitigation Survey

Q9 What organization, agency, or entity do you represent?

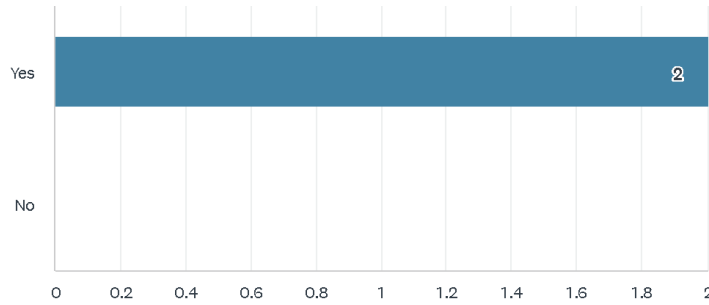
Answered: 2 Skipped: 37

#	RESPONSES	DATE
1	Prince George's County DPW&T	11/22/2022 8:00 PM
2	Maryland Department of the Environment Dam Safety	11/16/2022 11:09 AM

Prince George's County Hazard Mitigation Survey

Q10 Do you have a hazard-related expertise that you would be willing to use to review sections of the plan (or the entire plan)?

Answered: 2 Skipped: 37



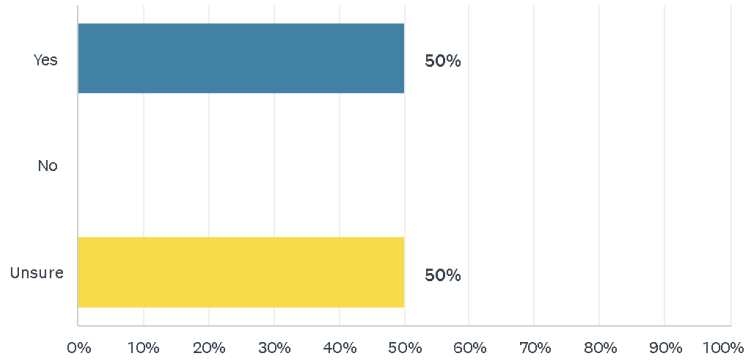
ANSWER CHOICES	RESPONSES
Yes	100% 2
No	0% 0
TOTAL	2

#	IF YES, PLEASE DESCRIBE.	DATE
1	Civil engineer design and management experience of road and bridge infrastructure.	11/22/2022 8:00 PM
2	Dam Breach Inundation Mapping/Dam Hazard Classification/Participation in Tabletop Exercises of Emergency Action Plans	11/16/2022 11:09 AM

Prince George's County Hazard Mitigation Survey

Q11 Are you interested in joining the Mitigation Advisory Committee?

Answered: 2 Skipped: 37



ANSWER CHOICES	RESPONSES	
Yes	50%	1
No	0%	0
Unsure	50%	1
<b>TOTAL</b>		<b>2</b>

Prince George's County Hazard Mitigation Survey

Q12 If you would like to be contacted by Prince George's County staff to discuss potential ways you can further participate in the hazard mitigation planning process as a stakeholder, please provide contact information.

Answered: 2 Skipped: 37

ANSWER CHOICES	RESPONSES
Name	100% 2
Title/Position	100% 2
Email Address	100% 2

#	NAME	DATE
1	Erv Beckett	11/22/2022 8:00 PM
2	Kelly Flint	11/16/2022 11:09 AM

#	TITLE/POSITION	DATE
1	Chief, Highway and Bridge Design Division	11/22/2022 8:00 PM
2	Senior Engineer/Dam Safety Permits Division	11/16/2022 11:09 AM

#	EMAIL ADDRESS	DATE
1	[REDACTED]	11/22/2022 8:00 PM
2	[REDACTED]	11/16/2022 11:09 AM

Prince George's County Hazard Mitigation Survey

Q13 Use this space to provide any other comments or questions you want to share.

Answered: 1 Skipped: 38

#	RESPONSES	DATE
1	-Spreading awareness of hazard creep with local government planners -Spreading an awareness of maintaining stream/floodplain buffers	11/16/2022 11:09 AM

Prince George's County Hazard Mitigation Survey

Q14 Which jurisdiction do you represent?

Answered: 0 Skipped: 39

#	RESPONSES	DATE
	There are no responses.	



Prince George's County Hazard Mitigation Survey

**Q15 Would your jurisdiction be open to collaborating on a hazard mitigation project or action?**

Answered: 0 Skipped: 39

 No matching responses.

ANSWER CHOICES	RESPONSES	
Yes	0%	0
No	0%	0
Maybe	0%	0
I do not know	0%	0
TOTAL		0

Prince George's County Hazard Mitigation Survey

Q16 Is there a specific project or type of project you would be interested in collaborating on? If so, please describe it below.

Answered: 0 Skipped: 39

#	RESPONSES	DATE
	There are no responses.	

Prince George's County Hazard Mitigation Survey

**Q17 Please select all hazards that your jurisdiction would be most interested in collaborating on a project to address.**

Answered: 0 Skipped: 39

 No matching responses.

ANSWER CHOICES	RESPONSES
Flooding (riverine or stormwater)	0% 0
Flooding (coastal)	0% 0
Hurricane/Tropical Storm	0% 0
Earthquake	0% 0
Drought	0% 0
Extreme Cold	0% 0
Extreme Heat	0% 0
High Winds	0% 0
Land Movement (e.g., landslide)	0% 0
Severe Storm Flood-Related)	0% 0
Severe Storm (Wind-Related)	0% 0
Sinkhole	0% 0
Tornado	0% 0
Wildfire	0% 0
Winter Storm/Blizzard	0% 0
Other (please specify)	0% 0
Total Respondents: 0	

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Prince George's County Hazard Mitigation Survey

**Q18 If you would like Prince George's County staff to reach out to you regarding opportunities for collaboration, please provide contact information.**

Answered: 0 Skipped: 39

ANSWER CHOICES	RESPONSES	
Name	0%	0
Company	0%	0
Address	0%	0
Address 2	0%	0
City/Town	0%	0
State/Province	0%	0
ZIP/Postal Code	0%	0
Country	0%	0
Email Address	0%	0
Phone Number	0%	0

#	NAME	DATE
	There are no responses.	
#	COMPANY	DATE
	There are no responses.	
#	ADDRESS	DATE
	There are no responses.	
#	ADDRESS 2	DATE
	There are no responses.	
#	CITY/TOWN	DATE
	There are no responses.	
#	STATE/PROVINCE	DATE
	There are no responses.	
#	ZIP/POSTAL CODE	DATE
	There are no responses.	
#	COUNTRY	DATE
	There are no responses.	
#	EMAIL ADDRESS	DATE
	There are no responses.	
#	PHONE NUMBER	DATE
	There are no responses.	

Prince George's County Hazard Mitigation Survey

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Prince George's County Hazard Mitigation Survey

Q19 Please provide any additional comments or questions to be addressed as Prince George's County and the City of Laurel update the hazard mitigation plan.

Answered: 0 Skipped: 39

#	RESPONSES	DATE
	There are no responses.	

Prince George's County Hazard Mitigation Survey

Q20 Which dam or levee do you own/operate?

Answered: 0 Skipped: 39

▲ No matching responses.

Prince George's County Hazard Mitigation Survey

ANSWER CHOICES	RESPONSES	
Allen Pond	0%	0
Allison Street Levee System	0%	0
Aragona Village	0%	0
Ashcroft Drive- Woodbridge Pond	0%	0
Beechtree Dam	0%	0
Bladensburg Levee	0%	0
Bowie Gateway SWM Pond Dam	0%	0
Bowie Town Center Lake	0%	0
Brentwood Levee	0%	0
Cash Lake Dam	0%	0
Cherry Hill Park Dam	0%	0
Collington Facility 14 SWM Dam	0%	0
Collington Facility 9 Dam	0%	0
Collington Life Care Center Lake	0%	0
Colmar Manor Levee	0%	0
Contee Main Settling Pond	0%	0
Cosca Regional Park Dam	0%	0
Fedex Field Pond No. 1	0%	0
Forest Heights Levee	0%	0
Frost Pond	0%	0
Greenbelt Dam	0%	0
Hanson Oaks SWM	0%	0
Hensen Creek Flood Control Dam #17	0%	0
Heritage Glen Dam	0%	0
Indian Creek Site 2	0%	0
Indian Creek Site 3	0%	0
Karington SWM Dam	0%	0
Lake Arbor (Lake Arbor Way)	0%	0
Lake Largo Town Center Dam (Kings Way)	0%	0
Laurel Lakes No 2	0%	0
Laurel Lakes No. 1 (Lower)	0%	0
Madison Hill SWM Pond 1 (Silk Tree Drive)	0%	0



Prince George's County Hazard Mitigation Survey

Marlton South SWM Dam	0%	0
New Bald Eagle Road SWM	0%	0
Northridge SWM Pond	0%	0
Parker Farms Dam	0%	0
Perywood	0%	0
Perywood (Water Fowl Way)	0%	0
Prince George Country Club Dam	0%	0
Redington Lake Dam	0%	0
Ritchie Hill SWM Pond	0%	0
Riverdale-Hyattsville Levee	0%	0
Snowden Pond	0%	0
Soil Conservation Service Lake	0%	0
Stonegate SWM Dam	0%	0
Summerfield SWM Pond No. 1 (Chatsfield Way)	0%	0
Summerfield SWM Pond No. 2	0%	0
Summit Creek- Mount Auburn Dr.	0%	0
T. Howard Duckett Dam	0%	0
Tall Oaks Crossing	0%	0
Tinkers Creek Regional SWM Pond No. 8	0%	0
UMSTC Lower Dam	0%	0
Upper Marlboro Levees (Collington Branch and Western Branch)	0%	0
Van Dusen Road	0%	0
Other (please specify)	0%	0
<b>TOTAL</b>		<b>0</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Prince George's County Hazard Mitigation Survey

Q21 How worried are you about each of the following hazards impacting your dam/levee?

Answered: 0 Skipped: 39

⚠ No matching responses.

	NOT WORRIED	SOMEWHAT WORRIED	VERY WORRIED	EXTREMELY WORRIED	TOTAL	WEIGHTED AVERAGE
Flooding (riverine or stormwater)	0% 0	0% 0	0% 0	0% 0	0	0.00
Flooding (coastal)	0% 0	0% 0	0% 0	0% 0	0	0.00
Hurricane/Tropical Storm	0% 0	0% 0	0% 0	0% 0	0	0.00
Earthquake	0% 0	0% 0	0% 0	0% 0	0	0.00
Drought	0% 0	0% 0	0% 0	0% 0	0	0.00
Extreme Cold	0% 0	0% 0	0% 0	0% 0	0	0.00
Extreme Heat	0% 0	0% 0	0% 0	0% 0	0	0.00
High Winds	0% 0	0% 0	0% 0	0% 0	0	0.00
Land Movement (e.g., landslides)	0% 0	0% 0	0% 0	0% 0	0	0.00
Severe Storm (Flood-related)	0% 0	0% 0	0% 0	0% 0	0	0.00
Severe Storm (Wind-related)	0% 0	0% 0	0% 0	0% 0	0	0.00
Sinkhole	0% 0	0% 0	0% 0	0% 0	0	0.00
Tornado	0% 0	0% 0	0% 0	0% 0	0	0.00
Wildfire	0% 0	0% 0	0% 0	0% 0	0	0.00
Winter Storm/Blizzard	0% 0	0% 0	0% 0	0% 0	0	0.00

Prince George's County Hazard Mitigation Survey

**Q22 Please select all hazards that have affected the operation of your dam/levee**

Answered: 0 Skipped: 39

 No matching responses.

ANSWER CHOICES	RESPONSES
Flooding (riverine or stormwater)	0% 0
Flooding (coastal)	0% 0
Hurricane/Tropical Storm	0% 0
Earthquake	0% 0
Drought	0% 0
Extreme Cold	0% 0
Extreme Heat	0% 0
High Winds	0% 0
Land Movement (e.g., landslide)	0% 0
Severe Storm Flood-Related)	0% 0
Severe Storm (Wind-Related)	0% 0
Sinkhole	0% 0
Tornado	0% 0
Wildfire	0% 0
Winter Storm/Blizzard	0% 0
Total Respondents: 0	

Prince George's County Hazard Mitigation Survey

Q23 How vulnerable do you believe your dam/levee currently is to a breach due to the above hazards?

Answered: 0 Skipped: 39

⚠ No matching responses.

ANSWER CHOICES	RESPONSES
High Vulnerability	0% 0
Moderately Vulnerability	0% 0
Low Vulnerability	0% 0
TOTAL	0

Prince George's County Hazard Mitigation Survey

**Q24 Select the projects or activities relating to your dam or levee that you are potentially interested in:**

Answered: 0 Skipped: 39

 No matching responses.

ANSWER CHOICES	RESPONSES
Creating/updating an Emergency Action Plan (EAP)	0% 0
Adding redundant or improved operational systems (for complex dams)	0% 0
Adding interim risk reduction measures to reduce risk until permanent solutions can be funded	0% 0
Decommissioning and removing the dam/levee to eliminate dam- and levee-related hazards if the structure is no longer needed or outlives its benefit	0% 0
Conducting training	0% 0
Conducting dam/levee inspections	0% 0
Conducting a dam/levee evaluation	0% 0
Perform operations and maintenance	0% 0
Establish an instrumentation program (i.e., computer-based data-processing systems that evaluate collected data and issue warnings or alarms if certain threshold values are exceeded)	0% 0
Other (please specify)	0% 0
Total Respondents: 0	

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

Prince George's County Hazard Mitigation Survey

**Q25 Are you interested in working with Prince George's County and/or the City of Laurel to potentially complete a hazard mitigation project related to your dam or levee to help reduce risk associated with it? (Outside funding may be available)**

Answered: 0 Skipped: 39

 No matching responses.

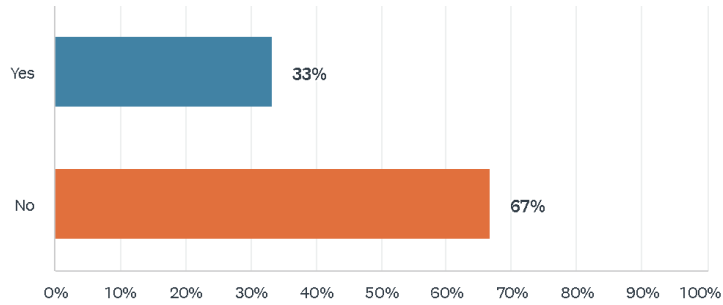
ANSWER CHOICES	RESPONSES
Yes	0% 0
No	0% 0
Maybe	0% 0
Unsure	0% 0
<b>TOTAL</b>	<b>0</b>

#	COMMENTS	DATE
	There are no responses.	

Prince George's County Hazard Mitigation Survey

Q26 Before this survey, were you aware that Prince George's County maintains a hazard mitigation plan?

Answered: 27 Skipped: 12

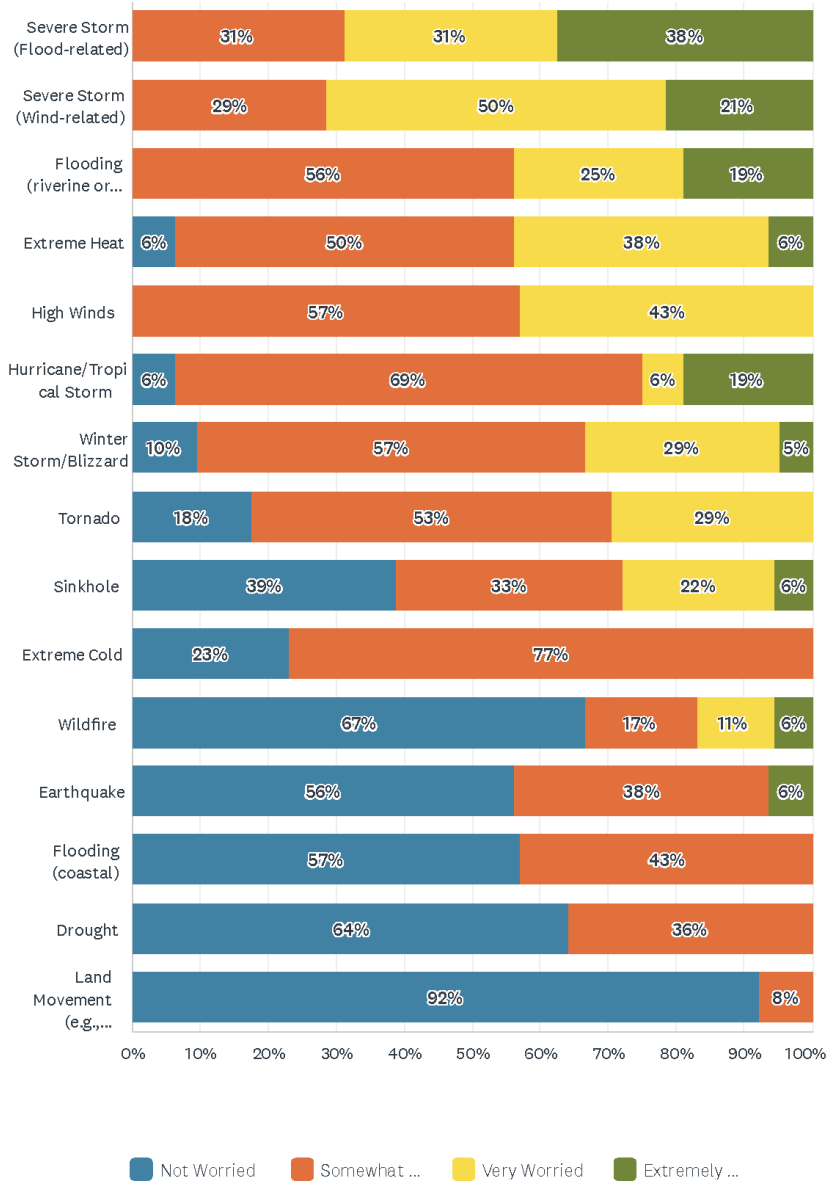


ANSWER CHOICES	RESPONSES	
Yes	33%	9
No	67%	18
TOTAL		27

Prince George's County Hazard Mitigation Survey

Q27 How worried are you about each of the following hazards impacting Prince George's County?

Answered: 27 Skipped: 12





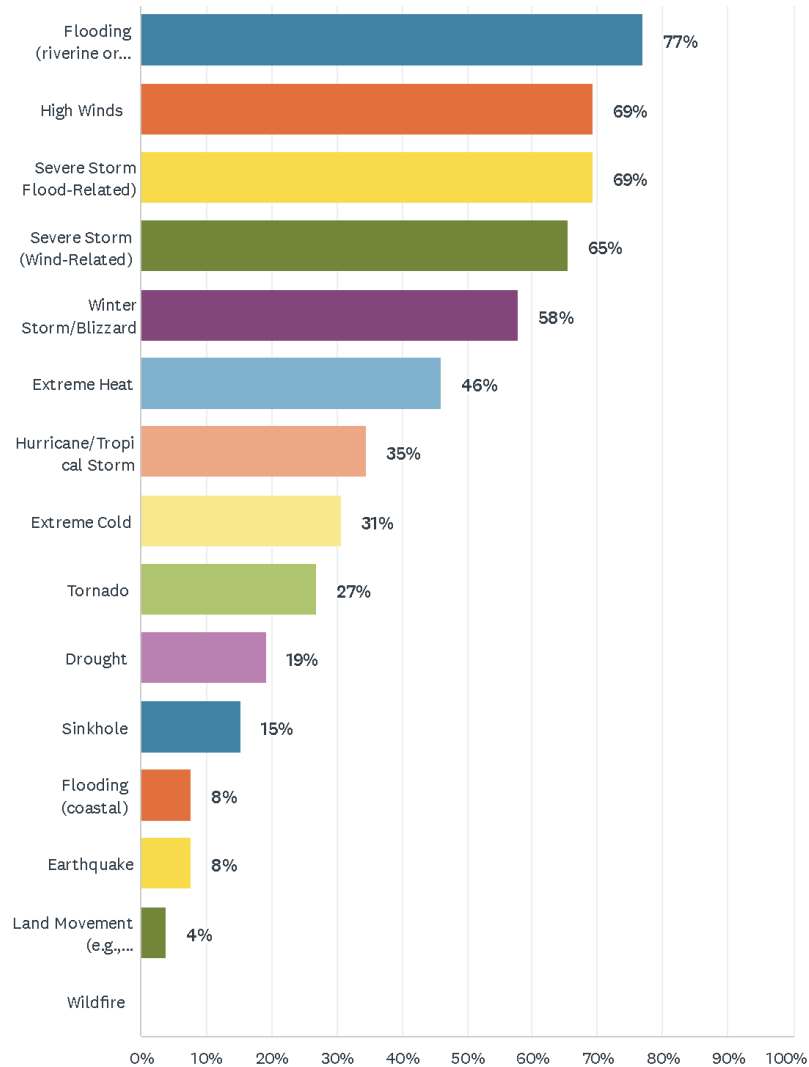
Prince George's County Hazard Mitigation Survey

	NOT WORRIED	SOMEWHAT WORRIED	VERY WORRIED	EXTREMELY WORRIED	TOTAL	WEIGHTED AVERAGE
Severe Storm (Flood-related)	0% 0	31% 5	31% 5	38% 6	16	2.06
Severe Storm (Wind-related)	0% 0	29% 4	50% 7	21% 3	14	1.93
Flooding (riverine or stormwater)	0% 0	56% 9	25% 4	19% 3	16	1.63
Extreme Heat	6% 1	50% 8	38% 6	6% 1	16	1.44
High Wnds	0% 0	57% 8	43% 6	0% 0	14	1.43
Hurricane/Tropical Storm	6% 1	69% 11	6% 1	19% 3	16	1.38
Winter Storm/Blizzard	10% 2	57% 12	29% 6	5% 1	21	1.29
Tornado	18% 3	53% 9	29% 5	0% 0	17	1.12
Sinkhole	39% 7	33% 6	22% 4	6% 1	18	0.94
Extreme Cold	23% 3	77% 10	0% 0	0% 0	13	0.77
Wildfire	67% 12	17% 3	11% 2	6% 1	18	0.56
Earthquake	56% 9	38% 6	0% 0	6% 1	16	0.56
Flooding (coastal)	57% 8	43% 6	0% 0	0% 0	14	0.43
Drought	64% 9	36% 5	0% 0	0% 0	14	0.36
Land Movement (e.g., landslides)	92% 12	8% 1	0% 0	0% 0	13	0.08

Prince George's County Hazard Mitigation Survey

Q28 Please select all hazards that have had the biggest impact on Prince George's County (i.e., your home, business, or neighborhood).

Answered: 26 Skipped: 13



Prince George's County Hazard Mitigation Survey

ANSWER CHOICES	RESPONSES	
Flooding (riverine or stormwater)	77%	20
High Winds	69%	18
Severe Storm Flood-Related)	69%	18
Severe Storm (Wind-Related)	65%	17
Winter Storm/Blizzard	58%	15
Extreme Heat	46%	12
Hurricane/Tropical Storm	35%	9
Extreme Cold	31%	8
Tornado	27%	7
Drought	19%	5
Sinkhole	15%	4
Flooding (coastal)	8%	2
Earthquake	8%	2
Land Movement (e.g., landslide)	4%	1
Wildfire	0%	0
Total Respondents: 26		

Prince George's County Hazard Mitigation Survey

**Q29 What recent hazard events/disasters (if any) made you more aware of the danger of hazards?**

Answered: 24 Skipped: 15

#	RESPONSES	DATE
1	Witnessing a sinkhole, witnessing a large amount of snowfall and seeing that the county was underprepared.	12/18/2022 6:03 PM
2	Flooding in August 2022 from serve downpours Wind damage from storm on July 2022 that had 100+ mile per hour winds	11/27/2022 3:04 PM
3	The 'ornado' level storm and the enormous rainstorm in this area.	11/25/2022 6:22 PM
4	Recent wind storm in July	11/24/2022 6:25 PM
5	2 events this year, wind storm followed by heavy rains causing local flooding	11/24/2022 10:43 AM
6	Bow echo storm in July 2022. We lost many trees in the neighborhood. Tree care is major concern. It's very expensive to manage the canopy of old growth trees.	11/23/2022 5:49 PM
7	This past summer when low grade tornado came through our town and did destruction. Very scary.	11/23/2022 7:27 AM
8	Flash flooding in 2014 & 2022	11/22/2022 10:14 PM
9	Increase in flooding episodes and wind storms.	11/22/2022 5:05 PM
10	High winds in July 2022 knocked down many trees in our neighborhood.	11/22/2022 2:21 PM
11	July windstorm that toppled many trees. We weren't personally affected (all but one big tree had been removed previously and replaced with smaller ones), but the damage nearby was extensive. Last month we took out the last of our large maples, which could fall on our daughter's bedroom, and plan to put in another river birch in its place.	11/22/2022 1:40 PM
12	Storm this summer that knocked out our power for multiple days and toppled trees making it impossible to leave our neighborhood for half a day.	11/22/2022 1:30 PM
13	Flooding	11/21/2022 12:36 PM
14	Flooding in Upper Marlboro which caused access issues to the Town.	11/18/2022 9:45 AM
15	Micro burst	11/18/2022 8:51 AM
16	July and August 2022 flash floods in Riverdale and Lanham areas September 2020 flash floods in Cheverly and Riverdale areas	11/17/2022 6:43 PM
17	Partial failure of a significant hazard dam, recent tornadoes and storm related high winds in AA and PG Counties. Severe storm flood related in Salisbury resulting in condemned residences.	11/16/2022 11:16 AM
18	Earthquake, Hurricane in 2014, Derecho	11/15/2022 10:37 AM
19	The last hurricane that came through Prince George's County and the last big snow storm.	11/14/2022 7:42 PM
20	Summer storms	11/9/2022 6:37 AM
21	Power outages in Greenbelt in summer of 2022 related to a sudden wind storm was somewhat disruptive. Also, last winter a storm that caused power outages throughout the region, fortunately did not impact us, but if it had it would have been very disruptive since our home relies on electricity for heat.	11/8/2022 8:21 PM
22	Recent wind storm and flooding in Berwyn Heights.	11/8/2022 6:16 PM
23	Driving through heavy rains which has flooded the roads I was driving. Also, the rise in humidity with heat making it difficult to breath when outside or not being in air conditioned places.	11/8/2022 4:38 PM

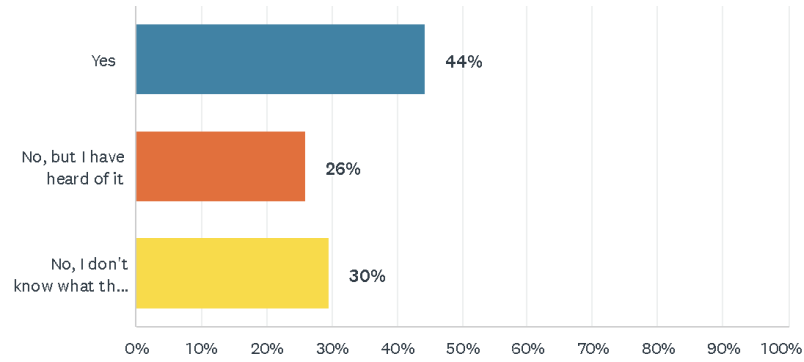
Prince George's County Hazard Mitigation Survey

24	The storm on July 13th that downed numerous trees and lead to a multiday power outage. The August 10th flooding event that blocked my way home from work.	11/8/2022 3:59 PM
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Prince George's County Hazard Mitigation Survey

Q30 Have you signed up for the Alert Prince George's emergency notification system (formerly known as Notify Me Prince George's)?

Answered: 27 Skipped: 12

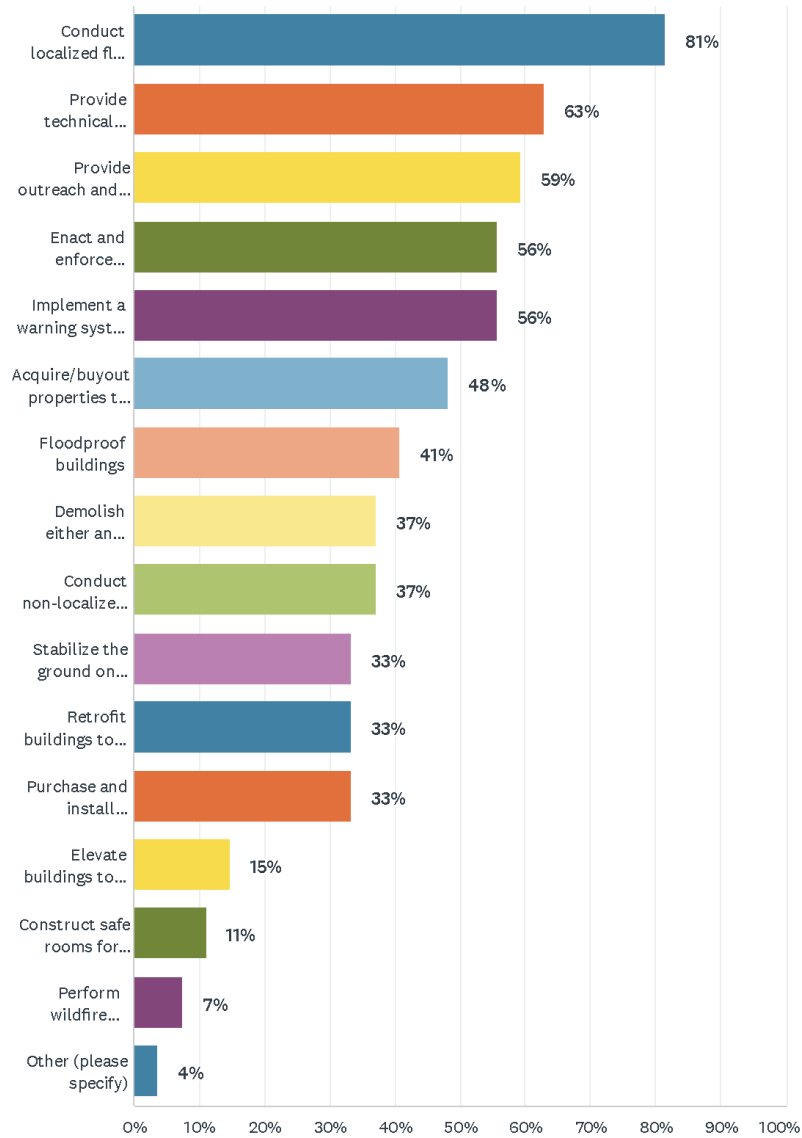


ANSWER CHOICES	RESPONSES	
Yes	44%	12
No, but I have heard of it	26%	7
No, I don't know what that is	30%	8
TOTAL		27

Prince George's County Hazard Mitigation Survey

Q31 What are the most important things that your community can do to help mitigate hazards and become more resilient over time?

Answered: 27 Skipped: 12



Prince George's County Hazard Mitigation Survey

ANSWER CHOICES		RESPONSES	
Conduct localized flood risk reduction projects, such as stormwater management projects or stabilizing roads/bridges		81%	22
Provide technical assistance to residents, businesses, jurisdictions, and organizations to help them preform hazard mitigation projects		63%	17
Provide outreach and education to residents, business, jurisdictions, and organizations to help them understand risks and mitigate hazards		59%	16
Enact and enforce regulations, codes and ordinances, such as zoning regulations and building codes		56%	15
Implement a warning system to alert the public of impending hazards		56%	15
Acquire/buyout properties to create open space and reduce flooding		48%	13
Floodproof buildings		41%	11
Demolish either an entire building or part of a building in order to rebuild it in a way that mitigates it from flooding		37%	10
Conduct non-localized flood risk reduction projects, such as rehabilitating dams and levees		37%	10
Stabilize the ground on slopes to prevent slope failures/landslides		33%	9
Retrofit buildings to reduce future damages from erosion, high winds, earthquakes, or snow.		33%	9
Purchase and install generators		33%	9
Elevate buildings to avoid potential floodwaters		15%	4
Construct safe rooms for hurricanes, tornadoes, etc.		11%	3
Perform wildfire mitigation projects, such as creating defensible space, retrofitting buildings with ignition-resistant building materials, or vegetation management		7%	2
Other (please specify)		4%	1
Total Respondents: 27			
#	OTHER (PLEASE SPECIFY)	DATE	
1	Provide adequate stormwater runoff.	11/22/2022 10:17 PM	



Prince George's County Hazard Mitigation Survey

**Q32 In your opinion, what are some steps your local government could take or projects they could complete to reduce or eliminate the risk of future hazard damages in your neighborhood or community?**

Answered: 15 Skipped: 24

#	RESPONSES	DATE
1	Encorporate the individual municipalities into planning to ensure that each community's needs are met.	12/18/2022 6:04 PM
2	Offer flood insurance to those who don't have it.	11/25/2022 6:24 PM
3	N/a	11/24/2022 6:27 PM
4	Review and update storm water systems to meet current conditions	11/24/2022 10:50 AM
5	Take care of some of the floor areas that continue to recur. Someone needs to take responsibility and fix issues between PEPCO and town.	11/23/2022 7:29 AM
6	Build adequate stormwater runoff drains and/or piping to reduce/eliminate flood damage.	11/22/2022 10:17 PM
7	Respond to residents needs and develop a simple plan to help residents that are vulnerable.	11/22/2022 5:07 PM
8	Flood mitigation projects along the Collington Branch that flows through the Town of Upper Marlboro.	11/18/2022 9:47 AM
9	Executing long-term flood mitigation projects.	11/18/2022 8:51 AM
10	Routine maintenance of infrastructure Education and outreach to stakeholders and the public Enacting and enforcing regulations	11/16/2022 11:20 AM
11	Conduct Risk Assessments on every community in PG County	11/14/2022 7:43 PM
12	Continue to trim trees around power lines to avoid power outages. Reduce development in floodplains and make significant strides on reducing the amount of impervious surfaces/protect more open space within the county to avoid sudden riverine flooding in the county. Consider an open space ordinance, similar to Montgomery County's farm preserve, to protect open space from development and encourage smarter, denser development.	11/8/2022 8:25 PM
13	Use taxpayers money to direct waters to lakes and other waterways.	11/8/2022 6:18 PM
14	Speed limits should be followed reducing emissions, provide better public transit, electrify buses and provide incentives for electric car purchasing, more charging stations (Level 2 is best), community solar farms esp. available for low and moderate income people, solar panels above parking lots, and on all government buildings. Incentives for solar panels on homes and apartment buildings. Developers need to build homes that fit the need of the population... older citizens, not large homes, affordable, energy efficient with solar, keeping trees that many older as their canopy is much larger than new tree plantings can provide. Good grocery stores near people's homes so reducing travel.	11/8/2022 4:58 PM
15	Improve stormwater management to better prevent flooding, and harden the power system to tree damage.	11/8/2022 4:01 PM

Prince George's County Hazard Mitigation Survey

**Q33** If you wish to be notified of hazard mitigation plan updates and meetings, please provide your name and email address.

Answered: 14 Skipped: 25

ANSWER CHOICES	RESPONSES	
First Name	100%	14
Last Name	100%	14
Email Address	100%	14

#	FIRST NAME	DATE
1	Noelle	11/29/2022 3:52 PM
2	Courtney	11/27/2022 3:08 PM
3	David	11/24/2022 10:51 AM
4	Daniel	11/22/2022 10:18 PM
5	Helen	11/22/2022 5:07 PM
6	dawn	11/17/2022 6:45 PM
7	Kelly	11/16/2022 11:20 AM
8	Dr. Toye	11/14/2022 7:44 PM
9	Amanda	11/9/2022 6:38 AM
10	Adriaan	11/8/2022 8:27 PM
11	Shinita	11/8/2022 6:19 PM
12	Kathy	11/8/2022 4:59 PM
13	James	11/8/2022 4:01 PM
14	Chris	11/8/2022 3:47 PM

#	LAST NAME	DATE
1	Burnett	11/29/2022 3:52 PM
2	Cavanaugh	11/27/2022 3:08 PM
3	Wolfinger	11/24/2022 10:51 AM
4	Robson	11/22/2022 10:18 PM
5	Weinrich	11/22/2022 5:07 PM
6	nixon	11/17/2022 6:45 PM
7	Flint	11/16/2022 11:20 AM
8	Latimore	11/14/2022 7:44 PM
9	Townsend	11/9/2022 6:38 AM
10	Passchier	11/8/2022 8:27 PM
11	Hemby	11/8/2022 6:19 PM
12	Bartolomeo	11/8/2022 4:59 PM

Prince George's County Hazard Mitigation Survey

13	McCormack	11/8/2022 4:01 PM
14	Brittan-Powell	11/8/2022 3:47 PM
#	EMAIL ADDRESS	DATE
1	[REDACTED]	11/29/2022 3:52 PM
2	[REDACTED]	11/27/2022 3:08 PM
3	[REDACTED]	11/24/2022 10:51 AM
4	[REDACTED]	11/22/2022 10:18 PM
5	[REDACTED]	11/22/2022 5:07 PM
6	[REDACTED]	11/17/2022 6:45 PM
7	[REDACTED]	11/16/2022 11:20 AM
8	[REDACTED]	11/14/2022 7:44 PM
9	[REDACTED]	11/9/2022 6:38 AM
10	[REDACTED]	11/8/2022 8:27 PM
11	[REDACTED]	11/8/2022 6:19 PM
12	[REDACTED]	11/8/2022 4:59 PM
13	[REDACTED]	11/8/2022 4:01 PM
14	[REDACTED]	11/8/2022 3:47 PM

Prince George's County Hazard Mitigation Survey

**Q34 Please provide any additional comments or questions to be addressed as Prince George's County and the City of Laurel update our hazard mitigation plan.**

Answered: 4 Skipped: 35

#	RESPONSES	DATE
1	None.	11/23/2022 7:29 AM
2	Flooding is now a more occurring dilemma. Something must be done to protect life and property.	11/22/2022 10:18 PM
3	One question in the survey (level of worry of hazards) would only allow selection of four options so should be fixed (i.e., I could only select one hazard for each option (not worried at all, somewhat worried, etc).	11/8/2022 8:27 PM
4	The county council must push to implement the Prince George's County Climate Action Plan that so many researched and studied.	11/8/2022 4:59 PM

## C. Public Meeting – Draft Plan Review

### C.1. Presentation



# Prince George's County & City of Laurel Hazard Mitigation Plan - 2023 Update

Public Meeting: Draft Plan Review

February 2, 2023 | Microsoft Teams (Virtual)

## AGENDA

- Hazard Mitigation Overview
- Draft Plan Highlights
- Public Input Opportunity
- Open Forum: Questions & Feedback



# Hazard Mitigation Overview

3 Public Meeting: Draft Hazard Mitigation Plan Review

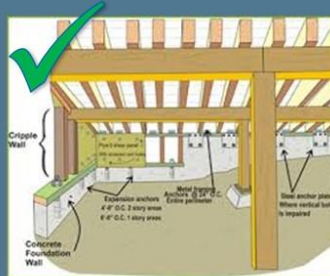


## What is hazard mitigation?

Any sustainable action that will **reduce or eliminate injury** to citizens, damages to structures and allow continuity of critical society functions



**Mitigation**  
Defensible Space for  
Wildfire Mitigation



**Mitigation**  
Earthquake Retrofit



**Preparedness & Response**  
purchase of a police  
command vehicle

4 Public Meeting: Draft Hazard Mitigation Plan Review





# Why have a hazard mitigation plan?

Prince George's County, MD

- Reduces or eliminates the need to respond (lessens resource burden)
- Increases resilience and promotes climate adaptation
- Promotes Data sharing between different levels of government and academia
- Supports decision-making
- Disaster Mitigation Act of 2000
  - Certain FEMA Public Assistance (State Plans)
  - FEMA's Hazard Mitigation Assistance Programs

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Public Meeting: Draft Hazard Mitigation Plan Review



## Draft Hazard Mitigation Plan

Highlights & New Additions

6

Public Meeting: Draft Hazard Mitigation Plan Review



# Hazard Risk Assessment Update

## Future Conditions - Population

- Used the Maryland Department of Planning, Projects, and State Data Center projects (pre-2020 Census)
- Adjusted projections based on 2020 Census counts using annualized growth rates

### A.3.h. Future Conditions Analysis: Population

The United States Census Bureau's Population Estimates Program states Prince George's County, Maryland's population as 955,306 as of July 1, 2021. This is a -1.2% change from the April 1, 2020 U.S. Census count. Population clusters are located around the Town of Bowie, the City of Laurel, and the combined metro area of Hyattsville, College Park, and Greenbelt. Compared to the 2010 U.S. Census, the County has seen a population change of +12.0%. As of December 2020, the Maryland Department of Planning, Projections and State Data Center projects the population of Prince George's County to be about 983,870 by 2045, which would only be a 3.0% increase from the most recent 2021 estimate from the Census Bureau. This projection was created without 2020 Census data, so if the State's 2020 projection of 911,140 is adjusted to reflect the 2020 Census population (967,201) and the same annualized growth rates are then used on the new baseline, a new projection for the County's population in 2045 is 1,043,973.<sup>44</sup>

Based on this cumulative information, the population of Prince George's County by 2045 is estimated to be about 7.9% higher than the most current (2021) estimate. It is assumed that most of this change will occur in and around the development areas highlighted in A.3.g.1 Proposed Future Development. The City of Laurel has seen a similar population trend, as shown in Table 35.

Table 35. Population Changes in Prince George's County and the City of Laurel since 2010

	City of Laurel	Prince George's County
Population, Census (April 1, 2010)	25,115	863,420
Population, Census (April 1, 2020)	30,060 (+19.7%)	967,201 (+12.0%)
Population Estimate (July 1, 2021) <sup>45</sup>	29,490 (-1.8%)	955,306 (-1.2%)
Projected Population (2045) <sup>46</sup>	N/A	983,870 (+3.0%)

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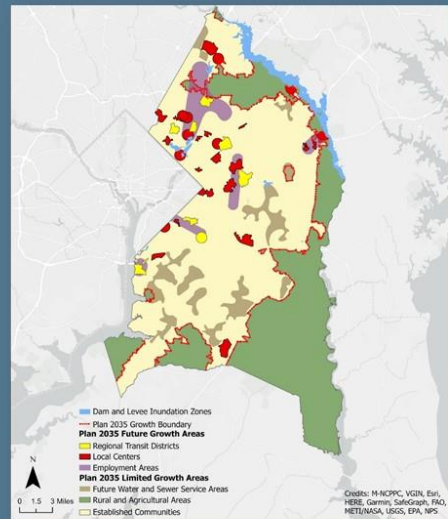
Public Meeting: Draft Hazard Mitigation Plan Review



# Hazard Risk Assessment Update

## Future Conditions - Development

- Prince George's County Plan 2035 Future Growth Areas Data
- Example: Future Growth Areas & Dam and Levee Inundation Zones (see image)
- Riverine Flood, Extreme Heat, Dam & Levee Failure, Wildfire



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Public Meeting: Draft Hazard Mitigation Plan Review

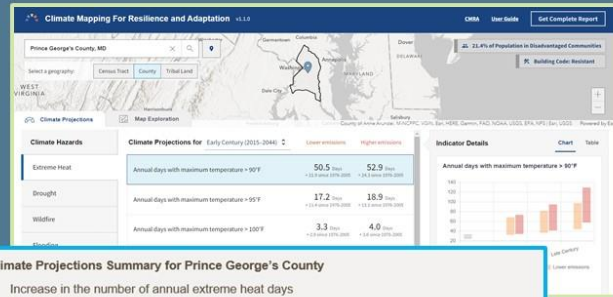




# Hazard Risk Assessment Update

## Future Conditions - Climate

- FEMA now requires that states evaluate changes to climate conditions that may affect and influence their long-term vulnerability
- Climate Mapping for Resilience and Adaptation Tool



- Climate Projections Summary for Prince George's County**
- Increase in the number of annual extreme heat days
  - Milder winters, with fewer extreme cold days
  - Increased risk of extreme heat and dry conditions overlapping, leading to an increased risk of droughts and wildfires
  - Increased average total annual precipitation
  - More extreme precipitation events, with more rain falling in shorter amounts of time, which can lead to more flash floods, riverine flooding, and pluvial flooding
  - 0.2% of the County's land is expected to be impacted by sea level rise within the next 20 years
  - Intensified winter storm events
  - Stronger hurricanes that bring more rain, stronger winds, intensify quickly, and move slower over land

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Public Meeting: Draft Hazard Mitigation Plan Review

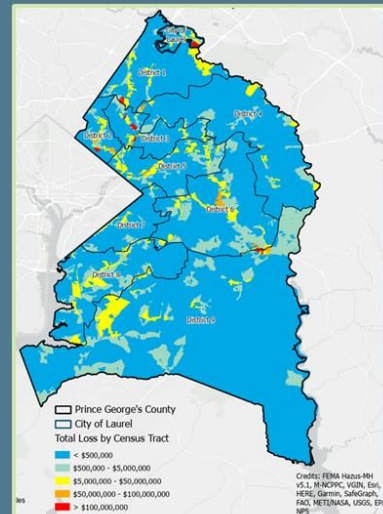


# Hazard Risk Assessment Update

## Hazus-MH v5.1 Loss Estimation

- Riverine & Coastal Flooding, Hurricane, Earthquake hazards
- Example: Total Flood Loss

Prince George's County	100-Year Riverine Flood Losses				Total
	Residential	Commercial	Industrial	Other	
<b>Total Exposure</b>					
Prince George's County	\$130,144,361,000	\$26,242,415,000	\$5,564,076,000	\$7,454,437,000	\$169,405,289,000
<b>Direct Losses</b>					
Building	\$834,296,000	\$323,906,000	\$73,819,000	\$72,724,000	\$1,304,745,000
Contents	\$392,305,000	\$408,448,000	\$126,548,000	\$93,673,000	\$1,019,972,000
Inventory	\$0	\$10,790,000	\$19,217,000	\$298,000	\$30,305,000
Subtotal	\$1,226,601,000	\$743,142,000	\$218,584,000	\$196,696,000	\$2,385,022,000
<b>Business Interruption</b>					
Income	\$2,396,000	\$232,281,000	\$2,882,000	\$28,440,000	\$286,001,000
Relocation	\$111,416,000	\$78,858,000	\$2,828,000	\$17,590,000	\$209,090,000
Rental Income	\$57,472,000	\$57,232,000	\$543,000	\$3,069,000	\$118,316,000
Wage	\$5,684,000	\$280,289,000	\$4,002,000	\$289,408,000	\$539,383,000
Subtotal	\$176,960,000	\$626,660,000	\$10,255,000	\$316,907,000	\$1,132,800,000
<b>TOTAL</b>	<b>\$1,403,581,000</b>	<b>\$1,369,802,000</b>	<b>\$228,837,000</b>	<b>\$485,602,000</b>	<b>\$3,487,822,000</b>



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Public Meeting: Draft Hazard Mitigation Plan Review



# Hazard Risk Assessment Update

## Hazard Risk Index Score

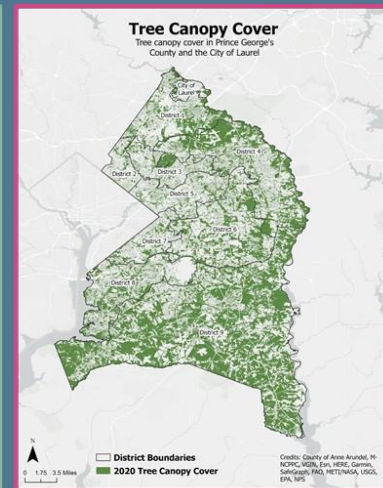
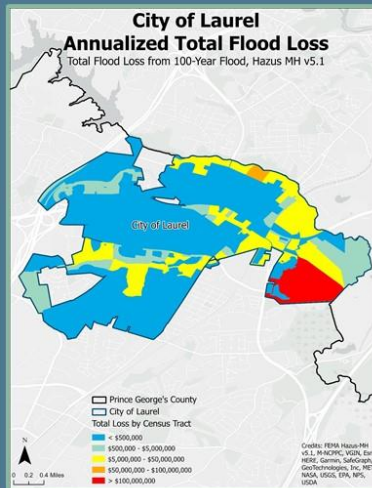
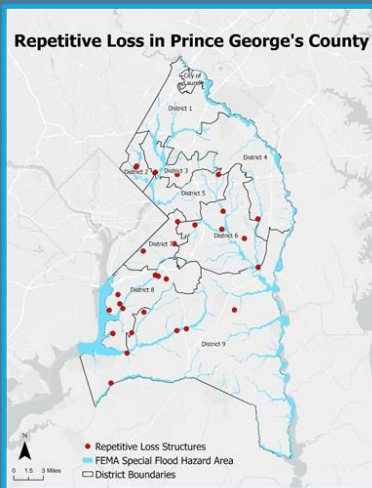
$$\text{HRI Score} = (\text{probability value} \times 0.20) + (\text{impact value} \times 0.35) + (\text{geographic extent value} \times 0.20) + (\text{warning time value} \times 0.10) + (\text{community concern value} \times 0.15)$$

Hazard	Occurrence Probability	Impact	Geographic Extent	Warning Time	Community Concern	Hazard Risk Index Score & Overall Rank	State Ranking (5 = highest)	FEMA Ranking (5 = highest)
Riverine Flood	Highly Likely	Critical	Moderate	Limited	High	3.25 (High)	5	2
Severe Storm (Flood-Related)	Highly Likely	Critical	Moderate	Limited	High	3.25 (High)	5	N/A
Severe Storm (Wind-Related)	Highly Likely	Limited	Large	Limited	High	3.1 (High)	5	3
High Winds	Likely	Limited	Large	Limited	High	2.95 (High)	5	3
Tornado	Likely	Critical	Minor	No Notice	Moderate	2.9 (Moderate)	5	4
Extreme Heat	Highly Likely	Limited	Large	Extended	Moderate	2.8 (Moderate)	4	4
Winter Storm	Highly Likely	Minor	Large	Limited	Moderate	2.55 (Moderate)	5	4
Hurricane/Tropical Storm	Somewhat Likely	Limited	Large	Limited	Low	2.4 (Moderate)	4	2
Dam and Levee Failure	Unlikely	Limited	Negligible	No Notice	Low	1.85 (Moderate)	4	N/A
Earthquake	Likely	Minor	Minor	No Notice	Negligible	1.8 (Moderate)	N/A	2
Extreme Cold	Somewhat Likely	Minor	Large	Extended	Negligible	1.75 (Moderate)	4	3
Sinkhole	Highly Likely	Minor	Negligible	Minimal	Negligible	1.65 (Low)	2	N/A
Wildfire	Highly Likely	Minor	Negligible	Limited	Negligible	1.55 (Low)	4	1
Landslide	Somewhat Likely	Minor	Negligible	No Notice	Negligible	1.45 (Low)	2	2
Drought	Somewhat Likely	Minor	Minor	Extended	Negligible	1.35 (Low)	4	2
Coastal Flood	Unlikely	Minor	Minor	Limited	Negligible	1.3 (Low)	5	2



# Hazard Risk Assessment Update

## New Maps, Analyses & Data Integration



# Mitigation Strategy Update

## Updated Hazard Mitigation Goals & Actions

### D. 2023-2028 Mitigation Actions

All 2023-2028 mitigation actions are outlined in Table 131 and Table 132, along with key details to add relevant context and objectives to implementation and accountability. The descriptors and/or definitions for the elements that accompany each action are described in Table 133. The actions plans of the "high priority" actions, refer to **Appendix F**.

Table 130. Action Description Inputs

Action Detail	Input Description
Category of mitigation action	Prevention, property protection, natural resource protection, structural projects, emergency services, or other
Action number	Jurisdiction abbreviation - # (e.g., PG-1)
Applicable goal(s)	<ul style="list-style-type: none"> <li>Goal 1: Implement structural projects that mitigate the risks of natural hazards to people, infrastructure, and assets while equitably distributing project benefits.</li> <li>Goal 2: Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.</li> <li>Goal 3: Increase public education and awareness of natural hazard risks to people and private property, and new opportunities to participate in mitigation planning.</li> <li>Goal 4: Prevent future climate-related damages and losses to communities, critical facilities, and natural resources, policies, and plans aligned with regional and state resilience and equity goals.</li> </ul>
Action lead	The department or office responsible for ensuring the action is implemented
Timeframe for implementation	<ul style="list-style-type: none"> <li>Short-term: less than three years</li> <li>Long-term: more than three years</li> <li>Ongoing: continuous with no designated end date</li> <li>Funding contingent: timeline is dependent on funding from a source outside of the jurisdiction</li> </ul>
Priority level for implementation	High, medium, or low

Action Number	Action	Goal 1	Goal 2	Goal 3	Goal 4	Action Lead	Timeframe	Priority
<b>Prevention</b>								
PG-1	Partner with federal agencies, the state, and Non-governmental Organizations to utilize available technical assistance to translate identified risks into mitigation projects, especially for benefit cost analyses for the County and municipalities.	X		X		Office of Emergency Management	Ongoing	Medium
PG-2	Using the best available data, check the locations of Hazardous sites, National Pollutant Discharge Elimination System sites, and other land uses; if found to be in flood hazard areas, communicate with the owner/handler of hazardous materials and known pollutants regarding risk and appropriate			X	X	Department of Environment	Short-term	Medium
PG-3	Integrate mitigation other appropriate comprehensive							
PG-4	Conduct flood deep provide elevation Special Flood Hazard							

**Icon 1 (Head with sound waves):** Increase public education and awareness of natural hazard risks to people and private property, and promote current and new opportunities to participate in mitigation planning.

**Icon 2 (Shield with plus):** Prevent future climate-related damages and losses to communities, critical facilities, and natural resources through ordinances, policies, and plans aligned with regional and state resilience and equity goals.

**Icon 3 (Gears):** Implement structural projects that mitigate the risks of natural hazards to people, infrastructure, and environmental assets while equitably distributing project benefits.

**Icon 4 (Lightbulb with gear):** Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.

# Implementation Plan Update

## Technical Assistance

Table 135. Sources of Technical Assistance

Name	Overview	Contact
<b>FEMA Mitigation Planning Technical Assistance</b>	FEMA's Risk Mitigation Action Planning (MAP) Program identifies flood risk to promote informed planning and development practices. Risk information is primarily conducted on a county or tribal basis and includes both regulatory flood risk maps and nonregulatory risk information. Under FEMA Risk MAP program, agency staff or their contractors can provide technical assistance tailored to a community's need, such as increasing understanding of risk and mitigation or helping prepare for project funding or implementation. This may include a project alternatives analysis or exploring project costs and benefits.  For more information refer to the <a href="#">Incorporating Mitigation Planning Technical Assistance into Risk MAP Projects Guidance</a> and the <a href="#">FEMA Region 3 Hazard Mitigation Planning</a> webpage.	Primary point of contact at Maryland Department of Emergency Management or FEMA Region 3
<b>FEMA Building Resilient Infrastructure and Communities (BRIC) Direct Technical Assistance</b>	Building Resilient Infrastructure and Communities (BRIC) Direct Technical Assistance (DTA) gives full support to communities that may not have the resources to begin climate resilience planning and project solution design on their own. Through process-oriented, hands-on support, BRIC DTA will work to enhance a community's capacity to design holistic, equitable climate adaptation solutions that advance numerous community-driven objectives.  For more information, refer to the <a href="#">BRIC Direct Technical Assistance</a> webpage.	Communities can send a request through an online submission form found <a href="#">here</a> .

### Risk and Priority Assessment & Funding Opportunities and Best Practices

- Assistance need:** In 2016, Hurricane Matthew - a major flooding in eastern North Carolina - dumped a large amount of rainfall shortly on top of a large rainfall event that occurred the week before. The most severe flooding experienced took place in Fayetteville (Cumberland County) and Lumberton (Robeson County). The State (North Carolina) and the affected communities sought assistance to organize post-Matthew resilient redevelopment planning and grant identification in the area.
- About the assistance:** Assistance included multiple engagements with key officials and the general public as well as identification and basic scoping of mitigation project ideas that could be funded with post-disaster funding. In each county, the planning team led a series of six meetings (three with local officials and three with the public) to determine major impacts from the storm, identify any unmet needs that still existed several months after the event, and develop a set of mitigation projects. During these meetings, planners used an online ArcGIS portal to identify specific locations where impacts had occurred and to discuss details of what occurred during the storm. These high impact areas became the basis to propose potential projects.
- Results:** The resulting plans mobilized the communities to prioritize their greatest mitigation needs and provided the needed elements to begin preparation of mitigation grant applications, several of which were submitted to FEMA and later Department of Housing and Urban Development.

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- Results:** The resulting plans mobilized the communities to prioritize their greatest mitigation needs and provided the needed elements to begin preparation of mitigation grant applications, several of which were submitted to FEMA and later Department of Housing and Urban Development.

# Implementation Plan Update

## Funding Opportunities

Table 136. Sources of Potential Funding

Name	Source	Funding Type	Maximum Funding	Local Cost Share	URL
Hazard Mitigation Grant Program (HMGP)	FEMA	Grant	—	25%	<a href="#">Webpage</a>
Building Resilient Infrastructure and Communities (BRIC)	FEMA	Grant	\$2 million (state set-aside) or million (national competition)	25%	<a href="#">Webpage</a>
Flood Mitigation Assistance (FMA) Program	FEMA	Grant	\$25,000 (planning) \$50,000 (technical assistance) \$900,000 (project scoping)	—	—

**Review of Mitigation Actions**

Table 2 and Table 3 review the mitigation actions from the Hazard Mitigation Plan for Prince George's County and the City of Laurel, reporting the status of each action. Reviewers of this report should refer to the Hazard Mitigation Plan for more detailed descriptions of each action and the prioritization process.

- Plan [Table 2](#) and [Table 3](#) integrated policies are shown in orange.
- Critical Action Step Priority Recommendations are shown in green.

Address the following in the "Comments" column of the following table:

- Was any element of the action carried out during the reporting period?
- If no action was completed, why?
- Is the timeline for implementation for the action still appropriate?
- If the action was completed, does it need to be changed or removed from the action plan?

Table 2: Prince George's County 2023-2028 Mitigation Actions Status Report

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
<b>Prevention</b>						
PG-1	Partner with federal agencies, the state, and NGOs to utilize available technical assistance to translate identified risks into mitigation projects, especially for benefit-cost analyses for the County and municipalities.	Office of Emergency Management	Ongoing	Medium		
PG-2	Using the best available data, check the locations of Hazard sites, National Pollutant Discharge Elimination System sites, and other land uses, if found to be in flood hazard areas, communicate with the owner/landlord of	Department of Environment	Short-term	Medium		

Prince George's County and the City of Laurel Hazard Mitigation Plan  
Annual Progress Report

**Reporting Period**  
The reporting period for this progress report is \_\_\_\_\_ (date) through \_\_\_\_\_ (date).

**Background**  
This is an annual update of the Prince George's County and the City of Laurel Hazard Mitigation Plan. This update also meets annual certification requirements for Prince George's County floodplain management and Community Rating System (CRS) program.  
Prince George's County and the City of Laurel developed a hazard mitigation plan to reduce risk from all hazards by identifying resources, information, and strategies for risk reduction. The federal Disaster Mitigation Act of 2000 requires state and local governments to develop hazard mitigation plans as a condition of receiving federal disaster relief. To prepare the plan, the County, City, and participating agencies assessed risks from natural hazards within the County, reviewed mitigation alternatives, and developed an implementation strategy. By completing this process, the County met the requirements of the federal Disaster Mitigation Act, achieving eligibility for mitigation grant funding under the Stafford Act.

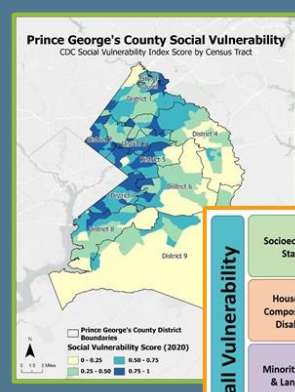
**Progress**  
The Hazard Mitigation Plan became effective on \_\_\_\_\_, 2023. The initial performance period for this plan will be 5 years, starting on \_\_\_\_\_, 2020. As of this reporting period, the plan is \_\_\_\_\_% complete. The Hazard Mitigation Plan has been implemented in Prince George's County and 14 hazard mitigation actions for the reporting period. As of the reporting period, the following actions are reported as being completed:  
\_\_\_\_\_ reported as being completed.  
\_\_\_\_\_ reported no action taken.



# FEMA HMA Program Tailoring

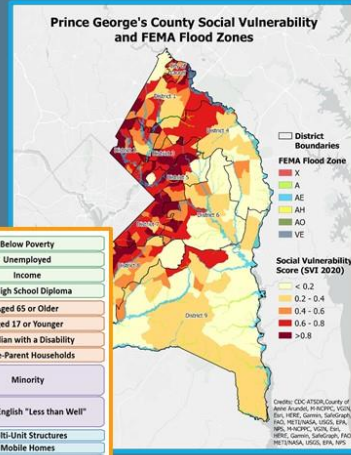
## Social Vulnerability, Plan Integration & Community Lifelines

- Social vulnerability (BRIC/FMA)
  - CDC Social Vulnerability Index (SVI) 2020 data
  - Each census tract is ranked by 15 social factors that are grouped into four related themes to show overall vulnerability
- Plan integration (HMGP, BRIC, FMA)
- Community lifelines (BRIC)



**Overall Vulnerability**

Socioeconomic Status	Below Poverty Unemployed Income No High School Diploma
Household Composition & Disability	Aged 65 or Older Aged 17 or Younger Civilian with a Disability Single-Parent Households
Minority Status & Language	Minority Speaks English "Less than Well"
Housing Type & Transportation	Multi-Unit Structures Mobile Homes Crowding No Vehicle Group Quarters



# Final Public Input Opportunity

17

Public Meeting: Draft Hazard Mitigation Plan Review



## Draft Plan Review Survey

Last chance to take the **draft plan review survey**:

<https://www.surveymonkey.com/r/NBHDW9K>



Please submit survey by  
**Sunday, 2/5 at 11:59 pm**

18

Public Meeting: Draft Hazard Mitigation Plan Review



## Open Forum: Questions & Feedback



## C.2. Agenda



### Public Meeting Agenda

**Title:** Prince George's County Hazard Mitigation Plan Update – **Public Meeting #2**

**Location:** [Microsoft Teams \(Virtual\)](#)  
**Register Here:**  
<https://bit.ly/PublicHMP2>

**Date:** Thursday, February 2<sup>nd</sup>, 2023

**Time:** 5:30 – 6:30 pm ET

**Purpose:** Dewberry will provide an overview of the 2023 Draft Hazard Mitigation Plan, highlighting the new sections added to the 2023 Plan. There will be a discussion to gather feedback from the public on the Draft Plan. The meeting will close with next steps and questions.

#### Agenda Items

Topic	Presenter	Time
<b>Welcome and Opening Remarks</b>	Prince George's County Representative	5:30 – 5:35 pm
<b>Hazard Mitigation Plan Overview</b> - What is hazard mitigation? - What is the plan's purpose?	Scott Choquette, Dewberry	5:35 – 5:40 pm
<b>Draft Plan Review</b> - New Plan Highlights - Draft Plan Review Survey Results	Jade Payne, Dewberry	5:40 – 5:55 pm
<b>Next Steps</b> - MDEM & FEMA Review - Adoption by City and County	Scott Choquette, Dewberry	5:55 – 6:00 pm
<b>Open Forum</b> - Questions, comments, and input from members of the public	Jade Payne, Dewberry	6:00 – 6:30 pm

### C.3. Advertisements

The screenshot shows a Reddit post from the community r/HyattsvilleMD. The post is titled "Hazard Mitigation Plan virtual public meeting for all county residents tomorrow (2/2) @ 5:30 pm" and was posted by u/WP-Hazard-Mitigation 48 minutes ago. The post text describes a virtual public meeting for the Draft 2023 Prince George's County Hazard Mitigation Plan, providing an overview and an opportunity for public feedback. It includes the date (Thursday, February 2, 2023), time (5:30-6:30 pm), and a link to register: <https://bit.ly/PublicHMP2>. A survey link is also provided: <https://www.surveymonkey.com/r/PG-HMP-Draft-2023>.

The post includes an image with the following text: "Help Prince George's County prepare for disasters. Attend the virtual Hazard Mitigation Public Meeting on Thursday, Feb. 2nd, from 5:30 - 6:30 pm." The image features a QR code and the instruction "Scan with your phone's camera" with the URL <https://bit.ly/PublicHMP2>. The image also depicts houses and a tree under a stormy sky.

The right sidebar shows the "About Community" section for r/HyattsvilleMD, which includes a description of the city, the number of members (173), and the creation date (July 11, 2022). Below this, there are buttons for "Joined" and "Create Post", and a section for "COMMUNITY OPTIONS". The "r/HyattsvilleMD Rules" section lists three rules: 1. Relevancy, 2. Spam/Self-Promotion, and 3. Respectful.



collegeparkmd

Posts

Posted by u/WP-Hazard-Mitigation 45 minutes ago

**Hazard Mitigation Plan virtual public meeting for all county residents tomorrow (2/2) @ 5:30 pm**

Event

**Post is awaiting moderator approval.**  
This post is currently awaiting approval by the moderators of r/collegeparkmd before it can appear in the subreddit.

There is a virtual Public Meeting providing an overview of the Draft 2023 Prince George's County Hazard Mitigation Plan & an opportunity for the public to ask questions and provide feedback. The plan covers natural hazards and the issues they create (like roads flooding, etc.).

Date: Thursday, February 2, 2023

Time: 5:30-6:30 pm

Link for more information and to register for the meeting: <https://bit.ly/PublicHMP2>

You can also review the draft plan and provide feedback via the very brief survey: <https://www.surveymonkey.com/r/PG-HMP-Draft-2023>

**Help Prince George's County prepare for disasters.**  
**Attend the virtual Hazard Mitigation Public Meeting on Thursday, Feb. 2nd, from 5:30 - 6:30 pm.**

Scan with your phone's camera

<https://bit.ly/PublicHMP2>

**About Community**

r/collegeparkmd

Unofficial subreddit. Not affiliated with the City of College Park, Maryland.

Created Nov 3, 2021

479 Along Route 1 9 Stuck in traffic Top 50% Ranked by Size

Joined

Create Post

USER FLAIR PREVIEW

WP-Hazard-Mitigation

COMMUNITY OPTIONS

**r/collegeparkmd Rules**

1. We're about the city (and surrounding areas), not the university.
2. Be neighborly.
3. Article titles should largely appear as published.
4. Local selling/fundraising is permitted. Petitions/surveys/etc. require pre-approval.

## County Connect Prince George's

Private group · 5.8K members



About Discussion Featured Topics Members Events Media Files Reel



Jade Payne

5h · 🌐



VIRTUAL Public Meeting: Draft Prince George's County Hazard Mitigation Plan Overview & Feedback Opportunity

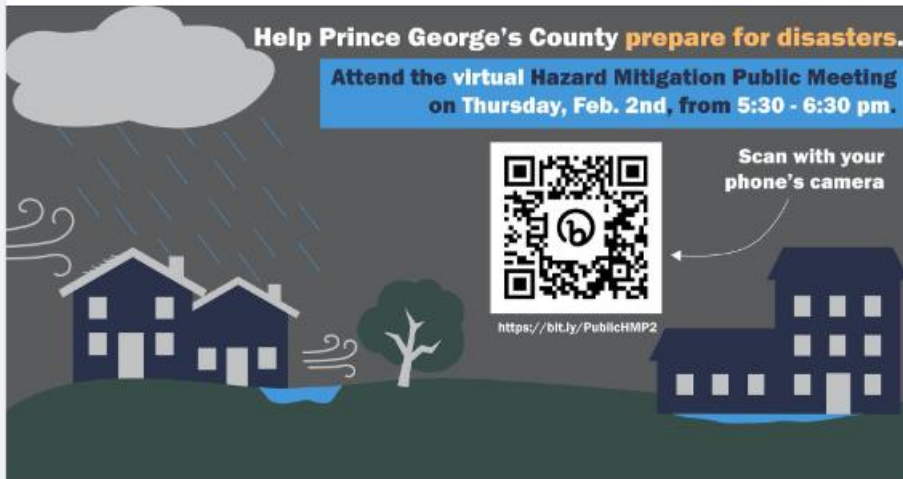
Date: Thursday, February 2, 2023

Time: 5:30-6:30 pm

Register and attend: <https://bit.ly/PublicHMP2>

Everyone is welcome -- just listen or ask questions via chat!

You can also review the draft plan and provide feedback via the very brief survey:  
<https://www.surveymonkey.com/r/PG-HMP-Draft-2023>



Like

Comment

Send



Write a comment...



Press Enter to post.

r/PrinceGeorgesCountyMD

---

Posts

↑  
1  
↓

Posted by [u/WP-Hazard-Mitigation](#) [Hyattsville](#) 47 minutes ago

### Hazard Mitigation Plan virtual public meeting for all county residents tomorrow (2/2) @ 5:30 pm

There is a virtual Public Meeting providing an overview of the Draft 2023 Prince George's County Hazard Mitigation Plan & an opportunity for the public to ask questions and provide feedback. The plan covers natural hazards and the issues they create (like roads flooding, etc.).

Date: Thursday, February 2, 2023

Time: 5:30-6:30 pm

Link for more information and to register for the meeting: <https://bit.ly/PublicHMP2>

You can also review the draft plan and provide feedback via the very brief survey: <https://www.surveymonkey.com/r/PG-HMP-Draft-2023>

🔔

Prince George's County Hazard Mitigation Plan Public Meeting Info

**About Community**

**r/PrinceGeorgesCountyMD**

Welcome to PrinceGeorgesCountyMD

🏠 Created May 17, 2012

---

2.6k  
Members
6  
Online

---

Joined

Create Post

---

USER FLAIR PREVIEW ✎

WP-Hazard-Mitigation

Hyattsville

COMMUNITY OPTIONS ▼

---

**r/PrinceGeorgesCountyMD Rules**

1. Relevant to the region ▼
2. No advertising/buying/selling/job/solicitation/surveys ▼
3. Be civil ▼

**From:** [Redacted]  
**To:** [Undisclosed Recipient](#)  
**Bcc:** [Redacted]  
**Subject:** Virtual Prince George's County Public Meeting Today!  
**Date:** Thursday, February 2, 2023 12:50:00 PM  
**Attachments:** [image012.png](#)

---

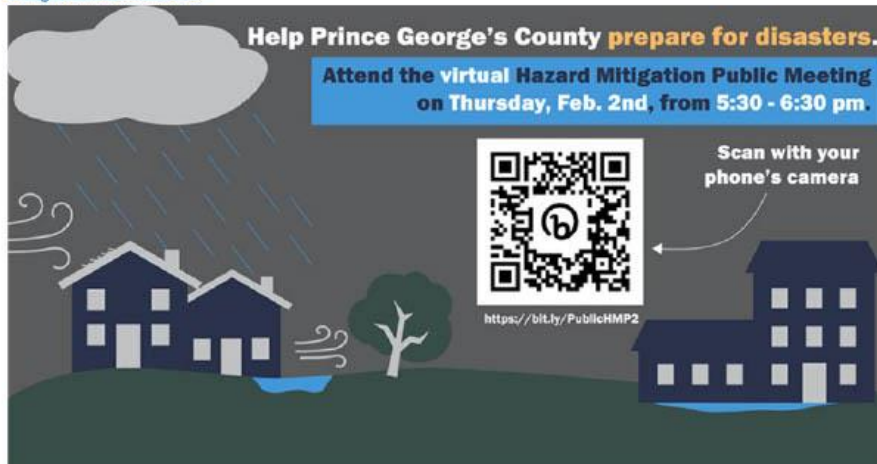
Good afternoon,

My name is Jade Payne, and I am working with Prince George's County and the City of Laurel during the update of their [Hazard Mitigation Plan](#). You are receiving this email because you are listed as the main point-of-contact for a homeowner, civic association, or community group [on the Prince George's County website](#). As a member of one of these groups, you are in a wonderful position to share important information with your fellow community members. I am sharing the below information with you in the hopes that you can participate yourself, as well as share the information with others.

There are two opportunities to participate in the Hazard Mitigation Plan update process before the plan is finalized:

1. [Register and attend \(https://bit.ly/PublicHMP2\)](https://bit.ly/PublicHMP2) the Virtual Draft Hazard Mitigation Plan Review Public Meeting **today, Thursday, February 2<sup>nd</sup>, 2023, from 5:30-6:30 pm**. The meeting will include an overview of the draft plan and an opportunity to ask questions and provide feedback.
2. Review the draft plan and provide feedback via a [brief draft plan survey \(https://www.surveymonkey.com/r/PG-HMP-Draft-2023\)](https://www.surveymonkey.com/r/PG-HMP-Draft-2023).

Participating in both is encouraged! For more information, visit the [Prince George's County Hazard Mitigation Plan website](#).



Please reach out to me if you have any questions in the meantime.

Thank you,

Jade Payne

*Working on behalf of Prince George's County*

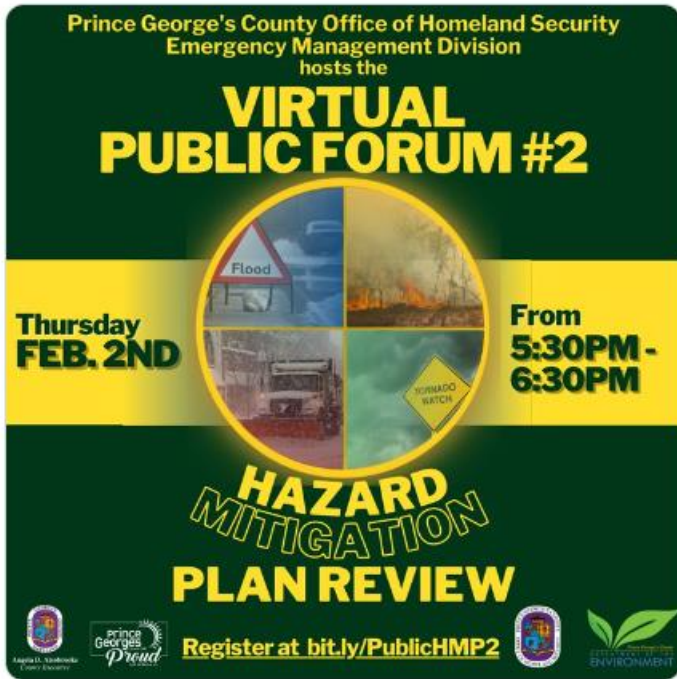
← Tweet



PG County Office of Emergency Management  
@PGCountyOEM

...

On Thurs, Feb 2nd at 5:30pm,  
@PGCountyOEM and @PGCSprout will be hosting  
the 2nd Virtual Public Forum for County residents!  
During this forum we will review the updated 2023  
Draft Hazard Mitigation Plan and seek input from  
residents.  
To Register: [bit.ly/PublicHMP2](https://bit.ly/PublicHMP2)



9:10 AM · Jan 27, 2023 · 266 Views

3 Retweets 1 Like





Prince George's County Office of Homeland Security/Office of Emergency Management  
Emergency Preparedness Specialist Alexandra Harris

# Prince George's County Hazard Mitigation Plan (HMP): Virtual Public Forum Thursday, Feb 2nd

The content of this post is only visible to members of the community. Please sign up or log in to continue reading.

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2 reactions

RPS Planners\_Prince George's County Hazard Mitigation Plan Update\_Public Meeting\_ Neighboring Jurisdictions



● Gooding, Shelly S. <SSGooding@co.pg.md.us>

Today at 10:23 AM

Cc: ● Bahador, Ehsan; ● Henderson, Joey L.

Bcc: Adams, Elizabeth (VDEM); Alex Horne; Alex Weston; Amelia Gagnon; Andrew Irvine; christopher.wise1@maryland.gov; Daniel Ruiz; Eli Russ; Elizabeth Moore; English, Walter; Erin De Luca; ● Gill, Ronald E.; Harrison Brown -MDEM-; [REDACTED] Kevin Coleman; Marquis, Matthew C.; Matthew Smith -MDEM-; Patrick Fleming; Worrell, Andrew (HSEMA); Myers, Kelly; Coutroulis, Alec (HSEMA); Barbara Hunsberger; Jess Sadick; Holly Fuller; Lee, Michelle (HSEMA) ^

Good morning,

Please find the email below from Ehsan Bahador. Kindly direct any responses to Mr. Bahador (cc'd on this email).

Kindly,

Shelly Gooding

We are finalizing our HMP and will have our last public meeting. We need to show that our neighboring jurisdictions (i.e., neighboring counties' emergency management/environment offices) have been engaged via email – *Some state/FEMA reviewers will require this!*

**Event Title:** Public Meeting: Prince George's County and the City of Laurel Draft Hazard Mitigation Plan Review

**Subheading:** An opportunity for the Prince George's County and City of Laurel public to ask questions or provide feedback on the Draft 2023 Hazard Mitigation Plan update

**Date:** Thursday, February 2<sup>nd</sup>, 2023

**Time:** 5:30 – 6:30 pm

**About this Event:**

This meeting will provide an overview of the updated 2023 Draft Hazard Mitigation Plan and allow members of the public to ask questions and give feedback on the Draft Plan. The Draft Plan is available for review before the meeting on the County's [Hazard Mitigation Plan webpage](#). A feedback survey is also available for those that would like to submit their comments and questions in advance or cannot attend the meeting.

About the Hazard Mitigation Plan Update:

Every five years, Prince George's County and the City of Laurel update their Hazard Mitigation Plan. The County is currently leading a plan update for 2023.

The Hazard Mitigation Plan update is meant to guide the actions that Prince George's County, the City of Laurel, and other incorporated municipalities will take to reduce risk from disasters over the next five years and beyond. This plan assesses natural hazards that can impact the County and develops a strategy to reduce hazard impacts and build resilience. It integrates with new and existing plans, building and zoning regulations, and environmental projects.

During this update, the plan took a much closer look at how future climate conditions will impact the hazards and how equity could be further elevated and integrated into the mitigation strategy. These additional focus areas will make sure that Prince George's County and the City of Laurel responsibly and equitably plan actions and projects that will effectively mitigate risk from natural hazards for many years to come, especially for those most vulnerable to their impacts.

Meeting Link: <https://bit.ly/PublicMeetingHMP2023>

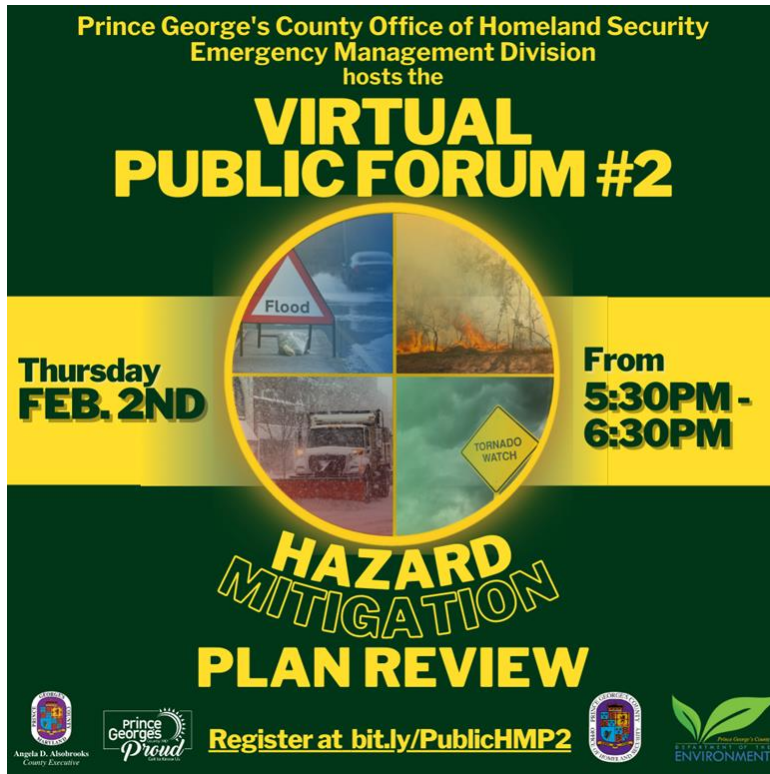
Meeting ID: 234 450 078 526

Meeting Passcode: pp5T8K

Call in Information (Audio Only): [+1 571-360-4685](tel:+15713604685), [703631473#](tel:+1703631473) (Phone Conference ID: 703 631 473#)

Thank you,  
Ehsan

=====  
**Ehsan Bahador, MPS**  
Emergency Management Specialist

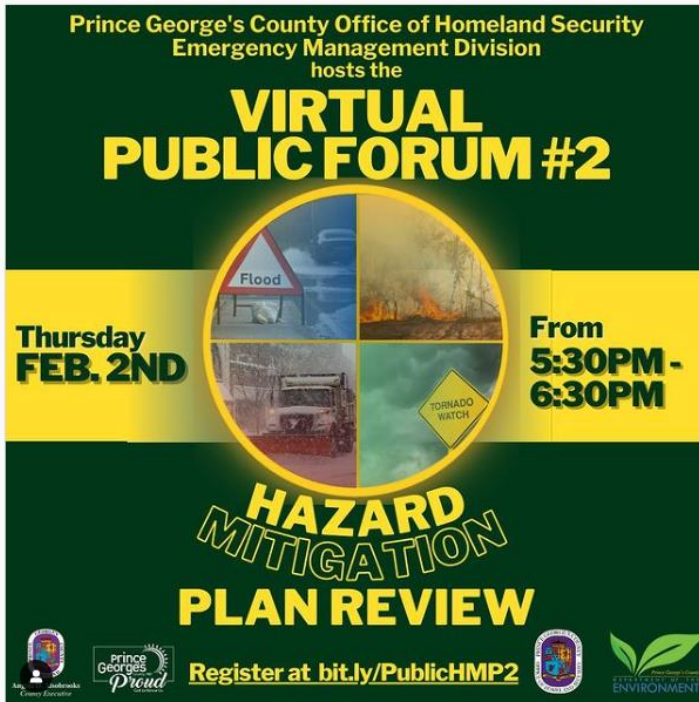


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pgcountyoem • Follow  
Prince George's County, Maryland



pgcountyoem The Office of Homeland Security (OHS), in collaboration with the Department of Environment (DoE), will host the second Virtual Public Forum for County residents on Thursday, February 2nd from 5:30pm-6:30pm.

During this forum, we will provide an overview of the updated 2023 Draft Hazard Mitigation Plan and allow members of the public to ask questions and give feedback on the Draft Hazard Mitigation Plan.

To register visit, [bit.ly/PublicHMP2](https://bit.ly/PublicHMP2)

#CreatingResilientCommunities  
#PreparePrinceGeorges  
#HazardMitigation



6 likes

JANUARY 27

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**Subject:** Prince George's County Hazard Mitigation Plan (HMP): Virtual Public Forum Thursday, Feb 2nd  
**Attachments:** [image001.png](#)  
[image002.png](#)  
[HMP Forum Flyer \(2\).png](#)

---

Good Morning Municipal Partners,

As you all are aware, the Prince George's County Office of Homeland Security/Emergency Management Division (OHS/EMD) is in the process of updating the County Hazard Mitigation Plan (HMP). We are continuing to make our way through the process of updating the HMP, we are hosting a second Virtual Public Forum **Thursday, February 2<sup>nd</sup> at 5:30pm** for County Residents. During this forum, our office, in collaboration with the Department of Environment, will provide an overview of the updated 2023 Draft Hazard Mitigation Plan and allow members of the public to ask questions and give feedback on the Draft Plan. The Draft Plan will be available for review before the meeting on the County's [Hazard Mitigation Plan webpage](#), along with the feedback survey, for those that would like to submit their comments and questions in advance or cannot attend the meeting.

Residents can register for the public forum at [bit.ly/PublicHMP2](https://bit.ly/PublicHMP2). For more information on Prince George's County's Hazard Mitigation Plan update, visit the [OHS website](#).

Please consider sharing this information with your constituents and residents. I have included the flyer in this email, for your convenience.

Thank you all in advance for your continued support and collaboration!

**\*Call-in information, in case any of the links have problems**

Join on your computer, mobile app or room device

Meeting Link: <https://bit.ly/PublicMeetingHMP2023>

Meeting ID: 234 450 078 526

Meeting Passcode: pp5T8K

Call in Information (Audio Only): +1 571-360-4685,,703631473# (Phone Conference ID: 703 631 473#)

Kindest Regards,

Alexandra D. Harris, MS, MPH, CEM  
Emergency Management Specialist  
Emergency Management Division  
Prince George's County Office of Homeland Security

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Profile  
More

**Laurel City OEM** @LaurelCityOEM

**#AreYouPrepared?** The **#CityofLaurel** is working w/ PG County and other jurisdictions to update the Hazard Mitigation Plan for our area, which helps to reduce loss of life and property by minimizing the impact of disasters....1/2 @PGCountyOEM @cityoflaurel @laurelpio @LaurelPD

**Help the City of Laurel prepare for disasters.**  
**Attend the virtual Hazard Mitigation Public Meeting on Thursday, Feb. 2nd, from 5:30 - 6:30 pm.**

Scan with your phone's camera

<https://bit.ly/PublicHMP2>

8:32 AM · Jan 31, 2023 · 1 View

View Tweet analytics

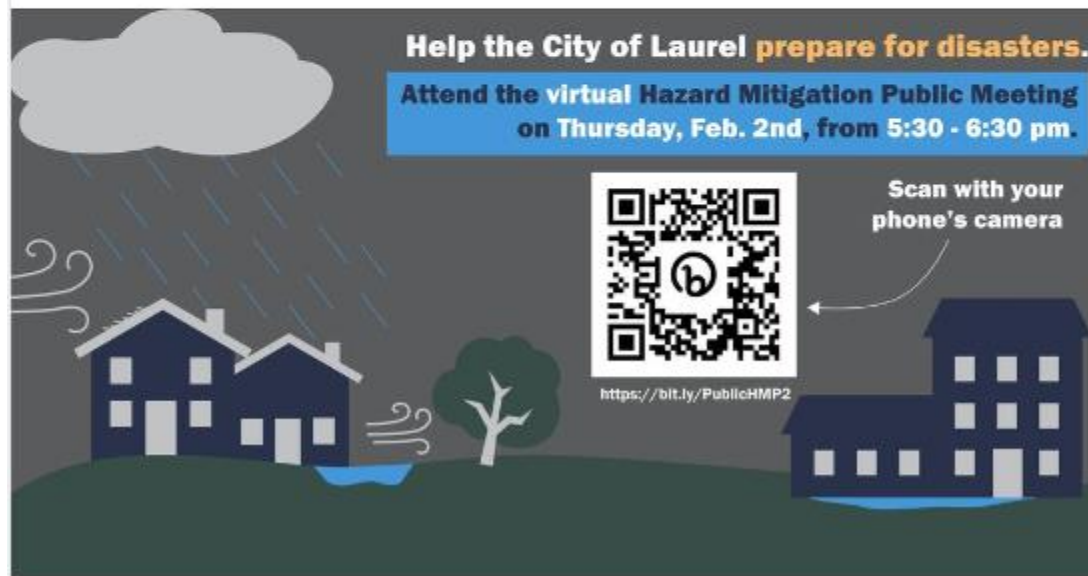
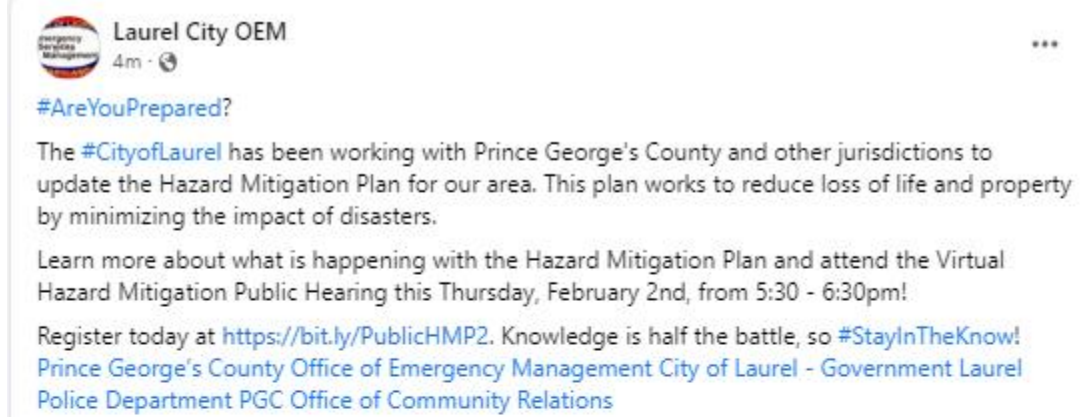
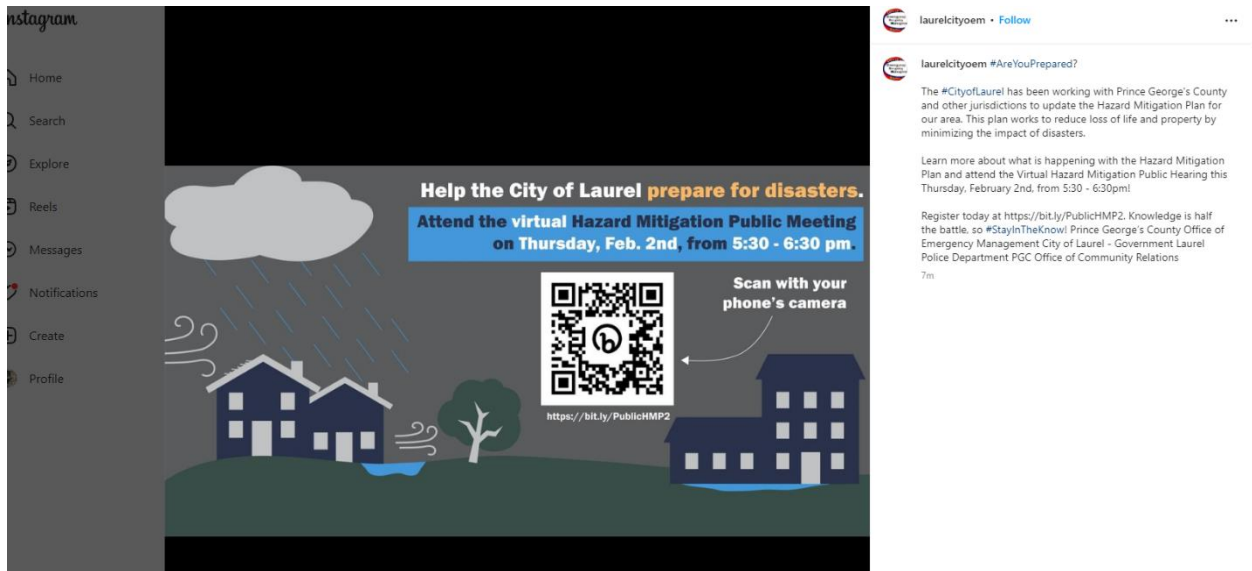
Tweet your reply

**Laurel City OEM** @LaurelCityOEM · 7s

Replying to @LaurelCityOEM

Learn more about what is happening with the Hazard Mitigation Plan and attend the Virtual Hazard Mitigation Public Hearing this Thursday, February 2nd, from 5:30 - 6:30pm! Register today at [bit.ly/PublicHMP2](https://bit.ly/PublicHMP2). Knowledge is half the battle, so **#StayInTheKnow!** @PGCCCommunity

Prince George's County & City of Laurel  
**HAZARD MITIGATION PLAN 2023**



1/30/23, 4:22 PM

Public Meeting #2: Prince George's County and the City of Laurel Draft HMP Tickets, Thu, Feb 2, 2023 at 5:30 PM | Eventbrite

eventbrite

🔍 Menu 👤



Feb 02



## Public Meeting #2: Prince George's County and the City of Laurel Draft HMP

An opportunity for the Prince George's County and City of Laurel public to ask questions or provide feedback on the Draft 2023 HMP update.

By Prince George's County Office of Homeland Security 122 followers [Follow](#)

### When and where



#### Date and time

Thu, February 2, 2023, 5:30 PM – 6:30 PM EST



#### Location

Online

<https://www.eventbrite.com/e/public-meeting-2-prince-georges-county-and-the-city-of-laurel-draft-hmp-tickets-522781442277>

1/4

1/30/23, 4:22 PM

Public Meeting #2: Prince George's County and the City of Laurel Draft HMP Tickets, Thu, Feb 2, 2023 at 5:30 PM | Eventbrite

**General Admission** – 1

Free ⓘ

Reserve a spot

allow members of the public to ask questions and give feedback on the Draft Plan. The Draft Plan will be available for review before the meeting on [the County's Hazard Mitigation Plan webpage](#). A feedback survey will also be available for those that would like to submit their comments and questions in advance or cannot attend the meeting.

### Tags

- Online Events
- Online Other
- Online Government Other
- #planning
- #prince\_georges\_county
- #hazard\_mitigation
- #public\_meeting
- #city\_of\_laurel
- #second\_public\_meeting

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#### Prince George's County Office of Homeland Security

Organizer of Public Meeting #2: Prince George's County and the City of Laurel Draft HMP

Follow

Contact

<https://www.eventbrite.com/e/public-meeting-2-prince-georges-county-and-the-city-of-laurel-draft-hmp-tickets-522781442277>

2/4

1/30/23, 4:22 PM

Public Meeting #2: Prince George's County and the City of Laurel Draft HMP Tickets, Thu, Feb 2, 2023 at 5:30 PM | Eventbrite

General Admission - 1

Free ⓘ

Reserve a spot



### Draft Development Servicing Plans

Tue, Feb 7, 2023 1:00 AM EST

Free

Snowy Monaro Regional Council

53 followers



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<https://www.eventbrite.com/e/public-meeting-2-prince-georges-county-and-the-city-of-laurel-draft-hmp-tickets-522701442277>

3/4

1/30/23, 4:22 PM

Public Meeting #2: Prince George's County and the City of Laurel Draft HMP Tickets, Thu, Feb 2, 2023 at 5:30 PM | Eventbrite

<b>General Admission</b>	– 1
Free ⓘ	

Reserve a spot

<https://www.eventbrite.com/e/public-meeting-2-prince-georges-county-and-the-city-of-laurel-draft-hmp-tickets-522701442277>

4/4



## C.4. Notes



### Public Meeting Notes

**Title:** Prince George's County Hazard Mitigation Plan Update – **Public Meeting #2**

**Location:** [Microsoft Teams \(Virtual\)](#)  
**Register Here:**  
<https://bit.ly/PublicHMP2>

**Date:** Thursday, February 2<sup>nd</sup>, 2023

**Time:** 5:30 – 6:30 pm ET

**Purpose:** Dewberry will provide an overview of the 2023 Draft Hazard Mitigation Plan, highlighting the new sections added to the 2023 Plan. There will be a discussion to gather feedback from the public on the Draft Plan. The meeting will close with next steps and questions.

**Attendees:**

1. Christina Cornwell	11. Albert (Guest)
2. Batten-Mickens, Meloyde R.	12. Laboy, Kristina
3. Danielle	13. Choquette, Scott
4. Tommy Owens LARC (Guest)	14. Henderson, Joey L.
5. Dr. Toye Y. Latimore (Guest)	15. Rush, Hanna R.
6. Head, Cynthia	16. Gosse, Courtney
7. Bahador, Ehsan	17. Betty Colonomos
8. Bannerman, Erica S.	18. Michael Weekley (Guest)
9. Wells, Tyrone N.	19. Hawkins-Nixon, Dawn
10. Payne, Jade	20. Jodie Kulpa-Eddy

#### Meeting Summary

Scott Choquette (Project Manager, Dewberry) and Jade Payne (Deputy Project Manager, Dewberry) met with the public on February 2, 2023, to review the 2023 Draft Hazard Mitigation Plan. A PowerPoint presentation was used to review the project status, review the Draft plan, and next steps for the project. Discussions were held throughout the presentation so Dewberry could gather feedback from the public. Discussion and presentation topics are grouped below with input and questions from the public.

#### Meeting Notes

<b>Introduction</b>
<ul style="list-style-type: none"> <li>• Scott introduced the Dewberry team and gave an overview of the agenda</li> </ul>
<b>Hazard Mitigation Plan Overview</b>
<ul style="list-style-type: none"> <li>• Scott explained hazard mitigation and Hazard Mitigation Plans</li> <li>• Scott gave examples of hazard mitigation actions that can be informed by hazard mitigation plans (ex: retrofitting a building, land use policies)</li> </ul>



- Scott explained the purposes of having a hazard mitigation plan: including informing budgeting, promoting data sharing between levels of government, increases resilience, decreases damage to people & structures, allows for access to grant funding

#### Draft Plan Review

- Jade explained the new addition of future planning regarding population, which incorporates population estimates for the future in the County
- Jade explained the new addition of future planning regarding future development, which uses the Prince George's County Plan 2035 future growth areas and overlays with hazard areas to determine hot spot areas
- Jade explained the new addition of future planning regarding climate, which is a new requirement of FEMA
- Jade discussed the new additions to the HIRA section of the Plan, including Hazus-MH analyses, which were not used in previous plans
- Other new additions to the HIRA section included a new Hazard Risk Index Score, new maps & analyses
- Jade explained the updates to the Mitigation Strategies for this Plan update, as well as the update of creating four new goals for the Mitigation Strategies
- Jade discussed the additions to the Implementation Plan, highlighting a Technical Assistance section with common Technical Assistance programs and contact information for applying for Assistance
- An additional addition to the Implementation Plan includes a Funding Opportunities section, which shows the funding organization, and funding type, and other relevant details
- Jade explained how the elements of the Plan align with FEMA grant programs to allow for the County and City to more easily apply for grant funding (ex: social vulnerability data, plan integration, FEMA Community Lifelines)

#### Next Steps

- Scott explained the timeline for the project going forward, from MDEM/FEMA review to Plan adoption by the County & City
- Scott explained that the Draft Plan is available for review from the public now, and the Draft Review Survey is available until Sunday 2/5/23

#### Open Forum

- Betty Colonomos mentioned that she lives in an older neighborhood (in College Park), and they have an inordinate amount of flooding during storms due to an old sewer/drainage system, as well as a lot of wind damage due to downed trees. She asked if there's anything that each City could do to improve stormwater management?
- Scott replied that lately, due to climate change, there have been more frequent high intensity rainfall events causing stormwater flooding, so this is a common problem. There is a Mitigation Strategy within the Plan to use funding to identify the problem areas for stormwater flooding within the County, and the County could use this research to apply for grant funding to complete stormwater system improvements to reduce flooding. Wind damage may be more difficult for the County to address, as tree trimming is typically completed by utility companies.
- Jodie Kulpa-Eddy asked if the presentation will be available after the meeting.
- Jade replied that the presentation will be posted on the Hazard Mitigation Youtube page, and the slides may be accessed from the County's Office of Homeland Security website.

## C.5. Attendance

### 1. Summary

	Public Meeting: Prince George's County & City of Laurel 2023 Hazard Mitigation Plan Draft Review
Meeting title	
Attended	20
Start time	2/2/23, 5:11:29 PM
End time	2/2/23, 6:25:22 PM
Meeting duration	1h 13m 53s
Average attendance time	32m 7s

### 2. Participants

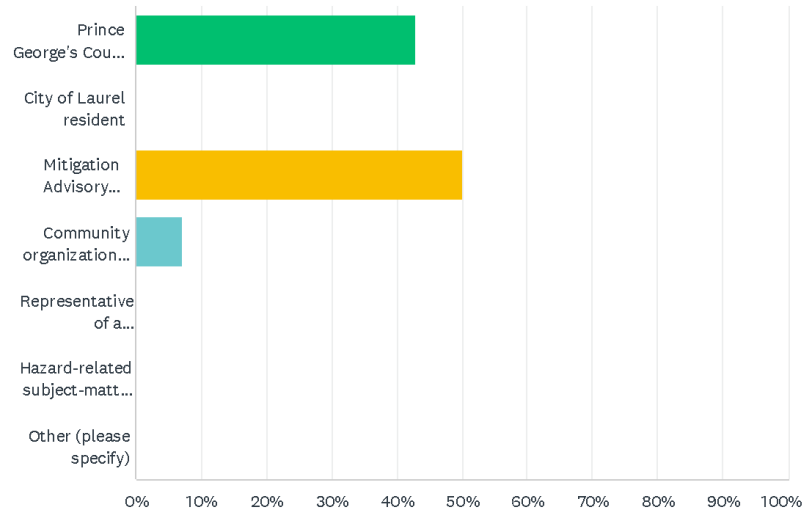
Name	First join	In-meeting d	Email
Christina Cornwell	2/2/23, 5:27:48 PM	34m 6s	[REDACTED]
Batten-Mickens, Meloyde R. Danielle	2/2/23, 5:27:49 PM	34m 12s	[REDACTED]
	2/2/23, 5:27:49 PM	57m 32s	
Tommy Owens LARC (Guest)	2/2/23, 5:27:50 PM	34m 1s	
Dr. Toye Y. Latimore (Guest)	2/2/23, 5:27:50 PM	34m 51s	
Head, Cynthia	2/2/23, 5:27:50 PM	29m 36s	[REDACTED]
Bahador, Ehsan	2/2/23, 5:27:50 PM	34m 13s	[REDACTED]
Bannerman, Erica S.	2/2/23, 5:27:51 PM	34m 5s	[REDACTED]
Wells, Tyrone N.	2/2/23, 5:29:03 PM	20m 24s	[REDACTED]
Payne, Jade	2/2/23, 5:29:04 PM	33m 10s	[REDACTED]
albert (Guest)	2/2/23, 5:29:26 PM	32m 56s	
Laboy, Kristina	2/2/23, 5:29:55 PM	32m 8s	[REDACTED]
Choquette, Scott	2/2/23, 5:29:58 PM	32m	[REDACTED]
Henderson, Joey L.	2/2/23, 5:30:03 PM	31m 53s	[REDACTED]
Rush, Hanna R.	2/2/23, 5:30:34 PM	31m 22s	[REDACTED]
Gosse, Courtney	2/2/23, 5:30:49 PM	31m 3s	[REDACTED]
Betty Colonomos	2/2/23, 5:32:07 PM	29m 59s	
Michael Weekley (Guest)	2/2/23, 5:33:33 PM	28m 28s	
Hawkins-Nixon, Dawn	2/2/23, 5:35:00 PM	26m 57s	[REDACTED]
Jodie Kulpa-Eddy	2/2/23, 5:42:36 PM	19m 21s	[REDACTED]

## D. Public Draft Plan Review Survey

2023 DRAFT Hazard Mitigation Plan Review

### Q1 Which most specifically describes you?

Answered: 14 Skipped: 0



ANSWER CHOICES		RESPONSES	
Prince George's County resident		42.86%	6
City of Laurel resident		0.00%	0
Mitigation Advisory Committee member		50.00%	7
Community organization representative		7.14%	1
Representative of a neighboring jurisdiction		0.00%	0
Hazard-related subject-matter expert		0.00%	0
Other (please specify)		0.00%	0
<b>TOTAL</b>			<b>14</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

2023 DRAFT Hazard Mitigation Plan Review

**Q2 What is your name?**

Answered: 11 Skipped: 3

#	RESPONSES	DATE
1	Courtney Gosse	2/5/2023 11:40 PM
2	Dawn Hawkins-Nixon	2/5/2023 11:40 PM
3	Michael Weekley	2/4/2023 9:14 PM
4	Amanda Townsend	2/2/2023 9:36 AM
5	Dr. Toye Y Latimore	2/1/2023 8:28 PM
6	Dawn Hawkins-Nixon	2/1/2023 4:02 PM
7	Stephanie Robinson	1/24/2023 8:31 AM
8	Meloyde R. Batten-Mickens (Prince George's County OHS/EM)	1/20/2023 5:57 PM
9	Mel Batten-Mickens (Prince George's County OHS/EM)	1/18/2023 5:17 PM
10	Erin Meyer	1/13/2023 2:40 PM
11	Dr. Toye Latimore	1/13/2023 10:49 AM

2023 DRAFT Hazard Mitigation Plan Review

Q3 What is the name of your organization (if applicable)?

Answered: 1 Skipped: 13

#	RESPONSES	DATE
1	American Red Cross	2/5/2023 11:43 PM

2023 DRAFT Hazard Mitigation Plan Review

Q4 If you have information/a tool in a document you'd like to share with the County and/or City to help their hazard mitigation efforts, please upload it here. (Note: there will be an opportunity to upload a document with draft plan feedback later in the survey, if needed)

Answered: 0 Skipped: 14

#	FILE NAME	FILE SIZE	DATE
There are no responses.			

2023 DRAFT Hazard Mitigation Plan Review

Q5 What is your title/role (if applicable)?

Answered: 1 Skipped: 13

#	RESPONSES	DATE
1	Disaster Program Manager	2/5/2023 11:43 PM



2023 DRAFT Hazard Mitigation Plan Review

Q6 What is your area (or areas) of subject matter expertise (if applicable)?

Answered: 1 Skipped: 13

#	RESPONSES	DATE
1	Disaster Preparedness and Response in Southern Maryland	2/5/2023 11:43 PM

2023 DRAFT Hazard Mitigation Plan Review

Q7 Do you have any best practices that you believe Prince George's County would benefit from implementing?

Answered: 0 Skipped: 14

#	RESPONSES	DATE
	There are no responses.	

2023 DRAFT Hazard Mitigation Plan Review

### Q8 What jurisdiction do you represent?

Answered: 0 Skipped: 14

#	RESPONSES	DATE
	There are no responses.	

2023 DRAFT Hazard Mitigation Plan Review

**Q9 Would your jurisdiction be interested in collaborating with Prince George's County or City of Laurel on any hazard mitigation actions/projects?**

Answered: 0 Skipped: 14

 No matching responses.

ANSWER CHOICES	RESPONSES	
Yes	0.00%	0
Potentially	0.00%	0
No	0.00%	0
Unsure/Do not know	0.00%	0
TOTAL		0

2023 DRAFT Hazard Mitigation Plan Review

Q10 What would your jurisdiction be interested in collaborating on?

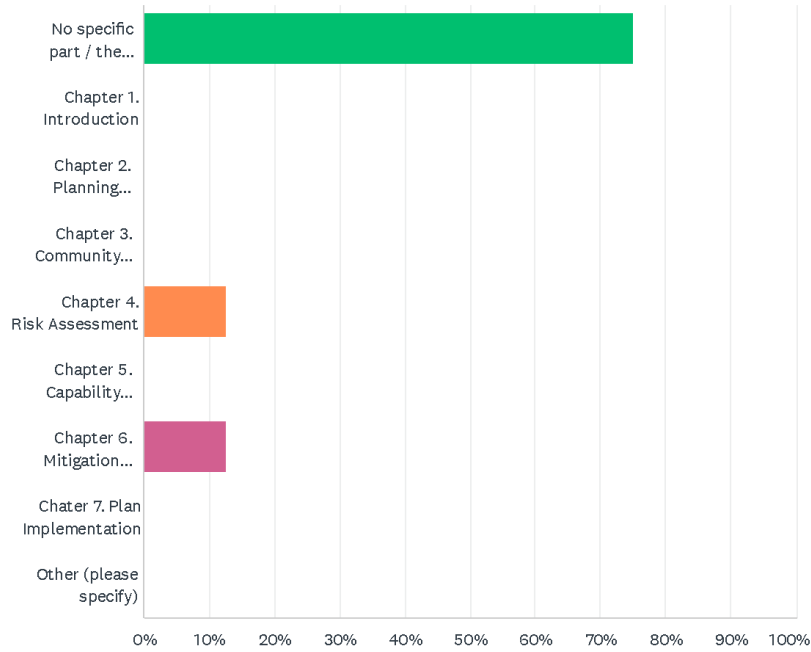
Answered: 0 Skipped: 14

#	RESPONSES	DATE
	There are no responses.	

2023 DRAFT Hazard Mitigation Plan Review

Q11 Which part of the plan are you commenting on?

Answered: 8 Skipped: 6



ANSWER CHOICES	RESPONSES
No specific part / the entire plan	75.00% 6
Chapter 1. Introduction	0.00% 0
Chapter 2. Planning Process	0.00% 0
Chapter 3. Community Profile	0.00% 0
Chapter 4. Risk Assessment	12.50% 1
Chapter 5. Capability Assessment	0.00% 0
Chapter 6. Mitigation Strategy	12.50% 1
Chapter 7. Plan Implementation	0.00% 0
Other (please specify)	0.00% 0
<b>TOTAL</b>	<b>8</b>

#	OTHER (PLEASE SPECIFY)	DATE
	There are no responses.	

2023 DRAFT Hazard Mitigation Plan Review

Q12 What feedback/input would you like to provide?

Answered: 8 Skipped: 6

#	RESPONSES	DATE
1	Could you please change the name of the Red Cross region that is stated in the text "The National Capitol Region" (NCR) to to "The National Capitol and Greater Chesapeake Region"(NC&GCR). Also, could you change the representative/member of the Red Cross from Joseph Lenz to Courtney Gosse.	2/5/2023 11:50 PM
2	Chapter 4 provides an in-depth assessment of flood and severe weather related risks. However, I'm concerned that risk associated with heat waves might be under-estimated.	2/5/2023 11:50 PM
3	I think it is well written and thought out. Getting citizens and businesses to go along with it, especially to pay for it, will take educating them in what they may be looking at in the next twenty years, what can be done to mitigate the effects of global warming and that it will be worth the cost. One almost has to read the whole document, I did, to understand what is at stake to want to agree with it.	2/4/2023 9:18 PM
4	This was a very extensive well written plan. It provided me with knowMedge in an area that I had not had an opportunity to provide input.	2/1/2023 8:30 PM
5	Happy to see flooding addressed, my street floods every time there is a big storm. Hopefully this plan will help flood mitigation in the County	2/1/2023 2:46 PM
6	See attached document, thank you!	1/24/2023 10:17 AM
7	Very organized and detailed plan. Kudos the team to present this valuable content in an informative and thorough manner. - While MDEM is noted in the abbreviations, please check the content for a few instances to replace Maryland Emergency Management Agency with Maryland Department of Emergency Management - Consideration to add Hazus-MH to the abbreviations section - the survey qstn #6 denotes 2022 draft plan, should be 2023 draft plan - page 28 is missing the stakeholder groups. I suspect since this was highlighted the content will be inserted. - Determine the appropriate Prince George's County and City of Laurel seals are to be used -	1/20/2023 6:13 PM
8	This is an impressive update that is clearly the culmination of an enormous amount of hard work. I appreciate being part of the planning process. I'm especially glad to see the robust risk assessment section supporting the revised hazard prioritization. This level of documentation is essential to conducting a comprehensive HIRA for our community.	1/13/2023 2:52 PM

2023 DRAFT Hazard Mitigation Plan Review

Q13 If you have feedback in a separate document, please upload it here.

Answered: 1 Skipped: 13

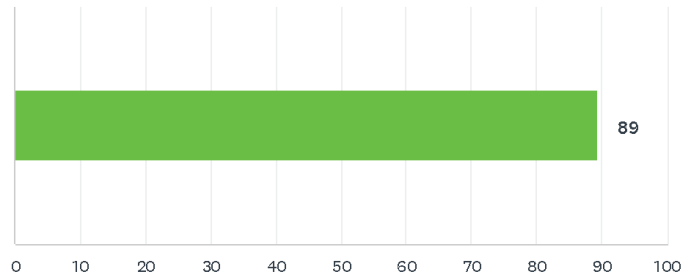
#	FILE NAME	FILE SIZE	DATE
1	Bowe_FinalPlanComments.docx	14.7KB	1/24/2023 10:16 AM



2023 DRAFT Hazard Mitigation Plan Review

Q14 How well do you feel the 2023 draft plan will encourage worthwhile hazard mitigation activities in Prince George's County and the City of Laurel?

Answered: 7 Skipped: 7



#		DATE
1	90	2/5/2023 11:50 PM
2	90	2/5/2023 11:50 PM
3	90	2/4/2023 9:18 PM
4	85	2/1/2023 8:30 PM
5	91	1/24/2023 10:17 AM
6	100	1/20/2023 6:13 PM
7	79	1/13/2023 2:52 PM

2023 DRAFT Hazard Mitigation Plan Review

**Q15 Please provide any additional comments or questions to be addressed as Prince George's County and the City of Laurel update their Hazard Mitigation Plan.**

Answered: 4 Skipped: 10

#	RESPONSES	DATE
1	1- Regarding Table 7: Existing Land Use for Prince George's County (2014), the table headings do not agree with the populated. 2- Confirm the home agency of each MAC member	2/5/2023 11:54 PM
2	I think you should come up with a much shorter version for the average citizen to read with access to the whole plan. That may make it easier of them to grasp. It took me three days to read this and my eyes were not happy.	2/4/2023 9:21 PM
3	Excellent plan, I really appreciate the work and inclusion of Bowie data. Thank you!	1/24/2023 10:17 AM
4	None	1/13/2023 2:53 PM

2023 DRAFT Hazard Mitigation Plan Review

**Q16** If you'd like to collaborate further or be kept up to date on County/City hazard mitigation efforts, please provide contact information below.

Answered: 5 Skipped: 9

ANSWER CHOICES	RESPONSES
Name	0.00% 0
Company	0.00% 0
Address	0.00% 0
Address 2	0.00% 0
City/Town	0.00% 0
State/Province	0.00% 0
ZIP/Postal Code	0.00% 0
Country	0.00% 0
Email Address	100.00% 5
Phone Number	0.00% 0











#	NAME	DATE
	There are no responses.	
#	COMPANY	DATE
	There are no responses.	
#	ADDRESS	DATE
	There are no responses.	
#	ADDRESS 2	DATE
	There are no responses.	
#	CITY/TOWN	DATE
	There are no responses.	
#	STATE/PROVINCE	DATE
	There are no responses.	
#	ZIP/POSTAL CODE	DATE
	There are no responses.	
#	COUNTRY	DATE
	There are no responses.	
#	EMAIL ADDRESS	DATE
1	[REDACTED]	2/5/2023 11:51 PM
2	[REDACTED]	2/4/2023 9:21 PM
3	[REDACTED]	2/1/2023 8:30 PM
4	[REDACTED]	1/24/2023 10:17 AM

2023 DRAFT Hazard Mitigation Plan Review

5	[REDACTED]	1/13/2023 2:53 PM
#	PHONE NUMBER	DATE
	There are no responses.	

## E. Online Outreach Materials

### E.1. Video Meeting Statistics

<input type="checkbox"/>	Video	Visibility	Restrictions	Date ↓	Views	Comments	Likes (vs. dislikes)
<input type="checkbox"/>	 Prince George's County Hazard Mitigation Plan - MAC Draft Plan Review The Prince George's County and City of Laurel (Maryland) Mitigation Advisory Committee (MAC) met on Wednesday, February 1, 2023, to review the draft...	 Public	None	Feb 1, 2023 Published	0	0	-
<input type="checkbox"/>	 Prince George's County Hazard Mitigation Plan - MAC Mitigation Strategy The Prince George's County, MD Mitigation Advisory Committee (MAC) met on Wednesday, December 14, 2022, to discuss the actions that should be...	 Public	None	Dec 15, 2022 Published	4	0	-
<input type="checkbox"/>	 Prince George's County Hazard Mitigation Plan - MAC Risk Assessment... The Prince George's County, MD Mitigation Advisory Committee (MAC) met on Wednesday, November 16, 2022 to review the results of the risk...	 Public	None	Nov 16, 2022 Published	36	0	100.0% 1 like
<input type="checkbox"/>	 Prince George's County Hazard Mitigation Plan Update - Public Meeting ... This meeting took place on Wednesday, November 9, 2022.	 Public	None	Nov 15, 2022 Published	7	0	-
<input type="checkbox"/>	 Prince George's County Hazard Mitigation Plan Update - MAC Kick Off The Mitigation Advisory Committee (MAC) met to kick off the 2023 update of the Prince George's County and the City of Laurel Hazard Mitigation Plan...	 Public	None	Nov 1, 2022 Published	11	0	-

## E.2. [StoryMap](#)

The screenshot shows a StoryMap interface. At the top, there is a header with the Prince George's County logo and the text 'Prince George's County Hazard Mitigation Plan'. Below the header is a large aerial photograph of a river winding through a forested area. Overlaid on the photograph is the title 'Prince George's County Hazard Mitigation Plan' in large white font, followed by '2022 Hazard Mitigation Plan Update' and 'Prince George's County and the City of Laurel' in smaller white font. At the bottom of the screenshot, there is a navigation menu with the following items: 'Introduction' (underlined), 'Our Hazard Mitigation Plan', 'Identified Hazards', 'Help us Identify Problem Areas', 'How to Get Involved', 'Add Your Information', and 'Credits'. The interface also includes standard StoryMap controls like a star, a share icon, and a user profile icon.

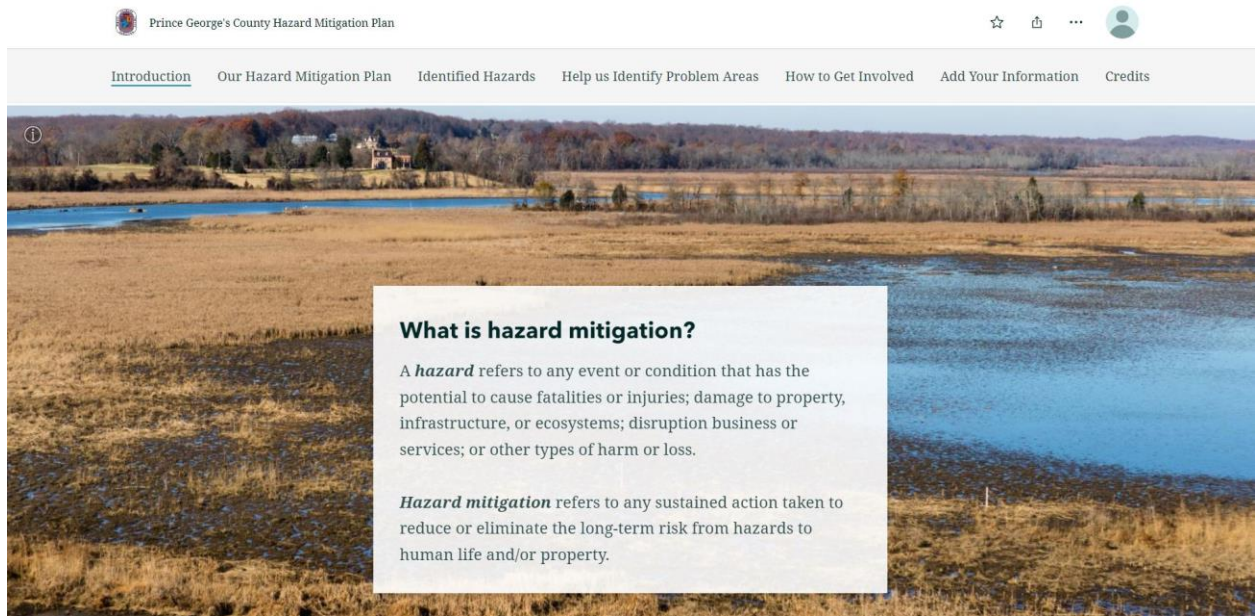
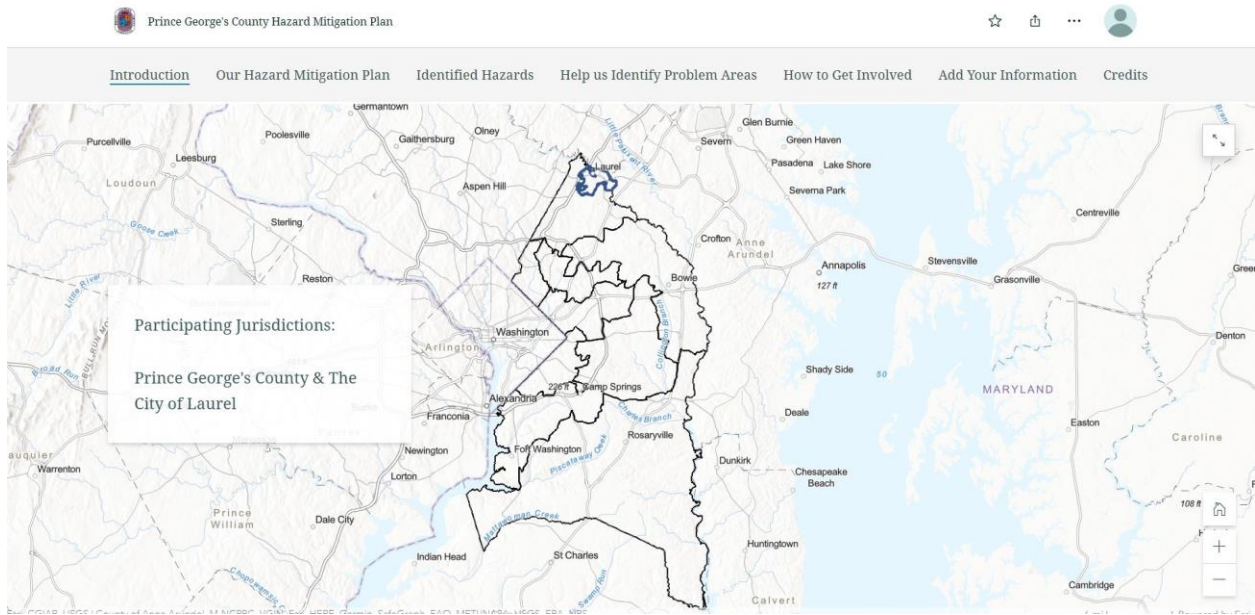
### Introduction

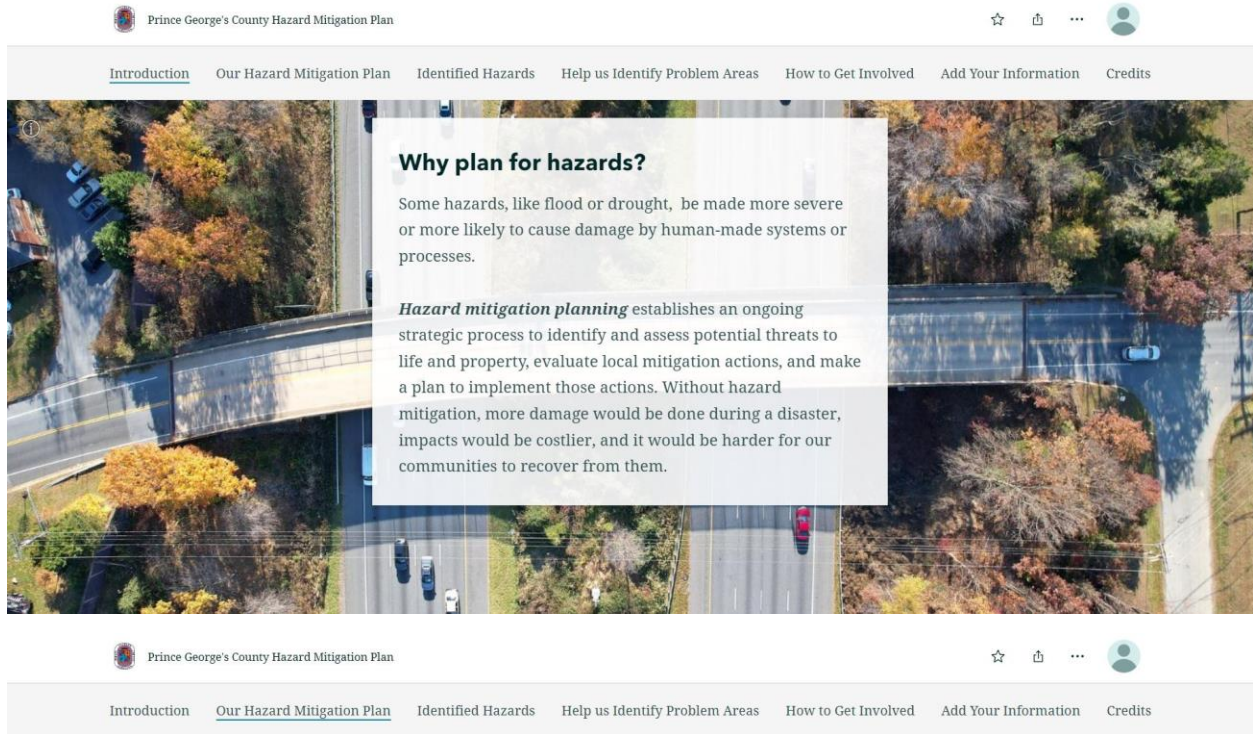
Every five years, Prince George's County and the City of Laurel update their Hazard Mitigation Plan. The County is currently leading a plan update for 2022.

The Hazard Mitigation Plan Update is meant to guide the actions Prince George's County, the City of Laurel, and other incorporated municipalities will take to reduce risk from disasters over the next five years, and beyond.

This plan assesses hazards that can impact the County and develops strategies to reduce the impacts of natural disasters and build resilience. It is meant to integrate with new and existing plans, building and zoning regulations, and environmental projects.

As the plan update is developed, community input is critical to understanding what we need to prioritize and protect. Stay up-to-date on input opportunities, public meetings, and hazard mitigation planning news by visiting [our website](#).



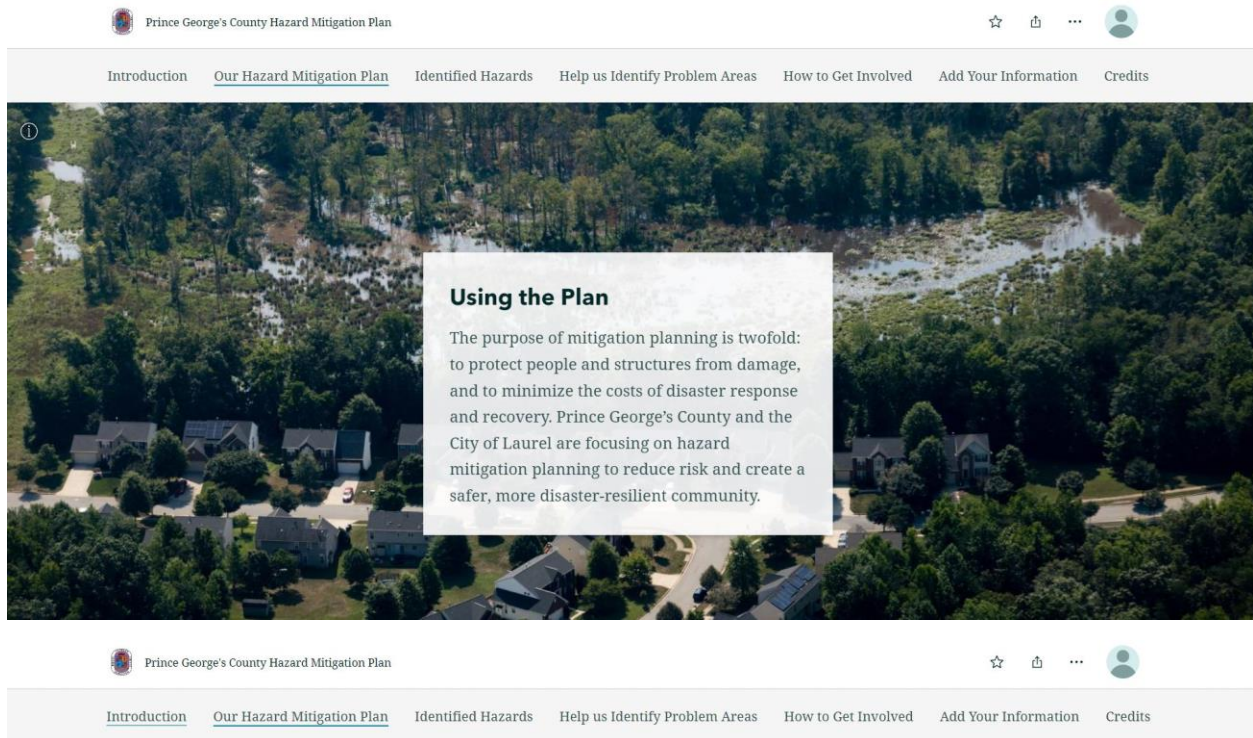


## Our Hazard Mitigation Plan

The Prince George's County Hazard Mitigation Plan was last updated five years ago. Since then, **the intersection of climate change and hazards has never been clearer**. This year, the plan will also take a much closer look at how our future climate will impact the hazards across the county. Adapting to these potential changes can help make sure Prince George's County and the City of Laurel responsibly plan actions and projects that will protect the county now and for many years to come.







## Update of the Plan

The plan will include the following components:

### Planning Process

An overview of the county agencies and local representatives involved in the plan development, the process they will follow, and the public outreach strategy

### Hazard Identification & Risk Assessment

Profiles of relevant hazards and their associated risks, including vulnerability analyses and loss estimations for high-risk hazards

### Capability Assessment

An assessment of existing ordinances, policies, plans, and programs that relate to hazard risk reduction

Prince George's County Hazard Mitigation Plan

Introduction Our Hazard Mitigation Plan Identified Hazards Help us Identify Problem Areas How to Get Involved Add Your Information Credits

## Mitigation Strategies

A blueprint for the steps the County, and City of Laurel will take to reduce its risk to hazards, based on findings from public outreach events and the hazard, risk and capability assessments

## Implementation Plan

A description of how the County will maintain the plan over the next five years

Prince George's County Hazard Mitigation Plan

Introduction Our Hazard Mitigation Plan Identified Hazards Help us Identify Problem Areas How to Get Involved Add Your Information Credits

## Identified Hazards

The plan will analyze the following hazard types: extreme temperature, geologic, flood-related, wind-related, and fire-related. Climate change interacts with the majority of these hazard types in uniquely complex processes, potentially affecting how severe or frequently they occur.

### Extreme Temperature

- Extreme Heat
- Extreme Cold

### Geologic

- Earthquake
- Landslide
- Sinkhole

Prince George's County Hazard Mitigation Plan

Introduction Our Hazard Mitigation Plan Identified Hazards Help us Identify Problem Areas How to Get Involved Add Your Information Credits

### Flood-Related

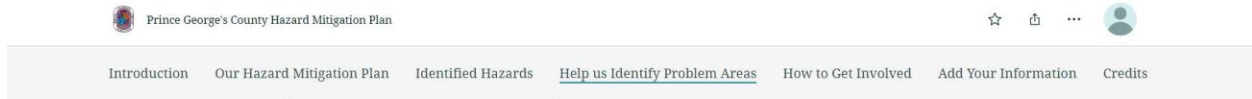
- Riverine & Coastal Flooding
- Dam & Levee Failure
- Severe Storm

### Wind-Related

- Tornado
- Hurricane
- Winter Storm
- Severe Storm
- High Winds

### Fire-Related

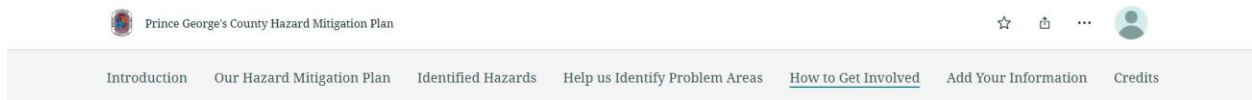
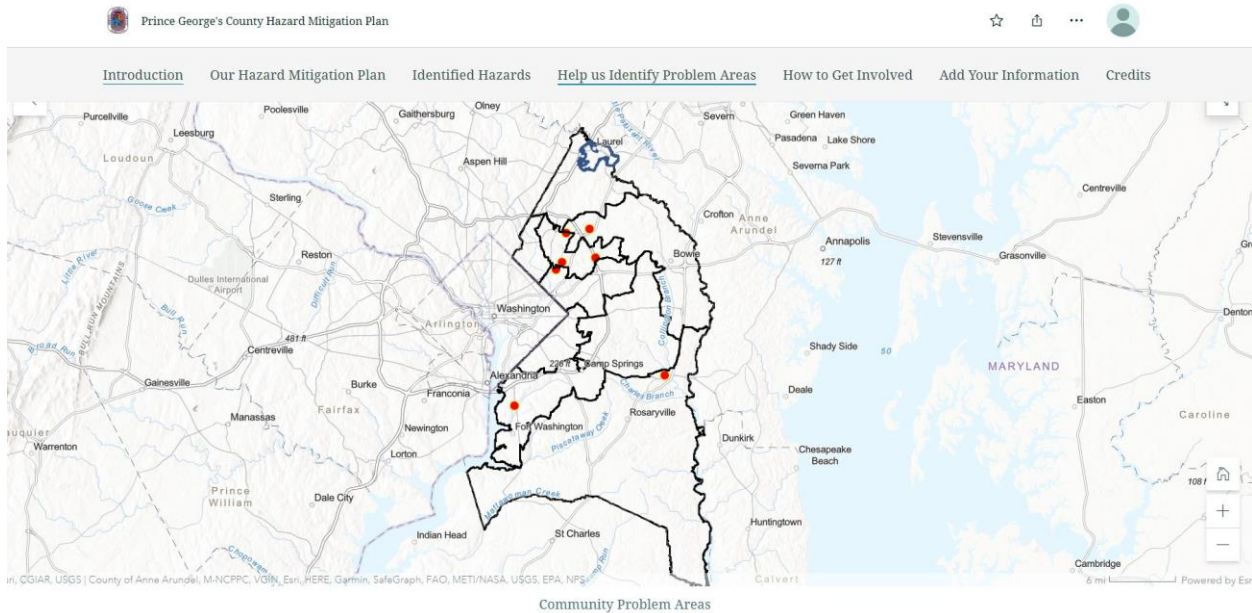
- Drought
- Wildfire



## Help us Identify Problem Areas

Do you know about any areas that frequently flood, appear at risk for landslides or wildfires, or pose threats to the community? Fill out this survey using the link below!

[Identify Community Problem Areas](#)



## How to Get Involved

Public participation is very important for a successful hazard mitigation plan. The valuable knowledge from the residents and businesses of Prince George's County and the City of Laurel help produce a plan that fully understands what matters most to people living in the county.

### Here are some ways you can get involved:

1. Take the [County Mitigation Planning Survey](#) and make sure your voice is heard!
2. Attend a **public meeting** (the first meeting will be held on November 9th, 2022)
3. Identify [community hazard problem areas](#) above

## Add Your Information

### Add Your Information

Join our mailing list for details on the upcoming Hazard Mitigation Plan & for more ways you can get involved!

**Full Name**

(First, Last)

**Email**

**Your Community**

**Email**

**Your Community**

### Credits

Created by the Prince George's County Office of Emergency Management in collaboration with Dewberry Engineers, Inc.

## E.3. Prince George's County Website

**About Us** ▶

**Emergency Operations Center**

**Local Emergency Planning Committee**

**Training & Exercise**

**Preparedness Center** ▶

**Hazard Mitigation Plan - Draft**

**MDEMA Student Scholarship**

**Creating Resilient Communities**

Home > Government > County Government > Departments & Offices > Public Safety > Homeland Security > About Us > Divisions > Emergency Management > Hazard Mitigation Plan - Draft ▼ ▲

---

### Hazard Mitigation Plan

**TAKE ACTION!**

Attend the upcoming the next public meeting, review the drafted [2023 Hazard Mitigation Plan](#) and drafted [Appendices](#) and take the [Feedback Survey](#).

**Overview**

Every five years, Prince George's County and the City of Laurel update their Hazard Mitigation Plan. The County is currently leading a plan update for 2022.

The Hazard Mitigation Plan Update is meant to guide the actions Prince George's County, the City of Laurel, and other incorporated municipalities will take to reduce risk from disasters over the next five years and beyond. This plan assesses natural hazards that can impact the County and develops a strategy to reduce the impacts and build resilience. It will be integrated with new and existing plans, building and zoning regulations, and environmental projects.

This year, the plan will also take a much closer look at how future climate conditions will impact the hazards and how equity can be further elevated and integrated in the strategy. These additional focus areas will make sure that Prince George's County and the City of Laurel responsibly and equitably plan actions and projects that will effectively mitigate risk from natural hazards for many years to come.

**What is Hazard Mitigation?**

Hazard mitigation is any sustained action taken to reduce or eliminate long-term risk to life and property from hazards, such as flooding, winter storms, or dam failures. Disasters can cause loss of life, damage to buildings and infrastructure, and have long-lasting impacts on a community's economic, social, and environmental well-being. To help prevent this, mitigation actions are taken, such as public education and outreach programs, elevating buildings above potential floodwaters, or strengthening building codes to make sure new buildings can withstand hurricane-force winds.

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*Prince George's County's goal is to become a disaster-resilient community, so proactive mitigation planning is an important component of overall development planning.*

The purpose of mitigation planning is to both protect people and structures from damage and to minimize the costs of disaster response and recovery. Prince George's County and the City of Laurel are focusing on hazard mitigation planning to reduce risk and create a safer, more disaster-resilient community.

**Get Involved**

Public participation is critical for a successful hazard mitigation plan. The valuable knowledge from the residents and businesses of Prince George's County and the City of Laurel help produce a plan that fully integrates what matters most to people living and working in the county.

Opportunities to provide information, input, and feedback will be available throughout the planning process.

1. Review the drafted [2023 Hazard Mitigation Plan](#) and drafted [Appendices](#)
2. Attend a public meeting (see below for details on upcoming meetings).
3. Take the [Feedback Survey](#) to provide your thoughts on the planning process and the [drafted HMP](#) and [appendices](#).

**Public Meeting**

Date: Thursday, February 2nd, 2023

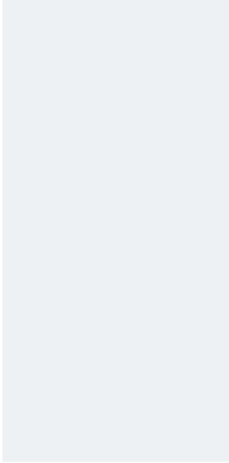
Time: 5:30 – 6:30 pm ET

Registration Link: <https://bit.ly/PublicHMP2>

Virtual Meeting Link to Join on a Computer: <https://bit.ly/PublicMeetingHMP2023>. (Meeting ID: 234 450 078 526 | Passcode: pp5T8K)

Call-In Information (audio only): +1 571-360-4685 (Phone Conference ID: 703 631 473#)

Topic and Purpose: This meeting will provide an overview of the updated 2023 Draft Hazard Mitigation Plan and allow members of the public to ask questions and give feedback on the Draft Plan. The Draft Plan will be available for review before the meeting. A feedback survey will also be available for those that would like to submit their comments and questions in advance or cannot attend the meeting.



**Meeting Recordings**

- [Mitigation Advisory Committee Kick-Off \(9/16/2022\)](#)
- [Public Meeting #1 \(11/9/2022\)](#)
- [Mitigation Advisory Committee: Risk Assessment Results \(11/16/2022\)](#)
- [Mitigation Advisory Committee Meeting #2: Strategy Meeting \(12/14/2022\)](#)
- [Final Mitigation Advisory Committee Meeting: Draft Plan Review \(2/1/2023\)](#)

**Meeting Materials**

- [Mitigation Advisory Committee Kick-Off Notes](#)
- [Mitigation Advisory Committee Kick-Off Presentation](#)
- [Public Meeting #1 Notes](#)
- [Public Meeting #1 Presentation](#)
- [Mitigation Advisory Committee Risk Assessment Review Notes](#)
- [Mitigation Advisory Committee Risk Assessment Review Presentation](#)
- [Mitigation Advisory Committee Meeting #2 Notes](#)
- [Mitigation Advisory Committee Meeting #2 Presentation](#)
- [Final Mitigation Advisory Committee Meeting Notes](#)
- [Final Mitigation Advisory Committee Meeting Presentation](#)

## F. FEMA Region III- Local Hazard Mitigation Plan Engagement Strategy Worksheet

### FEMA Region 3: Local Hazard Mitigation Plan Engagement Strategy

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FEMA Region 3 recommends that you develop an engagement strategy before you start your local hazard mitigation plan (HMP) update. This strategy will guide your planning process. It outlines when and how information is exchanged with all plan participants. This worksheet walks through key considerations for developing this strategy.

#### Getting Started: Identifying Plan Participants

Developing an engagement strategy before kicking off your HMP update will help you make sure the right partners share the right information at the right time. This helps communities work together to better identify risk and mitigation solutions. It will also help you better understand the level of effort needed for the HMP update. This starts with identifying who should be involved.

#### Who Should Be Involved?

Plan participants include the following:

- **Plan Owner:** community, county or regional planning authorities.
- **Participating Jurisdictions:** local jurisdictions within the planning area.  
*Representatives from these jurisdictions should include emergency management and public works staff, floodplain administrators, engineering, planning and zoning staff, administrative staff, Geographic Information Systems specialists, and elected officials.*
- **Plan Stakeholders:** neighboring communities, nonprofit organizations, academia, businesses and private organizations.  
*The plan must document the opportunity for the following stakeholders to be involved: agencies involved in hazard mitigation activities; agencies that regulate development; neighboring communities; representatives of businesses, academia and other private organizations; and representatives of nonprofits supporting **underserved communities and vulnerable populations**.*
- **Plan Developer:** entity responsible for pulling together all information and analyses to prepare the plan.
- **Public:** individuals who live and work in the community.  
*The plan must document the opportunity for the public to be involved.*



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FEMA Region 3: Local HMP Engagement Strategy

**Recommendation:** Work with community representatives to choose the best **public outreach approach** for their community. Your public outreach strategy may align with or can be different from your plan participant engagement strategy. This depends on the unique character and needs of each community.

When identifying plan participants for your HMP update, remember the benefits of bringing together diverse, community-based stakeholders representing the interests of the whole community:

1. Direct input from the community.
2. A shared understanding of risk.
3. Opportunities to integrate related plans, policies and projects.
4. Identification of champions for community resilience and hazard mitigation.
5. Support for implementing mitigation actions that reflect risk priorities.

Once you know who should be involved in the HMP update, you should decide how and when to engage the plan participants. This will be the foundation of your engagement strategy.

**Recommendations:** Explore [FEMA's Guides to Expanding Mitigation](#) for more ideas about who should be involved. Also, think about including partners who support [Community Lifelines](#). Going beyond traditional planning partners can expand the conversation on risk, mitigation actions and local capabilities.

Consider asking for **letters of commitment** to the planning process from plan participants, especially from participating jurisdictions. This can help make sure that community representatives have the support of their local officials throughout the process – from data sharing to plan adoption.

## Considerations: Developing an Engagement Strategy

A plan based on an equitable engagement strategy and inclusive risk communication helps guide investments to reduce risk. A wide range of public and private resources can be used effectively when there is an understanding of whole-community needs and capabilities. The following questions and considerations will help you create a robust and interactive engagement strategy for four key components of an HMP update: Planning Process, Risk Assessment, Capability Assessment and Mitigation Strategy.

### Planning Process

1. What are your expectations for plan participant involvement for each phase of the plan update?

Participants will be involved through virtual meetings, surveys, and email correspondences throughout the planning process. Participants will also have the opportunity to share their thoughts on priorities for the plan update, and give feedback on the draft plan.

Learn more at [fema.gov](https://www.fema.gov)

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**2. How do you think plan participants see their role in the update process?**

Plan participants see their role as providing their expertise to the update process. They are able to determine priority areas for the plan update and have multiple opportunities to give feedback throughout the plan update.

**3. How can plan participants support the planning process?**

Plan participants can support the planning process by attending virtual meetings, providing feedback through surveys, and reaching out with any questions or comments they may have throughout the planning process.

**4. List how many meetings you will hold during the planning process, how they will be delivered, and who will be invited.**

There will be four meetings involving the Mitigation Advisory Committee throughout the process. Each member of the Mitigation Advisory Committee will be invited to these meetings, and they will be delivered virtually. The four meetings include:

1. Kick-Off meeting
2. Hazard Identification and Risk Assessment meeting
3. Mitigation Strategy meeting
4. Draft Plan Review meeting

There will be two public meetings throughout the process. Meeting invitations will be advertised on social media to reach as many community members as possible. These meetings will also be held virtually. The two meetings include:

1. Meeting 1: Hazard Mitigation Planning overview, project updates, Hazard Identification and Risk Assessment, mitigation goal development, public questions and discussion, next steps
2. Meeting 2: Review of draft Plan update, public questions and discussion, next steps

**5. Are there upcoming meetings or events you can use to engage plan participants?**

Plan participants can begin to engage in the planning process starting with the Kick-Off meeting, and then with every following virtual meeting.

**6. How will data requests be made to plan participants (e.g., electronically, in-person hard copy at meetings, etc.)? What is the desired timeframe for response?**

Plan participants will be provided with virtual surveys to provide data for the plan update. The desired time frame for response will be announced when the surveys are sent out to participants, and will vary based on the length of the survey.

FEMA Region 3: Local HMP Engagement Strategy

<p>7. When and how do you expect plan participants to give input?</p> <p><b>Reminder:</b> Jurisdictions that want to adopt the HMP should have at least two documented instances of participation that include attending one meeting and completing one data request form.</p> <p>Plan participants can give input at any of the virtual meetings that will be hosted, and through any of the surveys that will be sent out to collect data.</p>
<p>8. Are there any potential challenges to plan participation? How will they be overcome?</p> <p><b>Example:</b> Several smaller communities within a planning area did not join the kickoff meeting. The Planning Steering Committee included county representatives who had frequent contact with these communities. They volunteered to individually reach out to the communities to share information on the HMP update and document the conversations. The communities were then able to complete forms and provide input for plan development and meet plan participation requirements.</p> <p>It may be more difficult to get participation from the City of Laurel, as it is a smaller community within the planning area. This can be overcome by asking one representative from the City of Laurel to reach out to their community to share information on the HMP update and ask them to join a virtual meeting and respond to a survey so their data can be included in the plan update.</p>
<p>9. What data, plans, reports and projects should plan participants expect to review or provide?</p> <p>Plan participants should expect to provide data on hazard locations within the County, as well as other feedback for the Hazard Identification and Risk Assessment section, including ranking the natural hazards that impact the County. Additionally, plan participants should expect to provide feedback on the Mitigation Actions to be included in the plan update, as well as feedback on the draft plan update.</p>
<p>10. Have you identified a plan developer? If so, what is their role within your engagement strategy?</p> <p>Consultants from Dewberry Engineers, LLC will serve as the plan developers. Dewberry consultants will schedule and host each virtual meeting, and create the surveys that are sent out to plan participants to acquire data for the plan update.</p>

**Recommendation:** Use the kickoff meeting for the HMP update to bring all partners to the table. There, you can use your engagement strategy to set expectations for participation and information sharing. The kickoff meeting should lay out the planning process for all participants. It should clearly explain their important role in completing the plan update.

FEMA Region 3: Local HMP Engagement Strategy

## Risk Assessment

1. How will risk data (e.g., Flood Risk Products) be shared with plan participants prior to completing the risk assessment?

Risk data will be shared with plan participants through a StoryMap created in ArcGIS Online, that includes risk data and asks for feedback from plan participants about risk within the County. Risk data will also be shared with plan participants through virtual meeting prior to completing the risk assessment.

2. Will information be shared through a group meeting? Will there be one-on-one sessions with communities?

Information will be shared through virtual meetings with both the public and the Mitigation Advisory Committee.

3. How will you ask plan participants for new or local risk information?

New and local risk information will be acquired from plan participants through an online survey and through the StoryMap that will be shared with participants. The StoryMap will have a map feature within a survey so participants can place a point on the map to represent specific locations for local risk issues.

4. What types of forms will be used to collect data? Are they hard copies or electronic?

Surveys will be used to collect data, and they will be electronic.

5. Will you ask plan participants for information on specific types of community assets (e.g., structures, infrastructure, vulnerable populations, etc.)? How will this information be used in the plan?

Plan participants will be asked about any structures, infrastructure, critical facilities, and vulnerable populations that they would like to be included in the plan update. Plan participants' specific feedback will be included in the section of the plan that it pertains to.

Learn more at [fema.gov](https://www.fema.gov)

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6. Will you include [Community Lifelines](#) in your risk assessment? *This is recommended.* How will plan participants help identify these lifelines?

Community lifelines will be included in the risk assessment. Plan participants will help identify lifelines during the virtual meetings.

7. How will risk assessment results be shared with plan participants? How will their feedback be used in the plan?

Risk assessment results will be shared with plan participants through a virtual meeting following the completion of the risk assessment. Feedback at the virtual meeting to review the risk assessment will be incorporated into the plan through edits.

8. Will the plan prioritize at-risk community assets? If so, how will plan participants be involved in prioritization?

The plan will prioritize at-risk community assets. Plan participants will be asked to prioritize assets for inclusion in the plan.

9. Based on the vulnerability analysis and prioritization of at-risk assets, will plan participants be asked to develop problem statements?

**Definition:** Problem statements are concise statements that identify key issues or problems with vulnerable community assets. The more specific the problem statement, the easier it is to find solutions.

**Example Problem Statement:** The nursing home is in a low-lying area and is flooded frequently. This causes disruption of services for residents and occasional evacuations.

Based on the vulnerability analysis and prioritization of at-risk assets, plan participants will contribute to creating problem statements. Plan developers will work with plan participants to develop problem statements.

### Capabilities Assessment

1. How will plan participants work together to review of all mitigation capabilities?

Plan participants will work together to review mitigation capabilities at a virtual meeting and through comments on the draft Capabilities Assessment section from the plan update document.

Learn more at [fema.gov](https://www.fema.gov)

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2. What criteria will plan participants use to evaluate their mitigation capabilities? What specific questions should they ask themselves?

Plan participants will use existing County plans and departments to evaluate their mitigation capabilities. They should ask themselves what systems are currently in place for mitigation, and what is needed to carry out the mitigation efforts outlined in the HMP plan update.

3. How will plan participants consider actions and opportunities to address identified needs and improvements?

Plan participants will have the opportunity to speak about actions and opportunities to address identified needs and improvements by giving feedback during virtual meetings.

**Mitigation Strategy**

1. How will you provide plan participants who are new to mitigation information on types of actions that should be included in the plan?

**Definition:** *Mitigation is action taken to reduce or eliminate long-term risk to hazards.*

Plan participants who are new to mitigation will be introduced to the mitigation strategies from the previous plan updates as an example of successful mitigation actions within the County. Dewberry consultants will also be available to answer any questions plan participants may have on mitigation throughout the plan update process.

2. How will plan participants be asked to share the status of previously identified mitigation projects? If projects were recently completed, how will you collect best practices or opportunities for improvement?

Dewberry consultants will work with the Mitigation Advisory Committee to determine the status of previously identified mitigation projects within the County. Members of the Mitigation Advisory Committee will share best practices and opportunities for improvement.

3. How will plan participants be asked to use risk assessment findings to develop mitigation actions? How will their input be used in the plan?

At a virtual meeting, plan participants will be asked to use risk assessment findings to develop new mitigation actions or update previous mitigation actions to address risks within the County. Feedback from the virtual meeting will be used to inform the Mitigation Strategy section of the HMP update.

FEMA Region 3: Local HMP Engagement Strategy

4. Will plan participants be asked to solve for specific problem statements and focused areas of concern? If so, how? Or will there be a general request for actions?

There will be a general request for actions.

5. How will plan participants help prioritize actions that mitigate risks?

Plan participants will help prioritize actions that mitigate risks through ranking actions in an electronic survey.

6. Will engagement during mitigation strategy development be on a one-on-one basis with each plan participant? Or will general forms be given out?

Engagement during mitigation strategy development will be through virtual meeting with Mitigation Advisory Committee members as well as an electronic survey for prioritizing mitigation actions.

**Recommendation:** Host a mitigation action strategy workshop. Show participants problem statements before and during the workshop. At the workshop, talk about various ways to resolve each problem statement. Emphasize the importance of including the four types of mitigation actions: (1) Local Planning and Regulations; (2) Structure and Infrastructure Projects; (3) Natural Systems Protection; and (4) Education and Awareness Programs. This will help identify a wide range of actions and project types to address specific risks and vulnerabilities.

For more information and resources to help you with your HMP update, visit the [FEMA Region 3 Hazard Mitigation Planning](#) page. You can also contact your FEMA Region 3 planner or State Hazard Mitigation Officer.

## Appendix C. Hazard History

Historical hazard events are included in this appendix. Notable historical hazard events may be found in the respective hazard sections in the Hazard Mitigation Plan. Event information has been compiled from disaster declarations, event databases, hazard mitigation grant data, online research, staff and resident anecdotes, and news articles.

### **Contents:**

7. Riverine Flood
8. Severe Storm (Flood-Related)
9. Tornado
10. Severe Storm (Wind-Related)
11. Hurricane/Tropical Storm
12. Winter Storm
13. High Wind
14. Extreme Heat
15. Dam and Levee Failure
16. Earthquake
17. Extreme Cold
18. Drought
19. Coastal Flood
20. Landslide
21. Wildfire
22. Sinkhole

## A. Riverine Flood

- 09/29/2010: Remnants of Tropical Storm Nicole produced massive amounts of rain throughout Maryland.
- 08/26/2011: Hurricane Irene did not make direct landfall, but due to the large size, hurricane conditions were felt inland. FEMA issued an Emergency declaration (FEMA-EM-3335-MD) for the incident beginning August 26, 2011.
- 09/20/2011: The remnants of Tropical Storm Lee moved across Maryland, causing widespread flooding.7 Prince Georges County experienced around 24 inches of rainfall from this storm. FEMA issued a Major Disaster declaration (FEMA-DR-4038-MD) for the incident beginning September 6, 2011. Additionally, the NOAA NCEI Storm Events Database reported two flood events – one in Upper Marlboro and one in Brown.
- 10/29/2012: Hurricane Sandy makes landfall north of the state. However, due to the tremendous size of the storm, its effects were felt all over Maryland. Over a foot of rain fell in some spots along with very gusty winds. FEMA issued Emergency (FEMA-EM-3349-MD) and Major Disaster (FEMA-DR-4091-MD) declarations for Sandy beginning October 26, 2012. Additionally, the NOAA NCEI Storm Events Database indicates one flood event was reported in Wells Corner.
- 04/30/2014 – 06/01/2014: There were at least eleven flash floods reported in the region during this time due to heavy rainfall.
- 08/12/2014: There were several flash floods and riverine flooding occurred due to heavy rainfall. The NOAA NCEI Storm Events Database indicates three flood events were reported –two in Piscataway and one in Upper Marlboro.
- 09/29/2015: A couple of flash floods and riverine flooding occurred due to heavy rainfall
- 10/10/2016: While Hurricane Matthew did not make landfall in the state, the storm still brought rain and gusty winds to Prince George's County and the City of Laurel due to its large size.
- 09/07/2018: The remnants of Hurricane Florence slowly tracked through the area with thunderstorms and rain showers, leading to instances of flooding.
- 10/11/2018: As Hurricane Michael passed south of the County, heavy rain caused flooding.
- 08/04/2020: Tropical Storm Isaias passed through Prince George's County, bringing flooding rain. Heavy rain also led to incidents of flash flooding.
- 09/10/2020: Flash flooding due to heavy rainfall flooded U.S. Route 50 in Prince George's County with up to five feet of water.
- 08/09/2021: Thunderstorms produced isolated instances of flash flooding in Prince George's County.
- 07/16/2022: A cold front dropped down from the north, causing showers and thunderstorms to develop. This led to instances of flooding and flash flooding.
- 08/10/2022: Thunderstorms caused heavy rainfall, and with a slow storm motion this led to instances of flooding and flash flooding. Multiple 911 calls were received for water rescues.

## B. Severe Storm (Flood-Related)

- 08/17/1971: FEMA Major Disaster declaration (FEMA-DR-309-MD) issued for flooding and severe storms.



- 10/4/1975: FEMA Major Disaster declaration (FEMA-DR-489-MD) issued for flooding and severe storms.
- 07/19/1996: Torrential rains estimated at 2 inches per hour caused the rapid onset of flash flooding along the Capital Beltway near Camp Springs. Two lanes were closed due to high standing water which was up to guardrail height in some spots.
- 01/28/1998: A fairly intense and slow-moving nor'easter produced a large area of moderate to heavy rains across central and lower southern Maryland beginning late on the 27th and continuing through late afternoon on the 28th. The heaviest rain fell while the storm was tracking along the South and North Carolina coastline. Storm totals ranged from 1 1/2 to 2 1/2 inches over the area, except between 3 and 4 inches across lower southern Maryland.
- 08/25/1999: Showers producing very heavy rain moved very slowly very slowly across South Central Maryland during the afternoon. The deluge caused several streets and creeks to become rapidly flowing rivers.
- 06/15/2000: A line of thunderstorms which produced winds in excess of 55 MPH, large hail, heavy rain, and frequent lighting moved across the area during the afternoon and evening of the 15th. In Prince George's County, rainfall totals included 1.93 inches in Landover, 1.90 inches on Lottsford Road, and 1.59 inches on Harry Truman Drive.
- 05/16/2003: A large area of showers and thunderstorms containing heavy downpours moved through the region between the afternoon of the 15th and the morning of the 16th. In Prince George's County, high water forced sewage to pour out of a manhole onto Indian Head Highway.
- 12/2009: Remnants of Hurricane Ida (or the November 2009 Mid Atlantic nor'easter) contributed to gusty winds and heavy rain. The NOAA NCEI Storm Events Database indicates one flood event was reported in Temple Hills.
- 09/07/2011: Abnormally moist atmosphere across the mid-Atlantic allowed showers and thunderstorms to produce exceptional rainfall rates across portions of Maryland as the remnants of Tropical Depression Lee interacted with a nearly stationary boundary near the Mason-Dixon line. Major flooding and flash flooding occurred in numerous areas.
- 06/10/2014: A frontal boundary was located across the region. Warm and humid conditions returned to the Mid Atlantic slow-moving showers and thunderstorms produced heavy rainfall in localized areas.
- 07/29/2017: A strong upper level low interacted with a frontal boundary near the Mid-Atlantic region and low pressure formed along the boundary. High moisture content and thunderstorms led to widespread flooding across the Mid-Atlantic region.
- 05/17/2018: Heavy rain fell in southern Maryland during the night of May 17th into the morning hours of the 18th. 1-4 inches of rain caused flooding, including of streams.
- 09/04/2020: Flash flooding due to heavy rainfall flooded U.S. Route 50 in Prince George's County with up to five feet of water.
- 08/09/2021: Thunderstorms produced isolated instances of flash flooding in Prince George's County.

## C. Tornado

- 06/01/2012: A short narrow damage path was encountered between Meadowhill Road and Forbes Boulevard, consisting of spotty tree damage. The debris field exhibited evidence of

cyclonic curvature consistent with a weak EF-0 tornado. This began and ended in the Buena Vista area.

- 04/19/2013: At 7:26 PM, a brief EF-0 tornado with peak winds of 85 mph touched down in Prince Georges county in the Marlboro Ridge subdivision off Ritchie Marlboro Rd. The tornado uprooted and snapped several trees. It also damaged three homes, blowing out windows and garage doors. One home had a side wall of the garage blown out when wind entered the garage through the damaged door. Several other homes on both sides of Ritchie Marlboro Road had minor siding and shingle damage. The tornado traveled a half mile before lifting and lasted less than a minute. This began in the Westphalia area and ended in the Brown area.
- 07/01/2013: After a review of radar observations, eyewitness reports and video and a ground survey, The National Weather Service Baltimore/Washington DC has confirmed a EF-0 tornado touched down in the area south of Clinton and west of Brandywine Maryland in Prince Georges County Maryland on the evening of Monday, July 1 2013. Peak winds are estimated to have been 65 mph with much of the two-mile track falling between 40 to 65 mph. Those winds were enough to snap large limbs between 6- and 12-inch diameter and top several trees. Topping means a tree was twisted and snapped high up. The only noted minor structural damage was some flashing peeled from one home in the Crestview Manor development of Eilerson Street and some minor vinyl fence damage off Whitaker Park Drive. The rotating cloud that eventually produced this tornado was seen and documented by several spotters and members of the public from Northern Charles County to where it touched down in Southern Prince Georges County. This began and ended in the Crestview Manor area.
- 09/29/2015: The National Weather Service in Baltimore MD/Washington DC has confirmed a tornado near Laurel and Scaggsville in Prince Georges and Howard counties in Maryland on September 29 2015. The National Weather Service in Baltimore MD/Washington DC has confirmed a tornado rated EF0 produced scattered damage along a path extending from Laurel, MD in northern Prince Georges County to just east of Scaggsville in southern Howard County. Based on information obtained from a ground survey conducted by a member of the National Weather Service of storm damage in southern Howard County and a detailed damage report from the Director of Public Works for the City of Laurel, it was determined that an EF0 tornado produced intermittent damage along a 4 mile path extending from just southeast of Laurel, MD to a point about 1 mile east of Scaggsville, MD. The tornado first produced damage shortly after 10pm Tuesday evening in Laurel, MD. It damaged the facade of a commercial building near the intersection of Fort Meade Rd and Maryland Route 197. It then moved northwest and into downtown Laurel causing multiple tree damage, along with damage to several roofs. A portion of one home had a small part of its roof peeled back and several commercial buildings lost roof material. Damage in Laurel was limited to a several block areas bounded by North Second Street, Fetty Alley, Avondale St and the Little Patuxent River. The tornado then crossed the Little Patuxent River into Howard County. Based upon this ground survey along with analysis of available NWS and FAA radar data and interviews with persons along the path, the NWS in Sterling confirms an EF0 tornado occurred. This began and ended in the Laurel area.
- 07/05/2018: A supercell thunderstorm spawned a brief EF1 tornado just north of Bowie, MD in Prince Georges County late on Tuesday afternoon July 5th, 2022, between 5:31 and 5:34 PM EDT. This supercell spawned along the Howard/Montgomery County line as a result of a remnant mesoscale convective vortex moving through the region which had moved through the Ohio Valley earlier in the day. It evolved into a cluster of cells initially before splitting off into an

individual supercell that would develop rotation as it moved out of southeastern Montgomery County into northwestern Prince Georges County. The tornado caused extensive tree damage in the Somerset subdivision just north of Bowie, MD. There was also one instance where a tree had fallen on top of a residence near the intersection of Stafford Lane near Saber Lane. However, there were several other trees down in the area outside of the more concentrated tornadic damage, particularly along Buckingham Drive perpendicular to White Marsh Branch. At this location along Buckingham Drive, trees fell upon power lines, snapping several supporting utility poles. The tornado initially touched down around Tarragon Lane and tracked eastward over the Bowie High School Annex before tracking into the Somerset subdivision, where the majority of the damage was observed. The tornado would then lift just before reaching southern portions of Whitemarsh Park.

*Table 1. NCEI Historical tornado events in Prince George's County*

<b>Fujita Scale</b>	<b>Date</b>	<b>Community Affected</b>	<b>Deaths</b>	<b>Injuries</b>	<b>Property Damages</b>	<b>Total Damages</b>
EF1	05 July 2018	Bowie	0	0	n/a	n/a
EF0	29 Sep 2015	Laurel	0	0	\$0	\$0
EF0	01 July 2013	Crestview Manor	0	0	\$500	\$500
EF0	19 April 2013	Westphalia	0	0	\$25,000	\$5,000
EF0	01 June 2012	Buena Vista	0	0	\$2,000	\$2,000
EF0	08 May 2008	Clinton Hyde Fld Arp	0	0	\$100,000	\$100,000
EF0	08 May 2008	Woods Corner	0	0	\$50,000	\$50,000
EF1	20 Apr 2008	University Park	0	0	\$40,000	\$40,000
F3	24 Sep 2001	Hyattsville	2	55	\$100,000,000	\$100,000,000
F1	25 May 2001	Brandywine	0	0	\$25,000	\$25,000
F1	21 Jun 2000	Laurel	0	0	\$150,000	\$150,000
F1	13 May 2000	Brandywine	0	0	\$100,000	\$100,000
F0	24 Jun 1996	Andrews AFB	0	0	\$200,000	\$200,000
F1	24 Jun 1996	Upper Marlboro	0	0	\$500,000	\$500,000

Fujita Scale	Date	Community Affected	Deaths	Injuries	Property Damages	Total Damages
F2	05 Oct 1995	Temple Hills	0	3	\$5,000,000	\$5,000,000
F1	18 May 1995	Cheverly	0	2	\$2,000,000	\$2,000,000

## D. Severe Storm (Wind-Related)

- 5/4/2012: A large tree about one foot in diameter was blown down by thunderstorm winds. A stationary boundary combined with warm and humid air ahead of it to trigger showers and thunderstorms. An isolated thunderstorm produced damaging winds.
- 6/1/2012: Trees were heavily damaged with limbs of 8 to 12 inches ripped off from strong thunderstorm winds. Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes.
- 6/1/2012: Multiple trees were blown down across train tracks near the town of Cheverly. Low pressure tracked through the Ohio Valley and into the Great Lakes. The warm front associated with this system passed through our region during the first. Plenty of moisture from the Gulf of Mexico and the Atlantic Ocean combined with strong forcing associated with the warm front, causing thunderstorms to develop. Moderate instability along with strong forcing caused some thunderstorms to become severe. Wind speed and direction changed rapidly with height near the warm front. This caused rotating thunderstorms, and some of them were able to produce tornadoes.
- 6/22/2012: About 20 trees, with the largest 15-20 inches in diameter, were ripped out of the ground. Two walls of a concrete building near the intersection of University Blvd. and West Park Dr. were damaged. An upper-level trough and associated cold front moved across Maryland, northern Virginia and eastern West Virginia during the afternoon and evening of the 22nd. High humidity and instability values provided the ingredients for severe storms to develop early in the afternoon and linger into the late evening hours.
- 6/22/2012: Several large branches about eight inches in diameter were blown down by strong thunderstorm winds. An upper-level trough and associated cold front moved across Maryland, northern Virginia and eastern West Virginia during the afternoon and evening of the 22nd. High humidity and instability values provided the ingredients for severe storms to develop early in the afternoon and linger into the late evening hours.
- 6/22/2012: Extensive damage occurred to buildings and trees along Newton Street. Roof damage was sustained at an apartment building with several hundred people displaced. An upper-level trough and associated cold front moved across Maryland, northern Virginia and eastern West Virginia during the afternoon and evening of the 22nd. High humidity and instability values

provided the ingredients for severe storms to develop early in the afternoon and linger into the late evening hours.

- 6/22/2012: A wind gust of 58 mph was measured in Springdale. An upper-level trough and associated cold front moved across Maryland, northern Virginia and eastern West Virginia during the afternoon and evening of the 22nd. High humidity and instability values provided the ingredients for severe storms to develop early in the afternoon and linger into the late evening hours.
- 6/29/2012: A roof was partially torn off a seven-story building. A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage.
- 6/29/2012: A wind gust around 51 knots was measured near Suitland. A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage.
- 6/29/2012: Several trees were down. A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage. A wind gust of 68 mph was measured near Calverton. A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage. A wind gust of 76 mph was measured near Seat Pleasant. A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage. A wind gust of 68 mph was measured near Morningside. A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage. A wind gust of 61 mph was measured. A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage. A wind gust of 61 mph was measured. A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage. Trees were down along Green Street

and Woodyard Road and at Green Street and Perth Drive. A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage. Several power poles were snapped. Homes lost shingles and blown out upper windows. Widespread tree damage was also reported. A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage. A large tree was down and a road sign was snapped by the wind. A strong upper-level disturbance passed through the region in a northwest flow aloft. Extremely hot and humid conditions caused high amounts of instability. The upper-level disturbance triggered a line of thunderstorms that moved through the area. Due to the high instability, thunderstorms caused widespread wind damage.

- 7/28/2012: A wind gust of 60 mph was measured. A cold front along with an upper-level trough moved into the area on the 28th. Showers and thunderstorms developed near the cold front. There was enough instability from cooler air aloft associated with the upper-level trough for thunderstorms to produce damaging wind gusts.
- 9/8/2012: A cold front crossed WV in the morning and made it to the I-95 corridor by the evening. Increased instability led to prefrontal showers and thunderstorms that were capable of damaging winds. There were power flashes observed from OPCS in new building. This corresponds with where the tornado warning was issued. A cold front crossed WV in the morning and made it to the I-95 corridor by the evening. Increased instability led to prefrontal showers and thunderstorms that were capable of damaging winds. There were multiple large trees with branches up to a foot in diameter downed in Fox Run Estates. Trees consisted of pine trees, bradford pears and oak trees. There was a tree down in the roadway at US 301 North at Collington Road. A cold front crossed WV in the morning and made it to the I-95 corridor by the evening. Increased instability led to prefrontal showers and thunderstorms that were capable of damaging winds. There was a tree down near US 50 and the US 301 North interchange.
- 9/18/2012: There was a tree down blocking eastbound lane on Suitland Parkway near Silver Hill Road. A cold front moved through the region and showers and severe thunderstorms occurred across the Mid Atlantic. A strong low-level jet drove activity through the Interstate 95 corridor and abundant amounts of moisture produced heavy rain. There was a tree down covering a vehicle on Maryland State Route 295 near route. There was a tree down near Suitland Parkway and Silver Hill Road. There were downed trees covering right lane of Maryland State Route 295 near 197.
- 4/19/2013: There were two treetops sheared off at residence on Woodyard Road. A cold front moved across the Mid-Atlantic and was accompanied by showers and thunderstorms that produced gusty winds. A strong jet of 50 knot winds was located at 850 mb or about a mile off the surface.
- 5/28/2013: There was a tree down near 13200 block of Brandywine Road. A shortwave trough moved north of the region. Organized convection developed near the I-95 corridor where instability was the greatest. Scattered showers and thunderstorms produced large hail, heavy rainfall and damaging winds. There were two large trees down near 6700 Block of Floral Park Road. There was a tree down on the 8500 block of Timothy Road. There were multiple tree branches about four inches in diameter broken off and on the ground. There was a tree down on

Molly Berry Road near North Keys. There was a tree down near the intersection of Cross Road trail and North Keys Road.

- 6/13/2013: A cold front stalled across the Mid-Atlantic and low pressure formed and moved along it. Southerly flow advected gulf moisture into the region and showers and thunderstorms easily formed. Heavy rain, hail, damaging winds and tornadoes occurred throughout the day. There was one tree uprooted into a house at 5900 Parkway Drive. There was a tree down on Park Hall Drive near Sandy Spring Road.
- 5/22/2014: There was a tree reported down at the entrance to Bowie State University. A warm front lifted northward across the Mid-Atlantic and showers and thunderstorms formed across the Central Foothills where breaks in the clouds led to increased instability. Thunderstorms spread east and north as the boundary moved northward. There was a tree down near the intersection of Maddox Lane and Laurel Bowie Road. There was a tree down in the driveway on Oxhill Court in Bowie.
- 6/18/2014: There was a tree down on a home near the intersection of Oxon Hill Road and Fort Foote Road. A weak cold front moved across the Mid-Atlantic region while hot and humid conditions led to an unstable environment. Showers and thunderstorms formed in vicinity of the front in the afternoon and some thunderstorms led to damaging winds. There were a couple of large trees uprooted. There were large branches broken with one into the back window of a vehicle. There were multiple trees onto power lines along Bella Vista Terrace extending from Bella Vista Court to Cagle Road to Riverview Road. There were trees down on Andrews Air Force Base. There were trees down near the intersection of Ritchie Marlboro Road and Pennsylvania Avenue. There were trees down in the Croom area. There was a tree down on US 301 South at Old Crain Highway.
- 6/25/2014: There was a tree down on wires at the intersection of Baltimore Avenue and Contee Place. A cold front moved across the region and showers and thunderstorms formed in a warm moist environment. Some thunderstorms produced damaging winds and heavy rain that led to flash flooding. There was a tree down on wires on Central Avenue at the beltway.
- 7/3/2014: The Mid-Atlantic was in between a cold front approaching from the Appalachian Mountains and Hurricane Arthur off the Delaware Coast. Warm and humid conditions were across the region and showers and thunderstorms led to heavy rain. Unstable conditions led to severe thunderstorms that produced damaging winds and large hail. There was structural damage to a building along Route 1.
- 6/18/2015: A tree was reported down on Phoebe Lane. The Mid-Atlantic remained in the warm sector as a nearly stalled warm front lingered just north of the Mason-Dixon line and the associated cold front swung in from the west by the evening. The unstable air mass led to SBCAPE values between 2000-3500 J/kg while effective shear values were between 30-40 knots.
- 6/30/2015: A tree was reported down at the intersection of Crane Highway and Trade Zone Ave. A warm front passed through the area while an upper-level trough approached from the west. A southerly flow behind the front caused an unstable atmosphere, and moderate amounts of instability developed due to colder air aloft ahead of the approaching trough. There was enough instability for some thunderstorms to become severe as a cold front approached from the west.
- 7/1/2015: A tree was reported down on Upshur St at 46th St. A line of showers and thunderstorms with embedded severe thunderstorms moved through the region ahead of an

approaching cold front. Southerly flow ahead of the front resulted in modest instability and shear. Multiple branches between 3 and 4 inches thick were reported down along Beaver Dam Rd. A gas station canopy was toppled over. Reported by WUSA 9 CBS. A tree was reported down at the intersection of Springfield Rd and Good Luck Rd. Several branches 8 inches to 1 foot thick were reported down at the intersection of 5th St and Maple Ave. Several large trees were uprooted along NW Branch. Trained spotter PGN152.

- 8/11/2015: A 10 inch in diameter tree limb was snapped near the intersection of Crain Hwy and Route 4. Reported by spotter PGE38. Scattered showers and isolated thunderstorms formed as an upper level trough swung through the northeast overnight. An abundance of moisture from persistent southerly flow led to enough instability to result in scattered convection and embedded stronger to severe thunderstorms.
- 2/24/2016: Multiple trees and power lines were reported down. Strong low pressure moved from the deep south to the Great Lakes, dragging a cold front through the Mid-Atlantic. Strong veering winds as a warm front lifted north ahead of the cold front led to increased sheer across the area. This combined with marginal instability led to multiple rounds of thunderstorms, with embedded severe with strong winds and small hail and multiple tornadic cells.
- 5/2/2016: Numerous trees reported down with power outages across College Park. A cold front moved through the Mid-Atlantic region and showers and thunderstorms developed ahead and along the frontal boundary. Many thunderstorms became severe with large hail and damaging winds. Five trees were reported down, that hit 2 homes and 3 sheds. Reported by Capital Weather Gang. Estimated 50 to 60 mph wind gusts in Hyattsville. Numerous trees were reported down around Hyattsville. House damage due to fallen tree. House damage due to fallen tree along Princess Garden Pwky. A fallen tree damaged a house.
- 6/21/2016: A tree fell onto a house at the 12300 block Lisborough Rd. Reported by Washington Post. Scattered showers and thunderstorms formed ahead of an approaching cold front. Plenty of warm air and moisture advection on unilateral southerly flow provided the instability and shear to be conducive for thunderstorm development. Multiple trees down near NWR visitors center. A tree fell on a car in Bowie Town Center. Reported by Washington Post.
- 6/28/2016: A roof of a parking garage was damaged. Reported by former NWS student intern. A cold front swung through the region. With increased instability and shear ahead of the system, scattered thunderstorms with embedded severe developed.
- 7/18/2016: Large tree limbs were snapped near the intersection of Candy Hill road and Croom Road. A cold front passed through the area. Ahead of the front, hot and humid conditions led to an unstable atmosphere. The forcing from the cold front combined with the instability to trigger thunderstorms. Stronger shear from an upper-level trough caused some thunderstorms to become severe.
- 7/19/2016: A tree was down on Woodyard Road at Sherwood Drive. A boundary stalled over the area. Warm and humid conditions led to an unstable atmosphere while an upper-level trough passed through the area. The forcing from the boundary front combined with the instability to trigger thunderstorms. Stronger shear from the upper-level trough caused some thunderstorms to become severe.
- 8/15/2016: Multiple trees were down on wires. A southwest flow caused hot and humid conditions over the area. A pressure trough triggered showers and thunderstorms, and some became severe due to the unstable atmosphere. Large tree limb down and blocking southbound side of



soil Conservation Road between Powder Mill Road and Beaver Dam Road. Multiple trees were down. Several large trees two to two and one-half feet in diameter were knocked over or uprooted near Pine Lane, Livingston Road and Route 210. Several trees were down along Livingston Road.

- 8/17/2016: Damage was done to a metro transit warehouse roof and bay door. A southwest flow caused hot and humid conditions over the area. A pressure trough triggered showers and thunderstorms, and some became severe due to the unstable atmosphere. A wind gust of 66 mph was recorded. Trees were down at the intersection of Locust Glen Drive and Enterprise Road.
- 2/12/2017: A wind gust of 72 mph was reported at Andrews Air Force Base. A strong cold front passed through during the evening hours of the 13th. A line of showers developed along the front and they were able to mix down strong winds from aloft.
- 3/1/2017: There were multiple reports of wires down in Hyattsville. A potent cold front passed through on the 1st. A southwest flow ushered in warm and moist air ahead of the boundary. Showers and a few thunderstorms developed, and they were able to mix down strong winds from aloft. A wind gust of 58 mph was reported. There were multiple reports of wires down in the Marlboro area. A wind gust of 60 mph was reported. A wind gust of 58 mph was reported in Bowie. A wind gust of 58 mph was reported.
- 4/6/2017: A wind gust of 66 mph was reported. Cutoff low pressure was over the Ohio Valley. Another area of low pressure strengthened overhead on the occluded boundary. Warm and moist air from the south lead to an unstable atmosphere. Strong shear profiles were in place due to the cutoff low to the west. Strong lift associated with the developing low combined with strong shear and enough instability to produce severe thunderstorms. A wind gust of 68 mph was reported. Trees were down near Bowie. Five large trees were down in the neighborhood off of Moylan Drive. Trees were down on power lines as well as houses and cars in the area of Milan Way. Wind gusts of 59 mph were reported near Bowie.
- 4/20/2017: A large tree fell onto a couple townhomes along Greenspire Terrace. High pressure was centered to the south and this allowed warm and moist air to move into the area. A few thunderstorms became severe due to the unstable atmosphere. Structural damage was reported to an Apartment building on Metzertott Road.
- 4/21/2017: Large trees were down on power lines near the intersection of Route 4 and Old Crain Highway. A cold front moved through the area. Ahead of the boundary, a southwest flow led to warm and humid conditions. The unstable atmosphere from warm and humid conditions along with stronger winds aloft caused some storms to become severe.
- 5/5/2017: A tree was down in the 3800 Block of 37th place. Low pressure was located across the Tennessee Valley while a strong low level jet transported moisture into the Mid-Atlantic. Showers and thunderstorms developed across Maryland and the unstable atmosphere caused a few thunderstorms to become severe.
- 5/19/2017: Several large branches were down at the Cross Creek Golf Club. A warm and humid air mass led to the development of thunderstorms. A few thunderstorms became severe due to stronger winds aloft.
- 6/19/2017 Numerous large trees were down around Lake Artemesia. A potent cold front passed through the area. Warm and humid conditions along with forcing from the boundary caused showers and thunderstorms to develop. Stronger winds aloft caused some storms to

become severe. A part of a tree was snapped off onto a portion of the road near the intersection of Adelphi Road and University Boulevard. A 12 to 14 inch in diameter tree fell onto the fence on Ridge Road. A large tree limb fell in the road near MD 202 and Kettering Drive. Two large trees were down along the intersection of Silvergate Lane and Silverbrook Way in Bowie. A few trees were down on Goddard Space Flight Center's campus.

- 7/1/2017: A tree limb six inches in diameter fell onto a house. A cold front moved into the area triggering showers and thunderstorms. Hot and humid air ahead of the boundary caused an unstable air mass, which led to some thunderstorms becoming severe. A tree was down blocking Croom Road near Whites Landing Road.
- 7/14/2017: A tree was down along the 8600 Block of Temple Hill Road. A cold front passed through the area. At the same time, an upper-level trough passed through increasing the winds aloft. There was enough shear to combine with an unstable atmosphere for severe thunderstorms to develop. A wind gust of 58 mph was reported. A tree was down along 7909 Pinewood Drive.
- 7/22/2017: A tree was down blocking Golden Pass Lane. A weak boundary moved into the area, but hot and humid conditions led to moderate to high amounts of instability. An upper-level trough increased winds aloft which caused storms associated with the boundary to become severe.
- 7/23/2017: A tree was down along the intersection of Lanham Severn Road and Louise Street. A boundary remained over Maryland near and east of Interstate 95. The boundary triggered showers and thunderstorms. Moderate to high amounts of instability along with stronger winds aloft led to some storms becoming severe.
- 8/3/2017: A tree was down near Church Road and Mount Oak Road. A weak boundary along with hot and humid air caused thunderstorms to develop. A few thunderstorms became severe due to high amounts of instability. Several large trees were down and uprooted.
- 8/12/2017: Several large six inch in diameter tree limbs were down along Nottingham Road and Molly Berry Road. A cold front and an unstable atmosphere led to some severe thunderstorms.
- 5/14/2018: Trees were down along Route 4 at Dower House Road. Low pressure passed through the area on the 14th. The low tracked along a boundary that separated warm and humid air to the south and west from cooler marine air to the north and east. The warm and humid air led to an unstable atmosphere, and there was enough instability for storms to become severe. Trees were down along Route 193 at Lisborough Road.
- 7/17/2018: A tree six inches in diameter was down blocking a lane of traffic on Brinkley Road. A cold front passed through on the 17th, and southwest winds ahead of the boundary led to an unstable atmosphere. The instability combined with the lift from the cold front to produce severe thunderstorms.
- 7/22/2018: A tree fell on power lines blocking the westbound ramp from MD-214 to US-301 Crain Highway. A cutoff low from the jet stream developed just to our west on the 22nd. A couple thunderstorms became severe due to an unstable atmosphere and stronger winds that were able to mix down from aloft.
- 8/7/2018: A tree was blown down at the intersection of Brandywine Road and Ashbox Road. A tree was also blown down at the intersection of Cederville Road and Brandywine Road. An upper level low near the region combined with high instability and increasing winds aloft to produce thunderstorms, some of which became severe.
- 8/13/2018: A tree was blown down in the 5300 block of Eastern Avenue Northeast. An upper level low pressure system combined with high amounts of moisture and instability to

produce thunderstorms. A few storms became severe. Numerous trees were blown down in the College Park area.

- 3/22/2019; A wind gust of 50 knots (58 mph) was measured at Templeton Elementary School. A potent upper level trough as well as a surface cold front crossed the region during the afternoon of March 22nd. Out ahead of the trough, surface heating and cold upper levels were able to generate marginal amounts of surface instability. This was enough to generate scattered showers and a few thunderstorms as the front and trough passed across the area. Steep low level lapse rates and low freezing levels allowed for some of these thunderstorms to become locally severe. A tree was blown down near the intersection of MD Route 193 and MD Route 214.
- 4/15/2019: A wind gust of 60 mph (52 knots) was measured at KMDRIVER3 near Hyattsville. A warm front crossed the state of Maryland from south to north during the morning hours of April 14th, allowing for increasing warm and moist air to move overhead. During the afternoon and evening, low pressure moved through the Ohio Valley and into the eastern Great Lakes, leading to an increase in the wind field across all levels and therefore an increase in deep layer shear. Instability remained somewhat limited, but was enough to produce showers and scattered thunderstorms during the afternoon and evening hours, a couple of which became severe. A second round of showers and thunderstorms then moved across the state as a strong cold front crossed the region during the late evening and overnight hours. These thunderstorms took the form of a quasi-linear convective system which became severe and produced locally damaging winds. A wind gust of 62 mph (54 knots) was measured at LNDSH near Seat Pleasant. A tree was blown down across Maryland Route 197 at Old Laurel-Bowie Road. A tree was blown down across a portion of Maryland Route 373 near Newasa Lane. A tree was blown down near the intersection of Croom Road and Mount Calvert Road. All southbound lanes of Maryland Route 202 Largo Road were blocked by a fallen tree at Watkins Lane Drive.
- 4/26/2019: Numerous trees were blown down in the Lanham area, including a few onto houses and power lines. An upper level trough east of the Mississippi River on the morning of April 26th deepened and closed off over the eastern Great Lakes by the morning of April 27th. A forced convective line was ongoing in the morning hours of April 26th over West Virginia and progressed eastward into Maryland during the afternoon hours. A few individual cells also formed ahead of this convective line. Modest instability developed during the late morning and early afternoon hours which helped to support showers and thunderstorms across the region, and this combined with moderate levels of wind speed shear, led to strong to severe thunderstorms which produced locally damaging winds. There was also enough low level directional shear to produce a tornado in central Maryland. A tree was blown down near the intersection of Maryland Route 564 and 98th Avenue. Two trees were blown down alongside the ramp from I-495 Capital Beltway Inner Loop to I-95 northbound.
- 5/2/2019: A tree was reported blown down on the outbound lane of Pennsylvania Avenue near Suitland Parkway. A warm front lifted across the region during the morning hours of May 2nd, with warm and humid conditions developing by the afternoon. This led to ample amounts of instability over the region, and as an upper level disturbance moved into the area providing wind shear and lift, scattered showers and thunderstorms developed, a few of which became severe.
- 5/23/2019: A tree was blown down onto a house. A warm front crossed the region during the morning hours of May 23rd, placing the area in the warm sector by the afternoon hours. At the same time, surface low pressure tracked across the northern Great Lakes, with an attendant cold front moving into the Ohio Valley by the evening. A mesoscale convective system (MCS) was

ongoing during the morning hours and moved eastward and into the region during the afternoon hours. Out ahead of the MCS, moisture and warmth increased with moderate instability developing. Aloft, wind shear increased throughout the day and became quite substantial by the late afternoon. The MCS entered Maryland by the mid afternoon hours and intensified into a linear feature that produced damaging winds and one tornado before exiting during the evening. Multiple trees and utility poles were blown down throughout Prince Georges County.

- 5/30/2019: A tree was blown down on a house in the 3200 block of Maygreen Avenue. On the morning of May 30th a surface front was positioned across Pennsylvania, with a surface low positioned west of Chicago, Illinois. Through the day the surface low moved eastward along the frontal boundary, reaching western Pennsylvania by late in the afternoon. The low then quickly pushed eastward off the NJ coastline by late in the evening, with a cold front crossing the region. In addition, two disturbances aloft moved across the area, one during the mid to late afternoon hours, and another in the evening. Out ahead of the front, warmth and humidity allowed for the development of moderate instability and that coupled with moderate wind shear aloft set the stage for two rounds of scattered showers and thunderstorms, some of which became severe. Two tornadoes occurred across central Maryland.
- 6/17/2019: Multiple trees were blown down in Kettering along MD-193. While large scale forcing was weak across the region on June 17th, a zone of differential heating and a weak lee trough near the Blue Ridge, when combined with local terrain and sea-breeze circulations, were enough to generate scattered thunderstorms across the region during the afternoon and evening hours. Marginal instability and sufficient wind shear promoted the growth of some of these thunderstorms to severe levels. Several trees and telephone poles and wires were blown down.
- 6/28/2019: Numerous trees were blown down in the Capitol Heights and Suitland area, including several onto houses. While large scale forcing was weak, moderate amounts of instability combined with local terrain circulations and remnant mesoscale boundaries to generate scattered showers and thunderstorms in the afternoon. With steep low level lapse rates, a few of these storms became strong to locally severe.
- 6/29/2019: Tree limbs were blown down onto power lines in the Laurel area. Heat and humidity through the day on June 29th led to a moderately unstable air mass by the afternoon. A weak pressure trough developed and heights began to fall by the evening as an upper level ridge broke down. Also late in the evening, a cold front began to approach, increasing forcing across the region. Several rounds of scattered showers and thunderstorms developed from the mid afternoon hours through well past sunset. Some thunderstorms became strong to severe. Tree limbs were blown down onto power lines in the Riverdale area. Heat and humidity through the day on June 29th led to a moderately unstable air mass by the afternoon.
- 7/2/2019: A tree was blown down at the intersection of Old Annapolis Road and Collington Road. Wires were also blown down in the 9800 block of Franklin Avenue and in the 12400 block of Canfield Lane. Increasing temperatures and low level moisture led to developing instability across the region during the day of July 2nd. The strongest mid-level forcing remained to the north across northern PA/OH where a stationary boundary lingered. However, a weak upper level shortwave trough moving through did help showers and scattered thunderstorms to develop across the state, and given the instability a few became severe. A tree was blown down in the 3900 block of Winchester Lane. A tree was blown down onto wires in the 8600 block of Old Brown's Lane.

- 7/4/2019: Large tree limbs were blown down onto power lines in the 3500 block of Madonna Lane. Heat and plentiful low level moisture led to the development of instability and therefore scattered showers and thunderstorms during the afternoon of July 4th. While forcing was limited, some of the thunderstorms did briefly become pulse severe.
- 7/6/2019: Multiple trees and wires were blown down in the Hyattsville area. An approaching cold front coupled with upper level shortwave energy and instability across the region led to the development of afternoon scattered showers and thunderstorms. Several of these thunderstorms became severe. Trees and wires were blown down in the Upper Marlboro area.
- 7/11/2019: A couple of trees and several large branches were blown down in the Berwyn Heights area. A cold front approached from the west during the day of July 11th, with warm and moist air advection occurring on southerly flow. This promoted the development of significant amounts of instability, and that coupled with an approaching shortwave trough and modest shear values, led to the generation of scattered showers and thunderstorms, some of which became severe.
- 7/17/2019: A tree was blown down on Steed Road. On July 17th, the remnant circulation of Barry moved into Pennsylvania with a surface pressure trough out ahead of it over the Mid-Atlantic. Out ahead of the circulation, a hot, humid, and unstable air mass was in place, and this helped to initiate scattered to numerous showers and thunderstorms in the afternoon. Some of these thunderstorms became strong to locally severe.
- 7/22/2019: Trees and wires were reported down across Fort Washington Road. Falling heights, an increasing southwest flow aloft, an approaching cold front, and strengthening pressure trough overhead combined with instability from a hot and humid air mass in place to trigger showers and thunderstorms during the afternoon hours of July 22nd. With high levels of CAPE and increased shear profiles, thunderstorms became strong to severe as they organized into linear structures.
- 8/5/2019: A couple of large tree limbs were blown down. An upper-level trough moved overhead during the afternoon and evening hours of August 5th while a weak surface trough remained positioned near the area as well. A southwest flow aloft ahead of the trough helped to usher in warmth and humidity, which led to the development of marginal instability across the region. This led to the formation of scattered showers and thunderstorms, a couple of which became locally severe.
- 8/20/2019: A 50-knot (58 mph) wind gust was measured at Andrews Air Force Base. A mesoscale convective system (MCS) and its associated energy was moving across central West Virginia on the morning of August 20th. As this moved eastward into the region during the afternoon and evening hours, it served as the focus for additional shower and thunderstorm development. Significant amounts of instability and steepening low level lapse rates led some of these thunderstorms to become severe.
- 8/21/2019: A 55-knot (63 mph) wind gust was measured at College Park Airport. A single engine, 4000-pound airplane flipped and began leaking fuel. A tree was blown down on wires along Dartmouth Avenue. Another tree was blown down onto a house on Girard Avenue. A tree was blown down on Pony Trail Lane. Several other trees were blown down along Calvert Road. An upper level trough crossed the Appalachian Mountains during the morning of August 21st and moved through the region during the mid to late afternoon hours, followed by a second weaker trough in the evening. At the surface, a weak pressure trough gradually pushed eastward through the day as well. Modest amounts of instability and deep layer shear were present during the afternoon and evening when these features moved across and a few isolated strong to locally

severe thunderstorms were able to develop in central Maryland near Washington DC. A tree was blown down on wires on Newton Street.

- 2/7/2020: Large tree branch down onto power lines near the intersection of Largo Road and Hancock Drive. An area of low pressure formed over the area in response to an impressive longwave trough approaching from the west. A line of low-topped showers and thunderstorms formed along the system's cold front, leading to the formation of multiple tornadoes within the high shear-low CAPE environment. These tornadoes, along with straight-line winds from other storms, produced widespread damage across much of central and northern Maryland.
- 4/13/2020: Wires were blown down in the 5800 block of Burgundy Street. A very strong cold front passed through the area while a potent upper-level trough was positioned just to our west. Strong winds aloft were able to mix down in heavier showers and thunderstorms due to an unstable atmosphere. Low-level winds changing speed and direction with height combined with a thunderstorm to trigger an isolated tornado. A tree was blown down onto Rhode Island Avenue near Edgewood Road.
- 6/25/2020: Trees were blown down on Largo Road in Upper Marlboro. An unseasonably strong upper-level trough interacted with a modestly unstable environment over the Middle Atlantic to produce several supercell thunderstorms which transitioned into small bowing line segments across far eastern West Virginia, central Maryland and northern Virginia. The storms produce substantial and relatively widespread wind damage and some hail along their path, though the storms themselves were isolated to widely scattered in nature.
- 7/4/2020: Tree damage was reported near Bowie, including a tree down on eastbound MD-214 Central Avenue at US-301 Crain Highway. An isolated severe thunderstorm developed over central Maryland on the afternoon of Saturday, July 4th, 2020, causing some wind damage.
- 7/6/2020: A tree was blown down near the I-95/I-495 Capital Beltway Interchange. A second tree was blown down on I-95/I-495 Capital Beltway near MD-295 Baltimore-Washington Parkway. A third tree was blown down onto MD-295 Baltimore-Washington Parkway near Powder Mill Road. An upper-level disturbance triggered scattered to numerous showers and thunderstorms. The very unstable lower-level air mass resulted in an environment conducive to downburst winds, some of which were significant. Trees were blown down in the area of MD-197 Collington Road and US-50 John Hanson Highway. Trees down in the area of Branch Avenue and Silver Hill Road. Trees were blown down in Upper Marlboro, including one onto a house. A tree blew down near the intersection of MD-381 Brandywine Road and Kathleen Lane. A tree blew down near the intersection of MD-373 Accokeek Road and MD-5 Branch Avenue.
- 7/20/2020: Numerous trees and power lines were blown down near Friendly, particularly in the vicinity of Livingston Road. Some power poles were snapped by falling trees and large snapped branches. Isolated severe thunderstorms developed near and southwest of the DC metro during the late afternoon and early evening hours of Monday, July 20th, 2020.
- 7/22/2020: Trees were blown down near Upper Marlboro, including on US-301 Crain Highway near Sasscer Lane, and on MD-382 Croom Road near Mattaponi Road. An upper-level trough interacted with a stalled surface front draped over the Mid-Atlantic resulting in scattered to numerous showers and thunderstorms developing in the lee of the Appalachians Mountains as early as midday. The storms coalesced into a bow echo moved eastward across central Maryland and northern Virginia (including the DC metro) during the mid afternoon. Thunderstorms exited the area by nightfall.

- 7/23/2020: Several trees were blown down in the Oxon Hill area. A few severe thunderstorms developed along a weak, stalled front. Several trees were blown down in the Bladensburg area.
- 7/31/2020: Trees were reported down in Largo, including on westbound MD-202 Largo Road at MD-214 Central Avenue. A stalled front ignited scattered strong to severe thunderstorms across east-central Virginia into central/southern Maryland.
- 8/3/2020: Trees and large branches were blown down in the area of MD-382 Croom Road and Molly Berry Road. A band of showers and thunderstorms developed well ahead of Tropical Cyclone Isaias. Some of the thunderstorms in the band produced damaging wind gusts. A few isolated cells just ahead of the band also produced severe weather.
- 8/25/2020: A tree blew down onto a house on Pritchard Lane. An outflow boundary from a decaying convective system triggered an isolated severe thunderstorm over northern Virginia around midday. A cold front then triggered an organized line of thunderstorms which produced scattered to numerous damaging wind gusts over eastern West Virginia, western Maryland, and northern into central Virginia as well as the DC metro area.
- 9/3/2020: A tree blew down onto MD-193 University Boulevard East at Metzert Road. A disturbance (the remnant of convection from the day before over the Tennessee River Valley) triggered a few supercells and line segments from eastern West Virginia into the Washington/Baltimore metro areas. A tree was blown down blocking Belle Chasse Boulevard. A tree was blown down onto MD-197 near Muirkirk Road. Dozens of trees and wires were blown down in the Lanham and Springdale area. A 50-knot (58 MPH) wind gust was measured by a mesonet at Hyattsville Middle School. A tree blew down onto wires along MD-193 Enterprise Road at Locust Dale Court. Trees were blown down on MD-201 Kenilworth Avenue near MD-295 Baltimore-Washington Parkway.
- 11/15/2020: Trees were blown down between Beltsville and Bladensburg, including one on MD-295 Baltimore-Washington Parkway near MD-410. A strong cold front spawned a line of low-topped showers and thunderstorms that produced wind gusts of up to 70 MPH and numerous instances of downed trees.
- 5/26/2021: Several trees were reported down near Friendly, including a tree that blew down on MD-210 Indian Head Highway at Old Fort Road. A pre-frontal trough and approaching cold front ignited multiple rounds of severe thunderstorms during the afternoon and evening hours. Some thunderstorms produced significant microbursts. Widespread wind damage was reported near Tantallon and Fort Washington. Half a dozen trees blew down onto houses, with several more falling on cars. Numerous other trees, branches and wires were reported down. One person was injured when a tree fell on a house in the 13300 block of Pendleton Street in Fort Washington. A tree blew down onto an occupied car in the 10900 block of Sweetgum Way; the occupant was uninjured. Another tree blew down in the 9000 block of MD-223 Piscataway Road. Trees were reported down in the Upper Marlboro area. A building under construction collapsed in the 3700 block of US-301 Crain Highway. A tree blew down on MD-4 Pennsylvania Avenue near MD-717 Water Street.
- 6/8/2021: A tree blew down in a yard in Capitol Heights. Several other trees and large branches were blown down in the area. An isolated thunderstorm caused tree damage just east of DC.
- 6/14/2021: A tree blew down onto northbound MD-295 Baltimore-Washington Parkway north of MD-450 Annapolis Road. A cold front spawned several clusters of supercells that produced hail and wind during the evening hours.

- 7/1/2021: A tree blew down on southbound MD-295 Baltimore-Washington Parkway past NASA Goddard. Two rounds of severe thunderstorms produced two tornadoes, hail, and widespread wind damage (some significant) across the DC metro and central Maryland, with spottier wind damage extending into the Baltimore area. A tree blew down on MD-704 Martin Luther King Junior Highway near Sheriff Road. A couple dozen trees and large tree limbs were blown down in Mitchellville, including along MD-193 Enterprise Road between MD-214 Central Avenue and Woodmore Road. A large tree and multiple tree limbs were blown down in the 7700 block of Hanover Parkway. A tree blew down near the intersection of MD-223 Woodyard Road and Welshire Drive. A few dozen trees and large limbs were blown down in the vicinity of the US-301 Crain Highway/MD-214 Central Avenue interchange. A couple dozen trees and large limbs were blown down near Bowie. Trees blew down near the intersection of MD-197 Collington Road near Lyle Lane, Gallant Fox Lane, and Tulip Grove Drive. Numerous trees blew down just southeast of Bowie, including at residence where about a dozen 100 foot tall trees snapped near the top. A couple dozen trees and large branches blew down in Capitol Heights. A tree blew down onto a house on Highview Place near Hillview Court. Several large branches blew down nearby. Dozens of large tree limbs were snapped in the 5700 block of Falkland Place and on adjacent Rollins Avenue north of Walker Road as well as along Brooke Road.
- 7/21/2021: A tree blew down on northbound I-295 Anacostia Freeway at I-95/I-495 Capital Beltway. Several thunderstorms ahead of a cold front produced widely scattered instances of wind damage. A tree blew down onto a residence in the 4800 block of Indian Head Highway. Several wires blew down in the area.
- 7/29/2021: A few trees blew down in the Hyattsville area. Supercell thunderstorms produced large hail, damaging wind and a tornado during the afternoon hours. The hardest hit areas were near Columbia, Maryland, and near Falmouth, Virginia. Numerous trees, branches and wires blew down in the Landover area. Trees blew down along MD-214 Central Avenue near Hill Road/Shady Glen Drive.
- 8/9/2021: Several trees blew down in the Greenbelt area. A tree blew down near the I-95/I-495 Capital Beltway/MD-450 Annapolis Road interchange. A tree blew down onto northbound I-95/I-495 Capital Beltway Outer Loop at Exit 22A/MD-295 Baltimore-Washington Parkway. A tree blew down on northbound MD-295 Baltimore-Washington Parkway near I-95/I-495 Capital Beltway. A tree blew down on northbound MD-295 Baltimore-Washington Parkway at Good Luck Road. A tree blew down on northbound MD-295 Baltimore-Washington Parkway near MD-410 Riverdale Road. A cluster of thunderstorms produced a few downbursts from Northeast DC into nearby adjacent metro Maryland and over southeastern Anne Arundel County.
- 8/13/2021: Trees blew down on southbound MD-197 near Race Track Road. A cold front intersected an extremely unstable airmass. The result was numerous strong to severe thunderstorms containing damaging wind gusts and some hail. Trees blew down near the intersection of MD-193 Watkins Park Drive and Keverton Drive. Trees blew down on MD-193 Watkins Park Drive near Oak Grove Road. Trees blew down on MD-4 Southern Maryland Boulevard near MD-408 Mount Zion Marlboro Road. Trees blew down near the intersection of MD-725 Main Street and MD-202 Largo Road.
- 8/14/2021: Trees blew down near the intersection of MD-381 Aquasco Road and Aquasco Farm Road. Thunderstorms ignited along a stalled front and produced several instances of wind damage.



- 8/26/2021: A tree was reported down on northbound MD-382 Croom Road at River Airport Road. Isolated severe thunderstorms produced a few instances of wind damage over central and western Maryland.
- 9/1/2021: A tree blew down onto a house off of Harkins Road. The remnants of Ida produced two tornadoes and sporadic straight line wind damage.
- 5/16/2022: Trees blew down between Fort Washington and Piscataway. A large tree blew down blocking the right lanes of southbound MD-210 Indian Head Highway near Piscataway Creek. An intense supercell thunderstorm spawned by a strong cold front and negatively-tilted upper-level trough resulted in a swath of considerable wind damage and significant hail from parts of northern Virginia, across the southern suburbs of Washington DC, to southern Maryland. A tree blew down in the 7000 block of Livingston Road. A tree blew down in the 14000 block of Brandywine Road.
- 5/22/2022: Wires blew down in the 2200 block of Cool Spring Road. A strong cold front produced multiple rounds of strong to severe thunderstorms resulting in isolated large hail and scattered wind damage. Wires blew down in the 4500 block of Dallas Place. Wires blew down in the 1100 block of Baltimore Lane.
- 5/27/2022: Trees blew down along MD-210 Indian Head Highway near the intersection of Palmer Road/Livingston Road. Multiple rounds of severe thunderstorms spawned by a strong cold front produced hail, scattered damaging wind gusts, and a couple of tornadoes. Tree damage was reported in Marlow Heights, including a tree that blew down onto wires near the intersection of Fisher Road and Brinkley Road.
- 6/2/2022: Tree damage was reported near the DC/Prince Georges County line, including a tree that blew down blocking all lanes of Michigan Avenue Northeast at Eastern Avenue Northeast. Scattered to numerous showers and thunderstorms produced isolated instances of large hail and wind damage. Tree damage was reported near the University of Maryland, including trees that blew down onto westbound MD-431 Campus Drive prior to Diamondback Drive. Tree damage was reported near New Carrollton, including trees that blew down MD-564 Lanham Severn Road between Santa Cruz Street and Woodstream Drive.

## E. Hurricane/Tropical Storm

- 06/23/1972: FEMA Major Disaster declaration (FEMA-DR-351-MD) issued for flooding from remnants of Hurricane Agnes.
- 09/16/1999: 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 by evening on the 16th. A total of 5 to 8 inches fell across Baltimore, Prince George's, and Charles Counties. In Prince George's County, road crews cleared 500 trees from roadways. More than 60,000 customers lost power. Two people were injured and one person was killed by carbon monoxide fumes after losing power and running a generator inside their home
- 09/18/2003: FEMA Major Disaster declaration (FEMA-DR-1492-MD) issued for flooding from remnants of Hurricane Isabel.
- 12/2009: Remnants of Hurricane Ida (or the November 2009 Mid Atlantic nor'easter) contributed to gusty winds and heavy rain. Prince Georges County had high water on the Patuxent, Potomac and Anacostia River fronts. Much of the shoreline has a good rise protecting it from flooding, but three roads were closed from flooding and some property may also have been impacted.
- 08/27/2011: Hurricane Irene tracked up the Mid-Atlantic Coast during the evening hours of the 27th through the early morning hours of the 28th. Irene passed by just to the east of Ocean City, Maryland during the early morning hours of the 28th. The minimum central pressure was 958 millibars and maximum sustained winds were 80 mph, making Irene a category one hurricane. Irene produced tropical storm conditions across portions Maryland near and east of the Interstate 95 Corridor. Hundreds of trees were down across the county. At least one tree fell onto a house and another fell onto a car. Power outages were in the tens of thousands.
- 08/04/2020: Tropical Storm Isaias moved up the east coast, passing through southern Maryland on the morning of Tuesday, August 4th, 2020, spawning several tornadoes as well as flooding rain and tropical storm force winds. Sustained winds of 31 mph reported at the Andrews Air Force Base ASOS (KADW) at 8:03 AM EST, with a peak wind gust of 44 mph at 8:19 AM EST. Isolated reports of trees down across the county, but no significant damage reported.

## F. Winter Storm

- 01/7/1996: Prince George's experienced a blizzard between 01/06/1996 and 1/12/1996 that resulted in 1 death. The total damage caused by this event was approximately \$56,290. This event was considered a Declared Disaster by FEMA.
- 03/13/1993: A severe snowfall and winter storm occurred from 3/13/1993 to 3/17/1993 and was declared as an Emergency Declaration by FEMA.
- 02/08/1994: Prince George's County experienced severe winter weather and ice storms between 02/08/1994 and 02/18/1994 and was declared as a disaster by FEMA.
- 01/25/2000: Between 01/25/2000 and 01/30/2000, the county experienced a severe winter storm and was declared as a disaster by FEMA.
- 02/14/2003: There was an Emergency Declaration by FEMA for the county due to a severe snowstorm that occurred between 02/14/2003 and 02/23/2003.
- 02/05/2010: Between 02/05/2010 and 02/11/2010 there was a severe winter storm and snowstorm that FEMA declared as a disaster.

- 6/22/2012: Estimated quarter size hail fell along Bladensburg Road. An upper-level trough and associated cold front moved across Maryland, northern Virginia and eastern West Virginia during the afternoon and evening of the 22nd. High humidity and instability values provided the ingredients for severe storms to develop early in the afternoon and linger into the late evening hours.
- 5/28/2013: A shortwave trough moved north of the region. Organized convection developed near the I-95 corridor where instability was the greatest. Scattered showers and thunderstorms produced large hail, heavy rainfall and damaging winds.
- 01/22/2016: On 01/22/2016 and 01/23/2016 an incident of a severe winter storm and snowstorm occurred that was declared a disaster by FEMA.
- 7/1/2016: Quarter sized hail was reported near Bowie. A cold front passed through the area on July 1st. A southerly flow ahead of the boundary caused warm and humid air in place, which led to an unstable atmosphere. The instability combined with lift from the cold front caused thunderstorms to develop. Some thunderstorms were severe due to stronger sheer profiles from an upper-level trough overhead along with the unstable atmosphere.
- 4/21/2017: Quarter sized hail was reported. A cold front moved through the area. Ahead of the boundary, a southwest flow led to warm and humid conditions. The unstable atmosphere from warm and humid conditions along with stronger winds aloft caused some storms to become severe.
- 4/21/2017: Quarter sized hail was reported. A cold front moved through the area. Ahead of the boundary, a southwest flow led to warm and humid conditions. The unstable atmosphere from warm and humid conditions along with stronger winds aloft caused some storms to become severe.
- 4/21/2017: Half dollar sized hail was reported. A cold front moved through the area. Ahead of the boundary, a southwest flow led to warm and humid conditions. The unstable atmosphere from warm and humid conditions along with stronger winds aloft caused some storms to become severe.
- 8/13/2018: Hail up to the size of quarters fell at this location. An upper level low pressure system combined with high amounts of moisture and instability to produce thunderstorms. A few storms became severe.
- 6/17/2019: Hail up to the size of golf balls (1.75 in diameter) was reported. While large scale forcing was weak across the region on June 17th, a zone of differential heating and a weak lee trough near the Blue Ridge, when combined with local terrain and sea-breeze circulations, were enough to generate scattered thunderstorms across the region during the afternoon and evening hours. Marginal instability and sufficient wind shear promoted the growth of some of these thunderstorms to severe levels.
- 8/20/2019: Up to half-dollar sized hail (1.25 in diameter) reported near Andrews Air Force Base. A mesoscale convective system (MCS) and its associated energy was moving across central West Virginia on the morning of August 20th. As this moved eastward into the region during the afternoon and evening hours, it served as the focus for additional shower and thunderstorm development. Significant amounts of instability and steepening low level lapse rates led some of these thunderstorms to become severe.

- 8/28/2020: Golf ball size hail was reported on Brinkley Road near Camp Springs. A broken line of strong to severe thunderstorms developed southward into the area from Pennsylvania during the mid to late afternoon and early evening hours.
- 7/1/2021: Quarter size hail was reported near Glenn Dale. Two rounds of severe thunderstorms produced two tornadoes, hail, and widespread wind damage (some significant) across the DC metro and central Maryland, with spottier wind damage extending into the Baltimore area.
- 7/1/2021: Quarter size hail was reported southeast of Glenn Dale. Two rounds of severe thunderstorms produced two tornadoes, hail, and widespread wind damage (some significant) across the DC metro and central Maryland, with spottier wind damage extending into the Baltimore area.
- 7/1/2021: Hail up to golf ball size was reported northwest of Bowie. Two rounds of severe thunderstorms produced two tornadoes, hail, and widespread wind damage (some significant) across the DC metro and central Maryland, with spottier wind damage extending into the Baltimore area.
- 7/1/2021: Quarter size hail was reported just north of Bowie. Two rounds of severe thunderstorms produced two tornadoes, hail, and widespread wind damage (some significant) across the DC metro and central Maryland, with spottier wind damage extending into the Baltimore area.
- 7/1/2021: Quarter size hail was reported just south of Crofton. Two rounds of severe thunderstorms produced two tornadoes, hail, and widespread wind damage (some significant) across the DC metro and central Maryland, with spottier wind damage extending into the Baltimore area.
- 7/26/2021: Half dollar size hail was reported near Andrews Air Force Base. A pair of fronts spawned two clusters of severe thunderstorms that produced localized considerable wind damage near Staunton, Virginia, Silver Spring, Maryland, and Washington, DC.
- 5/16/2022: Ping pong ball size hail was reported near Baden. An intense supercell thunderstorm spawned by a strong cold front and negatively tilted upper-level trough resulted in a swath of considerable wind damage and significant hail from parts of northern Virginia, across the southern suburbs of Washington DC, to southern Maryland.
- 6/2/2022: Quarter size hail was reported northwest of Lower Marlboro. Scattered to numerous showers and thunderstorms produced isolated instances of large hail and wind damage.

## G. High Wind

- 10/29/2012: Hurricane Sandy moved up the Atlantic coast and then turned Northwest and made landfall northeast of MD. Heavy rain and high winds over spread coastal regions and most of Maryland, eastern panhandle of West Virginia and Northern Virginia. Heavy rain caused flooding and river flooding. Estimated wind gusts of 60 mph caused damage to seventeen residences.
- 03/12/2014: A cold front moved through the Mid Atlantic while sharp pressure rises occurred behind the frontal passage. Gusty Northwest winds occurred across the region with widespread gusts up to 55 mph with localized higher amounts. Estimated gusts of 50 knots blew down trees across the county.
- 02/14/2015 – 02/15/2015; Strong gradient winds formed as a resulting of a tight pressure gradient between low pressure near New England and high pressure building in from the Midwest. Multiple sources in surrounding areas measured gusts up to 60 mph and sustained winds up to 40 mph.

- 04/02/2016: A strong cold front swung through the Mid-Atlantic. Surge of cold air advection immediately and then again after the frontal passage resulted in two rounds of strong winds, one with a squall line that formed along the front and another more pro-longed with the synoptic flow. Several trees were reported down across College Park with one tree falling on a car, injuring the two occupants.
- 04/03/2016: A strong cold front swung through the Mid-Atlantic. Surge of cold air advection immediately and then again after the frontal passage resulted in two rounds of strong winds, one with a squall line that formed along the front and another more pro-longed with the synoptic flow. Reported by site near Seat Pleasant. Gusts between 48 and 60 mph reported across the county.
- 04/03/2016: A strong cold front swung through the Mid-Atlantic. Surge of cold air advection immediately and then again after the frontal passage resulted in two rounds of strong winds, one with a squall line that formed along the front and another more pro-longed with the synoptic flow. A tree was reported down on a car at 49th St and Lakawanna Dr in College Park, with 2 injuries.
- 02/12/2017: Low pressure rapidly intensified as it moved up the New England coast. A strong pressure gradient between the low and high pressure over the Midwest caused high winds. A wind gust of 72 mph was reported at Andrews Air Force Base. A wind gust of 58 mph was also reported at 11:32 pm.
- 03/02/2018 – 03/03/2018: A low pressure system moving eastward from the central United States on Thursday March 1st, intensified rapidly as it moved offshore Thursday night and early Friday, deepening to 974 mb by the evening of Friday March 2nd. Strong winds were present in the low levels of the atmosphere due to the strengthening pressure gradient and were able to mix down to the surface in strong wind gusts under northwest flow cold air advection. A wind gust of 58 mph was reported in Upper Marlboro. A wind gust of 61 mph was reported at Andrews Air Force Base. Numerous trees were down across the county from high winds. The Prince Georges County 911 center reported approximately 1000 wind-related calls, mainly for trees and wires down.
- 02/25/2019: An area of low pressure rapidly intensified as it moved from the Mid-Mississippi Valley northward into the Great Lakes from late in the evening of February 24th and into the morning hours of February 25th. The low then tracked northeastward into Canada during the remainder of the 25th. A secondary area of low pressure also developed along the Mid-Atlantic coastline and moved into New England. Strong winds associated with the system led to high wind gusts across the majority of Maryland north and west of Interstate 95. Wind gusts of up to 58 mph were estimated. There were also several reports of downed trees and wires.
- 04/13/2020: Strong low pressure to the northwest along with high pressure over the Atlantic resulted in a strong pressure gradient over southern Maryland. This led to high winds with gusts in excess of 58 mph. Wind gusts were estimated to be around 50 knots based on observations nearby.
- 10/11/2018: After Hurricane Michael made landfall near Mexico Beach, Florida with maximum sustained winds of 155 mph and minimum central pressure of 919 mb on Wednesday October 10th, it weakened to a tropical storm as it tracked northeastward through Georgia and South Carolina. The tropical storm then tracked across North Carolina and southeast Virginia Thursday and Thursday night, October 11th, emerging back into the Atlantic Ocean early Friday morning, October 12th. As the system passed south of the region, heavy rain then caused instances of flooding, and strong winds brought down trees. Across Maryland, maximum sustained winds

reached 38 mph, peak wind gusts reached 62 mph, and some rainfall totals were observed in excess of 6 inches. A tree was blown down on Maryland Route 381 in Eagle Harbor.

- 02/25/2019: An area of low pressure rapidly intensified as it moved from the Mid-Mississippi Valley northward into the Great Lakes from late in the evening of February 24th and into the morning hours of February 25th. Wind gusts of up to 58 mph were estimated. There were also several reports of downed trees and wires.
- 04/13/2020: Strong low pressure to the northwest along with high pressure over the Atlantic resulted in a strong pressure gradient over southern Maryland. This led to high winds with gusts in excess of 58 mph. Wind gusts were estimated to be around 50 knots based on observations nearby.

## H. Extreme Heat

- 07/04/1999: Record high temperatures were recorded in the area. State police reported 20 vehicles were disabled by the heat, and AAA responded to 600 heat related service calls across the state. Power companies reported record high energy consumption during the late afternoon of the 5th and 6th. High demand for electrical power blew transformers. 5 people in Prince George's County were treated for heat-related illnesses.
- 07/28/2002 - 07/29/2002: During a heat wave in 2002, heat index values reached 100 to 110 degrees over a two-day period. One heat-related fatality was reported in Prince George's County.
- 08/01/2002 - 08/05/2002: Another heat wave in summer of 2002 led to heat indices of up to 110 degrees in Prince George's County. Two heat-related fatalities were reported in the county throughout this five-day heat wave period.
- 06/09/2008: A strong ridge of high pressure set up across the eastern United States for several days in early- to mid-June in 2008. High temperatures combined with dew points in the lower 70s allowed heat index values to reach near 105 degrees in lower southern Maryland. The County opened cooling stations, and one heat-related death was reported.
- 07/04/2010: In July 2010, a ridge of high pressure aloft along with a southwest flow around surface high pressure resulted in hot and humid conditions during the Fourth of July through the 8th. Temperatures on the 6th and 7th of July soared past 100 degrees. Prince Georges County authorities reported that twenty-eight people were taken to the hospital due to heat-related illnesses from July 4th through July 8th.
- 07/22/2011: In July 2011, a strong upper-level high pressure build up over Prince George's County led to heat indices as high as 120 degrees. Hot and humid conditions led to numerous reports of heat-related illnesses in the region. Heat indices up to 118 degrees were reported at Andrews Air Force Base. Unfortunately, one fatality was reported due to the high heat in the County.
- 08/13/2016: A southerly flow around high pressure ushered in unseasonably hot and humid conditions. Heat indices around 110 degrees were reported at observations nearby.
- 07/03/2018: An upper-level high along with surface high over the western Atlantic led to hot and humid conditions. Heat indices around 110 degrees were reported.
- 07/19/2019- 07/21/2019: Temperatures from the mid 90s to around 100 degrees combined with dew points in the 70s to create dangerously high heat index values. Heat index values exceeded 110 degrees. A 65+ year old female died due to heat-related conditions.

## I. Dam and Levee Failure

*No recorded events*

## J. Earthquake

- August 23, 2011: A 5.8 magnitude (V-VI intensity) earthquake had an epicenter near Louisa, VA outside of Richmond, VA. Damage was widespread in Prince George's County, but there were no serious injuries or deaths reported. However, there were reports of falling objects, foundation cracks, and other structural damage. Over 200 public schools were closed pending safety inspections after the earthquake. Two apartment buildings were condemned, displacing hundreds of people who were housed in a County shelter for a couple of nights.
- July 16, 2010: A 3.6 magnitude earthquake was reported in the Potomac-Shenandoah Region. The epicenter was located near Germantown, MD, but it was felt across the entire region. The USGS categorized the quake as "minor." However, the USGS said it was the largest recorded earthquake within 50 kilometers of D.C. since a database was created to track activity in 1974.
- February 23, 2005: A 2 magnitude earthquake occurred in the Chesapeake Bay region. The earthquake was considered "very minor" and had an epicenter in Baltimore County, about 6 miles beneath the surface.
- December 9, 2003: A 4.5 magnitude earthquake occurred 28 miles west of Richmond in rural Powhatan County, VA. This earthquake was felt in Prince George's County. Light shaking was reported by residents in the area, but no injuries or major damage.

## K. Extreme Cold

- 01/21/2000: During the morning of the 21st, northwest winds were blowing at 15 to 30 MPH. Temperatures across the region were in the teens. This resulted in wind chill readings from 10 to 25 degrees below zero between midnight and 10 AM. The winds also caused snow that had fallen in the past 24 hours to drift back onto roads, resulting in a difficult morning commute.
- 01/27/2000: High pressure was centered directly over the Mid-Atlantic region on the 28th and 29th. The combination of clear skies, calm winds, and a snowpack led to unusually cold temperatures. On the morning of the 28th and 29th, the mercury dropped into the single digits above and below zero in many locations.
- 04/19/2001: High pressure over the Mid-Atlantic region created calm winds and clear skies during the early morning hours of the 19th. These conditions in combination with a chilly airmass in place allowed temperatures to plummet into the mid-20s to lower 30s between 3 and 7 AM EDT. This resulted in a hard freeze which unfortunately was preceded by unseasonably warm weather which had caused many plants to bloom early. Homeowners and nurseries with outdoor vegetation reported losses.
- 01/05/2018: Cold/Wind Chill – Arctic air and gusty winds caused low wind chills to develop.
- 01/21/2019: Cold/Wind Chill – A low-pressure system moved up the eastern seaboard of the United States on January 20th, with cold temperatures and strong northwest winds funneling behind the system from the night of the 20th into the morning of the 21st. This produced very low wind chills across much of the state.

- 01/30/2019: Cold/Wind Chill – A low-pressure system moved into southeastern Canada on January 30th, with a cold front crossing through the Mid-Atlantic states. Cold temperatures and strong northwest winds followed behind the front on the night of the 30th and into the morning of the 31st. This was able to produce very low wind chills across much of the state.

## L. Drought

- 08/01/1998 – 08/1/1998: Persistent high pressure brought unusually dry weather to central and lower southern Maryland. By mid-month, the Maryland Department of Agriculture reported that 51 percent of the state's corn crop and 56 percent of the soybean crop was rated "fair" to "very poor". In addition, the tobacco crop was showing signs of water stress by the end of the month.
- 11/01/1998: This was the fifth month in a row that drought conditions were seen across Central and Northern Maryland. Persistent high pressure over the Southeast U.S. forced most rain producing low pressure systems to steer north of the region. Water levels and reserves were greatly affected by the persistent drought.
- 05/01/1999 – 09/01/1999: The county experienced a drought that lasted five months. High pressure was the dominant weather feature across Maryland during the month. This weather pattern directed rain producing low pressure systems north of the region and continued the climatological drought throughout the months.
- 08/27/2002: Recorded that 100% of the county was experiencing a drought of category D3 (Extreme Drought) and 57.31% of the county was categorized as D4 (Exceptional Drought)
- 10/01/2007: Severe Drought conditions persisted through October. Many counties and cities in Maryland posted both voluntary and mandatory water restrictions throughout the month.

## M. Coastal Flood

- August 1933 - This unnamed hurricane caused flooding along the Potomac River and throughout the Chesapeake Bay; the Livingston Bridge on Piscataway Creek also flooded.
- October 1954 - Hurricane Hazel raised water levels in the Potomac River Basin; statewide, the storm caused 6 deaths and an estimated \$11.5 million in damage.
- August 1955 - Hurricane Connie caused riverine flooding that inundated a large commercial section of Upper Marlboro and flooded several buildings along Piscataway Creek; surge reached 4 feet above normal at the confluence of Patuxent River with Western Branch.
- June 1972 - Tropical Storm Agnes; this storm of record brought high water levels along the Patuxent and Potomac River basins; statewide, it caused 19 deaths and \$80 million in damage; in Prince George's County, the storm caused more than \$10 million in damage.
- November 1985 - Hurricane Juan affected the Potomac River Basin; Prince George's County was included in the major disaster declaration.
- September 1996 - Hurricane Fran; remnants of this large storm caused flooding along the Potomac River Basin; Prince George's County was included in the major disaster declaration.
- September 2011 - Tropical Storm Lee; this storm brought heavy rain and high water levels along the Patuxent River and Western Branch; it caused severe flooding in Upper Marlboro.



## N. Landslide

- 1975: A landslide occurred causing damage to 25 homes and approximately \$500,000 worth of damage.
- 05/2014: Heavy rains triggered a landslide in the Piscataway Hills community of Fort Washington. The landslide impacted 28 homes, damaged local roads and water lines, and required approximately \$15 million in hillside restoration and infrastructure repairs.

## O. Wildfire

- 02/19/2011 - 02/20/2011: There were two counts of fires categorized as Fire Size E (300 to 999 Acres). On the 19<sup>th</sup>, the fire affected 431 acres of land while the fire that occurred on the 20<sup>th</sup> affected 344.18 acres, totaling approximately 775 acres of land.

Table 2: Number of Wildfires from 1992 to 2018 in Prince George's County

Political Area	Fire Size Code	Fire Description	Total Fires
City of Laurel	--	--	--
District 1	A	0.25 Acres or less	1
	B	0.26 to 9.9 Acres	3
	C	10.0 to 99.9 Acres	1
District 2	B	0.26 to 9.9 Acres	1
District 3	B	0.26 to 9.9 Acres	4
District 4	A	0.25 Acres or less	6
	B	0.26 to 9.9 Acres	15
District 5	B	0.26 to 9.9 Acres	1
District 6	A	0.25 Acres or less	1
	B	0.26 to 9.9 Acres	1
District 7	A	0.25 Acres or less	1
	B	0.26 to 9.9 Acres	1
District 8	B	0.26 to 9.9 Acres	2
	C	10.0 to 99.9 Acres	1
District 9	A	0.25 Acres or less	13
	B	0.26 to 9.9 Acres	29

Political Area	Fire Size Code	Fire Description	Total Fires
	C	10.0 to 99.9 Acres	3
	E	300 to 999 Acres	2
<b>Total</b>			<b>88</b>

## P. Sinkhole

- 05/11/2008 - 5/12/2008: A significant subsidence incident occurred after 12 hours of continuous and relatively uniformly distributed rainfall (average 0.25-inch rain/hour). The area behind five homes on the south side of Yorkville Road was affected, resulting in the formation of a sinkhole approximately 500 feet long, 100 feet wide, and 10 feet deep. In 2009, the Department of Environmental Resources obtained FEMA HMGP funds to acquire the properties, demolish the homes, stabilize the site, and retain the land as open space.

## Appendix D. Critical Facility Hazard Analysis

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- 23. Table Key for Critical Facility Hazard Analysis
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- 25. City of Laurel Critical Facility Hazard Analysis

## A. Table Key for Critical Facility Hazard Analysis

The table key below provides an explanation of the codes for the hazard risk area designations. Only the hazards with applicable, defined hazard risk areas are included in this analysis.

### **Table Key**

- **Flood Zone:**
  - X-unshaded = Facility located in an area of minimal flood hazard, which are the areas outside the SFHA and higher than the elevation of the 0.2% annual chance (i.e., 500-year) flood
  - X-shaded = Facility located in an area of moderate flood hazard between the limits of the base flood (i.e., 1% annual chance or 100-year) and the 0.2% annual chance flood
  - A = Facility located in an area subject to inundation by the 1% annual chance flood event; generally determined using approximate methodologies. Detailed hydraulic analyses have not been performed, so no Base Flood Elevations or flood depths are available
  - AE = Facility located in an area subject to inundation by the 1% annual chance flood event determined by detailed methods
- **Floodway:**
  - Yes = Facility located in a mapped floodway
  - No = Facility not located in a mapped floodway
- **Wildland Urban Interface:**
  - Interface = Facility located in a developed area that abuts wildland vegetation
  - Intermix = Facility located in an area where structures and wildland vegetation intermingle
  - Other = Facility not located in wildfire interface or intermix
- **Earthquake:**
  - High = High risk of being impacted by an earthquake
  - Medium = Medium risk of being impacted by an earthquake
  - Low = Low risk of being impacted by an earthquake
- **Dam Inundation:**
  - Duckett Dam = Facility located in the Duckett Dam inundation area
  - Lake Arbor Dam = Facility located in the Lake Arbor Dam inundation area
  - Largo Town Center Dam = Facility located in the Largo Town Center Dam inundation area
  - Laurel Lake Dam = Facility located in the Laurel Lake Dam inundation area
  - None = Facility not located in a mapped dam inundation area<sup>1</sup>

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<sup>1</sup> Not all dams within the planning area have inundation data/mapping available, so facilities with the “none” designation may either be outside of a dam inundation area or in a dam inundation area for a dam that does not have inundation data/mapping available. See the “Dam and Levee Failure” section of the “Risk Assessment” chapter of the Hazard Mitigation Plan for more information.

## B. Prince George's County Critical Facility Hazard Analysis

Table 3. Critical facility hazard area analysis for Prince George's County

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Chemical	Air Gas East, Inc. - Bladensburg Plant	2900 52nd Avenue	X-unshaded	No	Other	Low	None
Chemical	Baxter Healthcare Corporation	12040 Indian Creek Court	X-unshaded	No	Other	Low	None
Chemical	Chem-Met Company	6419 Yochelson Place	X-unshaded	No	Other	Low	None
Chemical	Jeong H. Kim Engineering Building	University of Maryland	X-unshaded	No	Other	Low	None
Chemical	New Dawn Manufacturing Company / Daycon's Corporate Headquarters	16001 Trade Zone Avenue	X-unshaded	No	Other	Low	None
Chemical	R and D Cross Inc.	13801 Martin Road	X-unshaded	No	Intermix	Low	None
Chemical	R and D Cross of Upper Marlboro	15610 Marlboro Pike	X-unshaded	No	Other	Low	None
Chemical	Radiation Service Organization, Inc.	P.O. Box 1526 (5204 Minnick Rd)	X-unshaded	No	Other	Low	None
Chemical	Roberts Oxygen Inc.	4811 Stamp Road	X-unshaded	No	Other	Low	None
Chemical	Rockwood Pigments	7011 Muirkirk Road	X-unshaded	No	Other	Low	None
Chemical	Sherwin Williams	10406 Tucker Street	X-unshaded	No	Other	Low	None
Communications	AiNet	11700 Montgomery Rd	X-unshaded	No	Other	Low	None
Communications	OITC Data Center Cc	9201 Basil Ct. #B8	X-unshaded	No	Other	Low	None
Communications	Verizon Communications Inc.	7020 Virginia Manor Rd	X-unshaded	No	Other	Low	None
Dams	Allen Pond Dam	N/A	X-unshaded	No	Other	Low	None
Dams	Cash Creek Dam	N/A	X-unshaded	No	Other	Low	None
Dams	Clinton Regional Park Dam	N/A	X-unshaded	No	Other	Low	None
Dams	Contee Main Settling Pond Dam	N/A	X-unshaded	No	Other	Low	None
Dams	Greenbelt Dam	N/A	X-unshaded	No	Other	Low	None
Dams	Northampton Lake Dam	N/A	X-unshaded	No	Other	Low	None
Dams	Redington Lake Dam	N/A	X-unshaded	No	Other	Low	None
Dams	Rocky Gorge Dam	N/A	A	No	Other	Low	Duckett Dam
Dams	Soil Conservation Service Lake Dam	N/A	X-unshaded	No	Other	Low	None
Defense Industrial Base	Beretta U.S.A. Corp.	17601 Beretta Drive	X-unshaded	No	Interface	Low	None
Emergency Services	Accokeek Volunteer Fire Department Station 24	16111 Livingston Road	X-unshaded	No	Intermix	Low	None
Emergency Services	Allentown Road Volunteer Fire Department Station 32	8709 Allentown Road	X-unshaded	No	Other	Low	None
Emergency Services	Allentown Road Volunteer Fire Department Station 47	10900 Fort Washington Road	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Emergency Services	Beltsville Volunteer Fire Department Sta 31	4911 Prince George's Avenue	X-unshaded	No	Other	Low	None
Emergency Services	Beltsville Volunteer Fire Department Sta 41	3939 Powder Mill Road	X-unshaded	No	Other	Low	None
Emergency Services	Berwyn Heights Police Dept.	5700 Berwyn Road	X-unshaded	No	Other	Low	None
Emergency Services	Berwyn Heights Volunteer Fire Department Sta 14	8811 60th Avenue	X-unshaded	No	Other	Low	None
Emergency Services	Bladensburg Police Department	4910 Tilden Road	X-unshaded	No	Other	Low	None
Emergency Services	Bladensburg Volunteer Fire Department Sta. 9	4213 Edmonston Road	X-unshaded	No	Other	Low	None
Emergency Services	Boulevard Heights Volunteer Fire Department Sta 17	4101 Alton Street	X-unshaded	No	Other	Low	None
Emergency Services	Bowie Volunteer Fire Department & Rescue Squad	3262 Superior Lane Suite 270	X-unshaded	No	Interface	Low	None
Emergency Services	Bowie Volunteer Fire Department Sta 39	15454 Annapolis Road	X-unshaded	No	Interface	Low	None
Emergency Services	Bowie Volunteer Fire Department Sta 43	16408 Pointer Ridge Drive	X-unshaded	No	Interface	Low	None
Emergency Services	Branchville Volunteer Fire Company Station 11	4905 Branchville Road	X-unshaded	No	Other	Low	None
Emergency Services	Brandywine Volunteer Fire Department	14201 Brandywine Road	X-unshaded	No	Other	Low	None
Emergency Services	Brentwood Volunteer Fire Department	3712 Utah Avenue	X-shaded	No	Other	Low	None
Emergency Services	Bunker Hill Volunteer Fire Department	3716 Rhode Island Avenue	X-unshaded	No	Other	Low	None
Emergency Services	Capitol Heights Volunteer Fire Department, Sta. 5	6061 Central Avenue	X-unshaded	No	Other	Low	None
Emergency Services	Captiol Heights Police Department	401 Capitol Heights Blvd.	X-unshaded	No	Other	Low	None
Emergency Services	Chapel Oaks Volunteer Fire Department	5544 Sheriff Road	X-unshaded	No	Other	Low	None
Emergency Services	Chillum Fire Station Station 44	6330 Riggs Road,	X-unshaded	No	Other	Low	None
Emergency Services	Chillum-Adelphi Volunteer Fire Department	7833 Riggs Road	X-unshaded	No	Other	Low	None
Emergency Services	Clinton Volunteer Fire Department Sta 25	9025 Woodyard Road	X-unshaded	No	Other	Low	None
Emergency Services	College Park Volunteer Fire Department. Sta 12	8115 Baltimore Avenue	AE	No	Other	Low	None
Emergency Services	Cottage City Fire Department	3840 Bladensburg Road	X-unshaded	No	Other	Low	None
Emergency Services	District Heights Volunteer Fire Department Sta 26	6208 Marlboro Pike	X-unshaded	No	Other	Low	None
Emergency Services	Forestville Volunteer Fire Department Sta 23	8321 Old Marlboro Pike	X-unshaded	No	Other	Low	None
Emergency Services	Glenn Dale Fire Association, Inc.	11900 Glenn Dale Boulevard	X-unshaded	No	Other	Low	None
Emergency Services	Greenbelt Police Department	550 Crescent Rd	X-unshaded	No	Other	Low	None
Emergency Services	Greenbelt Volunteer Fire Department Sta 35	125 Crescent Road	X-unshaded	No	Other	Low	None
Emergency Services	Hyattsville Police Department	4310 Gallatin St	X-unshaded	No	Other	Low	None
Emergency Services	Hyattsville Volunteer Fire Department	6200 Belcrest Road	X-unshaded	No	Other	Low	None
Emergency Services	James J. Rowley Training Center, USSS	9200 Powder Mill Road	AE	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Emergency Services	Kentland Volunteer Fire Department Sta 33	7701 Landover Road,	X-unshaded	No	Other	Low	None
Emergency Services	Landover Hills Police Department	6904 Taylor St	X-unshaded	No	Other	Low	None
Emergency Services	Landover Hills Volunteer Fire Department 30	6801 Webster Street	X-unshaded	No	Other	Low	None
Emergency Services	Marlboro Volunteer Fire Department 845	7710 Croom Road	X-unshaded	No	Intermix	Low	None
Emergency Services	Marlboro Volunteer Fire Department Sta. 20	14815 Pratt Street	X-unshaded	No	Other	Low	None
Emergency Services	Marlboro Volunteer Fire Department Sta. 820	14815 Pratt Street	X-unshaded	No	Other	Low	None
Emergency Services	Maryland Fire/Rescue Institute (Assoc.)	University of Maryland Rt 1	X-shaded	No	Other	Low	None
Emergency Services	Maryland National Capital Park Police Department	6700 Riverdale Rd	X-unshaded	No	Other	Low	None
Emergency Services	Maryland State Police College Park Barrack	10100 Rhode Island Avenue	X-unshaded	No	Other	Low	None
Emergency Services	Maryland State Police Forestville Barrack	3500 Forestville Road	X-unshaded	No	Other	Low	None
Emergency Services	Morningside Police Department	6901 Ames St	X-unshaded	No	Other	Low	None
Emergency Services	Morningside Volunteer Fire Department Sta 27	6200 Suitland Road	X-unshaded	No	Other	Low	None
Emergency Services	Mount Rainier Police Department	3409 Rhode Island Ave	X-unshaded	No	Other	Low	None
Emergency Services	MSP CVED I-495/I-95 Park @ Ride Insp. Facility	N & S Bound U.S. Route 301	X-unshaded	No	Other	Low	None
Emergency Services	MSP Metropolitan Area DTask Force	7500 Greenway Center Dr.	X-unshaded	No	Other	Low	None
Emergency Services	NASA Security	8800 Greenbelt Road	X-unshaded	No	Other	Low	None
Emergency Services	NEW CARROLLTON POLICE DEPARTMENT	6016 Princess Garden Pkwy	X-unshaded	No	Other	Low	None
Emergency Services	Oxon Hill Volunteer Fire & Rescue Co Sta. 21	7600 Livingston Road	X-unshaded	No	Other	Low	None
Emergency Services	Oxon Hill Volunteer Fire & Rescue Company Sta 42	1100 Marcy Avenue	X-unshaded	No	Other	Low	None
Emergency Services	P.G. County (HHS) Division of Environmental / Fire/EMS	9201 Basil Court, Suite 318	X-unshaded	No	Other	Low	None
Emergency Services	Prince George's Co. Public Safety Comm. Center 911	17321 Melford Boulevard	X-unshaded	No	Other	Low	None
Emergency Services	Prince Georges County Fire Department	1220 Caraway Court	X-unshaded	No	Other	Low	None
Emergency Services	Prince Georges County Fire Marshall	6820 Webster St Room 127	X-unshaded	No	Other	Low	None
Emergency Services	Prince Georges County Police Department Information & Tech Svcs	4923 43rd Avenue	X-unshaded	No	Other	Low	None
Emergency Services	Prince George's County Police Headquarters	7600 Barlowe Road	X-unshaded	No	Other	Low	None
Emergency Services	Prince Georges County Sheriff's Office	5303 Chrysler Way	X-unshaded	No	Other	Low	None
Emergency Services	Prince Georges County Volunteer Underwater Rescue	16608 Brandywine Road	X-unshaded	No	Intermix	Low	None
Emergency Services	Prince George's Emergency Operations Center	7915 Anchor Street	X-unshaded	No	Other	Low	None
Emergency Services	Ritchie Volunteer Fire Department	1415 Ritchie Marlboro Road	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Emergency Services	Riverdale Fire Department, Inc. Sta. 7	4714 Queensbury Road	X-unshaded	No	Other	Low	None
Emergency Services	Riverdale Heights Fire & Rescue Squad Sta. 1	6101 Roanoke Avenue	X-unshaded	No	Other	Low	None
Emergency Services	Riverdale Park Police Department	6700 Riverdale Road	X-unshaded	No	Other	Low	None
Emergency Services	Riverdale Park Police Dept.	5004 Queensbury Road	X-unshaded	No	Other	Low	None
Emergency Services	Seat Pleasant Police Department	6011 Addison Rd	X-unshaded	No	Other	Low	None
Emergency Services	Seat Pleasant Volunteer Fire Company, Inc. Sta. 8	6305 Addison Road	X-unshaded	No	Other	Low	None
Emergency Services	Silver Hill Volunteer Fire Department	3900 Old Silver Hill Road	X-unshaded	No	Other	Low	None
Emergency Services	Tuxedo-Cheverly Fire Company Sta. 22	5711 Tuxedo Road	X-unshaded	No	Other	Low	None
Emergency Services	Upper Marlboro Police Department	14211 School Lane	X-unshaded	No	Other	Low	None
Emergency Services	US Park Police B/W PKWY Greenbelt	6501 Greenbelt Rd	X-unshaded	No	Other	Low	None
Emergency Services	West Lanham Hills Volunteer Fire Department Sta 28	7609 Annapolis Road	X-unshaded	No	Other	Low	None
Emergency Services	West Lanham Hills Volunteer Fire Department Sta 48	8501 Good Luck Road	X-unshaded	No	Other	Low	None
Energy	A. P. Woodson Co. Petro	8101 Parston Drive	X-unshaded	No	Other	Low	None
Energy	Burches Hill Substation	8101 Surratts Road	X-unshaded	No	Other	Low	None
Energy	Burchess Hill	Surratts Road/ Valley Rd.	X-unshaded	No	Other	Low	None
Energy	Capital Energy Systems	14612 Old Gunpowder Road	X-unshaded	No	Other	Low	None
Energy	Exelon Montpelier	8900 Muirkirk Road	X-unshaded	No	Interface	Low	None
Energy	Gott Company	13703 Cherry Tree Crossing	X-unshaded	No	Intermix	Low	None
Energy	Green Petroleum	7508 Old Alexander Ferry Rd	X-unshaded	No	Other	Low	None
Energy	Jericho Park SFC	Lemons Bridge Road - Milepost 119.5	X-unshaded	No	Intermix	Low	None
Energy	Mirant Mid-Atlantic	8301 Professional PI	X-unshaded	No	Other	Low	None
Energy	NRG ENERGY Chalk Point Generating Station	25100 Chalk Point Road	X-unshaded	No	Intermix	Low	None
Energy	Oak Grove Substation/PEPCO	2400 Brown Station Rd	X-unshaded	No	Other	Low	None
Energy	Substation 23 Bowie	12901 Railroad Ave	X-unshaded	No	Other	Low	None
Energy	Substation 24 Landover	Rt.202 & Landover Rd. - Milepost 128.8	X-unshaded	No	Other	Low	None
Food & Agriculture	FDA/PP	8301 Muirkirk Rd.	X-unshaded	No	Other	Low	None
Food & Agriculture	GIANT FOOD LLC	8301 Professional PI, Ste 115	X-unshaded	No	Other	Low	None
Food & Agriculture	GIANT FOOD LLC	8301 Professional PI, Ste 115	X-unshaded	No	Other	Low	None
Food & Agriculture	Giant Foods Distribution Center	6300 Sheriff Road, Landover MD	X-unshaded	No	Other	Low	None



Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Food & Agriculture	Hana Food Distributor Inc	7925 Parston Drive, Forestville MD	X-unshaded	No	Other	Low	None
Food & Agriculture	Henry A. Wallace Beltsville Agricultural Research Center (BARC) (USDA)	10300 Baltimore Ave Building 307	X-unshaded	No	Other	Low	None
Food & Agriculture	Marva Maid - Landover Operations LLC	6310 Sheriff Road	X-unshaded	No	Other	Low	None
Food & Agriculture	MD & VA Milk Producers Manufacturing Plant	5 S Club Drive, Hyattsville, MD	X-unshaded	No	Other	Low	None
Food & Agriculture	MDA College Park Animal Health Laboratory	8077 Greenmead Drive	X-shaded	No	Other	Low	None
Food & Agriculture	Murry's Distributor	8300 Pennsylvania Avenue , Upper Marlboro MD	X-unshaded	No	Other	Low	None
Food & Agriculture	Prince George's County Public School Food and Nutrition Services	13300 Old Marlboro Pike	X-unshaded	No	Other	Low	None
Food & Agriculture	Safeway Distribution Center	16020 Leeland Rd	X-unshaded	No	Other	Low	None
Food & Agriculture	UM Central Maryland research and Education Center	12000 Beaver Dam Road	X-unshaded	No	Other	Low	None
Food & Agriculture	Walmart Store	3300 Nw Crain Hwy	X-unshaded	No	Other	Low	None
Food & Agriculture	Walmart Store	8745 Branch Avenue	X-unshaded	No	Other	Low	None
Food & Agriculture	Walmart Store - Landover Hills	6210 Annapolis Road	X-unshaded	No	Other	Low	None
Food & Agriculture	Whole Foods	1555 Cabin Branch Dr	X-unshaded	No	Other	Low	None
Government Facilities	Adelphi Elementary	8820 Riggs Road	X-unshaded	No	Other	Low	None
Government Facilities	Al-Huda School	5301 Edgewood Road	X-unshaded	No	Other	Low	None
Government Facilities	Allenwood Elementary	6300 Harley Lane	X-unshaded	No	Other	Low	None
Government Facilities	Andrew Jackson Middle	3500 Regency Parkway	X-unshaded	No	Other	Low	None
Government Facilities	Annapolis Road Academy (Alternative HS)	5150 Annapolis Road	X-unshaded	No	Other	Low	None
Government Facilities	An-Nur Academy	9150 Lanham Severn Road	X-unshaded	No	Other	Low	None
Government Facilities	Apple Grove Elementary	7400 Bellefield Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Ardmore Elementary	9301 Ardwick Ardmore Road	X-unshaded	No	Other	Low	None
Government Facilities	Army Recruiting Office - HYATTSVILLE	2970 Belcrest Center Dr Suite 110	X-unshaded	No	Other	Low	None
Government Facilities	Army Recruiting Office - LARGO	800 Shoppers Way Suite A Building P	X-unshaded	No	Other	Low	None
Government Facilities	Army Recruiting Office - OXON HILL	5432 St. Barnabas Rd, STE 4 Sunrise Shopping Center	X-unshaded	No	Other	Low	None
Government Facilities	Army Recruiting Office - RCTG CO LANDOVER	12164 Central Avenue Suite 221	X-unshaded	No	Other	Low	None
Government Facilities	Ascension Lutheran School	7415 Buchanan Street	X-unshaded	No	Other	Low	None
Government Facilities	Augsburg Academy, The	13800 Old Gunpowder Road	X-unshaded	No	Other	Low	None
Government Facilities	Baden Elementary	13601 Baden Westwood	X-unshaded	No	Other	Low	None
Government Facilities	Barnaby Manor Elementary	2411 Owens Road	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	Beacon Heights Elementary	6929 Furman Parkway	X-unshaded	No	Other	Low	None
Government Facilities	Beddow High School, The	501 Bryan Point Road	X-unshaded	No	Intermix	Low	None
Government Facilities	Beddow School, Inc., The	8600 Loughran Road	X-unshaded	No	Other	Low	None
Government Facilities	Belair Baptist Christian Academy	2801 Belair Drive	X-unshaded	No	Other	Low	None
Government Facilities	Beltsville Elementary	4300 Wicomico Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Beltsville Seventh Day Adventist School	4230 Ammendale Road	X-unshaded	No	Other	Low	None
Government Facilities	Benjamin D. Foulois Elementary	4601 Beauford Road	X-unshaded	No	Other	Low	None
Government Facilities	Benjamin Stoddert Middle	2501 Olson Street	X-unshaded	No	Other	Low	None
Government Facilities	Benjamin Tasker Middle	4901 Collington Road	X-unshaded	No	Other	Low	None
Government Facilities	Berkshire Elementary	6201 Surrey Square Lane	X-unshaded	No	Other	Low	None
Government Facilities	Berwyn Baptist Day School	4720 Cherokee Street	X-unshaded	No	Other	Low	None
Government Facilities	Berwyn Heights Elementary	6200 Pontiac Street	X-unshaded	No	Other	Low	None
Government Facilities	Bishop McNamara High School	6800 Marlboro Pike	X-unshaded	No	Other	Low	None
Government Facilities	Bladensburg Elementary	4915 Annapolis Road	X-unshaded	No	Other	Low	None
Government Facilities	Bladensburg High	4200 57th Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Bond Mill Elementary	16001 Sherwood Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Bowie Christian School	2518 Kenhill Drive	X-unshaded	No	Other	Low	None
Government Facilities	Bowie High	15200 Annapolis Road	X-unshaded	No	Other	Low	None
Government Facilities	Bowie Montessori Children's House	5004 Randonstone Lane	X-unshaded	No	Interface	Low	None
Government Facilities	Bowie State University	1400 Jericho Park Road	X-unshaded	No	Other	Low	None
Government Facilities	Bradbury Heights Elementary	1401 Glacier Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Brandywine Elementary	14101 Brandywine Road	X-unshaded	No	Interface	Low	None
Government Facilities	Bread of Heaven Christian Academy	802 61st Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Buck Lodge Middle	2611 Buck Lodge	X-unshaded	No	Other	Low	None
Government Facilities	C. Elizabeth Rieg School	15542 Peach Walker Drive	X-unshaded	No	Interface	Low	None
Government Facilities	C.H.I.L.D. Center Academy	70 Watkins Park Drive	X-unshaded	No	Other	Low	None
Government Facilities	Calverton Elementary	3400 Beltsville Road	X-unshaded	No	Other	Low	None
Government Facilities	Capitol Christian Academy	610 Largo Road	X-unshaded	No	Other	Low	None
Government Facilities	Capitol Heights Elementary	601 Suffolk Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Carmody Hills Elementary	401 Jadeleaf Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Carrollton Elementary	8300 Quintana Street	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	Catherine T. Reed Elementary	9501 Greenbelt Road	X-unshaded	No	Other	Low	None
Government Facilities	Central High	200 Cabin Branch Road	X-unshaded	No	Other	Low	None
Government Facilities	Cesar Chavez Elementary	6609 Riggs Road	X-unshaded	No	Other	Low	None
Government Facilities	Chapel Forge Early Childhood Center	12711 Milan Way	X-unshaded	No	Interface	Low	None
Government Facilities	Charles Carroll Middle	6130 Lamont Drive	X-unshaded	No	Other	Low	None
Government Facilities	Charles Herbert Flowers High	10001 Ardwick-Ardmore Road	X-unshaded	No	Other	Low	None
Government Facilities	Cherokee Lane Elementary	9000 25th Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Cheverly Weekday Nursery	2801 Cheverly Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Children of Promise Christian Academy	7808 Marlboro Pike	X-unshaded	No	Other	Low	None
Government Facilities	Children's Guild, Inc. in Chillum, The	5700 Sargent Road	X-unshaded	No	Other	Low	None
Government Facilities	Chillum Elementary	1420 Chillum Road	X-unshaded	No	Other	Low	None
Government Facilities	Christian Family Montessori School	3628 Rhode Island Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Clinton Christian School	6707 Woodyard Road	X-unshaded	No	Other	Low	None
Government Facilities	College Park Nursery School, Inc.	4512 College Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Columbia Park Elementary	1901 Kent Village Drive	X-unshaded	No	Other	Low	None
Government Facilities	Community Based Classroom	5150 Annapolis Road	X-unshaded	No	Other	Low	None
Government Facilities	Community-Based Classroom	9470 Annapolis Road	X-unshaded	No	Other	Low	None
Government Facilities	Concord Elementary	2004 Concord Lane	X-unshaded	No	Other	Low	None
Government Facilities	Concordia Lutheran School	3799 East West Highway	X-unshaded	No	Other	Low	None
Government Facilities	Cool Spring Elementary	8910 Riggs Road	X-unshaded	No	Other	Low	None
Government Facilities	Cooper Lane Elementary	3817 Cooper Lane	X-unshaded	No	Other	Low	None
Government Facilities	Cora L. Rice Elementary	950 Nalley Road	X-unshaded	No	Other	Low	None
Government Facilities	Corkran Methodist Preschool	5200 Temple Hills Road	X-unshaded	No	Other	Low	None
Government Facilities	Cornerstone Christian Academy	16010 Annapolis Road	X-unshaded	No	Interface	Low	None
Government Facilities	Creative Minds Christian Academy	6108 Old Silver Hill Road #200	X-unshaded	No	Other	Low	None
Government Facilities	Cresthill Baptist Church Child Development Center	6510 Laurel-Bowie Road	X-unshaded	No	Other	Low	None
Government Facilities	Cresthill Christian Academy	6510 Laurel-Bowie Road	X-unshaded	No	Other	Low	None
Government Facilities	Croom Vocational	8520 Duvall Road	X-unshaded	No	Interface	Low	None
Government Facilities	Cross Cultures Learning Center	6711 Farmer Drive	X-unshaded	No	Other	Low	None
Government Facilities	Crossland High / Pathways School	6901 Temple Hill Road	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	DuVal High School	9880 Good Luck Road	X-unshaded	No	Other	Low	None
Government Facilities	Dwight D. Eisenhower Middle	13725 Briarwood Drive	X-unshaded	No	Other	Low	None
Government Facilities	Early Years Child Enrichment Center	9400 Old Palmer Road	X-unshaded	No	Intermix	Low	None
Government Facilities	Faith Temple Academy	7809 Parston Drive	X-unshaded	No	Other	Low	None
Government Facilities	Flintstone Elementary	800 Comanche Drive	X-unshaded	No	Other	Low	None
Government Facilities	Forest Heights Elementary	200 Talbert Drive	X-unshaded	No	Other	Low	None
Government Facilities	Frederick Douglass High	8000 Croom Road	X-unshaded	No	Intermix	Low	None
Government Facilities	From the Heart Christian School	4207 Norcross Street	X-unshaded	No	Other	Low	None
Government Facilities	G. Gardner Shugart Middle	2000 Callaway Street	X-unshaded	No	Other	Low	None
Government Facilities	G. James Gholson Middle	900 Nalley Road	X-unshaded	No	Other	Low	None
Government Facilities	G. L. O. W. Academy	4937, 4931, and 4933 Suitland Road	X-unshaded	No	Other	Low	None
Government Facilities	Genesis Christian Day School	3409 Brightseat Road	X-unshaded	No	Other	Low	None
Government Facilities	Genesis Christian Day School	6717 Glenn Dale Road	X-unshaded	No	Other	Low	None
Government Facilities	Genesis Christian Day School - Oxen Hill	5474 St. Barnabas Road	X-unshaded	No	Other	Low	None
Government Facilities	Genesis Christian Day School - South Location	5001 St. Barnabas Road	X-unshaded	No	Other	Low	None
Government Facilities	George E. Peters Seventh Day Adventist Elementary School	6301 Riggs Road	X-unshaded	No	Other	Low	None
Government Facilities	Gethsemane Baptist Church Christian Academy	2500 Enterprise Road	X-unshaded	No	Other	Low	None
Government Facilities	Gladys Noon Spellman Elementary	3324 64th Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Glassmanor Elementary	1011 Marcy Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Glenarden Woods Elementary	7801 Glenarden Parkway	X-unshaded	No	Other	Low	None
Government Facilities	Glenn Dale Elementary	6700 Glenn Dale Road	X-unshaded	No	Other	Low	None
Government Facilities	Glenridge Elementary	7200 Gallatin Street	X-unshaded	No	Other	Low	None
Government Facilities	Goddard Child Development Center	NASA/GSFC Code 200.9	X-unshaded	No	Other	Low	None
Government Facilities	Goddard Child Development Center	8800 Greenbelt Road	X-unshaded	No	Other	Low	None
Government Facilities	God's Church International Higher Learning Center	4650 Suitland Road	X-unshaded	No	Other	Low	None
Government Facilities	Grace Brethren Christian School	6501 Surratts Road	X-unshaded	No	Other	Low	None
Government Facilities	Grace Christian School	7210 Race Track Road	X-unshaded	No	Interface	Low	None
Government Facilities	Grace of God Day Care Academy	3900 48th Street	X-unshaded	No	Other	Low	None
Government Facilities	Greater International Church of Praise and Deliverance Academy	4670 Suitland Road	X-unshaded	No	Other	Low	None
Government Facilities	Greater Mt. Nebo Christian Academy	1001 Mitchellville Road	X-unshaded	No	Intermix	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	Green Valley Academy (Alternative MS/HS)	2215 Chadwick Street	X-unshaded	No	Other	Low	None
Government Facilities	Greenbelt Elementary	66 Ridge Road	X-unshaded	No	Intermix	Low	None
Government Facilities	Greenbelt Middle	8950 Edmonston Road	X-unshaded	No	Other	Low	None
Government Facilities	Greenwood School	6525 Belcrest Road	X-unshaded	No	Other	Low	None
Government Facilities	Gwynn Park High	13800 Brandywine Road	X-unshaded	No	Other	Low	None
Government Facilities	Gwynn Park Middle	8000 Dyson Road	X-unshaded	No	Interface	Low	None
Government Facilities	H. Winship Wheatley Early Childhood Center	8801 Ritchie Drive	X-unshaded	No	Other	Low	None
Government Facilities	Harambee Christian School of Excellence	8805 Temple Hill Road	X-unshaded	No	Other	Low	None
Government Facilities	Heather Hills Elementary	12605 Heming Lane	X-unshaded	No	Other	Low	None
Government Facilities	Henry G. Ferguson Elementary	14600 Berry Road	X-unshaded	No	Other	Low	None
Government Facilities	Henson Valley Middle School	13400 Edgemoade Road	X-unshaded	No	Intermix	Low	None
Government Facilities	Henson Valley Montessori School	13400 Edgemoade Road	X-unshaded	No	Intermix	Low	None
Government Facilities	High Bridge Elementary	7011 High Bridge Road	X-unshaded	No	Intermix	Low	None
Government Facilities	High Point High	3601 Powder Mill Road	X-unshaded	No	Other	Low	None
Government Facilities	High Road Academy of Prince George's County	5100 Philadelphia Way	X-unshaded	No	Other	Low	None
Government Facilities	High Road School of Prince George's County	8723 Ashwood Drive	X-unshaded	No	Other	Low	None
Government Facilities	High Road Upper School of Prince George's County	12050 Baltimore Avenue, Suite 100	X-unshaded	No	Other	Low	None
Government Facilities	Highland Park Christian Academy	6801 Sheriff Road	X-unshaded	No	Other	Low	None
Government Facilities	Highland Park Elementary	6501 Lowland Drive	X-unshaded	No	Other	Low	None
Government Facilities	Hillcrest Baptist Preschool	2200 Iverson Street	X-unshaded	No	Other	Low	None
Government Facilities	Hillcrest Heights Elementary	4305 22nd Place	X-unshaded	No	Other	Low	None
Government Facilities	Hollywood Elementary	9811 49th Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Holy Family School	2200 Callaway Street	X-unshaded	No	Other	Low	None
Government Facilities	Holy Redeemer School	4902 Berwyn Road	X-unshaded	No	Other	Low	None
Government Facilities	Holy Trinity Episcopal Day School	11902 Daisey Lane	X-unshaded	No	Other	Low	None
Government Facilities	Holy Trinity Episcopal Day School	13106 Annapolis Road	X-unshaded	No	Other	Low	None
Government Facilities	Hope Christian Academy	11416 Cedar Lane	X-unshaded	No	Other	Low	None
Government Facilities	Hopewell Academy	8710 Old Branch Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Howard B. Owens Science Center	9601 Greenbelt Road	X-unshaded	No	Other	Low	None
Government Facilities	Hunter Memorial Christian Academy	5001 Holly Spring Street	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	Hyattsville Elementary	5311 43rd Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Hyattsville Hills Child and Family Center	5701 42nd Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Hyattsville Middle	6001 42nd Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Imagine Foundations Public Charter	4605 Brown Station Road	X-unshaded	No	Other	Low	None
Government Facilities	Independent Baptist Academy	9255 Piscataway Road	X-unshaded	No	Other	Low	None
Government Facilities	Indian Queen Elementary	9551 Fort Foote Road	X-unshaded	No	Other	Low	None
Government Facilities	International Christian Academy	3000 Buck Lodge Road	X-unshaded	No	Other	Low	None
Government Facilities	Isaac J. Gourdine Middle	8700 Allentown Road	X-unshaded	No	Other	Low	None
Government Facilities	J. Frank Dent Elementary	2700 Corning Avenue	X-unshaded	No	Other	Low	None
Government Facilities	James E. Duckworth School	11201 Evans Trail	X-unshaded	No	Other	Low	None
Government Facilities	James H. Harrison Elementary	13200 Larchdale Road	X-unshaded	No	Other	Low	None
Government Facilities	James Madison Middle	7300 Woodyard Road	X-unshaded	No	Other	Low	None
Government Facilities	James McHenry Elementary	8909 McHenry Lane	X-unshaded	No	Other	Low	None
Government Facilities	James Ryder Randall Elementary	5410 Kirby Road	X-unshaded	No	Other	Low	None
Government Facilities	Jericho Christian Academy	8601 Jericho City Drive	X-unshaded	No	Other	Low	None
Government Facilities	Jericho Early Childhood Development Center	8500 Spectrum Drive	X-unshaded	No	Other	Low	None
Government Facilities	Jessie B. Mason School	2710 Iverson Street	X-unshaded	No	Other	Low	None
Government Facilities	Jesus Is Lord Schools	6417 Marlboro Pike	X-unshaded	No	Other	Low	None
Government Facilities	John Carroll Elementary	1400 Nalley Terrace	X-unshaded	No	Other	Low	None
Government Facilities	John Eager Howard Elementary	4400 Shell Street	X-unshaded	No	Other	Low	None
Government Facilities	John H. Bayne Elementary	7010 Walker Mill Road	X-unshaded	No	Intermix	Low	None
Government Facilities	John Hanson French Immersion	6360 Oxon Hill Road	X-unshaded	No	Other	Low	None
Government Facilities	John Hanson Montessori	6360 Oxon Hill Road	X-unshaded	No	Other	Low	None
Government Facilities	Judge Sylvania W. Woods Elementary	3000 Church Street	X-unshaded	No	Other	Low	None
Government Facilities	Judith P. Hoyer Early Childhood Center	2300 Belleview Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Kenilworth Elementary	12520 Kembridge Drive	X-unshaded	No	Other	Low	None
Government Facilities	Kenmoor Elementary	3211 82nd Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Kenmoor Middle	2500 Kenmoor Drive	X-unshaded	No	Intermix	Low	None
Government Facilities	Kettering Elementary	11000 Layton Street	X-unshaded	No	Other	Low	None
Government Facilities	Kettering Middle	65 Herrington Drive	X-unshaded	No	Other	Low	None
Government Facilities	Kiddie Academy of Oxon Hill	6031 Oxon Hill Road	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	Kingdom Christian Academy	529 Commerce Drive	X-unshaded	No	Other	Low	None
Government Facilities	Kingdom Kids Academy	515 Kerby Hill Road	X-unshaded	No	Other	Low	None
Government Facilities	Kingsford Elementary	1401 Enterprise Road	X-unshaded	No	Other	Low	None
Government Facilities	Lake Arbor Elementary	10205 Lake Arbor Way	X-unshaded	No	Other	Low	None
Government Facilities	Lamont Elementary	7107 Good Luck Road	X-unshaded	No	Other	Low	None
Government Facilities	Langley Park-McCormick Elementary	8201 15th Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Lanham Christian School	8400 Good Luck Road	X-unshaded	No	Other	Low	None
Government Facilities	Lansdowne Learning Center	1798 Brightseat Road	X-unshaded	No	Other	Low	None
Government Facilities	Largo Evening High School	505 Largo Road	X-unshaded	No	Other	Low	None
Government Facilities	Largo High	505 Largo Road	X-unshaded	No	Other	Low	None
Government Facilities	Leary School - Prince George's County	7100 Oxon Hill Road	X-unshaded	No	Other	Low	None
Government Facilities	Lewisdale Elementary	2400 Banning Place	X-unshaded	No	Other	Low	None
Government Facilities	Lighthouse Christian Academy	6310 Cipriano Road	X-unshaded	No	Other	Low	None
Government Facilities	Lincoln Public Charter School	3120 Branch Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Little Ones Kiddy College Child Development Center	6012 Wesson Drive	X-unshaded	No	Other	Low	None
Government Facilities	Living Water Christian Academy	6207 Summerhill Road	X-unshaded	No	Other	Low	None
Government Facilities	Longfields Elementary	3300 Newkirk Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Magnolia Elementary	8400 Nightengale Drive	X-unshaded	No	Other	Low	None
Government Facilities	Margaret Brent School	5816 Lamont Terrace	X-unshaded	No	Other	Low	None
Government Facilities	Marlton Elementary	8506 Old Colony Drive South	X-unshaded	No	Other	Low	None
Government Facilities	Martin Luther King, Jr. Middle	4545 Ammendale Road	X-unshaded	No	Other	Low	None
Government Facilities	Mary Harris ""Mother"" Jones Elementary	2405 Tecumseh Street	X-unshaded	No	Other	Low	None
Government Facilities	Maryland Family Christian Center Day Care Center	7748 Marlboro Pike	X-unshaded	No	Other	Low	None
Government Facilities	Maryland Fire/Rescue Institute (Assoc.)	4500 Campus Drive	X-shaded	No	Other	Low	None
Government Facilities	Maryland Gospel Assembly School	12406 Brandywine Road	X-unshaded	No	Intermix	Low	None
Government Facilities	Maryland International Day School	6400 Livingston Road	X-unshaded	No	Other	Low	None
Government Facilities	Mattaponi Elementary	11701 Duley Station Road	X-unshaded	No	Interface	Low	None
Government Facilities	Mattaponi Elementary	11701 Duley Station Road	X-unshaded	No	Interface	Low	None
Government Facilities	Matthew Henson Elementary	7910 Scott Road	X-unshaded	No	Other	Low	None
Government Facilities	Matthew Henson Elementary	7910 Scott Road	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	MDNG - Laurel Armory	8601 Odell Road	X-unshaded	No	Other	Low	None
Government Facilities	Melwood Elementary	7100 Woodyard Road	X-unshaded	No	Other	Low	None
Government Facilities	Melwood Elementary	7100 Woodyard Road	X-unshaded	No	Other	Low	None
Government Facilities	Middleton Valley Elementary	4815 Dalton Street	X-unshaded	No	Other	Low	None
Government Facilities	Middleton Valley Elementary	4815 Dalton Street	X-unshaded	No	Other	Low	None
Government Facilities	Mitchellville Montessori School	12112 Central Avenue	X-unshaded	No	Other	Low	Lake Arbor Dam
Government Facilities	Mitchellville Montessori School	12112 Central Avenue	X-unshaded	No	Other	Low	Lake Arbor Dam
Government Facilities	Mitchellville School, The	3501 Moylan Drive	X-unshaded	No	Other	Low	None
Government Facilities	Montpelier Elementary	9200 Muirkirk Road	X-unshaded	No	Interface	Low	None
Government Facilities	Montpelier Elementary	9200 Muirkirk Road	X-unshaded	No	Interface	Low	None
Government Facilities	Morningside Elementary	6900 Ames Street	X-unshaded	No	Other	Low	None
Government Facilities	Morningside Elementary	6900 Ames Street	X-unshaded	No	Other	Low	None
Government Facilities	Mount Rainier Elementary	4011 32nd Street	X-unshaded	No	Other	Low	None
Government Facilities	Mt. Calvary School	6704 Marlboro Pike	X-unshaded	No	Other	Low	None
Government Facilities	Mt. Calvary School	6704 Marlboro Pike	X-unshaded	No	Other	Low	None
Government Facilities	NASA Goddard Space Flight Center *	Code 240.1-Security Off	X-unshaded	No	Other	Low	None
Government Facilities	NASA Off of Inspector Gen	Goddard Space Flight Center	X-unshaded	No	Other	Low	None
Government Facilities	NASA Security	8800 Greenbelt Road	X-unshaded	No	Other	Low	None
Government Facilities	National Christian Academy	6700 Bock Road	X-unshaded	No	Other	Low	None
Government Facilities	National Christian Academy	6700 Bock Road	X-unshaded	No	Other	Low	None
Government Facilities	New Chapel Christian Academy	5601 Old Branch Avenue	X-unshaded	No	Other	Low	None
Government Facilities	New Chapel Christian Academy	5601 Old Branch Avenue	X-unshaded	No	Other	Low	None
Government Facilities	New Covenant Christian Academy	3805 Lawrence Street	X-unshaded	No	Other	Low	None
Government Facilities	New Covenant Christian Academy	3805 Lawrence Street	X-unshaded	No	Other	Low	None
Government Facilities	New Hope Academy	7009 Varnum Street	X-unshaded	No	Other	Low	None
Government Facilities	New Hope Academy	7009 Varnum Street	X-unshaded	No	Other	Low	None
Government Facilities	New Horizon Child Development Center	5664 Silver Hill Road	X-unshaded	No	Other	Low	None
Government Facilities	New Horizon Child Development Center	5664 Silver Hill Road	X-unshaded	No	Other	Low	None
Government Facilities	Nicholas Orem Middle	6100 Editor's Park Drive	X-unshaded	No	Other	Low	None
Government Facilities	Nicholas Orem Middle	6100 Editor's Park Drive	X-unshaded	No	Other	Low	None
Government Facilities	North Forestville Elementary	2311 Ritchie Road	X-unshaded	No	Other	Low	None



Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	North Forestville Elementary	2311 Ritchie Road	X-unshaded	No	Other	Low	None
Government Facilities	Northview Elementary	3700 Northview Drive	X-unshaded	No	Other	Low	None
Government Facilities	Northview Elementary	3700 Northview Drive	X-unshaded	No	Other	Low	None
Government Facilities	Northwestern Evening/Saturday High	7000 Adelphi Road	X-unshaded	No	Other	Low	None
Government Facilities	Northwestern Evening/Saturday High	7000 Adelphi Road	X-unshaded	No	Other	Low	None
Government Facilities	Northwestern High School	7000 Adelphi Road	X-unshaded	No	Other	Low	None
Government Facilities	Northwestern High School	7000 Adelphi Road	X-unshaded	No	Other	Low	None
Government Facilities	NSA CASL (University of Maryland)	7005 52nd Ave	X-unshaded	No	Other	Low	None
Government Facilities	NSA LPS/LTS	8050 - 8080 Greenmeade Drive	X-shaded	No	Other	Low	None
Government Facilities	Oakcrest Elementary	929 Hill Road	X-unshaded	No	Other	Low	None
Government Facilities	Oaklands Elementary	13710 Laurel-Bowie Road	X-unshaded	No	Interface	Low	None
Government Facilities	Oaklands Elementary	13710 Laurel-Bowie Road	X-unshaded	No	Interface	Low	None
Government Facilities	Open Arms Christian Child Development Center	13611 Laurel-Bowie Road	X-unshaded	No	Interface	Low	None
Government Facilities	Our Savior's School	3111 Forestville Road	X-unshaded	No	Other	Low	None
Government Facilities	Outreach Christian Center Academy	6701 Clinton Manor Drive	X-unshaded	No	Other	Low	None
Government Facilities	Overlook Elementary	3298 Curtis Drive	X-unshaded	No	Other	Low	None
Government Facilities	Owens Road Elementary	1616 Owens Road	X-unshaded	No	Other	Low	None
Government Facilities	Oxon Hill Elementary	7701 Livingston Road	X-unshaded	No	Other	Low	None
Government Facilities	Oxon Hill High	6701 Leyte Drive	X-unshaded	No	Other	Low	None
Government Facilities	Oxon Hill Middle	9570 Fort Foote Road	X-unshaded	No	Other	Low	None
Government Facilities	P.G. County Department of Corrections	13400 Dille Drive	X-unshaded	No	Other	Low	None
Government Facilities	Paint Branch Elementary	5101 Pierce Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Paint Branch Montessori School	3215 Powder Mill Road	X-unshaded	No	Other	Low	None
Government Facilities	Paint Branch Montessori School	3215 Powder Mill Road	X-unshaded	No	Other	Low	None
Government Facilities	Panorama Elementary	2002 Callaway Street	X-unshaded	No	Other	Low	None
Government Facilities	Parkdale High	6001 Good Luck Road	X-unshaded	No	Other	Low	None
Government Facilities	Pathways School--DuVal Re-Entry, The	9880 Good Luck Road	X-unshaded	No	Other	Low	None
Government Facilities	Pathways School--Hyattsville, The	3120 Nicholson Street	X-unshaded	No	Other	Low	None
Government Facilities	Patuxent Elementary	4410 Bishopmill Drive	X-unshaded	No	Intermix	Low	None
Government Facilities	Patuxent Montessori School	14210 Old Stage Road	X-unshaded	No	Intermix	Low	None
Government Facilities	Patuxent Research Refuge	12100 Beech Forest Road	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	Perrywood Elementary	501 Watkins Park Drive	X-unshaded	No	Other	Low	None
Government Facilities	Phyllis E. Williams Elementary	9601 Prince Place	X-unshaded	No	Other	Low	None
Government Facilities	Pneuma Academy of Christian Character, The	6305 Allentown Road	X-unshaded	No	Other	Low	None
Government Facilities	Pointer Ridge Elementary	1110 Parkington Lane	X-unshaded	No	Interface	Low	None
Government Facilities	Port Towns Elementary	4351 58th Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Potomac High	5211 Boydell Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Potomac Landing Elementary	12500 Fort Washington Road	X-unshaded	No	Interface	Low	None
Government Facilities	Power Academy	5106 Boulder Drive	X-unshaded	No	Other	Low	None
Government Facilities	Prince George's Community College	301 Largo Road	X-unshaded	No	Other	Low	None
Government Facilities	Prince Georges County Admin Building	14741 Governor Oden Bowie Drive	AE	No	Other	Low	None
Government Facilities	Prince Georges County Admin Building	14741 Governor Oden Bowie Drive	AE	No	Other	Low	None
Government Facilities	Prince Georges County Government	3500 C Brown Station Road	AE	No	Other	Low	None
Government Facilities	Prince George's Sport & Learning Complex	8001 Sheriff Road	X-unshaded	No	Other	Low	None
Government Facilities	Princeton Claremont Academy, Inc. (Jesus is Lord) Schl	6417 Marlboro Pike	X-unshaded	No	Other	Low	None
Government Facilities	Princeton Claremont Academy, Inc. (Jesus is Lord) Schl	6417 Marlboro Pike	X-unshaded	No	Other	Low	None
Government Facilities	Princeton Day Academy	4200 Forbes Blvd	X-unshaded	No	Other	Low	None
Government Facilities	Princeton Day Academy	4200 Forbes Blvd	X-unshaded	No	Other	Low	None
Government Facilities	Princeton Elementary	6101 Baxter Drive	X-unshaded	No	Other	Low	None
Government Facilities	Progressive Christian Academy	5406 Brinkley Road	X-unshaded	No	Other	Low	None
Government Facilities	Queen Anne School	14111 Oak Grove Road	X-unshaded	No	Intermix	Low	None
Government Facilities	REDEEM Christian Academy	1901 Iverson Street	X-unshaded	No	Other	Low	None
Government Facilities	Refuge Temple Christian Academy & Christian Preschool	11201 Tippet Road	X-unshaded	No	Intermix	Low	None
Government Facilities	Reid Temple Christian Academy	11400 Glenn Dale Boulevard	X-unshaded	No	Interface	Low	None
Government Facilities	Renaissance Christian Academy	2101 Shadyside Avenue	X-unshaded	No	Other	Low	None
Government Facilities	RICA - Southern Maryland	9400 Suratts Road	X-unshaded	No	Other	Low	None
Government Facilities	Ridgecrest Elementary	6120 Riggs Road	X-unshaded	No	Other	Low	None
Government Facilities	Riverdale Baptist School	1133 Largo Road	X-unshaded	No	Other	Low	None
Government Facilities	Riverdale Elementary	5006 Riverdale Road	X-unshaded	No	Other	Low	None
Government Facilities	Robert Frost Elementary	6419 85th Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Robert Goddard Montessori	9850 Good Luck Road	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	Robert R. Gray Elementary	4949 Addison Road	X-unshaded	No	Other	Low	None
Government Facilities	Rockledge Elementary	7701 Laurel-Bowie Road	X-unshaded	No	Interface	Low	None
Government Facilities	Rogers Heights Elementary	4301 58th Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Rosa L. Parks Elementary	6111 Ager Road	X-shaded	No	Other	Low	None
Government Facilities	Rosaryville Elementary	9910 Dale Drive	X-unshaded	No	Interface	Low	None
Government Facilities	Rose Valley Elementary	9800 Jacqueline Drive	X-unshaded	No	Other	Low	None
Government Facilities	S.A.C.R.E.D. Life Academy for Boys	7230 Central Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Samuel Chase Elementary	5700 Fisher Road	X-unshaded	No	Other	Low	None
Government Facilities	Samuel Ogle Middle	4111 Chelmont Lane	X-unshaded	No	Interface	Low	None
Government Facilities	Samuel P. Massie Elementary	3301 Regency Parkway	X-unshaded	No	Other	Low	None
Government Facilities	Seabrook Elementary	6001 Seabrook Road	X-unshaded	No	Other	Low	None
Government Facilities	Seat Pleasant Elementary	6411 G Street	X-unshaded	No	Other	Low	None
Government Facilities	Seed Learning Academy (formerly: Little Folks Development Center)	6200 Riverdale Road	X-unshaded	No	Other	Low	None
Government Facilities	SHA	9300 Kenilworth Avenue	X-unshaded	No	Other	Low	None
Government Facilities	SHABACH! Christian Academy	3600 Brightseat Road	X-unshaded	No	Other	Low	None
Government Facilities	Skyline Elementary	6311 Randolph Road	X-unshaded	No	Other	Low	None
Government Facilities	Springhill Lake Elementary	6060 Springhill Drive	X-unshaded	No	Other	Low	None
Government Facilities	St. Ambrose School	6310 Jason Street	X-unshaded	No	Other	Low	None
Government Facilities	St. Ann's High School	4901 Eastern Avenue	X-unshaded	No	Other	Low	None
Government Facilities	St. Columbia School	7800 Livingston Road	X-unshaded	No	Other	Low	None
Government Facilities	St. Hugh's School	145 Crescent Road	X-unshaded	No	Other	Low	None
Government Facilities	St. Jerome's School	5207 42nd Place	X-unshaded	No	Other	Low	None
Government Facilities	St. John the Evangelist School	8912 Old Branch Avenue	X-unshaded	No	Other	Low	None
Government Facilities	St. Joseph's School	11011 Montgomery Road	X-unshaded	No	Other	Low	None
Government Facilities	St. Mark's School	7501 Adelphi Road	X-unshaded	No	Other	Low	None
Government Facilities	St. Mary of the Assumption School	4610 Largo Road	X-unshaded	No	Intermix	Low	None
Government Facilities	St. Mary's School	7207 Annapolis Road	X-unshaded	No	Other	Low	None
Government Facilities	St. Mary's School of Piscataway	13407 Piscataway Road	X-unshaded	No	Other	Low	None
Government Facilities	St. Matthew's Parish Day School	5901 36th Ave.	X-unshaded	No	Other	Low	None
Government Facilities	St. Matthew's United Methodist Early Education Center	14900 Annapolis Road	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	St. Matthias Apostle School	9473 Annapolis Road	X-unshaded	No	Other	Low	None
Government Facilities	St. Paul's Christian Children's Center	8505 Heathermore Boulevard	X-unshaded	No	Other	Low	None
Government Facilities	St. Philip the Apostle School	5414 Henderson Way	X-unshaded	No	Other	Low	None
Government Facilities	St. Pius X Regional School	14710 Annapolis Road	X-unshaded	No	Other	Low	None
Government Facilities	Stephen Decatur Middle	8200 Pinewood Drive	X-unshaded	No	Other	Low	None
Government Facilities	Suitland Elementary	4650 Homer Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Suitland High	5200 Silver Hill Road	X-unshaded	No	Other	Low	None
Government Facilities	Suitland Road Baptist Church School, The	6412 Suitland Road	X-unshaded	No	Other	Low	None
Government Facilities	Surrattsville High	6101 Garden Drive	X-unshaded	No	Other	Low	None
Government Facilities	Tabernacle Learning Academy, The	11601 South Laurel Drive	X-unshaded	No	Other	Low	None
Government Facilities	Tall Oaks Vocational	2112 Church Road	X-unshaded	No	Other	Low	None
Government Facilities	Tanglewood School	8333 Woodyard Road	X-unshaded	No	Other	Low	None
Government Facilities	Tayac Elementary	8600 Allentown Road	X-unshaded	No	Other	Low	None
Government Facilities	Templeton Elementary	6001 Carters Lane	X-unshaded	No	Other	Low	None
Government Facilities	Thomas Claggett Elementary	2001 Addison Road	X-unshaded	No	Other	Low	None
Government Facilities	Thomas G. Pullen	700 Brightseat Road	X-unshaded	No	Other	Low	None
Government Facilities	Thomas Johnson Middle	5401 Barker Place	X-unshaded	No	Other	Low	None
Government Facilities	Thomas S. Stone Elementary	4500 34th Street	X-shaded	No	Other	Low	None
Government Facilities	Thurgood Marshall Middle	4909 Brinkley Road	X-unshaded	No	Other	Low	None
Government Facilities	Tulip Grove Elementary	2909 Trainor Lane	X-unshaded	No	Other	Low	None
Government Facilities	Turning Point Academy	7800 Good Luck Road	X-unshaded	No	Other	Low	None
Government Facilities	U.S. Census Bureau	4600 Silver Hill Road	X-unshaded	No	Other	Low	None
Government Facilities	U.S. Census Bureau	17101 Melford Blvd.	X-unshaded	No	Other	Low	None
Government Facilities	Univeristy System of Maryland	3300 Metzertott Road, Suite 2C	X-unshaded	No	Intermix	Low	None
Government Facilities	University of Maryland	7403 Hopkins Avenue	X-unshaded	No	Other	Low	None
Government Facilities	University of Maryland	1122 Patuxent Building	X-unshaded	No	Other	Low	None
Government Facilities	University of Maryland College Park	1101 Main Administration Building	X-unshaded	No	Other	Low	None
Government Facilities	University of Maryland University College	3501 University Boulevard East	X-unshaded	No	Other	Low	None
Government Facilities	University of Maryland, College Park	4321 Hartwick Rd	X-unshaded	No	Other	Low	None
Government Facilities	University of Mayrland, College Park	4321 Hartwick Rd	X-unshaded	No	Other	Low	None
Government Facilities	University Park Elementary	4315 Underwood Street	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Government Facilities	University System of Maryland	3300 Metzertott Road, Suite 2C	X-unshaded	No	Intermix	Low	None
Government Facilities	Upper Marlboro Courthouse	14701 Governor Oden Bowie Drive	X-unshaded	No	Other	Low	None
Government Facilities	Urban Scholars Christian School for Family Learning	9877 Good Luck Road #T1	X-unshaded	No	Other	Low	None
Government Facilities	US Dept of Labor, Wage & Hour Division (WHD)	6525 Belcrest Rd, Ste 250	X-unshaded	No	Other	Low	None
Government Facilities	Valley View Elementary	5500 Danby Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Victory Christian Academy	13701 Annapolis Road	X-unshaded	No	Other	Low	None
Government Facilities	Waldon Woods Elementary	10301 Thrift Road	X-unshaded	No	Interface	Low	None
Government Facilities	Walker Mill Middle	800 Karen Boulevard	X-unshaded	No	Intermix	Low	None
Government Facilities	Washington Bible College/Capital Bible Seminary	6511 Princess Garden Parkway	X-unshaded	No	Other	Low	None
Government Facilities	Washington Classical and Christian School	2200 Culbera Drive	X-unshaded	No	Other	Low	None
Government Facilities	Washington New Church School	11914 Chantilly Lane	X-unshaded	No	Other	Low	None
Government Facilities	Washington United Christian Academy	4610 69th Avenue	X-unshaded	No	Other	Low	None
Government Facilities	Whitehall Elementary	3901 Woodhaven Lane	X-unshaded	No	Interface	Low	None
Government Facilities	William Beanes Elementary	5108 Dianna Drive	X-unshaded	No	Other	Low	None
Government Facilities	William Paca Elementary	7801 Sherriff Road	X-unshaded	No	Other	Low	None
Government Facilities	William S. Schmidt Environmental Ed. Ctr.	18501 Aquasco Road	X-unshaded	No	Intermix	Low	None
Government Facilities	William W. Hall Elementary	5200 Marlboro Pike	X-unshaded	No	Other	Low	None
Government Facilities	William Wirt Middle	62nd Place and Tuckerman Street	X-unshaded	No	Other	Low	None
Government Facilities	Woodmore Elementary	12500 Woodmore Road	X-unshaded	No	Other	Low	None
Government Facilities	Woodridge Elementary	5001 Flintridge Drive	X-unshaded	No	Other	Low	None
Government Facilities	Woodstream Christian Academy	9800 Lottsford Road	X-unshaded	No	Other	Low	None
Government Facilities	World View Christian Center	12700 South East Crain Highway	X-unshaded	No	Interface	Low	None
Government Facilities	Yorktown Elementary	7301 Race Track Road	X-unshaded	No	Interface	Low	None
Healthcare & Public Health	American Women's Services	6005 Landover Road Suite 6	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Baxter Bioscience	12140 Indian Creek Court	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Baxter Healthcare Corporation	12040 Indian Creek Court	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Beltsville Agricultural Research Police	10300 Baltimore Ave Building 307	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Cardinal Health	7051 Muikirk Meadows Drive #L	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Cytimmune Sciences, Inc.	8075 Greenmead Road	X-shaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Healthcare & Public Health	Doctors Community Hospital	8118 Good Luck Road	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Dr. Vijayan Charles	7237 Hanover Pkwy., "B"	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Fort Washington Medical Center	11711 Livingston Road	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Innovative Technology International, Inc.	10747 Tucker Street	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Integrated OB/Gyn Services	7610 Pennsylvania Avenue, Suite 305	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Integrated OB/GYN Services	3321 Toledo Terrace, Room D102	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Laurel Regional Hospital	7300 Van Dusen Road	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Maryland Q.C. Laboratories Inc (MQC Labs)	11593 Edmonston Rd	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Metropolitan Family Planning Institute, Inc.	5625 Allentown Rd.Suite #203	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Metropolitan Family Planning Institute, Inc.	5915 Greenbelt Rd	X-unshaded	No	Other	Low	None
Healthcare & Public Health	P.G. County (HHS) Division of Environmental / Fire/EMS	9201 Basil Court, Suite 318	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Prince Georges County Health Department	1701 McCormick Drive	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Prince Georges Hospital Center	3001 Hospital Drive	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Prince George's Reproductive Health Services	7411 Riggs Road, Suite 300	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Roberts Oxygen Co.	13309 Baltimore Avenue	X-unshaded	No	Other	Low	None
Healthcare & Public Health	Southern Maryland Hospital	7503 Surratts Road	X-unshaded	No	Intermix	Low	None
Healthcare & Public Health	Spherix	12051 Indian Creek Court	X-unshaded	No	Other	Low	None
Information Technology	ERT Inc.	14401 Sweitzer Lane Suite 300	X-unshaded	No	Other	Low	None
Information Technology	National CyberWatch Center	301 Largo Rd	X-unshaded	No	Other	Low	None
Nuclear	Maryland Q.C. Laboratories Inc (MQC Labs)	11593 Edmonston Rd	X-unshaded	No	Other	Low	None
Nuclear	University of Maryland Nuclear Reactor	Building 090	X-unshaded	No	Other	Low	None
Transportation	Capital Connector	US 50 at I-95	X-unshaded	No	Other	Low	None
Transportation	Chalk Point Generating Sta Heliport (MD27)	Eagle Harbor	X-unshaded	No	Intermix	Low	None
Transportation	Citizens Bank Headquarters Heliport (MD37)	14401 Sweitzer Lane	X-unshaded	No	Other	Low	None
Transportation	College Park Airport (CGS)	1909 Corporal Frank Scott Dr	AE	No	Other	Low	None
Transportation	Fort Washington Medical Center Heliport (MD72)	11711 Livingston Road	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Transportation	Freeway Airport (W00)	3900 Church Rd	X-unshaded	No	Other	Low	None
Transportation	Greater Laurel Beltsville Hospital Heliport (0MD5)	7100 Contee Rd	X-unshaded	No	Other	Low	None
Transportation	I-95 and I-295 Exchange	Greenbelt	X-unshaded	No	Other	Low	None
Transportation	I-95 and I-495	I-95 and I-495	X-shaded	No	Other	Low	None
Transportation	Metroplex Heliport (1MD6)	8201 Corporate Drive	X-unshaded	No	Other	Low	None
Transportation	Metroplex Heliport (1MD6) New Carrollton	8201 Corporate Drive	X-unshaded	No	Other	Low	None
Transportation	MTA BOWIE STATE MARC nb/sb	13900 JERICHO PARK RD	X-unshaded	No	Other	Low	None
Transportation	MTA COLLEGE PARK MARC nb/sb	7202 BOWDOIN AVE	X-unshaded	No	Other	Low	None
Transportation	MTA GREENBELT MARC nb/sb	5600 GREENBELT METRO DRIVE	X-unshaded	No	Other	Low	None
Transportation	MTA MUIRKIRK MARC nb/sb & PARK & RIDE	7012-B MUIRKIRK ROAD	X-unshaded	No	Other	Low	None
Transportation	MTA NEW CARROLLTON MARC nb/sb	4300 GARDEN CITY DRIVE	X-unshaded	No	Other	Low	None
Transportation	MTA RIVERDALE MARC nb/sb	6200 RHODE ISLAND AVE	X-unshaded	No	Other	Low	None
Transportation	MTA SEABROOK MARC nb/sb	6221 SEABROOK RD	X-unshaded	No	Other	Low	None
Transportation	New Carrollton Rail Station	4300 Garden City Drive	X-unshaded	No	Other	Low	None
Transportation	Patuxent River Bridge	Rt. 50 at Patuxent River	X-shaded	No	Other	Low	Duckett Dam
Transportation	Potomac Airfield Airport (VKX)	10300 Glen Way	X-unshaded	No	Other	Low	None
Transportation	Prince Georges County Government	3500 C Brown Station Road	AE	No	Other	Low	None
Transportation	Prince George's Hospital Center Heliport (1MD4)	3001 Hospital Dr	X-unshaded	No	Other	Low	None
Transportation	Southern Md Hospital Center Heliport (3MD1)	7503 Surratts Rd	X-unshaded	No	Interface	Low	None
Transportation	UPS Regional Distribution Center	14841 Sweitzer Lane	X-unshaded	No	Other	Low	None
Transportation	Washington Bulk Mail Distribution Center	9201 Edgeworth Drive	X-unshaded	No	Other	Low	None
Transportation	Washington Executive/hyde Field Airport (W32)	10399 Piscataway Rd	X-unshaded	No	Intermix	Low	None
Transportation	Washington Metro Area Transit Authority	5801 Sunnyside Ave.	X-unshaded	No	Other	Low	None
Transportation	WMATA Addison Road - Seat Pleasant Station	100 Addison Road S	X-unshaded	No	Other	Low	None
Transportation	WMATA Branch Avenue Station	4704 Old Soper Road	X-unshaded	No	Other	Low	None
Transportation	WMATA Capitol heights station	133 Central Avenue	X-unshaded	No	Intermix	Low	None
Transportation	WMATA College Park Station	4391 Calvert Road	X-unshaded	No	Other	Low	None
Transportation	WMATA Greenbelt Station	5717 Greenbelt Metro Drive	AE	No	Other	Low	None
Transportation	WMATA Largo Town Center Station	9000 Lottsford Road	X-unshaded	No	Other	Low	None
Transportation	WMATA Morgan Boulevard Station	300 Garrett Morgan Blvd, Landover	X-unshaded	No	Other	Low	None
Transportation	WMATA Naylor Road Station	3101 Branch Avenue	X-unshaded	No	Other	Low	None

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Transportation	WMATA New Carrollton	4700 Garden City Drive	X-unshaded	No	Other	Low	None
Transportation	WMATA Prince George's Plaza	3575 East West Highway	X-unshaded	No	Other	Low	None
Transportation	WMATA Southern Avenue Station	1411 Southern Avenue		No	Other	Low	None
Transportation	WMATA Suitland Station	4500 Silver Hill Road	X-unshaded	No	Other	Low	None
Transportation	WMATA West Hyattsville Station	2700 Hamilton Street	X-unshaded	No	Other	Low	None
Transportation	Woodrow Wilson Memorial Bridge	I-495 / 95 over the Potomac River	AE	No	Other	Low	None
Water & Wastewater Systems	Bowie Wastewater Treatment Plant	16550 Annapolis Rd.	X-unshaded	No	Interface	Low	Duckett Dam
Water & Wastewater Systems	Bowie WWTP	16550 Annapolis Rd.	X-unshaded	No	Other	Low	None
Water & Wastewater Systems	Central Avenue Pumping Station	Brightseat Road	X-unshaded	No	Other	Low	None
Water & Wastewater Systems	Parkway WWTP	10100 Canadian Way	X-unshaded	No	Other	Low	None
Water & Wastewater Systems	Patuxent Water Filtration Plant	6101 Sandy Spring Rd.	X-unshaded	No	Other	Low	None
Water & Wastewater Systems	Piscataway WWTP	11 Farmington Road West	X-unshaded	No	Other	Low	None
Water & Wastewater Systems	Washington Suburban Sanitary Commission (WSSC)	Wssc Treatment Plant Rd	X-unshaded	No	Intermix	Low	None
Water & Wastewater Systems	Washington Suburban Sanitary Commission	11 Farmington Rd West	X-unshaded	No	Other	Low	None
Water & Wastewater Systems	Washington Suburban Sanitary Commission	6101 Sandy Spring Road	X-unshaded	No	Other	Low	None
Water & Wastewater Systems	Washington Suburban Sanitary Commission (WSSC)	14501 Sweitzer Lane	X-unshaded	No	Other	Low	None
Water & Wastewater Systems	Western Branch WWTP	6600 Crain Hwy	X-unshaded	No	Other	Low	None



## C. City of Laurel Critical Facility Hazard Analysis

Table 4. Critical facility hazard area analysis for the City of Laurel

Facility Type	Facility Name	Street Address	Flood Zone	Floodway	WUI Zone	Earthquake	Dam Inundation
Communications	AiNet	312 Laurel Ave.	X-unshaded	No	Other	Low	None
Communications	TW Telecom	14405 Laurel PI	X-unshaded	No	Other	Low	None
Emergency Services	Laurel City Police Department	350 Municipal Square	X-shaded	No	Other	Low	None
Emergency Services	Laurel Police, Community Outreach Ctr, Laurel Mall	14828 Baltimore Avenue, Suite 84	X-shaded	No	Other	Low	Laurel Lake Dam
Emergency Services	Laurel Volunteer Fire Department Sta. 10	7411 Cherry Lane	X-unshaded	No	Other	Low	None
Emergency Services	Laurel Volunteer Rescue Squad 49	14910 Bowie Road	AE	No	Other	Low	Duckett Dam & Laurel Lake Dam
Energy	Laurel Fuel Oil & Heating Co., Inc.	101 Main St.	AE	No	Other	Low	Duckett Dam
Government Facilities	Army Recruiting Office - LAUREL	805 Washington Blvd S. Laurel Shopping Center	X-unshaded	No	Other	Low	None
Government Facilities	DHMH	312 Marshall Avenue 7th Floor	X-unshaded	No	Other	Low	None
Government Facilities	Holy Trinity Christian Day School	7607 Sandy Spring Road	X-unshaded	No	Other	Low	None
Government Facilities	Laurel Elementary	516 Montgomery Street	X-unshaded	No	Other	Low	None
Government Facilities	Laurel High	8000 Cherry Lane	X-unshaded	No	Other	Low	None
Government Facilities	Pallotti Early Learning Center, Inc.	113 St. Mary's Place	X-unshaded	No	Other	Low	None
Government Facilities	Scotchtown Hills Elementary	15950 Dorset Road	X-unshaded	No	Other	Low	None
Government Facilities	St. Mary of the Mills School	106 St. Mary's Place	X-unshaded	No	Other	Low	None
Government Facilities	St. Vincent Pallotti High School	113 St. Mary's Place	X-unshaded	No	Other	Low	None
Healthcare & Public Health	BioServe Biotechnologies, Ltd.	1050 West Street	X-unshaded	No	Other	Low	None
Information Technology	Aquilent	1100 West St.	X-unshaded	No	Other	Low	None
Transportation	MTA LAUREL MARC nb/sb	22 Main Street	X-unshaded	No	Other	Low	Duckett Dam

# Appendix E. 2017-2023 Mitigation Actions Status Report

During the 2023 Hazard Mitigation Plan update, the Mitigation Advisory Committee reviewed and discussed the status of the 2017-2023 mitigation actions (whether they were completed, removed, not started, or in progress) and whether to modify and/or retain actions. The results of these discussions are shown in **Table 5** and **Table 6** below. Actions that are being carried over to the 2023 Hazard Mitigation Plan will have the “2023 Action Number” column filled out. Any modifications will be highlighted in the “Notes” column.

## A. Prince George’s County Mitigation Action Status (2017-2023)

Table 5. Prince George's County 2017-2023 Actions Status Report

2017 Action Number	2023 Action Number	Action	Action Lead	2017 Priority	2023 Action Update	Notes
		<b>Prevention</b>				
County - 1	PG-1	Continue to partner with FEMA/MDE to promote use of Updated Flood Hazard Maps. Updated Mapping will continue to inform Risk Reduction and mitigation of at-Risk Buildings such as repetitive loss structures.	Department of Environment Support: Maryland- National Capital Park & Planning	High	In Progress	The County continued to partner with FEMA/MDE on use of updated flood hazard maps. This action item is on-going.
County - 2		Partner with FEMA/MDE to Update Flood Hazard Mapping; Use Updated Mapping for Risk Reduction. Private Nonprofit Buildings. Search the updated list of flood-prone properties to determine if any are owned by private nonprofit organizations.	Department of Environment Support: Maryland- National Capital Park & Planning	Medium	Completed	Staff review of flood hazard mapping was performed in the previous year and is ongoing. Staff coordinates with FEMA on revisions to the FIRM and FIS. Staff will prepare and maintain an additional dataset for flood-prone properties.
County - 3	PG-2	Using the revised Flood Maps, check locations of HazMat sites, NPDES sites, and other land uses; if found to be in flood hazard areas, communicate with owner/handler of hazardous materials and known pollutants regarding risk and appropriate response and protection measures.	Fire/EMS; Department of Environment; Maryland Department of the Environment	High	Not Started	Due to limited staff capacity, there is no activity to report for this action item. Mapping of HazMat sites, strategy for effective outreach and education and additional activity will be initiated following the fill of position vacancies in flood management unit.

2017 Action Number	2023 Action Number	Action	Action Lead	2017 Priority	2023 Action Update	Notes
County - 4	PG-3	Integrate mitigation plan requirements and actions into other appropriate planning mechanisms such as comprehensive plans and capital improvement plans.	Office of Homeland Security; Department of Environment	Medium	In Progress	Flood mitigation actions have been incorporated in the Stormwater Management Capital Improvement Program (CIP). Also, these actions align with flood protection actions that are outlined in the County's general plan entitled "Plan2035."
County - 5	PG-4	Collect flood depth information to support a grant to provide elevation certificates in areas newly included in Special flood hazard areas to assist residents in obtaining elevation certificates to support LOMAs or reduced-risk NFIP premiums.	Office of Homeland Security	High	Not Started	Due to limited staff capacity, there is no activity to report for this action item. Activity will be initiated following the fill of position vacancies in flood management unit.
		<b>Property Protection</b>				
County - 6		Continue to coordinate the Building Code & Floodplain Ordinance whenever either is updated.	Department of Environment; Department of Public Works & Transportation	High	Completed	Inter-agency coordination between DoE and the Department of Permitting, Inspections and Enforcement is included in the County's capabilities.
County - 7	PG-14	Support mitigation projects that will result in protection of public or private property from natural hazards. Eligible projects include but are not limited to: 1. acquisition of flood-prone property 2. Elevation of flood- prone structures 3. Minor structural flood control projects 4. Relocation of structures from hazard prone areas 5. Retrofitting of existing buildings, facilities and infrastructure 6. Retrofitting of existing buildings and facilities for shelters 7. Critical infrastructure protection measures 8. Stormwater management improvements 9. Advanced warning systems and hazard gauging systems (weather radios, reverse-911, stream gauges, I-flows) 10. Targeted hazard education	Office of Homeland Security; Department of Environment, DPWT	High	In Progress	DoE's annual budget proposal for the Stormwater Management CIP includes allocations for drainage improvement and flood prevention projects. The approved FY'20 Stormwater Management CIP budget includes appropriations for a levee improvement project and multiple drainage improvement projects.

2017 Action Number	2023 Action Number	Action	Action Lead	2017 Priority	2023 Action Update	Notes
		11. wastewater and water supply system hardening and mitigation				
County - 8	PG-15	Promote appropriate mitigation measures for hazard-vulnerable priority critical facilities	Office of Homeland Security; Dept. of Environment	High	In Progress	Consultants to the County have developed hazard vulnerability maps for critical facilities. Next step is to review the mapping and coordinate with the Local Emergency Planning Committee on priority measures and implementation strategy.
County - 9	PG-30	Update Upper Marlboro Emergency Response Plan to address flooding, including evacuation, emergency response, mitigation, etc.	Office of Homeland Security	Medium	In Progress	Staff has started the effort of reviewing emergency evacuation routes and refining messages for flood emergency alerts. These tasks are part of the larger effort to flesh out relevant templates in the County's Everbridge Mass Notification system.
County - 10	PG-35	Continue annual flood risk awareness and mitigation mailing to all owners of high-risk properties in the SFHA, including RL structures.	Office of Homeland Security	High	In Progress	Prince George's County Department of the Environment (DoE) continues to run the annual "June is Flood Awareness Month" campaign and sends letters and brochures about flood prevention and protection services and flood insurance to lenders, insurance agents and realtors. Additionally, DoE shares flood facts, recommendations for flood prevention and other relevant public outreach with residents and community partners via listserv, webpage and other media outlets.
		<b>Natural Resource Protection</b>				
County - 11		Continue implementation of Best Management Practices and Low Impact Development practices to meet NPDES water pollution requirements. The County has EPA-listed Total	Office of Homeland Security	High	Completed	The County continues to implement LID practices to meet NPDES water pollution requirements. Additionally, DoE awards grants to non-profits to install green infrastructure

2017 Action Number	2023 Action Number	Action	Action Lead	2017 Priority	2023 Action Update	Notes
		Daily Maximum Load (TMDL) stream segments due to high levels of Nitrogen, Phosphorous, Sediment and Trash which it continues to mitigate.				and to conduct outreach and education for purpose of reducing stormwater runoff and the transport of pollutants to local waterways.
County - 12		Use the Maryland-National Capital Park and Planning Commission 2016 water quality biological stream assessment studies to prioritize stabilization projects, especially if funding from outside resources is available for mitigation of environmental impacts.	Department of Environmental Resources The Maryland-National Capital Park & Planning Commission - Debbie Tyner	Medium	Completed	Capital projects for shoreline restoration are in progress for several areas in the County.
		<b>Structural Projects</b>				
County - 13		Anacostia Levee Improvements. Work with the Corps of Engineers to pursue funding to implement the levee improvement work. Four of five levee systems have been FEMA- accredited. Complete accreditation of Arundel Street Levee System. Maintain accreditation through O & M Plan implementation as prescribed by USACE.	Department of Environment Department of Public Works & Transportation	High	Completed	The Arundel Canal levee improvement project is in-progress.
		<b>Emergency Services</b>				
County - 14		Update the flood warning system notification lists used in the Everbrite system with the list of flood-prone properties based on revised flood maps. Distribute general warnings to all County citizens using traditional and social media platforms such as the ORM website, Twitter and Facebook.	Department of Environment; Office of Homeland Security	High	Completed	The Everbridge Emergency Notification System will notify the occupants of structures in the regulatory floodplain (i.e. flood prone structures) using the White Pages, 9-1-1 data and the phone numbers and email addresses for persons that have registered for Alert Prince George's.

2017 Action Number	2023 Action Number	Action	Action Lead	2017 Priority	2023 Action Update	Notes
County - 15	PG-31	Complete disaster recovery plan, family reunification plan.	Office of Homeland Security	High	Not Started	The County will create a disaster recovery plan that includes a post-disaster strategic rebuilding decision framework that comprehensively integrates equity.
County - 16	PG-32	The Department of Family Services Agency on Aging will continue its outreach to seniors about health and safety during periods of extreme heat and extreme cold. Information will be added to the Family Service's web page and frozen meal distribution with supplement provision of hot meals during severe weather periods from January through March.	Department of Family Services	High	Not Started	The Department of Family Services Agency on Aging will continue its outreach to other vulnerable populations, in addition to seniors during periods of extreme temperatures.
County - 17		Continue to Support Regional Drought Response and Planning. Continue the County's commitment and participation with the MWCOG and WSSC when drought awareness responses are activated.	Department of Environmental Resources Washington Suburban Sanitary Commission	Medium	Removed	Included in the County's capabilities.
		<b>Education &amp; Outreach</b>				
County - 18		Continue participation in community and neighborhood events to promote hazard awareness and mitigation options.	Office of Homeland Security; Dept. of Environment	High	Removed	Included in the County's capabilities.
County - 19	PG-36	Expand use of Social Media for natural hazard awareness and hazard mitigation messaging.	Office of Homeland Security	High	Not Started	The County will implement natural hazard awareness and hazard mitigation messaging with a County Hazard Mitigation hub website.
County - 20		Work with County municipalities to provide hazard awareness messaging and information on storm preparedness and mitigation for promotion using local newspapers, municipal websites, etc.	Office of Homeland Security	High	Not Started	The County will work with municipalities and/or develop public-private partnerships to provide information on storm preparedness and mitigation in secondary languages.

2017 Action Number	2023 Action Number	Action	Action Lead	2017 Priority	2023 Action Update	Notes
County - 21	PG-37	Distribute Citizens' Preparedness Guide and Business Preparedness Guides at community events. Upon updating, incorporate new HMP Hazard information.	Office of Homeland Security	Medium	Not Started	Integrate hazard mitigation considerations in future updates of the Citizens' Preparedness Guide and Business Preparedness Guide.

## B. City of Laurel Mitigation Action Status (2017-2023)

Table 6. City of Laurel 2017-2023 Actions Status Report

2017 Action Number	2023 Action Number	Action	Action Lead	2017 Priority	2023 Action Update	Notes
		<b>Prevention</b>				
Laurel -1	L-1	Continue to partner with FEMA/MDE to promote use of Updated Flood Hazard Maps. Updated Mapping will continue to inform Risk Reduction and mitigation of at-Risk Buildings such as repetitive loss structures.	Emergency Manager; Department of Economic & Community Development	Medium - High	Not Started	Utilize available technical assistance to translate identified risks into mitigation projects, especially for benefit cost analyses for the City.
Laurel - 2	L-2	Integrate mitigation plan requirements and actions into other appropriate planning mechanisms such as comprehensive plans and capital improvement plans.	Emergency Manager; Department of Economic & Community Development	Medium - High	Not Started	Integrate 2023 mitigation plan requirements and actions into new City plans.
		<b>Property Protection</b>				
Laurel - 3	L-4	Support mitigation projects that will result in protection of public or private property from natural hazards. Eligible projects include but are not limited to: 1. acquisition of flood-prone property 2. Elevation of flood- prone structures 3. Minor structural flood control projects 4. Relocation of structures from hazard prone areas 5. Retrofitting of existing buildings, facilities and infrastructure 6. Retrofitting of existing buildings and facilities for shelters 7. Critical infrastructure protection measures 8. Stormwater management improvements 9. Advanced warning systems and hazard gauging systems (weather radios, reverse-911, stream gauges, I-flows) 10.	Emergency Manager; Department of Economic & Community Development	Medium - High	In Progress	Continue to support mitigation projects that will result in protection of public or private property from natural hazards. Additional acquisitions should include hazard-prone property structures.



2017 Action Number	2023 Action Number	Action	Action Lead	2017 Priority	2023 Action Update	Notes
		Targeted hazard education 11. wastewater and water supply system hardening and mitigation				
Laurel - 4		Seek mitigations solutions for city facilities including: the flood- prone municipal swimming pool; Department of Public Works flood-prone buildings and the City of Laurel Police Department Building. Determine pro-active preventive mitigation actions and seek grant funds for permanent solutions.	Emergency Manager; Department of Economic & Community Development; Department of Public Works; Laurel Police Department; Department of Recreation	High	Removed	Implement mitigation solutions for city facilities and conduct related studies, planning, and grant development work as necessary.
Laurel - 5	L-6	After flood events, the City of Laurel will evaluate whether to pursue funding to implement flood mitigation projects.	Prince George's County Department of Environment	Medium - High	In Progress	After the release of any Notices of Funding Opportunity or a Presidential Disaster Declaration, decide which mitigation projects will be included in upcoming grant applications.
Laurel - 6		Pursue participation in the FEMA Community Rating System to reduce the cost of National Flood Insurance Policy premiums.	Emergency Manager	High	Completed	Joined CRS program in April 2022.
		<b>Emergency Services</b>				
Laurel - 7		Continue to support regional drought response and Planning.	Prince George's County Department of Environment; Washington Suburban Sanitary Commission Emergency Manager	Medium	Removed	Included in City's capabilities.

2017 Action Number	2023 Action Number	Action	Action Lead	2017 Priority	2023 Action Update	Notes
Laurel - 8		Continue to support regional drought response and planning by continuing the City's commitment and participation with MWCOG and WSSC when drought awareness responses are activated. Examine appropriate water conservation measures for City office buildings.	Prince George's County Department of Environment; Washington Suburban Sanitary Commission Emergency Manager	High	Removed	Additional actions include implementing water conservation measures for City facilities.
Laurel - 9		The new notification procedures must be tested and exercised within the City of Laurel and Prince George's County to identify any shortfalls or procedures that need to be amended. Expanded floodplain areas must be addressed in relationship to areas effected by a release of water from the dams.	Emergency Manager	High	Removed	Included in City's capabilities.
		<b>Education &amp; Awareness</b>				
Laurel - 10		Continue outreach efforts to promote recently completed bi-lingual Citizens Emergency Preparedness Guide	Emergency Manager; CERT volunteers	High	Completed	
Laurel - 11	L-12	Work with City closed circuit television network to produce seasonal hazard awareness and topical mitigation programming.	Emergency Manager; Department of Communications	Medium	In Progress	The City will continue to produce seasonal hazard awareness and topical mitigation programming.

## Appendix F. 2023-2028 Mitigation Action Plans

Mitigation action plans were developed for each high-priority action. **Table 7** shows the action plan format, element descriptions, and possible inputs. **Appendix F.A** and **Appendix F.B** provide the action plans for Prince George's County and the City of Laurel, respectively. A list of all the 2023-2028 mitigation actions can be found in **Chapter 6** of the 2023 HMP.

*Table 7. Mitigation action plan element descriptions and possible inputs*

<b>Action Number</b>	<b>Action Description</b>
<b>Mitigation Category</b>	Prevention, property protection, natural resource protection, structural projects, emergency services, or education and awareness
<b>Applicable Goal(s)</b>	<ul style="list-style-type: none"> <li>• <u>Goal 1</u>: Implement structural projects that mitigate the risks of natural hazards to people, infrastructure, and environmental assets while equitably distributing project benefits.</li> <li>• <u>Goal 2</u>: Integrate hazard mitigation into regular staff training and responsibilities to improve capabilities and ensure climate adaptation is adequately considered and addressed in county/city actions.</li> <li>• <u>Goal 3</u>: Increase public education and awareness of natural hazard risks to people and private property, and promote current and new opportunities to participate in mitigation planning.</li> <li>• <u>Goal 4</u>: Prevent future climate-related damages and losses to communities, critical facilities, and natural resources through ordinances, policies, and plans aligned with regional and state resilience and equity goals.</li> </ul>
<b>Hazard(s) Mitigated</b>	Riverine flood, severe storm (flood-related), severe storm (wind-related), high wind, tornado, extreme heat, winter storm, hurricane/tropical storm, dam and levee failure, earthquake, extreme cold, sinkhole, wildfire, landslide, drought, coastal, flood, all hazards
<b>Plan Integration</b>	<i>Plan(s) that features the same or similar action, or a goal that the action supports</i>
<b>Risk Reduction/Benefits</b>	<ul style="list-style-type: none"> <li>• <u>Very high</u>: Significant losses avoided and/or significant benefits with consideration of STAPLEE factors</li> <li>• <u>High</u>: Numerous losses avoided and/or numerous benefits with consideration of STAPLEE factors</li> <li>• <u>Moderate</u>: Some losses avoided, some benefits with consideration of STAPLEE factors</li> <li>• <u>Low</u>: No losses avoided, no public benefits with consideration of STAPLEE factors</li> </ul>
<b>Action Lead</b>	<i>The department or office responsible for ensuring the action is implemented</i>
<b>Potential Funding Source(s)</b>	County staff time

<b>Implementation Timeframe</b>	<ul style="list-style-type: none"> <li>• <u>Short-term</u>: less than three years</li> <li>• <u>Long-term</u>: more than three years</li> <li>• <u>Ongoing</u>: continuous with no designated end date</li> <li>• <u>Funding contingent</u>: timeline is dependent on funding from a source outside of the jurisdiction</li> </ul>
<b>Priority</b>	High, medium, low
<b>Notes</b>	<i>Additional action notes or details, if any</i>

## A. Prince George's County Action Plans

<b>Action PG-3</b>	<b>Integrate mitigation plan requirements and actions into other appropriate planning mechanisms, such as comprehensive plans and capital improvement plans.</b>
<b>Mitigation Category</b>	Prevention
<b>Applicable Goal(s)</b>	Goal 4
<b>Hazard(s) Mitigated</b>	All hazards
<b>Plan Integration</b>	2023 Prince George's County Hazard Mitigation Plan; 2021 State of Maryland Hazard Mitigation Plan
<b>Risk Reduction/ Benefits</b>	Very high: Significant losses avoided and/or significant benefits
<b>Action Lead</b>	Maryland-National Capital Park and Planning Commission
<b>Potential Funding Source(s)</b>	County staff time
<b>Implementation Timeframe</b>	Ongoing
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-6</b>	<b>Prohibit all waivers to allow development in floodplains.</b>
<b>Mitigation Category</b>	Prevention; property protection; natural resource protection
<b>Applicable Goal(s)</b>	Goal 4

<b>Hazard(s) Mitigated</b>	Flooding; Severe Storm (flood-related); Coastal Flooding
<b>Plan Integration</b>	Plan Prince George's 2035 Approved General Plan; Climate Action Plan; Green Infrastructure Plan
<b>Risk Reduction/ Benefits</b>	Very high: Significant losses avoided and/or significant benefits
<b>Action Lead</b>	Department of Permitting, Inspections and Enforcement
<b>Potential Funding Source(s)</b>	County staff time
<b>Implementation Timeframe</b>	Ongoing
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-7</b>	<b>Revise Prince George's County Code of Ordinances to incorporate and require climate-resilient design, nature-based infrastructure, and climate-resilient practices. Adopt and enforce policies to require green infrastructure practices for new and existing properties, especially native plantings, rain gardens, green corridors, runoff retention, and other nature-based ways to reduce and naturally filter runoff on private and public properties.</b>
<b>Mitigation Category</b>	Prevention; property protection; natural resource protection
<b>Applicable Goal(s)</b>	Goal 1, Goal 4
<b>Hazard(s) Mitigated</b>	All hazards
<b>Plan Integration</b>	Green Infrastructure Plan; Climate Action Plan
<b>Risk Reduction/ Benefits</b>	High: Numerous losses avoided and/or numerous benefits
<b>Action Lead</b>	Planning Department
<b>Potential Funding Source(s)</b>	BRIC
<b>Implementation Timeframe</b>	Short-term
<b>Priority</b>	High

<b>Notes</b>	n/a
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<b>Action PG-8</b>	<b>Office of the County Executive must introduce and support a County Council resolution requiring the County to integrate extreme weather and energy-efficiency criteria into building codes.</b>
<b>Mitigation Category</b>	Prevention; property protection
<b>Applicable Goal(s)</b>	Goal 4
<b>Hazard(s) Mitigated</b>	All hazards
<b>Plan Integration</b>	Climate Action Plan
<b>Risk Reduction/ Benefits</b>	Very high: Significant losses avoided and/or significant benefits
<b>Action Lead</b>	Department of Permitting, Inspections, and Enforcement
<b>Potential Funding Source(s)</b>	County staff time
<b>Implementation Timeframe</b>	Short-term
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-10</b>	<b>Avoid Future Development in Flood Inundation Areas Below Existing High-hazard Dams. Require that plan sets for subdivision proposals and permit applications to show the danger reach and inundation area and prohibit new construction in these areas.</b>
<b>Mitigation Category</b>	Prevention; property protection
<b>Applicable Goal(s)</b>	Goal 4
<b>Hazard(s) Mitigated</b>	Dam and Levee Failure
<b>Plan Integration</b>	2023 Prince George's County Hazard Mitigation Plan
<b>Risk Reduction/ Benefits</b>	Moderate: Some losses avoided, some benefits

<b>Action Lead</b>	Maryland-National Capital Park and Planning Commission, Planning Department
<b>Potential Funding Source(s)</b>	County staff time
<b>Implementation Timeframe</b>	Ongoing
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-11</b>	<b>Conduct Countywide Thermal Mapping of Tree Canopy Cover with Shade Study, and Aerial Utility Mapping exercises. Then conduct a neighborhood-level Heat Vulnerability Assessment. Address the identified gaps in the tree canopy through appropriate heat mitigation actions and projects.</b>
<b>Mitigation Category</b>	Prevention; emergency services
<b>Applicable Goal(s)</b>	Goal 4
<b>Hazard(s) Mitigated</b>	Extreme Heat
<b>Plan Integration</b>	2023 Prince George's County Hazard Mitigation Plan
<b>Risk Reduction/ Benefits</b>	Moderate: Some losses avoided, some benefits
<b>Action Lead</b>	Department of the Environment
<b>Potential Funding Source(s)</b>	County staff time
<b>Implementation Timeframe</b>	Short-term
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-13</b>	<b>Adopt the most recent published edition of the I-Codes (e.g., International Building Code, International Residential Code).</b>
<b>Mitigation Category</b>	Prevention; property protection

<b>Applicable Goal(s)</b>	Goal 4
<b>Hazard(s) Mitigated</b>	All hazards
<b>Plan Integration</b>	n/a
<b>Risk Reduction/ Benefits</b>	Very high: Significant losses avoided and/or significant benefits
<b>Action Lead</b>	Department of Permitting, Inspections and Enforcement
<b>Potential Funding Source(s)</b>	County staff time
<b>Implementation Timeframe</b>	Short-term
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-15</b>	<b>Implement appropriate mitigation measures for hazard-vulnerable priority critical facilities.</b>
<b>Mitigation Category</b>	Prevention; property protection
<b>Applicable Goal(s)</b>	Goal 1, Goal 4
<b>Hazard(s) Mitigated</b>	All hazards
<b>Plan Integration</b>	Plan Prince George's 2035 Approved General Plan
<b>Risk Reduction/ Benefits</b>	High: Numerous losses avoided and/or numerous benefits
<b>Action Lead</b>	Department of Public Works and Transportation
<b>Potential Funding Source(s)</b>	BRIC, HMGP
<b>Implementation Timeframe</b>	Long-term
<b>Priority</b>	High
<b>Notes</b>	n/a



<b>Action PG-18</b>	<b>Implement proposed flood mitigation projects from the upcoming watershed study for the Collington Branch Stream. Develop a Memorandum of Agreement with the City of Laurel to inspect and clean the portion of the stream that runs through their jurisdiction.</b>
<b>Mitigation Category</b>	Prevention; property protection; structural projects
<b>Applicable Goal(s)</b>	Goal 4
<b>Hazard(s) Mitigated</b>	Flooding; Severe Storm (flood-related)
<b>Plan Integration</b>	Climate Action Plan
<b>Risk Reduction/ Benefits</b>	Moderate: Some losses avoided, some benefits
<b>Action Lead</b>	Department of the Environment
<b>Potential Funding Source(s)</b>	BRIC, FMA
<b>Implementation Timeframe</b>	Long-term
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-23</b>	<b>Align Economic Development Plans with the Climate Action Plan, preserving existing agricultural land and natural areas and promoting development in already-developed areas near high-capacity transit. Perform an economic development and climate adaptation analysis of existing agricultural land and natural areas that are crucial to climate resilience on a sub watershed basis. Identify areas of open space for preservation and optimum use for climate resilience.</b>
<b>Mitigation Category</b>	Prevention; property protection; natural resource protection
<b>Applicable Goal(s)</b>	Goal 4
<b>Hazard(s) Mitigated</b>	All hazards
<b>Plan Integration</b>	Climate Action Plan; Plan Prince George's 2035 Approved General Plan
<b>Risk Reduction/ Benefits</b>	Moderate: Some losses avoided, some benefits

<b>Action Lead</b>	Department of the Environment
<b>Potential Funding Source(s)</b>	BRIC
<b>Implementation Timeframe</b>	Short-term
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-25</b>	<b>Conduct a Countywide Flood Assessment (including pluvial mapping) to understand the impact of updated rainfall intensity estimates per the latest version of NOAA Atlas 14, recent elevation data, and stormwater controls. Identify priority areas for mitigation projects and update the stormwater ordinance as needed.</b>
<b>Mitigation Category</b>	Prevention
<b>Applicable Goal(s)</b>	Goal 4
<b>Hazard(s) Mitigated</b>	Flooding; Severe Storm (flood-related)
<b>Plan Integration</b>	n/a
<b>Risk Reduction/ Benefits</b>	High: Numerous losses avoided and/or numerous benefits
<b>Action Lead</b>	Department of the Environment
<b>Potential Funding Source(s)</b>	FMA; BRIC
<b>Implementation Timeframe</b>	Ongoing; currently, several watershed scale studies are being conducted. In following years, other watersheds should be included
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-26</b>	<b>Develop structural and action plans with inundation mapping for all High Hazard Potential Dams with poor conditions and no EAPs. Develop structural and action plans for high-risk pump stations, levees, and other flood control infrastructure. Ensure a process for supporting affected "downflow" communities that a dam failure hazard would inundate.</b>
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<b>Mitigation Category</b>	Prevention; property protection; emergency services
<b>Applicable Goal(s)</b>	Goal 3, Goal 4
<b>Hazard(s) Mitigated</b>	Dam and Levee Failure
<b>Plan Integration</b>	n/a
<b>Risk Reduction/ Benefits</b>	Moderate: Some losses avoided, some benefits
<b>Action Lead</b>	Department of Public Works and Transportation
<b>Potential Funding Source(s)</b>	HHPD
<b>Implementation Timeframe</b>	Long-term
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-27</b>	<b>Implement stormwater management projects, such as drainage retrofits, to address pluvial/stormwater flooding in community-identified areas. Prioritize restoration projects from the Watershed Implementation Plan (WIP) that will support the Plan 2035 future land use pattern. Downtowns should be given priority for stormwater retrofits, especially environmental site design practices. Land acquisition or ecological restoration activities should be targeted to stronghold watersheds.</b>
<b>Mitigation Category</b>	Prevention; property protection; natural resource protection; structural projects
<b>Applicable Goal(s)</b>	Goal 1, Goal 4
<b>Hazard(s) Mitigated</b>	Severe Storm (flood-related)
<b>Plan Integration</b>	Plan Prince George's 2035 Approved General Plan
<b>Risk Reduction/ Benefits</b>	High: Numerous losses avoided and/or numerous benefits
<b>Action Lead</b>	Department of Public Works and Transportation
<b>Potential Funding Source(s)</b>	BRIC; HMGP

<b>Implementation Timeframe</b>	Ongoing
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-34</b>	<b>Assess Climate Projections and Consequences of Dam and Levee Failure. Analyze baseline conditions against local/regional climate projections to highlight future vulnerabilities and risk. Model hydrological loads to the consequences of failure under present and future conditions and jointly evaluate dams, levees, and interdependent components. Incorporate Findings in Emergency Action Plans.</b>
<b>Mitigation Category</b>	Prevention; property protection
<b>Applicable Goal(s)</b>	Goal 4
<b>Hazard(s) Mitigated</b>	Dam and Levee Failure
<b>Plan Integration</b>	Climate Action Plan
<b>Risk Reduction/ Benefits</b>	Moderate: Some losses avoided, some benefits
<b>Action Lead</b>	Department of Public Works & Transportation
<b>Potential Funding Source(s)</b>	HHPD
<b>Implementation Timeframe</b>	Ongoing
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-35</b>	<b>Continue annual flood risk awareness and mitigation mailing to all owners of high-risk properties in the SFHA, including RL/SRL structures. Provide additional outreach in response to new/upcoming grant opportunities and funding.</b>
<b>Mitigation Category</b>	Emergency services; education and awareness
<b>Applicable Goal(s)</b>	Goal 3, Goal 4

<b>Hazard(s) Mitigated</b>	Flooding
<b>Plan Integration</b>	2023 Prince George's County Hazard Mitigation Plan; 2021 Maryland State Hazard Mitigation Plan
<b>Risk Reduction/ Benefits</b>	High: Numerous losses avoided and/or numerous benefits
<b>Action Lead</b>	Office of Homeland Security
<b>Potential Funding Source(s)</b>	County staff time
<b>Implementation Timeframe</b>	Ongoing
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-36</b>	<b>Work with County municipalities and/or develop public-private partnerships to provide hazard awareness messaging and information on hazard preparedness and mitigation in secondary languages for promotion using local newspapers, municipal websites, social media, etc.</b>
<b>Mitigation Category</b>	Prevention; education and awareness
<b>Applicable Goal(s)</b>	Goal 2, Goal 3, Goal 4
<b>Hazard(s) Mitigated</b>	All hazards
<b>Plan Integration</b>	2023 Prince George's County Hazard Mitigation Plan; 2021 Maryland State Hazard Mitigation Plan
<b>Risk Reduction/ Benefits</b>	Moderate: Some losses avoided, some benefits
<b>Action Lead</b>	Department of Community Relations
<b>Potential Funding Source(s)</b>	BRIC
<b>Implementation Timeframe</b>	Ongoing
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action PG-42</b>	<b>Send a digital copy of the 2023 Hazard Mitigation Plan to all County and City staff, as well as all homeowner associations within the planning area.</b>
<b>Mitigation Category</b>	Education and awareness
<b>Applicable Goal(s)</b>	Goal 2, Goal 3, Goal 4
<b>Hazard(s) Mitigated</b>	All hazards
<b>Plan Integration</b>	2023 Prince George's County Hazard Mitigation Plan
<b>Risk Reduction/ Benefits</b>	Moderate: Some losses avoided, some benefits
<b>Action Lead</b>	Office of Homeland Security
<b>Potential Funding Source(s)</b>	County staff time
<b>Implementation Timeframe</b>	Short-term
<b>Priority</b>	High
<b>Notes</b>	n/a

## B. City of Laurel Action Plans

<b>Action L-2</b>	<b>Integrate mitigation plan requirements and actions into other appropriate planning mechanisms, such as comprehensive plans and capital improvement plans.</b>
<b>Mitigation Category</b>	Prevention
<b>Applicable Goal(s)</b>	Goal 4
<b>Hazard(s) Mitigated</b>	All Hazards
<b>Plan Integration</b>	2023 Prince George's County Hazard Mitigation Plan; 2021 State of Maryland Hazard Mitigation Plan
<b>Risk Reduction/ Benefits</b>	Very high: Significant losses avoided and/or significant benefits
<b>Action Lead</b>	Office of Homeland Security
<b>Potential Funding Source(s)</b>	City staff time
<b>Implementation Timeframe</b>	Ongoing
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action L-3</b>	<b>Adopt the most recent published edition of the I-Codes (e.g., International Building Code, International Residential Code).</b>
<b>Mitigation Category</b>	Prevention; property protection
<b>Applicable Goal(s)</b>	Goal 4
<b>Hazard(s) Mitigated</b>	All Hazards
<b>Plan Integration</b>	n/a
<b>Risk Reduction/ Benefits</b>	Very high: Significant losses avoided and/or significant benefits
<b>Action Lead</b>	Department of the Fire Marshal and Permit Services
<b>Potential Funding Source(s)</b>	City staff time

<b>Implementation Timeframe</b>	Short-term
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action L-6</b>	<b>After flood events, the City of Laurel will evaluate whether to pursue funding to implement flood mitigation projects.</b>
<b>Mitigation Category</b>	Prevention; property protection; structural projects
<b>Applicable Goal(s)</b>	Goal 1, Goal 4
<b>Hazard(s) Mitigated</b>	Flooding; Severe Storm (Flood-related)
<b>Plan Integration</b>	n/a
<b>Risk Reduction/ Benefits</b>	High: Numerous losses avoided and/or numerous benefits
<b>Action Lead</b>	Office of Homeland Security
<b>Potential Funding Source(s)</b>	City staff time
<b>Implementation Timeframe</b>	Ongoing
<b>Priority</b>	High
<b>Notes</b>	n/a

<b>Action L-10</b>	<b>Implement stormwater management projects, such as drainage retrofits, to address pluvial/stormwater flooding in community-identified areas.</b>
<b>Mitigation Category</b>	Prevention; property protection; structural projects
<b>Applicable Goal(s)</b>	Goal 1, Goal 4
<b>Hazard(s) Mitigated</b>	Flooding; Severe Storm (Flood-related)
<b>Plan Integration</b>	2023 Prince George's County Hazard Mitigation Plan; 2021 State of Maryland Hazard Mitigation Plan; Prince George's County Green Infrastructure Plan



<b>Risk Reduction/ Benefits</b>	High: Numerous losses avoided and/or numerous benefits
<b>Action Lead</b>	Department of Public Works
<b>Potential Funding Source(s)</b>	City staff budget; BRIC
<b>Implementation Timeframe</b>	Ongoing
<b>Priority</b>	High
<b>Notes</b>	Notable stormwater flooding issues to address include the 19 Main Street drain, 1 Main Street drain, 807 Karen Court (near Police Department), 516 9 <sup>th</sup> Street, and MARC Station parking lot

## Appendix G. Record of Changes

General Changes:

- The reference chapter was removed and replaced with footnotes throughout all the chapters for easier and quicker references for the reader.
- The City of Laurel Plan was disbanded and incorporated into the “Planning Process and Community Profile” and “Capability Assessment” chapters as appropriate for consistency with the way the “Hazard Identification and Risk Assessment” and “Mitigation Strategy” chapters are structured.

Table 8. Record of changes made to the 2017 Hazard Mitigation Plan during the 2023 Hazard Mitigation Plan update

2023 Plan Chapter	Section	Change Description
Executive Summary	A. Planning Context	Updated
	B. Planning Committee Members	Updated with new Planning Committee Members
	C. Hazard Identification and Risk Assessment	Updated criteria for hazard ranking and included 2023 Priority Rankings.
	D. Capability Assessment	Updated summary
	E. Mitigation Strategy	Updated with four new goals
	F. Plan Implementation	Updated
	G. Conclusion	Updated
Chapter 1. Introduction	A. Purpose	Updated
	B. Planning Context	Added new State and County-level hazard mitigation and climate planning sections
	C. Plan Organization	Updated with new chapter organization
	D. Acknowledgements	Updated

2023 Plan Chapter	Section	Change Description
Chapter 2. Planning Process	A. Planning Process	Updated with description of 2023 planning process
	B. The Mitigation Advisory Committee	Updated
	C. Public Participation and Stakeholder Engagement	Updated participation description and public survey results
	D. Community Lifelines	New section. Incorporated FEMA Community Lifeline and BRIC information
Chapter 3. Community Profile	A. Physiography	Updated
	B. Hydrology	Updated
	C. Climate	Updated
	D. Land-use and Development Trends	Updated
	E. Population	Updated with current statistics
	F. Business and Labor	Updated
	G. Future Growth and Development	Updated
	H. Transportation	Updated
	I. Infrastructure	Updated
	J. City of Laurel	Updated
Hazard Identification and Risk Assessment	A. Introduction	Updated summary of each hazard section
	B. Riverine Flood	Updated hazard history, maps, and used Hazus to perform loss estimate in Vulnerability Assessment. Added Future Development and Social Vulnerability sections.
	C. Severe Storm (Flood-related)	Updated hazard history, incorporated climate change into Probability of Future Events section.

2023 Plan Chapter	Section	Change Description
	D. Severe Storm (Wind-related)	Updated hazard history, incorporated climate change into Probability of Future Events section.
	E. High Wind	Updated hazard history, incorporated climate change into Probability of Future Events section.
	F. Tornado	Updated hazard history, incorporated climate change into Probability of Future Events section. Used FEMA National Risk Index for Tornadoes map viewer to determine County-wide tornado risk.
	G. Extreme Heat	Updated hazard history, maps, incorporated climate change and social vulnerability into section. Added Future Development section.
	H. Winter Storm	Updated hazard history, incorporated climate change into Probability of Future Events section.
	I. Hurricane/Tropical Storm	Updated hazard history, maps, and used Hazus to perform loss estimate in Vulnerability Assessment section. Added Social Vulnerability section.
	J. Dam and Levee Failure	Added maps of inundation zones and levee extents. Incorporated climate change impacts and created new future development section.
	K. Earthquake	Updated hazard history and used Hazus to perform loss estimate in Vulnerability Assessment section.
	L. Extreme Cold	Updated hazard history, incorporated climate change into Probability of Future Events section.
	M. Sinkhole	Updated hazard history, created new map of sinkhole complaints from the past 5 years, incorporated climate change into Probability of Future Events section.
	N. Wildfire	Updated hazard history, maps, incorporated climate change impacts into section. Added Future Development and Social Vulnerability section.
	O. Landslide	Updated hazard history, added photos from the County, incorporated climate change into Probability of Future Events section.

2023 Plan Chapter	Section	Change Description
	P. Drought	Updated hazard history, incorporated climate change into Probability of Future Events section.
	Q. Coastal Flood	Updated hazard history, maps, and used Hazus to perform loss estimate in Vulnerability Assessment section. Incorporated climate change impacts into Probability of Future Events section.
Capability Assessment	A. Prince George's County Capability Assessment	Updated
	B. City of Laurel Capability Assessment	Updated
	C. Summary of Existing Mitigation Activities	Updated
	D. Plan Assessment	New section
Mitigation Strategy	A. Introduction	Updated
	B. Mitigation Goals	Updated with new mitigation goals
	C. Mitigation Action Selection	Updated
	D. 2023-2028 Mitigation Actions	Updated with new mitigation actions
	E. Mitigation Actions Summary	Updated
Plan Implementation and Maintenance	A. Distribution	Updated
	B. Implementation and Maintenance	Added new Technical Assistance and Funding Opportunities section
	C. Monitoring and Reporting Process	Updated
	D. Evaluation and Revisions	Updated
	E. Future Improvements	Updated

# Appendix H. Adoption Resolutions

**Contents:**

1. Sample Adoption Resolution
2. Prince George's County Adoption Resolution
3. City of Laurel Adoption Resolution

## A. Sample Adoption Resolution

Resolution #

**JURISDICTION**

A RESOLUTION OF THE JURISDICTION ADOPTING THE 2023 PRINCE GEORGE'S COUNTY AND THE CITY OF LAUREL HAZARD MITIGATION PLAN

WHEREAS the (GOVERNING BODY) recognizes the threat that natural hazards pose to people and property within (JURISDICTION); and

WHEREAS the (JURISDICTION) has prepared a multi-hazard mitigation plan, hereby known as Prince George's County & City of Laurel Hazard Mitigation Plan, 2023, in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

WHEREAS Prince George's County & City of Laurel Hazard Mitigation Plan, 2023, identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in (JURISDICTION) from the impacts of future hazards and disasters; and

WHEREAS adoption by the (GOVERNING BODY) demonstrates its commitment to hazard mitigation and achieving the goals outlined in the Prince George's County & City of Laurel Hazard Mitigation Plan, 2023.

NOW THEREFORE, BE IT RESOLVED BY THE (JURISDICTION), MARYLAND, THAT:

Section 1. In accordance with (LOCAL RULE FOR ADOPTING RESOLUTIONS), the (GOVERNING BODY) adopts the Prince George's County & City of Laurel Hazard Mitigation Plan, 2023. While content related to (JURISDICTION) may require revisions to meet the Federal Emergency Management Agency's plan approval requirements, changes occurring after adoption will not require (JURISDICTION) to re-adopt any further iterations of the plan associated with this update. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.

ADOPTED by a vote of # in favor and # against, and # abstaining, this # day of MONTH, 2023.

APPROVED: \_\_\_\_\_ ATTEST: \_\_\_\_\_

Print jurisdiction head of the governing body name      Print jurisdiction representative name

## B. Prince George's County Adoption Resolution

DR-1

**COUNTY COUNCIL OF PRINCE GEORGE'S COUNTY, MARYLAND**  
**2023 Legislative Session**

Resolution No. CR-065-2023  
Proposed by The Chair (by request – County Executive)  
Introduced by Council Members Dernoga, Watson, Harrison, Ivey, Olson and Franklin  
Co-Sponsors Council Member Hawkins  
Date of Introduction June 20, 2023

**RESOLUTION**

1 A RESOLUTION concerning  
2 Prince George's County Hazard Mitigation Plan  
3 For the purpose of adopting an updated County-wide Hazard Mitigation Plan as required by the  
4 Federal Emergency Management Agency (FEMA) to remain eligible for Federal mitigation  
5 assistance for natural disasters.  
6 WHEREAS, Prince George's County Hazard Mitigation Plan was approved by Prince  
7 George's County through CR-20-2005, and an updated Hazard Mitigation Plan was approved in  
8 2018 through CR-34-2018. Upon adoption of this Resolution, the County's 2023 Hazard  
9 Mitigation Plan supersedes all previous County Mitigation plans; and  
10 WHEREAS, the federal Disaster Mitigation Act of 2000 was signed into law to reduce the  
11 effects of disasters. The law encourages, among other initiatives, a planning process based on  
12 cooperation among state and local authorities, community partners and the public at large; and  
13 WHEREAS, the federal Disaster Mitigation Act of 2000 recognizes local and state pre-  
14 disaster planning and promotes "resiliency" as a major mitigation strategy; and  
15 WHEREAS, pursuant to the regulations implementing the federal Disaster Mitigation Act  
16 of 2000, states and local governments must have an approved and adopted hazard mitigation plan  
17 in order to maintain eligibility for pre and post disaster mitigation grant funding; and  
18 WHEREAS, the Federal Emergency Management Agency (FEMA) is responsible for  
19 reviewing and approving State and local plans; and  
20 WHEREAS, the Prince George's County Hazard Mitigation Plan 2023 is a major update to  
21 the 2018 Hazard Mitigation Plan and is in accordance with all State and federal rules and  
22 regulations governing local hazard mitigation plans; and



CR-065-2023 (DR-1)

1           WHEREAS, Prince George's County, pursuant to the requirements of the Robert T.  
2 Stafford Disaster Relief and Emergency Assistance Act, 42 U.S.C. §§ 5121-5207 and  
3 implementing regulations at 44 CFR Part 201, adopted its Hazard Mitigation Plan; and  
4           WHEREAS, 44 CFR § 201.3 requires that the County update its Hazard Mitigation Plan at  
5 a minimum of every 5 years to continue its eligibility for federal funding to implement certain  
6 mitigation projects; and  
7           WHEREAS, 44 CFR Part 78 prescribes procedures for the Flood Mitigation Assistance  
8 Program, authorized by the National Flood Insurance Act of 1968, 42 U.S.C. §§ 4104c and  
9 4104d, requiring that the County adopt a mitigation plan in order to be eligible for funding to  
10 implement certain flood mitigation projects; and  
11           WHEREAS, Prince George's County has experienced past flooding and other natural  
12 hazard events that pose risks to public health and safety and which may cause serious property  
13 damage; and  
14           WHEREAS, the planning process fostered by the Maryland Emergency Management  
15 Agency and set forth by FEMA offers the opportunity to consider natural hazards and risks, and  
16 to identify mitigation actions to reduce future impacts of such hazards; and  
17           WHEREAS, the State of Maryland has provided federal mitigation funds to support the  
18 development of the mitigation plan; and  
19           WHEREAS, in developing the updated Hazard Mitigating Plan, a core planning team, the  
20 Mitigation Advisory Committee, was assembled consisting of the Prince George's County Office  
21 of Homeland Security, Prince George's County agencies, municipalities, utility companies and  
22 the community and volunteer organizations; and  
23           WHEREAS, public hearings were held to solicit public comments and questions and to  
24 present an updated plan and the proposed updated mitigation actions; and  
25           WHEREAS, in addition to the public hearings, public input was sought and received via  
26 community events, social media, civic and HOA meetings and online via the Prince George's  
27 Office of Homeland Security; and  
28           WHEREAS, the Hazard Mitigation Plan recommends several mitigation actions that will  
29 help minimize and reduce safety threats and damage to private and public property and the  
30 Hazard Mitigation Plan (2023) is set forth in Attachment A, attached hereto and made a part  
31 hereof; and

CR-065-2023 (DR-1)

1 WHEREAS, the Hazard Mitigation Plan must be updated as required by FEMA in order to  
2 continue eligibility for Federal Disaster Assistance; and

3 WHEREAS, the purpose of the Hazard Mitigation Plan is to identify policies, capabilities,  
4 activities, and tools to help make Prince George's County more resilient in the face of future  
5 disasters.

6 NOW, THEREFORE, BE IT RESOLVED by the County Council of Prince George's  
7 County, Maryland, that that the attached Hazard Mitigation Plan (2023) is hereby adopted as an  
8 official plan of Prince George's County.

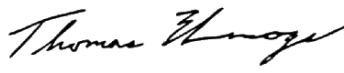
9 BE IT FURTHER RESOLVED that the Prince George's County Office of Homeland  
10 Security and Prince George's County offices identified in the Hazard Mitigation Plan are hereby  
11 directed to pursue implementation of the recommended priority actions that are assigned to their  
12 agencies.

13 BE IT FURTHER RESOLVED that any action proposed in the Hazard Mitigation Plan  
14 shall be subject to and contingent upon budget approval, if funding is required, and this  
15 resolution shall not be interpreted so as to mandate any such appropriations.


16 BE IT FURTHER RESOLVED that the Prince George's County Office of Homeland  
17 Security is designated to coordinate with other offices and entities and shall periodically report  
18 on the activities, accomplishments, and progress, and shall prepare a progress report as required  
19 by the Maryland Emergency Management Agency.

Adopted this 26<sup>th</sup> day of September, 2023.

COUNTY COUNCIL OF PRINCE  
GEORGE'S COUNTY, MARYLAND

BY:   
Thomas E. Demoga  
Chair

ATTEST:

  
Donna J. Brown  
Clerk of the Council

## C. City of Laurel Adoption Resolution



### CITY OF LAUREL, MARYLAND

#### RESOLUTION NO. 9-2023

**A RESOLUTION OF THE MAYOR AND CITY COUNCIL OF LAUREL, MARYLAND TO ADOPT THE HAZARD MITIGATION PLAN OF PRINCE GEORGE'S COUNTY AS THE CITY'S OFFICIAL PLAN.**

*Sponsored by the President on behalf of the Administration.*

**WHEREAS**, Prince George's County has prepared a multi-hazard mitigation plan, hereby known, as Prince George's County and City of Laurel Hazard Mitigation Plan, 2023, in accordance with federal laws, including the Robert T. Stafford Disaster Relief and Emergency Assistance Act, as amended; the National Flood Insurance Act of 1968, as amended; and the National Dam Safety Program Act, as amended; and

**WHEREAS**, Prince George's County and City of Laurel Hazard Mitigation Plan, 2023, identifies mitigation goals and actions to reduce or eliminate long-term risk to people and property in Prince George's County and the City of Laurel from the impacts of future hazards and disasters; and

**WHEREAS**, adoption of the Prince George's County and City of Laurel Hazard Mitigation Plan, 2023 by the Mayor and City Council of Laurel demonstrates its commitment to hazard mitigation and achieving the goals outlined in said Plan.

**NOW, THEREFORE, BE IT RESOLVED**, by the Mayor and City Council of Laurel, Maryland that:

1. In accordance with Section 316 (1) of the Laurel City Charter, the Mayor and City Council of Laurel hereby adopt the Prince George's County and City of Laurel Hazard Mitigation Plan, 2023. While content related to the City of Laurel may require revisions to meet the Federal Emergency Management Agency's plan approval requirements, changes occurring after adoption will not require the City of Laurel to re-adopt any further iterations of the plan associated with this update. Subsequent plan updates following the approval period for this plan will require separate adoption resolutions.
2. Any action proposed in the Prince George's County and City of Laurel Hazard Mitigation Plan, 2023, shall be subject to and contingent upon budget approval, if funding is required and this resolution shall not be interpreted to mandate any such appropriations.


3. The City's Director/Emergency Manager, Department of Community Resources and Emergency Management (CREM) is hereby designated to pursue implementation of the recommended priority actions in the Plan, and to coordinate with other City offices/departments, as well as Prince George's County to accomplish those goals. The City's Director/Emergency Manager, Department of CREM shall also periodically report to the Mayor and City Council as to the activities, accomplishments, and progress regarding these goals, and shall prepare a progress report as required by the Maryland Department of Emergency Management.

**AND, BE IT FURTHER RESOLVED**, that this Resolution shall take effect on the date of its adoption.

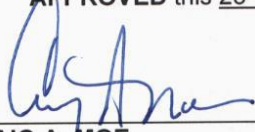
**ADOPTED** this 23<sup>rd</sup> day of October, 2023.

**ATTEST:**

  
\_\_\_\_\_  
**SARA A. GREEN, CPM, CMC**  
City Clerk

  
\_\_\_\_\_  
**BRENCIS D. SMITH**  
President of the City Council

**APPROVED** this 23<sup>rd</sup> day of October, 2023.

  
\_\_\_\_\_  
**CRAIG A. MOE**  
Mayor

# Appendix I. FEMA Requirements

**Contents:**

1. FEMA Local Plan Review Tool
2. FEMA Formal Approval Letter
3. Annual Progress Report Template

## A. FEMA Local Plan Review Tool

### LOCAL MITIGATION PLAN REVIEW TOOL +HHPD

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*.

<b>Jurisdiction:</b> Prince George's County, MD City of Laurel, MD	<b>Title of Plan:</b> Prince George's County & City of Laurel Hazard Mitigation Plan	<b>Date of Plan:</b> 2023
<b>Local Point of Contact:</b> Ehsan Bahador <b>Title:</b> MPS, Emergency Management Specialist	<b>Address:</b> 7915 Anchor Street Landover, MD 20785	
<b>Agency:</b> Prince George's County Office of Homeland Security		
<b>Phone Number:</b> Office: 301-324-4342 Cell: 240-393-1657	<b>E-Mail:</b> <a href="mailto:EBahador@co.pg.md.us">EBahador@co.pg.md.us</a>	

<b>State Reviewer:</b> Jesse Delph Marcia Barben Aliyah Russell	<b>Title:</b> Senior Hazard Mitigation Project Officer Hazard Mitigation Project Officer Hazard Mitigation Project Officer	<b>Date:</b>
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<b>FEMA Reviewer:</b> Lorena Reyes	<b>Title:</b> Community Planner	<b>Date:</b> 3/21/2023
<b>Date Received in FEMA Region (insert)</b>	3/9/2023	
<b>Plan Not Approved</b>		
<b>Plan Approvable Pending Adoption</b>	<b>APA status</b>	
<b>Plan Approved</b>		

**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	Location in Plan (section and/or page number)	Met	Not Met
<b>Regulation (44 CFR § 201.6 Local Mitigation Plans)</b>			
<b>ELEMENT A. PLANNING PROCESS</b>			
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))		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))		X	
A3. Does the Plan document how the public was involved in the planning process during the drafting stage? (Requirement §201.6(b)(1))		X	
A4. Does the Plan describe the review and incorporation of existing plans, studies, reports, and technical information? (Requirement §201.6(b)(3))		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))		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))		X	

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
<b>Regulation (44 CFR § 201.6 Local Mitigation Plans)</b>				
<b>ELEMENT A</b>				
<p><b>Recommended revisions:</b></p> <ul style="list-style-type: none"> <li>Table 7: Mitigation Advisory Committee Meeting Summary and Attendance - According to table 7 Christina Cornwall provided input to the survey but she is not listed as a responder in the survey results (Pg. 73 - Appendices). Brian K Lee from City of Laurel is listed as a survey responder. Christina does appear to have attended the Mitigation Strategy Workshop according to meeting notes, which is not listed in Table 7.                             <ul style="list-style-type: none"> <li>Addressed March 2023</li> </ul> </li> <li>Table 6: Mitigation Advisory Committee Meetings - Need to update the "summary" column for the Feb 1, 2023, Plan Draft Review Meeting. Currently says TBD with highlight. Same for Table 8: Public Meetings the Feb 2, 2023, Public Meeting #2 summary, since both meetings have taken place and meeting notes are in the appendix.                             <ul style="list-style-type: none"> <li>Addressed March 2023</li> </ul> </li> <li>A2(a) states the plan must identify all stakeholders involved or given an opportunity to be involved in the planning process. At a minimum, stakeholders must include 1) Local and regional 2) Agencies that have authority to regulate 3) Neighboring communities. A2(b) further states, the plan must provide the agency or organization represented and the person's position or title within the agency. Currently, the plan states that Adjacent counties of Montgomery, Howard, Charles, Calvert, Anne Arundel participated but I couldn't find documentation with position/title etc. of representatives invited. The plan met the requirement by documenting the participation of the University which can be considered a "neighboring community" however, under the newly released guidance there will be a distinction between neighboring communities and universities, and both will be required.                             <ul style="list-style-type: none"> <li>Addressed March 2023</li> </ul> </li> </ul>				
<b>ELEMENT B. HAZARD IDENTIFICATION AND RISK ASSESSMENT</b>				
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))			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)(j))			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)(iii))			X	
B4. Does the Plan address NFIP insured structures within the jurisdiction that have been repetitively damaged by floods? (Requirement §201.6(c)(2)(iii))			X	

**Commented [P31]:** Christina Cornwall is listed as a responder in the City of Laurel survey results under the name "Chrissy" Cornwall (pg. 129 in Appendices). Brian Lee responded to the Prince George's County survey (pg. 72 in Appendices).

Chrissy attended the Mitigation Strategy Workshop, which is now reflected in table 7 of the main plan.

**Commented [P32]:** Done: See Chapter 2 Section B for Table 6 and Chapter 2 Section C.1 for Table 8

**Commented [P33]:** Invitations to participate in the Public Draft Plan Review meeting were sent to the neighboring jurisdictions. The email is seen on pg. 263 of the Appendices. Text was added to clarify it was sent to the emergency managers on pg. 37 of the main plan.



1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
Regulation (44 CFR § 201.6 Local Mitigation Plans)				
<b>ELEMENT B:</b>				
Recommended revisions:				
<ul style="list-style-type: none"> <li>Dam Failure Hazard (Moderate risk score): Page 182 of the HMP states the county owns 6 high hazard dams. These 6 county-owned dams include: Laurel Lakes, Indian Creek #2, Indian Creek #3, Lake Arbor, Largo Town Center, and Heritage Glen dams. However, <i>Table B4: Dams located in in Prince George's County and City of Laurel</i> identifies Heritage Glen Dam and Largo Town Center Dam as Significant hazard potential, not high.                             <ul style="list-style-type: none"> <li>Addressed March 2023</li> </ul> </li> <li>Figure 34: Prince George's County Social Vulnerability and FEMA Flood Zones - The reds and yellows/beige are similar and can make it hard to differentiate in the map. Recommend using vertical lines for one of the categories and colors for the other.</li> <li>High Wind Hazard (High risk score): Pg. 143 of the plan identifies non-native English speakers, low-income households and the homeless as populations at risk. The community profile chapter, specifically the Census data integrated, uses similar but different terminology – "Foreign born persons" or "Language other than English spoke..." and "Persons in poverty" with respective population percentages. I recommend aligning terminology from the vulnerability narrative to the Census data so that the narrative is backed by information in the plan.                             <ul style="list-style-type: none"> <li>Addressed March 2023</li> </ul> </li> <li>The plan includes Substantial Damage claims data but doesn't describe how each community implements the substantial damage provisions of their floodplain management regulations after an event. This is something that will be required when new guidance goes in effect April 19, 2023. This is important especially given that more than half (64%) of survey respondents said they would repair or rebuild their property in the same location if a disaster substantially damaged their home (pg. 36- HMP).                             <ul style="list-style-type: none"> <li>Addressed March 2023</li> </ul> </li> </ul>				
<b>ELEMENT C. MITIGATION STRATEGY</b>				
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©(3))			X	
C2. Does the Plan address each jurisdiction's participation in the NFIP and continued compliance with NFIP requirements, as appropriate? (Requirement §201.6©(3)(ii))			X	
C3. Does the Plan include goals to reduce/avoid long-term vulnerabilities to the identified hazards? (Requirement §201.6©(3)(i))			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©(3)(ii))			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©(3)(iv)); (Requirement §201.6©(3)(iii))			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©(4)(ii))			X	

Commented [P14]: Done; see Chapter 4 section I.2.a

Commented [P35]: done; see Chapter 4 section E.5

Commented [P36]: Addressed: Refer to Capability Assessment, sections A.5.a and B.3.h.2

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
<b>Regulation (44 CFR § 201.6 Local Mitigation Plans)</b>				
<b>ELEMENT C:</b>				
<b>Recommended revisions:</b>				
<ul style="list-style-type: none"> <li>strongly encourage that any projects submitted under BRIC/FMA or HMGP DR-4491 be included explicitly in the plan. While the plan currently does include general actions that support restoration projects (PG-27), critical infrastructure protection (L-4), warning systems (PG-14) there aren't specific mitigation actions that identify areas of focus such as Fort Washington neighborhood or 75<sup>th</sup> Avenue, and no actions explicitly identify generators to mitigate or protect critical facilities.                             <ul style="list-style-type: none"> <li>Addressed March 2023</li> </ul> </li> </ul>				
<p><b>HMGP-4491-DR-MD-0009:</b> Prince George's County Preparation of Flood Warning System SOP. 5% initiative project. The purpose of the proposed activity is to develop a standard operating procedure (SOP) for Prince George's County's two flood warning systems which enable the County to monitor real-time flood conditions and provide information to relevant authorities and impacted communities.</p>				
<p><b>HMGP-4491-DR-MD-0012:</b> City of Laurel, Prince George's County Emergency Back-Up Generators for Critical Facilities 6. Regular project. Upsizing of 5 and obtaining 1 generator at 6 critical facilities. Buildings include: City/Municipal Hall, Laurel Police Department, Park and Recreation Maintenance Facility, Laurel Armory Facility, City Services Building, and Public Works Facility.</p>				
<p><b>HMGP-4491-DR-MD-0017:</b> Prince George's County Town of Eagle Harbor Shoreline Restoration - Phased. Regular project. The living shoreline component of this Project will prevent shoreline erosion, increase resilience against storms, improve water quality, and protect properties and infrastructure along the shoreline.</p>				
<p><b>HMGP-4491-DR-MD-0016:</b> Prince George's Residential Flood Mitigation 75th Ave (phased project).</p>				
<p><b>HMGP-4491-DR-MD-0018:</b> Fort Washington Neighborhood Flood Risk Mitigation Project (Phased project).</p>				
<b>ELEMENT D. PLAN REVIEW, EVALUATION, AND IMPLEMENTATION</b> (applicable to plan updates only)				
D1. Was the plan revised to reflect changes in development? (Requirement §201.6(d)(3))			X	
D2. Was the plan revised to reflect progress in local mitigation efforts? (Requirement §201.6(d)(3))			X	
D3. Was the plan revised to reflect changes in priorities? (Requirement §201.6(d)(3))			X	
<b>ELEMENT D: REQUIRED REVISIONS</b>				
<b>ELEMENT E. PLAN ADOPTION</b>				
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(e)(5))			Forthcoming	
E2. For multi-jurisdictional plans, has each jurisdiction requesting approval of the plan documented formal plan adoption? (Requirement §201.6(e)(5))			Forthcoming	

Commented [P37]: Added after the Mitigation Strategy table, see Chapter 6, section D.3.

1. REGULATION CHECKLIST		Location in Plan (section and/or page number)	Met	Not Met
<b>Regulation (44 CFR § 201.6 Local Mitigation Plans)</b>				
<b>ELEMENT E: REQUIRED REVISIONS</b>				
<b>ALL DAM RISKS – ELIGIBLE HIGH HAZARD POTENTIAL DAMS</b>				
HHPD1. Did Element A4 (planning process) describe the incorporation of existing plans, studies, reports, and technical information for eligible high hazard potential dams?			X	
HHPD2. Did Element B3 (risk assessment) address eligible high hazard potential dams in the risk assessment?			X	
HHPD3. Did Element C3 (mitigation goals) include mitigation goals to reduce long-term vulnerabilities from eligible high hazard potential dams that pose an unacceptable risk to the public?			X	
HHPD4. Did Elements C4-C5 (mitigation actions) prioritize mitigation actions to reduce vulnerabilities from eligible high hazard potential dams?			X	
<b>REQUIRED REVISIONS</b>				
<b>Recommended Revisions:</b>				
<ul style="list-style-type: none"> <li>HHPD2(b): While the plan documents the limitations as a lack of data (inundation mapping) it doesn't describe why that is or what challenges exist to obtain or develop the data needed to complete a risk assessment for the other dams.</li> </ul>				
<b>ELEMENT F. ADDITIONAL STATE REQUIREMENTS (OPTIONAL FOR STATE REVIEWERS ONLY; NOT TO BE COMPLETED BY FEMA)</b>				
F1.				
F2.				
<b>ELEMENT F: REQUIRED REVISIONS</b>				

**SECTION 2:  
PLAN ASSESSMENT**

<p><b>Plan Strengths</b></p> <p>Planning Process:</p> <ul style="list-style-type: none"> <li>- The Hazard Mitigation Plan's (HMP) and appendices are well-organized.</li> <li>- Kudos on including an executive summary.</li> <li>- The specific meetings and engagements that each Mitigation Advisory Committee member supported are clearly depicted in Table 7:Mitigation Advisory Committee Meeting Summary and Attendance.</li> </ul> <p>Risk Assessment:</p> <ul style="list-style-type: none"> <li>- In addition to the FEMA flood maps, the plan integrates the information from the Riverine Climate Ready Action Boundary Inundated Zone created by Maryland Dept. of Planning in 2021 which expands the FEMA floodplain by vertically adding 3 feet of water on top of the SFHA elevations and pushing the volume of water out horizontally. The HMP could benefit from describing the methodology and reasoning for the expansion.</li> <li>- The plan does a good job describing the effects of future conditions, including climate change, to their probability projections. This is something that will be required when new guidance goes in effect April 19, 2023.</li> <li>- The plan does a good job analyzing data and findings from the <i>Fourth National Climate Assessment</i> (NCA4), the CDC Social Vulnerability Index 2020, FEMA's National Risk Index, and the Climate Mapping for Resilience and Adaptation Assessment Tool.</li> <li>- In addition, the plan includes a risk assessment summary at the end of the chapter which is very helpful, and it includes Table 123. 2023 Hazard Risk Index Score Results &amp; Overall Ranking.</li> </ul> <p>Mitigation Strategy:</p> <ul style="list-style-type: none"> <li>- The plan goes above and beyond current requirement and includes a good description of existing building codes, land use, development ordinances, and regulations. This is something that will be required when new guidance goes in effect April 19, 2023.</li> </ul> <p><b>Areas of Improvement</b></p> <p>Planning Process:</p> <ul style="list-style-type: none"> <li>- For CRS communities seeking to use their HMP to meet elements that will also earn CRS credits, the planning committee must meet at least 5 times at key steps. Each community must have 2 staff representatives on the committee and at least half of all committee representatives must attend all meetings.</li> <li>- Strongly encourage all 27 incorporated municipalities to participate in the annual planning meetings and pursue full participation in the next plan update. Although the NFIP only recognizes local governments with land use authority, the FEMA Mitigation Planning Program encourages all local governments to participate in the planning process, seek plan approval and adopt the plan. Our guidance, in accordance with 44 CFR 201.2, defines local governments as "any county, municipality, city, town, township, public authority, school district, special district,</li> </ul>
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intrastate district, council of governments (regardless of whether the council of governments is incorporated as a nonprofit corporation under State law), regional or interstate government entity, or agency or instrumentality of a local government; any Indian tribe or authorized tribal organization, or Alaska Native village or organization; and any rural community, unincorporated town or village, or other public entity.”

o Addressed March 2023

**Risk Assessment:**

- The risk assessment includes an analysis of Repetitive Loss structures within the planning area using the NFIP definition. It may be helpful, while not required, to also do an analysis of the RL properties using the Flood Mitigation Assistance definition since that can better inform the planning team on how to develop a project application and what grant funding to pursue.

**Mitigation Strategy:**

- The plan includes Substantial Damage claims data but doesn't describe how each community implements the substantial damage provisions of their floodplain management regulations after an event. This is something that will be required when new guidance goes in effect April 19, 2023. This is important especially given that more than half (64%) of survey respondents said they would repair or rebuild their property in the same location if a disaster substantially damaged their home (pg. 36- HMP).

o Addressed March 2023

**Resources for Implementing Your Approved Plan**

- FEMA: [National Risk Index \(NRI\) for Natural Hazards](#)
- FEMA: [Resilience Analysis and Planning Tool \(RAPT\)](#)
- FEMA: [Mitigation Action Portfolio](#)
- FEMA: [Community Lifelines | FEMA.gov](#)
- FEMA: [Region 3 HM Planning Resources](#)
- FEMA: [Region 3 Conducting Annual Hazard Mitigation Plan Reviews Resource](#)
- FEMA: [Region 3 High Hazard Potential Dams State and Local Mitigation Planning Tips Resource](#)
  - o **Note:** The latest version will be shared before or following the plan review discussion/technical assistance call.
- FEMA: [Region 3 Checking In On The NFIP Resource](#)
  - o **Note:** This resource includes updated NFIP survey sheets.
- FEMA: [Guides to Expanding Mitigation](#)
- FEMA: [Protect Your Home from Flooding, Low Cost Project You Can Do Yourself Resource](#)
  - o **Note:** This resource will be shared before or following the plan review discussion/technical assistance call.
- Resilient Nation Partnership Network, NOAA, & FEMA: [Building Alliances for Equitable Resilience Resource \(April 2021\)](#)

**Commented [P38]:** Added that all 27 incorporated municipalities within PG County will be invited and encouraged to attend annual planning meetings (see Chapter 7, section C)

**Commented [P39]:** Addressed: Refer to Capability Assessment, sections A.5.a and B.3.h.2

- FEMA: *Protect Your Home from Flooding, Low Cost Project You Can Do Yourself Resource*

**SECTION 3:**  
**MULTI-JURISDICTION SUMMARY SHEET (OPTIONAL)**

**INSTRUCTIONS:** For multi-jurisdictional plans, a Multi-jurisdiction Summary Spreadsheet may be completed by listing each participating jurisdiction, which required Elements for each jurisdiction were 'Met' or 'Not Met,' and when the adoption resolutions were received. This Summary Sheet does not imply that a mini-plan be developed for each jurisdiction; it should be used as an optional worksheet to ensure that each jurisdiction participating in the Plan has been documented and has met the requirements for those Elements (A through E).

MULTI-JURISDICTION SUMMARY SHEET												
#	Jurisdiction Name	Jurisdiction Type (city/township/village, etc.)	Plan POC	Mailing Address	Email	Phone	Requirements Met (Y/N) *-HHPD					
							A. Planning Process*	B. Hazard Identification & Risk Assessment*	C. Mitigation Strategy*	D. Plan Review, Evaluation & Implementation	E. Plan Adoption	F. State Requirements
1	Prince George's County	County					X	X	X	X		
2	City of Laurel	City					X	X	X	X		
3												
4												
5												
6												
7												

## B. FEMA Formal Approval Letter

U.S. Department of Homeland Security  
Federal Emergency Management Agency  
Region 3

One Independence Mall  
615 Chestnut Street, 6<sup>th</sup> floor  
Philadelphia, PA 19106-4404



**FEMA**

November 3, 2023

The Honorable Thomas Dernoga  
Chair, County Council  
Prince George's County  
1301 McCormick Drive  
Largo, Maryland 20774

Community:	Prince George's County, Maryland
Plan Adoption Date:	09/26/2023
Plan Approval Date:	09/26/2023
Plan Expiration Date:	09/25/2028

Dear Chair Dernoga:

I am pleased to tell you that FEMA has approved your Hazard Mitigation Plan (HMP). The plan meets the requirements of Title 44, Chapter 1, Section 201.6, of the Code of Federal Regulations ([44 CFR 201.6](#)). It addresses the required elements: planning process, risk assessment and hazard identification, mitigation strategy, maintenance and implementation, and adoption.

Your HMP also met the requirements to address all dam risks, based on the Fiscal Year 2022 Rehabilitation of High Hazard Potential Dams (HHPD) Notice of Funding Opportunity.

Participating communities are now eligible for FEMA non-emergency assistance and mitigation grants from the following programs:

- [Hazard Mitigation Grant Program \(HMGP\)](#)
- [Building Resilient Infrastructure and Communities \(BRIC\)](#)
- [Flood Mitigation Assistance \(FMA\)](#)
- [HHPD Grant Program](#)

Funding from these programs can be used for qualified mitigation planning and projects that reduce disaster losses and protect life and property from future disasters. Approved HMPs can also earn points under the [Community Rating System](#).

Within 5 years, your community must revise its plan and obtain approval to remain eligible for mitigation grant funding. You should review the plan annually to keep it relevant to the mitigation goals in your community. Please consider the enclosed recommendations to further strengthen your plan during its next update.

[www.fema.gov](http://www.fema.gov)

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I commend you and the planning team for your hard work and continued commitment to building a safer, more resilient community. For questions about your plan or mitigation grant funding, please contact Caitlin Whiteleather, State Hazard Mitigation Officer, at (410) 517-3600 (ext. 2581).

Sincerely,




Sarah Wolfe, Branch Chief  
Floodplain Management and Insurance Branch  
FEMA Region 3

Enclosure

cc: Caitlin Whiteleather, State Hazard Mitigation Officer, MDEM  
Jesse Delph, Project Support Officer, MDEM  
Marcia Barben, Hazard Mitigation Project Officer, MDEM  
Aliyah Russell, Mitigation Project Officer, MDEM  
Ehsan Bahador, MPS, Emergency Management Specialist, Prince George's County  
Joey Henderson, MS, Manager, Preparedness and Outreach, Prince George's County




# Region 3 Local Mitigation Plan Review Tool Annex: Recommendations for Improvement

<b>Jurisdiction: Prince George's County &amp; City of Laurel</b>	<b>Title of Plan: Prince George's County &amp; City of Laurel Hazard Mitigation Plan</b>	<b>Date of Plan: 2023</b>
 <b>Element A: Planning Process</b>		
<input type="checkbox"/>	<p>Expand the planning team to include a broad range of stakeholders. These can include the following:</p> <ul style="list-style-type: none"> <li>• Municipalities without land use authority</li> <li>• Watershed organizations.</li> <li>• Special districts</li> <li>• Dam owners</li> <li>• Utility providers</li> </ul> <p>They can also include any other partners who can help with mitigation implementation and community outreach.</p>	
<input type="checkbox"/>	<p>Better align planning efforts between the Community Rating System (CRS) and the hazard mitigation plan.</p>	
<input type="checkbox"/>	<p>Standardize long-term monitoring of hazard-related activities. Add mitigation values to community officials' roles. Keep momentum through engagement during the five-year planning cycle. Share reviews with the state and FEMA for training, funding, and mitigation actions.</p>	



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Region 3 Local Mitigation Plan Review Tool Annex: Recommendations for Improvement

<input type="checkbox"/>	<p>Add the mitigation strategy into current local planning mechanisms; document how this was done. Use the <a href="#">Plan Integration: Linking Local Planning Efforts</a> document to learn how to link local planning mechanisms. You should add the mitigation strategy to the local comprehensive plan. It should inform land use and development.</p>
	<p><b>Element B: Hazard Identification and Risk Assessment</b></p>
<input type="checkbox"/>	<p>Compare National Flood Insurance Program (NFIP) Insurance Policies in Force with insurable structures in the Special Flood Hazard Area (SFHA). This should be done to analyze flood insurance coverage or financial risk.</p>
<input type="checkbox"/>	<p>Find historic properties and/or cultural resources being added to the plan. Add the following:</p> <ul style="list-style-type: none"> <li>• A list of team members and stakeholders who participated in the planning process.</li> <li>• The results of the risk assessment and loss estimation.</li> <li>• Mitigation goals that aim to reduce or avoid the effects of hazards.</li> <li>• Mitigation actions that will help the tribe, state, region, or community meet those goals.</li> <li>• Strategies that state how the mitigation actions will be implemented.</li> </ul>
<input type="checkbox"/>	<p>Add and document new data you obtain or develop to the next plan update. Mitigation grant applications can use vulnerable structure data (i.e., lowest floor elevation, value, building materials) and similar information. Be sure to document more than one data set (i.e., TEIF vs. Hazus).</p>
<input type="checkbox"/>	<p>Consider using Non-Regulatory Flood Risk Products (NRFRLPs), if available. These should help to establish opportunities to speak with local officials. They can help you learn more about specific structures' vulnerabilities within the planning area. They can also point out potential chances for mitigation.</p>
<input type="checkbox"/>	<p>Find gaps or inaccuracies in existing data. These can include natural hazards data, GIS mapping, and research on successful risk reduction methods. Act to fill those gaps. Public agencies are key resources for data and technical information. They include regional planning agencies, geological surveys, forestry divisions, emergency management offices, dam safety agencies, and weather service offices. They can be at the regional, state, and federal government levels. Online resources can also be used for hazard data. The National Climatic Data Center (part of NOAA) is one such resource.</p>

Learn more at [fema.gov](https://www.fema.gov)

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Region 3 Local Mitigation Plan Review Tool Annex: Recommendations for Improvement

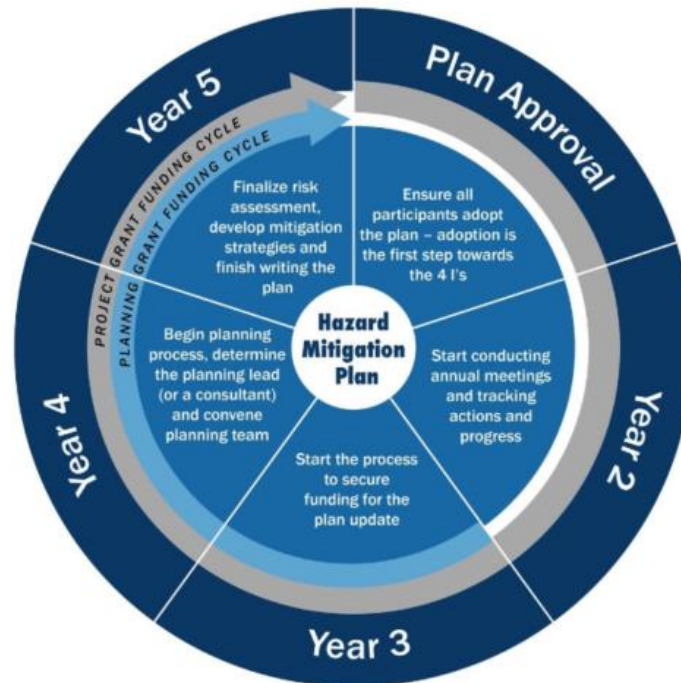
<input type="checkbox"/>	Analyze the RL properties using the Flood Mitigation Assistance definition. That can better inform the planning team on how to develop a project application and what grant funding to pursue.
<input type="checkbox"/>	
	<b>Element C: Mitigation Strategy</b>
<input type="checkbox"/>	Increase community-level interactions and risk-based discussions. Improve descriptions and connections between the outcome of the risk assessment/vulnerability analysis with the mitigation strategy. Content should flow from problem identification (risk/vulnerability) to mitigation strategy (goals/objectives/actions).
<input type="checkbox"/>	<p>Use the four overarching hazard mitigation techniques. They are:</p> <ul style="list-style-type: none"> <li>• Local Plans and Regulations.</li> <li>• Structure and Infrastructure.</li> <li>• Natural Systems Protection.</li> <li>• Education and Awareness.</li> </ul> <p>Make sure the mitigation action plan includes actions that fall under all four groups. This will help you achieve a more robust mitigation strategy.</p>
<input type="checkbox"/>	Identify alternative actions. Detail why some mitigation actions could not be done. Reasons could relate to funding, staffing, politics, and more. This helps document obstacles to successful implementation.
<input type="checkbox"/>	Consider developing Substantial Improvement/Substantial Damage Administrative Procedures.
<input type="checkbox"/>	

Learn more at [fema.gov](https://www.fema.gov)

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Region 3 Local Mitigation Plan Review Tool Annex: Recommendations for Improvement

 <b>Element D: Plan Review, Evaluation, and Implementation</b>	
<input type="checkbox"/>	Use the Five-Year Planning Wheel. It reflects the regular development, implementation and enhancement of your hazard mitigation plan.
<input type="checkbox"/>	Submit annual progress reviews. Plan talks with the state and FEMA.
<input type="checkbox"/>	Review the <a href="#">Local Mitigation Planning Policy Guide</a> . It will show you programmatic changes since the approval of your plan.
<input type="checkbox"/>	Reach out to your State Hazard Mitigation Planner 36 months from your plan's expiration date. That way, you can start the scope of work for your next update.
<input type="checkbox"/>	Seek out an opportunity with the State/FEMA to participate in a Plan Implementation and Grants Development (PIGD) Workshop over the next 5 years.
<input type="checkbox"/>	
<input type="checkbox"/>	



Learn more at [fema.gov](http://fema.gov)

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## C. Annual Progress Report Template

### Prince George's County and the City of Laurel Hazard Mitigation Plan Annual Progress Report

#### Reporting Period

The reporting period for this progress report is \_\_\_\_\_(date) through \_\_\_\_\_(date).

#### Background

This is an annual update of the Prince George's County and the City of Laurel Hazard Mitigation Plan. This update also meets annual certification requirements for Prince George's County floodplain management and Community Rating System (CRS) program.

Prince George's County and the City of Laurel developed a hazard mitigation plan to reduce risk from all hazards by identifying resources, information, and strategies for risk reduction. The federal Disaster Mitigation Act of 2000 requires state and local governments to develop hazard mitigation plans as a condition for federal disaster grant assistance. To prepare the plan, the County, City, and participating stakeholders and partners organized resources, assessed risks from natural hazards within the County and City, developed planning goals and objectives, reviewed mitigation alternatives, and developed an action plan to address probable impacts from natural hazards. By completing this process, the County and City maintained compliance with the Disaster Mitigation Act, achieving eligibility for mitigation grant funding opportunities afforded under the Robert T. Stafford Act.

The plan can be viewed online at: \_\_\_\_\_

#### Summary Overview of the Plan's Progress

The performance period for the Local Hazard Mitigation Plan became effective on \_\_\_\_\_, 2023, with the final approval of the plan by FEMA. The initial performance period for this plan will be 5 years, with an anticipated update to the plan to occur before \_\_\_\_\_, 2028. As of this reporting period, the performance period for this plan is considered to be \_\_\_\_% complete. The Hazard Mitigation Plan has targeted 43 hazard mitigation actions for Prince George's County and 14 hazard mitigation actions for the City of Laurel to be pursued during the 5-year performance period. As of the reporting period, the following overall progress can be reported:

- \_\_\_\_ out of \_\_\_\_ actions (\_\_\_\_%) reported ongoing action toward completion.
- \_\_\_\_ out of \_\_\_\_ actions (\_\_\_\_%) were reported as being complete.
- \_\_\_\_ out of \_\_\_\_ actions (\_\_\_\_%) reported no action taken.

#### Purpose

The purpose of this report is to provide an annual update on the implementation of the action plan identified in the Hazard Mitigation Plan. The objective is to ensure that there is a continuing and responsive planning process that will keep the Hazard Mitigation Plan dynamic and responsive to the needs and capabilities of the planning partners. This report discusses the following:

- Natural hazard events that have occurred within the last year
- Changes in risk exposure within the planning area

- Mitigation success stories
- Review of the action plan
- Changes in capabilities that could impact plan implementation
- Recommendations for changes/enhancement

**Mitigation Advisory Committee**

The Mitigation Advisory Committee, comprised of County and City staff, planning partners, and stakeholders within the planning area, reviewed and approved this progress report at its annual meeting held on \_\_\_\_, 202\_\_. It was determined through the plan's development process that the Mitigation Advisory Committee would remain in service to oversee maintenance of the plan. At a minimum, the Mitigation Advisory Committee will provide technical review and oversight on the development of the annual progress report. It is anticipated that there will be turnover in the membership annually, which will be documented in the progress reports. For this reporting period, the Mitigation Advisory Committee membership present at the meeting is as indicated in **Table 1**.

*Table 1: Mitigation Advisory Committee Members Present*

Name	Jurisdiction/ Category	Department	Title

**Natural Hazard Events within the Planning Area**

During the reporting period, there were \_\_ natural hazard events in the planning area that had a measurable impact on people or property. A summary of these events is as follows:

**Changes in Risk Exposure in the Planning Area**

*(Insert brief overview of any natural hazard event in the planning area that changed the probability of occurrence or ranking of risk for the hazards addressed in the hazard mitigation plan)*

**Mitigation Success Stories**

*(Insert brief overview of mitigation accomplishments during the reporting period)*

**Review of Mitigation Actions**

**Table 2** and **Table 3** review the mitigation actions from the Hazard Mitigation Plan for Prince George's County and the City of Laurel, reporting the status of each action. Reviewers of this report should refer to the Hazard Mitigation Plan for more detailed descriptions of each action and the prioritization process.

- [Plan 2035 Prince George's Elements](#) integrated policies are shown in **orange**.
- [Climate Action Plan](#) Priority Recommendations are shown in **green**.

Address the following in the "Comments" column of the following table:

- Was any element of the action carried out during the reporting period?
- If no action was completed, why?
- Is the timeline for implementation for the action still appropriate?
- If the action was completed, does it need to be changed or removed from the action plan?

Table 2: Prince George's County 2023-2028 Mitigation Actions Status Report

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	<b>Prevention</b>					
PG-1	Partner with federal agencies, the state, and Non-governmental Organizations to utilize available technical assistance to translate identified risks into mitigation projects, especially for benefit cost analyses for the County and municipalities.	Office of Homeland Security	Ongoing	Medium		
PG-2	Using the best available data, check the locations of HazMat sites, National Pollutant Discharge Elimination System sites, and other land uses; if found to be in flood hazard areas, communicate with the owner/handler of hazardous materials and known pollutants	Department of Environment	Short-term	Medium		



Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	regarding risk and appropriate response and protection measures.					
PG-3	Integrate mitigation plan requirements and actions into other appropriate planning mechanisms, such as comprehensive plans and capital improvement plans.	M-NCPPC	Ongoing	High		
PG-4	Collect flood depth information to support a grant to provide elevation certificates in areas newly included in the Special Flood Hazard Area or to those experiencing flooding issues to support Letter of Map Amendments (LOMA) or NFIP premium reductions.	Office of Homeland Security	Funding contingent	Medium		
PG-5	Expand codes and standards enforcement, such as for existing land use regulations and policies.	Department of Permitting, Inspections and Enforcement	Ongoing	Medium		
PG-6	Prohibit all waivers to allow development in floodplains.	Department of Permitting, Inspections and Enforcement	Ongoing	High		
PG-7	Revise Prince George's County Code of Ordinances to incorporate and require climate-resilient design, nature-based infrastructure, and climate-resilient practices. Adopt and enforce policies to require green infrastructure practices for new and existing properties, especially native plantings, rain gardens, green corridors, runoff	Maryland-National Capital Park and Planning Commission,	Short-term	High		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	retention, and other nature-based ways to reduce and naturally filter runoff on private and public properties.	Planning Department				
PG-8	Office of the County Executive must introduce and support a County Council resolution requiring the County to integrate extreme weather and energy-efficiency criteria into building codes.	Department of Permitting, Inspections, and Enforcement	Short-term	High		
PG-9	Require County Stormwater Management (SWM) Standards to Incorporate Projected Climate Change Impacts by using approved downscaled and up-to-date climate impact information to reevaluate peak rainfall estimates and future design storm profiles. Evaluate SWM standards using this criterion at least every three (3) years. Require all upgrades of County storm drain systems and Capital Improvement Project roadway, bridge, culvert and stormwater management repair or renovation projects to meet these updated climate-resilient design criteria.	Department of Public Works and Transportation, Stormwater Management Division	Long-term	Medium		
PG-10	Avoid Future Development in Flood Inundation Areas Below Existing High-hazard Potential Dams. Require that plan sets for subdivision proposals and permit applications to show the danger reach and inundation area and prohibit new construction in these areas.	Maryland-National Capital Park and Planning Commission, Planning Department	Ongoing	High		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
PG-11	Conduct Countywide Thermal Mapping of Tree Canopy Cover with Shade Study, and Aerial Utility Mapping exercises. Then conduct a neighborhood-level Heat Vulnerability Assessment. Address the identified gaps in the tree canopy through appropriate heat mitigation actions and projects.	Department of the Environment	Short-term	High		
PG-12	Conduct a study on the feasibility of using climate-smart building materials in mitigation projects and normal County/City construction projects to mitigate impacts from extreme temperatures and rainfall. Examples include those listed on the Maryland Department of the Environment's " <a href="#">Alternative/Innovative Technology List of Approved Practices</a> ." Once complete, develop a process that promotes the use of these materials wherever feasible.	Department of the Environment	Long-term	Medium		
PG-13	Adopt the most recent published edition of the I-Codes (e.g., International Building Code, International Residential Code).	Department of Permitting, Inspections and Enforcement	Short-term	High		
	<b>Property Protection</b>					
PG-14	Support mitigation projects that will result in the protection of public or private property from natural hazards. Eligible projects include but are not limited to: 1. acquisition of hazard-prone property or structures 2. Elevation of flood-prone structures 3. Minor structural flood control projects 4. Relocation of structures from hazard-	Office of Homeland Security	Ongoing	Medium		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	prone areas 5. Retrofitting of existing buildings, facilities, and infrastructure 6. Retrofitting of existing buildings and facilities for shelters 7. Critical infrastructure protection measures 8. Stormwater management improvements 9. Advanced warning systems and hazard gauging systems (weather radios, reverse-911, stream gauges, I-flows) 10. Targeted hazard education 11. wastewater and water supply system hardening and mitigation					
PG-15	Implement appropriate mitigation measures for hazard-vulnerable priority critical facilities	Department of Public Works and Transportation	Long-term	High		
	<b>Natural Resource Protection</b>					
PG-16	Use the Watershed Implementation Plan to prioritize stabilization projects, especially if funding from outside resources is available for the mitigation of environmental impacts.	Department of the Environment	Ongoing	Medium		
PG-17	Coordinate with Pepco, Baltimore Gas and Electric, and any other utility companies (as appropriate) to schedule and perform regular tree trimming to mitigate the risk of power outages during windstorms. Maintenance should be conducted to retain a healthy tree canopy, ensure trees' longevity, and decrease the risk of power outages. Prioritize socially vulnerable neighborhoods/ populations first and maintain old-growth trees with large canopies to	Department of Public Works and Transportation	Ongoing	Medium		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	encourage tree retention for extreme heat mitigation. Develop mutual aid with the City of Laurel to provide limited resources and personnel to assist in trimming and tree control as needed.					
PG-18	Implement proposed flood mitigation projects from the upcoming watershed study for the Collington Branch Stream. Develop a Memorandum of Agreement with the City of Laurel to inspect and clean the portion of the stream that runs through their jurisdiction.	Department of the Environment	Long-term	High		
PG-19	Conduct a study to determine the feasibility of creating a stormwater park/greenway (or another watershed- or landscape-scale flood risk reduction project) that will improve natural floodplain functions in areas of high risk.	M-NCPPC	Short-term	Medium		
PG-20	Develop a program to utilize vacant land (both publicly and privately owned) for stormwater management. Acquire land to serve the dual purpose of green infrastructure/ stormwater infiltration and recreational/open space.	Maryland-National Capital Park and Planning Commission, Planning Department	Ongoing	Medium		
PG-21	Use conservation subdivisions (or other site planning and landscape conservation tools) when developing in Established Communities near Rural and Agricultural Areas to cluster development, transition density, and encourage the preservation of green infrastructure	Maryland-National Capital Park and Planning Commission,	Ongoing	Medium		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	corridors, as defined by the County's Green Infrastructure Plan.	Planning Department				
PG-22	To preserve environmentally sensitive land and to encourage development in the Regional Transit Districts, evaluate a transfer of development rights program, density exchanges, or purchase of development rights program for the Rural and Agricultural Areas. Explore opportunities to transfer development rights within areas and to coordinate with the Watershed Implementation Plan and Maryland Accounting for Growth Policy	Department of the Environment	Ongoing	Low		
PG-23	Align Economic Development Plans with the Climate Action Plan, preserving existing agricultural land and natural areas and promoting development in already-developed areas near high-capacity transit. Perform an economic development and climate adaptation analysis of existing agricultural land and natural areas that are crucial to climate resilience on a subwatershed basis. Identify areas of open space for preservation and optimum use for climate resilience.	Department of the Environment	Short-term	High		
	<b>Structural Projects</b>					
PG-24	Create metrics to track routine stormwater maintenance and monitor how the work is	Department of Public Works	Ongoing	Medium		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	increasing capacity and where additional capacity may be needed through retrofits.	and Transportation				
PG-25	Conduct a Countywide Flood Assessment (including pluvial mapping) to understand the impact of updated rainfall intensity estimates per the latest version of NOAA Atlas 14, recent elevation data, and stormwater controls. Identify priority areas for mitigation projects and update the stormwater ordinance as needed.	Department of the Environment	Ongoing	High		
PG-26	Develop structural and action plans with inundation mapping for all High Hazard Potential Dams with poor conditions and no Emergency Action Plans. Develop structural and action plans for high-risk pump stations, levees, and other flood control infrastructure. Ensure a process for supporting affected "downflow" communities that a dam failure hazard would inundate.	Department of Public Works and Transportation	Long-term	High		
PG-27	Implement stormwater management projects, such as drainage retrofits, to address pluvial/stormwater flooding in community-identified areas. Prioritize restoration projects from the Watershed Implementation Plan (WIP) that will support the Plan 2035 future land use pattern. Downtowns should be given priority for stormwater retrofits, especially environmental site design practices. Land acquisition or	Department of Public Works and Transportation	Ongoing	High		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	ecological restoration activities should be targeted to stronghold watersheds.					
PG-28	To reduce system outages from natural hazards, perform energy grid modernization in socially vulnerable areas by adding a solar microgrid. Prioritize areas that are known to suffer multiple outages during the year.	Department of Public Works and Transportation	Ongoing	Low		
PG-29	Evaluate new and existing government buildings, critical facilities, and infrastructure for solar energy generation potential and install solar panels and batteries if feasible.	Department of Public Works and Transportation	Ongoing	Low		
	<b>Emergency Services</b>					
PG-30	Update Upper Marlboro Emergency Response Plan to address flooding, including evacuation, emergency response, mitigation, etc.	Office of Homeland Security	Short-term	Medium		
PG-31	Update the County's disaster recovery plan to include a post-disaster strategic rebuilding decision framework that comprehensively integrates equity.	Office of Homeland Security	Short-term	Medium		
PG-32	The Department of Family Services Agency on Aging will continue its outreach to seniors and other vulnerable populations about health and safety during periods of extreme heat and extreme cold. Information will be added to the Family Service's web page and frozen meal	Department of Family Services	Ongoing	Medium		



Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	distribution with supplement provision of hot meals during severe weather periods from January through March.					
PG-33	Develop a plan with the Department of Social Services, Department of Health, and Office of Sustainability to create Resilience Hubs in vulnerable communities to increase community capacity to prepare for, withstand, and respond to natural hazard impacts and emergency situations. These should also function as heating/cooling centers.	Department of Social Services; Department of Health; Office of Sustainability	Long-term	Low		
PG-34	Assess Climate Projections and Consequences of Dam and Levee Failure. Analyze baseline conditions against local/regional climate projections to highlight future vulnerabilities and risk. Model hydrological loads to the consequences of failure under present and future conditions and jointly evaluate dams, levees, and interdependent components. Incorporate Findings in Emergency Action Plans.	Office of Homeland Security	Ongoing	High		
	<b>Educations &amp; Awareness</b>					
PG-35	Continue annual flood risk awareness and mitigation mailing to all owners of high-risk properties in the Special Flood Hazard Area, including Repetitive Loss/Severe Repetitive Loss structures. Provide additional outreach in response to new/upcoming grant opportunities and funding.	Office of Homeland Security	Ongoing	High		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
PG-36	Work with County municipalities and/or develop public-private partnerships to provide hazard awareness messaging and information on hazard preparedness and mitigation in secondary languages for promotion using local newspapers, municipal websites, social media, etc.	Department of Community Relations	Ongoing	High		
PG-37	Integrate hazard mitigation considerations in future updates of the Citizens' Preparedness Guide and Business Preparedness Guide, including mitigation projects they can implement and how they can get their project included in an upcoming grant application.	Office of Homeland Security	Ongoing	Medium		
PG-38	Conduct outreach to homeowners located on Founders Terrace (and other high-priority streets/neighborhoods) on opportunities to get funding for potential flood mitigation projects for the streams that run behind their homes.	Department of Community Relations	Short-term	Medium		
PG-39	Develop a County Hazard Mitigation Hub website similar to the public outreach website for <a href="#">Vision Zero</a> . This should be combined with the future Climate Resilience Website as described in Plan 2035 if possible. Coordinate with various county agencies, such as the Department of Environment (DoE), Office of Homeland Security, and Office of Information Technology (OIT).	Office of Homeland Security	Short-term	Medium		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
PG-40	Demonstrate County commitment to climate action through publicly transparent tracking, monitoring, evaluation, and reporting. Require the Maryland-National Capital Park and Planning Commission to create and establish a public Smart Growth Dashboard that tracks approved preliminary plans of subdivisions, approved site plans and development proposals. Integrate this into the hazard mitigation/climate action hub website (refer to Action PG-41).	M-NCPPC	Ongoing	Medium		
PG-41	Develop an action guide for socially vulnerable communities that provides step-by-step guidance on how they can get their home considered for inclusion in a mitigation project/grant application.	Office of Homeland Security	Short-term	Medium		
PG-42	Send a digital copy of the 2023 HMP to all County and City staff, as well as all homeowner associations within the planning area.	Office of Homeland Security	Short-term	High		
PG-43	Integrate conducting an annual/semi-annual comprehensive grant availability search and information dissemination into a County staff member's job description. This staff member should coordinate an annual workshop with the County and its municipalities to discuss county-wide priorities and projects that should be submitted in grant applications.	Office of Homeland Security	Ongoing	Medium		

Table 3: City of Laurel 2023-2028 Mitigation Actions Status Report

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	<b>Prevention</b>					
L-1	Partner with federal agencies, the state, and non-governmental organizations to utilize available technical assistance to translate identified risks into mitigation projects, especially for benefit-cost analyses.	Office of Homeland Security	Ongoing	Medium		
L-2	Integrate mitigation plan requirements and actions into other appropriate planning mechanisms, such as comprehensive plans and capital improvement plans.	Office of Homeland Security	Ongoing	High		
L-3	Adopt the most recent published edition of the I-Codes (e.g., International Building Code, International Residential Code).	Department of the Fire Marshal and Permit Services	Short-term	High		
	<b>Property Protection</b>					
L-4	Support mitigation projects that will result in the protection of public or private property from natural hazards. Eligible projects include but are not limited to: 1. acquisition of hazard-prone property or structures 2. Elevation of flood-prone structures 3. Minor structural flood control projects 4. Relocation of structures from hazard-prone areas 5. Retrofitting of existing buildings, facilities, and infrastructure 6. Retrofitting of existing buildings and facilities for shelters 7. Critical infrastructure protection measures 8. Stormwater management	Department of Economic & Community Development	Ongoing	Medium		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	improvements 9. Advanced warning systems and hazard gauging systems (weather radios, reverse-911, stream gauges, I-flows) 10. Targeted hazard education 11. wastewater and water supply system hardening and mitigation					
L-5	Promote the use of climate-smart building materials in mitigation projects and normal City construction projects to mitigate impacts from extreme temperatures and rainfall, such as those listed on the Maryland Department of the Environment's " <a href="#">Alternative/Innovative Technology List of Approved Practices</a> ."	Department of Economic & Community Development	Ongoing	Medium		
	<b>Structural Projects</b>					
L-6	After flood events, the City will evaluate whether to pursue funding to implement flood mitigation projects.	Office of Homeland Security	Ongoing	High		
L-7	Assess Climate Projections and Consequences of Dam and Levee Failure. Analyze baseline conditions against local/regional climate projections to highlight future vulnerabilities and risk. Model hydrological loads to the consequences of failure under present and future conditions and jointly evaluate dams, levees, and interdependent components. Incorporate Findings in Emergency Action Plans.	Department of Public Works; Department of the Environment	Short-term	Medium		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
L-8	To reduce system outages from natural hazards, perform energy grid modernization in socially vulnerable areas by adding a solar microgrid. Prioritize areas that are known to suffer multiple outages during the year.	Department of Public Works	Funding contingent	Medium		
L-9	Evaluate new and existing government buildings, critical facilities, and infrastructure for solar energy generation potential and install solar panels and batteries if feasible.	Department of Public Works	Short-term	Low		
L-10	Implement stormwater management projects, such as drainage retrofits, to address pluvial/stormwater flooding in community-identified areas.	Department of Public Works	Ongoing	High		
	<b>Emergency Services</b>					
L-11	At the intersection of Van Dusen Road and Contee Road (Anderson's Corner), add a comprehensive recreational building, comprised of indoor recreational space, gymnasium(s), and meeting rooms. Unlike a typical community center, the City envisions more of a steel building structure with a hybrid use between drop-in programs for local residents and a larger multiuse footprint to host a wider range of recreational sports and activities. The City will conduct a feasibility study that includes considering stormwater runoff effects and the potential to use the facility as a hazard shelter and/or extreme temperature refuge.	Department of Economic & Community Development	Long-term	Medium		

Action Number	Action	Action Lead	Timeframe	Priority	Status	Comments
	<b>Educations &amp; Awareness</b>					
L-12	Work with City closed circuit television network to produce seasonal hazard awareness and topical mitigation programming.	Office of Homeland Security	Short-term	Low		
L-13	Develop an action guide for socially vulnerable communities that provides step-by-step guidance on how to get their home considered for inclusion in a mitigation project/grant application.	Office of Homeland Security	Short-term	Medium		
L-14	Send a digital copy of the 2023 HMP to all County and City staff.	Office of Homeland Security	Short-term	Medium		

**Changes That May Impact Implementation of the Plan**

*(Insert brief overview of any significant changes in the planning area that would have a profound impact on the implementation of the plan. Specify any changes in technical, regulatory and financial capabilities identified during the plan's development)*

**Recommendations for Revisions and Enhancements**

Based on the review of this report by the Mitigation Advisory Committee, the following recommendations will be noted for future updates or revisions to the plan:

**Public Review Notice**

The contents of this report are considered to be public knowledge and have been prepared for total public disclosure. Copies of the report have been provided to the governing boards of all planning partners and to local media outlets and the report is posted on the Prince George's County and City of Laurel Local Hazard Mitigation Plan websites. Any questions or comments regarding the contents of this report should be directed to:



## Appendix J. Hazus Reports

### Contents:

1. Riverine Flood Global Summary Report
2. Riverine Flood Quick Assessment
3. Coastal Flood Global Summary Report
4. Coastal Flood Quick Assessment
5. Combined Flood Quick Assessment
6. Earthquake Quick Assessments (multiple)
7. Hurricane Debris Summary Report (North)
8. Hurricane Direct Economic Losses Report (North)
9. Hurricane Shelter Summary Report (North)
10. Hurricane Quick Assessment Report (North)
11. Hurricane Global Summary Reports (multiple; North)
12. Hurricane Debris Summary Report (South)
13. Hurricane Direct Economic Losses Report (South)
14. Hurricane Shelter Summary Report (South)
15. Hurricane Quick Assessment Report (South)
16. Hurricane Global Summary Reports (multiple; South)



## Hazus: Flood Global Risk Report

**Region Name:** pg\_Riverine\_Flood

**Flood Scenario:** 100 year Riverine

**Print Date:** Tuesday, October 11, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.*

*Totals only reflect data for those census tracts/blocks included in the user's study region.*

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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 488 square miles and contains 15,508 census blocks. The region contains over 304 thousand households and has a total population of 863,420 people (2010 Census Bureau data). The distribution of population by State and County for the study region is provided in Appendix B .

There are an estimated 256,312 buildings in the region with a total building replacement value (excluding contents) of 109,482 million dollars. Approximately 90.98% of the buildings (and 81.93% of the building value) are associated with residential housing.



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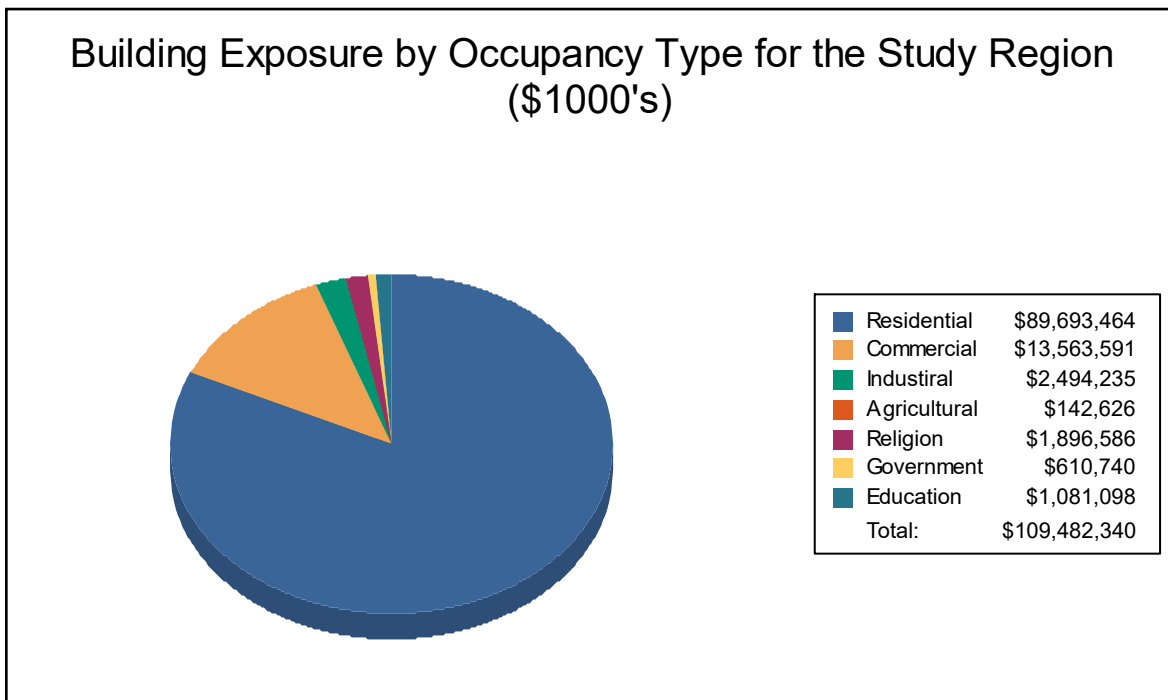
## Building Inventory

### General Building Stock

Hazus estimates that there are 256,312 buildings in the region which have an aggregate total replacement value of 109,482 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	89,693,464	81.9%
Commercial	13,563,591	12.4%
Industrial	2,494,235	2.3%
Agricultural	142,626	0.1%
Religion	1,896,586	1.7%
Government	610,740	0.6%
Education	1,081,098	1.0%
<b>Total</b>	<b>109,482,340</b>	<b>100%</b>



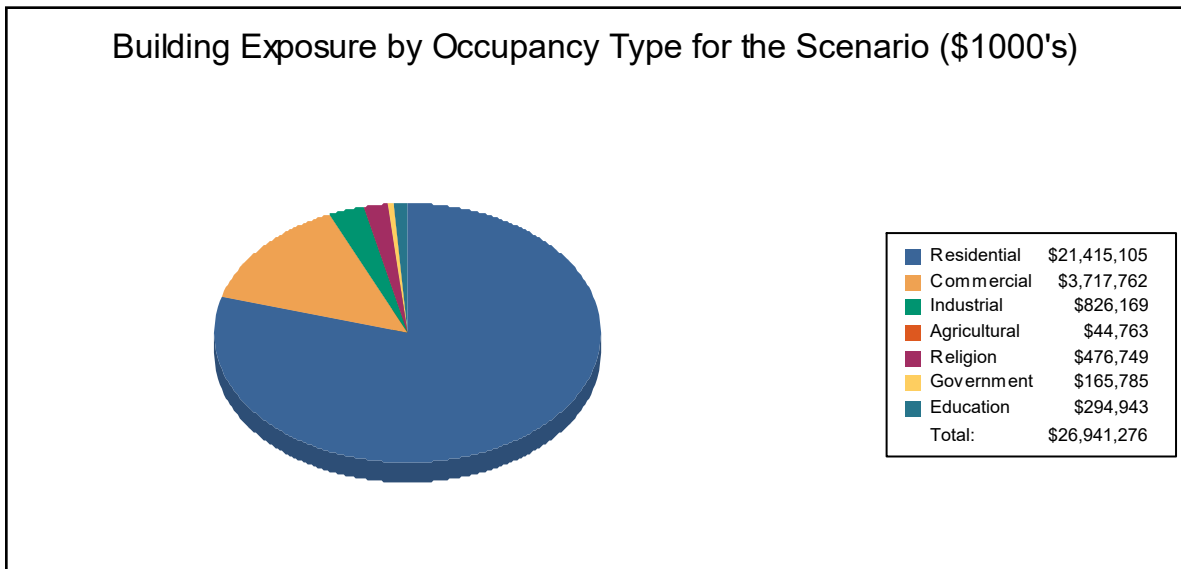
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**Table 2**  
**Building Exposure by Occupancy Type for the Scenario**

<b>Occupancy</b>	<b>Exposure (\$1000)</b>	<b>Percent of Total</b>
Residential	21,415,105	79.5%
Commercial	3,717,762	13.8%
Industrial	826,169	3.1%
Agricultural	44,763	0.2%
Religion	476,749	1.8%
Government	165,785	0.6%
Education	294,943	1.1%
<b>Total</b>	<b>26,941,276</b>	<b>100%</b>



**Essential Facility Inventory**

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 836 beds. There are 330 schools, 48 fire stations, 39 police stations and 2 emergency operation centers.



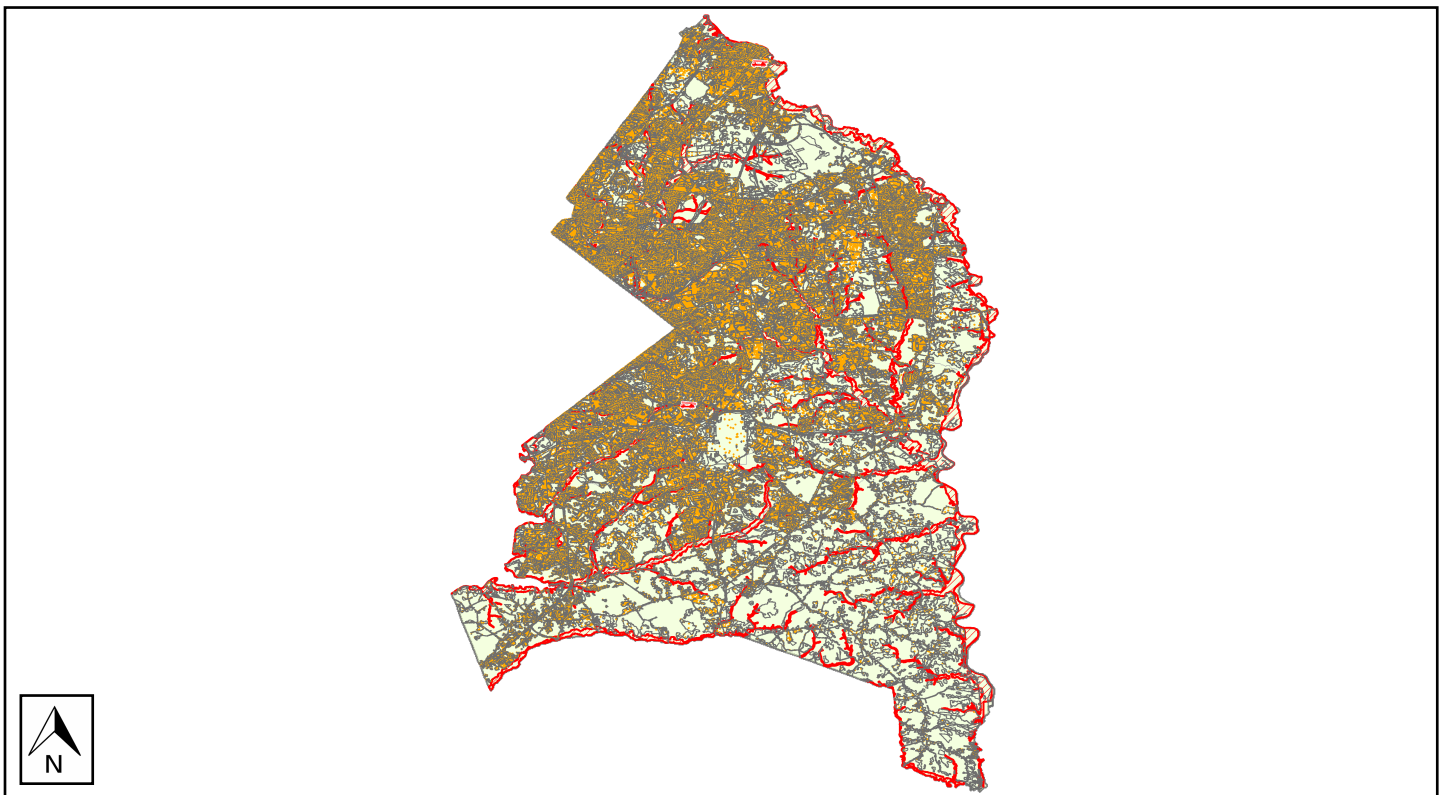
## Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

<b>Study Region Name:</b>	pg_Riverine_Flood
<b>Scenario Name:</b>	100 year Riverine
<b>Return Period Analyzed:</b>	100
<b>Analysis Options Analyzed:</b>	No What-Ifs

### Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



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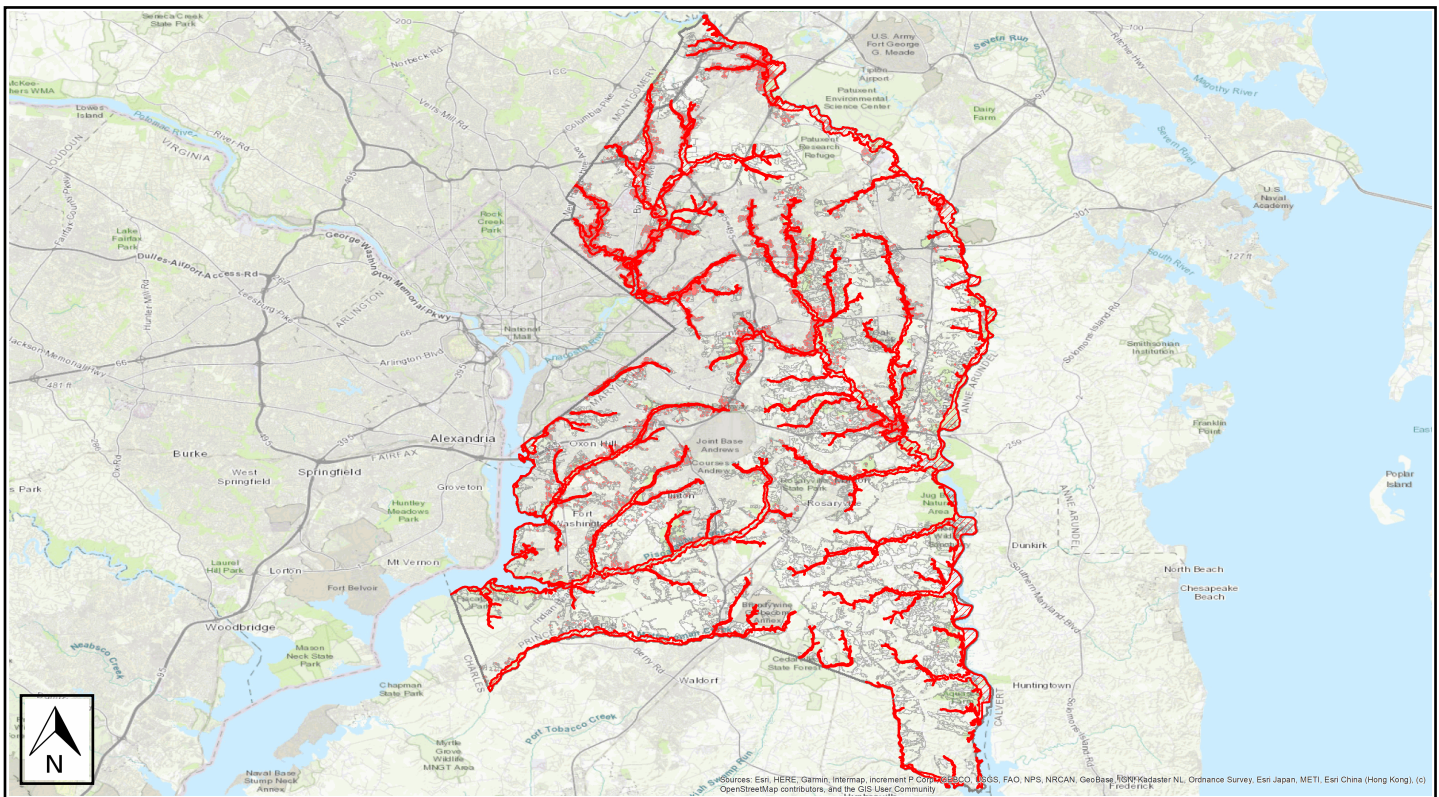


## Building Damage

### General Building Stock Damage

Hazus estimates that about 2,358 buildings will be at least moderately damaged. This is over 7% of the total number of buildings in the scenario. There are an estimated 2,183 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

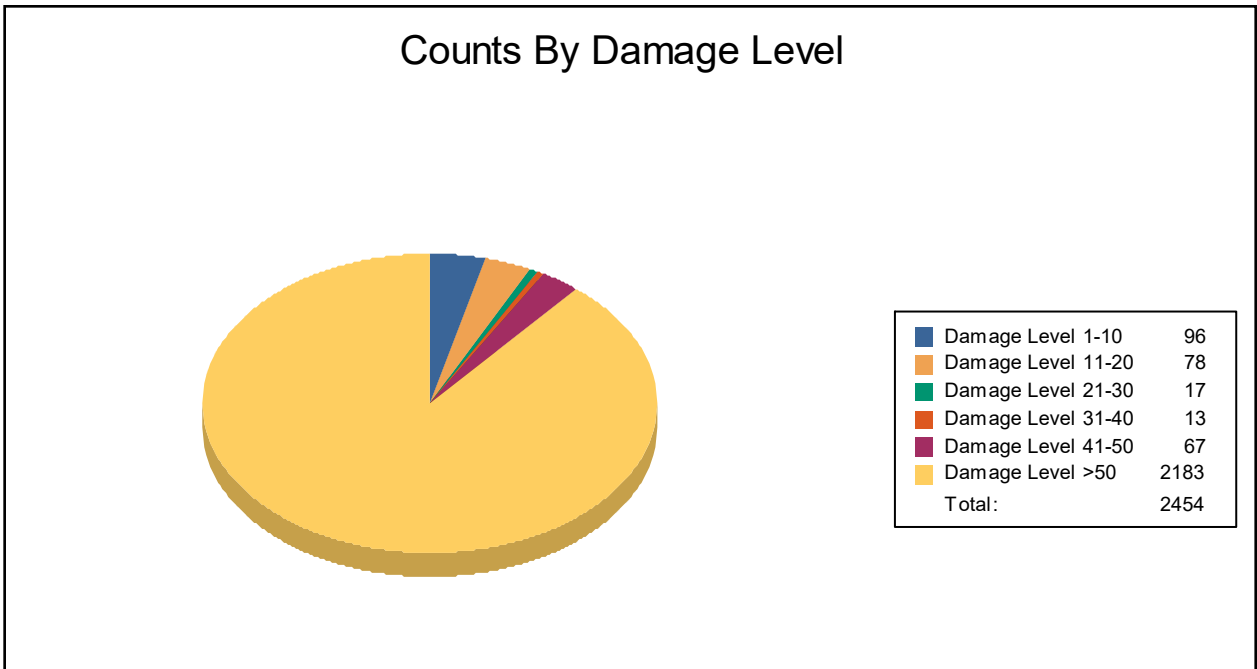






**Table 3: Expected Building Damage by Occupancy**

Occupancy	1-10		11-20		21-30		31-40		41-50		>50	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	0	0	0	0	0	0	0	0	0	0	0	0
Commercial	6	7	2	2	0	0	0	0	0	0	83	91
Education	0	0	0	0	0	0	0	0	0	0	0	0
Government	0	0	0	0	0	0	0	0	0	0	6	100
Industrial	4	24	0	0	2	12	0	0	1	6	10	59
Religion	0	0	0	0	0	0	0	0	0	0	3	100
Residential	86	4	76	3	15	1	13	1	66	3	2,081	89
<b>Total</b>	<b>96</b>		<b>78</b>		<b>17</b>		<b>13</b>		<b>67</b>		<b>2,183</b>	



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**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	3	100
ManufHousing	0	0	0	0	0	0	0	0	0	0	2	100
Masonry	23	4	19	3	4	1	3	0	16	2	585	90
Steel	7	11	0	0	2	3	0	0	1	2	51	84
Wood	67	4	56	3	11	1	10	1	50	3	1,518	89



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## Essential Facility Damage

Before the flood analyzed in this scenario, the region had 836 hospital beds available for use. On the day of the scenario flood event, the model estimates that 836 hospital beds are available in the region.

**Table 5: Expected Damage to Essential Facilities**

Classification	# Facilities			
	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	2	0	0	0
Fire Stations	48	0	2	2
Hospitals	7	0	0	0
Police Stations	39	0	0	0
Schools	330	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.



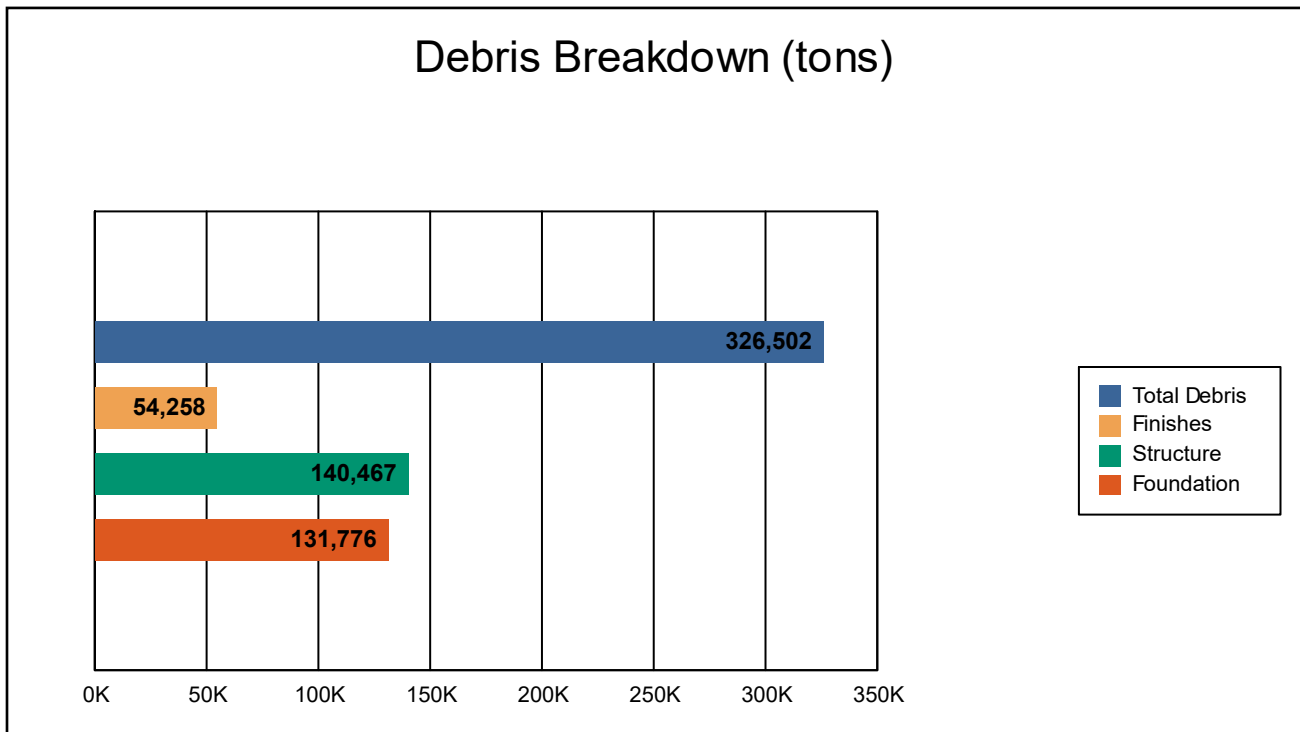
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## Induced Flood Damage

### 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.



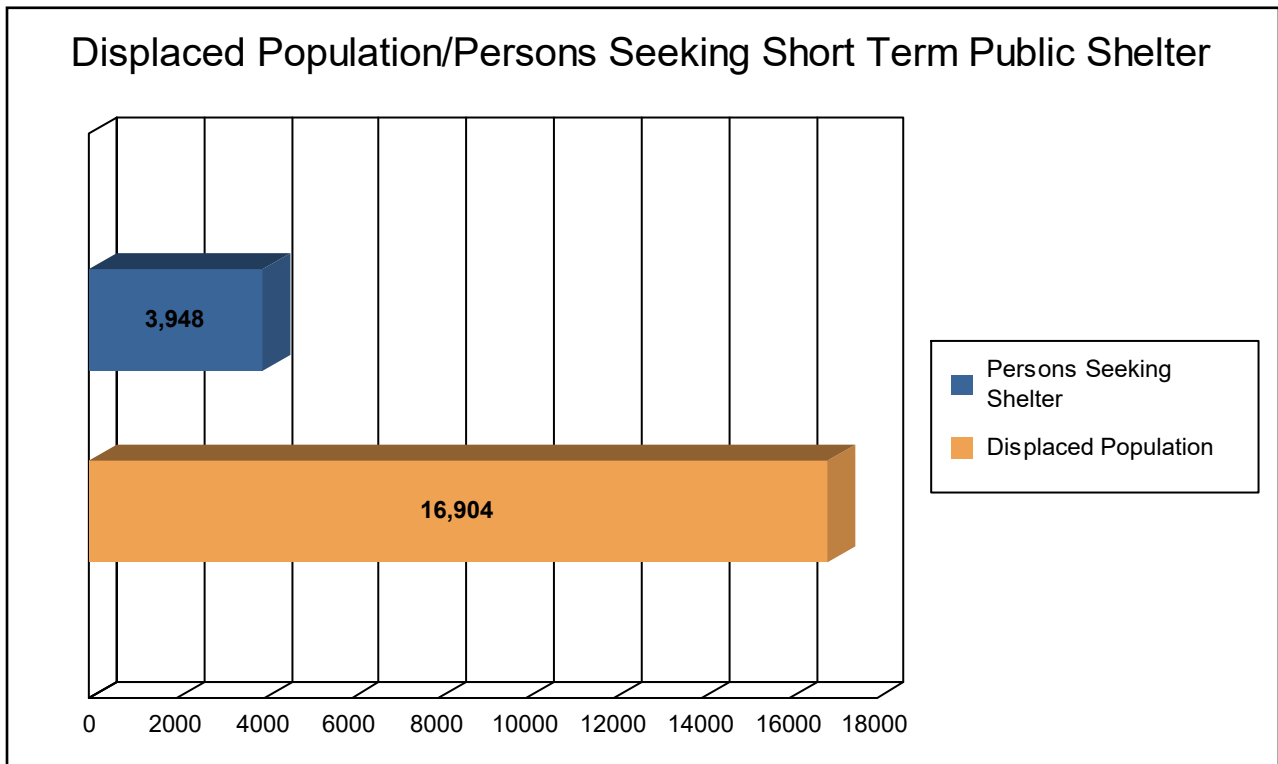
The model estimates that a total of 326,502 tons of debris will be generated. Of the total amount, Finishes comprises 17% of the total, Structure comprises 43% of the total, and Foundation comprises 40%. If the debris tonnage is converted into an estimated number of truckloads, it will require 13061 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 5,635 households (or 16,904 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 3,948 people (out of a total population of 863,420) will seek temporary shelter in public shelters.



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## Economic Loss

The total economic loss estimated for the flood is 3,940.87 million dollars, which represents 14.63 % 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 2,652.70 million dollars. 33% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 39.35% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.



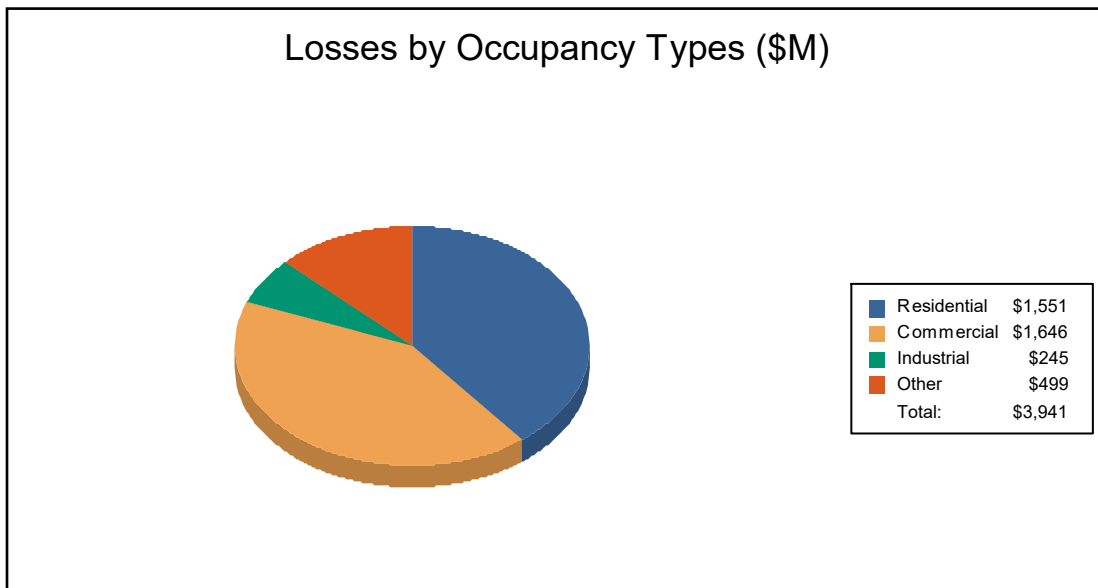
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**Table 6: Building-Related Economic Loss Estimates**  
(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<u>Building Loss</u>						
	Building	920.72	389.84	79.58	75.84	1,465.99
	Content	433.76	488.18	134.48	97.28	1,153.70
	Inventory	0.00	12.39	20.29	0.33	33.01
	<b>Subtotal</b>	<b>1,354.49</b>	<b>890.41</b>	<b>234.35</b>	<b>173.46</b>	<b>2,652.70</b>
<u>Business Interruption</u>						
	Income	3.26	283.25	3.20	29.56	319.27
	Relocation	120.45	93.43	3.05	18.59	235.53
	Rental Income	64.91	69.58	0.58	3.12	138.19
	Wage	7.72	309.06	4.29	274.11	595.19
	<b>Subtotal</b>	<b>196.35</b>	<b>755.32</b>	<b>11.12</b>	<b>325.38</b>	<b>1,288.17</b>
<b>ALL</b>	<b>Total</b>	<b>1,550.83</b>	<b>1,645.73</b>	<b>245.48</b>	<b>498.83</b>	<b>3,940.87</b>





## **Appendix A: County Listing for the Region**

Maryland

- Prince George's



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**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
<b>Maryland</b>				
Prince George's	863,420	89,693,464	19,788,876	109,482,340
<b>Total</b>	<b>863,420</b>	<b>89,693,464</b>	<b>19,788,876</b>	<b>109,482,340</b>
<b>Total Study Region</b>	<b>863,420</b>	<b>89,693,464</b>	<b>19,788,876</b>	<b>109,482,340</b>





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## Quick Assessment Report

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October 11, 2022

**Study Region :** pg\_Riverine\_Flood  
**Scenario :** 100 year Riverine  
**Return Period:** 100  
**Analysis Option:** 0

### Regional Statistics

<b>Area (Square Miles)</b>	488
<b>Number of Census Blocks</b>	15,508
<b>Number of Buildings</b>	
Residential	233,197
Total	256,312
<b>Number of People in the Region (x 1000)</b>	863
<b>Building Exposure (\$ Millions)</b>	
Residential	89,693
Total	109,482

### Scenario Results

#### Shelter Requirements

Displaced Population (# Households)	5,635
Short Term Shelter (# People)	3,948

#### Economic Loss

Residential Property (Capital Stock) Losses (\$ Millions)	1,354
Total Property (Capital Stock) Losses (\$ Millions)	2,653
Business Interruption (Income) Losses (\$ Millions)	1,288

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## Hazus: Flood Global Risk Report

**Region Name:** pg\_Coastal\_Flood

**Flood Scenario:** pg\_Coastal100yr

**Print Date:** Tuesday, October 11, 2022

**Disclaimer:**

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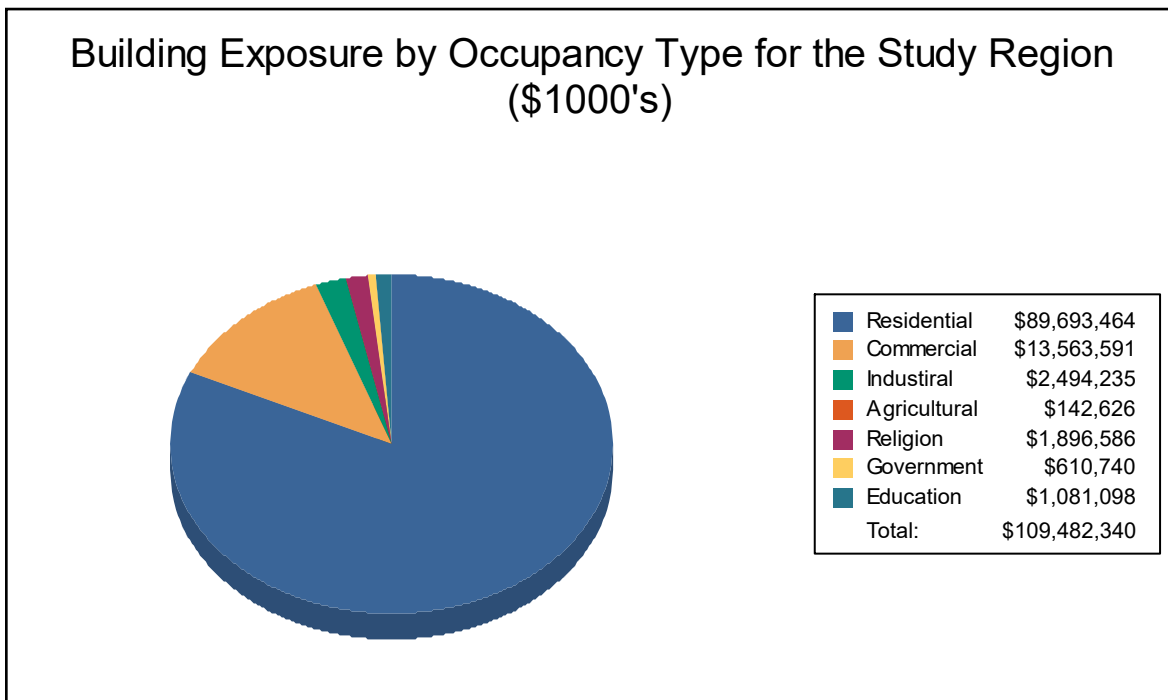
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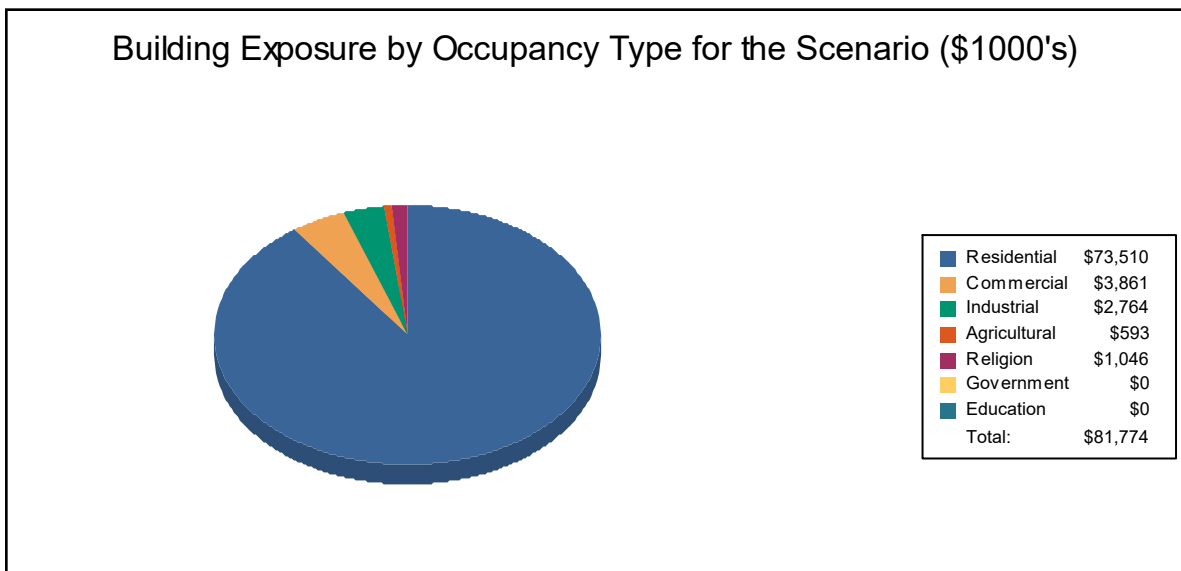
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**Table 2**  
**Building Exposure by Occupancy Type for the Scenario**

<b>Occupancy</b>	<b>Exposure (\$1000)</b>	<b>Percent of Total</b>
Residential	73,510	89.9%
Commercial	3,861	4.7%
Industrial	2,764	3.4%
Agricultural	593	0.7%
Religion	1,046	1.3%
Government	0	0.0%
Education	0	0.0%
<b>Total</b>	<b>81,774</b>	<b>100%</b>



**Essential Facility Inventory**

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 836 beds. There are 330 schools, 48 fire stations, 39 police stations and 2 emergency operation centers.



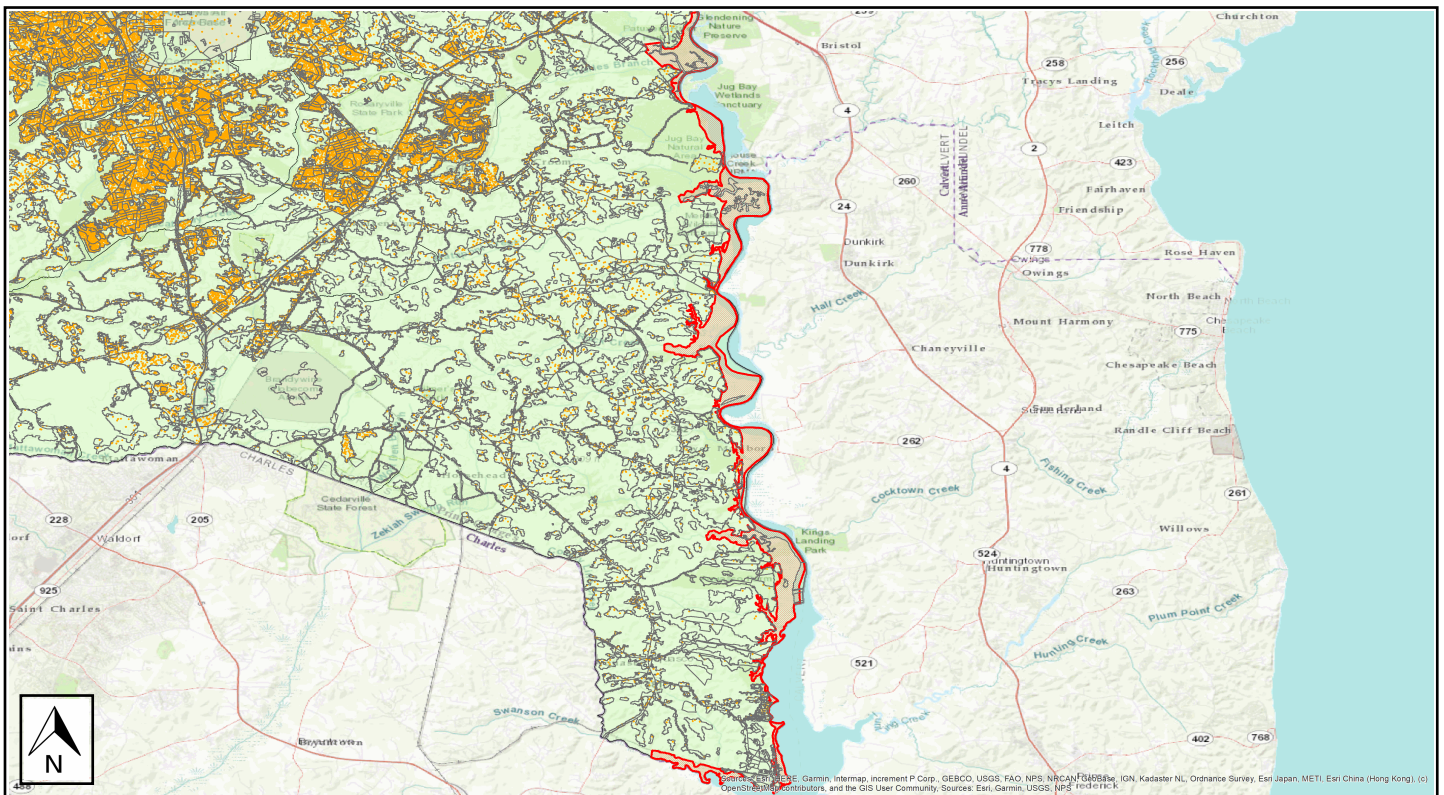
## Flood Scenario Parameters

Hazus used the following set of information to define the flood parameters for the flood loss estimate provided in this report.

<b>Study Region Name:</b>	pg_Coastal_Flood
<b>Scenario Name:</b>	pg_Coastal100yr
<b>Return Period Analyzed:</b>	100
<b>Analysis Options Analyzed:</b>	No What-Ifs

### Study Region Overview Map

Illustrating scenario flood extent, as well as exposed essential facilities and total exposure



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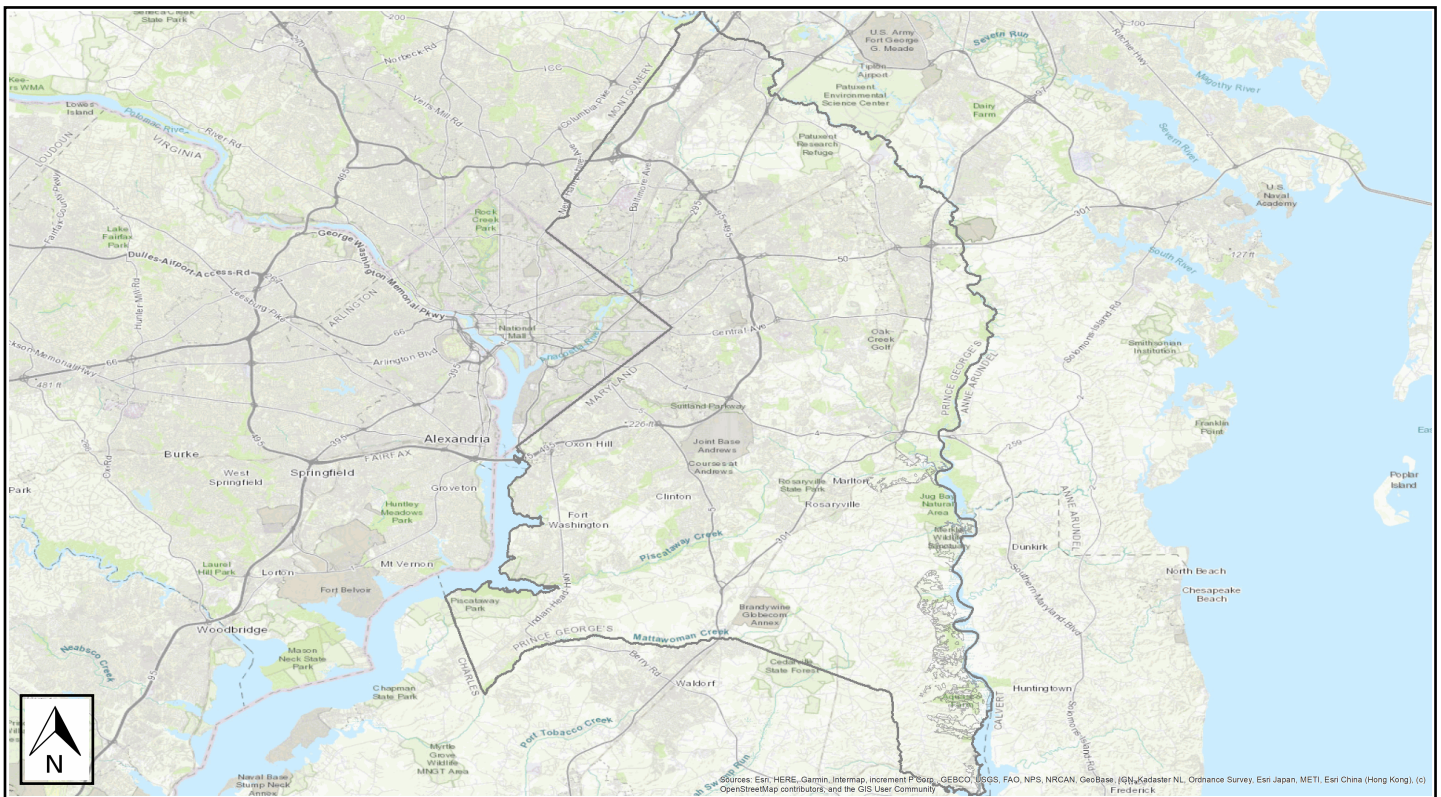


## Building Damage

### General Building Stock Damage

Hazus estimates that about 1 building will be at least moderately damaged. This is over 0% of the total number of buildings in the scenario. There are an estimated 1 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**



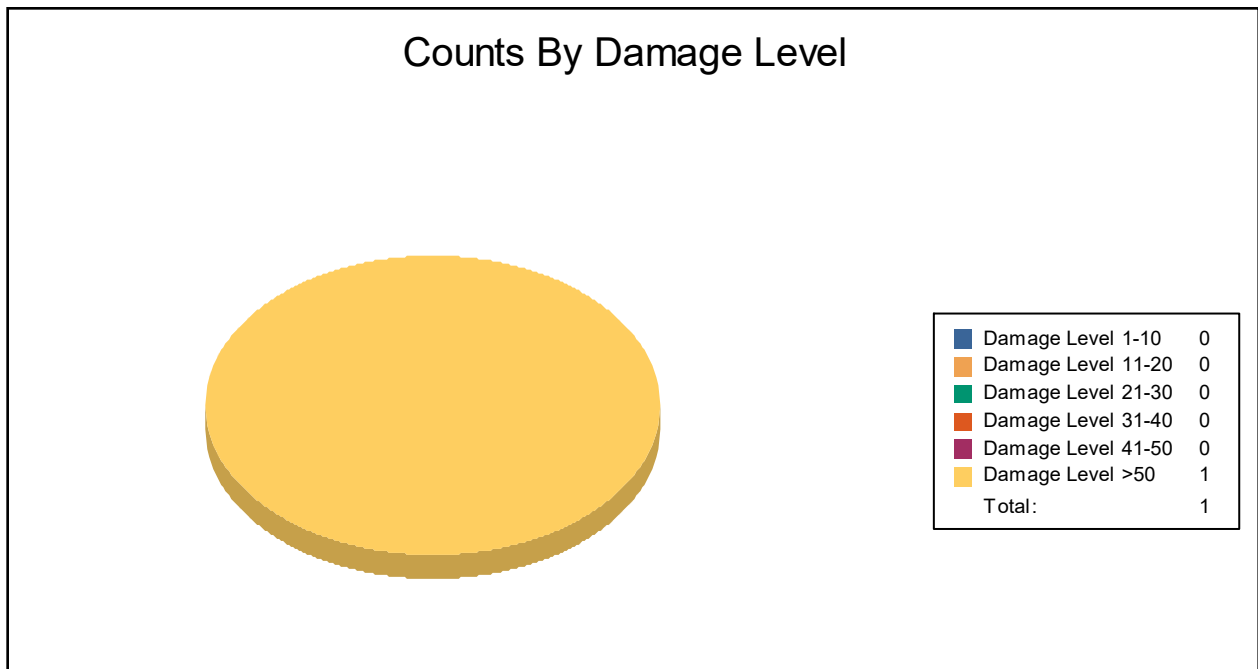
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**Table 3: Expected Building Damage by Occupancy**

Occupancy	1-10		11-20		21-30		31-40		41-50		>50	
	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	0	0	0	0	0	0	0	0	0	0	1	100
<b>Total</b>	<b>0</b>		<b>0</b>		<b>0</b>		<b>0</b>		<b>0</b>		<b>1</b>	



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**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	0	0	0	0	0	0	0	0	0	0
Steel	0	0	0	0	0	0	0	0	0	0	0	0
Wood	0	0	0	0	0	0	0	0	0	0	1	100



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## Essential Facility Damage

Before the flood analyzed in this scenario, the region had 836 hospital beds available for use. On the day of the scenario flood event, the model estimates that 836 hospital beds are available in the region.

**Table 5: Expected Damage to Essential Facilities**

Classification	# Facilities			
	Total	At Least Moderate	At Least Substantial	Loss of Use
Emergency Operation Centers	2	0	0	0
Fire Stations	48	0	0	0
Hospitals	7	0	0	0
Police Stations	39	0	0	0
Schools	330	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.



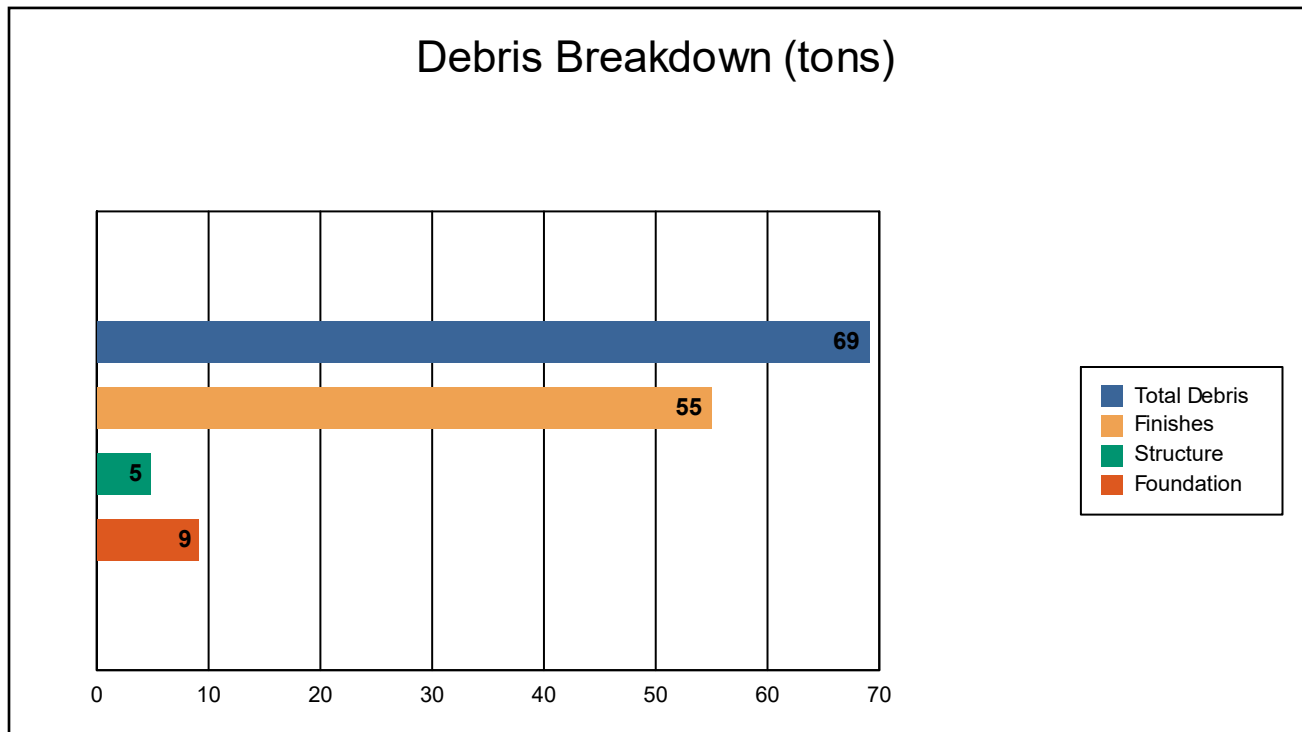
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## Induced Flood Damage

### 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.



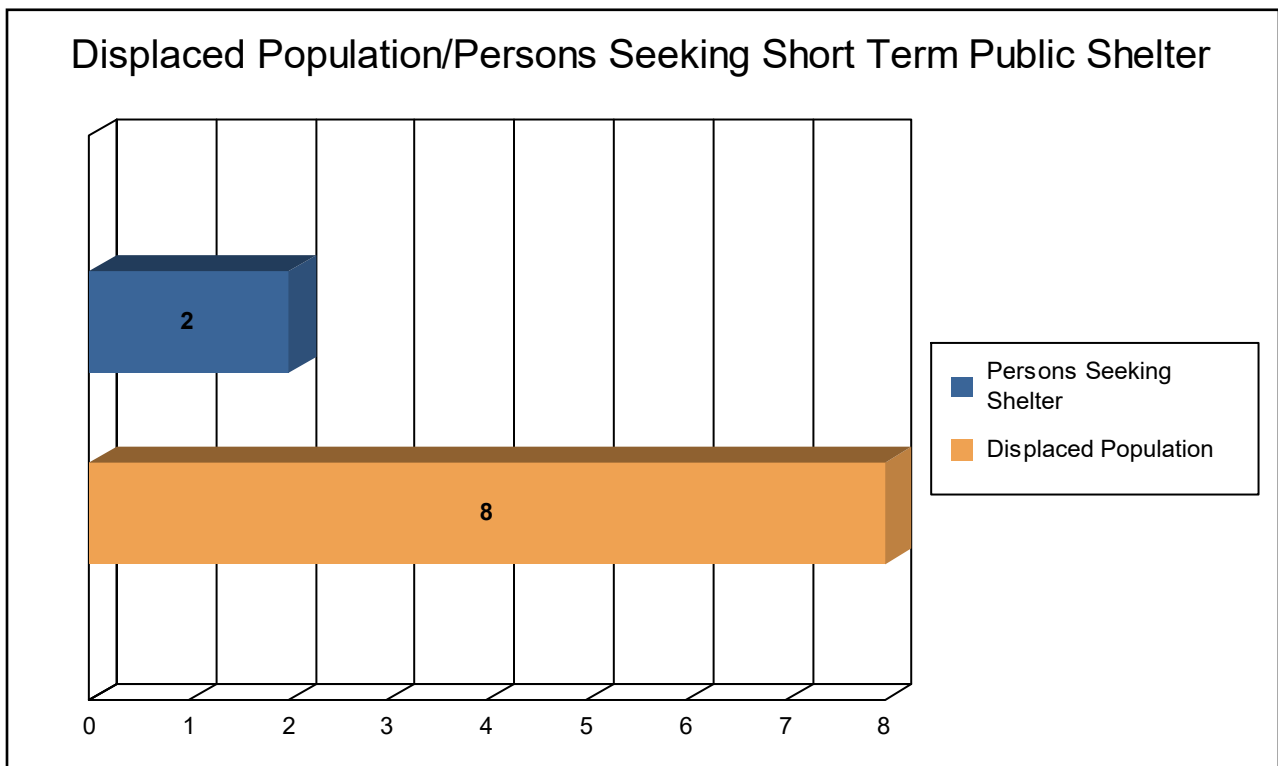
The model estimates that a total of 69 tons of debris will be generated. Of the total amount, Finishes comprises 80% of the total, Structure comprises 7% of the total, and Foundation comprises 13%. If the debris tonnage is converted into an estimated number of truckloads, it will require 3 truckloads (@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 3 households (or 8 of people) will be displaced due to the flood. Displacement includes households evacuated from within or very near to the inundated area. Of these, 2 people (out of a total population of 863,420) will seek temporary shelter in public shelters.



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## Economic Loss

The total economic loss estimated for the flood is 1.65 million dollars, which represents 2.01 % 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 1.37 million dollars. 17% of the estimated losses were related to the business interruption of the region. The residential occupancies made up 97.21% of the total loss. Table 6 below provides a summary of the losses associated with the building damage.



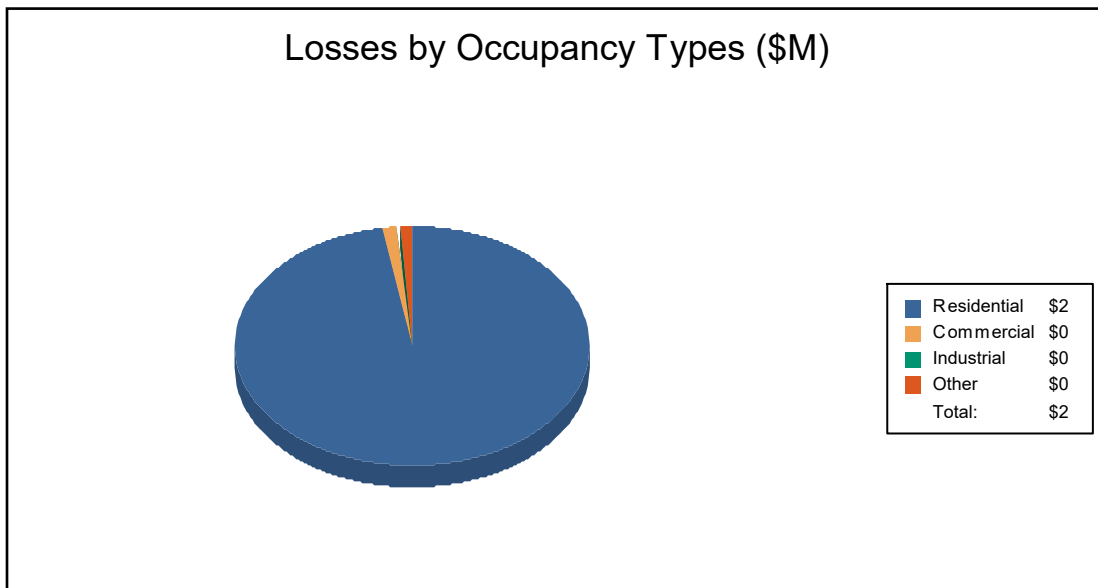
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**Table 6: Building-Related Economic Loss Estimates**  
(Millions of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<u>Building Loss</u>						
	Building	0.84	0.00	0.00	0.00	0.85
	Content	0.51	0.01	0.00	0.01	0.53
	Inventory	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>1.35</b>	<b>0.01</b>	<b>0.00</b>	<b>0.01</b>	<b>1.37</b>
<u>Business Interruption</u>						
	Income	0.02	0.01	0.00	0.00	0.03
	Relocation	0.14	0.00	0.00	0.00	0.14
	Rental Income	0.05	0.00	0.00	0.00	0.05
	Wage	0.05	0.00	0.00	0.01	0.05
	<b>Subtotal</b>	<b>0.26</b>	<b>0.01</b>	<b>0.00</b>	<b>0.01</b>	<b>0.27</b>
<b>ALL</b>	<b>Total</b>	<b>1.60</b>	<b>0.02</b>	<b>0.00</b>	<b>0.02</b>	<b>1.65</b>







## **Appendix A: County Listing for the Region**

Maryland

- Prince George's



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**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
<b>Maryland</b>				
Prince George's	863,420	89,693,464	19,788,876	109,482,340
<b>Total</b>	<b>863,420</b>	<b>89,693,464</b>	<b>19,788,876</b>	<b>109,482,340</b>
<b>Total Study Region</b>	<b>863,420</b>	<b>89,693,464</b>	<b>19,788,876</b>	<b>109,482,340</b>





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## Quick Assessment Report

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October 11, 2022

**Study Region :** pg\_Coastal\_Flood  
**Scenario :** pg\_Coastal100yr  
**Return Period:** 100  
**Analysis Option:** 0

### Regional Statistics

<b>Area (Square Miles)</b>	488
<b>Number of Census Blocks</b>	15,508
<b>Number of Buildings</b>	
Residential	233,197
Total	256,312
<b>Number of People in the Region (x 1000)</b>	863
<b>Building Exposure (\$ Millions)</b>	
Residential	89,693
Total	109,482

### Scenario Results

#### Shelter Requirements

Displaced Population (# Households)	3
Short Term Shelter (# People)	2

#### Economic Loss

Residential Property (Capital Stock) Losses (\$ Millions)	1
Total Property (Capital Stock) Losses (\$ Millions)	1
Business Interruption (Income) Losses (\$ Millions)	0

#### **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.



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## Quick Assessment Report

**RiskMAP**  
Increasing Resilience Together

October 11, 2022

**Study Region :** pg\_Combined\_Flood  
**Scenario :** pg\_Combined100yr  
**Return Period:** 100  
**Analysis Option:** 0

### Regional Statistics

<b>Area (Square Miles)</b>	488
<b>Number of Census Blocks</b>	15,508
<b>Number of Buildings</b>	
Residential	233,197
Total	256,312
<b>Number of People in the Region (x 1000)</b>	863
<b>Building Exposure (\$ Millions)</b>	
Residential	89,693
Total	109,482

### Scenario Results

#### Shelter Requirements

Displaced Population (# Households)	5,636
Short Term Shelter (# People)	3,948

#### Economic Loss

Residential Property (Capital Stock) Losses (\$ Millions)	1,355
Total Property (Capital Stock) Losses (\$ Millions)	2,653
Business Interruption (Income) Losses (\$ Millions)	1,288

#### **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.



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# Hazus: Earthquake Global Risk Report

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**Region Name:** pg\_EQ\_prob

**Earthquake Scenario:** EQ Annual Probabalistic

**Print Date:** October 19, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
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 earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.*

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## General Description of the Region

Hazus-MH is a regional earthquake loss estimation model that was developed by the Federal Emergency Management Agency (FEMA) and the National Institute of Building Sciences. 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 earthquake loss estimates provided in this report was based on a region that includes 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 487.73 square miles and contains 218 census tracts. There are over 304 thousand households in the region which has a total population of 863,420 people (2010 Census Bureau data). The distribution of population by Total Region and County is provided in Appendix B.

There are an estimated 256 thousand buildings in the region with a total building replacement value (excluding contents) of 109,482 (millions of dollars). Approximately 91.00 % of the buildings (and 82.00% of the building value) are associated with residential housing.

The replacement value of the transportation and utility lifeline systems is estimated to be 6,825 and 6,706 (millions of dollars) , respectively.



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## Building and Lifeline Inventory

### Building Inventory

Hazus estimates that there are 256 thousand buildings in the region which have an aggregate total replacement value of 109,482 (millions of dollars) . Appendix B provides a general distribution of the building value by Total Region and County.

In terms of building construction types found in the region, wood frame construction makes up 65% of the building inventory. The remaining percentage is distributed between the other general building types.

### Critical Facility Inventory

Hazus breaks critical facilities into two (2) groups: essential facilities and high potential loss facilities (HPL). Essential facilities include hospitals, medical clinics, schools, fire stations, police stations and emergency operations facilities. High potential loss facilities include dams, levees, military installations, nuclear power plants and hazardous material sites.

For essential facilities, there are 7 hospitals in the region with a total bed capacity of 836 beds. There are 330 schools, 48 fire stations, 39 police stations and 2 emergency operation facilities. With respect to high potential loss facilities (HPL), there are no dams identified within the inventory. The inventory also includes 35 hazardous material sites, no military installations and no nuclear power plants.

### Transportation and Utility Lifeline Inventory

Within Hazus, the lifeline inventory is divided between transportation and utility lifeline systems. There are seven (7) transportation systems that include highways, railways, light rail, bus, ports, ferry and airports. There are six (6) utility systems that include potable water, wastewater, natural gas, crude & refined oil, electric power and communications. The lifeline inventory data are provided in Tables 1 and 2.

The total value of the lifeline inventory is over 13,531.00 (millions of dollars). This inventory includes over 280.86 miles of highways, 555 bridges, 12,724.44 miles of pipes.



**Table 1: Transportation System Lifeline Inventory**

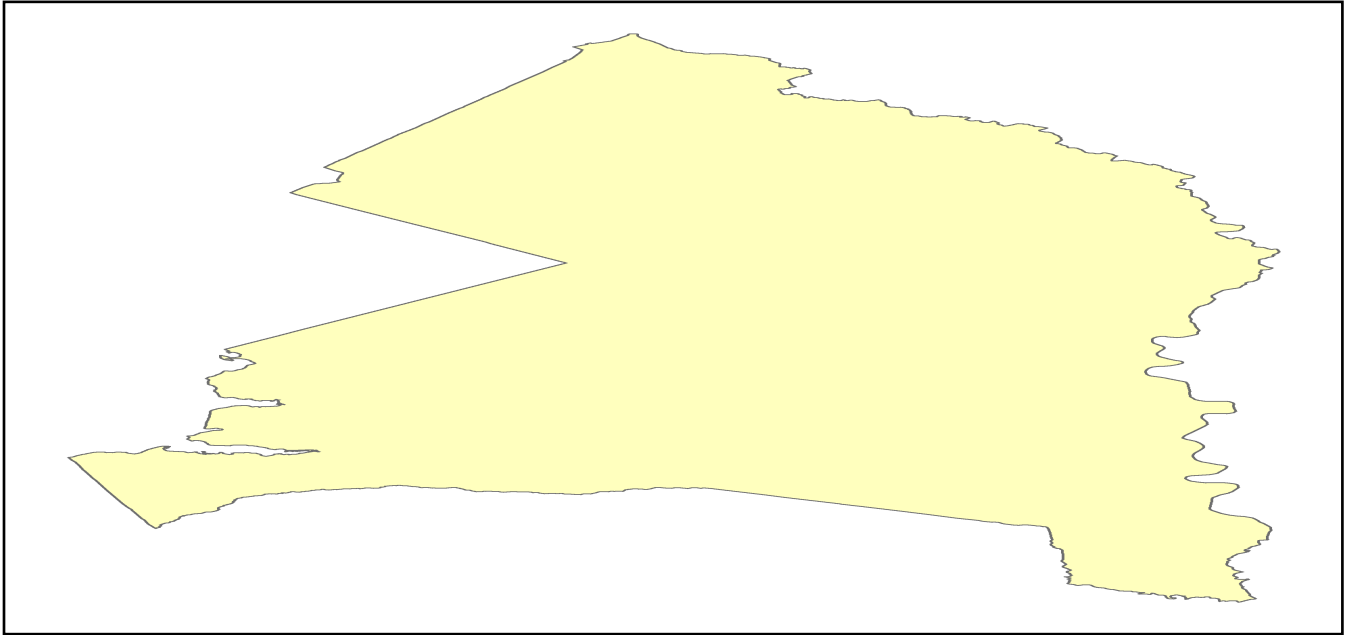
System	Component	# Locations/ # Segments	Replacement value (millions of dollars)
<b>Highway</b>	Bridges	555	2331.8048
	Segments	277	3555.7797
	Tunnels	0	0.0000
	<b>Subtotal</b>		<b>5887.5845</b>
<b>Railways</b>	Bridges	45	205.3125
	Facilities	1	2.6630
	Segments	76	177.9848
	Tunnels	0	0.0000
	<b>Subtotal</b>		<b>385.9603</b>
<b>Light Rail</b>	Bridges	0	0.0000
	Facilities	20	58.4000
	Segments	23	93.7422
	Tunnels	0	0.0000
	<b>Subtotal</b>		<b>152.1422</b>
<b>Bus</b>	Facilities	3	4.3800
	<b>Subtotal</b>		<b>4.3800</b>
<b>Ferry</b>	Facilities	0	0.0000
	<b>Subtotal</b>		<b>0.0000</b>
<b>Port</b>	Facilities	1	2.8835
	<b>Subtotal</b>		<b>2.8835</b>
<b>Airport</b>	Facilities	2	22.9950
	Runways	6	369.8791
	<b>Subtotal</b>		<b>392.8741</b>
		<b>Total</b>	<b>6,825.80</b>

**Table 2: Utility System Lifeline Inventory**

System	Component	# Locations / Segments	Replacement value (millions of dollars)
<b>Potable Water</b>	Distribution Lines	NA	255.8812
	Facilities	3	98.9010
	Pipelines	0	0.0000
	<b>Subtotal</b>		<b>354.7822</b>
<b>Waste Water</b>	Distribution Lines	NA	153.5287
	Facilities	32	4175.6000
	Pipelines	0	0.0000
	<b>Subtotal</b>		<b>4329.1287</b>
<b>Natural Gas</b>	Distribution Lines	NA	102.3525
	Facilities	0	0.0000
	Pipelines	4	5.1380
	<b>Subtotal</b>		<b>107.4905</b>
<b>Oil Systems</b>	Facilities	0	0.0000
	Pipelines	0	0.0000
	<b>Subtotal</b>		<b>0.0000</b>
<b>Electrical Power</b>	Facilities	4	1914.4250
	<b>Subtotal</b>		<b>1914.4250</b>
<b>Communication</b>	Facilities	7	0.6930
	<b>Subtotal</b>		<b>0.6930</b>
		<b>Total</b>	<b>6,706.50</b>

## Earthquake Scenario

Hazus uses the following set of information to define the earthquake parameters used for the earthquake loss estimate provided in this report.



<b>Scenario Name</b>	EQ Annual Probabalistic
<b>Type of Earthquake</b>	Probabilistic
<b>Fault Name</b>	NA
<b>Historical Epicenter ID #</b>	NA
<b>Probabilistic Return Period</b>	Annualized
<b>Longitude of Epicenter</b>	NA
<b>Latitude of Epicenter</b>	NA
<b>Earthquake Magnitude</b>	NA
<b>Depth (km)</b>	NA
<b>Rupture Length (Km)</b>	NA
<b>Rupture Orientation (degrees)</b>	NA
<b>Attenuation Function</b>	NA

## Direct Earthquake Damage

### Building Damage

Hazus estimates that about buildings will be at least moderately damaged. This is over % of the buildings in the region. There are an estimated buildings that will be damaged beyond repair. The definition of the 'damage states' is provided in Volume 1: Chapter 5 of the Hazus technical manual. Table 3 below summarizes the expected damage by general occupancy for the buildings in the region. Table 4 below summarizes the expected damage by general building type.

### Damage Categories by General Occupancy Type

<span style="color: red;">■</span>	Complete
<span style="color: orange;">■</span>	Extensive
<span style="color: #FFD700;">■</span>	Moderate
<span style="color: green;">■</span>	Slight

**Table 3: Expected Building Damage by Occupancy**

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
<b>Total</b>										

**Table 4: Expected Building Damage by Building Type (All Design Levels)**

	None		Slight		Moderate		Extensive		Complete	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
<b>Total</b>										

\*Note:

- RM     Reinforced Masonry
- URM    Unreinforced Masonry
- MH     Manufactured Housing

### **Essential Facility Damage**

Before the earthquake, the region had 836 hospital beds available for use. On the day of the earthquake, the model estimates that only 0 hospital beds (0.00%) are available for use by patients already in the hospital and those injured by the earthquake. After one week, 0.00% of the beds will be back in service. By 30 days, 0.00% will be operational.

**Table 5: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		At Least Moderate Damage > 50%	Complete Damage > 50%	With Functionality > 50% on day 1
Hospitals	7	0	0	0
Schools	330	0	0	0
EOCs	2	0	0	0
PoliceStations	39	0	0	0
FireStations	48	0	0	0

Transportation Lifeline Damage



**Table 6: Expected Damage to the Transportation Systems**

System	Component	Number of Locations_				
		Locations/ Segments	With at Least Mod. Damage	With Complete Damage	With Functionality > 50 %	
					After Day 1	After Day 7
Highway	Segments	277	0	0	0	0
	Bridges	555	0	0	0	0
	Tunnels	0	0	0	0	0
Railways	Segments	76	0	0	0	0
	Bridges	45	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	1	0	0	0	0
Light Rail	Segments	23	0	0	0	0
	Bridges	0	0	0	0	0
	Tunnels	0	0	0	0	0
	Facilities	20	0	0	0	0
Bus	Facilities	3	0	0	0	0
Ferry	Facilities	0	0	0	0	0
Port	Facilities	1	0	0	0	0
Airport	Facilities	2	0	0	0	0
	Runways	6	0	0	0	0

Table 6 provides damage estimates for the transportation system.

Note: Roadway segments, railroad tracks and light rail tracks are assumed to be damaged by ground failure only. If ground failure maps are not provided, damage estimates to these components will not be computed.

Tables 7-9 provide information on the damage to the utility lifeline systems. Table 7 provides damage to the utility system facilities. Table 8 provides estimates on the number of leaks and breaks by the pipelines of the utility systems. For electric power and potable water, Hazus performs a simplified system performance analysis. Table 9 provides a summary of the system performance information.

**Table 7 : Expected Utility System Facility Damage**

System	# of Locations				
	Total #	With at Least Moderate Damage	With Complete Damage	with Functionality > 50 %	
				After Day 1	After Day 7
Potable Water	3	0	0	0	0
Waste Water	32	0	0	0	0
Natural Gas	0	0	0	0	0
Oil Systems	0	0	0	0	0
Electrical Power	4	0	0	0	0
Communication	7	0	0	0	0

**Table 8 : Expected Utility System Pipeline Damage (Site Specific)**

System	Total Pipelines Length (miles)	Number of Leaks	Number of Breaks
Potable Water	7,950	0	0
Waste Water	4,770	0	0
Natural Gas	5	0	0
Oil	0	0	0

**Table 9: Expected Potable Water and Electric Power System Performance**

	Total # of Households	Number of Households without Service				
		At Day 1	At Day 3	At Day 7	At Day 30	At Day 90
Potable Water						
Electric Power						



## Induced Earthquake Damage

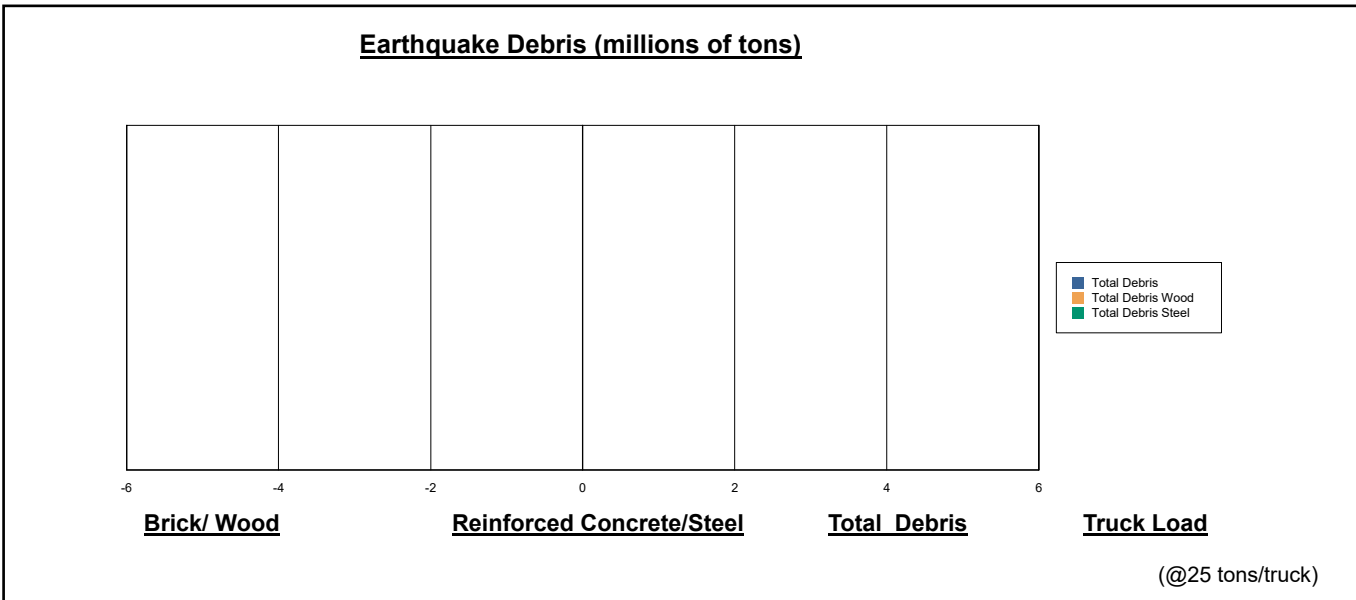
### Fire Following Earthquake

Fires often occur after an earthquake. Because of the number of fires and the lack of water to fight the fires, they can often burn out of control. Hazus uses a Monte Carlo simulation model to estimate the number of ignitions and the amount of burnt area. For this scenario, the model estimates that there will be 0 ignitions that will burn about sq. mi % of the region's total area.) The model also estimates that the fires will displace about 0 people and burn about 0 (millions of dollars) of building value.

### Debris Generation

Hazus estimates the amount of debris that will be generated by the earthquake. The model breaks the debris into two general categories: a) Brick/Wood and b) Reinforced Concrete/Steel. This distinction is made because of the different types of material handling equipment required to handle the debris.

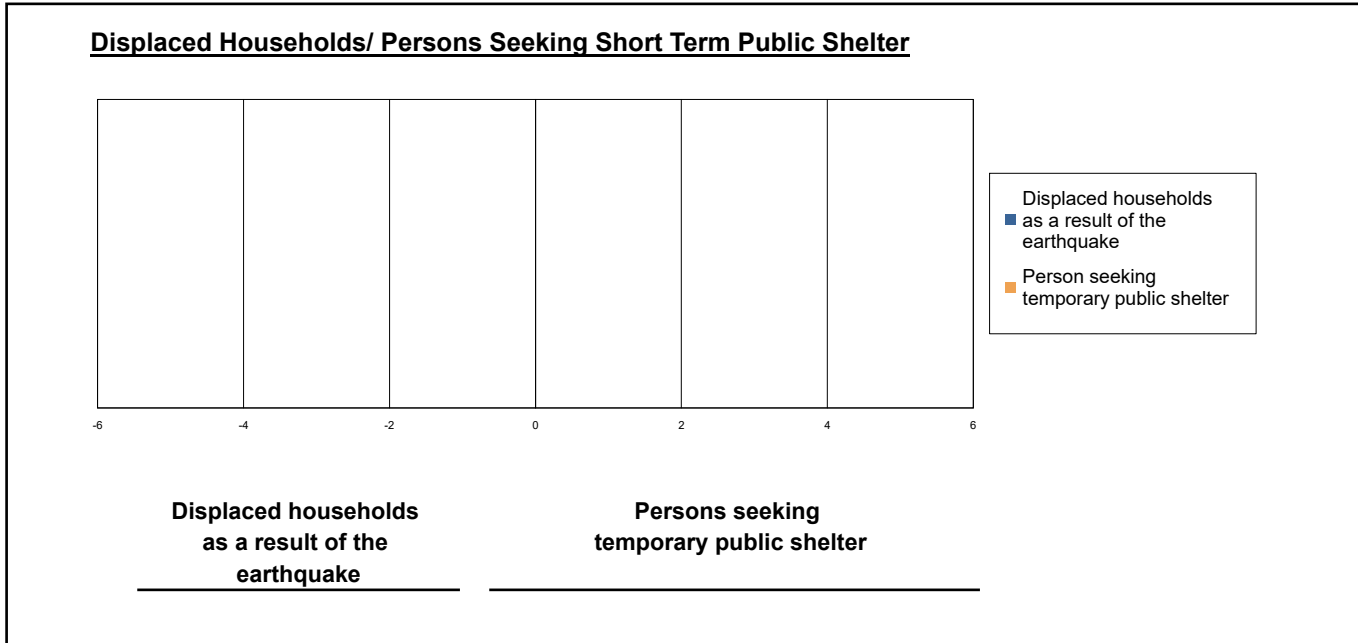
The model estimates that a total of tons of debris will be generated. Of the total amount, Brick/Wood comprises % of the total, with the remainder being Reinforced Concrete/Steel. If the debris tonnage is converted to an estimated number of truckloads, it will require truckloads (@25 tons/truck) to remove the debris generated by the earthquake.



## Social Impact

### Shelter Requirement

Hazus estimates the number of households that are expected to be displaced from their homes due to the earthquake and the number of displaced people that will require accommodations in temporary public shelters. The model estimates households to be displaced due to the earthquake. Of these, people (out of a total population of 863,420) will seek temporary shelter in public shelters.



### Casualties

Hazus estimates the number of people that will be injured and killed by the earthquake. The casualties are broken down into four (4) severity levels that describe the extent of the injuries. The levels are described as follows;

- Severity Level 1: Injuries will require medical attention but hospitalization is not needed.
- Severity Level 2: Injuries will require hospitalization but are not considered life-threatening
- Severity Level 3: Injuries will require hospitalization and can become life threatening if not promptly treated.
- Severity Level 4: Victims are killed by the earthquake.

The casualty estimates are provided for three (3) times of day: 2:00 AM, 2:00 PM and 5:00 PM. These times represent the periods of the day that different sectors of the community are at their peak occupancy loads. The 2:00 AM estimate considers that the residential occupancy load is maximum, the 2:00 PM estimate considers that the educational, commercial and industrial sector loads are maximum and 5:00 PM represents peak commute time.

Table 10 provides a summary of the casualties estimated for this earthquake

**Table 10: Casualty Estimates**

		Level 1	Level 2	Level 3	Level 4
<b>2 AM</b>	Commercial	0.00	0.00	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.00	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.00	0.00	0.00	0.00
	Other-Residential	0.04	0.00	0.00	0.00
	Single Family	0.15	0.02	0.00	0.00
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>2 PM</b>	Commercial	0.13	0.01	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.04	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.01	0.00	0.00	0.00
	Other-Residential	0.01	0.00	0.00	0.00
	Single Family	0.03	0.00	0.00	0.00
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>5 PM</b>	Commercial	0.09	0.01	0.00	0.00
	Commuting	0.00	0.00	0.00	0.00
	Educational	0.01	0.00	0.00	0.00
	Hotels	0.00	0.00	0.00	0.00
	Industrial	0.01	0.00	0.00	0.00
	Other-Residential	0.02	0.00	0.00	0.00
	Single Family	0.06	0.01	0.00	0.00
	<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

---

## Economic Loss

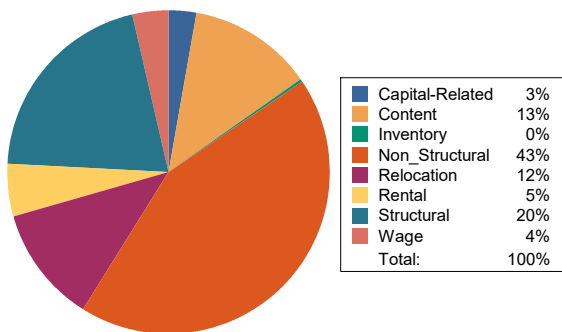
The total economic loss estimated for the earthquake is 0.81 (millions of dollars), which includes building and lifeline related losses based on the region's available inventory. The following three sections provide more detailed information about these losses.

### 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 earthquake. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the earthquake.

The total building-related losses were 0.81 (millions of dollars); 23 % of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 68 % of the total loss. Table 11 below provides a summary of the losses associated with the building damage.

Earthquake Losses by Loss Type (\$ millions)



Earthquake Losses by Occupancy Type (\$ millions)

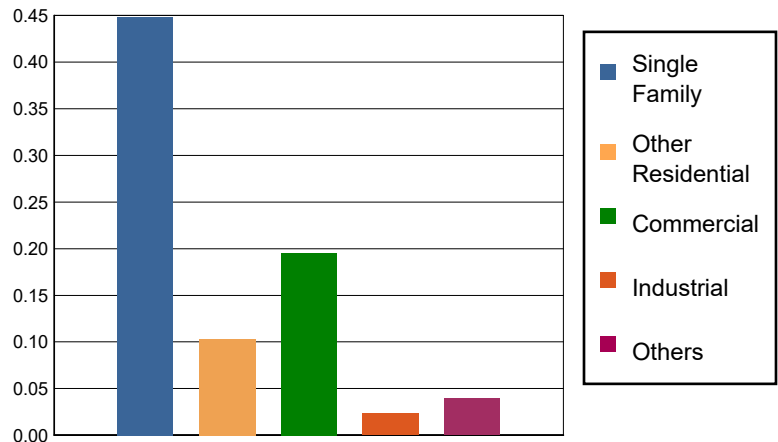


Table 11: Building-Related Economic Loss Estimates

(Millions of dollars)

Category	Area	Single Family	Other Residential	Commercial	Industrial	Others	Total
<b>Income Losses</b>							
	Wage	0.0000	0.0015	0.0246	0.0004	0.0025	0.0290
	Capital-Related	0.0000	0.0006	0.0202	0.0002	0.0004	0.0214
	Rental	0.0163	0.0088	0.0170	0.0002	0.0008	0.0431
	Relocation	0.0575	0.0063	0.0225	0.0017	0.0070	0.0950
	<b>Subtotal</b>	<b>0.0738</b>	<b>0.0172</b>	<b>0.0843</b>	<b>0.0025</b>	<b>0.0107</b>	<b>0.1885</b>
<b>Capital Stock Losses</b>							
	Structural	0.1089	0.0167	0.0289	0.0041	0.0070	0.1656
	Non_Structural	0.2142	0.0569	0.0559	0.0101	0.0151	0.3522
	Content	0.0514	0.0124	0.0256	0.0059	0.0067	0.1020
	Inventory	0.0000	0.0000	0.0006	0.0009	0.0000	0.0015
	<b>Subtotal</b>	<b>0.3745</b>	<b>0.0860</b>	<b>0.1110</b>	<b>0.0210</b>	<b>0.0288</b>	<b>0.6213</b>
	<b>Total</b>	<b>0.45</b>	<b>0.10</b>	<b>0.20</b>	<b>0.02</b>	<b>0.04</b>	<b>0.81</b>

### Transportation and Utility Lifeline Losses

For the transportation and utility lifeline systems, Hazus computes the direct repair cost for each component only. There are no losses computed by Hazus for business interruption due to lifeline outages. Tables 12 & 13 provide a detailed breakdown in the expected lifeline losses.

**Table 12: Transportation System Economic Losses**  
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Highway	Segments	3555.7797	0.0000	0.00
	Bridges	2331.8048	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Subtotal	<b>5887.5845</b>	<b>0.0000</b>	
Railways	Segments	177.9848	0.0000	0.00
	Bridges	205.3125	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	2.6630	0.0000	0.00
	Subtotal	<b>385.9603</b>	<b>0.0000</b>	
Light Rail	Segments	93.7422	0.0000	0.00
	Bridges	0.0000	0.0000	0.00
	Tunnels	0.0000	0.0000	0.00
	Facilities	58.4000	0.0000	0.00
	Subtotal	<b>152.1422</b>	<b>0.0000</b>	
Bus	Facilities	4.3800	0.0000	0.00
	Subtotal	<b>4.3800</b>	<b>0.0000</b>	
Ferry	Facilities	0.0000	0.0000	0.00
	Subtotal	<b>0.0000</b>	<b>0.0000</b>	
Port	Facilities	2.8835	0.0000	0.00
	Subtotal	<b>2.8835</b>	<b>0.0000</b>	
Airport	Facilities	22.9950	0.0000	0.00
	Runways	369.8791	0.0000	0.00
	Subtotal	<b>392.8741</b>	<b>0.0000</b>	
<b>Total</b>		<b>6,825.82</b>	<b>0.00</b>	

**Table 13: Utility System Economic Losses**  
(Millions of dollars)

System	Component	Inventory Value	Economic Loss	Loss Ratio (%)
Potable Water	Pipelines	0.0000	0.0000	0.00
	Facilities	98.9010	0.0000	0.00
	Distribution Lines	255.8812	0.0000	0.00
	<b>Subtotal</b>	<b>354.7822</b>	<b>0.0000</b>	
Waste Water	Pipelines	0.0000	0.0000	0.00
	Facilities	4175.6000	0.0000	0.00
	Distribution Lines	153.5287	0.0000	0.00
	<b>Subtotal</b>	<b>4329.1287</b>	<b>0.0000</b>	
Natural Gas	Pipelines	5.1380	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	Distribution Lines	102.3525	0.0000	0.00
	<b>Subtotal</b>	<b>107.4905</b>	<b>0.0000</b>	
Oil Systems	Pipelines	0.0000	0.0000	0.00
	Facilities	0.0000	0.0000	0.00
	<b>Subtotal</b>	<b>0.0000</b>	<b>0.0000</b>	
Electrical Power	Facilities	1914.4250	0.0000	0.00
	<b>Subtotal</b>	<b>1914.4250</b>	<b>0.0000</b>	
Communication	Facilities	0.6930	0.0000	0.00
	<b>Subtotal</b>	<b>0.6930</b>	<b>0.0000</b>	
	<b>Total</b>	<b>6,706.52</b>	<b>0.00</b>	



FEMA

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**Appendix A: County Listing for the Region**

Prince George's, MD



**Appendix B: Regional Population and Building Value Data**

State	County Name	Population	Building Value (millions of dollars)		
			Residential	Non-Residential	Total
<b>Maryland</b>	Prince George's	863,420	89,693	19,788	109,482
<b>Total Region</b>		<b>863,420</b>	<b>89,693</b>	<b>19,788</b>	<b>109,482</b>

## Hazus Quick Assessment Report

### Estimated Economic Loss (\$ Billions)

Category	Description	Range
General Building Stock	Building Damage	< 0.1
	Building Contents	< 0.1
	Business Interruption	< 0.1
Infrastructure	Lifelines Damage	
<b>Total</b>		< 0.1

### Preliminary Damage Assessment (PDA) Estimates

Description	Residential	Commercial	Other	Total
Affected				
Minor				
Major				
Destroyed				
<b>Total</b>				

### Estimated Casualties : Night Time

Severity Level	Description	# Persons
Level 1	Medical Aid	< 10
Level 2	Hospital Care	< 10
Level 3	Life-threatening	< 10
Level 4	Fatalities	< 10

### Estimated Shelter Needs

Type	Households	People
Displaced Households	< 1.0	< 1.0
Public Shelter	0	0

Comments :

\*Hazus damage estimates are presented using FEMA Preliminary Damage Assessment (PDA) categories. These estimates should be used for planning purposes and may not reflect actual observed damages from the PDA process.

#### Disclaimer:

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 earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

### Earthquake Information

Location :

Origin Time:

Magnitude : 0.00

Epicenter Latitude/Longitude :

/

Depth & Type : /P

Name :

NA

Ground Motion /Attenuation :

Maximum PGA:

Information Sources:

Comments :

### Population and Building Exposure (2010 D&B) (2010 Census)

Population: 863,420

### Building Exposure : (\$ Millions)

Residential	89,693
Commercial	13,563
Other	6,225
<b>Total</b>	<b>109,481</b>

Counties :

- Prince  
George's, MD

Major Metro Area :

## Hazus Quick Assessment Report

### Estimated Economic Loss (\$ Billions)

Category	Description	Range
General Building Stock	Building Damage	< 0.1
	Building Contents	< 0.1
	Business Interruption	< 0.1
Infrastructure	Lifelines Damage	
<b>Total</b>		< 0.1

### Preliminary Damage Assessment (PDA) Estimates

Description	Residential	Commercial	Other	Total
Affected				
Minor				
Major				
Destroyed				
<b>Total</b>				

### Estimated Casualties : Day Time

Severity Level	Description	# Persons
Level 1	Medical Aid	< 10
Level 2	Hospital Care	< 10
Level 3	Life-threatening	< 10
Level 4	Fatalities	< 10

### Estimated Shelter Needs

Type	Households	People
Displaced Households	< 1.0	< 1.0
Public Shelter	0	0

Comments :

\*Hazus damage estimates are presented using FEMA Preliminary Damage Assessment (PDA) categories. These estimates should be used for planning purposes and may not reflect actual observed damages from the PDA process.

#### Disclaimer:

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 earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

### Earthquake Information

Location :

Origin Time:

Magnitude : 0.00

Epicenter Latitude/Longitude :

/

Depth & Type : /P

Name :

NA

Ground Motion /Attenuation :

Maximum PGA:

Information Sources:

Comments :

### Population and Building Exposure (2010 D&B) (2010 Census)

Population: 863,420

### Building Exposure : (\$ Millions)

Residential	89,693
Commercial	13,563
Other	6,225
<b>Total</b>	<b>109,481</b>

Counties :

- Prince  
George's, MD

Major Metro Area :

## Hazus Quick Assessment Report

### Estimated Economic Loss (\$ Billions)

Category	Description	Range
General Building Stock	Building Damage	< 0.1
	Building Contents	< 0.1
	Business Interruption	< 0.1
Infrastructure	Lifelines Damage	
<b>Total</b>		< 0.1

### Preliminary Damage Assessment (PDA) Estimates

Description	Residential	Commercial	Other	Total
Affected				
Minor				
Major				
Destroyed				
<b>Total</b>				

### Estimated Casualties : Commute Time

Severity Level	Description	# Persons
Level 1	Medical Aid	< 10
Level 2	Hospital Care	< 10
Level 3	Life-threatening	< 10
Level 4	Fatalities	< 10

### Estimated Shelter Needs

Type	Households	People
Displaced Households	< 1.0	< 1.0
Public Shelter	0	0

Comments :

\*Hazus damage estimates are presented using FEMA Preliminary Damage Assessment (PDA) categories. These estimates should be used for planning purposes and may not reflect actual observed damages from the PDA process.

#### Disclaimer:

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 earthquake. These results can be improved by using enhanced inventory, geotechnical, and observed ground motion data.

### Earthquake Information

Location :

Origin Time:

Magnitude : 0.00

Epicenter Latitude/Longitude :

/

Depth & Type : /P

Name :

NA

Ground Motion /Attenuation :

Maximum PGA:

Information Sources:

Comments :

### Population and Building Exposure (2010 D&B) (2010 Census)

Population: 863,420

### Building Exposure : (\$ Millions)

Residential	89,693
Commercial	13,563
Other	6,225
<b>Total</b>	<b>109,481</b>

Counties :

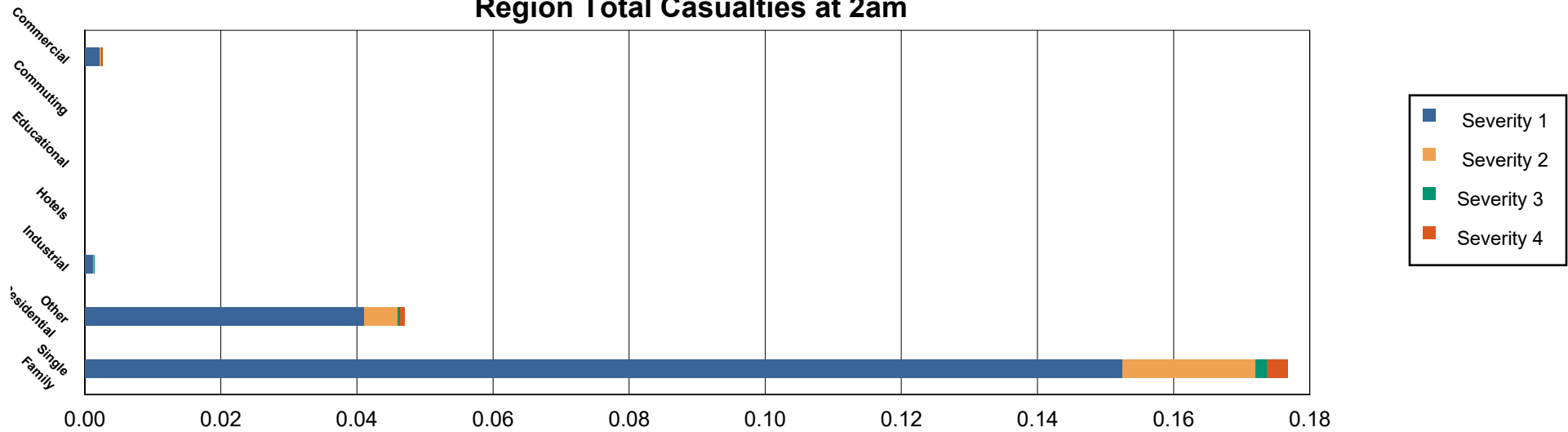
- Prince George's, MD

Major Metro Area :

## Casualties Summary Report at 2 AM

October 19, 2022

### Region Total Casualties at 2am



	Injury Severity Level				total
	Population	Severity 1	Severity 2	Severity 3	
<b>Maryland</b>					
<b>Prince George's</b>					
Other-Residential		0	0	0	0
Industrial		0	0	0	0
Commuting		0	0	0	0
Single Family		0	0	0	0

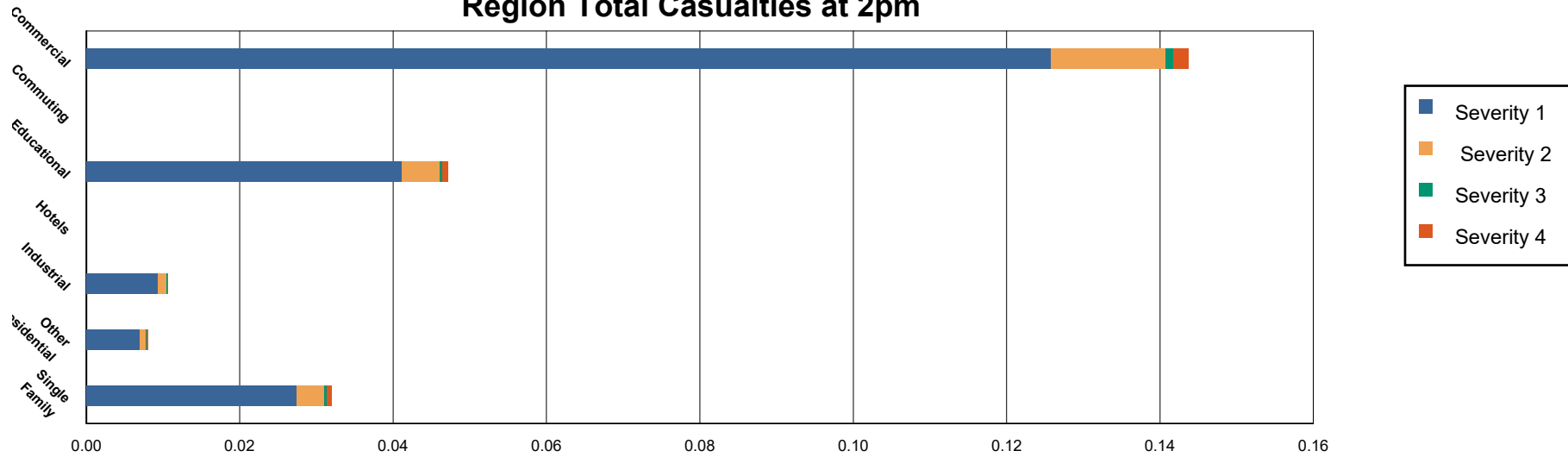
	Population	Injury Severity Level				total
		Severity 1	Severity 2	Severity 3	Severity 4	
<i>Commercial</i>		0	0	0	0	0
<i>Hotels</i>		0	0	0	0	0
<i>Educational</i>		0	0	0	0	0
<b>Total Prince George's</b>	863,420	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total Maryland</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Region Total</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

*Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.*

## Casualties Summary Report at 2 PM

October 19, 2022

### Region Total Casualties at 2pm



Population	Severity 1 #	Severity 2 #	Severity 3 #	Severity 4 #	Total #
<b>Maryland</b>					
Prince George's					
Other-Residential	0	0	0	0	0
Industrial	0	0	0	0	0



	Population	Severity 1 #	Severity 2 #	Severity 3 #	Severity 4 #	Total #
<i>Commuting</i>		0	0	0	0	0
<i>Single Family</i>		0	0	0	0	0
<i>Commercial</i>		0	0	0	0	0
<i>Hotels</i>		0	0	0	0	0
<i>Educational</i>		0	0	0	0	0
<b>Total Prince George's</b>	863,420	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total Maryland</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Region Total</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

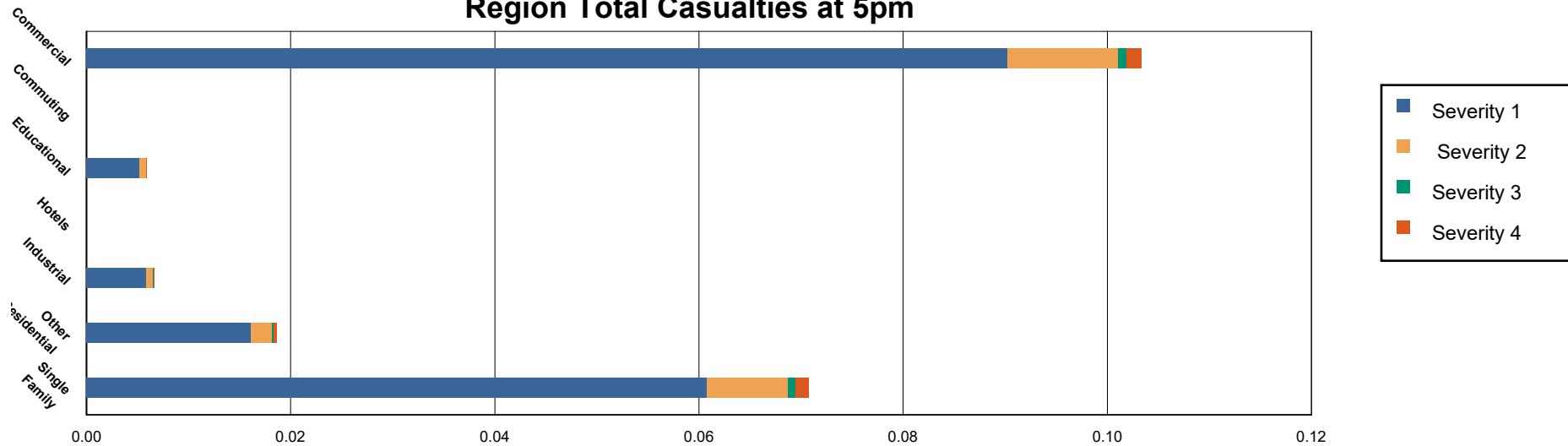
Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.



## Casualties Summary Report at 5 PM

October 19, 2022

### Region Total Casualties at 5pm



Population	Injury Severity Level				total
	Severity 1	Severity 2	Severity 3	Severity 4	
<b>Maryland</b>					
Prince George's					
Other-Residential	0	0	0	0	0
Industrial	0	0	0	0	0



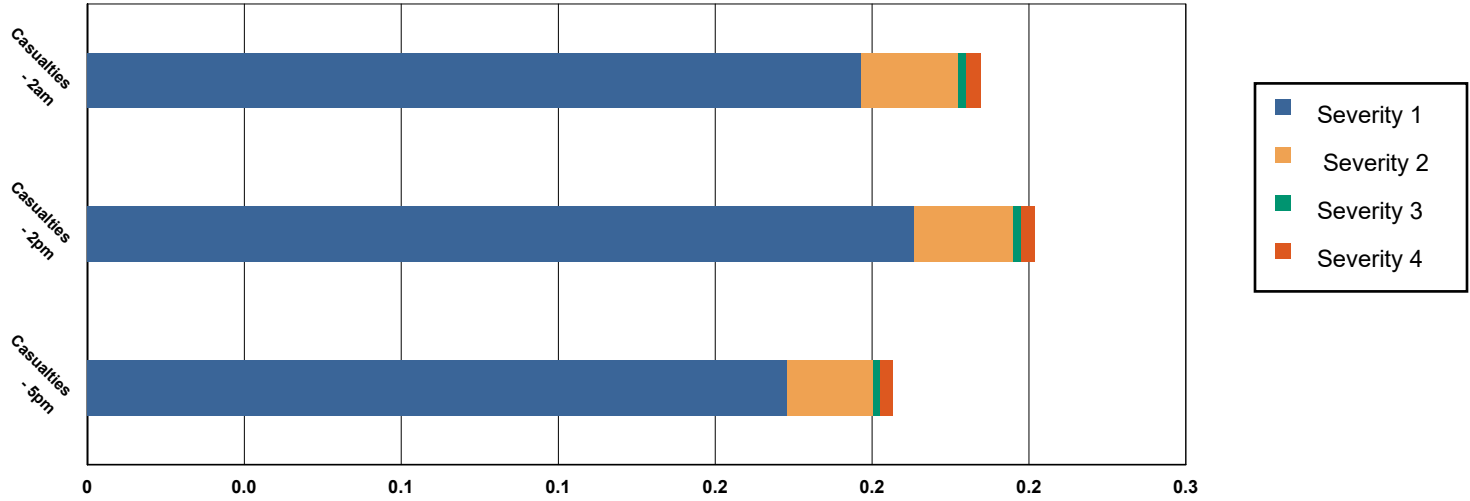
	Population	Injury Severity Level				total
		Severity 1	Severity 2	Severity 3	Severity 4	
<i>Commuting</i>		0	0	0	0	0
<i>Single Family</i>		0	0	0	0	0
<i>Commercial</i>		0	0	0	0	0
<i>Hotels</i>		0	0	0	0	0
<i>Educational</i>		0	0	0	0	0
<b>Total Prince George's</b>	863,420	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total Maryland</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Region Total</b>		<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

# Casualties Summary Report

October 19, 2022

## Region Total Casualties



### Injury Severity Level

Severity 1	Severity 2	Severity 3	Severity 4	Total
------------	------------	------------	------------	-------

#### Maryland

##### Prince George's

##### Casualties - 2am

	Severity 1	Severity 2	Severity 3	Severity 4	Total
Single Family	0	0	0	0	0
Commercial	0	0	0	0	0
Other-Residential	0	0	0	0	0
Commuting	0	0	0	0	0
Educational	0	0	0	0	0
Hotels	0	0	0	0	0
Industrial	0	0	0	0	0

##### Total Casualties - 2am

0	0	0	0	0
---	---	---	---	---

##### Casualties - 2pm

	Severity 1	Severity 2	Severity 3	Severity 4	Total
Commercial	0	0	0	0	0
Commuting	0	0	0	0	0
Single Family	0	0	0	0	0
Hotels	0	0	0	0	0
Educational	0	0	0	0	0
Industrial	0	0	0	0	0
Other-Residential	0	0	0	0	0

	Injury Severity Level				
	Severity 1	Severity 2	Severity 3	Severity 4	Total
<b>Maryland</b>					
<b>Prince George's</b>					
<b>Total Casualties - 2pm</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Casualties - 5pm</b>					
Hotels	0	0	0	0	0
Educational	0	0	0	0	0
Industrial	0	0	0	0	0
Other-Residential	0	0	0	0	0
Commuting	0	0	0	0	0
Commercial	0	0	0	0	0
Single Family	0	0	0	0	0
<b>Total Casualties - 5pm</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Region Total</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>	<b>NA</b>

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.



## Shelter Summary Report

October 19, 2022

	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's		
Total		
Region Total		

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/states were selected at the time of study region creation.

**Debris Summary Report: 10 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Debris Summary Report: 20 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Debris Summary Report: 50 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	0	0	331	267	598
<b>Total</b>	<b>0</b>	<b>0</b>	<b>331</b>	<b>267</b>	<b>598</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>	<b>331</b>	<b>267</b>	<b>598</b>





**Debris Summary Report: 100 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	327	0	2,072	1,951	4,350
<b>Total</b>	<b>327</b>	<b>0</b>	<b>2,072</b>	<b>1,951</b>	<b>4,350</b>
<b>Study Region Total</b>	<b>327</b>	<b>0</b>	<b>2,072</b>	<b>1,951</b>	<b>4,350</b>



**Debris Summary Report: 200 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	3,377	0	5,692	5,024	14,093
<b>Total</b>	<b>3,377</b>	<b>0</b>	<b>5,692</b>	<b>5,024</b>	<b>14,093</b>
<b>Study Region Total</b>	<b>3,377</b>	<b>0</b>	<b>5,692</b>	<b>5,024</b>	<b>14,093</b>



**Debris Summary Report: 500 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	15,120	0	18,512	15,248	48,880
<b>Total</b>	<b>15,120</b>	<b>0</b>	<b>18,512</b>	<b>15,248</b>	<b>48,880</b>
<b>Study Region Total</b>	<b>15,120</b>	<b>0</b>	<b>18,512</b>	<b>15,248</b>	<b>48,880</b>



**Debris Summary Report: 1000 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	30,965	3	29,844	23,861	84,673
<b>Total</b>	<b>30,965</b>	<b>3</b>	<b>29,844</b>	<b>23,861</b>	<b>84,673</b>
<b>Study Region Total</b>	<b>30,965</b>	<b>3</b>	<b>29,844</b>	<b>23,861</b>	<b>84,673</b>

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.



**Direct Economic Losses For Buildings: Annualized Losses**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	1,590	338	1	0.00	73	5	8	31	2,047
<b>Total</b>	<b>1,590</b>	<b>338</b>	<b>1</b>	<b>0.00</b>	<b>73</b>	<b>5</b>	<b>8</b>	<b>31</b>	<b>2,047</b>
<b>Study Region Total</b>	<b>1,590</b>	<b>338</b>	<b>1</b>	<b>0.00</b>	<b>73</b>	<b>5</b>	<b>8</b>	<b>31</b>	<b>2,047</b>

**Direct Economic Losses For Buildings: 10 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	0	0	0	0.00	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Direct Economic Losses For Buildings: 20 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	0	0	0	0.00	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Direct Economic Losses For Buildings: 50 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	1,116	922	0	0.00	0	0	0	0	2,039
<b>Total</b>	<b>1,116</b>	<b>922</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,039</b>
<b>Study Region Total</b>	<b>1,116</b>	<b>922</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,039</b>





**Direct Economic Losses For Buildings: 100 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	20,562	3,786	0	0.03	9	0	0	0	24,356
<b>Total</b>	<b>20,562</b>	<b>3,786</b>	<b>0</b>	<b>0.03</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>24,356</b>
<b>Study Region Total</b>	<b>20,562</b>	<b>3,786</b>	<b>0</b>	<b>0.03</b>	<b>9</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>24,356</b>



**Direct Economic Losses For Buildings: 200 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	62,036	10,529	0	0.09	152	0	0	62	72,780
<b>Total</b>	<b>62,036</b>	<b>10,529</b>	<b>0</b>	<b>0.09</b>	<b>152</b>	<b>0</b>	<b>0</b>	<b>62</b>	<b>72,780</b>
<b>Study Region Total</b>	<b>62,036</b>	<b>10,529</b>	<b>0</b>	<b>0.09</b>	<b>152</b>	<b>0</b>	<b>0</b>	<b>62</b>	<b>72,780</b>



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**Direct Economic Losses For Buildings: 500 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	183,949	29,690	27	0.28	6,608	0	0	3,081	223,355
<b>Total</b>	<b>183,949</b>	<b>29,690</b>	<b>27</b>	<b>0.28</b>	<b>6,608</b>	<b>0</b>	<b>0</b>	<b>3,081</b>	<b>223,355</b>
<b>Study Region Total</b>	<b>183,949</b>	<b>29,690</b>	<b>27</b>	<b>0.28</b>	<b>6,608</b>	<b>0</b>	<b>0</b>	<b>3,081</b>	<b>223,355</b>



**Direct Economic Losses For Buildings: 1000 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	309,630	51,213	183	0.47	11,284	675	586	6,072	379,643
<b>Total</b>	<b>309,630</b>	<b>51,213</b>	<b>183</b>	<b>0.47</b>	<b>11,284</b>	<b>675</b>	<b>586</b>	<b>6,072</b>	<b>379,643</b>
<b>Study Region Total</b>	<b>309,630</b>	<b>51,213</b>	<b>183</b>	<b>0.47</b>	<b>11,284</b>	<b>675</b>	<b>586</b>	<b>6,072</b>	<b>379,643</b>

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region : pg\_Hur\_prob\_north  
 Scenario : Probabilistic



**Shelter Summary Report: 10 - year Event**



November 30, 2022

	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>



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**Shelter Summary Report: 20 - year Event**

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November 30, 2022

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	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>

---



Shelter Summary Report: 50 - year Event



November 30, 2022

	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>



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**Shelter Summary Report: 100 - year Event**

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November 30, 2022

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	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>





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**Shelter Summary Report: 200 - year Event**

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November 30, 2022

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	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>

---



**Shelter Summary Report: 500 - year Event**



November 30, 2022

	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>



Shelter Summary Report: 1000 - year Event



November 30, 2022

	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	2	2
<b>Total</b>	<b>2</b>	<b>2</b>
<b>Study Region Total</b>	<b>2</b>	<b>2</b>

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

## Quick Assessment Report

November 30, 2022

Study Region : pg\_Hur\_prob\_north

Scenario : Probabilistic

### Regional Statistics

Area (Square Miles)	189
Number of Census Tracts	131
Number of People in the Region	538,419
General Building Stock	

<i>Occupancy</i>	<i>Building Count</i>	<i>Dollar Exposure (\$ K)</i>
Residential	134,304	53,046,000
Commercial	10,254	9,194,217
Other	4,674	4,149,696
Total	149,232	66,389,913

### Scenario Results

#### Number of Residential Buildings Damaged

<i>Return Period</i>	<i>Minor</i>	<i>Moderate</i>	<i>Severe</i>	<i>Destruction</i>	<i>Total</i>
10	0	0	0	0	0
20	0	0	0	0	0
50	56	0	0	0	56
100	128	2	0	0	131
200	627	28	0	0	656
500	3,718	282	0	0	4,001
1000	8,357	877	2	7	9,243

#### Number of Buildings Damaged

<i>Return Period</i>	<i>Minor</i>	<i>Moderate</i>	<i>Severe</i>	<i>Destruction</i>	<i>Total</i>
10	0	0	0	0	0
20	0	0	0	0	0
50	89	0	0	0	90
100	174	2	0	0	176
200	714	30	0	0	744
500	3,977	299	1	0	4,278
1000	8,907	937	8	7	9,859

#### Shelter Requirements

<i>Return Period</i>	<i>Displaced Households (#Households)</i>	<i>Short Term Shelter (#People)</i>
10	0	0
20	0	0
50	0	0
100	0	0
200	0	0
500	0	0
1000	2	2

**Economic Loss (x 1000)**

<b>ReturnPeriod</b>	<b>Property Damage (Capital Stock) Losses</b>		<b>Business Interruption (Income) Losses</b>
	<b>Residential</b>	<b>Total</b>	
10	0	0	0
20	0	0	0
50	2,038	2,038	0
100	23,469	24,348	9
200	71,032	72,565	214
500	208,317	213,666	9,689
1000	346,433	361,026	18,617
Annualized	1,829	1,930	117

**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 Hurricane. These results can be improved by using enhanced inventory data.



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**RiskMAP**  
Increasing Resilience Together

# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_north

**Hurricane Scenario:** Probabilistic 10-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 189.46 square miles and contains 131 census tracts. There are over 184 thousand households in the region and a total population of 538,419 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 149 thousand buildings in the region with a total building replacement value (excluding contents) of 66,390 million dollars (2014 dollars). Approximately 90% of the buildings (and 80% of the building value) are associated with residential housing.



## Building Inventory

### General Building Stock

Hazus estimates that there are 149,232 buildings in the region which have an aggregate total replacement value of 66,390 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

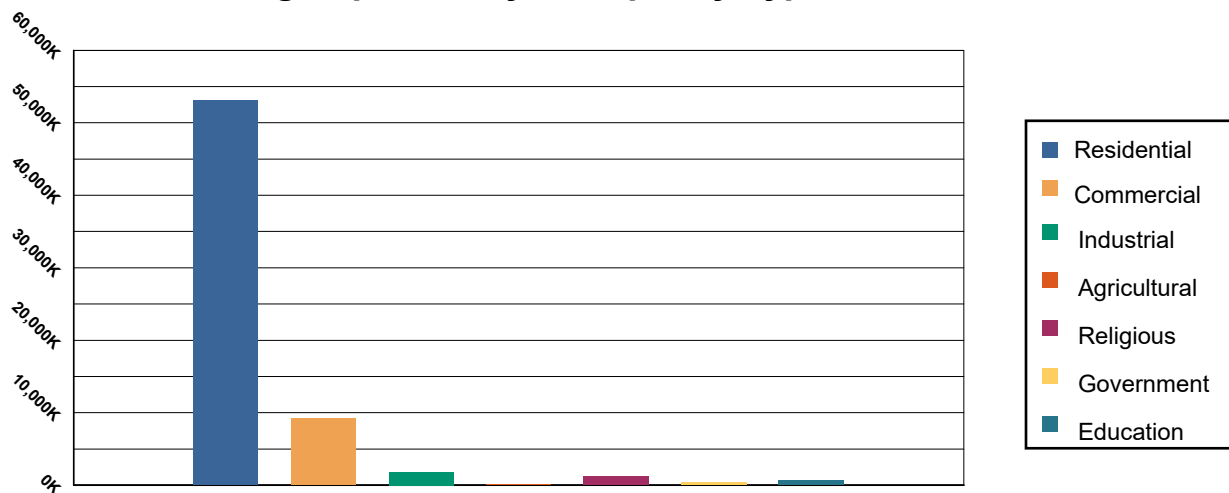


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	53,046,000	79.90%
Commercial	9,194,217	13.85%
Industrial	1,822,008	2.74%
Agricultural	86,197	0.13%
Religious	1,217,968	1.83%
Government	345,623	0.52%
Education	677,900	1.02%
<b>Total</b>	<b>66,389,913</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 607 beds. There are 201 schools, 28 fire stations, 30 police stations and 2 emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic



## Building Damage

### General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

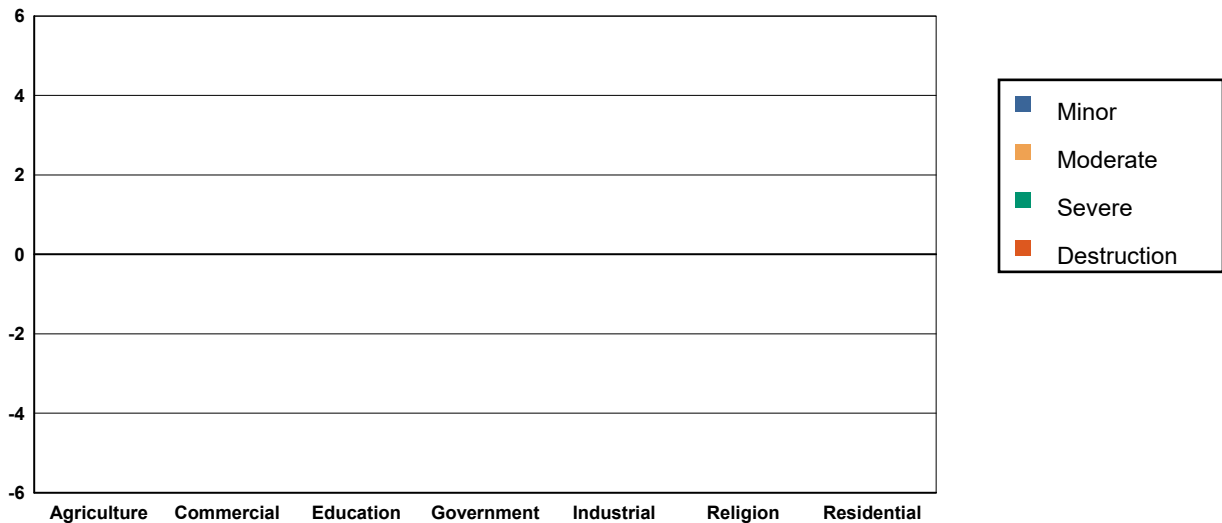


Table 2: Expected Building Damage by Occupancy : 10 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	295.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	10,254.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	485.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Government	302.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	2,403.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Religion	1,189.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Residential	134,304.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>149,232.00</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>	



**Table 3: Expected Building Damage by Building Type : 10 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,696	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	40,665	100.00	0	0.00	0	0.00	0	0.00	0	0.00
MH	182	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	6,065	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	95,831	100.00	0	0.00	0	0.00	0	0.00	0	0.00



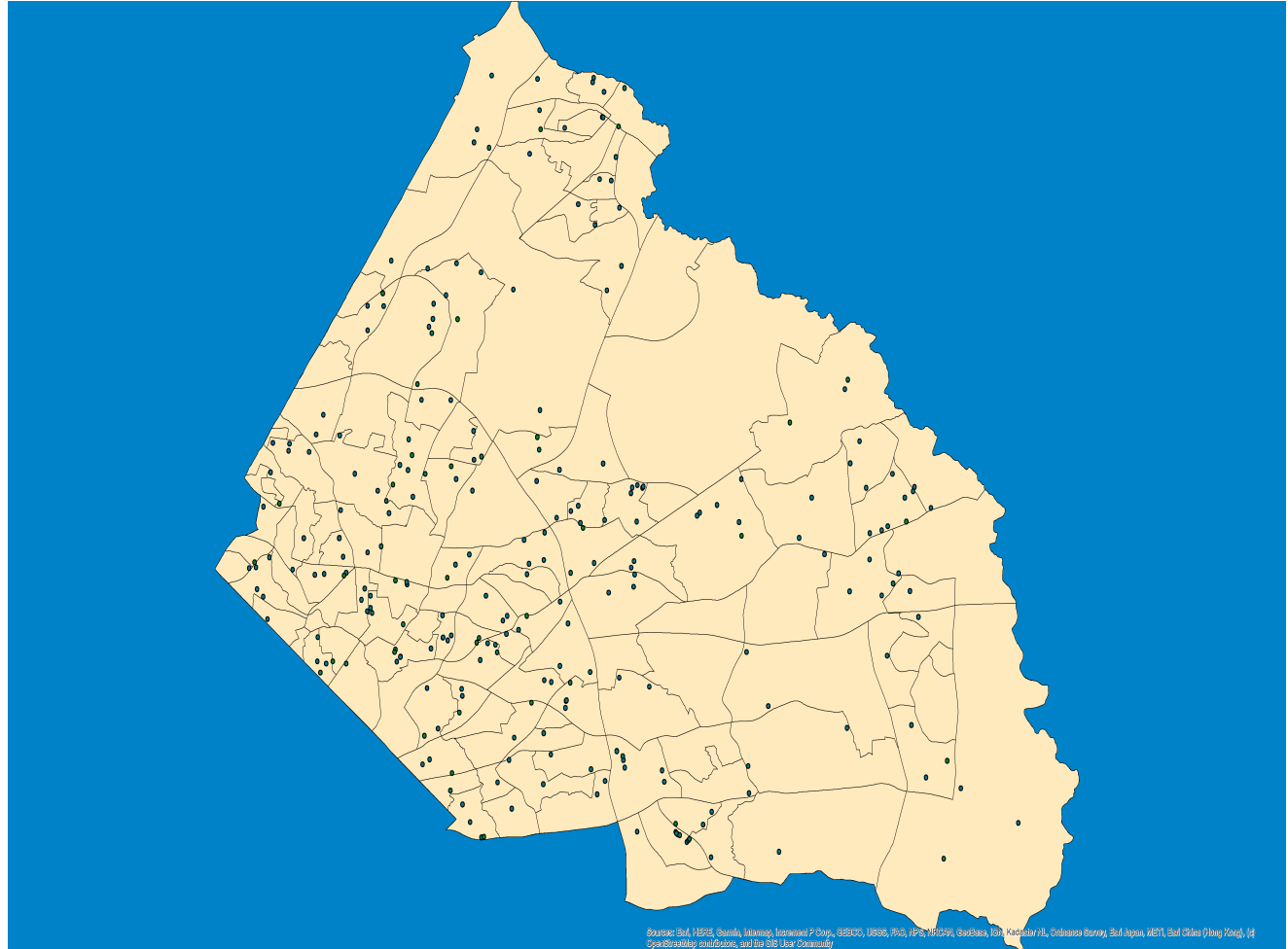
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### **Essential Facility Damage**

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 607 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**



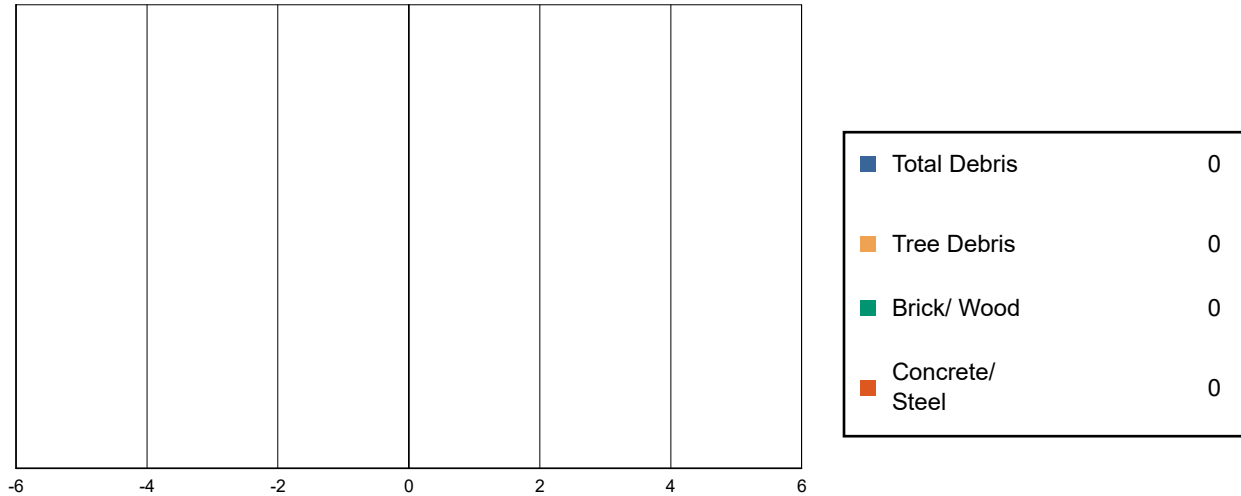
**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
EOCs	2	0	0	2
Fire Stations	28	0	0	28
Hospitals	5	0	0	5
Police Stations	30	0	0	30
Schools	201	0	0	201

## Induced Hurricane Damage

### Debris Generation

**Estimated Debris (Tons)**

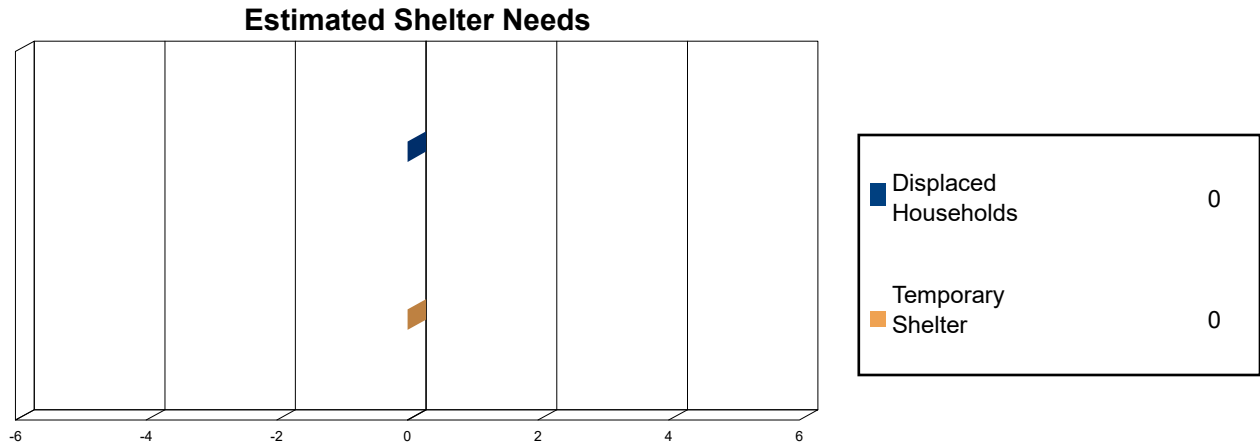


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, 0 tons (0%) is Other Tree Debris. Of the remaining 0 tons, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 0 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 538,419) will seek temporary shelter in public shelters.





## Economic Loss

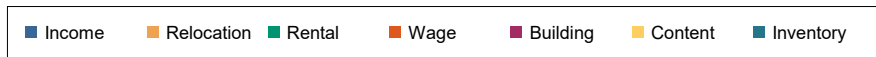
The total economic loss estimated for the hurricane is 0.0 million dollars, which represents 0.00 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 0 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 0% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

**Loss by Business Interruption Type (left)  
and Building Damage Type (right)**



**Loss Type by General Occupancy**



**Table 5: Building-Related Economic Loss Estimates**  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	0.00	0.00	0.00	0.00	0.00
	Content	0.00	0.00	0.00	0.00	0.00
	Inventory	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Business Interruption Loss</b>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>



FEMA

Total

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Total	0.00	0.00	0.00	0.00	0.00
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
<b>Maryland</b>				
Prince George's	538,419	53,046,000	13,343,913	66,389,913
<b>Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>
<b>Study Region Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>



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**RiskMAP**  
Increasing Resilience Together

# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_north

**Hurricane Scenario:** Probabilistic 20-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 189.46 square miles and contains 131 census tracts. There are over 184 thousand households in the region and a total population of 538,419 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 149 thousand buildings in the region with a total building replacement value (excluding contents) of 66,390 million dollars (2014 dollars). Approximately 90% of the buildings (and 80% of the building value) are associated with residential housing.



## Building Inventory

### General Building Stock

Hazus estimates that there are 149,232 buildings in the region which have an aggregate total replacement value of 66,390 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

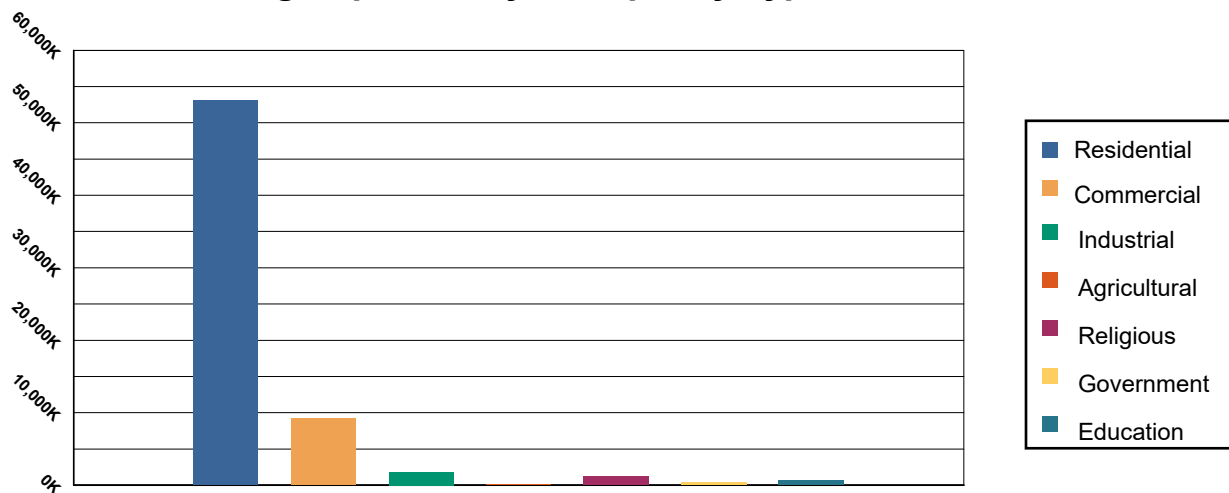


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	53,046,000	79.90%
Commercial	9,194,217	13.85%
Industrial	1,822,008	2.74%
Agricultural	86,197	0.13%
Religious	1,217,968	1.83%
Government	345,623	0.52%
Education	677,900	1.02%
<b>Total</b>	<b>66,389,913</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 607 beds. There are 201 schools, 28 fire stations, 30 police stations and 2 emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic



## Building Damage

### General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

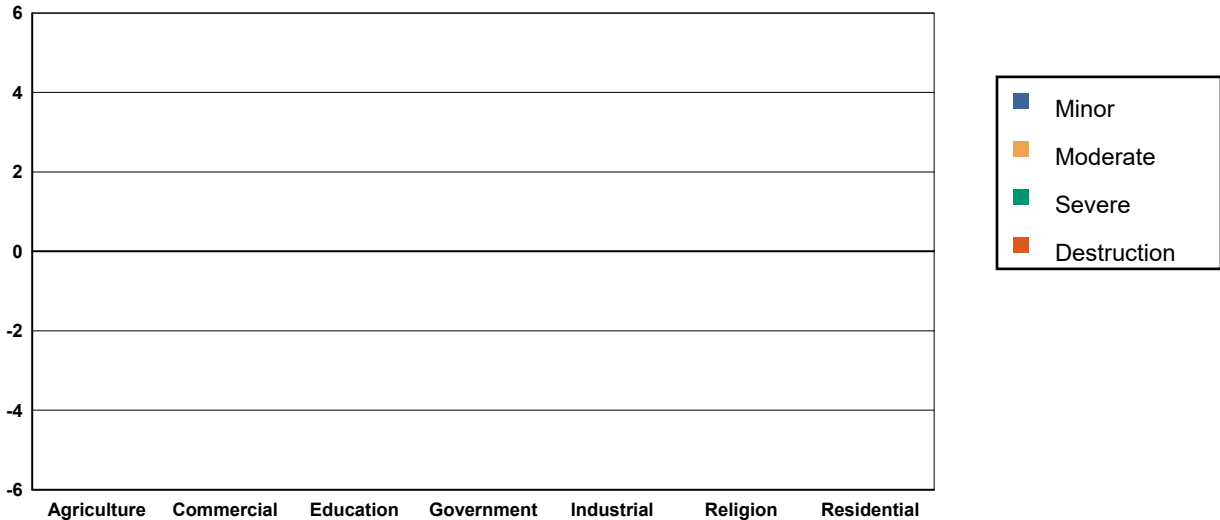


Table 2: Expected Building Damage by Occupancy : 20 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	295.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	10,254.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	485.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Government	302.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	2,403.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Religion	1,189.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Residential	134,304.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>149,232.00</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>	



**Table 3: Expected Building Damage by Building Type : 20 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,696	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	40,665	100.00	0	0.00	0	0.00	0	0.00	0	0.00
MH	182	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	6,065	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	95,831	100.00	0	0.00	0	0.00	0	0.00	0	0.00

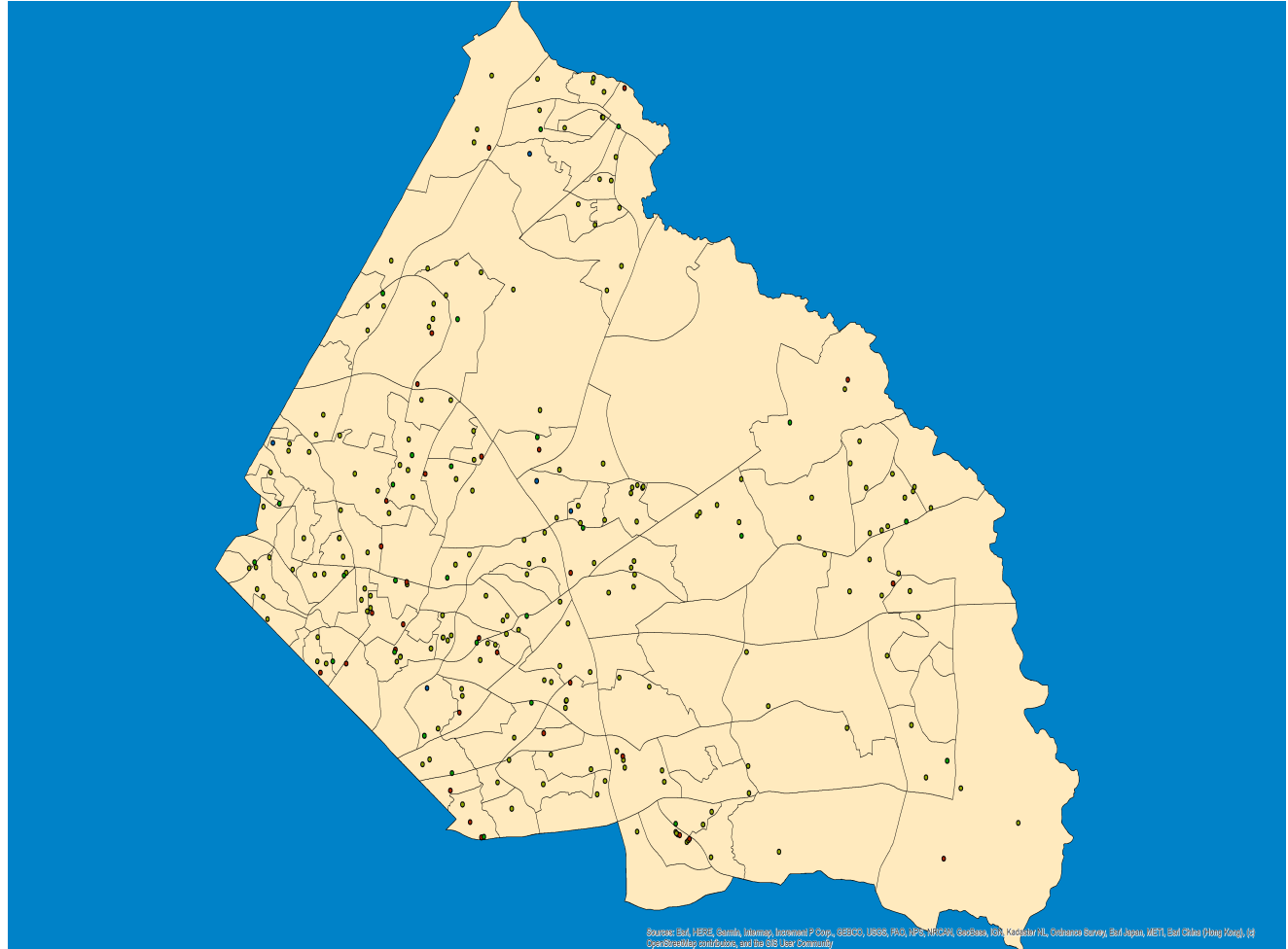


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### **Essential Facility Damage**

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 607 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**



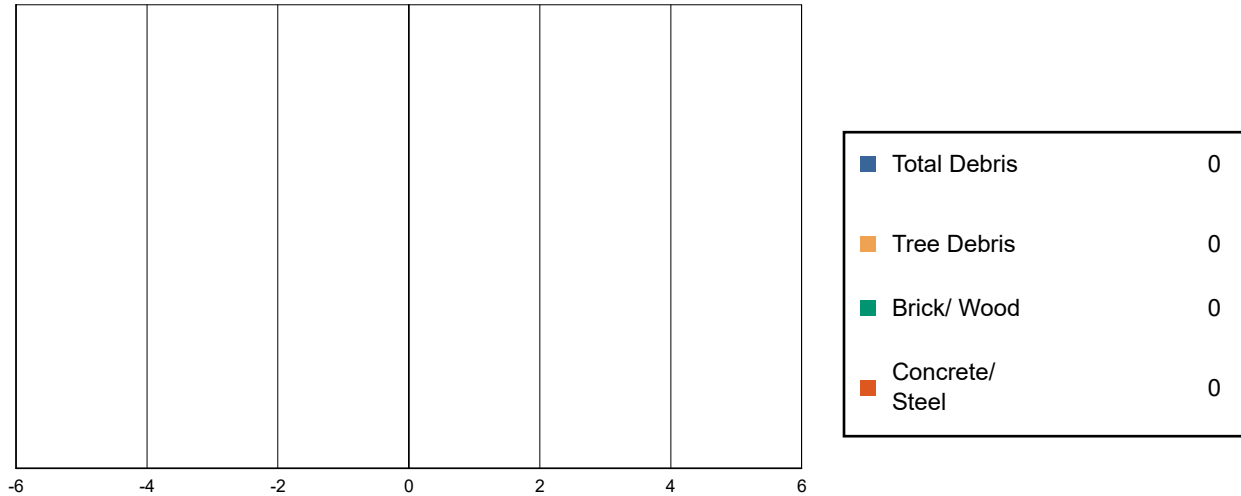
**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
EOCs	2	0	0	2
Fire Stations	28	0	0	28
Hospitals	5	0	0	5
Police Stations	30	0	0	30
Schools	201	0	0	201

## Induced Hurricane Damage

### Debris Generation

**Estimated Debris (Tons)**

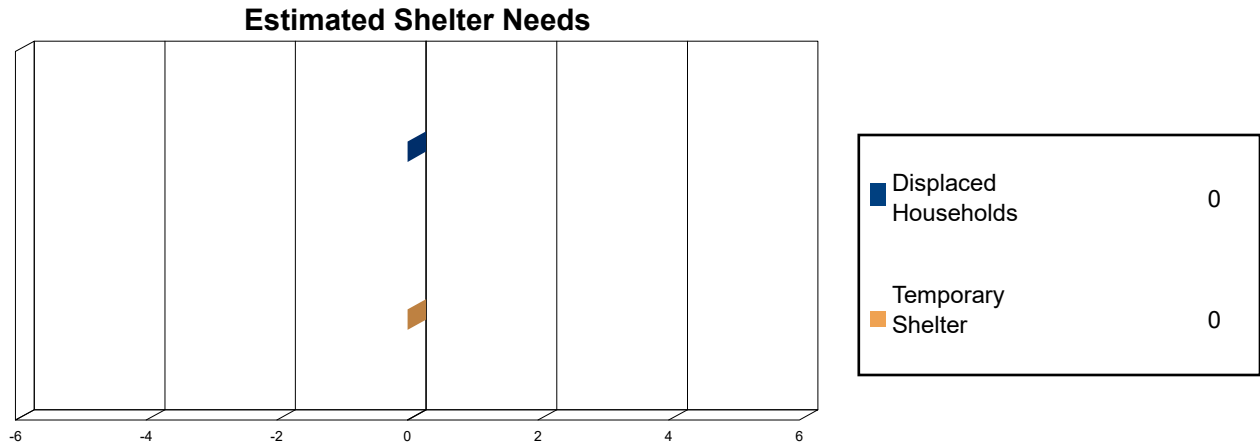


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, 0 tons (0%) is Other Tree Debris. Of the remaining 0 tons, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 0 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 538,419) will seek temporary shelter in public shelters.





## Economic Loss

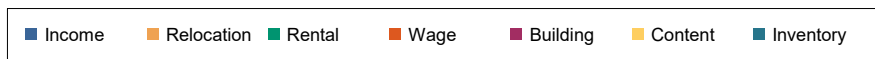
The total economic loss estimated for the hurricane is 0.0 million dollars, which represents 0.00 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

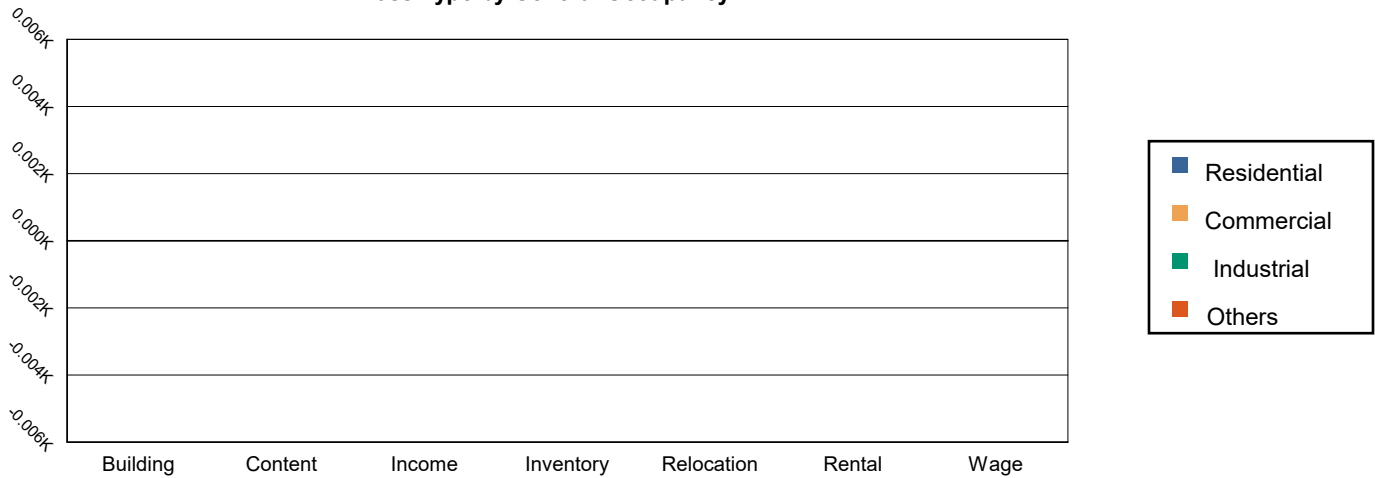
The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage losses are the estimated costs to repair or replace the damage caused to the building and its contents. The business interruption losses are the losses associated with inability to operate a business because of the damage sustained during the hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 0 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 0% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

**Loss by Business Interruption Type (left)  
and Building Damage Type (right)**



**Loss Type by General Occupancy**



**Table 5: Building-Related Economic Loss Estimates**  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	0.00	0.00	0.00	0.00	0.00
	Content	0.00	0.00	0.00	0.00	0.00
	Inventory	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Business Interruption Loss</b>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>



FEMA

Total

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Total	0.00	0.00	0.00	0.00	0.00
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
<b>Maryland</b>				
Prince George's	538,419	53,046,000	13,343,913	66,389,913
<b>Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>
<b>Study Region Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>



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**RiskMAP**  
Increasing Resilience Together

# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_north

**Hurricane Scenario:** Probabilistic 50-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 189.46 square miles and contains 131 census tracts. There are over 184 thousand households in the region and a total population of 538,419 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 149 thousand buildings in the region with a total building replacement value (excluding contents) of 66,390 million dollars (2014 dollars). Approximately 90% of the buildings (and 80% of the building value) are associated with residential housing.



## Building Inventory

### General Building Stock

Hazus estimates that there are 149,232 buildings in the region which have an aggregate total replacement value of 66,390 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

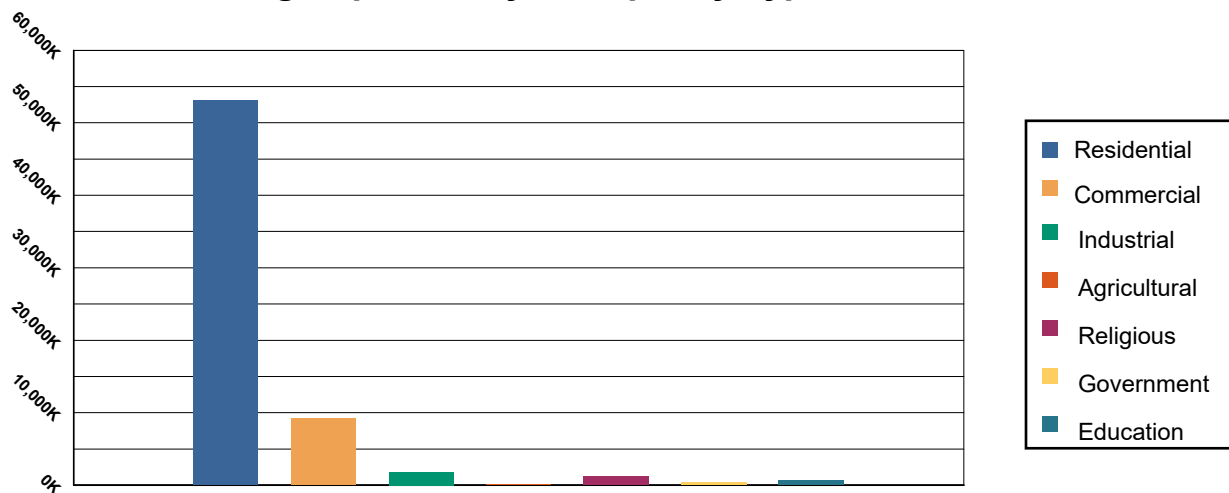


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	53,046,000	79.90%
Commercial	9,194,217	13.85%
Industrial	1,822,008	2.74%
Agricultural	86,197	0.13%
Religious	1,217,968	1.83%
Government	345,623	0.52%
Education	677,900	1.02%
<b>Total</b>	<b>66,389,913</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 607 beds. There are 201 schools, 28 fire stations, 30 police stations and 2 emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic

## Building Damage

### General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

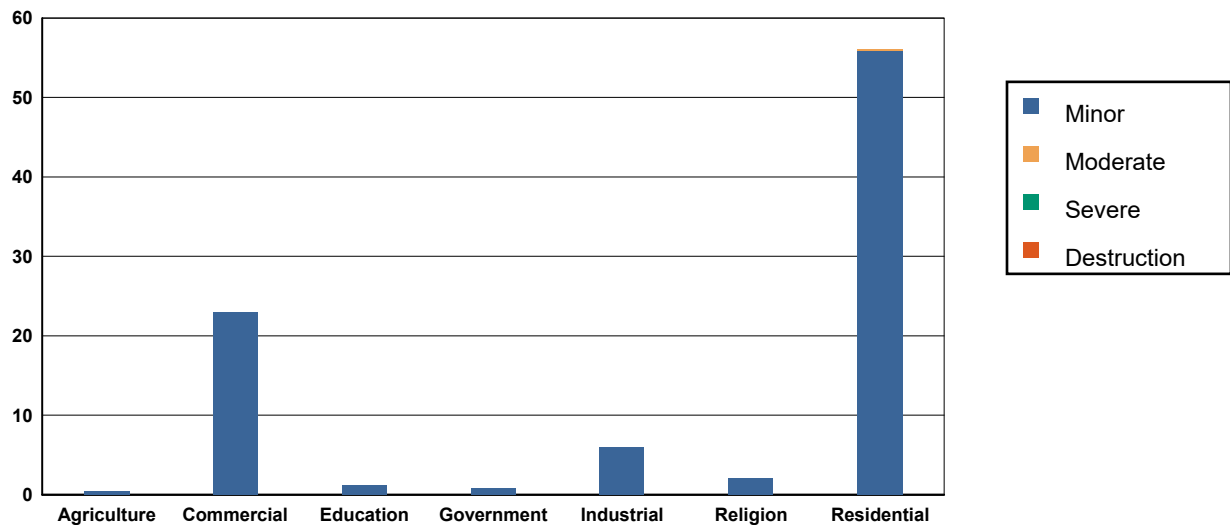


Table 2: Expected Building Damage by Occupancy : 50 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	294.55	99.85	0.45	0.15	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	10,231.00	99.78	23.00	0.22	0.00	0.00	0.00	0.00	0.00	0.00
Education	483.80	99.75	1.20	0.25	0.00	0.00	0.00	0.00	0.00	0.00
Government	301.22	99.74	0.78	0.26	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	2,396.96	99.75	6.04	0.25	0.00	0.00	0.00	0.00	0.00	0.00
Religion	1,186.94	99.83	2.06	0.17	0.00	0.00	0.00	0.00	0.00	0.00
Residential	134,247.95	99.96	55.89	0.04	0.15	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>149,142.41</b>		<b>89.44</b>		<b>0.15</b>		<b>0.00</b>		<b>0.00</b>	



**Table 3: Expected Building Damage by Building Type : 50 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,691	99.68	5	0.32	0	0.00	0	0.00	0	0.00
Masonry	40,604	99.85	61	0.15	0	0.00	0	0.00	0	0.00
MH	182	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	6,048	99.73	17	0.27	0	0.00	0	0.00	0	0.00
Wood	95,830	100.00	1	0.00	0	0.00	0	0.00	0	0.00



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### **Essential Facility Damage**

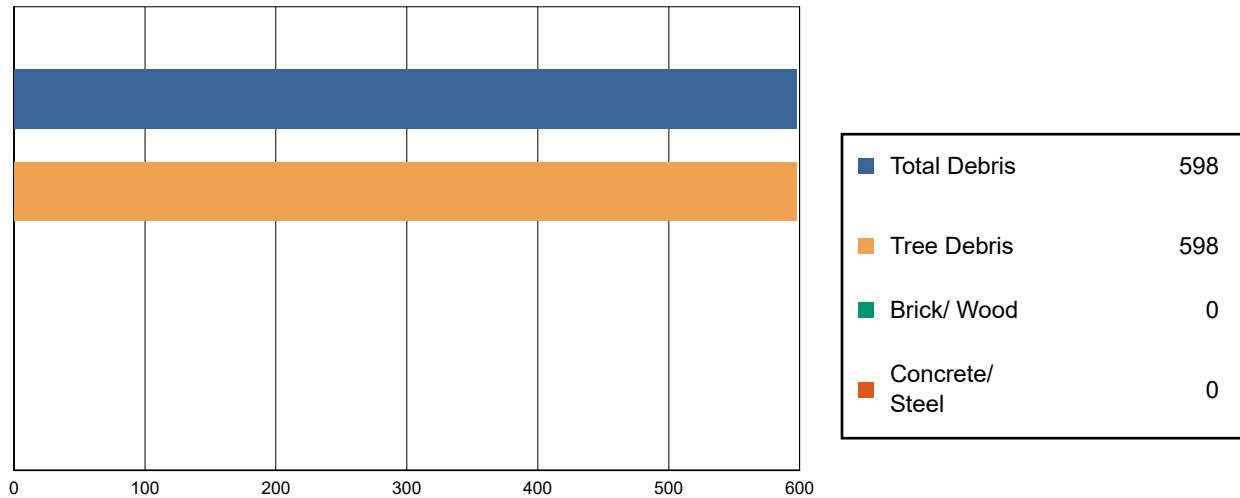
Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 607 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.



## Induced Hurricane Damage

### Debris Generation

**Estimated Debris (Tons)**

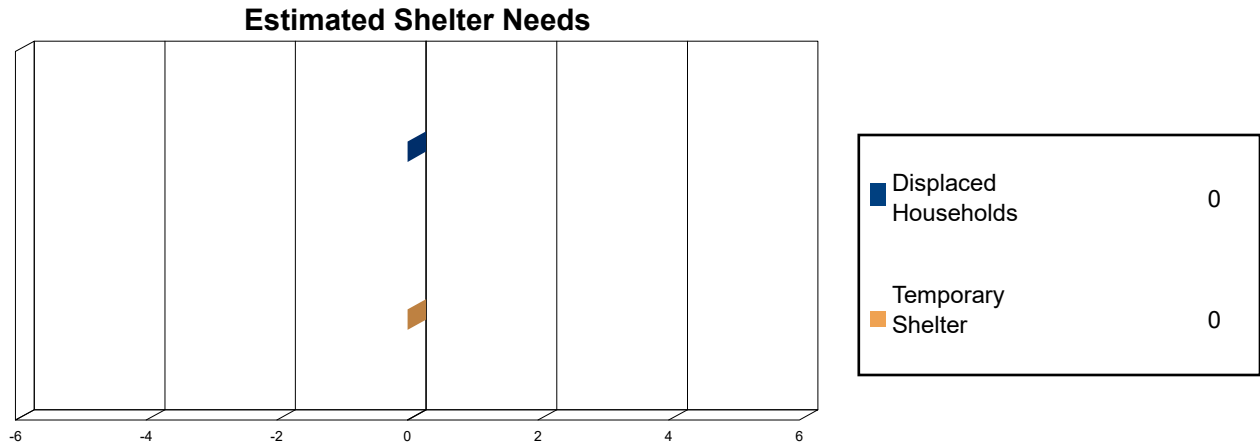


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 598 tons of debris will be generated. Of the total amount, 267 tons (45%) is Other Tree Debris. Of the remaining 331 tons, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 331 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 538,419) will seek temporary shelter in public shelters.





## Economic Loss

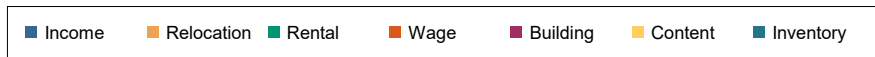
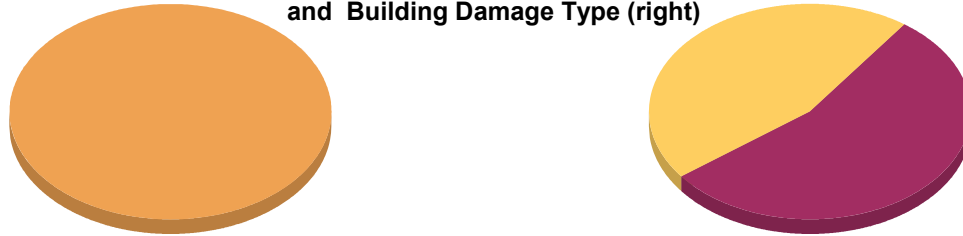
The total economic loss estimated for the hurricane is 2.0 million dollars, which represents 0.00 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 2 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 100% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy



Table 5: Building-Related Economic Loss Estimates  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	1,116.34	0.00	0.00	0.00	1,116.34
	Content	922.15	0.00	0.00	0.00	922.15
	Inventory	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>2,038.49</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>2,038.49</b>
<b>Business Interruption Loss</b>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.47	0.00	0.00	0.00	0.47
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>0.47</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.47</b>



FEMA

Total

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Total	2,038.96	0.00	0.00	0.00	2,038.96
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
<b>Maryland</b>				
Prince George's	538,419	53,046,000	13,343,913	66,389,913
<b>Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>
<b>Study Region Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>



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# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_north

**Hurricane Scenario:** Probabilistic 100-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 189.46 square miles and contains 131 census tracts. There are over 184 thousand households in the region and a total population of 538,419 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 149 thousand buildings in the region with a total building replacement value (excluding contents) of 66,390 million dollars (2014 dollars). Approximately 90% of the buildings (and 80% of the building value) are associated with residential housing.



## Building Inventory

### General Building Stock

Hazus estimates that there are 149,232 buildings in the region which have an aggregate total replacement value of 66,390 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

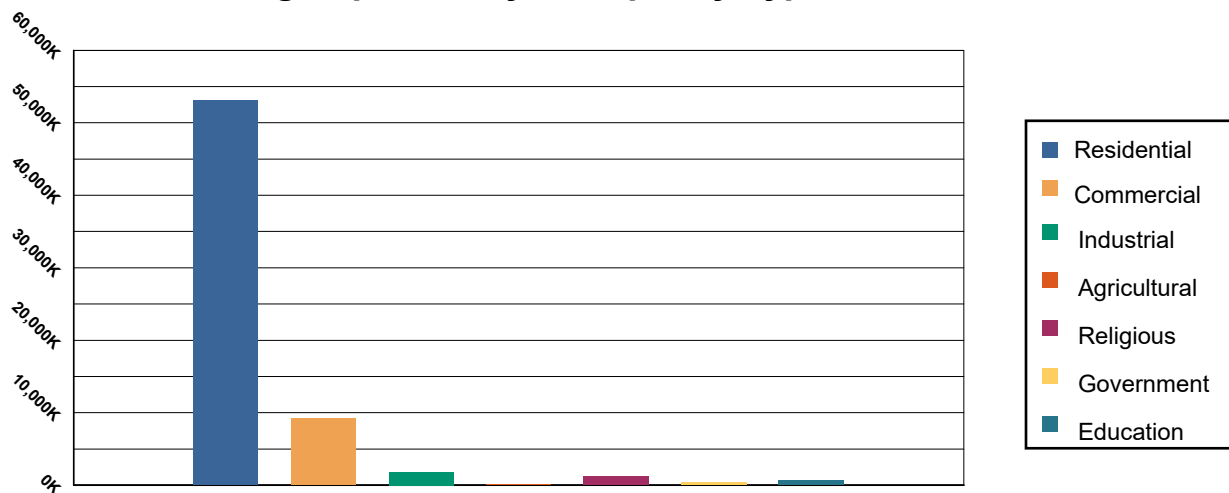


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	53,046,000	79.90%
Commercial	9,194,217	13.85%
Industrial	1,822,008	2.74%
Agricultural	86,197	0.13%
Religious	1,217,968	1.83%
Government	345,623	0.52%
Education	677,900	1.02%
<b>Total</b>	<b>66,389,913</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 607 beds. There are 201 schools, 28 fire stations, 30 police stations and 2 emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic

## Building Damage

### General Building Stock Damage

Hazus estimates that about 2 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

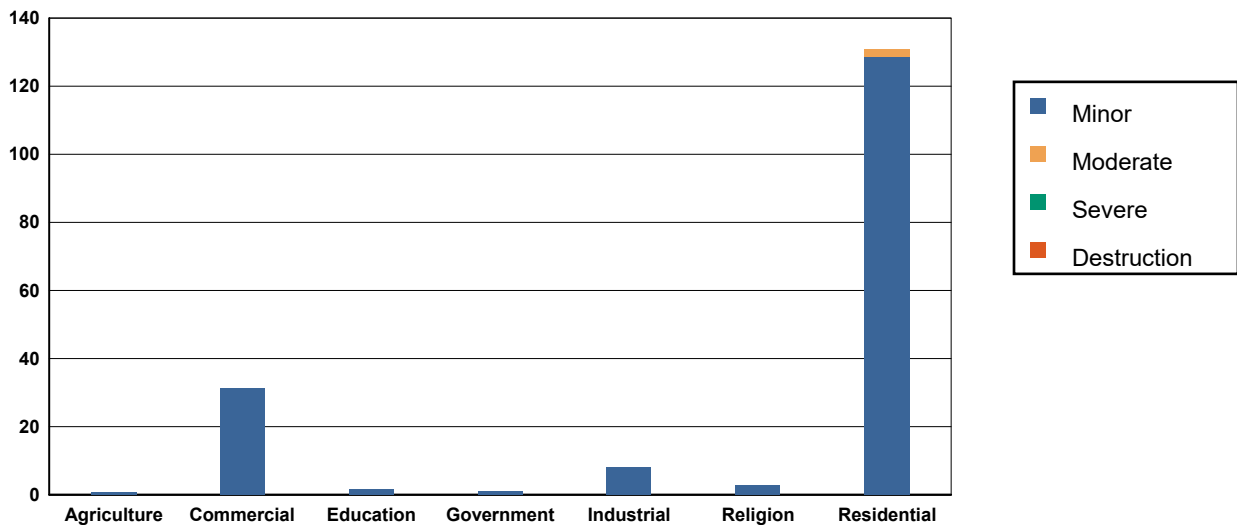


Table 2: Expected Building Damage by Occupancy : 100 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	294.30	99.76	0.70	0.24	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	10,222.85	99.70	31.13	0.30	0.02	0.00	0.00	0.00	0.00	0.00
Education	483.39	99.67	1.61	0.33	0.00	0.00	0.00	0.00	0.00	0.00
Government	300.98	99.66	1.02	0.34	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	2,394.87	99.66	8.13	0.34	0.00	0.00	0.00	0.00	0.00	0.00
Religion	1,186.16	99.76	2.84	0.24	0.00	0.00	0.00	0.00	0.00	0.00
Residential	134,173.13	99.90	128.49	0.10	2.38	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>149,055.70</b>		<b>173.90</b>		<b>2.40</b>		<b>0.00</b>		<b>0.00</b>	



**Table 3: Expected Building Damage by Building Type : 100 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,689	99.56	7	0.44	0	0.00	0	0.00	0	0.00
Masonry	40,558	99.74	104	0.26	2	0.01	0	0.00	0	0.00
MH	182	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	6,043	99.63	22	0.37	0	0.00	0	0.00	0	0.00
Wood	95,802	99.97	29	0.03	0	0.00	0	0.00	0	0.00



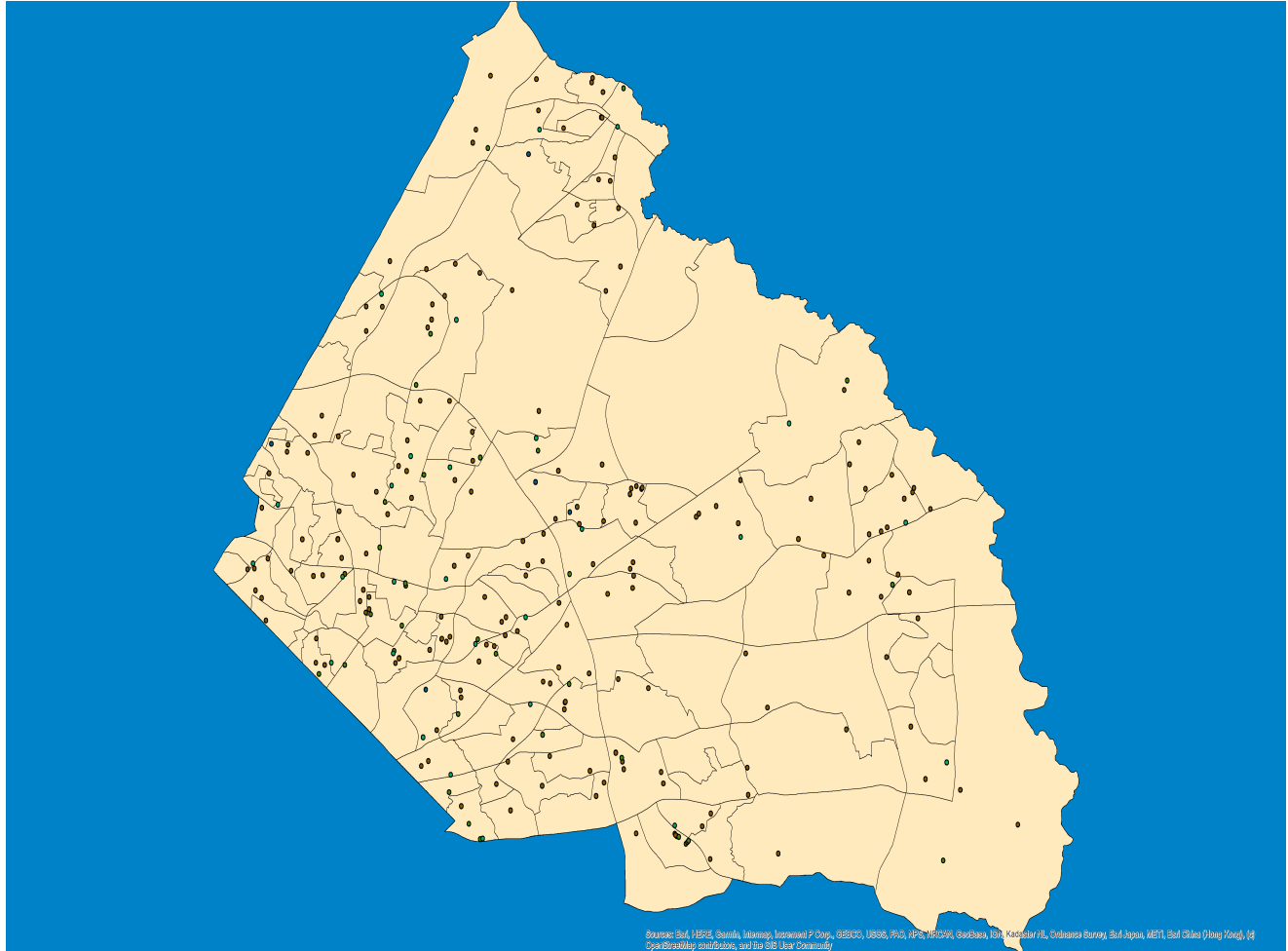
FEMA

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### **Essential Facility Damage**

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 607 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**

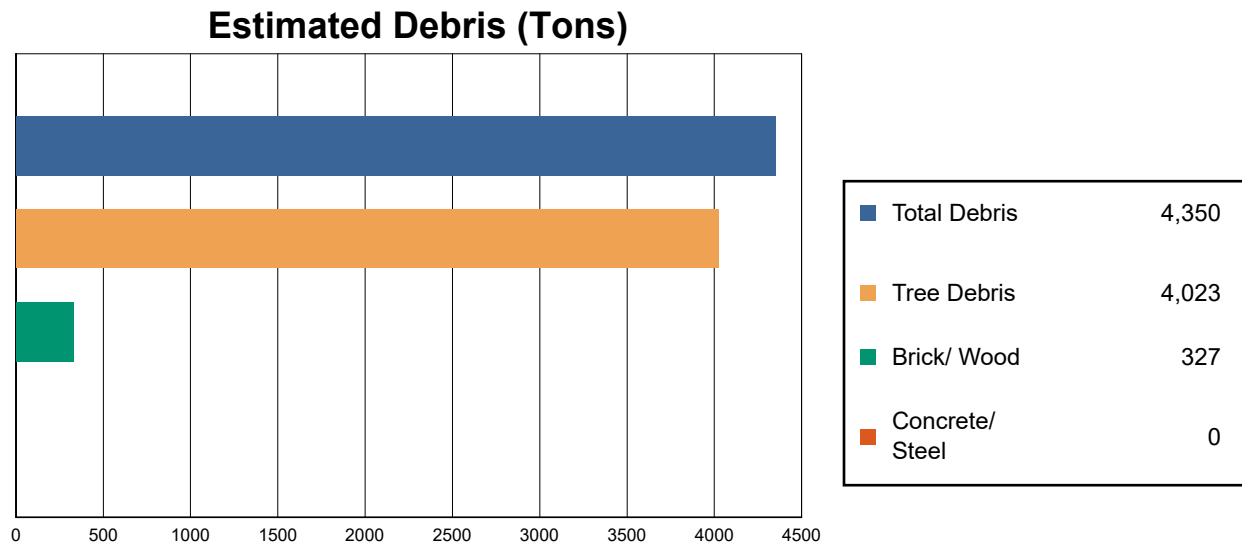


**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
EOCs	2	0	0	2
Fire Stations	28	0	0	28
Hospitals	5	0	0	5
Police Stations	30	0	0	30
Schools	201	0	0	201

## Induced Hurricane Damage

### Debris Generation

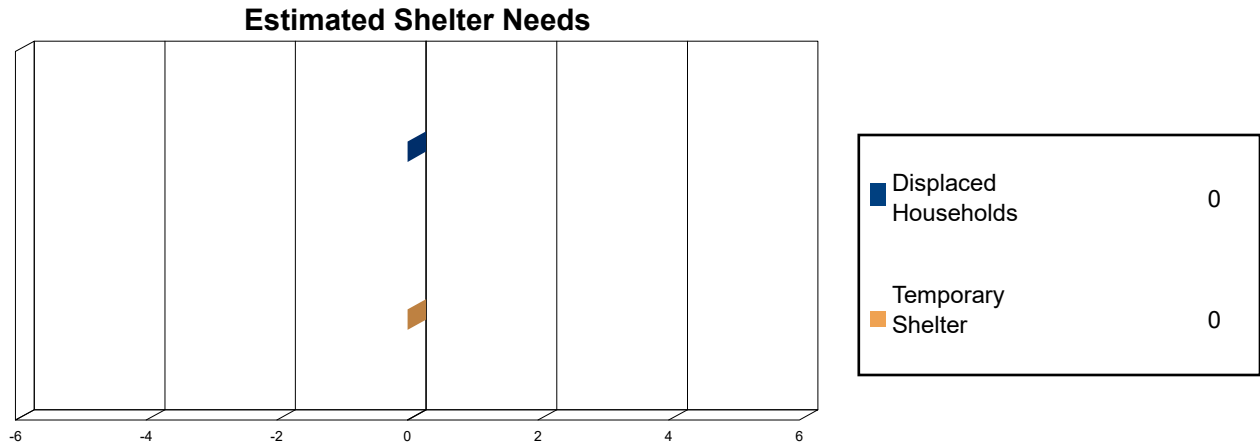


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 4,350 tons of debris will be generated. Of the total amount, 1,951 tons (45%) is Other Tree Debris. Of the remaining 2,399 tons, Brick/Wood comprises 14% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 13 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 2,072 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 538,419) will seek temporary shelter in public shelters.





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## Economic Loss

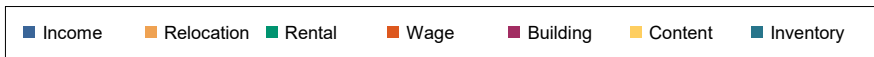
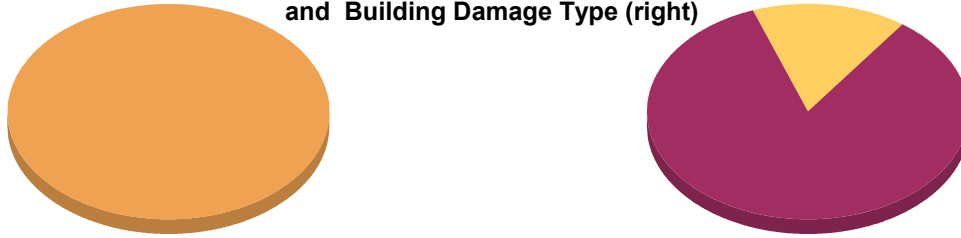
The total economic loss estimated for the hurricane is 24.4 million dollars, which represents 0.04 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 24 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 96% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy



Table 5: Building-Related Economic Loss Estimates  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	19,683.34	616.32	115.08	146.82	20,561.57
	Content	3,785.96	0.00	0.00	0.00	3,785.96
	Inventory	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>23,469.30</b>	<b>616.32</b>	<b>115.08</b>	<b>146.82</b>	<b>24,347.52</b>
<b>Business Interruption Loss</b>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	8.50	0.25	0.00	0.00	8.76
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>8.50</b>	<b>0.25</b>	<b>0.00</b>	<b>0.00</b>	<b>8.76</b>



FEMA

Total

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Total	23,477.81	616.58	115.08	146.82	24,356.29
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
<b>Maryland</b>				
Prince George's	538,419	53,046,000	13,343,913	66,389,913
<b>Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>
<b>Study Region Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>



**RiskMAP**  
Increasing Resilience Together

# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_north

**Hurricane Scenario:** Probabilistic 200-year Return Period

**Print Date:** Wednesday, November 30, 2022

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## General Description of the Region

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Note:

Appendix A contains a complete listing of the counties contained in the region .

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There are an estimated 149 thousand buildings in the region with a total building replacement value (excluding contents) of 66,390 million dollars (2014 dollars). Approximately 90% of the buildings (and 80% of the building value) are associated with residential housing.





## Building Inventory

### General Building Stock

Hazus estimates that there are 149,232 buildings in the region which have an aggregate total replacement value of 66,390 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

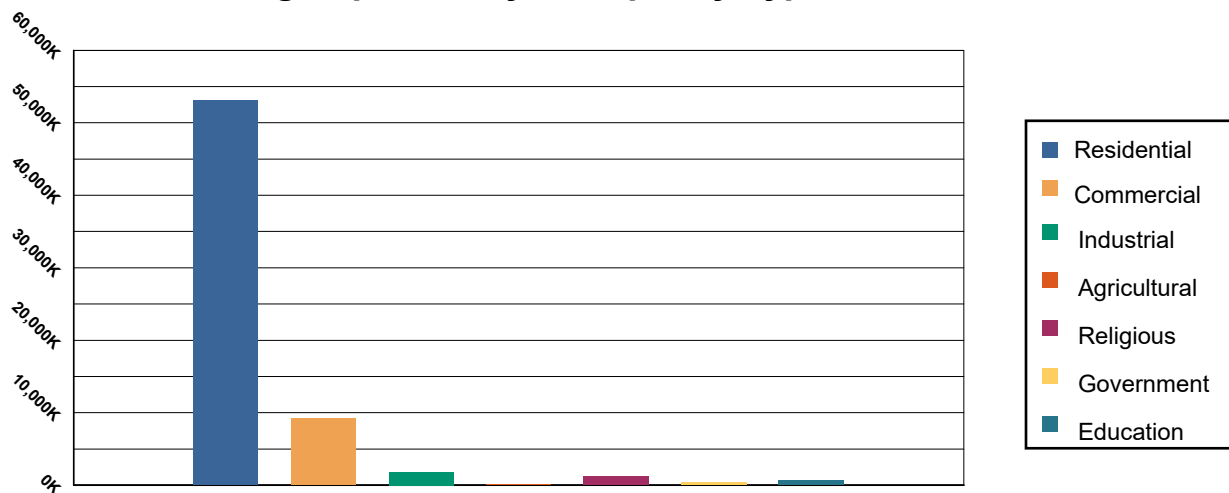


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	53,046,000	79.90%
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Agricultural	86,197	0.13%
Religious	1,217,968	1.83%
Government	345,623	0.52%
Education	677,900	1.02%
<b>Total</b>	<b>66,389,913</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 607 beds. There are 201 schools, 28 fire stations, 30 police stations and 2 emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

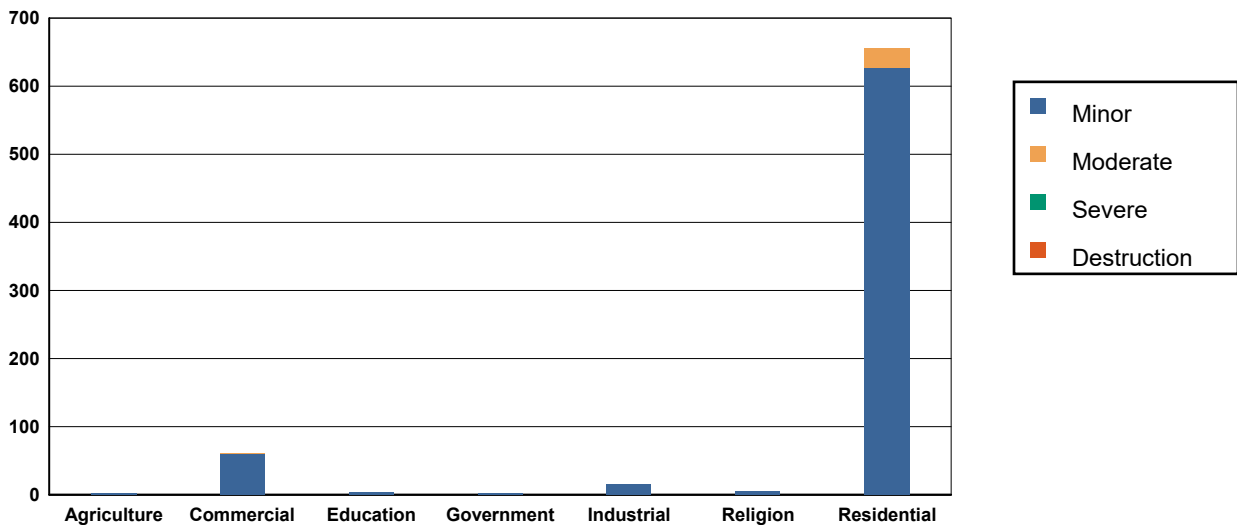
**Type:** Probabilistic

## Building Damage

### General Building Stock Damage

Hazus estimates that about 30 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy



**Table 2: Expected Building Damage by Occupancy : 200 - year Event**

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	293.44	99.47	1.51	0.51	0.05	0.02	0.01	0.00	0.00	0.00
Commercial	10,193.00	99.41	59.68	0.58	1.33	0.01	0.00	0.00	0.00	0.00
Education	482.05	99.39	2.95	0.61	0.00	0.00	0.00	0.00	0.00	0.00
Government	300.09	99.37	1.91	0.63	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	2,387.78	99.37	15.17	0.63	0.05	0.00	0.00	0.00	0.00	0.00
Religion	1,183.51	99.54	5.49	0.46	0.00	0.00	0.00	0.00	0.00	0.00
Residential	133,648.27	99.51	627.27	0.47	28.43	0.02	0.04	0.00	0.00	0.00
<b>Total</b>	<b>148,488.13</b>		<b>713.98</b>		<b>29.85</b>		<b>0.05</b>		<b>0.00</b>	



**Table 3: Expected Building Damage by Building Type : 200 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,682	99.15	14	0.84	0	0.00	0	0.00	0	0.00
Masonry	40,319	99.15	321	0.79	25	0.06	0	0.00	0	0.00
MH	182	99.99	0	0.00	0	0.01	0	0.00	0	0.00
Steel	6,023	99.30	42	0.68	1	0.01	0	0.00	0	0.00
Wood	95,535	99.69	293	0.31	2	0.00	0	0.00	0	0.00



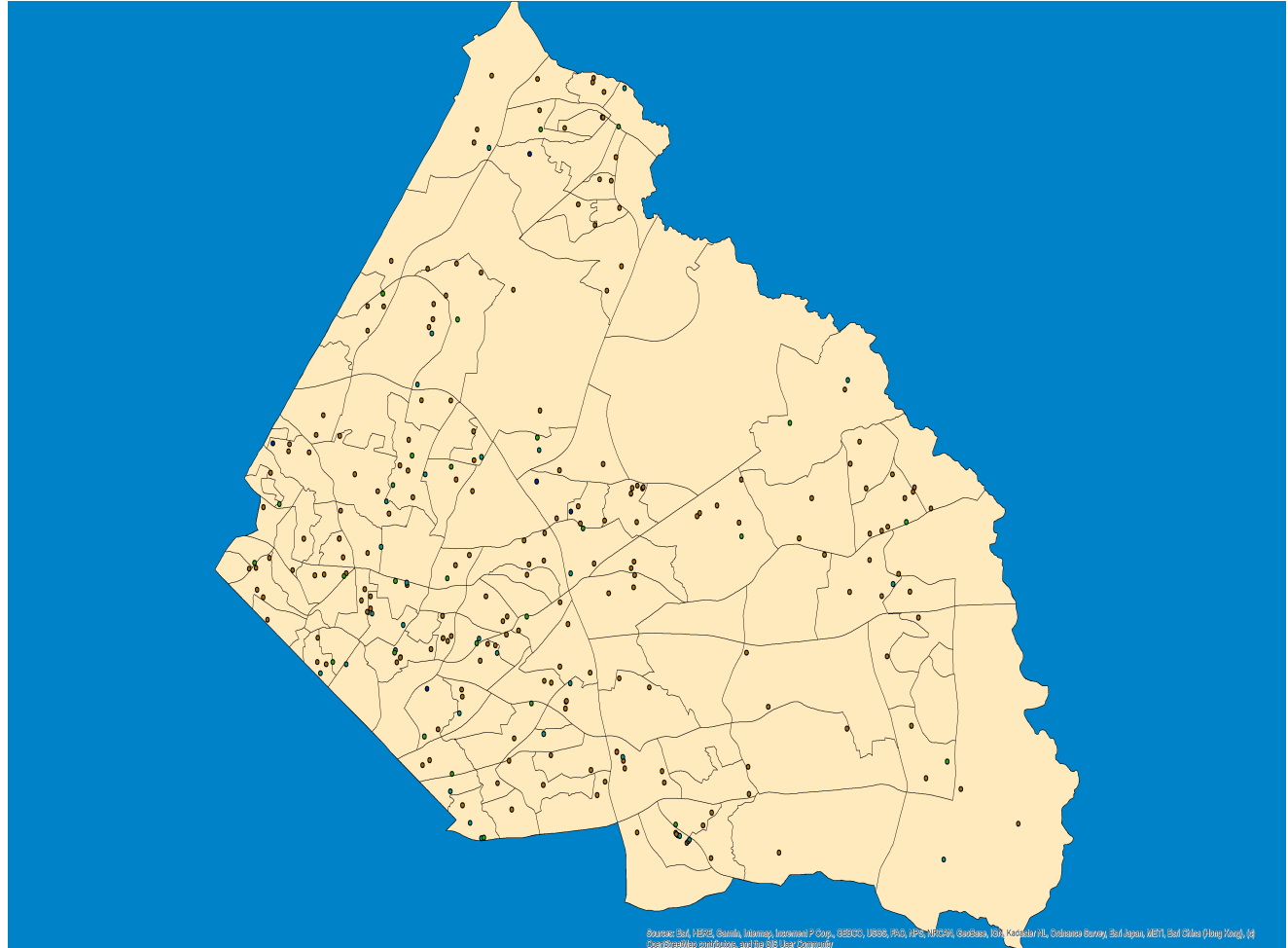
FEMA

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### **Essential Facility Damage**

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 607 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**



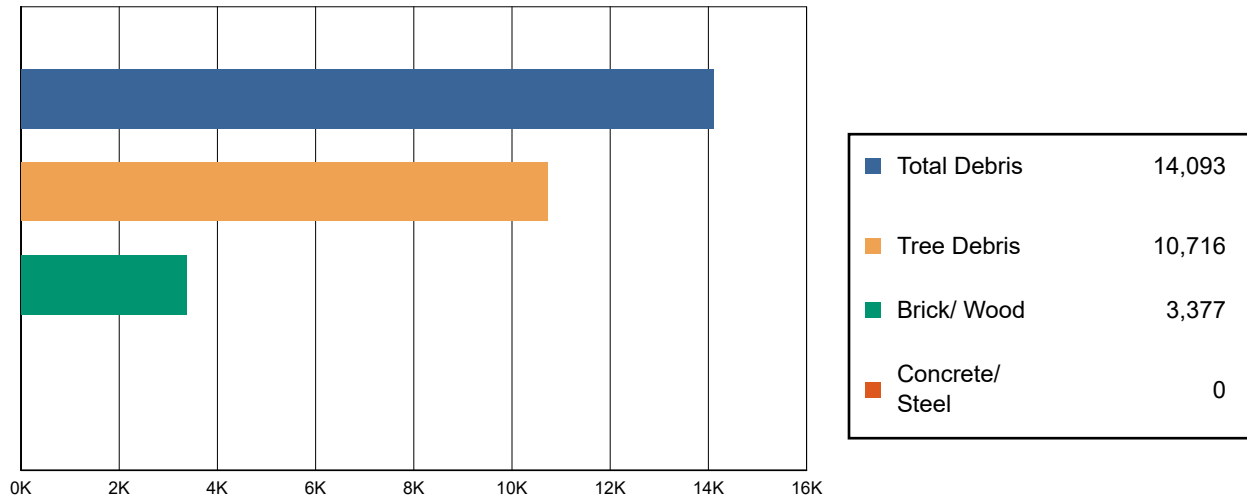
**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
EOCs	2	0	0	2
Fire Stations	28	0	0	28
Hospitals	5	0	0	5
Police Stations	30	0	0	30
Schools	201	0	0	201

## Induced Hurricane Damage

### Debris Generation

Estimated Debris (Tons)

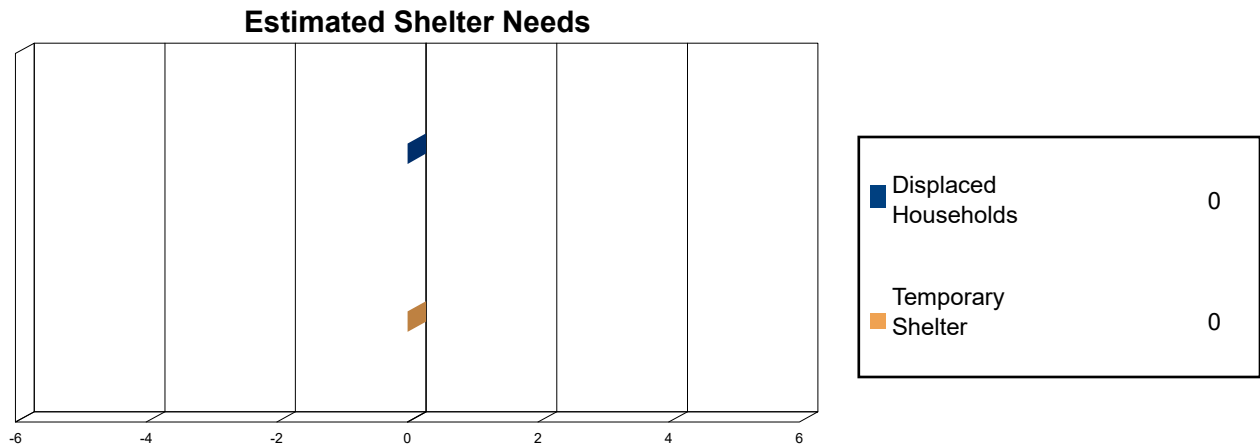


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 14,093 tons of debris will be generated. Of the total amount, 5,024 tons (36%) is Other Tree Debris. Of the remaining 9,069 tons, Brick/Wood comprises 37% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 135 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 5,692 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 538,419) will seek temporary shelter in public shelters.





## Economic Loss

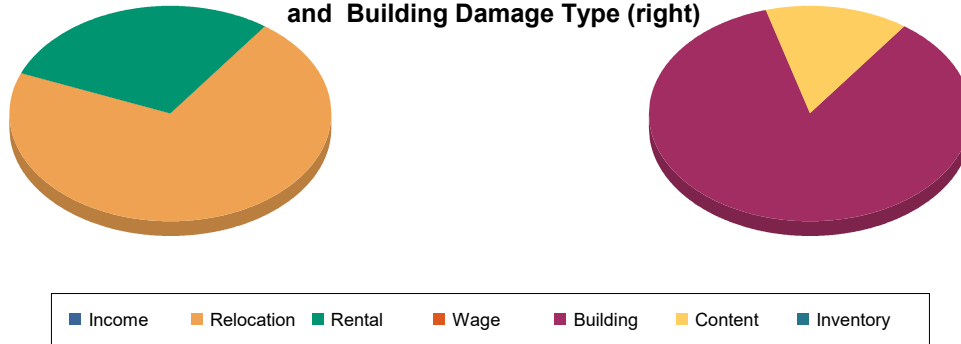
The total economic loss estimated for the hurricane is 72.8 million dollars, which represents 0.11 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 73 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 98% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

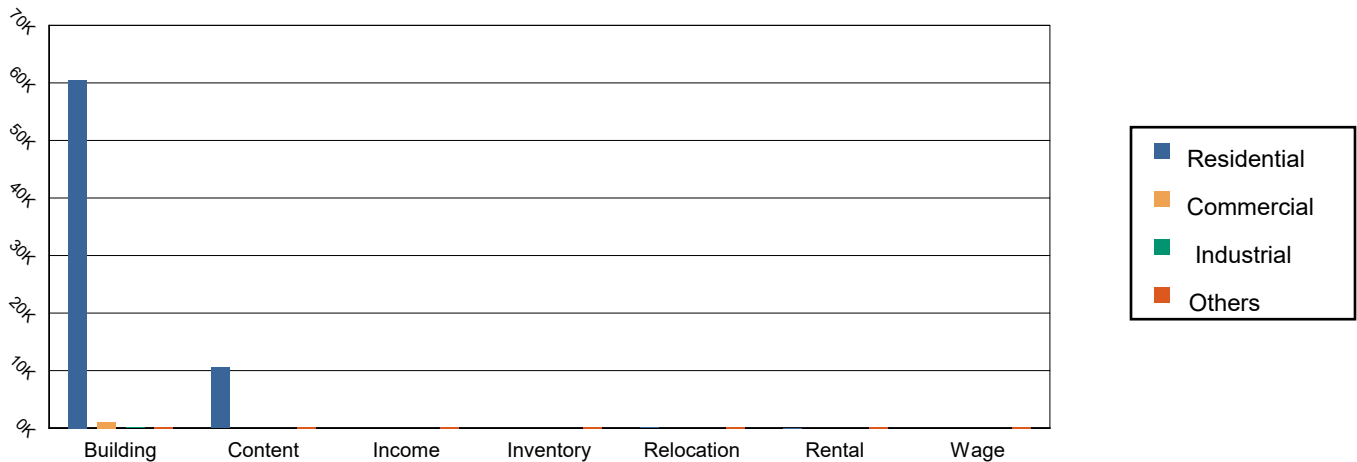


Table 5: Building-Related Economic Loss Estimates  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	60,503.07	1,074.25	201.68	257.44	62,036.44
	Content	10,529.01	0.00	0.00	0.00	10,529.01
	Inventory	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>71,032.08</b>	<b>1,074.25</b>	<b>201.68</b>	<b>257.44</b>	<b>72,565.45</b>
<b>Business Interruption Loss</b>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	140.19	11.69	0.01	0.12	152.00
	Rental	62.06	0.00	0.00	0.00	62.06
	Wage	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>202.25</b>	<b>11.69</b>	<b>0.01</b>	<b>0.12</b>	<b>214.06</b>



FEMA

Total

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Total	71,234.33	1,085.94	201.68	257.56	72,779.51
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		Total
		Residential	Non-Residential	
<b>Maryland</b>				
Prince George's	538,419	53,046,000	13,343,913	66,389,913
<b>Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>
<b>Study Region Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>



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**RiskMAP**  
Increasing Resilience Together

# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_north

**Hurricane Scenario:** Probabilistic 500-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 189.46 square miles and contains 131 census tracts. There are over 184 thousand households in the region and a total population of 538,419 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 149 thousand buildings in the region with a total building replacement value (excluding contents) of 66,390 million dollars (2014 dollars). Approximately 90% of the buildings (and 80% of the building value) are associated with residential housing.





## Building Inventory

### General Building Stock

Hazus estimates that there are 149,232 buildings in the region which have an aggregate total replacement value of 66,390 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

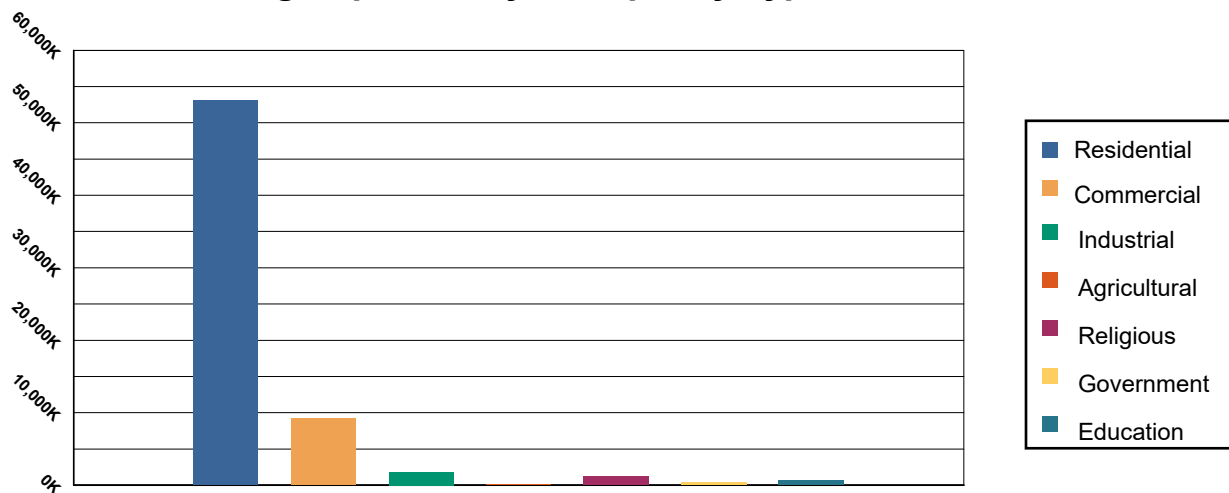


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	53,046,000	79.90%
Commercial	9,194,217	13.85%
Industrial	1,822,008	2.74%
Agricultural	86,197	0.13%
Religious	1,217,968	1.83%
Government	345,623	0.52%
Education	677,900	1.02%
<b>Total</b>	<b>66,389,913</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 607 beds. There are 201 schools, 28 fire stations, 30 police stations and 2 emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

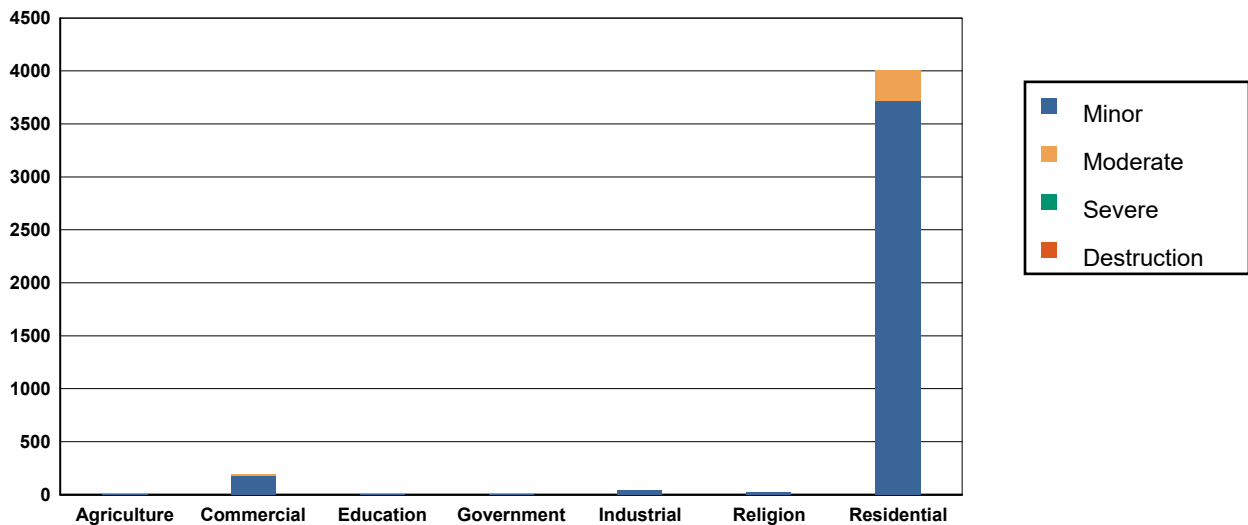
**Type:** Probabilistic

## Building Damage

### General Building Stock Damage

Hazus estimates that about 300 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy



**Table 2: Expected Building Damage by Occupancy : 500 - year Event**

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	288.65	97.85	5.60	1.90	0.57	0.19	0.17	0.06	0.01	0.00
Commercial	10,061.08	98.12	178.38	1.74	13.92	0.14	0.62	0.01	0.00	0.00
Education	476.46	98.24	8.38	1.73	0.16	0.03	0.00	0.00	0.00	0.00
Government	296.63	98.22	5.26	1.74	0.10	0.03	0.00	0.00	0.00	0.00
Industrial	2,358.71	98.16	42.53	1.77	1.52	0.06	0.22	0.01	0.02	0.00
Religion	1,169.45	98.36	19.21	1.62	0.33	0.03	0.00	0.00	0.00	0.00
Residential	130,303.16	97.02	3,718.03	2.77	282.39	0.21	0.40	0.00	0.02	0.00
<b>Total</b>	<b>144,954.15</b>		<b>3,977.40</b>		<b>298.99</b>		<b>1.41</b>		<b>0.05</b>	



**Table 3: Expected Building Damage by Building Type : 500 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,657	97.68	38	2.26	1	0.06	0	0.00	0	0.00
Masonry	39,120	96.20	1,335	3.28	210	0.52	1	0.00	0	0.00
MH	182	99.80	0	0.16	0	0.03	0	0.00	0	0.01
Steel	5,946	98.04	110	1.82	8	0.14	1	0.01	0	0.00
Wood	93,453	97.52	2,317	2.42	62	0.06	0	0.00	0	0.00



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### **Essential Facility Damage**

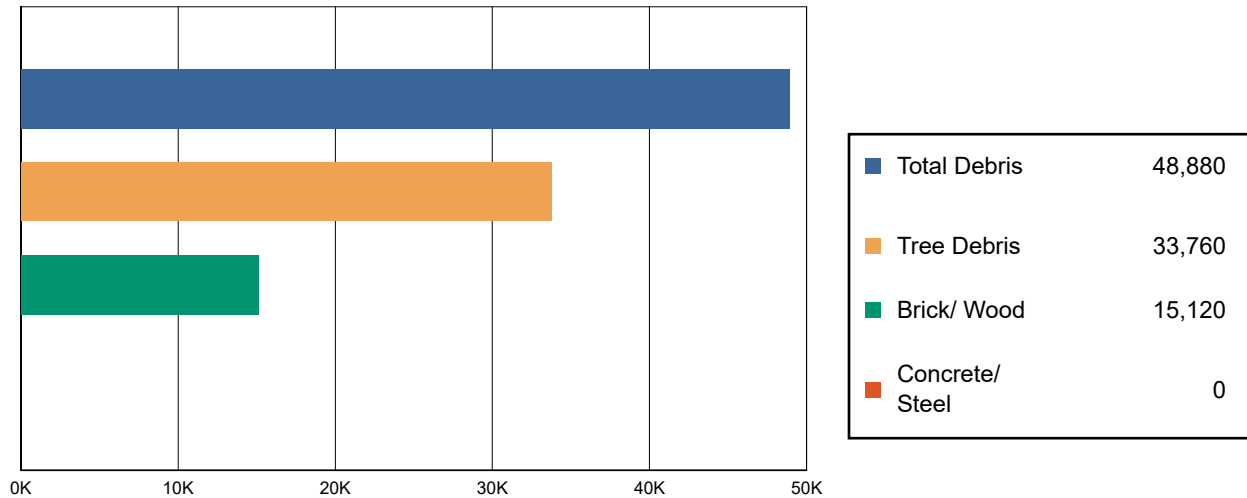
Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 607 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.



## Induced Hurricane Damage

### Debris Generation

Estimated Debris (Tons)

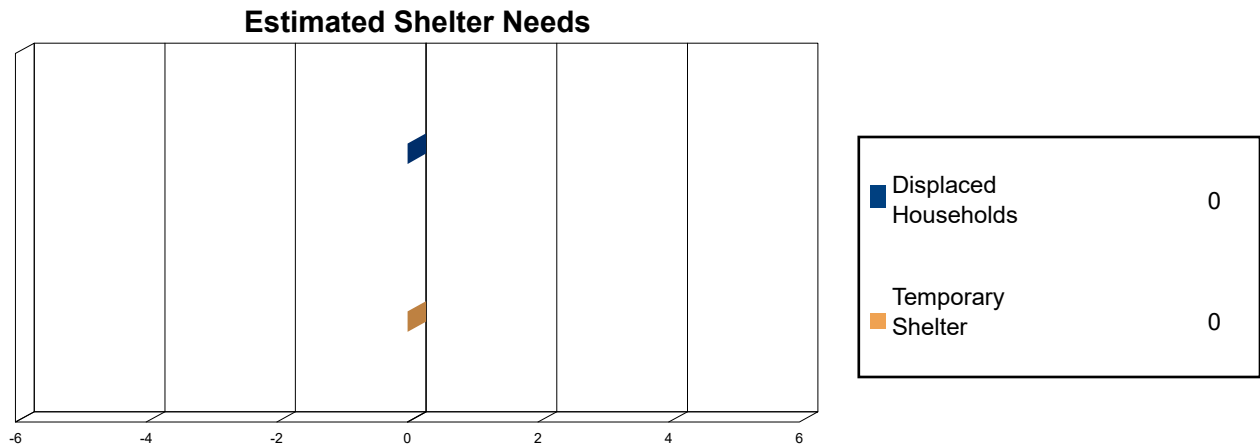


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 48,880 tons of debris will be generated. Of the total amount, 15,248 tons (31%) is Other Tree Debris. Of the remaining 33,632 tons, Brick/Wood comprises 45% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 605 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 18,512 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 538,419) will seek temporary shelter in public shelters.





## Economic Loss

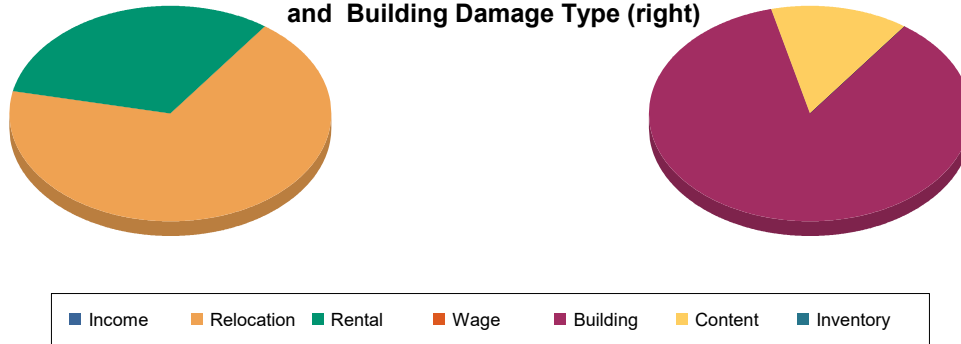
The total economic loss estimated for the hurricane is 223.4 million dollars, which represents 0.34 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 223 million dollars. 4% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 98% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

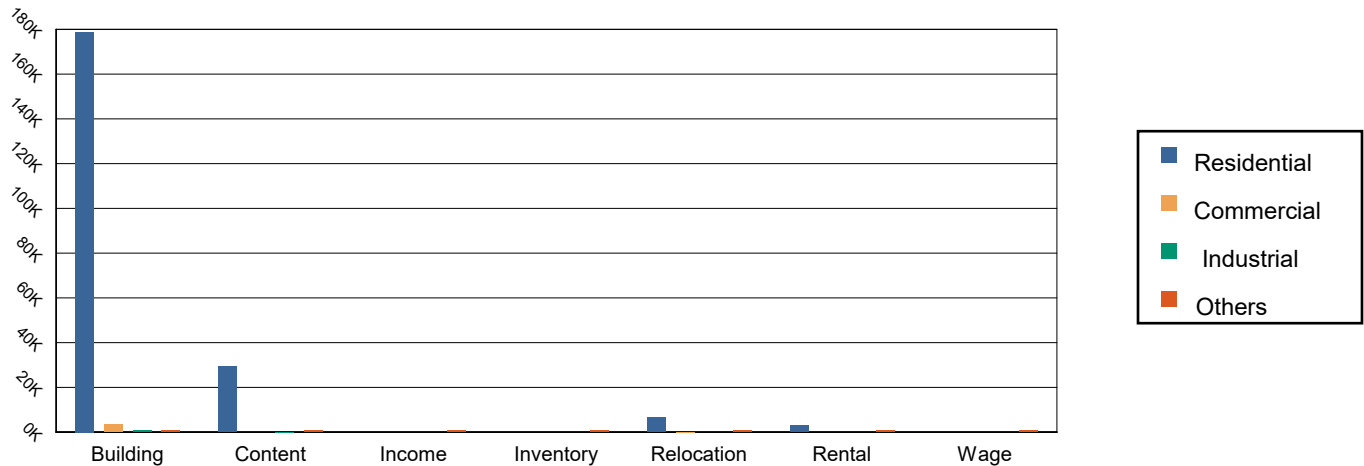


Table 5: Building-Related Economic Loss Estimates  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	178,809.96	3,599.80	706.96	831.99	183,948.72
	Content	29,506.69	68.94	102.79	11.64	29,690.06
	Inventory	0.00	4.99	20.64	1.30	26.93
	<b>Subtotal</b>	<b>208,316.65</b>	<b>3,673.73</b>	<b>830.39</b>	<b>844.94</b>	<b>213,665.70</b>
<b>Business Interruption Loss</b>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	6,469.02	126.73	6.37	6.06	6,608.18
	Rental	3,080.87	0.00	0.00	0.00	3,080.87
	Wage	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>9,549.88</b>	<b>126.73</b>	<b>6.37</b>	<b>6.06</b>	<b>9,689.05</b>



FEMA

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Total

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Total	217,866.53	3,800.46	836.76	851.00	223,354.75
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		
		Residential	Non-Residential	Total
<b>Maryland</b>				
Prince George's	538,419	53,046,000	13,343,913	66,389,913
<b>Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>
<b>Study Region Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>



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# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_north

**Hurricane Scenario:** Probabilistic 1000-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

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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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 189.46 square miles and contains 131 census tracts. There are over 184 thousand households in the region and a total population of 538,419 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 149 thousand buildings in the region with a total building replacement value (excluding contents) of 66,390 million dollars (2014 dollars). Approximately 90% of the buildings (and 80% of the building value) are associated with residential housing.





## Building Inventory

### General Building Stock

Hazus estimates that there are 149,232 buildings in the region which have an aggregate total replacement value of 66,390 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

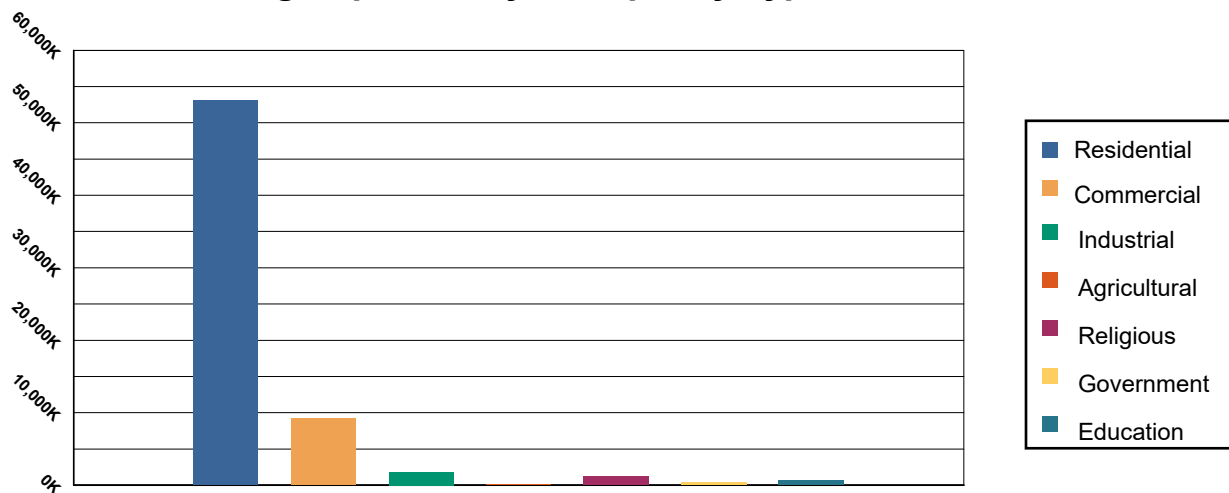


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	53,046,000	79.90%
Commercial	9,194,217	13.85%
Industrial	1,822,008	2.74%
Agricultural	86,197	0.13%
Religious	1,217,968	1.83%
Government	345,623	0.52%
Education	677,900	1.02%
<b>Total</b>	<b>66,389,913</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 5 hospitals in the region with a total bed capacity of 607 beds. There are 201 schools, 28 fire stations, 30 police stations and 2 emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic

## Building Damage

### General Building Stock Damage

Hazus estimates that about 952 buildings will be at least moderately damaged. This is over 1% of the total number of buildings in the region. There are an estimated 7 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

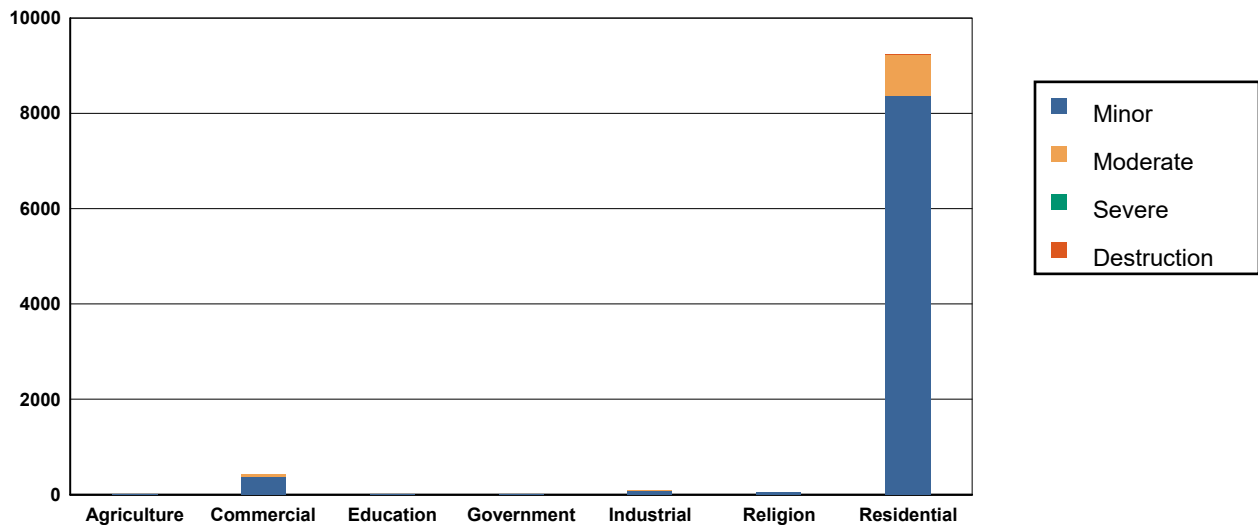


Table 2: Expected Building Damage by Occupancy : 1000 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	280.76	95.17	11.76	3.99	1.76	0.60	0.69	0.23	0.04	0.01
Commercial	9,826.20	95.83	378.01	3.69	45.95	0.45	3.83	0.04	0.00	0.00
Education	466.28	96.14	17.68	3.65	1.03	0.21	0.01	0.00	0.00	0.00
Government	290.35	96.14	10.97	3.63	0.67	0.22	0.01	0.00	0.00	0.00
Industrial	2,306.91	96.00	87.03	3.62	7.75	0.32	1.26	0.05	0.05	0.00
Religion	1,141.61	96.01	45.19	3.80	2.20	0.19	0.01	0.00	0.00	0.00
Residential	125,060.75	93.12	8,356.51	6.22	877.49	0.65	2.47	0.00	6.79	0.01
<b>Total</b>	<b>139,372.85</b>		<b>8,907.15</b>		<b>936.85</b>		<b>8.27</b>		<b>6.88</b>	



**Table 3: Expected Building Damage by Building Type : 1000 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,615	95.21	75	4.44	6	0.36	0	0.00	0	0.00
Masonry	37,387	91.94	2,699	6.64	575	1.41	3	0.01	1	0.00
MH	181	99.20	1	0.59	0	0.16	0	0.00	0	0.06
Steel	5,814	95.86	218	3.60	30	0.49	3	0.05	0	0.00
Wood	89,996	93.91	5,565	5.81	265	0.28	1	0.00	4	0.00



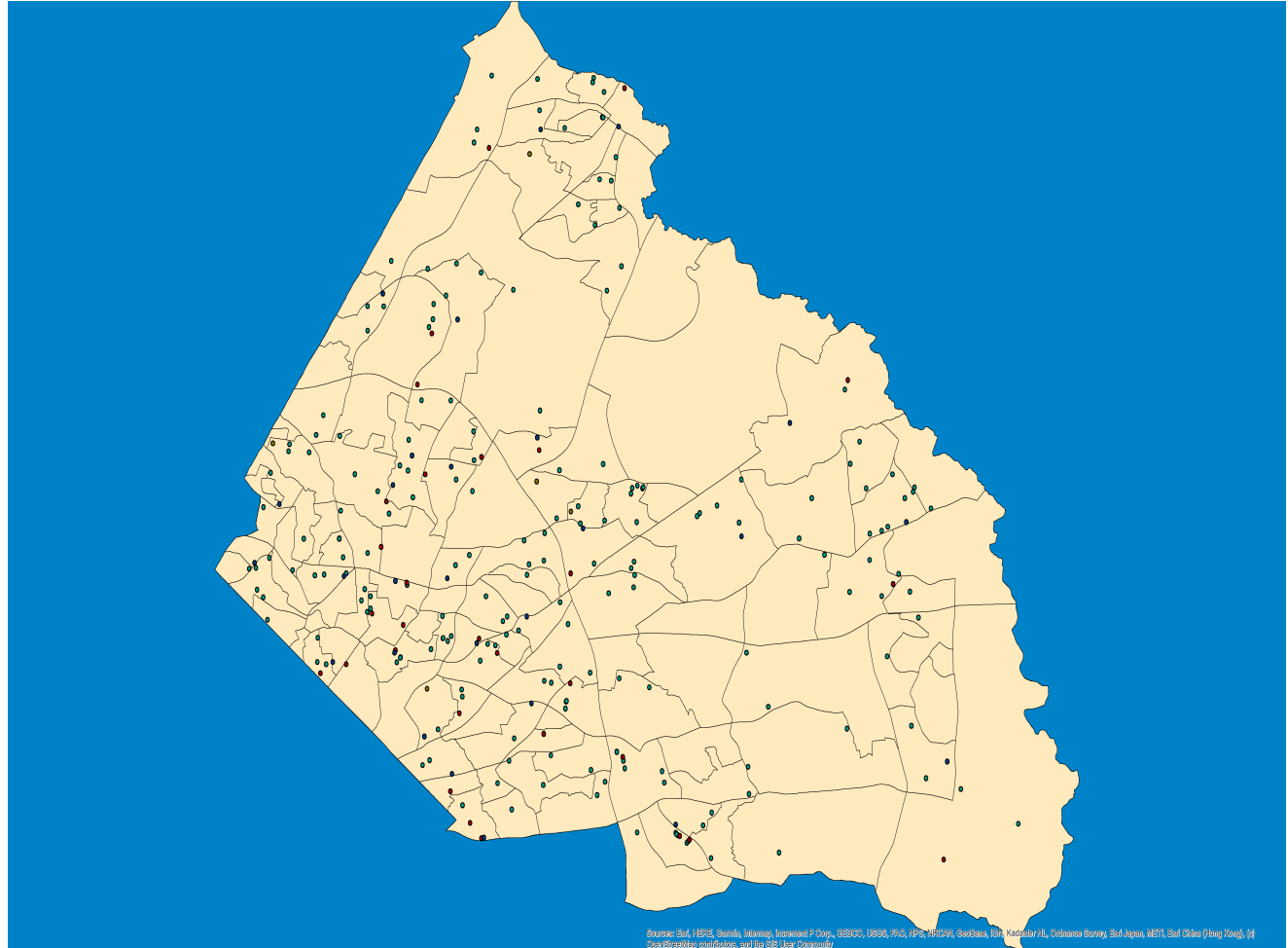
FEMA

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### **Essential Facility Damage**

Before the hurricane, the region had no hospital beds available for use. On the day of the hurricane, the model estimates that 607 hospital beds (0%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, none of the beds will be in service. By 30 days, none will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**



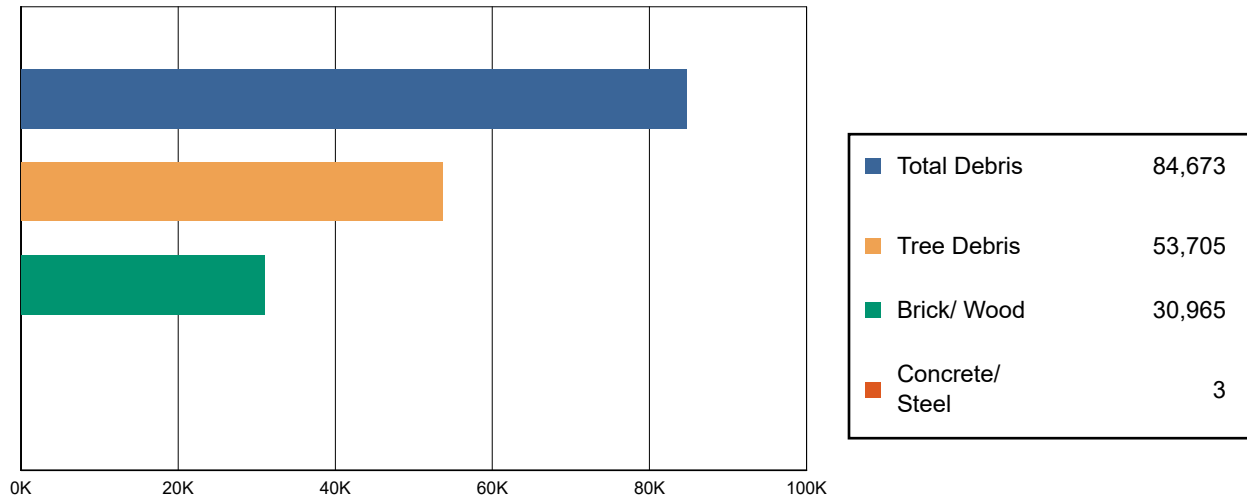
**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
EOCs	2	0	0	2
Fire Stations	28	0	0	28
Hospitals	5	0	0	5
Police Stations	30	0	0	30
Schools	201	0	0	201

## Induced Hurricane Damage

### Debris Generation

Estimated Debris (Tons)

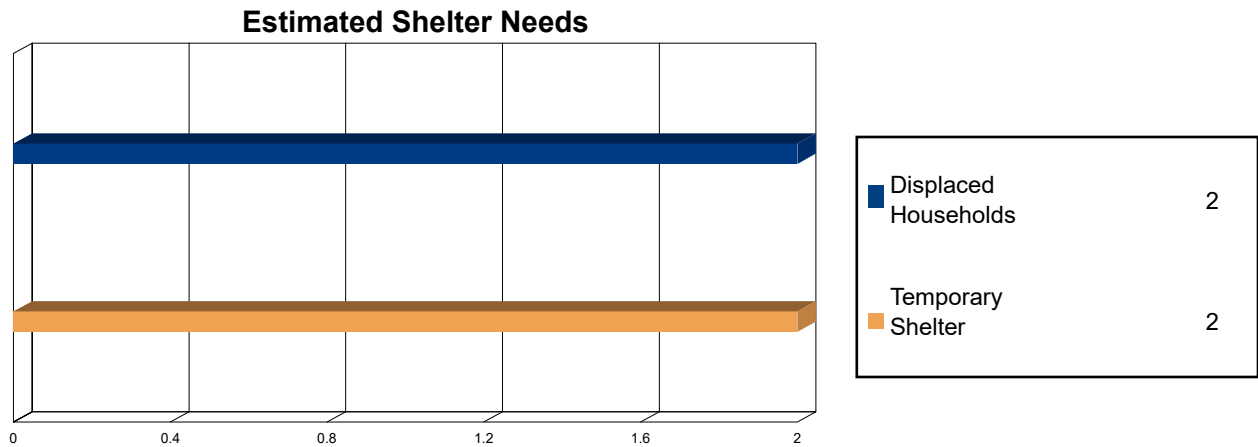


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 84,673 tons of debris will be generated. Of the total amount, 23,861 tons (28%) is Other Tree Debris. Of the remaining 60,812 tons, Brick/Wood comprises 51% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 1239 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 29,844 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 2 households to be displaced due to the hurricane. Of these, 2 people (out of a total population of 538,419) will seek temporary shelter in public shelters.





## Economic Loss

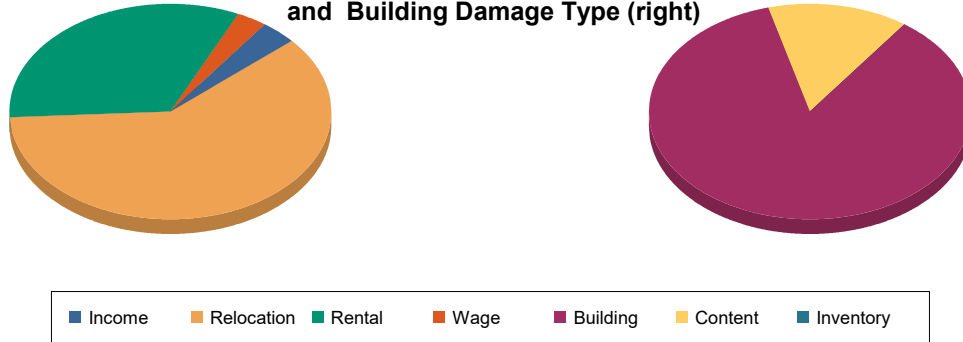
The total economic loss estimated for the hurricane is 379.6 million dollars, which represents 0.57 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 380 million dollars. 5% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 95% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

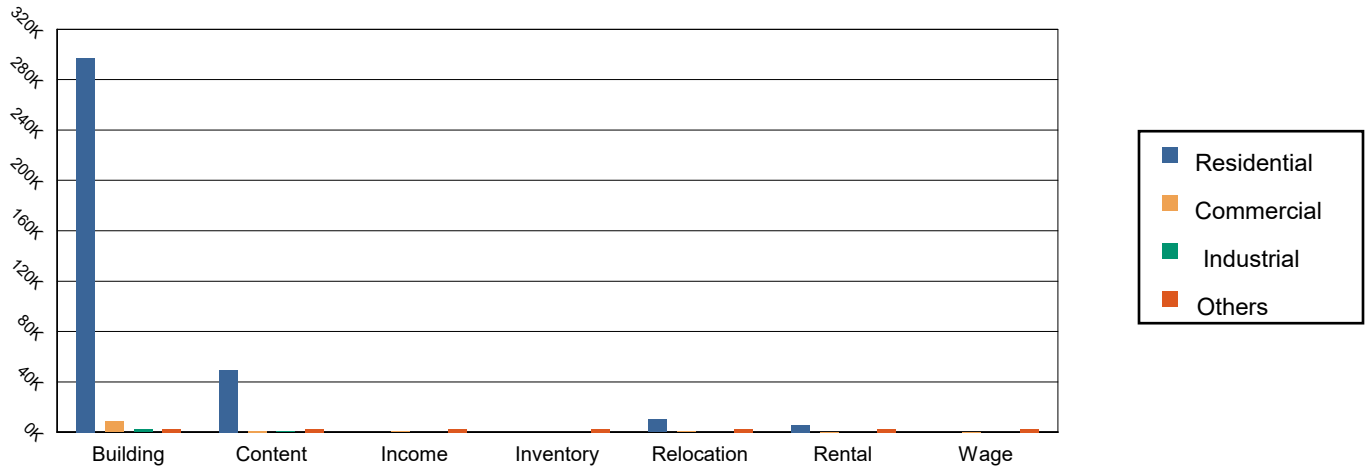


Table 5: Building-Related Economic Loss Estimates  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	297,197.31	8,317.82	2,055.21	2,059.25	309,629.59
	Content	49,235.88	980.65	807.57	189.03	51,213.13
	Inventory	0.00	33.29	144.73	5.14	183.16
	<b>Subtotal</b>	<b>346,433.19</b>	<b>9,331.77</b>	<b>3,007.51</b>	<b>2,253.42</b>	<b>361,025.88</b>
<b>Business Interruption Loss</b>						
	Income	0.00	590.11	10.23	75.09	675.42
	Relocation	10,329.56	799.87	61.70	92.89	11,284.03
	Rental	5,750.67	308.32	7.27	5.74	6,072.00
	Wage	0.00	300.80	14.90	269.88	585.58
	<b>Subtotal</b>	<b>16,080.23</b>	<b>1,999.10</b>	<b>94.10</b>	<b>443.61</b>	<b>18,617.03</b>



FEMA

Total

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Total	362,513.42	11,330.87	3,101.61	2,697.02	379,642.91
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		Total
		Residential	Non-Residential	
<b>Maryland</b>				
Prince George's	538,419	53,046,000	13,343,913	66,389,913
<b>Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>
<b>Study Region Total</b>	<b>538,419</b>	<b>53,046,000</b>	<b>13,343,913</b>	<b>66,389,913</b>



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**Debris Summary Report: 10 - year Event**

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November 30, 2022

All values are in tons.

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	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

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**Debris Summary Report: 20 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Debris Summary Report: 50 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	0	0	321	1,420	1,741
<b>Total</b>	<b>0</b>	<b>0</b>	<b>321</b>	<b>1,420</b>	<b>1,741</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>	<b>321</b>	<b>1,420</b>	<b>1,741</b>





**Debris Summary Report: 100 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	343	0	1,906	9,084	11,333
<b>Total</b>	<b>343</b>	<b>0</b>	<b>1,906</b>	<b>9,084</b>	<b>11,333</b>
<b>Study Region Total</b>	<b>343</b>	<b>0</b>	<b>1,906</b>	<b>9,084</b>	<b>11,333</b>



**Debris Summary Report: 200 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	2,587	0	4,411	10,017	17,015
<b>Total</b>	<b>2,587</b>	<b>0</b>	<b>4,411</b>	<b>10,017</b>	<b>17,015</b>
<b>Study Region Total</b>	<b>2,587</b>	<b>0</b>	<b>4,411</b>	<b>10,017</b>	<b>17,015</b>



**Debris Summary Report: 500 - year Event**

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	10,375	0	17,725	52,185	80,285
<b>Total</b>	<b>10,375</b>	<b>0</b>	<b>17,725</b>	<b>52,185</b>	<b>80,285</b>
<b>Study Region Total</b>	<b>10,375</b>	<b>0</b>	<b>17,725</b>	<b>52,185</b>	<b>80,285</b>

## Debris Summary Report: 1000 - year Event

November 30, 2022

All values are in tons.

	Brick, Wood and Other	Reinf. Concrete and Steel	Eligible Tree Debris	Other Tree Debris	Total
<b>Maryland</b>					
Prince George's	20,579	0	27,203	65,730	113,512
<b>Total</b>	<b>20,579</b>	<b>0</b>	<b>27,203</b>	<b>65,730</b>	<b>113,512</b>
<b>Study Region Total</b>	<b>20,579</b>	<b>0</b>	<b>27,203</b>	<b>65,730</b>	<b>113,512</b>

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.



**Direct Economic Losses For Buildings: Annualized Losses**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	1,178	243	0	0.00	49	3	4	19	1,497
<b>Total</b>	<b>1,178</b>	<b>243</b>	<b>0</b>	<b>0.00</b>	<b>49</b>	<b>3</b>	<b>4</b>	<b>19</b>	<b>1,497</b>
<b>Study Region Total</b>	<b>1,178</b>	<b>243</b>	<b>0</b>	<b>0.00</b>	<b>49</b>	<b>3</b>	<b>4</b>	<b>19</b>	<b>1,497</b>

**Direct Economic Losses For Buildings: 10 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	0	0	0	0.00	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Direct Economic Losses For Buildings: 20 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	0	0	0	0.00	0	0	0	0	0
<b>Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Direct Economic Losses For Buildings: 50 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	1,754	777	0	0.00	0	0	0	0	2,531
<b>Total</b>	<b>1,754</b>	<b>777</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,531</b>
<b>Study Region Total</b>	<b>1,754</b>	<b>777</b>	<b>0</b>	<b>0.00</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>2,531</b>



**Direct Economic Losses For Buildings: 100 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	15,997	2,828	0	0.04	13	0	0	3	18,841
<b>Total</b>	<b>15,997</b>	<b>2,828</b>	<b>0</b>	<b>0.04</b>	<b>13</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>18,841</b>
<b>Study Region Total</b>	<b>15,997</b>	<b>2,828</b>	<b>0</b>	<b>0.04</b>	<b>13</b>	<b>0</b>	<b>0</b>	<b>3</b>	<b>18,841</b>

**Direct Economic Losses For Buildings: 200 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	49,854	8,108	0	0.12	123	0	0	77	58,162
<b>Total</b>	<b>49,854</b>	<b>8,108</b>	<b>0</b>	<b>0.12</b>	<b>123</b>	<b>0</b>	<b>0</b>	<b>77</b>	<b>58,162</b>
<b>Study Region Total</b>	<b>49,854</b>	<b>8,108</b>	<b>0</b>	<b>0.12</b>	<b>123</b>	<b>0</b>	<b>0</b>	<b>77</b>	<b>58,162</b>

**Direct Economic Losses For Buildings: 500 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	139,729	21,313	9	0.32	4,516	15	5	1,883	167,470
<b>Total</b>	<b>139,729</b>	<b>21,313</b>	<b>9</b>	<b>0.32</b>	<b>4,516</b>	<b>15</b>	<b>5</b>	<b>1,883</b>	<b>167,470</b>
<b>Study Region Total</b>	<b>139,729</b>	<b>21,313</b>	<b>9</b>	<b>0.32</b>	<b>4,516</b>	<b>15</b>	<b>5</b>	<b>1,883</b>	<b>167,470</b>



**Direct Economic Losses For Buildings: 1000 - year Event**

November 30, 2022

All values are in thousands of dollars

	Capital Stock Losses				Income Losses				Total Loss
	Cost Building Damage	Cost Contents Damage	Inventory Loss	Loss Ratio %	Relocation Loss	Capital Related Loss	Wages Losses	Rental Income Loss	
<b>Maryland</b>									
Prince George's	227,035	35,199	45	0.53	7,166	309	112	3,378	273,243
<b>Total</b>	<b>227,035</b>	<b>35,199</b>	<b>45</b>	<b>0.53</b>	<b>7,166</b>	<b>309</b>	<b>112</b>	<b>3,378</b>	<b>273,243</b>
<b>Study Region Total</b>	<b>227,035</b>	<b>35,199</b>	<b>45</b>	<b>0.53</b>	<b>7,166</b>	<b>309</b>	<b>112</b>	<b>3,378</b>	<b>273,243</b>

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

Study Region : pg\_Hur\_prob\_south  
 Scenario : Probabilistic



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**Shelter Summary Report: 10 - year Event**

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**RiskMAP**  
Increasing Resilience Together

November 30, 2022

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	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>



Shelter Summary Report: 20 - year Event



November 30, 2022

	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>



**Shelter Summary Report: 50 - year Event**



November 30, 2022

	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>



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**Shelter Summary Report: 100 - year Event**

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**RiskMAP**  
Increasing Resilience Together

November 30, 2022

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	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>





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**Shelter Summary Report: 200 - year Event**

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November 30, 2022

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	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>



**Shelter Summary Report: 500 - year Event**



November 30, 2022

	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>



Shelter Summary Report: 1000 - year Event



November 30, 2022

	# of Displaced Households	# of People Needing Short Term Shelter
Maryland		
Prince George's	0	0
<b>Total</b>	<b>0</b>	<b>0</b>
<b>Study Region Total</b>	<b>0</b>	<b>0</b>

Totals only reflect data for those census tracts/blocks included in the user's study region and will reflect the entire county/state only if all of the census blocks for that county/state were selected at the time of study region creation.

## Quick Assessment Report

November 30, 2022

Study Region : pg\_Hur\_prob\_south

Scenario : Probabilistic

### Regional Statistics

Area (Square Miles)	298	
Number of Census Tracts	87	
Number of People in the Region	325,001	
General Building Stock		
<b>Occupancy</b>	<b>Building Count</b>	<b>Dollar Exposure (\$ K)</b>
Residential	98,893	36,647,464
Commercial	5,507	4,369,374
Other	2,680	2,075,589
Total	107,080	43,092,427

### Scenario Results

#### Number of Residential Buildings Damaged

Return Period	Minor	Moderate	Severe	Destruction	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	30	0	0	0	30
100	115	2	0	0	116
200	504	22	0	0	527
500	3,117	202	0	0	3,319
1000	6,617	586	1	5	7,210

#### Number of Buildings Damaged

Return Period	Minor	Moderate	Severe	Destruction	Total
10	0	0	0	0	0
20	0	0	0	0	0
50	48	0	0	0	48
100	140	2	0	0	142
200	556	23	0	0	579
500	3,274	213	1	0	3,488
1000	6,936	619	4	5	7,565

#### Shelter Requirements

Return Period	Displaced Households (#Households)	Short Term Shelter (#People)
10	0	0
20	0	0
50	0	0
100	0	0
200	0	0
500	0	0
1000	0	0

**Economic Loss (x 1000)**

<b>ReturnPeriod</b>	<b>Property Damage (Capital Stock) Losses</b>		<b>Business Interruption (Income) Losses</b>
	<b>Residential</b>	<b>Total</b>	
10	0	0	0
20	0	0	0
50	2,531	2,531	0
100	18,486	18,825	16
200	56,971	57,962	200
500	158,129	161,051	6,419
1000	255,184	262,280	10,964
Annualized	1,373	1,421	76

**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 Hurricane. These results can be improved by using enhanced inventory data.



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**RiskMAP**  
Increasing Resilience Together

# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_south

**Hurricane Scenario:** Probabilistic 10-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 298.39 square miles and contains 87 census tracts. There are over 119 thousand households in the region and a total population of 325,001 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 107 thousand buildings in the region with a total building replacement value (excluding contents) of 43,092 million dollars (2014 dollars). Approximately 92% of the buildings (and 85% of the building value) are associated with residential housing.



## Building Inventory

### General Building Stock

Hazus estimates that there are 107,080 buildings in the region which have an aggregate total replacement value of 43,092 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

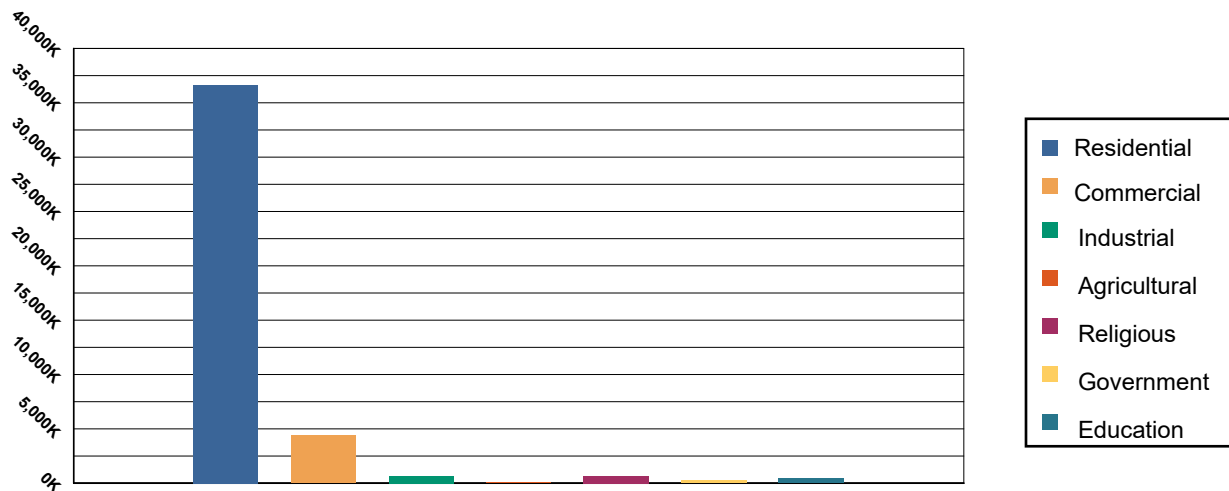


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	36,647,464	85.04%
Commercial	4,369,374	10.14%
Industrial	672,227	1.56%
Agricultural	56,429	0.13%
Religious	678,618	1.57%
Government	265,117	0.62%
Education	403,198	0.94%
<b>Total</b>	<b>43,092,427</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 2 hospitals in the region with a total bed capacity of 229 beds. There are 129 schools, 20 fire stations, 9 police stations and no emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic



## Building Damage

### General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

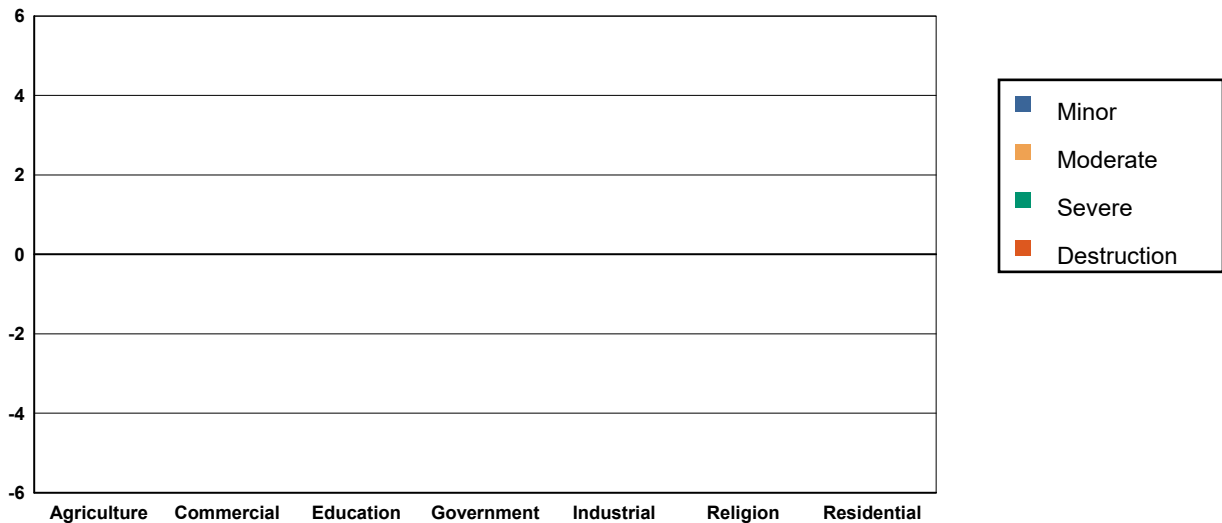


Table 2: Expected Building Damage by Occupancy : 10 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	186.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	5,507.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	312.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Government	212.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	1,210.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Religion	760.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Residential	98,893.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>107,080.00</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>	



**Table 3: Expected Building Damage by Building Type : 10 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,101	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	28,991	100.00	0	0.00	0	0.00	0	0.00	0	0.00
MH	988	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	3,254	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	69,843	100.00	0	0.00	0	0.00	0	0.00	0	0.00

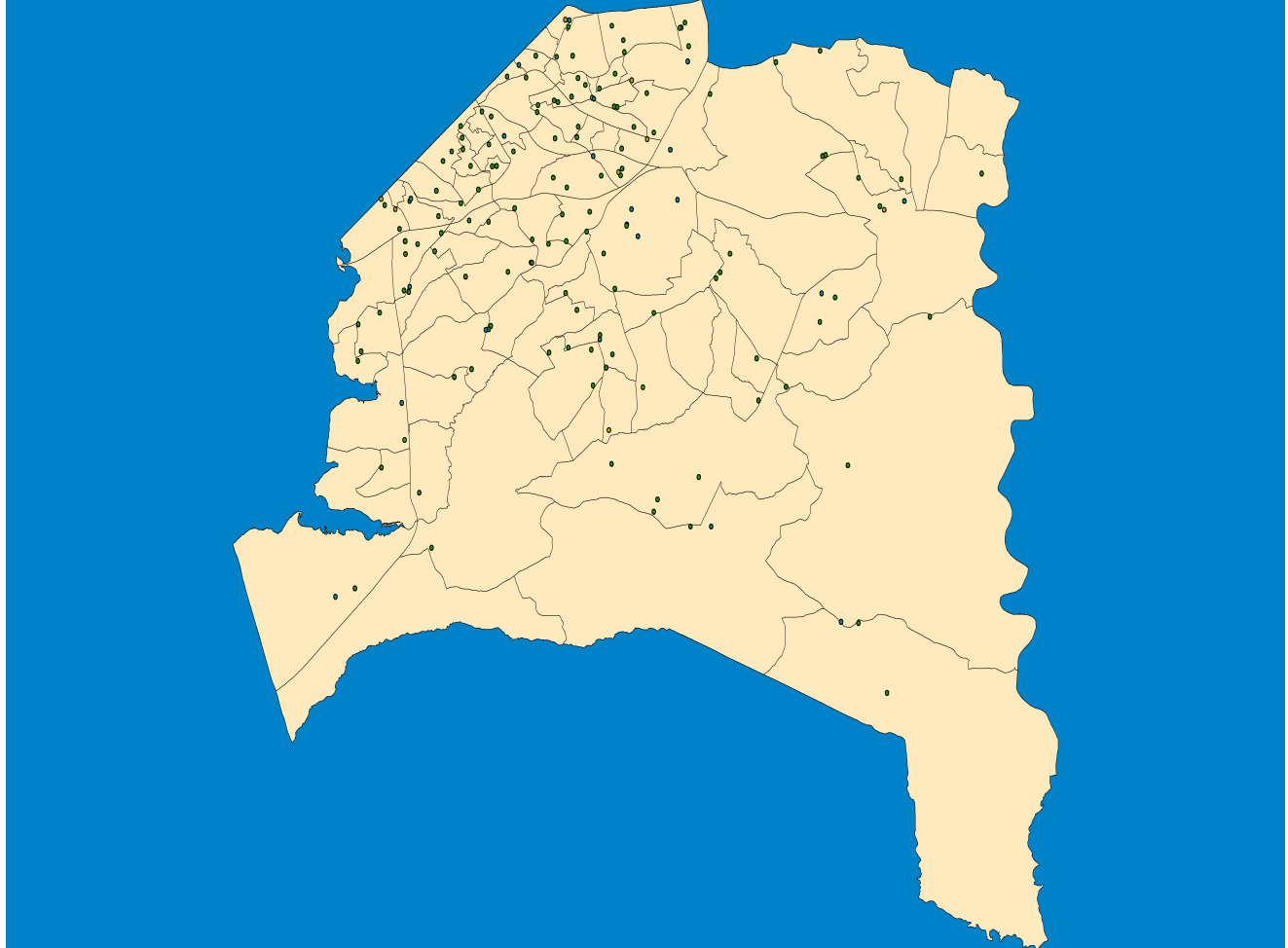


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### **Essential Facility Damage**

Before the hurricane, the region had 229 hospital beds available for use. On the day of the hurricane, the model estimates that 229 hospital beds (only 100.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**



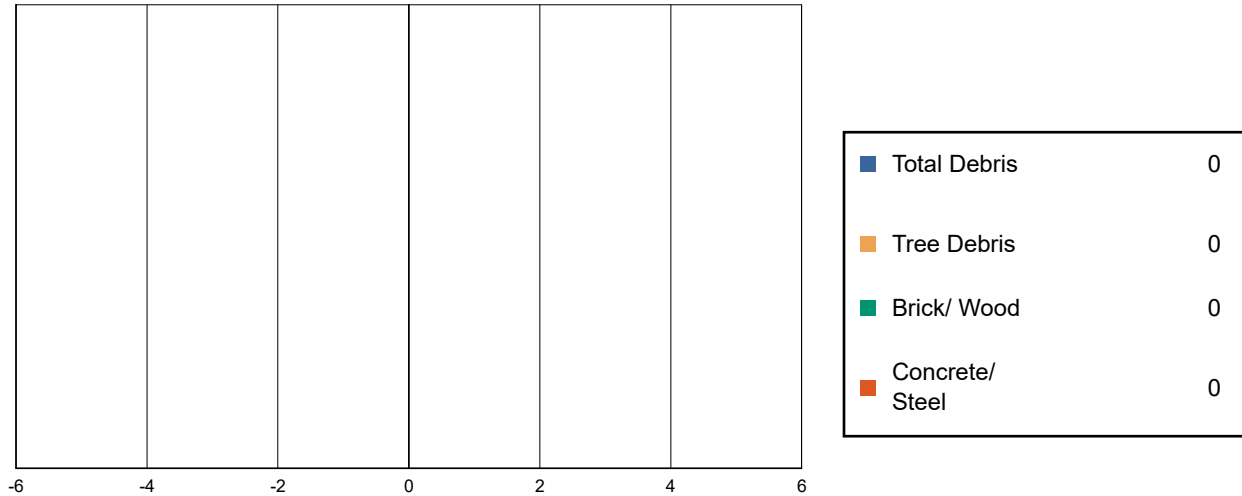
**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
Fire Stations	20	0	0	20
Hospitals	2	0	0	2
Police Stations	9	0	0	9
Schools	129	0	0	129

## Induced Hurricane Damage

### Debris Generation

**Estimated Debris (Tons)**

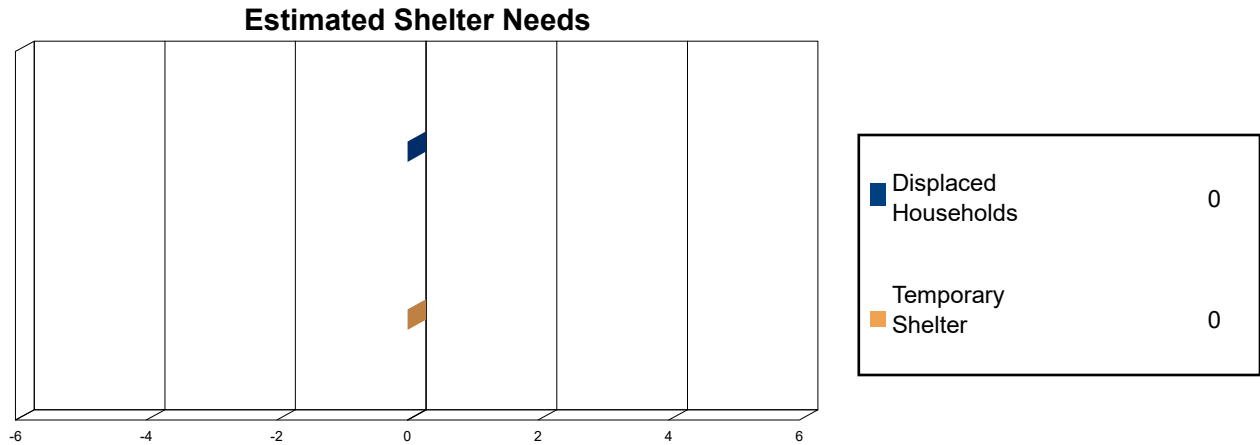


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, 0 tons (0%) is Other Tree Debris. Of the remaining 0 tons, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 0 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 325,001) will seek temporary shelter in public shelters.





## Economic Loss

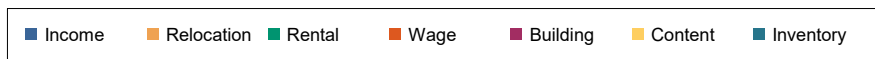
The total economic loss estimated for the hurricane is 0.0 million dollars, which represents 0.00 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 0 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 0% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

**Loss by Business Interruption Type (left)  
and Building Damage Type (right)**



**Loss Type by General Occupancy**



**Table 5: Building-Related Economic Loss Estimates**  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	0.00	0.00	0.00	0.00	0.00
	Content	0.00	0.00	0.00	0.00	0.00
	Inventory	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Business Interruption Loss</b>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>



FEMA

Total

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Total	0.00	0.00	0.00	0.00	0.00
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		Total
		Residential	Non-Residential	
<b>Maryland</b>				
Prince George's	325,001	36,647,464	6,444,963	43,092,427
<b>Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>
<b>Study Region Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>



**RiskMAP**  
Increasing Resilience Together

# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_south

**Hurricane Scenario:** Probabilistic 20-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 298.39 square miles and contains 87 census tracts. There are over 119 thousand households in the region and a total population of 325,001 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 107 thousand buildings in the region with a total building replacement value (excluding contents) of 43,092 million dollars (2014 dollars). Approximately 92% of the buildings (and 85% of the building value) are associated with residential housing.



## Building Inventory

### General Building Stock

Hazus estimates that there are 107,080 buildings in the region which have an aggregate total replacement value of 43,092 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

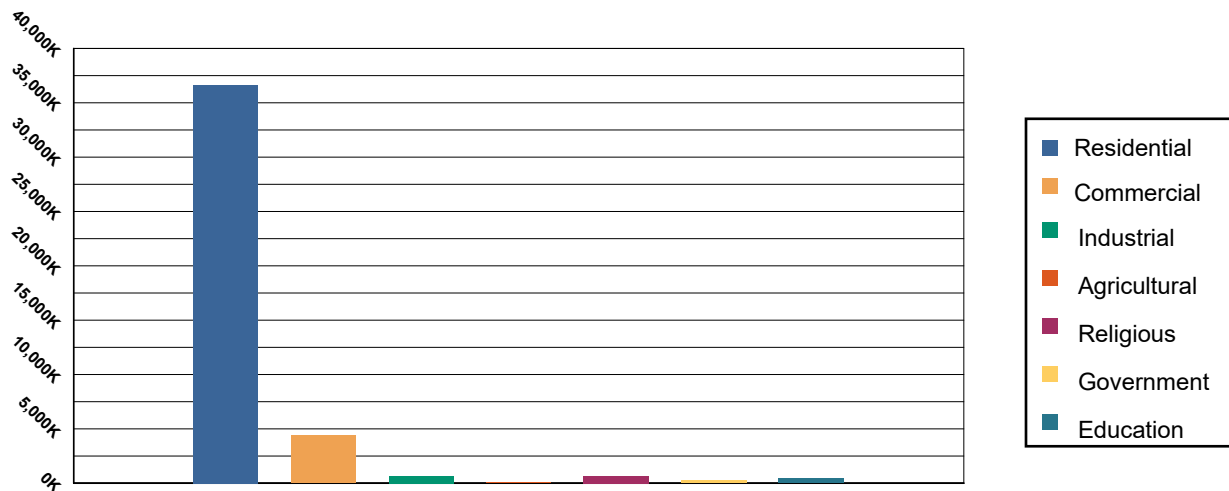


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	36,647,464	85.04%
Commercial	4,369,374	10.14%
Industrial	672,227	1.56%
Agricultural	56,429	0.13%
Religious	678,618	1.57%
Government	265,117	0.62%
Education	403,198	0.94%
<b>Total</b>	<b>43,092,427</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 2 hospitals in the region with a total bed capacity of 229 beds. There are 129 schools, 20 fire stations, 9 police stations and no emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic



## Building Damage

### General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

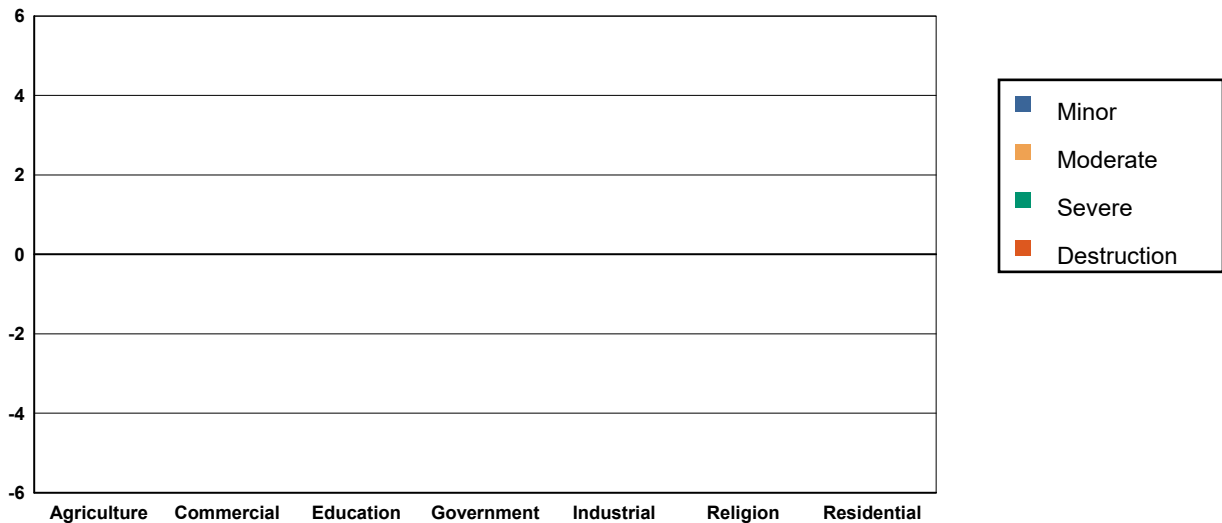


Table 2: Expected Building Damage by Occupancy : 20 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	186.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	5,507.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Education	312.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Government	212.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	1,210.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Religion	760.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Residential	98,893.00	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>107,080.00</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>	



**Table 3: Expected Building Damage by Building Type : 20 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,101	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Masonry	28,991	100.00	0	0.00	0	0.00	0	0.00	0	0.00
MH	988	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	3,254	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Wood	69,843	100.00	0	0.00	0	0.00	0	0.00	0	0.00



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### **Essential Facility Damage**

Before the hurricane, the region had 229 hospital beds available for use. On the day of the hurricane, the model estimates that 229 hospital beds (only 100.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**



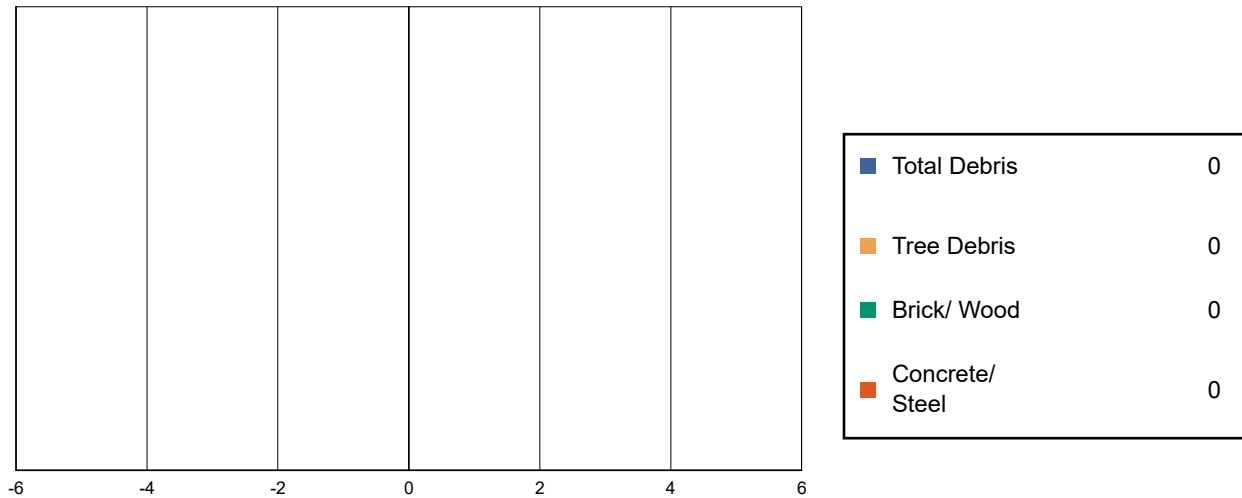
**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
Fire Stations	20	0	0	20
Hospitals	2	0	0	2
Police Stations	9	0	0	9
Schools	129	0	0	129

## Induced Hurricane Damage

### Debris Generation

#### Estimated Debris (Tons)

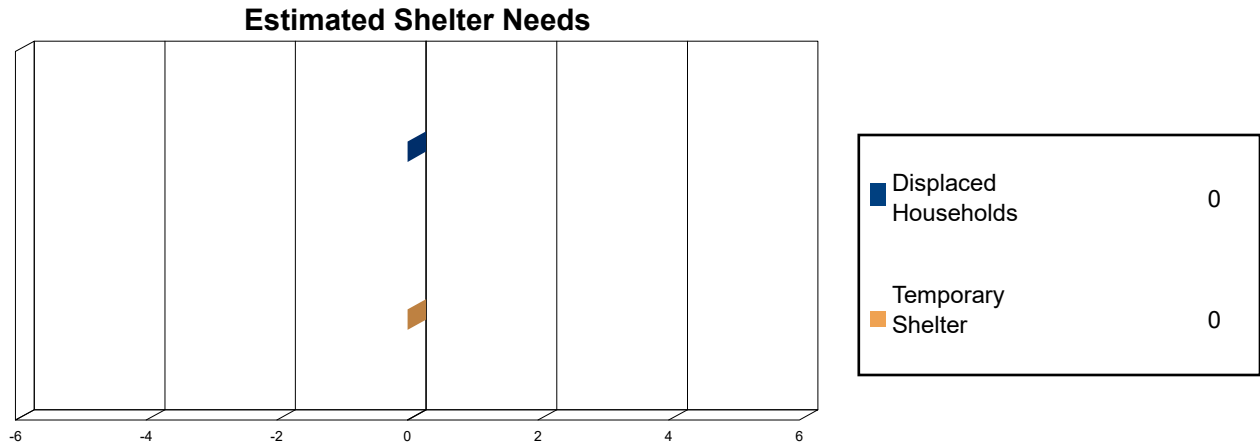


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 0 tons of debris will be generated. Of the total amount, 0 tons (0%) is Other Tree Debris. Of the remaining 0 tons, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 0 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 325,001) will seek temporary shelter in public shelters.





## Economic Loss

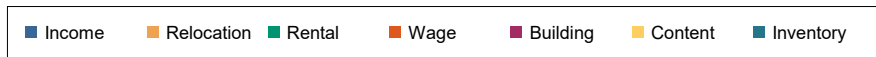
The total economic loss estimated for the hurricane is 0.0 million dollars, which represents 0.00 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 0 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 0% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

**Loss by Business Interruption Type (left)  
and Building Damage Type (right)**



**Loss Type by General Occupancy**



**Table 5: Building-Related Economic Loss Estimates**  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	0.00	0.00	0.00	0.00	0.00
	Content	0.00	0.00	0.00	0.00	0.00
	Inventory	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>
<b>Business Interruption Loss</b>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.00	0.00	0.00	0.00	0.00
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>



FEMA

Total

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Total	0.00	0.00	0.00	0.00	0.00
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		Total
		Residential	Non-Residential	
<b>Maryland</b>				
Prince George's	325,001	36,647,464	6,444,963	43,092,427
<b>Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>
<b>Study Region Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>



FEMA

**RiskMAP**  
Increasing Resilience Together

# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_south

**Hurricane Scenario:** Probabilistic 50-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.*

*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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 298.39 square miles and contains 87 census tracts. There are over 119 thousand households in the region and a total population of 325,001 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 107 thousand buildings in the region with a total building replacement value (excluding contents) of 43,092 million dollars (2014 dollars). Approximately 92% of the buildings (and 85% of the building value) are associated with residential housing.



## Building Inventory

### General Building Stock

Hazus estimates that there are 107,080 buildings in the region which have an aggregate total replacement value of 43,092 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

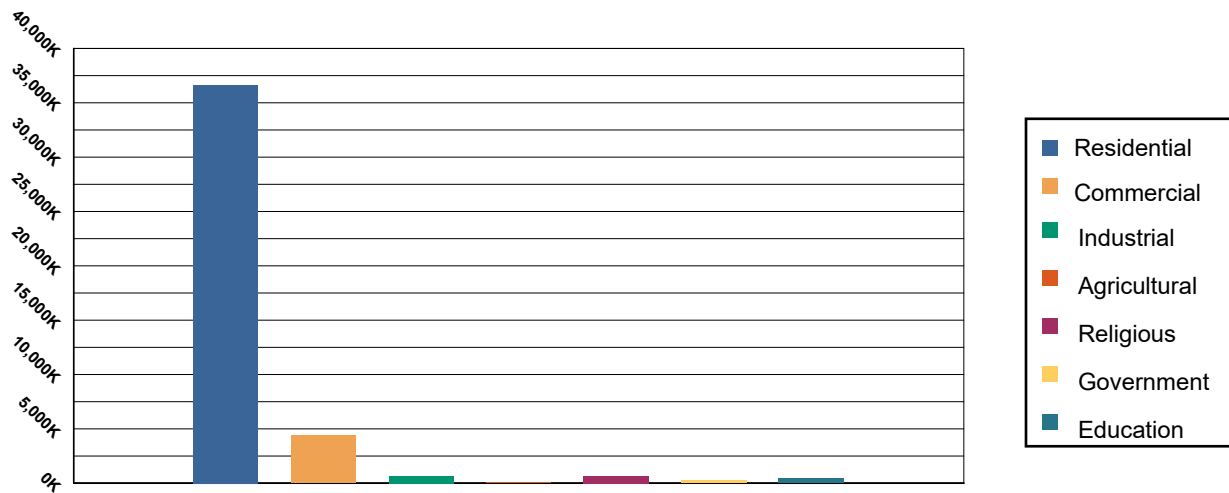


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	36,647,464	85.04%
Commercial	4,369,374	10.14%
Industrial	672,227	1.56%
Agricultural	56,429	0.13%
Religious	678,618	1.57%
Government	265,117	0.62%
Education	403,198	0.94%
<b>Total</b>	<b>43,092,427</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 2 hospitals in the region with a total bed capacity of 229 beds. There are 129 schools, 20 fire stations, 9 police stations and no emergency operation facilities.



## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic

## Building Damage

### General Building Stock Damage

Hazus estimates that about 0 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

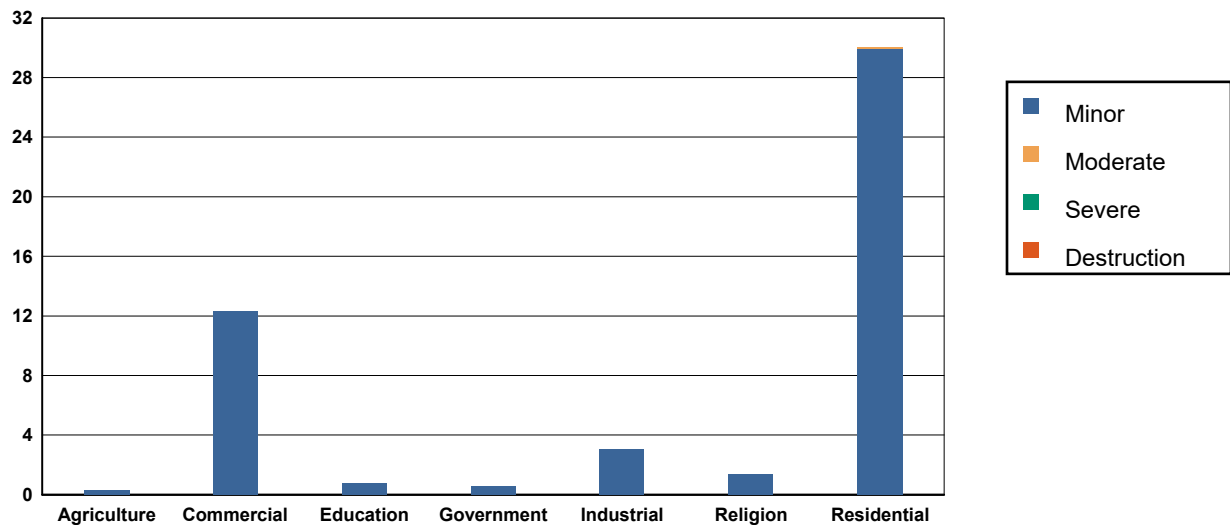


Table 2: Expected Building Damage by Occupancy : 50 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	185.71	99.84	0.29	0.16	0.00	0.00	0.00	0.00	0.00	0.00
Commercial	5,494.70	99.78	12.30	0.22	0.00	0.00	0.00	0.00	0.00	0.00
Education	311.24	99.76	0.76	0.24	0.00	0.00	0.00	0.00	0.00	0.00
Government	211.45	99.74	0.55	0.26	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	1,206.98	99.75	3.02	0.25	0.00	0.00	0.00	0.00	0.00	0.00
Religion	758.66	99.82	1.34	0.18	0.00	0.00	0.00	0.00	0.00	0.00
Residential	98,862.99	99.97	29.93	0.03	0.08	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>107,031.73</b>		<b>48.19</b>		<b>0.08</b>		<b>0.00</b>		<b>0.00</b>	



**Table 3: Expected Building Damage by Building Type : 50 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,098	99.69	3	0.31	0	0.00	0	0.00	0	0.00
Masonry	28,957	99.88	34	0.12	0	0.00	0	0.00	0	0.00
MH	988	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	3,245	99.73	9	0.27	0	0.00	0	0.00	0	0.00
Wood	69,842	100.00	1	0.00	0	0.00	0	0.00	0	0.00



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### **Essential Facility Damage**

Before the hurricane, the region had 229 hospital beds available for use. On the day of the hurricane, the model estimates that 229 hospital beds (only 100.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**



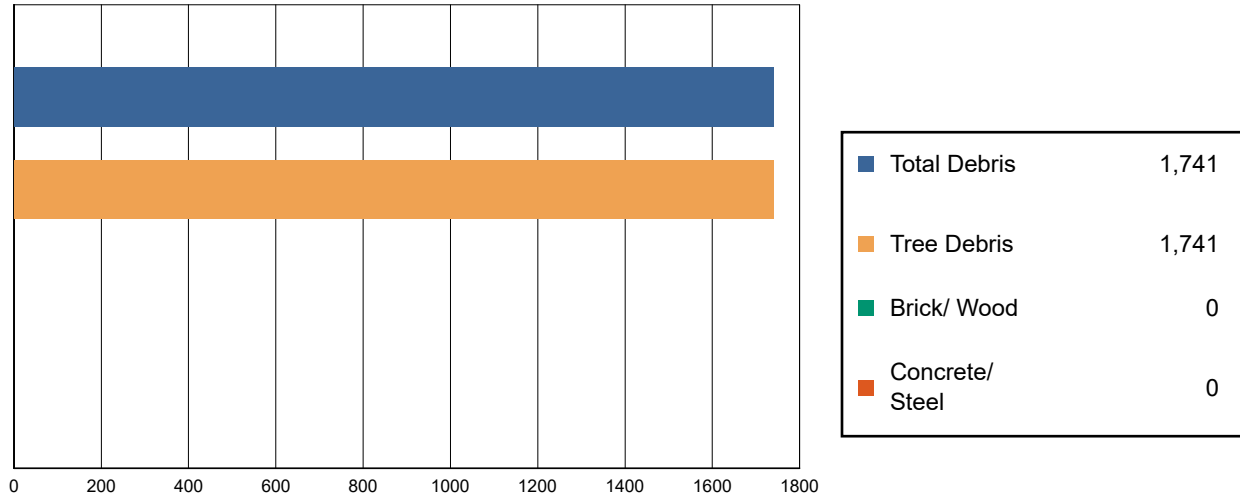
**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
Fire Stations	20	0	0	20
Hospitals	2	0	0	2
Police Stations	9	0	0	9
Schools	129	0	0	129

## Induced Hurricane Damage

### Debris Generation

**Estimated Debris (Tons)**

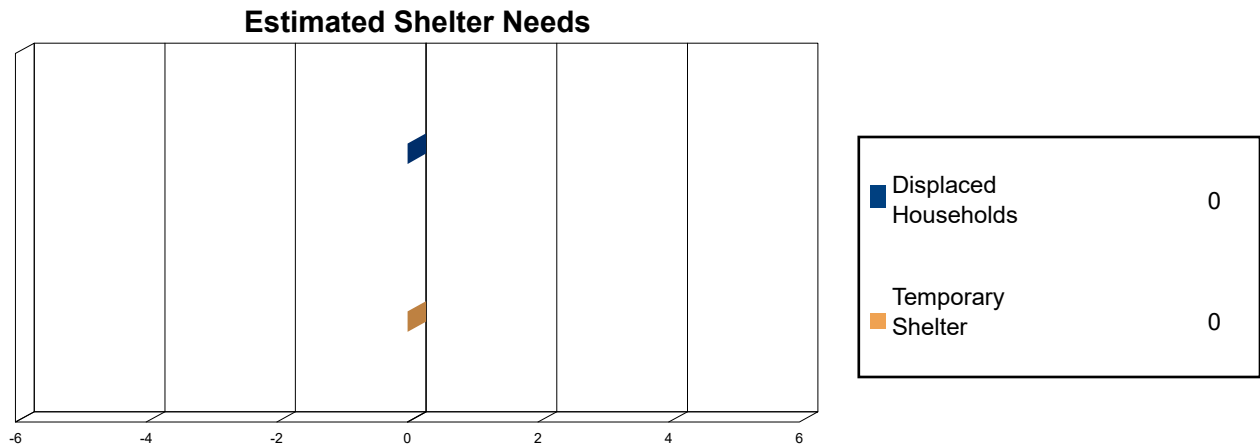


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 1,741 tons of debris will be generated. Of the total amount, 1,420 tons (82%) is Other Tree Debris. Of the remaining 321 tons, Brick/Wood comprises 0% of the total, Reinforced Concrete/Steel comprises 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 0 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 321 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 325,001) will seek temporary shelter in public shelters.





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## Economic Loss

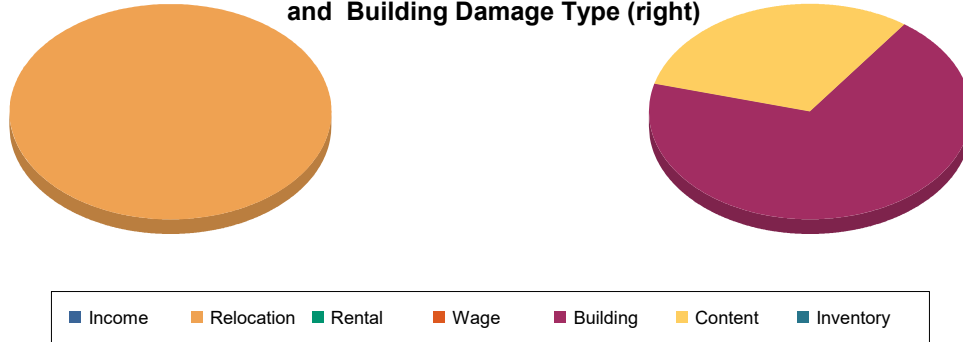
The total economic loss estimated for the hurricane is 2.5 million dollars, which represents 0.01 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 3 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 100% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

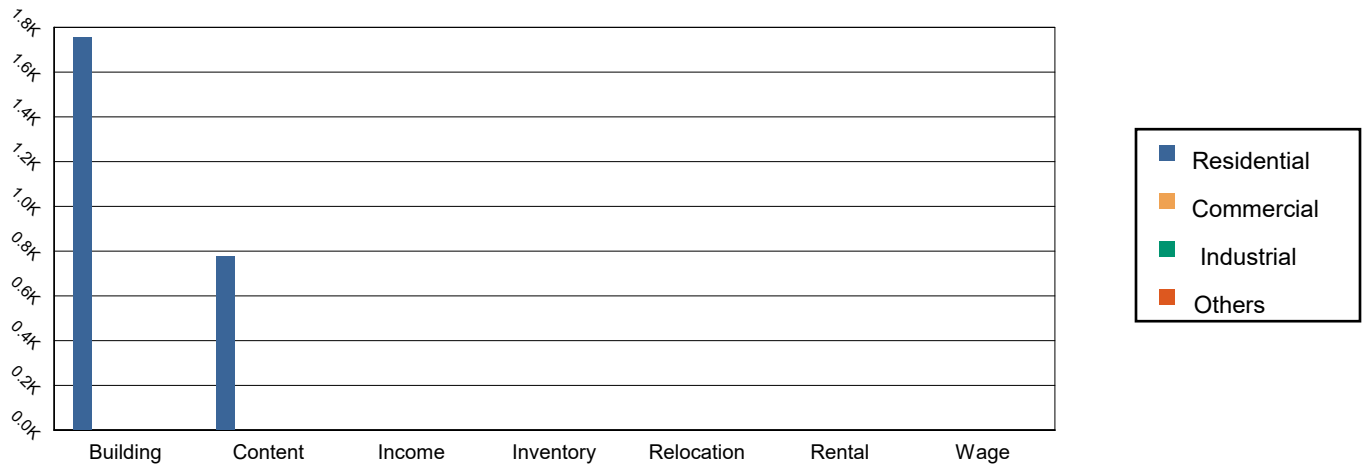


Table 5: Building-Related Economic Loss Estimates  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	1,753.52	0.00	0.00	0.00	1,753.52
	Content	777.39	0.00	0.00	0.00	777.39
	Inventory	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>2,530.91</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>2,530.91</b>
<b>Business Interruption Loss</b>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	0.21	0.00	0.00	0.00	0.21
	Rental	0.00	0.00	0.00	0.00	0.00
	Wage	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>0.21</b>	<b>0.00</b>	<b>0.00</b>	<b>0.00</b>	<b>0.21</b>



FEMA

Total

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Total	2,531.12	0.00	0.00	0.00	2,531.12
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		Total
		Residential	Non-Residential	
<b>Maryland</b>				
Prince George's	325,001	36,647,464	6,444,963	43,092,427
<b>Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>
<b>Study Region Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>



# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_south

**Hurricane Scenario:** Probabilistic 100-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 298.39 square miles and contains 87 census tracts. There are over 119 thousand households in the region and a total population of 325,001 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 107 thousand buildings in the region with a total building replacement value (excluding contents) of 43,092 million dollars (2014 dollars). Approximately 92% of the buildings (and 85% of the building value) are associated with residential housing.



## Building Inventory

### General Building Stock

Hazus estimates that there are 107,080 buildings in the region which have an aggregate total replacement value of 43,092 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

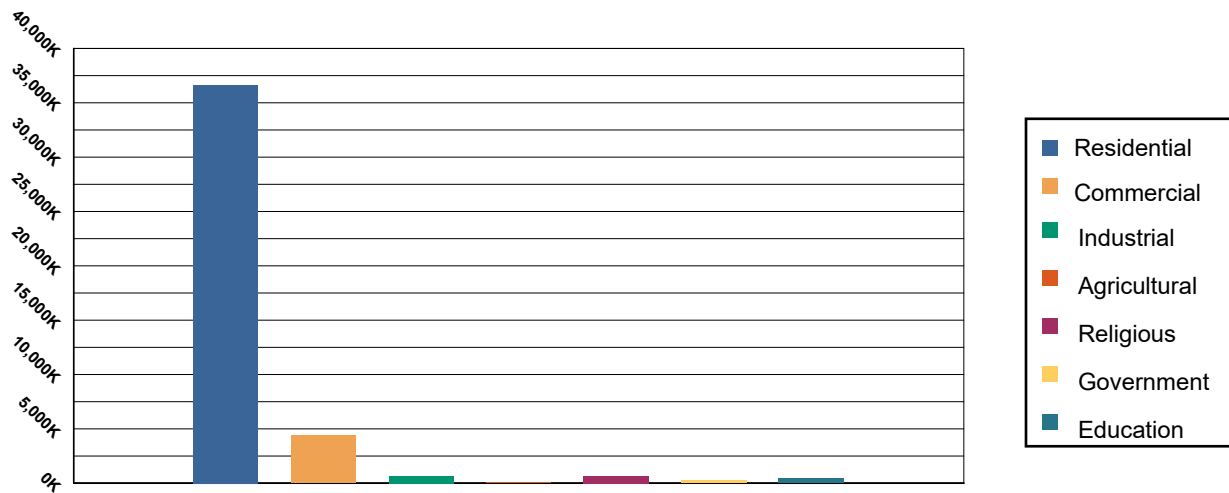


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	36,647,464	85.04%
Commercial	4,369,374	10.14%
Industrial	672,227	1.56%
Agricultural	56,429	0.13%
Religious	678,618	1.57%
Government	265,117	0.62%
Education	403,198	0.94%
<b>Total</b>	<b>43,092,427</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 2 hospitals in the region with a total bed capacity of 229 beds. There are 129 schools, 20 fire stations, 9 police stations and no emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic

## Building Damage

### General Building Stock Damage

Hazus estimates that about 2 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

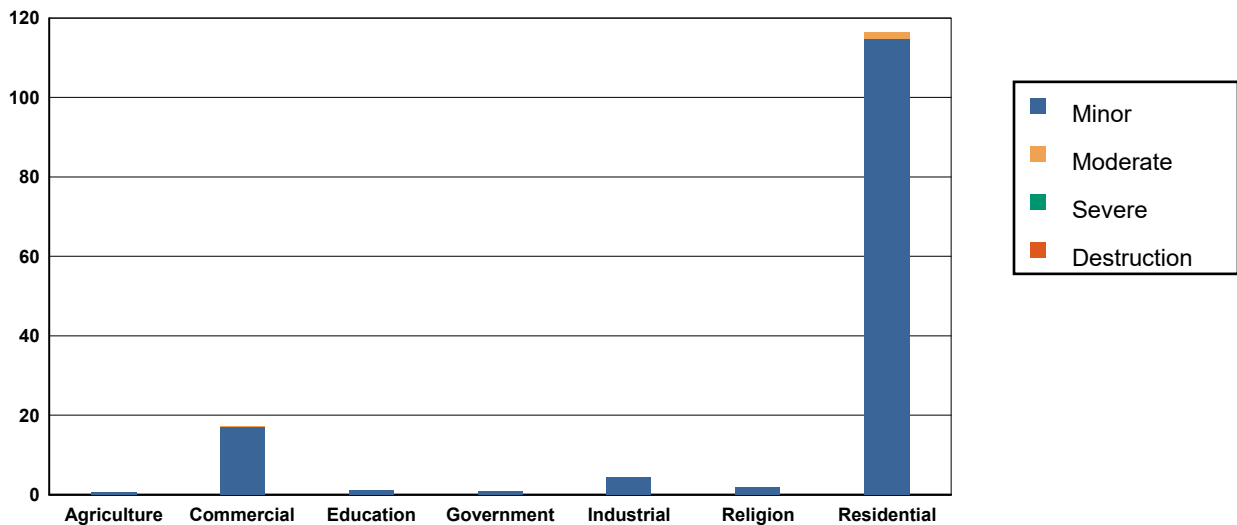


Table 2: Expected Building Damage by Occupancy : 100 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	185.41	99.68	0.58	0.31	0.01	0.01	0.00	0.00	0.00	0.00
Commercial	5,489.77	99.69	17.09	0.31	0.14	0.00	0.00	0.00	0.00	0.00
Education	310.92	99.65	1.08	0.35	0.00	0.00	0.00	0.00	0.00	0.00
Government	211.16	99.60	0.84	0.40	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	1,205.68	99.64	4.32	0.36	0.01	0.00	0.00	0.00	0.00	0.00
Religion	758.09	99.75	1.91	0.25	0.00	0.00	0.00	0.00	0.00	0.00
Residential	98,776.62	99.88	114.65	0.12	1.72	0.00	0.00	0.00	0.00	0.00
<b>Total</b>	<b>106,937.63</b>		<b>140.48</b>		<b>1.89</b>		<b>0.01</b>		<b>0.00</b>	



**Table 3: Expected Building Damage by Building Type : 100 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,096	99.57	5	0.43	0	0.00	0	0.00	0	0.00
Masonry	28,923	99.76	67	0.23	2	0.01	0	0.00	0	0.00
MH	988	100.00	0	0.00	0	0.00	0	0.00	0	0.00
Steel	3,242	99.62	12	0.38	0	0.00	0	0.00	0	0.00
Wood	69,795	99.93	48	0.07	0	0.00	0	0.00	0	0.00



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### **Essential Facility Damage**

Before the hurricane, the region had 229 hospital beds available for use. On the day of the hurricane, the model estimates that 229 hospital beds (only 100.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**



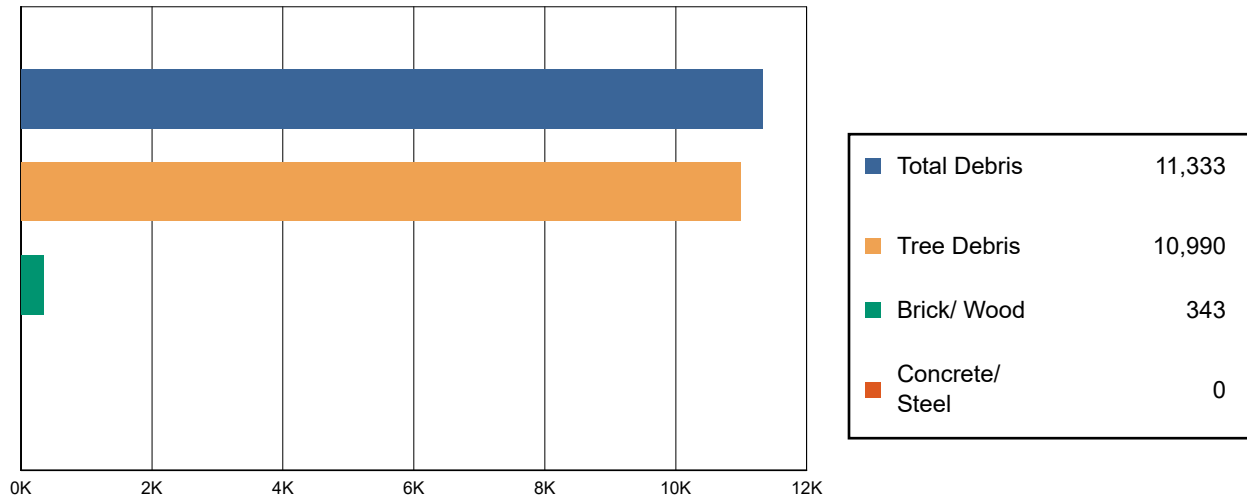
**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
Fire Stations	20	0	0	20
Hospitals	2	0	0	2
Police Stations	9	0	0	9
Schools	129	0	0	129

## Induced Hurricane Damage

### Debris Generation

Estimated Debris (Tons)

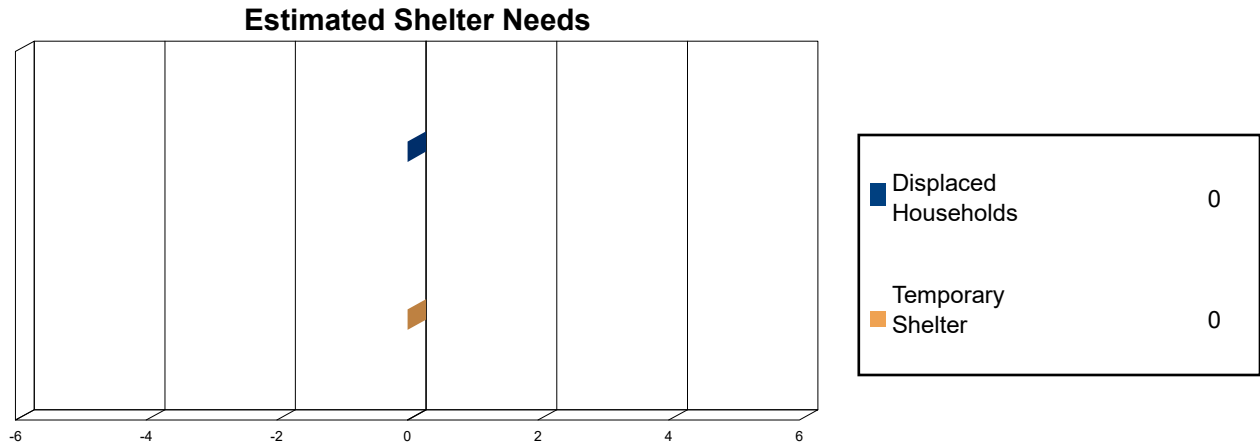


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 11,333 tons of debris will be generated. Of the total amount, 9,084 tons (80%) is Other Tree Debris. Of the remaining 2,249 tons, Brick/Wood comprises 15% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 14 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 1,906 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 325,001) will seek temporary shelter in public shelters.





## Economic Loss

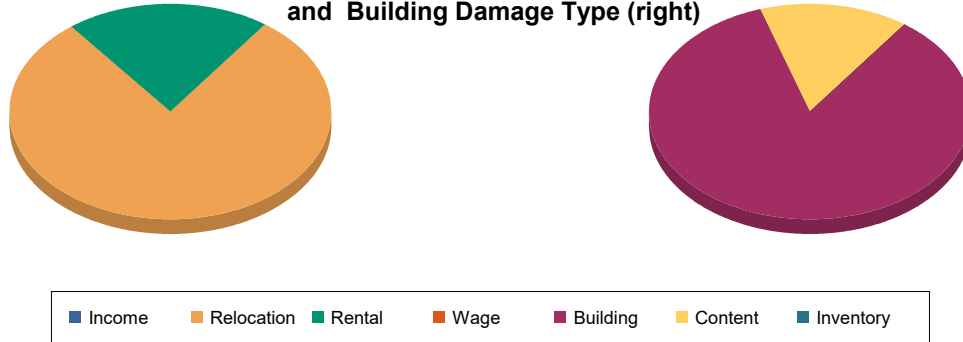
The total economic loss estimated for the hurricane is 18.8 million dollars, which represents 0.04 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 19 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 98% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy



Table 5: Building-Related Economic Loss Estimates  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	15,657.93	225.42	44.48	69.01	15,996.84
	Content	2,827.74	0.00	0.00	0.04	2,827.78
	Inventory	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>18,485.67</b>	<b>225.42</b>	<b>44.48</b>	<b>69.05</b>	<b>18,824.62</b>
<b>Business Interruption Loss</b>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	11.98	0.69	0.01	0.04	12.72
	Rental	3.31	0.00	0.00	0.00	3.31
	Wage	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>15.29</b>	<b>0.69</b>	<b>0.01</b>	<b>0.04</b>	<b>16.03</b>



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Total

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Total	18,500.96	226.11	44.49	69.09	18,840.66
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FEMA

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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		Total
		Residential	Non-Residential	
<b>Maryland</b>				
Prince George's	325,001	36,647,464	6,444,963	43,092,427
<b>Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>
<b>Study Region Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>



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**RiskMAP**  
Increasing Resilience Together

# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_south

**Hurricane Scenario:** Probabilistic 200-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 298.39 square miles and contains 87 census tracts. There are over 119 thousand households in the region and a total population of 325,001 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 107 thousand buildings in the region with a total building replacement value (excluding contents) of 43,092 million dollars (2014 dollars). Approximately 92% of the buildings (and 85% of the building value) are associated with residential housing.



## Building Inventory

### General Building Stock

Hazus estimates that there are 107,080 buildings in the region which have an aggregate total replacement value of 43,092 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

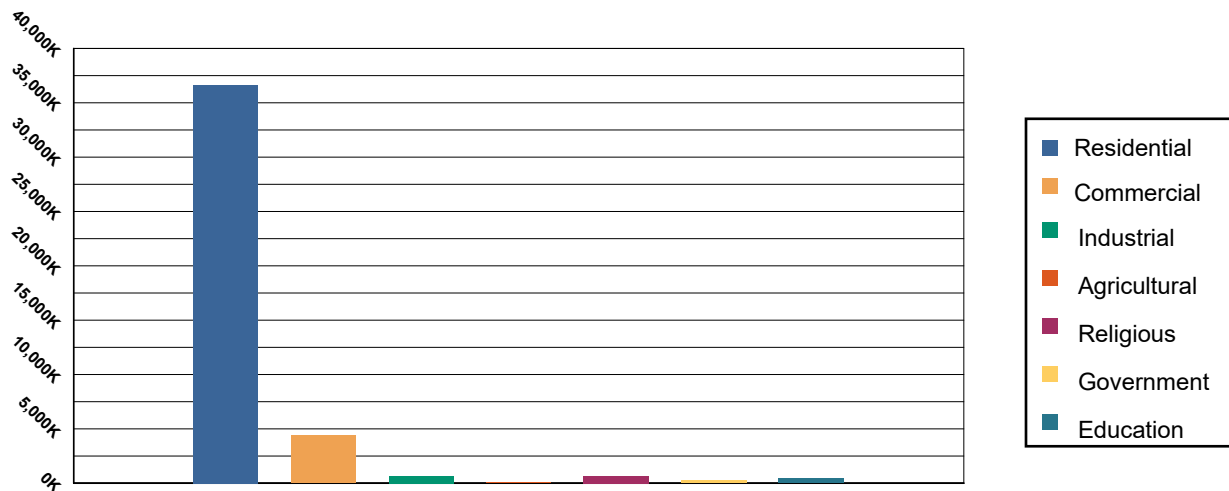


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	36,647,464	85.04%
Commercial	4,369,374	10.14%
Industrial	672,227	1.56%
Agricultural	56,429	0.13%
Religious	678,618	1.57%
Government	265,117	0.62%
Education	403,198	0.94%
<b>Total</b>	<b>43,092,427</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 2 hospitals in the region with a total bed capacity of 229 beds. There are 129 schools, 20 fire stations, 9 police stations and no emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic

## Building Damage

### General Building Stock Damage

Hazus estimates that about 23 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

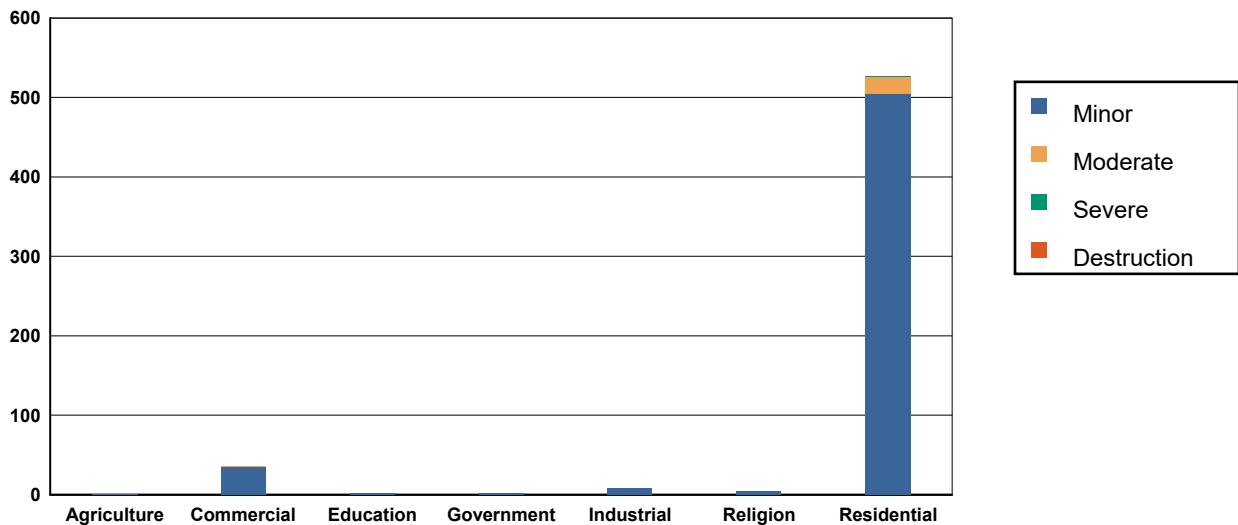


Table 2: Expected Building Damage by Occupancy : 200 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	184.95	99.43	1.02	0.55	0.03	0.02	0.01	0.00	0.00	0.00
Commercial	5,471.28	99.35	34.87	0.63	0.85	0.02	0.00	0.00	0.00	0.00
Education	309.94	99.34	2.06	0.66	0.00	0.00	0.00	0.00	0.00	0.00
Government	210.52	99.30	1.48	0.70	0.00	0.00	0.00	0.00	0.00	0.00
Industrial	1,201.63	99.31	8.34	0.69	0.02	0.00	0.01	0.00	0.00	0.00
Religion	756.15	99.49	3.85	0.51	0.00	0.00	0.00	0.00	0.00	0.00
Residential	98,366.12	99.47	504.31	0.51	22.49	0.02	0.08	0.00	0.00	0.00
<b>Total</b>	<b>106,500.59</b>		<b>555.93</b>		<b>23.39</b>		<b>0.10</b>		<b>0.00</b>	



**Table 3: Expected Building Damage by Building Type : 200 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,092	99.14	9	0.85	0	0.00	0	0.00	0	0.00
Masonry	28,745	99.15	228	0.79	18	0.06	0	0.00	0	0.00
MH	988	99.99	0	0.00	0	0.01	0	0.00	0	0.00
Steel	3,230	99.25	24	0.73	0	0.01	0	0.00	0	0.00
Wood	69,574	99.61	266	0.38	3	0.00	0	0.00	0	0.00

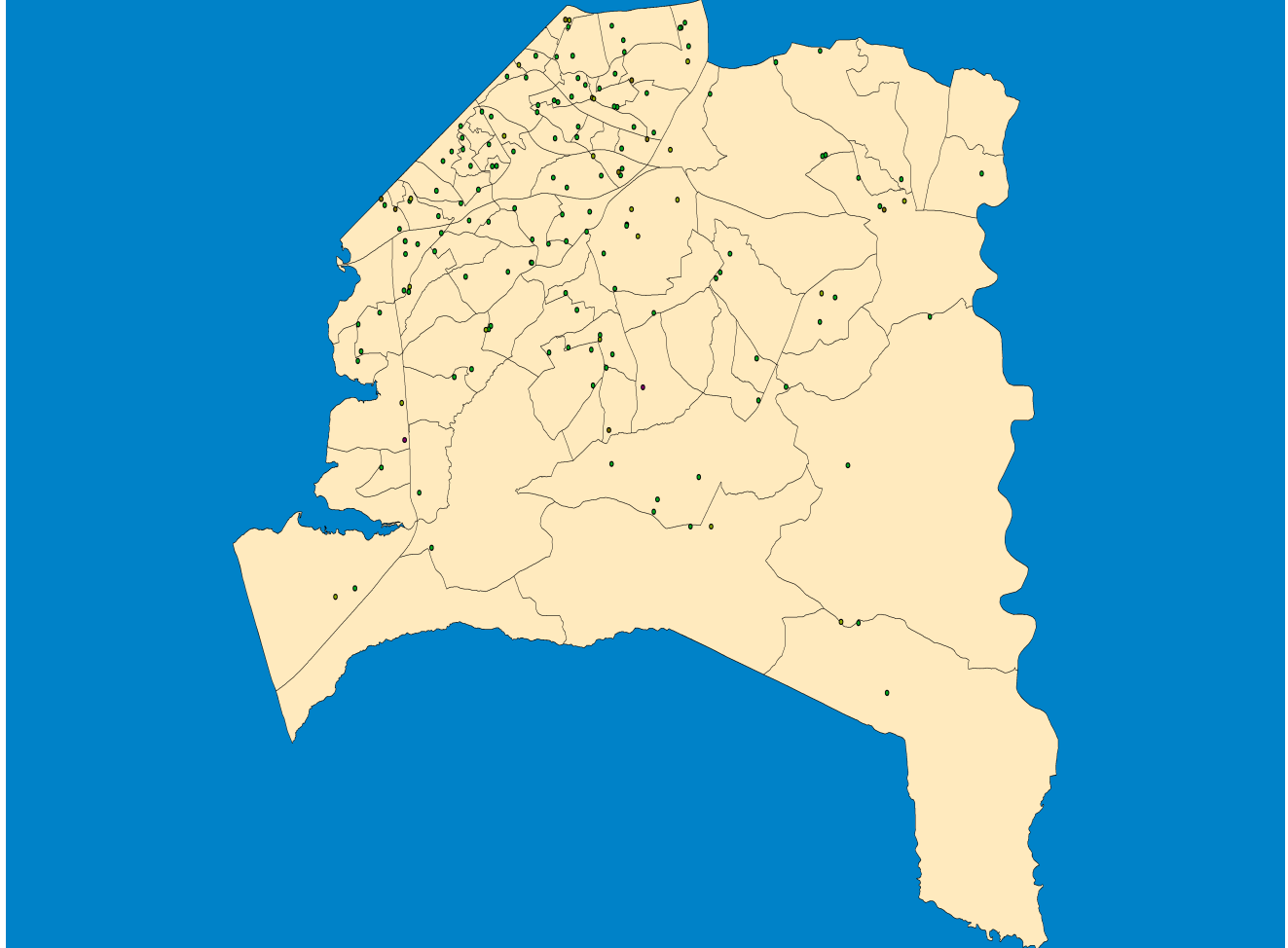


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### **Essential Facility Damage**

Before the hurricane, the region had 229 hospital beds available for use. On the day of the hurricane, the model estimates that 229 hospital beds (only 100.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**

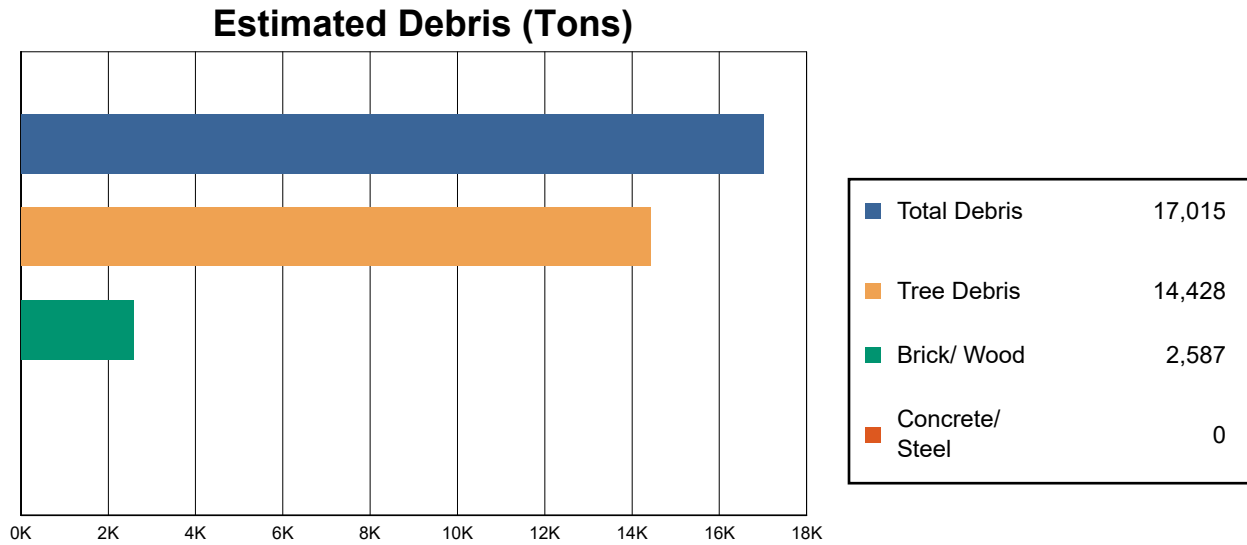


**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
Fire Stations	20	0	0	20
Hospitals	2	0	0	2
Police Stations	9	0	0	9
Schools	129	0	0	129

## Induced Hurricane Damage

### Debris Generation

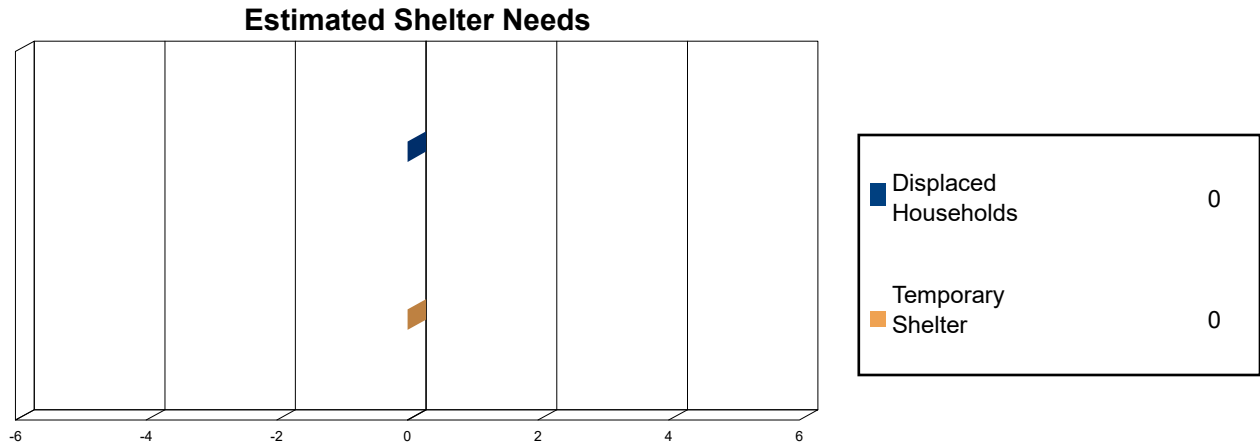


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 17,015 tons of debris will be generated. Of the total amount, 10,017 tons (59%) is Other Tree Debris. Of the remaining 6,998 tons, Brick/Wood comprises 37% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 103 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 4,411 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 325,001) will seek temporary shelter in public shelters.





## Economic Loss

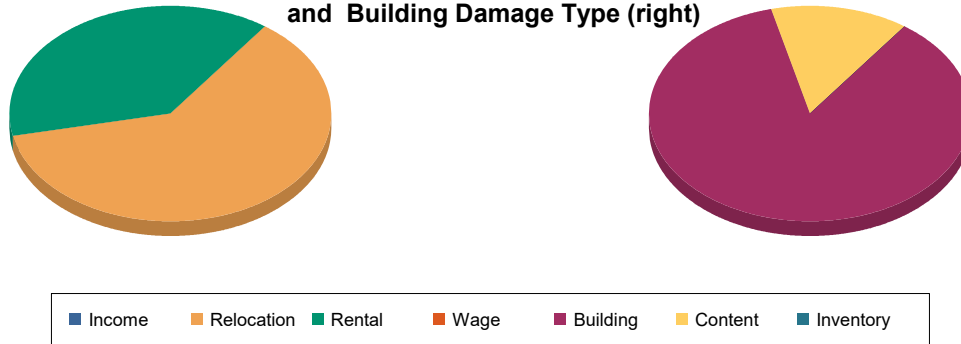
The total economic loss estimated for the hurricane is 58.2 million dollars, which represents 0.13 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 58 million dollars. 0% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 98% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

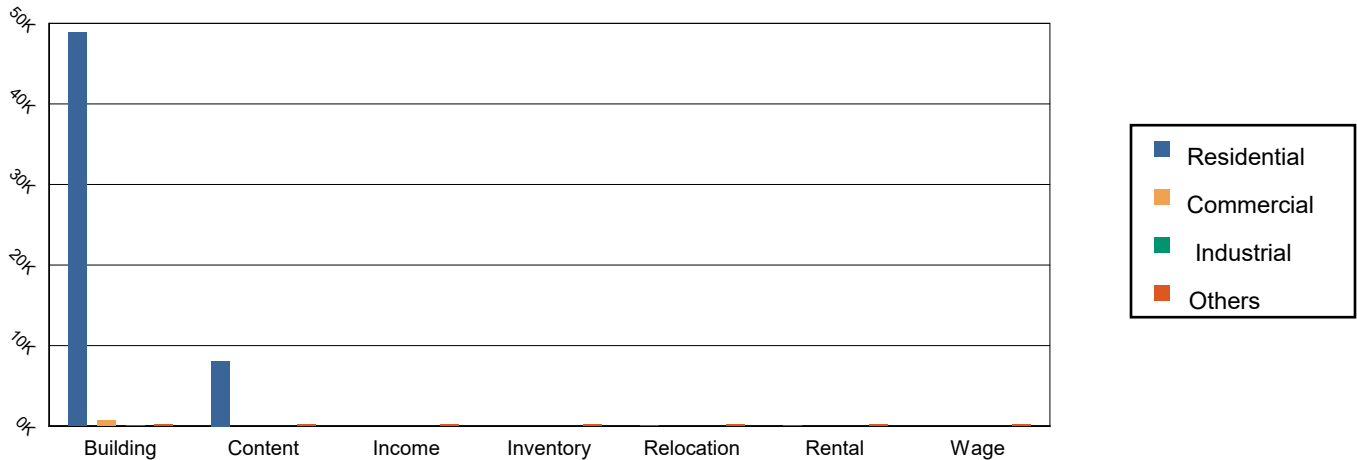


Table 5: Building-Related Economic Loss Estimates  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	48,863.55	665.20	106.45	218.98	49,854.18
	Content	8,107.58	0.00	0.00	0.00	8,107.58
	Inventory	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>56,971.12</b>	<b>665.20</b>	<b>106.45</b>	<b>218.98</b>	<b>57,961.75</b>
<b>Business Interruption Loss</b>						
	Income	0.00	0.00	0.00	0.00	0.00
	Relocation	117.57	5.72	0.00	0.09	123.37
	Rental	76.82	0.00	0.00	0.00	76.82
	Wage	0.00	0.00	0.00	0.00	0.00
	<b>Subtotal</b>	<b>194.39</b>	<b>5.72</b>	<b>0.00</b>	<b>0.09</b>	<b>200.19</b>



FEMA

Total

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Total	57,165.51	670.92	106.45	219.06	58,161.94
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		Total
		Residential	Non-Residential	
<b>Maryland</b>				
Prince George's	325,001	36,647,464	6,444,963	43,092,427
<b>Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>
<b>Study Region Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>



**RiskMAP**  
Increasing Resilience Together

# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_south

**Hurricane Scenario:** Probabilistic 500-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
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 Hurricane. These results can be improved by using enhanced inventory data.*



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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 298.39 square miles and contains 87 census tracts. There are over 119 thousand households in the region and a total population of 325,001 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 107 thousand buildings in the region with a total building replacement value (excluding contents) of 43,092 million dollars (2014 dollars). Approximately 92% of the buildings (and 85% of the building value) are associated with residential housing.



## Building Inventory

### General Building Stock

Hazus estimates that there are 107,080 buildings in the region which have an aggregate total replacement value of 43,092 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

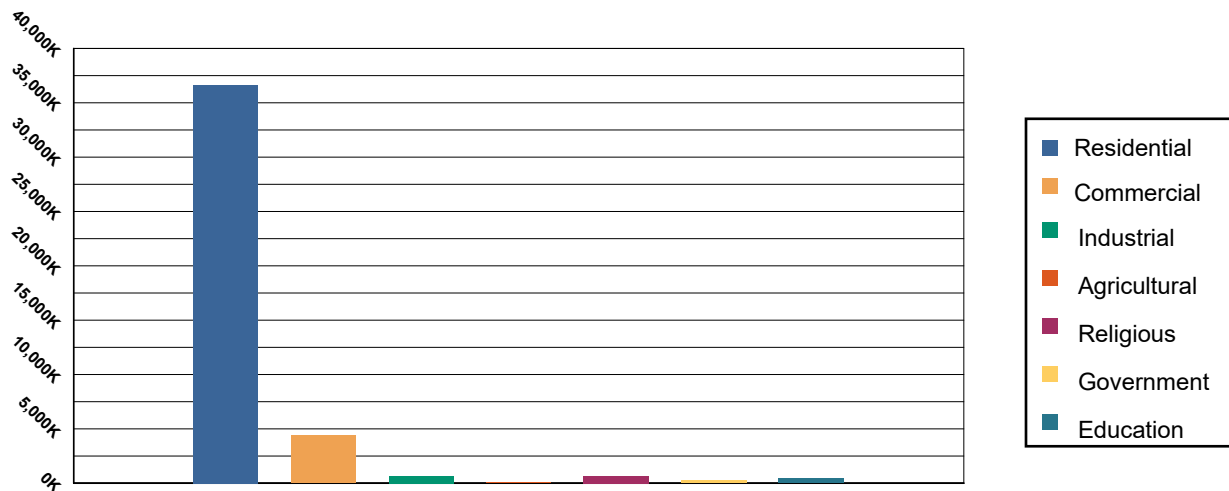


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	36,647,464	85.04%
Commercial	4,369,374	10.14%
Industrial	672,227	1.56%
Agricultural	56,429	0.13%
Religious	678,618	1.57%
Government	265,117	0.62%
Education	403,198	0.94%
<b>Total</b>	<b>43,092,427</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 2 hospitals in the region with a total bed capacity of 229 beds. There are 129 schools, 20 fire stations, 9 police stations and no emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic

## Building Damage

### General Building Stock Damage

Hazus estimates that about 214 buildings will be at least moderately damaged. This is over 0% of the total number of buildings in the region. There are an estimated 0 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

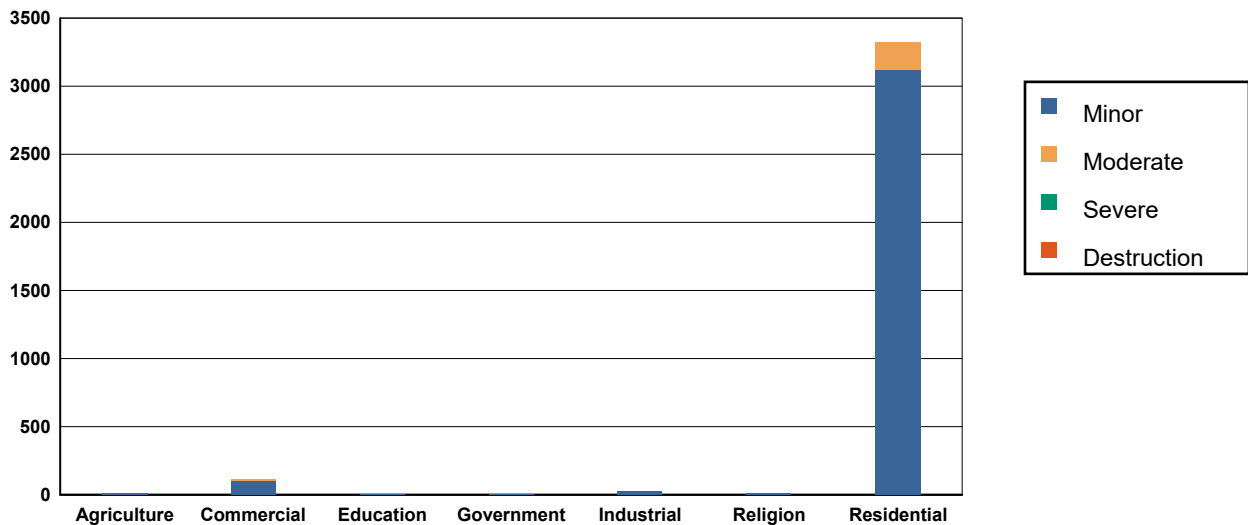


Table 2: Expected Building Damage by Occupancy : 500 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	180.88	97.25	4.41	2.37	0.53	0.28	0.18	0.10	0.01	0.00
Commercial	5,392.76	97.93	104.84	1.90	8.94	0.16	0.46	0.01	0.00	0.00
Education	305.86	98.03	6.00	1.92	0.15	0.05	0.00	0.00	0.00	0.00
Government	207.45	97.85	4.43	2.09	0.13	0.06	0.00	0.00	0.00	0.00
Industrial	1,184.80	97.92	24.02	1.99	1.02	0.08	0.14	0.01	0.01	0.00
Religion	746.00	98.16	13.71	1.80	0.29	0.04	0.00	0.00	0.00	0.00
Residential	95,573.97	96.64	3,116.83	3.15	201.55	0.20	0.22	0.00	0.43	0.00
<b>Total</b>	<b>103,591.71</b>		<b>3,274.23</b>		<b>212.61</b>		<b>1.01</b>		<b>0.44</b>	



**Table 3: Expected Building Damage by Building Type : 500 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,075	97.61	26	2.32	1	0.07	0	0.00	0	0.00
Masonry	27,842	96.04	1,019	3.51	129	0.45	0	0.00	0	0.00
MH	985	99.69	2	0.24	1	0.05	0	0.00	0	0.02
Steel	3,185	97.87	64	1.95	5	0.16	0	0.01	0	0.00
Wood	67,750	97.00	2,029	2.90	64	0.09	0	0.00	0	0.00



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### **Essential Facility Damage**

Before the hurricane, the region had 229 hospital beds available for use. On the day of the hurricane, the model estimates that 229 hospital beds (only 100.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**



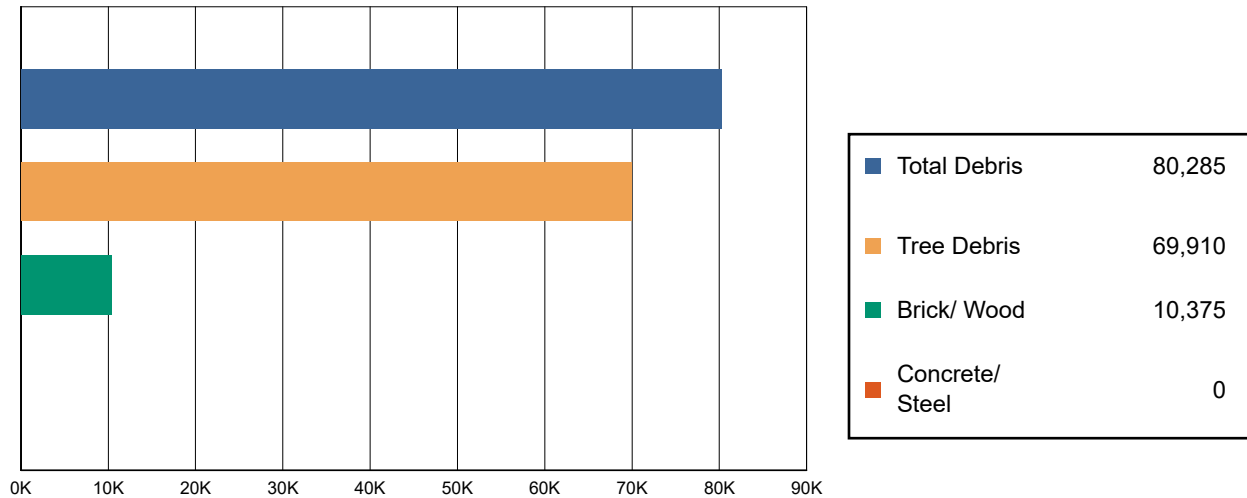
**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
Fire Stations	20	0	0	20
Hospitals	2	0	0	2
Police Stations	9	0	0	9
Schools	129	0	0	129

## Induced Hurricane Damage

### Debris Generation

Estimated Debris (Tons)

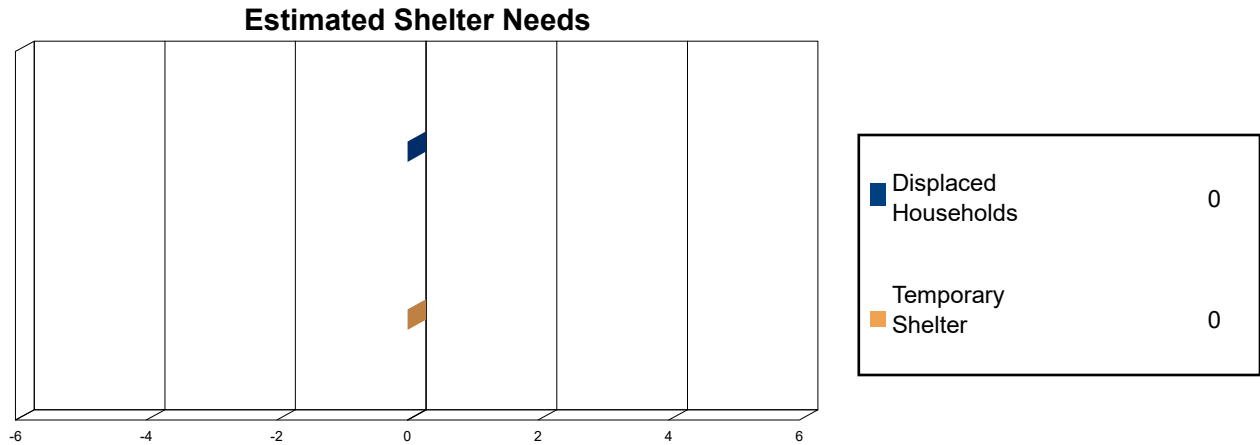


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 80,285 tons of debris will be generated. Of the total amount, 52,185 tons (65%) is Other Tree Debris. Of the remaining 28,100 tons, Brick/Wood comprises 37% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 415 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 17,725 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 325,001) will seek temporary shelter in public shelters.





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## Economic Loss

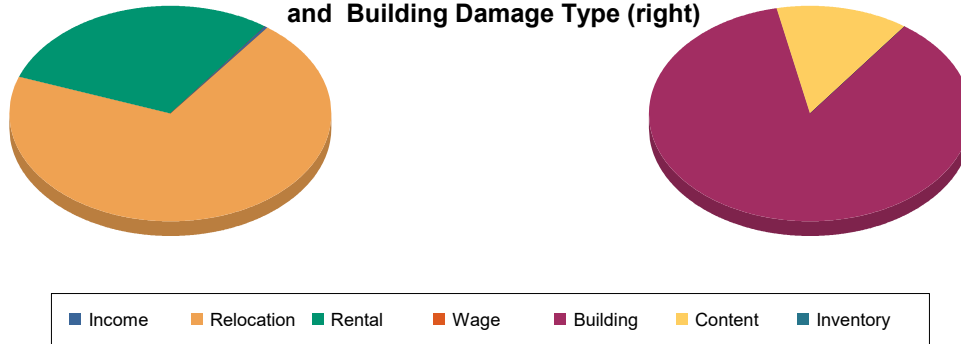
The total economic loss estimated for the hurricane is 167.5 million dollars, which represents 0.39 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 167 million dollars. 4% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 98% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

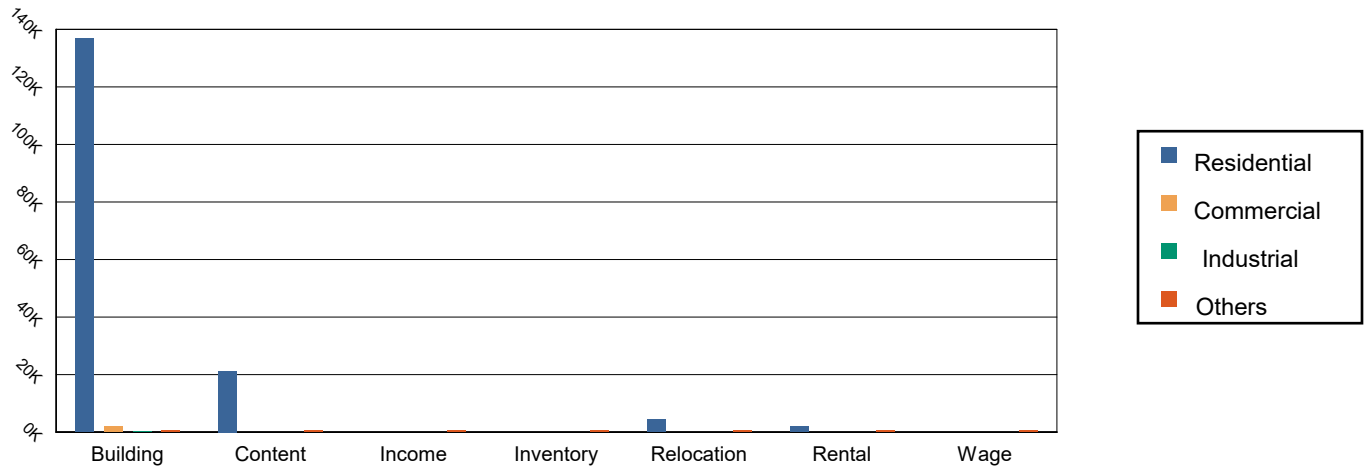


Table 5: Building-Related Economic Loss Estimates  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	136,914.68	1,930.18	280.91	603.39	139,729.16
	Content	21,213.90	48.59	31.34	18.75	21,312.57
	Inventory	0.00	1.99	6.04	1.34	9.38
	<b>Subtotal</b>	<b>158,128.58</b>	<b>1,980.76</b>	<b>318.29</b>	<b>623.49</b>	<b>161,051.11</b>
<b>Business Interruption Loss</b>						
	Income	0.00	15.13	0.02	0.00	15.15
	Relocation	4,433.50	72.33	3.54	6.21	4,515.59
	Rental	1,875.70	6.82	0.02	0.02	1,882.55
	Wage	0.00	5.45	0.03	0.00	5.49
	<b>Subtotal</b>	<b>6,309.20</b>	<b>99.73</b>	<b>3.61</b>	<b>6.24</b>	<b>6,418.77</b>



FEMA

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Total

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Total	164,437.77	2,080.48	321.90	629.73	167,469.88
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FEMA

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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		Total
		Residential	Non-Residential	
<b>Maryland</b>				
Prince George's	325,001	36,647,464	6,444,963	43,092,427
<b>Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>
<b>Study Region Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>



**RiskMAP**  
Increasing Resilience Together

# Hazus: Hurricane Global Risk Report

**Region Name:** pg\_Hur\_prob\_south

**Hurricane Scenario:** Probabilistic 1000-year Return Period

**Print Date:** Wednesday, November 30, 2022

**Disclaimer:**

*This version of Hazus utilizes 2010 Census Data.  
Totals only reflect data for those census tracts/blocks included in the user's study region.*

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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 and the National Institute of Building Sciences. 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 hurricane loss estimates provided in this report are based on a region that includes 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 298.39 square miles and contains 87 census tracts. There are over 119 thousand households in the region and a total population of 325,001 people (2010 Census Bureau data). The distribution of population by State and County is provided in Appendix B .

There are an estimated 107 thousand buildings in the region with a total building replacement value (excluding contents) of 43,092 million dollars (2014 dollars). Approximately 92% of the buildings (and 85% of the building value) are associated with residential housing.



## Building Inventory

### General Building Stock

Hazus estimates that there are 107,080 buildings in the region which have an aggregate total replacement value of 43,092 million (2014 dollars). Table 1 presents the relative distribution of the value with respect to the general occupancies. Appendix B provides a general distribution of the building value by State and County.

### Building Exposure by Occupancy Type

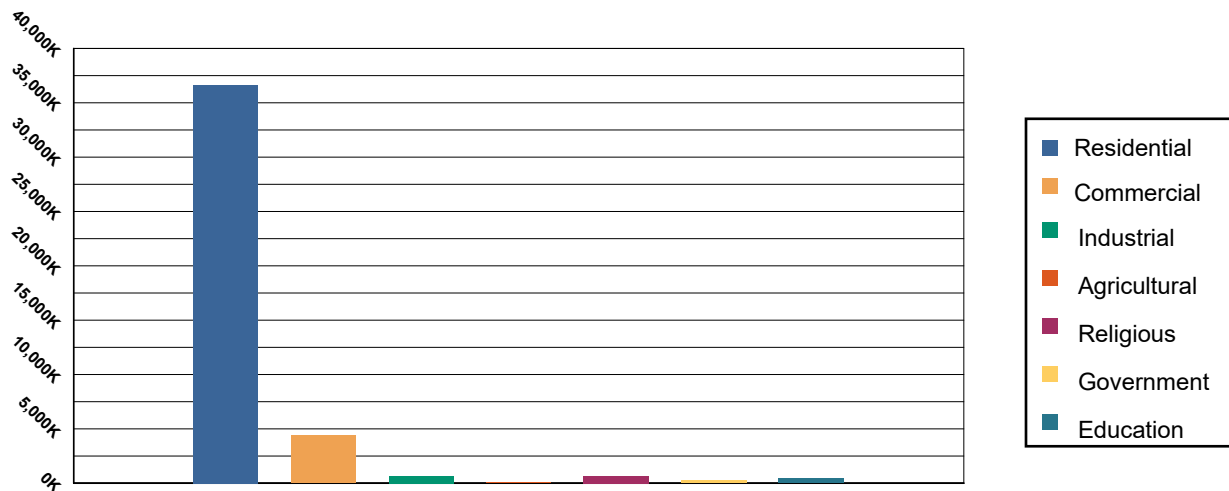


Table 1: Building Exposure by Occupancy Type

Occupancy	Exposure (\$1000)	Percent of Tot
Residential	36,647,464	85.04%
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Industrial	672,227	1.56%
Agricultural	56,429	0.13%
Religious	678,618	1.57%
Government	265,117	0.62%
Education	403,198	0.94%
<b>Total</b>	<b>43,092,427</b>	<b>100.00%</b>

### Essential Facility Inventory

For essential facilities, there are 2 hospitals in the region with a total bed capacity of 229 beds. There are 129 schools, 20 fire stations, 9 police stations and no emergency operation facilities.



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## Hurricane Scenario

Hazus used the following set of information to define the hurricane parameters for the hurricane loss estimate provided in this report.

**Scenario Name:** Probabilistic

**Type:** Probabilistic

## Building Damage

### General Building Stock Damage

Hazus estimates that about 628 buildings will be at least moderately damaged. This is over 1% of the total number of buildings in the region. There are an estimated 5 buildings that will be completely destroyed. The definition of the 'damage states' is provided in the Hazus Hurricane technical manual. Table 2 below summarizes the expected damage by general occupancy for the buildings in the region. Table 3 summarizes the expected damage by general building type.

### Expected Building Damage by Occupancy

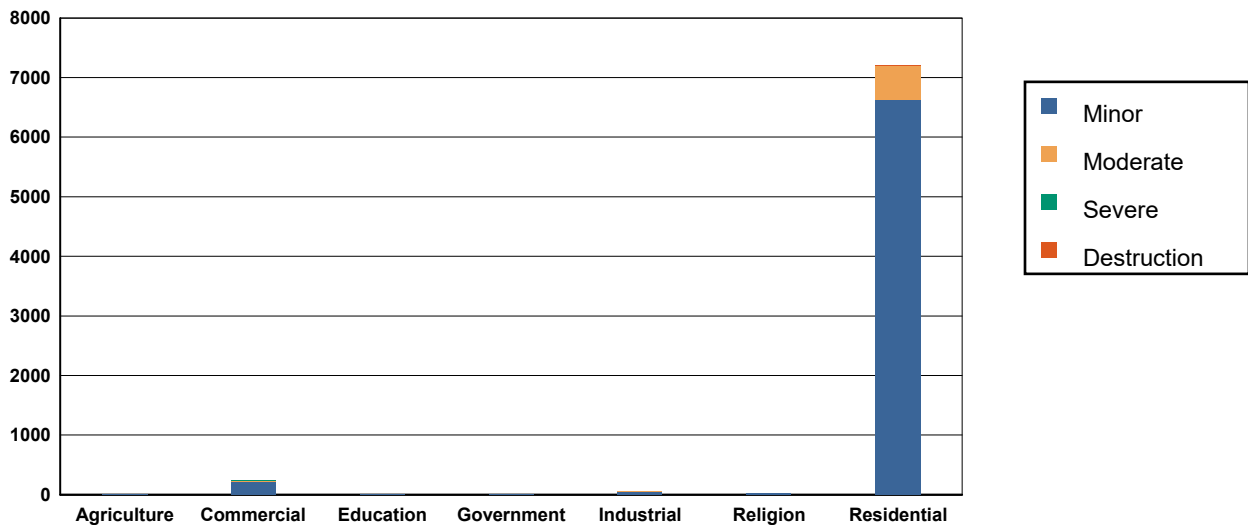


Table 2: Expected Building Damage by Occupancy : 1000 - year Event

Occupancy	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Agriculture	175.88	94.56	8.32	4.47	1.27	0.68	0.51	0.28	0.02	0.01
Commercial	5,264.71	95.60	215.14	3.91	25.23	0.46	1.91	0.03	0.00	0.00
Education	299.60	96.03	11.78	3.77	0.62	0.20	0.00	0.00	0.00	0.00
Government	203.32	95.91	8.21	3.87	0.46	0.22	0.00	0.00	0.00	0.00
Industrial	1,159.62	95.84	46.07	3.81	3.72	0.31	0.58	0.05	0.02	0.00
Religion	729.01	95.92	29.72	3.91	1.27	0.17	0.00	0.00	0.00	0.00
Residential	91,683.20	92.71	6,616.97	6.69	586.32	0.59	1.31	0.00	5.20	0.01
<b>Total</b>	<b>99,515.35</b>		<b>6,936.22</b>		<b>618.89</b>		<b>4.31</b>		<b>5.23</b>	



**Table 3: Expected Building Damage by Building Type : 1000 - year Event**

Building Type	None		Minor		Moderate		Severe		Destruction	
	Count	(%)	Count	(%)	Count	(%)	Count	(%)	Count	(%)
Concrete	1,050	95.35	48	4.34	3	0.31	0	0.00	0	0.00
Masonry	26,608	91.78	2,030	7.00	350	1.21	2	0.01	1	0.00
MH	979	99.13	6	0.66	2	0.16	0	0.00	1	0.06
Steel	3,115	95.74	121	3.73	16	0.48	2	0.05	0	0.00
Wood	65,151	93.28	4,476	6.41	213	0.30	0	0.00	3	0.00



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### **Essential Facility Damage**

Before the hurricane, the region had 229 hospital beds available for use. On the day of the hurricane, the model estimates that 229 hospital beds (only 100.00%) are available for use by patients already in the hospital and those injured by the hurricane. After one week, 100.00% of the beds will be in service. By 30 days, 100.00% will be operational.

**Thematic Map of Essential Facilities with greater than 50% moderate**



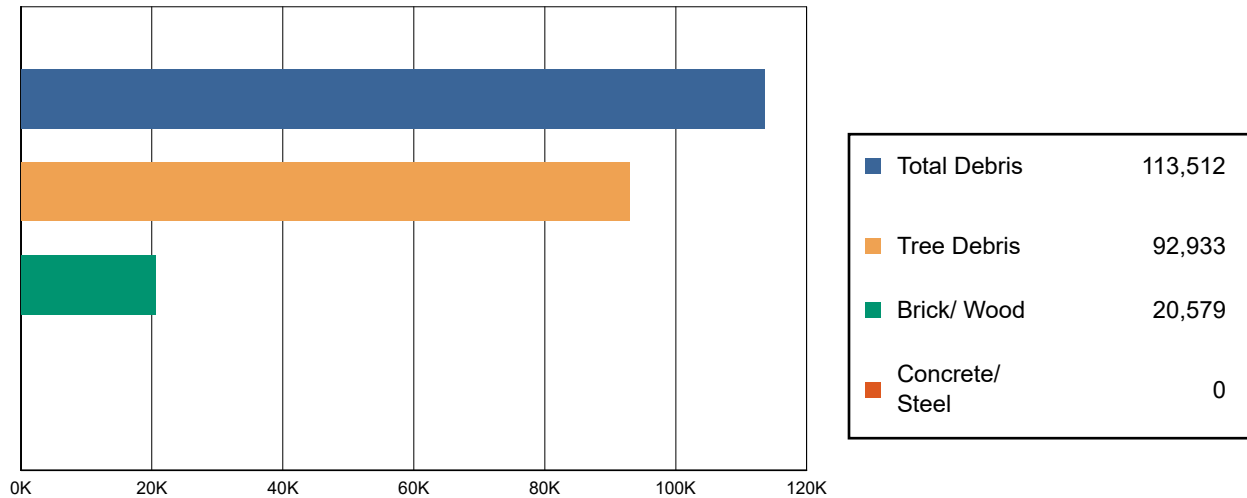
**Table 4: Expected Damage to Essential Facilities**

Classification	Total	# Facilities		
		Probability of at Least Moderate Damage > 50%	Probability of Complete Damage > 50%	Expected Loss of Use < 1 day
Fire Stations	20	0	0	20
Hospitals	2	0	0	2
Police Stations	9	0	0	9
Schools	129	0	0	129

## Induced Hurricane Damage

### Debris Generation

Estimated Debris (Tons)

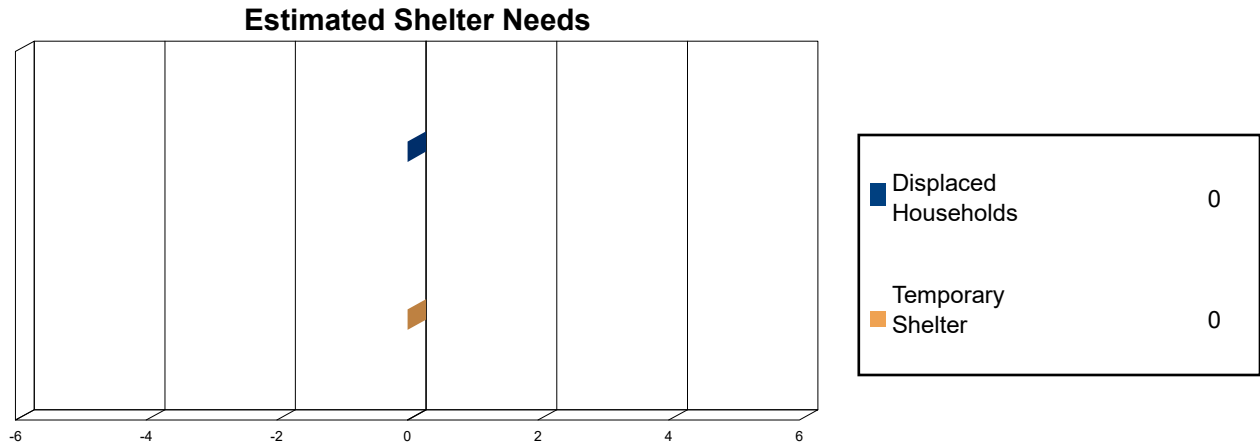


Hazus estimates the amount of debris that will be generated by the hurricane. The model breaks the debris into four general categories: a) Brick/Wood, b) Reinforced Concrete/Steel, c) Eligible Tree Debris, and d) Other Tree Debris. This distinction is made because of the different types of material handling equipment required to handle the debris.

The model estimates that a total of 113,512 tons of debris will be generated. Of the total amount, 65,730 tons (58%) is Other Tree Debris. Of the remaining 47,782 tons, Brick/Wood comprises 43% of the total, Reinforced Concrete/Steel comprises of 0% of the total, with the remainder being Eligible Tree Debris. If the building debris tonnage is converted to an estimated number of truckloads, it will require 823 truckloads (@25 tons/truck) to remove the building debris generated by the hurricane. The number of Eligible Tree Debris truckloads will depend on how the 27,203 tons of Eligible Tree Debris are collected and processed. The volume of tree debris generally ranges from about 4 cubic yards per ton for chipped or compacted tree debris to about 10 cubic yards per ton for bulkier, uncompacted debris.

## Social Impact

### Shelter Requirement



Hazus estimates the number of households that are expected to be displaced from their homes due to the hurricane and the number of displaced people that will require accommodations in temporary public shelters. The model estimates 0 households to be displaced due to the hurricane. Of these, 0 people (out of a total population of 325,001) will seek temporary shelter in public shelters.





## Economic Loss

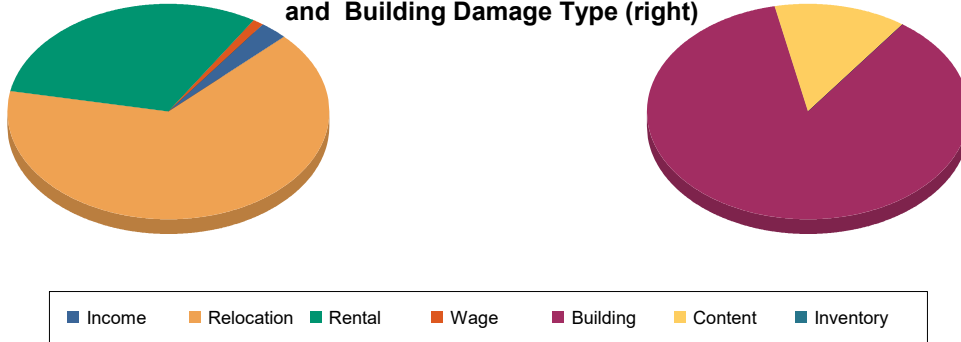
The total economic loss estimated for the hurricane is 273.2 million dollars, which represents 0.63 % of the total replacement value of the region's buildings.

### **Building-Related Losses**

The building related losses are broken into two categories: direct property damage losses and business interruption losses. The direct property damage 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 hurricane. Business interruption losses also include the temporary living expenses for those people displaced from their homes because of the hurricane.

The total property damage losses were 273 million dollars. 4% of the estimated losses were related to the business interruption of the region. By far, the largest loss was sustained by the residential occupancies which made up over 97% of the total loss. Table 5 below provides a summary of the losses associated with the building damage.

Loss by Business Interruption Type (left) and Building Damage Type (right)



Loss Type by General Occupancy

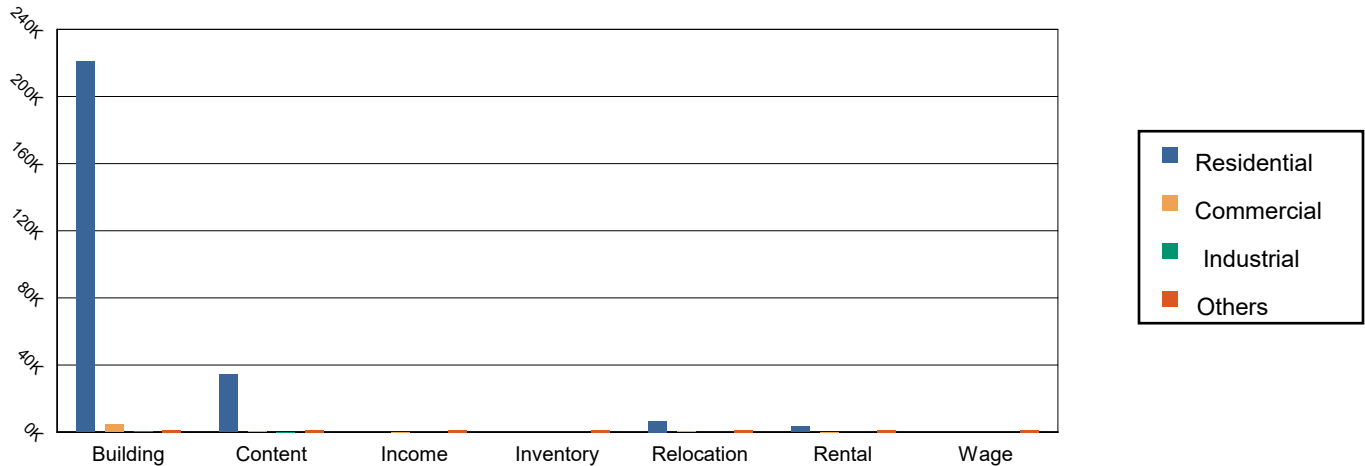


Table 5: Building-Related Economic Loss Estimates  
(Thousands of dollars)

Category	Area	Residential	Commercial	Industrial	Others	Total
<b>Property Damage</b>						
	Building	220,782.88	4,339.72	624.18	1,288.13	227,034.91
	Content	34,400.96	508.44	173.34	116.54	35,199.29
	Inventory	0.00	12.50	28.74	4.15	45.39
	<b>Subtotal</b>	<b>255,183.84</b>	<b>4,860.65</b>	<b>826.26</b>	<b>1,408.83</b>	<b>262,279.59</b>
<b>Business Interruption Loss</b>						
	Income	0.00	307.31	1.34	0.00	308.65
	Relocation	6,767.00	354.00	17.48	27.09	7,165.57
	Rental	3,237.17	139.47	1.10	0.33	3,378.07
	Wage	0.00	109.37	2.21	0.00	111.59
	<b>Subtotal</b>	<b>10,004.17</b>	<b>910.15</b>	<b>22.13</b>	<b>27.43</b>	<b>10,963.87</b>



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Total

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Total	265,188.01	5,770.80	848.39	1,436.26	273,243.46
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**Appendix A: County Listing for the Region**

Maryland  
- Prince George's



**Appendix B: Regional Population and Building Value Data**

	Population	Building Value (thousands of dollars)		Total
		Residential	Non-Residential	
<b>Maryland</b>				
Prince George's	325,001	36,647,464	6,444,963	43,092,427
<b>Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>
<b>Study Region Total</b>	<b>325,001</b>	<b>36,647,464</b>	<b>6,444,963</b>	<b>43,092,427</b>